START

TITLE: OFFICIAL GAZETTE OF THE UNITED STATES PATENT AND TRADEMARK OFFICE. PATENTS.

| | | | |
|---|---|---|---|
| REEL NO: | 5 | Patents | 5,012,525 - 5,020,155 |
| VOLUME: | 1126 | Issues: | 1-4 |
| DATE: | May 7-28, 1991 | | |
| PUBLICATION NO: | 10426.00 | | |
| NOTES: | | | |

THIS PERIODICAL MAY BE COPYRIGHTED, IN WHICH CASE THE CONTENTS REMAIN THE PROPERTY OF THE COPYRIGHT OWNER. THE MICROFORM EDITION IS REPRODUCED BY AGREEMENT WITH THE PUBLISHER. DUPLICATION OR RESALE WITHOUT PERMISSION IS PROHIBITED.

UNIVERSITY MICROFILMS INTERNATIONAL, ANN ARBOR, MICHIGAN

U·M·I

THE PAPER AND INK USED IN THE ORIGINAL MATERIAL AFFECT THE QUALITY OF THE MICROFORM EDITION. THIS REPRODUCTION IS MADE FROM THE BEST COPY AVAILABLE.

VOL
126

SS
1

MY
7

1991

UMI

C 21.5:1126/1
Official Gazette, Patents, ...

Vol. 1126 Number 1

# OFFICIAL GAZETTE
## of the
## UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:
________________
________________
________________
________________
________________
________________
________________
________________

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

VOL
1126
ISS
1
MY
7
1991
UMI

# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

May 7, 1991 Volume 1126 Number 1

## CONTENTS

Page

Patent and Trademark Office Notices 1126 OG 2
  Patent Cooperation Treaty (PCT) Information 1126 OG 2
  Patent Cooperation Treaty Update—Ratification by Cote d'Ivoire 1126 OG 2
  Accession by Greece and Mongolia 1126 OG 2
  Accession by Czechoslovakia 1126 OG 3
  PCT Member Countries 1126 OG 3
  Notice of Maintenance Fees Payable
  Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees 1126 OG 4
  Notification of Acceptance of Delayed Payment of Maintenance 1126 OG 6
    Fee 1126 OG 7
  Reissue Applications Filed 1126 OG 7
  Requests for Reexaminations Filed 1126 OG 8
  Registration to Practice 1126 OG 8
  Registration to Practice 1126 OG 8
  Erratum 1126 OG 9
  Patent Certificates of Correction 1126 OG 10
  Special Boxes for Mail
Reference Collections of U.S. Patents Available for Public Use in 1126 OG 11
  Patent Depository Libraries 1126 OG 13
Patent Examining Corps 1
**Reexaminations** 3
**Statutory Invention Registrations** 7
Reissue Patents Granted ( 33,582 ) 9
Plant Patents Granted ( 7,514 )
Patents Granted 11
  General and Mechanical ( 5,012,525 ) 289
  Chemical ( 5,013,327 ) 455
  Electrical ( 5,013,869 ) 623
Design Patents Granted ( 316,622 ) PI 1
Index of Patentees
Indices of Reissue, Reexamination, Design, Plant Patents and Statutory Invention Registrations PI 75
Classification of PI 81
  Patents (Including Reissues and Reexaminations) PI 85
  Designs, and Plants Applications
Geographical Index of Residence of Inventors PI 87
  Patents (Including Reissues and Reexaminations) PI 89
  Designs and Plant Applications PI 91
Change of Address Form and Subscription Order Form

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

---

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

---

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

292-457 O.G.-91-1

# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German marks and the exchange rate of the U.S. dollar in relation to the German mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed | 550.00 |
| —Corresponding prior U.S. national application filed | 380.00 |
| —Supplemental search fee, per additional invention | 150.00 |
| European Patent Office as ISA | 1492.00 |
| Preliminary examination fee | |
| USPTO as International Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as ISA | 400.00 |
| —Additional examination fee, per additional invention | 130.00 |
| —ISA not the USPTO | 600.00 |
| —Additional examination fee, per additional invention | 200.00 |
| International fees | |
| Basic fee | 559.00 |
| Basic Supplemental fee (for each page over 30) | 11.00 |
| Designation fee per country or region for the first 10 national or regional offices | 135.00 |
| Designation fee for 11th and subsequent designations | No Charge |
| Handling fee | 171.00 |

U.S. National Stage fees

| | Small Entity | Regular |
|---|---|---|
| USPTO was IPEA | 165.00 | 330.00 |
| USPTO was ISA but not IPEA | 185.00 | 370.00 |
| USPTO was neither ISA nor IPEA | 250.00 | 500.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 18.00 | 36.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 60.00 | 120.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) | 60.00 | 120.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) | 30.00 | 30.00 |

April 11, 1991

HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner*
*of Patents and Trademarks.*

---

## Patent Cooperation Treaty Update
## Ratification by Cote d'Ivoire

The United States Patent and Trademark Office has received notification from the World Intellectual Property Organization that Cote d'Ivoire deposited its instrument of ratification to the Patent Cooperation Treaty (PCT) on 31 January 1991. Cote d'Ivoire will become the 46th Contracting State of the PCT on 30 April 1991. Consequently, nationals and residents of Cote d'Ivoire will be entitled to file international applications on and after 30 April 1991, and from the same date it will be possible to file international applications designating Cote d'Ivoire. Since Cote d'Ivoire is a member State of the African Intellectual Property Organization (OAPI), such designation has the effect of a designation of that country for the purposes of a regional patent issued by OAPI in Yaounde, Cameroon.

### Accession by Guinea and Mongolia

The United States Patent and Trademark Office has recieved notification from the World Intellectual Property Organization that Guinea and Mongolia deposited instruments of accession to the PCT on 27 February 1991. Guinea and Mongolia will become the 47th and 48th Contracting States of the PCT on 27 May 1991. Consequently, nationals and residents of Guinea and Mongolia will be entitled to file international applications on and after 27 May 1991, and from the same date it will be possible to file international applications designating Guinea and Mongolia. Since Guinea is a member State of OAPI, such designation has the effect of a designation of that country for the purposes of a regional patent issued by OAPI in Yaounde, Cameron.

### Accession by Czechoslovakia

The United States Patent and Trademark Office has also received notification from the World Intellectual Property Organization that Czechoslovakia deposited its instrument of accession to the PCT on 20 March 1991. Czechoslovakia will become the 49th Contracting State of the PCT on 20 June 1991. Consequently, nationals and residents of Czechoslovakia will be entitled to file international applications on and after 20 June 1991, and from the same date, it will be possible to file international applications designating Czechoslovakia.

### Listing of PCT Member Countries

| | Country | Ratification or Accession | Date of Ratification or Accession | Effective Date |
|---|---|---|---|---|
| (1) | Central African Republic* | Accession 15 | September 1971 01 | June 1978 |
| (2) | Senegal* | Ratification 08 | March 1972 01 | June 1978 |
| (3) | Madagascar | Ratification 27 | March 1972 01 | June 1978 |
| (4) | Malawi | Accession 16 | May 1972 01 | June 1978 |
| (5) | Cameroon* | Accession 15 | March 1973 01 | June 1978 |
| (6) | Chad* | Accession 12 | February 1974 01 | June 1978 |
| (7) | Togo* | Ratification 28 | January 1975 01 | June 1978 |
| (8) | Gabon* | Accession 06 | March 1975 01 | June 1978 |
| (9) | United States of America | Ratification 26 | November 1975 01 | June 1978 |
| (10) | Germany, Federal Republic of ** | Ratification 19 | July 1976 01 | June 1978 |
| (11) | Congo* | Accession 08 | August 1977 01 | June 1978 |
| (12) | Switzerland** | Ratification 14 | September 1977 01 | June 1978 |
| (13) | United Kingdom** | Ratification. 24 | October 1977 01 | June 1978 |
| (14) | France** | Ratification 25 | November 1977 01 | June 1978 |
| (15) | Soviet Union | Ratification 29 | December 1977 01 | June 1978 |
| (16) | Brazil | Ratification 09 | January 1978 01 | June 1978 |
| (17) | Luxembourg** | Ratification 31 | January 1978 01 | June 1978 |
| (18) | Sweden** | Ratification 17 | February 1978 01 | June 1978 |
| (19) | Japan | Ratification 01 | July 1978 01 | October 1978 |
| (20) | Denmark** | Ratification 01 | September 1978 01 | December 1978 |
| (21) | Austria** | Ratification. 23 | January 1979 23 | April 1979 |
| (22) | Monaco | Ratification 22 | March 1979 22 | June 1979 |
| (23) | Netherlands** | Ratification 10 | April 1979 10 | July 1979 |
| (24) | Romania | Accession 23 | April 1979 23 | July 1979 |
| (25) | Norway | Ratification 01 | October 1979 01 | January 1980 |
| (26) | Liechtenstein** | Accession 19 | December 1979 19 | March 1980 |
| (27) | Australia | Accession 31 | December 1979 31 | March 1980 |
| (28) | Hungary | Ratification 27 | March 1980 27 | June 1980 |
| (29) | Democratic People's Republic of Korea (North Korea) | Accession 08 | April 1980 08 | July 1980 |
| (30) | Finland | Ratification 01 | July 1980 01 | October 1980 |
| (31) | Belgium** | Ratification 14 | September 1981 14 | December 1981 |
| (32) | Sri Lanka | Accession 26 | November 1981 26 | February 1982 |
| (33) | Mauritania* | Accession 13 | January 1983 13 | April 1983 |
| (34) | Sudan | Accession 16 | January 1984 16 | April 1984 |
| (35) | Bulgaria | Accession 21 | February 1984 21 | May 1984 |
| (36) | Republic of Korea (South Korea) | Accession 10 | May 1984 10 | August 1984 |
| (37) | Mali* | Accession 19 | July 1984 19 | October 1984 |
| (38) | Barbados | Accession 12 | December 1984 12 | March 1985 |
| (39) | Italy** | Ratification 28 | December 1984 28 | March 1985 |
| (40) | Benin* | Accession 26 | November 1986 26 | February 1987 |
| (41) | Burkina Faso* | Accession 21 | December 1988 21 | March 1989 |
| (42) | Spain** | Accession 16 | August 1989 16 | November 1989 |
| (43) | Canada | Ratification 02 | October 1989 02 | January 1990 |
| (44) | Greece** | Accession 09 | July 1990 09 | October 1990 |
| (45) | Poland | Accession 25 | September 1990 25 | December 1990 |
| (46) | Cote d'Ivoire* | Ratification 31 | January 1991 30 | April 1991 |
| (47) | Guinea* | Accession 27 | February 1991 27 | May 1991 |
| (48) | Mongolia | Accession 27 | February 1991 27 | May 1991 |
| (49) | Czecholoslovakia | Accession 20 | March 1991 20 | June 1991 |

*Members of African Intellectual Property Organization (OAPI) regional patent system. Only regional patent protection is available for OAPI countries. A designation of any country is an indication that all OAPI countries have been designated. Only one designation fee is due regardless of the number of OAPI countries designated.

**Member of European Patent Convention (EPC) regional patent system. Either national or European patents for member countries are available through PCT, except for France, Belgium, Italy and Greece, for which only European patents are available if PCT is used. Note: Only one PCT designation fee is due if European regional patent protection is sought for one, several or all EPC member countries under the PCT.

April 15, 1991

HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner*
*of Patents and Trademarks*

---

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on May 3, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,741,050 through 4,742,577
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 1, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,445,231 through 4,446,570
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant....................................................$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant...........................................................$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))..........................................$415.00
By other than a small entity.......................................$850.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))..........................................$835.00
By other than a small enttity....................................$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982............................................................$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))..........................................$60.00
By other than a small entity.......................................$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.................................$550.00"

---

## Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

### *PATENTS WHICH EXPIRED FEBRUARY 24, 1991 DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,374,440 | 06/233,295 | 2/22/83 |
| 4,374,453 | 06/228,014 | 2/22/83 |
| 4,374,474 | 06/242,024 | 2/22/83 |
| 4,374,504 | 06/254,204 | 2/22/83 |
| 4,374,512 | 06/219,531 | 2/22/83 |
| 4,374,549 | 06/287,848 | 2/22/83 |
| 4,374,559 | 06/227,926 | 2/22/83 |
| 4,374,588 | 06/216,326 | 2/22/83 |
| 4,374,602 | 06/237,202 | 2/22/83 |
| 4,374,603 | 06/241,084 | 2/22/83 |
| 4,374,611 | 06/270,939 | 2/22/83 |
| 4,374,618 | 06/244,458 | 2/22/83 |
| 4,374,620 | 06/229,614 | 2/22/83 |
| 4,374,624 | 06/292,621 | 2/22/83 |
| 4,374,631 | 06/265,839 | 2/22/83 |
| 4,374,642 | 06/268,965 | 2/22/83 |
| 4,374,644 | 06/251,668 | 2/22/83 |
| 4,374,645 | 06/267,880 | 2/22/83 |
| 4,374,649 | 06/233,769 | 2/22/83 |
| 4,374,652 | 06/294,525 | 2/22/83 |
| 4,374,659 | 06/333,831 | 2/22/83 |
| 4,374,662 | 06/318,999 | 2/22/83 |
| 4,374,672 | 06/312,889 | 2/22/83 |
| 4,374,694 | 06/276,450 | 2/22/83 |
| 4,374,703 | 06/223,564 | 2/22/83 |
| 4,374,712 | 06/301,681 | 2/22/83 |
| 4,374,717 | 06/318,634 | 2/22/83 |
| 4,374,718 | 06/261,997 | 2/22/83 |
| 4,374,719 | 06/359,729 | 2/22/83 |
| 4,374,722 | 06/290,425 | 2/22/83 |
| 4,374,727 | 06/267,510 | 2/22/83 |
| 4,374,734 | 06/275,473 | 2/22/83 |
| 4,374,740 | 06/225,573 | 2/22/83 |
| 4,374,742 | 06/268,309 | 2/22/83 |
| 4,374,756 | 06/300,710 | 2/22/83 |
| 4,374,782 | 06/275,009 | 2/22/83 |
| 4,374,813 | 06/251,277 | 2/22/83 |
| 4,374,814 | 06/258,499 | 2/22/83 |
| 4,374,817 | 06/294,964 | 2/22/83 |
| 4,374,830 | 06/292,201 | 2/22/83 |
| 4,374,841 | 06/262,449 | 2/22/83 |
| 4,374,848 | 06/301,544 | 2/22/83 |
| 4,374,849 | 06/301,668 | 2/22/83 |
| 4,374,850 | 06/326,996 | 2/22/83 |
| 4,374,851 | 06/326,995 | 2/22/83 |
| 4,374,866 | 06/283,327 | 2/22/83 |
| 4,374,868 | 06/239,385 | 2/22/83 |
| 4,374,879 | 06/230,976 | 2/22/83 |
| 4,374,899 | 06/375,495 | 2/22/83 |
| 4,374,907 | 06/298,301 | 2/22/83 |
| 4,374,909 | 06/277,730 | 2/22/83 |
| 4,374,914 | 06/282,777 | 2/22/83 |
| 4,374,927 | 06/237,555 | 2/22/83 |
| 4,374,932 | 06/271,748 | 2/22/83 |
| 4,374,957 | 06/316,299 | 2/22/83 |
| 4,374,961 | 06/268,312 | 2/22/83 |
| 4,374,979 | 06/258,193 | 2/22/83 |
| 4,374,984 | 06/240,439 | 2/22/83 |
| 4,374,995 | 06/320,128 | 2/22/83 |
| 4,374,997 | 06/270,317 | 2/22/83 |
| 4,375,002 | 06/248,403 | 2/22/83 |
| 4,375,006 | 06/293,003 | 2/22/83 |
| 4,375,026 | 06/268,216 | 2/22/83 |
| 4,375,031 | 06/239,927 | 2/22/83 |
| 4,375,044 | 06/246,785 | 2/22/83 |
| 4,375,061 | 06/220,403 | 2/22/83 |
| 4,375,062 | 06/280,953 | 2/22/83 |
| 4,644,598 | 06/636,731 | 2/24/87 |
| 4,644,600 | 06/723,344 | 2/24/87 |
| 4,644,602 | 06/714,378 | 2/24/87 |
| 4,644,614 | 06/874,623 | 2/24/87 |
| 4,644,615 | 06/714,632 | 2/24/87 |
| 4,644,616 | 06/755,733 | 2/24/87 |
| 4,644,621 | 06/462,265 | 2/24/87 |
| 4,644,636 | 06/816,279 | 2/24/87 |
| 4,644,643 | 06/760,229 | 2/24/87 |
| 4,644,648 | 06/585,668 | 2/24/87 |
| 4,644,649 | 06/780,426 | 2/24/87 |
| 4,644,654 | 06/779,622 | 2/24/87 |
| 4,644,663 | 06/764,083 | 2/24/87 |
| 4,644,669 | 06/790,504 | 2/24/87 |
| 4,644,677 | 06/782,593 | 2/24/87 |
| 4,644,682 | 06/860,643 | 2/24/87 |
| 4,644,696 | 06/875,819 | 2/24/87 |
| 4,644,707 | 06/618,490 | 2/24/87 |
| 4,644,712 | 06/519,042 | 2/24/87 |
| 4,644,715 | 06/806,640 | 2/24/87 |
| 4,644,719 | 06/712,747 | 2/24/87 |
| 4,644,726 | 06/835,292 | 2/24/87 |
| 4,644,728 | 06/691,160 | 2/24/87 |
| 4,644,737 | 06/685,502 | 2/24/87 |
| 4,644,739 | 06/760,320 | 2/24/87 |
| 4,644,744 | 06/725,049 | 2/24/87 |
| 4,644,752 | 06/735,244 | 2/24/87 |
| 4,644,754 | 06/753,330 | 2/24/87 |
| 4,644,764 | 06/743,400 | 2/24/87 |
| 4,644,765 | 06/724.124 | 2/24/87 |
| 4,644,766 | 06/538,980 | 2/24/87 |
| 4,644,770 | 06/692,889 | 2/24/87 |
| 4,644,776 | 06/809,836 | 2/24/87 |
| 4,644,792 | 06/744,946 | 2/24/87 |
| 4,644,804 | 06/631,811 | 2/24/87 |
| 4,644,809 | 06/789,305 | 2/24/87 |
| 4,644,812 | 06/690,897 | 2/24/87 |
| 4,644,814 | 06/757,350 | 2/24/87 |
| 4,644,816 | 06/346,836 | 2/24/87 |
| 4,644,828 | 06/718,097 | 2/24/87 |
| 4,644,834 | 06/696,318 | 2/24/87 |
| 4,644,837 | 06/841,510 | 2/24/87 |
| 4,644,858 | 06/875,961 | 2/24/87 |
| 4,644,864 | 06/692,424 | 2/24/87 |
| 4,644,865 | 06/736,221 | 2/24/87 |
| 4,644,876 | 06/861,131 | 2/24/87 |
| 4,644,879 | 06/801,010 | 2/24/87 |
| 4,644,883 | 06/813,479 | 2/24/87 |
| 4,644,888 | 06/878,403 | 2/24/87 |
| 4,644,890 | 06/708,279 | 2/24/87 |
| 4,644,892 | 06/607,426 | 2/24/87 |
| 4,644,893 | 06/638,233 | 2/24/87 |
| 4,644,901 | 06/777,161 | 2/24/87 |
| 4,644,902 | 06/762,731 | 2/24/87 |
| 4,644,903 | 06/740,544 | 2/24/87 |
| 4,644,905 | 06/817,268 | 2/24/87 |
| 4,644,915 | 06/793,436 | 2/24/87 |
| 4,644,924 | 06/779,201 | 2/24/87 |
| 4,644,928 | 06/715,104 | 2/24/87 |
| 4,644,930 | 06/631,911 | 2/24/87 |
| 4,644,933 | 06/791,981 | 2/24/87 |
| 4,644,934 | 06/730,470 | 2/24/87 |
| 4,644,935 | 06/652,643 | 2/24/87 |
| 4,644,948 | 06/612,670 | 2/24/87 |
| 4,644,953 | 06/644,782 | 2/24/87 |
| 4,644,958 | 06/838,188 | 2/24/87 |
| 4,644,963 | 06/731,465 | 2/24/87 |
| 4,644,975 | 06/701,084 | 2/24/87 |
| 4,644,979 | 06/727,539 | 2/24/87 |
| 4,644,983 | 06/714,134 | 2/24/87 |
| 4,644,991 | 06/731,295 | 2/24/87 |
| 4,644,993 | 06/708,710 | 2/24/87 |
| 4,644,997 | 06/765,687 | 2/24/87 |
| 4,645,007 | 06/618,469 | 2/24/87 |
| 4,645,009 | 06/733,512 | 2/24/87 |
| 4,645,014 | 06/670,824 | 2/24/87 |
| 4,645,015 | 06/775,377 | 2/24/87 |
| 4,645,033 | 06/693,093 | 2/24/87 |
| 4,645,035 | 06/623,007 | 2/24/87 |
| 4,645,041 | 06/722,063 | 2/24/87 |
| 4,645,057 | 06/701,105 | 2/24/87 |
| 4,645,060 | 06/749,879 | 2/24/87 |
| 4,645,061 | 06/705,605 | 2/24/87 |
| 4,645,065 | 06/707,910 | 2/24/87 |
| 4,645,066 | 06/752,749 | 2/24/87 |
| 4,645,069 | 06/797,216 | 2/24/87 |
| 4,645,071 | 06/653,137 | 2/24/87 |
| 4,645,074 | 06/763,434 | 2/24/87 |
| 4,645,075 | 06/741,987 | 2/24/87 |
| 4,645,083 | 06/805,417 | 2/24/87 |
| 4,645,084 | 06/704,047 | 2/24/87 |
| 4,645,092 | 06/730,498 | 2/24/87 |
| 4,645,093 | 06/674,530 | 2/24/87 |
| 4,645,100 | 06/665,368 | 2/24/87 |
| 4,645,101 | 06/817,403 | 2/24/87 |
| 4,645,102 | 06/727,008 | 2/24/87 |
| 4,645,113 | 06/598,668 | 2/24/87 |
| 4,645,120 | 06/694,309 | 2/24/87 |
| 4,645,121 | 06/702,165 | 2/24/87 |
| 4,645,128 | 06/753,513 | 2/24/87 |
| 4,645,133 | 06/740,400 | 2/24/87 |
| 4,645,136 | 06/765,854 | 2/24/87 |
| 4,645,138 | 06/818,081 | 2/24/87 |
| 4,645,145 | 06/655,516 | 2/24/87 |
| 4,645,149 | 06/772,623 | 2/24/87 |
| 4,645,152 | 06/769,351 | 2/24/87 |
| 4,645,158 | 06/769,674 | 2/24/87 |
| 4,645,162 | 06/832,638 | 2/24/87 |
| 4,645,166 | 06/761,197 | 2/24/87 |
| 4,645,167 | 06/702,626 | 2/24/87 |
| 4,645,168 | 06/710,989 | 2/24/87 |
| 4,645,172 | 06/737,236 | 2/24/87 |
| 4,645,173 | 06/475,438 | 2/24/87 |
| 4,645,177 | 06/731,228 | 2/24/87 |
| 4,645,178 | 06/800,715 | 2/24/87 |
| 4,645,179 | 06/782,514 | 2/24/87 |
| 4,645,183 | 06/536,209 | 2/24/87 |
| 4,645,196 | 06/805,092 | 2/24/87 |
| 4,645,201 | 06/555,977 | 2/24/87 |
| 4,645,202 | 06/695,031 | 2/24/87 |
| 4,645,205 | 06/752,960 | 2/24/87 |
| 4,645,209 | 06/730,076 | 2/24/87 |
| 4,645,219 | 06/804,172 | 2/24/87 |
| 4,645,227 | 06/773,787 | 2/24/87 |
| 4,645,229 | 06/820,949 | 2/24/87 |
| 4,645,230 | 06/561,244 | 2/24/87 |
| 4,645,234 | 06/753,145 | 2/24/87 |
| 4,645,242 | 06/769,431 | 2/24/87 |
| 4,645,256 | 06/672,179 | 2/24/87 |
| 4,645,261 | 06/777,547 | 2/24/87 |
| 4,645,266 | 06/692,039 | 2/24/87 |
| 4,645,267 | 06/655,255 | 2/24/87 |
| 4,645,269 | 06/753,438 | 2/24/87 |
| 4,645,270 | 06/699,052 | 2/24/87 |
| 4,645,272 | 06/730,540 | 2/24/87 |
| 4,645,273 | 06/773,495 | 2/24/87 |
| 4,645,275 | 06/625,726 | 2/24/87 |
| 4,645,290 | 06/569,739 | 2/24/87 |
| 4,645,291 | 06/596,665 | 2/24/87 |
| 4,645,292 | 06/634,473 | 2/24/87 |
| 4,645,305 | 06/674,325 | 2/24/87 |
| 4,645,311 | 06/499,792 | 2/24/87 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,645,312 | 06/552,965 | 2/24/87 |
| 4,645,315 | 06/798,581 | 2/24/87 |
| 4,645,331 | 06/734,814 | 2/24/87 |
| 4,645,334 | 06/782,249 | 2/24/87 |
| 4,645,340 | 06/499,804 | 2/24/87 |
| 4,645,351 | 06/613,342 | 2/24/87 |
| 4,645,352 | 06/774,951 | 2/24/87 |
| 4,645,366 | 06/779,233 | 2/24/87 |
| 4,645,371 | 06/857,972 | 2/24/87 |
| 4,645,379 | 06/538,386 | 2/24/87 |
| 4,645,383 | 06/866,320 | 2/24/87 |
| 4,645,386 | 06/760,289 | 2/24/87 |
| 4,645,388 | 06/800,450 | 2/24/87 |
| 4,645,401 | 06/620,116 | 2/24/87 |
| 4,645,402 | 06/808,736 | 2/24/87 |
| 4,645,409 | 06/641,717 | 2/24/87 |
| 4,645,418 | 06/699,501 | 2/24/87 |
| 4,645,421 | 06/869,575 | 2/24/87 |
| 4,645,428 | 06/793,533 | 2/24/87 |
| 4,645,430 | 06/829,559 | 2/24/87 |
| 4,645,448 | 06/808,967 | 2/24/87 |
| 4,645,452 | 06/843,501 | 2/24/87 |
| 4,645,454 | 06/731,925 | 2/24/87 |
| 4,645,456 | 06/769,481 | 2/24/87 |
| 4,645,457 | 06/543,314 | 2/24/87 |
| 4,645,458 | 06/723,352 | 2/24/87 |
| 4,645,460 | 06/728,561 | 2/24/87 |
| 4,645,462 | 06/735,152 | 2/24/87 |
| 4,645,471 | 06/709,469 | 2/24/87 |
| 4,645,476 | 06/746,137 | 2/24/87 |
| 4,645,487 | 06/617,507 | 2/24/87 |
| 4,645,488 | 06/556,725 | 2/24/87 |
| 4,645,491 | 06/708,634 | 2/24/87 |
| 4,645,496 | 06/817,416 | 2/24/87 |
| 4,645,497 | 06/812,187 | 2/24/87 |
| 4,645,498 | 06/702,974 | 2/24/87 |
| 4,645,504 | 06/738,021 | 2/24/87 |
| 4,645,510 | 06/738,074 | 2/24/87 |
| 4,645,516 | 06/737,455 | 2/24/87 |
| 4,645,526 | 06/711,402 | 2/24/87 |
| 4,645,528 | 06/769,280 | 2/24/87 |
| 4,645,536 | 06/771,408 | 2/24/87 |
| 4,645,545 | 06/758,119 | 2/24/87 |
| 4,645,555 | 06/712,522 | 2/24/87 |
| 4,645,559 | 06/697,365 | 2/24/87 |
| 4,645,570 | 06/662,922 | 2/24/87 |
| 4,645,590 | 06/746,288 | 2/24/87 |
| 4,645,593 | 06/489,368 | 2/24/87 |
| 4,645,597 | 06/739,370 | 2/24/87 |
| 4,645,598 | 06/722,047 | 2/24/87 |
| 4,645,600 | 06/720,352 | 2/24/87 |
| 4,645,604 | 06/743,460 | 2/24/87 |
| 4,645,607 | 06/768,175 | 2/24/87 |
| 4,645,620 | 06/564,258 | 2/24/87 |
| 4,645,639 | 06/595,231 | 2/24/87 |
| 4,645,670 | 06/593,406 | 2/24/87 |
| 4,645,678 | 06/532,499 | 2/24/87 |
| 4,645,680 | 06/781,415 | 2/24/87 |
| 4,645,686 | 06/790,173 | 2/24/87 |
| 4,645,693 | 06/796,899 | 2/24/87 |
| 4,645,697 | 06/793,424 | 2/24/87 |
| 4,645,699 | 06/748,017 | 2/24/87 |
| 4,645,720 | 06/667,037 | 2/24/87 |
| 4,645,733 | 06/720,354 | 2/24/87 |
| 4,645,740 | 06/364,856 | 2/24/87 |
| 4,645,751 | 06/814,082 | 2/24/87 |
| 4,645,756 | 06/781,438 | 2/24/87 |
| 4,645,759 | 06/735,491 | 2/24/87 |
| 4,645,762 | 06/511,116 | 2/24/87 |
| 4,645,766 | 06/312,576 | 2/24/87 |
| 4,645,822 | 06/776,671 | 2/24/87 |
| 4,645,835 | 06/748,022 | 2/24/87 |
| 4,645,841 | 06/748,309 | 2/24/87 |
| 4,645,849 | 06/693,412 | 2/24/87 |
| 4,645,856 | 06/723,116 | 2/24/87 |
| 4,645,864 | 06/818,968 | 2/24/87 |
| 4,645,876 | 06/700,475 | 2/24/87 |
| 4,645,878 | 06/697,137 | 2/24/87 |
| 4,645,879 | 06/700,020 | 2/24/87 |
| 4,645,889 | 06/839,397 | 2/24/87 |
| 4,645,905 | 06/705,091 | 2/24/87 |
| 4,645,910 | 06/787,606 | 2/24/87 |
| 4,645,913 | 06/715,352 | 2/24/87 |
| 4,645,929 | 06/696,774 | 2/24/87 |
| 4,645,930 | 06/685,076 | 2/24/87 |
| 4,645,934 | 06/567,528 | 2/24/87 |
| 4,645,936 | 06/675,671 | 2/24/87 |
| 4,645,962 | 06/656,071 | 2/24/87 |
| 4,645,966 | 06/873,865 | 2/24/87 |
| 4,645,992 | 06/685,706 | 2/24/87 |
| 4,646,001 | 06/669,889 | 2/24/87 |
| 4,646,007 | 06/715,409 | 2/24/87 |
| 4,646,010 | 06/709,688 | 2/24/87 |
| 4,646,011 | 06/675,572 | 2/24/87 |
| 4,646,038 | 06/849.098 | 2/24/87 |
| 4,646,041 | 06/814,865 | 2/24/87 |
| 4,646,057 | 06/702,021 | 2/24/87 |
| 4,646,066 | 06/749,326 | 2/24/87 |
| 4,646,070 | 06/441,035 | 2/24/87 |
| 4,646,071 | 06/723,470 | 2/24/87 |
| 4,646,082 | 06/651,194 | 2/24/87 |
| 4,646,090 | 06/522,691 | 2/24/87 |
| 4,646,107 | 06/815,316 | 2/24/87 |
| 4,646,155 | 06/756,314 | 2/24/87 |
| 4,646,177 | 06/554,934 | 2/24/87 |
| 4,646,183 | 06/609,307 | 2/24/87 |
| 4,646,192 | 06/451,596 | 2/24/87 |
| 4,646,201 | 06/681,936 | 2/24/87 |
| 4,646,206 | 06/658,487 | 2/24/87 |
| 4,646,223 | 06/613,519 | 2/24/87 |
| 4,646,234 | 06/584,713 | 2/24/87 |
| 4,646,253 | 06/599,713 | 2/24/87 |
| 4,646,275 | 06/618,988 | 2/24/87 |
| 4,646,282 | 06/597,769 | 2/24/87 |
| 4,646,290 | 06/637,208 | 2/24/87 |
| 4,646,293 | 06/672,484 | 2/24/87 |
| 4,646,297 | 06/594,187 | 2/24/87 |
| 4,646,323 | 06/534,249 | 2/24/87 |
| 4,646,326 | 06/543,740 | 2/24/87 |
| 4,646,343 | 06/484,861 | 2/24/87 |
| 4,646,345 | 06/872,360 | 2/24/87 |
| 4,646,350 | 06/652,006 | 2/24/87 |
| 4,646,353 | 06/591,276 | 2/24/87 |
| 4,646,358 | 06/882,448 | 2/24/87 |

---

## NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE
### (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
|---|---|---|---|---|
| Re. 33,083 | 07/154,402 | 10/10/89 | 2/09/88 | 3/07/91 |
| (4,569,463) | (06/578,811) | (2/11/86) | (2/10/84) | |
| 4,346,185 | 06/280,782 | 8/24/82 | 7/06/81 | 2/25/91 |
| 4,346,214 | 06/297,715 | 8/24/82 | 8/31/81 | 2/25/91 |

| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
|---|---|---|---|---|
| 4,351,919 | 06/310,370 | 9/28/82 | 10/13/81 | 2/25/91 |
| 4,538,970 | 06/542,849 | 9/03/85 | 10/17/83 | 3/25/91 |
| 4,561,477 | 06/574,704 | 12/31/85 | 1/27/84 | 3/05/91 |
| 4,569,883 | 06/693,033 | 2/11/86 | 1/22/85 | 2/25/91 |
| 4,578,007 | 06/588,355 | 3/25/86 | 3/12/84 | 2/25/91 |
| 4,589,627 | 06/695,266 | 5/20/86 | 1/28/85 | 3/28/91 |
| 4,606,008 | 06/516,714 | 8/12/86 | 7/25/83 | 3/28/91 |

---

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

**4,403,594**, Re. S. N. 07/625,447, Filed Dec. 11, 1990, Cl. 124/352, BOW STRING RELEASE, Gary Todd, Owner of Record: *Inventor*, Attorney or Agent: Charles W. Chandler, Ex. Gp.: 351

**4,684,956**, Re. S. N. 07/668,708, Filed Mar. 12, 1991, Cl. 346, METHOD FOR APPLYING A HOT MELT INK TO A SUBSTRATE, Jeffery M. Ball, Owner of Record: *Willett International Limited, Chalvey, England*, Attorney or Agent: Charles D. Gunter, Ex. Gp.: 218

**4,687,212**, Re. S. N. 07/675,242, Filed Mar. 26, 1991, Cl. 277/205, SEAL ASSEMBLY WITH STABILIZING RIBS, Alma A. Timpson, et al., Owner of Record: *Cyl-Pak, Inc., Salt Lake City, Utah*, Attorney or Agent: Lynn G. Foster, Ex. Gp.: 246

**4,792,133**, Re. S. N. 07/630,274, Filed Dec. 19, 1990, Cl. 272/3, SUBSTITUTE, GROUND SURFACE MATERIAL, Paul Hawkins, et al., Owner of Record: *En-Tout-Cas Plc., Leicester, England*, Attorney or Agent: Alex Chartove, Ex. Gp.: 354

**4,797,907**, Re. S. N. 07/638,176, Filed Jan. 7, 1991, Cl. 378/101, BATTERY ENHANCED POWER GENERATION FOR MOBILE X-RAY MACHINE, Richard L. Anderton, Owner of Record: *Diasonics, Inc., San Fransisco, Calif.*, Attorney or Agent: David R. Halvorson, Ex. Gp.: 256

**4,808,991**, Re. S. N. 07/650,763, Filed Feb. 5, 1991, Cl. 340/793, METHOD AND APPARATUS FOR LIQUID CRYSTAL DISPLAY WITH INTERMEDIATE TONE, Tsugji Tachiuchi, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan*, Attorney or Agent: Melvin Kraus, Ex. Gp.: 269

**4,813,955**, Re. S. N. 07/672,516, Filed Mar. 20, 1991, Cl. 623/6, MULTIFOCAL, ESPECIALLY BIFOCAL, INTRAOCULAR, ARTIFICIAL OPHTHALMIC LENS, Manfred Achatz, Owner of Record: *Inventor*, Attorney or Agent: David A. Warmbold, Ex. Gp.: 338

**4,813,963**, Re. S. N. 07/672,718, Filed Mar. 20, 1991, Cl. 623/23, FEMORAL COMPONENT FOR A HIP PROSTHESIS, Roy Y. Hori, et al., Owner of Record: *Zimmer, Inc., Warsaw, Ind.*, Attorney or Agent: Todd A. Dawson, Ex. Gp.: 338

**4,815,033**, Re. S. N. 07/673,771, Filed Mar. 20, 1991, Cl. 364/900, METHOD AND APPARATUS FOR ACCESSING A COLOR PALETTE SYNCHRONOUSLY DURING REFRESHING OF A MONITOR AND ASYNCHRONOUSLY DURING UPDATING OF THE PALETTE, Steven Harris, Owner of Record: *Advanced Micro Devices, Inc., Sunnyvale, Calif.*, Attorney or Agent: Mark A. Haynes, Ex. Gp.: 232

**4,815,619**, Re. S. N. 07/676,755, Filed Mar. 27, 1991, Cl. 215/248, MEDICAMENT VIAL SAFTEY CAP, Thomas R. Turner, et al., Owner of Record: *Inventor*, Attorney or Agent: Michael L. Harrison, Ex. Gp.: 241

**4,817,328**, Re. S. N. 07/676,852, Filed Mar. 28, 1991, Cl. 16/66, PNEUMATIC DOOR-CLOSER HAVING A CLOSABLE PASSAGE AND A REGULATABLE PASSAGE, James C. Liu, Owner of Record: *Gouhill Industries Ca., Ltd., Taichung, Taiwan*, Attorney or Agent: George M. Sirilla, Ex. Gp.: 321

**4,847,113**, Re. S. N. 07/675,643, Filed Mar. 27, 1991, Cl. 427/54.1, THREAD LOCK, Richard B. Wallace, Owner of Record: *Oakland Corp., Troy, Mich.*, Attorney or Agent: Thomal P. Liniak, Ex. Gp.: 139

**4,848,450**, Re. S. N. 07/675,251, Filed Mar. 26, 1991, Cl. 165/166, HEAT EXCHANGER, Andrew Lapkowski, Owner of Record: *Jones Environics, Ltd., Winnipeg,,Canada*, Attorney or Agent: Adrian D. Battison, Ex. Gp.: 346

**4,859,025**, Re. S. N. 07/636,902, Filed Dec. 31, 1990, Cl. 350/96.23, OPTICAL FIBRE CABLE, Ian Houghton, Owner of Record: *STC Plc., London, England*, Attorney or Agent: William M. Lee, Ex. Gp.: 251

**4,871,127**, Re. S. N. 07/676,298, Filed Mar. 27, 1991, Cl. 242/86.50R, PORTABLE DEVICE FOR STORING AN ENDLESS METALLIC OR FIBER-OPTIC CABLE, Albert L. Clark, Owner of Record: *Stockbridge Manufacturing Inc., Stocebridge, Wisc.*, Attorney or Agent: Andrew S. McConnell, Ex. Gp.: 245

**4,882,271**, Re. S. N. 07/671,566, Filed Mar. 19, 1991, Cl. 435/7, PROCESS FOR PREPARATION OF HIGH MOLECULAR WEIGHT CELL-ASSOCIATED PROTEIN OF CAMPYLOBACTER PYLORI AND USE FOR SEROLOGICAL DETECTION OF CAMPYLOBACTER PYLORI INFECTION, Dolores G. Evans, et al., Owner of Record: *Baylor College of Medicine, Houston, Tex.*, Attorney or Agent: Thomas D. Paul, Ex. Gp.: 182

**4,889,135**, Re. S. N. 07/658,487, Filed Feb. 20, 1991, Cl. 128/849, REFLECTIVE SURGICAL DRAPE, Robert J. Poettgen, Owner of Record: *OR Concepts, Inc., Roanoke, Tex.*, Attorney or Agent: Randall C. Brown, Ex. Gp.: 331

**4,927,791**, Re. S. N. 07/676,201, Filed Mar. 27, 1991, Cl. 501/87, CHROMIUM CARBIDE SINTERED BODY, Dei Isozaki, et al., Owner of Record: *Denki Kagaku Kohyo Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: Adda C. Gogoris, Ex. Gp.: 118

**4,930,228**, Re. S. N. 07/675,958, Filed Mar. 27, 1991, Cl. 33/788, STEM LOAD DETERMINING SYSTEM, Paul G. Anderson, et al., Owner of Record: *Westinghouse Electric Corp., Pittsburgh, Pa.*, Attorney or Agent: H. J. Staal, Ex. Gp.: 246

**4,947,027**, Re. S. N. 07/675,089, Filed Mar. 25, 1991, Cl. 235/448, SYSTEM FOR IDENTIFYING AUTHORIZED USE OF CREDIT CARDS, Cecelia K. Golightly, Owner of Record: *Inventor*, Attorney or Agent: Paul W. O'Malley, Ex. Gp.: 239

---

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

OL
126
SS
1
MY
7
1991
UMI

**D. 273,544**, Reexam. No. 90/002,310, Requested Mar. 29, 1991, Cl. D8/376, TOOL RACK, Steven J. Sheffel, Owner of Record: *Crawford Products, Inc., West Hanover, Mass.*, Attorney or Agent: Richard L. Stevens, Samuels, Gauthier & Stevens, Boston. Mass., Ex. Gp.: 291, Requester: Owner

**D. 308,840**, Reexam. No. 90/002,305, Requested Mar. 21, 1991, Cl. D12/125, BICYCLE TOE CLIP, George J. Tackles, Owner of Record: *Specialized Bicycle Components, Inc., Morgan Hill, Calif.*, Attorney or Agent: Philip A. Dalton, San Francisco, Calif., Ex. Gp.: 291, Requester: Owner

**4,457,973**, Reexam. No. 90/002,312, Requested Feb. 22, 1991, Cl. 428/372, CONDUCTIVE COMPOSITE FILAMENTS AND METHODS FOR PRODUCING SAID COMPOSITE FILAMENTS, Masao Matsui, et al., Owner of Record: *Kanebo, Ltd., Tokyo, Japan*, Attorney or Agent: Terryence F. Chapman, Flynn, Thiel, Boutell & Tanis, Kalamazoo, Mich., Ex. Gp.: 154, Requester: Owner

**4,633,602**, Reexam. No. 90/002,311, Requested Apr. 1, 1991, Cl. 037/195, METHOD AND APPARATUS FOR PADDING PIPE, Ricky L. Layh, et al., Owner of Record: *CRC-Evans Pipeline International, Houston, Tex.*, Attorney or Agent: Robert C. Peterson, Milburn, Hudman & Peterson, Odessa, Tex., Ex. Gp.: 351, Requester: William B. Bishop, Albuquerque, N.M.

**4,741,743**, Reexam. No. 90/002,309, Requested Mar. 28, 1991, Cl. 051/309, GRINDING WHEEL WITH COMBINATION OF FUSED AND SINTERED ABRASIVE GRITS, Kesh S. Narayanan, et al., Owner of Record: *Norton Company, Worcester, Mass.*, Attorney or Agent: Rufus M. Franklin, Holden, Mass., Ex. Gp.: 118, Requester: Owner

**4,813,997**, Reexam. No. 90/002,306, Requested Mar. 26, 1991, Cl. 071/066, METHOD FOR REGULATING PLANT GROWTH, Alan M. Kinnersley, et al., Owner of Record: *CPC International, Inc., Engelwood Cliffs, N.J.*, Attorney or Agent: Ellen P. Trevors, Englewood Cliffs, N.J., Ex. Gp.: 129, Requester: Michael H. Laird, Unocal Corp., Brea, Calif.

**4,870,873**, Reexam. No. 90/002,304, Requested Mar. 21, 1991, Cl. 074/594.600, BICYCLE TOE CLIP, George J. Tackles, Owner of Record: *Specialized Bicycle Components, Inc., Morgan Hill, Calif.*, Attorney or Agent: Philip A. Dalton, San Francisco, Calif., Ex. Gp.: 358, Requester: Owner

**4,875,800**, Reexam. No. 90/002,302, Requested Mar. 21, 1991, Cl. 404/035, TEMPORARY SUPPORT SURFACES AND USE ON MUDDY OR MARSHY LAND AREAS, Gary D. Hicks, Owner of Record: *Inventor, Sugarland, Tex.*, Attorney or Agent: Burns, Doane, Swecker & Mathis, Alexandria, Va., Ex. Gp.: 356, Requester: Uni-Mat International, Houston, Tex.

**4,908,469**, Reexam. No. 90/002,307, Requested Mar. 26, 1991, Cl. 560/017, 2-HYDROXY-PROPANOIC ACID ACYCLIC ALKYL ESTERS FOR BENZOTHIOZEPINES, Daniel E. Martin, Owner of Record: *Marion Laboratories, Inc., Kansas City, Mo.*, Attorney or Agent: C.J. Rudy, Washington, D.C., Ex. Gp.: 129, Requester: Benton J. Duffett, Jr., Burns, Doane, Swecker & Mathis, Alexandria, Va.

### Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Disclipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical or other grounds should be furnished to the Director, Office of Enrollment and Discipline on or before June 21, 1991.

Cannon, Alan W., 4130 S. 16th St., Arlington, Va. 22209
Combs, Ervin M., 9013 Sudbury Rd., Silver Spring, Md. 20901
Franklin, Lawrence R., 11700 Amkin Dr., Clifton, Va. 22024
Imai, Jeffrey T., 65 Scadding Ave., Unit 312, Toronto, Ont., M5A 4L1, CANADA

April 2, 1991 CAMERON WEIFFENBACH, *Director*
*Office of Enrollment*
*and Discipline*

---

### Registration to Practice

The following list contains the names of persons who successfully passed the examination for registration to practice before the United Stated Patent and Trademark Office held on Oct. 10, 1990. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished to the Director, Office of Enrollment and Discipline on or before June 21, 1991.

Pili Curtis, Carmen B., 1800 R St., N.W., #209, Washington, D.C. 20009
Spahn, Gay Ann., 6200 Franconia Forest Ln., Alexandria, Va. 22310

April 2, 1991 CAMERON WEIFFENBACH, *Director*
*Office of Enrollment*
*and Discipline*

---

### Erratum

In the list of patents which expired on Dec. 23, 1990, due to failure to pay maintenance fees, in the O.G. of March 5, 1991, the following patent should not have appeared.

| Patent Number | Serial Number | Issue Date | Filing Date |
|---|---|---|---|
| 4,630,794 | 06/688,554 | 12/23/86 | 1/03/85 |

---

# PATENT NOTICES

### Certificates of Correction For Week of May 7, 1991

D. 305,988
4,581,455
4,614,961
4,625,217
4,697,111
4,722,999
4,728,924
4,730,030
4,739,751
4,740,918
4,741,887
4,749,490
4,753,452
4,758,114
4,758,242
4,759,279
4,759,734
4,770,380
4,773,413
4,778,291
4,781,062
4,784,747
4,787,616
4,790,437
4,798,854
4,801,417
4,803,822
4,804,525
4,804,950
4,806,124
4,807,348
4,808,411
4,810,412
4,812,625
4,812,859
4,814,100
4,816,078
4,820,545
4,821,312
4,823,396
4,824,441
4,824,872
4,828,640
4,829,402
4,832,144
4,832,977
4,835,168
4,837,398
4,837,490
4,837.897
4,839,368
4,839,923
4,844,685
4,845,357
4,847,303
4,847,613
4,848,041
4,848,465
4,848,637
4,849,431
4,850,278
4,853,807
4,855,457
4,856,235
4,861,849
4,870,000
4,871,446
4,872,399
4,873,551
4,875,348
4,875,532
4,875,780
4,876,552
4,876,991
4,878,720
4,879,250
4,879,591
4,882,203
4,882,257
4,882,359
4,883,331
4,884,311
4,884,409
4,885,072
4,885,332
4,885,600
4,887,982
4,889,671
4,889,787
4,889,883
4,889,968
4,891,407
4,891,834
4,894,330
4,894,414
4,895,389
4,895,757
4,895,768
4,896,361
4,896,376
4,896,515
4,897,305
4,898,183
4,898,735
4,899,488
4,899,852
4,900,861
4,901,246
4,901,423
4,901,712
4,902,733
4,903,333
4,903,943
4,905,575
4,905,607
4,905,688
4,905,690
4,906,261
4,907,392
4,907,901
4,908,317
4,908,846
4,909,450
4,909,923
4,910,749
4,910,948
4,911,665
4,911,736
4,913,232
4,913,273
4,913,315
4,913,408
4,913,451
4,913,473
4,913,595
4,913,639
4,914,990
4,915,753
4,916,346
4,917,189
4,919,711
4,919,735
4,923,005
4,923,114
4,923,242
4,924,534
4,925,687
4,925,705
4,925,854
4,933,879
4,934,105
4,959,213
4,962,920
4,986,809
4,994,114

OL
126
SS
1
MY
7
1991
UMI

## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box ________
Commissioner of Patents and Trademarks
Washington, D.C. 20231

| | |
|---|---|
| Box 3 | Mail for the Office of personel for NFC |
| Box 4 | Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs. |
| Box 5 | "No Fee" mail related to trademarks. |
| Box 6 | Mail for the Office of Procurement |
| Box 7 | Reissue applications for patents involved in litigation and subsequently filed related papers. |
| Box 8 | All papers for the Office of the Solicitor *except* communications relating to *pending litigation*; papers relating to pending litigation shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215 |
| Box 9 | Coupon orders for U.S. patent and trademark copies. |
| Box 10 | Orders for certified copies of patent and trademark applications. |
| Box 11 | Electronic Ordering Service (EOS). |
| Box 12 | Contributions to the Examiner Education Program. |
| Box 13 | Mail for the Employee and Labor Relations Division. |
| Box 14 | Invoices directed to the Office of Finance. |
| Box 15 | Mail for the Advisory Commission on Patent Law Reform. |
| Box 171 | Vacancy Announcement Applications. |
| Box AF | Expedited procedure for processing amendments and other responses after final rejection. |
| Box Assignment | All assignment documents except those filed with new applications. |
| Box DD | Mail related to Disclosure Documents. |
| Box EEO | Mail for the Office of Equal Employment Programs. |
| Box FWC | Requests for File Wrapper Continuation Applications (under 37 CFR 1.62) |
| Box Interference | Communications relating to interferences and applications and patents involved in interference. |
| Box Issue Fee | All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee. |
| Box ITU | All intent to use documents, excluding the initial application and amendments to allege use. |
| Box M. Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box Non-Fee-Amendment | Non-fee amendments to patent applications. (Use Box AF for responses after final rejection). |
| Box OED | Mail for the Office of Enrollment and Discipline |
| Box PATENT APPLICATION | New patent application and associated papers and fees. |
| Box TRADEMARK | New trademark application and associated papers and APPLICATION fees. |
| Box Pat. Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Reexam | Requests for Reexamination for *original* request papers *only*. |
| Box Sequence | Submission of diskette for biotechnical application. |
| Box SN | For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application"). |

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Alabama | Auburn University Libraries | (205) 844-1747 |
| | Birmingham Public Library | (205) 226-3680 |
| Alaska | Anchorage: Z. J. Loussac Public Library | (907) 261-2916 |
| Arizona | Tempe: Noble Library, Arizona State University | (602) 965-7607 |
| Arkansas | Little Rock: Arkansas State Library | (501) 682-2053 |
| California | Los Angeles Public Library | (213) 612-3273 |
| | Sacramento: California State Library | (916) 322-4572 |
| | San Diego Public Library | (619) 236-5813 |
| | Sunnyvale Patent Clearinghouse | (408) 730-7290 |
| Colorado | Denver Public Library | (303) 640-8847 |
| Connecticut | New Haven: Science Park Library | (203) 786-5447 |
| Delaware | Newark: University of Delaware Library | (302) 451-2965 |
| Dist. of Columbia | Washington: Howard University Libraries | (202) 806-7252 |
| Florida | Fort Lauderdale: Broward County Main Library | (305) 357-7444 |
| | Miami-Dade Public Library | (305) 375-2665 |
| | Orlando: University of Central Florida Libraries | (407) 823-2562 |
| | Tampa: Tampa Campus Library, University of South Florida | (813) 974-2726 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4508 |
| Hawaii | Honolulu: Hawaii State Public Library System | (808) 586-3477 |
| Idaho | Moscow: University of Idaho Library | (208) 885-6235 |
| Illinois | Chicago Public Library | (312) 269-2865 |
| | Springfield: Illinois State Library | (217) 782-5659 |
| Indiana | Indianapolis-Marion County Public Library | (317) 269-1741 |
| Iowa | Des Moines: State Library of Iowa | (515) 281-4118 |
| Kansas | Wichita: Ablah Library, Wichita State University | (316) 689-3155 |
| Kentucky | Louisville Free Public Library | (502) 561-8617 |
| Louisiana | Baton Rouge: Troy H. Middleton Library, Louisiana State University | (504) 388-2570 |
| Maryland | College Park: Engineering and Physical Sciences Library, University of Maryland | (301) 405-9157 |
| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
| Michigan | Ann Arbor: Engineering Transportation Library, University of Michigan | (313) 764-7494 |
| | Detroit Public Library | (313) 833-1450 |
| Minnesota | Minneapolis Public Library and Information Center | (612) 372-6570 |
| Misssissippi | Jackson: Mississippi Library Commission | Not Yet Operational |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 390 |
| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4281 |
| Nebraska | Lincoln: Engineering Library, University of Nebraska-Lincoln | (402) 472-3411 |
| Nevada | Reno: University of Nevada-Reno Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
| New Jersey | Newark Public Library | (201) 733-7782 |
| | Piscataway: Library of Science and Medicine, Rutgers University | (201) 932-2895 |
| New Mexico | Albuquerque: University of New Mexico General Library | (505) 277-4412 |
| New York | Albany: New York State Library | (518) 473-4636 |
| | Buffalo and Erie County Public Library | (716) 858-7101 |
| | New York Public Library (The Research Libraries) | (212) 714-8529 |
| North Carolina | Raleigh: D.H. Hill Library, North Carolina State University | (919) 737-3280 |
| North Dakota | Grand Forks: Chester Fritz Library, University of North Dakota | (701) 777-4888 |
| Ohio | Cincinnati and Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 292-6175 |
| | Toledo/Lucas County Public Library | (419) 259-5212 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 744-7086 |
| Oregon | Salem: Oregon State Library | (503) 378-4239 |
| Pennsylvania | Philadelphia, The Free Library of | (215) 686-5331 |
| | Pittsburgh, Carnegie Library of | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |

VOL
126
ISS
1
MY
7
1991
UMI

## Reference Collections of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Rhode Island | Providence Public Library | (401) 455-8027 |
| South Carolina | Charleston: Medical University of South Carolina Library | (803) 792-2372 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8876 |
|  | Nashville: Stevenson Science Library, Vanderbilt University | (615) 322-2775 |
| Texas | Austin: McKinney Engineering Library, University of Texas at Austin | (512) 471-1610 |
|  | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-2551 |
|  | Dallas Public Library | (214) 670-1468 |
|  | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext.2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
| Virginia | Richmond: James Branch Cabell Library, Virginia Commonwealth University | (804) 367-1104 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Library, University of Wisconsin Madison | (608) 262-6845 |
|  | Milwaukee Public Library | (414) 278-3247 |

---

# PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

| PATENT EXAMINING GROUPS | Phone Number Area Code 703 |
|---|---|
| **CHEMICAL EXAMINING GROUPS** |  |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING. GROUP 110—D. E. TALBERT, Director. | 308-0661 |
| ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director | 308-1235 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director | 308-0651 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 308-2351 |
| BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director | 308-0196 |
| **ELECTRICAL EXAMINING GROUPS** |  |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. KELLY, Director | 308-1782 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director | 308-0511 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—GERALD GOLDBERG, Director | 308-0754 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—CARLTON CROYLE Director | 308-0771 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, Director. | 308-0956 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director | 308-0962 |
| DESIGN, GROUP 290—ROBERT E. GARRETT, Director | 308-0511 |
| **MECHANICAL EXAMINING GROUPS** |  |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 308-1113 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director | 308-1148 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director | 308-0858 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—JOHN KITTLE, Director | 308-0861 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director | 308-0651 |

---

**Expiration of patents**: The patents within the range of numbers indicated below expire during April 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

| | |
|---|---|
| Patents | Numbers 3,800,329 to 3,808,603 inclusive |
| Plant Patents | 3,535 to 3,540 inclusive |

OL
126
SS
1
MY
7
1991
UMI

# REEXAMINATIONS

MAY 7, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

### B2 3,713,100 (1460th)
### METHOD AND APPARATUS FOR IDENTIFYING LETTERS, CHARACTERS, SYMBOLS, AND THE LIKE

**Harold S. Hemstreet, Binghamton, N.Y., assignor to Harold S. Hemstreet**

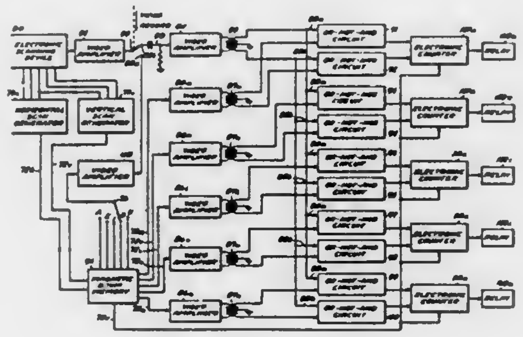
**Reexamination Request No. 90/002,099, Jul. 31, 1990.**

**Reexamination Certificate for Patent No. 3,713,100, issued Jan. 23, 1973, Ser. No. 336,080, Feb. 10, 1953.**

**Reexamination Certificate B1 3,713,100, issued Jul. 3, 1990.**

**Int. Cl.$^5$ G06K** *9/68*

U.S. Cl. 382—34



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–12**, **14–21**, **24–34**, **37–44**, **50–57** and **59–65** is confirmed.

Claims **22**, **23**, **35**, **45–49** and **58** were previously cancelled.

Claim **13** was previously disclaimed.

Claim **36** is cancelled.

**1.** In a device of the character described, means for comparing two different electrical quantities each comprising a plurality of pulses in time sequence, said means comprising an electronic gate for each quantity, and a coincidence circuit, each of said electrical quantities being connected to a first input of its respective electronic gate, and each being connected to a respective input of the coincidence circuit, both of said gates being biased to pass pulses of at least one polarity from either input quantity, a counter energized by the outputof said gates, the coincidence circuit being biased to produce an output when energized by simultaneous pulses of said polarity, the output of said coincidence circuit being connected to a second input of each of said gates so that an output from the coincidence circuit causes both of said gates to be blocked so that no pulses from either of said electrical quantities are sent to said counter.

---

B1-4,657,696 (146st)

**Patent Not Issued For This Number**

---

### B1 4,761,324 (1462nd)
### ELASTIC, LAMINATED, WATER-PROOF, MOISTURE-PERMEABLE FABRIC

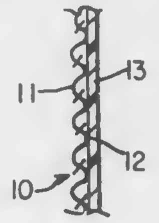
**Leonard J. Rautenberg, Sands Point, N.Y.; Milton M. Gilbert, Waterford, Conn.; James H. Wyner, and Daniel M. Wyner, both of Boston, Mass., assignors to Dash Partners, New York, N.Y.**

**Reexamination Request No. 90/002,083, Jul. 2, 1990.**

**Reexamination Certificate for Patent No. 4,761,324, issued Aug. 2, 1988, Ser. No. 68,907, Jun. 24, 1987.**

**Int. Cl.$^5$ B32B** *3/26, 7/14*

U.S. Cl. 428—198



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–12 is confirmed.

**1.** A laminated elastic fabric comprising:
a layer of stretch material having substantial elastic qualities;
a polymer film layer having a thickness less than 1.0 mil, said film layer being breathable and water-resistant and having elastic qualities comparable to said stretch material; and
an adhesive bonding said film layer to said layer of stretch material, said adhesive being present in substantially discontinuous segments.

# STATUTORY INVENTION REGISTRATIONS

PUBLISHED MAY 7, 1991

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

## H911

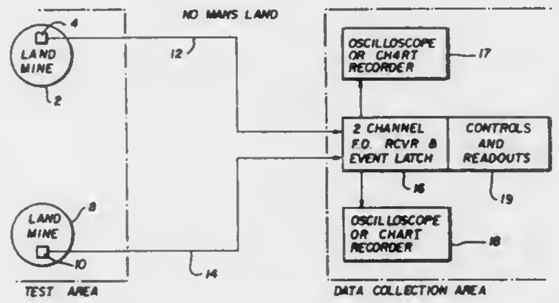
## FIBER OPTIC LINK FOR DETECTING MECHANICAL VIBRATION IN THE PRESENCE OF AN ELECTROMAGNETIC FIELD

**John E. B. Tuttle, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jul. 26, 1989, Ser. No. 386,379**

**Int. Cl.$^5$ G01L** *5/14*

U.S. Cl. 73—167 7 Claims



1. An apparatus for detecting the mechanical vibration of an explosive device in the presence of an electromagnetic field, comprising,

an explosive device which is capable of producing mechanical vibration upon arming,

means located in proximity to said explosive device for sensing said vibration while being subjected to an electromagnetic field, and for generating an electric signal corresponding thereto,

optical transmitter means located in proximity to said explosive device for generating a light wave signal corresponding to said electrical signal,

optical receiver means disposed at a location remote from said explosive device for receiving said light wave signal and generating an electrical signal corresponding thereto,

an optical fiber link connecting said optical transmitter means and optical receiver means, and

means responsive to said electrical signal generated by said optical receiver means for indicating information about said mechanical vibration which is produced by said explosive device, whereby said optical fiber link prevents the coupling of energy produced by the electromagnetic field from interfering with said indicating means and said explosive device.

---

## H912

## ULTRASONIC LIQUID-IN-LINE DETECTOR FOR TUBES

**Thomas C. Piper, Idaho Falls, Id., assignor to The United States of Amercia as represented by the United States Department of Energy, Washington, D.C.**

**Filed Mar. 6, 1989, Ser. No. 318,874**

**Int. Cl.$^5$ G01H** *3/12*

U.S. Cl. 73—592 7 Claims

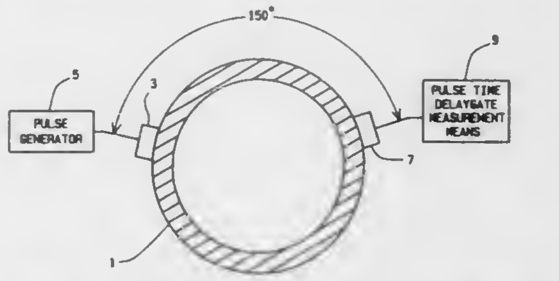
1. An apparatus for detecting the presence of liquid in a tube comprising:

a sending transducer in direct contact with said tube, a receiving transducer in direct contact with said tube at the same location along said tube as said sending transducer but circumferentially displaced from said sending transducer by an angle less than 180°,

means for sending an ultrasonic pulse from said sending transducer,

means for selectively measuring the amplitude of an ultrasonic pulse received by said receiving transducer, said selective measuring means operably capable of selectively measuring the amplitude of an ultrasonic pulse during a time period that includes the time period after which an ultrasonic pulse arrives at said selective measuring means by a path through the tube less than 180° and ends before an ultrasonic pulse arrives at said selective measuring means through the tube by a path through the tube greater than 180°,

whereby the presence of liquid in the tube can be detected by the attenuation of a pulse sent by said sending transducer and received by said receiving transducer.



---

## H913

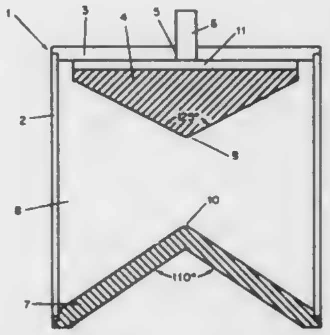
## EXPLOSIVE DEVICES FOR FOXHOLE MANUFACTURE, DEMOLITION AND URBAN WARFARE

**Joseph Hershkowitz, W. Caldwell, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Aug. 17, 1989, Ser. No. 396,499**

**Int. Cl.$^5$ F42B** *1/02*

U.S. Cl. 102—307 14 Claims



1. An explosive device for foxhole manufacture, demolition and urban warfare comprising:

a hollow cylinder;

a cap closing said cylinder at the top end, said cap having a waveshaper on the interior thereof, and said cap having a hole therethrough for insertion of an ignition charge;

a closure at the bottom end of said cylinder, said closure having the form of a cone depressed internally within said hollow liner, and constituting the shaped charge liner which provides the jet;

an explosive composition disposed within said hollow cylin-

VOL 126
ISS 1
MY 7 1991
UMI

der between said waveshaper and said shaped charge liner.

---

### H914

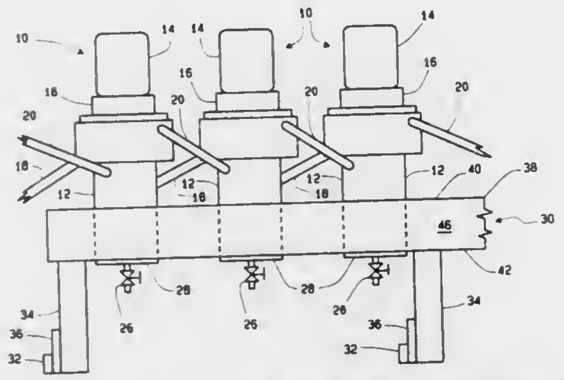
### APPARATUS FOR SUPPORTING CONTACTORS USED IN EXTRACTING NUCLEAR MATERIALS FROM LIQUIDS

**Ralph A. Leonard, River Forest, and Robert C. Frank, Crestwood, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 21, 1988, Ser. No. 260,751**

**Int. Cl.$^5$ G21G** *1/00*

**U.S. Cl. 422—159** **7 Claims**



1. Apparatus for supporting at least one contactor stage for removing radioactive materials from aqueous solutions, the contactor stage having a housing, a rotor in the housing, a motor secured to the top of the housing for turning the rotor, and a drain in the bottom of the housing, said apparatus comprising

a tubular, rectangular frame member having substantially flat, spaced top and bottom surfaces separated by substantially vertical side surfaces, said top and bottom surfaces each having an opening through which the housing may be placed,

means for supporting said frame without substantially obstructing access to the contactor drain from three sides of the contactor stage, and

means for securing said housing to said frame member, whereby the contactor stage is secured in a stable manner without obstructing access to the contactor drain.

---

### H915

### CONTROLLED MACROPOROUS COPOLYMER PROPERTIES BY REMOVAL OF IMPURITIES IN THE DILUENT

**Marylu B. Gibbs, 2375 Deer Valley Rd., Midland, Mich. 48640**

**Continuation-in-part of Ser. No. 161,271, Feb. 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 757,709, Jul. 22, 1985, abandoned. This application Sep. 5, 1989, Ser. No. 402,571**

**Int. Cl.$^5$ C08J** *5/20*

**U.S. Cl. 521—25** **12 Claims**

1. In a process for recycling an inert diluent used for preparing macroreticular crosslinked copolymer particles, wherein the copolymer particles are prepared by polymerizing under suspension polymerization conditions a first monomer mixture of a monoethylenically unsaturated monomer and a polyethylenically unsaturated monomer, in the presence of an inert diluent in which the monomer mixture is soluble and the prepared copolymer particles are insoluble, thereby preparing a first batch of macroreticular crosslinked copolymer particles, and then recycling the inert diluent from the first batch to a second batch monomer mixture, the improvement comprises purifying the inert diluent before the recycling step, whereby the resulting macrorecticular crosslinked copolymer particles produced in each batch are substantially consistent in pore size and porosity.

---

### H916

### THERMOPLASTIC RESIN COMPOSITION

**Kozi Nishida, Toyama, Japan, assignor to Mitsubishi Rayon Company Limited, Tokyo, Japan**

**Filed Jul. 12, 1989, Ser. No. 378,766**

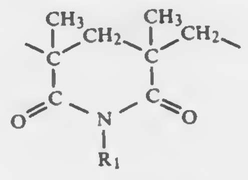
**Claims priority, application Japan, Jul. 29, 1988, 63-191566**

**Int. Cl.$^5$ C08G** *63/48*

**U.S. Cl. 525—66** **5 Claims**

1. A thermoplastic resin composition, comprising:

(A) 20–95% by weight of a methacrylimide group-containing polymer containing at least 5% by weight of an imide ring structural unit expressed by the structural formula (I)



(I)

(wherein $R_1$ is a hydrogen atom or a substituted or non-substituted alkyl group having 1–20 carbon atoms, cycloalkyl group, aryl group, alkaryl group or an aralkyl group or allyl group);

(B) 5–30% by weight of at least one thermoplastic elastomer selected from the group consisting of polyether esters, polyether ester amides and polyether amides; and

(C) 2.5–50% by weight of a graft-copolymer obtained by graft-polymerizing at least one monomer selected from the group consisting of vinyl cyanate monomer, aromatic vinyl monomer and acrylic monomer to a butadiene rubber.

---

### H917

### POLYMER BLEND

**William P. Gergen, Houston, Tex.; Robert G. Lutz, Santa Rosa, Calif., and Richard L. Danforth, Missouri City, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Jul. 28, 1989, Ser. No. 386,177**

**Int. Cl.$^5$ C08G** *63/48;* **C08F** *283/00*

**U.S. Cl. 525—64** **14 Claims**

1. A composition comprising a non-miscible blend of, as a major component, a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, and, as a minor component, a maleated polyolefin polymer.

---

### H918

### DECARBONYLATION AND DEHYDROGENATION OF CARBOHYDRATES

**Mark A. Andrews, Ridge, N.Y., and Stephen A. Klaeren, Corpus Christi, Tex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 5, 1988, Ser. No. 253,641**

**Int. Cl.$^5$ C07D** *307/02*

**U.S. Cl. 549—497** **8 Claims**

1. A process for the decarbonylation of an aldose or kitose sugar, each of said sugars having unprotected alcohol moieties, comprising the steps of:

(a) dissolving said sugar in a solution containing a transition metal complex decarbonylation agent, selected from the group consisting of chlorotis(triphenylphosphine)rhodium, dichlorotetrakis(triphenylphosphine) dirhodium, chlorotris(diphenylmethylphosphine)-rhodium, $[Rh(Ph_2PCH_2CH_2PPH_2)_2]^+$, and mixtures thereof, and a suitable aprotic, polar solvent free of CO-donating impurities, under an inert atmosphere; and

(b) heating the carbonyl-free solution containing the dissolved sugar which results from step (a) for a time sufficient to effect decarbonylation of said sugar while maintaining said inert atmosphere.

---

### H919

### PROCESS FOR PRODUCING POLYAMINE BORANES

**John A. Marsella, 744 N. Broad St., Allentown, Pa. 18104**

**Filed Aug. 2, 1989, Ser. No. 388,540**

**Int. Cl.$^5$ C07C** *69/76*

**U.S. Cl. 564—8** **11 Claims**

1. In a process for producing amine boranes by the reaction of a metal borohydride with a tertiary amine in the presence of an inert organic solvent and a protic acid source, the improvement for enhancing formation of a borane complex of a polyamine containing a tertiary nitrogen atom as the tertiary amine which comprises:

effecting the reaction in the presence of water wherein the water is present in a catalytically effective amount but insufficient for forming two phases.

---

### H920

### METHOD OF REMOVING CESIUM FROM STEAM

**Neill J. Carson, Jr., Clarendon Hills; Robert A. Noland, Oak Park, and Westly E. Ruther, Skokie, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Feb. 12, 1990, Ser. No. 478,329**

**Int. Cl.$^5$ G21C** *19/42*

**U.S. Cl. 376—313** **16 Claims**

1. Method for the removal of radioactive cesium from a vapor stream which comprises:

(a) passing an input vapor stream containing radioactive cesium into a bed of silicate glass particles at a temperature of at least about 700° F.;

(b) chemically incorporating at least a portion of the radioactive cesium in said silicate glass particles; and

(c) withdrawing an output vapor stream containing a reduced content of radioactive cesium from said bed.

9. Method for the removal of radioactive cesium from steam which comprises:

(a) passing input steam containing radioactive cesium into a bed of silicate glass particles;

(b) chemically incorporating at least a portion of the radioactive cesium in said silicate glass particles at a temperature of at least about 700° F.; and

(c) withdrawing output steam containing a reduced content of radioactive cesium from said bed.

---

### H921

### STRESS CONTROLLING MOUNTING STRUCTURES FOR PRINTED CIRCUIT BOARDS

**Robert L. Wannemacher, Jr., Mesa, Ariz., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 18, 1990, Ser. No. 599,768**

**Int. Cl.$^5$ H05K** *7/10*

**U.S. Cl. 361—400** **20 Claims**

1. A printed circuit assembly comprising:

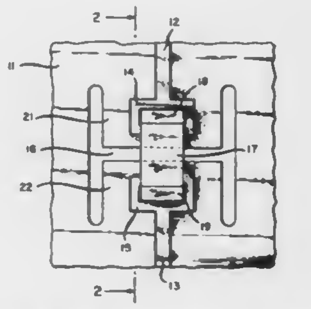
a board;

at least one mounting member flexibly attached to said board;

a pattern of printed wires mounted on the surface of the board;

first and second spaced conductive surfaces connected to said wires and at least one of which is mounted on said mounting member; and

an electronic component fixed to each of said conductive surfaces.



---

### H922

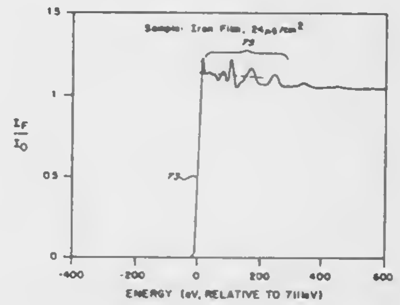
### METHOD FOR ANALYZING MATERIALS USING X-RAY FLUORESCENCE

**Johnny P. Kirkland, Shoreham, N.Y.; Wm. Timothy Ehm, Alexandria, Va., and John V. Gilfrich, Bethesda, Md., assignors to United States of America, Washington, D.C.**

**Filed Aug. 1, 1988, Ser. No. 227,023**

**Int. Cl.$^5$ G01N** *23/223*

**U.S. Cl. 378—45** **1 Claim**



1. A method of identifying at least one elemental; constituent of a material sample, said method comprising steps for:

(a) exposing said sample for a preselected time to a substantially monochromatic x-ray beam of preselected frequency;

(b) measuring the amount of fluorescence emitted by said sample into a preselected solid angle during said preselected time responsive to said step for exposing;

(c) measuring the amount of energy delivered to said sample in said preselected time by step (a);

(d) varying the frequency of said monochromatic x-ray beam;

(e) repeating steps (a) through (d) a sufficient number of times to identify an absorption edge transition of said elemental constituent of said sample;

(f) measuring the change of magnitude of said amount of fluorescence at said absorption edge;

(g) using said change of magnitude to calculate the amount of said elemental constituent of said sample.

OL
126
SS
1
MY
7
1991
UMI

# REISSUES

## MAY 7, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

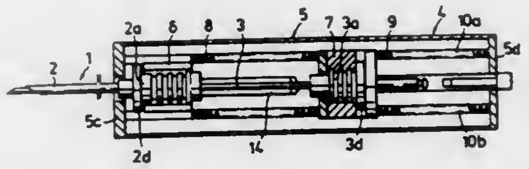
### Re. 33,582
### TISSUE SAMPLING DEVICE

**Per G. Lindgren, Uppsala, Sweden, assignor to C.R. Bard, Inc., Murray Hill, N.J.**

**Original No. 4,699,154, dated Oct. 13, 1987, Ser. No. 890,543, Jul. 30, 1986. Application for reissue Jul. 31, 1989, Ser. No. 387,864**

**Int. Cl.$^5$ A61B** *10/00*

**U.S. Cl. 128—754** **23 Claims**



*9. A biopsy needle for use with a tissue sampling device having a housing, a first slide mounted for longitudinal motion within said housing, and a second slide having a transverse recess formed therein and being mounted for longitudinal motion within said housing, said biopsy needle comprising:*

*a hollow first needle having proximal and distal ends;*

*a second needle extending through said hollow first needle and freely slidable therewithin, said second needle having proximal and distal ends;*

*a first head mounted to said proximal end of said first needle, said first head having front and rear flanges formed thereon in spaced-apart relation for receiving said first slide therebetween, such that when said first head is placed on said first slide, said slide is matingly received between said front and rear flanges to couple said first needle to said first slide; and*

*a second head mounted to said proximal end of said second needle, said second head having a flange thereon dimensioned to be received within said transverse recess of said second slide such that when said second head is placed on said second slide, said flange on said second head engages said transverse recess in said second slide to couple said second needle to said second slide.*

---

### Re. 33,583
### MECHANISM WITH TORQUE-LIMITING DEVICE FOR CONTROLLING A REARVIEW MIRROR

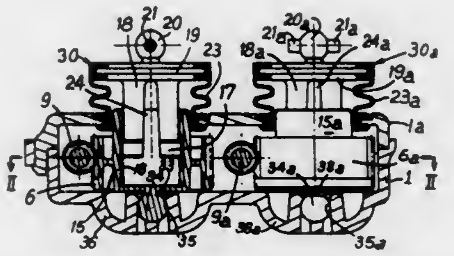
**Stephane Manzoni, Saint-Claude, France, assignor to Societe Manzoni Bouchot, France**

**Original No. 4,598,605, dated Jul. 8, 1986, Ser. No. 491,633, May 5, 1983. Application for reissue Oct. 19, 1987, Ser. No. 111,447**

**Claims priority, application France, May 3, 1982, 82 08347**

**Int. Cl.$^5$ G02B** *7/18*

**U.S. Cl. 350—633** **11 Claims**



1. A torque-limiting mechanism for operating a rearview mirror of a vehicle, said torque-limiting mechanism comprising:

a casing having a cavity therein;

*a spherical bearing adjoining said casing;*

a cover member mounted to said casing, said cover member having at least one opening therein;

a support member attached to said mirror, said support member further being spaced a predetermined distance from said cover member of said casing;

universal pivot joint means interposed said support member and said cover member of said casing, said universal pivot joint means adapted to allow pivoting movement of said mirror about at least one axis;

rotation to translation means mounted in said cavity of said casing, said rotation to translation means comprising:

at least one pinion gear [member mounted] *adapted to be directly driven by a worm, said at least one pinion gear being located* in said cavity of said casing and *mounted to said casing;*

at least one selectively movable control member having a central axis and being mounted to said at least one pinion gear [member] for movement relative thereto, said at least one selectively movable control member further having one end portion and an opposite end portion;

second pivot joint means located at said one end portion of said at least one selectively movable control member, said second pivot joint means adapted to cooperate with said support member for pivot motion of said support member relative to said at least one selectively movable control member;

a first spherical ball joint member means [adjoining] *in one piece with* said at least one pinion gear [member], *said first spherical ball joint member means being received by said spherical bearing for providing universal movement of said at least one pinion gear relative to said casing,* said first spherical ball joint member means being defined by a spherical radius having a center of curvature lying substantially along said central axis of said at least one selectively movable control member; and

motor means mounted in said casing at a preselected location relative to said at least one pinion gear [member] and adapted to rotate said at least one pinion gear [member].

---

### Re. 33,584
### HIGH ELECTRON MOBILITY SINGLE HETEROJUNCTION SEMICONDUCTOR DEVICES

**Takashi Mimura, Machida, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Original No. 4,424,525, dated Jan. 3, 1984, Ser. No. 220,968, Dec. 29, 1980. Application for reissue Jun. 2, 1986, Ser. No. 869,669**

**Claims priority, application Japan, Dec. 29, 1979, 54-171026; Dec. 29, 1979, 54-171027; Jun. 17, 1980, 55-82035; Jun. 27, 1980, 55-87527**

**Int. Cl.$^5$ H01L** *29/80, 29/78*

**U.S. Cl. 357—22** **40 Claims**

1. An active semiconductor device with high electron mobility, comprising

a source layer of a semiconductor doped with donor impurities,

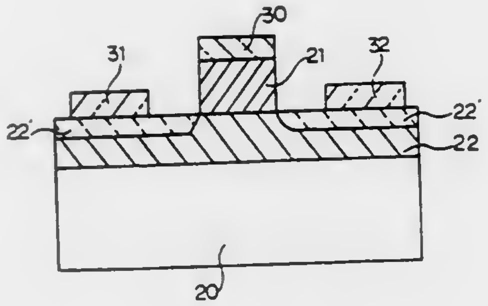
a channel layer of a semiconductor having a larger electron affinity than the semiconductor of the source layer and forming a heterojunction with said source layer, wherein a channel is formed in said channel layer along said heterojunction,

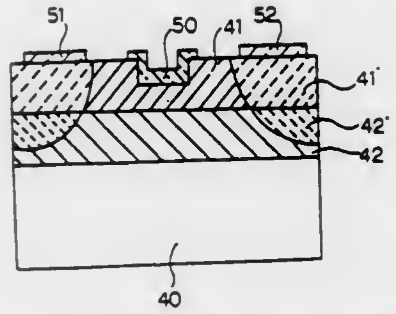
at least one control terminal formed on [a selected one of] said source [and channel layers] *layer* over [said] *a* portion of said heterojunction,

a pair of output terminals selectively formed on said source and channel layers, on opposite sides of said at least one control terminal,

said source layer having sufficiently small thickness, at least under said at least one control terminal, so as to be entirely depleted of majority carriers under said at least one control electrode,

wherein said output terminals are electrically connected, at least under said at least one control terminal, only by an accumulation of electrons with high mobility in said channel in said channel layer, depending on a control voltage applied to said control terminal.





---

### Re. 33,585

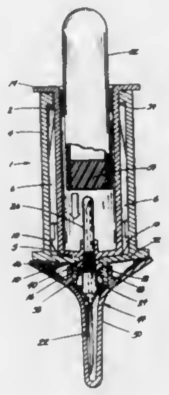
### SHIELDED SAFETY SYRINGE

**Terry M. Haber, El Toro; Clark B. Foster, Laguna Niguel, and William H. Smedley, Lake Elsinore, all of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.**

**Original No. 4,758,231, dated Jul. 19, 1988, Ser. No. 43,042, Apr. 27, 1987. Application for reissue Mar. 31, 1989, Ser. No. 332,520**

**Int. Cl.$^5$ A61M** *5/32*

**U.S. Cl. 604—198** **23 Claims**



9. A shielded safety syringe comprising an inner cylinder having proximal and distal ends and a hypodermic needle supported by and extending outwardly from said distal end, said syringe further comprising:

an outer sleeve having proximal and distal ends and being coaxially aligned with and movable axially relative to said inner cylinder from a retracted position, where said needle projects past the distal end of said outer sleeve, to a distally advanced position, where said needle is located within and completely surrounded by said outer sleeve;

first and second locking means being axially spaced from one another and [projecting from] *extending around the periphery of* one of said inner cylinder or said outer sleeve; and

third locking means *comprising a lip* projecting from *and extending continuously and uninterruptedly around the periphery of* the other of said inner cylinder or said outer sleeve;

the continuous axial movement of said outer sleeve from the retracted position to the distally advanced position causing *the lip of* said third locking means to be received in the space between said first and second locking means to thereby lock said outer sleeve at the distally advanced position with said needle shielded by said outer sleeve.

---

# PLANT PATENTS

## GRANTED MAY 7, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

### 7,514

### CARNATION PLANT NAMED CFPC TWILIGHT

**Walter H. Jessel, Jr., Salinas, Calif., assignor to California Florida Plant Company L.P., Salinas, Calif.**

**Filed Feb. 9, 1990, Ser. No. 478,191**

**Int. Cl.$^5$ A01H** *5/00*

U.S. Cl. Plt.—70 **1 Claim**

1. A new and distinctive cultivar of Carnation plant, named CFPC Twilight substantially as herein shown and described.

---

### 7,515

### CHRYSANTHEMUM PLANT NAMED OCASO

**Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio**

**Filed Jan. 24, 1990, Ser. No. 469,821**

**Int. Cl.$^5$ A01H** *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1 A new and distinct Chrysanthemum plant named Ocaso, as described and illustrated.

---

### 7,516

### CHRYSANTHEMUM PLANT NAMED CHANTAL

**Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio**

**Filed Feb. 16, 1990, Ser. No. 481,067**

**Int. Cl.$^5$ A01H** *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Chantal, as described and illustrated.

---

### 7,517

### CHRYSANTHEMUM PLANT NAMED NICOLE

**Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio**

**Filed Dec. 29, 1989, Ser. No. 458,838**

**Int. Cl.$^5$ A01H** *5/00*

U.S. Cl. Plt.—77 **1 Claim**

1. A new and distinct Chrysanthemum plant named Nicole, as described and illustrated.

---

### 7,518

### CHRYSANTHEMUM PLANT NAMED PERLA

**Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio**

**Filed Jan. 24, 1990, Ser. No. 469,822**

**Int. Cl.$^5$ A01H** *5/00*

U.S. Cl. Plt.—77 **1 Claim**

1. A new and distinct Chrysanthemum plant named Perla, as described and illustrated.

---

### 7,519

### CHRYSANTHEMUM PLANT NAMED CANELA

**Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio**

**Filed Jan. 24, 1990, Ser. No. 469,308**

**Int. Cl.$^5$ A01H** *5/00*

U.S. Cl. Plt.—79 **1 Claim**

1. A new and distinct Chrysanthemum plant named Canela, as described and illustrated.

OL
126
SS
1
MY
7
1991
UMI

# PATENTS

## GRANTED MAY 7, 1991

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 125-015 | 5,012,792 |
| 228-119 | 5,012,800 |
| 166-363 | 5,012,854 |
| 283-081 | 5,013,088 |
| 403-030 | 5,013,182 |
| 417-287 | 5,013,198 |
| 501-024 | 5,013,362 |
| 524-862 | 5,013,809 |
| 392-470 | 5,013,889 |
| 392-497 | 5,013,890 |
| 342-375 | 5,013,979 |
| 333-020 | 5,014,018 |
| 335-167 | 5,014,025 |
| 338-099 | 5,014,223 |

OL
126
SS
1
MY
7
1991
UMI

# PATENTS

GRANTED MAY 7, 1991

## GENERAL AND MECHANICAL

5,012,525

### VEHICLE WINDSHIELD WIPER DEVICE

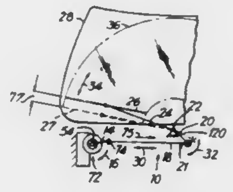
**Gerd Kühbauch, Bühlertal, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

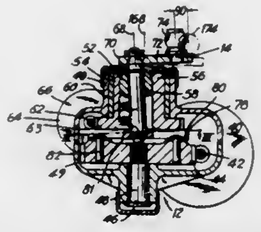
**PCT No. PCT/DE88/00482, § 371 Date Feb. 9, 1990, § 102(e) Date Feb. 9, 1990, PCT Pub. No. WO89/01886, PCT Pub. Date Mar. 9, 1989**

**PCT Filed Aug. 5, 1988, Ser. No. 473,947**

**Int. Cl.$^5$ B60S** *1/22*

U.S. Cl. 15—250.16 **13 Claims**





1. A wiper device for a vehicle windshield having a wiping field, said wiper device comprising a housing; a wiper blade movable over the wiping field between two oscillating reverse positions and having a rest position in which said wiper blade is located in front of the wiping field; a rocker shaft; a wiper arm for supporting said wiper blade on said rocker shaft; a drive mechanism for oscillating said rocker shaft, said drive mechanism including an electric motor, a crank operatively connected with said electric motor and said rocker shaft for translating a rotational movement of said electric motor into oscillating movement of said rocker shaft; a shaft for supporting said crank; and eccentric bushing for supporting said crank supporting shaft and pivotably supported in said housing for pivotal movement between two positions for displacing a pivotal axis of said crank between an operating position and an additional position in which a pivotal axis position influences the rest position of said wiper blade, said eccentric bush having a pot-shaped base for supporting said crank supporting shaft, and adjusting means for pivoting said eccentric bush and operating independently from said drive mechanism, said adjusting means including an electric drive motor and a worm gear drive including worm gear means formed on an outer surface of said eccentric bush.

---

5,012,526

### AUTOMATIC TOOL COMPENSATOR

**William W. Romans, Ankeny, and Dudley L. Lukehart, Des Moines, both of Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Nov. 16, 1989, Ser. No. 437,967**

**Int. Cl.$^5$ A46B** *13/02*

U.S. Cl. 15—256.5 **8 Claims**

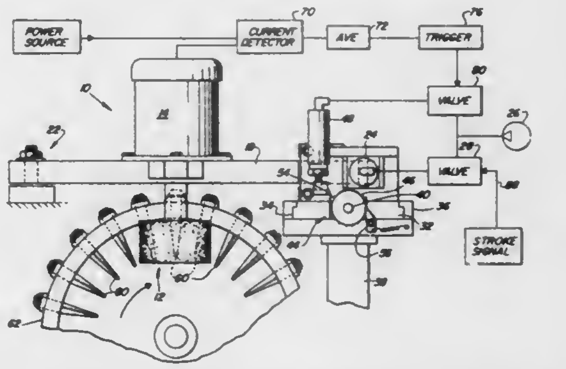
1. In a tool including an electrically driven finishing portion adapted for adjustable contact with a plated workpiece, wherein the current drawn by the finishing portion is indicative of the amount of contact between the finishing portion and the workpiece, tool positioning structure comprising:

means for supporting the workpiece adjacent the tool;

means including a stroke cylinder for supporting the workpiece and finishing portion for relative movement with respect to each other;

a moveable cylinder support connected to the stroke cylinder;

means for stroking the cylinder to move the workpiece and finishing portion into contact with each other;



means for providing a current signal indicative of the current draw of the finishing portion; and

means responsive to the current signal for moving the cylinder support to thereby move the workpiece and finishing portion relative to each other in response to the current signal deviating beyond a preselected limit to reduce the current signal deviation.

---

5,012,527

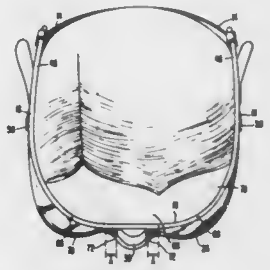
### ATHLETIC NOSE GUARD

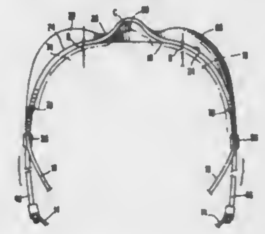
**Lorraine M. Michel, 613 S. Walter Reed Dr., Apt. 611 C, Arlington, Va. 22204**

**Continuation-in-part of Ser. No. 891,954, Aug. 1, 1986, abandoned. This application Feb. 5, 1987, Ser. No. 11,194**

**Int. Cl.$^5$ A61F** *9/02*

U.S. Cl. 2—9 **13 Claims**





8. A rigid or semi-rigid guard for protecting a wearer's nose comprising:

an upper edge partially adapted to rest on the wearer's forehead and partially adapted to be adjacent to the wearer's temples;

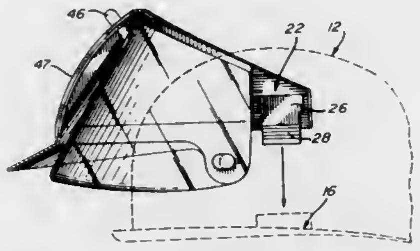
a lower edge having first and second edge portions adapted to be adjacent to the wearer's cheekbones and a third edge

OL
126
SS
1
MY
7
1991
UMI

portion adapted to be adjacent to the wearer's nose, the wearer's mouth and jaw being unobstructed;
a protrusion extending from said upper edge to said lower edge and covering the nose and the wearer's eyes, said protrusion protruding further adjacent to said upper edge than it protrudes adjacent to said lower edge; and
two arms for securing said guard to the wearer's face, one of said arms passing over one of the wearer's ears and another of said arms passing over the other of the wearer's ears; and
securing means for holding said arms in position,
wherein a minimum distance between the nose and a forward portion of said protrusion is greater than a distance between said first and second edge portions and the cheekbones, and further wherein sides of said protrusion are spaced a minimum distance from sides of the nose, such that said minimum distance between said sides of said protrusion and said sides of the nose is greater than the distance between said upper edge and the temples.

### 5,012,528
### VISOR ATTACHMENT FOR SAFETY HELMET

**Martin Pernicka, Montreal, and Mario Gagnon, Outremont, both of Canada, assignors to Institut De Recherche En Sante Et En . . ., Montreal, Canada**
**Filed Mar. 1, 1990, Ser. No. 486,821**
**Int. Cl.$^5$ A42B** *3/18*
**U.S. Cl. 2—10** **12 Claims**

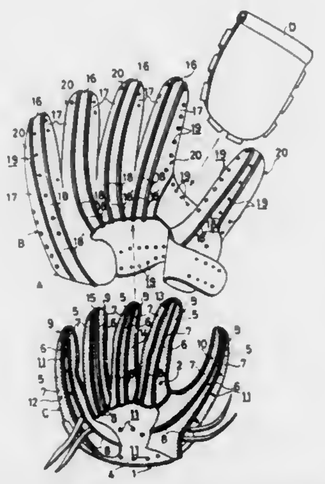


1. A visor attachment for use in combination with a conventional safety helmet having a front brim continuous with a rim extending along each opposite side and the back of the helmet and displaying a slot in the rim of each opposite side thereof, said visor attachment comprising:
(a) a body adapted to be removably mounted to the helmet, including an arcuate portion for covering the back rim of the helmet and a pair of opposite side extensions each including, on an inner face thereof, a connecting member adapted to engage a corresponding rim slot of the helmet and, on an outer face thereof, slot means adapted to receive accessories associated with the use of the safety helmet; said connecting member including a releasable portion adapted to engage the rim slot; and
(b) a visor pivotally mounted to said body and being retractable between said arcuate portion and the back part of the helmet; whereby said conventional safety helmet, when combined with said visor attachment, is worn front-to-back.

### 5,012,529
### BASEBALL GLOVE AND INTERIOR CORE COVERING THEREOF

**Hideaki Murai, 7-16 Daikoku 3-chome, Naniwa-ku, Osaka, Japan**
**Filed Nov. 22, 1989, Ser. No. 440,521**
**Claims priority, application Japan, May 17, 1989, 1-56934[U]**
**Int. Cl.$^5$ A41D** *13/10*
**U.S. Cl. 2—18** **12 Claims**

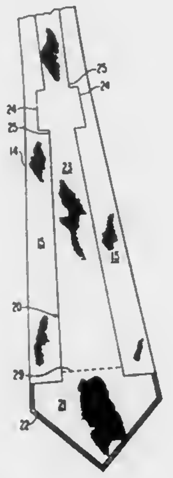
1. An interior core covering of a baseball glove comprising:
a core covering surface member having a palm piece and five finger pieces extending from an upper edge of the palm piece;
a back member consisting of back pieces smaller in width than the finger pieces arranged to extend from tip portions of corresponding finger pieces to a central back portion of said palm piece, and side pieces substantially equal in length to respective back pieces arranged at each side of corresponding back pieces;
said back pieces being formed such that the width of each back piece increases progressively from a tip portion to a root portion;



said back member being formed by seams connecting a first side edge of respective side pieces to said back pieces such that edges of said pieces form a pair of outwardly extending ribs on an external surface of each back piece of said back member in a longitudinal direction of the finger; and
a second edge of each side piece being seamed with a peripheral edge of a corresponding finger piece of said core covering surface member whereby a covering body adapted for insertion of a hand is formed by the core covering surface member and the back member.

### 5,012,530
### DIMPLE FORMING NECKTIE AND METHOD OF MAKING THE SAME

**Myron H. Ackerman, 7209 Promenade Dr., Apartment D-201, Boca Raton, Fla. 33433**
**Filed Feb. 8, 1990, Ser. No. 476,753**
**Int. Cl.$^5$ A41D** *25/00, 25/16*
**U.S. Cl. 2—144** **18 Claims**

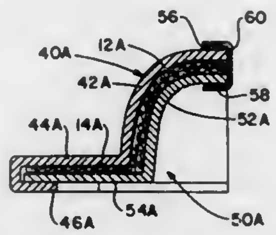


1. A tie comprising:

an outer casing having a first end, a second end and an intermediate knot forming portion;
a secondary fabric having longitudinal marginal edges and a central portion therebetween, said fabric further including laterally spaced ears that extend from said longitudinal margin edges and fold back toward said central portion, each ear including an end distal to a respective longitudinal marginal edge, said distal ends being spaced from one another, said fabric being fixed to the back of said outer casing such that said ears are in the vicinity of said knot forming portion;
whereby when a knot is placed in said knot forming portion, said ears cause a dimple to be formed in said outer casing immediately below the knot.

### 5,012,531
### FORM RETAINING HOLDER FOR VISORED CAP

**Richard L. Schoonover, 181 Lake Terrace Dr., Munroe Falls, Ohio 44262**
**Filed Apr. 25, 1990, Ser. No. 514,661**
**Int. Cl.$^5$ A42C** *5/00*
**U.S. Cl. 2—185 B** **16 Claims**

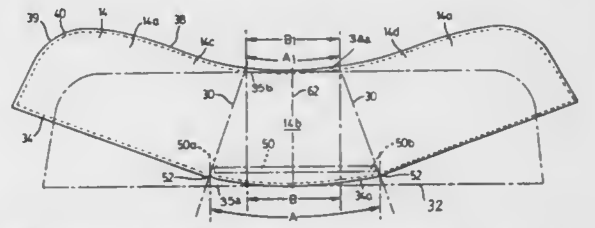


1. A form retaining case for a cap, said cap having a crown portion with front and rear halves, and a visor portion affixed to the front half of said crown portion, said rear half of said crown portion being inwardly foldable to be proximate to said front half thereby forming first and second surfaces in such folded position, said protective case comprising:
a first shell member having a visor portion and a crown portion and first and second surfaces, said first shell member having its second surface sized and adapted to be slightly larger than, and to closely accommodate, the first surface of said cap when the crown portion of said cap is in said folded position;
a second shell member having a visor portion and crown portion and first and second surfaces, said second shell member having its first surface sized and adapted to be slightly smaller than, and to closely accomodate, the second surface of said cap when the crown portion of said cap is in said folded position;
at least one means for engaging the visor portion of said first shell member with the visor portion of said second shell member while the visor portion of said cap is juxtaposed between said the visor portions of said first and second shell members; and
at least one means for fastening the crown portion of said first shell member to the crown portion of said second shell member when the crown portion of said cap is juxtaposed between the crown portions of said first and second shell members.

### 5,012,532
### SIZE ADJUSTABLE CAP

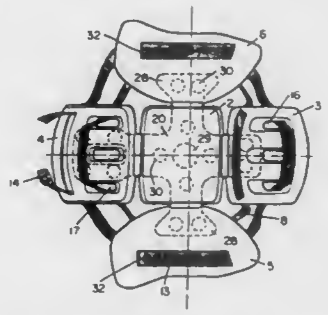
**Joseph Krystal, Downsview, Canada, assignor to Krystal Cap Company Ltd., Toronto, Canada**
**Filed Jun. 2, 1989, Ser. No. 360,279**
**Int. Cl.$^5$ A42B** *1/22*
**U.S. Cl. 2—197** **9 Claims**

1. A cap that has a head encircling portion which is adjustable in size between a first size and a second size that is larger than the first size by a predetermined amount that is sufficient to provide for adjustment between a first cap size and a second cap size, comprising; a tip panel which has a front end and a back end, a side panel and a peak panel, the side panel having a posterior portion which extends around and across the back of the cap and anterior portions which extend from opposite ends of the posterior portion to the front of the cap, the side panel also having an upper edge, a lower edge and a front edge and being shaped such that when said side panel is laid-out flat, the posterior portion is arcuate in shape and the upper edge thereof extends along a shallow concave arc of curvature and the lower edge extends along a convex arc of curvature, the arcuate length of the lower edge of the posterior portion being greater than the arcuate length of the upper edge of the posterior portion by an amount that is at least equal to said predetermined amount and wherein, when the cap is assembled, and elastic member is fastened at its opposite ends to spaced points on the posterior portion adjacent opposite ends thereof and adjacent the lower edge thereof, said spaced points being spaced a sufficient distance from one another and said elastic member being sufficiently elastic to draw the posterior portion inwardly along said lower edge to reduce the length of the lower edge of the posterior portion by said predetermined amount to provide the first cap size and being sufficiently extensible to permit the posterior portion of the cap to be expanded to provide the second cap size.



### 5,012,533
### HELMET

**Dieter Raffler, Ulm, Fed. Rep. of Germany, assignor to K. W. Hochschorner GmbH, Martinsried, Fed. Rep. of Germany**
**Filed Jul. 17, 1989, Ser. No. 379,788**
**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1989, 3910889**
**Int. Cl.$^5$ A42B** *3/00*
**U.S. Cl. 2—420** **30 Claims**



1. A helmet comprising
a plurality of foamed plastic shell parts,
plate-like sections integrated within the foamed plastic shell parts interconnecting in an articulated manner the individual shell parts, and
at least several shell parts being connected to a regulatable adjusting system for producing a usable shape of the helmet from an approximately flat configuration.

OL 126
SS 1
MY 7 1991
UMI

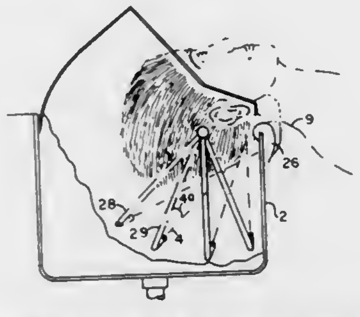
### 5,012,534
### AUTOMATIC HAIR AND SCALP TREATMENT MACHINES

**Ronnie W. McWhorter, Nashville, Tenn., assignor to IHT, Inc., Nashville, Tenn.**

**Filed Apr. 5, 1990, Ser. No. 504,845**

**Int. Cl.$^5$ A45D** *19/10*

**U.S. Cl. 4—519** **3 Claims**



1. In the apparatus for use in applying hair and scalp treating solutions to the human head, which includes a bowl having a front wall, a closure therefor adapted to enclose the head with the face outside the closure and the base of the neck on top of the front bowl wall, an arcuate header including an upper and a lower spray manifold adapted to oscillate in an arc from a point where said upper manifold is located opposite the forehead to a point where said lower manifold is located adjacent the bowl front, means imparting partial rotation to the arcuate header to effect said oscillatory movement, a plurality of nozzles disposed on each manifold to dispense adjacent pressurized sprays of treating solutions against the head, means for contacting the neck area with sprays wherein at least one nozzle on the lower manifold is disposed at an angle of inclination away from the upper manifold with respect to the plane in which the lower arcuate manifold lies, wherein the angle of inclination is so correlated with the slope of the front bowl wall that throughout the third of the arc through which the lower manifold oscillates ahead of the front of the bowl spray therefrom is deflected off of the front bowl wall, impinging on the back of the head above and below the hairline, driving the hair away from the front bowl wall, and separating strands of hair which previously clung to the front bowl wall.

---

### 5,012,535
### WHIRLPOOL TUB WITH AUTOMATIC PRE-FLUSHING OF THE SYSTEM

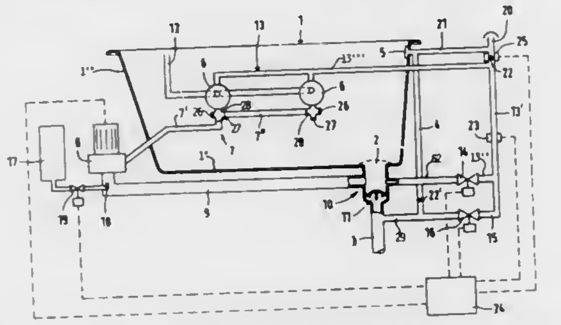
**Manfred Klotzbach, Düren, Fed. Rep. of Germany, assignor to Hoesch Metall & Kunststoffwerk GmbH & Co., Kreuzau-Schneidhausen, Fed. Rep. of Germany**

**Division of Ser. No. 284,546, Dec. 15, 1988, Pat. No. 4,901,926. This application Nov. 30, 1989, Ser. No. 443,204**

**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1987, 3742432**

**Int. Cl.$^5$ A61H** *33/02*

**U.S. Cl. 4—541** **11 Claims**



1. In a tub including a fluid system having a pump including a suction side and a pressure side; at least one nozzle for introducing a water-and-air mixture into the interior of the tub; the nozzle having a nozzle portion in communication with the pump; a pressure line connecting the pressure side of the pump with the nozzle; a suction opening provided in a bottom region of said tub; a closable tub drain fitting connected to the suction opening; and a suction line connecting the suction side of the pump with the suction opening; the improvement comprising:

- (a) valve means provided in the portion of the nozzle in communication with the pump for cutting off fluid flow from the pump through the nozzle; said valve means being accessible from the interior of the tub;
- (b) an overflow line having a closable vent opening; said overflow line being coupled to the suction side of the pump;
- (c) means for selectively allowing or blocking fluid communication between said overflow line and the suction line of the pump; and
- (d) supply means for introducing a cleaning agent at a location upstream of said nozzle as viewed in a direction of fluid flow therethrough.

---

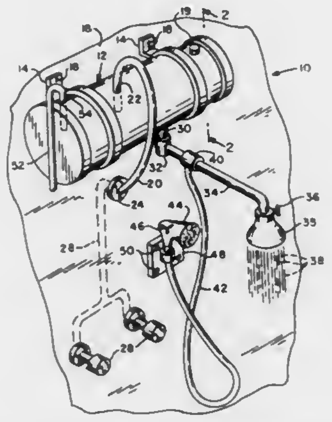
### 5,012,536
### ECONOMIC SHOWER

**Antolin Rivera, HC 71 Box 2031, Naranjito**

**Filed Sep. 1, 1989, Ser. No. 401,934**

**Int. Cl.$^5$ A47K** *3/22*

U.S. Cl. 4—605 3 Claims



1. A shower unit for use in a building provided with hot and cold water sources;

a shower unit, comprising,

- (a) a buffer reservoir tank, for storage of mixed hot and cold water travelling under pressure from the hot and cold water sources of the building;
- (b) mounting straps on said buffer reservoir tank adapted to be secured by fasteners to a wall of said building;
- (c) an input pipe having one end received and secured in said buffer reservoir tank, for transmitting mixed hot and cold water from the building water sources;
- (d) a mixer pipe having one end coupled to the other end of said input pipe and an opposite end adapted to be coupled to hot and cold water control valves of the building water sources;
- (e) a water overflow pipe secured to a top portion of one end of said buffer reservoir tank and depending downwardly from said reservoir tank, for indicating to the user that said buffer reservoir is full; and
- (f) an output pipe having one end secured to a lower portion of said buffer reservoir tank, for gravity feed of mixed water from said buffer reservoir tank and a shower head secured to an opposite end of said output pipe and having shut-off valve means whereby the buffer reservoir tank will store sufficient water from the hot and cold water sources of the building at a desired temperature so as to act as a buffer, preventing sudden temperature variations in the water fed to the shower head in the event of sudden changes in relative water pressures of the hot and cold water sources of the building.

---

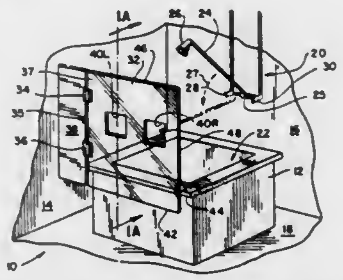
### 5,012,537
### CLEANING SHIELD

**Joanna L. Underwood, 550 Knowlton St., Waterloo, Wis. 53594**

**Filed Jun. 17, 1988, Ser. No. 208,270**

**Int. Cl.$^5$ E03C** *1/186*

**U.S. Cl. 4—658** **3 Claims**



1. In a hospital washroom or cleaning station including an open-topped commode where items such as bed pans, urine bottles and the like are cleaned, and including a generally vertical wall disposed to the rear or side of said commode, and a source of water which is pivotally mounted to said rear or side wall so as to be moveable between a raised or lowered position, apparatus comprising:

- a) a transparent member having at least two open apertures therein, said apertures being spaced adjacent from each other to accommodate the left and right arms of a person, said member having a size that is sufficiently large to shield the head and upper torso of said person; and
- b) mounting means for removably mounting said member to said pivotally mounted source of water such that said member when attached to said source of water pivots relative to said wall between said raised and said lowered position such that when said member is in said raised position, said commode is open and unshielded, and when said member is in said lowered position, said member is in a generally horizontal plane over said commode, and said commode is open and shielded whereby said person can place both arms through said apertures of said member thereby placing both hands on one side of said member so as to use both hands to clean said items in said commode while said person's head and upper torso remain on the other side of the member so that said person's head and upper torso are shielded from splashing as said items are cleaned.

---

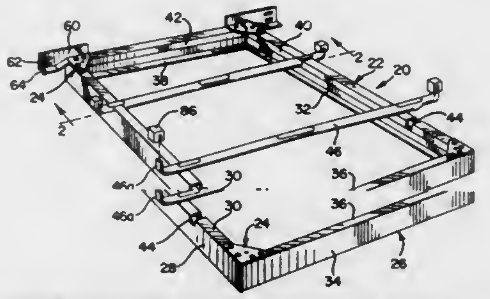
### 5,012,538
### PLATFORM BED FRAME

**Robert Timm, Park Forest, Ill., assignor to Dresher, Incorporated, Bedford, Ill.**

**Filed Oct. 31, 1989, Ser. No. 429,315**

**Int. Cl.$^5$ A47C** *19/00*

**U.S. Cl. 5—200.1** **9 Claims**



1. A platform bed frame for supporting mattress means in spaced relationship to a floor, comprising:

a pair of spaced parallel side plates, each side plate having substantially the same dimensions and including a wall portion having an upper edge and a lower edge and disposed generally vertically in relation to the floor, an upper horizontal member integral with the upper edge of the wall portion, said upper horizontal member having a given thickness dimension, and a generally horizontal foot portion integral with the lower edge of the wall portion for confronting the surface upon which the platform is situated;

a pair of longitudinally spaced end plates extending substantially transversely between said side plates, each end plate having substantially the same dimensions and including an intermediate portion having an upper edge and a lower edge and disposed generally vertically in relation to the floor, a generally horizontal upper arm portion integral with the upper edge of the intermediate portion, said upper arm portion having a given thickness dimension, and a generally horizontal lower leg portion integral with the lower edge of the intermediate portion for confronting the surface upon which said platform is situated; and

means for detachably securing each of said side plates to form a generally rectangular platform and comprising a connecting bracket having projection portions integrally formed along one face thereof, said projection portions extending outwardly from said one face by a dimension greater than the given thickness dimensions of said upper horizontal member and said upper arm portion, the ends of said side plates and end plates being provided with apertures formed therethrough, said projection portions being larger in cross-sectional dimension than its corresponding aperture so as to be in press fit engagement with such aperture when the ends of aid side plates and end plates are positioned adjacent to one another and said connecting bracket is positioned with its said major face disposed in facing relationship with the upper horizontal member of the side plate and the horizontal upper arm portion of the end plate.

---

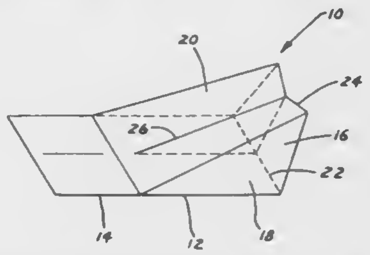
### 5,012,539
### INFLATABLE MULTI-PURPOSE MEDICAL SUPPORT PILLOW

**Ellen S. Grigg, 816 Dixie Ave., Florence, Ala. 35630**

**Filed Feb. 13, 1990, Ser. No. 479,169**

**Int. Cl.$^5$ A47C** *20/00*

**U.S. Cl. 5—431** **9 Claims**



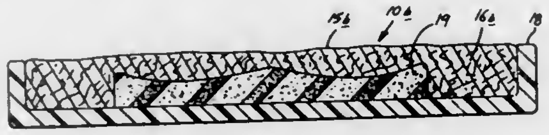
1. Inflatable multi-purpose medical support pillow comprising:

- a. a base member including a body anchor secured to one end of the base member;
- b. an end member of a trapezoidal shape secured to another end of said bottom member;
- c. a top of a trapezoidal shape and having a common edge to an edge of said end member of a trapezoidal shape;
- d. opposing side members of a triangle shape secured to sides of said base member for engaging said end member and said top member; and,
- e. an internal center support of triangular shape secured between mid-sections of said base member, said end member and said top member, said internal support being of a lessor area than any one of said side members for supporting and defining a groove along a surface of said top member whereby said groove supports and centers a body member about said groove thereby forming a crease in said pillow and supporting a body member.

OL
126
SS
1
MY
7
1991
UMI

### 5,012,540
### DISPOSABLE SHEET PROTECTIVE DEVICE

**Susan D. Hockaday, 13038 Berlin St., Poway, Calif. 92064**
**Filed Dec. 18, 1989, Ser. No. 451,631**
**Int. Cl.$^5$ A47G** *9/00;* **A61F** *13/15*
**U.S. Cl. 5—487** **2 Claims**



1. A disposable bedding protective device comprising a flexible body member including a central, elongate body defined by a predetermined width including a first leg member extending longitudinally from a first end of the body member, and a second leg member extending longitudinally from a second end of the body member, wherein the first and second leg members are longitudinally aligned with the body member, and

securement means mounted on an upper surface of the first leg member for selective securement to the second leg member, and

the body member further including a top relatively thick liquid absorbent layer, and a relatively thin liquid impermeable sheet mounted to and underlying the top layer, and

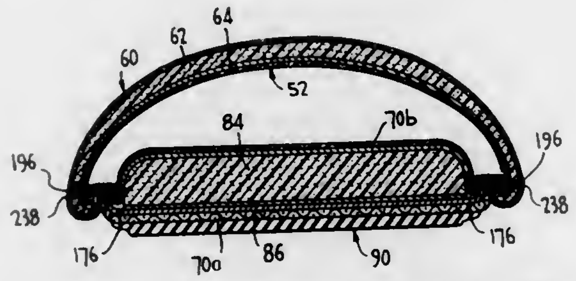
wherein the top layer is coextensively laminated to the bottom layer, and

wherein the top layer includes a foam polymeric pad mounted medially of the top layer, wherein the polymeric pad is defined by an undulating upper surface to accommodate a buttocks of an individual positioned thereon, and the sheet includes side perimeter walls extending upwardly about a perimeter defined by the top layer.

---

### 5,012,541
### SLIPPER AND METHOD OF MAKING SAME

**Michael H. Ganon, Bexley, Ohio, assignor to R. G. Barry Corporation, Pickerington, Ohio**
**Filed Jan. 27, 1989, Ser. No. 302,345**
**Int. Cl.$^5$ A43B** *1/02*
**U.S. Cl. 12—142 G** **23 Claims**

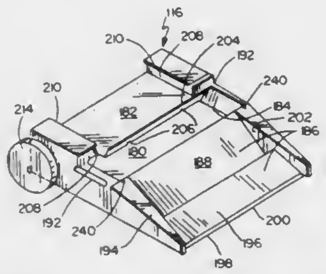


1. The method of making a slipper comprising attaching a vamp to an outsole, attaching heel portions of said outsole and vamp to a heel portion of a sock to provide a space between said outsole and said sock and leaving an opening at the toe portions of said outsole, vamp and sock, turning said attached heel portions of said outsole, vamp and sock through said opening, providing an elongated flexible filler having a length and a width and including a toe portion and a heel portion, the filler being of such a size as to substantially fill said space, said filler comprising a thick layer of foam cushioning material and a thin layer of flexible reinforcing material, providing a clamping means including a pair of elongated substantially flat clamping members, clamping said filler between said flat clamping members along a substantial portion of the length of the filler from the toe portion of the filler to a point near the heel portion thereof, inserting the clamping members and the clamped filler through said opening into said space, unclamping said filler, removing said clamping members from said space while said filler remains within and substantially fills said space, permanently closing said opening, and turning the slipper to its right side.

---

### 5,012,542
### MOPPING SYSTEM

**William R. Lynn, 38 Prospect St., Dover, N.H. 03820**
**Continuation-in-part of Ser. No. 21,339, Mar. 3, 1987, Pat. No. 4,926,515. This application Sep. 14, 1989, Ser. No. 407,445**
**Int. Cl.$^5$ A47L** *13/22, 13/52*
**U.S. Cl. 15—1** **16 Claims**



1. A scoop pan for receiving liquid and waste material from a surface being cleaned, comprising:

a ramp means extending from a ramp edge, for intimately contacting a said surface, to an opening leading to a container for receiving and containing said liquid and waste material,

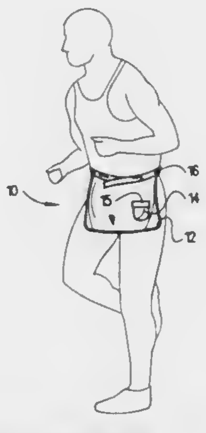
a mop contact area with means for captively engaging a cooperating mop head, said area being disposed on a side of said opening of the said container remote from said ramp means,

wherein said area is terminated adjacent said opening by a ridge extending transversely of said scoop pan and disposed for engagement by a mop head to squeeze liquid therefrom into said container.

---

### 5,012,543
### ATHLETIC TOWEL

**John Lewis, Sr., 7621 Gleason Rd., Houston, Tex. 77016**
**Filed Jul. 19, 1989, Ser. No. 381,809**
**Int. Cl.$^5$ A41D** *27/00*
**U.S. Cl. 15—209 R** **1 Claim**



1. An athletic towel, comprising:

an elongated generally rectangular fabric piece formed from an absorbent cloth material;

an elongated strap secured across a central portion of said fabric piece, said strap dividing said fabric piece into two substantially equal sized rectangular portions, said substantially equal sized rectangular portions folded in overlying relation along said strap;

cooperating hook and loop fasteners on opposite free ends of said strap for securement around an individual's waist;

at least one pocket on one of said rectangular portions of said fabric piece for carrying accessory items, said pocket disposed so as to face the body of a wearing individual so as to be hidden from view;

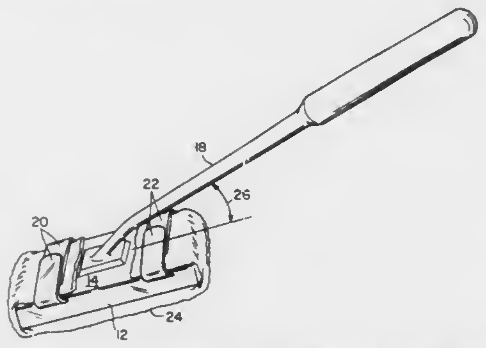
a flap closing said pocket and cooperating hook and loop fasteners on said pocket and flap for securing said pocket in a closed position; and

reflective indicia on the other one of said rectangular portions of said fabric piece providing a safety warning.

---

### 5,012,544
### MULTIPURPOSE BATHING WIPER CONSTRUCTION

**George H. Verry, 179 Monroe St., Pembroke, Mass. 02359**
**Filed Sep. 27, 1989, Ser. No. 413,247**
**Int. Cl.$^5$ A47K** *7/04*
**U.S. Cl. 15—209 R** **3 Claims**

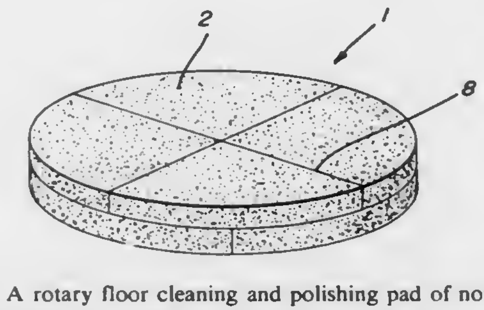


1. A wiper construction which comprises a plate having a first and a second surface, a handle secured to a central portion of said first surface of said plate, wherein the angle between said handle and said first surface of said plate is between about 15° and 45° degrees, a first strap means secured to a first end portion of said plate, a second strap means secured to a second end portion of said plate, said first and second strap means each comprising two mating strap sections comprising mating surfaces each having a multiplicity of plastic filaments extending outwardly in diverse directions and having hook like shapes at the free ends of said filaments, and said strap means adapted to secure a sheet-like washing material to said first surface of said plate and around said second surface.

---

### 5,012,545
### ROTARY CLEANING AND POLISHING PAD

**Max W. Boy, 4651 Bartow Carver Rd., Acworth, Ga. 30101**
**Filed Jan. 26, 1990, Ser. No. 470,705**
**Int. Cl.$^5$ B24B** *29/00*
**U.S. Cl. 15—230.12** **7 Claims**

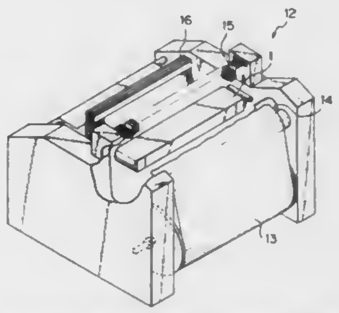


1. A rotary floor cleaning and polishing pad of nonwoven fibrous material comprising a pair of layers, each of said layers comprising multiple discrete segments, each of said segments having an outer edge and a pair of side edges, said layers being adhered in flat face contacting relation, and each segment of one layer overlying adjacent side edges in the other layer.

---

### 5,012,546
### LOOM CLEANING APPARATUS

**Syokichi Kuwabara, Kawachinagano, and Toyotoshi Yoshioka, Toyota, both of Japan, assignors to Luwa Japan Limited, Osaka, Japan**
**Filed Jul. 6, 1990, Ser. No. 549,428**
**Claims priority, application Japan, Jul. 12, 1989, 1-177886**
**Int. Cl.$^5$ D03J** *1/00*
**U.S. Cl. 15—301** **11 Claims**

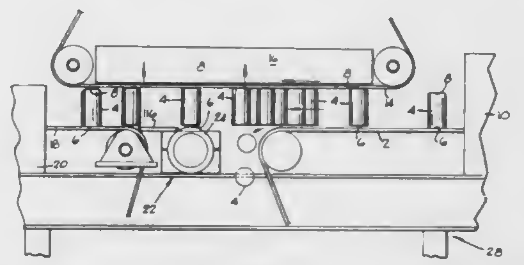


1. A loom cleaning apparatus disposed under a warp between a back beam of a loom and heddles thereof, comprising: a duct extended across the loom and having upper and lower air-permeable walls; at least one fan disposed within the duct to produce an air current flowing from an upper wall toward a lower wall of the duct; a fly collecting endless filtering belt disposed such that at least part thereof runs along an upper surface of the duct; and a fly removing device disposed contiguously with the endless filtering belt, for removing flies collected on the endless filtering belt.

---

### 5,012,547
### APPARATUS FOR REMOVING FLUID PARTICLES FROM CONTAINERS

**Ralph Z. Marsh, Golden, Colo., assignor to Adolph Coors Company, Golden, Colo.**
**Filed Nov. 27, 1989, Ser. No. 441,551**
**Int. Cl.$^5$ B08B** *5/02*
**U.S. Cl. 15—304** **17 Claims**



1. Apparatus for removing fluid particles from containers comprising:

a support frame mounted at a fixed location;

a first moving conveyor mounted on said support frame and having a plurality of containers supported thereon, wherein said containers are exiting from a washing operation and have fluid particles retained thereon;

said containers having an open end and a closed end and said open ends are in contact with said first moving conveyor;

a second moving conveyor mounted on said support frame and having a plurality of containers supported thereon for moving said containers through a processing operation

OL
126
SS
1
MY
7
1991
UMI

wherein said open ends of said containers are in contact with said second moving conveyor;

moving means mounted on said support frame for moving containers from said first moving conveyor to said second moving conveyor; and

at least one fluid removing means mounted on said support frame for removing at least a portion of said fluid particles retained on said containers during said movement of said containers from said first moving conveyor to said second moving conveyor.

---

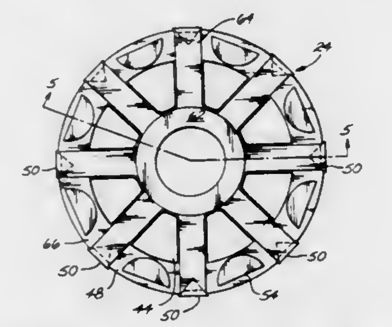
### 5,012,548
### MAGNETIC TAPE CLEANER

**Stuart W. Jeffries, Santa Clarita, Calif., assignor to Data Devices International, Chatsworth, Calif.**

**Filed Mar. 20, 1989, Ser. No. 326,030**

**Int. Cl.$^5$ A47L** *9/06*

**U.S. Cl. 15—308** **28 Claims**



1. An apparatus for cleaning magnetic tape comprising:

(a) means for transporting tape from reel to reel;

(b) a rotatable cleaning element having a plurality of hard sharp-edged inserts for cleaning scraping tape, said inserts being embedded in the circumference of a softer carrier structure;

(c) means for directing tape past the cleaning element in contact with the inserts; and

(d) means for rotating the cleaning element at a rotational speed so that the tape passing over the inserts slips relative to the element.

---

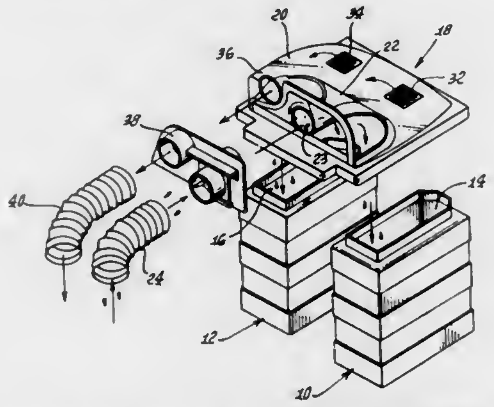
### 5,012,549
### SIDE LOADING DUAL PAIL WET VACUUM WITH FLOW DIVIDER

**William H. Williams, 4938 Golden Arrow Dr., Rancho Palos Verdes, Calif. 90274, and Paul G. Jacobs, 9958 Amestoy Ave., Northridge, Calif. 91325**

**Filed Apr. 25, 1990, Ser. No. 514,094**

**Int. Cl.$^5$ A47L** *7/00*

**U.S. Cl. 15—320** **7 Claims**



1. In a liquid vacuum extraction system comprising a reservoir for fresh cleaning solution, means including a floor tool for applying said solution to the floor, carpet or other surface to be cleaned, vacuum means for sucking up the solution and contained dirt in an air stream from the surface being cleaned; the improvement comprising:

a pair of spaced apart liquid reservoirs each having an upper open end, a common closure sealing said upper open ends, said closure including an inlet communicating with said floor tool for return air bearing cleaning water and included dirt, and an outlet communicating with said vacuum means, said inlet communicating with a flow splitter head within the closure and positioned over said liquid reservoirs whereby all of the contained liquid is separated from the air and dropped into each of said liquid reservoirs at essentially equal rates while the air passes through to said outlet.

---

### 5,012,550
### CASTER WITH BRAKE

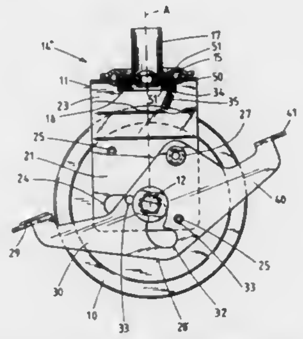
**Klaus Schlösser, Bochum, Fed. Rep. of Germany, assignor to Wicke GmbH & Co., Sprockhövel-Herzkamp, Fed. Rep. of Germany**

**Filed Aug. 15, 1990, Ser. No. 568,255**

**Claims priority, application Austria, Aug. 16, 1989, 1942/89**

**Int. Cl.$^5$ B60B** *33/00*

**U.S. Cl. 16—35 R** **18 Claims**



1. A caster for mobile scaffolds and like structures, comprising a support connectable to a mobile structure; a wheel frame having a portion adjacent said support; a bearing connecting said portion of said frame to said support for angular movement about a first axis, said frame further having two legs rigid with and extending from said portion in a direction away from said support, each of said legs having an elongated slot extending substantially transversely of said first axis; a shaft extending into and being movable in said slots substantially transversely of said first axis; a wheel mounted on said shaft for rotation between said legs about a second axis which is normal to said first axis; a brake mounted in said frame and being movable by said wheel into and from frictional engagement with said support and with said wheel in response to movement of said shaft between first and second positions relative to said frame; and means for moving said shaft between said positions.

---

### 5,012,551
### FURNITURE HINGE

**Ulrich Beneke, Bünde; Jürgen Gross, Enger; Wilfried Oepping, Kirchlengern; Manfred Schnelle, and Günter Sundermeier, both of Bünde, all of Fed. Rep. of Germany, assignors to Paul Hettich Gmbh & Co., Kirchlengern, Fed. Rep. of Germany**

**PCT No. PCT/DE88/00729, § 371 Date Aug. 15, 1989, § 102(e) Date Aug. 15, 1989, PCT Pub. No. WO89/05388, PCT Pub. Date Jun. 15, 1989**

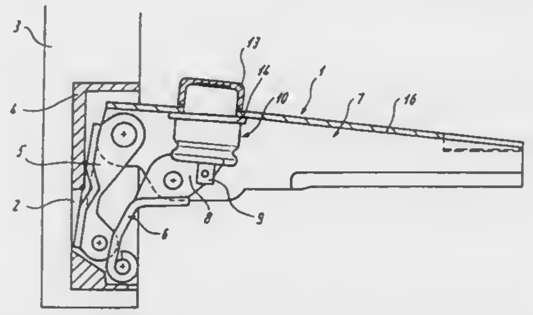
**PCT Filed Nov. 25, 1988, Ser. No. 415,268**

**Claims priority, application Fed. Rep. of Germany, Dec. 9, 1987, 3741712**

**Int. Cl.$^5$ E05F** *3/00*

**U.S. Cl. 16—49** **38 Claims**

1. A hinge for an item of furniture having a main structure and a closure for the main structure, comprising a first hinge component mountable on the main structure; a second hinge component mountable on the closure; and a damping device located in one of said first and second hinge components connecting said first and second components, said damping device including a housing defining at least a portion of the exterior of said damping device having a compartment, a partition in said compartment dividing the latter into first and second chambers, a body of hydraulic fluid in said compartment, and means for transferring said fluid between said chambers, said housing including an elastically deformable housing part.



---

### 5,012,552
### BLIND AND CARRIER FOR VERTICAL SLATS AND/OR CURTAINS

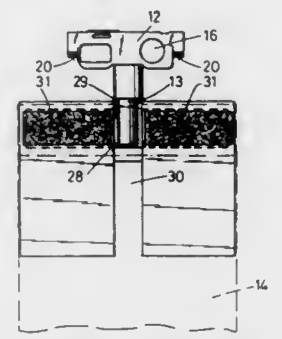
**Hubert J. Wulf, deceased, late of Aschendorf, Fed. Rep. of Germany by Maria A. Wulf, nee Bothorn, heiress , assignor to Riloga-Werk Julius Schmidt GmbH & Co. KG., Remscheid, Fed. Rep. of Germany**

**Filed Dec. 1, 1989, Ser. No. 444,545**

**Claims priority, application Fed. Rep. of Germany, Jan. 10, 1989, 3900465**

**Int. Cl.$^5$ A47H** *13/00*

**U.S. Cl. 16—87.4 R** **18 Claims**



1. A blind comprising an elongated support; a row of carriers provided on said support and arranged to support the upper end portions of discrete substantially vertical slats; and curtain holding means provided on said carriers for supporting a discrete curtain independently of the slats.

---

### 5,012,553
### LIGHTWEIGHT HANDLE

**James S. Hardigg, South Deerfield, and Stanley W. Lewandowski, Jr., Buckland, both of Mass., assignors to Hardigg Industries, Inc., South Deerfield, Mass.**

**Filed Jul. 11, 1989, Ser. No. 378,266**

**Int. Cl.$^5$ A47B** *95/02*

**U.S. Cl. 16—126** **30 Claims**

1. A lightweight handle for lifting and transporting a heavy-duty container, comprising:

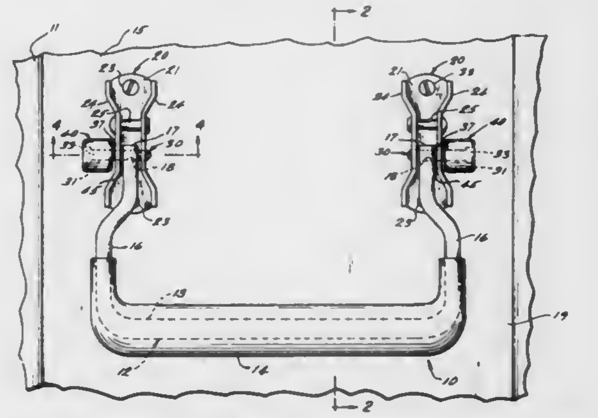
a shank member having a hand-grip portion and a pair of pivoting arm members extending from said hand-grip portion, said shank member capable of being pivoted between a first inoperative position and a second operative position, and being returned automatically to said first inoperative position;

a pair of bracket support members each comprising an elongated base plate and a pair of sidewalls extending therefrom;

said pivoting arm members each having a respective distal end pivotally secured to said pair of respective bracket support members;

a pair of pivot pin means each having an axis and two ends, each pivot pin means engaging at one end respective bracket support members to that said pivot pin means rotates about said pin axis, said one end of each pivot pin means fixedly engaged with respective distal ends of said arm members so that said shank member can pivot with respect to said bracket support members, and said other end of said pivot pin means located remotely from said bracket support members; and,

spring means having two distal ends, one of said distal ends of said spring means engaging said bracket support members, the other of said distal ends of said spring means rotatable with said pivot means at said remote end, whereby said spring means will be wound up as said shank member is pivoted from said first inoperative position into said second operative position and, upon release of said shank member from said second operative position, said spring means will bias said shank member into said first inoperative position.



---

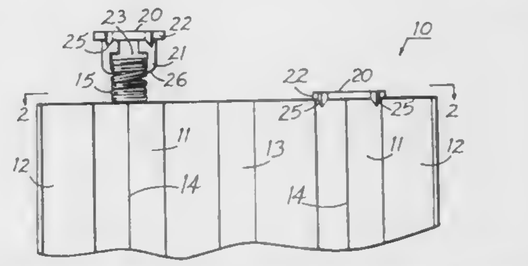
### 5,012,554
### AUTOMATIC ANCHORING SYSTEM FOR WINDOW SPRING

**Brian S. Dense, Rochester, N.Y., assignor to Caldwell Manufacturing Company, Rochester, N.Y.**

**Filed Oct. 17, 1989, Ser. No. 422,754**

**Int. Cl.$^5$ E05D** *13/00;* **E05F** *1/00*

**U.S. Cl. 16—197** **16 Claims**



1. An automatic anchoring system for retaining a window spring on an upper end of a jamb liner spring cover that is generally D-shaped in cross section, said anchoring system comprising:

a. a top clip with a body sized for fitting inside said spring

OL
126
SS
1
MY
7
1991
UMI

cover and connected to an upper region of said spring so that said body extends above a top end of said spring around an axis of said spring;
b. a lower region of said body having a rounded nose extending around said spring;
c. an upper region of said body having a flange extending radially outward far enough to overlap with said upper end of said spring cover so that said flange cannot move downward below said upper end of said spring cover;
d. said top clip and said spring being free to move upward above said upper end of said spring cover, and said rounded nose being positioned for guiding said body into said upper end of said spring cover as said body and said spring move downward into said spring cover; and
e. a plurality of retainer tangs spaced around an outer periphery of said flange and extending downward from said flange so that at least two of said tangs fit over an outside surface of said spring cover when said flange moves down into engagement with said upper end of said spring cover in any of a plurality of angular orientations.

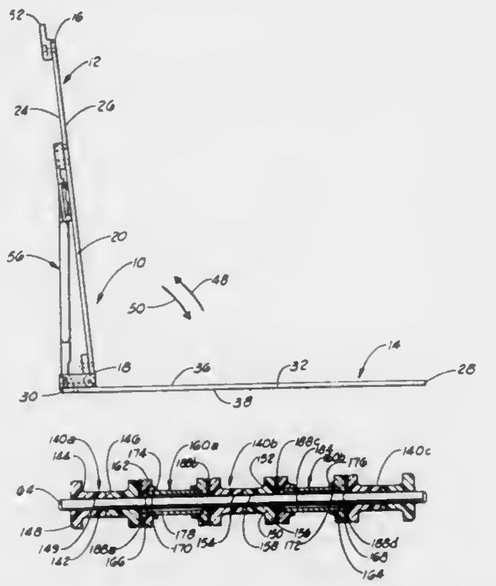
5. A method of automatically anchoring a window spring in a jamb liner spring cover that is generally D-shaped in cross section, said method comprising:
a. attaching a top clip to an upper region of said spring so that said top clip extends above an upper end of said spring;
b. lowering said spring and said top clip downward into said spring cover from above an upper end of said spring cover so that said top clip guides into an inside of said spring cover and a radially extending flange of said top clip seats against said upper end of said spring cover with retainer tangs extending downward from a perimeter of said flange to fit around an outside of said spring cover in any of a plurality of angular orientations of said top clip relative to said spring cover;
c. leaving said spring and said top clip free to snap upward above said upper end of said spring cover if said spring is snapped loose; and
d. reseating said top clip flange against said upper end of said spring cover by moving said spring and said top clip downward from a snapped up position above said upper end of said spring cover.

---

## 5,012,555
## KIT FOR MAKING A PHOTOTOOL

**Thomas L. Byers, 5840 Stewart Dr., Mustang, Okla. 73064**
**Filed Sep. 28, 1988, Ser. No. 250,706**
**The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.**
**Int. Cl.$^5$ E05D *11/08***
**U.S. Cl. 16—342** **16 Claims**

1. A kit for connecting a first member to a second member so the first and second members are hingedly movable with substantially no movement in the axial or radial directions, comprising:
a first hinge plate having a portion connectable to the second member;
a second hinge plate having a portion connectable to the first member;
a hinge shaft for connecting the first hinge plate to the second hinge plate;
first means connected to the first hinge plate and having a portion engaging the hinge shaft so that the hinge shaft substantially is not rotatable within said first means and so that the hinge shaft substantially is not movable in said first means in axial or radial directions relative to the hinge shaft comprising:
at least one first protrusion, each first protrusion having one end connected to the first hinge plate and each first protrusion extending a distance from the first hinge plate and terminating with an opposite end, each first protrusion having a first side and a second side and an opening extending therethrough intersecting the first and the second sides, the first protrusions being spaced a distance apart on the first hinge plate;
at least one non-rotating insert, each non-rotating insert being insertable generally through the opening formed in one of the first protrusions and each non-rotating insert having an opening extending therethrough, each opening in the non-rotating inserts having a diameter about the same size as the diameter of the hinge shaft and the opening in each non-rotating insert being sized to receive a portion of the hinge shaft extending therethrough with an interference fit being established between the non-rotating insert and the hinge shaft, the hinge shaft being substantially non-rotatable within said opening in the non-rotating inserts and the interference fit being established between the non-rotating inserts and the hinge shaft, comprising:
a first insert having a first end and a second end and an opening extending therethrough an intersecting the first and the second ends thereof and a cap being formed on the first end of the first insert, each first insert being insertable through the opening in one of the first protrusions connected to the first hinge plate and extending a distance therein to a position wherein the cap on the first insert generally abuts the first side of the first protrusion; and

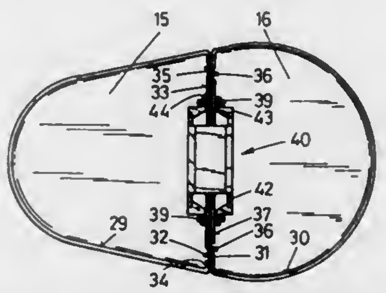


a second insert having a first end and a second end with an opening extending therethrough intersecting the first and the second ends thereof, each second insert being insertable through the opening in one of the first protrusions connected to the first hinge plate to a position wherein the cap on the second insert abuts the second side of the first protrusion and the second insert extends a distance through the opening in the first protrusion to a position wherein the second end of the second insert is disposed generally near the second end of the first insert and the openings through the first and the second inserts are generally aligned, the openings through the first and the second inserts each having a diameter about the same size as the diameter of the hinge shaft to establish the interference fit between each of the non-rotating inserts and the hinge shaft;
second means connected to the second hinge plate and having a portion engaging to the hinge shaft so that the second hinge plate substantially is not movable in axial or radial directions and so a minimum contact surface area exists generally between said second means and the hinge shaft for permitting rotation of said second means and the second hinge plate connected thereto generally about the hinge shaft, the hinge shaft extending through the first means connected to the first hinge plate and through the second means connected to the second hinge plate for connecting the first hinge plate to the second hinge plate comprising:
at least one second protrusion connected to the second hinge plate, each second protrusion having one end connected to the second hinge plate and extending a distance therefrom terminating with the opposite end and each second protrusion having a first side and a second side, each second protrusion being insertable generally between two adjacent spaced apart first protrusions connected to the first hinge plate and each second protrusion having an opening extending therethrough intersecting the first and the second sides thereof; and
at least one rotating insert, each rotating insert being insertable generally within the opening in one of the second protrusions connected to the second hinge plate and each rotating insert having an opening extending therethrough sized to receive a portion of the hinge shaft, the opening in each rotating insert having a diameter substantially the same size as the diameter of the hinge shaft so the hinge shaft substantially is non-movable in the opening and the interference fit being established between each of the rotating inserts and the hinge shaft and a surface area formed by the opening in the rotating insert defining the area of minimum contract.

---

## 5,012,556
## HINGE FOR COVERS IN MACHINES FOR MAXING HOT BEVERAGES

**Hans-Jürgen Precht, and Rudolf Maass, both of Solingen, Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany**
**Filed May 5, 1989, Ser. No. 348,300**
**Claims priority, application Fed. Rep. of Germany, May 18, 1988, 3816816**
**Int. Cl.$^5$ E05D *3/06***
**U.S. Cl. 16—366** **15 Claims**

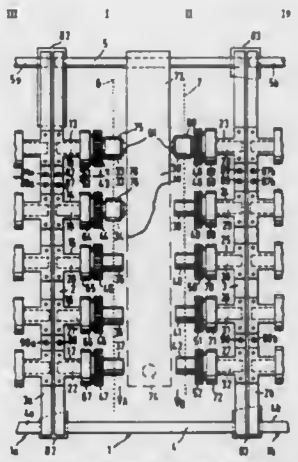


1. In a machine for brewing hot beverages, the combination of a housing; at least one liquid-receiving component on said housing; a first and second covers disposed above said component, said covers having neighboring portions defining a clearance; a hinge articulately connecting said covers to each other for movement of each cover between a substantially horizontal first position in which the covers overlie said component and a second position in which one of the covers overlie the other cover, said covers having inner sides confronting said component in the first positions of the covers and outer sides opposite the respective inner sides, said hinge being disposed at said inner sides and comprising a carrier extending across said clearance, first coupling means provided on said portions of said covers and second coupling means provided on said carrier, one of said coupling means including pintles and the other of said coupling means including sockets for said pintles; and means for preventing movements of said covers with reference to each other in the longitudinal direction of said clearance, said covers further comprising marginal rims at said inner sides thereof and said preventing means including a portion of at least one of said rims, said portion of at least one of said covers having a recess which receives a portion of the rim of the other cover in the first positions of said covers.

---

## 5,012,557
## DRAFTING UNIT WITH DETACHABLY MOUNTED SUPPORT COMPONENTS FOR BOTTOM ROLLERS

**Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7347 Bad Uberkingen, and Hans Stahlecker, Haldenstrasse 20, 7334 Sussen, both of Fed. Rep. of Germany**
**Filed Jan. 31, 1990, Ser. No. 473,160**
**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1989, 3904348**
**Int. Cl.$^5$ D01H *5/74***
**U.S. Cl. 19—258** **16 Claims**

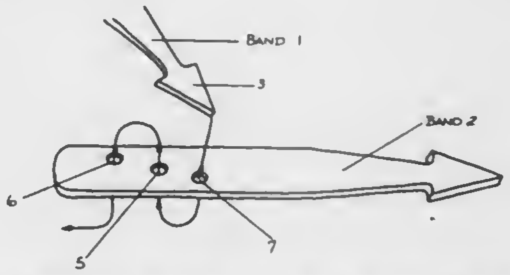


1. A drafting unit for a spinning machine comprising:
a plurality of bottom rollers supported on one end portion of bottom roller shafts, said bottom rollers being in driving connection with respective drive shafts extending through in a longitudinal direction of the machine,
and bottom roller shaft support components bearingly supporting the bottom roller shafts at an end thereof opposite the bottom rollers, said support components being detachably mounted at a machine frame accommodating the drive shafts, whereby said bottom rollers and support components can be readily detached for servicing operations without disturbing the drive shafts.

---

## 5,012,558
## REUSEABLE, MULTI-PURPOSE, EASY RELEASE PRESSURE BAND

**Henry D. Willoughby, 331 Long Dr., Pittsburgh, Pa. 15241**
**Filed Feb. 5, 1990, Ser. No. 475,346**
**Int. Cl.$^5$ B65D *63/00***
**U.S. Cl. 24—16 PB** **4 Claims**



1. A band for wrapping tightly about an object in self fastened relationship thereto, comprising a flat strip of elastic

OL
126
SS
1
MY
7
1991
UMI

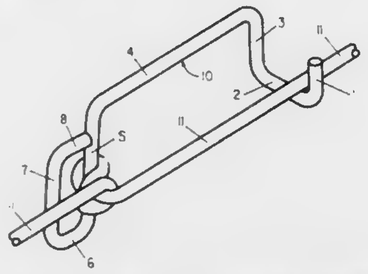
material having a tail end and an arrow shaped head end terminating in a neck portion, and a hole adjacent said tail end of a size to enable said arrow shaped head to be extended therethrough when said end is stretched longitudinally, together with hole means adjacent said tail end is stretched longitudinally staggered relationship to said hole and of a size through which said arrow shaped head may be extended when said tail end is stretched to enable two bands to be locked together end-to-end, said hole means comprising two holes each of which is longitudinally offset relatively on opposite sides of said hole adjacent said tail end and which are of sufficient size that when said tail end is stretched, the arrow shaped end of a joined band will fit said hole adjacent said tail end as well as said two holes.

---

**5,012,559**

## ROPE TIGHTENER

**Matt W. Flannery, 310 Berry Ave., Ashland, Ky. 41101**
**Filed Dec. 15, 1989, Ser. No. 451,136**
**Int. Cl.$^5$ A44B** *21/00*
U.S. Cl. 24—71.3 **2 Claims**



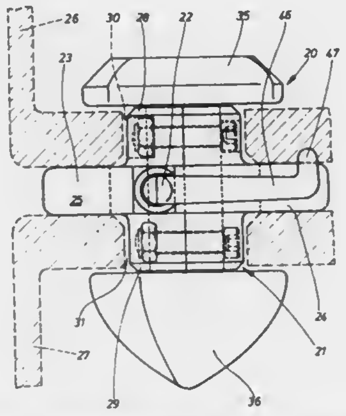
1. A rope tightening device containing an elongated cylindrical body and a rectangular shaped closed loop which is formed integrally with one end of said elongated cylindrical body and is turned downward from said elongated cylindrical body and has the long sides of the said rectangular shaped closed loop more or less perpendicular to said elongated cylindrical body and all four sides of said rectangular shaped closed loop are in a common vertical plane with said elongated cylindrical body, and the other end of said elongated cylindrical body has an integrally formed hook which is turned downward from said elongated cylindrical body and is more or less perpendicular to said elongated cylindrical body, the three sides of said hook are in a common vertical plane which is more or less perpendicular to the common vertical plane containing said elongated cylindrical body and the four sides of said rectangular shaped closed loop, the side of said hook which joins said elongated cylindrical body is located in both of said vertical planes; a rope which has been threaded through the eye of said rectangular shaped closed loop and is secured on both ends will be forceably twisted around one of the long sides of said rectangular shaped closed loop for one wrap and then around its own body for all other wraps to draw said rope taut when said rope tightening device is rotated in a plane adjacent to and parallel with the path of said rope, said hook prevents reverse rotation of said rope tightening device when it is hooked around said rope drawn taut by rotating said rope tightening device in a plane adjacent to and parallel with the path of said rope; the said rectangular shaped closed loop may be opened slightly at the point where the loop is closed to give an access opening wherein a rope which is already secured on both ends can be slidingly engaged by said rope tightening device; said rope tightening device can be formed as described to work with any size rope, line, or cord.

---

**5,012,560**

## COUPLING PIECE AND A METHOD FOR CONNECTING CONTAINERS

**Thomas Janke, Bremen, and Johannes Wielenberg, Oyten-Bassen, both of Fed. Rep. of Germany, assignors to Conver-OSR Ozean Service-Reparatur-Ingenieurtechnik GmbH, Bremen, United Kingdom**
**Filed Mar. 9, 1989, Ser. No. 321,150**
**Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 8809688[U]**
**Int. Cl.$^5$ B65D** *21/02*
U.S. Cl. 24—287 **21 Claims**



1. A coupling piece for releasably connecting adjacent containers, comprising:
a housing:
a rotatable locking bolt positioned within the housing and having a longitudinal axis, said locking bolt including a crossbar located at each end thereof;
a rotatable actuating lever including a central axle portion mounted in the housing, said central axle portion having a longitudinal axis that is transverse with respect to the longitudinal axis of the locking bolt, said actuating lever being rotatable about the longitudinal axis of the axial portion;
spring means connected to said locking bolt for normally urging said locking bolt in a locking direction, said locking bolt being engaged by a portion of said actuating lever so that upon rotation of the actuating lever in a first direction about the longitudinal axis of the axle portion, said locking bolt is rotated in a releasing direction which is opposite to said locking direction to rotate said crossbars from the locking position to a releasing position.

---

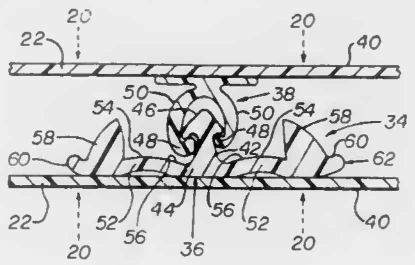
**5,012,561**

## CLOSURE FOR RECLOSABLE THERMOPLASTIC CONTAINERS

**Jose Porcbia, Midland; John O. McCree, Saginaw, and Brian C. Dais, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**
**Filed May 18, 1990, Ser. No. 525,937**
**Int. Cl.$^5$ B65D** *33/24*
U.S. Cl. 24—576 **10 Claims**

1. A closure for reclosable plastic containers which comprises:
oppositely disposed male and female closure elements having interlocking extremities; and
raised portion guiding means for guiding each of the extremities of a closure element which are suited for interlocking

engagement with an extremity of an oppositely disposed closure element toward such an interlocking engagement when deforming compressive force is applied to the elements.

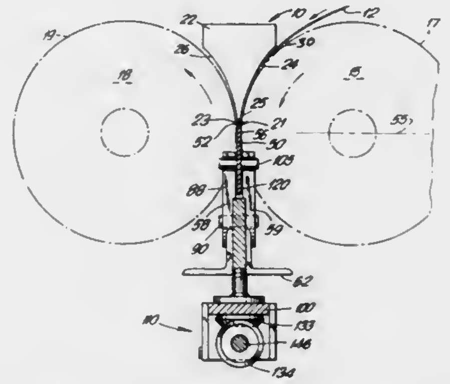


---

**5,012,562**

## COMPRESSIVE SHRINKING APPARATUS UTILIZING AN IMPROVED IMPACT BLADE FOR THE SHRINKING OF FABRIC

**Frank Catallo, 75 Channel Dr., Port Washington, N.Y. 11050**
**Filed Mar. 26, 1990, Ser. No. 498,537**
**Int. Cl.$^5$ D06C** *21/00*
U.S. Cl. 26—18.6 **16 Claims**



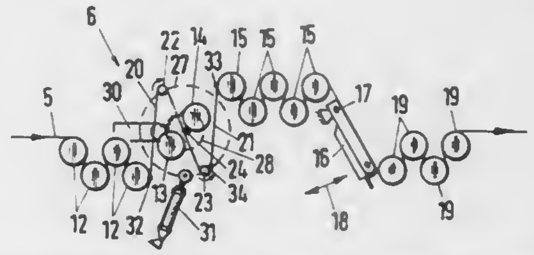
1. An apparatus for the compressive treatment of a fibrous material comprising:
(a) a movable surface,
(b) means for moving said movable surface in a predetermined direction and at a predetermined rate of speed,
(c) a confining means for said apparatus spaced from said movable surface and functioning with same to form a compaction chamber into which said fibrous material is adapted to be moved by the movable surface and from which the fibrous material is adapted to be moved by said apparatus,
(d) an impact blade extending into said compaction chamber for facilitating the compression of said fibrous web,
(e) said impact blade of a predetermined length; and
(f) said impact blade being provided with a surface for contacting the fibrous web perpendicular to the vertical axis of the blade and said contacting surface being flat.

---

**5,012,563**

## STRETCHING ARRANGEMENT FOR STRETCHING OF PLASTIC THREADS

**Bodgan Bogucki-Land, Offenbach, Fed. Rep. of Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Obertshausen, Fed. Rep. of Germany**
**Filed Mar. 21, 1990, Ser. No. 496,785**
**Claims priority, application Fed. Rep. of Germany, Mar. 22, 1989, 3909348**
**Int. Cl.$^5$ D02J** *1/22;* **D03H** *3/00*
U.S. Cl. 28—172.1 **15 Claims**



1. Arrangement for the stretching and warping of synthetic warp threads under the influence of heat comprising:
a feed roller means for driving said warp threads,
a take off roller means for driving said warp threads received from said feed roller means, said take off roller means having a higher circumferential speed than the said feed roller means,
at least two deflection rollers rotatable about their longitudinal axes, of which at least one roller is heatable,
means coupled to said heatable roller for providing heat thereto,
at least two auxiliary rollers rotatable about their longitudinal axes wherein a feed segment of the thread extends from the feed roller means the deflection roller proximate thereto and
a take off segment of the threads extends from the deflection roller proximate thereto, to the take off roller means,
wherein one of said auxiliary rollers is moveable against the side of the threads on the feed section contactable by the deflection roller proximate to the feed rollers and another auxiliary roller is moveable against the side of the thread of the takeoff segment contactable by the deflection roller proximate to the take off rollers whereby the threads are liftable from the deflection rollers.

---

**5,012,564**

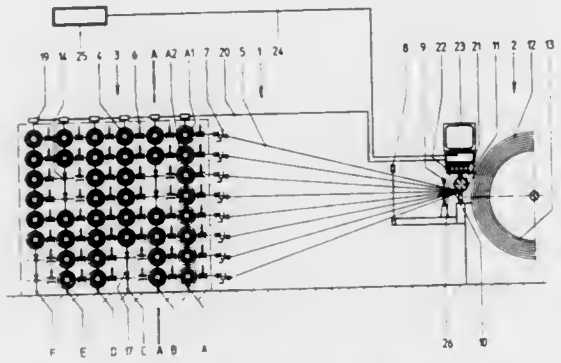
## METHOD AND APPARATUS FOR LOADING THE BOBBIN CREEL OF A WINDING INSTALLATION

**Fabrizio Gironi, Prato, Italy; Jakob Iten, Oberuzwil, Switzerland; Gerhard Koslowski, Uzwil, Switzerland, and Willy Probst, Gossau, Switzerland, assignors to Benninger AG, Uzwil, Switzerland**
**PCT No. PCT/CH89/00023, § 371 Date Oct. 16, 1988, § 102(e) Date Oct. 16, 1988, PCT Pub. No. WO89/07671, PCT Pub. Date Aug. 24, 1989**
**PCT Filed Feb. 13, 1989, Ser. No. 427,094**
**Claims priority, application Italy, Feb. 17, 1988, 9331 A/88**
**Int. Cl.$^5$ D02H** *1/00*
U.S. Cl. 28—193 **17 Claims**

1. A method of loading a bobbin creel (3) of a warping installation having a plurality of mounting devices (14) for supporting bobbins (4) of different kinds comprising steps of
determining an overall fitting pattern for an arrangement of the bobbins at the bobbin creel on a basis of a desired repeat pattern in a yarn array (10) to be wound,
storing the fitting pattern in a control means (21) forming output signals for sequentially identifying, fitting patterns of bobbins of each said different kind, and
loading the bobbin creel with all bobbins of the different

OL
126
SS
1
MY
7
1991
UMI

kind, during a respective signal sequence and repeating the preceding two steps until all signal sequences have taken place and all the different kinds of bobbins are arranged in the fitting pattern.

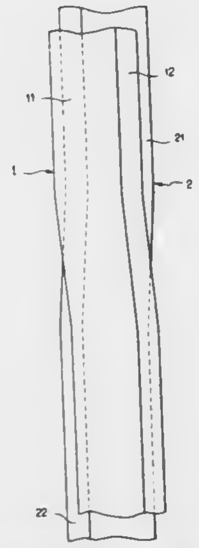


---

**5,012,565**

### METHOD FOR THE MANUFACTURE OF LAYERED CAPACITORS HAVING A THICKNESS OF INACTIVE LAYERS

**Robert Gillet, Seurre, France, assignor to Compagnie Europeenne de Composants Electroniques LCC, Courbevoie, France**
**Filed Dec. 21, 1989, Ser. No. 454,207**
**Claims priority, application France, Dec. 23, 1988, 88 17086**
**Int. Cl.$^5$ H01G** *4/30*
**U.S. Cl. 29—25.42** **3 Claims**



**1.** A method for manufacturing capacitors from two overlying strips, each strip having a layer of dielectric film contacting a conductive foil along a lateral edge;

winding a plurality of turns of the overlying strips to form a wound body to provide a mother capacitor from which stacked capacitors are formed, edges of the conductive foil being exposed at respective axial ends of the wound body;

during winding periodically laterally displacing one strip relative to the other to relocate the lateral edges of each strip relative to the other such that winding turns formed during the displacement have no exposed foil edges; and

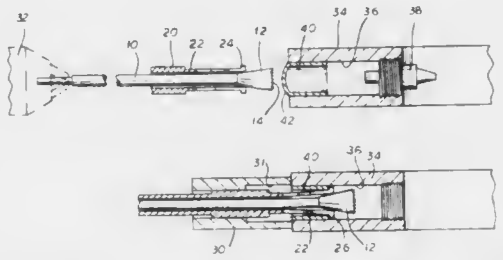
metallizing the axial ends of the wound body to form electrodes by electrically connecting the exposed edges of the conductive foil, electrical connection not occurring along the lateral edges of the displaced strips which form a thickness of inactive layers.

---

**5,012,566**

### DRILLING AND EXPANDING TOOL FOR REMOVING CARBURETOR SEAL PLUGS

**Carl R. Getz, Jr., RD #1, Box 397, Nanty Glo, Pa. 15943**
**Filed Nov. 6, 1989, Ser. No. 430,432**
**Int. Cl.$^5$ B23P** *19/04*
**U.S. Cl. 29—265** **7 Claims**



**1.** A tool for removing a hollow seal plug having a face cap from the end of a borehole for an air-jet valve in a carburetor baseplate, comprising

a drill bit means having a cutting face thereon for removing said face cap and said seal plug,

expansion means separate from said drill bit means for engaging a portion of said seal plug within said borehole, and

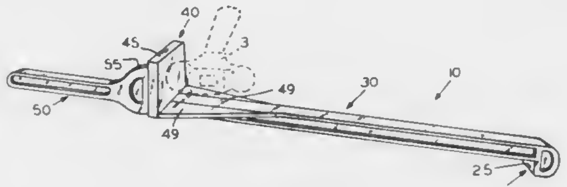
camming means on said drill bit means separate and opposite from said cutting face for engaging and expanding said expansion means to thereby remove said seal plug from said borehole.

---

**5,012,567**

### IMPACT TOOL

**Steven F. Hill, P.O. Box 15, Mt. Vernon, Oreg. 97865**
**Filed Aug. 28, 1989, Ser. No. 398,947**
**Int. Cl.$^5$ B25B** *27/00;* **B25D** *17/06*
**U.S. Cl. 29—275** **7 Claims**



**1.** A hand held impact tool comprising:

an elongated shank having a first end and a second end;

a first impact member affixed to the first end of said shank, said first impact member provided with a substantially planar impact face offset substantially perpendicular in only one direction to the longitudinal axis of said shank and facing the second end of said shank; and

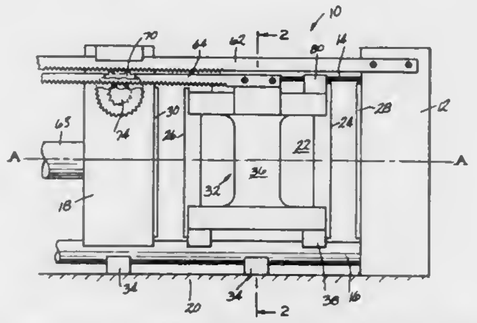
a second impact member affixed to the second end of said shank said second impact member provided with a substantially planar impact face offset substantially perpendicular to the longitudinal axis of said shank in an opposing lateral direction from said face of said first impact member and facing the first end of said shank so that an impact on one of said faces by a hand swung hammer pulls the opposing impact face in the same direction as the face impacted.

---

**5,012,568**

### METHOD FOR INSTALLING AND REPLACING PARTS IN AN INJECTION MOLDING MACHINE

**John DiSimone, Woodbridge; Paul Brown, Orangeville, and Christopher Huntington, Everett, all of Canada, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada**
**Division of Ser. No. 274,469, Nov. 18, 1988, Pat. No. 4,929,166. This application Dec. 26, 1989, Ser. No. 457,188**
**Int. Cl.$^5$ B23P** *19/04*
**U.S. Cl. 29—402.08** **7 Claims**



**1.** A method for installing and replacing a stack mold in an injection molding machine having a stationary platen, upper and lower tiebars extending from said stationary platen, and an outer platen movable along said tiebars, said method comprising:

providing first and second frame members each having shoes on upper and lower surfaces for contacting respective surfaces of said upper and lower tiebars and means for engaging and retaining said stack mold;

placing said first frame member between a first upper tiebar and a first lower tiebar and said second frame member between a second upper tiebar and a second lower tiebar;

installing wedge blocks on each said frame member to retain each said upper shoe in contact with its respective upper tiebar; and

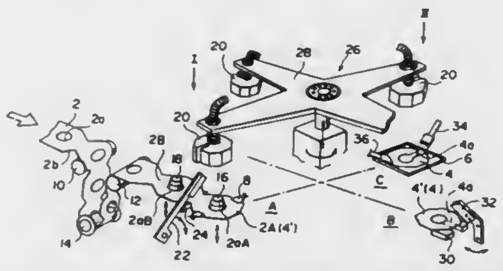
mounting said stack mold to said frame members.

---

**5,012,569**

### METHOD OF ASSEMBLING MAGNETIC DISK CARTRIDGE

**Akira Mizuta, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
**Filed Dec. 15, 1989, Ser. No. 450,982**
**Claims priority, application Japan, Dec. 16, 1988, 63-317758**
**Int. Cl.$^5$ B23P** *17/00*
**U.S. Cl. 29—417** **1 Claim**



**1.** A method of assembling a magnetic disk cartridge in which a liner material strip having a plurality of circular openings arranged in a row at predetermined intervals is fed intermittently in the direction of the row of the openings and cut to predetermined lengths in synchronization with the intermittent feed, thereby forming liners each having one of said circular openings, and each of the liners is incorporated in a predetermined position in a shell, wherein the improvement comprises the steps of

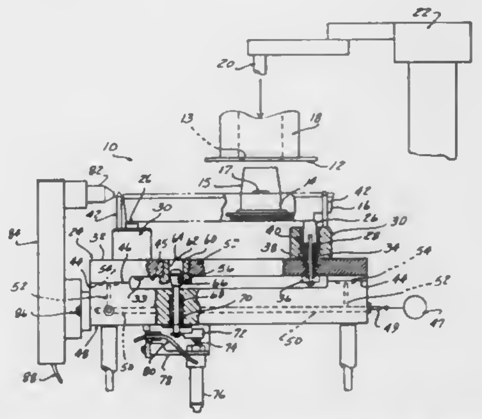
inserting a locator pin which is smaller in diameter than each of said circular openings and which has an arcuate locating side wall portion the radius of curvature of which is substantially equal to that of each of said openings into a frontmost one of said openings so that the locating side wall portion is opposed to a front edge of said frontmost one of said openings when the liner material strip is stopped; pulling the liner material strip in the direction opposite to the direction of the intermittent feed of the liner material strip so that the front edge of said frontmost one of said openings is brought into contact with the locating side wall portion of the locator pin; and cutting a leading end portion of the liner material strip to a predetermined length with the front edge of said frontmost one of said openings which is kept in contact with the locating side wall portion of the locator pin, thereby forming each of the liners.

---

**5,012,570**

### METHOD FOR ROBOT ASSEMBLY OF COMPUTER HARD DISC ONTO A SPINDLE

**Robert G. Hoskins, Batavia, and Steve P. Johns, Rochester, both of N.Y., assignors to Ambac Automation Corp., Carrollton, Tex.**
**Filed May 1, 1989, Ser. No. 346,052**
**Int. Cl.$^5$ B23Q** *3/155*
**U.S. Cl. 29—467** **3 Claims**



**1.** A method for robot assembly of computer hard discs **(12)** onto a spindle **(14)** in which a disc opening **(13)** is fit over the spindle **(14)** and the disc **(12)** is advanced axially onto the spindle **(14)**, comprising the steps of:

positioning a homing fixture **(15)** on an upper end of said spindle **(14)** configured tapering up from the diameter of said spindle **(14)** to a diameter sufficiently smaller then that of said spindle to ensure fitting of the disc opening **(13)** thereover;

positively fixing the position of said spindle **(14)** at a fixed location in a horizontal plane;

advaning said disc **(12)** with a robot device **(22)**, therby positioning said disc **(12)** with its opening **(13)** aligned over said homing fixture **(15)** and axially advancing said disc **(12)** with said robot device **(22)** over the samller diameter of said homing fixture **(15)**;

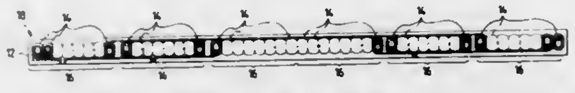
releasing said spindle **(14)** from said fixed location thereby allowing lateral movement of said spindle on said plane while supporting said spindle **(14)** on a frictionless bearing **(46, 54)** allowing substantially friction free lateral movement thereof;

contemporaneously advancing said disc **(12)** onto said spindle **(14)** to be seated thereon, with lateral movements of said spindle **(14)** accommodating misalignments between said disc opening **(13)** and said spindle **(14)**.

OL
126
SS
1
MY
7
1991
UMI

### 5,012,571
### METHOD OF MANUFACTURING SPIRALLY LAYERED AND ALIGNED PRINTED-CIRCUIT ARMATURE COIL

**Masahiko Fujita; Yuuji Shishido; Yuzuru Suzuki, and Masato Okamoto, all of Iwata, Japan, assignors to Minebea Co. Ltd., Japan**
**Division of Ser. No. 332,931, Mar. 21, 1989, Pat. No. 4,962,329.**
**This application Mar. 2, 1990, Ser. No. 487,145**
**Claims priority, application Japan, Aug. 3, 1987, 62-194014; Jul. 16, 1988, 63-177588**
**Int. Cl.$^5$ H02K** *15/04*
**U.S. Cl. 29—598** **4 Claims**



1. A method of manufacturing an armature coil comprising:

obtaining a printed coil formed by printing and arranging a plurality of sets of unit coil groups, each comprising an even number of unit coils, on a belt-like, thin and pliable insulating base material;

obtaining a pliable insulating material layer having a length greater than a length of said base material and two oppositely facing surfaces, said insulating material layer having adhesive thermoplastic layers formed on both of said oppositely facing surfaces;

overlying said insulating material layer over said printed coil;

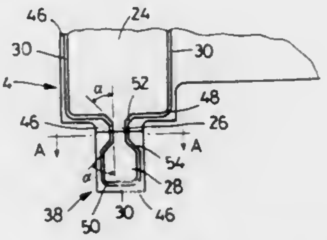
winding said overlaid insulating material layer and said printed coil into a wound and laminated cylindrical shape; and

adhering a trailing end of said insulating material layer to an adjoining inner peripheral layer of said wound and laminated cylindrical shape by heating said trailing and at least during the step of winding and laminating said printed coil and said insulating material layer into said cylindrical shape so as to fuse and bond the thermoplastic layer on said trailing end to the thermoplastic layer on said adjoining inner peripheral layer.

---

### 5,012,572
### METHOD FOR PRODUCING A HEAD CORE SLIDER

**Soichiro Matsuzawa, Kuwana, and Fuminori Takeya, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan and Applied Magnetics Corporation, Goleta, Calif.**
**Filed Mar. 13, 1989, Ser. No. 322,161**
**Claims priority, application Japan, Mar. 31, 1988, 63-80133**
**Int. Cl.$^5$ G11B** *5/42*
**U.S. Cl. 29—603** **15 Claims**



1. A method of producing a head core slider for a rigid magnetic disk drive, comprising the steps of:

preparing a first ferrite block from which a slider body is to be formed, and a second ferrite block from which a yoke portion is to be formed, and butting together said first ferrite block and said second ferrite block into an integral ferrite bar which defines a closed magnetic path having a magnetic gap;

forming an etching mask on a surface of said integral ferrite bar, said etching mask having a pattern which corresponds to a configuration to be formed on said surface of said integral ferrite bar, said configuration including (a) a pair of parallel air bearing portions provided on said slider body which are spaced apart from each other in a first direction (b) a track portion formed integrally with at least one of said pair of parallel air bearing portions, so as to extend from one of opposite ends of said air bearing portion in a second direction substantially perpendicular to said first direction, said track portion having a second width smaller than a first width of each of said air bearing portions in said first direction and (c) a protrusion provided on said yoke portion which extends from one end of said track portion remote from said air bearing portion in said second direction, said protrusion having a third width which is smaller than said first width and larger than said second width;

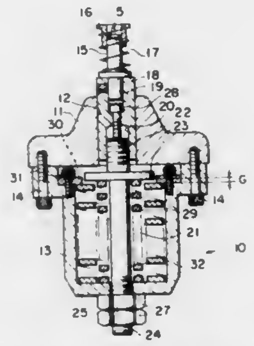
etching at least said surface of said integral ferrite bar, via said etching mask, so as to produce said configuration corresponding to said pattern of said etching mask, such that said pair of air bearing portions, said protrusion, and said track portion have a same predetermined height; and

cutting the etched integral ferrite bar into a plurality of pieces each of which serves as said head core slider, such that each of said pieces which have said slider body, said yoke portion and said track portion is provided with a narrow stepped portion which surrounds at least said track portion and said protrusion, said stepped portion having a surface which is spaced apart from top surfaces of said track portion and said protrusion in a third direction perpendicular to said first direction and said second direction, by a distance corresponding to said predetermined height.

---

### 5,012,573
### BUTTON APPLICATOR

**Kazuyoshi Ito, Toyama, Japan, assignor to Yoshida Kogyo K.K., Japan**
**Filed Jun. 4, 1990, Ser. No. 532,654**
**Claims priority, application Japan, Jun. 5, 1989, 1-142589**
**Int. Cl.$^5$ B23P** *19/00*
**U.S. Cl. 29—798** **9 Claims**



1. A button applicator for caulking one button element to another button element through a fabric piece, comprising:

a punch which is brought down for a predetermined stroke;

a die which is supported upwardly by a resilient force and to which a pressure is applied by pressing down thereon by said punch displacing said die downwardly against the resilient force;

a spring-positioning member;

a shaft having one end interconnected with a lower part of said die and which is inserted through said spring-positioning member;

a spring-supporting member which is interconnected to and moved in combination with said shaft and which is urged apart from said spring-positioning member by said resilient force;

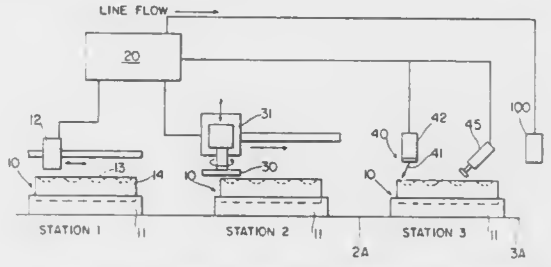
a first spring and a second spring which are provided between said spring-positioning member and said spring-supporting member, and said resilient force is created alternately by said first spring and said first and second spring in combination pressing against said spring-supporting member as the die is displaced downwardly;

a means for automatically shifting said resilient force from a resilient force created by said first spring, corresponding to a predetermined smaller caulking pressure, to a resilient force created by said first spring and said second spring, corresponding to a predetermined larger caulking pressure, when said pressure applied to said die exceeds said predetermined smaller caulking pressure and said first spring is compressed to be deformed with a displacement of a predetermined gap.

---

### 5,012,574
### CONTROLLED MACHINING OF COMBUSTION CHAMBERS GEARS AND OTHER SURFACES

**Timothy R. Pryor, Windsor, Canada, assignor to Diffracto Ltd., Windsor, Canada**
**Continuation of Ser. No. 767,374, Aug. 20, 1985, abandoned, which is a continuation of Ser. No. 560,259, Dec. 12, 1983, Pat. No. 4,559,684, which is a continuation of Ser. No. 238,702, Feb. 27, 1982, abandoned. This application Apr. 27, 1987, Ser. No. 42,527**
**The portion of the term of this patent subsequent to Dec. 24, 2002, has been disclaimed.**
**Int. Cl.$^5$ B23P** *13/00, 15/00*
**U.S. Cl. 29—888.06** **11 Claims**



1. A method for controlling the volume of the chambers in a cylinder head of an engine in an in-line manufacturing process, said method comprising:

determining, in line, the location of a finite plurality of points in the cylinder chamber as referenced to the face of the cylinder head, for each of the cylinder chambers of the cylinder head of the engine;

transmitting, in electrical form, the results produced by the determining step for each cylinder chamber, to computing means;

computing, using the computing means, the approximate volume of each chamber from said point locations;

comparing, using said computing means, the computed volumes of the cylinder chambers; and

selectively removing material from portions of the cylinder head defining the cylinder chambers, in line, as required in accordance with the results of said comprising step, so that all of said cylinder chambers have the same nominal volume.

---

### 5,012,575
### METHOD OF SECURING A WHEEL ASSEMBLY TO AN ASSOCIATED BODY STRUCTURE

**Robert J. Heideman, 34316 Barton, Westland, Mich. 48185**
**Division of Ser. No. 160,921, Feb. 26, 1988, Pat. No. 4,919,491.**
**This application Apr. 20, 1990, Ser. No. 511,455**
**Int. Cl.$^5$ B60B** *37/00;* **B21D** *53/26*
**U.S. Cl. 29—894.3** **9 Claims**

1. A method of providing a wheel assembly for use at the four corners of a cart to rollably support the cart, said method comprising the steps of:

providing a pair of flange mounting plates;

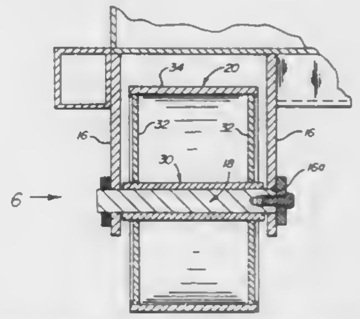
rigidly securing said flange mounting plates to a respective corner of the cart in a position extending downwardly from the main body of the cart in parallel spaced relation;

providing an aperture in the lower end of each mounting plate;

providing a wheel comprising a tubular hub having a central bore defining a journal surface, a rim, and means rigidly interconnecting said rim and said hub in concentric relation;

positioning the wheel between said mounting plates with the bore of said hub aligned with said apertures;

providing an axle presenting a journal portion of round cross section between its ends;



forming a threaded bore in one end of said axle;

providing radially extending means at the other end of said axle;

providing a bolt sized to be threaded into said threaded bore and having a head;

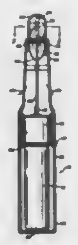
passing said axle slidably through one of said apertures, through said bore, and through the other aperture to bring said radially extending means into engagement with the outboard face of one mounting plate and to position the journal portion of said axle within said bore in juxtaposition to said journal surface and journal the wheel on said axle; and

threading said bolt into said threaded bore to secure the wheel assembly between the mounting plates.

---

### 5,012,576
### PERSONAL HAIR TRIMMER

**Jimmie R. Johannesson, 11689 - 64B Ave., Delta, B.C., Canada V4E 2E1**
**Filed Jul. 18, 1990, Ser. No. 554,616**
**Int. Cl.$^5$ B26B** *19/00*
**U.S. Cl. 30—29.5** **3 Claims**



1. A hair removal device for nose and ears comprising

a hand holdable container containing a power source and motor with a rotatable shaft extending from the motor to one end of the container;

metal screen at the one end of the container having apertures of sufficient size to allow hairs to pass therethrough, the metal screen semispherical in shape at the end and joined to a cylindrical portion;

cutting head attached to the rotatable shaft to rotate within the screen, the cutting head having blades to follow inside contour of the metal screen, adapted to cut hairs protruding through the screen, and being angled to provide fan-like action when rotated;

removable filter located within the container adjacent the screen, adapted to catch hair trimmings, and

vent located in the container to vent air pulled in by the fan-like action of the blades on the cutting head when rotated by the motor, the air entering through the screen, passing through the filter and exiting through the vent.

---

### 5,012,577
## SHAVING APPARATUS

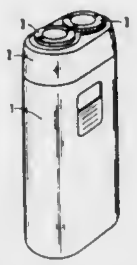
**Sieds Bosch, Drachten, Netherlands, assignor to U.S. Philips Corp., N.Y.**

**Filed Feb. 23, 1990, Ser. No. 484,702**

**Claims priority, application Netherlands, Feb. 23, 1989, 8900446**

**Int. Cl.$^5$ B26B** *19/14, 19/04*

**U.S. Cl. 30—43.6** **5 Claims**



1. A shaving apparatus comprising a holder for at least one shaving unit, which shaving unit comprises an external shaving member formed with hair-entry apertures and an internal shaving member which is rotatable relative to the external shaving member, the shaving unit being arranged in an opening of the holder and being retained by means of a retaining plate which is detachably secured to the holder, the holder and the retaining plate comprising corresponding fixing means, wherein the fixing means comprise a latching arm on the retaining plate and a corresponding latching projection on the holder near the circumference of the retaining plate, the latching arm comprising a latching portion at one end and, at the other end, a connecting portion for the connection to the retaining plate, which latching arm comprises an arm portion which is rotatable relative to the retaining plate and an arm portion which is rectilinearly movable relative to the retaining plate, which two arm portions are interconnected by a bent resilient arm portion, the retaining plate comprising means for the connection to the connecting portion and guide means for the rectilinearly movable arm portion.

---

### 5,012,578
## ONE-PIECE RAZOR WITH HINGED SLIDING CAP

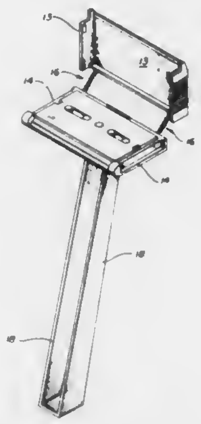
**David A. Siefer, Orange, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Mar. 5, 1984, Ser. No. 586,495**

**Int. Cl.$^5$ B26B** *21/14*

**U.S. Cl. 30—84** **10 Claims**

1. A disposable razor having at least one blade with a shaving edge, a unitary assembly of a molded plastic blade support for supporting said at least one blade and a molded plastic blade cap covering said blade, said cap and said blade support joined by a web-like molded plastic hinge having a loop formation between said cap and said blade support to allow sliding motion between said cap and said blade support, wherein said hinge is formed with a weakened cross-section operative to separate when said sliding motion occurs and is positioned opposite said shaving edge and allows relative motion between said cap and said support to provide a blade edge protected and a blade edge exposed position by movement of either said cap or said support.



---

### 5,012,579
## CUTTING MACHINE FOR SYNTHETIC RESIN PIPES

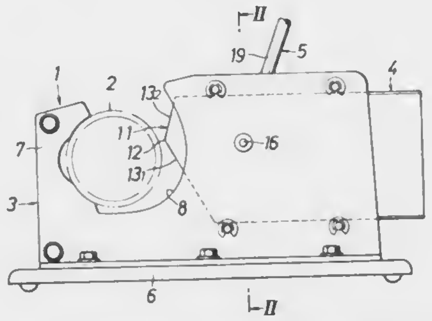
**Misao Matsumoto, Okayama, Japan, assignor to Hiroshi Karaki, Kobe, Japan**

**Filed Sep. 19, 1989, Ser. No. 409,353**

**Claims priority, application Japan, Sep. 20, 1988, 63-123868[U]; Dec. 7, 1988, 63-159945[U]**

**Int. Cl.$^5$ B23D** *21/06*

**U.S. Cl. 30—92** **7 Claims**



1. A cutting machine for a synthetic resin pipe comprising:

a machine body for holding a synthetic resin pipe subjected to cut work;

a plate-like cutter provided on the machine body for advancing and retracting movement with respect to the pipe within a plane perpendicular to a center line of the pipe, the cutter being provided at an edge opposite to the pipe with an angled cutting blade having a width in a direction perpendicular to the advancing and retracting direction of the cutter larger than an outside diameter of the pipe, said angled cutting blade being comprised of first and second inclined portions intersecting at a bight portion located on one side of an imaginary straight line passing through a center of the pipe and parallel with the advancing and retracting direction of the cutter, said first inclined portion being continuous to said bight portion and intersecting said imaginary straight line, and said second inclined portion being continuous to said bight portion on the side of said imaginary straight line opposite said first inclined portion and coming into contact with the inner peripheral surface of the pipe when said bight portion bites said inner peripheral surface in an intermediate process of the cutting work; and

a driving means for the cutter provided on the machine body.

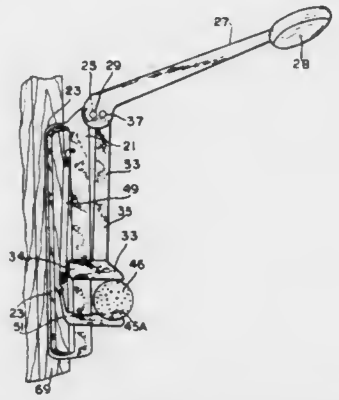
### 5,012,580
## MACADAMIA NUTCRACKER EMPLOYING SLIDING FORCE ARM DRIVEN BY LEVER WITH FIXED END AND FLOATING INTERMEDIATE PIVOTS

**Victor H. Goulter, 485 Mollmo Dr., San Francisco, Calif. 94127**

**Filed Feb. 5, 1990, Ser. No. 475,381**

**Int. Cl.$^5$ A47J** *43/26*

**U.S. Cl. 30—120.5** **20 Claims**



1. A device for converting rotary movement to linear movement with multiplied force which increases in proportion to the amount of rotary movement, comprising:

an elongated arm having first and second ends;

an elongated bar also having first and second ends,

an elongated lever also having first and second ends,

means for constraining said second end of said arm to move in a substantially linear manner with respect, parallel, and adjacent to said elongated bar,

said first end of said elongated lever being pivotally attached to said first end of said bar by a fixed pivot,

said first end of said elongated arm being pivotally attached to said first end of said lever by a floating pivot,

said floating pivot being located on said lever at a location closer to said second end of said lever than said fixed pivot is located,

said fixed and floating pivots also being located such that when said lever is rotated on said fixed pivot toward said bar, said floating pivot will move in an arc toward said bar and said fixed and floating pivots and said arm will be substantially coaxial at one position of said lever with respect to said bar.

---

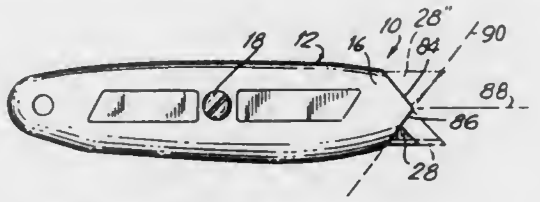
### 5,012,581
## UNIVERSAL UTILITY KNIFE

**William D. Fletcher, West Springfield; David H. Mallalieu, Springfield, and Donald P. Cummings, Sturbridge, all of Mass., assignors to Hyde Manufacturing Co., Sturbridge, Mass.**

**Filed Apr. 7, 1989, Ser. No. 335,111**

**Int. Cl.$^5$ B26B** *3/06, 3/03, 3/08, 1/00*

**U.S. Cl. 30—162** **4 Claims**



1. A utility knife comprising:

a casing assembly comprising two separable complementary halves secured together by a fastener for enclosing a removable slidable blade therein, said blade being slidable back and forth and having a cutting edge extending parallel to the direction of sliding, and a non-cutting edge opposite to said cutting edge, said casing assembly having an elongated slot at one end thereof, the length dimension between a first and a second end of second slot at least equaling the dimension of said blade between said cutting and non-cutting edges;

means for selectively aligning a blade with said slot, a portion of said blade and said cutting edge being subject to protruding from said slot when a blade is slid in one said direction toward said one slotted casing assembly end, said blade being selectively alignable with said cutting edge closer to one of said first slot end and said second slot end upon being removed from said casing assembly and reversed by being turned about an axis parallel to the cutting edge of the blade;

means, including a thumb piece, arranged externally on one side of said casing assembly for sliding said blade, said blade being in either selected blade alignment, said means for sliding responding to application thereto of an external force on said thumb piece; and means for automatically retracting a protruded blade and maintaining said blade within said casing assembly when said external force is released.

---

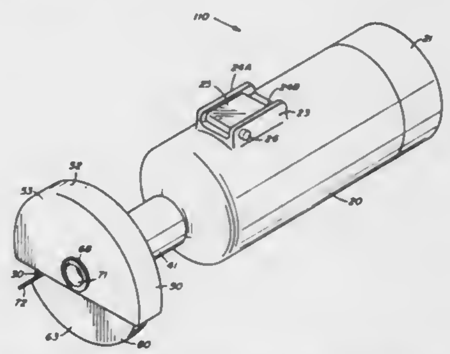
### 5,012,582
## HAND-HELD, BATTERY-OPERATED ROTARY BLADE SAW

**Steven L. Bristol, Sweeny, and Joseph D. Casanueva, Houston, both of Tex., assignors to Bristol and Williams, Sweeny, Tex.**

**Filed Dec. 15, 1989, Ser. No. 451,198**

**Int. Cl.$^5$ B23D** *47/00;* **B27B** *9/00, 11/02*

**U.S. Cl. 30—391** **4 Claims**



1. A hand-held, battery operated rotary blade saw comprising:

a housing,

batteries contained within said housing,

an electro-mechanical on-off switch,

a battery operated motor contained within said housing,

electrical connections between the said batteries and said motor through said electro-mechanical switch,

a rotor shaft extending out of said motor through said housing,

a rotary saw blade attached to said rotor shaft, and

a removable rotary saw blade shield which protects the rotary saw blade from inadvertent contact with objects exterior to the device;

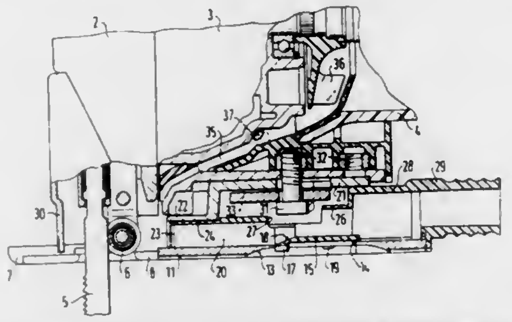
wherein:

the exterior of said housing serves as a handle, and the surface of said housing provides a detachable housing access cover; and

said removeable rotary saw blade shield comprises: a blade cover which is hollow and cylindrical in shape and provides both a blade cover male connector and a blade cover female connector.

OL
26
SS
1
MY
7
991
UMI

**5,012,583**
### COMPASS SAW
**Hans Blöchle, Ditzingen, and Paul Stooss, Langendorf, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**PCT No. PCT/DE88/00175, § 371 Date Oct. 5, 1989, § 102(e) Date Oct. 5, 1989, PCT Pub. No. WO88/07906, PCT Pub. Date Oct. 20, 1988**
**PCT Filed Feb. 21, 1988, Ser. No. 427,843**
**Claims priority, application Fed. Rep. of Germany, Mar. 21, 1988, 3712236**
**Int. Cl.⁵ B27B** *11/02, 19/09*
**U.S. Cl. 30—392** **19 Claims**



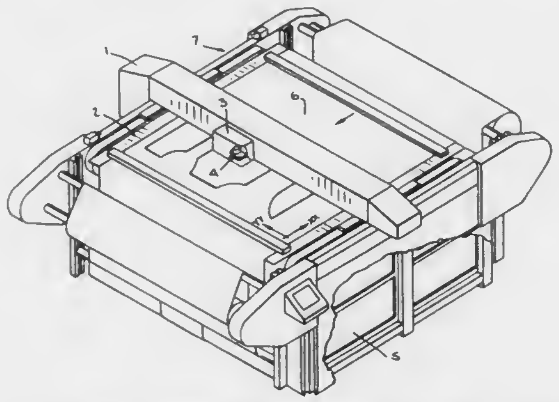
1. A compass saw comprising a housing; a motor and a gear unit located in said housing; a base plate, a carrier connected with said base plate and having a convexly curved outer surface for pivotally supporting said housing on said base; connecting means for adjustably securing said housing to said carrier; a saw blade driven by said motor; and a suction device including a suction channel for removing saw dust and chips, located in a space between said housing and said base plate, and having a suction port located behind said saw blade, and an opening through which said connecting means is inserted; said suction channel comprising a separate removable member inserted between said carrier and said base plate and having in an area of said opening for said connecting means such a shape that an inner contour of said member does not intersect said connecting means, and said suction channel having a suction path extending from said suction port, said suction path having a cross-section without flow-impeding projections or constructions.

---

**5,012,584**
### MARKING TOOL DRIVE SYSTEM FOR A DRAWING MACHINE OR SIMILAR TYPE OF MACHINE
**Mario A. Galan; Bernardo A. Perez, and Jose R. P. Gonzalez, all of Madrid, Spain, assignors to Investronica, S.A., Madrid, Spain**
**Filed Jun. 29, 1989, Ser. No. 374,082**
**Claims priority, application Spain, Jul. 1, 1988, 8802085**
**Int. Cl.⁵ G01D** *15/24;* **B43L** *13/00*
**U.S. Cl. 33—18.1** **13 Claims**

1. In a working tool drive system for a drawing machine wherein said drawing machine has a working surface for supporting a strip material, a tool carrier assembly for carrying a working tool having a longitudinal axis, transmission means for moving said tool carrier assembly over said working surface, the improvement being said working tool drive system comprising:
- electromagnetic means for moving said working tool downward toward said working surface upon energizing of said electromagnetic means;
- first resilient means for moving said working tool upward from said working surface upon deenergizing of said electromagnetic means;
- a first stroke limit means for limiting the downward movement of said working tool;
- a second stroke limit means for limiting the upward movement of said working tool;

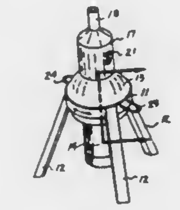
wherein said electromagnetic means, said first resilient means, said first stroke limit means, and said second stroke limit means are all disposed coaxially with said longitudinal axis of said working tool; and



wherein said working tool is a ruling tool, said ruling tool having a bottom surface for contacting strip material on said working surface, said bottom surface being provided with discharge means for removing waste material and for providing for better seating of the tool.

---

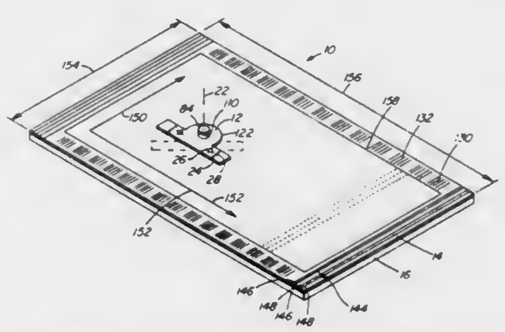
**5,012,585**
### LASER PLUMB-BOB APPARATUS
**Charlie J. DiMaggio, 1776-72 St., Brooklyn, N.Y. 11204**
**Filed May 7, 1990, Ser. No. 519,807**
**Int. Cl.⁵ G01C** *15/02*
**U.S. Cl. 33—286** **3 Claims**



1. A laser plumb-bob apparatus comprising,
- a spherical hollow housing, the housing including a first cylindrical housing mounted underlying the spherical housing, and
- ring support rotatably mounted about the spherical housing, the ring support including support members mounted to the ring support, the support members defined by a predetermined length, and
- the cylindrical housing defined by a further predetermined length, wherein the predetermined length is greater than the further predetermined length, and
- a laser oscillator mounted within the cylindrical housing, the laser oscillator arranged for directing a laser beam through the spherical housing coaxially aligned with the cylindrical housing, and
- wherein the ring support defines a concave interior surface, the concave interior surface complementarily aligned to the spherical housing to capture and secure the ring support the spherical housing, and
- further including a second cylindrical housing coaxially aligned with the cylindrical housing, the second cylindrical housing mounted to the spherical housing diametrically opposed about the spherical housing to the cylindrical housing, and a third cylindrical housing telescopingly mounted within the second cylindrical housing, the cylindrical housing, the second cylindrical housing, and the third cylindrical housing coaxially aligned relative to one another, and the second cylindrical housing including an objective lens mounted orthogonally to an axis defined by the second cylindrical housing, and a focusing lens mounted within the third cylindrical housing, wherein the focusing lens is arranged parallel to the objective lens, and
- wherein the cylindrical housing includes a battery pack mounted to a lowermost portion of the cylindrical housing providing electrical energy to the laser oscillator, and
- wherein the ring support includes a first support ring integrally mounted thereto, wherein the first support ring is mounted to an exterior surface of the ring support, and a second support ring mounted to the exterior surface of the ring support diametrically opposed to the first support ring, and a first tether line secured to the first support ring, and a second tether line secured to the second support ring; wherein the first and second tether lines permit securement of the apparatus to spaced vertical support surfaces.

---

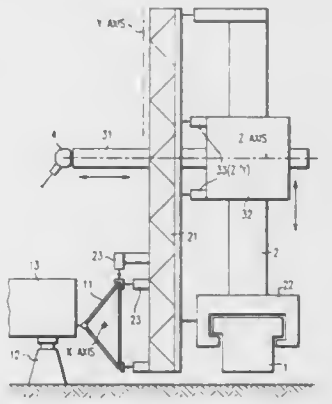
**5,012,586**
### PLOTTING AND DRAFTING APPARATUS WITH MAGNETIC GUIDE
**Anthony J. Ashworth, 2-1545 Marine Drive, West Vancouver, Canada V7V 1H9**
**Filed Aug. 28, 1989, Ser. No. 399,575**
**Int. Cl.⁵ B43L** *12/02*
**U.S. Cl. 33—430** **24 Claims**



7. A plotting and drafting apparatus having a drawing implement comprising:
- (a) a rule portion having a datum edge lying in a plane;
- (b) aligning and securing means for aligning and securing the apparatus to a cooperating surface, the means including;
  - (i) a body having a flat first surface lying fixed in said plane, the first surface providing means for supporting the implement on the cooperating surface; and
  - (ii) first generating means for generating a first series of juxtaposed parallel linear magnetic poles in the first surface, the poles of the first series extending linearly across the first surface in a first direction of parallelism, adjacent poles being spaced apart laterally from each other in a first normal direction normal to the direction of parallelism, the first surface having sufficient area to secure the implement to the cooperating surface; and
- (c) connecting means for pivotally connecting the body to the rule portion to permit selective free rotation between the rule portion and the first surface of the body, said rotation being about an axis perpendicular to said plane.

---

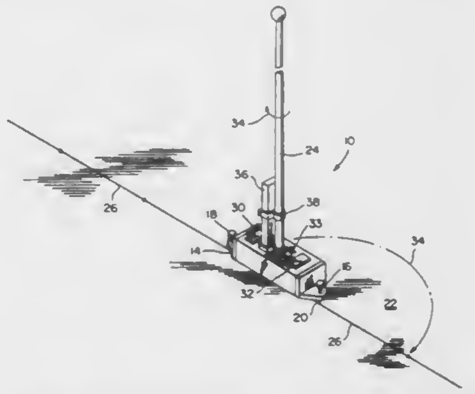
**5,012,587**
### MACHINE FOR MEASURING BY COORDINATES
**Jean-Marie David, Villeneuve D'Ascq, France, assignor to Renault Automation, Boulogne Billancourt, France**
**Continuation of Ser. No. 314,037, Feb. 23, 1989, abandoned.**
**This application Sep. 24, 1990, Ser. No. 587,610**
**Claims priority, application France, Feb. 23, 1988, 88 02109**
**Int. Cl.⁵ G01B** *7/03*
**U.S. Cl. 33—503** **3 Claims**



1. A coordinate measuring apparatus, which comprises:
- a plurality of coordinate measuring members located on a plurality of axes wherein a guide-carrying structure is positioned along one axis of said plurality of axes;
- a carriage movably mounted on said guide-carrying structure;
- a reference structure located separate from and spaced a predetermined distance from said carrying structure and connected to said carriage structure by link means;
- at least one sensor attached to said carriage for determining the position of said carriage relative to said reference structure; and
- a workpiece support wherein the reference structure of a first measuring axis is connected to said workpiece support.

---

**5,012,588**
### SELF-RECORDING READOUT SYSTEM FOR SURFACE MEASUREMENT DEVICE
**Samuel A. Face, III, Newport News, Va., assignor to Face Construction Technologies, Inc., Norfolk, Va.**
**Filed Mar. 29, 1989, Ser. No. 330,270**
**Int. Cl.⁵ G01C** *9/06;* **G01B** *7/34*
**U.S. Cl. 33—533** **6 Claims**



1. In combination with a device displaced between a plurality of measuring positions on a surface to be measured for flatness to generate signals in different level ranges respectively corresponding to the device at rest and during move-

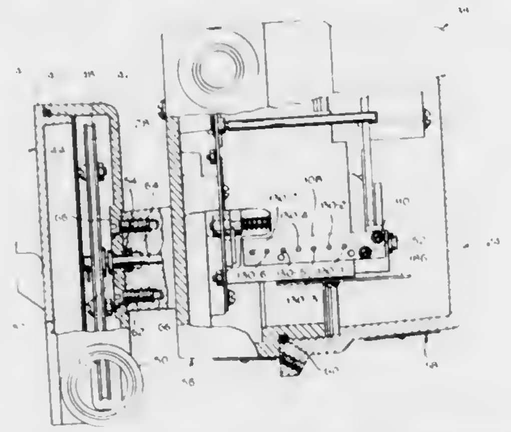
VOL
126
SS
1
MY
7
1991
UMI

ment between said measuring positions, said device including an accelerometer sensor from which said signals of the different level ranges are generated and display means operatively connected to the device for readout in response to said generated signals; a data processing system comprising means operatively connected to the device for sampling said generated signals at spaced intervals of time, comparator means connected to the sampling means for detecting substantial equality between the signals sampled successively, data storage means for recording the successively sampled signals in response to said detection of substantial equality therebetween and threshold logic means for disabling readout by the display means in response to changes in the successively sampled signals in excess of a predetermined threshold.

---

### 5,012,589
### DISPLACEMENT SERVO GAUGE

**Michel Reminn, Costa Mesa, Calif., assignor to Magnetrol International, Downers Grove, Ill.**
**Filed Jun. 16, 1989, Ser. No. 367,026**
**Int. Cl.⁵ G01F *23/36;* G01N *9/08***
**U.S. Cl. 33—720** **16 Claims**



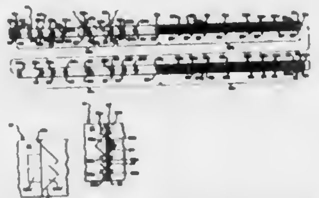
1. A displacement servo gauge operable to sense level for any one of a plurality of different liquids comprising:
a spool;
a displacer;
a tape wound on said spool and having an end connected to said displacer for suspending said displacer to impinge on a particular liquid surface;
a counterweight assembly linked to said spool to balance said displacer when said displacer impinges on the particular liquid surface;
a sensor operatively associated with said counterweight assembly for sensing a plurality of positions of said counterweight assembly, each position representing a balance condition for one of the plurality of different liquids;
means for selecting one of said counterweight assembly positions according to the particular liquid;
means for rotating said spool to move said displacer to the liquid surface incident to said sensor sensing an out of balance condition for the particular liquid; and
means for determining change in level of the liquid surface as a function of rotational movement of said spool.

---

### 5,012,590
### DISPOSABLE LAYOUT TAPE

**G. Anthony Wagner, 2176 E. River Rd., Grand Island, N.Y. 14072, and Michael L. Horning, 30 Dellwood, Amherst, N.Y. 14226**
**Filed May 25, 1989, Ser. No. 355,991**
**Int. Cl.⁵ G01B *3/10***
**U.S. Cl. 33—759** **13 Claims**

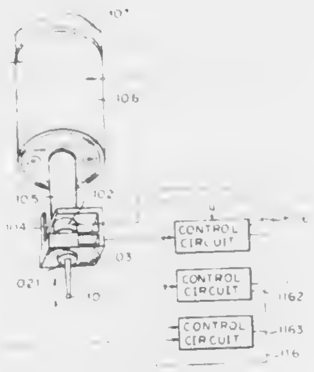
1. A layout tape for positioning building structural members such as studs, joists and rafters comprising an elongated strip divided lengthwise into a series of pairs of visually contrasting, alternatively arranged two foot segments, each of said two foot segments having indicia designating one foot segments therein and four, six and eight inch segments within each of said one foot segments, and having designs associated with said indicia for visually indicating to a user the direction of use of said tape, said designs also co-operating with said indicia to form a reference ensuring proper placement of said structural members for selective location on center, away or back relative to the indicia with which said design are associated, and further designs are associated with certain of said designs for visually indicating sixteen inch segments commencing with the beginning of one of said two foot segments of said series and ending with the end of a next adjacent one of said two foot segments of said series.



---

### 5,012,591
### FORCE CONTROLLING SYSTEM

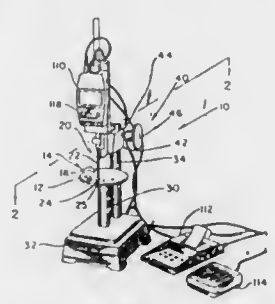
**Kazuo Asakawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**
**Division of Ser. No. 175,616, Mar. 29, 1988, Pat. No. 4,872,803. This application Oct. 25, 1989, Ser. No. 344,389**
**Claims priority, application Japan, Nov. 30, 1983, 58-226301; Nov. 30, 1983, 58-226302**
**Int. Cl.⁵ G01B *7/28***
**U.S. Cl. 33—832** **26 Claims**



1. A tactile apparatus comprising:
a base element;
a movable member;
an elastic member movably connecting said movable member to said base element;
a contact probe, mounted on said movable member to apply a force corresponding to a predetermined force to an object;
detecting means, provided in said elastic member, for detecting elastic deformation of said elastic member in a displacement direction and for generating a displacement signal responsive to the detected elastic deformation;
driving means for driving said movable member along the displacement direction;
control means, operatively connected to said detecting means and to said driving means, for controlling said driving means by positive feedback of the displacement signal so as to contradict the reactive force due to the displacement of said elastic member applied to the object, and so that said movable member substantially applies only the predetermined force to the object; and
measuring means, operatively connected to said detecting means, for measuring the shape of the object based on the displacement signal.

### 5,012,592
### FASTENER DIMENSION MEASURING MACHINE

**Joe E. Greenslade, P.O. Box 330865, Fort Worth, Tex. 76163**
**Continuation-in-part of Ser. No. 313,909, Feb. 23, 1989, abandoned. This application Jun. 27, 1990, Ser. No. 544,311**
**Int. Cl.⁵ G01B *3/22, 5/02, 5/08***
**U.S. Cl. 33—833** **13 Claims**

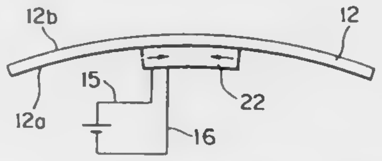


1. Apparatus for measuring dimensions comprising means for supporting a rotatable plate containing a plurality of different size opening to measure different size dimensions; means for supporting a dimension measuring member above said plate, wherein said plate is movable between a dimension measuring position and a fastener placement position; display means adjacent said measuring member for indicating the dimension measurements made; and recording means for recording the dimension measurements made.

---

### 5,012,593
### DEVICE FOR REMOVING WATER DROPLETS

**Shoji Okada, Toyota; Naofumi Fujie, Nagoya; Koji Ito, Kariya, and Tomoaki Imaizumi, Hoi, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan**
**Filed Aug. 9, 1989, Ser. No. 391,315**
**Claims priority, application Japan, Aug. 10, 1988, 63-200771; Sep. 30, 1988, 63-248369**
**Int. Cl.⁵ F26B *19/00***
**U.S. Cl. 34—69** **12 Claims**



1. A device for removing water droplets comprising a plate-like member, an ultrasonic vibrator bonded to the rear face of said plate-like member and oscillation means for vibrating said ultrasonic vibrator at a determined frequency, wherein
the thickness of said ultrasonic vibrator is defined as within a range;

$$0.25 \leqq T \leqq 2.5t$$

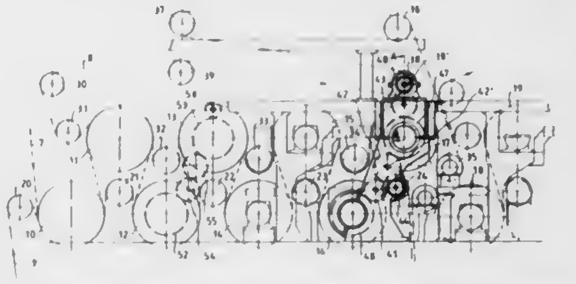
where
t represents the thickness of the plate-like member and T represents the thickness of the ultrasonic vibrator, and
wherein said plate-like member is bent repeatedly by vibration of said ultrasonic vibrator in a direction parallel to a face of said plate-like member, thereby removing water droplets deposited on said plate-like member.

---

### 5,012,594
### WEB DRYING UNIT

**Johann Preisetanz, Heidenheim, and Gerhard Kotitschke, Steinheim, both of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany**
**Filed Nov. 13, 1989, Ser. No. 435,195**
**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 8814118**
**Int. Cl.⁵ F26B *11/02***
**U.S. Cl. 34—121** **4 Claims**

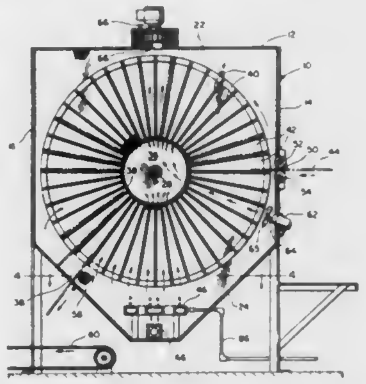
1. A drive for a drying group of a paper-making machine, wherein said drying group comprises:
several drying cylinders across which a web to be dried can run, said drying group including an upper row of cylinders with an upper backing belt and a lower row of cylinders with a lower backing belt, wherein only some of the drying cylinders are provided with a drive gear, said only some drying cylinders including a cylinder in said upper row of cylinders and an adjacent cylinder in said lower row of cylinders, said drive gears being in drive connection with a drive journal, the drive journal being connected to means for driving said journal;
several guide rolls for said backing belts for forcing said web against said drying cylinders, at least one of said guide rolls being in drive connection with said drive journal,
wherein a guide roll for said upper backing belt and a guide roll for said lower backing belt are each provided with a drive gear;
wherein said drive gears of the guide rolls are combined with the drive gear of said cylinder in the upper row of cylinders and the drive gear of said adjacent cylinder in the lower row of cylinders in a common gear case to form a single gear set, said gear case further supporting said driven journal and said driven guide rolls.



---

### 5,012,595
### ROTARY CROSS-BANDING VENEER DRYER

**Everett R. Christian, 1829 Brookhurst, Medford; Michael E. Christian, P.O. Box 1344, Ashland, and Theodore Z. Christian, 1557 #4, Medford, all of Oreg. 97520**
**Filed Oct. 19, 1989, Ser. No. 424,121**
**Int. Cl.⁵ F26B *11/00***
**U.S. Cl. 34—187** **9 Claims**



1. A machine for drying panels, said machine including a closed housing, a drum mounted within said housing for rotation about a generally horizontal axis at least substantially stationary relative to said housing, said drum including a central cylindrical area and support means for support of a plurality of panels to be dried therefrom for rotation with said drum and with said panels arranged generally in radial planes of said axis and spaced about a central cylindrical area of said drum concentric with said axis, said support means including peripherally spaced apart, generally radial plane vanes carried by and extending outwardly from said cylindrical area, the peripheral spacing between adjacent vanes defining pockets opening radially outwardly of said drum assembly in which to receive panels to be dried, air flow means operative to effect an up-

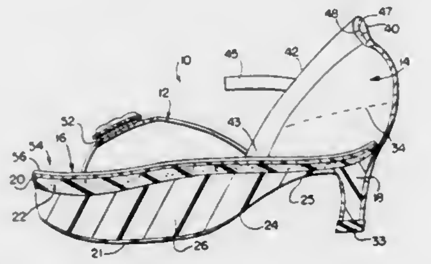
OL
126
SS
1
MY
7
991
UMI

ward flow of heated dry air within said housing through said pockets between adjacent vanes supported from said drum, said housing including panel ingress and egress means through means which panels to be dried may be passed into the interior of said housing from the exterior thereof for support from said support means and rotation therewith and through which dried panels may be passed from supported position on said drum within said housing to the exterior thereof, said air flow means including means operative to withdraw warm moist air from an upper portion of the interior of said housing above said drum assembly and to upwardly discharge the last mentioned air from a lower portion of the interior of said housing below said drum assembly, and means for reducing the humidity of said last mentioned air subsequent to the withdrawal of said air from the upper portion of said housing and prior to upward discharge of said air within said lower portion of said housing.

---

### 5,012,596
### SHOE

**Joan E. Schiller, 5294 Bridge Water Dr., Lyndhurst, Ohio 44124**
**Filed Jul. 10, 1989, Ser. No. 377,896**
**Int. Cl.$^5$ A43B** ***3/12, 13/14***
**U.S. Cl. 36—11.5** **7 Claims**



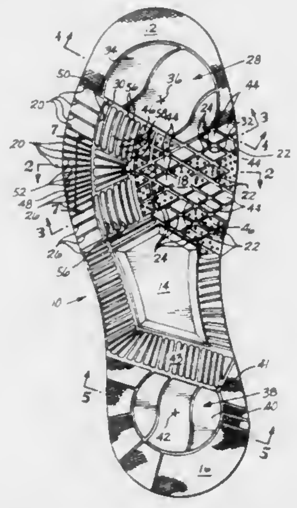
1. A high-heeled shoe comprising:
a sole portion forming a supporting area for a wearer's foot;
a heel joined with said sole portion extending perpendicularly downward at least an inch from said sole portion;
said sole portion and said heel portion having a forefoot area, an arch area and a heel area;
securing means for selectively securing said sole portion to a wearer's foot;
said forefoot area elevated to a level substantially horizontal with said heel area whereby said supporting area is generally flat;
wherein said sole portion includes an upper midsole layer and a lower midsole layer;
wherein said layers comprise sections made from ethyl vinyl acetate material;
wherein said securing means comprises an upper front portion and an upper rear portion; and
wherein said lower midsole layer includes a thick section tapering into a thin layer adjacent to said heel.

---

### 5,012,597
### SHOE SOLE WITH TWIST FLEX FEATURE

**Robert Thomasson, 20200 - 87th Ave. S., Kent, Wash. 98032**
**Filed Apr. 26, 1989, Ser. No. 343,429**
**Int. Cl.$^5$ A43B** ***5/00***
**U.S. Cl. 36—59 C** **13 Claims**

1. A shoe, comprising:
a sole presenting a surface contacting bottom having a toe portion, a heel portion, an arch portion forwardly of the heel portion, and a twist flex portion between the arch portion and the toe portion, generally below the ball region of the user's foot, said toe portion having pivot facilitating stiffness and a pivot facilitating lower surface, said twist flex portion comprising a first set of spaced apart, diagonal grooves in the bottom of the sole extending both transversely and rearwardly at least part way across the sole from the lateral side of the sole to the medial side of the sole, and a second set of spaced apart diagonal grooves extending both transversely and rearwardly at least part way across the sole from the medial side of the sole to the lateral side of the sole, said grooves reducing the thickness of the sole bottom at their locations rendering the sole easier to bend at the locations of the grooves in a direction perpendicular to the grooves, with the diagonal orientation of the first and second sets of grooves facilitating twisting of the sole bottom in the twist flex portion of the sole, said twist flex portion having a forward boundary defined by a crossing pair of forward most diagonal grooves, one from each of said first and second sets of diagonal grooves, with the intersection of said forward most grooves located adjacent where the user's toes meet the user's ball region of the foot, and
a truncated pivot ball in the toe portion of the sole, said twist flex portion extending into and truncating the pivot ball and providing the pivot ball with a pair of rear edges which are on intersecting chords and are defined by the intersecting diagonal grooves forming the forward boundary of the twist flex portion, said pivot ball otherwise having a substantially circular plan form and presenting a downwardly directed convex surface having a pivot center.

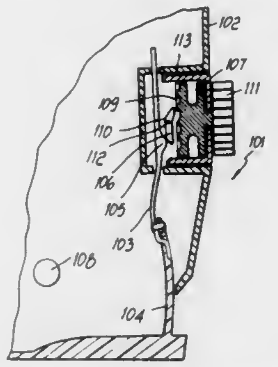


---

### 5,012,598
### FOOT SECURING DEVICE WITH AUTOMATIC RELEASE, PARTICULARLY FOR REAR-ENTRY SKI BOOTS

**Giorgio Baggio, S. Martino di Lupari, and Giuseppe De Bortoli, Montebelluna, both of Italy, assignors to Nordica S.r.l., Montebelluna, Italy**
**Filed Oct. 4, 1989, Ser. No. 417,100**
**Claims priority, application Italy, Oct. 11, 1988, 82594 A/88**
**Int. Cl.$^5$ A43B** ***5/04***
**U.S. Cl. 36—119** **7 Claims**

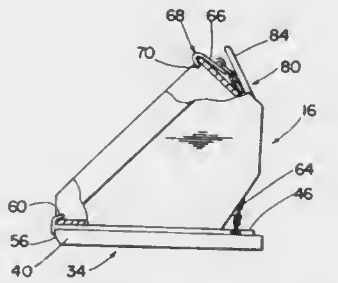
1. In a ski boot comprising a shell and at least one quarter being pivoted to said shell and having an open position and a closed position, a foot securing device with aromatic release, comprising a winding device associated with said quarter, a foot securing means arranged inside said boot, and a cable means being operatively connected with said foot securing means and with said winding device, said winding device having a pulley means adapted to wind said cable means to thereby adjust a degree of securement of said foot securing means, said winding device comprising means for releasably locking a rotation of said pulley means in a direction of unwinding of said cable means, said foot securing device further comprising a tab means having a first end connected to a fixed portion of said boot and a second end movably associated with said winding device such that said second end moves relatively to said winding device when said quarter is pivotally moved between said open position and said closed position, said second end of said tab means engaging with said means for releasably locking a rotation of said pulley means of said winding device when said quarter is pivotally moved from said closed position to said open position to thereby release said means for locking to allow said pulley means to rotate in said direction of unwinding of said cable means.



---

### 5,012,599
### PROTECTIVE PAD ASSEMBLY FOR THE LOADER BUCKET OF A BACKHOE

**Brian G. DeClair, 644 S. Orange Ave., El Cajon, Calif. 92020, and Kevin C. Barkey, 3759 Tennyson St., San Diego, Calif. 92107**
**Filed May 21, 1990, Ser. No. 526,024**
**Int. Cl.$^5$ E02F** ***3/96***
**U.S. Cl. 37—117.5** **6 Claims**

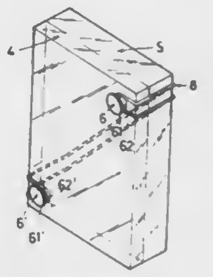


1. A protective pad assembly for the loader bucket of a backhoe comprising:
an elongated pad of non-metallic material having a predetermined length L1 and predetermined height H1, said pad having a top surface, a bottom surface, a front end and a rear end;
an elongated top plate having a predetermined length L2, a front end, a rear end, a top surface and a bottom surface;
a first hook member rigidly connected to the front end of said top plate member and it extends rearwardly over the top surface of said top plate and it is spaced a predetermined height thereabove so that the lower front cutting edge of the loader bucket of a backhoe can be detachably captured therein;
means for securing said top plate to the top surface of said elongated pad;
a second hook member having a shank portion and a curved portion, said curved portion being configured to detachably receive the upper front edge of the loader bucket of a backhoe;
a predetermined extended length of chain having its one end connected to said top plate and its other end connected to the shank portion of said second hook member; and
means for temporarily shortening the extended length of said chain between said top plate and said second hook member thereby clamping said protective pad assembly to the loader bucket of a backhoe.

---

### 5,012,600
### FRAME FIXATION STRUCTURE

**Thomas T. M. Wang, No. 1, Sublane 10, Lane 22, Kuang Fu S. Road, Taipei, Taiwan**
**Filed Aug. 3, 1989, Ser. No. 388,886**
**Int. Cl.$^5$ A47G** ***1/06;*** **G09F** ***1/12***
**U.S. Cl. 40—152** **3 Claims**

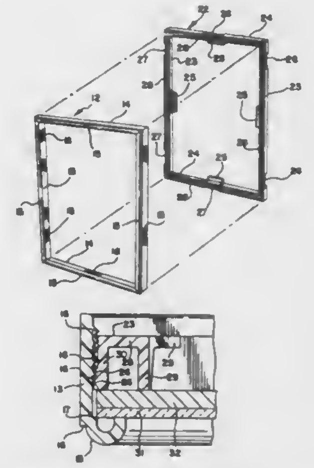


1. A frame structure comprising:
a front transparent plate and a rear plate having holes respectively at two diagonal corners of each plate, each hole in said front plate being aligned with a hole in said rear plate;
a pair of rivets, each having a head and a rod portion, one rivet extending through each aligned hole from the front plate to the rear plate with each head portion being adjacent but spaced away from said front plate;
an elastic band connecting said rivets and extending around the rod portion thereof between the head portion and said front plate and extending therefrom behind said back plate whereby said structure is assembled.

---

### 5,012,601
### PICTURE FRAME ASSEMBLY

**John R. Garland, 1 S. 045 Spring Rd., Oak Terrace, and Melvin L. Thomas, 550 N. Biermann, Villa Park, both of Ill. 60181**
**Filed Dec. 28, 1988, Ser. No. 291,060**
**Int. Cl.$^5$ A47G** ***1/06;*** **G09F** ***1/12***
**U.S. Cl. 40—152** **6 Claims**



1. A picture frame assembly, comprising:
(a) an outer frame member having a peripheral sidewall including two long sidewalls and two short sidewalls to encompass a framed picture unit and having a peripheral face for covering the outer circumferential portion of a framed picture unit;
(b) an inner frame member sized and shaped to fit snugly within the peripheral sidewall of the outer frame member, said inner frame member having a peripheral sidewall

VOL
126
SS
1
MY
7
1991
UMI

including two long sidewalls and two short sidewalls, said peripheral sidewall being channel shaped, having first and second legs in parallel spaced relationship to each other, said legs defining a peripheral face for pressing a framed picture unit against the back of the peripheral face of the outer frame member;

(c) a plurality of gripping means on the inside surface of the peripheral sidewall of the outer frame member and a like plurality of gripping means on the outside surface of the peripheral sidewall of the inner frame member, one of said gripping means being centrally located on each of said short sidewalls of said inner and outer frame members and two of said gripping means being located at upper and lower ends of each of said long sidewalls of said inner and outer frame members, said gripping means on said outer frame member being disposed to engage said gripping means on said inner frame member for coacting to releasably secure said inner frame member to said outer frame member when said inner frame member is fit within said outer frame member to hold a picture unit therebetween;

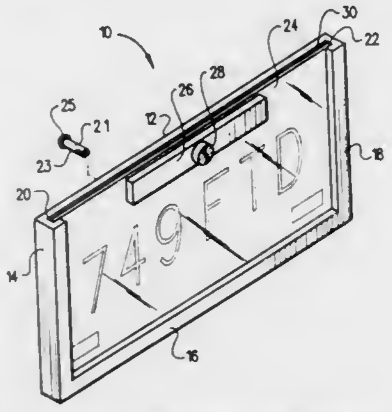
(d) a plurality of recesses in the sidewall surface of said inner frame member, said plurality of recesses containing therein the plurality of gripping means on said inner frame member to thereby provide a snug fit of said inner frame member within said outer frame member when said frame members are secured together;

(e) each of said gripping means including a set of gripping teeth, said teeth being in side-by-side relationship to each other and in longitudinal alignment with the respective peripheral sidewall of said inner and outer frame members, said teeth in said recesses in said inner frame member being configured so that a point of each said tooth is coplanar with an outside surface of the corresponding sidewall; and,

(f) said inner frame member including a plurality of tabs spaced about the inner surface of the peripheral sidewall on both said long and short sidewalls, said tabs projecting from said inner surface and being spaced away from the peripheral face of said inner frame member, and said tabs having a serrated edge for providing several points of support for said picture frame assembly upon a hanger device.

---

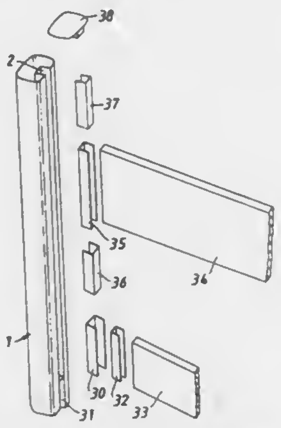
### 5,012,602
### LOCKING LICENSE PLATE HOLDER
**Gerald T. Storey, 6059 S. Dort Hwy., Grand Blanc, Mich. 48439**
**Filed Nov. 15, 1989, Ser. No. 436,695**
**Int. Cl.⁵ G09F** *7/00*
**U.S. Cl. 40—201** **3 Claims**



1. A locking license plate holder, comprising:
a frame;
a channel formed in said frame and dimensioned for insertion of a license plate;
a transparent cover plate on said frame;
an elongated hollow lock housing secured on said cover plate;
a spaced pair of aligned apertures formed through said frame, said license plate, said cover plate and a side wall of said lock housing;
a pair of retaining pins dimensioned for insertion through said pairs of aligned apertures;
a key actuated rotary locking cylinder centrally disposed in said lock housing;
a transverse aperture formed through each of said retaining pins;
a pair of transverse locking rods in said housing connected to said rotary locking cylinder for simultaneous extension and retraction through said transverse apertures in said retaining pins;
a pair of guide members in said housing constraining said locking rods to reciprocal linear movement; and
a pair of seats formed in said lock housing for engagement with inner ends of said retaining pins.

---

### 5,012,603
### SIGN SYSTEMS
**Kenneth W. A. Elcock, Hythe, England, assignor to Esselte Letraset Limited, United Kingdom**
**Filed Feb. 23, 1989, Ser. No. 314,638**
**Claims priority, application United Kingdom, Feb. 26, 1988, 8804557**
**Int. Cl.⁵ G09F** *15/00*
**U.S. Cl. 40—605** **12 Claims**



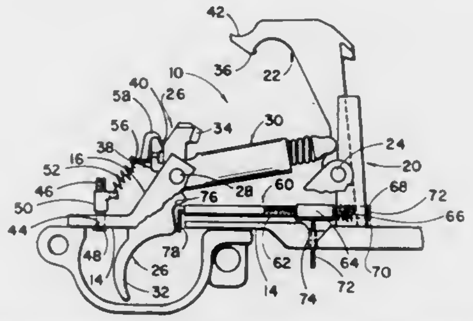
1. A modular sign system for accommodating signs of various thicknesses comprising:
a first nesting component and a second nesting component, each said component including a generally C-shaped recess for nesting and retaining a sign therein, the generally C-shaped recess of said first component also being selectively able to receive and retain said second component in one of a first and a second nested orientation, in said first nested orientation said second component being able to receive and retain a sign in its C-shaped recess, and in said second nested orientation said second component blocking the entrance of a sign into the C-shaped recesses of said first and second components.

---

### 5,012,604
### TRIGGER ASSEMBLY
**Laurence B. Rogers, 502 N. Ridgeway, Sapulpa, Okla. 74066**
**Filed Mar. 27, 1990, Ser. No. 499,799**
**Int. Cl.⁵ F41A** *19/16*
**U.S. Cl. 42—69.03** **17 Claims**

1. A trigger assembly for a gun, mounted in a housing of the gun, and comprising:
a trigger pivotally mounted in the housing,
a hammer pivotally mounted in the housing,

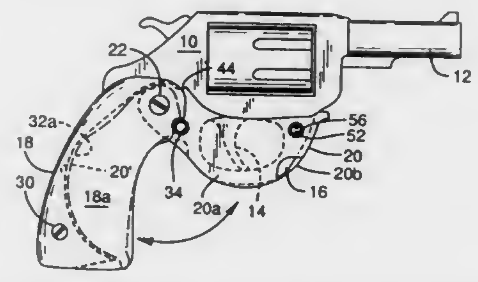
a spring-biased member mounted in the housing and urging the hammer into a fired position,
a main sear on the trigger to engage the hammer and hold the hammer in a cocked position,
an auxiliary sear pivotally mounted on the trigger to engage the hammer and hold the hammer in a cocked position in event the hammer is urged into a cocked position before the trigger is released,



an adjustable spring-biased member attached to the auxiliary sear to permit adjustment of the biasing of the auxiliary sear, and
an adjustable elongated spring-biased component positioned longitudinally adjacent a lower side of the housing and having a first end having a spring portion bearing against a front plate and a second end component impinging against a front lower face of the trigger to permit adjustment of trigger movement.

---

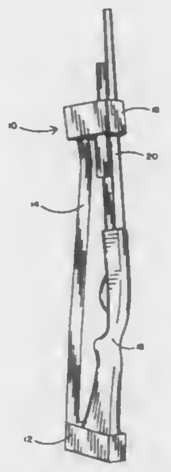
### 5,012,605
### TRIGGER COVER
**Jim Z. Nishioka, 1268 Hemlock NW., Salem, Oreg. 97304**
**Filed Oct. 23, 1989, Ser. No. 425,283**
**Int. Cl.⁵ F41A** *17/02*
**U.S. Cl. 42—70.07** **12 Claims**



1. In combination, a trigger cover and a gun, said gun including a trigger, a trigger guard and a grip portion for gripping by an operator to grip during operation of the gun,
said trigger cover including
cover means, said cover means including an open position and a closed position, said open position being a position of said cover means for exposing said trigger and allowing access to and operation of the latter, said closed position being a position of said cover means for covering and restricting access to said trigger,
said trigger cover also including connecting means for connecting said cover means to said gun,
said connecting means connecting said cover means to said gun when said cover means is in said closed position for covering and restricting access to said trigger,
said connecting means also connecting said cover means to said gun when said cover means is in said open position for exposing and allowing operation of said trigger,
said gun also including recess means for receiving at least a portion of said cover means during operation of said trigger cover, said recess means being positioned in said grip portion of said gun.

---

### 5,012,606
### SHOTGUN GUNLOCK
**James F. McNulty, Jr., 1290 Third St., Calimesa, Calif. 92320**
**Filed Aug. 1, 1989, Ser. No. 388,538**
**Int. Cl.⁵ F41A** *17/06*
**U.S. Cl. 42—70.11** **6 Claims**



1. An improved shotgun gunlock of the type used in police vehicles for securing a shotgun or rifle for selective release upon activation of a solenoid coil-controlled locking device; the improvement comprising:
a solenoid coil current regulating circuit having means for causing a first current to flow momentarily through said solenoid coil for unlocking said locking device and having means for automatically causing a second current to flow continuously through said solenoid coil for retaining said locking device in an unlocked configuration;
said second current being smaller in magnitude than said first current for preventing damage to said solenoid coil;
said first current causing means comprises a current source transistor connected in series with said solenoid coil; and
said second current causing means comprises an RC network and a biasing transistor, said RC network being connected to charge up over a selected period of time as a result of current flow through said solenoid coil, said biasing transistor being connected to respond to the charge on said RC network to reduce the gain of said current source transistor for reducing the current through said solenoid coil.

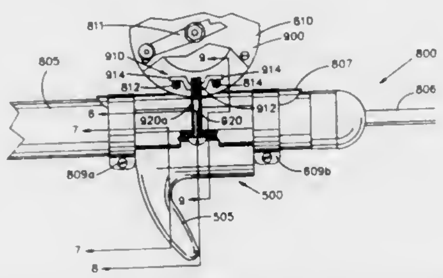
---

### 5,012,607
### ADD-ON TRIGGER WITH SAFETY FASTENER FOR FISHING ROD REEL
**Bodo Meschkat, 28731 Greenwood Pl., Castaic, Calif. 91384**
**Filed Jul. 11, 1989, Ser. No. 378,314**
**Int. Cl.⁵ A01K** *87/06*
**U.S. Cl. 43—25** **11 Claims**

1. In a fishing rod having a handle member supporting a fishing reel having a reel body with a support base extending between the reel body and the handle member, the improvement comprising:
(a) a separate trigger;
(b) means for removably fastening said trigger to said reel body so as to compress said rod handle member between said reel support base and said trigger and firmly hold both said trigger and said reel to said rod handle member;
wherein:
(c) said rod handle member is cylindrical;
(d) said trigger comprises:

VOL 126
ISS 1
MY 7
1991
UMI

(1) a trigger base, and
(2) a finger grip extending out from said trigger base in a first direction, said trigger base having a partial cylindrical recess in a side thereof opposite said finger grip;

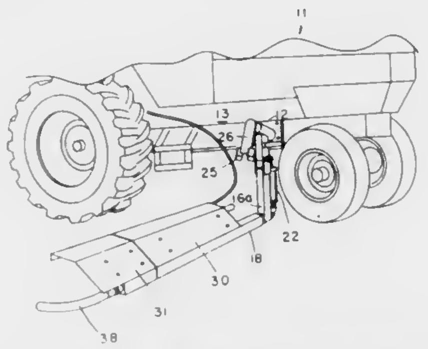


(e) said rod handle member is nested between said partial cylindrical reel support base and said partial cylindrical recess;
(f) said means for fastening comprises a pair of bolts coupled between said trigger base and a structural cross-member of said reel body.

---

### 5,012,608
### SPRAY BOOM

**Philip A. Brown, 4689 8 Mile Rd., NW., Conklin, Mich. 49403**
**Filed Aug. 9, 1989, Ser. No. 391,491**
**Int. Cl.$^5$ A01C *00/00;* A01G *00/00***
**U.S. Cl. 47—1.7** **10 Claims**



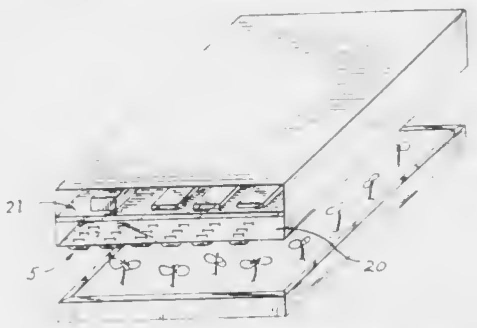
1. A spray boom for attachment to a standard farm tractor, comprising:
a boom carrying a spray means;
a pivot bracket adapted to be secured to a tractor, said spray boom having a horizontal axis extending laterally of the tractor, and said pivot bracket having a pivot axis which is inclined to said horizontal axis, said boom being secured to said bracket below said pivot axes.

---

### 5,012,609
### METHOD AND APPARATUS FOR IRRADIATION OF PLANTS USING OPTOELECTRONIC DEVICES

**Ronald W. Ignatius; Todd S. Martin, both of Dodgeville; Raymond J. Bula, Cross Plains; Robert C. Morrow, and Theodore W. Tibbitts, both of Madison, all of Wis., assignors to Automated Agriculture Associates, Inc., Dodgeville, Wis.**
**Filed Dec. 12, 1988, Ser. No. 283,245**
**Int. Cl.$^5$ A01C *1/00;* A01G *9/20***
**U.S. Cl. 47—58** **15 Claims**

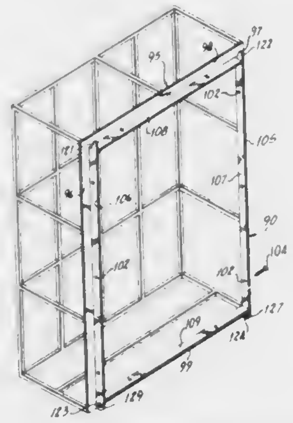
1. A method for providing radiant energy to support plant growth and development comprising the step of:
exposing a plant to radiant energy provided by an array of light emitting diodes having a maximum spectral emission that matches the maximum absorption of chlorophyll and meets the photomorphogenic and phototropic requirements of a plant at a sufficient intensity and duration to drive photosynthesis at a rate sufficient to support plant growth and development from germination to maturity.



---

### 5,012,610
### EMERGENCY ESCAPE FRAME FOR BUILDING APERTURES

**Jose Carballo, 3141 SW. 20 St., Miami, Fla. 33145**
**Filed Jul. 3, 1990, Ser. No. 547,555**
**Int. Cl.$^5$ E06B *3/68;* E05B *65/10***
**U.S. Cl. 49—57** **8 Claims**



1. A frame assembly for building apertures where a window is to be installed, comprising:
A. fixed frame means rigidly mounted in said apertures;
B. removable frame means removably mounted to said fixed frame means and having sufficiently large dimensions to cooperatively and rigidly house said window and said removable frame means further includes security bar means to prevent the entry of strangers through said window;
C. means for releasably locking said removable frame means to said fixed frame means; and
D. means for actuating said locking means.

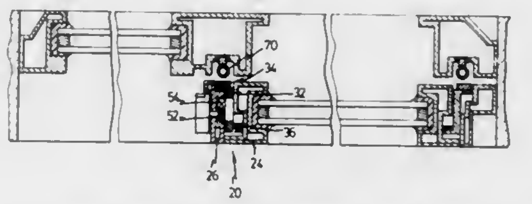
---

### 5,012,611
### SEALING MECHANISM FOR A WINDOW SET

**James Hsu, Taipei, Taiwan, assignor to Lava Group Inc., Taipei, Taiwan**
**Filed Jul. 19, 1990, Ser. No. 555,322**
**Int. Cl.$^5$ E05D *13/00***
**U.S. Cl. 49—225** **7 Claims**

1. A sealing mechanism used for a window set mounted in a wall, the set including a window having an inner side and an outer side, and a member in opposing relationship to the window, the window and the member defining first and second surfaces defined by the window and the member, respectively, comprising:

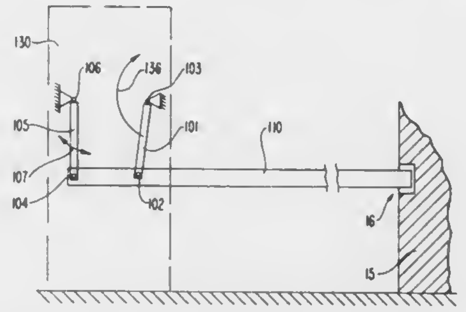
a guiding means having a frame arranged about the window along a periphery thereof and being moveable backwards and forwards relative and substantially perpedicular to the window, said guiding means comprising a first gasket attached to said frame for cooperating with the first sealing surface of said window and a second gasket attached to said frame for cooperating with the second sealing surface of the member; and
a driving means comprising a rack feed gear and a rack bar that is movable in a direction substantially perpendicular to the direction of the movement of said frame of said guiding means by said rack feed gear, said driving means converting a linear movement of said rack bar into said backward or forward movement of said guiding means so as to block a communication between said inner side and said outer side of the window by moving said first gasket into contact with said first sealing surface of said window and simultaneously by moving said second gasket into contact with said second sealing surface of said member.



---

### 5,012,612
### GATE

**Norbert Kille, Möllner Landstrasse 41, D-2056 Glinde, Fed. Rep. of Germany**
**Filed Apr. 24, 1989, Ser. No. 342,140**
**Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 3814005; Apr. 26, 1988, 3814012; Sep. 28, 1988, 3832825**
**Int. Cl.$^5$ E05D *15/58***
**U.S. Cl. 49—254** **16 Claims**

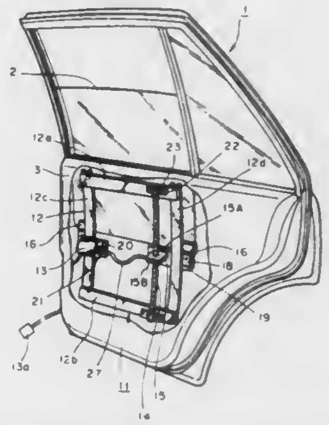


1. A gate for controlling passage through a passageway comprising:
a gatepost;
a barrier having a length and first and second opposite ends, said barrier being movable between a closed position, in which said barrier extends across the passageway, and an open position, in which said barrier is out of the passageway;
fixed means for preventing movement of said barrier transverse to the length of said barrier, said fixed means receiving one of the ends of said barrier in the closed position of said barrier; and
means for mounting said barrier on said gatepost for movement in a plane from said closed position, substantially solely in a direction parallel to the length of said barrier until said barrier is out of said fixed means, to said open position.

---

### 5,012,613
### POWER WINDOW APPARATUS

**Shuji Sekine, Yokohama, Japan, assignor to Jidosha Denki Kogyo K.K., Kanagawa, Japan**
**Filed Feb. 20, 1990, Ser. No. 481,401**
**Claims priority, application Japan, Feb. 22, 1989, 1-20061[U]**
**Int. Cl.$^5$ E05F *11/40***
**U.S. Cl. 49—362** **2 Claims**

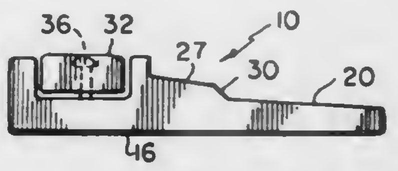


1. A power window apparatus for driving a curved window glass in an opening and closing direction along the curvature of said curved window glass comprising:
support means having a curved window glass movably mounted thereon;
a reversible motor fixedly mounted on said support means;
a curved screw threaded rod having a curvature substantially equal to the curvature of said curved window glass and fixedly mounted on said support means in parallel with said curved window glass;
movable means connected to said curved window glass and engaging said curved screw threaded rod for movement along said rod; and
means connected to said motor and said movable means for driving said movable means along said curved screw threaded rod upon operation of said motor for raising and lowering said curved window glass.

---

### 5,012,614
### BLOW-MOLDED UNITARY THERMOPLASTIC THRESHOLD

**Gregory T. Shea, 8797 Birgham Ct., Dublin, Ohio 43017**
**Filed Nov. 22, 1989, Ser. No. 440,498**
**Int. Cl.$^5$ E06B *1/70***
**U.S. Cl. 49—468** **14 Claims**



1. A blow-molded thermoplastic threshold for attaching to a jamb assembly comprising at least two vertical jambs and a lower horizontal jamb, and having an inside and an outside, which comprises:
a hollow, sealed to the outside one-piece threshold made by blow molding a parison of thermoplastic material and having a bottom adapted to rest on a lower horizontal jamb and having a stiffener rib disposed thereat;
an integral planar tread segment disposed to the outside; and
a transverse U-shaped channel having upstanding inside and outside disposed vertical channel walls, said channel adapted to receive a sill and having sill apertures for

/OL
126
SS
1
MY
7
1991
UMI

receiving threaded elongate members for adjusting the height of said sill, the outside disposed vertical channel wall being joined about its top to an outer, sloping wall that meets said tread segment; wherein at predetermined locations, said bottom being recessed upwardly to engage with the bottom of said outside vertical channel wall and with said sloping wall at its meeting with said tread segment, the bottom recesses having upwardly projecting side weirs from said inner vertical wall to said sloping wall/tread segment meeting, there being a hole in said vertical channel wall at its bottom and in said sloping wall at its meeting with said tread segment for water to flow from within said channel through said holes and onto said tread segment; the bottom or top adjacent each sealed threshold end containing an end channel parallel to each side and adapted to present with each said end at least two walls for said threshold to be attached to vertical side jambs for its installation.

---

### 5,012,615
## HERMETICALLY TIGHT SEALING DEVICE FOR MOTOR VEHICLES

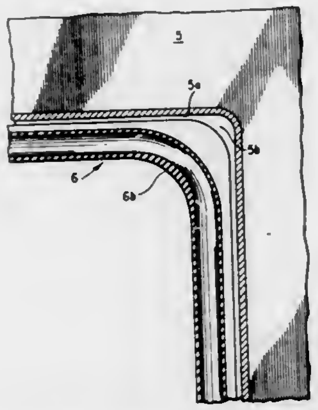
**Dino Piccinini, and Domenico Arabino, both of Rome, Italy, assignors to SMAE - Societa' Meridionale Accessori Elastomerici S.p.A., Italy**

**Continuation-in-part of Ser. No. 297,346, Jan. 17, 1989, abandoned. This application Jul. 19, 1990, Ser. No. 555,679**

**Claims priority, application Italy, Jan. 15, 1988, 19075 A/88**

**Int. Cl.$^5$ E06B *7/16***

U.S. Cl. 49—477 3 Claims



1. A device for hermetically sealing a door of a motor-vehicle, said device comprising:
a sealing strip adapted to extend along a rabbet edge of a body portion of said vehicle and comprising a sealing portion made of an elastically deformable material capable of being compressed and elastically deformed between the rabbet edge to provide a hermetically tight seal between the body portion and the door, said sealing portion comprising a tubular section including (i) an inner portion hermetically closed relative to the ambient and (ii) zones within a same cross-section of said tubular section having differentiated thickness for providing the sealing portion, when the sealing portion is inflated, with a tendency toward dilatation in a predetermined direction relative to said cross-section of said tubular section;
an operation means, connected to said sealing portion, for (i) inflating said sealing portion by passing a fluid into said inner portion of said sealing portion until an inner pressure within said inner portion of said sealing portion reaches a predetermined pressure and maintaining said predetermined pressure within said inner portion of said sealing portion, responsive to said door being closed relative to said body portion of the vehicle and (ii) deflating said inner portion of said sealing portion responsive to said door being opened relative to said body portion of the vehicle.

---

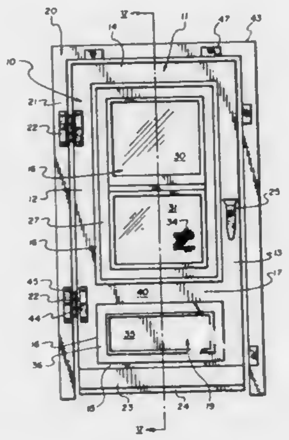
### 5,012,616
## STORM DOOR OF TUBULAR FRAME CONSTRUCTION

**William D. Martin, 5880 S. Jordan Canal Rd., Taylorsville, Utah 84118**

**Filed Apr. 16, 1990, Ser. No. 516,061**

**Int. Cl.$^5$ E06B *3/00***

U.S. Cl. 49—501 7 Claims



1. A door comprising
a frame assembly means including tubular metal frame members, said tubular metal frame members having a uniform rectangular cross-sectional shape, said frame members forming a rectangularly shaped frame of continuous unibody construction, said frame forming at least one opening therein,
an insertion assembly means including a frame having a flange which extends around the entire perimeter of said insertion frame, said flange being attached to said frame assembly means around the entire perimeter of said at least one opening.

---

### 5,012,617
## DUAL PURPOSE GRINDING MACHINE

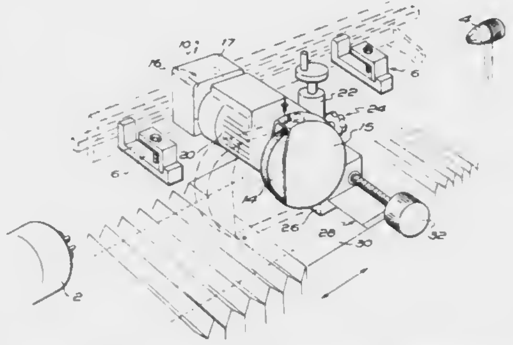
**Ralph Winstanley, Wetmoor Lane, Wath-upon-Dearne, Rotherham S63 7LR, England**

**Continuation of Ser. No. 302,109, Jan. 25, 1989, abandoned, which is a continuation of Ser. No. 61,420, Jun. 12, 1987, abandoned, which is a continuation of Ser. No. 862,264, May 12, 1986, abandoned. This application Sep. 18, 1990, Ser. No. 584,390**

**Claims priority, application United Kingdom, May 21, 1985, 8512770**

**Int. Cl.$^5$ B24B *3/42. 3/55***

U.S. Cl. 51—3 7 Claims



1. A dual purpose grinding machine for grinding mowing machine cylinder blades and bottom blades, selectively, the machine including a common basal surface and respective separate mounting assemblies for locating on the common basal surface for respectively separately mounting a blade cylinder for rotation about its longitudinal axis and for separately mounting a bottom blade in parallel relation to the mounting assembly for the blade cylinder, the mounting assembly for mounting a bottom blade in position for grinding including a pair of spaced brackets for clamping in position on the basal surface and carrying between them a mounting frame for a bottom blade, the mounting frame being provided with means for securing a bottom blade in position thereon and being adjustably clamped to the spaced brackets about a longitudinal axis for varying the angle of the surface of the bottom blade to be ground; a grinding wheel head mounted on guides for transverse movement longitudinally of the blade cylinder and of the bottom blade, whichever is mounted at the time; a mounting for a cylindrical grinding wheel on the grinding wheel head; a mounting for a cupped grinding wheel on the grinding wheel head, the cupped grinding wheel having an axially facing annular grinding surface for grinding the bottom blade; and means for bringing the two grinding wheels to respective operative grinding positions, selectively, for use, by movement of the grinding wheel head about a vertical axis.

---

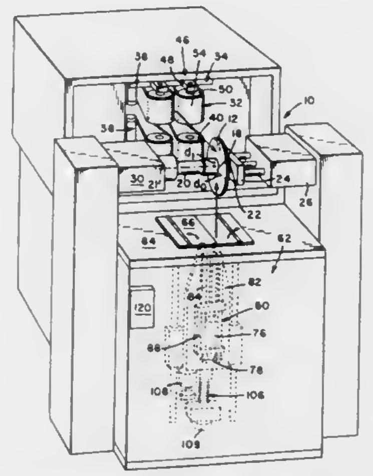
### 5,012,618
## MAGNETIC DISC SURFACE TREATMENT AND APPARATUS

**Rick C. Price, Fremont; Atef H. Eltoukhy, Saratoga, and Yassin Mehmandoust, Berkeley, all of Calif., assignors to HMT Technology Corporation, Fremont, Calif.**

**Filed Dec. 21, 1989, Ser. No. 454,284**

**Int. Cl.$^5$ B24B *21/00***

U.S. Cl. 51—140 3 Claims



1. Apparatus for automated surface treatment of a magnetic disc having known inner and outer diameter dimensions, comprising
a frame;
a drive mechanism attached to the frame adapted for rotating the disc about a fixed, horizontal axis at a selected disc rotation speed,
a tape assembly having movable, belt-like tapes adapted to contact opposite-side surfaces of the disc, at a selected tape speed, with the disc carried on the drive mechanism, when the tape assembly is moved to an operative position and activated to place the tapes in contact with the opposite-side surfaces of the disc,
a head assembly having a pair of heads adapted to fly over the opposite-side surfaces of the disc, with such spinning on the drive mechanism, as the heads are moved from an inner-diameter position to an outer-diameter position adjacent the disc, and activated to position the heads for flying over the spinning disc,
means for moving the tape assembly between its operative position and a retracted position at which the head assembly can be positioned at its inner-diameter position, and for activating the tapes for contacting the surfaces of a disc, when the tape assembly is in its operative position,
means for moving the head assembly from its inner-diameter position to its outer-diameter position, and for activating the heads, to position the heads for flying over the disc as the heads are moved from inner- to outer-diameter positions, and for moving the head assembly from its outer-diameter position to a retracted position at which the tape assembly can be moved to its operative position, said means including a worm screw, and a stepper motor which drives the worm screw, and
programmable means for controlling in a selected sequence the rotation of the disc, the movement and activation of the tape assembly, and the movement and activation of the head assembly, including means for delivering pulses to the stepper motor, at a relatively high rate, when the tape assembly is moved from its retracted position to a position close to its inner-diameter position, and for delivering pulses to the stepper motor at a relatively slow rate when the tape assembly is moved from such close position to the inner-diameter position, and from its inner-diameter to its outer-diameter position.

---

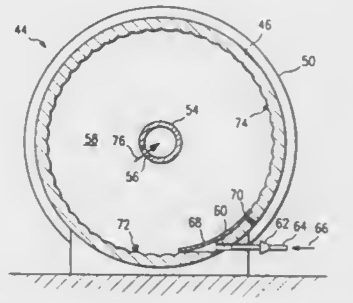
### 5,012,619
## METHOD AND APPARATUS FOR FORMING SPHERES

**Vernon E. Kneppratb, Sherman, and Jules D. Levine, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 21, 1989, Ser. No. 454,617**

**Int. Cl.$^5$ B24B *31/10***

U.S. Cl. 51—163.1 13 Claims



8. An apparatus for transforming irregular-shaped particles to spherical particles, which comprises:
a substantially cylindrical chamber having a top plate and a bottom plate engaged at each end for containing the irregular-shaped particles;
an abrasive lining formed on the interior sides of said chamber;
an inlet line tangentially connected to said chamber;
a gas source coupled to said inlet line for injecting gas into said chamber to form an gas vortex within said chamber, such that the irregular-shaped particles repeatedly collide with said abrasive lining for creating spherical particles.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,012,620

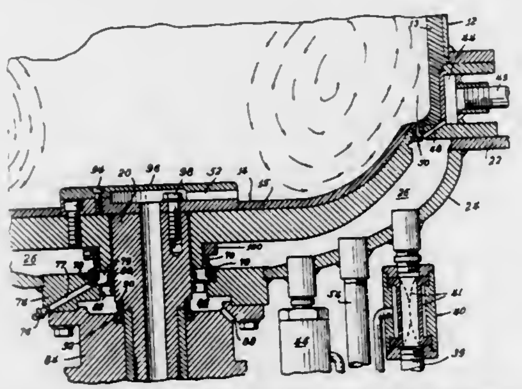
## CENTRIFUGAL FINISHING APPARATUS EMBODYING IMPROVED SEAL AND METHOD

**Gary L. McNeil, Allegan, Mich., assignor to Roto-Finish Company, Inc., Kalamazoo, Mich.**

**Division of Ser. No. 105,273, Oct. 6, 1987, Pat. No. 4,884,372. This application Mar. 2, 1989, Ser. No. 318,078**

**Int. Cl.⁵ B24B** *31/12*

**U.S. Cl. 51—313** **16 Claims**



1. An improved method for finishing parts of workpieces by a process which comprises

subjecting said parts or workpieces to attrition by relative motion with loose, comminuted, granular, or particulate solid finishing material in the presence of a liquid vehicle in a finishing chamber, having an internal cavity and containing surfaces comprising an outer upstanding wall member and an imperforate bottom member which is rotatable with respect to said wall member, with seal means therebetween, characterized by providing said seal means in the form of a resiliently restricted zone around the periphery of said bottom member, said zone being defined by a resilient bottom-forming element on said bottom member and upwardly-extending side walls formed by complementary upwardly-extending surfaces on said bottom member and said upstanding wall member, and forcing fluid under pressure into said zone and thence upwardly into said finishing chamber internal cavity around the periphery of said bottom member and said bottom-forming element, providing separate means for draining fluid from said finishing chamber cavity, and effecting drainage of fluid frcm said cavity otherwise than through said seal means.

---

### 5,012,621

## LIFT SHAFT APPARATUS

**Leslie Power, and John Prewer, both of London, England, assignors to Inventio AG, Hergiswil, Switzerland**

**PCT No. PCT/EP89/00266, § 371 Date Oct. 2, 1989, § 102(e) Date Oct. 2, 1989, PCT Pub. No. WO89/08753, PCT Pub. Date Sep. 21, 1989**

**PCT Filed Mar. 9, 1989, Ser. No. 439,359**

**Claims priority, application United Kingdom, Mar. 15, 1988, 8806063**

**Int. Cl.⁵ E04B** *1/34, 1/348*

**U.S. Cl. 52—30** **15 Claims**

1. An apparatus for assembling a lift shaft comprising:

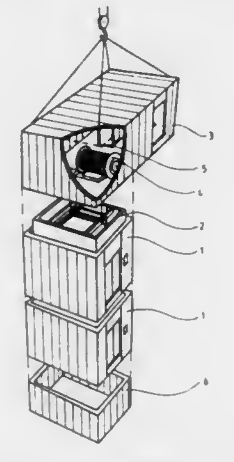
a plurality of separate self-supporting prefabricated lift shaft modules adapted to be stacked to form a lift shaft at a building site;

said plurality of modules being adapted to be used as containers for carrying a fully assembled lift car and counterweight between a factory and said building site;

each of said plurality of modules having a structural strength sufficient to support at least one of said plurality of modules above, said lift shaft formed by said stacked modules being adapted to be supported by a module below an uppermost module of said stacked modules;

said plurality of modules further comprising a module adapted to be an uppermost module, containing winding apparatus for connection to said lif: car and to said counterweight for raising and lowering said lift car and said counterweight in said lift shaft;

each of said plurality of modules comprising a door adapted for operation in conjunction with said lift car for providing access to and from said lift car at each respective module; and



each of said plurality of modules further comprising an upper end and a lower end; a respective encircling flange and sealing strip surrounding each of said upper end and said lower end; and a respective temporary cover to form container-like units.

---

### 5,012,622

## STRUCTURAL FILLER FILLED STEEL TUBE COLUMN

**Takanori Sato; Yasushi Watanabe; Seiho Kitagawa; Hideyo Shiokawa; Tomoo Shokawa; Yutaka Saito; Osamu Hosokawa; Takeshi Sano; Kazunori Koshida; Yasukazu Nakamura; Hideo Nakashima; Kenichi Ikeda, and Yoshihiro Orito, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 107,680, Oct. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 899,549, Aug. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 847,495, Apr. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 835,954, Mar. 4, 1986, Pat. No. 4,722,156. This application Mar. 30, 1990, Ser. No. 503,147**

**Claims priority, application Japan, Mar. 5, 1985, 60-42979; Mar. 7, 1985, 60-45285; Apr. 23, 1985, 60-87172; Apr. 23, 1985, 60-87173; Jul. 3, 1985, 60-146386; Jul. 16, 1985, 60-156365; Jul. 16, 1985, 60-156366; Sep. 2, 1985, 60-193388; Sep. 24, 1985, 60-210453; Sep. 24, 1985, 60-210454; Sep. 24, 1985, 60-210456; Oct. 28, 1985, 60-241049; Dec. 25, 1985, 60-295377; Dec. 28, 1985, 60-299531; Jan. 10, 1986, 61-3179; Sep. 18, 1987, 62-234374**

Int. Cl.⁵ E04C *3/34*

U.S. Cl. 52—725 8 Claims

1. A structural filler filled steel tube column, comprising:

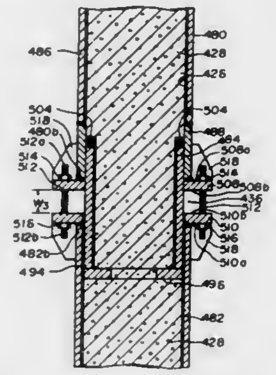
(a) an axially extending steel tube having an inner face and including upper and lower tube sections;

(b) a core made from the structural filler disposed within the steel tube;

(c) a first separating layer, interposed between the inner face of the steel tube and the core, for separating the core from the inner face of the steel tube so that the steel tube is unbonded to the core;

(d) the upper and lower tube sections being axially spaced apart and forming an axial gap therebetween, said axial gap circumferentially extending completely around the steel tube and comprising axial stress reducing means, said gap having a variable axial length and being adapted to reduce said axial length when the steel tube is axially displaced due to an axial load applied thereto;

(e) a cylindrical member axially extending completely between the upper and lower tube sections and radially disposed between the core and the gap, said cylindrical member forming an inside closure for said gap and maintaining the core separated from the gap while permitting axial movement of the upper tube section relative to the lower tube section; and



(f) axial load transmitting means, mounted to the steel tube, for transmitting the axial load, applied to the steel tube, to the corc.

---

### 5,012,623

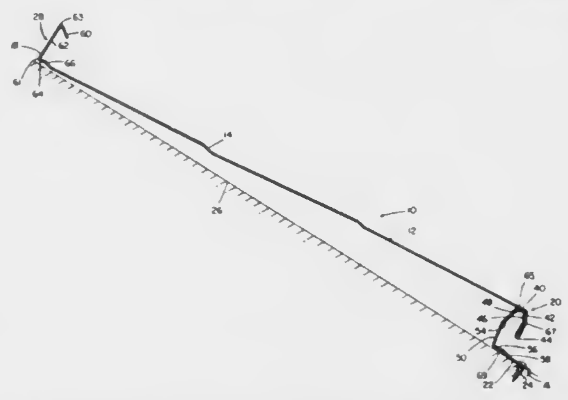
## METHODS OF INTERLOCKING PANELS AND PANEL STRUCTURES USEFUL THEREIN

**Duane F. Taylor, Salem, Oreg., assignor to Janet R. Taylor, Salem, Oreg.**

**Filed Mar. 22, 1990, Ser. No. 497,463**

**Int. Cl.⁵ E04D** *3/362*

**U.S. Cl. 52—531** **20 Claims**



5. An interlocking panel capable of being installed from the top of an underlying structure downward and of generating a horizontal pattern upon installation of a plurality of panels of substantially similar type, the panel comprising:

a primary panel portion having an uphill side and a downhill side;

a housing disposed along the downhill side of the primary panel portion, the housing comprising an accepting mechanism, a directing mechanism, a tensioner, and an interlocking mechanism; and

a locking mechanism disposed along the uphill side of the primary panel portion,

wherein the accepting mechanism permits introduction of a locking mechanism of a next adjacent panel into the housing;

wherein the directing mechanism directs the locking mechanism of the next adjacent panel into a relationship of maximum tension with the housing of the panel;

wherein the tensioner causes the housing to reversibly deform in response to a force exerted in installing the locking mechanism of the next adjacent panel;

wherein the interlocking mechanism directs the locking mechanism of a next adjacent panel into a relationship of lesser tension within the housing and locks the next adjacent panel in that relationship.

---

### 5,012,624

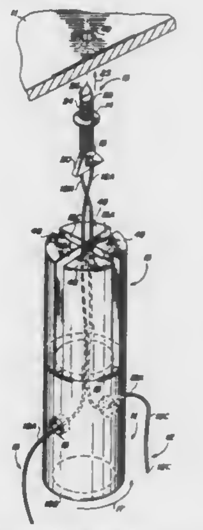
## METHOD AND APPARATUS FOR INSTALLING WIRE ANCHORS FOR SUSPENDED CEILINGS

**Steven W. Dahlgren, 7226 W. Sierra St., Peoria, Ariz. 85345**

**Filed Jun. 19, 1989, Ser. No. 367,967**

**Int. Cl.⁵ E04B** *9/18*

**U.S. Cl. 52—484** **2 Claims**



2. A system for installing an anchor in a metal panel in a ceiling, said system including

(a) a secondary aperture formed through said metal panel;

(b) a unitary elongate anchor--hanger member including

(i) a first end positioned below said ceiling and having a contact surface and a wire receiving aperture formed through said first end, and

(ii) a second end having a distal tip and a threaded portion,
said threaded portion
contacting said secondary aperture,
having an inner thread diameter, and
having an outer thread diameter;

(c) an elongate wire extending through said wire receiving aperture and having first and second portions

(i) interconnected at said aperture,

(ii) each having a distal end, and

(iii) each extending outwardly away from said aperture and said anchor--hanger member in opposed relationship;

(d) a collar member

(i) attached to said anchor--hanger member intermediate said first and second ends,

(ii) outwardly extending from said anchor--hanger member, and

(iii) contacting said ceiling,

said collar member preventing said anchor--hanger member from being turned further into said secondary aperture;

(e) drill means attached to said first end of said anchor---hanger member to rotate said anchor--hanger member and said distal tip, said distal tip being shaped and dimensioned to drill, when rotated and pressed against said metal panel, a primary aperture through said panel having a diameter of at least ten percent less than said inner thread diameter such that when said threaded portion is

OL
126
SS
1
MY
7
1991
UMI

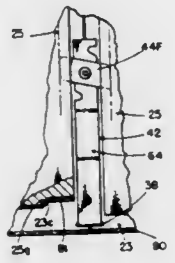
turned through said primary aperture, the portion of said metal panel adjacent said primary aperture is outwardly deformed from said metal panel and away from said first end of said anchor--hanger member to enlarge said primary aperture to form said secondary aperture to permit said threaded portion to turn into and contact said secondary aperture, said drill means including

- (i) an elongate torque member having at least one radial slot shaped and dimensioned to slidably removably receive said first end to engage said contact surface and rotate said anchor--hanger member to cause said distal tip to drill said primary aperture when said torque member is rotated,
- (ii) means for rotating said torque member,
- (iii) a hollow formed through said torque member to slidably removably receive said first and second portions of said wire such that
  - when said slot receives said contact surface and said torque member rotates said anchor--hanger said first and second portions of said wire rotate simultaneously with said anchor member and said torque member, and
  - when said torque member turns said threaded portion into said secondary aperture until said collar member contacts said ceiling and said torque member is pulled free from said first end and said first and second portions of said wire remain in said hollow, rotating said torque member causes said first and second portions to twist around one another to secure said wire in said first end of said anchor--hanger member.

---

### 5,012,625
### BUILDING ENCLOSURE SYSTEM AND METHOD

**Robert L. Propst, 18845 NE. 49th Pl., Redmond, Wash. 98052**
**Division of Ser. No. 208,896, Jun. 17, 1988. This application Feb. 12, 1990, Ser. No. 478,343**
**Int. Cl.⁵ E04H** *1/00*
**U.S. Cl. 52—241** **10 Claims**



1. In combination:

a series of floor rail sections placed end-to-end at meeting ends defining a series of floor rail joints;

a series of upright wall panels seated on respective of said rail sections in side-by-side relation defining a series of vertical panel joints directly above said floor rail joints;

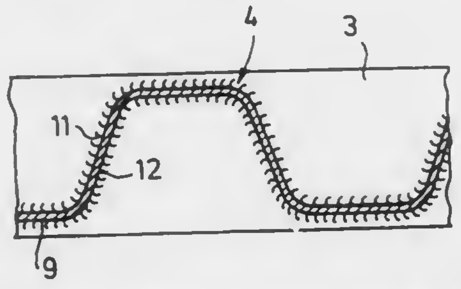
interfitting positioning means between said panels and floor rail sections for preventing motion of the lower ends of said panels longitudinally of said floor rail sections without restricting vertical motion of said panels; and

a series of hold-down means gripping said panels at said panel joints at locations spaced above said rail sections and interfitting with said rail sections in adjoining keeper slots therealong located at opposite sides of each said floor rail joint.

---

### 5,012,626
### STRUCTURAL BAR

**Hans Spelten, Frankstrasse 21, D-4054 Nettetal 2, Fed. Rep. of Germany**
**Continuation of Ser. No. 418,787, Oct. 3, 1989, abandoned, which is a continuation of Ser. No. 355,149, May 16, 1989, abandoned, which is a continuation of Ser. No. 116,572, Sep. 1, 1987, abandoned. This application Feb. 15, 1990, Ser. No. 481,793**
**Claims priority, application Fed. Rep. of Germany, Jan. 8, 1986, 8600280[U]**
**Int. Cl.⁵ E04C** *3/07*
**U.S. Cl. 52—729** **12 Claims**



1. A structural bar having a longitudinal length and a lateral width comprising separate chord and web elements welded together to provide the structural bar with uniform load bearing properties, said chord elements comrpising weldable metal upper and lower chords extending along the longitudinal length and lateral width of the structural bar, each of said chords having a substantially uniform thickness extending along the length and width of the structural bar, said web element comprising a flat plate of weldable metal having a substantially uniform height extending between upper and lower extremities respectively connected by continuous welds to said upper and lower chords and bulges extending in alternating lateral directions toward opposite lateral edges of said structural bar, said flat plate having said bulges therein arranged in an open-bottomed trapezoidal shape, and said bulges comprising angular sections of said flat plate joined by curved portions of said flat plate, said flat plate comprising a substantially continuous and uninterrupted strip of metal having a thickness and the curved portion thereof having a radius of curvature at each curved portion at least as large as $1\frac{1}{2}$ times the thickness of the strip of metal, whereby said web is free of sharp-edged or acute junctions between angular sections of said bulges which tend to cause uncontrollable variations in the properties of the web and the load capacity of the structural bar.

---

### 5,012,627
### CONSTRUCTION PROCESS FOR MULTIPLE-STORY CONCRETE BUILDING

**Bo J. Lundmark, 3219 Overland Ave., #9197 Los Angeles Calif. 90034**
**Filed May 25, 1989, Ser. No. 357,331**
**Int. Cl.⁵ E04B** *1/16*
**U.S. Cl. 52—741** **18 Claims**

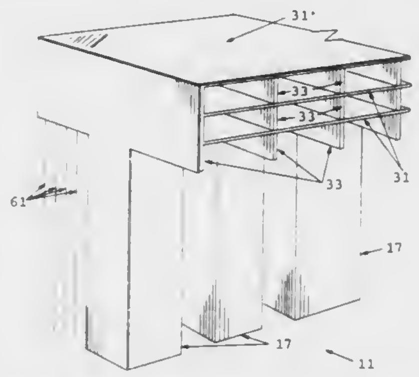
1. A process for constructing a multiple-story, concrete building comprising steps of:

erecting a multiple-story core tower;

constructing forms for a floor slab and integral concrete wall positioned beneath the floor slab, projecting horizontally outwardly from the multiple-story core tower, at or near the top of the tower, and further constructing a horizontal support structure for supporting the forms;

placing concrete in the forms, to produce a floor slab and integral underlying wall, wherein the weight of the floor slab and integral wall is transferred directly to the core tower;

lowering the forms and horizontal support structure a predetermined distance beneath the previously produced floor slab and integral wall; and

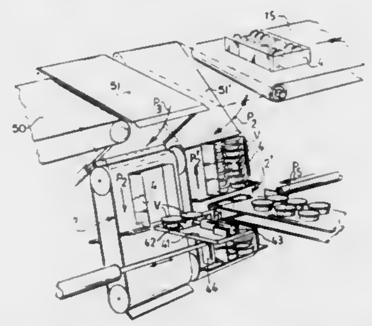


repeating the steps of placing and lowering until a selected number of floor slabs and underlying integral walls have been produced, wherein the weight of each such floor slab and integral wall is transferred directly to the core tower.

---

### 5,012,628
### METHOD AND APPARATUS FOR ARRANGING ARTICLES

**Jan J. J. Van Oord, Ulvenhout, Netherlands, assignor to Breda Packaging B.V., Breda, Netherlands**
**Filed Aug. 21, 1989, Ser. No. 396,243**
**Claims priority, application Netherlands, Aug. 22, 1988, 8802075**
**Int. Cl.⁵ B65B** *5/10, 35/40*
**U.S. Cl. 53—448** **17 Claims**



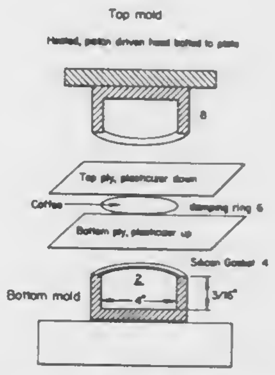
1. A method for continuous arrangement of rows of articles in a container, said container having a bottom surface, a first side edge extending from said bottom surface and an open upper end opposed to said bottom surface, said method comprising:

- (a) feeding said container along a substantially horizontal upper plane, wherein said bottom surface of said container lies in said upper plane;
- (b) transferring said container downwardly from said upper plane and into a nonhorizontal position such that said bottom surface of said container lies in a nonhorizontal plane and said first side edge of said container is positioned downwardly;
- (c) stacking a first row of said articles in said container upon said first side edge, said first row containing a predetermined number of said articles;
- (d) moving said container downwardly along said nonhorizontal plane a sufficient distance to permit stacking an additional row of said articles upon a previously stacked row of said articles, and stacking said additional row of said articles upon said previously stacked row of articles, until said container includes a predetermined number of rows of said articles;
- (e) transferring said container upwardly along said nonhorizontal plane and returning said container to said upper plane such that said bottom surface of said container lies in said upper plane; and
- (f) removing said container along said upper plane.

---

### 5,012,629
### METHOD FOR PRODUCING INFUSION COFFEE FILTER PACKS

**Warren C. Rehman, Flemington, N.J., and Michael E. Delonis, Croton-On-Hudson, N.Y., assignors to Kraft General Foods, Inc., Glenview, Ill.**
**Filed Oct. 11, 1989, Ser. No. 419,861**
**Int. Cl.⁵ B65B** *47/00*
**U.S. Cl. 53—453** **10 Claims**


Top mold
Heated, piston driven head bolted to plate
8
Top ply, plasticizer down
Coffee
clamping ring 6
Bottom ply, plasticizer up
Silicon Gasket 4
Bottom mold
2
4"
3/16"

1. A method for producing drip infusion coffee filter packs having loose ground coffee therein comprising:

- a. placing a first strip of filter paper adjacent to an integral and unitary mold defining an integral and unitary cylindrical mold pocket, and causing the first strip of filter paper to stretch and conform to the integral and unitary cylindrical mold pocket while increasing the surface area of the first strip of filter paper by at least three per cent relative to its area prior to the stretching and conforming step;
- b. depositing a measured quantity of loose ground coffee into the integral and unitary cylindrical mold pocket over the first strip of filter paper stretched and conformed thereto;
- c. placing a second substantially flat and unstretched strip of filter paper over the first strip of filter paper and the loose ground coffee in the integral and unitary cylindrical mold pocket while providing a head space of at least 50% of the volume of the pocket between said first and second strips of filter paper to provide for expansion of the ground coffee during brewing;
- d. sealing the first stretched strip of filter paper and the second flat and unstretched strip of filter paper together in a flange area having a width of substantially one half inch around the loose ground coffee deposited in the integral and unitary mold pocket; and
- e. trimming the filter paper around the one half inch wide flange area, wherein the presence of the one half inch flange in combination with the increased surface area of the first strip of filter paper and the provided head space results in a brewed coffee having an increase in soluble solids extraction, and also results in a decrease in the standard deviation of soluble solids extraction.

---

### 5,012,630
### CLOSURE APPLICATION SYSTEM

**Keith W. Ingram, Portage, Mich.; Mark J. Schoenlein, and Clifford T. Harger, both of Perrysburg, Ohio, assignors to Owens-Illinois Closure Inc., Toledo, Ohio**
**Filed Mar. 1, 1990, Ser. No. 486,996**
**Int. Cl.⁵ B65B** *7/28, 3/20*
**U.S. Cl. 53—490** **13 Claims**

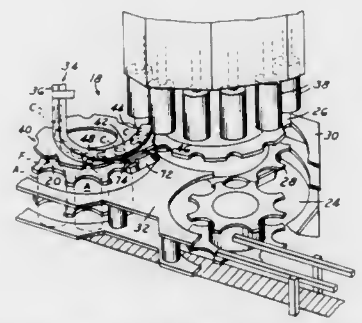
1. In the method of handling of plastic closures for applying threaded caps to threaded necks of containers for delivery to a rotary capping machine wherein the containers are moved in

VOL 126
ISS 1
MY 7 1991
UMI

an arcuate path successively in an upright position and a plastic closure is provided in loose engagement on the neck of each container, the improvement for applying plastic closure having tamper indicating bands comprising

moving the containers in said arcuate path to said capping machine at a spacing such that more than one closure and container are in a portion of said arcuate path,

providing successive independent closely spaced vertical forces downwardly into said portion of said arcuate path of the closures and containers such that the containers with the closures thereon are subjected successively to independent downward forces on the loosely positioned closures as the containers and closures are moved in said portion of said arcuate path, and



simultaneously applying a friction force to the periphery of the closures throughout a portion of the arcuate path during which the downward forces are being applied such that more than one closure has said force applied thereto and each closure is rotated relative to the container through at least one rotation to insure a pre-threading of the closure on the container before it is delivered to the capping machine.

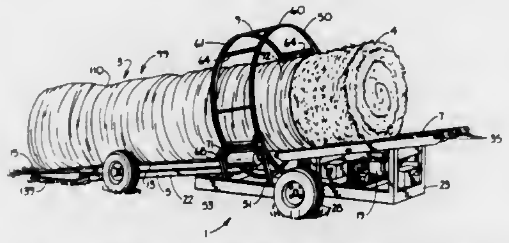
### 5,012,631
### BALE WRAPPER

**Dewey L. Hostetler; David L. Lansdowoe, and Delmar Hostetler, all of Harper, Kans., assignors to DewEze Manufacturing, Inc., Harper, Kans.**

**Filed Dec. 27, 1989, Ser. No. 457,491**

**Int. Cl.$^5$ B65B** *13/12*

**U.S. Cl. 53—588** **18 Claims**



1. An apparatus for wrapping hay bales with a web of weather resistant material comprising:

(1) an elongate frame;

(b) infeed conveyor means mounted on said frame and adapted to receive upwrapped bales;

(c) bale wrapping means mounted on said frame adjacent to said infeed conveyor means; said bale wrapping means for wrapping a continuous web in a helical path about a series of bases so as to form a row of bales in a single protective cocoon of said web material; said infeed conveyor means adapted to transport bales to said bale wrapping means and urge bales through said bale wrapping means;

(d) outfeed conveyor means mounted on said frame adjacent to said wrapping means for receiving bales from said wrapping means, controlling the speed of bales being transported through said wrapping means resulting in a uniform and continuous wrapping of said web material about the bales and transporting wrapped bales to the ground; and

(e) motor means for operatively motivating said infeed conveyor means, said bale wrapping means and said outfeed conveyor means; said motor means also operatively propelling said elongate frame during bale wrapping so as to synchronize the discharge of bales from the apparatus to place wrapped bales in generally adjacent end-to-end relationship within the cocoon of the web material; and

(f) control means cooperating with said motor means for independently driving:

(1) said infeed conveyor means;

(2) said wrapping means;

(3) said elongate frame; and

(4) said outfeed conveyor means.

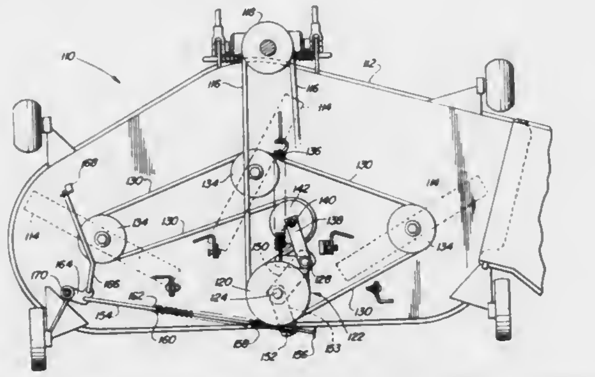
### 5,012,632
### BELT TENSIONER

**John B. Kuhn, Rubicon; Kenneth E. Hunt, Oconomowoc, and Christopher S. Thorman, Beaver Dam, all of Wis., assignors to Deere & Company, Moline, Ill.**

**Filed Mar. 5, 1990, Ser. No. 488,197**

**Int. Cl.$^5$ A01D** *69/08;* **F16H** *7/08*

**U.S. Cl. 56—11.6** **29 Claims**



1. An improved vegetation mower usable with a vehicle having a power source, said mower including:

a deck carried by the vehicle;

blades carried by the deck for cutting vegetation;

a primary belt driven by the power source;

a shiftable primary pulley that engages the primary belt;

means for biasing the primary pulley to shift into engagement with the primary belt;

a secondary drive means coupling the primary belt with the blades; and

means for selectively shifting the primary pulley by exerting force on the primary pulley, said means being positionable in a first mode wherein the shifting means biases the primary pulley into the primary belt to tension the primary belt, a second released mode wherein the shifting means exerts no force on the primary pulley, and a third mode wherein the shifting means exerts a force on the primary pulley in a direction away from engagement with the primary belt to shift the primary pulley away from the second mode and away from engagement with the primary belt, such that the force applied by the biasing means is overcome.

### 5,012,633
### LAWN MOWER

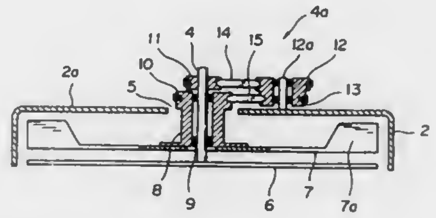
**Kunio Ito; Takeshi Konno, and Yutaka Tabata, all of Saitama, Japan, assignors to Honda Giken Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 2, 1990, Ser. No. 503,476**

**Claims priority, application Japan, Apr. 3, 1989, 1-84552; Apr. 3, 1989, 1-84553; Apr. 3, 1989, 1-84884**

**Int. Cl.$^5$ A01D** *34/73, 34/76, 34/82, 55/00*

**U.S. Cl. 56—12.9** **12 Claims**



7. A lawn mower comprising:

a cutter housing;

means rotatably supported within said housing for cutting grass;

means for discharging grass clippings cut by said cutting means out of said housing, said discharge means being rotatably supported within said housing upwardly of said cutting means; and

means for rotating said cutting means at a first speed and for rotating said discharge means at a second speed lower than said first speed;

said cutting means being adapted to cut grass while generating substantially no turbulent air flows.

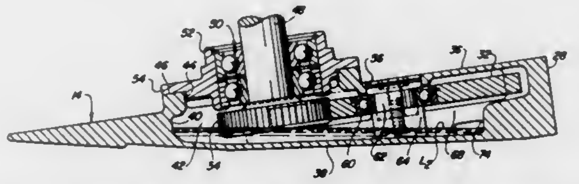
### 5,012,634
### CUTTERBAR GEAR HOUSING DESIGN FOR CONTAINING GEAR LUBRICATION FLUID

**James C. Walters; Craig A. Richardson, and Michael J. Verhulst, all of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Jun. 1, 1990, Ser. No. 531,604**

**Int. Cl.$^5$ A01D** *34/30*

**U.S. Cl. 56—13.6** **9 Claims**



1. In a cutterbar of a rotary mower including a plurality of cutter units mounted in spaced relationship along the length of the cutterbar and coupled for being driven by a spur gear train contained within a fluid tight gear housing defined by the cutterbar, the improvement comprising: said gear housing, when in its highest cutting position, including a top wall which is generally horizontal and a bottom wall which converges forwardly throughout its length toward the top wall from a generally upright rear wall such that the housing has a generally wedge shaped interior with the thickest dimension of the interior being towards the rear of the interior; and said gear train being disposed adjacent said top wall and thereby establishing a relatively large void in said interior below said gear train for serving as a lubricant reservoir.

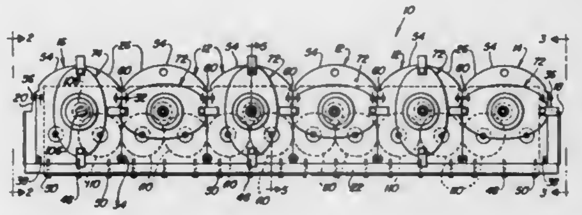
### 5,012,635
### MODULAR CUTTERBAR FOR ROTARY MOWER

**James C. Walters; Craig A. Richardson, and Michael J. Verhulst, all of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Jun. 1, 1990, Ser. No. 531,605**

**Int. Cl.$^5$ A01D** *34/44*

**U.S. Cl. 56—13.6** **14 Claims**



1. In a cutterbar for a rotary mower including right end, left end and intermediate modules connected together in end-to-end relationship to each other with each module including a cutting unit comprising a drive shaft having a pinion gear fixed to the lower end thereof, the improvement comprising: said modules respectively including identical gear housing sections; each housing section having transversely spaced substantially planar, fore-and-aft extending vertical end faces, with the cutting unit being located substantially centrally therebetween and with adjacent housing sections being releasably secured together with adjacent ones of the end faces thereof being in engagement with each other; the respective housing sections of each of the right and left modules having at least one spur-type idler gear mounted therein in mesh with the respective pinion gear thereof; and the respective housing sections of the intermediate modules each having two idler gears mounted therein with at least one of the idler gears being meshed with the pinion gear thereof.

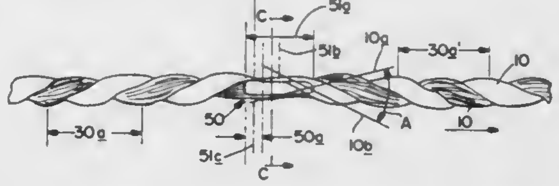
### 5,012,636
### APPARATUS AND PROCESS FOR FORMING ALTERNATE TWIST PLIED YARN AND PRODUCT THEREFROM

**Donald E. Hallam; Peter Popper, both of Wilmington, Del.; Harold F. Staunton, Avondale, Pa., and Paul W. Yngve, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 188,559, Apr. 29, 1988, Pat. No. 4,873,821, which is a continuation-in-part of Ser. No. 181,847, Apr. 15, 1988, abandoned. This application Mar. 13, 1989, Ser. No. 322,624**

**Int. Cl.$^5$ D02G** *3/28, 3/40*

**U.S. Cl. 57—204** **13 Claims**



1. An alternate twist plied yarn formed from a plurality of strands ply twisted in alternating directions in lengthwise intervals of first half-cycles of ply-twist followed by second half-cycles of ply-twist between reversal nodes, there being a bond formed adjacent each node wherein the first half-cycle of ply-twist is located within the bond and the second half-cycle of ply-twist originates at one end of the bond.

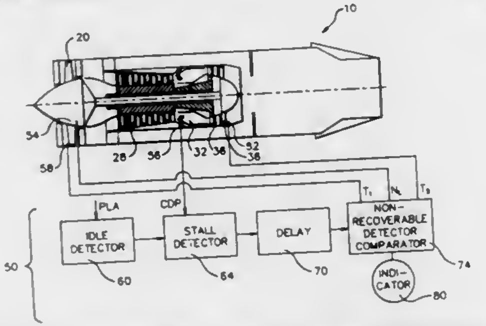
VOL
1126
ISS
1
MY
7
1991
UMI

### 5,012,637

### METHOD AND APPARATUS FOR DETECTING STALLS

**Murray L. Dubin, Peabody, and Linda J. Smith, Danvers, both of Mass., assignors to General Electric Company, Cincinnati, Ohio**

**Filed Apr. 13, 1989, Ser. No. 337,690**
**Int. Cl.$^5$ F02C** *9/00*
**U.S. Cl. 60—39.02** **4 Claims**



1. A gas turbine engine control system for use on a gas turbine engine including a fan and a combustor;
   means for receiving a first signal indicative of engine speed and proportional to said speed;
   means for receiving a temperature signal representative of the engine temperature downstream of said engine combustor;
   comparator means for receiving said first signal and said temperature signal and for producing a nonrecoverable stall output signal when said temperature signal indicates the temperature is greater than a scheduled value for the given first signal; and
   delay means for delaying said nonrecoverable stall output signal for a predetermined period of time, said delay means including a means for comparing a predetermined number of previous values of said temperature signal and said scheduled value and delaying said nonrecoverable output stall signal until said previous temperature signals indicate that the previous temperatures are greater than the previous scheduled values.

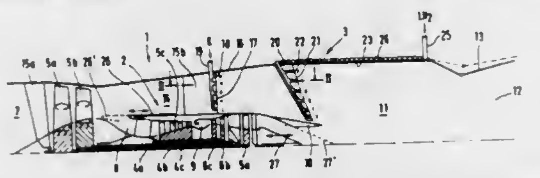
---

### 5,012,638

### FUEL FEED METHOD AND APPARATUS FOR A TURBORAMJET ENGINE

**Hubert Grieb, Germering; Burkhard Simon, Röhrmoos, and Martin Albers, Munich, all of Fed. Rep. of Germany, assignors to MTU Motoren- Und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany**

**Filed Aug. 31, 1989, Ser. No. 401,237**
**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 3829775; Oct. 29, 1988, 3836912**
**Int. Cl.$^5$ F02K** *7/16*
**U.S. Cl. 60—224** **3 Claims**



1. Fuel feed method for a turboramjet engine for a hypersonic aircraft, having a combined combustion chamber operable as a turbine engine afterburner and a ramjet engine combustion chamber, where before being injected, liquid hydrogen is used for cooling a combustion chamber wall, wherein kerosene and hydrogen are simultaneously injected into the combustion chamber such that combustion in the combustion chamber is sustained essentially by means of kerosene in a lower Mach number range, wherein over the entire Mach number range, hydrogen is added at least sufficiently to adequately cool the combustion chamber wall on the one hand and to achieve an adequately high combustion chamber temperature to support economical combustion of kerosene on the other, and wherein at growing Mach number, the kerosene/hydrogen feed ratio is increasingly growing richer in hydrogen.

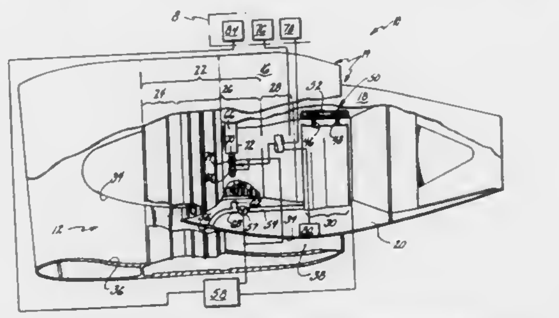
---

### 5,012,639

### BUFFER REGION FOR THE NACELLE OF A GAS TURBINE ENGINE

**Jeffrey L. Ream, Tolland, and Robert Bubello, North Meriden, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Jan. 23, 1989, Ser. No. 300,516**
**Int. Cl.$^5$ F02K** *3/02;* **F02C** *7/12*
**U.S. Cl. 60—226.1** **18 Claims**



1. A buffer system for the nacelle of a turbofan gas turbine engine, which comprises:
   a nacelle wall extending circumferentially about the engine having an interior and an exterior, the nacelle wall having an opening in the nacelle wall for flowing air from the exterior of the nacelle to the interior;
   a buffer region on the interior of the nacelle having a portion of at least one coolable component disposed therein;
   a passage for buffer air in flow communication with the opening in the nacelle wall and with the buffer region on the interior of the nacelle; and,
   means for positively moving air through said passage to the preselected buffer region after cessation of engine operation, said means including a source of energy which is not dependent on engine operation to supply energy after engine operation to enable operation of the means after the cessation of engine operation;
   wherein the buffer air region blocks air in the nacelle which is heated by the engine after engine operation from transferring heat by convection to said component.

---

### 5,012,640

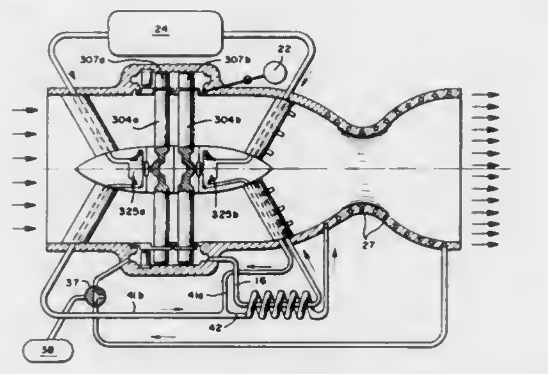
### COMBINED AIR-HYDROGEN TURBO-ROCKET POWER PLANT

**Francois J. Mirville, Melun, France, assignor to Societe Nationale D'etude et de Construction De Moteurs D'Aviation (S.N.E.C.M.A.), Paris, France**

**Filed Mar. 13, 1989, Ser. No. 322,512**
**Claims priority, application France, Mar. 16, 1988, 88 03367**
**Int. Cl.$^5$ F02M** *67/00, 2/08;* **F01D** *5/20*
**U.S. Cl. 60—246** **20 Claims**

1. An airbreathing, liquid hydrogen turbo-rocket engine comprising:
   (a) an air duct defining an air intake;
   (b) an axial air compressor having at least one pair of compressor rotor stages, each having a rotor stage wheel with a plurality of compressor blades disposed within the air duct;
   (c) nozzle means operatively associated with the air duct to exhaust gases therefrom;
   (d) means defining at least one annular chamber extending around the air duct in the plane of the rotor stages;
   (e) turbine means disposed in the at least one annular chamber comprising:
      (i) at least one durbine stator vane stage; and,
      (ii) at least one turbine rotor blade stage with at least one turbine blade operatively associated with each of the compressor blades of each of the compressor stages such that rotation of the turbine rotor stages causes rotation of the at least one pair of compressor rotor stages;

   (f) a source of hydrogen;
   (g) pump means to pump the hydrogen from the source into the annular chamber so as to rotate the turbine rotor stage; and,



   (h) exhaust means to exhaust hydrogen from the annular chamber into the air duct.

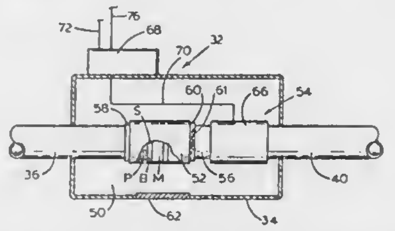
---

### 5,012,641

### EMISSIONS CONTROL SYSTEM FOR USE IN CONJUNCTION WITH AN IC ENGINE PRIMARY EMISSIONS CONTROL SYSTEM

**Lucy M. Travalee, 2439 Consaul Rd., Schenectady, N.Y. 12304**

**Filed Jun. 8, 1989, Ser. No. 362,945**
**Int. Cl.$^5$ F01N** *3/02;* **F02B** *35/00*
**U.S. Cl. 60—297** **2 Claims**



1. Apparatus for removing impurities from exhaust gases emitted by an internal combustion engine having an exhaust manifold into which engine exhaust gases are introduced for disposal, an exhaust pipe fluidically connected at an inlet end thereof to said exhaust manifold and having an outlet end, comprising
   (A) a primary emissions control system having a housing with an inlet end fluidically connected to said exhaust pipe outlet end, a catalyst material therein through which engine exhaust gases from said exhaust pipe flow, and an outlet end,
   (B) a tailpipe having an inlet end fluidically connected to said primary emissions control system outlet end;
   (C) a releasable coupling on said tailpipe adjacent to said tailpipe outlet;
   (D) an inlet conduit having an inlet end fluidically connected to said tailpipe outlet by said releasable coupling and an outlet; and
   (E) apparatus which cleans gases exhausted from said primary emissions control system and which includes
      (1) a tubular housing having an inlet fluidically connected to said inlet conduit outlet and receiving exhaust gases therefrom,
      (2) a central chamber defined in said tubular housing, said inlet conduit extending into said tubular housing central chamber,
      (3) exhaust gas treatment means in said central chamber, said exhaust gas treatment means including a cartridge,
      (4) first coupling means releasably connecting said cartridge to said inlet conduit,
      (5) a connecting conduit in said central chamber,
      (6) a second coupling means releasably connecting said cartridge to said connecting conduit, and
      (7) an exhaust gas flow control means in said central chamber and which is connected to said connecting conduit, said exhaust gas flow control means including
         (a) a fan having an inlet thereof fluidically connected to said connecting conduit and an outlet,
         (b) an exhaust conduit extending into said central chamber and having an inlet fluidically connected to said fan outlet and an outlet to atmosphere,
         (c) a motor mounted on said tubular housing and powering said fan, said motor being connected to an electrical system of the internal combustion engine, and
         (d) a control system connected to said fan motor and including a pressure sensor located in said engine exhaust manifold, a microprocessor connected to said pressure transducer and to said fan motor and varying fan speed as gas pressure in the engine exhaust manifold varies, said control system maintaining a preset pressure drop between the engine exhaust manifold and atmosphere, and
      (8) an access door in said tubular housing adjacent to said cartridge, said access door being sized to permit said cartridge to move into and out of said tubular housing via said access door.

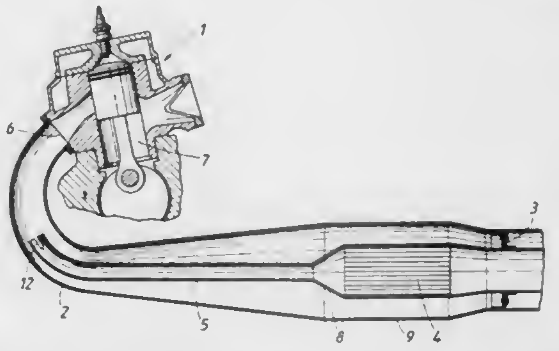
---

### 5,012,642

### EXHAUST SYSTEM FOR TWO-STROKE CYCLE INTERNAL COMBUSTION ENGINES

**Franz Laimböck, Waldsdorfberg 86, A-8051 Graz-Thal, Austria**

**Filed May 8, 1990, Ser. No. 520,261**
**Claims priority, application Austria, Jun. 1, 1989, 1331/89**
**Int. Cl.$^5$ F01N** *3/18*
**U.S. Cl. 60—299** **5 Claims**



1. In an exhaust system for connection to an exhaust gas outlet of a two-stroke cycle internal combustion engine, which exhaust system comprises
   a tubular diffuser having an inlet end and an outlet end and flaring in the direction from said inlet end to said outlet end and adapted to be connected at said inlet end to said exhaust gas outlet,
   a shell, which is connected to said diffuser at said outlet end and is equal in diameter to said outlet end.
   a tubular structure, which is connected to said shell at its end that is opposite to said diffuser,
   a catalytic converter, which is contained in said shell and has upstream and downstream ends and defines a first annular clearance space with said shell,
   a diffuser discharge pipe, which extends in said diffuser and is much smaller in diameter than said shell and is connected to said converter at its upstream end,
   a converter outlet pipe, which is connected to said converter at its downstream end and extends through said tubular structure and defines a second annular clearance space therewith, and
   an annular baffle, which is spaced from said converter and surrounds said outlet pipe in said tubular structure and seals said second clearance space around said outlet pipe,
the improvement residing in that

VOL
1126
ISS
1
MY
7
1991
UMI

said discharge pipe has a discharge pipe inlet, which is close to said inlet end of said diffuser, and

said discharge pipe has opposite to said discharge pipe inlet a discharge pipe outlet, which is connected by a steep funnel to said upstream end said converter.

---

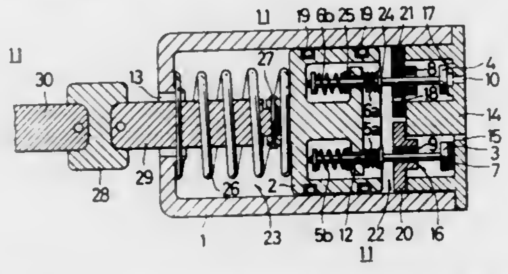
### 5,012,643
### PRESSURE-DRIVEN ENGINE

**Masanobu Higami, 14-10, 2-chome, Asahi-machi, Takarazuka-shi, Hyogo-ken, Japan**

**Filed Dec. 7, 1989, Ser. No. 447,552**

**Int. Cl.$^5$ F16D *31/02***

U.S. Cl. 60—369 **4 Claims**



1. A pressure-drive engine which is composed of an engine body comprising:

a cylinder provided with an air hole at one end thereof, and an intake hole connected to a pressure source and an exhaust hole on the other end thereof;

a piston slidably inserted into said cylinder and having a return spring around a piston rod thereof;

an intake valve and an exhaust valve for opening and closing said intake hole and said exhaust hole, respectively, each of said intake valve and said exhaust valve having a valve rod slidably inserted into a corresponding pair of sliding portions provided at one end of said piston and a pair of springs which are provided around said valve rod on both sides of said corresponding sliding portion;

an intake magnet opposed to the intake valve so as to open said intake hole by attracting said intake valve; and

an exhaust magnet opposed to said exhaust valve so as to open said exhaust hole by attracting said exhaust valve.

---

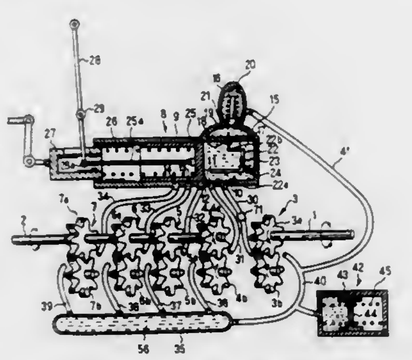
### 5,012,644
### AUTOMATIC SPEED CHANGING APPARATUS

**Tokuichiro Yoshida, 13-14 Ise-cho, Kawasaki-ku Kawasaki-shi, Japan**

**Filed Mar. 8, 1989, Ser. No. 320,593**

**Int. Cl.$^5$ F16D *31/02***

U.S. Cl. 60—425 **15 Claims**



1. An automatic speed changing apparatus comprising;

at least one hydraulic pump on the driving side having suction and outlet ports and being mounted on a driving shaft operatively connected to an engine drive shaft;

a plurality of hydraulic motors on the driven side, said hydraulic motors being mounted on a driven shaft in equally spaced relationship and each motor having inlet and outlet ports;

a distributor comprising a cylinder and a piston slidably, received in said cylinder, a plurality of distributor ports in the cylinder corresponding to the hydraulic pump on the driving side and the hydraulic motors on the driven side in equally spaced relationship in the axial direction of the cylinder, a head section in the cylinder, said piston being normally biased toward said head section of the cylinder by a predetermined intensity of resilient force of a coil spring, said head portion of the cylinder including a first hydraulic chamber and a second hydraulic chamber secured to said cylinder in a side-by-side relationship, said first hydraulic chamber communicating with the head section of the cylinder via a communication hole adapted to be closed by a first one-way valve which is opened only during a period of idling and said second hydraulic chamber communicating with the first hydraulic chamber via a communication hole adapted to be closed by a second one-way valve which is opened against the resilient force of a coil spring in the second hydraulic chamber when hydraulic pressure in the first hydraulic chamber is raised to a predetermined level of pressure;

a hydraulic oil collecting pipe having a large diameter to which a plurality of pipings are connected, one of said pipings communicating with the suction port of the hydraulic pump and the other pipings communicating with the outlet ports of the hydraulic motors, said one piping communicating via the hydraulic pump with a piping extending from the outlet port thereof to the distributor port located nearest to the head section of the cylinder and the other pipings communicating via said hydraulic motors with motor inlet pipings extending from the inlet ports of said motors to the other distributor ports in the cylinder, said hydraulic oil collecting pipe communicating with the second hydraulic chamber via a branch piping connecting said one piping at an intermediate location thereon to said second hydraulic chamber;

an idling lever connected at one end to said first one-way valve and pivotally supported in the cylinder to be operated during a period of idling, said idling lever being pivoted by the piston when displaced forwardly toward the head section to abut against a second end of said lever to open said first one-way valve in the first hydraulic chamber; and

a piston operating lever for displacing the piston axially in the cylinder to predetermined selected positions where selected distributor ports in the cylinder are opened and closed during normal operation and during a period of engine braking, said lever being operatively connected to the piston via a connecting rod.

---

### 5,012,645
### COMBUSTOR LINER CONSTRUCTION FOR GAS TURBINE ENGINE

**Harold G. Reynolds, West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Aug. 3, 1987, Ser. No. 81,083**

**Int. Cl.$^5$ F02C *1/00***

U.S. Cl. 60—754 **2 Claims**

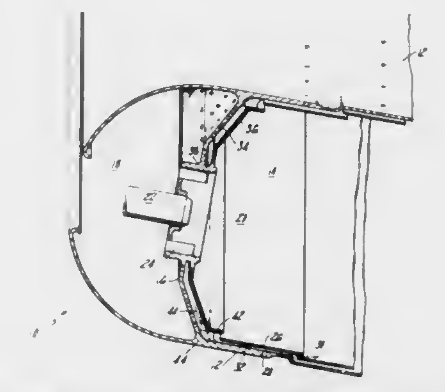
1. In a gas turbine combustor having a combustor wall defining a combustor volume, a dome dividing said combustor volume into an air inlet plenum and a combustion chamber, heat shield panels closely space inwardly of said combustor wall forming a wall airflow path between the heat shield panels and the combustor wall, and means for introducing air to said airflow path with at least a portion of the air flowing through said wall airflow paths toward said dome, the improvement comprising:

a dome heat shield closely spaced inwardly toward said combustion chamber and parallel to said dome, forming a dome airflow path therebetween;

said dome having a plurality of holes therethrough to pass dome cooling air against said dome heat shield and through said dome airflow path;

said dome heat shield having an outer portion closely spaced from and overlapping the portion of said wall heat shield closest to said dome;

said wall airflow path extending to and blocked by said dome, but in fluid communication with said dome airflow path at a location immediately upstream of said outer portion of said dome shield whereby said portion of wall airflow reverses direction, joining with said dome airflow and forces said airflow against said outer portion of said dome heat shield improving the cooling thereof.



---

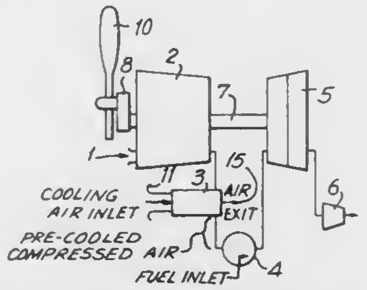
### 5,012,646
### TURBINE ENGINE HAVING COMBUSTOR AIR PRECOOLER

**Stephen R. Speer, Spokane, Wash., assignor to Machen, Inc., Spokane, Wash.**

**Filed Nov. 28, 1988, Ser. No. 276,642**

**Int. Cl.$^5$ F02C *1/00***

U.S. Cl. 60—728 **19 Claims**



1. In a turbine engine designed for use on aircraft, the turbine engine comprising a compressor having an inlet for ambient air and having an outlet for compressed air; a combustor to burn compressed air and fuel and having an air intake in fluid flow connection with the outlet of the compressor and an exhaust for hot combustion gases, and a turbine in fluid flow connection with the exhaust from the combustor and having mechanical power output means in operative connection with the compressor; the improvement comprising: a combustor air pre-cooler heat exchanger means having a hot compressed air inlet and a cooled compressed air outlet, first fluid flow connection means between the compressor and the compressed air inlet, and second fluid flow connection means between the cooled compressed air outlet and the combustor, the second fluid flow connection means being free of means to increase fluid pressure, the precooler being designed to cool the compressed air from the compressor outlet, such that the temperature of the cooled compressed air entering the combustor is reduced such that the temperature drop ratio between the compressor outlet and the combustor air intake is greater than the pressure drop ratio between those two locations.

---

### 5,012,647
### THROTTLE-CONTROLLED HYDRAULIC POWER BRAKE BOOSTER

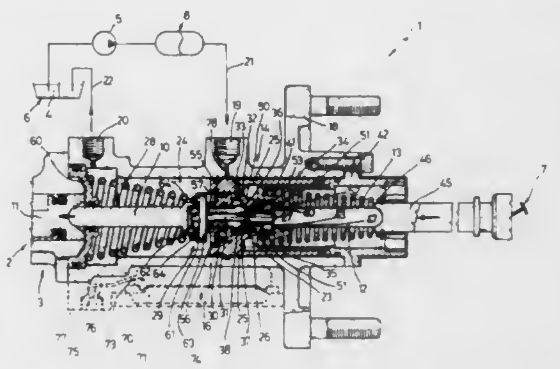
**Virginio Maggioni, Rosta, and Vittorino Torrielli, Torino, both of Italy, assignors to Fiat Auto S.p.A., Italy**

**Filed Jun. 13, 1989, Ser. No. 365,378**

**Claims priority, application Italy, Jun. 14, 1988, 67560 A/88**

**Int. Cl.$^5$ F15B *1/047, 9/10***

U.S. Cl. 60—413 **8 Claims**



1. A throttle-controlled hydraulic power brake comprising a first axially-sliding push rod designed to operate the master cylinder of a brake pump; a second axially-sliding push rod operated by a brake pedal against the action of first elastic means; and hydraulic means supplied by a pressurized fluid source and located between said first and second push rods, said hydraulic means being designed to enable servo-assisted displacement of said first push rod in accordance with and in proportion to corresponding displacement of said second push rod; characterized by the fact that said hydraulic means comprises a booster body enclosing a variable-volume pressure chamber designed to receive said pressurized fluid; a piston mounted, in fluidtight manner, axially integral with said first push rod and sliding axially inside said booster body, so as to define a movable wall of said pressure chamber; and a first face seal shuttle valve and a second face seal shuttle valve, the opening of which is controlled, against the action of second elastic means, by the axial position of said second push rod in relation to said piston; said first valve being designed to feed said pressurized fluid into said pressure chamber, and said second valve being designed to connect said pressure chamber to a circuit for draining off said pressurized fluid, said pressurized fluid source consisting of a pump connected to said pressure chamber via the interposition of a hydraulic accumulator, said hydraulic accumulator comprising a tubular casing externally integral and coaxial with said booster body; and a sleeve type deformable membrane located coaxially and in fluidtight manner between said booster body and said casing, so as to divide the gap between the same into two tubular variable-volume chambers, the radially-innermost of which is connected to said pump and said pressure, and the radially-outermost of which is sealed in fluidtight manner and filled with a compressible gaseous fluid.

---

### 5,012,648
### EXHAUST SYSTEM FOR TWO-STROKE ENGINE

**Shigeo Okumura, and Koushiro Inaba, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Sep. 22, 1986, Ser. No. 910,498**

**Claims priority, application Japan, Sep. 27, 1985, 60-212090**

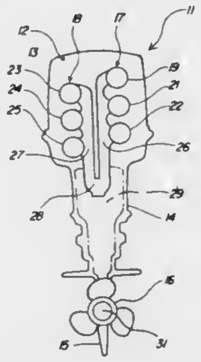
**Int. Cl.$^5$ F02B *27/04***

U.S. Cl. 60—313 **16 Claims**

1. An exhaust system for a two-cycle engine having a first group of cylinders having their exhaust ports communicating with a first exhaust manifold and a second group of clinders having their exhaust ports all communicating with a second exhaust manifold, the improvement comprising the firing order

VOL 1126 ISS 1 MY 7 1991 UMI

of said cylinders being such that one cylinder of said first is on its scavenge cycle when one cylinder of said second group is on its exhaust cycle, and means for communicating said exhaust manifolds with each other for restricting the scavenging of said cylinders for reducing torque and heat loading of the engine.



---

### 5,012,649
### POWER ACTUATOR

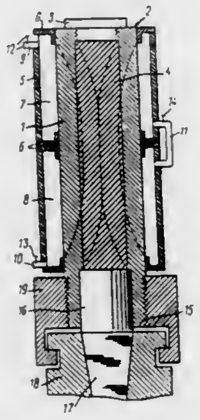
**Ivan V. Chevakin, 2-proezd Metallurgov, 2, korpus 2, kv. 5; Nikolai P. Zharov, ulitsa Michurina, 143, kv. 8, both of Tula; Oleg V. Popov, Sokolnicheskv val, 24, korpus 1, kv. 134, Moscow; Abram I. Pesin, ulitsa Levy bereg Oki, 57, kv. 20, Orel, and Petr A. Radchenko, ulitsa Kharkovskaya, 3, korpus 4, kv. 27, Moscow, all of U.S.S.R.**

**PCT No. PCT/SU88/00141, § 371 Date Feb. 28, 1990, § 102(e) Date Feb. 28, 1990, PCT Pub. No. WO90/01116, PCT Pub. Date Feb. 8, 1990**

**PCT Filed Jul. 25, 1988, Ser. No. 460,952**

**Int. Cl.$^5$ F03G** *7/06*

U.S. Cl. 60—527 **1 Claim**



1. A power actuator comprising:
an enclosure having an inner cavity extending in the direction of the longitudinal axis of the enclosure;
transverse partitions made of an elastic material operatively engaged to the enclosure and adapted to divide the inner cavity into intercommunicated sections for receiving a source of thermal energy;
a load-bearing casing within said enclosure and extending along the longitudinal axis of said enclosure, said casing comprising;
walls defining a chamber containing a working medium,
an open end adapted to receive an actuating member into said chamber for interacting with said working medium;
said walls made of a shape-memory material which when subject to said thermal energy are adapted to reduce the space of the chamber forcing the working medium to exert a force on said actuating member.

---

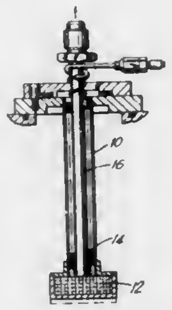
### 5,012,650
### CRYOGEN THERMAL STORAGE MATRIX

**Ralph Longsworth, Allentown, Pa., assignor to APD Cryogenics, Inc., Allentown, Pa.**

**Filed Oct. 11, 1989, Ser. No. 419,766**

**Int. Cl.$^5$ F25B** *19/02*

U.S. Cl. 62-–51.2 **11 Claims**



1. A thermal storage matrix for the collection and storage of liquid and solid cryogens for use in conjunction with the cooling of detectors by liquid or solid cryogens, comprising multiple layers of at least one highly adsorbent material which effectively adsorbs liquid cryogens and at least one relatively porous material which exhibits high thermal conductivity at cryogenic conditions and transfers heat in and out of the matrix and allows a path for a gas, generated as a liquid cryogen evaporates, to escape, without blowing the liquid out from said at least one highly adsorbent material.

---

### 5,012,651
### HEAT PUMP APPARATUS

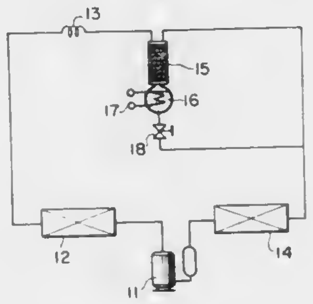
**Kazuo Nakatani, Kadoma; Mitsuhiro Ikoma, Ikoma; Yuji Yoshida, Itami; Takeshi Tomizawa, Ikoma; Koji Arita, Osaka, and Minoru Tagashira, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Dec. 26, 1989, Ser. No. 457,234**

**Claims priority, application Japan, Dec. 28, 1988, 63-334451; Mar. 10, 1989, 1-058325; Apr. 6, 1989, 1-087620**

**Int. Cl.$^5$ F25B** *45/00*

U.S. Cl. 62—149 **14 Claims**



1. A heat pump apparatus comprising:
a main heat pump circuit in which nonazeotropic mixed refrigerant is enclosed and structured by a compressor, a utilization side heat exchanger, a restrictor, and a heat source side heat exchanger; and
a fractioning/separating device provided with a reservoir and a heater, said fractioning/separating device having an upper portion wherein the upper portion is connected to an outlet port of said restrictor, said upper portion is also connected to an inlet port of said heat source side heat exchanger, whereby the pressure at said fractioning-/separating device is made to be as high as a low pressure in said main heat pump circuit.

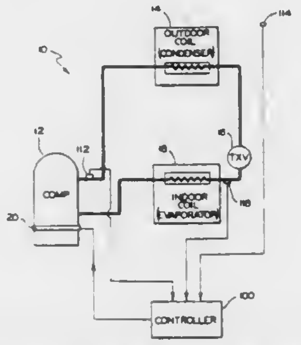
### 5,012,652
### CRANKCASE HEATER CONTROL FOR HERMETIC REFRIGERANT COMPRESSORS

**Kevin F. Dudley, Cazenovia, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

**Filed Sep. 21, 1990, Ser. No. 586,122**

**Int. Cl.$^5$ F25B** *43/02*

U.S. Cl. 62—192 **2 Claims**



1. In a refrigeration system serially including a hermetic compressor having a crankcase heater, an outdoor coil, an expansion device, and an indoor coil, crankcase heater control means comprising:
first temperature sensing means for sensing a temperature indicative of outdoor temperature;
second temperature sensing means for sensing a temperature indicative of indoor coil temperature;
third temperature sensing means for sensing a temperature indicative of compressor temperature;
controller means operatively connected to said first, second and third temperature sensing means and said crankcase heater for comparing said temperatures sensed by said first, second and third temperature sensing means when said compressor is deenergized and for energizing said crankcase heater when said temperature sensed by said third temperature sensing means is less than a predetermined amount above the lower of said temperatures sensed by said first and second temperature sensing means and for deenergizing said crankcase heater when said temperature sensed by said third temperature sensing means is more than a second predetermined amount above the lower of said temperatures sensed by said first and second temperature sensing means.

---

### 5,012,653
### MULTICOMPARTMENT TEMPERATURE CONTROLLED ROAD VEHICLES

**Michael J. Ryde, and Peter J. Warwick, both of Southampton, Great Britain, assignors to Petter Refrigeration Limited, United Kingdom**

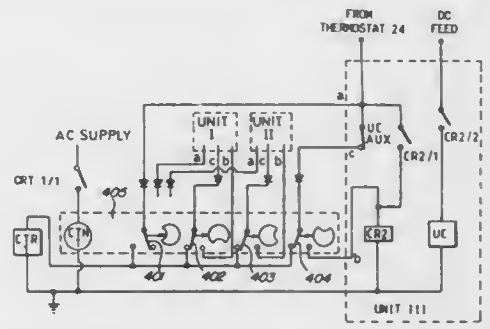
**Filed Feb. 6, 1989, Ser. No. 307,274**

**Claims priority, application United Kingdom, Feb. 5, 1988, 8802600**

**Int. Cl.$^5$ F25B** *41/00;* **H02J** *1/00*

U.S. Cl. 62—203 **6 Claims**

1. A multicompartmented road vehicle comprising:
at least three load compartments thermally insulated from each other;
at least three temperature sensors, one temperature sensor of said at least three temperature sensors being disposed in each of said at least three load compartments; each temperature sensor generating an output signal in response to the temperature in said load compartment in which it is disposed exceeding a preselected temperature;
at least three separately driven refrigeration circuits, one refrigeration circuit of said at least three refrigeration circuits associated with a respective one of said at least three load compartments and the temperature sensor disposed therein, each of said refrigeration circuits providing cold air to its associated load compartment in response to its temperature sensor generating an output signal;
start sequencing means connected between said at least three temperature sensors and said at least three refrigeration circuits for connecting one at a time, each of said three temperature sensors to its associated refrigeration circuit in a predetermined sequence in response to at least one of said at least three temperature sensors generating said output signal, said predetermined sequence selected to allow only one of said refrigeration circuits to be started at any given time independent of more than one of said at least three temperature sensors generating said output signal at the same time;
a common electrical generator for supplying electrical power to each of said at least three refrigeration circuits; and
wherein each refrigeration circuit of said at least three refrigeration circuits includes means for disconnecting its associated temperature sensor from said start sequencing means and connecting its associated temperature sensor directly to itself in response to receiving said output signal from its associated temperature sensor from said start sequencing means.



---

### 5,012,654
### MEANS FOR COOLING DRINKS, ESPECIALLY IN CANS, IN CORRESPONDENCE OF AIR GRATINGS OF MOTOR-VEHICLE PASSENGER COMPARTMENTS

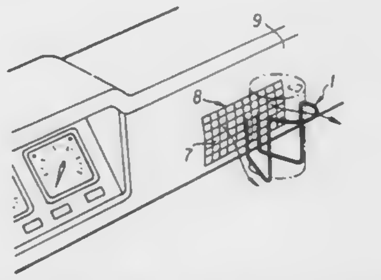
**Stefano Gatti, Via G. Frua 7, 20146 Milano, Italy**

**Filed Jun. 13, 1990, Ser. No. 536,877**

**Claims priority, application Italy, Jun. 14, 1989, 21236 8/89**

**Int. Cl.$^5$ B60H** *1/32*

U.S. Cl. 62—244 **2 Claims**



1. Means for cooling drinks, especially soft drinks and beer contained in cans, aboard a running motor vehicle, in correspondence of air gratings of the passenger compartment of said motor vehicle, characterized in that it comprises, on the one hand, support consisting of a wire, bent at its centre, so as to define a housing to contain a can or the like, and whose ends, projecting at right angles from said housing, slightly diverging and elastically strainable, form elements, which can be inserted and engaged in the openings of an air grating in the passenger compartment of a motor vehicle, on the other hand, a strip or cover of soakable material, to be applied wet to the can or the

VOL 1126 ISS 1 MY 7 1991 UMI

like before putting it on said support, exposed to the air jet going out through said grating.

---

### 5,012,655

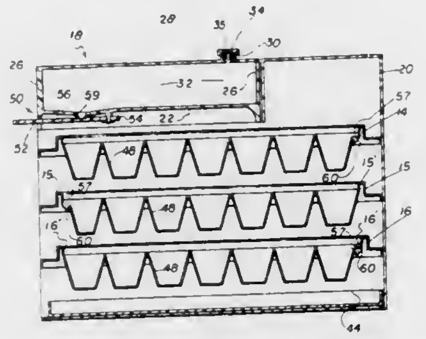
## FILLING ASSEMBLY FOR ICE TRAYS

**Philip Chatterton, 8165 N. University Dr., #42, Tamarac, Fla. 33321**

**Filed Nov. 3, 1989, Ser. No. 431,211**

**Int. Cl.$^5$ F25C** ***1/00***

**U.S. Cl. 62—340** **14 Claims**



1. A water filling assembly designed to fill containers in which ice is formed when placed in a reduced temperature environment, said assembly comprising, in combination,

a. a plurality of ice trays each including a plurality of forming cavities extending the length thereof and a liquid exiting structure formed thereon and disposed in communicating relation with a next adjacent tray,

b. a housing including a support means structured for support of said plurality of trays in a spaced, vertically aligned and stacked array,

c. a reservoir mounted on said housing and including a hollow interior portion disposed in fluid delivering relation to said plurality of trays,

d. said reservoir and said plurality of trays removably mounted on the housing and correspondingly disposed to direct liquid flow under gravity from said reservoir successively to each of said trays,

e. said reservoir and each of said trays being collectively mounted on said housing in a vertical, completely overlying, stacked and spaced relation to one another, said reservoir and plurality of trays collectively disposed to successively direct liquid flow, under gravity, from said reservoir, to an uppermost one of said plurality of trays and therefrom, successively through each of such plurality of trays to a lowermost one of said plurality of trays, and

f. said liquid exiting structure of each of said trays including an overflow trough extending transversely across said tray and disposed at one longitudinal end thereof, said trough including aperture means formed therein for the exiting of liquid overflow therefrom to a next lower adjacent tray mounted within said housing.

---

### 5,012,656

## HEAT SINK FOR A CONTROL DEVICE IN AN AUTOMOBILE AIR CONDITIONING SYSTEM

**Yasuji Tamura, Ojima, Japan, assignor to Sanden Corporation, Gunma, Japan**

**Filed Mar. 5, 1990, Ser. No. 488,106**

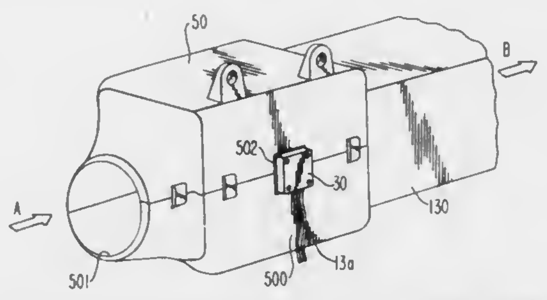
**Claims priority, application Japan, Mar. 3, 1989, 1-50098**

**Int. Cl.$^5$ F25D** ***29/00***

**U.S. Cl. 62—498** **5 Claims**

1. In an automobile air conditioning system including an electric circuit having at least one electric device and a refrigerant circuit formed by refrigerant elements such as a compressor, a condenser, an expansion element and an evaporator, wherein said evaporator is contained within a housing and wherein said housing is in turn connected to the passenger compartment of the automobile to be cooled by a duct, said electric circuit further including at least one control device associated therewith for controlling the operation of said at least one electric device to thereby control at least one of said elements of said refrigerant circuit, the improvement comprising;

said at least one control device being fixedly attached to an exterior surface of said evaporator so that heat generated by said at least one control device is conducted to said exterior surface of said evaporator which exterior surface is not direct contact with air flowing through the evaporator whereby the flow of air through the evaporator and duct to the passenger compartment is not impeded by the control device.



---

### 5,012,657

## MACHINE FOR THE CONTINUOUS DYNAMIC-FLUID TREATMENT OF AGGREGATED FILIFORM MATERIALS

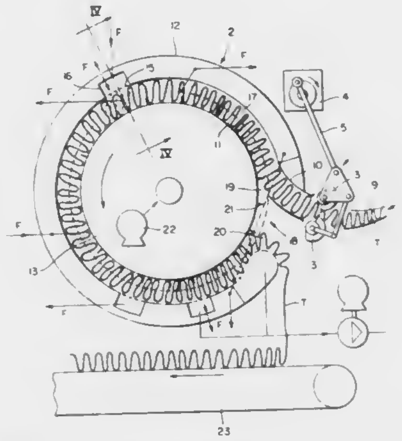
**Jose M. Serracant-Clermont, V. Gracia, 52, and Juan Serracant-Clermont, A. Concordia, 25, both of Sabadell, Spain**

**Filed Oct. 16, 1989, Ser. No. 421,595**

**Claims priority, application Spain, Oct. 14, 1988, 8803121**

**Int. Cl.$^5$ D06B** ***5/08***

**U.S. Cl. 68—5 E** **12 Claims**



1. Machine for the dynamic-fluid treatment of grouped filiform textile materials in the form of a cord, cords, wicks, and the like comprising:

a feeder device for feeding and changing the density of filiform textile material comprising,

an entry channel through which said material is passed at a first density,

an exit channel spaced from said entry channel through which said material is passed at a second reduced density,

two spaced movable elements disposed between said channels for engaging said material from said entry channel therebetween and changing the density thereof from said first to said second density, and means to operate said two movable elements; and a dynamic fluid treatment device comprising,

a pressure treatment chamber formed by a stationary channel shaped part having an open side portion, and a moving part substantially closing said open side portion of said channel shaped part and movable relative thereto,

an inlet in said channel shaped part for receiving said material from said exit channel of said feed device,

an outlet in said channel shaped part for the discharge of said material therefrom,

sealing means between said moving and stationary parts for making said treatment chamber substantially watertight except at said inlet and outlet,

means for feeding treatment fluid into said pressure treatment chamber for treating said material therein, and

transverse shoulder means on said moving part in said pressure treatment chamber for engagement with and moving of said material between said material inlet and outlet.

---

### 5,012,658

## FULL AUTOMATIC WASHING MACHINE

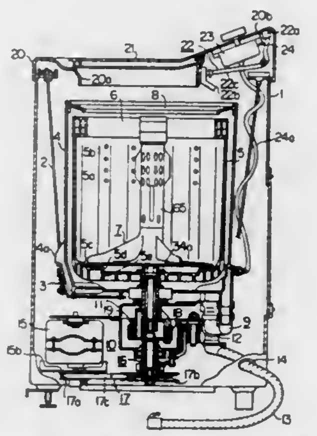
**Tamotsu Shikamori, Juo; Hiroyuki Toshimitsu; Hiroshi Ohsugi, both of Hitachi; Isao Hiyama, Hitachi, and Soichi Fukuzawa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 575,785, Feb. 1, 1984, abandoned, which is a continuation of Ser. No. 347,311, Feb. 9, 1982, abandoned. This application May 30, 1989, Ser. No. 358,413**

**Claims priority, application Japan, Oct. 7, 1981, 56-158779**

**Int. Cl.$^5$ D06F** ***17/08, 33/02***

**U.S. Cl. 68—12.01** **6 Claims**



1. A fully automatic washing machine adapted to wash and rinse, the washing machine comprising:

a housing means;

outer cell means supported in the housing means;

a water supplying valve means for supplying water to said outer cell means;

rotary blade means rotatably provided on an inner bottom surface of said outer cell means comprising a centrally disposed cylindrical column means including a disk-shaped base means provided on said column means, a plurality of first radially extending blade means formed on an upper surface of said base means, a plurality of second radially extending blade means formed on said upper surface of said base means, and a plurality of axially extending projection means disposed on said column means for providing an equal power for agitating or stirring water in the washing machine, said plurality of second blade means having a radial length greater than a radial length of said plurality of first blade means, said plurality of axially extending projection means are divided into a group of first projection means and second projection means, said first projection means are positioned on the column means at an upper portion thereof, and said second projection means are positioned on the column means such that at least a portion thereof is positioned below said first projection means;

a plurality of hole means provided in and extending through a side wall of the column means in an area of said axially extending projection means, said hole means communicating with a water supplying hole means provided in said column means below said base means;

a washing machine electric motor means mechanically coupled to said rotary blade means for generating a torque to drive said rotary blade means in forward and backward directions in a washing step and a rinsing step;

mechanical means interposed between said washing machine motor means and said rotary blade means for transmitting the torque of said washing machine motor means to said rotary blade means at a predetermined speed in the forward and backward directions; and

control circuit means for controlling said washing machine motor means so as to control a rotation of said rotary blade means in the washing and rinsing step, wherein a speed of rotation of said rotary blade means is in a range of 100ϕ rpm to 250 rpm. and a time length during which said rotary blade means rotates in each of the forward and backward directions is selected to be less than three seconds.

---

### 5,012,659

## LOCKING DEVICE WITH KEY-CODED PRINTER CONNECTION

**Armin Eisermann, Velbert, Fed. Rep. of Germany, assignor to Schulte-Schlagbaum Aktiengesellschaft, Velbert, Fed. Rep. of Germany**

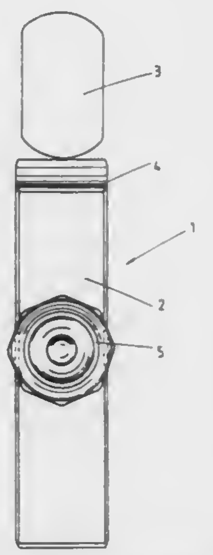
**PCT No. PCT/EP89/00650, § 371 Date Feb. 9, 1990, § 102(e) Date Feb. 9, 1990, PCT Pub. No. WO89/12155, PCT Pub. Date Dec. 14, 1989**

**PCT Filed Jun. 9, 1989, Ser. No. 458,713**

**Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 3819955**

**Int. Cl.$^5$ E05B** ***47/00***

**U.S. Cl. 70—276** **11 Claims**



1. An electronic locking device comprising lock and key-cards, the lock electronics of which has a data storage and which can be coupled with a data-retrieving mobile printer which can be connected to the lock electronics, the locking device having an insert shaft for the key cards in which a shaft card reader is arranged and which shaft is provided at its end with a socket connected to the lock electronics for a card-shaped coupling element of the printer which can be inserted

VOL 1126 ISS 1 MY 7 1991 UMI

into the insert shaft and has electric contacts, wherein the coupling element has a keycard code, a slide which can be displaced together with the coupling element by the insertion of the latter is present in the insert shaft, which slide can be fixed in position by tumblers which are moved into a release position in case of a valid key-card code and thus permit a displacement of the slide into its end position in which the contacts come into engagement with the socket device.

---

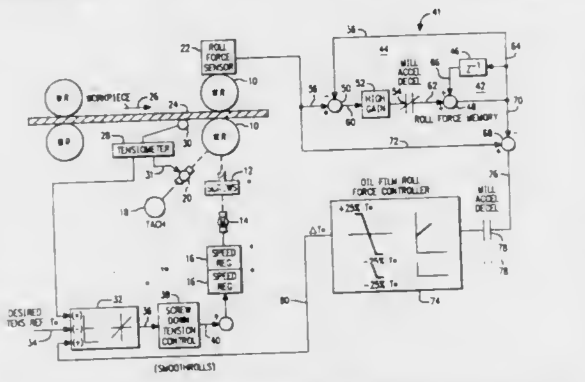
## 5,012,660
## CONTROL SYSTEM AND METHOD FOR COMPENSATING FOR SPEED EFFECT IN A TANDEM COLD MILL

**Robert S. Peterson, Indiana Twp., Allegheny County, Pa., and John A. Larsen, Phoenix, Ariz., assignors to AEG Westinghouse Industrial Automation Corporation, Somerville, N.J.**

**Filed Nov. 29, 1989, Ser. No. 443,695**

**Int. Cl.$^5$ B21B** *37/00*

**U.S. Cl. 72—8** **36 Claims**



1. A method for compensating for speed effects in a stand of a tandem cold mill having two work roll assemblies defining a roll gap through which a workpiece travels, and which roll gap is controlled by roll gap means, the steps comprising:

during the operation of said mill and prior to the acceleration and deceleration phases of said mill where the speed of said stand is running at a low rate or at a high rate, sensing and generating a representation for a roll force in said stand being exerted on said work roll assemblies and storing an updated value of said roll force representation being exerted on said work roll assemblies for said roll gap control,

immediately prior to said acceleration and deceleration phases, memorizing said updated representation for said roll force, and

during said acceleration and deceleration phases of said stand, continually performing the following steps:

using said memorized updated roll force representation and a representation of an instantaneous roll force, and producing a roll force error value representative of a change in said roll gap and in the tension in said workpiece due to said speed effects,

converting said roll force error value into a percentage of a desired tension value for said workpiece,

using said converted value with said desired tension value and with an actual tension value in said workpiece to produce a tension error value, and

employing said tension error value to vary and control said roll gap to produce a relatively on gauge workpiece along the length of said workpiece travelling through said mill during said acceleration and deceleration phases of said mill, whereby a constant roll force is produced in said stand which allows said roll gap to open or remain opened during said acceleration phase in which said speed effects usually cause said roll gap to close and which allows said roll gap to close or remain closed during said deceleration phase in which said speed effects usually cause said roll gap to open.

---

## 5,012,661
## SHEET WORKPIECE BENDING MACHINE

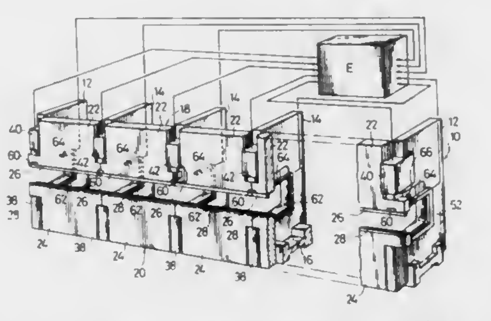
**Alberto A. Catti; Franco Sartorio, and Stefano Vergano, all of Turin, Italy, assignors to Amada Company, Limited, Japan**

**Filed Dec. 29, 1989, Ser. No. 459,427**

**Claims priority, application Italy, Dec. 29, 1988, 68166 A/88**

**Int. Cl.$^5$ B21D** *5/01*

**U.S. Cl. 72—21** **6 Claims**



1. A sheet workpiece bending machine comprising:

upper and lower bending tools having a long and narrow shape defining a longitudinal direction of the bending tools, with the bending tools defining in the longitudinal direction at least three sections, and relatively movable toward and away from each other, for bending a sheet workpiece interposed therebetween;

at least three supporting frames each provided to lie within one of three planes perpendicular to the longitudinal direction of the bending tools, the supporting frame supporting, through apron members, the upper and lower bending tools in a manner such that the bending tools are relatively movable toward and away from each other;

driving force exerting means, each mounted on one of the supporting frames, for exerting a driving force on the at least three sections in the longitudinal direction of the upper or the lower bending tools, in order to relatively move the upper and the lower tools toward and away from each other; and

control means for controlling the driving force exerting means so that spacings between the upper and the lower tools, at least at the three sections of the bending tools, are maintained to be the same during actual bending operation.

---

## 5,012,662
## WATER SOLUBLE SALT PRECOATS FOR WIRE DRAWING

**Thomas W. Tull, Southfield, Mich., assignor to Henkel Corporation, Ambler, Pa.**

**Continuation of Ser. No. 307,643, Feb. 7, 1989, abandoned. This application Mar. 13, 1990, Ser. No. 492,697**

**Int. Cl.$^5$ B21B** *45/02*

**U.S. Cl. 72—42** **19 Claims**

1. In a method for the drawing of steel wire, the improvement comprising coating the wire prior to drawing with a composition comprising:

(A) from about 50 to about 99.99% by weight of a component selected from the group consisting of $K_2SO_4$, $Na_2SO_4$, and mixtures thereof;

(B) from about 0 to about 49.99% by weight of a component selected from the group consisting of $Na_2B_4O_7$, $NaBO_2$, $K_2B_4O_7$, $KBO_2$, and mixtures of any two or more thereof; and

(C) from about 0.01 to about 5% of a component selected from the group consisting of ammonium soaps, potassium soaps, sodium soaps, and mixtures of any two or more thereof;

wherein the percentages by weight are based on the total weight of components A, B, and C in said composition, and wherein not more than 50% by weight of the total of sodium plus potassium plus ammonium ions in the composition consists of sodium ions.

---

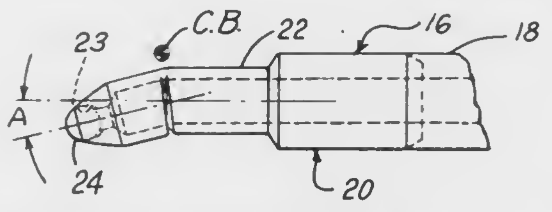
## 5,012,663
## METHOD OF BENDING A BALL POINT PEN TIP

**Robert L. Brown, Boston, Mass., assignor to Gillette Company, Boston, Mass.**

**Filed Mar. 28, 1990, Ser. No. 501,077**

**Int. Cl.$^5$ B21D** *53/76*

**U.S. Cl. 72—369** **16 Claims**



1. A method of manufacturing a ball point member for use in a ball point pen which includes the steps of:

providing a cylindrical point member comprising a tubular body member formed by a thin wall having a spherical ball retained in one end thereof and open at the opposite end for receiving writing fluid;

forming at least one substantially V-shaped groove circumferentially on the outer surface of the thin wall covering less than the entire circumference of the wall and leaving a non-grooved surface over substantially the length of the tubular body member opposite the groove; and

bending the tubular body member in a direction whereby the grooved surface is on the compression side of the bend and the non-grooved surface is on the tension side of the bend.

---

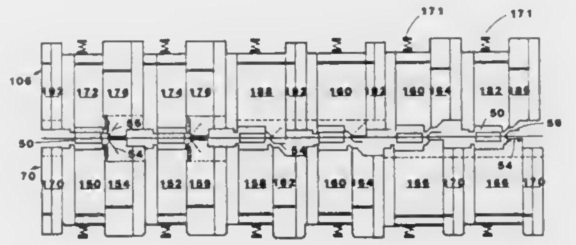
## 5,012,664
## PROGRESSIVE FORM DIE

**David R. Hembree, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.**

**Continuation-in-part of Ser. No. 282,517, Dec. 12, 1990, abandoned. This application Jan. 30, 1990, Ser. No. 472,253**

**Int. Cl.$^5$ H01R** *43/00;* **B21F** *1/00*

**U.S. Cl. 72—404** **11 Claims**



1. In an apparatus to produce bends in the lead wires of a multiple in-line lead intergrated circuit package contained in a lead frame comprising a cooperating die assembly and punch assembly, the improvement comprising:

(a) a plurality o first pairs of cooperating clamps and punches on each of the respective die assembly and punch assembly adapted to make a first bend simultaneously on each of said lead wires;

(b) a plurality of second pair of cooperating punches and anvils on each of the respective die assembly and punch assembly adapted to make a second bend in an alternating one-half of said lead wires;

(c) a plurality of pairs of cooperating punches and anvils arranged opposite from those of step (b) and adapted to form a second bend in the other alternating one-half of said lead wires; and

(d) means to index the package through the apparatus such that the first bend and the second bend are formed sequentially on said lead wires.

---

## 5,012,665
## PRESS INSTALLATION HAVING SEVERAL PRESSES FOR THE WORKING OF SHEET-METAL PARTS

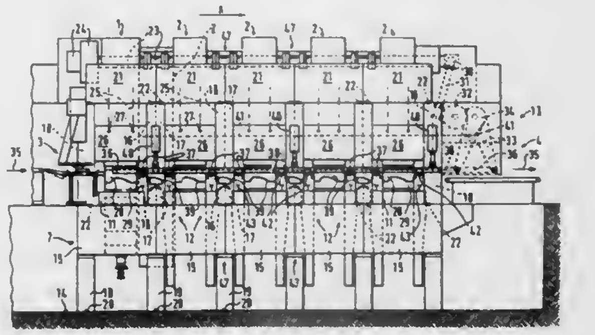
**Rudi Brandstetter, Adelberg, Fed. Rep. of Germany, assignor to L. Schuler GmbH, Fed. Rep. of Germany**

**Filed Oct. 30, 1989, Ser. No. 428,587**

**Claims priority, application Fed. Rep. of Germany, Feb. 18, 1989, 3905069**

**Int. Cl.$^5$ B21D** *43/05*

**U.S. Cl. 72—405** **18 Claims**



1. A press installation including several presses each forming a working stage for working of sheet metal parts, transfer means for feeding and removing of sheet metal parts and for the transferring sheet metal parts between the working stages and intermediate storage means for storing sheet metal parts at idle stages between working stages, the sheet metal parts being transferred along a conveying plane through the working stages, each of the presses having a slide for working the sheet metal parts which can be moved up and down by a drive means, a press bed and press frame means for supporting of head pieces of the several presses and a sliding table for facilitating a tool change which is assigned to each slide, wherein:

the several presses include additional transfer presses arranged behind a head press, the several presses being spaced at a narrow distance from one another;

the press frame means have supporting areas for separately supporting each of the head pieces of the several presses;

at least one tool is assigned to each of the slides, a single working stage being performed by each of the several presses;

one intermediate depositing means is arranged between two working stages;

synchronizing means are provided for coordinating movements of the slides and the transfer means from a common drive shaft; and

the transfer means further includes holding means for holding sheet metal parts and shifting means, for moving the holding means, the holding means and the shifting means being guided above a sheet metal part conveying plane at the several presses.

---

## 5,012,666
## CRIMP TOOL WITH ADJUSTABLE JAW

**Ching-Wen Chen, No. 29-1, Luh-Tyi St., and Ching-Jen Chen, No. 33-1, Luh-Tyi-St., both of Panchiao City, Taipei Hsien, Taiwan**

**Filed Jul. 24, 1989, Ser. No. 384,309**

**Int. Cl.$^5$ B21D** *7/06;* **H01R** *43/042*

**U.S. Cl. 72—410** **3 Claims**

1. A crimping tool comprising:

an elongated first handle member having a front portion and

VOL 1126 ISS 1 MY 7 1991 UMI

a rear portion, said front portion having a first pivot hole which is oblong is a transverse direction relative to said first handle member, said oblong hole defined by major and minor axes,

a head member pivoted to said front portion for moving between a clamping position and a releasing position with respect to said front portion, said head member having a second pivot hole aligned with said first pivot hole and further having a third pivot hole offset from said second pivot hole,

a first pivot pin member passing through said first and second pivot holes and being movable along the major axis in said oblong first pivot hole,

a second elongated handle member pivoted to said head member for moving away from and towards said rear portion of said first handle member, said second handle member having a fourth pivot hole to be aligned with said third pivot hole, said fourth pivot hole being oblong substantially in the longitudinal direction of said head member, said oblong hole defined by major and minor axes,

a second pivot pin passing through said third and fourth pivot holes and being movable along said major axis in said fourth oblong pivot hole,

two jaw members attached to said front portion and said head member,

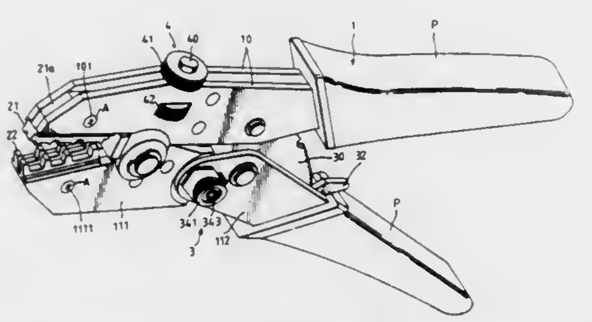
a first screw adjustment means connected to said first pivot pin member and said front portion so as to adjust the position of said first pivot pin member,

a ratchet plate connected to said first handle member adjacent to said front portion as well as to said second handle member adjacent to said third pivot hole, said ratchet plate having an edge bridging said first and second handles, said edge having a curved toothed section,

a spring connected to said ratchet plate and said front portion of said first handle and urging said ratchet plate to a position that causes said jaw members to open,

a pawl member resiliently mounted on said second handle member for engaging with said curved toothed section when said second handle member is moved to said first handle member, and

a second adjustment means having a rotary knob connected to said second pivot pin, said rotary knob being rotatable about the axis of said pivot pin and having a flange end of polygonal cross-section which has at least two sides at different radial distances from said second pivot pin axis, said second adjustment means further having an engaging means formed on said second handle member adjacent to said rotary knob for selectively engaging with said two sides of said flanged end, said second pivot pin being thereby adjustably positioned at different positions along said major axis in said fourth oblong pivot hole upon engagement of said sides of said flanged end and said engaging boss.



5,012,667

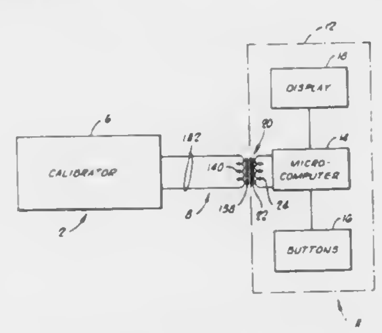
## APPARATUS AND METHOD FOR CALIBRATING A MEASURING DEVICE

**Richard M. Kruse, Wichita, Kans., assignor to Great Plains Industries, Inc., Wichita, Kans.**

**Division of Ser. No. 170,315, Mar. 18, 1988, Pat. No. 4,918,973. This application Feb. 22, 1990, Ser. No. 484,044**

**Int. Cl.$^5$ G01D *18/00***

U.S. Cl. 73—1 R **14 Claims**



1. An apparatus for calibrating a measuring device, said apparatus comprising:

calibration signal generating means for generating, independently of the operation of the measuring device, a calibration signal, the calibration signal generating means comprising:

power supply means for providing electrical energy to said apparatus;

switch for activating said power supply means; and

timer means, having a time period which expires if the time period is not restarted prior thereto, for automatically deactivating said power supply means when said time period expires; and

communicating means for communicating said calibration signal to the measuring device without disassembling the measuring device.

---

5,012,668

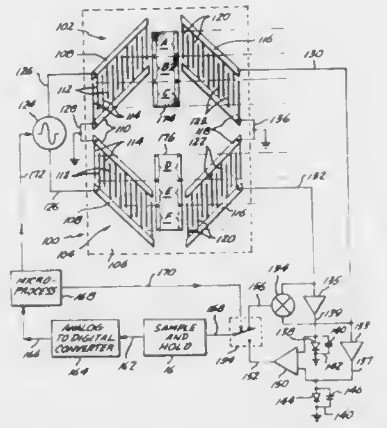
## INCLINED ELECTRODE SURFACE ACOUSTIC WAVE SUBSTANCE SENSOR

**John Haworth, Lynnwood, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Aug. 22, 1989, Ser. No. 397,009**

**Int. Cl.$^5$ G01N *31/00***

U.S. Cl. 73—24.06 **21 Claims**



1. A surface acoustic wave sensor for detecting a substance, comprising

(a) a first pair of electrodes formed on a surface of a substrate, said first pair of electrodes including a plurality of spaced apart, generally parallel interlaced fingers extending from one electrode of the first pair toward the other electrode of the first pair;

(b) a second pair of electrodes formed on the surface of the substrate, spaced apart from the first pair of electrodes, one end of each of the second pair of electrodes being substantially closer to the first pair of electrodes than an opposite end thereof, said second pair of electrodes also including a plurality of spaced apart, interlaced fingers extending from one electrode of the second pair toward the other electrode of the second pair, generally parallel to each other and to the interlaced fingers of the first pair of electrodes, said first and second pairs of electrodes being disposed on the substrate so that the extent of overlap between any interlaced finger and successive interlaced fingers of the first and second electrode pairs varies along the length of individual electrodes of said electrode pairs; and

(c) a plurality of different coatings disposed in regions on the substrate, in an area between the first pair of electrodes and the second pair of electrodes, said coatings changing the phase, delay, and amplitude of a surface acoustic wave propagating over the substrate generally transverse to and between the overlapping interlaced fingers of the first and second pair of electrodes and similarly affecting a signal output from the second pair of electrodes in response thereto, as a function of the amount of the substance absorbed by the coating of the region through which the surface acoustic wave passes.

---

5,012,669

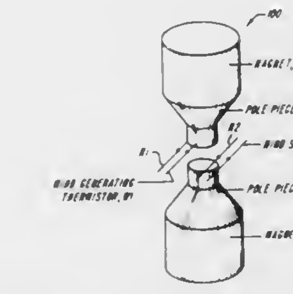
## OXYGEN SENSING METHOD AND APPARATUS

**Emilio Meyer, Assago-Milano, Italy, assignor to Panametrics, Inc., Waltham, Mass.**

**Continuation-in-part of Ser. No. 252,812, Oct. 3, 1988, Pat. No. 4,893,495. This application Jan. 16, 1990, Ser. No. 465,025**

**Int. Cl.$^5$ G01N *27/74***

U.S. Cl. 73—25 **6 Claims**



1. In apparatus for measuring the concentration of a paramagnetic gas in a gas mixture, the improvement comprising

magnetic field means for generating an inhomogeneous magnetic field, said magnetic field means including first and second magnet pole pieces,

said first and second magnet pole pieces having a selected sectional shape,

said first and second magnet pole pieces being positioned adjacent each other with a selected gap between said first and second magnet pole pieces,

said first and second magnet pole pieces each having a gap-facing surface having a selected configuration,

said selected sectional shape of said first and second magnet pole pieces, and said selected configuration of said gap-facing surfaces, providing an elongate region of maximum magnetic field intensity in said gap,

magnetic wind generating thermistor means, including at least one electrically heated magnetic wind generating thermistor, for generating a magnetic wind in the presence of a paramagnetic gas, the magnetic wind having a magnitude proportional to concentration of the paramagnetic gas in the gas mixture,

said at least one wind generating thermistor having an electrical parameter proportional to temperature,

said at least one wind generating thermistor being positioned within said gap and inside said inhomogeneous magnetic field,

magnetic wind sensing thermistor means, including at least one electrically heated magnetic wind sensing thermistor, said at least one magnetic wind sensing thermistor having an electrical parameter proportional to temperature, for sensing the magnetic wind generated by said at least one magnetic wind generating thermistor in the presence of a paramagnetic gas,

said at least one magnetic wind sensing thermistor being positioned adjacent to said at least one magnetic wind generating thermistor,

proximate to said elongate region of maximum magnetic field intensity,

such that a heated region associated with said at least one magnetic wind generating thermistor and said at least one magnetic wind sensing thermistor is substantially encompassed by said elongate region of maximum magnetic field intensity,

so that only gas substantially within the elongate region of maximum magnetic field intensity is subjected to heating and reduction of magnetic susceptibility, whereby gas outside the elongate region of maximum magnetic field intensity is attracted with a selected maximum force.

---

5,012,670

## OXYGEN SENSOR

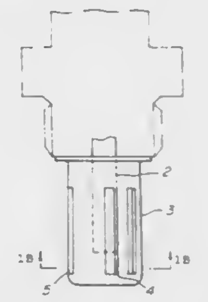
**Nobuhide Kato, Aichi, and Yasubiko Hamada, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Aichi, Japan**

**Filed May 12, 1989, Ser. No. 351,071**

**Claims priority, application Japan, May 25, 1988, 63-125939**

**Int. Cl.$^5$ G01N *27/56***

U.S. Cl. 73—31.05 **3 Claims**



1. An oxygen sensor comprising a plate-shaped oxygen sensor element, a measuring electrode arranged on a broader width surface of said sensor element, and a protective cover covering said sensor element, said protective cover having gas inlet holes for introducing a gas to be measured therein and comprising guide plates provided at said gas inlet holes for changing the direction of the flow of the gas to be measured, said gas inlet holes having different spacings therebetween on the circumference of said protective cover.

---

5,012,671

## GAS DETECTING DEVICE

**Shinji Yagawara, and Wasaburo Ohta, both of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Nov. 13, 1989, Ser. No. 434,255**

**Claims priority, application Japan, Nov. 15, 1988, 63-289880; Nov. 16, 1988, 63-290974**

**Int. Cl.$^5$ G01N *27/12***

U.S. Cl. 73—31.06 **22 Claims**

1. A gas detecting device, comprising:

a substrate;

VOL
1126
ISS
1
MY
7
1991
.UMI

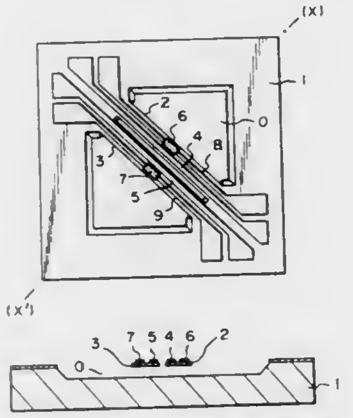
a plurality of overhang portions made from an electric insulation material and disposed in a space over said substrate;

a gas sensitive film made from a metallic oxide semiconductor material and mounted on each of said overhang portions;

said metallic oxide semiconductor material of said gas sensitive film on at least one of said plurality of overhang portions having a composition ratio of metal to oxygen different from that of the other gas sensitive films;

a pair of detecting leads connected to said gas sensitive film; and

a heating means for heating said gas sensitive film and mounted on each of said overhang portions.



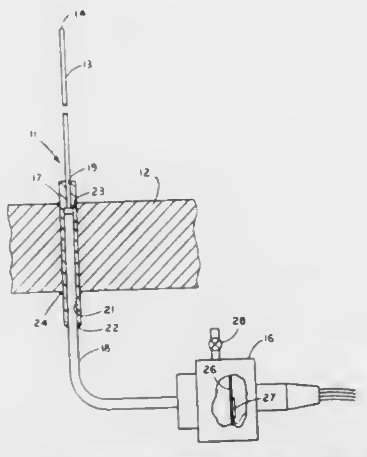
## 5,012,672
## HYDROGEN GAS SENSOR AND METHOD OF MANUFACTURE

**John M. McKee, Hinsdale, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Division of Ser. No. 93,378, Sep. 3, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 382,199**

**Int. Cl.⁵ G01N** *37/00*

**U.S. Cl. 73—31.07** **14 Claims**



1. In a method of manufacturing a sensor for monitoring the pressure of hydrogen gas, the steps of: sealing one end of an elongated tube having a hydrogen permeable wall defining an internal chamber, connecting the other end of the tube to a pressure transducer with the chamber in communication with a pressure responsive element in the transducer, providing a vent opening in the transducer, exposing the exterior of the tube to pressurized hydrogen gas at an elevated temperature and allowing the hydrogen gas to diffuse through the wall of the tube into the chamber and to flow out through the vent opening for a time sufficient to remove all other gasses from the chamber, closing the vent opening to seal the chamber with some of the hydrogen gas trapped therein, and cooling the tube so that the hydrogen gas trapped in the chamber diffuses out through the wall of the tube to form a vacuum in the chamber.

## 5,012,673
## METHOD AND APPARATUS FOR DETECTING A ROTATION ANGLE

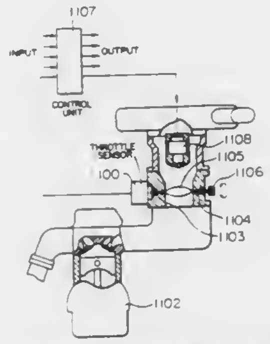
**Yoshiya Takano, Katsuta, and Yoshikazu Hoshi, Ibaraki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 1, 1988, Ser. No. 176,087**

**Claims priority, application Japan, Apr. 30, 1987, 62-80970; Jun. 30, 1987, 62-161191**

**Int. Cl.⁵ G01M** *15/00*

**U.S. Cl. 73—118.1** **9 Claims**



1. An angle detector for producing an absolute signal representing a rotation angle of a rotor, comprising:

means for generating a plurality of absolute signals in a measurement range with at least one of said plurality of absolute signals representing at least one specific angle, wherein the interval of the absolute signals in a specific measurement range is smaller than in another measurement range;

means for sequentially generating increment signals at a predetermined interval in accordance with the rotation of the rotor in measurement ranges above and below the specific angle; and

means for adding or subtracting the increment signals to or from the at least one absolute signal representing said specific angle to produce the absolute signal representing the rotation angle of the rotor.

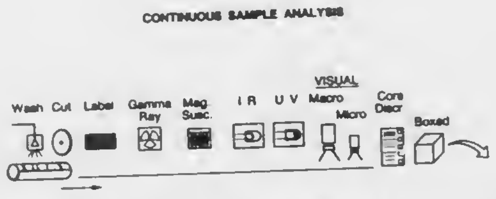
## 5,012,674
## METHOD OF EXPLORATION FOR HYDROCARBONS

**Keith K. Millheim; Houston B. Mount, II; Chandra S. Rai, all of Tulsa, and Carl H. Sondergeld, Broken Arrow, all of Okla., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Oct. 31, 1988, Ser. No. 265,073**

**Int. Cl.⁵ E21B** *49/02*

**U.S. Cl. 73—153** **14 Claims**



7. A core analysis facility for use adjacent a well to produce a depth correlated record of the earth's subsurface, comprising:

means for analyzing substantially all lithologies represented within a core removed from substantially the entire length of a well to obtain a measurement of physical properties thereof promptly after the core is removed from the well, and

means for producing a depth correlated record of the physical properties.

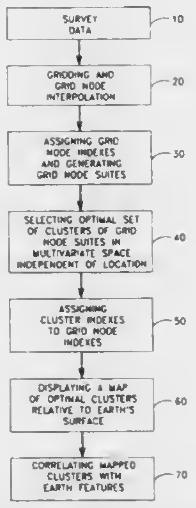
## 5,012,675
## INTEGRATING MULTIPLE MAPPABLE VARIABLES FOR OIL AND GAS EXPLORATION

**Glenn R. Koller, Tulsa, Okla., and Matt F. Trout, Brookshire, Tex., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Jul. 25, 1989, Ser. No. 385,597**

**Int. Cl.⁵ G01V** *9/00*

**U.S. Cl. 73—432.1** **16 Claims**


SURVEY DATA
10
GRIDDING AND GRID NODE INTERPOLATION
20
ASSIGNING GRID NODE INDEXES AND GENERATING GRID NODE SUITES
30
SELECTING OPTIMAL SET OF CLUSTERS OF GRID NODE SUITES IN MULTIVARIATE SPACE INDEPENDENT OF LOCATION
40
ASSIGNING CLUSTER INDEXES TO GRID NODE INDEXES
50
DISPLAYING A MAP OF OPTIMAL CLUSTERS RELATIVE TO EARTH'S SURFACE
60
CORRELATING MAPPED CLUSTERS WITH EARTH FEATURES
70

1. A method of exploring for one of oil, gas and other minerals comprising the steps of:

(a) locating relative to the earth's surface subterranean features useful in exploring for one of oil, gas and other minerals, the locating step comprising:

obtaining a set of grid node suites representing grid nodes for an area on the earth's surface in reference to which subterranean features are to be mapped, the set of grid node suites comprising a suite of survey values for each grid node;

assigning grid nodes into clusters based on grid node suites independently of location of grid nodes relative to the surface of the earth;

locating and mapping clusters relative to the surface of the earth;

assigning at least one cluster of subterranean feature; and

(b) further exploring for one of oil, gas and other minerals in an area on the earth specifically corresponding to at least one of the thus located and mapped clusters.

## 5,012,676
## GAS RATE SENSOR SYSTEM

**Tsuneo Takahashi; Tomoyuki Nishio; Masayuki Ikegami, and Takahiro Gunji, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 11, 1989, Ser. No. 295,839**

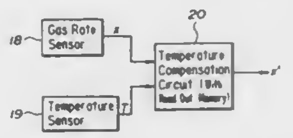
**The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.**

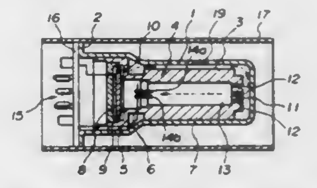
**Claims priority, application Japan, Jan. 13, 1988, 63-5394**

**Int. Cl.⁵ G01P** *9/00*

**U.S. Cl. 73—497** **3 Claims**

1. A gas rate sensor system which provides an output signal x in response to any difference between the output signals supplied from a pair of thermal sensing elements, which difference is caused when the gas flow ejected from a gas nozzle deviates to flow more on one of the thermal sensing elements than on the other due to the influence of an angular velocity to be determined on the gas flow, characterized in that said gas rate sensor system comprises: a gas rate sensor; means to detect the temperature T within the gas rate sensor; and means to carry out an arithmetic operation for correction of gas rate sensor output signals x in accordance with the detected temperature T, said arithmetic operation having as an operand one of preset values representing changes of gas rate sensor output signals x with temperature.





## 5,012,677
## DIFFERENTIAL PRESSURE TRANSMITTER

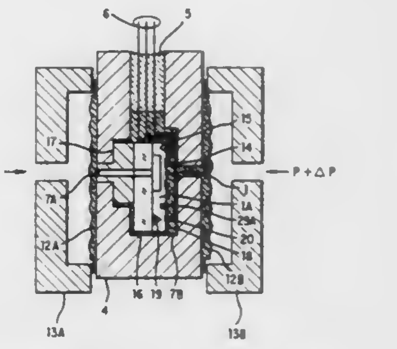
**Satoshi Shimada, Hitachi; Yasushi Shimizu, Katsuta, and Seiichi Ugai, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 23, 1988, Ser. No. 275,580**

**Claims priority, application Japan, Nov. 27, 1987, 62-297629**

**Int. Cl.⁵ G01L** *9/06*

**U.S. Cl. 73—721** **1 Claim**



1. A differential pressure transmitter, comprising:

a sensor substrate;

a mount holding said sensor substrate;

a differential pressure sensor formed on one portion of said sensor substrate; and

a static pressure sensor, sensing a static pressure of a fluid by utilizing a difference in Young's modulus between the sensor substrate and the mount, formed on another portion of the sensor substrate;

wherein the sensor substrate has a first groove so that said static pressure sensor detects a peak stress caused by a static pressure, and the sensor substrate also has a second groove formed between the differential pressure sensor and the static pressure sensor to reduce crosstalk between the two sensors.

## 5,012,678
## OVERPRESSURE RELIEF SAFETY PLUG FOR PRESSURE GAUGES

**Steven O. Buchanan, Rolling Prairie, Ind., assignor to Dwyer Struments, Inc., Michigan City, Ind.**

**Filed Aug. 15, 1990, Ser. No. 567,404**

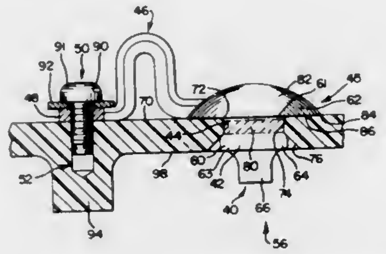
**Int. Cl.⁵ G01L** *19/06, 19/14*

**U.S. Cl. 73—738** **12 Claims**

1. For a pressure gauge that includes a housing and sensing

VOL
1126
ISS
1
MY
7
1991
UMI

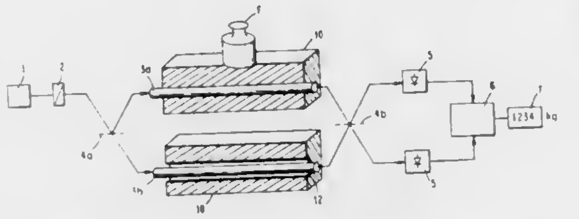
means within the housing for measuring pressure of a source of pressure externally of the housing,
- an overpressure blow out plug for pressure relief of the gauge internally of the housing,
- said plug comprising:
- a body formed from 30 durometer Shore A hardness scale silicon elastomer,
- said body defining:



- a generally cylindrical shank having an annular seal portion thereabout,
- a stop cap at one end of said shank defining a spherically contoured plug head portion forming an annular planar undersurface centered on said shank and having a marginal circular rim of a radius of approximately twice that of said shank,
- with said shank annular seal portion including surface pore entrapped talcum powder.

### 5,012,679
### OPTICAL SENSOR

**Hans W. Haefner, Aichach-Walchshofen, Fed. Rep. of Germany, assignor to Pfister GmbH, Fed. Rep. of Germany**
**PCT No. PCT/DE88/00026, § 371 Date Jul. 11, 1989, § 102(e) Date Jul. 11, 1989, PCT Pub. No. WO88/05529, PCT Pub. Date Jul. 28, 1988**
**PCT Filed Jan. 20, 1988, Ser. No. 392,623**
**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1987, 3701548; Jan. 21, 1987, 3701632**
**Int. Cl.$^5$ G01L** *1/24*
**U.S. Cl. 73—800** **26 Claims**

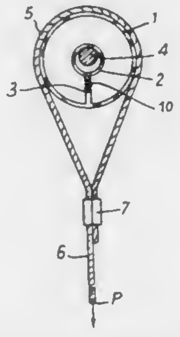


1. A force measuring sensor comprising:
- a fibre-type light wave guide changing its light transmitting characteristics in response to the influence of a force or pressure, this change being used for measuring said force or pressure;
- a layer formed of force or pressure transmitting material, said light wave guide being embedded in said layer; and
- a rigid force introduction plate essentially covering one main side of a said layer and fixedly adhering thereto.

### 5,012,680
### STRESS GAUGE FORCE SENSING DEVICE

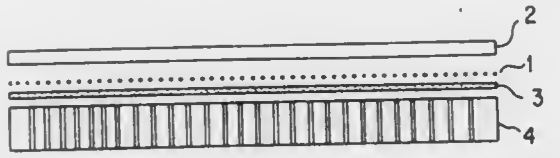
**Claude Castagnoli, Mery Sur Seine, France, assignor to Tractel S. A., Montreuil, France**
**Filed Sep. 22, 1989, Ser. No. 412,291**
**Claims priority, application France, Sep. 23, 1988, 88 12445**
**Int. Cl.$^5$ G01L** *1/22, 5/10*
**U.S. Cl. 73—862.39** **6 Claims**

1. A stress sensing device using stress gauges which comprises a structure which transmits and canalizes stresses along a preferred direction and a stress gauge system carried by said structure, the structure comprising:
- (a) a ring to a point of the periphery to which is applied the resultant of an action force;
- (b) a hub disposed inside said ring and carried by a supporting shaft providing a reaction force, and action force and reaction force being aligned along a same axis, of opposite directions and directed one towards the other;
- (c) a sector connecting said hub to said ring and oriented along a single radius of the ring, said sector carrying said stress gauge system; said sector being disposed in a position diametrically opposite the point of application of the resultant of said action force to the ring periphery with relation to said supporting shaft providing the reaction force, so as to canalize towards said sector the stresses to be sensed resulting from said action and reaction forces, said structure being disposed on said supporting shaft in such a manner that said sector is automatically in line with the axis of said action and reaction forces.



### 5,012,681
### SAMPLING PROCEDURES AND PROTECTIVE LAYERS FOR THE PRESERVATION OF PARTICULATES OBTAINED BY FILTER COLLECTION AND IMPINGEMENT OPERATIONS

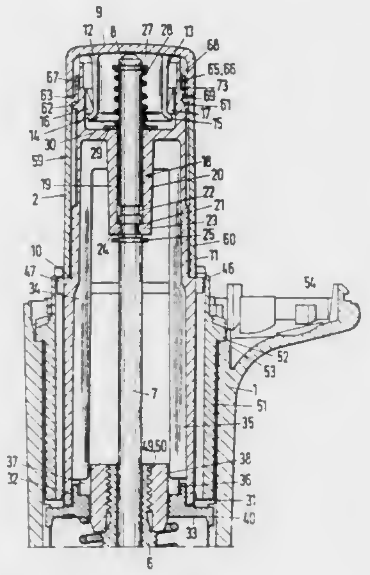
**Donald E. Lentzen, 305 Oakridge Rd., Cary, N.C. 27511**
**Continuation of Ser. No. 82,028, Aug. 5, 1987, abandoned. This application May 19, 1989, Ser. No. 356,624**
**Int. Cl.$^5$ B01D** *50/00*
**U.S. Cl. 73—863.23** **13 Claims**



1. A method for collecting and preserving a sample of particulate as present in a particulate suspension, comprising:
- (a) coating a collecting substrate with an optically and/or electron transparent substance, wherein the optically and/or electron transparent substance is a carbon coating;
- (b) collecting the sample of particulate on the collecting substrate, wherein the particulate is deposited on the collecting substrate in substantially the same condition and configuration as present in the particulate suspension; and
- (c) placing an optically and/or electron transparent overlay on top of the deposited particulate, thereby retaining the deposited particulate in substantially the same condition and configuration as when the particulate was initially deposited.

### 5,012,682
### PIPETTING DEVICE

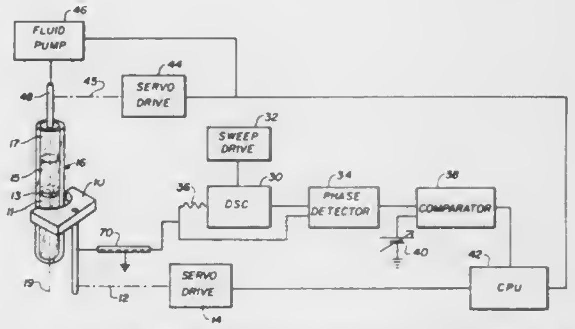
**Horst Sabloewski, Hamburg, Fed. Rep. of Germany, assignor to Firma Eppendorf-Netheler-Hinz GmbH, Hamburg, Fed. Rep. of Germany**
**Filed Oct. 23, 1989, Ser. No. 425,791**
**Claims priority, application European Pat. Off., Oct. 21, 1988, 88117553**
**Int. Cl.$^5$ G01N** *1/14;* **B01L** *3/02*
**U.S. Cl. 73—864.18** **19 Claims**



1. A pipetting device comprising:
- a housing having a top end,
- an actuating element, which protrudes from said top end and is depressible against spring action,
- a piston, which is axially connected to the actuating element,
- a cylinder, which is disposed in said housing and contains said piston, which is movable in said cylinder to move an air volume,
- a tubular pipette connector, which is adapted to be slidably fitted into a pipette tip, which connector and tip are open at both ends,
- means which connect said cylinder and said pipette connector and establish a fluid communication between the interior of said cylinder and the interior of said pipette connector,
- means by which said actuating element is rotatably mounted in said housing, and
- means for controlling said air volume in dependence on the angular position of said actuating element relative to said housing,
- which pipette device is improved in that said actuating element is rotatably mounted in said housing by means of a nut (3), which is fixed to said housing, and of a screw (6), which is non-rotatably coupled to said actuating element and is screwed into and extends through said nut and is axially coupled to said piston, said actuating element (2) and said housing (1) being non-rotatably connected by an axially separable detent element joint (31, 32), said actuating element (2) being axially movable to establish and to eliminate said joint, said piston (56) being connected to a piston rod (7), said screw (6) being rotatable and axially movable in said nut (3) when said detent element joint (31, 32) has been separated, and said actuating element (2) being non-rotatably coupled to said screw (6) by a coupling (34, 35, 36 37) which causes said screw (6) to be rotated by said actuating element (2) when said detent element joint (31, 32) has been separated.

### 5,012,683
### CAPACITIVE LIQUID INTERFACE SENSOR

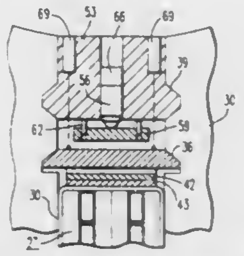
**James E. Davis, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.**
**Filed Jan. 18, 1990, Ser. No. 466,938**
**Int. Cl.$^5$ B01L** *3/02*
**U.S. Cl. 73—864.24** **9 Claims**



1. A non-contacting capacitive sensor for determining the level of an interface between two liquids having different dielectric values, the liquids being held in a container having a generally vertical axis, the sensor comprising:
- an electrically conductive element,
- first drive means for translating the element along the outer surface of the container generally parallel to the axis,
- an oscillator coupled to the element for applying a high frequency signal to the element, the amplitude and/or phase of the high frequency signal being affected by the capacitance of the element, and
- comparator means for generating a level sense signal according to the amplitude or phase of the high frequency signal for signalling the element having reached a liquid interface, whereby such signal denotes the region along the container axis where there is a liquid interface.

### 5,012,684
### LOAD DEFLECTION TESTING APPARATUS FOR GENERATOR SLOT WEDGES AND RIPPLE SPRINGS

**Benjamin T. Humphries, Orlando, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Nov. 29, 1989, Ser. No. 442,967**
**Int. Cl.$^5$ G01B** *7/14, 21/16*
**U.S. Cl. 73—865.8** **2C Claims**



1. In a dynamo-electric machine having a stator including longitudinal slots having stator coils therein, said slots having two pairs of generally parallel grooves in opposed side portions thereof, said coils being held in place by slot wedges inserted in one pair of said parallel grooves and ripple springs therebetween, an apparatus for determining the tightness of said slot wedges and ripple springs, the apparatus comprising:
- a wedge block adapted to be inserted into the other pair of said parallel grooves disposed radially inward of the one pair;
- means cooperatively associated with said wedge block for displacing said slot wedge radially outward with respect to the stator so as to compress said ripple spring:

VOL
1126
ISS
1
MY
7
1991
UMI

means cooperatively associated with said wedge block for measuring the displacement of said slot wedge in compressing said ripple spring; and

means for measuring the force required to compress said ripple spring, whereby the tightness of said slot wedge and said ripple spring is determined based upon the amount of displacement of said slot wedge and the force exerted by the ripple spring.

---

### 5,012,685

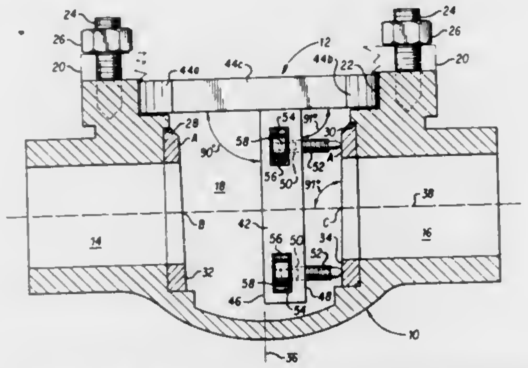
### BALL VALVE SEAT DISTANCE MEASURING DEVICE AND METHOD OF USING SAME

**Mark B. Lackman, 717 Oleander Cir., Virginia Beach, Va. 23464**

**Filed Mar. 8, 1990, Ser. No. 490,434**

**Int. Cl.$^5$ G01D *21/00***

**U.S. Cl. 73—866.5** **15 Claims**



1. A measuring device for measuring the distance between seating rings in a valve body having a bonnet recess symmetrically located with respect to the axis of the valve body, said measuring device comprising:

a locator means, dimensioned to fit without play into the bonnet recess of the valve body, for locating the measuring device relative to said valve body;

a support arm depending from said locator means so as to extend into said valve body when said locator means is positioned in the bonnet recess;

first and second means for probing supported by said support arm and movable relative to said support arm; and,

means for moving said first and second means for probing into contact with a seating ring at first and second points.

---

### 5,012,686

### PINION SHIFTING MECHANISM OF AN ENGINE STARTER

**Akira Morishita; Shuzoo Isozumi, and Toshinori Tanaka, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 4, 1989, Ser. No. 389,725**

**Claims priority, application Japan, Aug. 6, 1988, 63-196901; Aug. 24, 1988, 63-210211; Mar. 8, 1989, 1-56653**

**Int. Cl.$^5$ F02N *11/00***

**U.S. Cl. 74—7 A** **7 Claims**

1. An engine starter for driving a driven gear coupled to an internal combustion engine, comprising:

an electric motor having an output shaft;

a pinion assembly axially slidably mounted on said output shaft of the electric motor to be driven and rotated by the electric motor, said pinion assembly including a pinion adapted to be brought into meshing engagement with the driven gear of the internal combustion engine by a movement of the pinion assembly toward a first axial direction directed away from said electric motor;

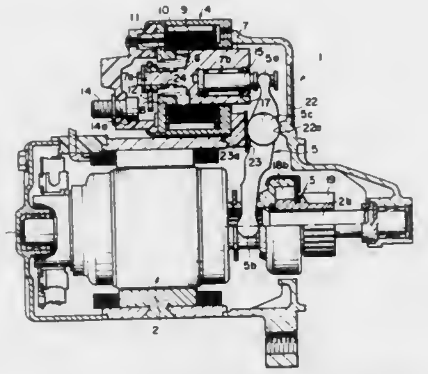
an electromagnetic switch device disposed at a side of said electric motor and having a cylindrical plunger driven and slidable between a first and a second position in an axial direction parallel to an axial direction of said output shaft of the electric motor;

an engager member mounted to said plunger of the electromagnetic switch so as to be slidable along the axial direction of the plunger;

first urging spring means (**17**) for urging said engager member with respect to said plunger in an axial direction opposite to said first axial direction;

a shift lever having one end engaged with an end of said engager member and the other end engaged with said pinion assembly, said shift lever having at a middle of its length a pivot support on which the shift lever can be turned;

support surface means (**22*a***) for limiting a movement of said pivot support of the shift lever directed toward said first axial direction; and



resilient support means (**32**) including second urging spring means (**32*b***) for urging said pivot support of the shift lever in said first axial direction toward said support surface means, wherein said resilient support means allows, by a yielding of said second urging spring means, a movement of said pivot support of the shift lever in a direction away from said support means over a predetermined length, wherein when said plunger is driven from the first to the second position in a second axial direction opposite to said first axial direction, to shift said pinion assembly via the shift lever toward said first axial direction, said second urging spring means (**32*b***) of the resilient support means yields first, before any yielding of said first urging spring means (**17**) occurs, to allow a movement of the pivot support of the shift lever in said second axial direction, said first urging spring means beginning to yield after said pivot support of the shift lever has been moved away from said support surface means by said predetermined length.

---

### 5,012,687

### BALL SCREW

**Kaoru Hoshide, Yokohama, Japan, assignor to THK Co., Ltd., Tokyo, Japan**

**Filed Nov. 7, 1989, Ser. No. 432,939**

**Claims priority, application Japan, Nov. 16, 1988, 63-287782**

**Int. Cl.$^5$ F16H *25/22***

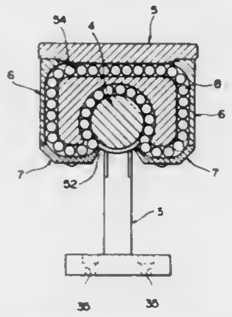
**U.S. Cl. 74—89.15** **2 Claims**

1. A ball screw comprising:

struts provided with bearing members at their top ends and disposed at proper spacings;

a screw shaft including supported parts rotatably supported on said bearing members of said struts, said screw shaft being chased, on its outer periphery, with helical ball rolling grooves a root diameter of which is substantially equal to an outside diameter of said bearing member; a nut formed, on its underside, with an opening through which said struts pass and an endless circulatory path consisting of a load region including load rolling grooves standing vis-a-vis with said helical rolling grooves and a non-load region for connecting both ends of said load region to permit communication with each other, said nut being greater in length in the axial direction of said load region than in the axial direction of said bearing member and moving on said screw shaft in accordance with rotations of said screw shaft, said nut including;

a nut body having a through-hole for the passage of said screw shaft therethrough with an inner peripheral surface curvilinearly chased with said load rolling grooves therein standing vis-a-vis with said ball rolling grooves on said screw shaft, non-load rolling slots each defining one component of said non-load region for connecting said both ends of said load region and formed in positions corresponding to said load rolling grooves and defining one component of each said endless circulatory path in a direction orthogonal to said through-hole;



a pair of lateral plates fastened, respectively, to opposite sides of said nut parallel to the axis of said through hole, said lateral side plates each having non-load roller grooves;

a pair of lower plates each fastened, respectively, to said underside of said nut at opposite sides of said opening in said nut through which said struts pass, each of said lower plates having roller grooves therein, each aligned, at its opposite ends, with said roller grooves in said nut body and said lateral side plates, respectively; and

a multiplicity of balls circulating within said endless circulatory path and undergoing loads between said load rolling grooves of said nut and said rolling grooves of said screw shaft.

---

### 5,012,688

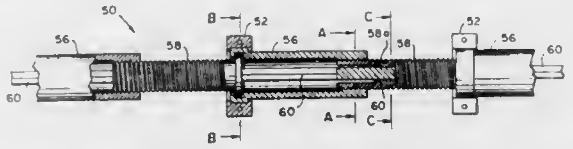
### SIZING APPARATUS AND PROPORTIONAL SPACING MECHANISM

**Malcolm P. Ellis, Ellis Farms, Rte. 227, P.O. Box R, Ashland, Me. 04732**

**Division of Ser. No. 314,953, Feb. 24, 1989. This application Jul. 3, 1990, Ser. No. 547,949**

**Int. Cl.$^5$ F16H *21/16***

**U.S. Cl. 74—89.15** **2 Claims**



1. A proportional spacing mechanism for proportionally spacing objects comprising:

a plurality of coupling means coupled respectively to the objects, each coupling means comprising an internally threaded receiver on one side of the coupling means in fixed relationship to the coupling means and an elongate externally threaded bolt coupled for relative rotation to the coupling means and extending from a side opposite said one side of the coupling means;

said plurality of coupling means being coupled together with the externally threaded bolt of one coupling means engaging the internally threaded receiver of another coupling means effectively forming a multi-element shaft;

said bolts being formed with an internal channel having a length of non-circular cross section;

and a rod of complementary non-circular cross section extending through the bolts for engaging and rotating the bolts relative to the receivers thereby spacing the coupling means and respective objects proportionally from a reference position.

---

### 5,012,689

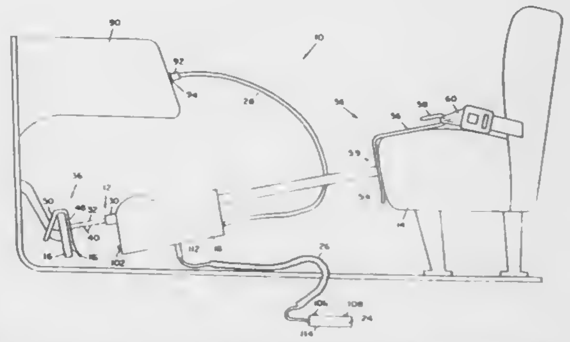
### VEHICLE FOOT PEDAL ACTUATOR APPARATUS AND METHOD

**Steven R. Smith, 1503 Oak Knoll La., Lockhart, Tex. 78644**

**Filed Oct. 4, 1989, Ser. No. 417,197**

**Int. Cl.$^5$ F16H *19/04;* G05G *1/21***

**U.S. Cl. 74—89.17** **22 Claims**



1. A vehicle foot pedal actuator device for actuating the foot pedals of an automobile or the like, the actuator device comprising:

A. extension means, adapted to be connected between the vehicle driver's seat and the pedal to be actuated, for extending to depress the pedal and for retracting to pull the pedal back to its normal position;

B. drive means connected to the extension means for selectively extending the extension means with an extending force to depress the pedal to be actuated and retracting the extension means with a retracting force, the drive means being capable of applying the retracting force in substantially the same magnitude as the extending force; and

C. moveable control means for controlling the operation of the drive means from various positions outside of the vehicle passenger compartment.

---

### 5,012,690

### PROGRAMMABLE SHUTTLE SHIFTING IN TRANSMISSIONS

**Garth H. Bulgrien, Ephratra, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.**

**Division of Ser. No. 444,312, Dec. 1, 1989. This application Mar. 29, 1990, Ser. No. 501,573**

**Int. Cl.$^5$ B60K *20/10***

**U.S. Cl. 74—335** **3 Claims**

1. A method of selecting a forward to reverse speed ratio in a powershift transmission having an electrical control system responsive to switches actuated by manual movement of a gearshift lever between a plurality of positions for controlling clutches in the transmission, said method comprising:

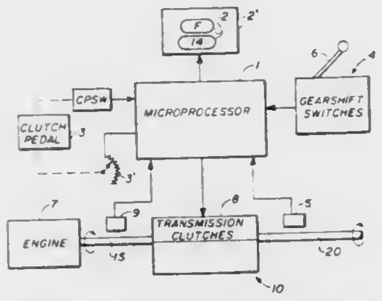
holding the gearshift lever in a predetermined one of said positions while turning on the ignition switch to enable a microprocessor to enter a ratio value selection routine;

selectively moving said gearshift lever while the microprocessor is in said routine to generate a ratio value and store said value in a non-volatile memory;

subsequently using said ratio value and a forward gear value selected by movement of said gearshift lever to thereby

VOL 1126
ISS 1
MY 7
1991
UMI

obtain a reverse gear value bearing a predetermined relationship to said forward gear value; and

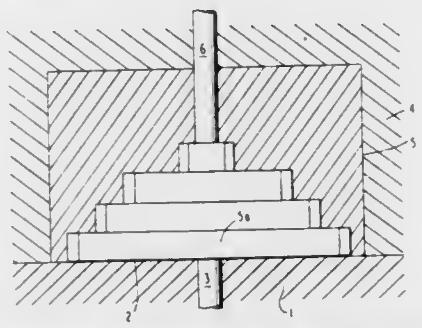


generating from said reverse gear value signals which are applied to said clutches to select the reverse gear speed of the transmission.

---

### 5,012,691
### CLUSTER OF MOLDED GEARS WITH HELICAL TEETH

**Maurice M. Bertot, Luxueil Les Bains, France, assignor to ECIA - Equipements Et Composants Pour L'Industrie Automobile, Audincourt, France**
**Filed Oct. 15, 1986, Ser. No. 919,296**
**Claims priority, application France, Oct. 16, 1985, 85 15348**
**Int. Cl.$^5$ B29D** *15/00*
**U.S. Cl. 74—434** **5 Claims**



1. Cluster of integral moulded plastic gears with helical teeth comprising a cluster of integral stepped coaxial pinions of which the teeth have the same helical sense and the same pitch, characterized in that, among parameters, Mrn and Mri designating the reel moduli of the pinions of any rank n and i respectively of the cluster, Zn and Zi, designating the numbers of teeth of said pinions, and $\beta$n and $\beta$i, designating their helix angles, there exists the following relationship:

$$\sin\beta n = \sin\beta i \; Mrn \; Zn/Mri \; Zi.$$

and in that the number of pinions is at least two, so that the moulded cluster can be stripped from a single moulding cavity in a fixed single-piece matrix in a single operation of rotation combined with a translation of the cluster.

---

### 5,012,692
### CHANGE-SPEED LEVER APPARATUS FOR USE IN BICYCLE

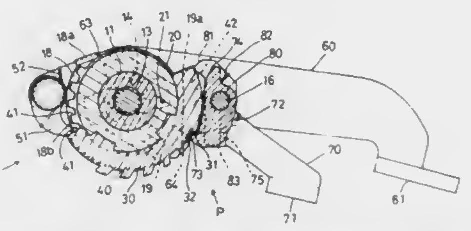
**Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**
**Filed Sep. 22, 1989, Ser. No. 411,314**
**Claims priority, application Japan, Sep. 24, 1988, 63-239266; May 10, 1989, 1-117693**
**Int. Cl.$^5$ B62M** *25/04;* **B62K** *23/06;* **G05G** *5/06*
**U.S. Cl. 74—475** **27 Claims**

1. A speed change lever apparatus for use in a bicycle, the apparatus comprising:

a fixed member;

a cable-pulling lever supported by the fixed member and operable to effect a speed change by pulling and maintaining a speed change control cable, the cable-pulling lever being returned to a home position thereof after completion of the lever operation;

a release lever supported by the fixed member and operable to effect the speed change by loosening the speed change control cable, the release lever being returned to a home position thereof whenever operated;

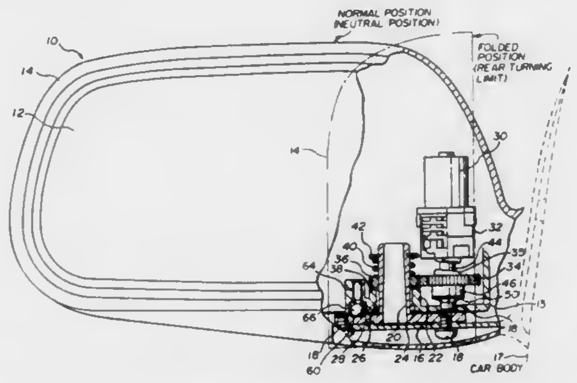


control portions defined in the cable-pulling lever and the release lever, respectively, to be operable in substantially the same directions from the home positions thereof and located at different positions in a direction normal to their operating directions and at the same time located adjacent each other in the home positions thereof.

---

### 5,012,693
### DRIVE MECHANISM FOR REAR-VIEW MIRROR ASSEMBLY OF MOTOR-DRIVEN FOLDING TYPE

**Masao Enomoto, Hadano; Masami Yamamoto, Machida; Yoshiro Nagayama, and Yoshinori Yamauchi, both of Isehara, all of Japan, assignors to Ichikoh Industries, Ltd., Tokyo, Japan**
**PCT No. PCT/JP88/00827, § 371 Date May 25, 1989, § 102(e) Date May 25, 1989, PCT Pub. No. WO89/01427, PCT Pub. Date Feb. 23, 1989**
**PCT Filed Aug. 19, 1988, Ser. No. 381,415**
**Claims priority, application Japan, Aug. 20, 1987, 62-125652; Jun. 30, 1988, 63-85770; Jun. 30, 1988, 63-85771**
**Int. Cl.$^5$ F16C** *1/10;* **G02B** *7/18*
**U.S. Cl. 74—502.1** **12 Claims**


NORMAL POSITION (NEUTRAL POSITION)
FOLDED POSITION (REAR TURNING LIMIT)
10
14
12
30
42
40
36
38
64
66
32
44
39
34
46
50
15
20
16
18
29
26
24
16
22
18
60
17
CAR BODY

1. A drive mechanism for a side-view mirror assembly of the motor-driven folding type comprising:

an electric motor to pivot between a normal and a folded position a mirror housing pivotably supported on a shaft fixed to a mirror base which is to be fixed to a car body;

a speed reducer comprising a plurality of planetary gear units including a sun gear coupled to an output shaft of said motor, and;

a transmission gear group including at least a first spur gear fixed on said motor shaft and a second spur gear connected to an output shaft of said speed reducer and which is in mesh with said first spur gear,

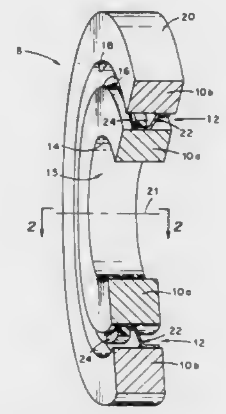
said speed reducer comprising a first cylindrical casing, housing coaxially some of said plurality of planetary gear units including at least the planetary gear unit including said sun gear coupled to the output shaft of said motor and which has formed on the inner circumferential wall thereof a first ring gear common to said some planetary gear units, a second cylindrical casing, housing coaxially the remaining plurality of planetary gear units so as to be in mesh with said some planetary gear units of the first cylindrical casing and has formed on the inner circumferential face thereof a second ring gear common to said remaining planetary gear units, and a means for coupling together said first and second casings,

said first and second ring gears being formed with different gear modules such that the first ring gear formed in said first casing is formed with a smaller gear module than that of the second ring gear formed in said second casing.

---

### 5,012,694
### HIGH SPEED FLYWHEEL

**Stephen V. McGrath, Knoxville, Tenn., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.**
**Filed Jan. 29, 1990, Ser. No. 471,341**
**Int. Cl.$^5$ F16F** *15/30*
**U.S. Cl. 74—572** **13 Claims**



1. A flywheel comprising:

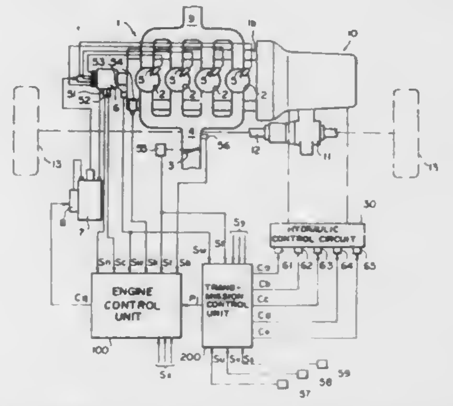
at least two ringlike components arranged in a spaced, concentric relationship for rotation about an axis so that one of said components is an inner component and the other of said components is an outer component, each of said components contributing appreciably to the storage of kinetic energy during flywheel operation and constructed of a material possessing a relatively low mass and high strength; and

an expansion device joining said ringlike components and adapted to accommodate radial growth of said components during flywheel operation, said expansion device including a resilient support member having an inner portion in engagement with the inner ringlike component and an outer portion in engagement with the outer ringlike component and adapted to grow radially outwardly during flywheel operation at a faster rate than said outer component so that during flywheel operation, said outer portion of said support member maintains its engagement with said outer ringlike component, said expansion device also including a support ring positioned about the inner portion of said support member for maintaining the inner portion in engagement with the inner ringlike component during flywheel operation.

---

### 5,012,695
### GEAR-SHIFTING SHOCK SUPPRESSING SYSTEM FOR AUTOMATIC TRANSMISSION VEHICLE

**Takahiro Kyohzuka; Masaki Fujii; Toshiyuki Kikuchi; Mitsutoshi Abe, and Yuji Matsuno, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**
**Filed Oct. 4, 1989, Ser. No. 417,015**
**Claims priority, application Japan, Oct. 17, 1988, 63-253068; Feb. 17, 1989, 1-39129**
**Int. Cl.$^5$ B60K** *41/18*
**U.S. Cl. 74—859** **12 Claims**



1. A gear-shifting shock suppressing system for a vehicle provided with an automatic transmission which shifts to a desired gear-speed on the basis of a gear-shifting signal, said gear-shifting shock suppressing system being for controlling the output of the engine of the vehicle in order to suppress gear-shifting shock which occurs when the automatic transmission shifts and characterized by having

a determining means which detects the interval between successive two gear-shifting signals and determines whether the interval therebetween is longer or shorter than a preset time, and

a control changing means which causes the gear-shifting shock suppressing system to control the output of the engine when the interval between successive two gear-shifting signals is longer than the preset time in a manner different from the manner in which the gear-shifting shock suppressing system controls the output of the engine when the interval between successive two gear-shifting signals is shorter than the preset time.

---

### 5,012,696
### LINE PRESSURE CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

**Motohisa Miyawaki, Kawasaki, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Oct. 18, 1989, Ser. No. 423,037**
**Claims priority, application Japan, Oct. 19, 1988, 63-263356**
**Int. Cl.$^5$ B60K** *41/18*
**U.S. Cl. 74—866** **3 Claims**

1. A line pressure control system for a continuously variable transmission for transmitting the power of an automotive engine to wheels of a motor vehicle having an accelerator pedal, the system having a drive pulley with a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a driven pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a belt engaged with both pulleys and a hydraulic circuit having a pressure regulator valve for regulating the line pressure in the circuit,

the system comprising:

a wheel speed sensing means for sensing speed of wheels;

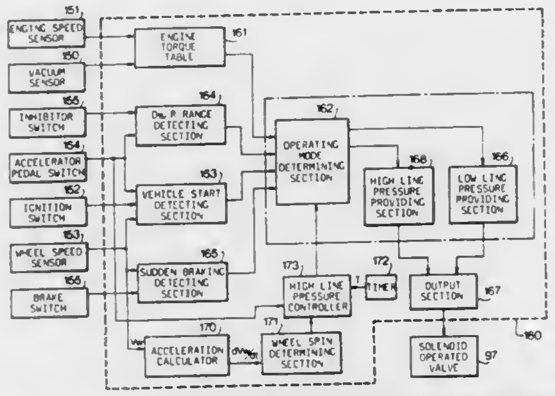
an accelerator pedal switching means for detecting the depression of the accelerator pedal;

wheel spin detector means responsive to signals of the wheel speed sensing means and the accelerator pedal switching

VOL 1126 ISS 1 MY 7 1991 UMI

means for producing a wheel spin signal when the acceleration of the wheel speed is higher than a predetermined value;

means responsive to the wheel spin signal for producing a changing signal to change the line pressure;



ENGINE SPEED SENSOR
VACUUM SENSOR
INHIBITOR SWITCH
ACCELERATOR PEDAL SWITCH
IGNITION SWITCH
WHEEL SPEED SENSOR
BRAKE SWITCH
ENGINE TORQUE TABLE
D & R RANGE DETECTING SECTION
VEHICLE START DETECTING SECTION
SUDDEN BRAKING DETECTING SECTION
OPERATING MODE DETERMINING SECTION
HIGH LINE PRESSURE PROVIDING SECTION
LOW LINE PRESSURE PROVIDING SECTION
HIGH LINE PRESSURE CONTROLLER
TIMER
OUTPUT SECTION
ACCELERATION CALCULATOR
WHEEL SPIN DETERMINING SECTION
SOLENOID OPERATED VALVE

line pressure level changing device provided in the hydraulic circuit for changing the line pressure from low level to high level in response to the changing signal.

---

### 5,012,697

### REVOLUTION CONTROLLER FOR A CONTINUOUSLY VARIABLE TRANSMISSION

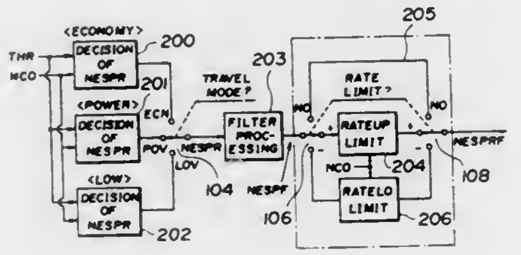
**Yoshlnori Yamashita; Sadayuki Hirano; Katsuaki Murano, all of Shizuoka; Takumi Tatsumi, and Hiroaki Yamamoto, both of Hyogo, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan**

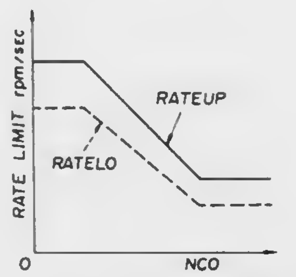
**Filed Nov. 29, 1989, Ser. No. 443,720**

**Claims priority, application Japan, Nov. 30, 1988, 63-302732**

**Int. Cl.$^5$ F16H** *59/24, 59/46*

**U.S. Cl. 74—866** **4 Claims**





1. A revolution controller for a continuously variable transmission for a vehicle, the transmission including a driving side pulley and a driven side pulley each having a fixed pulley part and having a movable pulley part supported for movement toward and away from the fixed pulley part, the width of a groove between the pulley parts of each said pulley being increased and decreased to increase and decrease at each said pulley a rotating radius of a belt wound around both of the pulleys to change a belt ratio, said controller limiting the rate of change of a target number of revolutions for an engine driving said transmission to a rate of change of engine revolution limit lower than a prescribed rate when the target number of revolutions of the engine specified by a speed change schedule map based on a throttle opening and a vehicle speed is changed during travel of the vehicle.

---

### 5,012,698

### RANGE SELECTION CONTROL ARRANGEMENT FOR AUTOMATIC AUTOMOTIVE TRANSMISSION

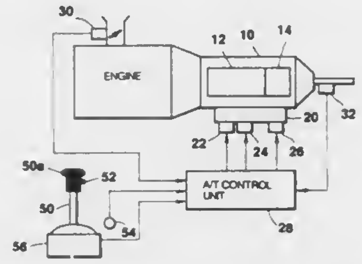
**Koichi Hayasaki, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jun. 5, 1990, Ser. No. 533,311**

**Claims priority, application Japan, Jun. 13, 1989, 1-149871**

**Int. Cl.$^5$ B60K** *41/18*

**U.S. Cl. 74—866** **6 Claims**



1. In an automatic automotive transmission

a gear train capable of producing a plurality of forward speeds;

a select lever which is selectively movable between a plurality of forward speed range positions, said plurality of forward speed positions including at least one forward range position wherein the transmission is conditioned to produce engine braking, said select lever being arranged so that the lowest forward speed range it can be selectively moved to is a range wherein said transmission will produce the second lowest forward gear; and

a lowest range switch; and

means for permitting the transmission to downshift to the lowest forward speed when said lowest range switch is operated while said select lever is set in one of a forward range position wherein engine braking is induced and to produce the second lowest lowest gear.

---

### 5,012,699

### APPARATUS FOR CONTROLLING GEARSHIFTS IN AUTOMATIC TRANSMISSION

**Takashi Aoki; Noboru Sekine; Shigeo Ozawa, all of Saitama, and Takamichi Shimada, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 18, 1989, Ser. No. 353,829**

**Claims priority, application Japan, May 20, 1988, 63-123296**

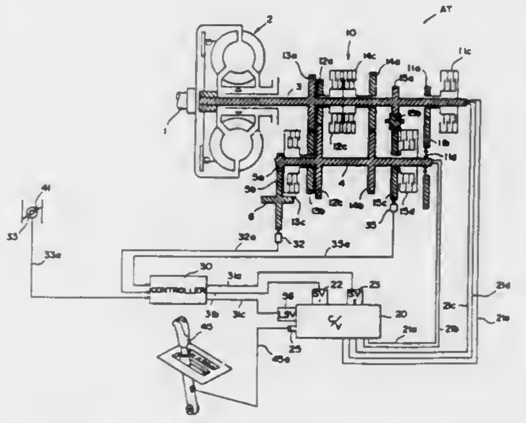
**Int. Cl.$^5$ B60K** *41/08*

**U.S. Cl. 74—869** **8 Claims**

1. An apparatus for controlling gearshifts in an automatic transmission having power transmission means comprising a plurality of power transmission paths, and a plurality of hydraulic gearshift means for selecting the power transmission paths under hydraulic pressure, said gearshift means being selectively operable in response to a gearshift command for switching said power transmission paths to effect gearshifts, said apparatus comprising:

a hydraulic pressure release valve for releasing a hydraulic pressure from the hydraulic gearshift means associated with a previous gear position when said gearshift command is issued wherein operation of said hydraulic pressure release valve is controlled based on a hydraulic control pressure generated by a control pressure control valve and a hydraulic pressure from the hydraulic gearshift means associated with a next-gear-position; and

control means responsive to a gearshift command for a power-on/downshift or a power-off/upshift for controlling said hydraulic control pressure depending on a magnitude of a gearshift-dependent change in a rotational speed of an engine associated with the automatic transmission, for thereby controlling operation of said hydraulic pressure release valve.



---

### 5,012,700

### HYDRAULIC CONTROL DEVICE FOR AUTOMATIC TRANSMISSION FOR VEHICLE HAVING CLUTCH DISENGAGE CONTROL MEANS INDEPENDENT OF CLUTCH ENGAGE CONTROL MEANS

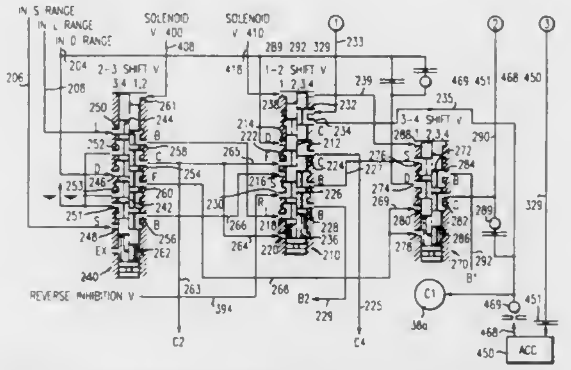
**Mitsuru Takada; Hiroshi Itoh, both of Toyota; Tokuyuki Takahashi, Aichi, and Makoto Funahashi, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Aug. 2, 1989, Ser. No. 388,486**

**Claims priority, application Japan, Aug. 2, 1988, 63-192965; Nov. 2, 1988, 63-278345; Nov. 25, 1988, 63-297785**

**Int. Cl.$^5$ B60K** *41/06*

**U.S. Cl. 74—869** **5 Claims**



1. In an automatic transmission for a vehicle such as an automobile having a speed stage shifting mechanism including parallelly arranged first and second hydraulically operated input clutches and adapted to provide a certain first speed stage in which said first and second input clutches are both engaged and a certain second speed stage higher than said first speed stage in which said first input clutch is disengaged and said second input clutch is engaged, said certain first speed stage being set up with engine braking when said first input clutch is engaged, wherein said certain first speed stage may be set up without engine braking when said first input clutch is not engaged,

a hydraulic control device comprising a hydraulic pressure supply control means for variably controlling speed of supply of a hydraulic pressure to said first input clutch according to conditions for engaging said first input clutch so as to variably provide a certain substantial delay in supplying the hydraulic pressure to said first input clutch, and a hydraulic pressure exhaustion control means for controlling speed of exhaustion of a hydraulic pressure from said first input clutch during shifting from said certain first speed stage to said certain second speed stage, independently of said hydraulic pressure supply control means, said hydraulic pressure exhaustion control means including a first hydraulic control system means operative to exhaust said first input clutch substantially instantly.

---

### 5,012,701

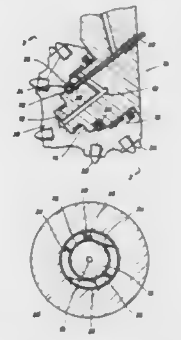
### METHOD OF MAKING A THREADED RETAINER RING FOR A ROLLER CUTTER ON A DRILL BIT

**Jeffrey E. Daly, Cypress, Tex., assignor to Camco International Inc.**

**Filed Feb. 5, 1990, Ser. No. 475,285**

**Int. Cl.$^5$ B21K** *5/02*

**U.S. Cl. 76—108.2** **14 Claims**



1. A method of making a threaded retainer ring for fitting within an annular groove on a journal of a rotary drill bit and engaging screw threads on a roller cutter to retain the roller cutter for rotation on the journal; said method comprising the following steps:

providing an externally threaded circular retaining ring of an outer diameter larger than a predetermined desired outer threaded diameter for retaining the cutter on the journal thereby to form a ring having an oversized outer threaded diameter prior to cutting of the ring into two separate semicircular portions for fitting within a groove of the journal; and

then cutting said ring into two semicircular portions for fitting within the journal groove with the cut removing a thickness of material between 0.003 inch and 0.045 inch, the oversizing of said outer diameter being an amount to compensate for the thickness of material removed by cutting of said ring thereby to provide the desired outer threaded diameter.

---

### 5,012,702

### SPLIT HEAD HAMMERS

**John D. Taylor, Umberleigh, England, assignor to Thor Hammer Company Limited, Shirley, England**

**Continuation of Ser. No. 314,763, Feb. 3, 1989, abandoned. This application Mar. 6, 1990, Ser. No. 492,421**

**Claims priority, application United Kingdom, Aug. 6, 1986, 8619165**

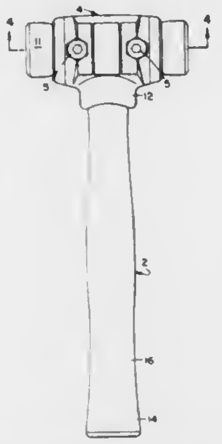
**Int. Cl.$^5$ B25D** *1/00*

**U.S. Cl. 81—25** **12 Claims**

1. A split head hammer which includes a head and a shaft, the head comprising a first part and a second part, means for releasably and adjustably connecting together said head parts, said parts when connected together defining a pair of axially aligned oppositely opening striking piece sockets and a hollow shaft receiving stem having an open end and a closed end, said stem having a larger cross sectional area at the closed end than at the open end, said stem extending behind and beyond the axes of said sockets, said shaft having an end received in and

VOL
1126
ISS
1
MY
7
1991
UMI

substantially filling said stem, striking members received in said sockets, said connecting means comprising a pair of tightenable connectors releasably engaging said parts on opposite sides of said stem, said stem having an internal circumferential contact surface and said end of said shaft having an external circumferential contact surface of different shape than said internal surface such that when said shaft end is positioned in said stem said internal surface of said stem engages between one third and three quarters of the shaft end external surface, the portion of the shafts external surface received within said stem but not engaged by the internal surface thereof defining with said internal surface initially unoccupied space arranged that upon tightening of said connectors the cross section of said stem and said sockets are reduced and said shaft end within said stem deforms into said initially unoccupied space to enable said sockets and said stem to clamp said shaft end in said stem and said striking pieces in said sockets against axial separation from said parts.

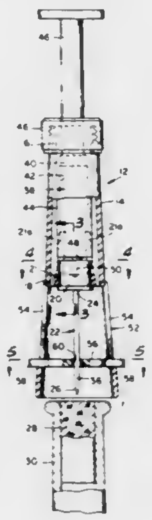


---

### 5,012,703
### CORK REMOVAL APPARATUS

**Helmut Reinbacher, 20135 Keswick St., Apt., Canoga Park, Calif.**

**Filed Feb. 5, 1990, Ser. No. 474,943**
**Int. Cl.$^5$ B67B *7/18***
**U.S. Cl. 81—3.29** **4 Claims**

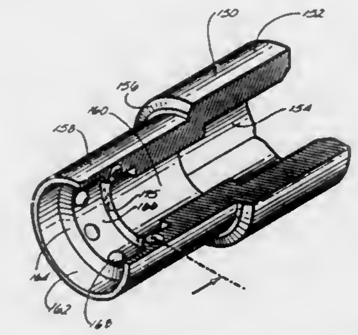


1. A cork removal apparatus for removing a cork from a bottle comprising:
(a) a body;
(b) an elongated hollow needle depending from said body for penetrating the cork;
(c) gas supply means carried by said body for supplying gas under pressure to said hollow needle;
(d) a skirt depending from said body, said skirt surrounding said hollow needle and including a pair of oppositely disposed elongated slots; and
(e) needle extracting means associated with said skirt for a least partially retracting said hollow needle from the cork following penetration of the cork by said hollow needle, said needle extracting means comprising a generally disk shaped member having a pair of oppositely disposed ears slidably receivable with said slots of said skirt and including a centrally disposed aperture for receiving said hollow needle.

---

### 5,012,704
### BALL DRIVER FOR A THREADED COLLAR

**George S. Wing, 531 Esplanade, Apt. 515, Redondo Beach, Calif. 90277**
**Division of Ser. No. 219,077, Jul. 14, 1988, Pat. No. 4,858,299, which is a division of Ser. No. 122,493, Nov. 16, 1987, Pat. No. 4,784,549, which is a continuation of Ser. No. 702,811, Feb. 15, 1985, abandoned. This application Jun. 21, 1989, Ser. No. 369,256**
**Int. Cl.$^5$ B25B *13/00***
**U.S. Cl. 81—59.1** **2 Claims**



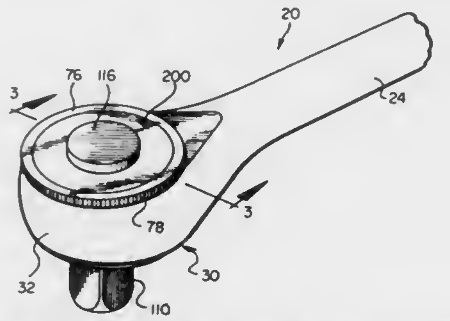
1. A driver for setting a collar in a joint by application of torque to the collar, the collar, the collar having a plurality of axially extending troughs and circumferentially extending bark means between the troughs, the driver comprising:
(a) means for accepting a torque from a torque applying tool;
(b) an annular driving section having a right cylindrical axial bore, the axial bore opening at one end of the driver; and
(c) a plurality of balls mounted in the driving section at equal angular intervals, the balls being mounted in the driving section at least substantially by swaging of driving section material around the balls such that the swaged material captures the balls and prevents them from coming out of their mountings while permitting the balls to rotate in their mounting, the mounting also being such that the balls extend inwardly towards the axis of the driver for engaging the walls of the trough in the collar to apply a torque to the collar and failing the bark of the collar circumferentially adjacent the troughs to develop circumferential furrows between the troughs upon reaching a predetermined pre-load in the joint.

---

### 5,012,705
### RATCHET WRENCH WITH MANUALLY REMOVABLE CORE

**Kirk K. Chow, Dallas, Tex., assignor to National Hand Tool Corporation, Dallas, Tex.**
**Filed Mar. 16, 1990, Ser. No. 494,610**
**Int. Cl.$^5$ B25B *13/46***
**U.S. Cl. 81—63** **6 Claims**

1. In a ratchet wrench including a drive head, a core having a body surmounted by a radilally-enlarged cap, said core body being rotatable in and releasably secured in said drive head,
a shank fastened to and projecting from said core body axially thereof for releasably securing a tool to said shank,
pawl means intercoupling said drive head with said core body for reversibly driving said core body and said shank attached thereto in each of selective, opposed annular driving modes upon rotation of said drive head,
interlock means for securing said core in said drive head;
said interlock means comprising flange means carried by and extending radially outwardly of said shank and spaced axially from said core body, said flange means and said core body defining an annular channel therebetween, and
arcuately shiftable locking plate means having a diametric boundary exceeding a diameter of said core, said locking plate means having a central, key-way-like opening of a non-circular configuration for receiving said flange means of said interlock means therethrough upon positioning of said plate means over said shank in a encircling mode about said shank with said locking plate means overlying said drive head,
wing means integrally formed with and generally coplanar with said plate means,
said wing means constituting a radially inwardly directed keying projection of said plate means extending into said central opening thereof for slidably and matingly invading said channel to seat therewithin upon arcuate rotation of said plate means through an annular sector and about said shank to establish an orientation of said wing means in at least partial vertical alignment with said flange means and preventing withdrawal of said core axially from said drive head,
said plate means being rotatably shiftable to withdraw said wing means from said channel and to permit removal of said plate means from said shank and to allow axial displacement of said core with respect to said locking plate means.

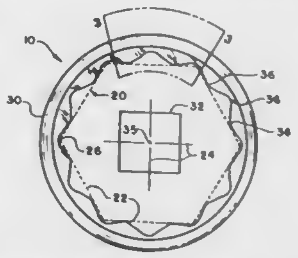


---

### 5,012,706
### SOCKET WRENCH OPENING

**Richard B. Wright, Akron; Theodore M. Vozenilek, Canton, and Brent P. Fleming, Copley, all of Ohio, assignors to Wright Tool Company, Barberton, Ohio**
**Continuation-in-part of Ser. No. 286,604, Dec. 16, 1988, Pat. No. 4,882,957. This application Oct. 31, 1989, Ser. No. 429,761**
**The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.**
**Int. Cl.$^5$ B25B *13/06***
**U.S. Cl. 81—121.1** **8 Claims**

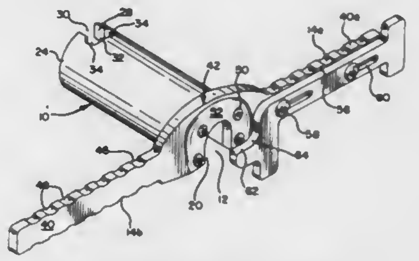
1. A wrench for turning a fastener nut having a central axis and an even-numbered plurality of flat bounding surfaces parallel to said central axis with diametrically opposite pairs being parallel to each other wherein said bounding surfaces intersect in adjacent pairs to form fastener corners, said wrench having a fastener nut engaging socket defined about a central socket axis, said fastener nut engaging socket defined by a plurality of uniformly spaced peripherally and radially disposed protuberances and a plurality of uniformly spaced corner recesses disposed between said protuberances, each protuberance including a straight connecting surface and complimentary straight engaging surfaces diverging at least 2° outwardly from said connection surface at a point disposed at an angle of about 12° on either side of a radial line extending from said central socket axis and bisecting said connecting surface, said engaging surfaces being at about a 176° outside obtuse angle to each other for registry with said flat bounding surfaces on said fastener nut, said connecting surfaces having a length substantially equal to 0.21256 times (×) the mean flats of the fastener nut to be driven, each corner recess comprised of an arcuate surface defined by a circle about said central axis of said socket and transitional surfaces converging from said engaging surfaces of adjacent protuberances inwardly toward said arcuate surface.



---

### 5,012,707
### AWNING SPRING WINDER

**Anthony J. DiBiagio, Granger, Ind., assignor to Holiday Rambler Corporation, Wakarusa, Ind.**
**Filed Jan. 27, 1989, Ser. No. 302,430**
**Int. Cl.$^5$ B25B *13/02***
**U.S. Cl. 81—124.2** **12 Claims**

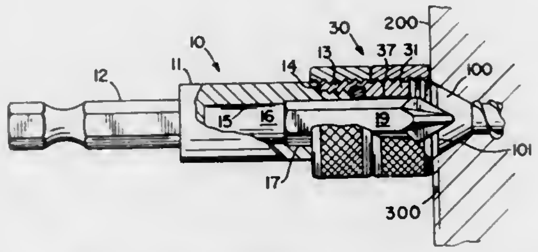


1. A hand tool for tensioning awning springs, comprising:
a spring chamber including an elongate hollow sleeve having a predetermined length to accommodate a predetermined length of an awning spring within the sleeve, said sleeve having a slot which extends the length of said sleeve between the sleeve ends along a first axis of said tool, the slot providing an opening in said sleeve so that said hand tool receives the awning spring predetermined length within said sleeve, one end of said sleeve having means for engaging an end of an awning spring and preventing rotation of said awning spring relative to said tool, the spring engagement means being disposed along a tool second axis generally parallel to the tool first axis, the opposite end of said sleeve including means for applying rotation to said spring which includes a winding handle radially extending generally perpendicularly from said sleeve and having gripping surfaces thereon, said winding handle including means for securing a portion of said spring.

VOL
1126
ISS
1
MY
7
1991
UMI

## 5,012,708
## DEPTH LOCATOR APPARATUS FOR INSERT BIT HOLDERS

**J. Richard Martindell, 9605 Village Green NE., Albuquerque, N. Mex. 87111**
**Continuation of Ser. No. 391,648, Aug. 7, 1989, abandoned, which is a continuation of Ser. No. 257,272, Oct. 13, 1988, abandoned. This application May 21, 1990, Ser. No. 526,686**
**Int. Cl.$^5$ B25B** *23/00*
**U.S. Cl. 81—429** **1 Claim**



1. A depth locating apparatus to control the depth of a driven screw type fastener head relative to the surface of the work being fastened comprised of in combination:

a bit holder having a cylindrical body and a socket in the body for receiving a bit;

an external threaded portion disposed on the cylindrical body about the socket;

an insert type screwdriving bit disposed in the socket;

sleeve means to be secured to the bit holder, including

- a bore having a threaded portion for engagement with the external threaded portion of the cylindrical body of the bit holder,
- an outer end on the threaded portion of the bore in the sleeve means through which the screwdriving bit extends,
- a non-threaded internal portion of the bore having a diameter smaller than the diameter of the threaded portion of the bore,
- an internal circular groove located in said non-threaded internal portion adjacent to the outer end of the threaded portion of the bore.
- a ring of elastomeric material disposed in the internal circular groove to bear on and frictionally retain the screwdriving bit when the sleeve means is threadedly engaged with the bit holder, and
- a threaded cylindrical external surface;

two rings, each of said rings having a circular bore threaded to engage the threaded cylindrical external surface of the sleeve means, one ring being a work engaging ring, the other being a locking ring, said rings threadedly assembled to the sleeve means; and

said sleeve means, when attached to said bit holder, with the bit disposed therein, comprises, in operation, depth locating apparatus to determine the depth of a screw type fastener head relative to a workpiece surface, said depth being determined by the location of the work engaging ring relative to the bit, the rings being threadedly adjustable for depth variation, and the desired depth being set by the locking action of the locking ring against the work engaging ring.

---

## 5,012,709
## IMPACT SCREW DRIVER

**Jen-Sung Su, No. 1, Lane 155, Sec. 1, Chang-Ping Rd., Taichung City, Taiwan**
**Filed Aug. 13, 1990, Ser. No. 566,509**
**Int. Cl.$^5$ B25B** *19/00*
**U.S. Cl. 81—466** **3 Claims**

1. An impact screw driver comprising:

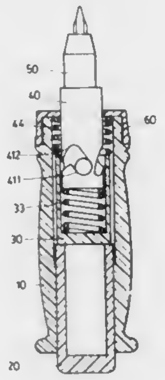
a tubular handle having a top end and a bottom end;

a handle cap mounted detachably on said top end of said handle, said handle cap having a central hole formed therethrough;

an impact rod, slidable axially within said handle, having a top end and a bottom end which is biased to extend from said bottom end of said handle;

a driving rod, slidable axially within said handle, including an open top end and a bottom end which abuts said top end of said impact rod, a spring seat disposed on said bottom end of said driving rod, and a guide means retained on a wall of said driving rod;

a driving head disposed slidably within said driving rod and having a top end extending through said top end of said driving rod and said central hole in said handle cap, a bottom end positioned in said driving rod, and a cam slot means formed in said driving head receiving slidably therein said guide means of said driving rod whereby axial movement of said driving rod is converted into rotational movement of said driving head, relative to said driving rod;



a coiled torsion spring placed on said spring seat in said driving rod under said driving head so as to bias said driving head to move upward;

a coiled compression spring sleeved on said driving head and placed over said driving rod in said handle so as to bias said driving rod and said impact rod to move downward;

a tool bit; and

a sleeve head connecting said tool bit to said driving head.

---

## 5,012,710
## DEVICE FOR THE AUTOMATIC ENGAGEMENT OF THE FEED MOVEMENT AND OF THE RETURN MOVEMENT OF THE TOOL SLIDE OF A BORING HEAD

**Nicola D'Andrea, and Ermanno D'Andrea, both of Lainate, Italy, assignors to D'Andrea S.p.A., Italy**
**Filed Oct. 11, 1989, Ser. No. 420,056**
**Claims priority, application Italy, Oct. 14, 1988, 22323 A/88**
**Int. Cl.$^5$ B23B** *29/034*
**U.S. Cl. 82—1.2** **3 Claims**

1. In a machine tool of the type having a facing and boring head extending along a longitudinal axis, and a tool holder mounted on the head for reciprocating movement along feed and return directions along a transverse axis perpendicular to the longitudinal axis, an arrangement for automatically controlling the movement of the tool holder along the feed and return directions, comprising:

(a) an annular rim gear rotatable about the longitudinal axis and having transversely-extending pins on the rim gear for joint rotary movement therewith;

(b) an annular member having a plurality of cam portions arranged about the longitudinal axis and engageable with the pins between raised and lowered positions along the longitudinal axis during the rotary movement of the rim gear, said annular member also having longitudinally-extending spring-biased projections;

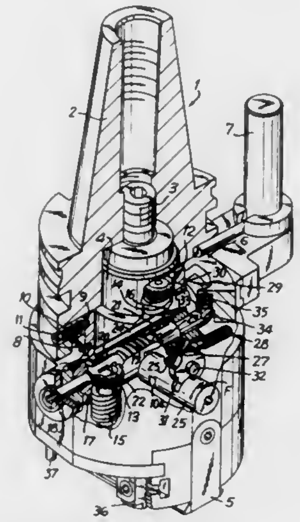
(c) an actuator disc mounted for turning movement between actuating positions, and having a cam follower surface engaged by the projections for turning the actuator between said actuating positions during the rotary movement of the rim gear;

(d) a control cylinder having a control peg mounted for movement between end positions in response to movement of the actuator disc between the actuating positions;

(e) a transversely-extending sleeve mounted on the head for reciprocating movement along the transverse axis;

(f) a first gear transmission coupled between the rim gear and the tool holder for moving the tool holder along the feed direction;

(g) a second gear transmission coupled between the rim gear and the tool holder for moving the tool holder along the return direction;



(h) a transversely-extending worm shaft having opposite end regions; and

(i) a pair of spur gears mounted at the opposite end regions of the worm shaft, each spur gear being mounted at opposite ends of the sleeve for joint movement therewith along the transverse axis, one of the spur gears being moved into engagement with the first gear transmission in response to movement of the control peg to one end position to initiate movement of the tool holder along the feed direction, and the other of the spur gears being moved into engagement with the second gear transmission in response to movement of the control peg to the other end position to initiate movement of the tool holder along the return direction.

---

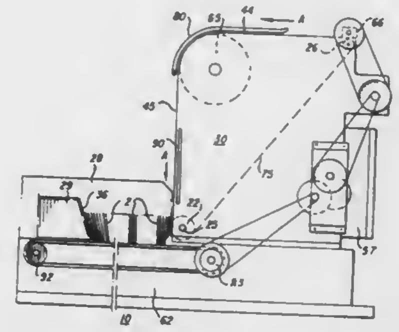
## 5,012,711
## HIGH SPEED CUTTING AND STACKING APPARATUS

**Donald A. Lane, Wakefield, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.**
**Continuation-in-part of Ser. No. 214,028, Jun. 27, 1988, Pat. No. 4,902,194. This application Feb. 2, 1989, Ser. No. 305,837**
**Int. Cl.$^5$ B65H** *29/24*
**U.S. Cl. 83—92** **24 Claims**

1. An improved apparatus for collection and stacking tickets to provide an array of tickets of the type having a transport assembly for collecting tickets from a cutter and transporting the tickets to a stacker, and a stacking assembly for receiving the tickets and stacking the tickets in a horizontal array, wherein the improvement comprises an improved stacking assembly, comprising:

a planar stacking surface moveable along a horizontal stacking axis in a displacement direction away from an input end of said planar stacking surface, wherein tickets are stacked on said stacking surface in an upended configuration with an elongate edge of each ticket resting on the stacking surface;

a back stop, located above the planar stacking surface and having an upright stacking face which is inclined away from the input end of said stacking surface;



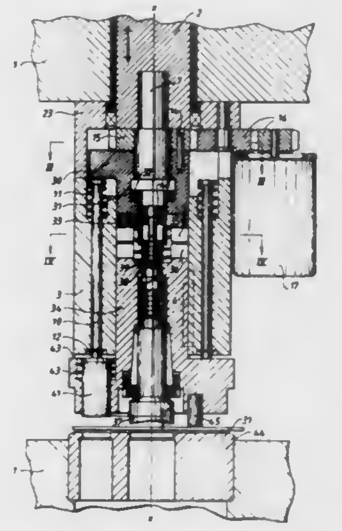
means for sequentially feeding tickets in a substantially vertical orientation to the input end of the stacking surface and for depositing tickets in a stack resting against the stacking face of said back stop; and

means for incrementally moving the stacking surface and back stop along the horizontal stacking axis in said displacement direction.

---

## 5,012,712
## TOOL HOLDER FOR PUNCHING TOOLS

**Bengt H. Nordquist, Täby, Sweden, assignor to Pullmax AB, Goteborg, Sweden**
**Filed Apr. 14, 1989, Ser. No. 338,604**
**Claims priority, application Sweden, Apr. 25, 1988, 8801527**
**Int. Cl.$^5$ B21D** *28/02;* **B26F** *1/04*
**U.S. Cl. 83—571** **3 Claims**



1. Tool holder for punching tools with punches capable of actuation as required intended for a punching machine, including a housing (3) which is essentially coaxial with a cutter slide (2) of the punching machine for the rotation-free accommodation and the axially movable control of a punch holder (4) connected to the cutter slide with a number of axially movable punches (5, 5′) situated eccentrically around the axis (x—x) of the housing and so arranged as to be actuated individually so as to interact with die openings in a die part (20) adapted to the punches by means of a push-rod (10) arranged coaxially with each punch, which push-rod is in contact at one end with the punch and is so arranged at the opposite end as to be capable of connection to the cutter slide in such a way as to be caused

VOL
1126
ISS
1
MY
7
1991
UMI

to move in an axial sense with the cutter slide, characterized in that each push-rod (10) is supported in the housing (3) in such a way as to permit movement in parallel with the axis (x—x) of the housing, and in that the push-rod at its aforementioned opposite end is so arranged as to be connected to the cutter slide (2) in such a way as to permit movement in the direction of the operating stroke of the cutter slide by an impact heel (13) attached to the cutter slide and projecting radially from the cutter slide, which impact heel follows the axial movement of the cutter slide without exerting an eccentric force on the punch holder (4), wherein the impact heel and the housing are capable of rotating relative to one another about the common axis (x—x) of the housing and the cutter slide so as to permit the adjustment as required of the impact heel towards the aforementioned opposite end of the push-rod, and wherein the punch holder (34) also supports a punch (37) which is coaxial with the housing (3) and securely held in the punch holder, characterized by a coupling component (33) which is connected in a rotation-free fashion to the impact heel (30) and is incapable of movement in an axial sense, which coupling component is so arranged via tooth-coupling (35, 36) executed on the punch holder and the coupling component, as to engage axially with the punch holder (34) in a first rotated position which the teeth of the coupling component are positioned directly in line with corresponding teeth (36) on the punch holder, whilst the coupling component, when in a second rotated position, does not engage axially with the punch holder when the teeth (35, 36) of the tooth-coupling are directly in line with a corresponding gap in the teeth, wherein the impact heel (30) in the first rotated position is situated between two push-rods (10) without actuating them, and in the second position is situated directly in line with a push-rod in such a way as to actuate it.

---

### 5,012,713

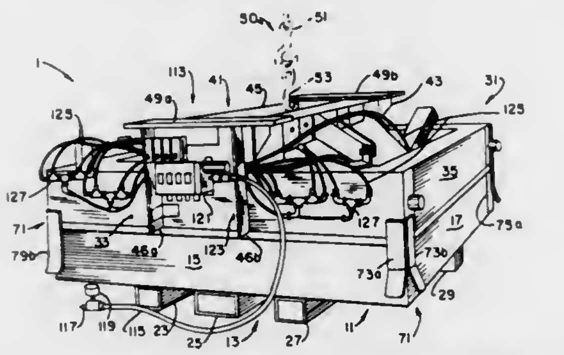
### DIE POWER PACK FOR CUTTING APPARATUS

**Thomas E. Schmitt, Randolph, Ill., assignor to Progressive Service Die Company, St. Louis, Mo.**

**Filed Dec. 18, 1989, Ser. No. 451,926**

**Int. Cl.⁵ B26D *5/12***

**U.S. Cl. 83—639.3** **8 Claims**



1. An apparatus for cutting a three-dimensionally shaped work-piece comprising:
- a mold in which the work-piece is receivable, the mold having a shape conforming to the final shape of the work-piece;
- first frame means for holding the mold;
- second frame means positioned above the first frame means and vertically movable with respect thereto;
- means for raising and lowering the second frame means relative to the first frame means;
- a plurality of pre-positioned cutting means carried by the second frame means for cutting the work-piece, said cutting means being operable to cut the work-piece when the second frame means is lowered a short distance to a position immediately above the first frame means;
- each cutting means comprising a knife and means for moving the knife from a first and retracted position to a second and extended position, the knife cutting the work-piece as it is moved to its extended position, each moving means being attached to the second frame means, the moving means being attached to the second frame means such that when all the moving means have moved their associated knife to its extended position, the knives have completely cut-out the work-piece, each knife being contacted by a plate, and the moving means including an inflatable bladder pushing against the plate, when the bladder is inflated, for the plate to move the knife into a cutting position;
- said first frame means comprises a generally rectangular lower frame assembly formed of side members connected at their respective ends, and the mold comprises a three-dimensional mold the perimeter of which is secured to an inner wall of the side members to mount the mold within the lower frame assembly, the second frame means comprises a generally rectangular upper frame assembly formed of side members having ends and with their respective ends being connected, and a beam attached to the top of the upper frame assembly and extending lengthwise of the upper frame assembly, the upper frame assembly including a pair of cross beams extending between respective side members of the upper frame assembly parallel to each other, said cross beams being orthogonal to a longitudinal axis of the apparatus and equidistantly spaced on each side of a mid-point of the upper frame assembly, the upper frame assembly further including diagonal beam members extending across each diagonal of the assembly;
- each knife being mounted in a housing, the respective housings being permanently suspended from the cross beams and the beam members in an orientation and angulation such as to permit the knives to cut out the work-piece when the cutting means are operated;
- means for guiding the movement of the upper frame assembly, said guiding means including a guide plate assembly attached exteriorly of the side members at each corner of the apparatus, each guide plate assembly projecting downwardly below the side members of the upper frame assembly to contact the lower frame assembly as the upper frame assembly is lowered thereon, each guide plate assembly including a pair of guide plates positioned at respective corners of the upper frame assembly, each guide plate comprising one guide plate of each pair thereof being secured to the respective end of a side member so as to disposed each pair of guide plate at right angles to each other, each guide plate flaring outwardly so as to guide the upper frame assembly onto the lower frame assembly when the guide plates contact the lower frame assembly;
- each cutting means including said inflatable bladder and said apparatus further including pneumatic means mounted on the upper frame assembly for selectively inflating the bladder of each cutting means, the pneumatic means including a pressure source attached to one of the side members, a pressure hose extending from the source to the bladder of each cutting means, and a control means for pressurizing each of the bladders during operating of the cutting means, each cutting means further including a block having a longitudinal slot therein through which the knife is received to hold and guide the knife during its cutting, and said plate contacting the knife being positioned between the bladder and the block, and each cutting means further including spring means interposed between the plate contacting the knife and the block to retract the knife after a cutting operation.

---

### 5,012,714

### BRASS INSTRUMENT

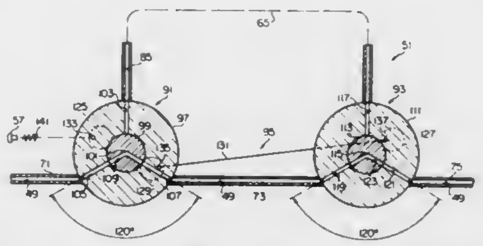
**Akihiko Kongou, Shizuoka, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan**

**Filed Sep. 19, 1989, Ser. No. 409,942**

**Claims priority, application Japan, Sep. 19, 1988, 63-234320**

**Int. Cl.⁵ G10D *9/04***

**U.S. Cl. 84—390** **5 Claims**



1. A brass instrument having a vibratile column of air for producing a sound, comprising:
- (a) a mouthpiece having a first air passage and propagating a buzzing to said vibratile column of air;
- (b) a main tube member having a second air passage connected to said first air passage;
- (c) a plurality of bypassing tube members respectively having a plurality of bypassing air passages;
- (d) a plurality of valve units respectively provided in association with said bypassing tube members, each of said valve units allowing the sound to change its pitch depending upon a position thereof regardless of a position of another valve unit; and
- (e) a plurality of manipulating members respectively provided in association with said valve units and operative to shift the valve units between first and second positions, respectively, in which each of said valve units comprises a first valve assembly having a first port coupled to said second air passage, a second port also coupled to said second air passage, a third port coupled to the bypassing air passage of said associated bypassing tube member and a first air conduit interconnecting said first and second ports in said first position and said first and third ports in said second position, a second valve assembly having a fourth port coupled to said second air passage, a fifth port also coupled to said second air passage, a sixth port coupled to the bypassing air passage of said associated bypassing tube member and a second air conduit interconnecting said fourth and fifth ports in said first position and said fourth and sixth ports in said second position, and a link mechanism allowing said first and second valve assemblies to be simultaneously shifted between said first and second positions, and in which said first and second air passages and said valve units or said first, second and bypassing air passages and the valve units form in combination said vibratile column of air depending upon the positions of said valve units, said first valve assembly comprising a first valve casing provided with said first, second and third ports, and a first valve rotor rotatably inserted in the valve casing and having said first air conduit, said first valve rotor having a rotational axis, said second valve assembly comprising a second valve casing provided with said fourth, fifth and sixth ports, and a second valve rotor rotatably inserted in the valve casing and having said second air conduit, said second valve rotor having a rotational axis, said first valve casing being separated from said second valve casing, said link mechanism comprising a first lug portion connected to said associated manipulator and causing said first valve rotor to rotate around the rotational axis thereof, a first coupling portion driven for rotation together with the first valve rotor, a second lug portion causing said second valve rotor to rotate around the rotational axis thereof, and a connecting rod turnably connected at one end thereof to said first coupling portion and at the other end thereof to said second lug portion, each of said first and second air conduits forming a 120 degree bend between the opposite ends thereof and each of said valve assemblies being connected to said second air passage so that said vibratile column of air turns at 30 degrees at the interface between said second air passage and said first port, at 60 degrees in said first air conduit, at 30 degrees at the interface between said second port and said second air passage, at 30 degrees at the interface between said second air passage and said fourth port, at 60 degrees in said second air conduit and at 30 degrees at the interface between said fifth port and said second air passage while said first and second valve assemblies are held in said first position.

---

### 5,012,715

### SENSOR FOR AN AUTOMATIC PIANO PLAYER APPARATUS

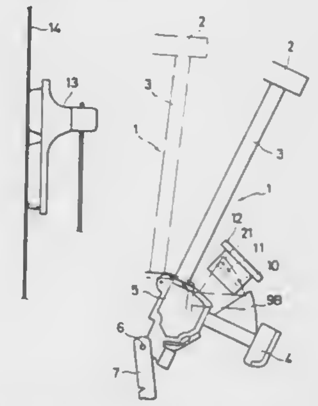
**Hiroshi Matsunaga, Hamamatsu; Hisamitsu Honda, Shizuoka; Haruhiko Matsui, Masahiko Akita; Tatsuya Inaba; Tetsusai Kondo; Toshio Oka, Hamamatsu, all of Japan, assignors Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan**

**Filed Aug. 2, 1989, Ser. No. 388,561**

**Claims priority, application Japan, Aug. 3, 1988, 63-192797; Apr. 14, 1989, 1-94415**

**Int. Cl.⁵ G10C *3/18;* G10H *1/34, 3/06***

**U.S. Cl. 84—724** **10 Claims**

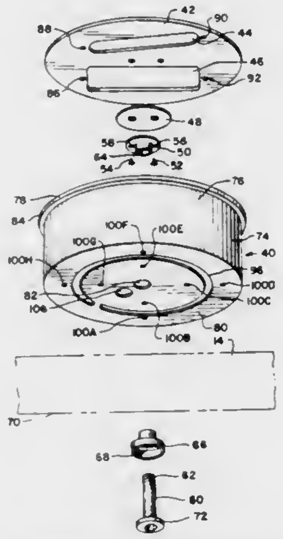


1. A sensor arrangement for an automatic piano player apparatus, said apparatus having a keyboard, piano strings, each of said strings having a damper mechanism and a rotatable hammer system for striking a piano string in response to depression of a key in said keyboard comprising:
- a plurality of switches operatively associated with said hammer system and being turned on and off at a point of time A when a damper starts leaving a string in response to the rotating action of said hammer system, at a point of time B when said hammer system has rotated through a predetermined angle, at a point of time C when said hammer system has rotated through another predetermined angle and at a point of time D when the sound stops, respectively; and
- information output means for obtaining a key position information corresponding to a depressed key from the outputs of said switches, a string-striking intensity information corresponding to the time length between said point of time B and said point of time C from the outputs of said switches at said points of time B and C, and a state-of-condition information of said damper over the time between said point of time A and said point of time D from the outputs of said switches at said points of time A and D.

VOL
1126
ISS
1
MY
7
1991
UMI

## 5,012,716
## ROTATABLE PICK-UP HEAD FOR ELECTRIC GUITAR

**Claudio Pagelli, Chur, Switzerland, assignor to Dronge & Rapport Inc., Tenafly, N.J.**
**Filed Mar. 21, 1989, Ser. No. 326,521**
**Int. Cl.$^5$ G10H** *3/18*
**U.S. Cl. 84—727** **16 Claims**



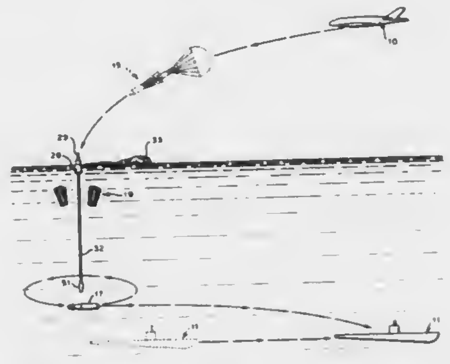
1. A manually rotatable electromagnetic pickup device for sensing vibrations in a musical instrument, said device comprising:
- a manually rotatable disc;
- means for rotatably mounting said rotatable disc on said musical instrument;
- means for selectively fixing the rotational position of said rotatable disc;
- means for mounting one or more electromagnetic pickups on said rotatable disc;
- means for electrically connecting said electromagnetic pickups to one or more amplifiers;
- said means for rotatably mounting said rotatable disc on said musical instrument comprising a shaft member fixedly attached at a first end two said rotatable disc and rotatably attached to the second end to said musical instrument;
- a substantially circular groove on said bottom portion of said cylinder means for supporting the central portion within said substantially circular groove; and
- a guide member extending from said rotatable disc into said circular groove so as to guide the rotation of said disc.

---

## 5,012,717
## AIR-TO-SUBSURFACE MISSILE SYSTEM

**Morton L. Metersky, Warminster, and James R. Howard, Huntingdon Valley, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Sep. 29, 1964, Ser. No. 402,060**
**Int. Cl.$^5$ B64D** *1/04;* **F41F** *5/00;* **F42B** *19/46, 22/44, 25/00*
**U.S. Cl. 89—1.11** **8 Claims**

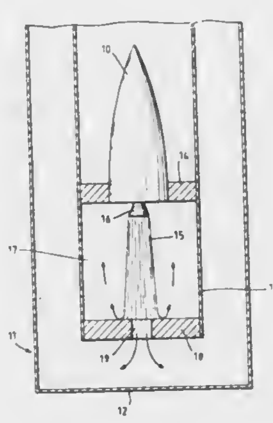
1. An air-to-subsurface missile system for use against high speed submarines and surface vessels, comprising:
- an acoustic homing torpedo;
- a directional sonobuoy positioned in tandem behind said torpedo; and
- cowling means removably connected to said torpedo and said sonobuoy forming thereby a rigid unitary aerodynamic missile, said cowling means including a pair of elongated semicircular casings abutting along the longitudinal edges and enveloping said torpedo and sonobuoy about the proximal ends thereof, securing means releasably connected to said casings and activated upon delivery of said missile to a desired position in water for jettisoning said casings, and fin means radially extending from said casings for providing aerodynamic stability to said missile.



---

## 5,012,718
## IMPINGEMENT PRESSURE REGULATOR

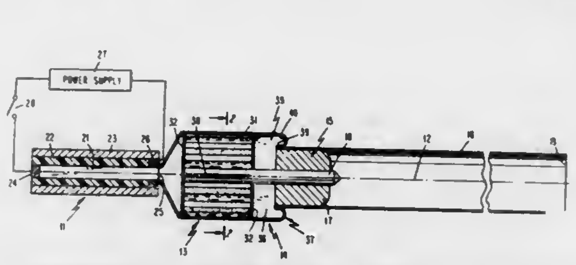
**Lee D. Miller, Bristol, United Kingdom, assignor to British Aerospace Public Limited Company, London, England**
**Filed Sep. 27, 1989, Ser. No. 412,807**
**Claims priority, application United Kingdom, Oct. 27, 1988, 8825195**
**Int. Cl.$^5$ F41F** *3/04*
**U.S. Cl. 89—1.816** **8 Claims**



1. An apparatus for launching a projectile which has a projectile body and a nozzle at one end of said projectile body for emitting gas during launch, said apparatus comprising:
- support means for supporting said projectile body at least during launch;
- means for generating additional thrust during launch comprising:
  - means defining a chamber in surrounding relation to said one end of said projectile body and in communication with said projectile nozzle for receiving at least some of said gas emitted from said nozzle during launch, and
  - means defining an orifice in a wall of said chamber for receiving and exhausting at least some of a jet emitted from said projectile nozzle during launch,
  - said orifice being sized and disposed with respect to said projectile nozzle so that a predetermined pressure is generated within said chamber during launch to thereby provide an additional boost to said one end of said projectile body during launch, and
- canister means around and spaced from said chamber means and including a closed end spaced from said orifice.

## 5,012,719
## METHOD OF AND APPARATUS FOR GENERATING HYDROGEN AND PROJECTILE ACCELERATING APPARATUS AND METHOD INCORPORATING SAME

**Yeshayahu S. A. Goldstein, Gaithersburg; Derek A. Tidman, Silver Spring, both of Md., and David Fleischer, Great Falls, Va., assignors to GT-Devices, Alexandria, Va.**
**Filed Jun. 12, 1987, Ser. No. 61,214**
**Int. Cl.$^5$ F41B** *6/00*
**U.S. Cl. 89—8** **77 Claims**

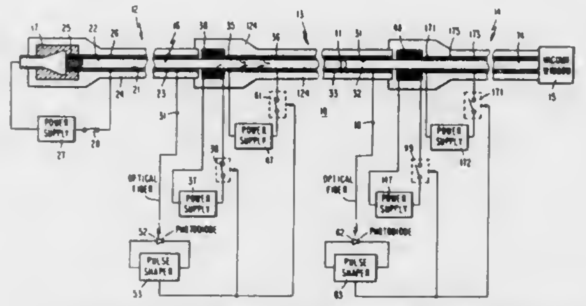


1. Apparatus for accelerating a projectile comprising a barrel through which the projectile is accelerated, a source of controlled temperature plasma gas jet having a predetermined propagation direction, a hydrogen generator positioned downstream of the source to be responsive to the plasma jet for generating high pressure hydrogen gas in a chamber in flow relation with the barrel and the source so the chamber is behind the projectile, the hydrogen generator including a liquid having hydrogen and oxygen and elemental metal or a metal hydride, the elemental metal or metal hydride and the temperature of the jet being such that high pressure elemental hydrogen gas and a non-vaporous oxide compound of the metal are formed by an exothermic reaction of the liquid reacting with the elemental metal or metal hydride under the control of the plasma jet, and means for applying the high pressure hydrogen gas without substantial presence of the metal oxide compound to the barrel so the hydrogen gas accelerates the projectile through the barrel.

---

## 5,012,720
## PLASMA PROJECTILE ACCELERATOR WITH VALVE MEANS FOR PREVENTING THE BACKWARD FLOW OF PLASMA IN PASSAGE THROUGH WHICH PROJECTILE IS ACCELERATED

**Derek A. Tidman, Falls Church, Va., assignor to GT-Devices, Alexandria, Va.**
**Filed Aug. 29, 1989, Ser. No. 400,291**
**Int. Cl.$^5$ F41B** *6/00*
**U.S. Cl. 89—8** **25 Claims**

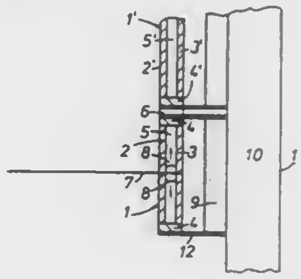


1. A projectile accelerator comprising an elongated wall having an interior passage through which the projectile is accelerated, said wall including a pair of electrodes longitudinally spaced in the direction of projectile acceleration, a mass of ionizable material between said electrodes, said mass of material being ionized in response to a discharge voltage being applied to said electrodes to produce a plasma having sufficiently high pressure in said passage behind the projectile to accelerate the projectile, and valve means activated synchronously with the derivation of the high pressure plasma for preventing the flow of the plasma to a portion of the passage behind the electrodes after the plasma has been established between the electrodes, said valve means including means for applying a magnetic field to plasma in said portion of the region.

---

## 5,012,721
## REACTIVE ARMOR WALL STRUCTURE

**Gunnar Medin; Erik Olsson; Sjöö Lennart, all of Eskilstuna, and Roger Lundgren, Bromma, all of Sweden, assignors to Affarsverket FFV, Eskilstuna, Sweden**
**Continuation of Ser. No. 124,996, Nov. 24, 1987, abandoned. This application Feb. 27, 1990, Ser. No. 488,519**
**Claims priority, application Sweden, Mar. 27, 1986, 8601436**
**Int. Cl.$^5$ F41H** *5/007*
**U.S. Cl. 89—36.17** **7 Claims**



1. A reactive armour wall structure for protection against hollow explosive charge jets, comprising:
- at least one closed container formed by a separate and replaceable panel structure, and in which a high detonation pressure can be produced,
- said separate and replaceable panel structure consisting of two mutually spaced and mutually parallel armour walls and mutually spaced armour side walls extending substantially at right angles to said two mutually spaced and mutually parallel armour walls across opposite portion thereof, to define said closed container,
- an explosive substance filling said closed container and which is detonated by one of said hollow explosive charge jets,
  - said mutually spaced armour side walls having a density greater than 2000 kg./m$^3$ such that said side walls possess high shockwave reflecting properties, and so that detonation shockwaves initiated in said explosive substance in said closed container by the hollow explosive charge jet which propagate in respective opposite directions away from the jet and towards said side walls are substantially reflected by said side walls backing respective reverse directions towards the jet to disturb the jet, the side walls also being made of ductile material and having a thickness and mass such that a product of density and thickness of said side walls is at least equal to a product of density and thickness of said two mutually spaced and mutually parallel armour walls of said separate and replaceable panel structure.

---

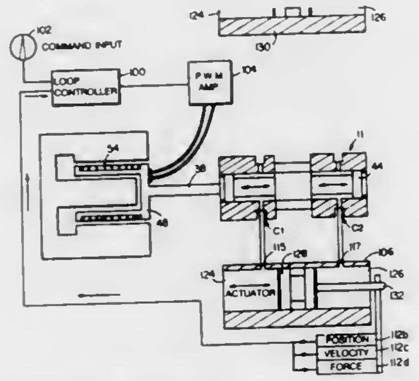
## 5,012,722
## FLOATING COIL SERVO VALVE

**Joseph F. McCormick, Holyoke, Mass., assignor to International Servo Systems, Inc., Newport, R.I.**
**Filed Nov. 6, 1989, Ser. No. 432,978**
**Int. Cl.$^5$ F15B** *9/03, 13/044*
**U.S. Cl. 91—361** **21 Claims**

1. A servo valve, comprising
- a magnet assembly defining an air gap containing a magnetic flux;
- a coil support carrying an electrical winding in said air gap;
- a spool valve comprising a spool slidably disposed in a spool valve housing;

VOL
1126
ISS
1
MY
7
1991
UMI

operator means connected between said spool and said coil support to operate said spool valve by sliding said spool in said spool housing, said coil support, operator means and spool being free floating with respect to said magnet assembly;



electrical excitation means, connected to said electrical winding, for applying a bipolar electrical signal to said electrical winding, said electrical signal having a bipolar switching rate beyond the mechanical frequency response of said servo valve, and said electrical excitation means being responsive to a modulation signal to change the average DC value of said electrical signal.

---

### 5,012,723
### BRAKE BOOSTER

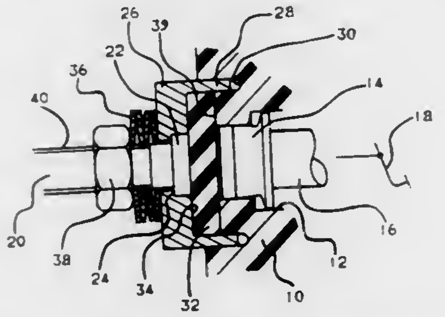
**Jean-Pierre Gauthier, Aulnay Sous Bois, France, assignor to Bendix France, Drancy, France**

**Filed Apr. 21, 1989, Ser. No. 341,520**

**Claims priority, application France, Apr. 28, 1988, 88 05657**

**Int. Cl.$^5$ F15B** *13/16*

**U.S. Cl. 91—369.21** **7 Claims**



1. A brake booster comprising a casing and a diaphragm which divides sealingly an interior of the casing into a front chamber and a rear chamber, a hollow piston movable in the casing, an input member intended to be connected to a brake pedal, an output assembly intended to be connected to a piston of a master cylinder, a reaction disk made of a deformable material and arranged between the hollow piston and the output assembly in order to receive an output force of the booster when the booster is put into operation, the output force causing a first deformation of the reaction disk, the deformation tending to push back the input member, said output assembly being formed from two parts, one part movable relative to the other part and counter to spring means, in order to act on a reduced surface of the reaction disk, wherein the one part of the two parts of said output assembly is mounted slideably inside the other part, and the other part axially and slideably engaging the hollow piston to be freely displaceable according to forces acting upon the other part.

---

### 5,012,724
### RADIAL PISTON HYDRAULIC MOTOR OF VARIABLE CYLINDER CAPACITY

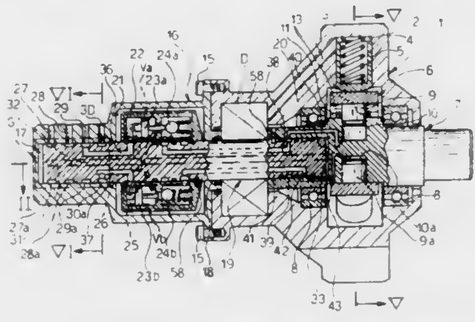
**Bruno Giamello, Corso Piave 66, Alba (Cuneo), Italy**

**Filed May 17, 1989, Ser. No. 353,110**

**Claims priority, application Italy, May 19, 1988, 67464 A/88; Feb. 17, 1989, 67097 A/89**

**Int. Cl.$^5$ F01B** *13/06*

**U.S. Cl. 91—497** **10 Claims**



2. A hydraulic motor of a rotary type with variable cylinder capacity, comprising:

a motor frame;

a motor shaft journaled in said frame;

an eccentric ring mounted on and rotationally coupled to said shaft;

hydraulic actuators carried by the shaft;

a rotating hydraulic coupling, caused to rotate by the shaft and connecting said actuators to a control circuit, said rotating coupling being integral with and external to the frame of the motor and connected hydraulically to the said actuators by means of elements which rotate with the shaft;

drive pistons radially shiftable in respective drive cylinders on said frame and bearing radially on said ring for driving said shaft; and

a distributor for activating said drive pistons said actuators comprising of positioning pistons which slide in corresponding positioning cylinders in said ring, said ring being fixed with respect to rotation to the shaft, this ring, when impelled by the said positioning pistons, being capable of radial displacement with respect to an axis of the shaft, guided by contact between surfaces of the said shaft and of the said ring, the said ring being radially locked with respect to the axis of the motor shaft by locking means which can be relieved in a controlled way through said rotating hydraulic coupling.

---

### 5,012,725
### THREE POSITION ACTUATOR FOR SHIFTING A TWO SPEED TRANSFER CASE

**Richard C. Leary, Troy, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.**

**Filed Apr. 19, 1990, Ser. No. 511,360**

**Int. Cl.$^5$ F01B** *7/00*

**U.S. Cl. 92—63** **6 Claims**

1. A remote actuator for controlling the position of a gear control lever comprising:

an actuator rod having a first portion and a second portion;

a first piston having a first bore disposed for reciprocation on said first portion;

a second piston fixed to said second portion of said actuator rod for reciprocation therewith;

a first housing defining a first bore sealingly receiving said first piston;

a second housing defining a second bore sealingly receiving said second piston;

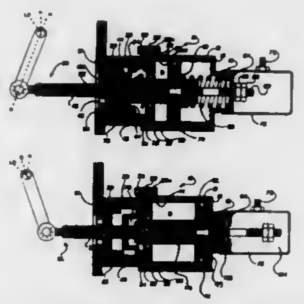
means connecting said first and said second housing;

a connecting wall disposed between said first and said second housing having a bore defined therein for sealingly receiving said second portion of said actuator rod;

a first chamber defined by said first bore and said first piston which may be pressurized to displace said first piston and said actuator rod from an initial position to a first position;

a second chamber defined by said second bore and said second piston which may be pressurized to displace said second piston and said actuator rod from said first position to a second position;

a spring engaging said second piston and said second housing for defining an initial position to which said actuator rod returns upon release of pressure from said first and second chambers;



said first portion of said actuator rod is smaller than said second portion defining an annular face which may be engaged by said first piston; and said first piston has a first end portion, an intermediate axially connecting portion and a second end portion whereby said first end portion is axially spaced from said second end portion and wherein said first end portion engages said first bore of said first housing to define said initial position and said second end portion engages said connecting wall to define said first position.

---

### 5,012,726
### FOOD PRODUCTION APPARATUS, THE PRODUCTION OF FOOD AND NOVEL FOOD PRODUCT

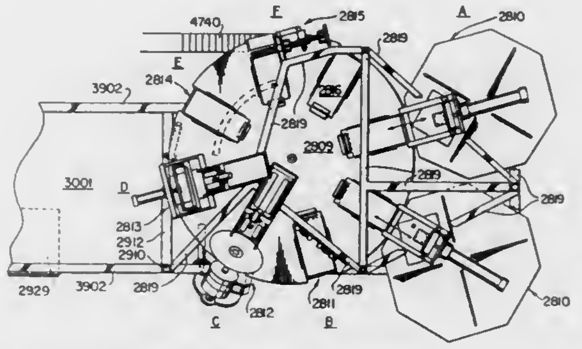
**Amos Fehr, and Joseph Chong, both c/o 4572 Erie Ave., Niagara Falls, Ontario, Canada L2E 3N3**

**Division of Ser. No. 337,638, Apr. 13, 1989. This application Nov. 15, 1989, Ser. No. 436,768**

**Claims priority, application Canada, Jun. 30, 1988, 571001**

**Int. Cl.$^5$ A21C** *9/00;* **A23P** *1/00*

**U.S. Cl. 99—450.6** **24 Claims**



1. Food production apparatus comprising:

(a) a supporting frame structure;

(b) a conveyor system supported thereon, said conveyor system passing a plurality of work stations;

(c) intermittent moving means for intermittently moving said conveyor system from one work station to the next work station downstream therefrom;

(d) a dough sheet feeding mechanism, said mechanism having means thereon for intermittently loading a square sheet of dough at a diamond orientation onto at least one discrete region of said conveyor system while said conveyor system is stationary;

(e) at least one foodstuff loading mechanism at one work station downstream from said dough sheet feeding mechanism and operable to load foodstuff onto discrete regions of said sheet of dough while said sheet of dough is resting on discrete region of said conveyor system and while said conveyor system is stationary;

(f) a loaded dough sheet folding mechanism at another work station downstream from the previously referred-to work station, and operable to provide a substantially-hexagonally-shaped, loaded folded, sheet of dough, while said conveyor system is stationary;

(g) a loaded, folded dough sheet rolling mechanism operable at another work station downstream from the previously referred-to work station and operable to provide a generally, cylindrical, overlapped-folded, loaded, rolled dough product, while said conveyor system is stationary;

(h) means for discharging said generally-cylindrical, overlapped-folded, loaded rolled dough product from said conveyor system;

and

(i) means to synchronize the intermittent movement of said conveyor system with the sequential operation of said dough sheet feeding mechanism, with said foodstuff loading mechanism, with said loaded dough sheet folding mechanism, with said loaded, folded, dough sheet rolling mechanism and with said discharge means.

---

### 5,012,727
### APPARATUS FOR THE CONTROL OF A PASTEURIZING PROCESS

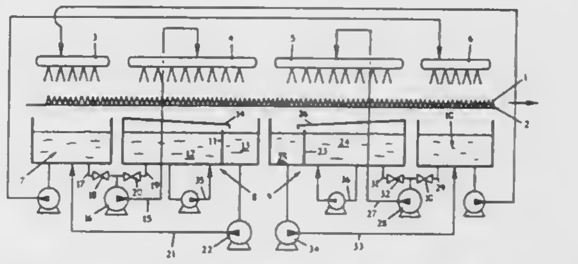
**Narciso Pesente, Verona, Italy, assignor to Enomec S.p.A., Verona, Italy**

**Filed Nov. 26, 1990, Ser. No. 617,744**

**Claims priority, application Italy, Nov. 27, 1989, 85000 A/89**

**Int. Cl.$^5$ A23B** *7/00;* **A23L** *3/00;* **A61L** *2/04;* **B65B** *55/00*

**U.S. Cl. 99—470** **2 Claims**



1. An apparatus for the control of a pasteurizing process designed to be applied to the middle area of a pasteurizer where the pasteurization occurs, said middle area being located downstream of a heating area from which the bottles of product carried by a conveyor provided with a feed motion in a forward direction come, and upstream of a cooling area to which said bottles are sent, provision being made in said middle area for a series of tanks containing water at differentiated temperatures and a series of sprayers fed with water from said tanks located above the sprayers, which sprayers spout water onto the bottles arranged on the conveyor, the first tank in the direction of movement of the conveyor, containing water at a temperature of about 50° C., feeding the last sprayer and the last tank containing water at a temperature of about 50° C. feeding the first sprayer, said apparatus comprising:

a second tank located downstream of said first tank and divided by an upright partition into one chamber and a second chamber, the firt chamber containing water about 65° C. being covered with a sloping shed adapted to convey the water coming from a second sprayer to the second chamber;

one pipeline provided with one pump adapted to send the water contained in said first tank at about 50° C. or the

VOL
1126
ISS
1
MY
7
1991
UMI

water contained in said first chamber at about 65° C. to said second sprayer, said first pipeline comprising one branch connected to said first tank at about 50° C. to which one valve is mounted and a second branch connected to said first chamber at about 65° C. to which a second valve is mounted;

a second pipeline provided with a second pump adapted to send the water contained in said second chamber to said first tank at about 50° C.;

a third tank located upstream of said last tank and divided by an upright partition into a third and a fourth chamber, the third chamber containing water at about 62° C. being covered with a sloping shed adapted to convey the water coming from a third sprayer to the fourth chamber;

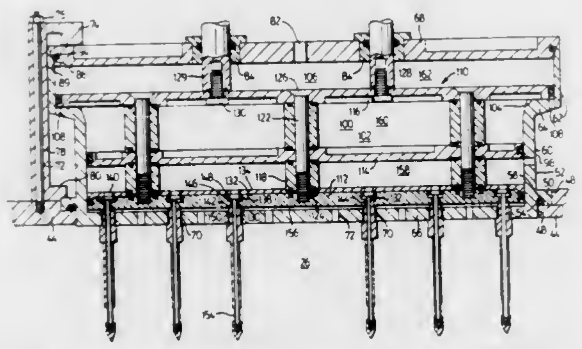
a third pipeline provided with a third pump adapted to send the water contained in said last tank at about 50° C. or the water contained in said third chamber at about 62° C. to said third sprayer, said third pipeline comprising a third branch connected to said last tank at about 50° C. to which a third valve is mounted and a fourth branch connected to said third chamber at about 62° C. to which a fourth valve is mounted;

a fourth pipeline provided with a fourth pump adapted to send the water contained in said fourth chamber to said last tank at about 50° C.

---

### 5,012,728
### INJECTION NEEDLES FOR INJECTING BRINE AND THE LIKE INTO MEAT

**Jacobus J. Langen, Rexdale; John H. J. Langen, and Bernard A. Langen, both of Brampton, all of Canada, assignors to H. J. Langen & Sons Limited, Mississauga, Canada**
**Filed May 1, 1989, Ser. No. 345,770**
**Int. Cl.⁵ B02B** *3/12, 23/00*
**U.S. Cl. 99—533** **19 Claims**



1. An injection needle assembly for injecting a fluid into a meat product comprising:

(a) an injection needle having a proximal end and a distal end and a bore which extends from the proximal end to the distal end,

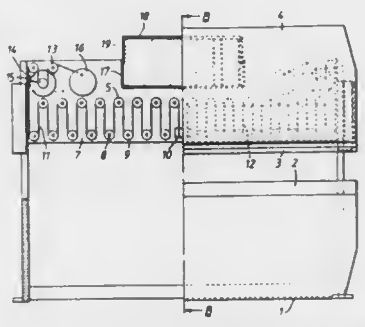
(b) discharge passage means opening through the needle from the bore at the distal end of the needle,

(c) a valve member slidably mounted in the bore of said needle for movement relative to the needle between a first position in which it closes the discharge passage to retain fluid within said needle and a second position in which it opens the discharge passage to permit fluid to be discharged therethrough into the meat in use.

---

### 5,012,729
### DEVICE FOR WORKING PLATE-SHAPED MATERIAL

**Teunis Slot, Laren, Netherlands, assignor to Safan B. V., Lochem, Netherlands**
**Filed Feb. 16, 1990, Ser. No. 483,032**
**Claims priority, application Netherlands, Feb. 22, 1989, 8900429**
**Int. Cl.⁵ B30B** *5/00, 1/00*
**U.S. Cl. 100—278** **12 Claims**



1. Apparatus for working plate-like material, comprising:

a frame;

first and second cooperating elongated working means, said first working means mounted stationary relative to said frame, said second working means mounted for movement relative to said frame in a direction transverse to the longitudinal direction of said second working means and towards and away from said first working means;

a first plurality of guide means mounted on said second working means and aligned longitudinally along said second working means;

a second plurality of guide means mounted on said frame and aligned in the same longitudinal direction as said first plurality of guide means and disposed generally opposite said first plurality of guide means;

an elongated flexible pulling means passing over alternate ones of said first and second guide means;

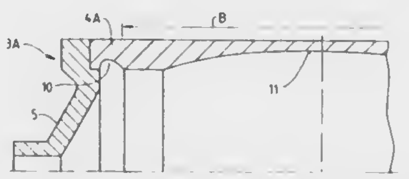
means for fixing one end of said flexible pulling means relative to said frame; and

driving means coupled to the other end of said flexible pulling means for selectively pulling and releasing said flexible pulling means longitudinally.

---

### 5,012,730
### PRESS ROLL FOR PAPER MACHINES

**Christian Schiel, Heidenheim, Fed. Rep. of Germany, assignor to J.M. Voith GmbH, Heidenheim, Fed. Rep. of Germany**
**Filed Jan. 18, 1990, Ser. No. 467,003**
**Claims priority, application Fed. Rep. of Germany, Jan. 19, 1989, 3901468**
**Int. Cl.⁵ B30B** *3/04;* **B21B** *13/02*
**U.S. Cl. 100—160** **10 Claims**



1. A press roll for the treatment of web type material having a web width for use in combination with a backing roll having controllable deflection, wherein the press roll together with the backing roll form a press gap therebetween through which the web type material passes, said press roll and said backing roll each having characteristic flex lines indicative of a flexure profile during operation, said press roll comprising:

a tubular cylinder having a length and a diameter and a wall thickness, the wall thickness being at most about one-eighth of the roll diameter;

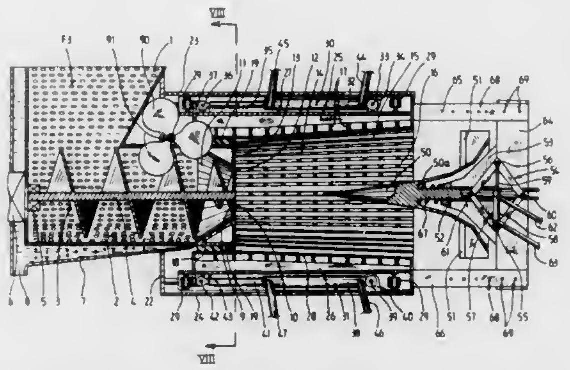
a pair of cylinder heads each disposed at a respective end of said tubular cylinder and each including a journal;

said tubular cylinder including at least one internal peripheral groove such that the wall thickness of the tubular cylinder is non-uniform across the cylinder length, and such that in operation the flex line of the press roll is adapted to the flex line of the backing roll at least within the web width.

---

### 5,012,731
### DEVICE FOR PRESSING HETEROGENEOUS MIXTURES WITH REGULATED PRESSING FORCE FOR SEPARATING LIQUID AND SOLID FRACTIONS THEREOF, IN PARTICULAR FRUIT JUICES

**Yves Maisonneuve, L'Habit, Echallat (Charente), France 16170**
**Continuation-in-part of Ser. No. 273,712, Nov. 17, 1988, abandoned, which is a continuation of Ser. No. 139,107, Dec. 22, 1987, abandoned, which is a continuation of Ser. No. 877,307, Jun. 23, 1986, abandoned. This application Jul. 27, 1989, Ser. No. 447,031**
**Claims priority, application France, Jun. 26, 1985, 85 9689; Oct. 23, 1985, 85 15712; Dec. 2, 1985, 85 17905**
**Int. Cl.⁵ B30B** *9/06*
**U.S. Cl. 100—110** **26 Claims**



1. An apparatus for pressing a heterogenous mixture for separating therefrom solid and liquid fractions intimately associated therein, comprising;

a longitudinal vessel having side walls pierced with a plurality of fine openings for passing liquid therethrough, said vessel having opposite open ends, one end of said vessel being an upstream inlet end and provided with an opening for admission into said vessel of a heterogenous mixture of intimately associated solid and liquid fractions, the other end of said vessel being an open downstream outlet end for the evacuation of solid fractions from said vessel;

a piston means situated at the upstream inlet end opening of the vessel and coaxially with respect to a longitudinal axis of said vessel, for imparting axial pressing forces upon said heterogenous mixture in said vessel; and

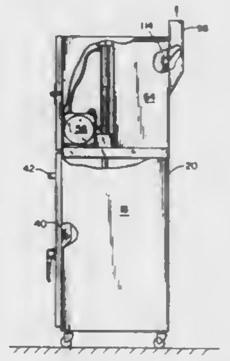
central conical shield means accommodated coaxially in the downstream outlet end opening of the vessel, for receiving and reacting thrust forces acting upon said heterogenous mixture in said vessel and, in conjunction with said vessel, for providing an annular discharge passage around said shield means at said downstream outlet end opening for evacuation of said solid fractions therethrough;

said piston means, said shield and said vessel being mounted for relative movement between said piston means and said shield and vessel for pressing the liquid and solid fractions in said heterogenous mixture between the shield and the piston means for forcing the liquid fractions of said mixture to pass through the vessel side walls via the fine openings therethrough and for forcing the solid fractions of said mixture to be discharged around said shield means through said annular discharge passage.

---

### 5,012,732
### TRASH COMPACTOR FOR SANITARY HANDLING OF SOLID WASTE

**Anthony Fox, Bloomington, Minn., assignor to Marcella M. Fox, Bloomington, Minn.**
**Filed May 29, 1990, Ser. No. 529,661**
**Division of Ser. No. 357,206, May 26, 1989, Pat. No. 4,944,220**
**Int. Cl.⁵ B30B** *13/00*
**U.S. Cl. 100—35** **2 Claims**



1. A method for compacting trash without the introduction of airborne contamination into the area surrounding the compacting apparatus comprising the steps of:

(a) providing a trash compacting apparatus including a cabinet in which is contained a reciprocally movable compaction plate and a first door through which trash to be compacted is introduced into said cabinet and a second door through which the compacted trash can be removed;

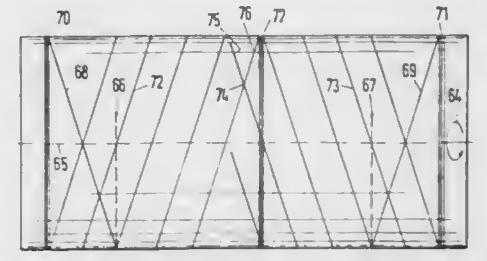
(b) creating a predetermined negative pressure within said cabinet effective to draw ambient air in through said first and second doors and to prevent the outflow of airborne contamination from said compacting apparatus; and

(c) creating a negative pressure greater than said predetermined negative pressure when one of said first and second doors is opened.

---

### 5,012,733
### METHOD FOR BINDING OF ROUND BALES OF HARVESTED AGRICULTURAL CROPS

**Ingo Staudinger, Clausthal-Zellerfeld, Fed. Rep. of Germany, assignor to Gebrüder Welger GmbH & Co. Kommanditgesellschaft, Wolfenbüttel, Fed. Rep. of Germany**
**Filed Jul. 5, 1989, Ser. No. 375,818**
**Claims priority, application Fed. Rep. of Germany, Jul. 4, 1988, 3822553**
**Int. Cl.⁵ B65B** *13/02, 13/10*
**U.S. Cl. 100—2** **8 Claims**



1. A method for helically binding round bales of harvested agricultural crops, comprising the steps of:

providing a first cord strand and a second cord strand;

conducting the cord strands back and forth over a bale so that both strands cross over at one point;

VOL
1126
ISS
1
MY
7
1991
UMI

cutting the cord strands consecutively after the strands cross; and

crossing the cut end of the first cut strand several times with the subsequently second cut strand.

---

### 5,012,734

### DEVICE FOR PRINTING ENDORSEMENTS OF DOCUMENTS

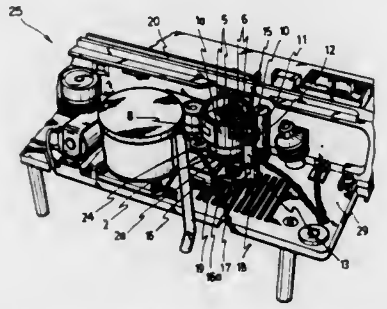
**Emilio B. Martin, Madrid, Spain, assignor to Amper, S.A., Madrid, Spain**

**Filed May 4, 1989, Ser. No. 347,499**

**Claims priority, application Spain, May 4, 1988, 8801366**

**Int. Cl.⁵ B41L** *47/46*

**U.S. Cl. 101—91** **20 Clair s**



1. Apparatus for printing endorsements on documents comprising:

a rotatable outer housing, said outer housing having an interior opening, a projection and a cylindrically shaped exterior surface, said exterior surface of said outer housing having a notch in communication with said interior opening;

an arm;

means for biasing said arm into engagement with said projection, thereby stopping the rotation of said outer housing, and for biasing said arm out of engagement with said projection, thereby permitting the continued rotation of said outer housing;

a stamp for printing an endorsement on said documents, said stamp mounted on said exterior surface of said outer housing;

an inner housing mounted in said interior opening of said outer housing;

at least one band having characters or digits thereon, said at least one band supported by said inner housing and projecting through said notch to form a substantially continuous surface with said exterior surface of said outer housing;

a circular ring gear attached to said outer housing, said ring gear having teeth along a first part of its circumference, said ring gear being toothless along a second part of its circumference;

a rotatable pinion for engaging the teeth along said first part of said ring gear to rotate said outer housing, said pinion unable to engage said second part of said ring gear; and

spring means for rotationally biasing said outer housing so that said pinion may engage said toothed portion of said ring gear.

---

### 5,012,735

### WEB-FED ROTARY PRINTING MACHINE WITH ONE PRINTING COUPLE FOR FLYING PLATE CHANGE

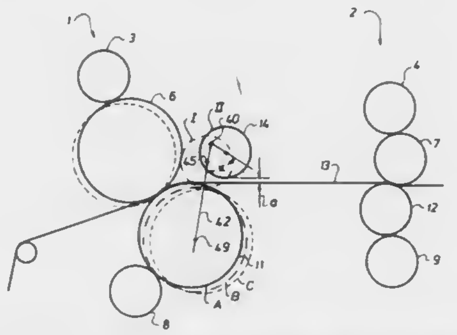
**Christian M. M. Fischer, Marktheidenfeld, and Helmut Holm, Erlabrunn, both of Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Wurzburg, Fed. Rep. of Germany**

**Filed Jul. 14, 1989, Ser. No. 379,813**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825145**

**Int. Cl.⁵ B41F** *5/06, 5/22, 7/12*

**U.S. Cl. 101—177** **10 Claims**



1. A web-fed rotary offset printing machine selectively useable for peıfecting and imprinting with a flying plate change, said printing machine comprising:

first and second rotary printing couples situated successively along a path of travel of a printing carrier web, each said first and second printing couples being useable to apply ink to a printing carrier web;

a first plate cylinder and a first cooperating blanket cylinder and a second plate cylinder and a second cooperating blanket cylinder in each said first and second printing couples, said first and second blanket cylinders in each said first and second printing couples being concurrently engageable with a printing carrier web during perfecting;

an impression cylinder for said first printing couple;

means for stopping rotation of said first plate cylinder and said cooperating first blanket cylinder of said first printing couple to effect a flying plate change on said first printing couple; means for effecting contact between said second blanket bylinder and said impression cylinder during said flying plate change; and

means for supporting said impression cylinder for pivotable movement between a working position in contact with a printing carrier web during said flying plate change and a waiting position out of contact with a printing web carrier during perfecting.

---

### 5,012,736

### SEALING ASSEMBLY FOR LIQUID FOUNTAIN

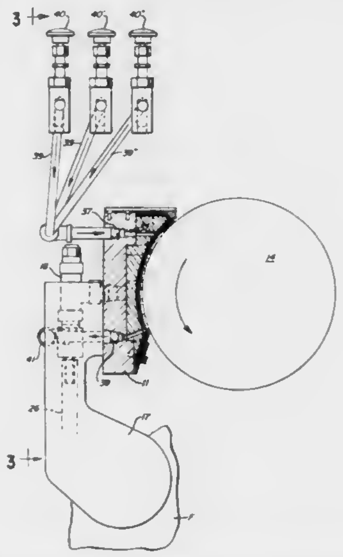
**Eugene M. Van Kanegan, Elmhurst, Ill., and Wayne D. Klimek, Green Bay, Wis., assignors to Paper Converting Machine Company, Green Bay, Wis.**

**Continuation of Ser. No. 99,128, Sep. 21, 1987, abandoned. This application Oct. 19, 1989, Ser. No. 423,637**

**Int. Cl.⁵ B41F** *31/02, 31/06;* **B41L** *27/08*

**U.S. Cl. 101—211** **4 Claims**

1. A method of operating a split color fountain printing press comprising providing an anilox roll having cells and equipped with a fountain having circumferentially extending divider means therein providing at least two ink-holding chambers for drying type inks of different color but with a common liquid solvent wherein the anilox roll closes each chamber and is in contact with the ink held in each chamber, introducing ink into each chamber and continuously introducing air-free compatible liquid solvent through said divider means at the contact are between said divider means and said anilox roll for axial flow from said contact area toward and into both of said chambers to effect a seal between said chambers, to provide make-up solvent for said ink and to prevent dry-up of ink in the cells of said anilox roll.



---

### 5,012,737

### INK FEEDER WITH MOISTURE REMOVAL

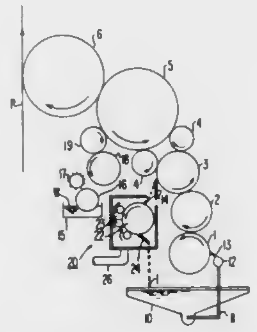
**Katsuaki Makino, and Toshihiro Toyofuku, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 24, 1989, Ser. No. 397,793**

**Claims priority, application Japan, Sep. 22, 1988, 63-236517**

**Int. Cl.⁵ B41F** *31/04, 31/20, 35/00, 7/24*

**U.S. Cl. 101—350** **3 Claims**



1. An ink feeder for feeding ink in a printing press, said ink feeder comprising:

a printing unit comprising a roller;

ink feed means for feeding ink to the roller of the printing unit, said ink feed means including an ink feed tank for accommodating a supply of ink; and

an ink recovery system comprising scraping means for scraping surplus ink from the roller of said printing unit, and moisture removing means for receiving the surplus ink scraped from said roller by said scraping means, for removing moisture from the surplus ink, and for returning the surplus ink to said ink feed tank once the moisture has been removed therefrom,

said moisture removing means including a rotary roll rotatably supported in the ink recovery system at a position to receive surplus ink that has been scraped from the roll of said printing unit by said scraping means, and small-diameter rolls rotatably supported in the ink recovery system and contacting said rotary roll at the outer circumference thereof so as to coact with said rotary roll and form the surplus ink received by said rotary roll into a thin film on the outer circumference of said rotary roll, said rotary roll having heating means therein for heating the surplus ink on the outer circumference thereof to evaporate moisture from the surplus ink.

---

### 5,012,738

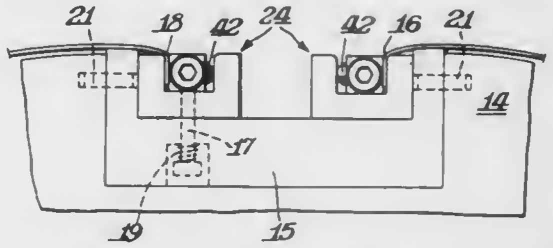
### PRINTING PLATE LOCKING DEVICE

**William Bloothoofd, Wilmington, Del., assignor to Hercules, Incorporated, Wilmington, Del.**

**Filed Nov. 13, 1989, Ser. No. 435,185**

**Int. Cl.⁵ B41F** *27/12*

**U.S. Cl. 101—415.1** **15 Claims**



1. A locking device for clamping a member in place comprising a housing, said housing having an abutment surface and a clamping surface remote from said abutment surface, a jaw in said housing, said jaw having a first wall disposed adjacent said abutment surface of said housing, said jaw having a clamping wall disposed adjacent said clamping surface of said housing whereby a member to be clamped may be inserted between said clamping surface and said clamping wall, an elongated slot in said first wall, a plurality of sets of clamp members in said jaw, each of said sets comprising three clamp members, said three clamp members being two end members separated by an intermediate member, a cushioning member disposed under the intermediate. clamp member in each of said sets to urge said intermediate clamp member toward said slot, each of said clamp members having rounded clamp surfaces, spacers separating said sets from each other, said spacers contacting said clamp members, a fixed stop member in said jaw, an actuating member in said jaw remote from said stop member, and said actuating member being movable into said jaw to provide a force against said spacers and said clamp members to displace said intermediate clamp member from each set partially through said slot and against said abutment surface of said housing as said spacers and clamp members are squeezed between said actuating member and said stop member whereby said jaw is moved toward said clamping surface of said housing to clamp the member between said clamping surface and said clamping wall.

---

### 5,012,739

### WASHING DEVICE

**Gerhard Loos, Horrenberg, and Nikolaus Spiegel, Walldorf, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed Mar. 20, 1990, Ser. No. 496,530**

**Claims priority, application Fed. Rep. of Germany, Mar. 20, 1989, 3909114**

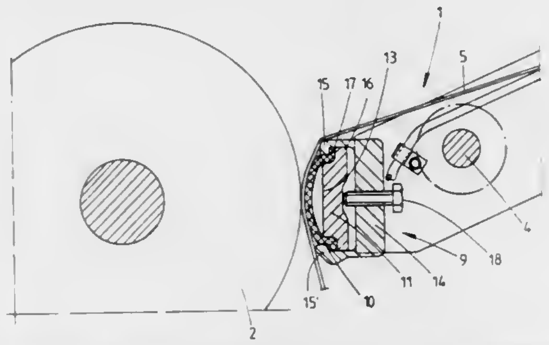
**Int. Cl.⁵ B41F** *35/00;* **B41L** *41/00*

**U.S. Cl. 101—425** **6 Claims**

1. Washing device of a printing machine for cleaning the outer cylindrical surface of a roller or a cylinder, comprising a supply roll having a cleaning cloth wound thereon and a take-up roll, an actuable pressure application disposed between said supply roll and said take-up roll, means for withdrawing the cleaning cloth from said supply roll by winding it on said take-up roll via said actuable pressure applicator so that said pressure applicator presses the cleaning cloth against a roller or cylinder to be cleaned, said pressure applicator having an

VOL
1126
ISS
1
MY
7
1991
UMI

elastic membrane member and a slidable spacer disposed adjacent one another, said membrane member having mutually opposite first and second end walls, said membrane member having mutually opposite marginal regions disposed thereon and extending from said first to said second end walls of said membrane member, clamping means for fastening said first and said second end walls of said membrane member sealingly to said spacer so as to define a compressed-air cushion between said membrane member and said spacer, said clamping means comprising a holding member for receiving said spacer therein in a manner like that of a sliding block, said holding member having a substantially C-shaped profile with mutually opposing legs, said legs having free ends respectively formed with guiding projections directed towards one another, said marginal regions of said membrane member engaging behind said guiding projections of said holding member, and means for biasing said spacer towards said guiding projections for sealingly clamping said marginal regions of said membrane therebetween.

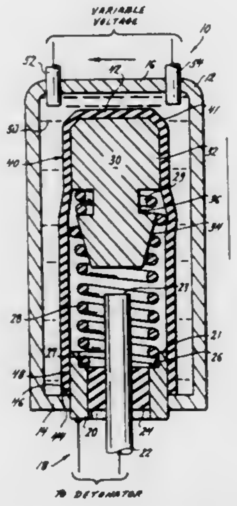


---

### 5,012,740
## ELECTRORHEOLOGICALLY DAMPED IMPACT SYSTEM

**Lee R. Hardt, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 5, 1990, Ser. No. 461,566**
**Int. Cl.$^5$ F42C** *19/06*
**U.S. Cl. 102—216** **18 Claims**



1. An acceleration activated impact switch, comprising:

an elongated housing;

a rigid coaxial conductor axially and sealably extending into and through one end of said housing, said conductor having an outer tubular shaped contact having a cylindrical recess in its end inside said housing, an inner cylindrical contact extending beyond the end of said tubular contact in said housing, and a tubular-shaped insulative seal between said inner and outer contacts, said seal extending between the end of said outer contact outside said housing to the bottom of said recess;

a mass,

an electrically conductive elastic means affixed to and coaxially extending from within said recess, about and to a point beyond the end of said inner contact, said elastic means for retaining said mass spaced from and in movable relation to said inner cylindrical contact, and for making contact with said inner cylindrical contact;

a flexible means having a movable portion and an immovable portion, said flexible means for enclosing said contacts and mass movably within and spaced from said housing, said movable portion enclosing said contacts and said mass, and said immovable portion affixed to the outer surface of said outer contact and abutting the inner surface of said housing proximate to said coaxial conductor entry;

a voltage activated fluid means for damping movement of said mass within said housing, said fluid means occupying the space between the outside of said flexible means and the inside of said housing; and

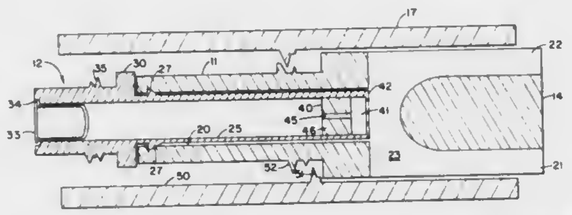
a means extending through said housing and into said fluid means for applying a voltage to said fluid means.

---

### 5,012,741
## INITIATOR FOR A TRANSMISSION TUBE

**Richard J. Peebles; Richard J. Michna, both of Winsted; David E. Monat, Torrington; Stephen W. Bartholomew, and Craig F. Adams, both of Granby, all of Conn., assignors to The Ensign-Bickford Company, Simsbury, Conn.**

**Filed Apr. 16, 1990, Ser. No. 509,490**
**Int. Cl.$^5$ C06C** *5/00;* **F42B** *3/16, 3/26*
**U.S. Cl. 102—275.4** **4 Claims**



1. Apparatus for use with a hand-held firing device to initiate a signal through the side of a transmission tube, intermediate sealed ends of the tube, the tube having a reactive substance therein, comprising:

means for connecting the apparatus to the firing device;

initiation means for providing an initiation signal in response to the selective activation of said initiation means by said firing device, said initiation signal being of a character sufficient to convey a signal through the side of the tube to initiate the reactive substance;

a body having a passageway formed therein, said passageway being configured for receiving and retaining said initiation means, said body retaining said initiation signal upon activation of said initiation means;

a holder having a channel formed therein for receiving the transmission tube, said holder holding a side of the transmission tube in close proximity to said initiation means for initiating a signal in the tube in response to said selective activation of said initiation means; and

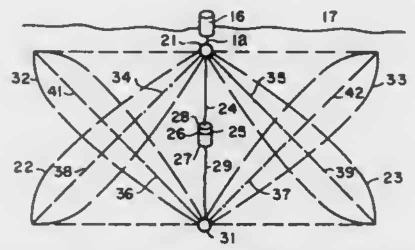
a protective containment cover for retaining the transmission tube in said holder, said cover being capable of withstanding the internal force of said initiation signal.

---

### 5,012,742
## PROXIMITY FUZE

**Louis F. Jones, Panama City, Fla., assignor to The United States of America, as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 25, 1966, Ser. No. 522,985**
**Int. Cl.$^5$ F42B** *22/04*
**U.S. Cl. 102—418** **9 Claims**



1. A proximity fuze system comprising in combination: a pair of spatially disposed transducers; an explosive means;

first means effectively interconnecting the outputs of said pair of transducers and the input of said explosive means for effecting the detonation thereof at a predetermined time after a given signal is received by either of said transducers; and

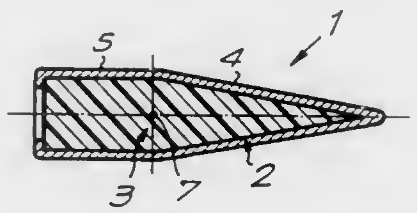
second means effectively interconnecting the outputs of said pair of transducers and the input of said explosive means for effecting the detonation thereof within a predetermined time after said given signal is received by both of said pair of transducers, if it has not already been detonated by the aforesaid first means.

---

### 5,012,743
## HIGH-PERFORMANCE PROJECTILE

**Jean-Paul Denis, Grace-Hollogne, and Marc Neuforge, Aywaille, both of Belgium, assignors to Fabrique National Herstal, en abrege FN, societe anonyme, Herstal, Belgium**

**Filed Dec. 5, 1989, Ser. No. 446,538**
**Claims priority, application Belgium, Dec. 5, 1988, 8801362**
**Int. Cl.$^5$ F42B** *12/74, 12/76*
**U.S. Cl. 102—514** **11 Claims**



1. A projectile comprising:

a hollow casing (2) having a tapered head portion and a cylindrical portion, the casing being formed of a hard material having a density and having an overall length and a caliber dimension, the ratio of the overall length and caliber dimension being between 3 and 6;

a core (3), inserted within the casing, the whole core being formed of a rigid high density plastic material having a lower density than the density of the casing material;

the head portion (4) of the projectile having a length between 1.5 and 3 times the caliber dimension;

the cylindrical portion (5) of the projectile having a length between 0.7 and 2 times the caliber dimension and being connected to the head portion;

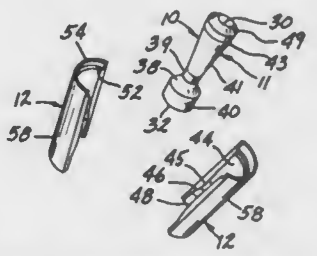
the projectile further having a center of gravity (7) situated in the cylindrical portion.

---

### 5,012,744
## SABOT BULLET

**Robert P. Sowash, Santa Cruz, Calif., assignor to Olin Corporation, Cheshire, Conn.**

**Continuation-in-part of Ser. No. 397,363, Aug. 22, 1989, which is a continuation of Ser. No. 246,898, Sep. 16, 1988, abandoned, which is a continuation of Ser. No. 31,721, Mar. 30, 1987, abandoned. This application Feb. 27, 1990, Ser. No. 485,680**
**Int. Cl.$^5$ F42B** *14/06*
**U.S. Cl. 102—523** **12 Claims**



1. A sabot bullet comprising:

a bullet body having a pair of axially aligned conical parts adjacent to and spaced apart from each other, each conical part increasing in diameter as the conical part extends away from the other conical part, there being means extending longitudinally of the bullet body for separating and interconnecting the conical parts, said connecting means including an annular connecting part having a rounded outer surface portion which merges smoothly with the outer surface portions of the adjacent ends of the conical parts; and

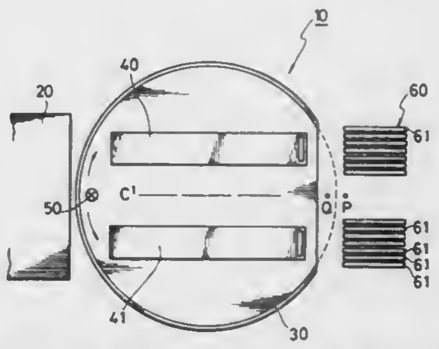
a number of sabot segments engaging and forming a shell in surrounding relationship to the bullet body, each sabot segment having inner surface portions substantially complementary to the adjacent outer surface portions of the bullet body.

---

### 5,012,745
## VEHICLE TURN-TABLE

**Kyoichi Yamashita, Kanagawa, Japan, assignor to Koyo Jidoki Company Limited, Yokohama, Japan**

**Filed Jan. 8, 1990, Ser. No. 462,176**
**Claims priority, application Japan, Mar. 8, 1989, 1-53900**
**Int. Cl.$^5$ B60S** *13/02*
**U.S. Cl. 104—44** **1 Claim**



1. A vehicle turn-table comprising a table which is rotatable in both directions about an upright axis; a pair of driven belts mounted on the table for receiving the wheels of a vehicle; a detector positioned outside the periphery of the table, having foot-boards onto which a pair of transversely spaced vehicle wheels are receivable; means responsive to the detector for calculating a transverse position of the wheels on the detector and hence causing the table to rotate until the pair of wheels and the belts of the table are in alignment; and a sensor

VOL
1126
ISS
1
MY
7
1991
UMI

mounted on or near the table to determine a stop position of the vehicle when fully positioned on the table.

---

### 5,012,746
## CONVEYING DEVICE

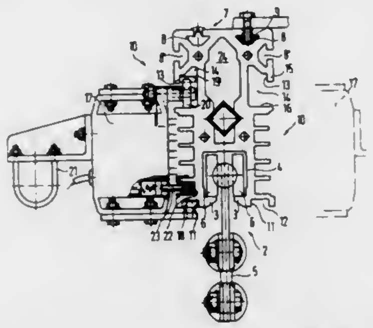
**Uwe Bormann, Rümmingen; Ekkehard Matzko, Neu-Ulm, and Dieter Görner, Hausen, all of Fed. Rep. of Germany, assignors to Wampfler GmbH, Weil am Rheim-Markt, Fed. Rep. of Germany**

**Filed Feb. 5, 1990, Ser. No. 474,947**

**Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3903949**

**Int. Cl.⁵ B61B** *3/00*

**U.S. Cl. 104—93** **15 Claims**



1. A conveying system comprised of a rail and at least one transport hanger which can travel back and forth along the rail on rollers, the rollers having horizontal axes of rotation, the rail having horizontal conveyer support projections which are located at the bottom of the rail and along which the rollers are positioned for travel back and forth along the rail carrying the transport hanger with them, trolley wires which are insulated from one another being located on the rail offset to one of either side of the path of motion of the transport carriage offset to said one side of the path of motion of the transport hanger for facilitating support and movement of the trolley carriage back and forth to the one side of the transport hanger and independently thereof, the trolley carriage having sliding contacts for engagement of the trolley wires for powering a tool that may be carried by the trolley carriage.

---

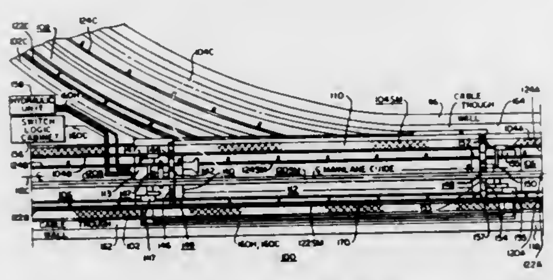
### 5,012,747
## ROTARY GUIDEWAY SWITCH HAVING GUIDEBEAM AND/OR ELECTRIC RAIL STRUCTURE LOCATED ABOVE AND BETWEEN GUIDEWAY TIRE PATHS

**Thomas J. Burg, Forest Hills; Ronald H. Ziegler, Elizabeth; William K. Cooper, Monroeville; John W. Kapala, and Robert J. Anderson, both of McMurray, all of Pa., assignors to AEG Westinghouse Transportation Systems, Inc., Pittsburgh, Pa.**

**Filed Jun. 27, 1988, Ser. No. 211,724**

**Int. Cl.⁵ E01B** *25/06*

**U.S. Cl. 104—130** **9 Claims**



1. A rotary guideway switch for a people mover guideway having a pair of spaced tire paths with a predetermined tire path, guidebeam and electric rail configuration, said rotary switch providing for routing a transit car from one entry guideway path to at least either of two exit guideway paths or vice versa and comprising:

an elongated structural switch frame member provided with guidebeam, electric rail and tire path structure on one side compatible with the guideway configuration to provide car routing to one of said two exit paths; said switch frame member further provided with guidebeam, electric rail and tire path structure on another side compatible with the guideway configuration to provide car routing to the other of said two exit paths;

said structure on said one side including first frame means disposed to provide at least one first-side switch tire path in alignment with the corresponding guideway tire path for car routing to one of said exit paths; said structure on said other side including second frame means disposed to provide at least one other-side switch tire path in alignment with the corresponding guideway tire path for car routing to the other of said exit paths;

said structure on said one side further including a first switch section guidebeam and first switch section electric rail means disposed for car routing to said one exit path; said structure on said other side further including a second switch section guidebeam and second switch section electric rail means disposed for car routing to said other exit path;

at least one of said first switch section guidebeam and electric rail means located above said first-side switch tire path and located between said first-side switch tire path and the other tire path for the guideway when said one side of said switch frame member faces upwardly; at least one of said second switch section guidebeam and electric rail means located above said second-side switch tire path and the other tire path for the guideway when said other side of said switch frame member faces upwardly;

said electric rail means on said one side of said switch frame member and said electric rail means on said other side of said switch frame member each include three elongated power rails and at least two elongated signal rails, and means for supporting said switch section electric rails on each side of said switch frame member within the space between the associated tire paths for electrical connection to collection means on the underside of cars that pass over either side of said switch;

first support means having first shaft means for supporting one end of said switch frame member;

second support means having second shaft means for supporting the other end of said switch frame member;

means for driving at least one of said shaft means to rotate said switch frame member between first and second frame positions;

said switch frame member having its one side aligned with the entry guideway path and the one exit guideway path in said first frame position and having its other side aligned with the entry guideway path and the other exit guideway path in said second frame position; and

means for locking said switch frame member against rotation from said first or second frame position.

---

### 5,012,748
## SLEIGHROAD

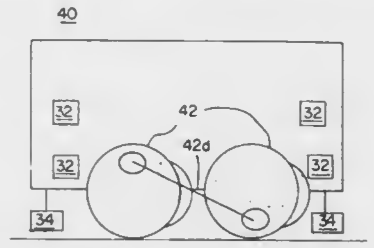
**Timothy T. J. Young, 656 Lytton Ave., Apt. B421, Palo Alto, Calif. 94301**

**Filed Mar. 6, 1989, Ser. No. 319,700**

**Int. Cl.⁵ A63G** *21/00*

**U.S. Cl. 104—134** **1 Claim**

1. A sleighroad of the wheelless surface transportation type comprising carriages (**30**) with undercarriages equipped with ball thrust bearings (**34**) for running on steel tracks or rails (**12,28,29**) wherein the plurality of carriages (**30**) are propelled by a single locomotive (**40**), the locomotive (**40**) including motorized horsehoofing thruster means (**42**), the track (**12,28,29**) being made of cast steel clad rails, each rail or track (**12,28,29**) having a reinforced concrete beam as the core, sheet metal laid on angle irons (**14**) connecting the rails to form a floor and with the upper side of the rail (**12,28,29**) sufficing as the support rail, wire fences on both sides of the arrangement to which are connected cast steel clad guard or guide railings (**22**), each guard or railing having a reinforced concrete rod as the core for keeping said carriages on the track or rails (**12,28,29**), the locomotive (**40**) including an undercarriage equipped with ball bearings (**34**) of the thrust bearing type for running on the rails or tracks (**28,29**) and wherein said thruster means (**42**) includes a plurality of such motorized thrusters (**42**) disposed in tandem relationship to work in synchronization to keep the locomotive (**40**) and carriages (**30**) from see-sawing, each thruster means (**42**) comprising a drum (**42*b***) and crescent-shaped shoe (**42*c***) for the hoof and comprising suction cups (**52**) and magnetic pieces (**54**) for dynamic stability, the shoe (**42*c***) made of flexible material such as rubber or plastic with said magnetic pieces (**54**) embedded in the shoe (**42*c***), wherein the tandem thruster means (**42**) include a common rod (**42*d***) connecting at least some of the thruster means (**42**), wherein the ball thrust bearings (**34**) take the place of conventional carriage wheels, said guard or guide railings (**22**) operatively connect to said carriages (**30**) and said locomotive (**40**) by way of roller thrust bearings (**22**) fixed on the respective sides of said carriages (**30**) and on the sides of the locomotive (**40**) for lateral or transverse stability.



---

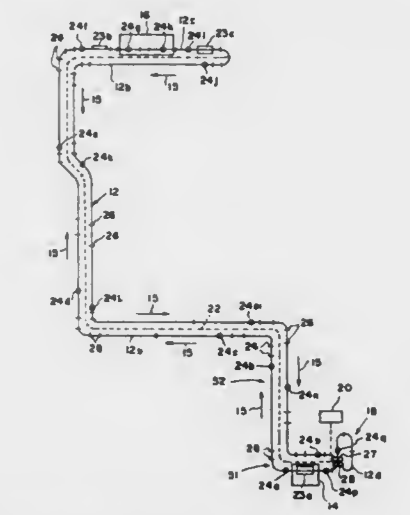
### 5,012,749
## RADIO CONTROLLED MATERIAL HANDLING APPARATUS

**Robert D. Passage, Jr., Bay City, Mich., assignor to The Allen Group Inc., Saginaw, Mich.**

**Continuation of Ser. No. 290,753, Dec. 27, 1988, abandoned. This application Oct. 4, 1990, Ser. No. 595,692**

**Int. Cl.⁵ B61C** *17/12;* **B61L** *3/16*

**U.S. Cl. 104—297** **7 Claims**



1. A material handling system comprising:

at least one delivery device;

means for defining a pathway along which said delivery device is adapted to travel; and

central electronic control means for controlling the operation of said system;

each of said delivery devices including drive means for driving the delivery device along said pathway; an onboard power supply for providing power to said drive means; and an onboard electronic control means for controlling operation of said delivery device;

said onboard electronic control means including an onboard transceiver and said central electronic control means including a central transceiver for providing a radio frequency communication link between said central electronic control means and said onboard electronic control means;

said onboard transceiver being capable of transmitting plural information signals to said central transceiver, said central transceiver being capable of receiving said information signals and for transmitting control signals to said onboard transceiver for control of said delivery device;

said drive means comprising a DC motor and said onboard power supply comprising a rechargeable battery;

means for monitoring the charge of said rechargeable battery and for generating a low battery signal when said charge drops below a predetermined level,

said means for defining a pathway comprising track means which includes a supply track portion along which the delivery device is adapted to travel with a load from a loading station to an unloading station, a return track portion along which said delivery device is adapted to travel from said unloading station to said loading station, and a repair/battery recharging track portion with a track switching means for guiding the delivery device from said return track portion to said repair/battery recharging track portion for recharging said battery when said onboard electronic control means generates said low battery signal.

---

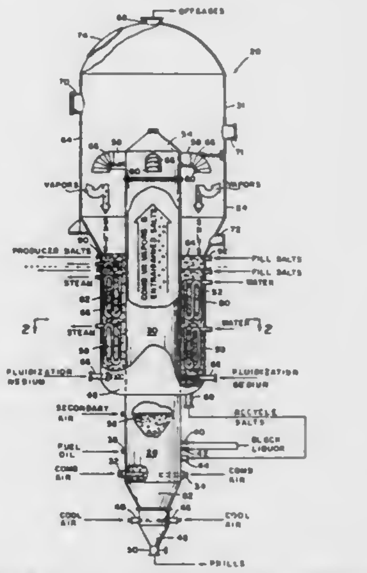
### 5,012,750
## APPARATUS FOR RECOVERY OF CONSTITUENTS AND HEAT FROM FLUIDIZED BED COMBUSTION

**Harold R. Sheely, Orleans; Constantine D. Miserlis, Arlington, both of Mass., and Ivan L. Rosenblatt, Birmingham, Ala., assignors to International Paper Company, Purchase, N.Y.**

**Division of Ser. No. 461,695, Jan. 8, 1990, Pat. No. 4,979,448. This application Sep. 12, 1990, Ser. No. 581,735**

**Int. Cl.⁵ F23G** *5/00;* **F22B** *1/00*

**U.S. Cl. 110—245** **9 Claims**



1. A system for the recovery of chemical constituents or heat energy from a fluidized bed combustion process comprising:

a fluidized bed combustor section having a generally verti-

VOL
1126
ISS
1
MY
7
1991
UMI

cally-oriented chamber within which fluidized bed combustion takes places and wherein small and large particles of unburned constituents are formed by and provide the bed medium for the combustion process, said chamber having a passageway adjacent its lower end through which larger particles of the bed medium can be extracted for recovery purposes;

a heat exchange section including a shell positioned about said combustor section chamber so that the lower end of said chamber is disposed beneath said shell and the upper end of said chamber extends upwardly into the shell cavity for discharging gaseous products of the combustion process and small particles entrained by the combustion gases into the shell cavity and so that the shell is spaced from and encompasses the portion of the combustor section chamber adjacent the upper end thereof, said shell including a lower portion for collecting small particles which separate from the combustion gases so that the collected small particles accumulate in a bed in the shell lower portion and an upper portion having an opening therein through which the substantially particle-free combustion gases exit the shell cavity;

heat exchange means associated with the shell cavity for extracting heat from the bed of small particles which accumulate in the lower portion of the shell; and

means associated with the lower portion of the shell and the combustor section for routing an amount of the small particles which accumulate in the shell cavity to the combustor section.

---

5,012,751

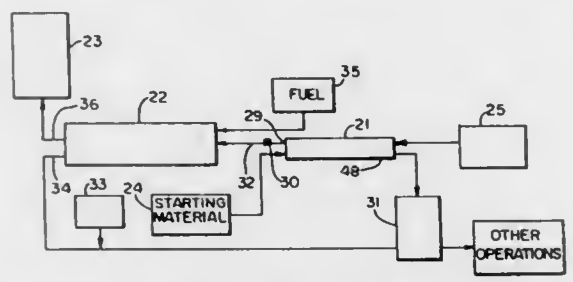
### PROCESS AND APPARATUS FOR TREATING SOLID REFUSE

**William M. Kirlin, Summerville, S.C., assignor to Giant Resource Recovery Company, Inc., Harleyville, S.C.**

**Filed Apr. 18, 1990, Ser. No. 511,398**

**Int. Cl.$^5$ F23G** *5/00*

**U.S. Cl. 110—346** **10 Claims**



1. In a furnace assembly comprising a resource recovery furnace connected to a cement manufacturing furnace, a method of treating solid refuse which includes polluted soils or ash, said refuse comprising both recoverable material having determinable vaporization or sublimation temperatures and useful in cement, and contaminants having vaporization temperatures lower than the vaporization or sublimation temperatures of the recoverable material, said method comprising the steps of:

- (a) introducing all of the solid refuse into one end of the resource recovery furnace and causing the refuse to move through the resource recovery furnace toward the other end;
- (b) as the refuse is moved, controlling the temperature of the refuse to above the vaporization temperatures of the contaminants and below the vaporization or sublimation temperature of the recoverable material in order to vaporize and thereby separate the contaminants from the residual solid recoverable material;
- (c) removing the residual solid contaminant-free recoverable material from the resource recovery furnace and employing the recoverable material in the form of raw material for use in cement;
- (d) introducing cement-making constituents into the cement manufacturing furnace;
- (e) combining and supplying the vaporized contaminants along with fuel and combustion air to the cement manufacturing furnace;
- (f) burning said combination in the cement manufacturing furnace to generate a temperature at which the vaporized contaminants are decomposed into an environmentally safe off gas and said constituents are made into cement; and
- (g) discharging the off gas from the cement manufacturing furnace.

---

5,012,752

### WORK PIECE SETTING APPARATUS WITH PATTERN MATCHING

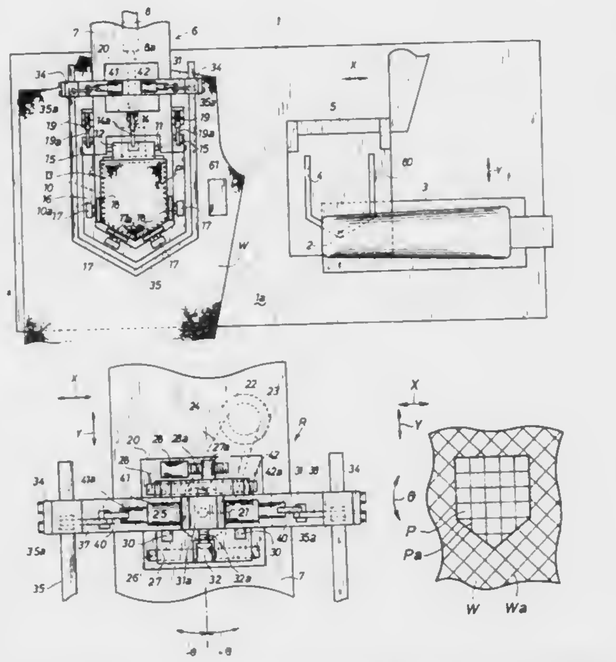
**Kunihiko Murata, Tsushima; Satoshi Morii, Nagoya; Hiroyuki Mitsui, Kasugai; Toru Takemura, Nagoya; Toshiaki Iwasaki, Nagoya, and Takaaki Suzuki, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Jun. 26, 1989, Ser. No. 371,057**

**Claims priority, application Japan, Jun. 27, 1988, 63-158758**

**Int. Cl.$^5$ D05B** *21/00*

**U.S. Cl. 112—121.12** **20 Claims**



17. A work piece setting and attaching apparatus for setting one patterned work piece on another patterned work piece so that the pattern of one work piece has a predetermined relative position to a pattern on the other work piece, comprising:

lower work piece holding means for holding a lower work piece at a setting position on a work table;

upper work piece holding means for holding an upper work piece, the upper work piece holding means moving vertically from the work table at the setting position;

detecting means for detecting patterns on both work pieces;

moving means for moving the lower work piece holding means along at least one axis on the work table;

rotating means for rotating the lower work piece holding means around an axis perpendicular to the work table;

calculating means for calculating a mismatch amount of the patterns detected by the detecting means;

control means for controlling both the moving means and the rotating means according to the mismatch amount of the patterns and for correcting a relative position between the two work pieces;

superposing means for superposing the upper work piece over the lower work piece; and

carrying means for carrying the superposed work pieces to an attaching position from the setting position on the work table; and

attaching means for attaching the superposed work pieces to each other at the attaching position.

---

5,012,753

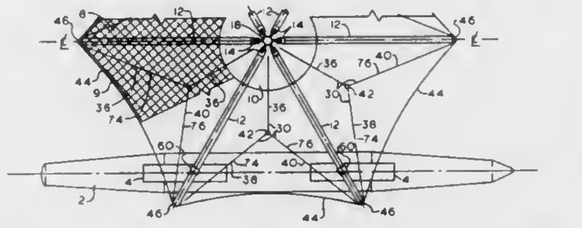
### MECHANISM FOR TENSIONING A FABRIC PLATFORM

**David Grassi, 675 A Castro St., San Francisco, Calif. 94114, and James K. Antrim, 4018 Archery Way, El Sobrante, Calif. 94803**

**Continuation-in-part of Ser. No. 812,294, Dec. 23, 1985, abandoned. This application May 2, 1988, Ser. No. 189,322**

**Int. Cl.$^5$ B63B** *3/48*

**U.S. Cl. 114—39.1** **25 Claims**



1. In combination, a flat fabric platform with a perimeter shaped as a series of connected parabolic or catenary curves between support points, and a means for tensioning said fabric platform comprising:

- (a) a cable enclosed within a sleeve around said perimeter of said platform, said sleeve and said cable following said catenary or parabolic perimeter curve,
- (b) at least three radial arms pivotably connected to and extending out from a radial arm hub and connected at their outer ends to said perimeter cable to form said support points,
- (c) at least one radial cable for each of said radial arms connected to an extending out from a radial cable hub and connected at its outer end to or near the outer end of said radial arm, and
- (d) means for connecting said radial arm hub to said radial cable hub and for moving said radial cable hub away from said radial arm hub in an axial direction generally perpendicular to said radial arms and said radial cable.

---

5,012,754

### OPEN-BOTTOM GRAVEL DUMP BOAT

**Toshifumi Mori, Hyogo, Japan, assignor to Marusen Co., Ltd., Hyogo, Japan**

**PCT No. PCT/JP86/00559, § 371 Date Sep. 8, 1987, § 102(e) Date Sep. 8, 1987, PCT Pub. No. WO87/02960, PCT Pub. Date May 21, 1987**

**PCT Filed Nov. 5, 1986, Ser. No. 72,265**

**Claims priority, application Japan, Nov. 8, 1985, 60-251514**

**Int. Cl.$^5$ B63B** *35/28*

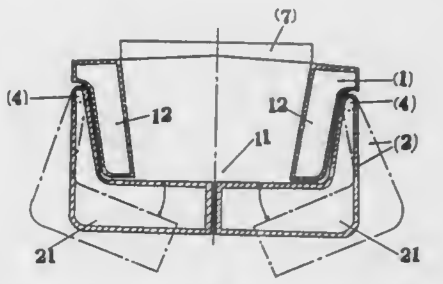
**U.S. Cl. 114—36** **10 Claims**

1. A hopper barge hull construction comprising:

a single body structure having a stem section, a stern section and a side wall section therebetween, said side wall section forming a hold having an outlet defined in a bottom portion thereof for discharge of cargo, the stem section and the stern section having a closed bottom and the outlet in the side wall section being located between the stem section and the stern section;

a pair of L-shaped doors for closing the outlet in the side wall section, said doors being movable between an open position opening the outlet and a closed position closing the outlet, each door having a forward side adjacent the stem section and a rearward side adjacent the stern section each L-shaped door having a first leg which closes the opening when in the closed position, and a second leg positioned laterally outwardly of the side wall section;

hinge means for pivotably attaching each of the doors of the pair of doors to the side wall section; and



drive means for pivoting the doors between the open position and the closed position, said drive means being provided at least at one of a position near the forward and rearward sides of the pair of doors.

---

5,012,755

### APPARATUS FOR TENSIONING A SAIL

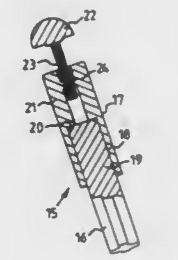
**Reed Lockhart, Sai Kung, Hong Kong, and Barry Spanier, Kahului, Hi., assignors to Neil Pryde Limited, Hong Kong**

**Filed Jun. 28, 1989, Ser. No. 373,151**

**Claims priority, application United Kingdom, Jul. 5, 1988, 8815945**

**Int. Cl.$^5$ B63H** *9/04*

**U.S. Cl. 114—103** **2 Claims**



1. An apparatus for tensioning a sail, the apparatus comprising:

an elongate pocket formed on and extending across the sail which is closed at both ends having a closeable opening extending substantially along the whole length of the pocket;

a batten which fits in the pocket and bears against the ends of the pocket;

means to adjust the length of the batten comprising an end cap fitted on an end of a batten portion; and

means for adjusting the length of the end cap to adjust the overall length of the batten.

---

5,012,756

### FLOATING CONSTRUCTION

**Per H. Kristensen, P.O. Box 284, N-1324 Lysaker, Norway**

**Filed Jun. 2, 1989, Ser. No. 360,339**

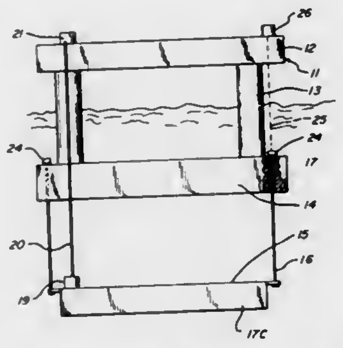
**Int. Cl.$^5$ B63B** *35/44*

**U.S. Cl. 114—265** **9 Claims**

1. A floating structure with submersible pontoons that provide the buoyancy for a platform with a deck that is located on columns that extend upwards from the pontoons, where the pontoons have the general shape of elongated hulls, and where a separate, submerged ballast unit having a plurality of ballast tanks is attached to the pontoons to help stabilize the floating structure and improve its motion in waves, characterized by the ballast unit being of approximately the same size in the

VOL
1126
ISS
1
MY
7
1991
UMI

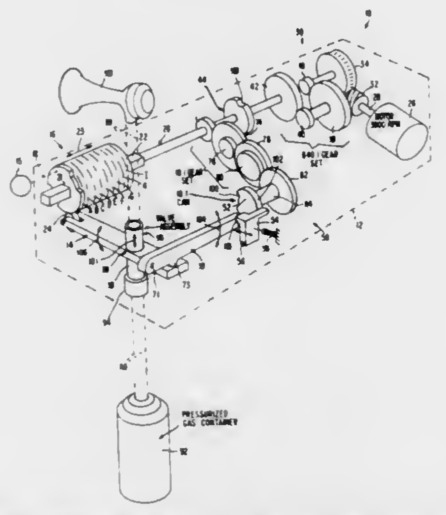
horizontal plane as the extent of the pontoons, and that the ballast unit is attached to the floating structure by a plurality of vertical struts that extend through and above the pontoons, the struts being connected to the ballast unit by a means whereby they can be quickly connected or removed from the ballast unit, and where at the upper end of the struts there is an attachement means which can be attached to a lifting device, and the means for connecting the vertical struts to the ballast unit includes a plurality of quick-connect type retaining fittings attached to the sides of the ballast unit so that the vertical struts can be quickly attached or removed from the ballast unit.



---

### 5,012,757
### AUTOMATIC HORN WARNING SIGNAL APPARATUS FOR USE ON BOATS

**James E. Williams, 542 Stillwater Rd., Stamford, Conn. 06902**
**Filed Apr. 20, 1990, Ser. No. 511,639**
**Int. Cl.⁵ G08B *3/02;* B63B *45/08***
**U.S. Cl. 116—19** **22 Claims**



1. Horn signal apparatus for use on boats, said apparatus comprising:

a horn,

valve means connected between said horn and a removable container of pressurized gas for preventing

said valve means normally being closed for preventing pressurized gas from flowing from said container to said horn,

said valve means being actuatable for allowing pressurized gas to flow from said container to said horn for sounding said horn,

actuating means for actuating said valve means, said actuating means including a plurality of rotatable cams,

each of said rotatable cams having a configuration corresponding to a respective horn-sounding signal sequence for actuating said valve means for allowing pressurized gas to flow to said horn for sounding said horn corresponding to the respective horn-sounding signal sequence,

said respective horn-sounding signal sequences being different one from another for relating to predetermined respective boat situations in accord with marine horn-signalling protocol,

electric motor drive means for driving said actuating means, electric circuit means connected to said electric motor drive means for controlling said electric motor drive means,

said electric circuit means including switch means responsive to rotation of said plurality of cams for controlling energization of said electric motor drive means,

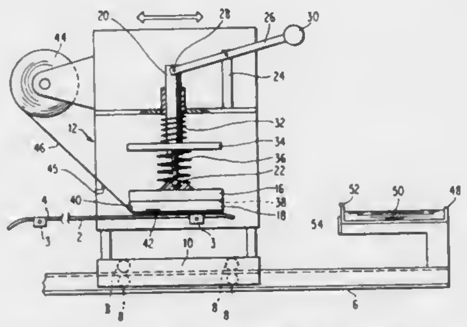
speed-reducing, torque-increasing transmission means coupling said electric motor drive means to said plurality of cams for rotating said plurality of cams, and

manually-operable, mode-selection means operatively associated with said plurality of cams for selecting any one of said cams for actuating said valve means in accordance with the configuration of said selected cam.

---

### 5,012,758
### METHOD AND APPARATUS FOR THE TREATMENT OF GLIDING SURFACES ON WINTER SPORTS EQUIPMENT

**Peter Künzler, Altstatten, Switzerland, assignor to Tobler & Co. AG, Chemische Fabrik, Altstatten, Switzerland**
**Filed Feb. 28, 1989, Ser. No. 316,837**
**Claims priority, application Switzerland, Mar. 1, 1988, 761/88**
**Int. Cl.⁵ B05C *11/00***
**U.S. Cl. 118—264** **9 Claims**

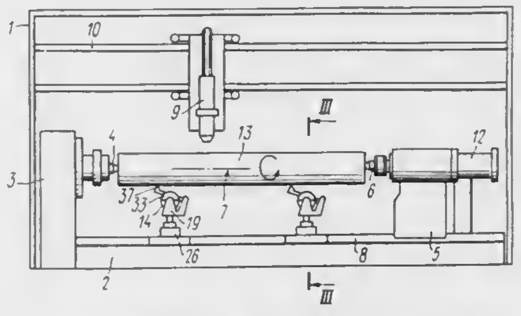


1. An apparatus for the treatment of gliding surfaces of winter sports equipment, comprising: a treatment device (12) for the gliding surface, clamping means (3) for holding the sports equipment with its gliding surface facing upwardly, carriage means mounting the treatment device, including a shifting device comprising a fixed part (6) and a mobile part (8, 10) for shifting the treatment device and the sports equipment relative to each other in a longitudinal direction of the gliding surface, a storage device (48) for holding a substance to be fed into the treatment device, wherein the treatment device has a body (16) with a heatable sole (18) arranged parallel to the gliding surface, an insert (42) extending across the width of the sole and consisting of a porous material for absorbing the substance from the storage device, an adjustment device (26) for shifting the body and sole vertical to the gliding surface, means (32, 34) for biasing the body and sole downwardly against the gliding surface, and roll means (44) for storing and feeding absorbent sheet material (46) between the gliding surface and the sole to implement the removal of a previous substance coating the gliding surface and the application of a coating of new substance thereto.

---

### 5,012,759
### APPARATUS FOR HOT GAS SPRAY DEPOSITION OF COATINGS ON PRODUCTS IN THE FORM OF BODIES OF REVOLUTION

**Alexandr D. Tatur, ulitsa Parizhskoi Kommony, 21, kv. 12; Oskar G. Kilimnik, ulitsa Stroitelei, 6a, kv. 70; Mark B. Yalkut, ulitsa Serafimovicha, 7, kv. 107; Eduard A. Rubin, ulitsa Kashtanovaya, 12b, kv. 94; Viktor G. Ponomarev, ulitsa I. Franko, 9, kv. 27; Petr N. Mirchevsky, ulitsa Mechnikova, 22a, kv. 17; Ivan K. Gurzhy, ulitsa Oktyabrskoi Revoljutsii, 25, kv. 16; Alexandr A. Karev, ulitsa Uralskaya, 6/1, kv. 4, and Alexandr M. Boguslavsky, prospekt Pobedy, 21, kv. 74, all of Kiev, U.S.S.R.**
**PCT No. PCT/SU87/00153, § 371 Date Aug. 21, 1989, § 102(e) Date Aug. 21, 1989, PCT Pub. No. WO89/05693, PCT Pub. Date Jun. 29, 1989**
**PCT Filed Dec. 24, 1987, Ser. No. 415,367**
**Int. Cl.⁵ B05C *1/02***
**U.S. Cl. 118—320** **5 Claims**

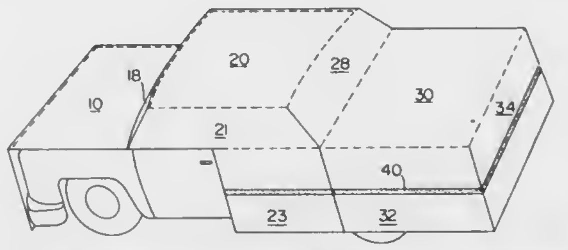


1. In an apparatus for hot gas spray deposition of coatings on products in the form of bodies of revolution, having a chamber having a base supporting a headstock having a spindle and a tailstock having a revolving center coaxial with the spindle, and a spray gun mounted on a guide member for movement, the improvement comprising a power actuator provided for the revolving center of the tailstock for axially moving the product towards the headstock, and rollers provided on the base for supporting the product during its movement, each roller having a means for imparting vertical movement thereto and a rotatable shield screening a surface of the roller from the sprayed material.

---

### 5,012,760
### PERFORM MASK FOR PAINTING VEHICLES

**David L. George, Jr., 1372 Phoenixville Pike, West Chester, Pa. 19380**
**Continuation of Ser. No. 55,166, May 28, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 368,422**
**Int. Cl.⁵ B05C *11/00***
**U.S. Cl. 118—505** **10 Claims**



1. A disposable flexible preform adapted to be planar when disposed on a planar surface and to cover and conform to the shape of a vehicle and comprising a plurality of planar polygonal segments having shapes and sizes adapted to cover surface segments of a vehicle and connected together along weakened fold lines, said plurality of planar polygonal segments including:

(a) a roof segment adapted to cover a roof of a vehicle,

(b) a front portion connected to said roof segment and having segments adapted to cover a front window, a pair of front fenders, a hood and a front of a vehicle,

(c) a back portion connected to said roof segment and having segments adapted to cover a back window, a pair of rear fenders, a deck and a back of a vehicle, and

(d) two side portions connected to opposite sides of said roof segment and each having segments adapted to cover a side window and a door of a vehicle.

---

### 5,012,761
### CHICKEN EGG HAVING RELATIVELY HIGH PERCENTAGE OF LONG CHAIN FATTY ACIDS AND METHOD OF REDUCING HEART RELATED DISEASE IN HUMANS USING SUCH EGGS

**Suk Y. Oh. 108 Flagstone, Lee's Summit, Mo. 64063**
**Filed Nov. 17, 1988, Ser. No. 273,229**
**Int. Cl.⁵ A23K *1/16***
**U.S. Cl. 119—6.8** **8 Claims**

1. A method of increasing the omega-3 polyunsaturated fatty acid content of chicken eggs comprising the steps of:

(a) obtaining a grain based chicken feed;

(b) forming a mixture of said chicken feed and an oil containing omega-3 polyunsaturated fatty acid with said oil being from about 3.0 percent to about 10.0 percent by weight of the mixture;

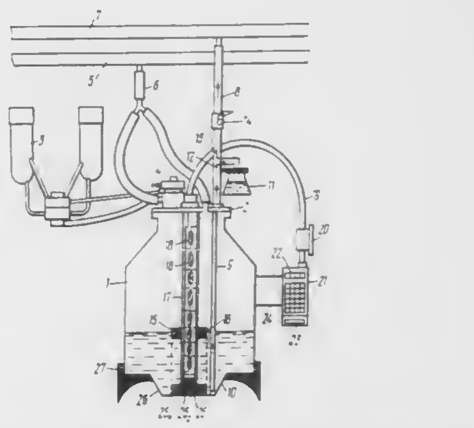
(c) thereafter feeding chicken laying hens said mixture as a primary source of food for said hens; and

(d) collecting the eggs of such hens laid subsequent to the hens eating the mixture.

---

### 5,012,762
### DEVICE FOR DETERMINING THE INDEX OF INDIVIDUAL PRODUCTIVITY AND FEED RATION OF ANIMALS

**Gennady A. Moskvin, ulitsa Satixmes,49,kv,59, Latviiskaya SSR, Elgave, U.S.S.R.**
**PCT No. PCT/SU89/00092, § 371 Date Jan. 9, 1990, § 102(e) Date Jan. 9, 1990, PCT Pub. No. WO89/10687, PCT Pub. Date Nov. 16, 1989**
**PCT Filed Apr. 11, 1989, Ser. No. 449,875**
**Claims priority, application U.S.S.R., May 5, 1988, 4413033**
**Int. Cl.⁵ A01J *5/00***
**U.S. Cl. 119—14.18** **3 Claims**



1. A device for determining the index of individual productivity and animal feed ration, comprising:

a milk storage container;

a milking apparatus fluidly connected to said milk storage container;

a milk conduit fluidly connected to said milk storage container;

a milk suction pipe fluidly connected to said milk storage container;

VOL
1126
ISS
1
MY
7
1991
UMI

milk level sensor means for sensing the level of milk in said milk storage container, said milk level sensor means being located inside the milk storage container and including a float with a magnet;

computing means associated with the milk storage container for performing various computations;

milk level identifying means for identifying the milk level in the milk storage container, said milk level identifying means including a first group of switch devices installed one above the other along the height of the milk storage container, said switch devices interacting with the magnet of the float and being connected to respective inputs of said computing means; and

a programming unit in the form of a second group of switch devices in the milk storage container and spaced from each other by a distance equal to the value of the optimum animal feed ration corresponding to the index of their individual productivity, the switch device of the second group being connected to the respective inputs of the computing means.

---

**5,012,763**

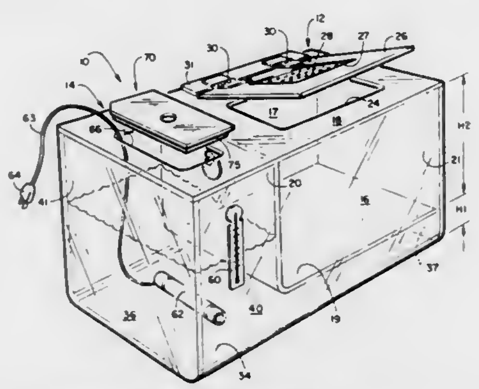
## PORTABLE AQUABROOD

**Michael L. Morrison, 8363 Tommy Dr., San Diego, Calif. 92119**

**Filed Feb. 27, 1990, Ser. No. 485,632**

**Int. Cl.$^5$ A01K** *31/20, 41/00*

**U.S. Cl. 119—34** **8 Claims**



1. A portable aquabrood comprising:

an enclosed animal habitat chamber assembly having a first vertical end wall, a second vertical end wall, a front vertical wall, a rear vertical wall, a substantially horizontal top wall, and a substantially horizontally primary bottom wall;

an animal access opening in one of the walls of said animal habitat chamber assembly, a primary cover panel for said animal access opening, a plurality of air apertures in said primary cover panel that allows air to enter said animal habitat chamber assembly;

an enclosed water chamber assembly that shares said first vertical end wall and said primary bottom wall as common walls;

said first vertical end wall having a top end and a humidity adjustment aperture is formed therein adjacent its top end that is in communication with both said animal habitat chamber assembly and said water chamber assembly, a humidity adjustment valve assembly is mounted in said water chamber assembly for closing said humidity adjustment aperture;

a submersible heater positioned in said water chamber assembly;

said water chamber assembly having a top wall having a cover aperture, a secondary cover being removably seated in said cover aperture; and

said water chamber assembly also having a major bottom wall that is spaced a predetermined height H1 below the primary bottom wall of said animal habitat chamber assembly so that when a predetermined amount of water is deposited in said water chamber assembly and it is heated by said submersible heater, the heated water will directly transmit heat into said animal habitat assembly through both of said common walls.

---

**5,012,764**

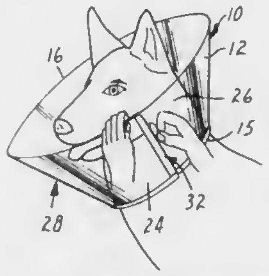
## ANIMAL PROTECTIVE COLLAR

**Therese A. Fick, Marine, and Byron D. Fair, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jul. 26, 1990, Ser. No. 558,166**

**Int. Cl.$^5$ A01K** *27/00*

**U.S. Cl. 119—106** **6 Claims**



1. A custom-fittable, protective collar assembly capable of being fitted, removed, and thereafter reapplied in a compliant manner, said collar assembly comprising:

(1) a substantially flat collar-forming sheet of resiliently flexible material having inner and outer arcuate edges generally concentric about a common axis, said edges extending between first and second ends of said sheet, said sheet being adapted to be bent in order to overlap portions of said sheet adjacent said ends, thereby forming said material into the shape of a truncated cone with a substantial portion of said inner edge adapted to fit around the neck of an animal and

(2) first and second elongate closure members, each of said closure members having an attachment surface adapted for releasable engagement with the attachment surface of the other closure member, each of said closure members also having a surface opposite said attachment surface, said first closure member being attached at its opposite surface to a portion of said sheet adjacent one of said ends and extending generally radially of said common axis, said second elongate member being releasably engaged to said first elongate member and having a layer of pressure sensitive adhesive on its opposite surface substantially covered by a releasable liner,

whereby said assembly can be bent around the neck of an animal, with portions of said sheet adjacent said first and second ends overlapped to provide said releasable liner facing a desired location of an overlapping portion of sheet material, in order to form said material into the shape of a truncated cone with a substantial portion of said inner edge adapted to fit the neck of the animal;

said releasable liner can be removed to expose said adhesive layer and said exposed adhesive layer adhered by pressure at the desired location on said overlapping sheet material in order to retain said assembly in its fitted shape around the neck of the animal; and

the engagement of said elongate closure members can be released and said assembly removed from the neck of the animal in a manner such that said assembly can be later bent again around the neck of the animal, and said elongate closure members again engaged to achieve substantially the same fit as that originally made.

**5,012,765**

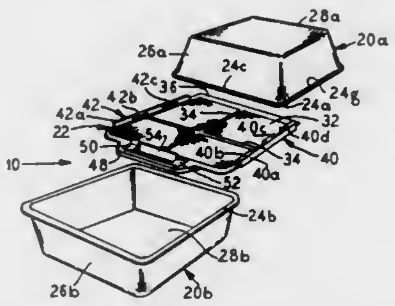
## CAT LITTER SCREENING DEVICE

**Joseph I. Naso, Lombard; Joseph L. Barbaro, Western Springs, and John Howard, West Chicago, all of Ill., assignors to Cielo Industries, Inc., Lombard, Ill.**

**Filed Apr. 30, 1990, Ser. No. 516,355**

**Int. Cl.$^5$ A01K** *1/035*

**U.S. Cl. 119—166** **19 Claims**



1. An animal litter screening device comprising:

a first litter pan having side walls, a bottom, and a first substantially open face;

a second litter pan having secono side walls, a second bottom, and a second substantially open face;

a screen member comprising a screening plate, and a track arranged on opposite face sides of said screening plate;

a first means for guiding arranged along a length of said first litter pan;

a second means for guiding arranged along a length of said second litter pan, said screen member arranged between said first litter pan and said second litter pan, said first substantially open face and said second substantially open face in facing arrangement, said first and second litter pans slidingly engaged to said screen member by engagement of said track with said first and second means for guiding;

a catch means for releasably locking at least one of said first and second litter pans to said screen member preventing sliding of said one of said first and second litter pans with respect to said screen member when said at least one of said first and second litter pans is positioned in an operable position onto said screen member.

---

**5,012,766**

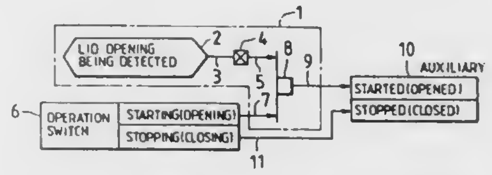
## SAFEGUARD ARRANGEMENT FOR PLANT

**Seiitsu Nigawara; Takehiko Ikematsu, and Masayuki Fukai, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 370,827, Jun. 23, 1989, abandoned, which is a division of Ser. No. 240,193, Sep. 6, 1988, Pat. No. 4,905,632. This application May 11, 1990, Ser. No. 522,063**

**Int. Cl.$^5$ F22B** *37/42*

**U.S. Cl. 122—504** **4 Claims**



1. A method of safely protecting a power generating plant which has a communicating portion communicated with other portions, and a cover for maintenance of the inside of said power generating plant, and which is adapted to be operated with said cover closed during a normal operation of said power generating plant, comprising the steps of providing a detector for detecting the opening of the cover of the plant and automatically delivering a signal from said detector to close said communicating portion, or preventing said communicating portion from being opened, in accordance with an opening action of said cover.

---

**5,012,767**

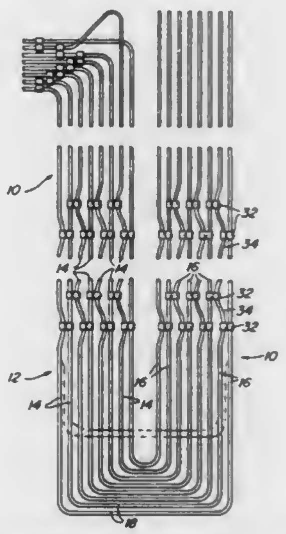
## HEAT EXCHANGER TUBE SPACERS

**Ramsey U. Sheikh, Oley, and Steve A. Stavrou, Gilbertsville, both of Pa., assignors to Leighton Industries, Inc., Phoenixville, Pa.**

**Filed Oct. 3, 1989, Ser. No. 416,352**

**Int. Cl.$^5$ F22B** *37/06*

**U.S. Cl. 122—511** **5 Claims**



1. In a vapor heating unit comprising convection heater means and a bank of spaced apart upright vapor tubes extending transversely of the flow path of heating gases generated by said heater means, spacer means for maintaining a constant distance between said tubes and for allowing axial movement of a first of said tubes relative to a second tube adjacent to the first, said spacer means including a first ring shaped collar element surrounding a first one of said tubes, means comprising said first ring shaped collar element for receiving said first one of said tubes, said first ring shaped collar element means providing clearance with said tube for relative axial movement, and said spacer means further including a second ring shaped collar element joined to the first ring shaped collar element in side-by-side relationship therewith, said second ring shaped collar element surrounding said second tube and mechanical restraining means for preventing relative axial and rotational movement of the second ring shaped collar element with respect to the second tube.

---

**5,012,768**

## COOLING SYSTEM

**Dieter Roschinski, Cologne, Fed. Rep. of Germany, assignor to Kloeckner-Humboldt-Deutz AG, Cologne, Fed. Rep. of Germany**

**Filed Apr. 19, 1990, Ser. No. 511,065**

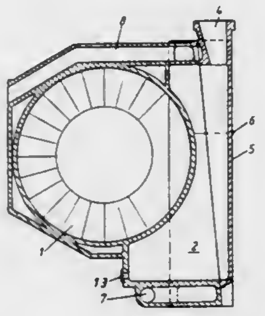
**Int. Cl.$^5$ F01P** *7/10*

**U.S. Cl. 123—41.49** **4 Claims**

1. Cooling system for internal-combustion engines, exhibiting at least a radiator (3), a fan shroud (1) positioned for directing air through said radiator (3) and a compensator reservoir

VOL
1126
ISS
1
MY
7
1991
UMI

(2), operable to communicate with said radiator, characterized by the fact that the compensator reservoir (2) and the fan shroud (1) are fabricated in one piece and made as a support for the radiator (3).



---

5,012,769

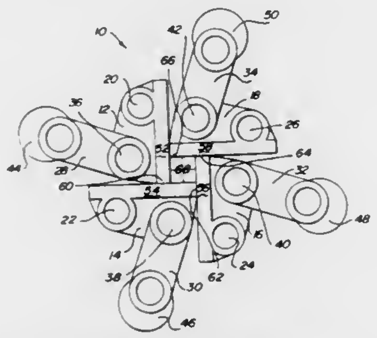
### ENERGY TRANSFER UNIT HAVING AT LEAST THREE ADJACENT PISTON MEMBERS

**Brent R. Cottingham, 3255 Nottingham Rd., Ocean Springs, Miss. 39564**

**Filed Feb. 27, 1990, Ser. No. 485,649**

**Int. Cl.$^5$ F01B** *7/02;* **F02B** *25/08*

**U.S. Cl. 123—51 R** **13 Claims**



1. An energy transfer unit comprising:

a transfer unit housing having a top inner wall and a bottom inner wall, said walls being in a parallel and fixed relationship to one another; and

at least three movable piston members, each of said piston members having a piston face and at least one edge;

said faces of said piston members being pivotably situated between said walls;

said faces coacting with each other by said edge of one piston contacting with and sliding against said face of an adjacent piston, whereby said piston faces collectively define an alternatingly expandable and contractable surface area within said compression chamber; and

a number of connecting rods and crankshafts equal to the number of said piston members, one of said connecting rods interconnecting one each of said piston members and said crankshafts.

---

5,012,770

### INTAKE APPARATUS FOR INTERNAL COMBUSTION ENGINE

**Kazuhisa Okamoto, Yokohama, and Fumikazu Ishibashi, Yamato, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

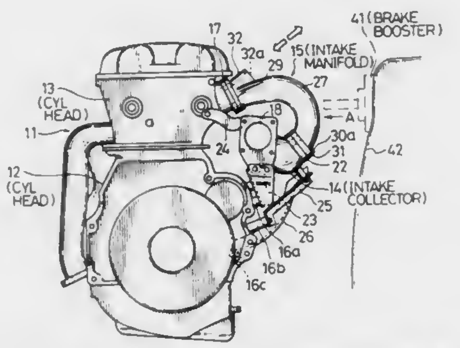
**Filed Jul. 12, 1990, Ser. No. 551,385**

**Claims priority, application Japan, Jul. 24, 1989, 1-191138**

**Int. Cl.$^5$ F02M** *35/10*

**U.S. Cl. 123—52 MC** **7 Claims**

1. An intake apparatus for an engine having an engine body composed of a cylinder head and a cylinder block formed with a plurality of engine cylinders; an intake manifold for supplying intake air into the engine cylinders, respectively; and an intake collector for distributing intake air into the intake manifold, wherein said intake collector is disposed along and fixed to the engine body; and said intake manifold is disposed over said intake collector and removably supported by said engine body and said intake collector.



---

5,012,771

### INTAKE SYSTEM FOR MULTI-CYLINDER ENGINE

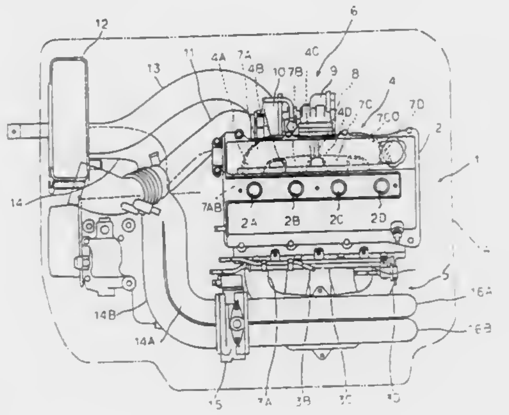
**Hiroyuki Oda, Hiroshima; Toshimitsu Tanaka, Yamaguchi; Naoyuki Yamagata, and Kazuhiko Hashimoto, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

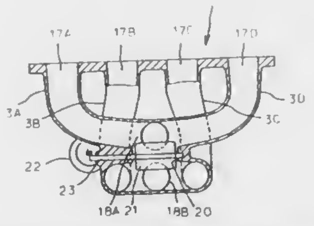
**Filed Feb. 28, 1990, Ser. No. 485,876**

**Claims priority, application Japan, Feb. 28, 1989, 1-49392**

**Int. Cl.$^5$ F02M** *35/10*

**U.S. Cl. 123—52 MB** **6 Claims**





1. An intake system for a multi-cylinder internal combustion engine, said intake system comprising:

an engine having an engine body which includes a plurality of cylinders;

an intake manifold having a plurality of discrete intake passages connected to said plurality of cylinders, respectively; and

two intake pipes, respectively communicating with two groups of said discrete intake passages connected to two groups of said cylinders which in each and the same group are not intended to be fired one after another, each said intake pipe being arranged to extend substantially vertically from a communicating portion where each said intake pipe communicates with a respective one of said groups of said intake passages, turns to extend horizontally in one longitudinal direction of said engine body and turns back to extend in the opposite longitudinal direction of said engine body surrounding said discrete intake passages.

---

5,012,772

### INTERNAL COMBUSTION ENGINE

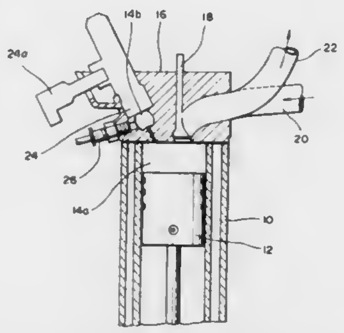
**Akira Nakamura, Muroto, Japan, assignor to Sankoshoki Corporation, Murato, Japan**

**Continuation of Ser. No. 235,390, Aug. 24, 1988, abandoned. This application Mar. 27, 1990, Ser. No. 501,365**

**Claims priority, application Japan, Jun. 17, 1988, 63-150521**

**Int. Cl.$^5$ F02B** *47/00*

**U.S. Cl. 123—25 C** **13 Claims**



1. In an internal combustion engine, a combustion chamber defined by a cylinder, a piston capable of reciprocatingly moving in said cylinder, and a cylinder head including a fuel injection means and an exhaust means communicating with said combustion chamber, the improvement comprising:

water injection means for injecting a water jet into said combustion chamber timed to the completion of the fuel gas detonation process; and

said water injection means including a part having a structure capable of heat-transfer positioned in a part of said cylinder head of said exhaust means at a place where said exhaust means passes through said cylinder head.

---

5,012,773

### INTAKE- AND/OR EXHAUST-VALVE TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

**Akio Akasaka; Seiji Suga; Yasuo Fukuda, and Takanori Sawada, all of Kanagawa, Japan, assignors to Atsugi Motor Parts Company, Limited, Kanagawa, Japan**

**Filed Aug. 18, 1989, Ser. No. 395,582**

**Claims priority, application Japan, Aug. 18, 1988, 63-108490[U]**

**Int. Cl.$^5$ F01L** *1/34*

**U.S. Cl. 123—90.17** **7 Claims**

1. An intake- and/or exhaust-valve timing control system for an internal combustion engine comprising:

a gear mechanism disposed between a timing pulley and a camshaft for adjusting the phase angle between said pulley and said camshaft;

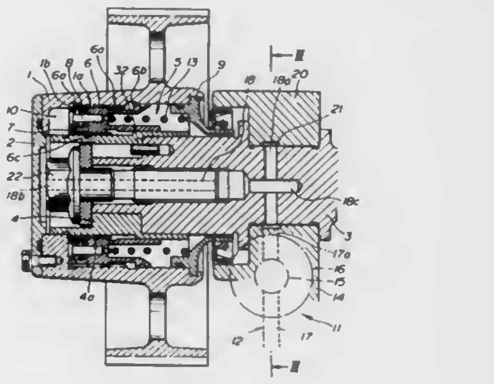
a drive mechanism provided for drivingly controlling said gear mechanism via oil pressure depending upon the operating state of said engine;

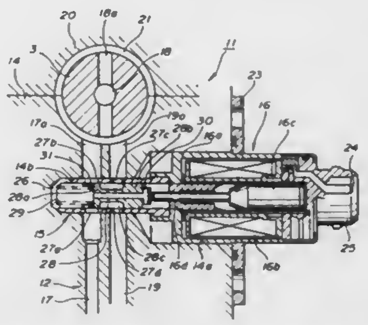
said drive mechanism including;

a hydraulic circuit having an oil supply passage for supplying working fluid from an oil pressure source for pressurizing the working fluid to said gear mechanism and an oil exhaust passage for exhausting the working fluid from said gear mechanism to an oil pan of said engine;

a flow control valve disposed in said hydraulic circuit at a location included in a stationary member of said engine for controlling the amount of working fluid flowing through said hydraulic circuit;

said oil exhaust passage being communicated through said flow control valve with the oil pan in such a manner as to prevent working fluid exhausted therethrough from being mixed with blow-by fumes or other vapors in said engine;





said oil supply passage and said oil exhaust passage are juxtaposed and said flow control valve is arranged in such a manner as to traverse both said oil supply and oil exhaust passages;

means for monitoring the operating state of said engine, said monitoring means generating a control signal representative of the operating state of said engine; and

an actuator for actuating said flow control valve in response to said control signal from said monitoring means.

---

5,012,774

### DEVICE FOR THE RELATIVE ANGULAR ADJUSTMENT OF A CAMSHAFT

**Hans-Jürgen Strauber, Stuttgart; Robert Niklas; Rolf Ohlendorf, both of Weinstadt, and Wolfgang Speier, Tübingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Mar. 1, 1990, Ser. No. 486,933**

**Claims priority, application Fed. Rep. of Germany, Mar. 4, 1989, 3907077**

**Int. Cl.$^5$ F01L** *1/34, 1/46*

**U.S. Cl. 123—90.17** **6 Claims**

1. A device for adjusting an angular position of an internal combustion engine camshaft in relation to the engine crankshaft comprising:

an adjusting bushing which is rotationally fixed on an input end of the camshaft and has external gear teeth;

an input sleeve connected to an input gear;

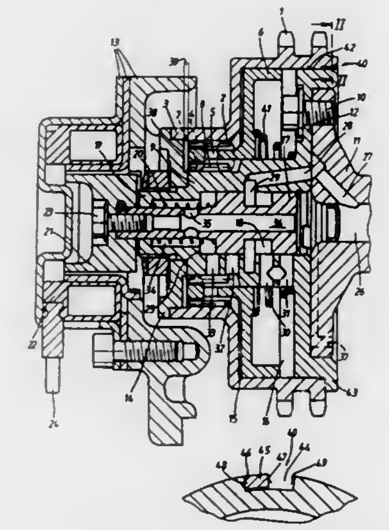
said input sleeve surrounding the adjusting bushing and having internal gear teeth;

an actuator displaceably arranged between the input sleeve and the adjusting bushing to be displaced from an initial position to a working position;

said actuator having two sets of gear teeth, one set in en-

VOL
1126
ISS
1
MY
7
1991
UMI

gagement with the internal gear teeth of the input sleeve and the other set in engagement with the external gear teeth of the adjusting bushing;
wherein at least one of said engaging gear teeth is designed as helical teeth;



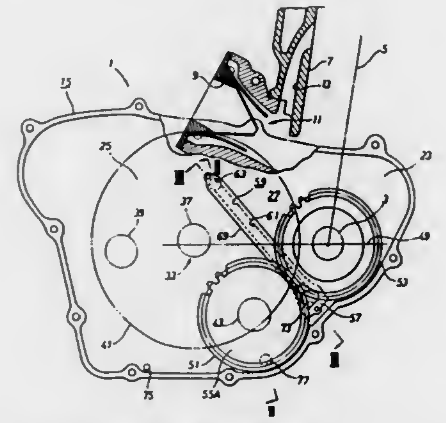
a spring means for holding the actuator in its initial position;
wherein the rotational adjustment of the camshaft is limited by a stop means; and
wherein the stop means acts between the input sleeve and the adjusting bushing.

---

5,012,775

### TWO-CYCLE ENGINE

**Ikuo Oike, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 198,200, May 25, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,537**
**Claims priority, application Japan, Jul. 29, 1987, 62-189706**
**Int. Cl.⁵ F02B** *75/00*
U.S. Cl. 123—192 B **16 Claims**



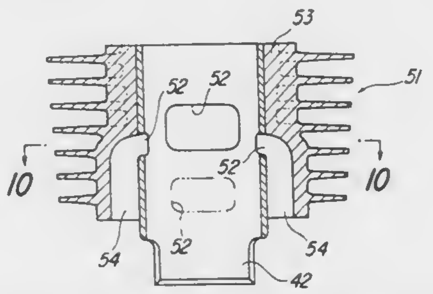
1. A two-cycle engine comprising:
a engine casing containing an integrally formed intake passage, a crank chamber and a transmission chamber,
a transmission mechanism having a main shaft in said transmission chamber;
a crank shaft in said crank chamber for driving said main shaft;
a balancer shaft having a driven gear;
a drive gear mounted on said crank shaft for meshing engagement with said driven gear;
a side chamber in said engine casing housing said drive gear and said driven gear, including a pressure chamber containing meshing portion of said drive gear and said driven gear whereby the pressure of lubricant oil supplied to said engine is increased; and
means for conducting pressurized lubricating oil from said pressure chamber to a point of use.

---

5,012,776

### COMPOSITE CYLINDER BLOCK ASSEMBLY

**Hiroshi Yamagata, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**
**Division of Ser. No. 61,463, Jun. 15, 1987, Pat. No. 4,750,393, which is a continuation-in-part of Ser. No. 704,535, Feb. 25, 1985, Pat. No. 4,637,110. This application Feb. 23, 1988, Ser. No. 159,321**
**Claims priority, application Japan, Dec. 14, 1984, 59-262822; Dec. 21, 1984, 59-268452**
**Int. Cl.⁵ F02F** *1/00*
U.S. Cl. 123—193 C **2 Claims**



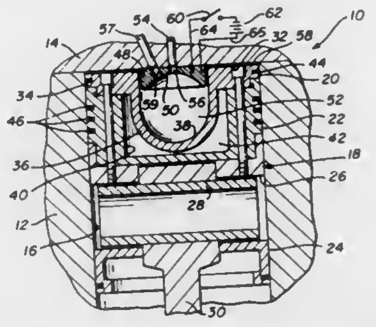
1. A composite cylinder block having a cylinder liner having at least one opening extending in a generally radial direction through the liner from its inner surface to its outer surface and a surrounding block formed from a different material than the liner, said surrounding block having its material extending into said opening of said liner for interlocking the liner with the surrounding material and for defining a port opening communicating with the inner surface of said liner.

---

5,012,777

### INTERNAL COMBUSTION ENGINE

**Quentin A. Baker, P.O. Box 6477, San Antonio, Tex. 78209; Henry E. Mecredy, 1630-C W. 6th, Austin, Tex. 78703, and Glenn B. O'Neal, 6503 Wagner Way, San Antonio, Tex. 78256**
**Filed Jan. 12, 1990, Ser. No. 464,105**
**Int. Cl.⁵ F02F** *1/00*
U.S. Cl. 123—254 **11 Claims**



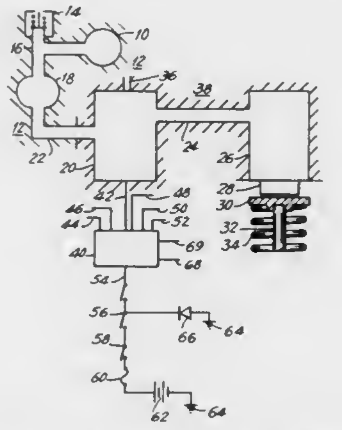
1. In an improved internal combustion engine of the diesel type, including a cylinder block having a cylinder bore therein, a head connected to the block covering one end of the bore, exhaust and air intake ports connected with the bore, a piston located in the cylinder bore and movable toward and away from the head, starter means for reciprocating the piston, and fuel supply means for injecting fuel into the cylinder bore, the improvement comprising:
an ignition plug member connected to said head;
a precombustion chamber defined by the piston and said plug member, said precombustion chamber connected to the fuel supply means for injection of fuel thereinto; and
a main combustion chamber in the cylinder bore defined by the piston, head and block, said main combustion chamber connected to said precombustion chamber when said piston is remote from said plug member and isolated therefrom when said piston is located proximate the head.

---

5,012,778

### EXTERNALLY DRIVEN COMPRESSION RELEASE RETARDER

**Vincent J. Pitzi, South Windsor, Conn., assignor to Jacobs Brake Technology Corporation, Wilmington, Del.**
**Filed Sep. 21, 1990, Ser. No. 585,954**
**Int. Cl.⁵ F02D** *13/04*
U.S. Cl. 123—321 **10 Claims**



1. An engine retarding system of a gas compression release type comprising a multi-cylinder four cycle internal combustion engine having a crankshaft, engine piston means associated with said crankshaft, exhaust valve means associated with each cylinder of said engine, high pressure hydraulic fluid supply means driven by said engine, retarder housing means, hydraulically driven actuator means movable between first and second positions in said retarder housing means and associated with said exhaust valve means to open said exhaust valve means, said actuator means being movable between a first position out of contact with said exhaust valve means and a second position opening said exhaust valve means, electronic controller means affixed to said engine and programmed to deliver a signal in response to the speed and position of said crankshaft, and solenoid actuated servo valve means having a drain outlet and positioned in said retarder housing means between said high pressure hydraulic fluid supply means and said actuator means, said servo valve means movable by said solenoid between a closed position wherein said servo valve means communicates between said actuator means and said drain outlet and an open position wherein said servo valve means communicates between said actuator means and said high pressure hydraulic fluid supply means.

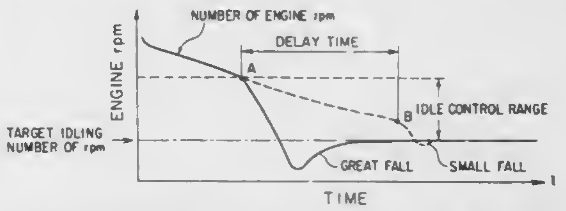
---

5,012,779

### ENGINE ROTATION CONTROL DEVICE

**Wataru Fukui, and Toshio Iwata, both of Himeji, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan**
**Filed Apr. 18, 1990, Ser. No. 510,759**
**Claims priority, application Japan, Apr. 19, 1989, 1-97641; Apr. 27, 1989, 1-105950**
**Int. Cl.⁵ F02D** *41/16*
U.S. Cl. 123—339 **9 Claims**

1. An engine control device for controlling the number of revolutions per minute of an engine to be at a prescribed target value during the idling operation thereof, said engine control device comprising:
a signal generator for generating an output signal representative of the crank angle of the engine in synchrony with the rotation thereof;
rotational number determining means for receiving the output signal of said signal generator and determining the number of revolutions per minute of the engine based on the signal generator output in a successive manner; and
ignition timing controlling means for controlling ignition timing in dependence upon various operating conditions of the engine, said ignition timing controlling means being operable to calculate a present average number of revolutions per minute of the engine which is updated every ignition instant, determine a deviation of the present average number of revolutions per minute of the engine from the predetermined target value and modify the ignition timing based on the deviation thus determined in such a manner as to maintain the number of engine rpm at the target value,
wherein said ignition timing controlling means calculates the present average number of revolutions per minute of the engine ($N_{AVE}(n)$) based on the preceding average number of revolutions per minute ($N_{AVE}(n-1)$) and the present number of revolutions per minute ($N_{IDL}$) by the use of the following formula:



$$N_{AVE}=(N_{AVE}(n-1)+K\{N_{AVE}(N-1)-N_{IDL}\}$$

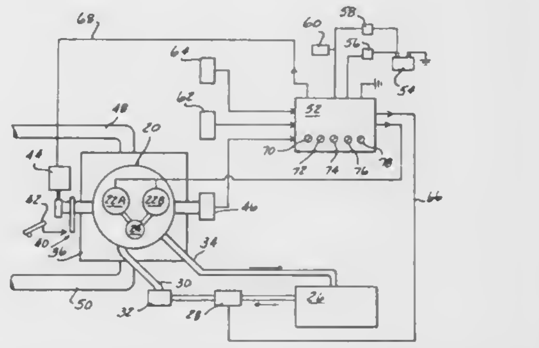
where K is an averaging constant.

---

5,012,780

### STAND ALONE FUEL INJECTION SYSTEM

**Ralph Bugamelli, Sterling Heights, Mich., assignor to Coltec Industries Inc., New York, N.Y.**
**Filed Jan. 5, 1990, Ser. No. 475,464**
**Int. Cl.⁵ F02D** *41/08;* **F02M** *51/00*
U.S. Cl. 123—339 **18 Claims**



3. a stand-alone throttle body fuel injection system including fuel injector means for injecting fuel from a throttle body into the fuel-air inlet of an engine manifold, comprising:
an electronic control means for controlling the activation of he fuel injector, the electronic control means comprising:
means for generating a pulse width modulated signal having a predetermined frequency and pulse width to the fuel injectors;
frequency signal generating means, responsive to the engine RPM, for generating a signal to the pulse width modu-

VOL
1126
ISS
1
MY
7
1991
UMI

lated signal generating means having a frequency proportional to the engine RPM;

pulse width signal generating means, responsive to the engine throttle position, for generating a signal to the pulse width modulated signal generating means having a pulse width proportional to the engine throttle position;

throttle position sensor means for sensing the throttle position and generating an output proportional thereto;

means, responsive to the engine RPM, for generating an engine RPM signal;

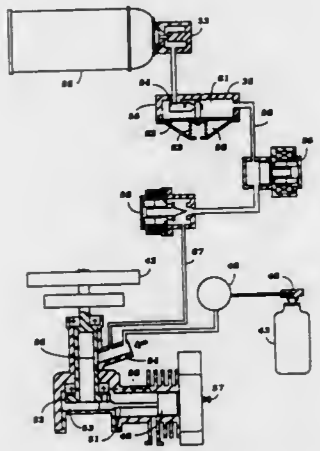
first idle adjustment means, input to the pulse width signal generating means, for establishing a base idle pulse width;

second mid-range adjustment means, responsive to the throttle position sensor means, for varying the pulse width when the throttle position is at a position corresponding to mid range engine RPM operating conditions; and

third adjustment means, input to the pulse width signal generating means, for adjusting the pulse width under high RPM engine operating conditions.

### 5,012,781
### GAS ENGINE

**Yoshiharu Yokoyama; Shigeru Akiyama; Hironori Nakayama, and Tsuyoshi Kamiya, all of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**
**Filed Jul. 10, 1989, Ser. No. 377,419**
**Claims priority, application Japan, Jul. 11, 1988, 63-170866**
**Int. Cl.⁵ F02D** *19/02, 31/00*
U.S. Cl. 123—353 9 Claims



1. An engine speed control for a small gas fueled engine comprising an unthrottled air passage to said engine, a readily removable container containing a pressurized source of fuel, conduit means having a readily detachable connection to said container for supplying fuel from said fuel source to said unthrottled air passage of said engine, valves means in said conduit means moveable between an opened position and a closed position, and means for cycling said valve means between its opened and closed positions with a duty cycle that varies to control the amount of fuel supplied to the engine and the speed of said engine without throttling air flow.

### 5,012,782
### ENGINE CONTROL SYSTEM

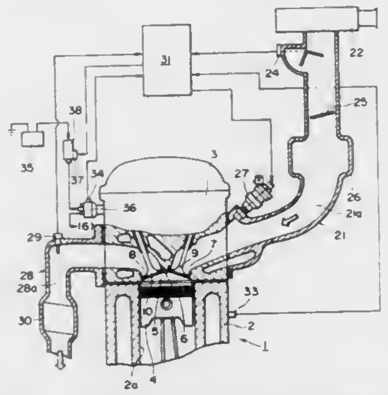
**Shoji Tokuda, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan**
**Filed Aug. 15, 1989, Ser. No. 394,083**
**Claims priority, application Japan, Aug. 15, 1988, 63-202851**
**Int. Cl.⁵ F02P** *5/18*
U.S. Cl. 123—425 16 Claims

1. An engine control system for controlling an engine control value, at which an internal combustion engine is operated, according to a grade of gasoline delivered into said internal combustion engine, said control system comprising:

a knock sensor for detecting knockings caused in said internal combustion engine;

engine operating condition detecting means for detecting if an engine operating condition, over a predetermined engine load, falls in a first operating zone for knocking detection ranging under a predetermined engine speed or in a second operating zone for knocking detection ranging over said predetermined engine speed;

grade determining means for determining, only when said engine operating condition detecting means detects an engine operating condition in said first operating zone, if gasoline delivered in said internal combustion engine has a high grade or a low grade, based on frequency levels of knockings continually detected by said knock sensor;



first control value changing means for setting said engine control value to a first standard engine control value suitable for gasoline having a high grade and changing said engine control value from said first standard control value every time said knock sensor detects knockings, when said engine operating condition detecting means detects an engine operating condition in said first operating zone; and

second control value changing means for setting said engine control value to a second standard engine control value suitable for gasoline having a low grade when said engine operating condition detecting means detects an engine operating condition in said second operating zone, and when said knock sensor detects knockings within a predetermined period from a transition of said engine operating condition to said first operating zone.

### 5,012,783
### CYLINDER HEAD FOR AN INTERNAL COMBUSTION ENGINE WITH FIVE VALVES PER CYLINDER

**Francesco Ferrazzi, Turin, Italy, assignor to Fiat Auto S.p.A., Turin, Italy**
**Filed Aug. 6, 1990, Ser. No. 562,990**
**Claims priority, application Italy, Aug. 4, 1989, 67684 A/89**
**Int. Cl.⁵ F01L** *1/26*
U.S. Cl. 123—432 2 Claims

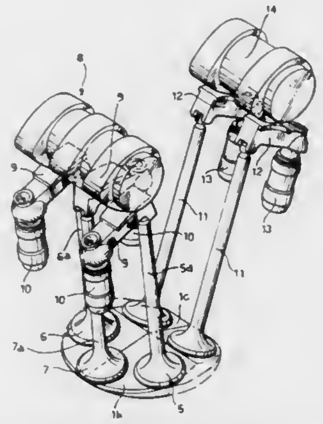
1. A cylinder head for an internal combustion engine, including, for each cylinder:

three inlet ducts which open in the surface of the cylinder head facing the cylinder, in a surface portion which is inclined to the general plane of the surface,

three inlet valves associated with the inlet ducts, the axes of two of the inlet valves being contained in a plane substantially perpendicular to the inclined surface portion, the axis of the third inlet valve being separate from the plane containing the axes of the other two inlet valves,

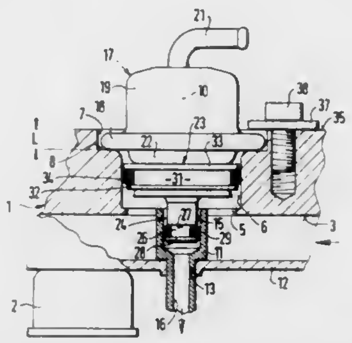
a camshaft which operates all three inlet valves from above by means of respective interposed rocker arms, each of which bears on the stem of the respective inlet valve at one end and on a tappet for taking up the valve clearance at its other end.

wherein the axis of the third inlet valve is parallel to the plane containing the axes of the other two inlet valves and the rocker arm associated with the third inlet valve is in a reverse orientation relative to the other two rocker arms, that is, its end which bears on the respective valve is on the side where the other two rocker arms bear on the respective tappets.



### 5,012,784
### PRESSURE REGULATOR DEVICE AND FUEL LINE RECEPTOR THEREFOR

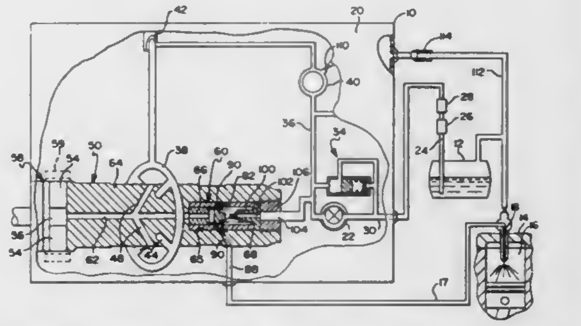
**Siegfried Fehrenbach, Markgroeningen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Filed Oct. 25, 1989, Ser. No. 426,269**
**Claims priority, application Fed. Rep. of Germany, Jan. 14, 1989, 3900986**
**Int. Cl.⁵ F02M** *00/00*
U.S. Cl. 123—463 8 Claims



1. A pressure regulator valve which is separate from and disposable on a rigid fuel distributor line for supplying fuel to fuel injection valves of a fuel injection system connected thereto for internal combustion engines, the pressure regulator valve includes a protruding outlet neck (**24**) which protrudes into a receiving opening (**15**) of an outlet connection (**11**) of the fuel distributor line, said regulator valve includes a bottom part (**23**) adjoining the outlet neck which protrudes into a guide opening (**6**), said outlet neck (**24**) includes an annular neck groove (**26**) defined in an axial direction by an outer shoulder (**28**), and by an inner shoulder (**27**) oriented toward said bottom part (**23**), said bottom part includes an annular housing groove (**31**) defined in an axial direction by an inner shoulder (**32**) oriented toward the outlet neck and by an outer shoulder (**33**), first elastic sealing ring (**29**) effecting sealing with respect to the receiving opening **15** is disposable in the annular neck groove (**26**), and a second elastic sealing ring (**34**) effecting sealing with respect to the guide opening is disposable in the annular housing groove (**31**), said inner shoulder (**27**) defining the annular neck groove (**26**) has a smaller diameter than the outer shoulder (**28**) thereof, and the inner shoulder (**32**) defining the annular housing groove (**31**) has a smaller diameter than its outer shoulder (**33**).

### 5,012,785
### FUEL INJECTION DELIVERY VALVE WITH REVERSE FLOW VENTING

**David L. Long, Mount Clemens; Mark A. Mitchell, Dryden, and David P. Sczomak, Troy, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Jun. 28, 1989, Ser. No. 372,596**
**Int. Cl.⁵ F02M** *39/00*
U.S. Cl. 123—467 3 Claims



1. A fuel injection pump including high pressure pumping means and separate discharge fittings for supplying fuel from a source of liquified fuel to the combustion chambers of an internal combustion engine through fuel injector nozzles connected to fuel injection lines into which high pressure pulses of fuel are delivered from said high pressure pumping means through said fittings, the improvement comprising delivery valve assembly means operatively mounted in each of said fittings for feeding pulses of fuel into said fuel injector lines and for retracting fuel from said fuel injector lines, each of said delivery valve assembly means including a valve element operatively mounted for shifting movement in an associated fitting, an inlet passage in said fitting for receiving pulses of high pressure fuel from said high pressure pumping means, said delivery valve element having hydraulic passage means therein which hydraulically feeds said pulses to an associated high pressure line for delivery to its injector nozzle for subsequent feed into the associated combustion chamber, said valve assembly means having fluid passage means therein so that pressure waves of fuel reflecting from said fuel injector nozzle will be routed by said valve element to a low pressure area in said pump to eliminate secondary fuel injections.

### 5,012,786
### DIESEL ENGINE FUEL INJECTION SYSTEM

**James R. Voss, Six Eastwood Dr., Wilbraham, Mass. 01095**
**Filed Mar. 8, 1990, Ser. No. 490,341**
**Int. Cl.⁵ F02M** *41/00, 7/00*
U.S. Cl. 123—467 16 Claims

1. An improved fuel injection system for a diesel internal combustion engine having a plurality of cylinders and adapted to be operated so as to control the formation of oxides of nitrogen as well as smoke, particulates, carbon dioxide and odor that may be caused by incomplete combustion, the improved system comprising:

a source of fuel for the diesel engine;

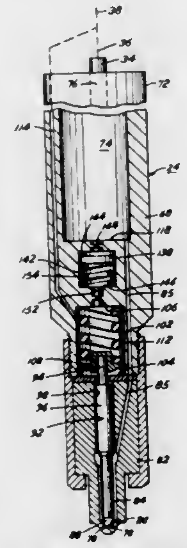
means for pumping fuel under pressure to each cylinder of the diesel engine, the pumping means including a plurality of fuel inlets in fluid connection with the source of fuel and a plurality of fuel outlets for permitting the flow of pressurized fuel from the pump means with there being a

VOL
1126
ISS
1
MY
7
1991
UMI

fuel inlet and fuel outlet for each of the cylinders of the diesel engine;

a plurality of injection lines, one for each fuel outlet of the pump means, with each injection line having a first end in fluid communication with one of the fuel outlets of the pump means and a second end;

a plurality of accumulator nozzles, one for each one of the cylinders of the diesel engine, with each accumulator nozzle having an opening pressure, a closing pressure, and a charging pressure and also having at least one orifice through which fuel under pressure may be injected, with each one of the accumulator nozzles being operatively associated with one cylinder of the diesel engine so that fuel under pressure may be injected through the orifice of the associated accumulator nozzle into that cylinder and with each accumulator nozzle also including: an inlet that is in fluid connection with the second end of the one injection line; an accumulator chamber in fluid connection with the inlet; a check valve for permitting the flow of fuel under pressure from the one injection line, through the inlet and to the accumulator chamber; a nozzle needle valve having a first end and a second end that is adapted to be moved between a first position wherein fuel may flow through the orifice and a second position wherein the first end of the nozzle needle valve prevents the flow of fuel through the orifice; a second chamber that is adjacent to the second end of the nozzle needle valve and the orifice and that is in fluid connection with the accumulator chamber, with the second end of the nozzle needle valve including a surface area that is subject to the pressure of the fuel in the second chamber so that the pressure of the fuel therein biases the nozzle needle valve to its first position; a third chamber adjacent to the first end of the nozzle needle valve; a spill line being in fluid connection between the third chamber and the one injection line, upstream of the accumulator nozzle check valve; means for contacting the nozzle needle valve and, together with the pressure of the fuel in the third chamber, for biasing the nozzle needle valve towards its second position; and means for permitting the opening pressure of the accumulator nozzle to be close to the closing pressure of the accumulator nozzle so as to provide a high turn down ratio without having an excessive maximum charging pressure;



means for receiving fuel from the spill lines of the accumulator nozzles including means for imposing a back pressure on the spill lines and thus the third chambers of the accumulator nozzles, which back pressure is low under engine cranking conditions and is high under engine operating conditions;

a plurality of secondary valves, one disposed in each of the injection lines, between their first and second ends and upstream from the interconnection of the injection line and its associated spill line; a plurality of secondary lines, one for each one of the secondary valves, with a secondary line providing a fluid connection between each one of the secondary valves and the fuel receiving means, and with each one of the secondary valves being selectively moveable between a first position wherein the fuel may flow through its associated injection line from the fuel outlet of the pump means to its associated accumulator nozzle and a second position wherein fuel may flow to the fuel receiving means from its associated spill line and the injection line, downstream of the one secondary valve; and

means for selectively moving each of the secondary valves between their first and second positions so that the accumulator nozzles will have a low opening pressure during engine cranking and will have a high closing pressure under normal operating conditions.

---

## 5,012,787
## FUEL INJECTION SYSTEM

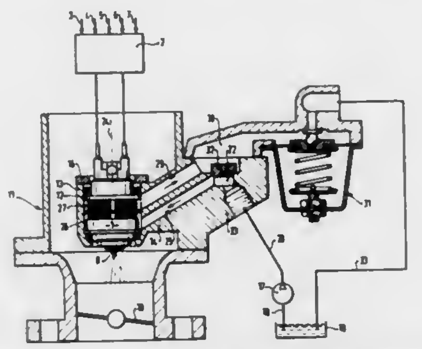
**Udo Hafner, Lorch; Harro Herth, Vaihingen/Enz; Wolfgang Kienzle, Schwieberdingen; Heinrich Knapp, Leonberg; Rudolf Krauss, Stuttgart; Manfred Lembke, Gerlingen; Werner Paschke, Schwieberdingen, and Rudolf Sauer, Benningen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Continuation of Ser. No. 397,970, Jul. 14, 1982, abandoned. This application Dec. 7, 1987, Ser. No. 129,904**

**Claims priority, application Fed. Rep. of Germany, Oct. 16, 1981, 3141154**

**Int. Cl.$^5$ F02M** *37/04*

**U.S. Cl. 123—470** **11 Claims**



1. A fuel injection system for a mixture-compressing internal combustion engine having externally supplied ignition which comprises an air intake tube and at least one fuel injection valve, said fuel injection valve being disposed in a holder body provided within said air intake tube and arranged to experience air flow circumferentially around said holder body and further arranged to communicate with a fuel supply line and a fuel return line, by means of which fuel is injectable into the air intake tube, said fuel supply line and said fuel return line are inclined relative to a longitudinal axis of said fuel injection valve, each of said lines extending toward the fuel injection valve in a downwardly directed manner, said fuel injection valve having first and second axially spaced circumferential grooves between an outer circumference of said fuel injection valve and an inner circumference of said holder body, each of said first and second grooves communicating respectively with an interior of said fuel injection valve, said first groove communicating with said fuel supply line and said second groove communicating with said fuel return line, said second groove that communicates with said fuel return line being above said first groove that communicates with said fuel supply line, a deaeration chamber connected to said fuel supply line remote from the fuel injection valve, said deaeration chamber is arranged to communicate via a deaeration nozzle with the fuel return line, a fuel feed line that extends from a fuel supply pump and discharges into the deaeration chamber, and said fuel feed line discharges into the deaeration chamber upwardly at an angle of inclination toward the deaeration chamber.

---

## 5,012,788
## FUEL-AIR MIXTURE-FORMING DEVICE FOR INTERNAL COMBUSTION ENGINES

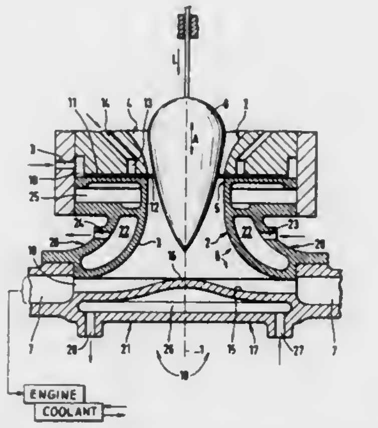
**Martin Feldinger, Königstein, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Mar. 15, 1990, Ser. No. 494,637**

**Claims priority, application Fed. Rep. of Germany, May 31, 1989, 3917681**

**Int. Cl.$^5$ F02M** *19/08, 9/12*

**U.S. Cl. 123—545** **6 Claims**



1. A fuel-air mixture-forming device for internal combustion engine comprising

a nozzle body of rotational symmetry;

a throttle member of rotational symmetry which is displaceable in the nozzle body, the nozzle body and the throttle body together forming a convergent-divergent nozzle and a radial diffusor; and

wherein the nozzle body has a slot which extends around the nozzle in the vicinity of its narrowest cross section and discharges into the nozzle, the nozzle discharging into the diffusor, there being at least one fuel line which opens into the slot;

the radial diffusor is formed by a region of the nozzle body which is curbed outward in the direction of flow of the mixture and by a wall; and

the mixture-forming device includes a structural member having said wall and forming a structural unit with an intake pipe of the internal combustion engine, said wall lying opposite the throttle member and downstream thereof and being of rotational symmetry with respect to a longitudinal axis of the throttle member; and

said wall has a bulge facing the throttle member.

---

## 5,012,789
## COLD START BY-PASS VALVE

**Carol A. Spicuzza, and Lawrence B. Reimer, both of Janesville, Wis., assignors to SSI Technologies, Inc., Janesville, Wis.**

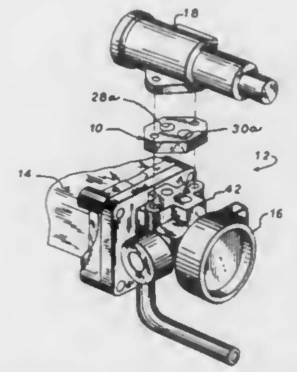
**Filed Jun. 18, 1990, Ser. No. 540,629**

**Int. Cl.$^5$ F02D** *9/00*

**U.S. Cl. 123—587** **10 Claims**

1. A cold start air control device for an internal combustion engine having an air delivery system in which the delivery of air to a vacuum generating manifold is controlled by a throttle valve and a by-pass valve having a predetermined crosssectional area and disposed in parallel with the throttle valve, said control device comprising:

means defining a passageway in parallel with the throttle valve and the by-pass valve and having a cross-sectional area greater than the by-pass valve so as to offer a less restricted air flow path than the by-pass valve, said passageway providing communication between the manifold and atmosphere,



valve means disposed within said passageway for opening and closing said passageway, said valve means biased to said open position and movable to said closed position in response to a predetermined vacuum level generated in the manifold.

---

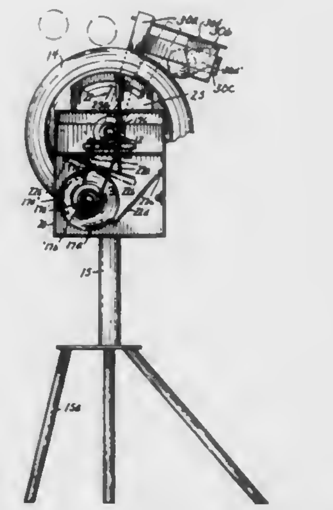
## 5,012,790
## BASEBALL PRACTICE MECHANISM

**Michael R. Bates, P.O. Box 72, New Haven, Ill. 62867**

**Filed Jun. 26, 1989, Ser. No. 371,063**

**Int. Cl.$^5$ F41B** *4/00*

**U.S. Cl. 124—81** **7 Claims**



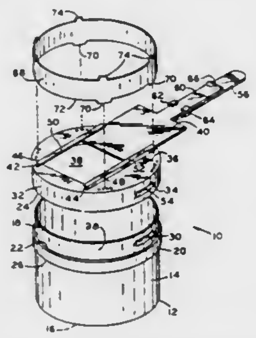
1. A baseball practice mechanism comprising a framework supporting a baseball propelling tire, means for rotating said tire, a speed control for said rotating tire defined by a pivotal plate, means normally urging said rotating means towards said pivotal plate, and a threaded adjustment selectively bearing against said pivotal plate to achieve a variable and uninterrupted speed function upon movement of said rotating means, and a pivotal baseball directional control assembly disposed on said framework movable to positions representative of hitting practice, ground ball practice and fly ball practice and including a plate member having an opening through which a baseball is introduced by simple operator release, serving a consistent successive baseball entry relationship and operative baseball engagement with said tire, where said operative engagement of said baseball with said tire is independent of any said movement of said speed control.

VOL
1126
ISS
1
MY
7
1991
UMI

**5,012,791**

### CHAFING DISH BURNER

**George McCabe, 314 Westfield, Nashville, Tenn. 37221**
**Filed May 14, 1990, Ser. No. 523,319**
**Int. Cl.⁵ F24C** *5/00*
**U.S. Cl. 126—43** **17 Claims**



1. A chafing dish burner comprising: an open-topped base; and a cover configured to close said open-topped base, said cover containing an opening therein, said cover further including a valve means including a sliding valve member for variably closing said opening, said sliding valve member being supported with respect to said cover so as to slide substantially linearly,

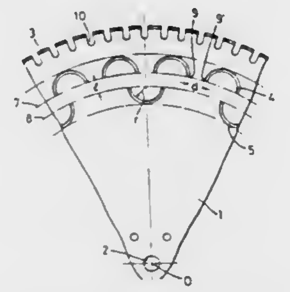
said cover includes a top, an annular upstanding windscreen extending axially upwardly, said windscreen being axially spaced from said top by a plurality of downwardly extending legs such that an annular space interrupted by said legs is defined between said windscreen and said top.

---

**5,012,792**

### ROTARY BLADE AND A ROTARY SUBSTRATE FOR USE IN THE ROTARY BLADE

**Azuma Kawata, Kasaoka; Shuichiro Koroku; Hirofumi Kano, both of Sakai, and Ichiro Miyao, Sakai, all of Japan, assignors to Osaka Diamond Industrial Co., Ltd., Osaka, Japan**
**Filed Dec. 27, 1989, Ser. No. 457,954**
**Claims priority, application Japan, Dec. 27, 1988, 63-169720[U]; Dec. 28, 1988, 63-335561**
**Int. Cl.⁵ B24D** *5/06*
**U.S. Cl. 125—15** **10 Claims**



1. A rotary blade, comprising:

a rotary substrate having an outer edge, said rotary substrate having a plurality of first-semicircular slits therein opening toward the center of rotation of said rotary substrate and annularly distributed on said rotary substrate on a first circle about said center of rotation, and said rotary substrate having a plurality of second semicircular slits therein opening in a direction opposite to the opening direction of said plurality of first semicircular slits and annularly distributed on said rotary substrate on a second circle about said center of rotation inside of said plurality of first slits such that said second slits at least partially interrupt radii extending from said center of rotation to said plurality of first semicircular slits;

filler materials disposed in said plurality of first semicircular slits and said plurality of second semicircular slits; and

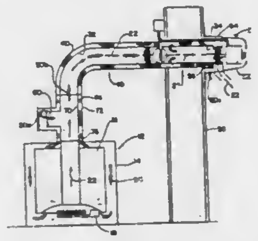
a plurality of chips disposed at intervals on said outer edge of said rotary substrate, each said chip being integrally formed of diamond particles and a metallic bond material.

---

**5,012,793**

### POWER VENTED DIRECT VENT SYSTEM

**Steven E. Guzorek, Kinston, N.C., assignor to The Field Controls Company, Kinston, N.C.**
**Filed Oct. 5, 1989, Ser. No. 417,476**
**Int. Cl.⁵ F24C** *3/00*
**U.S. Cl. 126—85 B** **5 Claims**



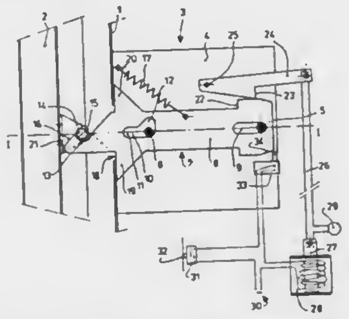
1. A power vented direct vent system for a fuel-burning appliance comprising, a vent pipe for conveying flue gas to an outlet end of the vent pipe at a discharge location outside of a building and having an inlet end for connection to an appliance, means including an intake pipe and a blower for supplying make up air from outside the building to the appliance, said intake pipe and vent pipe being concentric over substantially their entire extent between the blower and the appliance to define an unobstructed air path for ambient air to the appliance, and means for controlling the amount of make up air which flows directly from the intake pipe to the vent pipe to assure sufficient draft at the burner of the appliance, said controlling means including means for controllably delivering make up air flowing in the unobstructed air path into the vent pipe adjacent to the inlet end of the vent pipe.

---

**5,012,794**

### OVEN CLOSURE DEVICE

**Jacques Faurel, Annecy, France, assignor to Societe Cooperative de Production Bourgeois, Faverges, France**
**Filed Nov. 17, 1989, Ser. No. 436,625**
**Claims priority, application France, Nov. 17, 1988, 88 15209**
**Int. Cl.⁵ F24C** *15/04*
**U.S. Cl. 126—197** **11 Claims**



1. A closure device having a longitudinal axis for retaining an oven door in a closed relationship with a front face of an oven body, comprising a hook mounted in the oven body and cooperating with a catch mounted in the door for retaining the catch and the door in the locked position and releasing the catch and the door for opening the oven, the hook comprising a retainer housing in which the catch is engaged in the locked position when the hook is in an axial position along the longitudinal axis, a retainer ramp limiting the retainer housing and forming a bearing surface for retaining the catch in the locked position, a tripping ramp being provided on the front face of the hook for causing the hook to pivot and escape from its axial position during introduction of the catch for closing the door, wherein:

said hook is mounted for longitudinal sliding on guide means of the oven body, between a retracted locking position in which the guide means prevent the hook from pivoting and an advanced engagement position in which said guide means allow the hook to pivot about a fixed pin, away from its axial position;

first resilient means for urging the hook in a direction perpendicular to the longitudinal axis to return it to its axial position;

a mobile locking stop, which moves between first position in which it retains the hook in the retracted locking position, and a second position in which it releases the hook,

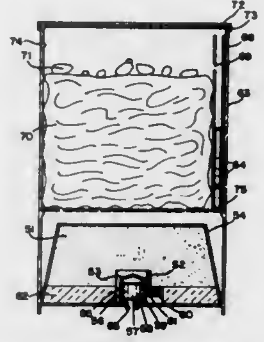
actuating means for actuating the mobile locking stop towards its first and second positions.

---

**5,012,795**

### SELF-HEATING CONTAINER

**Ryoichi Suzuki, Yokohama; Kunio Yamauchi, Hikone; Choji Kawabata, Tatebayashi; Akira Takeuchi, Fukaya, and Koki Ando, Tokyo, all of Japan, assignors to Nissin Shoknhin Kabushiki Kaisha, Osaka, Japan**
**Division of Ser. No. 395,768, Aug. 18, 1989. This application Nov. 5, 1990, Ser. No. 608,730**
**Claims priority, application Japan, Aug. 18, 1988, 63-108529[U]; Nov. 30, 1988, 63-156177[U]; Jun. 28, 1989, 1-74838[U]**
**Int. Cl.⁵ A47G** *23/04*
**U.S. Cl. 126—262** **2 Claims**



1. A self-heating container comprising a container, a heater fixed within said container, said heater including a solid fuel, a firing agent adjacent with and easier to fire than said solid fuel, and an igniter mounted adjacent said firing agent, said igniter including a rotatably supported striker wheel and a flint for compressive engagement with said wheel, said wheel being adapted to be rotated by operation from outside said container, said solid fuel and said firing agent each comprising a mixture of an oxidation agent and an inflammable material, said flint being compressed against said striker wheel, said striker wheel having an axial bore, said container having an opening formed adjacent said wheel and aligned with said bore, said bore being adapted for engagement with a trigger from outside of said container through said opening so as to rotate said wheel by said trigger.

---

**5,012,796**

### SOLAR HEAT COLLECTOR

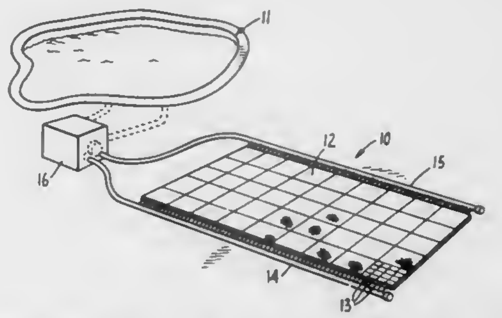
**Philip E. Park, 1510 Second Ave., Walnut Creek, Calif. 94596**
**Filed Sep. 2, 1988, Ser. No. 239,946**
**Int. Cl.⁵ F24J** *2/42*
**U.S. Cl. 126—416** **2 Claims**

1. A solar heat collector comprising in combination, a mat formed of integral intersecting ribs and posts, one end of each post and one side of each rib being substantially co-planar and defining a support surface, the end opposite to said one end of each post projecting downward and below said intersecting ribs to form open channels between said posts;

a plurality of fluid conduits extending beneath said mat and located in channels between said posts;

and a pair of headers extending along one or more sides of said mat fluidly connected, respectively, to opposite ends of said fluid conduits;

whereby fluid may be introduced into one header, passed through said conduits and withdrawn through a second header.

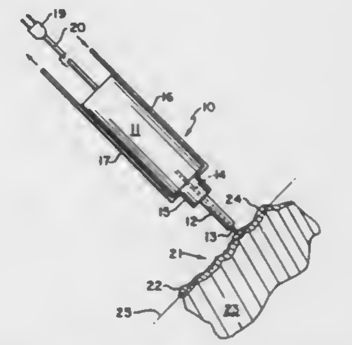


---

**5,012,797**

### METHOD FOR REMOVING SKIN WRINKLES

**Marc D. Liang, and Krishna Narayanan, both of Pittsburgh, Pa., assignors to Montefiore Hospital Association of Western Pennsylvania, Pittsburgh, Pa.**
**Filed Jan. 8, 1990, Ser. No. 461,624**
**Int. Cl.⁵ A61B** *17/32*
**U.S. Cl. 128—24 A** **5 Claims**



1. A method for removing skin wrinkles from a region of living mammal skin, said skin wrinkles including raised portions of the epithelial layer which are elevated above a normal surface of said skin, by use of a high frequency vibrating tool having an output tip which comprises:

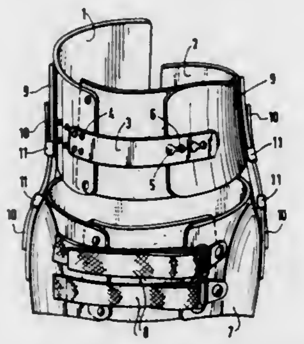
a. introducing subcutaneously in said region (1) an effective amount of anesthetic; (2) an effective amount of vasoconstrictor; (3) an effective amount of enzyme spreading factor;
b. selecting engaging said raised portions of the epithelial layer of said skin in said region with the output tip of said high frequency vibrating tool oscillating at frequencies from 20,000 to 50,000 Hertz to abrade selectively said raised portions of the epithelial skin layer in said region and to expose the subepithelial layer beneath said raised portions;
c. allowing the exposed subepithelial skin layers to heal, whereby the region of skin has reduced skin surface irregularities.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,012,798
### ORTHESIS FOR THE TRIDIMENSIONAL REDUCTION OF SCOLIOSES

**Henry Graf, 8, rue Duquesne, 69006 Lyon, and Gérard Dauny, 15, rue des Murgers, 21240 Savigny-les-Beaune, both of France**

**Filed Mar. 23, 1990, Ser. No. 498,104**
**Claims priority, application France, Mar. 23, 1989, 89 03833**
**Int. Cl.$^5$ A61F** *5/02*
**U.S. Cl. 128—78** **6 Claims**



1. An orthesis for the tridimentional reduction of scoliosis in a dynamic manner, which orthosis comprises:

firstly, two lateral hands (**1, 2**) of an elastically deformable plastic material, intended to enclose laterally the thorax of the patient, each hand with a front part arranged to the front of the thorax and a rear part arranged to the rear of the thorax, the front parts of these hands being attached by joining means (**3**) which prevent them from moving away from one another, while the rear parts are free to be displaced laterally relative to one another when they are stressed by the thorax during the respiratory cycle;

secondly, a pelvic girdle (**7**) intended to be made secure to the pelvis of the patient;

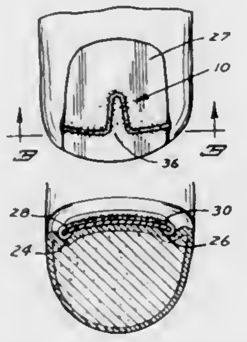
finally, at least two lateral supports (**9**) of an elastically deformable semi-rigid material, which connect respectively in the vertical direction one of said hands (**1, 2**) and the corresponding part of the pelvic girdle (**7**), for exerting a torsional return stress on the rear parts of the hands (**1, 2**) when the latter move away from one another in the phase of inspiration of the thorax of the patient.

---

### 5,012,799
### INGROWN CORRECTING TOE NAIL APPLIANCE

**Werner G. Remmen, 6957 Hwy. 10 NW., Anoka, Minn. 55303**

**Filed Jun. 4, 1990, Ser. No. 533,110**
**Int. Cl.$^5$ A61F** *5/11*
**U.S. Cl. 128—81 A** **1 Claim**



1. An appliance correcting an ingrown toe nail, comprising a resilient member of narrow width comprising

a central inverted V-shaped span portion of said member forming a pointed tip,

said span portion having side members joined at one end thereof forming said tip,

an arm extending from the free end of each of said side members,

said arms being disposed laterally in opposed relation to one another defining a transverse curvature thereacross which is a lesser curvature than the transverse curvature of a toe nail to which said appliance is applied,

a downwardly reversely curved tip portion forming a hook at the end of each of said arms,

said reversely curved tip portions being pressed downwardly to receive the corners of said toe nail causing the tip of said inverted V-shaped span portion to engage the surface of said toe nail leveraging said arms to develop a torque on the longitudinal axes of said side members, and

said torque urging said hooks upwardly elevating the corners of said toe nail sufficiently to cause said toe nail to grow out in a naturally correct position.

---

### 5,012,800
### MECHANICAL-METALLURGIC PROCESS FOR REPAIRING MACHINES OR MACHINE COMPONENTS DAMAGED BY CRACKS, FISSURES, WEARINGS OR SQUASHES MADE OF METALLIC MATERIAL DIFFICULT TO WELD AND OF ANY FORMS

**José F. Lopes, Rua Padre José Achoteguin, 37, Sao Paulo-SP, Brazil**

**Filed Nov. 9, 1989, Ser. No. 434,923**
**Int. Cl.$^5$ B23K** *31/02*
**U.S. Cl. 228—119** **1 Claim**

1. A mechanical-metallurgic process for repairing machine components damaged by cracks, fissures, wearings or dents, made of metallic material, the steps comprising:

initially cleaning chemically or mechanically a surface of a component to be repaired revealing all existing difficulties;

non-destructive testing and sampling defining difficulties and analyzing characteristics of the components base material;

selecting a welding rod or addition material that is appropriate to the base material;

superficially removing surface damage zones, and providing cracks or fissures with chamfers produced mechanically or by carbon are

defining reference points for a dimensional control during a welding process, for dimensionally monitoring said component, said reference points are determined according to characteristics of a biggest opening to be repaired and main axles of the component, said reference points being created by welding, in the component, of pins in extremities of reference measures;

hypothetically dividing the component into zones with similar masses, as symmetrically as possible, wherein for each zone, a center of mass is determined as accurately as possible;

applying thermocouples in the center of each zone for effective control of temperature variation during the whole process;

final isostatic positioning of the element preferentially, or, as a second option, hyperstestic positioning of wherein the element;

applying normal electric resistance for heating for the welding process on zones to be heated, wherein the resistance amount is distributed on the surface of each zone depending on its thermic inertia, the electric resistance being insulated with pieces of ceramic;

applying thermic insulating covering the area of repair difficulties, belting the insulation for fixation, the pins for the reference points being long enough to show up in the insulating layer;

applying heat up to a temperature of 300 C.°, wherein the heating rate in all the zone does not exceed 150 C.°/h;

applying heat treatment for stress relief thereby eliminating or minimizing pre-welding stresses;

applying welding through said windows to an area to be repaired;

dimensionally controlling the component by said reference pins, monitored by a system of micrometric screws, or comparative gauges, and the thermically controlling the zones by compatible thermocouples and pyrometric systems, wherein when the component is highly complex, with many points for a dimensional and/or thermic control, a computerized control system is used;

said welding being in the following sequence: opening of the insulation by a corresponding window, welding, cleaning, closing of the window, thermic equilibrium and dimensional conference, repeating this procedure as many times as necessary until the welding is performed within the specified dimensions;

after the welding is finished, maintaining the temperature level long enough to relieve the welding stresses, and cooling at a controlled rate to a temperature of 80 C.°; and

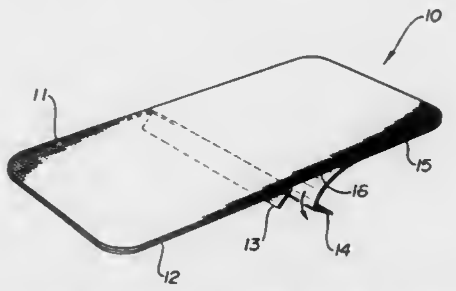
at an environmental temperature, performing dimensional tests and non-destructive tests, and repeating the above process if necessary.

---

### 5,012,801
### LOW FRICTION FILM DRESSING

**Ronald M. Feret, Hamilton Square, N.J., assignor to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.**

**Filed Jul. 19, 1989, Ser. No. 382,526**
**Int. Cl.$^5$ A61F** *13/00, 15/00*
**U.S. Cl. 128—155** **14 Claims**



1. A thin film, self-adhesive dressing for the prevention and treatment of skin friction blisters comprising an embossed elastomeric film coated on one surface with a pressure-sensitive adhesive, said film having a thickness of from about 0.5 to 10 mils, a moisture vapor transmission rate of more than about 100 g/M$^2$/day, and a coefficient of friction on the adhesive free surface of less than about 1.0, said film being embossed to provide a plurality of raised bosses defined by intersecting channels on a first side of said film with a plurality of corresponding depressions defined by raised intersecting ridges on the other side of said film, said first side being coated with said pressure-sensitive adhesive.

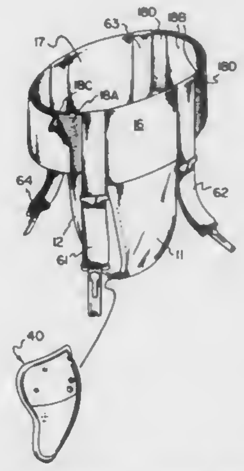
---

### 5,012,802
### ATHLETIC PROTECTOR

**Linda L. Bischoff, Box 174, Celista, B.C., Canada U0E 1L0**

**Filed Dec. 27, 1989, Ser. No. 457,880**
**Int. Cl.$^5$ A61F** *5/40*
**U.S. Cl. 128—158** **8 Claims**

6. A jock strap having a front panel, a pouch on said front panel with an open edge for removably receiving therein a rigid protective cup and a rigid protective cup removably insertable into said pouch, said protective cup having an upper portion and a lower, rearwardly curved portion and wherein said lower portion is adjustably secured to said upper portion



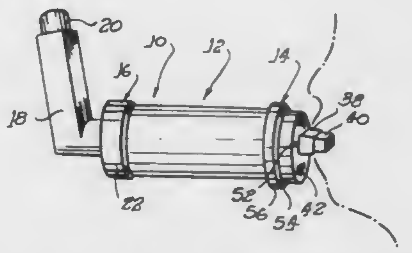
to selectively vary the degree of arcuate curvature of said lower portion relative to said upper portion.

---

### 5,012,803
### MODULAR MEDICATION INHALER

**Martin P. Foley, London, Canada, and Exequiel D. Cruz, Arlington Heights, Ill., assignors to Trudell Medical, London, Canada**

**Filed Mar. 6, 1989, Ser. No. 319,282**
**Int. Cl.$^5$ A61M** *11/00*
**U.S. Cl. 128—200.23** **11 Claims**



1. A modular medication inhaler comprising a cylindrical body having an axis of rotation and having an upstream entering end and a downstream exit end and open at both ends, an integral inwardly directed peripheral flange at the exit end transverse of said axis of rotation, said flange having an outer surface a fitting on the entering end adapted to receive structure for applying misted medication into said cylindrical body, a flexible diaphragm at said exit end and having a slit therein, said diaphragm flexing and opening said slit upon inhalation for passing air and medication, and a fitting at the exit end of said cylindrical body and secured to said body, said exit end fitting having

an outer cylindrical flange snugly encircling said cylindrical body on the exterior of said body, an inwardly directed flange transverse of said axis, and arcuate protruberance means on said inwardly directed fitting flange engaging said diaphragm adjacent the periphery thereof and inwardly of said cylindrical body and clamping said diaphragm against the outer surface of said inwardly directed peripheral flange, and further including retaining means on said cylindrical body, comprising means providing a plurality of apertures arcuately spaced in said cylindrical body and said exit end integral inwardly directed flange and defining retaining edges on said flange, and a plurality of inwardly directed teeth on said exit end fitting cylindrical flange snapped over said retaining means and securing said exit end fitting on said cylindrical body.

VOL
1126
ISS
1
MY
7
1991
UMI

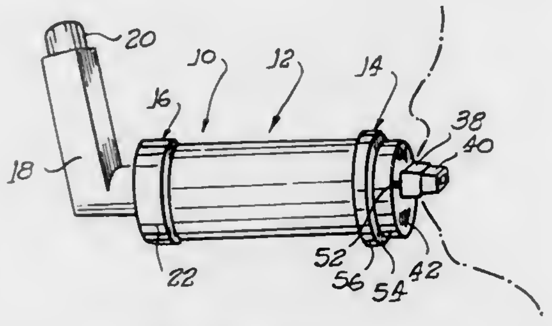
### 5,012,804
### MEDICATION INHALER WITH ADULT MASK

**Martin P. Foley, London, Canada, and Exequiel D. Cruz, Arlington Heights, Ill., assignors to Trudell Medical, London, Canada**

**Division of Ser. No. 319,282, Mar. 6, 1989. This application May 23, 1990, Ser. No. 527,287**

**Int. Cl.$^5$ A61M** *11/00*

**U.S. Cl. 128—200.23** **4 Claims**



4. A mask for use with a medication inhaler and made of generally flexible material permitting adaptation thereof to the face of a patient, said mask having a substantially cylindrical portion adapted for mounting to a medication inhaler, and including further a frustoconical portion extending from said cylindrical portion to an integral flexible open outer edge to engage the face of a patient, said frustoconical portion including an outward protrusion of relatively narrow width and extending throughout the length of the frustoconical portion and of substantially thinner material rendering the protrusion more flexible, said protrusion accommodating a patient's nose and adapted for squeezing of a patient's nose therethrough to insure patient inhalation through the mouth.

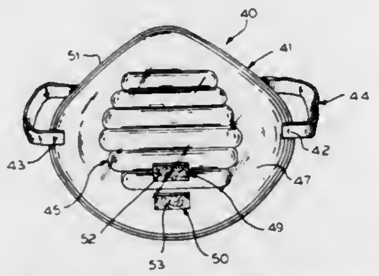
### 5,012,805
### SURGICAL MASK BARRIER APPARATUS

**Myron C. Muckerheide, 1018 Noridge Dr., Port Washington, Wis. 53074**

**Filed Jun. 9, 1988, Ser. No. 204,545**

**Int. Cl.$^5$ A62B** *7/10*

**U.S. Cl. 128—205.28** **17 Claims**



1. A surgical mask barrier apparatus for preventing infectious hazardous material such as HIV infected blood, and other contaminated body fluids from penetrating through a cup-shaped conventional surgical respiratory mask wherein said surgical mask barrier apparatus cooperates with said conventional surgical respiratory mask of the type worn by medical personnel during surgical procedures, said apparatus shielding the underlying conventional surgical mask, and in turn, the wearer from contact with infectious hazardous material which typically splatter onto a conventional surgical respiratory mask during invasive surgical procedures and which would otherwise soak through said conventional surgical respiratory mask thereby infecting the wearer with any virus, bacteria or carcinogen carried by said contaminated body fluids, said surgical mask barrier apparatus comprising:

separate, substantially non-porous shielding means that abuts but is not affixed to said conventional surgical respiratory mask and having an internal side and an external side opposite to said internal side,

said internal side of said substantially non-porous shielding means juxtaposed to said conventional surgical respiratory mask, wherein said external side of said substantially non-porous shielding means is positioned in exposed relationship to the source of said infectious hazardous materials,

said substantially non-porous shielding means having substantially the same pre-formed cup-shape and contour as said conventional surgical respiratory mask so as to facilitate the juxtaposition of said conventional surgical respiratory mask with said substantially non-porous shielding means,

said substantially non-porous shielding means further having an overall surface dimension greater than that of said conventional surgical respiratory mask so as to completely enshroud said conventional surgical respiratory mask when said non-porous shielding means is positioned juxtaposed thereto;

spacing means operably associated with said substantially non-porous shielding means for providing air passages between said conventional surgical respiratory mask and said internal side of said substantially non-porous shielding means when juxtaposed thereto, towards allowing the entry of oxygen and the exit of carbon dioxide during normal breathing of the wearer;

carbon dioxide absorption means operably positioned between said internal side of said substantially non-porous shielding means and said conventional surgical respiratory mask, said carbon dioxide absorption means serving to absorb accumulated carbon dioxide;

positioning means operably associated with said substantially non-porous shielding means for retaining said substantially non-porous shielding means in juxtaposed orientation to said conventional surgical respiratory mask, said substantially non-porous shielding means thereby cooperating with said conventional surgical respiratory mask, to, in turn, prevent said infectious hazardous materials from contacting and soaking through said conventional surgical respiratory mask to, in turn, protect said wearer from said infectious hazardous materials.

### 5,012,806
### IMPLANTATIONS FOR CARDIAC STIMULATION BY PACEMAKER

**Ferruccio De Bellis, Viale Pola,23, 00198 Rome, Italy**

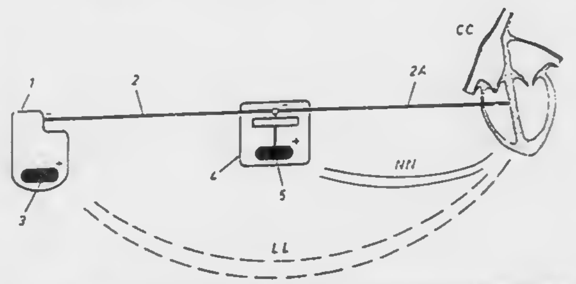
**PCT No. PCT/IT87/00096, § 371 Date Jul. 8, 1988, § 102(e) Date Jul. 8, 1988, PCT Pub. No. WO88/03423, PCT Pub. Date May 19, 1988**

**PCT Filed Nov. 11, 1987, Ser. No. 243,782**

**Claims priority, application Italy, Nov. 11, 1986, 48642 A/86**

**Int. Cl.$^5$ A61N** *1/00*

**U.S. Cl. 128—419 P** **5 Claims**



1. A cardiac stimulation implantation through a pacemaker adapted for implantation within a patient's body including an electrode adapted to be connected to the patient's heart, equipped with a radio-frequency receiver for alternative stimulation by a pacemaker located external to the patient's body and a radio-frequency transmitter, wherein the radio-frequency receiver is clamped on said electrode, characterized in that said electrode is a two-lead bipolar electrode at least in the length between said radio receiver and the patient's heart, and the outgoing and return current paths for stimulating signals produced by the radio-frequency receiver are through the bipolar electrode, and not through the patient's tissue, such that the radio-frequency receiver requires no contact plate for connection to the patient's tissue.

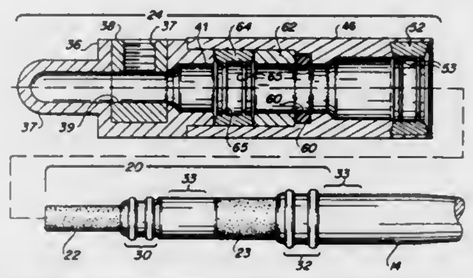
### 5,012,807
### MULTI-PART MOLDED PACEMAKER CONNECTOR AND METHOD OF MAKING SAME

**William H. Stutz, Jr., Burbank, Calif., assignor to Siemens-Pacesetter, Inc., Sylmar, Calif.**

**Filed May 3, 1990, Ser. No. 518,618**

**Int. Cl.$^5$ A61N** *1/375*

**U.S. Cl. 128—419 P** **20 Claims**



1. A multi-part pacemaker connector comprising:

a molded body tip including a connector block and first conductive means for making electrical contact with said connector block, said connector block and at least a portion of said first conductive means being molded into said body tip so as to form an integral part thereof;

a molded body ring including second conductive means, said second conductive means having a hook at one end thereof that defines an exposed precision diameter within said body ring, said hook end of said second conductive means being molded into said body ring so as to form an integral part thereof;

a garter spring sized to slide into said molded body ring, said garter spring comprising an electrically conductive material;

means for maintaining said garter spring in physical contact with the exposed diameter of the hook end of said second conductive means, whereby said garter spring makes electrical contact with said second conductive means; and

means for joining said molded body tip to said molded body ring so as to form said multi-part pacemaker connector;

whereby first and second spaced apart proximal electrodes of a pacemaker lead may be inserted into said pacemaker connector and make respective electrical contact with said block electrode and said garter spring;

whereby electrical contact may be made with said first and second proximal electrodes of said pacing lead via said first and second conductive means, respectively.

### 5,012,808
### PULSE GENERATION, PARAMETER DETERMINATION, AND MODIFICATION SYSTEM

**Ron Stubbers; Chen Chen; Malcolm Skolnick; Chris Hymel; Staw B. Ostrum, all of Houston, Tex., assignors to Zion Educational Foundation, London, England**

**Continuation-in-part of Ser. No. 95,009, Sep. 8, 1987, Pat. No. 4,779,044. This application Oct. 17, 1988, Ser. No. 258,785**

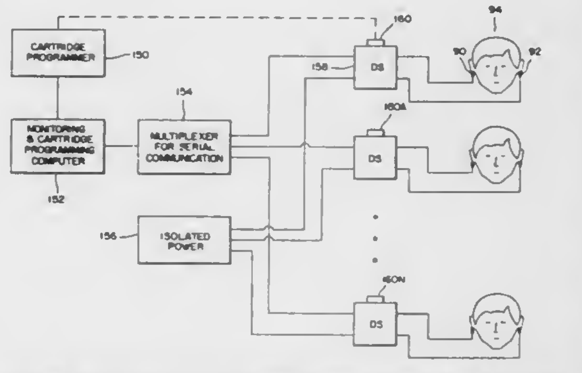
**Int. Cl.$^5$ A61N** *1/00*

**U.S. Cl. 128—419 R** **36 Claims**

1. The method of electrical pulse generation, parameter determination, and modification which comprises

generating a train of repetitive, substantially identical electrical pulses, each pulse having a predetermined on-set time, pulse structure comprising positive and negative amplitudes, and duration, wherein the parameters determining said pulse on-set time, structure and duration can be changed to accommodate alteration of pulses for application under different conditions,

averaging a selected one of the positive and negative amplitudes of a first pulse in said train over the predetermined duration thereof and producing a first fixed averaged pulse value,


CARTRIDGE PROGRAMMER
150
160
94
90
92
158
DS
154
160A
MONITORING & CARTRIDGE PROGRAMMING COMPUTER
MULTIPLEXER FOR SERIAL COMMUNICATION
DS
152
156
ISOLATED POWER
160N
DS

utilizing said first fixed averaged pulse value obtained from said averaging of said first pulse to modify a selected one of the positive and negative amplitudes of a second pulse, and

averaging said amplitude of said second pulse in said train over the predetermined duration thereof and producing a second fixed averaged pulse value.

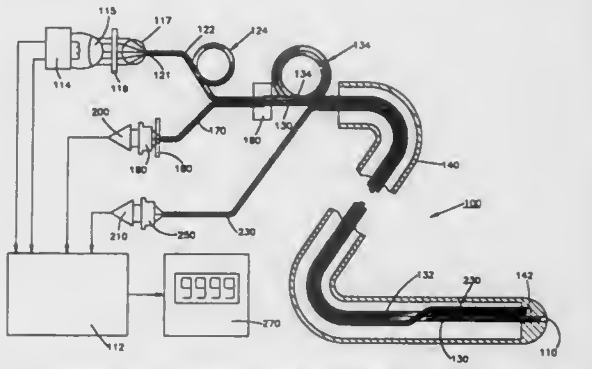
### 5,012,809
### FIBER OPTIC CATHETER SYSTEM WITH FLUOROMETRIC SENSOR AND INTEGRAL FLEXURE COMPENSATION

**John E. Shulze, 1450 Corte de Prima Vera, Thousand Oaks, Calif. 91360**

**Filed Oct. 10, 1986, Ser. No. 917,399**

**Int. Cl.$^5$ A61B** *5/00*

**U.S. Cl. 128—634** **3 Claims**



1. A fluorometric sensor for measuring oxygen concentration in a body fluid comprising:

a means for emitting excited light in which at least one wavelength emitted is in the upper visible-long ultraviolet light spectrum;

an elongated fiber-optic equipped catheter having a distally positioned fluorometric sensor comprising a silicone copolymer matrix and a fluophor formed by dissolving into a silicone copolymer an amount of about 0.1% to 3% by weight of the fluophor selected from the group consisting of parylene dibutyrate, tris (4,7-diphenyl-1,10 phenanthroline) ruthenium II, tris (disulphonated 4,7-diphenyl-1,10 phenanthroline) ruthenium II, and tris (bipyridine) ruthenium II, in order for the fluophor to emit a fluorescent signal in response to the excited light transmitted from a

VOL
1126
ISS
1
MY
7
1991
UMI

proximal end of the catheter and the fluorescent signal having an intensity that is quenched by oxygen permeating from the body fluid into the silicone copolymer matrix, and wherein the silicone copolymer is selected from the group consisting of silicone polycarbonate copolymer and silicone polystyrene copolymer; and

means for measuring the intensity of the fluorescent signal from the fluorometric sensor transmitted back to the proximal end of the catheter and for correlating the intensity of the fluorescent signal to the oxygen concentration in the body fluid.

---

### 5,012,810

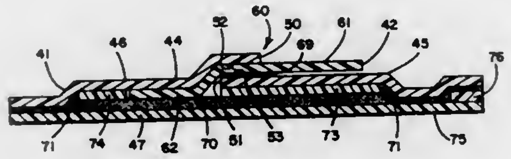
### BIOMEDICAL ELECTRODE CONSTRUCTION

**Jerome E. Strand, Hudson, Wis.; Lawrence W. Craighead, Mendota Heights, and Clarence A. Niven, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation of Ser. No. 247,707, Sep. 22, 1988, abandoned. This application Jun. 22, 1990, Ser. No. 542,637**

**Int. Cl.$^{5}$ A61B** *5/0402*

**U.S. Cl. 128—640** **31 Claims**



1. A biomedical electrode comprising:

(a) a flexible insulator construction having first and second opposite sides and including first and second sections of substantially non-conductive material, said sections each having an edge portion including a border portion;
  (i) each of said first and second sections defining a portion of said insulator construction first and second opposite sides; and
  (ii) said first and second sections being oriented to extend substantially coplanar with one another, with said edge portions oriented opposed to, and in overlapping relationship with, one another;

(b) a substantially flat, flexible, conductor member having a pad portion and a tab portion;
  (i) said conductor member being oriented in said electrode with said pad portion positioned on said first side of said insulator construction, and with said tab portion positioned on said second side of said insulator construction, and with a portion of said conductor member projecting between said first and second section edge portions.

---

### 5,012,811

### FETAL ELECTRODE PRODUCT WITH PROTECTIVE CAP

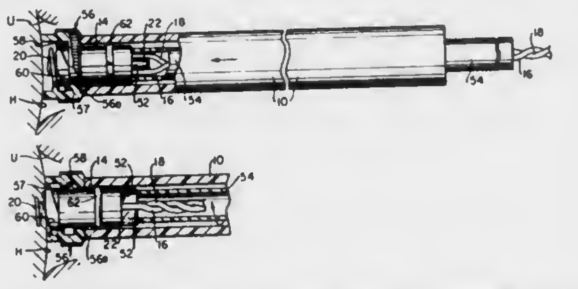
**Michael J. Malis, Trumbull, and Flave L. Jones, Guilford, both of Conn., assignors to American Home Products Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 154,639, Feb. 9, 1988, abandoned. This application Dec. 20, 1988, Ser. No. 287,269**

**Int. Cl.$^{5}$ A61B** *5/04*

**U.S. Cl. 128—642** **4 Claims**

1. A fetal electrode product, comprising a guide tube, an electrode assembly having a holder member with a forward end and a spiral electrode extending from said forward end, a flexible drive tube extending through said guide tube and adapted to engage said electrode assembly for rotating said spiral electrode, a protective cap enveloping said spiral electrode and extending forwardly from the electrode assembly beyond the pointed edge of the electrode so as to protect a user from inadvertent contact with the pointed electrode, said protective cap being displaceable so that the point of the electrode is automatically exposed when the electrode is rotated for attachment to the fetus, and retaining means for irremovably retaining said cap on said holder member during normal use of the electrode product, said cap having an inner surface and said holder member having an outer surface, said retaining means including threads on the inner surface of the cap which engage corresponding threads on the outer surface of said holder member whereby rotation of the holder member will cause displacement of the electrode assembly relative to said cap.



---

### 5,012,812

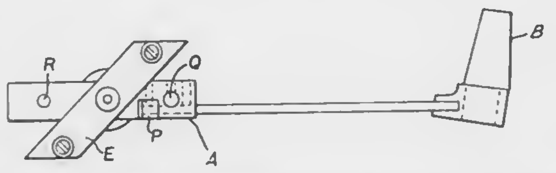
### APPLANATION TONOMETERS

**Henry J. Stockwell, Roydon, England, assignor to Clement Clarke International Limited, Harlow, England**

**Continuation of Ser. No. 333,682, Dec. 23, 1981, abandoned. This application Jul. 25, 1984, Ser. No. 633,685**

**Int. Cl.$^{5}$ A61B** *3/16*

**U.S. Cl. 128—652** **3 Claims**



1. An applanating tonometer having a body; an arm; and applanating member mounted on said arm; a spindle pivotally mounted with respect to said body, said arm being rotatably mounted on the spindle; two spiral springs; a manual adjustment knob rotatably mounted with respect to the body, said first spring being coupled at one end to said knob for being stressed upon rotation of said knob and being coupled at he other end to said spindle for urging said spindle to rotate when stressed by rotation of said knob and said second spiral spring being coupled at one end to said spindle for being stress when spindle is rotated and being coupled at the other end to said arm for urging said arm to rotate when stressed by rotation of said spindle; and indicator means coupled with said spindle for indicating the force applied to said arm through said springs, said springs extending in a direction for, when manual movement of said adjustment knob is effected, said first spring is stressed and thereby rotates said spindle, and said rotation of the spindle stressing said second spring and thereby rotating said arm about said spindle.

---

### 5,012,813

### RADIATION DETECTOR HAVING IMPROVED ACCURACY

**Francesco Pompei, Wellesley Hills, and Philip R. Gaudet, Jr., Concord, both of Mass., assignors to Exergen Corporation, Natick, Mass.**

**Continuation-in-part of Ser. No. 280,546, Dec. 6, 1988. This application Apr. 14, 1989, Ser. No. 338,968**

**Int. Cl.$^{5}$ A61B** *6/00*

**U.S. Cl. 128—664** **8 Claims**

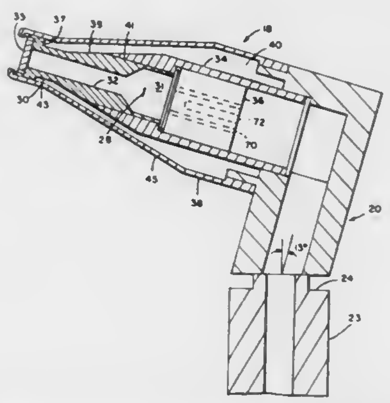
1. A radiation detector comprising:

a thermopile having a hot junction and a cold junction, the hot junction being mounted to view a target;

a temperature sensor for sensing the temperature of the cold junction;

an electronic circuit coupled to the thermopile and responsive to the voltage across the thermopile and a temperature sensed by the temperature sensor to determine the temperature of the target, the electronic circuit determining the temperature of the target as a function of the voltage across the thermopile and the temperature of the hot junction of the thermopile determined from the cold junction temperature and a thermopile coefficient; and

a display for displaying an indication of the temperature of the target determined by the electronic circuit.



---

### 5,012,814

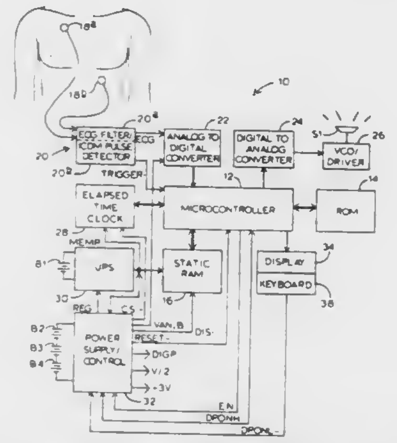
### IMPLANTABLE-DEFIBRILLATOR PULSE DETECTION-TRIGGERED ECG MONITORING METHOD AND APPARATUS

**Gary N. Mills, Gladstone, and Habib Homayoun, Aloha, both of Oreg., assignors to Instromedix, Inc., Hillsboro, Oreg.**

**Filed Nov. 9, 1989, Ser. No. 433,753**

**Int. Cl.$^{5}$ A61N** *1/37*

**U.S. Cl. 128—691** **12 Claims**



1. For non-invasive monitoring of a patient having an implanted defibrillator, an externally worn ambulatory heart monitoring apparatus comprising:

ECG data sampling and recording means, said sampling means for sampling the voltage across a region of the patient's skin and including at least a pair of electrodes for measuring the voltage across a region of the patient's skin and said recording means for producing an ECG data record representative thereof over a continuously advancing period of time of predetermined duration;

detection means including comparing means operatively connected with said electrode pair for detecting a defibrillation pulse produced by an implanted defibrillator, and for comparing the sampled voltage to predetermined criteria, said detection means produced a trigger signal upon the occurrence of such a pulse; and

means operatively connected with said sampling and recording means and responsive to said trigger signal of selectively capturing ECG data recorded near in time to the occurrence of said trigger signal.

---

### 5,012,815

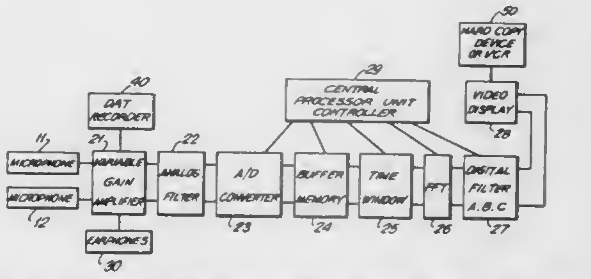
### DYNAMIC SPECTRAL PHONOCARDIOGRAPH

**William R. Bennett, Jr., New Haven, Conn., and Jean Bennett, Baltimore, Md., assignors to Yale University, New Haven, Conn.**

**Division of Ser. No. 306,137, Feb. 2, 1989, Pat. No. 4,967,760. This application Jun. 5, 1990, Ser. No. 533,544**

**Int. Cl.$^{5}$ A61B** *5/02*

**U.S. Cl. 128—715** **12 Claims**



1. A method of producing automated diagnosis of heart disease in a patient from irregular heart sound patterns at different portions of a heart cycle, comprising steps of:

a. producing a computer-based catalog of sets of first spectral expansion coefficients based on Fourier analysis of heart sounds from previous diagnosis of representative cases of irregular heart ground patterns;

b. producing a set of second spectral expansion coefficients based on Fourier analysis of heart sounds for a particular unknown example of irregular heart ground patterns;

c. performing generalized scalar products of the set of second spectral expansion coefficients with each of said sets of first expansion coefficients and for producing a heart disease identification signal based on a maximum value of the generalized scalar products.

---

### 5,012,816

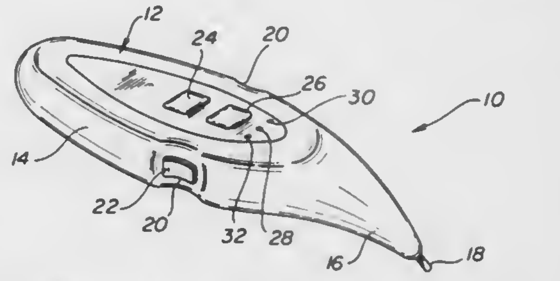
### ELECTRONIC ACUPUNCTURE DEVICE

**Gabor Lederer, 3 Opal Ct., Pomona, N.Y. 10970**

**Filed Aug. 31, 1989, Ser. No. 401,174**

**Int. Cl.$^{5}$ A61H** *39/02*

**U.S. Cl. 128—735** **12 Claims**



1. An electronic acupuncture device comprising:

a hand-holdable casing having a non-conducting outer surface and a conducting inner surface;

probe means for supplying current to the skin of a person, said probe means extending from said casing and being

VOL
1126
ISS
1
MY
7
1991
UMI

movable with respect to said casing in an axial direction of said probe means, said probe means being in sliding electrical contact with said inner surface of said casing;

biasing means for biasing said probe means out of said casing; and

current supply means for supplying current to said probe means through said conducting inner surface of said casing.

---

### 5,012,817

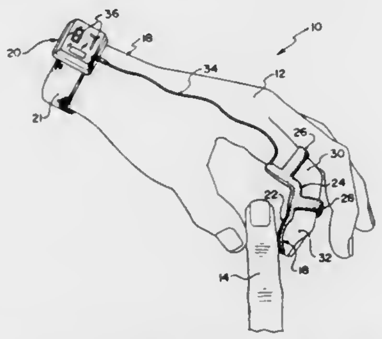
## DOLORIMETER APPARATUS

**Adam Zeilinski, and Christopher J. Atkins, both of Victoria, Canada, assignors to University of Victoria, Victoria, Canada**

**Filed May 19, 1989, Ser. No. 354,370**

**Int. Cl.$^5$ A61B** *5/22*

**U.S. Cl. 128—744** **19 Claims**



1. A dolorimeter apparatus comprising:

a member having an electrical property which varies according to pressure applied to the member, means for securing the member to a hand of the user so said member fits under a finger tip of the user, the member comprising a pressure sensitive flexible film dimensioned to fit between the finger tip and body tissue to be touched by the user, the member being sufficiently thin and flexible to permit substantial tactile communication between said finger and the body tissue to enable the user to monitor manually the application and location of force applied to the body tissue, and means connected to the member for quantifying the variance in said property outputted from said member.

---

### 5,012,818

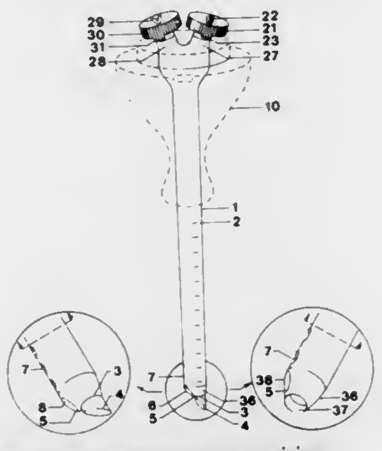
## TWO IN ONE BONE MARROW SURGICAL NEEDLE

**Suresh K. Joisby, P.O. Box 641, Abha, Saudi Arabia**

**Filed May 4, 1989, Ser. No. 347,239**

**Int. Cl.$^5$ A61B** *10/00*

**U.S. Cl. 128—754** **14 Claims**



1. A needle biopsy instrument, comprising:

an elongate rigid hollow needle having proximal and distal ends, said needle having an aspiration lumen and a biopsy lumen extending along the length of said needle, said aspiration lumen and said biopsy lumen each having openings at said proximal and distal ends;

a first stylet slidably received within said biopsy lumen and extending from said proximal end to said distal end of said needle; and

a second stylet slidably received within said aspiration lumen and extending from said proximal end to said distal end of said needle;

one of said first and second stylets having an end extending from the distal end of said needle and having a sharp cutting edge adapted to pierce a body bone for bone marrow biopsy such that when said stylet having a sharp cutting edge is withdrawn after piercing a body bone and said needle is further advanced a slice of marrow extends within said needle.

---

### 5,012,819

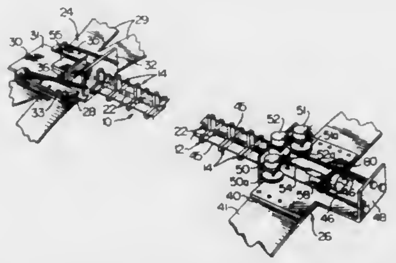
## APPARATUS FOR MONITORING THE MOTION COMPONENTS OF THE SPINE

**William S. Marras, 225 Beach Trail Court, Powell, Ohio 43065; Shelby W. Davis, Amlin; Robert J. Miller, Westerville; Gary A. Mirka, Brecksville, all of Ohio**

**Continuation of Ser. No. 336,896, Apr. 12, 1989, abandoned. This application Jul. 11, 1990, Ser. No. 551,649**

**Int. Cl.$^5$ A61B** *5/11*

**U.S. Cl. 128—781** **16 Claims**



1. An apparatus adapted to be mounted on the back of a patient for monitoring the motion components of the spine during movement of the patient, and comprising

an elongate exoskeleton comprising a plurality of generally flat elements disposed in a longitudinally spaced apart arrangement, a spacer means disposed between each adjacent pair of elements for maintaining the separation thereof and with said spacer means being longitudinally aligned and defining a central longitudinal axis, and a plurality of openings extending longitudinally through each of said elements, with each of said openings of each element being spaced from said central longitudinal axis and being longitudinally aligned with a corresponding opening of the remaining elements,

support means adapted for supporting said exoskeleton on the back of a patient and so that the exoskeleton can be generally aligned along the spine, said support means comprising a top plate, strap means for releasably securing said top plate on the upper back of the patient, a base plate, belt means for releasably securing said base plate on the lower back of the patient,

wire means for extending longitudinally through each of the aligned openings of said elements, with each of said wire means being resiliently extensible in length, and with the opposite ends of each wire means being respectively attached to said top plate and said base plate, and such that flexing movement of the exoskeleton caused by the movement of the patient causes each of said wire means to selectively change in length, and

movement signaling means mounted to said support means for detecting longitudinal movement of each of said wire means caused by changes in length thereof, and for providing an output signal representative of such movement.

---

### 5,012,820

## DEVICE FOR INVESTIGATION OF MUSCULAR CONTRACTION

**Niels Meyer, Adalbertstrasse 7a, 6000 Frankfurt am Main, Fed. Rep. of Germany**

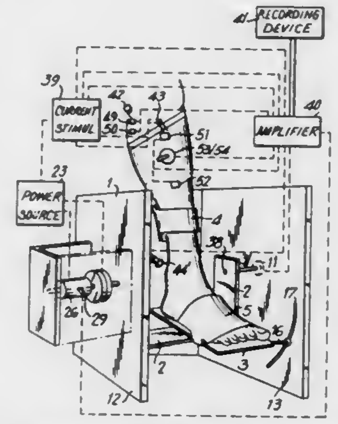
**PCT No. PCT/DE86/00504, § 371 Date Aug. 11, 1987, § 102(e) Date Aug. 11, 1987, PCT Pub. No. WO87/03466, PCT Pub. Date Jun. 18, 1987**

**PCT Filed Dec. 10, 1986, Ser. No. 113,280**

**Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3543763**

**Int. Cl.$^5$ A61B** *5/10*

**U.S. Cl. 128—782** **29 Claims**



1. A device for determining a change in mechanical magnitudes during muscular contraction and for correlating with a change in electrical magnitudes of nerve and muscle during muscular contraction in a body part having a joint with an axis of rotation, comprising:

a housing and within the housing, a member for supporting the body part;

two axles extending outward from said member and being supported for rotation in said housing so as to align horizontally with the axis of rotation of the joint;

means for exciting the muscle so that the muscle becomes contracted during a period of muscle contraction and thereby moves the body part rotatably about the axis of rotation of the axle joint to effect rotating movement, whereby said axles (7, 8) rotate in response to the rotating movement of the body part;

counterforce means coupled to one of said axles for providing a counterforce against the force of the muscle during the period of muscle contraction as caused by said exciting means; and

measuring means for measuring muscular contraction and transmitting measured values indicative of said muscular contraction including potentiometer means attached to the other axle to measure angular positions of said axle in relation to the rotating movement of the body part during said period of muscle contraction; means for measuring a total nerve potential and conductive speed of the nerve including a first pair of electrodes (**49, 50**) attachable to the body part above a nerve of the contracted muscle; means for measuring electric potential fluctuations and including a second pair of electrodes (**51, 52**) attachable to the body part above the contracted muscle; means for measuring muscular vibration and including a stethoscope head (**3**) and microphone (**54**) coupled to the stethoscope head (**3**), said stethoscope head (**3**) being attachable to the body part above the contracted muscle; and means for simultaneously recording measured values delivered by said potentiometer means, said first and second pairs of electrodes and said microphone.

---

### 5,012,821

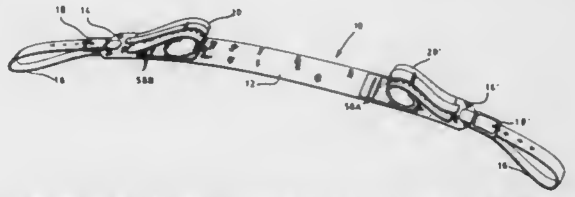
## MEDICAL RESTRAINT APPARATUS

**Charles W. Tarver, 4058 Sequoyah Ave., Knoxville, Tenn. 37919**

**Continuation-in-part of Ser. No. 193,668, May 23, 1988, abandoned. This application May 8, 1989, Ser. No. 348,768**

**Int. Cl.$^5$ A61F** *5/37*

**U.S. Cl. 128—876** **13 Claims**



1. A medical restraint apparatus for the limbs of a patient, said apparatus comprising:

a web strap having first and second opposite ends which can be secured to a bed frame and having forward and rearward surfaces, said web strap defining at least a pair of cuff securing openings;

a pair of cuffs for receiving and restraining said limbs and for being releasably mounted on said forward surface of said web strap at spaced locations, each of said cuffs including closure means for releasable securing said cuffs to said limbs of said patient; and

securing means for releasably securing said cuffs on said web strap whereby said cuffs can be selectively removed from said web strap for repair or replacement, said securing means including at least one staple carried by each said cuff, each said staple being substantially u-shaped and having a pair of spaced apart end portions secured to said cuff whereby said staple extends outwardly from said cuff and defines a locking aperture, each said staple being proportioned to be received through one said opening of said web strap and to extend beyond said rearward surface of said web strap, said securing means further comprising at least a pair of closure straps secured to said rearward surface of said web strap, one said closure strap being operatively associated with each said cuff, each said closure strap having a first free end portion for being slidably received through said securing aperture of said staple as said staple is received through said web strap.

---

### 5,012,822

## METHOD FOR CONTROLLING URINARY INCONTINENCE

**Gerald R. Schwarz, 3710 SW. Scholls Ferry Rd., Portland, Oreg. 97221**

**Division of Ser. No. 256,650, Oct. 11, 1988, Pat. No. 4,969,474. This application Sep. 10, 1990, Ser. No. 580,198**

**Int. Cl.$^5$ A61F** *5/48, 2/02, 2/04*

**U.S. Cl. 128—885** **10 Claims**

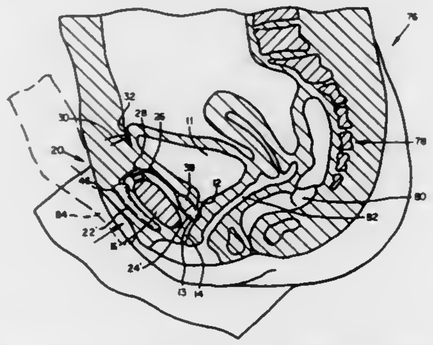
1. A method for controlling urinary incontinence in a patient having a bladder and a urethra, the method comprising:

implanting an inflatable compression balloon intrapelvically about the pelvic diaphragm adjacent an anterior side of the urethra;

VOL
1126
ISS
1
MY
7
1991
UMI

inflating said compression balloon thereby urging said balloon against a lengthwise portion of the urethra and/or bladder neck along said anterior side to occlude the urethra; and

deflating the compression balloon to permit voiding.



---

### 5,012,823

### TOBACCO PROCESSING

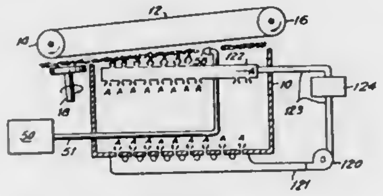
**Gus D. Keritsis; Jose G. Nepomuceno; Douglas E. Albertson, and Lewis A. Haws, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.**

**Continuation-in-part of Ser. No. 901,447, Aug. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 637,259, Aug. 3, 1984, Pat. No. 4,619,276. This application Sep. 2, 1987, Ser. No. 92,124**

**The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.**

**Int. Cl.$^5$ A24C** *5/00, 5/14, 5/18*

**U.S. Cl. 131—31** **10 Claims**



1. Apparatus for manufacturing cigarettes, said apparatus comprising:

a cigarette maker having means for providing a moving stream of tobacco, said maker including an inlet chimney for receiving cut tobacco filler, an ecreteur section, and a garniture, movable garniture tape and short tongue for forming said filler into a cigarette rod;

means for producing a liquid additive foam;

means for applying said liquid additive foam to said moving stream of tobacco; and

means for drying and setting said applied liquid additive foam.

---

### 5,012,824

### CUTTING MACHINES

**Eric T. Ray, Salisbury, England, assignor to GBE International PLC, Hampshire, England**

**PCT No. PCT/GB89/00597, § 371 Date Mar. 23, 1990, § 102(e) Date Mar. 23, 1990, PCT Pub. No. WO89/11803, PCT Pub. Date Dec. 14, 1989**

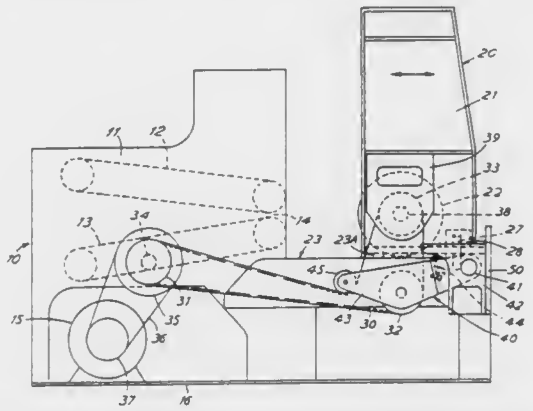
**PCT Filed May 31, 1989, Ser. No. 460,142**

**Claims priority, application United Kingdom, Jun. 3, 1988, 8813195**

**Int. Cl.$^5$ A24C** *5/39*

**U.S. Cl. 131—118** **14 Claims**

1. A rotary drum cutting machine for cutting or shredding lamina material such as tobacco leaf, comprising a support frame, means for compressing and feeding material to be cut, as a plug, to a mouth mounted on the support frame, a cutter carriage movably mounted on a track on the support frame, a cutter drum mounted for rotation on said cutter carriage, and drive means arranged to move the cutter carriage between an open inoperative position with the cutter drum away from the mouth to a closed operative position to cut or shred material as it issues from the mouth.



---

### 5,012,825

### APPARATUS FOR PERFORATING RUNNING WEBS OF WRAPPING MATERIAL AND CLEANING DEVICES THEREFOR

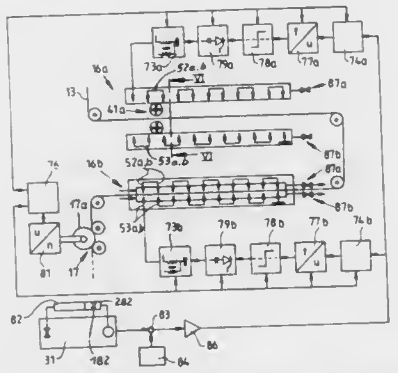
**Rolf Lindemann, Glinde, and Uwe Heitmann, Hamburg, both of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany**

**Filed Nov. 22, 1988, Ser. No. 275,121**

**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1987, 3742250**

**Int. Cl.$^5$ A24C** *5/00, 5/60*

**U.S. Cl. 131—281** **17 Claims**



1. Apparatus for electrically perforating a running web of wrapping material for smokers' products, comprising means for advancing a web in a predetermined direction along a predetermined path; a first perforating unit adjacent a first portion of said path; and a second perforating unit adjacent a second portion of said path downstream of said first portion, each of said units comprising first and second electrode holders disposed at opposite sides of said path and at least one row of perforating electrodes on each of said holders, said rows extending substantially in said predetermined direction and each electrode on each of said first holders being located opposite an electrode on the respective second holder, the distribution of electrodes in said first unit with reference to said path being substantially identical with the distribution of electrodes in said second unit with reference to said path so that one of said units can be operated to perforate the running web while the other of said units is idle without altering the perforating action upon the web.

### 5,012,826

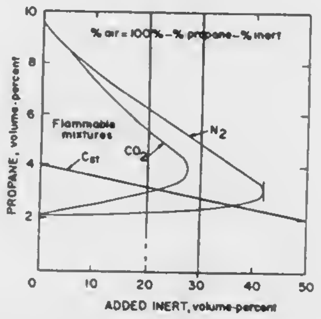
### METHOD OF EXPANDING TOBACCO

**Anatoly I. Kramer, Winston-Salem, N.C., assignor to R. I. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Filed Aug. 4, 1989, Ser. No. 389,388**

**Int. Cl.$^5$ A24B** *3/18*

**U.S. Cl. 131—291** **30 Claims**



1. A process for increasing the filling capacity of tobacco comprising the steps of:

contacting tobacco with a mixture of an inert, normally gaseous expansion agent having an atmospheric pressure boiling point in the range of from about −90° C. to about 2° C., and about 15–35 weight percent carbon dioxide at a pressure, above the critical pressure of said mixture and at a temperature in the range of from about the critical temperature of said mixture to about 65° C. above the critical temperature of the mixture, for a time of at least about 1 minute;

subsequently releasing the pressure to a substantially atmospheric level to thereby expand the tobacco and recovering the expanded tobacco.

---

### 5,012,827

### PROCESS FOR THE EXTRACTION OF ORGANIC COMPONENTS FROM SOLID MATERIALS

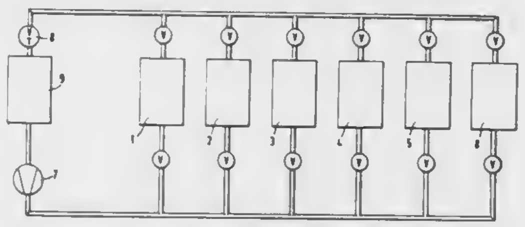
**Hans J. Beutler, Willich; Hans J. Gahrs, Dusseldorf; Ulrich Lenhard, and Franz Lurken, both of Krefeld, all of Fed. Rep. of Germany, assignors to Messer Griesheim GmbH, Fed. Rep. of Germany**

**Filed Feb. 26, 1988, Ser. No. 160,867**

**Claims priority, application Fed. Rep. of Germany, Feb. 28, 1987, 3706594**

**Int. Cl.$^5$ A24B** *15/24, 15/26*

**U.S. Cl. 131—297** **9 Claims**



1. In a process for the extraction of organic components from solid materials including the steps of flowing a gaseous solvent under high pressure through an extractor filled with solid material having organic components to be separated, charging the solvent with the organic components from the material, flowing the charged solvent to a separator where the organic components are separated from the solvent, repeating the steps of delivering the gaseous solvent back to the extractor and then to the separator for subsequent extraction and separation stages, the improvement being in that prior to the extraction stage wherein the solvent in charged with the organic components, the solid material in the extractor is soaked with a gaseous solvent under high pressure without gas circulation, and the gaseous solvent used in the extraction stage and for the soaking stage having the same components.

---

### 5,012,828

### TOBACCO SMOKE FILTER CONTAINING PARTICULATE ADDITIVE

**Ernest B. Hayes, 14 Heath Court, Leighton Buzzard LU7 7JR, Bedfordshire, and Paul F. Clarke, 39 Horsley Hill Road, South Shields, Tyne & Wear, both of England**

**Filed Sep. 29, 1989, Ser. No. 415,049**

**Claims priority, application United Kingdom, Oct. 5, 1988, 8823388**

**Int. Cl.$^5$ A24D** *3/00, 3/02, 3/04*

**U.S. Cl. 131—341** **12 Claims**

1. A method of forming a tobacco smoke filter which comprises: (a) providing tobacco smoke filtering material; (b) coating at least one thread or strip which is separate and distinct from said filtering material with a predetermined quantity of an insoluble solvent particulate additive; and (c) entraining and gathering said thread(s) or strip(s) into said filtering material.

---

### 5,012,829

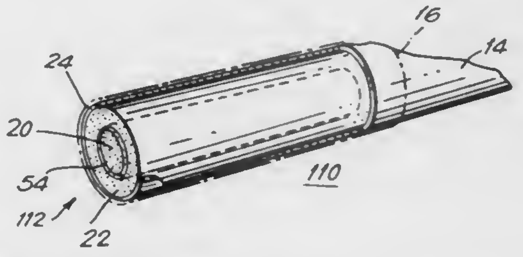
### FLAVORED CIGARETTE FILTERS, AND METHODS AND APPARATUS FOR MAKING SAME

**Richard A. Thesing, and Walter A. Nichols, both of Richmond, Va., assignors to Philip Morris Incorporated, Richmond, Va.**

**Continuation-in-part of Ser. No. 799,750, Nov. 19, 1985, Pat. No. 4,715,390. This application Dec. 28, 1987, Ser. No. 138,584**

**Int. Cl.$^5$ A24D** *3/04, 3/02*

**U.S. Cl. 131—344** **19 Claims**



19. A smoking article filter comprising:

a substantially cylindrical inner member of filter material having a first density;

a wrapping layer concentrically surrounding said inner member;

an outer member of filter material concentrically surrounding said wrapping layer and having a second density different from said first member;

a plugwrap concentrically surrounding said outer member; and

a flavorant associated with at least one of said inner and outer members.

---

### 5,012,830

### HAIRSTYLING METHOD AND DEVICE

**John C. Vaccaro, 210 Brookdale Rd., Mahopac, N.Y. 10541, and Paul D. Lupinacci, 219 Stone Ave., Yonkers, N.Y. 10701**

**Filed Dec. 7, 1989, Ser. No. 447,174**

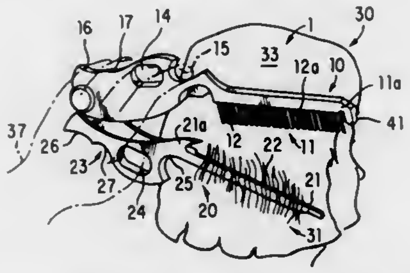
**Int. Cl.$^5$ A45D** *24/34*

**U.S. Cl. 132—213.1** **19 Claims**

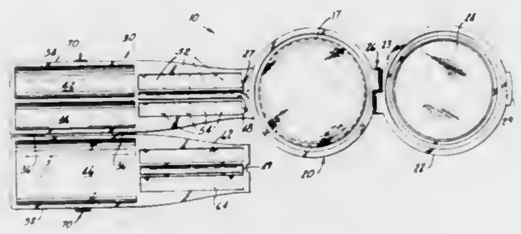
3. A hairstyling device, for use in conjunction with a hair cutting device, for rapid precision cutting of hair on a person's head, with the hairstyling device comprising means for sectioning a layer of hair, by lifting the layer of hair away from the hair; means for combing the sectioned layer of hair; and means for locking the sectioned hair at a selected cutting length for cutting by the hair cutting device, wherein the improvement comprises that the sectioning means, combing means and locking means are integrated, to be manipulable with one hand

VOL
1126
ISS
1
MY
7
1991
UMI

without position re-orientation of the hairstyling device in the hand during sectioning, combing and locking; and wherein the locking means locks the layer of hair in place with a substantially uniform pressure when the selected cutting length has been reached by the combing; wherein the sectioning means comprises a sectioning member comprised of an elongated bar member, having a free end, adapted to be inserted beneath a selected layer of hair and lifted away from the hair to effect the sectioning; and wherein the bar member is tapered to a smaller cross-sectional dimension, at the free end whereby the bar member can be utilized to section thin layers of hair.



## 5,012,831
## VANITY AND HAIR BRUSH COMBINATION
**Heriberto Canela, 8027 W. 14 Ave., Hialeah, Fla. 33014**
**Filed Jul. 25, 1989, Ser. No. 384,387**
**Int. Cl.$^5$ A45D** *40/18*
**U.S. Cl. 132—313** **6 Claims**



1. A hair brush device, comprising:

A. elongated handle means having two ends wherein said elongated handle means is hollow and comprises two substantially symmetrical longitudinal halves that are hingedly mounted with respect to each other and defining a plurality of cavities therein; and

B. powder compartment means mounted to one of said ends and said powder compartment means including a bottom surface and perpendicularly extending peripheral walls and further including bristles perpendicularly mounted to an outer surface of said bottom surface;

C. cover means hingedly and removably mounted to said powder compartment means and having an internal surface further including a mirror member mounted to said internal surface, a lid member removably secured above said bottom surface and snugly housed within said peripheral walls so that a compartment is defined therein for the storage of powder and said powder stored therein does not escape from said compartment when said cover means is removed by a user.

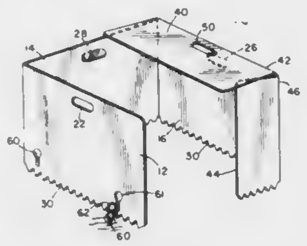
## 5,012,832
## WIND BLOCKING SCREEN
**J. Clark Turner, 1660-A Chalcedony, San Diego, Calif. 92109**
**Filed Jun. 29, 1989, Ser. No. 373,797**
**Int. Cl.$^5$ E04H** *15/00*
**U.S. Cl. 135—87** **10 Claims**

1. A wind blocking screen comprising:

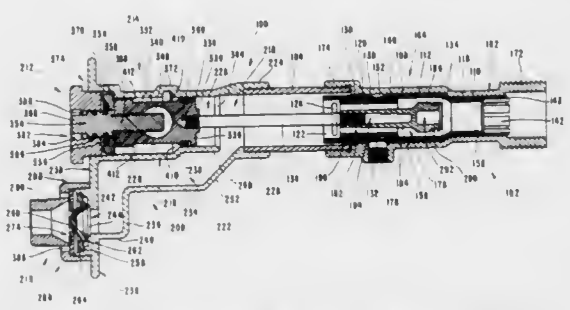
at least three panels of substantially rigid material joined together along integral fold lines to form a continuous row of side-by-side panels, the fold lines comprising means for allowing the panels to be folded flat against one another into a storage position or opened out at any desired angle to one another into an erect, wind blocking position;

the panels having spaced upper and lower edges, each of the lower edges having sharp pointed serrations along their length for cutting into earth or sand to anchor the screen in the ground, each panel having a handle opening adjacent the center of one of the edges positioned for alignment with the handle openings in the other two panels when the panels are folded into said storage position; and

an integral cut-out flap at the edge of the handle opening in one of the panels for pulling through the other two openings to secure the panels together when they are folded flat.



## 5,012,833
## FREEZE-PROOF HYDRANT
**Eugene C. Hunley, Jr., Rogers, and Terry H. Jozwiak, Witter, both of Ark., assignors to Amtrol Inc., West Warwick, R.I.**
**Division of Ser. No. 414,452, Sep. 29, 1989, Pat. No. 4,971,097.**
**This application Jun. 11, 1990, Ser. No. 535,479**
**Int. Cl.$^5$ F16K** *24/02, 11/07*
**U.S. Cl. 137—15** **11 Claims**



1. Process for replacing a cartridge in a housing of a freeze proof hydrant, comprising the steps of:

(a) urging a plunger within the cartridge against a roller pin lodged in the cartridge;

(b) deforming a first end of the cartridge away from a ridge in the housing;

(c) sliding the cartridge out of the housing;

(d) deforming the first end of a replacement cartridge;

(e) sliding the replacement cartridge into place within the housing; and

(f) expanding the first end of the replacement cartridge to capture the ridge in the housing.

## 5,012,834
## FLUID PRESSURE FLARE RELIEF VALVE
**Julian S. Taylor, 8300 S.W. 8th, Oklahoma City, Okla. 73128**
**Filed Sep. 10, 1990, Ser. No. 580,070**
**Int. Cl.$^5$ F16K** *17/14*
**U.S. Cl. 137—70** **6 Claims**

1. An in-line fluid pressure relief valve, comprising:

a valve body having a lateral opening and having axial inlet and outlet flow passageway forming end portions adapted to be interposed in a pipe line;

wall means including opposing spaced-apart walls interposed in the flow passageway and secured to the body outlet end portion for normally closing the downstream end portion of the flow passageway, each wall of said spaced-apart walls having an aperture coaxially aligned with a cooperating aperture in the opposite wall;

pistons means having a common piston rod projecting laterally of said body for normally closing the wall apertures;

collapsible pin means axially connected with the outward end of said piston rod for normally maintaining said pistons in wall aperture closed position;

valve head means for closing the valve body lateral opening and biasing said pistons in a pin collapsing direction for opening the wall apertures and flow passageway in response to upstream fluid pressure above a predetermined value.

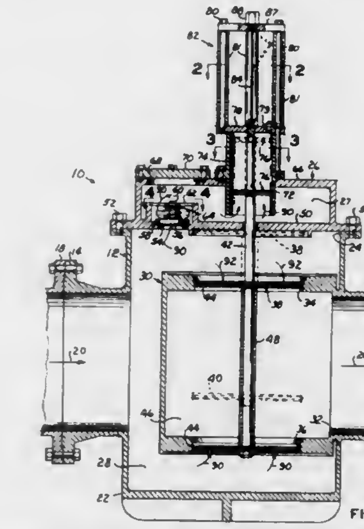
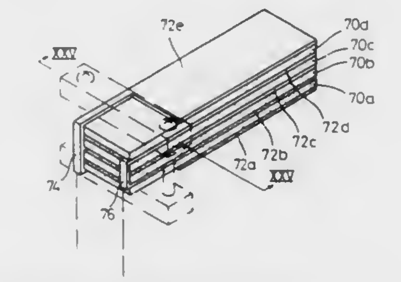


FIG. 1

## 5,012,835
## NOZZLE FLAPPER MECHANISM
**Motoshige Ikehata; Hiroyuki Mikami; Naoto Inayama, and Katsuhiko Odajima, all of Sohka, Japan, assignors to SMC Corporation, Tokyo, Japan**
**Division of Ser. No. 301,708, Jan. 26, 1989, Pat. No. 4,934,401.**
**This application Apr. 12, 1990, Ser. No. 507,879**
**Claims priority, application Japan, Nov. 17, 1988, 63-290950**
**Int. Cl.$^5$ G05D** *16/20*
**U.S. Cl. 137—82** **3 Claims**



1. A nozzle flapper mechanism comprising:

an electrostrictive device;

a plate member coupled to said electrostrictive device;

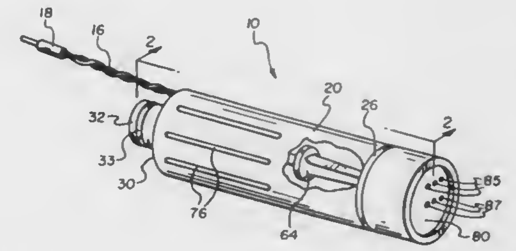
a nozzle having an orifice facing the plate member on said electrostrictive device; and

means for applying a voltage to said electrostrictive device to keep a nozzle back pressure constant or vary the nozzle back pressure;

said electrostrictive device comprising a plurality of piezoelectric ceramics members, and a plurality of thin-film electrodes disposed on faces and backs of said piezoelectric ceramics members;

wherein said electrodes have leads extending respectively therefrom, said leads also being disposed on the faces and backs of said piezoelectric ceramics members positioned to one side thereof, the lead from each of said electrodes being positioned on an opposite side of the electrostrictive device with respect to the lead from an adjacent one of said electrodes.

## 5,012,836
## SERVOVALVE APPARATUS FOR USE IN FLUID SYSTEMS
**Stephen C. Jacobsen; Edwin K. Iversen; David F. Knutti, and Clark C. Davis, all of Salt Lake City, Utah, assignors to Sarcos Group, Salt Lake City, Utah**
**Filed Jan. 31, 1990, Ser. No. 473,301**
**Int. Cl.$^5$ G05D** *16/20*
**U.S. Cl. 137—83** **12 Claims**



1. A servovalve apparatus for use in fluid systems, comprising

a hollow, substantially cylindrical casing made of a magnetic material and having a plurality of slots formed to extend generally parallel with the longitudinal axis of the casing,

an elongate, flexible valve element positioned within the cylindrical casing so as to be substantially coaxial with the longitudinal axis of the casing, the valve element having a fixed end and a free end and being made of a material having a thermal coefficient of expansion substantially the same as that of the material from which the casing is made,

a mandrel surrounding at least a portion of the valve element adjacent its fixed end,

an electrical conductor wound around the mandrel so as to form a conductive coil,

an armature affixed to the valve element near the free end thereof,

a first magnet and a second magnet positioned on substantially opposite sides of the valve element, the first magnet being positioned such that a north magnetic pole faces the armature and the second magnet being positioned such that a south magnetic pole faces the armature,

a receiving plate positioned adjacent the free end of the valve element, the receiving plate having at least one fluid channel formed therein, and

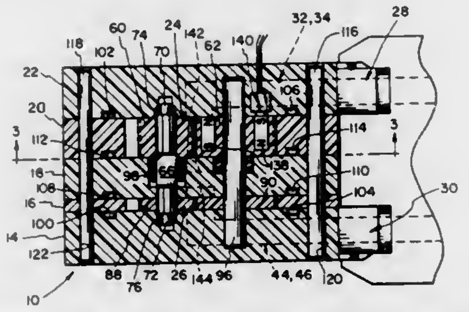
a porting element secured to the free end of the valve element for porting a fluid stream received by the porting element into the fluid channel.

## 5,012,837
## RATIO DEVICE FOR DISPENSING LIQUIDS
**Lawrence P. Zepp, Fort Wayne, Ind., assignor to Xolox Corporation, Fort Wayne, Ind.**
**Filed Oct. 10, 1990, Ser. No. 595,312**
**Int. Cl.$^5$ F04D** *23/00*
**U.S. Cl. 137—99** **8 Claims**

1. A ratio device for dispensing first and second liquids in a pre-selected ratio comprising a housing assembly having two pairs of inlets and outlets, a first pair of oval gears in said

VOL
1126
ISS
1
MY
7
1991
UMI

housing having meshing teeth, rotation of said gears operating to receive said first liquid through the inlet and to force it out of the outlet of the respective one of said two pairs of inlets and outlets, a second pair of oval gears in said housing having meshing teeth, rotation of said second gears operating to receive said second liquid through the inlet and to force it out of the outlet of the other of said two pairs of inlets and outlets, means interconnecting said first and second pairs of gears for concurrent rotation, and said gear pairs being of different displacement such that the volume of said first liquid dispensed from the outlet of said first pair is correspondingly different from the volume of said second liquid dispensed from the outlet of said second pair.

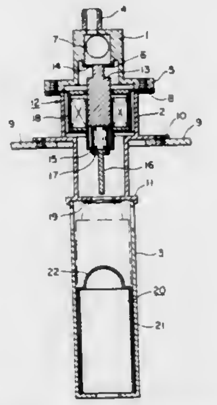


---

## 5,012,838
## SOLENOID VALVE INCORPORATING LIQUID SURFACE DETECTING VALVE

**Toshirou Kawase, Ibaraki; Shiro Saito, and Masanobu Miyake, both of Tokyo, all of Japan, assignors to Kyosan Denki Kabushiki Kaisha and Fuji Jukogyo Kabushiki Kaisha, both of Tokyo, Japan**

**Filed May 18, 1990, Ser. No. 525,762**
**Claims priority, application Japan, Jul. 14, 1989, 1-82225[U]**
**Int. Cl.$^5$ F02M** *33/08, 37/20;* **F16K** *31/06, 31/22*
**U.S. Cl. 137—202** **4 Claims**



1. An apparatus for discharging evaporate fuel emissions from a fuel tank, comprising:

a first hollow casing attached to the fuel tank;

a second hollow casing connected to a lower end of said first casing and extending downwardly into the interior of the fuel tank through an opening therein, means defining a valve opening which extends through said first and second casings for communicating the interior of said first casing with the interior of said second casing, a downwardly facing valve seat disposed in surrounding relationship to said valve opening, said second casing having a hole therein for communicating the interior of said second casing with the interior of fuel tank;

said first casing defining therein an exhaust passage for communicating said valve opening with a point located exteriorly of said first and second casings and the fuel tank;

a solenoid valve including magnet means supported in said first casing, and a plunger movably supported inside said magnet means for vertically reciprocal movement relative to said casings;

said plunger having closure means provided thereon for permitting closing of said exhaust passage in response to movement of said plunger to an operative position;

a freely floatable valve member disposed in said second casing for vertical floating movement relative thereto, said floatable valve member being vertically displaced by liquid fuel in said second casing to an elevation which corresponds to the level of liquid fuel in the fuel tank, said floatable valve member having a valve head which is adapted to seat upwardly against said downwardly facing valve seat and block said valve opening when said freely floating valve member reaches a predetermined elevation;

an elongated pin depending downwardly from said plunger and supported for movement therewith, said elongate pin being disposed in overlying relationship to said valve opening and being long enough to contact and displace the valve head downwardly away from the valve seat when said plunger is in a lower operative position and said exhaust passage is open for communication between said valve opening and said exteriorly located point;

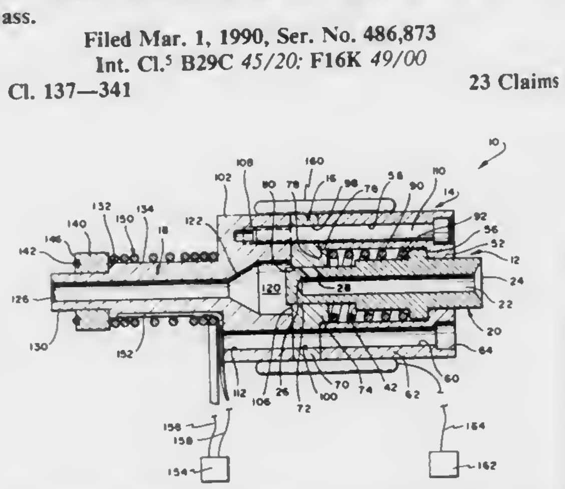
spring means coacting between said pin and said plunger for yieldably urging said pin downwardly relative to said plunger and permitting relative movement of said pin and said plunger toward each other, said spring means applying to said pin a downwardly directed resilient force which is greater than an adhesive force which, due to the viscosity of the liquid fuel, tends to adhere said valve head to said valve seat but less than an upwardly directed buoyant force associated with an upward displacement of said floatable valve member by the liquid fuel in the fuel tank, said downwardly spring-urged elongate pin being operable when said plunger moves to said lower operative position to forcibly downwardly remove said valve head from adherence to said valve seat, and said downwardly spring-urged elongated pin being upwardly yieldable when contacted by said valve head during upward floating movement of said floatable valve member to permit said valve head to seat upwardly against said valve seat and interrupt communication between the interiors of said first and second casings when the liquid fuel reaches a predetermined level.

---

## 5,012,839
## HEATED PLASTIC FLOW CONTROL VALVE

**David J. Rogers, Belchertown, and Martin J. Broga, Springfield, both of Mass., assignors to The Hanson Group Ltd., Ludlow, Mass.**

**Filed Mar. 1, 1990, Ser. No. 486,873**
**Int. Cl.$^5$ B29C** *45/20;* **F16K** *49/00*
**U.S. Cl. 137—341** **23 Claims**



1. A heated plastic flow control valve assembly useable to

control flow of molten plastic to and from a mold in a molding press, said valve assembly comprising:

a slide valve having a plastic flow passage, said slide valve being slidable between a closed position in which flow of plastic through said plastic flow passage is prevented and an open position in which flow of plastic through said plastic flow passage is allowed;

a plurality of plastic discharge orifices formed in said slide valve at a discharge end of said plastic flow passage;

a valve body which slidably supports said slidable slide valve for movement of said slide valve between said open and closed positions, said valve body having a central slide valve opening which closes off said plurality of plastic discharge orifices in said slide valve when said slide valve is in said closed position;

means for biasing said slide valve to said closed position;

a sprue core having an elongated sprue passage in plastic flow communication with said plurality of plastic discharge orifices in said slide valve when said slide valve is in said open position in said valve body and in plastic flow communication with a mold to direct a flow of plastic from said slide valve to a mold; and

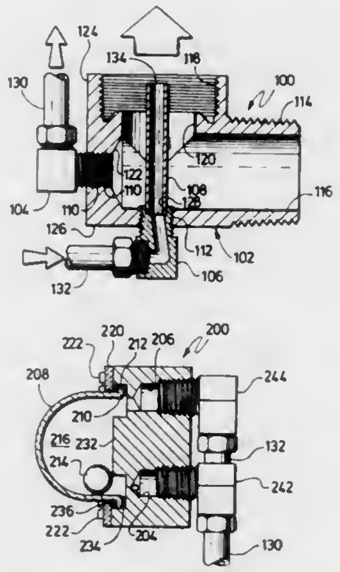
means to heat said valve assembly.

---

## 5,012,840
## FLUID FLOW INDICATOR SYSTEM

**Mark H. Betzler, McDaniel, Md., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed May 2, 1990, Ser. No. 521,058**
**Int. Cl.$^5$ F16K** *37/00*
**U.S. Cl. 137—559** **23 Claims**



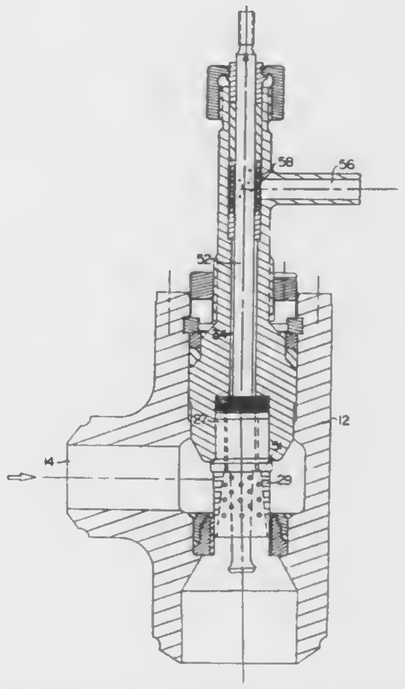
10. A fractional flow diverting element comprising a valveless right angle inverted flare elbow for angularly directing the flow of fluid, said elbow including a major inlet for receiving fluid from a fluid supply conduit, a surface opposite said major inlet for angularly directing the flow of fluid through said elbow, a major outlet for discharging the angularly directed fluid flow, a fractional output port for diverting a fraction of said fluid received by said major inlet at a first fluid pressure, and a fractional input port for returning fluid diverted by said fractional output into said angularly directed fluid flow in the area of said major outlet and at a second fluid pressure less than said first fluid pressure.

---

## 5,012,841
## PRESSURE REDUCING AND CONDITIONING VALVES

**Max Kueffer, Blue Bell, Pa., assignor to Keystone International Holdings Corp., Wilmington, Del.**

**Filed Aug. 24, 1989, Ser. No. 398,200**
**Int. Cl.$^5$ F16K** *11/07*
**U.S. Cl. 137—625.39** **6 Claims**



1. A conditioning valve for simultaneously reducing the pressure and temperature of incoming steam comprising:

a valve body divided into first and second chambers, said first chamber having an inlet port for introducing superheated steam under high pressure into said conditioning valve, said second chamber having an outlet port for expelling conditioned steam out of said conditioning valve;

an annular seat affixed to the interior of said valve body between said first and second chambers;

cylindrical valve means slidably matable with said annular seat and extending between said first and second chambers, said cylindrical valve means having a plurality of perforations over a portion of its body to permit the flow of steam between said first and second chambers when the cylindrical valve means is in a first position, said perforations being closed off from said flow of steam when said cylindrical valve means is in a second position, said cylindrical valve means having additional perforations to permit a controlled leakage of steam when said cylindrical valve means is in said second position;

a water stem extending through said cylindrical valve means and terminating in said second chamber for transporting desuperheating water to said second chamber, said stem being coupled to said cylindrical valve means and slidably adjusting said cylindrical valve means between said first and second positions; and

nozzle means located at the terminal end of said water stem for injecting desuperheating water into said second chamber to be mixed with steam entering said second chamber, said nozzle means comprising a plurality of tangentially extending conduits which generate a swirling vortex of water and a hollow cylindrical sleeve extending into said second chamber for transporting and accelerating said swirling vortex of water into said second chamber.

VOL
1126
ISS
1
MY
7
1991
UMI

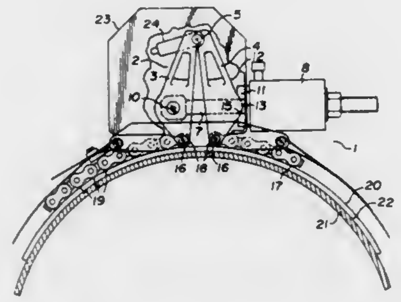
### 5,012,842
### FLUID ACTUATED PIPE CLAMP TIGHTENER

**Donald D. Savard, Edmonton, Canada, assignor to Interprovincial Pipe Line Company, Edmonton, Canada**

**Continuation-in-part of Ser. No. 458,257, Dec. 28, 1989. This application Sep. 13, 1990, Ser. No. 581,955**

**Int. Cl.⁵ F16L** *55/16*

**U.S. Cl. 138—161** **2 Claims**



1. In combination:
- a pipeline;
- a pair of semi-circular shells mounted about the pipeline; and
- a tightener for clamping the shells against the pipeline, said tightener comprising
- a scissor clamp having a pair of arms pivotally connected at their first ends,
- a loop of chain extending around the shells, the ends of the loop being pivotally connected with the second ends of the arms, whereby the arms may pull on the loop ends to tighten the loop about the shells,
- a fluid-actuated cylinder, pivotally connected with the first arm between its ends, for biasing the first arm toward or away from the second arm, said cylinder being arranged generally perpendicularly to the arms and being spaced out of contact with the chain,
- said second arm abutting and being supported by the front end of the cylinder.

---

### 5,012,843
### COP WINDING DEVICE WITH KNOT DISALIGNMENT FOR SHUTTLE LOOM

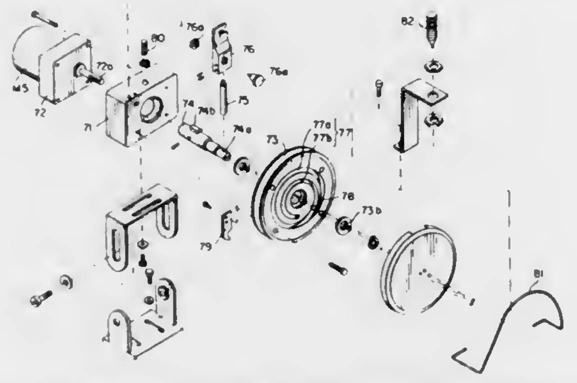
**Takao Yarita, Chiba; Hideo Komori, Ibaraki; Koji Ogasawara, and Hiroaki Takami, both of Kanagawa, all of Japan, assignors to Ichikawa Woolen Textile Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 207,484, Jun. 16, 1988. This application Jun. 16, 1989, Ser. No. 367,174**

**Claims priority, application Japan, Jun. 16, 1987, 62-148063; Jun. 26, 1987, 62-157834; Jun. 30, 1987, 62-161024; Jun. 30, 1987, 62-161025**

**Int. Cl.⁵ D03D** *45/00;* **B65H** *69/04*

**U.S. Cl. 139—224 A** **3 Claims**



1. An adjusting device for use in a loom in which weaving is effected by passing a shuttle containing a cop around which a weft yarn is wound between upper and lower warp yarns, comprising: a disc-shaped reel provided with circumferential channel parts for accommodating a wound thread thereon; thread holding means projecting outward of said circumferential channel parts of said reel for holding threads; hooking means for hooking the threads held by said holding means and for rotating said threads around said disc-shaped reel, thereby winding said threads onto said circumferential channel parts of said reel; and sensing means for sensing the number of times a thread is wound around said disc shaped reel.

---

### 5,012,844
### WEFT YARN THREADING DEVICE FOR A JET LOOM

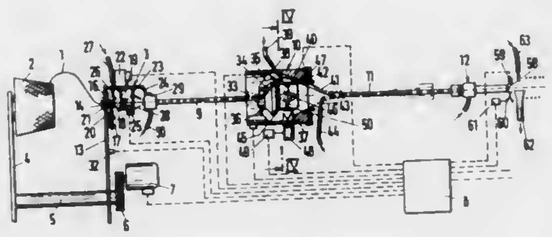
**John D. Griffith, Cleadon, Great Britain, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Oct. 4, 1989, Ser. No. 416,935**

**Claims priority, application Switzerland, Oct. 19, 1988, 03899/88**

**Int. Cl.⁵ D03D** *47/34*

**U.S. Cl. 139—452** **27 Claims**



1. In a loom, the combination comprising
- a picking nozzle;
- a yarn storage device for feeding a predetermined length of yarn to said picking nozzle;
- a first yarn guiding passage extending to said storage device for guiding a yarn from a package in a closed path to said storage device; and
- a second yarn guiding passage extending to and between said storage device and said picking nozzle for guiding a yarn therebetween in a closed path.

---

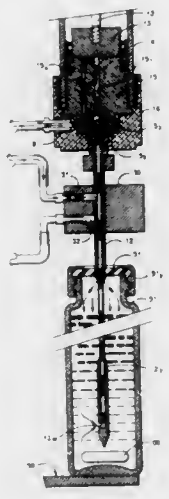
### 5,012,845
### FLUID INJECTOR

**Julius P. Averette, Baker, La., assignor to Dynatech Precision Sampling Corporation, Baton Rouge, La.**

**Filed Aug. 18, 1988, Ser. No. 233,354**

**Int. Cl.⁵ G01N** *1/14*

**U.S. Cl. 141—329** **9 Claims**



1. In apparatus useful for the pick up of a fluid specimen from a fluid specimen-containing septum sealed vial carried by a magazine, and injection of preselected quantities of the fluid specimen into an analytical instrument, the combination comprising
- a syringe assembly which includes
- a barrel,
- a plunger rod reciprocably mounted in one end of the barrel,
- a pair of concentric hollow needles of different diameters, an outer larger diameter needle containing a side wall opening communicating with the axial opening therethrough, mounted in the end of the barrel opposite the plunger to form an annulus between the external wall surface of said inside smaller diameter needle and the inside wall surface of said larger diameter needle,
- means for reciprocation of the plunger rod within the barrel of the syringe,
- means for the reciprocal movement of the syringe barrel,
- a tubular block valve the tubular opening through which said concentric pair of needles can be projected into a vial carried by said magazine and positioned in-line therewith, said valve further including a pair of lateral channels communicated with said tubular opening, the first of said lateral channels fluidly communicating with a pressurized gas, the second of said lateral channels adapted to be connected to said analytical instrument,
- whereby, when the dispensing end of the pair of needles is projected through the septum into a vial and an end of the smaller diameter needle immersed in a fluid specimen, gas is passed via the side wall opening of the large diameter needle and the first lateral opening of said block valve via the needle annulus to pressurize the fluid contents of the vial and drive fluid specimen into the axial opening of the small diameter needle, and on retraction of the plunger rod into the syringe barrel, and on the closure of said first lateral block valve opening and opening of the second lateral block valve opening, the fluid specimen can be displaced from the syringe barrel and expressed via said second lateral block valve opening to the analytical instrument.

---

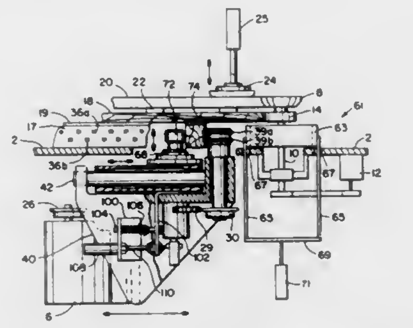
### 5,012,846
### CUTTING TOOL GUARD FOR A CUTTING MACHINE

**William T. Rhodes, 3347 Camp Ground Rd., P.O. Box 16348, Louisville, Ky. 40216**

**Filed Aug. 9, 1990, Ser. No. 564,596**

**Int. Cl.⁵ B27C** *1/18. 5/02*

**U.S. Cl. 144—145 A** **3 Claims**



1. In an automatic shaping device that includes a frame, a table mounted onto said frame, a movable template mounted onto said table, means to move said template in driving relationship with said template, shaping cutter means mounted above said table, a power-drive workpiece carrying member mounted to said table, and means to feed a workpiece to said shaping cutter means, the improvement comprising:
- cutter means guard means movable between a lowered position below said cutter means and a raised position surrounding said cutter means.

---

### 5,012,847
### PNEUMATIC TIRE HAVING TREAD PATTERN WITH REDUCED STONE BITING

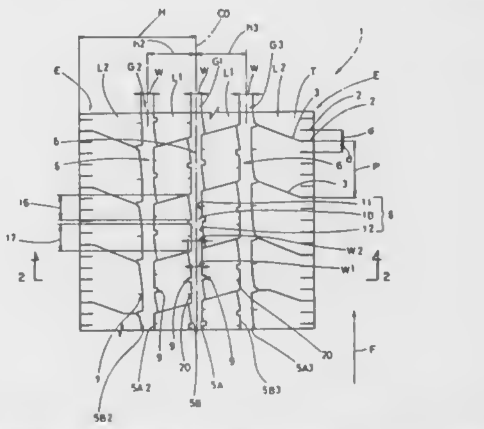
**Testuhiro Fukumoto, and Atsushi Yamahira, both of Kobe, Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**

**Filed Jul. 26, 1989, Ser. No. 385,145**

**Claims priority, application Japan, Jul. 29, 1988, 63-191881**

**Int. Cl.⁵ B60C** *11/06*

**U.S. Cl. 152—209 R** **5 Claims**



1. A pneumatic tire having a tread provided with a central longitudinal groove and lateral longitudinal groove,
- said longitudinal grooves extending substantially straight in the circumferential direction of the tire to define two center circumferential ribs between said central longitudinal groove and said lateral longitudinal grooves,
- the longitudinal grooves being positioned so that the distance (h) from the groove center of the lateral longitudinal grooves to the tire equator is not more than ⅜ times the distance (H) from the tire equator to the edge of the tread,
- a plurality of lateral grooves arranged at intervals in the circumferential direction of the tire and extending across the center circumferential ribs whereby said ribs are divided into a plurality of axially adjacent blocks which extend in the circumferential direction of the tire, said axially adjacent blocks defining therebetween said central longitudinal groove with a repeating pattern as it extends in the circumferential direction of the tire,
- said pattern having a narrowed area which gradually increases in width on both sides thereof, and the interval between the adjacent lateral grooves is equal to the length, in the circumferential direction of the tire, of the repeating pattern of said longitudinal grooves,
- said increase in width of the central longitudinal groove on both sides of the narrowed area being defined by a straight wall portion extending parallel to the tire equator and an opposing inclined wall portion, said straight and inclined wall portions changing to the opposite walls of the longitudinal groove on opposite sides of the narrowed areas.

---

### 5,012,848
### ANTISKID DEVICE

**Michel Metraux, Pully, Switzerland, assignor to Autotyp S.A., Etagnieres, Switzerland**

**Filed Jul. 13, 1989, Ser. No. 379,049**

**Claims priority, application Switzerland, Jul. 13, 1988, 2679/88-2**

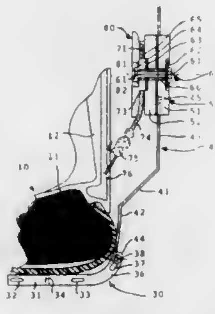
**Int. Cl.⁵ B60C** *27/20*

**U.S. Cl. 152—218** **36 Claims**

16. An antiskid device for a vehicle wheel comprising:
- a movable antiskid rolling track on the periphery of the wheel;
- a central housing having a plurality of radial connecting arms extending therefrom;

VOL
1126
ISS
1
MY
7
1991
UMI

chain guides attached at a distal end of said radial connecting arms;
said chain guides being inserted in said rolling track;
a return means for automatically positioning said rolling track on the wheel and for holding the rolling track on the periphery of the wheel;
said rolling track comprising
  resilient means for eliminating the play between the peripheral surface of the wheel and said antiskid rolling track, said resilient means comprising an elastomeric plate,

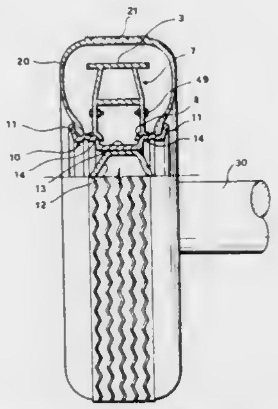


  at least two circles of chains forming sides of the rolling track, and
  a plurality of bars placed in a direction transverse to motion of the vehicle wheel, said bars being disposed between the sides at regular intervals along said track; and
wherein the circles of chains are formed from links attached to said elastomeric plate, and said elastomeric plate comprises an extension having means for fastening to said radial connecting arm thereby forming said chain guide.

---

### 5,012,849
### INTERNAL TIRE SUPPORT WHEEL

**Seh D. Ko, 26-203 Ushin villa, San 18, Kung-dong, Kuro-gu, Seoul, Rep. of Korea**
**Filed Feb. 23, 1990, Ser. No. 483,789**
**Claims priority, application Rep. of Korea, Aug. 26, 1988, 13946/1988[U]**
**Int. Cl.$^5$ B60C** *17/02, 17/04, 5/00*
**U.S. Cl. 152—520** **4 Claims**

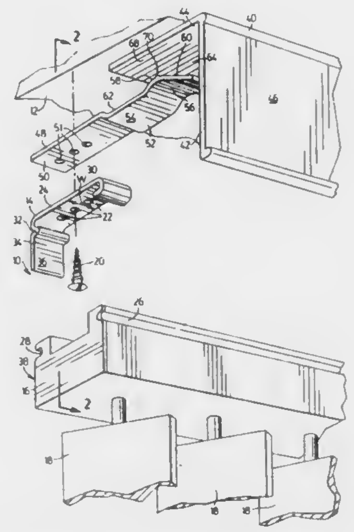


1. An internal tire support wheel for a vehicle comprising:
a plurality of tire support members which conform to the configuration of a tire, each of said plurality of tire support members including:
  an arc configured plate,
  a first pair of leg members and a second pair of leg members extending from said arc configured plate at both end positions thereof,
  a foot member extending from each of said leg members for engagement with a tire rim, and
  means for connecting each of said plurality of tire support members to adjacent tire support members, said connecting means including an aperture disposed at a latitudinal extending portion from each of said first leg members, an aperture disposed at a recessed portion in each of said second leg members for tightly receiving said latitudinal extending portion, and a bolt and a nut for securing said extending portion to said recessed portion so as to connect each of the plurality of tire support members to adjacent tire support members, whereby upon the deflation of the tire, the internal tire support wheel supports and stabilizes the vehicle, thus preventing the vehicle from tilting.

---

### 5,012,850
### VALANCE CLIP

**James E. Schrader, Gilford, Canada, assignor to Kwik Clip, Barrie, Canada**
**Filed May 26, 1989, Ser. No. 357,260**
**Int. Cl.$^5$ E06B** *9/00*
**U.S. Cl. 160—38** **14 Claims**



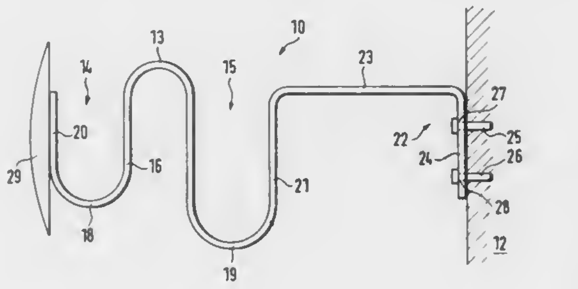
1. In a vertical blind assembly comprising a valance clip for securing a valance thereto, said vertical blind assembly comprising brace means, a track portion, and a track clip having means for releasably securing said track portion to said brace means; said valance clip comprising a base for securing said clip to said assembly between said track clip and said brace means, and an elongate portion extending from said base and integral therewith, said elongate portion biased to urge same against said brace means for releasably securing said valance therebetween.

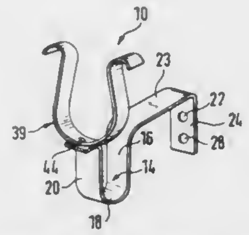
---

### 5,012,851
### HOLDER FOR DRAPING CURTAINS, ARRANGEMENT OF HOLDERS AND PROCESS FOR DRAPING CURTAINS

**Christer Hannerstig, Höllviksnäs, Sweden, assignor to AB A. Svensson & Co., Malmö, Sweden**
**Filed Oct. 3, 1989, Ser. No. 416,541**
**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1989, 3927074**
**Int. Cl.$^5$ A47H** *13/14*
**U.S. Cl. 160—348** **23 Claims**

1. A holder comprising four parallel legs and three U-shaped members connecting ends of the parallel legs, said U-shaped members facing each other in alternating directions to form an "S" which continues to form a reverse "S" to form a front and rear recess for supporting a curtain material, which recesses when said holder is attached to a wall, open upward with the U-shaped member forming the rear recess being closer to the wall and extending deeper than the U-shaped member that forms the front recess, said holder being constructed so that said parallel legs are oriented parallel to a wall when the holder is mounted to a wall; and
  means for attaching the holder to a wall comprising a transverse member attached at one end to the leg of the deeper extending recess furthest from the other three legs and being extended at a 90° angle from said furthest leg and extending to form a vertical member parallel to the legs, said vertical member providing the means for attaching the holder to a wall.

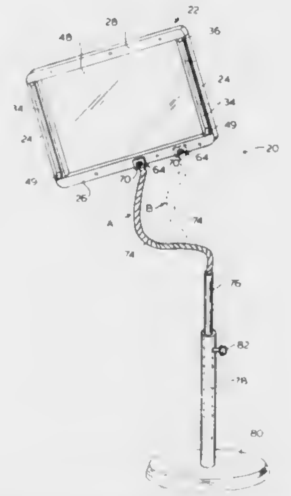




---

### 5,012,852
### BARRIER ASSEMBLY

**Michael L. Blackhurst, Main St., Antrim, N.H. 03440**
**Filed Mar. 6, 1989, Ser. No. 319,572**
**Int. Cl.$^5$ A47G** *5/00*
**U.S. Cl. 160—351** **6 Claims**

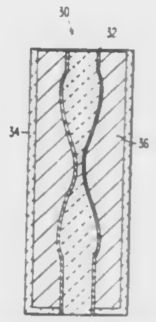


1. A frame assembly for tensionally retaining a thin, flexible, resilient film, comprising:
(a) a frame having four sides, said frame comprising:
  (i) opposedly positionable frame side members, each side member having axially extending protrusions at respective ends thereof, each said protrusion having a radially extending projection at its extremity, each said side member further including a longitudinally extending retention strip which is hingedly attached to said frame member at a first extremity thereof so as to be hingedly swingable to an open position, with closure means at a second end of the strip, and a complementary closure element on each said frame side member lockingly matable with the strip closure means; and
  (ii) opposedly positionable top and bottom frame members, each having openings at its respective ends for mating engagement with the protrusions of respective frame side members, such openings being configured so that the radial projections on said frame side members are secured against vertical movement by engagement of corresponding laterally extending passages in the openings, and when so engaged, the longitudinally extending retention strip is frontally disposed on the frame;
(b) a means to hold the film on the frame; and
(c) a support structure for the frame, said support structure being positionally adjustable.

---

### 5,012,853
### PROCESS FOR MAKING ARTICLES WITH SMOOTH COMPLEX INTERNAL GEOMETRIES

**John A. Bihlmaier, Marengo, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**
**Filed Sep. 20, 1988, Ser. No. 246,620**
**Int. Cl.$^5$ B22D** *19/00*
**U.S. Cl. 164—75** **30 Claims**



1. A process for making a turbine nozzle having a gas flow path with an internal geometry without requiring machining of the internal geometry to produce a smooth internal surface comprising:
  forming a mandrel containing a negative image of the internal geometry;
  coating the mandrel with a nonferrous material which is not chemically reactive with the material from which the mandrel is formed;
  capturing the mandrel in a mold which is to receive a molten metal from which the turbine nozzle is to be cast, the molten metal from which the turbine nozzle is to be cast not being chemically reactive with the coating and having a melting point below the melting point of the material of the coating;
  filling the mold with molten casting metal to capture the mandrel and coating in solidified casting material contained in the mold; and
  removing the mold and the mandrel from the turbine nozzle while retaining the non-ferrous material as the gas flow path of the turbine nozzle.

---

### 5,012,854
### PRESSURE RELEASE VALVE FOR A SUBSEA BLOWOUT PREVENTER

**John A. Bond, Houston, Tex., assignor to Baroid Technology, Inc., Houston, Tex.**
**Filed Mar. 31, 1987, Ser. No. 33,041**
**Int. Cl.$^5$ E21B** *33/064, 34/04, 43/12*
**U.S. Cl. 166—363** **2 Claims**

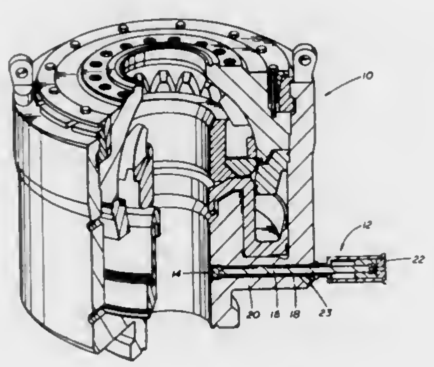
1. A pressure release valve within a subsea blowout preventer having a first housing and a central passage extending

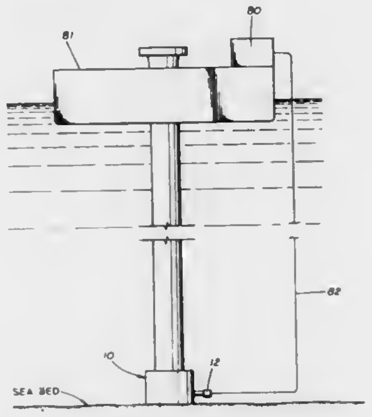
VOL
1126
ISS
1
MY
7
1991
UMI

through said first housing, said passage having upper and lower ends, comprising:

a shaft slidably disposed within an aperture through said first housing;

a valve piston mounted on said shaft for sealing said aperture when said shaft and said valve piston are in a closed position;





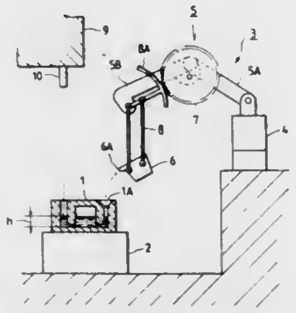
an open vent conduit through said first housing communication said aperture with the outside of said first housing; and

a hydraulic operator assembly mounted on said first housing for moving said shaft and said valve piston into an open position to permit gases within the central passage to flow through said aperture and through said open vent conduit.

---

### 5,012,855
### INDUSTRIAL ROBOT

**Hisao Kato, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Sep. 30, 1988, Ser. No. 251,289**
**Claims priority, application Japan, Sep. 30, 1987, 62-247215**
**Int. Cl.⁵ B22D** *37/00*
**U.S. Cl. 164—155** **5 Claims**



1. An industrial robot for casting products by pouring molten metal in a ladle mounted on an arm of said robot into successively conveyed molds, comprising;

a drive mechanism for driving said ladle to incline with respect to said mold;

measuring means for continuously measuring a level of molten metal in said mold, said measuring means comprising energy radiating means for radiating energy directly into a main portion of said mold to measure said level of molten metal in said mold;

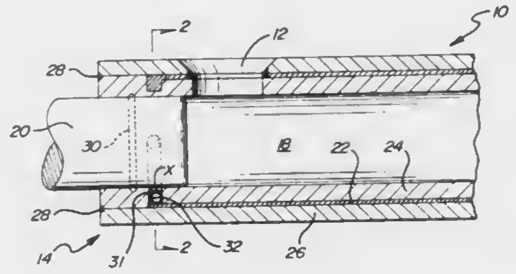
detecting means for detecting an inclination rate of said ladle; and

a central processing unit having a memory for storing an optimum level of molten metal in said mold and an inclination rate of said ladle, said central processing unit being connected to said measuring means and said detecting means, and adapted to receive actual level data from said measuring means and actual inclination rate data from said detecting means, compare said actual level data and said actual inclination rate data with said optimum level and inclination rate data stored in said memory, calculate deviations of said actual level data and said actual inclianation rate data from said optimum level and inclination rate, and supply control signals to said drive mechanism to control the latter optimally.

---

### 5,012,856
### FLUID COOLED SHOT SLEEVE

**Kenneth P. Zecman, 46520 Strathmore, Plymouth, Mich. 48170**
**Continuation-in-part of Ser. No. 279,924, Dec. 5, 1988, Pat. No. 4,926,926. This application Mar. 2, 1990, Ser. No. 487,385**
**Int. Cl.⁵ B22D** *17/00*
**U.S. Cl. 164—312** **20 Claims**



1. A shot sleeve assembly for moving molten metal into a mold cavity, said assembly having;

an elongated shot sleeve having a bore extending axially therethrough from a first end to a second end adapted to be positioned adjacent the mold cavity;

a well opening extending through a side wall of said shot sleeve at a location adjacent said first end;

an injection piston slidably mounted in said bore, said shot sleeve comprising:

an inner barrel having an inner and outer perimeter defining a wall extending the length of said shot sleeve;

a heat transfer sleeve having a higher thermal conductivity than said inner barrel disposed around the outer perimeter of the barrel to form a two-layer assembly;

a high strength outer shell enclosing under compression said two-layer assembly; and

first cooling means disposed in contact with both the inner barrel and heat transfer sleeve portions of said body to promote heat transfer from the inner barrel.

---

### 5,012,857
### MOLDING MEDIUM, METHOD FOR MAKING SAME AND EVAPORATIVE PATTERN CASTING PROCESS

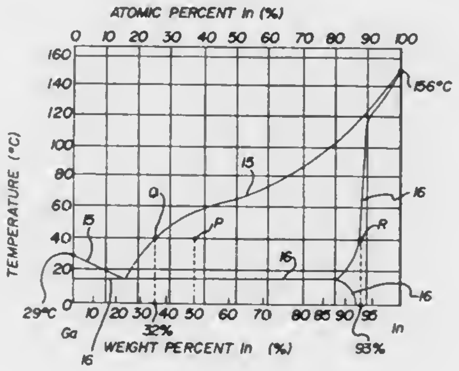
**Leslie D. Rikker, 15441 Betty Ann La., Oak Forest, Ill. 60452**
**Division of Ser. No. 651,291, Sep. 17, 1984, Pat. No. 4,651,798. This application Jul. 8, 1986, Ser. No. 883,103**
**The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.**
**Int. Cl.⁵ B22C** *9/04*
**U.S. Cl. 164—529** **36 Claims**

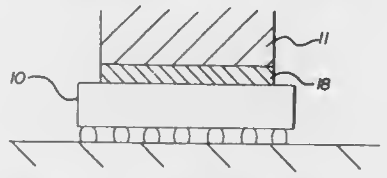
24. A method for producing a molding medium for forming castings by the evaporative pattern casting process wherein a flowable, unbound molding medium is provided for surrounding an evaporative pattern disposed in a casting box, the method comprising the steps of mixing a base particulate material having particles having a substantially spherical shape formed by man and not found in nature with a binding agent thereby to coat said particles with said binding agent, and firing the mixture, said mixture having a refractory component, said refractory component comprising a coating formed by the steps of coating said particles of said base particulate material with said binding agent and mixing a refractory material with said particles, said refractory material adhering to said binding agent and eliminating the need for a refractory wash coat to be applied to the evaporative pattern.

---

### 5,012,858
### METHOD OF COOLING A SEMICONDUCTOR DEVICE WITH A COOLING UNIT, USING METAL SHERBET BETWEEN THE DEVICE AND THE COOLING UNIT

**Katsuhide Natori, Yokohama; Isao Watanabe, Sagamihara; Koji Katsuyama, Yokohama; Isao Kawamura, Yokohama; Haruhiko Yamamoto, Yokohama, and Takeshi Nagai, Yokohama, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan**
**Continuation of Ser. No. 106,842, Oct. 13, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 334,770**
**Claims priority, application Japan, Oct. 20, 1986, 61-248801**
**Int. Cl.⁵ H05K** *7/20;* **F28D** *21/00*
**U.S. Cl. 165—1** **3 Claims**



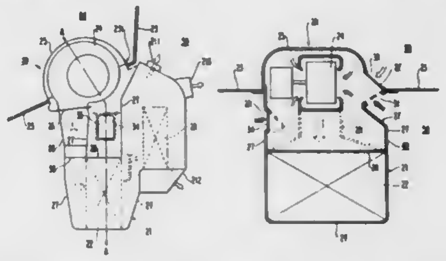


1. In a method for cooling a semiconductor device using heat transfer means, the improvement comprising the use of a heat conducting body disposed between said semiconductor device and said heat transfer means, said heat conducting body being an alloy which is in the state of a two-phase field of liquid and solid uniformly throughout the body when the semiconductor device is at operating temperature and having a coefficient of viscosity greater than 3,000 centipoise at a temperature less than 40° C.

---

### 5,012,859
### AUTOMOTIVE AIR CONDITIONING SYSTEM

**Takeharu Nakazawa, Tamamura, and Toshihiko Fujita, Isesaki, both of Japan, assignors to Sanden Corporation, Gunma, Japan**
**Filed Jan. 23, 1989, Ser. No. 299,428**
**Claims priority, application Japan, Jan. 21, 1988, 63-5284[U]**
**Int. Cl.⁵ F25B** *29/00;* **F14F** *11/02*
**U.S. Cl. 165—42** **9 Claims**



1. In an automotive air conditioning system comprising a duct for conveying conditioned air to a passenger compartment, a blower for forcing air through said duct and a partition wall for separating said passenger compartment from an engine compartment, said blower being positioned adjacent to one end of said duct which is in fluid communication with an opening formed in said partition wall, said duct having a heater element disposed therein, the improvement comprising:

an evaporator being positioned in said duct:

a shell which covers at least a portion of said blower and which is associated with said one end of said duct;

a chamber, wherein said shell, a portion of said duct and a wall adjacent one side of the evaporator substantially form the boundaries of said chamber and said blower is in fluid communication with the interior of said chamber; and

air intake means associated with said chamber for alternately introducing air, either external to or from said passenger compartment, into said chamber, said air intake means comprising

an outside air intake port disposed on one side of said partition wall and a passenger compartment air intake port disposed on the other side of said partition wall, each port communicating with said chamber,

at least one additional passenger compartment air intake port associated with said chamber to provide fluid communication between said passenger compartment and said chamber, and

control means forming part of the wall of said chamber for selectively controlling the source of air intake, said control means comprising

a damper mounted on said partition wall adjustably positioned over either of said outside air intake port and said passenger compartment air intake port, and

at least one damper for opening and closing said at least one additional passenger compartment air intake port,

wherein said blower forces said air introduced into said chamber into said duct.

---

### 5,012,860
### ACTIVELY COOLED HEAT PROTECTIVE SHIELD

**Samar B. Mukherjee, Munich, Fed. Rep. of Germany, assignor to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Goettingen, Fed. Rep. of Germany**
**Filed Aug. 7, 1989, Ser. No. 391,159**
**Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828902**
**Int. Cl.⁵ F16L** *59/00;* **G21C** *11/08*
**U.S. Cl. 165—47** **9 Claims**

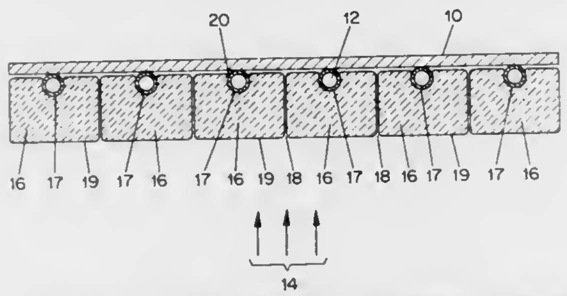
1. An actively cooled shield for protecting a wall from a source of heat comprising, in combination:

a series of parallel equally spaced cooling pipes having a predetermined outside diameter secured to said wall on

VOL
1126
ISS
1
MY
7
1991
UMI

the surface thereof facing the source of heat and adapted for connection to a coolant system, and

a plurality of protective element bodies associated with and removably supported on said cooling pipes, each formed of a heat-resistant material and having side edges, top and bottom edges, a front surface which faces the source of heat and a back surface which is parallel to the front surface, and a width substantially equal to said spacing between said cooling pipes, and having formed in its back



surface a generally cylindrical recess having a diameter larger than the outside diameter of said cooling pipes which extends between its top and bottom edges, equidistant from its side edges, in which a cooling pipe is received with sliding fit, the center axis of said recess being spaced inwardly from said back surface a distance selected to cause the interior cylindrical portion of the recess to engage an arcuate portion of the exterior surface of a respective cooling pipe throughout an angular range from about 210° to about 300°.

### 5,012,861
### MACHINE HOUSING

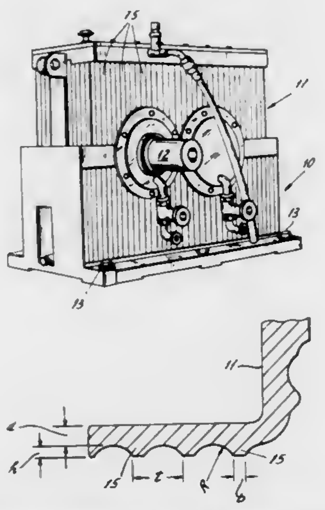
**Volkmar Kunze, Heidenheim; Kurt Zimmermann, Satteldorf, both of Fed. Rep. of Germany, and Erwin Hinterdorfer, Pölten, Austria, assignors to J. M. VoithGmbH, Fed. Rep. of Germany**

**Filed Nov. 2, 1988, Ser. No. 266,102**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1988, 8805009[U]**

**Int. Cl.$^5$ F16M** *1/026*

**U.S. Cl. 165—47** **7 Claims**



1. A transmission housing having a plurality of walls, at least one of the walls of the housing extending within an essentially vertical plane in the installed position of the transmission housing, the wall having an outer side;

the wall including a plurality of ribs for discharging heat from the wall to surrounding air, the ribs being defined on and extending along the outer side of the wall, the ribs being essentially vertical in the installed position of the transmission housing so as to prevent dirt from accumulating between the ribs;

the wall having a first thickness between the ribs and a second thickness at the ribs, the second thickness being greater than the first thickness, the height of the ribs being equal to the second thickness minus the first thickness, the ratio between the first thickness and the height of the ribs being in the range of 3:1 to 1:1, the ribs being spaced apart from each other at a rib pitch, the ratio between the rib pitch and the first thickness being in the range of 5:1 to 1:1;

wherein in a section through the housing wall through the ribs, the other side of the housing wall is of undulating shape, and between each two ribs, which define undulation crests, there is an undulation base having an inwardly directed, substantially constant curvature.

### 5,012,862
### HYDROPHILIC FINS FOR A HEAT EXCHANGER

**Kenneth W. Espeut, Tampa, and Leon Barry, St. Petersburg, both of Fla., assignors to JW Aluminum Company, Mt. Holly, S.C.**

**Filed Sep. 12, 1990, Ser. No. 581,356**

**Int. Cl.$^5$ F28F** *13/18*

**U.S. Cl. 165—133** **5 Claims**

1. An aluminum fin stock comprising a thin sheet of aluminum, said sheet having one or more sides coated with an aqueous solution of a polysulfonic acid, said solution being subsequently dried.

### 5,012,863
### PIPE MILLING TOOL BLADE AND METHOD OF DRESSING SAME

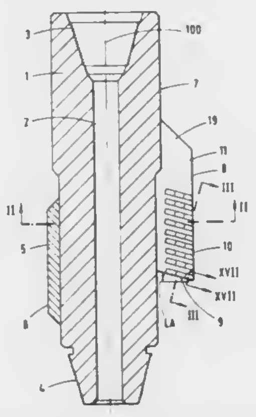
**Johann Springer, Hanover, Fed. Rep. of Germany, assignor to Smith International, Inc., Houston, Tex.**

**Filed May 12, 1989, Ser. No. 350,976**

**Claims priority, application United Kingdom, Jun. 7, 1988, 8813452; Sep. 21, 1988, 8822134**

**Int. Cl.$^5$ E21B** *29/00;* **B23D** *21/14*

**U.S. Cl. 166—55.7** **24 Claims**



1. A blade for a pipe milling tool adapted to be connected to a rotatable drilling string body having a longitudinal axis, said blade having at least one slot means formed therein extending both in a generally radial direction and in an intended direction of rotation, and at least one cutting element secured in each said at least one slot means, said slot means and said cutting element having a greater depth in said blade in the intended direction of rotation than height in the longitudinal axis direction, said slot means and said cutting element having a ratio of depth to height in the range 2:1 to 4:1.

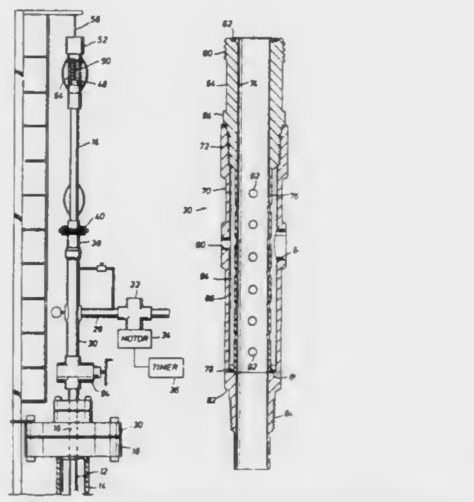
### 5,012,864
### WELLHEAD APPARATUS INVOLVING A FREE FALL PLUNGER IN A WELL

**David J. Enright, Lafayette, La., assignor to Vernon E. Faulconer, Inc., Breaux Bridge, La.**

**Continuation-in-part of Ser. No. 267,992, Nov. 7, 1988, Pat. No. 4,898,235. This application Feb. 2, 1990, Ser. No. 473,893**

**Int. Cl.$^5$ E21B** *33/68, 43/12*

**U.S. Cl. 166—70** **11 Claims**



1. Wellhead apparatus for attachment to a gas well in which a reciprocating plunger fitting in the tubing of the well repetitively travels along the production tubing string of the well to the wellhead wherein the wellhead apparatus comprises:

(a) a plunger pathway communicating from a tubing string in a well wherein the pathway extends through
  (1) the tubing string of the well;
  (2) a transition tubing and a tee therein;
  (3) an extension thereabove;
(b) a lateral production flow line connected with said tee for removing production from the well through said tee; and
(c) said tee including
  (1) an inner hollow cylindrical member forming the plunger pathway,
  (2) an outer hollow cylindrical member surrounding the inner member and defining an annular flow space therebetween.
  (3) flow openings from said inner member into said annular space for directing flow of production fluids from the tubing string into the annular space, one or more of said flow openings being located below the flow line connection point, and
  (4) a lateral port connected to said lateral flow line.

### 5,012,865
### ANNULAR AND CONCENTRIC FLOW WELLHEAD ISOLATION TOOL

**Roderick D. McLeod, 5104 - 125 Street, Edmonton, Alberta, Canada T6H 3V5**

**Filed Sep. 27, 1989, Ser. No. 413,187**

**Int. Cl.$^5$ E21B** *33/03*

**U.S. Cl. 166—90** **5 Claims**

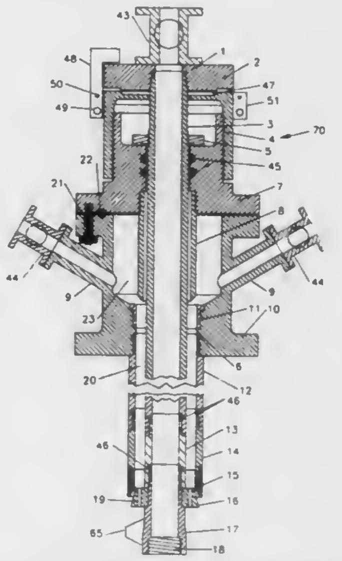
1. In a wellhead isolation tool having a body for external mounting on a wellhead, the wellhead having well tubing and casing, an outer mandrel supported in the body and having a lower end, and an inner mandrel supported within the outer mandrel and connectable to the well tubing, the improvement comprising:

annular sealing means attached to the lower end of the outer mandrel for sealing against the casing;

first fluid passage means attached to the body for providing fluid into the tubing;

at least one second fluid passage means attached to the body for providing fluid into the annulus between the inner and outer mandrel;

an expander for expanding the sealing means into sealing relationship with the casing; and



the expander having axial passages extending through the expander to provide a connection between the annulus formed by the casing and tubing and the annulus formed by the inner and outer mandrels.

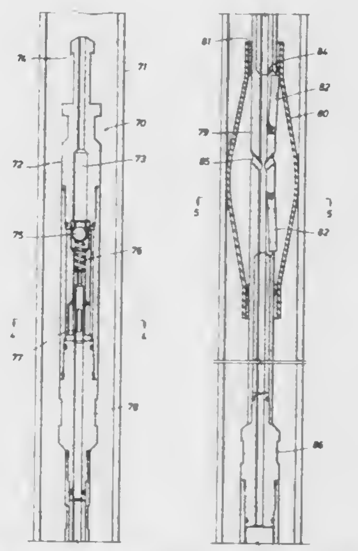
### 5,012,866
### DRILL STEM MUD WIPING APPARATUS

**Uvon Skipper, 7409 S. Rice Ave., Bellaire, Tex. 77401**

**Continuation-in-part of Ser. No. 396,233, May 8, 1990, Pat. No. 4,923,011. This application May 1, 1990, Ser. No. 517,303**

**Int. Cl.$^5$ E21B** *12/06, 33/08, 37/00*

**U.S. Cl. 166—170** **19 Claims**



1. A wiping apparatus adapted to be placed in a drill stem including internal upset pipe when pulling the drill stem from a well borehole, the apparatus comprising:

(a) an elongate mandrel;
(b) an elongate sleeve telescoped around said mandrel for wiping movement thereabout wherein said sleeve comprises:
  (i) spaced upper and lower ends having a sufficiently

VOL
1126
ISS
1
MY
7
1991
UMI

narrow diameter to pass through internal upsets of the internal upset pipe;

(ii) a central wiping portion between said ends thereof and sized to contact the inside wall of the pipe making up the drill stem; and

(iii) said sleeve being formed of resilient material permitting reduction in diameter when encountering an internal upset in the pipe making up the drill stem; and

(c) mans for inflating said sleeve and causing said sleeve to expand radially outwardly to contact against and wipe the inside wall of the pipe and wherein said inflating means deflates and inflates said sleeve on entry into and departure from internal upsets of the drill stem.

---

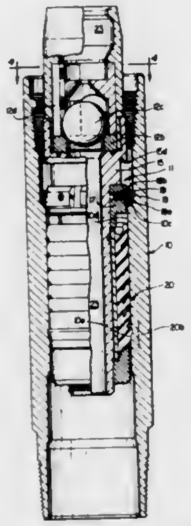
### 5,012,867
### WELL FLOW CONTROL SYSTEM

**Marion D. Kilgore, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**

**Filed Apr. 16, 1990, Ser. No. 509,179**

**Int. Cl.$^5$ F16K** *15/04*

U.S. Cl. 166—188 2 Claims



1. A standing valve having a through flow passage comprising:

(a) a body having a fishing neck;

(b) check valve means in said flow passage for permitting upward flow and preventing downward flow through said flow passage;

(c) retractible landing ring means on said body, said landing ring means including: a retracting camming surface on said body, a support ring mounted around said body, a spring ring positioned in expanded position around said support ring by at least one shearable pin through said spring ring into said support ring, said spring ring having a landing surface and a camming surface engageable with said retracting camming surface, said spring ring moveable to a retracted position; and

(d) sealing means sealed around said body, said sealing means including a resilient section having a plurality of lips and a cylindrical section.

---

### 5,012,868
### CORROSION INHIBITION METHOD AND APPARATUS FOR DOWNHOLE ELECTRICAL HEATING IN MINERAL FLUID WELLS

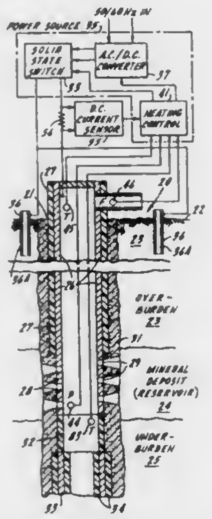
**Jack E. Bridges, Park Ridge, Ill., assignor to Uentech Corporation, Denver, Colo.**

**Filed Mar. 14, 1989, Ser. No. 322,930**

**The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.**

**Int. Cl.$^5$ E21B** *43/24, 41/02*

U.S. Cl. 166—248 31 Claims



1. A method of corrosion inhibition in an electromagnetic heating system for a mineral fluid well, the heating system including a heating circuit comprising a heating electrode located downhole in the well, and an electrical power source connected to the heating circuit and operating to maintain a high amplitude A.C. heating current in the heating circuit, the method comprising the following steps:

A. applying a low D.C. bias voltage to the heating circuit, in addition to the high amplitude heating current, with a polarity to inhibit corrosion of the downhole heating electrode;

B. sensing the D.C. bias current in the heating circuit; and

C. adjusting the D.C. bias voltage to maintain the D.C. bias current sensed in step B below a given minimum level.

7. In an electromagnetic heating system for an oil well or other mineral fluid well, including a main heating electrode located downhole in the well at a level adjacent a mineral fluid deposit, and a return electrode at a location remote from the main electrode so that an electrical current between the electrodes passes through and heats a portion of the mineral fluid deposit, electrical energizing apparatus comprising:

a A.C. power source for generating an high amplitude A.C. heating current, of at least fifty amperes;

a D.C. bias source for generating a low amplitude D.C. bias current having a polarity such as to inhibit corrosion at the main electrode; and

connection means for applying both the A.C. heating current and the D.C. bias current to the electrodes of the well heating system.

---

### 5,012,869
### METHOD FOR RESTRICTING GAS INFLUX DURING WELL CEMENTING

**Donald L. Whitfill, and Lee E. Whitebay, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.**

**Filed Oct. 3, 1990, Ser. No. 592,747**

**Int. Cl.$^5$ E21B** *33/14*

U.S. Cl. 166—285 5 Claims

1. In a method of cementing a casing in a wellbore penetrating a potentially hydrocarbon-producing formation wherein a casing extends into said wellbore and cement is pumped down said wellbore and back up the outside of said casing into the annulus between said casing and the wall of said wellbore at least over the portion of said wellbore traversing said potentially hydrocarbon-producing formation, the improvement comprising:

(a) prior to placing said cement in said annulus, contacting the portion of said wellbore wall traversing said potentially hydrocarbon-producing formation with a skin-forming fluid comprised of one or more water-soluble high molecular weight polyfunctional polymers capable of forming several nucleophilic sites when treated with base, and an effective quantity of one or more potassium salts whose anions are Bronsted-Lowry bases of sufficient strength to raise the pH of the resultant fluid to above 9.0 but which are relatively weak nucleophiles compared to the polymeric nucleophilic sites, thereby forming a substantially impermeable skin on said wellbore wall by reaction of said skin-forming fluid with divalent ions present in said formation, whereby influx of formation fluids is reduced or eliminated while said cement hardens.

---

### 5,012,870
### AMINATED SULFONATED OR SULFORMETHYLATED LIGNINS AS CEMENT FLUID LOSS CONTROL ADDITIVES

**Peter Schilling, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.**

**Division of Ser. No. 312,497, Feb. 21, 1989, Pat. No. 4,990,191. This application Apr. 20, 1990, Ser. No. 512,269**

**Int. Cl.$^5$ E21B** *33/14*

U.S. Cl. 166—293 6 Claims

1. A method of cementing a zone in a well penetrating a subterranean formation comprising injecting down the well and positioning in the zone to be cemented a hydraulic aqueous cement slurry composition comprising

(a) a hydraulic cement, and the following expressed as parts by weight per 100 parts of said hydraulic cement,

(b) water from about 25 to 105 parts, and

(c) a fluid loss control additive comprising from about 0.5 to 2.5 parts of a compound selected from the group consisting of a sulfonated lignin and a sulfomethylated lignin, wherein said lignin has been aminated by reacting it with between about 2–5 moles of a polyamine and 2–5 moles of an aldehyde per 1,000g of said lignin, and

(d) 0.1 to 1.5 parts of a compound selected from the group consisting of sodium carbonate, sodium metasilicate, sodium phosphate, sodium sulfite and sodium naphthalene sulfonate and a combination thereof.

---

### 5,012,871
### FLUID FLOW CONTROL SYSTEM, ASSEMBLY AND METHOD FOR OIL AND GAS WELLS

**Charles W. Pleasants, Carrollton, Tex.; David R. Burnett, and Donald W. Head, both of Kuala Belait, Brunei, assignors to Otis Engineering Corporation, Carrollton, Tex.**

**Filed Apr. 12, 1990, Ser. No. 508,895**

**Int. Cl.$^5$ E21B** *23/00, 33/124, 34/14*

U.S. Cl. 166—386 46 Claims

1. A fluid flow control assembly comprising:

a. a sliding sleeve valve comprising:

(1) a tubular housing having a radial opening extending therethrough;

(2) means for connecting said housing in a wellbore tube; and

(3) a sleeve extending within said housing and having a radial opening extending therethrough, said sleeve being slidable relative to said housing to and from a position in which said openings align;

b. a straddle assembly comprising:

(1) a mandrel having a radial opening extending therethrough;

(2) means for connecting said mandrel to a tool for inserting said mandrel in said housing with said opening in said mandrel in alignment with said opening in said housing; and

(3) axially spaced sealing means supported on said mandrel and extending between, and in sealing engagement with, the outer surface of said mandrel and the inner surface of said housing; said opening in said mandrel extending between said sealing means; and

(4) means for preventing the flow of said fluid axially through said mandrel; and

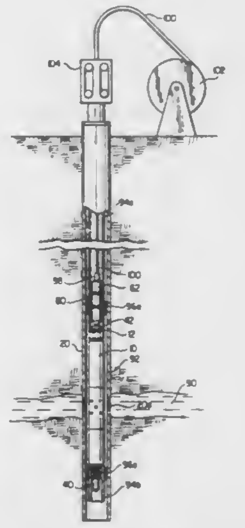
c. a stinger assembly comprising:

(1) a tubular sub having a radial opening extending therethrough; and

(2) means for connecting an end of said sub to reeled tubing for inserting at least a portion of said sub into said mandrel with said opening in said sub in alignment with said openings in said mandrel and said housing; and

d. locking means associated with said mandrel and said sub for preventing axial movement between said mandrel and said sub;

e. whereby fluid flow is directed, by said packing means, through said aligned openings and between said reeled tubing and the space between said housing and said wellbore tube.



27. A method of controlling the flow of fluid between reeled tubing and a wellbore tube, said method comprising the steps of:

a. including a sliding sleeve assembly valve in said wellbore tube, said sleeve valve assembly having a radial opening extending therethrough;

b. inserting a straddle assembly into said sleeve valve assembly with an opening in said straddle assembly in alignment with said opening in said sleeve valve assembly;

c. providing two spaced packings on said straddle assembly extending between, and in sealing engagement with, the outer surface of said straddle assembly and the inner surface of said sleeve valve assembly with said aligned openings extending between said packings;

d. connecting an end of a stinger assembly to said reeled tubing for inserting at least a portion of said stinger assembly into said straddle assembly with an opening in said stinger assembly in alignment with said aligned openings;

e. preventing the flow of said fluid axially through said straddle assembly; and

f. locking said stinger assembly and said straddle assembly against relative axial movement;

g. whereby fluid flow is directed, by said packing means, through said aligned openings between said reeled tubing

VOL
1126
ISS
1
MY
7
1991
UMI

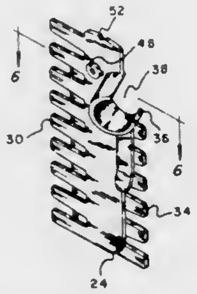
and the space between said housing and said wellbore tube.

---

### 5,012,872
## GOLF CLUB RAKE

Bernard Cohn, 16300 Golf Club Rd., Fort Lauderdale, Fla. 33326

Filed Nov. 16, 1990, Ser. No. 614,594
Int. Cl.⁵ A01D *7/00;* A63B *57/00*
U.S. Cl. 172—380 2 Claims



1. A rake head for attachment to the tapered handle of a golf club comprising:

first and second rake blades, each of said rake blades including an elongated planar support member having a plurality of teeth substantially coplanar therewith but extending transversely thereto;

a golf club handle engaging collar carried by said first rake blade and adapted to removably mount said rake head to the handle of a golf club;

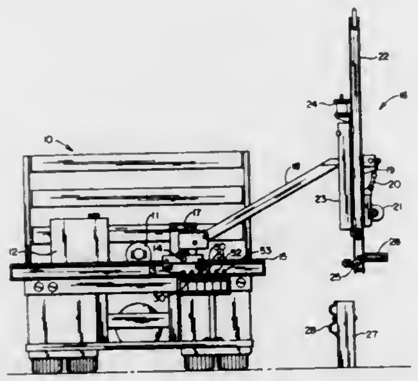
means pivotally mounting said first and second rake blades together so that the same can be pivoted between an open position wherein said elongated support members are in substantial alignment with each other and a closed position wherein said first rake blade substantially overlies said second rake blade.

---

### 5,012,873
## DEVICE FOR FORCING A REFLECTIVE HIGHWAY POST INTO THE GROUND

Ralph Kennedy, deceased, late of Pickerington by Barry D. Cheney, executor , and Ralph W. Kennedy, Pataskala, both of Ohio, assignors to Ampsco Corporation, Columbus, Ohio

Filed Jul. 14, 1989, Ser. No. 379,750
Int. Cl.⁵ E21B *7/02*
U.S. Cl. 173—22 8 Claims



1. A device for forcing a flexible reflective highway post into the ground in a vertical position comprising:

a mobile platform,

a vertical column spaced from and supported by said mobile platform,

guide means slidably mounted on said vertical column and adapted to hold a flexible reflective highway post in a vertical position and adapted to prevent said highway post from bending and flexing while said post is forced into the ground, means for mounting said guide means out of said ground at all times,

means mounted on said guide means for forcing said post into the ground, and

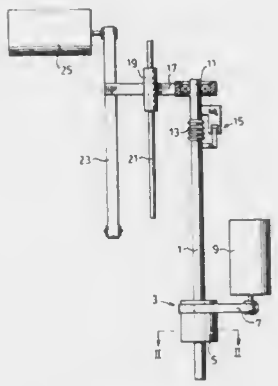
means for moving said vertical column in a vertical direction and including means for raising both said vertical column and said guide means when said reflective highway post has been forced a sufficient distance into the ground.

---

### 5,012,874
## MOVABLE TOOL HEAD FOR MOUNTING MACHINES AND A ROTATABLE, AXIALLY MOVABLE SHAFT THEREFOR

Lennart Stridsberg, Enskede, Sweden, assignor to Mydata Automation AB, Sweden

Filed Mar. 3, 1989, Ser. No. 318,291
Claims priority, application Sweden, Mar. 4, 1988, 8800779
Int. Cl.⁵ B23P *11/00*
U.S. Cl. 173—108 5 Claims



1. A movable tool head comprising:

an elongated, rotatable and axially movable tool shaft having a rotational axis and a plurality of longitudinal guide surfaces, each said guide surface having a center;

a housing configured as a sleeve having a center bore through which said tool shaft passes, said housing for rotatably and axially movably supporting said tool shaft, said housing being rotatably supported by and axially fixed to a base element;

a first driving element rigidly attached to said base element for rotating said housing;

a second element for rotatably movably supporting and axially fixing said tool shaft, wherein said tool shaft is movable only in a direction parallel to the axis of said tool shaft by a second driving element rigidly attached to said base element;

four rotatable bearing elements having rotatable axes perpendicular to said axis of said tool shaft and arranged inside said sleeve to cooperate with four longitudinal guide surfaces on said tool shaft, said longitudinal guide surfaces being essentially flat and parallel to said axis of said tool shaft;

two of said guide surfaces forming a first pair disposed at an angle to each other, the remaining two of said guide surfaces forming a second pair disposed at the same angle to each other, such that each of said first pair of guide surfaces is parallel to one of said second pairs of guide surfaces;

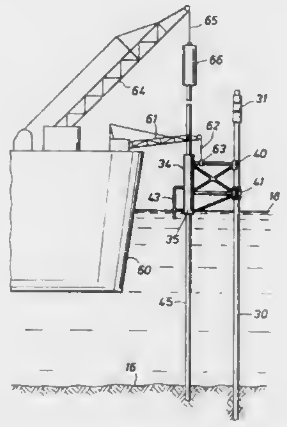
wherein a perpendicular plane passes through the center of each guide surface perpendicular to each said guide surface, each of said perpendicular planes being spaced from said axis of said tool shaft, such that said guide surfaces are places asymmetrically with respect to said axis.

---

### 5,012,875
## METHOD AND APPARATUS FOR PROTECTING A SHALLOW-WATER WELL

Aramis O. P. Casbarian, Metairie, and Kenneth M. Dewalt, Covington, both of La., assignors to Barnett & Casbarian, Inc., Metairie, La.

Continuation of Ser. No. 936,219, Dec. 1, 1986, abandoned. This application Feb. 5, 1988, Ser. No. 154,492
Int. Cl.⁵ E02B *17/02;* E02D *31/00*
U.S. Cl. 175—9 27 Claims



1. A method of drilling a shallow-water offshore well from a drilling barge and subsequently reinforcing an unsupported columnar well installation to resist the effect of wind and wave forces encountered by said well installation, said method comprising the steps of:

(a) installing a well conductor in the ocean floor at a shallow water location and anchoring it to the ocean floor,

(b) drilling a well through said well conductor and closing the top of the well with a production wellhead, thereby forming an unsupported columnar well installation of an offshore unsupported well conductor,

(c) providing a pile guide template frame comprising at least two spaced-apart pile guides connected together by laterally-extending support members with additional laterally-extending support members arranged to extend between and be connected at one end to each of the pile guides and at the other end to the well conductor when positioned thereagainst, with the pile guides being at a selected distance from the well conductor,

(d) transporting the pile guide template frame to the offshore unsupported well conductor,

(e) positioning said frame in a manner such that the other ends of the additional laterally-extending support members are operatively positioned adjacent a wall of said well conductor, said position being such that at least said other ends of said additional laterally-extending support members at the top of the frame are above the surface of the water,

(f) lowering a pile through each of said pile guides of said frame and driving said pile into the ocean floor, and

(g) forming an interconnected reinforcing structure by suspending the pile guide template frame above the ocean floor upon the piles and the well conductor, said step of forming the interconnected reinforcing structure comprising:

(1) fixedly connecting each pile to its surrounding pile guide, and

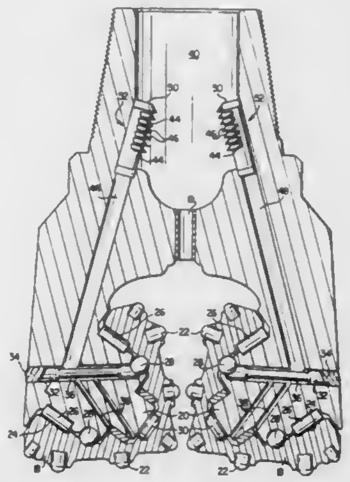
(2) operatively connecting at least said other ends of said laterally-extending support members at the top of the frame to the well conductor, whereby said frame forms the interconnecting reinforcing structure between the piles and the well conductor to resist the effect of wind and wave forces encountered by said well conductor.

---

### 5,012,876
## ROTARY DRILL BIT PROVIDING SEPARATION OF LIQUID FROM GAS

Tod T. Bruchmiller, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 1, 1990, Ser. No. 473,417
Int. Cl.⁵ E21B *10/24, 10/18*
U.S. Cl. 175—69 20 Claims



1. A drill bit having fluid circulation, comprising:

a main body having a cavity adapted to receive a gas-liquid mixture from a fluid source so that the gas-liquid mixture from said fluid source moves in a general direction of flow in said cavity;

at least one cutting member rotatably attached to said main body;

bearings for reducing friction between said main body and each said at least one cutting member;

at least one passageway, each said at least one passageway having one end which extends to and opens into the bearings of a cutting member and the other end which extends into said cavity and which has a plurality of openings to said cavity, said plurality of openings being positioned at a series of locations in said other end of said passageway with each said location containing at least one of said plurality of openings, which locations are spaced apart from each other with respect to the general direction of flow of said gas-liquid mixture in said cavity adjacent to said other end of said passageway; and

a plurality of deflectors, each of said deflectors being positioned at a respective one of said locations and associated with at least a respective one of said plurality of openings and each of said plurality of openings being associated with a deflector such that when fluid is supplied from said fluid source, each deflector of said plurality of deflectors at least substantially precludes liquid in said fluid from entering the at least one opening associated with that deflector so that liquid in said fluid continues to travel in the same general direction of flow in said cavity adjacent to said other end of said passageway but each deflector of said plurality of deflectors permits the diversion of a portion of the gas in said fluid so that the thus diverted portion of gas travels into at least one opening associated with that deflector and into said at least one passageway which directs gas substantially free of liquid to the bearings of a cutting member to cool and clean the bearings.

11. A method of utilizing the gas in a liquid-gas fluid mixture so as to cool and to clean the bearings of a drill bit, said drill bit comprising a main body, at least one cutting member rotatably attached to said main body, and bearings for reducing friction between said main body and each cutting member, comprising the steps of:

(a) passing said liquid-gas fluid mixture into a cavity in the

VOL
1126
ISS
1
MY
7
1991
UMI

interior of said main body and sequentially past a plurality of deflectors in said cavity;

(b) diverting, by each deflector of a plurality of deflectors which are sequentially in the path of said fluid mixture in said cavity, a substantially liquid-free portion of the gas in said fluid mixture into a plurality of openings which are associated with the respective deflector while the remainder of said fluid mixture continues past said deflectors and said openings, said openings providing entranceways into a passageway leading to the bearings; and

(c) directing all portions of gas diverted into said openings through said passageway so that the thus diverted gas is in proximity with said bearings so as to cool and clean the bearings.

---

### 5,012,877

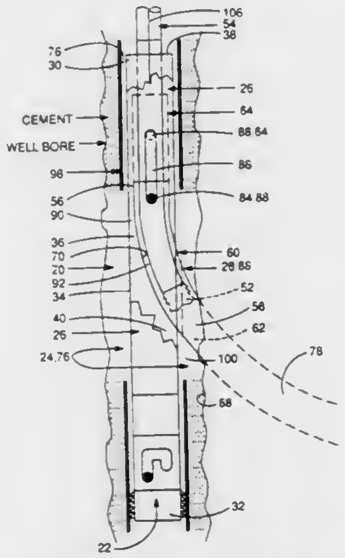
### APPARATUS FOR DEFLECTING A DRILL STRING

**Warren J. Winters, and Michael B. Burton, both of Tulsa, Okla., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Nov. 30, 1989, Ser. No. 443,768**

**Int. Cl.$^5$ E21B *7/08***

**U.S. Cl. 175—80** 3 Claims



1. Apparatus for deflecting the drilling direction of a rotary drill string and drill bit through a borehole wall, comprising:

anchor means, for anchoring the apparatus in the borehole;

a housing, connectable to the anchor means, the housing having an uphole end, a downhole end, a sidewall extending between the uphole end and the downhole end, and a passageway extending through the housing, the passageway having an entrance through the uphole end of the housing and an exit through the sidewall of the housing;

a chute, slidably disposed in the housing passageway, the chute having an uphole end, a downhole end, a sidewall extending between the uphole end and the downhole end, and a passageway extending through the chute from the uphole end through the downhole end for passing the drill bit and drill string through the chute; the chute being movable between a retracted position in which the chute is retracted into the housing passageway and an extended position in which the chute is extended through the housing passageway exit to the borehole wall; and

first retention means for releasably retaining the chute in the retracted position and for releasing the chute to move to the extended position including a chute shear pin connected between the housing and the chute, and second retention means for releasably retaining the drill string to the chute and for releasing the drill string from the chute including a string shear pin connected between the drill string and the chute.

---

### 5,012,878

### ROCK BORING MACHINE DRIVE HEAD WITH UP AND DOWN DRILLING CAPABILITY

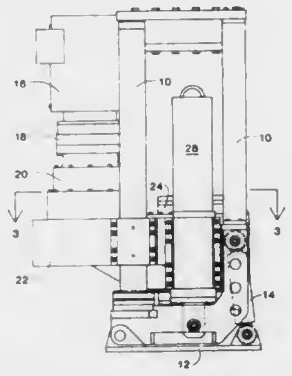
**Llewellan Anderson, Renton, Wash., assignor to The Robbins Company, Seattle, Wash.**

**Continuation-in-part of Ser. No. 267,527, Nov. 4, 1988, abandoned. This application Oct. 6, 1989, Ser. No. 417,878**

**Claims priority, application South Africa, Nov. 26, 1987, 87/8873; Australia, Nov. 25, 1988, 25949/88; Canada, Nov. 25, 1988, 584129; Fed. Rep. of Germany, Nov. 25, 1988, 3839898; Finland, Nov. 25, 1988, 885483; United Kingdom, Nov. 25, 1988, 8827553; South Africa, Nov. 29, 1988, 88/8930**

**Int. Cl.$^5$ E21B *3/02***

U.S. Cl. 175—162 12 Claims



1. Drive head apparatus for a drill string of a rock boring machine, said apparatus comprising a drill string connector securable to drive a drill string, said connector being floatingly mounted in a housing to recoil in use against resilient means while being rotated by spline means, there being an axially fixed bearing surface behind the drill string connector having a co-operant floating bearing on the drill string connector engageable with and rotatable with the fixed bearing surface, the floating bearing being separably secured to the drill string connector so as to be replaceable without replacement of the drill string connector.

---

### 5,012,879

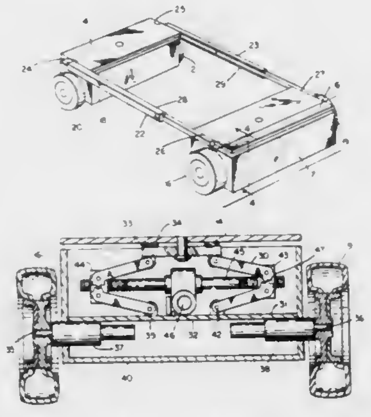
### SELF-PROPELLED JACKING APPARATUS FOR FACTORY CONSTRUCTED BUILDINGS

**Richard J. Bienek, 2274 Bulson Rd., Mount Vernon, Wash. 98273, and Henry E. Ford, 16600 25th Ave. NE., Rte. 106, Arlington, Wash. 98223**

**Filed Jun. 26, 1990, Ser. No. 544,190**

**Int. Cl.$^5$ B62D *11/04***

**U.S. Cl. 180—6.48** 2 Claims



1. Four wheeled jacking apparatus comprising first and second jacking units, each of said units comprising:

a base plate having an upper side and a lower side and first and second ends,

a powered jack mounted on said upper side and having a load support member oriented essentially parallel to said base plate,

a jacking plate and

a thrust bearing,

said jacking plate having a first end and a second end and being pivotally mounted on said load support member with said jacking plate separated from said load support member by said thrust bearing,

two wheels, each having an axis of rotation and

two wheel drive units, each having a drive shaft having an axis of rotation,

one of said two wheels being attached to said drive shaft of one of said two wheel drive units and the other of said two wheels being attached to said drive shaft of the other of said two drive units,

said wheel drive units being attached to said lower side of said base plate such that all of said axes of rotation are coincident and one of said wheels is at said first end of said base plate and the other wheel is at said second end of said base plate,

auxiliary equipment and

a box,

said box being attached to said base plate and said auxiliary equipment being installed in said box,

first and second adjustable length tie beams, each having a first end and a second end,

said first end of said first adjustable length tie beam being attached to said first end of said jacking plate of said first jacking unit, said second end of said first adjustable length tie beam being attached to said second end of said jacking plate of said second jacking unit, said first end of said second adjustable length tie beam being attached to said second end of said jacking plate of said first jacking unit and said second end of said second adjustable length tie beam being attached to said first end of said second jacking unit, whereby said jacking apparatus is a four-wheeled apparatus.

---

### 5,012,880

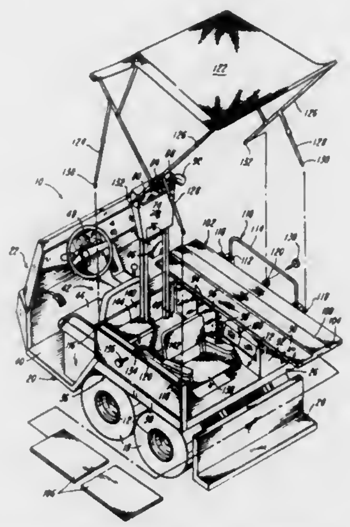
### MINI-AMBULANCE

**Jerry L. Abner, 11760 Oxford Rd., Germantown, Ohio 45327**

**Filed May 14, 1990, Ser. No. 522,738**

**Int. Cl.$^5$ B60Q *3/02;* A61G *3/00***

U.S. Cl. 180—89.11 **10 Claims**



1. A mini-ambulance for providing emergency medical treatment and for transporting the injured and sick from a remote site over difficult terrain to a medial treatment facility, which comprises:

a motor vehicle for transporting an operator, attendant, injured and sick, and medical supplies and equipment, which comprises (i) a vehicle body having a front end, a rear end with a step bumper, two sides each with wheel skirts, and a floor defining an operator section and a patient care section, (ii) means for operating the motor vehicle, and (iii) a plurality of rotatable wheels having a plurality of pneumatic tires;

an operator seat and a plurality of dash mounted indicators and accessory controlling switches in the operator section from which seat the operator is able to drive the motor vehicle and to operate the accessory controlling switches;

a housing for emergency lights generally defining a box-like structure affixed to a plurality of support posts that are affixed to the floor of the patient care section;

an elongated housing for medical equipment and supplies generally defining a box-like structure parallelly adjacent to one of the two sides and affixed to the floor of the patient care section, the top of the housing having affixed thereto an elongated platform for supporting a cot;

a rotatable attendant arm chair rearwardly affixed to the floor of the patient care section;

a convertible roof for the patient care section removably attached to the sides of the motor vehicle; and

an oxygen cylinder and a lockable container for medical equipment located in the front left area of the patient care section.

---

### 5,012,881

### VEHICLE STEERING SYSTEM WITH FLOW DIVIDING VALVE

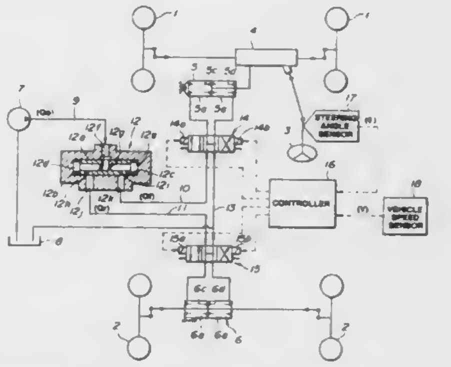
**Masatsugu Yokote; Fukashi Sugasawa, both of Yokohama; Hiroshi Mouri, Yokosuka, and Junsuke Kuroki, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jul. 17, 1989, Ser. No. 379,790**

**Claims priority, application Japan, Jul. 20, 1988, 63-178951**

**Int. Cl.$^5$ B62D *5/09***

**U.S. Cl. 180—140** **9 Claims**



1. A steering system for a vehicle, comprising;

a front hydraulic actuator for varying an actual front wheel steer angle of said vehicle,

a rear hydraulic actuator for varying an actual rear wheel steer angle of said vehicle,

controlling means for controlling said actual front and rear wheel steer angles by producing front and rear control signals,

a front hydraulic circuit comprising a front control valve for varying a fluid pressure supplied to said front actuator in accordance with said front control signal,

a rear hydraulic circuit comprising a rear control valve for varying a fluid pressure supplied to said rear actuator in accordance with said rear control signal,

a common fluid pressure source, and

a flow dividing valve having an input port connected with said common fluid pressure source, a first output port connected with said front hydraulic circuit, and a second output port connected with said rear hydraulic circuit,

VOL
1126
ISS
1
MY
7
1991
UMI

wherein each of said front and rear control valves is of an open center type, and said controlling mans includes means for determining a desired front and rear wheel auxiliary steer angles, producing said front control signal which is an electrical signal representing said desired front wheel auxiliary steer angle and said rear control signal which is an electrical signal representing said desired rear wheel auxiliary steer angle, and controlling said actual front and rear wheel steer angles by sending said front control signal to said front control valve through an open loop signal path having no summing point for feedback, and sending said rear control signal to said rear control valve through an open loop signal path having no summing point for feedback.

---

**5,012,882**

### DRIVING WHEEL SLIP CONTROL SYSTEM FOR VEHICLES

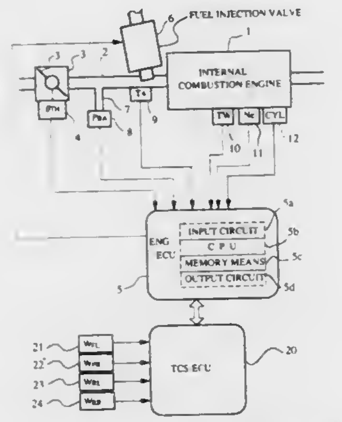
**Tetsuya Oono, and Eitetsu Akiyama, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 28, 1990, Ser. No. 546,607**

**Claims priority, application Japan, Jul. 17, 1989, 1-83903[U]**

**Int. Cl.$^5$ B60K** *31/00*

**U.S. Cl. 180—197** **4 Claims**



1. In a system for controlling a slip of at least one driving wheel of an automotive vehicle having an engine room in which is installed an internal combustion engine having a plurality of cylinders arranged, respectively, in a front bank located in a front portion of said engine room and a rear bank located in a rear portion of same, said system including driving wheel slip-detecting means for detecting a slip of said at least one driving wheel, and fuel supply cutoff means for cutting off the fuel supply to said engine, cylinder by cylinder, in response to an output from said driving wheel slip-detecting means;

the improvement comprising:

cylinder-discriminating means for determining whether or not a cylinder to be controlled in respect of fuel supply when said fuel supply cutoff means has determined that fuel cut is required for the first time after a predetermined oondition for carrying out control of said slip of said at least one driving wheel was satisfied, belongs to said rear bank; and

fuel cut-inhibiting means for inhibiting said fuel supply cutoff means from cutting off the fuel supply to said cylinder, when said cylinder-discriminating has determined that said cylinder belongs to said rear bank.

---

**5,012,883**

### AIR DUCT DEVICE FOR A MOTORCYCLE

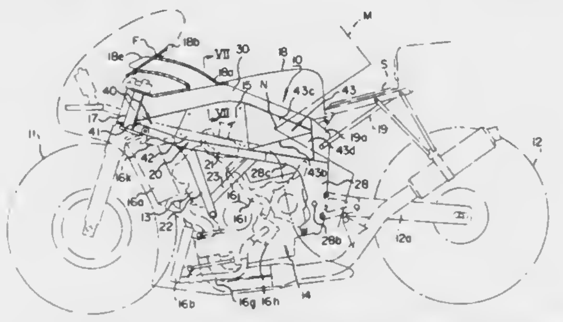
**Kinuo Hiramatsu, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 17, 1989, Ser. No. 325,167**

**Claims priority, application Japan, Mar. 20, 1988, 63-36931[U]; Jun. 28, 1988, 63–157938**

**Int. Cl.$^5$ B62M** *7/00;* **B62D** *61/02*

**U.S. Cl. 180—225** **14 Claims**



1. A frame for a motorcycle having a transverse in-line engine, comprising:

a headpipe for supporting a front wheel;

a pivot section for supporting a swing arm for a rear wheel;

a lower frame passing along sides of said engine and extending downwardly from said headpipe to said pivot section, said lower frame including a pair of laterally spaced frame sections, one on each side of said engine; and

an upper frame extending from said headpipe to an area near a front end of a motorcycle seat and passing over said engine, said upper frame including a pair of laterally spaced frame sections, corresponding to said lower frame laterally spaced frame sections, wherein said upper and lower frames are connected together at rear end portion thereof;

wherein said upper and lower laterally spaced frame sections are joined together by a generally vertical right side plate on one side of said motorcycle and generally vertical left side plate on the other side of said motorcycle to form laterally spaced right and left frames extending outward from said head pipe, each having a hollow interior; and

a hollow cross-member connecting said right and left frames together at an intermediate portion thereof, wherein the hollow interior of said cross member communicates with the hollow interiors of said frames;

intake openings disposed on said right and left frames on portions thereof extending laterally beyond said headpipe, said portions located in front of said cross member, for feeding air into said right and left frames;

an exhaust opening formed on the bottom of said cross-member for exhausting said air downward.

---

**5,012,884**

### ANTILOCK BRAKING METHOD AND APPARATUS FOR A FOUR-WHEEL DRIVE VEHICLE

**Makoto Sato, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

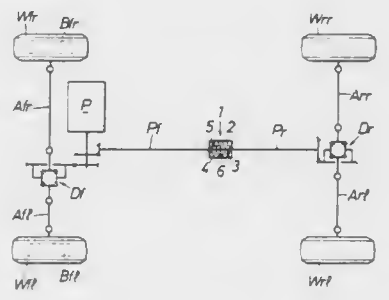
**Filed Nov. 5, 1986, Ser. No. 927,793**

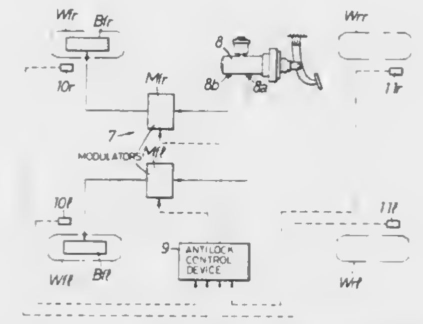
**Claims priority, application Japan, Nov. 5, 1985, 60-247328**

**Int. Cl.$^5$ B60T** *8/34, 8/62*

**U.S. Cl. 180—244** **14 Claims**

1. A four-wheel drive vehicle comprising front and rear axle arrangements, left and right wheels on each axle arrangement, a power unit drivingly connected to one of said front and rear axle arrangements, torque transmission means connected the other of said axle arrangements to said power unit, said torque transmission means being capable of transmitting torque between the front and rear axle arrangements which increase in accordance with increase in relative rotational speed of said front and rear axle arrangements, brakes on the wheels mounted on said front axle arrangements, the wheels mounted on the rear axle arrangements being devoid of brakes, means for applying force to the said brakes to cause said brakes to apply braking pressure to said wheels on the front axle arrangement, and means connected said front and rear axle arrangements to one another through said torque transmission means such that when braking force is applied to the brakes on the wheels on the front axle arrangement, braking action will be applied to the rear axle arrangement via said torque transmission means.





---

**5,012,885**

### REAR WHEEL SUSPENSION AND STEERING SYSTEM

**Gilbert R. Hilden, Owosso, Mich., assignor to DLMA Transportation Inc., Troy, Mich.**

**Filed Mar. 10, 1989, Ser. No. 321,393**

**Int. Cl.$^5$ B60K** *17/30*

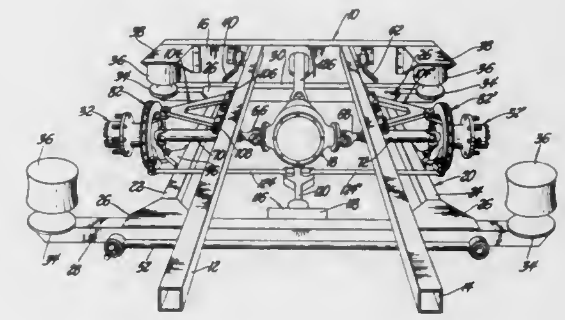
**U.S. Cl. 180—254** **5 Claims**

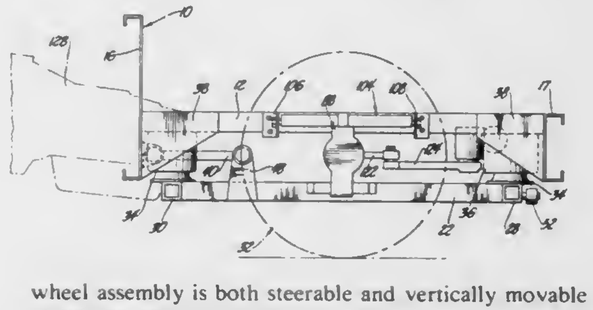
1. A rear wheel support and driving system of the type comprising a rack-type dead axle (20) adapted to support a vehicle body structure (10) spring means (36) for supporting the body structure upon the dead axle, a pair of wheel assemblies (32), ball joint means (98–102, 110–114) for steerably supporting said wheel assemblies upon said dead axle, a differential drive mechanism (18) supported upon the vehicle body structure and movable with said structure relative to the dead axle, the differential mechanism including a power input shaft (126) and power output shafts (66, 68), a pair of live axles (70, 72) respectively drivingly connected at one end to the output shafts and at the other end to wheel driving shafts (76, 76′), said wheel driving shafts being rotatably supported within said wheel assemblies, the dead axle being generally rectilinear in shape and having a first pair of longitudinal beams (22, 24) respectively transversely spaced outboard of said differential mechanism, a second pair of cross beams (28, 30) respectively spaced fore and aft of said differential mechanism and integrally secured to the first pair of beams, the improvement comprising:

A. each wheel assembly (32) includes a yoke (88) having upper and lower arms (94, 92);

B. first means (96, 98–102) connecting the lower yoke arm (92) to the, longitudinal beam (22) whereby the wheel assembly is both steerable relative to and vertically movable with the dead axle;

C. second means (106–112) connecting the upper yoke arm (94) to the vehicle body structure (10) in a way that the





wheel assembly is both steerable and vertically movable relative to the body structure; and

D. means (116–124) for imparting steering movement to the wheel assemblies (32).

---

**5,012,886**

### SELF-GUIDED MOBILE UNIT AND CLEANING APPARATUS SUCH AS A VACUUM CLEANER COMPRISING SUCH A UNIT

**André Jonas 31, Chemin du Colombier; Bernard Jonas, 29, Chemin du Colombier, both of, 06650 Le Rouret, France**

**Division of Ser. No. 131,000, Dec. 10, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,558**

**Claims priority, application France, Dec. 11, 1986, 86 17356; Sep. 8, 1987, 87 12577**

**Int. Cl.$^5$ B60K** *28/10;* **B60L** *3/00*

**U.S. Cl. 180—279** **5 Claims**

4. A mobile unit adapted to follow guides, comprising

a chassis,

means for supporting the chassis on a floor,

a steering and advance element,

means for driving the steering and advance element in a predetermined direction so as to advance the mobile unit,

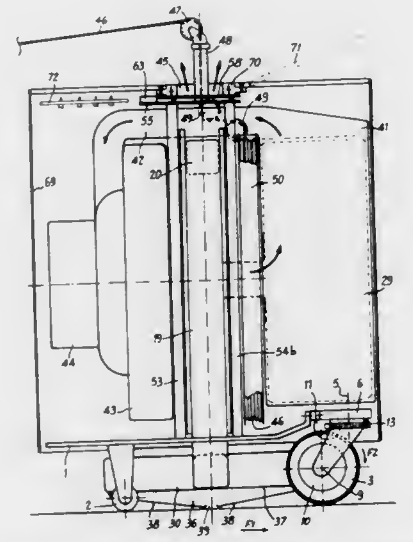
orientation means for pivoting the steering and advance element with respect to the chassis, around an approximately vertical axis,

detection means mounted for translational movement, in an approximately horizontal plane, with respect to the chassis, said detection means being adapted to bear against said guides, and

means for controlling said orientation means so as to cause the steering and advance element to pivot in a first direction when the bearing force between the detection means and the guide is lower than a predetermined first threshold

VOL
1126
ISS
1
MY
7
1991
UMI

force, and in a second direction opposite the first when the bearing force is greater than said first threshold,



wherein said detection means comprises a cylindrical hood having a vertical axis about which the hood may rotate with respect to the chassis.

### 5,012,887
### DRIVE FOR MOTOR VEHICLES

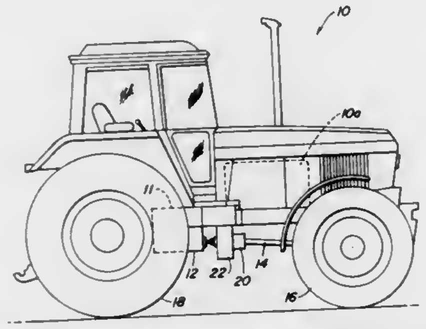
**Dieter Butz, Mannheim; Franz Erbach, Otterstadt, and Kurt Müller, Lapmertheim, all of Fed. Rep. of Germany, assignors to Deere & Company, Moline, Ill.**

**Filed Jul. 26, 1989, Ser. No. 385,763**

**Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826341**

**Int. Cl.$^5$ B60K** *17/00*

**U.S. Cl. 180—305** **14 Claims**



1. A drive for a motor vehicle having a power source and at least one set of wheels, comprising:

a drive shaft for driving the wheels;

a shiftable gearbox selectively connectible between said drive shaft and the power source to drive said wheels;

hydraulic power means having an output shaft selectively connectible between said drive shaft and said power source to drive said wheels;

connection means for selectively connecting one, but not both, of said shiftable gearbox and said hydraulic power means to said drive shaft and said power source, said connection means including a drive shaft gear splined to said drive shaft for rotation therewith but axially slidable relative thereto, the splines of said drive shaft gear also being drivingly connected to said hydraulic power means output shaft when axially shifted in one direction and disconnected therefrom when axially shifted in the other direction, and said connection means further including an intermediate gear rotatably mounted about said drive shaft and having a first and a second set of gear teeth thereon, said first set of teeth being selectively engagable by the splines of said drive shaft gear and said second set of teeth being driven by said hydraulic power means output shaft; and

an auxiliary gearbox housing having said hydraulic power means mounted thereto and said drive shaft gear, shift sleeve and intermediate gear mounted therein.

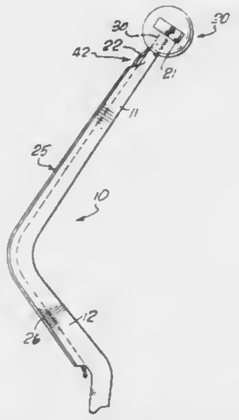
### 5,012,888
### SHIFTING METHOD AND APPARATUS

**Richard F. MacInnis, P.O. Box 2541, White City, Oreg. 97503**

**Filed Nov. 13, 1987, Ser. No. 120,033**

**Int. Cl.$^5$ B60K** *17/00*

**U.S. Cl. 180—336** **2 Claims**



1. Apparatus for changing the shift range of a transmission having multiple ranges comprising a shift bar which cooperates with the transmission to enable shifting to various gear ratios within a given shift range; an electrical switch associated with said shift bar and connected to wires in such a manner as to enable the carrying of current to a solenoid valve capable of activating a range switching mechanism within a transmission; said shift bar being essentially dog leg shaped and rectangular in cross section; and said electrical wires being carried in a channel along one edge of said shift bar.

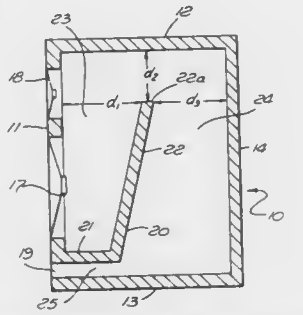
### 5,012,889
### SPEAKER ENCLOSURE

**Howard Rodgers, Woodland Hills, Calif., assignor to Rogersound Labs, Inc., Canoga Park, Calif.**

**Filed Nov. 30, 1989, Ser. No. 443,914**

**Int. Cl.$^5$ H05K** *5/00*

**U.S. Cl. 181—152** **25 Claims**



1. A loudspeaker system comprising: a loudspeaker having front and rear surfaces for radiating sound waves;

an enclosure for said loudspeaker including a first wall having a first aperture therethrough for receiving the loudspeaker such that said front surface is external to said enclosure and said rear surface is internal to said enclosure, said enclosure having a second aperture therethrough; an at least partially inclined partition disposed within said enclosure defining a folded acoustic path between said rear surface of said loudspeaker and said second aperture, said folded acoustic path having a region of decreased cross-sectional area proximate to said second aperture.

### 5,012,890
### ACOUSTIC APPARATUS

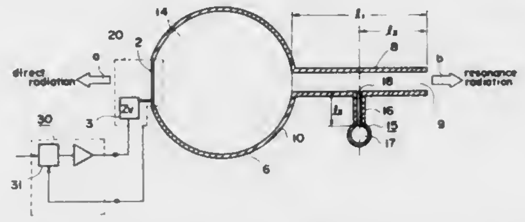
**Katsuo Nagi, and Kazunari Furukawa, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan**

**Filed Mar. 15, 1989, Ser. No. 323,667**

**Claims priority, application Japan, Mar. 23, 1988, 63-67122; Mar. 23, 1988, 63-67123**

**Int. Cl.$^5$ G10K** *11/04*

**U.S. Cl. 181—160** **8 Claims**



1. An acoustic apparatus comprising:

a cabinet with an open duct attached thereto for radiating acoustic waves by resonance, the cabinet having an internal cavity which together with said duct defines a Helmholtz resonator;

a vibrator having a diaphragm for driving said Helmholtz resonator;

a vibrator driver supplying a drive signal to the vibrator, wherein said vibrator driver includes a servo unit to control the vibrator to substantially cancel reaction from the Helmholtz resonator; and

duct resonance absorbing means, situated at or near an antinode position of resonance of the open duct, for reducing resonance from the open duct.

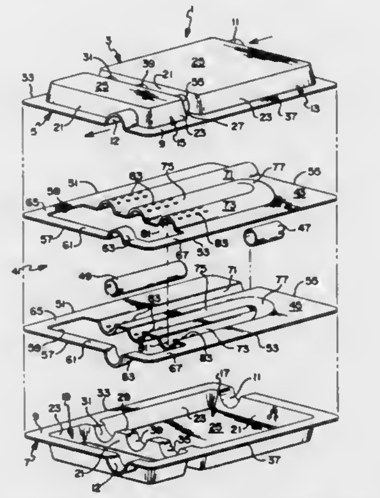
### 5,012,891
### MUFFLER ASSEMBLY

**Howard C. Macaluso, Jackson, Mich., assignor to Tennessee Gas Pipeline Company, Lincolnshire, Ill.**

**Filed Feb. 15, 1989, Ser. No. 310,583**

**Int. Cl.$^5$ F01N** *7/18*

**U.S. Cl. 181—282** **10 Claims**



1. A sound attenuating exhaust gas muffler for a vehicle exhaust system comprising a housing formed of two pan-shaped halves, each of said pan-shaped halves having a recess which are operable to form a gas flow turn-around chamber, a plurality of gas flow plated disposed between said pan-shaped halves, said gas flow plates having troughs integrally press-formed therein defining a tri-flow gas flow passage, said troughs comprising three parallel gas flow sections including inlet and outlet flow sections and a return flow section and a turn-around section connecting the return flow section and either the inlet or outlet flow section, two of said parallel gas flow sections opening into said turn-around chamber, inlet gas port means connected to the inlet flow section, and outlet gas port means connected to the outlet gas flow section.

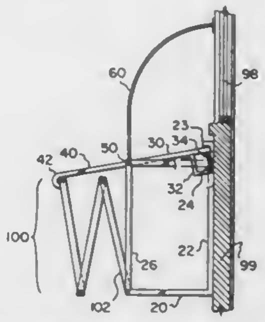
### 5,012,892
### ESCAPE LADDER

**Peter J. Kelly, 3219 Bliss Rd., Windsor, Ontario, Canada N8W 3B2**

**Filed Jul. 10, 1989, Ser. No. 377,040**

**Int. Cl.$^5$ E06C** *9/10*

**U.S. Cl. 182—84** **19 Claims**



1. An escape ladder assembly comprising in combination:

(a) a framework structure for attaching the assembly to a vertical wall and which includes a wall engagement section and a pair of spaced apart ladder support members projecting outwardly from said wall engagement section;

(b) a plurality of interconnected ladder sections movable between a first ladder inoperative position where the ladder sections are collapsed and a second ladder operative position where the ladder sections are extended;

(c) means connecting a first one of said ladder sections to said ladder support members;

(d) a platform carried by said framework structure and located between said wall engagement section and said means connecting said first one of said ladder sections to said ladder support members, said platform being movable within selected limits from one to the other of respective first and second platform positions;

(e) latch means engageable with at least one of said ladder sections for maintaining said ladder sections in said first ladder inoperative position when said platform is in said first platform position; and

(f) means responsive to movement of said platform from said first to said second platform position for disengaging said latch means and thereby permitting said ladder sections to assume said second ladder operative position.

### 5,012,893
### MULTI-PURPOSE SAWHORSE

**Thomas F. Kraeger, 306 W. Davies Ave. N., Littleton, Colo. 80120**

**Filed Dec. 11, 1989, Ser. No. 448,721**

**Int. Cl.$^5$ B27B** *21/00;* **B25H** *1/06*

**U.S. Cl. 182—153** **14 Claims**

1. A collapsible horse, capable of supporting downward-bearing loads on any one of three possible orientations along its height, length or breadth, comprising:

(a) a cross beam member of pre-determined length;

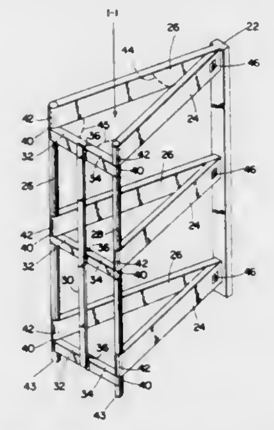
(b) at least two pairs of legs connected to said cross beam

VOL
1126
ISS
1
MY
7
1991
UMI

member, which leg pairs are laterally disposed along said cross beam member, and are downwardly divergent in a plane transverse to that of said cross beam member;

(c) two base beam members running substantially parallel to said cross beam member, having substantially similar length as that of said cross beam member and to which said pairs of legs are connected; and

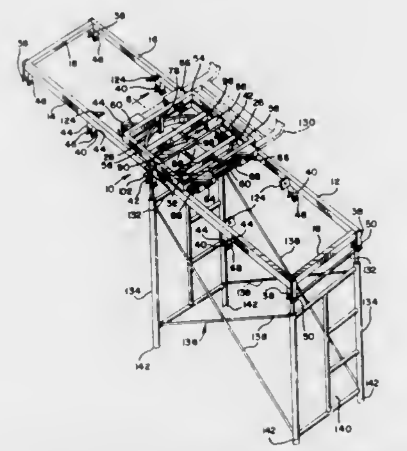
(d) a plurality of base beam braces in one-to-one association with each of said pairs of legs, each brace being pivotally connected to said base beam members and each brace being pivotable about a hinge means.



---

### 5,012,894
### SCAFFOLD ERECTION STRUCTURE

**Kurt A. Nelson, P.O. Box 272, Batavia, Ill. 60510**
**Filed Jul. 23, 1990, Ser. No. 557,328**
**Int. Cl.⁵ E04G** *1/06, 1/15*
**U.S. Cl. 182—178** **12 Claims**



1. A device particularly adapted for erecting sections of scaffolding, said device comprising:

a structure having an upper frame portion carrying a lower frame portion,

lifting means carried by said structure to allow selective raising and lowering of said structure by external power means, and

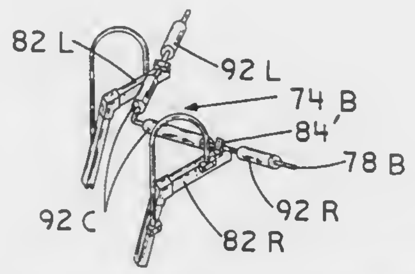
bracket means connected to said lower frame portion for selective securement of end frame units of said scaffolding,

wherein said structure may be operatively engaged by said power means to raise said structure above a supporting surface thereunder, said scaffold end frame units may be secured in said bracket means to hang vertically therebelow in a spaced apart relationship, and said end frame units may be connected by cross bracing to form said sections of said scaffolding.

---

### 5,012,895
### LADDER STABILIZER COMPRISING TOP EXTENSION ARMS AND ATTACHED STABILIZER BARS

**Virgil Santos, Rodeo, Calif., assignor to Joseph H. Couch, IIII, San Leandro, Calif., a part interest**
**Filed Feb. 8, 1989, Ser. No. 307,844**
**Int. Cl.⁵ E06C** *7/48*
**U.S. Cl. 182—204** **13 Claims**



1. Apparatus for stabilizing a ladder of the type comprising: (a) a pair of parallel side rails extending in a first direction, said side rails having free upper ends, and (b) a plurality of rungs interconnecting said side rails, said rungs being perpendicular to said side rails and extending in a second direction perpendicular to said first direction, said rungs including a top rung, said ladder to be used with its top leaning against a support, comprising:

a pair of top extension arms, each arm comprising a pair of joined sections comprising an upper section and a lower section, said lower section of each arm comprising a rectangular tube having a wall, said sections being joined at an obtuse angle, each of said lower sections having an open lumen sized to fit over said free upper end of a respective side rail, said upper section of each arm extending at an angle to its respective side rail, said upper sections of said extension arms being parallel and lying in a plane which intersects a plane which is parallel to said first and second directions,

means for removably connecting said extension arms to said free top ends of said respective side rails, said means comprising a rung notch on said wall of each lower section, each of said rung notches positioned to mate with said top rung of said ladder when said lower section is fit over said free upper end of its respective arm, and at least one rung lock bar and means for connecting said rung bar across one of said notches so as to lock said notch onto said rung.

---

### 5,012,896
### LUBRICATING SYSTEM FOR ROTARY HORIZONTAL CRANKSHAFT HERMETIC COMPRESSOR

**Caio Mario F. N. Da Costa, Joinville, Brazil, assignor to Empresa Brasileira de Compressores, Joinville, Brazil**
**Filed Feb. 2, 1990, Ser. No. 475,358**
**Claims priority, application Brazil, Feb. 17, 1989, PI8900780**
**Int. Cl.⁵ F01M** *1/00*
**U.S. Cl. 184—6.16** **8 Claims**

1. Lubricating system for a rotary horizontal crankshaft hermetic compressor comprising:

a hermetic shell provided with discharge and suction tubes and defining a lubricating oil sump at its bottom;

a compressor set in said shell including a cylinder block in whose interior a rolling piston rotates as an eccentric portion of a horizontal crankshaft, and an electric motor for rotating the crankshaft;

a main bearing and a sub bearing adjacent the cylinder block within which one end of the crankshaft is supported, the other end of the crankshaft mounted to the rotor of the

electric motor, the crankshaft having at least one internal channel to provide oil lubrication to said main bearing within which it rotates;

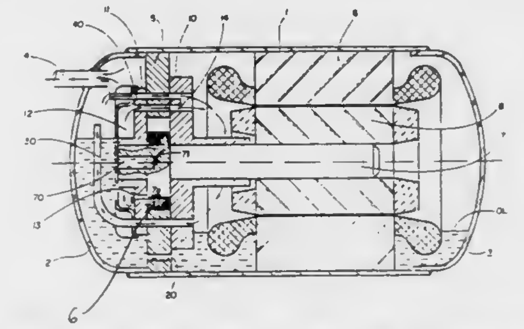
the compressor set dividing the interior of the shell into a first section housing the electric motor and a second section, said discharge tube communicating with said second section;

means for providing gas flow communication of a discharge pressure between the second section and the first section;

an oil passage in the cylinder block below a minimum sump lubricating oil level to be produced in both sections;

a gas duct with one end communicating with the first section at a point above a maximum oil level to be provided in the first section and with the opposite end communicating with the second section at a point above a normal operational level of the lubricating oil in this section, said normal operational level of the lubricating oil in said second section being at a point above the level of the crankshaft and above said minimum oil level; and

a level regulating passage through said cylinder block providing communication between said first and second sections to define the maximum lubricating oil level in the second section, said passage being dimensioned that the oil operational level in the second section elevated by a pressure differential between the two sections to reach at least the level of the crankshaft, which conveys the oil to the shaft internal channel to provide for bearing lubrication.

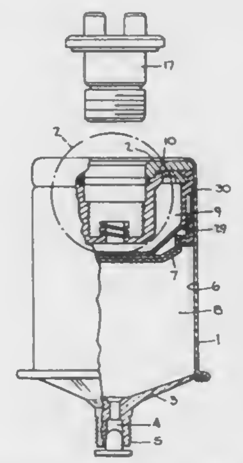


---

### 5,012,897
### DEVICE FOR THE CONTINUOUS SUPPLY OF LIQUID OR VISCOUS MEDIUMS, IN PARTICULAR LUBRICANTS

**Bernd Jorissen, Euerdorf, Fed. Rep. of Germany, assignor to Gebbard Satzinger GmbH & Co., Bad Kissingen, Fed. Rep. of Germany**
**PCT No. PCT/DE87/00592, § 371 Date Aug. 7, 1989, § 102(e) Date Aug. 7, 1989, PCT Pub. No. WO88/04751, PCT Pub. Date Jun. 30, 1988**
**PCT Filed Dec. 12, 1987, Ser. No. 372,335**
**Int. Cl.⁵ F16N** *11/10*
**U.S. Cl. 184—39** **15 Claims**

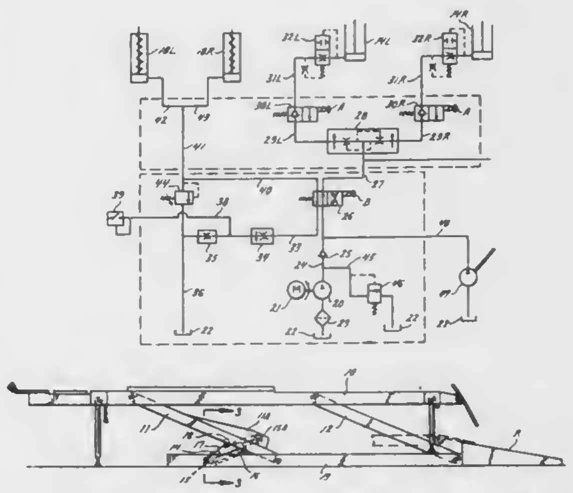
1. A device for the continuous supply of liquid mediums of varying viscosities, including a container and a lid, said container being sub-divided by separation means into a chamber for holding said medium and a chamber for holding a pressure gas, said device being capable of being triggered into action at any time for the electrochemical generation of gas which builds up pressure in said pressure gas chamber, causing said separation means to expand as a function of time, thus causing said medium to travel from said holding chamber via a channel until it is dispensed, characterized by the fact that at least one compact cell comprising of an electrolyte, an anode, and a cathode is provided for the electromechanical generation of said gas, said cell being installed, together with an electric circuit containing an electric resistor connecting said anode and cathode with each other inside a component which is capable of being inserted in said container lid, said cell being capable of moving inside said component and further characterized by when said component is inserted into said container lid, means are provided to cause said cell to be displaced and said electric circuit to be closed for the generation of said gas.



---

### 5,012,898
### CONTROL SYSTEM FOR VEHICLE LIFT RACKS

**Anatoly Tsymberov, Ballwin, Mo., assignor to Hunter Engineering Company, Bridgeton, Mo.**
**Filed Sep. 15, 1988, Ser. No. 244,284**
**Int. Cl.⁵ B66F** *7/08;* **F15B** *7/00, 15/26*
**U.S. Cl. 187—8.47** **2 Claims**



1. A control system for vehicle lift racks comprising in combination:

(a) a pair of runways on which a vehicle may be lifted and lowered;

(b) a pump and a source of fluid;

(c) a fluid circuit to accommodate the flow of fluid under pressure by said pump from said source of fluid;

(d) a plurality of pressure fluid directing valve means in said fluid circuit, one of said plurality of fluid directing valve means having a first setting for establishing a first path for pressure fluid into other ones of said plurality of pressure fluid directing valve means to effect the operation of said runways for lifting a vehicle;

(e) said one of said plurality of pressure fluid directing valve means being operable to create a second path for the return of fluid to said source of fluid in bypass of said pump for lowering the runways for lowering a vehicle;

VOL
1126
ISS
1
MY
7
1991
UMI

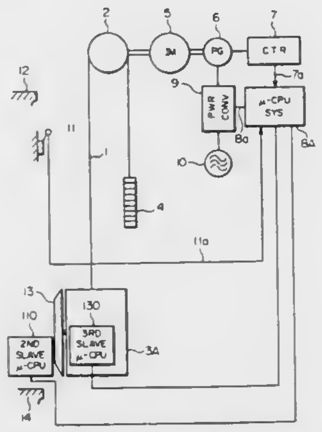
(f) an electrical control circuit for energizing said pump and said plurality of pressure fluid directing valve means in a predetermined sequence;

(g) control means for selectively managing said electrical control circuit and said plurality of pressure fluid directing valve means, said control means having a vehicle lift selector means to supply pump operated fluid to effect runway lifting of a vehicle, and a vehicle selector lowering means for stopping pump supply of fluid and directing the fluid into said created second path for the return of fluid in bypass of said pump operated source of fluid; and cooperative means connected into said second path which receives the return of fluid in bypass of said pump so as to be responsive to the occurrence of a predetermined reduced fluid flow in bypass of said pump for effecting the closing of said other ones of said plurality of pressure fluid directing valve means to arrest the lowering of a vehicle.

---

### 5,012,899
### APPARATUS FOR CONTROLLING AN ELEVATOR

**Shigemi Iwata, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Apr. 25, 1989, Ser. No. 342,896**
**Claims priority, application Japan, Apr. 26, 1988, 63-101392**
**Int. Cl.⁵ B66B** *1/00*
**U.S. Cl. 187—101** **5 Claims**



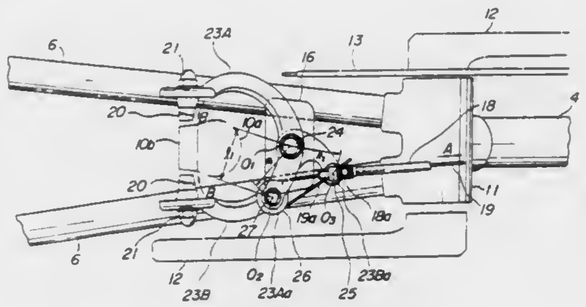
1. An apparatus for controlling an elevator under a distributed control by a plurality of microcomputers comprising:

- a master microcomputer and a plurality of slave microcomputers,
- said master microcomputer including a microprocessor and memory which stores control data representing regulating and set values and control programs for the slave microcomputers,
- each of said slave microcomputers including a slave system memory which can receive and store a control program and the control data received from said master microcomputer,
- transmitting means connected between said master microcomputer and each of said plurality of slave microcomputers for transmitting control data and control programs from said master microcomputer memory to said respective slave microcomputers to be stored in said slave system memories.

---

### 5,012,900
### BRAKE FOR BICYCLE

**Hideyuki Ishibashi, Ageo, Japan, assignor to Bridgestone Cycle Co., Ltd., Tokyo, Japan**
**Filed May 16, 1989, Ser. No. 352,244**
**Int. Cl.⁵ B62L** *1/02, 3/00*
**U.S. Cl. 188—24.12** **6 Claims**



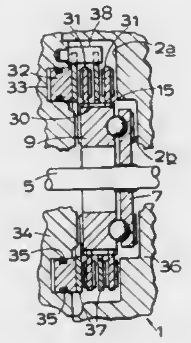
1. A caliper brake for a bicycle, comprising:

- support means for mounting said brake on a bicycle frame;
- first and second caliper arms, each being pivotally supported on said frame by said support means, and each having a first end for supporting a brake shoe, a second free end, and a main body portion between said first end and said second, free end;
- a pulley rotatably provided on said second, free end of said first caliper arm; and
- a brake operating wire having an inner wire and an outer wire, said outer wire being anchored at an anchor point to said second, free end of said second caliper arm, said inner wire extending around said pulley to form an operating force acting point of said first caliper arm by the pulley, at which brake operating force acts on said first caliper arm, one end of said inner wire being connected to said second, free end of said second caliper arm to form an operating force acting point of said second caliper arm by the anchoring point, at which brake operating force acts on said second caliper arm;
- wherein said second free ends of said caliper arms do not extend laterally outwardly beyond said main body portion of each caliper arm.

---

### 5,012,901
### SELF-ENERGIZING DISC BRAKES

**Roy Campbell, Worcestershire, England, and Anthony G. Price, Gwent, Wales, assignors to Lucas Industries public limited company, Birmingham, United Kingdom**
**Filed Sep. 25, 1989, Ser. No. 411,708**
**Claims priority, application United Kingdom, Sep. 28, 1988, 8822764**
**Int. Cl.⁵ F16D** *55/04*
**U.S. Cl. 188—71.4** **16 Claims**

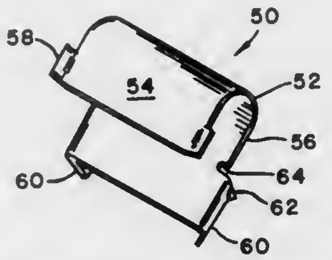


1. A self-energising disc brake assembly of the compound type comprising a housing, a rotatable shaft to be braked extending into said housing, spaced braking surfaces in said housing, first and second pressure plates located between said braking surfaces and having in adjacent faces thereof complementary oppositely inclined angularly spaced recesses of which edges define ramp surfaces, and camming means between said plates, said camming means comprising rolling bodies located in complementary pairs of said recesses, relative angular movement between the plates causing said plates to move axially apart and into engagement with said braking surfaces due to said rolling bodies riding said ramps, wherein said first plate comprises a driven plate having an outer peripheral edge, means coupling said driven plate to said rotatable shaft so that said plate is axially movable with respect to said shaft but angularly immovable relative thereto, and said second plate comprises an input plate carried from said driven plate by means of said camming means, said compound brake also comprising primary braking means provided in said housing to retard rotation of said input plate, and a secondary brake formed by said self-energising engagement of said pressure plates with said braking surfaces, actuation of said secondary brake being effected by application of said primary braking means to retard said input plate and so cause relative angular movement between said pressure plates, in turn causing said pressure plates to engage said braking surfaces whereby to initiate a self-energising braking action by said secondary brake, and wherein said input plate has an outer peripheral edge, and torque-transmitting means co-operates with said input plate, said torque-transmitting means comprising at least one annular ring extending radially outwards beyond said outer peripheral edge of said driven plate and having a radial friction surface beyond the said edge, and keying means keying said ring to said outer peripheral edge of said input plate for axial movement relative thereto, said primary braking means being adapted to apply a force to said radial friction surface of said torque-transmitting means substantially in an axial direction in order to retard said input plate.

---

### 5,012,902
### CALIPER AND RETAINING PIN SPACER

**Mark D. Moody, and Robert T. DuCharme, both of South Bend, Ind., assignors to Allied-Signal Inc., Morristown, N.J.**
**Filed Sep. 29, 1989, Ser. No. 414,803**
**Int. Cl.⁵ F16D** *65/02*
**U.S. Cl. 188—73.35** **4 Claims**

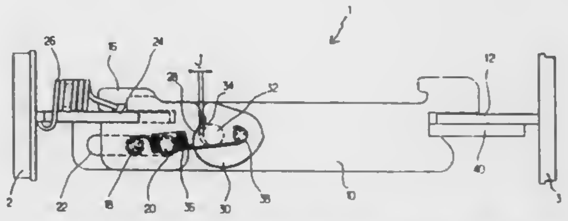


1. A spacer positioned between a caliper housing and pin means which connects the caliper housing with a torque support member of a disc brake, the caliper housing having an axially extending opening receiving therein the pin means connected with said torque member, the pin means shaped complementary with the caliper housing opening, the spacer comprising a generally C-shaped spacer member with a curved portion connecting together upper and lower portions having respective upper and lower flanges, the upper flanges extending axially outwardly from the upper portion of the spacer member to be axially outside the housing opening, the upper portion being bowed radially inwardly toward the pin and a center area of the spacer member, the lower flanges of the lower portion extending substantially radially away from a center portion of the C-shaped spacer member and bent axially inwardly toward one another so as to grip adjacent portions of the caliper housing, each of the lower flanges having a corner ear adjacent the curved portion and which is bent axially outwardly away from the respective lower flange and the other ear, the curved portion joined to the lower portion and lower flanges by means of axially opposite notches disposed in the spacer member in order to prevent stress cracking, and the spacer member disposed within the caliper housing opening and about the pin means in order to reduce dynamic movement and dampen vibration therebetween.

---

### 5,012,903
### AUTOMATICALLY ADJUSTABLE SPACER FOR A DRUM BRAKE

**Jean-Charles Maligne, Aubervilliers, and Jean-Louis Magnaval, Neuilly-Plaisance, both of France, assignors to Bendix France, Drancy, France**
**Filed Oct. 16, 1989, Ser. No. 422,202**
**Claims priority, application France, Oct. 25, 1988, 88 13905**
**Int. Cl.⁵ F16D** *65/58*
**U.S. Cl. 188—79.54** **2 Claims**



1. An automatically adjustable spacer for a drum brake, intended to be mounted in the vicinity of clamping means arranged between movable ends of first and second shoes fitted with friction elements, said spacer comprising essentially:

- a first part bearing at one end on the first shoe, and a second part bearing at an opposite end on the second shoe, said first and second parts being mounted slidably longitudinally relative to one another and said shoes,
- a locking element, substantially half of a periphery of which has a toothing, mounted movably on said first part and meshing only with a corresponding toothed quadrant provided oppositely on part of a curved periphery of said second part, said locking element being mounted movably in terms of rotation about a pin integral with said locking element, said pin being mounted movably in terms of longitudinal translational motion in a slot provided in said first part, and being in the form of a toothed cam a rotational movement of which results in an increase of a distance between said pin and a meshing zone between said toothing at the periphery of said locking element and said toothed quadrant at the curved periphery of said second part, and
- a draw spring fastened to said second part and to said locking element, said spring imparting a rotational movement to said locking element as soon as said toothing and said toothed quadrant no longer mesh with one another, the length of said toothed quadrant provided on said second part being substantially equal to the length of said meshing zone when said spacer is completely extended.

---

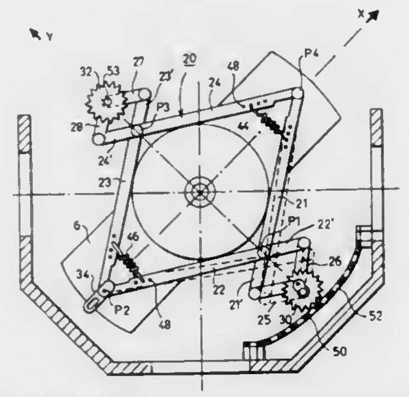
### 5,012,904
### CENTRIFUGAL BRAKE AND GYROSCOPES INCLUDING SAME

**Yona Becher, Rishon LeZion, Israel, assignor to Israel Aircraft Industries Ltd., Lod, Israel**
**Filed Dec. 29, 1983, Ser. No. 566,567**
**Claims priority, application Israel, Dec. 31, 1982, 67600**
**The portion of the term of this patent subsequent to Jan. 7, 2004, has been disclaimed.**
**Int. Cl.⁵ G01C** *19/30*
**U.S. Cl. 188—185** **10 Claims**

2. A centrifugal brake for limiting the rotational speed of a

VOL
1126
ISS
1
MY
7
1991
UMI

rotatable body with respect to a reference body, which brake includes at least one brake element movable by centrifugal force into engagement with an abutment member fixed to the reference body when the rotational speed of the rotatable body exceeds a predetermined value with respect to the reference body; wherein each of said at least one brake elements is disposed at a corner of a parallelogram mechanism made of a plurality of pivotably-coupled links such that the brake element is displaced into contact with the abutment member of the reference body when the rotational speed of the rotatable body exceeds the predetermined value, wherein said parallelogram mechanism includes four linds pivotably mounted to each other and to the rotational body such that a first pair of opposite corners of the parallelogram mechanism are displaced away from the center of rotation of the rotational body by centrifugal force, while the remaining pair of opposite corners are displaced towards the center of rotation of the rotational body, each one of said at least one brake elements being mounted to one corner of said first pair of opposite corners of the parallelogram mechanism.



---

### 5,012,905

## DOUBLE WRAP BRAKE BAND AND ITS MANUFACTURING METHOD

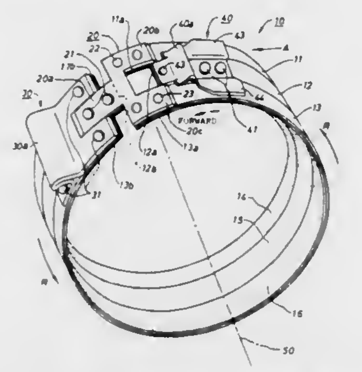
**Teruhiko Tanaka, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**

**Filed Sep. 5, 1989, Ser. No. 402,411**

**Claims priority, application Japan, Sep. 12, 1988, 63-227680**

**Int. Cl.$^5$ F16D** *65/06*

**U.S. Cl. 188—250 H** **8 Claims**



1. A double wrap brake band including three bands flush with each other and formed into approximately annular shape, side-by-side friction facings fastened to inner peripheral surfaces of the respective bands, each of said bands having circumferentially spaced ends, a connecting member circumferentially connecting one end of said ends of both outside bands of said three bands with a circumferential opposite end of an intermediate band of said three bands, a first bracket member secured to the opposite ends of said both outside bands, and a second bracket member secured to a circumferential one end of said intermediate band; characterized by that said three bands, said connecting member, and said first and second bracket members, respectively, are separately made of sheet metal, an edge for receiving a piston at a backside thereof is integrally formed on one of said first and second bracket members and an edge for receiving an anchor at a backside thereof is integrally formed on the other of said first and second bracket members, said connecting member and said first and second bracket members are, respectively, secured to corresponding places on said three bands by means of rivets and said second bracket member is provided with wing-shaped reinforcing members stretching integrally from opposite sides of a portion of said second bracket member secured to said intermediate band at the backside of said edge and in a lateral direction of said both outside bands to substantially completely cover the total width of said outside bands over an outer peripheral, circumferential portion thereof, said second bracket member extending integrally in a circumferential direction to a front side portion of said edge.

---

### 5,012,906

## APPARATUS FOR DISENGAGING A FRICTION CLUTCH WHICH COUPLES AN EXHAUST GAS TURBINE TO AN INTERNAL COMBUSTION ENGINE

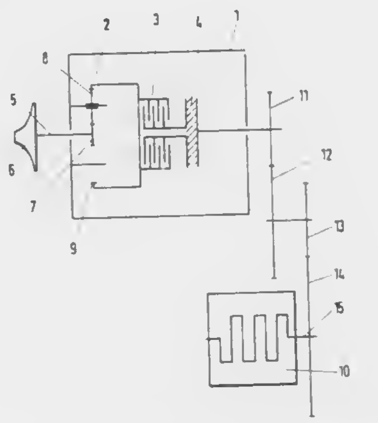
**Emil Meyer, Petershausen, and Johann Eichinger, Vaterstetten, both of Fed. Rep. of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany**

**Filed Sep. 21, 1989, Ser. No. 410,593**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832288**

**Int. Cl.$^5$ F16D** *43/284*

**U.S. Cl. 192—56 F** **19 Claims**



1. An apparatus, comprising: a friction clutch which can be closed to effect clutch engagement and opened to effect clutch disengagement, including a ring piston movably supported in an annular chamber of a rotatably supported cylinder member rotatably driven by driving means, said ring piston moving against a force of a spring to compress friction members of said clutch to effect engagement thereof in response to pressure of a fluid supplied form a pump into said annular chamber of said cylinder member, said annular chamber communicating with a location external to said friction clutch through a relief bore extending through said cylinder member from a point in said chamber having a relatively low peripheral speed, rotation of said ring piston relative to said cylinder member being limited by a pin fastened in said cylinder member and projecting approximately axially into a recess provided in said ring piston, said driving means including an exhaust-gas turbine operatively coupled to said cylinder member; an internal combustion engine having a crankshaft driven by an output part of said friction clutch; and means for interrupting the fluid supply to said annular chamber in response to the occurrence of either of first and second conditions, said first condition existing when a

speed of said output part becomes greater than the speed of said cylinder member, and said second condition existing when said engine is idling.

---

### 5,012,907

## TRANSMISSION FOR SEPARATELY DRIVABLE RIGHT AND LEFT WHEELS

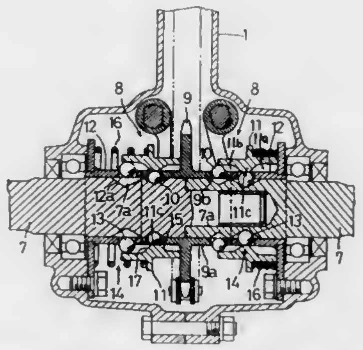
**Hisatake Fujioka; Tokio Horikawa, and Nobuhide Yanagawa, all of Osaka, Japan, assignors to Kubota Corp., Osaka, Japan**

**Filed Apr. 9, 1990, Ser. No. 506,127**

**Claims priority, application Japan, Apr. 28, 1989, 1-109298**

**Int. Cl.$^5$ F16D** *67/02*

**U.S. Cl. 192—13 R** **8 Claims**



1. A transmission for separately drivable right and left wheels comprising:

- right and left transmission shafts connected to said right and left wheels, respectively,
- ball type side clutches each having clutch balls movable radially of each of said right and left transmission shafts to transmit power to each of said right and left transmission shafts, said clutch balls being movable between a clutching position engaged with a first engagement portion of a respective transmission shaft and a declutching position radially retracted from said respective transmission shaft,
- ball type side brakes each having brake balls movable radially of each of said right and left transmission shafts to brake the respective transmission shaft, said brake balls being movable between a braking position engaged with a second engagement portion of each of said right and left transmission shafts and a releasing position radially retracted from said respective transmission shaft, and
- shifter sleeves axially movably mounted on each of the right and left transmission shafts, respectively, each of said shifter sleeves including a first space for accommodating said clutch balls, a second space for accommodating said brake balls, and pressing means for pressing said clutch balls and said brake balls, and movable between a first position in which said pressing means presses said clutch balls into said first engagement portion, and a second position in which said pressing means presses said brake balls into said second engagement portion with said clutch balls accommodated in said first space.

---

### 5,012,908

## CONTROL COUPLING FOR TORQUE TRANSMISSION

**Katsuyuki Kobayashi, Aichi; Masaki Inui; Satoshi Ashida, both of Toyota; Keiichi Nakamura, Kariya, and Masaji Yamamoto, Okazaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Toyoda Koki Kabushiki Kaisha, Karyia, both of, Japan**

**Filed Feb. 2, 1990, Ser. No. 474,507**

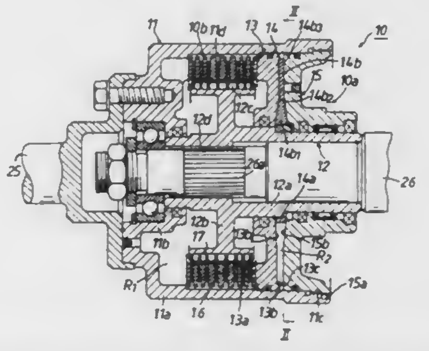
**Claims priority, application Japan, Feb. 3, 1989, 1-26074**

**Int. Cl.$^5$ F16D** *25/063, 25/02, 43/284*

**U.S. Cl. 192—57** **5 Claims**

1. A control coupling for torque transmission between a pair of rotary members coaxially arranged for relative rotation, comprising a cylindrical casing mounted on one of the rotary members for rotation therewith, a friction clutch assembled within said casing for effecting drive connection between the rotary members when it has been engaged, and a thrust mechanism including a thrust piston axially slidably coupled within said casing for rotation therewith and being in engagement with said friction clutch, an end wall member coupled with said casing for rotation therewith and spaced from said piston to form a fluid chamber filled with an amount of viscous fluid, and a rotor disposed in said fluid chamber and mounted on the other rotary member for rotation therewith, said rotor having at least one radial blade extending radially outwardly therefrom and being disposed between said piston and said end wall member, said rotor being shaped to form at least one sub-chamber in said fluid chamber, each said sub-chamber at least partially axially overlapping a portion of said rotor radially aligned therewith, as seen in the direction of rotation of said rotor,

wherein the radial blade of said rotor has a base portion thickened in an axial direction to increase the amount of viscous fluid stored in said fluid sub-chamber and an outer end portion formed thinner than the base portion in the axial direction, and wherein an internal surface of said piston and said end wall member exposed to said fluid chamber if formed to correspond with opposite surfaces of said radial blade.



---

### 5,012,909

## CHANGE-SPEED CONTROL CONSTRUCTION

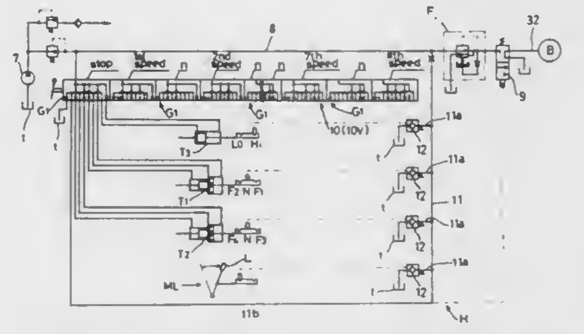
**Satoshi Machida, and Akio Hattori, both of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan**

**Filed Oct. 18, 1989, Ser. No. 423,765**

**Claims priority, application Japan, Jan. 26, 1989, 1-19311; Jan. 27, 1989, 1-18290; Jan. 27, 1989, 1-18291**

**Int. Cl.$^5$ F16D** *25/14*

**U.S. Cl. 192—3.57** **11 Claims**



1. A change-speed control construction comprising:

a hydraulic clutch disposed in a propelling transmission system; and

a hydraulic control mechanism for disengaging the hydraulic clutch to start a change-speed operation and for engaging the hydraulic clutch to complete a change-speed operation;

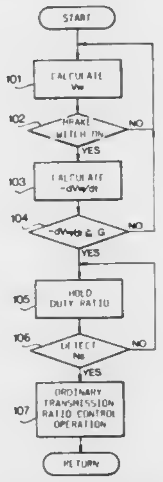
VOL
1126
ISS
1
MY
7
1991
UMI

the hydraulic control mechanism including,
- a selector valve disposed in an oil passage extending to the hydraulic clutch, the selector valve being controlled by a pilot pressure to selectively engage and disengage the hydraulic clutch, and
- check valve means for switching over the pilot pressure to the selector valve for engaging or disengaging the hydraulic clutch in accordance with a change-speed operation.

---

## 5,012,910
## TRANSMISSION RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

**Motohisa Miyawaki, Kawasaki, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Dec. 8, 1989, Ser. No. 448,058**
**Claims priority, application Japan, Dec. 14, 1988, 63-317274**
**Int. Cl.$^5$ B60K *41/26***
**U.S. Cl. 192—4 A** **8 Claims**



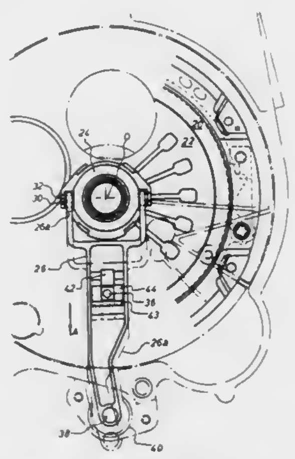
1. A control system for a continuously variable transmission for transmitting the power of an automotive engine to driving wheels of a vehicle, the transmission comprising a drive pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a driven pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc of the driven pulley, and a belt engaged with both the pulleys, the system comprising a hydraulic circuit having a pump for supplying oil to both the hydraulic cylinders, a transmission ratio control valve with a valve body and a spool slidably mounted in the valve body, sensing means for sensing various driving conditions of the vehicle, control means responsive to the driving conditions for calculating a desired transmission ratio to generate a control signal relating to the desired transmission ratio, and actuating means responsive to the control signal for actuating the spool to control oil pressure to be applied to the hydraulic cylinder of the drive pulley to control transmission ratio of the transmission so as to change the transmission ratio of the transmission, the system comprising:
- lock detecting means for detecting locking of the wheels of the vehicle at braking of the vehicle and for producing a lock signal;
- release detecting means for detecting releasing of the locked wheels and for producing a release signal;
- holding means responsive to the lock signal for holding the control signal at that time so as to maintain the oil pressure in the hydraulic cylinder of the drive pulley; and
- said holding means responsive to the release signal for releasing the holding of the control signal to immediately restart the control of the transmission ratio during coasting of the vehicle.

7. A method for controlling a control system for controlling transmission ratio of a continuously variable transmission for transmitting the power of an automotive engine to driving wheels of a vehicle, the transmission comprising a drive pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a driven pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc of the driven pulley, and a belt engaged with both the pulleys, the control system having a hydraulic circuit having a pump for supplying oil to both the hydraulic cylinders, a transmission ratio control valve with a valve body and a spool slidably mounted in the valve body, sensing means for sensing various driving conditions of the vehicle, control means responsive to the driving conditions for calculating a desired transmission ratio to generate a control signal relating to the desired transmission ratio, and actuating means responsive to the control signal for actuating the spool to control oil pressure to be applied to the hydraulic cylinder of the drive pullcy to control the transmission ratio so as to change the transmission ratio of the transmission, the method comprising the steps of:
- detecting locking of wheels of the vehicle at braking of the vehicle to produce a lock signal;
- in response to the lock signal holding the control signed at that time so as to maintain the oil pressure in the hydraulic cylinder of the drive pulley;
- detecting releasing of the locked wheels to produce a release signal; and
- releasing the holding of the control signal in response to the release signal to immediately restart the control of the transmission ratio during coasting of the vehicle.

---

## 5,012,911
## PULL TYPE CLUTCH

**Yoshiaki Kabayama, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**
**PCT No. PCT/JP88/01132, § 371 Date Jul. 3, 1989, § 102(e) Date Jul. 3, 1989, PCT Pub. No. WO89/04926, PCT Pub. Date Jun. 1, 1989**
**PCT Filed Nov. 10, 1988, Ser. No. 381,712**
**Claims priority, application Japan, Nov. 24, 1987, 62-179401[U]**
**Int. Cl.$^5$ F16D *13/44***
**U.S. Cl. 192—89 B** **2 Claims**

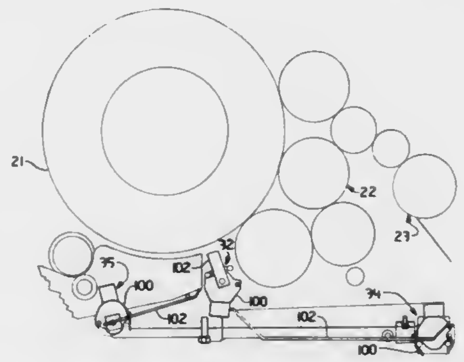


1. A pull type clutch having a clutch disc and a pressure plate in a clutch cover mounted on a flywheel between said flywheel and a transmission, an approximately annular diaphragm spring connected at its outer peripheral part to said clutch cover and connected at its inner peripheral part to a circular release bearing slidable in an axial direction by a lever-like release fork supported by a fulcrum fixed to a transmission housing by a fulcrum post, and a fulcrum slot in a recessed portion on said release fork through which said fulcrum post passes for supporting said release fork on said fulcrum in said recessed portion during normal use of said clutch, said fulcrum slot extending longitudinally in said release fork and toward the center of said circular release bearing so that said release fork can be moved radially outwardly from said release bearing for removing said transmission, with said release fork attached to said transmission, from said clutch.

---

## 5,012,912
## SAFETY INTERLOCK/LATCH ASSEMBLY FOR A PRINTING PRESS

**Harold Sanderson, Glen Ellyn, and Larry J. Vande Walle, Hinsdale, both of Ill., assignors to Rockwell International Corporation, El Segundo, Calif.**
**Filed Feb. 26, 1990, Ser. No. 485,017**
**Int. Cl.$^5$ F16P *3/08***
**U.S. Cl. 192—133** **20 Claims**

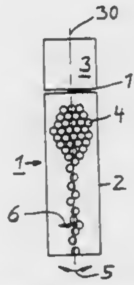


7. A safety interlock/latch assembly for use on a printing press, comprising:
- at least one guard element in said printing press;
- at least one lockable pivot means for causing rotation of said guard element, said lockable pivot means attached to a first end of said guard element;
- keyslot roller means for engaging said lockable pivot means, said keyslot roller means having a means for switch actuation;
- support means for rotatably holding said keyslot roller means, said support means having an aperture with a predetermined configuration for receiving said lockable pivot means, said support means located at least between said guard element and said keyslot roller means and attached to said printing press.

---

## 5,012,913
## TROUGH AND PROCESS FOR SEPARATING BULK GOODS

**Norbert Krämer, Röntgenstrasse 68, D-6100 Darmstadt 12, Fed. Rep. of Germany**
**PCT No. PCT/DE88/00216, § 371 Date Oct. 25, 1989, § 102(e) Date Oct. 25, 1989, PCT Pub. No. WO88/07967, PCT Pub. Date Oct. 20, 1988**
**PCT Filed Apr. 2, 1988, Ser. No. 427,841**
**Claims priority, application Fed. Rep. of Germany, Apr. 8, 1987, 3711827; Apr. 8, 1987, 8705219[U]**
**Int. Cl.$^5$ B65G *11/00***
**U.S. Cl. 193—2 R** **8 Claims**

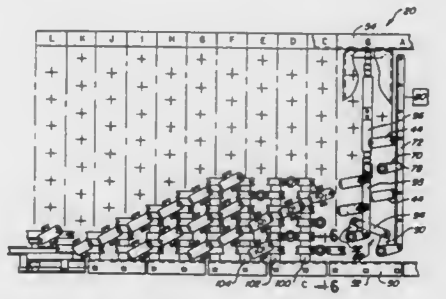


1. Device for singularizing tablets, pills, suppositories, grains and analogous bulk goods, comprising a trough having an upper end and a discharge end for singularized goods, said trough sloping downwardly toward said discharge end and having a longitudinal axis; and a motor having a rotary shaft connected with the upper end of said trough and arranged to impart to said trough cyclical back and forth movements about a rotational axis extending along said longitudinal axis, each of said cyclical movements lasting between approximately 0.5 and 3 seconds.

---

## 5,012,914
## DIVERTER ASSEMBLY FOR ARTICLE CONVEYOR

**Howard Berends, Fruitport, Mich., and Thomas L. Garzelloni, Worth, Ill., assignors to Automotion, Inc., Worth, Ill.**
**Filed Oct. 23, 1989, Ser. No. 425,427**
**Int. Cl.$^5$ B65G *47/46***
**U.S. Cl. 198—372** **21 Claims**

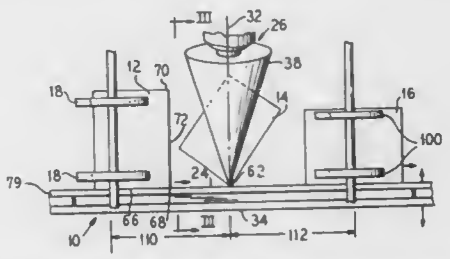


9. An article conveyor comprising:
- a frame;
- a drive wheel having a peripheral article engaging surface;
- a wheel support on said frame;
- means for mounting the wheel to the wheel support for rotation about a first axis;
- means for rotating the wheel to thereby effect advancement of articles in contact with said article engaging surface,
- said rotating meens comprising a rotary shaft having a shaft axis and a surface to engage the drive wheel; and
- means for selectively varying the orientation of the wheel support relative to the frame to thereby vary the orientation of the first axis relative to the frame and thus the direction of advancement of articles by said rotating wheel engaging surface and vary the orientation of the first axis relative to the rotary shaft axis,
- said drive wheel tracing a circular path on said rotating shaft surface as said rotary shaft drives the drive wheel, regardless of the orientation of the wheel support and drive wheel relative to the rotary shaft.

---

## 5,012,915
## METHOD AND APPARATUS FOR ROTATING AN ITEM

**Jay L. Kristola, Kiel, and John Préttie, Plymouth, both of Wis., assignors to H.G. Weber & Co., Inc., Kiel, Wis.**
**Filed Feb. 15, 1990, Ser. No. 480,259**
**Int. Cl.$^5$ B65G *47/24***
**U.S. Cl. 198—411** **23 Claims**



1. A device for rotating an item in a plane through an angle

VOL
1126
ISS
1
MY
7
1991
UMI

wherein said item is being conveyed in a linear longitudinal direction in said plane comprising:

opposed and continuously rotating members for positively controlling said item as it is being conveyed in said linear longitudinal direction;

means for engaging a first portion of said item and for moving said portion at a first linear speed in said longitudinal direction;

means for simultaneously engaging a second, laterally spaced portion of said item and for moving said laterally spaced portion at a second, different linear speed in said longitudinal direction;

means for releasing said positive control of said opposed rotating members when said item is engaged by said means for engaging; and

a mechanically adjustable mechanism to provide positive controlling and release of said item at preselected times by said continuously rotating members.

---

5,012,916

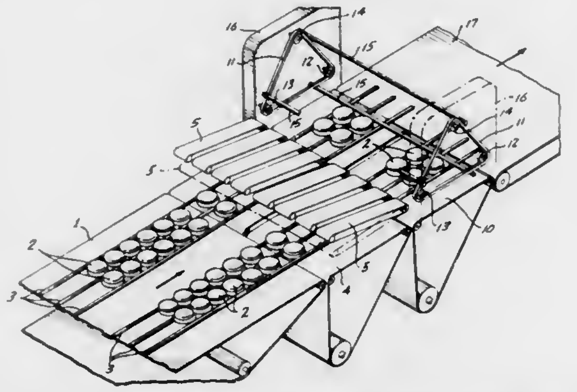
### ARTICLE GROUP-SEGREGATING APPARATUS AND METHOD

**Michael Cruver, Port Townsend, Wash., assignor to Formost Packaging Machines, Inc., Woodinville, Wash.**

**Filed Oct. 13, 1988, Ser. No. 256,899**

**Int. Cl.$^5$ B65G *47/26***

**U.S. Cl. 198—419.3** **3 Claims**



1. Apparatus for segregating groups of articles from a line of such articles comprising segregating mechanism including an orbiting group-forming member movable along a lower substantially horizontal path for controlling movement of a group of articles behind it, drive means for driving said group-forming member continuously, article infeed means for moving articles from such line toward said group-segregating mechanism and crowding a plurality of articles from such line against the back side of said group-forming member to form a group, arresting means cooperating with said article infeed means for arresting movement of the article closest to said segregating mechanism, a continuously moving outfeed conveyor moving at a speed greater than the speed of movement of said orbiting group-forming member, and said segregating mechanism further including group-supporting conveyor mechanism having a horizontal stretch close beneath the lower substantially horizontal path of said group-forming member and means driving said group-supporting conveyor mechanism at a speed greater than the speed of said orbiting group-forming member along its lower substantially horizontal path for moving onto said outfeed conveyor a group of articles released from said group-forming member.

---

5,012,917

### TRANSPORT APPARATUS FOR AN ASSEMBLY LINE

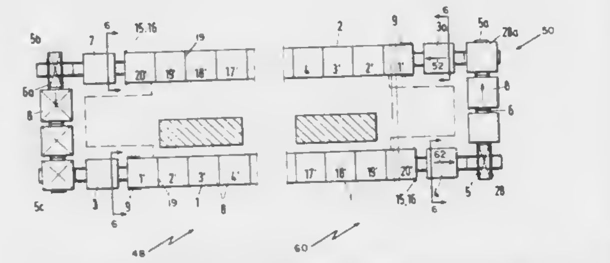
**Arthur Gilbert, Ludwigshafen; Norbert Gottstein, Weinheim, and Joachim Rostock, Heidelberg, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany**

**Filed Jun. 23, 1989, Ser. No. 370,939**

**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1988, 3840256**

**Int. Cl.$^5$ B65G *21/20***

**U.S. Cl. 198—465.2** **18 Claims**



1. Transport apparatus for transporting movable platforms along an assembly line which has a first end and a second end such as for motor vehicles, said transport apparatus comprising;

first and second platform means each for supporting a vehicle with each said platform means having a first end and a second end, said second end being opposite said first end with said first end of said first platform means for removably transmitting a force to said second end of said second platform means;

support means for being in contact with said platform means for supporting said platform means;

drive means positioned at the first end of the assembly line and for being in contact with said first platform means for applying a force to said first platform means with said force being transmitted from said first end of said first platform means to said second end of said second platform means to transport said first and second platform means along the assembly line; and

brake means at the second end of the assembly line and for being in contact with said platform means and for resisting movement of said platform means along the assembly line, whereby said drive means moves said first platform means along the assembly line and said first platform means pushes said second platform means along the assembly line.

---

5,012,918

### INTERMITTENT WORK CONVEYING APPARATUS

**John N. Acker, and Bradley M. Andreae, both of Sturgeon Bay, Wis., assignors to Therma-Tron-X, Inc., Sturgeon Bay, Wis.**

**Filed Dec. 30, 1988, Ser. No. 292,500**

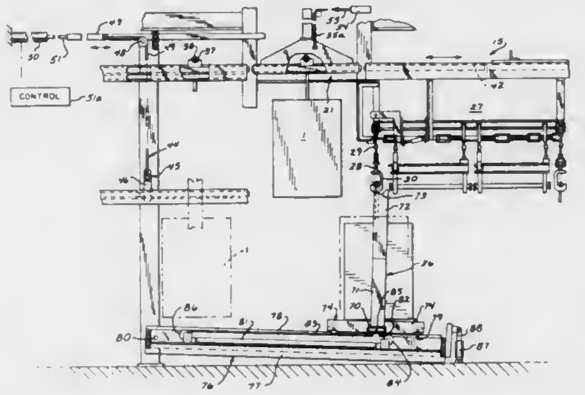
**Int. Cl.$^5$ B65G *37/00***

**U.S. Cl. 198—465.4** **25 Claims**

1. A work processing apparatus comprising a first section and a second section mounted in spaced alignment and connected at a first end by a transfer section and at a second end by a load and unload section,

said first section including a plurality of equispaced stations with the part moving the same distance between each station to the next adjacent station, a transport location in spaced alignment with said stations through which parts are moved into alignment with the stations,

a slide rail conveyor unit including laterally spaced slide rails extended longitudinally across all of said stations and similar laterally spaced slide rails extended throughout said second section, a plurality of slide units filling each of said rails and each slide unit having a length corresponding to the length of movement between each of said stations, a transfer device to transfer a slide unit from the downstream end of the first section to the upstream end of the second section, a reciprocating drive system coupled to transport the slide rail unit at the input end of the first section and at the input end of the second section for the length of a slide unit for circulating of said slide units through said first section and said second section in a continuous stepped sequence, movable transfer device at the downstream end of said first section and moving between a first position aligned with said rails of said first section and a second position aligned with said rails of said second section, said rails of said second section including an inlet end located immediately downstream of said vertically movable transfer device whereby said slide unit in said transfer device moves into said rails of said second section in response to longitudinal movement of the slide unit from said transfer rail, and means located at said input end of said rails of said first section for selectively connecting and disconnecting of parts from said slide units at said inlet end of said first section.



---

5,012,919

### APPARATUS FOR STORING PIECE GOODS

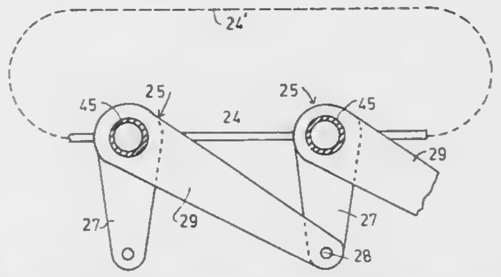
**Hans-Juergen Trapp, Salinenweg 31, D-7889 Grenzach-Wyhlen, and Reinhard Buerger, Ostfildern, both of Fed. Rep. of Germany, assignors to Hans-Juergen Trapp, Fed. Rep. of Germany**

**Filed May 30, 1989, Ser. No. 359,021**

**Claims priority, application Fed. Rep. of Germany, Jun. 2, 1988, 3818781**

**Int. Cl.$^5$ B65G *47/84***

**U.S. Cl. 198—474.1** **22 Claims**



1. Apparatus for storing piece goods, particularly data carrier cassettes, comprising:

a guideway forming a closed movement path defined by circular arcs and linear portions connecting the circular arcs;

a plurality of chassis movable in at least one direction along the guideway, at least one mounting support for holding a single piece good being attached on each of the plurality of chassis in a rotary manner about a vertical axis;

a driving means for driving the plurality of chassis in a controlled manner for bringing a selected one of the chassis to a controlled manner for bringing a selected one of the chassis in a location where a piece good can be removed from or inserted into a corresponding selected mounting support; and,

each of the chassis having a push rod and a steering lever associated therewith, the push rod for each chassis being non-rotatably fixed relative to the chassis and pivotally fixed to the steering lever of an adjacent chassis at a pivot point spaced laterally from said vertical axis, the mounting supports being coupled in non-rotary manner relative to the chassis and relative to the push rod, whereby the mounting supports are forcibly guided such that rotary movement of the mounting supports is initiated in shock-free manner in the vicinity of a transition between the linear portion and the curved portion of the movement path and is ended in shock-free manner in the vicinity of a transition between the curved portion and the linear portion of the movement path.

---

5,012,920

### ROLLER CONVEYOR SYSTEMS

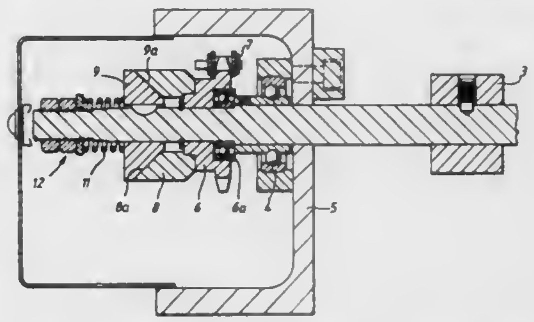
**Brian N. Wakefield, Leamington Spa, England, assignor to The Reiss Engineering Co. Ltd., Stanmore, England**

**Filed Dec. 6, 1989, Ser. No. 446,871**

**Claims priority, application United Kingdom, Dec. 7, 1988, 8828605**

**Int. Cl.$^5$ B65G *13/06***

**U.S. Cl. 198—781** **10 Claims**

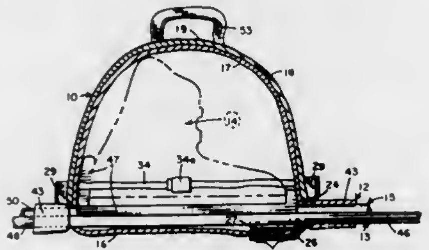


1. A roller conveyor system comprising a plurality of transversely extending roller assemblies rotatably mounted in longitudinally extending frame members and drive means for rotating at least some of the roller assemblies, said drive means comprising, in respect of at least one of said driven roller assemblies, a rotatable drive member mounted on an end portion of a shaft extending outwardly from a frame member, said rotatable drive member being rotatable relative to said roller assembly about an axis of said shaft end portion, a first drive transmitting member mounted on said drive member for rotation therewith and having a first annular drive transmitting surface centered on said axis and facing outwardly in the direction of the outer end of said shaft end portion, a second drive transmitting member mounted on said shaft end portion outwardly of and co-axially with said first drive transmitting member for rotation with said roller assembly and having a second annular drive transmitting surface centered on said axis facing inwardly towards said first annular drive transmitting surface, said first and second drive transmitting surfaces being frusto-conical with their cone angles substantially equal and being axially directed, opposed and maintained in contact to normally transmit drive by frictional engagement between said surfaces from said drive member to said roller assembly, and to slip relative to each other when the resistance to rotation of said roller assembly exceeds a predetermined level, said first and second drive transmitting members being dismountable from said drive member and shaft end portion, respectively, without the need to dismount said drive member from said shaft end portion.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,012,921
## CARRYING BAG FOR SKIS, BOOTS THEREON AND POLES

**Lane T. Becker, 3115 Fairway Ct., Coeur d'Alene, Id. 83814**
**Filed Aug. 14, 1989, Ser. No. 393,215**
**Int. Cl.⁵ A45C** *13/20;* **A63C** *11/10;* **B65D** *85/18*
**U.S. Cl. 206—315.1** **7 Claims**



5. A bag for carrying a pair of skis having medial bindings and ski boots in place on the bindings on the skis, comprising in combination:

a flexible bag having a bottom and two opposed upwardly extending sides with overlapping portions to peripherally define a space to carry the medial portion of a pair of skis in side by side relationship with a pair of ski boots in releasably fastened position on bindings on said skis, said bag having

opposed forward and rearward ends,

a medial vertically extending opening communicating with ski slots defined in opposed ends of the bag sides upwardly adjacent the bag bottom to carry a pair of skis in side by side relationship and allow their passage through the ski slots,

means for releasably closing said vertical opening,

handle means carried by each bag side and extending upwardly therefrom to aid manual carriage of the bag,

a rigid skid plate carried on the lower forward surface of the bottom of the bag to aid skidding over a supporting surface, and

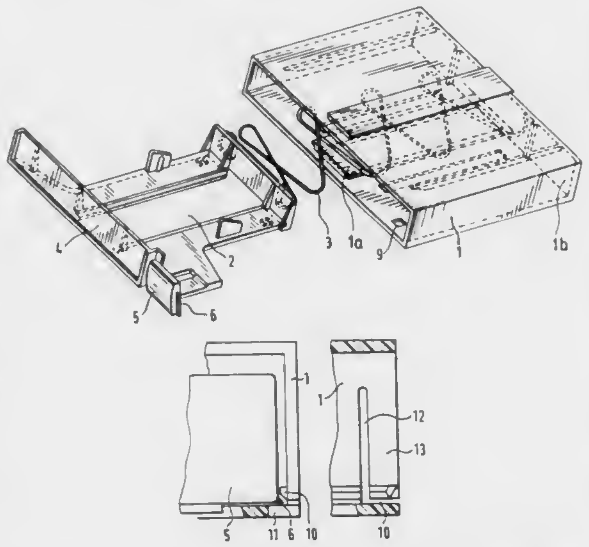
a plurality of strap fasteners forming closed loops carried in spaced array on the external surface of the bag to allow passage of a flexible strap therethrough for fastening the bag in closed condition; and

an elongate flexible strap having fastening means at each of its ends extending through at least two of the aforesaid strap fasteners, said flexible strap having therein flexible cable means to aid in preventing mechanical severance of the flexible strap.

---

### 5,012,922
## CONTAINER FOR RECEIVING A CASSETTE WITH A TAPE-LIKE RECORDING MEDIUM

**Wolfgang Nehl, Tumlingen, Fed. Rep. of Germany, assignor to fischerwerke Artur Fischer GmbH & Co. Kg., Waldachtal/-Tumlingen, Fed. Rep. of Germany**
**Filed Mar. 2, 1990, Ser. No. 487,775**
**Claims priority, application Fed. Rep. of Germany, Mar. 2, 1989, 3906605**
**Int. Cl.⁵ B65D** *85/672*
**U.S. Cl. 206—387** **8 Claims**

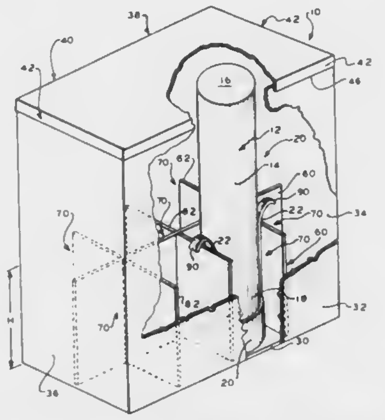


1. A container for receiving a cassette with a tape-like recording medium, said container comprising a rectangular housing having a rear wall and a side wall; a transporting slider member for supporting the cassette and movable between a storage position in which the cassette is stored in said housing and a cassette removal position, said housing including means for supporting said transporting slider member for movement along said side wall between the storage and cassette removal positions; spring means supported in said housing between said rear wall and said transporting slider member for advancing said transporting slider member from the storage position to the cassette removal position; and means for retaining said transporting slider member in said housing in the storage position of said transporting slider member, said transporting slider member including a finger-actuatable push-button which releases said transporting slider member upon application of the finger pressure to said push-button and having a side wall facing said side wall of said housing; said retaining means comprising a leaf spring connected with said push-button, extending in a direction of movement of said transporting slider member between the storage and cassette removal positions, and having a free end, a tooth secured at said free end of said leaf spring and which engages an aperture in said housing to retain said transporting slider member therein, a counter-supporting member secured to a portion of said wall of said housing, and a snap hook which is arranged on said side of said push-button opposite said portion of said side wall of said housing, and which snaps over said counter-supporting member, and holds said push-button in a disengaged position thereof when said push-button is actuated, and which snaps under said counter-supporting member when said transporting slider member is advanced into said housing.

---

### 5,012,923
## SUBDIVIDED FLARE-HOLDING CONTAINER

**Robert Hayes, 19A Forrest Glen Rd., Valley Cottage, N.Y. 10989**
**Filed Mar. 19, 1990, Ser. No. 495,719**
**Int. Cl.⁵ B65D** *85/20, 25/04, 25/10*
**U.S. Cl. 206—443** **15 Claims**



1. A container for receiving a plurality of articles such as road flares, or the like, wherein each article is of generally elongated stick-like configuration and includes a wire support structure having ends disposed at a predetermined position between respective ends of the article; comprising:

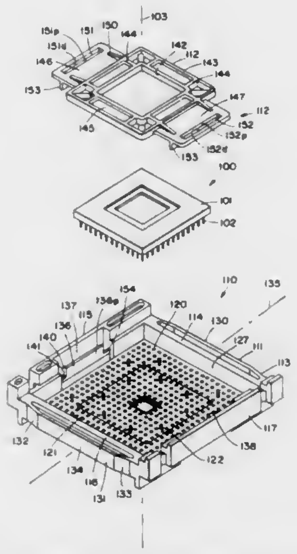
(a) container body means including at least a bottom and a plurality of sides extending up from said bottom to define therebetween an enclosed container space having a bottom and sides rising up from said bottom to a first predetermined height;

(b) article support structure means disposed within said container space proximate said bottom and of a configuration and construction to provide a plurality of article components extending up from said container bottom, open at their respective tops, with each such compartment of a size and configuration to receive and support a road flare so that the flare wire support structure ends are disposed above said article support structure means.

---

### 5,012,924
## CARRIERS FOR INTEGRATED CIRCUITS AND THE LIKE

**Robert H. Murphy, Merrimack, N.H., assignor to R. H. Murphy Company, Inc., Amherst, N.H.**
**Filed Mar. 19, 1990, Ser. No. 495,860**
**Int. Cl.⁵ B65D** *73/02;* **H05F** *3/00;* **H01H** *47/00*
**U.S. Cl. 206—331** **24 Claims**



1. A carrier for facilitating the handling by external means of an electronic component having a housing and terminals extending therefrom in a predetermined configuration, said carrier comprising:

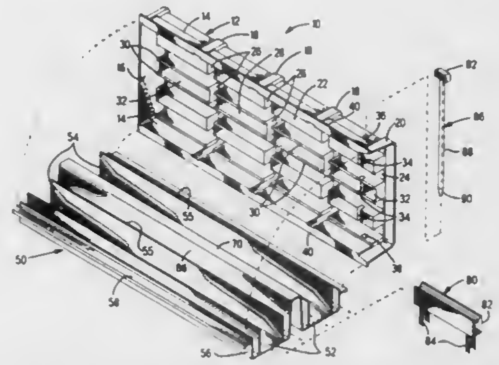
A. insulating means for positioning the component in said carrier and electrically isolating the leads therefrom including a first surface for engaging the housing, plural second surfaces for supporting each terminal in electrical isolation and third and fourth surfaces, and

B. conductive frame means including boundary means circumscribing said insulating means for engagement by the external means and abutting a said third surface of said insulating means and conductive means for abutting said fourth surface whereby said conductive frame means substantially dissipates any electrical charge that otherwise would tend to accumulate on said insulating means.

---

### 5,012,925
## PACKAGE FOR SLIDABLY HOUSING COMPONENTS

**Robert E. Gallagher, Sr., Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**
**Filed May 30, 1990, Ser. No. 530,387**
**Int. Cl.⁵ B65D** *85/30, 81/00*
**U.S. Cl. 206—332** **6 Claims**



1. A package for housing components each having a cross-sectional profile including a body with rows of relatively long and fragile legs protruding from the body and spaced relatively close together, said package comprising:

a top and bottom which fit together to house and protect said components;

said top being comprised of a thermoformed plastic sheet material configured to define a plurality of channels extending therealong and a plurality of wall sections extending transversely to said channels for strengthening said top,

said bottom being comprised of an extruded plastic material defining a first plurality of channels complementary to the channels of said top when the said top and bottom are fitted together to house said components, the said bottom including wall sections of solid extruded material of a thickness to provide rigidity along the length of the bottom and fit between the rows of legs of said components to slidingly support the component bodies attached thereto within the channels of the said top, the said wall sections defining thin solid rails having a height substantially greater than the thickness thereof, said height also being greater than the length of the said legs of components to facilitate loading and unloading of said package by virtue of said components sliding on the tops of said rails in said channels.

---

### 5,012,926
## ELECTRICALLY CONDUCTIVE CONTAINER

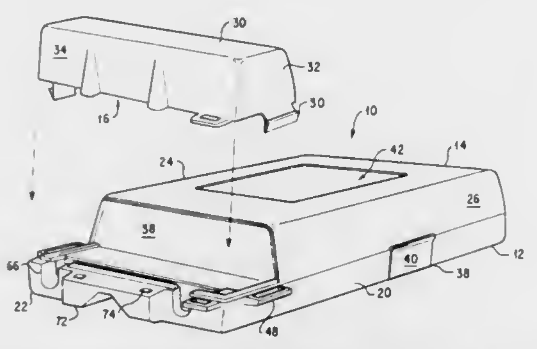
**David S. Jamison, Roanoke Rapids, N.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.**
**Continuation of Ser. No. 36,041, Apr. 8, 1987, abandoned. This application Jul. 31, 1990, Ser. No. 560,716**
**Int. Cl.⁵ B65D** *85/00*
**U.S. Cl. 206—334** **1 Claim**

1. A blow molded container suitable for storing a computer panel comprising:

(a) a base having:
  (i) a bottom,
  (ii) side walls,
  (iii) end walls, and
  (iv) at least one recessed area in one wall to accommodate wiring;
(b) a cover having:
  (i) a first segment having side walls and end walls, and
  (ii) a second segment having side walls and an end wall; and
(c) means for latching the base to the second segment at either side of the base and second segment respectively;

VOL
1126
ISS
1
MY
7
1991
UMI

the segment, when closed, forming a first and second compartment respectively; and



the first compartment not being exposed when the second segment is in the open position and the first segment is in the closed position.

---

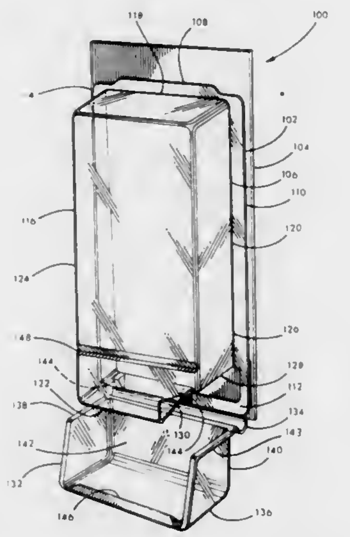
### 5,012,927
## RECLOSABLE THERMOFORMED BLISTER CARD DISPLAY PACKAGE

**Rodney D. Borst, Oregon, Wis., assignor to Placon Corporation, Madison, Wis.**

**Continuation-in-part of Ser. No. 406,137, Sep. 11, 1989, Pat. No. 4,930,627. This application May 9, 1990, Ser. No. 521,223**

**Int. Cl.$^5$ B65D** *73/00*

**U.S. Cl. 206—470** **6 Claims**



1. A display package comprising:
- a) a backing card;
- b) a thermoformed thermoplastic blister having top, left, right and bottom peripheral flanges sealed to the backing card, a front face spaced from the backing card by top and bottom faces and a left side face and a right side face, which faces adjoin the top, bottom, left and right flanges respectively, wherein the adjoining faces, the front face, and the card define an article compartment;
- c) an egress opening in the article compartment defined by portions of a side face located near the bottom face;
- d) a cover independent of the body and connected to the bottom flange of the body by an integral hinge, the cover being pivotable about the integral hinge between a first position in which the cover overlies a portion of the body and fully closes the egress opening and a second position in which the egress opening is fully revealed for unimpeded access thereto; and
- e) means formed in the front face of the blister and the cover for releasably fastening the cover to the front face in the cover first position.

3. A display package comprising:
- a) a backing card;
- b) a thermoformed thermoplastic blister having top, left, right and bottom peripheral flanges sealed to the backing card, a front face spaced from the backing card by top, left, right, and bottom side faces which adjoin the top, left, right, and bottom flanges respectively, wherein the side faces, the front face, and the card define an article compartment;
- c) an egress opening in the article compartment wherein the egress opening is formed by portions of the front face, the bottom face, and a side face adjoining the bottom face;
- d) a cover independent of the body and connected to a flange of the body by an integral hinge, the cover being pivotable about the integral hinge between a first position in which the cover overlies a portion of the body and fully closes the egress opening and a second position in which the egress opening is fully revealed for unimpeded access thereto; and
- e) means formed in the front face of the blister and the cover for releasably fastening the cover to the front face in the cover first position.

4. A thermoformed blister of flexible plastic material for a reclosable blister card display package comprising:
- a) a bubble body, the body having an article compartment, and top, left, right and bottom peripheral flanges for sealing to a backing card to close the article compartment, a body front face spaced from the flanges, a body left side face and a body right side face adjoining the front face and a flange, and a body bottom face connecting the front face to the bottom flange and adjoining the left and right side faces, wherein a side face has portions located near the bottom face defining an egress opening;
- b) a cover independent of the body and connected to the bottom flange of the body by an integral hinge, the cover being pivotable about the integral hinge between a first position in which the cover overlies a portion of the body and fully closes the egress opening in the side face and a second position in which the egress opening is fully revealed for unimpeded access thereto; and
- c) means formed in the body front face and the cover for releasably fastening the cover to the front face in the cover first position.

5. The package of claim 4 wherein the cover has a front face with an adjoining side face substantially perpendicular to the front face and a peripheral flange on the side face which is parallel to the cover front face and spaced from the cover front face such that when the cover is closed on the body the cover peripheral flange overlies and is adjacent to the flange of the body adjacent the egress opening.

---

### 5,012,928
## STACKABLE FOOD CONTAINER WITH LID

**James R. Proffitt, Dublin, and Dale S. Richardson, Westerville, both of Ohio, assignors to Borden, Inc., Columbus, Ohio**

**Continuation-in-part of Ser. No. 348,192, May 5, 1989, abandoned, and a continuation-in-part of Ser. No. 495,932, Mar. 19, 1990. This application Jul. 6, 1990, Ser. No. 549,224**

**Int. Cl.$^5$ B65D** *21/02, 41/62*

**U.S. Cl. 206—508** **7 Claims**

1. A package comprising a tray and a cover,

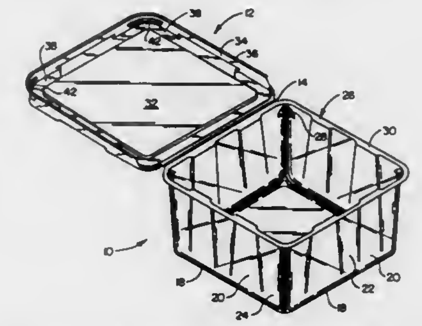
said tray being formed of a resin and having a bottom, vertically extending sidewalls joined together at corners and having an open upper end, and a horizontally extending sealing surface adjacent the open upper end of said sidewalls,

vertically extending flutes on the exterior of said sidewalls to increase structural stability, said flutes extending outwardly of the sidewall, one of said flutes at each vertically extending corner extends from one sidewall to the other,

an outwardly extending flange on the sidewalls adjacent said open upper end, said flange comprising said sealing surface, a transparent sealing sheet extending across said upper end of said tray and sealingly bonded to said flange after goods have been placed in said tray to thereby seal said gods in air-tight relationship within said tray,

an outwardly projecting shelf formed only at each corner, each said shelf being located intermediate the sidewall flange and the tray bottom, each said shelf extending a distance outwardly whereby it will engage the surface of a flange corresponding to said flange if inserted into an identically shaped tray to thereby space apart the bottoms of such trays,

said cover being integrally formed with said flange and including a generally planar surface which is about the same size and configuration as said bottom of said tray, a mating lip on said cover extending around and transverse to the planar surface, at least part of said mating lip circumscribing a cross-sectional area parallel to said planar surface which is greater than the cross--sectional area circumscribed by said flange n a plane parallel to said open upper end,



means forming a hinge between said cover and said flange,

said cover having an upper surface configured to receive a surface corresponding to the lower surface of said tray bottom and hold it in general vertical alignment in a stack of covered trays,

the lip including an outwardly extending shoulder at its periphery to hold the cover in a stable configuration and minimize bowing of the cover intermediate the corners of the tray,

locking beads formed in said lip being configured to snap into place below said flange on said sidewalls and thereby pull said planar surface of said lid downward into contact with said sealing sheet in a locked position, said planar surface depressing said sealing sheet about 0.03 inches below the surface of said flange and into engagement with the goods in said tray.

---

### 5,012,929
## TWIN TRAY CONTAINER

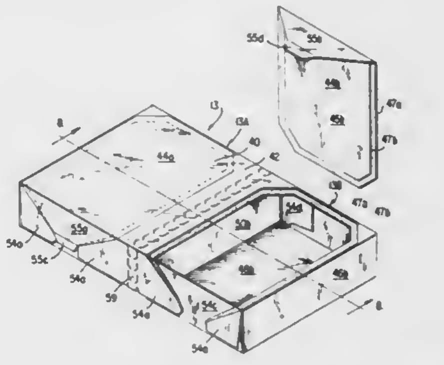
**Paul D. Roosa, Saugerties, N.Y., assignor to International Paper Company, Purchase, N.Y.**

**Filed Jul. 26, 1990, Ser. No. 557,821**

**Int. Cl.$^5$ B65D** *5/48, 5/54*

**U.S. Cl. 206—602** **10 Claims**

1. A one-part paperboard blank for forming a tamper proof twin tray type structure comprising two separate containers suitable for packaging food, said blank including successively:
- (a) a relatively large central panel portion for forming a bridge across a substantial space between the two such containers and also for forming major panels of both such containers,
- (b) inner minor panel portions foldably attached to the ends of the central panel portion for forming side edge panels of said containers,
- (c) outer major panel portions foldably attached to the outer edges of said inner minor panel portions for forming the other major panels of said containers,
- (d) outer minor panel portions foldably attached to the outer edges of said outer major panel portions for forming other side edge panels of said containers,
- (e) glue tabs foldably attached to the outer edges of said outer minor panel portions,



- (f) end panel portions foldably attached to at least some of said panel portions to provide end panels for said containers, and
- (g) said blank having at least one tear-away portion integrally formed in at least one of said panel portions providing easy access to the contents of each of said containers.

---

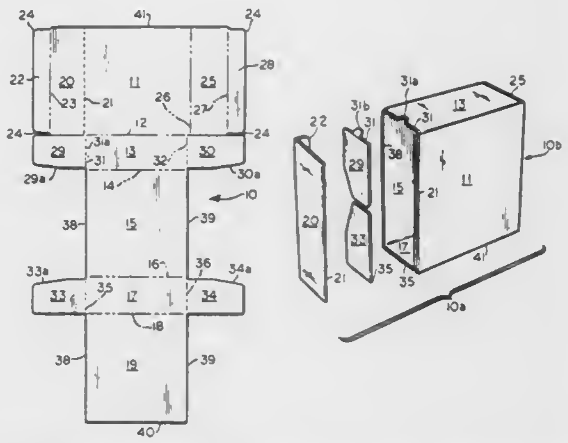
### 5,012,930
## ONE-PIECE, SELF-LOCKING COMPUTER SOFTWARE CONTAINER

**Gerald M. Hansen, Maumee, Ohio, assignor to Nekoosa Packaging Corporation, Atlanta, Ga.**

**Filed Mar. 19, 1990, Ser. No. 495,407**

**Int. Cl.$^5$ B65D** *5/54*

**U.S. Cl. 206—620** **16 Claims**



1. A one-piece blank of corrugated paperboard for a container, the one-piece blank comprising:

five panels disposed longitudinally end-to-end and connected to each other at parallel, lateral fold lines, the first and third panels forming external sidewalls of the con-

VOL
1126
ISS
1
MY
7
1991
UMI

tainer and the second and fourth panels forming top and bottom walls thereof,

laterally extending integral side flaps connected on opposite sides of said first panel and foldable along parallel longitudinal first fold lines, one of said side flaps being adapted to form one end wall of the container, and the other side flap being adapted to form the opposite other end wall of the container,

the first panel being slightly greater in its width dimension between said parallel longitudinal first fold lines than the width dimension of the third and fifth panels,

locking flaps extending laterally from said side flaps and connected thereto along longitudinal second fold lines,

the fifth panel being hingedly connected to said fourth panel and having a free lateral edge, said fifth panel being folded to lie in underlying relationship to said first panel, and its free lateral edge abutting said second panel,

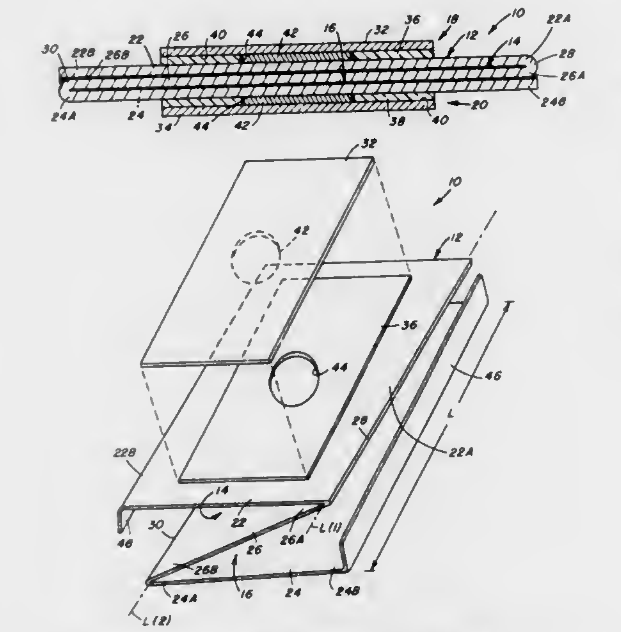
laterally extending flaps hingedly connected to one side of the second and fourth panels and to the other side of the second and fourth panels, said laterally extending flaps being inwardly foldable so that one edge of each laterally extending flap is adapted to lie adjacent said fifth panel and the other parallel edge of each flap lies adjacent the third panel, and

said locking flaps being foldable inwardly and held between said other edge of said lateral flaps of the second and fourth panels and said third panel, to thereby close the opposite ends of the container.

---

### 5,012,931
## Z-SHAPED DUAL-COMPARTMENT RESEALABLE DISPENSING CONTAINER

**John Ferrera, P.O. Box 1032, San Juan Bautista, Colo. 95045**
**Continuation-in-part of Ser. No. 396,526, Aug. 22, 1989. This application Aug. 22, 1990, Ser. No. 571,333**
**Int. Cl.$^5$ B65D** *75/40*
U.S. Cl. 206—631.100 15 Claims



1. A flexible dispensing container, comprising:

(a) a single sheet of flexible packaging material having peripheral edges, said sheet being folded upon itself into a Z-configuration about a pair of parallel spaced fold lines extending parallel to a longitudinal dimension of said sheet and sealed to itself at its unfolded peripheral edges;

(b) said Z-folded sheet forming upper, lower and middle wall portions defining separate dual compartments on opposite upper and lower sides of said middle wall portion; and

(c) separate means resealably attached to exteriors of said upper and lower wall portions for permitting separate opening and closing of said compartments.

11. A flexible dispensing container, comprising:

(a) a single sheet of packaging material being folded upon itself into a Z-configuration about a pair of parallel spaced fold lines extending parallel to a longitudinal dimension of said sheet;

(b) said Z-folded sheet forming upper, lower and middle wall portions each having opposite longitudinal side edges and opposite transverse end edges;

(c) said upper wall portion at one of said opposite longitudinal side edges thereof being connected by a first longitudinal fold of said sheet with one of said opposite longitudinal side edges of said middle wall portion, said upper wall portion at the other of said opposite longitudinal side edges thereof being connected by a first seal with the other of said opposite longitudinal side edges of said middle wall portion;

(d) said lower wall portion at one of said opposite longitudinal side edges thereof being connected by a second longitudinal fold of said sheet with the other of said opposite longitudinal side edges of said middle wall portion, said lower wall portion at the other of said opposite longitudinal side edges thereof being connected by a second seal with the one of said opposite longitudinal side edges of said middle wall portion;

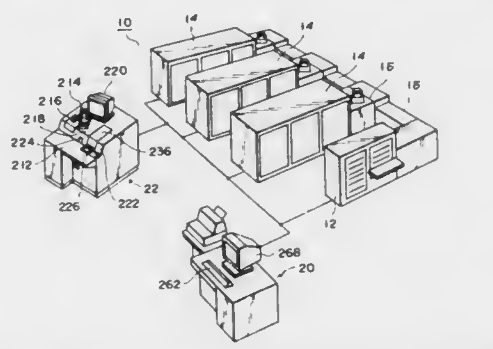
(e) said upper and lower wall portions at opposite transverse end edges thereof being connected by third and fourth seals with said opposite transverse end edges of said middle wall portion such that said opposite side folds and seals and said opposite end seals connecting said upper and lower wall portions with said middle wall portion defined separate dual compartments on opposite upper and lower sides of said middle wall portion; and

(f) separate means resealably attached to exteriors of said upper and lower wall portions for permitting separate opening and closing of said compartments.

---

### 5,012,932
## PAPER SHEET PROCESSING APPARATUS

**Hideo Omura, Tokyo; Nobusato Maruyama, Musashino; Masatoshi Shioya, Yokohama; Yoshiaki Ashikawa, Yokosuka; Kazunori Kinoshita, Yokohama; Kozo Matsumoto, Kawasaki; Toshiyuki Miyano, and Hitoshi Takahashi, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Aug. 3, 1988, Ser. No. 227,924**
**Claims priority, application Japan, Aug. 4, 1987, 62-195906; Aug. 5, 1987, 62-196573**
**Int. Cl.$^5$ B07C** *5/34;* **B65B** *27/08*
U.S. Cl. 209—534 9 Claims



1. A system for processing paper sheets, a first number of paper sheets being bound by at least one strap to form a sheaf, a second number of sheafs being bound by at least one band to form a bundle, comprising:

an input structure on which a first predetermined number of bundles may be placed;

take-out means for removing bundles one by one from the input structure;

insertion side conveying means for receiving bundles from the takeout means and conveying them in a first predetermined direction;

a pluralitv of inspecting apparatuses, each such inspecting apparatus including:

means for receiving bundles from the insertion side conveying means;

means for unbinding the paper sheets in the bundles by cutting and removing the bands binding the bundles and the straps binding the sheafs;

means for inspecting the paper sheets one by one;

means for sorting the sheets into reusable sheets, non-reusable sheets, and unidentifiable sheets based on the inspection;

means for counting the number of the reusable sheets in each sheaf and the number of non-reusable sheets in each sheaf;

means for wrapping at least one strap around the first number of reusable sheets to form an inspected sheaf;

means for wrapping at least one band around the second number of the inspected sheafs to form an inspected bundle; and

means for discharging inspected bundles;

reception side conveying means for receiving inspected bundles from the inspection apparatuses and conveying the inspected bundles in a second predetermined direction;

an output structure upon which the first predetermined number of inspected bundles can be placed;

take-in means for receiving the inspected bundles from the reception side conveying means and for stacking the inspected bundles on the output structure;

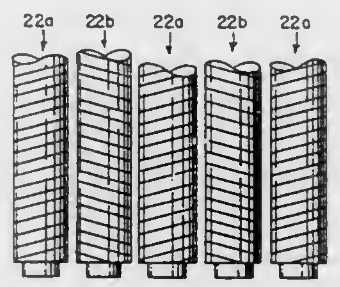
controller means, electrically connected to each inspecting apparatus, for receiving from said inspecting apparatuses and sequentially storing the number of non-reusable sheets in each sheaf and the number of reusable sheets in each sheaf; and

unidentifiable sheet processcr means, electrically connected to the controller means, for aiding an operator in the manual inspection of the unidentifiable sheets by fetching the number of reusable sheets in each sheaf and the number of non-reusable sheets in each sheaf from the controller means, by presenting information based on said numbers to the operator, and by counting the number of sheets determined not to be rejectable by the manual inspection.

---

### 5,012,933
## MACHINE AND METHOD FOR SORTING OUT OVER-THICK WOOD CHIPS

**Adrian Artiano, Mukilteo, Wash., assignor to Acrowood Corporation, Everett, Wash.**
**Continuation-in-part of Ser. No. 155,270, Feb. 12, 1988, Pat. No. 4,903,845. This application Jan. 17, 1989, Ser. No. 296,756**
**Int. Cl.$^5$ B07B** *13/07*
U.S. Cl. 209—671 18 Claims



1. A machine for separating over-thick chips having a thickness exceeding a preset thickness limit of about 8 mm from acceptable chips of lesser thickness in a supply of chips containing over-thick chips and acceptable chips, said machine comprising:

a plurality of spaced-apart, side-by-side, parallel rollers collectively providing a bed having its length transverse of said rollers and having infeed and discharge ends;

drive means for rotating said rollers in the same direction of rotation;

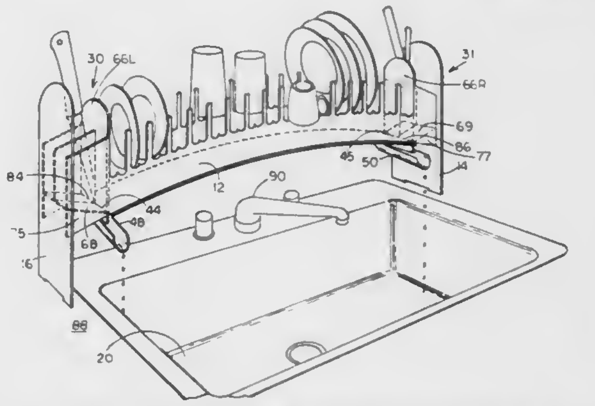
means for feeding a supply of chips onto the infeed end of said bed;

the outer surface of each said roller having a plurality of tapered, chip-agitating protuberances separated by valleys which are shallower than said thickness limit and which occupy spiral paths extending around and along the roller, there being spiral paths of opposite hand on adjacent rollers, and the gaps between the protuberances of adjacent said rollers having a width equal to said thickness limit when such protuberances pass one another during rotation of such adjacent rollers, whereby acceptable chips will drop through said gaps and over-thick chips will discharge from said discharge end of the bed.

---

### 5,012,934
## DRAINER FOR DRYING AND STORING KITCHEN AND OTHER UTENSILS

**Robert J. Newhall, 968 Tulare, Albany, Calif. 94707**
**Filed Sep. 17, 1990, Ser. No. 583,447**
**Int. Cl.$^5$ A47F** *7/00*
**U.S. Cl. 211—41** **20 Claims**



1. A drainer for drying utensils, said drainer comprising:

at least two spaced supports;

at least one substantially horizontally extending shelf having means for supporting utensils above said shelf to be dried, a pair of opposite ends, a top surface, and a pair of opposite longitudinal edges;

said top surface of the shelf sloping downwardly lengthwise between a point located intermediate said ends of the shelf and said ends thereof; and

means for channelling water dripping from said utensils above said shelf onto said top surface of said shelf to a place of disposal.

---

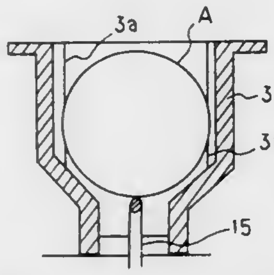
### 5,012,935
## SUPPORT FRAME FOR SUPPORTING A SEMICONDUCTOR WAFER CARRIER

**Seiichiro Aigo, 3-15-13, Negishi, Daito-ku, Tokyo, Japan**
**Filed Feb. 27, 1990, Ser. No. 485,540**
**Claims priority, application Japan, Feb. 27, 1989, 1-21645[U]**
**Int. Cl.$^5$ A47G** *19/08*
**U.S. Cl. 211—41** **4 Claims**

1. In a support frame for supporting a semiconductor wafer carrier in a vessel for washing or other processing of semiconductor wafers housed in the carrier, said support frame comprising guide means to guide and hold said carrier in position against displacement of the carrier therearound, the improvement wherein said support frame is provided with wafer stop-

VOL 1126 ISS 1 MY 7 1991 UMI

per means located substantially in the central area of the support frame, whereby the respective semiconductor wafers housed in a carrier located in position in the support frame are



slightly lifted with the lowermost portion of the semiconductor wafers abutting against said wafer stopper means to thereby effect contact of the whole surface of the respective semiconductor wafers with the liquid contained in a vessel.

---

**5,012,936**

## MERCHANDISER ASSEMBLY

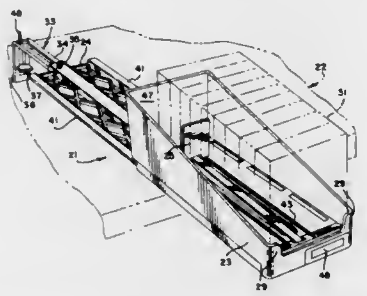
**Peter Crum, Belgium, Wis., assignor to Oscar Meyer Foods Corporation, Madison, Wis.**

**Continuation of Ser. No. 176,954, Apr. 4, 1988, Pat. No. 4,907,707. This application Dec. 15, 1989, Ser. No. 455,838**

**The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.**

**Int. Cl.⁵ A47F** *7/00*

**U.S. Cl. 211—59.3** **17 Claims**



1. A merchandiser assembly for use in storing and displaying products in a shelf-like orientation, the merchandiser assembly comprising:

product tray means for holding and supporting a plurality of merchandised products, said product tray means having a front end portion and a rear end portion;

track means for providing generally horizontally oriented support of said product tray means, said track means having a front portion;

engagement means of said product tray means and of said track means for effecting sliding engagement between said product tray means and said track means and for permitting said product tray means to move with respect to said track means along a pathway that is generally longitudinally oriented with respect to said product tray means;

a generally upstanding product follower member slidably mounted with respect to said product tray means for movement generally between said rear end portion and said front end portion of the product tray means;

biasing means for urging said product follower member and any merchandised products in front of said product follower member generally toward said front end portion of the product tray means;

stop means for engaging said product follower member with said front portion of the track means when the merchandiser assembly is in a fill mode at which the front end portion of said product tray means is slidably extended beyond said front portion of the track means, whereby movement of said generally upstanding product follower member beyond said front portion of the track means is prevented and whereby said product follower member is positioned in spaced away relationship with respect to said front end portion of the product tray means in opposition to said biasing means;

clamp means included along said track means, said clamp means being for securing the merchandiser assembly to a shelf, said clamp means includes a front clamp and a rear securement assembly, said rear securement assembly includes a vertically adjustable clamping plate by which said merchandiser assembly is securable to a rear edge of said shelf; and

said product tray means is for holding a plurality of merchandised products resting on their respective edges and oriented in a generally horizontally oriented stack.

---

**5,012,937**

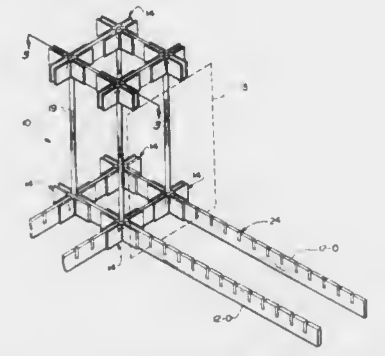
## GREETING CARD DISPLAY RACK

**Nancy Owens, 1758 Adams Cir. South, Largo, Fla. 34641**

**Filed Jul. 21, 1989, Ser. No. 382,983**

**Int. Cl.⁵ A47F** *7/00*

**U.S. Cl. 211—189** **2 Claims**



1. A greeting card display rack, simulating a tree configuration, comprising:

a central shaft having surfaces defining a base plane, said base plane seatable upon a planar support surface;

a base of four sets of two card support branches, said branches of each set arranged in parallel relationship to one another and in rectangular relationship to adjacent sets, each branch of each set of branches being duplicates with a like plurality of notches opening upwardly and in mutual alignment to receive and support a greeting card in upright display;

each branch of each set being removably attached and supported at one end thereof to said central shaft at the base, to establish a set of four card support sets around said central shaft;

a second array of four sets of two card support branches, said branches of each set arranged in parallel relationship to one another and in rectangular relationship to adjacent sets, each branch of each set of branches of said second array being duplicates with a like plurality of notches opening upwardly and in mutual alignment to receive and support a greeting card in upright display;

each branch of each set in said second array being removably attached and supported at one end thereof to said central shaft;

said second array being above the base plane and each branch of said second array being shorter than the branches of the set below;

whereby, the second array may be added as the numbers of greeting cards on display in the base four sets fill the available support.

---

**5,012,938**

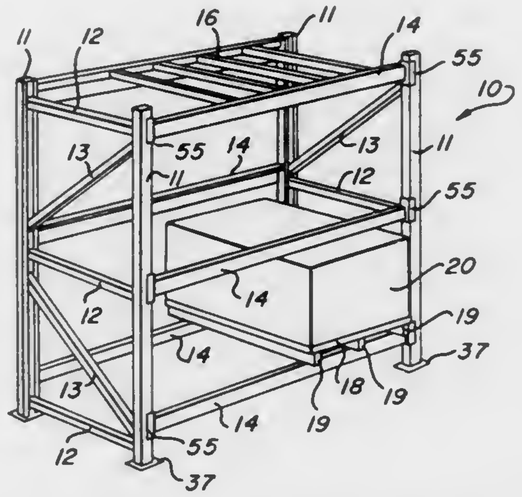
## STORAGE RACK CORNER POST

**John R. King, West Bloomfield, Mich., assignor to S&K Enterprises, Inc., Detroit, Mich.**

**Filed Feb. 16, 1990, Ser. No. 481,628**

**Int. Cl.⁵ A47F** *5/00*

**U.S. Cl. 211—191** **12 Claims**



1. A corner post for a heavy duty storage rack formed of vertical corner posts which are interconnected by elongated horizontal and angled members to form a frame for supporting heavy loads, comprising:

a vertical, sheet metal tube bent into a rear wall with integral opposite side walls and with the free edges of the side walls bent into flat wall sections that extend towards each other to form a front wall having a central, vertically extending space located between the sections;

each of said sections having an integral end portion which is bent away from the rear wall to form a pair of spaced apart, parallel base walls which terminate in integral, narrow flanges that are bent outwardly, relative to each other, roughly parallel to their sections, so that the sections and their respective base walls and flanges form oppositely opening channels extending vertically along the length of the post;

a series of spaced apart holes formed in the opposite base walls, with each hole in one base wall being horizontally aligned with a corresponding hole in the opposite base wall, screw-like fasteners received through the aligned pairs of holes;

screw fastening nuts received in said channels, said channels being of a width to closely receive said screw fastening nuts positioned within the channels and through which the screws may be extended for fastening the screws to the posts, so that the screws may be manually turned while the nuts are restrained from turning during the fastening of the screws thereto;

and with the spacing between the horizontal base walls being preselected to closely received end portions of rack horizontal and angled members having opening through which screws that pass through a pair of aligned holes formed in the base walls may be extended for thereby rigidly fastening the member end portions to the post;

whereby a pair of posts may be rapidly interconnected by said elongated members by inserting the end portions of the members between the base walls and inserting screws through aligned holes in the base walls and the member end portion and holding corresponding nuts within one of the channels and rotating the screw head for fastening the screw in place.

---

**5,012,939**

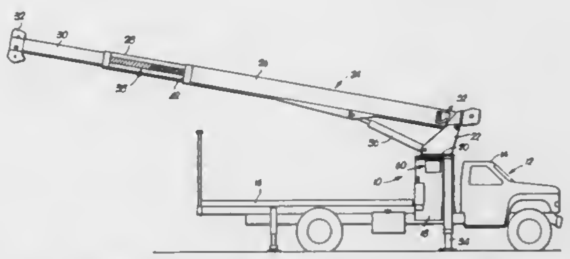
## COLOR CODED BOOM AND CHART SYSTEM FOR PROPORTIONALLY EXTENSIBLE BOOM ASSEMBLY

**Raymond F. Pitman, Prairie Village, and Raymood J. Wacht, Overland Park, both of Kans., assignors to Simon-RO Corporation, Olathe, Kans.**

**Filed Aug. 29, 1989, Ser. No. 399,843**

**Int. Cl.⁵ B66C** *13/16*

**U.S. Cl. 212—157** **1 Claim**



1. In combination with a multiple stage boom including a base boom and a plurality of relatively extensible and retractable boom stages, and means mounting the base boom for pivoting movement thereof about a horizontal axis, the improvement comprising:

angle measuring means operatively coupled with the boom for measuring and indicating the upright angle at which the boom is disposed during pivotable movement thereof about a horizontal axis;

extension indicating means for indicating the distance of extension of the boom from the horizontal pivot axis thereof to the outermost end of the boom, the extension indicating means including—

a plurality of separate markings provided on and spaced from one another along the length of one of the extensible and retractable stages, said one stage being the stage located adjacent the base boom, the markings being sequentially revealed when the boom stages are extended from a retracted position, each of the markings being representative of the total length of the boom at the point of extension of the boom stages where that marking is first revealed on the boom,

a plurality of color sections extending along the one boom stage, each of the color sections being provided between a different pair of the markings and being colored differently than the other color sections to provide visual confirmation of the distance of extension of the boom as the color sections are revealed along with the markings on the one boom stage during extension and retraction of the boom stages,

said base boom and boom stages each being colored differently from said color sections; and

a boom load rating chart adapted to be observable by a boom operator during boom operation and presenting thereon a table and a diagram,

the table including a plurality of columns each colored in a color corresponding to, respectively, said base boom color and one of the color sections of the extension indicating means for facilitating location of the column of the table corresponding to the indicated distance of extension of the boom, and being provided with numerals in each of the columns corresponding to the different angles at which the boom may be disposed as indicated by the angle measuring means so that it is possible to located the applicable information in the table by noting the exposed color sections on the one boom stage, and the color of said base boom, and the angle indicated by the angle measuring means and locating the corresponding column and numerals on the table,

the diagram including a plurality of arcuate sections each colored in a color corresponding to, respectively, said base boom color and one of the color sections of the

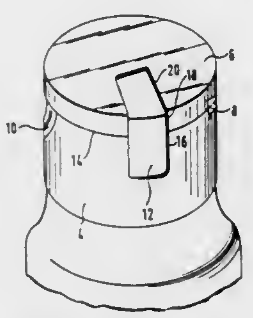
VOL
1126
ISS
1
MY
7
1991
UMI

extension indicating means for facilitating location of the arcuate section of the diagram corresponding to the boom, the diagram further including numbers representative of the operating radius of the boom for various angles and lengths of extension of the boom so that it is possible to determine the operating radius of the boom by noting the exposed color sections on the one boom stage, and the color of the base boom, and the angle indicated by the angle measuring means and locating the corresponding numbers on the diagram.

---

### 5,012,940
### CLOSURE WITH ORIGINALITY GUARANTEE

**Jochen Koehn, Bergwinkel, Fed. Rep. of Germany, assignor to Zeller Plastik GmbH, Zell, Fed. Rep. of Germany**
**Filed Jul. 7, 1988, Ser. No. 217,595**
**Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722330**
**Int. Cl.⁵ B65D** *41/32*
**U.S. Cl. 215—230** **15 Claims**



1. An arrangement for indicating whether a closed container has been opened, said container being of the type for receiving a multi-part closure and having a label adhered in part to a first portion of the closure and in part to a second portion of said closure, said label having a certain size and shape, said arrangement comprising:

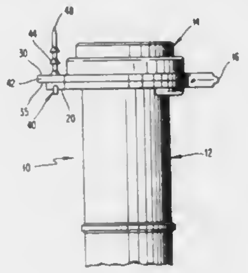
- means disposed on said first portion for defining a first flat recess for receiving the label, and
- means disposed on said second portion for defining a further flat recess for receiving said label, said first and second recesses being in registry with one another when said container receives said closure and together defining a composite recess having said certain shape and size of said label.

---

### 5,012,941
### TAMPER-PROOF CONTAINER AND CAP ASSEMBLY

**Robert S. Abrams, Albany, and H. Carl Smith, Fultonville, both of N.Y., assignors to Robert S. Abrams, Albany, N.Y.**
**Filed Jan. 12, 1990, Ser. No. 464,417**
**Int. Cl.⁵ B65D** *55/06*
**U.S. Cl. 215—250** **22 Claims**

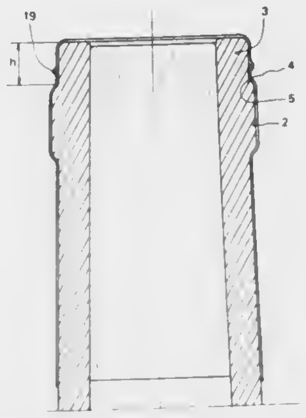
16. A tamper-proof plastic vial comprising a container and a cap of integrally molded one piece construction and including a hinge therebetween, said container including a first flange having a first through-hole, said cap including a second flange arranged to overlie said first flange when said cap is inserted onto a rim of said container, said flange of one of said container and cap including a strip integrally molded in one piece therewith, said strip being sufficiently flexible and of a length sufficient to enable said strip to be inserted through said holes while remaining attached to said last-named flange, said strip including portions configured for one-way passage through said through-holes whereby removal of said strip is possible only by permanent destruction thereof, said second flange defining a thumb tab facilitating opening of said cap.



---

### 5,012,942
### EASILY CUT ALUMINIUM CLOSURE CAPSULE

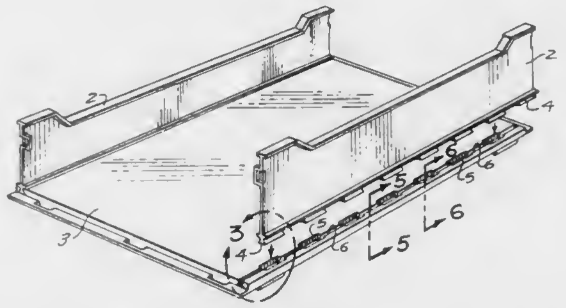
**Guy Druesne, St. Seurin sur l'Isle, and Joël Michaud, Montpon Menestrol, both of France, assignors to Cebal, Clichy, France**
**Filed Aug. 14, 1989, Ser. No. 393,257**
**Claims priority, application France, Sep. 7, 1988, 88 12059**
**Int. Cl.⁵ B65D** *41/00*
**U.S. Cl. 215—253** **7 Claims**



1. A closure capsule formed of aluminum or aluminum alloy and having a container contacting inner surface and an outer surface, said capsule comprising a head portion and an integral skirt portion, said head portion including an annular radially projecting rib, said skirt portion including an annular radially projecting shoulder portion adapted to rest juxtaposed an annular radially projecting ring of a neck of a container, said annular radially outwardly projecting rib of said head portion and said annular radially outwardly projecting shoulder portion defining therebetween a generally imperforate cutting zone for guidance of a knife blade or the like for severing said head portion from said skirt portion, said cutting zone provided with an annular weakened zone formed in said container contacting inner surface for facilitating severing of head and skirt, said capsule being adapted to be crimped onto the container in overlying relation to the access area of the container with said shoulder portion juxtaposed the annular radially outwardly projecting ring.

### 5,012,943
### SEGMENTED INTERLOCKING TRACKS PRODUCED BY INJECTION MOLDS

**Nick King, 6161 Portobelo Ct., San Diego, Calif. 92124**
**Filed Jun. 7, 1990, Ser. No. 535,011**
**Int. Cl.⁵ B65D** *7/42*
**U.S. Cl. 220—4.32** **1 Claim**



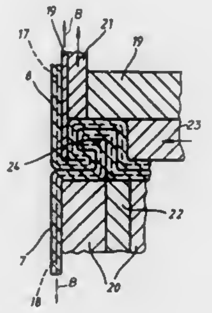
1. A knock-down box produced by injection mold process comprising:

- a multiplicity of sides and a bottom,
- a multiplicity of male trapezoidal segments along a edge of said side,
- an alternating sequence of a multiplicity of rectangular tracks and a multiplicity of female trapezoidal segments contiguous and in-line with each other parallel to an edge of said bottom,
- a dimensioning of said male trapezoidal segments to permit insertion into said rectangular tracks alternately in-line with said female trapezoidal sections,
- said dimensioning designed to assure a friction slip of said male trapezoidal segments along said rectangular track into a captive engagement in female trapezoidal segment assuring a rigid construction of said sides with said bottom,
- a multiplicity of end caps which hinge and lock said sides to said bottom resulting in a box structure which may be likewise disassembled and stored flat,
- said trapezoidal and rectangular segments shape being compatible with elementary injection molding techniques to accomplish a low cost container product.

---

### 5,012,944
### MULTI-LAYERED PLASTIC CONTAINER PRODUCED BY COEXTRUSION BLOW-MOLDING

**Dieter Scheurenbrand, Wolfschlugen, and Helmut Wawra, Korb, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany**
**Filed Sep. 22, 1988, Ser. No. 247,530**
**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1987, 3731750**
**Int. Cl.⁵ B29C** *17/07*
**U.S. Cl. 220—677** **2 Claims**



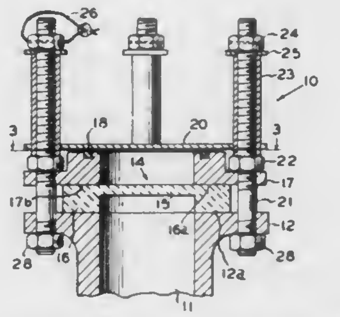
1. Multi-layered plastic container, formed by blow-molding of a multi-layered coextrudate and with the multi-layer extrudate forming a web seam at a connection point where two identical multi-layered extrudate portions of the container are joined to each other by being folded in a labyrinthal L-shape transversely to the web seam;

- the two identical multi-layers extrudite portions being welded to each other;
- wherein the two extrudite portions of the fold positively interlock through multiple reverse foldings to resist bursting forces acting on the container walls from within; and
- wherein the length of the web seam prior to folding is equivalent to at least three times the thickness of the coextrudate, and wherein the web seam is folded at least once.

---

### 5,012,945
### RUPTURE DISK ASSEMBLY

**Gordon A. Keenan, Baton Rouge, La., assignor to Exxon Research and Engineering Co.**
**Filed Dec. 15, 1989, Ser. No. 450,967**
**Int. Cl.⁵ F16K** *17/164;* **B65D** *51/16*
**U.S. Cl. 220—89.1** **8 Claims**



1. A rupture disk assembly for mounting on a tubular vent of a fluid containment vessel comprising:

- a replaceable rupture disk for horizontal mounting over the tubular vent;
- a top flange means positioned over the rupture disk;
- securing means for urging the top flange downwardly and securing the rupture disk over the tubular vent thereby sealing the fluid in the vessel from the atmosphere;
- a vertically moveable cover plate horizontally disposed over and resting on the top flange;
- means for guiding the vertical movement of the cover plate whereby the cover plate will move vertically upward upon failure of the rupture disk caused by an increase in pressure in the fluid containment vessel above a predetermined pressure, thereby relieving the increased pressure and the cover plate will move vertically downward and seal the vent when the pressure is relieved;
- means for securing the cover plate over the top flange after a failure of the rupture disk; and,
- a sealing wire operatively connected to the means for securing the cover plate whereby the sealing wire must be broken before the cover plate can be secured over the top flange by the means for securing the plate thereby preventing inadvertent securing of the cover plate.

---

### 5,012,946
### INNERSEAL FOR A CONTAINER AND METHOD OF APPLYING

**Theresa A. McCarthy, West St. Paul, Minn., assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn.**
**Continuation of Ser. No. 314,394, Feb. 27, 1989, abandoned. This application Jun. 29, 1990, Ser. No. 546,669**
**Int. Cl.⁵ B65D** *77/20, 51/20*
**U.S. Cl. 220—258** **16 Claims**

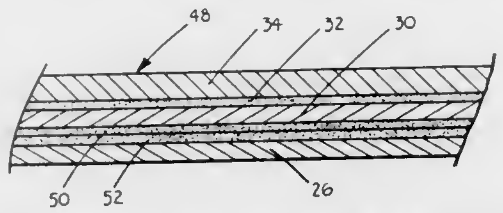
1. An improved easy opening innerseal for use with a container of the type having an opening defined by an upper rim, comprising:

- a body portion having an upper surface and adapted for

VOL
1126
ISS
1
MY
7
1991
UMI

fitting over an upper rim of a container, said body portion including membrane means for preventing passage of fluid through said body portion, said membrane means including an adhesive layer; and means adapted for bonding said body portion against the upper rim of the container; said bonding means having a first bonding stratum for bonding against the container rim with a first bonding force and a second bonding stratum which is bonded to said adhesive layer of said membrane means on one side and adhered to said first bonding stratum on an opposite side with a second bonding force which is less than said first boding force, said first boding stratum being fabricated of a material which has a rupture strength that is less than either of said second bonding force and said first bonding force; and

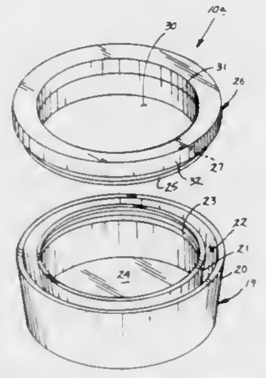
gripping means attached to an outer periphery of said body means for a user to grip while removing said innerseal from a container, whereby a first part of said first bonding stratum will delaminate from said second bonding stratum over the container rim and remain adhered to the rim when said gripping means is pulled, while a second part of said first bonding stratum will remain adhered to said second bonding stratum, thereby exposing the opening.



---

### 5,012,947
### WATER CHAMBER BAKING PAN

**Edward W. Roland, 28 Anglers Cove, Hilton, N.Y. 14468**
**Filed Mar. 15, 1990, Ser. No. 493,690**
**Int. Cl.$^5$ A47J** *27/10*
**U.S. Cl. 220—428** **5 Claims**



1. A water chamber baking pan apparatus comprising, in combination,

a pan housing including a planar floor defined by an external periphery, and an exterior side wall mounted integrally to the external periphery of the floor, and

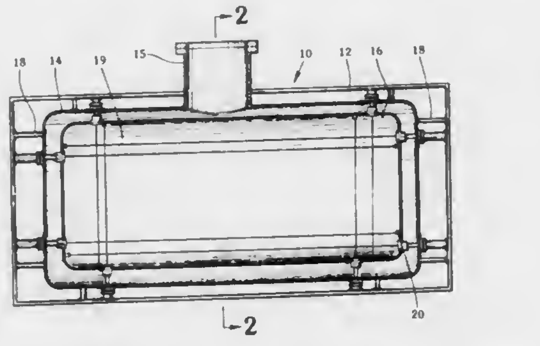
an internal wall spaced interiorly from the external periphery coaxially aligned with the external wall defining a fluid chamber therebetween, and

wherein the external wall includes an upper terminal edge and the interior wall includes a further upper terminal edge, and the interior wall includes a threaded interior surface, and a lid including a downwardly depending skirt, wherein the downwardly depending skirt includes external threads formed thereon cooperative with the internally threaded surface.

---

### 5,012,948
### SUPPORT ARRANGEMENT FOR A SPACE BASED CRYOGENIC VESSEL

**Hugo H. Van Den Bergh, San Diego, Calif., assignor to General Dynamics Corporation, Convair Division, San Diego, Calif.**
**Filed Jun. 21, 1989, Ser. No. 369,448**
**Int. Cl.$^5$ F17C** *3/08, 13/08*
**U.S. Cl. 220—437** **10 Claims**



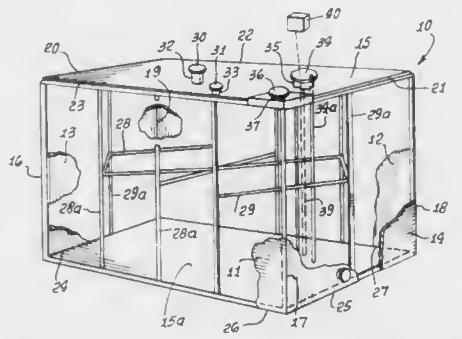
1. In a space based cryogenic vessel arrangement for a superconducting apparatus that includes an external support frame and an evacuated vacuum vessel which contains a vessel adapted to receive liquid helium or the like and a superconductive apparatus, said contained vessel being spaced from said vacuum vessel, the improvement comprising;

means for supporting said contained vessel independently of said surrounding vacuum vessel by a connection directly between said external frame and said contained vessel, said means for supporting the contained vessel comprises at least one cable assembly, said at least one cable assembly having interconnected lengths of material having contrasting coefficients of thermal expansion.

---

### 5,012,949
### FIRE RESISTANT TANK CONSTRUCTION

**David C. McGarvey, San Gabriel, and Jerry E. Buffalini, Corona, both of Calif., assignors to LRS, Inc., South El Monte, Calif.**
**Filed Mar. 31, 1989, Ser. No. 331,548**
**Int. Cl.$^5$ B65D** *90/06, 90/22, 90/50*
**U.S. Cl. 220—455** **28 Claims**



1. In fire resistant tank apparatus adapted for transportation and for installation above-ground to receive and dispense a liquid hydrocarbon or hydrocarbons, or the like, the combination comprising

(a) a metallic tank having lightweight wall means including an upright side or walls, a top wall and a bottom wall,

(b) first means on the top wall defining access porting to the tank interior,

(c) second means projecting beneath said bottom wall to support the tank at an above ground installation site,

(d) and first resistant material applied as a coating to the outer side or sides of said tank walls, and hardened in situ to define a relatively lightweight shell enclosing said tank, the shell extending into adjacency with said first and second means,

(e) the shell having thickness between about ¼ inch and 1 inch,

(f) said fire resistant material being characterized as charring in response to flame impingement thereon,

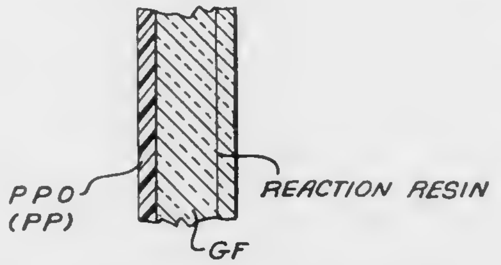
(g) the tank walls having thickness between about ¼ inch and 1 inch,

(h) said fire resistant material being free of retention to said tank by metallic bands with clips.

---

### 5,012,950
### PLASTIC CONTAINER FOR LIQUIDS OR GASES

**Holger Knappe, Ringstrasse, 2061 Grabau, Fed. Rep. of Germany**
**Filed Apr. 27, 1989, Ser. No. 343,640**
**Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3814699; Apr. 14, 1989, 3912270**
**Int. Cl.$^5$ B65D** *90/04*
**U.S. Cl. 220—459** **11 Claims**



1. A plastic container comprising a seamless liner, as an inner layer, of modified polyphenylene oxide and an outer glass fiber layer wound on approximately geodesic lines on said liner, wherein said outer layer has a coating of thermoplastics or reaction resins, wherein said reaction resins are at least one of polyester resins, or unsaturated polyester resins not containing monomeric styrene.

5. A plastic container comprising a seamless liner, as an inner layer, of modified polyphenylene oxide or polypropylene, and an outer glass fiber layer wound on approximately geodesic lines on said liner, wherein said outer layer has a coating of thermoplastics or reaction resins not containing monomeric styrene, and said seamless liner comprising at least one layer comprised of modified polyphenylene oxide or polypropylene, and at least one other thermoplastic.

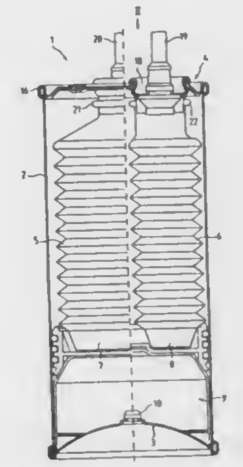
10. A plastic container comprising a seamless liner, as an inner layer, of modified polyphenylene oxide or polypropylene, and an outer glass fiber layer wound on approximately geodesic lines on said liner, wherein said outer layer has a coating comprising polypropylene or modified polyphenylene oxide foam saturated glass fiber wherein said outer layer does not contain monomeric styrene.

---

### 5,012,951
### HOPPER FOR PRESSURIZED CONTAINER

**Lothar Miczka, Feldwiesenstrasse 22, Altstätten, Switzerland**
**Filed May 29, 1987, Ser. No. 55,322**
**Claims priority, application Switzerland, Jun. 10, 1986, 2343/86**
**Int. Cl.$^5$ B21D** *39/00*
**U.S. Cl. 220—626** **3 Claims**

1. A hopper for use with a hollow cylindrical container having an axis and open at one end, the open container end having an exposed edge, said hopper comprising a plurality of at least two partial hoppers, the partial hoppers extending generally at right angles to the axis of the container and being disposed one below the other, all partial hoppers being secured together, each partial hopper having an outer periphery of the same shape as the periphery of the open container end, at least the uppermost partial hopper having its peripheral edge secured to the exposed edge of the open container end, all partial hoppers having a common opening spaced inwardly from the peripheries of the partial hoppers, the peripheral edge of the uppermost hopper and the peripheral edge of the open container end being flanged together, the partial hoppers defining a partially profiled and substantially flat disc; the partial hoppers having in common a raised peripheral edge surrounding the common opening which extends upwardly above and away from the open container end, and further including a valve seal secured to the raised edge and enclosing the common opening, wherein:



the plurality of partial hoppers is equal to two, both partial hoppers being circular, the diameter of the upper hopper being larger than the diameter of the lower partial hopper;

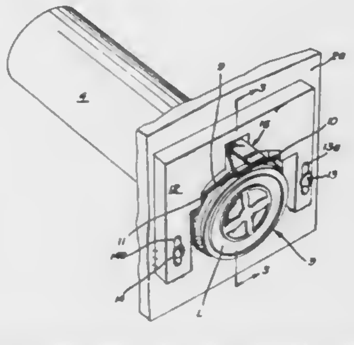
the partial hoppers are provided with at least one cavity and passages connecting the cavity to the interior of the container for venting; and

an elastic tongue is disposed in the cavity, said tongue having a closed position at which venting is blocked and an open position at which venting is not blocked, the tongue being normally held in closed position by spring tension and being adapted to be moved into open position when a pin is inserted from the outside of the upper hopper into the cavity and engages the tongue.

---

### 5,012,952
### LID AND CUP DISPENSER HAVING AN ELONGATED YIELDABLE TENSION ELEMENT SECURED BY A TRANSVERSELY ADJUSTABLE ANCHORING BLOCK DISPOSED ASTRIDE THE DISPENSING OPENING

**Leo J. Franz, 3792 Hollow Tree La., Lilburn, Ga. 30247**
**Filed Jun. 12, 1989, Ser. No. 365,010**
**Int. Cl.$^5$ B65H** *1/08, 3/26;* **B65D** *83/04*
**U.S. Cl. 221—36** **12 Claims**



1. A device for dispensing an article from a group of nested

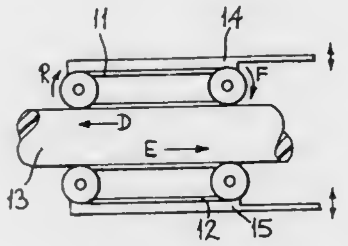
VOL
1126
ISS
1
MY
7
1991
UMI

substantially identical flanged articles disposed in an elongated container and biased toward and open end of said container, said device comprising an elongated yieldable tension element disposed astride said open end of said container and in engagement with the flange of an article disposed at said open end of said container and normally holding said article against dislodgement from said container, said elongated yieldable tension element being adapted to override said flange of said article thereby to release and to aid in ejecting said article from said container, and anchoring means disposed at said open end of said container and having securing means for respectively engaging and holding opposite ends of said elongated yieldable tension element so as to cause said elongated yieldable tension element to impart an inward force to said article, said anchoring means being bodily movable in a direction transverse to the axis of said container thereby to adapt the device for use with articles of different transverse dimensions.

---

### 5,012,953
## METHOD OF OPERATING A HOT MELT DISPENSER

**Willi Borst, Florstadt, and Christian Wooge, Bad Homburg, both of Fed. Rep. of Germany, assignors to Bostik, Inc., Middletown, Mass.**
**Continuation of Ser. No. 238,805, Aug. 31, 1988, abandoned. This application Nov. 21, 1989, Ser. No. 420,606**
**Claims priority, application United Kingdom, Oct. 6, 1987, 8723427**
**Int. Cl.$^5$ B67D** *5/42*
**U.S. Cl. 222—1** **1 Claim**



1. A method for operating a hot melt dispenser having a trigger for operating the dispenser, a solid rod of thermoplastic material, a melt chamber for receiving the rod and a positive feed mechanism for feeding the rod into the melt chamber including opposed feed belts which are located with their longitudinal axes parallel to the axis of the solid rod comprising:

pulling the trigger to run the opposed feed belts in a feed rod direction and in the event at least one of the feed belts is spaced from the solid rod and located at a spaced position, displace the at least one feed belt spaced from the solid rod from the spaced position to position in engagement with the solid rod,

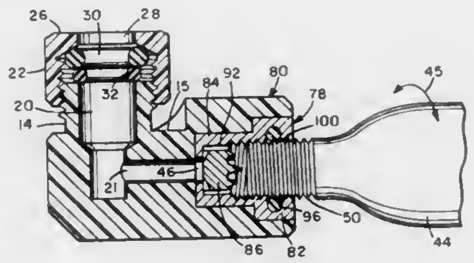
releasing the trigger to run the opposed feed belts in an opposite retract direction for a predetermined period of time, and

controlling the displacement of the at least one feed belt by pulling the trigger within a selected period of time to maintain said at least one feed belt in engagement with the rod and not pulling the trigger within said selected period of time to displace said at least one feed belt to the spaced position.

---

### 5,012,954
## TIRE INFLATION SYSTEM

**Conrad A. Will, 4130 La Jolla Village Dr., #201, La Jolla, Calif. 92037**
**Filed Feb. 8, 1990, Ser. No. 476,876**
**Int. Cl.$^5$ B60C** *23/10*
**U.S. Cl. 222—5** **8 Claims**



1. A tire inflation system for inflating a tire inner tube through a tire inflation valve comprising:

a cartridge having an end with a seal and containing a volume of pressed gas;

a conduit having an inlet port for connection to the cartridge and an outlet port for connection to a tire inflation valve and a flow passage interconnecting said ports;

said inlet port and the end of the cartridge having connection means for connection to one another and for allowing movement of the end of the cartridge in said inlet port;

puncture means contained within the inlet port having a projection for contacting and puncturing the cartridge seal to permit the gas to enter the flow passage;

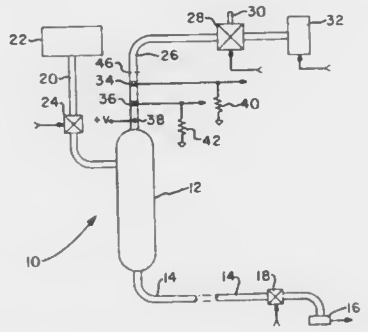
said puncture means having an outer sealing ring for contacting said sealed opening around the point of puncturing for controlling the flow of gas from said cartridge through the space between said sealing ring and said sealed opening to said flow passage; and

said puncture means having at least one outer channel for conducting the flow from said inlet port to said flow passage.

---

### 5,012,955
## SYRUP DISPENSING SYSTEM

**Joseph W. Shannon, Kent, Ohio, assignor to ABC/Sebrn Tech-Corp., Akron, Ohio**
**Filed Oct. 30, 1989, Ser. No. 428,608**
**Int. Cl.$^5$ B67D** *5/08*
**U.S. Cl. 222—61** **15 Claims**



1. A syrup dispensing system, comprising:

a dispensing head for dispensing syrup into a container placed therebeneath during a dispensing cycle;

a pump means in communication with said dispensing head for receiving and maintaining a reservoir of syrup therein and passing said syrup to said dispensing head;

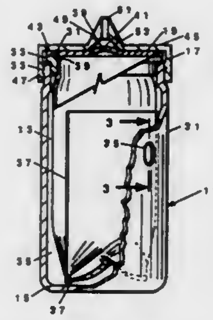
flow sensing means in communication with said pump means for measuring a rate of flow of said syrup from said dispensing head, said flow sensing means comprising first and second sensors interposed in a flow path of said pump means, said sensors defining a fixed volume therebetween within said flow path; and

flow adjustment means in communication with said pump means and said flow sensing means for adjusting said rate of flow of said syrup during said dispensing cycle.

---

### 5,012,956
## SQUEEZE BOTTLE WITH BAG, DISPENSING SYSTEM

**William R. Stoody, 8659 Summerdale Rd., San Diego, Calif. 92126**
**Filed Aug. 7, 1989, Ser. No. 390,117**
**Int. Cl.$^5$ B65D** *35/22*
**U.S. Cl. 222—94** **9 Claims**



1. A squeeze bottle class dispensing system for isolated containment and dispensing of fluid product therefrom, which comprises:

a bottle having resilingly deflectable side walls, and an easily obturated vent means which facilitate squeezing of said bottle for dispensation of said fluid product;

at least one collapsible bag, containing dispensable fluid product, being suspended within said bottle and spaced from said walls;

a normally closed valve, which facilitates containment and dispensation of said fluid product, being disposed on and closing said bag;

and a bottle closure being secured to said bottle and thereby retaining said valve and said bag in place relative to said bottle;

said bag having, integral therewith, a passive guide means that promotes collapsing of said bag and thereby ensures against proliferation and sustainment of fluid retention pockets in said bag;

said fluid product within said bag being in dispensing readiness communication with said valve regardless of attitude of said dispensing system.

---

### 5,012,957
## DISPENSER APPARATUS

**Stavros Mihail, Seattle, Wash., assignor to Promation Incorporated, Seattle, Wash.**
**Filed Jan. 27, 1989, Ser. No. 303,540**
**Int. Cl.$^5$ B67D** *5/08*
**U.S. Cl. 222—190** **27 Claims**

1. A dispenser apparatus for dispensing a predetermined quantity of a flowable material, said apparatus comprising:

(a) a feed conduit for providing said flowable material from a primary source, said primary source including a supply conduit and a hopper, said supply conduit communicating between said hopper and said feed conduit, said hopper being vented to the atmosphere;

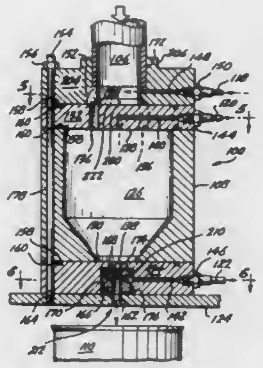
(b) a chamber having an inlet and an outlet;

(c) at least one inlet port passing through an inlet plate and communicating between said feed conduit and said chamber inlet;

(d) first means for providing pulses of pressurized gas to said chamber;

(e) second means for providing pressurized gas to said feed conduit;

(f) an outlet port communicating with said chamber outlet; and

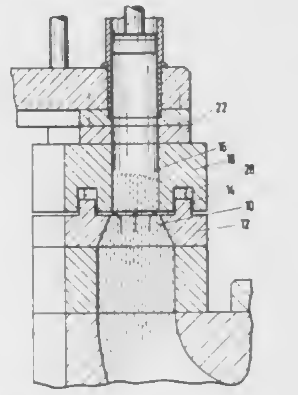


(g) an expandable valve means disposed within said outlet port for intermittently permitting said flowable material to pass through said outlet port.

---

### 5,012,958
## APPORTIONING UNIT FOR A FILLING SYSTEM FOR THE FILLING OF FOOD CANS

**Jurgen Gideon, Verden; Dieter Krieger, Langwedel-Etelsen, and Eirch Mengel, Verden/Borstel, all of Fed. Rep. of Germany, assignors to EFFEM GmbH, Verden/Aller, Fed. Rep. of Germany**
**PCT No. PCT/DE89/00237, § 371 Date Dec. 21, 1989, § 102(e) Date Dec. 21, 1989, PCT Pub. No. WO89/10304, PCT Pub. Date Nov. 2, 1989**
**PCT Filed Apr. 19, 1989, Ser. No. 458,645**
**Claims priority, application Italy, Apr. 22, 1988, 3813573**
**Int. Cl.$^5$ B65D** *88/54*
**U.S. Cl. 222—306** **3 Claims**



1. An apportioning unit for filling of food cans with a viscous, pasty or lumpy filling material, having at least one cylinder unit which is moved past a sealing plate, comprising:

a lower part having a first passage hole for the filling material and provided with an annular key which is arranged concentrically to said passage hole, and

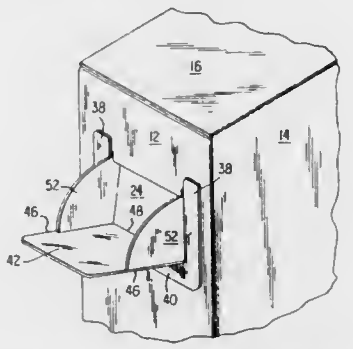
an upper part which bears a sealing plate and having a second passage hole for the filling material, said upper part being provided with an annular groove which receives said annular key and wherein said annular groove being arranged concentrically to said second passage hole,

the depth of said annular groove being greater than the height of the annular key and said annular groove receiving an elastic annular tube.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,012,959
### POUR SPOUT AND CARTON CONSTRUCTION

**Robert L. Gordon, Monroe, N.Y., assignor to International Paper Company, Purchase, N.Y.**
**Filed Nov. 17, 1988, Ser. No. 272,279**
**Int. Cl.$^5$ B65D** *43/00, 43/16*
U.S. Cl. 222—535 **7 Claims**

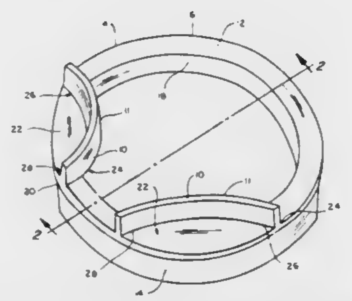


1. A pour spout and carton construction including a paperboard carton adapted to contain powdered or granular material, said carton having at least one flat wall portion, said flat portion having a dispensing opening therein, a unitary plastic pour spout fitment, said fitment including a generally U-shaped flat wall attached to said carton flat wall portion, a pour spout having a bottom wall and two parallel, curved side walls both extending in the same direction from and perpendicular to said bottom spout wall and toward the carton interior, said bottom wall integrally hinged at one end thereof to the middle portion of said U-shaped flat wall and whose side edges are frangibly secured to the legs of said U-shaped wall by frangible connections, whereby the pour spout bottom wall is normally parallel to said carton flat portion and coplanar with the legs of said U-shaped fitment, whereby the pour spout is openable to permit dispensing by breaking the bottom wall thereof from its frangible connections to the legs of the U-shaped wall, and whereby such breaking is evidence of opening of the pour spout, and means for providing an interference, snap-fit at the edges of the pour spout bottom wall, said means comprising stretched portions of the plastic of the frangible connections upon breaking the frangible connections to thereby enable the spout to be reclosed to substantially its initial position.

---

### 5,012,960
### GROOVE PROTECTOR AND SPOUT

**Samuel C. Arnold, 2315 Fairview Dr., Alton, Ill. 62002**
**Continuation of Ser. No. 472,024, Jan. 30, 1990, abandoned, which is a continuation-in-part of Ser. No. 332,476, Apr. 3, 1989, abandoned. This application Sep. 10, 1990, Ser. No. 579,816**
**Int. Cl.$^5$ B65D** *25/40*
U.S. Cl. 222—570 **1 Claim**



1. A groove protector and spout device for attaching to the upper portion of a paint can consisting of:

a planar ring member having parallel top and bottom surfaces and defining a substantially circular opening, frictional attachment means extending downwardly from said planar ring member including an outside wall portion located adjacent to the outside periphery of said ring planar member and an inside wall portion located adjacent the inside periphery of said planar ring member, said outside wall portion and said inside wall portion being parallel and extending downwardly an equal amount, said inside wall portion, said outside wall portion and said bottom surface defining a space for receiving the upper portion of a paint can, said outside wall portion and said inside wall portion being slidably engageable with said outside periphery and said inside periphery respectively of the upper portion of a paint can to frictionally attach said device thereto, said bottom surface being adjacent the upper portion of the paint can when so attached, an annular ridge member having a substantially semi-circular cross section located on said bottom surface and extending downwardly therefrom, said ridge member being intermediately positioned between said inside wall member and said outside wall member and being engageable with both the inside and outside edges of the groove of a paint can to prevent the penetration of paint into the groove from either edge when said device is frictionally attached to said paint can,

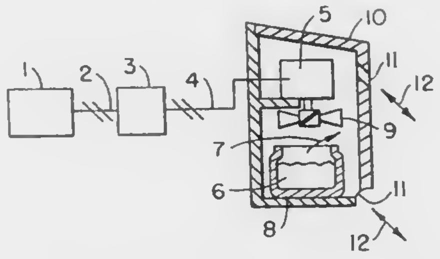
a pair of opposed pour guards coplanarly joined to said inside periphery of said planar ring member and extending into said circular opening, said opposed pour guards each having a convex inside edge, an inner end and an outer end opposite said inner end, said inner ends being in opposed relation and in close proximity with each other, said outer ends being relatively far apart, and,

a pair of raised lip portions each joined to the top surface of said ring member and to one of said opposed pour guards adjacent said convex inside edge, said raised lip portions each projecting upwardly and extending from the outer periphery of said ring member adjacent said inner end of one of said opposed pour guards to the outer periphery of said ring member adjacent said outer end of said pour guard to form a pouring spout which does not extend beyond the outer periphery of said ring member.

---

### 5,012,961
### METHOD OF DISPENSING VAPOR TO THE AIR IN A ROOM AND AN APPARATUS FOR CARRYING OUT THE METHOD

**Jens Madsen, Abyhoj, and Svend S. Kaae, Aarhusn, both of Denmark, assignors to Milliken Research Corporation, Spartanburg, S.C.**
**Division of Ser. No. 754,840, Jul. 15, 1985, Pat. No. 4,658,985. This application Oct. 20, 1986, Ser. No. 920,749**
**Int. Cl.$^5$ B67B** *7/00;* **G04C** *5/08*
U.S. Cl. 222—643 **9 Claims**

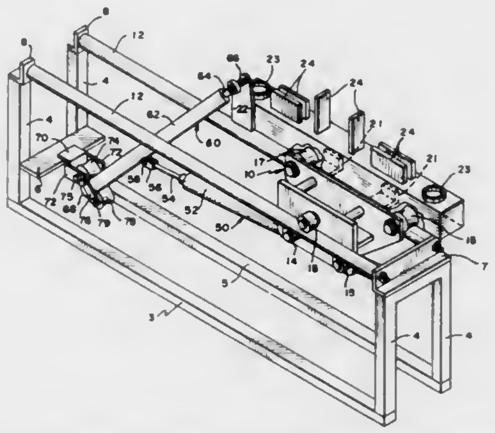


1. Apparatus to dispense an aromatic vapour to a space comprising: a vapour dispensing means having a pre-determined volume of an aromatic vapour dispensing substance, an electrically actuated means operably associated with said vapour dispensing means causing aromatic vapour from said substance to be dispensed to a room, means supplying a current to said electrically actuated means, means to periodically cut-off the current to said electrically actuated means and a control means to gradually increase the current to said electrically actuated means as the aromatic vapour dispensing substance is dissipated to maintain a constant level of vapour concentration until the vapour dispensing substance is used up.

---

### 5,012,962
### INDEXING MECHANISM FOR A MANNEQUIN CARRIAGE HAVING A SLIDABLE, PIVOTABLE SUPPORT AND INDEX BAR MOVEABLE BY A FLUID CYLINDER FOR MOVEMENT BETWEEN A DRESSING POSITION AND A GARMENT PRESS

**Gene Oberley, Cincinnati, and Barbara Downie, Norwood, both of Ohio, assignors to American Laundry Machinery, Inc., Cincinnati, Ohio**
**Filed Jan. 16, 1990, Ser. No. 465,434**
**Int. Cl.$^5$ D06C** *15/00;* **D06F** *71/00, 71/28*
U.S. Cl. 223—57 **7 Claims**



1. An indexing mechanism for use in a garment dressing and pressing machine having a support frame, at least one substantially horizontal guide rail secured to said support frame and a carriage supported by said at least one guide rail for linear movement between dressing and pressing positions comprising:

an elongated indexing bar having a first end portion pivotally secured to said carriage for linear movement therewith, a second distal end portion extending away from the carriage, and a central portion between said end portions;

bar guiding means attached to said support frame, said bar guiding means arranged to support said first end portion of said indexing bar for pivotal movement about a pivot axis and sliding movement along the length of the indexing bar;

the distal end portion of said indexing bar supported by said bar guiding means;

a telescoping fluid cylinder having relatively moveable portions including first and second ends, one of said ends being pivotally secured to said support frame and the other end being pivotally secured to the central portion of said indexing bar such that linear extension and retraction of a moveable portion of said relatively movable portions of said telescoping fluid cylinder results in pivotal movement of said indexing bar about said pivot axis and linear movement of said first end of the bar with said carriage along said at least one guide rail, with the linear movement of said first end and carriage being greater than the linear movement of the moveable portion of said cylinder.

---

### 5,012,963
### WALKER SUPPORT TOTE BAG

**Patricia Rosenbaum, 1020 Lees La., Florissant, Mo. 63031**
**Filed Sep. 29, 1989, Ser. No. 414,261**
**Int. Cl.$^5$ B60R** *11/00*
U.S. Cl. 224—42.46 R **8 Claims**

1. A tote bag adapted to be mounted to a walker support for carrying a variety of articles, comprising:

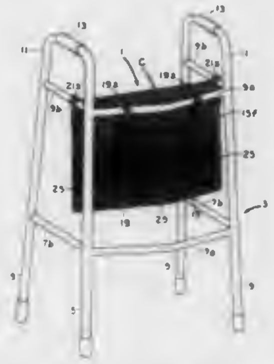
front and back panels made of flexible material each having a substantially rectangular configuration with upper, bottom and opposed side marginal edges, said front and back panels being secured to one another along the bottom and opposed side marginal edges thereof so as to maintain said front and back panels in juxtaposition relative to one another when said tote bag is in a closed and collapsed position to facilitate carrying and storage of the tote bag;

said tote bag being manually openable along the upper marginal edges of said front and back panels to provide a large compartment within the tote bag for carrying articles; and

strap means attached to said front and back panels and being configured, arranged and dimensioned relative to said tote bag for causing said front and back panels to be maintained in continuously spaced relationship from one another for storage of articles within the large compartment of the tote bag when mounted to the walker support;

said strap means including spaced intermediate strap elements attached to said front and back panels and each extending from the upper marginal edge of one panel to and through the attached bottom marginal edges of said panels to the upper marginal edge of the other panel in order to reinforce the flexible material from which the panels are made, each spaced intermediate strap element having a strap section extending beyond the upper marginal edges of said panels and including releasable fastening means for attaching said intermediate strap elements to the tote bag for mounting same to the walker support; and

said strap means also including spaced outer strap elements attached adjacent to the opposed marginal edges of one panel and including strap portions extending beyond the upper marginal edges of said panels, said spaced outer strap elements being attached to said one panel which is opposed to the panel containing the strap sections of the spaced intermediate strap elements that extend beyond the upper marginal edges of said panels, said spaced outer strap elements capable of being attached to the walker support in a direction transverse to the spaced intermediate strap elements to maintain said front and back panels in continuously spaced relationship for opening said large compartment, and said spaced outer strap elements including releasable fastening means for attachment to the tote bag for mounting same to said walker support.



---

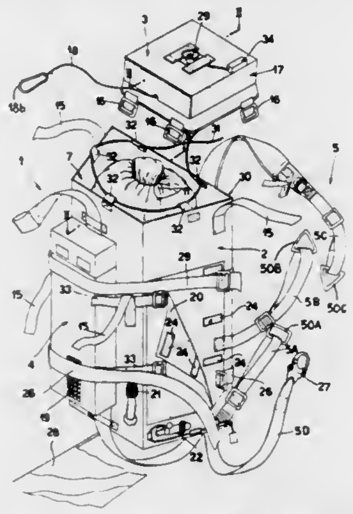
### 5,012,964
### AMPHIBIOUS BACKPACK

**Angelo Falletta, Via Tartaglia, 24, and Roberto Barbierato, Via Tallone, 12, both of Milan, Italy**
**Filed Jan. 24, 1989, Ser. No. 301,174**
**Claims priority, application Italy, Jan. 25, 1988, 19188 A/88**
**Int. Cl.$^5$ A45F** *4/02*
U.S. Cl. 224—153 **12 Claims**

1. An amphibious backpack comprising a body having an open top, a cover detachably mounted on said open top of the body, strap means on said body for fastening the backpack to the user, said body comprising front, central and rear compartments successively juxtaposed on one another, the rear com-

VOL
1126
ISS
1
MY
7
1991
UMI

partment being closest to the back of the user, an inflatable bladder in said front compartment, means for inflating said bladder, a sealable first sack in said central compartment for personal belongings of the user, a sealable second sack containing at least one sheet of foam material which can be used as a mattress in said rear compartment, said front compartment, central compartment, and rear compartment having bottom regions respectively provided with openings for drainage of water from said compartments, said strap means including straps and a releasable clamp means for detachably connecting said straps, said strap means having a first configuration in which the backpack can be worn by the user when walking on the ground and a second configuration for use in water, said clamp means being constructed to permit concurrent release of said straps in said second configuration to enable said body to be separated from the user, when in water and a line connected to the backpack including means for connection to the user and of a length such that with the backpack released from the user and floatable in water with said bladder inflated, the user is fully submerged and tethered to the backpack and can carry out underwater activities.

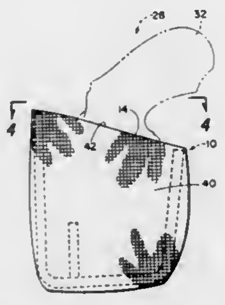


---

5,012,965

## HOLSTER FOR A HANDGUN

**David M. Miller, 7927 E. 77th Pl., Tulsa, Okla. 74133**
**Filed Mar. 30, 1990, Ser. No. 501,602**
**Int. Cl.$^5$ A45F *5/00*; B65D *57/00***
U.S. Cl. 224—255 **6 Claims**



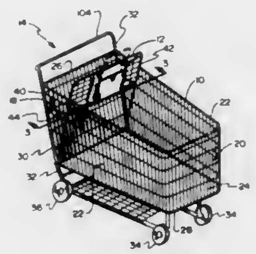
1. For use with a handgun having an open ended barrel, a holster apparatus adapted to be inserted into a pouch formed of front and back panels secured to each other along opposite side edges and bottom edges and being open along the top edges comprising:
- a support structure having a generally horizontal base member with a first and second end;
- an elongated barrel receiving member affixed to and extending upwardly from an intermediate location of said base member and configured to removably telescopically receive the open end of the barrel of a handgun thereon when said handgun is received in said pouch;
- a first elongated guide member affixed to said base member at said first end thereof and extending upwardly therefrom; and a second elongated guide member affixed to said base portion at said second end thereof and extending upwardly therefrom, said base member, barrel receiving member and said guide members being spaced apart and positioned substantially in a common plane and configured to be received in said pouch such that said base member is positioned adjacent to the bottom edges and said guide members are positioned adjacent respective side edges of said pouch.

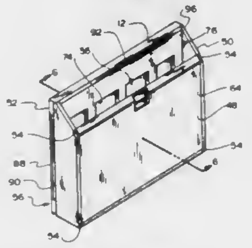
---

5,012,966

## CARD HOLDING DEVICE FOR USE WITH SHOPPING CARTS

**Winnie M. Turner, 816 S. Mississippi Ave., Lakeland, Fla. 33801; Elmer E. Sawyer, and Marie Sawyer, both of Rt. 2, Box 47-C, Bowling Green, Fla. 33834**
**Continuation-in-part of Ser. No. 373,191, Jun. 29, 1989. This application Nov. 27, 1989, Ser. No. 441,883**
**Int. Cl.$^5$ B60R *9/00***
U.S. Cl. 224—277 **13 Claims**





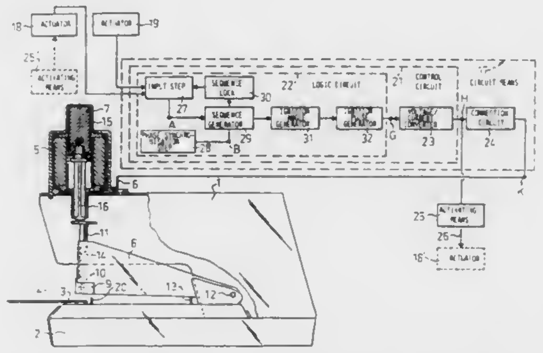
1. A shopping system comprising:
- a shopping cart having a basket for receiving and holding products to be purchased, a frame with a handle at the upper rear end, and wheels beneath the frame for effecting movement throughout a market, the shopping cart also having a pivotable seat with a vertical section and horizontal section for a child at the rear end of the basket; and
- a holding device for greeting cards and magazines mounted within the basket to the front vertical section of the seat, the holding device having vertical front, middle and rear panels with sides and with an open top, the holding device also having a horizontal floor located between the front and middle panels, the floor being movable between a lower receipt orientation and an upper discharge orientation and with a finger located adjacent to the front panel for effecting the movement of the floor between its orientations.

---

5,012,967

## ELECTRIC TOOL FOR DRIVING IN FIXING ELEMENTS

**Mats Johansson, Hestra, Sweden, assignor to Isaberg AB, Hestra, Sweden**
**PCT No. PCT/SE88/00242, § 371 Date Oct. 25, 1989, § 102(e) Date Oct. 25, 1989, PCT Pub. No. WO88/08779, PCT Pub. Date Nov. 17, 1988**
**PCT Filed May 11, 1988, Ser. No. 424,271**
**Claims priority, application Sweden, May 15, 1987, 8701998**
**Int. Cl.$^5$ B25C *7/17***
U.S. Cl. 227—7 **3 Claims**



1. An electric tool for driving in fixing elements (**10**), such as staples and nails, into an object (**4**) by means of a magnetic field generated by supplying magnetising current to an electromagnetic device, said tool having a circuit means (**17**) which is adapted, when activated, to supply magnetising current to said electromagnetic device, characterised by two actuators (**18,19**) alternatively connectible to said circuit means (**17**) and adapted, when actuated, to activate said circuit means, one (**18**) of said actuators being an actuator which is activatable in a potential-free mode and which is, in an initial position of the tool, unconnected to said circuit means, and the other (**19**) of said actuators being connected to said circuit means in the initial position, and an activating means (**25**) adapted to be actuated by said circuit means (**17**) to produce, with a time delay after the actuation of said circuit means, a potential-free signal for actuation of an actuator (**18'**) which is activatable in a potential-free mode and included in an optionally subsequent said tool, said one actuator (**18**) being activatable by a said activating means of an optionally preceding said tool, so as to activate said circuit means (**17**) after being connected thereto.

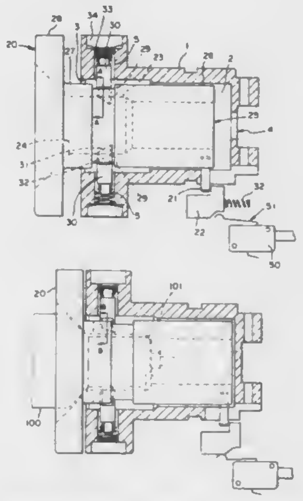
---

5,012,968

## DEVICE FOR CONTROLLING ACCESS IN FASTENER MANIPULATION SYSTEMS

**William Hylwa, Ansonia, Conn., assignor to Emhart Industries, Inc., Towson, Md.**
**Filed May 31, 1989, Ser. No. 359,291**
**Int. Cl.$^5$ B21J *15/38***
U.S. Cl. 227—156 **4 Claims**

1. A device for providing controlled access to an actuator of a fastener manipulations system comprising
- a cylindrical housing,
- a control switch,
- a discriminator located within said cylindrical housing and having actuator means extending through said housing, said discriminator being selectively axially displaceable from a first position whereat said actuator means is remote from said control switch to a second position whereat said actuator means actuates said control switch,
- said discriminator having a selectively configured axial bore for receiving a cylindrical fastener setting tool
- opposed latch means carried by said cylindrical housing and radially displaceable between retracted and advanced positions for preventing displacement of said discriminator from said first position to said second position when in said advanced position and for permitting displacement of said discriminator from said first position to said second position when in said retracted position,



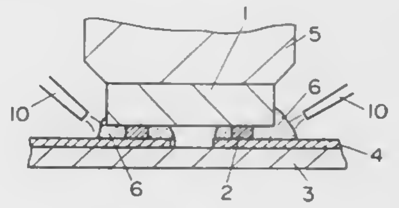
- said latch means being selectively configured so that engagement with opposed portions of the fastener setting tool as it is inserted into said discriminator will result in displacement of each of said latch means from said advanced to said retracted position.

---

5,012,969

## METHOD OF CONNECTING ELECTRODES

**Kenzo Hatada, Katano, and Hiroaki Fujimoto, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Continuation of Ser. No. 285,524, Dec. 16, 1988, abandoned. This application May 17, 1990, Ser. No. 525,223**
**Claims priority, application Japan, Dec. 17, 1987, 62-319443**
**Int. Cl.$^5$ H05K *3/32***
U.S. Cl. 228—104 **5 Claims**



1. A method of connecting electrodes comprising:
- a first step of positioning an electrode formed on a first substrate and an electrode formed on a second substrate, at least one of the first and second substrates including an electrical component;
- a step of pressing both of the electrodes together;
- a step of testing the electrical component to determine if it has predetermined characteristics and if so:
- a step of then injecting an insulating resin from the side of the first substrate so as to fill an area surrounding an interface between the two electrodes;
- a step of stiffening the insulating resin while continuing to press both of the electrodes together; and
- a step of relieving of pressure after the resin is stiffened, whereby the electrodes are electrically connected together and the first and second substrates are affixed together;
- and replacing the substrate including an electrical component if the step of testing the electrical component determines that the electrical component does not have the

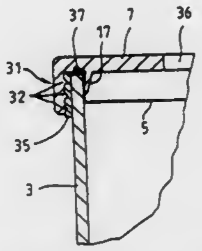
VOL
1126
ISS
1
MY
7
1991
UMI

predetermined characteristics and then repeating the method from the first step.

---

### 5,012,970
## CAP WITH CUTTING RING FOR COMPOSITE CONTAINERS

**Helmut Kücherer, Schriesheim, Fed. Rep. of Germany, assignor to Weidenhammer Packungen KG GmbH & Co., Hockenheim, Fed. Rep. of Germany**
**Filed Dec. 20, 1988, Ser. No. 287,484**
**Int. Cl.$^5$ B65D** *41/04*
**U.S. Cl. 229—4.5** **13 Claims**

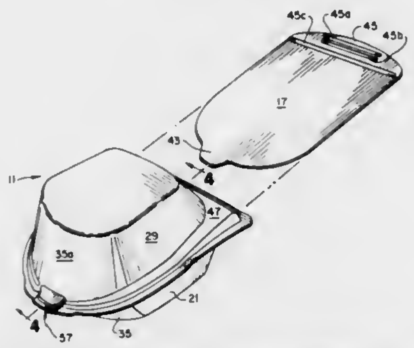


1. Package comprising a sleeve of composite cardboard or paper material having a sealed-on bottom and at the opposite end a sealed-on closure membrane which is at least partially openable, a cap that overlaps the sleeve with the closure membrane characterized in that the cap **(7)** features a rim flange **(16)** in the form of a cutting ring **(31)** overlapping the sleeve **(3)** such that the cutting ring **(31)** cuts into an exterior surface of the composite material as the cap **(7)** is screwed onto the sleeve **(3)**.

---

### 5,012,971
## FOOD CONTAINER AND METHOD

**Joseph J. Cozzi, Chicago; Timothy F. Conway, Riverside, both of Ill.; John A. LaFleur, Richmond, Va.; Eileen M. Rusnak, Darien, and Neil H. Johnson, Clarendon Hills, both of Ill., assignors to Restaurant Technology, Inc., Oak Brook, Ill.**
**Continuation-in-part of Ser. No. 267,898, Nov. 7, 1988, Pat. No. 4,951,866. This application Aug. 28, 1990, Ser. No. 573,940**
**Int. Cl.$^5$ B65D** *5/48*
**U.S. Cl. 229—120.07** **19 Claims**



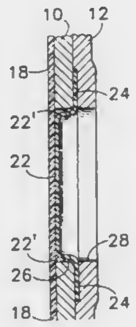
1. A container for storing contents in separate compartments comprising:

(a) a first compartment defined by a bottom portion and side portions and having an open portion opposite said bottom portion;
(b) a second compartment defined by a bottom portion and side portions and having an open portion opposite said bottom portion;
(c) hinge means located along and connecting a side portion of each of said first and second compartments permitting said second compartment to be folded over and onto said first compartment to define an enclosed volume comprising said first and second compartments with the bottom portion of said second compartment defining the top of said container when said container is in a closed position;
(d) latch means for locking the package together in said closed position, said latching means including a locking latch extending from the side opposite from the side where said hinge means is located in one of said compartments and a locking aperture in the side opposite from the side where said hinge means is in the other of said compartments, said locking latch and locking aperture located to permit insertion of the locking latch into the locking aperture when the container is in said closed position;
(e) a removable platform positionable over the open portion of said second compartment, said platform having a periphery, a portion of said periphery defining a support tab projecting from said platform, said support tab dimensioned to allow insertion of said tab into said locking aperture when said platform is positioned over said open portion of said second compartment to restrain movement of said platform; and
(f) an elongated slot extending adjacent said hinge means in the side of one of said compartments through which said platform can be removed from said container while in said closed position.

---

### 5,012,972
## PAPERBOARD CONTAINER WITH CONTENT INDICATING WINDOW

**Duane M. Nordstrom, Kelso, and Harold L. Baker, Longview, both of Wash., assignors to Longview Fibre Company, Longview, Wash.**
**Filed Oct. 27, 1989, Ser. No. 428,091**
**Int. Cl.$^5$ B65D** *25/54*
**U.S. Cl. 229—162** **13 Claims**



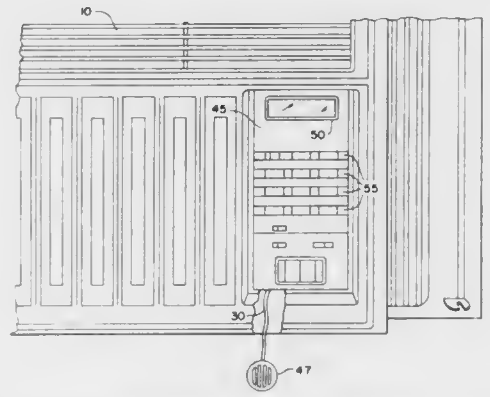
1. A container with content indicating window, comprising:

(a) a container side wall having inner and outer surfaces,
(b) an opening through the side wall providing visibility into the container,
(c) a transparent cup member in said opening having a closed end and an open end, said closed end of the cup member being located substantially coplanar with the inner surface of the container side wall,
(d) a flange extending laterally outward from the open end of the cup member and abutting the outer surface of the container side wall, and
(e) a transparent flexible liner within the container side wall for confining contents therein.

---

### 5,012,973
## WINDOW AIR CONDITIONING UNIT HAVING A BUILT-IN PROGRAMMABLE THERMOSTAT WITH REMOTE TEMPERATURE SENSOR

**Pearce Dick, Memphis, and Vinay Mehta, Germantown, both of Tenn., assignors to Hunter Fan Company, Memphis, Tenn.**
**Continuation-in-part of Ser. No. 236,720, Aug. 26, 1988, abandoned. This application Oct. 7, 1988, Ser. No. 254,579**
**Int. Cl.$^5$ F23N** *5/20*
**U.S. Cl. 236—46 R** **8 Claims**



1. A room air conditioning system comprising:

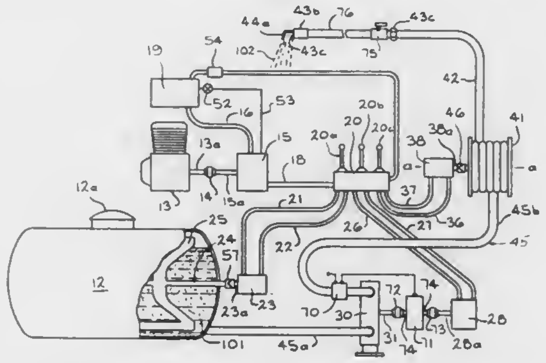
an individual air conditioning unit adapted to regulate the ambient temperature of a predetermined volume of space; and

a programmable thermostat intergral with said individual air conditioning unit for selectively controlling the on/off switching of said individual air conditioning unit in response to comparisons between the ambient temperature and control temperatures programmed in said programmable thermostat, said programmable thermostat having a first ambient temperature sensing mode utilizing first temperature sensor means built into said programmable thermostat for sensing the ambient temperature of the predetermined volume of space and a second ambient temperature sensing mode utilizing a second temperature sensor means selectively coupled to said programmable thermostat for sensing the ambient temperature of the predetermined volume of space at a location remote from said programmable thermostat.

---

### 5,012,974
## METHOD AND APPARATUS FOR APPLYING PREGERMINATED PLANTLETS

**Jesse D. Johnson, 133 Lake View La., Brighton, Mich. 48116**
**Filed Sep. 18, 1989, Ser. No. 408,212**
**Int. Cl.$^5$ B05B** *9/03*
**U.S. Cl. 239—1** **40 Claims**



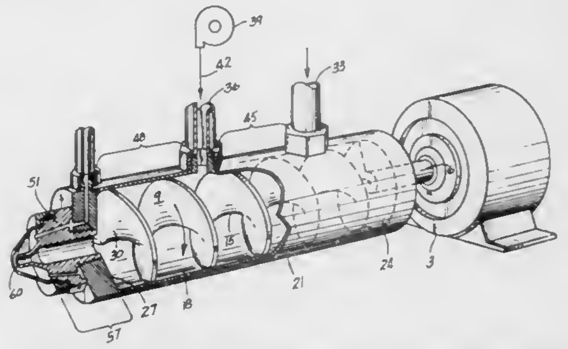
1. An apparatus adapted for broadcasting pregerminated seed plantlets in a particulate aqueous dispersion onto the ground which comprises:

(a) a portable support means;
(b) a peristaltic pump means mounted on the support means with an inlet and an outlet for the dispersion from a housing wherein a flexible tubular member means between the inlet and the outlet is pinched by a compression means of the pump means and wherein a drive shaft extends from the housing and is connected to the compression means so as to rotate the compression means;
(c) a drive means connected to the drive shaft for moving the compression means of the pump means to pinch the flexible tubular member and move the dispersion from the inlet to the outlet of the pump means, wherein the drive means is actuated by a hydraulic system mounted on the apparatus;
(d) a control means connected between the output of the peristaltic pump means and the drive means for selectively stopping and starting the pump means;
(e) a first fluid conduit means for broadcasting the dispersion from an opening mounted on the outlet of the pump means which conveys fluid through a valve means which can be opened or closed wherein the control means stops the pump means when the valve means is closed;
(f) a tank means mounted on the support means for holding the dispersion;
(g) a second fluid conduit means connected from the tank means to the fluid inlet of the pump means; and
(h) an agitator means in the tank means for mixing the dispersion during broadcasting of the dispersion.

---

### 5,012,975
## APPARATUS AND METHOD FOR MIXING AND SPRAYING A SLURRY

**Richard W. Korsmeyer, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.**
**Filed Feb. 21, 1990, Ser. No. 482,593**
**Int. Cl.$^5$ B05B** *7/04*
**U.S. Cl. 239—9** **10 Claims**



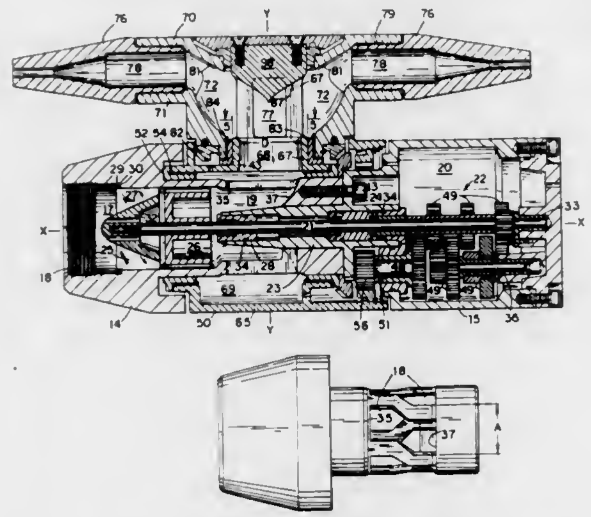
1. An apparatus particularly adapted for mixing and spraying a slurry comprising:

(a) a mixing chamber having an upstream and downstream end;
(b) a screw means, disposed within said chamber, for mixing and transporting material downstream;
(c) said chamber having a first inlet for introducing a particulate solid;
(d) said chamber having a second inlet for introducing a liquid;
(e) said first inlet being upstream of said inlet; and
(f) an air atomization nozzle in fluid communication with said chamber.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,012,976
### FLUID DRIVEN TANK CLEANING APPARATUS

**Loren L. Loberg, Lafayette, Calif., assignor to Sybron Chemicals, Inc., Hayward, Calif.**
**Filed Nov. 29, 1989, Ser. No. 443,722**
**Int. Cl.⁵ B05B *3/00***
U.S. Cl. 239—227 5 Claims



1. A fluid driven tank cleaning apparatus comprising:

an inlet stem having a fluid receiving chamber, an inlet for connecting said fluid receiving chamber to a source of fluid under pressure and a substantially cylindrical rear section having a plurality of discharge openings about its circumference;

a gear train housing secured to said inlet stem, said gear train housing having a secondary chamber separated from said fluid receiving chamber by a common wall;

a drive shaft rotatably mounted to said apparatus such that at least a portion of said device shaft is within said receiving chamber;

drive means connected to said drive shaft and disposed within said inlet for rotating said drive shaft in response to a fluid entering said inlet stem;

gear reduction means disposed within said secondary chamber and being connected to said drive shaft for reducing the rotation speed of said drive shaft;

a Tee-housing rotatably mounted to said inlet stem and/or gear training housing so as to rotate about a first axis, said Tee-housing having a generally cylindrical body section about said inlet stem and a nose section which extends for only a portion of the circumference of said rear cylindrical rear section of said inlet stem, said nose section rotates about the circumference of said inlet stem adjacent said discharge openings and has an inlet opening for receiving a fluid exiting from said discharge openings in said rear section of said inlet stem;

an output shaft rotatably mounted in said secondary chamber, and said output shaft being connected to said drive shaft through said gear reduction means;

a fluid nozzle assembly mounted to said Tee-housing for rotation about a second axis, said fluid nozzle assembly being fluidly connected to said fluid receiving chamber through said plurality of discharge openings in said inlet stem;

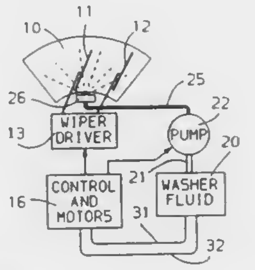
means for connecting said output shaft to said nozzle assembly so as to cause said nozzle assembly to rotate about said secondary axis in a predetermined manner;

said discharge openings in said inlet stem having a forward edge and a rear trailing edge with the forward edge of a discharge opening substantially coextending or slightly overlapping the rear edge of a next adjacent discharge opening such that said discharge openings have a size and configuration such that a substantially constant cross-sectional area of discharge opening is directly opposed to and communicates directly with said inlet opening of said nose section of said Tee-housing as said Tee-housing is rotated about said inlet stem.

---

### 5,012,977
### VEHICLE WINDOW WASHER WITH WASHER FLUID TEMPERATURE RESPONSIVE PRESSURE CONTROL

**Elgin J. Karklins, Kettering, Ohio; Stephen J. Scroggie, El Paso, Tex.; Steven L. Tracht, Springboro, and Mark W. Striker, West Carrollton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**
**Filed Sep. 18, 1989, Ser. No. 408,869**
**Int. Cl.⁵ B05B *1/10***
U.S. Cl. 239—284.1 8 Claims



1. A window washer system for a vehicle having a window, the window washer system comprising, in combination:

a washer fluid reservoir containing a washer fluid with a viscosity varying inversely with temperature;

a nozzle directed at the window;

a conduit from the reservoir to the nozzle;

a motor driven pump effective to pump washer fluid from the reservoir through the conduit and nozzle to the window, the motor driven pump having a first mode of operation in which it generates a first pump outlet pressure and a second mode of operation in which it generates a second pump outlet pressure less than the first pump outlet pressure;

a temperature sensor responsive to a temperature in the vicinity of the washer fluid reservoir so as to generate a temperature signal indicative of the temperature of washer fluid; and

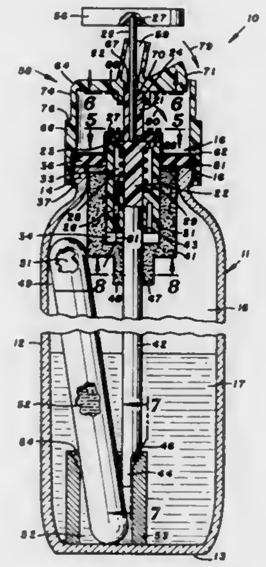
electric circuit means responsive to the temperature sensor to activate the motor driven pump in the first mode of operation with the temperature signal within a first temperature range and to activate the motor driven pump in the second mode of operation with the temperature signal within a second temperature range higher than the first temperature range, whereby the pump outlet pressure is automatically adjusted for the temperature dependent viscosity of the washer fluid.

---

### 5,012,978
### AEROSOL DISPENSER AND METHOD

**Lee R. Bolduc, 6416 Gainsborough Dr., Raleigh, N.C. 27612**
**Continuation-in-part of Ser. No. 251,806, Oct. 3, 1988, Pat. No. 4,941,615. This application Oct. 10, 1989, Ser. No. 419,508**
**The portion of the term of this patent subsequent to Jul. 17, 2007, has been disclaimed.**
**Int. Cl.⁵ B05B *9/04***
U.S. Cl. 239—304 51 Claims

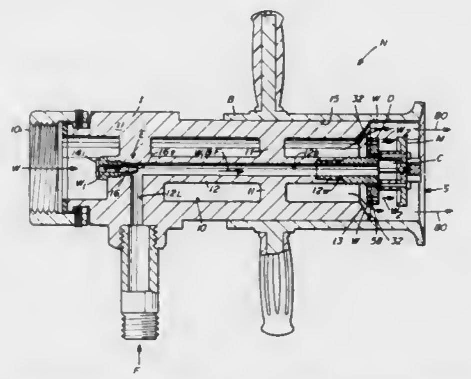
24. An aerosol foam dispenser comprising: a container having an internal chamber for storing a propellant and a first material, normally closed valve means mounted on said container to retain the propellant and first material in said chamber, said valve means being moveable to an open position to dispense foam to a desired location, at least one frangible ampule means located in the chamber containing a second material separate from the first material, means holding the ampule means in said chamber generally along the length of the chamber, rod means engageable with the valve means and said means for holding the ampule means, said rod means having an end portion movable between said means for holding the ampule means and the ampule means operable to break said ampule means when the valve means is first moved to the open position thereby releasing the second material into said chamber whereby the first and second materials are mixed together.



---

### 5,012,979
### ADJUSTABLE FOAMING CHAMBER STEM FOR FOAM-APPLYING NOZZLE

**Leslie P. Williams, Vidoo, Tex., assignor to CCA, Inc., Port Neches, Tex.**
**Filed Apr. 27, 1989, Ser. No. 343,683**
**Int. Cl.⁵ A62C *31/12***
U.S. Cl. 239—416.5 13 Claims



1. An adjustable foaming chamber stem for attachment to a foam-applying nozzle having a bore through which pass liquid and a stabilizer, comprising:

a deflector plate adapted to be affixed to the nozzle approximate the discharge end of the bore such that the plate restricts the flow of liquid discharged, the plate having a plurality of ducts that communicate through the plate in the direction of flow, at least some of the ducts being adjustable between an opened and a closed position;

a mixing plate affixed to and separated from the deflector plate such that some liquid flowing through the ducts strikes the mixing plate, the two plates forming a foaming chamber between them wherein the orientation of portions of the surface of the mixing plate is coordinated with the direction of flow of liquid from some of the ducts such that some liquid striking the mixing plate is reflected toward the center area of the mixing chamber;

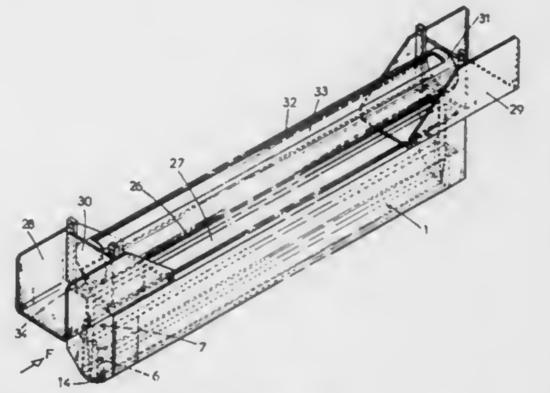
means for opening and closing at least some ducts; and

means for attaching the stem to the foam-applying nozzle.

---

### 5,012,980
### LINEAR-SPRAYING DEVICE

**Stéphane G. J. Viannay, Voisin-le-Bretonneux; Bernard M. Roth, Boulogne-Billancourt; Solange M. V. Mirigay, Chaville, and Georges J. B. Chastang, Coignieres, all of France, assignors to Bertin & Cie, Plaisir-Cedex, France**
**Filed Mar. 5, 1986, Ser. No. 836,644**
**Claims priority, application France, Mar. 6, 1985, 85 03280**
**Int. Cl.⁵ B05B *7/00***
U.S. Cl. 239—423 9 Claims



1. Linear spraying device comprising

an elongated hollow body comprising two elongated sleeves and including means for supplying said sleeves with a gas;

a sprayer separating said two elongated sleeves, said sprayer forming an elongated funnel having a wide and narrow part, said sprayer presenting a plane of longitudinal symmetry, which intersects said wide and narrow parts, the narrow part of the funnel including a spraying head which presents in the said plane of symmetry, at least a liquid supply slot through which a liquid is able to flow, and on either side of the liquid supply slot a gas supply slot through which the gas from said elongated sleeves is able to pass through;

a liquid supply tube, having a longitudinal slot which is arranged parallel to the plane of longitudinal symmetry, said liquid supply tube being in communication with the wide part of the funnel through which the liquid flows through to reach the slot of the said sprayer device.

---

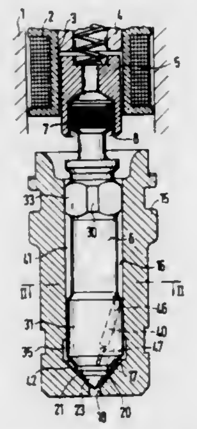
### 5,012,981
### INJECTION VALVE

**Volker Holzgrefe, Ditzingen; Nikolaus Simon, Gerlingen, and Ewald Ziegler, Heimsheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Continuation of Ser. No. 38,073, Apr. 14, 1987, abandoned. This application Aug. 23, 1990, Ser. No. 571,002**
**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1986, 3624476**
**Int. Cl.⁵ F02M *61/20, 61/10, 61/00***
U.S. Cl. 239—533.12 6 Claims

1. An injection valve for internal combustion engine fuel injection systems comprising a nozzle body having a guide bore therein for receiving a valve needle, said nozzle body provided with a conical valve seat at an innermost end of said

VOL
1126
ISS
1
MY
7
1991
UMI

bore and with an adjacent discharge opening, said valve needle being provided with a conical section, a sealing seat arranged to cooperate with the valve seat to control flow of fuel from said injection valve, said valve needle being further provided upstream of said valve seat with at least one peripheral guide portion adapted to guide a valve needle in said guide bore, said at least one guide portion being provided with at least one passage extending from an upper extremity thereof through said valve needle to exit in a lower extremity of the guide portion, a fuel chamber (42) between said lower extremity of said guide portion and said sealing seat, said passage including a larger diameter bore and a smaller concentric metering bore joining said larger diameter bore downstream thereof adapted to define a jet of discharge fuel into said fuel chamber between said lower extremity of said guide portion and said sealing seat, said smaller diameter metering bore being provided with an outlet penetrating said valve needle directly opposite said conical valve seat, thereby directing said jet of discharge fuel onto said conical valve seat, said smaller diameter metering bore being adapted to impart a spinning motion to said jet of discharge fuel.



---

### 5,012,982
## ELECTROMAGNETIC FUEL INJECTOR

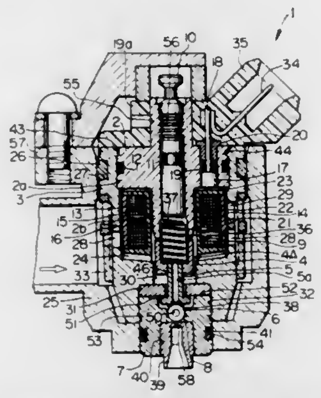
**Masahiro Souma, Hitachi; Tokuo Kosuge, Ibaraki; Tohru Ishikawa; Hisanobu Kanamaru, both of Katsuta; Mizuho Yokoyama, Katsuta, and Yasuo Kamituma, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engiueering Co., Ltd., Katsuta, both of, Japan**

**Continuation of Ser. No. 119,472, Nov. 12, 1987, abandoned. This application Jun. 5, 1989, Ser. No. 361,336**

**Claims priority, application Japan, Nov. 15, 1986, 61-272383; Jan. 16, 1987, 62-6022; Feb. 6, 1987, 62-24581**

**Int. Cl.$^5$ F02M** *51/08*

U.S. Cl. 239—585 17 Claims



1. An electromagnetic fuel injector comprising a cylindrical yoke opened at its respective ends; a cylindrical core made of magnetic material connected with one end of said yoke and having a distal end extending into said yoke; an electromagnetic coil supported between said core and said yoke; a valve guide fixed in the other end of the yoke and including a guide part for a ball valve located at a position remote from said electromagnetic coil; an elongated movable member with a ball valve provided at one end and an armature made of a magnetic material provided at the other end thereof; said elongated moveable member being disposed in such a manner that the distal end of said cylindrical core opposes said armature and said ball valve is disposed adjacent said guide part remote from said electromagnetic coil; said electromagnetic coil being disposed around said cylindrical core for producing an electromagnetic force between said cylindrical core and said armature when said coil is energized to effect axial movement of said elongated moveable member; and a guide member for guiding the movement of said elongated movable member in the axial direction and being disposed in the vicinity of said armature of said elongated movable member, said guide member provided in the vicinity of said armature of said elongated movable member being composed of a hollow sliding member made of an on-magnetic material disposed between and engaging with said armature and the distal end of said core so that magnetic flux from said electromagnetic coil does not pass therethrough; and wherein a sliding surface of the sliding member and an open inner wall surface of the yoke to which the valve guide is fixed are precisely coaxial.

---

### 5,012,983
## PERFORATED PLATE FOR A FUEL INJECTION VALVE

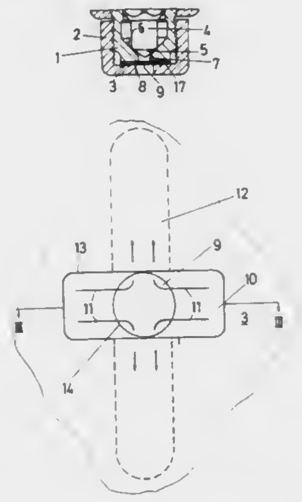
**Juergen Buchholz, Lauffen/Neckar, and Martin Maier, Moeglingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Dec. 6, 1989, Ser. No. 446,830**

**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1989, 3904446**

**Int. Cl.$^5$ B05B** *1/04*

U.S. Cl. 239—590.5 9 Claims



1. A perforated plate for a fuel injection valve in fuel injection systems of internal combustion engines, in which said perforated plate is disposed downstream of and displaced from a valve seat face provided in a nozzle body, said perforated plate includes at least one cylindrical hole therein, at least one pair of oppositely disposed elongated indentations (10) are provided in said perforated plate (3), said elongated indentations (10) are formed on a side of said perforated plate (3) oriented toward said nozzle body (1) and valve seat face, each of said at least one pair of oppositely disposed indentations slope on an incline from their outer edges downwardly to meet an outer surface of at least one of said at least one cylindrical hole, and each of said at least one pair of oppositely disposed elongated indentations discharge into at least one of said at least one cylindrical hole (9).

---

### 5,012,984
## PROCESS FOR PRODUCTION OF COAL-WATER MIXTURE

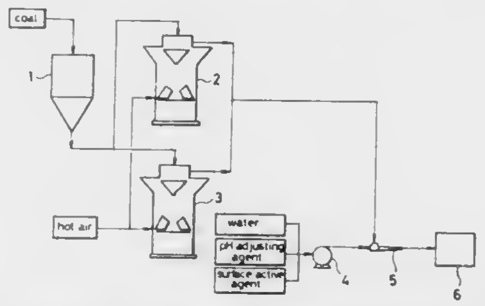
**Hiroshi Isbikawa, Zama; Kazuo Koyata, Sagamihara; Tetsuo Ono, Fujisawa; Takuo Motizuki, Niigata; Masayuki Sakuta, Ichikawa; Show Onodera, Nishinomiya; Hiroshi Yanagioka, and Yoshihisa Abe, both of Yokohama, all of Japan, assignors to Central Research Institute of Electric Power Industry, Osaka; Mixed Air Jet Pump Kaibatsu Co., Ltd., Niigata; Nippon Oil and Fats Co., Ltd., Tokyo and Chiyoda Corporation, Kanagawa, all of, Japan**

**Filed Mar. 5, 1990, Ser. No. 488,557**

**Claims priority, application Japan, Mar. 6, 1989, 1-51866**

**Int. Cl.$^5$ B02C** *23/24*

U.S. Cl. 241—16 3 Claims



1. A process for preparing a coal-water mixture, which comprises:

dry pulverizing coal in the presence of 0.2 to 0.6 parts by weight of air, at a temperature of 150° to 300° C., to form a mixture of the hot air and the pulverized coal, 90% of the pulverized coal has a particle size smaller than 200 μm and 10–60% of the pulverized coal has a particle size smaller than 10 μm;

forming a mixed-air jet water stream by supplying driving water to a mixed-air jet pump;

creating a suction vacuum by conveying the mixed-air jet water stream past an open suction pipe; and

sucking the mixture of the pulverized coal and hot air into the mixed-air jet water stream by the suction vacuum, said water of the mixed-air water jet stream containing 0.05 to 3.0% by weight of a surface active agent and 0.02 to 2% by weight of an alkaline pH adjusting agent, based on the weight of coal in the coal-water mixture.

---

### 5,012,985
## MULTIPLE STATION TURRET WINDING APPARATUS AND METHOD FOR WINDING WIRE ONTO REELS

**David Pepe, Meriden, Conn., assignor to Davis Electric Wallingford Corporation, Wallingford, Conn.**

**Continuation of Ser. No. 335,637, Apr. 10, 1989, abandoned. This application Jul. 30, 1990, Ser. No. 561,223**

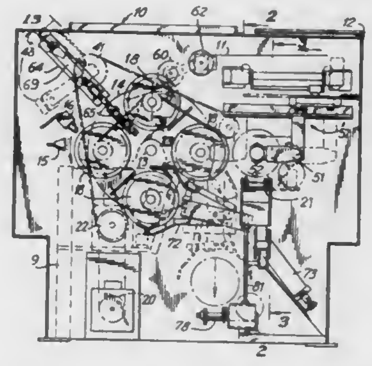
**Int. Cl.$^5$ B65H** *67/048*

**U.S. Cl. 242—25 A** **20 Claims**

1. A power driven take-up apparatus for winding flexible reeling stock onto take-up reels which comprises:

a. a power driven turret member having a plurality of stations, each adapted for receiving and supporting a reel or spool about which flexible reeling stock is to be wound;
b. automatic means for automatically mounting and positioning a reel or spool at a first station corresponding to a predetermined rotational position of said turret member;
c. means for rotating said turret member so that said reel or spool is moved at least to a second position;
d. means for directing reeling stock to be wound onto said reel to a location adjacent said reel or spool when it is located at said second position;
e. means for rotating said reel or spool at two of said positions in a direction adapted for winding the reeling stock thereabout;
f. means for stopping rotation of said reel or spool after a predetermined amount of wire is wound thereabout; and
g. automatic means for automatically removing said completely wound reel or spool from said turret member;

said apparatus being adapted for sequential mounting of reels or spools onto said turret member for winding flexible reeling stock thereabout to provide a substantially continuous sequential wire winding procedure, wherein said means for rotating said reel or spool at said two of said positions comprises a motor driven pulley and belt system arranged to selectively rotate each reel at said two of said positions of said turret member for winding the reeling stock around said reels or spools, said motor driven pulley and belt system comprises at least two power driven motors, each adapted to drive a separate system of pulleys and pulley driving belts, and each station on said turret member for receiving a take-up reel or spool has a rotatable shaft connected to at least two pulleys, and one of each said set of pulleys is adapted to be rotated by engagement of a pulley belt at a predetermined location corresponding to a turret member position.



---

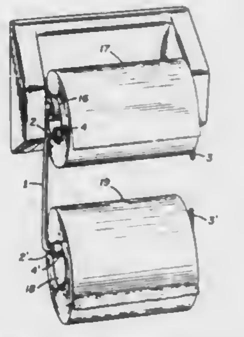
### 5,012,986
## SPARE TOILET TISSUE HOLDER

**Lloyd H. Needle, 9100 Potomac Station La., Potomac, Md. 20854**

**Continuation of Ser. No. 59,819, Jun. 9, 1987, abandoned. This application May 17, 1988, Ser. No. 196,814**

**Int. Cl.$^5$ D01H** *16/04*

U.S. Cl. 242—55.300 3 Claims



1. A toilet roll spindle suspendable holder for a spare roll of toilet tissue, comprising:

a C-shaped bar defining a spine, two sections connected perpendicularly to the spine at each end thereof and toilet tissue holding means on an end of each section radially projecting at least towards each other, said radial projec-

VOL 1126 ISS 1 MY 7 1991 UMI

tion being less than the diameter of a hollow spindle upon which a roll of toilet tissue is carried; and
- a rotatable sleeve mounted and maintained on each section, said sections being longer than the axial length of a roll of toilet tissue, one section of said C-shaped bar and rotatable sleeve being insertable through a hollow spindle of a rigidly mounted roll of toilet tissue, and the other section and rotatable sleevve being insertable through a spindle of a roll of toilet tissue to be suspended from said rigidly mounted roll of toilet tissue.

---

### 5,012,987
### DRUM-TYPE WINDER FOR WINDING A WEB OF MATERIAL, ESPECIALLY A WEB OF PAPER OR CARDBOARD, ON CORES

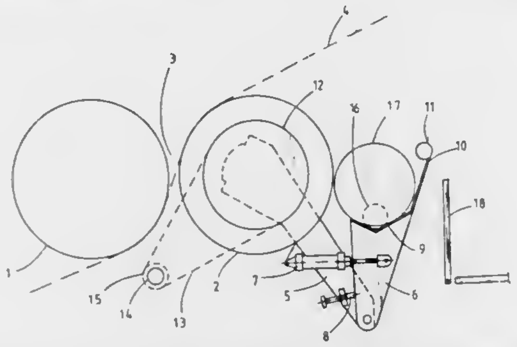
**Hartmut Dropczynski, Wilhelm Busch-Str. 100, 4047 Dormagen, Fed. Rep. of Germany**

**Filed Feb. 13, 1989, Ser. No. 310,402**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 3804402**

**Int. Cl.⁵ B65H** *19/22*

**U.S. Cl. 242—56 R** **3 Claims**



1. In a two drum-type winder for winding a web of material onto a core after looping partially around one of the drums, comprising means for inserting a fresh core in the drum valley, means for separating the web, a structure that accommodates the core, and a double-articulation arm that pivots about an axis parallel to the axes of the drums, the double-articulation arm being connected to the structure that accommodates the core and to the means for separating the web, the structure that accommodates the core being secured to a free section of the arm and the free section has an extension that projects beyond the core accommodation, to which extension the web-separating mechanism is connected, the improvement which comprises a mechanism that pivots the free section of the arm against an in-pivoting arm, and a continuously variable stop that limits the motion of the free section of the arm against the in-pivoting arm, the stop being attached to both arms proximate the pivot joint, the accommodating mechanism and the web-separating mechanism pivoting toward the bed around the unlooped drum, whereby the winder is capable of accommodating cores of various diameters and of pivoting through different arcs.

---

### 5,012,988
### METHOD OF, AND APPARATUS FOR, PROCESSING PRINTED PRODUCTS, PERIODICALS AND THE LIKE

**Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland**

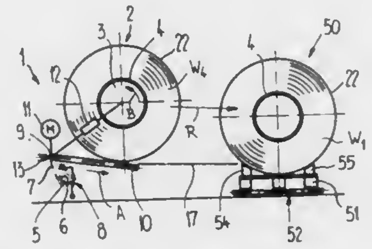
**Continuation of Ser. No. 42,329, Apr. 24, 1987, abandoned. This application Jul. 28, 1989, Ser. No. 388,305**

**Claims priority, application Switzerland, Apr. 28, 1986, 1 731/86**

**Int. Cl.⁵ B65H** *19/30*

**U.S. Cl. 242—59** **8 Claims**

1. A method of processing printed products arriving in an imbricated formation, especially newspapers, periodicals, and the like, comprising the steps of:
- rotating a hollow substantially cylindrical winding core about an essentially horizontal axis of rotation and upon which there is to be wound the imbricated formation of printed products at a winding location;
- winding the imbricated formation of printed products together with a tensioned winding band onto the rotating hollow substantially cylindrical winding core with one of the flat sides of each printed product facing the rotating hollow substantially cylindrical winding core in order to form a wound product package thereon;



- rolling each such formed wound product package in succession out of the winding location in a predetermined rolling direction upon a roll track onto a transport element in a storage unit arranged neighboring the winding location and capable of accommodating a plurality of the formed wound product packages for intermediate storage and further processing;
- during said step of rolling said wound product packages, supporting said wound product packages with their circumference upon said roll track;
- and displacing the transport element in timed relation to the rolling step in a direction perpendicular to said rolling direction to arrange the wound packages coaxially end to end on the transport element.

---

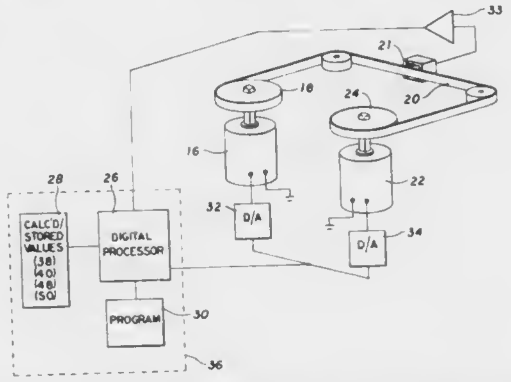
### 5,012,989
### APPARATUS AND METHOD FOR TAPE VELOCITY AND TENSION CONTROL IN A CAPSTANLESS MAGNETIC TAPE TRANSPORT

**Robert E. Whyte, Jr., Encinitas, and Ezra R. Alcudia, San Diego, both of Calif., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 24, 1989, Ser. No. 440,932**

**Int. Cl.⁵ G11B** *15/32;* **B65H** *59/38*

**U.S. Cl. 242—186** **5 Claims**



1. A capstanless transport apparatus for spooling a web of magnetic tape from a first reel to a second reel, said web having a span of said tape extending between said reels, said apparatus further comprising:
- a. a first reeling motor responsive to the flow of a first current therein for rotatably driving said first reel,
- b. a second reeling motor responsive to the flow of a second current flow therein for rotatably driving said second reel,
- c. first servo means operated in a closed loop configuration for controlling said first reeling motor to cause the span of tape to be transported at a controlled speed, and
- d. second servo means, operated in an open loop configuration and responsive to the magnitude of the first current supplied to said first reeling motor, for controlling said second reeling motor with the aforementioned second current to regulate tape tension, the sum of the first current and the second current being substantially constant.

---

### 5,012,990
### SPINNING REEL

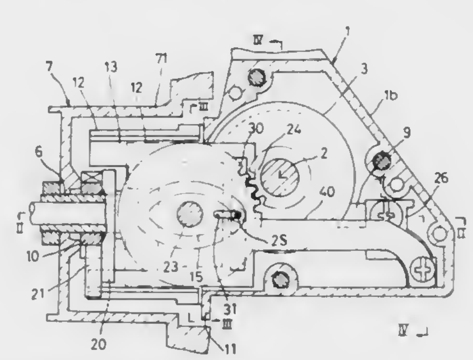
**Yozo Kawabe, Osaka, Japan, assignor to Shimano Industrial Co., Ltd., Osaka, Japan**

**Filed Sep. 1, 1989, Ser. No. 402,697**

**Claims priority, application Japan, Sep. 5, 1988, 63-116556[U]**

**Int. Cl.⁵ A01K** *89/01*

**U.S. Cl. 242—242** **7 Claims**



1. A spinning reel comprising:
- a reel body;
- a handle shaft rotatably supported to said reel body;
- a spool;
- a spool shaft for supporting said spool to said reel body, said spool shaft being axially slidable relative to said reel body;
- a rotary frame constructed as a hollow structure and rotatably supported to said reel body; said reel frame being rotatable by said handle shaft through a rotary transmission mechanism to wind up a line about a periphery of said spool;
- a slide element slidable back and forth attached to said spool shaft and being in said reel body for sliding said spool shaft;
- at least one guide portion on said reel body engaging said slide element for guiding the slide element back and forth in said reel body;
- a slide element gear rotatably supported to said reel body on a pivot shaft mounted on said reel body and extending substantially normal to said spool shaft; said slide element gear meshing with a gear which is mounted for rotation with said handle shaft; a cam mechanism having a loop-shaped cam attached to said reel body, an elongated slot defined in said slide element gear and a cam follower slidable in said loop-shaped cam and said elongated slot, said cam follower engaging said slide element for transducing rotary movement of said slide element gear into sliding movement of said slide element;
- said pivot shaft being positioned on the side of said rotary frame across from said handle shaft; and
- a portion of said slide element gear being caused to extend into said hollow structure of the rotary frame.

---

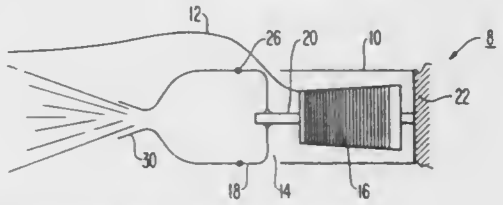
### 5,012,991
### PROJECTILE WITH AN OBTURATOR INCORPORATING A MOTOR

**George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.**

**Filed Mar. 15, 1990, Ser. No. 493,821**

**Int. Cl.⁵ F41G** *7/32*

**U.S. Cl. 244—3.12** **10 Claims**



1. A tube-launched projectile comprising:
- an airframe with an open aft end;
- an optical fiber-dispensing bobbin disposed within said aft end of said airframe;
- an obturator adjacent to but spaced from said aft end of said airframe, whereby optical fiber dispensed from said bobbin can pass between said airframe and said obturator; and
- a motor disposed in said obturator.

---

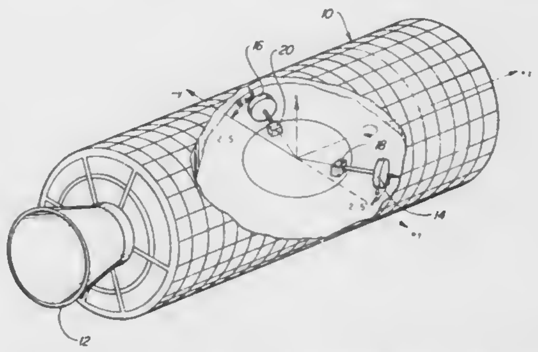
### 5,012,992
### SPIN STABILIZATION VIA MOMENTUM WHEELS OR SIMILAR DEVICES

**Jeremiah O. Salvatore, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 9, 1988, Ser. No. 282,418**

**Int. Cl.⁵ F42B** *10/02*

**U.S. Cl. 244—3.23** **9 Claims**



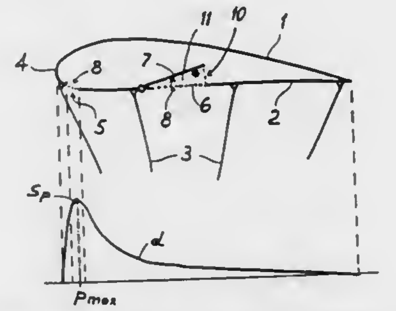
1. A stabilization system for a spinning spacecraft having three mutually perpendicular principal axes, defined as x, y and z axes, with the spacecraft spinning about the z-axis, the stabilization system including:
- a pair of rotatable momentum wheels carried by the spacecraft, each of said wheels having an axis of rotation oriented at an angle with respect to the z-axis on opposite sides of the x-axis in a common plane which includes both the z and y axes;
- means for rotating said wheels in respectively opposite directions but at the same speed, whereby components of angular momentum thereby generated by said wheels along the y-axis are annulingly subtractive, and components of angular momentum thereby generated by said wheels along the z-axis are additive, thereby providing additional angular momentum along the z-axis, wherein the magnitude of said additional momentum is to stabilize the spacecraft about the z-axis.

VOL
1126
ISS
1
MY
7
1991
UMI

5,012,993

## GLIDING PARACHUTE

**Konrad Schafroth, Wart 52, 3600 Thun, Switzerland**
**Filed Apr. 10, 1989, Ser. No. 337,626**
**Claims priority, application Switzerland, Apr. 8, 1988, 1293/88**
**Int. Cl.$^5$ B64D** *17/18*
**U.S. Cl. 244—145** **11 Claims**



1. A gliding parachute in the configuration of an airfoil structure, having an upper and a lower sheet of flexible material and a closed leading edge, defining together at least an inflatable airfoil chamber, the airfoil structure having an outside aerodynamic pressure distribution during flight conditions , the pressure distribution having a zone of maximum aerodynamic pressure located between the closed leading edge and the lower sheet, the airfoil structure comprising:

a first opening between the leading edge of the lower sheet and located in the zone of maximum aerodynamic pressure, said first opening remaining opened during flight to maintain a pressure communication between the outside aerodynamic pressure distribution and the airfoil chamber; and

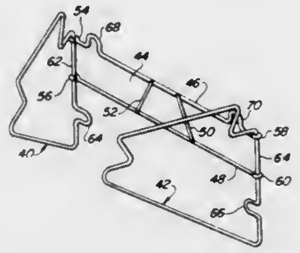
a second opening located downstream from said first opening in the lower sheet and being substantially larger than said first opening, said second opening including a check valve member to keep said second opening opened while the airfoil structure is inflating and closing said second opening after the airfoil structure is fully inflated.

---

5,012,994

## VARIABLE WIDTH BAG HOLDER

**Richard Keefe, 3515 Illinois Rd., Wilmette, Ill. 60091**
**Filed Apr. 24, 1989, Ser. No. 341,825**
**Int. Cl.$^5$ B65B** *67/04*
**U.S. Cl. 248—558** **15 Claims**



1. A bag holder support system for holding a plastic bag open by its oppositely disposed integral handle loops so that the bag may be held open for loading, said system comprising,

a pair of planar arms each of said arms having an upwardly extending U-shaped lug in the center of a horizontally extending member for engaging one of said handle loops, a vertical side from which said arm is supported and an arm positioning ear fixed to said vertical side and extending out from said arm at a non-perpendicular angle;

an elongate mounting panel having means for pivotally holding said vertical side of each of said arms in a spaced apart relationship such that each of said arms extend horizontally and lie within a vertical plane; and

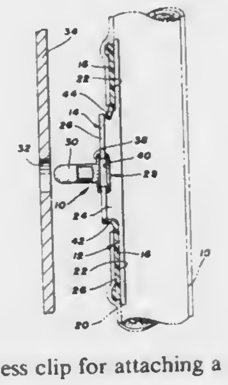
means for mounting said support system to a vertical surface.

---

5,012,995

## ADJUSTABLE WIRING HARNESS CLIP

**Robert W. Ward, Warren, Ohio, and Robert A. Jablonski, Menlo Park, Calif., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Mar. 16, 1990, Ser. No. 494,377**
**Int. Cl.$^5$ F16L** *3/00*
**U.S. Cl. 248—68.1** **3 Claims**



1. A wiring harness clip for attaching a wiring harness to a panel comprising:

an elongated body having a channel intermediate end portions which are adapted for attachment to a wiring harness, and

a slide which is slideably mounted in the channel so that panel mounting means of the slide for attaching the wiring harness clip to a panel is adjustable relative to the wiring harness when the wiring harness clip is attached to the wiring harness at a predetermined location, the channel being shaped so that the slide is spaced above surfaces of the end portions adapted to engage the wiring harness whereby the slide is freely slideable in the channel when the wiring harness clip is attached to the wiring harness.

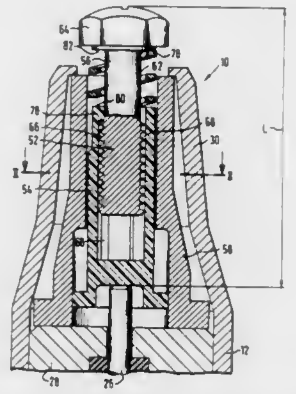
---

5,012,996

## LENGTH VARIABLE AND LOCKABLE POSITIONING DEVICE

**Gregor Poertzgen, Koblenz; Castor Fuhrmann, Brachtendorf, and Hans-Josef Hosan, Neuwied, all of Fed. Rep. of Germany, assignors to Stabilus GmbH, Koblenz-Neuendorf, Fed. Rep. of Germany**
**Filed Oct. 24, 1989, Ser. No. 426,094**
**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1988, 3836397**
**Int. Cl.$^5$ F16M** *11/00*
**U.S. Cl. 248—161** **37 Claims**

1. A length variable and lockable positioning device having a longitudinal axis and two ends and having adjacent one of its ends a locking control system with an adapter unit (**52**), said adapter unit (**52**) being oriented and movable along said longitudinal axis and having one end in operative connection with a locking means (**24**) of said positioning device (**10**) and a second end adapted for operative engagement with an external manipulating unit (**38**) of a construction (**32**) adapted to be operatively combined with said positioning device (**10**), said adapter unit (**52**) having an adjustable axial length and comprising at least two telescopically interengaging adapter elements (**54,56**), a first adapter element (**54**) operatively nearer to said locking means (**24**) and a second adapter element (**56**) operatively nearer to said manipulating unit (**38**), said adapter elements (**54,56**) being axially adjustable with respect to each other without relative rotation during relative axial adjustment and being fixable with respect to each other in a plurality of relative axial adjustment positions L with a fixing force sufficient to transmit axial control movement from said manipulating unit (**38**) to said first adapter element (**54**).

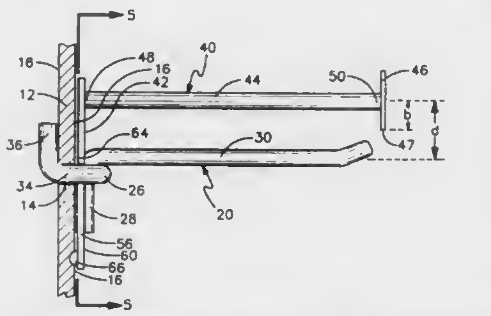


---

5,012,997

## INFORMATION DISPLAY BRACKET FOR USE IN PEGBOARD DISPLAY SYSTEMS

**V. James Hutchison, 1949 S. Robb Way, Lakewood, Colo. 80227**
**Filed Jul. 10, 1989, Ser. No. 377,524**
**Int. Cl.$^5$ E04G** *3/08*
**U.S. Cl. 248—220.4** **14 Claims**



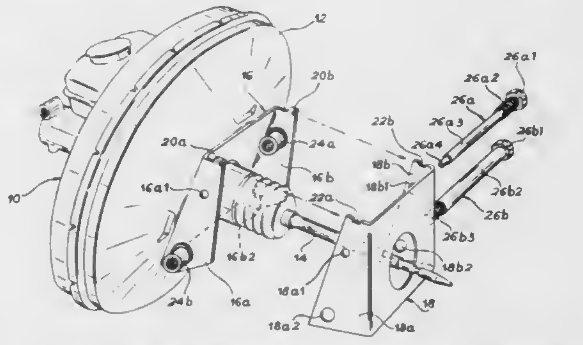
1. In a pegboard display system wherein an upright pegboard support has a plurality of mounting holes which extend through the pegboard support between front and rear surfaces thereof and wherein product support brackets are provided to mount on said pegboard support in order to display products, each said product support bracket including a mounting base, at least one prong adapted to extend through a selected mounting hole to fasten said product support bracket to said pegboard support and a product support arm connected to and projecting forwardly of said mounting base to terminate at a free outer end so that products may be received on said product support arm and displayed forwardly of said pegboard support when said product support bracket is fastened thereon with said mounting base supported against the front surface thereof, the improvement comprising an information display bracket including a mounting plate having an upper portion and a lower portion, a display arm having a proximal end connected to the upper portion of said mounting plate and projecting forwardly thereof to a distal end, and an information display plate connected to the distal end of said display arm, the lower portion of said mounting plate having a thickness permitting the lower portion of said mounting plate to be interposed between said mounting base and the front surface of said pegboard support when said product support bracket is fastened thereon, and wherein said mounting plate has engagement means for engaging said prong whereby said mounting plate is positively supported by and positioned with respect to the product support bracket such that said display arm is held in a spaced relation above said product support arm along the length thereof.

---

5,012,998

## DEVICE FOR ASSEMBLING A SERVOMOTOR ON A VEHICLE BULKHEAD

**Jean-Pierre Gautier, and Pedro Verbo, both of Aulnay Sous Bois, France, assignors to Bendix France, Drancy, France**
**Filed Nov. 20, 1989, Ser. No. 439,076**
**Claims priority, application France, Nov. 30, 1988, 88 15678**
**Int. Cl.$^5$ F16B** *21/00*
**U.S. Cl. 248—225.2** **11 Claims**



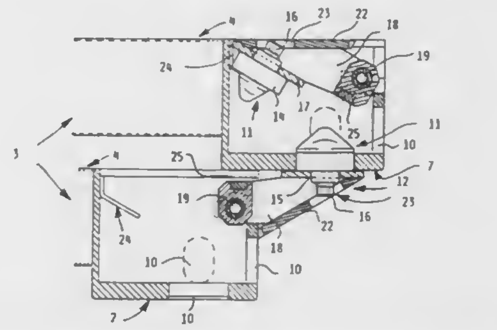
1. A device for assembling a servomotor on a bulkhead separating an engine side and a passenger side of a vehicle, said servomotor being arranged on the engine side of said bulkhead and comprising a housing, and a rear surface substantially perpendicular to an axial axis of said servomotor and located opposite said bulkhead, said device comprising support means including a support element connected with the rear surface of said servomotor and cooperating with a complementary support element connected with said bulkhead, the support elements comprising two pairs of axial plates which project axially toward each other, from said rear surface and from said bulkhead, respectively, and on either side of said axial axis, each axial plate comprising a planar axial surface and arranged in such a way that the planar axial surface of each plate of one pair is in contact with a corresponding planar axial surface of a plate of the other pair.

---

5,012,999

## LOCKING ASSEMBLY WITH RETRACTABLE INTEGRATED PIN FOR LOAD-SUPPORTING STRUCTURE

**Rene Donnard, Geispolsheim, France, assignor to Lohr Industrie, S.A., Hangenbieten, France**
**Filed Jun. 3, 1988, Ser. No. 201,791**
**Claims priority, application France, Jun. 3, 1987, 87 07856**
**Int. Cl.$^5$ A62B** *35/00*
**U.S. Cl. 248—685** **8 Claims**



1. A load-supporting extension assembly for use in connection with a load-supporting member having at least one exter-

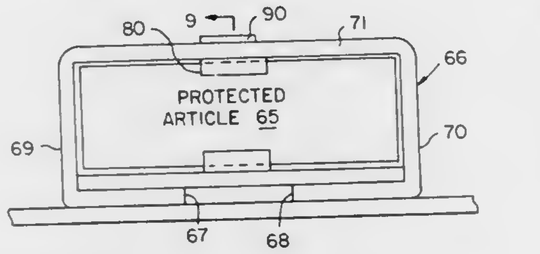
VOL
1126
ISS
1
MY
7
1991
UMI

nal side wall, and an upper support surface upon which a load can be supported, comprising:
- means defining within said load-supporting member a predetermined storage volume;
- a load-supporting extension having a load-supporting surface and a support surface fixedly connected to said load-supporting surface; and
- means pivotally mounting said load-supporting extension upon said load-supporting member so as to be movable between a first storage position at which said load-supporting extension is housed within said predetermined storage volume of said load-supporting member, and a second operative load-supporting position, external of said predetermined storage volume, at which said support surface of said load-supporting extension engages said external side wall of said load-supporting member so as to support said load-supporting extension upon said load-supporting member such that said load-supporting surface of said load-supporting extension is co-planar with said upper support surface of said load-supporting member whereby a load can be supported upon both said upper support surface of said load-supporting member and said load-supporting surface of said load-supporting extension.

---

### 5,013,000
### SECURITY MOUNTING

**Mark M. Gassaway, 2201 Stern La., Oxnard, Calif. 93035**
**Division of Ser. No. 195,942, May 19, 1988, Pat. No. 4,893,777, which is a division of Ser. No. 947,676, Dec. 30, 1986. This application Nov. 30, 1989, Ser. No. 444,566**
**Int. Cl.⁵ F16M** *13/00*
**U.S. Cl. 248—551** **3 Claims**

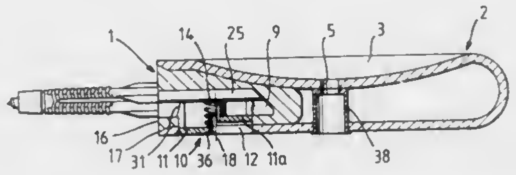


1. In combination:
- a continuous unhinged band having a top, two sides, one at each end of said top, and a band flange on each of said sides, said band flanges being directed toward one another, whereby an article to be protected can be substantially encircled by said band, said band flanges being adapted to be retained to a surface;
- a retainer attachable to said band, said retainer having a central portion, with a retainer flange at each of its ends, said central portion being adapted to be retained to said band, and extending beyond both sides of the band, and a retention flange on each end of said central portion, said retainer flanges and central portion forming a U-shaped structure so proportioned and arranged that when a protected article is placed in said band with the central portion attached to said band, the retainer flanges prevent the passage of the article through the band; and
- releasable means to hold the retainer to the band.

---

### 5,013,001
### RECEPTACLE

**Gerhard Liese, Zierenberg-Oberelsungen, Fed. Rep. of Germany, assignor to Hewi Heinrich Wilke GmbH, Arolsen, Fed. Rep. of Germany**
**Filed Oct. 27, 1988, Ser. No. 263,178**
**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736737**
**Int. Cl.⁵ A47K** *5/00*
**U.S. Cl. 248—551** **13 Claims**

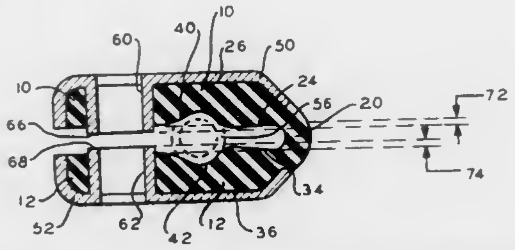


1. A receptacle, comprising: at least one base part adapted to be fastened to a wall or the like and having a first opening; said base part having a cavity which is connected with said first opening; a cover part adapted to be mounted on said base part, covering the latter in an installed state and having a second opening; a catch resiliently mounted on said base part; said catch having a crown projecting into said cavity, said crown having an undercut, and a spring pressing said undercut against an edge of the first opening; said catch projecting from said first opening to the outside of the base part, and catching, in the installed state, in the second opening, thereby coupling both parts to each other, but being releasable from said second opening by being forced deeper in to the first opening from the exterior for separating the cover part from the base part; and a locking mechanism having rotatable means which is rotatably mounted in said base part and is rotatable from the exterior either in at lest one unlocked position or in at least one locked position, and having blocking means which cooperate with said rotatable means and which in the locked position prevents the catch from being released from said second opening and which in the unlocked position permits the catch to be released from the second opening.

---

### 5,013,002
### ELASTOMERIC CLAMP

**Scott R. Lefferts, Huron; Dennis J. Stelzer, Sr., Milan, and Thomas V. Weisenberger, Norwalk, all of Ohio, assignors to The Pullman Company, Livingston, N.J.**
**Filed Apr. 16, 1990, Ser. No. 509,092**
**Int. Cl.⁵ F16L** *3/08*
**U.S. Cl. 248—74.1** **5 Claims**

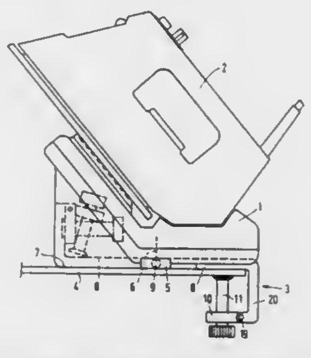


1. A clamp for securing an associated tubular member, such as a gas line, to another object and isolating the fuel line from vibrations emanating from the object, the clamp comprising:
- an upper elastomeric portion having an inner and outer face, the inner face of the upper portion having a first upper void operatively adapted to receive approximately one-half of the circumference of an associated tubular member;
- a lower elastomeric portion having an inner and outer face, the inner faces of the upper and lower portions being opposed, the inner face of the lower portion having a first lower void operatively adapted to receive approximately one-half of the circumference of the associated tubular member;
- an elastomeric hinge means connecting one end of the upper portion to one end of the lower portion;
- an upper sleeve which is received in a hole in the upper portion;
- a lower sleeve which is received in a hole in the lower portion, said lower sleeve aligned with the upper sleeve;
- an upper resilient plate fixedly attached to the outer face of the upper portion;
- a lower resilient plate fixedly attached to the outer face of the lower portion; and
- closure means received in said upper and lower sleeves for totally closing upper and lower portions about the associated tubular member and creating compressive force on the associated tubular member; said closure means in clamping engagement not allowing for disengagement of the tubular member.

---

### 5,013,003
### STAND FOR ELECTRIC IRON

**Pieter J. Driessen, and Jan Klok, both of Groningen, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**
**Filed Oct. 16, 1989, Ser. No. 421,861**
**Claims priority, application Netherlands, Oct. 17, 1988, 88 02545**
**Int. Cl.⁵ D06F** *79/00*
**U.S. Cl. 248—117.6** **10 Claims**



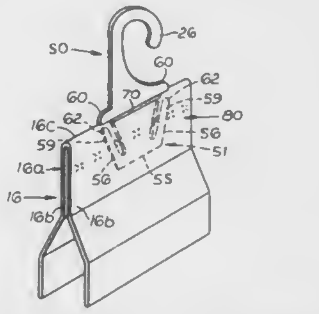
1. A stand for supporting an electric iron when not in use comprising a U-shaped clamping device for clamping the stand onto an ironing board; a rotary table rotatably supported in a bottom side of said stand for rotation of the stand to the desired position; means for attaching the clamping device to the rotary table; and locking means effective to lock the stand in any one of a plurality of positions relative to the rotary table, said locking means being constituted by a plurality of recesses present in the bottom side of the stand opposite the rotary table, one leg of the clamping device being located in one of the recesses in a locked position.

---

### 5,013,004
### SUSPENSION PACK AND APPARATUS FOR PRODUCING SUSPENSION PACKS

**Andre P. Wilkins, Private Road No.8, Colwick Industrial Estate, Nottingham NG4 2JX, England, and Brian Lee, Carlton, United Kingdom, assignors to Andre Philip Wilkins, United Kingdom**
**Filed Aug. 14, 1989, Ser. No. 393,383**
**Claims priority, application United Kingdom, Apr. 13, 1989, 8908368**
**Int. Cl.⁵ F16M** *13/00*
**U.S. Cl. 248—692** **11 Claims**

1. A pack for articles, the pack comprising:
- a body formed from a stiff sheet of material adapted to provide support for said articles, the body including a pair of folded wall portions located in face to face contact and joined by a fold; and
- a suspension member having a planar base portion and a suspension portion extending therefrom;
- the base portion being adapted for insertion through a slit formed adjacent the fold so that after insertion the base portion is located adjacent the internal face of at least one of said folded wall portions and the suspension portion extends externally of the folded wall portions to project beyond the fold;
- the base portion having an upper end adjacent to the suspension portion and a bottom terminal end which is of narrower width dimension than the upper end;

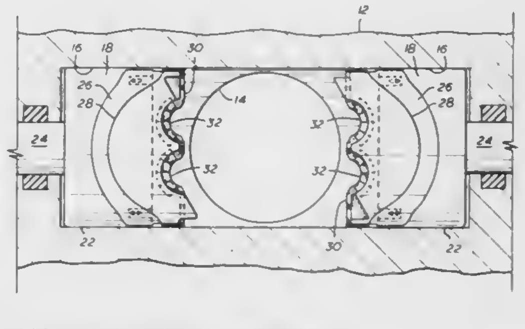


- the upper end being of greater width dimension than the length of said slit; and
- at least one side of the base portion being defined by an inwardly deflectable resilient tongue which extends along said one side from the bottom end of the base portion toward the suspension portion so that during insertion the tongue is deflected inwardly and that after insertion its terminal end underlies and engages beneath a marginal portion of the fold adjacent to said slit to resist withdrawal of the suspension member from said pair of folded wall portions.

---

### 5,013,005
### BLOWOUT PREVENTER

**James G. Nance, Spring, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.**
**Continuation of Ser. No. 853,601, Apr. 18, 1986, abandoned. This application Dec. 17, 1987, Ser. No. 134,084**
**Int. Cl.⁵ F16K** *3/02*
**U.S. Cl. 251—1.3** **1 Claim**



1. A blowout preventer comprising
- a body having a vertical bore therethrough and opposed aligned guideways extending outward from said bore,
- a ram in each of said guideways,
- means for reciprocating said rams in said guideways to retract from said bore and to move into said bore,
- each of said rams having
- a ram body having a packer receiving slot across its front surfaces facing said bore and dual arcuate recesses extending through the front face of said ram body in a direction parallel to the axis of said vertical bore,
- seal means for sealing between the top and sides of said ram

VOL
1126
ISS
1
MY
7
1991
UMI

body and the walls of the guideway in which it is positioned, and

a packer of resilient material positioned in said receiving slo` having its sides in engagement with said seal means to complete the side sealing against the walls of its guideway,

said packer having dual arcuate front recesses aligned with the recesses of said ram body, a plurality of tube supporting means lining a substantial portion of the recesses of said packer and a plurality of independently movable inserts embedded in said packer to support the resilient materail in sealing position against a tubing string and its encapsulated control lines,

said tube supporting means including

a plurality of gripping slips embedded in said packer and being movable radially of their recess to move into tight gripping engagement with a tubing string extending through said recess,

said inserts including a

a plurality of strip shaped inserts embedded in said packer immediately below said gripping slips parallel to the axis of their ram,

a plurality of strip shaped inserts embedded in said packer on the lower surface of said packer parallel to the axis of their ram,

an end insert embedded in said packet at each side of said arcuate recesses,

each of said end inserts having upper and lower flanges, and an integral neck extending between said flanges.

---

### 5,013,006
## MICRO-LEAKAGE REGULATING VALVE

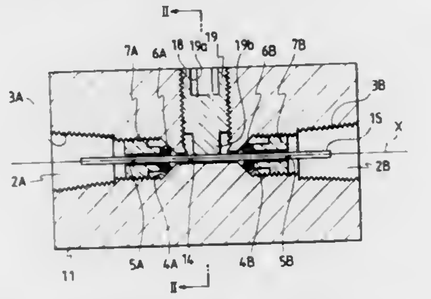
**Akio Furuse, Hachioji, Japan, assignor to Cosmo Instruments Co., Ltd., Tokyo, Japan**

**Filed Jul. 12, 1990, Ser. No. 551,413**

**Claims priority, application Japan, Jul. 24, 1989, 1-87260[U]; Feb. 16, 1990, 2-14410[U]**

**Int. Cl.$^5$ F16K** ***7/06;*** **F16L** ***55/14***

**U.S. Cl. 251—8** **9 Claims**



1. A micro-leakage regulating valve comprising:

a metal block;

a through hole extending through said metal block;

an adjusting tapped hole in said metal block which extends from a side of said block to said through hole at substantially right angles thereto to communicate with said through hole, said adjusting tapped hole having a diameter greater than said through hole and having a bottom face located within said block in spaced relation to said side of said block;

a capillary metal tube having a diameter slightly smaller than said through hole, said capillary metal tube being disposed in said through hole between said side of said block and said bottom face of said adjusting tapped hole, the opposite ends of said capillary metal tube projecting out of the opposite ends of said through hole;

seal means disposed near at least one of said opposite ends of said through hole to hold an intermediate portion of the metal tube in place and to provide a seal between an outer peripheral surface of said capillary metal tube and a surrounding wall surface of said metal block said capillary metal tube extending through said seal means and having a free end portion outward of said intermediate portion that projects beyond said seal means; and,

an adjusting screw screwed into said adjusting tapped hole, said adjusting screw having a tip end face for pressing a side portion of said capillary metal tube against said bottom face of said adjusting tapped hole to crush said capillary metal tube to a desired degree determined by the extent to which said adjusting screw is screwed into said adjusting tapped hole.

---

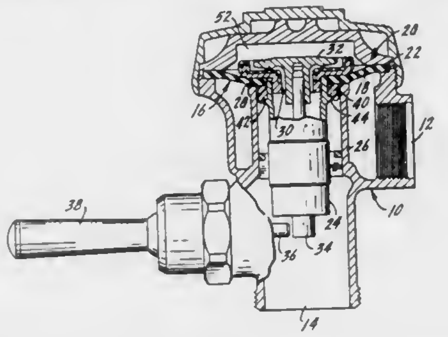
### 5,013,007
## FLUSH VALVE REFILL RING

**John F. Whiteside, Franklin Park, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.**

**Filed Sep. 18, 1989, Ser. No. 408,367**

**Int. Cl.$^5$ F16K** ***31/385***

**U.S. Cl. 251—40** **4 Claims**



1. In a flush valve, a body having an inlet and an outlet, a passage connecting the inlet and outlet, a valve seat at one end of said passage, a diaphragm positioned to control the flow of water through said passage and to close upon said seat, a guide member attached to the bottom of said diaphragm and positioned within said passage, a solid refill ring attached to said guide member adjacent the diaphragm, said refill ring having an closely approximating the inner diameter of the passage, a plurality of recesses formed in the exterior of the refill ring, closure of said diaphragm upon said seat moves the refill ring within said passage, the exterior of the ring being in substantial circumferential contact with the interior of the passage, whereby the flow of water past said refill ring is limited to the areas of said refill ring recesses.

---

### 5,013,008

**Patent Not Issued For This Number**

---

### 5,013,009
## TOP ENTRY VALVE

**Donald R. Nelson, Worcester, Mass., assignor to Goddard Valve Corporation, Worcester, Mass.**

**Filed Aug. 4, 1989, Ser. No. 389,637**

**Int. Cl.$^5$ F16K** ***3/12***

**U.S. Cl. 251—357** **10 Claims**

2. A gate valve having a body with a flow passage formed therein, and comprising;

gate receiving means comprising a pair of aligned seat members with facing, annular surfaces lying in planes at an acute angle to one another,

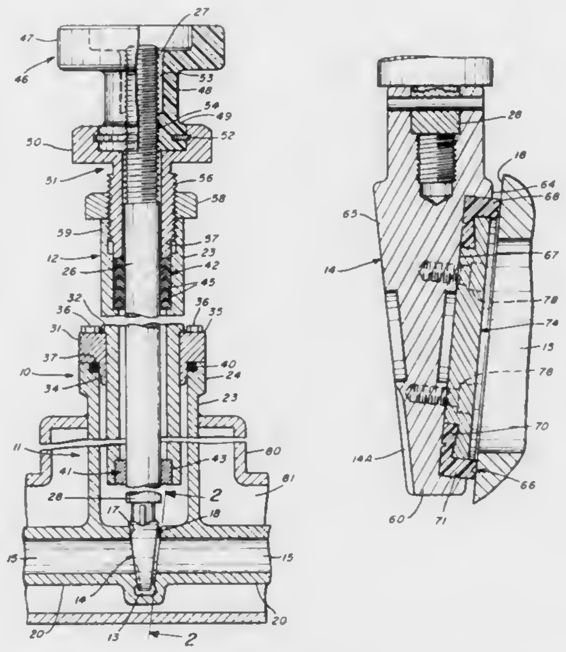
a gate having opposed faces lying at an acute angle to one another and having a recess within at least one of said faces,

a sealing means for at least one of said faces positioned within and projecting from said recess,

said sealing means comprising a sealing ring having a base flange and an annular flange extending outwardly from the base flange, and a rigid securing disk having a peripheral flange,

said peripheral flange tapers from a minimum thickness outwardly to a maximum thickness,

the engaging interface surface between said disk peripheral flange and said sealing ring base flange extending at a



tapered angle to the face of said gate to enhance securing of said sealing ring by said securing disk.

---

### 5,013,010
## APPARATUS FOR SPREADING APART VEHICLE TYRES IN THE BEAD REGION

**Horst Steffel, Gross Grönau, Fed. Rep. of Germany, assignor to Spezialmaschinenbau Steffel GmbH & Co. KG, Ratzeburg, Fed. Rep. of Germany**

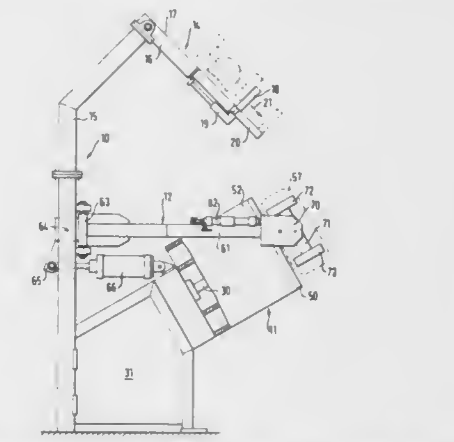
**Filed Dec. 22, 1989, Ser. No. 337,332**

**Claims priority, application European Pat. Off., Jan. 7, 1989, 89100242.0**

**Int. Cl.$^5$ G01M** ***17/02;*** **B60C** ***25/14***

**U.S. Cl. 254—50.2** **19 Claims**

1. Apparatus for spreading apart vehicle tires in the bead region, in which in a machine frame a receiving means is provided which receives a tire rotatably mounted and comprises at least one spreading element which grips the bead and pulls the latter outwardly and in which a drive means turns the tire in the receiving means, characterized in that the drive means is a rotary drive means (**50**) comprising an annular surface (**53**) against which the tire flank is pressed, at least three parallel rollers (**42**) are rotatably mounted on a bearing component (**30**) which by means of a first adjusting means is mounted adjustably in the axial direction of the rollers (**42**), the rollers (**42**) being stationarily held relative to the rotation of the rotary drive means (**50,53**), each roller (**42**) having a collar (**43**) adapted to engage the tire behind the bead thereof and on adjustment of the bearing component (**30**) press the associated tire flank against the rotary drive means (**50,53**) in such a



manner that the tire is spread apart and is rotated about the stationarily held rollers (**42**).

---

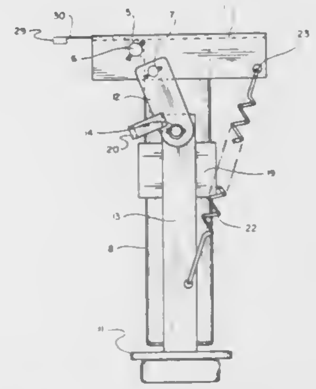
### 5,013,011
## SELF-DEPLOYING STABILIZING JACK

**Lowell E. Halloway, 17 Brook Haven, Mt. Vernon, Ill. 62864**

**Continuation-in-part of Ser. No. 63,008, Jun. 17, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 367,949**

**Int. Cl.$^5$ B66F** ***9/02***

**U.S. Cl. 254—423** **1 Claim**



1. A self-deploying jack support system for a vehicle with an electric ignition system, comprising:

(1) a plurality of inverted U-shaped brackets each having opposed upper first pivot holes and opposed off-set lower second pivot holes;

(2) a corresponding two-way cylinder for each of said brackets, each cylinder having an upper outer cylinder portion pivotally attached about said first corresponding holes and a lower ram portion having a foot at the lower end thereof;

(3) for each bracket and corresponding cylinder a flat upper lift arm having its upper portion pivotally attached about said second corresponding pivot holes and having opposed third pivot holes at its lower end;

(4) for each bracket and corresponding cylinder a flat lower lift arm having its upper end pivotally attached about said third corresponding pivot holes said lift arm further comprising a stabilizing sleeve attached to the upper end of said lower lift arm and having a lift plate at the lower end thereof, said bracket, corresponding cylinder and lift arms comprising a jack support;

(5) a means for deploying each cylinder;

(6) for each jack support an individual first safety means for

VOL
1126
ISS
1
MY
7
1991
UMI

signalling the operator of said jack support system when any individual jack support is in the deployed or non-deployed position;

(7) a second safety means which visually and audibly warns the operator of said jack support system when any jack support is deployed when the ignition "ON" and which raises said jack support whenever the ignition switch to the vehicle is turned "ON" and the jack support is in the deployed position; and

(8) an electrical cut-out switch for deploying one or more jacks when the ignition is "ON";

whereby, when a plurality of jack supports are attached to a vehicle, the vehicle may be supported by said jack supports, and further, warning signals visually alert the operator if each jack is deployed and visually and audibly alert the operator and raise the jack support if any jack support is deployed with the ignition in the "ON" position, and, whereby, one or more jacks may remain deployed with the ignition in the "ON" position by using only the electric cut-out switch.

---

### 5,013,012

### HYDRAULIC ANTI-VIBRATORY SUPPORT SLEEVES

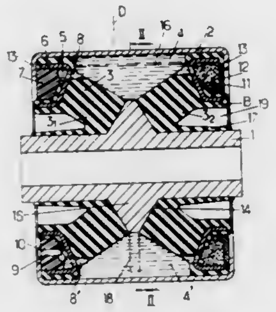
**Pierre Jouade, Chateaudun, France, assignor to Hutchinson, Paris, France**

**Filed May 26, 1987, Ser. No. 53,751**

**Claims priority, application France, Jun. 3, 1986, 86 07974**

**Int. Cl.$^5$ F16M *15/04***

**U.S. Cl. 267—140.1** **12 Claims**



1. In a support sleeve having two rigid tubular frames surrounding each other mutually and joined together by an elastomer body adhering thereto and shaped so as to form between said two frames at least two diametrically opposite sealed pockets communicating together through a narrow channel, the portion of the elastomer body which defines one at least of these pockets having in axial section the general form of a radially outwardly open V, and the assembly of pockets and the channel being filled with a damping liquid, said channel extends along a transverse arc of a circle having as axis the axis of the external tubular frame and is situated axially and radially at the level of the end of one of the arms of the above V.

---

### 5,013,013

### SPRING ASSEMBLIES

**Colin E. Spedding, Wolverhampton, England, assignor to GKN Technology Limited, Wolvethampton, England**

**PCT No. PCT/GB87/00795, § 371 Date Apr. 24, 1989, § 102(e) Date Apr. 24, 1989, PCT Pub. No. WO88/03617, PCT Pub. Date May 19, 1988**

**PCT Filed Nov. 9, 1987, Ser. No. 350,744**

**Claims priority, application United Kingdom, Nov. 15, 1986, 8627357**

**Int. Cl.$^5$ F16F *1/44***

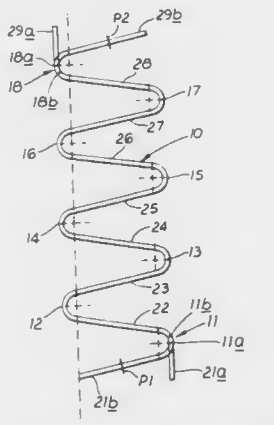
**U.S. Cl. 267—165** **7 Claims**

1. A spring assembly comprising:

a sulcated spring in the form of an elongate strip of fibre-reinforced plastics material with a centre line extending along the length of the strip;

the strip being arranged with a plurality of limbs in zig-zag configuration interconnected by reflex portions such that the longitudinal centre line of the strip lies substantially in a single plane;

an end limb extending in a direction generally lengthwise of the spring as a whole and at a tangent to an adjacent end reflex portion of the spring; and



means holding the end limb of the spring so that a portion of the end reflex portion where the end limb extends tangentially therefrom undergoes substantially no angular movement as the spring is compressed lengthwise, so that the other limbs and reflex portions of the spring undergo substantially uniform deflection during said compression of the spring.

---

### 5,013,014

### FIXTURE FOR WORKPIECES, PARTICULARLY TURBINE BLADES

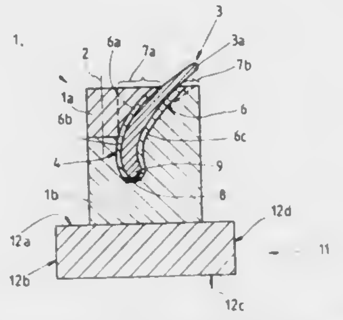
**Heinrich Mushardt, Neu-Börnsen, Fed. Rep. of Germany, assignor to Körber AG, Hamburg, Fed. Rep. of Germany**

**Filed Oct. 3, 1986, Ser. No. 914,813**

**Claims priority, application Fed. Rep. of Germany, Oct. 8, 1985, 3535809**

**Int. Cl.$^5$ B25B *1/00***

**U.S. Cl. 269—7** **35 Claims**



1. A securing body for workpieces which cannot be readily clamped directly on a machine tool, particularly for turbine blades, in which at least one portion of the workpiece is received in at least on cavity provided within the securing body and having a mouth and the remaining space between the workpiece portion and the adjacent walls surrounding the cavity is filled with a hardenable casting material, comprising a casing having a plurality of separable parts which define the at least one cavity, at least one of said parts being rigid with reference surfaces adapted to permit clamping of said one part of a machine tool; and sealing means disposed adjacent to the mouth of the one cavity to surround a projecting portion of the workpiece and to thereby minimize escape of flowable casting material from said casing.

### 5,013,015

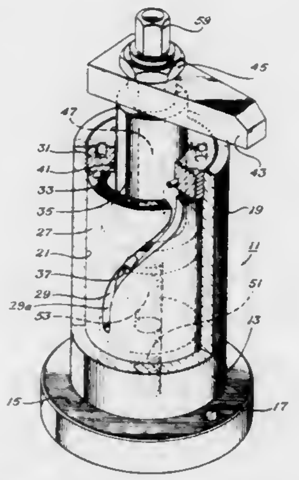
### MECHANICALLY ACTUATED SWING CLAMP

**John D. Fatheree, Benbrook, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.**

**Filed Jun. 11, 1990, Ser. No. 536,437**

**Int. Cl.$^5$ B23Q *3/08***

**U.S. Cl. 269—24** **13 Claims**



1. A swing clamp for clamping a work piece, comprising in combination:

a body having a base, the base having a threaded hole therein, the body having a longitudinal axis;
a tubular mandrel carried by the body and having an end extending therefrom;
a clamp member mounted to the end of the mandrel for movement therewith, the clamp member extending radially from the mandrel;
a shaft extending through the mandrel, the shaft having a threaded end which engages the threaded hole in the base, the shaft being rotatable relative to the mandrel and the clamp;
translational means for causing rotational movement of the shaft relative to the body to move the mandrel in axial directions relative to the body; and
guide means for causing the mandrel and clamp member to rotate a selected amount relative to the body as the mandrel moves in axial directions, so that rotation of the shaft causes the clamp member to move between a released position and a clamping position, clamping the work piece between the base and the clamp member.

---

### 5,013,016

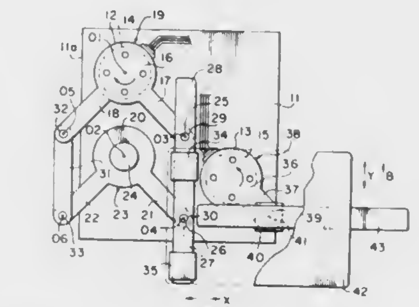
### POSITIONING TABLE

**Heizaburo Kato, Shizuoka, Japan, assignor to Sankyo Manufacturing Company, Ltd., Tokyo, Japan**

**Filed Jun. 18, 1990, Ser. No. 539,211**

**Int. Cl.$^5$ B67D *5/52***

**U.S. Cl. 269—73** **3 Claims**



1. A positioning table comprising:

(a) a base;
(b) first and second direct drive motors fixedly mounted on said base and having respective rotatable shafts directed upwardly;
(c) a first arm member fixedly mounted at its proximal end on said rotatable shaft of said first direct drive motor;
(d) a second arm member angularly movably mounted at its proximal end on said base;
(e) a first rail to which distal ends of said first and second arm members are pivotally connected, said first rail cooperating with said first and second arm members to form a parallel crank mechanism;
(f) first and second slide members mounted on said first rail for sliding movement therealong;
(g) a third arm member fixedly mounted at its proximal end on said rotatable shaft of said second direct drive motor;
(h) a third slide member pivotally mounted on a distal end of said third arm member;
(i) a second rail on which said third slide member is mounted for sliding movement therealong; and
(j) a table having a reverse surface to which said first and second slide members and said second rail are fixedly secured in such a manner that the direction of movement of said first and second slide members along said first rail is perpendicular to said second rail.

---

### 5,013,017

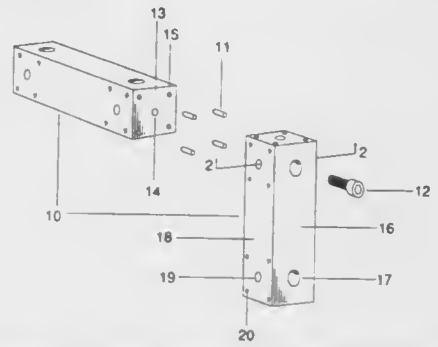
### ADAPTABLE MODULAR FIXTURING SYSTEM

**Rex Swann, 800 Commonwealth Dr., Warrendale, Pa. 15086**

**Filed Mar. 8, 1989, Ser. No. 320,469**

**Int. Cl.$^5$ B25B *1/00***

**U.S. Cl. 269—88** **3 Claims**



1. A plurality of bolts, a plurality of dowels and a plurality of long pillars, each long pillar comprising:

(a) a first end face having a first threaded center hole,
(b) a second end face having a second threaded center hole,
(c) a first countersunk bolt clearance hole passing completely through said long pillar, the countersunk portion being greater than one half of the overall length, said first countersunk bolt clearance hole being perpendicular to said long pillar's long axis and proximal to said first end face,
(d) a second countersunk bolt clearance hole passing completely through said long pillar, the countersunk portion being greater than one half of the overall length, said second countersunk bolt clearance hole being perpendicular to said long pillar's long axis and perpendicularly intersecting said first countersunk bolt clearance hole,
(e) a third countersunk bolt clearance hole passing completely through said long pillar, the countersunk portion being greater than one half of the overall length, said third countersunk bolt clearance hole being perpendicular to said long pillar's long axis and proximal to said second end face,
(f) a fourth countersunk bolt clearance hole passing completely through said long pillar, the countersunk portion being greater than one half of the overall length, said fourth countersunk bolt clearance hole being perpendicu-

VOL
1126
ISS
1
MY
7
1991
UMI

lar to said long pillar's long axis and perpendicularly intersecting said third countersunk bolt clearance hole, and

(g) a plurality to dowel holes,

(h) a first long pillar being attached to a second long pillar by passing a first bolt through said first long pillar's first countersunk bolt clearance hole and screwing said first bolt into said second pillar's first end face's threaded center hole,

(i) a third long pillar being attached to said first long pillar by passing a second bolt through said first long pillar's second countersunk bolt clearance hole and screwing said second bolt into said third pillar's first end face's threaded center hole, and

(j) relative rotation of the pillars being prevented by employing said plurality of dowels to engage opposing dowel holes,

whereby an orthogonal arrangement of pillars is constructed and by extension ay required orthogonal arrangement of pillars may be similarly constructed from only a single design of pillar.

---

5,013,018

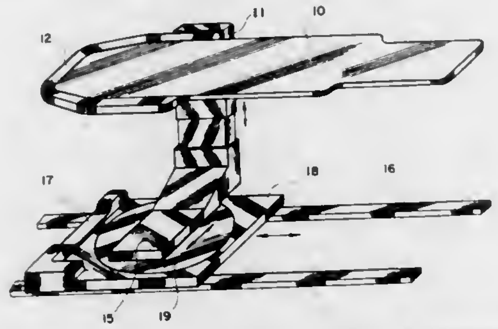
## TABLE POSITIONING FOR X-RAY EXAMINATIONS IN PLURALITY OF POSITIONS

**Bernard W. Sicek, and Aldona A. Siczek, both of 1252 Chinook Way, Boulder, Colo. 80303**

**Filed Jun. 22, 1989, Ser. No. 370,193**

**Int. Cl.⁵ A61G** *13/00*

**U.S. Cl. 269—323** **1 Claim**



1. A medical examination table comprising in combination:

a base assembly with a plurality of rollers rolling on and guided by a track installed on a floor, said base assembly supporting a columnar member vertically extending therefrom in an arrangement providing a sliding movement of said columnar member relative to said base assembly in a direction generally perpendicular to said track and a rotary movement of said columnar member relative to said base assembly about a vertical axis, said columnar member further including a securing member moveable along a vertical axis relative to said columnar member,

a table secured in an overhanging relationship to said securing member in a pivotable arrangement about a horizontal axis,

an actuating means included in said base assembly and comprising timing pulleys working in conjunction with timing belts secured to said track at the extremities thereof and shielding said track from dust, a drive imparting means for imparting driving motion to said timing pulleys causing displacement of said base assembly along said track.

---

5,013,019

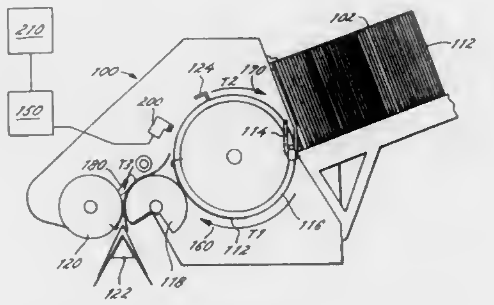
## COLLATING SYSTEM AND SIGNATURE FEEDER WITH EMBEDDED PRINTER

**Michael D. Samuels, Buffalo Grove, Ill., assignor to Print Controls Corporation, Buffalo Grove, Ill.**

**Filed Mar. 14, 1989, Ser. No. 323,358**

**Int. Cl.⁵ B41F** *13/54*

**U.S. Cl. 270—1.100** **22 Claims**



1. A collating system comprising:

a plurality of feeders each comprising transfer means, at least one of said feeders is further comprised of an embedded printer, for selectively printing wherein said printing is performed as the transfer means moves the signature past the printing head, said feeder selectively actuatable to deliver signatures to a conveyor to progressively build groups of signatures,

source means for establishing coded data which controls actuation of the feeders to build different groups of signatures in response to different coded data.

---

5,013,020

## APPARATUS TO GUIDE COPY SEGMENTS IN THE FOLDER OF ROTARY PRINTING PRESSES

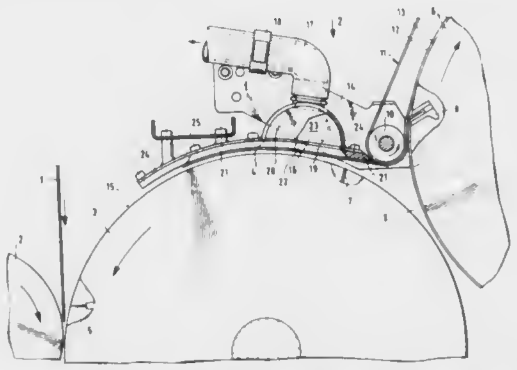
**Norbert Stoll, Beindersheim, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed Jul. 20, 1989, Ser. No. 383,603**

**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 8809285[U]**

**Int. Cl.⁵ B42C** *1/00*

**U.S. Cl. 270—49** **16 Claims**



1. Apparatus for guiding and moving a copy segment through a portion of the folding apparatus of a rotary printing press which includes a rotatable folding blade cylinder which defines a longitudinal dimension and a rotatable folding flap cylinder having a generally cylindrical exterior surface, said apparatus comprising:

movable conveyor belt means for being relatively positioned with respect to the folding flap cylinder with at least a portion of said movable conveyor belt means for moving in conjunction with and for bearing upon a copy segment adjacent at least a portion of the exterior surface of the folding flap cylinder, with the folding blade cylinder and the folding flap cylinder being relatively positioned and provided to guide and move the copy segment to between said movable conveyor belt means and the folding flap cylinder by the rotation of the movable conveyor belt means in conjunction with the folding flap cylinder being provided to further move and guide the copy segment through a portion of the folding apparatus;

folding means for folding the copy segment;

suction means positioned for removing the copy segment from the folding blade cylinder;

said suction means comprising a plurality of generally individual segments; and

means for adjusting suction in said individual segments.

---

5,013,021

## PAPER CONTAINER WITH A PAPER BINDING FUNCTION

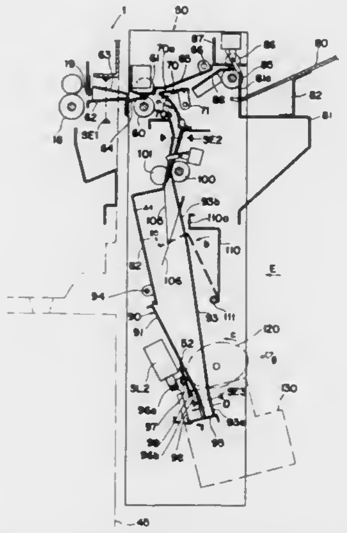
**Akiyoshi Johdai; Keichi Kinoshita, and Toshio Matsui, all of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 108,899, Oct. 15, 1987, abandoned. This application Jan. 8, 1990, Ser. No. 462,905**

**Claims priority, application Japan, Oct. 16, 1986, 61-159109; Oct. 16, 1986, 61-159110; Oct. 17, 1986, 61-248188; Oct. 17, 1986, 61-248189; Oct. 17, 1986, 61-248190; Oct. 17, 1986, 61-248191; Oct. 21, 1986, 61-251362**

**Int. Cl.⁵ B42B** *2/00*

**U.S. Cl. 270—53** **17 Claims**



1. A paper container for storing copying papers ejected from an image forming device, said paper container comprising:

a copying paper containing tray having a reference member, said reference member defining a reference point of paper alignment, said reference member located at a corner of said tray;

first means for transporting the copying paper to said tray, said first transporting means applying a first paper transporting force to the copying paper; and

second means for transporting the copying paper to said reference member, said second transporting means applying a second paper transporting force to the copying paper before a trailing edge of the copying paper leaves said first transporting means, said second transporting means being disposed so that the distance between the second transporting means and the reference member with respect to the transporting direction of the second transporting means is shorter than the length of a minimum copying paper used in the paper container.

---

5,013,022

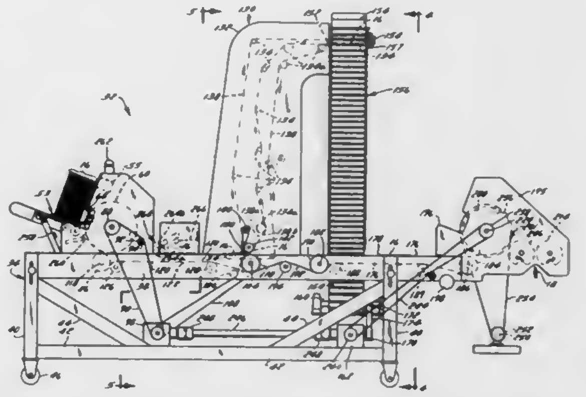
## APPARATUS AND METHOD FOR ASSEMBLING SIGNATURES

**William T. Graushar, Wauwatosa, Wis., assignor to Quad/Tech, Inc., Pewaukee, Wis.**

**Filed Aug. 18, 1989, Ser. No. 395,894**

**Int. Cl.⁵ B65H** *43/02*

**U.S. Cl. 270—56** **23 Claims**



21. A signature collating system of the type including a conveyor, a plurality of feeders, each said feeder including a hopper for maintaining a store of signatures, means for selectively delivering signatures to said conveyor and means for reading an optically readable code and selectively actuating individual ones of said feeders to progressively build different groups of signatures on said conveyor in accordance with said code, the improvement wherein:

said optically readable code is predisposed at a predetermined position on said signatures maintained in said hopper of one of said feeders;

said means for reading said code is disposed proximate to said hopper to read said code predisposed on said signature next to be delivered to said conveyor, whereby said code is substantially motionless when read; and said system further includes means for detecting misfeeding of said signatures with optically readable code from said hopper; and

means for selectively diverting misfed signatures into an auxiliary hopper disposed in the vicinity of said hopper.

---

5,013,023

## TEMPORARY SLIP STACKING APPARATUS OPERABLE IN A FIRST-IN FIRST-OUT MODE

**Toshiharu Hashimoto, Tokyo; Kazuhiko Shibata, and Makoto Kobayashi, both of Takasaki, all of Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 402,846, Sep. 6, 1989, abandoned. This application Sep. 4, 1990, Ser. No. 577,819**

**Claims priority, application Japan, Sep. 6, 1988, 63-221460**

**Int. Cl.⁵ B65H** *83/00*

**U.S. Cl. 271—3.1** **12 Claims**

11. An apparatus for receiving slips and stacking the slips temporarily for processing the slips or exchanging the slips for another kind of slips, comprising:

transport path means for defining a path for receiving and transporting a slip;

stationary storing means for holding the slip temporarily in a space therein;

feeding means for feeding the slip out of said stationary storing means and feeding the slip transported by said transport path means into said stationary storing means;

movable storing means interposed between said transport path means and said stationary storing means for accommodating in each of a number of compartments defined therein a part of any of the slips received by the apparatus, said movable storing means comprising a plurality of

VOL
1126
ISS
1
MY
7
1991
UMI

partition members, a first rotatable member supporting said plurality of partition members, and a support member supporting said first rotatable member, said plurality of partition members extending radially toward said support member to define said compartments in cooperation with nearby ones of said partition members, said compartments being so oriented as to commonly communicate with said stationary storing means and to communicate with said transport path means one at a time; and

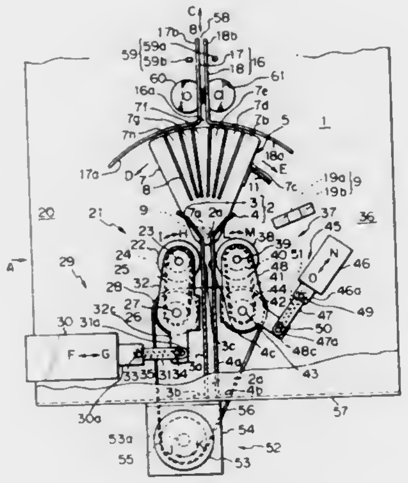
first driving means for rotating said first rotatable member about said support member;

said transport path means comprising a stop and guide member, having an opening communicating with the path, for closing ends of said compartments except for one compartment which is held in communication with said transport path means via said opening;

said feeding means comprising:

first feeding means, having a first rotatable body on a first side of said stationary storing means, for urging said first rotatable body toward the space, and for driving said first rotatable body to feed the slip into said space;

second feeding means, having a second rotatable body located at a second side of said stationary storing means opposite said first side for urging said second rotatable body toward the space and driving said second rotatable body to feed the slip out of said space;



said apparatus further comprising control means for controlling said first driving means and said first and second feeding means to feed the slip in and out of the stationary storing means in a first-in, first-out mode;

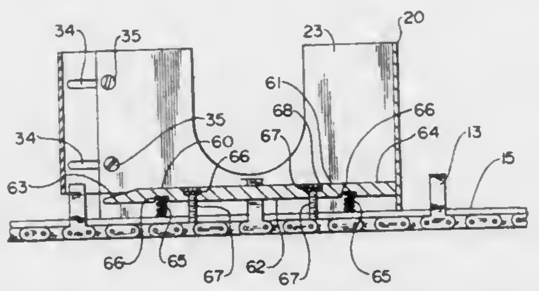
said control means controlling, when the slip is to be fed into said stationary storing means, said first driving means for rotating said first rotatable member to bring one of said compartments into communication with said transport path means, and controlling said first feeding means to drive said first rotatable body so as to introduce the slip into the space such that the slip adjoins other slips arranged in the space in an order of having been previously introduced into the space under the control of said control means, while being partly left in said one of said compartments;

said control means controlling, when the slip is to be fed out of said stationary storing means in the first-in, first-out mode, said first driving means for rotating said first rotatable member to bring the one of said compartments into communication with said transport path means, and controlling said second feeding means for driving said second rotatable body to feed the slip out of the space through said one of said compartments.

---

## 5,013,024
## VERTICALLY ADJUSTABLE STACK FEED MECHANISM

**Robert E. Stevens, 218 N. Adams, Westmont, Ill. 60559**
**Filed Aug. 28, 1989, Ser. No. 399,252**
**Int. Cl.⁵ B65H** *3/62, 1/06*
**U.S. Cl. 271—146** **9 Claims**



5. A magazine with ends and sides, mounted to the base of an insertion machine, for discharging items from a stack, the magazine including a support plate, also mounted on the base, comprising:

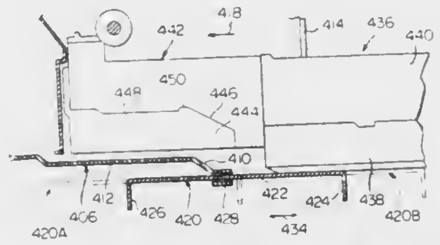
said magazine having an exit aperture and a conveyor moving therebeneath for individually discharging the items from the bottom of the stack through said aperture;

said plate being adapted to vibrate as the items in the stack fall thereon, as the lowermost items is removed, effecting the temporarily cleaving apart of said items to facilitate separation of the bottom item from the stack.

---

## 5,013,025
## PAPER FEEDING DEVICE

**Kiyotaka Arai, Osaka, and Masahiro Murakami, Shijonawate, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**
**Division of Ser. No. 158,239, Feb. 19, 1988, Pat. No. 4,915,370. This application Sep. 18, 1989, Ser. No. 408,216**
**Claims priority, application Japan, Mar. 2, 1987, 62-30159[U]; Mar. 3, 1987, 62-30686[U]**
**Int. Cl.⁵ B65H** *1/00*
**U.S. Cl. 271—164** **5 Claims**



1 In a paper feeding device comprising a cassette-receiving section defined within a housing of an apparatus with which said paper feeding device is employed and a cassette adapted to be loaded detachably in a loading direction into said cassette-receiving section through a cassette-loading opening defined in said housing, the improvement wherein:

said cassette-receiving section includes a first guiding portion extending in said loading direction from a lower edge of said opening, an inclined guide portion inclined upwardly from said first guiding portion in said loading direction, and a second guiding portion extending in said loading direction from said inclined guide portion;

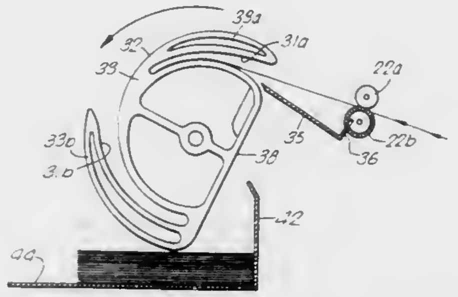
said first guiding portion being defined by a supporting plate and forming said lower edge of said cassette-loading opening and mounted on a lower end portion of said housing so as to be free to move in said loading direction; and

said cassette being introduced through said opening and detachably loaded into a predetermined position with respect to said second guiding portion as a result of a lower end of said cassette being guided by said first guiding portion.

---

## 5,013,026
## SHEET STACKING AND INVERTING APPARATUS

**Michael L. Howell, Parkend, United Kingdom, assignor to Xerox Corporation, Stamford, Conn.**
**Filed Jun. 20, 1989, Ser. No. 368,617**
**Claims priority, application United Kingdom, Jun. 22, 1988, 8814888**
**Int. Cl.⁵ B65H** *29/00*
**U.S. Cl. 271—187** **8 Claims**

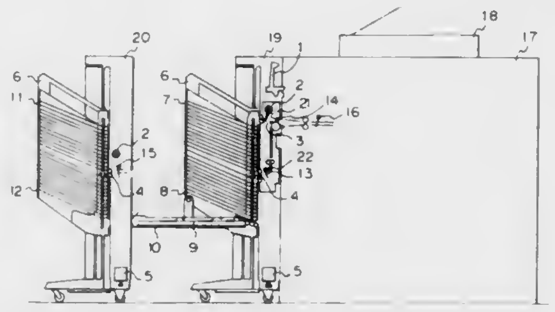


1. A sheet inverting and stacking apparatus comprising a sheet inverter wheel having at least one arcuate slot into which a sheet to be inverted may be inserted, means to rotate the inverter wheel from a sheet loading position to a sheet unloading position, means for feeding sheets one at a time into the arcuate slots when the inverter wheel is in the loading position, a sheet stripper at the unloading position for stripping a sheet from within the slot, and a catch tray adjacent the unloading position for holding inverter sheet(s) stripped from the slot in the inverter wheel said slot being adapted to accommodate a plurality of sheets, and a compiler tray adjacent the loading position for supporting the trailing portions of the sheets fed into the slot by the sheet feeding means, said compiler tray having a registration edge against which the trail edges of the sheets abut when they have been fed into the slot by the sheet feeding means.

---

## 5,013,027
## SHEET SORTER

**Hideaki Furukawa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 418,827, Oct. 4, 1989, abandoned, which is a continuation of Ser. No. 170,666, Mar. 10, 1988, abandoned, which is a continuation of Ser. No. 770,084, Aug. 28, 1985, abandoned. This application Aug. 1, 1990, Ser. No. 561,376**
**Claims priority, application Japan, Sep. 5, 1984, 59-185998**
**Int. Cl.⁵ B65H** *39/10*
**U.S. Cl. 271—290** **16 Claims**



1. A sheet sorter comprising:

a first sheet storage unit for storing sheets fed thereto;

a second sheet storage unit for storing sheets transferred thereto through said first sheet storage unit, each of said first and second sheet storage units comprising plural storage bin means;

first moving means for moving said storage bin means to store the sheets in said first sheet storage unit;

second moving means for moving said storage bin means to store the sheets in said second sheet storage unit;

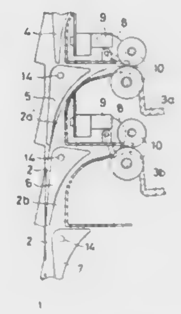
transfer means for transferring the sheets from said first sheet storage unit to said second sheet storage unit, said transfer means being movable relative to said second sheet storage unit; and

control means for controlling said first moving means and, said second moving means sos that a series of sheets related to a first job is stored in said first sheet storage unit and said second sheet storage unit, in that order, and a series of sheets related to a second job is stored in these storage units in the opposite order.

---

## 5,013,028
## DEVICE FOR CHANGING A PASSAGEWAY OF PAPER

**Akio Tajima, and Ryoichi Fujimoto, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan**
**Filed Mar. 2, 1990, Ser. No. 488,341**
**Claims priority, application Japan, Mar. 8, 1989, 1-55921**
**Int. Cl.⁵ B65H** *39/10*
**U.S. Cl. 271—305** **20 Claims**



1. In an apparatus for changing a passageway for paper comprising:

pivotably mounted downstream flap means and pivotably mounted upstream flap means juxtaposed to respective downstream and upstream diverting paper paths and also juxtaposed to a main paper path;

downstream control means and upstream control means for controlling pivotal movement of each of said downstream and upstream flap means respectively;

said downstream control means having one operable state in which said downstream control means positions said downstream flap means to guide one paper sheet to said downstream diverting path;

said upstream control means having a concurrent operable state in which said upstream control means applies a biasing force to said upstream flap means in one rotational direction to bias said upstream flap means into biasing contact with said one paper sheet being fed to said downstream diverting path such that said one paper sheet restrains further pivotal movement of said upstream flap means in said one rotational direction;

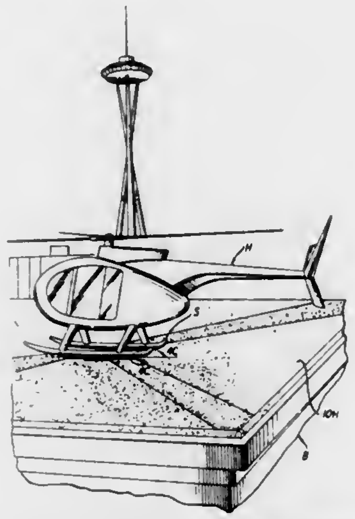
said upstream flap means being triggered to pivot further in said one rotational direction to a diverting position when the trailing edge of said one paper sheet passes said upstream flap means and said one paper sheet no longer restrains said pivotal movement of said upstream flap means, said upstream flap means when in said diverting position being disposed within said main paper path to divert the next paper sheet fed along said main paper path to said upstream diverting path.

VOL
1126
ISS
1
MY
7
1991
UMI

5,013,029

### SHOCK-ATTENUATING SEAMLESS SURFACE SYSTEM FOR USE ON VERTICAL TAKEOFF AND LANDING ZONES

**Thomas M. Vaux, 437 Tenth Ave. West, Kirkland, Wash. 98033**
**Continuation-in-part of Ser. No. 152,817, Feb. 5, 1988, Pat. No. 4,846,457, which is a continuation-in-part of Ser. No. 767,718, Apr. 23, 1986, Pat. No. 4,727,697, which is a continuation of Ser. No. 364,811, Apr. 2, 1982, abandoned. This application Jul. 10, 1989, Ser. No. 377,415**
**Int. Cl.$^5$ A63G *71/02***
**U.S. Cl. 272—3** **38 Claims**



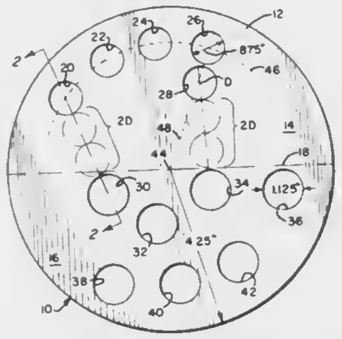
1. A surface system, for use on vertical takeoff and landing zones, for placement on a base, comprising:
a surface layer having a bottom and outer edges;
rib means, extending from the bottom of the surface layer, for defining an array of air-filled cells affixed to the bottom of the surface layer;
a first layer of sealer means and aggregate means, spread over the surface layer, the outer edges, and the base immediate to the surface layer, for preventing loss of attenuating properties in the surface system due to weathering and exposure to ultraviolet solar radiation;
median rib means, extending a shorter distance from the bottom of the surface layer than the defining rib means, for giving added support against a strong blow striking the surface layer and the array of air-filled cells affixed thereto; and
a second layer of sealer means, spread under the array of air-filled cells and above the base, for preventing the escape of air therefrom upon impact thereto and also for holding the array of air-filled cells in a substantially vertical orientation with respect to the base.

5,013,030

### EXERCISE DEVICE

**John J. Frins, 8 E. Clark Pl., South Orange, N.J. 07079**
**Continuation-in-part of Ser. No. 375,975, Jul. 6, 1989, abandoned. This application Jul. 16, 1990, Ser. No. 552,913**
**Int. Cl.$^5$ A63B *23/16, 21/02***
**U.S. Cl. 272—67** **7 Claims**

1. An exercise device, comprising:
a circular body; wherein said body comprises a disc;
said body has a diameter which defines equal halves of said disc;
said body further has a first plurality of apertures formed in only one of said halves of said disc for receiving therein the four, substantially juxtaposed fingers of a hand, that is, the little, ring, middle and index fingers; and
said body also has a second plurality of apertures formed in only the other half of said disc for receiving therein the thumb of a hand; wherein said disc encompasses a given area;
the areal sum of all of said apertures is substantially less than half of said given area;
said apertures of said first plurality thereof are smaller than said apertures of said second plurality thereof, to distinguish, keyingly, between finger apertures and thumb apertures;

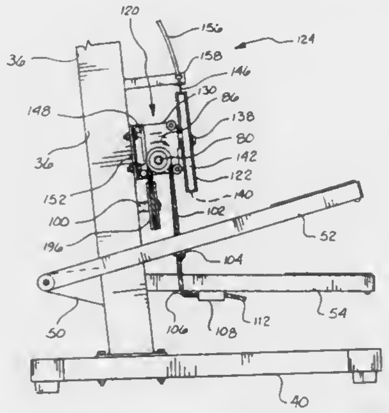


said apertures of said first plurality thereof each have a common diametral dimension;
all apertures of said second plurality thereof are spaced apart from a most proximate one of said apertures of said first plurality at least twice said diametral dimension; and
said disc has a thickness of approximately three-quarters of an inch.

5,013,031

### EXERCISE APPARATUS

**John W. Bull, 2505 Wedgewood Ct., Olympia, Wash. 98501**
**Continuation-in-part of Ser. No. 512,299, Apr. 17, 1990, abandoned. This application Sep. 17, 1990, Ser. No. 583,543**
**Int. Cl.$^5$ A63B *1/00***
**U.S. Cl. 272—70** **24 Claims**

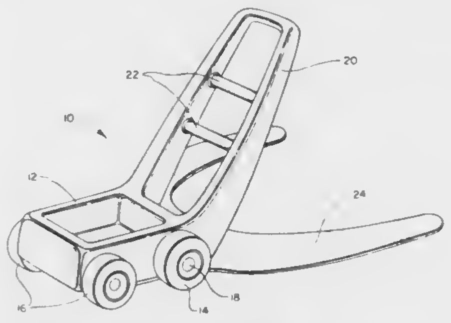


1. An exercise apparatus comprising:
a support structure;
a left foot lever pivotally connected to the support structure;
a right foot lever pivotally connected to the support structure;
a rotatable shaft rotatably attached to the support structure;
first clutch means drivingly connected to the rotatable shaft, the first clutch means for independently driving the rotatable shaft in a first-rotational direction when the first clutch means is rotated in the first-rotational direction and for overriding the rotatable shaft when the first clutch means is rotated in the counter first-rotational direction;
second clutch means drivingly connected to the rotatable shaft, the second clutch means for independently driving the rotatable shaft in the first-rotational direction when the second clutch means is rotated in the first-rotational direction and for overriding the rotatable shaft when the second clutch means is rotated in the counter first-rotational direction;
a first engaging member drivingly connected to the first clutch means;
a second engaging member drivingly connected to the second clutch means;
first flexible linking means for drivingly engaging the first engaging member, and for causing rotation of the first engaging member when the left foot lever is moved;
second flexible linking means for drivingly engaging the second engaging member, and for causing rotation of the second engaging member when the right foot lever is moved;
first biasing means for maintaining an upward bias on the left foot lever;
second biasing means for maintaining an upward bias on the right foot lever;
a worm gear mounted on the rotatable shaft;
a worm drivenly geared to the worm gear; and,
resistance means for resisting the rotation of the worm.

5,013,032

### CHILD WALKER-TRAINER

**Lloyd Baum, 25742 Hinckley St., Loma Linda, Calif. 72354, and Dan E. Fischer, 1345 E. 3900 South, Salt Lake City, Utah 84124**
**Filed Oct. 14, 1988, Ser. No. 258,147**
**Int. Cl.$^5$ A61H *3/00;* A47D *13/04***
**U.S. Cl. 272—70.3** **41 Claims**

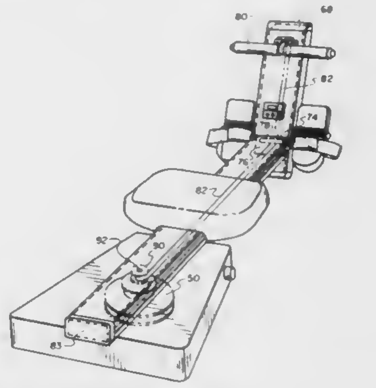


1. A child walker-trainer comprising:
a frame having at least three wheels mounted thereon such that the wheels engage a substantially planar walking surface upon which the walker-trainer moves, at least one of the wheels being mounted axially to the frame to form a rear wheel axis rearward of the other wheels;
a handle attached to the frame which extends upwardly and rearwardly of the rear wheel axis such that a downward force applied to said handle causes the walker-trainer to pivot about the rear wheel axis; and
means for immobilizing the walker-trainer when the walker-trainer is pivoted about the rear wheel axis such that when no downward force is applied to the handle the immobilizing means is essentially disengaged so that the walker-trainer moves freely on the wheels, and when a downward force is applied to the handle, the immobilizing means is engaged so that the walker-trainer is substantially immobilized.

5,013,033

### ROWING APPARATUS

**Scott R. Watterson, River Heights; William T. Dalebout, and Donald J. Standing, both of Logan, all of Utah, assignors to Proform Fitness Products, Inc., Logan, Utah**
**Filed Feb. 1, 1989, Ser. No. 305,939**
**Int. Cl.$^5$ A63B *69/06***
**U.S. Cl. 272—72** **16 Claims**



1. An exercise apparatus comprising:
a support frame;
a flywheel rotatably associated with said support frame by means of a generally vertical axle journaled in said support frame;
a cable having a first end mounted to said axle and a second end, said cable being wound about said axle;
a handle means mounted on said second end of said cable for permitting a user to displace said cable; and
spring means mounted on said support frame and said axle, for effecting a reactive rotational return force on said axle in opposition to a force imparted thereto by a user displacement of said handle means;
drag means mechanically associated with said flywheel for effecting a reaction force on said flywheel in opposition to said force applied thereto by a displacement of said handle means;
said drag means comprising:
an elongate band having opposing ends, said elongate band being trained about said flywheel;
a spring having a first end mounted on said support frame and a second end connected to both of said opposing ends of said elongate band for tensioning said elongate band thereby applying a selected pressure against said flywheel for creating a frictional force on said flywheel upon said flywheel's rotation; and
control means associated with said spring for controlling a magnitude of said tensioning.

5,013,034

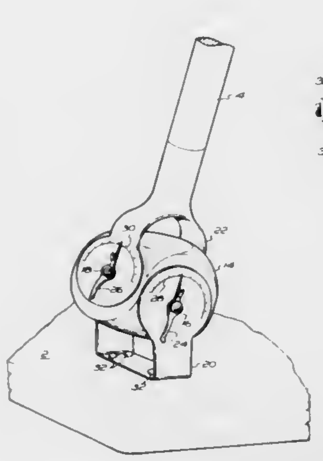
### EXERCISE MACHINE

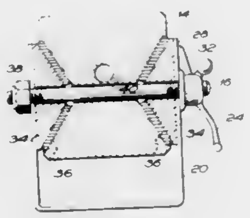
**Adrian A. C. March, Bordon, and Graham C. Laskey, Hindhead, both of United Kingdom, assignors to Health Habit Developments Limited, United Kingdom**
**Continuation of Ser. No. 92,320, Sep. 2, 1987, abandoned. This application Mar. 5, 1990, Ser. No. 488,509**
**Claims priority, application United Kingdom, Sep. 3, 1986, 8621216**
**Int. Cl.$^5$ A63B *21/22***
**U.S. Cl. 272—132** **7 Claims**

1. An exercise machine comprising:
a rigid base;
at least one handle; and
at least one friction pivot assembly connecting said at least one handle to said rigid base, said at least one pivot assembly having at least two physically defined non-parallel pivot axes, said at least one handle being movable relative

VOL
1126
ISS
1
MY
7
1991
UMI

to said base about said axes, said at least one pivot assembly also comprising a rigid element having first and second pairs of opposite sides, a first shaft connected to said handle to define a first one of said pivot axes, a second shaft connected to said base to define a second one of said pivot axes and being offset from said first shaft, said first and second shafts being linked by said rigid element, a first pair of resistance means associated with said first shaft for providing frictional resistance to movement of said handle about said first one of said pivot axes, first adjustment means connected to said first shaft for adjusting simultaneously the degrees of frictional resistance for said first pair of resistance means, a second pair of resistance means associated with said second shaft for providing frictional resistance to movement of said block about said second one of said pivot axes, and second adjustment means, independent of said first adjustment means, connected to said second shaft for adjusting simultaneously the degrees of frictional resistance for said second pair of resistance means so that the degrees of frictional resistances for each of said axes are independently adjustable for each of said axes.

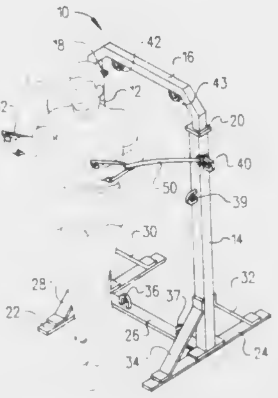




### 5,013,035
### EXERCISE DEVICE

**Keithley M. Nathaniel, P.O. Box 1052, St. Johns, Antigua**
**Filed Nov. 27, 1989, Ser. No. 441,525**
**Int. Cl.$^5$ A63B** *21/04*
**U.S. Cl. 272—136** **3 Claims**

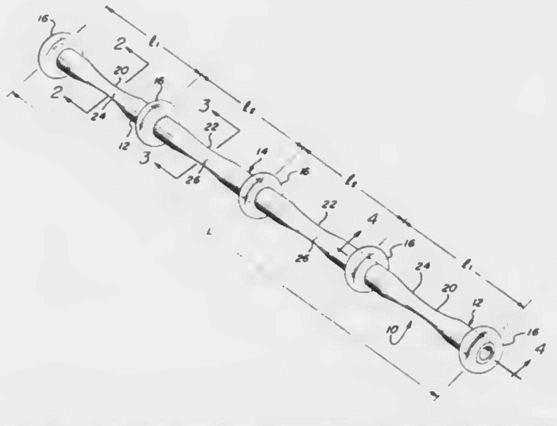
1. An exercise device, comprising:
a pair of spaced parallel base members adapted for support on a horizontal surface;
a cross member secured transversely between midpoints of said base members;
a pair of spaced parallel vertical posts, each of said vertical posts extending upwardly from an upper central position on each one of said base members, and wherein each of said vertical posts having a height of about 6 feet;
a pair of diagonal brace members, each of said diagonal brace members extending between each ends of each one of said base members and an associated one of said vertical posts;
a first pair of upstanding attachment loops secured in spaced relation on said cross member;
a second pair of attachment loops secured in vertical alignment on front faces of said vertical posts, wherein one of said second pair of attachment loops secured to one of said vertical posts and another of said second pair of attachment loops secured to another of said vertical posts;
a third pair of attachment loops secured in vertical alignment on side faces of said vertical posts, above said second pair of attachment loops, wherein one of said third pair of attachment loops secured to one of said vertical posts, and another of said third pair of attachment loops secured to another of said vertical posts;
said first, second, and third pairs of attachment loops extending in three orthogonal directions;
a first pair of flanges, one of said first pair of flanges formed on an upper end of one of said vertical posts, and another of said first pair of flanges formed on an upper end of another one of said vertical posts;
a transverse top bar having opposite ends terminating in a second pair of flanges, one of said second pair of flanges disposed at one of said opposite ends of said transverse top bar and another of said second pair of flanges disposed at another of said opposite ends of said transverse top bar, said second pair of flanges dimensioned for aligned engagement with said first pair of flanges, said top bar disposed at a vertical elevation about equal to the height of an intended user;
a plurality of threaded fasteners removably securing said first and second pair of flanges, whereas said transverse top bar extending above and between said vertical posts;
a fourth pair of attachment loops secured on a bottom face of said top bar;
and
at least one pair of elastic extension members, each of said extension members having a first end terminating in a clip for engagement with a selected one of said attachment loops and an opposite end terminating in a hand grip for providing a wide variety of exercises.



### 5,013,036
### EXERCISE APPARATUS

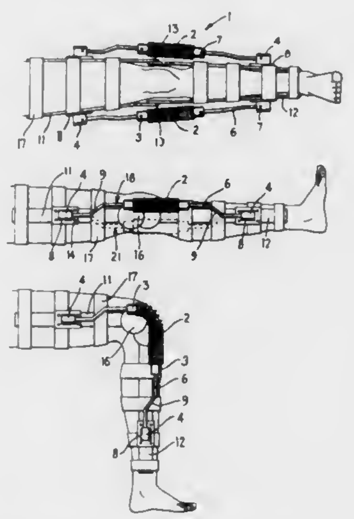
**Carlos Anchia, 3528 Copper Kettle Way, Orange, Calif. 92667**
**Filed Jul. 23, 1990, Ser. No. 557,602**
**Int. Cl.$^5$ A63B** *21/055*
**U.S. Cl. 272—137** **31 Claims**

1. An exercise apparatus which comprises a flexible, axially-resilient member having a plurality of first longitudinal sections each having a first resistance to stretching and a plurality of second longitudinal sections each having a second resistance to stretching, said second resistance to stretching being greater than said first resistance to stretching and said plurality of first longitudinal sections and said plurality of second longitudinal sections being arranged in series with one another.



### 5,013,037
### PHYSICAL THERAPY DEVICE

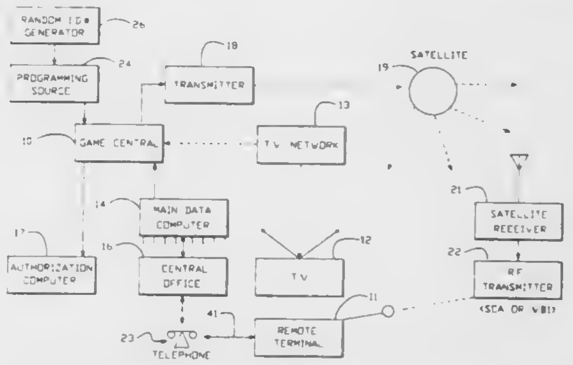
**Todd Stermer, 230 Amos, Portage, Mich. 49008**
**Filed Oct. 30, 1990, Ser. No. 605,960**
**Int. Cl.$^5$ A63B** *21/02, 23/00;* **A61H** *1/02*
**U.S. Cl. 272—139** **8 Claims**



1. A physical therapy device comprising:
means for biasing a limb of a user to an extended or contracted position;
means for supporting said biasing means lying along an imaginary longitudinal axis down the user's leg;
means for attaching said supporting means to the limb of the user;
said biasing means being offset from said imaginary longitudinal axis and further being rotatably connected to said support means so that said biasing means can be swivelled between a first position and a second position opposed to said first position;
whereby said supporting means supports said biasing means in one of said positions to bias said limb to be extended and furthermore supports said biasing means in the other of said positions to bias said limb against being extended.

### 5,013,038
### METHOD OF EVALUATING DATA RELATING TO A COMMON SUBJECT

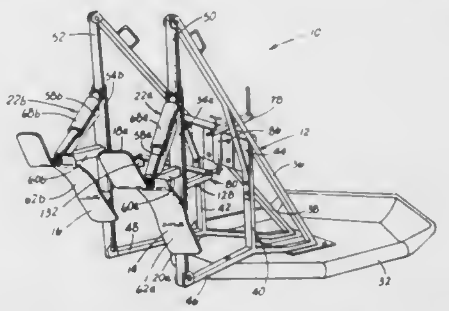
**Robert A. Luxenberg, Sunnyvale, and Robert J. Brown, Los Altos Hills, both of Calif., assignors to Interactive Network, Inc., Mountain View, Calif.**
**Filed Dec. 8, 1989, Ser. No. 448,001**
**Int. Cl.$^5$ A63F** *9/22;* **H04H** *9/00*
**U.S. Cl. 273—439** **3 Claims**



1. A method of evaluating data relating to a common subject to a plurality of remote data sources where each source may be down-loaded information on a one-way mass communications link from a central station but must up-load data from each of the remote sources to a central station by a dedicated and exclusive communications up-link, said method comprising the following steps:
statistically sampling a plurality of said remote data sources, said plurality being a small fraction of the total number of said data sources by signaling said data sources via said mass communications link, said data sources being responsive to said signaling to up-load data via said dedicated and exclusive respective up-links to said central station;
disabling said remote data sources not part of said statistical sample from up-loading via said up-link;
determining at said central location a statistical curve related to said statistically sampled data and downloading information of said curve via said mass communications link to said remote sources including said disabled sources for use in comparing the data of said remote source to said statistical curve.

### 5,013,039
### SPORTS TRAINING APPARATUS

**Danny R. Cole, Rt. 1, Box 224, Wayne, Okla. 73095**
**Filed Aug. 9, 1989, Ser. No. 391,456**
**Int. Cl.$^5$ A63B** *67/00*
**U.S. Cl. 273—55 R** **32 Claims**



1. A sports training apparatus supportable on a ground surface and adapted to assist in training a lineman in the sport of football, comprising:
a frame assembly supportable on the group surface;
a pad assembly having an upper end and a lower end and

VOL
1126
ISS
1
MY
7
1991
UMI

being adapted to be engageable by a lineman, the pad assembly having a head portion near the upper end and a torso portion disposed between the upper and lower ends of and extending a distance from the head portion toward the lower end, the head portion extending a distance at an angle from the torso portion;

means pivotally connecting the pad assembly to the frame assembly whereby the pad assembly is pivotally moveable from a stance position toward a raised position and pivotally moveable from the raised position to the stance position, the upper end of the pad assembly being moveable in a direction toward the frame assembly as the pad assembly moves toward the raised position and the upper end of the pad assembly being moveable in a direction away from the frame assembly as the pad assembly moves toward the stance position, the head portion of the pad assembly extending at an angle to the ground surface in the stance position and the torso portion extending about parallel with the ground surface in the stance position, and the torso position being movable toward a position extending generally perpendicular to the ground surface as the pad assembly is moved toward the raised position;

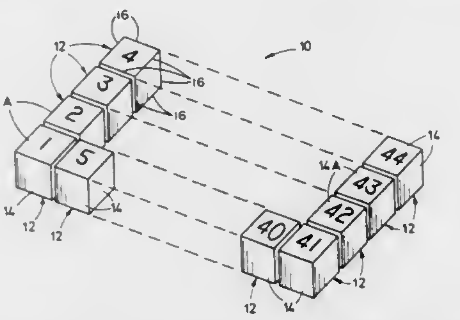
means connecting the pad assembly to the frame assembly for movement of the pad assembly in a left direction a distance from a center position in a right direction a distance from the center position and for movement back to the center position; and

means connected to the pad assembly for moving the pad assembly to and from said positions; and

means for locking the pad assembly in the center position, and for locking the pad assembly in the left of center position and for locking the pad assembly in the right of center position.

---

### 5,013,040
## DICE SET AND METHOD FOR SELECTING A SET OF INTEGERS FOR PLAYING A GAME OF CHANCE
**John J. Schiechl, 3451 S. Oak Ct., Lakewood, Colo. 80227**
**Filed Sep. 20, 1989, Ser. No. 409,811**
**Int. Cl.$^5$ A63F** *9/04*
**U.S. Cl. 273—146** **2 Claims**



1. A method of selecting a set of integers from a predetermined sequence of different integers wherein said integers in said predetermined sequence are different from one another and said integers in said integer set are different from one another and a preset number fewer than the number of integers in said predetermined sequence, said method comprising the steps of:

(a) providing a multiplicity of dice equal in number to the number of integers in the predetermined sequence with each die having a plurality of exterior faces but only one face bearing an integer of the predetermined sequence thereon, the other faces being free of integers, each said exterior face of each die having a multiplicity of interconnected peripheral edges be shared with said exterior faces adjacent thereto, each die being identical to one another and having an exterior shape being symmetrical from one exterior face to the next permitting the die when rolled on a flat surface to have an equal probability of coming to rest on any of said exterior faces;

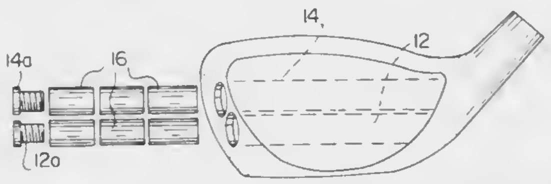
(b) shaking the multiplicity of dice;

(c) rolling the multiplicity of dice onto a surface; and

(d) repeating said shaking and rolling of the multiplicity of dice until, in a single rolling of the dice, only a number of the dice equal to the preset number of integers in the set being selected present their respective one integer-bearing face in the same preselected orientation, the set of integers thusly presented constituting the selected set of integers.

---

### 5,013,041
## GOLF DRIVER WITH VARIABLE WEIGHTING FOR CHANGING CENTER OF GRAVITY
**Donald J. C. Sun, San Diego, Calif., and Wen J. Tai, Kaohsiung, Taiwan, assignors to Cipa Manufacturing Corporation, Kang Shan Kaohsiung, Taiwan**
**Filed Jan. 22, 1990, Ser. No. 468,087**
**Int. Cl.$^5$ A63B** *53/04*
**U.S. Cl. 273—164** **5 Claims**



1. In a golf club head having a sole plate and a face plate having front and rear surfaces extending upwardly substantially normally from said sole plate, said sole plate having opposing bottom and top surfaces, the improvement comprising:

first and second similarly dimensional chambers formed along the rear surface of said face plate, said chambers running substantially the entire horizontal extent of said face plate in side by side substantially parallel relationship to each other,

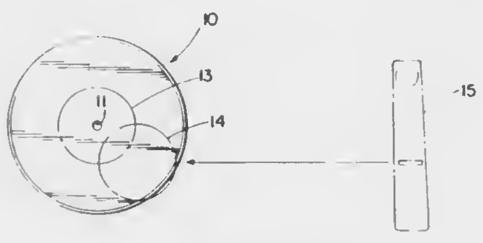
a plurality of sets of weight members, all of said weight members having the same dimensions which enable a plurality of said weight members to be fitted into said chambers, the weight members of each set being of a different density material, one end of each of said chambers being permanently closed, and

removable cap means for removably capping the other ends of said chambers to retain the weights therein,

said weight members being selectively installable in said chambers to variably shift the location to the center of gravity for said club head, both vertically and horizontally, said weight members being removable for replacement by means of said removable cap means.

---

### 5,013,042
## GOLF PUTTING PRACTICE DEVICE
**Joseph Garnes, 18307 Puritas Ave., Cleveland, Ohio 44135**
**Filed Jul. 18, 1990, Ser. No. 554,718**
**Int. Cl.$^5$ A63B** *69/36*
**U.S. Cl. 273—184 A** **3 Claims**



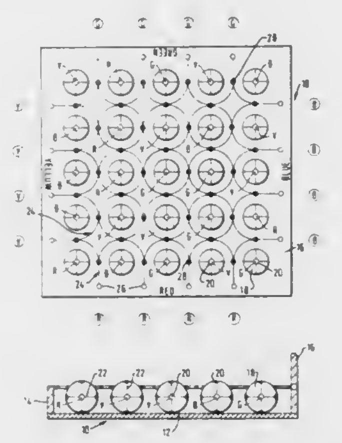
1. A practice putting device comprising:

first and second golf balls of essentially the same diameter,

a disc for simulating a conventional golf hole, said disc having a centrally located means for seating a golf ball, said first golf ball being seated on said seating means, the relative sizes of said disc and balls being such that when said seated ball is contacted by said second golf ball when putted at said seated ball, the golfer knows that said second ball would have entered said conventional golf hole since over half of the second ball would have traveled over the rim of the conventional hole.

---

### 5,013,043
## GAME
**Walter Halliday, 5 Stevenage Road, Hitchin, Hertfordshire SG4 9DH, England**
**Filed Oct. 13, 1989, Ser. No. 421,196**
**Claims priority, application United Kingdom, Oct. 17, 1988, 8824214**
**Int. Cl.$^5$ A63F** *3/00*
**U.S. Cl. 273—258** **3 Claims**

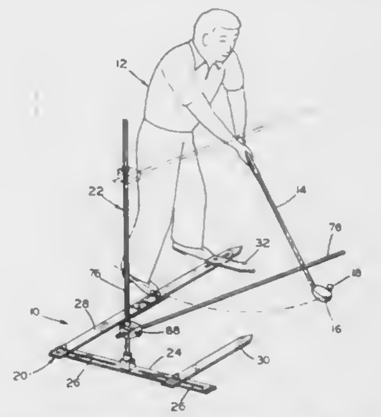


1. A game comprising a frame or housing, a plurality of independently rotatable balls held captive, in play, in a predetermined array in the frame or housing in such a manner that the balls partly protrude through respective holes in the frame or housing so that only a portion or portions of each ball is visible to players, wherein each ball is provided with four equally spaced surface markings around the equator of the ball and a further surface marking at each pole thereby to define sic independently distinguishable rotational setting for each ball, with each ball being manually rotatable between its said settings, and with some of the surface markings of each ball always being hidden from view, wherein the frame or housing is provided with markings indicating pathways between the array of balls, and a plurality of sets of counters for movement along the pathways indicated by the then-present surface markings visible on the balls, each set of counters having a distinct marking to distinguish each set of counters from each other set, and the distinct markings on the counters having counterparts among the surface markings on the balls such that each ball has among its surface markings a marking corresponding to each distinct set of counters.

---

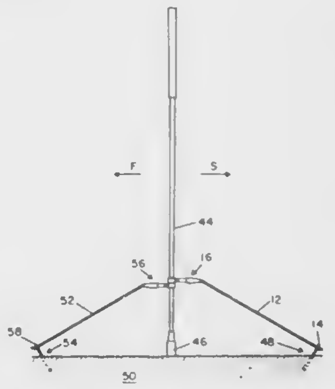
### 5,013,044
## TRAINING DEVICE FOR GOLFERS
**Frank C. Hesselbart, 1059 Craig Rd., Maumee, Ohio 43537**
**Filed Nov. 19, 1990, Ser. No. 615,501**
**Int. Cl.$^5$ A63B** *69/36*
**U.S. Cl. 273—186 C** **19 Claims**

1. A portable practice device for perfecting the stance, body alignment and club swing plane of golfers, comprising a base assembly adapted for placement upon a supporting surface on which a golfer is to practice, said base assembly including a base bar, an alignment bar extending from said base bar and along which the feet of the golfer are positioned for proper body alignment, a target line bar extending from said base bar and spaced therealong from said alignment bar, and a swing plane assembly carried by said base bar intermediate said alignment bar and said target line bar, said swing plane assembly including a support member extending upwardly from said base bar and a swing plane rod mounted on said support member and extending over said base assembly, said swing plane rod being mounted for movement along said support member to selected elevations above said base assembly and for swinging movement about said support member to selected angular positions relative to said base bar.



---

### 5,013,045
## GOLF CLUB SWING EXERCISING AND TRAINING APPARATUS AND METHOD
**Rex Elmore, 4408 Long Champ Dr., Austin, Tex. 78746**
**Filed May 25, 1990, Ser. No. 529,247**
**Int. Cl.$^5$ A63B** *69/36*
**U.S. Cl. 273—186 R** **16 Claims**



1. A golf club swing exercising and training apparatus comprising:

(a) a first elongated tension member made of an elastic material and having an anchor end and a club end, the first tension member being adapted for providing a first exercising force as it is stretched longitudinally;

(b) first anchor means secured to the anchor end of the first tension member for temporarily securing the anchor end of the first tension member to a desired surface at a desired first anchor point; and

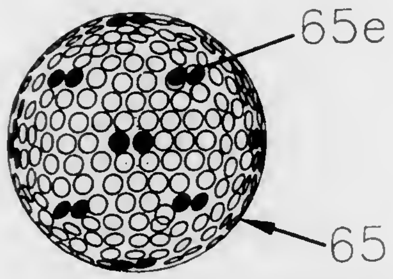
(c) first connecting means secured to the club end of the first tension member for releasably securing the club end of the first tension member to the shaft of a golf club at an exercising point located at substantially any position on the shaft above the club head so that the first exercising force may be transferred to the exercising point of the club shaft

VOL
1126
ISS
1
MY
7
1991
UMI

when the first tension member is stretched between the exercising point and the first anchor point.

---

### 5,013,046
### MULTIPLE MARK GOLF BALL AND PLAYING METHOD
**Tobias Koch, 6 N. Morgan Ave., Havertown, Pa. 19083**
**Filed Sep. 20, 1989, Ser. No. 410,250**
**Int. Cl.$^5$ A63B** *43/00*
**U.S. Cl. 273—213** **11 Claims**



1. A golf ball which is easily identified without touching it, rolling it over, or picking it up, even though it may lie in deep rough or may be almost completely buried in a sandtrap, comprising

a golf ball having an outside surface,

means for identifying the golf ball and distinguishing it from the golf balls of others without touching it, rolling it over, or picking it up, even though it may lie in deep rough or may be almost completely buried in a sandtrap,

said means comprising a multitude of identifying marks on the outside surface of the ball,

said marks being separate and discrete and spaced apart so that at least one mark is almost always visible to the eye no matter how the ball lies, and whether or not it lies in deep rough or is almost completely buried in a sandtrap,

said marks being different from the marks on similar golf balls having a multitude of identifying marks on their outside surface so as to distinguish said golf ball from said similar golf balls and enable a golfer to identify his ball and distinguish his ball from the ball of others even when it is almost buried in a sandtrap or in the rough.

---

### 5,013,047
### APPARATUS FOR DETERMINING THE IDENTITY AND POSITION OF GAME OBJECTS
**Günther Schwab, Munich, Fed. Rep. of Germany, assignor to Dr. Schwab Gesellschaft für Technologieberatung mbH, Munich, Fed. Rep. of Germany**
**PCT No. PCT/DE87/00111, § 371 Date Sep. 12, 1988, § 102(e) Date Sep. 12, 1988, PCT Pub. No. WO87/05723, PCT Pub. Date Sep. 24, 1987**
**PCT Filed Mar. 12, 1987, Ser. No. 274,931**
**Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608148**
**Int. Cl.$^5$ A63F** *3/02;* **G06F** *3/03, 15/44*
**U.S. Cl. 273—238** **24 Claims**

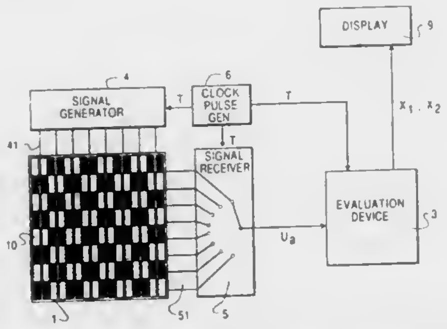
1. Apparatus for determining the identity and position of a plurality of individual game pieces disposed in different fields of a game board comprising:

a playing area divided into a plurality of equal size fields, each of said fields being subdivided into at least a first subfield and a second subfield and having an insulating layer disposed between said first and second subfields;

a plurality of identification devices, each respective identification device including an impedance arrangement and being disposed with a respective one of the plurality of individual game pieces, each said impedance arrangement electrically connecting said first and second subfields of a respective field when a game piece is placed upon the respective field;

signal generating means, connected with said first subfields, for applying an electrical input signal to said first subfields, the electrical input signal being conducted to the second subfield of a respective field by one of said identification devices placed on the respective field to produce an electrical output signal in dependence of the impedance of the impedance arrangement of said one identification device;

scanning means, connected with said second subfields, for scanning each of said second subfields and for determining if an electrical output signal is present at respective second subfields;

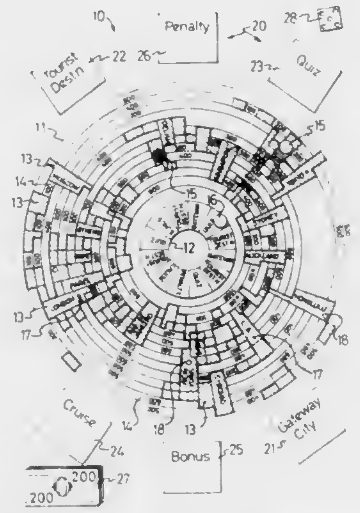


an evaluation device connected to said scanning means and including: storage means for storing signals associated with the impedance arrangement of each of said individual game pieces; and comparator means for comparing the stored signals with the scanned electrical output signals, said comparator means providing an output signal indicating that an electrical output signal scanned at a specific second subfield corresponds to one of said stored signals; and

output means for receiving the output signals of said comparator means and providing a signal corresponding to the identity and position of a game piece.

---

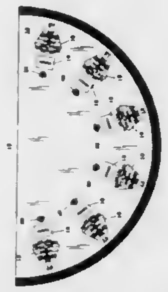
### 5,013,048
### GAME
**Roy G. Turner, 322 Titirangi Road, Titirangi, Auckland, New Zealand**
**Filed Feb. 8, 1990, Ser. No. 476,684**
**Claims priority, application New Zealand, Feb. 16, 1989, 228005**
**Int. Cl.$^5$ A63F** *3/04*
**U.S. Cl. 273—242** **5 Claims**



1. A game for a plurality of players, in normal use providing a simulation of world travel, including a board having a zone marked with spaces, markers which in normal use are moved within said zone on said board, a plurality of resource cards, and rules which in normal use govern the use of said board, markers and resource cards; said zone comprising a representation of the world; said spaces being arranged in a polar coordinate pattern and representing parts of the world; and wherein said spaces are arranged to substantially correspond with the arrangement of said parts of the world when represented by a South Pole centered polar coordinate map, the center of said zone being equivalent to the South Pole nd the outer perimeter of said zone being equivalent to the North Pole; whereby said zone provides a representation of the world having a proportionately larger northern hemisphere, and permitting continuous arcuate movement within and between said spaces in an East/West direction and radial movement within and between said spaces in a North/South direction; said resource cards corresponding to said spaces, wherein on the obverse side of each of said resource cards is a picture representing a scene of a part of the world to be identified, said scene associated with a said space representing said part of the world, on the reverse side of each of said resource cards is the identification of said scene and a point value.

---

### 5,013,049
### CARD GAME
**Joseph Tomaszewski, 2020 Palma Vista, Las Vegas, Nev. 89109**
**Filed May 14, 1990, Ser. No. 523,318**
**Int. Cl.$^5$ A63F** *1/00*
**U.S. Cl. 273—292** **17 Claims**



1. A method of playing a card game comprising:

(a) providing a deck of 54 cards comprising a standard 52 card deck of playing cards with two additional Jokers,

(b) establishing values for each card, the values being: Ace - 1, King - 0, Queen - 0, Jack - 0, Joker - 7 with no suit designation and all other cards keeping their face value,

(c) dealing five cards to a player and a dealer,

(d) the player and dealer each discarding and drawing up to two cards,

(e) the player and dealer each selecting the three of his five cards that numerically add up closest to, without going over, a total of 21,

(f) comparing the numerical value of the player's hand to the dealer's hand with the highest hand winning,

(g) in the event of a numerically tied hand, further comparing the hands according to a predetermined criteria to attempt to establish a winner.

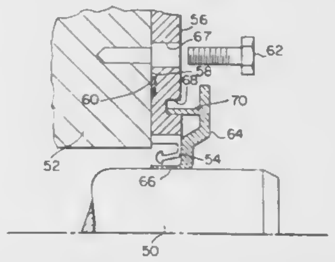
---

### 5,013,050
### SEAL INSTALLATION
**Trevor G. Curtis, Hornchurch, United Kingdom, assignor to Ford Motor Company, Dearborn, Mich.**
**Division of Ser. No. 135,883, Dec. 21, 1987. This application Oct. 3, 1989, Ser. No. 416,759**
**Claims priority, application United Kingdom, Dec. 23, 1986, 8630708**
**Int. Cl.$^5$ F16J** *15/32;* **B23P** *19/04;* **B23Q** *3/00*
**U.S. Cl. 277—9.5** **6 Claims**

1. A seal assembly for demountably mounting a seal in an angular gap between an axially extending shaft and a cylinder wall of a device, said assembly comprising:

surrounding an axial extent of said shaft an endplate comprising (i) means for mounting said endplate to a lateral surface of the device radially outward of and substantially normal to the gap, the radially inner periphery of the lateral surface defining an outer axial extremity of the gap, and (ii) a cylindrical alignment surface radially outward of said gap;

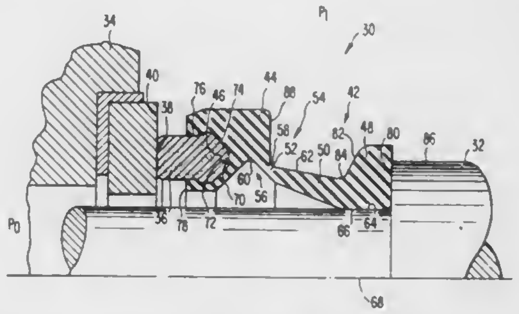
a seal having (i) a sealing surface on an axially extending sealing lip for sealing against said shaft, and (ii) a second surface coaxially aligned and fixed to said endplate; and



a tool comprising (i) an axially extending cylindrical projection, said projection having a first surface supporting said sealing lip by engagement with said sealing surface of said seal during storage and application, and said projection having a second surface engaging said shaft; and (ii) a third surface integral with said projection, said third surface extending to engagement with said cylindrical alignment surface of said endplate and coaxially aligning said endplate and tool about said shaft, said endplate being fixed in a position radially relative to said tool.

---

### 5,013,051
### SINGLE COMPONENT SEAL
**John A. Hilaris, Elmhurst, and George D. Waring, Woodridge, both of Ill., assignors to EG&G Sealol, Inc., Cranston, R.I.**
**Continuation of Ser. No. 811,231, Dec. 20, 1985, abandoned. This application Aug. 2, 1988, Ser. No. 227,459**
**Int. Cl.$^5$ F16J** *15/36*
**U.S. Cl. 277—89** **13 Claims**



1. A seal component for establishing a seal between a rotating shaft and a housing comprising:

an axially extending tubular elastomeric bellows having a first end portion, a second end portion, and an axially intermediate portion extending between and axially spacing the first end portion from the second end portion, for maintaining the first end portion in position with respect to a corresponding housing surface and the second end portion in position with respect to a corresponding shaft surface upon axial compression of the elastomeric bellows;

an annular face seal ring positioned in one of the first end portion and the second end portion, the annular face seal ring having a front radial face for abutting, sealing against, and rotating relative to the one of the housing surface and shaft surface corresponding to the one of the first end

VOL
1126
ISS
1
MY
7
1991
UMI

portion and second end portion in which the annular face seal ring is positioned;

the other of the first end portion and the second end portion in which the annular face seal ring is not positioned being provided for establishing a seal with the corresponding one of the housing surface and the shaft surface;

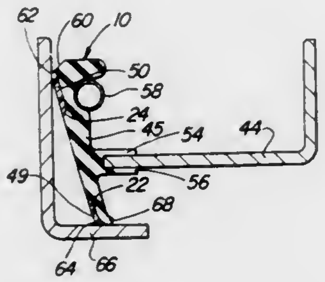
the axially intermediate portion diverging from the second end portion to the first end portion at an angle in the range of about 10° to 45°, the intermediate portion including means integral to the bellows and dimensioned and configured for buckling the bellows toward the shaft at a structurally weakened neck positioned at the junction between the intermediate portion and the first end portion and thereby gripping the one of the housing surface and the shaft surface corresponding to said other end portion with increasing force as the tubular elastomeric bellows is axially compressed, the structurally weakened neck being defined by a first circumferential configuration at the radially outer side of the seal component having a V-shaped cross-section and a second circumferential configuration at the radially inner side of the seal component having a V-shaped cross-section, an area having the least thickness of the intermediate portion located between the vertex of the V-shaped first circumferential configuration and a leg of the V-shaped second circumferential configuration, the vertex of the V-shaped first circumferential configuration being radially inward of the vertex of the V-shaped second circumferential configuration, the vertex of the V-shaped second circumferential configuration being positioned substantially on a line which is contiguous to and aligned with the outer surface of the intermediate portion.

---

### 5,013,052
### OIL SEAL HAVING ATTACHED THERETO TWO ALIGNED POLYTETRAFLUOROETHYLENE PIECES FORMING SEAL LIPS

**John D. Butler, Van Wert, Ohio, and Jon A. Chandler, Brighton, Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.**

**Filed May 3, 1989, Ser. No. 347,084**
**Int. Cl.$^5$ F16J** *15/32*
**U.S. Cl. 277—153** **3 Claims**



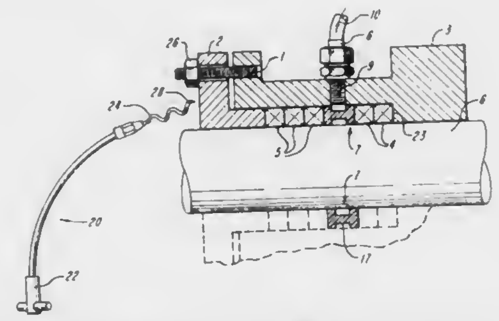
1. A lip seal, comprising:
a seal case;
an elastomeric seal body molded to said seal case;
a first seal lip bonded to said elastomeric seal body, said first seal lip comprising a first polytetrafluoroethylene piece;
a second seal lip bonded to said elastomeric seal body, said second seal lip comprising a second polytetrafluoroethylene piece; and
said first and second polytetrafluoroethylene pieces being split apart from a unitary lip liner blank such that said first and second polytetrafluoroethylene pieces respectively comprise first and second common parting fractured portions created upon splitting of said lip liner blank, said first and second common parting fractured portions being in opposed directions facing each other in substantially linear alignment and recessed within said elastomeric seal body.

---

### 5,013,053
### UNIVERSAL SEAL CAGE LANTERN RING WITH DOUBLE-SIDED SLOTTED LAND STRUCTURE

**George B. Champlin, Stoneham, Mass., assignor to New England Braiding Company, Inc., Manchester, N.H.**

**Filed May 26, 1989, Ser. No. 358,162**
**Int. Cl.$^5$ F16J** *15/18*
**U.S. Cl. 277—215** **5 Claims**



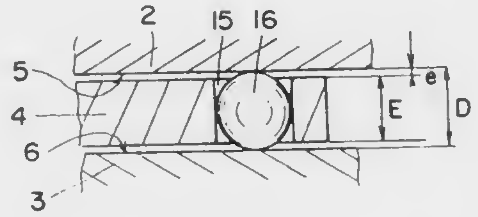
1. A lantern ring for use with packing to provide for the distribution of fluid to adjacent packing material about a shaft having an axis, comprising:
a length of flexible material having opposed ends defining the extent of said length, said length being formed into an annulus so that said opposed ends are juxtaposed unslotted seb, said web having opposed axially facing portions, each portion having an inner diameter and outer diameter, each portion at its respective inner and outer diameter having lands extending radially therefrom, said lands having radially extending slots therein.

---

### 5,013,054
### BUSH MOUNTING FOR A FLOATING CHUCK

**Jacques Burnet, Saint-Priest, France, assignor to SMP2 SA, Bron, France**

**Filed Nov. 13, 1989, Ser. No. 434,290**
**Claims priority, application France, Nov. 14, 1988, 88 15181**
**Int. Cl.$^5$ B23B** *31/02*
**U.S. Cl. 279—16** **1 Claim**



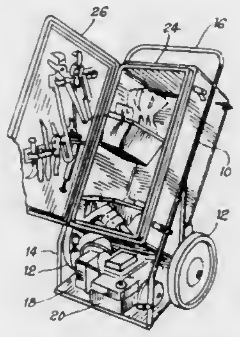
1. A floating chuck comprising:
a body,
a bush movable mounted with respect to the body,
a plate located between the bush and the body,
four openings formed 90 degrees apart in the periphery of the plate,
a pair of fingers mounted on the body, spaced arcuately apart by 180 degrees and each being receiving in one of an opposed pair of the openings in the plate,
a pair of fingers mounted on the bush, spaced arcuated apart by 180 degrees and each being received in one of another pair of opposed openings in the plate,
a plurality of bearing openings extending through the plate,
a spherical bearing member disposed in each bearing opening and in mutual abutting relationship with opposed bearing surfaces on the body and the bush, the bearing members having a diameter greater than the thickness of the plate and the difference between the diameter of the spherical bearings and the thickness of the plate being less than or equal to the total limiting value of the elastic deformation of a spherical bearing member and the bearing surfaces of the bush and the body.

---

### 5,013,055
### TOOL CADDY WITH SELF-CONTAINED POWER

**Randall C. Labrum, 2862 Via Del Alazan, Bonita, Calif. 92002**

**Filed Oct. 23, 1989, Ser. No. 425,116**
**Int. Cl.$^5$ B62B** *1/26*
**U.S. Cl. 280—47.19** **4 Claims**



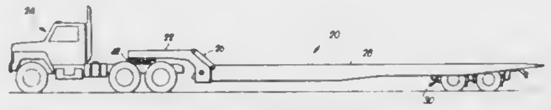
1. A tool caddy with self-contained electric power, comprising:
(a) a frame;
(b) an electric generator mounted in said frame;
(c) a utility box mounted to said frame and having a plurality of brackets for mounting electric-powered tools;
(d) two wheels for rolling said frame over the ground and near-ground-level support structure adjacent said wheels to act with said wheels to support said caddy in a stable, upright position such that said utility box is at least partially upright, when said caddy is either being moved, or in its stationary upright position;
(e) a power cord for extending from said generator to a power tool that would be used in the proximity of said tool caddy; and,
(f) said utility box resting in said frame at an angle on the order of 60 degrees from the horizontal when in the upright position.

---

### 5,013,056
### LOW LOAD ANGLE STEP DECK TRAILER HAVING SHIFTABLE UNDERCARRIAGE

**Donald R. Landoll; Kelly Williams, and Ted Peck, all of Marysville, Kans., assignors to Landoll Corporation, Marysville, Kans.**

**Filed May 19, 1989, Ser. No. 354,637**
**Int. Cl.$^5$ B60P** *1/04*
**U.S. Cl. 280—425.2** **19 Claims**



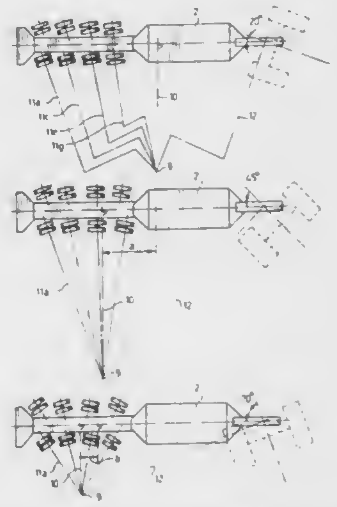
1. A shiftable undercarriage for use in supporting the deck of a trailer movable between a horizontal position and an angled position, the undercarriage comprising
an elongated undercarriage frame having forward and rear ends;
a first axle supported on the frame adjacent the forward end and extending transverse to the frame;
a second axle supported on the frame adjacent the rear end and extending in a direction parallel to the first axle;
a plurality of wheels rotatably supported on each of the axles; and
load distribution means mounted on the undercarriage frame for evenly distributing the weight of the deck between the first and second axles, the load distribution means including a floating link assembly having opposing first and second support arms and an intermediate link, each having first and second ends, the second ends of the support arms including bearing means adapted to engage the main deck for transmitting weight of the deck to the support arms,
the undercarriage frame including a pair of horizontal pivot axes on which the support arms are supported, the pivot axes each extending in a direction parallel to the direction in which the first axle extends and defining with the other axis a midpoint halfway therebetween which is vertically aligned with a midpoint defined halfway between the axles, the intermediate link being connected between the first ends of the support arms in a direction substantially perpendicular to the horizontal pivot axes and being vertically offset from the pivot axes, the intermediate link further being movable relative to the undercarriage frame for transmitting the weight of the deck equally between the support arms regardless of the angle of the deck and for evenly distributing the weight of the deck between the axles of the undercarriage.

---

### 5,013,057
### METHOD OF CONTROLLING A TRANSPORT MEANS AND A TRANSPORT MEANS FOR EFFECTING THE METHOD

**Pekka Vänninmaja, Tervakoski, and Rainer Jakobsson, Hämeenlinna, both of Finland, assignors to Teco Systems Oy, Tervakoski, Finland**

**Filed May 23, 1989, Ser. No. 356,342**
**Int. Cl.$^5$ B62D** *53/06*
**U.S. Cl. 280—426** **8 Claims**



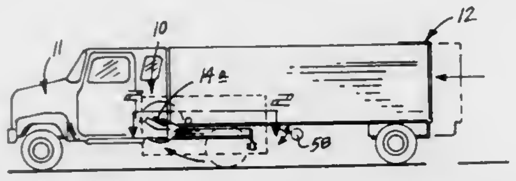
1. A transport means (**1**), comprising a body (**2**) and wheels (**3***a* to **3***h*) attached to the body on both sides of a central line thereof one after another in a longitudinal direction of the body, all of the wheels being turnable about vertical axes (**4***a* to **4***h*) of turning for changing the direction of travel of the transport means (**1**), power means (**18**) for turning the wheels (**3***a* to **3***h*), and control means (**7**, **8**, **13-22**) comprising an adjusting means (**8**) for controlling the power means (**18**) in such a way that when the direction of travel is changed the rotation axes (**11***a* to **11***h*) of all the wheels (**3***a* to **3***h*) intersect substantially at a same vertical axis (**9**) of turning, characterized in that the control means (**7**, **8**, **13-22**) comprise a control sensor (**7**) controlling the adjusting means (**8**), which sensor indicates an

VOL
1126
ISS
1
MY
7
1991
UMI

angle (α) of turning of the transport means (**1**), and that the adjusting means (**8**) is connected to control the power means (**18**) in such a way that at least when the angle (α) of turning exceeds a predetermined angle, the position of said same axis (**9**) of turning is shifted in the longitudinal direction of the transport means (**1**) in proportion to the angle (α) of turning.

### 5,013,058
### VARIABLE WHEEL BASE TRAILER APPARATUS

**Paul C. Kruger, 730 Fairlawn Dr., Columbus, Ohio 43214**
**Filed Jan. 25, 1990, Ser. No. 470,375**
**Int. Cl.$^5$ B62D *53/08***
**U.S. Cl. 280—429 11 Claims**



**1**. A variable wheel base tractor-trailer apparatus for roadway travel comprising, in combination,

a self-propelled tractor assembly with a longitudinal rearwardly extending tractor frame including a forward set of drive wheels, and

a wheeled trailer assembly selectively securable to the tractor assembly, wherein the trailer assembly includes a plurality of pivotally mounted parking wheels medially positioned underlying the trailer assembly, and

a reciprocating carriage means for selective securement to the trailer assembly, movably mounted to a plurality of elongate guide members, wherein the guide members comprise a first and second elongate guide rail for slidably receiving the carriage means thereon, the carriage means including first and second tractor supporting carriage wheel assembly secured to and directed laterally of each side of the carriage means, each carriage wheel assembly aligned relative to one another and to the carriage means, and

wherein the first and second guide rails include a first and second respective forward portion, wherein the first and second forward portion each include an arcuate forward upper surface directed overlying and spaced above the first and second guide rails, and a forward limit switch mounted in alignment with forward edges of the first and second guide rail portions for contact with the carriage means in a forward position, and a second limit switch mounted adjacent and in alignment with rear edge portions of the first and second guide members for contact with the carriage means when in a retracted rear position, and the first and second carriage wheel assembly in a roadway contacting orientation in the rear position, and the first and second carriage wheel assembly spaced above a roadway in the forward position, and

including first and second continuous chain members, the first and second chain members are spaced parallel to one another and between the first and second guide rails, and the carriage means includes a carriage platform, the carriage platform pivotally mounted to the first and second chain members.

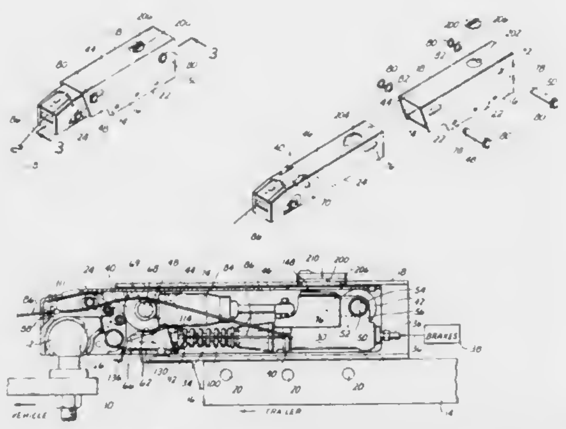
### 5,013,059
### ACTUATOR/COUPLER

**Bernhardt P. Goettker, 1031 Gale St., Escondido, Calif. 92027**
**Filed Jun. 4, 1990, Ser. No. 532,662**
**Int. Cl.$^5$ B60T *13/08***
**U.S. Cl. 280—446.1 5 Claims**

**1**. An actuator/coupler for a trailer having a forward coupler to receive a ball of a towing vehicle and a rear housing to attach to a tongue of said trailer, said trailer having hydraulically actuated brakes, the improvement, comprising:

(a) said coupler having generally a right-rectangular exterior shape and said housing having a hollow interior of right-rectangular shape generally fitting the shape of said coupler which has a telescoping relationship thereto, said housing having an exterior of right-rectangular shape,

(b) said coupler having a top wall with a pair of juxtaposed openings in a forward portion thereof and a first pair of juxtaposed rollers disposed in said openings and extending to a level above said top wall and said housing having an interior top wall and said rollers bearing on the underside of said interior top wall of said housing, said coupler having a pair of side openings and a first shaft supporting said rollers and extending laterally of said coupler and through said pair of side openings and said rollers being rotatably supported by said shaft, said housing having slots through which said first shaft extends which permit limited fore and aft movement of said shaft relative to said housing as said coupler telescopes relative to said housing,

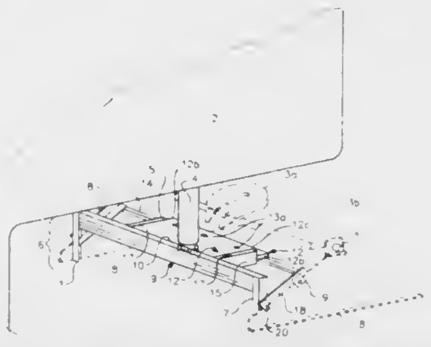


(c) a second pair of juxtaposed rollers and a second shaft supporting the same extending laterally of said housing in a rear portion thereof and said housing having a pair of side openings in either side in which the ends of said second shaft are disposed, said coupler having two slotted side walls through which said second shaft extends which permit limited fore and aft movement of said second shaft relative to said coupler as said coupler telescopes relative to said housing, and said second rollers bearing on the underside of said top wall of said coupler, said top wall of said coupler conforming to said right-rectangular interior shape of said housing, and

(d) hydraulic means and a line connecting said hydraulic means to said brakes, said hydraulic means applying hydraulic pressure to said brakes when said housing telescopes forwardly relative to said coupler and said hydraulic means releasing hydraulic pressure from said brakes when said housing telescopes rearwardly relative to said coupler.

### 5,013,060
### APPARATUS FOR PROTECTING A TRUCK BED AND SIDE RAILS

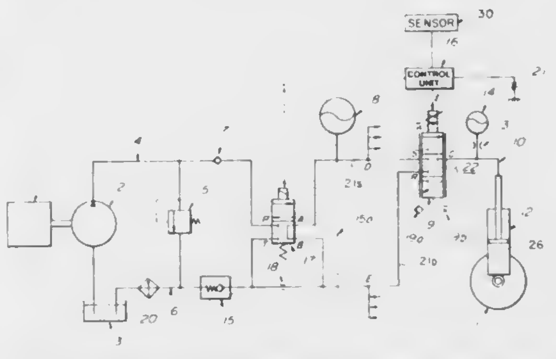
**Chris M. Van Andel, 1508 W. Grover St., and Larry M. Van Andel, 9898 Van Buren, both of, Lynden, Wash. 98264**
**Filed Sep. 13, 1989, Ser. No. 406,789**
**Int. Cl.$^5$ B60D *1/28***
**U.S. Cl. 280—477 12 Claims**



**1**. A device for restraining and capturing a trailer-associated component of a fifth-wheel-type hitch in the event that said trailer-associated component comes free of that part of said fifth-wheel hitch which is mounted in a bed of a towing vehicle, said device comprising: a component which has a front edge and a rear edge and first and second laterally spaced ends is adapted to extend transversely and in a generally horizontal orientation across and elevated above the towing vehicle bed with its end facing opposite sides of the bed and means at the ends and rear edge of said horizontally oriented component for trapping the trailer-associated hitch component as its falls onto said capturing and restraining device component on that component.

### 5,013,061
### HYDRAULIC CIRCUIT FOR ACTIVELY CONTROLLED AUTOMOTIVE SUSPENSION SYSTEM WITH FAIL-SAFE SYSTEM

**Itaru Fujimura; Naoto Fukushima; Yukio Fukunaga, and Yohsuke Akatsu, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**
**Filed Jan. 26, 1989, Ser. No. 303,338**
**Claims priority, application Japan, Jan. 26, 1988, 63-15480**
**Int. Cl.$^5$ B60G *17/015***
**U.S. Cl. 280—707 13 Claims**



**1**. An actively controlled suspension system comprising:

a suspension system interposed between a vehicular body and a suspension member rotatably supporting a vehicular wheel, said suspension system including a variable pressure chamber which is filled with a working fluid and which is variable of the pressure of said working fluid across a predetermined neutral pressure within said variable pressure chamber for varying suspension characteristics;

a fluid circuit means, connected to said variable pressure chamber and to a fluid pressure source, which circulates pressurized fluid in a fluid circuit;

a first valve means disposed in said fluid circuit and variable of valve position for adjusting pressure supply for said variable pressure chamber from said fluid circuit, said first valve means having a first port connected to said fluid pressure source via a supply line of said fluid circuit for supplying the pressurized fluid therethrough, a second port connected to said fluid pressure source via a drain line for draining pressurized fluid therethrough, and a third port connected to said variable pressure chamber via a pressure control line;

a second valve means disposed between said first valve means and said fluid pressure source, for permitting fluid flow from said pressurized fluid source to said first valve means and for blocking fluid flow in the opposite direction in a first mode, and, in a second mode, for permitting fluid flow from said first valve means to said pressurized fluid source when the fluid pressure at said supply line is higher than a predetermined threshold level and for concurrently blocking fluid flow in the opposite direction, and for blocking fluid communication between said pressurized fluid source and said first valve means when the fluid pressure at said supply line is lower than or equal to said threshold level;

a sensor means for monitoring a preselected suspension control parameter to produce a sensor signal representative thereof;

a fail detector means for monitoring a control signal supplied to said first valve means and for detecting an abnormality of said control signal; and

a controller means for normally operating to produce said control signal on the basis of said sensor signal for adjusting pressure to be introduced into said first valve means and thus for adjusting suspension characteristics in order to suppress attitude change in said vehicular body, and said controller means being responsive to said detector means detecting an abnormality of said control signal, to output a line pressure control signal to be fed to said second valve means for switching the valve position of said second valve means from said first position to said second position in order to maintain the line pressure in said fluid circuit at a pressure higher than or equal to said predetermined threshold level.

### 5,013,062
### US-OS CHARACTERISTIC CONTROL SYSTEM FOR A VEHICLE RESPONDING TO TURNING STATE QUANTITY AND THE CHANGING RATE THEREOF

**Takashi Yonekawa, 25-1, Fujimidai, Mishima-shi, Shizuoka-ken; Toshio Onuma, 2016-150, Chabatake, Susono-shi, Shizuoka-ken; Shuuichi Buma, 114-233, Sakanose, Kosema-cho, Toyota-shi, Aichi-ken; Hiroyuki Ikemoto, 1321, Misyuku, Susono-shi, Shizuoka-ken; Kaoru Ohasbi, 2-10-19, Midorigaoka, Okazaki-shi, Aichi-ken; Toshio Aburaya, 1-10, Takagami, Toyota-shi, Aichi-ken, and Kinihito Sato, 527, Imazato, Susono-shi, Shizunka-ken, all of Japan**
**Filed Dec. 29, 1989, Ser. No. 459,325**
**Int. Cl.$^5$ B60G *17/00;* B62D *15/00***
**U.S. Cl. 280—707 5 Claims**

**1**. A control system for controlling the US-OS characteristic of a vehicle having suspension for the front and the rear vehicle wheels, comprising:

a means for changing the US-OS characteristic of the vehicle;

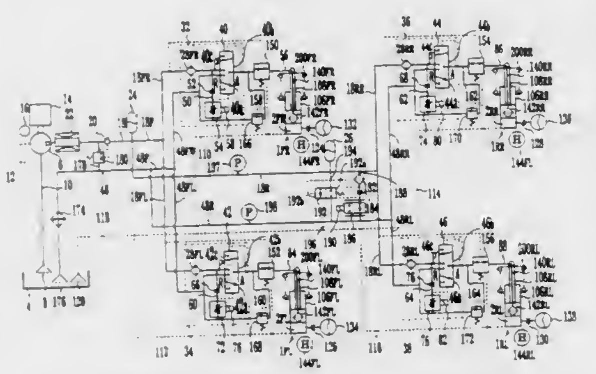
a means for detecting a turning state quantity;

a means for determining the changing rate of a turning state quantity:

a control means which, in response to the turning state quantity detected by said detecting means and the changing rate of the turning state quantity determined by said determining means, controls said US-OS characteristic changing means so that the higher the changing rate of the

VOL
1126
ISS
1
MY
7
1991
UMI

turning state quantity is, the more the US-OS characteristic may be shifted toward higher over-steer, and for the same changing rate the higher the turning state quantity is, the more the US-OS characteristic may be shifted toward higher under-steer.



---

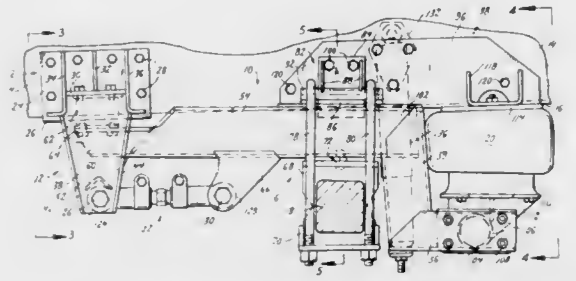
## 5,013,063
## AIR RIDE SUSPENSION SYSTEM WITH RIGID BOLSTER BEAM AND SLIPPER LOAD BUSHING

**Mitchell James L., Springfield, Mo., assignor to Ridewell Corporation, Springfield, Mo.**

**Filed Jul. 10, 1989, Ser. No. 377,222**

**Int. Cl.$^5$ B60G** *3/16, 11/26*

**U.S. Cl. 280—711** **22 Claims**



1. An air ride suspension system for a vehicle having a chassis and at least one axle, the system comprising:
- a hanger means adapted to be connected to a vehicle chassis;
- a bolster beam means having first and second ends and adapted to support a vehicle axle;
- a first spring means positioned between the first end of the bolster beam means and the vehicle chassis;
- a second spring means positioned between the bolster beam means and the vehicle chassis at a location spaced from the first end; and
- a torque rod having a first end connected to the hanger means below the first spring means, and a second end connected to the bolster beam means underneath the bolster beam and intermediate the first and second ends of the bolster beam.

---

## 5,013,064
## OCCUPANT RESTRAINT SYSTEM

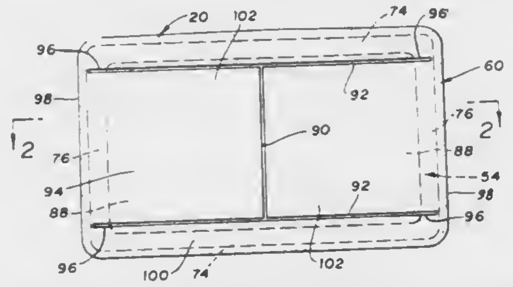
**Gregory A. Miller, Troy, and Jeffery L. Pearson, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 29, 1990, Ser. No. 529,799**

**Int. Cl.$^5$ B60R** *21/22*

**U.S. Cl. 280—730** **4 Claims**

1. An occupant restraint system comprising, in combination, a support box-like container including a base wall and first and second pairs of spaced side walls joined to the base wall along upper edges thereof and joined to each other along side edges thereof, a folded inflatable occupant restraint cushion within the container, the cushion being folded to provide a first portion opposite the base wall of the container and spaced second portions, each cushion second portion being located opposite a respective side wall of the first pair of side walls, first separable means in the base wall of the container adjacent each juncture thereof with the upper edge of a side wall of the first pair, second separable means joining the first separable means intermediate the second pair of side walls and defining therewith a pair of oppositely opening separable first flaps in the base wall of the container hinged to the upper edges of the second pair of side walls, the first flaps being separable from the container and moved to open position by the first portion of the cushion upon initial inflation of the cushion to permit initial deployment of the cushion along an intended path toward the occupant, each first separable means including extensions located adjacent the side edges of the second pair of side walls, the first separable means and extensions thereof defining a pair of oppositely opening second flaps, each said second flaps including a side wall of the first pair hinged to the support about the lower edge thereof and the portion of the base wall joined thereto, should the first portion of the cushion be unable to open the first pair of flaps to permit initial deployment of the cushion along the intended path toward the occupant upon inflation of the cushion, the second portions of the cushion separating the second pair of flaps from the container and moving said second pair flaps to open position about the hinged lower edges of the first pair of side walls to permit initial deployment of the cushion along paths parallel to the occupant, the second pair of side walls moving with the first flaps to open position about the hinged lower edges of said second pair of side walls upon subsequent deployment of the cushion along the intended path toward the occupant.



---

## 5,013,065
## GAS BAG APPARATUS FOR PROTECTION AGAINST AN IMPACT

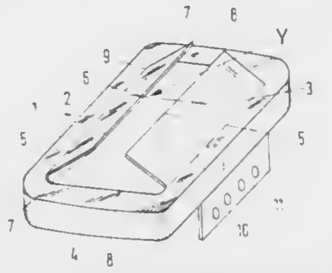
**Martin Kreuzer, Kleinwallstadt, Fed. Rep. of Germany, assignor to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany**

**Filed Nov. 1, 1989, Ser. No. 430,703**

**Claims priority, application Fed. Rep. of Germany, Nov. 1, 1988, 3837085**

**Int. Cl.$^5$ B60R** *21/20*

**U.S. Cl. 280—743** **7 Claims**



1. A covering for a gas bag apparatus for protection aganist an impact which is adaptable to be integrated into a steering wheel or instrument board of a motor vehicle and has a carrier for accommodating a collapsed, inflatable gas bag and a solid-fuel-operated gas generator connected to the gas bag, wherein the covering comprises a one piece injection molding of thermoplastic elastomer including a peripheral annular frame securable to the carrier and configured to extend around a rim of the bag and a cover with defined rated break lines forming cover sections connected to the frame at hingelike joints and covering the bag, wherein the rated break lines have an initial rated break portion having a length of 5 to 30 mm and a wall thickness of 0.30 to 0.75 mm and wherein the covering has a wall thickness which increases continuously along the rated break lines from 0.90 to 1.20 mm at the initial rated break portion disposed adjacent to free corners of the cover sections to 1.3 to 2.3 mm at its termination disposed adjacent to the hingelike joints between the cover sections and the frame of the covering.

---

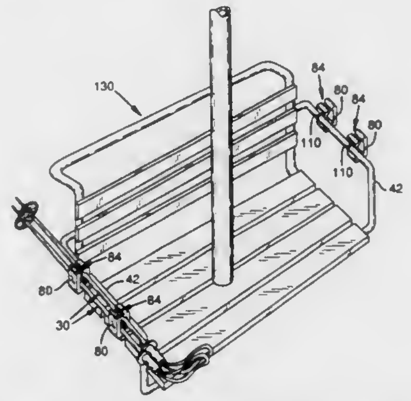
## 5,013,066
## SKI POLE HOLDER

**Keith W. Adkins, S. 11 Barker Rd., Green Acres, Wash. 99016-9704**

**Continuation-in-part of Ser. No. 223,924, Jul. 25, 1988, Pat. No. 4,936,602. This application Dec. 15, 1989, Ser. No. 451,819**

**Int. Cl.$^5$ A63C** *11/00*

**U.S. Cl. 280—809** **4 Claims**



1. In combination, an open ski lift and a holder for a ski pole, the ski pole having a rod section defining a ski pole axis, the rod section coupling a ski pole basket and a ski pole handle each of greater diameter relative to the ski pole axis than the rod section, the ski pole holder comprising:
- a first body having an external surface and an inner formation defining a first ski pole retention space, the first retention space being open at first and second opposite ends and otherwise substantially enclosed by said inner formation, the first body further including a first entry passage communicating said external surface and said inner formation, the first entry passage further communicating said first and second ends of said first retention space, the first entry passage sized to permit lateral movement of the rod section of the ski pole through the first entry passage and into the first retention space;
- first mounting means for mounting said first body to said open ski lift with said first and second ends substantially horizontally aligned, whereby the ski pole is held horizontally as said rod section comes to rest against an upward facing surface of said inner formation;
- a second body having an external surface and an inner formation defining a second ski pole retention space, the second retention space being open at first and second opposite ends and otherwise substantially enclosed by said inner formation of the second body, the second body further including a second entry passage communicating said external surface of the second body and said inner formation of the second body, the second entry passage further communicating said first and second ends of said second retention space, the second entry passage being sized to permit lateral movement of the rod section of the ski pole through the second entry passage and into the second retention space; and
- second mounting means for mounting said second body to said open ski lift in spaced horizontal alignment with said first body, whereby said first and second bodies cooperate to support the ski pole horizontally as said rod section comes to rest against an upward facing surface of the inner formation of the second body.

---

## 5,013,067
## METHOD AND APPARATUS FOR CONTROLLING VEHICLE HEIGHT

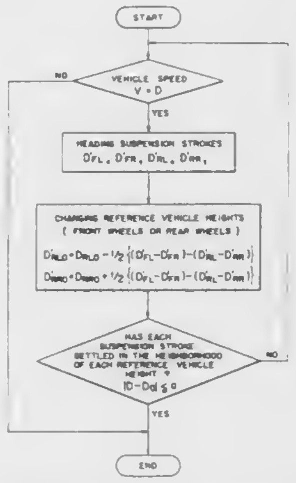
**Atsushi Mine; Katsuyoshi Kamimura, and Yutaka Hiwatashi, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 12, 1990, Ser. No. 464,389**

**Claims priority, application Japan, Jan. 19, 1989, 1-10334**

**Int. Cl.$^5$ B60G** *17/00*

**U.S. Cl. 280—840** **7 Claims**

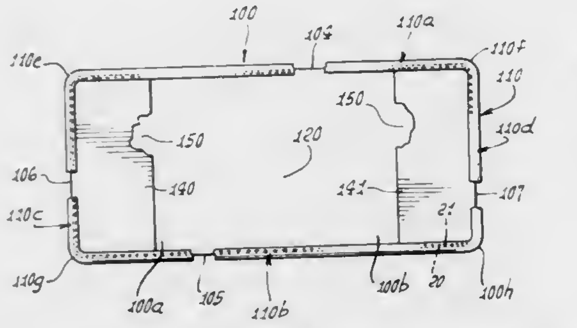

START
VEHICLE SPEED V = D
NO
YES
HEADING SUSPENSION STROKES D'FL, D'FR, D'RL, D'RR,
CHANGING REFERENCE VEHICLE HEIGHTS ( FRONT WHEELS OR REAR WHEELS )
D'RLO = DRLO − 1/2 {(D'FL−D'FR)−(D'RL−D'RR)}
D'RRO = DRRO + 1/2 {(D'FL−D'FR)−(D'RL−D'RR)}
HAS EACH SUSPENSION STROKE SETTLED IN THE NEIGHBORHOOD OF EACH REFERENCE VEHICLE HEIGHT ?
ID−DoI ≦ α
NO
YES
END

4. An apparatus for controlling height of a vehicle, having vehicle height adjusting means for each of front and rear wheels, detection means for detecting strokes of suspensions of the wheels, respectively, and setting means for setting a reference vehicle height, said apparatus comprising:
- first controlling means for controlling the vehicle height adjusting means with respect to one of the front wheel suspension pair and the rear wheel suspension pair to attain the reference vehicle height for the left and right wheels of the one pair so as to maintain one end part of the vehicle having said one pair of the suspensions parallel to a line connecting both contact points of a road surface with the left and right wheels of the one pair;
- sensing means for sensing a stationary condition of the vehicle;
- changing means responsive to the stationary condition for changing the reference vehicle heights for the left and right wheels of the other suspension pair, respectively, in accordance with the strokes detected by the detection means;
- second controlling means for controlling the vehicle height adjusting means with respect to the other suspension pair to converge the strokes of the other suspension pair to changed to reference vehicle heights, respectively, so as to maintain the balance between the contact loads of the wheels regardless of the distortion of the road surface.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,068
### STRETCHABLE, WATER REPELLANT BOOK COVER

**David J. Maldonado, 2357 Fifth St., La Verne, Calif. 91750**
**Filed Mar. 26, 1990, Ser. No. 498,411**
**Int. Cl.⁵ B42D *3/00;* A45F *5/12***
**U.S. Cl. 281—31** **12 Claims**



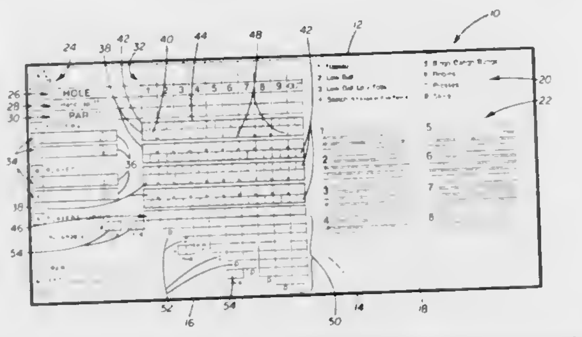
1. A protective envelope for a book having front and rear covers, and a binding area, said envelope comprising, in combination with said book;

(a) a stretchable sheet defining front and rear sections adapted to closely overlie said front and rear book covers, said sheet having edges,
(b) a stretchable and separate seam binding extending in a ·loop and attached to said edges,
(c) said front and rear sections having outer and inner sides, and including stretchable flaps extending adjacent said inner sides of the sheet sections to partially cover said inner sides, said flaps peripherally attached to said sections to form pockets for reception of the book covers into the respective pockets, in conformed, retained position therein,
(d) said sheet including a first layer of closed cell elastomeric, compressible foam, and a second layer of compressible, synthetic, polymer fabric, said second layer lining said first layer on one side thereof and being substantially thinner than said first layer, said first layer presented inwardly for frictional contact with the book cover or covers, and the second layer presented outwardly for manual grasping.

---

### 5,013,069
### GOLF SCORECARD

**James D. Hardin, 205 Pasadena Dr., Lexington, Ky. 40503**
**Filed Mar. 9, 1990, Ser. No. 491,435**
**Int. Cl.⁵ G09B *19/22***
**U.S. Cl. 283—48.1** **17 Claims**



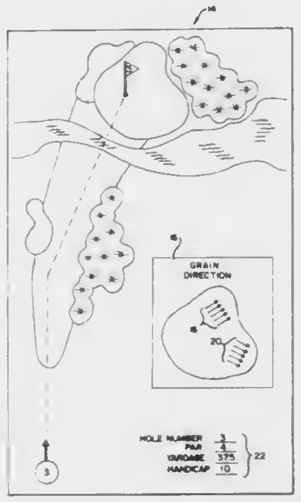
17. A method of recording individual and team stroke totals as well as individual and team game point totals on a golf scorecard including a plurality of rows of recording spaces comprising the steps of:

marking on a first row of recording spaces on said scorecard
an individual's stroke total for a hole or holes played;
marking on a second row of recording spaces on said scorecard an individual's game point total for a hole or holes played;
marking on a third row of recording spaces on said scorecard a team's game point total; and
marking a recording means provided on said scorecard to indicate skins won and presses made by a player.

---

### 5,013,070
### GOLF SCORE CARD WITH PUTTING GREEN GRAIN INDICIA

**Michael F. Maude, Sr., 25430 W. Cuba Rd., Barrington, Ill. 60010, assignor to Michael F. Maude, Sr., Barrington, Ill.**
**Filed Jun. 13, 1990, Ser. No. 537,236**
**Int. Cl.⁵ A63B *67/02***
**U.S. Cl. 283—49** **3 Claims**



1. A golf score card for assisting players in calculating the play of the greens of a golf course, said score card comprising:

a markable substrate having provided thereon scoring means for entering the scores of at least one player on a hole-by-hole basis;
a plurality of graphic means provided on said markable substrate, each of said graphic means comprising a graphic depiction of the general layout of each golf hole of the golf course, and an associated graphic depiction of the boundary of the respective putting green of the hole to thereby depict the general shape of the respective green; and
at least one grain indicia means associated with each of the graphic depictions of the putting greens of the golf course, for indicating the direction of the grain of the grass on the respective green, each said grain indicia means comprising at least one direction-indicating marking positioned within the graphic depiction of the boundary of the respective putting green.

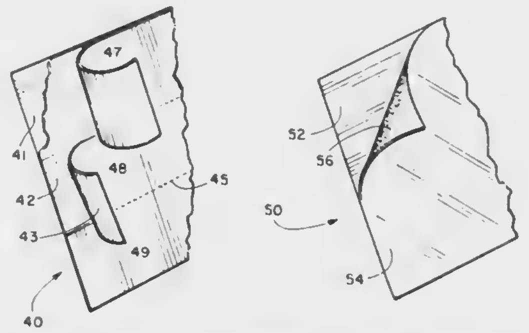
---

### 5,013,071
### FINGERPRINTING SYSTEM

**David K. Tremaine, P.O. Box 4556, San Diego, Calif. 92104**
**Filed Oct. 19, 1989, Ser. No. 423,389**
**Int. Cl.⁵ B42D *15/00***
**U.S. Cl. 283—69** **2 Claims**

1. An improved method of taking fingerprints comprising the following steps:

(a) providing a conventional fingerprint card having a top surface with a heading portion and a fingerprint portion printed thereon and placing the fingerprint card on a support surface with its top surface facing upwardly;
(b) providing a predetermined sheet having a bottom liner and a top liner and having a layer of adhesive material therebetween, removing the bottom liner to expose the layer of adhesive material and pressing it onto the fingerprint portion of the fingerprint card which causes the layer of adhesive material to adhere to the top surface of the fingerprint portion;
(c) removing the top liner from the layer of adhesive that is now adhered to the top surface of the fingerprint portion of the fingerprint card;

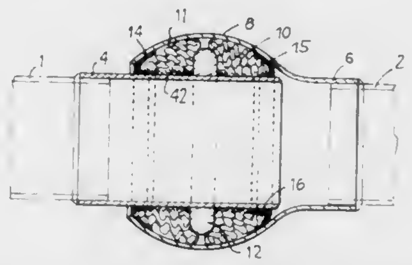


(d) applying fingerprint impressions of an individual to the fingerprint portion of the fingerprint card;
(e) providing a transparent sheet of plastic material having a bottom surface with a layer of adhesive thereon that is covered with a cover liner sheet, removing the cover liner sheet and applying the bottom surface of the plastic material to the top surface of said layer of adhesive material on the fingerprint portion of said fingerprint card.

---

### 5,013,072
### ARTICULATED TUBE CONNECTION, IN PARTICULAR FOR THE EXHAUST PIPEWORK OF A MOTOR VEHICLE

**Robert Roth, Hericourt, France, assignor to ECIA-Equipements et Composants Pour L'Industrie Automobile, Audincourt, France**
**Filed Nov. 29, 1989, Ser. No. 443,266**
**Claims priority, application France, Dec. 27, 1988, 88 17234**
**Int. Cl.⁵ F16L *55/02***
**U.S. Cl. 285—233** **11 Claims**



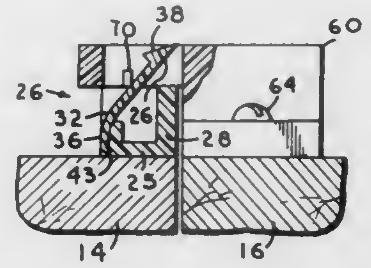
1. A connector for making an articulated fluid tight connection between two pipes, said connector comprising,

a cylindrical inner member joined with one of said pipes and having a radially projecting annular rib disposed intermediate its ends,
two annular pads surrounding said cylindrical inner member and disposed respectively on opposite sides of said annular rib,
an outer member comprising a cylindrical portion joined with the other of said two pipes and an integral enlarged portion forming an annular casing encasing said two annular pads an said annular rib, said casing being smoothly curved in axial section and having end portions encompassing said inner member with small gaps between said end portions of said casing and said inner member, and
gasket means for forming a fluid right seal between said casing and said inner member at at least on end of said casing,
said inner member, annular rib, annular pads, outer member and gasket means forming an articulated, fluid tight connection between said two pipes and constituting the sole connection between said two pipes.

---

### 5,013,073
### AUTOMATIC RESET WINDOW LATCH

**Harold T. Pehr, 3920 W. 96th St., Overland Park, Kans. 66207**
**Continuation-in-part of Ser. No. 277,288, Nov. 29, 1988, Pat. No. 4,925,041, which is a continuation of Ser. No. 160,571, Feb. 26, 1988, Pat. No. 4,787,526. This application May 14, 1990, Ser. No. 523,047**
**Int. Cl.⁵ F05C *3/14***
**U.S. Cl. 292—87** **7 Claims**



1. A latching mechanism adapted for use with a first closure member and a second closure member alternatively positionable in a closed alignment and an open alignment comprising:

(a) an elongate tongue connected at one end to the first closure member and having a barb extending outwardly from said tongue at an opposite end from where said tongue is connected to said first closure member;
(b) a bar attached to the second closure member and positioned such that when said first and second closure members are advanced to a closed alignment, said barb engages and overlaps said bar in an engaging relation so as to prevent said first and second closure members from being advanced to an open alignment;
(c) biasing means biasing said barb in engaging relation with said bar when said first and second closure members are in a closed alignment so as to resist the placement of said barb in a nonengaging relation with said bar;
(d) restraining means for selectively maintaining said barb in said nonengaging relation with said bar after said barb has been advanced out of said engaging relation with said bar so as to allow said first and second closure members to be advanced to an open alignment;
(e) automatic release means automatically releasing said barb from said restraining means when said first and second closure members are advanced to an open alignment so as to allow said barb to automatically engage said bar in said engaging position when said first and second closure members are subsequently advanced to a closed alignment.

---

### 5,013,074
### SUPPORT HANDLE

**Nicola Galle, Montreal, Canada, assignor to Nykon Products Inc., Montréal, Canada**
**Filed Feb. 20, 1990, Ser. No. 481,300**
**Int. Cl.⁵ B65D *23/10***
**U.S. Cl. 294—33** **4 Claims**

1. A holder for handling a bottle having a generally cylindrical body, said support comprising, in combination:

a vertical stem having an upper portion and a lower portion,
prehension means integrally projecting from the stem,
supporting means integrally projecting from the lower portion of said stem in a direction opposite to said prehension

VOL
1126
ISS
1
MY
7
1991
UMI

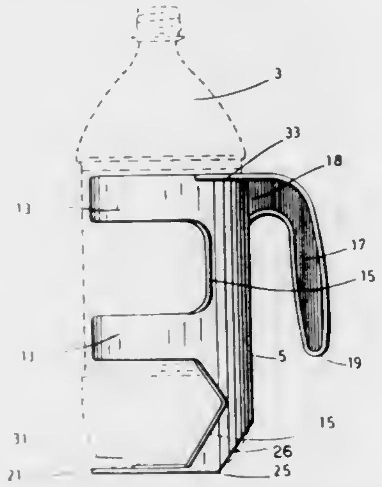
means, said supporting means being intended to support the bottle.

grasping means comprising two pairs of opposite arms made of a resilient material and extending above said supporting means, said arms integrally projecting from the stem and being intended to grasp and retain the bottle when said bottle is fitted in between said arms;

wherein, said stem is provided with an intermediate portion, one of said pairs of arms integrally projecting from the upper portion of the stem while the other pair of opposite arms integrally projects from the intermediate portion of the stem,

wherein the stem has a longitudinal axis and consists of a strip of resilient material having vertical edges, said strip being arcuate transversally with respect to said longitudinal axis, said strip having such a radius of curvature as to match the radius of the bottle cylindrical body,

wherein each arm of the grasping means consists of a strip of resilient material having opposite ends, one of said ends being integral with the corresponding vertical edge of the strip, said arm being arcuate transversally with respect to said longitudinal axis and having such a radius of curvature that when the bottle is fitted in between said arms, the arc of each arms is slightly disformed to increase its radius and thus follow the corresponding portion of the cylindrical body,



wherein the supporting means comprise a circular plate which extends perpendicularly to the stem,

wherein the prehension means consist of a handle having an upper end integral with the upper portion of the stem,

wherein the handle consists of an elongated member having opposite ends, one of said ends being integral and extending centrally with respect to the upper portion of the stem, said member being bent downwardly to have its other end positioned away from the stem, both ends of the elongated member extending in the same plane as said longitudinal axis;

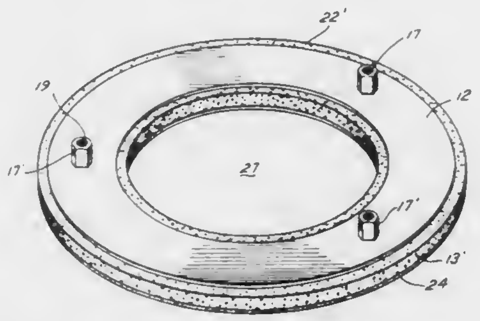
wherein the lower end of the stem is angularly cut off to form a bevel having a base line where it meets with the holder circular plate; said bevel being inclined inwardly sufficiently so that the holder may be tilted to rest on a supporting surface by said base line and by the other end of said handle with the center of gravity of the holder and bottle assembly lying between said base line and said other end,

wherein a part of the lower portion of the strip defining the stem and a part of the circular plate is cut off to define an aperture whose periphery define said second contact points

---

### 5,013,075
## VACUUM CUP CONSTRUCTION

**Edmund R. Littell, 81 High St., Winnetka, Ill. 60093**
**Continuation-in-part of Ser. No. 142,135, Jan. 11, 1988, Pat. No. 4,852,926. This application Jun. 19, 1989, Ser. No. 368,416**
**Int. Cl.$^5$ B25J *15/06*; B66C *1/02***
**U.S. Cl. 294—64.1** **30 Claims**



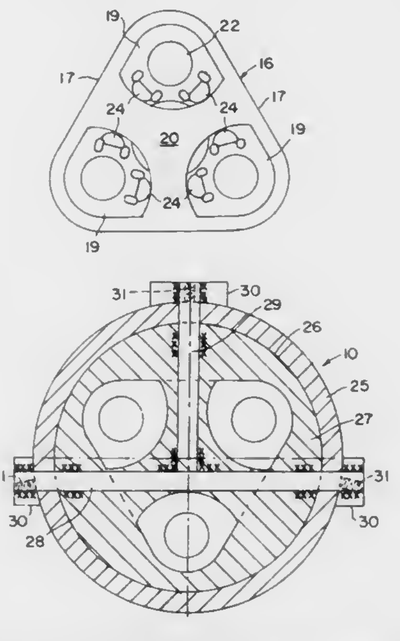
1. An improved vacuum cup construction comprising in combination:
   a. a first generally planar outer plate;
   b. a second, generally planar inner plate having an effective area which is less than that of the outer plate;
   c. a compressible generally planar sealing member between the outer and inner plates, the sealing member having an effective area greater than the inner plate area;
   d. a solid generally planar elastomeric member between the inner plate and the compressible sealing member, the solid elastomeric member having an effective area greater than the inner plate area;
   e. means for compressing the elastomeric member and the compressible sealing member between the outer plate and the inner plate and for deformation of the elastomeric member and the compressible sealing member therebetween, thereby forming a sealing edge about the periphery of the inner plate; and
   f. at least one vacuum passage extending from the inner side of the construction for connecting a vacuum source, whereby the construction may be positioned against a surface and a vacuum drawn to seal the sealing edge on the surface.

---

### 5,013,076
## LOCKING PLATE HOLDER FOR RAILROAD BEARING END CAPS

**Harry G. Robertson, Chicago, Ill., assignor to Railhead Corporation, Chicago, Ill.**
**Filed Dec. 27, 1989, Ser. No. 457,969**
**Int. Cl.$^5$ B60B *37/00***
**U.S. Cl. 295—42.2** **8 Claims**

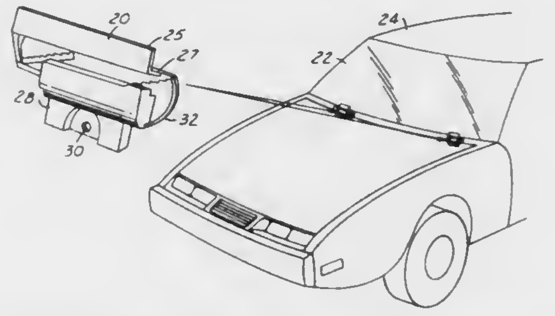
1. A removable holder for a locking plate of a railroad roller bearing assembly having an end cover providing a receiving well for the locking plate that is to be fastened therein by suitable cap screws torqued to a predetermined degree comprising;
   (a) a holder plate having a configuration corresponding to that of the receiving well of the bearing assembly and of a dimension equal to the inner dimension of the well so as to be secured therein against rotation created by the torque pressure applied to the cap screws, and
   (b) means provided by said holder plate for removably securing the same upon the locking plate as the the locking plate is secured in the receiving well against rotation in the direction of the torque applied to the cap screws fastening the plate to the bearing assembly.



---

### 5,013,077
## ADJUSTABLE SPACERS FOR SUPPORTING FRONT WINDOW GLASS IN AN AUTOMOBILE

**William T. Stevens, Rochester Hills, Mich., assignor to Automotive Moulding Company, Warren, Mich.**
**Continuation of Ser. No. 274,083, Nov. 21, 1988, Pat. No. 4,921,297. This application Feb. 5, 1990, Ser. No. 475,473**
**Int. Cl.$^5$ B60F *1/04***
**U.S. Cl. 296—96.21** **6 Claims**

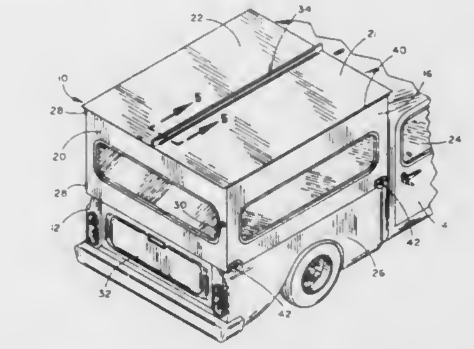


1. A spacer element for mounting a front window glass panel within a vehicle frame comprising:
   a bottom portion;
   a top portion;
   said bottom portion being formed with means to receive said top portion and allow said top portion to be incrementally advanced along said bottom portion;
   said bottom portion being formed with a rivet opening that will allow said bottom portion to be riveted to a vehicle frame;
   said top portion being formed with a support surface that will act to vertically support a window glass panel and a lateral support portion that will act to laterally support a window glass panel;
   said top portion being received within said bottom portion at any one of several distinct incremental positions, a first distance being defined as the distance from the rivet hole to said support surface formed on said top portion, said distance being measured along a line extending perpendicular to said support surface; and
   the incremental advancement of the top portion within the bottom portion causing lateral translation of said top portion relative to said bottom portion and allowing the adjustment of said first distance and the vertical adjustment of said lateral support portion in order to accommodate manufacturing tolerances between the spacer element or the vehicle frame or the window glass.

---

### 5,013,078
## TOPPER WITH PIVOTING ROOF PANELS

**Roger C. Eckerd, and Florence L. Beidler, both of Midwest Mobil Home, Box 740, Waukee, Iowa 50263**
**Filed Aug. 6, 1990, Ser. No. 563,536**
**Int. Cl.$^5$ B60P *7/02***
**U.S. Cl. 296—100** **5 Claims**



1. A container shaped cover for enclosing a box of a pick-up truck comprising:
   (a) a pair of oppositely arranged sidewalls supported on and extending the length of two side panels of the box;
   (b) a front wall secured to the front ends of said sidewalls;
   (c) a rear door hinged at one side edge to at least one of said sidewalls at a rear portion thereof;
   (d) a roof comprised of two laterally extending panels that normally lie on the top edges of said front and rear walls when in a closed condition to be supported by said front and rear walls; and
   (e) a hinge means for connecting the outer side edges of said roof panels to said sidewalls to permit each of said panels to be pivoted about said hinge means approximately 270° so that each of said panels is positioned in a surface-to-surface relationship with one of said sidewalls when in an open condition.
   (f) coacting means associated with said roof panels to inhibit the passage of moisture therebetween when they are in a closed condition, said coacting means comprised of:
   (1) a flange on the side edge of one of said roof panels; and
   (2) a channel on the side edge of the other of said roof panels for receiving said flange.

---

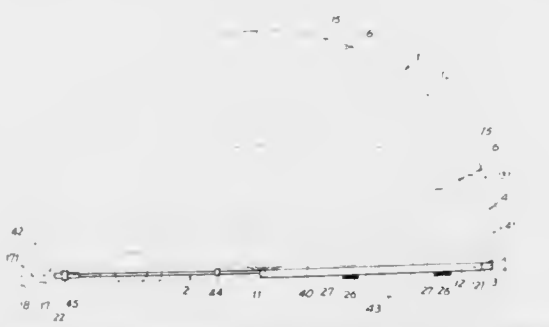
### 5,013,079
## TELESCOPICALLY-OPERATED VEHICLE CANOPY

**Chao-Chuan Ho, P.O. Box 10160, Taipei, Taiwan**
**Filed Nov. 27, 1989, Ser. No. 441,625**
**Int. Cl.$^5$ B60J *11/00***
**U.S. Cl. 296—136** **16 Claims**

1. An automatic vehicle canopy comprising:
   a canopy means including a canopy cloth secured on a plurality of ribs normally respectively stored in a pair of side troughs and a rear trough telescopically formed on a rear bottom portion of a vehicle body and retractably positioned under the rear bottom portion within a contour of the vehicle body;
   a telescopic means having a driving rod pivotally formed on a bottom portion of said vehicle body for operatively

VOL
1126
ISS
1
MY
7
1991
UMI

extending said telescopic means and said canopy means horizontally outwardly to separate said telescopic means and said canopy means from the vehicle body, and for operatively retracting the canopy means inwardly to be positioned under the bottom portion of said vehicle body; and



a canopy operating means having a rotating rod pivotally formed on a middle bottom portion of said vehicle body for operatively extending said canopy cloth of said canopy means for shielding said vehicle body, and for folding said canopy means towards the rear bottom portion of said vehicle body.

---

### 5,013,080
### DEVICE FOR COMPENSATING FOR SLEWING INDUCED IN A MOVING MOTOR VEHICLE BY GUSTS OF CROSS-WIND

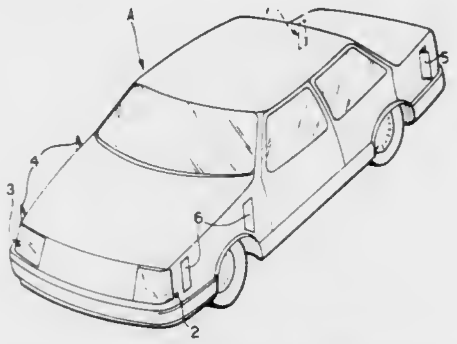
**Angelo Garrone, Cascine Vica-Rivoli, and Marco Masoero, Fiano, both of Italy, assignors to Fiat Auto S.p.A., Turin, Italy**

**Filed Feb. 17, 1988, Ser. No. 156,631**

**Claims priority, application Italy, Feb. 17, 1987, 67106 A/87**

**Int. Cl.$^5$ B62D** *37/02*

**U.S. Cl. 296—180.1** **6 Claims**



1. A device for compensating for slewing induced in a land motor vehicle moving in one direction by gusts of wind transverse that direction, including:

pressure sensor means arranged on opposite sides of the land motor vehicle relative to the said direction and able to generate a signal which is indicative of the presence of a gust and of the direction of the gust, and

flap means movably mounted on opposite sides of the motor vehicle and able to induce in the moving land motor vehicle slewing movements in opposite directions, the flap means being operatively connected to the sensor means so that, in the event of a gust, a slewing movement is induced in the moving land motor vehicle in the opposite direction to the slewing induced by the gust.

---

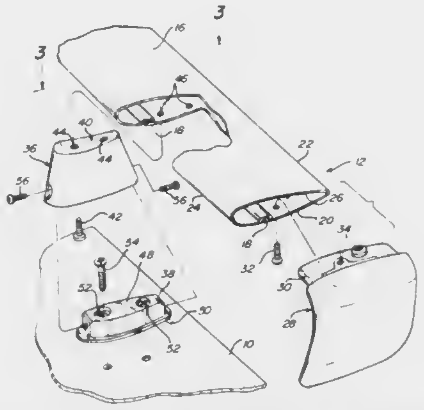
### 5,013,081
### VEHICLE SPOILER CONSTRUCTION

**Gary M. Cronce; Ronald W. Reid; Craig A. Stapleton, and Robert S. Zauner, all of Port Huron, Mich., assignors to Huron/St. Clair Incorporated, Port Huron, Mich.**

**Filed Mar. 13, 1990, Ser. No. 493,084**

**Int. Cl.$^5$ B62D** *37/02*

**U.S. Cl. 296—180.1** **11 Claims**



1. An aerodynamic spoiler adapted to be mounted to a surface of a vehicle, said spoiler comprising:

at least one base member secured to the vehicle surface using first fasteners extending through said at least one base member into the vehicle surface, said at least one base member including a peripheral flange and a reduced circumference boss;

a support member mounted to said at least one base member, said support member matingly receiving said boss of said at least one base member, the circumferential configuration of said support member substantially identical to the circumferential configuration of said peripheral flange such that said flange prevents contact between said support member and the vehicle surface

a substantially hollow elongated body mounted to said support member using second fasteners extending through said support member into said hollow body, said elongated body having open ends; and

an end cap member matingly received in each of said open ends of said elongated body.

---

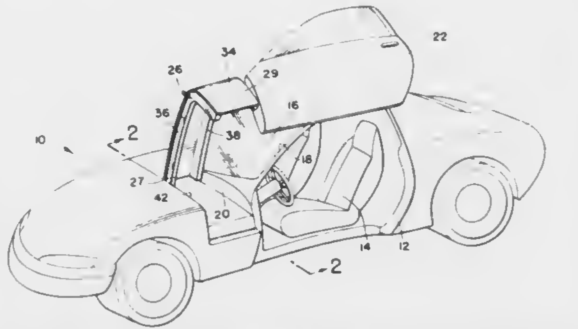
### 5,013,082
### DOOR OPENING SYSTEM

**Franklin D. Landmesser, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jul. 26, 1990, Ser. No. 558,276**

**Int. Cl.$^5$ B60J** *5/04*

**U.S. Cl. 296—202** **4 Claims**



1. The combination comprising: a motor vehicle having a door opening adjacent an occupant seat and a cowl structure extending transversely across the vehicle body forward of a fixed windshield, a door for closing the door opening, a door support arm having an inboard end pivotally mounted on the cowl structure and an outboard end connected to the door so that pivotal movement of the support arm swings the door bodily between a lowered closed position and raised opened position.

---

### 5,013,083
### ROOF MOLDING FOR USE WITH AUTOMOBILE AND CLIPS FOR SECURING THE SAME

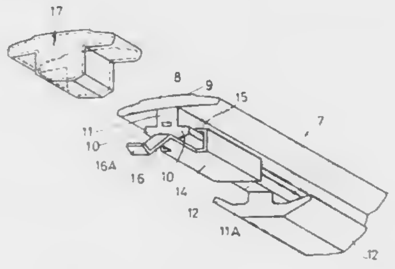
**Yukihiko Yada, Nagoya, and Toshio Hirose, Handa, both of Japan, assignors to Tokai Kogyo Kabushiki Kaisha, Obu, Japan**

**Filed Jul. 17, 1990, Ser. No. 553,338**

**Claims priority, application Japan, Jul. 25, 1989, 1-87201**

**Int. Cl.$^5$ B60D** *25/06*

**U.S. Cl. 296—213** **8 Claims**



1. A roof molding to be fitted in a groove formed along a joint line joining a roof panel to a roof side panel of an automobile said groove having side walls, comprising:

a top member to cover said groove;

a base member formed on the lower surface of said top member, said base member having a reinforcement member embedded therein and having flanged portions formed on both sides thereof;

resilient leg members connected to said base member, said leg member being transversely oppositely projected relative to each other so as to contact the side walls of said groove, said leg member being omitted at both end portions of said base member to form clip engaging surfaces thereon; and

clips secured to said clip engaging surfaces of said base member.

---

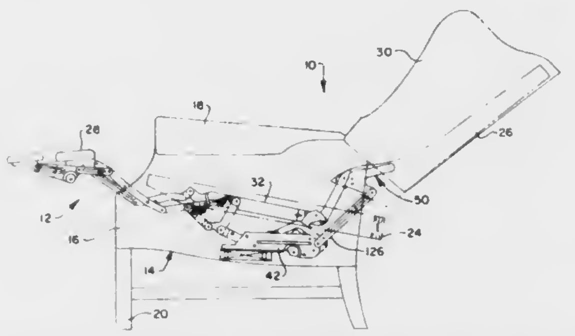
### 5,013,084
### MECHANISM FOR HIGH-LEG RECLINING CHAIR

**Teddy J. May, Tupelo, Miss., assignor to Action Industries, Inc., Tupelo, Miss.**

**Filed Apr. 6, 1989, Ser. No. 334,221**

**Int. Cl.$^5$ A47C** *1/02*

**U.S. Cl. 297—85** **4 Claims**



1. A mechanism for a high-leg recliner chair which, when mounted as a pair with a mirror-image duplicate thereof at the left and right between a chair base with generally horizontal, longitudinally extending left and right arms and a set of depending legs for supporting the chair on a floor, a seat, a back, and an ottoman, provides a push-on-the-arms-type of operation which permits the chair to have a fully erect position with the back up and ottoman retracted, a TV position with the back remaining at least somewhat erect but the ottoman extended, and a fully reclined position with the back more nearly tilted down at its top than in the TV position and the ottoman remaining extended, in which the mechanism, insofar as it is under the seat, is out of sight in use, and can be used to provide either two-way or three-way operation, by alternate positioning of a single pivot joint, said mechanism comprising:

a long upper longitudinal seat-mounting link; means for fastening the long upper longitudinal link to a respective side of said seat of the said chair; said long upper longitudinal link having a rear portion which projects upwardly thereby providing a spur;

a base-mounting bracket comprising a link folded along a longitudinal axis fold line so as to have an outboard, vertically oriented, longitudinally extending flange and a generally horizontal, inboard-extending flange at the lower extent of said vertically oriented flange; means for fastening said base mounting bracket to a respective side of said chair base; said vertically oriented flange being located inboard of a central portion of said long upper longitudinal link;

a V-shaped back-mounting link having forward leg and a rear leg which have respective upper ends and join at a lower end; a first transverse, horizontal axis pivot joint connecting said lower end of said back-mounting link to an upper end of said spur of said long upper longitudinal link; means for fastening said back-mounting link to a respective edge of a chair back;

a primary ottoman-mounting bracket comprising a link folded along a line which is substantially vertical when said ottoman is fully retracted, so as to have a rearwardly projecting longitudinal flange and, at a forward margin of said rearwardly projecting longitudinal flange, an inboard-projecting flange provided with means for fastening said primary ottoman-mounting bracket to a respective end of a primary ottoman;

a multiple-link lazy-tongs-type linkage provided at a front end of said seat-mounting link for mounting said primary ottoman-mounting bracket to said seat-mounting link; said linkage comprising an upper forward link, a lower forward link, an upper rear link and a lower rear link; said upper and lower forward links having respective forward ends connected, with vertical spacing between them, to said longitudinal flange of said primary ottoman-mounting bracket by respective second and third transverse, horizontal axis pivot joints; said upper and lower rear links having respective rear ends connected one in front of and above the other, to a forward end portion of said seat-mounting link by respective fourth and fifth pivot joints;

a sixth transverse, horizontal axis pivot joint is provided at a site where the upper forward link crosses the upper rear link, located part way down from the upper ends of these links; the lower front link having a lower end connected to a lower end of the upper rear link by a seventh transverse, horizontal axis pivot joint; a lower end of the upper front link being connected to a lower end of the lower rear link by an eighth transverse, horizontal axis pivot joint;

an inboard-extending pin provided on the upper rear link part way back from its upper end being available to engage an upper edge of the upper front link alternatively at two longitudinally spaced sites to provide respective stops limiting retraction and extension of the lazy tongs-type linkage as the primary ottoman is stowed and extended;

said seat-mounting link being provided with front and rear depending links respectively connected at upper ends thereof to the central portion of the seat-mounting link by a ninth transverse, horizontal axis pivot joint, and to the base of said spur near the rear end of the seat-mounting link by a tenth transverse, horizontal axis pivot joint;

VOL
1126
ISS
1
MY
7
1991
UMI

the front depending link being generally L-shaped, with a depending stem and a lower leg projecting forwards; a forward end of the lower leg of the front depending link including an angled downwards toe on which is provided an eleventh transverse, horizontal axis pivot joint;

an ottoman lazy tongs operator link having a rear, lower end connected to the toe of the front depending link by said eleventh pivot joint and a front, upper end connected to a site on the lower rear link of the lazy tongs-type linkage part-way down from the upper end of said lower rear link, by a twelfth transverse, horizontal axis pivot joint, so that when the front depending link swings forwards about its upper end, said operator link has its rear, lower end pushed towards the fourth and fifth pivot joints by which the upper and lower rear links are connected to the seat-mounting link, thereby extending the lazy tongs-type linkage and thrusting the primary ottoman, with a reverse sequence happening as the front depending link swings rearwards about its upper end;

above said first pivot joint, said back-mounting link being provided with an inboard-projecting pin which is available to engage a rear edge of said spur above said first pivot joint as the chair is erected, for defining the location of the back in the fully erect position of the chair and helping to maintain the back tightly in place in a closed position of the mechanism;

an operator link for the back-mounting link; said back-mounting link operator link having an upper end connected to the upper end of the rear leg of the back-mounting link by a thirteenth transverse, horizontal axis pivot joint, and a lower end connected to the rear end of the vertical, longitudinal flange of the base-mounting bracket by a fourteenth transverse, horizontal axis pivot joint so that when the base-mounting bracket translates forwards relative to the seat-mounting link, and the latter tips upwards to the front slightly as the mechanism opens from a fully closed to a TV position, the back-mounting link operator link mainly merely pivots forwards around its upper end, but also is pulled slightly downwards in a translational sense, so that the back-mounting link tilts slightly to the rear, thus slightly tilting the back of the chair;

the upper end of the rear depending link being provided with a rearwardly extending prong; the seat-mounting link being provided at the base of the spur, behind and below the tenth pivot joint connecting the upper end of the rear depending link to the seat-mounting link, with an inboards-extending pin which is engageable with a lower edge of said prong to limit forwards swinging of the rear depending link, and therefore the front depending link and the seat-mounting bracket, relative to the seat-mounting link, as the mechanism opens from the closed to the TV position thereof;

a longitudinally short contral link connected by an upper, rear end thereof to the vertical longitudinal flange of the base-mounting bracket part way forwards from the rear end of the base-mounting bracket, below the inboards-extending flange of the base-mounting bracket, by a fifteenth transverse, horizontal axis pivot joint; and outer portion of said short control link being provided with a slot, elongated along the length of said short control link, and a sliding, pivotal connection being provided between such portion and the lower end of the rear depending link by a sixteenth transverse, horizontal axis pivot joint which can slide along said slot, so that when the mechanism is closed, the short control link projects downwards and slightly forwards and the sixteenth pivot joint is located at the upper end of the slot, as the mechanism opens from the closed position to the TV position, the short control link pivots forwards about its upper end as the sixteenth pivot joint slides to the bottom of the slot;

three arcuate-shaped links, namely a forward long arcuate link, which is concave upwards, a rear long arcuate link, which is concave downwards, and, under the rear half of the rear long arcuate link, a rear short arcuate link, which is concave upwards;

the forward, upwardly concave arcuate link being connected in a central elbow region thereof to the vertical longitudinal flange of the base-mounting bracket near the fold line of the base-mounting bracket, part-way back from the front end of the base-mounting bracket, by a seventeenth transverse, horizontal axis pivot joint;

the front end of the forward long arcuate link being connected to a base of an upright standard of the front depending link by an eighteenth transverse, horizontal axis pivot joint;

an inboards-projecting pin provided on a front arm of the forward long arcuate link part-way forwards along that arm from the seventeenth pivot joint, so as to engage in the closed and TV positions of the mechanism on a recessed upper edge region of the vertical longitudinal flange of the seat-mounting bracket;

a forward end of the rear short upwardly concave link being connected to the rear depending link part-way up from the lower end of the latter, by a nineteenth transverse, horizontal axis pivot joint;

the rear short upwardly concave link being provided so as to remain substantially immobile as the mechanism moves between its fully closed and TV positions, with an outboards-projecting pin provided on the vertical, longitudinal flange of the base-mounting bracket engaging a lower edge of the rear, short upwardly concave link behind the fifteenth pivot joint;

the rear long arcuate link having a rear end connected to the rear end of the rear short upwardly concave link by a twentieth transverse horizontal axis pivot joint and a front end connected to the rear end of the forward concave-upwards arcuate link by a twenty-first transverse, horizontal axis pivot joint; said three arcuate links being provided so as to remain substantially immobile as the mechanism moves between its closed and TV positions, and, as the mechanism moves from the TV position to the fully reclined position, the forward, upwardly arcuate link being arranged to rock towards the rear about said seventeenth pivot joint, thus raising the front of the seat-mounting link relative to the base-mounting bracket, shifting the rear, downwardly concave link rearwards, thereby raising the rear of the seat-mounting link, the raising of the rear of the seat-mounting link pulling down the lower end of the back-operating link, thereby fully reclining the chair back; and

a tension coil spring mounted between two pins respectively provided on the seat-mounting link ahead of the ninth pivot joint and an intermediate location on the ottoman lazy tongs operator link acts as the primary ottoman is retracted to keep the primary ottoman firmly retracted in its stowed position;

said mechanism being adaptable to two alternative uses to provide either two-way operation in which the angle between the seat and back remains substantially constant as the mechanism moves from its TV position to its fully reclined position and back, or three-way operation in which the angle between the seat and back increases as the mechanism moves from its TV position to its fully reclined position and decreases as the mechanism moves from its fully reclined position to its TV position, by further including:

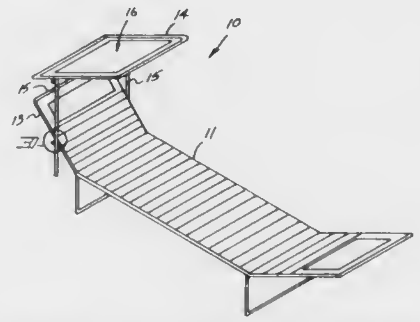
a first pair of transverse, horizontal axis openings respectively provided through said rear short upwardly concave arcuate link at a central bend thereof and the vertical, longitudinal flange of said base-mounting bracket at the rear end of the latter, below the connection of the lower end of the back-operating link to that flange; said openings of said first pair being axially aligned transversally of the mechanism when said mechanism is in said closed and TV positions thereof;

a second pair of transverse, horizontal axis openings respectively provided through said rear short upwardly concave arcuate link approximately midway between said nineteenth pivot joint and the respective said opening of said first pair through said rear short upwardly concave arcuate link, and the vertical, longitudinal flange of said base-mounting bracket; said openings of said second pair being axially aligned transversally of the mechanism when said mechanism is in said closed and TV positions thereof; and

a twenty-second transverse, horizontal axis pivot joint installed through one of said first and second pairs of transverse, horizontal axis openings.

---

### 5,013,085
### LOUNGE CHAIR CANOPY CONSTRUCTION
**John R. Craig, Rte. 6, Box 618, Albemarle, N.C. 28001**
**Filed Nov. 20, 1989, Ser. No. 439,161**
**Int. Cl.$^5$ A47C *7/10***
**U.S. Cl. 297—184** **3 Claims**



1. A lounge chair canopy construction comprising,

a chair including a chair tubular framework, and

a canopy overlying the chair framework including a canopy framework with a translucent visor member integrally secured interiorly of and coextensive with the canopy framework, and

spaced tubular framework arms integrally secured to the canopy framework extending downwardly therefrom with proximate upper ends of the arms secured to the canopy framework, and

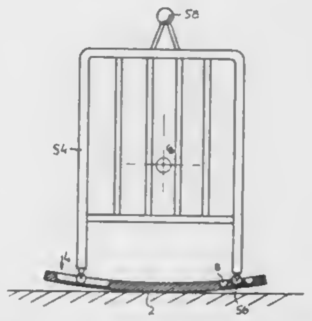
adjustable clamp means mounting the arms to the chair framework proximate lower ends of the arms, and

the clamp means clamping each arm of the chair framework wherein the clamp means include a plurality of coaxially aligned clamp members to receive a respective chair framework and a respective arm therein, and

wherein the clamp members include a first cylindrical connector block including a first semi-cylindrical recess formed in a rear face thereof, and first serrations formed on a forward face thereof, and a second cylindrical connector block formed with second serrations cooperating with the first serrations, and the second cylindrical connector block including a second semi-cylindrical recess formed on a forward face thereof, and a third cylindrical connector block formed with a third semi-cylindrical recess formed on a rear face thereof, the second and third semi-cylindrical recesses clamping a canopy arm therebetween, and the first semi-cylindrical recess configured for receiving a portion of the chair framework therewithin, and an elongate bolt directed through the chair framework and coaxially through each of the first, second, and third cylindrical connector blocks with a coil lock spring coaxially aligned with a forward face of the third cylindrical connector block, and a washer formed with a central bore overlying the coil spring, and a wing nut threadedly secured to a forward distal end of the elongate bolt to clamp the chair framework and the canopy arm within the connector blocks, and the elongate bolt including an enlarged head to secure the chair framework to the first cylindrical connector block.

---

### 5,013,086
### ROCKER
**Yoram Benzur, 34 Ha-arbah Street, Pisgat Zev, Jerusalem, Israel**
**Filed May 10, 1989, Ser. No. 349,863**
**Claims priority, application Israel, May 15, 1988, 86385**
**Int. Cl.$^5$ A47D *1/08***
**U.S. Cl. 297—272** **8 Claims**



1. Apparatus for converting a crib having generally vertically extending legs into a rocking cradle, said apparatus comprising:

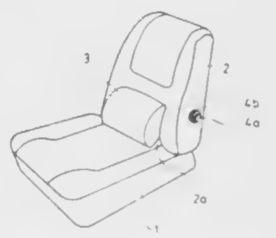
first and second generally arc shaped members each having a generally convex bottom surface adapted for rocking motion, each of said generally arc shaped members being formed with first and second crib leg receiving recess means,

said first crib leg receiving recess means comprising at least one first leg receiving recess configured to removably receive the leg of a crib and to releasably retain it in substantially non-slidable relationship relative to the arc shaped member along the arc thereof,

said second crib leg receiving recess means comprising at least one second leg receiving recess which is substantially wider than said first leg receiving recess along said arc, thereby to accomodate cribs having varying separations between the legs thereof.

---

### 5,013,087
### SEAT HAVING ADJUSTABLE LUMBAR SUPPORT
**Youetsu Nagasaka, Fujisawa, Japan, assignor to Shiroki Corporation, Fujisawa, Japan**
**Filed Jul. 25, 1989, Ser. No. 384,616**
**Claims priority, application Japan, Mar. 31, 1989, 1-38046**
**Int. Cl.$^5$ A47C *7/40***
**U.S. Cl. 297—284** **13 Claims**



1. A seat, comprising:

a seat cushion;

a seat back connected to said seat cushion, a space being formed within a lower portion of said seat back;

a rod rotatably interposed between oppositely disposed side frames of said seat back;

a hip support secured upon an intermediate portion of said rod and disposed within said space provided within said seat back;

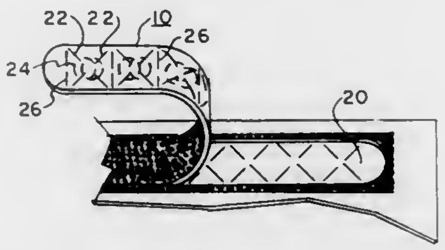
a support board disposed upon a support plate provided within said hip support in such a manner as to be vertically

VOL
1126
ISS
1
MY
7
1991
UMI

movable along said support plate in order to engage different lumbar regions of a person seated within said seat;
first operation handle means operatively connected to said support board for moving said support board upwardly and downwardly along said support plate; and
second operation handle means for rotating said rod by means of a brake mechanism so as to move said hip support in a forward and backward mode relative to said space defined within said seat back.

---

### 5,013,088
## DISINTEGRATABLE MASKING LABEL
**Thomas C. Marin, Willow Grove, Pa., assignor to Data Tech Servies, Inc., West Point, Pa.**
**Filed Dec. 22, 1989, Ser. No. 455,097**
**Int. Cl.$^5$ B42D** *15/00*
U.S. Cl. 283—81 9 Claims

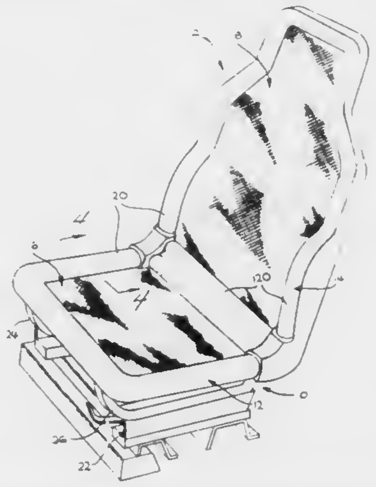


1. A disintegrating tamper-proof label for masking the contents of written or printed matter comprising:
a label having an opaque coating and further having a removable adhesive backing for adhering said opaque paper label over written or printed matter to be masked and permitting said label to be removed without destroying said written or printed matter to be masked,
said making label further having a plurality of cuts extending radially outward from the center of the label such that when said label is removed from said masked written or printed matter, said label fragments and disintegrates thereby evidencing the tampering of said label.

---

### 5,013,089
## THIN PROFILE INTEGRATED SUSPENSION AND SEAT TRIM COVER
**Ismat A. Abu-Isa, Rochester; Susan C. Moran, Fraser, and Michael A. Roy, Troy, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Continuation-in-part of Ser. No. 409,556, Sep. 15, 1989, abandoned. This application Aug. 15, 1990, Ser. No. 567,590**
**Int. Cl.$^5$ A47C** *7/02*
U.S. Cl. 297—452 8 Claims

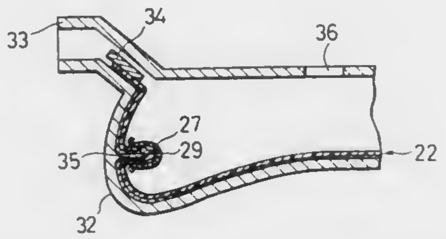
1. A seat assembly, such as a vehicle seat assembly, having a seat frame and a low profile seat suspension stretched across and attached to the frame, the improvement being that said seat suspension comprises a mat including first and second knitted layers of yarn each having a looped interlock stitch construction throughout to define laterally spaced longitudinally extending rows of looped stitches,
elastomeric filament means inserted laterally across said rows of stitches at a predetermined longitudinal frequency and with alternate rows of said stitches being disposed on opposite sides of said elastomeric filament means to prevent any significant displacement of said filament means longitudinally of said mat,
said elastomeric filament means being made from a block copolymer material having a diameter between 0.10 to 2.0 millimeters, a high tensile strength and a modulus of elasticity at 100 percent elongation which is at least twice that of natural rubber,
said layers being interknitted with each other throughout a central portion of said mat to provide a double knit construction and having knitted side edge portions which are attachable to said seat frame, said mat being prestretched to at least 5% elongation when attached to said frame



whereby said seat suspension mat has a thin profile and functions both as a support and as an aesthetic trim cover.

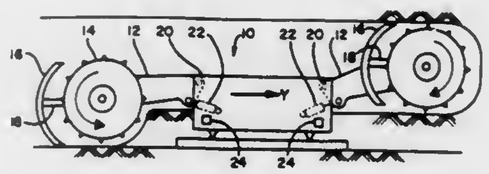
---

### 5,013,090
## SKIN COVERED FOAMED PLASTIC SEAT WITH IDENTATIONS
**Ichiro Matsuura, Ayase, Japan, assignor to Ikeda Bussan Co., Ltd., Kanagawa, Japan**
**Filed Sep. 20, 1989, Ser. No. 410,079**
**Claims priority, application Japan, Oct. 25, 1988, 63-139142[U]**
**Int. Cl.$^5$ A47C** *7/18*
U.S. Cl. 297—452 8 Claims



1. A skin covered foamed plastic seat, comprising:
a pad member made from liquid foam resin having at least one indentation;
a skin cover covering a surface of the skin covered foamed plastic seat and having sewed up portions located at the indentation of the pad member; and
a clip attached to the sewed up portions of the skin cover, the clip having a plurality of holes connecting an inner side of the clip with an outer side of the clip for allowing penetration of the liquid foam resin and extension of the pad member into the inner side of the clip, the clip having an approximate horseshoe shaped cross section, where in the sewed up portions are tightly gripped by, and are inserted into the inner side of the clip, said sewed up portions being pinched between opening ends of the horseshoe shaped cross section.

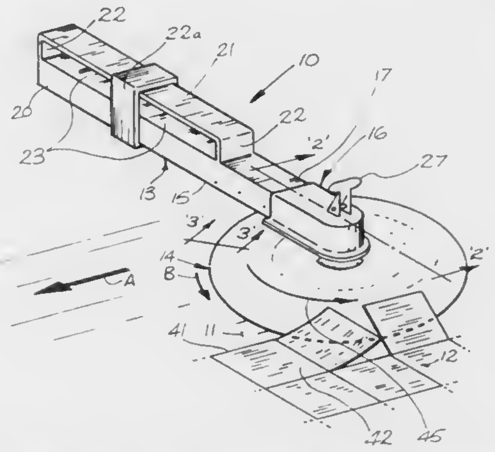
### 5,013,091
## METHOD OF INDIRECT MEASUREMENT OF COWL POSITION ON A LONGWALL SHEARER
**Stephen L. Bessinger, Morgantown, W. Va., and Michael G. Nelson, Fairbanks, Ak., assignors to Consolidation Coal Company, Pittsburgh, Pa.**
**Filed Dec. 22, 1989, Ser. No. 455,102**
**Int. Cl.$^5$ E21C** *35/20*
U.S. Cl. 299—1 3 Claims



1. In a longwall shearer having a cowl rotatably supported on a ranging arm, said ranging arm pivotably supported on the shearer by apparatus including a clevis pin and a lift cylinder, the method of determining the rotated position of the cowl on the ranging arm by sensing the load on at least a portion of said apparatus.

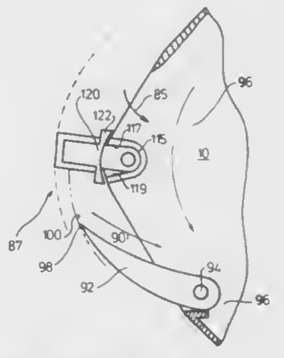
---

### 5,013,092
## SURFACE STRIPPING DEVICE
**Nicholas Kulhawy, 5919-5th Street S.E., Calgary, Alberta, Canada T2H 1L5**
**Filed Jun. 18, 1990, Ser. No. 539,705**
**Claims priority, application Canada, Sep. 28, 1989, 613822**
**Int. Cl.$^5$ A47L** *11/14;* **B26B** *3/08*
U.S. Cl. 299—40 15 Claims



1. A stripper device for removing a covering from a flat surface, said device comprising
a stripper blade including a disk member having an upper convex surface intersecting a lower surface at a shallow angle in a horizontal plane to form a circular peripheral shearing edge,
said disk member having a central axis extending substantially normal to the plane of said periphery,
a blade carrier frame member for forcing said blade over the surface,
mounting means attaching said blade under said frame for free-wheeling rotation of said disk member relative to said frame about said axis.

### 5,013,093
## UNIVERSAL RIPPER MINER
**Roger J. Morrell, Bloomington, and David A. Larson, Minneapolis, both of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**
**Filed May 4, 1989, Ser. No. 351,134**
**Int. Cl.$^5$ E21C** *29/30*
U.S. Cl. 299—67 10 Claims



1. A ripper miner comprising:
a movable cutter head having a cyclical cutting cycle traversing an arcuate angle in a generally vertical plane;
a material drag cutter having a bit holder and at least one removable material engaging bit insert therein, said drag cutter being mounted on said cutter head and extending therefrom, said drag cutter being movable with the head to engage the material to be cut with its removable bit during the cutting cycle;
machine frame means for mounting the cutter head to the miner;
first means for moving the cutter head and drag cutter with respect to said frame means from its initial position in the aforesaid cyclical arcuate motion and then returning the bit to its original position to provide for removable bit entrance and exit into the material;
material collection and transfer means mounted on the cutter head and frame means for temporarily collecting and storing collected cuttings before they reach the mine floor;
wherein said at least one bit insert is a substantially circular bit having a substantially circular cutting edge, and means for mounting the bit to the bit holder, wherein said mounting means is operable to enable rotation of the bit to expose a fresh cutting edge to the material being cut by advancement of the fresh cutting edge into the generally vertical plane without removal of the bit from the mounting means.

---

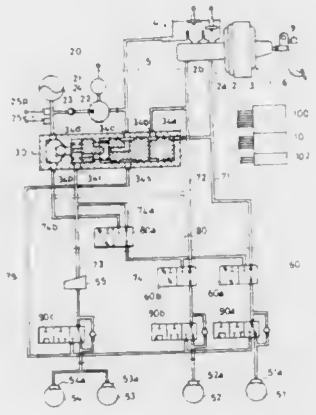
### 5,013,094
## HYDRAULIC BRAKING SYSTEM
**Michiharu Nishii, Toyota; Genji Mizuno, Toyoake; Hideo Mizukoshi, Hazu; Satoshi Ishida, Chiryu, and Kyousuke Hata, Kariya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**
**Filed Aug. 25, 1989, Ser. No. 398,527**
**Claims priority, application Japan, Aug. 25, 1988, 63-210932**
**Int. Cl.$^5$ B60T** *8/32*
U.S. Cl. 303—52 6 Claims

1. A hydraulic braking system comprising:
a reservoir for brake fluid,
a master cylinder having at least a pair of pressure chambers for pressurizing and transmitting the brake fluid of said reservoir as a brake hydraulic pressure in response to actuation of a brake pedal,
a plurality of wheel cylinders connected and communicating with said master cylinder through a plurality of hydraulic circuits,
an auxiliary hydraulic pressure generator provided with a

VOL
1126
ISS
1
MY
7
1991
UMI

power hydraulic pressure source for increasing the brake fluid of said reservoir to a determined pressure and transmitting the power hydraulic pressure, said auxiliary hydraulic pressure generator being connected to at least one hydraulic circuit of said plurality of hydraulic circuits, and

regulator means comprising: a housing having at least four ports which individually are connected to at least one of said pressure chambers of the master cylinder, said reservoir, said power hydraulic pressure source, and at least one of said wheel cylinders; piston means for providing a pressure chamber connected to at lest a first one of the pressure chambers of the master cylinder and a pressure control chamber connected to at least one of said wheel cylinders; and valve means for controlling communication between said power hydraulic pressure source and said reservoir, wherein said regulator means controls the output power hydraulic pressure of said power hydraulic pressure source in response to the output brake hydraulic pressure of said master cylinder.



### 5,013,095
### DUAL-CIRCUIT HYDRAULIC BRAKE CIRCUIT

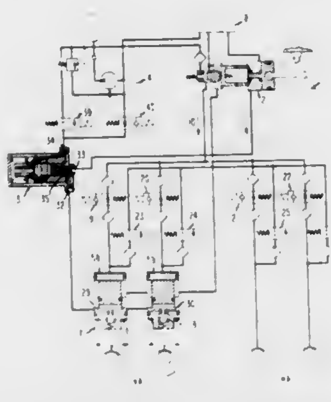
**Erich Reinecke, Burgdorf, Fed. Rep. of Germany, assignor to Wabco Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany**

**Filed Oct. 13, 1989, Ser. No. 421,036**

**Claims priority, application Fed. Rep. of Germany, Oct. 22, 1988, 3836079**

**Int. Cl.$^5$ B60T** *8/42*

**U.S. Cl. 303—113** **37 Claims**



1 A dual-circuit hydraulic brake system, said dual-circuit hydraulic brake system comprising:

(a) at least one servo cylinder, said at least one servo cylinder including:
  (i) a master receptacle disposed therein adjacent to a first end of the servo cylinder which receives a first portion of a pressure medium therein during a brake application, and
  (ii) an annular receptacle disposed therein intermediate to said first end of the servo cylinder, and a second end of the servo cylinder which receives a second portion of said pressure medium during an unregulated brake application;
(b) a hydrostatic circuit connected to communicate said second portion of said pressure medium to said annular receptacle in said at least one servo cylinder during said unregulated brake application;
(c) a servo circuit connected to communicate said first portion of said pressure medium to said master receptacle in said at least one servo cylinder during said brake application, said at least one servo cylinder separates said hydrostatic circuit from said servo circuit;
(d) an electrically controlled anti-locking brake system having at least two solenoid-controlled valves disposed in said servo circuit for controlling said first portion of said pressure medium being communicated to said master receptacle in said at least one servo cylinder during said brake application;
(e) a volume receptacle means disposed in said hydrostatic circuit for absorbing at least a portion of said second portion of said pressure medium present in said annular receptacle in said at least one servo cylinder when said dual brake application by said electrically controlled anti-locking brake system; and
(f) a means disposed in said volume receptacle for varying a volume capacity of said volume receptacle.

### 5,013,096
### ANTI-LOCK BRAKE SYSTEM WITH TRACTION SLIP CONTROL

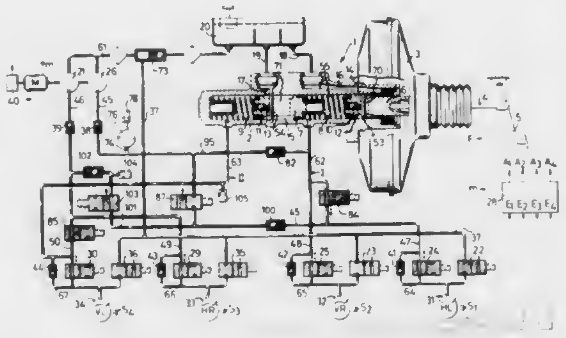
**Norbert Ocvirk, Offenbach, and Lutz Weise, Mainz, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 18, 1989, Ser. No. 423,067**

**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1988, 3837315**

**Int. Cl.$^5$ B60T** *13/68*

**U.S. Cl. 303—116** **4 Claims**



1. An anti-lock brake system with traction slip control comprising a pedal-actuated, auxiliary-force-assisted braking pressure generator having a master cylinder with at least two chambers, to which wheel brakes are connected by way of main brake lines, and having auxiliary-pressure hydraulic pumps, and wheel sensors and electronic circuits for determining the wheel rotational behavior and for generating electric braking-pressure control signals which, for the purpose of slip control, control electromagnetically actuatable pressure-fluid inlet valves and outlet valves, with the main brake lines communicating by way of supply lines with the pumps, whose suction ports are connected to a supply reservoir by way of a suction lines, a valve inserted into one of the supply lines by way of which pressure fluid is delivered into the connected main brake line for the purpose of traction slip control, wherein the portion of the supply line (**45, 46**) interconnecting the pump (**21, 26**) and the valve (**86, 87, 93**) is connected with one of the chambers of the master cylinder by way of a bypass line (**95, 96**), and wherein a pressure-relief valve (**82, 83**) is interposed into the bypass line (**95, 96**) which permits the delivery of pressure fluid through the bypass line into the main brake line after a minimum pressure is exceeded, but which precludes pressure fluid flow in opposite direction, and wherein a pressure-fluid accumulator is in communication with said bypass line, into which fluid is supplied by the pump until attainment of the minimum pressure, wherein branch lines branch off from a main supply line downstream of the valve and lead to other supply lines, and wherein downstream of the branch point one non-return valve opening towards the main brake lines is inserted into the main supply line and one non-return valve opening towards the main brake lines is inserted into the branch lines.

### 5,013,097
### ANTI-SKID APPARATUS FOR A VEHICLE BRAKE SYSTEM

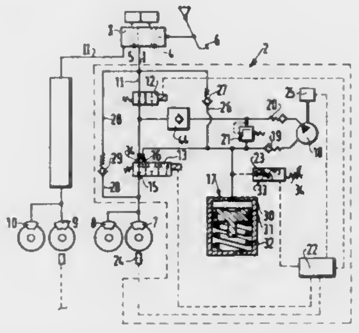
**Reinhard Gutzeit, Stuttgart, and Wolf-Dieter Jonner, Beilstein Schmidhausen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 20, 1989, Ser. No. 424,647**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842370**

**Int. Cl.$^5$ B60T** *8/58, 13/68*

**U.S. Cl. 303—116** **9 Claims**



1. An anti-skid apparatus operatively positioned between a master brake cylinder and at least one wheel brake controlled by a braking circuit of a vehicle; having an inlet of a master brake line valve (**12**) connected to an outlet side of the master brake cylinder; at least one electrically controllable anti-skid valve assembly (**13**) having an inlet (**14**) connected to an outlet side of said master brake line valve, said anti-skid valve assembly having a first and second outlet, said first outlet (**15**) communicating with said at least one wheel brake; said second outlet (**16**) communicating with a pressure fluid holder (**17**), a return pump (**18**) that has an inlet communicating with said second outlet of said anti-skid valve assembly, said return pump having an outlet communicating with said inlet of the anti-skid valve assembly; a pressure limiting valve (**21**) that communicates with said outlet of said return pump, said pressure fluid holder (**17**), and said inlet of said return pump; an electrical control unit connected to said master brake line valve (**12**) for controlling said master brake line valve (**12**) and said anti-skid valve assembly; and at least one wheel brake relief line (**28**) which bypasses said anti-skid valve assembly and said master brake line valve; said at least one wheel brake relief line is equipped with a one-way check valve (**29**) that opens toward said master brake cylinder; said master brake line valve (**12**) is embodied as an electromagnetically controllable 2/2-way valve, which is open in its basic position and assumes its closing position in anti-skid braking operation, further said master brake line valve (**12**) is disposed between said outlet of said return pump (**18**) and said master brake cylinder, whereby a flow of pressure fluid pumped by said return pump (**18**) in ABS operation can only reach the inlet of said valve assembly (**13**), and the pressure fluid holder (**17**) through said pressure limiting valve (**21**).

### 5,013,098
### METHOD AND APPARATUS FOR FEEDBACK-FREE ABS CONTROL

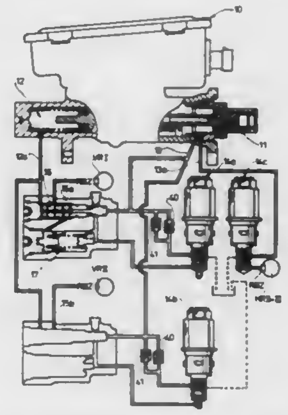
**Robert Mergenthaler, Markgroeningen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jun. 29, 1990, Ser. No. 546,594**

**Claims priority, application Fed. Rep. of Germany, Jul. 1, 1989, 3921683**

**Int. Cl.$^5$ B60T** *8/32, 13/12, 13/68*

**U.S. Cl. 303—119** **9 Claims**



1. A method for feedback-free ABS control in hydraulic brakes for mobile units, motor vehicles, motorcycles, which comprises operating a pedal-operated master brake cylinder and hydraulic brake booster, applying fluid pressure to at least one isolation or shutoff 3/2-way valve in case of normal braking, feeding pressure to associated front wheel brake cylinders in a static circuit, where in case of ABS operation, blocking a connection between the wheel brake cylinder(s) and the master brake cylinder by operation of said isolation valve, operating an ABS 3/3 way valve to open a hydraulic pressure line between said master brake cylinder and an associated plunger-piston controlled by said ABS 3/3-way valve, arresting said pistons during normal braking operation because of entry of pressure fluid into a chamber of each hydraulic 3/2-way isolation valve and on a rear of the plunger-piston, blocking of a return flow of fluid in such a way, that said pistons do not move during normal braking operation.

### 5,013,099
### TISSUE DISPENSER

**Delbert G. Styles, and Keunja Styles, both of 3811 N. 48th Dr., Phoenix, Ariz. 85031**

**Filed Jan. 22, 1990, Ser. No. 468,187**

**Int. Cl.$^5$ B65H** *19/00*

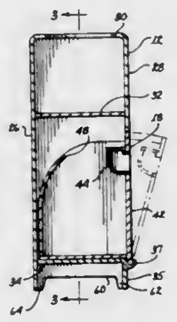
**U.S. Cl. 312—37** **1 Claim**

1. A combined tissue dispenser and tissue storage assembly comprising, in combination:

a tissue box having an opening in a top surface thereof; at least one tissue extending outwardly from said opening in said tissue box;
removable drawer means comprising an outwardly movable drawer located on the front of said assembly for storing used tissues;
said assembly having a first compartment means located at a top portion of said assembly for holding said box of tissues and having a second compartment means located at a bottom portion of said assembly, open on one side, for slidably receiving said drawer means, said first compartment means has a first opening means located on one side

VOL
1126
ISS
1
MY
7
1991
UMI

of said first compartment means an don one side of said assembly for inserting therethrough said box of tissues and



a second opening means located above said opening in said tissue box and on top of said first compartment means for extracting said tissue therefrom.

## 5,013,100
## MULTI-PART SHELF

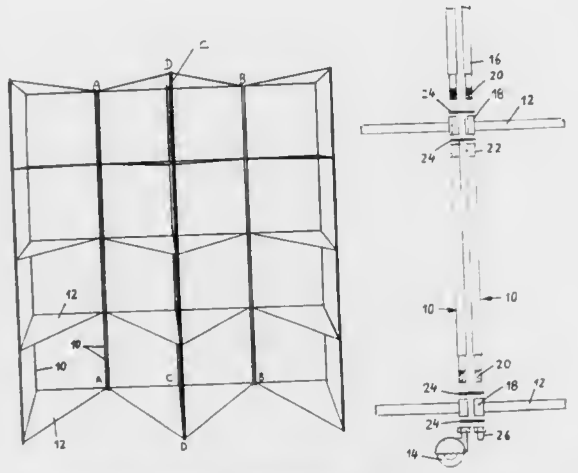
**Bernhard Zich, Oskar-Sommer-Str. 20, D-6000 Frankfurt/Main 70, Fed. Rep. of Germany**

**Filed Nov. 30, 1989, Ser. No. 443,160**

**Claims priority, application Fed. Rep. of Germany, Dec. 3, 1988, 8815057[U]; Jan. 19, 1989, 8900642[U]; Jul. 15, 1989, 3923452**

**Int. Cl.⁵ A47B** *87/00*

**U.S. Cl. 312—200** **10 Claims**



1. A multi-part shelf comprising:

a unitary middle part (R1) and two side parts (R2, R3), each of said parts having a plan outline in the form of an equilateral right triangle whereby each said part has a hypotenuse side and two cathetus sides and whereby an outline area of said middle part is twice an outline area of said side part, each of said parts including a plurality of superposed triangular shelf floor sections having three corners and a plurality of elongate uprights structurally connecting adjacent said floor sections at each of said three corners; and

a respective articulation connection means (A, B) provided between said middle part and each respective said side part for pivotally connecting said parts such that said side parts are individually pivotable between a configuration where one said cathetus side of said side part is immediately adjacent said hypotenuse side of said middle part and a configuration where said hypotenuse side of said side part is immediately adjacent one said cathetus side of said middle part.

---

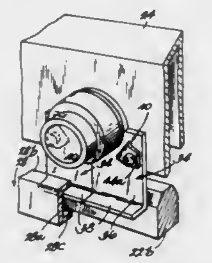
## 5,013,101
## ANTI-TIP APPARATUS FOR MOBILE STORAGE UNITS

**James C. Muth, Eagle, Wis., assignor to Spacesaver Corporation, Fort Atkinson, Wis.**

**Filed Mar. 12, 1990, Ser. No. 491,836**

**Int. Cl.⁵ A47B** *21/00*

**U.S. Cl. 312—201** **11 Claims**



1. In a mobile storage system having at least one movable carriage including a pair of wheels journaled to said carriage and adapted to engage and move along each of at least two parallel tracks on a building floor, an anti-tip mechanism comprising:

a pair of catch rails, each catch rail positioned adjacent to and substantially coextensive with a respective one of said tracks, and each catch rail being formed of a substantially upright support portion and a generally horizontal portion positioned at the top of said upright support portion and projecting toward said respective track;

a pair of hook plates for each of said catch rails, each of said hook plates having a lower leg projecting beneath said horizontal portion of said respective catch rail;

each of said hook plates attached to said carriage by means of an L-tab, each L-tab having an insert portion which is inserted into a slot in the respective hook plate and a slot in the carriage, and an overlay portion which overlies the hook plate and is attached to said carriage by a threaded fastener which passes through the overlay portion and into the hook plate, and at least into the carriage, said insert portion thus providing added resistance to shear of the threaded fastener.

---

## 5,013,102
## TRASH ORGANIZER

**Eldon Loblein, 6 Jackson Ave., Belfast, Me. 04915**

**Filed Jan. 31, 1990, Ser. No. 472,760**

**Int. Cl.⁵ A47B** *88/00*

**U.S. Cl. 312—234.1** **5 Claims**

1. In combination with a countertop of a domestic kitchen or the like, a trash collector and organizer to facilitate recycling which comprises

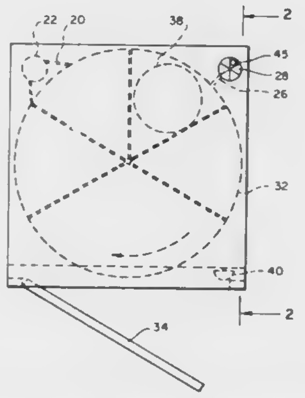
a revolvable base adapted to support a circular nest of generally triangularly shaped open top trash cans,

a mount for said base holding the same at a predetermined level and location beneath the countertop,

said countertop having a trash drop hole at a preselected location above said open cans,

a top cover hinged to the countertop adapted to conceal said drop hole when closed and to expose said drop hole to receive trash when open,

mechanism for revolving said base so as selectively to locate the open mouth of any individual can directly beneath said drop hole,



indexing means actuated by the revolving movement of said base to assist in the selection of the cans, said indexing means comprising

a rotatable indicia bearing gauge and

a drive from said revolving mechanism for rotating said gauge,

said revolving mechanism having a pedal-controlled drive motor for revolving the can supporting base to selected rotated positions while simultaneously actuating said indexing means, and

a door which, when open, facilitates the removal of individual cans from said base from the front beneath the counter and which, when closed, serves to conceal the collector and organizer from view.

---

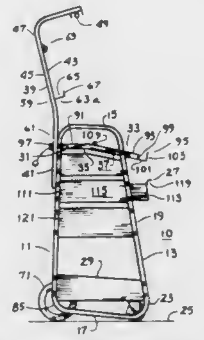
## 5,013,103
## QUALITY CONTROL WORK STATION

**Thomas E. Addison, Racine, Wis., assignor to Qualtech of Racine, Inc., Racine, Wis.**

**Filed Aug. 7, 1989, Ser. No. 390,201**

**Int. Cl.⁵ A47B** *91/00*

**U.S. Cl. 312—250** **15 Claims**



1. A work station especially useful for quality control purposes including:

a support frame including a pair of side members, each of the side members having an upwardly extending rear support member, and lower and front rails cooperating to define a knee for providing a means of support for the station;

a work panel supported by the frame, the panel having a first, generally horizontal rear surface terminating in a rear edge and a forwardly extending second surface depending angularly downward from the first surface and located above said knee in a position to substantially avoid the imposition of tipping forces on the work station when downward pressure is applied to the second surface;

a display panel attached to the rear support members at a position generally above the rear edge, the display panel including a generally planar display surface and means for retaining a data collecting device, said retaining means having a generally planar lip extending forwardly from a lower edge of the display surface and a generally planar retaining edge extending upwardly from the lip to define a channel for retention of a data collecting device in position to be readily viewed and accessed by a user of the work station; and

a plurality of wheels disposed in a load supporting relationship to the support frame for relocating the work station.

---

## 5,013,104
## CONTROL CONSOLE COMPRISING PEDESTAL, CONSOLE PART AND TOP

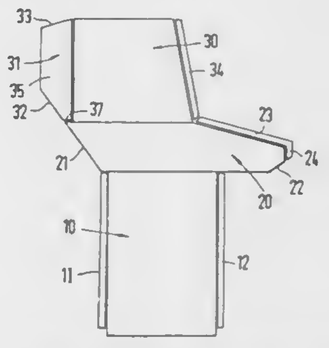
**Hans-Martin Knoppel, Giessen; Oskar Elm, Dietzholztal, and Udo Munch, Sinn, all of Fed. Rep. of Germany, assignors to Rittal-Werk Rudolf Loh GmbH & Co. KG, Fed. Rep. of Germany**

**Filed Apr. 9, 1990, Ser. No. 506,458**

**Claims priority, application Fed. Rep. of Germany, Apr. 8, 1989, 8904421[U]**

**Int. Cl.⁵ A47B** *91/00*

**U.S. Cl. 312—254** **4 Claims**



1. In a control console having a pedestal, a console part and a top, at least one of a pedestal front and a pedestal back of said pedestal being closed with a pedestal door, said console part positioned on top of said pedestal and extending beyond said pedestal front, said top disposed on said console part, an extending portion of said console part extending beyond said top being closed with a hinged lid, a top front of said top being closed with a top door, the improvement comprising: an overhanging cover (31) covering a top back of said top (30), a cover top and a cover bottom (32, 33) inclined rearwardly towards each other, and cover side walls (35, 36) of said cover (31) ending flush with facing vertical top side walls of said top (30);

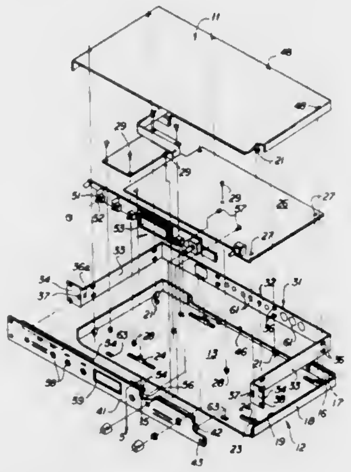
an inclined back wall enclosing a console back of said console part (20) beginning at said pedestal back of said pedestal (10) and extending outward from said pedestal back, said back wall (21) of said console part (20) correspondingly inclined with said cover bottom (32) of said cover (31) and said back wall (21) of said console part (20) and said cover bottom (32) of said cover (31) making a flush transition into each other; and

said back wall (21) of said console part (20) extending beyond said top back of said top (30), and a lower section of said cover bottom (32) of said cover (31) terminating in a horizontal end section (37) compensating for an offset of said back wall (21) of said console part (20) with respect to said top back of said top (30).

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,105
### SCREWLESS ELECTRONIC INSTRUMENT ENCLOSURE

**John R. Rossum, Jr., San Jose, Calif., assignor to E-mu Systems, Inc., Scotts Valley, Calif.**
**Filed Jan. 19, 1990, Ser. No. 467,133**
**Int. Cl.$^5$ A47B** *47/00*
**U.S. Cl. 312—263** **18 Claims**



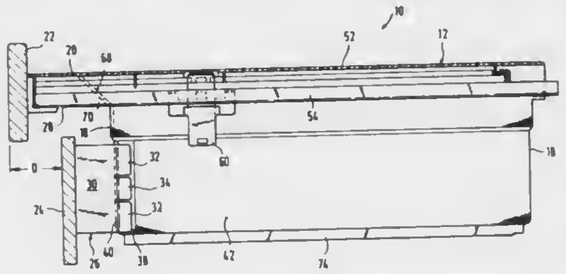
1. An enclosure comprising:
a plastic top portion,
a plastic bottom portion,
at least one said portion having an integral upstanding back edge along at least a part of the back of said one portion and integral side edges along at least parts of the sides of said one portion, said back and side edges having inner lips which are co-planar,
a plurality of substantially vertical, flexible first and second hooks integral with and extending approximately perpendicular to said portions, said first hooks being spaced inward relative to said back edge and said second hooks being spaced inward relative to said side edges of said portions, said hooks having outward directed distal barbs,
a U-shaped core, said core being formed of sheet metal and having a core back disposed inside of and parallel to and in proximity to said back edge and outside said first hooks and two core sides disposed inside of a parallel to and in proximity to said side edges and outside said second hooks dimensioned so that said core back fits between said back edge and some of said hooks and said core sides fitting between said side edges and some of said hooks,
said core being formed with a plurality of first holes shaped and positioned to receive the barbs of said hooks to latch said top portion and bottom portion to said core and relative to each other, and
said top and bottom portions meeting along opposed surfaces and forming an enclosure closed at the top, bottom back and two sides.

---

### 5,013,106
### PLINTH DRAWER

**Guenter Twellmann, Spenge-Lenzinghausen, Fed. Rep. of Germany, assignor to Ninkaplast GmbH, Bad Salzuflen, Fed. Rep. of Germany**
**Filed Mar. 13, 1990, Ser. No. 492,463**
**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1989, 8903297[U]**
**Int. Cl.$^5$ A47B** *88/00*
**U.S. Cl. 312—330.1** **19 Claims**

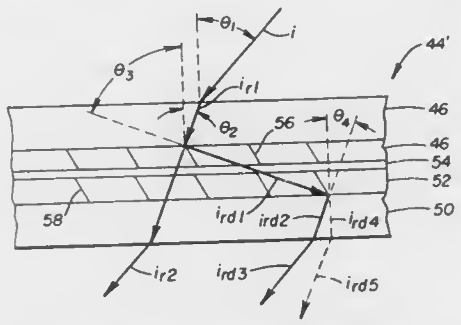
1. A plinth drawer comprising:
(a) a frame;
(b) a bar projecting from a front upper edge of said frame;
(c) a front piece attached to said bar;
(d) a plinth panel; and
(e) a holder for connecting said plinth panel to said frame, said holder being set back in relation to at least a portion of the bar, said holder being formed by two adaptors constructed as plastic moldings which are clamped to said frame and which are removably fastened to said plinth panel.



---

### 5,013,107
### POLARIZATION SELECTIVE HOLOGRAPHIC OPTICAL ELEMENT

**Jonathan R. Biles, 1422 SE. Knight St., Portland, Oreg. 97202**
**Filed Sep. 15, 1988, Ser. No. 244,955**
**Int. Cl.$^5$ G02B** *5/32, 27/28, 27/42*
**U.S. Cl. 350—3.7** **28 Claims**



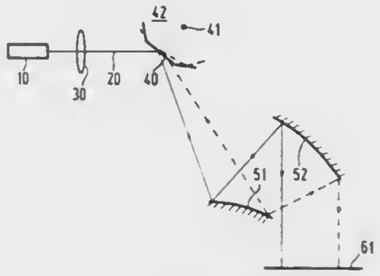
1. A holographic optical element, comprising:
first holographic means for transmitting without diffraction a first component of incident light and diffracting a second component of the incident light by a selected angle in a selected plane;
second holographic means for transmitting without diffraction the first component of the incident light transmitted by said first holographic optical element and diffracting the second component of the incident light diffracted by said first holographic optical element by a selected angle in said selected plane; and
means for maintaining said first and second holographic means in optical contact so that the second component of incident light diffracted by said first holographic means is transmitted into said second holographic means substantially without refraction.

---

### 5,013,108
### OPTICAL SCANNING DEVICE AND MIRROR CORRECTION SYSTEM FOR USE IN SUCH A DEVICE

**Willem D. Van Amstel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Jul. 13, 1989, Ser. No. 379,514**
**Claims priority, application Netherlands, Jul. 15, 1988, 8801803**
**Int. Cl.$^5$ G02B** *26/10*
**U.S. Cl. 350—6.1** **4 Claims**

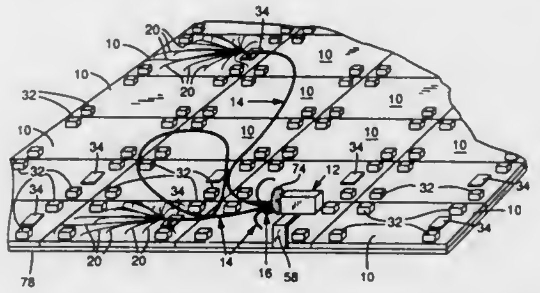
1. A scanning device for optically scanning a surface of an object along a line, which device comprises a radiation source unit for supplying a scanning beam, an optical system for forming a point of smallest constriction in the scanning beam and for forming a scanning spot on the surface by means of the scanning beam, and deflection means for deflecting the scanning beam through a variable deflection angle to a position on the surface to be scanned, said optical system comprising a main imaging system which is arranged in the radiation path of the scanning beam between the radiation source unit and said deflection means and a correction system which is arranged in the radiation path of the scanning beam between said deflection means and the surface to be scanned, wherein the correction system is composed of at least two curved mirrors arranged one after the other in the radiation path of the scanning beam and the optical distance between the main imaging system and the point of smallest constriction is substantially independent of the deflection angle.



---

### 5,013,109
### MODULAR SYSTEM FOR DECORATIVE LIGHTING

**Donald J. Zelan, Portland, Oreg., and William G. Dubay, Sparks, Nev., assignors to Fiber Tech, Inc., Portland, Oreg.**
**Filed Nov. 6, 1989, Ser. No. 431,927**
**Int. Cl.$^5$ G02B** *6/00*
**U.S. Cl. 350—96.1** **8 Claims**

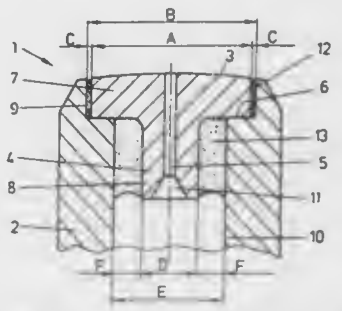


1. A preassembled panel to be further assembled together with multiple similar panels in side-by-side relation to cooperatively provide a ceiling or wall structure displaying an array of light points, said pre-assembled panel comprising;
a panel member having a back side and a front side and provided with multiple holes, light transmitting fiber strands projected through the holes from the back side with their projected ends substantially flush with the front side of the panel for front side viewing of light transmitted through the fiber strands, the strands having substantial length and extending out of the holes from the back side and gathered into a common elongate bundle of fiber strands, the elongate bundle being flexible and having a substantial length as required for the gathering together of multiple bundles from multiple of the panels in the further assembly process,
the fiber strands of the elongate bundle all terminating at a common end position, a fitting surrounded and capturing the end of the bundle, said fitting provided with means for mounting the bundle end into a designated fixture adapted to receive multiple fittings of multiple fiber bundles for common exposure of the multiple bundle ends to a light source.

---

### 5,013,110
### OPTICAL FIBRE END PIECE FOR AN OPTICAL FIBRE

**Silvio Marazzi, Cavigliano, Switzerland, assignor to Diamond S.A., Losone, Switzerland**
**Filed Dec. 27, 1989, Ser. No. 457,837**
**Claims priority, application Switzerland, Jan. 10, 1989, 71/89**
**Int. Cl.$^5$ G02B** *6/36*
**U.S. Cl. 350—96.2** **10 Claims**

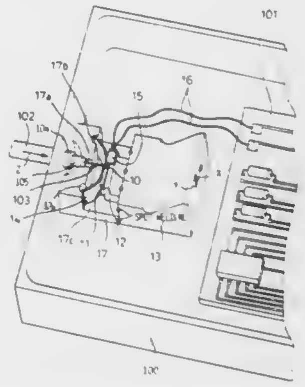


1. An optical fiber end piece (1) for an optical fiber, comprising a hollow cylindrical outer part (2) of a relatively hard material having an end portion, which serves as a connection to a similar optical fiber end piece, and a core (4) of plastically deformable material mounted within said end portion, said core having a coaxial bore (5) in which an optical fiber can be fixed, said outer part having a supporting shoulder (6), the core resting upon said supporting shoulder in such a way that there is radial clearance between the core and the outer part, the core being supported axially at the supporting shoulder only, said core being firmly connected to the outer part at least at the supporting shoulder.

---

### 5,013,111
### METHOD AND DEVICE FOR MOUNTING A LASER DIODE AND A LIGHT CONDUCTOR

**Bodo Tilly, Grafing, and Robert Rieger, Ostermuenchen, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany**
**Filed Oct. 20, 1989, Ser. No. 424,662**
**Claims priority, application Fed. Rep. of Germany, Oct. 20, 1988, 3835701**
**Int. Cl.$^5$ G02B** *6/42*
**U.S. Cl. 350—96.2** **7 Claims**



7. An apparatus for mounting and aligning a laser diode and a light conductor relative to each other with reference to the X-Y-Z-coordinates in space, comprising a laser diode device including said laser diode and a light conductor having a light conducting fiber (103) in a jacket (105) and a free fiber end extending out of said jacket, a mounting block for holding said laser diode device and said jacket of said light conductor, said mounting block having a first recess (17*a*) with a longitudinal axis extending in the Z-direction of said coordinates for hold-

VOL
1126
ISS
1
MY
7
1991
UMI

ing said jacket of said light conductor in said recess in a fixed position relative to said Z-direction and so that said free fiber end extends in cantilever fashion toward said laser diode so that said free fiber end is free to move outside its jacket without applying any tension to said free fiber end, and a second recess (17*c*) in said mounting block, said second recess defining a plane extending perpendicularly to said Z-direction, spring force applying means (**14**) for initially holding said laser diode device in said second recess (**17*c***) after an adjustment of said laser diode device relative to said free fiber end of said light conductor, and laser spot weldings permanently holding said laser diode device in a fixed X-Y-position relative to said free end of said light conductor for introducing light from said laser diode into said free fiber end of said light conductor.

---

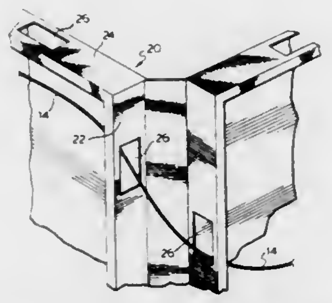
### 5,013,112
### COMBINED FIBER OPTIC CONDUITS AND OFFICE PANEL

**John Hellwig, Toronto, Canada, assignor to Teknion Furniture Systems Inc., Downsview. Canada**

**Filed Apr. 17, 1990, Ser. No. 509,744**

**Int. Cl.⁵ G02B *6/00, 6/14***

**U.S. Cl. 350—96.10** **10 Claims**



1. In combination, an office panelling system and fiber optic communication cable, said office panelling system comprising interconnected panels, said panels interconnecting in a straight line or at angles, including 90 degrees, each panel having a metal framework onto the sides of which cover members are secured with the interior of said framework generally available for receiving said fiber optic cable, said framework having vertical and horizontal structural members with said structural members including a host of distributed passage ports therethrough for allowing communication cables and the like to pass through said framework where desired; said fiber optic communication cable being strung through the frameworks of said panels and rounding corners between panels at an angle by using both the vertical and horizontal planes of the framework and appropriate passage ports in said structural members to provide a curvature in said cable rounding the corner of said angled panels much greater than an angle of curvature of the cable if the cable was confined to a single horizontal plane for rounding the same corner.

---

### 5,013,113
### LOSSLESS NON-INTERFEROMETRIC ELECTRO-OPTIC III-V INDEX-GUIDED-WAVE SWITCHES AND SWITCHING ARRAYS

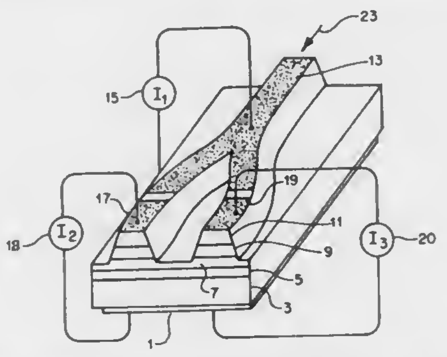
**Richard A. Soref, Newton Centre, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Aug. 31, 1989, Ser. No. 403,216**

**Int. Cl.⁵ G02F *1/29***

**U.S. Cl. 350—96.13** **32 Claims**

1. Non-interferometric guided wave electro-optic switch comprising a light transmitting semiconductor index-guided waveguide having a cross-sectional laser-like structure, together with carrier injection means for continuously injecting carriers into first portions of said waveguide to amplify the intensity of light transmitted therethrough and for intermittently injecting carriers into at least one second portion of said waveguide to change the state of said switch, and wherein said carrier injection means comprises a first set of electrodes for continuously applying first voltage levels to first waveguide portions of said switch for producing amplification of light traveling through said first waveguide portions together with a second set of electrodes for selectively applying to selected second waveguide portions either said first voltage levels for producing light amplification, or second voltage levels to block the transmission of light therethrough.



---

### 5,013,114
### OPTICAL SWITCH APPARATUS

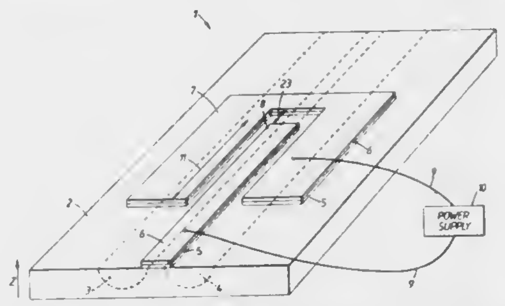
**Terence P. Young, Clemsford, United Kingdom, assignor to The General Electric Company, p.l.c., London, United Kingdom**

**Continuation of Ser. No. 78,940, Jul. 29, 1987, abandoned. This application Jul. 3, 1989, Ser. No. 374,924**

**Claims priority, application United Kingdom, Jul. 30, 1986, 8618545**

**Int. Cl.⁵ G02B *6/10***

**U.S. Cl. 350—96.14** **21 Claims**



1. An optical switch apparatus comprising: a body having first and second closely spaced apart light transmissive regions of higher refractive indices than said body; a first electrode having first and second spaced-apart portions, the first portion of the first electrode being positioned at least partially over the first region and the second portion of the first electrode being positioned at least partially over the second region; a second electrode disposed between the first and second portions of the first electrode and covering portions of the first and second regions, the second electrode being separated from the first portion of the first electrode by a gap and being separated from the second portion of the first electrode by another gap, wherein the first and second regions are substantially distinct from one another along the length of the electrodes, and wherein applying a potential difference between said first and second electrodes produces a localised variation in refractive index under each gap so as to alter the distance between said regions.

### 5,013,115
### POLARIZATION INSENSITIVE OPTICAL FREQUENCY MIXER

**Raman Kashyap, Ipswich, England, assignor to British Telecommunications public limited company, Great Britain**

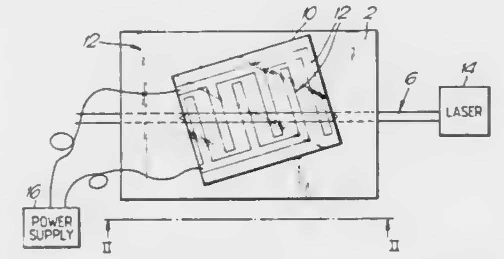
**PCT No. PCT/GB89/00149, § 371 Date Oct. 2, 1989, § 102(e) Date Oct. 2, 1989, PCT Pub. No. WO89/07782, PCT Pub. Date Aug. 24, 1989**

**PCT Filed Feb. 15, 1989, Ser. No. 411,529**

**Claims priority, application United Kingdom, Feb. 15, 1988, 8803450**

**Int. Cl.⁵ G02F *1/37***

**U.S. Cl. 350—96.14** **10 Claims**



1. A polarisation insensitive optical frequency mixer for generating a harmonic of a light signal comprising
- an optical waveguide; and
- a pair of interdigitated electrodes located on one side of the waveguide for producing within the waveguide a spatially periodic electric field having a reversal every half period;
- the period being selected to phasematch the interacting frequencies each with its own mode with the light signal and the electrode dimensions being selected to provide that the electric field within the optical waveguide is substantially equal in two mutually orthogonal directions transverse to the waveguide.

---

### 5,013,116
### POLARIZATION CONTROL OF BIDIRECTIONALLY TRANSMITTED BEAMS BY A SINGLE POLARIZATION CONTROLLER

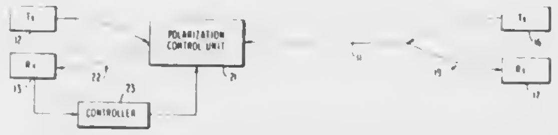
**Shuntaro Yamazaki, and Takashi Ono, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed May 23. 1990, Ser. No. 527,470**

**Claims priority, application Japan, May 23, 1989, 1-130510; May 23, 1989, 1-130511**

**Int. Cl.⁵ G02B *6/26, 6/42***

**U.S. Cl. 350—96.15** **19 Claims**



1. A polarization control system for use in an optical communication system comprising an optical fiber having first and second ends, first and second transmitter devices for delivering first and second signal beams to said first and said second ends, respectively, and first and second receiver devices for receiving said second and said first signal beams from said first and said second ends, respectively, said first receiver device thereby producing a detected signal, said polarization control system comprising a polarization control unit having a fiber end connected to said first end and a device end connected to said first transmitter device and said first receiver device, and a controller supplied with said detected signal for controlling said polarization control unit so as to make said polarization control unit supply said second signal beam to said first receiver device with a polarization state which is kept substantially constant.

---

### 5,013,117
### METHOD FOR MANUFACTURING A FIBER TYPE COUPLER

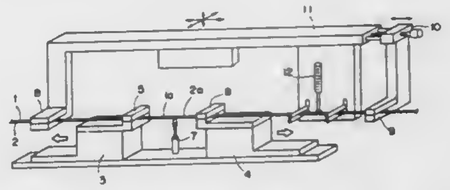
**Masumi Fukuma, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Oct. 13, 1989, Ser. No. 421,098**

**Claims priority, application Japan, Oct. 25, 1988, 63-269105; Oct. 26, 1988, 63-270009**

**Int. Cl.⁵ G02B *6/26***

**U.S. Cl. 350—96.15** **12 Claims**



1. A method for manufacturing a fiber type coupler including a coupler member and a protective member protecting the coupler member, comprising the steps of: forming the coupler member, applying a predetermined tension to the coupler member along the optical axis thereof, and fixing the coupler member to the protective member unless any breakage occurs in the coupler member in the step of applying a predetermined tension, wherein said predetermined tension includes a first tension used in tensile test for said coupler member, and a second tension being lower than said first tension.

---

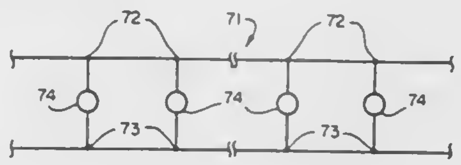
### 5,013,118
### FILTERING HIGH ORDER MODES OF SHORT WAVELENGTH SIGNALS PROPAGATING IN LONG WAVELENGTH SINGLE MODE FIBERS

**Lucjan Sniadower, Paris, France, assignor to Raynet Corporation, Menlo Park, Calif.**

**Filed Dec. 22, 1989, Ser. No. 455,641**

**Int. Cl.⁵ G02B *6/28***

**U.S. Cl. 350—96.16** **11 Claims**



1. An optical fiber network, comprising:
- a single mode optical fiber having a cutoff wavelength above about 900 nanometers such that the optical fiber has single mode waveguiding characteristics for propagating light at wavelengths above the cutoff wavelength and multimode waveguiding characteristics for propagating light at wavelengths below the cutoff wavelength;
- means for separately generating N optical signals each having a dominant light intensity at a light wavelength below the cutoff wavelength, N being an integer greater than 1;
- means for separately injecting the N optical signals into the optical fiber at N separate locations serially located on the optical fiber so as to be capable of multiplexing the N optical signals into the optical fiber, and
- means for detecting and discriminating a fundamental mode from other modes of at least one of the N optical signals when detecting the fundamental mode of the at least one optical signal at a location downstream from all of the N injecting means.

VOL
1126
ISS
1
MY
7
1991
UMI

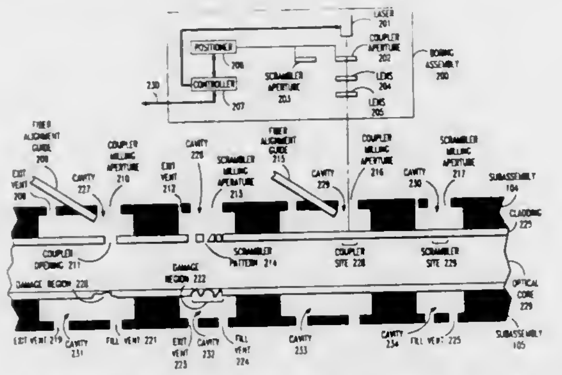
### 5,013,119
## FABRICATION OF AN INTEGRATED OPTICAL FIBER BUS

**Richard J. Coyle, Jr., Lawrenceville, N.J.; Gary J. Grimes, Thornton; Lawrence J. Haas, Broomfield, both of Colo.; Anthony J. Serafino, Cranbury, and George J. Shevchuk, Old Bridge, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Dec. 21, 1989, Ser. No. 454,613**

**Int. Cl.$^5$ G02B** *6/28*

U.S. Cl. 350—96.16 **11 Claims**



1. Apparatus for fabricating optical couplers and optical mode scramblers on an optical fiber which has a cladding surrounding an optical core, said apparatus comprising:

- a boring assembly;
- a bus assembly attached to said optical fiber and said bus assembly having a plurality of mode scrambler milling apertures each aligned with an individual one of a plurality of mode scrambler sites and a plurality of coupler milling apertures each aligned with an individual one of a plurality of coupler sites;
- said boring assembly having a radiation source and a first aperture to define a first predefined pattern at each of said coupler sites by forming radiation from said radiation source and a second aperture to define a second predefined pattern at each of said mode scrambler sites by forming radiation from said radiation source;
- lens for focusing said formed radiation by said first aperture through each of said coupler milling apertures onto each of said coupler sites;
- controller for controlling the energy level of said radiation so as to substantially ablate all of the cladding corresponding to said first predefined pattern at each of said coupler sites;
- said lens further focusing radiation formed by said second aperture through each of said mode scrambler milling apertures onto each of said mode scrambler sites; and
- controller for controlling the energy level of said radiation source so as to substantially ablate all of the cladding corresponding to said second predefined pattern at each of said mode scrambler sites.

---

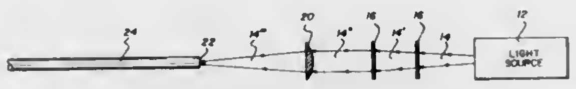
### 5,013,120
## MONOCHROMATOR TO FIBER-CABLE COUPLING SYSTEM

**John S. Gergely, and F. Monte Evens, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.**

**Filed May 31, 1990, Ser. No. 531,964**

**Int. Cl.$^5$ G02B** *6/32, 3/04;* **G01J** *3/30*

U.S. Cl. 350—96.18 **21 Claims**



1. In a spectrometer system, an apparatus for coupling light from an excitation monochromator into a fiber optic cable comprising:

- a first cylindrical lens having a preselected F number for receiving light from the monochromator to collimate said light in a first direction;
- a second cylindrical lens having said preselected F number for receiving light passing through said first cylindrical lens to collimate said light in a second direction; and
- a plano convex lens arranged to receive light that has been collimated in two directions passing through said second cylindrical lens to focus said corrected light on the fiber optic cable.

---

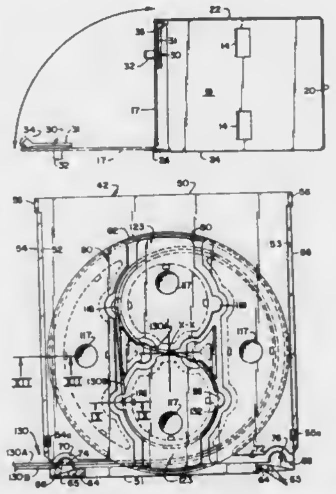
### 5,013,121
## OPTICAL FIBER STORAGE CONTAINER

**Mark A. Anton, 5521 Cumberland Rd., Minneapolis, Minn. 55410, and Wayne A. Johnson, 16280 Galena Ave., Rosemount, Minn. 55068**

**Filed Jun. 29, 1989, Ser. No. 374,008**

**Int. Cl.$^5$ G02B** *6/36*

U.S. Cl. 350—96.20 **6 Claims**



1. An optical fiber storage apparatus comprising:

- a first member and a second member rotatably received on said first member to rotate relative to said first member complete about an axis of rotation;
- said second member having means for defining an outer circumferential track sized to receive an optical fiber within said outer track and wound around said outer track;
- affixing means disposed on an interior of said outer track for releasably affixing an optical fiber to said second member for rotation therewith;
- surfaces of said second member defining a cable pathway connecting said interior to said outer track;
- said first member having means defining a pathway connecting an exterior of said apparatus to said outer track; and
- said affixing means including means for positioning said fiber with said fiber having first and second portions each extending in a similar radial direction from said interior to said outer track.

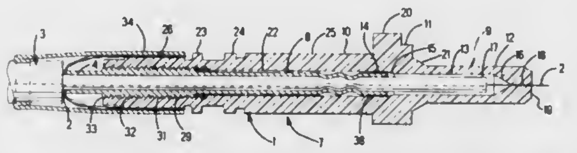
### 5,013,122
## THREADED CRIMPING BODY FOR FIBER OPTIC TERMINATION

**Wallace R. Savitsky; Ronald R. Schaffer, and Gary N. Warner, all of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Continuation-in-part of Ser. No. 400,303, Aug. 29, 1989. This application Oct. 31, 1989, Ser. No. 429,676**

**Int. Cl.$^5$ G02B** *6/26*

U.S. Cl. 350—96.20 **5 Claims**



1. A termination for optical members comprising an alignment ferrule and an optical member having buffer and optical fiber wherein the alignment ferrule comprises an elongated sleeve body and has tubular passageway for encircling the buffer and optical fiber, and a tip with centrally disposed aperture therethrough for closely receiving an end of the fiber from the tubular passageway wherein;

- the tubular passageway of the alignment ferrule has a connection section with inwardly directed threads and further comprising a crimping body of deformable material intimately surrounding the flexible buffer and fiber, the crimping body having a connection section with outwardly directed threads engaged with the inwardly directed threads of the passageway.

---

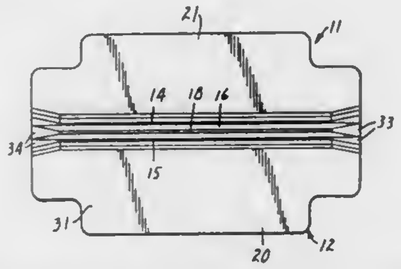
### 5,013,123
## STAMPED PRECISION LIGHTGUIDE INTERCONNECT CENTERING ELEMENT

**Richard A. Patterson, Georgetown, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation-in-part of Ser. No. 305,471, Feb. 1, 1989, abandoned, which is a continuation of Ser. No. 182,872, Apr. 18, 1988, Pat. No. 4,824,197. This application Nov. 15, 1989, Ser. No. 437,027**

**Int. Cl.$^5$ G02B** *6/38*

U.S. Cl. 350—96.21 **24 Claims**



1. A splice element for use in splicing two abutting ends of optical fibers which generally have different diameters due to manufacturing tolerances, said element being formed from a deformable material and comprising means defining three generally planar fiber supporting surfaces disposed with each surface positioned at an acute angle to a second surface and defining an optical fiber passageway therebetween adapted to receive therein two fiber ends in abutting relationship to be spliced together, said passageway having a generally triangular cross-section, and means for supporting at least one of said fiber supporting surfaces for movement in relationship to the other fiber supporting surfaces to draw said one of said supporting surfaces toward the other of said surfaces with sufficient force to engage two fiber ends and cause each said fiber supporting surface to deform uniformly around said fiber ends with a larger of said fiber ends being embedded uniformly into each of said three fiber supporting surfaces forming said fiber passageway to a slightly greater depth than said smaller diameter fiber to accommodate said variations in fiber diameter due to manufacturing tolerances but resulting in two said fiber ends being brought into coaxial alignment and for clamping said fiber ends with sufficient compressive force to restrict said fiber ends from being pulled out of said fiber alignment passageway and insufficient force to be deleterious to said optical fibers.

---

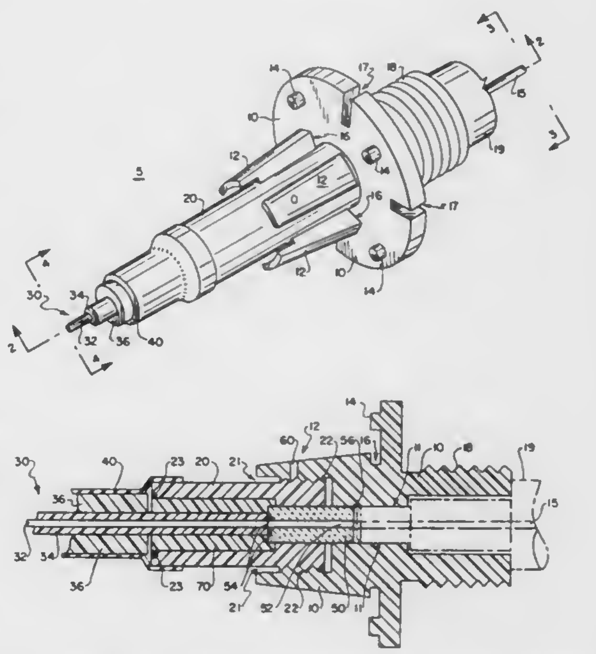
### 5,013,124
## METHOD AND APPARATUS FOR CONNECTING OPTICAL FIBERS

**J. Richard Focht, Katonah, N.Y., assignor to Codenoll Technology Corporation, Yonkers, N.Y.**

**Filed Jan. 5, 1989, Ser. No. 293,719**

**Int. Cl.$^5$ G02B** *6/38*

U.S. Cl. 350—96.21 **29 Claims**



1. A fiber optic connector for aligning and joining together two optical fibers comprising:

- housing means having a first end for receiving a first removable insertable optical fiber assembly insertable to a predetermined depth, a second end for receiving a second optical fiber insertable to a predetermined depth, and an alignment channel of constant cross-sectional area providing communication between said first and said second ends;
- a rigid insert of constant cross-sectional area slidably insertable into said alignment channel and having a concentric bore of constant diameter therethrough for receiving a fiber element of said second optical fiber; and
- adapter means in which the insert is mounted for adjustably introducing said insert and said fiber element of said second optical fiber into said alignment channel, said adapter means and said fiber element of said second optical fiber being insertable into said second end an adjustable distance such that said insert is inserted in said alignment channel so as to have a desired separation distance between the end of a fiber element of said first mating removable insertable optical fiber and an end of said fiber element of said second optical fiber within said alignment channel;
- wherein said end of said fiber element of said second optical fiber is maintained concentrically within said alignment channel, and said separation distance is adjusted by adjust-

VOL 1126 ISS 1 MY 7 1991 UMI

ing the distance which said adapter means is inserted into said second end.

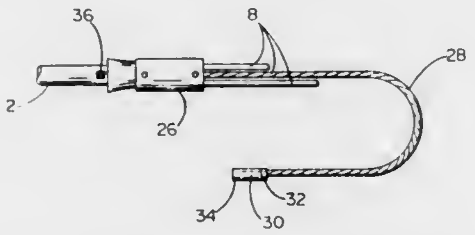
### 5,013,125
### PULLING EYE ASSEMBLY FOR CONNECTORIZED OPTICAL FIBER CABLES

**Richard C. Nilsson, and Jeffrey S. Barker, both of Hickory, N.C., assignors to Alcatel NA Cable Systems Inc., Claremont, N.C.**

**Filed Oct. 2, 1989, Ser. No. 416,607**

**Int. Cl.$^5$ G02B *6/44***

**U.S. Cl. 350—96.23** **18 Claims**



6. A pulling eye assembly for an optical fiber cable of the type having a central strength member, a plurality of loose buffer tubes disposed about said central strength member, and an outer jacket, said assembly comprising:

cable gripping apparatus including a crimping sleeve adapted to receive the cable and to be crimped onto the outer jacket;

central strength member gripping means in contact with said cable gripping means and including a cylindrical member having a conical opening therein adapted to receive the central strength member of the cable, collets adapted to be wedged between the central strength member and the surface of the conical opening, means for forcibly driving said collets into engagement with the central strength member and the surface of the conical opening, means for forming channels in an outer surface of said cylindrical member in which the loose buffer tubes of the cable may be placed, and a cylindrical sleeve encompassing the central strength member gripping means and the channel forming means and attached to said crimping sleeve; and

a hose assembly including a flexible hose portion encompassed by a braided metal hose, said flexible hose portion defining an interior chamber into which said buffer tubes may extend, attachment means secured to one end of said braided metal hose, and means secured to the other end of said braided hose for attaching to said cylindrical sleeve, whereby tension exerted on said attaching means is conveyed through said braided hose to said cylindrical sleeve to said crimping sleeve to said central strength member gripping means and to said central strength member for pulling an optical fiber cable through a duct.

### 5,013,126
### WATERPROOF OPTICAL FIBER CABLE

**Tomoyuki Hattori; Nobuhiro Akasaka, and Toru Yamanishi, all of Yokohama, Japan, assignors to Sumitomo Electric Industries Ltd., Osaka, Japan**

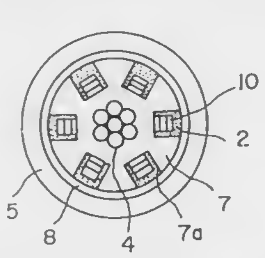
**Filed Oct. 9, 1990, Ser. No. 594,544**

**Claims priority, application Japan, Oct. 9, 1989, 1-262096; Oct. 9, 1989, 1-263583**

**Int. Cl.$^5$ G02B *6/44;* H02G *15/00***

**U.S. Cl. 350—96.23** **5 Claims**

1. A waterproof optical fiber cable which comprises at least one coated optical fiber and a waterproof compound surrounding said at least one coated optical fiber, wherein a swelling



degree of a coating material of the optical fiber induced by said waterproof compound is not larger than 10%.

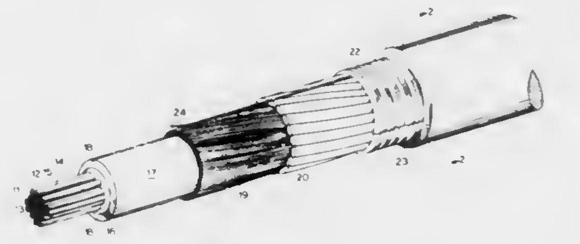
### 5,013,127
### FLEXIBLE FIBER OPTIC DISTRIBUTION CABLE

**Werner Bernard, Hickory, N.C., assignor to Siecor Corporation, Hickory, N.C.**

**Filed Apr. 26, 1990, Ser. No. 514,747**

**Int. Cl.$^5$ G02B *6/44;* H02G *15/22***

**U.S. Cl. 350—96.23** **11 Claims**



1. A fiber optic cable, comprising:

(a) a first tube containing a plurality of optical fibers;

(b) a second tube containing the first tube; and,

(c) a metallic tube having at least 15 transverse corrugations per inch between the first tube and the second tube.

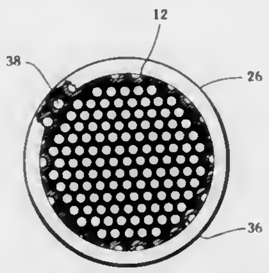
### 5,013,128
### FIBER OPTIC LIGHT GUIDE WITH IMPROVED END-TO-END EFFICIENCY

**Theodore G. Stern, and Mickey Cornwall, both of San Diego, Calif., assignors to General Dynamics Corporation, Convair Division, San Diego, Calif.**

**Filed Jun. 7, 1990, Ser. No. 534,984**

**Int. Cl.$^5$ G02B *6/04***

**U.S. Cl. 350—96.24** **3 Claims**



1. An inexpensive, highly efficient, flexible fiber optic light guide comprising:

a longitudinally extending flexible optical fiber light guide means, said fiber optic light guide means comprises a bundle of conventional flexible optic fibers that has at least a portion of which includes light fibers unclad along at least a portion of their length, having an aperture adapted to receive light and an aperture adapted to exit light,

a layer of clad optic fibers arranged around the outer periphery of the flexible light guide means; and longitudinally extending flexible cladding means to protect the flexible optic light guide means from external damage.

### 5,013,129
### OPTICAL WAVELENGTH CONVERTER DEVICE AND METHOD OF MANUFACTURING SAME

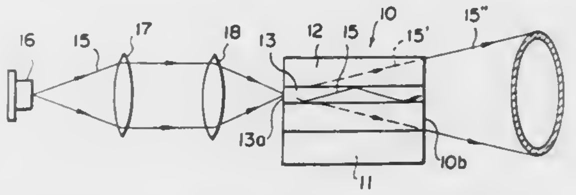
**Akinori Harada, and Yoji Okazaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Apr. 3, 1990, Ser. No. 503,571**

**Claims priority, application Japan, Apr. 7, 1989, 1-89482**

**Int. Cl.$^5$ G02B *6/16;* G02F *1/37***

**U.S. Cl. 350—96.29** **5 Claims**



1. An optical wavelength converter device comprising a three-dimensional optical waveguide including:

(i) a cladding having a first refractive index;

(ii) a waveguide element embedded in said cladding and having a second refractive index higher than said first refractive index, at least one of said cladding and said waveguide element being made of a nonlinear optical material, whereby said waveguide element converts the wavelength of a fundamental wave guided therein;

(iii) each of said cladding and said waveguide element being made of a III - V group, mixed-crystal compound semiconductor material or a II - VI group, mixed-crystal compound semiconductor material; and

(iv) said cladding including portions covering all surfaces of said waveguide element which fully reflect the fundamental wave.

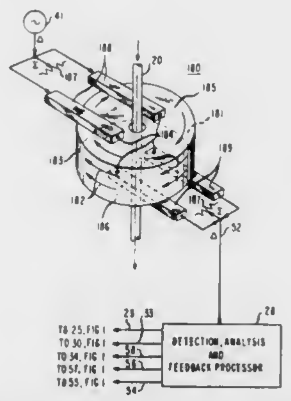
### 5,013,130
### METHOD OF MAKING A CARBON COATED OPTICAL FIBER

**Robert M. Atkins, Millington; George E. Peterson, Warren, and Raymond D. Tuminaro, Livingston, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jul. 31, 1989, Ser. No. 387,261**

**Int. Cl.$^5$ G02B *6/10, 6/00;* C03C *25/02;* B05D *5/06***

**U.S. Cl. 350—96.3** **9 Claims**



1. An optical fiber comprising a core and a cladding together with a coating of carbon for hermetically sealing the optical fiber, the optical fiber being made by the process of

heating at least an end portion of an optical fiber perform and drawing material from the heated portion of the optical fiber preform into an elongated moving optical fiber;

exposing the moving optical fiber to a gaseous carbon-containing compound under conditions such that the compound decomposes in response to the heat in the optical fiber and a coating consisting primarily of elemental carbon is deposited on the surface of the optical fiber in a thickness which is thick enough to effectively hemetically seal the optical fiber and, yet thin enough to avoid vulnerability of the carbon coating to cracking which could lead to a reduction in the fiber strength;

measuring contactlessly an electrical property at least partially dependent upon thickness of the carbon coating deposited on the moving optical fiber, said electrical property including electrical conductance per unit length of the carbon coating; and

in response to the measured electrical property, changing at least one processing parameter for controlling the thickness of the carbon coating being deposited on the moving optical fiber, said parameter being at least one of

(a) temperature of the moving optical fiber,

(b) concentration of carbon-containing compound,

(c) pressure of the carbon-containing compound,

(d) duration of optical fiber exposure to the carbon-containing compound.

### 5,013,131
### SINGLE-MODE OPTICAL, FIBER AND PROCESS FOR ITS PRODUCTION

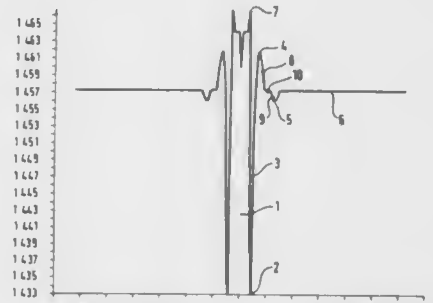
**Ulrich Fotheringham, Wiesbaden, Fed. Rep. of Germany, assignor to Schott Glaswerke, Mainz, Fed. Rep. of Germany**

**Filed Apr. 12, 1989, Ser. No. 337,205**

**Claims priority, application Fed. Rep. of Germany, Apr. 12, 1988, 3812140**

**Int. Cl.$^5$ G02B *6/18;* C03C *25/02***

**U.S. Cl. 350—96.31** **19 Claims**



1. A single-mode multiple-layer fiber with a refractive index profile n(r), in which n means the refractive index of the fiber material at distance r from the axis of the fiber, and the refractive index profile is adjusted by doping of matrix material from which the fiber is predominantly made, with at least one dopant with formation of a number of layers having different refractive indices, characterized in that:

(a) the refractive index profile n(r) is adjusted for preset values of at least one of the desired properties of chromatic dispersion, mode field diameter, attenuation and overmode cutoff;

(b) a number m of layers of thickness $\Delta r$ is greater than the number of desired properties; and

(c) each layer contains just enough dopant so that the relative refractive indices, with the desired properties maintained, meet at least approximately the condition

$$\sum_{i=1}^{m} |n(r_i) - n_o| \cdot r_i \cdot \Delta r = \text{Minimum}$$

in which $n_o$ means the refractive index of the matrix material and $r_i = i \cdot \Delta r$.

17. A process for the production of a single-mode multiple-layer optical fiber, in which the fiber is designed with multiple layers having different refractive indices, and the refractive

VOL
1126
ISS
1
MY
7
1991
UMI

index is adjusted by using at least one dopant in the matrix material from which the fiber is predominantly made, characterized in that:

(a) the refractive index profile n(r) is adjusted for preset values of at least one of the desired properties of chromatic dispersion, mode field diameter, attenuation, and overmode cutoff;

(b) the number m of layers of thickness $\Delta r$ is selected large compared with the number of desired properties; and

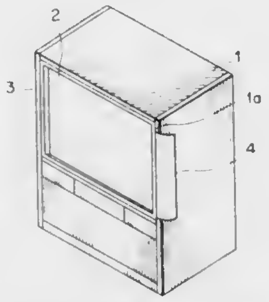
(c) each layer is provided with just enough so that the relative refractive indices while maintaining the desired properties meets approximately the condition

$$\sum_{i=1}^{m} |n(r_i) - n_o| \cdot r_i \cdot \Delta r = \text{Minimum}$$

in which $n_o$ means the refractive index of the matrix material and $r_i = i \cdot \Delta r$.

---

### 5,013,132
## REAR-PROJECTION TELEVISION
**Toru Yokoo, and Hideki Yamamoto, both of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**
**Filed Aug. 7, 1990, Ser. No. 563,641**
**Claims priority, application Japan, Oct. 20, 1989, 1-122254[U]**
**Int. Cl.⁵ G03B *21/60***
**U.S. Cl. 350—128** **2 Claims**



1. A rear-projection television comprising:

a transmission type two-layer screen made up of a Fresnel lens and a lenticular lens stacked together;

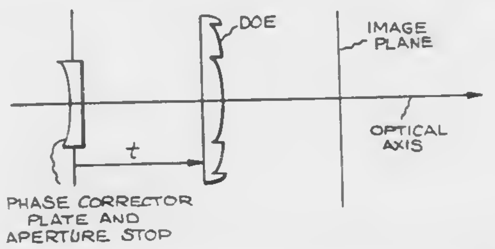
a transparent protective sheet interposed between the Fresnel lens and the lenticular lens; and

an opening provided near the edge of the Fresnel lens and the lenticular lens to allow the protective sheet to be pulled out.

---

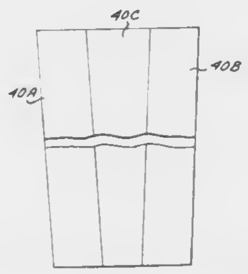
### 5,013,133
## DIFFRACTIVE OPTICAL IMAGING LENS SYSTEMS
**Dale A. Buralli, Rochester, and G. Michael Morris, Fairport, both of N.Y., assignors to The University of Rochester, Rochester, N.Y.**
**Continuation-in-part of Ser. No. 264,755, Oct. 31, 1988. This application Jun. 28, 1989, Ser. No. 372,735**
**Int. Cl.⁵ G02B *5/18, 27/44***
**U.S. Cl. 350—162.11** **25 Claims**

8. A diffractive optical imaging system which comprises a diffractive optical element having an optical axis, a focal length, f, for light of wavelength $\lambda_0$ from an object which illuminates said element and forms an image of the object, said element having a front focal plane and an image plane on object and image sides thereof, said focal plane and image plane being perpendicular to the optical axis of said element, said image being focused in said image plane, an aperture stop disposed on the one of said sides wherein the object or image is located furthest from the element such being the longest conjugate distance at a distance from said element sufficient to reduce aberrations in said image.



---

### 5,013,134
## GHOST-FREE AUTOMOTIVE HEAD-UP DISPLAY EMPLOYING A WEDGED WINDSHIELD
**Ronald T. Smith, Torrance, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**
**Filed Sep. 28, 1989, Ser. No. 413,932**
**Int. Cl.⁵ G02B *27/10;* E04C *2/54***
**U.S. Cl. 350—174** **16 Claims**



1. A head-up display including a transparent optical combiner, comprising:

a head-up display image projection unit for projecting a beam of image light toward the optical combiner for reflection toward a predetermined view box; and

wherein said optical combiner comprises a first surface and a second surface, wherein said surfaces are nonparallel and disposed at respective first and second angles with respect to the image beam so that the respective images reflected from the first and second surfaces substantially overlap at the view box, wherein said optical combiner comprises first and second optical members sandwiching an intermediate layer of transparent material, and wherein said intermediate layer is characterized by a taper in its thickness dimension from adjacent a first edge of the combiner to adjacent a second edge of the combiner, such that the layer thickness is greater adjacent the first edge than the second edge;

whereby a substantially ghost-free head-up display image is provided at the view box.

---

### 5,013,135
## HEAD-UP DISPLAY WITH TWO FRESNEL LENSES
**Souhei Yamamura, Takarazuka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Mar. 20, 1990, Ser. No. 496,297**
**Claims priority, application Japan, Jul. 10, 1989, 1-177508; Jul. 10, 1989, 1-177537; Dec. 28, 1989, 1-342648**
**Int. Cl.⁵ G02B *27/10, 3/08***
**U.S. Cl. 350—174** **14 Claims**

1. A head up display system having an HUD optical axis, said head up display for installation in or adjacent to a dashboard of a vehicle and comprising:

a first Fresnel lens adapted to be provided on an upper plate of the dashboard;

a liquid crystal display positioned below and spaced apart from said first Fresnel lens, said liquid crystal display and said first Fresnel lens defining a space therebetween;

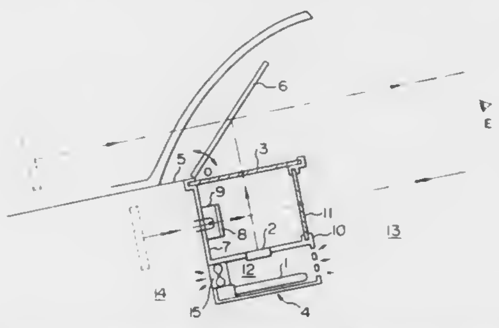
instrument meter clusters disposed in said space;

a first light source provided below said liquid crystal display;

a combiner adapted to be positioned above the upper plate of the dashboard and having a reflecting optical axis, for reflecting a virtual image of said liquid crystal display which is transmitted by said first Fresnel lens through said space so as to cause said virtual image of said liquid crystal display to be visible to a driver;

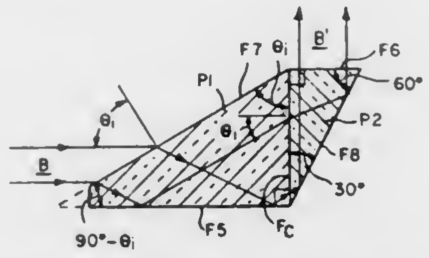
a second light source provided behind said instrument meter clusters; and

a second Fresnel lens disposed in said space in front of said instrument cluster meters so as to cause said virtual image of said instrument meter clusters to be visible to the driver.



---

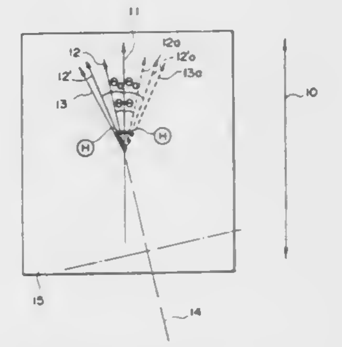
### 5,013,136
## METHOD AND APPARATUS FOR ANAMORPHICALLY SHAPING AND ACHROMATICALLY DEFLECTING ELECTROMAGNETIC BEAMS
**Frank R. Whitehead, Orangevale, and Ingolf Sander, Cupertino, both of Calif., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Continuation-in-part of Ser. No. 292,720, May 25, 1990, Pat. No. 4,929,067. This application Jan. 8, 1990, Ser. No. 461,877**
**Int. Cl.⁵ G02B *5/04***
**U.S. Cl. 350—286** **7 Claims**

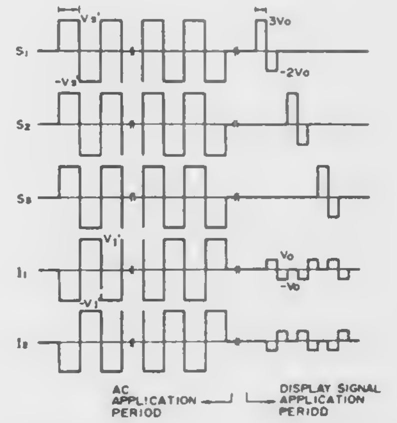


2. An achromatic prism for anamorphically shaping an incident beam of polychromatic radiation of two different wavelengths and for achromatically deflecting such beam by 90°; said prism comprising first and second prism elements made of optical materials having different refractive indices and dispersive powers, each of said prism elements having at least three faces, two of said three faces in each prism element being arranged at a 90° angle, said prism elements being joined together to share a common face, and thereby define a complex prism having four faces which interact with an incident beam entering said complex prism in a direction perpendicular to said common face to provide a desired anamorphic shaping and 90° achromatic deflection of such beam, two of said four faces being parallel and the other two faces being non-parallel, one of said non-parallel faces forming internal prism angles of $90°-\Theta_i$ with one of said parallel faces, where $\Theta_i$ is a desired angle of incidence of a beam of radiation with said one of said non-parallel faces, and the other of said non-parallel faces forming an internal prism angle of approximately 60° with the other of said parallel faces, said optical materials and said angle $\Theta_i$ being chosen so that the 90° deflection of said beam is substantially independent of said two different wavelengths.

---

### 5,013,137
## FERROELECTRIC LIQUID CRYSTAL DEVICE HAVING INCREASED TILT ANGLE
**Akira Tsuboyama, Tokyo; Yutaka Inaba, Kawaguchi; Hiroyuki Kitayama, Tokyo; Shinjiro Okada, Kawasaki; Osamu Taniguchi, Kawasaki; Hideyuki Kawagishi, Tokyo, and Yukio Hanyu, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 900,882, Aug. 27, 1986, abandoned. This application Feb. 2, 1989, Ser. No. 309,034**
**Claims priority, application Japan, Sep. 4, 1985, 60-193832; Oct. 3, 1985, 60-220755; Dec. 6, 1985, 60-273408; Dec. 7, 1985, 60-274328; Jul. 2, 1986, 61-155817; Aug. 12, 1986, 61-187676**
**Int. Cl.⁵ G02F *1/13***
**U.S. Cl. 350—333** **29 Claims**





1. A liquid crystal apparatus, comprising:

a ferroelectric liquid crystal device comprising a pair of substrates which are each provided with an electrode thereon having a ferroelectric liquid crystal layer disposed between the pair of substrates, said liquid crystal layer being a thickness thin enough to release the spiral structure of the ferroelectric liquid crystal, wherein said ferroelectric liquid crystal provides two average molecular axis directions forming an angle $2\theta$ therebetween, each average molecular axis direction corresponding to one of two stable orientation states of the ferroelectric liquid crystal; said ferroelectric liquid crystal providing two average molecular axis directions forming an angle 2 therebetween when voltages exceeding the threshold voltage of the ferroelectric liquid crystal are applied to the ferroelectric liquid crystal; said ferroelectric liquid crystal also providing two average molecular directions forming an angle $2\theta$a therebetween in the absence of an electric field after applying to said ferroelectric liquid crystal an alternating electric field having a waveheight and a pulse

VOL
1126
ISS
1
MY
7
1991
UMI

duration sufficient to cause switching between one and the other of said orientation states the angle $\theta$, H and $\theta a$ satisfying the relationship of: $\theta < \theta a \leqq H$ and

means for applying the voltages exceeding the threshold voltage of the ferroelectric liquid crystal during a display operation period of the ferroelectric liquid crystal device and for applying the alternating electric field before the display operation period.

---

### 5,013,138
### LIQUID CRYSTAL DISPLAY

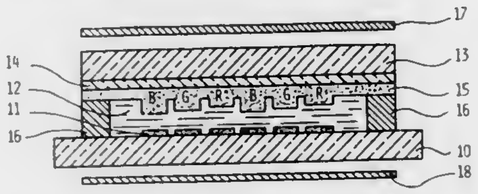
**Raymond A. Roosen, 's-Gravenwezel; Marcellus H. de Meyer, Edegem, and Marcel J. Monbaliu, Mortsel, all of Belgium, assignors to AGFA-Gevaert N.V., Mortsel, Belgium**

**Division of Ser. No. 143,377, Jan. 13, 1988, Pat. No. 4,830,941. This application Jan. 23, 1989, Ser. No. 299,455**

**Claims priority, application European Pat. Off., Jan. 27, 1987, 87200118.5**

**Int. Cl.$^5$ G02F** *1/133, 9/00;* **G02B** *5/22*

**U.S. Cl. 350—339 F** **4 Claims**



1. A liquid crystal display wherein a liquid crystal material is contained in a gap defined between two facing surfaces, at least one of the said facing surfaces of the gap being constructed by a multi-colour relief layer obtained by the colour-development of a single hydrophilic colloid silver halide emulsion layer, said relief layer having different regions of multiple different thicknesses corresponding to the plurality of colours thereof, the thickness of each such relief region being characteristic of the particular colour of that region, each different relief region containing a dye of said corresponding colour derived from a colour coupling agent by said colour development and a diffusion-resistant colourless compound derived from a colourless coupling agent by said colour development, said colourless compound being present in each relief region in an amount which is different from that in each other relief region and is characteristic of that region, said thicknesses being so determined in relation to the wave length of the corresponding colour that an improvement in visual contrast between electrically energized and electrically non-energized regions of the display is obtained.

---

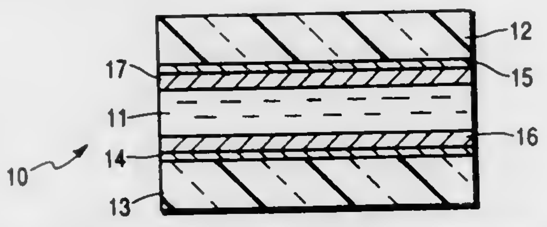
### 5,013,139
### ALIGNMENT LAYER FOR LIQUID CRYSTAL DEVICES AND METHOD OF FORMING

**Grezgorz Kaganowicz, Belle Mead; Frank P. Cuomo, and Leon J. Vieland, both of Princeton, all of N.J., assignors to General Electric Company, Princeton, N.J.**

**Filed Oct. 30, 1989, Ser. No. 428,693**

**Int. Cl.$^5$ G02F** *1/13*

**U.S. Cl. 350—340** **6 Claims**



1. In a liquid crystal device having a liquid crystal material disposed between first and second substrates and electrodes arranged on the surfaces of said substrates adjacent to said liquid crystal material, an improvement comprising:

alignment layers deposited by glow discharge onto said electrodes and comprised of a percentage of nitrogen falling within a range of 1 to 10% percentage, a percentage of carbon falling within a range of 40 to 85% percentage, and a percentage of hydrogen needed to bring the total percentage to 100%.

---

### 5,013,140
### OPTICAL SPACE SWITCH

**Peter Healey, and Stephen R. Mallinson, both of Ipswich, England, assignors to British Telecommunications public limited company, London, England**

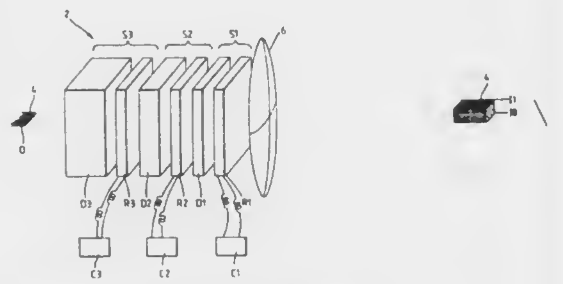
**PCT No. PCT/GB88/00745, § 371 Date Apr. 27, 1989, § 102(e) Date Apr. 27, 1989, PCT Pub. No. WO89/02614, PCT Pub. Date Mar. 23, 1989**

**PCT Filed Sep. 9, 1988, Ser. No. 348,576**

**Claims priority, application United Kingdom, Sep. 11, 1987, 8721472; Feb. 23, 1988, 8804202**

**Int. Cl.$^5$ G02F** *1/13;* **G02B** *5/30*

**U.S. Cl. 350—347 E** **15 Claims**



1. An optical space switch comprising:

an optical output;

n optical deflection stages each comprising a polarization rotator responsive to a respective control signal to rotate the polarization of an optical signal through 90°, and a deflection means for selectively deflecting optical signals according to their polarization;

said n deflection stages being serially arranged to define $2^n$ distinct source locations from where any single optical signal is selectively deflectable successively by the n deflection stages to said optical output, a distinct combination of states of the n control signals corresponding to each location;

a plurality of up to $2^n$ optical sources each located at one of said $2^n$ source locations;

and in which each deflection stage preserves the spatial integrity of the deflected optical signals.

### 5,013,141
### LIQUID CRYSTAL LIGHT MODULATION DEVICE

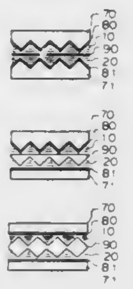
**Hajime Sakata, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 831,525, Feb. 20, 1986, abandoned. This application Aug. 1, 1989, Ser. No. 391,621**

**Claims priority, application Japan, Feb. 21, 1985, 60-033281; Feb. 21, 1985, 60-033282; Feb. 21, 1985, 60-033283; Feb. 21, 1985, 60-033284; May 3, 1985, 60-043237; May 3, 1985, 60-043238**

**Int. Cl.$^5$ G02F** *1/13*

**U.S. Cl. 350—348** **4 Claims**



2. A light modulating device for diffracting-modulating a light including mutually perpendicular polarization components, comprising:

a first grating structure;

a first surface facing said first grating structure, with a first intermediate layer being formed between said first surface and said first grating structure;

a first liquid crystal for filling said first intermediate layer, said first liquid crystal having liquid crystal molecules oriented in a first direction which is substantially parallel with said first surface;

a second grating structure;

a second surface facing said second grating structure, with a second intermediate layer being formed between said second surface and said second grating structure;

a second liquid crystal for filing said second intermediate layer, said second liquid crystal having liquid crystal molecules oriented in a second direction which is substantially parallel with said second surface and perpendicular to said first direction; and

means for applying an electric field to said first and second intermediate layers, with said electric field being applied substantially simultaneously to said first and second intermediate layers in a direction perpendicular to said first and second surfaces so that each liquid crystal molecule of said first and second liquid crystals is substantially simultaneously oriented in a third direction which is perpendicular to said first and second surfaces, wherein

said first grating structure, said first intermediate layer, said second grating structure and said second intermediate layer are provided along an optical path of the light, and said first and second liquid crystals respectively assume the same normal index of refraction and the same extraordinary index of refraction, and said first and second grating structures are disposed to assume a refractive index substantially equal to said normal index of refraction, wherein said first liquid crystal is oriented in the first direction and said second liquid crystal is oriented in the second direction when one of the polarization components of the light is diffracted by said first grating structure and the other polarization component of the light is diffracted by said second grating structure, and said first and second liquid crystals are oriented in said third direction when each of the polarization components of the light is not substantially diffracted by said first and second grating structures.

---

### 5,013,142
### BIFOCAL OPTICAL SYSTEM

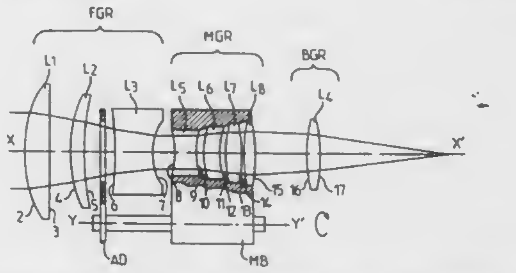
**Joël Rollin, and Jean-Claude Perrin, both of Vanves, France, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Dec. 12, 1989, Ser. No. 449,638**

**Claims priority, application France, Dec. 16, 1988, 88 16642**

**Int. Cl.$^5$ G02B** *15/02*

**U.S. Cl. 350—422** **4 Claims**



1. A bifocal optical system, having a long focal length LF and a short focal length SF and comprising an objective with fixed lenses arranged in a front group and a rear group, and an intermediate group in a movable holder for insertion between the front and rear groups, characterized in that the front group having a focal length LF/$\gamma$ is convergent and comprises three lenses, the rear group is convergent and includes a lens having a magnification $\gamma$ in that the movable holder is rotatable around an axis parallel to the system optical axis, and in the intermediate group is convergent constituted by four lenses and has a magnification of $\gamma' = SF/LF$.

---

### 5,013,143
### LENS

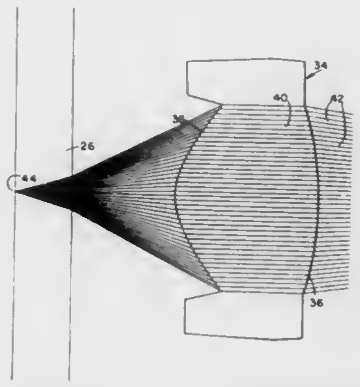
**Ian K. Pasco, Bracknell, England, assignor to Combined Optical Industries Limited, Slough, England**

**Continuation-in-part of Ser. No. 287,647, Dec. 20, 1988, abandoned, which is a continuation of Ser. No. 130,451, Nov. 10, 1987, abandoned. This application Dec. 21, 1989, Ser. No. 456,631**

**Claims priority, application United Kingdom, Mar. 19, 1986, 8606838**

**Int. Cl.$^5$ G02B** *3/02*

**U.S. Cl. 350—432** **3 Claims**



1. A finite conjugate lens for use in reading optical data, said lens having first and second aspheric surfaces, each said surface being configured as such a conic base curve modified by use of higher order correction terms up to 40th order such that the light passes within the lens between said first and said second surfaces as a substantially parallel beam.

VOL
1126
ISS
1
MY
7
1991
UMI

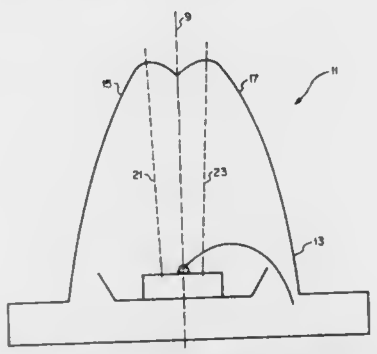
### 5,013,144
## LIGHT SOURCE HAVING A MULTIPLY CONIC LENS

**David E. Silverglate, Santa Cruz, and Greg P. Smestad, San Jose, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation of Ser. No. 253,997, Oct. 15, 1988, abandoned. This application Jul. 23, 1990, Ser. No. 560,489**

**Int. Cl.⁵ G02B *3/04***

U.S. Cl. 350—435 **26 Claims**



20. A lens that is rotationally symmetric about an optical axis, the lens comprising in cross-section:

a first conic section having a first axis translated and tilted from the lens optical axis; and

a second conic section having a second axis translated and tilted from the lens optical axis opposite the first conic section, such that the first and second conic sections intersect at a point on the lens optical axis that is displaced from all foci of both conic sections.

---

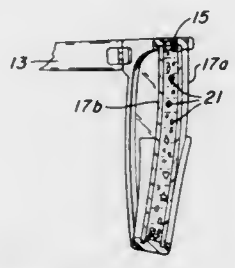
### 5,013,145
## EYEGLASSES WITH LIQUID-FILLED LENSES

**Theodore P. Croll, 4242 Mechanicsville Rd., Mechanicsville, Pa. 18934**

**Filed Nov. 20, 1989, Ser. No. 438,313**

**Int. Cl.⁵ G02C *11/02***

U.S. Cl. 351—52 **6 Claims**



1. Novelty eyeglasses, comprising:

a. an eyeglass frame;

b. a plurality of lenses rigidly mounted in said frame in substantially parallel spaced relation;

c. a flowable liquid occupying the space between said lenses;

d. access ports including closures located in said frame located to provide a conduit from the outside to the space between said lenses; and

e. decorative particles within said liquid between said lenses.

---

### 5,013,146
## OPTHALMOLOGICAL MEASUREMENT APPARATUS

**Koichi Akiyama, Tsukuba, Japan, assignor to Kowa Company Limited, Japan**

**Filed Aug. 18, 1989, Ser. No. 396,639**

**Claims priority, application Japan, Sep. 14, 1988, 63-228485**

**Int. Cl.⁵ A61B *3/14, 3/10***

U.S. Cl. 351—208 **13 Claims**

1. In an ophthalmological measurement apparatus in which a laser beam is directed into the eye under examination and a measurement value is output on the basis of the state of scattering of the laser beam within the eye under examination, the improvement comprising:

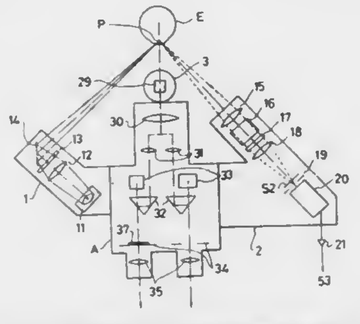
a laser beam projection section for focusing a laser beam produced by a laser beam source at a predetermined point within an eye under examination;

a light receiving section equipped with a photoelectric conversion element for receiving scattered laser light from the eye under examination;

an alignment index projection section for forming at a predetermined point within the eye under examination an alignment index image for use in judging alignment between the apparatus and the eye under examination;

an observation section for observing the state of the laser beam and of the light of the alignment index image at the eye under examination, the observation section including indices for indicating the positions within a field of vision of the observation section which are assumed by the light scattering points produced at the cornea of the eye under examination by the laser beam and the light of the alignment index image when the relative positions of the apparatus and the eye under examination are in predetermined alignment; and

means for controlling the relative position between the eye under examination and the apparatus to cause light scattering points produced at the eye under examination by the laser beam and the light of the alignment index image to assume predetermined positions within the field of the observation section.



---

### 5,013,147
## SYSTEM FOR PRODUCING STATIONARY OR MOVING THREE-DIMENSIONAL IMAGES BY PROJECTION

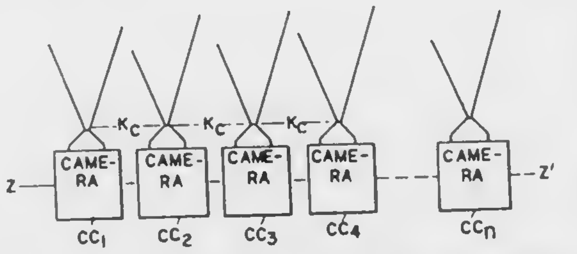
**Juan D. Montes, Urbanizacion Las Cabanas II, Chalet No. 9, Las Rozas, Madrid, Spain**

**Continuation-in-part of Ser. No. 247,368, Sep. 21, 1988, which is a continuation-in-part of Ser. No. 138,665, Dec. 28, 1987. This application Mar. 21, 1990, Ser. No. 498,093**

**Claims priority, application Spain, Dec. 29, 1986, 8603612**

**Int. Cl.⁵ G03B *35/00***

U.S. Cl. 352—58 **7 Claims**



1. An optical system, for the reproduction of three-dimensional images with vertical and horizontal parallax on which N images are projected, having projector objectives forming a rectangle, taken from N different places, also forming a rectangle, formed of two sheets of cylindrical lenses which are perpendicular to each other, characterized by the fact that the vertical optical aperture has a value greater than the quotient obtained by dividing the distance between two contiguous vertical projection objectives by the projection distance and less than twice said value, and the horizontal optical aperture has a value greater than the quotient obtained by dividing the distance between two contiguous horizontal projection objectives by the projection distance and less than twice said value.

---

### 5,013,148
## PROJECTOR FOR TRANSPARENT FILE SHEET

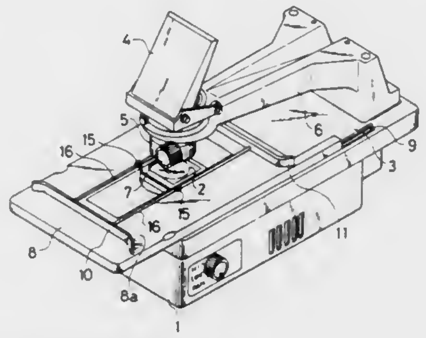
**Jiro Ozeki, Tokyo, Japan, assignor to Slidex Corporation, Tokyo, Japan**

**Filed Jul. 12, 1989, Ser. No. 378,979**

**Claims priority, application Japan, Jul. 12, 1988, 63-173059; Apr. 18, 1989, 1-97762**

**Int. Cl.⁵ G03B *5/00, 21/00***

U.S. Cl. 353—27 R **10 Claims**



1. A projector comprising

a housing,

a horizontally extending support frame with a carrying surface for carrying a flexible file sheet in which a plurality of transparent materials are arranged in the form of a matrix longitudinally and transversely and with an opening on the carrying surface for projecting the transparent material,

light source means arranged in the housing at one side of the support frame,

projecting lens means arranged at the other side of the support frame,

the support frame being mounted on the housing for a reciprocating movement in a first direction,

the support frame being provided with guide means for movably carrying the file sheet in a second direction perpendicular to the first direction,

retaining means for retaining the file sheet onto the carrying surface, the retaining means being mounted on the support frame for allowing the file sheet to move relative to the retaining means with the retaining means maintaining contact with the file sheet in a horizontal plane,

a roller frame,

the retaining means including a pair of rods arranged on the support frame above the carrying surface in a spaced relationship with each other in the second direction and extending in the first direction,

the roller frame being provided with a plurality of rollers,

the roller frame being removably mounted on the rods.

---

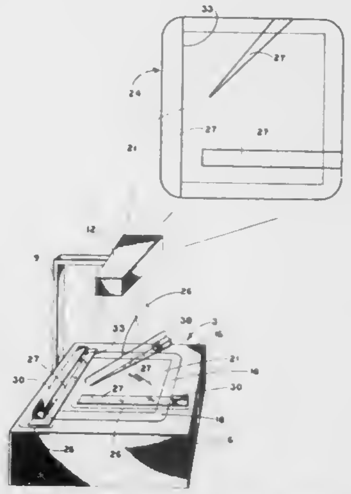
### 5,013,149
## OVERHEAD PROJECTION HIGHLIGHTING DEVICE AND METHOD OF USE

**Daniel L. Downum, 104 Abrozo Ct., Folsom, Calif. 95630, and Robert L. LaFond, 436 S. Manengo, Apt. 104, Pasadena, Calif. 91101**

**Filed Jun. 2, 1989, Ser. No. 360,352**

**Int. Cl.⁵ G03B *21/64***

U.S. Cl. 353—122 **8 Claims**



1. A highlighting device for use on a stage surface of an overhead projector comprising a color tinted light transmissive body with upper and lower surfaces, wherein said body lies directly on or next to an information transparency sheet placed upon said stage surface and said body casts a substantially distortion free image upon a viewing surface to highlight said information transparency sheet, further comprising a plurality of support elements affixed to said lower body surface for supporting said body on said stage surface, wherein each of said support elements provides a sufficiently high coefficient of friction between said stage surface and said highlighting device so as to prevent movement of said highlighting device when at least two of said support elements are employed as a register for aligning and emphasizing an edge of said information transparency sheet.

---

### 5,013,150
## METHOD FOR DETECTION OF FLUORESCENCE OR LIGHT SCATTER

**Richard P. Watts, San Mateo; Wylie I. Lee, Laguna Beach, and John W. Vorpahl, Livermore, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 176,475, Apr. 1, 1988, Pat. No. 4,934,811. This application Mar. 23, 1990, Ser. No. 498,065**

**The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.**

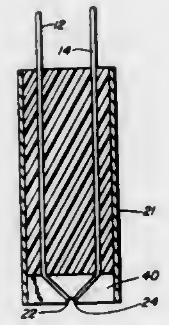
**Int. Cl.⁵ G01N *21/49, 21/64***

U.S. Cl. 356—73 **1 Claim**

1. In an assay for the determination of an analyte in a liquid sample by means of at least two angularly disposed optical fibers, the improvement comprising defining a finite interrogation volume of less than about $10^{-5}$ cubic centimeters within said sample with said optical fibers having longitudinal axes by

VOL 1126 ISS 1 MY 7 1991 UMI

orienting said longitudinal axes so as to intersect with a dihedral angle of between about 40°-140°, immersing said optical



fibers within said liquid sample and optically coupling said optical fibers.

---

### 5,013,151
### VARIABLE BEAM WIDTH LASER RADAR SYSTEM

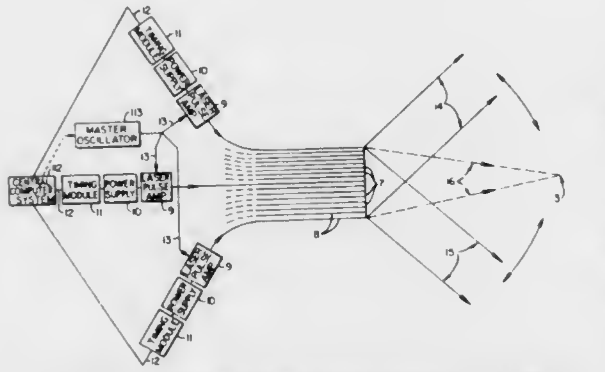
**John L. Hughes, Canberra, Australia, assignor to Australian Electro Optics Pty Ltd., Australia**

**Filed Dec. 7, 1981, Ser. No. 327,863**

**Claims priority, application Australia, Dec. 9, 1980, PE6837**

**Int. Cl.$^5$ G01B *11/26;* B64D *1/04***

**U.S. Cl. 356—152** **10 Claims**



1. A variable beam laser radar system capable of operating in diverging, parallel and converging beam modes, comprising: at least one optical transmitter having individual fibres in a fibre bundle, said transmitter including an output aperture composed of a close packed, coherent array of single mode fibres having optically polished fibre ends forming a substantially planar face, the other optically polished ends of individual fibres of said fibre bundle being loose and each such one of said individual fibres being connected to a single mode laser source in an array of such sources, the laser sources being activated such that the laser emission from the individual fibres forming the transmitter output aperture is phase-locked at said face of said output aperture, allowing for both output beam scanning and output beam focussing.

---

### 5,013,152
### INTERCHANGEABLE INTERFEROMETRIC OPTICAL MOUNTING ELEMENTS

**John C. Crownshaw, Beverston, United Kingdom, assignor to Renishaw plc, Gloucestershire, United Kingdom**

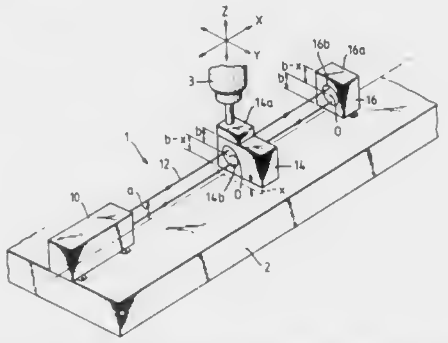
**PCT No. PCT/GB88/00821, § 371 Date May 22, 1989, § 102(e) Date May 22, 1989, PCT Pub. No. WO89/03516, PCT Pub. Date Apr. 20, 1989**

**PCT Filed Oct. 5, 1988, Ser. No. 362,455**

**Claims priority, application United Kingdom, Oct. 12, 1987, 8723902**

**Int. Cl.$^5$ G01B *9/02***

**U.S. Cl. 356—345** **5 Claims**



1. An optical device for use in interferometric measuring systems comprising:

an optical component, said optical component having a geometric center; and

a housing, said optical component mounted in said housing such that said geometric center is asymmetrically positioned with respect to at least a first side and an opposing second side of said housing, said asymmetrically positioned geometric center being closer to said first side by a clearance distance and at a fixed distance from said second side such that by proper orientation said optical device may be mounted on one of a moving part and a stationary part in a manner permitting a light beam passing at said fixed distance from a bed of a machine to pass through said geometric center and said moving part may move without hinderance.

---

### 5,013,153
### INTERFEROMETRIC GAS COMPONENT MEASURING APPARATUS FOR SMALL GAS MOLECULES

**Rolf Disch, Reute, and Wolfgang Hartig, Waldkirch, both of Fed. Rep. of Germany, assignors to Erwin Sick GmbH Optik-Elektronik, Fed. Rep. of Germany**

**Filed Jul. 20, 1989, Ser. No. 383,461**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825683**

**Int. Cl.$^5$ G01B *9/02;* G01J *3/45***

**U.S. Cl. 356—346** **6 Claims**

1. An interferometric gas component measuring apparatus, comprising:

a light source having a bandwidth of light which encompasses the absorption spectra to be used with the gases which are to be measured,

an input objective and an output objective;

a condenser which forms an image of the light source in the input objective;

a measurement path for containing the gas components to be measured, said measurement path illuminated by light from the light source entering said measurement path through the input objective;

a polarizer which receives the light emerging from the measurement path;

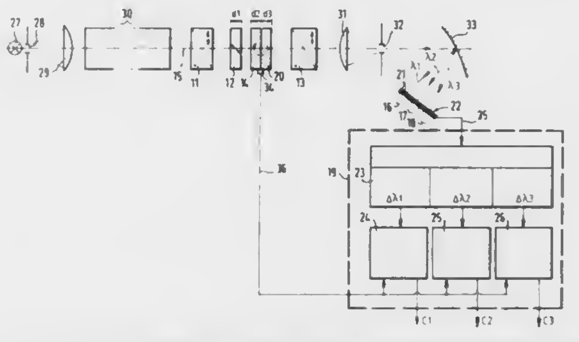
a stationary first double refracting plate arranged between the polarizer and the output objective, said polarizer having an optical axis which includes an angle of 45° with the direction of polarization of the polarizer, and a thickness (d1) such that a phase displacement between mutually perpendicular polarized beams in the first double refracting plate corresponds directly to a reciprocal of a quasi-periodic line splitting of a selected vibration and/or rotation band of gas molecules contained in the gas component to be measured;

an analyzer arranged between the first double refracting plate and the output objective, said analyser having an optical axis extending parallel to the optical axis of the, said output objective having an output diaphragm at its focal point;

a diffraction grating disposed adjacent to the output diaphragm;

a diffraction grating for deflecting light of the selected vibrational and/or rotational band to a photoreceiver which transmits an electrical concentration signal representative of the concentration of the relevant gas component in the measurement path;

a rotatable second double refracting plate adjacent to the first double refracting plate, wherein the second double refracting plate has a thickness (d2) such that the sum (d1+d2) or difference (|d2−d1|) of the thicknesses (d1, d2) of the first double refracting plate and the second double refracting plate produces a phase displacement between the mutually perpendicular polarised beams in the first double refracting plate and the second double refracting plate which corresponds to a reciprocal of the quasi periodic line splitting of a selected vibrational and/or rotational band of gas molecules of a gas component;



a first and second photoreceiver corresponding to the selected vibrational and/or rotational bands; and

an electrical evaluation circuit, wherein output signals from the first and second photoreceivers and an angular position signal taken from the rotating second double refracting plate is applied to the electrical evaluation circuit, and at predetermined instantaneous angular positions of the rotating second double refracting plate, said electrical evaluation circuit forms a first concentration signal corresponding to the thickness (d1) of the first double refracting plate and a second concentration signal corresponding to the sum (|d1−d2|) or difference (|d2−d1|) of the first double refracting plate and second double refracting plate thicknesses.

---

### 5,013,154
### SYSTEM FOR REMOTELY READING AN ANALOG METER

**Richard A. Kominsky, Westfield, Mass., assignor to K and M Electronics, Inc., West Springfield, Mass.**

**Filed Oct. 16, 1989, Ser. No. 422,133**

**Int. Cl.$^5$ G01B *11/14;* H04N *7/18***

**U.S. Cl. 356—375** **5 Claims**

1. System for remotely reading out an analog meter having a movable pointer overlying and being mobile over a stationary scale, said pointer being characterized by a first optical reflectivity (R1), and said scale being characterized by a second optical reflectivity (R2), comprising:

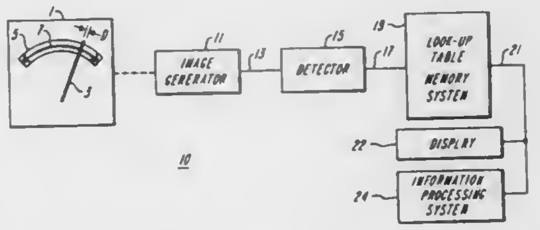
A. imaging means for generating an image signal representative of the optical reflectivity of a composite image of said pointer overlying said scale,

B. detection means for processing said image signal to generate a pointer position signal representative of the relative position of said pointer with respect to said scale, and

wherein said image signal is representative of the optical reflectivity of said composite image along a path of interest across said scale including regions underlying possible positions of said pointer, and

wherein detection means includes:

i. means for generating a first reflectivity change signal representative of the change in optical reflectivity between R1 and R2 along said path of interest,



ii. means for summing said first reflectivity change signal with a temporally offset inverted form of said first reflectivity change signal. said temporally offset inverted form being temporally offset from said first reflectivity change signal by a time corresponding to the width of said pointer along said path of interest,

iii. means for generating said pointer position signal, said pointer position signal corresponding to said sum of first reflectivity change signal and said temporally offset inverted form.

---

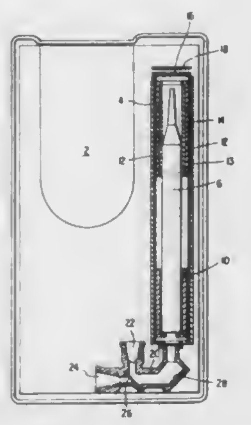
### 5,013,155
### PORTABLE SPECTROPHOTOMETRIC INSTRUMENT HAVING VIAL HOLDER AND LIGHT INTEGRATOR

**Franklyn M. Rybak, Glen Arm, Md., assignor to Chemetrics, Inc., Calverton, Va.**

**Continuation of Ser. No. 412,453, Sep. 26, 1989, abandoned. This application Sep. 27, 1989, Ser. No. 413,375**

**Int. Cl.$^5$ G01N *21/31, 21/51***

**U.S. Cl. 356—408** **9 Claims**



1. Apparatus for optical analysis of a sample comprising a body having receptacle means for receiving a sample vial, illumination means for illuminating said sample vial through a base of said vial, and detector means for detecting light which has passed through said sample vial, wherein said receptacle means comprises holder means for engaging said base of said vial and integrator means spaced from said holder for sur-

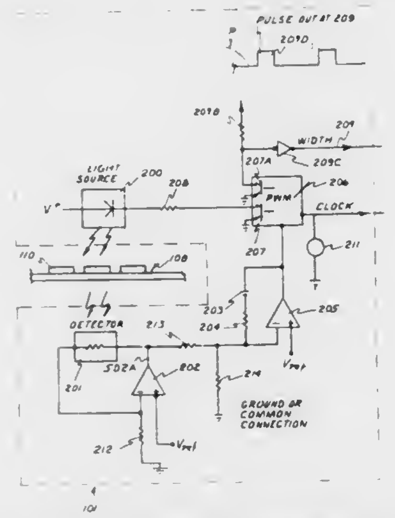
VOL
1126
ISS
1
MY
7
1991
UMI

rounding the upper part of said vial and integrating light emerging from said vial.

---

### 5,013,156
### OPTICAL DENSITY MEASUREMENT APPARATUS IN THE CONTEXT OF LABELING AND OTHER DEVICES

**William J. Murphy, South Acworth, N.H., assignor to IMTEC, Inc., Bellows Falls, Vt.**
**Filed Mar. 24, 1989, Ser. No. 328,286**
**Int. Cl.⁵ G01N** *21/55, 21/59, 21/86*
**U.S. Cl. 356—432** **25 Claims**



1. Optical density measurement apparatus to measure the optical density of a composite material, that comprises:

a light source whose spectral characteristics are matched to the material to be measured, positioned to direct radiation onto the composite material which effects a change in the intensity of the radiation;

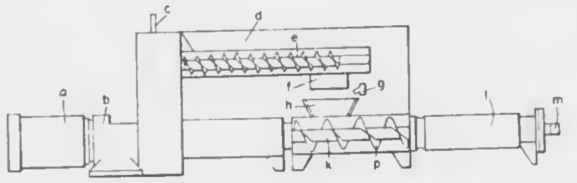
a detector whose optical characteristics are matched to the light source positioned to detect the radiation after interaction with the composite material and operable to generate a voltage signal indicative of the intensity level of the detected radiation; and

a control circuit whose output is connected to energize the light source and being interconneted to receive the voltage signal, the performance characteristics of the control circuit being chosen such that the control circuit is operable in response to the voltage signal to modify the average output of the light source to maintain the voltage output of the detector substantially constant, the control circuit being pulse-width modulated to effect modification of the average output of the light source to maintain substantially constant output from the detector by varying the average output from the light source in response to the voltage signal, the light source being one that can be modulated to produce an average light output that is proportional to the peak output of the control circuit output times the duty cycle of the control circuit output, said duty cycle being a direct measure of said optical density.

---

### 5,013,157
### APPARATUS FOR PRODUCING AERATED CEMENTITIOUS COMPOSITIONS

**Peter S. Mills, Burton-on-Trent, and Ivor K. Daly, Melbourne, both of England, assignors to Coal Industry (Patents) Limited, London, United Kingdom**
**Continuation of Ser. No. 607,805, May 4, 1984, Pat. No. 4,624,574. This application Jul. 31, 1986, Ser. No. 891,374**
**Claims priority, application United Kingdom, May 5, 1983, 8312326**
**Int. Cl.⁵ B28C** *5/06*
**U.S. Cl. 366—13** **8 Claims**



1. Apparatus for producing an aerated cementitious composition, comprising

a mixing chamber being open to atmosphere and containing mixing means,

feed means for feeding ingredients comprising cement, foaming agent and liquid to the mixing chamber,

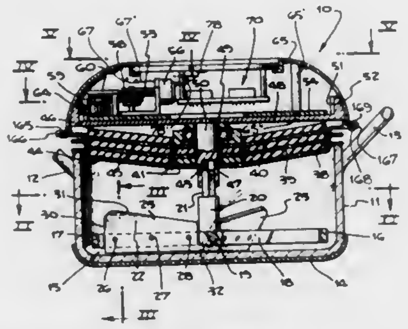
mixing means for mixing ingredients fed to the mixing chamber, pump means for pumping the mixed ingredients to a desired site and having a pump inlet connected to an outlet of the mixing chamber,

drive motor means connected through gearbox means to the mixing means, the pump means and the feed means providing a pumping capacity of the pump means greater than the feed rate of ingredients to the mixing chamber provided by the feed means, such that in operation air is drawn into the mixing chamber, and entrained in the mixed ingredients.

---

### 5,013,158
### SELF STIRRING VESSEL

**Kenneth A. Tarlow, 138 Waterview, Playa del Rey, Calif. 90293**
**Continuation-in-part of Ser. No. 250,901, Sep. 29, 1988, abandoned. This application Mar. 7, 1990, Ser. No. 489,496**
**Int. Cl.⁵ A47J** *27/00;* **B01F** *7/20*
**U.S. Cl. 366—251** **11 Claims**



1. A self stirring vessel comprising:

a container having at least an inner bottom wall, an upper peripheral lip and an interconnecting side wall adapted to hold liquids therein;

a stirring assembly having a centrally mounted elongated shaft terminating at the top in a key, said stirring assembly including a blade assembly fixed to the bottom of said shaft and adapted to rest on the inner bottom wall of said container;

stirring assembly actuating means having lip support means for engaging the peripheral lip of said container and resting thereon at the top of said container and also having a key adapted to be coupled to said first-mentioned key and configured with respect thereto for driving relationship therewith when said actuating means is mounted on the peripheral lip of said container, said actuating means further including motive means engaging said second-mentioned key for rotating the same which in turn rotates said first-mentioned key when it is coupled to said second-mentioned key;

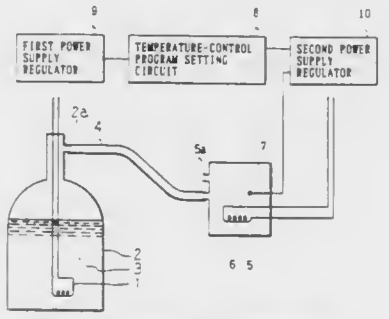
said actuating means including heat insulating means between said motive means and the interior of said container for insulating said motive means from the heat given off from the interior of said container when said container is heated, said heat insulating means including a plurality of vertically stacked spaced rigid trays separated by resilient pads; and

cover means enclosing said actuating means and electronically coupled thereto and coupled to both the uppermost one of said trays and to said motive means for selectively activating said actuating means.

---

### 5,013,159
### THERMAL ANALYSIS APPARATUS

**Nobutaka Nakamura; Haruo Takeda, and Masafumi Take, all of Tokyo, Japan, assignors to Seiko Instruments, Inc., Tokyo, Japan**
**Filed Oct. 12, 1989, Ser. No. 420,311**
**Claims priority, application Japan, Oct. 13, 1988, 63-257992**
**Int. Cl.⁵ G01N** *25/00;* **G01K** *1/20*
**U.S. Cl. 374—12** **3 Claims**


9
8
10
FIRST POWER SUPPLY REGULATOR
TEMPERATURE-CONTROL PROGRAM SETTING CIRCUIT
SECOND POWER SUPPLY REGULATOR
2a
4
5a
7
2
3
1
6
5

1. A thermal analysis apparatus comprising:

a first electrically operated heater;

a thermal insulating container in which said first heater is disposed, said container having a top provided with a coolant outlet opening and containing a mass of liquified coolant;

a sample chamber having a coolant inlet opening and a gas outlet opening;

a vapor flow pipe connected between said coolant outlet opening and said coolant inlet opening for conducting coolant vapor from said container to said chamber;

a second electrically operated heater disposed in said chamber to heat the interior of said chamber;

temperature detecting means disposed for detecting the actual temperature within said sample chamber and providing an output signal representative of that temperature;

a temperature control program setting circuit for producing a control signal representing a desired temperature;

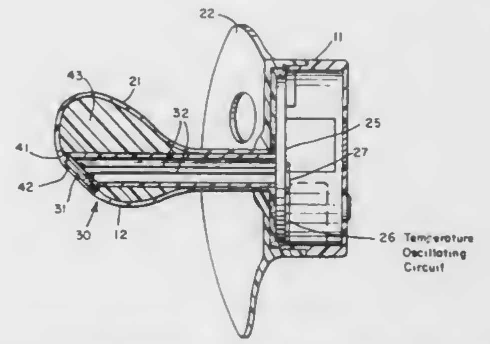
a first power supply regulator connected between said temperature control program setting circuit and said first heater and responsive to the control signal produced by said temperature control program setting circuit for regulating the electrical power supplied to said first heater in a manner to cause coolant in said container to be vaporized at a selected rate and to flow through said pipe into said sample chamber in order to cool the interior of said sample chamber; and

a second power supply regulator connected to said temperature control program setting circuit, said temperature detecting means and said second heater for receiving said control signal and said output signal and regulating the electrical power supplied to said second heater as a function of the difference between the desired temperature and the actual temperature within said chamber in order to heat the interior of said chamber to the desired temperature.

---

### 5,013,160
### COMBINED ELECTRONIC CLINICAL THERMOMETER AND PACIFIER

**Darryl D. Massey, 1148 10th St., Manhatten Beach, and Michael D. Gordon, 4707 La Villa Marina, Apt. A, Marina Del Rey, both of Calif.**
**Filed Jan. 4, 1990, Ser. No. 442,845**
**Int. Cl.⁵ G01K** *7/14, 13/00*
**U.S. Cl. 374—151** **1 Claim**



1. An integral mouth-piece having a flexible nipple portion and a stop ring flange portion for use in a combined electronic clinical thermometer and pacifier for use in easily and safely taking the temperature of either an infant or a small chile, the combined electronic clinical thermometer and pacifier including:

a. a housing which has a front face and which is mechanically coupled to the stop ring flange portion;

b. a temperature sensitive element having a transducer and a pair of wire leads, the transducer of the temperature sensitive element being disposed in the flexible nipple portion of the integral mouth-piece whereby when the flexible nipple portion is inserted into the mouth the transducer detects a body temperature;

c. a circuit board which is disposed within the housing;

d a temperature oscillating circuit which is electrically coupled to the pair of wire leads of the temperature sensitive element and which is disposed on the circuit board;

e. a body temperature measuring circuit which is electrically coupled to the temperature oscillating circuit and which is disposed on the circuit board; and

f. a digital display device which is electrically coupled to the body temperature measuring circuit and which is disposed on the circuit board, said flexible nipple portion of said integral mouth-piece comprising an outer sidewall and an inner sidewall with a recessed area in order to allow the transducer, which is disposed adjacent to said recessed area, to be as close to said outer sidewall as possible.

---

### 5,013,161
### ELECTRONIC CLINICAL THERMOMETER

**Robert Zaragoza, New York, N.Y.; Thomas V. McLinden, Oxford, Conn., and James A. O'Connell, Short Hills, N.J., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.**
**Filed Jul. 28, 1989, Ser. No. 387,457**
**Int. Cl.⁵ G01K** *1/00, 7/00*
**U.S. Cl. 374—208** **23 Claims**

1. A reusable thermometer for measuring the temperature of a living being comprising:

a rigid housing having a hollow probe extending outwardly therefrom in a distal direction;

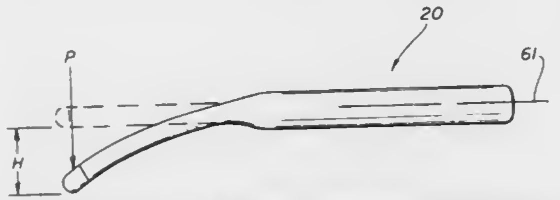
VOL
1126
ISS
1
MY
7
1991
UMI

temperature sensing means located at the distal end of said probe;

said housing holding display means and electrical means for converting the temperature measured by said temperature sensing means into a read-out on said display means, said electrical means adapted to engage a battery to facilitate operation of said thermometer;

conductor means for providing electrical communication between said electrical means and said temperature sensing means;

resilient soft cover means covering said probe and a portion of said housing to form a gripping surface for the user while allowing visualization of said display means, said resilient cover means being softer than said probe;



said probe being more flexible in response to bending force than said housing wherein said probe is capable of maintaining its shape while said thermometer is being held by said gripping surface and capable of deflecting in response to forces experienced during oral temperature measurement; and

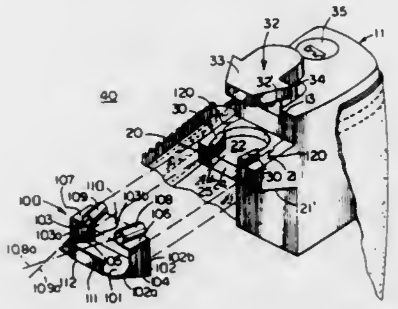
said probe and said cover means being constructed so that a force of 22 grams applied perpendicularly to the longitudinal axis of said thermometer at said distal end of said probe, while the thermometer is being firmly held by said gripping surface, will cause said distal end of said probe to deflect within the range of 1.0 mm to 25 mm in the direction of said force.

---

### 5,013,162
### FLEXIBLE-WALLED SECURITY CONTAINERS

**George W. Williams, Nanticoke, and Arnold S. Rifkin, Wilkes-Barre, both of Pa., assignors to A. Rifkin Co., Wilkes Barre, Pa.**

**Filed Aug. 9, 1990, Ser. No. 565,381**
**Int. Cl.$^5$ B65D** *33/16;* **E05B** *67/38*
**U.S. Cl. 383—97** **19 Claims**

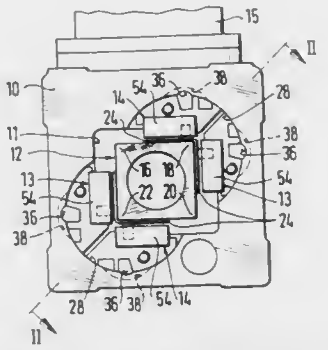


1. In a security container having a pair of flexible walls, an opening between edge margins of the walls, fastener means including a slider shiftable along the edge margins of the walls for opening and closing the opening, a body fixed generally interiorly of the container adjacent to the opening, and a retainer shiftably carried on the body generally exteriorly of the container, the body including a receiver extending transversely from an inner end surface of the body in a direction generally along the opening, the receiver including an upper surface facing generally outwardly through the opening, a lower surface on a side of the receiver opposite the upper surface, an outer end surface connecting the upper and lower surfaces and a recess in the upper surface with a reduced-width passageway extending through the outer end surface for receiving the slider in the recess through the outer end surface, the receiver further including a pair of lugs extending generally outwardly from the upper surface towards the opening on opposing sides of the passageway, the lugs being spaced from the inner end surface whereby gaps are formed on opposing sides of the upper surface between the lugs and the inner end surface, the retainer including a member extending generally in a direction along the opening and having one side facing inwardly through the opening toward the recess and the lugs, the retainer member being shiftable towards and away from the recess to releasably retain the slider in the recess and to cover portions of the bag edge margins adjoining the slider, the improvement comprising a clip adapted for removable attachment to the receiver, the clip including a base and a pair of arms extending generally the same direction transversely from the base sufficiently to substantially cover the gaps between the lugs and the inner end surface when the base is facing the lower surface of the receiver.

---

### 5,013,163
### LINEAR UNIT FOR MANIPULATION DEVICES AND THE LIKE

**Gerhard Gosdowski, Bietigheim-Bissingen, and Roland Rappold, Plüderhausen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**PCT No. PCT/DE87/00542, § 371 Date Jul. 24, 1989, § 102(e) Date Jul. 24, 1989, PCT Pub. No. WO88/06246, PCT Pub. Date Aug. 25, 1988**
**PCT Filed Oct. 21, 1987, Ser. No. 392,995**
**Claims priority, application Fed. Rep. of Germany, Feb. 16, 1987, 3704800**
**Int. Cl.$^5$ F16C** *23/04. 29/00. 33/00*
**U.S. Cl. 384—38** **8 Claims**

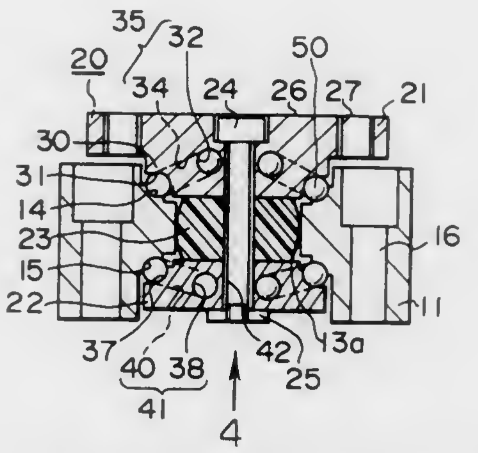


1. A linear unit for a manipulation device comprising a housing part having a passage therethrough; a spindle sleeve received in said passage for displacement therein and having a longitudinal axis, at least one longitudinal edge lying in a common plane with the longitudinal axis, and bearing surfaces extending adjacent said at least one longitudinal edge; and two bearing elements supported in said housing part and engaging said bearing surfaces of said spindle sleeve for supporting said spindle sleeve for displacement in said passage of said housing part, said housing part including a cylindrical bore longitudinally intersecting said passage and for receiving said two bearing elements, said cylindrical bore having a longitudinal axis in the common plane in which said longitudinal edge of said spindle sleeve and the longitudinal axis of said spindle sleeve lie, and forming an acute feed angle with the longitudinal axis of said spindle sleeve, and said cylindrical bore having a cylindrical wall, each of said two bearing elements including a guide segment having a cylindrical supporting surface abutting said cylindrical wall.

---

### 5,013,164
### CONSTANT PRESSURE PRELOAD LINEAR GUIDE BEARING APPARATUS

**Toru Tsukada, Maebashi, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**
**Filed Aug. 23, 1990, Ser. No. 572,616**
**Claims priority, application Japan, Aug. 29, 1989, 1-100665p7 Yp8**
**Int. Cl.$^5$ F16C** *29/06;* **F16H** *26/22*
**U.S. Cl. 384—45** **3 Claims**



1. A constant pressure preload linear guide bearing apparatus comprising:

a guide rail having an H-shaped cross section and an axially extending through bore formed in a web located at an axial center portion of the guide rail, the guide rail having a pair of axially extending upper rolling member rolling grooves formed in upper surfaces of base portions of the web and having a pair of lower rolling member rolling grooves formed in lower surfaces of the base portions of the web;

a slider having a substantially I-shaped cross section and inserted into the through bore of the guide rail, the slider being movable in an axial direction,

the slider including:

a table member having a pair of upper rolling member rolling grooves respectively formed in both lateral sides thereof so that the pair of upper rolling member rolling grooves respectively oppose the pair of upper rolling member rolling grooves in the web of the guide rail, the table member having a pair of rolling member circulating paths respectively disposed in communication with the pair of upper rolling member rolling grooves formed in both of the lateral sides of the table member,

a leg member having a pair of lower rolling member rolling grooves formed in both lateral sides thereof so that the pair of lower rolling member rolling grooves respectively oppose the pair of lower rolling member rolling grooves in the web of the guide rail, the leg member having a pair of rolling member circulating paths respectively disposed in communication with the pair of lower rolling member rolling grooves formed in both of the lateral sides of the leg member, and

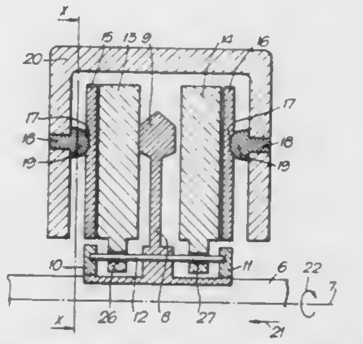
a distance member formed of an elastic body sandwiched between the table member and the leg member and integrally coupled thereto by a clamping spring member, the distance member being held in a compressed condition so that outer side surfaces of the distance member are expanded outwardly due to an elastic force of the clamping spring member; and

a plurality of balls movably inserted in the opposing rolling member rolling grooves of the guide rail and the slider.

---

### 5,013,165
### SELF-ACTING AIR SUPPORTED THRUST BEARING

**Paul Newman, Bristol, England, assignor to Rolls-Royce plc, England**
**Filed Jul. 30, 1990, Ser. No. 559,051**
**Claims priority, application United Kingdom, Aug. 25, 1989, 8919319**
**Int. Cl.$^5$ F16C** *32/00*
**U.S. Cl. 384—122** **7 Claims**

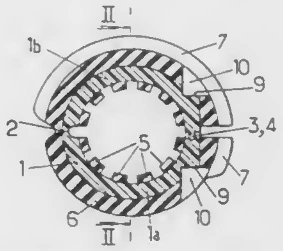


1. A self acting gas supported thrust bearing comprising: a static thrust pad, a shaft rotating about an axis and carrying a thrust parallel to the axis, a rotor connected to the shaft by a flexible link; the flexible link being arranged to drive the rotor at the same rotational velocity as the shaft and to allow the rotor to move radially and axially relative to the shaft, and a thrust element acting to transfer the thrust from the shaft to the rotor, the rotor and thrust pad co-operating to produce a pressurised layer of gas between them by the viscokinetic effect and to use this pressurised gas layer to generate a reaction force to the thrust.

---

### 5,013,166
### TORSION BAR BEARING

**Michel Domer, Valdampierre, France, assignor to Hutchinson, France**
**Filed Jan. 30, 1990, Ser. No. 472,635**
**Claims priority, application France, Jan. 31, 1989, 89 01188**
**Int. Cl.$^5$ F16C** *27/06;* **F16F** *1/38*
**U.S. Cl. 384—220** **6 Claims**



1. A torsion bar bearing, in particular an anti-roll bar bearing for a motor vehicle, characterized in that it comprises:

a relatively rigid frame having an inner face and two ends, said frame being formed of two opposite half-shells each being of a general semi-cylindrical shape which allows said inner face to be closely fitted on a torsion bar and locked thereon by a closure means;

resilient material ribs, integral with said inner face of said frame and extending substantially along generatrices of said half-shells, said ribs being adapted to nip the bar when said frame is locked thereon;

and a resilient material pad more flexible than said ribs, which is fastened externally to said frame and is adapted to be locked in a support means of the vehicle, said pad being adapted to work under torsion during operation of the bar.

VOL
1126
ISS
1
MY
7
1991
UMI

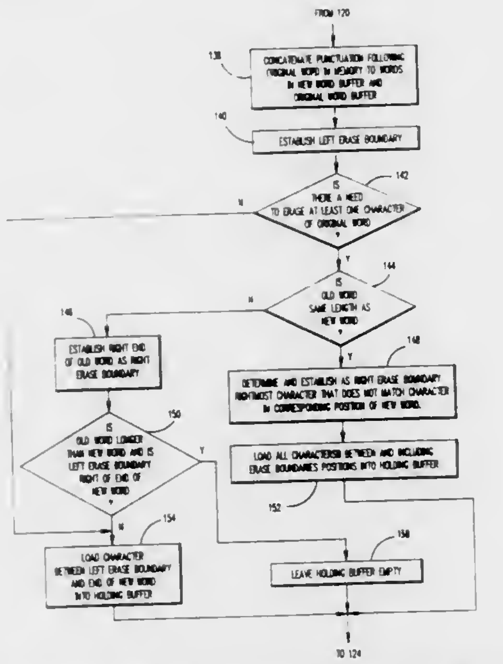
### 5,013,167
## BOUNDED WORD REPLACE FUNCTION FOR AN ELECTRONIC TYPEWRITER ERASING A ZONE BOUNDED BY ERRONEOUS CHARACTERS

**Julie M. Ervin, Versailles, Ky.; Mark M. Ingerman, Boston, Mass., and Ronald E. Jones, Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 9, 1988, Ser. No. 153,905**

**Int. Cl.⁵ B41J** *5/30, 29/26*

U.S. Cl. 400—63 6 Claims


FROM 120
138
CONCATENATE PUNCTUATION FOLLOWING ORIGINAL WORD IN MEMORY TO WORDS IN NEW WORD BUFFER AND ORIGINAL WORD BUFFER
140
ESTABLISH LEFT ERASE BOUNDARY
142
IS THERE A NEED TO ERASE AT LEAST ONE CHARACTER OF ORIGINAL WORD ?
N
Y
144
IS OLD WORD SAME LENGTH AS NEW WORD ?
146
ESTABLISH RIGHT END OF OLD WORD AS RIGHT ERASE BOUNDARY
148
DETERMINE AND ESTABLISH AS RIGHT ERASE BOUNDARY RIGHTMOST CHARACTER THAT DOES NOT MATCH CHARACTER IN CORRESPONDING POSITION OF NEW WORD.
150
IS OLD WORD LONGER THAN NEW WORD AND IS LEFT ERASE BOUNDARY RIGHT OF END OF NEW WORD ?
LOAD ALL CHARACTERS BETWEEN AND INCLUDING ERASE BOUNDARIES POSITIONS INTO HOLDING BUFFER
152
154
LOAD CHARACTER BETWEEN LEFT ERASE BOUNDARY AND END OF NEW WORD INTO HOLDING BUFFER
156
LEAVE HOLDING BUFFER EMPTY
TO 124

1. A typewriter having a keyboard for generating character and control signals; print means comprising marking means and a platen for support of a record sheet cooperating to place marks on said sheet; memory for storing a collection of preselected correctly spelled words in electronic code form; electronic control means for controlling said print means in response to signals from said keyboard, said print means further comprising means for erasing characters under the control of said electronic control means;

said electronic control means comprising means for verifying spelling of words as said words are entered through said keyboard, and means for selecting candidate words from said stored correctly spelled words which most closely correspond with a misspelled word, and means for selecting one of said candidate words and for initiating operations of said electronic control means to change said misspelled word to said selected one of said candidate words;

said electronic control means further comprising means responsive to said means for selecting and initiating for comparing said misspelled word and said selected candidate word and for delimiting the left and right end of a sequence of characters having an erroneous character at the beginning and the end of said sequence which may or may not include one or more correct characters, and for controlling said print means to remove the characters in said sequence in said misspelled word which has erroneous characters at the beginning and the end of said sequence, regardless of whether or not said sequence contains one or more correct characters, and for replacing any said removed character with a character from said selected word to form said word, and for preserving any correct characters prior to or after said sequence of characters to form said selected word.

---

### 5,013,168
## TANDEM STATION DOT MATRIX PRINTER

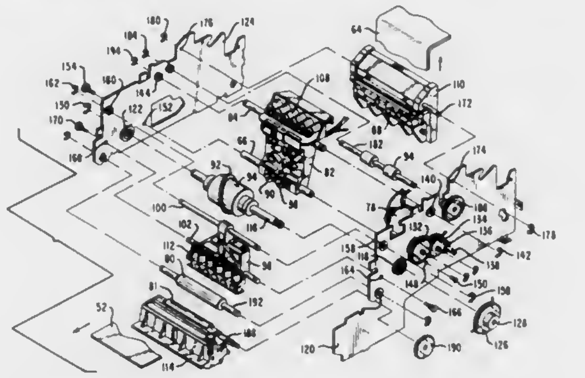
**Katsuyoshi Yokota, Kamakura; Toshihiro Jingu, Hiratsuka, and Kazunori Matsumoto, Fujisawa, all of Japan, assignors to NCR Corporation, Dayton, Ohio**

**Filed Jul. 24, 1989, Ser. No. 385,333**

**Claims priority, application Japan, Sep. 16, 1988, 63-230156**

**Int. Cl.⁵ B41J** *3/54*

U.S. Cl. 400—82 18 Claims



1. A printer comprising a

frame including spaced side plates, a

first printing station positioned between and supported by said side plates and including a first guide shaft means a first carriage carried by said first guide shaft means and a print head carried on said first carriage for printing on a first record medium, a

second printing station positioned in tandem relationship with respect to said first printing station and positioned between and supported by said side plates and including a second guide shaft means parallel to said first guide shaft means a second carriage carried by said second guide shaft means and a print head carried on said second carriage for printing on a second record medium, and

a single driving means common to and positioned between said first guide shaft means and said second guide shaft means and coupled to said first printing station carriage and to said second printing station carriage for driving each of said carriages an equal distance and in opposite directions in printing operations.

---

### 5,013,169
## PRINT HEAD HAVING REDUCED NOISE AND VIBRATION CHARACTERISTICS

**Tsutomu Ikehata; Makoto Yasunaga, and Hirofumi Suzuki, all of Saitama, Japan, assignors to Citizen Watch Company, Ltd., Tokyo, Japan**

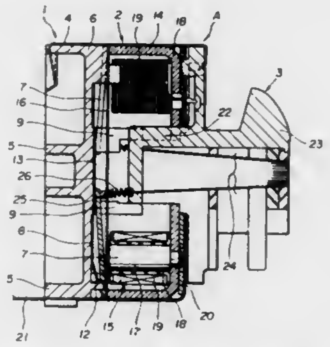
**Filed Aug. 16, 1989, Ser. No. 394,416**

**Claims priority, application Japan, Aug. 23, 1988, 63-109640[U]**

**Int. Cl.⁵ B41J** *2/28, 11/20*

U.S. Cl. 400—124 4 Claims

1. In a dot matrix print head for dot printing by wires projecting therefrom, which comprises a plurality of movable armatures for controlling the movement of said wires, the improvement comprising means for reducing noise and damping vibrations including an armature base formed from a liquid crystal polymer of an aromatic series polyester resin, said armature base disposed adjacent said armatures in the print head to arrest the movement thereof and to reduce noise and dampen vibrations tending to be generated by impacts occurring during the arresting of the movement of the armatures.



---

### 5,013,170
## PLASTIC PLATEN FOR TYPEWRITERS OR SIMILAR OFFICE EQUIPMENT

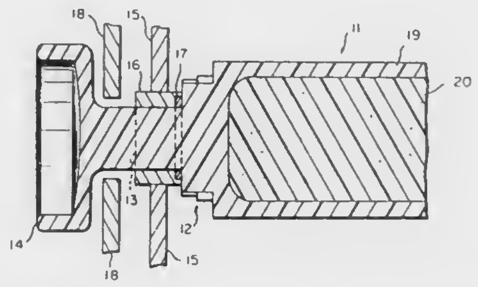
**Johannes Haftmann, Schwabach, and Rudolf Schmeykal, Hemhofen, both of Fed. Rep. of Germany, assignors to TA TRIUMPH ADLER Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany**

**Filed Feb. 21, 1989, Ser. No. 312,519**

**Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805215**

**Int. Cl.⁵ B41J** *11/04*

U.S. Cl. 400—659 5 Claims



1. A platen for a typewriter or similar office equipment, comprising:

a compact outer covering of cylindrical configuration formed of an impact resistant polyolefin containing an unexpanded foaming agent;

a foam core formed of expanded impact resistant polyolefin, said foam core being integral and unitary with said compact covering; and

first and second compact end portions substantially entirely covering said foam core, said end portions being formed of impact resistant polyolefin containing unexpanded foaming agent, said end portions being continuous with said compact outer covering and being integral and unitary with said compact outer covering and said foam core;

said compact outer covering, said compact end portions and said foam core being injection molded in one step; and

at least one of a line advance wheel and a notch wheel integrally injection molded together with said platen.

---

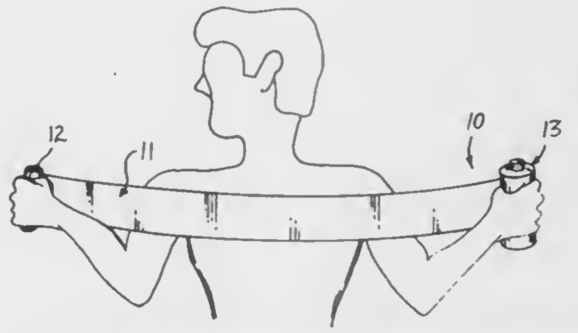
### 5,013,171
## BODY LOTION APPLICATOR APPARATUS

**Arthur W. Almond, II, 11808 Chase Wellesley Dr. #1321, Richmond, Va. 23233**

**Filed Mar. 15, 1990, Ser. No. 493,781**

**Int. Cl.⁵ A46B** *5/02*

U.S. Cl. 401—6 6 Claims



1. A lotion applicator apparatus comprising in combination,

an elongate axially aligned cylindrical housing, and

an elongate flexible web normally biased and retracted within the housing in a first position and extensible relative to the housing in a second position, and

retraction means mounted within the housing to secure a first end of the web and maintain the web within the housing in a furled orientation, and

a second end of the web including a rigid base member, and

a generally "U" shaped handle mounted pivotally to the base member, and

wherein the housing includes an entrance nozzle including an externally threaded surface, and an internally threaded cap cooperative with the externally threaded surface to permit filling of the housing with a fluid lotion, and

wherein the housing includes a continuous flange formed integrally to the housing and extending orthogonally therefrom defining a conduit within the flange, and the rigid base including a continuous groove, and the continuous groove accommodating the continuous flange therewithin in a complementary relationship, and

wherein the retraction means includes a support cylinder mounting a first end of the web thereto wherein the support cylinder including a support spindle coaxially directed through the support cylinder wherein the support spindle includes spaced ends projecting from the support cylinder wherein the spaced ends include a lower end directed through a lower web of the housing coaxially aligned with the housing, and an upper end of the spaced ends directed through an upper web of the housing contained completely within the housing, and biasing means mounted between an interior wall of the support cylinder and mounted to the support spindle to normally bias the support cylinder to the first position, and

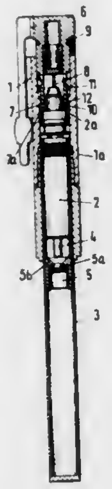
wherein the biasing means includes a plurality of coaxially spaced springs wherein each spring includes a first end mounted to the interior surface of the support cylinder and a second end directed through and received within an aperture formed within the support spindle to secure each spring in a fixed relationship between the support cylinder and the support spindle, and

wherein the web includes an open mesh belt contiguously and coextensively mounted to the web to maintain geometric integrity of the web in use, and the web including a matrix of concave recesses directed throughout its surface to enhance tension of fluid lotion within the web.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,172
### WRITING UTENSIL WITH SPACER RING

**Albert Menrath, Leimen, Fed. Rep. of Germany, assignor to Hermann Boehler GmbH, Dossenheim, Fed. Rep. of Germany**
**Filed Oct. 6, 1989, Ser. No. 418,267**
**Claims priority, application Fed. Rep. of Germany, Oct. 6, 1988, 3834352**
**Int. Cl.⁵ B43K** *5/00, 5/18, 9/00*
**U.S. Cl. 401—133** **2 Claims**



1 A one shot use, such as nonreusable and/or nonrefillable writing implement comprising:

a holder barrel with inserted writing insert, said writing insert having a front end with a writing tip and having a rear end with a tubular projection, the insert being movable in said barrel;

a writing liquid (India ink etc.) reservoir of tubular configuration and extending rewardly in relation to said writing tip and from said barrel;

a closure element being part of and connected to said reservoir and being axially aligned but prior to use normally spaced from said projection, and said insert situated in said barrel such that upon sliding towards said reservoir said projection is capable of penetrating and perforating said closure element to thereby provide an ink-liquid-conductive relation between the interior of the reservoir and the writing insert including the tip;

a two part cap on said barrel and having an end piece as one of its parts being axially slidable in a sleevelike cap portion being the other part, said sleevelike cap portion being connectable and disconnectable from said barrel;

said end piece of said cap having a sleevelike portion with two beads defining two relative positions vis-a-vis the cap sleeve, said cap sleeve having constriction means for latching behind one or the other of the beads to thereby establish two definite positions of the end piece vis-a-vis the cap sleeve which in turn establishes two different positions for the writing insert owing to the engagibility of the sleevelike portion of the end piece with the writing insert:

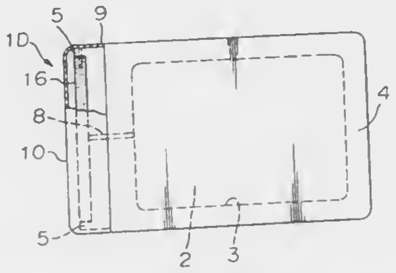
one of the positions being a position of axial displacement of the projection of the writing insert from the closure and the other one being a position of penetration and perforation of said projection vis-a-vis said closure element; and

a spacer ring normally maintaining in a pristine unused state in that said end piece is held in a first axial displaced position vis-a-vis said cap sleeve corresponding to a first latch position between one of the beads and said constriction, on removal of said on spacer ring, said end piece upon being pushed towards the cap sleeve permitting establishing the second position wherein the second one of the beads latches behind the constriction and the projection of the writing insert opens through perforation said closure.

---

### 5,013,173
### CONTAINER FOR A COSMETIC LIQUID

**Katsumune Shiraishi, 3-54-5, Sendagaya, Shibuya-ku, Tokyo, Japan**
**Filed Sep. 20, 1989, Ser. No. 409,778**
**Claims priority, application Japan, Apr. 4, 1989, 1-39822[U]**
**Int. Cl.⁵ B05C** *17/00;* **A45D** *34/04*
**U.S. Cl. 401—202** **3 Claims**



1. A container for a cosmetic liquid which comprises:

a flat, rectangular container body, of the size of a cash card, having an inner chamber capable of storing a cosmetic liquid,

an applying body attached to an end portion of said container body and being wettable to the cosmetic liquid;

a conduit for supplying the cosmetic liquid in said inner chamber to said applying body provided at the end portion of said container body; and

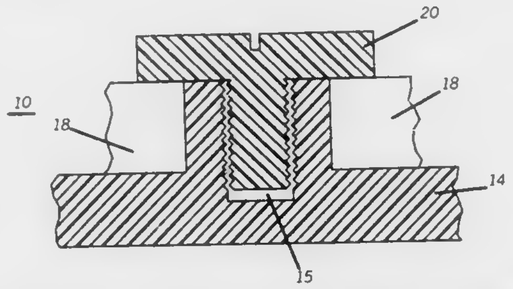
a cap detachably attached to said container body so as to cover said applying body;

said container having a thickness within a range of 0.3 to 1.0 cm, a width within a range of 5.0 to 6.0 cm and a length within a range of 8.0 to 9.0 cm to allow said container to be stored and carried in a similar manner as a cash card.

---

### 5,013,174
### DUAL FUNCTION FASTENER

**Eduardo J. Marabotto, Miami, and Peter Gilmore, Plantation, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Dec. 4, 1989, Ser. No. 445,512**
**Int. Cl.⁵ F16B** *17/00*
**U.S. Cl. 403—11** **17 Claims**



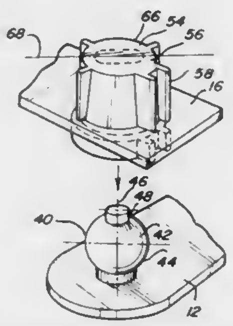
1. A boss formed on a first member and used to fasten a second member to the first member, comprising:

a deformable portion of the boss, arranged and constructed to protrude through an aperture in the second member, for initially fastening the first member to the second member by deforming the deformable portion, said deformable portion being removable by such means as cutting or burning; and

means, subsequent to removal of the deformed portion and utilizing the remaining portion, for alternatively fastening the first member to the second member.

### 5,013,175
### WINDSHIELD WIPER ANTI-ROLL CONNECTOR

**William L. Hayden, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.**
**Filed Oct. 10, 1989, Ser. No. 419,418**
**Int. Cl.⁵ F16D** *1/00*
**U.S. Cl. 403—24** **5 Claims**



1. In a linkage system for windshield wiper systems of the type in which a pair of crank arms are each mounted in laterally spaced fashion for reciprocal movement about a pivotal axis in timed relationship to each other and a connecting arm extends between the crank arms, an improved linkage connector for attaching the connecting arm to the crank arms comprising:

a pair of ball studs each having a ball portion defining a bearing surface, one ball stud fixedly secured to each of the crank arms and each arranged to define a pivotal axis parallel to the other and to each of the pivotal axes of the crank arms.;

a pair of mounting apertures formed through opposed ends of the connecting arm.;

a pair of ball sockets mounted in each of said mounting apertures and including a bearing surface engaging said ball stud ball portion;

a pin formed on at least one of said ball studs and projecting outwardly therefrom parallel to the pivotal axis thereof; and

means defining an elongated slot, an axis of elongation therealong, arranged generally normal to said ball stud pivotal axis in a corresponding number of said ball sockets and receiving a corresponding number of said pins in sliding relationship along the axis of elongation of said slot, said axis of elongation being aligned to perpendicularly intersect said ball stud pivotal axes.

---

### 5,013,176
### CONTINUOUS CONNECTOR

**Eric W. Orbom, 5812 Venice Blvd., Los Angeles, Calif. 90019**
**Filed Apr. 20, 1989, Ser. No. 340,861**
**Int. Cl.⁵ F16B** *7/04*
**U.S. Cl. 403—171** **5 Claims**

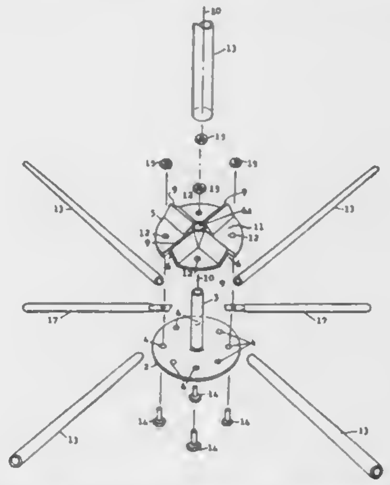
1. A connector for interconnecting tubing comprising:

an essentially planar base having a planar surface and having a central axis orthogonal to the plane of the base;

receptacle means secured to and projecting from the base, said receptacle means being coaxial with the central axis and being shaped to receive and nonrigidly secure an end of a piece of tubing extending along the central axis;

a cover having a peripheral edge and an aperture receiving the receptacle means therethrough, the cover having a plurality of indentations extending radially realtive to the central axis, each indentation being disposed radially between the aperture and the peripheral edge of the cover, each indentation opening toward the base providing thereby means for slideably receiving an end of a piece of tubing disposed within the indentation between the planar surface of the base and the cover in abutting relationship with the receptacle means; and

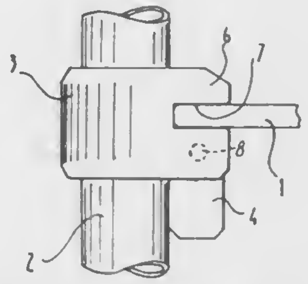
urging means for urging the cover toward the base to nonrigidly secure an end of a piece of tubing within the indentation between the base and the cover and in abutting relationship with the receptacle means, and with said end portion being in direct abutting relationship with said receptacle means.



---

### 5,013,177
### CLAMP FOR FASTENING A PLATE TO A PIPE

**Jean-Jacques Sol, 45 rue Raspail, Levallois Perret, France**
**Continuation of Ser. No. 837,055, Mar. 6, 1986, abandoned. This application Aug. 31, 1987, Ser. No. 567,681**
**Claims priority, application France, Mar. 6, 1985, 85 03631**
**Int. Cl.⁵ F16B** *7/04*
**U.S. Cl. 403—235** **3 Claims**



1. A clamp for the assembly of a plate to an upright, the clamp comprising, in combination:

a generally U-shaped stirrup member defining an opening for the upright and having a pair of spaced arms adapted to be positioned on opposite sides of the upright, each arm having an inner and an outer surface, the arms including end portions defining a slit for receiving the plate and each of said arms having an open-sided bearing thereon;

a pivot pin removably carried by the arms of the stirrup member and having each end thereof respectively disposed in one of the open-sided bearings and wherein each of said open-sided bearings defines an L-shaped recess for receiving the corresponding end of the pivot pin; and

lever means mounted on the pivot pin to removably support the lever means on the arms of the stirrup member for a pivot movement with respect thereto and removably mountable between the inner surfaces of the arms, the lever means being pivotally movable between a first position, wherein the lever means is in a substantially horizontal position and bear directly against the upright and the plate may be slidably received within the slit, and a second position, wherein the lever means is in a substantially vertical position and generally perpendicular surfaces thereof bear directly against the plate inserted within the slit and the upright and has a head portion which enters

VOL
1126
ISS
1
MY
7
1991
UMI

said openings and said slit during said pivotal movement to secure both said plate and said upright to said clamp to maintain the plate and the upright in a fixed relationship, relative to one another.

---

### 5,013,178
### LATCHING MECHANISM

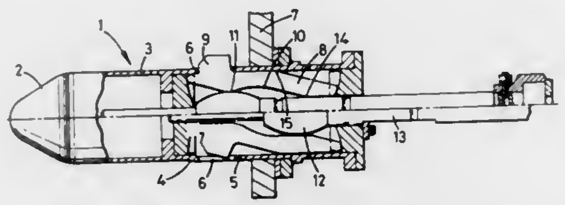
**Peter E. Baker, Brislington; Michael G. Warren, Clevedon, and David G. W. White, Chewstoke, all of England, assignors to The British Petroleum Company, p.l.c., London, England**

**Filed Mar. 22, 1990, Ser. No. 497,291**

**Claims priority, application United Kingdom, Mar. 22, 1989, 8906605**

**Int. Cl.$^5$ B25G** *3/18*

**U.S. Cl. 403—330** **5 Claims**



1. A latching mechanism comprising:

(a) first cylinder containing at least one cam and at least one cam operated pivotting member within the cylinder, each pivotting member having

(i) a lug adapted to project through an aperture in the cylinder in the latched position and to retract into the cylinder in the unlatched position,

(ii) an internal surface having a curved recess and adjoining shoulders on either end of the recess, and

(iii) an external surface having a shoulder contacting the internal surface of the cylinder, each cam being operated by a push rod and having a curved surface adapted to cooperate with the curved recess of the pivotting member to pivot the member, and with one of the adjoining shoulders to hold the member in the latched position with the lug projecting, and with the other adjoining shoulder to hold the member in the unlatched position with the lug retracted, the pivotting member having a first moving rolling pivot axis depending on the position of the cam with respect to the curved recess of the pivotting member, and a second fixed rocking pivot axis formed by the shoulder on the external surface of the pivotting member in contact with the internal surface of the cylinder, and

(b) a second cylinder cooperating with the first cylinder, the first cylinder being adapted to slide into the second, the second cylinder having an aperture or apertures adapted to receive and restrain the lug(s) of the pivotting member(s) within the first cylinder in the latched position.

---

### 5,013,179
### BOX-SHAPED BASE CONSISTING OF TWO WEDGE-COUPLED SHELLS

**René Rothmund, Holunderweg 8, 7000-Chur, Switzerland**

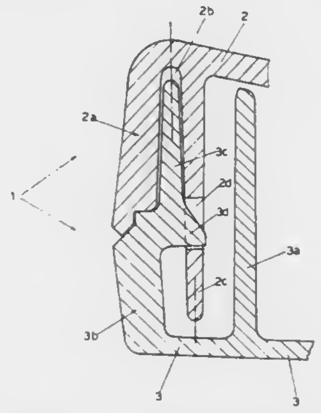
**Filed Sep. 27, 1989, Ser. No. 413,295**

**Claims priority, application Italy, Mar. 6, 1989, 19408/89[U]**

**Int. Cl.$^5$ F16B** *17/00*

**U.S. Cl. 403—335** **1 Claim**

1. A sturdy base for use in the construction of furniture comprising: a first half-shell and a second half-shell, the first half-shell having a regular external surface suitable for decorative finishes, the first half-shell being substantially hollow, the second half-shell having at least one rib therein, and means for coupling the half-shells to one another to substantially prevent subsequent separation thereof; wherein the first half-shell has vertical side walls having a height, the first half-shell further having a peripheral vertical edge, the vertical edge having a longitudinal length, such that a groove is formed between the side walls and the vertical edge, the vertical edge having a plurality of spaced apart slots at regular intervals along the longitudinal length of the vertical edge; the second half-shell having at least one stiffening rib formed therein, the second half-shell further having vertical side peripheral walls, said side walls being spaced apart from the at least one stiffening rib, said side walls having a top and having a height which is less than the height of the vertical side walls of the first half-shell, a wedge shaped lip being formed on the top of said side walls of the second half-shell, the lip having a bottom, a plurality of spaced apart teeth being formed at regular intervals on the bottom of the lip, the teeth being oriented in a direction toward the at least one stiffening rib and in a direction opposite to the side walls, such that when the two half-shells are placed against one another, the teeth on the second half-shell may couple with the slots on the first half-shell, the lip of the second half-shell being received in the groove in the first half-shell and the side walls of the first half shell contacting the vertical side walls of the second half-shell such that access to the teeth and the slots is prevented.



---

### 5,013,180
### RAISED PAVEMENT MARKING DEVICE

**Myung D. Ko, Kangnam Apt., 18-Dong, 40-Ho, 1648-Shinrim-Dong, Kwanack-Ku, Seoul 151-0181, Rep. of Korea**

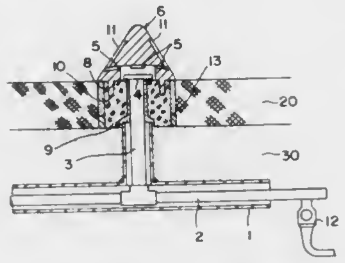
**PCT No. PCT/KR89/00005, § 371 Date Oct. 5, 1989, § 102(e) Date Oct. 5, 1989, PCT Pub. No. WO89/08743, PCT Pub. Date Sep. 21, 1989**

**PCT Filed Mar. 6, 1989, Ser. No. 411,505**

**Claims priority, application Rep. of Korea, Mar. 10, 1988, 88/2499**

**Int. Cl.$^5$ E01F** *9/00*

**U.S. Cl. 404—10** **1 Claim**



1. A raised pavement marking device disposed on pavement roadways, and connected to pipe connecting means, comprising:

a body member for safely driving a vehicle thereon;

a plurality of supporting legs extending from the bottom of said body member for inserting into apertures disposed on a concrete block;

a cavity disposed in the inside of said body member for keeping a hot air stream therewithin so as to immediately heat said pavement marking device;

a nozzle member disposed within said cavity for connecting to said pipe connecting means so as to supply the hot air stream;

a plurality of apertures communicated with said cavity, said plurality of apertures disposed radially around the outer surface of said body member; and

a reflector surrounding and contacting the outer surface of the body member and disposed above said plurality of apertures, whereby when snow, ice, or water are on the pavement roadways, the raised pavement marking device can immediately, effectively melt or dry the snow or ice and moisture thereon, and gradually melt or dry the snow or ice and moisture therearound.

---

### 5,013,181
### TRAFFIC LANE MARKING DEVICE

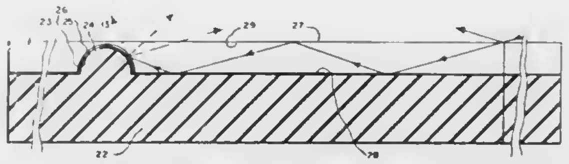
**George M. Harrison, 529 Guilford Rd., Vermilion, Ohio 44089**

**Filed Sep. 21, 1989, Ser. No. 410,598**

**Continuation-in-part of Ser. No. 240,623, Sept. 9, 1988, U.S. Pat. No. 4,875,799.**

**Int. Cl.$^5$ E01F** *9/06, 9/08*

**U.S. Cl. 404—12** **2 Claims**



1. A night-visible traffic marking device for installation embedded into aircraft landing strips, vehicle roadways and the like, comprising:

a generally planar plate member of transparent material installed with its upper surface flush with the traffic contacting surface;

at least one night visible object upstanding within the plate member to provide a substantial vertical profile from the point of view from an oncoming vehicle, the side of said object facing the vehicle including material selected to be highly visible when impinged upon by light;

light-emitting means positioned within the transparent plate member to illuminate the vehicle facing side of the upstanding object during periods of darkness; wherein

said device includes power generating means self-contained therein, including

a photo-voltaic panel imbedded within the transparent plate member and positioned to receive sunlight therethrough so that a voltage is generated during at least a portion of each diurnal period;

battery means chargeable by current from voltage from the panel;

light-emitting means powered by the battery means and positioned to illuminate the vehicle facing side of the upstanding object;

normally open light triggered switching means controlling power transmission from the battery means to the light-emitting means; wherein

the transparent plate includes a recess; and the light-emitting means is carried within a module removably installed within the recess.

---

### 5,013,182
### SELF-ADJUSTING MOUNTING-BAND ASSEMBLY

**Paul R. Coulvonvaux, Bruxelles, and Eric L. VandeVeire, Lubbeek, both of Belgium, assignors to Donaldson Company, Inc., Minneapolis, Minn.**

**Filed Apr. 4, 1989, Ser. No. 334,065**

**Int. Cl.$^5$ F16B** *2/06*

**U.S. Cl. 403—30** **1 Claim**

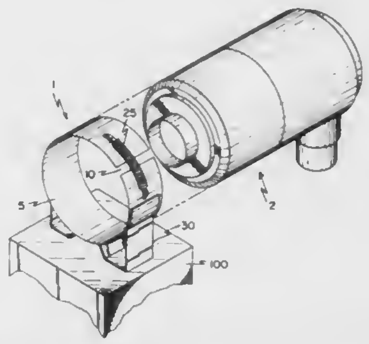
1. A mounting band assembly comprising:

a. a filter housing constructed of a material having a first rate of thermal expansion;

b. a band encircling the exterior of the filter housing, the band constructed of a material having a second rate of thermal expansion that is different from said first rate of thermal expansion;

c. securing means for securing the band to a support structure; and

d. self-adjusting means for enabling the band to maintain a constant pressure on the filter housing as the housing and the band expand and contract during heating and cooling, thereby allowing the housing to return to its original configuration upon each return to a cool condition;



wherein the pressure that is applied by the band and maintained by the self-adjusting means has been calculated to minimize the permanent deformation of the filter housing; and

wherein the mounting band is discontinuous, thereby defining two ends, and wherein the self-adjusting means draws the two ends of the band together with a constant force throughout a range of relative positions of the ends; and

wherein the self-adjusting means is a spring with two ends, each end of the spring being secured to one of the ends of the band, such that different thermal expansion of the band material and the housing material results in the spring progressively extending and contracting.

---

### 5,013,183
### APPARATUS FOR DRAWING OFF GROUND AIR

**Bengt Eriksson, Yrvädersgatan 16, Gävle, Sweden S-802 30 , and Bertil Clavensjö, Ormvraksväsen 11, Uppsala, Sweden S-752 52**

**PCT No. PCT/SE88/00686, § 371 Date Sep. 29, 1989, § 102(e) Date Sep. 29, 1989, PCT Pub. No. WO89/05890, PCT Pub. Date Jun. 29, 1989**

**PCT Filed Dec. 15, 1988, Ser. No. 399,477**

**Claims priority, application Sweden, Dec. 18, 1987, 8705069**

**Int. Cl.$^5$ B65G** *65/30;* **B09B** *1/00*

**U.S. Cl. 405—59** **6 Claims**

1. Apparatus for preventing radon gases from entering a house structure, comprising:

a tube with a first open end and an opposite second open end and with a first end portion and an opposite second end portion, a plurality of holes being provided in said first end portion, said tube being arranged vertically in an opening provided in the ground with said first end portion facing downwardly;

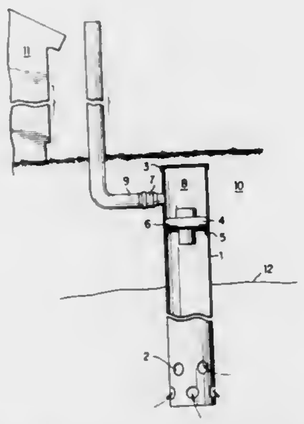
mounting and sealing means for sealingly mounting a blower means at a location within said tube so as to divide said tube into a lower section, comprising said first end portion and said first open end, and an upper section comprising said second end portion and said second open end;

cover means covering said second open end;

duct means having a first end section and an opposite second end section, said first end section opening into said upper section and said second end section opening into air above ground surface, and

VOL
1126
ISS
1
MY
7
1991
UMI

blower means arranged inside said tube between said first end portion and said second end portion at said mounting and sealing means for sucking ground air into said lower section of said tube through said plurality of holes and through said first open end, and for blowing said ground air into said upper section and through said duct means to said air above said ground surface, so that a ground air volume of reduced pressure extends around said tube and under said house structure thus preventing said radon gases from entering said house structure.



---

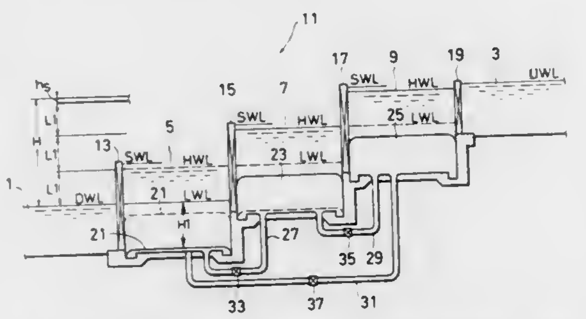
### 5,013,184
## LOCK USING AIR CHAMBERS

**Toshikatsu Omachi, Matsudo, Japan, assignor to Toshikatsu Omachi and Foundation of River & Basin Integrated Communications, Japan**

**Claims priority, application Japan, Sep. 18, 1989, 1-239873**

**Int. Cl.$^{5}$ E02C** *5/00*

**U.S. Cl. 405—85** **17 Claims**



1. A lock for connecting an upper stream and a lower stream, comprising:

an upper lock chamber containing water, located adjacent to the upper stream;

a first flexible air chamber capable of being inflated with air, located on a base of the upper lock chamber;

a lower lock chamber containing water, located between the upper lock chamber and the lower stream, the upper lock chamber and the lower lock chamber being capable of transferring a surcharge water therebetween;

a second flexible air chamber capable of being inflated with air, located on a base of the lower lock chamber; and

pipe means for connecting the first air chamber and the second air chamber, equipped with valve means for controlling a flow of air between the first air chamber and the second air chamber, such that the first air chamber is inflated while the second air chamber is deflated, and the first air chamber is deflated while the second air chamber is inflated, where the inflation and deflation of the first air chamber and the second air chamber are activated by weight difference of the waters contained in the upper lock chamber and the lower lock chamber which is produced by a transfer of the surcharge water between the upper lock chamber and the lower lock chamber.

---

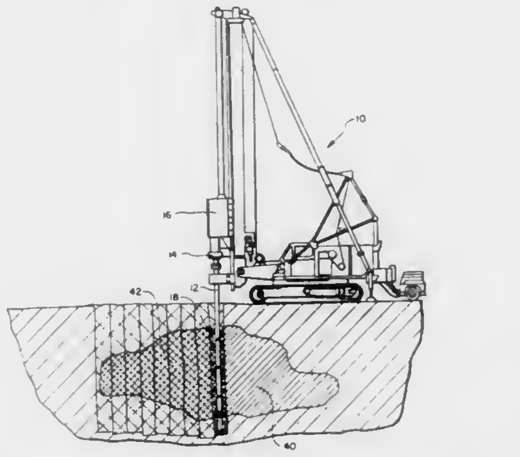
### 5,013,185
## MULTI-SHAFT AUGER APPARATUS AND PROCESS FOR FIXATION OF SOILS CONTAINING TOXIC WASTES

**Osamu Taki, 2558 Somerset Dr., Belmont, Calif. 94002**

**Continuation-in-part of Ser. No. 172,401, Mar. 23, 1988, Pat. No. 4,886,400. This application Mar. 23, 1988, Ser. No. 172,286**

**Int. Cl.$^{5}$ E02D** *3/12*

**U.S. Cl. 405—128** **56 Claims**



1. A method for in situ fixation of soil contaminated with toxic wastes using a multi-shaft auger apparatus, the method comprising the steps of:

(a) augering a plurality of boreholes downwardly into the contaminated soil with an auger apparatus having a plurality of shafts, each shaft having penetrating means at a lower end of the shaft and a plurality of soil mixing paddles extending outwardly from the shaft;

(b) injecting a chemical hardener into the contaminated soil during the augering of the boreholes;

(c) blending the contaminated soil and the chemical hardener in situ with the soil mixing paddles to form a soil/-hardener mixture, said blending process minimizing the vertical movement of the contaminated soil out of the boreholes in order to maximize in situ containment of the contaminated soil;

(d) withdrawing the multi-shaft auger apparatus from the contaminated soil; and

(e) allowing the soil/hardener mixture to cure to form a hardened column in the borehole, thereby fixating the contaminated soil.

---

### 5,013,186
## CABLE SHIP

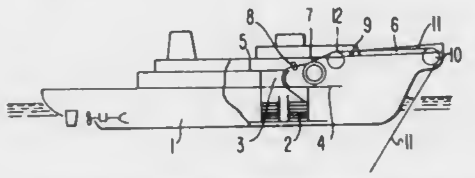
**Sadao Kakizaki, Shimonoseki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 25, 1990, Ser. No. 470,075**

**Claims priority, application Japan, Feb. 20, 1989, 1-39615**

**Int. Cl.$^{5}$ F16L** *1/04*

**U.S. Cl. 405—166** **4 Claims**



1. In a cable ship having a hull, an inboard deck, and a cable tank for accommodating a length of communication cable, equipment for paying out the communication cable from the cable tank to the outside of the hull, said equipment comprising:

a bow sheave disposed at an upper portion of the bow of the ship and rotatably supported thereat;

a cable-handling engine rotatably supported in the ship on said inboard deck for feeding cable from the cable tank to said bow sheave, said cable handling engine having a drum defining an uppermost guide section along which the communication cable extends from the cable-handling engine toward said bow sheave when said cable-handling engine is feeding cable from the cable tank; and

an intermediate sheave disposed between said bow sheave and said cable-handling engine for guiding the communication cable from said cable-handling engine to said bow sheave, said intermediate sheave defining an uppermost guide section along which the communication cable is guided from the intermediate sheave to said bow sheave when said cable-handing engine is feeding cable from the cable tank, the uppermost guide section of said intermediate sheave being located at a level that is higher than that at which the uppermost guide section defined by the drum of said cable-handling engine is located with respect to sea level when the ship is afloat on the surface of a sea.

---

### 5,013,187
## POSITIONING COMPONENTS AND ENERGIZING SEALING ASSEMBLIES THEREFOR

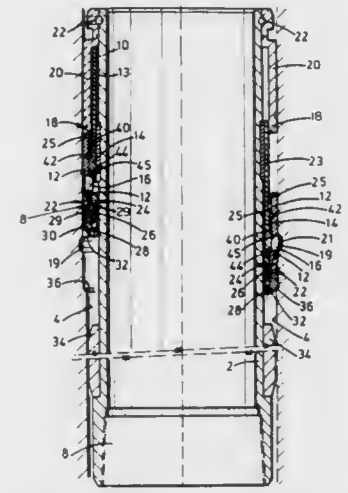
**Brian MacIntyre, Milngavie; Frank Close, Airdrie, and Sean McAvoy, Coatbridge, all of Scotland, assignors to Cooper Industries, Inc., Houston, Tex.**

**Filed Jul. 20, 1989, Ser. No. 383,117**

**Claims priority, application United Kingdom, Jul. 22, 1988, 8817554**

**Int. Cl.$^{5}$ F16L** *1/12*

**U.S. Cl. 405—169** **11 Claims**



7. A method of installing an inner annular member within a bore of an outer annular member so as to be received therewithin in a fluid-tight manner by means of expandable sealing means, comprising:

providing a shoulder within the bore of the outer annular member adapted to be contacted by a leading edge of an annular installation member,

driving two concentrically arranged sleeve members within the bore towards the shoulder,

encircling said inner annular member by the sleeve members and securing the sleeve members together by shearable links,

moving one of the sleeve members towards the shoulder to be arrested by abutment of the sleeve member against the shoulder,

continuing to apply a driving force to the other sleeve member so as to shear the shearable links and permit further movement of the other sleeve member,

said further movement operating energization means on the sleeve members to expand the sealing means and ensure a fluid-tight seal between the inner annular member and the inner surface of the bore of the outer annular member.

---

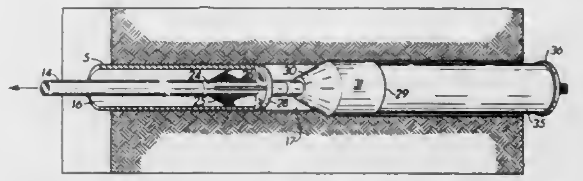
### 5,013,188
## PROCESS FOR REPLACING A LENGTH OF BURIED PIPE

**David B. Campbell, 43 Glenmeadow Crescent, St. Albert, Alberta, Canada T8N 3A2 , and Donald N. Campbell, 22 Ivy Crescent, Sherwood Park, Alberta, Canada**

**Filed Apr. 17, 1990, Ser. No. 509,757**

**Int. Cl.$^{5}$ F16L** *1/00*

**U.S. Cl. 405—184** **13 Claims**



1. In a method for replacing a buried section of old pipe which extends through a passageway formed in the soil, wherein first and second pits are provided at each end of the section to expose segments of the old pipe, and wherein these segments are sufficiently removed to make accessible the bore of the old pipe section, and wherein a string of rods having first and second ends is tripped from the first pit to the second pit through t he bore, the improvement comprising:

(a) attaching to the second end of the rod string a tool assembly comprising, in sequence, second means for bearing against the adjacent annular second end face of the old pipe section, third means for expanding the diameter of the passageway, and fourth means for engaging and pulling new pipe into the expanded passageway behind the old pipe as the latter is pulled toward the first pit, said fourth means having a section of new pipe associated therewith;

(b) providing means for breaking up the old pipe in the course of its advance out of the old passageway; and

(c) tripping the rod string, thereby simultaneously advancing the old pipe out of the old passageway, breaking up the old pipe as it leaves the passageway, expanding the diameter of the passageway, and advancing the new pipe into the expanded passageway to replace old pipe with new pipe.

---

### 5,013,189
## INTERMEDIATE PIPE-JACKING APPARATUS

**Toshio Akesaka, Yokohama, Japan, assignor to Kabushiki Kaisha Iseki Kaihatsu Koki, Tokyo, Japan**

**Filed Apr. 18, 1990, Ser. No. 510,616**

**Claims priority, application Japan, Apr. 28, 1989, 1-107365**

**Int. Cl.$^{5}$ F16L** *1/028;* **E21D** *9/06*

**U.S. Cl. 405—184** **9 Claims**

1. An intermediate pipe-jacking apparatus for use in the propulsion of pipes in the ground, comprising:

a movable frame spanning adjacent pipes and disposed in said pipes;

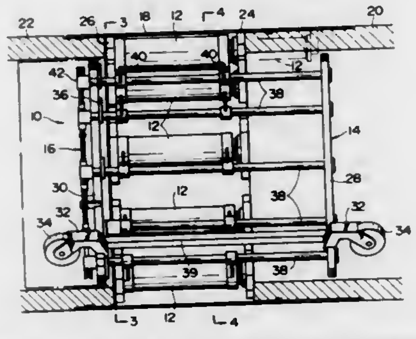
a plurality of hydraulic jacks supported by said frame and used for propelling the pipes;

an operating mechanism for shifting said hydraulic jacks between an operative position between the end faces of the adjacent pipes in a juxtaposed relationship for engaging the end faces and an inoperative position out of the

VOL
1126
ISS
1
MY
7
1991
UMI

juxtaposed relationship by being spaced diametrically inward and longitudinally away from the end faces of the adjacent pipes;

wherein said frame is provided with a pair of hollow end frame members located in the cross section of said pipes and substantially conforming to the inner peripheral surfaces of said pipes, said end frame members being spaced from one another, and a plurality of rod members rotatably supported by the end frame members;



said hydraulic jacks are respectively fixed to said rod members; and

said operating mechanism is disposed adjacent one of said end frame members and rotates said rod members so as to shift said hydraulic jacks between said operative position and said inoperative position.

---

5,013,190

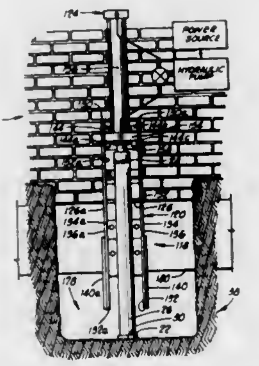
## DEVICES FOR LIFTING AND SUPPORTING A STRUCTURE AND METHOD

**Paul W. Green, 724 Lariat, Mustang, Okla. 73064**

**Filed Feb. 15, 1990, Ser. No. 480,421**

**Int. Cl.⁵ E02D** *5/00*

**U.S. Cl. 405—230** **6 Claims**



1. A support collar for supporting a structure, disposable on the upper portion of a support shaft and capable of securing a lifting head thereto, the lifting head comprising a housing capable of supporting a lifting jack, the housing comprising a top plate disposed between a first leg and a second leg, and horizontal slide bars secured to the legs capable of slidingly receiving, and thereby securing, the lifting head stand, comprising:

- a tubular section having an upper end and a lower end telescopable over and securable to the upper end portion of the support shaft;
- a support member secured to the tubular section disposable under the structure; and
- a lifting head stand secured about the upper end of the tubular section capable of being slidingly receiving and thereby secured to the lifting head.

---

5,013,191

## CAST-IN-PLACE PILING METHOD AND APPARATUS

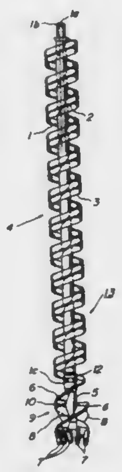
**Katsumi Kitanaka, 24-8, Sakuragaoka-Cho, Shibuya-Ku, Tokyo, Japan**

**Filed Dec. 28, 1989, Ser. No. 458,363**

**Claims priority, application Japan, Jan. 9, 1989, 1-1174; May 31, 1989, 1-136139; Jul. 3, 1989, 1-171591**

**Int. Cl.⁵ E02D** *5/34*

**U.S. Cl. 405—233** **18 Claims**



1. A cast-in-place piling method employing an earth auger main body having a hollow shaft, a spiral screw blade being provided about the hollow shaft, and a spiral belt being provided on an outer circumference of the spiral screw blade and being substantially parallel with an outer circumferential surface of the hollow shaft, and an auger head being provided at a lower end of the earth auger main body and having check means for preventing excavated earth and sand from flowing in a return direction as the earth auger is rotated in a reverse direction, said spiral belt being provided over substantially the entire length of said earth auger main body;

said method comprising the steps of excavating the ground to a predetermined depth by rotating said earth auger in a normal direction so that said earth auger penetrates the ground to said predetermined depth; placing said excavated earth and sand on said spiral screw blade; rotating said earth auger in the reverse direction thereby actuating said check means raising the earth auger together with excavated earth and sand; retaining excavated earth and sand on said spiral screw blade by said spiral belt to enable the earth and sand to be removed from the excavated hole; inserting reinforcing steel into the excavated hole; and pouring cement paste through a tremie pipe into the excavated hole to successively accumulate from the bottom to the top of the hole.

---

5,013,192

## DYNAMIC ROCK STABILIZING FIXTURE

**James J. Scott, Rolla, Mo., assignor to Scott Investment Partners, Rolla, Mo.**

**Continuation of Ser. No. 789,790, Oct. 21, 1985, now Re. 32,645. This application Jul. 6, 1987, Ser. No. 70,230**

**The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.**

**Int. Cl.⁵ E21D** *21/00*

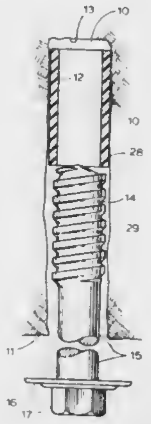
**U.S. Cl. 405—259** **6 Claims**

1. An anchor fixture for stabilizing geologic structure, which structure has a walled bore of a predetermined diameter, with an open end and a closed end, and a given length from said open end thereof to said closed end, said fixture comprising:

a separate body of formable material, adapted to be formed into a tubular shape, and sufficiently flexible to permit such tubular shape to conform to the bore shape, for independent insertion thereof into such bore only in close adjacency to the closed end of such bore hole; wherein

said body has a length which is substantially less than said given length of such bore hole, in order that said body will be clear of the open end of the bore hole;

an elongated rod which has a length at least as long as said given length of such bore hole, a diameter that is less than said predetermined diameter of such bore hole, and a surface configuration thereon extending lengthwise thereof, for a forced penetration of said body only by an end portion of said rod, following insertion of said body into such bore hole, to effect an interpositioning of such body between the wall of such bore hole and only said end portion of said rod, dynamic engagement of said body and said end portion of said rod by the wall of such bore hole, and a radiation of thrust forces from said rod and body into such geologic structure through substantially the length of said body; and



a load bearing plate engaged with said rod for retention of said plate, by said rod, against a surface of such geologic structure which surrounds such bore hole, for loading said rod in tension to effect and maintain a dynamic support of such geologic structure and to maintain the aforesaid radiation of thrust forces into such structure.

---

5,013,193

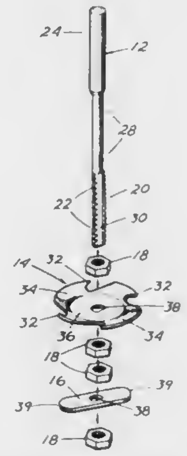
## CLOSET FLANGE REBORING TOOL

**Frederick N. Rabo, 2120 Oro-Chico Hwy., Durham, Calif. 95938, and Steven J. Masonek, 7475 Cana Hwy., Chico, Calif. 95926**

**Filed Jul. 12, 1990, Ser. No. 551,279**

**Int. Cl.⁵ B23B** *45/14, 51/00*

**U.S. Cl. 408—201** **9 Claims**



1. A reboring tool for removing, by guided rotary cutting action, a plastic closet flange affixed to a plastic drainage pipe, said reboring tool comprising;

- an elongated arbor having a first end and an oppositely disposed second end, said second end having means for affixment to a rotatable chuck of a tool;
- a non-circular guide member affixed on said arbor adjacent said first end thereof;
- a cutting member having at least one cutting blade thereon, said cutting member having an aperture therethrough, said arbor positioned within said aperture of said cutting member, said cutting member positioned on said arbor between said guide member and said second end of said arbor;
- a fastening means to prevent movement of said guide member upward and downward along said arbor;
- a releasable fastening means to prevent movement of said cutting member upward and downward along said arbor;
- selective placement means allowing selective movement of said cutting member towards and away from said first end of said arbor and said guide member with said releasable fastening means in a released state;
- anti-rotation means preventing rotation of said cutting member independently of said arbor on at least a portion of said arbor.

---

5,013,194

## CHUCK ASSEMBLY FOR TOOL BITS

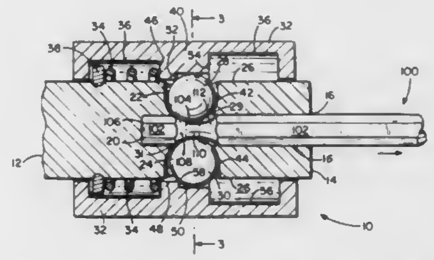
**James L. Wienhold, 11800 Brier La., Minnetonka, Minn. 55343**

**Continuation of Ser. No. 241,710, Sep. 8, 1988, Pat. No. 4,900,202. This application Feb. 6, 1990, Ser. No. 475,653**

**The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.**

**Int. Cl.⁵ B23B** *31/04*

**U.S. Cl. 408—240** **12 Claims**



1. A quick release chuck assembly for a tool bit having a shank and a groove extending circumferentially about the shank with a radiused portion, the chuck assembly comprising:

- a spindle including,
  - a forward face,
  - a longitudinal bore into the spindle from the forward face having an inner end for receiving the shank of the tool bit,
  - at least a first radial bore communicating with the longitudinal bore through the spindle, and
  - a detent ball disposed in each radial bore and extendable into the longitudinal bore against the groove of the shank of the tool bit;
- a sleeve disposed around the spindle including,
  - a forward bore disposed around the spindle for receiving the detent balls when the balls are moved out of the longitudinal bore,
  - a radially inwardly extending shoulder adjacent the forward bore for engaging and urging the balls into the longitudinal bore and against the groove of the shank,
  - the shoulder further including a substantially minimum diameter center bore permitting free translation of the sleeve around the spindle and a concentrically graduated portion between the forward bore and the center bore, and
  - the concentrically graduated portion further including a first intermediate bore between the center bore and the

VOL
1126
ISS
1
MY
7
1991
UMI

forward bore which is larger in diameter than the center bore and smaller in diameter than the forward bore; and
a spring means for biasing the sleeve against the detent balls causing the shoulder to contact the balls to urge the detent balls forward against the interior walls of the radial bores generating responsive tangential forces through the detent balls against the radiused portion of the groove and further to urge the detent balls into the longitudinal bore and against the shank whereby the detent balls are positionally locked between the shoulder, the shank and the radial bores;
whereby the shank of the tool bit is locked in position with substantially no end play between the detent balls and the inner end of the longitudinal bore.

---

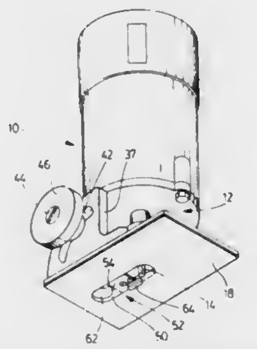
### 5,013,195
### ROUTER GUIDE

**Frank Strazar, 12 Dumont St., Willowdale, Ontario, Canada M2M 3B8**

**Continuation-in-part of Ser. No. 351,783, May 15, 1989, abandoned. This application Apr. 9, 1990, Ser. No. 506,342**

**Int. Cl.⁵ B23C *1/20;* B27C *5/00***

**U.S. Cl. 409—180** **10 Claims**



1. A guide apparatus for use in association with a router, said router being adapted to receive a router bit, said guide apparatus, in turn, comprising:
support means adapted to be attached to said router;
base plate means supported on said support means:
opening means in said base plate means through which a said router bit may pass;
a router guide member mounted on said plate means, said router guide member including a leg portion extending substantially normal to said base plate means, and a guide boss mounted on said leg portion, spaced from said base plate means, and defining a semi-cylindrical surface portion, said semi-cylindrical surface portion defining a radius slightly greater than the radius of a said router bit, and,
adjustment means securing said guide boss to said base plate means whereby said semi-cylindrical surface portion is adapted to be positioned slightly offset relative to the axis of said router bit, and wherein said boss defines a predetermined width, and wherein said leg portion has a width less than that of said boss, and wherein said guide boss is shaped and dimensioned whereby one side surface thereof is adapted to lie in a common plane with one side of said router bit, and wherein the other side surface thereof is adapted to lie in a plane parallel to, but spaced outwardly from the plane of the opposite side of said router bit.

---

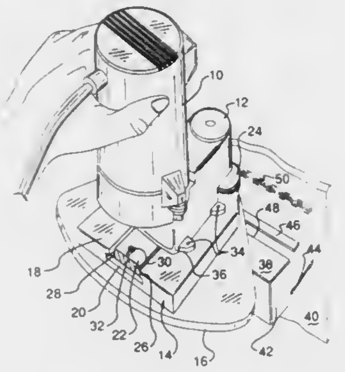
### 5,013,196
### SCRIBING ACCESSORY FOR OFFSET ROUTER

**William R. Friegang, 5025 Vanderbilt Dr., San Jose, Calif. 95130**

**Filed Jul. 23, 1990, Ser. No. 556,660**

**Int. Cl.⁵ B27C *5/10;* B23C *1/20***

U.S. Cl. 409—182 10 Claims



1. A scribing accessory for offset type routers comprising:
wheel means for maintaining a router bit at a predetermined fixed distance from a wall or other surface the contour of which is to be matched;
spacer means for attachment to the router mechanism and for separating the lower extremity thereof from a work engaging surface a distance sufficient to accommodate the axial thickness of said wheel means; and
journal means for rotatably connecting said wheel means to said spacer means and for providing a cylindrical passageway concentric with the outer perimeter of said wheel means through which the router bit may be extended.

---

### 5,013,197
### LOCKING BOLT FOR EQUIPMENT SUPPORT

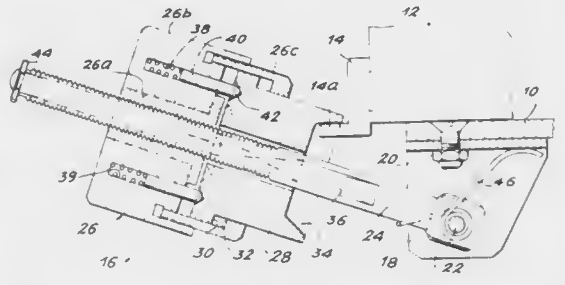
**Francois Allaert, Pibrac; Pierre Faurie, Toulouse; Serge Roques, Blagnac, and Sylvain Segol, Toulouse, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France**

**Filed Nov. 8, 1989, Ser. No. 433,525**

**Claims priority, application France, Nov. 10, 1988, 88 14691**

**Int. Cl.⁵ F16B *31/02***

U.S. Cl. 410—77 6 Claims



1. Locking bolt for an equipment support, comprising:
a threaded rod having one end which can be articulated to the support;
a manipulating nut screwed to said rod and movable thereon;
a front abutment on said nut;
a bearing part freely mounted on said threaded rod between said articulated end and the manipulating nut so that said bearing part can be brought into engagement with a member fixed to equipment placed on the support, by rotation of said manipulating nut, so as to have a predetermined axial clearance with respect to the manipulating nut along the axis of the threaded rod;
an elastic means being placed between said manipulating nut and said bearing part in order to permanently urge said bearing part towards said articulated end of the threaded rod in the direction of said front abutment formed on the nut, said elastic means also actuating anti-release means opposing with a predetermined force a relative rotation between the manipulating nut and the bearing part, said elastic means having at least two compression springs received in blind cylindrical slots formed in the manipulating nut, said slots opening towards a rear face of the bearing part and being offset with respect to the axis of said threaded rod; and
an anti-release member being received in each slot between the spring and the rear face of said bearing part, said rear face having indentations sufficient in number to match the number of said anti-release members which can be positioned facing said anti-release members.

---

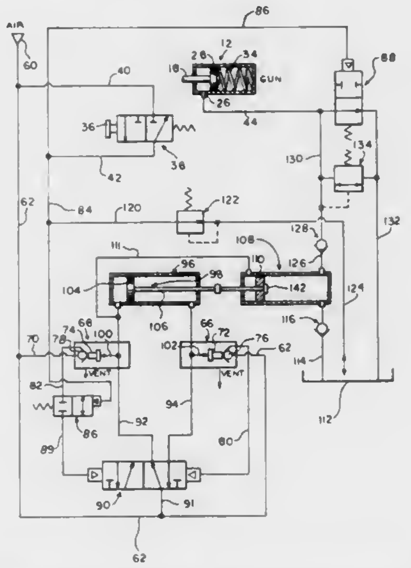
### 5,013,198
### AIR-HYDRAULIC PUMP WITH AUXILIARY PUMPING MEANS

**Richard A. Schultz, 1491 Inlynd Dr., Sullivan, Wis. 53178**

**Filed Nov. 30, 1988, Ser. No. 278,010**

**Int. Cl.⁵ F04B *3/00***

**U.S. Cl. 417—287** **17 Claims**



1. A pressurized air hydraulic fluid pump for use in a hydraulic system, comprising:
a pump body;
air supply means for providing pressurized air to said pump body;
air operated control means associated with said pump body and operable by pressurized air provided to said pump body;
a first pumping member movably mounted to said body and responsive to said control means for delivering a first level of hydraulic pressure to said system at a first flow rate; and
an auxiliary pumping member movably mounted to said body and being responsive to said control means for delivering hydraulic pressure to said system at a second level less than said first level and at a second flow rate greater than said first flow rate, said auxiliary pumping member being responsive to the load on said system such that, when the load on said system exceeds a predetermined level, said auxiliary pumping member ceases operation and said first pumping member supplies pressure to said system;
wherein said first pumping member is mounted to said pump body for movement independent of said auxiliary pumping member after said auxiliary pumping member ceases operation, for delivering said first level of pressure to said system.

---

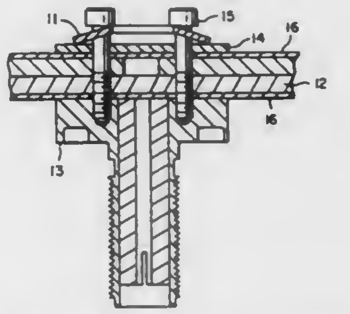
### 5,013,199
### STRIPLINE LAUNCHER SPRING WASHER

**Carville M. Downes, Pasadena, Md., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Dec. 18, 1989, Ser. No. 451,846**

**Int. Cl.⁵ F16B *43/02;* H01R *11/22***

**U.S. Cl. 411—544** **17 Claims**



1. A stripline launcher spring washer comprising:
a dish-like member having a topside, a bottomside, an inside rim and an outside rim;
a hole through said dish-like member contacting said inside rim;
a plurality of slotted screw holes contacting said hole and placed along said inside rim of said dish-like member with each of said plurality of slotted screw holes capable of housing an individual screw; and,
clamping force means effected by tightening the individual screws in their respective screw holes to compress the washer for providing a constant clamping force over various environmental conditions to hardware contacting said dish-like member.

---

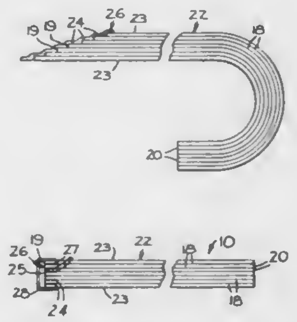
### 5,013,200
### BINDING SYSTEM

**Ray A. Hunder; Alden R. Miles; Stephen H. Dwyer, and Dorman N. Thompson, all of P.O. Box 33427, St. Paul, Minn. 55133-3427**

**Continuation of Ser. No. 194,820, May 17, 1988, abandoned. This application Mar. 20, 1989, Ser. No. 328,805**

**Int. Cl.⁵ B42C *9/00;* B42B *5/00***

**U.S. Cl. 412—6** **8 Claims**



1. A method for binding a stack of sheets each having a spine edge, and an outer edge opposite the spine edge, said method comprising the steps of:
providing a first cover assembly including a first cover plate having a spine edge, an inner surface adapted to be placed adjacent one side surface of the stack, and an outer surface, first and second liners projecting from the spine edge of the first cover plate, a generally uniformly thick first layer of pressure sensitive adhesive between and releasably adhered to both of said liners, a flexible backing

VOL
1126
ISS
1
MY
7
1991
UMI

having an edge portion attached to a portion of the outer surface of the first cover plate adjacent the spine edge of the first cover plate and projecting past the spine edge of the first cover plate along the side of the second liner opposite the first liner, and a second layer of pressure sensitive adhesive firmly adhered to the projecting portion of the backing and releasably adhered to the second release liner;

providing a second cover assembly including a second cover plate having a spine edge, an inner surface adapted to be placed adjacent a side surface of the stack opposite the first cover plate with the spine edge of the second cover plate aligned with the spine edge of the sheets in the stack, and a disposable plate, the disposable plate being separately attached edge to edge to the spine edge of the second cover plate;

disposing the sheets in a stack having side surfaces with narrow side surface portions of the sheets adjacent the spine edges exposed beyond the spine edges of overlying sheets;

positioning the cover plates on opposite side surfaces of the stack with the spine edges of the cover plates aligned with the spine edges of the sheets during said disposing step and the inner surfaces of the cover plates adjacent opposite side surfaces of the stack;

removing the first liner from the first cover assembly;

pressing the first layer of the pressure sensitive adhesive against the spine edges and the narrow side surface portions of the sheets in the stack and against the disposable plate of the second cover assembly through the second liner after said step of removing the first liner;

removing the second liner after said pressing step;

moving the sheets to a position with the spine edges of the sheets generally aligned in a plane generally at a right angle to the side surfaces of the stack after said step of removing the second liner to re-form the first layer of pressure sensitive adhesive so that a major portion of the re-formed first layer of pressure sensitive adhesive extends in a generally uniform continuous layer along the spine edges of the sheets and minor portions of the re-formed first layer of pressure sensitive adhesive extend between the narrow side surface portions of the sheets to retain adhesion of the re-formed first layer of pressure sensitive adhesive to the spine edges and the narrow side surface portions;

removing the disposable plate from the second cover plate after said pressing step to remove any portion of the first layer of pressure sensitive adhesive extending beyond the stack; and

adhering a generally planar central portion of the backing over and to the major portion of the re-formed first layer of pressure sensitive adhesive on its side opposite the spine edges; and

adhering an edge portion of the backing to a portion of the second cover plate sheet adjacent its spine edge.

---

### 5,013,201

### TRAVELING CONVEYOR ARRANGEMENT

**Hartmut Grathoff, Wendelstein, and Werner Hübel, Nuremberg, both of Fed. Rep. of Germany, assignors to MAN Gutehoffnungshütte, Oberhausen, Fed. Rep. of Germany**

**Filed Apr. 23, 1990, Ser. No. 512,828**

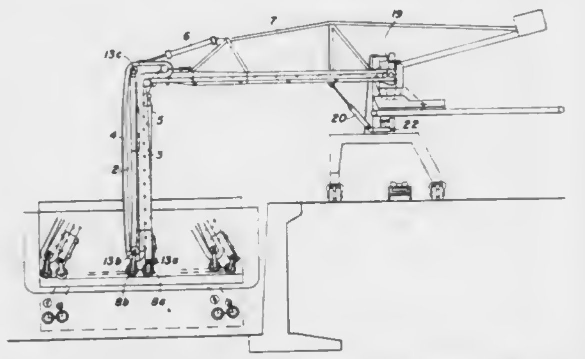
**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1989, 3913359**

**Int. Cl.$^5$ B65G *67/60***

**U.S. Cl. 414—139.4** **7 Claims**

1. A travelling continuous conveyor for a bulk material, comprising:

a travelling frame; a boom hinged to said travelling frame; a boom conveyor belt supported by said boom; linear tilting adjustment means connected to each of said traveling frame and said boom for tilting said boom with respect to said travelling frame to adjust the height of a free end of said boom; a steep conveyor structure supporting a covered belt conveyor, said steep conveyor structure being pivotally connected at said free end of said boom; first linear drive means connected to said boom and connected to said steep conveyor structure for pivoting said steep conveyor structure around a horizontal axis; deflecting pulleys positioned at ends of said steep conveyor structure supporting conveyor belts of said covered belt conveyor, said conveyor belts being led around said deflecting pulleys, said covered belt conveyor having a carrying belt which is preferably connected to said boom conveyor belt and a cover belt; first and second casting drums mounted in a support frame defining a take-up zone at an end of said steep conveyor structure, a three connecting rod mechanism including a first connecting rod mechanism providing a hinged connection, connecting said first and second casting drums to each other, a second connecting rod mechanism connecting said first casting drum to an axis of a lower deflecting pulley and a third connecting rod mechanism connecting said second casting drum to an axis of another lower deflecting pulley, said lower deflecting pulleys being positioned adjacent said casting drums, an axis of each of said lower deflecting pulleys being adjustable in height, said cover belt forming a unit including a support profile member, said lower deflecting pulleys and upper deflecting pulleys, a unit being displaceable in a direction parallel to said support frame by a second linear drive; a third linear drive connected to a side of said support frame and connected to one of said second and third connecting rod mechanisms for adjusting the position of said first, second and third adjusting rod mechanisms to change a relationship between the position of the axes of said casting drums with respect to axis of said lower deflecting pulleys, said first, second and third connecting rod mechanism positioning a leading one of said casting drums higher than the other casting drums such that the two casting drums catch at least approximately equal amounts of material to be conveyed, said first and second casting drums as well as pairs of said lower deflecting pulleys being provided in an overhung arrangement; first control means for controlling said linear tilting adjustment means depending upon the deflection of said steep conveyor structure from a vertical position such that movement of said casting drums occurs at a constant height parallel to an inclination piane of a material being conveyed; and, second control means connected to said third linear drive and said second linear drive for adjusting said first, second and third connecting rod mechanism linkage and for height adjustment of said leading casting drum independent upon the deflection of said steep conveyor structure from a vertical position such that during a pendular movement of said steep conveyor structure at right angles to the direction of movement of the boom conveyor, the casting drums always assume an identical position relative to an inclined plane of a bulk material being conveyed and to provide that a stream of bulk material is always directed at least approximately perpendicularly to said first connecting rod mechanism into the take up zone of the steep conveyor structure.



---

### 5,013,202

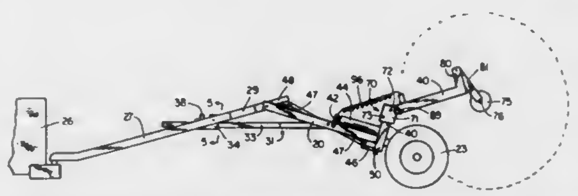
### APPARATUS FOR PICKING UP, TRANSPORTING AND UNROLLING LARGE BALES OF HAY

**Phillip W. Love, P.O. Box 295, Smithville, Tenn. 37166**

**Filed May 8, 1990, Ser. No. 521,278**

**Int. Cl.$^5$ A01D *90/02***

**U.S. Cl. 414—24.5** **4 Claims**



1. An improvement in apparatus for picking up and transporting a large bale of material, such as a bale of hay, in which the apparatus is of the type comprising a main frame supported by wheel means having a pivot axis transverse of the main frame adjacent to the rear end portion of the main frame; braking means for braking the wheel relative to the main frame; a hitch frame having one end pivotally connected to the front end portion of the main frame, with the other end of the hitch frame adapted to be connected to a tow vehicle, so that when the braking means are activated and the tow vehicle is backed up, the front end portion of the main frame swings upwardly, and when the braking means are activated and the tow vehicle moves forward, the front end portion of the main frame swings back downwardly; a pair of bale engaging and clamping swing arms pivotally attached to the respective sides of the main frame, each swing arm being adapted to pivot about an axis substantially parallel to the corresponding side of the main frame to which it is attached; and means associated with the main frame and hitch frame for pivotally moving the outward ends of the swing arms away from each other when the forward end of the main frame is swung upwardly and, conversely, for pivotally moving the outward ends of the swing arms toward each other when the forward end of the main frame moves back downwardly, said improvement comprising

a joint in each of said swing arms;

means for locking the joints in each of the swing arms in a rigid condition with the swing arms extending outwardly in a bale lifting position from said main frame;

means for releasing the joints in each of the swing arms so that the free ends of said swing arms can move to a reclining, bale resting position in which the swing arms extend backwardly from the trailing end of the main frame when the main frame is in its downward position;

bale engagement means that allow the bale to be rotated about an axis extending between the engagement means;

a pair of offset coupling members having first and second ends, with the first ends of the coupling members being attached to the respective ends of the swing arms such that the second ends of the coupling members extend upwardly from the ends of the swing arms when the swing arms are in their reclined positions;

a pair of extension arms having first and second ends, with the first ends of the extension arms being pivotally attached to respective second ends of said offset coupling members, such that the extension arms generally are oriented substantially transverse of the ends of said swing arms but can swing outwardly and upwardly away from the trailing end of the swing arms when a bale is being rested on the ground with the swing arms in their reclined positions; and

the bale engagement means are pivotally attached to the ends of said extension arms,

whereby a bale can be picked up for transportation when the joints in each of the swing arms are maintained in a rigid position, and the bale can be rested on the ground to be unrolled when the joints in each of the swings arms are released.

---

### 5,013,203

### ELECTRICALLY DRIVEN SELF-PROPELLED TRUCK AND APPARATUS FOR CHANGING COURSE THEREOF

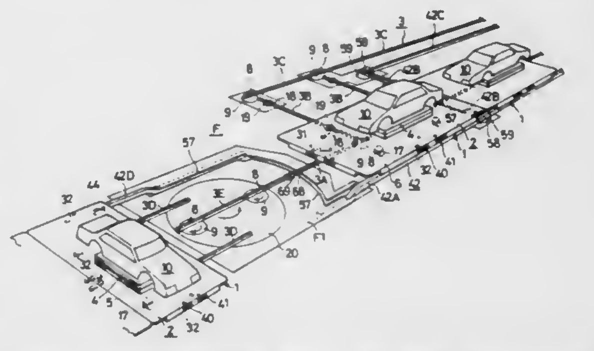
**Takao Wakabayashi, Osaka, Japan, assignor to Nakanishi Metal Works Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 341,998, Apr. 20, 1989, abandoned. This application Sep. 6, 1990, Ser. No. 579,227**

**Claims priority, application Japan, Apr. 20, 1988, 63-98848; Apr. 20, 1988, 63-98849**

**Int. Cl.$^5$ B61J *1/10***

**U.S. Cl. 414—222** **4 Claims**



1. In a production assembly line for assembling articles from parts as the article being assembled is moved along said line, said line having guide rails mounted in fixed directions on a base and rails segments mounted at fixed positions at the ends of selected of said guide rails, said rail segments being pivotable on said base for alignment with ends of said selected guide rails, an electrically driven self-propelled truck for movement along said guide rails and rails segments comprising a truck body having a plurality of swivel mounted wheels mounted on an underside of said truck body, at least one of said swivel mounted wheels being engagable with said guide rails and rail segments for guiding said truck along said production line, an electrically driven wheel mounted on said underside of said truck body and engagable with said base for propelling said truck along said guide rails, an article lift table mounted on an upper side of said truck body and liftable on said upper side by drive means, said truck body having an article space and a work space at at least one side of said article space, and an adjacent truck coupling provided at each the front, rear, right and left side portions of said truck body.

---

### 5,013,204

### INTERFACE CONTROL AND STOP MEANS FOR AIRCRAFT CARGO LOADER PLATFORM

**Michael A. Leon, Orlando, Fla., assignor to FMC Corporation, Chicago, Ill.**

**Filed Jul. 17, 1989, Ser. No. 380,363**

**Int. Cl.$^5$ B65F *9/00***

**U.S. Cl. 414—347** **12 Claims**

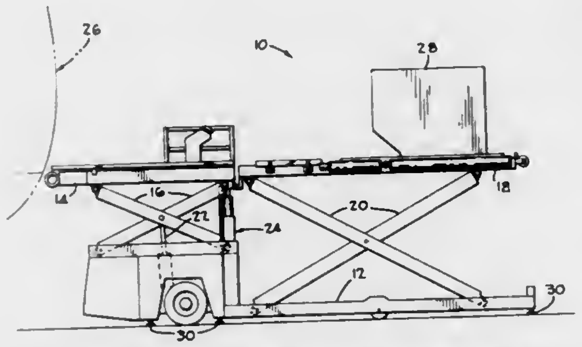
1. Interface interlock means for use on an aircraft cargo loader including a front platform having a roll plate surface an elevatable rear platform, said interface interlock comprising:

a left pivot arm pivotally attached to said front platform at a pivotal attachment point and having a center of gravity relative to said pivotal attachment point to cause said pivot arm to normally project above the plane surface of said front platform in a normal position;

means for displacing said left and said right pivot arms from said normal position to a second position where said pivot arms do not project above said roll plane of said front platform.

VOL
1126
ISS
1
MY
7
1991
UMI

first and second left proximity switch means for generating proximity signals carried on said front platform within an arc which may be covered by said left pivot arm and first and second proximity switch means for generating proximity signals carried on said front platform within an arc which may be covered by said right pivot arm;



logic means; for receiving said proximity signals and generating control signals

lift means for reasoning said control signals and raising and lowering said elevatable rear platform in response to control signals.

---

### 5,013,205

## TOWING VEHICLE FOR SHUNTING AIRCRAFT ON THE GROUND

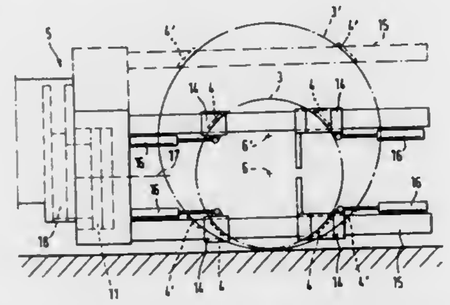
**Volker Schardt, Kreuztal, Fed. Rep. of Germany, assignor to KAMAG Transporttechnik GmbH & Co., Ulm, Fed. Rep. of Germany**

**Filed Nov. 1, 1989, Ser. No. 431,031**

**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1988, 3837151**

**Int. Cl.$^5$ B64F** *1/22*

**U.S. Cl. 414—429** **3 Claims**



1. In a towing vehicle for shunting airplanes on the ground, with a U-shaped recess in the rear part of the towing vehicle for reception of a front wheel assembly which is turnable about a substantially vertical axis, a holding- and lifting device disposed at each side of the U-shaped recess of the towing vehicle and comprising front and rear gripper arms serving to engage the front wheel assembly in the region of the periphery of at least one of the front wheels, the rear gripper arms being pivotable as a pair inwardly and outwardly in a vertical plane which is disposed at right angles to the longitudinal axis of the towing vehicle, an adjusting vehicle which conforms the gripper arms to the diameters of the respective front wheels, the turning axis of the front wheel assembly crossing the axis of the rear wheels of the towing vehicle at an angle of 90 degrees, the improvement which consists in that the holding- and lifting device comprises four gripper arms serving to embrace each front wheel and being mounted on pushers which are shiftably mounted on substantially horizontally extending upper and lower slideways for horizontal conformance to the diameters of the respective front wheels, in that the slideways are mounted on support means and are movable relative to each other in a vertical direction for vertical conformance to the diameter of the respective front wheel, and in that the entire movable part of the holding- and lifting device is mounted in a live ring for limited pivotal movement about an axis which is parallel to the longitudinal axis of the towing vehicle, the engagement movements of the gripper arms being adjustable in dependency on the diameter of the front wheel of the respective aircraft type in such a way that, when the turning axis of the front wheel assembly crosses at right angles the axis of the non-steerable rear wheels of the towing vehicle, the axis of the live ring invariably coincides with the axis of each front wheel.

---

### 5,013,206

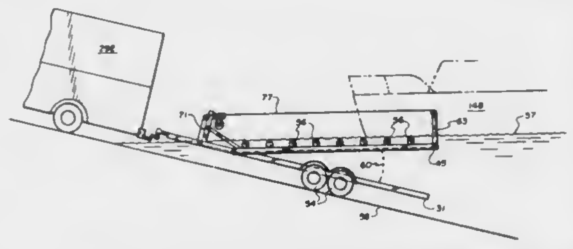
## GUIDE MOUNTED BOAT TRAILER

**Guenter Ernst, 3999 Morning Star Dr., Salt Lake City, Utah 84124, and Steven S. Davis, 298 S. Cobble Creek Rd., Farmington, Utah 84025**

**Filed Jan. 12, 1989, Ser. No. 296,720**

**Int. Cl.$^5$ B60P** *1/28, 3/10*

**U.S. Cl. 414—483** **10 Claims**



1. A trailer for loading, transporting and launching a boat comprising:

a first frame;

a pair of wheels rotatably mounted to said first frame;

guide means, mounted on said first frame, for guiding a water borne boat onto said frame, said guide means comprising;

a subframe hingedly mounted to said first frame to be rotatable about a lateral axis,

a plurality of upright stanchions mounted on said subframe,

at least one upright stanchion mounted on said first frame, and

at least one cable mounted to and connecting said stanchions to form a guide track for receiving a boat being loaded on said trailer;

a buoyant member, mounted on said guide means, for elevating said guide means upon said trailer being driven into a body of water, said buoyant member being adapted for elevating said guide means to an altitude proximate a surface level of said body of water.

---

### 5,013,207

## CROP TRANSPORTER

**Malcolm J. Baker, and James R. Warren, both of Bundaberg, Australia, assignors to Austoft Industries Limited, Bundaberg, Australia**

**Continuation of Ser. No. 431,711, Nov. 2, 1989, abandoned, which is a continuation of Ser. No. 209,535, Jun. 21, 1988, abandoned. This application Jun. 7, 1990, Ser. No. 535,306**

**Claims priority, application Australia, Jun. 22, 1987, P12594**

**Int. Cl.$^5$ B60P** *1/38*

**U.S. Cl. 414—489** **12 Claims**

1. A crop transporter comprising:

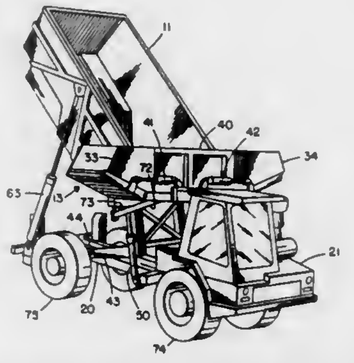
(a) a main frame,

(b) a bin having a forward end and a rearward end,

(c) an elevator with an entrance area located adjacent the forward end of the bin, said elevator extending forwardly and upwardly from the entrance area to a discharge area,

(d) a cross conveyor located below and adjacent to the discharge area of the elevator, the cross conveyor being connected to the bin and being movable therewith,

(e) first elevating means to raise and lower the forward end of the bin and the cross conveyor connected therewith, relative to the main frame, and



(f) second elevating means to raise and lower the rearward end of the bin relative to the main frame and to pivot the bin about an axis normal to the direction of movement of the elevator and adjacent the discharge area of the elevator.

---

### 5,013,208

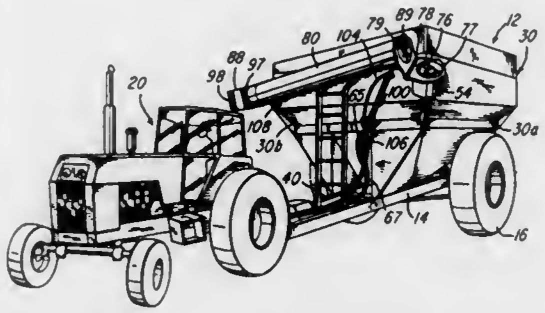
## GRAIN WAGON WITH UNLOAD MECHANISM

**Maurice Grieshop, Ft. Recovery, Ohio, assignor to J & M Manufacturing Co., Inc., Ft. Recovery, Ohio**

**Filed Jul. 26, 1989, Ser. No. 385,440**

**Int. Cl.$^5$ B60P** *1/40*

**U.S. Cl. 414—526** **7 Claims**



1. A grain wagon adapted to be pulled by a tow vehicle and to be conveniently used at the side of a grain transfer truck, said grain wagon comprising a wheel supported frame including means for connecting said frame to the tow vehicle, a container supported by said frame and including front and rear walls connected by left and right side walls to define a chamber having a generally rectangular configuration in horizontal cross section, said walls including converging and sloping lower portions to provide said chamber with a lower grain collecting portion, an elongated auger unit including a lower base portion and an upper extension portion each having a tubular conduit enclosing a rotary auger, power operated means for rotating said auger within each said conduit, said base portion of said auger unit extending upwardly and forwardly and laterally from said collecting portion adjacent a front corner portion of said container where said front wall connects with said left side wall, pivot means adjacent said front wall and connecting said extension portion of said auger unit to said base portion, said pivot means having a pivot axis inclined substantially upwardly and substantially rearwardly, said pivot means supporting said extension portion of said auger unit for tilting movement between a grain discharged position projecting upwardly and forwardly and laterally substantially from said container to form a continuation of said base portion and a retracted stow position adjacent said front wall of said container, power operated means for moving said extension portion of said auger unit between said discharge and stow positions, and said pivot means providing for observing from the tow vehicle the entire extension portion during movement between said discharge and stow positions.

---

### 5,013,209

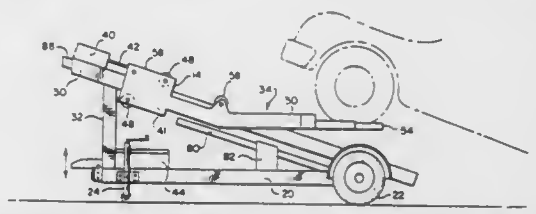
## WHEEL LIFT TOWING DOLLY

**Mardon DeMichele, Mesa, Ariz., and Jules G. Patout, New Iberia, La., assignors to Towing Technologies, Inc., Alexandria, Va.**

**Filed Jul. 14, 1989, Ser. No. 379,948**

**Int. Cl.$^5$ B60P** *3/12*

**U.S. Cl. 414—563** **45 Claims**



1. In a towing dolly for towing a wheeled vehicle, said towing dolly having a frame with ground engaging wheels, a tow hitch at the front end thereof, a rearwardly and downwardly inclined rail, and a vehicle engaging carriage selectively movable along said rail to thereby raise from the ground the wheels at only one end of the vehicle to be towed, the improvement wherein said carriage includes means adopted to lift the wheels of the vehicle to be towed at the end thereof to be raised without otherwise contacting such vehicle so that such vehicle may be supported on said wheel engaging means by its suspension system for towing and structural damage thereto avoided.

---

### 5,013,210

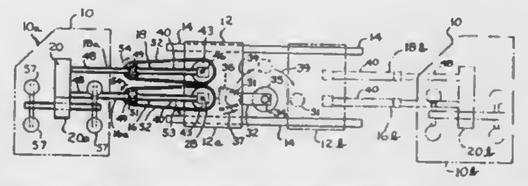
## WORKPIECE TRANSFER APPARATUS WITH FOLDING ARMS

**Irvin D. Bond, 1027 Allen Rd., Clarkston, Mich. 48016**

**Filed May 8, 1989, Ser. No. 348,554**

**Int. Cl.$^5$ B25J** *18/04*

**U.S. Cl. 414—744.6** **5 Claims**



1. A work transfer mechanism comprising:

a first work station location (**10***a*) and a second work station location (**10***b*) spaced apart a predetermined distance;

a work platform adapted for movement between the work station locations

linear guide means (**14**) extending along an imaginary path line drawn through the work station locations, said linear guide means having a lesser length than said predetermined distance so that opposite ends of said guide means are spaced from the work station locations;

a carriage (**12**) movably supported on said linear guide means for movement between a first position at one end of the guide means and a second position at the other end of the guide means;

a pair of similarly dimensioned foldable arm structures extending between the carriage and the work platform;

each foldable arm structure comprising a first elongated arm (**40**) having at one end thereof a first pivot connection to

VOL 1126 ISS 1 MY 7 1991 UMI

the carriage whereby said first arm is swingable in a first horizontal plane spaced above the carriage, and a second elongated arm (**48**) having at one end thereof a second pivot connection to the other end of the first arm whereby said second arm is swingable in a second horizontal plane spaced above the carriage; said second arm having its other end located underneath the work platform;

means (**56** or **58**) connecting said other ends of said second arms (**48**) to each other and to the work platform, said connection means including a series of meshed gears arranged so that said second arms can swing in unison independently of the platform while transporting the platform along a linear path defined by said linear guide means (**14**);

each first arm (**40**) having a stroke of approximately 180 degrees measured around the associated first pivot connection, each second arm (**48**) having a stroke of approximately 180 degrees measured around the associated second pivot connection, whereby the arms in each foldable arm structure are essentially in longitudinal alignment when the work platform reaches either work station location;

and power means for moving said carriage along the linear guide means and for swinging said arms around their associated pivot connections;

said foldable arm structures serving as linear extensions of the carriage when the work platform is at either work station location; said work platform being transportable between the work station locations by a combination of carriage motion and arm structure motion.

---

### 5,013,211
## SYSTEM FOR STACKING VENEER SHEETS CONVEYED FROM TWO DIFFERENT DIRECTIONS

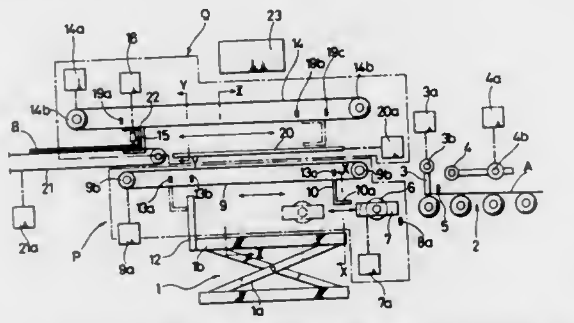
**Toshinori Nakaoda; Teruaki Aoto; Nagara Aoyama; Tsuyoshi Nakamura, and Ritsuo Nishimura, all of Ohbu, Japan, assignors to Meinan Machinery Works, Inc., Ohbu, Japan**

**Filed Mar. 6, 1989, Ser. No. 320,109**

**Claims priority, application Japan, Mar. 12, 1988, 63-59080; Dec. 3, 1988, 63-306714**

**Int. Cl.⁵ B65H** *9/00*

**U.S. Cl. 414—789.6** **8 Claims**



1. A system for stacking veneer sheets conveyed from two different directions to one and the same place, which comprises

(a) a stack support on which to stack veneer sheets,

(b) a first carry mechanism located above said stack support and including

(i) carry means for supporting a first veneer sheet conveyed from a first direction and carrying the first veneer sheet, in a substantially horizontal plane, to a first position directly above a predetermined position on said stack support, and

(ii) release means which frees the first veneer sheet from the support thereof by said carry means so as to allow the first veneer sheet to drop from said first position on said predetermined position on said stack support,

(c) a second carry mechanism located above said first carry mechanism and including

(i) carry means for supporting a second veneer sheet conveyed from a second direction and carrying the second veneer sheet, in a substantially horizontal plane, to a second position above said first position where one edge of the second veneer sheet is substantially in alignment with a corresponding edge of the first veneer sheet carried to said first position in a vertical plane, and

(ii) release means which frees the second veneer sheet from the support thereof by said carry means of said second carry mechanism so as to allow the second veneer sheet to drop from said second position on said predetermined position on said stack support,

(d) control means for first operating said release means of said second carry mechanism after the first and second veneer sheets have been carried to said first and second positions, respectively, and then operating said release means of said first carry mechanism after the lapse of a predetermined period of time from the operation of said release means of said second carry mechanism, thereby starting to drop the second veneer sheet earlier than the first veneer sheet, wherein

(A) said carry means of said first carry mechanism includes a trailing support which first allows a leading end portion of the first veneer sheet to pass thereon toward said first position and then supports an approximate trailing end portion of the first veneer sheet and carries the first veneer sheet to said first position while supporting said approximate trailing end portion thereof, said trailing support being supported for reciprocating motion for a predetermined distance in horizontal directions, and a leading support which receives said leading end portions of the first veneer sheet from said trailing support and carries the first veneer sheet to said first position together with said trailing support while supporting said leading end portion of the sheet, said leading support being supported for reciprocating motion substantially synchronous with said trailing support in horizontal directions, and

(B) said release means of said first carry mechanism includes a fixed stopper which contacts a leading edge of the first veneer sheet when the first veneer sheet has been carried to said first position, and means for moving said leading support away from said trailing support, after the contact of said stopper and said leading edge of the first veneer sheet, in such a direction that the first veneer sheet becomes unsupported by said leading support.

---

### 5,013,212
## APPARATUS FOR PACKING PROFILES WITH THE ASSISTANCE OF AN ELECTROMAGNETIC TRANSFER HANGING MECHANISM

**Frederico Castellani, Treppo Grande, Italy, assignor to S.I.M.A.C. S.p.A., Tarcento, Italy**

**Filed Dec. 5, 1989, Ser. No. 446,484**

**Claims priority, application Italy, Jan. 4, 1989, 83302 A/89**

**Int. Cl.⁵ B65G** *57/04, 57/18*

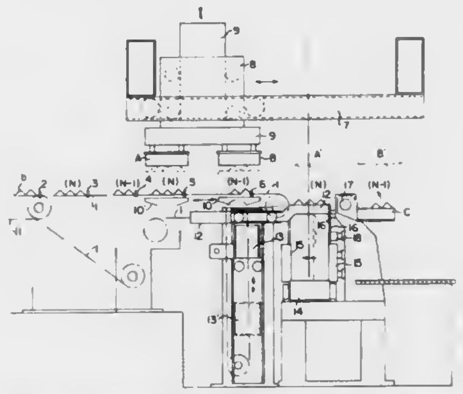
**U.S. Cl. 414—791.4** **9 Claims**

1. An apparatus for moving rods to a packaging area and packing the rods thereat comprising:

conveying means for advancing movement of the rods between retractable stop means which are capable of separating the rods into rod layers (N, N−1, . . . );

upsetting means for upsetting movement of selected layers of said rod layers along said conveying means such that said selected layers can fall downwardly into the packaging area;

electromagnetic transfer hanging means for transferring said rod layers into said upsetting means or depositing the same in the packaging area, said electromagnetic transfer hanging means having at least two rows of electromagnets capable of vertical rectilinear and horizontal rectilinear movement of said rod layers above said upsetting means and the packaging area.



---

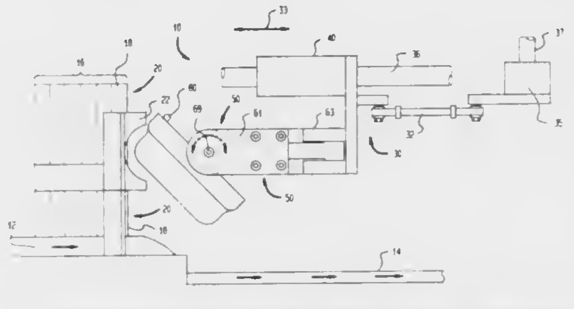
### 5,013,213
## AUTOMATIC DENESTING MACHINE

**David J. Roberts, Hamburg, and Ghandi Kadkoy, Montague, both of N.J., assignors to KAR Enterprises, Inc., Hamburg, N.J.**

**Filed Apr. 20, 1990, Ser. No. 512,760**

**Int. Cl.⁵ B65G** *59/10*

**U.S. Cl. 414—798.9** **7 Claims**



1. A machine for denesting packaging baskets comprising

first conveying means for delivering a sideways laying stack of nested packaging baskets to a front end of said first conveying means,

second conveying means located downstream of the front end of said first conveying means for receiving denested baskets from said stack,

gripper means for gripping said baskets in said stack,

reciprocating means for moving said gripper means in a reciprocating movement towards and away from the front end of the first conveying means along a trajectory above said second conveying means to enable said gripper means to grip the frontmost basket from said stack and to denest the frontmost basket from the stack by moving said frontmost basket away from the stack, and

rotating means for rotating said denested basket when said reciprocating means causes said denested basket to move away from said stack to upright the denested basket, so that the denested basket is deposited wherein said rotating means comprise a rod mounted across said conveying means at a height above the trajectory of said reciprocating means on said second conveying means in an upright position.

---

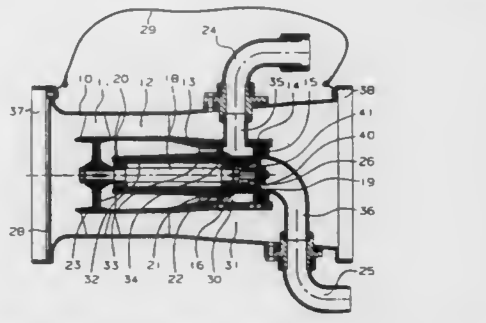
### 5,013,214
## PORTABLE WATER DRIVEN HIGH VELOCITY FAN

**Davorin Kapich, 3111 Serrano Dr., Carlsbad, Calif. 92009**

**Filed Feb. 6, 1989, Ser. No. 306,699**

**Int. Cl.⁵ F01D** *9/02*

**U.S. Cl. 415—202** **7 Claims**



1. A portable water driven fan comprising:

(a) a generally cylindrically shaped fan housing open to the passage of air at both ends;

(b) at least two shaft bearings;

(c) a shaft bearing support means contained in said housing and for supporting said at least two bearings;

(d) a shaft supported by said at least two bearings and defining a shaft axis;

(e) a turbine nozzle body defining a turbine nozzle outlet surface and positioned inside said housing and firmly attached, to said housing and comprising a turbine inlet cavity and a plurality of nozzles each of said nozzles providing a passageway for water to pass from said turbine inlet cavity to said turbine nozzle outlet surface and defining a nozzle centerline, where each of nozzle centerlines:

(1) intersects said turbine nozzle outlet surface at points of intersection on a circle defining a nozzle exit circle which circle is concentric about said shaft axis and defines a nozzle exit plane which is perpendicular to said axis and

(2) forms an angle of about 10 to 30 degrees with said nozzle exit plane;

(f) a water inlet means for providing water under pressure to said water cavity;

(g) an axial flow bladed impeller solidly attached at one end of the said shaft;

(h) an axial flow water turbine wheel solidly attached at the other end of said shaft and fully submerged in water having a plurality of turbine blades, said wheel and blades being positioned adjacent to said turbine body outlet surface such that water discharged from said nozzles impinge on said blades;

5. A method of manufacturing portable water driven fans having:

(a) a generally cylindrical shaped fan housing open to the passage of air at both ends:

(b) at least two shaft bearings;

(c) a shaft bearing support means contained in said housing and for supporting said at least two bearings;

(d) a shaft supported by said at least two bearings and defining a shaft axis;

(e) a turbine nozzle body defining a turbine body outlet surface and positioned inside said housing and solidly connected to said housing and comprising a turbine inlet cavity and a plurality of nozzles each of said nozzles providing a passageway for water to pass from said turbine inlet cavity to said outlet surface and defining a nozzle centerline, where each of nozzle centerlines:

(1) intersects said turbine body outlet surface at points of intersection on a circle defining a nozzle exit circle which circle is concentric about said shaft axis and defines nozzle exit plane which is perpendicular to said axis and

VOL
1126
ISS
1
MY
7
1991
UMI

(2) forms an angle of about 10 to 30 degrees with said nozzle exit plane;

(f) a turbine inlet means for providing water under pressure to said water cavity;

(g) an axial flow bladed impeller solidly attached at one end of said shaft;

(h) an axial flow water turbine wheel solidly attached at the other end of said shaft having a plurality of turbine blades, said wheel and blades being positioned adjacent to said turbine body outlet surface such that water discharged from said nozzles impinge in said blades;

said method comprising: producing a first model of said fan having a standard output rating and also producing at least one higher output model of said fan having substantially increased power output as compared to said first model without any significant decrease in efficiency by enlarging the diameter of said plurality of nozzles of said first model by machining said turbine nozzle body of said first model so that said turbine body outlet surface is closer to said water cavity, repositioning said water turbine wheel on said shaft to maintain essentially the same relative distance between said water turbine wheel and said turbine body outlet surface as compared to said first model and using a water turbine wheel having turbine blades larger than those for said first model.

---

### 5,013,215

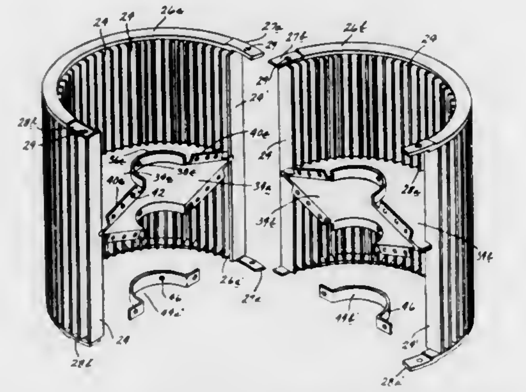
## BLOWERS FOR FREEZER SYSTEM AND METHODS OF INSTALLATION THEREOF

**Carl E. Diehl, Troy, Ill., assignor to Wetterau Incorporated, Hazelwood, Mo.**

**Filed Jan. 25, 1990, Ser. No. 469,960**

**Int. Cl.$^5$ F04D** *29/62*

**U.S. Cl. 416—178** **13 Claims**



1. An easily installable and removable centrifugal blower assembly comprising a finned barrel to be driven by a shaft by rotation about a longitudinal axis of rotation, the barrel being divided longitudinally into portions, at least one hub assembly for securement of the barrel portions to the shaft, the hub assembly similarly being divided longitudinally into hub portions, selectively fastenable and unfastenable means for selectively joining the hub portions about the shaft in assembled integral relation with the hub assembly in driving relationship with the shaft, and selectively fastenable and unfastenable means for selectively joining the barrel portions in integral relation about the shaft, and fastener means for securing the hub assembly to the shaft for driving relationship, whereby the blower assembly may be installed and removed from the shaft without its removal.

---

### 5,013,216

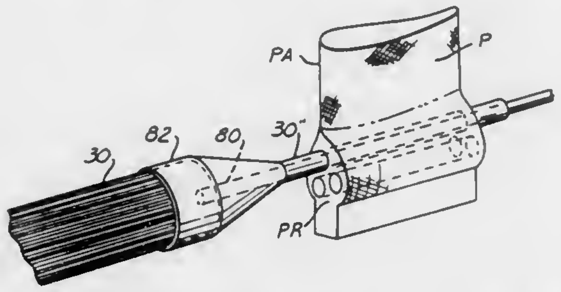
## COMPOSITE BLADE PERFORM WITH DIVERGENT ROOT

**Carlos Bailey, Farmington, and Raymond G. Spain, Farmington Hills, both of Mich., assignors to Airfoil Textron Inc., Lima, Ohio**

**Division of Ser. No. 243,074, Sep. 9, 1988. This application Nov. 29, 1989, Ser. No. 442,595**

**Int. Cl.$^5$ F01D** *5/14*

**U.S. Cl. 416—230** **10 Claims**



1. A gas turbine engine blade preform comprising a 3D braided fiber preform having an airfoil precursor portion and an integral root precursor portion, said root precursor portion having a plurality of fiber inserts extending chordwise of the blade therein to impart an enlarged, divergent shape to said root precursor portion.

---

### 5,013,217

## COMPRESSING APPARATUS WITH EXTENDED VARIABLE CAPACITY RANGE AND CAPACITY CONTROL METHOD THEREOF

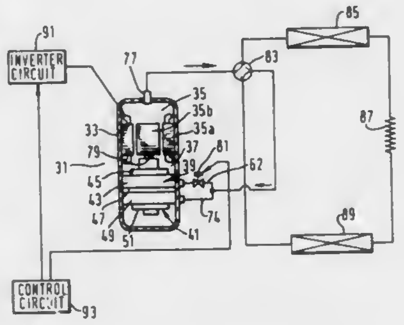
**Toshiaki Hitosugi, Numazu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 294,791, Jan. 9, 1989, abandoned. This application Mar. 27, 1990, Ser. No. 501,317**

**Claims priority, application Japan, Jan. 29, 1988, 63-018917**

**Int. Cl.$^5$ F04B** *49/00*

**U.S. Cl. 417—26** **6 Claims**



1. A compressing apparatus comprising:

first compressing means for compressing refrigerant;

second compressing means, coupled with the first compressing means, for compressing refrigerant;

means for variably driving the first and second compressing means, the driving means including a variable rotation motor mechanically connected to the first and second compressing means and inverter means for varying the driving frequency supplied to the motor within prescribed driving frequency range defined by a minimum driving frequency and a maximum driving frequency higher than the minimum driving frequency;

means for selecting one of a parallel operation state wherein both the first and second compressing means compress and a single operation state wherein one of the first and second compressing means compresses; and

means for controlling the selecting means and the inverter means for increasing the driving frequency supplied to the motor to a value which increases an energy efficiency ratio of the compressing apparatus when the operation state of the first and second compressing means is changed from the parallel operation state to the single operation state, wherein when said compressing apparatus is changed from the parallel operation state to the single operation state, the driving frequency changes from the minimum frequency to a mid-frequency, said mid-frequency being significantly less than the maximum driving frequency but greater than said minimum driving frequency, and a capacity of the compressing apparatus remains constant when the state of the apparatus is changed from the parallel to the single operation state and once the apparatus is in the single operation state the driving frequency of the apparatus in the single state can then decrease to the minimum frequency where the capacity of the apparatus is a minimum.

---

### 5,013,218

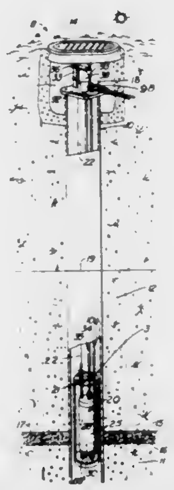
## SUBMERSIBLE PNEUMATIC PUMP FOR WATER TABLE

**Larry K. Spencer, Dallas, Tex., assignor to Sigma Enterprises, Inc., Dallas, Tex.**

**Filed Oct. 11, 1988, Ser. No. 256,691**

**Int. Cl.$^5$ F04B** *23/00*

**U.S. Cl. 417—37** **38 Claims**



1. Apparatus for removing hydrocarbons from a water table comprising: a vessel having a negative buoyancy, said vessel having an inlet; cable means positioning said inlet at a location below the surface of hydrocarbons floating on the surface of the water and above the interface between the upper surface of the water and the lower surface of the hydrocarbon material; pump means having an inlet communicating with said vessel; control means; and support means secured to said cable for suspending said vessel such that the inlet is positioned above the interface between the water and the hydrocarbons such that hydrocarbons floating on the surface of the water flow into the vessel; and actuating means associated with said support means adapted to energize said pump means when tensions in said cable reaches a predetermined magnitude when said vessel contains more than a predetermined volume of hydrocarbons.

---

### 5,013,219

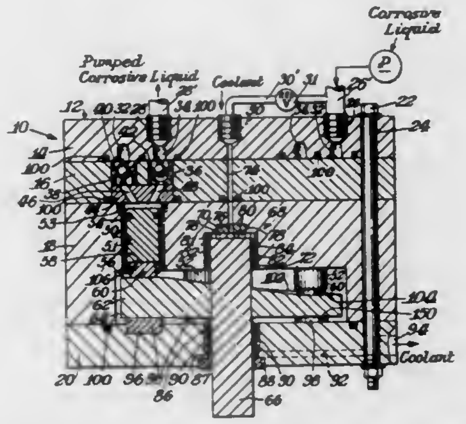
## POSITIVE DISPLACEMENT PISTON PUMP

**Douglas C. Hicks, Lewes, Del., and Charles M. Pleass, Havre De Grace, Md., assignors to The University of Delaware, Newark, Del.**

**Continuation-in-part of Ser. No. 309,041, Feb. 9, 1989, abandoned, which is a division of Ser. No. 32,351, Mar. 31, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 371,315**

**Int. Cl.$^5$ F04B** *1/14*

**U.S. Cl. 417—269** **20 Claims**



1. A high pressure positive displacement piston pump for pumping a corrosive aqueous fluid, comprising a pump body including plate means, said plate means comprising an outer plate and an inner valve plate mounted thereto, said pump body having inlet means, means for supplying the fluid to said inlet means under pressure, a plurality of cylinders mounted therein, an axially rotating member in said pump body, a first plate mounted to said rotating member for joint rotation therewith, said first plate having a first camming surface, a piston in each of said cylinders, each of said pistons having a piston head at one end thereof and a second camming surface at its opposite end, said piston head being located in a piston head chamber at one end of its said cylinder, each of said second camming surfaces riding against said first camming surface whereby rotation of said rotating member periodically overcomes the opposing force of the fluid pressure acting against each of said piston heads and thereby causes each of said piston heads to reciprocate axially in its said piston head chamber, said inlet means including an exposed inlet port in said outer plate, a plurality of inlet one-way valve means in said valve plate corresponding to the number of said cylinders with each of said inlet valve means being associated with a respective one of said cylinders, an inlet channel creating flow communication between said inlet port and said plurality of said inlet valve means, each of said inlet valve means being in flow communication with a respective piston head chamber, an exposed outlet port in said valve place corresponding to the number of said cylinders with each of said outlet valve means being associated with a respective one of said cylinders, an outlet channel creating flow communication between said outlet port and said plurality of said outlet valve means, each of said outlet valve means communicating with a respective piston head chamber, a corrosive fluid path formed by the elements of said inlet port and aid inlet channel and said inlet valve means and said piston head chamber and said outlet valve means and said outlet channel as said outlet port, of all of said elements of said pump body which comprise said corrosive fluid path being made of a material which is non-corrodible in the aqueous fluid, a lubricating and cooling means for lubricating and cooling said first and second camming surfaces, said lubricating and cooling means including a liquid coolant and lubricant in contact with said first and second camming surfaces, the fluid being pumped being the same as said liquid coolant and lubricant, said lubricating and cooling means including a coolant passageway in flow communication with the corrosive aqueous fluid whereby

VOL
1126
ISS
1
MY
7
1991
UMI

the fluid supplied to said inlet port also flows into said coolant passageway, said coolant passageway communicating with said first and said second camming surfaces, a coolant outlet passage downstream from said first and said second camming surfaces and exiting from said pump body, said second camming surface being a removable insert at the end of said piston, and at least one of said first and second camming surfaces being formed of an organic material.

---

### 5,013,220

### OIL PUMP HAVING REGULATOR VALVE ISOLATED FROM DYNAMIC PRESSURE OF PUMPED OIL

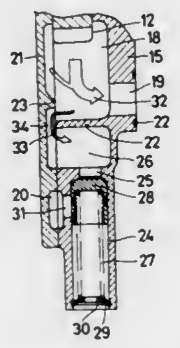
**Takashi Nakagawa, Kariya City, and Tetsuya Suyama, Nagoya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya City, Japan**

**Filed Dec. 1, 1989, Ser. No. 444,428**

**Claims priority, application Japan, Feb. 22, 1989, 1-20054**

**Int. Cl.$^5$ F04B** *49/08*

**U.S. Cl. 417—310** **6 Claims**



1. An oil pump comprising:

a housing;

an inlet port formed in the housing;

an outlet port formed in the housing;

pumping means located between the inlet port and the outlet port for pumping oil from said inlet port to said outlet port;

a regulator valve fluidically communicating with said outlet port; and

an interrupting means located between said pumping means and said regulator valve for substantially isolating said regulator valve from a dynamic pressure of pumped oil, whereby low oil pressure is avoided;

said interrupting means comprising a rib portion provided on said housing and forming a restricted passage leading to said regulator valve;

a cover cooperating with said housing to define said outlet port, further including a rib portion on said cover cooperating with said rib portion on said housing for forming said passage.

---

### 5,013,221

### ROTARY FUEL PUMP WITH PULSE MODULATION

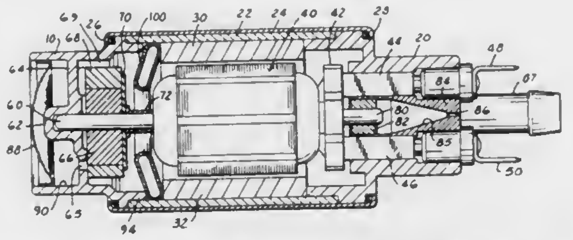
**Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.**

**Division of Ser. No. 533,899, Jun. 6, 1990. This application Aug. 27, 1990, Ser. No. 572,669**

**Int. Cl.$^5$ F04B** *35/00*

**U.S. Cl. 417—365** **10 Claims**

1. In an electrical fuel pump that includes an elongated housing having an inlet and an outlet at axially opposed ends thereof, a d.c. motor including armature means journaled for rotation with said housing between said ends and stator means within said housing surrounding said armature means and magnetically coupled thereto, and pumping means affixed to said armature means and positioned adjacent to said inlet end of said housing for pumping fuel from said inlet through said housing to said outlet and thereby creating a pressure differential across said pumping means tending to urge said pumping means into frictional engagement with said inlet end, the improvement in which said stator means has a greater dimension axially of said housing toward said outlet end than toward said inlet end with respect to said armature means, thereby being effectively offset within said housing toward said outlet and magnetically attracting said armature axially of said housing toward said outlet so as to at least partially counterbalance said pressure differential across said pumping means.



---

### 5,013,222

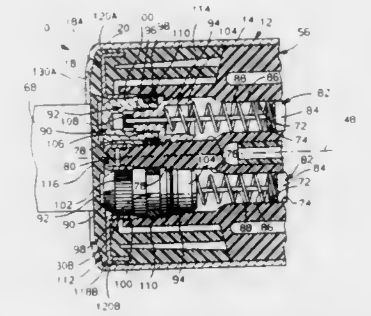
### FUEL PUMP FOR MOTOR VEHICLE

**James M. Sokol, Pontiac; Robert L. Lochmann, and John G. Fischer, both of Grand Blanc, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 19, 1990, Ser. No. 511,131**

**Int. Cl.$^5$ F04B** *35/04*

**U.S. Cl. 417—366** **3 Claims**



1. In an electric motor driven fuel pump for motor vehicles including

a tubular metal housing having an inlet end and a discharge end,

a pump in said tubular housing adjacent said inlet end,

a plastic end cap in said tubular housing adjacent said discharge end having a pair of brush passages therein parallel to a longitudinal centerline of said tubular housing,

an electric motor in said tubular housing between said pump and said plastic end cap including a commutator rotatable about said longitudinal centerline,

a pair of brushes in respective ones of said brush passages butting against said commutator,

a pair of spring means in respective ones of said brush passages for biasing said brushes against said commutator, and

a pair of shunt wires in respective ones of said brush passages electrically connected to said brushes,

the combination comprising:

a pair of terminal studs each having an outside shoulder thereon and each interference press fitted in respective ones of said brush passages and electrically connected to the corresponding ones of said shunt wires,

a pair of elastomeric seals between respective ones of said terminal studs and corresponding ones of said brush passages to prevent high pressure fuel leakage around said terminal studs from inside said tubular housing,

a generally cup-shaped plastic RFI module closely received in said tubular housing at said discharge end thereof over and completely shrouding said terminal studs on said plastic end cap and including a pair of generally semicircular flat metal contact plates encapsulated in said RFI module in a common plane perpendicular to said longitudinal centerline of said tubular housing to define a circular reinforcement in said RFI module,

each of said contact plates having an exposed integral annular flange interference press fitted over a respective one of said terminal studs when said RFI module is fitted over said plastic end cap and aligned with said outside shoulder on the corresponding one of said terminal studs to block withdrawal of said corresponding terminal stud from said brush passage, and

means defining a peripherally crimped edge of said tubular housing over said RFI module around the full diameter thereof and overlapping the outside diameter of said circular reinforcement therein defined by said pair of flat metal contact plates.

---

### 5,013,223

### DIAPHRAGM-TYPE AIR PUMP

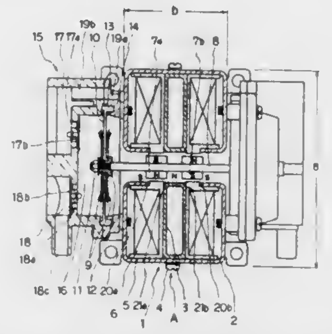
**Keizo Takahashi, Mino, and Noboru Bando, Takatsuki, both of Japan, assignors to Takatsuki Electric Mfg. Co., Ltd., Takatsuki, Japan**

**Continuation-in-part of Ser. No. 251,553, Aug. 12, 1988, abandoned. This application Apr. 19, 1989, Ser. No. 340,838**

**Claims priority, application Japan, Aug. 20, 1987, 62-207291; Sep. 4, 1987, 62-135872; Sep. 4, 1987, 62-222233; Sep. 14, 1987, 62-140538**

**Int. Cl.$^5$ F04B** *17/04*

**U.S. Cl. 417—413** **7 Claims**



1. A diaphragm-type air pump wherein a diaphragm connected to a rod having permanent magnets is driven by electromagnetic vibration of the rod caused by magnetic interaction between an electromagnet and the permanent magnets, said air pump electromagnet comprising:

a core having a main pole and at least one side pole;

said main pole and said at least one side pole being fixed to each other to form a path of magnetic flux through said core having a gap between opposing tips of said poles;

wherein said pole tips are formed to approach other a distance closer than a distance between said main pole and said at least one side pole, such that gap magnetic flux between said main pole and at least one side pole is increased and thereby enables the use of permanent magnets having smaller width than the distance between the main pole and the at least one side pole.

---

### 5,013,224

### FAN ASSEMBLY

**Yin-Chieh Liao, No. 106, Lane 6, Sec. 1 Chung-Shan Road, Ta-Tsuen Hsiang, Changhua Hsien, Taiwan**

**Filed Dec. 7, 1989, Ser. No. 447,204**

**Int. Cl.$^5$ E04B** *35/04;* **B63H** *3/00;* **H01R** *39/00*

**U.S. Cl. 417—423.5** **8 Claims**

1. A fan assembly comprising:

a stationary support:

a rotary support mounted on said stationary support for rotation about the axis of said stationary support;

a first motor connected to said rotary support so as to rotate said rotary support;

a plurality of fan units mounted on said rotary support, each of said fan units being provided with a second motor;

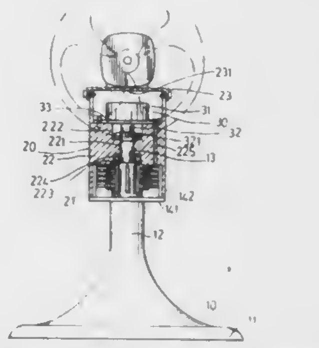
a first conductor connected to said first motor;

second conductors respectively connected to said second motors;

first conducting plates mounted to said rotary support to rotate simultaneously with said rotary support, each of said first conducting plates connected to each of said second conductors and having a first annular conductive face;

second conducting plates each provided between two adjacent said frist contacting plates, said second conducting plates being stationary and each having a second annular conductive face in contact with said first annular conductive face; and

third conductors respectively connected to said second conducting plates.



---

### 5,013,225

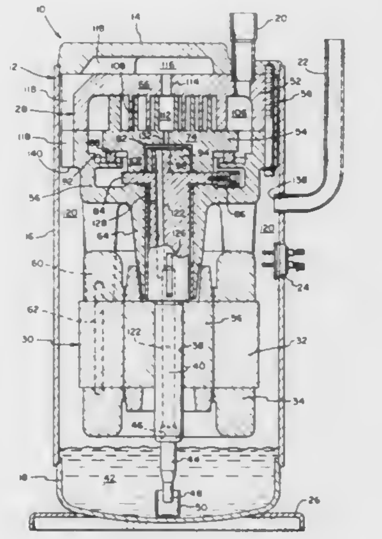
### LUBRICATION SYSTEM FOR A SCROLL COMPRESSOR

**Hubert Richardson, Jr., Brooklyn, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.**

**Filed Aug. 30, 1989, Ser. No. 400,785**

**Int. Cl.$^5$ F04C** *18/04, 29/02*

**U.S. Cl. 418—1** **17 Claims**



1. A scroll-type compressor for compressing refrigerant fluid, comprising:

a hermetically sealed housing including therein a discharge

VOL
1126
ISS
1
MY
7
1991
UMI

pressure chamber at discharge pressure and a suction pressure chamber at suction pressure;

an oil sump within said discharge pressure chamber;

suction inlet means for conveying refrigerant fluid from outside of said housing to said suction pressure chamber;

discharge outlet means for conveying refrigerant fluid from said discharge pressure chamber to outside said housing;

a fixed scroll member and an orbiting scroll member, each including a respective plate portion and a respective involute wrap element, said fixed and orbiting scroll members being operably intermeshed to define a compression interface therebetween wherein refrigerant fluid is compressed upon orbiting motion of said orbiting scroll member with respect to said fixed scroll member, a discharge portion of said compression interface being in constant fluid communication with said discharge pressure chamber through a discharge port;

drive means for causing said orbiting scroll member to orbit with respect to said fixed scroll member, said drive means including a rotatable crankshaft; and

centrifugal pumping means operable upon rotation of said crankshaft for pumping oil from oil sump directly to said discharge portion of said compression interface while the oil remains at at least discharge pressure.

---

5,013,226

## ROTATING SCROLL MACHINE WITH BALANCE WEIGHTS

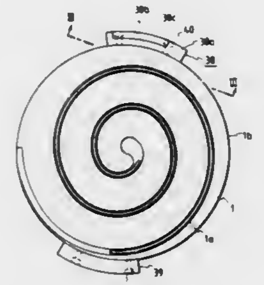
**Mitsuhiro Nishida, Fukuoka, Japan, assignor to Mitsubishi Denki K. K., Tokyo, Japan**

**Continuation-in-part of Ser. No. 219,419, Jul. 15, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 397,626**

**Claims priority, application Japan, Jul. 16, 1987, 62-179358**

**Int. Cl.$^5$ F01C** *1/04, 21/00*

**U.S. Cl. 418—55.1** **3 Claims**



1. A scroll machine, comprising:

a driving scroll rotatably disposed about a first axis;

a driven scroll rotatably disposed about a second axis, said driven scroll being driven by said driving scroll, said second axis being eccentric to said first axis, each of said driving scroll and said driven scroll including a disc portion and a scroll portion, said scroll portions being respectively disposed on one side of said disc portions, wherein a balance weight is attached to a first peripheral portion of said disc portion of said driven scroll and said driving scroll such that said balance weight projects toward said one side of said disc portion so as to be disposed radially adjacent said scroll portion and a dummy weight is attached to a second peripheral portion of said disc portion opposite said first peripheral portion.

---

5,013,227

## MULTISTAGE ROOTS PUMP AND A METHOD OF ASSEMBLING SUCH A PUMP

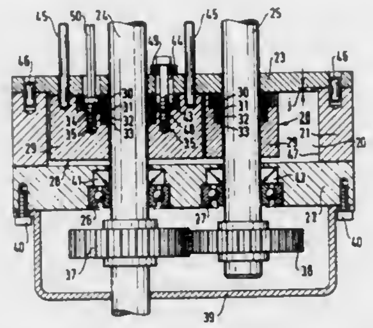
**Dominique Guittet, Annecy; Eric Taberlet, and Jean-Francois Vuillermoz, both of Annecy-le-Vieux, all of France, assignors to Societe Anonyme dite: Alcatel Cit, Paris, France**

**Filed Nov. 7, 1989, Ser. No. 434,044**

**Claims priority, application France, Nov. 7, 1988, 88 14493**

**Int. Cl.$^5$ F04C** *2/12, 18/12*

U.S. Cl. 418—206 3 Claims



1. A multistage Roots pump comprising a rotor assembly and a stator, the stator defining a plurality of successive compression chambers (20), each compression chamber being delimited axially by two stator plates (22), and radially by a stator ring (21), the rotor assembly being situated inside the stator and being constituted by two parallel shafts (24, 25), each shaft comprising a compression lobe (23) in each compression chamber (20), the lobes being placed and fixed on their shafts during assembly of the pump, the shafts being supported by bearings (26, 27) in the stator plates (22) situated at the ends of the stator, and including synchronizing gearing (37, 38) situated in a housing (39) fixed to one of the end stator plates, one of the shafts (24) being driven by a drive motor, the improvement wherein said stator plates (22) and stator rings (21) are separate parts stacked in alternation, each compression lobe is constituted by a body (29) and a clamping plate (30), the clamping plate being fixed to the body by axially disposed screws (34) and compressing a set of two conical rings (32, 33) interposed axially between said clamping plate and said body, one ring (33) penetrating inside the other (32) with said one ring shrunk radially, and fixing each lobe on its shaft at a defined axial position, thereby enabling a highly accurate assembly to be achieved for the multiple rotary lobes on said shafts at axially defined positions with small lateral clearances between the lobes and the stator plates permitting pump vacuums to be obtained which are approximately ten times higher than those of current machines.

---

5,013,228

## INJECTION MOULDING APPARATUS

**John B. Thornthwaite, and Robert Naismith, both of Nottingham, England, assignors to Games Workshop Limited, Nottinghamshire, United Kingdom**

**Continuation of Ser. No. 248,068, Sep. 23, 1988, abandoned. This application Jul. 12, 1990, Ser. No. 551,647**

**Claims priority, application United Kingdom, Sep. 26, 1987, 8722668**

**Int. Cl.$^5$ B29C** *45/46, 45/40*

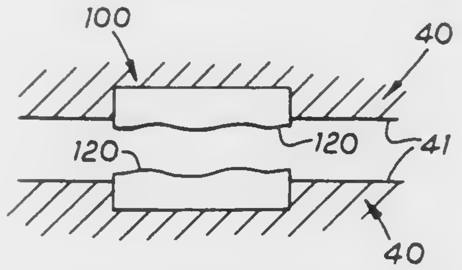
U.S. Cl. 425—2 11 Claims

1. A mold for a thermoplastics injection molding machine, comprising:

a first mold part having a relatively rigid body portion and an abutment face within said rigid body portion;

at least one additional mold part having a relatively rigid body portion and an abutment face within said rigid body portion of said additional mold part which may abut said abutment face of said first mold part;

said relatively rigid body portion of said first mold part further having a recess within its said abutment face and a mold insert being made of resilient material and having a contact face and positioned within said recess and said contact face projecting above said abutment face such that when the first and at least one additional mold part are positioned against one another the contact face of said mold insert first contacts the abutment face of said additional mold part and is compressed by said additional mold part and, upon further closing, the abutment face of said first mold part abuts the abutment face of said additional mold part and a mold cavity is formed by the mold insert of the first mold part, said mold cavity being suitable for forming a molded article by thermoplastics injection molding and when the first and at least one additional mold part are moved away from one another they permit removal of said molded article;



and further wherein when said molded article is removed from said mold insert, a part of said mold insert is moved by said molded article with respect to said relatively rigid body of said first mold part and once said molded article is removed from said first mold part, said part of said mold insert substantially returns to its original position with respect to said relatively rigid member of said first mold part, thereby enabling said molded article to have acute undercuts;

an injection means for injecting thermoplastics fluids under pressure; and

an inlet channel open at one end to said injection means and open at the other end to said mold cavity.

---

5,013,229

## MAT-MAKING APPARATUS FOR PARTICLEBOARD MANUFACTURE

**Werner Ufermann, Schwalmtal, and Jürgen Kieser, Nettetal, both of Fed. Rep. of Germany, assignors to G. Siempelkamp GmbH & Co., Krefeld, Fed. Rep. of Germany**

**Filed Dec. 1, 1989, Ser. No. 444,886**

**Claims priority, application Fed. Rep. of Germany, Dec. 8, 1988, 3841276**

**Int. Cl.$^5$ B29C** *43/22;* **D01G** *25/00* ·

**U.S. Cl. 425—83.1** **8 Claims**

1. An apparatus for forming a particle mat for the production of particleboard, the apparatus comprising:

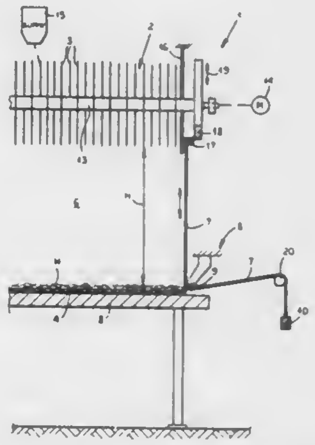
a transport belt having a stretch moving in a longitudinal transport direction and forming a deposition surface in turn defining a floor of a deposition space;

dispensing means upwardly delimiting the space and including a dispensing roller for depositing particles as a mat in the space on the longitudinally moving deposition surface;

a pair of transversely spaced and longitudinally extending upper guides extending generally the full longitudinal length of the pace generally at the dispensing means;

a pair of transversely spaced and longitudinally extending lower guides extending generally the full longitudinal length of the space underneath the respective upper guides and generally at the deposition surface;

a pair of longitudinally extending, continuous, and transversely spaced flexible one-piece sheets extending the full longitudinal length of the space and each having an inner edge secured to one of the guides of a respective one of the pairs of guides and an outer edge, the sheets each passing around the other of the guides of the respective pair of guides and therefore each having an upright section extending generally vertically between the respective upper and lower guides; and



tensioning means engaging the outer edges of the sheets and maintaining the wall sections taut, upright, and generally planar between the respective upper and lower guides, whereby the deposition space is transversely delimited by the sections of the sheets.

---

5,013,230

## APPARATUS FOR MAKING A SHRIMP-SHAPED FOOD PRODUCT

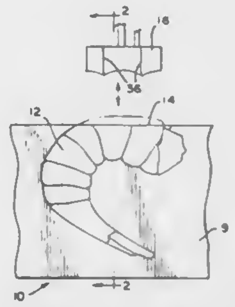
**Horoji Ikeuchi, and Kiyoaki Ikeuchi, both of Akashi, Japan, assignors to Kabushiki Kaisha Ikeuchi Tekkosho, Akashi, Japan**

**Division of Ser. No. 190,369, May 5, 1988, Pat. No. 4,919,957, which is a continuation-in-part of Ser. No. 75,575, Jul. 20, 1987, Pat. No. 4,748,039. This application Nov. 22, 1989, Ser. No. 440,271**

**Claims priority, application Japan, May 6, 1987, 62-111519**

**Int. Cl.$^5$ B29C** *33/42*

**U.S. Cl. 425—127** **8 Claims**



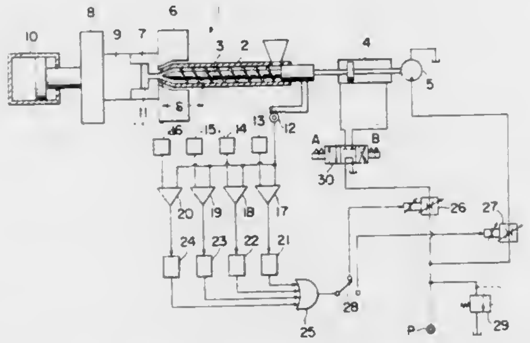
1. Apparatus for producing a shrimp-shaped food product from a minced fish meat material, comprising a split mold formed by two mold halves having adjoining surfaces which when moved together form a mold cavity therein, said mold further having an injection opening formed therein at said adjoining surfaces leading to said cavity and said opening being at one side of said mold, means for injecting the material into said cavity through said opening and filling said cavity and said opening with fish meat material, and a device which is movable into said opening when said mold halves are moved together to form said cavity to form a groove in the material in said opening, said groove being substantially in the plane of said adjoining surfaces.

VOL
1126
ISS
1
MY
7
1991
UMI

## 5,013,231
## CONTROL SYSTEMS FOR INJECTION MOLDING MACHINES

**Shigeru Fujita; Hiroshi Kanno, and Takashi Kamiyama, all of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 169,372, Mar. 17, 1988, abandoned.**
**This application Sep. 8, 1989, Ser. No. 405,036**
**Claims priority, application Japan, Mar. 24, 1987, 62-69998; Mar. 24, 1987, 62-69999; Dec. 15, 1987, 62-317223**
**Int. Cl.$^5$ B29C** *45/77*
**U.S. Cl. 425—145** **6 Claims**



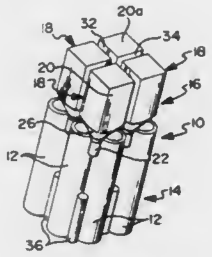
1. A control system of an injection molding machine for molding a molten resin and including a heating cylinder connected to a metal mold defining therein a mold cavity, a screw coaxially contained in said heating cylinder for kneading and injecting said molten resin into said metal mold cavity through a first end of said heating cylinder, an injection cylinder connected to said screw on a second end of said heating cylinder for reciprocating said screw in said heating cylinder, and means connected to said injection cylinder for rotating said screw, said control system comprising:
- means (**12**) for detecting a position of said screw during an injection stroke thereof;
- a plurality of position setters (**13–16**) located along said injection stroke and respectively set with predetermined positions along said injection stroke;
- a plurality of comparators (**17–20**), each comparator inputted with an output signal of said position detecting means (**12**) and an output signal of a corresponding position setter for producing a coincident signal when said output signal of said position detecting means and a signal from a corresponding position setter coincide with each other;
- means (**25**) responsive to the coincident signal of any one of said comparators;
- a plurality of setters (**21–24**) each connected to receive an output signal from a corresponding comparator (17–20) for setting an injection speed or a number of revolutions of said screw;
- a transfer switch (**28**) responsive to any one of the output signals received by said setters (**21–24**) for selectively controlling said injection cylinder and said screw rotating means and electromagnetic flow control valves (26)(27) controlled by said transfer switch for controlling the injection speed of said screw or the number of revolutions of said screw; and
- means for continuing rotation of said screw during advancement caused by said injection cylinder; and
- wherein said position detecting means (**12**), said plurality of position setters (**13–16**), said plurality of comparators (**17–20**), said means responsive to the coincident signal (**25**), said plurality of setters (**21–24**), said transfer switch (**28**) and said means for continuing rotation of said control system are connected to perform multistage program control of the injection speed or the number of revolutions of the screw.

---

## 5,013,232
## EXTRUSION DIE CONSTRUCTION

**Terrance Way, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Division of Ser. No. 399,184, Aug. 24, 1989, Pat. No. 4,955,524.**
**This application Jun. 1, 1990, Ser. No. 531,620**
**Int. Cl.$^5$ B29C** *47/30*
U.S. Cl. 425—192 R 5 Claims



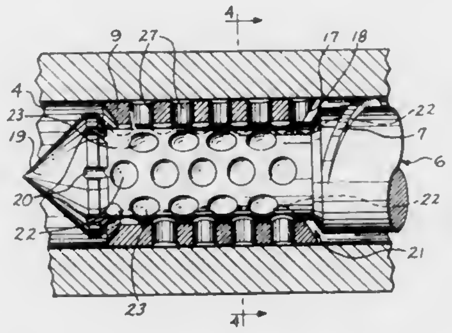
1. In an extrusion die for extruding honeycomb structures of the type having feed holes for directing the extrudable material to a plurality of extrusion slots having a cross-sectional shape conforming to the shape of the cell walls of the honeycomb structural body, the improvement comprising:
- a plurality of individual tube elements having an opening therethrough defining feed holes for flow of extrudable material;
- each of said individual tube elements having an external wall segment thereon and said individual tube elements being stacked so that said wall segments are in engagement to provide a reference space therebetween;
- a plurality of individual shaping teeth;
- each of said shaping teeth having a head portion and a shank portion, said shank portion inserted into one of said reference spaces to locate said head portion in spaced relationship with a head portion on another of said shaping teeth to define extrusion slots therebetween arranged in intersecting rows conforming to the shape of the cell walls of the honeycomb structure: and
- means for defining a flow transition path from said feed openings to said extrusion slots for smooth flow of the extrudable material through said extrusion slots so as to shape the extrudable material into the honeycomb structural body as it passes from said feed holes through said extrusion slots.

---

## 5,013,233
## DISTRIBUTIVE MIXER DEVICE

**Gerardus J. M. Semmekrot, Borne, Netherlands, assignor to Universiteit Twente, Enschede, Netherlands**

**Filed May 1, 1989, Ser. No. 346,051**
**Claims priority, application Netherlands, May 3, 1988, 8801156**
**Int. Cl.$^5$ B29C** *45/52, 47/64*
**U.S. Cl. 425—208** **13 Claims**



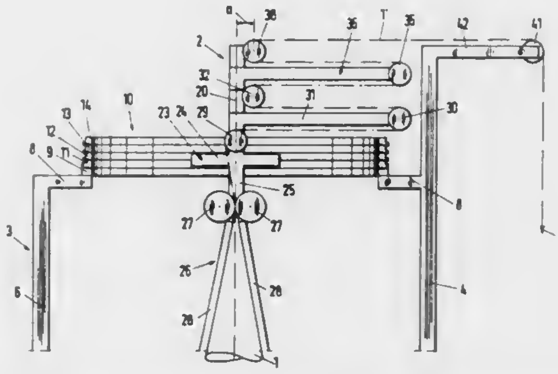
1. An extruder, the extruder comprising a mixer device with distributive mixing action, the mixer device having a hollow stator with an inner surface, a rotor having an outer surface and arranged for rotation in said stator, and at least one separate mixing ring arranged between said rotor and said stator for rotation around said rotor, said mixing ring having passages that are radially oriented in said mixing ring, the passages at one end substantially abutting said inner stator surface and at another end substantially abutting said outer rotor surface.

---

## 5,013,234
## OFF-DRAWING APPARATUS FOR TUBULAR WEBS OF PLASTIC FILM

**Klaus Reinhold, Krönerstrasse 3, 4540 Lengerich (Wesf.), Fed. Rep. of Germany**

**Filed Jul. 16, 1990, Ser. No. 552,730**
**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1989, 8908769[U]**
**Int. Cl.$^5$ B29C** *53/20*
**U.S. Cl. 425—327** **29 Claims**



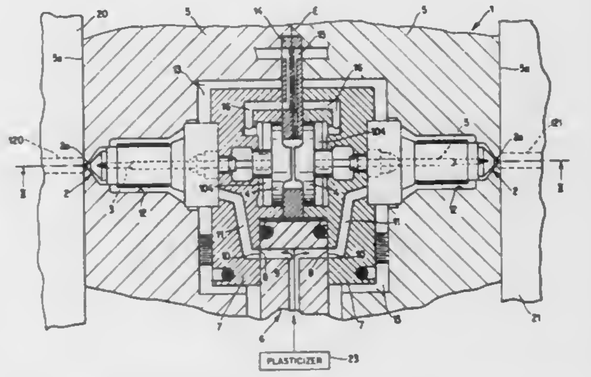
1. An off-drawing apparatus for a web of plastic material produced by an extruder having a fixed extruder head, said web having a generally circular cross-sectional configuration as said web is fed from said extruder with said circularly cross-sectioned web having a web axis, comprising a lay-flat means at which said web changes from said circular cross section to a flat web, a pair of pinch roll means between which said flat web passes, a frame means, a ring stack means rotatable on said frame means, said ring stack means comprising a plurality of rings rotatable about said web axis, and a turn-around means mounted on said ring stack means and comprising a turning roll disposed at one location for turning said flat web a first 180-degree turn and a turning bar disposed at another location for turning said flat web another 180-degree turn, said turn-around means further comprising a first mounting means mounted on a first ring of said ring stack means, said turning roll along with said pair of pinch rolls and said lay-flat means being mounted on said first mounting means such that said first mounting means along with said first ring, said pair of pinch rolls and said lay-flat means rotate together as a unit about said web axis, said turn-around means further comprising a second mounting means mounted on a second ring of said ring stack means, said turning bar being mounted on said second ring, said first ring being rotatable relative to said second ring, and a stationary winding means which receives said flat web from said turn-around means and winds said flat web into a roll.

---

## 5,013,235
## STACK INJECTION MOLDING MELT TRANSFER APPARATUS

**Raimund Friderich, Sasbach, Fed. Rep. of Germany, assignor to Otto Männer, Bahlingen, Fed. Rep. of Germany**

**Filed Nov. 1, 1989, Ser. No. 431,472**
**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1988, 3843037**
**Int. Cl.$^5$ B29C** *45/22*
**U.S. Cl. 425—564** **13 Claims**



1. A multiple-cavity stack molding apparatus, comprising a hollow housing having opposed first and second sides; first and second injection nozzles respectively having first and second melt-discharging orifices or discharging melt into adjacent mold cavities, said first and second melt-discharging orifices located at said opposed first and second sides respectively and said first and second injection nozzles including first and second valving elements for said first and second melt-discharging orifices, respectively, said first and second valving elements being movable between extended and retracted positions to seal and expose the first and second orifices, respectively; melt supplying means provided in said housing for supplying melt to said first and second melt-discharging orifices, said melt supplying means including a separate discrete melt-conveying member for each of said nozzles and an additional melt-conveying member having means for delivering melt to said discrete melt-conveying members; and means for moving said first and second valving elements, said moving means including reciprocable first and second pistons provided in said melt supplying means for moving said first and second valving elements respectively, said first and second pistons, said first and second valving elements and said first and second injection nozzles positioned along a common axis.

---

## 5,013,236
## ULTRA-LOW POLLUTANT EMISSION COMBUSTION PROCESS AND APPARATUS

**Mark J. Khinkis, Morton Grove, Ill., assignor to Institute of Gas Technology, Chicago, Ill.**

**Filed May 22, 1989, Ser. No. 354,837**
**Int. Cl.$^5$ F23C** *6/04*
**U.S. Cl. 431—10** **32 Claims**

20. The method for ultra-low pollutant emission combustion of fossil fuel, the steps comprising:
- introducing into a primary combustion chamber a first fuel portion of about 1 percent to about 20 percent of a total fuel to be combusted;
- introducing primary combustion air into said primary combustion chamber in an amount selected from one of a first range of about 40 percent to about 90 percent of a first stoichiometric requirement for complete combustion of said first fuel portion and a second range of about 140 percent to about 230 percent of the first stoichiometric requirement for complete combustion of said first fuel portion;

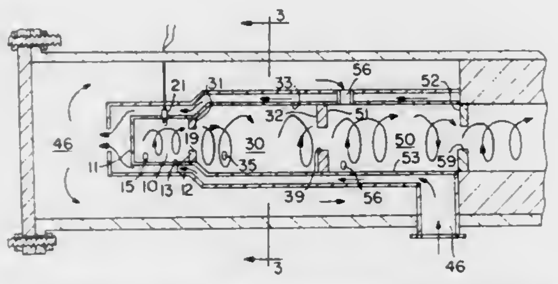
VOL
1126
ISS
1
MY
7
1991
UMI

combusting said first fuel portion with said primary combustion air in said primary combustion chamber at a temperature about 2000° F. to about 2700° F. producing initial combustion products;

passing said initial combustion products into a secondary combustion chamber;

introducing into said secondary combustion chamber a second fuel portion of about 80 percent to about 99 percent of the total fuel to be combusted;

introducing secondary combustion air into said secondary combustion chamber in an amount of about 150 percent to about 260 percent of a second stoichiometric requirement for complete combustion of said second fuel portion;



combusting said second fuel portion and any remaining fuel in said initial combustion products with said secondary combustion air in said secondary combustion chamber at a temperature about 1700° F. to about 2600° F. producing final combustion products;

passing said final combustion products into a dilution chamber;

introducing dilution air into said dilution chamber producing ultra-low pollutant emission vitiated air at a temperature about 100° F. to about 2500° F.; and

discharging said ultra-low pollutant emission vitiated air from said dilution chamber.

---

### 5,013,237

### OVEN FOR DEHYDRATING PULVERULENTS, SAND OR GRANULES

**René Bergounhon, Alpha Platre, 18 Rue Pierre-Grange, 94120 Fontenay-Sous-Bois, France**

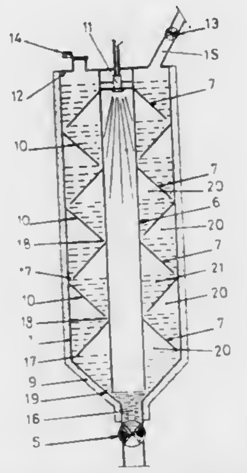
**PCT No. PCT/FR88/00111, § 371 Date Jan. 6, 1989, § 102(e) Date Jan. 6, 1989, PCT Pub. No. WO88/07163, PCT Pub. Date Sep. 22, 1988**

**PCT Filed Feb. 29, 1988, Ser. No. 347,897**

**Claims priority, application France, Mar. 16, 1987, 87 03528**

**Int. Cl.$^5$ F27D** *1/08;* **F26B** *17/12*

**U.S. Cl. 432—100** **9 Claims**



1. A continuous flow static vertical oven for drying under pressure granular or powder products in a wet or dry environment, comprising a thermally insulated outer jacket including a bottom wall, a top inlet in said thermally insulated outer jacket, products to be treated being conveyed through the top inlet into the thermally insulated outer jacket and drawn off after treatment through an orifice provided in the bottom wall of the outer jacket,

a concentric inner jacket forming a combustion chamber, an upper part of which houses a burner, and further comprising, in a space between the two jackets, a first series of frustoconical walls connected at their top edge to the outer jacket at different levels while their bottom edges define with the inner jacket first narrow annular passages, and a second series of frustoconical walls alternating with those of the first series, connected at their top edge to the inner jacket and of which the bottom edges define with the outer jacket second narrow annular passages,

means to permit passage of gas counter-current to the flow of product to be treated through the space between the jackets and over the entire height of the oven comprising a gap between the lower end of the inner jacket and the bottom wall of the outer jacket,

outlet seal means for the said orifice,

and wherein the said frustoconical walls define with the inner and outer jackets mixing chambers and the gas fluidizes the product to be treated in each mixing chamber.

---

### 5,013,238

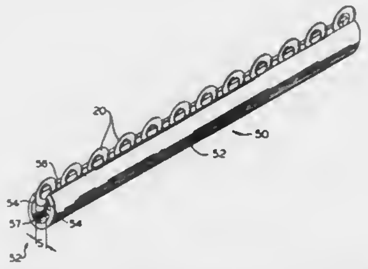
### ASEPTIC ORTHODONTIC DISPENSING APPLIANCES

**Terry L. Sterrett, Long Beach, and Gerald W. Schmidt, Ventura, both of Calif., assignors to Ormco Corporation, Glendora, Calif.**

**Filed Jan. 25, 1989, Ser. No. 301,122**

**Int. Cl.$^5$ A61C** *3/00*

**U.S. Cl. 433—2** **9 Claims**



1. An orthodontic O-ring dispensing device comprising:

at least one elongated hollow tube structure having an elongated slot which extends along the longitudinal axis of said tube to at least one end of said tube, said slot forming a pair of engaging flexible arms for clamping holding a plurality of orthodontic O-ring; and

a plurality of O-rings disposed in said slot, each O-ring being clamped in position between said engaging arms of said tube.

---

### 5,013,239

### POSITIONER WITH ROTATIONAL CONTROL ELEMENTS

**Christopher K. Kesling, LaPorte, Ind., assignor to TP Orthodontics Inc., Westville, Ind.**

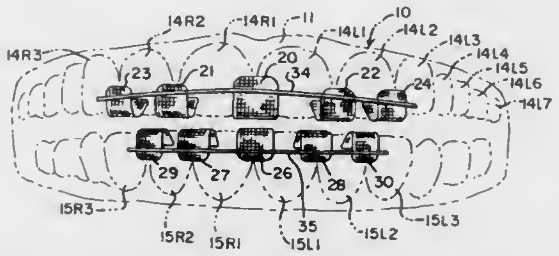
**Filed Sep. 25, 1989, Ser. No. 411,667**

**Int. Cl.$^5$ A61C** *7/00*

**U.S. Cl. 433—6** **12 Claims**

1. An orthodontic appliance comprising a molded arch-shaped body of resilient material, said body being formed to fit within the mouth of a person between the upper and lower arches and including a series of adjacent sockets for teeth of the arches arranged to urge at least some teeth into preselected positions, said sockets having a bottom wall to engage the incisal/occlusal surface of a tooth and opposed labial and

lingual walls adapted to engage the respective labial and lingual surfaces of a tooth, and means substantially more rigid than said resilient material molded in the appliance body, said means positioned in said sockets so as to bridge two adjacent sockets and to concurrently overlap a portion of adjacent teeth at the labial and lingual surfaces to inhibit tooth rotation and enhance desired rotational corrections, said means conforming to the labial and lingual tooth surfaces.



---

### 5,013,240

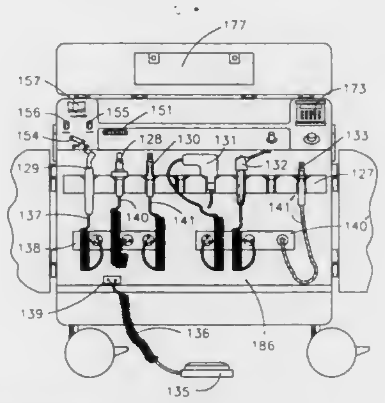
### PORTABLE DENTAL APPARATUS

**James R. Bailey, Indianapolis, and C. Robert Schrock, Greenwood, both of Ind., assignors to International Equipment & Supply Corp., Indianapolis, Ind.**

**Filed Jun. 19, 1990, Ser. No. 540,084**

**Int. Cl.$^5$ A61G** *15/00;* **A61C** *1/02*

**U.S. Cl. 433—77** **8 Claims**



4. A portable dental apparatus comprising:

a portable main housing having an interior;

transport means beneath said main housing operable to allow said portable dental apparatus to have an in-use stationary state and a transport state;

dental tool holding means on said main housing;

a plurality of dental tools removably mountable on said dental tool holding means;

drive means mounted within said interior operable to drive said dental tools;

connecting means connected between said drive means and said plurality of dental tools;

lid means mounted to said main housing, said lid means and said main housing forming a storage cavity to receive said plurality of dental tools and said connecting means when said portable dental apparatus is in said transport state;

said dental tool holding means is movably mounted to said main housing and is movable from external of said storage cavity when said portable dental apparatus is in said in-use stationary state and into said storage cavity when said portable dental apparatus is in said transport state;

said plurality of dental tools include a dental drill hand piece, a syringe, and a suction handpiece;

said main housing includes a control panel operably associated with said drive means and said plurality of dental tools, said lid means and further includes a lid mounted atop said control panel, said lid is movable to an open condition uncovering said control panel when said portable dental apparatus is in said in-use stationary state and to a closed condition covering said control panel when said portable dental apparatus is in said transport state;

control means having a foot control and a line connecting said foot control to said drive means, said foot control stored within said cavity when said portable dental apparatus is in said transport state, said control means further having additional controls mounted on said control panel and operably associated with said tools and said drive means, said additional controls being concealed when said lid is closed and said portable dental apparatus is in said transport state;

said drive means includes a compressor, a source of water, and a removable container for liquid waste;

said control panel includes mounted thereon amalgamate means operable to shake materials to be affixed to a tooth, said control panel further includes mounted thereon said additional controls which includes drill speed control means associated with said dental drill hand piece and said compressor, and water flow control means associated with said source of water and said syringe; and

said lid includes a lightable x-ray display means thereon.

---

### 5,013,241

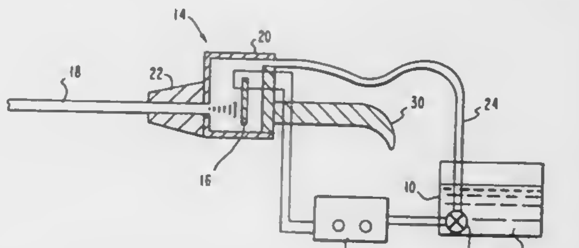
### ULTRASONIC JET DENTAL TOOL AND METHOD

**Robert J. von Gutfeld, 600 W. 115th St., New York, N.Y. 10025, and Nelly Ropper, 205 West End Ave., New York, N.Y. 10023**

**Filed Sep. 18, 1989, Ser. No. 409,042**

**Int. Cl.$^5$ A61C** *1/07*

**U.S. Cl. 433—86** **28 Claims**



1. A method for removing plaque from a tooth including the steps of focussing an ultrasound sonic wave in a liquid stream to form a sonified liquid stream, said sonic wave having a frequency in the range of about 1–100 MHz and

directing said sonified liquid stream at said tooth, the energy of the focussed sonic wave in said stream being sufficient to remove plaque from said tooth, said liquid stream having a pressure less than that which would cause damage to gums surrounding said tooth.

---

### 5,013,242

### JAW IMPLANT

**László Prezmecky Grundackerstrasse 20/E, CH-4414 Füllinsdorf, Switzerland**

**Filed Nov. 22, 1988, Ser. No. 274,186**

**Claims priority, application European Pat. Off., Nov. 26, 1987, 87810699.6**

Int. Cl.$^5$ A61C *8/00*

**U.S. Cl. 433—174** **7 Claims**

1. A jaw implant comprising:

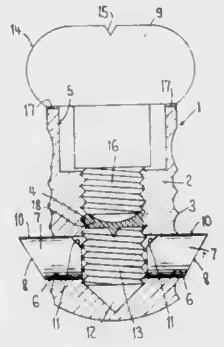
a substantially cylindrical body having exterior sides and intersecting vertical and horizontal bores, the vertical bore and the exterior sides being substantially threaded,

at least one retention pin adapted to be inserted into the horizontal bore and having top, bottom, outer and inner sides and an upper inner corner, said retention pin being bevelled at its outer side so that its bottom side is shorter than its top side and chamferred at its upper inner corner,

VOL
1126
ISS
1
MY
7
1991
UMI

the inner side being perpendicular to a longitudinal axis through said pin, and

a substantially cylindrical, externally threaded member having a lower end which is tapered to a point so that when



moved into the vertical bore, it cooperates with the upper inner corner of said retention pin, forcing said retention pin outward so that the inner side of said pin rests on the external threads of said cylindrical member.

### 5,013,243
### DENTURE ATTACHMENT

**Yoshinobu Tanaka; Yoshiro Iwama; Yoshinobu Honkura; Kazuo Arai, and Aki Watarai, all of Aichi, Japan, assignors to Aichi Steel Works, Limited, Araocho, Japan**

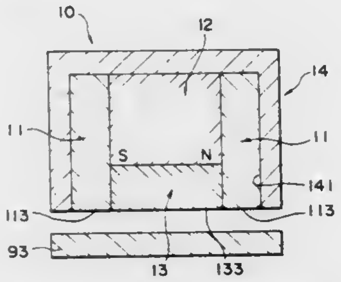
**PCT No. PCT/JP89/00548, § 371 Date Jan. 29, 1990, § 102(e) Date Jan. 29, 1990, PCT Pub. No. WO89/11835, PCT Pub. Date Dec. 14, 1989**

**PCT Filed Jun. 1, 1989, Ser. No. 460,073**

**Claims priority, application Japan, Jun. 1, 1988, 63-134737; May 10, 1989, 64-116595; May 10, 1989, 64-116596**

**Int. Cl.$^5$ A61C** *13/235*

**U.S. Cl. 433—189** **12 Claims**



1. A denture attachment to be embedded in a denture base so as to face a soft magnetic alloy coping embedded in the root of a tooth, the denture attachment comprising:

a spacer formed essentially of a corrosion-resistant non-magnetic alloy, the spacer disposed on the side of the coping;

a pair of end plates formed essentially of a corrosion-resistant soft magnetic alloy, the pair of end plates arranged perpendicularly to the coping with the spacer sandwiched therebetween;

a magnet body disposed on the opposite side of the spacer with respect to the coping, the S and N poles of the magnet body facing the end plates respectively; and

a cap covering the magnet body, the pair of end plates and the spacer except on the coping side,

the boundary surfaces of the cap and the end plates and the boundary surfaces of the spacer and the end plates being respectively joined together on the side of the coping.

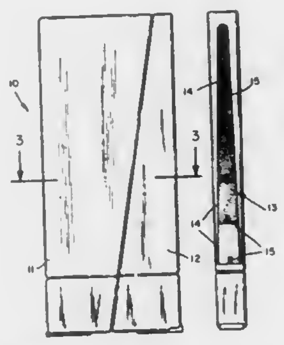
### 5,013,244
### COLORIMETRIC SCALE FOR CORRELATING A SHADE TWO BLENDED COLORS WITH THE SUN PROTECTION FACTOR OF A SUN SCREENING AGENT

**Jeffrey L. Davidson, 3735 Bagley Ave., Los Angeles, Calif. 90034**

**Filed Nov. 15, 1989, Ser. No. 436,655**

**Int. Cl.$^5$ G09B** *29/00*

**U.S. Cl. 434—81** **1 Claim**



1. A kit comprising:

a. a first dispenser which stores and dispenses a first sun screening agent of a low sun protection factor of a first color;

b. a second dispenser which stores and dispenses a second sun screening agent of a high sun protection factor of a second color whereby said first sun screening agent and said second sun screening agent may be mixed together in order to obtain sun screening agent of intermediate sun protection factor so that the first and second colors are blended; and

c. a colorimetric scale having a plurality of represention of shades of blends of the first and second colors and a plurality of designations of sun protection factors each of which has been calibrated to correlate with one of said representations of shades of the blended first and second colors in order determine the sun protection factor of the intermediate sun screening agent.

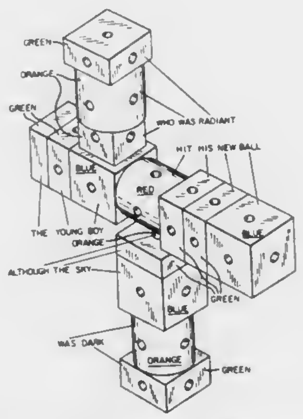
### 5,013,245
### INFORMATION SHAPES

**Morgan D. Benedict, 802 S. Gay St., Longmont, Colo. 80501**

**Continuation of Ser. No. 188,679, Apr. 29, 1988, abandoned, which is a continuation of Ser. No. 876,722, Jun. 20, 1986, abandoned. This application Aug. 25, 1989, Ser. No. 399,426**

**Int. Cl.$^5$ G09B** *1/00*

**U.S. Cl. 434—170** **7 Claims**



1. An information device comprising:

(a) a series of three-dimensional geometric shapes representing parts of speech comprising:

- a cube,
- a cylinder,
- a smaller cube,
- a rectangular parallelopiped,
- a smaller rectangular parallelopiped,
- a smaller volume cylinder,
- a smallest volume cylinder,
- a isosceles prism,
- a cylindrical dowel,
- a smaller cylindrical dowel,
- a smallest cylindrical dowel,
- a dowel tee,
- a dowel cross, and,
- a dowel tee-cross; and

(b) means for connecting each geometric shape to every other geometric shape comprising at least one hole in each said geometric shape within which a dowel is fitted.

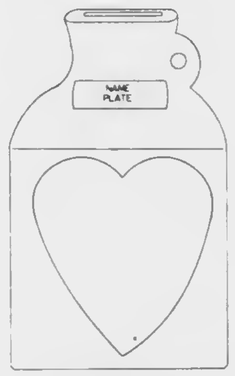
### 5,013,246
### METHOD OF PROMOTING SELF-ESTEEM BY ASSEMBLING A PERSONALIZED KIT

**Nancy L. C. Doyle, 1303 Foulk Rd., Wilmington, Del. 19803**

**Filed Jul. 12, 1989, Ser. No. 378,651**

**Int. Cl.$^5$ G09B** *19/00*

**U.S. Cl. 434—236** **2 Claims**



1. A method of promoting self-esteem by assembling a personalized kit whose features comprise—

(a) chips imprinted with one or more character quality words such as, but not limited to, honesty, integrity, loyalty, justice, courtesy, and responsibility;

(b) blank chips for hand printing of character quality words not found among the printed chips; and

(c) a container with an opening of a size which permits the insertion of the chips through the opening; said method comprising the steps of:

identifying the character qualities and/or values recognized and admired in the designated individual for whom the said kit is being assembled;

recording on any enclosure card the identified admirable character qualities/values;

recording on the same enclosure card, the name of the recipient and the name of the presenter or the individual assembling the kit;

selecting the preprinted chips which correspond to those qualities identified and recorded;

printing, by hand, the remaining identified qualities on the blank chips;

inserting the selected preprinted chips and the hand printed chips into the container;

inscribing the recipient's name on the container;

presenting the assembled personalized kit to the recipient with an accompanying warm embrace; and completing the following three steps only when 25 specified qualities such as, but not limited to, Charity, Compassion, Courage, Love, Receptivity, Accountability, Excellence, Independence, Industry, Self-discipline, Commitment, Courtesy, Justice, Loyalty, Responsibility, Appreciation, Aspiration, Curiosity, Trust, Self-esteem, Honesty, Cognition, Integrity, Peace, Truth, have been identified in the recipient—

inserting a chip imprinted with the words, "The Laudable 25 Sense", into the container,

listing those 25 specified qualities together with the recipient's name on a card or paper designated as a recognition certificate, and

presenting the recognition certificate to the recipient.

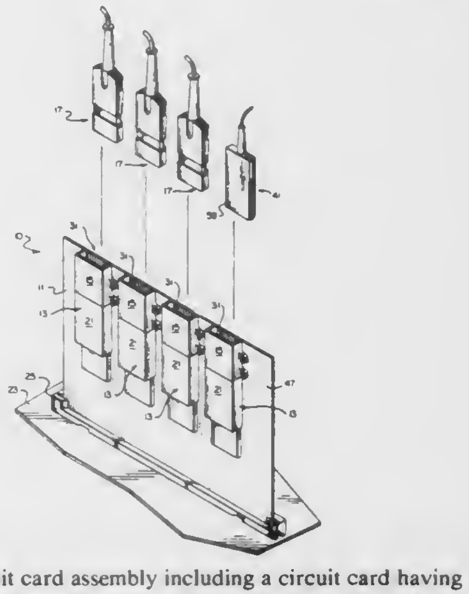
### 5,013,247
### FIBER OPTIC CONNECTOR ASSEMBLY ADAPTED FOR PROVIDING CIRCUIT CARD CHARGING

**Joseph L. Watson, Apalachin, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 16, 1989, Ser. No. 422,337**

**Int. Cl.$^5$ H01R** *9/09*

**U.S. Cl. 439—55** **12 Claims**



1. In a circuit card assembly including a circuit card having at least one fiber optic connector assembly located thereon for being optically connected to corresponding circuitry in said card assembly, said fiber optic connector assembly including a housing located on a first surface of said circuit card to occupy a predetermined area on said card, said housing adapted for having a fiber optic cable connector positioned therein during operation of said card assembly, the improvement comprising:

means for providing electrical connection to said card assembly to achieve electrical charging of said circuit card prior to positioning of said fiber optic cable connector within said housing, said electrical connection occurring within said predetermined area on said circuit card occupied by said connector housing of said fiber optic connector assembly, said housing including an opening therein adjacent said predetermined area on said circuit card, said electrical charging occurring through said opening.

### 5,013,248
### MULTICIRCUIT CONNECTOR ASSEMBLY

**Thomas E. Brown, Mechanicsburg, and Thomas F. Davis, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Continuation-in-part of Ser. No. 407,762, Sep. 19, 1989. This application Nov. 30, 1989, Ser. No. 444,577**

**Int. Cl.$^5$ H01R** *9/09*

**U.S. Cl. 439—66** **15 Claims**

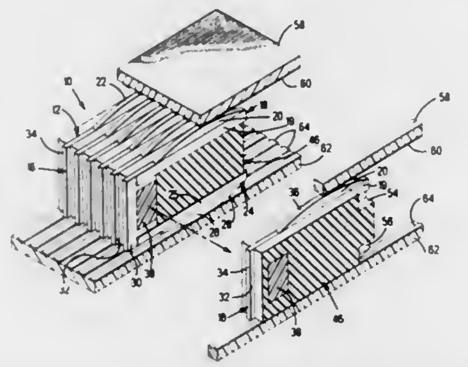
1. An electrical connector for interconnecting a pair of

VOL
1126
ISS
1
MY
7
1991
UMI

electrical articles said connector being integrally molded from rigid and compressible materials by a dual injection molding process, said connector comprising:

at least one bifurcated substantially rigid tine having first and second arm portions coextending from a bight section and deflectable toward each other said arm portions being curved arcuately outwardly, and adapted to have circuit means defined along outer surfaces thereof, said tine being formed from a dielectric material;

support means integrally molded between said first and second arm portions, said support means being formed from said compressible material; and



continuous circuit means defined along outer surfaces of said arm and bight portions respectively of said molded member, said circuit means including first and second contact sections on said first and second arm portions respectively adapted to engage respective corresponding contact means of said pair of articles, said compressible material having sufficient durometer to maintain contact normal force between said first and second contact sections and the corresponding contact means of opposed first and second electrical articles upon said arm portions being compressively held between said pair of electrical articles.

---

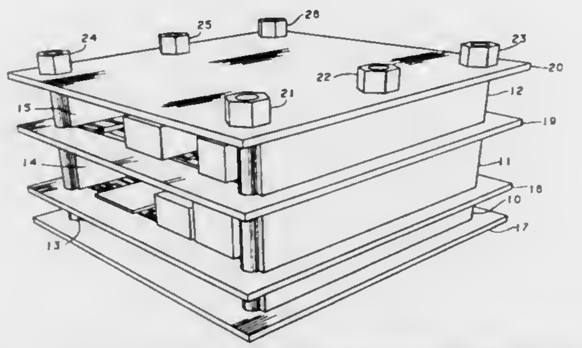
### 5,013,249
### ELECTRICAL CONNECTORS

**Richard J. Lindeman, Wood Dale, Ill., and Robert J. Smith, II, Austin, Tex., assignors to Labinal Components and Systems, Inc., Elk Grove Village, Ill.**

**Continuation-in-part of Ser. No. 297,303, Jan. 13, 1989, abandoned, which is a division of Ser. No. 947,317, Jun. 19, 1986, Pat. No. 4,806,110, which is a continuation-in-part of Ser. No. 876,179, Jun. 19, 1986, Pat. No. 4,710,133, which is a continuation-in-part of Ser. No. 352,499, May 16, 1989, which is a continuation-in-part of Ser. No. 375,588, Jul. 5, 1989. This application Sep. 12, 1989, Ser. No. 406,142**

**Int. Cl.$^5$ H01R** *9/09, 13/648*

**U.S. Cl. 439—66** **22 Claims**



1. An electrical connector for connection of conductive pads of circuit boards, comprising: a block of insulating material having opposite surfaces in spaced generally parallel planes and having a row of spaced parallel openings therethrough extending between and in transverse relation to said opposite surfaces thereof, a row of elongated slugs of conductive material positioned in said openings with there being inward spacings between opposite terminal ends of each slug and said opposite surfaces of said block to provide a pair of cavities within each opening at the opposite ends of each of said slugs, a pair of resilient wadded conductor contact elements disposed in each of said pairs of said cavities for engagement with surfaces of conductive circuit board pads placed in alignment with said cavities and pressed toward said opposite surfaces of said block, and a wall portion of conductive material in parallel relation to said row of elongated slugs and having opposite edges adjacent said opposite surfaces of said block, said wall portion being arranged for connection to circuit board conductors to provide a ground plane in parallel relation to said row of elongated slugs.

---

### 5,013,250
### MULTI-POLE CONNECTOR PLUG

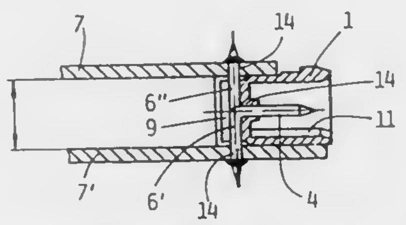
**Erhard Schulz, Nuremberg, Fed. Rep. of Germany, assignor to Fritz Hartmann Gerätebau GmbH & Co. KG, Baiersdorf, Fed. Rep. of Germany**

**Filed Dec. 15, 1989, Ser. No. 450,001**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 8815974[U]**

**Int. Cl.$^5$ H01R** *23/70*

**U.S. Cl. 439—79** **10 Claims**



1. A multi-pole plug-in connector for connecting a female connector of an electrical cable to first and second printed circuit boards, said multi-pole plug-in connector comprising:

an elongated insulating strip having a substantially U-shaped cross-section with a bottom wall and a pair of parallel side walls extending from said bottom wall;

a plurality of spaced parallel grooves defined in an outer surface of said bottom wall, with said grooves extending to respective outer surfaces of both of said side walls and transverse to the longitudinal direction of said strip; and

a plurality of contact pins attached to said insulating strip, disposed in substantially mutually parallel planes, and extending through said bottom wall and through respective ones of said grooves, and with each of said plurality of contact pins including a plug-in arm disposed between said side walls and a printed circuit board arm extending from said outer surface of said bottom wall; and wherein:

(1) said plug-in arms are located in a common plane substantially perpendicular to said mutually parallel planes, are disposed between said side walls in a single row, extend in a first direction, and are connectable to female connectors;

(2) a first plurality of said printed circuit board arms extend in a second direction transverse to said common plane and outwardly of the respective said outer surface of a first of said pair of side walls, are disposed in respective ones of said grooves, and are electrically and mechanically connectable with a first printed circuit board; and

(3) a second plurality of said printed circuit board arms extend from said bottom wall in a third direction and are electrically and mechanically connectable with a second printed circuit board, with said third direction being at an angle to said second direction.

---

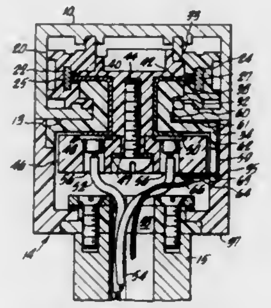
### 5,013,251
### ADAPTOR AND MECHANISM FOR GROUNDING A TRACK LIGHT SYSTEM

**Ralph S. Stringer, Gardena, and Horace L. Green, Jr., Lynwood, both of Calif., assignors to Marco/Marvin Electric Manufacturing Co., Los Angeles, Calif.**

**Filed Aug. 4, 1989, Ser. No. 389,608**

**Int. Cl.$^5$ H01R** *4/66*

**U.S. Cl. 439—94** **16 Claims**



4. A connector apparatus, comprising:

a connector housing having a platform with an upper surface and a protrusive member extending perpendicularly therefrom, said connector housing securing a ground conductor, a first conducting line and a second conducting line therein;

a first contacting member and a second contacting member mounted to the protrusive member and electrically engaging the first conducting line, respectively;

a grounding mechanism electrically connected to the ground conductor and configured to be wrapped around the upper surface of the platform and a lower surface thereunder.

---

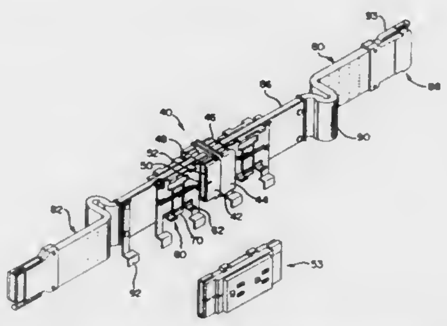
### 5,013,252
### ELECTRIFIED WALL PANEL SYSTEM

**James H. Nienhuis, Wyoming; Jeffrey L. Clark, Holland; Michael L. De Pree, Hamilton, and Robert L. Beck, Zeeland, all of Mich., assignors to Herman Miller, Inc., Zeeland, Mich.**

**Continuation-in-part of Ser. No. 467,267, Jan. 18, 1990, abandoned. This application May 18, 1990, Ser. No. 526,064**

**Int. Cl.$^5$ H01R** *25/00*

**U.S. Cl. 439—215** **21 Claims**



11. A multi-circuit electrical distribution system for wall panel units in which wall panel units may be connected at the ends thereof comprising:

a power distribution server comprising four receptacle module ports oriented in an H-shaped configuration in which a first receptacle module port on a first side of the server unit opens toward a first end of the server, a second receptacle module port on the first side of the server opens toward the opposite end of the server, a third receptacle module port on an opposite side of said server opens toward the first end of the server, and a fourth receptacle module port on the opposite side of the server opens toward the opposite end of the server;

a first harness electrically connected at one end to said power distribution server, said first harness of a length to extend to one end of a wall panel unit, said first harness including on the other end thereof a harness end connector port; and

a second harness connected at one end to said power distribution server on the side of said power distribution server opposite said first harness, said second harness of a length to extend to the other end of said wall panel unit, said second harness including on the other end thereof a harness end connector port,

---

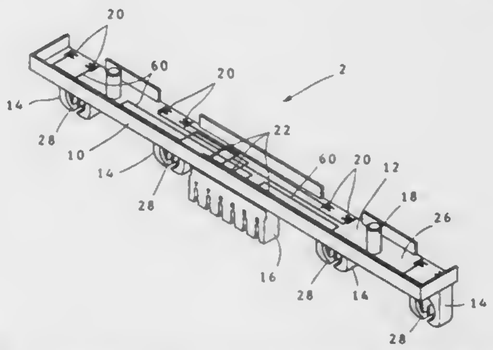
### 5,013,253
### FLUORESCENT LIGHT CONNECTOR ASSEMBLY

**Richard E. Aiello, Tobaccoville; Christopher L. Allgood, Lewisville; Donald G. Stillie, Winston-Salem, and Allan J. Sykora, Kernsersville, all of N.C., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 20, 1990, Ser. No. 482,111**

**Int. Cl.$^5$ H01R** *33/02*

**U.S. Cl. 439—235** **21 Claims**



1. A subassembly for use in a lighting fixture assembly, comprising:

an insulative body having a plurality of first and second cavities extending from a first face to a second face;

a plurality of insulative lamp support members protruding from the first face of the insulative body, first cavities extending through the insulative body and into the lamp support members, said insulative body and insulative lamp support members being part of a one-piece molded structure;

a plurality of first terminals in the first cavities and second terminals in the second cavities, corresponding pairs of first and second terminals being joined by interconnecting wires extending therebetween along the second face, the first terminal including means for establishing contact with a lamp inserted into a support member, the second terminal including means, exposed on the first face, for establishing contact with lead wires interconnecting the subassembly to the remainder of the lighting fixture, whereby the subassembly can be completely wired as a modular subassembly before incorporation into a complete lighting fixture assembly.

---

### 5,013,254
### LATCHING MECHANISM FOR TEST PROBE APPARATUS

**Robert A. Williams, Fort Worth, and Jeffrey W. Herron, Arlington, both of Tex., assignors to Williams Instruments, Inc., Fort Worth, Tex.**

**Filed Oct. 5, 1990, Ser. No. 593,053**

**Int. Cl.$^5$ H01R** *4/38*

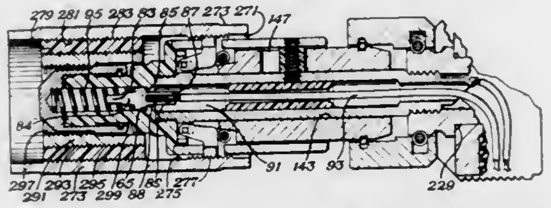
**U.S. Cl. 439—255** **6 Claims**

1. A test probe apparatus, comprising:

body means having a front end and a rear end,

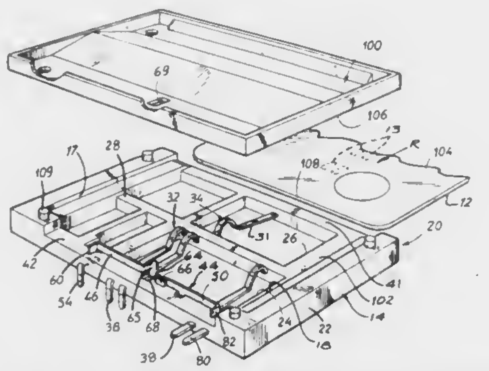
VOL
1126
ISS
1
MY
7
1991
UMI

support means carrying a first electrical contact means supported at said front end of said body means,
a first electrical lead means coupled to said first electrical contact means and extending toward said rear end and out of said apparatus,
wall means spaced from and surrounding said body means defining a surrounding space located between said wall means and said body means and having an opening facing rearward,
a plurality of angularly spaced apart openings formed through said wall means, a movable sleeve means located around said body means,
said sleeve means being movable between forward and rearward positions relative to said body means,
at least the forward portion of said sleeve means being located for movement in said surrounding space,
a plurality of latch means located in said surrounding space and having coupling portions pivotally coupled to structure of said apparatus at angularly spaced apart positions and latching portions located to move to outward and inward positions through said plurality of openings respectively,
at least one of said latch means being formed of an electrically conducting material,
means for electrically insulating said one latch means from said first electrical contact means whereby said one latch means forms a second electrical contact means,
a second electrical lead electrically coupled to said one latch means and extending out of said apparatus,
engaging means for engaging said plurality of latch means when said sleeve means is moved toward said forward position for moving said latching portions of said plurality of latch means outward through said plurality of openings for use for latching said test probe apparatus to structure of an opening,
retracting means for retracting said latching means to their inward positions when said sleeve means is moved toward said rearward position.



---

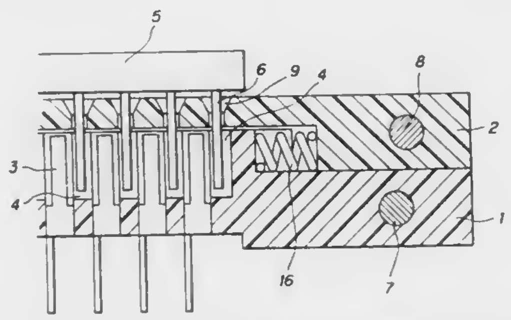
### 5,013,255
## CARD CONNECTOR AND PRODUCTION METHOD
**Bernard Juret, Dole, and Alain Janniere, Paris, both of France, assignors to ITT Composants et Instruments, Bagneux, France**
**Filed Oct. 19, 1989, Ser. No. 423,911**
**Claims priority, application France, Oct. 26, 1988, 88 13988**
**Int. Cl.⁵ H01R** *13/15*
**U.S. Cl. 439—260** **8 Claims**



1. An electrical connector for receiving an electronic memory card having a plurality of card contact regions, that is inserted in a predetermined rearward direction into the connector, comprising:
a housing forming a slot having forward and rearward ends for receiving said card;
a plurality of terminals mounted in said housing and positioned to engage said card contact regions as said card is inserted;
a microcontact device for detecting full insertion of said card, comprising a detection contact and an output contact, each contact having a mount portion mounted on said housing, said contacts having free ends lying near said slot rear end so at least one of said free ends can be deflected by said card between a first configuration wherein said free ends engage each other and a second configuration wherein said free ends are out of engagement with each other;
said free end portion of said detection contact has a bent zone that projects toward said front slot end, said detection contact free end portion also having an end tab lying behind and in contact with the free end of said output contact, said bent zone lying in the path of said card to be deflected by said card during its insertion, and said housing having a stop that engages said output contact to limit its rearward movement.

---

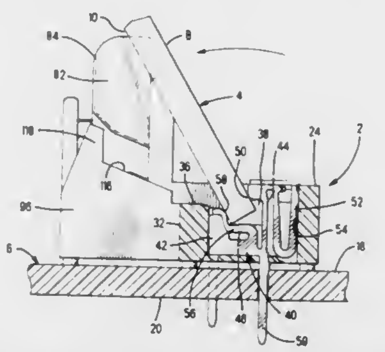
### 5,013,256
## SOCKET FOR ELECTRIC PART
**Noriyuki Matsuoka, and Kazumi Uratsuji, both of Tokyo, Japan, assignors to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan**
**Filed Mar. 21, 1990, Ser. No. 497,080**
**Claims priority, application Japan, Mar. 22, 1989, 1-33063**
**Int. Cl.⁵ H01R** *13/15, 11/22*
**U.S. Cl. 439—264** **10 Claims**



1. A socket for receiving at least one terminal of an electrical part, comprising:
a socket body having at least one electrical contact mounted therein and at least one no-load insertion space formed adjacent said at least one contact, respectively;
a movable plate having at least one terminal insertion hole formed therethrough, and being slidably mounted on said socket body for slidable movement between a no-load insertion position in which said at least one terminal insertion hole is aligned with said at least one no-load insertion space, respectively, so as to allow the at least one terminal to be respectively inserted through said at least one terminal insertion hole and into said at least one no-load insertion space without encountering resistance from said at least one contact, and a contacting position in which said at least one terminal insertion hole is misaligned with respect to said at least one no-load insertion space, respectively, and in which, when said at least one terminal is inserted through said at least one terminal insertion hole, said at least one terminal is engaged with said at least one contact, respectively; and
biasing means for continuously urging said movable plate toward said no-load insertion position with a force insufficient to disengage the at least one terminal from said at least one contact but sufficient to move said plate into said no-load insertion position when the at least one terminal is not engaged with said at least one contact, respectively.

---

### 5,013,257
## CIRCUIT BOARD CONNECTOR HAVING IMPROVED LATCHING SYSTEM
**Iosif Korsunsky, Harrisburg, and Richard C. Schroepfer, Thompsontown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**
**Filed Jun. 27, 1990, Ser. No. 544,458**
**Int. Cl.⁵ H01R** *13/00*
**U.S. Cl. 439—326** **20 Claims**

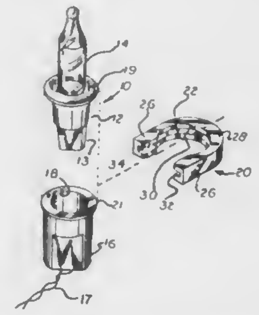


1. An electrical connector comprising an insulating housing having opposite ends, a board-receiving face and a mounting face which is directed oppositely with respect to the board-receiving face, a trough-like recess extending into the board-receiving face and extending between the ends, each of the ends having a latch-receiving cavity which extends into the board-receiving face, a stamped and formed latch member in each of the cavities, each latch member being generally U-shaped and having first and second arms which extend from a bight, the first arm of each latch member being proximate to the recess and being flexible towards the second arm to permit insertion of edge portions of a circuit board into the recess, the first arm of each latch member having shoulder means which engages the board after insertion and retains the board in the recess, the connector being characterized in that:
each cavity has an integral support member extending thereacross between the arms, the bight portion of each latch member being between the support member and the mounting face, the support members being adjacent to the bight portions, whereby,
upon flexure of the first arms towards the second arms during insertion of a circuit board into the recess, the bight portions are supported by the support members and the board retaining effect of the latch members is thereby enhanced.

---

### 5,013,258
## LATCHING ASSEMBLY FOR A LIGHT BULB AND ELECTRICAL SOCKET
**Irving W. Schaef, Hialeah, Fla., assignor to G.K.I., Miami, Fla.**
**Filed Jan. 29, 1990, Ser. No. 471,777**
**Int. Cl.⁵ H01R** *4/50*
**U.S. Cl. 439—347** **8 Claims**

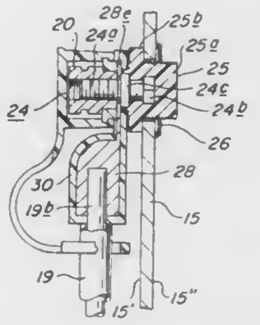
1. A decorative string set of miniature light bulbs comprising in combination:
(a) an electrically wired socket including electrical connection means in the socket,
(b) a light bulb with an associated filament, a base and electrical leads coupled to said filament and mounted on said base in exposed relation for connection to said electrical connection means, said base being sized and configured for snug receipt of said socket.
(c) a first flange secured to said socket and extending outwardly from an outer surface thereof,
(d) a second flange mounted on said base and extending outwardly from an outer surface of said base,
(e) said base and said socket cooperatively dimensioned and configured to removably position said base within said socket in an operative position defined by electrical connection therebetween.
(f) said operative position further defined by adjacent, parallel disposition of said first and second flanges with one another, and



(g) a resilient interiorly channeled collar, dimensioned and configured to receive said flanges, in order to maintain in a confronting, engaging and sandwiched relation said light bulb to said socket and structured to concurrently engage said first and second flanges, said collar having spaced apart legs with outwardly extending projections formed within said collar, said collar having sufficient flexibility to expand outwardly from a normal position upon engagement of said projections with said flanges when in said operative position, said projections disposed and dimensioned to resist sliding disengagement of said flanges from said collar when fully engaged.

---

### 5,013,259
## REMOTE AUXILIARY TERMINAL ASSEMBLY
**Terrence L. Maurer, Wyomissing, Pa., assignor to Kalas Manufacturing, Inc., Denver, Pa.**
**Filed Feb. 26, 1990, Ser. No. 485,043**
**Int. Cl.⁵ H01R** *13/52*
**U.S. Cl. 439—522** **8 Claims**



1. For use in providing an electrical connection on a vehicle at an accessible location remote from a storage battery carried on the vehicle, the vehicle mounting a frame member having a hole extending between the obverse and the reverse sides of the frame member, a remote jump start terminal, comprising:
a connector element having a head and a threaded shank,
an insulator molded directly onto said head for completely embedding it while exposing a portion of said threaded shank,
said insulator having a flange portion adapted to engage the obverse side of the frame member for causing said shank to extend only from the obverse side of the frame member,

VOL
1126
ISS
1
MY
7
1991
UMI

said insulator also having a boss portion extending through said frame member hole to the reverse side of said frame member,

fastener means for releasably engaging said boss portion and the reverse side of said frame member for mounting said insulator, and

a grooved nut threadedly carried on said shank for effecting a permanent battery cable connection to said shank and insulator while permitting releasable connection of a jumper cable from the obverse side of the vehicle frame.

---

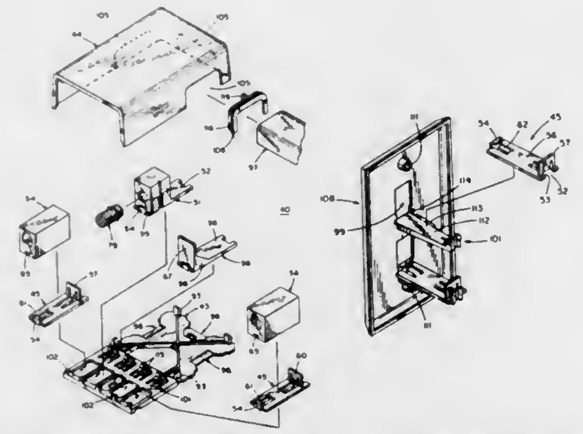
### 5,013,260
### COMMUNICATION BOX ASSEMBLY

**Jack E. Caveney, Hinsdale; John J. Bulanda, New Lenox; Richard L. Fischer, Lisle; Andrew J. Stroede, and Donald C. Wiencek, both of Tinley Park, all of Ill., assignors to Panduit Corp., Tinley Park, Ill.**

**Division of Ser. No. 421,418, Oct. 13, 1989, Pat. No. 4,950,184, which is a division of Ser. No. 179,157, Apr. 8, 1988, Pat. No. 4,875,881. This application Jun. 22, 1990, Ser. No. 543,934**

**Int. Cl.$^5$ H01R** *13/73*

**U.S. Cl. 439—535** **2 Claims**



1. A kit of parts for mounting a connector to an office wall either above or recessed within the office wall, comprising:

at least one connector mounting insert having an elongate body member including connector mounting means for securing a connector to and above the body member with an operative mating face of the connector disposed adjacent a first edge of the insert;

a base for securing the insert to the surface of a wall, the base having a first insert mounting means for securing the insert to a substantially planar inner surface of the base, the first insert mounting means positioning the insert with the first edge of the insert adjacent an outer edge of the base whereby the operative mating face of the connector carried by the insert is positioned for convenient connection with office service cables, the base and first insert mounting means capable of being integrally formed by a simple two plate mold without side action; and

a wall plate for securing the connector mounting insert within a standard electrical mounting box with the plane of the operative mating face of the connector mounted thereon being disposed substantially parallel to the wall plate, the wall plate having a second insert mounting means having structural features substantially similar to the first mounting means of the base whereby the connector mounting insert can be interchangeably mounted within either the base or the wall plate, the wall plate and second insert mounting means capable of being integrally formed by a simple two plate mold without side action, whereby the cost of manufacturing the kit of parts is minimized.

---

### 5,013,261
### DEVICE FOR CONNECTING A COAXIAL CABLE

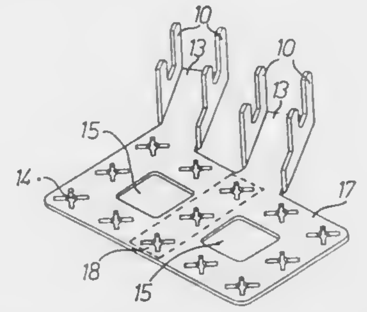
**Michael Seisz, Herrieden; Roland Knauf; Dieter Schwarz, both of Nuremberg, and Hans-Jürgen Weidner, Winkelhaid, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 12, 1989, Ser. No. 449,663**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842406**

**Int. Cl.$^5$ H01R** *17/18*

**U.S. Cl. 439—581** **6 Claims**



1. A device for connecting the inner and outer conductors of a coaxial cable to contact pins in a given array, said device comprising:

a planar electrical conductor having an array of first apertures therethrough oriented in said given array for receiving and electrically coupling said pins thereto and a second aperture dimensioned for receiving a pin therethrough in electrical isolation; and

an electrically conductive U-shaped lug member having a base wall and two upstanding walls, said base wall being coplanar with said planar conductor, said member being secured to the planar conductor and arranged to electrically couple and secure said outer conductor thereto in a given orientation with said inner conductor aligned with said second aperture.

---

### 5,013,262
### MULTI-CONTACT SOCKET

**Yasuji Shibano, Izumisano, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan**

**Filed Jun. 20, 1990, Ser. No. 540,768**

**Claims priority, application Japan, Jun. 26, 1989, 1-75410[U]**

**Int. Cl.$^5$ H01R** *9/03*

**U.S. Cl. 439—610** **6 Claims**

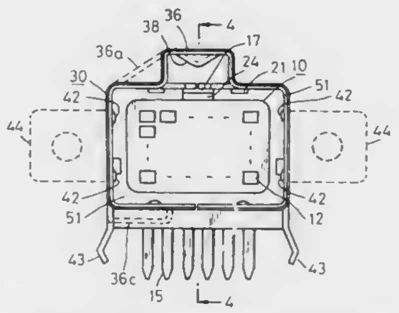
4. A multi-contact socket comprising:

a rectangular body of an insulating material which has a forward portion and a rear portion, said forward portion of said rectangular body being smaller than said rear portion both in width and in height and forming a stepped portion around said body at a boundary between said forward and rear portions thereof, a plurality of contact housing holes extending through said forward portion and arranged in rows and columns, said rear portion of said rectangular body being hollow and said hollow being open at the rear thereof;

a plurality of socket contacts housed in said contact housing holes, rear end portions of said contacts being extended into said hollow and bent down to form terminal portions;

a holder made of an insulating material which holds said terminal portions of said contacts inserted therethrough, said holder being mounted on said body to define a bottom of said hollow;

a rectangular tubular shield cover of metal put on said rectangular body and open at the bottom of the rear portion of said body, forward portions of said shield cover and said rectangular body defining therebetween a square groove for receiving a mating plug;



a top panel of said shield cover having two spaced-apart L-shaped claws formed integrally therewith at a rear end edge thereof, said body having guide grooves therein at positions corresponding to said L-shaped claws, said guide grooves extending rearwardly from said stepped portion, said body having bridges formed integrally therewith each of which forms a recess for receiving a corresponding one of said claws at the rear end of said guide groove;

engaging key means protrusively provided on a panel of said shield cover for determining a position of engagement of said socket with a mating plug; and

engaging means provided on said engaging key means for locking a mating plug to said socket.

---

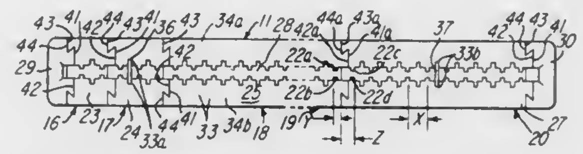
### 5,013,263
### MODULAR ELECTRICAL CONNECTOR STRUCTURE

**William Gordon, 8 Maple La., Mine Hill, N.J. 07801, and Mark A. Minter, 10 Maple Ave., Newton, N.J. 07860**

**Continuation of Ser. No. 800,805, Nov. 22, 1985, abandoned. This application Sep. 11, 1987, Ser. No. 96,800**

**Int. Cl.$^5$ H01R** *13/00*

**U.S. Cl. 439—630** **21 Claims**



1. A modular electrical connector structure comprising:

(a) first and second side walls and a bottom wall molded of insulating material to form an insulating support member having top and bottom surfaces, and first and second ends spaced apart in a first, or longitudinal, direction;

(b) a projection extending from the first end and comprising a first slide extending across the first end and having a dovetail-shaped cross section with predetermined dimensions;

(c) a recess in the second end comprising a second slide extending across the second end parallel to the first slide and having a cross-sectional shape that is the complement of the cross-sectional shape of the first slide, whereby the first slide, if on a different such support member, would interlock firmly with the second slide;

(d) first and second bearing surfaces adjacent the first and second slides, respectively, and facing in longitudinally opposite directions;

(e) a plurality of contact locations evenly spaced a unit distance apart along the longitudinal direction of the support member, the longitudinal distance from the first bearing surface to the next-adjacent one of the contact locations in the direction toward the second end of the support member plus the longitudinal distance from the second bearing surface to the next-adjacent one of the contact locations in the direction toward the second end of the support member being equal to the unit distance.

---

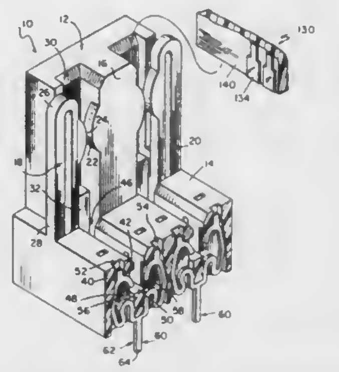
### 5,013,264
### EDGE CARD CONNECTOR HAVING PRELOADED CONTACTS

**Robert J. Tondreault, Louisville, Ky., assignor to Robinson Nugent, Inc., New Albany, Ind.**

**Filed Sep. 25, 1989, Ser. No. 411,796**

**Int. Cl.$^5$ H01R** *13/62*

**U.S. Cl. 439—636** **21 Claims**



1. A low insertion force edge card connector having electrically conductive spring arms to establish an electrical contact between the preloaded spring arms and the edge card the edge card connector comprising

an insulative housing consisting essentially of a dielectric material and having a substantially rigid inflexible portion,

a spring arm having a first end coupled to the insulative housing and a second end,

a contact arm connected to the second end of the spring arm to define a junction interconnecting the spring arm and the contact arm, the contact arm having an unrestrained end with a contact surface to engage the edge card in electrical connection, and

means for engaging the substantially rigid infexible portion of the insulative housing to establish a preloaded position for the spring arm with respect to the insulative housing, the engaging means being appended to the junction interconnecting the spring arm and the contact arm.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,265
### CONNECTOR FOR MATING BLADE-SHAPED MEMBERS

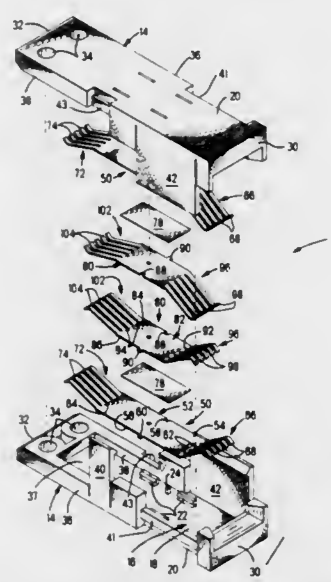
**Randolph L. Buchter, and John P. Huss, Jr., both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Apr. 27, 1990, Ser. No. 515,980**

**The portion of the term of this patent subsequent to Jan. 1, 2008, has been disclaimed.**

**Int. Cl.$^5$ H01R *13/11***

**U.S. Cl. 439—724** **9 Claims**



1. An electrical connector for mating two blade-shaped members, each having opposed first and second sides, said connector comprising:

a pair of opposing first and second separate subassemblies, each subassembly comprising a housing member having major inner and outer surfaces, and at least a first terminal element secured to said inner surface of said housing member;

means detachably securing said subassemblies together, said subassemblies when secured together defining respective cavity means at opposite ends thereof for receiving first and second blade-shaped members;

each first terminal element including a body portion having first and second arrays of arms are one-piece with said body portion and extend outwardly from opposite ends thereof such that said arrays of arms extend inwardly from the respective inner housing surface toward the opposite subassembly and into respective cavity means when said subassemblies are secured together, thereby defining first and second receptacles including first and second opposed arrays of contact arms adapted to receive blade-shaped members and be deflected outwardly toward respective inner housing surfaces upon receiving said blade-shaped members; whereby

upon mating said connector with first and second blade-shaped members and outward deflection against spring bias of all said arms by said blade-shaped members, said arrays of contact arms of said first terminal element of said first subassembly engage said first and second blade-shaped members at a plurality of locations along corresponding first sides thereof and said arms of said first terminal element of said second subassembly engage said first and second blade-shaped members at a plurality of locations along corresponding second sides thereof, thus allowing said blade-shaped members to be bipolar with said first and second sides thereof electrically isolated from each other.

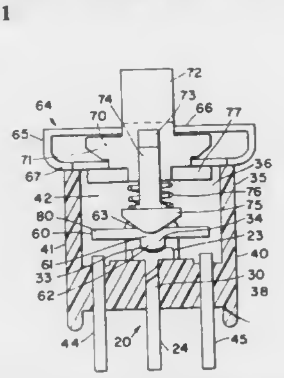
### 5,013,266
### TWISTED TERMINAL FOR SWITCHING DEVICE

**Robert F. Murphy, Nashua, N.H., and Thompson Shek, Newburport, Mass., assignors to Augat, Inc., North Andover, Mass.**

**Filed Jan. 16, 1990, Ser. No. 465,924**

**Int. Cl.$^5$ H01R *13/415***

**U.S. Cl. 439—741** **14 Claims**



1. A terminal structure for an electrical switching device having a housing with an internal switching cavity comprising, as an integral terminal structure, a planar conductive member having, at locations along a longitudinal axis and at opposite ends of said conductive member, an internal contact section for being positioned inside the cavity and an external terminal section for being positioned external to the housing, said conductive member additionally comparing a body section along the longitudinal axis adjacent said external terminal section and a neck section of reduced width that extends along the longitudinal axis intermediate said body and internal contact sections, said body section being adapted for capture in the electrical switching device housing thereby to prevent rotation of said body section about the longitudinal axis and said neck section enabling said internal contact section to be twisted about the longitudinal axis inside the cavity with respect to said body section thereby to enable said internal contact section to engage the housing inside the cavity and to capture said conductive member longitudinally in said housing.

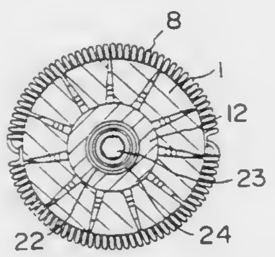
### 5,013,267
### ELECTRIC CONNECTOR

**Mistutoshi Watanabe, Kawasaki, Japan, assignor to Kabushiki Kaisha Shinko, Tokyo, Japan**

**Filed Feb. 8, 1990, Ser. No. 476,729**

**Int. Cl.$^5$ H01R *4/48***

**U.S. Cl. 439—821** **3 Claims**



1. A connector, comprising:

a plurality of arcuate conductive strips, said plurality of arcuate conductive strips being arranged in an annular shape forming a substantially cylindrical socket body having a plug inserting hole therethrough;

a plurality of annular grooves along the outer peripheral surface of said substantially cylindrical socket body;

a spring band in each of said annular grooves for holding said plurality of said arcuate conductive strips in said annular shape forming said substantially cylindrical socket body and allowing said arcuate conductive strips to expand and contract;

an internal annular groove on the internal peripheral surface of said substantially cylindrical socket body;

an internal surface regulating disk fitted in said annular groove for regulating the internal peripheral surface of said arcuate conductive strips; and

a fixed plug inserted into said plug inserting hole threadedly secured to said internal surface regulating disk.

### 5,013,268
### DEVICE FOR CONNECTING A HEATING WIRE TO A CURRENT CONDUCTOR TERMINAL

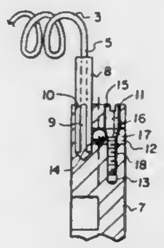
**Anton Kunz, Triesenberg, Liechtenstein, assignor to Balzers Aktiengesellschaft, Balzers, Liechtenstein**

**Filed Jan. 11, 1990, Ser. No. 403,373**

**Claims priority, application Switzerland, Feb. 10, 1989, 489/89**

**Int. Cl.$^5$ H01R *4/50***

**U.S. Cl. 439—807** **3 Claims**



1. A device for connecting a heating wire intended for generating a stream of ions to respective current conductor terminals, comprising:

an axial bore at the end of a respective current conductor terminal in which a rectilinear end section of said heating wire is received, comprising further a tapped hole extending parallel to said axial bore and a screw bolt having a tapered section threaded thereinto and a recess located between said axial bore and said tapped hole in said current conductor terminal in which a clamping member is located, said clamping member being urged by said tapered section of said screw bolt upon its tightening against said rectilinear end section of said heating wire, the respective end section of the heating wire being enclosed by a shoe having longitudinal slot at the clamped area, against which shoe said clamping member is pressed.

### 5,013,269
### MODULAR NAVIGATION VESSEL EQUIPPED WITH ROTATING FLOATS

**Auguste Legoy, 25 Rue Guillaume Apollinaire, and Alain Quibel, 123 Avenue Foc, both of 76290 Montivilliers, France, assignors to Auguste Legoy; Alain Quibel; Marthe Saillard; Claude Legoy; Philippe Legoy, all of Montivilliers; Annick Legoy, Balan Mire; Yvette Hamel, Montivilliers; Anne-Sophie Quibel, Montivilliers; Pierre Quibel, Montivilliers and Vincent Quibel, Montivilliers, all of, France**

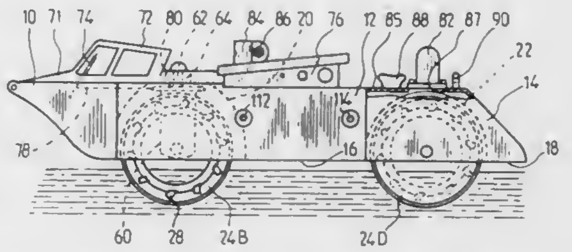
**Filed Aug. 17, 1988, Ser. No. 233,208**

**Claims priority, application France, Aug. 17, 1987, 8711653**

**Int. Cl.$^5$ B63H *1/38***

**U.S. Cl. 440—100** **19 Claims**

1. A navigation vessel comprising at least three main modules, including a forward module ending in a stem, a central module and a rear module, said central and rear modules each having a flat bottom and being rigidly assembled to each other by removable connection means; wherein the central module is in the form of a caisson with forward and rearward parallel lateral walls which are connected to a lateral wall of said forward module arranged parallel to said forward wall of said central module and a lateral wall of said rear module arranged parallel to said rearward wall of said central module in an uninterrupted fashion to form a regular hull from the stem to the stern, said lateral walls of the central module being connected together by means of spacers and each having orifices provided for attaching various accessories on the vessel; at least one of said modules being equipped with axles supporting rotating floats, said floats having a size sufficient to keep the hull entirely above the surface of the water, each float being provided with a plurality of rigid paddles spaced at a constant angle from one another, said panels having a concave shape in relation to the direction of rotation of said float, such that each paddle penetrates into the water substantially parallel to the surface of the water, and each paddle emerges therefrom slightly inclined to the surface of the water.



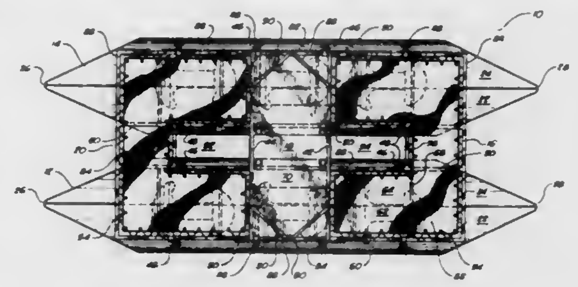
### 5,013,270
### RIVER RAFT

**H. Wayne Walls, P.O. Box 222, Pagosa Springs, Colo. 81147**

**Filed Oct. 16, 1989, Ser. No. 421,808**

**Int. Cl.$^5$ B63C *13/00***

**U.S. Cl. 441—45** **18 Claims**



1. A raft comprising:

a first pontoon;

a second pontoon;

a framework detachably connected to said first and second pontoons, said framework positioned on the top surface of said first and second pontoons, said first and second pontoons arranged parallel to each other, said framework comprised of a plurality of separable members; and

a floor means connected to said framework, said floor means defining a surface extending on said framework above said first and second pontoons, said floor means comprising:

a saddle;

a flat surface connected to the bottom of said saddle; and

a crossbar extending perpendicular to said saddle, said crossbar being detachably connected to said framework, said crossbar comprising:

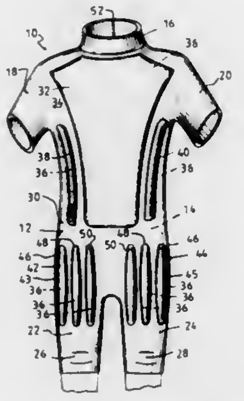
a first round tubing fastened to the bottom of said saddle and extending outwardly beyond said flat surface; and

a second round tubing fastened to another portion of the bottom of said saddle, said second round tubing being parallel to said first round tubing, each of said first and second round tubings having ends of flat L-shaped configuration, said L-shaped configuration fitting over the exterior of said framework.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,271
### BUOYANT BODY SURFING SUIT

**Thomas C. Bartlett, 1219 Keeaumoku St., #400, Honolulu, Hi. 96814**
**Filed Aug. 8, 1990, Ser. No. 564,340**
**Int. Cl.$^5$ A63C** *15/02*
**U.S. Cl. 441—65** **2 Claims**



1. A buoyant body surfing suit for a body surfer having knees, comprising:

(a) an upper portion including a pair of short sleeves, a collar, a front, and a rear;
(b) a lower portion including a front and a pair of legs said pair of legs, ending below the knees of the body surfer so that due to said collar and said pair of short sleeves water is prevented from entering under the buoyant body surfing suit and slow down the speed of the body surfer, said upper portion, said pair of short sleeves, said collar, said lower portion, and said pair of legs are one homogeneous piece of neoprene which has a very slick surface that reduces drag and contains a nylon liner for comfort;
(c) a plurality of buoyancy increasing means disposed on said front of said upper portion, said rear of said upper portion and said front of said lower portion of the buoyant body surfing suit, said plurality of buoyancy increasing means include a buoyant chest pad shaped to be widest at the shoulders and tapering to the waist with a plurality of buoyant substantially channel shaped pads disposed therewith, a plurality of buoyant substantially channel shaped pads disposed on said front of said pair of legs of said lower portion, and a plurality of buoyant back pads disposed on said back of said upper portion, said buoyant chest pad with said plurality of buoyant substantially channel shaped pads disposed therewith, said plurality of buoyant substantially channel shaped pads disposed on said front of said pair of legs, and said plurality of buoyant back pads being filled with a floatation foam material.

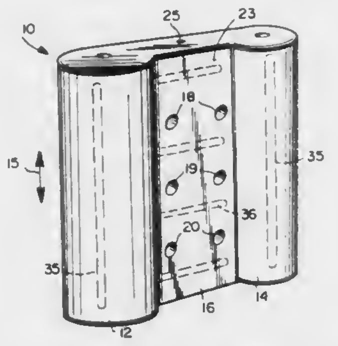
---

### 5,013,272
### RAFTING CUSHION

**Richard Watkins, Gloversville, N.Y., assignor to N.A. Taylor Company, Inc., Gloversville, N.Y.**
**Filed Sep. 6, 1989, Ser. No. 403,454**
**Int. Cl.$^5$ B63C** *9/30*
**U.S. Cl. 441—127** **25 Claims**

24. A boat fender comprising:

an elongated substantially hollow integral body of flexible material;
means defining at least one first through-extending closed periphery open end passageway in said body, generally parallel to the dimension of elongation;
means defining at least one second through-extending closed periphery open end passageways in said body, generally perpendicular to said dimension of elongation; and

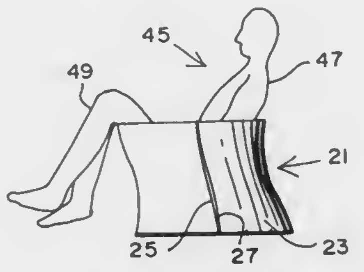


said passageways being large enough to receive a line therein.

---

### 5,013,273
### MULTIPURPOSE AQUATIC FLOTATION DEVICE

**Daniel Williams, 2424 S. Dixie Hwy., Suite 200, Miami, Fla. 33133**
**Continuation of Ser. No. 332,162, Apr. 3, 1989, abandoned. This application Jul. 9, 1990, Ser. No. 549,533**
**Int. Cl.$^5$ B63B** *35/74*
**U.S. Cl. 441—130** **12 Claims**



1. An aquatic flotation chair comprising a flexible, multi-cellular, floatable, water-repellant mattress having opposite complementary end surfaces of similar shape and size, said mattress having a length about three times the width thereof; and means for detachably coupling said end surfaces together to form a toroidal shape with said mattress having first and second open ends such that said first and second open ends are oriented such that they lie one above the other, each in a substantially horizontal plane, wherein said first and second open ends form an upper open end and a lower open end, whereby a portion of said upper end and a portion of said toroidal shape is folded downwardly substantially into said lower open end so as to form a seat, and whereby a portion of said toroidal shape not folded downwardly forms a backrest for said seat.

12. A method for forming a chair from an aquatic flotation device comprising a flexible, multi-cellular, floatable, water-repellant mattress having opposite complementary end surfaces of similar shape and size, said mattress having a length about three times the width thereof; said method comprising detachably coupling said end surfaces together to form a toroidal shape with said mattress such that said toroidal shape has first and second open ends, orienting said toroidal shape such that said first open end and said second open end lie one above the other, each in a substantially horizontal plane, wherein said first and said second open ends form an upper open end and a lower open end, folding a portion of said upper open end and a portion of said toroidal shape downwardly substantially into said lower open end so as to form a seat, and leaving a portion of said toroidal shape unfolded so as to form a backrest for said seat.

### 5,013,274
### PROCESS FOR RESTORING LOCALLY DAMAGED PARTS, PARTICULARLY ANTICATHODES

**Michel Bargues, Orange; Didier Boya, Jonquieres; Dominique Gaillard, Paris, and Pierre Netter, Pont Saint-Esprit, all of France, assignors to Comurhex Societe pour la Conversion de l'Uranium en Metal et Hexafluorure, Courbevoie, France**
**Filed Jun. 27, 1989, Ser. No. 371,728**
**Claims priority, application France, Jun. 28, 1988, 88 08665**
**Int. Cl.$^5$ C23C** *16/48*
**U.S. Cl. 445—2** **5 Claims**

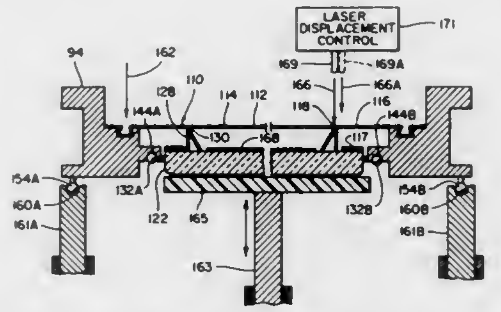
1. A process for repairing a refractory metal or refractory metals alloy x-ray anticathode having a surface with at least one locally damaged area, said process comprising:

depositing material from which said surface is made onto said damaged area, said depositing being by chemical vapor deposition and said depositing being substantially limited to said damaged area; and
machining said surface to conceal said damaged area, whereby an x-ray anticathode having no damaged areas is obtained.

---

### 5,013,275
### CONTINUOUS LASER BEAM FTM MOUNTING FOR CRT

**Allan D. Kautz, Naperville, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**
**Filed Jan. 2, 1990, Ser. No. 460,037**
**Int. Cl.$^5$ H01J** *9/00;* **B23K** *26/00*
**U.S. Cl. 445—30** **6 Claims**



1. A method for attaching a thin foil tension mask (FTM) on the order of 0.001 inch thick to a metal support rail disposed on the inner surface of a flat glass faceplate during manufacture of a color cathode ray tube (CRT), the method comprising the steps of:

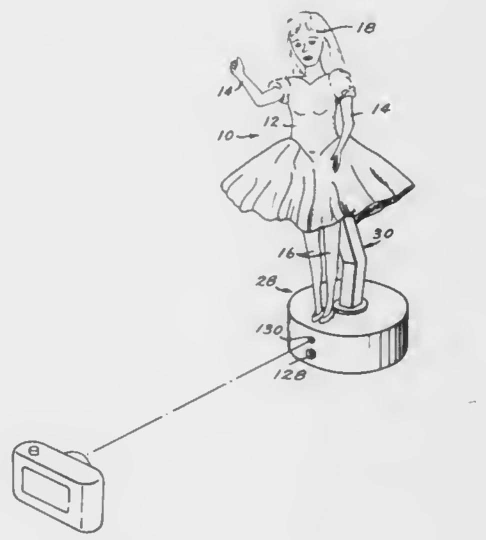
aligning the FTM with the support rail;
positioning the FTM in intimate contact with the support rail;
irradiating the FTM with a continuous laser beam having an output power within the range of 160–200 watts; and
displacing the laser beam over the FTM where the FTM and support rail are in contact so as to form a continuous weldment of generally uniform depth between the FTM and the support rail.

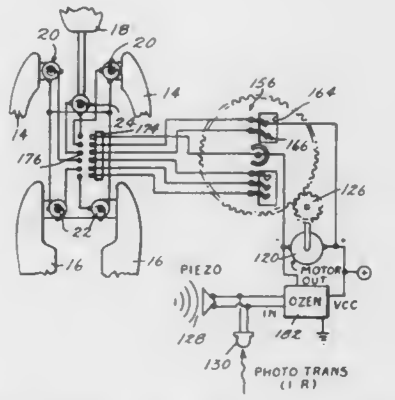
---

### 5,013,276
### ANIMATED DOLL

**Henry A. Garfinkel, 31 Dogwood Rd., Searingtown, N.Y. 11507**
**Filed May 7, 1990, Ser. No. 519,761**
**Int. Cl.$^5$ A63H** *13/00*
**U.S. Cl. 446—14** **25 Claims**

1. An animated fashion doll adapted to be hand held and including multiple independently articulated appendages, a base, means removably mounting said doll to said base, a separate actuator means in said doll for each appendage, each actuator means being mounted in engagement with its associate appendage for effecting movement of the appendage upon actuation of the actuator means, controller means for controlled activation of said separate actuator means, said controller means including means for independently activating each of said separate actuator means, means for programming the activation of each of said actuator means, said means for programming the activation of said actuator means comprising a replaceable program element in said controller means, said controller means being electrically energizable and sensor means on said controller means responsive to external stimulation for energizing said controller, each of said actuator means being a thermal motor responsive to electrical stimulation from said controller means, each said thermal motor including a thermal member selectively moveable in response to application and removal of heat to and from said thermal member.





---

### 5,013,277
### AERIAL TOY

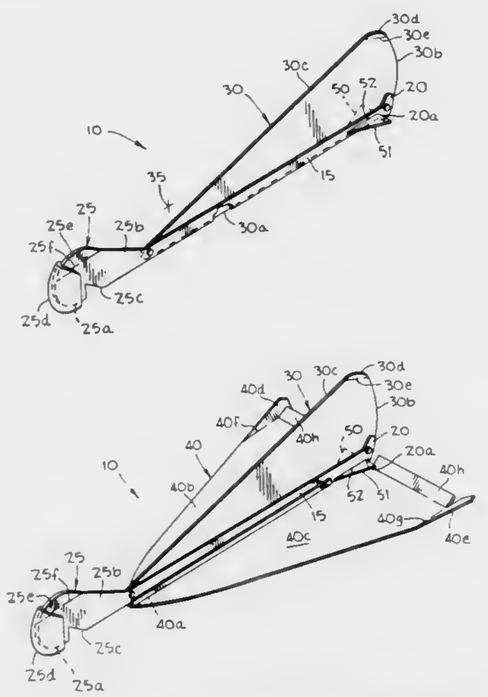
**Gerald R. Hufeld, 9570 Sinnard, Live Oak, Calif. 95953**
**Continuation of Ser. No. 363,177, Jun. 8, 1989, abandoned. This application Apr. 9, 1990, Ser. No. 507,093**
**Int. Cl.$^5$ A63H** *27/00*
**U.S. Cl. 446—34** **8 Claims**

1. An aerial toy propelled by an elastic band under tension, said aerial toy comprising:

(a) an elongated body having a plurality of extremities;
(b) a nose section disposed at one extremity of said body, said nose section being formed with a launching notch to receive an elastic band to be tensioned for propelling said aerial toy;
(c) a trailing section disposed at another extremity of said body; and
(d) an airfoil secured substantially along the entire length

VOL
1126
ISS
1
MY
7
1991
UMI

thereof to said body and extending from said trailing section to said nose section, said airfoil being formed from a flexible sheet having opposing parallel planar surfaces, said airfoil projecting outwardly from said body and decreasing in the extent of its projection from said body in

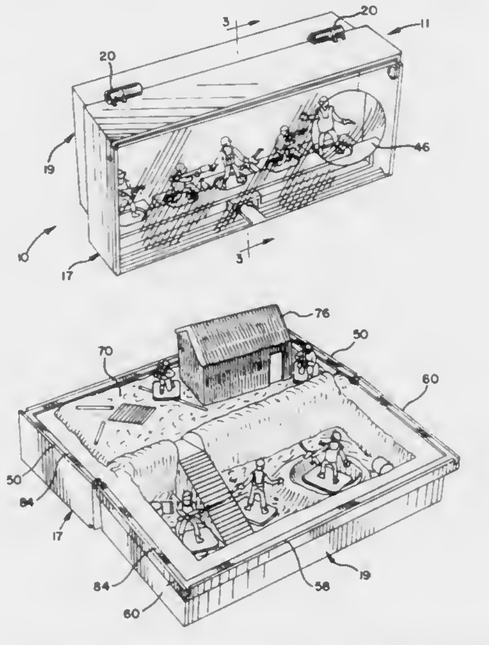


the direction from said trailing section toward said nose section, said nose section being in the form of a counterweight in which said launching notch is formed, said trailing section including a manual gripping tab projecting from and integrally formed with said body to be grasped by an operator.

---

### 5,013,278
### DIORAMA TOY KIT
**Anthony J. Dixon, Maresfield, and Peter R. J. Manning, St. Briavels, both of England, assignors to Monogram Models, Inc., Morton Grove, Ill.**
**Filed Apr. 19, 1990, Ser. No. 511,224**
**Int. Cl.$^5$ A63H** *3/00, 3/50*
**U.S. Cl. 446—73** **11 Claims**

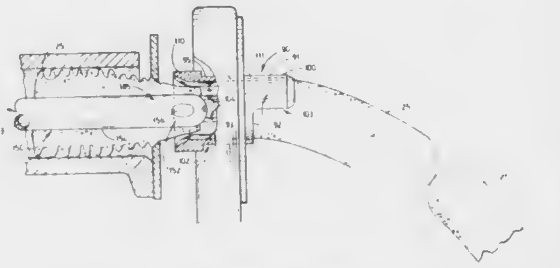
1. A miniature toy kit comprising:
a case having a pair of pivotally connected compartments;
a plurality of figures;
means in one of said compartments for storing said figures;
a three-dimensional diorama; and
retainer means operationally mounting said diorama in said case with portions thereof positioned in the other of said compartments,
said compartments being pivotable between an open condition wherein the same provide a support field for the diorama and figures and a closed condition wherein the same provide a storage case for the diorama and figures, said diorama comprising an elastic member compressible into the case when in the closed condition and springing



back to three-dimensional form when the case is in the open condition.

---

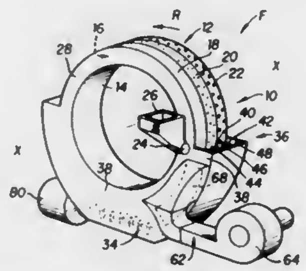
### 5,013,279
### APPARATUS FOR ENCASING A PRODUCT IN A CURVED CASING
**William E. Southworth, Plymouth, Wis., assignor to Johnsonville Sausage, Inc., Sheboygan, Wis.**
**Filed Mar. 30, 1990, Ser. No. 502,534**
**Int. Cl.$^5$ A22C** *7/00*
**U.S. Cl. 452—46** **13 Claims**



1. An apparatus for encasing a product in a curved casing comprising:
a base;
a stuffing tube mounted on the base, and having a product receiving end and a discharge end, said discharge end having a plurality of apertures;
a pump borne on the base and adapted to introduce the product to be encased into the product receiving end of the stuffing tube;
a chuck rotatably mounted on the base and disposed in substantially coaxial alignment with the stuffing tube, said chuck having a wall defining a passageway, and wherein the wall has opposite first and second ends and wherein the wall located at the first end is substantially continuous and wherein the wall at the second end is discontinuous, and wherein the chuck is adapted to receive the curved casing to be filled; and
drive means borne by the base and operable for selectively rotating said chuck, and wherein the casing upon being filled with the product exits the chuck at the second end thereof and moves generally radially outwardly relative to the chuck thereby maintaining the curved casing in an attitude whereby the curved casing can be substantially filled with the product.

---

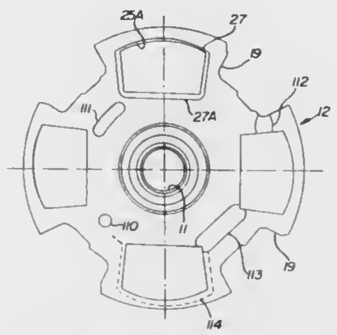
### 5,013,280
### DEVICE FOR SECONDARY SEPARATION OF GRAIN IN A COMBINE HARVESTER
**Alain Zachary, VONCQ, 08400 Vouziers, France**
**Filed Feb. 16, 1990, Ser. No. 480,494**
**Claims priority, application France, Feb. 20, 1989, 89 02197**
**Int. Cl.$^5$ A01F** *12/44;* **A01D** *41/2*
**U.S. Cl. 460—80** **12 Claims**



1. A device for secondary separation of grain in a combine harvester, the device being characterized in that it comprises a rotary outer drum (**12**) having a horizontal axis and comprising at least two perforated lengths (**18, 20, 22**) in succession from an upstream end to a downstream end, a feed chute (**24**) situated at the upstream end of the outer drum for pouring substances to be separated into the drum substantially along a vertical tangent to the outer drum, at least one curved wall (**14**) situated inside the outer drum running from the feed chute down to a bottom zone of the outer drum and defining, together with the outer drum, an annular gap (**16**) for collecting substances, a plurality of deflector fins (**30**) projecting radially inward from the outer drum, and inclined relative to the drum axis, a collecting volute (**34**) surrounding at least a portion of the outer drum and including one or more parallel radially-directed partitions (**40, 42**) defining collection channels (**44, 46, 48**) facing the successive lengths of the outer drum.

---

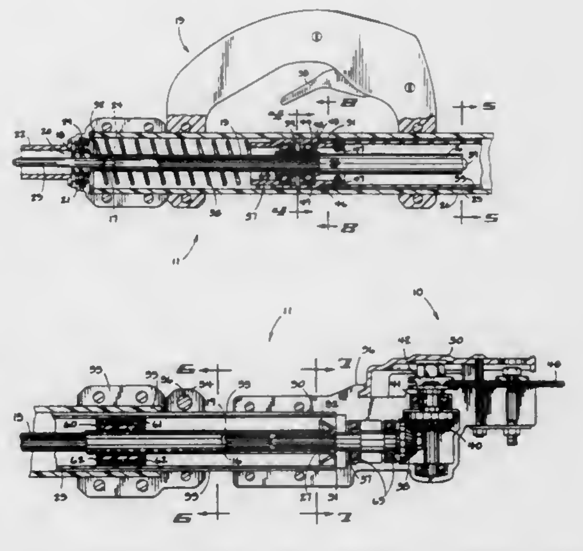
### 5,013,281
### MONOBLOC HUB, PARTICULARLY FOR AN AUTOMOTIVE VEHICLE
**Michel Graton, Paris, and Richard Lewandowski, Rubempre, both of France, assignors to Valeo, Paris, France**
**Filed Sep. 15, 1989, Ser. No. 408,194**
**Claims priority, application France, Sep. 16, 1988, 88 12090**
**Int. Cl.$^5$ F16D** *3/66*
**U.S. Cl. 464—68** **2 Claims**



1. A monobloc hub comprising a transversely extending hub plate, said hub plate having a plurality of projections, said hub plate further having at its outer periphery a plurality of openings, some of said openings being adapted to receive circumferentially acting resilient means, said projections representing local thickening of said hub plate and constituting reinforcement in the region of said peripheral openings of said hub plate, some of the openings formed in the hub plate comprising slots to accommodate, extending therethrough, spacer bars connecting together two guide rings of a torsion damper, and wherein said slots have at least some of said projections being arranged along their edges.

---

### 5,013,282
### EXTENDIBLE SHAFT ASSEMBLY FOR PORTABLE TOOLS
**Harold A. Keller, Clarkston, Wash., assignor to Technic Tool Corporation, Lewiston, Id.**
**Filed Nov. 20, 1989, Ser. No. 439,286**
**Int. Cl.$^5$ F16C** *1/28;* **F16D** *3/06*
**U.S. Cl. 464—172** **16 Claims**



1. An extensible power shaft assembly for portable tools, comprising:
a telescoping axial drive shaft assembly including a pair of overlapping inner and outer shafts each having first and second axial ends;
the inner and outer shafts having complementary outside and inside surfaces, respectively, to transmit rotary driving force between them regardless of their relative overlapping axial positions;
a telescoping housing coaxially surrounding the drive shaft assembly;
the housing including a pair of inner and outer tubes mounted in an overlapping relationship to one another, the inner and outer tubes each including first and second axial ends and having adjacent outside and inside surfaces, respectively;
first bearing means connected between the first axial end of the outer tube and the first axial end of the inner shaft for rotatably supporting the first axial end of the inner shaft;
second bearing means connected between the first axial end of the inner tube and the first axial end of the outer shaft for rotatably supporting the first axial end of the outer shaft; and
an intermediate bearing assembly fixed to the second end of the inner elongated tube;
the intermediate bearing assembly including inner bearing means slidably engaging the outer surface of the inner shaft for rotatably supporting the inner shaft relative to

VOL
1126
ISS
1
MY
7
1991
UMI

the inner tube and for permitting relative axial movement between them;

the intermediate bearing assembly further including outer bearing means engaging the inner surface of the outer tube for coaxially supporting the outer tube relative to the inner tube and for permitting relative axial movement between them.

### 5,013,283
### ADJUSTABLE PULLEY WITH IMPROVED SUPPORT STRUCTURE

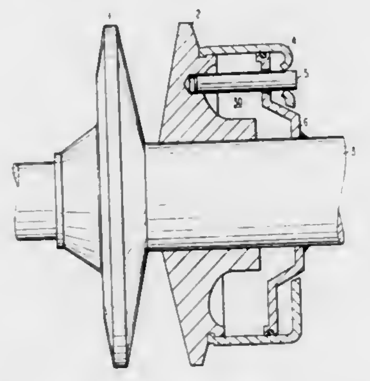
**Bastiaan A. d'Herripon, Tilburg, Netherlands, assignor to Van Doorne's Transmissie B.V., Tilburg, Netherlands**

**Filed Mar. 12, 1990, Ser. No. 491,913**

**Claims priority, application Netherlands, Mar. 20, 1989, 8900674**

**Int. Cl.$^5$ F16H** *55/56*

**U.S. Cl. 474—8** **25 Claims**



1. An adjustable pulley, comprising:

a pulley shaft;

two discs disposed on said pulley shaft, said discs fixed against rotation relative to said shaft with one of said discs being axially movable on said shaft, and wherein said axially movable disc is supported radially outward from said shaft, said support being provided eccentrically with respect to said pulley shaft.

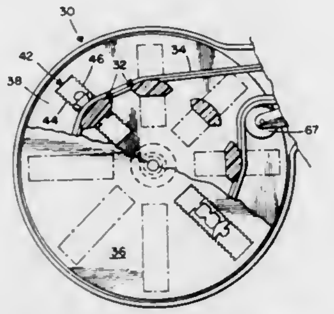
### 5,013,284
### VARIABLE RATIO DRIVE SYSTEM

**George H. Leonard, Darien, Conn., assignor to Hamlin Transmission Corporation, Wilton, Conn.**

**Filed Mar. 26, 1990, Ser. No. 499,910**

**Int. Cl.$^5$ F16H** *55/54*

**U.S. Cl. 474—52** **25 Claims**



1. Variable ratio drive apparatus comprising:

a rotatably mounted drive mechanism including a plurality of circumferentially spaced radially extending elongated tracks with opposed tooth-like formations therein;

an endless drive member;

a movable sheave segment mounted in association with each of said tracks, each said sheave segment including cam/-bearing means and first and second opposed engagement blocks, said cam/bearing means having at least one camming surface associated with each of said engagement blocks and independently movable radially relative to each of said engagement blocks, said cam/bearing means engaged by said endless drive member when said drive mechanism is outside a predetermined arc of rotation, to rigidly bias each of said engagement blocks against an associated one of said tooth like formations; and

resilient means interposed between said first and second engagement blocks for biasing said engagement blocks into engagement with said tracks.

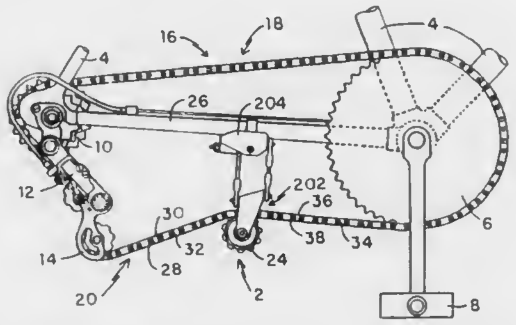
### 5,013,285
### CHAIN CONTROL APPARATUS

**James P. Carlyle, 3153 Ames, Denver, Colo. 80214**

**Continuation-in-part of Ser. No. 512,898, Apr. 23, 1990, which is a continuation of Ser. No. 263,348, Oct. 17, 1988, Pat. No. 4,919,644. This application Sep. 6, 1990, Ser. No. 578,726**

**Int. Cl.$^5$ F16H** *11/08*

**U.S. Cl. 474—80** **20 Claims**



1. Apparatus for use with a bicycle to control undesirable chain travel comprising:

a bicycle frame;

at least one driven wheel;

a plurality of gear means for rotating said at least one driven wheel at different speeds;

driving apparatus rotatably mounted on said bicycle frame and having at least one gear mounted thereon for rotation therewith;

support means mounted on said driving means so that a user may contact said support means and rotate said driving apparatus;

at least one chain drive means journaled around at least one of said plurality of gear means and said at least one gear of said driving apparatus so that said at least one chain drive means has an upper run and a lower run and drives said plurality of gear means;

said upper and lower runs lying generally in the same plane;

chain tensioning means for maintaining the proper tension on said at least one chain drive means;

chain control means for controlling the movement of said chain drive means and having an opening extending therethrough;

mounting means for mounting said chain control means on said bicycle frame so that said lower run passes through said opening;

said chain control means having a support surface adapted to be contacted by said lower run so as to limit movement of said lower run in a direction away from said upper run; and

movement permitting means for permitting pivotal movement of said chain control means around a generally horizontal axis extending generally in the direction between said plurality of gear means and said driving apparatus and around at least one generally vertical axis.

---

### 5,013,286
### BELT DRIVE COMPRISING A TOOTHED BELT AND A TOOTHED PULLEY

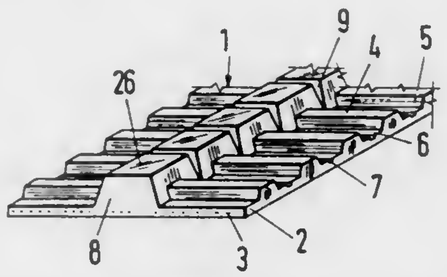
**Rudolf Breher, Porta Westfalica, Fed. Rep. of Germany, assignor to Breco Kunststoffverarbeitungs-GmbH & Co. KG, Porta Westfalica, Fed. Rep. of Germany**

**Filed Mar. 14, 1990, Ser. No. 494,134**

**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1989, 3909949**

**Int. Cl.$^5$ F16G** *1/00*

**U.S. Cl. 474—205** **7 Claims**



1. In a belt drive comprising a toothed belt and a toothed pulley, with said toothed belt containing an inextensible reinforcing insert that is embedded in the belt body thereof and also being provided with guide rib means that extends in a longitudinal direction of said belt and traverse teeth of said belt, with said guide rib means, during rotation of said belt about said toothed pulley, engaging in an annular recess means disposed on the periphery of said pulley, and with said guide rib means, to increase the flexibility thereof, being provided with notches in the vicinity of grooves of said belt between said teeth thereof, the improvement wherein:

said annular recess means of said toothed pulley has a base on which is disposed an annular insert means made of a material that has a softer resilience than does the material of said toothed belt, with said insert means having a height, prior to the time that said belt runs up onto said pulley, that is a predetermined amount greater than the distance between said base of said annular recess means and a head surface of said guide rib means when the same engages said annular recess means.

### 5,013,287
### AUTOMATIC TRANSMISSION WITH STATOR SHAFT MOUNTING STRUCTURE

**Yoichi Hayakawa, Toyoake; Chihiro Hosono, and Yasuhito Ogasawara, both of Anjo, all of Japan, assignors to Aisin Aw Co., Ltd., Anjo, Japan**

**Filed Jan. 4, 1989, Ser. No. 293,240**

**Claims priority, application Japan, Aug. 1, 1988, 63-192355**

**Int. Cl.$^5$ F16H** *47/08;* **B60K** *17/10*

**U.S. Cl. 475—61** **6 Claims**

1. An automatic transmission comprising,

an input shaft,

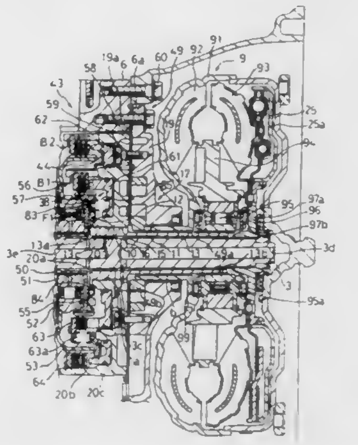
a torque converter for transmitting rotation from an engine to the input shaft, said torque converter having a pump impeller, a turbine impeller connected to the input shaft, and a stator,

an oil pump assembly arranged adjacent to the torque converter and adapted to be fixed to a stationary casing of the automatic transmission, said oil pump assembly having an inner radial peripheral surface, said input shaft extending inside the inner radial peripheral surface.

a stator shaft situated over the input shaft, connected to the stator and secured under pressure in the inner peripheral surface of the oil pump assembly to bear stator reaction force,

a first bushing situated between the stator shaft and input shaft and located radially inwardly within an axial extent of the inner peripheral surface of the oil pump assembly to support the stator shaft and the inner peripheral surface of the oil pump assembly,

a second bushing situated between the stator shaft and input shaft adjacent the first bushing to form a space between the first and second bushings, said second bushing being located radially inwardly within an axial extent of the oil pump, said first and second bushings rotationally supporting the input shaft near one end thereof to prevent whirling of the input shaft, and



an oil channel formed by the space between the first and second bushings and communicating with torque converter to supply oil thereto through the space between the first and second bushings.

### 5,013,288
### TRANSMISSION SYSTEMS

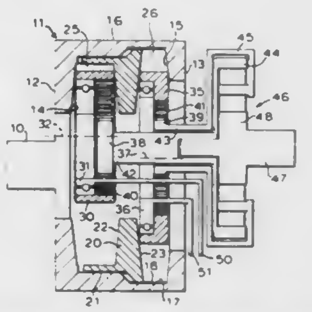
**Bryan N. V. Parsons, Stoney Stanton, United Kingdom, assignor to Jaguar Cars Limited, United Kingdom**

**Filed Jan. 16, 1990, Ser. No. 464,985**

**Claims priority, application United Kingdom, Jan. 21, 1989, 8901322**

**Int. Cl.$^5$ F16H** *1/32*

**U.S. Cl. 475—166** **20 Claims**



1. A continuously variable transmission system comprising an input assembly having a first member adapted to be connected to an input shaft, said first member having a pair of annular formations in fixed axially spaced and rotational relationship, the opposed faces of the annular formations being conical and of opposite inclination, a second member mounted on the first member so that it is fixed rotationally but movable axially relative thereto, said second member defining an annular formation with oppositely inclined conical faces and being mounted intermediate of the annular formations of the first member, so that the conical faces of the annular formations of the first member and the conical faces of the annular formation of the second member define a pair of circumferential grooves, the walls of each groove being defined by an oppositely inclined pair of the conical faces, first and second annular discs are mounted for rotation about axes parallel to but eccentric of

VOL
1126
ISS
1
MY
7
1991
UMI

the axis of rotation of the input assembly, so that each disc engages in a different one of the grooves defined by the input assembly, each disc engaging the opposed conical faces defining the walls of its associated groove so that drive is transmitted from the input assembly to each of the discs, means being provided for movement of the axis of rotation of each of the discs so that the radial position of engagement of each disc with the conical faces defining the walls of its associated groove may be varied, one disc moving into its associated groove while the other disc moves out of its associated groove and vice versa, so that both the discs are maintained in driving engagement with the conical faces defining the walls of their associated grooves, the first disc being drivingly connected to one element of an epicyclic gear train, the second disc being drivingly connected to a second element of the epicyclic grear train and an output being taken from the third element of the epicyclic gear train.

---

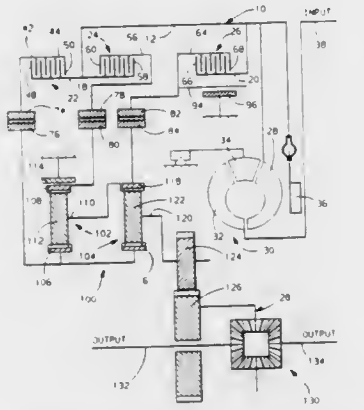
### 5,013,289
### POWER TRANSMISSION

**Keith D. Van Maanen, Berkley, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 20, 1990, Ser. No. 482,132**

**Int. Cl.⁵ F16H** *37/06*

**U.S. Cl. 475—286** **3 Claims**



2. A power transmission comprising: input means for delivering power to said transmission; output means for delivering power from said transmission; first planetary gear means; second planetary gear means, said first and second planetary gear means having first interconnected members and second interconnected members, one of said planetary gear means having a member connected with said output means; a plurality of input gear means selectively connectable between said input means and said first interconnected members, said second interconnected members and another member of the other of said planetary gear means respectively for providing selective gear ratios therebetween; a plurality of clutch means for selectively operatively connecting said input means with respective ones of said input gear means; and a plurality brake means for selectively restricting rotation of one of said interconnected members and said another member; whereby a plurality of forward drive ratios and a reverse ratio are establishable between said input means and said output means.

---

### 5,013,290
### SERIAL DISPENSING BAGS WHICH OPEN AUTOMATICALLY

**Robert B. DeMatteis, Grass Valley, Calif., assignor to Cupples Paper Bag Company, La Mirada, Calif.**

**Filed Apr. 5, 1989, Ser. No. 334,049**

**Int. Cl.⁵ B31B** *1/00*

**U.S. Cl. 493—196** **6 Claims**

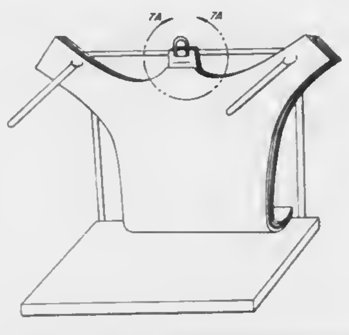
1. A method for producing a serialized bundle of thermoplastic T-shirt grocery bags for dispensing from a supporting dispensing rack, said method comprising the steps of:

providing said dispensing rack having a pair of supporting rods protruding horizontally outward from said rack and a defined supporting member supported from said rack intermediate said supporting rods;

providing a tube of blown thermoplastic for forming bag units having an inside layer disposed to the inside of a bag unit to be formed with a first relatively low coefficient of friction between inside layers of said bag unit, and an outside layer disposed away from said bag unit to be formed with a second relatively high coefficient of friction between outside layers of said bag units, said high coefficient of friction being greater than said first relatively low coefficient of friction;

sealing, severing, and stacking said tube at predetermined lengths to dispose said bag units into a bundle for common support from said dispensing rack;

performing a T-shirt bag cut out operation with respect to said bundle to define paired handles in each said bag section with a tab unit defined therebetween;



cutting in each handle an aperture including a flap, said flap oriented so that when threaded to said pair of supporting rods of said rack said flap is disposed away from the mass of said bags to pass the weight of said bundle downward and onto said rods through overlapped flaps on said rods;

fusing said bundle of discrete bag units together at tab units to provide a common wicket for support from said defined supporting member;

attaching said wicket of said fused bundle of bag units to the supporting member of said racks;

threading said fused bundle of bag units at said aperture in said handles to said rods of said rack;

dispensing bags serially from said wicket whereby each serially dispensed bag readily separates at said aperture including said flap to open said bag due to the low coefficient of friction of said inside layers of said flap on said supporting rod of said rack and each said bag when removed from said rack entrains a serially trailing bag due to said higher coefficient of friction of flap on said supporting rod of said rack of the dispensed bag with respect to the serially trailing bag.

---

### 5,013,291
### DEVICE DESTINED TO AUTOMATICALLY DISPENSE WIPING MATERIALS OF A CONCERTINA FORM CONSISTING OF ROLLED UP STRIPS

**Maurice Granger, 42270 Saint Priest en Jarez, 17 rue Marcel Pagnol, France**

**Filed Jul. 26, 1988, Ser. No. 224,408**

**Claims priority, application France, Apr. 26, 1988, 88 05939; Jun. 6, 1988, 88 07823**

**Int. Cl.⁵ A47K** *10/36;* **B65H** *45/20, 45/22;* **B26D** *1/56*

**U.S. Cl. 493—357** **14 Claims**

1. A device for manually dispensing and cutting discrete longitudinally corrugated web materials from an elongated web comprising:

support means,

wall means dependingly hinged from said support means,

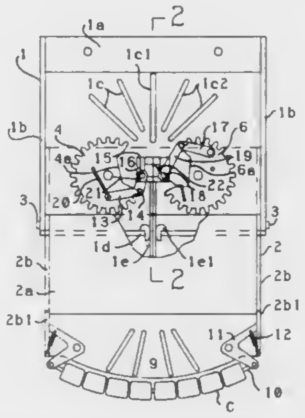
elongated web support means disposed on one side of said wall means,

a plurality of elongated spaced first projections defining a fan configuration affixed to the other side of said wall means,

a plurality of elongated spaced second projections defining a fan configurations affixed to said support means,

said first projections and said second projections positioned whereby the said projections interleave in spaced relationship when said dependingly hinged wall means is arcuately moved into operative confronting relationship with said support means,

guide roll means positioned transverse with respect to said first and second projections when said depending hinged wall means is in confronting relationship with said support means adapted and constructed to guide said elongated web from said support means to between the spaces of said projections, and to longitudinally corrugated said elongated web,



a pair of cooperatively journalled intermeshing cogwheels positioned transverse to said first and second projections on the side opposite to said guide rolls adapted and constructed to receive therebetween said corrugated elongated web as it is payed from said elongated web support means,

each of said cogwheels having cooperatively disposed radial recesses and being oppositely rotated when said elongated web passes therebetween,

each of said radial recesses having blade means adapted and constructed to at least partially sever said corrugated elongated web as it is payed therebetween to thereby define discrete portions of elongated longitudinally corrugated web.

---

### 5,013,292
### SURGICAL CORRECTION OF FEMALE URINARY STRESS INCONTINENCE AND KIT THEREFOR

**Claude Lemay, Ste. Croix, Canada, assignor to R. Laborie Medical Corporation, Quebec, Canada**

**Filed Feb. 24, 1989, Ser. No. 315,279**

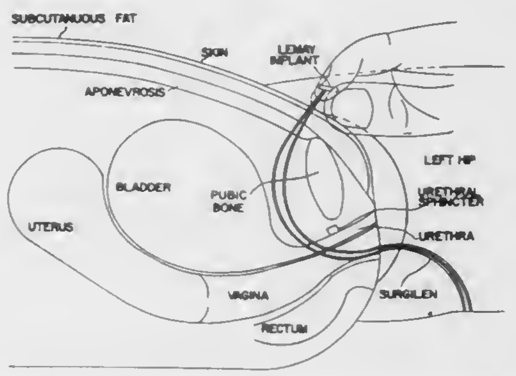
**Int. Cl.⁵ A61B** *19/00*

**U.S. Cl. 600—30** **21 Claims**

1. A kit for use in the surgical correction of female urinary stress incontinence comprising:

at least one needle, said needle comprising a cannula and a trocar, said cannula being receivable of said trocar, said trocar being removably disposable within said cannula, said needle being bendable to a desired degree of curvature; and

a pair of implants, each of said implants comprising a head portion and a suture portion, said head portion adapted to rest on the pubic bone, said head protion comprising a substanitally figure eight shaped member of surgical titanium having a central cross bar and said sutrue portion comprising a surgical suture acceptable, substantially non-biodegradable thread having a first end, a second end and a central portion, said central portion being wrapped about said central cross bar with said first and second ends



disposed on a single side of said head portion, said first and second ends being guidingly receivable within said cannula.

---

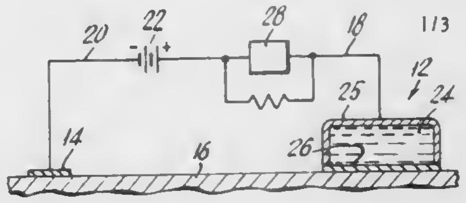
### 5,013,293
### PULSATING TRANSDERMAL DRUG DELIVERY SYSTEM

**Dan Sibalis, Stony Brook, N.Y., assignor to Drug Delivery Systems Inc., New York, N.Y.**

**Division of Ser. No. 163,941, Mar. 3, 1988, abandoned, which is a continuation of Ser. No. 55,518, May 28, 1987, abandoned. This application Nov. 13, 1989, Ser. No. 436,118**

**Int. Cl.⁵ A61M** *37/00*

**U.S. Cl. 604—20** **4 Claims**



1. An electrolytic transdermal patch for delivering to the bloodstream of a female patient a type drug capable of inducing ovulation in a female or of causing ovulation to cease comprising in combination:

(a) means defining a reservoir for containing liquid having said type drug and positioned in use in contact with the skin of the patient,

(b) an electrical source of power,

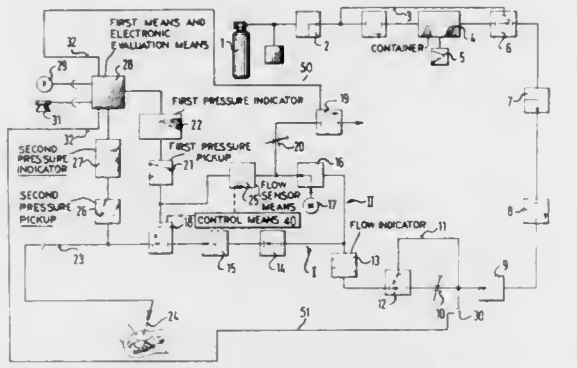
(c) an electrical circuit having an electrode positioned in use in contact with the skin of the patient and electrically connecting the electrode, power source and said reservoir,

(d) means in said electrical circuit for causing periodic variation of current applied to said reservoir by said source of power in a rhythm similar to a natural delivery rhythm of an ovulation-causing compound of the body of the patient for effecting periodic transdermal delivery of said type of drug inducing ovulation in accordance with said natural rhythm and for selectively causing periodic variation of current delivery of said power source in a steady state mode or at a frequency greater than said natural delivery rhythm of the patient to effect ceasing of ovulation of the patient.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,294
### INSUFFLATION DEVICE FOR ENDOSCOPIC INTERVENTION

**Manfred Baier, Bretten, Fed. Rep. of Germany, assignor to Richard Wolf GmbH, Fed. Rep. of Germany**
**Filed Nov. 17, 1988, Ser. No. 272,315**
**Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3739003**
**Int. Cl.$^5$ A61M** *13/00*
**U.S. Cl. 604—26** **7 Claims**



1. In an insufflation device for introducing a gas into a body cavity through a feed pipe, said device including a feed pipe, a source of gas being selectively connected to an expansion valve by one of a direct line and a second line having an intermediate container, said expansion valve being connected by a shut-off valve, a pressure regulator and flow indicator to the feed pipe which has an end connected to a cannula insertable into the body cavity, the improvements comprising the flow indicator being connected to two parallel flow channels leading to a switching valve connected to said feed pipe, a first flow channel of the two parallel flow channels having a shut-off valve and an expansion valve means for setting the gas pressure at a value above a desired, required pressure in the body cavity, a second flow channel of the two parallel flow channels having an expansion valve being adjustable to the desired, required pressure of the body cavity, flow sensor means for determining the flow in the second flow channel, a first pressure pickup and a first pressure indicator, said feed pipe downstream of said switching valve being connected to a second pressure pickup with a second pressure indicator, first means for constantly comparing the first and second pressure indicators, said switching valve having control means for changing the switching valve between a first position only connecting the first flow channel to the pipe for an initial time period and a second position only connecting a second flow channel to the pipe, said flow sensor means monitoring the flow in the second flow channel while the switching valve is in the second position and then creating a signal for the control means to change the switching valve back to the first position if the flow in the second flow channel exceeds a predetermined amount.

---

### 5,013,295
### SYRINGE FOR USE IN CATARACT SURGERY

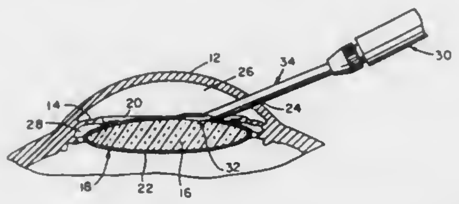
**Seymour Dubroff, 3806 Thornapple St., Chevy Chase, Md. 20815**
**Division of Ser. No. 173,625, Mar. 25, 1988, Pat. No. 4,909,784. This application Feb. 22, 1989, Ser. No. 320,541**
**Int. Cl.$^5$ A61M** *1/00*
**U.S. Cl. 604—38** **13 Claims**

7. A medical syringe for the body comprising a syringe body;

a first tubular member having open distal and proximal ends;

a second tubular member disposed in concentric relation with said first tubular member having open distal and proximal ends; and

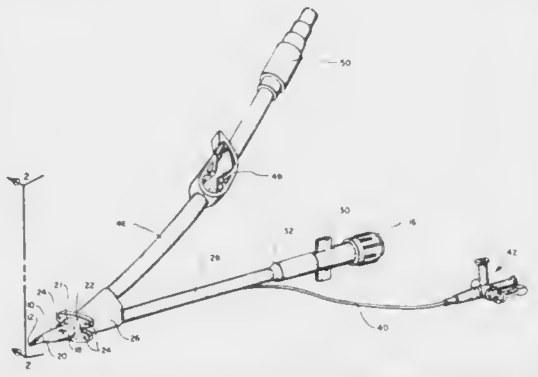
chamber means disposed in said syringe body including piston means movable therein to define a first chamber portion on one side of said piston means communicating with said proximal end of said first tubular member and a second chamber portion on the opposite side of said piston means communicating with said proximal end of said second tubular member whereby movement of said piston means to force fluid from said first chamber portion through said first tubular member simultaneously creates a suction at said distal end of said second tubular member means to aspirate material from the body.



---

### 5,013,296
### ANTEGRADE CARDIOPLEGIA CANNULA

**Gerald D. Buckberg, Los Angeles, Calif., and Robert J. Todd, Salt Lake City, Utah, assignors to Research Medical, Inc., Salt Lake City, Utah**
**Filed Sep. 21, 1989, Ser. No. 470,702**
**Int. Cl.$^5$ A61M** *3/00*
**U.S. Cl. 604—44** **31 Claims**



1. A cannula for administering cardioplegic solutions and other liquids in an antegrade direction into the heart through the wall of a vessel associated with the heart, the cannula comprising:

means for piercing the vessel wall, said means positioned at a distal end of the cannula;

a flow lumen having a distal end located adjacent the distal end of the cannula and a proximal end, the flow lumen extending between the means for piercing the vessel wall and a proximal end of the cannula, the flow lumen adapted to be placed in communication with a liquid reservoir and allow the flow of a liquid from the liquid reservoir to the interior of the heart in an antegrade direction;

first connecting means for connecting the proximal end of the flow lumen to the liquid reservoir;

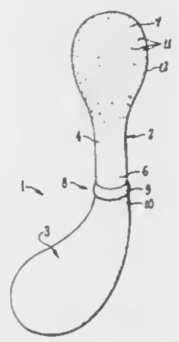
a pressure lumen located substantially parallel to the flow lumen having distal and proximal ends;

a pressure port located at the distal end of the pressure lumen such that the pressure port opens directly into the vessel and does not open into the flow lumen when the cannula is in place on the vessel wall and such that the pressure within the vessel is communicated from the pressure port, through the pressure lumen, to the proximal end of the pressure lumen; and

second connecting means for connecting the second end of the pressure lumen to a pressure monitoring device.

### 5,013,297
### VAGINAL DOUCHE

**John F. Cattanach, 140 Power Street, Hawthorn, Victoria 3122, Australia**
**Filed Dec. 12, 1988, Ser. No. 294,555**
**Claims priority, application Australia, Apr. 21, 1987, PI1507; PCT Int'l Appl., Apr. 21, 1988, PCT/AU88/00116**
**Int. Cl.$^5$ A61M** *31/60*
**U.S. Cl. 604—55** **16 Claims**



1. A douching device for administering douche solution to a human female vagina, comprising:

a discharge member insertable into a female vagina for administering a douche solution thereto, said discharge member including

an elongate body of generally thin walled tubular construction and composed at least substantially of a flexible material, the body including

means defining an elongate flow passage extending therealong having an inlet end at which the body is connectable to a supply of douche solution, and

means defining a spaced apart outlet end having an array of outlet openings through which solution is discharged in a spray pattern as claimed in any preceding claim;

a container for holding a quantity of douche solution and connectable to the inlet end of the discharge member body for supplying douche solution thereto; and

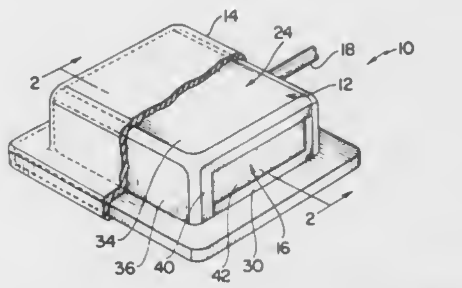
an applicator instrument separate from and exterior to the discharge member for inserting the discharge member into the vagina, the instrument being composed of stiff material and being elongate with opposite leading and trailing end regions, the discharge member being positionable so as to lie in a collapsed condition along the instrument with the outlet end adjacent the leading end region and the inlet end adjacent the trailing end region, and with the discharge member so positioned, the instrument being insertable in an elongate direction into the vagina, the leading end region leading, so as to carry the discharge member into the vagina therewith until the outlet end is located toward the cervix and the inlet end remains external of the vagina, the applicator instrument thereafter being withdrawable from the vagina to leave the discharge member extending along the vagina.

---

### 5,013,298
### LATERALLY COMPRESSED SEPTUM ASSEMBLY AND IMPLANTABLE INFUSION PORT WITH LATERALLY COMPRESSED SEPTUM

**James R. Moden, Bristol; Michael D. Caldwell, East Greenwich, and Robert D. Moden, Warren, all of R.I., assignors to Surgical Engineering Associates, Inc., Bristol, R.I.**
**Filed Feb. 13, 1989, Ser. No. 310,637**
**Int. Cl.$^5$ A61M** *11/00*
**U.S. Cl. 604—93** **8 Claims**

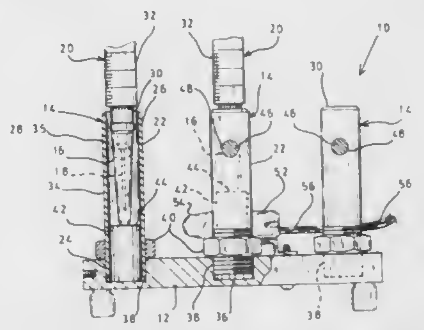
1. In an implantable infusion port for dispensing medication in the body of a patient including a housing having an access opening therein, a septum made of a substantially solid elastomeric material received in said access opening and cooperating with said housing for defining a substantially closed interior cavity, said septum having an outwardly lacing outer surface thereon and being penetrable by a hypodermic needle by inserting said needle through said outwardly facing surface, and catheter means communicating with said cavity for dispensing medication therefrom into the body of said patient, the improvement comprising said septum having an inwardly facing surface which faces substantially opposite from said outwardly facing surface, said infusion port further comprising first and second elastomeric layers secured in overlying relation on said outwardly facing surface and said inwardly facing surface, respectively, said first and second compression layers cooperating to compress said septum by between 1% and 30% in a direction which is substantially parallel to said outwardly and inwardly facing surfaces.



---

### 5,013,299
### SYRINGE RESHEATHING DEVICE

**William C. Clark, P.O. Box 2777, Knoxville, Tenn. 37901**
**Continuation-in-part of Ser. No. 164,348, Mar. 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 23,638, Mar. 9, 1987, abandoned, and a continuation-in-part of Ser. No. 28,410, Mar. 20, 1987, abandoned. This application Sep. 18, 1989, Ser. No. 408,676**
**Int. Cl.$^5$ A61M** *5/38;* **B65D** *85/00*
**U.S. Cl. 604—114** **20 Claims**



1. A syringe resheathing device for lockably receiving the needle sheath of a hypodermic syringe, said device comprising:

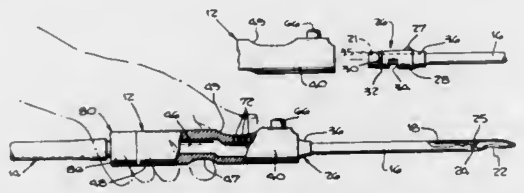
a base member for being supported on a support surface during use of said device;

at least one sheath holder, said sheath holder having sidewalls and first and second end portions, said first end portion being secured to said base member whereby said sheath holder is supported by said base member, said second end portion extending outwardly from said base member, said sheath holder sidewalls defining a sheath receptor within said sheath holder for closely receiving said needle sheath of said syringe; and

locking means extending through said sidewalls of said sheath holder, said locking means having a first end within said receptor for engaging said needle sheath in said sheath receptor, and a second end exterior to said sheath holder for operation of said locking means by a user, whereby said needle sheath is releasably and securely held in said sheath receptor during the unsheathing and resheathing of said syringe by said user using only one hand.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,300
## APPARATUS FOR SUCTION LIPECTOMY SURGERY
**James D. Williams, 3700 Westfall Dr., Encino, Calif. 91436**
**Filed Mar. 9, 1989, Ser. No. 321,504**
**Int. Cl.⁵ A61M** *1/00*
**U.S. Cl. 604—119** **2 Claims**

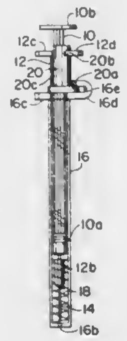


1. An Apparatus for removing subcutaneous fatty tissue comprising in combination:
a suction source;
a surgical instrument means for removing fatty tissue;
a tube means for interconnecting said suction source and said instrument means for conducting tissue under aspirating conditions;
said instrument means including:
a cannula having a through passageway, one end of said cannula having a configures end closure portion provided with a side inlet opening to said passageway:
a mounting sleeve member fixed on the other end of said cannula;
a handle means having a through bore receiving at one end said mounting sleeve member for interconnecting said cannula and handle means, said handle means receiving at its other end said tube means for providing communication between said suction source and said cannula's configured end;
said cannula having an axis coaxial with said through bore;
said mounting sleeve member and said handle means having means for orienting said configured end of said cannula with said handle means;
a control means on said handle means for varying the suction forces in said cannula passageway;
said control means including a first concave recess in said handle means, and a plurality of spaced holes extending from said recessed to said through bore in said handle means;
a means for quickly connecting and disconnecting said handle means from said cannula;
a retaining means carried by said handle means for releasably engaging said mounting sleeve member on said cannula;
said retaining means having a spring bracing said retaining means into locked position; and
said retaining means is located forwardly of said first recess on said handle means and including a cap to facilitate applying pressure to said retaining means;
a swivel means interconnecting said handle means and one end of said tube means whereby said handle means and said cannula maybe manipulated over a wide range of positions relative to said tube means during withdrawal of said fatty tissue under suction forces applied subcontaneously through a skin surface incision.

---

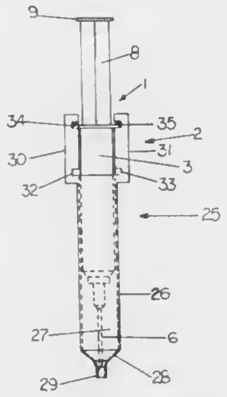
### 5,013,301
## SYRINGE HOLDER
**Phillip Marotta, Jr.; Debbie Marotta, and Amy L. Marotta, all of 9 Wall St., Cromwell, Conn. 06416**
**Filed Nov. 18, 1988, Ser. No. 273,243**
**Int. Cl.⁵ A61M** *5/32*
**U.S. Cl. 604—197** **8 Claims**

1. In combination with a syringe having a plunger slidably received in a barrel, and wherein the barrel has an open end and a needle end, with a finger engageable flange at the open end and an annular flange surrounding a needle in the needle end, a syringe holder comprising a generally tubular housing having a length corresponding to the combined length of the syringe barrel and needle and having an internal cavity adapted to receive the syringe barrel, said housing having an open end through which the syringe barrel is adapted to be inserted, said housing also having a needle end opposite said open end thereof, said needle end defining an opening for receiving the syringe needle, biasing means inside said housing cavity for acting on the syringe barrel to urge it and the needle toward a first position such that the needle is retracted inside the housing, means defined by said housing adjacent the open end of said housing for cooperating with the finger engageable flange at the open end of the syringe barrel to releasably secure the syringe barrel in the housing in a second position such that the needle projects from the housing, and a resilient plastic chip having an axial length corresponding generally to the axial displacement of said syringe barrel relative to said housing corresponding to said first and second positions, said clip having one portion and an opposite end portion, said one portion cooperating with said housing defined means at the open end of said housing and the opposite end portion cooperating with the finger engageable flange at the open end of said syringe barrel to secure the barrel to said housing in said first position.



---

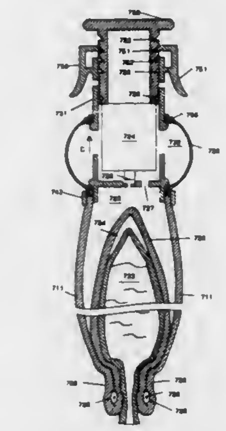
### 5,013,302
## HYPODERMIC NEEDLE SHEATH
**David A. Schmidt, Bay City, Mich., assignor to Schmidt Industries, Inc., Bay City, Mich.**
**Filed Dec. 26, 1989, Ser. No. 456,481**
**Int. Cl.⁵ A61M** *5/32*
**U.S. Cl. 604—198** **4 Claims**



1. A hypodermic syringe comprising a tubular barrel having at one end an outwardly extending flange and at its other end a needle extending in one direction longitudinally of said barrel in prolongation thereof, said needle terminating at its distal end in a free tip; a sheath having an annular body of such length as to accommodate therein said needle in its entirety and at least a portion of said barrel, said portion of said barrel and said body being relatively rotatable and axially slideable; and a latch keeper carried by said body and extending axially thereof in a direction opposite that in which said needle extends from said barrel, said latch keeper having a circumferentially extending groove therein for the removable and slideable accommodation of said flange, said groove and said flange being of such relative circumferential lengths that said flange is movable in response to relative rotation of said barrel and said body between a first position in which said flange is accommodated in said groove thereby preventing relative axial movements of said barrel and said body and a second position in which said flange is clear of said groove thereby enabling relative axial movements of said barrel and said body a distance sufficient to extend said needle tip beyond said sheath.

---

### 5,013,303
## CONSTANT PRESSURE INFUSION DEVICE
**Yehuda Tamari, 12 Pondview Dr., Muttontown, N.Y. 11791, and Michael B. Meyers, 1 Willow Rd., Woodbury, N.Y. 11797**
**Filed Nov. 3, 1988, Ser. No. 267,235**
**Int. Cl.⁵ A61M** *37/00*
**U.S. Cl. 604—140** **23 Claims**

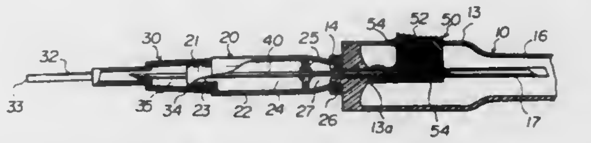


1. A constant pressure infusion device for dispensing a physiological solution from a sterile disposable bag, said device comprising:
- (a) a housing member, said housing member having:
  - (i) non-expandable walls, said walls arranged to receive a disposable bag of physiological solution therewithin, said bag having a dispensing conduit extending therefrom for discharging physiological solution therethrough,
  - (ii) an inflatable means for pressurizing said bag of physiological solution within said walls,
- (b) a first pressure chamber, said chamber configured to receive a canister of pressurized fluid having a spring-loaded discharge valve mounted on said canister, said first pressure chamber being in fluid communication with the inflatable means,
- (c) at least one elastic wall defined by said first pressure chamber, said elastic wall, when stressed, generating at least one contractive force vector,
- (d) means for engaging said spring-loaded discharge valve along one of said contractive force vectors to selectively open said spring-loaded discharge valve to pressurized the first pressure chamber to a predetermined constant pressure.

---

### 5,013,304
## INTRAVASCULAR CATHETER ASSEMBLY
**John P. Russell, Centerpoint; Terry Carroll, Dora, and Sam Miller, Birmingham, all of Ala., assignors to BFD, Inc., Gardendale, Ala.**
**Filed Feb. 22, 1989, Ser. No. 313,465**
**Int. Cl.⁵ A61M** *5/00*
**U.S. Cl. 604—167** **5 Claims**

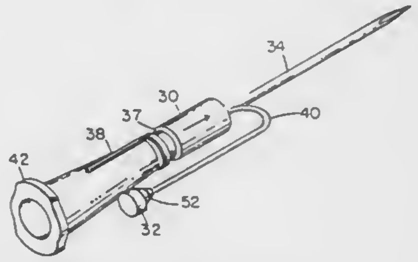
1. An intravascular catheter assembly comprising:
- (a) a catheter member having a plastic needle tube for receiving a needle therethrough for insertion into a vein, a catheter passageway, and a rearwardly opening hub member;
- (b) a catheter adapter and backflow device having a front adapter end for insertion into said rearwardly opening hub member in a fluid tight manner, an adapter cavity within said backflow device for fluidly communicating with said catheter member, a rear adapter hub member, and a self-closing valve member for preventing fluid leakage from said catheter member which is disposed in said catheter adapter between said adapter cavity and said adapter hub member, said self-closing valve member comprising an elastomeric diaphragm which re-seals by a return of the diaphragm material to its original position so as to fill a puncture opening caused by a needle, wherein said backflow device receives a needle through said self-closing valve for fluid communication therewith; and,



- (c) a catheter needle safety sheath comprising:
  - (i) an elongated hollow sheath housing having an elongated sheath slot formed therein and a tapered front end adapted for insertion into said rear adapter hub member;
  - (ii) a retractable needle slidably disposed in said sheath housing;
  - (iii) a needle hub member mounted on a rearward end of said needle;
  - (iv) a fin-shaped handle mounted on said needle hub member, said handle projecting out of said sheath slot for slidably moving said needle so it projects out of said front end or retracts into said sheath housing; and,
  - (v) a needle hub end member mounted on a rearward end of said needle hub member and slidably disposed within a rear portion of said sheath housing.

---

### 5,013,305
## NEEDLE SAFETY SYSTEM AND METHOD
**Eric A. Opie, 24186 Alaska Rd., Brier, Wash. 98036, and Fred E. Silverstein, 1246 15th Ave. E., Seattle, Wash. 98112**
**Filed Jun. 29, 1988, Ser. No. 212,887**
**Int. Cl.⁵ A61M** *5/32*
**U.S. Cl. 604—192** **17 Claims**



1. A needle safety device comprising:
a hub for coupling to a syringe;
a needle coupled at a base thereof to said hub and having a sharp tip spaced away from said hub;
a sleeve slidably coupled to said needle;
a cord coupled to said hub and extending through said sleeve; and
a blocking member coupled to said cord and having a flange for engaging an interior surface of said sleeve for retaining said blocking member in said sleeve, said cord having a length approximately equal to the length of said needle

VOL 1126
ISS 1
MY 7
1991
UMI

such that said blocking member is held adjacent the tip of said needle when said blocking member is in said sleeve.

---

### 5,013,306

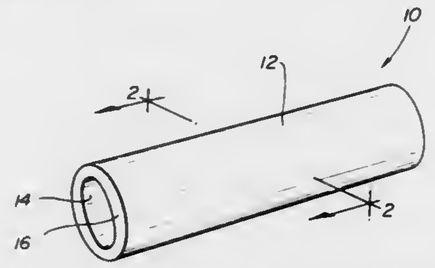
## ANTI-INFECTIVE AND ANTITHROMBOGENIC MEDICAL ARTICLES AND METHOD FOR THEIR PREPARATION

**Donald D. Solomon, Spring Valley, and M. Parke Byron, Centerville, both of Ohio, assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.**

**Continuation-in-part of Ser. No. 298,392, Jan. 18, 1989, abandoned. This application Mar. 21, 1990, Ser. No. 497,780**

**Int. Cl.$^5$ A61M** *25/00, 1/00;* **A61K** *31/74;* **A61L** *29/00*

U.S. Cl. 604—265 **12 Claims**



1. A medical article comprising a polymeric base layer having a water absorption of at least 0.6% by weight and a coating thereon, said base layer having chlorhexidine bulk distributed throughout and said coating being selected from the group consisting of chlorhexidine, an antibiotic and an antithrombogenic agent.

---

### 5,013,307

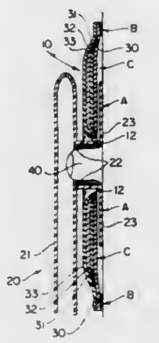
## ABSORBENT PAD FOR AN OSTOMY APPLIANCE

**Marna Broida, P.O. Box 1558, North Kingstown, R.I. 02852**

**Filed Aug. 2, 1989, Ser. No. 388,607**

**Int. Cl.$^5$ A61F** *5/44*

U.S. Cl. 604—338 **30 Claims**



1. An absorbent pad for use with an ostomy appliance of the type having an enclosed bag portion and an adhesive flange which are connected together around an aperture adapted for receiving a stoma, to absorb fluid leakage from around the flange of said ostomy appliance comprising:

a flexible laminate formed with an inner layer of material permeable to and capable of absorbing fluid disposed on one side to face toward the patient's skin and an outer layer of material impermeable to fluid disposed to cover said inner layer and to face away from the patient's skin, said layers being sealed together;

a releasable adhesive layer provided on the peripheral border of said pad on the one side to face toward the patient's skin and encircling the absorbent surface area of said laminate, said adhesive layer being effective to seal to the patient's skin around the fluid-absorbing inner layer of the laminate and to prevent, in cooperation with said impermeable outer layer of said laminate, fluid from being released; and

an opening formed through said laminate substantially in the center of said absorbent surface area being adapted for fitting securely around the connection between the ostomy appliance bag and flange, enabling the peripheral edge of the ostomy appliance flange to terminate in a region that is surrounded by said absorbent surface area.

---

### 5,013,308

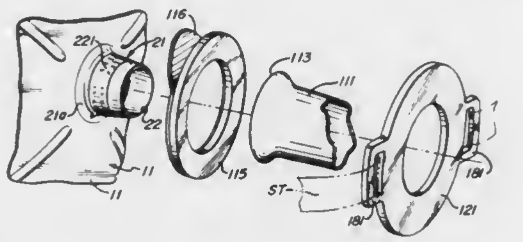
## EXTERNAL MALE CATHETER

**Mark Sullivan, 26732 Crown Valley Pkwy., No. 111, Mission Viejo, Calif. 92691, and Gilbert Salz, 27702 Via Rodrigo, Mission Viejo, Calif. 92692**

**Filed Aug. 20, 1990, Ser. No. 569,431**

**Int. Cl.$^5$ A61F** *5/44*

U.S. Cl. 604—349 **4 Claims**



1. An external catheter assembly, comprising:

an elastomeric membrane of substantially rectangular plan form, including a frustoconical projection extending therefrom characterized by a tapered thickness reducing towards an opening therein;

a first annular adhesive strip attachable to said membrane in surrounding relationship about said projection;

a cylindrical elastomeric sleeve characterized by an expanded opening at one end thereof, said expanded opening being of a peripheral dimension lesser than the peripheral dimension of said first annular strip, selectively adhered by said expanded opening to said first annular strip;

a second annular adhesive strip selectively adhered to said sleeve, said first annular strip and said membrane; and

fluid conveying means connected to the other end of said sleeve.

---

### 5,013,309

## INCONTINENT PAD WITH HIGH ABSORBENT PACKET

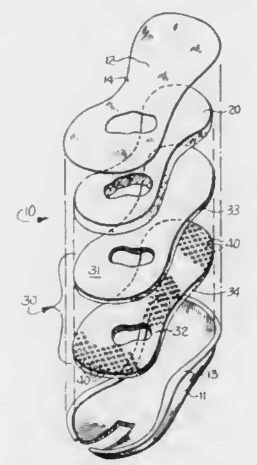
**Joseph F. Baigas, Jr., Charlotte, and John T. Haynes, Jr., Waxhaw, both of N.C., assignors to Kem-Wove Incorporated, Charlotte, N.C.**

**Filed Apr. 24, 1989, Ser. No. 342,527**

**Int. Cl.$^5$ A61F** *13/15*

U.S. Cl. 604—368 **25 Claims**

1. An incontinent pad comprising a liquid impervious layer defining the outer surface of the pad, a nonwoven staple fiber face layer defining the inner surface of the pad, and wherein said liquid impervious layer and said textile staple fiber face layer each includes edge portions with the edge portions of both layers connected together to form an envelope thereat having a pervious inner surface and impervious outer surface, a high absorbent packet contained within said formed envelope and overlying major areas of the impervious outer layer, and a high loft porous webbed section substantially filling the envelope with one surface of the porous section being in intimate engagement with said high absorbent packet and the opposing surface of the face layer, said high absorbent packet comprising at least two juxtapositioned nonwoven webs of textile staple fibers, a layer of superabsorbent non-thermoplastic polymer powder positioned between all of said adjacent layers of said nonwoven webs of textile staple fibers and wherein the average size of the superabsorbent powder particles are between 40 and 150 microns in diameter, and said nonwoven webs have a weight of 1.0 to 3 ounces per square yard, and are formed of staple fibers having a length of between 0.5" to 3.0" and a denier of about 1 to 5 so as to provide a Frazier permeability test equipment value reading of less than 244 feet per minute air flow at a 0.5 inch water gauge pressure drop so as to prevent superabsorbent powder, particularly the smaller particle sizes, from migrating through the juxtapositioned nonwoven webs, said webs having edge portions sealed together to prevent escapement of the superabsorbent powder from within, and each of said nonwoven webs of textile staple fibers having binder means thereon to impart sufficient strength to the nonwoven web for facilitating the handling thereof.



---

### 5,013,310

## METHOD AND APPARATUS FOR REMOVING AN IMPLANTED PACEMAKER LEAD

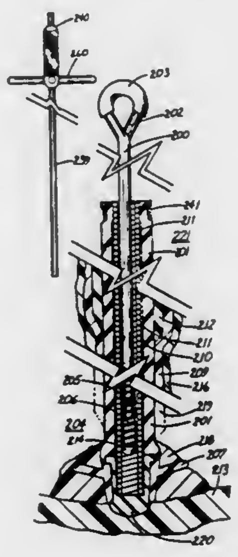
**Louis Goode, Evans City, and Frederick J. Shipko, Spring Church, both of Pa., assignors to Cook Pacemaker Corporation, Leechburg, Pa.**

**Continuation-in-part of Ser. No. 269,771, Nov. 9, 1988. This application Jan. 17, 1989, Ser. No. 298,100**

**The portion of the term of this patent subsequent to Jan. 29, 2008, has been disclaimed.**

**Int. Cl.$^5$ A61B** *17/00*

U.S. Cl. 606—1 **24 Claims**



1. Apparatus for removing a pacemaker lead implanted in a heart, comprising:

stylet means for inserting into a longitudinal passageway of said implanted lead; and

coil means attached about a distal end of said stylet means for radially expanding about said stylet means and securing said stylet means to said lead when said stylet means is inserted in said passageway.

---

### 5,013,311

## ENVELOPE GENERATOR FOR A POWER BEAM

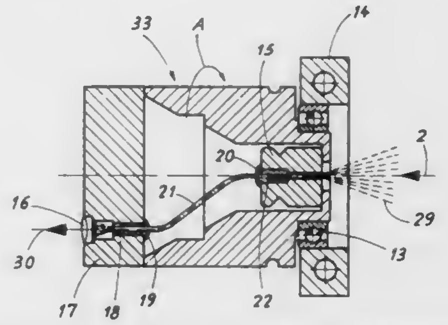
**Taoufik Nouri, Oberhofen, Switzerland, assignor to Lasag AG, Thun, Switzerland**

**Filed Oct. 5, 1989, Ser. No. 417,599**

**Claims priority, application Switzerland, Oct. 6, 1988, 3746/88**

**Int. Cl.$^5$ A61N** *5/02*

U.S. Cl. 606—4 **16 Claims**



1. A surgical treatment device, in particular for ophthalmological purposes comprising:

at least one first light source emitting a power beam along a first optical axis and having a predetermined cross-section,

a second light source emitting a visible light beam along a second optical axis,

a rotating element rotating around said second optical axis, said element including means for transforming the beam issuing from said second source into at least one elementary beam turning around said second optical axis and arranged to form a luminous tubular beam intended to surround said power beam,

means for combining said power beam and said luminous tubular beam along a third common optical axis, and

a lens arranged in the path of the third optical axis so as to concentrate said power beam and said luminous tubular beam which surrounds it onto the focal point of the lens in accordance with a core having a predetermined vertex angle,

wherein the transforming means forming part of said rotating element include at least one homogeneous light guide.

---

### 5,013,312

## BIPOLAR SCALPEL FOR HARVESTING INTERNAL MAMMARY ARTERY

**David J. Parins, White Bear Lake; Gerald S. Szczech, Minnetonka; Demitre M. Nicoloff, Edina, and Steven W. Berhow, Brooklyn Center, all of Minn., assignors to Everest Medical Corporation, Minneapolis, Minn.**

**Filed Mar. 19, 1990, Ser. No. 495,405**

**Int. Cl.$^5$ A61B** *17/39*

U.S. Cl. 606—37 **14 Claims**

11. An electrosurgical instrument for resectioning of an internal mammary artery comprising:

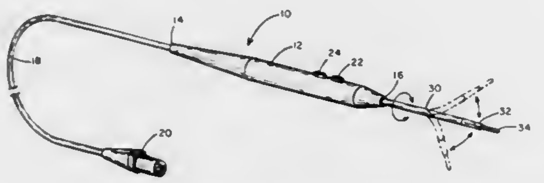
(a) a rigid tubular handle member having a proximal end and a distal end, said handle including a longitudinal bore extending proximally from said distal end;

(b) a bipolar blade member including an insulating substrate having at least one tapered working edge and first electrode means extending along said one working edge in spaced-apart orientation on opposed sides of said substrate to define a cut gap;

VOL
1126
ISS
1
MY
7
1991
UMI

(c) a bendable cylindrical metal tube having a proximal end inserted into said longitudinal bore and a distal end;

(d) blade clamping means attached to said distal end of said metal tube for securing said blade member to said distal end of said metal tube; and



(e) conductor means extending through said proximal end of said handle and through said cylindrical metal tube to said first electrode means for carrying electrical signals to said first electrode means.

---

## 5,013,313
## DEVICE FOR FIXATION OF PART ON A SUPPORT, ESPECIALLY OF AN IMPLANT ON A BONE

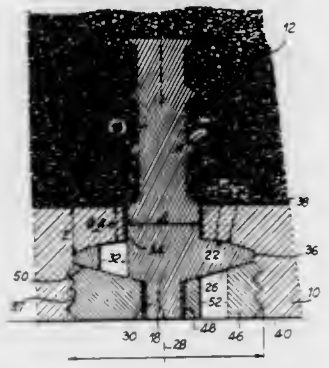
**Patrick Surer, Rue du Prieuré de Béré , 44110-Chateaubriant, France**

**Filed May 26, 1989, Ser. No. 357,766**

**Claims priority, application France, May 30, 1988, 88 07170**

**Int. Cl.$^5$ A61F** *5/04*

**U.S. Cl. 606—60** **19 Claims**



1. An assembly for securing two elements of different hardness, including:

(a) a support made of a first material of a first hardness;

(b) a part made of second material of a second hardness being harder than said first hardness, said part including:

  (1) a cylindrical passage in said part and

  (2) a countersink having internal threads and a first diameter, axially aligned in said part with said passage, including a base; and

(c) fastener means for affixing said part and said support and for transferring compressive stress laterally into said part without causing substantial compression at the interface between the support and the part, said fastener means being anchored in said support and in said part, and said fastener means comprising:

  (1) a head having a second diameter less than said first diameter,

  (2) a rod secured to said support, said rod being axially aligned with and secured to said head, and

  (3) an externally threaded locking member being threadedly received by said countersink internal threads.

---

## 5,013,314
## INSTRUMENTATION AND METHOD FOR INSERTING FLEXIBLE IMPLANTS INTO FRACTURED BONES

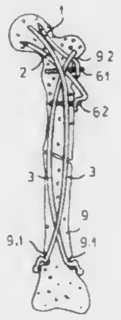
**Andrei Firica; Alexandru I. B. Manof, and Dragos Gheorghiu, all of Bucharest, Romania, assignors to Intreprinderea Industria Tehnico-Medicala, Bucharest, Romania**

**Continuation-in-part of Ser. No. 97,968, Jun. 16, 1987, abandoned. This application May 31, 1989, Ser. No. 359,837**

**Claims priority, application Romania, Nov. 5, 1985, 120633**

**Int. Cl.$^5$ A61F** *5/04*

**U.S. Cl. 606—64** **9 Claims**



1. An instrument set for driving flexible bone implants into fractured long bones, said set comprising:

a first handle;

a longitudinally elongated window in said first handle;

a first anvil at one end of said first handle;

a tool head at the other end of said first handle for releaseably holding a tool;

a plurality of tools adapted to be held individually and interchangeably in said tool head and including:

a boring tool for forming an arcuate passage from at least one opening drilled in the shank of a bone which arcs into longitudinal alignment with the bone for the initial introduction of a shank implant formed by a long rod, said boring tool having a body formed respectively with a short, straight central portion extending forwardly to a shaped, arcuate portion having a plurality of cutting edges converging forwardly to a sharp point, a rear end of said boring tool being provided with formations enabling said boring tool to be held in said tool head,

a first force-directing tool for initially driving the shank implant having a first S-curve adjacent a rear end thereof partially into the bone shank and completely driving a lower femoral head implant formed by a short rod and having a second S-curve adjacent a rear end thereof into the femoral head, said first tool having a short, straight body with a forward end formed with a longitudinally elongated first recess adapted to engage the first and second S-curves of the respective shank and lower femoral head implants, said recess having an internal pocket engageable with a curve of a respective S-curve for supporting the implant, a rear end of said first tool being provided with formations enabling said first tool to be held in said tool head,

a second force-directing tool for completely driving the shank implant into the shank, said second tool having a long, straight body with a forward end formed with a longitudinally elongated second recess adapted to engage the first S-curve, a rear end of said second tool being provided with formations enabling said second tool to be held in said tool head,

a third force-directing tool for seating the shank implant in the shank, said third tool having an elongated body formed on opposite sides with a respective inclined flank tapering forwardly relative to one another to an arcuate third recess adapted to engage a curve of the first S-curve disposed in the drilled opening for driving the shank implant in a direction opposite to the initial insertion direction for imbedding the curve in the bone tissue surrounding the opening in the shank, a rear end of said third tool being provided with formations enabling said third tool to be held in said tool head,

a fourth force-directing tool for initially driving an upper femoral head implant, formed by a short rod and having a circular lug end, partially into the femoral head to an adjustable depth, said fourth tool having an elongated, straight central portion with a forward end disposed at an obtuse angle to the longitudinal axis of the central portion and adapted to engage the lug end of the upper femoral head implant, with a longitudinally adjustable plate mounted on said central portion parallel thereto and having a forward end formed so as to partially surround the lug end of the upper implant for guiding same and to act as a stop after a predetermined amount of penetration of the upper implant into the femoral head, said central portion being further provided with a second anvil having an inclined impact portion with a longitudinal axis substantially parallel to that of said forward end, a rear end of said fourth tool being inclined in the same direction as said forward end and provided with formations enabling said fourth tool to be held in said tool head,

a fifth force-directing tool for driving the upper implant partially into the femoral head to an intermediate position, said fifth tool having a crank-shaped body with a forward end formed with a semi-circular first seat adapted to engage the circular lug end of the upper implant, whereby the remaining portion of said crank-shaped body is spaced from the bone, a rear end of said fifth tool being inclined to said forward end and provided with formations enabling said fifth tool to be held in said tool head,

a sixth force-directing tool for completely driving the upper implant into the femoral head, said sixth tool having a short, straight body provided with a forward end formed with a generally spherical head having a flat face forming an obtuse angle with a longitudinal axis of said body, said face being formed with a semi-circular fourth recess having a forwardly directed opening, said fourth recess being adapted to engage the circular lug end of said upper femoral head implant in a manner which enables said flat face to ride along the surface of the bone, a rear end of said sixth tool being provided with formations enabling said sixth tool to be held in said tool head,

a positioning tool for changing the position of the first lug end of the lower femoral head implant and a second lug end of the lower femoral head implant after their initial introduction into the femoral head of the bone, said positioning tool having an elongated, straight body formed at one end with a cylindrical head in which there is provided a fifth recess opening outwardly at a cylindrical wall thereof and adapted to engage the first lug end or the second lug end, the other end of said body being provided with formations enabling said positioning tool to be held in said tool head, and

a guiding tool for stabilizing the shank implants as they are being introduced into the bone by hammering, said guiding tool being formed by an elongated body having a jaw fixed at one end thereof, and an adjustable jaw juxtaposed with said fixed jaw and displaceable relative thereto on a stud extending from said fixed jaw, said fixed jaw and said adjustable jaw each being formed with a respective groove extending across a respective confronting face thereof and adapted to at least in part surround the shank implant for preventing bending thereof during hammering, the end of said body opposite said fixed jaw being provided with formations enabling said guiding tool to be held in said tool head;

a rotation tool for altering the penetration direction of the shank and lower femoral head implants during hammering thereof into the bone, said rotation tool being formed by an elongated, cylindrical body having both ends formed with respective first and second cylindrical collars, said body being adapted to engage said elongated window in said first handle to act as a crank for the rotation thereof, at least one of said first and second cylindrical collars being provided with a sixth recess shaped so as to enable seating therein of a respective curve of the first and second S-curves for providing an alternative means of altering the penetration direction of the shank and lower femoral head implants; and

a first impact tool adapted to hammer said first anvil of said first handle for providing the forces necessary to drive said respective shank implant and said lower and upper femoral head implants into said bone, said first impact tool having a first impact head with a central section formed by a truncated cone, delimited at a larger end thereof by a first cylindrical section, and at a smaller end thereof by a second cylindrical section, and an elongated second handle extending from said truncated section of said first impact head adjacent said second cylindrical section and providing a relatively large inertia moment, a longitudinal axis of said second handle lying perpendicular to that of said first impact head.

---

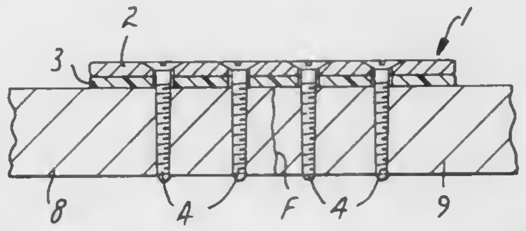
## 5,013,315
## SEMIABSORBABLE BONE PLATE SPACER

**Thomas H. Barrows, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jan. 12, 1985, Ser. No. 754,870**

**Int. Cl.$^5$ A61F** *5/04*

**U.S. Cl. 606—71** **20 Claims**



1. A medical prosthesis for; use in bone fracture fixation comprising a bone plate, a bone plate spacer comprising a blend or mixture of a nonabsorbable polymer and a bioabsorbable polymer, and a means for fastening both said bone plate and said bone plate spacer to the bone.

---

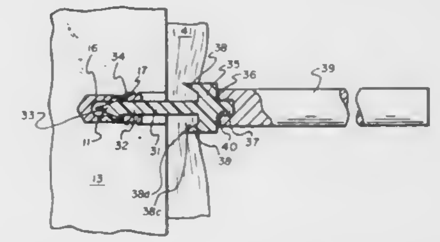
## 5,013,316
## SOFT TISSUE ANCHOR SYSTEM

**E. Marlowe Goble, 850 E. 1200 North, and W. Karl Somers, 651 N. 150 West, both of Logan, Utah 84321**

**Filed Mar. 26, 1990, Ser. No. 498,831**

**Int. Cl.$^5$ A61F** *5/04, 2/08*

**U.S. Cl. 606—72** **8 Claims**



1. A soft tissue anchor system comprising, a footing stud means for endosteal installation in a bone mass at a site of a soft tissue attachment that includes a longitudinal cavity for receiving a tack which has a central portion that has a greater diameter than distal and proximal ends of said cavity a cone axially secured to the tack means shaft end by attaching the shaft into a cone base central portion of said longitudinal cavity formed in said footing stud means, allowing said cone to collapse towards said tack means shaft and, when released, expand into said footing stud central portion for permanently coupling said

VOL
1126
ISS
1
MY
7
1991
UMI

tack means to said footing stud means, with a head axially secured to the other tack means shaft end.

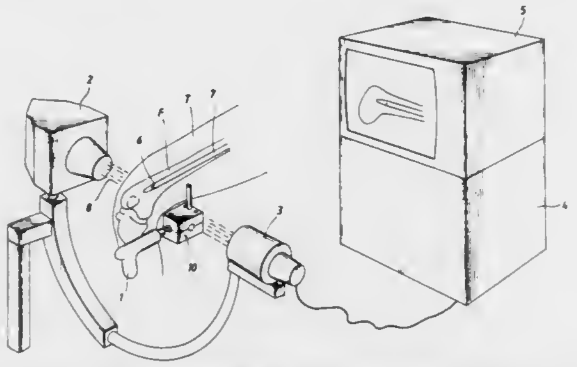
---

### 5,013,317

### MEDICAL DRILL ASSEMBLY TRANSPARENT TO X-RAYS AND TARGETING DRILL BIT

**J. Dean Cole, Orlando, Fla., and A. Glenn Durham, Memphis, Tenn., assignors to Smith & Nephew Richards Inc., Memphis, Tenn.**

**Filed Feb. 7, 1990, Ser. No. 476,173**
**Int. Cl.$^5$ A61F** *5/04;* **G01C** *15/00;* **A61B** *6/08*
**U.S. Cl. 606—96** **19 Claims**



1. An X-ray transparent adapter for aligning a drill bit, pin or other elongated member, the adapter being capable of connecting to a drive source, comprising:

a drive means having a first end and a second end;

means for holding the elongated member connected to said first end of said drive means;

means for engaging the drive source connected to said second end of said drive means;

said drive means being adapted to rotate the elongated member when driven by the drive source;

at least said drive means and said means for holding the elongated member being formed of X-ray transparent material so that an operator can align the elongated member with an internal predetermined direction in an X-ray transparent medium; and

said means for holding and said means for engaging being located and oriented relative to each other so that the drive source is out of the X-ray line of sight when the operator aligns the elongated member with the internal predetermined direction.

---

### 5,013,318

### MEDICAL INSTRUMENT FOR MEASURING DEPTH OF FASTENER HOLD IN BONE

**Joseph J. Spranza, III, Grass Valley, Calif., assignor to Special Devices Incorporated, Grass Valley, Calif.**

**Filed Jul. 31, 1990, Ser. No. 560,871**
**Int. Cl.$^5$ A61F** *5/04;* **A61B** *1/00*
**U.S. Cl. 606—102** **11 Claims**

1. An instrument for measuring the depth of a hole comprising:

means defining a tubular body adapted to pass into and through a hole,

zero index means at one end of said body said zero index adapted to expand and contract controllably exclusively in a plane normal to the axis of said tubular body,

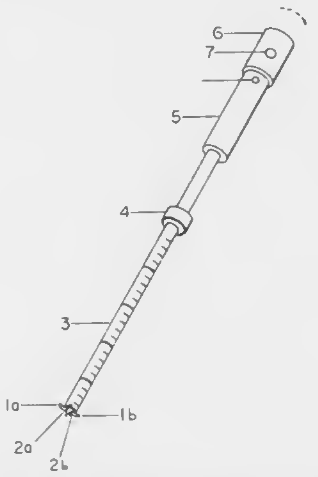
a scale means to measure the length of said tubular body which is inserted into a hole,

a marker means associated with said scale means, frictionally restrained to stay where it is placed,

a handle means attached to the opposite end of said body from said zero index, and

actuating means attached to said handle, operatively connected with said zero index providing means whereby said zero index is expanded and contracted,

said zero index being adapted to pass through said hole when contracted but when expanded, to engage distal edge of hole, thereby effecting alignment of zero index with distal wall of said hole such that closest interpolation of scale is an accurate reading of hole depth.



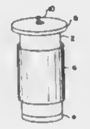
---

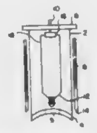
### 5,013,319

### APPARATUS AND METHOD FOR CORNEA MARKING

**Andrew Davis, Matawan, N.J., assignor to Mount Sinai School of Medicine of the City University of New York, New York, N.Y.**

**Filed Jun. 5, 1989, Ser. No. 361,240**
**Int. Cl.$^5$ A61D** *1/00*
**U.S. Cl. 606—166** **20 Claims**





1. An apparatus for maintaining a patient's visual fixation and centration while marking the patient's cornea, comprising:

(a) a first housing;

(b) a light source axially aligned and integral to the first housing to maintain the patient's visual fixation and centration while the cornea is marked, the light source acting as a point source of light and enabling the patient to see a shadow image of the patient's pupil; and

(c) a second housing coaxial with the first housing having means for marking the cornea which are integral to the second housing and positioned such that the light source and means for marking are axially aligned.

---

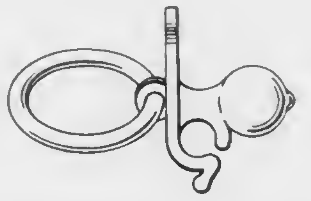
### 5,013,320

### PACIFIER WITH LIP CLIP

**Roni Orpaz, 128 Renov Ahad Ha'am, Tel Aviv, Israel**

**Filed Jan. 29, 1990, Ser. No. 470,608**
**Int. Cl.$^5$ A61J** *17/00*
**U.S. Cl. 606—234** **3 Claims**

1. A baby's pacifier including a protection disc with a nipple attached on one side of said disc and a gripping handle attached on an other side of said disc, the improvement comprising:



clip means on said protection disc for engaging the lip of the user and retaining said pacifier thereon.

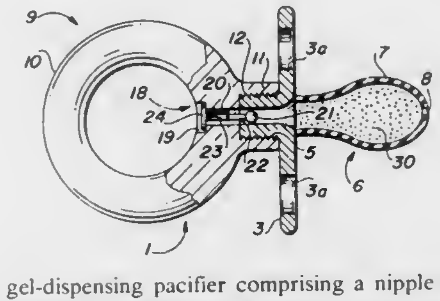
---

### 5,013,321

### GEL-DISPENSING PACIFIER

**Benjamin F. MacVane, P.O. Box 7422, Alexandria, La. 71301**

**Filed Oct. 12, 1988, Ser. No. 256,594**
**Int. Cl.$^5$ A61J** *17/00*
**U.S. Cl. 606—234** **2 Claims**



1. A gel-dispensing pacifier comprising a nipple having a hollow interior for containing a supply of gel; at least one gel-dispensing opening provided in said nipple, said gel-dispensing opening communicating with said hollow interior; a guard carried by said nipple opposite said gel-dispensing opening; a guard opening provided in said guard, said guard opening communicating with said gel-dispensing opening; a ring removably carried by said guard for handling said pacifier; a valve seat provided in said ring, a seat opening projecting through said ring, said seat opening communicating with said valve seat, said guard opening and said hollow interior of said nipple; a valve neck slidably disposed in said seat opening; a ball attached to one end of said valve neck facing said hollow nipple, said ball located in said guard opening; and a ball stay located in said valve seat and attached to the opposite end of said valve neck for transmitting air to said nipple and facilitating the dispensing of gel from said nipple to an infant.

---

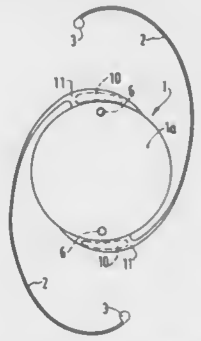
### 5,013,322

### YAG COMPATIBLE POSTERIOR CHAMBER INTRAOCULAR IMPLANT

**Daniele S. A. Rosa, 28, Avenue Raphael, 75016 Paris, France**

**Filed Nov. 22, 1985, Ser. No. 800,719**
**Int. Cl.$^5$ A61F** *2/16*
**U.S. Cl. 623—6** **2 Claims**

1. A YAG compatible posterior chamber intraocular implant, comprising a biconvex lens of circular section, the lens having a posterior face with a radius of curvature which is substantially equal to 3.5 times a radius of curvature of the anterior face, haptics for fixing the implant inside the natural lens bag or the ciliary sulcus, the haptics being affixed to the periphery of the lens by bases, the bases being arcuate in configuration and being tangentially positioned relative to the lens, the haptics extending tangentially from the bases, and spacer members for spacing the posterior capsule from the lens, the said spacer members being disposed on the bases of the haptics, the sides of the spacer members being tangential to the sides of the bases, the height of the spacer members above the edge of the lens being about 0.5 mm.



---

### 5,013,323

### IMPLANT MATERIAL FOR REPLACING HARD TISSUE OF LIVING BODY

**Masahiro Kobayashi, Funabashi; Hideo Tagai, Ota; Yoshikatsu Kuroki, Yokohama; Shigeo Niwa, Aza, and Mikiya Ono, Hanno, all of Japan, assignors to Mitsubishi Mining & Cement Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 799,755, Nov. 19, 1985, abandoned. This application Aug. 13, 1987, Ser. No. 86,247**
**Claims priority, application Japan, Dec. 4, 1984, 59-255006**
**Int. Cl.$^5$ A61F** *2/28*
**U.S. Cl. 623—16** **23 Claims**

1. An implant material for replacing hard tissue of a living body, comprising 10 to 90% by weight of a fiber glass mainly composed of calcium phosphate and 90 to 10% by weight of an organic high polymer material not inhibiting affinity with the living body, the surface of the fiber glass being coated with a calcium phosphate compound having a Ca/P molar ratio of from 0.8 to 1.7 and resulting from dipping the fiber glass in a solution containing phosphoric ions and having a pH value of from 2 to 7, a portion of said fiber glass being exposed on the surface of said implant material, said implant material having a bending strength of from 500 kg/cm$^2$ to 16500 kg/cm$^2$, a modulus of bending elasticity of from 0.6 to $10^5$ kg/cm$^2$ to $5.5\times10^5$ kg/cm$^2$, and a density of from 1.3 to 2.3 g/cm$^3$, said fiber glass containing a total content of CaO and $P_2O_5$ of not less than 15% by weight, and having a molar ratio of Ca/P of from 0.3 to 4.0, the bending strength, the modulus of bending elasticity and the density being adjusted within said range by varying the content of the fiber glass.

---

### 5,013,324

### PROSTHETIC IMPLANT WITH WRAPPED POROUS SURFACE

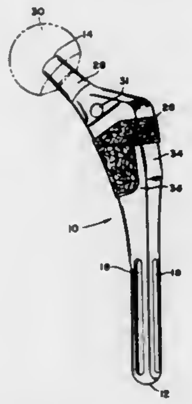
**Arden R. Zolman, Warsaw; Phillip J. Andersen, Silver Lake, and Steven T. Bayne, Warsaw, all of Ind., assignors to Zimmer, Inc., Warsaw, Ind.**

**Continuation of Ser. No. 88,363, Aug. 24, 1987, abandoned. This application Nov. 28, 1988, Ser. No. 277,527**
**Int. Cl.$^5$ A61F** *2/28*
**U.S. Cl. 623—23** **7 Claims**

1. A prosthetic implant including a stem portion having a plurality of sides and a discrete, circumferential porous pad mounted directly on said stem portion in surrounding relation thereto, the pad includes a first end and a second end such that when the pad is mounted on the stem portion, the first end and

VOL
1126
ISS
1
MY
7
1991
UMI

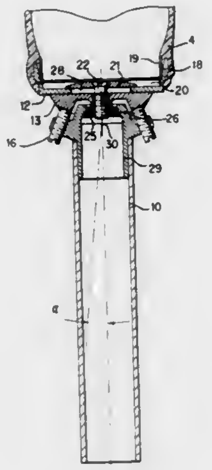
the second end face each other and are flush with one another without interruption therebetween on one of said sides of the stem portion, and wherein the porous pad is attached securely and directly to the stem portion prior to implantation.



---

## 5,013,325
## ARTIFICIAL LEG

**Gustav Rennerfelt, Nilstorpsvägen 53, S-181 47 Lidingö, Sweden**
**PCT No. PCT/SE87/00233, § 371 Date Oct. 26, 1988, § 102(e) Date Oct. 26, 1988, PCT Pub. No. WO87/06819, PCT Pub. Date Nov. 19, 1987**
**PCT Filed May 12, 1987, Ser. No. 263,797**
**Claims priority, application Sweden, May 12, 1986, 8602143**
**Int. Cl.$^5$ A61F** *2/62*
**U.S. Cl. 623—38** **10 Claims**

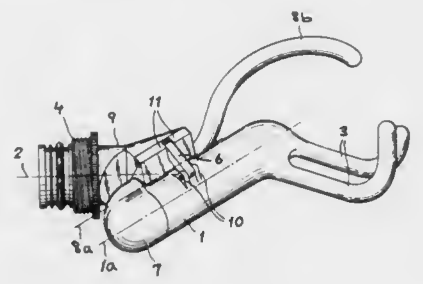


1 A leg prosthesis including an interface member, an adjusting head arranged at the proximal end of the interface member and intended for attaching the prosthesis to a first sleeve arranged on the leg stump, first means for adjusting the angular position of the interface member relative an imagined load line, second means for allowing a translatory movement of the interface member, and fixing means for fixing the interface member in a desired translatory position relative the first sleeve, said first and second means both being situated on the adjusting head at the proximal end of the interface member and both allowing basic adjustment of the interface member with the prosthesis in place on the patient, wherein said first means comprise a second sleeve fixed to the proximal end of the interface member, said second sleeve including a throat provided with a plurality of radially projecting arms arranged on the throat to form an angle with the longitudinal axis of the second sleeve, and a threaded through hole in the end portion of each arm for receiving an adjusting screw with a rounded end, said rounded end engaging against abutments of a lower surface of a support plate which is disposed below said first sleeve and forms a part of said second means.

---

## 5,013,326
## ARTIFICIAL HAND

**Eduard Horvath, Vienna, Austria, assignor to Otto Bock Orthopadische Industrie Besitz- und Verwaltungs-KG, Duderstadt, Fed. Rep. of Germany**
**Filed Jul. 18, 1989, Ser. No. 381,604**
**Claims priority, application Australia, Jul. 18, 1988, 1841/88**
**Int. Cl.$^5$ A61F** *2/54*
U.S. Cl. 623—64 12 Claims



1. An artificial hand, comprising:
a connector having a first axis and formed with means for connecting the artificial hand to a prosthesis;
a thumb carrier formed with a thumb of the artificial hand, extending at an acute angle to said thumb carrier, and constituting a first gripper;
a finger carrier formed with at least one finger of the artificial hand extending at an acute angle to a longitudinal axis of said finger carrier and constituting a second gripper opposed to the first gripper,
 said grippers being relatively swingable toward and away from one another around a common second axis connecting said carriers of said grippers and including an acute angle with a plane normal to said first axis of said connector, and opening toward said connector;
means for mounting one of said grippers to said connector; and
a drive for swinging at least one of said grippers about said common second axis.

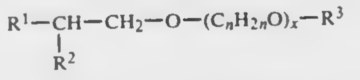
---

# CHEMICAL

## 5,013,327
## MERCERIZING AND/OR CAUSTICIZING WETTING AGENT: 2-ETHYL-HEXYL-SULFATE AND MIXTURE OF ALKYL END-BLOCKED POLYETHERS

**Bernd Wahle, Kaarst, and Faize Selen, Duesseldorf, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany**
**Filed Jul. 6, 1989, Ser. No. 376,089**
**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1988, 3823454**
**Int. Cl.$^5$ B01F** *17/02;* **D06M** *11/40, 13/26, 15/53*
**U.S. Cl. 8—125** **13 Claims**

1. A mercerizing or causticizing wetting agent composition comprising from about 15 to about 30% by weight of an alkali metal or ammonium salt of 2-ethyl hexyl sulfate, from about 1 to about 10% by weight of a mixture of terminally blocked polyethers corresponding to the following formulae



$$R^1-\underset{\displaystyle R^2}{\underset{|}{CH}}-CH_2-O-(C_nH_{2n}O)_x-R^3 \qquad (A)$$

in which $R^1$ is a linear $C_{1-20}$ alkyl radical, $R^2$ is a linear $C_{1-20}$ alkyl radical, $R^3$ is a $C_{1-22}$ alkyl, alkenyl, cycloalkyl, aryl, arylalkyl or alkylaryl radical, n is the number 2, 3 or 4, and x is a number of 2 to 25, and

$$R^4-O-(C_nH_{2n}O)_x-R^3 \qquad (B)$$

in which $R^4$ is a $C_{8-22}$ alkyl or alkenyl radical, $R^3$ is a $C_{1-22}$ alkyl, alkenyl, cycloalkyl, aryl, arylalkyl or alkylaryl radical, n is the number 2, 3 or 4, and x is a number of 2 to 25, and 0 to about 5% by weight of a trialkyl phosphate containing 1 to 6 carbon atoms in the alkyl groups wherein the ratio by weight of A to B is between about 0.1 and about 10.

---

## 5,013,328
## AFTERTREATMENT OF DYED SUBSTRATES

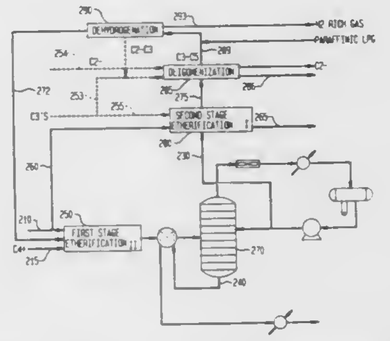
**Oskar Annen, Aesch, and Bernhard Schlick, Basel, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**
**Continuation of Ser. No. 270,938, Nov. 14, 1988, abandoned. This application Nov. 15, 1989, Ser. No. 437,481**
**Int. Cl.$^5$ D06P** *1/39, 3/60, 5/08*
**U.S. Cl. 8—442** **20 Claims**

1. A process for the aftertreatment of yarn to which a dyestuff or optical brightener has been applied by exhaust dyeing, which comprises applying by an exhaust process to the dyed or brightened yarn on a cross-wound spool or a package a cationic or protonatable polymeric Product P selected from:
(A) a polymeric Product A, which is a reaction product of a monofunctional or polyfunctional amine having one or more primary and/or secondary and/or tertiary amino groups with cyanamide, dicyandiamide, guanidine or bisguanidine in which up to 50 mole percent of the cyanamide, dicyandiamide, guanidine or bisguanidine may be replaced by a dicarboxylic acid or a mono- or di-ester thereof, with the splitting off of ammonia, said Product A containing at least one free hydrogen atom linked to a nitrogen atom;
(B) the polymeric Product B, which is a reaction product of Product A with
 (a) epichlorohydrin or a precursor thereof; or
 (b) an N-methylol derivative of a urea, melamine, guanamine, triazinone, urone, carbamate or acid amide, and
(C) a water-soluble homo- or co-polymer, Product C, of monoallylamines, diallylamines and/or triallylamines; Product P being applied in the presence of an assistant comprising an anionic Component I and a non-ionic Component II;
Component I being selected from $C_{11-18}$alkane sulphonic acids, aryl$C_{1-22}$alkylbenzene sulphonic acids, $C_{8-22}$ fatty amido amine sulphonic acids; amidobenzenesulphonic acids, Turkey red oil, $C_{1-22}$alkyl-aryl disulphonic acids; $C_{1-22}$alkyl arylaryl sulphonic acids and sulphonated or sulphated products of phenols, phenol-$C_{1-6}$alkyl ethers; naphthol, naphthalene, benzylnaphthalenes, phenylether sulphones, tolylether sulphone, novolak products, dinaphthylmethanes; and sulphonated aromatic formaldehyde-condensation products; and
Component II being the addition product of $C_{2-4}$alkyleneoxide with a compound selected from saturated or unsaturated $C_{8-22}$ fatty alcohol, a $C_{8-22}$ fatty aminopropylamine, $C_{3-22}$ secondary alcohol, $C_{1-22}$alkylphenol and a carboxylic acid.

---

## 5,013,329
## CONVERSION OF LIGHT HYDROCARBONS TO ETHER RICH GASOLINE

**Weldon K. Bell, Pennington; Werner O. Haag; Mohsen N. Harandi, both of Lawrenceville, and Hartley Owen, Belle Mead, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**
**Filed Mar. 31, 1989, Ser. No. 331,201**
**Int. Cl.$^5$ C10L** *1/18*
**U.S. Cl. 44—448** **22 Claims**



1. An integrated process for the production of ether-rich rich liquid fuels, comprising:
(a) contacting a fresh mixture of lower alkanol and a light hydrocarbon feedstock containing linear olefins and $C_4+$ tertiary olefins with an acidic etherification catalyst in a first etherification zone under tertiary olefin etherification conditions whereby an etherification effluent stream containing lower alkyl tertiary alkyl ethers is produced;
(b) separating said etherification effluent stream to provide a first stream comprising ether-rich $C_5+$ gasoline and a second stream comprising unreacted lower alkanol and linear olefins of $C_5-$ hydrocarbons;
(c) contacting said second stream with an acidic catalyst in a second etherification zone under conditions effective to etherify said linear olefinic hydrocarbons;
(d) recovering a first stream comprising $C_5+$ gasoline containing lower alkyl ethers of said $C_5-$ linear olefins and a second stream comprising unreacted olefins of $C_4-$ hydrocarbons from said second etherification zone;
(e) passing said second stream to an olefins to higher molecular weight hydrocarbons conversion zone in contact with an acidic metallosilicate catalyst under olefins and oxygenates conversion conditions at elevated temperature whereby higher molecular $C_5+$ gasoline boiling range hydrocarbons are produced plus $C_5-$ paraffinic hydrocarbon by-product.

VOL
1126
ISS
1
MY
7
1991
UMI

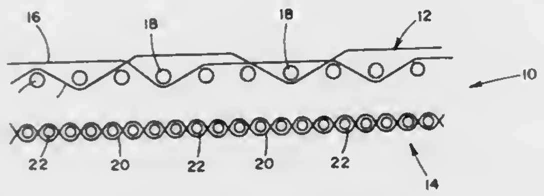
### 5,013,330
### MULTI-LAYERED PAPERMAKERS FABRIC FOR THRU-DRYER APPLICATION

**Thomas B. Durkin, Depere, and Frank Biasone, Appleton, both of Wis., assignors to Asten Group, Inc., Charleston, S.C.**

**Filed Dec. 4, 1989, Ser. No. 445,547**

**Int. Cl.$^5$ B24D *11/00***

**U.S. Cl. 51—297** **5 Claims**



1. A papermaker's fabric for forming and transporting an aqueous paper web comprising:

a woven base fabric layer;

a woven upper fabric layer for defining a paper carrying surface which assists in the further forming of the web;

said base layer being woven in a substantially finer mesh than said upper layer from yarns having a significantly smaller size than the upper layer yarns;

said woven base fabric layer being woven with approximately twice the number of warp and shute yarns per inch than the warp and shute yarns per inch of said upper fabric layer;

means for interconnecting said upper and base layers into a unitary fabric such that the interconnection of said base layer with said upper woven layer provides structural support and stability to said upper woven layer as it forms and transports the aqueous web; and

said interconnecting means comprising pairs of binding yarns of substantially the same size as the bottom layer warp yarns, interwoven with said bottom layer substantially within the repeat of the bottom layer in a single warp yarn location and interweaving with selected individual yarns of said upper layer.

---

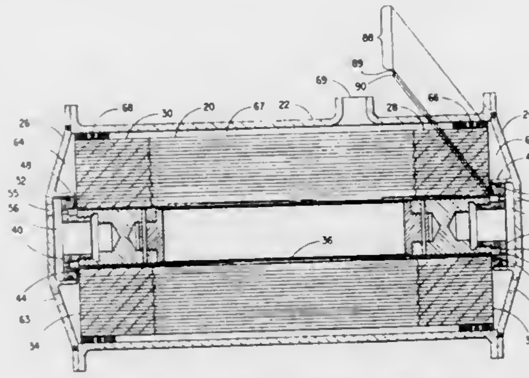
### 5,013,331
### PERMEATOR WITH SELECTABLE FLOW RATES

**Donald W. Edwards, Wilmington, and Billy J. Etienne, Newark, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jun. 30, 1989, Ser. No. 374,203**

**Int. Cl.$^5$ B01D *53/22, 63/04***

**U.S. Cl. 55—16** **26 Claims**



1. A method for separating a product gas as either a permeated or non-permeated gas stream from a mixture of said product gas and at least one other gas comprising:

a. feeding said mixture to a hollow-fiber permeator, said permeator having a plurality of first connecting lines for feeding the gas mixture to a plurality of ports providing fluid communication through an enclosing means to a plurality of first sealed volumes formed by contact of the enclosing means with a tubesheet in which the hollow fibers terminate and a plurality of second connecting lines for feeding a non-permeated gas mixture from a plurality of ports providing fluid communication from a plurality of second sealed volumes formed in the same manner as the plurality of first sealed volumes through enclosing means, each first connecting line corresponding to a second connecting line,

b. maintaining sufficient pressure differential across the membrane so that a permeated and a non-permeated gas are produced, and

c. stopping the flow of the feed mixture to certain first sealed volumes when product flow is such that bundle portions defined by the certain sealed volumes are not required to achieve flow and by preventing backflow of non-permeated gas into those bundle portions.

8. A hollow fiber permeator, comprising:

a. bundle of hollow fibers having open bores in a first tubesheet at a feed end and a second tubesheet at a discharge end;

b. a first enclosing means at the feed end and a second enclosing means at the discharge end, said enclosing means contacting first tubesheet and second tubesheet in a means that forms a plurality of sealed volumes each containing separate portions of the bores of the hollow fibers at the feed end and at the discharge end, the portions at the feed end corresponding to and in fluid communication with the bores at the discharge end; and

c. a plurality of ports in each enclosing means, the ports providing fluid communication through each enclosing means.

---

### 5,013,332
### MEMBRANES FORMED FROM RIGID POLYARYLATES

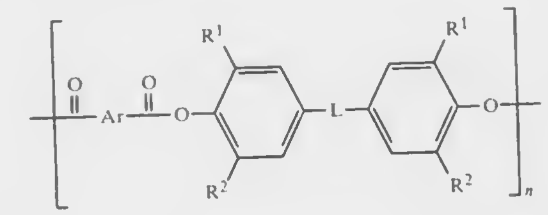
**Andrew D. Surnamer, Allentown, and Chao-Fong Tien, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed May 3, 1990, Ser. No. 518,400**

**Int. Cl.$^5$ B01D *53/22, 71/30***

**U.S. Cl. 55—16** **8 Claims**

1. A semi-permeable membrane formed from a polyarylate containing polymerizable units of the formula:



wherein Ar is a $C_1$–$C_{20}$ divalent hydrocarbon radical; $R^1$ and $R^2$ are independently halo or methyl substituents; n is an integer greater than 50; and L is a cyclohexyl moiety either substituted at the 4 position with a $C_4$–$C_{12}$ alkyl group or a $C_6$–$C_{20}$ aryl group, or diequitorally substituted at the 3, 5 positions with a $C_1$–$C_4$ alkyl group.

6. A process for separating a component of a gas mixture containing at least one other component, said process comprising: bringing said gas mixture into contact with the membrane of claim 1 which is selectively permeable toward one component of said gas mixture, whereby said component selectively permeates through said membrane from a feed side having a higher partial pressure of said component to a permeate side having a lower partial pressure of said component.

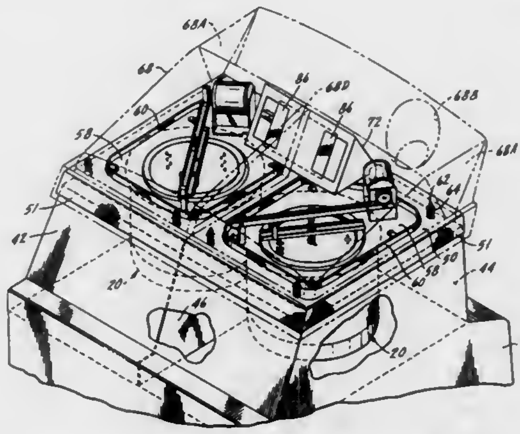
### 5,013,333
### UNATTENDED AIR CLEANING SYSTEM FOR SURFACE MAINTENANCE MACHINE

**Jeffrey J. Beaufoy, Prior Lake; Robert C. Aigner, Ham Lake, and Steven A. Burke, Champlin, all of Minn., assignors to Tennant Company, Minneapolis, Minn.**

**Filed Apr. 13, 1990, Ser. No. 508,559**

**Int. Cl.$^5$ B01D *46/04***

**U.S. Cl. 55—21** **20 Claims**



1. An unattended air cleaning system for use in a powered mobile surface maintenance machine having an air exhaust system for dust control, said unattended air cleaning system comprising:

a minimum of two air filters in the air exhaust system arranged such that part of the air stream normally flows through each filter,

valve means to selectively isolate each of the filters one at a time from the air stream, said valve means also being capable of readmitting airflow through each filter, means to shake or jolt each of the filters individually to remove accumulated dust from it,

means to sense the differential air pressure across at least one of the filters to determine when it is at a predetermined level,

control means to initiate and carry out an unattended filter cleaning cycle when the predetermined level of differential air pressure is determined,

said filter cleaning cycle comprising:

isolating a first filter from the air stream, then

shaking or jolting said first filter for a predetermined period of time, thereby cleaning it, while it is isolated from the air stream, meanwhile allowing the air stream to flow through the balance of the filters,

subsequently readmitting airflow through the first filter, and

subsequently dealing in the same way with each of the other filters in turn until all have been cleaned.

---

### 5,013,334
### METHANE PURIFICATION BY PRESSURE SWING ADSORPTION

**Richard T. Maurer, Nanuet, N.Y., assignor to UOP, Des Plaine050133784s, Ill.**

**Filed Jan. 9, 1990, Ser. No. 462,514**

**Int. Cl.$^5$ B01D *53/04***

**U.S. Cl. 55—26** **18 Claims**

1. A pressure swing adsorption process for the separation of ethane from a feedstream comprising mixtures thereof with methane, said process comprising:

(a) passing the feedstream at an upper adsorption pressure through an adsorption zone containing a zeolitic molecular sieve of the faujasite type having a framework $SiO_2/Al_2O_3$ molar ratio of from 2 to 100 and containing at least 20 equivalent percent of zinc cations and containing not more than 80 equivalent percent of alkali or alkaline earth metal cations or mixtures thereof, wherein ethane and methane are adsorbed and recovering an adsorption effluent stream enriched in methane relative to the feedstream;

(b) regenerating the adsorption zone by depressurizing the adsorption zone to a desorption pressure, said desorption pressure being lower than said adsorption pressure, and recovering a desorption effluent stream comprising ethane and methane; and

(c) repressurizing the adsorption zone to the adsorption pressure.

---

### 5,013,335
### PROCESS FOR SEQUESTERING AMMONIA AND THE ODOR ASSOCIATED THEREWITH

**Bonita K. Marcus, Rye, N.Y., assignor to UOP, Des Plaines, Ill. Continuation-in-part of Ser. No. 67,977, Jun. 30, 1987, Pat. No. 4,795,482. This application Sep. 22, 1988, Ser. No. 247,642**

**Int. Cl.$^5$ B01D *53/04***

**U.S. Cl. 55—70** **6 Claims**

1. Process for sequestering ammonia and the odor associated therewith from the environment which comprises contacting and adsorbing at a temperature of from −25° C. to 100° C. the ammonia with a crystalline siliceous molecular sieve which has been at least partially activated, has the faujasite crystal structure, has pore diameters large enough to adsorb ammonia, has a capacity for adsorbed water not greater than 10 weight percent when measured at 25° C. and a water vapor pressure of 4.6 torr and has a framework $SiO_2/Al_2O_3$ ratio of at least 50, said contacting and adsorbing of said ammonia being to a sufficient degree that residual concentration thereof over the adsorbent are below the detection threshold of the human sense of smell.

---

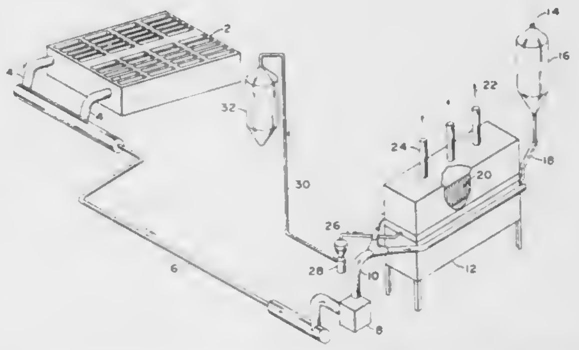
### 5,013,336
### METHOD AND APPARATUS FOR EMISSION CONTROL

**Timothy W. Kempf; Robert F. Corcoran, and Dennis C. Sikora, all of Newburgh, Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Nov. 3, 1989, Ser. No. 431,289**

**Int. Cl.$^5$ B01D *53/06***

**U.S. Cl. 55—71** **18 Claims**



1. A process for removing a substance from a gas comprising:

(a) fluidizing a bed of particles in a container;

(b) introducing a gas containing a substance into said bed;

(c) removing said substance through deposition on said particles;

(d) controlling temperatures in the container by injection coolant fluid through a coolant nozzle; and

(e) providing a pressure of coolant fluid and a pressure of a purge gas to said coolant nozzle such that interchangeable selection can be made between said coolant fluid and purge gas in a time period sufficiently short to control said temperatures and to reduce clogging or fouling on said coolant nozzle.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,337
## PROCESS FOR SEPARATING A MIXTURE OF MOLECULAR SPECIES USING CRYSTALLINE MICROPOROUS METAL SULFIDE COMPOSITIONS

**Robert L. Bedard, Fishkill; Lawrence D. Vail, Tappan; Stephen T. Wilson, Shrub Oak, and Edith M. Flanigen, White Plains, all of N.Y., assignors to UOP, Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 416,170, Oct. 2, 1989, Pat. No. 4,933,068, which is a continuation-in-part of Ser. No. 280,757, Dec. 6, 1988, Pat. No. 4,880,761. This application Apr. 12, 1990, Ser. No. 507,819**

**Int. Cl.$^5$ B01D** *53/04*

**U.S. Cl. 55—75** **4 Claims**

1. A process for separating a mixture of molecular species having different kinetic diameters comprising contacting the mixture, under adsorption separation conditions, having a three-dimensional microporous framework structure of $MA_2$ units, where A is sulfur or selenium having an intracrystalline pore system and having the empirical formula expressed in molar ratios: $xR{:}MA_{2\pm0.2}{:}zH_2O$ where R represents at least one organic templating agent present in the intracrystalline pore system, x has a value greater than 0 to about 1.0, and z has a value of about 0 to about 4.0 and M is germanium, tin, or a combination thereof, the crystalline composition having pore diameters large enough to adsorb at least one but not all the molecular species of said mixture, the crystalline composition being at least partially activated, whereby at least some molecules of the molecular species whose kinetic diameters are sufficiently small can enter the intracrystalline pore system of the crystalline composition.

---

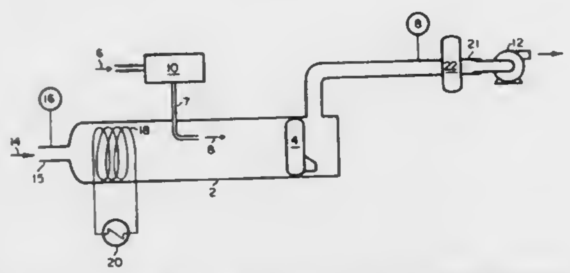
### 5,013,338
## PLASMA-ASSISTED POLYMERIZATION OF MONOMERS ONTO POLYMERS AND GAS SEPARATION MEMBRANES PRODUCED THEREBY

**Madhu Anand, Allentown; Christine A. Costello, Easton, and Keith D. Campbell, Slatington, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Sep. 1, 1989, Ser. No. 403,261**

**Int. Cl.$^5$ B01D** *53/22*

**U.S. Cl. 55—158** **12 Claims**



1. A composite of a rigid, glassy semi-permeable membrane produced by forming a substrate membrane from a silyl or germyl-containing polyacetylene polymer, exposing the substrate membrane to vapors of a monomer containing pendant nitrogen heterocycles for between 15 seconds and 15 minutes at a pressure from 0.025 to 0.5 torr such that said substrate sorbs monomer vapor, subsequently discontinuing the flow of monomer vapor and lighting a plasma with a carrier gas in the presence of said substrate at a power of from 33 to 300 watts and a pressure from 0.05 to 1 torr for 30 seconds to 2 hours, such that the monomer is plasma polymerized in-situ onto the surface of the substrate membrane.

---

### 5,013,339
## COMPOSITIONS USEFUL FOR MAKING MICROPOROUS POLYVINYLIDENE FLUORIDE MEMBRANES, AND PROCESS

**Robert D. Mahoney, Danville, and Richard A. Lundgard, Antioch, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 5, 1989, Ser. No. 446,027**

**Int. Cl.$^5$ B01D** *53/22, 71/34*

**U.S. Cl. 55—158** **28 Claims**

1. A microporous polyvinylidene fluoride polymer membrane useful in liquid separations comprising a microporous polyvinylidene fluoride polymer membrane containing at least one compound selected from the group consisting essentially of glycerol monoacetate, glycerol diacetate, glycerol triacetate, and mixtures thereof.

4. A water impervious, air permeable material comprising an air permeable substrate to which is bonded on the outer surface thereof a water impervious, air permeable polyvinylidene fluoride film.

---

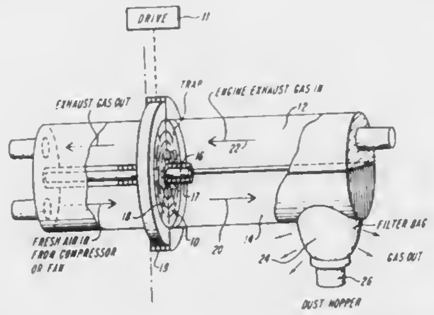
### 5,013,340
## ROTATING DIESEL PARTICULATE TRAP

**Mohammad E. Taslim, Needham, and Yiannis A. Levendis, Boston, both of Mass., assignors to Northeastern University, Boston, Mass.**

**Filed Jun. 29, 1989, Ser. No. 374,078**

**Int. Cl.$^5$ B01D** *46/38*

**U.S. Cl. 55—290** **10 Claims**



1. A rotating diesel engine particulate trap for a diesel engine, the diesel engine coupled to an exhaust duct for expelling hot combustion gases laden with particulates generated by the diesel engine comprising:

means for coupling the exhaust duct of the diesel engine to the rotating particulate trap;

means for providing gas flow substantially parallel and adjacent to the combustion gases flowing through the exhaust duct including a duct disposed parallel to the exhaust duct, and wherein said gas flow is counterflow to the combustion gases generated by the diesel engine;

filter element means for filtering particulates from the combustion gases flowing through the exhaust duct, said filter element means being disposed transversely to the combustion gases flowing through the exhaust duct and to said gas flow and operative for rotational movement with respect thereto;

means for effecting rotational movement of said filter element means;

wherein said rotational movement of said filter element means transversely to the combustion gases filters particulates therefrom, and

wherein said rotational movement of said filter element means transversely to said gas flow causes particulates collected in said filter element means to be expelled therefrom; and

receptacle means coupled to said gas flow providing means, downstream from said filter element means, for trapping particulates expelled from said filter element means.

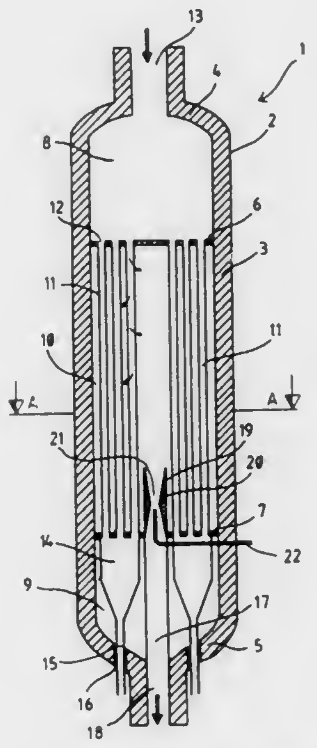
### 5,013,341
## APPARATUS FOR SEPARATING PARTICULATE MATERIAL FROM HIGH-TEMPERATURE GASES

**Juhani Isaksson, Karhula, Finland, and Dave B. Russell, San Diego, Calif., assignors to A. Ahlstrom Corporation, Finland**

**Continuation of Ser. No. 378,628, Jul. 12, 1989, abandoned. This application Aug. 29, 1990, Ser. No. 574,550**

**Int. Cl.$^5$ B01D** *46/04*

**U.S. Cl. 55—302** **20 Claims**



1. An apparatus for separating particulate material from a high-temperature gas, comprising:

a housing;

a pair of cross-sectional support plates having apertures therethrough and dividing said housing into a first end section, a second end section and at least one intermediate filtration chamber therebetween;

an inlet for gas containing entrained particulate material in said first end section;

a discharge port for separated particulate material in said second end section;

a plurality of open-ended hollow elongated gas-permeable filter elements in said filtration chamber affixed at both end portions to the apertures through the support plates, said filter elements having inlet openings in communication with said first end section, outlet openings in communication with said second end section and gas permeable side portions permitting gas to flow in a first direction from the hollow, space inside the filter elements through the gas permeable side portion into said filtration chamber;

a clean gas outlet conduit in communication with said filtration chamber, said gas permeable filter elements permitting gas to flow through said elements into said clean gas outlet conduit; and

means inside said housing for supplying a reverse flow pressure pulse of cleaning gas directly into said filtration chamber exteriorly of said filter elements and in a direction opposite said first direction for cleaning said filter elements.

---

### 5,013,342
## CENTRIFUGAL SEPARATOR AND GRANULAR FILTER UNIT

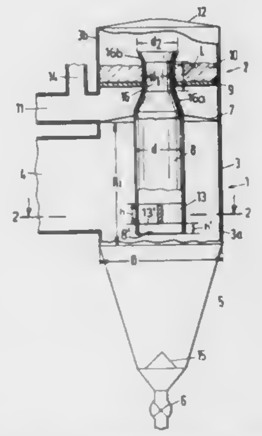
**Wilhelm Leussler, Frankfurt; Robert Würl, Nidderau, and Herbert Schlaffer, Kelsterbach, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 1, 1989, Ser. No. 444,889**

**Claims priority, application Fed. Rep. of Germany, Dec. 1, 1988, 3840510**

**Int. Cl.$^5$ B01D** *45/12;* **B04C** *9/00*

**U.S. Cl. 55—337** **20 Claims**



1. An apparatus for separating solid particles from a gas stream, said apparatus comprising:

a centrifugal separator for removing at least some of said solid particles from said gas stream, said centrifugal separator comprising:

a vertical cylindrical housing formed with a partition separating said housing into an upper part and a lower part of a height H,

a rectangular cross section gas inlet duct opening tangentially into said lower part and having a height equal substantially to 60% to 80% of said height H and a width equal substantially to 20% to 30% of said height H,

a conically downwardly converging dust-collecting bin disposed below said lower part with said lower part opening axially directly into said bin,

an outlet formed at a lower end of said bin for discharging solid particles collected from said gas stream from said bin,

a vertical gas outlet pipe disposed centrally in said housing and having a lower end opening in said lower part and an upper end opening in said upper part above said partition, and

gas-guiding means in said pipe and extending generally parallel to an axis thereof; and

a granular bed filter disposed above said centrifugal separator, receiving said gas stream from said centrifugal separator and discharging said gas stream from said apparatus, said granular bed filter comprising:

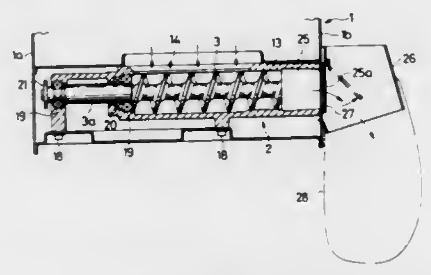
a grate extending across said upper part and traversed by said pipe with said upper end of said pipe opening into said upper part of said housing above an annular bed in a shape of a circular ring of filter granules surrounding said upper end of said pipe and supported on said grate, and

a gas outlet duct communicating with said upper part of said housing between said grate and said partition for discharging said gas stream, whereby said gas stream traverses said bed from top to bottom, said granular bed filter and said centrifugal separator forming a single structural unit.

VOL 1126
ISS 1
MY 7 1991
UMI

### 5,013,343
### DUST COLLECTOR

**Kouichi Miyamoto, Hiroshima, Japan, assignor to Ryobi, Ltd., Hiroshima, Japan**
**Filed May 28, 1987, Ser. No. 54,917**
**Claims priority, application Japan, May 28, 1986, 61-124308**
**Int. Cl.$^5$ B01D** *29/94*
**U.S. Cl. 55—395** **5 Claims**



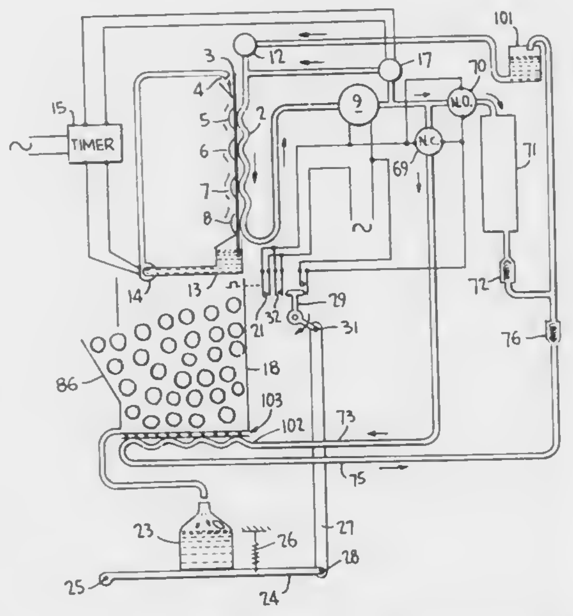
1. A dust collector comprising:
a dust collector casing connected to a dust collecting duct;
an electric motor for rotating a dust collecting fan to suck dust and waste material into said dust collector casing; and
a dust discharging section having dust compressing means comprising an extruding screw having an inlet end and an outlet end, and an extruding space having one end communicating with said outlet end of said extruding screw and an opposite end communicating with a discharge opening, said extruding screw being rotated by said motor to compress without stirring in said extruding space said sucked dust and waste materials and to discharge said compressed dust and waste material from said dust discharging section through said discharge opening, said dust discharging section further comprising a screw casing defining a screw space for accommodating said extruding screw, said screw space communicating with an inner-space, said extruding space forming a separate and distinct compression chamber located between said outlet end of said extruding screw and said discharge opening, wherein said dust compressing means further comprises a normally closed dust cover disposed at said opposite end of said extruding space so as to close said discharge opening and which is openable in an outward direction by said compressed dust and waste materials in said extruding space.

---

### 5,013,344
### ICEMAKER AND WATER PURIFIER WITH CONTROLLED CONDENSING TEMPERATURE

**John D. Ruff, Alexandria, Va., assignor to Thermadyne, Inc., Alexandria, Va.**
**Continuation-in-part of Ser. No. 278,447, Dec. 1, 1988, Pat. No. 4,897,099. This application Jan. 29, 1990, Ser. No. 471,885**
**The portion of the term of this patent subsequent to Jul. 17, 2007, has been disclaimed.**
**Int. Cl.$^5$ B01D** *9/04;* **C02F** *1/22*
**U.S. Cl. 62—532** **28 Claims**

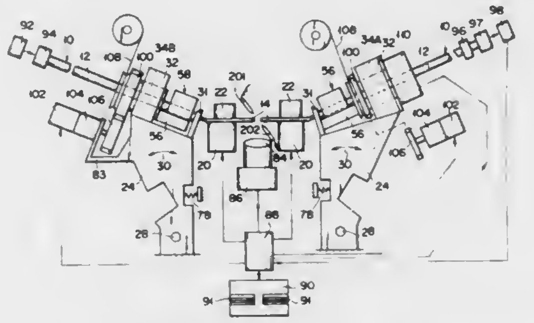
1. A method for providing a supply of purified ice and a supply of purified liquid water from a source of unpurified liquid water, said method comprising the steps of:
(a) cooling selected areas of at least one ice-forming surface to a temperature below the freezing temperature of water by conducting thermal energy to at least one evaporator passage from said selected areas of said ice-forming surface;
(b) directing a water stream of the unpurified liquid water over said selected areas to form ice at said selected areas while washing impurities away from the formed ice with said stream;
(c) increasing the temperature at said selected areas at various times to remove said ice from said ice-forming surface;
(d) collecting the ice removed in step (c) in a bin;
(e) warming a portion of said bin at selected times to melt some of the ice collected therein into purified liquid water;
(f) collecting in a container the purified liquid water obtained in step (e);
wherein said evaporator passage is part of a continuous refrigerant flow path for refrigerant fluid, said flow path including a compressor, condenser means, a metering device and the evaporator passage, and wherein step (a) includes energizing said compressor;
(g) sensing the amount of collected ice in said bin;
(h) sensing the amount of collected purified liquid water in said container;
(i) in response to both the amount of said collected ice in said bin exceeding a first predetermined amount, and the amount of said collected purified liquid water in said container exceeding a second predetermined amount, de-energizing said compressor;
(j) following step (i), re-energizing said compressor whenever either or both of the following occurs: (1) the amount of collected ice in said bin falls below the first predetermined amount; and (2) the amount of collected purified liquid water in said container falls below the second predetermined amount;



wherein said condenser means in said refrigerant flow path includes first and second condensers disposed in respcctive parallel and alternatively conductive first and second path sections, said second condenser being disposed at the underside of said bin to heat collected ice at the bottom of said bin;
(k) maintaining a suitably high condensing temperature of at least 60° F. in said second condenser while using the rejected heat from said second condenser to melt ice in said bin at a temperature of approximately 32° F.;
and wherein step (e) includes the steps of:
(e.1) in response to the amount of collected purified liquid in said container being less than said second predetermined amount, actuating said second path section to cause heated refrigerant fluid to flow through said second condenser; and
(e.2) in response to the amount of collected purified liquid in said container exceeding said second predetermined amount, actuating the first path section to cause refrigerant fluid to flow through said first condenser and thereby bypass said second condenser.

### 5,013,345
### METHOD OF FUSION-SPLICING POLARIZATION MAINTAINING OPTICAL FIBERS

**Kenichiroh Itoh, Sakura; Nikio Yoshinuma; Naomichi Suzuji, both of Yachiyo; Takeshi Yamada, and Hiroyuki Taya, both of Sakura, all of Japan, assignors to Fujikura Ltd., Tokyo, Japan**
**Filed Dec. 1, 1988, Ser. No. 278,602**
**Claims priority, application Japan, Dec. 4, 1987, 62-307192; Dec. 4, 1987, 62-307193; Mar. 7, 1988, 63-52799**
**Int. Cl.$^5$ C03E** *23/20*
**U.S. Cl. 65—4.2** **14 Claims**

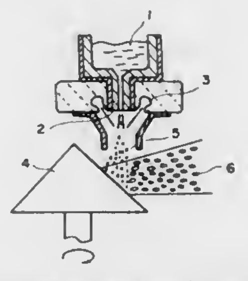


1. A method for fusion-splicing polarization maintaining optical fibers, comprising the steps of:
observing a polarization maintaining optical fiber containing stress applying members in a predetermined direction, using a core direct monitoring method to obtain a reference image;
setting a pair of polarization maintaining optical fibers to be fusion-spliced in a line;
rotating said pair of optical fibers in a circumferential direction thereof, while observing said pair of optical fibers by a core direct monitoring method, so that images of said pair of optical fibers coincide with said reference image said rotating step being automatically performed based on an automatic comparison of said images of said pair of optical fibers and said reference image.
and fusion splicing said fiber.

---

### 5,013,346
### METHOD OF MAKING ADDITIVE POWDERS FOR COATING MATERIALS OR PLASTICS

**Tsuyoshi Masumoto, 8-22, Uesugi 3-chome, Sendai-shi, Miyagi-ken; Akihisa Inoue, Sendai; Masahiro Oguchi, and Yoshio Harakawa, both of Tokyo, all of Japan, assignors to Teikoku Piston Ring Co., Ltd., Tokyo, Japan and Tsuyoshi Masumoto, Japan**
**Division of Ser. No. 261,972, Oct. 24, 1988, Pat. No. 4,891,068. This application Oct. 10, 1989, Ser. No. 419,153**
**Claims priority, application Japan, May 12, 1988, 63-115485; May 12, 1988, 63-115486; Jun. 17, 1988, 63-149450; Jun. 17, 1988, 63-149451; Jul. 22, 1988, 63-183098**
**Int. Cl.$^5$ C03B** *19/00;* **B22F** *9/08*
**U.S. Cl. 65—21.2** **24 Claims**

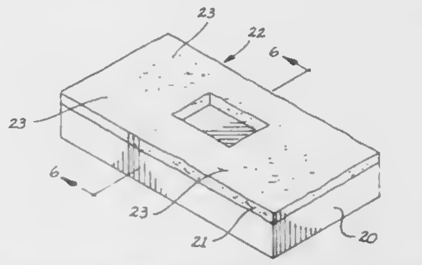


1. A method of preparing an additive powder for coating materials or plastics, comprising melting a metal or glass starting material, expelling the resulting melt to flow out from a nozzle and jetting a gas to the melt to form droplets of the melt, followed by cooling to effect solidification to form a powder, wherein a rotating cooling member having the shape of a cone or horn is provided in the direction of the flow of said droplets, and wherein said droplets of said melt are directed to contact an outer inclined surface of said rotating cooling member to cool and solidify said droplets.

---

### 5,013,347
### GLASS BONDING METHOD

**Chew E. Seng; Wee T. Hork, and Wong Y. Lee, all of Singapore, Singapore, assignors to Microelectronic Packaging Inc., Scottsdale, Ariz.**
**Filed Jun. 29, 1989, Ser. No. 373,285**
**Int. Cl.$^5$ C03C** *27/04*
**U.S. Cl. 65—43** **2 Claims**



1. A method of producing a sintered layer of a sealing glass on a ceramic structure used for packaging semiconductor integrated circuits or the like, said method comprising the steps of:
(a) providing said ceramic structure for being processed through a sealing glass paste composition printing and sintering deposition process;
(b) preparing at least two sealing glass paste compositions wherein a first of said at least two sealing glass paste compositions consists of a glass powder and a liquid vehicle containing a mixture of 93 wt % isotridecyl alcohol, 5 wt % diacetone acetate and 2 wt % acrylic resin and is characterized by having a glass-to-vehicle ratio range of 9:1 to 15:1, and wherein a second of said at least two sealing glass paste compositions consists of a glass powder and a liquid vehicle containing a mixture 93 wt % isotridecyl alcohol, 0 to ≡wt % acrylic resin with diacetone acetate being the remainder and is characterized by having a glass-to-vehicle ratio range of 8:1 to 12:1;
(c) printing said first of said compositions onto a surface of said ceramic structure;
(d) pressing while printing said second of said compositions onto said printed first composition;
(e) sintering said printed first and second compositions to produce a first layer of sintered sealing glass; and
(f) repeating steps (c), (d), and (e) according to a predetermined sealing glass thickness requirement.

---

### 5,013,348
### MOLD ASSEMBLY AND METHODS FOR PRODUCING MOLDED GLASS

**Shinichiro Hirota, Hachioji, Japan, assignor to Hoya Corporation, Tokyo, Japan**
**Filed Jul. 11, 1989, Ser. No. 378,376**
**Claims priority, application Japan, Jul. 13, 1988, 63-174071**
**Int. Cl.$^5$ C03B** *23/00*
**U.S. Cl. 65—102** **17 Claims**

1. A mold assembly for producing a thin molded glass article from a glass preform, comprising:
an upper mold having a circular molding surface having an outer diameter;
a lower mold having a circular molding surface having an outer diameter, said circular molding surface of said lower mold facing toward said circular molding surface of said

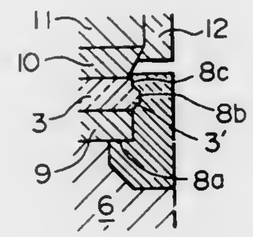
VOL
1126
ISS
1
MY
7
1991
UMI

upper mold, enabling the glass preform to be received therebetween;

at least one of said upper and lower molds being movable toward one another;

said circular molding surfaces of the respective upper and lower molds cooperating with each other, when the at least one of said upper and lower molds is moved toward the other, to clamp the glass preform received therebetween and press the glass preform into said molded glass article;

said lower mold having a maximum thickness at most equal to 1/10 of said outer diameter of said lower mold; and



a third mold for disposition between said upper and lower molds and having a bore including an upper portion having an inner diameter, an intermediate portion including an annular recess having an inner diameter at least about 50 μm greater than said inner diameter of said upper portion for receiving a portion of the glass preform in response to pressing thereof between said upper and lower molds thereby preventing said molded glass article from adhering to said molding surface of said upper mold, and a lower portion whose inner surface is formed with a shoulder for supporting said lower mold.

---

### 5,013,349
## SOIL CONDITIONER AND METHOD OF PRODUCING THE SAME

**Koji Tanaka, Okayama, Japan, assignor to Japan Exlan Company Limited, Osaka, Japan**

**Filed Aug. 17, 1983, Ser. No. 524,037**

**Claims priority, application Japan, Aug. 30, 1982, 57-151047**

**Int. Cl.$^5$ C05G** *3/04*

**U.S. Cl. 71—27** **14 Claims**

1. A soil conditioner composed of a powdery or granular material, in which a filler having a specific gravity more than 1.5 and a particle diameter less than 1 mm is uniformly distributed within and integrally included in a hydrogel, and which soil conditioner has a specific gravity more than 1.3, said soil conditioner being prepared by uniformly mixing an aqueous solution of a cross-linkable hydrophilic polymer and a filler having a specific gravity more than 1.5 and a particle diameter less than 1 mm; drying the mixture after cross-linking or simultaneously with cross-linking, or cross-linking after drying; pulverizing the mixture to form a powdery or granular product having a specific gravity more than 1.3, whereby said cross-linked hydrophilic polymer forms a hydrogel with the filler materials distributed within said hydrogel.

---

### 5,013,350
## STABILIZED THIOCARBONATE SOLUTIONS

**James A. Green, Chino, and Donald C. Young, Fullerton, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 490,461, May 2, 1983, abandoned, which is a continuation-in-part of Ser. No. 315,492, Oct. 27, 1981, Pat. No. 4,476,113. This application May 29, 1987, Ser. No. 55,923**

**Int. Cl.$^5$ A01N** *59/02, 47/28*

**U.S. Cl. 71—65** **22 Claims**

1. An aqueous solution comprising (1) a thiocarbonate selected from the group consisting of alkali and alkaline earth metal thiocarbonates, and combinations thereof dissolved in a quantity of water, and (2) an amount of urea, dissolved in said solution, greater than the solubility limit of urea in said quantity of water.

---

### 5,013,351
## TRIAZOLO-PYRIMIDINE-2-SULPHONAMIDES USEFUL AS HERBICIDES

**Klaus Jelich, Wuppertal; Wolfgang Krämer, Burscheld; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

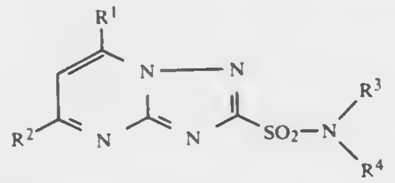
**Continuation-in-part of Ser. No. 117,257, Nov. 5, 1987, abandoned. This application Apr. 7, 1989, Ser. No. 335,002**

**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1986, 3640155**

**Int. Cl.$^5$ C07D** *487/04;* **A61K** *31/14*

**U.S. Cl. 71—92** **10 Claims**

1. A triazolo-pyrimidine-2-sulphonamide of the formula



in which
$R^1$ represents $—CH_2—O—R^5$, and at the same time
$R^2$ represents straight-chain or branched alkyl with 1 to 6 carbon atoms, or
$R^2$ represents $—CH_2—O—R^5$, and at the same time
$R^1$ represents straight-chain or branched alkyl with 1 to 6 carbon atoms,
wherein
$R^5$ in both cases represents straight-chain or branched alkyl with 1 to 6 carbon atoms,
$R^3$ represents hydrogen, or represents in each case straight-chain or branched alkyl, alkylcarbonyl, alkoxycarbonyl or alkylsulphonyl with in each case 1 to 4 carbon atoms in the individual alkyl parts, or represents in each case straight-chain or branched alkenyl or alkinyl with in each case 3 to 6 carbon atoms, or represents aralkyl which has 1 to 4 carbon atoms in the alkyl part and 6 to 10 carbon atoms in the aryl part and is straight-chain or branched in the alkyl part and optionally monosubstituted or polysubstituted by identical or different substituents in the aryl part said substituents being fluorine, chlorine, bromine, iodine, cyano, nitro, hydroxyl and in each case straight-chain or branched alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy and halogenoalkylthio with in each case 1 to 4 carbon atoms and if appropriate 1 to 9 identical or different halogen atoms, and
$R^4$ represents aryl which has 6 to 10 carbon atoms and is optionally monosubstituted or polysubstituted by identical or different substituents, or represents a 5— to 7—membered heterocyclic radical which has 1 to 3 hetero atoms, said hetero atoms being nitrogen, oxygen and/or sulphur, and is optionally monosubstituted or polysubstituted by identical or different substituents and/or benzo-fused, said substituents in each case being fluorine, chlorine, bromine, iodine, cyano, nitro, hydroxyl, in each case straight-chain or branched alkyl, alkoxy, alkylthio, alkylcarbonyl, alkylsulphinyl and alkylsulphonyl with in each case 1 to 6 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl, halogenoalkylsulphonyl, halogenoalkylcarbonyl or halogenoalkoxycarbonyl with in each case 1 to 6 carbon atoms and 1 to 9 identical or different halogen atoms, phenyl, phenoxy, phenylthio, phenylcarbonyl, hydroxycarbonyl, in each case straight-chain or branched alkoxycarbonyl, alkenyloxycarbonyl and alkoxy-alkoxycarbonyl with in each case 1 to 6 carbon atoms in the individual alkyl parts and 3 to 6 carbon atoms in the alkenyl part, and hydroximinoalkyl and straight-chain or branched alkoximinoalkyl with in each case 1 to 4 carbon atoms in the individual alkyl parts.

---

### 5,013,352
## SUBSTITUTED PYRIDYL-CYCLOHEXANEDIONES AND THEIR HERBICIDAL USES

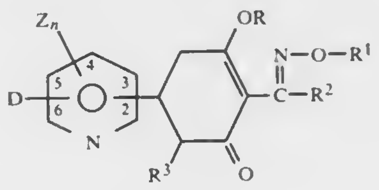
**Lowell D. Markley; Christopher T. Hamilton, both of Midland, Mich.; Beth A. Swisher, Fairfield, Calif., and Jacob Secor, Midland, Mich., assignors to DowElanco, Indianapolis, Ind.**

**Filed Mar. 30, 1990, Ser. No. 503,201**

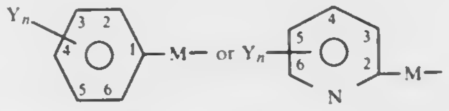
**Int. Cl.$^5$ C07D** *401/00, 213/62, 213/69;* **A01N** *43/40*

**U.S. Cl. 71—94** **27 Claims**

1. A substituted cyclohexanedione compound corresponding to the formula

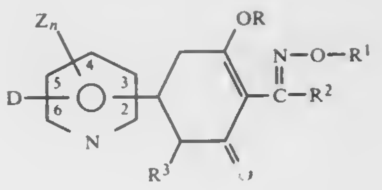


wherein
D is a group corresponding to one of the formulae,

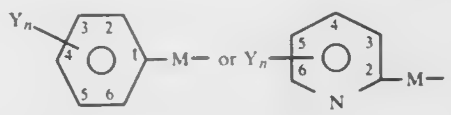


R represents hydrogen, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ haloalkyl, $C_2$-$C_4$ alkenyl, $C_3$-$C_4$ alkynyl, $C_1$-$C_4$ alkylsulfonyl, phenylsulfonyl or acyl;
$R^1$ represents $C_1$-$C_4$ alkyl, $C_1$-$C_4$ haloalkyl, $C_2$-$C_4$ alkenyl, $C_2$-$C_4$ haloalkenyl, $C_3$-$C_4$ alkynyl, or $C_3$-$C_4$ haloalkynyl:
$R_2$ represents $C_1$-$C_4$ alkyl, $C_1$-$C_4$ fluoroalkyl, $C_1$-$C_4$ alkylthiomethyl, $C_1$-$C_4$ alkoxymethyl, $C_2$-$C_4$ alkenyl or $C_3$-$C_4$ alkynyl;
$R^3$ represents hydrogen, $C_1$-$C_4$ alkyl or $C_1$-$C_4$ alkoxycarbonyl;
each Z independently represents hydrogen, halo, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ alkoxy or $—CF_3$;
M represents $=O$, $=S$, $=S(O\ )$ or $=S(O)_2$;
Y represents hydrogen, halo, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ alkoxy, $C_1$-$C_4$ alkylthio, $C_1$-$C_4$ alkylsulfinyl or $C_1$-$C_4$ alkylsulfonyl or $—CF_3$, with the proviso that when M is $=S(O)$, Y cannot be $C_1$-$C_4$ alkylthio and when M is $=S(O)_2$, Y cannot be $C_1$-$C_4$ alkylthio or $C_1$-$C_4$ alkylsulfinyl: and
n represents the integer 1, 2 or 3;
or a herbicidally acceptable organic or inorganic salt thereof.

19. A method for the kill or control of grassy weeds which comprises contacting said weeds or their habitat with a herbicidally effective amount of a composition which comprises an inert carrier in intimate admixture with a herbicidally active ingredient which is a substituted cyclohexanedione compound corresponding to the formula



wherein
D is a group corresponding to one of the formulae,



R represents hydrogen, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ haloalkyl, $C_2$-$C_4$ alkenyl, $C_3$-$C_4$ alkynyl, $C_1$-$C_4$ alkylsulfonyl, phenylsulfonyl or acyl:
$R_1$ represents $C_1$-$C_4$ alkyl, $C_1$-$C_4$ haloalkyl, $C_2$-$C_4$ alkenyl, $C_2$-$C_4$haloalkenyl, $C_3$-$C_4$ alkynyl, or $C_3$-$C_4$ haloalkynyl:
$R^2$ represents $C_1$-$C_4$ alkyl, $C_1$-$C_4$ fluoroalkyl, $C_1$-$C_4$ alkylthiomethyl, $C_1$-$C_4$ alkoxymethyl, $C_2$-$C_4$ alkenyl or $C_3$-$C_4$ alkynyl:
$R^3$ represents hydrogen, $C_1$-$C_4$ alkyl or $C_1$-$C_4$ alkoxycarbonyl:
each Z independently represents hydrogen, halo, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ alkoxy or $—CF_3$
M represents $=O$, $=S$, $=S(O)$ or $=S(O)_2$;
Y represents hydrogen, halo, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ alkoxy, $C_1$-$C_4$ alkylthio, $C_1$-$C_4$ alkylsulfinyl or $C_1$-$C_4$ alkylsulfonyl or $—CH_3$, with the proviso that when M is $=S(O)$, cannot be $C_1$-$C_4$ alkylthio and when M is $=S(O)_2$, Y cannot be $C_1$-$C_4$ alkylthio or $C_1$-$C_4$ alkylsulfinyl; and
n represents the integer 1, 2 or 3;
and the herbicidally acceptable organic and inorganic salts thereof.

---

### 5,013,353
## HERBICIDAL METHOD USING DIFLUFENICAN

**Richard H. Hewett, Thaxted, and Ponnan Veerasekaran, Ongar, both of England, assignors to May & Baker Limited, Dagenham, United Kingdom**

**Division of Ser. No. 881,006, Jul. 1, 1986. This application Jun. 14, 1990, Ser. No. 537,944**

**Claims priority, application United Kingdom, Jul. 2, 1985, 8516764; Oct. 30, 1985, 8526733**

**Int. Cl.$^5$ A01N** *43/40, 47/28,* **B65D** *79/00*

**U.S. Cl. 71—94** **4 Claims**

1. A packaged product comprising an effective amount of
(a) at least one urea herbicide of the general formula

$$R^1N(R^2)CON(R^3)R^4 \qquad 1$$

wherein $R^2$ represents a hydrogen atom;
$R^3$ represents a methyl group;
$R^1$ represents a 3-chloro-4-methylpheny or 4-isopropylphenyl group and $R^4$ represents methyl group, or $R^1$ represents a 3,4-dichlorophenyl group and $R^4$ represents a methyl, methoxy or butyl group; and
(b) diflufenican,
in which the packed ratio of (a) to (b) ranges from 400:1 to 1:5 by weight and the components (a) and (b) are capable of controlling the growth of weeds at a locus.

VOL
1126
ISS
1
MY
7
1991
UMI

**5,013,354**

## 3-PHENYLPROPIONIC ACID DERIVATIVES

**Barbara Schwalge, Ludwigshafen; Peter Plath, Frankenthal; Karl Eicken, Wachenheim; Norbert Meyer, Ladenburg, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

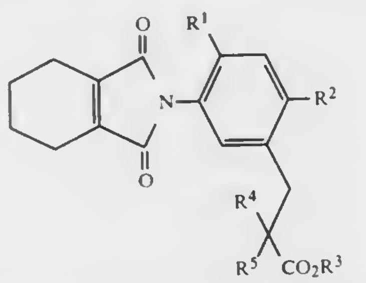
**Filed Jal. 11, 1988, Ser. No. 217,167**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724395**

**Int. Cl.$^5$ C07D** *209/48;* **A01N** *43/38*

U.S. Cl. 71—95 6 Claims

1. 3-Phenylpropionic acid compounds of the formula I:



I

wherein $R^1$ is hydrogen or halogen; $R^2$ is halogen; $R^3$ is $C_2$-$C_6$-alkyl which is substituted by $C_1$-$C_4$-alkoxy or $C_1$-$C_4$-alkylthio; $C_1$-$C_6$-alkyl or $C_1$-$C_6$-alkyl which is substituted by $C_5$-$C_7$-cycloalkyl; $C_5$-$C_7$-cycloalkyl; $C_3$-$C_6$-alkenyl or $C_3$-$C_6$-alkynyl or, $R^3$ together with $R^4$, is $C_2$-$C_4$-alkylene $R^4$ is $C_1$-$C_4$-alkoxy, $C_1$-$C_4$-alkylthio, $C_5$-$C_7$-cycloalkyl-substituted $C_1$-$C_6$-alkyl, -$C_7$-cycloalkyl, $C_3$-$C_6$-alkenyl or halogen-substituted $C_3$-$C_6$-alkenyl or $C_3$-$C_6$-alkynyl, or $R^4$, together with $R^5$, is $C_3$-$C_6$-cycloalkyl which is uninterrupted or interrupted by an oxygen or sulfur atom; and $R^5$ is $C_1$-$C_4$-alkoxy or $C_1$-$C_4$-alkylthio-substituted $C_2$-$C_6$-alkyl; cyano or acyl or the formula $COR^6$ or alkoxycarbonyl of the formula $CO_2R^7$, wherein $R^6$ is $C_1$-$C_6$-alkyl or, together with $R^4$, a $C_3$-$C_5$-alkylene chain and $R^7$ is $C_2$-$C_6$-alkyl which is unsubstituted or substituted by halogen, $C_1$-$C_4$-alkoxy or $C_1$-$C_4$-alkylthio-substituted $C_2$-$C_6$ alkyl or $C_1$-$C_6$-alkyl or $C_5$-$C_7$-cycloalkyl-substituted $C_1$-$C_6$-alkyl or $C_5$-$C_7$-cycloalkyl, $C_3$-$C_6$-alkenyl or $C_3$-$C_6$-alkynyl, with the proviso that $R^1$ and $R^4$ are not simultaneously hydrogen when $R^5$ is cyano or $CO_2R^7$.

---

**5,013,355**

## METHOD AND APPARATUS FOR PRODUCING MATTE AND/OR METAL

**Hans I. Elvander, Helsingborg, and Rolf E. Malmström, Helsingfors, both of Sweden, assignors to A. Ahlstrom Corporation, Noormarkku, Finland**

**Filed Mar. 15, 1989, Ser. No. 323,708**

**Claims priority, application Finland, Mar. 30, 1988, 881486**

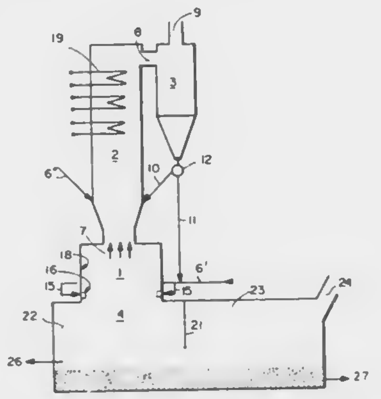
**Int. Cl.$^5$ C22B** *5/14, 5/08*

U.S. Cl. 75—23 12 Claims

1. A method for producing matte and/or metals from sulphidic fine-grained ore or ore concentrate utilizing a gas cooler comprising a fluidized bed reactor having a bottom which is open to a flame chamber having walls, a collecting means adjacent the bottom of the flame chamber, and a particle separator connected to the fluidized bed materials, the method comprising the steps of:

(a) blowing the ore or ore concentrate into the flame chamber, together with an oxidizing agent so as to cause sulfur and readily oxidizing metals in the ore or ore concentrate to oxidize thereby generating $SO_2$-containing gases, freeing energy and causing at least part of the ore or ore concentrate in the flame chamber to melt into molten particles, be separated on the walls of the flame chamber and flow downwardly to the collecting means;

(b) conducting the $SO_2$-containing gases formed in the flame chamber upwardly to the gas cooler fluidized bed reactor and introducing the gases as fluidizing gases in the fluidized bed reactor, rapidly cooling the gases and particles of ore or ore concentrate and molten particles entrained by the gases in the fluidized bed;



(c) separating the cooled particles from the gases in the particle separator; and

(d) recirculating at least part of the separated particles to the fluidized bed.

---

**5,013,356**

## PROCESS FOR THE PROCESSING OF SLAG FROM ALUMINIUM SCRAP AND WASTE MELTING, RECOVERY OF COMPONENTS THEREOF AND TREATMENT OF GASSES GENERATED

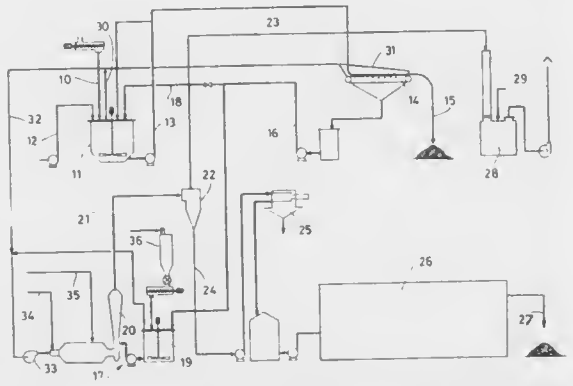
**Marco Olper, Monza; Tullio Corsini, Sesto Calende, and Pierluigi Fracchia, Milan, all of Italy, assignors to Engitec Impianti S.p.A., Milan, Italy**

**Filed Jan. 16, 1990, Ser. No. 465,777**

**Claims priority, application Italy, Jan. 18, 1989, 19118 A/89**

**Int. Cl.$^5$ C22B** *7/04*

U.S. Cl. 75—586 5 Claims



1. Process for the recovery and treatment of gases and saline solution that are produced during the processing of saline slag, which results from the melting of aluminum scrap or waste with flux containing alkaline chlorides, comprising the steps of leaching the saline slag with water thereby to produce numerous gases and a saline solution containing chlorides, filtering and concentrating the saline solution produced by said leaching step for recovery of the chlorides therein, adding a supporting fuel to the numerous gases which are produced during said leaching step, and burning said gases after the addition thereto of said supporting fuel thereby to produce heat and hot combustion gases.

**5,013,357**

## DIRECT PRODUCTION OF NIOBIUM TITANIUM ALLOY DURING NIOBIUM REDUCTION

**Samuel A. Worcester, and Patti L. Case, both of Ogden, Utah, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 26, 1989, Ser. No. 426,840**

**Int. Cl.$^5$ C22B** *34/00*

**U.S. Cl. 75—622 16 Claims**

1. A process for the direct production of a superconductive niobium-titanium alloy during reduction of niobium pentoxide, comprising mixing at least one of titanium metal powder and titanium dioxide powder with niobium pentoxide powder and aluminum powder; heating the resulting mixture to form a niobium-titanium alloy and a slag consisting essentially of aluminum oxide; and separating said alloy and said slag.

---

**5,013,358**

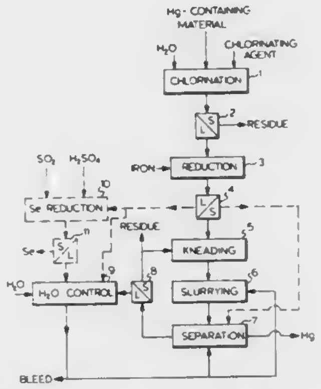
## METHOD FOR THE RECOVERY OF MERCURY FROM MERCURY-CONTAINING MATERIAL

**Donald L. Ball, Castlegar, and Daniel A. D. Boateng, Montrose, both of Canada, assignors to Cominco Ltd., Vancouver, Canada**

**Filed Aug. 28, 1989, Ser. No. 399,140**

**Int. Cl.$^5$ C22B** *43/00*

U.S. Cl. 75—742 11 Claims



1. A method for the recovery of mercury from mercury-containing material in the form of sludges, wastes, residues, process streams and effluents and containing a water insoluble form of mercury, which method comprises the steps of: forming an aqueous slurry of said material; chlorinating said slurry by the addition to said slurry of a chlorinating agent capable of converting said water-insoluble form of mercury to mercuric chloride, and to form a dissolved mercury-containing chlorination solution and a chlorination residue, the addition of said chlorinating agent being continued until the oxidation reduction potential of the slurry in the chlorination has a value in the range of about 1100 to 1200 mV (Pt: Ag/AgCl); separating chlorination solution from chlorination residue; treating separated chlorination solution with an amount of iron in a reduction to reduce dissolved mercury to elemental mercury, to form reduced solution, and to form reduction solids containing said elemental mercury; separating reduced solution from reduction solids; slurrying the separated reduction solids with aqueous solution to form an elemental mercury-containing slurry; feeding said elemental mercury-containing slurry to a separator capable of separating elemental mercury from said slurry; and recovering separated elemental mercury.

---

**5,013,359**

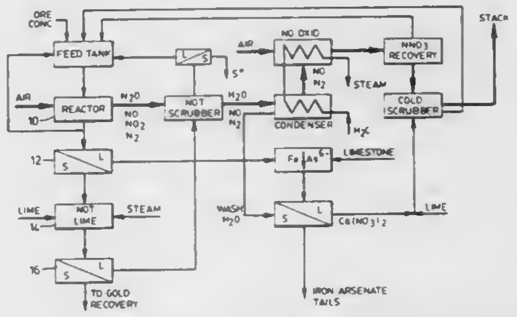
## PROCESS FOR RECOVERING GOLD FROM REFRACTORY SULFIDIC ORES

**Kenneth J. Fair, Willowdale; Gezinus Van Weert, Caledon East, and John C. Schneider, Acton, all of Canada, assignors to Hydrochem Developments Ltd., Brampton, Ontario, Canada**

**Filed Oct. 31, 1988, Ser. No. 264,790**

**Int. Cl.$^5$ C22B** *11/00;* **B03D** *1/00*

**U.S. Cl. 75—744 15 Claims**



1. A process for recovering gold from a refractory sulfidic ore which has been suspended in an aqueous slurry and oxidized using nitric acid so that substantially all of the gold in the ore is made available for recovery and at least a portion of sulfidic components present during the oxidation are oxidized to elemental sulfur, comprising:

bubbling a process compatible gas as a discontinuous phase upwardly through the oxidized slurry which is strongly acidic and without conditioning the oxidized slurry, thereby creating a froth containing elemental sulfur and gold;

separating the froth from the slurry to provide a concentrate;

and recovering gold from the concentrate.

---

**5,013,360**

## SEALING GLASS COMPOSITIONS

**Leo Finkelstein, San Francisco; Maurice E. Dumesnil, Los Altos Hills, and Richard R. Tetschlag, San Jose, all of Calif., assignors to VLSI Packaging Materials, Inc., Sunnyvale, Calif.**

**Filed Sep. 5, 1989, Ser. No. 407,470**

**Int. Cl.$^5$ C03C** *3/12, 3/21, 8/24, 14/00*

**U.S. Cl. 106—1.23 45 Claims**

1. A low-melting glass composition comprising, in weight percent calculated on an oxide basis:

(a) PbO: 35-50%

(b) $V_2O_5$: 35-50%

(c) $Bi_2O_3$: 0.1-6%

(d) $P_2O_5$, $Nb_2O_5$, $Ta_2O_5$, or combinations thereof: 0.1-8%

(e) ZnO, MgO, CaO, BaO, SrO, or combinations thereof: 0.1-5%

(f) $TiO_2$, $ZrO_2$, or combinations thereof: 0.1-5%

wherein the combined weight percent of (c)+(d)+(e)+(f) is in the range of 0.4-24%.

---

**5,013,361**

## BALL-POINT WRITING INSTRUMENT CONTAINING AN AQUEOUS INK COMPOSITION

**Laura K. Case, deceased, late of Winchester by Leslie C. Case, executor ; Chandrasen Gajria, Hingham; Rachel M. Loftin, Halifax, and Henry Peper, Marblehead, all of Mass., assignors to The Gillette Company, Boston, Mass.**

**Continuation-in-part of Ser. No. 809,174, Dec. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 693,930, Jan. 23, 1985, Pat. No. 4,671,691. This application Nov. 23, 1987, Ser. No. 123,827**

**Int. Cl.$^5$ C09D** *11/00*

**U.S. Cl. 106—22 37 Claims**

1. A shear-thinning ink composition which does not undergo

VOL
1126
ISS
1
MY
7
1991
UMI

a significant change in viscosity in response to temperature and which consists essentially of:

(a) from about 50 to about 99 percent by weight of the total composition weight of a polar solvent system including at least about 50 percent by weight water,
(b) colorant material, and
(c) from about 0.7 to about 6 percent by weight of the total composition weight of a water-dispersible, polymeric shear-thinning material said ink composition having a shear-thinning index of from 0.01 to 0.6, a viscosity of 50 cPs of greater at a shear rate of 30 $\sec^{-1}$ and a viscosity of 100 cPs or less at shear rates produced by writing.

---

5,013,362

### FLUORINE-FREE SUPEROPAQUE ENAMEL FRITS

**Werner Joseph, Cologne, and Hans-Joachim Schittenhelm, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany**

**Continuation of Ser. No. 230,308, Aug. 9, 1988, abandoned. This application Apr. 23, 1990, Ser. No. 512,565**

**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1987, 3727644**

**Int. Cl.$^5$ C03C** *8/00*

**U.S. Cl. 501—24** **10 Claims**

1. Fluorine-free, opaque titanium white enamel frits having improved covering power for enamelling steel consisting essentially of:

35 to 45 parts by weight of $SiO_2$, $ZrO_2$ or a mixture thereof,
18 to 22 parts by weight of $TiO_2$,
18 to 22 parts by weight of $B_2O_3$, $Al_2O_3$ or a mixture thereof,
15 to 18 parts by weight of a mixture of lithium, sodium and potassium oxides,
2.5 to 4.5 parts by weight of $P_2O_5$, and
0.8 to 1.4 parts by weight of magnesium oxide,

with the proviso that the ratio of atomic numbers is as follows:

$(A+2B)$ to C is $0.9\pm0.05$,
(lithium+0.5 magnesium) to phosphorus is $1\pm0.1$, and sodium to potassium is 1.2 to 2.6,

wherein A is the sum of monovalent atoms, B is the sum of divalent atoms and C is the sum of trivalent atoms.

---

5,013,363

### MOLD FOR THE CASTING OF GLASS CERAMIC

**Yasuharu Hakamatsuka, and Kazuhiro Watanabe, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Jan. 29, 1990, Ser. No. 471,840**

**Claims priority, application Japan, Feb. 6, 1989, 1-27155**

**Int. Cl.$^5$ B28B** *7/34*

**U.S. Cl. 106—38.3** **11 Claims**

1. A mold for the casting of glass ceramics, said mold being made of a phosphate system mold material consisting essentially of refractory materials containing cristobalite and quartz; and binders containing metal oxides and a phosphate, wherein the weight ratio of said refractory materials to said binders is 80:20 to 90:10, said metal oxides contained in said binders consisting essentially of magnesia clinker and hard-baked magnesia and said phosphate is aluminum dihydrogen phosphate.

---

5,013,364

### STABILIZED 1,1,1-TRICHLOROETHANE

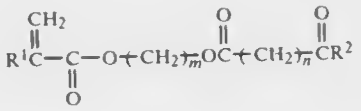
**Felipe A. Donate, Midland, and James G. Papajesk, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Nov. 3, 1989, Ser. No. 431,273**

**Int. Cl.$^5$ C08K** *5/04;* **C09K** *15/06;* **C11D** *7/50*

**U.S. Cl. 106—311** **10 Claims**

1. A composition comprising 1,1,1-trichloroethane containing a stabilizing amount of a compound corresponding to the formula



$$R^1\overset{\overset{CH_2}{\|}}{C}-\underset{\underset{O}{\|}}{C}-O\!\left(CH_2\right)_m\!\overset{\overset{O}{\|}}{OC}\!\left(CH_2\right)_n\!\overset{\overset{O}{\|}}{C}R^2$$

wherein $R^1$ is hydrogen, methyl or ethyl; m is from about 2 to about 4; n is from about 1 to about 6 and $R^2$ is methyl or ethyl.

---

5,013,365

### IRON OXIDE BLACK PIGMENTS, PROCESSES FOR THEIR PREPARATION AND THEIR USE

**Jakob Rademachers; Wolfgang Bockelmann; Wilfried Burow, and Kurt Schäfer, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 23, 1990, Ser. No. 497,923**

**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1989, 3910783**

**Int. Cl.$^5$ C09C** *1/22*

**U.S. Cl. 106—456** **12 Claims**

1. A process for the preparation of iron oxide black pigments obtained by the nitrobenzene reduction process, the process characterised in that the iron oxide black is heated in a final stage at temperatures from 400° to 800° C. in an oxidising atmosphere containing from 0.1 to 3% by volume of oxygen.

---

5,013,366

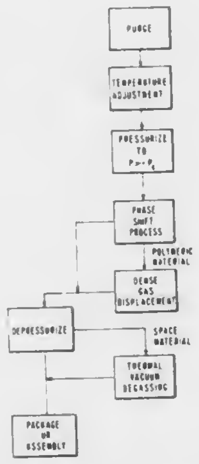
### CLEANING PROCESS USING PHASE SHIFTING OF DENSE PHASE GASES

**David P. Jackson, Saugus, and Orval F. Buck, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 7, 1988, Ser. No. 287,207**

**Int. Cl.$^5$ B08B** *3/08, 3/12*

**U.S. Cl. 134—1** **36 Claims**



1. A process for removing two or more contaminants from a chosen substrate comprising the steps of:

(a) placing said substrate containing said contaminants in a cleaning vessel;
(b) contacting said substrate containing said contaminants with a chosen dense phase gas at a pressure equal to or above the critical pressure of said dense phase gas; and
(c) shifting the phase of said dense phase gas between the liquid state and the supercritical state by varying the temperature of said dense phase gas in a series of steps between a temperature above the critical temperature of said dense phase gas and a temperature below said critical temperature, maintaining said temperature at the completion of each said step for a period of time sufficient to remove one or more of said contaminants, and maintaining contact between said dense phase gas and said substrate containing said contaminants for said period of time at each said step wherein a solvent spectrum of said dense phase gas is provided to thereby remove said two or more contaminants from said substrate.

---

5,013,367

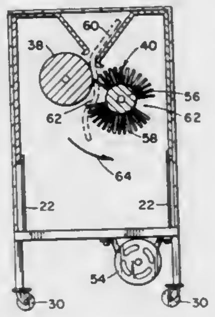
### RUG CLEANING APPARATUS

**James N. Butts, 416 Ferncreek Ave. N., Orlando, Fla. 32803**

**Filed Jan. 22, 1990, Ser. No. 467,934**

**Int. Cl.$^5$ B08B** *1/04, 7/02*

**U.S. Cl. 134—9** **11 Claims**



1. A dry rug cleaning apparatus for carpet type rugs comprising a housing having a front wall, a back wall, a top, and a pair of opposite end walls, an opening being formed in the top for allowing insertion of a rug into the apparatus, a driven roller brush being mounted in the apparatus and extending from one to another of the pair of end walls, the roller brush having bristles extending therefrom for brushing against a nap surface of a rug inserted into the apparatus, at least a portion of the bristles being removed from the roller brush such that during at least a predetermined portion of rotation of the roller brush a portion of the rug nap surface is not in contact with brush bristles, and means attached to the apparatus and positioned adjacent the driven roller for urging the rug nap surface into contact with the roller brush for brushing debris from the rug and for effecting vibration of the rug by repeated contact and lost of contact between the rug nap surface and bristles on the rug.

---

5,013,368

### METHOD AND DEVICE FOR CLEANING A TUBE IN WHICH A FLUID-CIRCULATES, AND THEIR USE IN HEAT-EXCHANGER TUBES

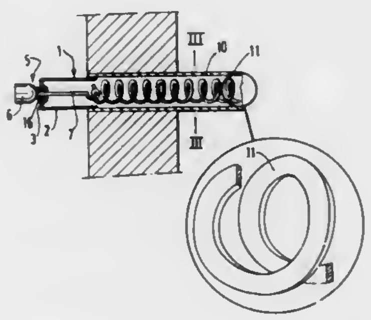
**Pierre Maroy, Versailles; Thierry Patureaux, Montivilliers; David Freychet, and Roben Loutaty, both of Le Havre, all of France, assignors to Compagnie de Raffinage et de Distribution Total France, Levallois-Perret, France**

**Filed Nov. 20, 1989, Ser. No. 439,088**

**Claims priority, application France, Nov. 18, 1988, 88 14996**

**Int. Cl.$^5$ B08B** *9/02*

**U.S. Cl. 134—22.11** **17 Claims**



2. A device for the continuous cleaning of a tube in which a fluid circulates, comprising a movable element of such shape that it can be driven in rotation by the fluid and having at least one sharp edge formed of two faces meeting at an angle no greater than an acute angle along an extended length of the movable element, designed to scrape the inner surface of the tube, this edge being disposed so that during the rotation of the movable element it is, along every cross section of the tube, the portion of the movable element farthest removed from the axis of the tube, and a mechanical linkage permitting one end of the movable element to be fastened to one end of the tube while allowing said movable element to rotate freely on itself about the axis of the tube.

11. A device as defined in claim 2, wherein said movable element has a cross section that has the form of an arc of a circle.

---

5,013,369

### METHOD OF CLEANING BOTTOM OF FEEDING CHANNEL FOR FISH AND APPARATUS THEREOF

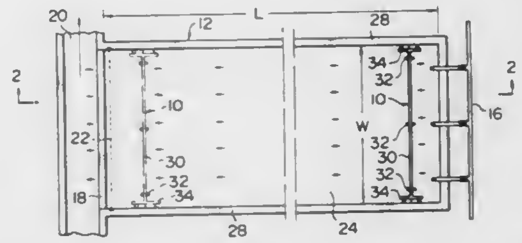
**Hiroshi Kato, 1268-1, Tate-machi, Hachiouji-shi, Tokyo, Japan**

**Continuation of Ser. No. 943,074, Dec. 18, 1986, abandoned. This application Aug. 2, 1989, Ser. No. 390,444**

**Claims priority, application Japan, Dec. 18, 1985, 60-285305**

**Int. Cl.$^5$ B08B** *3/02*

**U.S. Cl. 134—24** **7 Claims**



1. A method of cleaning a bottom of a feeding channel comprising the following steps:

supplying a feeding channel with a flow of water which flows from an upstream end to a downstream end of said feeding channel;
positioning a baffle having a blade-like structure extending substantially vertically and across a portion of said feeding channel orthogonally with respect to the flow of water, said baffle being movable mounted and spaced to form a gap above a bottom surface of said feeding channel, said gap being substantially shorter in height than said blade-like structure;
imparting motion to said baffle to traverse the feeding channel in a direction from said upstream end to said downstream end
to provide a jet of water from the gap; and
collecting a deposit within said feeding channel by utilizing the jet of flow of water to position the deposit on said downstream end of said feeding channel for eventual removal.

---

5,013,370

### METHOD FOR LOCALIZATION OF TENSILE RESIDUAL STRESS AND PRODUCT PRODUCED THEREBY

**Thomas P. Diaz, San Martin, Calif., assignor to General Electric Company, San Jose, Calif.**

**Continuation of Ser. No. 328,850, Mar. 27, 1989, abandoned. This application Jul. 2, 1990, Ser. No. 548,437**

**Int. Cl.$^5$ C21D** *1/00*

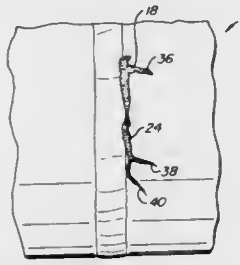
**U.S. Cl. 148—13** **6 Claims**

1. A method for inducing localized tensile residual stress comprising in combination:

providing two pipe sections having respective beveled sections;

VOL
1126
ISS
1
MY
7
1991
UMI

abutting and initially welding said pipe sections together from the outside of said pipe;
filling said abutted and initially welded pipe sections with coolant;
completing said welding of said pipe sections from the outside of said pipe to thereby produce on said pipe a compressional stress on the inside of said pipe at said weld;

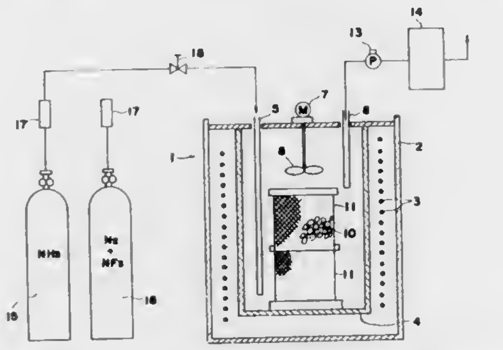


capping one end of said pipe;
immersing the exterior surface of said pipe in a coolant;
heating a defined segment of said welded pipe from the inside thereof adjacent said welded surface; and,
allowing said surface to cool whereby said heated segment is in a tensile residual stress for inducing cracks in said segment of said pipe adjacent said weld.

---

## 5,013,371
## METHOD OF NITRIDING STEEL

**Masaaki Tahara, Takatsuki; Takakazu Tomoda, Sennan; Kenzo Kitano, Kawachinagaro, and Teruo Minato, Hasimoto, all of Japan, assignors to Daidousanso Co., Ltd., Osaka, Japan**
**Filed Feb. 12, 1990, Ser. No. 479,013**
**Claims priority, application Japan, Jul. 10, 1989, 1-177660**
**Int. Cl.$^5$ C21D *1/06***
**U.S. Cl. 148—16.6** **1 Claim**



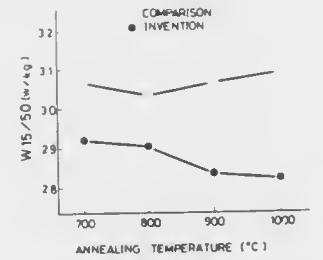
1. A method of nitriding steel which comprises treating the steel with $NF_3$ gas at a temperature of 150°-350° C. to form a fluorinated layer on the surface of the steel, and then heating the fluorinated steel at 480°-700° C. in a nitriding atmosphere to form a nitrided layer on the steel.

---

## 5,013,372
## SEMI-PROCESS NON-ORIENTED ELECTROMAGNETIC STEEL STRIP HAVING LOW CORE LOSS AND HIGH MAGNETIC PERMEABILITY, AND METHOD OF MAKING

**Atsuhito Honda, Chiba; Michiro Komatsubara, Kurashiki; Ko Matsumura, and Keiji Nishimura, both of Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan**
**Division of Ser. No. 207,198, Jun. 16, 1988, Pat. No. 4,946,519. This application May 25, 1989, Ser. No. 341,475**
**Claims priority, application Japan, Jun. 18, 1987, 62-150208**
**Int. Cl.$^5$ H01F *1/04***
**U.S. Cl. 148—111** **3 Claims**

1. A process for preparing a semi-process non-oriented electromagnetic steel strip having a low core loss and a high magnetic permeability, comprising the steps of:



heating a slab having a composition consisting essentially of, in % by weight,

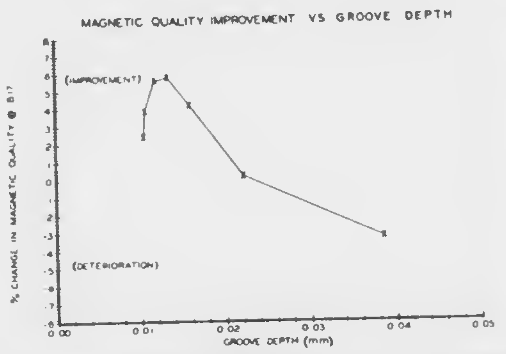
| | |
|---|---|
| C: | up to 0.02%, |
| Si: | 0.2 to 2.0%, |
| Al: | 0.1 to 0.6%, |
| P: | 0.02 to 0.10%, |
| Mn: | 0.5 to 1.5%, |
| Ni: | 0.1 to 1.0%, and optionally, |
| Cu: | up to 0.6%, and optionally, |

one or both of Sb and Sn: 0.01 to 0.2%, and the balance iron and inevitable impurities, to a temperature in the range of from 1,100 to 1,200° C.,
hot rolling the slab into a strip at a finishing temperature of at least 700° C. in the austenite region,
coiling the strip,
annealing the coiled strip at a temperature in the range of from 800° to 880° C. for at least one hour,
cold rolling and annealing the strip, and
skin pass rolling the annealed strip with a reduction rate of 2 to 12%.

---

## 5,013,373
## METHOD FOR TREATING ELECTRICAL STEEL BY ELECTROETCHING AND ELECTRICAL STEEL HAVING PERMANENT DOMAIN REFINEMENT

**Wayne F. Block, West Chester, Ohio, assignor to Armco, Inc., Middletown, Ohio**
**Continuation of Ser. No. 173,696, Mar. 25, 1988, abandoned. This application Mar. 1, 1990, Ser. No. 488,409**
**Int. Cl.$^5$ H01F *1/02***
**U.S. Cl. 148—113** **10 Claims**



1. A high speed method for permanent domain refinement by selective coating and base metal removal in linearly spaced regions on final high high temperature annealed grain oriented electrical steel strip with removal depths controlled for optimum improvements in magnetic quality, said method comprising:
(a) removing said coating in linearly spaced regions having a width of about 0.05 to 0.3 mm and spaced about 5 to 20 mm apart to slightly expose said base metal;

(b) electroetching said expose metal regions to provide a depth from about 0.012 to about 0.075 mm; and
(c) monitoring the permeability of said electrical steel during said electroetching and controlling said removal depth in response to the permeability to provide uniform core loss improvement.

---

## 5,013,374
## PERMANENT DOMAIN REFINEMENT BY ALUMINUM DEPOSITION

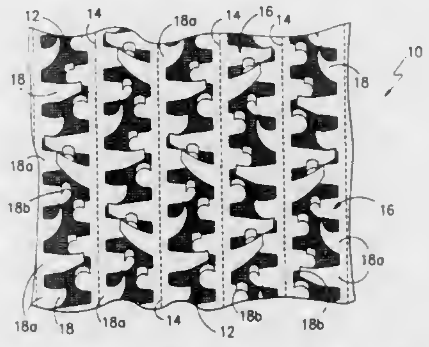
**Wayne F. Block, West Chester, and Wade S. Wright, Fairfield, both of Ohio, assignors to Armco Inc., Middletown, Ohio**
**Continuation of Ser. No. 173,697, Mar. 25, 1988, abandoned. This application Feb. 28, 1990, Ser. No. 489,766**
**Int. Cl.$^5$ H01F *1/02***
**U.S. Cl. 148—113** **17 Claims**

1. A continuous high-speed process for producing permanent domain refinement in grain oriented electrical steel strip having a glass film, said process comprising:
(a) removing said glass film in narrow regions about 0.0025 to about 0.0125 mm deep, about 0.05 to 0.3 mm wide about 4 to about 10 mm apart, said regions being substantially perpendicular to the rolling direction of said strip;
(b) depositing by electrophoresis an aluminum coating into said regions;
(c) bonding the aluminum coating to the steel strip by heating the aluminum coated steel strip;
(d) subsequent cooling causing localized stress to develope in the aluminum coated steel strip as the result of differential thermal contraction between the aluminum coating and the electrical steel, said localized stress causing magnetic domain refinement in the electrical steel strip.

---

## 5,013,375
## METHOD AND APPARATUS FOR PRODUCING AN IMPROVED CAMOUFLAGE CONSTRUCTION

**Robert R. Leonard, Spartanburg, S.C. 29302, assignor to Milliken Research Corporation, Spartanburg, S.C.**
**Filed Jul. 7, 1989, Ser. No. 377,083**
**Int. Cl.$^5$ B32B *31/18***
**U.S. Cl. 156—61** **9 Claims**

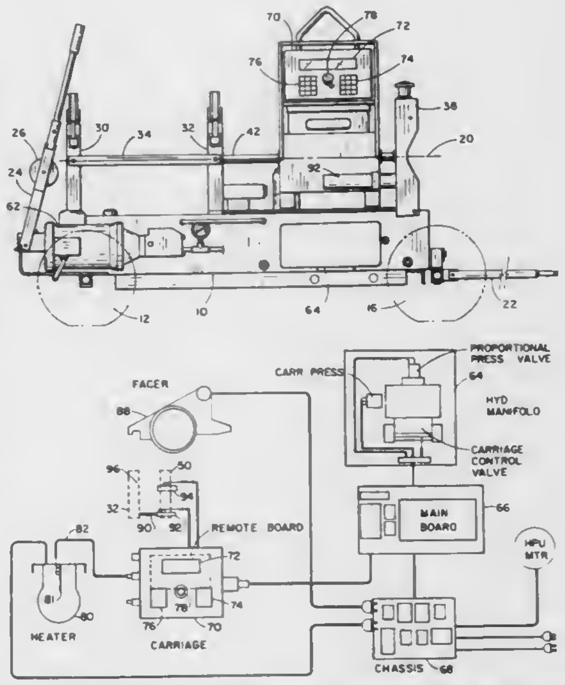


1. A method of producing a composite camouflage construction from a composite material comprising a net substrate in contiguous facing relation with a continuous sheet of material and bonded thereto along plural spaced lines of attachment extending along a length of the composite construction, comprising the steps of passing the composite construction in a desired path of travel while spacing the sheet from the substrate between adjacent lines of attachment, and cutting the sheet between its adjacent lines of attachment to the substrate to form a plurality of lobes, each lobe having a base portion attached to the net substrate and an outer end portion free from the substrate to simulate the appearance of natural objects of a terrain.

---

## 5,013,376
## PROGRAMMABLE COMPUTER CONTROLLED PIPE FUSION DEVICE

**Arthur H. McElroy, II, Tulsa, and Jim M. Craig, Broken Arrow, both of Okla., assignors to McElroy Manufacturing, Inc., Tulsa, Okla.**
**Filed Oct. 2, 1989, Ser. No. 416,062**
**Int. Cl.$^5$ B65H *69/06***
**U.S. Cl. 156—64** **15 Claims**



1. Apparatus for pre-treating and heat fuse joining plastic pipe with a digital computer-controller using an apparatus having:
a frame means to define a longitudinal axis:
fixed pipe clamp means on said frame to retain a pre-treated end of a first pipe with its axis parallel to said longitudinal axis;
at least one pipe carriage means axially spaced from said pretreated end of said first pipe to retain a pretreated end of a second pipe co-axial with said first pipe;
said carriage means movably supported upon guide rods, said rods fixed to said frame means on each side of said pipe, the axis of which lie in an imaginary plane which intersects said longitudinal axis;
pipe end pretreatment means removably received on said guide rods comprising a pipe end facing cutter and a pipe end heater means, said pretreatment means being separately positionable transverse to said longitudinal axis between said first and second pipe ends;
a transducer means on said frame for indicating the relative position of said pipe carriage to said fixed pipe clamp;
hydraulic pressure means to axially move said pipe carriage means toward said fixed clamp means;
said digital computer being programmable to receive input data as to said pipe, its type, its size, and wall thickness to form programmed parameters for fusing said pipe;
said computer on communication with a controller that is sequentially responsive to said programmed parameters; said controller having thermostatic control means to actuate and maintain said pipe end heater means to a minimal temperature or temperature range, and having means based on said memory to sequentially actuate said hydraulic pressure means and reciprocate said carriage and said

VOL
1126
ISS
1
MY
7
1991
UMI

second pipe under a computed hydraulic pressure and for a computed amount of time to:

(1) Communicate said first and second pipe ends with said pipe end facing means to create substantially parallel pipe ends which are transverse to said longitudinal axis;
(2) Communicate the first and second pipe ends together at a low hydraulic pressure to check pipe alignment, the pipe end flatness;
(3) Communicate the first and second pipe ends at a higher hydraulic pressure to check for any slippage of the pipe in the clamps;
(4) Communicate said first and second pipe ends with said pipe and heater means to form molten pipe ends; and
(5) Communicate said molten first and second pipe ends together until fused.

---

### 5,013,377
## APPARATUS FOR LAYING STRIP ON GLASS OR LIKE MATERIAL

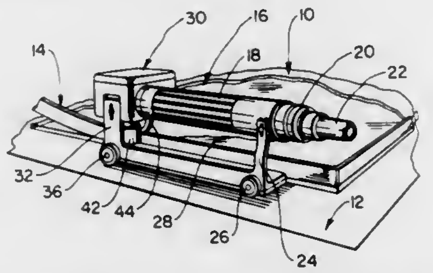
**Luc Lafond, Boisbriand, Canada, assignor to Tremco, Inc., Beachwood, Ohio**

**Filed Sep. 20, 1989, Ser. No. 409,717**

**Claims priority, application Canada, Sep. 23, 1988, 578349**

**Int. Cl.$^5$ B32B** *35/00*

**U.S. Cl. 156—109** **30 Claims**



1. Apparatus for laying an adhesive strip along the peripheral edges of a glass sheet or other member resting on a work table, comprising:

a handle;
first support means at one end of said handle including means for contacting said work table;
a housing mounted at the opposite end of said handle;
a second support means mounted to said housing including means for contacting the work table; and
strip receiving and applying means operatively associated with said housing and including:
  first roller means contacting said strip on one side thereof;
  pressure roller means contacting said strip along a top edge thereof and applying pressure thereon as it is being laid on the member; and
  further roller means adapted to cooperate with said first roller means and said pressure roller means for applying said strip at said peripheral edges and at corners of said glass sheet.

---

### 5,013,378
## PLEATED TROUSER CREASE-FORMING METHOD AND MACHINE IMPROVEMENTS THEREFOR

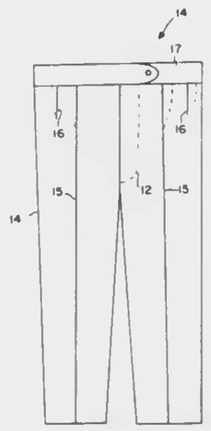
**William F. Farah, El Paso, Tex., assignor to Farah Incorporated, El Paso, Tex.**

**Filed Nov. 30, 1989, Ser. No. 443,890**

**Int. Cl.$^5$ D06J** *1/12;* **A41D** *1/10;* **B05C** *13/02*

**U.S. Cl. 156—226** **10 Claims**

1. In a method for producing a permanently pleated garment whereby pleat formation is achieved during subassembly thereof but before finishing said garment, the improvement comprising: positioning a subassembly with a pre-pressed pleat therein on a vacuum device having a conforming pleat groove thereon, exerting a vacuum on said subassembly and on a pleat formed within said subassembly, maintaining a vacuum on said garment subassembly and said pleat dispensing along said pleat a sufficient amount of a polymeric dispersion, maintaining a vacuum on said pleat while dispensing said polymeric dispersion, and folding and removing said subassembly from said vacuum device for curing of said polymeric dispersion and subsequent incorporation in a finished garment.



---

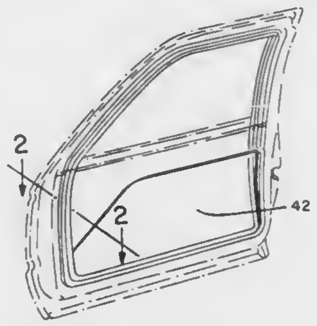
### 5,013,379
## COHESIVE BONDING PROCESS FOR FORMING A LAMINATE OF A WEAR RESISTANT THERMOPLASTIC AND A WEATHER RESISTANT RUBBER

**Mark L. Brooks, and Keith E. Wilson, both of Wabash, Ind., assignors to GenCorp Inc., Fairlawn, Ohio**

**Division of Ser. No. 305,583, Feb. 3, 1989, Pat. No. 4,923,759, which is a division of Ser. No. 148,247, Jan. 25, 1988, Pat. No. 4,913,976. This application Jan. 12, 1990, Ser. No. 464,073**

**Int. Cl.$^5$ B29C** *47/06*

**U.S. Cl. 156—244.11** **12 Claims**



1. A process to form a laminate of a layer of a cured weather resistant rubber and a layer of thermoplastic comprising the steps of:

extruding a layer of a curable weather resistant rubber having a first surface and a layer of the thermoplastic having a melting point of 350° F. or less and having a top surface and a bottom surface, said extruding step causing said bottom thermoplastic surface to form an interface with said curable weather resistant rubber first surface;
bonding said curable weather resistant rubber and said thermoplastic layers by heating said weather resistant rubber layer to a curing temperature which is above the melting point of said thermoplastic layer, and
cooling said top surface of said thermoplastic layer whereby only a portion of said thermoplastic layer at said interface is melted.

### 5,013,380
## PROCESS FOR PRODUCING INTEGRATED STRUCTURES OF SYNTHETIC CORUNDUM SINGLE-CRYSTALS

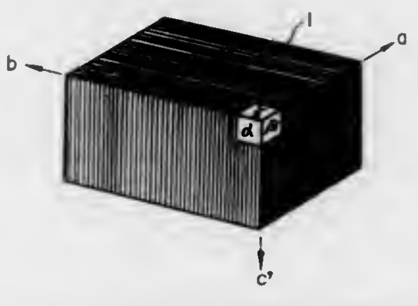
**Hiroaki Aoshima, 4-34-14 Yayoicho, Nakano ku, Tokyo, Japan**

**Filed Jun. 29, 1989, Ser. No. 373,868**

**Claims priority, application Japan, Jul. 4, 1988, 63-167262**

**Int. Cl.$^5$ B32B** *31/18*

**U.S. Cl. 156—250** **9 Claims**



1. A process for producing an integrated structure of synthetic corundum single-crystals comprising:

cutting a synthetic single-crystal ingot to form a rectangular prism;
optically polishing one face of said rectangular prism;
surrounding said rectangular prism with a jig in a clean-air environment having a predetermined controlled temperature and humidity;
cutting said rectangular prism into a first plate piece along a plane perpendicular to said optically polished face;
optically polishing upper and lower plane surfaces of said first plate piece;
cutting said first plate piece into a plurality of plate pieces;
placing said plurality of plate pieces one on top of the other with their optically polished surfaces in contact, said plurality of plate pieces having their planes, edges, axes and axial angles aligned with each other and held in an assembling jig;
bringing said plurality of plate pieces into chemically mating contact with one another; and
heating said mated plurality of plate pieces to a temperature substantially less than the melting point temperature of said synthetic corundum;
whereby said plurality of plate pieces are bonded and closely joined.

---

### 5,013,381
## PROCESS FOR THE TREATMENT OF A METAL OXIDE LAYER, A PROCESS FOR BONDING A METAL OBJECT COMPRISING A METAL OXIDE LAYER AND STRUCTURES PRODUCED THEREFROM

**Richard A. Cayless, Maidenhead, and Leonard B. Hazell, Burpham, both of England, assignors to The British Petroleum Company p.l.c., London, England**

**Filed Feb. 2, 1989, Ser. No. 305,831**

**Claims priority, application United Kingdom, Feb. 3, 1988, 8802375; Feb. 25, 1988, 8804392**

**Int. Cl.$^5$ B32B** *31/00*

**U.S. Cl. 156—281** **7 Claims**

1. A process for bonding a metal object to a second object, the metal object comprising a surface metal oxide layer which is formed by exposure to oxygen of the metal object, comprising contacting a part of the surface metal oxide layer with an adhesive and bringing the second object into contact with the adhesive characterised in that the part of the surface metal oxide layer in contact with the adhesive has been treated with an aqueous solution of a salt of a metal selected from the group consisting of yttrium and metals of the lanthanum series having atomic numbers from 57 to 71 inclusive.

### 5,013,382
## METHOD OF MAKING AN ABSORBENT DISPOSABLE ARTICLE

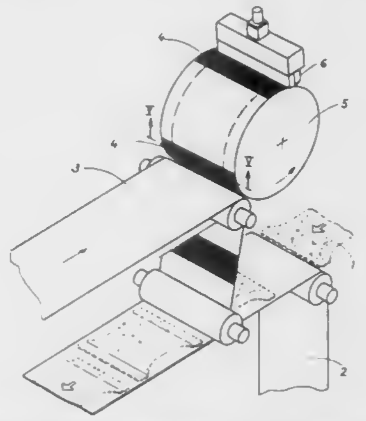
**Krzysztof Nalowaniec, and Kurt Simmler, both of Heidenheim, Fed. Rep. of Germany, assignors to Paul Hartmann Aktiengesellschaft, Heidenheim, Fed. Rep. of Germany**

**Division of Ser. No. 38,546, Apr. 15, 1987. This application Mar. 31, 1988, Ser. No. 177,898**

**Claims priority, application Fed. Rep. of Germany, Apr. 17, 1986, 3613042**

**Int. Cl.$^5$ B32B** *31/08, 31/10*

**U.S. Cl. 156—298** **10 Claims**



1. In a process for the manufacture of an absorbent disposable article the steps comprising,

covering a thin absorbent body having two sides on one side by a liquid-impermeable protective sheet and on a side opposite thereto by a porous cover layer, there being defined borders between the absorbent body and the porous cover layer, said absorbent body defining edges, there being defined regions where the protective sheet and the porous cover layer project beyond said edges,
bonding the protective sheet and the porous cover layer to each other at the regions where the protective sheet and the porous cover layer project beyond said edges of the absorbent body,
providing in at least a portion of an area near an edge of the absorbent body a liquid barrier layer so that the liquid barrier layer extends up to a respective border between the absorbent body and the porous cover layer, and wherein the liquid barrier layer is a heat-sealable thermoplastic material in the form of a liquid-impervious sheet, and
physically bonding said liquid impervious sheet along at least one edge of said absorbent body , but only to a small extent into the surface of the porous cover layer, without however altogether penetrating the porous cover layer completely.

---

### 5,013,383
## EPOXY ADHESIVE FOR USE WITH THERMAL INK-JET PRINTERS

**Charles B. Chapman, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jul. 11, 1989, Ser. No. 378,345**

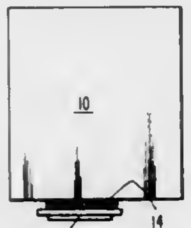
**Int. Cl.$^5$ C09J** *5/02*

**U.S. Cl. 156—307.3** **9 Claims**

1. A method for bonding a printhead of a thermal ink-jet printer to a portion of a pen body, said portion defined by an opening therein to an interior reservoir for storing an aqueous-based ink therein, to form a thermal ink-jet pen, comprising applying an adhesive to at least one of said printhead and said pen body, joining said printhead and said pen body, and curing said adhesive, said adhesive permitting positioning of said printhead prior to curing and providing both a liquid seal

VOL
1126
ISS
1
MY
7
1991
UMI

against said ink and structural stability following said curing, said adhesive comprising a resin/hardener consisting essentially of a solid polyamide dispersed in an unmodified diglycidyl ether of bis-phenol A, an aliphatic epoxy silane coupling agent, and, optionally, at least one of a reactive diluent and fumed silica.



---

### 5,013,384
### VACUUM SYSTEM

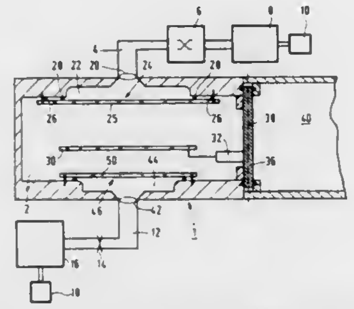
**Willem F. Mellink, Eindhoven; Peter J. G. M. Janssen, Nijmegen; Jan Zwier, Eindhoven, and Harm Lotterman, Nijmegen, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 22, 1990, Ser. No. 542,454**

**Claims priority, application Netherlands, Jun. 28, 1989, 8901630**

**Int. Cl.⁵ B65G** ***1/00;*** **C23C** ***14/00;*** **C03C** ***15/00***

**U.S. Cl. 156—345** **12 Claims**



1. A vacuum system for the storage, measurement or treatment of objects sensitive to dust contamination comprising:

a housing forming an evacuatable chamber, said chamber having a gas inlet and a gas outlet, said inlet and outlet each having a corresponding given cross-sectional area;

means for forming an intermediate chamber between said inlet and said chamber; and

a porous filter plate between said intermediate chamber and said evacuatable chamber, said plate having a gas passage surface area relatively large with respect to said inlet cross-sectional area.

---

### 5,013,385
### QUAD PROCESSOR

**Joseph A. Maher, South Hamilton, Mass.; E. John Vowles, Goffstown; Joseph D. Napoli, Winham, both of N.H.; Arthur W. Zafiropoulo, Manchester, and Mark W. Miller, Burlington, both of Mass., assignors to General Signal Corporation, Stamford, Conn.**

**Continuation of Ser. No. 115,774, Oct. 30, 1987, abandoned, which is a continuation of Ser. No. 923,125, Oct. 14, 1986, Pat. No. 4,715,921, which is a continuation-in-part of Ser. No. 853,775, Apr. 18, 1986, abandoned. This application Dec. 1, 1989, Ser. No. 443,039**

**Int. Cl.⁵ H01L** ***21/306;*** **B44C** ***1/22***

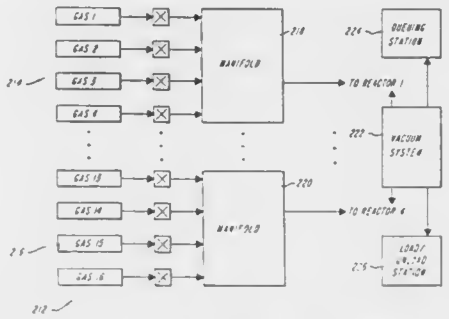
**U.S. Cl. 156—345** **25 Claims**

1. A multiple-processing and contamination-free wafer handling and processing system, comprising:

plural, wafer receiving and surface processing vessels each having an ingress and egress defining port that are arrayed about a predetermined spacial locus in such a way that the several ports thereof are accessible from a single location spaced from the several ports;

a wafer queuing station spaced with the plural vessels along the same predetermined spacial locus defining a wafer access port accessible from said single location;

plural valve means individually coupled to corresponding ones of said plural, vessel ingress and egress ports and to said wafer queuing station wafer access port;



transfer means disposed at said single location and cooperative with corresponding ones of said plural valve means for moving wafers from and to said wafer access port of said queuing station from and to selected ones of said wafer receiving and surface processing vessels through the associated one of said ingress and egress ports thereof; and

processor means for controlling said vessels, said transfer means and said valve means to provide selectable single or multistep processing of wafers in said queuing station in one or more of said vessels.

---

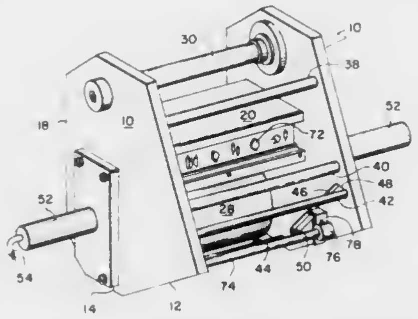
### 5,013,386
### APPARATUS FOR APPLYING THIN ROLL MATERIAL TO A SURFACE

**Virginia A. Myers, Tenacre - R.R. #1, Solon, Iowa 52333; Daniel L. Wenman, R.R. 2, Oxford, Iowa 52322, and James R. Phillips, 22 S. Mt. Vernon Dr., Iowa City, Iowa 52240**

**Filed Mar. 2, 1989, Ser. No. 317,762**

**Int. Cl.⁵ B32B** ***31/20***

**U.S. Cl. 156—351** **6 Claims**



1. An apparatus for applying thin roll material to a surface said apparatus comprising a housing having generally vertical spaced-apart side members dispensing means supported by said side members for removably retaining a roll of the material to be applied, a stamping roller supported by the side members so as to be engagable with the surface to which the material is to be applied, guide means between the dispensing means and the stamping roller to guide the material along a predetermined path from the dispensing means to the stamping roller, the guide means including a plurality of guide rods extending between the side members substantially parallel to the axis of the stamping roller, the guide rods being spaced-apart between the dispensing means and stamping roller to guide the material from the dispensing means beneath the stamping roller, all but one of the guide rods being fixed and the other one of the guide rods being moveable along a defined and limited path toward and away from the fixed guide rod closest to the stamping roller, the material passing between the moveable guide rod and the fixed guide rod closest to the stamping roller so that tension is applied to the material when the moveable guide rod moves toward the fixed guide rod closest to the stamping roller thereby clamping the material between them, means for controllably heating the surface of the stamping roller, and means connected to the housing to provide for manual operation of the apparatus by a user.

---

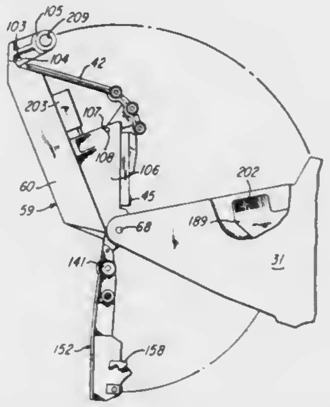
### 5,013,387
### HAND-HELD LABELLER

**Brent E. Goodwin, Middletown; Donald L. Karn, Springboro; John D. Mistyurik, Tipp City; John R. Monteith, Dayton; Mark A. Seale, New Carlisle, and David R. Wisecup, Xenia, all of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio**

**Filed Apr. 10, 1990, Ser. No. 506,974**

**Int. Cl.⁵ B65C** ***11/02***

**U.S. Cl. 156—384** **28 Claims**



1. A hand-held labeler for printing and applying labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, means on the housing for supporting a supply roll of a composite label web, a thermal print head, means for providing a path for the composite label web from the supply roll to the print head, means for delaminating printed labels from the carrier web, means for applying printed labels, means including an electric motor for advancing the carrier web to effect delamination of a printed label and to advance the printed label into label applying relationship with the label applying means, wherein the housing includes a first housing section and a second housing section movable relative to the first housing section, means for connecting the first and second housing sections to each other for relative movement of the first and second housing sections between open and closed positions wherein the inside of the housing is accessible when the first and second housing sections are in the open position, a keyboard on the housing for entering data to be printed by the thermal print head, a microprocessor, circuitry electrically coupling the microprocessor, the keyboard, the thermal print head and the electric motor, the circuitry being in the housing and including first and second circuit portions, wherein the first circuit portion includes a first connector, wherein the second circuit portion includes a second connector, the first circuit portion being on the first housing section, the second circuit portion being on the second housing section, wherein the first and second connectors are connected when the first and second housing sections are in the closed position, and wherein the first and second connectors are disconnected when the first and second housing sections are in the open position.

---

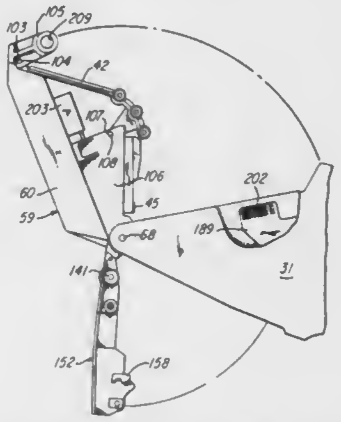
### 5,013,388
### HAND-HELD LABELER

**Brent E. Goodwin, Middletown; John D. Mistyurik, Tipp City, and Mark A. Seale, New Carlisle, all of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio**

**Division of Ser. No. 209,759, Jun. 22, 1988, Pat. No. 4,956,045. This application Apr. 10, 1990, Ser. No. 506,983**

**Int. Cl.⁵ B65C** ***11/02***

**U.S. Cl. 156—384** **18 Claims**



8. A hand-held labeler for printing and dispensing labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, means on the housing for supporting a supply roll of a composite label web, a thermal print head, a platen cooperable with the print head to effect printing on the labels, means for providing a path for the composite label web from the supply roll to between the print head and the platen, means for delaminating printed labels from the carrier web, means for advancing the carrier web to effect delamination of a printed label and to advance the printed label, means for mounting the print head with respect to the housing for movement between a first position in printing cooperation with the platen and a second position away from the platen to facilitate servicing of the print head, a keyboard mounted on the mounting means for entering data representative of indicia to be printed by the print head, means for mounting the platen with respect to the housing for movement between a first position in printing cooperation with the print head and a second position away from the print head, a microprocessor mounted on the print head mounting means, circuitry for operating the print head, the circuitry including a first circuit portion adapted to be connected to a source of electrical energy and a second circuit portion connected to the keyboard, the microprocessor and the print head, the first circuit portion having a first electrical connector, the second circuit portion having a second electrical connector, and wherein the first and second electrical connectors are coupled when the print head is in the first position and uncoupled when the print head is in the second position.

13. A hand-held labeler for printing and applying labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, a first mounting section movably mounted on the housing between open and closed positions, a second mounting section movably mounted on the housing between open and closed positions, a platen mounted on the first mounting section, a thermal print head mounted on the second mounting section, means on the housing for supporting a supply roll of a composite label web, means for providing a path for the composite label web from the supply roll to between the print head and the platen, means for delaminating printed labels from the carrier web, means for applying printed labels, means for advancing the carrier web to effect delamination of a printed label and to advance the printed label into label applying relationship with respect to the label applying means, and wherein the print head and the platen are in printing cooperation to print on a label but only when both the

VOL
1126
ISS
1
MY
7
1991
UMI

first movable section and the second movable section are in their closed positions.

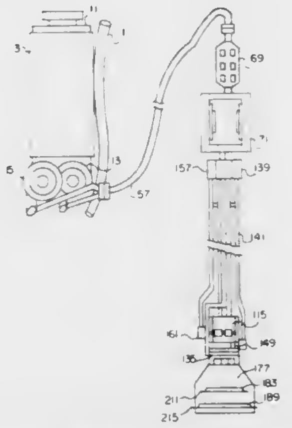
### 5,013,389
### WALLBOARD TAPING APPARATUS

**Kahrl Retti, Timonium, Md., assignor to Mudbuster, Inc., Baltimore, Md.**

**Continuation of Ser. No. 224,709, Jul. 27, 1988, abandoned. This application May 7, 1990, Ser. No. 518,320**

**Int. Cl.$^5$ B32B *31/00;* B67D *5/64***

**U.S. Cl. 156—526** **18 Claims**



1. An apparatus for taping joints between pieces of wallboard comprising:

a taping head means, slidingly contactable with a wall, for substantially simultaneously applying a first layer of a joint compound to a joint between pieces of wallboard, embedding a wallboard tap in said first layer of said joint compound, overcoating said embedded wallboard tape with a second layer of said joint compound, and overcoating said second layer of said joint compound with a third layer of said joint compound;

a handle means, connectable to said taping head means, for supporting said taping head means, said handle means being manually graspable by an operator, said handle means having fluid conduit means formed therein for passing joint compound to said taping head means;

tape supplying means, mounted on said handle means, for supplying wallboard tape to said taping head means;

backpack means, wearable by said operator, for supporting a supply of said joint compound and for producing a pressurized stream of said joint compound;

flexible connecting means for fluidically interconnecting said backpack means and said fluid conduit means to pass said pressurized stream of said joint compound from said backpack means to said fluid conduit means;

wherein said taping mead means comprises:

a first support plate, attached to said handle means;

a guide means, attached to said first support plate, for guiding a wallboard tape of predetermined width being applied to a joint;

a first orifice means, attached to said first support plate, for feeding a first layer of joint compound to a surface of said wall board tape intermediate said joint and said wallboard tape, said first orifice means fluidically connected to said fluid conduit means;

a tape cutting means, mounted on said first support plate, intermediate said guide means and said first orifice means, for cutting said wallboard tape widthwise after having passed through said guide means;

a second support plate, releasably attachable to said handle means;

second orifice means, formed in said second support plate proximate said first support plate, of overcoating said wallboard tap with a second layer of said joint compound, said second orifice means having a width greater than said wallboard tape, said second orifice means being centered, widthwise with respect to said guide means;

third orifice means, formed in said second support plate remote from said first support plate, for overcoating said second layer of said joint compound with a third layer of said joint compound, said third orifice means having a width greater than said second orifice means, said third orifice means being centered, widthwise, with respect to said guide means.

### 5,013,390
### HAND-HELD LABELLER

**Klaus-Dieter Hermann, Ritterweg 17, D-6932 Hirschhorn, Fed. Rep. of Germany**

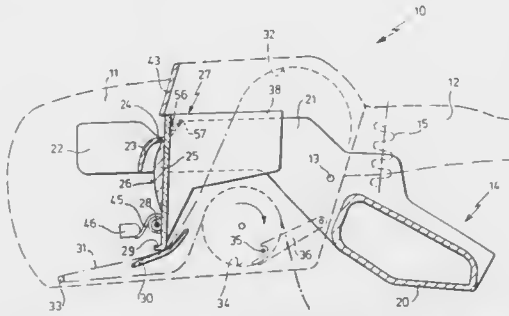
**PCT No. PCT/DE88/00209, § 371 Date Oct. 6, 1989, § 102(e) Date Oct. 6, 1989, PCT Pub. No. WO88/07960, PCT Pub. Date Oct. 20, 1988**

**PCT Filed Apr. 1, 1988, Ser. No. 427,842**

**Claims priority, application Fed. Rep. of Germany, Apr. 9, 1987, 3711960**

**Int. Cl.$^5$ B65C *11/00***

**U.S. Cl. 156—577** **5 Claims**



1. A hand-held labeling device (**10**) having a housing (**11**) and a movable handle (**14**) which is arranged for swinging about a first axis (**13**) and, in a rest position, said movable handle being swung away from a second handle (**12**) fixed to the housing, a transport mechanism (**34** to **36**) for a label tape (**31**) said mechanism being operated during movement of the said movable handle (**14**) to said rest position, a supply roller (**32**) carried in the upper portion of the housing, a tape dispensing edge (**33**) carried within the housing, the said label tape being pulled off the supply roller (**32**) and run to the said transport mechanism (**34** to **36**) over the dispensing edge (**33**), a tape brake including a brake lever (**27**) having opposed arms one of said arms having an end (**29**) and a guide plate (**30**) arranged between the said supply roller (**32**) and the said dispensing edge (**33**) for fixing and releasing the said label tape (**31**) in a direction longitudinal of the tape, the said brake lever (**27**) being arranged to swing about a second axis against the force of a first return spring (**45**), the spring in the rest position of the said movable handle (**14**), acting to press the said label tape (**31**) against the guide plate (**30**) by the end (**29**) of the one arm of the said brake lever (**27**), while the other arm of the lever coacts with the said movable handle (**14**) in such a manner that operating the movable handle will cause the end (**29**) of the one arm of the breake lever to be lifted, characterized in that a lever (**22**) actuated by the said movable handle (**14**) carries an element (**55**) which acts, in addition to the said return spring (**45**), to fix the said brake lever (**27**) in a rest position, in the rest position of the said movable handle (**14**).

---

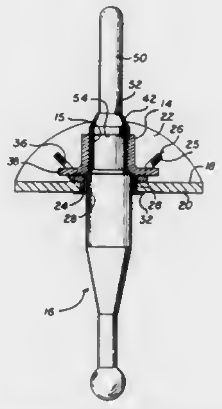
### 5,013,391
### ADHESIVE NUTPLATE ASSEMBLY FOR MOUNTING

**Charles G. Hutter, III, Carson City, and Alexander B. Carter, III, Gardnerville, both of Nev., assignors to Physical Systems, Inc., Carson City, Nev.**

**Filed Jun. 12, 1989, Ser. No. 364,105**

**Int. Cl.$^5$ F16B *37/04***

**U.S. Cl. 156—578** **22 Claims**



1. An attachment assembly for adhesive mounting onto a substrate having a front side and a blind side and an access opening extending therebetween, said attachment assembly comprising:

an attachment having an underside surface and adhesive means for adhesive mounting of said attachment onto the blind side of the substrate; and

a fixture pin having a neck portion extending through a central opening formed in said attachment and joined at one end thereof to a diametrically enlarged body disposed generally at one end of said attachment central opening;

said body having a length to extend substantially through the substrate access opening and having a diametric size and being manipulatable for substantial binding within the substrate access opening to force and retain said underside surface of said attachment against the blind side of the substrate, said body being manipulatable to permit forced removal from the attachment by pulling the body at the front side of the substrate.

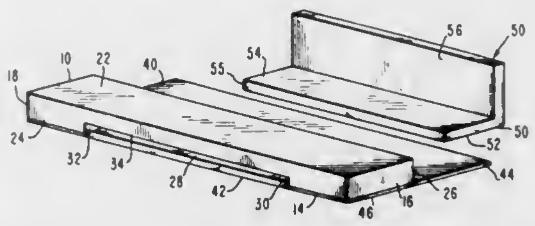
### 5,013,392
### THIN FILM DELAMINATION TOOL

**Michael J. Virgadamo, Pasadena, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Feb. 15, 1990, Ser. No. 480,419**

**Int. Cl.$^5$ B32B *31/18***

**U.S. Cl. 156—584** **14 Claims**



1. A tool for delaminating a hologram having a protective layer of glass from a substrate to which the layer of glass is bonded by a layer of adhesive comprising:

a frame having a cutting surface and a channel formed through said frame said channel being open to said cutting surface;

a metal blade secured to the cutting surface and disposed to extend across the channel, said blade having a leading edge which is sharpened and a lower surface which is operable to travel along the substrate; and

a pressure plate operable to slidably fit within the channel of said frame and contact said blade for keeping said blade from buckling toward said frame, whereby said pressure plate is operably extracted from the channel as said blade is moved along the substrate and inserted into the layer of adhesive during delamination of the hologram from the substrate.

### 5,013,393
### PROCESS FOR THE MELTING AND DIRECTIONAL SOLIDIFICATION OF METALS

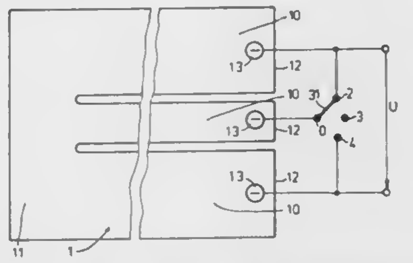
**Ingo Schwirtlich, and Peter Woditsch, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation of Ser. No. 117,693, Nov. 5, 1987, abandoned, which is a continuation of Ser. No. 901,609, Aug. 29, 1986, abandoned. This application May 1, 1990, Ser. No. 517,235**

**Claims priority, application Fed. Rep. of Germany, Sep. 10, 1985, 3532142**

**Int. Cl.$^5$ C30B *11/02***

**U.S. Cl. 156—616.2** **2 Claims**



1. A process for the production of unidirectionally; and columnarly solidified silicon bodies by completely melting silicon and then solidifying said silicon in a crucible having substantially vertical sides, wherein the dissipation of heat is greater at the upper or lower end of the crucible than at the vertical sides, which comprises substantially avoiding dissipation of heat through the vertical sides of the crucible by continuously supplying heat to the vertical sides of the crucible during solidification of the silicon through a single heating element having heating sections in such a quantity that a melt of the silicon is formed, and establishing a directional solidification by establishing a temperature gradient by varying the heat output among the heating sections of the heating element.

### 5,013,394
### METHOD FOR DETECTION OF END OF GRINDING OF A THIN LAYER MAGNETIC HEAD

**Jean-Luc Rolland; Jean-Yves Beguin, both of Paris; Henriette Magna, Antony; Alain Jacobelli, St Michel Sur Orge, and Maurice Penot, Palaiseau, all of France, assignors to Compagnie Europeenne de Composants Electroniques LCC, Courbevoie, France**

**PCT No. PCT/FR88/00518, § 371 Date Jun. 26, 1989, § 102(e) Date Jun. 26, 1989, PCT Pub. No. WO89/04038, PCT Pub. Date May 5, 1989**

**PCT Filed Oct. 21, 1988, Ser. No. 381,749**

**Claims priority, application France, Oct. 27, 1987, 87 14821**

**Int. Cl.$^5$ B44C *1/22;* C23F *1/00;* C03C *15/00, 25/06***

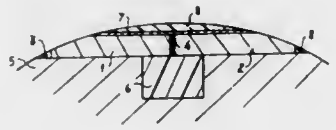
**U.S. Cl. 156—627** **7 Claims**

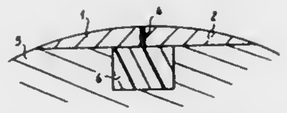
1. Method for the detection of the end of grinding of at least one thin layer magnetic head, the head comprising, at the stage of implementation of said method, an active face, formed by two magnetic poles separated by a gap, the detection being obtained through the interruption of an electrical circuit, characterized in that it comprises the following steps:

deposition of a conductive layer on the entire active face to form said electrical conduit;

VOL
1126
ISS
1
MY
7
1991
UMI

etching of the active face coated with said conductive layer;
deposition of a layer of dielectric material on the etched active face;





grinding of the active face starting from the face that is free of the layer of dielectric material until total removal of that part of the conductive layer located above said gap, said removal being detected by the sudden variation in resistivity between the two magnetic poles.

---

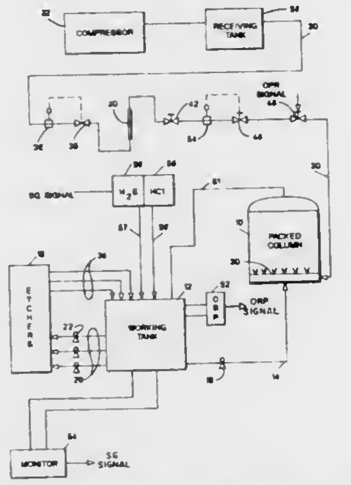
### 5,013,395
## CONTINUOUS REGENERATION OF ACID SOLUTION

**Lawrence R. Blumberg, Johnson City; Douglas D. Coolbaugh, Newark Valley; John A. Kurowski, Chenango Forks, all of N.Y., and Eugene A. Stromecki, Monmouth Junction, N.J., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 28, 1987, Ser. No. 91,009**

**Int. Cl.$^5$ C23F** *1/02*

**U.S. Cl. 156—627** **13 Claims**



1. A method of continuously regenerating a spent bulk acid solution containing metal ions capable of being continuously oxidized in said solution, said solution being enhanced with a salt-free material, comprising:

receiving said spent bulk acid solution from a working tank;

introducing compressed air into a packed reaction vessel substantially cocurrently with said spent bulk acid solution, to effect oxidation; and

recirculating regenerated bulk acid solution from said packed reaction vessel into said working tank.

---

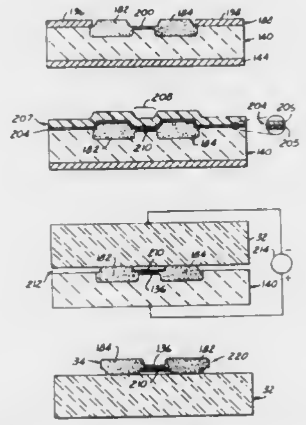
### 5,013,396
## METHOD OF MAKING AN ULTRAMINIATURE PRESSURE SENSOR

**Kensall D. Wise, and Hin-Leung Chau, both of Ann Arbor, Mich., assignors to The Regents of the University of Michigan, Ann Arbor, Mich.**

**Division of Ser. No. 190,310, May 4, 1988, Pat. No. 4,881,410, which is a division of Ser. No. 57,884, Jun. 1, 1987, Pat. No. 4,815,472. This application Nov. 3, 1989, Ser. No. 431,627**

**Int. Cl.$^5$ H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—628** **23 Claims**



1. A method of making a pressure sensor having a diaphragm and rim structure including bulk silicon, comprising the steps of:

(a) providing a silicon wafer;

(b) forming at least one mesa upon the silicon wafer to be used as part of the rim structure of the pressure sensor;

(c) impregnating a selected portion of the silicon wafer which includes the mesa with at least a first material which alters an etching characteristic of the first selected portion;

(d) impregnating a second selected portion of the silicon wafer which will become the diaphragm of the sensor with a second material which alters an etching characteristic of the second selected portion; and

(e) removing by etching at least a selected third portion of the silicon wafer adjacent to the first and second portions as part of forming the diaphragm and rim structure.

---

### 5,013,397
## PRINTED CIRCUIT BOARD AND METHOD OF PREPARING SAME

**Hiroshi Tsukakoshi, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

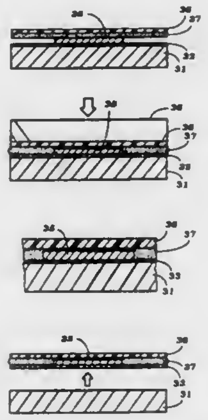
**Filed Sep. 2, 1988, Ser. No. 240,093**

**Claims priority, application Japan, Mar. 10, 1988, 63-57729; May 13, 1988, 63-117563**

**Int. Cl.$^5$ B44C** *1/22;* **C23F** *1/00;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—631** **39 Claims**

1. The method of making a printed electrical circuit comprising the steps of forming a panel plating layer, plating a discrete circuit onto said panel plating layer, applying an adhesive and an overlying base to the plated panel plating layer applying pressure to said base and said plated panel plating layer to completely embed said discrete circuit into said adhesive with said adhesive separating said base from said circuit,



and chemically removing the panel plating layer to leave the discrete circuits on the base.

---

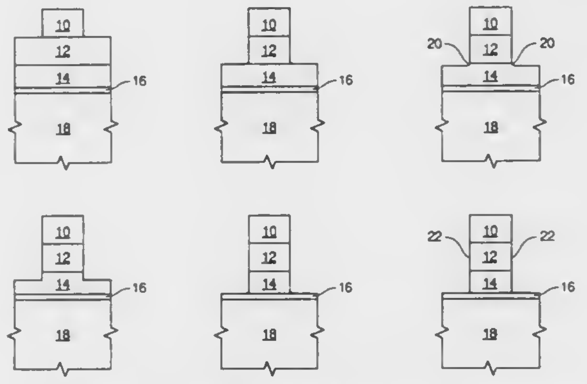
### 5,013,398
## ANISOTROPIC ETCH METHOD FOR A SANDWICH STRUCTURE

**Paul D. Long, Meridian, and Jose J. Guerricabeitia, Boise, both of Id., assignors to Micron Technology, Inc., Boise, Id.**

**Filed May 29, 1990, Ser. No. 530,139**

**Int. Cl.$^5$ H0IL** *21/306;* **B44C** *1/22;* **C03C** *15/00;* **C23F** *1/02*

**U.S. Cl. 156—643** **17 Claims**



1. A method to etch a sandwich structure of a first layer selected from the group of silicon dioxide and silicon nitride, on a second layer selected from the group of polycrystalline silicon and a refractory metal silicide, on a third layer selected from the group of silicon dioxide and silicon nitride, comprising the steps of:

providing a patterned mask layer on the structure, leaving a region of the first layer exposed;

providing a plasma etch reactor having a non-erodible electrode and using it for:

etching the exposed first layer in a first atmosphere of He and 16:1 to 22:1 $CHF_3:SF_6$, in a 2.0 to 2.6 $W/cm^2$ plasma, at 400 to 600 mTorr and 15° to 25° C., until the second layer is exposed and a sidewall is formed in the first layer;

etching the exposed second layer in a second atmosphere of 3.2:1 to 3.5:1 HBr:He, in a 1.0 to 1.2 $W/cm^2$ plasma, at 180 to 220 mTorr and 15° to 25° C., until any prograde in said second layer is counteracted; and

etching the exposed second layer in a third atmosphere of 1.7:1 to 2.3:1 HBr:He, in a 1.2 to 1.4 $W/cm^2$ plasma, at 135 to 165 mTorr and 15° to 25° C., until the third layer is exposed and a sidewall is formed in the second layer.

---

### 5,013,399
## METHOD OF PREPARING SUPPORT FOR LITHOGRAPHIC PRINTING PLATE

**Akio Uesugi; Tsutomu Kakei, and Shinichiro Minato, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 146,868, Jan. 22, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 422,312**

**Claims priority, application Japan, Jan. 22, 1987, 62-11367; Feb. 17, 1987, 62-28347**

**Int. Cl.$^5$ C23F** *1/00;* **B44C** *1/22;* **B05D** *3/06;* **B23K** *26/00*

**U.S. Cl. 156—643** **5 Claims**

1. A method of preparing an aluminum or aluminum alloy support for a lithographic printing plate, comprising placing an aluminum or an aluminum alloy support in an acidic or alkaline solution and irradiating the support while in the solution with laser radiation to render the surface thereof rough, said surface roughness comprising thin pits within larger pits wherein said thin pits are produced by a laser activated chemical reaction with the acidic or alkaline solution and said larger pits are produced by direct laser irradiation.

---

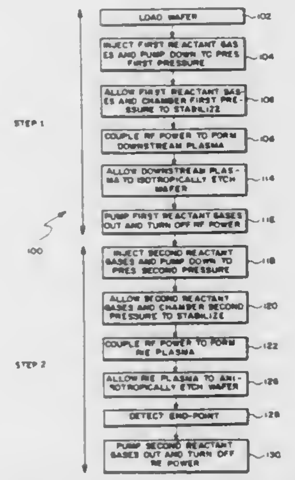
### 5,013,400
## DRY ETCH PROCESS FOR FORMING CHAMPAGNE PROFILES, AND DRY ETCH APPARATUS

**Howard S. Kurasaki, San Jose; Barbara F. Westlund, Saratoga; James E. Nulty, San Jose, all of Calif., and E. John Vowles, Deering, N.H., assignors to General Signal Corporation, Stamford, Conn.**

**Filed Jan. 30, 1990, Ser. No. 472,327**

**Int. Cl.$^5$ H01L** *21/312;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643** **33 Claims**


LOAD WAFER
102
INJECT FIRST REACTANT GASES AND PUMP DOWN TO PRES FIRST PRESSURE
104
ALLOW FIRST REACTANT GASES AND CHAMBER FIRST PRESSURE TO STABILIZE
106
STEP 1
COUPLE RF POWER TO FORM DOWNSTREAM PLASMA
108
ALLOW DOWNSTREAM PLASMA TO ISOTROPICALLY ETCH WAFER
114
PUMP FIRST REACTANT GASES OUT AND TURN OFF RF POWER
116
100
INJECT SECOND REACTANT GASES AND PUMP DOWN TO PRES SECOND PRESSURE
118
ALLOW SECOND REACTANT GASES AND CHAMBER SECOND PRESSURE TO STABILIZE
120
COUPLE RF POWER TO FORM RIE PLASMA
122
STEP 2
ALLOW RIE PLASMA TO ANISOTROPICALLY ETCH WAFER
126
DETECT END-POINT
128
PUMP SECOND REACTANT GASES OUT AND TURN OFF RF POWER
130

27. A process for fabricating champagne profiles in a layer previously applied to a substrate by the steps comprising:

controllably producing a first plasma bearing charged and neutral species in a reaction vessel and in such a manner that the first plasma is electrically and physically isolated from the substrate at a preselected comparatively-high pressure and corresponding comparatively-low mean free path in order to isotropically etch the layer primarily by the neutral species thereof; and

thereafter producing a second plasma bearing charged and neutral species in the same reaction vessel and in such a manner that the second plasma is electrically coupled and physically proximate the wafer at a preselected comparatively-low pressure and corresponding comparatively-high mean free path in order to anisotropically etch the layer primarily by the charged species thereof.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,401
## MICROWAVE PLASMA ETCHING METHOD AND APPARATUS

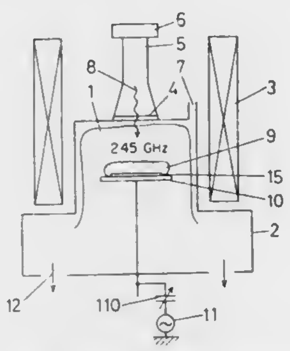
**Seiji Samukawa, Tokyo; Masami Sasaki, and Sumio Mori, both of Fuchu, all of Japan, assignors to NEC Corporation and Anelva Corporation, both of Tokyo, Japan**

**Filed Mar. 21, 1990, Ser. No. 497,077**

**Claims priority, application Japan, Mar. 27, 1989, 1-74316**

**Int. Cl.$^5$ B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643** **8 Claims**



1. A microwave plasma etching method which includes the steps of:

forming a stream of plasma from a processing gas within a plasma formation chamber, by using an electric field produced by a microwave and an electron cyclotron resonance phenomenon produced by a magnetic field perpendicular to the electric field; and

processing a substrate surface by exposing it to a radiation of the plasma stream, wherein the method further includes the step of processing the substrate susrface by locating it at the electron cyclotron resonance point.

---

### 5,013,402
## METHOD OF MANUFACTURING DOUBLE-SIDED WIRING SUBSTRATE

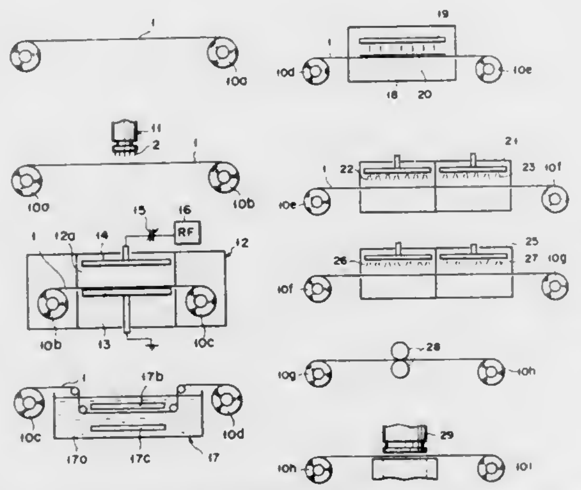
**Yoshio Yarita, Mizuho, and Yoshihiro Kawamura, Fussa, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 464,410, Jan. 12, 1990, Pat. No. 4,964,947. This application Jul. 18, 1990, Ser. No. 555,058**

**Claims priority, application Japan, Jan. 20, 1989, 1-11366; Jan. 30, 1989, 1-20623**

**Int. Cl.$^5$ C23F** *1/02;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—645** **12 Claims**



1. A method of manufacturing a double-sided wiring substrate comprising the steps of:

providing an insulating film rolled up in a reel;

unrolling and feeding intermittently said insulating film;

forming a hole in said insulating film by a pin;

forming a thin metal film on upper and lower surfaces of said insulating film and an inner wall of the hole by deposition;

forming a thick metal film on said thin metal film by plating;

etching a predetermined portion of said thin and thick metal films formed on said upper and lower surfaces of said insulating film to form a conductive patterns having a layered structure of said thin and thick metal films, said conductive patterns extending form said inner wall of the hole to said upper and lower surfaces of said insulating film; and

cutting said insulating film into a predetermined configuration so as to make a plurality of final wiring substrates.

---

### 5,013,403
## PROCESS FOR CONTINUOUS DETERMINATION OF PAPER STRENGTH

**Lee M. Chase, Los Gatos, Calif., assignor to Measurex Corporation, Cupertino, Calif.**

**Filed Oct. 5, 1987, Ser. No. 106,828**

**Int. Cl.$^5$ D21F** *7/06, 9/00, 11/00*

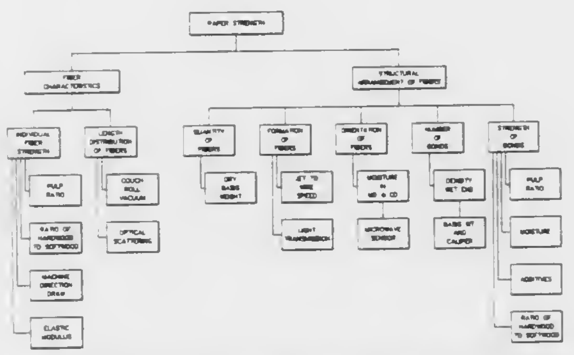
**U.S. Cl. 162—49** **20 Claims**

1. A process for detecting the strength of continuous paper sheet material during manufacture by detecting parameters indicative of at least four of the following properties: (a) the strength of individual fibers, (b) the length distribution of fibers, (c) the quantity of fibers, (d) the distribution of fibers, (e) the orientation of fibers, (f) the number of bonds between fibers, and (g) the bond strength of fibers, the process comprising the steps of:

(i) sensing the parameters for at least four of said properties during manufacture of paper sheet material in a papermaking machine;

(ii) for the selected papermaking machine and paper grade, calculating correlations of said at least four parameters with laboratory tests of paper strength; and

(iii) during production of paper on the papermaking machine, nondestructively sensing the at least four parameters and, based upon the determined correlations, calculating the predicted strength of paper being produced by the papermaking machine.



---

### 5,013,404
## PROCESS FOR ALKALINE PEROXIDE BLEACHING OF WOOD PULP USING A QUATERNARY AMINE AS ADDITIVE

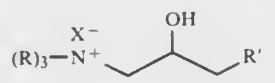
**Steven H. Christiansen, Richwood; Teresa Littleton, and Robert T. Patton, both of Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Nov. 15, 1989, Ser. No. 437,482**

**Int. Cl.$^5$ D21C** *9/12, 9/16*

**U.S. Cl. 162—72** **39 Claims**

1. In a process for bleaching mechanical wood pulp using hydrogen peroxide in an aqueous alkaline system in which the pulp is bleached with a solution of stabilized alkaline hydrogen peroxide, the improvement which comprises adding to the bleach solution at least one quaternary amine having the formula:



$$(R)_3-N^+(X^-)-CH_2-CH(OH)-CH_2-R'$$

wherein R is an alkyl group containing 1–3 carbon atoms and R′ is hydrogen, a halogen, hydroxyl, R or $-N^+(R)_3$ together with $X^-$, and $X^-$ is a negatively charged counter-ion, and bleaching the mechanical wood pulp with the stabilized alkaline hydrogen peroxide bleach solution containing the at least one quaternary amine.

---

### 5,013,405
## METHOD OF MAKING A LOW DENSITY FROTHED MINERAL WOOL

**David G. Izard, Wauconda, Ill., assignor to USG Interiors, Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 2,495, Jan. 12, 1987, abandoned. This application Aug. 4, 1989, Ser. No. 389,514**

**Int. Cl.$^5$ D21J** *1/00, 1/20*

**U.S. Cl. 162—101** **19 Claims**

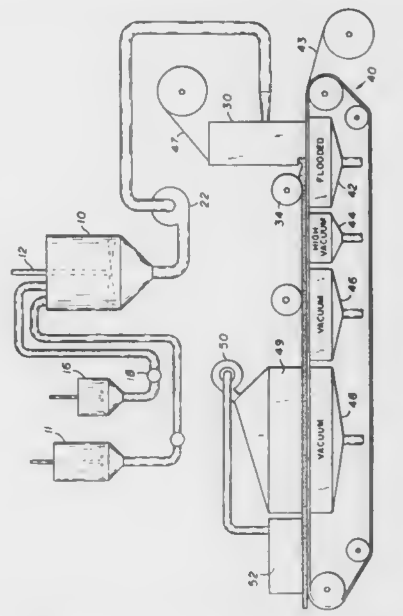
1. A method for manufacturing a low density, porous structural panel of mineral fiber on a moving foraminous support wire which comprises:

(1) forming a dilute aqueous mineral fiber slurry consisting essentially of mineral fibers, inorganic lightweight aggregate, binder and foaming aid;

(2) mixing the slurry with air to form a frothlike, unstable mass of non-resilient, irregularly sized bubbles;

(3) depositing the frothlike mass upon a continuous scrim bottom cover sheet;

(4) maintaining the frothlike mass and scrim sheet under quiescent conditions in a flooded section of the foraminous wire wherein the mass rapidly dewaters by gravitational pull;



(5) passing the frothlike mass into a high vacuum, pressure differential zone to collapse the bubbles and strip the water from the mineral fiber mass;

(6) passing the mineral fiber mass into a lower pressure zone while passing high velocity, heated air through the mass whereby additional water is stripped from the mass; and

(7) recovering a dried, mineral fiber, structural panel having a density of about 3 to about 10 pounds per cubic foot.

---

### 5,013,406
## TRAILING ELEMENT DEVICE FOR A HEADBOX

**Richard R. Hergert, Rockton, Ill., assignor to Beloit Corporation, Beloit, Wis.**

**Filed Nov. 9, 1989, Ser. No. 433,937**

**Int. Cl.$^5$ D21F** *1/06*

**U.S. Cl. 162—343** **10 Claims**

1. A headbox of a papermaking machine having a trailing element device arranged therein, said trailing element device comprising:

a plurality of laminated sheets, said sheets being disposed within the headbox for dampening turbulence with the headbox wherein said sheets are staggered relative to each other such that said trailing element device is of a tapered configuration, said trailing element device tapering from said upstream bead toward said downstream end;

binding means cooperating with said plurality of sheets for binding said sheets together such that the trailing element device defines an upstream bead which extends in a cross-machine direction within the headbox;

said bead being anchored within a slot defined by the headbox such that said bead is permitted to pivot within said slot so that a downstream end of said trailing element device is permitted to freely float within the headbox for attentuating said turbulence within the headbox;

VOL
1126
ISS
1
MY
7
1991
UMI

wear resistant cladding means applied to said upstream bead for inhibiting wear and fracturing of said sheets caused by frictional engagement between the trailing element device and said slot;

said slot being of triangular cross-sectional configuration, said slot having an opening toward said downstream end of the trailing element device;

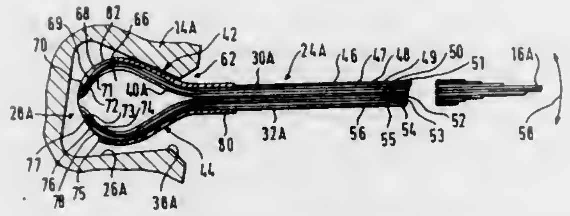
said bead including:

a central core extending in a cross-machine direction;

a plurality of upstream ends of said sheets being curved around said core such that said curved upstream ends and said binding means cooperate together to prevent the passage of said upstream bead through said opening, so that said device is anchored within said slot; and

said wear resistant cladding means including:

a metal sheath extending around at least a portion of the outer surface of said upstream bead, and extending therefrom towards said downstream end such that said metal sheath inhibits wear and fracturing of the sheets caused by frictional engagement between the trailing element device and said slot.



---

## 5,013,407
## APPARATUS FOR REACTIVE DISTILLATION

**Jean-Luc Nocca, Rueil-Marmaison; Jacques Leonard, Montigny; Jean-Ferdinand Gaillard, Lyon, and Pierre Amigues, Francheville, all of France, assignors to Institut Francais Du Petrole, Rueil-Malmaison and Elf France, Courbevoie, both of, France**

**Division of Ser. No. 171,340, Mar. 21, 1988, Pat. No. 4,847,431.**
**This application May 24, 1989, Ser. No. 356,090**
**Int. Cl.$^5$ B01D** *3/20;* **B01J** *8/04*

U.S. Cl. 202—158 11 Claims

1. An apparatus for reactive distillation comprising:

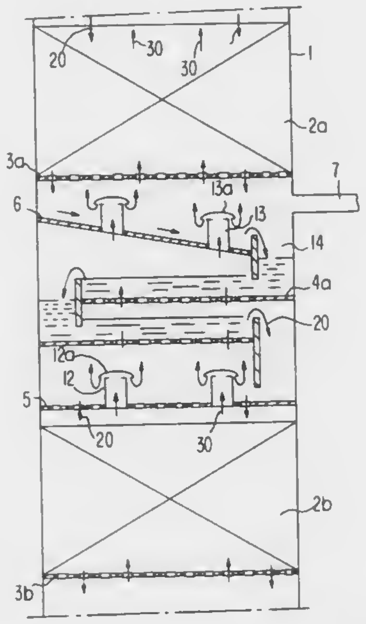
a substantially cylindrical vessel having an upper portion and a lower portion, at least one feed inlet means for introducing a charge, at least one vapor outlet means in said upper portion of said vessel for withdrawing a vapor phase, at least one reflux inlet means in said upper portion of said vessel for a reflux feed, at least one liquid outlet means in said lower portion of said vessel for withdrawing a liquid phase, at least one vapor inlet means in said lower portion of said vessel for introducing an at least partially vaporized phase;

at least two superposed non-contiguous fixed catalyst beds positioned within said vessel, each of said beds being placed on a perforated support member,

at least one distillation means placed in at least one free space between two consecutive catalyst beds, said distillation means having means to permit an upwardly flowing vapor stream to come into contact with a downwardly flowing liquid stream; and

at least one discontinuous liquid redistribution tray, placed in at least one free space between a distillation means and the catalyst bed just below said distillation means to distribute liquid onto said catalyst bed

wherein said catalyst bed, distillation means, and redistribution tray are positioned to direct a downwardly flowing liquid discharged from said distillation means onto and through said redistribution tray and then to flow downwardly through said catalyst bed.



---

## 5,013,408
## DECARBONIZATION APPARATUS FOR COKE OVEN CHAMBER

**Keniti Asai; Hideaki Ito; Yoji Nakagawa; Yasutaka Shihara; Toshiaki Hodate, and Akikazu Nakazaki, all of c/o Nippon steel Corporation, Yawata Works, 1-1-1, Edamitsu, Yahatahigashi-ku, Kitakyushu-shi, Fukuoka-ken, Japan**

**Continuation of Ser. No. 97,265, Sep. 17, 1987, abandoned, which is a continuation of Ser. No. 817,598, Jan. 10, 1986, abandoned. This application Dec. 20, 1988, Ser. No. 287,626**

**Claims priority, application Japan, Jan. 9, 1986, 61-2742; Jan. 9, 1986, 61-2743**

**Int. Cl.$^5$ C10B** *43/12*

U.S. Cl. 202—241 4 Claims

1. A decarbonization apparatus in combination with a coking chamber in a coke oven for decarbonizing the coking chamber, wherein said coking chamber includes side walls, an interior and an upper wall, said apparatus comprising:

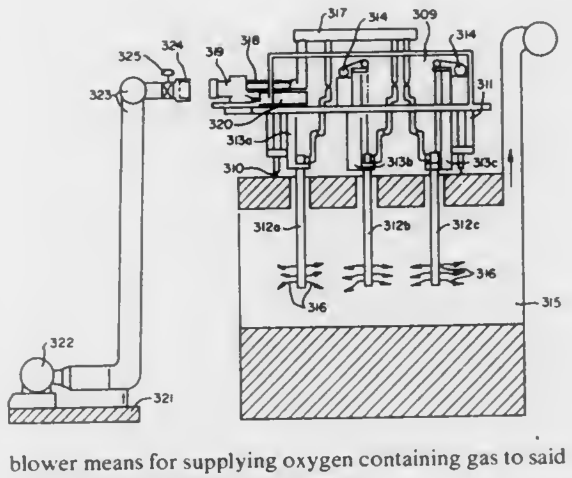
a car movable to and from said coking chamber;

at least one elongated lance member having at least one nozzle disposed substantially parallel to the side walls of the coking chamber for ejecting oxygen-containing gas into an interior of the coking chamber;

a guide for guiding the at least one elongated lance member into and out of a charging hole in the upper wall of the coking chamber;

means for controllably moving the at least one alongated lance member up and down on said guide and into and out of the interior of the coking chamber; and

blower means for supplying oxygen containing gas to said at least one elongated lance member.



---

## 5,013,409
## ELECTRODEPOSITION PROCESS

**Doug Czor, 10008 Caddie, N.W., Albuquerque, N. Mex. 87114**
**Filed Mar. 23, 1989, Ser. No. 328,069**
**Int. Cl.$^5$ C25D** *1/10*

U.S. Cl. 204—6 18 Claims

1. A process for electrodepositing a metal on a mold comprising the following steps:

(a) obtaining an original solid object comprising a surface configuration which is to be essentially duplicated by the electrodeposition process;

(b) applying an elastic molding material to the surface of the original object;

(c) allowing the elastic molding material to cure or solidify to obtain a solid elastic mold comprising an object-facing surface configuration which is in a reverse configuration to the surface configuration of the object, the elastic mold being essentially non-reactive to an electrodeposition solution;

(d) removing the elastic mold from the surface of the original object;

(e) providing conductive means to the object-facing surface of the mold;

(f) placing the mold comprising the conductive means into an electrodeposition bath, the electrodeposition bath comprising the electrodeposition solution and at least one anode;

(g) providing weighting means to the elastic mold for preventing the elastic mold from floating in the electrodeposition bath;

(h) electrodepositing metal onto the object-facing surface of the mold for a sufficient time to form a metal deposit on the object-facing surface of the mold;

(i) removing the mold from the electrodeposition bath; and

(j) detaching the elastic mold from the metal deposit to produce an electrodeposited metal product comprising a mold-facing surface and a back surface, the mold-facing surface having a substantially similar configuration to the surface configuration of the original object.

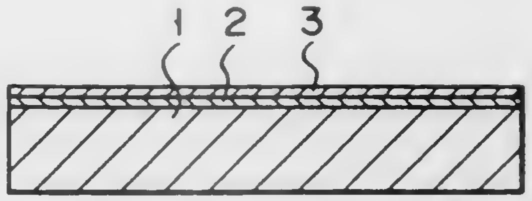
---

## 5,013,410
## METHOD OF MANUFACTURING AN ALUMINUM-PLATED STEEL SHEET FOR CANS

**Hiroshi Kagechika; Tadahiko Mishima; Yoshinori Yomura; Hiroshi Ishikawa; Naoyuki Oniwa; Yoshihiko Yasue, and Hiroshi Kibe, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan**

**Division of Ser. No. 280,147, Dec. 2, 1988, Pat. No. 4,906,533.**
**This application Jan. 3, 1990, Ser. No. 460,354**
**Claims priority, application Japan, Dec. 10, 1987, 62-313013**
**Int. Cl.$^5$ C25D** *5/44;* **C23C** *14/34*

U.S. Cl. 204—27 4 Claims



1. A method of manufacturing an aluminum-plated steel for cans, comprising the steps of:

preparing a steel sheet;

forming a chromium plating layer having a thickness of 0.005 to 0.05 μm on the surface of said steel sheet, and simultaneously forming a hydrated chromium oxide layer on the surface of said chromium plating layer;

removing all of said hydrated chromium oxide layer; and

plating aluminum on the surface of said chromium plating layer, from which said hydrated chromium oxide layer has been removed, to a thickness of not less than 0.01 μm.

---

## 5,013,411
## METHOD FOR PRODUCING A CORROSION RESISTANT RARE EARTH-CONTAINING MAGNET

**Takehisa Minowa, and Masao Yoshikawa, both of Fukui, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed May 31, 1989, Ser. No. 359,382**
**Claims priority, application Japan, Jun. 2, 1988, 63-134423**
**Int. Cl.$^5$ C25D** *5/34*

U.S. Cl. 204—29 8 Claims

1. In a method for producing a corrosion resistant rare earth containing magnet wherein a magnet unit having surfaces is obtained from a rare earth containing alloy through the following steps:

(a) preparing an ingot of an alloy containing at least 5 to 40 weight percent of at least one rare earth element, 50 to 90 weight percent of Fe, 0 to 15 weight percent of Co, 0.2 to 8 weight percent of B, and 0 to 8 weight percent of at least one element selected from the group consisting of Ni, Nb, Al, Ti, Zr, Cr, V, Mn, Mo, Si, Sn, Ga, Cu, and Zn;

(b) pulverizing the ingot into a fine powder;

(c) magnetically orienting the powder in a mold;

(d) compacting the powder in the mold to produce a compact;

(e) sintering the compact;

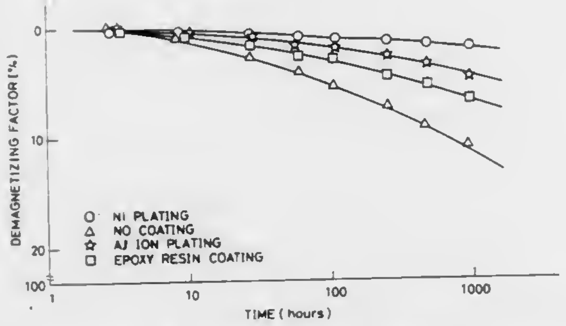
(f) aging the compact at elevated temperatures; and

(g) dividing the compact in units having surfaces; the improvement comprising the following steps to which each magnet unit is subjected after step (g):

(h) cleaning the surfaces of the magnet unit;

VOL
1126
ISS
1
MY
7
1991
UMI

(i) activating the cleaned magnet surfaces by treating the magnet surfaces with a substance selected from the group consisting of a soap, a synthesized anionic surface active agent, a cationic surface active agent, a nonionic surface active agent and combinations thereof;



(j) subjecting the activated magnet surfaces to ultrasonic vibrations in water to remove foreign material therefrom; and

(k) coating the magnet surfaces with at least one layer of a Ni-containing film by electroplating.

---

### 5,013,412

### PROCESS FOR THE ELECTROSYNTHESIS OF A BETA,GAMMA-UNSATURATED ESTER

**Annie Conan, Bagneux; Esther D'Incan, Chatenay-Malabry; Jacques Perichon, Savigny-sur-Orge, and Soline Sibille, Saint-Maur-des-Fosses, all of France, assignors to Societe Nationale des Poudres et Explosies (SNPE), Paris, France**

**Filed Apr. 18, 1990, Ser. No. 510,879**

**Claims priority, application France, Apr. 28, 1989, 89 05626**

**Int. Cl.$^5$ C25B** *3/00*

**U.S. Cl. 204—59 R** **20 Claims**

1. A process for the electrosynthesis of a beta, gamma unsaturated ester from an alpha, beta unsaturated halide and an alpha halogenated ester, said process comprising electrolyzing, in an electrolytic cell fitted with electrodes in an organic solvent medium, a mixture of an alpha, beta unsaturated halide and an alpha halogenated ester in the presence of an amount, which is less that the stoichiometric amount for the reaction between said halide and said ester, of a catalyst based on nickel complexed with a binitrogenous bidentate organic ligand, said electrolytic cell having only a single compartment and being fitted with a sacrificial anode made of a reducing metal or an alloy thereof.

---

### 5,013,413

### APPARATUS FOR THE CONTINUOUS PRODUCTION OF A POLYVALENT METAL

**Airy-Pierre Lamaze, Grenoble, and Patrick Paillere, Ugine, both of France, assignors to Compagnie Europeenne du Zirconium Cezus of Tour Manhattan, Courbevoie, France**

**Filed Apr. 16, 1990, Ser. No. 509,131**

**Claims priority, application France, Apr. 21, 1989, 89 06134**

**Int. Cl.$^5$ C25C** *3/00, 3/26, 7/00*

**U.S. Cl. 204—64 R** **4 Claims**

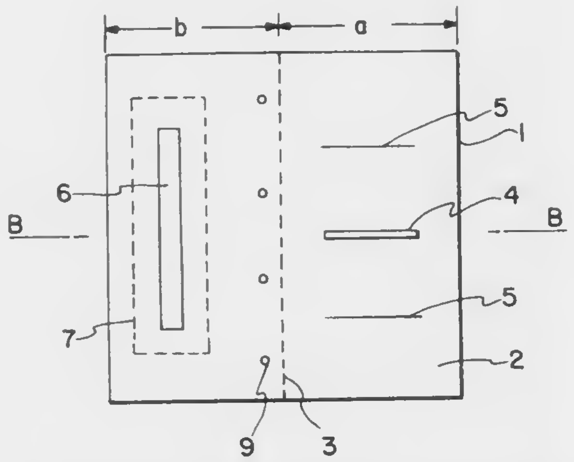
3. Method for continuous production of a polyvalent metal by electrolysis of a halide of the metal in a bath of at least one molten salt, comprising the steps of:

disposing a first electrodismutation cell contiguous with a second prereduction cell, and disposing between the cells a grid serving as a common wall which is insulated from other walls of the cells;

disposing in said first cell at least one deposition cathode and at least two electrodismutation anodes;

disposing in said second cell a prereduction anode and a diaphragm, which separates the prereduction anode from the grid;

supplying metal halide to said prereduction cell, and causing a flow of bath by forced convection from top-to-bottom in said electrodismutation cell and from bottom-to-top in said prereduction cell;



in said electrodismutation cell, passing and at least partly direct current between said deposition cathode and said electrodismutation anodes, said current having an anodic density insufficient to convert the halide to free halogen but sufficient to cause an increase in valency of at least a part of the metal, and a cathodic density sufficient to reduce the metal halide to free metal; and

in said prereduction cell, passing an at least partly direct current between said prereduction anode and said grid serving as a cathode, said current having an anodic density sufficient to convert the halide to free halogen, and a cathodic density insufficient to deposit free metal, but sufficient to cause a decrease in the valency of at least part of the metal.

---

### 5,013,414

### ELECTRODE STRUCTURE FOR AN ELECTROLYTIC CELL AND ELECTROLYTIC PROCESS USED THEREIN

**Gregory J. E. Morris; Pierluigi A. V. Borrione, and Umberto Leoni, all of Milan, Italy, assignors to The Dow Chemical Company, Midland, Mich. and Denora Permelec S.p.A., Milan, Italy**

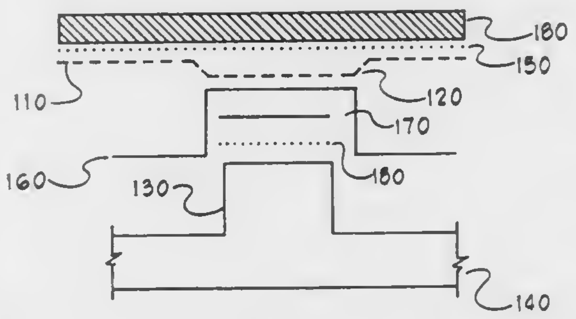
**Filed Apr. 19, 1989, Ser. No. 340,605**

**Int. Cl.$^5$ C25B** *1/14, 11/03*

**U.S. Cl. 204—98** **83 Claims**

1. A substantially planar primary hydraulically permeable electrode member having a plurality of spaced apart depressions located at positions throughout the electrode member, wherein said depressions correspond in location to a plurality of stand-off means on a central barrier support means.

50. An electrolytic method comprising passing electrical current between an anode and a cathode, wherein at least one of the anode or the cathode is a hydraulically permeable electrode member which has a plurality of spaced apart depressions located at points substantially throughout the primary hydraulically permeable electrode member, said depressions being in mechanical and electrical contact with stand-off means emanating outward from a central barrier.



---

### 5,013,415

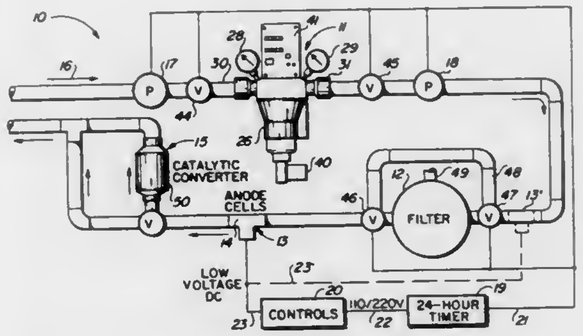
### LIQUID PURIFICATION SYSTEM

**Wilbur N. Hudson, 4733 E. Grandview Rd., Phoenix, Ariz. 85032**

**Filed May 12, 1989, Ser. No. 350,934**

**Int. Cl.$^5$ C02F** *1/46;* **C10G** *17/06*

**U.S. Cl. 204—152** **9 Claims**



1. A liquid treatment apparatus comprising:

pump means for circulating liquid from an inlet port to an outlet port,

a filtering means for receiving said liquid and discharging filtered liquid therefrom,

said filtering means comprising a first filter for removing particles larger than a first predetermined size and a second filter for sequentially removing particles larger than a second predetermined size,

said first filter comprising a hollow cone shaped configuration having a porous surface through which said liquid is passed to separate it from it matter held in suspension larger than said first predetermined size,

valve means upstream of said first filter for diverting a part of said liquid over the outside surface of said first filter for rinsing it and discharging said portion to a drain,

ionizing means for receiving and passing therethrough said filtered liquid,

said ionizing means comprising copper/silver alloy electrode for passing electrical current therebetween through the filtered liquid from one to the other of said electrodes, and

a catalytic water converter connected to receive the ionized liquid from said ionizing means,

said converter electro-chemically changing the ion and molecule composition of the ionized liquid passing therethrough prior to discharging it through said outlet port.

---

### 5,013,416

### PROCESS FOR MANUFACTURING TRANSPARENT, CONDUCTIVE FILM

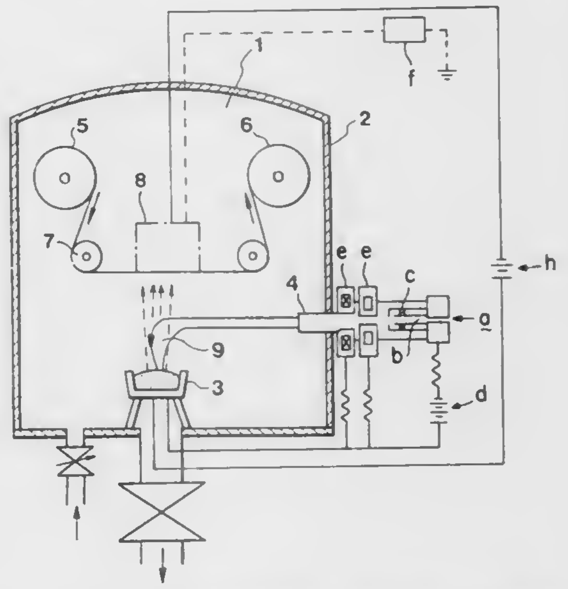
**Yoichi Murayama, 304, Domusu Mejiro 17-44, Shimoochiai 3-chome, Shinsuku-ku, Tokyo, 161, and Tetsuya Nomachi, Kyoto, both of Japan, assignors to Tobi Col, Ltd., Osaka and Yoichi Murayama, Tokyo, both of, Japan**

**Continuation of Ser. No. 124,208, Apr. 8, 1988, abandoned. This application Sep. 19, 1990, Ser. No. 585,263**

**Claims priority, application Japan, Mar. 12, 1986, 61-54162**

**Int. Cl.$^5$ C23C** *14/08, 14/32*

**U.S. Cl. 204—192.1** **2 Claims**



1. A process for manufacturing a transparent, conductive film which comprises:

(a) moving a polymer film substrate at high velocity, and

(b) depositing a transparent conductive thin film on the surface of the polymer film by ion-plating using a pressure-gradient discharge.

---

### 5,013,417

### WATER PURIFIER

**Lawrence M. Judd, Jr., 2414 Makiki Heights Dr., Honolulu, Hi. 96822**

**Filed May 23, 1990, Ser. No. 528,691**

**Int. Cl.$^5$ C25B** *15/00, 9/00, 9/04, 11/02*

**U.S. Cl. 204—228** **34 Claims**

19. A device for purifying water, comprising:

a water container;

an insulating waterproof floating casing adapted for floating

VOL
1126
ISS
1
MY
7
1991
UMI

inside said container having a bottom, a support member aperture in said bottom, and at least one contact member aperture in said bottom;

a conducting support member mounted in said support member aperture and extending downwards from the bottom of said casing;

a conducting contact member mounted in each of said contact member apertures and protruding from the bottom of said casing;

an insulating plug mounted on said support member;

an inner substantially disk shaped electrode mounted on said insulating plug and in electrical contact with said contact members;

an outer substantially disk shaped electrode mounted on said support member spaced apart from and substantially parallel to said inner electrode and in electrical contact with said support member;

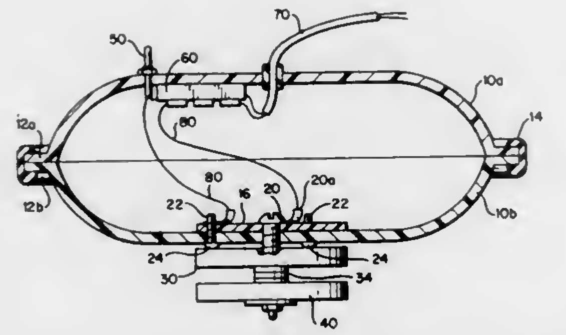
a removable retaining member mounted on said support member for removably retaining said outer electrode on said support member; and

an electrical power source connected to said support member and said contact members to provide said inner electrode and said outer electrode with electrical power.

25. A device according to claim **19**, further comprising:

an alternator mounted in said container to alternate the polarity of said electrical power at predetermined intervals;

whereby said electrodes are provided with electrical power of alternating polarity.



---

### 5,013,418
### ELECTROLYZER

**Heinz Wüllenweber, Frankfurt am Main, Fed. Rep. of Germany, and Jürgen Borchardt, Troistorrents, Switzerland, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

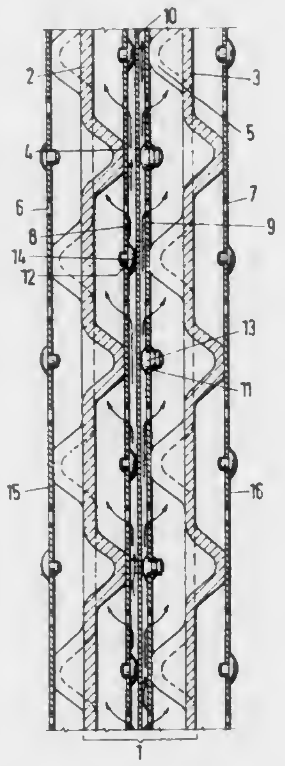
**Filed May 2, 1989, Ser. No. 346,060**

**Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815266**

**Int. Cl.⁵ C25B** *9/00, 11/03, 13/04*

**U.S. Cl. 204—253** **8 Claims**

1. An electrolyzer comprising individual cells which are geometrically arranged one behind the other and wherein each cell comprises two metallic partitions disposed between the cell and the adjacent cells and have profiled spacing means on both sides, a diaphragm disposed between the portions, and apertured electrodes mounted on both sides of and spaced from the diaphragm to define a space therebetween joined to and in contact with the profiled spacing means disposed on a side of the associated partition which faces the diaphragm, and spacers consisting of a non-metallic, high-melting hard material and firmly joined to the electrodes and disposed in each space between the electrode and the diaphragm, wherein the spacers consist of ceramic oxide materials, including aluminum oxide, nickel oxide and zirconium oxide.



---

### 5,013,419
### COATING APPARATUS

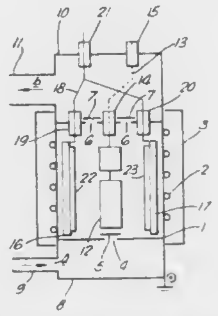
**David S. Rickerby, Jesmond; Derek S. Whitmell, Blewbury; Joseph P. Coad, Uffington, and Richard S. Nelson, Goring-on-Thames, all of England, assignors to United Kingdom Atomic Energy Authority, London, England**

**Filed May 15, 1986, Ser. No. 863,580**

**Claims priority, application United Kingdom, May 16, 1985, 8512455**

**Int. Cl.⁵ C23C** *14/22*

**U.S. Cl. 204—298.05** **6 Claims**



1. An apparatus for applying a coating of a first material to a second material by sputter ion plating comprising a chamber having a gas inlet and outlet for passing gas under low pressure continuously therethrough; a cathode, positioned in the chamber, and fabricated of the first material or of a precursor therefor; and means for generating a glow discharge within the chamber to transfer the first material by sputtering from the cathode to form a coating thereof or of a product obtained therefrom on a substrate fabricated of the second material and also positioned in the chamber, wherein the cathode includes a plurality of projections extending from a surface and being so disposed and of such geometry that, in operation of the apparatus, the effective ion current density adjacent the cathode is greater than in their absence, wherein the cathode surface is flat and the projections comprise rectangular fins mounts substantially normally on the surface, and wherein the aspect ratio of the fins is about 2:1.

---

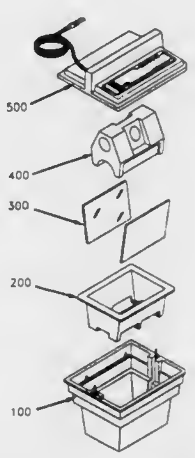
### 5,013,420
### GEL ELECTROPHORESIS/ELECTRO-BLOT APPARATUS

**Michael W. Schuette, Vienna, Va., assignor to Life Technologies Inc., Gaithersburg, Md.**

**Filed Apr. 19, 1990, Ser. No. 511,345**

**Int. Cl.⁵ G01N** *27/26*

**U.S. Cl. 204—299 R** **12 Claims**



1. Apparatus for analyzing chemical compositions using gel slabs or gel slab assemblies, comprising:

a buffer tank having a single buffer solution reservoir;

a support frame for supporting at least one gel slab, said support frame being mountable in said buffer tank;

means for securing the at least one gel slab in said support frame;

wherein, when said support frame and said securing means are mounted in said buffer tank, said frame, said securing means and said buffer tank create and define a first and second reservoir from said single buffer solution reservoir;

first and second electrodes located in said first and second buffer solution reservoirs, respectively; and

means for connecting said first and second electrodes to a power source.

---

### 5,013,421
### ION-SELECTIVE ELECTRODES

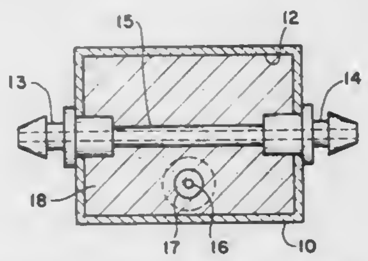
**K. Jagan M. Rao, and K. Savitri Rao, both of 2 Baldwin Hill Pl., Moorestown, N.J. 08052**

**Continuation-in-part of Ser. No. 138,361, Dec. 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 908,363, Sep. 17, 1986, abandoned. This application Mar. 15, 1989, Ser. No. 324,295**

**Int. Cl.⁵ G01N** *24/30*

**U.S. Cl. 204—409** **21 Claims**

1. In a flow-through electrode assembly having as an element a tube for the passage of liquid sample through said assembly and a membrane comprising a membrane matrix of an organic plastic material containing a non-volatile solvent plasticizer and an ion-active material dissolved in said solvent plasticizer, the improvement to provide a structurally stable membrane of increased active area and a flow-through electrode assembly of increased operating life in which said tube comprises a porous tube in which the pores are impregnated with said membrane matrix, said porous tube comprising a material which is essentially nonreactive with a solution to be tested and in which pores are generally uniformly distributed throughout said tube, said pores communicating between the inside of said tube and the exterior of said tube and having a maximum diameter of about 100 microns, said plasticizer being essentially nonreactive with and a nonsolvent for said tube material.



---

### 5,013,422
### CATALYTIC HYDROCRACKING PROCESS

**Robert P. L. Absil, W. Deptford; Thomas F. Degnan, Moorestown; Scott Han, Lawrenceville; David O. Marler, Deptford, all of N.J.; Richard F. Socha, Newtown, Pa., and Michael R. Stapleton, Freebold, N.J., assignors to Mobil Oil Corp., Fairfax, Va.**

**Continuation-in-part of Ser. No. 254,524, Oct. 6, 1988, Pat. No. 4,954,325, which is a continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Feb. 14, 1990, Ser. No. 479,790**

**The portion of the term of this patent subsequent to Nov. 6, 2007, has been disclaimed.**

**Int. Cl.⁵ C10G** *47/20, 65/10*

**U.S. Cl. 208—27** **25 Claims**

11. A dual stage hydrocracking conversion process which comprises:

(a) contacting a hydrocarbon stream boiling above a temperature of about 300° F. in a first stage under hydrocracking conditions and in the presence of hydrogen with a first hydrocracking catalyst composition comprising (i) a synthetic porous crystalline material characterized by an X-ray diffraction pattern including values substantially as set forth in Table I of the specification and (ii) at least one hydrogentaion component to provide a first hydrocracked effluent; and

(b) contacting said first hydrocracked effluent in a second stage under hydrocracking conditions and in the presence of hydrogen with a second hydrocracking catalyst composition comprising (i) zeolite Beta and (ii) at least one hydrogenation component to provide a second hydrocracked effluent.

---

### 5,013,423
### REFORMING AND DEHYDROCYCLIZATION

**Nai Y. Chen, Titusville; Ralph M. Dessau, Edison; Randall D. Partride, W. Trenton, all of N.J., and Ernest W. Valyocsik, Yardley, Pa., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Continuation-in-part of Ser. No. 230,729, Aug. 4, 1988, abandoned, which is a continuation of Ser. No. 122,089, Nov. 17, 1987, abandoned, and a continuation of Ser. No. 138,463, Dec. 28, 1987, abandoned, and a continuation of Ser. No. 138,474, Dec. 28, 1987, abandoned, and a continuation of Ser. No. 138,472, Dec. 28, 1987, abandoned. This application Jan. 11, 1989, Ser. No. 295,959**

**Int. Cl.⁵ C10G** *35/06;* **C07C** *12/02*

**U.S. Cl. 208—64** **66 Claims**

1. A process for manufacturing benzene, toluene, or mixtures thereof, said process comprising providing a feed com-

VOL
1126
ISS
1
MY
7
1991
UMI

prising substantially isomer-free normal hexane, substantially isomer-free normal heptane, or mixtures thereof and contacting said feed under dehydrocyclization conditions of temperature, pressure and space velocity with a non-acidic dehydrogenation catalyst consisting essentially of a platinum group metal supported on an indium containing zeolite, said zeolite having the crystal structure of ZSM-5, ZSM-11, ZSM-12, ZSM-23, ZSM-35, ZSM-38 or ZSM-48, and recovering said benzene, toluene or mixture thereof.

**53**. A method for increasing the aromatic content of a reformate with a research octane in the range of 50 to 90 comprising

providing said reformate of research octane of 50 to 90 containing $C_6^+$ aliphatics and contacting said reformate with a catalyst composition, at a temperature of at least about 800° F., at a pressure ranging from about 0 to about 500 psig, and at a liquid hourly space velocity (LHSV) ranging from 0.1 to 20; wherein said catalyst composition comprises a hydrogenation/dehydrogenation component and an indium containing non-acidic crystalline, microporous material;

producing a product of research octane greater than that of the reformate and of aromatic components content greater than that of the reformate.

**57**. The method of claim **53**, further including increasing the liquid yield of reforming, by contacting a naphtha, under reforming conditions, with an acidic reforming catalyst to produce said reformate of research octane of 50 to 90 and containing said $C_6^+$ aliphatics, and then undertaking said contacting.

---

### 5,013,424

### PROCESS FOR THE SIMULTANEOUS HYDROGENATION OF A FIRST FEEDSTOCK COMPRISING HYDROCARBONACEOUS COMPOUNDS AND HAVING A NON-DISTILLABLE COMPONENT AND A SECOND FEEDSTOCK COMPRISING HALOGENATED ORGANIC COMPOUNDS

**Robert B. James, Jr., Northbrook; Tom N. Kalnes, La Grange, and Steven P. Lankton, Wheeling, all of Ill., assignors to UOP, Des Plaines, Ill.**

**Filed Jul. 30, 1990, Ser. No. 559,820**

**Int. Cl.$^5$ C07C** *15/02*

**U.S. Cl. 208—78** **18 Claims**

**1**. A process for the simultaneous hydrogenation of a first feedstock comprising hydrocarbonaceous compounds and having a non-distillable component, and a second feedstock comprising halogenated organic compounds which process comprises:

(a) contacting said first feedstock with a first hydrogen-rich gaseous stream having a temperature greater than said first feedstock in a flash zone at flash conditions thereby increasing the temperature of said first feedstock and vaporizing at least a portion thereof to provide a hydrocarbonaceous vapor stream comprising hydrogen, and a heavy product comprising said non-distillable component;

(b) contacting said hydrocarbonaceous vapor stream comprising hydrogen with a hydrogenation catalyst in a first hydrogenation reaction zone at hydrogenation conditions to increase the hydrogen content of said hydrocarbonaceous compounds contained in said hydrocarbonaceous vapor stream;

(c) condensing at least a portion of the resulting effluent from said first hydrogenation reaction zone to produce a second hydrogen-rich gaseous stream and a first liquid hydrogenated stream comprising hydrogenated distillable hydrocarbonaceous compounds;

(d) reacting said second feedstock comprising halogenated organic compounds and at least a portion of said second hydrogen-rich gaseous stream with a hydrogenation catalyst in a second hydrogenation reaction zone at hydrogenation conditions selected to produce hydrocarbonaceous compounds and at least one water-soluble inorganic halide compound;

(e) contacting the resulting effluent from said second hydrogenation zone containing hydrocarbonaceous compounds and at least one water-soluble inorganic halide compound with a halide-lean aqueous scrubbing solution;

(f) introducing a resulting admixture of said effluent from said second hydrogenation zone and said halide-lean aqueous scrubbing solution into a separation zone to provide a third hydrogen-rich gaseous stream, a second liquid hydrogenated stream comprising hydrocarbonaceous compounds and a halide-rich aqueous scrubbing solution containing at least a portion of said water-soluble inorganic halide compound;

(g) recycling and heating at least a portion of said third hydrogen-rich gaseous stream recovered in step (f) into step (a) as at least a portion of said first hydrogen-rich gaseous stream; and

(h) recovering said first liquid hydrogenated stream comprising hydrogenated distillable hydrocarbonaceous compounds from step (c) and said second liquid hydrogenated stream comprising hydrocarbonaceous compounds from step (f).

---

### 5,013,425

### CONVERSION OF SIDE BY SIDE FCC UNIT

**Ismail B. Cetinkaya, Palatine, Ill., assignor to UOP, Des Plaines, Ill.**

**Filed May 18, 1990, Ser. No. 525,018**

**Int. Cl.$^5$ C10G** *11/00*

**U.S. Cl. 208—113** **6 Claims**

**1**. A process for the fluidized catalytic cracking of an FCC feedstock said process comprising:

(a) contacting an FCC feedstock with regenerated catalyst in an upstream section of a reactor riser and passing said catalyst and feedstock mixture through said riser to crack said hydrocarbons and produce product vapors while depositing coke on said catalyst;

(b) discharging coke-containing catalyst and product vapors from said riser, separating said coke-containing catalyst from said product vapors, recovering said product vapors and passing coke-containing catalyst downwardly into a catalyst stripping zone;

(c) contacting said coke-containing catalyst with a stripping gas in said stripping zone to strip additional product vapors from said coke-containing catalyst, passing said additional product vapors out of said stripping zone for recovery and passing stripped coke-containing catalyst particles out of said stripping zone and into a first regeneration zone;

(d) collecting said stripped coke-containing catalyst particles in said first regeneration zone, contacting said stripped catalyst particles with an oxygen-containing gas to initiate the combustion of coke from said catalyst particles and produce a first flue gas stream containing gaseous products of coke combustion, maintaining a dense bed of said catalyst particles in said first regeneration zone, separating said catalyst particles from said first flue gas stream, withdrawing flue gas from an upper portion of said first regeneration zone and withdrawing initially regenerated catalyst from a lower portion of said regeneration zone;

(e) passing said initially regenerated catalyst from said first regeneration zone to a regenerator riser and contacting said catalyst with an oxygen containing gas stream, passing said catalyst and oxygen-containing gas through said riser and discharging said catalyst and gas from said regenerator riser into a second regeneration zone;

(f) maintaining a dense bed of catalyst particles in said second regeneration zone and combusting coke from catalyst in said second regeneration zone to provide partially regenerated catalyst and produce a second flue gas steam, separating catalyst from said second flue gas steam, withdrawing said second flue gas steam from said second regeneration zone, and passing partially regenerated catalyst downwardly from said second regeneration zone to a third regeneration zone; and

(g) passing said catalyst downwardly through a plurality of vertically spaced and downward sloping baffles in said third regeneration zone and cascading the catalyst from side to side as it passes downwardly through said third regeneration zone, passing an oxygen-containing gas upwardly through said third regeneration zone and countercurrently contacting said partially regenerated catalyst with said oxygen-containing gas to combust additional coke and produce a third flue gas stream, passing said third flue gas steam upwardly out of said third regeneration zone, withdrawing regenerated catalyst particles from lower portion of said third regeneration zone and passing said catalyst particles from said third regeneration zone to said upstream portion of said reactor riser.

---

### 5,013,426

### A CATALYTIC REFORMING METHOD WITH FLOW OF A HEAT-CARRYING FLUID THROUGH A PLURALITY OF HOLLOW INTERNAL SPACES

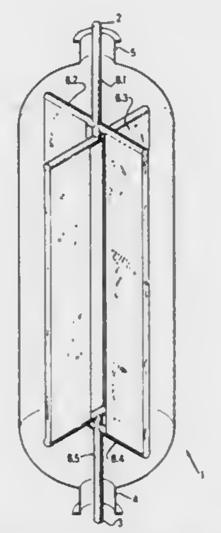
**Quang Dang Vu, Neuilly; Jean-Paul Bournonville, Cergy Pontoise, and Jean-Francois Le Page, Rueil Malmaison, all of France, assignors to Institut Francais Du Petrole, Rueil Malmaison, France**

**Filed Jun. 29, 1989, Ser. No. 372,998**

**Claims priority, application France, Jun. 29, 1988, 88 08898**

**Int. Cl.$^5$ C10G** *35/04*

**U.S. Cl. 208—134** **20 Claims**



**1**. A method of catalytically reforming hydrocarbons, comprising:

flowing a hydrocarbon charge through a reaction zone under reforming conditions and in the presence of hydrogen, said reaction zone being defined by a substantially cylindrical shaped enclosure having a longitudinal axis, wherein the pressure is 0.1 to 3.5 MPa,

said reaction zone containing a catalyst bed in the form of a ring defined by two coaxial cylindrical walls,

entirely disposed within said catalyst bed are a plurality of hollow internal spaces defined by walls, said internal spaces have a substantially parallelepipedic shape and are disposed radially with respect to said longitudinal axis of said reaction zone,

providing a flow of heat-carrying fluid through said internal spaces, and

said charge passes through said catalyst bed in a direction which is substantially perpendicular to said longitudinal axis of said reaction zone.

---

### 5,013,427

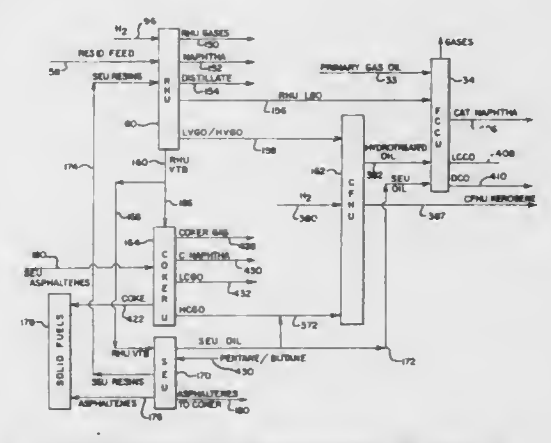
### RESID HYDROTREATING WITH RESINS

**James F. Mosby, Burr Ridge, Ill.; Lawrence B. Peck, Houston, Tex.; James L. Taylor, Naperville, and William I. Beaton, Wheaton, both of Ill., assignors to Amoco Corportion, Chicago, Ill.**

**Filed Jul. 18, 1989, Ser. No. 381,372**

**Int. Cl.$^5$ C10G** *1/00*

**U.S. Cl. 208—211** **20 Claims**



**1**. A hydrotreating process, comprising the steps of:

feeding a first feed stream comprising resid to a combined feed line upstream of a reactor

feeding a separate second stream comprising recycled substantially deasphalted solvent-extracted resins to said combined feed line upstream of said reactor

mixing said first stream comprising said resid and said second stream comprising said recycled deasphalted solvent-extracted resins in said combined feed line;

feeding said mixed first stream comprising said resid and said second stream comprising said recycled deasphalted resin to said reactor;

feeding hydrotreating catalyst to said reactor;

injecting hydrogen-rich gases into said reactor; and

hydrotreating said mixed first stream comprising said resid and said second stream comprising said recycled deasphalted solvent-extracted resins in said reactor by contacting said mixed first stream comprising said resid and said second stream comprising said recycled deasphalted solvent-extracted resins with said hydrogen-rich gases in the presence of said hydrotreating catalyst under hydrotreating conditions to produce hydrotreated oil;

fractionating said hydrotreated oil in a fractionator to produce gas oil and resid bottoms;

substantially separating said resid bottoms by solvent extraction into one stream comprising asphaltenes and said second stream comprising said substantially deasphalted solvent-extracted resins; and

recycling said second stream comprising said recycled deasphalted solvent-extracted resins to said combined feed line upstream of said reactor.

---

### 5,013,428

### RECOVERY OF OIL FROM A SHALE CONTAINING THE SAME

**Ben A. Christolini, Yorba Linda; Kimanh T. Le, Corona; Mitchell J. Berndt, Placentia, and Steven E. Howe, Chino, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Filed Apr. 5, 1990, Ser. No. 504,937**

**Int. Cl.$^5$ C10G** *1/00*

**U.S. Cl. 208—415** **29 Claims**

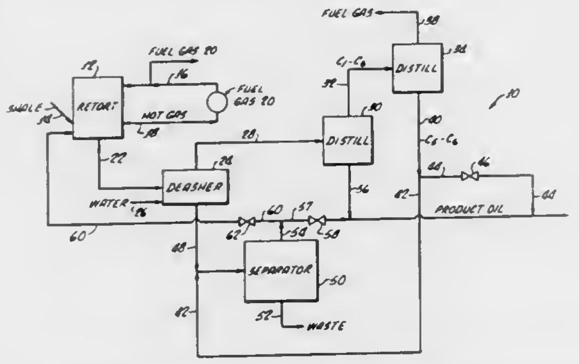
**1**. A process for recovering oil from a shale containing the same comprising the steps of:

(a) introducing a pulverized oil-containing shale into a retort

VOL
1126
ISS
1
MY
7
1991
UMI

zone to produce a slurry comprising shale particulates and oil;

(b) introducing the slurry from step (a) into a deashing zone and separating the slurry into a substantially shale-free oil fraction and a shale fraction containing entrained oil;



(c) separating the shale-free oil fraction from step (b) into at least a product oil fraction and a light hydrocarbon solvent; and

(d) contacting the shale fraction from step (b) with at least a portion of the light hydrocarbon solvent from step (c) for a time sufficient to produce an oil-solvent mixture and an oil depleted shale fraction.

---

### 5,013,429

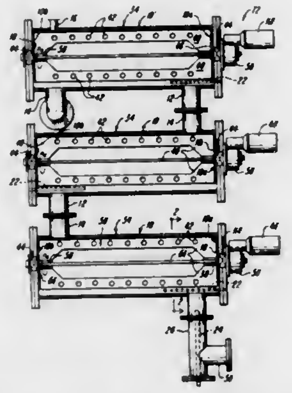
### APPARATUS FOR STABILIZING SLUDGE

**Milos Krofta, Lenox, Mass., assignor to Lenox Institute for Research, Inc., Lenox, Mass.**

**Filed Mar. 8, 1989, Ser. No. 320,400**

**Int. Cl.$^5$ C02F** ***11/06***

**U.S. Cl. 210—137** **13 Claims**



1. A stabilizer for sludge having a solid content in the range of approximately 3% to 8% dry solid content comprising
   at least one hollow reactor tank having an inlet and an outlet for the sludge,
   means for controlling the flow of sludge through said tank so that the tank is substantially filled with the sludge at a hyperbaric pressure,
   means for introducing microscopic bubbles of oxygen and/or ozone gas directly into the sludge within said tank,
   a mixer mounted within said tank to work said gas bubbles into contact with the sludge, said mixer being mounted and configured with respect to the interior of said tank that the sludge is carried by the mixer into contact with any accumulation of said gas at the upper interior portion of said tank, and
   means for driving said mixer.

13. A system for stabilizing sludge such as that produced by a municipal waste water treatment plant comprising,
   a first mixer that mixes the sludge in a liquid phase with a polymer,
   a reducer that receives the sludge and polymer from said first mixer and thickens the sludge to a solid content in the range of approximately 3% to 8%,
   a second mixer that mixes the sludge received from said reducer with an acid to remove heavy metals,
   at least one reactor tank extending horizontally and having an inlet at one side and outlet at the opposite side,
   a metering pump that feeds the acidified sludge from the second mixer to said inlet reactor tank,
   means for introducing microscopic bubbles of $O_2$ and/or $O_3$ into the sludge within said reactor tank,
   means for mechanically mixing said sludge and bubbles within said tank to increase their mutual contact surface area,
   means for controlling the flow of sludge from said outlet so as, in cooperation with said metering pump, to maintain a hyperbaric pressure of said sludge within said tank, and
   thickening means to increase the solid content of said sludge to a value in the range of 20% to 40%.

---

### 5,013,430

### DEVICE FOR SEPARATION AND TRANSPORT OF WASTE MATERIAL FROM POLLUTED LIQUID

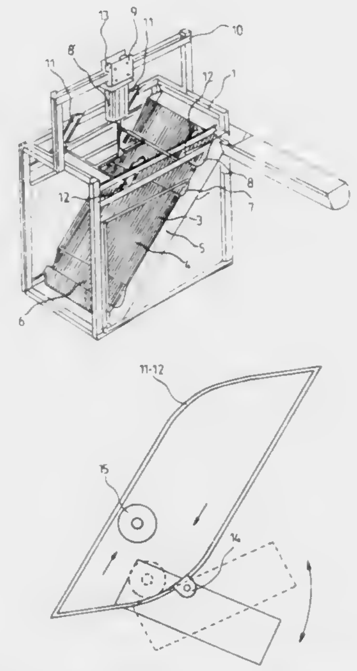
**Ola Mileson, Elledalsgatan 9, SE-385 00 Torsås, Sweden**

**Filed Jul. 19, 1989, Ser. No. 382,735**

**Claims priority, application Sweden, Mar. 18, 1988, 8800995**

**Int. Cl.$^5$ B01D** ***33/00***

U.S. Cl. 210—159 6 Claims



1. A device for the separation and transport of material from polluted liquid medium, comprising
   a support structure;
   a grate mounted in the support structure and comprising a series of stable and adjustable rods, every other rod in the gate of respective stable and adjustable rods being joined together to form a respective unit, and wherein the edges of the rods include three wave-shaped shelves turned against the direction of flow of the medium;
   a first shelf provided to the grate;
   a second shelf provided to the grate;
   a third shelf provided to the grate, where the first shelf is positioned at the bottom of the grate just under a surface level of the medium, and the second shelf and the third shelf are arranged at the top of the grate, with the second shelf mounted at about the surface level of the medium;
   a rail mounted in the support structure and disposed above the grate;
   a first wheel;
   a trolley supporting the first wheel and being attached to the rail with the first wheel running along the rail;
   a piston suspended in the trolley and said piston to be driven up and down, wherein the adjustable rod unit is attached to the piston;
   four two-track steerings positioned at the support structure grate, each said two track steering including a stop;
   a second wheel attached to the adjustable rod unit for performing a proper movement, which second wheel is arranged to press down the stop and which second wheel is mounted in the four two-track steerings, wherein each said steering is arranged to give two tracks, one track being used for ascent lifting the adjustable rod unit and the material thereon from one shelf to another, and the other track being used for descent drawing-in said shelf into a transport position.

---

### 5,013,431

### APPARATUS FOR ANAEROBIC PURIFICATION OF WASTE WATER

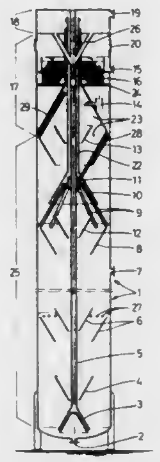
**Albert R. Doets, Westzaan, Netherlands, assignor to Meyn Machinefabriek, B.V., Oostzaan, Netherlands**

**Filed Apr. 25, 1989, Ser. No. 343,889**

**Claims priority, application Netherlands, May 9, 1988, 8801221**

**Int. Cl.$^5$ C02F** ***3/28***

U.S. Cl. 210—188 3 Claims



1. Apparatus for the anaerobic purification of waste water with an anaerobic sludge material, comprising:
   (a) an elongated vertical reactor chamber having means for receiving waste water and sludge material at the bottom of said chamber;
   (b) means for supplying waste water to the bottom of said reactor chamber;
   (c) baffle means disposed within said reactor chamber for mixing sludge material with said waste water;
   (d) a sludge-wastewater separator disposed above said reactor chamber for receiving the mixed sludge material and waste water;
   (e) means within said sludge-wastewater separator for separating said sludge from said water after said water is purified;
   (f) a gas-sludgewater separator disposed above said sludge-waste water separator for receiving a residue of said sludge and waste water from said sludge-wastewater separator;
   (g) means within said gas-sludgewater separator for separating gas from said sludge-wastewater;
   (h) two super-imposed conical gas separator disposed within said reactor chamber above said baffle means for collecting gas formed in said reactor chamber and for discharging said gas with sludgewater material into said gas-sludgewater separator, said gas separators being opened at their upper side so that said reactor chamber contents can move upwardly therein; and
   (i) a central vertical tube having an opening in said gas-sludgewater separator for receiving sludge water and returning it to said reactor chamber through an outlet opening into said chamber for mixing with waste water supplied to the bottom of said chamber.

---

### 5,013,432

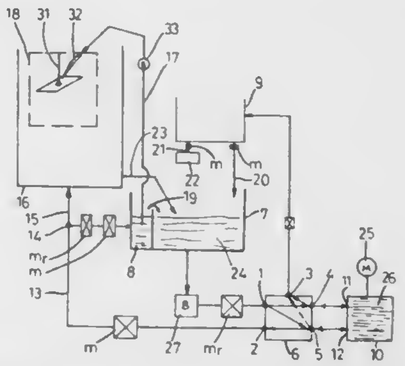
### FILTER SYSTEM FOR LIQUIDS WITH PARTICLES IN SUSPENSION

**Fernando Martinez-Mugica, Larrasoloeta, 5, 48200 Durango, Spain**

**Filed Apr. 28, 1989, Ser. No. 345,104**

**Int. Cl.$^5$ B01D** ***35/157***

U.S. Cl. 210—195.1 **10 Claims**



1. A filtering system for filtering liquids having particles in suspension comprising:
   (a) a first receptacle for liquid to be filtered free of particles;
   (b) a second receptacle for filtered liquid which is free of particles;
   (c) a decanting receptacle;
   (d) a filter; and
   (e) a valve unit constructed and arranged to fluidly connect the first receptacle, the second receptacle, and the decanting receptacle with each other and with the filter, the valve unit the filtering system having a filtering phase, a filter-washing phase and a rinsing phase, having means to differently connect the receptacles in the respective phases:
   (f) the valve unit comprising means to:
      (i) cause the liquid to flow from the first receptacle through the filter in a filtering direction to the second receptacle during the filtering phase;
      (ii) cause the liquid to flow from the decanting receptacle through the filter in a direction counter to the filtering direction to the first receptacle during the filter-washing phase; and
      (iii) cause the liquid to flow from the first receptacle through the filter in a filtering direction to the decanting receptacle during the rinsing phase.

VOL
1126
ISS
1
MY
7
1991
UMI

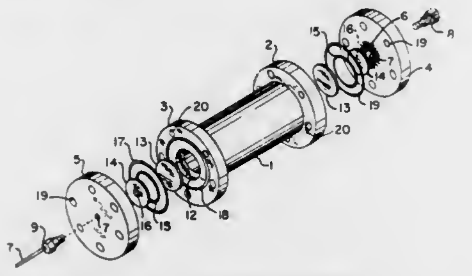
### 5,013,433
### ZERO VOID COLUMN END PLATE FOR CHROMATOGRAPHY

**Yehuda Shalon, St. Louis County, Mo., assignor to H.T. Chemicals, Inc., St. Louis, Mo.**

**Division of Ser. No. 328,781, Mar. 31, 1989, Pat. No. 4,882,047, which is a continuation of Ser. No. 67,553, Jun. 26, 1987, abandoned, Continuation-in-part of Ser. No. 5,641, Jan. 21, 1987, Pat. No. 4,719,011, which is a continuation of Ser. No. 714,730, Mar. 27, 1985, abandoned. This application Oct. 10, 1989, Ser. No. 419,086**

**Int. Cl.$^5$ B01D** *15/08*

**U.S. Cl. 210—198.2** **5 Claims**



1. A fluid dispersion apparatus comprising:

(a) an end plate. said end plate having an inlet port and fluid dispersion means, said dispersion means comprising a plurality of grooves on the surface of said end plate proximate said frit means, said grooves extending radially towards the periphery of said plate and increasing in volume in a direction towards the periphery of said plate, each of said grooves increasing in depth in a direction towards the periphery of said plate and also increasing in width in a direction towards the periphery of said plate, wherein the surface of said end plate proximate said frit means has no other grooves thereon; and

(b) frit means, said frit means being mounted proximate said end plate, said frit means being porous and providing for fluidic communication between said inlet port and an interior chamber, said frit means including a porous member substantially entirely formed with intereconnecting pores for the passage of fluids, except for a central high density region which does not allow the passage of fluids through said region.

---

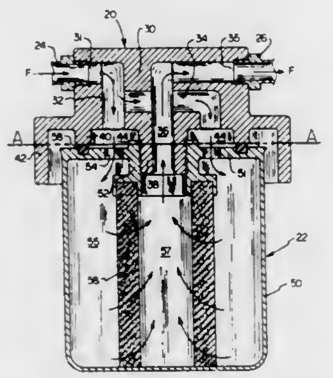
### 5,013,434
### FLUID FILTER CARTRIDGE SUPPORT HOUSING

**Roger W. Furrow, High Point, N.C., assignor to Gilbarco, Inc., Greensboro, N.C.**

**Filed Apr. 10, 1990, Ser. No. 508,008**

**Int. Cl.$^5$ B01D** *27/08*

**U.S. Cl. 210—232** **1 Claim**



1. A fuel filter mounting support for connecting a filter cartridge to a fuel dispenser, said filter cartridge being of the type which includes in an upper wall a central, internally threaded tubular portion which provides egress for fuel filtered in said cartridge back into said mounting support and a plurality of openings in the upper wall surrounding said tubular portion which provide an entrance for fuel from said support into said cartridge, said support comprising:

(a) a housing having means for attachment to a fuel conduit means and including an ingress port for the ingress of fuel to be filtered and egress port for delivering filtered fuel back to said conduit means;

(b) a first passageway extending internally of said housing for providing communication for fuel between said ingress port and an outlet means on a lower surface of said housing which is operative communication with said plurality of openings;

(c) a second passageway extending internally of said housing between a return inlet means for filtered fuel on the lower surface of said housing which is in operative communication with said central tubular portion and said egress port;

(d) attachment means extending downwardly from a central portion of the lower surface of said housing at a point aligned with said central tubular portion for releasably connecting said filter cartridge to said housing in such a position that entering unfiltered fuel is passed through said first passageway downwardly through said plurality of openings into said fuel cartridge, through a filter media therein, and back up through said central tubular portion into said second passageway from whence it flows through said second passageway;

(e) an annular ridge protruding downwardly from said lower surface along a path lying radially outward of said attachment means, said plurality of openings and said outlet means, against which said filter cartridge may be sealed when assembled; and

(f) a peripheral skirt extending downwardly from said housing below the point at which the lower surface of said housing is engaged by an assembled fuel cartridge for diverting escaping fuel and vapors downwardly should said filter cartridge be inadvertently loosened if the fuel supply to the filter cartridge is pressurized.

---

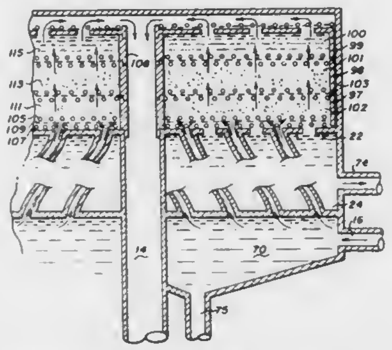
### 5,013,435
### CLARIFYING SYSTEM FOR LIQUIDS

**Allison L. Rider, 313 Hames Rd., Watsonville, Calif. 95076, and Robert S. Smith, San Jose, Calif., assignors to Allison L. Rider, Watsonville, Calif.**

**Filed Aug. 29, 1989, Ser. No. 399,844**

**Int. Cl.$^5$ B01D** *21/02*

**U.S. Cl. 210—262** **21 Claims**



20. A tubular bundle clarifying apparatus for removing particulates and organic and ionic contaminants from a liquid which comprises:

(a) a plurality of settling tubes each having a common cross-sectional dimension and a common length, each formed into a continuous helix having a common slope, and each having a bottom opening into which said liquid enters and a top opening out of which said liquid exits permitting said particulates to settle in said tubes and flow back out of said bottom openings;

(b) at least one means for filtering disposed above said settling tubes, arranged as a stack of filtering members with one member spaced above another, to define spaces therebetween; and

(c) treatment media located in each of said spaces so that said clarified liquid flows up through said settling tubes and said spaces wherein said contaminants are removed by interaction with said treatment media, and compaction of said media is prevented by said upward flow of said liquid through said treatment media.

---

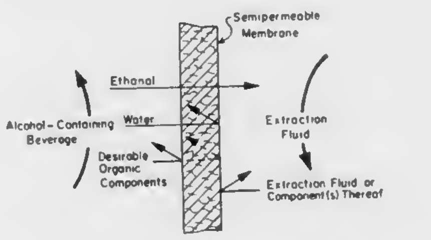
### 5,013,436
### PRODUCTION OF LOW-ETHANOL BEVERAGE BY MEMBRANE EXTRACTION

**Eric K. L. Lee, 8 Till Dr., Acton, Mass. 01720; Vinay J. Kalyani, 70 Boston Rd., #H 226, Chelmsford, Mass. 01824, and Stephen L. Matson, 15 Withington Ln., Harvard, Mass. 01451**

**Division of Ser. No. 296,255, Jan. 12, 1989, abandoned. This application Jul. 19, 1989, Ser. No. 382,615**

**Int. Cl.$^5$ B01D** *61/36, 63/02*

**U.S. Cl. 210—321.8** **22 Claims**


Semipermeable Membrane
Ethanol
Alcohol-Containing Beverage
Water
Desirable Organic Components
Extraction Fluid
Extraction Fluid or Component(s) Thereof

1. An apparatus for producing from a first alcoholic beverage a second beverage of reduced alcoholic content comprising:

a membrane which is impermeable to a congener and permeable to alcohol;

means for enabling alcohol which diffuses from a first alcoholic beverage through said membrane into a gas-phase extraction fluid comprising water vapor and alcohol on the second side of said membrane to produce a second alcoholic beverage on the second side of said membrane having reduced alcohol content, said means including,

means for feeding a first alcoholic beverage across a first side of said membrane;

means for providing a gas-phase extraction fluid to a second side of said membrane; and

means for regulating the relative humidity of said gas-phase extraction fluid on said second side of said membrane.

---

### 5,013,437
### HOLLOW FIBER MEMBRANE FLUID SEPARATION DEVICE ADAPTED FOR BORESIDE FEED WHICH CONTAINS MULTIPLE CONCENTRIC STAGES

**Johnny L. Trimmer, Antioch; Terrence L. Caskey, Concord, and Janine L. Jorgensen, Clayton, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 429,928, Oct. 30, 1989, Pat. No. 4,961,760, which is a continuation-in-part of Ser. No. 309,756, Feb. 9, 1989, Pat. No. 4,929,259. This application Aug. 24, 1990, Ser. No. 573,090**

**Int. Cl.$^5$ B01D** *63/04, 63/06*

**U.S. Cl. 210—321.78** **26 Claims**

1. A concentric multistage hollow fiber membrane fluid separation device adapted for boreside feed comprising:

A. a bundle comprising a plurality of hollow fiber membranes adapted for the separation of one or more fluids from one or more other fluids in a feed fluid mixture, wherein the bundle is partitioned into multiple stages comprising concentric annular regions comprising a feed stage and at least one non-permeate stage, wherein each stage possesses a feed end and a non-permeate end, wherein the feed end of each non-permeate stage is located at the opposite end of the bundle from the feed end of the immediately preceding stage and the non-permeate end of each non-permeate stage is located at the opposite end of the bundle from the non-permeate end of the immediately preceding stage;

B. a first tubesheet comprising a thermoset or thermoplastic polymeric material located adjacent to the first end of the bundle, wherein the first tubesheet is arranged such that the hollow fiber membranes are embedded in the first tubesheet and communicate through the first tubesheet and are open on the exterior face of the first tubesheet;

C. a second tubesheet comprising a thermoset or thermoplastic polymeric material located adjacent to the second end of the bundle opposite the first end of the bundle, wherein the second tubesheet is arranged such that the hollow fiber membranes are embedded in the second tubesheet and communicate through the second tubesheet and are open on the exterior face of the second tubesheet;

D. a first end capping means arranged and adapted for sealing at the vicinity of the first end of the bundle and/or the first tubesheet;

E. a first attachment means arranged for attaching the first end capping means at the vicinity of the first end of the bundle and/or the first tubesheet;

F. a first means for forming a seal between the first end capping means and the first end of the bundle and/or the first tubesheet;

G. a second end capping means arranged and adapted for sealing at the vicinity of the second end of the bundle and/or the second tubesheet;

H. a second attachment means arranged for attaching the second end capping means at the vicinity of the second end of the bundle and/or the second tubesheet;

I. a second means for forming a seal between the second end capping means and the second end of the bundle and/or the second tubesheet;

J. a feed inlet means adapted for introducing the feed fluid mixture to be separated into the device;

K. a feed inlet region, wherein the feed inlet region is sealed such that fluid enters the feed inlet region through the feed inlet means or leaves the feed inlet region through the hollow fiber membranes disposed within the feed stage, wherein the feed inlet region is arranged to introduce the feed fluid mixture into the bores of the hollow fiber membranes disposed within the feed stage at the feed end of said feed stage;

L. at least one non-permeate mixing region encompassing the non-permeate end of a stage and the feed end of the immediately successive stage, wherein the non-permeate from said stage enters each non-permeate mixing region from the bores of the hollow fiber membranes disposed within said stage at the non-permeate end of said stage, and each non-permeate mixing region cooperates with the immediately successive non-permeate stage to introduce fluid into the bores of the hollow fiber membranes disposed within said immediately successive non-permeate stage at the feed end of said immediately successive stage;

M. a non-permeate outlet means adapted for removing fluid which does not permeate through the hollow fiber membranes from the device;

N. a non-permeate outlet region, wherein the non-permeate outlet region is sealed such that fluid which does not permeate the hollow fiber membranes enters the non-permeate outlet region through the hollow fiber mem-

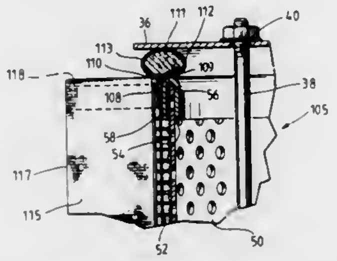
VOL
1126
ISS
1
MY
7
1991
UMI

branes or leaves the non-permeate outlet region through the non-permeate outlet means, wherein the non-permeate outlet region is arranged to remove the fluid which does not permeate the hollow fiber membranes from the device through the non-permeate outlet means; and

O. means for forming a seal between the non-permeate end of each non-permeate stage and the feed end of each immediately preceding stage.

---

### 5,013,438
## FLUID FILTER MEDIUM INCLUDING A TUBULAR FABRIC MEMBER
**Lawrence Smith, 206 E. Hwy. 90, Lot 3, Iowa, La. 70647**
**Filed Nov. 14, 1989, Ser. No. 435,758**
**Int. Cl.⁵ B01D** *27/06*
U.S. Cl. 210—455 21 Claims

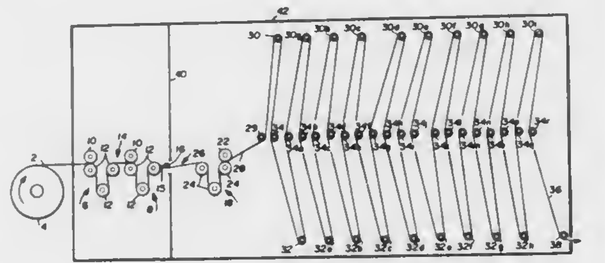


1. A filter medium in combination with a filter element frame including a central cylindrical perforated core and a plurality of attached filter leaves extending radially outward from the core, comprising:
- a fabric sleeve having opposite ends and a plurality of radially extending pockets configured to enclose the leaves and the outer side, but not the ends, of the perforated core of such filter element frame, with a separate pocket enclosing each such leaf;
- each end of such sleeve terminating in a continuous tubular fabric member extending along the periphery of such end;
- a resilient material filling each such tubular fabric member; and
- each such tubular fabric member being spaced from the outer edge of such pockets, a distance sufficient to enable the tubular fabric member to be compressed against an end of the perforated core and not the leaves of such filter element frame.

---

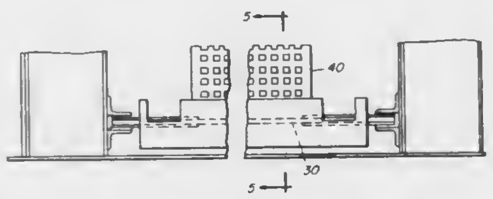
### 5,013,439
## MICROPOROUS MEMBRANES HAVING INCREASED PORE DENSITIES AND PROCESS FOR MAKING THE SAME
**Harold M. Fisher; Daniel E. Leone; James J. Lowery, all of Charlotte, N.C., assignors to Hoechst Celanese Corporation, Somerville, N.J.**
**Continuation of Ser. No. 193,327, May 12, 1988, abandoned. This application Nov. 9, 1989, Ser. No. 433,450**
**Int. Cl.⁵ B01J** *71/26*
U.S. Cl. 210—500.23 14 Claims

1. A process for preparing an open-celled, microporous polymer membrane which comprises the steps of:
- (a) uniaxially cold stretching a non-porous crystalline polymeric precursor to said membrane at a temperature in the range of between about −20° C. to about 20° C. below the crystalline melting point of the polymeric precursor, said uniaxial cold stretching being such that said polymeric precursor is extended greater than about 30% in length as compared to the initial length of said polymeric precursor; and
- (b) uniaxially hot stretching in the same direction the cold stretched precursor achieved in the practice of step (a) at a temperature in the range of between about 20° C. below the crystalline melting point of the polymeric precursor to about 5° C. below the crystalline melting point of the polymeric precursor whereby to achieve a microporous polymer membrane having an open-celled structure consisting of a dense plurality of interconnected pores and characterized by having a reduced bulk density as compared to the bulk density of a corresponding nonopen-celled structure, and having a pore density of greater than about 75 pores per square micron of membrane surface area, and wherein the pores have an average length of less than about 0.10 micron, an average breadth of less than about 0.035 micron, and an average surface area of less than about $2.5 \times 10^{-3}$ square micron.



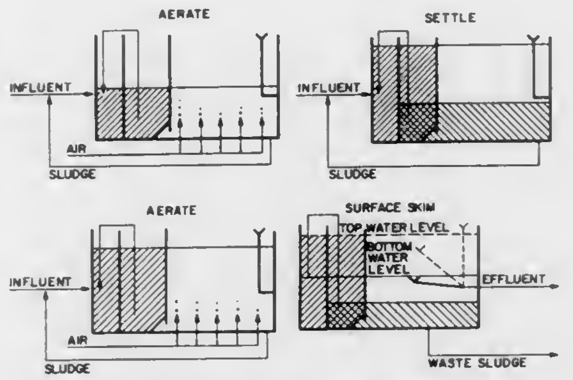
---

### 5,013,440
## FLUSHING LIQUOR DECANTER DRAG MODIFICATION
**Frederick L. Maddalena, Rostraver Township, Westmoreland County, Pa., assignor to USX Corporation, Pittsburgh, Pa.**
**Filed Nov. 6, 1989, Ser. No. 431,820**
**Int. Cl.⁵ B01D** *17/025*
U.S. Cl. 210—526 6 Claims



1. An apparatus for separating tar from coke oven flushing liquor, said apparatus comprising:
- an elongated generally rectangular decanter, means for controlling the rate of flow of tar exiting the decanter,
- a continuous drag assembly, said continuous drag assembly having a plurality of spaced spindles with solid outer cylindrical surfaces,
- endless travel means mounted on the spindles, means for driving the endless travel means and a plurality of members mounted on the endless travel means at spaced locations for removing solids from the decanter, said member mounted on the endless travel means including a drag bar having a T-shaped cross section normal to the length thereof, the crossbar of the T-shaped drag bar being aligned in a direction normal to the axis of the spindles, at least one of said T-shaped drag bars having a screen member in the form of a substantially planar metal plate, said metal plate projecting from the cross bar of the T-shaped drag bar toward a plane through axes of adjacent spindles in the decanter, said metal plate having a plurality of holes in a screen portion therein, said screen member serving to remove floating agglomerates of coal and coke from the tar in the decanter and permit uniform outflow of tar exiting the decanter.

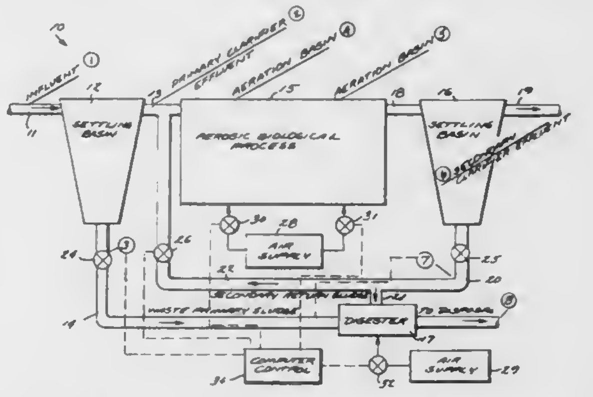
### 5,013,441
## BIOLOGICAL NUTRIENT REMOVAL WITH SLUDGE BULKING CONTROL IN A BATCH ACTIVATED SLUDGE SYSTEM
**Mervyn C. Goronszy, 8/106 Young Street, Cremorne, New South Wales-2090, Australia**
**Filed Jul. 20, 1988, Ser. No. 221,753**
**Int. Cl.⁵ C02F** *3/30*
U.S. Cl. 210—605 2 Claims



2. A sewage treatment process comprising:
- periodically introducing untreated sewage in a non-aerated first reaction zone that is so configured and operated as to be a non-aerated, variable volume, unmixed plug flow reaction zone;
- reacting the outflow of the first reaction zone in a second reaction zone that is so configured and operated as to be an anaerobic, variable volume, mixed reaction zone the contents of which are homogeneous during the reaction therein;
- reacting the outflow of the second reaction zone in a third reaction zone,
- the three reaction zones being so constructed and configured as to be formed in a single basin by baffles separating, respectively, the first reaction zone from the second reaction zone and the second reaction zone from the third reaction zone, the three zones being in fluid communication with each other and being at the same hydrostatic level as one another;
- aerating and mixing the third reaction zone during a first time period;
- permitting the third reaction zone to be quiescent and non-aerated during a second time period;
- recycling anaerobically fermented, partially treated sewage from the second reaction zone to the first reaction zone by mixing the partially treated sewage with the untreated sewage inflowing into the first reaction zone;
- recycling activated sludge from the third reaction zone to the first reaction zone by mixing the sludge with the untreated sewage inflowing into the first reaction zone;
- mixing the contents of the second reaction zone for keeping said contents homogeneous during the reaction in the second reaction zone;
- during said second time period decanting treated sewage from the third reaction zone to thereby reduce the volume of and the liquid level in all three reaction zones; and
- following the decanting step, inflowing untreated sewage into the first reaction zone for operating the three reaction zones as a variable volume batch reaction system.

---

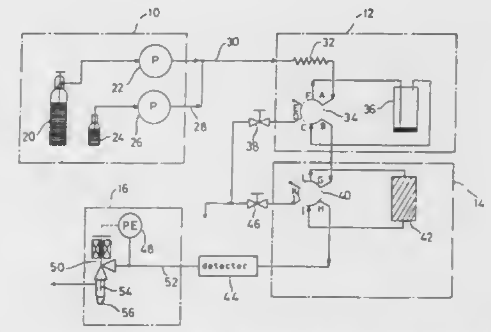
### 5,013,442
## AEROBIC WASTEWATER TREATMENT WITH ALKALINITY CONTROL
**H. Forbes Davis, and James P. Harshman, both of Tallevast, Fla., assignors to Davis Water & Waste Industries, Inc., Tallevast, Fla.**
**Filed Feb. 9, 1990, Ser. No. 479,150**
**Int. Cl.⁵ C02F** *3/12*
U.S. Cl. 210—614 21 Claims



1. In the aerobic treatment of wastewater in which oxygen is supplied to microbes and feed, utilizing a clarifier, aerobic zone, and aerobic digester, a method of monitoring alkalinity within a predetermined range so as to maintain the pH of the wastewater between about 6.5-8.0 during treatment, by practicing the steps of:
- (a) sensing the alkalinity of the wastewater at a plurality of points in the aerobic treatment of wastewater, including at each of the clarifier, aerobic zone, and aerobic digester; and
- (b) adjusting the alkalinity adjacent the plurality of points so that it is within about 100 mg of $CaCO_3/L$ of a desired value by changing the rate of oxygen supply and/or the concentration of microbes and feed, so as to control alkalinity to maintain pH within the range of about 6.5-8.0 without the addition of chemicals or additives.

---

### 5,013,443
## EXTRACTION AND SEPARATION METHOD AND APPARATUS USING SUPERCRITICAL FLUID
**Sakae Higashidate, Hachioji; Yoshio Yamauchi, Hino, and Muneo Saito, Hachioji, all of Japan, assignors to Nibon Bunko Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Jan. 16, 1990, Ser. No. 465,706**
**Claims priority, application Japan, Jan. 23, 1989, 1-14532**
**Int. Cl.⁵ B01D** *11/04*
U.S. Cl. 210—634 4 Claims



**1. A method of extracting, purifying and separating 5, 8, 11, 14, 17-eicosapentaenoic acid ester and 4, 7, 10, 13, 16, 19-docosahexaenoic acid ester from methyl esterified fish oil comprising:**

VOL
1126
ISS
1
MY
7
1991
UMI

extracting methyl esterified fish oil with a supercritical fluid to obtain a supercritical fluid containing extracted components;

introducing said supercritical fluid containing extracted components into a silica gel absorption column coated with silver nitrate and maintaining a fluid pressure of about 80 atmospheres; separating 5, 8, 11, 14, 17-eicosapentaenoic acid ester from said column by supplying supercritical fluid into said column at a pressure of 120 atmospheres; and

separating 4, 7, 10, 13, 16, 19-docosahexaenoic acid ester from said column by supplying supercritical fluid and alcohol into said column at a pressure of about 200 atmospheres.

---

### 5,013,444

### PROCESS FOR SEPARATING OFF ENOL ETHERS FROM REACTION MIXTURES CONTAINING ALCOHOLS

**Hilmar Mildenberger, Kelkheim/Taunus; Stephen Lachhein, Hofheim am Taunus; Siegbert Rittner, Mörfelden, and Heribert Tetzlaff, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Aug. 29, 1990, Ser. No. 576,934**

**Claims priority, application Fed. Rep. of Germany, Aug. 31, 1989, 3928774**

**Int. Cl.$^5$ B01D** *11/04;* **C02F** *1/26, 1/44*

**U.S. Cl. 210—634** **17 Claims**

1. A process for the separation of enol ethers and water-soluble alcohols by extraction, which comprises using as the extraction agent an aqueous solution of a base in a phase ratio of the amount of aqueous phase:enol ether/alcohol mixture of at least 0.5:1; based on the weights of the phases, and carrying out the reaction in several stages or continuously with a theoretical number of stages of at least 2.

---

### 5,013,445

### METHOD FOR SEPARATING IMMUNOGLOBULIN G. SUBCLASSES

**Shunichi Gohzu; Misao Horie, both of Yokohama, and Kuniyo Inouye, Sagamihara, all of Japan, assignors to Tosoh Corporation, Shinnanyo, Japan**

**Continuation of Ser. No. 219,434, Jul. 15, 1988, abandoned. This application Apr. 16, 1990, Ser. No. 511,978**

**Claims priority, application Japan, Jul. 15, 1987, 62-174763**

**Int. Cl.$^5$ B01D** *15/08*

**U.S. Cl. 210—635** **8 Claims**

8. A method for separating immunoglobulin G subclasses, which comprises separating immunoglobulin G subclasses by liquid chromatography by using as the solid phase a hydrophilic porous gel having an exclusion limit molecular weight of 50,000,as calculated as protein, and a phosphate buffer solution having an ionic strength of from 0.24 to 0.99, and containing from 0.05M NaCl to 0.8M NaCl, as the mobile phase, to obtain said immunoglobulin G subclasses in substantially isolated form, wherein said chromatography is carried out without adjusting the pH of said phosphate buffer solution.

---

### 5,013,446

### CHROMATOGRAPHIC GEL CONTACTOR AND PROCESS

**Yao-Tzu Li, Lincoln, Mass., and Brad Yundt, Nashua, N.H., assignors to Y. T. Li Engineering, Inc., Acton, Mass.**

**Continuation-in-part of Ser. No. 388,248, Aug. 1, 1989. This application Apr. 25, 1990, Ser. No. 514,097**

**Int. Cl.$^5$ B01D** *15/04, 15/08*

**U.S. Cl. 210—635** **23 Claims**

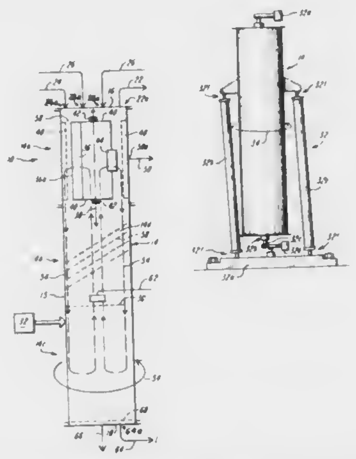
17. A process for removing a product from a fluid carrying the product and suspended particles, comprising the steps of:

providing a container,

introducing a supply of a granular substance into said container which selectively binds the product to remove it from said fluid,

introducing said fluid and suspended particles into a container holding said granular substance,

mixing said suspended particles and said granular substance by circulating the fluid, product, suspended particles and granular substance within said container,



filtering the fluid and suspended particles from the granular substance by using a filter mounted within said container,

depolarizing the filter during said mixing,

introducing an elution buffer into said container after said mixing has continued for a sufficient period of time to bind most of the product to said granular substance,

and draining the elution buffer and the product carried in the elution buffer from the container.

---

### 5,013,447

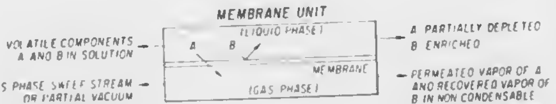
### PROCESS OF TREATING ALCOHOLIC BEVERAGES BY VAPOR-ARBITRATED PERVAPORATION

**Eric K. Lee, Acton; Vinay J. Kalyani, Twwksbury, and Stephen L. Matson, Harvard, all of Mass., assignors to Sepracor, Marlbrough, Mass.**

**Continuation-in-part of Ser. No. 382,615, Jul. 19, 1989, which is a division of Ser. No. 296,255, Jan. 12, 1989, Pat. No. 4,933,198, which is a continuation-in-part of Ser. No. 897,489, Aug. 18, 1986, Pat. No. 4,816,407, which is a division of Ser. No. 786,787, Oct. 11, 1985, Pat. No. 4,778,688. This application Jan. 10, 1990, Ser. No. 463,098**

**Int. Cl.$^5$ B01D** *61/36*

**U.S. Cl. 210—640** **40 Claims**


MEMBRANE UNIT
(LIQUID PHASE)
A
B
MEMBRANE
(GAS PHASE)
VOLATILE COMPONENTS A AND B IN SOLUTION
GAS PHASE SWEEP STREAM OR PARTIAL VACUUM CONTAINING CONTROLLED AMOUNT OF B VAPOR
A PARTIALLY DEPLETED B ENRICHED
PERMEATED VAPOR OF A AND RECOVERED VAPOR OF B IN NON CONDENSABLE GAS ON PARTIAL VACUUM

1. A method comprising manipulating the concentration of at least one preselected member of a plurality of volatile components including an alcohol and water present in an alcoholic beverage in which substantially any predetermined desired concentrations of alcohol and water in an alcoholic beverage are provided, while preserving the flavor and aroma of the alcoholic beverage by;

(a) providing a membrane having a feed side and a permeate side opposite feed side, said membrane being permeable to said at least one preselected member;

(b) contracting said alcoholic beverage against said feed side of said membrane;

(c) contacting a gas-phase extraction fluid against said permeate side membrane, said extraction fluid comprising a vapor mixture capable of arbitrating the pervaporation of

said volatile components such that a portion of said preselected member passes from said feed side of said membrane to said permeate side of said membrane and mixes with said extraction fluid, while a substantial portion of the remaining members of said plurality of volatile components is retained in said alcoholic beverage on said feed side of said membrane; and

(d) allowing said alcoholic beverage and said extraction fluid to remain in contact with said feed side and said permeate side of said membrane, respectively, for a period of time sufficient to provide a second liquid on said feed side of said membrane in which the concentration of said preselected member has been manipulated to the desired level.

---

### 5,013,448

### PROCESS FOR THE PREPARATION OF CHLORINE-RESISTANT POLYESTER SEMIPERMEABLE MEMBRANES

**A. Xavier Swamikannu, Mt. Prospect, Ill., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Continuation-in-part of Ser. No. 336,394, Apr. 11, 1989, abandoned, and a continuation-in-part of Ser. No. 336,395, Apr. 11, 1989, abandoned, and a continuation-in-part of Ser. No. 336,161, Apr. 11, 1989, abandoned, and a continuation-in-part of Ser. No. 336,190, Apr. 11, 1989, abandoned. This application Feb. 20, 1990, Ser. No. 482,445**

**Int. Cl.$^5$ B01D** *61/08, 67/00, 69/00, 71/48*

**U.S. Cl. 210—642** **59 Claims**

1. A process for the preparation of a chlorine-resistant polyester semipermeable membrane which comprises providing resistance to chlorine degradation in a reverse osmosis process by contacting a porous support backing material at contacting conditions with a solution comprising a blend of two polymers which will form a polyester by an acid-catalyzed esterification reaction under curing conditions, said blend comprising a polymeric hydroxyalkyl acrylate and a polymeric monocarboxylic acid or a polymeric polycarboxylic acid, recovering the resultant solution-coated porous support composite, curing said composite at curing conditions to form said polyester, and recovering the resultant chlorine-resistant polyester semipermeable membrane.

---

### 5,013,449

### PROCESS FOR SOLUTE RECOVERY UTILIZING RECYCLE LIQUIDS HAVING A STORED CONCENTRATION PROFILE

**Gonzalo Garcia-Huidobro, Santiago, Chile, and Douglas C. Greminger, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 26, 1989, Ser. No. 358,738**

**Int. Cl.$^5$ B01D** *15/00*

**U.S. Cl. 210—672** **14 Claims**

1. A process for recovering a solute from a dilute solution feed wherein said dilute solution is contacted with an adsorbent in a fixed bed of adsorbent particles, said solute elutable from said adsorbent by an eluent solution, said process comprising:

passing said dilute solution through said bed wherein said adsorbent is loaded with solute, resulting in an effluent from said bed that is barren with respect to said feed in concentration of solute;

eluting said bed with said eluent, forming effluent liquid portions having concentration profiles including (1) a donor portion having a concentration of solute ranging from barren to just less than a desired product concentration, (2) a product portion having a desired concentration of solute and (3) a receiver portion having a concentration of solute ranging from just less than product to barren concentration;

storing separately effluent portions (1) and (3) such that each portion maintains its concentration profile:

treating said bed, after said bed has adsorbed said solute, with said stored donor portion, whereby the amount of solute adsorbed and retained by the adsorbent is increased and a first portion of the resulting bed effluent is recycled to said dilute solution feed and the remaining portion is returned to donor storage such that its concentration profile is maintained:

adding, without mixing, to said stored donor portion, a portion of a less than product concentration liquid, equal in volume to said first portion of donor liquid sent to dilute solution feed:

treating said bed, after said bed has been eluted, with said stored receiver liquid whereby liquid remaining in said bed is reduced in solute concentration and a first portion of the resulting bed effluent is added to said product portion and the remaining receiver effluent portion is returned to receiver storage such that its concentration profile is maintained; and

adding, without mixing, to said stored receiver liquid a portion of wash liquid equal in volume to that portion of receiver liquid sent to product,

wherein said product portion is recovered and said loading, eluting, and subsequent steps are repeated to recover solute from additional dilute solution.

---

### 5,013,450

### METHOD AND SOLID MATERIAL BODY FOR THE PURIFICATION OF FLUIDS SUCH AS WATER, AQUEOUS FLUIDS AND LIQUID FUELS

**Luis Gomez, 2033 W. 73rd St., Hialeah, Fla. 33016**

**Continuation-in-part of Ser. No. 355,704, May 23, 1989, Pat. No. 4,959,155. This application Jan. 23, 1990, Ser. No. 468,661**

**The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.**

**Int. Cl.$^5$ B01D** *15/00;* **C23F** *11/18*

**U.S. Cl. 210—687** **3 Claims**

1. In a method for the purification of a fluid selected from the group consisting of water, aqueous fluids and liquid fuels, which comprises the steps of providing a hollow chamber having inlet and outlet ports, providing a solid material body within said chamber, said solid material body being made of a metal alloy, passing said fluid through said chamber for contacting said fluid with said solid material body, and recovering purified fluid from said chamber, the improvement wherein said solid material body comprises a metallic alloy which comprises 50 to 60% copper, 20 to 28% zinc, 0.5 to 8% nickel, 0.005 to 2.5% aluminum, 7 to 15% manganese, and 1.3 to 4.5% tin, based on the total weight of the alloy.

---

### 5,013,451

### METHODS FOR TREATING HYDROCARBON RECOVERY OPERATIONS AND INDUSTRIAL WATERS

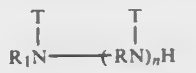
**Neil E. S. Thompson, Creve Coeur, and Robert G. Asperger, Des Peres, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 208,627, Jun. 20, 1988, Pat. No. 4,864,075, which is a continuation-in-part of Ser. No. 7,701, Jan. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 645,740, Aug. 30, 1984, abandoned. This application Jun. 30, 1989, Ser. No. 375,119**

**Int. Cl.$^5$ C02F** *1/54*

**U.S. Cl. 210—708** **22 Claims**

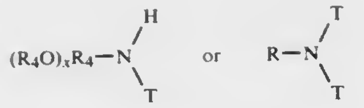
1. A method of water clarification by demulsification of an oil emulsion from an aqueous effluent and the removal of the separated oil to produce clarified water comprising adding to said aqueous effluent an effective demulsifying amount of a compound having the formula



$$R_1\overset{\overset{\displaystyle T}{|}}{N}\!-\!\!\!-\!\!\!-\!(R\overset{\overset{\displaystyle T}{|}}{N})_nH$$

wherein T is hydrogen, C(=S)SR$_2$.

VOL
1126
ISS
1
MY
7
1991
UMI



$$(R_4O)_xR_4-N\begin{smallmatrix}H\\ \\T\end{smallmatrix} \quad \text{or} \quad R-N\begin{smallmatrix}T\\ \\T\end{smallmatrix}$$

with the proviso that at least two 's are C(=S)SR$_2$; R is an alkylene having 2-30 carbon atoms; R$_1$ is hydrogen or an alkyl having 1-30 carbon atoms; R$_2$ is an alkali metal, an alkaline earth metal, or N(R$_3$)$_4$ where R$_3$ is a lower alkyl; R$_4$ is C$_2$-C$_4$ alkylene; x is an integer of 3-200; and n is an integer of 1-10 and removing the resulting separated oil from the effluent.

---

### 5,013,452
## RESOLUTION OF EMULSIONS FORMED IN THE PRODUCTION OF PHARMACEUTICALS
**Thomas J. Bellos, St. Louis, and Richard D. Keating, Bridgeton, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 370,501, Jun. 23, 1989. This application Dec. 4, 1989, Ser. No. 445,578**

**Int. Cl.$^5$ B01D *17/05***

U.S. Cl. 210—708 20 Claims

1. A method for resolving emulsions produced in preparation of pharmaceuticals by fermentation and other such bioprocessing applications, comprising adding an effective amount of a demulsifier to an emulsion that includes both a pharmaceutical which is desired to be extracted from the emulsion and at least about 25% by weight of an organic solvent, said demulsifier comprising a nitrogen composition selected from the group consisting of

(a) polyoxyalkylated amines that have been derived from amines having about six to about thirty carbon atoms,
(b) polyoxyalkylated amines that have been quaternized to at least some extent and that have been derived from amines having about six to about thirty carbon atoms,
(c) conjugate acid salts of polyoxyalkylated amines that have been derived from amines having about six to about thirty carbon atoms,
(d) salts of polyoxyalkylated amines that have been quaternized to at least some extent and that have been derived from amines having about six to about thirty carbon atoms,
(e) condensation product formed by heating an oxyalkylated amine under dehydration condensation conditions to produce a polyoxyalkylated amine of molecular weight of at least about 400,
(f) conjugate acid salts of said condensation product,
(g) said condensation product that has been quaternized to at least some extent,
(h) conjugate acid salts of said condensation product that have been quaternized to at least some extent,
(i) linear copolymers of an epihalohydrin and an amine selected from the group consisting of lower aliphatic primary amines having from about two to about eight carbon atoms and lower aliphatic secondary amines having from two to about eight carbon atoms,
(j) such copolymers of an epihalohydrin and an amine wherein the amine is a lower aliphatic primary amine having from two to about eight carbon atoms, in which at least some of the nitrogen atoms of the copolymers therein have been quaternized,
(k) polydialkyldiallyl ammonium salts,
(l) polymers of acrylamido alkylene quaternary ammonium salts, and
(m) mixtures thereof.

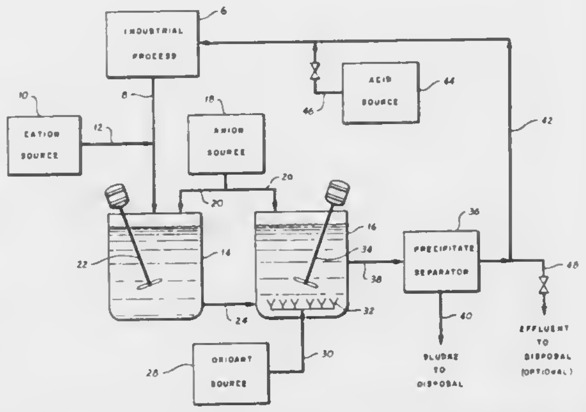
---

### 5,013,453
## METHOD FOR REMOVING HEAVY METALS FROM AQUEOUS SOLUTIONS BY COPRECIPITATION
**Douglas T. Walker, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 126,845, Nov. 25, 1987, Pat. No. 4,847,829, which is a continuation of Ser. No. 721,281, Apr. 8, 1985, Pat. No. 4,710,917, Continuation of Ser. No. 477,212, Mar. 21, 1983, abandoned. This application Apr. 16, 1987, Ser. No. 42,565**

**Int. Cl.$^5$ C02F *1/52***

U.S. Cl. 210—712 58 Claims



1. A method for removing heavy metal ions from an aqueous solution containing heavy metal ions and ferrous ions, comprising:

(a) adding ferrous ions to said solution so as to increase the molar ratio of ferrous ions to heavy metal ions;
(b) rapidly oxidizing in a reaction zone essentially all ferrous ions in said solution to ferric ions while controlling the pH of said solution with added base so as to rapidly form a substantially completely amorphous precipitate comprising a substantial proportion of ferric hydroxide and a substantial proportion of said heavy metal ions; and
(c) separating said amorphous precipitate from said solution so as to form an effluent solution having a reduced concentration of heavy metal ions;

wherein said aqueous solution contains ferrous ions and at least four heavy metals selected from the group consisting of copper, chromium, lead, nickel, cadmium, and zinc, and wherein said amorphous precipitate contains essentially all the iron introduced into said reaction zone and further contains at least four of said heavy metals, one of which being nickel, lead, or copper and two of which being chromium and zinc, removed by at least the percentage shown in the following table:

| Heavy Metal | Removal Efficiency |
|---|---|
| chromium | 100% |
| nickel | at least 94.3% |
| copper | at least 98.8% |
| lead | at least 99.5% |
| cadmium | at least 96.8% |
| zinc | at least 99.7% |

wherein at least 95% of all heavy metals in said aqueous solution are removed from said solution by said precipitate, and wherein the added base consists of aqueous ammonia, and wherein essentially none of said precipitate is recycled back to said reaction zone.

---

### 5,013,454
## METHOD OF REMOVING ORGANIC SUBSTANCES FROM EFFLUENTS FROM PULP AND PAPER MANUFACTURING PROCESSES
**Pertti Hynninen, Helsinki, Finland, assignor to A. Ahlstrom Corporation, Finland**

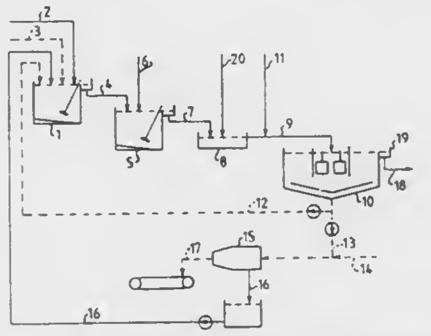
**PCT No. PCT/SE88/00512, § 371 Date Oct. 29, 1990, § 102(e) Date Oct. 29, 1990, PCT Pub. No. WO89/03911, PCT Pub. Date May 5, 1989**

**PCT Filed Oct. 6, 1988, Ser. No. 474,020**

**Claims priority, application Sweden, Oct. 27, 1987, 8704167**

**Int. Cl.$^5$ C02F *1/54***

U.S. Cl. 210—718 20 Claims



1. A method of removing dissolved and colloidal macromolecular organic substances from effluents from processes used in the manufacture of pulp and paper, comprising the steps of:

(a) subjecting cellulose fibers to mechanical treatment so that the fibers are broken and split open, increasing the specific fiber surface thereof and their ability to catch organic substances in the effluent;
(b) mixing the fibers from step (a) with an acid sludge so that a first mixture having a pH value of about 1.6-2.5 is formed;
(c) mixing the first mixture of fibers and acid sludge from step (b) with said effluent containing dissolved and colloidal macro-molecular organic substances to produce a second mixture;
(d) if necessary, adjusting the pH of the second mixture to about 4.5-6.0; and
(e) subjecting the second mixture of fibers and effluent from steps (c) and (d) to sedimentation so that the fibers precipitate out of the mixture, with macro-molecular organic substances adhered thereto.

---

### 5,013,455
## PROCESS FOR ENHANCING THE FILTERABILITY OF ORGANIC PIGMENTS
**Marius Leimer, Riehen; Jost von der Crone, Arconciel, both of Switzerland; Fridolin Bäbler, Hoctessin, Del., and Heinz Neuschütz, Rheinfelden, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Sep. 26, 1990, Ser. No. 588,404**

**Claims priority, application Switzerland, Oct. 4, 1989, 3629/89**

**Int. Cl.$^5$ B01D *37/02***

U.S. Cl. 210—729 8 Claims

1. A process for enhancing the filterability of organic pigments, which comprises adding to an aqueous pigment suspension 0.5 to 15% by weight, based on the pigment, of an unbranched aliphatic 1,2-dihydroxy compound containing 8 to 22 carbon atoms; stirring the mixture for at least 15 minutes in the temperature range from 20° to 100° C.; and, filtering the mixture to recover the organic pigments.

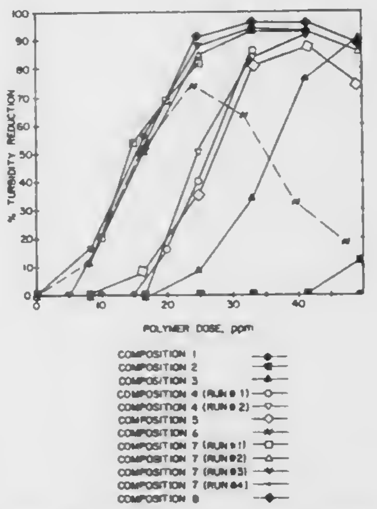
---

### 5,013,456
## DIALLYLDIMETHYL AMMONIUM CHLORIDE POLYMERS WITH ANIONIC MONOMERS FOR COAGULATING DEINKING PROCESS WATERS
**Michael R. St. John, Chicago, Ill., and Ronnie L. Alexander, Mt. Laurel, N.J., assignors to Nalco Chemical Company, Naperville, Ill.**

**Filed Apr. 13, 1990, Ser. No. 508,434**

**Int. Cl.$^5$ C02F *1/56***

U.S. Cl. 210—734 5 Claims



1. A process of the type wherein a water soluble polymer is used to coagulate suspended solids from deinking process waters which results from the processing of recycled paper, the improvement which comprises using as the coagulant a polydiallyl dimethyl ammonium chloride polymer which contains from between 5-30 mole percent of a water soluble anionic monomer and has an Intrinsic Viscosity of at least 0.3 said polymer being added to the deinking process waters in an amount sufficient to cause coagulation of the suspended solids.

---

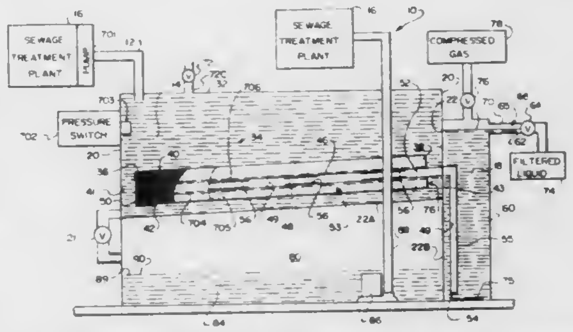
### 5,013,457
## PRESSURIZED BACKWASH FILTER
**Ken Mims, Lake Monroe, Fla., assignor to Uddo-Mims International, Edgewater, Fla.**

**Continuation-in-part of Ser. No. 229,695, Aug. 8, 1988, abandoned, which is a continuation of Ser. No. 49,840, May 15, 1987, Pat. No. 4,818,420. This application May 31, 1989, Ser. No. 359,648**

**The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.**

**Int. Cl.$^5$ B01D *29/62***

U.S. Cl. 210—741 10 Claims



1. A liquid filtering and backwashing apparatus comprising: a filter tank having a first end and a second end to receive under a first pressure a liquid to be filtered;

VOL
1126
ISS
1
MY
7
1991
UMI

a filter cell to filter the liquid to be filtered;
a conduit having a first portion and a second portion;
said filter cell including said first portion of said conduit and an outer member with said outer member positioned around and spaced from said first portion of said conduit;
said first portion of said conduit and said outer member each being provided with a plurality of openings to enable fluid communication therethrough;
said conduit having a first end and a second end;
said outer member having a first end and a second end;
said filter cell having a first end and a second end with said first end of said filter cell including said first end of said outer member and said first end of said conduit and with said second end of said filter cell including said second end of said outer member;
said first portion of said conduit and said outer member of said filter cell disposed within said filter tank;
a filtering medium positioned in use between said first portion of said conduit and said outer member to entrap filter clogging material from the liquid to be filtered thereby forming a filtered liquid;
said first and second ends of said filter cell being sealed in use such that said filtering medium is contained between said first portion of said conduit and said outer member;
a backwash holding tank to collect said filtered liquid;
said second portion of said conduit extending into said backwash holding tank to provide fluid communication between said backwash holding tank and said first portion of said conduit;
said first end of said filter tank including means for enabling outward fluid flow from said filter tank to a reservoir;
said backwash holding tank having a first outlet valve to enable said filtered liquid to drain from said holding tank;
said backwash holding tank having an inlet valve to admit a compressed gas into said holding tank after closing said first outlet valve of said holding tank to enable backwashing of said filter cell and filter tank;
a backwash outlet valve connected to said filter tank;
a vent valve connected to said filter tank; and
a pressure switch control means positioned in said filter tank;
said pressure switch being activated when a second pressure in said filter tank is reached; and means connected to said activated pressure switch for closing said first outlet valve of said backwash holding tank, opening said inlet valve of said holding tank to admit compressed gas into said holding tank, reducing said pressure of said received liquid to be filtered. opening said backwash outlet valve and opening said vent valve.

---

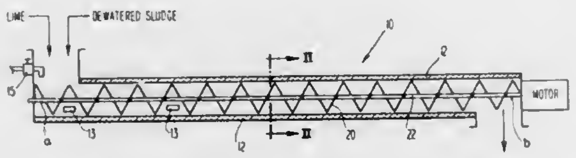
## 5,013,458
## PROCESS AND APPARATUS FOR PATHOGEN REDUCTION IN WASTE

**Robert W. Christy, Sr., and Paul G. Christy, both of Devon, Pa., assignors to RDP Company, Plymouth Meeting, Pa.**

**Filed Apr. 6, 1990, Ser. No. 505,938**

**Int. Cl.$^5$ C02F** *11/14, 11/18*

**U.S. Cl. 210—751** **1 Claim**



1. A process for treatment of sludge, which comprises:
(a) mixing dewatered sludge having a solids content in the range of 10–60% with an additive selected from the group consisting of calcium oxide and calcium carbonate to generate and release heat, with said additive present in sufficient quantity to adjust the pH of the sludge to at least a predetermined level of about 12, including the step of maintaining the predetermined pH level of the sludge for at least about 2 hours.
(b) retaining within the sludge at least a substantial amount of the heat released during step (a) above by maintaining the sludge in a substantially closed chamber at at least about 70° C. for at least about one half hour;
(c) including the step of applying supplemental heat to the sludge.

---

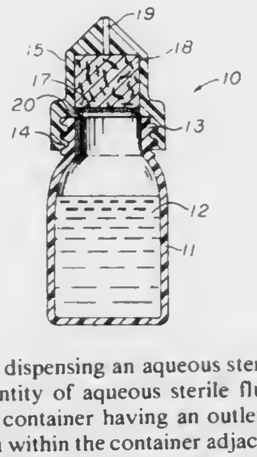
## 5,013,459
## OPTHALMIC FLUID DISPENSING METHOD

**Richard L. Gettings, Freeland, and William C. White, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

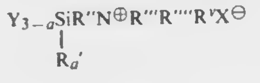
**Filed Nov. 9, 1989, Ser. No. 433,817**

**Int. Cl.$^5$ C02F** *1/50*

**U.S. Cl. 210—764** **40 Claims**

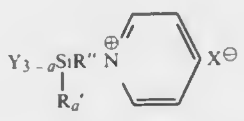


1. A method of dispensing an aqueous sterile fluid comprising storing a quantity of aqueous sterile fluid in a reservoir within a portable container having an outlet, arranging a porous filter medium within the container adjacent the outlet, and causing the aqueous sterile fluid to pass from the reservoir through the porous medium to the outlet, the porous medium having covalently bonded thereto an antimicrobially effective amount of an organosilicon quaternary ammonium compound, the organosilicon quaternary ammonium compound being an organosilane having the formula selected from the group consisting of consisting of



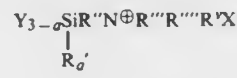
$$\mathrm{Y_{3-a}\underset{\underset{\textstyle R_a'}{|}}{Si}R''N^{\oplus}R'''R''''R^{v}X^{\ominus}}$$

and

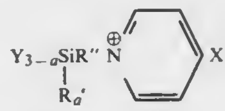


wherein, in each formula,
Y is R or RO where each R is an alkyl radical of 1 to 4 carbon atoms or hydrogen;
a has a value of 0, 1 or 2;
R' is a methyl or ethyl radical;
R'' is an alkylene group of 1 to 4 carbon atoms;
R''', R'''' and $R^V$ are each independently selected from a group consisting of alkyl radicals of 1 to 18 carbon atoms, $—CH_2C_6H_5$, $—CH_2CH_2OH$, $—CH_2OH$, and $—(CH_2)_xNHC(O)R^{vi}$. wherein x has a value of from 2 to 10 and $R^{vi}$ is a perfluoroalkyl radical having from 1 to 12 carbon atoms; and
X is chloride, bromide, fluoride, iodide, acetate or tosylate.

22. A device for dispensing an aqueous sterile fluid comprising a portable container having a reservoir in communication with an outlet, a porous filter medium within the container adjacent the outlet, the aqueous sterile fluid passing from the reservoir through the porous medium to the outlet, the porous medium having covalently bonded thereto an antimicrobially effective amount of an organosilicon quaternary ammonium compound, the organosilicon quaternary ammonium compound being an organosilane having the forumla selected from the group consisting of



$$\mathrm{Y_{3-a}\underset{\underset{\textstyle R_a'}{|}}{Si}R''N^{\oplus}R'''R''''R^{v}X^{\oplus}}$$



wherein, in each formula,
Y is R or RO where each R is an alkyl radical of 1 to 4 carbon atoms or hydrogen;
a has a value of 0, 1 or 2; R' is a methyl or ethyl radical;
R'' is an alkylene group of 1 to 4 carbon atoms;
R''', R'''' and $R^v$ are each independently selected from a group consisting of alkyl radicals of 1 to 18 carbon atoms, $—CH_2C_6H_5$, $—CH_2CH_2OH$, $=CH_2OH$, and $—(CH_2)_xNHC(O)R^{vi}$, wherein x has a value of from 2 to 10 and $R^{vi}$ is a perfluoroalkyl radical having from 1 to 12 carbon atoms; and
X is chloride, bromide, fluoride, iodide, acetate or tosylate.

---

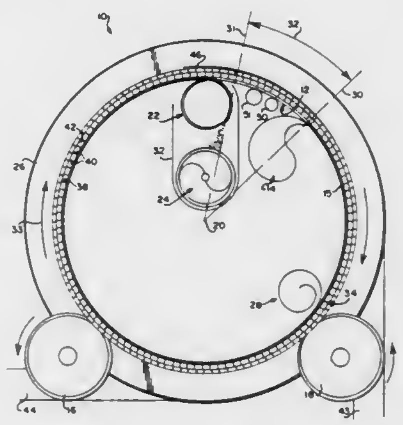
## 5,013,460
## CENTRIFUGAL WASHER FOR PAPER PULP WITH MEANS TO FEED PULP AS A THIN SHEET

**Michael D. Meredith, Tigard, Oreg., assignor to Kamyr, Inc., Glens Falls, N.Y.**

**Filed Nov. 13, 1989, Ser. No. 435,035**

**Int. Cl.$^5$ B01D** *33/06, 33/62*

**U.S. Cl. 210—770** **20 Claims**



8. A method of acting on pulp to treat it utilizing centrifugal force, and utilizing a perforated cylinder having an interior surface and an exterior surface and rotatable about axis, said method comprising the steps of substantially sequentially:
(a) applying pulp from a stock head box in a thin sheet directly onto an interior surface of the cylinder at a first arcuate position;
(b) rotating the cylinder about its axis to cause liquid in the pulp to move radially outwardly, under the influence of centrifugal force, through the cylinder, to be discharged;
(c) withdrawing the sheet from the cylinder at a second arcuate position less than 360° from the first position in the direction of rotation; and
(d) passing the pulp to a further treatment or use stage.

---

## 5,013,461
## REGENERATION METHOD OF FILTER DEVICE HAVING FILTER AID MATERIAL AND PISTON APPARATUS

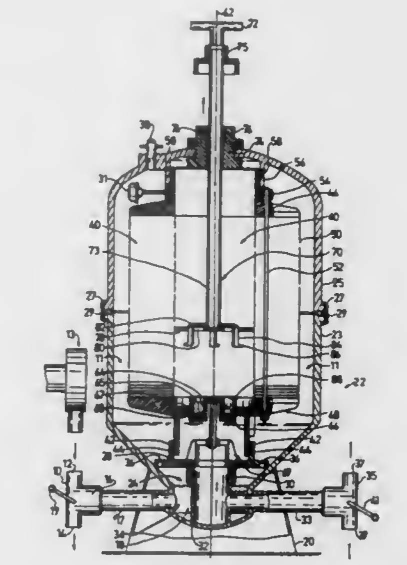
**Mordeki Drori, 89 Zahal Street, Kiron, Israel**

**Filed Sep. 16, 1988, Ser. No. 245,737**

**Claims priority, application Israel, Sep. 18, 1987, 83950; Oct. 25, 1987, 84274**

**Int. Cl.$^5$ C01D** *37/02*

**U.S. Cl. 210—777** **3 Claims**



1. A regeneration method for use with a fluid filter comprising a housing, a filter element disposed in the housing and arranged to receive a flow of fluid to be filtered from an upstream side of the element to a downstream side thereof, a fluid inlet communicating with the interior of the housing and with the upstream side of the filter element, a fluid outlet communicating with the downstream side of the filter element, and piston apparatus disposed adjacent the downstream side of the filter element, said regeneration method comprising the step of operating the piston for producing circulation of fluid generally simultaneously from the downstream side of the filter element to the upstream side thereof and from the upstream side of the filter element to the downstream side thereof, thereby dislodging and reorienting particulate matter engaging the filter element and wherein a layer of filter aid material is positioned adjacent the filter element and forms part of the particulate matter which is dislodged and reoriented and wherein the regeneration method also comprises the step of removing fine particulate matter from the filter without removing filter aid material therefrom.

---

## 5,013,462
## METHOD FOR IMPROVING PRODUCTION OF VISCOUS CRUDE OIL

**Dennis E. Danley, Ledyard, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Continuation of Ser. No. 181,801, Apr. 15, 1988, abandoned, which is a continuation-in-part of Ser. No. 47,950, May 8, 1987, Pat. No. 4,757,833, which is a continuation-in-part of Ser. No. 790,916, Oct. 24, 1985, abandoned. This application Mar. 7, 1990, Ser. No. 492,236**

**Int. Cl.$^5$ E21B** *43/25*

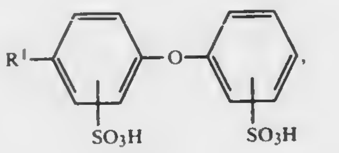
**U.S. Cl. 252—8.554** **24 Claims**

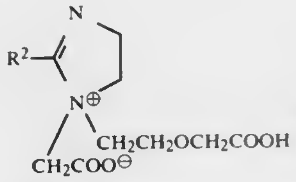
1. An oil-in-water emulsion containing 20 to 80 percent by weight of a viscous crude oil having an API gravity of less than about 25° and/or a viscosity greater than about 500 cP at any temperature, 80 to 20 percent by weight of water and from 100 to 1500 parts by weight of a surfactant blend per million

VOL
1126
ISS
1
MY
7
1991
UMI

parts by weight of emulsion, said blend consisting essentially of from 15 to 85 parts by weight of an anionic or amphoteric surfactant

(A) selected from those of the formula $\mathrm{Ar(OCH_2CH_2)_nOSO_3H}$,

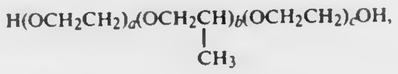




or a sodium or ammonium salt thereof; and from 85 to 15 parts by weight of a nonionic surfactant selected from

(B) of the formula $\mathrm{Ar(OCH_2CH_2)_pOH}$, or

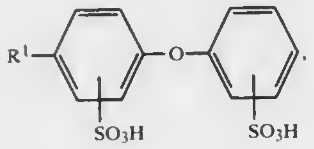
(C) of the formula

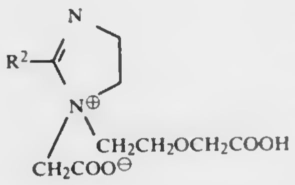


$$\mathrm{H(OCH_2CH_2)_a(OCH_2\underset{\underset{\displaystyle CH_3}{|}}{C}H)_b(OCH_2CH_2)_cOH},$$

said surfactant (C) having an HLB value of from 10 to 20;
where Ar is octylphenyl or nonylphenyl,
n is a number from 2 to 10,
p is a number from 10 to 100,
a is a number from 10 to 40,
b is a number from 15 to 55,
c is a number from 10 to 40,
$R^1$ is $C_8$ to $C_{18}$ alkyl and $R^2$ is $C_{12}$ to $C_{18}$ alkyl.

17. A method for improving the productivity of a viscous crude oil producing well which comprises forming downhole an oil-in-water emulsion containing 20 to 80 percent by weight of said viscous crude oil and 80 to 20 percent by weight of water in the presence of from 100 to 1500 parts by weight of a surfactant blend per million parts by weight of said emulsion, said blend consisting essentially of from 15 to 85 parts by weight of an anionic or amphoteric surfactant (A) selected from those of the formulae $\mathrm{Ar(OCH_2CH_2)_nOSO_3H}$,

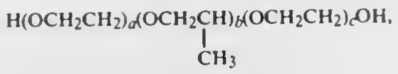




and a sodium or ammonium salt thereof; and from 85 to 15 parts by weight of a nonionic surfactant selected from

(B) of the formula $\mathrm{Ar(OCH_2CH_2)_pOH}$, or

(C) of the formula



$$\mathrm{H(OCH_2CH_2)_a(OCH_2\underset{\underset{\displaystyle CH_3}{|}}{C}H)_b(OCH_2CH_2)_cOH},$$

said surfactant (C) having an HLB value of from 10 to 20;
where Ar is octylphenyl or nonylphenyl,
n is a number from 2 to 10,
p is a number from 10 to 100,
a is a number from 10 to 40,
b is a number from 15 to 55,
c is a number from 10 to 40,
$R^1$ is $C_8$ to $C_{18}$ alkyl and $R^2$ is $C_{12}$ to $C_{18}$ alkyl.

---

### 5,013,463

## PROCESS FOR OVERBASED PETROLEUM OXIDATE

**Francis J. Slama, Montgomery, Ill., assignor to Amoco Corporation, Chicago, Ill.**

**Filed Nov. 19, 1986, Ser. No. 932,305**

**Int. Cl.$^5$ C10M** *159/20*

**U.S. Cl. 252—18** **13 Claims**

1. A process for preparation of an overbased alkali metal or alkaline earth metal petroleum oxidate additive for lubricants useful as a detergent, dispersant, and antirust friction modifier which process comprises:

(a) introducing into a reaction zone a petroleum oil,

(b) a base selected from the group consisting of an alkali metal compound or an alkaline earth metal compound to form a mixture,

(c) contacting said mixture with an oxidizing gas or compound at a temperature from about −40° F. to about 800° F. to effect oxidation of said petroleum oil and reaction of said base with the oxidized oil, followed by

(d) optionally filtering said mixture to separate the base-reacted oxidized oil as a petroleum oxidate,

(e) carbonating said petroleum oxidate in the presence of a base selected from the group consisting of an alkali metal compound and an alkaline earth metal compound to form a reaction product comprising an overbased alkali metal or alkaline earth metal petroleum oxidate,

(f) optionally filtering said mixture to remove unreacted alkali metal compound or alkaline earth metal compound, and

(g) stripping said overbased alkali metal or alkaline earth metal petroleum oxidate to remove water.

---

### 5,013,464

## LIQUID SUSPENSION COMPOSITION CONTAINING GALLIUM PARTICLES AND PROCESS FOR PRODUCING THE SAME

**Kentaro Sugimura, Chiba; Shoji Hasimoto, Kosakamachi, and Takayuki Ono, Sendai, all of Japan, assignors to Dowa Mining Co., Ltd., Tokyo, Japan**

**Filed Jan. 12, 1990, Ser. No. 464,523**

**Claims priority, application Japan, Apr. 28, 1989, 1-107405; Jul. 8, 1989, 1-176792**

**Int. Cl.$^5$ C10M** *125/04*

**U.S. Cl. 252—26** **22 Claims**

1. A liquid suspension composition comprising 0.005–5 parts by weight of gallium or gallium alloy particles having a size not greater than 150 μm suspended in 100 parts by weight of a liquid medium, said gallium or gallium alloy particles being covered on the surface thereof with a coating agent selected from the group consisting of waxes, coupling agents and polymerizable monomers.

---

### 5,013,465

## DITHIOPHOSPHATES

**Terence Colclough, Abingdon, England, assignor to Exxon Chemical Patents, Inc., Linden, N.J.**

**Filed Dec. 22, 1988, Ser. No. 288,292**

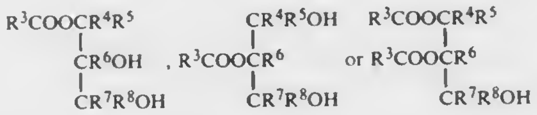
**Claims priority, application United Kingdom, Dec. 23, 1987, 8729963**

**Int. Cl.$^5$ C10M** *137/04*

**U.S. Cl. 252—32.7 E** **13 Claims**

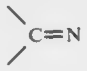
1. A metal dithiophosphate comprising reaction product of basic compound selected from the group consisting of zinc compounds, copper compounds and molybdenum compounds

with dithiophosphoric acid, said dithiophosphoric acid comprising reaction product of phosphorus pentasulphide with mixture of alcohols comprising at least one first alcohol represented by the formula ROH wherein R is an aliphatic hydrogen and carbon containing group having at least 4 carbon atoms or alkaryl group, and at least one second alcohol selected from the group consisting of (i) at least one alcohol represented by the formula:



$$\begin{array}{l}\mathrm{R^3COOCR^4R^5}\\ \quad\ \ |\\ \quad\ \mathrm{CR^6OH}\\ \quad\ \ |\\ \quad\ \mathrm{CR^7R^8OH}\end{array},\quad \begin{array}{r}\mathrm{CR^4R^5OH}\\ |\qquad\\ \mathrm{R^3COOCR^6}\\ |\qquad\\ \mathrm{CR^7R^8OH}\end{array}\quad \text{or}\quad \begin{array}{l}\mathrm{R^3COOCR^4R^5}\\ \qquad\quad |\\ \mathrm{R^3COOCR^6}\\ \qquad\quad |\\ \qquad\ \mathrm{CR^7R^8OH}\end{array}$$

wherein $R^3$ is an aliphatic hydrogen and carbon containing group containing at least 9 carbon atoms and $R^4$, $R^5$, $R^6$ and $R^7$ are independently hydrogen or alkyl groups, and at least one alcohol represented by the formula $R^1(OH)_m$ wherein m is 1 or 2 and $R^1$ comprises hydrogen and carbon containing group containing at least 12 carbon atoms and containing (a)



group or (b) group represented by the formula $—C_nH_{2n-p}R^2{}_pO)_q$ wherein $R^2$ is alkylene group, n is an integer of from 2 to 5, p is zero or an integer of from 1 to 5, and q is an integer of 2 or more, with the proviso that p is less than 2n.

---

### 5,013,466

## LUBRICATING GREASE

**Kenjiro Obara; Kazuyuki Nakamura; Yoshio Murakami, all of Ibaraki; Takao Soda, Hyogo; Toshihiro Kanie, Hyogo, and Tamio Adaka, Hyogo, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo and Natsumra Oil Research Corporation, Nishinomiya, both of, Japan**

**Filed Mar. 21, 1990, Ser. No. 496,700**

**Claims priority, application Japan, Mar. 23, 1989, 1-71473**

**Int. Cl.$^5$ C10M** *105/08*

**U.S. Cl. 252—42.7** **1 Claim**

1. A lubricating grease comprising the following ingredients:

(A) 55wt % to 90 wt % of a base oil composed of an alkyl substituted tetraphenylether having 1–4 substituents at least one of which has 6–20 carbon atoms;

(B) 5 wt % to 25 wt % of a bentonite-based thickener;

(C) 5 wt % to 20 wt % of at least one lubricant that is selected from the group consisting of molybdenum disulfide and tungsten disulfide and that has a particle size of 0.1 μm to 20 μm, and (D) up to 5 wt. % of an anti-oxidant.

---

### 5,013,467

## NOVEL OLEAGINOUS COMPOSITION ADDITIVES FOR IMPROVED RUST INHIBITION

**Jacob Emert, Brooklyn, N.Y., and Malcolm Waddoups, Westfield, N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.**

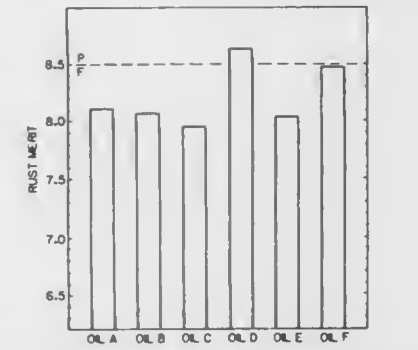
**Filed Sep. 16, 1987, Ser. No. 97,178**

**Int. Cl.$^5$ C10M** *105/80*

**U.S. Cl. 252—46.4** **26 Claims**

1. An oleaginous composition comprising (i) an oleaginous material comprising lubricating oils, (ii) an oil soluble non-borated ashless dispersant, (iii) an oil soluble ashless rust inhibitor, and (iv) an oil soluble copper carboxylate antioxidant compound, wherein said oleaginous composition is substantially free of boron, and wherein said copper carboxylate antioxidant is employed in an antioxidant effective amount of from about 5 to 500 parts per million by weight of added copper in the form of said oil soluble copper compound, provided, however, that the amount of said copper antioxidant is at least sufficient to provide an atomic ratio of B:Cu in said oleaginous composition of from 0 to about 0.6:1.

14. A process for forming an oleaginous composition having improved rust inhibition properties which is substantially free of boron which comprises admixing (i) an oleaginous material comprising lubricating oils, (ii) an oil soluble non-borated ashless dispersant, (iii) an oil soluble ashless rust inhibitor, and (iv) an oil soluble copper carboxylate antioxidant compound, said oleaginous composition being substantially free of boron, wherein said copper carboxylate antioxidant is employed in an antioxidant effective amount of from about 5 to 500 parts per million by weight of added copper in the form of said oil soluble copper compound, provided, however that the amount of said copper antioxidant is at least sufficient to provide an atomic ratio of B:Cu in said oleaginous composition of from 0 to about 0 6:1.



---

### 5,013,468

## DISPERSANT/ANTIOXIDANT VII LUBRICANT ADDITIVE

**Nicholas Benfaremo, Wappingers Falls, N.Y., assignor to Texaco Inc., White Plains, N.Y.**

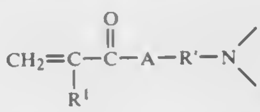
**Filed Oct. 10, 1989, Ser. No. 419,407**

**Int. Cl.$^5$ C10M** *145/14, 149/04*

**U.S. Cl. 252—47.5** **14 Claims**

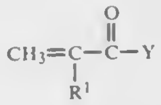
1. A polymeric dispersant/antioxidant, Viscosity Index Improving polymethacrylate composition, having a molecular weight ranging from about 20,000 to about 2,500,000, said compositions comprising a base oil and 1.0 wt. %–15 wt. % of a dispersant monomer, 1.0 wt %–15 wt % of an antioxidant monomer and 78 wt %–98 wt % of an alkyl monomer, said composition being prepared by:

(a) mixing a dispersant monomer of the formula



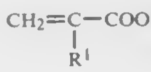
$$\mathrm{CH_2{=}\underset{\underset{\displaystyle R^1}{|}}{C}{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}A{-}R'{-}N}\begin{matrix}\nearrow R^4\\ \searrow R^5\end{matrix}$$

with an antioxidant monomer of the formula



$$\mathrm{CH_3{=}\underset{\underset{\displaystyle R^1}{|}}{C}{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}Y}$$

and an alkyl monomer of the formula



$$\mathrm{CH_2{=}\underset{\underset{\displaystyle R^1}{|}}{C}{-}COOR^2}$$

wherein
A is —NH—, —O— or —S—;
$R^1$ is H or a lower alkyl group;

VOL
1126
ISS
1
MY
7
1991
UMI

$R_2$ is a ($C_1$-$C_{200}$) alkyl group;
$R^4$ and $R^5$ are alkyl, alkaryl, aralkyl, aryl or arylene groups; and
Y is an aromatic amine or amine residue, and an oil solvent to provide an intermediate reaction mixture;
(b) stirring and purging said reaction mixture by nitrogen ebullation for about 25–35 minutes at about 200 ml/min;
(c) heating said purged mixture to about 75°–85° C.;
(d) adding both a mercaptan and a radical polymerization catalyst to said heated mixture and then after about 2.0 hours adding an additional amount of said catalyst to said heated mixture, and then heating said heated mixture for an additional 2.0 hours;
(e) increasing the temperature of said heated mixture to about 95° C.–105° C. and maintaining said mixture at such temperature for a sufficient period of time to remove any excess of said polymerization catalyst; and
(f) recovering the product polymethacrylate.

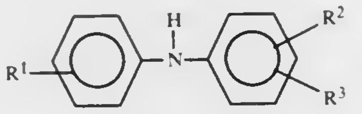
---

## 5,013,469

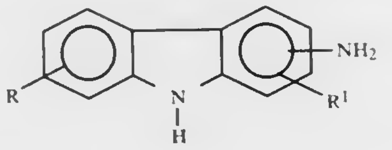
## VI IMPROVER, DISPERSANT, AND ANTI-OXIDANT ADDITIVE AND LUBRICATING OIL COMPOSITION CONTAINING SAME

**Thomas F. DeRosa, Passaic, N.J.; Theodore E. Nalesnik, Wildwood Manor, and Benjamin J. Kaufman, Hopewell Junction, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.**
**Filed Aug. 24, 1989, Ser. No. 397,946**
**Int. Cl.$^5$ C10M** *149/10*
**U.S. Cl. 252—47.5** **14 Claims**

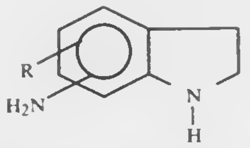
1. A lubricating oil additive composition prepared by the steps comprising:
(A) reacting a styrene-ethylenebutylene-styrene block copolymer, having styrene-ethylenebutylene-styrene molecular weight ratios, respectively, of 1:6:1 to 1:3:1 characterized in that unsaturation in the styrene blocks is equal to or greater than 50 percent and and the ethylene butylene block is hydrogenated leaving no more than 10 percent unsaturation, with at least one olefinic carboxylic acid acylating material to form one or more acylating reaction intermediates characterized by having a carboxylic acid acylating function within their structure, and
(B) reacting said reaction intermediate in (A) with an amino-aromatic polyamine compound selected from the group consisting of:
(a) an N-arylphenylenediamine represented by the formula:



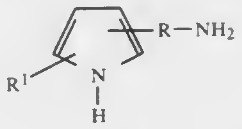
in which $R^1$ is hydrogen, -NH-aryl, NH-arylalkyl, a branched or straight chain radical having from 4 to 24 carbon atoms that can be alkyl, alkenyl, alkoxyl, aralkyl, alkaryl, hydroxyalkyl or aminoalkyl, $R^2$ is $NH_2$, $CH_2$-$(CH_2)_n$--$NH_2$, $CH_2$-aryl-$NH_2$ in which n has a value from 1 to 10, and $R^3$ is alkyl, alkenyl, alkoxyl, aralkyl, alkaryl having 4 to 24 carbon atoms,
(b) an aminocarbazole represented by the formula:



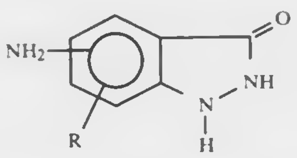
in which R and $R^1$ represent hydrogen or an alkyl or alkenyl radical having from 1 to 14 carbon atoms,
(c) an aminoindole represented by the formula:



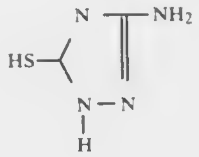
in which R represents hydrogen or an alkyl radical having from 1 to 14 carbon atoms,
(d) an aminopyrrole represented by the formula:



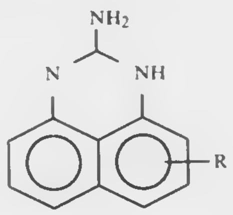
in which R is a divalent alkylene radical having 2 to 6 carbon atoms and $R^1$ hydrogen or an alkyl radical having from 1 to 14 carbon atoms,
(e) an amino-indazolinone represented by the formula:



in which R is hydrogen or an alkyl radical having from 1 to 14 carbon atoms,
(f) an aminomercaptotriazole represented by the formula:



and
(g) an aminoperimidine represented by the formula:



in which R represents hydrogen or an alkyl radical having from 1 to 14 carbon atoms.

---

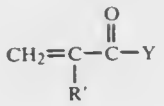
## 5,013,470

## ANTIOXIDANT VII LUBRICANT ADDITIVE

**Nicolas Benfaremo, Wappingers Falls, N.Y., assignor to Texaco Inc., White Plains, N.Y.**
**Filed Oct. 10, 1989, Ser. No. 419,565**
**Int. Cl.$^5$ C10M** *145/14, 149/02*
**U.S. Cl. 252—47.5** **9 Claims**

1. A polymeric antioxidant, Viscosity Index-Improving polymethacrylate composition, having a molecular weight ranging from about 20,000 to about 2,500,000, said composition comprising a base oil and effective amounts of an antioxidant monomer, said composition being prepared by:

(a) mixing an antioxidant monomer of the formula



$$CH_2{=}\underset{\substack{|\\ R'}}{C}{-}\overset{\substack{O\\ \|}}{C}{-}Y$$

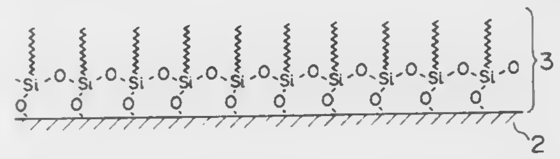
wherein Y is selected from the group consisting of a hydroxy diphenylamine, an amino-phenothiazine, an N-arylphenylenediamine, an aminothiazole, an aminobenzothia--diazole, an aminoalkylthiazole, an aminocarbaxole, an aminoindole, an aminopyrole, an aminomercaptotrizole, and an aminoperimidine, with a ($C_1$–$C_{20}$) alkyl methacrylate, and an oil solvent to provide an intermediate reaction mixture;
(b) stirring and purging said reaction mixture by nitrogen ebullition for about 25–35 minutes at about 200 ml/min;
(c) reducing the nitrogen ebullition to about 15–25 mo/min and heating said purged mixture to about 75°–85° C.;
(d) adding both a mercaptan and a radical polymerization catalyst to said heated mixture and then after about 2.0 hours adding an additional amount of said catalyst to said heated mixture, and then heating said heated mixture for an additional 2.0 hours;
(e) increasing the temperature of said heated mixture to about 95° C.–105° C. and maintaining said mixture at such temperature for a sufficient period of time to remove any excess of said polymerization catalyst; and
(f) recovering the product polymethacrylate.

---

## 5,013,471

## MAGNETIC FLUID, METHOD FOR PRODUCING IT AND MAGNETIC SEAL MEANS USING THE SAME

**Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed May 31, 1989, Ser. No. 359,337**
**Claims priority, application Japan, Jun. 3, 1988, 63-137822**
**Int. Cl.$^5$ H01F** *1/28*
**U.S. Cl. 252—62.52** **8 Claims**



1. A magnetic fluid comprising particles of a ferromagnetic material having their surfaces covered with a monomolecular chemically adsorbed film formed from a chloro-silane surfactant, wherein the number of carbons in the hydrocarbon chain of the chloro-silane surfactant is 10 to 25, said particles of magnetic material being dispersed in an oil.

---

## 5,013,472

## CHLOROTRIFLUOROETHYLENE TELOMERS

**Antonio Marraccini, Novara; Gabriele Perego, Turin, and Giovanni Guastalla, Novara, all of Italy, assignors to Ausimont S.R.L., Milan, Italy**
**Filed Dec. 23, 1988, Ser. No. 289,004**
**Claims priority, application Italy, Dec. 23, 1987, 23179 A/87**
**Int. Cl.$^5$ C10M** *105/52, 105/54*
**U.S. Cl. 252—78.1** **33 Claims**

18. Chlorotrifluoroethylene telomer mixtures containing the species:

$R_x—CF_2—O—(M)_n—F$ (A)

$R_x—CF_2—O—(M)_n—O—CF_2—R_x$ (B)

$R_x—(M)_n—F$ (C)

$R_x—(M)_n—R_x$ (D)

$R_x—CF_2—O—(M)_n—R_x$ (E)

$R_x—O—(M)_n—F$ (F)

$R_x—O—(M)_n—O—CF_2—R_x$ (G)

$R_x—O—(M)_n—R_x$ (H)

$R_x—CF_2—(M)_n—F$ (I)

$R_x—CF_2—(M)_n—O—CF_2—R_x$ (J)

$R_x—CF_2—(M)_n—R_x$ (K)

$R^1—O—(M)_n—OCF_2—R_x$ (L)

$R_1—O—(M)_n—R_x$ (N)

$R^1—(M)_n—F$ (O)

$CF_3—O—(M)_n—F$ (P)

$F—(M)_n—F$ (Q)

wherein $R_x$ represents a perhalogenated alkyl radical, a perhaloalkylmonoether radical, or a perhaloalkylpolyether radical, wherein $R_x$ is either linear or branched, having 1 to 10 carbon atoms, containing fluorine atoms or fluorine atoms and chlorine atoms, but free from vicinal chlorine atoms and from —$CCl_3$ groups; M represents $CF_2$—CFCl; $R^1$ represents a radical derived from $R_x$ containing from 1 to 9 carbon atoms, and "n" has a value ranging from 2 to 20.

---

## 5,013,473

## ENCAPSULATED COSMETIC MATERIALS AND PROCESS OF MAKING

**Robert J. Norbury, Cottage Grove; Robert W. H. Chang, Roseville, and Lowell C. Zeller, Cottage Grove, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Feb. 25, 1988, Ser. No. 160,135**
**Int. Cl.$^5$ C11D** *10/06;* **A61K** *7/02, 7/50*
**U.S. Cl. 252—174.13** **23 Claims**

1. Stable compositions which can be applied to the skin comprising liquid cleansers of cosmetic creams comprising brittle microcapsules with encapsulated oil therein useful in applications to skin said microcapsules comprising an oil having at least one polymetric thickener therein encapsulated by a polymeric shell consisting essentially of addition polymers, condensation polymers, phenolic aldehydes, urea aldehydes or acrylic polymer, said oil without polymeric thickeners having a viscosity at 20° C. of between 2 and 150 cp, said microcapsules having average diameters between 50 and 2500 microns, wherein said cleaner comprises at least a synthetic detergent, surfactant, and thickener, and wherein said cosmetic creams are compositions selected from the group consisting essentially of

a. creams comprising wax, oil, and emulsifier,
b. creams comprising wax, water, emulsifier, and thickener,
c. creams comprising oils containing glycerin, long chain carboxylic acids and esters, alkanolamines, and emulsifiers,
d. creams comprising oil, long chain carboxylic acids and esters, alkanolamines, emulsifiers, and stabilizers, and
e. creams comprising more than 30% by volume oil, alcohols, emollient, and water.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,474
## LIQUID CRYSTAL DISPLAY DEVICE

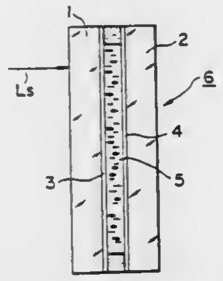
**Kunihiko Arai; Tetsuo Urabe; Tetsuya Morita; Konoe Miura, all of Kanagawa; Tetsuo Ozawa, Tokyo, and Junko Iwanami, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo and Mitsubishi Chemical Industries Limited, Kanagawa, both of, Japan**

**Continuation of Ser. No. 846,747, Apr. 1, 1986, abandoned. This application Nov. 23, 1988, Ser. No. 277,465**

**Claims priority, application Japan, Apr. 2, 1985, 60-69560**

**Int. Cl.$^5$ C09K** *19/00*

**U.S. Cl. 252—299.1** **3 Claims**



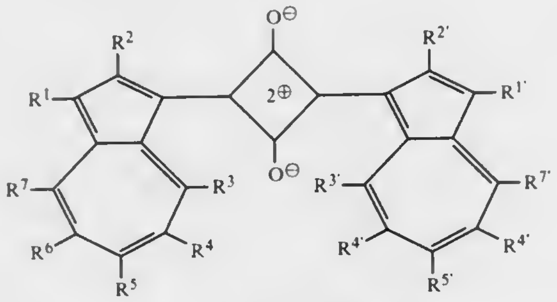
1. A liquid crystal display device comprising:

a liquid crystal cell comprising opposed transparent electrode plates,

a liquid crystal layer including a smectic liquid crystal composition confined between said electrode plates,

a laser beam source positioned to emit a laser beam at said liquid crystal layer, said laser beam emitting a range of wavelengths including the range of visible red to infrared,

said smectic liquid crystal composition containing at least two distinct squarylium dyes represented by the following general formula:



[I]

where $R^1$ to $R^7$ and $R^{1'}$ to $R^{7'}$ each represents a hydrogen atom or an alkyl group of from 1 to 13 carbon atoms, each being present in an amount less than its solubility limit in said liquid crystal composition, all of said dyes evidencing a maximum absorption in said range of wavelengths emitted by said laser beam, and the dyes being present in an amount between approximately 0.05 to about 5 percent by weight of the total amount of the liquid crystal composition.

---

### 5,013,475
## OPTICALLY ACTIVE ESTER COMPOUND AND LIQUID CRYSTAL COMPOSITION CONTAINING THE SAME

**Toshihiro Shibata; Masaki Kimura, and Norio Kurosawa, all of Urawa, Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan**

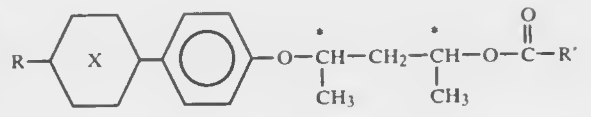
**Filed Oct. 27, 1989, Ser. No. 427,603**

**Claims priority, application Japan, Oct. 27, 1988, 63-271751**

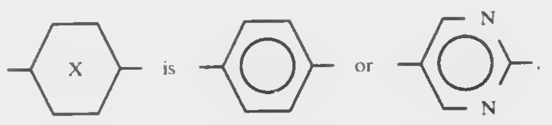
**Int. Cl.$^5$ C09K** *19/34;* **C07C** *41/00*

**U.S. Cl. 252—299.61** **2 Claims**

1. An optically active ester compound of the formula:



wherein R is $C_{1-18}$ alkyl or $C_{1-18}$ alkoxy; R′ is $C_{1-18}$ alkyl or $C_{1-18}$ haloalkyl; and



---

### 5,013,476
## LIQUID CRYSTAL COMPOUNDS AND INDICATING DEVICE EMPLOYING SAME

**Arthur Boller, Binningen; Richard Buchecker, Zurich, both of Switzerland; Hans-Jürgen Fromm, Tokyo, Japan; Stephen Kelly, Möhlin, Switzerland; Martin Schadt, Seltisberg, Switzerland, and Alois Villiger, Basel, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

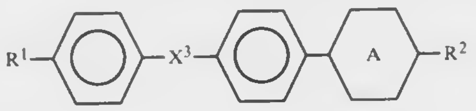
**Filed Nov. 17, 1987, Ser. No. 121,712**

**Claims priority, application Switzerland, Nov. 20, 1986, 4649/86; Sep. 10, 1987, 3505/87**

**Int. Cl.$^5$ C09K** *19/34, 19/32, 19/12;* **G02F** *1/13*

**U.S. Cl. 252—299.61** **9 Claims**

1. A liquid crystalline mixture with ferroelectric properties containing at least 2 components, wherein at least one of said components is an optically active compound of the formula



I

wherein

$R^1$ is straight chain alkenyl with a terminal double bond, or straight chain alkenyloxy with a terminal double bond; $X^3$ is —COO— or —OOC—; ring A is 1,4-phenylene or pyrimidin-2,5-diyl; and $R^2$ is alkyl, alkoxy, methylalkyl or methylalkoxy.

---

### 5,013,477
## ALKENYLBICYCLOHEXANE LIQUID CRYSTALS

**Richard Buchecker, Zurich, and Martin Schadt, Seltisberg, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

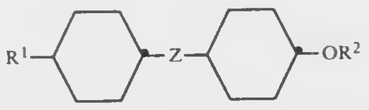
**Filed Oct. 26, 1988, Ser. No. 262,653**

**Claims priority, application Switzerland, Nov. 6, 1987, 4354/87; Aug. 24, 1988, 3137/88**

**Int. Cl.$^5$ C09K** *19/30;* **C07C** *41/00*

**U.S. Cl. 252—299.63** **15 Claims**

1. A compound of the formula



I

wherein Z is a single covalent bond or $—CH_2CH_2—$, $R^1$ is 1E-alkenyl with 2-10 carbon atoms or 3E-alkenyl with 4-10 carbon atoms and $R^2$ is alkyl with 1-10 carbon atoms, 2E-alkenyl with 3-10 carbon atoms or 3-alkenyl with 4-10 carbon atoms.

### 5,013,478
## LIQUID CRYSTALS

**Martin Petrzilka, Kaiseraugst, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

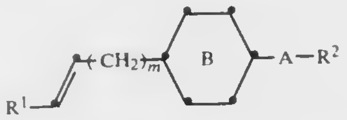
**Continuation of Ser. No. 925,642, Oct. 31, 1986, abandoned, which is a division of Ser. No. 586,471, Mar. 5, 1984, Pat. No. 4,676,604. This application Aug. 31, 1988, Ser. No. 239,069**

**Claims priority, application Switzerland, Mar. 16, 1983, 1436/83; Mar. 22, 1983, 1539/93; Jan. 19, 1984, 226/84**

**Int. Cl.$^5$ C09K** *19/30, 19/32, 19/12;* **G02F** *1/13*

**U.S. Cl. 252—299.63** **27 Claims**

1. A compound of the formula:



I

wherein $R^1$ is hydrogen or straight-chain alkyl; $R^2$ is —CN, —R, —COR, —COOR or when $R^2$ is positioned on an aromatic ring $R^2$ also can be —OR or —OOCR; R is alkyl; A is a group with 1 to 4 six-membered rings, these rings being linked directly with one another and with ring B in each case via a single covalent bond or being linked at one or two positions also via —COO—, —OOC— or $—CH_2—CH_2—$; ring B is trans-1,4-cyclohexylene and the six-membered rings in A each are 1,4-phenylene or trans-1,4-cyclohexylene or one of these rings in A also is trans-2,5-disubstituted m-dioxane, 2,5-disubstituted pyrimidine or 3,6-disubstituted pyridazine; or ring B is trans-2,5-disubstituted m-dioxane and the six membered rings in A each are 1,4-phenylene or trans-1,4-cyclohexylene; with the proviso that a maximum of two adjacent trans-1,4-cyclohexylene rings are linked directly via a single covalent bond and with the further proviso that ring B or one of the rings in group A is a heterocyclic ring when ring B and group A are linked directly via a single covalent bond; and m is the integer 0 or 2.

---

### 5,013,479
## OPTICALLY ACTIVE ETHER DERIVATIVES, PREPARATION PROCESS THEREFOR, LIQUID CRYSTAL MATERIALS AND AN OPTICAL SWITCHING ELEMENT

**Masayoshi Minai, Moriyama, and Takayuki Higashii, Kishiwada, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hitachi, Ltd., Tokyo, both of, Japan**

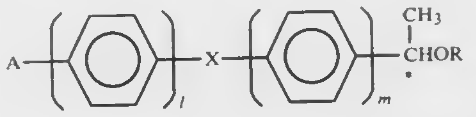
**Continuation of Ser. No. 201,877, Jun. 3, 1988, abandoned. This application Apr. 18, 1990, Ser. No. 512,523**

**Claims priority, application Japan, Jun. 10, 1987, 62-145469; Mar. 22, 1988, 63-68449**

**Int. Cl.$^5$ C09K** *19/12*

**U.S. Cl. 252—299.65** **9 Claims**

1. Optically active ether derivatives represented by the formula (I):



(1)

wherein X represents —COO— or —OCO—; A represents an alkyl or alkoxyl group having 6 to 15 carbon atoms; R represents an alkyl or alkoxyalkyl group having 1 to 20 carbon atoms; l and m each represents the number of 1 to 2 provided that the sum of l and m is 2 or 3; and * indicates an asymmetric carbon atom.

---

### 5,013,480
## PHOSPHOR FOR CATHODE RAY TUBE

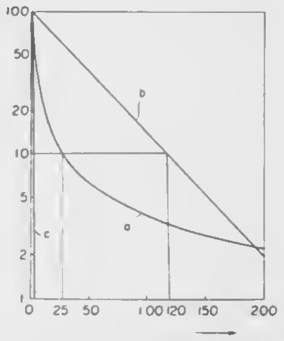
**Kazu Matsunaga, Amagasaki; Hiroshi Okuda, Nagaokakyo, and Kenzo Awazu, deceased, late of Nishinomiya, all of Japan by Setsuko Awazu, legal representative , assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 21, 1986, Ser. No. 867,854**

**Claims priority, application Japan, May 21, 1985, 60-109801**

**Int. Cl.$^5$ C09K** *11/78, 11/86*

**U.S. Cl. 252—301.4 H** **1 Claim**



1. A phosphor for a cathode ray tube obtained by a single stage firing at a temperature of 1300 to 1400° C. of a mixture comprising yttrium oxide and europium oxide in relative proportion to yield a tervalent europium-activated yttrium oxide of the formula $Y_2O_3$:Eu containing 2.0 to 5.0% by weight of magnesium fluoride.

---

### 5,013,481
## BOILER CHEMICALS AND METHOD OF PREVENTING CORROSION OF BOILERS

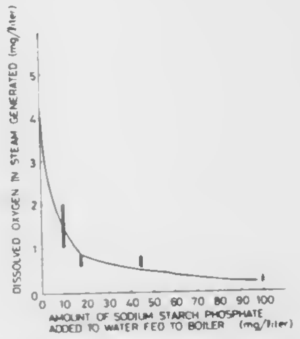
**Shiro Taya, Tokyo, Japan, assignor to Kurita Water Industries, Ltd., Tokyo, Japan**

**Filed Sep. 19, 1989, Ser. No. 409,328**

**Claims priority, application Japan, Sep. 21, 1988, 63-237373**

**Int. Cl.$^5$ C23F** *11/10*

**U.S. Cl. 252—389.23** **7 Claims**



1. A method of preventing corrosion of boiler, comprising,

adding a starch phosphate and/or a water-soluble salt thereof to a boiler feed water, and

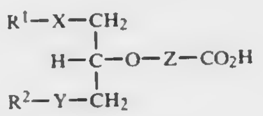
hydrolyzing the starch phosphate and/or water-soluble salt thereof to form starch and phosphate ion in the boiler feed water, said starch reacting with dissolved oxygen to remove oxygen from water as oxygen scavenger and said phosphate ion reacting with hard components of water to prevent formation of scales in the boiler.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,482
## CORROSION INHIBITION

**Robert M. O'Neil, Flixton, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Filed Jul. 17, 1989, Ser. No. 381,213**
**Claims priority, application United Kingdom, Jul. 21, 1988, 8817381; Sep. 29, 1988, 8822847**
**Int. Cl.⁵ C023** *11/10*
**U.S. Cl. 252—395 10 Claims**

1. A method of protecting a metal surface against corrosion comprising contacting the metal surface with a functional fluid containing an effective corrosion inhibiting amount of a compound of the formula I:



$$\begin{array}{l} R^1-X-CH_2 \\ \qquad\;\; | \\ \quad H-C-O-Z-CO_2H \\ \qquad\;\; | \\ R^2-Y-CH_2 \end{array} \qquad (I)$$

as well as salts or esters thereof, wherein

- $R^1$ is $C_4$-$C_{20}$ linear or branched alkyl, phenyl or $C_7$-$C_{20}$alkylphenyl;
- $R^2$ is $C_1$-$C_{12}$ linear or branched alkyl, phenyl or $C_7$-$C_{20}$alkylphenyl, or arylalkyl containing 7-20 carbon atoms;
- X is $CH_2$, O or S;
- Y is O or S; and
- Z is —$(CH_2)_n$— in which n is 1, 2, 3, 4 or 5, or Z is —$CH_2$—$CH(CH_3)$—.

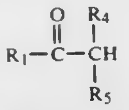
---

### 5,013,483
## PROCESS AND COMPOSITION FOR INHIBITING IRON AND STEEL CORROSION

**Wayne Frenier, Tulsa; Fred Growcock, Broken Arrow; Victoria R. Lopp, Tulsa, all of Okla., and Brian Dixon, Holliston, Mass., assignors to Dowell Schlumberger Incorporated, Tulsa, Okla.**
**Continuation of Ser. No. 765,890, Aug. 14, 1985, abandoned. This application Jan. 30, 1990, Ser. No. 474,232**
**Int. Cl.⁵ C23F** *11/10*
**U.S. Cl. 252—396 25 Claims**

1. A method for forming an alkenylphenone corrosion inhibiting composition comprising the steps of:

providing a precursor compound having the structure



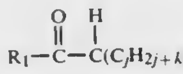
$$\begin{array}{l} \quad\;\; O \quad R_4 \\ \quad\;\; \| \quad\; | \\ R_1-C-CH \\ \qquad\quad\;\; | \\ \qquad\quad\; R_5 \end{array}$$

wherein $R_1$ is an unsubstituted or inertly substituted aryl of 6 to about 10 carbons; $R_4$ is an ether or alcohol or 0 to 8 carbon atoms in length, and $R_5$ is hydrogen, or an alkyl, alkenyl, alkynyl, cycloaliphatic or aryl group of 0 to 8 carbon atoms in length; and

reacting the precursor compound with an aqueous acid to form an alkenylphenone composition.

12. A method for forming an alkenylphenone corrosion inhibiting composition comprising the steps of:

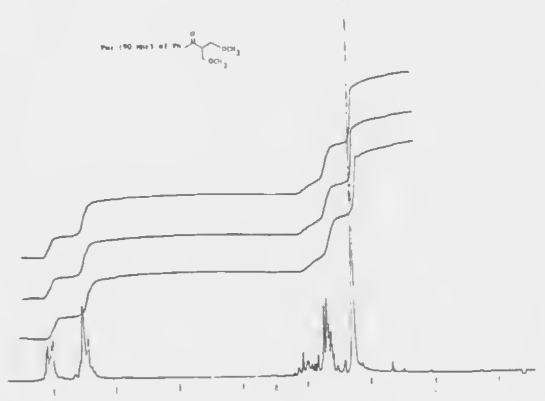
providing a precursor compound having the structure

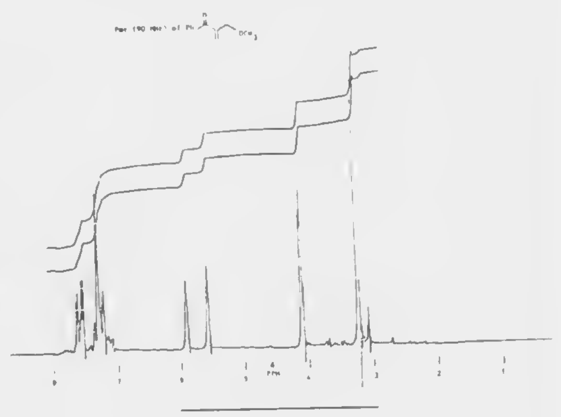


$$\begin{array}{l} \quad\;\; O \quad H \\ \quad\;\; \| \quad\; | \\ R_1-C-C(C_jH_{2j+k}O_2) \end{array}$$

wherein $R_1$ is an unsubstituted or inertly substituted aryl of 6 to about 10 carbons; (j) is an integer from 2 to 8, and (k) is an integer from 0 to 2; and

reacting the precursor compound with an aqueous acid to form an alkenylphenone composition.





---

### 5,013,484
## METHOD OF TREATING CONTACT LENSES

**Mauro De Gregorio, Rome, Italy, assignor to Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A., Rome, Italy**
**Division of Ser. No. 296,275, Jan. 11, 1989, Pat. No. 4,895,676, which is a continuation of Ser. No. 77,620, Jul. 24, 1987, abandoned. This application Nov. 7, 1989, Ser. No. 432,797**
**Claims priority, application Italy, Aug. 1, 1986, 21384 A/86**
**Int. Cl.⁵ A61K** *31/415*
**U.S. Cl. 252—542 14 Claims**

1. A method of treating a contact lens wherein a lens is contacted with an effective amount of bendazac, 5-hydroxybendazac or of a salt thereof with an inorganic or organic physiologically acceptable base, said lens being in the eye and said contact occurring inside the eye.

2. A method of inhibiting protein sedimentation from lacrimal fluid on a contact lens and neutralizing irritative effect of existing protein sediments without substantially affecting mucus secretion by mucous membranes of the contact lens wearer wherein said lens is contacted with an effective amount of a composition comprising bendazac, 5-hydroxy-bendazac, or a salt thereof with an inorganic or organic physiologically acceptable base, and a physiologically acceptable carrier, said contact occurring after insertion into the eye.

### 5,013,485
## LIQUID DETERGENT COMPOSITION CONTAINING TERPENE AND CALCIUM OR MAGNESIUM SALTS

**Kazunori Tsukuda; Masakazu Toda, both of Utsunomiya; Masami Saito, Ichikai, and Masaki Tsumadori, Utsunomiya, all of Japan, assignors to Kao Corporation, Tokyo, Japan**
**Filed Jun. 28, 1989, Ser. No. 373,278**
**Claims priority, application Japan, Jul. 19, 1988, 63-177996**
**Int. Cl.⁵ C11D** *1/12, 3/04, 3/18*
**U.S. Cl. 252—551 7 Claims**

1. A liquid detergent composition comprising as essential components:

(A) 0.01-1.0% by weight of an anionic surface active agent,
(B) 0.01-1.0% by weight of a terpene hydrocarbon solvent selected from monoterpenes and sesqueterpenes; and
(C) 0.001-0.1% by weight of a water-soluble divalent metallic salt selected from the group consisting of $CaCl_2$, $CaSO_4$ and $MgSO_4$.

---

### 5,013,486
## DETERGENT BAR WITH IMPROVED STAIN REMOVING AND ANTIBACTERIAL PROPERTIES

**David Joshi, So. Plainfield, N.J., assignor to Colgate-Palmolive Company, Piscataway, N.J.**
**Filed Apr. 28, 1989, Ser. No. 344,410**
**Int. Cl.⁵ C11D** *1/14, 1/22, 3/48*
**U.S. Cl. 252—559 2 Claims**

1. A detergent bar which has good hardness, mildness and foaming characteristics consisting essentially of 5 to 35 percent alkyl benzene sulfates having 9 to 18 carbon atoms, 5 to 35 percent higher fatty alcohol sulfate, about 2.4 percent zeolite, about 2.9 percent of a 25 percent solution of magnesium sulfate and 0.5 to 5 percent pine oil.

---

### 5,013,487
## INFRARED RADIATION ABSORBING GLUE GLASS COMPOSITION

**J. Joseph Cheng, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Co., Toledo, Ohio**
**Continuation-in-part of Ser. No. 395,550, Aug. 18, 1989, abandoned. This application Oct. 10, 1989, Ser. No. 418,657**
**Int. Cl.⁵ F21V** *9/04;* **G02B** *5/20;* **C03C** *3/083, 3/087*
**U.S. Cl. 252—587 4 Claims**

1. A blue-colored, infrared radiation absorbing glass composition, comprising:

(A) from about 68 to about 74 weight percent $SiO_2$;
(B) from about 11 to about 14 weight percent $Na_2O$;
(C) from about 0 to about 1 weight percent $K_2O$;
(D) from about 1.5 to about 5 weight percent MgO;
(E) from about 6 to about 13 weight percent CaO;
(F) from about 0 to about 3 weight percent $Al_2O_3$;
(G) from about 0 to about 0.5 weight percent $TiO_2$;
(H) from about 0 3 to about 0.7 weight percent $Fe_2O_3$;
(I) from about 0 to about 0.6 weight percent $SnO_2$;
(J) from about 0.5 to about 1.2 weight percent ZnO; and
(K) from about 0.15 to about 0 4 weight percent $SO_3$--.

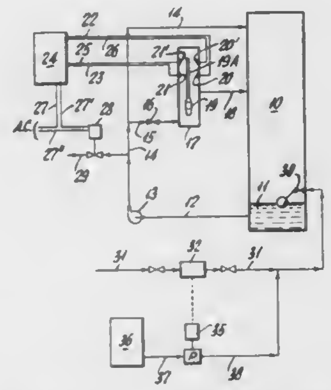
---

### 5,013,488
## APPARATUS FOR CONTROL OF HARD WATER SCALE IN EVAPORATIVE COOLERS

**Khodabandeh Abadi, P.O. Box 2425, Tucson, Ariz. 85702, and Craig A. Hunt, Tucson, Ariz., assignors to Khodabandeh Abadi, Tucson, Ariz.**
**Filed Mar. 19, 1990, Ser. No. 495,351**
**Int. Cl.⁵ C02F** *5/00;* **B01F** *3/04*
**U.S. Cl. 261—70 4 Claims**

1. In combination with an evaporative cooling system containing hard water as the evaporative cooling medium, an outlet for discharging water from the system including a outlet valve for starting and stopping the flow of water through the outlet, and a water level controlled valve associated with the cooling system for introducing fresh makeup water thereto, means for limiting the buildup of mineral solids in the cooling system which comprises:

a vertically elongated float of relatively small horizontal cross sectional area responsive to the density of the water in the system freely floating in water in the system, and

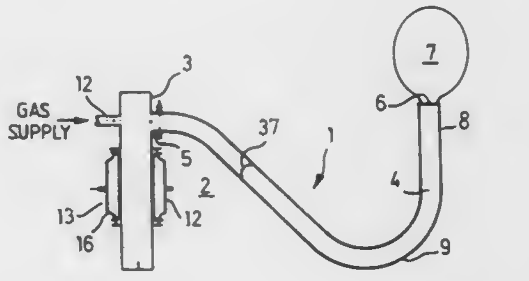


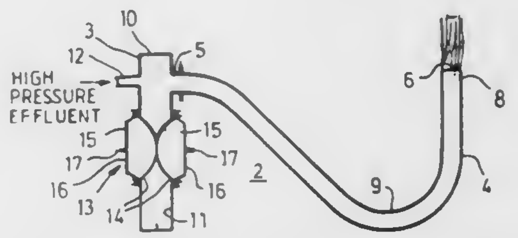
means responsive to the level of the float relative to the level of the water surrounding the float effecting the starting and stopping of flow of water through said outlet.

---

### 5,013,489
## SLUDGE TREATMENT APPARATUS

**Kenneth G. Clark, Rectory Lane, Wallington, Surrey, SM6 3DX, United Kingdom**
**Filed Nov. 6, 1989, Ser. No. 431,781**
**Claims priority, application United Kingdom, Dec. 15, 1988, 8829220**
**Int. Cl.⁵ B01F** *3/04*
**U.S. Cl. 261—77 28 Claims**





1. A gas bubble generator for mixing or promoting turbulence in a liquid medium, comprising:

a hollow gas collector having a gas inlet opening and a gas outlet opening formed in a first portion thereof and a liquid medium ingress-egress opening formed in a second portion thereof and spaced from said first portion, and

siphon pipe means leading from said gas outlet opening to a gas-bubble forming outlet of said siphon pipe means,

said gas inlet opening being formed in a first sidewall portion of said gas collector and said gas outlet opening being formed in an opposite sidewall portion of said gas collec-

VOL
1126
ISS
1
MY
7
1991
UMI

tor and in substantial alignment with said gas inlet opening.

3. A gas bubble generator for mixing or promoting turbulence in a liquid medium, comprising:

a hollow gas collector having a gas inlet and a gas outlet formed in a first portion thereof and a liquid ingress-egress opening formed in a second portion thereof and spaced from said first portion,

siphon pipe means leading from said gas outlet opening to a gas-bubble forming outlet of said siphon pipe means, and

means for selectively blocking liquid communication between said first portion of said gas collector and the exterior of said gas collector by way of said liquid ingress-egress opening, so as to enable purging of said siphon pipe means by introducing a pressurized fluidic purging medium into said first portion of said gas collector.

---

### 5,013,490

## DEVICE FOR RELEASING AND DIFFUSING BUBBLES INTO LIQUID

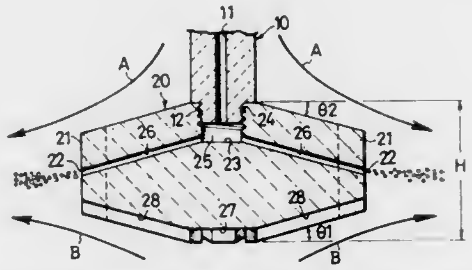
**Shigemi Tanimoto, and Yoshiaki Eguchi, both of Osaka, Japan, assignors to Showa Aluminum Corporation, Osaka, Japan**

**Filed Oct. 18, 1989, Ser. No. 423,304**

**Claims priority, application Japan, Oct. 21, 1988, 63-266673; Oct. 21, 1988, 63-266674**

**Int. Cl.$^5$ B01F *3/04***

**U.S. Cl. 261—87** **12 Claims**



1. A bubble releasing-diffusing device for releasing a gas into a liquid in a form of finely divided bubbles and diffusing the bubbles through an entire body of liquid, the device comprising:

a rotary shaft to be disposed in the liquid approximately vertically and rotatable about an axis, the rotary shaft having a gas channel axially extending therethrough;

a bubble releasing-diffusing rotor having a recessed portion into which a lower end of the rotary shaft is partially threaded and inserted to form a gas chamber therein which is smaller in size than the lower end of said rotary shaft and said rotor having a plurality of liquid agitating projections formed along a periphery at a specified spacing circumferentially thereof, the rotor formed in a bottom face with a plurality of grooves extending radially from a central portion of the bottom face to outer ends of respective liquid agitating projections for centrifugally guiding the liquid when the rotary shaft is in rotation; and

gas discharge ports of the rotor communicating with the gas channel of the rotary shaft via inclined communication passages connected to said gas chamber and equal in number to the number of the grooves for discharging the gas therefrom so that bubbles are entrained in the liquid centrifugally flowing out from outer ends of the grooves in a peripheral surface of the rotor.

---

### 5,013,491

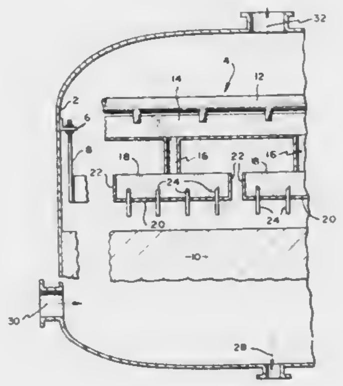
## APPARATUS FOR DISTRIBUTING LIQUID IN GAS-LIQUID CONTACT APPARATUS, AND METHOD FOR MAKING IT

**Dale E. Nutter, 7935 S. New Haven, Tulsa, Okla. 74136**

**Continuation-in-part of Ser. No. 363,786, Jun. 9, 1989, abandoned. This application Mar. 13, 1990, Ser. No. 492,848**

**Int. Cl.$^5$ B01F *3/04***

**U.S. Cl. 261—97** **16 Claims**



1. Apparatus for distributing liquid onto a bed of packing media in a gas-liquid contact apparatus, comprising:

a deck having first and second surfaces and being provided with a plurality of openings,

a plurality of flow tubes positioned in said deck, each of said flow tubes having a vertically elongated slot located above the deck for admitting liquid into the tube, each of said flow tubes having an outlet opening below the deck for releasing liquid into a bed of packing media in the gas-liquid contact apparatus,

each of said tubes having an external circumferential rib spaced from said slot a distance which is uniform for all of said flow tubes in the deck, said rib having a surface that bears against the first surface of the deck to fix the tube to the deck and accurately set the orientation and elevation of the slot relative to the deck,

each of said tubes having at least one external locking protrusion at a position spaced axially from said rib, said locking protrusion bearing against the second surface of the deck, whereby each said tube is immovably secured to the deck by said rib and said protrusion.

---

### 5,013,492

## ARRANGEMENT FOR CONTACT BODIES FOR LIQUID AND GAS

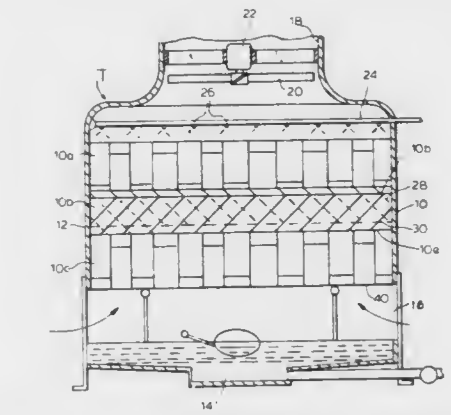
**George A. Gay, Califon, N.J., and Robert H. Miller, Fort Myers, Fla., assignors to Munters Corporation, Fort Myers, Fla.**

**Filed Apr. 6, 1990, Ser. No. 505,561**

**Int. Cl.$^5$ B01F *3/04***

**U.S. Cl. 261—112.2** **6 Claims**

1. A contact body for liquid and gas, primarily for cooling towers, said body comprising at least two separate contact body packs supported one upon the other and defining an interface therebetween, said packs each being formed of a plurality of formed sheets positioned in contact with each other and defining passages therebetween, said packs being positioned such that their sheets extend at an angle to one another; said sheets in said packs each having edge portions at said interface, and selected sheets in each pack having their edge portions at said interface offset with respect to the remaining sheets, whereby enlarged passageway segments are formed at the interface.



---

### 5,013,493

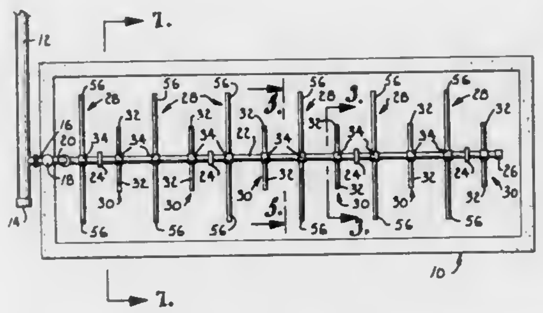
## STAGGERED DIFFUSER ARRANGEMENT FOR WASTE WATER TREATMENT SYSTEMS

**Charles E. Tharp, Columbia, Mo., assignor to Environmental Dynamics, Inc., Columbia, Mo.**

**Filed Jan. 22, 1990, Ser. No. 468,190**

**Int. Cl.$^5$ B01F *3/04***

**U.S. Cl. 261—122** **15 Claims**



1. A waste water treatment system for aerating waste water, comprising:

a supply conduit for receiving air under pressure;

at least one branch pipe extending from the supply pipe and into the waste water;

an air lateral communicating with said branch pipe to receive air therefrom, said air lateral being submerged in the waste water;

a plurality of relatively long diffuser assemblies each including at least one relatively long diffuser having a generally tubular configuration, each of said long diffusers communicating with the air lateral to receive air therefrom and being constructed to discharge air into the waste water in bubbles;

a plurality of relatively short diffuser assemblies each including at least one relatively short diffuser which is shorter than the long diffusers and which is generally tubular, each of said short diffusers communicating with the air lateral to receive air therefrom and being constructed to discharge air into the waste water in bubbles; and

means for connecting said diffuser assemblies to said air lateral in a pattern wherein the long assemblies and short assemblies alternate along the length of the air lateral with the diffusers in each assembly projecting on opposite sides of said air lateral.

---

### 5,013,494

## PROCESS FOR PREPARING BLAZED HOLOGRAMS

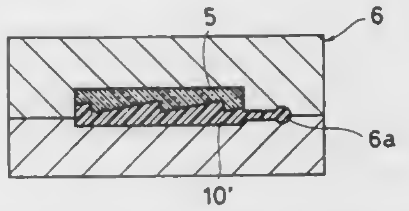
**Katsuhiro Kubo, Yamatokoriyama; Keiji Sakal, Nara; Yuklo Kurata, Tenri, and Hideyoshi Yamaoka, Matsubara, all of Japan, assignors to Sharp Kabushiki Kaisha, Japan**

**Filed Aug. 1, 1989, Ser. No. 388,118**

**Claims priority, application Japan, Aug. 3, 1988, 63-194161**

**Int. Cl.$^5$ B29D *11/00;* B29C *45/00***

**U.S. Cl. 264—1.3** **11 Claims**



1. A process for preparing blazed holograms which comprises fabricating a glass or metal plate having a surface of serrated cross section corresponding to a desired blazed grating pattern, disposing the glass or metal plate in an injection mold to allow the surface of serrated cross section to constitute an inner surface of the mold, injecting an acrylic resin in molten form into the mold under molding pressure of 1500 kgf/cm$^2$ or more and removing a molded acrylic resin from the glass or metal plate to obtain an acrylic blazed hologram.

---

### 5,013,495

## METHOD OF PRODUCING OPTICAL FIBER CONNECTORS

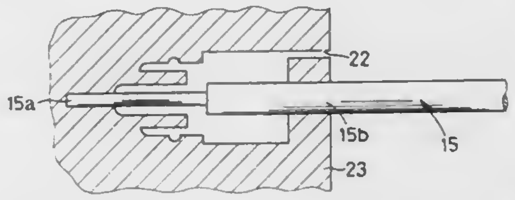
**Kunihiro Noba, Nagoya; Yukio Sakuraba, and Katsuyoshi Urano, both of Kasugai, all of Japan, assignors to Tokai Rubber Industries, Ltd., Aichi, Japan**

**Division of Ser. No. 303,893, Jan. 30, 1989, Pat. No. 4,907,852. This application May 30, 1989, Ser. No. 357,896**

**Claims priority, application Japan, Feb. 5, 1988, 63-26379; Feb. 18, 1988, 63-20152[U]**

**Int. Cl.$^5$ B29D *11/00;* G02B *6/38***

**U.S. Cl. 264—1.5** **11 Claims**



1. A method of producing an optical fiber connector assembly for optically connecting end to end a plastic first optical fiber to another optical fiber, said first optical fiber having a core and a sheath covering said core, said method comprising the steps of:

removing an end portion of said sheath of said plastic first optical fiber to obtain an exposed end portion of said core, said exposed end portion of said core and a terminal portion of the remaining sheath adjacent to said exposed portion of the core cooperating with each other to form a connecting end portion of said first optical fiber;

providing a mold having a cavity for forming a connector for optical connection of said connecting end portion of said first optical fiber to said another optical fiber, and at least one injection aperture formed therethrough extending in a predetermined direction, and communicating with said cavity, said cavity including a portion which corresponds to a body of said connector, and a portion which corresponds to a connecting portion of said connector;

setting said connecting end portion of said first optical fiber in said mold such that said connecting end portion extends

VOL
1126
ISS
1
MY
7
1991
UMI

through said cavity, in a direction parallel to said predetermined direction, and is fixed in said mold in direct contact with said mold and in coaxial relation with said portion of said cavity corresponding to said connecting portion of said connector;

maintaining an interior of said mold at a temperature not higher than a softening point of said first optical fiber; and

preparing a molten mass of a material for forming said connector, and injecting said molten mass into said cavity at a melt flow rate not lower than 5g/min., while said molten mass to be injected is maintained at a temperature which is higher than said softening point but is not higher than a temperature 150° C. above said softening point, whereby said connector is formed of said material in integrally bonded relation with an outer surface of said connecting end portion of said first optical fiber.

---

### 5,013,496

## PROCESS FOR MOLDING A HIGHLY-REFRACTIVE PLASTIC LENS

**Teruyuki Nagata; Koju Okazaki, both of Omuta; Nobuyuki Kajimoto; Tohru Miura, both of Yokohama; Yoshinobu Kanemura, and Katsuyoshi Sasagawa, both of Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan**

**Filed Feb. 15, 1989, Ser. No. 310,388**

**Claims priority, application Japan, Feb. 22, 1988, 62-37515; Feb. 22, 1988, 63-37523; Feb. 22, 1988, 63-37525**

**Int. Cl.$^5$ B29D** *11/00*

**U.S. Cl. 264—2.3** **5 Claims**

1. A process for producing a plastic lens characterized by adding at least one internal mold releasing agent selected from the group consisting of fluorine-containing nonionic surface active agents, silicon-containing nonionic surface active agents, quaternary alkylammonium slats and acidic phosphates to a mixture of one or more of sulfur-containing aromatic polyisocyanate compounds and one or more of active hydrogen compounds selected from the group consisting of polyol compounds and polythiol compounds followed by casting polymerization in a lens mold so as to form a plastic lens.

---

### 5,013,497

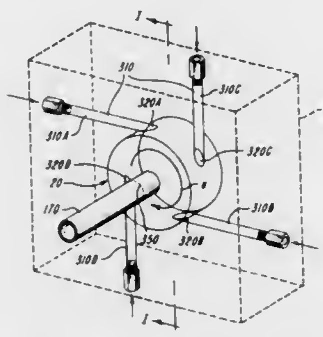
## METHOD AND APPARATUS FOR PRODUCING LIPID VESICLES

**Costas Yiournas, Vineland, N.J., and Donald F. H. Wallach, Brookline, Mass., assignors to Micro-Pak, Inc., Wilmington, Del.**

**Division of Ser. No. 163,806, Mar. 3, 1988, Pat. No. 4,895,452. This application Nov. 1, 1989, Ser. No. 430,119**

**Int. Cl.$^5$ B01J** *13/02;* **A61K** *9/127*

**U.S. Cl. 264—4.1** **7 Claims**



1. A method of producing multilamellar or paucilamellar lipid vesicles comprising the steps of:

providing a mixing chamber, said mixing chamber having a substantially cylindrical inner surface having with at least one tangentially directed inlet orifice and at least one additional inlet orifice opening through said inner surface into said mixing chamber, said mixing chamber further including an outlet orifice for removing said lipid vesicles after formation,

inputting a lipophilic phase into said mixing chamber through one of said inlet orifices with sufficient force to create a flow of said lipophilic phase about said inner surface,

inputting an aqueous phase through another of said inlet orifices with sufficient force to create a flow of said aqueous phase about said inner surface, wherein at least one of said aqueous phase and said lipophilic phase is input through said tangentially directed inlet orifice,

allowing said flow of said lipophilic phase and said flow of said aqueous phase to intersect, thereby providing shear mixing of said lipophilic phase and said aqueous phase, said shear mixing providing sufficient mixing to form said lipid vesicles, and

removing said lipid vesicles from said mixing chamber through said outlet orifice.

---

### 5,013,498

## METHOD AND APPARATUS FOR PRODUCING PASTILLES

**Reinhard Froeschke, Weinstadt, Fed. Rep. of Germany, assignor to Santrade Ltd., Luzern, Switzerland**

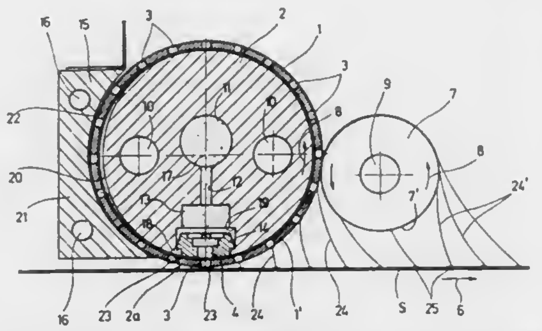
**PCT No. PCT/EP89/00369, § 371 Date Dec. 26, 1989, § 102(e) Date Dec. 26, 1989, PCT Pub. No. WO89/10187, PCT Pub. Date Nov. 2, 1989**

**PCT Filed Apr. 6, 1989, Ser. No. 457,805**

**Claims priority, application Fed. Rep. of Germany, Apr. 23, 1988, 3813756**

**Int. Cl.$^5$ B29B** *9/00;* **B29C** *67/02*

**U.S. Cl. 264—8** **15 Claims**



1. In a method of forming pastilles wherein small quantities of a liquid viscous material are passed through small openings and onto a moving conveyor surface upon which said quantities of material are cooled and solidified, the improvement wherein said liquid viscous material is contacted by said moving conveyor surface after said liquid viscous material protrudes from said openings and while such protruding liquid viscous material is in a stable state, whereby said moving conveyor surface forcefully extracts said quantities of liquid viscous material from said openings.

---

### 5,013,499

## METHOD OF FLAME SPRAYING REFRACTORY MATERIAL

**David C. Willard, Freeport, The Bahamas, assignor to Sudamet, Ltd., The Bahamas**

**Filed Oct. 11, 1988, Ser. No. 255,634**

**Int. Cl.$^5$ B05D** *1/08;* **B32B** *35/00;* **F27D** *1/16*

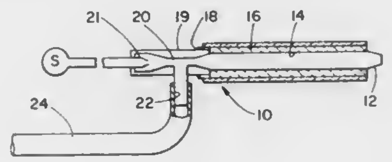
**U.S. Cl. 264—30** **25 Claims**

1. A method of forming a refractory mass comprising the steps of:

(a) delivering through an oxygen outlet nozzle a high pressure stream of oxygen to a flame spraying apparatus, the

high pressure stream of oxygen having a pressure of 50 psi to 150 psi;

(b) delivering into the high pressure stream of oxygen in the flame spraying apparatus, a mixture comprising a carrier gas and entrained particles of an oxidizable material and of an incombustible refractory material, the carrier gas having a pressure of 5 psi to 15 psi, to form an oxygen-carrier gas-oxidizable material-refractory material stream, said mixture being delivered in an amount to effect a volume ratio of from 5 1 to about 30 to 1 oxygen to carrier gas at their respective pressures;



(c) projecting the oxygen-carrier gas-oxidizable material-refractory material stream from an outlet nozzle of the flame spraying apparatus toward a refractory lining;

(d) burning the oxidizable material; and

(e) forming a refractory mass.

---

### 5,013,500

## PROCESS FOR PRODUCING HOLLOW CERAMIC ARTICLES

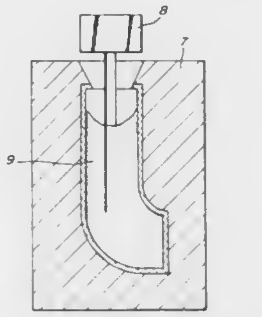
**Toshiyuki Hamanaka, Suzuka; Takashi Harada, Nagoya, and Fumio Hattori, Ichinomiya, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan**

**Continuation of Ser. No. 255,386, Oct. 11, 1988, abandoned. This application Sep. 21, 1990, Ser. No. 586,374**

**Claims priority, application Japan, Oct. 13, 1987, 62-257656; Oct. 13, 1987, 62-257657; Oct. 13, 1987, 62-257659; Oct. 13, 1987, 62-257660; Oct. 13, 1987, 62-257661**

**Int. Cl.$^5$ B28B** *1/26, 7/36, 11/12;* **B29C** *41/18*

**U.S. Cl. 264—40.4** **8 Claims**



1. A method of producing a hollow raw ceramic article, comprising the steps of:

pouring enough slurry, comprising water and ceramic raw material, into an opening of an hydrophilic mold to substantially fill such mold with said slurry;

inserting a device, for measuring a change in liquid surface level of said slurry, through said opening into said slurry;

measuring a liquid surface level of said slurry of said substantially filled mold using said liquid level measuring device;

absorbing an amount of water from said slurry through said mold to thereby deposit said ceramic raw material from said slurry onto an inner surface of said mold;

measuring a decrease in said liquid surface level, corresponding to said amount of said water absorbed from said slurry through said mold, using said liquid level measuring device;

draining excess slurry from said mold through said opening based upon a measured decrease of said liquid surface level which corresponds to deposition of a given thickness of said ceramic raw material from said slurry onto said inner surface of said mold, thereby forming said raw ceramic article; and

---

### 5,013,501

## METHOD OF PROUDCING CERAMIC MANIFOLDS FOR THERMALLY INSULATING EXHAUST CHANNELS

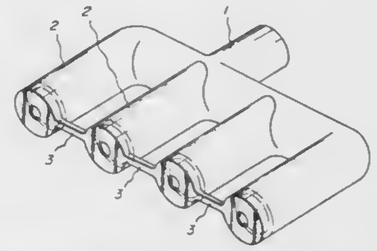
**Kaname Fukao, Inuyama; Toshiyuki Hamanaka, Suzuka, and Takashi Harada, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Aichi, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,381**

**Claims priority, applicetion Japan, Dec. 21, 1988, 63-322890**

**Int. Cl.$^5$ B28B** *11/00, 1/26*

**U.S. Cl. 264—67** **6 Claims**



1. A method of producing a ceramic manifold for thermally insulating exhaust channels, comprising the steps of forming by drain casting an intermediate product including a main ceramic pipe having a plurality of branch pipes extending therefrom whose ends are integrally connected together by at least one elongated connection member to maintain a constant spacing between the branch pipes during firing, firing the intermediate product, and cutting off the ends of the branch pipes together with the at least one elongated connection member.

---

### 5,013,502

## CONTINUOUS PRODUCTION OF ACRYLONITRILE FILAMENTS AND FIBERS FROM SPINNING MATERIAL OF LOW RESIDUAL SOLVENT CONTENT

**Ulrich Reinehr; Rolf-Burkhard Hirsch; Hermann Josef Jungverdorben, and Joachim Dross, all of Dormagen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Sep. 19, 1989, Ser. No. 409,550**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1988, 3832870**

**Int. Cl.$^5$ D01F** *6/18*

**U.S. Cl. 264—103** **15 Claims**

1. In the production of filaments and fibers of an acrylonitrile polymer containing at least 40% by weight of acrylonitrile units by spinning and aftertreatment, in which a spinning solution of the polymer in a highly polar organic solvent is spun with superheated steam in a spinning tube, most of the spinning solvent is evaporated in the spinning tube and, after finishing, the tow obtained by combining several filaments is subjected to continuous aftertreatment by stretching, crimping and shrinking, the improvement wherein prior to such aftertreatment

(a) the fibers are spun at outputs of <20 kg/tube/hour,

(b) superheated steam substantially free from water droplets is used as the spinning gas,

(c) the amount of spinning steam used amounts to at least 20 kg/tube/hour,

(d) the ration by weight of acrylonitrile polymer to the throughput of spinning steam is at least 1:3,

(e) the spinning steam temperature is at least 360° C.,

(f) the spinning tube temperature is at least 230° C.,

(g) and the filaments are finished at the lower end of the spinning tube either with water or with an aqueous, or an aqueous oil-containing preparation containing an antistatic agent for bundling to promote cohesion, the moisture content of the filaments is more than 10% by weight,

VOL
1126
ISS
1
MY
7
1991
UMI

based on fiber solids, and the filament temperature on leaving the spinning tube is at most 130° C.

---

### 5,013,503
## PROCESS FOR CONTINUOUS PRODUCTION OF CARBONACEOUS PASTE

**Christian Jonville, and Jean-Robert Nicollin, both of St. Jean-de-Maurienne, France, assignors to Aluminium Pechiney, Paris, France**

**Filed Feb. 5, 1990, Ser. No. 475,312**

**Claims priority, application France, Feb. 6, 1989, 89 01917**

**Int. Cl.$^5$ B29C** *67/02*

**U.S. Cl. 264—117** **6 Claims**

1. A process for the continuous production of a carbonaceous paste to be shaped, comprising the steps of:
continuously introducing into a kneader having an upstream end, a downstream end, and a rotating shaft associated with kneading elements, at least one carbonaceous aggregate and a cokable binder, and kneading to form a carbonaceous paste;
passing said paste from said upstream end to said downstream end, during kneading;
heating said paste in the upstream end of said kneader to a temperature Th;
injecting water into the paste in the downstream end of said kneader, causing a reduction in temperature of the paste and vaporization of the water;
discharging the vaporized water from an orifice in the kneader; and
continuously discharging from the downstream end of said kneader, the paste reduced in temperature to a shaping temperature Tb below Th.

---

### 5,013,504
## DRY SPINNING PROCESS WITH HOT AIR AND WITH SPINNING CELL OUTPUTS GREATER THAN 20 KG PER CELL PER HOUR

**Ulrich Reinehr; Günter Türck; Rolf B. Hirsch, and Hermann-Josef Jungverdorben, all of Dormagen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Sep. 22, 1989, Ser. No. 411,078**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1988, 3832872**

**Int. Cl.$^5$ D01F** *6/18;* **D01D** *5/04*

**U.S. Cl. 264—130** **6 Claims**

1. In the production of PAN filaments by spinning a hot solution of PAN in DMF through an annular spinneret having a large number of spinning holes into a spinning cell provided with hot air, applying a finish to the formed filaments, and collecting the filaments, the improvement wherein
(a) the spinning cell output is at least 20 kg of PAN solid per spinning cell per hour with a DMF content of less than 30% by weight,
(b) the amount of hot air used is at least 70 $m^3$ (S.T.P.)/h,
(c) the hot air is at a temperature of at least 360° C., with the air directed downwardly from top to bottom, essentially parallel to the direction of the fibers,
(d) the cell wall temperature is at least 200° C.,
(e) the specific energy consumption is at least 0.09 kWh per kg of PAN solid and per $m^2$ of heated surface,
(f) the hole density of the annular spinneret is not more than 10.5 holes per $cm^2$ of annular spinneret surface area,
(g) the spinneret has at least 500 holes with a spacing at least 2.8 mm,
(h) finishing the filaments inside the spinning cell, with water or an aqueous/oil-containing preparation,
(i) the finish being applied in an amount to provide more than 10% by weight of moisture, based on PAN solid in the filament on leaving the spinning cell and
(k) the temperature of the spun filaments, measured at the cell outlet, is below 110°.

---

### 5,013,505
## METHOD OF MOLDING A CASING ON A ROTARY ELECTRIC COMPONENT

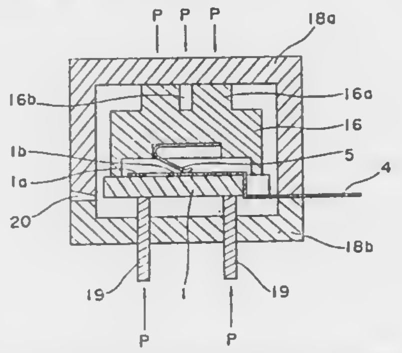
**Fumitoshi Masuda, Fukui, Japan, assignor to Murata Manufacturing Co., Ltd., Japan**

**Division of Ser. No. 849,552, Apr. 8, 1986, abandoned. This application Dec. 3, 1987, Ser. No. 128,045**

**Claims priority, application Japan, Apr. 12, 1985, 60-78843**

**Int. Cl.$^5$ B29C** *45/14*

**U.S. Cl. 264—130** **6 Claims**



1. A method of manufacturing an electronic component, said method comprising the steps of:
supporting a stator and a rotor in a mold;
pouring a resin material into said mold, the shape of said mold and the locations of said stator and rotor being such that said resin material fully encloses said stator and encloses all but one exposed portion of said rotor so as to form a unitary molded casing which houses said stator and rotor, said one exposed portion of said rotor being exposed to the outside of the casing;
urging said mold against said part of said rotor to be exposed; and urging said stator against said rotor; so that said resin material will enter neither between said exposed rotor part and said mold, nor between said rotor and stator; and
subjecting at least a portion of the surface of said rotor which will be in contact with said casing to a mold releasing treatment so that the rotor is freely rotatable with respect to both the stator and the casing after the molding is completed.

---

### 5,013,506
## PROCESS FOR PRODUCING POLYESTER FIBERS

**Shigemitsu Murase; Kouji Kakumoto; Shouji Miyazaki; Masaru Sugawa, and Mikio Ide, all of Kyoto, Japan, assignors to Unitika Ltd., Hyogo, Japan**

**Division of Ser. No. 26,703, Mar. 17, 1987, Pat. No. 4,869,958. This application Jul. 25, 1989, Ser. No. 384,527**

**Int. Cl.$^5$ D01D** *5/12;* **D01F** *6/62*

**U.S. Cl. 264—210.8** **5 Claims**

1. A process for producing polyester fibers which comprises melt spinning fibers from the spinneret, converging said fibers at a convergence point under a spinning tension, taking up the melt-spun fibers in the absence of heat at a speed of from 5,000 to 6,000 m/min under conditions that satisfy the following relations (IX) and (X), subsequently heat-treating the fibers for a period of from 0.01 to 0.05 seconds with a heating roller at from 160° to 220° C. while the length of the melt-spun fibers is held constant with no drawing step being provided between the taking up and heat treatment steps, and finally winding up the heated fibers, said fibers having a filament fineness within the range of from 1 to 3 d

$$0.04 \leqq L/(SSxD) \leqq 0.08 \qquad (IX)$$

$$1.0 \leqq To \leqq 1.5 \qquad (X)$$

where L is the distance (cm) between the spinneret and the convergence point, SS is the speed (m/min) of a take up roller, To is the spinning tension (g/d) at a point immediately after the convergence point, and D is the filament fineness (d) of the fibers wound up.

---

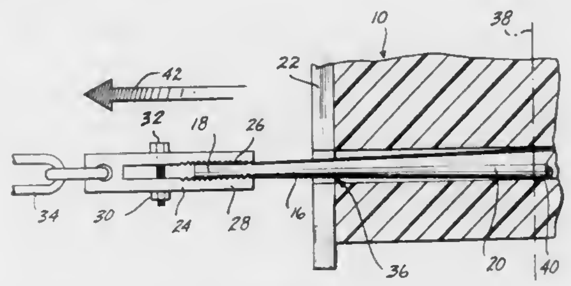
### 5,013,507
## METHOD FOR PRODUCING AN ELONGATE PASSAGE WITHIN A COMPONENT

**Gerald J. Julien, Puyallup; Steven P. Robinson, and Ronald H. Bondy, both of Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Sep. 29, 1989, Ser. No. 415,898**

**Int. Cl.$^5$ B29C** *39/10, 41/20, 41/42*

**U.S. Cl. 264—219** **23 Claims**



1. A method for creating an elongate cavity of a desired cross-sectional shape and size within a component, comprising the steps of:
(a) forming a memory metal alloy into an elongate element having substantially the same cross-sectional shape and size as that desired of the elongate cavity;
(b) fabricating the component with the elongate element positioned where the elongate cavity is desired, the component conforming around the cross-sectional shape of the elongate element along a substantial portion of the length of the elongate element; and
(c) axially pulling the elongate element from the component with sufficient force to substantially convert the memory metal alloy into a stress-induced martensitic state, whereby the elongate element experiences:
i. a plastic, inelastic deformation, wherein it stretches axially in length with a substantial decrease in cross-sectional area; and
ii. a substantial increase in tensile strength, said decrease in cross-sectional area and increase in tensile strength respectively freeing the elongate element and enabling it to be withdrawn from the component, without breaking; the elongate cavity within the component thus comprising the space previously occupied by the elongate element after it is pulled from the component.

---

### 5,013,508
## METHOD FOR PRODUCING ELASTOMER SKINS AS LINING MATERIAL FOR PLASTIC MOLDED ARTICLES SUCH AS AUTOMOBILE DASHBOARDS

**Guenther Troester, Tannenweg 6, Breitenguessbach, Fed. Rep. of Germany 8613 , assignor to Guenther Troester, Breitenguessbach, Fed. Rep. of Germany**

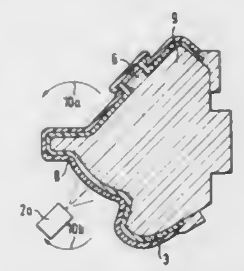
**Filed May 12, 1989, Ser. No. 351,126**

**Claims priority, application Fed. Rep. of Germany, May 14, 1988, 3816553; Apr. 21, 1989, 3913157**

**Int. Cl.$^5$ B29C** *41/08*

**U.S. Cl. 264—224** **21 Claims**

1. A method for producing elastomer skins as lining for plastic molded articles, such as automobile dashboards, comprising:
providing a working model;
applying a layer of elastomer material onto said working model to form a preform having an inner side facing said working model and an outer side facing away from said working model;
removing said preform from said working model;
inverting said preform in at least certain regions thereof by turning said preform substantially inside out so that said inner side of the preform previously facing said working model is on the outside of said preform and said outer side is on the inside thereof;
applying a polyurethane paint onto said outside of said inverted preform;
providing at least one spraying tool at said outside of said preform in said inverted position;



applying at least one polyurethane layer by said at least one spraying tool onto said outside of said inverted preform to form a manipulable elastomer skin having the shape of said inverted preform;
removing said elastomer skin together with said layer of polyurethane paint integral therewith from said preform; and
inverting said elastomer skin by turning said elastomer skin inside out so that the side thereof originally facing said preform and having said integral layer of polyurethane paint thereon is on the outside of said elastomer skin.

---

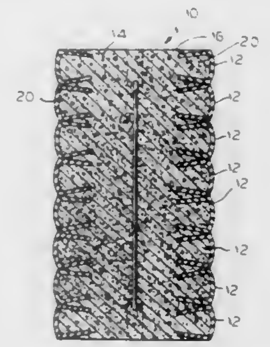
### 5,013,509
## METHOD FOR FORMING A TIRE CLAD CONCRETE LOG

**Donald L. Kiselewski, 4705 Holly Dr., Palm Beach Gardens, Fla. 33418**

**Division of Ser. No. 379,067, Jul. 13, 1989. This application Oct. 25, 1990, Ser. No. 603,175**

**Int. Cl.$^5$ B28B** *1/16, 19/00*

**U.S. Cl. 264—229** **7 Claims**



1. A method of forming a tire clad concrete log for the purpose of environmental enhancement, comprising the steps of:
providing a plurality of used tires and thereafter making a form by placing said used tires in sidewall-to-sidewall contact and slightly compressing said used tires in generally coaxial relation;
providing a quantity of a waste ash and thereafter mixing said waste ash with a binder forming a concrete material;
filling said form with said concrete material while also maintaining said used tires slightly compressed and in sidewall-to-sidewall contact; and
thereafter allowing said concrete material in said form made

VOL
1126
ISS
1
MY
7
1991
UMI

of said used tires to cure to form said tire clad concrete log.

---

### 5,013,510
### PROCESS FOR PREPARING LONG CHAIN N,N-DIALKYLHYDROXYLAMINES BY DIRECT OXIDATION

**Stephen D. Pastor, Danbury, Conn., and Paul A. Odorisio, Edgewater, N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 947,003, Dec. 29, 1986, abandoned. This application Jun. 14, 1989, Ser. No. 366,974**

**Int. Cl.$^5$ C07C** *239/10*

**U.S. Cl. 564—301** **7 Claims**

1. An improved process for the preparation of a long chain N,N-dialkylhydroxylamine which comprises oxidizing a secondary dialkylamine of the formula

$$E_1E_2NH$$

wherein $E_1$ and $E_2$ are independently alkyl of 10 to 30 carbon atoms, with aqueous hydrogen peroxide solution at a temperature of 40 to 65° C. to give the corresponding N,N-dialkylhydroxylamine

$$E_1\ E_2NOH$$

wherein the improvement comprises
dissolving the secondary dialkylamine

$$E_1E_2NH$$

in a lower alkanol solvent,
oxidizing said dialkylamine with a molar excess of 10–70% aqueous hydrogen peroxide to form the N,N-dialkylhydroxylamine

$$E_1E_2NOH$$

which precipitates from the aqueous lower alkanol reaction medium, and
isolating the insoluble N,N-dialkylhydroxylamine, said process being carried out in the absence of a catalyst or of a sequestering agent.

---

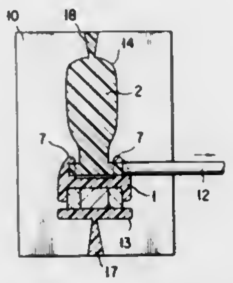
### 5,013,511
### METHOD OF MAKING A SLIDER FOR USE IN A SLIDE FASTENER

**Shunji Akashi, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Dec. 4, 1989, Ser. No. 445,027**

**Int. Cl.$^5$ B29C** *45/16*

**U.S. Cl. 264—242** **1 Claim**



1. A method of making a slider for use in a slide fastener, which slider consists of a slider body having a pair of bearings for a pull tab on the opposite sides of its upper surface and a pull tab having a pintle at its base end pivotably supported between said respective bearings for the pull tab; comprising:

(A) a first preparatory step, in which a mold provided with a slider body mold cavity and a pull tab mold cavity in continuation with pull tab bearing mold portions of said slider body mold cavity is employed, a slide core is inserted into said pull tab bearing mold portions to block the slider body mold cavity from the pull tab mold cavity by means of said slide core and also to form hollow space portions in the pull tab-bearings;

(B) a first injection molding step, in which an amount of molten synthetic resin is injected into the blocked slider body mold cavity and is left for a solidifying period, thereby forming said slider body with said pair of pull tab bearings;

(C) a second preparatory step, in which said slide core is retreated to make the pull tab mold cavity communicate with the already injection-molded slider body via a pull tab pintle mold portion between the respective pull tab bearings; and

(D) a second injection-molding step, in which an amount of molten synthetic resin having a larger thermal contraction coefficient than the synthetic resin injected into the slider body mold cavity, is injected into the pull tab mold cavity and pull tab pintle mold portion, and is left for a solidifying period thereby forming said pull tab and pintle, said pintle becoming smaller in diameter than said pull tab bearings due to said larger thermal contraction such that said slider body and pull tab are swingably associated.

---

### 5,013,512
### METHOD OF MANUFACTURING AN ELONGATED STRUCTURAL MEMBER

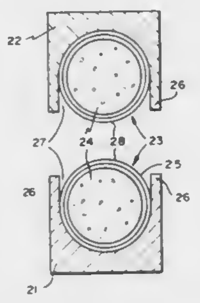
**Sven E. Malmström, Erlenstrasse 42 CH 3612, Steffisburg, Switzerland**

**Continuation of Ser. No. 183,422, Apr. 18, 1988, abandoned, which is a continuation of Ser. No. 39,839, Apr. 17, 1987, abandoned, which is a continuation of Ser. No. 830,823, Feb. 19, 1986, Pat. No. 4,677,201. This application Jun. 26, 1989, Ser. No. 372,150**

**Claims priority, application Sweden, Feb. 19, 1985, 8500767; Feb. 19, 1985, 8500769**

**Int. Cl.$^5$ B29C** *43/18*

**U.S. Cl. 264—255** **5 Claims**



1. A method of manufacturing an elongated, multi-component structural member having a substantially uniform cross-section comprising a pultrusion process including the steps of:

(a) forming a porous core having an outer surface;
(b) applying a first layer comprising an air-tight skin over the outer surface of said porous core;
(c) applying a second layer comprising peripherally-extending fibers over said first layer;
(d) applying a third layer comprising axially-extending fibers impregnated with an excess of uncured thermosetting plastic over said second layer;
(e) applying a fourth layer comprising peripherally-extending fibers over said third layer, said fibers of said fourth layer being substantially free of uncured thermosetting plastic;
(f) positioning the resulting multi-component member in a mold and curing said multi-component member, wherein excess uncured thermosetting plastic from said third layer indirectly impregnates said fourth layer.

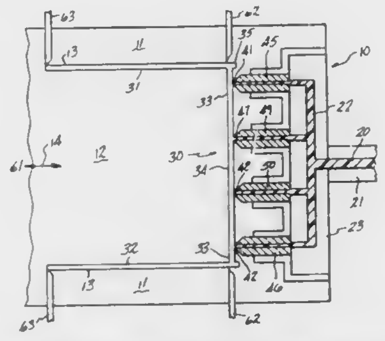
### 5,013,513
### METHOD OF REMOVING GAS FROM THE CAVITY AND STABILIZING THE CORE DURING INJECTION MOLDING

**Robert D. Schad, Toronto; John Disimone, Woodbridge, both of Canada, and Terry Philips, Willoughby, Ohio, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada**

**Filed May 26, 1989, Ser. No. 357,122**

**Int. Cl.$^5$ B29C** *45/22*

**U.S. Cl. 264—328.8** **3 Claims**



1. A method which comprises: providing an injection molding assembly including a mold, a core and a mold cavity therebetween, wherein said mold cavity has a base, a peripheral area of said base and a central area of said base; injecting molten plastic material into said mold cavity through at least two injection gates, wherein said injection gates are situated adjacent the peripheral area of said mold cavity in a substantially balanced fashion generally equidistantly spaced from each other with a substantially symmetrical disposition, whereby molten plastic advances from the injection gates in the mold cavity to force gas in advance of the plastic and to stabilize the core; including in addition injecting molten plastic material through an injection gate positioned adjacent the central area of said base, wherein molten plastic is first injected through the central gate followed by injecting molten plastic through the peripheral gates and including the step of maintaining the peripheral gates at a lower temperature than the central gate; and venting the gas from the mold cavity.

---

### 5,013,514
### PROCESS FOR THE CONSTRUCTION OF HOLLOW MONOLITHIC ELEMENTS OF COMPOSITE MATERIAL, PARTICULARLY CARBON FIBRES

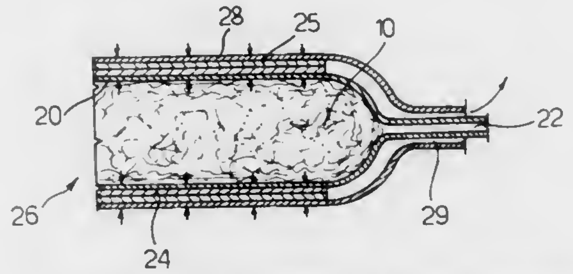
**Roberto Azzani, Modena; Lino M. Dori, Fiorano Modenese, and Oscar Scaglietti, Montale Di Castelnuovo Rangone, all of Italy, assignors to Ferrari Engineering S.p.A., Modena, Italy**

**Filed Nov. 21, 1989, Ser. No. 439,976**

**Claims priority, application Italy, Nov. 22, 1988, 68035 A/88**

**Int. Cl.$^5$ B32B** *31/20*

**U.S. Cl. 264—512** **19 Claims**



1. A process for the production of a hollow monolithic element of composite material, by wrapping and superimposing onto a core a plurality of sheets or mats of fibres impregnated with synthetic plastics resin, compaction of the said sheets or mats, and subsequent polymerisation and curing thereof, with the said core positioned between a pair of mould halves clamped together in an autoclave, under predetermined temperature and pressure for a time such as to cause the mutual adhesion thereof, characterised by the fact that a core is utilised, made of an easily eliminable expanded synthetic resin, and by the fact that the compaction of the sheets or mats is effected in the following stages:

(a) wrapping the core in a fluid-tight manner in a first envelope provided with means for ensuring hydraulic connection of the interior of said first envelope with the environment outside thereto;
(b) laminating first said sheets or mats onto the core clad with said first envelope;
(c) wrapping the thus obtained partly finished product in a fluid-tight manner with a second envelope in such a way as to leave the interior of said first envelope, by said hydraulic connection means, in communication with the outside of said second envelope;
(d) applying a vacuum within the interior of said second envelope and applying pressure through said hydraulic connection means to the interior of said first envelope;
(e) eliminating said second envelope and laminating onto said core and said first sheets or mats second sheets or mats necessary for forming said element;
(f) inserting the thus obtained partly finished product between said mould halves, mutual clamping of these latter and wrapping the mould in a fluid-tight manner with a third envelope in a way so as to leave the interior of said first envelope in communication with the outside of said third envelope through said hydraulic connection means; and
(g) applying a vacuum within the interior of said third envelope and applying pressure through said hydraulic communication means into said first envelope.

---

### 5,013,515
### INJECTION STRETCHING AND BLOW MOLDING PROCESS INCLUDING A SECONDARY TREATMENT OPERATION

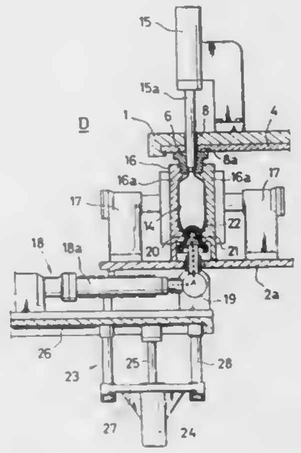
**Katashi Aoki, 6037 Ohazaminamijo, Sakakimachi, Hanishina-gun, Nagano-ken, Japan**

**Division of Ser. No. 932,561, Jan. 5, 1987, Pat. No. 4,741,688, which is a continuation of Ser. No. 638,949, Aug. 8, 1984, abandoned, which is a division of Ser. No. 491,030, May 3, 1983, abandoned. This application Dec. 29, 1987, Ser. No. 138,942**

**Claims priority, application Japan, May 10, 1982, 57-77988; May 11, 1982, 57-78752**

**Int. Cl.$^5$ B29C** *49/06, 49/36, 49/20*

**U.S. Cl. 264—513** **1 Claim**



1. A method for producing hollow reinforced blow molded products of superior structural strength in a continuous manner, said method comprising the steps of:

(a) successively moving a plurality of spaced apart neck

VOL
1126
ISS
1
MY
7
1991
UMI

mold assemblies simultaneously so that each of said neck mold assemblies sequentially pass through injection, heat treating and forming/blow molding stations wherein the respective steps of:

(i) forming a parison whose neck is supported within the neck mold assembly;

(ii) heating the parison; and

(iii) stretching and blow molding the parison into a blow molded product, are performed in a successive manner at the above-mentioned stations;

(b) wherein after successively moving each of said neck mold assemblies through said forming/blow molding station, moving each of said neck mold assemblies successively through a secondary treatment station to perform a secondary treatment operation whereupon the blow molded product is placed into a splittable mold having a cavity of a shape conforming to the blow molded product and having portions of the cavity in the region of the bottom of the blow molded product spaced from the blow molded product for providing a reinforcement mold cavity region defined by said cavity portions and the surface of the blow molded product in the mold cavity;

(c) introducing pressurized air into said blow molded product, while said blow molded product is at said secondary treatment station, to maintain the blow molded product in the shape obtained at the forming/blow molding station;

(d) injecting a molten plastic material through an opening provided in said splittable mold and beneath the bottom of said blow molded product to enter into said cavity portions and thereby apply plastic material to the bottom of the blow molded product and filling said cavity portions to form a reinforcing layer of increased thickness over the entire bottom of the blow molded product and which conforms to the shape of the mold cavity portion, thereby forming a reinforced blow molded product;

(e) thereafter splitting the mold and removing the mold from said reinforced blow molded product after completion of said secondary treatment operation; and

(f) then successively moving each of said neck mold assemblies thereby advancing the neck mold assembly carrying the reinforced blow molded product from the secondary treatment station to a dispensing location and releasing the reinforced blow molded product from the neck mold assembly in preparation for initiation of a new product forming cycle.

---

## 5,013,516

## METHOD OF MANUFACTURING CONTAINER COVERS

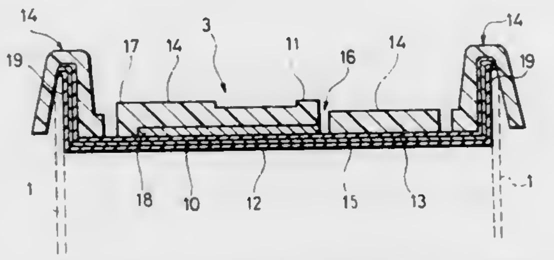
**Takashi Suzuki; Tetsuo Yasuda; Otohiko Miyauchi, and Junji Yotsuyanagi, all of Kanagawa, Japan, assignors to Showa Denko K.K., Tokyo, Japan**

**Filed May 25, 1984, Ser. No. 614,095**

**Claims priority, application Japan, May 25, 1983, 58-90749; May 25, 1983, 58-90750; Jun. 13, 1983, 58-104185; Jul. 11, 1983, 58-124756**

**Int. Cl.⁵ B29C** *45/16*

U.S. Cl. 264—130 4 Claims



1. In a method for manufacturing a can-like container's cover by forming a second resin layer on a multi-layer sheet by injection molding, a handle being formed by said second resin layer, the improvement comprising; applying a treatment for allowing said handle to be readily peeled off said multi-layer sheet to a part of the upper surface of said multi-layer sheet which is covered by said handle before said second resin layer is formed on said multi-layer sheet, and forming said second resin layer on said multi-layer sheet to include a peripheral part and an opening part completely separated from each other by a closed loop slot, said step of forming a second resin layer comprising injection molding said peripheral part using a first gate and injection molding said opening part, including said handle, using a second gate, independent of said first gate, to thereby independently form said peripheral part and opening part with a closed loop slot therebetween.

---

## 5,013,517

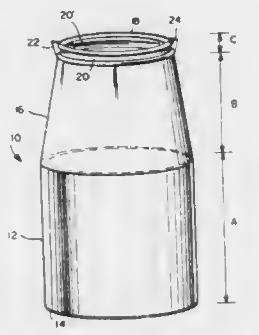
## METHOD OF BLOW MOLDING INTEGRAL PRESS-LOCK CONTAINER

**Edward S. Robbins, III, 459 N. Ct., Florence, Ala. 26360**

**Continuation-in-part of Ser. No. 8,658, Jan. 30, 1987, abandoned. This application Sep. 30, 1987, Ser. No. 102,612**

**Int. Cl.⁵ B29C** *49/04, 49/22, 49/52*

U.S. Cl. 264—515 15 Claims



1. A method of forming an open-ended, closeable plastic container comprising the steps of:

(a) extruding one or more plastic materials to form a tubular parison having at least one end portion of a first predetermined thickness and a remaining portion wherein at least part of said remaining portion has a thickness less than said at least one end portion;

(b) providing a blow mold comprising a pair of mold halves which together define a mold cavity having interior surfaces and including male closure forming surfaces on one of said pair of mold halves, and complementary female closure forming surfaces on the other of said pair of mold halves, wherein the male and female closure forming surfaces are located directly opposite each other and adjacent one end of said mold cavity; and

(c) blow molding the parison into engagement with the interior surfaces of said mold cavity so that said one end portion of said parison engages said male and female closure forming surfaces to form a container with a hollow male closure component and an opposed, complementary female closure component, said male and female closure components adapted in use to be pressed into interfitting engagement to seal the container closed.

---

## 5,013,518

## PROCESS FOR THE PRODUCTION OF POLYAMIDE SHEET PRODUCTS

**Werner Nielinger; August Böckmann; Hermann Brinkmeyer, and Helmut Schulte, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Jul. 17, 1989, Ser. No. 380,392**

**Claims priority, application Fed. Rep. of Germany, Jul. 27, 1988, 3825411**

**Int. Cl.⁵ C08G** *69/16*

U.S. Cl. 264—564 6 Claims

1. Process for the production of transparent sheet products

comprising blowing or extruding a copolyamide comprising of from 85.0 to 99.5 parts by weight of units of ε-caprolactam and from 0.5 to 15.0 parts by weight of units of equimolar quantities of dimerised fatty acids and diamines wherein said products are formed at a temperature of from 220° to 260° C. to form said product.

---

## 5,013,519

## AUTONOMOUS, DECENTRALIZED FAST BREEDER REACTOR SYSTEM

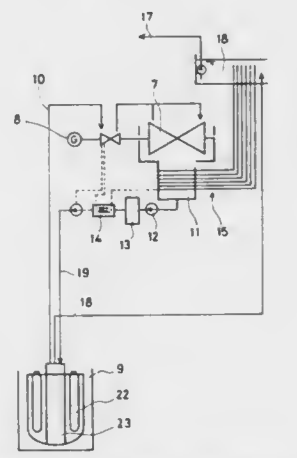
**Hisashi Nakamura; Hideo Sakaba; Kunihiko Yokoyama; Hitoshi Hayashida; Toshio Yatabe; Makinori Ikeda; Hiroaki Ohhira; Naoyuki Kisohara; Minoru Gunji; Satoru Nakai, and Akira Ohtaki, all of Oarai, Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan**

**Filed Jan. 30, 1990, Ser. No. 472,142**

**Claims priority, application Japan, Jan. 31, 1989, 1-23371**

**Int. Cl.⁵ G21G** *1/06*

U.S. Cl. 376—179 5 Claims



1. An autonomous, decentralized fast breeder reactor system comprising:

a single main vessel of a nuclear reactor;

a plurality of unit-type nuclear reactor subsystems disposed in said main vessel and each having a small-scale faster breeder reactor core;

a plurality of steam generator subsystems disposed in said main vessel;

a first coolant circulating naturally through the interior of said main vessel;

a second coolant circulating naturally through the interior of each unit-type nuclear reactor subsystem; and

means for causing a heat transfer to take place between each unit-type nuclear reactor subsystem and each steam generator subsystem by said first coolant circulating naturally through the interior of said main vessel and undergoing a heat exchange with said second coolant circulating naturally through the interior of each unit-type nuclear reactor subsystem.

---

## 5,013,520

## APPARATUS FOR INSERTING FUEL RODS INTO A CAN

**Wolfgang Hummel, Weisendorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Aug. 11, 1989, Ser. No. 393,284**

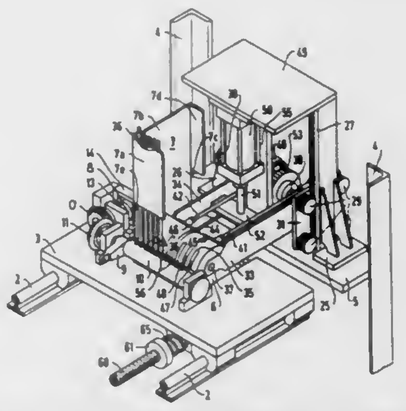
**Claims priority, application European Pat. Off., Aug. 24, 1988, 88113815.0**

**Int. Cl.⁵ G21C** *19/32*

U.S. Cl. 376—261 7 Claims

1. Apparatus for the insertion of mutually parallel, elongated fuel rods into an elongated can having a rectangular cross section, a longitudinal direction and a lateral transverse slit formed therein, comprising

a holder for holding a can, a fuel rod positioning arm having an insertion end for insertion through the slit in the can in an insertion direction at right angles to the longitudinal direction of the can, a support structure attached to said insertion end of said arm for supporting fuel rods, said support structure having a pivot axis at right angles to the insertion direction of said arm and to the longitudinal direction of the can about which said support structure is pivotable back and forth within a given pivot angle, said support structure having a jacket surface with two fuel rod support surfaces being curved outwardly about said pivot axis and offset alongside one another in the direction of said pivot axis,



one of said support surfaces merging from a first segment with a relatively shorter radial spacing from said pivot axis than the other of said support surfaces, into a second segment with a relatively greater radial spacing from said pivot axis than the other of said support surfaces, and

said radial spacing of one of said two support surfaces from said pivot axis increasing steadily within said given pivot angle, and said radial spacing of the other of said two support surfaces from said pivot axis decreasing steadily, as seen in the same circumferential direction.

---

## 5,013,521

## INTERNAL SHELL OF A FAST-NEUTRON NUCLEAR REACTOR COMPRISING A THERMAL PROTECTION DEVICE

**Garo Azarian, Nay-Aux-Roses, France, assignor to Novatome, Courbevoie, France**

**Filed Jun. 8, 1989, Ser. No. 362,996**

**Claims priority, application France, Jun. 9, 1988, 88 07722**

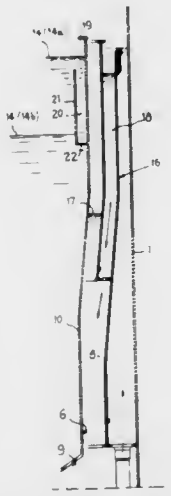
**Int. Cl.⁵ G21C** *11/08, 15/12*

U.S. Cl. 376—290 **5 Claims**

1. A fast neutron nuclear reactor which comprises a main vessel (**1**) enclosing liquid metal for cooling the reactor, an upper free level of said liquid metal being capable of moving inside an internal shell, during normal operation of the reactor, between two defined positions respectively referred to as high level (**14***a*) and low level (**14***b*), and, inside the main vessel (**1**), the internal shell (**6**) comprising at least one cylindrical sleeve (**10**) with a vertical axis, a top part of which is located above said high level (**14***a*) of the liquid metal inside the main vessel, and an annular enclosure (**20**) on the internal periphery of the cylindrical sleeve (**10**) of the internal shell (**6**), open upwards at its top part and delimited by a secondary sleeve (**21**) arranged substantially coaxially and inside the cylindrical sleeve (**10**), and by an annular base (**22**) fixed to the bottom end of the cylindrical sleeve (**21**) and onto the internal surface of the

VOL
1126
ISS
1
MY
7
1991
UMI

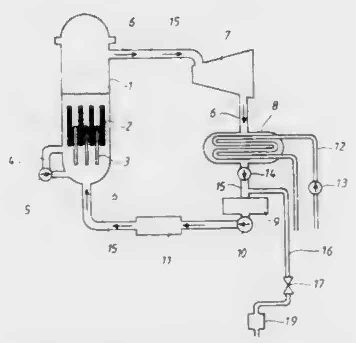
cylindrical sleeve (**10**) of the internal shell, below the low level (**14***b*) of the liquid metal, wherein the top end of the secondary sleeve (**21**) is located below the high level (**14***a*) of the liquid metal.



---

### 5,013,522
### METHOD FOR ANALYSIS OF PARTICULATE COMPOUNDS

**Göran Granath, Göteborg, and Gunnar Wikmark, Upsala, both of Sweden, assignors to ABB Atom AB, Västerås, Sweden**
**Filed Oct. 27, 1989, Ser. No. 427,483**
**Claims priority, application Sweden, Oct. 27, 1988, 8803840**
**Int. Cl.⁵ G21C** *19/42*
**U.S. Cl. 376—310** **7 Claims**



1. A method of determining the chemical composition and content of particulate compounds in a flowing liquid using an analyzing apparatus for the particulate compounds and a sealable container positioned in a microwave oven, the sealable container being made of a material that is permeable to microwaves and containing a filter for the particulate compounds. said method comprising the steps of:

(a) withdrawing a batch sample of fixed volume from said flowing liquid and passing said sample into said container,
(b) causing said sample to pass through said filter in said container to deposit the particulate compounds in the sample on the filter and provide a permeate,
(c) removing the permeate from the container,
(d) supplying a fixed amount of solvent for the particulate compounds into the container to contact the particulate compounds on the filter,
(e) passing microwaves into the container from the microwave oven to heat the solvent and particulate compounds therein and cause the particulate compounds to dissolve in the solvent, forming a solution, and
(f) passing the solution to the analysis apparatus for analysis of the particulate compounds therein.

---

### 5,013,523
### METAL-BASED COMPOSITE MATERIAL AND PROCESS FOR PREPARATION THEREOF

**Hajime Hata, Marugame; Takao Kitamura, Takamatsu; Kohji Sakane, Takamatsu; Hideo Wada, Takamatsu, and Seiji Sogabe, Marugame, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo and Shikoku Chemicals Corporation, Kagawa, both of, Japan**
**Filed Apr. 18, 1990, Ser. No. 510,445**
**Claims priority, application Japan, Apr. 21, 1989, 1-99941; Sep. 18, 1989, 1-242949**
**Int. Cl.⁵ C22C** *1/09. 21/00*
**U.S. Cl. 419—19** **2 Claims**

1. A process for the preparation of a metal-based composite material which comprises mixing a powder of aluminum or an aluminum alloy with an aluminum borate whisker, on the surface of which lithium hydroxide is spread, pressure-molding the mixture and firing the molded body.

2. A process for the preparation of a metal-based composite material which comprises mixing a powder of aluminum or an aluminum alloy with an aluminum borate whisker, the surface of which is covered with a vinyl silane, and firing the mixture under compression.

---

### 5,013,524
### MARTENSITE-HARDENABLE STEEL

**Karl Leban, Weiner Neustadt, Austria, assignor to Boehler Gesellschaft M.B.H., Kapfenberg, Austria**
**Filed Apr. 24, 1990, Ser. No. 513,622**
**Claims priority, application Austria, Apr. 24, 1989, 964/89**
**Int. Cl.⁵ C22C** *38/60. 38/08*
**U.S. Cl. 420—87** **9 Claims**

1. Martensite-hardenable steel for the production of molds for plastic comprising in weight %:

| | |
|---|---|
| carbon | 0.06-0.2 |
| silicon | 0.15-0.8 |
| manganese | 1.4-3.6 |
| sulfur | 0.12-0.4 |
| chromium | 0-0.9 |
| nickel | 2.8-4.3 |
| vanadium | 0.03-0.15 |
| copper | 0.1-4.0 |
| aluminum | 0.1-4.0 |
| aluminum + copper | 0.9-4.1 |
| niobium | 0.03-0.12 |
| zirconium | 0.01-0.1 |
| calcium | 0-0.01 |
| titanium | 0.01-0.1 |
| molybdenum | 0-1.0 |
| tungsten | 0-1.0 |
| MO + W/2 | 0-1.5 |
| residue: iron and production impurities. | |

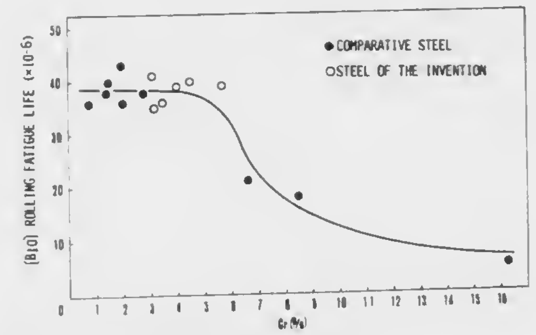
---

### 5,013,525
### STEEL FOR CORROSION-RESISTANT ROLLING PART AND ROLLING PART

**Kaneaki Hamada; Kazuichi Tsubota, both of Himeji, and Tomoki Muraoka, Fujisawa, all of Japan, assignors to Sanyo Special Steel Co., Ltd. and Nippon Seiko Kabushiki Kaisha, both of, Japan**
**Filed Nov. 28, 1989, Ser. No. 442,259**
**Claims priority, application Japan, Dec. 9, 1988, 63-311357**
**Int. Cl.⁵ C22C** *38/18*
**U.S. Cl. 420—104** **8 Claims**

1. A steel for a corrosion-resistant rolling part consisting of:
0.5% or more and 0.7% or less by weight of carbon,
0.1% or more and 1.5% or less by weight of silicon,

0.1% or more and 2.0% or less by weight of manganese,
3.0% or more and less than 6.0% by weight of chromium,
0.05% or less by weight of phosphorus,

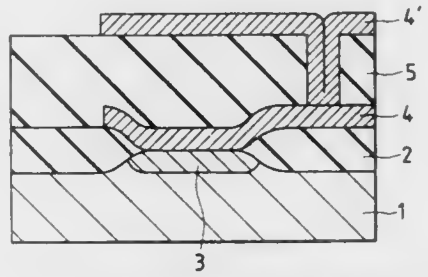


0.03% or less by weight of sulfur, and
0.0015% or less by weight of oxygen, with the balance being iron and unavoidable impurities.

---

### 5,013,526
### SUPERCONDUCTING ALLOYS COMPRISING TUNGSTEN, MOLYBDENUM, SILICON AND OXYGEN

**Nobuyoshi Kobayashi, Kawagoe; Masayuki Suzuki; Seiichi Kondo, both of Kokubunji; Makoto Matsui, Kunitachi, and Kiichiro Mukai, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Nov. 17, 1989, Ser. No. 438,596**
**Claims priority, application Japan, Nov. 24, 1988, 63-294532**
**Int. Cl.⁵ H01L** *39/22. 27/12;* **B32B** *9/06*
**U.S. Cl. 420—430** **12 Claims**



1. A superconducting material comprising tungsten, 2 to 40 atomic % of silicon, and 0.88 to 2.8 atomic % of oxygen.

---

### 5,013,527
### INTEGRAL MULTILAYER ANALYTICAL ELEMENT FOR ANALYSIS OF ALBUMIN

**Fuminori Arai, and Takeshi Takayama, both of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
**Filed Aug. 19, 1988, Ser. No. 234,465**
**Claims priority, application Japan, Aug. 20, 1987, 62-207259**
**Int. Cl.⁵ G01N** *21/00*
**U.S. Cl. 422—56** **7 Claims**

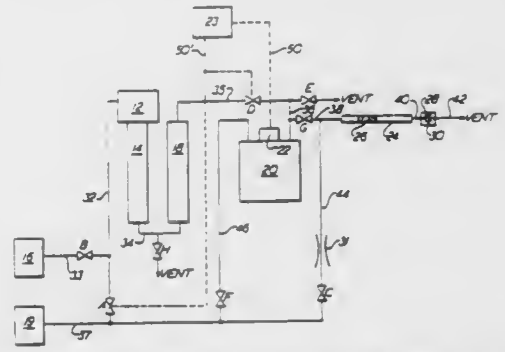
1. In an integral multilayer analytical element for the analysis of albumin in a sample containing interfering protein having, in this order, a porous spreading layer, at least one hydrophilic polymer binder layer, and a light-transmissive, water-impermeable support layer, wherein one surface of this spreading layer faces the support layer and the other surface of the spreading layer faces away from the support layer and the support layer contains an indicator compound capable of binding to albumin and the interfering protein to produce a color change,

the improvement which comprises said spreading layer containing a pH buffer and said indicator in the spreading layer being dispersed in a hydrophilic polymer or a mixture of a hydrophilic polymer and a hydrophobic polymer, such that the color change due to albumin binding occurs substantially towards the surface of the spreading layer facing the support layer and the color change due to the interfering protein occurs substantially towards the surface facing away from the support layer.

---

### 5,013,528
### ANALYSIS OF ORGANIC MATERIAL

**Stanley D. Norem, Bayside, N.Y.; Richard T. Ferranti, Huntington, and Robert F. Culmo, Woodbridge, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**
**Division of Ser. No. 19,905, Feb. 27, 1987. This application Jul. 13, 1988, Ser. No. 218,721**
**The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.**
**Int. Cl.⁵ G01N** *31/21*
**U.S. Cl. 422—94** **2 Claims**



1. Apparatus for quantitatively analyzing a gaseous mixture for its components, comprising:;

a fixed-volume vessel for collecting a gaseous mixture;
pressurized fluid means connected to force a gaseous mixture of a base component and a plurality of additional components into the vessel up to a preselected pressure;
a chromatographic column having an input end and an output end, the input end being in fluid flow relationship with the vessel;
a sample chamber in fluid flow relationship with the output end of the tubular column;
discharge means for discharging a portion of the mixture from the vessel successively through the column and the sample chamber for a predetermined time period with the mixture being initially at the preselected pressure in the vessel;
extracting means disposed in the column for extracting a predetermined amount of each additional component from the mixture such as to produce a time variant composition of the mixture in the sample chamber during the predetermined time period; and
component detection means consisting of a single detector communicating with the sample chamber for detecting a physical property of the mixture dependent on the time variant composition such as to provide a measure of the amount of each of the additional components in the gaseous mixture in the sample chamber during the predetermined time period.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,529
### APPARATUS FOR DISTRIBUTING SAMPLE LIQUID

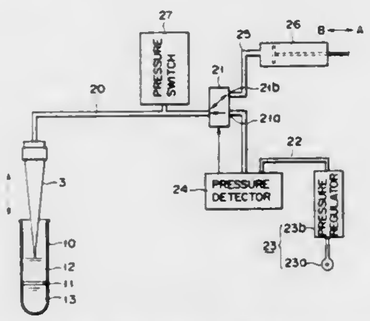
**Teruaki Itoh, 5-25, Kokaihonmachi, Kumamoto-shi, Kumamoto-ken, Japan**

**Continuation of Ser. No. 187,737, Apr. 29, 1988, abandoned. This application Feb. 6, 1990, Ser. No. 474,257**

**Claims priority, application Japan, May 2, 1987, 62-67021; May 2, 1987, 62-67022; May 2, 1987, 62-67023; May 2, 1987, 62-67024**

**Int. Cl.$^5$ G01N** *35/00*

**U.S. Cl. 422—100** **3 Claims**



1. An apparatus for distributing sample liquids contained in a plurality of source test tubes into a plurality of destination test tubes, comprising:

a plurality of distribution units having a plurality of plugs each provided with an O-ring for air-tight sealing at an outer periphery thereof, and being formed of a cylindrical body including a through-hole at a center portion thereof;

a plurality of distribution tips fitted to said plugs, said tips being arranged so that a distal end portion of each of said tips can be inserted into and taken out of the corresponding one of said source test tubes, and a proximal opening portion thereof is detachably fitted with the corresponding one of said plugs of said distribution units;

adjusting means for varying and setting the interval between any two of said plurality of distribution units, which are next to each other, so that the interval between said distribution tips coincides with each of the intervals between said source test tubes and/or said destination test tubes;

a plurality of air-operated systems provided for said distribution units, and having a function of sucking and holding the sample liquids contained in said source test tubes, and a function of discharging the sample liquids held in said distribution tips into said destination test tubes;

a mechanism for moving all of said distribution units simultaneously so that said distribution tips, which are holding the sample liquids sucked in by said air-operated systems, are transferred from a first position where said source test tubes are disposed to a second position where said destination test tubes are disposed;

catching means for catching liquid leaking from said distribution tips while the distribution tips are transported by said moving mechanism, said catching means having a tray driven so that it is always located beneath all of said distribution tips while transporting the tips; and

automatic replacing means for replacing said distribution tips, in which after the sample liquids held in said distribution tips are discharged by said air-operated systems into said destination test tubes, said distribution tips are removed from said plugs by hitching the proximal opening end of each of said distribution tips on a semicircular-shaped notch formed on a plate member for removing said tips, so as to mount new distribution tips on said plugs;

each of said plurality of air-operated systems comprising:

an air pipe having openings at both ends, one of which is connected to the corresponding one of said plugs of said distribution tips;

a changeover valve having a common air-inlet port connected to the other end of said air pipe, and first and second air-inlet ports, one of which is selected to be connected to said common air-inlet port;

an air-supplying device connected to said first air-inlet port of said changeover valve, for supplying a small amount of air to be discharged from said distal end of the corresponding one of said distribution tips thereto;

a pressure detector for detecting a change of the pressure of the air being supplied from said air-supplying device and generating a signal upon detecting the change of the air pressure;

a changeover means for switching said changeover valve from said first air-inlet port to said second air-inlet port in response to the signal generated from said pressure detector; and

an air piston/cylinder device connected to said second air-inlet port of said changeover valve, for sucking and holding the liquid contained in the corresponding one of said source test tubes in the corresponding one of said distribution tips, and for discharging the liquid held in said corresponding one of said distribution tips into the corresponding one of said destination test tubes.

---

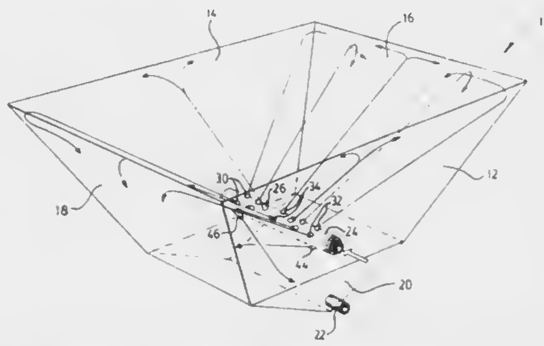
### 5,013,530
### SPARGER SYSTEM FOR DISCHARGE OF BULK MATERIAL FROM HOPPER CARS

**Colin R. McGregor, Oakville, Canada, assignor to Tenneco Canada Inc., Islington, Canada**

**Division of Ser. No. 205,726, Jun. 23, 1988. This application Jan. 9, 1990, Ser. No. 462,232**

**Int. Cl.$^5$ B01F** *1/00*

**U.S. Cl. 422—278** **1 Claim**



1. In a railway hopper car for the transportation of a mass of particulate material and for the discharge of said particulate material therefrom in the form of a slurry or solution, wherein said hopper car has a top wall, downwardly-sloping side walls and end walls terminating in a lower sump having a discharge pipe communicating therewith and a sparger extending between said side walls for discharge of liquid into said mass of particulate material to form said slurry or solution for discharge from said sump through said discharge pipe, the improvement wherein:

a first pair of orifices provided adjacent one end of said sparger pipe and being directed towards one side wall adjacent to but not into its joints with said end walls, whereby the liquid discharged from said first pair of orifices, after penetrating the particulate material in the enclosure, impacts the one side wall and flushes through the respective joint with the end walls and partially across the end walls,

a second pair of orifices provided adjacent the opposite end of said sparger pipe from said one end and being directed towards the other side wall adjacent to but not into its joints wit h said end walls, whereby the liquid discharged from said second pair of orifices, after penetrating the particulate material in the enclosure, impacts the other side wall and flushes through respective joint with the end walls and partially across the end walls,

a third pair of orifices located adjacent the central portion of the length of said sparger pipe and being directged one toward each end wall adjacent its joint to the top wall approximately at the mid-section of the width thereof,

a fourth pair of orifices located one on either longitudinal side of the third pair of orifices and being directed towards each side wall adjacent its joint to the top wall approximately at the mid-section of the width thereof;

a fifth pair of orifices located between said first pair of orifices and said third pair of orifices and directed towards said top wall between the sparger from said first and third pairs of orifices and adjacent its joint to each of said end walls,

a sixth pair of orifices located between said second pair of orifices and said third pair of orifices and directed towards said top wall between the sparger from said second and third pair of orifices and adjacent its joint to each of said end walls; and

a seventh pair of orifices located one adjacent each end of said sparger and directly downwardly into said sump to effect a swirling motion therein,

wherein each of said plurality of orifices comprises a nozzle of compact shape having a generally circular opening at its upstream end and a generally elongate opening at its downstream end to provide flat compact sprays from said nozzles.

---

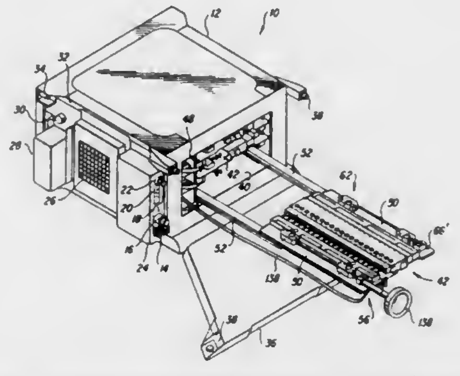
### 5,013,531
### MACROMOLECULAR CRYSTAL GROWING SYSTEM

**Robert S. Snyder, Huntsville; Blair J. Herren, Arab; Daniel C. Carter; Vaughn H. Yost, both of Huntsville; Charles E. Bugg; Lawrence J. DeLucas, both of Birmingham, all of Ala., and Fred L. Suddath, Marietta, Ga., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Aug. 31, 1990, Ser. No. 575,736**

**Int. Cl.$^5$ B01D** *9/00*

**U.S. Cl. 422—245** **17 Claims**



1. A macromolecular crystal growing system for growing crystals in both the gravity of earth and the low gravity of space comprising:

at least one tray assembly;

a carrier assembly including a tray receiver means for removably receiving said at least one tray assembly;

a refrigeration-incubation module including a carrier receiver means for removably receiving said carrier assembly and a temperature control means for controlling the temperature of said carrier assembly when said carrier assembly is received in said carrier receiver means; and

a cranking tool;

said tray assembly including

(a) a planar base,

(b) a plurality of sealed chambers mounted to said base and extending along an axis, each said chamber having (i) a syringe containing a crystal growing solution and extending into one side of said chamber parallel to said base, said syringe including a barrel, a tip disposed in said chamber, a piston in said barrel, and a piston rod connected to each respective said piston and extending parallel to said base out of said chamber, (ii) a plug means for sealing said tip, said plug means including a plug rod extending into an opposite side of said chamber parallel to said base and toward said tip, a plug located on a proximal end of said plug rod which resiliently seals against said tip, and a distal end which is located outside of said chamber; and (iii) a reservoir material in said chamber containing a solution causing crystal growth when the crystal growing solution is extruded from said tip,

(c) a first ganging means for moving said pistons of all of said syringes simultaneously comprising i) a first tiebar extending parallel to said axis and slidably mounted to said base for movement toward and away from said chambers, (ii) a first connecting means for connecting all of said piston rods to said first tiebar, (iii) a first moving means for moving said first tiebar toward and away from said chambers, said first moving means including a first longitudinal rack extending parallel to said axis and having a threaded end, two first rack blocks mounted to said base through which said first longitudinal rack extends and including a first pinion means for engaging said first longitudinal rack, a first lateral rack which extends from said first rack block to an attachment to said first tiebar and which also engages said first pinion means, a first screw block mounted to said base adjacent said threaded end of said first longitudinal rack, and a first rack screw threadably mounted in said first screw block and having a proximal end adapted for engagement with said cranking tool and a distal end which threadably mates with said threaded end of said first longitudinal rack, and

(d) a second ganging means for moving said plugs for all of said syringes simultaneously comprising (i) a second tiebar extending parallel to said axis and slidably mounted to said base for movement toward and away from said chambers, (ii) a second connecting means for connecting all of said plug rods to said second tiebar, (iii) a second moving means for moving said second tiebar toward and away from said chambers, said second moving means including a second longitudinal rack extending parallel to said axis and having a threaded end, two second rack blocks mounted to said base through which said second longitudinal rack, and extends and including a second pinion means for engaging said second longitudinal rack, a second lateral rack which extends from said second rack block to an attachment to said second tiebar and which also engages said second pinion means, a second screw block mounted to said base adjacent said threaded end of said second longitudinal rack, and a second rack screw threadably mounted in said second screw block and having a proximal end adapted for engagement with said cranking took and a distal end which threadably mates with said threaded end of said second longitudinal rack.

---

### 5,013,532
### METHOD FOR RECYCLING ELECTRIC ARC FURNACE DUST

**Guggilam C. Sresty, Burbank, Ill., assignor to IIT Research Institute, Chicago, Ill.**

**Filed Dec. 15, 1988, Ser. No. 285,088**

**Int. Cl.$^5$ C01G** *28/00, 21/00, 9/00, 49/00*

**U.S. Cl. 423—88** **9 Claims**

1. A method for the separation and recovery of metals as metal oxides from raw material containing a mixture of metals and metal oxides comprising:

(a) heating a raw material containing a mixture of metals and metal oxides in briquette, pellet, granular or lump form in a furnace to a temperature above that at which the desired

VOL
1126
ISS
1
MY
7
1991
UMI

metals are vaporized, said temperature being in the range of from about 900° C. to about 1200° C.;

(b) contracting the heated raw materials with a stream of hydrogen gas to reduce and vaporize the desired metal oxide or oxides;

(c) humidifying the stream of hydrogen gas and metallic vapors recovered from the furnace with water in the form of water vapor or steam to lower the temperature of the gas stream to that at which the metallic vapors react with the water to produce a solid metallic oxide or mixture of metallic oxides, said humidification taking place in a first humidification step wherein the temperature is reduced to within the range of from about 700° C. to about 900° C. and is followed by a second humidification step to a temperature in the range of from about 150° C. to about 250° C.;

(d) separating the solidified metal oxide from the hydrogen gas stream;

(e) condensing excess water from the hydrogen gas stream; and

(f) recycling the hydrogen gas stream.

---

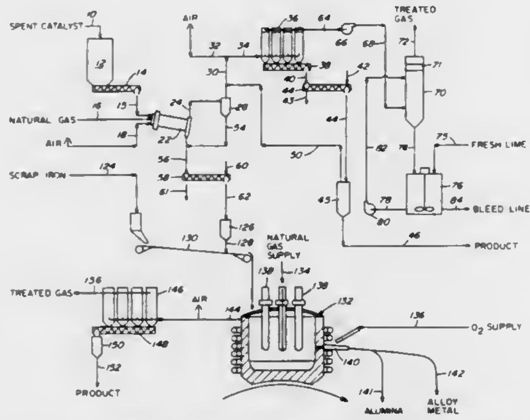
## 5,013,533

## PROCESS FOR RECOVERING VALUABLE METALS FROM SPENT CATALYSTS

**Robert A. Howard, #10 Dartmoor St., Sugarland, Tex. 77499, and Wilson R. Barnes, 4111 Elderwood Dr., Seabrook, Tex. 77586**

**Filed Mar. 1, 1990, Ser. No. 486,797**
**Int. Cl.$^5$ C22B *4/00***

**U.S. Cl. 423—133** **21 Claims**



1. A process for recovering heavy metals and alumina from spent catalysts comprising:

calcining the spent catalysts under oxidizing conditions at a temperature of from about 1400° F. to about 1600° F. to produce calcine feed for an electric arc furnace;

smelting the feed in the electric arc furnace at a temperature of from about 3000° F. to about 4500° F. to form molten alumina and molten heavy metals;

forming an alloy of molten heavy metals by reducing the molten heavy metals to a metallic state; and

separating the molten alumina from the alloy of molten heavy metals.

---

## 5,013,534

## MORPHOLOGICALLY IMPROVED RARE EARTH TRIFLUORIDES

**Antoine Dissaux, Chagnolet, and Jean-Luc Le Loarer, La Rochelle, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France**

**Filed Jun. 30, 1989, Ser. No. 373,453**
**Claims priority, application France, Jul. 1, 1988, 88 08909**
**Int. Cl.$^5$ C01B *9/08;* C01F *17/00***

**U.S. Cl. 423—263** **29 Claims**

1. Aggregated, monodispersed rare earth trifluoride particulates, said aggregates having a mean diameter ranging from 0.10 μm to 0.50 μm.

---

## 5,013,535

## STABILIZED ALUMINOPHOSPHATE COMPOSITIONS AND PROCESS FOR PREPARING SAME

**Robert L. Bedard, Fishkill; Robert L. Patton, Katonah, and Stephen T. Wilson, Shrub Oak, all of N.Y., assignors to UOP, Des Plaines, Ill.**

**Filed Apr. 20, 1989, Ser. No. 340,829**
**Int. Cl.$^5$ C01B *33/34, 35/00***

**U.S. Cl. 423—277** **18 Claims**

1. Process for stabilizing a crystalline aluminophosphate composition against thermally induced alternation of the framework structure, said compositions having an x-ray powder diffraction pattern containing at least the following d-spacings:

| $2\theta$ | d,A | Relative Intensity |
|---|---|---|
| 5.1–5.5 | 16.07–17.32 | VS |
| 10.45–10.95 | 8.08–8.47 | M |
| 21.3–22.1* | 4.02–4.17 | M |
| 21.5–22.8 | 3.99–4.13 | M |
| 22.0–22.8* | 3.90–4.04 | M |
| 22.2–23.0 | 3.87–4.00 | M |
| 23.2–24.0 | 3.71–3.83 | W |
| 26.75–27.45 | 3.249–3.3333 | M |

* = doublet

which process comprises contacting said composition with a solution of boric acid or a salt thereof at a temperature within the range of 20° C. to 90° C. in proportions such that at least 6 ppm by weight of boron is imparted to the aluminophosphate composition, and recovering the boron-containing stabilized product.

---

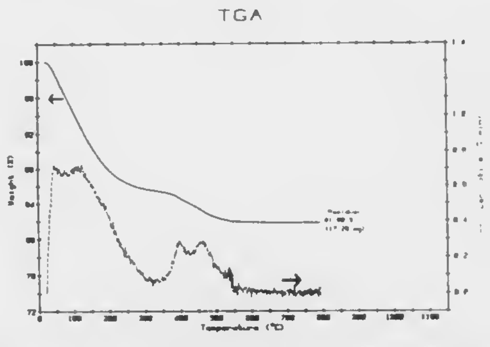
## 5,013,536

## ECR-18, METHOD OF ITS PREPARATION, AND USES FOR SORPTION AND SEPARATION

**David E. W. Vaughan, Flemington, and Karl G. Strohmaier, Port Murray, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed Aug. 22, 1988, Ser. No. 234,649**
**Int. Cl.$^5$ C01B *33/28***

**U.S. Cl. 423—328** **14 Claims**



1. A synthetic ECR-18 zeolite, having a paulingite structure, at least three different charge balancing cations within the structure,

and having an overall chemical composition:

$$a\,R_2O{:}\ b\,Na_2O{:}\ c\,(K,Rb,Ba_{0.5})\,{}_2O{:}\ Al_2O_3{:}\ 3\text{-}20\,SiO_2$$

where a = 0.04 to 0.20; b = 0.35 to 0.75; c = 0.10 to 0.60, R is TEA or ME3,

and substantially the x-ray diffraction pattern shown in Table 1.

---

## 5,013,537

## PROCESS FOR THE SYNTHESIS OF ZEOLITES OF THE FERRISILICATE TYPE, PRODUCTS SO OBTAINED

**Joël Patarin; Jean-Louis Guth, both of Mulhouse; Henri Kessler, Wittenheim; Gisèle Coudurier, Meyzieu, and Francis Raatz, Rueil Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**

**Continuation of Ser. No. 133,842, Dec. 16, 1987, abandoned.**
**This application Nov. 17, 1989, Ser. No. 437,308**
**Claims priority, application France, Dec. 16, 1986, 86 17711**
**Int. Cl.$^5$ C01B *33/34***

**U.S. Cl. 423—328** **18 Claims**

1. A synthetic crystalline ferrisilicate zeolite of MFI structure, having:

(a) the following approximate chemical formula

$$M_{2/n}O.\ Fe_2O_3,\ xSiO_2$$

wherein

M represents a proton and/or a metal cation,

n is the valence of said cation,

x is 40 to 1000,

(b) an x-ray diffraction diagram shown in Table 1 of the accompanying specification, and

(c) a fluorine content of about 0.01% to 1.6% weight, wherein the iron is distributed homogeneously within the crystals.

---

## 5,013,538

## PREPARATION OF ALKALINE EARTH METAL TITANATES

**Francoise Seon, Montreuil, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France**

**Filed Mar. 9, 1989, Ser. No. 321,205**
**Claims priority, application France, Mar. 9, 1988, 88 03019**
**Int. Cl.$^5$ C01G *23/08***

**U.S. Cl. 423—608** **25 Claims**

1. A process for the preparation of an alkaline earth metal titanate having the formula $MTiO_3$, wherein M is an alkaline earth metal, comprising directly reacting, in a medium which comprises a molten salt bath, (a) at least one titanium compound, with said titanium compound A reactive with said titanium compound to generate the species $TiO_3^{2-}$, and (c) at least one alkaline earth metal nitrate, $MNO_3$, reactive in said molten salt bath medium to produce said alkaline earth metal titanate.

---

## 5,013,539

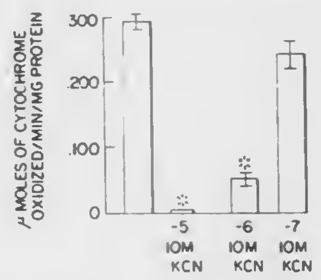
## METHOD AND COMPOSITION FOR ANTAGONISM OF SODIUM NITROPRUSSIDE TOXIC EFFECTS

**James C. Norris, c/o Technical Laboratory Weyerhauser Co.; P.O. Box 188, Longview, Wash. 98632, and Arthur S. Hume, Jackson, Miss. 00000**

**Filed Mar. 4, 1986, Ser. No. 835,991**
**Int. Cl.$^5$ A61K *00/00***

**U.S. Cl. 424—10** **19 Claims**

1. A method for reducing sodium nitroprusside-induced toxic effects which comprises administering by infusion or injection a therapeutically effective amount of alpha-ketoglutaric acid to a person in need thereof prior to the administration of sodium nitroprusside.



---

## 5,013,540

## USING NMDA RECEPTOR ANTAGONISTS TO REDUCE DAMAGE DUE TO LASER TREATMENT

**Dianna A. Redburn, Houston, Tex., assignor to Board of Regents, The University of Texas System, Houston, Tex.**

**Filed Nov. 30, 1989, Ser. No. 444,725**
**Int. Cl.$^5$ A61K *49/00, 31/44***

**U.S. Cl. 424—10** **12 Claims**

1. A method of reducing the damaging effects of laser treatment on neuronal tissue, including the step of administering to a living subject an effective amount of a NMDA receptor blocker compound in conjunction with laser treatment of neuronal tissue in that subject.

---

## 5,013,541

## POLY(ALPHA-HYDROXY ACRYLIC ACID) AND DERIVATIVES AS ANTITARTAR ACTIVES IN ORAL COMPOSITIONS

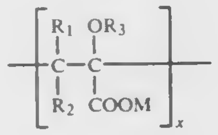
**David L. Elliott, Hawthorne, and Catherine L. Howie, Parsippany, both of N.J., assignors to Conopco, Inc., New York, N.Y.**

**Filed Apr. 18, 1990, Ser. No. 510,652**
**Int. Cl.$^5$ A61K *7/16, 7/18***

**U.S. Cl. 424—52** **9 Claims**

1. An oral dentifrice, toothpaste or rinse composition whose essential antiplaque and antitartar agent consists of:

(i) an effective amount to prevent tartar formation a polymer whose structure is:



$$\left[-\overset{\displaystyle R_1}{\underset{\displaystyle R_2}{\overset{|}{\underset{|}{C}}}}-\overset{\displaystyle OR_3}{\underset{\displaystyle COOM}{\overset{|}{\underset{|}{C}}}}-\right]_x$$

wherein:

R₁ and R₂ may independently be selected from the group consisting of hydrogen and $C_1$–$C_3$ alkyl;

$R_3$ is selected from the group consisting of hydrogen, phosphate, sulphate and $C_1$–$C_{22}$ alkyl;

M is selected from the group consisting of zinc and copper;

x is an integer from 3 to 10,000; and

(ii) an effective amount of a carrier to convey the polymer into an oral cavity.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,542
## METHOD TO INHIBIT ADHESION OF DISEASE-CAUSING MICROORGANISMS TO TEETH

**Donald I. Hay, Wayland; Ronald J. Gibbons, Boston, and Edgard G. Moreno, Nahant, all of Mass., assignors to Forsyth Dental Infirmary for Children, Boston, Mass.**

**Filed Feb. 8, 1988, Ser. No. 153,084**

**Int. Cl.$^5$ A61K** *37/18*

U.S. Cl. 424—54 16 Claims

1. A method of inhibiting the adhesion of microorganisms to a mineral surface, which method comprises:

contacting the mineral surface with an adhesive-inhibiting amount of a non-immunogenic, acidic, amino-terminal segment of an anionic proline-rich protein to inhibit the adhesion of disease-causing microorganisms to the mineral surface.

---

### 5,013,543
## COSMETIC EYELINER FORMULATION

**Clara Mercado, Aberdeen, and Amit R. Shah, Iselin, both of N.J., assignors to Revlon, Inc., New York, N.Y.**

**Continuation of Ser. No. 873,568, Jun. 12, 1986, abandoned. This application Nov. 9, 1988, Ser. No. 270,429**

**Int. Cl.$^5$ A61K** *7/021*

U.S. Cl. 424—63 6 Claims

1. A cosmetic eyeliner composition in the form of a flowable liquid dispersion or solution suitable for application with a wick-type nib pen consisting of:

40-60 % of a pigment intermediate substantially free of a fatty oxyethylenated alcohol ether surface active agent,

30-45% water,

5-10% ethanol

1-6% plasticizer selected from the group consisting of propylene glycol and polysorbate 20,

0.5-1.0% preservative selected from the group consisting of phenoxyethanol and one or more alkyl parabens, wherein said pigment intermediate consists of

40-60% by weight of said pigment intermediate of a pigment having an average particle size of 5 microns or less selected from the group consisting of FDA approved inorganic eye product pigments, carmine pigments and mixtures thereof,

35-55% by weight of said pigment intermediate of polyvinylpyrrolidone,

2-15% by weight of said pigment intermediate of a plasticizer selected from the group consisting of propylene glycol and polysorbate 20.

---

### 5,013,544
## CONTRACEPTIVE METHODS AND COMPOSITIONS

**Eric N. Chantler, Marple Bridge, and Max Elstein, Didsbury, both of England, assignors to The Victoria University of Manchester, Manchester, England**

**Continuation of Ser. No. 238,667, Aug. 31, 1988, abandoned. This application Jan. 29, 1990, Ser. No. 471,699**

**Claims priority, application United Kingdom, Jun. 1, 1988, 8812928**

**Int. Cl.$^5$ A61K** *31/74, 31/155*

U.S. Cl. 424—78 7 Claims

1. A pharmaceutical composition useful for spermicidal or sperm-immobilizing purposes consisting essentially of a combination of chlorhexidine and a spermicidal surfactant which is a nonylphenol/ethylene oxide condensate wherein the proportion of chlorhexidine to the surfactant is in the range of 10:1 to 1:10, by weight, said combination providing a synergistic spermicidal or sperm-immobilizing effect compared to use of the chlorhexidine or surfactant separately.

---

### 5,013,545
## AQUEOUS GELS CONTAINING TOPICAL MEDICAMENTS

**Steven Blackman, New York, and Irene Ralske, North Bellmore, both of N.Y., assignors to Thames Pharmacal Co., Inc., Ronkonkoma, N.Y.**

**Filed Dec. 9, 1987, Ser. No. 130,445**

**The portion of the term of this patent subsequent to May 29, 2007, has been disclaimed.**

**Int. Cl.$^5$ A61K** *31/045, 47/12, 47/38, 31/13*

U.S. Cl. 424—81 28 Claims

1. An aqueous, non-irritating, bactericidal and bacteriostatic gel composition for topical use, comprising:

(a) from about 60 to about 90% by weight ethyl alcohol;
(b) from about 0.5 to about 30% by weight water;
(c) from about 0.5 to about 5% by weight of at least one gelling agent; and
(d) a pharmaceutically effective amount of a topically active antihistaminic agent selected from the group consisting of diphenhydramine and diphenhydramine hydrochloride, whereby the combination of the above ingredients maintains the treated areas substantially bacteria-free for a prolonged period of time.

---

### 5,013,546
## METHODS FOR MODULATING ANTIBODY PRODUCTION IN TREATING PATIENTS WITH AIDS, ARC AND OTHER DISEASES

**A. Arthur Gottlieb, New Orleans, and Robert C. Sizemore, Metarie, both of La., assignors to Imreg, Inc., New Orleans, La.**

**Continuation of Ser. No. 235,475, Aug. 23, 1988, abandoned, which is a continuation-in-part of Ser. No. 13,067, Feb. 10, 1987, abandoned. This application Mar. 29, 1990, Ser. No. 501,973**

**The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.**

**Int. Cl.$^5$ A61K** *37/02, 45/05*

U.S. Cl. 424—85.1 4 Claims

1. A method of decreasing quantity of immunoglobulin produced by B-cells of a human or other mammalian subject in response to antigen, where said subject suffers from a disease or condition in which excessive immunoglobulin production occurs, comprising administering to said subject an effective dosage amount of an amplifier of the immune system, said amount being effective to decrease said quantity of immunoglobulin, and said ampifier being Beta-1.0, Beta-1.11, or Beta-1.12.

---

### 5,013,547
## ANTICANCER DRUG - ANTIBODY CONJUGATES AND METHOD FOR PREPARING SAME

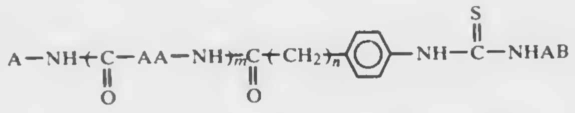
**Frederick Sweet, and Leonard O. Rosik, both of St. Louis County, Mo., assignors to Erbamont, Inc., Dublin, Ohio**

**Filed Feb. 7, 1989, Ser. No. 307,644**

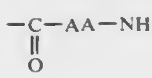
**Int. Cl.$^5$ A61K** *39/44, 17/06*

U.S. Cl. 424—85.91 8 Claims

1. A drug-protein conjugate of the general formula (1):



where the moiety A—NH— is the condensation product of an antibiotic having a free amino group; n is 0, 1 or 2; m is 1, 2 or 3; the moiety —NHAB is the condensation product of a protein having a free amino group; and the moiety



$$-\underset{\underset{O}{\|}}{C}-AA-NH-$$

is the condensation product of an amino acid of the formula HOOC—AA—$NH_2$.

---

### 5,013,548
## PRODUCTION OF ANTIBODIES TO HIV

**Barton F. Haynes, and Thomas J. Palker, both of Durham, N.C., assignors to Duke University, Durham, N.C.**

**Continuation of Ser. No. 93,854, Sep. 8, 1987. This application Jan. 21, 1988, Ser. No. 146,720**

**Int. Cl.$^5$ A61K** *39/12, 37/02*

U.S. Cl. 424—89 4 Claims

1. A method of producing, in a primate, antibodies that neutralize human immunodeficiency virus (HIV) comprising administering to said primate at least one covalently linked aggregate of at least two conjugates, each of said conjugates comprising a carrier molecule covalently attached to at least one SP-10-like peptide, or an antigenic portion thereof.

---

### 5,013,549
## PRODUCTION, ISOLATION, AND IDENTIFICATION OF NOVEL ANTIFUNGAL COMPOUNDS

**Alan R. Putnam, Gallatin Gateway, Mont.; Saroj K. Mishra, Houston, Tex., and Muraleedharan G. Nair, East Lansing, Mich., assignors to Board of Trustees Operating Michigan State University, East Lansing, Mich.**

**Continuation-in-part of Ser. No. 311,299, Feb. 16, 1989. This application Jul. 9, 1990, Ser. No. 550,070**

**Int. Cl.$^5$ A61K** *31/71;* **C07H** *15/24*

U.S. Cl. 424—116 11 Claims

1. A composition or compound selected from the group consisting of spartanamicin A and B, having the molecular formula $C_{42}H_{53}O_{16}N$ with a molecular weight of 827 for spartanamicin B and molecular formula $C_{42}H_{51}O_{16}N$ with a molecular weight of 825 for spartanmicin A, which is produced by and isolated from mycelium of *Micromanospora spartanea* ATCC 53803.

---

### 5,013,550
## ANTIBIOTICS CALLED "CHLOROPOLYSPORINS B AND C", A PROCESS FOR THEIR PREPARATION, AND THEIR THERAPEUTIC AND VETERINARY USE

**Tatsuo Haneishi; Takao Okazaki; Akio Torikata, and Mutsuo Nakajima, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan**

**Division of Ser. No. 379,656, Jul. 11, 1989. Pat. No. 4,918,054, which is a continuation of Ser. No. 813,617, Dec. 26, 1985, abandoned. This application Feb. 6, 1990, Ser. No. 475,688**

**Claims priority, application Japan, Jan. 11, 1985, 60-2805**

**Int. Cl.$^5$ A61K** *35/74, 37/02;* **C07K** *7/50, 9/00*

U.S. Cl. 424—117 6 Claims

1. An antibiotic substance named chloropolysporin B and pharmaceutically acceptable salts thereof, which, as its sulfate, is characterized by the properties:

(a) it takes the form of an amphoteric white powder, soluble in water;
(b) specific rotation: $[\alpha]^{25}-64.5^\circ$ ($C=1.04$, 0.1 N aqueous hydrochloric acid, sodium D-line);
(c) elemental analysis:
  C, 48.33%; H, 5.05%; N, 5.48%; Cl, 5.11%; S, 1.00%;
(d) on acid hydrolysis it yields:
  neutral saccharides: glucose, mannose and rhamnose; amino acids: 3-chloro-4-hydroxyphenylglycine and N-methyl-p-hydroxyphenylglycine;
(e) ultraviolet absorption spectrum:
  as illustrated in FIG. 1 of the accompanying drawings, having an absorption maximum $\lambda_{max}$ at 280 nm ($E_{1cm}=51$) in a 0.1 N solution of hydrochloric acid, the absorbence, E, being measured at a concentration of 1% w/v;
(f) infrared absorption spectrum;
  the infrared absorption spectrum ($\nu$ $cm^{-1}$) measured on a KBr disc is as shown in FIG. 2 of the accompanying drawings;
(g) nuclear magnetic resonance spectrum:
  the nuclear magnetic resonance spectrum ($\delta$ ppm), measured at 270 MHz in deuterated dimethyl sulfoxide using tetramethylsilane as the internal standard, is as illustrated in FIG. 3 of the accompanying drawings;
(h) solubility:
  soluble in water and methanol, sparingly soluble in acetone, and insoluble in ethyl acetate, chloroform and benzene;
(i) color reactions:
  positive in Ninhydrin and Rydon-Smith reactions;
(j) thin layer chromatography:
  Rf value=0.65, using a cellulose sheet (Eastman) as adsorbent and a 15:10:3:12 by volume mixture of butanol, pyridine, acetic acid and water as the developing solvent;
(k) high voltage paper electrophoresis: using Toyo's filter paper No. 51A in a 0.1 M tris-hydrochloric acid buffer solution of pH 7.5 (3300 volt/60 cm, 1 hour); the migration distance (detected by bioautography with *Bacillus subtilis* PCI 219) from the origin to the cathode was 4 cm;
(l) molecular formula:
  $C_{83}H_{89}O_{34}N_8Cl_3$. $0.5H_2SO_4$. $10H_2O$;
(m) molecular weight:
  the molecular weight, measured by FAB-MS, was 1846 ($MH^+$, 1847).

---

### 5,013,551
## ANIMAL REPELLANT LLDPE

**Charles E. Atkinson, Orange, Tex., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 1, 1990, Ser. No. 473,684**

**Int. Cl.$^5$ A01N** *25/34*

U.S. Cl. 424—412 15 Claims

1. In the process of forming articles from a melt of LLDPE, wherein said LLDPE is a linear low density polyethylene which is a copolymer of ethylene with at least one monomer selected from the group consisting of $C_4$ to $C_{10}$ alpha monoolefins, wherein the low density of said LLDPE is about 0.91 to 0.935 g/cc the improvement comprising incorporating terpene into said melt in an amount effective to repel animals in the resultant article.

---

### 5,013,552
## MODIFIED POLLEN GRAINS FOR DELIVERING BIOLOGICALLY ACTIVE SUBSTANCES TO PLANTS AND ANIMALS

**Moh. Samir Amer, P.O. Box 1439, Santa Barbara, Calif. 93102, and Rashad Tawashi, 66 Hyde Park, Beaconsfield, Quebec, Canada H9W 5L8**

**Filed Feb. 6, 1989, Ser. No. 306,170**

**Int. Cl.$^5$ A61K** *37/26, 9/50, 31/715;* **A01N** *25/34*

U.S. Cl. 424—408 6 Claims

1. A composition of matter comprising original cellulose shells of pollen grain the pores of which are internally loaded with about 5% to about 50% by weight of a biologically active substance, said loaded substance being releasable in or on a plant or animal, said loaded substance being foreign to the naturally occurring pollen grain.

VOL
1126
ISS
1
MY
7
1991
UMI

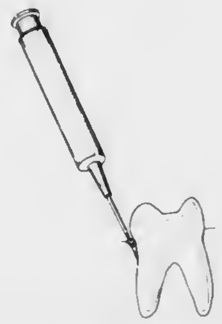
### 5,013,553
### DRUG DELIVERY DEVICES

**G. Lee Southard, and Ronald J. Harkrader, both of Fort Collins, Colo., assignors to Vipont Pharmaceutical, Inc., Fort Collins, Colo.**

**Continuation of Ser. No. 68,251, Jun. 30, 1987, abandoned. This application Aug. 29, 1989, Ser. No. 400,561**

**Int. Cl.$^5$ A61K** *7/26, 6/00;* **A61F** *2/00*

U.S. Cl. 424—426 28 Claims



1. A bioerodable composition suitable for placement subgingivally in a periodontal pocket, said composition comprising:

(a) bioerodable, biocompatible, sustained release, polymeric material; and

(b) an active agent consisting essentially of a benzophenanthridine alkaloid:

wherein said alkaloid is releasably contained in said material in a manner such that said alkaloid is slowly released from said composition so as to maintain an effective concentration of said alkaloid for a period of several days in said pocket; wherein said alkaloid is present in said composition in an amount of at least 1% by weight; and wherein an aliquot of said composition suitably sized for the periodontal pocket and containing 500 micrograms of said alkaloid has a release rate in the range of about 30 to 100 micrograms per day.

---

### 5,013,554
### ORAL PHARMACEUTICAL COMPOSITIONS CONTAINING DEXTROPHAN SALTS

**Carlos Passarotti; Antonio Fossati; Mauro Valenti, and Gianluigi Bandi, all of Milan, Italy, assignors to Prodotti Formenti s.r.l., Milan, Italy**

**Filed Sep. 12, 1989, Ser. No. 406,298**

**Claims priority, application Italy, Sep. 16, 1988, 21965 A/88**

**Int. Cl.$^5$ A61K** *9/20, 9/08, 9/14, 31/489*

U.S. Cl. 424—440 3 Claims

1. A method of treating a tussive condition which comprises the oral administration to a patient of an effective amount for treating a tussive condition of a composition the principal active ingredient of which is dextrorphan citrate in admixture with a pharmaceutical acceptable carrier.

---

### 5,013,555
### AGENT FOR DESENSITIZING MAN AND/OR ANIMALS AGAINST AN ALLERGEN

**Amy L. T. Collins, 7605 Ridgecrest Dr., Alexandria, Va. 22308**

**Continuation-in-part of Ser. No. 190,378, May 5, 1988, abandoned. This application Mar. 9, 1989, Ser. No. 320,795**

**Int. Cl.$^5$ A61K** *37/22, 35/78, 35/58*

U.S. Cl. 424—450 19 Claims

1. An agent for desensitization of man or animals against an allergen comprising liposomes that comprise an allergen, wherein said allergen is at least one selected from the group consisting of food allergens, drug allergens, venom allergens, plant allergens, animal allergens and extracts thereof, either in an unconjugated form or in the form of a hapten conjugated to a carrier.

---

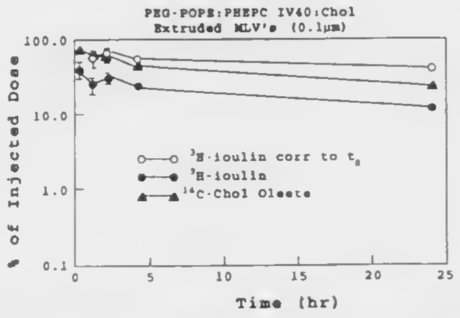
### 5,013,556
### LIPOSOMES WITH ENHANCED CIRCULATION TIME

**Martin C. Woodle, Menlo Park; Francis J. Martin, San Francisco; Annie Yau-Young, Los Altos, and Carl T. Redemann, Walnut Creek, all of Calif., assignors to Liposome Technology, Inc., Menlo Park, Calif.**

**Filed Oct. 20, 1989, Ser. No. 425,224**

**Int. Cl.$^5$ A61K** *37/22*

U.S. Cl. 424—450 34 Claims



1. A liposome composition for use in delivering a compound via the bloodstream comprising

liposomes composed of vesicle-forming lipids and between 1–20 mole percent of an amphipathic, vesicle-forming lipid derivatized with a polyethyleneglycol, and containing the compound in liposome-entrapped form, and

characterized by a blood level, 24 hours after intravenous injection, which is severalfold times that of the liposomes in the absence of the derivatized lipid.

---

### 5,013,557
### TASTE MASKING COMPOSITIONS COMPRISING SPRAY DRIED MICROCAPSULES CONTAINING SUCRALFATE AND METHODS FOR PREPARING SAME

**Anna W. Tai, Bridgewater, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Oct. 3, 1989, Ser. No. 416,630**

**Int. Cl.$^5$ A61K** *9/58*

U.S. Cl. 424—493 47 Claims

1. A spray dried spheroidal microcapsule under about 150 microns in diameter which comprises in percentages by weight of the microcapsule composition:

(a) sucralfate present in an amount from about 1% to about 70%; and

(b) a polymer soluble in the gastric fluids present in an amount from about 30% to about 99%.

---

### 5,013,558
### PHARMACEUTICAL TREATMENTS FOR CEREBRAL AND NEURONAL DISEASES

**Jin-emon Konishi, Hyogo, Japan, assignor to Nippon Zoki Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Jun. 15, 1989, Ser. No. 366,704**

**Claims priority, application Japan, Jun. 20, 1988, 63-152492**

**Int. Cl.$^5$ A61K** *35/00*

U.S. Cl. 424—520 2 Claims

1. A method for treating spino-cerebellar degeneration, which comprises administering to a patient in need of such treatment an effective amount of a protein-free extract of infected tissues inoculated with a poxvirus, said extract having the following physical and chemical properties:

pale yellowish-brown, hygroscopic powder;
soluble in water, methanol and ethanol;
ultraviolet adsorption, λmax=255–275 nm;
positive ninhydrin reaction;
gives a blue color with amidol and ammonium molybdate;
gives a green color with orcin and iron (II) ammonium sulfate;
gives a precipitate with silver nitrate; and
contains nucleic acid bases.

---

### 5,013,559
### MICROBICIDES

**Ludwig Maier, Arlesheim, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 131,710, Dec. 11, 1987, Pat. No. 4,859,466. This application May 15, 1989, Ser. No. 352,240**

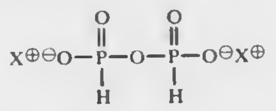
**Claims priority, application Switzerland, Dec. 23, 1986, 5202/86**

**The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.**

**Int. Cl.$^5$ A01N** *59/26*

U.S. Cl. 424—605 3 Claims

1. A fungicidal composition for protecting plants containing a fungicidally effective amount of a salt of the pyrophosphorous acid of formula I



$$X^{\oplus}{}^{\ominus}O-\overset{\overset{\displaystyle O}{\|}}{\underset{\underset{\displaystyle H}{|}}{P}}-O-\overset{\overset{\displaystyle O}{\|}}{\underset{\underset{\displaystyle H}{|}}{P}}-O^{\ominus}X^{\oplus} \qquad (I)$$

wherein X⊕ is a cation equivalent selected from the group consisting of sodium, potassium, lithium, beryllium, magnesium, aluminium, zinc, manganese, copper and $NH_4$, together with a suitable carrier therefor and a surfactant.

---

### 5,013,560
### MICROBIALLY-STABLE BISMUTH-CONTAINING LIQUID PHARMACEUTICAL SUSPENSIONS

**Laura L. Stentz, Fairfield; Jerry R. Maney, Mason, and Thomas E. Sox, Sharonville, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Mar. 17, 1989, Ser. No. 324,927**

**Int. Cl.$^5$ A01N** *59/16, 55/02;* **A61K** *33/24, 31/29*

U.S. Cl. 424—653 15 Claims

1. Microbially-stable liquid pharmaceutical suspensions for oral administration comprising:

(a) from about 0.1% to about 10% of a bismuth-containing pharmaceutical agent;

(b) from about 0.01% to about 0.075% of benzoic acid;

(c) from about 0.01% to about 0.04% of sorbic acid;

(d) from about 0.1% to about 10% of a suspension system; and

(e) from about 80% to about 99% water, and wherein further said liquid composition has a pH within the range of from about 3.0 to about 5.5.

---

### 5,013,561
### PROCESS FOR RECOVERY OF PRODUCTS FROM WAXY BARLEY

**Kenneth J. Goering, and Robert F. Eslick, both of Bozeman, Mont., assignors to Barco, Inc., Bozeman, Mont.**

**Continuation-in-part of Ser. No. 150,434, Jan. 28, 1988, Pat. No. 4,804,545, which is a continuation of Ser. No. 914,877, Oct. 3, 1986, abandoned, which is a continuation of Ser. No. 639,345, Aug. 10, 1984, abandoned. This application Dec. 20, 1988, Ser. No. 287,663**

**Int. Cl.$^5$ A23L** *1/10;* **A23J** *1/12;* **C12P** *19/22, 19/14*

U.S. Cl. 426—28 21 Claims

1. A method for producing and recovering beta-glucan solids, a bran residue, a protein concentrate, a barley oil, waxy barley starch and a maltose syrup from waxy barley, comprising the steps:

(a) reducing the particle size of waxy barley to form a meal;

(b) mixing the meal solely with water at a temperature of about 40°-60° C. to produce a liquid water extract and barley solids;

(c) separating the barley solids from the water extract and heating the water extract at about 80°-115° C.;

(d) separating coagulated protein from the water extract;

(e) separating beta-glucan solids containing less than 5.0 wt % protein from water extract remaining after separating coagulated protein in step (d);

(f) mixing the separated barley solids with water;

(g) screening off bran to obtain a bran fraction and a liquid passing through the screen;

(h) separating crude starch by centrifugation from the liquid passing through the screen in step (g);

(i) kneading the crude starch into a dough, allowing time for dough development and dispersing the dough in water;

(j) screening the dispersed dough from step (i) to separate barley gluten solids and a liquid dispersion of starch;

(k) separating waxy barley starch from the dispersion of starch remaining in step (j) by centrifuging the liquid dispersion;

(l) mixing the bran fraction from step (g) with water, adding an amylolytic enzyme and a beta-glucanase enzyme, and heating to a temperature of about 70°-75° C. for a sufficient period to effect partial starch conversion;

(m) cooling the mixture to about 50°-60° C.;

(n) adding an enzyme having at least alpha-amylase activity and maintaining the mixture at this temperature to complete starch conversion and form a liquid starch mixture;

(o) separating rough solids from the liquid starch mixture and recovering bran residue rough solids and a remaining liquid starch mixture;

(p) separating solids from the remaining liquid starch mixture of step (o);

(q) extracting the solids with an alcohol to separate a protein concentrate and an extracted barley oil and separately recovering the barley oil and the protein concentrate; and

(r) recovering a maltose syrup from liquid remaining after separating solids in step (p).

---

### 5,013,562
### LIQUOR INCLUDED ICE

**Katsuzo Somura, 4-4, Chuo 5-chome, Nakano-ku, Tokyo, Japan 164**

**Filed Feb. 26, 1990, Ser. No. 484,418**

**Claims priority, application Japan, Oct. 6, 1989, 1-261668**

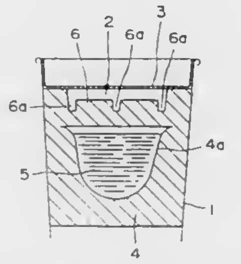
**Int. Cl.$^5$ C12G** *3/00*

U.S. Cl. 426—66 8 Claims

1. A liquor included ice body comprising a transparent ice lump having a concavity therein, said ice lump containing no impurities so that it is tasty, a liquor filled in said concavity, an

VOL
1126
ISS
1
MY
7
1991
UMI

ice plate positioned on top of said transparent ice lump closing said concavity, said ice plate being arranged to break easily by an outer force, and a glass-like container containing at least said transparent ice lump, liquor and ice plate.



---

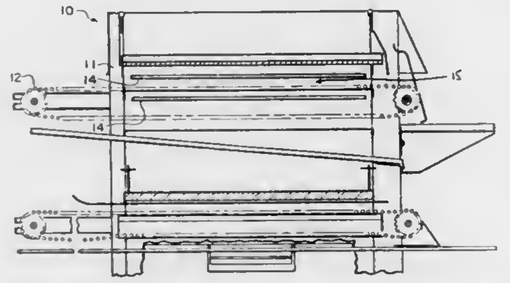
### 5,013,563
### CONVEYORIZED COOKING METHOD

**Robert M. Stuck, York County, S.C., assignor to Marshall Air Systems, Inc., Charlotte, N.C.**

**Continuation-in-part of Ser. No. 866,478, May 23, 1986, Pat. No. 4,924,767. This application Aug. 22, 1989, Ser. No. 396,945**

**Int. Cl.$^5$ A23L** *1/00*

**U.S. Cl. 426—233** **9 Claims**



1. A method of preparing foodstuffs in a conveyorized cooking apparatus, comprising the steps of:
  - providing a cooking zone,
  - providing planar electrical heating elements in the cooking zone and imposing in the cooking zone a blanket of heat,
  - progressively moving foodstuffs through the cooking zone and passing the moving foodstuffs through the blanket of heat,
  - cooking the moving foodstuffs in the cooking zone,
  - regulating the cooking of the foodstuffs in the cooking zone by controlling energization of the heating elements and adding thermal energy to raise the temperature in the cooking zone to a set temperature point,
  - removing the foodstuffs from the cooking zone, and
  - reducing the thermal energy supplied to the cooking zone and cooling the cooking zone at a predetermined rate from said set temperature point, said predetermined rate being set forth by the algorithm of

$$y = mx + b$$

where y is the temperature reached from said set temperature point during the reduction of thermal energy in said cooking zone, m is the slope of the line, x is the time elapsed from the beginning of the period of thermal reduction, and b is the set point temperature, and further wherein the value of m is in a range of from about −0.25 to about −3.00.

---

### 5,013,564
### REDUCED MONASCUS PIGMENT DERIVATIVES AS YELLOW FOOD COLORANTS

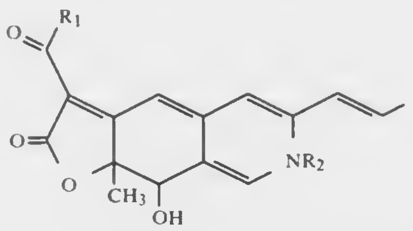
**Edward J. St. Martin, Libertyville; Paul R. Kurek, Barrington; Elaine F. Schumacher, Arlington Heights, and Ronald P. Rohrbach, Forest Lake, all of Ill., assignors to UOP, Des Plaines, Ill.**

**Filed Aug. 3, 1990, Ser. No. 562,880**

**Int. Cl.$^5$ A23L** *1/275*

**U.S. Cl. 426—250** **33 Claims**

1. A method of imparting a yellow color to an edible formulation comprising adding to an edible formulation an amount effective to impart said yellow color of a water-soluble yellow pigment of formula



where $R_1$ is $C_5H_{11}$, $C_7H_{15}$, or a mixture thereof, and where $R_2$ is such that $R_2NH_2$ is selected from the group consisting of amino acids, alkyl esters of amino acids whose alkyl group contains up to 10 carbon atoms, amino alcohols, dipeptides, alkyl esters of dipeptides whose alkyl group contains up to 10 carbon atoms, aliphatic and cycloaliphatic amines containing from 2 to 10 carbon atoms, and polymeric amines.

---

### 5,013,565
### WATER-SOLUBLE RED PIGMENTS FROM MONASCORUBRIN AND RUBROPUNCTATIN AS FOOD COLORANTS

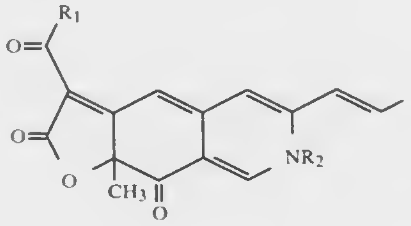
**Edward J. St. Martin, Libertyville; Paul R. Kurek, Barrington, and Elaine F. Schumacher, Arlington Heights, all of Ill., assignors to UOP, Des Plaines, Ill.**

**Filed Aug. 3, 1990, Ser. No. 562,879**

**Int. Cl.$^5$ A23L** *1/275*

**U.S. Cl. 426—250** **44 Claims**

1. A water-soluble red pigment at least 95 weight percent of which consists of homologs having the structure,



where $R_1$ is $C_5H_{11}$ or $C_7H_{15}$ and $R_2$ is a moiety such that $R_2NH_2$ is selected from the group consisting of naturally occurring amino acids, alkyl esters of amino acids whose alkyl group contains up to 10 carbon atoms, amino alcohols, dipeptides, alkyl esters of dipeptides whose alkyl group contains up to 10 carbon atoms, aliphatic and cycloaliphatic amines containing from 2 to 10 carbon atoms, and polymeric amines.

---

### 5,013,566
### PROCESS FOR OBTAINING IMPROVED YIELDS FROM PLANTS USED FOR HAY MAKING BY USING A COATING AGENT

**Michael J. Sampson, 18 Christchurch Road, Norwich Norfolk, England NR2 2AE**

**Filed Dec. 19, 1988, Ser. No. 286,322**

**Int. Cl.$^5$ A23K** *1/00*

**U.S. Cl. 426—302** **7 Claims**

1. A method for hay making, which comprises:
  - cutting or swathing a plant crop suitable for hay making selected from the group consisting of grass, alfalfa, clover or Birdsfoot Trefoil and
  - applying a coating material comprising di-1-p-menthene or polymers of di-1-p-menthene to said crop before or during the cutting or swathing, wherein the coating material is applied by spraying said crop with a formulation containing the coating material and from 1 to 30% of a surfactant or wetting agent wherein said formulation is applied in an amount of 0.03 to 0.5 liter of coating material per ton of said crop and wherein said coating material reduces leaf shedding during drying or harvesting.

---

### 5,013,567
### METHOD FOR THE GENERATION OF SMOKE FOR USE IN SMOKE-CURING OF FOODS

**Karl-Jan Govenius, Hämeenkatu 5, Lahti, Finland SF-15110**

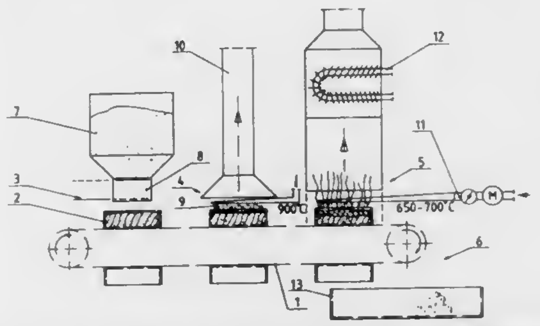
**PCT No. PCT/FI88/00061, § 371 Date Oct. 10, 1988, § 102(e) Date Oct. 10, 1988, PCT Pub. No. WO88/08251, PCT Pub. Date Nov. 3, 1988**

**PCT Filed Apr. 25, 1988, Ser. No. 411,493**

**Claims priority, application Finland, Apr. 23, 1987, 871777**

**Int. Cl.$^5$ A23B** *4/00*

**U.S. Cl. 426—314** **2 Claims**



1. A method for smoke-curing a food comprising burning a finely divided material which generates smoke during charring to form a layer of coals on the surface of the finely divided material; forming a burning zone which progresses through the finely divided material by passing a combustion air through said layer of coals in a counterflow direction to the flow of smoke generated by the burning of the finely divided material; contacting the food to be smoke-cured with the smoke obtained from the burning finely divided material when said layer of coals formed on the surface of the finely divided material has a thickness of about 0.05 to 100 nm.

---

### 5,013,568
### METHOD FOR TREATING FISH WITH ALPHA-2-MACROGLOBULIN

**Michel A. Lorier, and Brian L. Aitken, both of Christchurch, New Zealand, assignors to Life Technologies, Inc., Gaithersburg, Md.**

**Filed May 30, 1990, Ser. No. 530,592**

**Claims priority, application New Zealand, Jun. 1, 1989, 229385**

**Int. Cl.$^5$ A23L** *1/325*

**U.S. Cl. 426—332** **6 Claims**

1. A method of preparing a processed fish product comprising treating fish material with alpha-2-macroglobulin in an amount and in a manner sufficient to neutralize or inhibit protease contained in the fish material.

---

### 5,013,569
### INFANT FORMULA

**David Rubin, San Diego, Calif., assignor to Century Laboratories, Inc., Port Washington, N.Y.**

**Filed May 21, 1990, Ser. No. 526,096**

**Int. Cl.$^5$ A23C** *9/20*

**U.S. Cl. 426—585** **6 Claims**

1. An infant food formulation substantially approximating human milk in fatty acid composition, comprising:
  - a mixture of 4,7,10,13,16,19-docosahexaenoic acid (DHA) and 5,8,11,14,17-eicosapentaenoic acid (EPA) in a ratio of approximately from 1:1 to 2:1 by weight, the EPA and DHA being present in a quantity substantially to mimic the relative quantity of fatty acid in human mother's milk;
  - immunoglobulins in a quantity substantially to mimic the immunoglobulin content of human mother's milk;
  - a source of protein in a quantity substantially to mimic the protein content of human mother's milk;
  - a source of carbohydrate in a quantity substantially to mimic the carbohydrate content of human mother's milk;
  - and sufficient water to provide an easily assimilable infant formula, said DHA and EPA and said immunoglobulins being microencapsulated.

---

### 5,013,570
### METHOD OF PRODUCING ODORLESS RIPE JUICE OF HOUTTUYNIA CORDATA

**Eiyu Imamura, Higashi Yamanashi County, Japan, assignor to Yamanashi Yagen Limited, Yamanashi Prefecture, Japan**

**Filed May 15, 1990, Ser. No. 523,412**

**Claims priority, application Japan, May 16, 1989, 1-120543**

**Int. Cl.$^5$ A23L** *1/068*

**U.S. Cl. 426—599** **3 Claims**

3. A method of producing an odorless ripe juice of dokudamiso comprising the steps of preparing a green juice from fresh dokudamiso; subjecting said prepared green juice to rough filtration; then oxidizing said filtrated green juice.

---

### 5,013,571
### METHODS FOR MAKING TETRAHYDROISOALPHA AND HEXAHYDROISOALPHA ACIDS

**Bruce A. Hay, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Filed Jan. 31, 1990, Ser. No. 473,268**

**Int. Cl.$^5$ C12C** *3/00*

**U.S. Cl. 426—600** **33 Claims**

1. A method of converting alpha acids to hop flavors comprising exposing the alpha acids to an environment, capable of substantially simultaneously isomerizing and reducing the alpha acids to form tetrahydroisoalpha acids, and thus forming tetrahydroisoalpha acids.

---

### 5,013,572
### STEAM STRIPPING OF ODOR FORMING IMPURITIES FROM HOP FLAVORS

**Bruce A. Hay, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Filed Jan. 31, 1990, Ser. No. 473,089**

**Int. Cl.$^5$ C12C** *3/00*

**U.S. Cl. 426—600** **11 Claims**

1. A method for the removal of undesirable odor-forming impurities from a hop flavor selected from the group consisting of tetrahydroisoalpha acids and hexahydroisoalpha acids, which comprises steam stripping said impurities from the hop flavor at a pH such that steam stripping is effective in removing said impurities to produce the purified hop flavor.

VOL
1126
ISS
1
MY
7
1991
UMI

5,013,573

### SPREADS HAVING A GOOD MICROBIOLOGICAL STABILITY AND A FRESH DAIRY TASTE

**Janos Bodor, Rijswijk, Netherlands; Albert W. Schoenmakers, Dendermonde, Belgium, and Walter M. Verhue, Oostvoorne, Netherlands, assignors to Van den Bergh Foods Co., Division of Conop-Co, Inc., Lisle, Ill.**

**Continuation of Ser. No. 13,496, Feb. 11, 1987, abandoned. This application Jan. 6, 1989, Ser. No. 296,388**

**Claims priority, application United Kingdom, Feb. 19, 1986, 8604133**

**Int. Cl.$^5$ A23D** *7/00*

**U.S. Cl. 426—602** **17 Claims**

1. An edible, oil- and water-containing emulsion spread comprising a fat phase and an aqueous phase of a pH lower than 6.0, which aqueous phase comprises less than 40 milliequivalents acid/kg, diacetyl at a level of 1-40 mg/kg, calcium at a level of --720 mg/kg, magnesium at a level of 0–20 mg/kg, said aqueous phase being the product obtained by:
   (a) souring milk or a milk product with a bacterial culture productive of diacetyl or precursors thereof, and
   (b) electrodialyzing the milk or milk product to remove minerals and acid therefrom.

---

5,013,574

### EDIBLE DISPERSION CONTAINING A TARTARIC ACID ESTER OF MONO- AND DIGLYCERIDES AND AN EDIBLE FAT

**James E. Hassel, Harrison, N.Y., assignor to Fritzsche Dodge & Olcott Inc., New York, N.Y.**

**Continuation of Ser. No. 54,092, May 18, 1987, abandoned, which is a continuation of Ser. No. 730,679, May 3, 1985, abandoned. This application Apr. 3, 1989, Ser. No. 333,839**

**Int. Cl.$^5$ A23D** *7/00, 9/00;* **A23L** *1/22*

**U.S. Cl. 426—612** **6 Claims**

1. An edible, homogeneous, single system, liquid composition useful as a dispersing agent for the preparation of oil-in-water or water-in-oil edible dispersions consisting essentially of a tartaric acid ester and an edible fat or oil, said edible fat or oil being miscible in said tartaric acid ester and being selected from the group consisting of almond oil, butter fat, cocoa butter, coconut oil, corn oil, cottonseed oil, safflower oil, tallow, soybean oil, lard oil, olive oil, palm oil, peanut oil, sesame oil and sunflower oil.

---

5,013,575

### PROCESS FOR PRODUCING A CARAMELIZED NUT PRODUCT

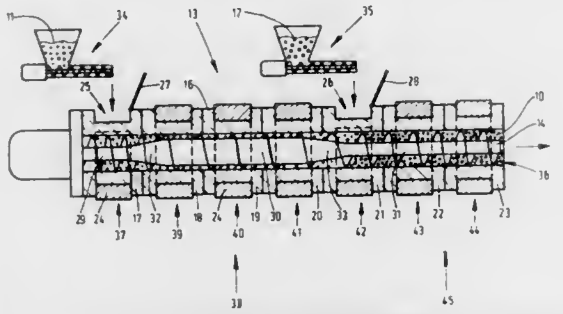
**Edwin Stadler, Anif Nr., Austria; Wolfgang Hergesell, Markt Schellenberg, Fed. Rep. of Germany, and Ernst Pidner, Anthering, Austria, assignors to Jacobs Suchard AG, Zurich, Switzerland**

**Filed Mar. 1, 1989, Ser. No. 317,812**

**Claims priority, application Fed. Rep. of Germany, Mar. 1, 1988, 3806471**

**Int. Cl.$^5$ A23G** *3/00, 7/00;* **A23P** *1/00*

**U.S. Cl. 426—639** **18 Claims**



1. A process for producing a product made of a mixture of sugar and an ingredient that includes nuts in a heated screw extruder, comprising the steps of:
   feeding the sugar into the screw extruder through a first intake zone;
   caramelizing the sugar by conveying the sugar along a conveying path in the screw extruder through a plurality of caramelization zones which are heated by a heating means;
   adding said ingredient to the caramelized sugar in the screw extruder through a second intake zone, said second intake zone being spaced from said first intake zone; and
   mixing the caramelized sugar with said ingredient and roasting said ingredient by conveying the caramelized sugar and said ingredient along the conveying path.

---

5,013,576

### GOURD POWDER COMPOSITION

**Shinzo Nakazawa, Yuuki; Taro Tsukada, Kuki, and Eiichi Suzuki, Ashikaga, all of Japan, assignors to Tokyo Tanabe Company, Limited, Tokyo, Japan**

**Filed Aug. 17, 1989, Ser. No. 395,334**

**Claims priority, application Japan, Aug. 19, 1988, 63-204694; Aug. 19, 1988, 63-204695: Sep. 16, 1988, 63-229741**

**Int. Cl.$^5$ A23B** *7/02*

**U.S. Cl. 426—640** **18 Claims**

1. Gourd powder composition comprising powder of gourd fruit plus L-ascorbic acid and/or a creaming syrup component such that, by weight, when L-ascorbic acid is present it is in an amount of less than 30% of the total gourd powder composition and in a ratio to the powder of gourd fruit of greater than 0.8 to 1, and when the creaming syrup is present, the powder of gourd fruit is in a ratio to the creaming syrup of not greater than 1.1 to 1.

---

5,013,577

### SILOXANE SOLUBLE $(CH_3)_3SIO_{1/2}/SIO_2$ (M/Q) RESINS WITH AMINE AND AMIDE ORGANOFUNCTIONALITY

**Antony P. Wright, Rhodes, and Padmakumari J. Varaprath, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Aug. 22, 1990, Ser. No. 570,668**

**Int. Cl.$^5$ B05D** *3/06*

**U.S. Cl. 427—35** **40 Claims**

1. An amine-capped siloxane resin of the formula $((CH_3)_3SiO_{1/2})_x(SiO_2)_y(O_{3/2}SiOY_2SiQNHB)_z$ wherein
   the ratio of "x" to the sum of "y" + "z" is within the range of about 0.6/1.0 to about 1.2/1.0;
   the ratio of "z" to "y" is within the range from about 0.01/1.0 to about 0.4/1.0;
   Y is a monovalent organic radical or a hydrogen atom;
   Q is a divalent organic radical; and
   B is a hydrogen atom,
      a monovalent hydrocarbon radical R or
      an amino radical having the formula —Q'NZE wherein
         Q' is a divalent organic radical the same or different than Q,
         Z is a hydrogen atom or a monovalent hydrocarbon radical R, and
         E is a hydrogen atom or a monovalent radical R' the same or different than R.

---

5,013,578

### APPARATUS FOR COATING A SURFACE WITH A METAL UTILIZING A PLASMA SOURCE

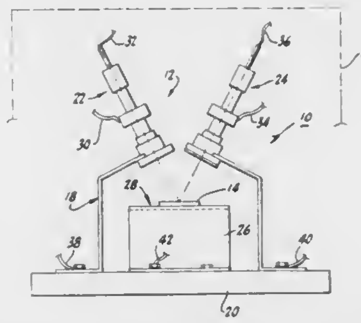
**Ian G. Brown, Berkeley; Robert A. MacGill, Richmond, and James E. Galvin, Emeryville, all of Calif., assignors to University of California, Berkeley, Calif.**

**Filed Dec. 11, 1989, Ser. No. 448,379**

**Int. Cl.$^5$ C23C** *16/00*

**U.S. Cl. 427—37** **11 Claims**

1. An apparatus for coating a surface with a metal utilizing a metal vapor vacuum arc plasma source, comprising:
   a. means for actuating the metal vapor vacuum arc plasma source in a pulsed mode at a predetermined rate, said actuating means including a pulse generator producing an output signal of a certain pulse width;
   b. means for supporting the surface to receive metal ions from the plasma source;
   c. means for electrically biasing the surface for a selected period of time during said pulsed mode operation of said means for actuating the metal vapor vacuum arc plasma source in a pulsed mode;
   d. means for synchronizing the activities of said means for actuating the metal vapor vacuum arc plasma source and said means for electrically biasing the surface for a selected period of time; and
   e. a vacuum chamber for enclosing at least a portion of the plasma source and the surface.



9. A method of coating a surface with a metal utilizing a metal vapor vacuum arc plasma source comprising:
   a. providing a vacuum chamber for enclosing the plasma source and the surface;
   b. supporting the surface a selected distance from the plasma source in the vacuum chamber;
   c. actuating the metal vapor vacuum arc plasma source in a pulsed mode and at a predetermined rate, utilizing a pulse generator producing an output signal of a certain pulse width;
   d. electrically biasing the surface for a selected period for time during said pulse mode operation of said metal vapor vacuum arc plasma source; and
   e. synchronizing the actuation of the metal vapor vacuum arc plasma source in a pulsed mode and the electrical biasing of the surface for a selected period of time.

---

5,013,579

### MICROWAVE ENHANCED CVD METHOD FOR COATING MECHANICAL PARTS FOR IMPROVED WEAR RESISTANCE

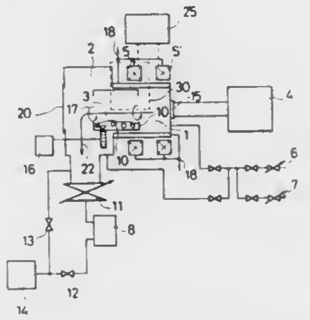
**Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 154,286, Feb. 10, 1988, abandoned. This application Sep. 26, 1989, Ser. No. 414,593**

**Claims priority, application Japan, Feb. 10, 1987, 62-28956**

**Int. Cl.$^5$ B05D** *5/12;* **C23C** *16/26, 16/50*

**U.S. Cl 427—38** **13 Claims**



1. A cyclotron resonance chemical vapor deposition method for coating mechanical component parts, said parts having (a) flat surfaces and (b) corners subject to wear, said method comprising the steps of:
   disposing said parts in a reaction chamber;
   inputting into said reaction chamber a reactive gas comprising (a) carbon and optionally (i) nitrogen or (ii) nitrogen and boron or (b) boron and nitrogen;
   exciting said reactive gas in said reaction chamber by applying microwave electromagnetic energy in the presence of a magnetic field in the pressure range of 0.01–300 Torr to cause cyclotron resonance in the reaction chamber where the electric field of said electromagnetic energy tends to concentrate at said corners of the parts; and
   depositing a layer on the corners and flat surfaces of said parts by chemical vapor reaction such that the layer at the corners is thicker than that on the flat surfaces due to the concentration of the electric field at the corners to thus render the corners more resistant to said wear.

---

5,013,580

### VIDEO RECORDING/PLAY-BACK HEAD, METHOD FOR MAKING IT AND APPARATUS APPLYING SAID METHOD

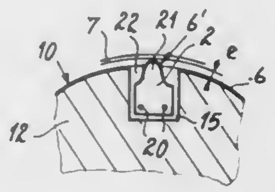
**Paul-Louis Meunier, Paris; Jean-Marie Mackowski, Villeurbanne, and Jean-Luc Rolland, Paris, all of France, assignors to Thomson-CSF, Paris, France**

**Filed Oct. 26, 1988, Ser. No. 262,718**

**Claims priority, application France, Oct. 27, 1987, 87 14819**

**Int. Cl.$^5$ B05D** *3/06;* **C23C** *14/00*

**U.S. Cl. 427—39** **5 Claims**



5. A method for making a video recording/play-back head, said head including a drum made of a non-magnetic material with a plurality of magnetic heads being arranged on the periphery of the drum and having their active recording/play-back surface emerging above an external surface of the drum, comprising the steps of:
   placing each active recording surface of each magnetic head **approximately 5 microns above the external surface** of the drum and thereby reducing turbulence created in a zone between the external surface of the drum and the active surface of the magnetic head is reduced;
   placing said video recording/play-back head inside a conductive chamber, and applying to an internal wall of said chamber forming an electrode a first potential voltage;
   applying a second potential voltage to the external surface of the drum and said magnetic heads, thereby forming a radial electric field around said video recording/play-back head; and
   radial plasma depositing a wear-resistant material on the external surface of the drum and an active surface of each magnetic head.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,581

### METHOD OF MAKING A POLYMER-METAL COMPOUND HAVING A PREDETERMINED ELECTRICAL CONDUCTIVITY BY DEPOSITING ON A SUBSTRATE FROM A GLOW DISCHARGE ZONE

**Harald Suhr; Angelika Etspüler, both of Tübingen; Ernst Feurer, Tübingen-Hirschau, and Christian Oehr, Reusten, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 193,589, May 12, 1988. This application Aug. 2, 1990, Ser. No. 561,934**

**Claims priority, application Fed. Rep. of Germany, May 12, 1987, 3716235**

**Int. Cl.$^5$ B05D** *3/06*

**U.S. Cl. 427—41** **12 Claims**

1. A method of making an electrically conductive polymer-metal compound on a substrate comprising the steps of preparing a reaction mixture of a gaseous metallo-organic compound and a metal-free gaseous organic compound, producing a glow discharge zone in said reaction mixture and exposing the substrate to action of the gaseous metallo-organic compound and the metal-free gaseous organic compound in the glow discharge zone so as to produce the electrically conductive polymer-metal compound with a predetermined electrical conductivity.

---

### 5,013,582

### PROCESS FOR PROVIDING HYDROLYSIS RESISTANT PHOSPHORS

**Ramon L. Yale, Towanda, Pa., assignor to GTE Products Corporation, Stamford, Conn.**

**Filed Apr. 24, 1989, Ser. No. 342,159**

**Int. Cl.$^5$ C09K** *11/84*

**U.S. Cl. 427—65** **2 Claims**

1. A process for making a rare-earth oxysulfide phosphor resistant to hydrolysis, said process comprising:

(a) forming a slurry of said phosphor in water;

(b) treating said slurry with a zinc compound, said treating consisting of adding to said slurry, a water-soluble zinc compound in an amount sufficient to result in a zinc ion concentration in said water of from about 0.01 molar to about 0.05 molar, and agitating said slurry;

(c) separating the resulting zinc-treated phosphor from the liquid portion of said slurry;

(d) heating said zinc-treated phosphor in air at a temperature of from about 500° C. to about 600° C. for a sufficient time to enhance the brightness of said phosphor; and

(e) screening the resulting heated phosphor to remove non-luminescent material therefrom, said phosphor having a resistance to hydrolysis that is at least about 50% greater than said rare-earth oxysulfide phosphor absent the zinc treatment.

---

### 5,013,583

### METHOD OF PRODUCING A MAGNETIC RECORDING MEDIUM

**Michio Yamaura, Hachioji; Toshiaki Yatabe, and Hiroshi Matsuzawa, both of Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan**

**Continuation of Ser. No. 236,318, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 78,418, Jul. 27, 1987, abandoned, which is a division of Ser. No. 793,633, Oct. 31, 1985, abandoned. This application Jan. 24, 1990, Ser. No. 471,668**

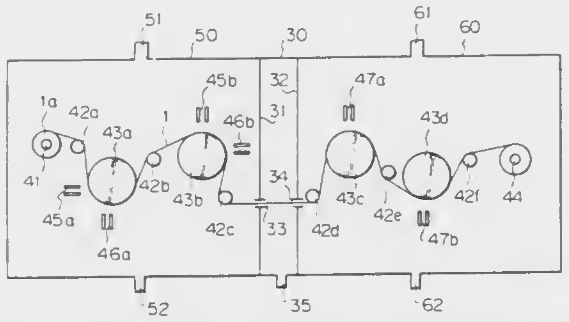
**Claims priority, application Japan, Feb. 11, 1984, 59-230075; May 2, 1985, 60-93720; May 2, 1985, 60-93721; May 2, 1985, 60-93722; May 2, 1985, 60-93723; May 2, 1985, 60-93724; May 22, 1985, 60-108382; May 27, 1985, 60-112070**

**Int. Cl.$^5$ B05D** *5/12*

**U.S. Cl. 427—131** **9 Claims**

1. A method for producing a magnetic recording medium which comprises:

forming, on a base, a thin ferromagnetic layer having a thickness of not more than 0.8 $\mu$m by a deposition process using a first target material as the source of the thin ferromagnetic layer material; and



forming on the ferromagnetic layer, by a physical vapor deposition process, using a second target material which has a chemical composition different from the first target material, a protective layer consisting essentially of $Co_3O_4$.

---

### 5,013,584

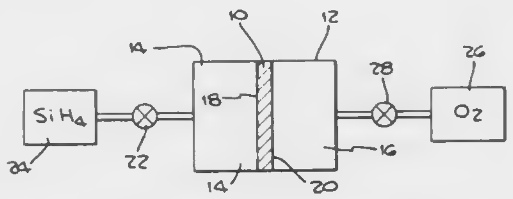
### METHOD OF REDUCING THE PERMEABILITY OF PLASTIC OPTICAL ARTICLES

**John E. Wreede, Monrovia, and Edward T. Knobbe, Playa Del Rey, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 123,493, Nov. 20, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,176**

**Int. Cl.$^5$ B05D** *5/06;* **C23C** *16/40*

**U.S. Cl. 427—162** **14 Claims**



1. A method for reducing the permeability of a plastic optical article made from gas permeable material, said method comprising the steps of:

migrating a first reactant into said material, wherein said first reactant is selected from the group consisting of silane, chlorosilane, and fluorosilane; and

migrating a second reactant into said material, wherein said second reactant comprises a gas selected from the group consisting of oxygen and water vapor, wherein said first and second reactants are migrated to react at a reaction interface to form solid reaction product particles consisting essentially of silicon dioxide which form a barrier layer that reduces the permeability through said plastic material, said silicon dioxide particles being small compared to the wavelength of light so that said barrier layer has little or not effect on the optical properties of said plastic optical article.

---

### 5,013,585

### METHOD FOR THE PREPARATION OF SURFACE-MODIFIED SILICA PARTICLES

**Takaaki Shimizu; Tsutomu Ogihara, and Masatoshi Takita, all of Niigata, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Jun. 6, 1990, Ser. No. 534,450**

**Claims priority, application Japan, Jun. 13, 1989, 1-149860**

**Int. Cl.$^5$ B05D** *7/00*

**U.S. Cl. 427—220** **8 Claims**

1. A method for the preparation of surface-modified silica particles dispersible in a hydrophobic organic solvent which comprises the steps of:

(a) hydrolyzing a tetraalkoxy silane compound in a medium of an alcohol containing from 2.5 to 6.0 moles of water and from 0.1 to 3 moles of an alkaline compound as a catalyst, each per mole of the tetraalkoxy silane compound, to form an alcosol of silica particles having alkoxy groups and hydroxy groups bonded to the silicon atoms on the surface; and

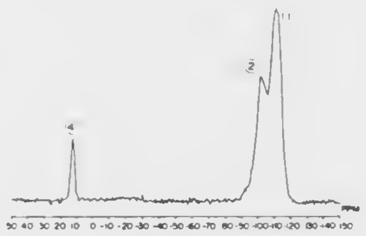
(b) admixing the alcosol of silica particles with an organosilicon compound selected from the group consisting of the compounds represented by the general formula

$R_{4-n}SiX_n$,

$(R_3Si)_2NH$, or

$YO—(—SiR_2—O—)_m—Y$,

in which each R is, independently from the others, a hydrogen atom or an unsubstituted or substituted monovalent hydrocarbon group having 1 to 20 carbon atoms, X is a hydroxy group or an alkoxy group having 1 to 4 carbon atoms, Y is a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, the subscript n is 1, 2 or 3 and the subscript m is a positive integer not exceeding 20, in an amount in the range from 0.01 to 10 moles per mole of $SiO_2$ in the silica particles under agitation of the mixture to effect a reaction for the modification of the surface of the silica particles.



---

### 5,013,586

### METHOD AND DEVICE FOR THE UNIFORMLY EVEN APPLICATION OF A RESIN COATING ON A SUBSTRATE

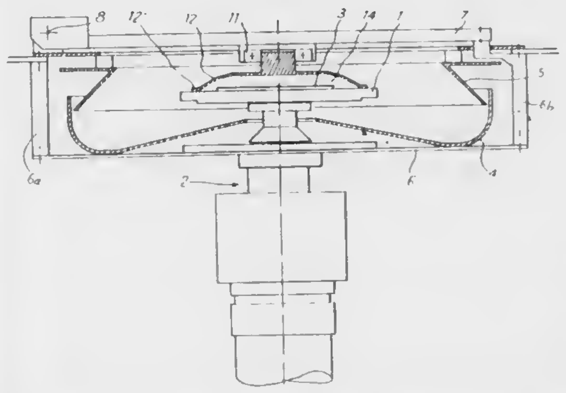
**Gilbert Cavazza, Viuz-en-Sallaz, France, assignor to Société Anonyme dite: Sulzer Electro-Technique "S.E.T." , Saint-Jeoire, France**

**Filed Sep. 14, 1989, Ser. No. 407,362**

**Claims priority, application France, Sep. 15, 1988, 88 12045**

**Int. Cl.$^5$ B05D** *3/12;* **B05C** *11/02*

**U.S. Cl. 427—240** **10 Claims**



1. Method to coat a substrate with a photosensitive resin coating, wherein a dissolved resin dose is deposited on the substrate in position on a circular rotary plate, after which the resin is immediately spread as a thin layer by the fast and accelerated rotation of the plate at the same time as evaporation of the solvent allows the resin coating of the desired thickness to be deposited on the plate and wherein a concentric cover defining along with said circular plate a gaseous volume encompassing the substrate is superimposed on the circular plate and wherein this cover is made to rotate with the plate so that said gaseous volume is driven in rotation synchronous with the plate and the cover.

2. Device for coating a substrate with a resin, said device comprising:

a rotatable plate,

means for attaching said substrate on said plate,

means for depositing a dose of said resin dissolved in a volatile solvent on the surface of said substrate, and

a cover defining with said plate a volume enclosing said substrate, said cover being adapted to rotate synchronously with said plate,

whereby atmosphere in contact with said substrate within said volume also rotates synchronously with said substrate.

---

### 5,013,587

### METAL FILLER COMPOSITION AND METHOD OF EMPLOYING SAME

**David D. Kiilunen, Brighton, Mich., and David A. Sartor, Sterling Heights, Mich., assignors to Midwest Thermal Spray, Inc., Westland, Mich.**

**Filed Jan. 5, 1990, Ser. No. 461,296**

**Int. Cl.$^5$ B05D** *3/02*

**U.S. Cl. 427—383.7** **8 Claims**

1. A method of applying metal to metal surfaces having voids therein, which comprises introducing into said voids to substantially fill the same a copper-base alloy which includes therewith tin, aluminum and silicon, and grinding said alloy in said voids to impart a smooth surface finish thereto.

---

### 5,013,588

### CORROSION RESISTANT SILICON INORGANIC POLYMERIC COATINGS

**Yeong C. Lin, San Diego, Calif., assignor to Advanced Diversified Technology, Inc., San Diego, Calif.**

**Filed Jul. 11, 1989, Ser. No. 378,011**

**Int. Cl.$^5$ B05D** *3/02*

**U.S. Cl. 427—397.7** **18 Claims**

1. A method of imparting a protective or a decorative layer to a substrate; said method comprising:

(a) coating said surface with a hydrolyzable solution of silicon alkoxide having a pH range of 1-3 in an organic solvent and having been hydrolyzed with a minimal effective amount of water;

(b) evaporating said solvent to yield a polymer film: and

(c) curing said film to yield a uniform protective layer on said substrate surface.

---

### 5,013,589

### PROCESS FOR THE PRODUCTION OF COATED OR LACQUERED METAL CONTAINERS AND THE USE THEREOF

**Dietrich M. Schäfer, Lindenberg, Fed. Rep. of Germany, and Simon Kleijmeer, Stompetoren, Netherlands, assignors to Grace GmbH, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 429,594, Oct. 31, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 481,671**

**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1988, 3840809**

**Int. Cl.$^5$ B65D** *25/14*

**U.S. Cl. 428—35.9** **11 Claims**

1. A coating for a metal sheet capable of being formed into a container comprising a double coating, a first layer of the coating being formed of a vinyl chloride-based organosol

VOL
1126
ISS
1
MY
7
1991
UMI

applied to at least one surface of the metal sheet which subsequently forms an inner surface of the container, and a second layer formed on the first layer and composed of an epoxy-phenolic lacquer.

---

### 5,013,590
### BIOCHEMICAL REACTION RECEPTACLE

**Jürgen F. Nerbe, Ansgarstrasse 8, D-2105 Seevetal 11, and Karl-Georg Wönne, Zum dicken Busch 12b, D-2000 Barsüttel, both of Fed. Rep. of Germany**

**PCT No. PCT/EP87/00649, § 371 Date Jun. 23, 1988, § 102(e) Date Jun. 23, 1988, PCT Pub. No. WO88/03648, PCT Pub. Date May 19, 1988**

**PCT Filed Oct. 31, 1987, Ser. No. 243,037**

**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1986, 3637421**

**Int. Cl.$^5$ G01N** *33/545;* **B01L** *3/00*

**U.S. Cl. 428—36.4** **9 Claims**

1. A reaction receptacle for carrying out chemical reactions with biospecific compounds, the receptacle comprising:
   a thermoplastic material shaped to form a body with inner and outer surfaces, and
   a non-migrating incorporated substance having molecules with reactive groups of atoms,
   said thermoplastic material being physically mixed with said non-migrating incorporated substance prior to the shaping of said body and having, after shaping of the body, said molecules of said incorporated substance with reactive groups of atoms exposed at least on the inside surface of the body,
   said thermoplastic material being chemically inert with respect to said incorporated substance and the compounds to be reacted in said receptacle.

---

### 5,013,591
### BUILDING SHEETING AND METHOD OF ITS MANUFACTURE

**Bert Haushofer, Königstein Ts.; Ernst Scherp, Brucköbel; Wilfried Schumacher, Offenbach, and Petru Sabau, Frankfurt, all of Fed. Rep. of Germany, assignors to Rutgerswerke Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed May 8, 1989, Ser. No. 348,382**

**Claims priority, application Fed. Rep. of Germany, May 10, 1988, 3815915**

**Int. Cl.$^5$ B32B** *7/12;* **B05D** *3/02, 11/04*

**U.S. Cl. 428—40** **7 Claims**

1. A building sheeting including a polymeric bitumen comprising at least one covering layer which includes a mixture of bitumen having a penetration between 70 and 420.1/10 mm and a softening point between 20° and 50° C., 10 to 30% by weight of a homo and/or copolymer based on atactic polypropylene (APP), 5 to 20% by weight isotatic polypropylene (IPP), with a melt flow index between 20 and 40, and further wherein the surface of the outer layer of the building sheeting contains crystalline polypropylene in the form of spherulites.

---

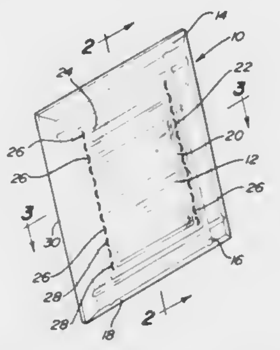
### 5,013,592
### MULTI-LAYERED PLAQUE AND ITS METHOD OF PREPARATION

**Ronnie Culpepper, 20194 Cooley, Detroit, Mich. 48129**

**Filed Jun. 26, 1989, Ser. No. 373,188**

**Int. Cl.$^5$ B44C** *5/04;* **G02B** *5/08*

**U.S. Cl. 428—46** **20 Claims**



1. A plaque for displaying and preserving one or more selected objects, said plaque comprising:
   a clear plate having a front side and a back side;
   a first layer of a paint on said back side, said paint covering only selected areas of said back side of said clear plate, said paint defining at least one non-painted display region and a plurality of non-painted design areas;
   said one or more objects being situated within said at least one non-painted display region;
   a first layer of film overlapping said non-painted design areas, said first layer of film being transparent;
   a second layer of film overlapping said first layer of film, said second layer of film being metallic; and
   a protective backing.

---

### 5,013,593
### INFORMATION STORAGE MEDIUM AND PROCESS FOR PRODUCING THE SAME

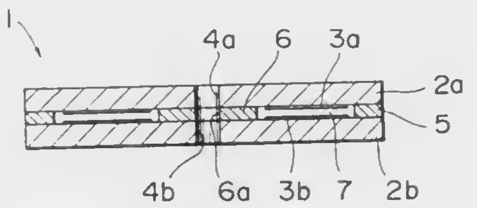
**Hideki Matsuzawa, Odawara; Masao Yabe, Fujinomiya; Tadashi Irie, Odawara; Seiichi Watanabe, Odawara, and Yusuke Ishihara, Odawara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Oct. 5, 1989, Ser. No. 417,322**

**Claims priority, application Japan, Oct. 6, 1988, 63-252679**

**Int. Cl.$^5$ B32B** *3/02*

**U.S. Cl. 428—64** **8 Claims**



1. An information storage medium of air-sandwich structure comprising two disc-shaped substrates joined together through a ring-shaped outer spacer and a ring-shaped inner spacer, wherein each of the spacers is made of the same kind of resin as that forming the disc-shaped substrates and the resin of the spacers has a viscosity-average molecular weight in the range of 1.3 to 2.0 times the viscosity-average molecular weight of the resin of the disc-shaped substrates.

### 5,013,594
### OPTICAL INFORMATION RECORDING MEDIUM AND ITS PRODUCTION

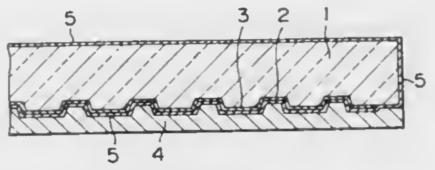
**Tetsuo Mizumura, Ibaraki; Minoru Ichijo, Toride; Ken-ichirou Nakao, Tsuchiura; Seiichi Matsushima, Tsukuba, and Yoshitane Tuburaya, Toride, all of Japan, assignors to Hitachi Maxwell, Ltd., Ushitora, Japan**

**Filed Sep. 22, 1988, Ser. No. 248,126**

**Claims priority, application Japan, Sep. 25, 1987, 62-238986**

**Int. Cl.$^5$ B32B** *3/02*

**U.S. Cl. 428—64** **10 Claims**



1. An optical device comprising:
   a substrate having an outer main surface and outer side surface,
   a recording or reflecting film on an inner main surface of said substrate,
   a protective film having an outer main surface and outer side surface provided on said recording or reflecting film, and
   a plasma-polymerized film of a halogen-containing resin provided at least at a periphery of said device so as to completely cover said outer side surfaces of said substrate and said protective film, at said periphery of said recording or reflecting film where said substrate and protective film come together thereby completely sealing said recording or reflecting film between said substrate and protective film to prevent any effect from the atmospheric elements, such as moisture.

---

### 5,013,595
### STRETCH FILM WITH AUXILIARY BAND

**John C. Parry, Baltimore, Md., assignor to J. C. Parry & Sons Co., Inc., Baltimore, Md.**

**Filed Nov. 25, 1987, Ser. No. 125,574**

**Int. Cl.$^5$ B32B** *3/14;* **B65D** *5/28*

**U.S. Cl. 428—77** **9 Claims**

1. A stretch wrapping laminate for wrapping pallets of stacked boxes and the like comprising
   a primary, substantially transparent, stretch film layer of a predetermined gauge and lateral width laminated with
   at least one auxiliary band of a stretchable film material visually different from that of said primary layer and of substantially lesser lateral width than said primary layer, for reinforcing the film and rendering it visually distinctive.

---

### 5,013,596
### RESILIENT STRIP AND MOUNTING MEMBER FOR FLUSH FITTING PROTECTIVE STRIP ASSEMBLY

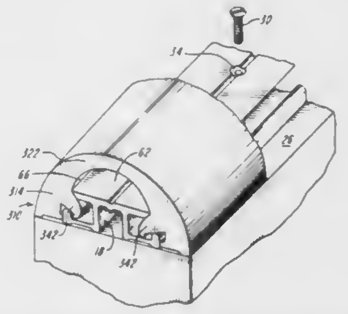
**Gerald Kessler, Youngstown, Ohio, assignor to Bostom Metal Products Corp., Medford, Mass.**

**Filed Jul. 21, 1989, Ser. No. 383,905**

**Int. Cl.$^5$ E04F** *19/02;* **B60J** *11/00*

**U.S. Cl. 428—100** **15 Claims**

1. An elongated protective strip of resilient material to be secured in and partially surrounding a mounting member, said resilient strip comprising:
   (a) a semi-cylindrical body partially surrounding the mounting member and having a pair of circumferentially facing edge portions; and
   (b) a pair of oppositely disposed, radially inwardly extending solid latch members, each terminating in a hook having an opening on the side of the latch member facing away from the mid-line of the semi-cylindrical body and each latch member located between a point 45 degrees away from the mid-line of the semi-cylindrical body and another point 90 degrees away from the mid-line, in the same direction.



---

### 5,013,597
### MULTI-LAYERED SOUND-INSULATING PANEL FOR MOTOR VEHICLES, OR SIMILAR

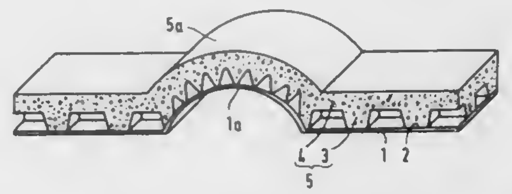
**Wilhelm Kracke, Celle, Fed. Rep. of Germany, assignor to Sony Corporation, Tokyo, Japan**

**Continuation of Ser. No. 458,555, Jan. 17, 1983, abandoned. This application Sep. 16, 1986, Ser. No. 908,947**

**Claims priority, application Fed. Rep. of Germany, Jan. 22, 1982, 8201511[U]**

**Int. Cl.$^5$ B32B** *1/00, 3/00*

**U.S. Cl. 428—141** **16 Claims**



1. A multi-layered sound-insulating panel in combination with a sheet metal surface of a motor vehicle having an engine and drivetrain and passenger compartment for use in reducing sound from the engine and drivetrain from being transmitted to the passenger compartment, which sound has substantial components in the 100–150 Hz frequency range and being present at different levels at different location in the motor vehicle, said panel comprising: a homogeneous foamed elastic material having at least one dense layer and a resilient layer, said resilient layer being adapted to be in contact with a sheet metal surface of the motor vehicle between the passenger compartment and the engine and drivetrain and having a predetermined shape constituted by a plurality of noise-insulating depressions or protrusions arranged in a nonuniform, predetermined distribution on the surface thereof to insulate said different sound levels at said different locations in the motor vehicle.

---

### 5,013,598
### METHOD OF MANUFACTURING A SAG-RESISTANT BONDED PARTICULATE ARTICLE

**Gerald J. Guerro, Trumbull, and Balwant Singh, Stamford, both of Conn., assignors to American Cyanamid, Stamford, Conn.**

**Filed Jun. 29, 1990, Ser. No. 546,139**

**Int. Cl.$^5$ B32B** *5/16*

**U.S. Cl. 428—283** **20 Claims**

1. A method of preventing or minimizing humidity-induced sag in bonded particulate substrates comprising applying to at least one side of said particulate substrate a coating composition comprising an aqueous dispersion of a mixture of an effective amount of a glyoxal resin or derivative thereof and an effective amount of a beta-hydroxy urethane compound, and

VOL
1126
ISS
1
MY
7
1991
UMI

an effective amount of a filler material, and curing said coating composition.

19. A bonded particulate article resistant to humidity-induced sag produced in accordance with the method of claim 1.

---

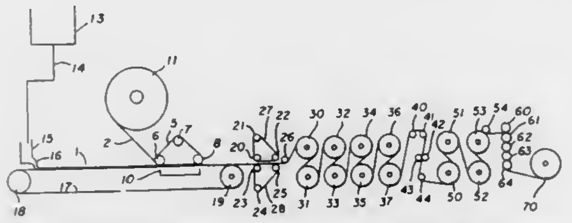
### 5,013,599
### COMPOSITE FIBROUS POLYETHYLENE SHEET

**Joseph R. Guckert, Midlothian, and Hyun S. Lim, Chesterfield, both of Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 415,831, Sep. 29, 1989, Pat. No. 4,941,947. This application Mar. 15, 1990, Ser. No. 497,217**

**Int. Cl.$^5$ B32B** *27/00*

**U.S. Cl. 428—286** **4 Claims**



1. A composite sheet particularly suited for detailed printing thereon comprising a first layer in face-to-face contact with a second layer,
- the first layer consisting essentially of flash-spun polyethylene plexifilamentary film-fibril strand sheet, having a weight in the range of 25 to 100 g/m$^2$,
- the second layer consisting essentially of a layer of polyethylene synthetic pulp having a weight in the range of 8.5 to 85 g/m$^2$,
- the first and second layers being thermally bonded to each other and
- the composite sheet having a total weight of no more than about 135 g/m$^2$ and a coefficient of variation of sheet thickness of no greater than 10%.

---

### 5,013,600
### METHOD AND DEVICE FOR CLEANING DIE PLATES

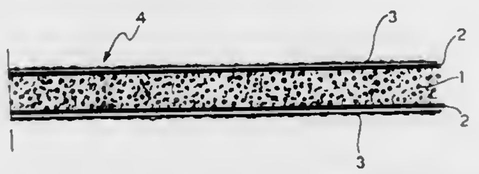
**Mario Da Ré, Turin, Italy, assignor to Fiat Auto S.p.A., Turin, Italy**

**Filed May 10, 1989, Ser. No. 350,999**

**Claims priority, application Italy, May 12, 1988, 53142/88[U]**

**Int. Cl.$^5$ B32B** *3/26*

**U.S. Cl. 428—316.6** **4 Claims**



1. A device for cleaning die plates, comprising a compressible sheet of sponge plastics material, a layer of adhesive which is flexible and viscous at ambient temperature deposited on each face of the sheet and an outer covering sheet of non-woven fabric superposed on each layer of adhesive.

---

### 5,013,601
### SELF-SUPPORTING SHEET-LIKE ARTICLE WITH SUPERIOR ANTISTATIC CHARACTERISTICS

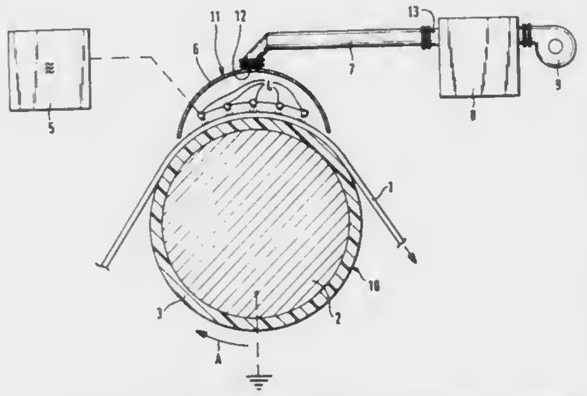
**Lothar Bothe, Mainz-Gonsenheim; John D. Gribbin, Schlangenbad, and Peter Dinter, Oestrich-Winkel, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Aug. 25, 1988, Ser. No. 236,377**

**Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732166**

**Int. Cl.$^5$ B32B** *5/16;* **B29C** *59/12*

**U.S. Cl. 428—323** **18 Claims**



1. A self-supporting sheet-like article comprising a substrate layer and an antistatic coating on at least one surface of said substrate layer, said antistatic coating being obtained by subjecting at least one surface of the substrate layer to an electrical corona discharge between a live electrode and a counter electrode and simultaneously, during the corona discharge, introducing an aerosol into the corona discharge area, said aerosol containing an antistatic agent.

---

### 5,013,602
### MAGNETIC RECORDING MEDIUM

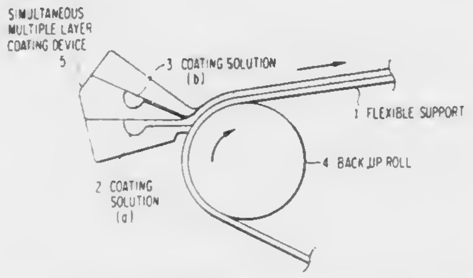
**Nobuo Yamazaki; Hiroo Inaba, and Kouichi Masaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Sep. 21, 1988, Ser. No. 247,211**

**Claims priority, application Japan, Sep. 21, 1987, 62-236877; Sep. 6, 1988, 63-221482**

**Int. Cl.$^5$ G11B** *23/00*

**U.S. Cl. 428—323** **9 Claims**



1. A magnetic recording medium comprising a nonmagnetic support having thereon a single magnetic layer or plural magnetic layers containing ferromagnetic particles dispersed in a binder, wherein said ferromagnetic particles are ferromagnetic particles of magnetic iron oxide having an adsorption amount of stearic acid of from $3\times10^{-6}$ to $6\times10^{-6}$ mol/m$^2$ per a surface area thereof; said binder contains at least one polymer having at least one polar group selected from the group consisting of $-SO_3M$, $-OSO_3M$, $-COOM$, $-PO(OM')_2$ and $-OPO(OM')_2$ in which M represents Na, Li, K, a hydrogen atom, $NR_4$ or $NHR_3$, M′ represents Na, Li, K, a hydrogen atom, $NR_4$, $NHR_3$ or an alkyl group, and $R_3$ and $R_4$ represent a lower alkyl group; and said magnetic layer further contains at least one fatty acid.

---

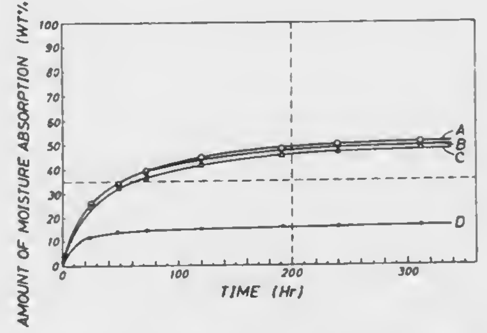
### 5,013,603
### INK JET RECORDING PAPER WITH AMORPHOUS SILICA FILLER

**Masahide Ogawa; Teiji Sato, both of Shibata; Masao Takahashi, Shiunji; Toshio Kitsu, Shibata; Seikichi Takahashi, Nakajo, and Kinichi Ono, Kurokawa, all of Japan, assignors to Mizusawa Industrial Chemicals, Ltd., Tokyo, Japan**

**Division of Ser. No. 205,445, Jun. 9, 1988, Pat. No. 4,915,923. This application Jan. 22, 1990, Ser. No. 468,140**

**Int. Cl.$^5$ B41M** *5/00*

**U.S. Cl. 428—331** **5 Claims**



1. An ink jet recording element which comprises a paper substrate and a layer of a filler coated on the surface of the substrate, wherein said filler comprises amorphous silica having (i) a median diameter, measured by the Coulter counter method, of 2 to 15 μm, (ii) an oil absorption of at least 180 ml/100 g, (iii) a refractive index, measured by the solvent method, of at least 1.450, (iv) a specific surface area of 280 to 500 m$^2$/g, (v) a pore volume, measured by the nitrogen adsorption method, of more than 1.30 cc/g, and (vi) a moisture absorption, measured when it is caused to absorb moisture for 200 hours at a relatively humidity of 90% and a temperature of 25° C., of at least 35%.

---

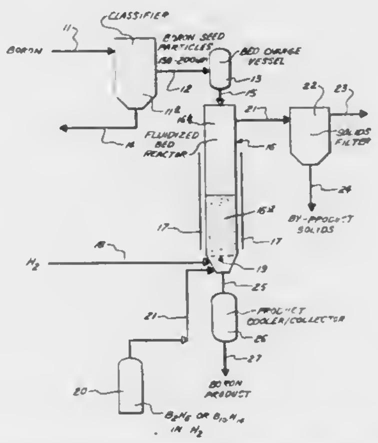
### 5,013,604
### PREPARATION OF HIGH PURITY BORON

**Robert H. Allen, and Jameel Ibrahim, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.**

**Filed Oct. 11, 1988, Ser. No. 255,446**

**Int. Cl.$^5$ B32B** *15/02*

**U.S. Cl. 428—402** **6 Claims**



1. Electronic grade boron in the form of free-flowing, bead-like particles, and suitable for use in continuous and semi-continuous Czochralski systems for preparing doped, single crystal silicon, said particles having an average size within the range of from about 500 to about 700 microns, a size distribution of less than about 100–150 microns, and a purity of at least 99.9995 percent.

---

### 5,013,605
### CORDIERITE-TYPE GLASS-CERAMIC WITH CONTROLLED COLORATION

**David N. Gritz, 163 Hilton Dr., and Herbert A. Miska, 1129 Park Ter., both of Horseheads, N.Y. 14845**

**Filed Aug. 11, 1988, Ser. No. 230,864**

**Int. Cl.$^5$ C03B** *32/00*

**U.S. Cl. 428—410** **5 Claims**

1. A glass-ceramic article composed essentially of MgO, $Al_2O_3$, $SiO_2$ and $TiO_2$ as a nucleating agent, having a primary crystalline phase of cordierite and a secondary phase of cristobalite, a surface layer on the article having a substantially diminished cristobalite content, and the article having a gray coloration.

---

### 5,013,606
### FILM FOR A RESISTANCE LAYER FOR AN ELECTRIC-THERMAL PRINT SYSTEM

**Motoyuki Miyoshi; Kazuhisa Kojima; Katsuhiko Sugiura, and Naomi Iketani, all of Tokyo, Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan**

**Filed Aug. 28, 1989, Ser. No. 399,005**

**Claims priority, application Japan, Aug. 31, 1988, 63-216759; May 16, 1989, 1-122623**

**Int. Cl.$^5$ B41M** *5/40;* **C08K** *3/04*

**U.S. Cl. 428—412** **6 Claims**

1. A ribbon for an electrical-thermal print system selected from the group consisting of (A) a three layered ribbon composed of ink layer/conductive layer/resistance layer, (B) a double layered ribbon composed of ink layer/resistance layer and (C) a double layered ribbon composed of conductive layer/resistance layer wherein said resistance layer comprises from 50 to 85% by weight of a polycarbonate resin and from 15 to 50% by weight of carbon black, and which further contains from 0.1 to 30 parts by weight, relative to 100 parts by weight of the polycarbonate resin, of an elastomer selected from the group consisting of styrene containing elastomers, polyolefin elastomers and acrylate elastomers.

---

### 5,013,607
### TRANSPARENT CONDUCTIVE CERAMIC-COATED SUBSTRATE PROCESSES FOR PREPARING SAME AND USES THEREOF

**Goro Sato, Fukuoka; Michio Komatsu, Tokyo; Toshiharu Hirai, Fukuoka; Yoneji Abe, Fukuoka, and Noboru Senjyuu, Fukuoka, all of Japan, assignors to Catalysts & Chemicals Industries Co., Ltd., Tokyo, Japan**

**PCT No. PCT/JP88/00793, § 371 Date Jun. 8, 1989, § 102(e) Date Jun. 8, 1989, PCT Pub. No. WO89/03114, PCT Pub. Date Apr. 6, 1989**

**PCT Filed Aug. 10, 1988, Ser. No. 391,604**

**Claims priority, application Japan, Sep. 30, 1987, 62-246316**

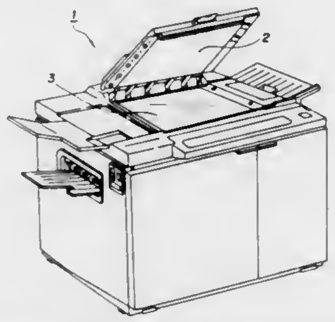
**Int. Cl.$^5$ B32B** *17/06;* **B05D** *5/12*

**U.S. Cl. 428—426** **14 Claims**

1. A transparent conductive ceramic-coated substrate having formed on the surface a transparent conductive ceramic coating by using a coating liquid for forming a transparent conductive ceramic coating, said coating liquid being prepared by homogeneously dissolving or dispersing dialkoxybisacetylacetonato zirconium, a partial hydrolysate of silicon

VOL
1126
ISS
1
MY
7
1991
UMI

alkoxide and a conductive substance in a mixed solvent comprising water and an organic solvent, and said substrate having a surface resistance of $10^3$–$10^{11}$ Ω□, a total light transmission of at least 85% and a haze of less than 10%.



---

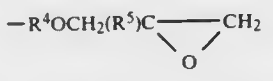
### 5,013,608
## HIGHLY TINTABLE ABRASION RESISTANT COATINGS

**Allen M. Guest, Chino; Martin W. Preus, Anaheim, and William Lewis, Tustin, all of Calif., assignors to Swedlow, Inc., Garden Grove, Calif.**

**Filed Jul. 7, 1989, Ser. No. 376,692**
**Int. Cl.$^5$ B32B** *17/10, 27/42*
**U.S. Cl. 428—436** **53 Claims**

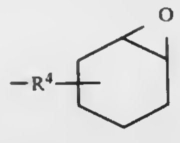
**44**. A process for tinting a transparent, tintable, abrasion-resistant coating that is coated on at least one surface of a solid substrate, said process comprising the steps of:

(i) contacting at least one surface of the solid substrate with a coating composition which forms a transparent, tintable, abrasion-resistant coating upon curing, said coating composition comprising:
  (A) a base resin comprising:
    (1) about 5 to about 75 weight percent solids, based on the total solids of (A), of a dispersion of a colloidal silica;
    (2) about 0 to about 50 weight percent, based on the total solids of (A), of a partial condensate of a silanol or a blend of silanols selected from the group consisting of silanols having the formula
      (a) $R^1Si(OH)_3$ wherein $R^1$ is methyl; and
      (b) $R^2Si(OH)_3$ wherein $R^2$ is selected from a group consisting of vinyl, allyl, phenyl, ethyl, propyl, 3,3,3-trifluoropropyl, gamma-methacryloxypropyl, gamma-mercaptopropyl and gamma-chloropropyl and mixtures thereof, and wherein when (b) is selected, the amount of (b) in (A) cannot exceed about 10 weight percent based on the total weight of (A);
    (3) about 10 to about 55 weight percent, based on the total solids of (A), of a partial condensate of a silanol of the formula $R^3Si(OH)_3$ wherein $R^3$ is selected from the group consisting of:



$$-R^4OCH_2(R^5)\underset{\diagdown\ O\ \diagup}{C\text{———}CH_2} \qquad (a)$$

wherein $R^4$ is an alkylene radical containing 1 to 4 carbon atoms, $R^5$ is a hydrogen atom or an alkyl radical of 1 or 2 carbon atoms, and


(b)

wherein $R^4$ has the meaning set forth above;

  (B) a crosslinker for (A);
  (C) a curing catalyst; and
  (D) at least about 3 percent but less than about 20 percent, by weight of total solids, of a tintability enhancing compound selected from the group consisting of polyhydroxyl-functional compounds and butylated urea formaldehyde compounds;

(ii) curing the coating composition on the solid substrate to form a transparent, tintable, abrasion-resistant coating; and

(iii) tinting the cured coating by immersing the coated surface of the solid substrate in a dye bath for a period of time sufficient for the coating to absorb or transmit to the solid substrate a desired amount of dye.

**45**. A solid substrate having a tinted coating prepared in accordance with the process of claim **44**.

---

### 5,013,609
## CERAMIC PRODUCTS DERIVED FROM POLYCARBOSILANES AND BOROXINES

**Leonard M. Niebylski, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Division of Ser. No. 306,097, Feb. 6, 1989, Pat. No. 4,873,353. This application Jun. 8, 1989, Ser. No. 363,484**
**Int. Cl.$^5$ B32B** *9/04*
**U.S. Cl. 428—447** **1 Claim**

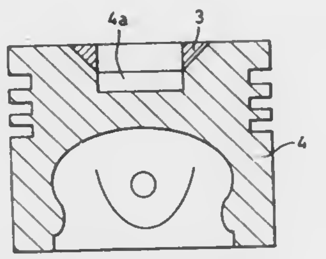
**1**. An article which comprises a substrate and a coating derived from a composition which has been prepared by mixing about 0.25–20 parts by weight of a trialkoxy-, triaryloxy-, or tri(arylalkoxy)boroxine with one part by weight of a polycarbosilane in an organic solvent.

---

### 5,013,610
## HEAT RESISTING MEMBER REINFORCED LOCALLY BY AN INORGANIC FIBER AND A PRODUCTIVE METHOD OF THE SAME

**Yoshihiro Suzuki, Saitama, Japan, assignor to Izumi Industries, Ltd., Kawagoe, Japan**

**Filed Mar. 26, 1990, Ser. No. 498,708**
**Int. Cl.$^5$ B22F** *3/00;* **F02F** *00/00;* **B23K** *35/22*
**U.S. Cl. 428—545** **7 Claims**



**1**. A heat resisting member, comprising:
an unreinforced body portion constructed from a first aluminum alloy, wherein the thermal expansion coefficient of said first aluminum alloy is reduced by the presence of silicon;
a reinforced metal matrix composite portion constructed from a second aluminum alloy with inorganic fibers as reinforcing material, wherein the thermal expansion coefficient of said second aluminum alloy is increased in order to reduce the difference in thermal expansion coefficients between said body portion and said reinforced portion by said second aluminum alloy consisting of (a) aluminum, (b) Si, Cu, Ni, and Mg at less than 1% by weight, (c) Fe and Mn, which exist as impurities, at less than 0.5% by weight, and (d) other impurities at less than 0.3% by weight.

---

### 5,013,611
## CAMSHAFT COMPOSITION

**Yasuo Suzuki, and Shunsuke Takeguchi, both of Tochigi, Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan**

**Filed Jan. 18, 1990, Ser. No. 466,836**
**Claims priority, application Japan, Jan. 19, 1989, 1-8615**
**Int. Cl.$^5$ B22F** *3/00*
**U.S. Cl. 428—552** **4 Claims**

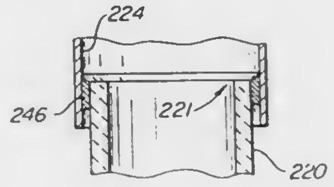
**1**. A camshaft comprising
a tubular steel shaft; and
a cam piece jointed to the tubular steel shaft, the cam piece having a surface layer portion and being formed of a sintered alloy consisting of 1.5 to 3.0% by weight of C, 0.5 to 1.2% by weight of Si, not more than 1.0% by weight of Mn, not more than 5.0% by weight of at least one of the materials selected from the group consisting of Ni and Mo, not more than 20.0% by weight of Cr, not more than 10% by weight of at least one of the materials selected from the group consisting of W, Nb and V, 0.2 to 1.0% by weight of P, not more than 0.1% by weight of S, and balance Fe, the surface layer portion of the cam piece being formed with iron tetroxide film.

---

### 5,013,612
## BRAZE MATERIAL FOR JOINING CERAMIC TO METAL AND CERAMIC TO CERAMIC SURFACES AND JOINED CERAMIC TO METAL AND CERAMIC TO CERAMIC ARTICLE

**Thomas K. Hunt, Ann Arbor, and Robert F. Novak, Farmington Hills, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 13, 1989, Ser. No. 434,380**
**Int. Cl.$^5$ B22F** *7/04*
**U.S. Cl. 428—552** **19 Claims**



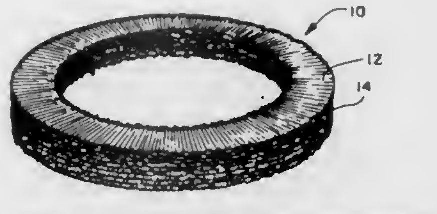
**15**. A ceramic to ceramic joined article comprising first and second ceramic members and a brazing filler material for joining said first and second ceramic members together, said brazing filler material comprising a mixture of a first material selected from the group consisting of molybdenum, tungsten, silicon carbide and mixtures thereof and which material has a coefficient of thermal expansion less than that of said ceramic, and an active metal filler material selected from the group consisting of alloys or mixtures of nickel and titanium, alloys or mixtures of nickel and zirconium, alloys or mixtures of nickel, titanium, and zirconium, alloys or mixtures of niobium and nickel, alloys or mixtures of niobium and zirconium, alloys or mixtures of niobium and titanium, alloys or mixtures of niobium, titanium, and nickel, alloys or mixtures of niobium, zirconium, and nickel, and alloys or mixtures of niobium, titanium, zirconium, and nickel, which active metal filler material has a coefficient of thermal expansion larger than that of said ceramic, and wherein said first material remains largely undissolved in said brazing filler material whereby the overall coefficient of thermal expansion of said brazing filler material is reduced due to the presence of said first material to cause it to be more closely matched with that of said ceramic.

---

### 5,013,613
## REINFORCING RINGS FOR HONEYCOMB PANELS AND METHOD AND APPARATUS FOR MAKING THEM

**Francis J. Gojny, Bonita; Guy S. Greene, Borrego Springs; Roswell L. Stahl, Jr., San Diego, and Charles Z. Street, La Mesa, all of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.**

**Filed Nov. 25, 1988, Ser. No. 275,912**
**Int. Cl.$^5$ B32B** *3/12*
**U.S. Cl. 428—593** **5 Claims**



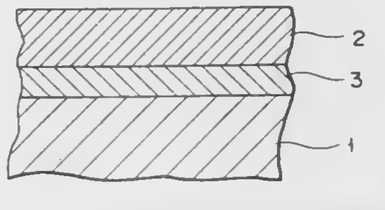
**1**. A ring insert for reinforcing honeycomb panel cores which comprises at least two corrugated foil strips having different corrugation periods, wound alternately in a ring shape with the surfaces of said strips and said corrugations lying substantially perpendicular to the ring axis and said strips bonded together to form a unitary ring structure.

---

### 5,013,614
## SURFACE TREATED STEEL PLATE FOR CANS

**Yoshihiko Yasue, and Hiroshi Kagechika, both of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan**

**Filed May 30, 1990, Ser. No. 530,604**
**Claims priority, application Japan, Jun. 13, 1989, 1-150194**
**Int. Cl.$^5$ B32B** *15/10, 15/00;* **B65D** *90/04*
**U.S. Cl. 428—651** **13 Claims**



**8**. A surface treated steel plate for cans, comprising:
a steel plate; and
a chromium or chromium alloy film formed in a thickness of 0.01 to 1.0 nm on at least that surface of the steel plate which faces the outside when the steel plate is drawn to have a cup shape; and
an Al-Sn alloy film formed in a thickness of 0.05 to 5.0 μin contact with the chromium or chromium alloy film.

---

### 5,013,615
## GLASS TO METAL SEAL

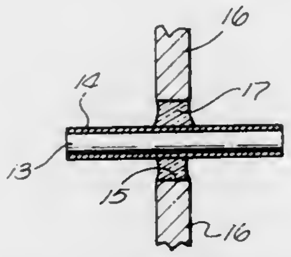
**Robert J. Sisolak, Huntington Beach, Calif., assignor to General Ceramics, Inc., Anaheim, Calif.**

**Filed Feb. 12, 1990, Ser. No. 479,535**
**Int. Cl.$^5$ H01J** *5/00;* **B32B** *15/00*
**U.S. Cl. 428—668** **10 Claims**

**1**. In a glass to metal seal for mounting an electrical conductor in a metal wall, the combination of:
a metal lead for serving as an electrical conductor;

VOL
1126
ISS
1
MY
7
1991
UMI

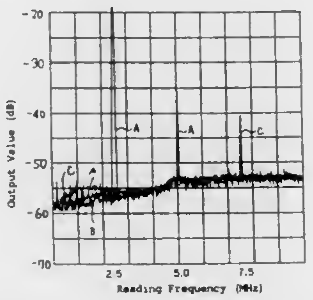
a layer of metallic iron on said metal lead to form an iron coated lead; and



a glass insulating sleeve, with said lead mounted in an opening in a metal wall with said glass insulating sleeve.

### 5,013,616
### MAGNETIC RECORDING MEDIUM OF THIN METAL FILM TYPE

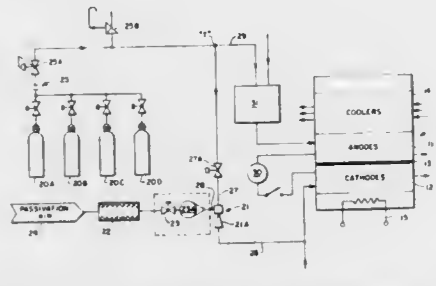
**Toshiaki Morichika; Toshio Tani; Nobuhiko Tanaka, and Tatsuhiko Kadowaki, all of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan**
**Continuation of Ser. No. 215,659, Jul. 6, 1988, abandoned. This application Sep. 12, 1990, Ser. No. 581,266**
**Claims priority, application Japan, Jul. 7, 1988, 62-170547**
**Int. Cl.$^5$ G11B** *23/00*
**U.S. Cl. 428—694** **1 Claim**



1. A magnetic recording medium comprising a substrate and a magnetic film on the substrate having the following ingredients present in the following ingredients present in the following atomic percentages Co: 63 to 75.2%, Cr: 3 to 10%, Ni: 17.6 to 27% and P: 2 to 5%.

### 5,013,617
### AIR EJECTOR SYSTEM FOR FUEL CELL PASSIVATION

**Glenn W. Scheffler, Tolland, Conn., assignor to International Fuel Cells Corporation, South Windsor, Conn.**
**Filed Dec. 29, 1989, Ser. No. 459,056**
**Int. Cl.$^5$ H01M** *8/04*
**U.S. Cl. 429—17** **13 Claims**



10. A method of controlling the cell potential in a fuel cell system, which fuel cell system includes
an anode section,
a cathode section having a maximum allowed voltage potential, and
an electrolyte providing electrochemical communication between said anode and said cathode sections,
comprising the following step(s):
(a) purging said cathode section with a gas mix having a dilute gas component and a majority gas component during at least some off-power conditions, causing the cathode potential to be limited to a voltage potential less than said maximum voltage limit; and
(b) ejecting said dilute gas component into a stream of said majority gas component upstream of the fuel cell using a small, limited area ejector to form said gas mix.

11. The method of claim 10, wherein there is included the step of:
using an oxygen ($O_2$) and nitrogen ($N_2$) gas mix, with oxygen being the dilute component and nitrogen being the majority component.

12. The method of claim 11, wherein there is included the step of:
using as the source of said gas mix an ejector bleeding in air as the oxygen source into a stream of high pressure nitrogen as the primary, majority gas component.

13. The method of claim 12, wherein there is included the step of:
using the ejector to meter high pressure nitrogen gas with a choked orifice or venturi and using the energy in the gas from the orifice or venture to suck ambient air into the nitrogen stream before entering the cathode section.

### 5,013,618
### TERNARY ALLOY FUEL CELL CATALYSTS AND PHOSPHORIC ACID FUEL CELL CONTAINING THE CATALYSTS

**Francis J. Luczak, Glastonbury, Conn., assignor to International Fuel Cells Corporation, South Windsor, Conn.**
**Filed Sep. 5, 1989, Ser. No. 402,328**
**Int. Cl.$^5$ H01M** *4/92;* **B01J** *21/06, 23/64, 23/89*
**U.S. Cl. 429—44** **6 Claims**

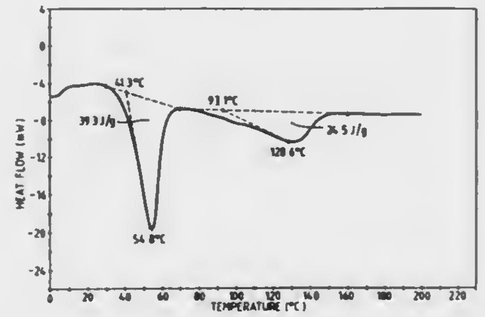
1. A high activity, high stability phosphoric acid fuel cell catalyst particularly adapted for the reduction of oxygen in phosphoric acid fuel cells consisting essentially of:
a ternary noble metal catalyst having the composition $Pt_i Ir_j X_k$ where X is selected from the group consisting essentially of Ti, Mn, Ni, Co, V, Cr, and Fe and i is between 40 and 80, j is between 20 and 50, and k is between 10 and 30.

4. A phosphoric acid fuel cell having an anode and a cathode with phosphoric acid disposed therebetween, said cathode comprising a platinum containing ternary alloy supported catalyst wherein the improvement consisting essentially of:
said platinum alloy having alloys having the composition $Pt_i$ $Ir_j$, $X_k$ where X is selected from the group consisting of Ti, Mn, Ni, Co, V, Cr, and Fe and $40 \leqq i \leqq 80$, $20 \leqq j \leqq 50$ and $10 \leqq k \leqq 30$.

### 5,013,619
### METHOD FOR MAKING A POLYMERIC ELECTROLYTE

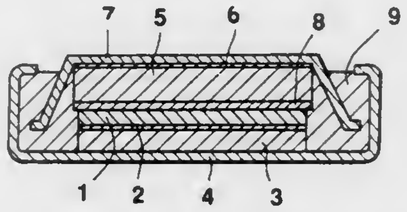
**John A. Cook, Oxfordshire; Geroge B. Park, Wiltshire; Robert H. McLoughlin, Wiltshire, and William J. Whitcher, Wiltshire, all of England, assignors to Scimat Limited, England**
**Division of Ser. No. 942,911, Dec. 17, 1986, Pat. No. 4,818,643, which is a continuation of Ser. No. 780,546, Sep. 26, 1985, abandoned, and a continuation-in-part of Ser. No. 618,104, Jun. 7, 1984, abandoned, and a continuation-in-part of Ser. No. 675,909, Nov. 28, 1984, abandoned. This application Nov. 21, 1988, Ser. No. 274,102**
**Claims priority, application United Kingdom, Dec. 15, 1983, 8333388; European Pat. Off., Dec. 13, 1984, 84308708**
**Int. Cl.$^5$ H01M** *6/18*
**U.S. Cl. 429—189** **10 Claims**

1. A method of making a polymeric electrolyte for use in an electrochemical device, comprising melt-blending a mixture of:
(a) an inorganic salt;
(b) an organic polymer that is capable of permitting sufficient transfer of dissociated ions of the salt that the blend can function as an electrolyte in the device in the substantial absence of liquid; and
(c) a plasticiser in an amount from about 5 to about 60% by weight based on the total weight of salt and polymer, the plasticiser having a dielectric constant of at least about 15:
and forming the blended mixture into a film.



### 5,013,620
### NONAQUEOUS ELECTROLYTE SECONDARY CELL

**Tadaaki Miyazaki, Higashiyamato; Takao Ogino, Tokorozawa; Yoshitomo Masuda, Tachikawa; Hiroaki Wada, Kawasaki, and Takahiro Kawagoe, Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**
**Filed Apr. 23, 1990, Ser. No. 512,446**
**Claims priority, application Japan, Apr. 26, 1989, 1-106823**
**Int. Cl.$^5$ H01M** *6/14*
**U.S. Cl. 429—194** **6 Claims**



1. In a nonaqueous electrolyte secondary cell comprising a positive electrode, a negative electrode of lithium or a lithium alloy, and a nonaqueous electrolytic solution containing lithium ions,
the improvement wherein said positive electrode includes an active material in the form of a solid solution which is obtained by incorporating a SI or Al component into a lithium-containing vanadium oxide of the formula: $Li_{1+x}V_3O_{8+y}$ wherein $0 \leqq x \leqq 0.6$ and $-0.5 \leqq y \leqq 0.3$.

### 5,013,621
### ONE-PART WHITE REFLECTIVE COATING

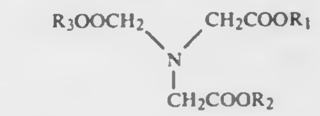
**John F. Kistner, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Apr. 23, 1990, Ser. No. 512,948**
**Int. Cl.$^5$ G03C** *1/76, 1/96, 7/14, 9/00*
**U.S. Cl. 430—11** **7 Claims**

1. An autostereographic print comprising a lenticular element having a lenticular front surface and a non-lenticular back surface, secured to said non-lenticular back surface one surface of a transparent optical element having at least two perspective images, and secured to the other surface of said optical element a backing layer comprising the dried and water repellant product of a composition comprising by weight:
0.1 to 50% of a white pigment,
0.1 to 20% of a water-insoluble synthetic polyacrylate polymeric binder, and
40 to 90% water.

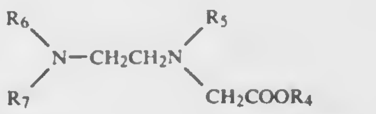
### 5,013,622
### SUPERSENSITIZATION OF SILVER HALIDE EMULSIONS

**Sharon M. Simpson, Lake Elmo, and John R. Boon, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Dec. 12, 1986, Ser. No. 941,287**
**Int. Cl.$^5$ G03C** *1/28*
**U.S. Cl. 430—550** **15 Claims**

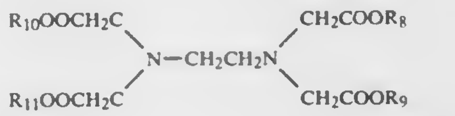
1. A chemically sensitized and spectrally sensitized silver halide emulsion having no latent image therein having an effective amount of a metal complexing agent wherein said complexing agent is an amine-type acetic compound, ester compounds thereof, or alkali metal salt thereof wherein said amine-type acetic acid compounds are present in a range between 2 and 35% by weight of silver in said emulsion and are represented by any of the formulae:



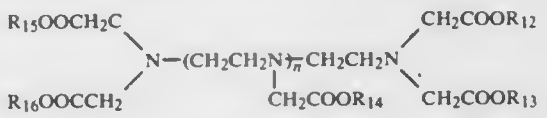
$$(R_3OOCH_2)(CH_2COOR_1)N{-}CH_2COOR_2 \qquad I$$



$$(R_6)(R_7)N{-}CH_2CH_2N(R_5)(CH_2COOR_4) \qquad II$$



$$(R_{10}OOCH_2C)(R_{11}OOCH_2C)N{-}CH_2CH_2N(CH_2COOR_8)(CH_2COOR_9) \qquad III$$



$$(R_{15}OOCH_2C)(R_{16}OOCCH_2)N{-}(\underset{\underset{CH_2COOR_{14}}{|}}{CH_2CH_2N})_n{-}CH_2CH_2N(CH_2COOR_{12})(CH_2COOR_{13}) \qquad IV$$

wherein $R_1$ through $R_4$, $R_8$ through $R_{16}$, which can be the same or different, each represents a hydrogen atom, an alkali metal atom, aryl group, or an alkyl group, and $R_5$–$R_7$, which can be the same or different, each represents a hydrogen atom, an alkyl group or an acetic acid group as shown below

$$-CH_2COOR_1$$

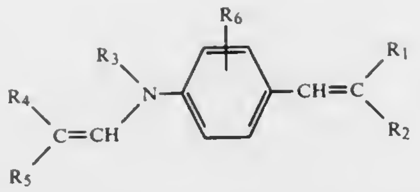
wherein $R_1$ is defined above, and n represents an integer of 1 or greater.

### 5,013,623
### ELECTROPHOTOGRAPHIC PHOTORECEPTOR WITH STILBENE COMPOUND

**Akira Itoh; Kozo Haino; Makoto Okaji; Kazuhiro Emoto, and Tatsuya Kodera, all of Tsukuba, Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan**
**Filed Jan. 3, 1990, Ser. No. 462,540**
**Claims priority, application Japan, Jan. 10, 1989, 1-3967; Jan. 18, 1989, 1-10329**
**Int. Cl.$^5$ G03G** *5/06, 5/047*
**U.S. Cl. 430—59** **9 Claims**

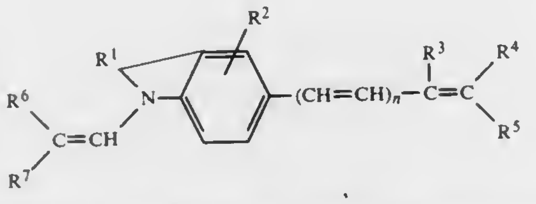
1. An electrophotographic photoreceptor which comprises an electroconductive support and, provided thereon, a photosensitive layer which contains a stilbene compound represented by the following formula [I], [II], or [III]:

VOL
1126
ISS
1
MY
7
1991
UMI



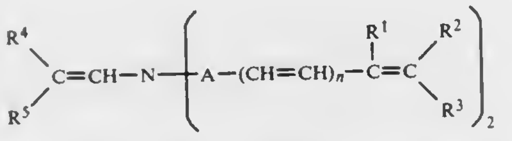
[I]

wherein $R_1$ and $R_2$ which may be identical or different each is a hydrogen atom or an alkyl, aryl, or styryl group which may have substituent and at least one of them is an aryl or styryl group which may have substituent; $R_3$ is an alkyl, aralkyl or aryl group which may have substituent; $R_4$ and $R_5$ which may be identical or different each is a hydrogen atom, or an alkyl, benzyl or phenyl group which may have substituent, and $R_6$ is a hydrogen atom, or an alkyl or alkoxy group which may have substituent, or a halogen atom;



[II]

wherein $R^1$ is an atom group necessary to form a ring together with nitrogen atom; $R^2$ is a hydrogen atom, or an alkyl or alkoxy group which may have substituent; $R^3$ is a hydrogen atom, or an alkyl or aryl group which may have substituent; $R^4$ is an aryl group which may have substituent; $R^5$ is a hydrogen atom, or an alkyl, aralkyl or aryl group which may have substituent; $R^6$ and $R^7$ which may be identical of different each is a hydrogen atom, or an alkyl, aralkyl or aryl group which may have substituent and $R^6$ and $R^7$ may form a ring; and n is 0 or 1; or



[III]

$$\begin{matrix} R^4 \\ \phantom{x} \end{matrix}\!\!\!\!\!> C{=}CH{-}N{-}\left(A{-}(CH{=}CH)_n{-}\overset{R^1}{\overset{|}{C}}{=}C\!<\!\begin{matrix} R^2 \\ R^3 \end{matrix}\right)_2 \quad (R^5 \text{ on } C)$$

wherein A is an aromatic ring and the two A may link through a bond, an atom or an atom group to form a heterocyclic ring together with nitrogen atom; $R^1$ is a hydrogen atom, or an alkyl or aryl group which may have substituent; $R^2$ is an aryl group which may have substituent; $R^3$ is an alkyl, aralkyl or aryl group which may have substituent; $R^4$ and $R^5$ which may be identical or different each is a hydrogen atom, or an alkyl, aralkyl or aryl group which may have substituent and $R^4$ and $R^5$ may form a ring; and n is 0 or 1.

**4**. An electrophotographic photoreceptor according to claim **1**, wherein the photosensitive layer comprises a carrier generation layer and a carrier transport layer which contains the stilbene compound.

---

5,013,624

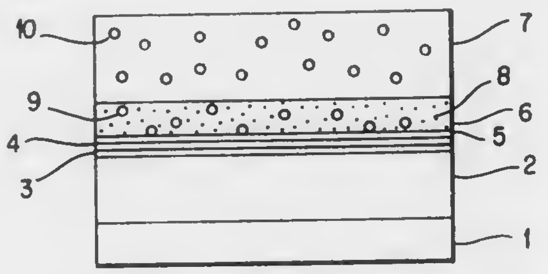
### GLASSY METAL OXIDE LAYERS FOR PHOTORECEPTOR APPLICATIONS

**Robert C.U. Yu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 15, 1989, Ser. No. 451,006**

**Int. Cl.$^5$ G03G** *15/00. 15/04*

**U.S. Cl. 430—60** **20 Claims**



**1**. An electrophotographic imaging member comprising a hole blocking layer, said hole blocking layer comprising a glassy network of metal oxide.

---

5,013,625

### PHOTORECEPTOR

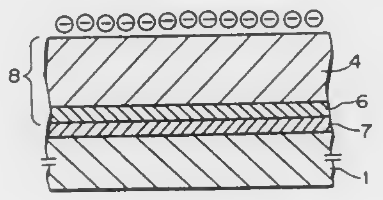
**Yoshio Takizawa; Kunio Sigeta; Shigeki Takeuchi; Hiroshi Yoshioka, and Yoshihide Fujimaki, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan**

**Filed Feb. 12, 1990, Ser. No. 478,569**

**Claims priority, application Japan, Feb. 13, 1989, 1-34240**

**Int. Cl.$^5$ G03G** *15/04*

**U.S. Cl. 430—64** **5 Claims**



**1**. A photoreceptor having an electro-conductive support, a subbing layer and a light-sensitive layer provided thereon, wherein said subbing layer is arranged between said support and said light-sensitive layer and said subbing layer is formed of a copolymer comprising ethylene, vinyl acetate and an unsaturated carboxylic acid or vinyl alcohol.

---

5,013,626

### CARRIER OF A MAGNETIC POWDER DISPERSED TYPE

**Yasuo Matsumura; Takayoshi Aoki; Ikutaroh Nagatsuka, and Masao Mochizuki, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 252,330, Oct. 3, 1988, abandoned. This application May 21, 1990, Ser. No. 525,230**

**Claims priority, application Japan, Oct. 6, 1987, 62-250639**

**Int. Cl.$^5$ G03G** *9/107*

**U.S. Cl. 430—106.6** **6 Claims**

**1**. A magnetic powder-dispersed carrier, comprising:

a binder resin; and

magnetic particles dispersed within said binder resin, said magnetic particles having a BET surface area not more than about 3.3 $m^2/g$ and an oil absorbing capacity of not more than about 22 ml/100 g.

5,013,627

### ELECTROPHOTOGRAPHIC TONERS WITH CATIONIC CHARGE INCREASING ADDITIVE

**Horst Harnisch, Much, and Roderich Raue, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Aug. 7, 1989, Ser. No. 390,557**

**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828193**

**Int. Cl.$^5$ G03G** *9/097*

**U.S. Cl. 430—110** **8 Claims**

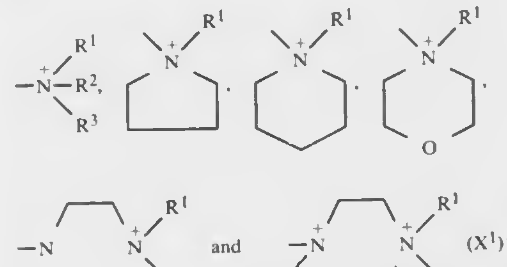
**1**. Electrophotographic toners containing resin and pigment particles and an additive which increases the cationic charge as has the general formula

$$(X^1)^- \; K^{+1}-Y^1-A-Y^2-K^{+2}\,(X^2)$$

wherein

$(X^1)$ and $(X^2)^-$ independently of one another are each an anion,

$K^{+1}$ and $K^{+2}$ independently of one another are each selected from the group comprising



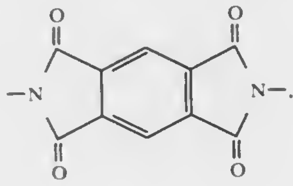
$R^1$ is selected from the group comprising $C_1$–$C_{22}$-alkyl, benzyl, phenyl, cyclohexyl and allyl,

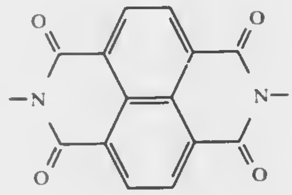
$R^2$ is selected from the group comprising hydrogen and $C_1$–$C_4$-alkyl,

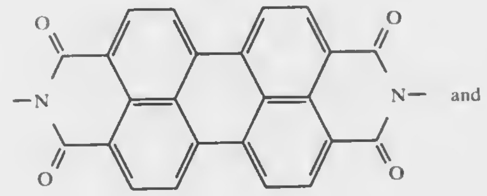
$R^3$ is $C_1$–$C_4$-alkyl and

$Y^1$ and $Y^2$ independently of one another are each $C_2$–$C_5$-alkylene or $\_C_6H_4{-}CH_2{-}$ (—m or —p), the bond marked with * being attached to A, and

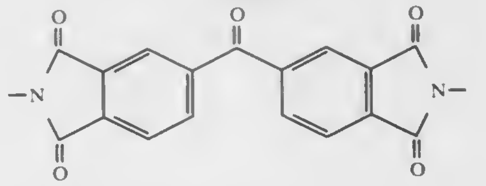
A is selected from the group comprising tetracarboxylic acid diimides of the formulae



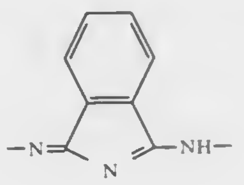




-continued



or a 3-amino-1-iminoisoindolenine of the formula



---

5,013,628

### PARTICULATE TONER MATERIAL WITH CHARGE CONTROL AGENT

**Piet Kok, Ghent; Luc J. Vanmaele, Lochristi; Serge M. Tavernier, Lint, and Hedwig E. De Deyne, Rumst, all of Belgium, assignors to AGFA-Gevaert, N.V., Mortsel, Belgium**

**Filed Feb. 5, 1990, Ser. No. 475,202**

**Claims priority, application European Pat. Off., Feb. 8, 1989, 89200290.8**

**Int. Cl.$^5$ G03G** *9/097*

**U.S. Cl. 430—110** **11 Claims**

**1**. Particulate toner material for use in the development of latent electrostatic images, wherein said particulate toner material is capable of acquiring by triboelectric contact electrification when in admixture with carrier particles a net positive charge and contains at least one thermoplastic resin as binder in combination with a colorant and a colourless compound capable of imparting a positive charge to the particulate toner material when in frictional contact with said carrier particles, wherein said colourless compound contains in its molecular structure at least one polyalkyl substituted piperidine group and a sterically hindered phenol group.

---

5,013,629

### COLOR IMAGE RECORDING MATERIAL

**Mikiya Sekine, Warabi, and Shigetoshi Hiraishi, Tokyo, both of Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan**

**Filed Jul. 26, 1989, Ser. No. 385,498**

**Claims priority, application Japan, May 9, 1989, 1-115600**

**Int. Cl.$^5$ G03C** *1/72*

**U.S. Cl. 430—138** **8 Claims**

**1**. A color image recording material which comprises a transparent or translucent support and, provided thereon, a photosensitive layer comprising three kinds of photo-curable microcapsules which contain any one of yellow, magenta or cyan dye or pigment and a photosensitive resin and which are sensitive to respectively different wavelengths and a whitening layer and an image receiving layer provided on the photosensitive layer in succession.

VOL 1126
ISS 1
MY 7
1991
UMI

### 5,013,630
### ENCAPSULATED TONER COMPOSITIONS

**Beng S. Ong, Mississauga; Grazyna Kmiecik-Lawrynowicz, Burlington; Fernando Yulo, Mississauga, and Kayong Koch, Scarborough, all of Canada, assignors to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 18, 1989, Ser. No. 395,677**
**Int. Cl.$^5$ G03C** *1/72;* **G03G** *9/00*
**U.S. Cl. 430—138** **42 Claims**

1. An encapsulated toner composition comprised of a core comprised of pigments or dyes and a polysiloxane incorporated core binder resin, which core is encapsulated in a shell and wherein the polysiloxane-incorporated core binder resin is comprised of a copolymer derived from functionalized polysiloxanes capable of undergoing addition polymerization, and a monomer; and wherein the shell is selected from the group consisting of polyurea, polyamide, polyester, polyurethane and mixtures thereof.

---

### 5,013,631
### ULTRAVIOLET CURABLE CONFORMAL COATINGS

**Wei-Fang A. Su, Murrysville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 3, 1989, Ser. No. 318,578**
**Int. Cl.$^5$ G03C** *1/76;* **G03F** *7/31*
**U.S. Cl. 430—271** **41 Claims**

1. An ultraviolet radiation curable conformal coating composition comprising the mixture:

Component (A) which comprises a mixture of (1) about 40% to 80% by weight, of a urethane having a free isocyanate group; (2) about 20% to 60% by weight of reactive acrylate diluents; (3) from 0% to about 10% by weight, of UV photoinitiators; (4) from 0% to 10%, by weight, of additives selected from adhesion promoters, pigments, dyes, flow control agents and their mixtures; and

Component (B) which comprises a mixture of (1) about 5% to 80% by weight, of an acrylate-epoxy resin which comprises an unsaturated epoxy oligomer having a molecular weight of from 2000 to 5000, where the epoxy in said oligomer is a bisphenol epoxy; (2) about 1% to 10% by weight, of an acrylate-urethane oligomer; (3) about 10% to 94% by weight of reactive acrylate monomers including acrylate monomer having a hydroxy functional group; (4) from 0% to 10%, by weight, of UV photoinitiators; and (5) from 0% to 10%, by weight, of additives selected from adhesion promoters, pigments, dyes, flow control agents and their mixtures; with the proviso that photoinitiator be present in one or both components and that the total percentage weight, based on total composition weight, of said UV photoinitiators plus additives not be less than 1 percent and not exceed about 10 percent.

28. A composition according to claim **1** in the form of a thin coating on a substrate.

29. A composition according to claim **28** wherein said substrate is a printed wiring board.

---

### 5,013,632
### PHOTOPOLYMER FILM FOR HOLOGRAPHY

**Andrew M. Weber, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Sep. 29, 1989, Ser. No. 414,419**
**Int. Cl.$^5$ G03F** *7/027, 7/033*
**U.S. Cl. 430—281** **4 Claims**

1. A photopolymer film for refractive index imaging consisting essentially of:

(a) approximately 25 to 90% of a polyvinyl acetate binder;
(b) acrylic anhydride in an amount effective to increase film speed;
(c) approximately 5 to 60% of an ethylenically unsaturated monomer;
(d) approximately 0 to 25% of a plasticizer; and
(e) approximately 0.1 to 10% of a photoinitiator;

wherein said percentages are weight percentages based on total film weight.

---

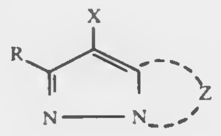
### 5,013,633
### METHOD FOR DEVELOPING A SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL FOR COLOR PROOF USING A SPECIFIED COLOR DEVELOPING AGENT

**Tomomi Yoshizawa; Keiji Ogi, and Nariko Kimura, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan**

**Filed Jun. 30, 1989, Ser. No. 374,469**
**Claims priority, application Japan, Jul. 4, 1988, 63-167073**
**Int. Cl.$^5$ G03C** *7/00, 5/24, 7/32*
**U.S. Cl. 430—358** **14 Claims**

1. A method of preparing a color proof from a silver halide color photographic light-sensitive material having a support and provided thereon, photographic component layers including silver halide emulsion layers each having different spectral sensitivities, and a black-and-white halftone dot image prepared by separating a color from an original, comprising steps of:

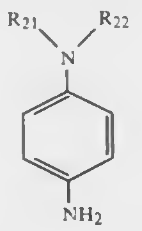
exposing said light-sensitive material through said halftone dot image, wherein one of said silver halide emulsion layers comprises a magenta coupler represented by Formula M-I;



Formula M-I

wherein Z represents a group of non-metal atoms necessary to form a nitrogen-containing heterocyclic ring including a substituted one; X represents one selected from the group consisting of a hydrogen atom and a group capable of splitting off upon a reaction with an oxidized product of a developing agent; and R represents one selected from the group consisting of a hydrogen atom and a substituent,

developing said exposed light-sensitive material in a developing solution containing a developing agent represented by Formula III in a ratio of not less than 55 mol% to total developing agents, to form at least a magenta image comprising $\lambda_{LO.2}$ of a spectral absorption in a wavelength region of 600 to 630 nm;



Formula III

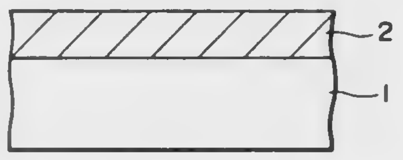
wherein $R_{21}$ and $R_{22}$ represent independently an alkyl group, provided that $R_{21}$ and $R_{22}$ may be same or different and combine with each other to form a ring.

---

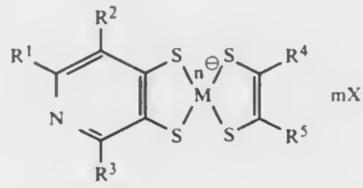
### 5,013,634
### OPTICAL INFORMATION RECORDING MEDIUM AND NICKEL COMPLEX COMPOUNDS EMPLOYED IN THE SAME

**Kazukiyo Nagai, Numazu, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Oct. 11, 1989, Ser. No. 420,020**
**Claims priority, application Japan, Oct. 12, 1988, 63-258170; Nov. 16, 1988, 63-289353**
**Int. Cl.$^5$ G03C** *1/00, 1/492;* **G01D** *9/00;* **B32B** *13/02*
**U.S. Cl. 430—495** **15 Claims**



1. An optical information recording medium comprising a substrate and an organic recording layer formed thereon comprising a polymethine dye and a dithiolate metal complex compound having formula (I):



(I)

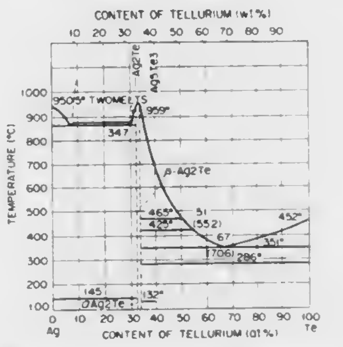
wherein $R^1$, $R^2$ and $R^3$ each independently represent hydrogen, a halogen, an alkyl group having 1 to 6 carbon atoms, or a perfluoroalkyl group having 1 to 6 carbon atoms; $R^4$ and $R^5$ each independently represent hydrogen, an alkyl group having 1 to 6 carbon atoms, an aryl group or a cyano group, which may form a heterocyclic ring; X represents a cation; M represents a transition metal; n is an integer of 0 to 2, which represents the valence number of the transition metal; and m represents the number of cations, which is an integer of 0 to 2, corresponding to the valence number of the transition metal.

---

### 5,013,635
### INFORMATION STORAGE MEDIUM

**Hideki Ohkawa, Tokyo; Norio Ozawa, Kawasaki; Hiroyuki Higashino, and Motonari Matsubara, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 29, 1989, Ser. No. 442,713**
**Claims priority, application Japan, Nov. 29, 1988, 63-299456; Dec. 23, 1988, 63-324930; Dec. 27, 1988, 63-327568**
**Int. Cl.$^5$ G03C** *1/00*
**U.S. Cl. 430—495** **18 Claims**



1. An information storage medium comprising:
a substrate; and
a recording layer provided on said substrate and including an organic discharge polymer film containing a Te eutectic alloy having a crystallization temperature of not less than 50° C., carbon, and hydrogen.

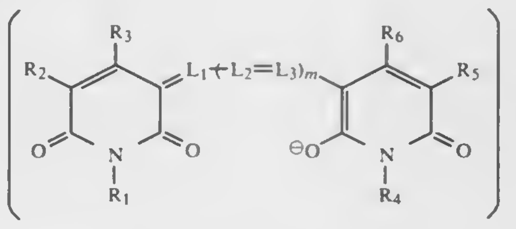
---

### 5,013,636
### SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

**Shigeru Ohno; Yoshihiro Jimbo; Keiichi Adachi, and Shigeru Kuwashima, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 10, 1989, Ser. No. 321,829**
**Claims priority, application Japan, Mar. 10, 1988, 63-57302**
**The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.**
**Int. Cl.$^5$ G03C** *1/40, 7/38*
**U.S. Cl. 430—522** **5 Claims**

1. A silver halide color photographic material comprising a support having in a layer thereon at least a dye represented by general formula (I)



(I)

wherein

$R_1$ and $R_4$, which may be the same or different, each represents a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, $—NR_7R_8$, $—NR_7CONR_7R_8$, $—NR_8COR_9$ or $—NR_8SO_2R_9$;

$R_2$ and $R_5$, which may be the same or different, each represents a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a cyano group, a sulfonic acid group, $—NR_7R_8$, $—NR_8COR_9$, $—NR_8SO_2R_9$, $—NR_7CONR_7R_8$, $—COOR_7$, $—CONR_7R_8$, $—COR_9$, $—SO_2R_9$ or $—SO_2NR_7R_8$;

$R_3$ and $R_6$, which may be the same or different, each represents a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, $—OR_7$, $—COOR_7$, $—COR_9$, $—CONR_7R_8$, $—NR_7R_8$, $—NR_8COR_9$ or $—NR_8SO_2R_9$, $—NR_7CONR_7R_8$, $—SO_2R_9$, $SO_2NR_7R_8$, $—OR_7$ or cyano group, where $R_7$ and $R_8$, which may be the same or different, each represents a hydrogen atom, an aliphatic group or an aromatic group;

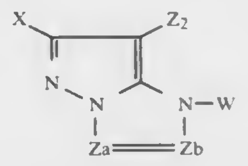
$R_9$ represents an aliphatic group or an aromatic group; and

$R_7$ and $R_8$ or $R_8$ and $R_9$ may combine to form a 5or 6-membered ring;

$L_1$, $L_2$ and $L_3$ each represents a methine group, m represents 0, 1 or 2; and

$M^{\oplus}$ represents a cation of valency n where n represents 1, 2 or 3;

and least a coupler represented by general formula (II)



(II)

wherein X represents a hydrogen atom or a substituent group; $Z_2$ represents a hydrogen atom or coupling leaving group; W represents a hydrogen atom, an acyl group, an aliphatic sulfonyl group or an aromatic sulfonyl group; and Za and Zb represent methine, substituted methine or —N=; and dimers or

VOL
1126
ISS
1
MY
7
1991
UMI

higher oligomers involving X, $Z_2$ or Za, or Zb as substituted methine.

---

### 5,013,637
### SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

**Kazuya Tsukada, Hino, Japan, assignor to Konica Corporation, Tokyo, Japan**

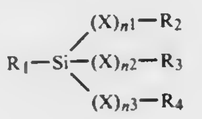
**Filed Oct. 11, 1990, Ser. No. 596,776**

**Claims priority, application Japan, Oct. 18, 1989, 1-270813**

**Int. Cl.$^5$ G03C** *1/85*

**U.S. Cl. 430—527** **14 Claims**

1. A silver halide photographic light-sensitive material comprising a support, a silver halide emulsion layer and an antistatic layer comprising a water-soluble conductive polymer, a hydrophobic polymer particle and a silane coupling agent represented by the following Formula I:



$$R_1-\mathrm{Si}\begin{array}{l}\diagup(X)_{n1}-R_2\\-(X)_{n2}-R_3\\\diagdown(X)_{n3}-R_4\end{array}\qquad(1)$$

wherein X is an oxygen atom or a —OCO— group; $R_1$, $R_2$, $R_3$ and $R_4$ are each an alkyl group or an aryl group which may be the same or different and are allowed to be substitued, and at least one of those groups represented by $R_1$, $R_2$, $R_3$ and $R_4$ is a group containing a double bond, a halogen atom, an epoxy group, an acid anhydride residue, an alkoxy group, an alkoxycarbonyl group, an amino group, an acryloyl group, a methacryloyl group, an acrylamido group, a methacrylamido group or a haloacylamino group; $n^1$, $n^2$ and $n^3$ are each 0 or 1, which may be the same or different, provided that the total of $n^1$, $n^2$ and $n^3$ is 1 or more.

---

### 5,013,638
### PHOTOGRAPHIC SILVER HALIDE ELEMENT CONTAINING SMALL AMOUNTS OF BROMIDE IONS

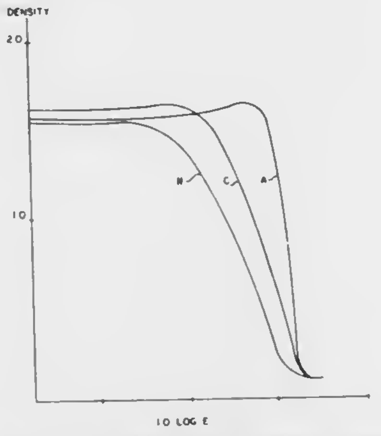
**Anthony M. Barnett, Bushey, and David A. Hallbery, Wembley, both of Great Britain, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 10, 1989, Ser. No. 418,593**

**Claims priority, application United Kingdom, Oct. 18, 1988, 8824364**

**Int. Cl.$^5$ G03C** *1/76*

**U.S. Cl. 430—539** **8 Claims**



1. A photographic element that is useful as a donor element in forming continuous tone images by a silver salt diffusion transfer process, said photographic element comprising:

(1) a support,

(2) a photosensitive silver halide emulsion layer comprising silver halide grains, said grains being at least 95% silver chloride, said emulsion layer containing from 0.002 to 0.05 mole of bromide ions per mole of silver halide; and

(3) a hydrophilic colloid layer overlying said emulsion layer which serves to retard access of a processing solutions to said emulsion layer, said hydrophilic colloid layer having a dry weight of from 1 to 10 grams per square meter;

said element including a development inhibitor in or adjacent to said emulsion layer in an amount of from 0.25 to 1.8 grams per mole of silver halide.

---

### 5,013,639
### INCORPORATION OF HYDROPHOBIC PHOTOGRAPHIC ADDITIVES INTO HYDROPHILIC COLLOID COMPOSITIONS

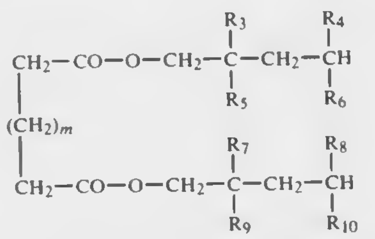
**Ivano Delprato, and Agostino Baldassarri, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation-in-part of Ser. No. 316,026, Feb. 27, 1989, abandoned. This application Apr. 12, 1990, Ser. No. 508,643**

**Int. Cl.$^5$ G03C** *1/005*

**U.S. Cl. 430—546** **18 Claims**

1. A light-sensitive silver halide photographic material comprising a support and a hydrophilic colloid layer coated thereon, said hydrophilic colloid layer containing droplets consisting essentially of hydrophobic photographic additives dispersed in fine droplets of one or more water-immiscible high boiling organic solvents, wherein at least one of said solvents is an aliphatic diester of an alkylenedicarboxylic acid compound corresponding to the general structural formula



$$\begin{array}{l}\mathrm{CH_2-CO-O-CH_2-}\underset{R_5}{\overset{R_3}{\mathrm{C}}}\mathrm{-CH_2-}\underset{R_6}{\overset{R_4}{\mathrm{CH}}}\\ |\\ (\mathrm{CH_2})_m\\ |\\ \mathrm{CH_2-CO-O-CH_2-}\underset{R_9}{\overset{R_7}{\mathrm{C}}}\mathrm{-CH_2-}\underset{R_{10}}{\overset{R_8}{\mathrm{CH}}}\end{array}$$

wherein $R_3$, $R_4$, $R_5$, $R_6$, $R_7$, $R_8$, $R_9$, and $R_{10}$, equal or different, each represents a hydrogen atom or a lower alkyl group, with the proviso that at least one of $R_3$, $R_5$, $R_7$ and $R_9$, is an alkyl group or at least one pair of $R_4$ and $R_6$ or $R_8$ and $R_{10}$ are both alkyl groups and the total number of carbon atoms in $R_3$, $R_4$, $R_5$ and $R_6$ and the total number of carbon atoms in $R_7$, $R_8$, $R_9$ and $R_{10}$ is, each, less than 12, and m is 0 to 10.

---

### 5,013,640
### PREPARATION OF LOW VISCOSITY SMALL-PARTICLE PHOTOGRAPHIC DISPERSIONS IN GELATIN

**Pranab Bagchi, Webster; Gary J. McSweeney, Hilton, and Steven J. Sargeant, Honeoye Falls, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 15, 1989, Ser. No. 366,397**

**Int. Cl.$^5$ G03C** *7/26, 7/32*

**U.S. Cl. 430—546** **28 Claims**

1. A melt consisting essentially of about 5 percent by weight gelatin, about 8 percent by weight coupler, and about 2 percent by weight surfactants, with the proviso that said coupler has a particle size below about 100 nm and said at least two surfactants selected from

A. an amphiphilic surfactant selected from the group consisting of a 6 to 22 carbon atom hydrophobic tail with one or more attached hydrophilic chains comprising at least 8 oxyethylene and/or glycedyl ether groups that may or may not be terminated with a negative charge such as a sulfate group,

and B. a block oligomeric surfactant selected from the group consisting of hydrophobic polyoxypropylene blocks (A) and hydrophilic polyoxyethylene blocks (B) joined in the manner of A-B-A, B-A-B, A-B, $(A\text{-}B)_n{\equiv}G{\equiv}(B\text{-}A)_n$, or $(B\text{-}A)_n{\equiv}G{\equiv}(A\text{-}B)_n$, where G is a connective organic moiety and n is between 1 and 3, and

C. a sugar surfactant selected from the group consisting of between one and three 6 to 22 carbon atom hydrophobic tail with one or more attached hydrophilic mono or oligosaccharidic hydrophilic chains that may or may not be terminated by a negatively charged group such as a sulfate group, to obtain sufficient low viscosity for coating.

---

### 5,013,641
### FORMATION OF TABULAR SILVER HALIDE EMULSIONS UTILIZING HIGH PH DIGESTION

**James R. Buntaine, and Robert V. Brady, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 19, 1989, Ser. No. 452,487**

**Int. Cl.$^5$ G03C** *1/005*

**U.S. Cl. 430—569** **22 Claims**

1. A method of forming silver halide emulsions comprising combining silver nitrate and sodium bromide in a gelatin solution so as to nucleate silver bromide particles, adding sodium hydroxide to adjust the pH to greater than about 9, allowing digestion of the nucleated particles, adjusting the pH to below 7 by acid addition, and adding silver nitrate and sodium halide to grow the nucleated particles.

---

### 5,013,642
### PHOTOGRAPHIC ELEMENT

**Annabel Muenter; Anthony Adin, both of Rochester; Richard L. Parton, Webster, all of N.Y.; Nicholas A. Pightling, Ruislip Manor, and David Beaumond, Chalfont St. Giles, both of United Kingdom, assignors to Eastman Kodak Company, Rochester, N.Y.**

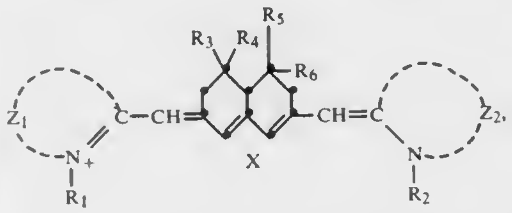
**Filed Nov. 15, 1989, Ser. No. 437,004**

**Int. Cl.$^5$ G03C** *1/02*

**U.S. Cl. 430—574** **10 Claims**

1. A photographic element comprising a support having thereon a silver halide emulsion layer spectrally sensitized with

(a) a first sensitizing dye according to the formula:



wherein

$Z_1$ and $Z_2$ each independently represents the atoms necessary to complete a substituted or unsubstituted 5- or 6-membered heterocyclic nucleus,

$R_1$ and $R_2$ each independently represents substituted or unsubstituted alkyl or substituted or unsubstituted aryl,

$R_3$, $R_4$, $R_5$, and $R_6$ each independently represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted aryl, and

X represents a counterion as needed to balance the charge of the molecule, and

(b) a second sensitizing.dye having a maximum sensitivity at a wavelength of about 5 to 100 nm less than the wavelength of maximum sensitivity of the first sensitizing dye.

---

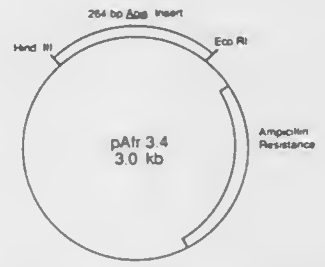
### 5,013,644
### IDENTIFICATION OF AFRICANIZED HONEY BEES

**David W. Severson, Mazomanie, and Judd M. Aiken, Black Earth, both of Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Dec. 7, 1987, Ser. No. 129,153**

**Int. Cl.$^5$ C12Q** *1/68;* **G01N** *33/566;* **C07H** *19/06, 15/12*

**U.S. Cl. 435—6** **23 Claims**



1. A method of identifying Africanized bees comprising the steps of:

(a) obtaining samples of honey bees;

(b) isolating the DNA for the sample bees;

(c) digesting the DNA from the sample bees with restriction enzyme Hae III to cut the DNA in a distinctive pattern of fragments;

(d) separating the fragments from each other;

(e) exposing the fragments to a DNA probe of at least 15 nucleotides having sufficient sequence homology to at least a portion of the 264 base pair Apis DNA insert in pAfr3.4, ATCC Accession No. 40383, to allow the probe to hybridize to repeating sequences present on the DNA fragments forming hybrid DNA complexes, and

(f) detecting among the hybrid DNA complexes an approximately 2.1 kilobase fragment as an indication of the presence in the samples of a DNA sequence characteristic of Africanized bees.

---

### 5,013,645
### IMMUNOLOGICAL METHODS AND MATERIALS FOR DETECTION OF TUMOR ASSOCIATED ANTIGENS

**Yung D. Kim, Libertyville, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Continuation-in-part of Ser. No. 38,129, Apr. 14, 1987, abandoned. This application Mar. 23, 1988, Ser. No. 166,059**

**Int. Cl.$^5$ G01N** *33/53, 33/543;* **C07K** *15/14;* **C12N** *15/00*

**U.S. Cl. 435—7.92** **15 Claims**

1. In a method for determining the presence or a prostate of breast cancer disease state in a human patient wherein a patient body fluid sample is subjected to analysis for detection of a tumor-associated antigen, wherein the improvement comprises analyzing said fluid sample for the presence of the tumor-associated antigen, specifically immunoreactive with the monoclonal antibody produced by murine derived hybridoma cell line ATCC HB 9390 and having a molecular weight of about 420,000 to about 520,000 daltons under non-reducing conditions, and thereby determining the presence of a prostate or breast cancer disease state.

VOL
1126
ISS
1
MY
7
1991
UMI

**5,013,646**

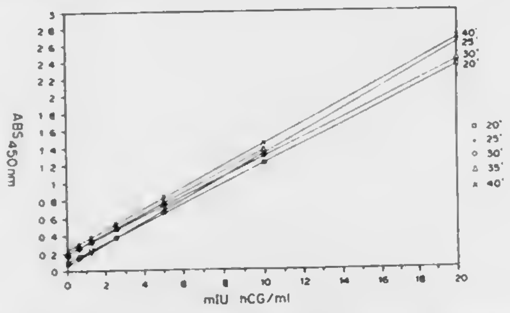
### TMB FORMULATION FOR SOLUBLE AND PRECIPITABLE HRP-ELISA

**James E. Woiszwillo, Milford, Mass., assignor to Transgenic Sciences, Inc., Worcester, Mass.**

**Continuation-in-part of Ser. No. 431,485, Nov. 3, 1989. This application Jan. 26, 1990, Ser. No. 470,678**

**Int. Cl.$^5$ C12Q *1/00;* G01N *33/53***

U.S. Cl. 435—7.92 24 Claims



1. A reagent for use in an ELISA comprising an aqueous buffer containing between 0.1% and 10% by weight povidone in combination with a chromogen.

---

**5,013,647**

### REMOVAL OF INTERFERING REDUCING SUBSTANCES WITH TETRAZOLIUM SALTS IN REDOX MEASUREMENT REACTIONS

**Michael-Harold Town, Oberhausen; Joachim Siedel, Bernried, and Joachim Ziegenhorn, Starnberg, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Apr. 3, 1987, Ser. No. 35,617**

**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611227**

**Int. Cl.$^5$ C12Q *1/26, 1/28, 1/32***

U.S. Cl. 435—25 37 Claims

1. Process for determining an enzyme substrate or enzyme activity comprising adding to a sample containing said substrate or said enzyme a redox color indicator system which undergoes a photometrically detectable redox reaction to produce a material which can be photometrically measured by its light absorption in the presence of said enzyme or substrate and measuring said redox reaction by measuring light absorption at a measurement wavelength to determine said substrate or enzyme activity, said redox reaction being carried out in the presence of at least one tetrazolium salt which forms a formazane by reaction with reducing substances in the sample which would disturb said measurement of the redox reaction, wherein said formazane does not absorb light at all or absorbs light only to a negligible extent that does not interfere with said measuring of the redox reaction at a measurement wavelength.

---

**5,013,648**

### ENZYMATIC DETECTION OF MONOVALENT ANIONS

**John Pasqua, West Deptford, and Wai T. Law, Sewell, both of N.J., assignors to EM Diagnostic Systems, Inc., Gibbstown, N.J.**

**Filed Sep. 9, 1988, Ser. No. 242,676**

**Int. Cl.$^5$ C12Q *1/26, 1/00***

U.S. Cl. 435—25 21 Claims

1. A method for the detection of chloride ions in a sample comprising the steps of:

mixing a sample suspected to contain chloride with a reagent comprising
- (a) an enzyme which is competitively inhibited by chloride,
- (b) a substrate or pseudosubstrate for the enzyme, and optionally
- (c) at least one cofactor for the enzyme; measuring an optical property of the resultant reaction mixture;

measuring said optical property again at a later time; and determining from the measurements the concentration of chloride in the sample.

---

**5,013,649**

### DNA SEQUENCES ENCODING OSTEOINDUCTIVE PRODUCTS

**Elizabeth A. Wang, Carlisle; John M. Wozney, Hudson, and Vicki Rosen, Brookline, all of Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.**

**Continuation-in-part of Ser. No. 28,285, Mar. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 943,332, Dec. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 880,776, Jul. 1, 1986, abandoned. This application Apr. 8, 1988, Ser. No. 179,100**

**Int. Cl.$^5$ C12P *21/06, 19/34;* C12N *15/00, 7/00, 5/00, 1/22, 1/16, 1/00;* C07H *15/12;* C07K *13/00***

U.S. Cl. 435—69.1 7 Claims

1. An isolated DNA sequence encoding an osteoinductive protein said DNA sequence comprising a coding sequence selected from the group consisting of
- (a) nucleotide #1 through nucleotide #387 of figure I,
- (b) nucleotide #356 through nucleotide #1543 of figure II,
- (c) Nucleotide #402 through nucleotide #1626 of figure III,
- (d) naturally occurring allelic sequences and equivalent degenerative codon sequences of (a), (b), and (c); and
- (e) sequences which
  - (1) hybridize to any of sequences (a), (b), (c), or (d) under stringent hybridization conditions; and
  - (2) encode a protein characterized by the ability to induce the formation of bone and/or cartilage.

---

**5,013,650**

### INCREASED FERMENTATION YIELD OF EXPRESSED PROTEIN

**Christine E. Carty, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 762,000, Aug. 2, 1985, abandoned. This application Aug. 25, 1988, Ser. No. 236,704**

**Int. Cl.$^5$ C12N *15/67***

U.S. Cl. 435—69.1 12 Claims

1. A process for increasing the yield of a foreign protein that is produced under control of a galactose inducible promoter by transformed yeast cells that express the foreign protein when induced with galactose comprising growing the transformed yeast cells in fed-batch mode using a medium substantially free of galactose until the cell density is at or about its maximum, and removing at least some of the spent culture medium from the yeast cells by washing the cells in a physiologically acceptable medium before continuing the incubation of the transformed yeast in the presence of at least some fresh culture medium and galactose to produce the foreign protein.

---

5,013,651

**Patent Not Issued For This Number**

---

**5,013,652**

### COMPOSITE YEAST VECTORS

**Robert L. Strausberg, and Susan L. Strausberg, both of Silver Spring, Md., assignors to Genex Corporation, Gaithersburg, Md.**

**Filed Oct. 14, 1986, Ser. No. 918,147**

**Int. Cl.$^5$ C12P *21/00, 21/02;* C12N *15/00***

U.S. Cl. 435—69.2 25 Claims

1. A DNA sequence comprising
- (a) a hybrid yeast promoter comprising the functional segment of the DNA sequence encoding the upstream activation site of a gene selected from the group consisting of GAL1, GAL7 and GAL10, operably linked to the functional segment of the transcription initiation site of MF-α-I;
- (b) the functional segment of a PHO5 signal sequence substantially comprising preferred yeast codons, wherein said signal sequence is operably linked to said hybrid yeast promoter;
- (c) the functional segment of the DNA sequence comprising a Saccharomyces GAPDH transcription terminator, wherein restriction sites are situated between said signal sequence and said transcription terminator for insertion of heterologous genes linked in phase to said signal sequence and said transcription terminator;
- (d) the functional segment of the Saccharomyces 2μ circle replication origin; and
- (e) the functional segment of the yeast LEU2-d selectable marker.

---

**5,013,653**

### PRODUCT AND PROCESS FOR INTRODUCTION OF A HINGE REGION INTO A FUSION PROTEIN TO FACILITATE CLEAVAGE

**James S. Huston, Newton; Marc F. Charette, West Roxbury; Charles M. Cohen, Medway; Roberto Crea, Boston; Peter C. Keck, Millbury; Hermann Oppermann, Medway; David C. Rueger, West Roxbury, and Richard J. Ridge, Acton, all of Mass., assignors to Creative Biomolecules, Inc., Hopkinton, Mass.**

**Continuation of Ser. No. 28,484, Mar. 20, 1987, abandoned. This application Dec. 28, 1989, Ser. No. 462,297**

**Int. Cl.$^5$ C12N *15/62, 15/09***

U.S. Cl. 435—69.7 26 Claims

1. A method of producing a selected target polypeptide expressed by a host cell culture, said method comprising the steps of:

a. expressing a fused polypeptide by culturing said host cell culture, the cells of said culture containing and being capable of expressing a recombinant DNA encoding said fused polypeptide, said fused polypeptide comprising:

a first sequence of amino acids defining a leader sequence, a hinge region, and at least one amino acid defining a cleavage site recognizable and cleavable by a selected cleavage agent,

said hinge region being a cysteine-free flexible amino acid sequence not normally associated with said leader sequence or said target polypeptide and comprising at least two amino acids defining a secondary structure which can promote cleavage by said cleavage agent at said cleavage site; and

a second sequence of amino acids linked to said first sequence defining a said selected target polypeptide;

b. exposing said fused polypeptide to said selected cleavage agent in an environment wherein said target polypeptide is disposed in its three dimensional conformation and said selected cleavage agent is rendered preferentially accessible to said cleavage site by said hinge region thereby to cleave said target polypeptide from the remainder of said fused polypeptide preferentially at said cleavage site; and

c. separating said target polypeptide from the remainder of said fused polypeptide.

---

**5,013,654**

### PRODUCTION OF EMULSIFYING AGENTS AND SURFACTANTS

**Santimoy Banerjee, Chicago, Ill.; Jeffrey S. Karns, Greenbelt, Md., and Ananda M. Chakrabarty, Villa Park, Ill., assignors to The Board of Trustees of the University of Illinois, Urbana, Ill.**

**Continuation of Ser. No. 158,105, Feb. 16, 1988, abandoned, Continuation of Ser. No. 600,972, Apr. 16, 1984, abandoned. This application Mar. 5, 1990, Ser. No. 490,548**

**Int. Cl.$^5$ C12P *19/00;* C12N *1/20***

U.S. Cl. 435—72 4 Claims

1. A biologically pure culture of *Pseudomonas aeruginosa* SB-30, A.T.C.C. 39615 capable of utilizing paraffins having no less than 12 carbon atoms as a source of carbon and energy.

2. A method for producing a lipid composition having emulsifying and surface active properties which comprises growing the bacteria of claim 1 an aqueous nutrient medium including a source of carbon, separating the bacteria from the medium, and recovering said composition from said medium.

---

**5,013,655**

### PROCESS FOR THE PREPARATION OF COLORANTS OR MONACOLIN K IN A STERILE FLUIDIZED BED OF LOW WATER CONTENT

**Thomas Bayer, Hanover; Rainer Buchholz, Unnau; Hans-Matthias Deger, Hofheim am Taunus, and Joachim Wink, Offenbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Continuation of Ser. No. 298,708, Jan. 19, 1989. This application Mar. 13, 1990, Ser. No. 492,796**

**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1988, 3801588**

**Int. Cl.$^5$ A61K *31/365;* C12P *1/02;* C12N *11/00;* A23L *1/27***

U.S. Cl. 435—119 5 Claims

1. A process for the preparation of colorants or monocolin K, wherein a microorganism of the genus Monascus is cultured in a sterile fluidized bed of low water content until the colorant or the monacolin K accumulates in the culture and, the colorant or the monacolin K is then isolated.

---

**5,013,656**

### PROCESS FOR PRODUCING OROTIC ACID BY FERMENTATION

**Kenichiro Takayama, Atsugi, and Tomoko Matsunaga, Machida, both of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan**

**Filed Oct. 12, 1988, Ser. No. 256,458**

**Claims priority, application Japan, Oct. 19, 1987, 62-261775**

**Int. Cl.$^5$ C12P *17/12;* C12N *1/20***

U.S. Cl. 435—122 2 Claims

1. A process for producing orotic acid by fermentation which comprises culturing in a medium a microorganism which is capable of producing orotic acid and has resistance to a pyrimidine analogue or to both a pyrimidine analogue and a sulfa drug, until orotic acid is accumulated in the culture, and recovering orotic acid therefrom; said microorganism being Corynebacterium glutamicum T-26 (FERM BP-1487), Corynebacterium glutamicum T-29 (FERM BP-1488) or Corynebacterium glutamicum T-30 (FERM BP-1489).

---

**5,013,657**

### SUBTILISIN MUTATIONS

**Philip N. Bryan, 1720 Dublin Dr., Silver Spring, Md. 20902, and Michael W. Pantoliano, 20107 Waterside Dr., Germantown, Md. 20874**

**Filed Apr. 12, 1988, Ser. No. 180,757**

**Int. Cl.$^5$ C12N *9/54, 9/56, 15/52, 15/00***

U.S. Cl. 435—172.3 2 Claims

1. A mutant subtilisin gene encoding a thermally stable subtilisin BPN' comprising an amino acid substitution of cysteine at amino acid position 206.

---

**5,013,658**

### TRANSPOSON TAGGING OF GENES IN TRANSFORMED PLANTS

**Hugo Dooner, Walnut Creek; Jonathan Jones, Alameda, and Pal Maliga, Moraga, all of Calif., assignors to DNA Plant Technology Corporation, Mt. Kisco, N.Y.**

**Filed May 13, 1988, Ser. No. 193,966**

**Int. Cl.$^5$ C12N *15/00, 1/20, 1/00, 5/00***

U.S. Cl. 435—172.3 17 Claims

1. A method for isolating a plant gene of interest conferring a characteristic phenotype, wherein said method comprises: (a) transforming a plant carrying the gene of interest to make transformed plants by introduction of a DNA construct containing an AC transposon inserted within a selectable marker

VOL
1126
ISS
1
MY
7
1991
UMI

effecting resistance to streptomycin wherein the transposon renders the marker inoperable; and (b) isolating those transformed plants having the transposon excised from the marker and inserted into the plant gene of interest.

## 5,013,659

## NUCLEIC ACID FRAGMENT ENCODING HERBICIDE RESISTANT PLANT ACETOLACTATE SYNTHASE

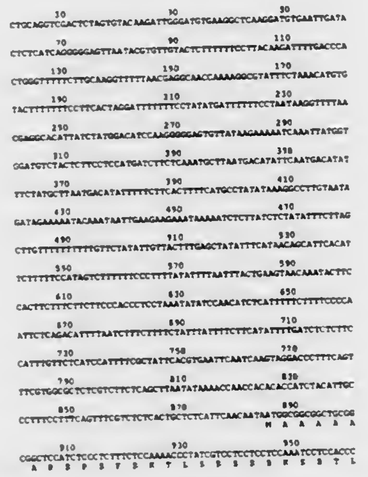
**John R. Bedbrook, Piedmont, Calif.; Roy S. Chaleff, Pennington, N.J.; Saverio C. Falco, Arden; Barbara J. Mazur, Wilmington, both of Del.; Christopher R. Somerville, Okemon, Mich., and Narendra S. Yadav, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 900,609, Aug. 26, 1986, abandoned. This application Mar. 4, 1988, Ser. No. 164,360**

**Claims priority, application Israel, Jul. 27, 1987, 83348**

**Int. Cl.$^5$ C12N** *15/00, 9/00;* **C07H** *15/12*

**U.S. Cl. 435—172.3** **40 Claims**



1. An isolated nucleic acid fragment comprising a nucleotide sequence encoding a plant acetolactate synthase protein which is resistant to a compound selected from the group consisting of sulfonylures, triazolopyrimidine sulfonamide, and imidazolinone herbicides, said nucleotide sequence comprises at least one sub-sequence which encodes one of the substantially conserved amino acid sub-sequences designated A, B, C, D, E, F, and G is FIG. 6, the nucleic acid fragment is further characterized in that at least one of the following conditions is met,

(a) the nucleic acid fragment has a sequence which encodes an amino acid sub-sequence A wherein $\epsilon_1$, is an amino acid other than alanine, or $\epsilon_2$ is an amino acid other than glycine,

(b) the nucleic acid fragment has a sequence which encodes an amino acid sub-sequence B wherein $\alpha_1$ is an amino acid other than proline,

(c) the nucleic acid fragment has a sequence which encodes an amino acid sub-sequence C wherein $\delta_2$ is an amino acid other than alanine,

(d) the nucleic acid fragment has a sequence which encodes an amino acid sub-sequence D wherein $\lambda_1$ is an amino acid other than lysine,

(e) the nucleic acid fragment has a sequence which encodes amino acid sub-sequence E wherein $\gamma_1$ is an amino acid other than aspartic acid,

(f) the nucleic acid fragment has a sequence which encodes an amino acid sub-sequence F wherein $\beta_3$ is an amino acid other than tryptophan, or $\beta_5$ is an amino acid other than valine or $\beta_7$ is an amino acid other than phenylalanine, and

(g) the nucleic acid has a sequence which encodes an amino acid sub-sequence G wherein $\sigma_1$ is an amino acid other than methionine.

---

## 5,013,660

## METHOD OF IMPLANTING LIVING CELLS WITH A FOREIGN SUBSTANCE

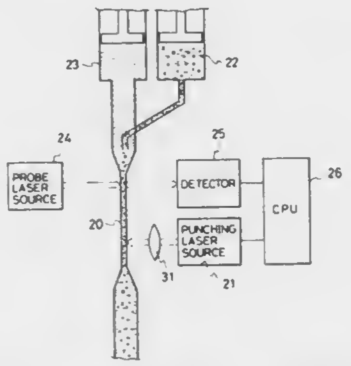
**Takahiro Kasuya; Yoji Ikawa; Motowo Tsukakoshi, all of Wako, and Shunichi Kurata, Fuchu, all of Japan, assignors to Science and Technology Agency, Tokyo, Japan**

**Continuation of Ser. No. 185,243, Apr. 19, 1988, abandoned, which is a continuation of Ser. No. 660,376, Oct. 12, 1984, abandoned. This application Sep. 5, 1990, Ser. No. 579,176**

**Claims priority, application Japan, Oct. 13, 1983, 58-191379**

**Int. Cl.$^5$ C12N** *13/00, 5/10, 5/04, 5/06*

**U.S. Cl. 435—173** **9 Claims**



1. Method of introducing a foreign substance into living eukaryotic cells comprising exposing a suspension of living eukaryotic cells in a liquid medium to a laser beam whereby at least some of said living eukaryotic cells become temporarily permeable to said foreign substance, and adding the foreign substance to the liquid medium before or after said exposure, whereby said temporarily permeable eukaryotic cells are associated with said foreign substance so that said foreign substance can enter said temporarily permeable eukaryotic cells.

---

## 5,013,661

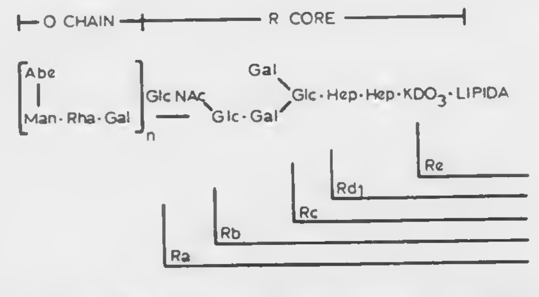
## LIPOPOLYSACCHARIDE-SPECIFIC ACYLOXYACYL HYDROLASE

**Robert S. Munford, and Catherine L. Hall, both of Dallas, Tex., assignors to The Board of Regents, The University of Texas System, Austin, Tex.**

**Continuation-in-part of Ser. No. 53,044, May 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 868,428, May 28, 1986, Pat. No. 4,929,604. This application Mar. 15, 1989, Ser. No. 323,679**

**Int. Cl.$^5$ C12N** *9/18;* **A61K** *31/715;* **C12P** *19/26*

**U.S. Cl. 435—197** **11 Claims**



1. A composition of matter comprising acyloxyacyl hydrolase which is at least 90% pure, said hydrolase being capable of hydrolyzing ester bonds between fatty acids and a hydroxyl function of a 3-hydroxyfatty acid bound to a lipopolysaccharide glycosaminyl residue without hydrolyzing ester or amide bonds between the 3-hydroxyfatty acid and the lipopolysaccharide glucosaminyl residues.

## 5,013,662

## BACTERIAL METHIONINE N-TERMINAL PEPTIDASE

**Arie Ben-Bassat, Concord; Keith A. Bauer, Oakland; Shing Chang, and Sheng-Yung Chang, Oakland, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.**

**Division of Ser. No. 860,330, May 6, 1988, Pat. No. 4,865,974, which is a continuation-in-part of Ser. No. 778,414, Sep. 20, 1985, Pat. No. 4,870,017. This application Oct. 7, 1988, Ser. No. 255,143**

**Int. Cl.$^5$ C12N** *9/48, 15/10, 15/57*

**U.S. Cl. 435—212** **2 Claims**

1. A Met-aminopeptidase in purified and isolated form which has the amino acid sequence shown in FIG. 2.

---

## 5,013,663

## CANINE CORONA VIRUS VACCINE

**William M. Acree, Temple, Tex., and John W. Black, Milton, Tenn., assignors to American Home Products Corporation, New York, N.Y.**

**Continuation of Ser. No. 821,194, Jan. 22, 1986, which is a division of Ser. No. 504,434, Jun. 15, 1983, Pat. No. 4,567,043. This application Mar. 24, 1989, Ser. No. 328,367**

**The portion of the term of this patent subsequent to Jan. 28, 2003, has been disclaimed.**

**Int. Cl.$^5$ C12N** *7/08, 7/00;* **C12Q** *1/37;* **A61K** *39/12*

**U.S. Cl. 435—237** **45 Claims**

1. Modified live Canine Corona Virus which is fully adapted to reproduction and growth in cell culture, which does not produce disease when administered to a dog and which, when administered to a dog by injection, infects intestinal epithelium in a dog to product localized immunity to Canine Corona Virus in the intestines.

---

## 5,013,664

## COMMON PROTEIN OF *HAEMOPHILUS INFLUENZAE* TYPE B IDENTIFIED BY A MONOCLONAL ANTIBODY

**Bernard R. Brodeur, #404-50 Emmerson, Ottawa, Ontario, Canada K1Y 4P7 ; Josee Hamel, 11 Juniper, Aylmer, Quebec, Canada J9H 5Y8 , and Serge Montplaisir, Hôspital Sainte-Justine, Department of Microbiology and Immunology, 3175, Côte Sainte-Catherine, Montreal, Quebec, Canada H3T 1C5**

**Filed May 28, 1986, Ser. No. 867,510**

**Int. Cl.$^5$ C12N** *5/12;* **C07K** *15/78;* **G01N** *33/53, 33/535*

**U.S. Cl. 435—7.32** **13 Claims**

1. The Hb-2 monoclonal antibody which has the A.T.C.C. Acession Number HB 10289, and which specifically binds to a surface-accessibel outer-membrane protein antigen of the bacterium *Haemophilus influenzae* type b.

---

## 5,013,665

## METHOD FOR REGENERATING DEACTIVATED MICROORGANISMS

**Motoshi Suzuki, Kenilworth; Howard Dalton; Anthony O. Richards, both of Leamington Spa, and Stephen H. Stanley, Kenilworth, all of United Kingdom, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan**

**Filed Nov. 17, 1988, Ser. No. 273,367**

**Int. Cl.$^5$ C12N** *1/12, 1/38*

**U.S. Cl. 435—244** **19 Claims**

1. In a method for reactivating the methane oxidizability of microbial cells of a methane-utilizing bacteria which have partly or wholly lost their methane oxidizability, the improvement which comprises reactivating said methane-utilizing bacteria in an reactivation solution containing a carbon source selected from the group consisting of not less than 10 n mol/-minute mg of cells methane, about 10 to 600 n mol/minute mg of cells methanol and about 10 to 600 n mol/minute mg of cells formaldehyde or a mixture thereof, while supplying thereto a not less than 1 n mol/minute mg of cells nitrogen source, a not less than 0.02 n mol/minute mg of cells sulfur source and oxygen.

---

## 5,013,666

## CONTROL FOR BLOOD GAS/CALCIUM ANALYSIS INSTRUMENTATION

**Ching Chiang, Acton, Mass., assignor to Bionostics, Incorporated, Acton, Mass.**

**Continuation of Ser. No. 207,182, Jun. 15, 1988, Pat. No. 4,945,062. This application Jul. 16, 1990, Ser. No. 553,989**

**The portion of the term of this patent subsequent to Jul. 31, 2007, has been disclaimed.**

**Int. Cl.$^5$ G01N** *33/49, 33/487, 33/00*

**U.S. Cl. 436—11** **8 Claims**

1. A liquid control standard for blood analysis instrumentation systems comprising an aqueous solution containing a buffering agent in an amount sufficient to maintain a control standard pH within a predetermined range of values, an amount of bicarbonate ions sufficient to maintain $pCO_2$ within a predetermined range of values, an amount of gaseous oxygen sufficient to maintain $pO_2$ within a predetermined range of values, an amount of calcium sufficient to maintain total calcium concentration within a predetermined range of values, and a sequestering agent to form complexes with calcium sufficient to maintain an ionized calcium concentration within a predetermined range of values, wherein said liquid control standard is autoclavable, stable, and homogeneous.

---

## 5,013,667

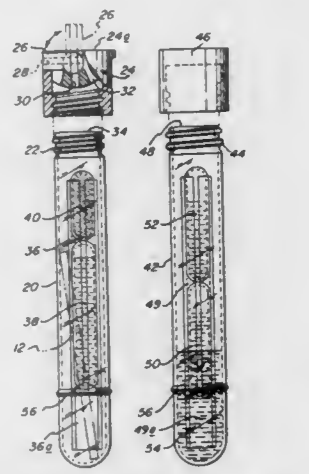
## APPARATUS AND METHOD FOR MEASURING HALOGEN CONTENT

**Theodore R. Lynn, Hamden, and Stephen R. Finch, Seymour, both of Conn., assignors to Dexsil Corporation, Hamden, Conn.**

**Continuation of Ser. No. 59,560, Jun. 8, 1987, abandoned. This application Aug. 6, 1990, Ser. No. 563,939**

**Int. Cl.$^5$ G01N** *33/00*

**U.S. Cl. 436—126** **17 Claims**



1. An apparatus for testing liquids comprises a test kit containing the following components:

(a) sampling means comprising (i) a frangible collector having an exterior and a collector interior of predetermined volume, the collector having therein (1) one opening leading from its exterior to its collector interior and defining a sampling end of the collector, and (2) another opening spaced from said one opening and leading from the exterior of the collector to its collector interior, said another opening defining a suction end of the collector; (ii) suction means having a suction port; and (iii) coupling means releasably connecting the suction end of the collector in flow communication with the suction port, whereby suitable suction applied to the suction end of the collector while the sampling end thereof is immersed in a hydrocarbon liquid will fill the collector with the liquid to provide a measured quantity of the liquid within the collector, and

VOL
1126
ISS
1
MY
7
1991
UMI

maintenance of such suction will retain the measured quantity of liquid within the collector;

(b) a container system comprising at least a first container having an exterior, a container interior, and a container opening therein, the first container and the container opening being dimensioned and configured to enable the entire collector and the liquid contained therein to be inserted through the container opening and deposited within the first container from exteriorly thereof, at least a portion of the first container being sufficiently flexible to enable breaking of the frangible collector within the first container by squeezing the first container from the exterior thereof; and

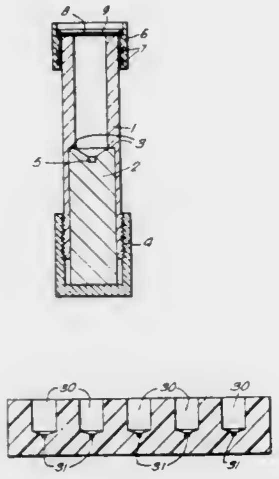
(c) one or more reagents stored in frangible segregating means which are dimensioned and configured to be stored within the container system, the reagents being of a quantity and type suitable for contacting the liquid within the container system and providing, in conjunction with the measured quantity of the liquids, a detectable indication of a characteristic of the liquid.

---

## 5,013,668

## METHOD OF ESTIMATING A CUMULATIVE EXPOSURE TO A COMPOUND OF A GAS AND APPARATUS THEREFOR

**Bernard Fields, Middlesbrough, England, assignor to Imperial Chemical Industries PLC, London, England**
**Filed Feb. 10, 1989, Ser. No. 308,675**
**Claims priority, application United Kingdom, Feb. 16, 1988, 8803515**
**Int. Cl.$^5$ G01N *21/00***
**U.S. Cl. 436—168** **8 Claims**



1. A method of determining a cumulative exposure to a component of a gas, comprising:

providing a reservoir means;

providing conduit means for defining a path of communication between said reservoir means and a body of gas to be monitored, said conduit means allowing substantially only diffusional migration of a component of interest of the gas from the body of gas to the reservoir means;

placing a liquid reagent in said reservoir means;

holding said liquid reagent in said reservoir means substantially only by surface tension;

exposing said liquid reagent to said body of gas through said conduit means

and determining the amount of the component of gas absorbed by the liquid reagent.

---

## 5,013,669

## MASS PRODUCIBLE BIOLOGICALLY ACTIVE SOLID PHASE DEVICES

**Donald F. Peters, Jr., Campbell, and Lawrence C. Dumont, Santa Cruz, both of Calif., assignors to SmithKline Diagnostics, Inc., San Jose, Calif.**
**Filed Jun. 1, 1988, Ser. No. 202,100**
**Int. Cl.$^5$ G01N *33/543***
**U.S. Cl. 436—518** **53 Claims**

33. A process for producing a solid phase binding member for an analyte in an aqueous test sample, the process comprising the steps of:

(a) covalently coupling a ligand to a water-soluble polymer in solution, the polymer being capable of a reversible transition between a solid phase aggregated by noncovalent interactions and a solution phase in either direction before the polymer is fixed to a solid support, the covalent coupling of the ligand to the polymer producing a ligand-polymer conjugate;

(b) impregnating at least a portion of a solid support having micropores with the ligand-polymer conjugate; and

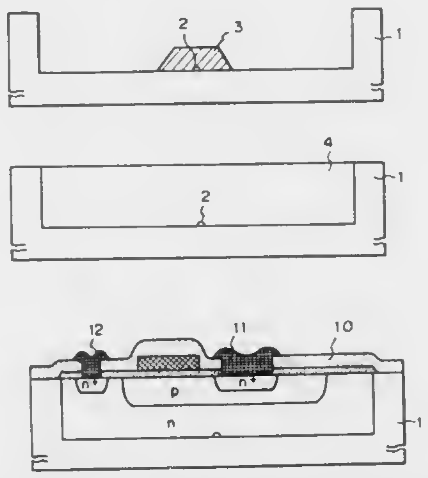
(c) cross-linking the polymer such that the ligand-polymer conjugate is noncovalently fixed to the solid support.

---

## 5,013,670

## PHOTOELECTRIC CONVERTER

**Shiro Arikawa, and Takao Yonehara, both of Atsugi, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 225,579, Jul. 28, 1988, abandoned, which is a continuation of Ser. No. 95,447, Sep. 11, 1987, abandoned. This application May 15, 1990, Ser. No. 523,828**
**Claims priority, application Japan, Sep. 18, 1986, 61-218140**
**Int. Cl.$^5$ H01L *31/18, 21/20***
**U.S. Cl. 437—2** **5 Claims**



1. A method for producing photoelectric conversion apparatus comprising a light transmissive substrate, a semiconductor region provided on said substrate, and a wiring portion provided on said semiconductor region, and capable of outputting a signal responsive to light incident from said substrate side, comprising steps of:

(a) preparing a light transmissive substrate having an amorphous deposition surface of a different material than said substrate, said amorphous deposition surface having a nucleation density greater than any other surface on the substrate and having a sufficiently small area so as to form thereon only a single nucleus from which a single crystal is grown, the area size being of the order of a few um;

forming the single nucleus on the amorphous deposition surface;

(c) growing the single crystal from the nucleus by vapor deposition;

(d) forming on said substrate a transistor having a main electrode region of a first conductivity type and a control electrode region of a conductivity type opposite to the first type; and

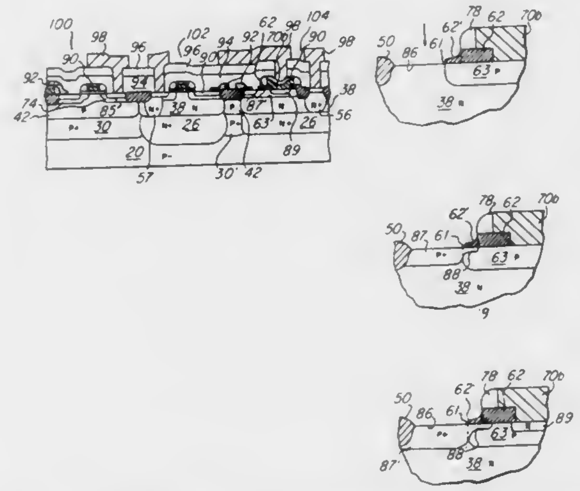
(e) forming on said substrate a wiring portion connected to the transistor.

---

## 5,013,671

## PROCESS FOR REDUCED EMITTER-BASE CAPACITANCE IN BIPOLAR TRANSISTOR

**Robert H. Havemann, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**
**Filed Jun. 20, 1990, Ser. No. 541,427**
**Int. Cl.$^5$ H01L *21/331***
**U.S. Cl. 437—31** **3 Claims**



1. A method for fabricating an integrated circuit in a substantially planar, upper surface of a semiconductor body including a bipolar base region having an intrinsic base region and an extrinsic base region, the method comprising:

(a) providing a tab region between and contiguous with the intrinsic base region and the extrinsic base region;

(b) implanting a first concentration of base-type dopant into the intrinsic base region and the tab region, but not into the extrinsic base region;

(c) providing an oxide on the upper surface of the semiconductor body at least partially covering the intrinsic base region and substantially covering the tab region, the oxide presenting a thickness;

(d) partially etching the oxide over the tab region so that the thickness thereat is decreased and substantially less than the thickness of the oxide at the intrinsic base region; and

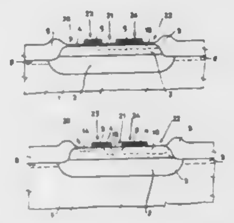
(e) delivering base-type dopant into the extrinsic base region, including the tab region, at the decreased oxide thickness of the tab region, to present peak dopant levels at a second concentration in the tab region and the extrinsic base region, whereby the respective dopant levels are stepped, and the tab region provides conductivity link-up between the intrinsic base region and the extrinsic base region of the bipolar base region, and whereby the necessity of completely etching the oxide at the tab region to achieve conductivity link-up, by implanting dopant at a second concentration rate, is eliminated.

---

## 5,013,672

## MANUFACTURING PROCESS FOR HIGH-FREQUENCY BIPOLAR TRANSISTORS

**Raffaele Zambrano, Mercato San Severino, Italy, assignor to SGS-Thomson Microelectronics s.r.l., Agrate Brianza, Italy**
**Filed Oct. 18, 1988, Ser. No. 259,261**
**Claims priority, application Italy, Oct. 23, 1987, 22392 A/87**
**Int. Cl.$^5$ H01L *21/331***
**U.S. Cl. 437—33** **3 Claims**



1. A process for manufacturing high-frequency transistors which comprises a succession of steps including:

diffusing a buried layer into an appropriate substrate;

growing an epitaxial layer on said buried layer and said substrate;

growing a thin layer of thermal oxide on said epitaxial layer;

depositing an oxidation resistant material on said thin oxide;

determining and oxidizing insulating regions;

determining a base region in the epitaxial layer and implanting therein a doping agent passing through said oxidation resistant material and thin oxide layers;

removing the oxidation resistant material except portions in separating zones between contact areas on the substrate;

implanting collector and emitter regions in the epitaxial layer under contact areas;

annealing and penetrating said implanted base, collector and emitter regions;

removing the thin oxide from the contact areas; and

metallization of the contact areas.

---

## 5,013,673

## IMPLANTATION METHOD FOR UNIFORM TRENCH SIDEWALL DOPING BY SCANNING VELOCITY CORRECTION

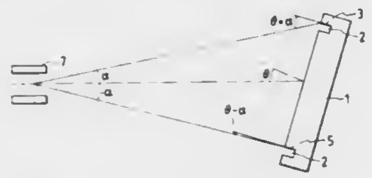
**Genshu Fuse, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan**
**Filed Jun. 26, 1990, Ser. No. 543,311**
**Claims priority, application Japan, Jun. 30, 1989, 1-170114**
**Int. Cl.$^5$ H01L *21/265***
**U.S. Cl. 437—38** **9 Claims**

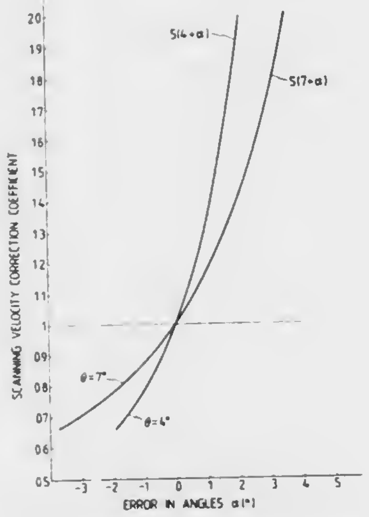
1. An ion implantation method comprising doping a trench sidewall formed in the surface of a semiconductor substrate, with impurities by intermittently rotating step ion implantation carried out in the state that said sidewall is angled with respect to an ion beam, wherein;

the amount of ion implantation to said sidewall is made uniform by varying the scanning velocity of the ion beam on the surface of said semiconductor substrate, at the

VOL
1126
ISS
1
MY
7
1991
UMI

position near to, and the position distant from, the upstream side of the beam applied to a position at which said surface of semiconductor substrate is inclined with respect to the beam.





---

### 5,013,674
## A METHOD OF MANUFACTURING INTEGRATED CIRCUITS COMPRISING EPROM MEMORY AND LOGIC TRANSISTORS

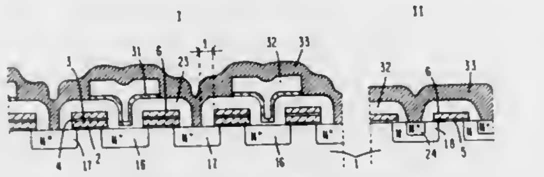
**Albert Bergemont, La Tronche, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France**

**Filed Jan. 16, 1990, Ser. No. 464,852**

**Claims priority, application France, Jan. 17, 1989, 89 01227**

**Int. Cl.⁵ H01L** *21/265*

**U.S. Cl. 437—43** **4 Claims**



1. A method of manufacturing MOS-type integrated circuits which comprise memory floating gate transistors and logic transistors, comprising the steps of:
- (a) forming thick oxide areas;
- (b) forming, between the thick oxide areas, a first gate oxide layer, and depositing a first polysilicon layer and a first isolation layer;
- (c) etching, at the position of the logic transistors, (i) the first isolation layer, (ii) the first polysilicon layer, and (iii) the first gate oxide layer;
- (d) forming a second gate oxide layer and depositing a second polysilicon layer;
- (e) depositing a second isolation layer;
- (f) etching, at the position of the memory transistors and logic transistors, the second isolation layer and the second polysilicon layer;
- (g) etching in the memory area, vertically with respect to the second isolation layer and second polysilicon layer eteched during step (f), the first isolation layer and the first polysilicon layer;
- (h) implanting heavily doped sources and drains of the memory transistors;
- (i) implanting, at the position of the logic transistor sources and drains, a first lightly doped region;
- (j) removing the second isolation layer at the position of the logic transistors;
- (k) depositing a third isolation layer which is then anisotropically etched on the whole circuit while leaving in the memory area lateral regions on the lateral edges of sandwiches of the first and second polysilicon layers and leaving, at the position of the logic transistors, spacers on the lateral edges of the remaining portions of the second polysilicon layer;
- (l) implanting at the position of the logic transistor sources and drains a second heavily doped region;
- (m) depositing in a memory area a silicon nitride layer, depositing on the whole circuit a fourth isolation layer, etching contact regions in the fourth isolation layer in the memory area and at the position of the logic transistors, the contacts in the memory area being self-aligned with respect to the sandwiches of the first and second polysilicon layers, and depositing a metal layer.

---

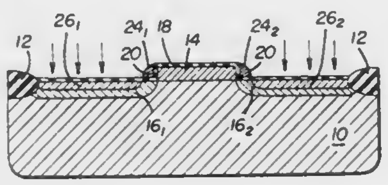
### 5,013,675
## METHOD OF FORMING AND REMOVING POLYSILICON LIGHTLY DOPED DRAIN SPACERS

**Lewis Shen; Zahra Hadjizadeh-Amini, both of Cupertino; Hsingya A. Wang, San Jose, and James J. Hsu, Saratoga, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

Filed May 23, 1989, Ser. No. 355,634

Int. Cl.⁵ H01L *21/265, 21/4763*

U.S. Cl. 437—44 8 Claims



1. A method of fabricating a semiconductor device having lightly doped drain regions by providing a gate on a portion of a substrate having an N-type background doping, implanting lightly doped regions using the gate as a mask, providing an oxide layer overlying the gate and the substrate, providing a polysilicon layer overlying the oxide layer, etching the polysilicon layer to form spacers at the ends of the gate, implanting P-type dopant ions through the oxide layer using the spacers to mask portions of the lightly doped regions to form source and drain regions, removing the spacers by etching, and activating the source and drain implant, characterized in that the method includes the steps of:
- (a) doping the polysilicon layer with an N-type dopant prior to etching the polysilicon layer to form the spacers; and
- (b) treating the device by rapid thermal annealing to cure defects in the oxide layer after the source and drain regions are implanted, and before the spacers are removed.

---

### 5,013,676
## STRUCTURE OF MIS-TYPE FIELD EFFECT TRANSISTOR AND PROCESS OF FABRICATION THEREOF

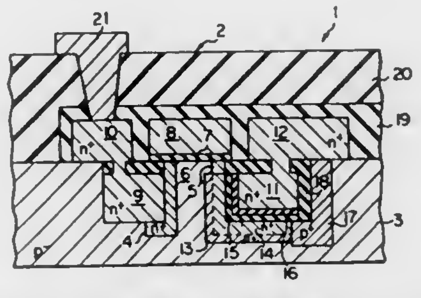
**Osamu Horigome, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 186,863, Apr. 27, 1988, abandoned. This application Jun. 16, 1989, Ser. No. 367,071**

**Claims priority, application Japan, Apr. 27, 1987, 62-105057**

**Int. Cl.⁵ H01L** *21/265, 21/443, 21/66, 27/00*

**U.S. Cl. 437—45** **9 Claims**



1. A process of fabricating a single MIS-type field effect transistor comprising the steps of:
- (a) preparing a semiconductor substrate of a first conductivity type;
- (b) forming two vertical cavities in said semiconductor substrate, a land portion with a predetermined lateral distance being formed between said two vertical cavities, said land portion having first and second vertical portions spaced apart from each other by said predetermined lateral distance, said first and second vertical portions partially defining said vertical cavities, respectively;
- (c) forming source and drain regions in the first and second vertical portions of said land portion, respectively;
- (d) measuring a lateral distance between said source and drain regions by using an optical device;
- (e) filling said vertical cavities with an oxidizable conductive material for forming source/drain contacting electrodes;
- (f) introducing impurity atoms into a surface portion of said land portion between said source and drain regions for adjustment of a threshold voltage of said single MIS-type field effect transistor;
- (g) forming a gate insulating film on said surface portion of said land portion; and
- (h) forming a gate electrode on said gate insulating film, in which said step (b) comprises the sub-steps of
- (b-1) covering a surface of said semiconductor substrate with a non-oxidizable insulating film, (b-2) partially removing said non-oxidizable insulating film for exposing portions of said surface, the surface portion of said land portion being covered with said non-oxidizable film, and (b-3) forming said vertical cavities in said portions to be exposed, respectively, and in which said step (f) comprises the sub-steps of (f-1) oxidizing surface portions of said source/drain contacting electrodes for forming oxide films, respectively, (f-2) removing said non-oxidizable insulating film so as to expose the surface portion of said land portion, and (f-3) implanting said impurity atoms into the surface portion of said land portion.

---

### 5,013,677
## METHOD FOR MANUFACTURE OF SEMICONDUCTOR DEVICE

**Hiroki Hozumi, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

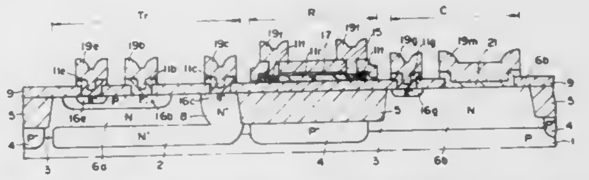
**Filed Jun. 18, 1990, Ser. No. 538,727**

**Claims priority, application Japan, Jun. 19, 1989, 1-156434**

**Int. Cl.⁵ H01L** *21/265*

**U.S. Cl. 437—47** **2 Claims**

1. A method of manufacturing a transistor and at least one other device comprising the steps of forming N and P regions in a substrate, forming an insulating film (**9**) on the surface of said substrate, forming a resist mask (**10**) on said insulating film (**9**), selectively etching said insulating film (**9**) through said resist mask (**10**) to form a plurality of windows (**9***a*, **9***b*, **9***c*) to said substrate, removing said resist mask (**10**), forming a polycrystalline layer (**11**) on said insulating film (**9**) and in said plurality of windows (**9***a*, **9***b*, **9***c*), forming a resist mask (**12**) on said polycrystalline layer (**11**), ion-implanting a P-type impurity through a window (**12R**) of the resist mask (**12**) into a portion (**11R**) which will be a resistor of said polycrystalline layer (**11**), removing said resist mask (**12**), forming another resist mask (**13**) on said polycrystalline layer (**11**), ion-implanting through windows (**13***e* **13***b*) of said resist mask (**13**) to form resistor contact portions (**11***e*) and a base contact portion (**11***b*) which will correspond to the base in said polycrystalline layer (**11**), removing said resist mask (**13**), forming another resist mask (**14**) on said polycrystalline layer (**11**), ion-implanting through windows (**14***e*, **14***c*) of said resist mask (**14**) to form emitter and collector electrodes, removing said another resist mask (**14**), forming an insulating film (**15**) on said polycrystalline layer (**11**), heat treating said substrate structure and diffusing N-type from portion (**11***b*) of said polycrystalline layer (**11**) which corresponds to the emitter region (**16***e*) and from portion (**11***c*) of polycrystalline layer (**11**) which corresponds to the collector contact into the base region (**7**) and the collector lead region **8** to form an emitter region (**16***e*) and a collector contact (**16***c*) and simultaneously diffusing the P-type impurity from portion (**11***b*) which corresponds to the base contact of polycrystalline layer (**11**) into the base region (**7**) to form a base contact **16**(*b*), removing said insulating film (**15**), forming patterns in said polycrystalline film (**11**) to leave the resistor part (**11***r*), the resistor contact (**11***e*) the portion (**11***e*) which corresponds to the emitter region (**16***e*), the portion (**11***b*) which corresponds to the base contact (**16***b*) and the portion (**11***c*) which corresponds to the collector contact **916***c*) forming a thin film (**17**) on the surface of the semiconductor device forming a relatively thick insulating film (**18**) on said thinfilm (**17**), patterning said insulating film (**18**) so that is partially left on the resistor part (**11***r*) and the resistor contact portion (**11***e*), removing said thin film (**17**) except those portions under said insulating film (**18**), and forming resistor electrodes (**19***e*) an emitter electrode (**19***c*), a base electrode (**19***b*) and a collector electrode (**19***c*).



---

### 5,013,678
## METHOD OF MAKING AN INTEGRATED CIRCUIT COMPRISING LOAD RESISTORS ARRANGED ON THE FIELD OXIDE ZONES WHICH SEPARATE THE ACTIVE TRANSISTOR ZONES

**Josef Winnerl, Landshut, and Franz Neppl, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Division of Ser. No. 113,480, Oct. 28, 1987, abandoned. This application Mar. 16, 1989, Ser. No. 305,193**

**Claims priority, application Fed. Rep. of Germany, Nov. 18, 1986, 3639357**

**Int. Cl.⁵ H01L** *21/70*

**U.S. Cl. 437—52** **20 Claims**

1. A method for production of a load resistor in an integrated circuit substrate containing a transistor having a terminal element and wherein the load resistor is arranged on a field oxide zone alongside an active transistor zone of the transistor on the substrate, comprising the steps of:

VOL
1126
ISS
1
MY
7
1991
UMI

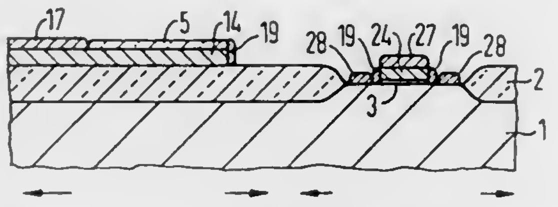
providing a polycrystalline silicon layer on the field oxide zone and at the transistor active zone;

applying a first oxide layer to a surface of the polycrystalline silicon layer;

covering the first oxide layer with a first photoresist mask shaped to define a zone for the load resistor;

structuring the first oxide layer with the first mask to create a structured oxide layer which defines the load resistance zone;

removing the first photoresist mask and applying a refractory metal silicide layer to a surface of the structured oxide layer and on the polycrystalline silicon layer at the transistor active zone;



applying a second oxide layer on the silicide layer at the load resistance zone and at the transistor active zone; and

applying a second photoresist mask at the transistor active zone and at the load resistance zone and using said second photoresist mask to structure the polycrystalline silicon layer and silicide layer to form the terminal element at the transistor active zone and to structure the silicide layer and polycrystalline silicon layer at the load resistance zone to form the load resistor and a load resistance terminal therefor, said structured oxide serving as an etch stop mask when structuring the polycrystalline silicon layer to define the load resistor.

---

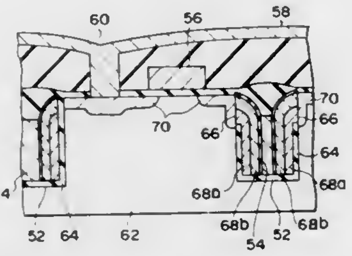
### 5,013,679

## CELL CAPACITOR OF A DYNAMIC RANDOM ACCESS MEMORY AND A METHOD OF MANUFACTURING THE SAME

**Jumpei Kumagai, and Susumu Yoshikawa, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 5, 1989, Ser. No. 403,292**
**Claims priority, application Japan, Sep. 9, 1988, 63-225912**
**Int. Cl.$^5$ H01L** *21/70*

U.S. Cl. 437—52 12 Claims



1. A method of manufacturing a cell capacitor of a dynamic random access memory, comprising the steps of:

forming a trench in a semiconductor substrate;

exposing a portion of said semiconductor substrate, which is located in a region on a side wall of said trench;

forming a semiconductor layer on the side wall of said trench;

causing an electrically conductive layer to be epitaxially and selectively grown only on said semiconductor layer and on the exposed portion of said semiconductor substrate, and integrating said electrically conductive layer during the growth;

forming a gate insulation film on a surface of said electrically conductive layer; and

forming a counter electrode on said gate insulation film and within said trench.

---

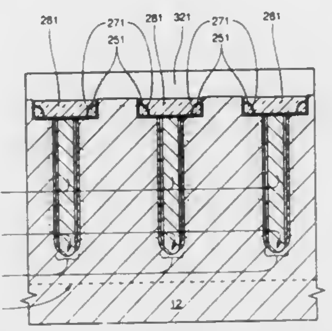
### 5,013,680

## PROCESS FOR FABRICATING A DRAM ARRAY HAVING FEATURE WIDTHS THAT TRANSCEND THE RESOLUTION LIMIT OF AVAILABLE PHOTOLITHOGRAPHY

**Tyler A. Lowrey; Randal W. Chance; D. Mark Durcan; Ruojia Lee; Charles H. Dennison; Yauh-Ching Liu; Pierre C. Fazan; Fernando Gonzalez, and Gordon A. Haller, all of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.**

**Filed Jul. 18, 1990, Ser. No. 555,980**
**Int. Cl.$^5$ H01L** *21/70*

U.S. Cl. 437—52 21 Claims



1. A process for fabricating a dynamic random access memory array on the planarized substrate of a silicon wafer of a first conductivity type, said array having feature widths that transcend the resolution limit of the employed photolithographic process, said process comprising the following steps:

(a) creating a first hard-material mask on the substrate, said first hard-material mask comprising a first series of substantially parallel, hard-material stringers, each of which has both a width of less than F, the minimum feature width of the employed photolithographic process, and also a separation distance, from one or more neighboring stringers in said first series, of less than F;

(b) anisotropically etching the substrate to create a series of substantially parallel isolation trenches in an array region on the wafer;

(c) filling the isolation trenches with insulative material;

(d) replanarizing the wafer back to the substrate level;

(e) creating a second hard-material etch mask on top of the array region comprising a series of substantially parallel, hard-material masking strips with substantially vertical longitudinal edges, each of which is separated from one or more neighboring masking strips, by gaps which are less than or equal to F, said masking strips being substantially perpendicular to said first series of hard-material masking stringers;

(f) etching a matrix of storage trenches in the substrate with an anisotropic etch that is selective for silicon over the insulative material used to fill the isolation trenches, said storage trenches having a pair of substantially vertical, opposing silicon walls and a pair of substantially vertical, opposing insulative-material walls, and said storage trenches being substantially less deep than said isolation trenches;

(g) angled implantation of an impurity which creates junctions of a second conductivity type on the silicon walls of said storage trenches;

(h) deepening said storage trenches with a further anisotropic etch that is selective for silicon over the insulative material, said storage trenches remaining substantially less deep than said isolation trenches;

(i) depositing a dielectric layer on the walls of said storage trenches;

(j) removal of the dielectric layer at the bottom of each storage trench;

(k) filling the storage trenches with polysilicon that is in-situ doped to said first conductivity type;

(l) replanarizing the wafer back to the substrate level;

(m) creating a third series of parallel photoresist strips on the array region, each strip within said third series being substantially perpendicular to the isolation trenches, having a feature width less than or equal to F, and, except at the edges of the array, being substantially centered between a pair of adjacent storage trench rows;

(n) creating a series of wordline mesas having substantially vertical longitudinal edges by anisotropically etching, to substantially equal levels, both silicon and insulative material that is not subjacent one of the photoresist strips of said third series;

(o) stripping said third series of photoresist strips;

(p) creation of a gate oxide layer on top of all exposed silicon;

(q) conformal deposition of a wordline layer;

(r) anisotropically etching said wordline layer to form a wordline stringer on each vertical longitudinal edge of each wordline mesa, the top of each wordline stringer being substantially below wordline mesa height level;

(s) implantation of an impurity which creates source and drain regions of a second conductivity type on exposed silicon surfaces;

(t) deposition of an insulative-material separation layer;

(u) planarizing said separation layer;

(v) masking said separation layer with a fourth series of parallel photoresist strips on the array region, each strip within said fourth series being substantially parallel to the isolation trenches, having a feature width less than or equal to F, and, except at the edges of the array, being substantially centered over an isolation trench and being separated from an adjacent strip within same said series by a gap that is also substantially centered over an isolation trench;

(w) anisotropically etching the separation layer to an extent that the tops of the wordline mesas are cleared, but wordline stringers are not exposed;

(x) deposition of a conformal metal layer; and

(y) anisotropically etching said metal layer to form bitline stringers.

---

### 5,013,681

## METHOD OF PRODUCING A THIN SILICON-ON-INSULATOR LAYER

**David J. Godbey, Bethesda; Harold L. Hughes, West River, and Francis J. Kub, Severna Park, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 29, 1989, Ser. No. 414,225**
**Int. Cl.$^5$ H01L** *21/20*

U.S. Cl. 437—86 19 Claims

1. A method of forming a thin semiconductor layer upon which semiconductor structures can be subsequently formed, comprising the steps of:

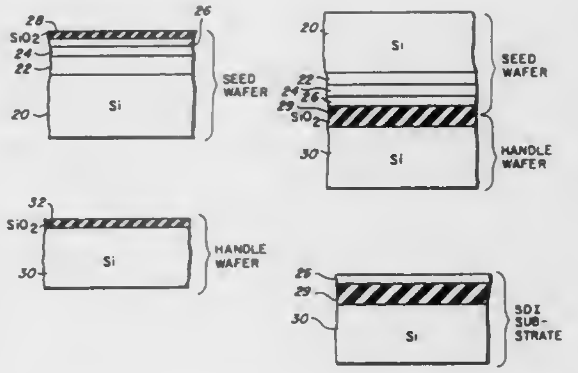
selecting one or more silicon substrates;

forming an etch-stop layer upon at least one of said one or more silicon substrates, said etch-stop layer comprising an alloy of silicon and one other Group IV element;

forming a silicon cap layer upon said etch-stop layer;

bonding said silicon cap layer to a mechanical substrate;

removing said at least one of said one or more silicon substrates and said etch stop layer without removing underlaying portions of said silicon cap layer, whereby said underlaying portions of said silicon cap layer remain on said mechanical substrate to form said thin semiconductor layer.



---

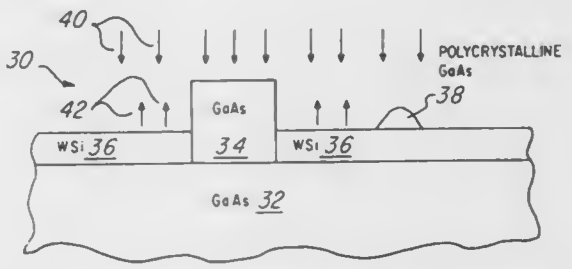
### 5,013,682

## METHOD FOR SELECTIVE EPITAXY USING A WST MASK

**Donald L. Plumton; Liem T. Tran, both of Dallas, and Hung-Dah Shih, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 921,913, Oct. 22, 1986, Pat. No. 4,868,633.**
**This application Jun. 30, 1989, Ser. No. 374,331**
**Int. Cl.$^5$ H01L** *21/20*

U.S. Cl. 437—89 23 Claims



1. A method of selective epitaxial growth of semiconductor material on a semiconductor body, comprising the steps of:

(a) providing a tungsten silicide growth mask on a semiconductor body, said growth mask being $W_xSi_yZn_{1-x-y}$ with $0.995 \geqq x+y \geqq 0.5$ and $0.1 \leqq x/y \leqq 20$; and

(b) growing epitaxial semiconductor material on the unmasked portions of said body.

---

### 5,013,683

## METHOD FOR GROWING TILTED SUPERLATTICES

**Pierre M. Petroff, and Herbert Kroemer, both of Santa Barbara, Calif., assignors to The Regents of the University of California, Berkeley, Calif.**

**Filed Jan. 23, 1989, Ser. No. 300,266**
**Int. Cl.$^5$ H01L** *21/20*

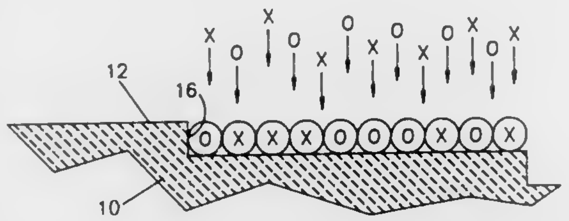
U.S. Cl. 437—110 33 Claims

1. The method for growing a superlattice structure on a substrate comprising the steps of:

(a) creating a periodic array of monoatomic surface steps on

VOL 1126
ISS 1
MY 7
1991
UMI

the substrate comprised of a plurality of equal and adjacent monoatomically thick steps on the surface of the substrate at an area to have the superlattice structure grown thereon wherein each step contains a plurality of atomic bonding sites on the surface thereof;
(b) providing means for creating a beam of a material being input thereto and control means operably connected for selectively including or not including respective ones of a plurality of materials within the beam;
(c) directing the beam at the steps of the substrate;



(d) establishing time periods for deposition of the materials for each of the monolayers such that the total number of atoms of the materials deposited will be equal in number to the number of the atomic bonding sites; and
(e) causing the control means to include and not include respective ones of the materials within the beam in a pre-established pattern of the time periods from step (d) which will cause the materials to be deposited on the steps in a series of stacked monolayers.

---

### 5,013,684

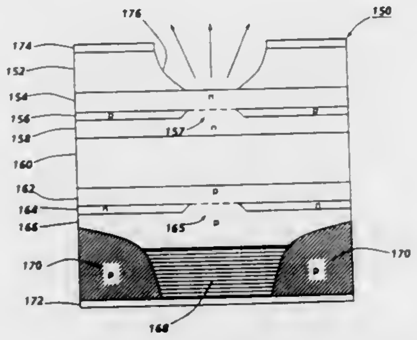
## BURIED DISORDERING SOURCES IN SEMICONDUCTOR STRUCTURES EMPLOYING PHOTO INDUCED EVAPORATION ENHANCEMENT DURING IN SITU EPITAXIAL GROWTH

**John E. Epler, Cupertino, and Thomas L. Paoli, Los Altos, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 24, 1989, Ser. No. 328,214**

**Int. Cl.$^5$ H01L *21/20***

**U.S. Cl. 437—129** **21 Claims**



1. The method of forming buried impurity sources in a semiconductor structure comprising the steps of:
epitaxially depositing several semiconductor layers on a substrate, at least one of said layers containing a concentration of an impurity species between $10^{19}$ and the point of saturated concentration of said impurity species in said one layer,
interrupting the epitaxial growth of said semiconductor layers after the deposition of said one layer,
selectively desorbing in situ portions of said one layer to the interface with the layer therebeneath employing photo induced evaporation, and
continuing the epitaxial deposition of remaining layers inducing at least initial impurity disordering of regions of deposited layers in proximity to the remaining portions of said one layer.

---

### 5,013,685

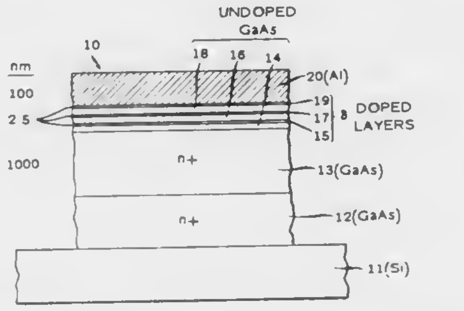
## METHOD OF MAKING A NON-ALLOYED OHMIC CONTACT TO III-V SEMICONDUCTORS-ON-SILICON

**Tien-Heng Chiu, Spotswood; John E. Cunningham, Lincroft, and Keith W. Goossen, Matawan, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Nov. 2, 1989, Ser. No. 430,558**

**Int. Cl.$^5$ H01L *21/44***

**U.S. Cl. 437—184** **16 Claims**



1. A method of fabricating a semiconductor device which comprises a doped layer of III-V semiconductor material and an ohmic contact to the doped layer, which comprises
(a) depositing upon a doped layer of III-V semiconductor material at least one set of layers comprising a delta-doped monolayer and a thin layer of undoped III-V semiconductor material, said thin layer being 2.5 nanometer or less in thickness, and
(b) epitaxially depositing an aluminum layer upon an uppermost of the layers of said at least one set of layers to complete the ohmic contact, said uppermost of the layers being a delta-doped monolayer.

---

### 5,013,686

## METHOD OF MAKING SEMICONDUCTOR DEVICES HAVING OHMIC CONTACT

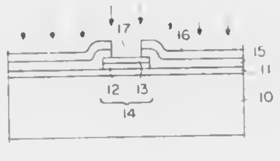
**Kyu-Hyun Choi, Seoul; Heyung-Sub Lee, Daejun, and Jung-Hwan Lee, Seoul, all of Rep. of Korea, assignors to SamSung Electronics Co., Ltd., Suwon, Rep. of Korea**

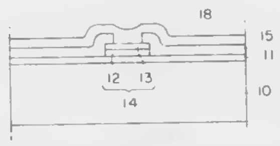
**Filed Sep. 30, 1988, Ser. No. 252,514**

**Claims priority, application Rep. of Korea, Sep. 30, 1987, 87-10932**

**Int. Cl.$^5$ H01L *21/88***

**U.S. Cl. 437—194** **15 Claims**





1. A method of making a semiconductor device having ohmic contact, characterized in that said method comprises the steps of:
forming a doped polysilicon layer and then forming a silicide layer thereon over a partial top surface of a semiconductor substrate;
forming an insulating layer over said silicide layer and the entire top surface of the substrate;
forming a contact window by etching the partial area of the insulating layer over said silicide layer to thereby expose said silicide; and
forming a polysilicon layer over the entire top surface of the substrate after performing ion-implantation through said contact window.

---

### 5,013,687

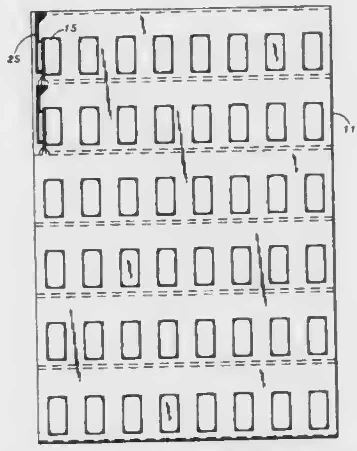
## FRAMED CHIP HYBRID STACKED LAYER ASSEMBLY

**Allen L. Solomon, Fullerton, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Jul. 27, 1989, Ser. No. 385,356**

**Int. Cl.$^5$ H01L *21/60***

**U.S. Cl. 437—209** **7 Claims**



1. A method of forming a multi-layer module comprising:
forming a plurality of substantially identical conductive patterns on a first surface of an insulating wafer;
forming a plurality of apertures in the insulating wafer, each of said apertures intersecting a dedicated one of the plurality of conductive patterns;
inserting an integrated circuit chip within each of the apertures;
electrically connecting the integrated circuit chip to a dedicated portion of the conductive pattern;
cutting the insulating layer to form a plurality of layer segments; and
vertically stacking the segments such-that the integrated circuits and conductive patterns are in substantial vertical registration to form a module.

---

### 5,013,688

## METHOD OF MANUFACTURING A SEMICONDUCTOR USING PLASMA PROCESSING

**Shunepi Yamazaki, Tokyo; Kazuo Urata, Atsugi; Itaru Koyama, Hatano; Noriya Ishida, Atsugi; Mari Sasaki, Atsugi; Shinji Imatou, Atsugi; Kazuhisa Nakashita, Atsugi, and Naoki Hirose, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

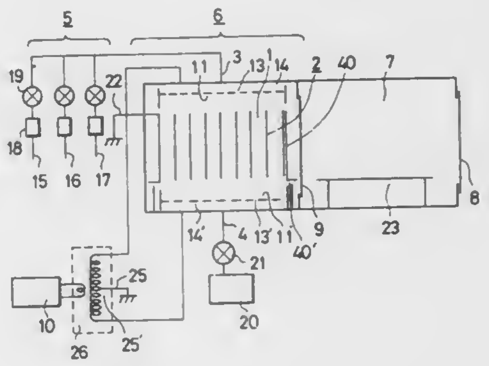
**Filed Jul. 26, 1989, Ser. No. 385,155**

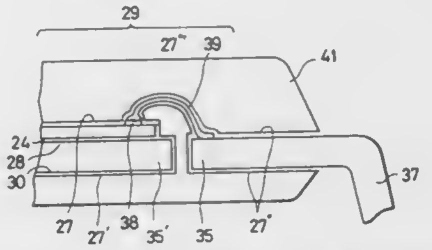
**Claims priority, application Japan, Aug. 5, 1988, 63-195685**

**Int. Cl.$^5$ H01L *21/321, 25/04***

**U.S. Cl. 437—210** **9 Claims**

1. A method of manufacturing electronic devices comprising the steps of:
making electrical connection between a semiconductor device and at least one associated lead;
cleaning the surface of said semiconductor device and said lead by plasma treatment;





enclosing said semiconductor device and said lead by an organic resin in order that a portion of said lead extends from the organic resin enclosure.

---

### 5,013,689

## METHOD OF FORMING A PASSIVATION FILM

**Isamu Yamamoto, and Jiro Fukushima, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 158,055, Feb. 12, 1988, abandoned, which is a continuation of Ser. No. 869,204, May 30, 1986, abandoned. This application Jan. 18, 1990, Ser. No. 467,325**

**Claims priority, application Japan, Aug. 14, 1985, 60-179010**

**Int. Cl.$^5$ H01L *21/312***

**U.S. Cl. 437—229** **8 Claims**

1. A method of forming a two-layer passivation film on a surface of a semiconductor chip which carries electrical elements consisting essentially of the following steps:
A. forming a first passivation layer selected from the group consisting of phosphosilicate glass and silicon nitride on said chip surface,
B. forming an organic resist layer on said first passivation layer formed of a material selected to be capable of acting as a passivation layer,
C. forming windows in said resist layer to expose said first passivation layer, and
D. selectively removing said first passivation layer through said windows and leaving said resist layer on the remainder of said semiconductor chip whereby said resist layer forms a primary passivation layer to complete said two-layer passivation film without the need for further processing.

---

### 5,013,690

## METHOD FOR DEPOSITION OF SILICON FILMS FROM AZIDOSILANE SOURCES

**Arthur K. Hochberg, Solana Beach; David L. O'Meara, Oceanside, and David A. Roberts, Carlsbad, all of Calif., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Feb. 1, 1990, Ser. No. 473,546**

**Int. Cl.$^5$ H01L *21/469***

**U.S. Cl. 437—233** **9 Claims**

1. A low temperature chemical vapor deposition process for

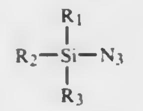
VOL
1126
ISS
1
MY
7
1991
UMI

preparing silicon films having a sheet resistance of approximately $1 \times 10^3$ Ω/square comprising the steps of:

heating in a chemical vapor deposition reactor a substrate upon which deposition is desired to a temperature of from about 550° C. to about 750° C.;

maintaining in the reactor a pressure of from about 0.1 torr to about 1 atmosphere during the process;

introducing into the reactor a volatile silicon-containing feed, said silicon containing feed consisting essentially of one or more compounds having the general formula



$$R_2{-}\overset{\displaystyle R_1}{\underset{\displaystyle R_3}{Si}}{-}N_3$$

wherein: $R_1$, $R_2$, and $R_3$ are hydrogen, azido or 1 to 6 carbon alkyl, phenyl or 7 to 10 carbon alkaryl groups, at least one of $R_1$, $R_2$, and $R_3$, being 1 to 6 carbon alkyl, phenyl or 7 to 10 carbon alkaryl, and

maintaining the temperature and pressure in said ranges to cause a film of silicon to deposit on said substrate.

---

## 5,013,691

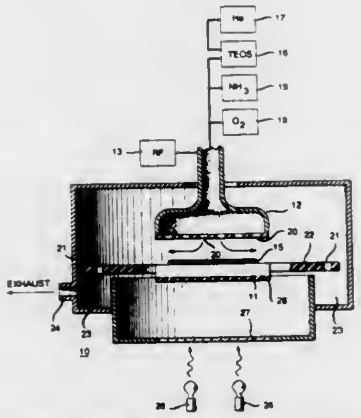
### ANISOTROPIC DEPOSITION OF SILICON DIOXIDE

**Earl R. Lory, Pennington, N.J., and Leonard J. Olmer, Austin, Tex., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jul. 31, 1989, Ser. No. 386,650**

**Int. Cl.$^5$ H01L** *21/90*

**U.S. Cl. 437—238** **16 Claims**



1. A method for making an integrated circuit device comprising the steps of depositing silicon dioxide on a substrate by subjecting the substrate to a radio-frequency plasma in an atmosphere including a source of silicon and a source of oxygen, characterized in that:

there is introduced into the atmosphere an inhibiting gas that inhibits the deposition of silicon dioxide on the substrate surface;

and the radio-frequency plasma is formed by subjecting the atmosphere to radio-frequency power in excess of 100 watts, whereby the density of said inhibiting gas is reduced on horizontal surfaces of the substrate with respect to vertical surfaces of the substrate, thereby promoting preferential silicon dioxide deposition on the horizontal surfaces.

---

## 5,013,692

### PROCESS FOR PREPARING A SILICON NITRIDE INSULATING FILM FOR SEMICONDUCTOR MEMORY DEVICE

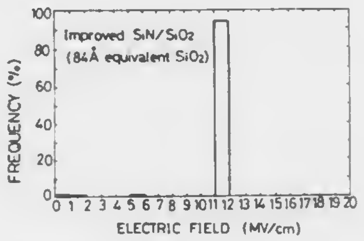
**Shigeaki Ide, Yamatokoriyama, and Ichiroh Oki, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 5, 1989, Ser. No. 446,115**

**Claims priority, application Japan, Dec. 8, 1988, 63-310510; Apr. 18, 1989, 63-99789**

**Int. Cl.$^5$ H01L** *21/283, 21/31, 21/311*

**U.S. Cl. 437—241** **10 Claims**



1. A process for preparing an insulating film for a semiconductor memory device which comprises formed a silicon nitride film over a substrate by a CVD technique, oxidizing the surface of the silicon nitride film to form a silicon oxide layer over the silicon nitride film, and removing the silicon oxide layer by etching to form an improved silicon nitride film having a capacitance and dielectric strength suitable for use as an insulating film in a semiconductor memory device, and then forming a conductive layer on the silicon nitride film.

---

## 5,013,693

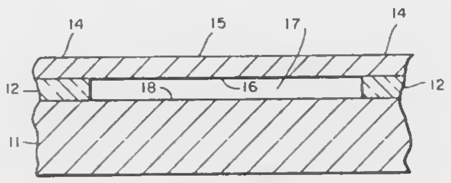
### FORMATION OF MICROSTRUCTURES WITH REMOVAL OF LIQUID BY FREEZING AND SUBLIMATION

**Henry Guckel, and Jeffry Sniegowski, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Feb. 16, 1989, Ser. No. 311,466**

**Int. Cl.$^5$ H01L** *21/64*

**U.S. Cl. 437—248** **35 Claims**



1. A method of producing a stable microstructure having a surface which is closely spaced to and faces a surface of a substrate and which has been formed by a liquid etching process such that the microstructure can deflect to contact the substrate if the liquid is dried from the substrate and microstructure, comprising the steps of:

(a) maintaining the substrate and microstructure in a freezable liquid so that the microstructure is not dried out after it is formed;

(b) freezing the liquid on the microstructure and the substrate;

(c) sublimating the frozen liquid from the microstructure and the substrate.

---

## 5,013,694

### TITANIUM DIBORIDE-CHROMIUM DIBORIDE-YTTRIUM TITANIUM OXIDE CERAMIC COMPOSITION AND A PROCESS FOR MAKING THE SAME

**Cressie E. Holcombe, Knoxville, and Norman L. Dykes, Oak Ridge, both of Tenn., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.**

**Filed Apr. 20, 1990, Ser. No. 513,337**

**Int. Cl.$^5$ C04B** *35/58*

**U.S. Cl. 501—98** **2 Claims**

2. A ceramic composition consisting essentially of from about 84 to 96 w/o titanium diboride, from about 1 to 9 w/o chromium diboride, and from about 3 to about 15 w/o yttrium-titanium--oxide made by a method comparing the following steps:

Step 1—providing a consolidated body containing stoichiometric quantities of titanium diboride and chromium diboride;

Step 2—enclosing and contacting said consolidated body with a thermally insulated package of yttria granules, said insulated package having a thickness of at least 0.5 inches; and

Step 3—heating said consolidated body enclosed in the thermally insulated package of yttria granules in a microwave oven with microwave energy to a temperature equal to or greater than 1,900 degrees centigrade to sinter and uniformly disperse yttria particles having a size range from about 1 to about 12 microns throughout the consolidated body forming a densified body consisting essentially of titanium diboride, chromium diboride, and yttrium-titanium-oxide, said densified body having enhanced fracture toughness and hardness.

---

## 5,013,695

### DIELECTRIC CERAMIC COMPOSITION

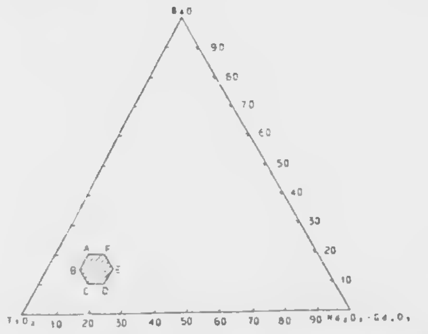
**Hiroshi Kato; Shinsuke Yano; Toshio Nonomura, and Susumu Nishigaki, all of Nagoya, Japan, assignors to Narumi China Corporation, Nagoya, Japan**

**Filed May 22, 1989, Ser. No. 354,564**

**Claims priority, application Japan, May 24, 1988, 63-126353**

**Int. Cl.$^5$ C04B** *35/46*

**U.S. Cl. 501—139** **4 Claims**



1. A dielectric ceramic composition consisting essentially of barium oxide, titanium oxide, neodymium oxide and gadolinium oxide and expressed by the formula:

$$aBaO\text{-}bTiO_2\text{-}c[(1-X)Nd_2O_3\text{-}XGd_2O_3]$$

wherein, $0.10 \leqq a \leqq 0.20$, $0.65 \leqq b \leqq 0.75$, $0.10 \leqq c \leqq 0.20$, $a+b+c=1$ (a, b, and c are mole fractions), and $0 < X \leqq 0.4$ (X is a mole fraction of $Gd_2O_3$ based on the total amount of $Nd_2O_3$ and $Gd_2O_3$).

---

## 5,013,696

### PREPARATION OF HIGH UNIFORMITY POLYCRYSTALLINE CERAMICS BY PRESINTERING, HOT ISOSTATIC PRESSING AND SINTERING AND THE RESULTING CERAMIC

**Charles D. Greskovich; William P. Minnear, both of Schenectady; Milivoj K. Brun, Ballstoo Lake, all of N.Y., and Robert J. Riedner, Waukesha, Wis., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 25, 1989, Ser. No. 412,237**

**Int. Cl.$^5$ C04B** *35/10*

**U.S. Cl. 501—153** **39 Claims**

1. A method of producing a ceramic body comprising:

providing a green compact of appropriate configuration and composition;

presintering said compact at a temperature sufficient to promote grain growth to a substantially closed pore stage;

hot isostatic pressing said presintered compact at a temperature and pressure sufficient to eliminate most pores which are located at grain boundaries; and

resintering said body to induce further grain growth and further densification by reducing the number density of pores by a factor of at least 125.

---

## 5,013,697

### SEALING GLASS COMPOSITIONS

**Masyood Akhtar, San Diego, Calif., assignor to Johnson Matthey Inc., Valley Forge, Pa.**

**Filed Jun. 21, 1990, Ser. No. 541,606**

**Int. Cl.$^5$ C03C** *3/21, 8/10*

**U.S. Cl. 501—46** **4 Claims**

1. A sealing glass composition for bonding ceramic surfaces which is capable of developing satisfactory bonding strength at firing temperatures of less than 400° C. comprising, in wt. % 18-70% lead oxide, 18-60% vanadium oxide, 1-10% phosphorous oxide, 0-30% bismuth oxide, 1-15% of at least one of the oxides from the group consisting of tellurium oxide and selenium oxide and 0.5 to 5% niobium oxide.

---

## 5,013,698

### METHOD OF REDUCING CARBON LOSS IN REGENERATION PROCESS

**Jack J. Lonsinger; Deborah A. Lonsinger, both of 508 Clayview Dr., Liberty, Mo. 64068**

**Filed Dec. 27, 1989, Ser. No. 457,395**

**Int. Cl.$^5$ B01J** *20/34, 38/60;* **C02F** *1/42*

**U.S. Cl. 502—27** **5 Claims**

1. A method of regenerating calcium contaminated spent activated carbon which has been used in water purification, said method being characterized by reducing carbon loss and comprising the steps of:

washing the carbon to be regenerated with an inorganic acid to remove calcium;

terminating said washing step prior to carbon regeneration;

rinsing the acid washed carbon with water to obtain a pH of about 5 or greater;

separating the washed carbon from the rinse water;

VOL
1126
ISS
1
MY
7
1991
UMI

drying the washed and rinsed carbon to remove any remaining water;
raising the temperature of the dried carbon to about 500 degrees C. to 1100 degrees C. while introducing water vapor so as to effect the reaction:

$C+H_2O \rightarrow CO+H_2$;

and
removing the regenerated carbon.

---

### 5,013,699
### NOVEL ZEOLITE COMPOSITIONS DERIVED FROM ZEOLITE Y

**James G. Vassilakis, New York, and Donald F. Best, Mahopac, both of N.Y., assignors to UOP, Des Plaines, Ill.**
**Continuation-in-part of Ser. No. 178,901, Apr. 7, 1988, abandoned. This application Oct. 5, 1989, Ser. No. 417,611**
**Int. Cl.$^5$ B01J** *29/08*
**U.S. Cl. 502—73** **6 Claims**

1. A zeolite composition prepared by the process comprising the steps of:
(a) providing a crystalline sodium zeolite Y starting composition and contacting said starting composition with ammonium cations under cation exchange conditions to reduce the $Na_2O$ content of the starting composition to less than 3.0 weight percent;
(b) hydrothermally steaming the ammonium exchanged zeolite Y of step (a) at a temperature of from 550° C. to about 850° C. to reduce the unit cell dimension of the crystal lattice;
(c) contacting the steamed product of step (b) with a sufficient amount of an aqueous solution of ammonium ions having a pH of less than about 4.0 and for a sufficient time to exchange at least some of the residual sodium cations and to increase the bulk $Si/Al_2$ ratio of the composition to the range of 6.5 to 20; and
(d) recovering the ion-exchanged and extracted product of step (c).

---

### 5,013,700
### METHOD OF PRODUCING DEALUMINISED ZEOLITE Y OF HIGH HYDROPHOBICITY

**Lars Falth, Videvägen 50, S-275 00 Sjobo, Sweden**
**Filed May 12, 1989, Ser. No. 353,627**
**Claims priority, application Sweden, Nov. 14, 1986, 8604873**
**Int. Cl.$^5$ B01J** *20/16, 29/08*
**U.S. Cl. 502—79** **7 Claims**

1. A method of increasing the hydrophobicity of dealuminised zeolite Y, comprising the steps of:
A. Washing the dealuminised zeolite Y with water to remove substantially all chloride,
B. Leaching the washed dealuminised zeolite Y with an acid; and
C. Heating the leached dealuminised zeolite Y to temperatures of between 800°-1100° C.

---

### 5,013,701
### CATALYST SYSTEM FOR HIGH-TEMPERATURE (CO) POLYMERIZATION OF ETHYLENE

**Luc M. C. Coosmans, Houthalen, Belgium; Johannes Blenkers, Beek, and Jacobus Loontjens, Meerssen, both of Netherlands, assignors to Stamicarbon, B.V., Geleen, Netherlands**
**Continuation of Ser. No. 154,371, Feb. 10, 1988, abandoned. This application Apr. 10, 1989, Ser. No. 336,608**
**Claims priority, application Netherlands, Feb. 11, 1987, 8700321**
**The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.**
**Int. Cl.$^5$ C08F** *4/685*
**U.S. Cl. 502—110** **23 Claims**

1. Catalyst system, suitable for the (co)polymerization of ethylene and optionally minor amounts of 1-alkenes and/or dienes at a temperature of at least 180° C., to be prepared by combining at least two components A and B, which components comprise:
A. one or more titanium compounds, one or more vanadium compounds, one or more aluminum compounds, one or more magnesium compounds and optionally one or more chlorides, the chlorides being selected from the group consisting of alkyl chlorides, acyl chlorides and aryl chlorides, in such amounts that the atomic ratio of magnesium to the sum of titanium and vanadium is between 0 and 10, the atomic ratio of aluminum to the sum of titanium and vanadium is at least 3, the atomic ratio of aluminum to magnesium is at least 1, and the atomic ratio of halogen to magnesium is at least 2, said titanium compound(s) being of the general formula $Ti(OR^1)_{4-n}\text{-}X^1_n$ and/or $Ti(OR^2)_{3-m}X^2_m$, where the symbols $R^1$ and $R^2$ are equal or different and represent hydrocarbon radicals with 1-20 carbon atoms, $X^1$ and $X^2$ halogen atoms, $0 \leqq n \leqq 4$ and $0 \leqq m \leqq 3$, said vanadium compound(s) being of the general formule $VO(OR^3)_{3-p}X^3_p$, where $R^3$represents a hydrocarbon radical with 1-20 carbon atoms, $X^3$ a halogen atom and $0 \leqq p \leqq 3$, and/or the compounds of the general formula $VX^4_3$ or $VX^4_4$, where $X^4$ represents a halogen atom, said magnesium compound(s) containing at least one hydrocarbon radical bound to the magnesium atom, said aluminum compound(s) being of the general formula $R^4_qAlX^5_{3-q}$, where the symbols $R^4$ are equal or different and represent a hydrocarbon radical with 1-20 carbon atoms, $X^5$ represents a halogen atom and $0 \leqq q \leqq 3$,
B. one or more organoaluminium compounds, of the general formula $R^5_sAlY_{3-s}$, where the symbols $R^5$ are equal or different and represent a hydrocarbon radical with 1-20 carbon atoms, Y a hydrogen atom, a hydrocarbon radical with 1-20 carbon atoms, a group of the general formula $—NR^6$ (where $R^6$ is a hydrocarbon radical with 1-10 carbon atoms), or a group of the general formula $—OR^7$ (where $R^7$ is a hydrocarbon radical with 1-20 carbon atoms, or a group of the general formula $—Si(R^8)_3$, where the symbols $R^8$ are equal or different and represent a hydrogen atom and/or a hydrocarbon radical with 1-20 carbon atoms), and $0 < s \leqq 3$, which two components are, separately or in combination, supplied direct to the polymerization vessel with mixing of the ingredients of the catalyst components for no longer than 5 minutes.

22. Process for the preparation of a catalyst according to claim 1, characterized in that the magnesium compound and the aluminium compound and the optional halogen compound of compound A are mixed with each other before the titanium and the vanadium compound are added.

---

### 5,013,702
### OLEFIN POLYMERIZATION CATALYST

**Gregory G. Arzoumanidis, Naperville; Nicholas M. Karayannis, Naperville; Habet M. Khelghatian, Naperville; Sam S. Lee, Hoffman Estates, all of Ill., and Bryce V. Johnson, Mound, Minn., assignors to Amoco Corporation, Chicago, Ill.**
**Division of Ser. No. 351,408, May 12, 1989, which is a division of Ser. No. 186,359, Apr. 25, 1988, Pat. No. 4,866,022, which is a continuation of Ser. No. 55,430, May 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 875,180, Jun. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 741,858, Jun. 6, 1985, Pat. No. 4,612,299, which is a continuation-in-part of Ser. No. 629,106, Jul. 9, 1984, abandoned, which is a continuation-in-part of Ser. No. 592,910, Mar. 23, 1984, Pat. No. 4,540,679. This application Nov. 9, 1989, Ser. No. 434,915**
**Int. Cl.$^5$ C08F** *4/656*
**U.S. Cl. 502—120** **5 Claims**

1. A solid, hydrocarbon-insoluble alpha-olefin polymerization catalyst component comprises a product formed by:
A. Forming a solution of a magnesium-containing species formed from a magnesium alkoxide and sulfur dioxide;

B. Precipitating solid particles from such magnesium-containing solution by treatment with a transition metal halide and an organosilane having a formula: $R_nSiR'_{4-n}$wherein n=0 to 4 and wherein R is hydrogen or an alkyl, a haloalkyl or aryl radical containing one to about ten carbon atoms or a halosilyl radical or haloalkylsilyl radical containing one to about eight carbon atoms, and R' is OR a halogen:
C. Reprecipitating such solid particles from a mixture containing a cyclic ether; and
D. Treating the reprecipitated particles with a transition metal compound and an electron donor.

---

### 5,013,703
### NOBLE METAL EXCHANGE OF HYDROPHOBIC MOLECULAR SIEVES

**Mark T. Staniulis, Peekskill; Douglas E. Crozier, Yonkers, both of N.Y.; Alan P. Risch, New Fairfield, and Jenny L. Pai, Brookfield, both of Conn., assignors to UOP, Des Plaines, Ill.**
**Filed Sep. 5, 1989, Ser. No. 402,745**
**Int. Cl.$^5$ B01J** *21/08, 23/38*
**U.S. Cl. 502—241** **14 Claims**

1. A method of making silicalite having at least 8 weight percent noble metal thereon at a dispersion of at least 60% comprising: (a) pretreating the silicalite with a base by contacting the silicalite at a temperature from about 10° to about 75° C. with an aqueous solution of a strong base; (b) mixing the base pretreated silicalite with an aqueous solution of a noble metal compound at a pH from about 9.5 to about 12.0 at a temperature between about 30° and about 75° C.; (c) calcining in a non-reducing atmosphere the resulting noble metal impregnated silicalite at a temperature between about 250° and about 450° C. for a time from 1 to about 6 hours; (d) repeating stages (b) and (c); and recovering the resulting noble metal impregnated silicalite.

11. A catalytic composite comprising a noble metal deposited on silicalite, said composite containing at least 8 weight percent of the noble metal at a dispersion of at least 60 percent, the noble metal being selected from the group consisting of platinum, palladium, rhodium, ruthenium, osmium, iridium, rhenium, gold, or any combination thereof.

---

### 5,013,704
### NOVEL PLATINUM-RHENIUM-ALUMINA CATALYSTS FOR REFORMING

**William C. Baird, Jr., Baton Rouge, La., and Ehsan I. Shoukry, Brights Grove, Canada, assignors to Exxon Research and Engineering Company, Florham Park, N.J.**
**Filed Jul. 3, 1989, Ser. No. 375,224**
**Int. Cl.$^5$ B01J** *21/14, 23/36, 23/58*
**U.S. Cl. 502—241** **16 Claims**

1. A catalyst composition for reforming naphthas, which composition is comprised of 0.01 to 2 wt. % platinum, 0.01 to 2 wt. % rhenium, and a modified alumina which modifier is comprised of about 100 to 500 wppm Si and at least about 10 wppm of one or more alkaline earth metals selected from the group consisting of Ca, Mg, Ba, and Sr, wherein the total amount of modifier does not exceed about 5000 wppm.

---

### 5,013,705
### PLATINUM-FREE THREE-WAY CATALYST

**Edgar Koberstein, Alzenau; Bernd Engler, Hanau; Rainer Domesle, Maintal, and Herbert Voelker, Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**
**Filed Oct. 28, 1988, Ser. No. 263,701**
**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736811**
**Int. Cl.$^5$ B01J** *21/04, 23/10, 23/44, 23/46*
**U.S. Cl. 502—262** **14 Claims**

1. A platinum-free three-way supported catalyst with an active phase applied to aluminum oxide of the transition series, said active phase consisting of 0.03-3% by weight palladium and rhodium with a weight ratio between palladium and rhodium of 1:1 to 20:1,
said aluminum oxide having a cerium dioxide content of 25 to 50% by weight, whereby the weight amounts of noble metal, cerium dioxide and aluminum oxide constitute 100%, the active phase being present as a coating on a honeycombed, inert carrier support of ceramic or metal,
the supported catalyst being obtained by a process comprising: depositing onto said honeycombed, inert carrier support the aluminum oxide, optionally latticestabilized, in the form of an aqueous suspension in which a cerium salt is dissolved in solution and which optionally additionally contains a cerium compound in solid form to thereby obtain a catalyst precursor A,
drying and tempering said catalyst precursor A deposited on said carrier support in air at 300°-950° C.,
thereafter impregnating said catalyst precursor A with an aqueous solution of palladium- and rhodium salt to thereby obtain a catalyst precursor B,
drying and finally tempering said catalyst precursor B at a temperature above 250° C., optionally in a gas stream containing hydrogen.

---

### 5,013,706
### METAL OXIDE POWDERS OR THEIR MIXTURES AND THEIR USE IN CATALYTIC DEHYDROGENATION OF HYDROCARBONS

**Bernhard Schramm, Heidelberg; Jurgen Kern, Bammental; Harald Schwahn, Wiesloch; August-Wilbelm Preuss, Dorsten; Klaus Gottlieb, Herdecke, and Hartmut Bruderreck, Borken, all of Fed. Rep. of Germany, assignors to Veba Oel Aktiengesellschaft, Gelsenkirchen, Fed. Rep. of Germany**
**PCT No. PCT/DE88/00683, § 371 Date Jun. 6, 1989, § 102(e) Date Jun. 6, 1989, PCT Pub. No. WO89/04717, PCT Pub. Date Jun. 1, 1989**
**PCT Filed Nov. 5, 1988, Ser. No. 372,358**
**Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3739002**
**Int. Cl.$^5$ B01J** *21/06, 23/22, 23/26*
**U.S. Cl. 502—309** **11 Claims**

1. A metal oxide powder comprising Cr (III) oxide, Ti (IV) oxide, V (V) oxide, or mixtures thereof, having a BET surface area of 5-50 $m^2/g$ and a mean particle diameter of 25-350 nm, having been prepared by continuous laser pyrolysis at a pressure of 10-1000 mbar of vaporized chromyl chloride, titanium tetrachloride, vanadyl chloride, or mixtures thereof, in the presence of a gas of hydrogen, nitrogen, sulfur hexafluoride, or oxygen, or a mixture of any of these gases with a noble gas, or in the presence of a noble gas.

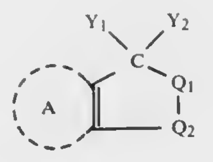
---

### 5,013,707
### PRESSURE- OR HEAT-SENSITIVE RECORDING MATERIAL

**Rox Phaff, Itingen, and Rudolf Zink, Therwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Filed Dec. 14, 1989, Ser. No. 450,650**
**Claims priority, application Switzerland, Dec. 21, 1988, 4714/88**
**Int. Cl.$^5$ B41M** *5/16, 5/18, 5/22*
**U.S. Cl. 503—212** **28 Claims**

1. A pressure-sensitive or heat-sensitive recording material comprising a substrate and a colour reactant system in which the colour reactant system comprises, as essential components, (A) an electron-donating compound of the formula

VOL
1126
ISS
1
MY
7
1991
UMI



(1)

in which

$Y_1$ and $Y_2$ are substituents which are detachable as anions and can be identical, different or bound to one another and

$Q_1$ is —O—, —S—, >N—R or >N—NH—R,

$Q_2$ is —$CH_2$—, —CO—, —CS— or $SO_2$—,

R is hydrogen, $C_1$–$C_{12}$alkyl, $C_5$–$C_{10}$cycloalkyl, aryl or aralkyl and

ring A is an aromatic radical which has 6 ring atoms and can contain an aromatic fused ring, it being possible not only for ring A but also for the fused ring to be substituted,

(B) two organic condensation components which are identical to or different from one another and together are capable of forming a chromogenic compound with component (A) and

(C) an electron-withdrawing and colour-developing component.

---

## 5,013,708
## PRESSURE-SENSITIVE RECORDING SHEET AND COATING MATERIAL THEREFOR

**Fumio Nishiyama, Tokyo, Japan, assignor to Jujo Paper Co., Ltd., Tokyo, Japan**

**Filed Oct. 24, 1989, Ser. No. 426,740**

**Claims priority, application Japan, Dec. 24, 1988, 63-326935**

**Int. Cl.$^5$ B41M** *5/165*

**U.S. Cl. 503—213** **6 Claims**

1. A coating material for a pressure-sensitive recording sheet which comprises both microcapsules A and microcapsules B, said microcapsules A having a volume-average particle size of circa 3–15 um and containing a colorless dye and a solvent $S_1$ which dissolves said colorless dye for a pressure-sensitive recording sheet, and said microcapsules B having a volume-average particle size of circa 2–10 um and containing a dye-free solvent $S_2$ which has no ability of dissolving dye and which has a lower boiling point than said solvent $S_1$.

---

## 5,013,709
## PRESSURE-SENSITIVE RECORDING PAPER AND COLOR DEVELOPER THEREFOR

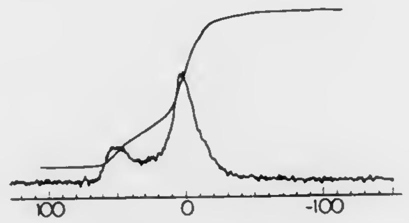
**Masahide Ogawa, Shibata; Teiji Sato, Shibata; Kiyoshi Abe, Shibata; Hisashi Tsuchida, Nakajo; Hiroo Inoue, Shiunji, and Mitsuo Saito, Nakajo, all of Japan, assignors to Mizusawa Industrial Chemicals, Ltd., Tokyo, Japan**

**Filed Sep. 19, 1989, Ser. No. 409,416**

**Claims priority, application Japan, Feb. 28, 1989, 1-45331**

**Int. Cl.$^5$ B41M** *5/16, 5/22*

**U.S. Cl. 503—225** **8 Claims**



6. A pressure-sensitive recording paper comprising a paper substrate and a layer of a color developer comprising a color developer composed of an acid-treated smectite clay mineral and a binder, which is formed on the surface of the paper substrate, wherein the acid-treated smectite clay mineral has a chemical composition, expressed based on oxides of the product dried at 110° C., comprising 75 to 92% by weight of $SiO_2$, 3.5 to 12.8% by weight of $Al_2O_3$, 0.7 to 3.0% by weight of $Fe_2O_3$ and 0.8 to 5.0% by weight of MgO, the acid-treated smectite clay mineral has an X-ray diffraction pattern peculiar to dioctahedral smecite in spacings of from 1.49 to 1.51 Å, in the $^{27}Al$ solid MAS-NMR measurement of the acid-treated smectite clay mineral, the ratio $S_{VI}/S_{IV}$ of the peak area ($S_{VI}$) in the chemical shift range of from 31 ppm to −50 ppm to the peak area ($S_{IV}$) in the chemical shift range of from 31 ppm to 100 ppm is in the range of from 60/40 to 85/15, and the acid-treated smectite clay mineral has a cation exchange capacity of 20 to 60 meg/100 g and a Hunter whiteness of at least 80%.

---

## 5,013,710
## HEAT TRANSFER SHEET

**Jumpei Kanto, and Hitoshi Saito, both of Shinjuku, Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 31, 1989, Ser. No. 304,037**

**Claims priority, application Japan, Feb. 2, 1988, 63-21226**

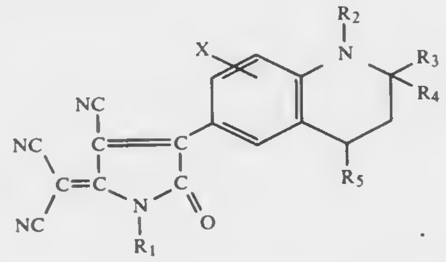
**Int. Cl.$^5$ B41M** *5/35, 5/26*

**U.S. Cl. 503—227** **4 Claims**

1. A process for heat transfer printing, comprising the steps of:

providing an image-receiving sheet comprising an image-receiving layer for receiving a dye;

providing a heat transfer sheet comprising a substrate sheet having opposed surfaces and a dye carrying layer formed on one of said opposed surfaces, said dye carrying layer comprising a binder and a dye represented by the formula (I) shown below:



(I)

wherein $R_1$ to $R_5$ each represent a hydrogen atom, a substituted or unsubstituted alkyl, cycloalkyl, alkenyl, alkynyl or phenyl group, and X represents a hydrogen atom, a halogen atom, an alkyl or alkoxy group, —NHCOR or —$NHSO_2R$, wherein R has the same meaning as $R_1$;

laminating said heat transfer sheet with said image-receiving sheet; and

applying heating means to said heat transfer sheet to selectively migrate said dye from said heat transfer sheet to said image-receiving layer to thereby form an image on said image-receiving sheet.

---

## 5,013,711
## IMAGE-RECEIVING SHEET

**Noritaka Egashira; Kenichiro Suto, and Atsushi Muro, all of Shinjuku, Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan**

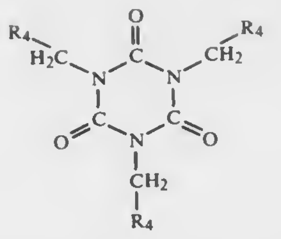
**Division of Ser. No. 268,987, Nov. 9, 1988, Pat. No. 4,929,591. This application Mar. 8, 1990, Ser. No. 490,422**

**Claims priority, application Japan, Nov. 13, 1987, 62-2865743; Oct. 24, 1988, 63-26624**

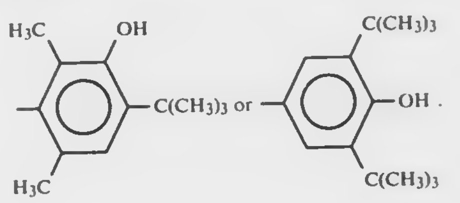
**Int. Cl.$^5$ B41M** *5/035, 5/26*

**U.S. Cl. 503—227** **6 Claims**

1. An image-receiving sheet for thermal dye transfer, comprising a substrate sheet and a dye receiving layer formed on at least one surface of said substrate sheet, said dye receiving layer comprising a synthetic resin and at least one anti-oxidant represented by the following formula:



wherein $R_4$ is at least one material selected from the group consisting of



---

## 5,013,712
## MAGENTA DYE-DONOR ELEMENT USED IN THERMAL TRANSFER AND THERMAL TRANSFER SHEET USING IT

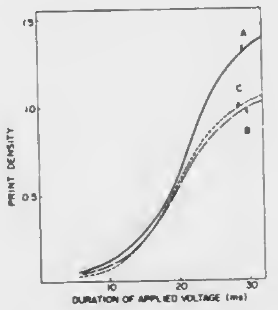
**Yoshiaki Hayashi, and Taira Fujita, both of Osaka, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan**

**Filed Oct. 12, 1989, Ser. No. 420,374**

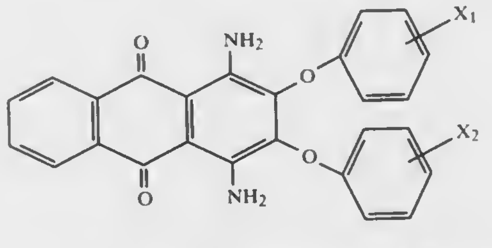
**Claims priority, application Japan, Oct. 13, 1988, 1-258935; Jul. 19, 1989, 63-187644**

**Int. Cl.$^5$ B41M** *5/035, 5/26;* **C09D** *11/00*

**U.S. Cl. 503—227** **22 Claims**

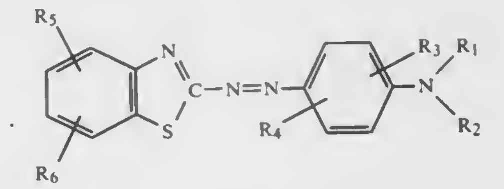


15. A thermal transfer sheet which comprises a substrate sheet and a magenta dye-donor element layer comprising a magenta dye dispersed or dissolved in a polymeric binder provided on one side of the substrate sheet, said magenta dye comprising a dye represented by the following formula (I):



(I)

wherein $X_1$ and $X_2$ each represents a hydrogen atom, a halogen atom, a trifluoromethyl group, a $C_1$–$C_6$ alkyl group or a $C_1$–$C_6$ alkoxy group dye represented by the following formula (II):



(II)

wherein $R_1$ and $R_2$ each represents a hydrogen atom, a $C_1$–$C_6$ alkyl group, a phenyl group, or a $C_1$–$C_4$ alkyl group substituted with a $C_1$–$C_4$ alkoxy group, a $C_1$–$C_4$ alkoxy-carbonyl group, a $C_1$–$C_4$ alkyl-carbonyloxy group, an aminocarbonyl group, a $C_1$–$C_4$ alkoxy-carbonyloxy group, a cyano group, a phenyl group or a chlorine atom, $R_3$ and $R_4$ each represents a hydrogen atom, a chlorine atom, a $C_1$–$C_6$ alkyl group, a $C_1$–$C_4$ alkyl-carbonylamino group, a phenylcarbonylamino group or a $C_1$–$C_4$ alkoxy group, and $R_5$ and $R_6$ each represents a hydrogen atom, a chlorine atom, a bromine atom, a cyano group, a thiocyano group, a nitro group, a $C_1$–$C_6$ alkyl group, a $C_1$–$C_4$ alkoxy group, a $C_1$–$C_4$ alkylthio group or a $C_1$–$C_4$ alkylsulfonyl group.

---

## 5,013,713
## PROLONGED RELEASE OF BIOLOGICALLY ACTIVE SOMATOTROPIN

**James W. Mitchell, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Continuation of Ser. No. 787,873, Oct. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 657,713, Oct. 4, 1984, abandoned. This application Sep. 29, 1989, Ser. No. 414,503**

**Claims priority, application Spain, Oct. 2, 1985, 85/547.489; Canada, Oct. 3, 1985, 3721567**

**Int. Cl.$^5$ A61K** *37/36;* **C07K** *13/00*

**U.S. Cl. 514—2** **29 Claims**

1. A method for achieving prolonged release of a biologically active somatotropin into the circulatory system of an animal which comprises parenteral administration to the animal by subcutaneous or intramuscular injection of a substantially non-aqueous composition comprising at least about 10% by weight of a biologically active somatotropin and, as a continuous phase of the composition, a biocompatible oil.

---

## 5,013,714
## VISCOELASTIC SOLUTION

**Richard L. Lindstrom, 1741 Archer Ct., Plymouth, Minn. 55447, and Debra Skelnik, P.O. Box 758, Rte. 1, Cambridge, Minn. 55008**

**Filed Dec. 15, 1988, Ser. No. 284,533**

**Int. Cl.$^5$ A61K** *37/00, 37/26, 37/36*

**U.S. Cl. 514—4** **4 Claims**

1. A viscoelastic solution comprising:

a. a buffered balanced salt solution;
b. hydroxypropyl methylcellulose;
c. chondroitin sulfate; and,
e. Epidermal Growth Factor (EGF);

the solution having a pH of 6.0–8.0 and an osmolality of 200–400 mOsmol/L.

---

## 5,013,715
## PASTY ORGANOPOLYSILOXANE COMPOSITION

**Shigeru Mori, and Satoshi Kuwata, both of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Mar. 24, 1988, Ser. No. 172,689**

**Claims priority, application Japan, Mar. 24, 1987, 62-69592**

**Int. Cl.$^5$ A61K** *31/00*

**U.S. Cl. 514—53** **8 Claims**

1. A pasty organopolysiloxane composition adapted for use as a base for pasty cosmetic and pharmaceutical preparations, substantially free from solids which leave a powdery residue

VOL
1126
ISS
1
MY
7
1991
UMI

on a surface to which the composition is applied and which consists essentially of, in admixture:

(A) a polysiloxane component which is

(i) a methyl phenyl polysiloxane fluid represented by the average unit formula

$R_aSiO_{(4-a)/2}$

in which R is a methyl group or phenyl group, at least one of the groups denoted by R in a molecule being phenyl, and the subscript a is a positive number in the range from 2 to 3, and having a viscosity in the range from 4 to 1000 centistokes at 25° C.; or

(ii) a mixture of (i) and up to 80% by weight of (i) of a cyclic poly(dimethyl siloxane) having a degree of polymerization of 3 to 6, a linear poly(dimethyl siloxane) having a degree of polymerization not exceeding 650 excepting the terminal groups, the terminal group being a silanolic hydroxy group or a trimethyl silyl group; and

(B) a fatty acid ester of saccharose in an amount in the range from 5 to 50 parts by weight per 100 parts by weight of the component.

---

### 5,013,716
### UNPLEASANT TASTE MASKING COMPOSITIONS AND METHODS FOR PREPARING SAME

**Subraman R. Cherukuri, Towaco, N.J.; Lucy L. Wong, Jackson Heights, N.Y., and Steven M. Faust, Stanhope, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Oct. 28, 1988, Ser. No. 264,281**

**Int. Cl.$^5$ A61K** *31/70, 31/715*

**U.S. Cl. 514—23** **31 Claims**

1. An unpleasant taste masking composition which comprises a medicament drug having a bitter taste or unpleasant off-note and a chlorodeoxysugar derivative selected from the group consisting of chlorodeoxysucrose derivatives and chlorodeoxygalactosucrose derivaties and mixtures thereof in an amount from about 0.001% to about 5.0%, by weight to nullify the taste or unpleasant off-note of the medicament drug.

---

### 5,013,717
### BLOOD COMPATIBLE, LUBRICIOUS ARTICLE AND COMPOSITION AND METHOD THEREFOR

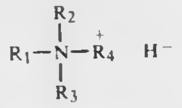
**Donald D. Solomon, Spring Valley; Robert A. Taller, Centerville, and Victor A. Williamitis, Dayton, all of Ohio, assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.**

**Filed Apr. 18, 1988, Ser. No. 182,694**

**Int. Cl.$^5$ A61K** *35/14*

**U.S. Cl. 514—56** **10 Claims**

1. A composition for coating a polymeric surface comprising a mixture of a quaternary ammonium complex of heparin and about 2 to 75% by weight of a noncuring lubricating silicone. said complex having the formula



$$R_1-\underset{\underset{R_3}{|}}{\overset{\overset{R_2}{|}}{N}}-\overset{+}{R_4}\quad H^-$$

wherein $R_1$,$R_2$,$R_3$ and $R_4$ are independently selected from the group consisting of an alkyl group of 1 to about 18 carbon atoms and an aralkyl group of about 7 to 18 carbon atoms and $H^-$ is a negative ion of heparin, said silicone having a viscosity of about 20 to 1,000,000 centistokes.

---

### 5,013,718
### METHOD FOR TREATING IRON OVERLOAD USING EPO

**John W. Adamson, Bainbridge Island; Joseph W. Eschbach, Bellevue, both of Wash.; Michael R. Downing, and Joan C. Egrie, both of Thousand Oaks, Calif., assignors to Amgen, Inc., Thousand Oaks, Calif.**

**Filed Nov. 21, 1986, Ser. No. 933,495**

**Int. Cl.$^5$ C07K** *37/24, 37/36*

**U.S. Cl. 514—8** **8 Claims**

1. A method for reducing stored iron and serum iron in a mammal having an iron overload disorder comprising:

(a) administering to the mammal a therapeutically effective amount of human erythropoietin; and

(b) phlebotomizing the mammal.

---

### 5,013,719
### METHOD OF EFFECTING IMMUNOSUPPRESSION

**Terry L. Bowlin, Maineville, Ohio, assignor to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Filed May 13, 1988, Ser. No. 193,847**

**Int. Cl.$^5$ A61K** *37/02*

**U.S. Cl. 514—11** **1 Claim**

1. A method of effecting immunosuppression in a patient in need thereof, comprising co-administering to said patient an effective amount of cyclosporin A and an effective amount of α-DFMO.

---

### 5,013,720
### SAP-6-VAL PROTEINS AND METHODS

**Jeffrey A. Whitsett, Cincinnati, Ohio, assignor to Abbott Laboratories**

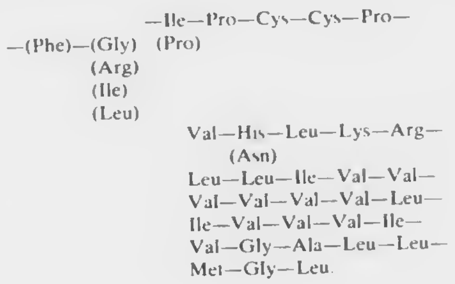
**Continuation of Ser. No. 860,239, May 6, 1986, abandoned. This application Apr. 4, 1990, Ser. No. 504,691**

**Int. Cl.$^5$ C07K** *13/00, 7/10;* **A61K** *37/00*

**U.S. Cl. 514—12** **51 Claims**

1. An isolated lung specific hydrophobic SAP-6-Val protein. said protein comprises a plurality of valine amino acid residues having a first stretch of about six adjacent valine amino acid residues and a second stretch of about three adjacent valine amino acid residues separated from the first stretch by about two hydrophobic amino acid residues, said protein enhances surfactant-like activity of phospholipids in lungs of an animal, has a molecular weight of about 3,500-4,000 daltons as determined by tricine-SDS-PAGE and a molecular weight of about 6,000 daltons as determined by SDS-PAGE, and is substantially resistant to protease, endoglycosidase F and collagenase enzymes.

7. An isolated lung specific hydrophobic surfactant-associated human protein having a molecular weight of about 3,500-4,000 daltons as determined by tricine-SDS-PAGE, said human protein enhancing surfactant-like activity of phospholipids in lungs of an animal and comprising the following amino acid sequence:



—Ile—Pro—Cys—Cys—Pro—
—(Phe)—(Gly) (Pro)
(Arg)
(Ile)
(Leu)
Val—His—Leu—Lys—Arg—
(Asn)
Leu—Leu—Ile—Val—Val—
Val—Val—Val—Val—Leu—
Ile—Val—Val—Val—Ile—
Val—Gly—Ala—Leu—Leu—
Met—Gly—Leu.

### 5,013,721
### ANOREXIGENIC AND HYPOTENSIVE PEPTIDES

**Pietro Melchiorri, and Lucia Negri, both of Segrate, Italy, assignors to Zambon Group S.P.A., Vincenza, Italy**

**Filed Jun. 20, 1989, Ser. No. 368,662**

**Claims priority, application Italy, Jul. 1, 1988, 21191 A/88**

**Int. Cl.$^5$ C07K** *7/10;* **A61K** *37/02*

**U.S. Cl. 514—13** **5 Claims**

1. A peptide of the general formula:

X—ILE—GLU—LYS—ARG—LEU—ASP—
THR—ILE—W (I)

wherein X is an amino acid residue or a peptide chain selected from the group consisting of:

ASP—LEU—SER—LEU GLU—LEU—LEU—LEU—MET— (II)
pGLU—LEU—LEU—ARG—CYS— (III)
MET—LEU—LEU—LEU— (IV)
pGLU—LEU—LEU—TYR— (V)
pGLU—MET—LEU—LEU— (VI)
pGLU—CYS—LEU—LEU— (VII)
MET—LEU—LEU—SER— (VIII)
pGLU—HIS—LEU—LEU— (IX)

and W is a hydroxy or amino group.

---

### 5,013,722
### CHOLECYSTOKININ ANALOGS FOR CONTROLLING APPETITE

**Waleed Danho, Wayne; Vincent S. Madison, Mountain Lakes, and Joseph Triscari, Bloomfield, all of N.J., assignors to Hoffmann-LaRoche Inc., Nutley, N.J.**

**Continuation of Ser. No. 65,241, Jun. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 871,721, Jun. 6, 1986, abandoned. This application Aug. 25, 1989, Ser. No. 400,177**

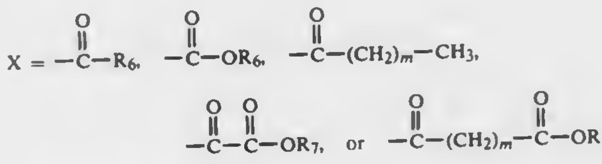
**Int. Cl.$^5$ A61K** *37/24;* **C07K** *7/06*

**U.S. Cl. 514—16** **22 Claims**

13. A method for suppressing food intake in mammals comprising administering to said mammal an effective food intake suppressing amount of a peptide of the formula:

$X—(R)_n—Tyr(SO_3H)—R_1—R_2—R_3—R_4—R_5—N—methyl—Phe—Y$

wherein



$$X = -\overset{\overset{O}{\|}}{C}-R_6,\quad -\overset{\overset{O}{\|}}{C}-OR_6,\quad -\overset{\overset{O}{\|}}{C}-(CH_2)_m-CH_3,$$
$$-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-OR_7,\quad \text{or}\quad -\overset{\overset{O}{\|}}{C}-(CH_2)_m-\overset{\overset{O}{\|}}{C}-OR_8$$

R=Asp or Aeg
$R_1$=Met, Nle, Leu, Ile, or a bond
$R_2$=Gly, Ala, D-Ala, of β-Ala
$R_3$=Trp or Trp(For)
$R_4$=Met, Nle, or Nva
$R_5$=Thr($SO_3H$), Ser($SO_3H$), or Hyp($SO_3H$)
$R_6$=H or $C_{1-3}$ alkyl
$R_7$=H, $C_{1-3}$ alkyl, or $C_{1-3}$ haloalkyl
$R_8$=H or $C_{1-3}$ alkyl
Y=$OR_8$ or $NR_9R_{10}$
$R_9$=H or $C_{1-3}$ alkyl
$R_{10}$=H or $C_{1-3}$ alkyl
n=0 or 1
m=1-4

or the pharmaceutically acceptable salt.

---

### 5,013,723
### NEW THYMOPENTIN RETRO-INVERSO ANALOGS AND FRAGMENTS THEREOF, A PROCESS OF PREPARATION OF THE NEW COMPOUNDS AND THE INTERMEDIATES OBTAINED THEREIN

**Alessandro Sisto, Rome, and Antonio Verdini, Monterotondo, both of Italy, assignors to Eniricerche S.p.A., Milan and Sclavo S.p.A., Siena, both of, Italy**

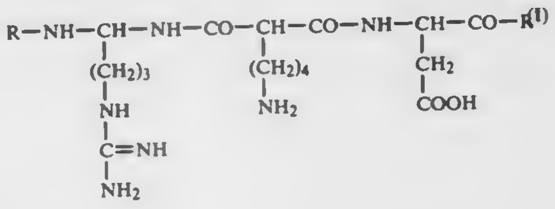
**Filed Mar. 15, 1988, Ser. No. 168,237**

**Claims priority, application Italy, Mar. 19, 1987, 19763 A/87**

**Int. Cl.$^5$ A61K** *37/02;* **C07C** *229/24, 251/02*

**U.S. Cl. 514—19** **5 Claims**

1. A compound of formula (I)



$$R-NH-\underset{\underset{\underset{\underset{\underset{\underset{\underset{NH_2}{|}}{C=NH}}{|}}{NH}}{|}}{(CH_2)_3}}{|}}{CH}-NH-CO-\underset{\underset{\underset{\underset{NH_2}{|}}{(CH_2)_4}}{|}}{CH}-CO-NH-\underset{\underset{\underset{\underset{COOH}{|}}{CH_2}}{|}}{CH}-CO-R^1 \quad (I)$$

wherein

R is hydrogen or an acyl radical, and

$R^1$ is an $—OR^2$

wherein

$R^2$ is hydrogen or a straight or branched alkyl radical of from 1 to 6 carbon atoms, a straight or branched alkenyl or alkynyl radical of from 3 to 6 carbon atoms, or an aryl-alkyl or alkyl-aryl radical of from 7 to 12 carbon atoms,

and the corresponding pharmaceutically acceptable acid- or base-addition salts.

5. A pharmceutical composition containing a pharmaceutically acceptable carrier and an immunoregulating amount of a compound of claim 1 as the active principle.

---

### 5,013,724
### PROCESS FOR THE SULFATION OF GLYCOSAMINOGLYCANS, THE SULFATED GLYCOSAMINOGLYCANS AND THEIR BIOLOGICAL APPLICATIONS

**Maurice Petitou, Paris Cedex, and Jean Choay, Paris, both of France, assignors to Sanofi Societe Anonyme, Paris, France**

**Filed Jul. 11, 1986, Ser. No. 884,404**

**Int. Cl.$^5$ C08B** *37/10;* **A61K** *31/725*

**U.S. Cl. 514—54** **69 Claims**

1. A process for the sulfation of glycosaminoglycans, which process comprises

(a) first, converting the glycosaminoglycans into amine salts, which salts are soluble in a dipolar aprotic solvent, and which salts allow the glycosaminoglycans to be treated with a sulfating agent without altering the degree of polymerization of the glycosaminoglycans, then

(b) dissolving the salts in the dipolar aprotic solvent, and

(c) treating the solution formed with the sulfating agent.

34. Glycosaminoglycans (I) with an altered sulfation pattern, wherein the glycosaminglycans (I) are represented by the following formula I:

$R—(XY)_n—R'$ (I)

in which:

R represents a uronic acid or an unsaturated uronic acid or an OH group;

X represents a glucosamine or a galactosamine moiety in which the carbon atom at position 2 has a substituent which is an $NHSO_3^-$ group, or, in the case of glucosamine and chains of the heparin type, an $NH_2$ or NH-acyl group;

Y represents a uronic acid selected from the group consisting of a D-glucuroic acid and a L-iduronic acid;

VOL
1126
ISS
1
MY
7
1991
UMI

n is an integer between 0 and 80;

R′ represents a glucosamine or galactosamine moiety in which the carbon atom at position 2 has a substituent which is an $NHSO_3^-$ group, or, in the case of glucosamine and chains of the heparin type, an $NH_2$ or an NH-acyl group, or represents an —O group or a glucosamine residue rearranged to a grouping with a 2,5-anhydromanno structure, or a galactosamine residue rearranged to a grouping with a 2,5 anhydrohexitol structure;

and the position of sulfate groups in the chain of the glycosaminglycans (I) is different from, and the degree of sulfation is greater than that encountered in naturally occurring glycosaminoglycans or depolymerized naturally occurring glycosaminoglycans otherwise having the structure of the glycosaminoglycans (1), said glycosaminoglycans (1) being other than those comprising mixtures of chains (a) with non-modified termini, (b) having a molecular weight less than 9,000, (c) with not more than a minor amount of species greater than 9,000, and their pharmacologically acceptable salts.

**59**. A pharmaceutical preparation which comprises as an active ingredient a glycosaminoglycan with a modified sulfation pattern according to claim **34**, in combination with a pharmaceutically acceptable carrier.

---

## 5,013,725
## PHARMACEUTICAL COMPOSITIONS SUBSTITUTED AMINOMETHYLENEBIS(PHOSPHONIC ACID) DERIVATIVES

**Yasuo Isomura, 4-12-11-919, Tabata sukai Haitsu, Nishiogu, Arakawa-ku, Tokyo, Japan 116 ; Makoto Takeuchi, 3-63-16, Purejiru Enomoto 201, Higashloizuml, Nerima-ku, Tokyo, Japan 178 ; Shuichl Sakamoto, 3-17-7, 402, Sakae-cho, Higashlmurayama-shi, Tokyo, Japan 189 , and Tetsushi Abe, 7-8-9, Azuma-cho, Iruma-shi, Saitama, Japan 358**

**Division of Ser. No. 333,971, Apr. 5, 1989, Pat. No. 4,933,472. This application Mar. 16, 1990, Ser. No. 495,388**

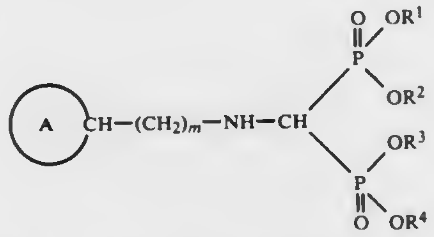
**Claims priority, application Japan, Apr. 8, 1988, 63-86347; Apr. 11, 1988, 63-89632; Feb. 18, 1989, 1-38871**

**The portion of the term of this patent subsequent to Jun. 12, 1990, has been disclaimed.**

**Int. Cl.⁵ A61K** *31/66, 31/665, 31/67*

**U.S. Cl. 514—99** **4 Claims**

1. A pharmaceutical composition comprising a substituted aminomethylenebis(phosphonic acid) derivative represented by the general formula:



in which $R^1$, $R^2$, $R^3$ and $R^4$ may be the same or different, each represents a hydrogen atom or a lower alkyl group; "m" is zero or represents an integer from 1 to 4; and ring "A" represents a cycloalkenyl group having 5 to 8 carbon atoms, a bicycloheptyl group, a bicycloheptenyl group or a saturated heterocyclic group having 4 to 7 carbon atoms and containing at least one member selected from the group consisting of an oxygen atom, a sulfur atom, a sulfinyl group (—SO—) and a sulfonyl group ($—SO_2—$), or pharmaceutically acceptable salts thereof and a pharmaceutically acceptable carrier.

---

## 5,013,726
## EXTERNAL ANALGESIC LOTION CONTAINING ACTIVE INGREDIENTS OF METHYL SALICYLATE AND CAMPHOR AND MENTHOL AND METHOD OF MAKING SUCH LOTION

**Jeffery W. Ivy, 218 Colller, Grand Sallne, Tex. 75140, and Curtis E. Payne, 255 Holley St., Alba, Te⁻. 75410**

**Filed Sep. 12, 1989, Ser. No. 406,072**

**Int. Cl.⁵ A61K** *9/06, 9/10, 33/24, 35/78*

**U.S. Cl. 514—159** **8 Claims**

1. An external analgesic lotion, consisting essentially of: from 0.0018 to 0.0022 parts by weight aloe powder; from 62.5510 to 76.4510 parts by weight deionized water; from 0.3150 to 0.3850 parts by weight carboxy polymethylene; from 3.6000 to 4.4000 parts by weight propylene glycol; from 0.1800 to 0.2200 parts by weight methyl hydroxybenzoate; from 0.0900 to 0.1100 parts by weight disodium dihydrogen ethylenediaminetetraacetate; from 0.6300 to 0.7700 parts by weight diethanolamine cetyl phosphate; from 1.0900 to 1.1000 parts by weight stearic acid; from 0.4500 to 0.5500 parts by weight PEG-8 distearate; from 4.5000 to 5.6800 parts by weight $C_{12-15}$ alcohols benzoate: from 0.0900 to 0.1100 parts by weight urea; from 1.8000 to 2.2000 parts by weight eucalyptus oil; from 9.0000 to 12.8000 parts by weight methyl salicylate; from 2.7000 to 3.3000 parts by weight camphor crystals; from 2.2500 to 2.7500 parts by weight menthol crystals; from 0.0900 to 0.1100 parts by weight jojoba oil; from 0.0900 to 0.1100 parts by weight of a blend in a 5 to 1 ratio of 1,000,000 International Units of vitamin A to 200,000 International Units of vitamin $D_3$; from 0.0900 to 0.1100 parts by weight di-alpha tocopheryl acetate; from 0.1800 to 0.2200 parts by weight ginseng American 1:1 propylene glycol; from 0.1800 to 0.2200 parts by weight imidazolidinyl urea; from 0.1800 to 0.2200 parts by weight triethanolamine; from 0.0900 to 0.1100 parts by weight of a solution of 1 percent FD&C Yellow #5 in water; and from 0.0423 to 0.0517 parts by weight 24 carat gold.

---

## 5,013,727
## PHARMACEUTICAL COMPOSITION AND METHOD FOR THE TREATMENT OF COLITIS ULCEROSA AND CROHN'S DISEASE BY ORAL ADMINISTRATION

**Soren Halskov, Helsinge, Denmark, assignor to Farmaceutisk Laboratorium Ferring A/S, Vanlose, Denmark**

**Division of Ser. No. 59,196, Jun. 8, 1987, Pat. No. 4,880,794, which is a continuation of Ser. No. 689,852, Jan. 8, 1985, abandoned, which is a division of Ser. No. 555,533, Nov. 28, 1983, Pat. No. 4,496,553, which is a continuation of Ser. No. 270,517, May 29, 1981, abandoned. This application Jun. 26, 1989, Ser. No. 371,123**

**Claims priority, application Denmark, Mar. 20, 1980, 1202/80**

**The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.**

**Int. Cl.⁵ A61K** *31/60*

U.S. Cl. 514—166 12 Claims

1. A method for the treatment of ulcerative colitis or Crohn's disease comprising orally administering an effective amount of a composition consisting essentially of a salt of 5-aminosalicylic acid in admixture with a pharmaceutically acceptable carrier so as to delay the release of said effective amount of 5-aminosalicylic acid to be administered essentially until the colon of the patient is reached.

---

## 5,013,728
## COMPOSITION FOR TREATING OSTEOPOROSIS AND HORMONAL IMBALANCE

**Marcus G. Grodberg, Newton, Mass., assignor to Colgate - Palmolive Company, New York, N.Y.**

**Filed May 4, 1990, Ser. No. 519,088**

**Int. Cl.⁵ A61K** *9/22, 9/26, 7/18, 33/16*

**U.S. Cl. 514—171** **9 Claims**

1. A medication for providing fluoride ion for the treatment and prevention of bone loss disease including osteoporosis, alveolar bone loss and hormonal imbalance, which comprises a solid, unitary dosage tablet, lozenge or capsule containing from about 20 to 100 milligrams of sodium monofluorophosphate and 0.02 to 1.2 mg of an estrogen-containing substance, uniformly and homogeneously dispersed in a hard dry compacted mass of water-swellable powders or fibers or cellulose material forming a coherent network as matrix which softens and loosens, from the remaining mass, upon introduction into an aqueous medium, to thereby release a stream of the uniformly and homogeneously dispersed fluoride and estrogen, for controlling the release of the monofluorophosphate over a period extending from four up to eight hours after swallowing, whereby the quantity of fluoride ions at any given time is below the threshhold value at which gastric irritation will occur.

---

## 5,013,729
## DIASTEREOMERIC 5R,6S-6-(1R-HYDROXYETHYL)-2-(CIS-1-OXO-3-THIOLANYLTHIO)-2-PENEM-3-CARBOXYLIC ACIDS

**Robert A. Volkmann, Ledyard, Conn., assignor to Pfizer Inc., New York, N.Y.**

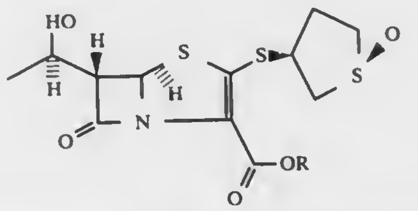
**PCT No. PCT/US87/01114, § 371 Date Oct. 18, 1989, § 102(e) Date Oct. 18, 1989, PCT Pub. No. WO88/08845, PCT Pub. Date Nov. 17, 1988**

**PCT Filed May 11, 1987, Ser. No. 460,118**

**Int. Cl.⁵ C07D** *499/00;* **A61K** *31/425*

**U.S. Cl. 514—195** **12 Claims**

1. A penem having the absolute stereochemical formula



wherein R is hydrogen or a radical forming an ester hydrolyzable under physiological conditions; or a pharmaceutically-acceptable cationic salt thereof when R is hydrogen.

---

## 5,013,730
## CEPHEM DERIVATIVES

**Jean C. Arnould, Cormontreuil, and Thomas G. C. Bird, Witry-Les-Reims, both of France, asslgnors to ICI-PHARMA, Gergy Cedex, France**

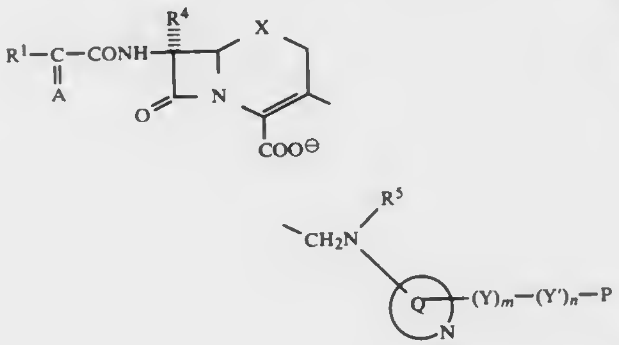
**Filed Jul. 18, 1988, Ser. No. 219,779**

**Claims priority, application European Pat. Off., Jul. 23, 1987, 87401720**

**Int. Cl.⁵ C07D** *501/38;* **A61K** *31/545*

**U.S. Cl. 514—202** **8 Claims**

1. A cephalosporin compound of the formula (Ia):



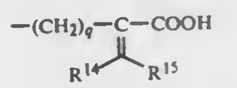
wherein:

X is sulphur or sulphinyl;

$R^1$ is 2-aminothiazol-4-yl or aminooxazol-4-yl each optionally substituted in the 5-position by fluorine, chlorine or bromine, or R1 is 5-aminoisothiazol-3-yl, 5-amino-1,2,4-thiadizol-3-yl, 3-aminopyrazol-5-yl, 3-aminopyrazol-4-yl, 2-aminopyrimidin-5-yl, 2-aminopyrid-6-yl, 4-aminopyrimidin-2-yl, 2-amino-1,3,4-thiadiazol-5-yl or 5-amino-1-methyl-1,2,4-triazol-3-yl;

A is of the formula $=NOR^2$ (having syn configuration about the double bond) wherein R2 is hydrogen, (1-6C)alkyl, (3-8C)cycloalkyl, (1-3C)alkyl(3-6C)cycloalkyl) (3-6C)cycloalkyl(1-3C)alkyl, (3-6C)alkenyl, optionally substituted by carboxy, (5-8C)cycloalkenyl, (3-6C)-alkynyl, 2-5C)alkylcarbamoyl, phenylcarbamoyl, benzycarbamoyl, di-(1-4C)alkylcarbamoyl(1-4C)alkyl, 1-4C)haloalkylcarbamoyl(1-4C)alkyl, (1-3C)haloalkyl, 2-6C)hydroxyalkyl, (1-4C)alkoxy(2-4C)alkyl, (1-4C)alkylthio(2-4C)alkyl, 1-4C)alkanesulphinyl(1-4C)alkyl, (1-4C)alkanesulphonyl(-1-4C)alkyl, amino(2-6C)alkyl, azido(2-6C)alkyl, ureido($C_2$-6)alkyl, (1-4C)alkylamino(1-6C)alkyl, (2-8C)dialkylamino(-2-6C)alkyl, 1-5C)cyanoalkyl, 3-amino-3-carboxypropyl, 2-(amidino)ethyl, 2-(amidinothio)ethyl, 2-(N-aminoamidinothio)ethyl, tetrahydropyran-2-yl, thietan-3-yl, 2-oxopyrrolidinyl, or 2-oxotetrahydrofuranyl,

or —R2 is of the formula IV



$$-(CH_2)_q-\underset{\underset{R^{14}\quad R^{15}}{\|}}{C}-COOH$$

in which q is 1 or 2 and R14 and R15 are hydrogen or (1-4-C)alkyl

or —R2 is of the formula V

$$-CR^{22}R^{23}-(CH_2)_r-COR^{24}$$

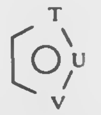
in which r is 0-3, R22 is hydrogen, (1-3C)alkyl or methyltio, R23 is hydrogen, (1-3C)alkyl, (3-7C)cycloalkyl, cyano, carboxy, (2-5C)carboxyalkyl or methanesulphonylamino, or R22 and R23 are joined to form, together with the carbon to which they are attached, a (3-7C)-carbocyclic ring, and R24 is hydroxy, amino, (1-4C)alkoxy, (1-4C)alkylamino or of the formula NHOR25 in which R25 is hydrogen or (1-4C)alkyl:

or A may be of the formula =CH.R3 wherein R3 is hydrogen, halogen, (1-6C)alkyl, (3-7C)cycloalkyl, (2-6C)alkenyl, (3-7C)cycloalkenyl, phenyl or benzyl;

$R^4$ is hydrogen, methoxy or formamido;

$R^5$ is hydrogen, (1-4C)alkyl, halo(1-4C)alkyl, hydroxy(1-4-C)alkyl, (1-4C carboxy(l-4C)alkyl, amino(1-4C)alkyl, cyano(1-4C)alkyl, (1-4C)alkanoylamino(1-4C)alkyl, (3-6C-)alkenyl, phenyl(1-4C)alkyl or heteroaryl(1-4C)alkyl wherein heteroaryl is furan or 4-pyridyl;

Q is a 5 or 6 membered ring containing the positively charged nitrogen atom and 0 to 3 further hetero atoms selected from nitrogen, oxygen and sulphur optionally fused on an available carbon-carbon or carbon-nitrogen bond to a benzene ring or a ring of the formula (VI):

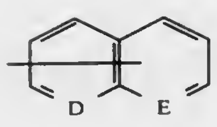


(VI)

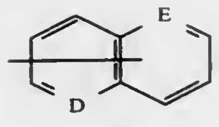
wherein T, U and V are selected from oxygen, sulphur, nitrogen, carbon, —NH— and —CH—;

or ring Q is of the formula VII-XXVI:

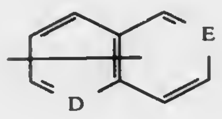
VOL
1126
ISS
1
MY
7
1991
UMI



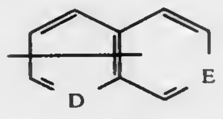
(VII)



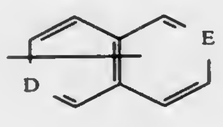
(VIII)



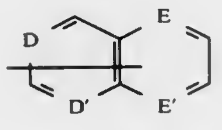
(IX)



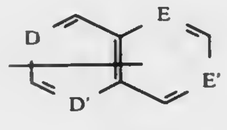
(X)



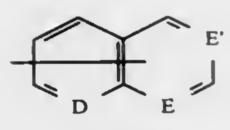
(XI)



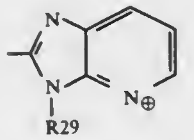
(XII)



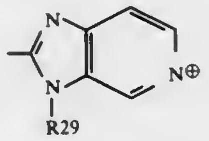
(XIII)



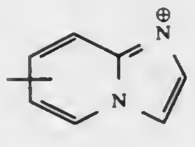
(XIV)



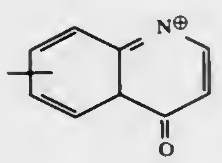
(XV)



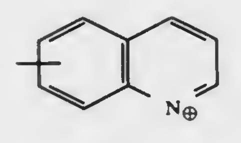
(XVI)



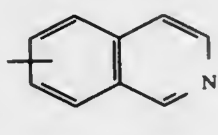
(XVII)



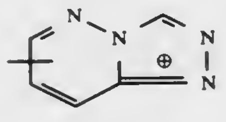
(XVIII)



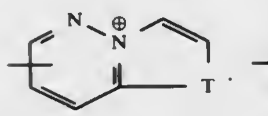
(XIX)



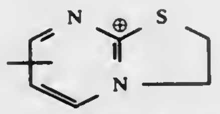
(XX)



(XXI)

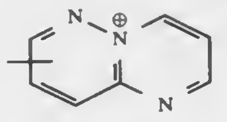


(XXII)

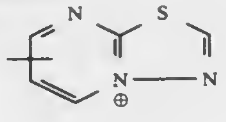


= Single or double bond
(XXIII)

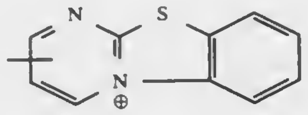
-continued



(XXIV)



(XXV)



(XXVI)

wherein D, $D^1$, E and $E^1$ represent nitrogen atoms one of which bears a positive charge and $R^{29}$ is hydrogen or a group $R^{27}$ (as hereinafter defined);

ring Q and the rings VI-XXVI being optionally substituted by at least one group $R^{26}$, $R^{27}$ or $R^{30}$ (as hereinafter defined);

on a carbon atom or atoms available for substitution by 1,2 or 3 groups R26 wherein R26 is halogen, (1–6C)alkyl, carboxy, (2–6C)alkoxycarbonyl, (2–6C)-alkoxycarbonyl(1–4C)alkyl, (1–6C)alkoxy, (1–6C)alkylthio, cyano, (1–4C) cyanoalkyl, amino, (1–6C)alkylamino, (2–8C)dialkylamino, phenyl(-1–4C)alkylamino, nitrophenyl(1–4C)alkylamino, (3–6C)alkeynlamino, amino(1–6C)alkylamino, (1–6C)alkoxy(1–6C-)alkylamino, hydroxy(1–6C)alkylamino, hydroxy, mercapto, carbamoyl, (2–6C)alkylcarbamoyl, (3–10C)dialkylcarbamoyl, phenylthio and heteroarylthio (wherein heteroaryl is furan, thiophene, imidazole, thiazle, pyrazole, thiadiazole, pyridine, pyrimidine, pyrazine or pyridazine) wherein when more than one group R26 is present these may be the same or different;

on an uncharged nitrogen atom available for substitution by a group R27 wherein R27 is (1–6C)alkyl, phenyl or benzyl;

on the charged nitrogen atom where possible by a group R30 wherein R30 is hydrogen, (1–6C)alkyl (optionally substituted by carboxy, (1–6C)alkoxycarbonyl, carbamoyl, mono- or di-(1–4C)alkylcarbamoyl, hydroxy, (1–4C)alkoxy, amino, mono-or di-(1–4C)alkylamino, (1–4C)alkanoyl, benzoyl, cyano, carboxyaminocarbonyl, (1–6C)alkoxycarbonylaminocarbonyl, (1–4C)alkoxy(2–4C)alkoxy or phenyl), (1–6C)alkoxy, phenyl(1–6C)alkoxy, amino, (1–6C-)alkylamino, (3–6C)cycloalkyl, (3–6C)cycloalkenyl, cyano(-3–6C)cycloalkenyl, (2–6C)alkenyl (optionally substituted by (1–6C)alkyl, halogen, cyano, carbamoyl, mono-or di-(1–4C-)alkylcarbamoyl, piperidinocarbonyl or morpholinocarbonyl), 2-ureidoethyl, 2-thioureidoethyl, 2-(thioacetylamino)et sulphamoyl, 2-amino-2-carboxyethyl, acetylaminomethyl, phthalimidomethyl, 4–5-dihydromidazol-2-yl-methyl, 3,4,5,6-tetrahydropyrimidin-2-ylmethyl, 2-(1,2,3,6-tetrahydro-2,6-dioxopurin-7-ylethyl, 2-hydroxyiminiopropyl (syn or anti) (1–4C)alkoxyimino propyl (syn or anti) or phenyl,

or R30 is of the formula $-(CH_2)_2$-NR31R32R33 in which R31, R32 and R33 are (1–4C)alkyl,

or R30 is of the formula $-(CH_2)_s$-R34 in which s is 0–2 and R34 is pyridine, pyridazine, pyrimidine, pyrazine, 1,2,5,6-dihydro-5,6-dioxo-1,2,4-triazine, 2-(1–4C)alkyl-1,2,5,6-dihydro-5,6-dihydro-5,6-dioxo-1,2,4-triazine, 1-[(1–4C)-alkyl]tetrazole, furan, thiophene, pyrrole, 1-(1–4C)alkyl-pyrrole, oxazole, thiazole, imidazole, 1-(1–4C)alkyl imidazole, isoxazole, isothiazole, pyrazole, 1,2,3-thiadiazole, 1-(1–4C)alkyl-pyrazole, benzfuran, benzthiophene, indole, oxindole, 1-(1–4C)alkyl indole, benzoxazole, benzthiazole, benzimidazole, 1-(1–4C)alkyl benzimidazole, or 3,4-dihydro-4-oxo-2H-benzo[e]oxazine (each of these ring systems being linked to $(CH_2)_s$ through carbon and each ring system being optionally substituted by halogen, (1–6C)alkyl, (1–4C)haloalkyl, (3–6C)-cycloalkyl, (3–6C)cycloalkyl(1 (2–6C)alkenyl, carboxy, (2–6C)alkoxycarbonyl, (1–6C)alkoxy, cyano, (2–6C)-cyanoalkenyl, carbamoyl, mono-or di-(1–4C)alkylcarbamoyl, (1–4C)alkanoylamino, guanidino, hydroxy, nitro or amino),

or R30 is 2-guanidino-thiazol-4-ylmethyl, hydroxybenzoylmethyl, 2-thenyl, 2-imidazolylmethyl or cinnamyl (each optionally substituted by halogen, (1–6C)alkyl, hydroxy, (1–4C)alkoxy, carboxy, (2–6C)alkoxycarbonyl, nitro or carbamoyl),

or R30 is $-(CH_2)_t$NHCOR35 or $-(CH_2)_t$S(O)u-R35 in which t is 1–6, u is 0, 1 or 2 and R35 is (1–6C)alkyl or (106C)alkoxy,

or R30 is of the formula $(CH_2)_2N{=}CR36NR37R38$ or $-(CH_2)_yC(=$ NR36)NR37R38 or a tautomer thereof in which y is 1–6 and R36, R37, R38 are hydrogen or (1–4C)alkyl,

(wherein when R30 is or contains a phenyl group, the phenyl group is optionally substituted by 1 or 2 groups selected from halogen, (1–6C)alkyl, (1–6C)alkoxy, amino, carboxy, nitro, carbamoyl, cyano, trifluoromethyl, aminoethyl, (1–4C)alkonyl, (1–4C)alkanoylamino, halo(1–4C)alkyl, (2–6C)alkoxycarbonyl, mono- or di-(1–4C)alkylcarbamoyl, mesyl, vinyl, sulpho, sulphamoyl or mono or di(1–4C)alkylsulphamoyl);

Y is straight or branched (1–6C)alkylene optionally substituted by cyano, carboxy, (1–4C)alkoxycarbonyl, nitro, halogen, carbamoyl, mono-or di(1–4C)alkylcarbamoyl or trifluoromethyl;

Y' is —CO—, —NHCO—, —CONH—, $-NHSO_2-$, $-SO_2NH-$, —)—, —S—, —CH=CH— or $-NR^a-$ wherein Ra is hydrogen, (1–4C)alkyl or (2–4C) alkenyl;

m and n are each 0 or 1, the link between ring Q and the group $-(Y)_m-(Y')_n-P$ being via an available site on ring Q selected from the positively charged nitrogen atom, an uncharged nitrogen atom or a carbon atom such that when m=0 and n=0 the rings Q and P are linked directly by a covalent bond or are fused on available carbon-carbon or carbon-nitrogen bonds;

P represents:

(i) a benzene ring optionally fused to a further benzene ring (so forming a naphthyl group) and said ring system substituted by groups w and Z which are ortho with respect to one another wherein W is hydroxy or an in vivo hydrolysable ester thereof and Z is hydroxy or an in vivo hydrolysable ester thereof;

ring system P optionally being further substituted by (1–4C)alkyl, halogen, hydroxy, cyano, trifluoromethyl, nitro, amino, mono- or di(1–4C)alkylamino, formyl, (1–4C)alkanoyl, (1–4C)alkoxy, (1–4C)alkylthio, (1–4C)alkanoyloxy, carbamoyl or mono- or di(1–4C)alkylcarbamoy;

and the N-oxides thereof where chemically possible;

and pharmaceutically acceptable salts thereof.

---

### 5,013,731
## CEPHALOSPORIN COMPOUNDS

**Jean C. Arnould, Cormontreuil; Jean J. Lohmann, Hermonville, and Georges Pasquet, Bazancourt, all of France, assignors to ICI Pharma, Cergy Cedex, France**

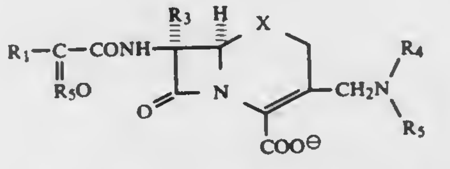
**Continuation of Ser. No. 936,721, Nov. 25, 1986, abandoned. This application Apr. 19, 1990, Ser. No. 512,069**

**Claims priority, application European Pat. Off., Nov. 27, 1985, 85402331.4**

**Int. Cl.$^5$ C07D** *501/18;* **A61K** *31/545*

**U.S. Cl. 514—202** **20 Claims**

1. A cephalosporin derivative of the formula I in which X is sulphur or sulphinyl (R or S configuration):



(I)

R1 is 2-aminooaxazol-4-yl each optionally substituted in the 5-position by fluorine, chlorine or bromine, or R1 is 5-aminoisothiazol-3-yl, 5-amino-1,2,4-thiadiazol-3-yl, 3-aminopyrazol-5-yl, 3-aminopyrazol-4-yl, 2-aminopyrimidin-5-yl, 2-aminopyrid-6-yl, 4-aminopyrimidin-2-yl, 2-amino-1,3,4-thiadiazol-5-yl or 5-amino-1-methyl-1,2,4-triazol-3-yl;

R50 is chloromethylene or a radical of the formula =N.O.R2, wherein R2 is hydrogen, (1–6C)alkyl, (3–8C-)cycloalkyl, (1–3C)alkyl)(3–6C)cycloalkyl, (3–6C)cycloalkyl(1–3C)alkyl, (3–6C)alkenyl optionally substituted by carboxy, (5–8C) cycloalkenyl, (3–6C)alkynyl, (2–5C-)alkylcarbamoyl, phenylcarbamoyl, benzylcarbamoyl, (1–4C)alkylcarbamoyl(1–4C)alkyl, di(1–4C)alkylcarbamoyl(1–4C)alkyl, (1–4C)haloalkylxcarbamoyl(1–4C)alkyl, triphenylmethyl, (1–3C)haloalkyl, (2–6C)hydroxyalkyl, (1–4C)alkoxy(2–4C)alkyl, (1–4C)alkylthio(2–4C)alkyl, (1–4C)alkanesulphinyl(1–4C)alkyl, (1–4C)alkanesulphonyl(1–4C)alkyl, (2–6C)aminoalkyl, (1–4C)alkylamino(1–6C)alkyl, (2–8C)dialkylamino(2–6C)alkyl, (1–5C)cyanoalkyl, 3-amino-3-carboxypropyl, 2-(amidinothio)ethyl, 2-(N-aminoamidinothio)ethyl, tetrahydropyran-2-yl, thietan-3yl, 2-oxopyrrolidinyl, or 2-oxotetrahydrofuran-3-yl,

or —R2 is of the formula $-(CH_2)_n-$R6 in which n is 1 to 4 and R6 is piperidino, pyrrolidino, morpholino, piperazino or N-methylpiperazino, each value of R6 being optionally substituted by (1–4C)alkyl, phenyl or benzyl,

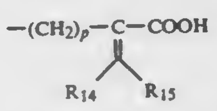
or —R2 is of the formula $-(CH_2)_m-$W—R7 in which m is 0 to 3, W is sulphur or a direct bond, and R7 is phenyl or pyridinio(1–4C)alkylene or R7 is pyridinyl, imidazolyl, 1,3,4-thiadiazolyl, tetrazolyl, 1-(1–4C)alkyltetrazolyl, thiazolyl, isothiazolyl or isoxazolyl in which the link with W is via a carbon or uncharged nitrogen, each value of R7 being optionally substituted, where possible, by one or two groups selected from (1–4C)alkyl, amino, hydroxy, carboxy, carbamoyl, nitro, (2–5C)alkoxycarbonyl, cyano or sulpho,

or —R2 is of the formula $-(CH_2)_n-$CO—R8 in which n is 1 to 4 and R8 is (1–4C)alkyl, phenyl or benzyl,

or 13R2 is of the formula —COR9 or $-(CH_2)_n-$OCO—R9 in which n is 1–4 and R9 is hydrogen, (1–4C)alkyl, (1–4C-)haloalkyl, phenyl or benzyl, such as phenyl or benzyl group being optionally substituted by 1,2, or 3 substituents selected from (1–6C)alkyl, (2–6C)alkanoyloxy and hydroxy groups.

or —R2 is of the formula $-G-CH_2-$R10 in which G is carbonyl or a direct bond and R10 is phthalimido,

or —R2 is of the formula II



$$-(CH_2)_p-\underset{\underset{R_{14}\quad R_{15}}{\diagdown\!\!\diagup}}{\overset{}{C}}\!\!=\!-COOH \qquad (II)$$

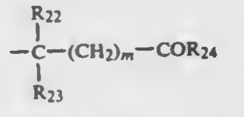
in which p is 1 or 2 and R14 and R15 are hydrogen or (1–4C)alkyl,

or —R2 is of the formula —P(O)R16R17 in which R16 is hydroxy, (1–4C)alkoxy, (2–8C)dialkylamino, phenoxy, phenylamino or one of the values given above for R6 , and R17 is (1–C)alkyl, (1–4C)alkoxy (2–8C)dialkylamino, phenoxy, phenylamino, piperidino, pyrrolidino, morpholino, piperazino or N-methylpiperazino,

or —R2 is of the formula $-CH_2P(O)R18R19$ in which R18 and r19 are hydroxy or (1–4C)alkoxy,

or —R2 is of the formula —CH(SR20)COOR21 in which R20 is (1–4C)alkyl and R21 is hydrogen or (1–6C)alkyl,

or —R2 is of the formula III



$$-\underset{R_{23}}{\overset{R_{22}}{\underset{|}{\overset{|}{C}}}}-(CH_2)_m-COR_{24} \qquad (III)$$

in which n is 0–3, R22 is hydrogen, (1–3C) alkyl or methylthio, R23 is hydrogen, (1–3C)alkyl, $(C_3–C_7)$-cycloalkyl, cyano, carboxy, (2–5C)carboxyalkyl or methanesul-

VOL
1126
ISS
1
MY
7
1991
UMI

phonylamino, or phenyl optionally substituted by amino or hydroxy, or R22 and R23 are joined to form, together with the carbon to which they are attached, a (3-7C) carboxylic ring, and R24 is hydroxy, amino, (1-4C)alkoxy, (1-4C)alkylamino, phenylamino or of the formula R6 given above or of the formula NHOR25 in which R25 is hydrogen, (1-C)alkyl, phenyl or benzyl,

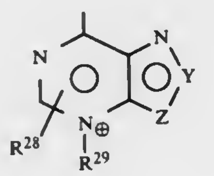
or R2 is of the formula — CH(COOH)Ph wherein Ph represents a benzene ring optionally substituted by 1, 2 or 3 substituents selected from (1-6C)alkyl, (2-6C)alkanoyloxy and hydroxy groups and wherein the chiral centre denoted by may have either the R or S absolute configuration or be a racemate thereof; provided that when R2 contains phenyl, and unless otherwise stated, the phenyl is optionally substituted by 1 or 2 groups selected from halogen, hydroxy, amino, carboxy, nitro, carbamoyl, cyano and aminomethyl,

R3 is hydrogen or methoxy;

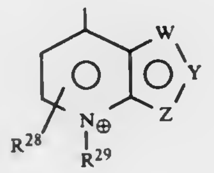
R4 is hydrogen, (1-4C)alkyl, halo(1-4C)alkyl, hydroxy(1-4-C)alkyl, (1-4C)alkoxy(1-4C)alkyl, carboxy (1-4)alkyl, amino (1-4C)alkyl, cyano(1-4C)alkyl, (1-4C)alkanoylamino(1-4C)alkyl, allyl, furfuryl, benzyl or pyridyl(1-4C)alkyl;

R5 is an aromatic heterocyclic fused ring system which is linked via carbon and is one of the formula IV to X

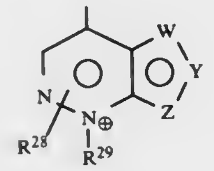
(IV)



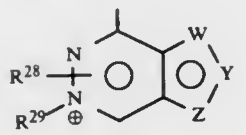
(V)

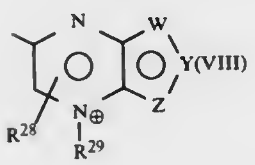


(VI)

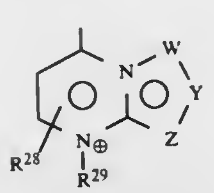


(VII)



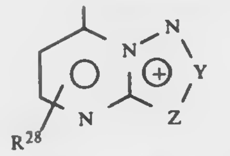


(IX)



-continued

(X)



inclusive in which W, Y and Z are selected from O, S, N, CR$^{26}$ (in which R$^{26}$ is selected from hydrogen, halogen, (1-5C)alkyl, carboxy, (2-6C)alkoxy-carbonyl, (2-6C)-alkoxycarbonyl(1-4C)cyanoalkyl, amino, (1-6C)alkylamino, (2-8C)dialkylamino, benzylamino (optionally substituted in the benzene ring thereof by nitro), thenylamino, allylamino, (1-6C)aminoylamino, (1-6C)alkoxy(1-6C)alkylamino, (1-6C)hydrpxyalkylamino, hydroxy, mercapto, carbamoyl, (2-6C)alkylcarbamoyl, (3-10C)dialkylcarbamoyl, phenylthio and heteroarylthio wherein heteroaryl is a 5- or 6-membered ring containing 1, 2 or 3 hetero atoms selected from oxygen, nitrogen and sulphur) and NR$^{27}$ (in which R$^{27}$ is selected from hydrogen, (1-6C)alkyl, phenyl or benzyl, which alkyl, phenyl or benzyl groups may be substituted when and where possible by one or two groups selected from halogen, nitrogen, (1-6C)alkyl, hydroxy, (1-4C)alkoxy, carboxy, cyano, (2-6C)alkoxycarbonyl, carbamoyl, sulphamoyl, sulpho, mono-or di(1-4C)alkylcarbamoyl, or mono- or di-(1-4C-)alkylsulphamoyl) provided that:

(i) only one of W, Y and Z can represent S or O;

(ii) in formulae IV and V, Y must be other than CR$^{26}$;

(iii) formula V one of W and Z must be other than CR$^{26}$; and

(iv) in formula IX neither W nor Z can be S and W cannot be O;

R$^{28}$ is attached to carbon and is selected from the atoms and groups listed above in respect of R$^{26}$; and

R$^{29}$ is selected from hydrogen, (1-6C)alkyl, (1-6C)alkyl(-2-6)alkenyl, (1-6C)alkoxy, (2-8C)alkoxyalkyl, carboxy(-1-6C)alkyl, carbonyl(1-6C)alkyl, [(1-6C)alkoxy]carbamoyl(1-6C)alkyl, mono- or di(1-4)alkylamino(1-6C)alkyl, [(1-6C)]carbonylaminocarbonyl(1-6C)alkyl, methyl, benzoylmethyl(1-6C)hydroxyalkyl, amino, (1-6C)alkylamino, (1-6C)aminoalkyl, phenyl(1-6C)alkyl, phenyl(1-6C)alkoxy, (3-6C)cycloalkyl, (3-6C)cycloalkenyl, cyano(3-6C)cycloalkenyl, mono- or di-(1-4)alkylcarbamoyl(1-6C)alkyl or (1-4C)alkoxy(2-4C)alkoxy(1-4-C)alkyl; or phenyl optionally substituted by 1 or 2 groups selected from halogen, (1-6C)alkyl, (1-6C)alkoxy, hydroxy, amino, carboxy, nitro, carbamoyl, cyano, trifluoromethyl, aminomethyl, (1-4C)alkanoyl, (1-4C)alkanoylamino, halo(1-4C)alkyl, (2-6)alkoxycarbonyl, mono- or di(1-4C)alkylcarbamoyl, mesyl, vinyl, sulpho, sulphamoyl, or mono- or di(1-4C)alkylsulphamoyl; or (2-6C)alkenyl optionally substituted by halogen, cyano, carbamoyl, mono-or di-(1-4C)alkylcarbamoyl, piperidinocarbonyl, morpholinocarbonyl, 2-ureidoethyl, 2-thioureidoethyl, 2-(thioacetylamino)ethyl, sulphamoyl, 2-amino-2-carboxyethyl, acetylaminomethyl, phthalimidomethyl, 4-5-dihydroimidazol-2-ylmethyl, 3,4,5,6-tetrahydropyrimidin-2-ylmethyl, 2-(1,2,3,6-tetrahydro-2,6-dioxopurin-7-ylethyl, 2-hydroxyiminopropyl (syn or anti) or 2propyl (syn or anti) or cyano(1-4C)alkyl;

or R$^{29}$ is of the formula —$(CH_2)_2$- NR30R31R32 in which R30, R31 and R32 are (1-4C)alkyl,

or R$^{29}$ is of the formula —$(CH_2)_q$—R33 in which q is 0—2 and —R33is pyridine, pyridazine, pyrimidine, pyrazine, 1,2,5,6-dihydro-5,6-dioxo-1,2,4-triazine, 2-[(1-C)alkyl]-1,2,5,6-dihydro-5,6-dioxo-1,2,4-triazine, 1-[(1-4C)alkyl tetrazole, furan, thiophene, pyrrole, 1-[(1-4C)alkyl]pyrrole, oxazole, thiazole, imidazole, 1-[(1-4C)alkyl-]imidazole, isoxazole, isothiazole, pyrazole, 1,2,3-thiadiazole, 1-[(1-6C)alkyl]pyrazole, benzfuran, benzthiophene, indole, oxindole, 1-[(1-6C)alkyl]indole, benzoxazole, benzthiazole, benzimidazole, 1-[(1-6C)alkyl]benzimidazole, 3,4-dihydro-4-oxo-2H-benzo[e]oxazine each of these ring systems being linked to $(CH_2)_q$ through carbon and each ring system being optionally substituted by halogen, amino, (1-6C)alkyl, (1-6C)haloalkyl, (3-6C-)cycloalkyl, (2-6C)alkenyl, carboxy, (2-6C)alkoxycarbonyl, (-6C)alkoxy, cyano, (2-6C)cyanoalkenyl, carbamoyl, mono- or di(1-4C)alkylcarbamoyl, (1-6C)alkanoylamino; guanidino, hydroxy, nitro or amino;

or R29 is 2-guanidino-thiazol-4-ylmethyl, hydroxybenzoylmethyl, 2-thenyl, 2-imidazolylmethyl or cinnamyl, optionally substituted by halogen, (1-6)alkyl, hydroxy, (1-6C)alkoxy, carboxy, (2-6C)alkoxycarbonyl, nitro or carbamoyl;

or R29 is —$(CH_2)_t$NHCOR34 or —$(CH_2)_t S(O)_s$—R34 in which t is 1-6, s is 0, 1 or 2, and R34 is (1-6C)alkyl or (1-6C)alkoxy,

or R29 is of the formula $(CH_2)_2N{=}CR36NR37R38$ or —$(CH_2)_n$ C(NR36)NR37R38 or a tautomer thereof in which n is 1-6 and R36, R37, R38 are hydrogen or (1-4-C)alkyl;

and the N-oxides thereof where chemically possible;

and the pharmaceutically acceptable acid-addition and base-addition salts thereof.

---

## 5,013,732
## 3-ARYLCARBONYL- AND 3-CYCLOALKYL-CARBONYL-1-AMINOALKYL-1H-INDOLES

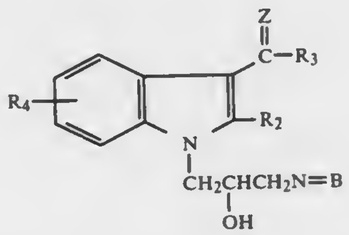
**Malcolm R. Bell, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.**

**Division of Ser. No. 409,913, Sep. 20, 1989, which is a division of Ser. No. 255,305, Oct. 11, 1988, Pat. No. 4,885,295, which is a continuation of Ser. No. 928,335, Nov. 7, 1986, abandoned, which is a division of Ser. No. 810,942, Dec. 19, 1985, Pat. No. 4,634,776, which is a continuation of Ser. No. 755,239, Jul. 15, 1985, Pat. No. 4,581,354, which is a continuation-in-part of Ser. No. 637,931, Aug. 6, 1984, abandoned. This application Jul. 30, 1990, Ser. No. 559,787**

**Int. Cl.$^5$ A61K** *31/40, 31/535;* **C07D** *209/12, 413/06*

**U.S. Cl. 514—210** **6 Claims**

1. A compound having the formula:



wherein:

$R_2$ is hydrogen, lower-alkyl, chloro, phenyl or benzoyl (or phenyl or benzoyl substituted by from one to two substituents selected from halo, lower-alkyl, lower-alkoxy, hydroxy, amino, lower-alkylmercapto, lower-alkylsulfinyl or lower-alkylsulfonyl);

$R_3$ is cyclohexyl, lower-alkoxycyclohexyl, phenyl (or phyenyl substituted by from one to two substituents selected from halo, lower-alkoxy, hydroxy, benzyloxy, lower-alkyl, nitro, amino, lower-alkylamino, di-lower-alkylamino, lower-alkoxy-lower-alkylamino, lower-alkanoylamino, benzoylamino, trifluroracetylamino, lower-alkyl-sulfonylamino, carbamylamo, lower-alkylmercapto, lower-alkylsulfinyl, lower-alkylsulfonyl, cyano, formyl and oximinomethylene), methylenedioxyphenyl, 3- or 4-hydroxy-1-piperidinylphenyl, 1-piperazinylphenyl, (1H-imidazol-1-yl)phenyl, (1-pyrrolyl)phenyl, aminomethylphenyl, guanidinylmethylphenyl, N-cyanoguanidinylmethylphenyl, styryl, lower-alkyl-substituted-styryl, fluorosubstituted-styryl, 2- or 4-biphenyl, 1- or 2-naphthyl (or1- or 2-naphthyl substituted by from one to two substituents selected from lower-alkyl, lower alkoxy, hydroxy, bromo, chloro, fluoro, lower-alkoxycarbonyl, carbamyl, cyano, lower-alkyl-mercapto, lower-alkylsulfinyl, lower-alkylsulfonyl and trifluoromethyl), thienyl, furyl, benzofuryl, benzothienyl, quinolyl, or (N-lower-alkyl)pyrrolyl;

$R_4$ is hydrogen or from one to two substituents selected from lower-alkyl, hydroxy, lower-alkoxy and halo in the 4-, 5-, 6- or 7-positions;

C=Z is C=O or C=NOH; and

N=B is azido, amino, N-lower-alkylamino, N,N-dilower-alkylamino, N-(hydroxy-lower-alkyl)amino, N,N-di-(hydroxy-lower-alkyl)amino, N-lower-alkyl-N-(hydroxy-lower-alkyl)amino, N-(lower-alkoxy-lower-alkyl)amino, N-(halo-n-propyl)amino, 4-morpholinyl, 2-lower-alkyl-4-morpholinyl, 2,6-di-lower-alkyl-4-morpholinyl, 4-thiomorpholinyl, 4-thiomorpholinyl-S-oxide, 4-thiomorpholinyl-S,S-dioxide, 1-piperidinyl, 3-or 4-hydroxy-1-piperidinyl, 3- or 4-lower-alkanoyloxy-1-piperidinyl, 3- or 4-amino-1-piperidinyl, 3- or 4-(N-lower-alkanoylamino)-1-piperidinyl, 2-cyclohexylmethyl-1-piperidinyl, 1pyrrolidinyl, 3-hydroxy-1-pyrrolidinyl, 1-azetidinyl, 1-piperazinyl, 4-lower-alkyl-1piperazinyl, 4-lower-alkanoyl-1-piperazinyl, 4-carbo-lower-alkoxy-1-piperazinyl, hexahydro-4H-1,4-diazepin-4-yl or the N=BN-oxides thereof; or an acid addition salt thereof.

6. A method for the relief of pain or rheumatic or inflammatory conditions in a patient requiring such treatment which comprises administering orally or parenterally to such patient a medication in solid or liquid dosage form containing, as the active component thereof, an effective analgesic, anti-rheumatic or anti-inflammatory amount of a compound according to claim 1.

---

## 5,013,733
## LACTAM DERIVATIVES

**Ian H. Coates, Hertford; Alexander W. Oxford; Peter C. North, both of Royston; Thomas Miller, Harefield; Anthony D. Baxter, Iver Heath, and Kevin I. Hammond, Ulverston, all of England, assignors to Glaxo Group Limited, England**

**Filed Feb. 27, 1990, Ser. No. 485,532**

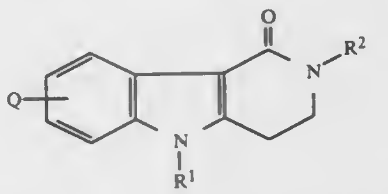
**Claims priority, application United Kingdom, Feb. 28, 1989, 8904551**

**Int. Cl.$^5$ A61K** *31/55;* **C07D** *223/00*

**U.S. Cl. 514—213** **9 Claims**

1. A compound of formula (I)

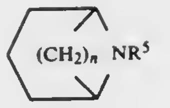
(I)

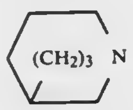


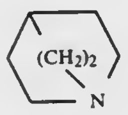
wherein R$^1$ represents a hydrogen atom or a group selected from $C_{1-6}$alkyl, $C_{3-6}$alkenyl, $C_{3-10}$alkynyl, $C_{3-7}$cycloalkyl,$C_{3-7}$cycloalkyl$C_{1-4}$alkyl, phenyl, phenyl$C_{1-3}$alkyl, phenylmethoxymethyl, phenoxyethyl, phenoxymethyl, —$CO_2R^3$, —$COR^3$, —$CONR^3R^4$ or —$SO_2R^3$ (wherein R$^3$ and R$^4$, which may be the same or different each represents a hydrogen atom, a $C_{1-6}$alkyl or $C_{3-7}$cycloalkyl group, or a phenyl or phenyl$C_{1-4}$alkyl group, in which the phenyl group is optionally substituted by one or more $C_{1-4}$alkyl, $C_{1-4}$alkoxy or hydroxy groups or halogen atoms, with the proviso that R$^3$ does not represent a hydrogen atom when R$^1$ represents a group —$CO_2R^3$ or —$SO_2R^3$);

and R$^2$ represents a group of formula (a), (b) or (c):

VOL
1126
ISS
1
MY
7
1991
UMI


(a)


(b)


(c)

wherein $R^5$ represents a hydrogen atom or a $C_{1-6}$alkyl, $C_{3-7}$cycloalkyl, $C_{3-6}$alkenyl or phenyl$C_{1-3}$alkyl group;

n represents 2, 3 or 4;

Q represents a hydrogen or a halogen atom, or a hydroxy, $C_{1-4}$alkoxy, phenyl$C_{1-3}$alkoxy or $C_{1-6}$alkyl group or a group $—NR^6R^7$ or $—CONR^6R^7$ wherein $R^6$ and $R^7$, which may be the same or different, each represents a hydrogen atom or a $C_{1-4}$alkyl or $C_{3-4}$alkenyl group, or together with the nitrogen atom to which they are attached form a saturated 5 to 7 membered ring);

or a physiologically acceptable salt or solvate thereof.

9. A method of treating a condition mediated through 5-$HT_3$ receptors which comprises administering to a patient an effective amount to relieve said condition of a compound of formula (I) as defined in claim **1** or a physiologically acceptable salt or solvate thereof.

---

### 5,013,734

### NOVEL ESTERS OF PHENYLALKANOIC ACID

**Sadahiko Iguchi; Masanori Kawamura, and Tsumoru Miyamoto, all of Osaka, Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan**

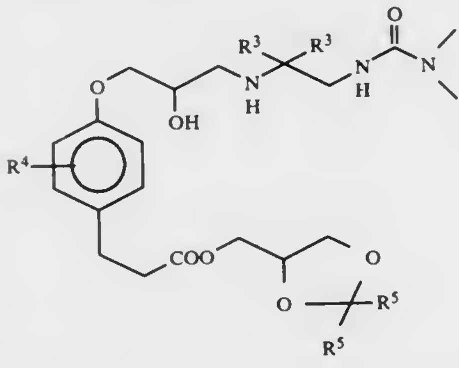
**Filed May 11, 1990, Ser. No. 521,962**

**Claims priority, application Japan, May 12, 1989, 1-119873**

**Int. Cl.⁵ A61K** *31/535;* **C07D** *317/22, 295/073, 233/02*

**U.S. Cl. 514—231.5** **9 Claims**

1. An ester of phenylalkanoic acid of the formula:


(I)

wherein

$R^1$ is 4–10 membered, saturated or unsaturated, mono- or bi-cyclic hetero ring containing as hetero atoms:
(i) one or two nitrogen,
(ii) two or three of nitrogen and sulfur in total, or
(iii) one or two sulfur;

$R^2$ is hydrogen; or

$R^1$ and $R^2$, taken together with a nitrogen to which they are attached, form 4–7 membered, saturated or unsaturated, monocyclic hetero ring containing as hetero atoms:
(i) one or two nitrogen, or
(ii) two or three of nitrogen and oxygen in total,

the aforementioned hetero rings, represented by $R^1$ or formed by $R^1$ and $R^2$, taken together with a nitrogen to which they are attached, may be substituted by one substituent selected from C1–4 alkyl and C2–5 acyl;

$R^3$ each, independently, is hydrogen or C1–4 alkyl;

$R^4$ is hydrogen, halogen, trihalomethyl, C1–4 alkyl, C1–4 alkoxy, C2–5 acyl, cyano, nitro or nitroxy;

$R^5$ each, independently, is hydrogen, or C1–4 alkyl or phenyl; or the two $R^5$'s, taken together with a carbon to which they are attached, form cyclopentane or cyclohexane;

or the pharmaceutically acceptable acid addition salts thereof.

9. A method for the prevention of and in the treatment of cardiovascular diseases such as angina pectoris, myocardial infarction, congestive heart failure, hypertension, arrhythmia, which comprise the administration of an effective amount of an ester of phenylalkanoic acid of the formula (I) depicted in claim 1. or the pharmaceutically acceptable acid addition salt thereof.

---

### 5,013,735

### METHOD OF TREATING THERAPY-RESISTANT SCHIZOPHRENIA WITH AMPEROZIDE (N-ETHYL-4-(4′,4′-BIS(P-FLUOROPHENYL)BUTYL)-1-PIPERAZINE-CARBOXAMIDE

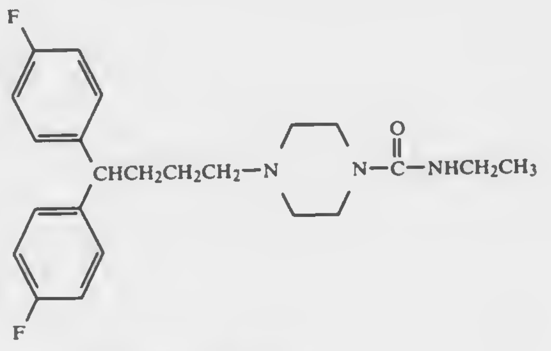
**Anders K. Björk, Jägarevägen, Sweden, assignor to Pharmacia AB, Sweden**

**Filed Mar. 1, 1990, Ser. No. 487,547**

**Int. Cl.⁵ A61K** *31/495*

**U.S. Cl. 514—255** **4 Claims**

1. A method of treating a human suffering from therapy-resistant schizophrenia comprising administering to the human a therapeutically effective amount of amperozide, N-ethyl-4-[4′,4′-bis-(p-flurophenyl) butyl]-1-piperazine-carboxamide of the formula:



or an acceptable acid salt thereof.

---

### 5,013,736

### AZAAZULENE COMPOUNDS WHICH ARE USEFUL AS ANTIALLERGIC AND ANTIINFLAMMATORY AGENTS

**Michiko Nagahara, Shiga; Chikara Ieda, Kusatsu; Mitsuo Mimura, Otsu; Katsuhiro Uchida, Kyoto; Solchiro Sato, Otsu, and Makoto Okumura, Moriyama, all of Japan, assignors to Kaken Pharmaceutical Co., Ltd., Tokyo, Japan**

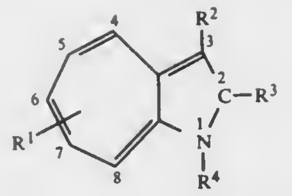
**Filed Dec. 26, 1989, Ser. No. 457,125**

**Claims priority, application Japan, Dec. 27, 1988, 63-334974**

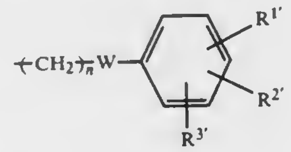
**Int. Cl.⁵ A61K** *31/40;* **C07D** *209/02*

**U.S. Cl. 514—255** **23 Claims**

22. An antiallergic agent containing an effective amount of an azaazulene derivative having the formula (I):


(I)

wherein $R^1$ is hydrogen atom or isopropyl group; the bond C N between at the 2-position C and N at the 1-position is single bond or double bond; when the bond C N is single bond, $R^2$ is 5-tetrazolyl group, $R^3$ is taken together with carbon atom to form carbonyl group at the 2-position, and $R^4$ is hydrogen atom, an alkyl group having 1 to 18 carbon atoms, a lower alkenyl group, a lower alkyl group having oxygen atom or sulfur atom in carbon chain, a lower alkyl group having a halogen atom or cyano group, a lower alkyl group having heteroaromatic ring selected from the group consisting of pyridinyl, thienyl and quinolinyl, a diphenyl lower alkyl group, or a lower alkyl group having hydrocarbon-aromatic ring with the formula:



in which W is a single bond or carbonyl group, oxygen atom, sulfur atom or $—CH=CH—$, n is an integer of 1 to 6, and $R^{1'}$, $R^{2'}$ and $R^{3'}$ are the same or different and each is hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxyl group, trifluoromethyl group, hydroxyl group, a lower alkoxycarbonyl group, carboxyl group, acetyl group or cyano group; when the bond C N is double bond, N at the 1-position has no substituent $R^4$, $R^2$ is cyano group, and $R^3$ is amino group or a salt thereof, azido group, a diphenyl lower alkyl amino group, a phenyl amino group optionally containing a substituent selected from the group consisting of a lower alkoxy group, lower alkoxycarbonyl group and a carboxyl group, a piperazinyl group optionally containing s substitutent selected from the group consisting of a lower alkoxyphenyl group, a diphenyl lower alkyl group, and a homopiperazinyl group optionally containing a substituent selected from the group consisting of a lower alkoxyphenyl group and a diphenyl lower alkyl group, an amino acid residue bonded to C-2 at the nitrogen terminus, and lower alkyl esters or salts thereof or a lower alkyl amino group which may have an alkyl amino group or a cycloalkylamino group as an active ingredient.

---

### 5,013,737

### 2,4,8-TRISUBSTITUTED-3H,6H-1,4,5A,8A-TETRAAZAACENAPHTYLENE-3,5-(4H)-DIONES AND 2,4-8-TRISUBSTITUTED-4,5-DIHYDRO-5-THIOXO-3H,6H-1,4,5A,8A-TETRAZAACENAPHTHYLEN-3-ONES

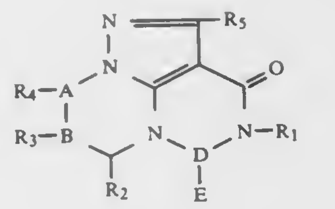
**Shin S. Tseng, Bridgewater, N.J.; Joseph W. Epstein, Monroe, and Jeremy I. Levin, Spring Valley, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.**

**Continuation-in-part of Ser. No. 278,296, Nov. 30, 1988, Pat. No. 4,916,147, which is a continuation-in-part of Ser. No. 158,448, Feb. 22, 1988, abandoned. This application Feb. 21, 1990, Ser. No. 482,568**

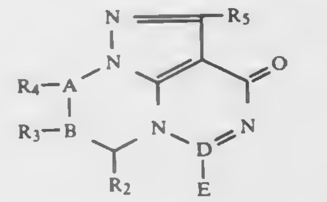
**Int. Cl.⁵ A61K** *31/505;* **C07D** *239/00*

**U.S. Cl. 514—267** **26 Claims**

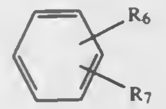
1. A compound selected from the group consisting of those of the formulae:


A

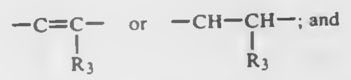
or


B

or a pharmaceutically acceptable salt thereof, wherein $R_1$ is selected from the group consisting of hydrogen, alkyl having from 1 to 10 carbon atoms, carboxamidomethyl, 4-chlorophenyl, benzyl and (4-nitrophenyl)methyl; $R_2$ and $R_3$ are hydrogen or alkyl having from 1 to 3 carbon toms; $R_4$ is 3-pyridinyl or



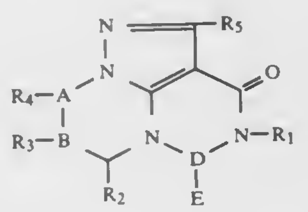
where $R_6$ and $R_7$ may be the same or different and are selected from the group consisting of hydrogen, halogen, alkyl having from 1 to 3 carbon atoms, N-alkyl-N-acylamino where both alkyl and acyl have from 1 to 3 carbon atoms, nitro, and trifluoromethyl and where halogen is selected from chlorine, bromine, fluorine and iodine; $R_5$ is hydrogen or alkyl having from 1 to 10 carbon atoms; A-B may be



$$-C=\underset{\displaystyle R_3}{\underset{|}{C}}- \quad \text{or} \quad -CH-\underset{\displaystyle R_3}{\underset{|}{CH}}-\text{; and}$$

wherein in Formula A D-E represents C═X where X is oxygen or sulfur; or wherein in Formula B D-E represents $C—SR_8$ where $R_8$ is alkyl having from 1 to 3 carbon atoms.

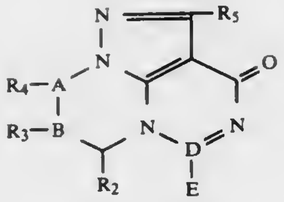
19. A method of lowering elevated blood pressure in humans or other mammals which comprises administering to said human or other mammal an effective hypotensive amount of a compound selected from those of the formulae:


A

or

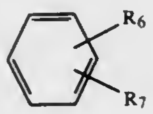
VOL
1126
ISS
1
MY
7
1991
UMI

-continued

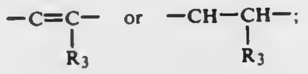


B

or a pharmaceutically acceptable salt thereof, wherein $R_1$ is selected from the group consisting of hydrogen, alkyl having from 1 to 10 carbon atoms, carboxamidomethyl, 4-chlorophenyl, benzyl and (4-nitrophenyl)methyl; $R_2$ and $R_3$ are hydrogen or alkyl having from 1 to 3 carbon atoms; $R_4$ is 3-pyridinyl or



where $R_6$ and $R_7$ may be the same or different and are selected from hydrogen, halogen, alkyl having from 1 to 3 carbon atoms, alkoxy having from 1 to 3 carbon atoms, N-alkyl-N-acylamino where both alkyl and acyl have from 1 to 3 carbon atoms, nitro and trifluoromethyl, and where halogen is selected from chlorine, bromine, fluorine and iodine; $R_5$ is hydrogen or alkyl having from 1 to 10 carbon atoms; A-B is



$$-\underset{\displaystyle R_3}{\underset{|}{C}}{=}C- \quad \text{or} \quad -CH-\underset{\displaystyle R_3}{\underset{|}{CH}}-;$$

and wherein in Formula A D-E represents C=X where X is oxygen or sulfur; or wherein in Formula B D-E represents $C{-}SR_8$ where $R_8$ is alkyl having from 1 to 3 carbon atoms.

---

5,013,738

## L-GLUTAMIC ACID DERIVATIVES

**Edward C. Taylor; Thomas H. Schrader, both of Princeton, and Loren D. Walensky, Millburn, all of N.J., assignors to The Trustees of Princeton University, Princeton, N.J.**

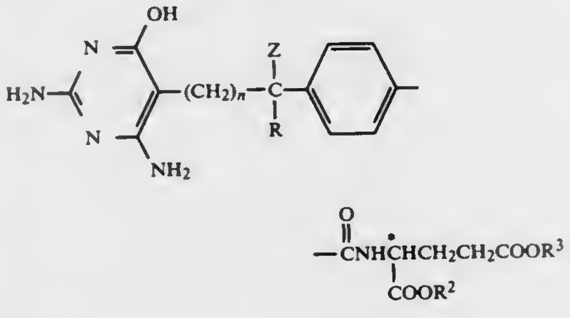
**Filed Apr. 18, 1990, Ser. No. 510,669**

**Int. Cl.⁵ A61K** *31/505;* **C07D** *239/36, 239/48*

**U.S. Cl. 514—272** **12 Claims**

1. A compound of the formula

(I)



in which

n has a value of 2 to 5;

R is vinyl or hydroxymethyl and Z is hydrogen or R and Z taken together are methylene;

each of $R^2$ and $R^3$ is hydrogen or a carboxylic acid protecting group; and

the configuration about the carbon atom designated * is L; and

the pharmaceutically acceptable salts thereof.

---

5,013,739

## METHOD OF TREATING CHRONIC FATIGUE SYNDROME USING AN OPIATE RECEPTOR ANTAGONIST

**Bernard Bihari, 29 W. 15th St., New York, N.Y. 10011, and Finvola Drury, 25 Colby St., Rochester, N.Y. 14610**

**Continuation-in-part of Ser. No. 129,862, Dec. 4, 1987, Pat. No. 4,888,346, which is a continuation-in-part of Ser. No. 916,180, Oct. 7, 1986, abandoned. This application Nov. 8, 1989, Ser. No. 433,152**

**Int. Cl.⁵ A61K** *31/44*

**U.S. Cl. 514—282** **5 Claims**

1. A method of treating humans suffering from chronic fatigue syndrome which comprises the steps of administering by a pharmacologically effective mode to such patient a therapeutically effective dose of an essentially pure opiate receptor antagonist, said dose corresponding to the therapeutic results produced by Naltrexone in the range from about 1.0 mg to about 10.0 mg.

---

5,013,740

## METHOD FOR TREATING EMOTIONAL NUMBNESS AND COMA

**Hillel Glover, 500 E. 77th St., #439, New York, N.Y. 10021**

**Continuation-in-part of Ser. No. 497,544, Mar. 22, 1990. This application May 4, 1990, Ser. No. 519,112**

**Int. Cl.⁵ A01H** *43/42*

**U.S. Cl. 514—282** **11 Claims**

1. A method for treating vegetative state due to closed head injury or cerebral vascular accident, comprising administering to a patient in need thereof an effective vegetative state reversing amount of an opiate antagonist or a pharmaceutically acceptable salt thereof.

---

5,013,741

## N-[SUBSTITUTED ALKYLIDENE]-1,2,3,4-TETRAHYDRO-9-ACRIDINAMINES USEFUL FOR ENHANCING THE CHOLINERGIC FUNCTION IN A MAMMAL

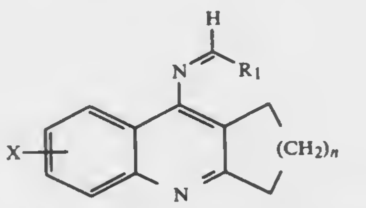
**Gregory M. Shutske, Somerset, N.J., assignor to Hoechst-Roussel Pharmaceuticals Incorporated, Somerville, N.J.**

**Continuation-in-part of Ser. No. 93,935, Sep. 8, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 223,846**

**Int. Cl.⁵ C07D** *219/10, 221/16;* **A61K** *31/47*

**U.S. Cl. 514—290** **67 Claims**

1. A compound of the formula



wherein n is 1–4; $R_1$ is hydrogen, alkyl, aryl, arylloweralkyl, naphthyl, furyl, thienyl, pyridinyl or pyrrolyl; X is hydrogen, loweralkyl, cycloalkyl, loweralkoxy, halogen, hydroxy, nitro, trifluoromethyl, formyl, loweralkylcarbonyl, arylcarbonyl, —SH, loweralkylthio, $-NHCOR_2$ or $-NR_3R_4$ where $R_2$ is hydrogen or loweralkyl, and $R_3$ and $R_4$ are independently hydrogen, loweralkyl or cycloalkyl; a stereo, optical or geometrical isomer thereof, or a pharmaceutically acceptable acid addition salts thereof.

**54**. A pharmaceutical composition for enhancing the cholinergic function in a mammal which comprises an effective amount of a compound as defined in claim 1 and a carrier therefor.

**61**. A method of enhancing the cholinergic function in a mammal which comprises administering to the mammal an effective cholinergic function enhancing amount of a compound as defined in claim 1.

---

5,013,742

## 4-PHENYL-4-N-(PHENYL) AMIDO PIPERIDINE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS AND METHOD EMPLOYING SUCH COMPOUNDS

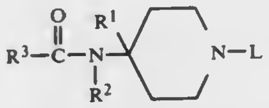
**Linas V. Kudzma, North Bergen; H. Kenneth Spencer, Chatham, and Sherry A. Severnak, Plainfield, all of N.J., assignors to BOC, Inc., Murray Hill, N.J.**

**Division of Ser. No. 440,933, Nov. 22, 1989, Pat. No. 4,957,929, which is a division of Ser. No. 255,180, Oct. 7, 1988, Pat. No. 4,921,864, which is a division of Ser. No. 115,284, Nov. 2, 1987, Pat. No. 4,791,121. This application Jun. 25, 1990, Ser. No. 543,249**

**Int. Cl.⁵ A61K** *31/445;* **C07D** *409/12*

**U.S. Cl. 514—329** **8 Claims**

8. A method for providing analgesia or anesthesia in a mammal, comprising administering to such mammal an analgesically or anesthetically effective amount of a compound of the formula



optically isomeric forms thereof, or pharmaceutically acceptable acid addition salts thereof, in which formula: $R^1$ is phenyl; $R^2$ is phenyl unsubstituted or substituted with one or more halogens; $R^3$ is a lower alkyl, lower cycloalkyl or a lower alkoxy lower alkyl; and L is phenyl lower alkyl.

---

5,013,743

## SELECTIVE ANTIBACTERIAL AGENT AGAINST CAMPYTOBACTER

**Tomoyuki Iwahi, and Hiroshi Satoh, both of Suita, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

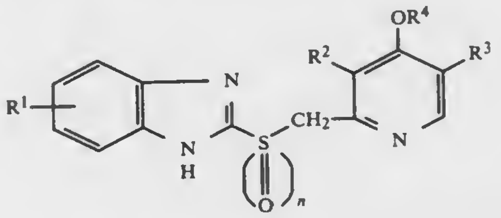
**Filed Feb. 12, 1990, Ser. No. 478,405**

**Claims priority, application Japan, Feb. 10, 1989, 1-032374; Sep. 15, 1989, 1-239233**

**Int. Cl.⁵ A01N** *43/40*

**U.S. Cl. 514—338** **15 Claims**

1. A method for combatting infectious diseases caused by the genus campylobater which comprises administering to a mammal in need thereof an antibiotially-effective amount of a compound of the formula



wherein $R^1$ stands for hydrogen, methoxy or triflouromethyl; $R^2$ and $R^3$, being the same or different from each other, stand for hydrogen or methyl; and $R^4$ stands for optionally substituted hydrocarbon residue and n denotes 0 or 1, or a pharmacologically acceptable salt thereof.

---

5,013,744

## ACETYLENES DISUBSTITUTED WITH A PYRIDINYL GROUP AND A SUBSTITUTED PHENYL GROUP HAVING RETINOID LIKE ACTIVITY

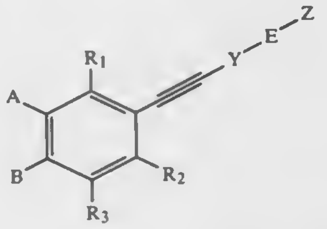
**Roshantha A. S. Chandraratna, El Toro, Calif., assignor to Allergan, Inc., Irvine, Calif.**

**Filed Dec. 29, 1989, Ser. No. 458,963**

**Int. Cl.⁵ A61K** *31/44;* **C07D** *213/55*

**U.S. Cl. 514—345** **43 Claims**

1. A compound of the formula



wherein

- $R_1$-$R_3$ independently are hydrogen, lower alkyl, cycloalkyl or lower alkenyl, A and B independently are hydrogen, lower alkyl, cycloalkyl, lower alkenyl, $SR_4$ or $OR_4$ where $R_4$ is lower alkyl, cycloalkyl or lower alkenyl;
- Y is pyridyl;
- E is divalent lower alkenyl, lower alkynyl, lower cycloalkyl, lower branched chain alkyl, or is characterized by the formula $(CH_2)_n$ where n is 0–5, and
- Z is H, OH, $OR_5$, $OCOR_5$, —COOH or a pharmaceutically acceptable salt, ester or amide thereof, $-CH_2OH$, $CH_2OR_6$, $CH_2OCOR_6$, or —CHO, $CH(OR_7)_2$, $CHOR_8O$, or $COR_9$ or $CR_9(OR_7)_2$, $CR_9OR_8O$ where $R_5$ is lower alkyl, phenyl or lower alkylphenyl, $R_6$ is lower alkyl, phenyl or lower alkylphenyl, $R_7$ is lower alkyl, $R_8$ is a divalent alkyl radical of 2–5 carbons, and $R_9$ is an alkyl, cycloalkyl or alkenyl group containing 1 to 5 carbons.

13. A pharmaceutical composition comprising an effective amount of a compound set forth in claim 1, in combination with a pharmaceutically acceptable excipient.

---

5,013,745

## NEMATICIDAL COMPOSITIONS

**Ernst Beriger, Allschwil, Switzerland, and Wolfgang Eckhardt, Lörrach, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Sep. 18, 1989, Ser. No. 408,838**

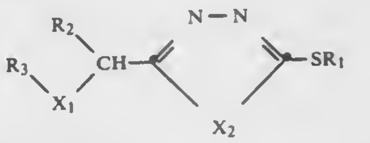
**Claims priority, application Switzerland, Sep. 23, 1988, 3536/88**

**Int. Cl.⁵ C07D** *285/125, 271/113, 413/04;* **A01N** *43/82*

**U.S. Cl. 514—364** **17 Claims**

1. A 2-Mercapto-1,3,4-oxadiazole and 2-mercapto-1,3,4-thiadiazole of the formula I

(I)



in which $X_1$ and $X_2$ independently of one another are oxygen or sulfur, $R_1$ is difluoromethyl or 3,4,4-trifluoro-3-buten-1-yl, $R_2$ is hydrogen or $C_1$–$C_3$ alkyl and $R_3$ is hydrogen, $C_1$–$C_5$ alkyl which is unsubstituted or substituted by halogen or $C_1$–$C_3$ alkoxy, $C_3$–$C_7$ alkenyl which is unsubstituted or substituted by halogen or $C_1$—$C_3$ alkoxy, $C_3$–$C_7$ alkynyl which is unsubstituted or substituted by halogen or $C_1$–$C_3$ alkoxy, or phenyl which is unsubstituted or substituted by halogen, $NO_2$, $CF_3$, $C_1$–$C_3$-alkyl or $C_1$–$C_3$ alkoxy, or wherein, furthermore, $R_2$ and $R_3$ together can form the methylene chain $(-CH_2-)n$ as a

VOL
1126
ISS
1
MY
7
1991
UMI

constituent of a 5- or 6-membered ring with the heteroatom X:, in which n is 3 or 4.

---

## 5,013,746
## IMAZALIL CONTAINING SYNERGISTIC COMPOSITIONS

**Jozef F. E. Van Gestel, Vosselaar; Jan R. Nys, Antwerp, and Paul F. M. Ruelens, Herk-de-Stad, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium**

**Continuation-in-part of Ser. No. 284,761, Dec. 12, 1988, abandoned, which is a continuation of Ser. No. 179,451, Apr. 8, 1988, abandoned. This application Apr. 7, 1989, Ser. No. 355,023**

**Int. Cl.$^5$ A01N** *43/50, 43/64, 43/78*

**U.S. Cl. 514—365** **11 Claims**

1. An antifungal composition comprising a carrier and, as the active ingredients, a fungicidally effective quantity of a mixture of (I) imazalil, or a fungicidally acceptable salt thereof, and (II) propiconazole, or a fungicidally acceptable salt, a stereoisomer, or stereoisomeric mixture thereof, wherein the active ingredients (I) and (II) are employed in proportions wherein the ratio by weight of (I) and (II) is within the range of from 1:50 to 50:1, and wherein said proportions produce a synergistic antifungal effect.

---

## 5,013,747
## WATER-SOLUBLE ANTISEPTIC OR ANTIFUNGAL COMPOSITION

**Sakae Katayama, Osaka; Yosuke Ito, Ohtsu, and Yasuhiro Nomura, Takatsuki, all of Japan, assignors to Katayama Chemical, Inc., Japan**

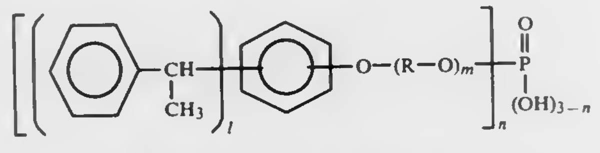
**Continuation-in-part of Ser. No. 230,165, Aug. 9, 1988, abandoned. This application Nov. 7, 1989, Ser. No. 432,568**

**Claims priority, application Japan, Aug. 26, 1987, 62-212422**

**Int. Cl.$^5$ A61K** *31/425*

**U.S. Cl. 514—367** **14 Claims**

1. A water-soluble antiseptic or antifungal composition which comprises 2-(thiocyanomethylthio) benzothiazole in an amount of 1–40% by weight of the composition, a polyoxyalkylene styrylphenyl ether phosphoric acid ester or alkali metal salt thereof in an amount of 5–40% by weight of the composition, and an organic solvent which can dissolve the above benzothiazole compound and is compatible with water, said phosphoric acid ester having the formula



in which R is a lower alkylene group, l is an integer of 1–3, m is an integer of about 5–50 and n is an integer of 1–3.

---

## 5,013,748
## EMULSIFIABLE BIOCIDAL CONCENTRATES FOR WOOD PRESERVATION

**Damien Radtke, Saint-Juery, and Edmond Wozniak, Labruguiere, both of France, assignors to Xylochimie, Neuilly Sur Seine, France**

**Filed Feb. 8, 1989, Ser. No. 307,740**

**Claims priority, application France, Feb. 8, 1988, 88 01660**

**Int. Cl.$^5$ A01N** *43/64, 43/52*

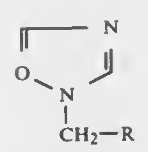
**U.S. Cl. 514—383** **15 Claims**

1. A water-emulsifiable, liquid biocidal concentrate which comprises:

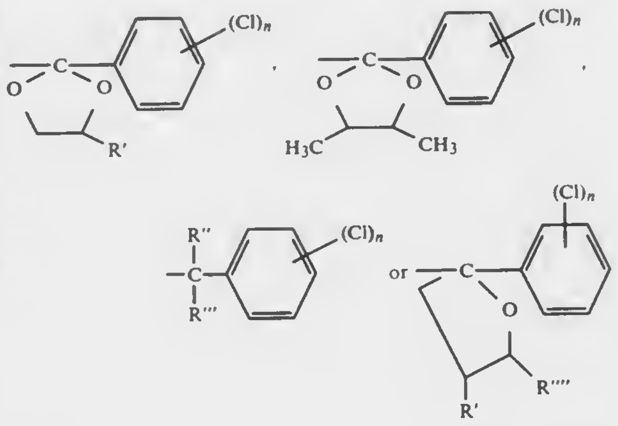
(A) a fungicidally effective amount of an active agent comprising:

(a1) at least one fungicidal compound having the formula:

(I)



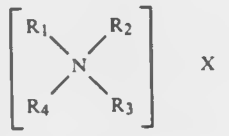
in which Q is N or CH; and R is one of the radicals:



in which R′ is a hydrogen atom or a linear or branched chain alkyl radical containing from 1 to 3 carbon atoms, R″ is a hydrogen atom or a hydroxyl or cyano group, R‴ is a linear or branched chain alkyl radical containing from 1 to 6 carbon atoms, or a substituted such radical bearing a cycloalkyl or phenyl substituent, an alkenyloxy radical containing from 3 to 4 carbon atoms or a phenyl radical, or a substituted such radical bearing one or more halogen atom substituents, R″″ is a hydrogen atom or a linear or branched chain alkyl radical containing from 1 to 3 carbon atoms, or a substituted such radical bearing one or more halogen atom substituents, and n is an integer equal to 1 or 2;

(a2) at least one fungicidal compound having the formula:

(II)



(cationic moiety) (anionic moiety)

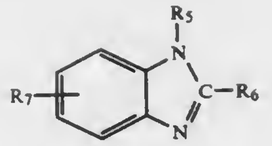
in which the cationic moiety of the salt has a total number of carbon atoms equal to or less than 50, and $R_1$, $R_2$, $R_3$ and $R_4$ are identical or different organic radicals, the free valency of which is borne by a carbon atom, with the proviso that one of the radicals $R_1$, $R_2$, $R_3$ or $R_4$ may be a hydrogen atom, or another ammonium group, and with the further provisos that two of such radicals may together form a single divalent radical, three of such radicals may together form a single trivalent radical, and two pairs of such radicals may together form two single divalent radicals; and

the anionic moiety X is derived from an inorganic or organic acid; and

(a3) at least one fungicidal compound selected from among:

(i) a benzimidazole compound having the formula:

(III)



in which $R_5$ is a hydrogen atom or a —CO—$NR_8R_9$ group wherein $R_8$ is a hydrogen atom or a linear or branched chain alkyl radical containing from 1 to 4 carbon atoms and $R_9$ is a linear or branched chain alkyl radical containing from 1 to 6 carbon atoms, a phenyl radical or a benzyl radical, or a substituted such radical substituted by a lower alkyl group or a lower alkoxy group; R6 is a hydrogen atom, an amino group—$NH_2$, and —NH—CO—$OR_8$ group or an —NH—CO—NH—$OR_8$ group wherein $R_8$ is an alkyl radical as defined above, or a 4-thiazolyl group, with the proviso that $R_6$ may form a single ring with $R_5$ and the atoms to which these radicals are bonded; and $R_7$ is a hydrogen atom or a hydroxyl group; and

(ii) a mixture of one or more of the benzimidazoles of formula (III) with one or more isothiazolinone compounds; and

(B) a liquid carrier medium for said active agent (A) comprising (bl) at least two solvents (b1.1) and (b1.2), wherein (b1.1) comprises an ether of a lower alkanol containing from 1 to 4 carbon atoms and of a saturated aliphatic diol containing from 2 to 10 carbon atoms, and (b1.2) comprises a saturated aliphatic monocarboxylic acid containing from 1 to 6 carbon atoms.

---

## 5,013,749
## IMIDAZOLE DERIVATIVES AND THEIR USE AS HYPERCHOLESTEROLEMIA AND HYPERLIPOPROTEINEMIA AGENTS

**Nigel S. Watson, Chalfont St Giles; Chnen Chan, Ickenham, and Barry C. Ross, Luton, all of England, assignors to Glaxo Group Limited, England**

**Filed Oct. 2, 1989, Ser. No. 415,917**

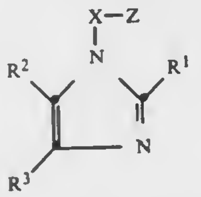
**Claims priority, application United Kingdom, Oct. 3, 1988, 8823191; Oct. 3, 1988, 8823192; Feb. 9, 1989, 8902847**

**Int. Cl.$^5$ A61K** *31/415, 31/44;* **C07D** *403/12, 233/54*

**U.S. Cl. 514—397** **22 Claims**

1. Compounds of general formula (I):

(I)



in which

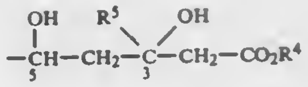
one of the groups $R^1$ or $R^2$ represents a $C_{1-6}$ alkyl group optionally substituted by one to three halogen atoms and the other represents a phenyl or pyridyl ring or N-oxide thereof optionally substituted by one or more substituents selected from halogen atoms and hydroxyl, $C_{1-3}$ alkyl, $C_{1-3}$ alkoxy and trifluoromethyl groups;

$R^3$ represents a phenyl or pyridyl ring or N-oxide thereof optionally substituted by one or more substituents selected from halogen atoms and hydroxyl, $C_{1-3}$ alkyl, $C_{1-3}$ alkoxy and trifluoromethyl groups with the proviso that only one of the groups $R^1$, $R^2$ or $R^3$ represents an optionally substituted pyridyl ring;

X represents —CH═CH—; and

Z represents

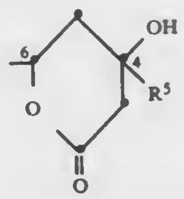
(a)



$$-\overset{\overset{\text{OH}}{|}}{\underset{5}{\text{C}}}\text{H}-\text{CH}_2-\overset{\overset{\text{R}^5\ \ \text{OH}}{\diagdown\ \diagup}}{\underset{3}{\text{C}}}-\text{CH}_2-\text{CO}_2\text{R}^4$$

or

(b)



wherein $R^4$ represents a hydrogen atom, a carboxyl protecting group or a cation; and

$R^5$ represents a hydrogen atom or a $C_{1-3}$ alkyl group; or solvate thereof, or acid addition salt of compounds wherein $R^4$ represents a hydrogen atom or a carboxyl protecting group.

---

## 5,013,750
## GLYCOCYAMIDINE DERIVATIVES

**Ko Nakamura, and Kazuharu Ienaga, both of Katoh, Japan, assignors to Nippon Zoki Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Jul. 11, 1990, Ser. No. 551,375**

**Int. Cl.$^5$ A61K** *31/415*

**U.S. Cl. 514—401** **1 Claim**

1. A method for evaluating renal failure in a patient which comprises determining the amount of 5-hydroxy-1-methylglycocycamidine in the patient's serum or urine.

---

## 5,013,751
## (+) SUPROFEN ESTERS AND AMIDES AS OPTHALMIC ANTI-INFLAMMATORY AGENTS

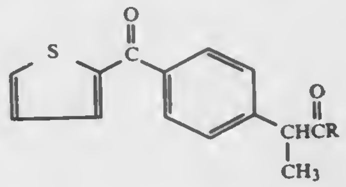
**Steven H. Gerson, and Wesley W. Han, both of Fort Worth, Tex., assignors to Alcon Laboratories, Inc., Fort Worth, Tex.**

**Continuation of Ser. No. 463,066, Jan. 10, 1989, abandoned, which is a continuation of Ser. No. 358,473, May 30, 1989, abandoned, which is a continuation of Ser. No. 249,624, Sep. 26, 1988, abandoned, which is a continuation of Ser. No. 948,181, Dec. 31, 1986, abandoned. This application Aug. 27, 1990, Ser. No. 573,516**

**Int. Cl.$^5$ A61K** *31/38;* **C07D** *333/22*

**U.S. Cl. 514—448** **8 Claims**

1. A compound of the following formula:



wherein R is selected from the group consisting of alkoxyl and hydroxyalkoxyl of 3 to 8 carbon atoms and alkylamino of 3 to 8 carbon atoms, wherein the remaining moiety attached to R is (+) suprofen substantially free of (−) suprofen.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,752
## PREVENTION AND TREATMENT OF ALCOHOLISM BY THE USE OF DIETARY CHROMIUM

**John P. Dobbins, 615 Allen Ave., San Marino, Calif. 91108**
**Continuation-in-part of Ser. No. 321,780, Mar. 10, 1989, Pat. No. 4,918,102. This application Apr. 16, 1990, Ser. No. 509,214**
**The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.**
**Int. Cl.$^5$ A61K** *33/24;* **A23G** *3/00*
**U.S. Cl. 514—505** **7 Claims**

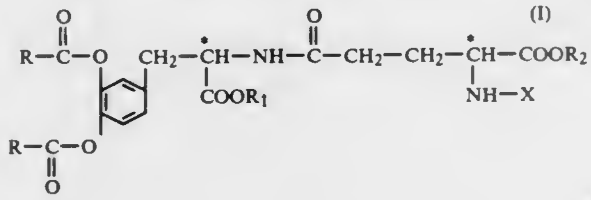
1. An edible food bar containing protein, carbohydrate, fat, vitamins, and minerals, said minerals including at least about 50 micrograms of chromium picolinate.

---

### 5,013,753
## PRODRUGS OF DOPAMINE

**Cesare Casagrande, Arese, and Francesco Santangelo, Milan, both of Italy, assignors to Simes, Vicenza, Italy**
**Filed Jul. 28, 1989, Ser. No. 386,106**
**Claims priority, application Italy, Jul. 29, 1988, 21543 A/88**
**Int. Cl.$^5$ A61K** *31/27*
**U.S. Cl. 514—512** **4 Claims**

1. A compound of formula



(I)

wherein
- R is methyl, ethyl, isopropyl, ethoxy, dimethylamino, phenyl, or 4-methoxyphenyl;
- $R_1$ and $R_2$, the same or different, are hydrogen atoms, or methyl, ethyl or isopropyl groups; and
- X is a hydrogen atom or an acetyl group;
- both the asymmetric carbon atoms, marked by an asterisk, having S configuration;

and salts thereof with pharmaceutically acceptable acids or bases.

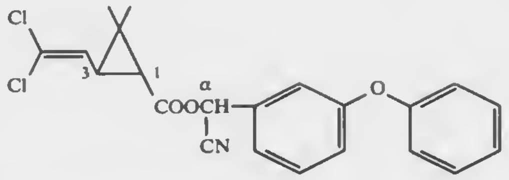
3. A method for the treatment of Parkinson's disease consisting in administering a therapeutically effective amount of a compound according to claim **1**.

---

### 5,013,754
## INSECTICIDAL COMPOSITION COMPRISING MORE THAN ONE ACTIVE INGREDIENT

**György Hidasi, Budapest; István Székely, Dunakeszi; Béla Bertók; Sándor Zoltán, both of Budapest; Lajos Nagy, Szentendre; Antal Gajári, Budapest; Éva Somfai, Budapest; Ágnes Hegedüs, Budapest; László Pap, Budapest; Rudolf Soós, Budapest; Erzsébet Radvány, Budapest; Sándor Botár, Budapest, and Tamás Szabolcsi, Budapest, all of Hungary, assignors to Chinoin Gyogyazer es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary**
**Division of Ser. No. 916,546, Oct. 15, 1986, Pat. No. 4,845,126. This application Jun. 16, 1989, Ser. No. 367,546**
**Claims priority, application Hungary, Jan. 16, 1985, 158/85; Jan. 8, 1986, 74/86**
**The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.**
**Int. Cl.$^5$ A01N** *37/34;* **C07C** *255/39*
**U.S. Cl. 514—521** **16 Claims**

3. A synergistic insecticidal composition containing a crystalline product harmless to the environment consisting in an amount of 0.001 to 99% by.weight of only the 1RtransS and 1StransR enantiomer pair of the synthetic pyrethroid of the Formula (I)



(I)

as the sole cypermethrin component together with an insecticidally inert carrier.

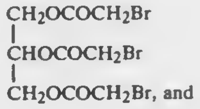
---

### 5,013,755
## GERMICIDAL COMPOSITION

**Susumu Mitsui, Koshigaya; Ryoji Funatsu, Tokyo, and Shigeru Kurose, Misato, all of Japan, assignors to Somar Corporation, Japan**
**Filed Oct. 25, 1989, Ser. No. 426,161**
**Int. Cl.$^5$ A01N** *37/10*
**U.S. Cl. 514—533** **14 Claims**

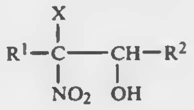
1. A germicidal composition comprising:

a first ingredient which is tribromoacetoxypropane of the formula:



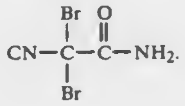
$$\begin{array}{l} CH_2OCOCH_2Br \\ | \\ CHOCOCH_2Br \\ | \\ CH_2OCOCH_2Br, \text{ and} \end{array}$$

a second ingredient selected from the group consisting of (a) an alcohol of the general formula:



$$R^1-\underset{\underset{NO_2}{|}}{\overset{\overset{X}{|}}{C}}-\underset{\underset{OH}{|}}{CH}-R^2$$

wherein $R^1$ and $R^2$ stand independently from each other for hydrogen, a halogen, an alkyl or a substituted alkyl and X stands for a halogen and (b) dibromocyanoacetamide of the formula:



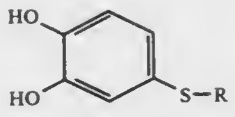
$$CN-\underset{\underset{Br}{|}}{\overset{\overset{Br}{|}}{C}}-\overset{\overset{O}{\|}}{C}-NH_2.$$

---

### 5,013,756
## CATECHOL DERIVATIVES, A PROCESS OF PREPARATION THEREOF, AND THERAPEUTICAL COMPOSITIONS CONTAINING THE SAME

**Michel Follet, and Marc Bonato, both of Aramon, France, assignors to Societe de Conseils de Recherches et d'Application Scientifiques (S.C.R.A.S), France**
**Continuation of Ser. No. 239,049, Aug. 30, 1988, abandoned, Continuation of Ser. No. 908,406, Sep. 16, 1986, abandoned. This application May 23, 1989, Ser. No. 356,568**
**Claims priority, application United Kingdom, Sep. 26, 1985, 8523776**
**Int. Cl.$^5$ A61K** *31/10, 31/235*
**U.S. Cl. 514—544** **2 Claims**

1. A method of inhibiting lipoxygenase or cyclogenase in a subject in which the inhibition of same would be beneficial comprising the administration, in a pharmaceutically acceptable carrier, of a lipoxygenase or cyclogenese inhibiting amount of a catechol derivative having the general formula



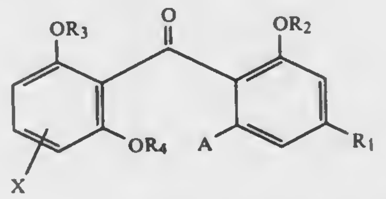
wherein R represents a straight or branched chain acyclic saturated hydrocarbon group having from 1 to 8 carbon atoms, one of which is optionally asymmetric, a mono- or bicycloalkyl group optionally substituted by one or more alkyl groups having from 1 to 7 carbon atoms, one of the carbon atoms of the mono- or bicycloalkyl group optionally being asymmetric, a phenyl group, a halophenyl group, a nitrophenyl group or a phenyl group substituted by one or more alkyl groups having from 1 to 7 carbon atoms or trifluoromethyl groups or COOY groups wherein Y stands for an alkyl having from 1 to 5 carbon atoms.

---

### 5,013,757
## PHYSIOLOGICALLY ACTIVE SUBSTANCE TAN-931, ITS DERIVATIVES, THEIR PRODUCTION AND USE

**Tsuneo Kanamaru, Takatsuki; Tsuneaki Hida, Osaka, and Masayuki Muroi, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**
**Division of Ser. No. 353,755, May 18, 1989, Pat. No. 4,935,543. This application Apr. 13, 1990, Ser. No. 508,188**
**Claims priority, application Japan, May 20, 1988, 63-124067**
**Int. Cl.$^5$ A61K** *31/19;* **C07C** *65/03, 65/19, 65/30*
**U.S. Cl. 514—568** **14 Claims**

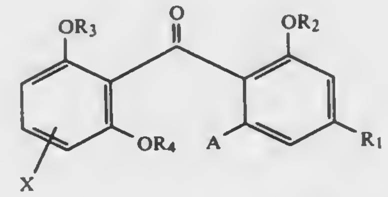
1. A compound of the formula (I):



(I)

wherein $R_1$is carboxyl; $R_2$, $R_3$ and $R_4$ are the same and or different and are hydrogen or alkyl; A is formyl, hydroxyiminomethyl or carboxyl; and X is hydrogen or halogen, or a salt thereof.

14. An aromatase inhibitor comprising as an active component a compound of the formula (I):



(I)

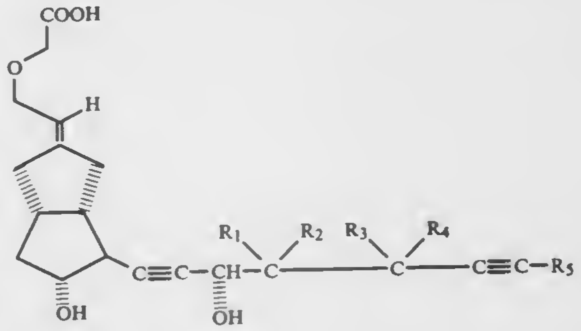
wherein $R_1$ is carboxyl; $R_2$, $R_3$ and $R_4$ are the same or different and are hydrogen or alkyl; A is formyl and X is hydrogen, or a salt thereof in combination with a pharmaceutically acceptable carrier or diluent.

---

### 5,013,758
## NOVEL CARBACYCLINS, PROCESSES FOR THEIR PREPARATION AND THEIR USE AS MEDICINAL AGENTS

**Werner Skuballa; Bernd Raduechel; Helmut Vorbrueggen; Claus-Steffen Stuerzebecher; Martin Haberey; Ekkehard Schillinger, all of Berlin, and Michael H. Town, Iffeldorf, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**
**Continuation of Ser. No. 242,983, Sep. 12, 1988, abandoned, which is a continnation of Ser. No. 803,453, Nov. 29, 1985, abandoned, which is a continuation of Ser. No. 581,851, Feb. 21, 1984, abandoned. This application Nov. 13, 1989, Ser. No. 434,561**
**Claims priority, application Fed. Rep. of Germany, Feb. 18, 1983, 3306123**
**Int. Cl.$^5$ A61K** *31/19*
**U.S. Cl. 514—573** **20 Claims**

1. A (5E)-13,14,18,18,19,19-hexadehydro-3-oxa-6a-carbaprostaglandin $I_2$ of the formula



wherein
- $R_1$, $R_2$, $R_3$, and $R_4$ each independently is hydrogen or alkyl of 1–5 carbon atoms, and
- $R_5$ is alkyl of 1–5 carbon atoms,

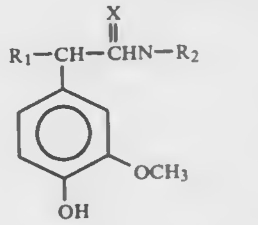
or a physiologically compatible salt thereof with a base.

---

### 5,013,759
## COMPOUNDS AND COMPOSITIONS HAVING ANTI-INFLAMMATORY AND ANALGESIC ACTIVITY

**Elizabeth F. Berman, Cincinnati, Ohio; Brian L. Buckwalter, Yardley, Pa.; Thomas L. Cupps, Oxford, and Joseph H. Gardner, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**
**Continuation of Ser. No. 220,355, Jul. 14, 1988, abandoned, which is a continuation of Ser. No. 90,418, Aug. 27, 1987, abandoned, which is a continuation of Ser. No. 742,833, Jun. 10, 1985, abandoned. This application Jan. 31, 1990, Ser. No. 473,122**
**Int. Cl.$^5$ A61K** *31/165*
**U.S. Cl. 514—622** **15 Claims**

1. A substituted phenylacetic acid amide compound, and pharmaceutically-acceptable salts thereof, of the formula:



wherein X is O or S; $R_1$ is H, OH or $CH_3$; $R_2$ is monounsaturated straight chain alkenyl having from 14 to about 20 carbon atoms.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,760
### PHENYLETHYLAMINE DERIVATIVES AND PHARMACEUTICAL USE

**John B. Farmer, Cropston; Francis Ince; Rodney A. Brown, both of Loughborough, and John Dixon, Belton, all of England, assignors to Fisons plc, Ipswich, England**

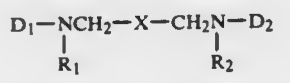
**Continuation of Ser. No. 402,084, Jul. 26, 1982, Pat. No. 4,645,768. This application Apr. 1, 1986, Ser. No. 846,846**

**Claims priority, application United Kingdom, Aug. 5, 1981, 8123962; Oct. 9, 1981, 8130594; Oct. 9, 1981, 8130595; Nov. 17, 1981, 8134551**

**Int. Cl.$^5$ C07C** *215/52*

**U.S. Cl. 514—649** **5 Claims**

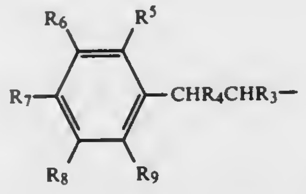
1. A compound of formula I,



$$D_1—\underset{R_1}{N}CH_2—X—CH_2\underset{R_2}{N}—D_2$$

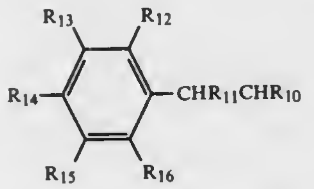
I

in which $D_1$ represents a group of formula II,



II

where $R_1$ represents hydrogen or alkyl $C_1$ to $C_8$,
$R_2$ represents hydrogen or alkyl $C_1$ to 8,
$R_3$, $R_4$, and $R_5$ are each hydrogen,
an adjacent pair of $R_6$, $R_7$, $R_8$ and $R_9$ represent hydroxy and the remainder represent hydrogen,
X represents a chain $—(CH_2)_n—$,
n is an integer from 3 to 5 inclusive,
$D_2$ represents alkyl $C_1$ to 8 substituted by phenyl;
or alkyl $C_1$ to 8 substituted by phenyl which in turn is substituted by halogen, alkyl $C_1$ to 8, amino alkoxy $C_1$ to 8, or nitro,
or $D_2$ represents a group of formula III,



III

where $R_{10}$ and $R_{12}$ form a chain $—CH_2CH_2—$,
$R_{11}$ represents hydrogen or alkyl $C_1$ to 8,
$R_{13}$, $R_{14}$, $R_{15}$ and $R_{16}$ represent hydrogen,
and pharmaceutically acceptable derivatives thereof.

5. A method of treatment of congestive heart failure which comprises administering an effective amount of a compound according to claim 1 to a patient suffering from such a condition.

---

### 5,013,761
### SEROTONIN ANTAGONISTS

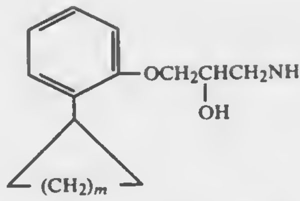
**Edward E. Beedle, Indianapolis; David W. Robertson, Greenwood, and David T. Wong, Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation of Ser. No. 202,767, Jun. 3, 1988, abandoned. This application Nov. 8, 1989, Ser. No. 434,137**

**Int. Cl.$^5$ A61K** *31/135;* **C07C** *277/00*

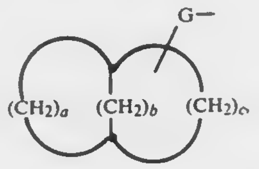
**U.S. Cl. 514—650** **10 Claims**

1. A compound of Formula



Ic

where m is 0–3, and $Z_c$ is ($C_7$–$C_8$ cycloalkyl)—G—, $C_6$–$C_{10}$ alkyl, phenyl substituted $C_2$–$C_{10}$ alkyl, —($C_1$–$C_4$ alkylidene)—T—($C_1$–$C_4$ alkyl), or



where each G is independently a bond or $C_1$–$C_4$ alkylidene, a and c are independently 1–5, b is 0–5, and (a+c) is greater than 2, and T is —O—, —S—, —SO—, or $—SO_2—$, and pharmaceutically acceptable salts thereof.

---

### 5,013,762
### METHOD FOR THE TREATMENT OF NEMATODES IN SOIL USING BROMONITROMETHANE

**Roger E. Smith; Scott Thornburgh, both of West Lafayette, Ind., and Rodrigo Rodriquez-Kabana, Auburn, Ala., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.**

**Filed Nov. 28, 1989, Ser. No. 442,314**

**Int. Cl.$^5$ A01N** *33/18*

**U.S. Cl. 514—740** **24 Claims**

1. A method for the treatment of nematodes in soil which comprises applying to the nematodes in the soil a nematicidal amount of bromonitromethane.

---

### 5,013,763
### WASH-OFF-RESISTANT SKIN PREPARATION

**David R. Tubesing, Erlanger, and Maxine L. Truax, Fort Mitchell, both of Ky., assignors to The Andrew Jergens Company, Cincinnati, Ohio**

**Filed Nov. 30, 1987, Ser. No. 126,453**

**Int. Cl.$^5$ A61K** *7/48*

**U.S. Cl. 514—772** **16 Claims**

1. A skin preparation comprising:
(a) a skin preparation base; and
(b) a plurality of wash-off-resistance substantivity agents, the wash-off-resistance substantivity agents being selected from the group consisting of:
  (b1) a polymeric skin-feel-modifying compound in an amount of from about 0.05 to about 3 percent by weight of the skin preparation;
  (b2) a quaternary ammonium compound in an amount of from about 0.1 to about 6 percent by weight of the skin preparation;
  (b3) a hydrophobic modified starch in an amount of from about 0.5 to about 10 percent by weight of the skin preparation;
  (b4) a substantive silicone in an amount of from about 0.1 to about 8 percent by weight of the skin preparation; and
  (b5) a substantive emollient in an amount of from about 0.1 to about 8 percent by weight of the skin preparation;
the skin preparation having a fraction of retained nonaqueous components as measured by a wash-off-resistance test of about 70 percent or greater.

### 5,013,764
### CATALYST AND METHOD FOR PRODUCING LOWER ALIPHATIC ALCOHOLS

**Jeffrey B. Harrison, Fishkill, and Chau-Hwa Yang, Hopewell Junction, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Aug. 3, 1989, Ser. No. 389,464**

**Int. Cl.$^5$ C07C** *27/06*

**U.S. Cl. 518—714** **23 Claims**

1. A method for preparing lower aliphatic alcohols which comprises reacting carbon monoxide and hydrogen in the presence of a catalyst composition which includes palladium, an alkali metal or a mixture of alkali metals and which has been modified by a molybdenum promoter, said catalyst composition being devoid of copper and thorium.

---

### 5,013,765
### METHOD FOR SULFONATING AROMATIC POLYETHER SULFONES

**Heinz-Dieter Sluma, Grossostheim, and Dieter Huff, Obernburg, both of Fed. Rep. of Germany, assignors to Akzo N.V., Arnhem, Netherlands**

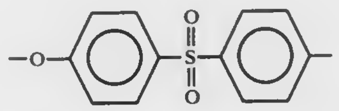
**Filed Apr. 27, 1989, Ser. No. 343,604**

**Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3814759; Apr. 30, 1988, 3814760**

**Int. Cl.$^5$ C08J** *5/20;* **C08G** *75/23*

**U.S. Cl. 521—27** **18 Claims**

1. A sulfonation method comprising sulfonating at least one aromatic polyether sulfone comprising the self-repeating structural unit:



in a solution of sulfur trioxide in concentrated sulfuric acid, the content of sulfur trioxide, based on the total amount of pure sulfuric acid present in the reaction mixture, being kept to a value of less than 6 percent by weight throughout the whole of the sulfonation reaction and the temperature of the reaction mixture being kept at less than +12° C. throughout the whole of the reaction.

---

### 5,013,766
### CLOSED CELL, RIGID POLYURETHANE FOAM

**Lotar H. Hanusa, Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.**

**Filed Sep. 15, 1989, Ser. No. 407,841**

**Int. Cl.$^5$ C08G** *18/14*

**U.S. Cl. 521—137** **5 Claims**

1. A process for preparing a rigid, closed cell polyurethane foam comprising reacting:
(a) an organic di and/or polyisocyanate and
(b) a polyol mixture comprising:
  (i) a polyol having an hydroxyl functionality of from 3 to 8 and an hydroxyl number of from about 300 to about 800, and
  (ii) from about 10 to about 90 parts by weight per 100 parts by weight of polyol (i), of a polyol having an hydroxyl functionality of from 2 to 3 and an hydroxyl number of from about 25 to about 115, in the presence of
(c) a catalyst,
(d) a blowing agent, and
(e) a foam stabilizer, at an isocyanate index of form about 70 to about 115.

---

### 5,013,767
### ASYMMETRIC GAS SEPARATION MEMBRANES HAVING IMPROVED STRENGTH

**Raymond F. Malon, St. Charles, and Clint A. Cruse, St. John, both of Mo., assignors to Permea, Inc., St. Louis, Mo.**

**Filed Sep. 27, 1989, Ser. No. 413,137**

**Int. Cl.$^5$ C08J** *9/28*

**U.S. Cl. 521—64** **3 Claims**

1. A dope suitable for use in the preparation of an asymmetric, substantially macrovoid-free membrane having potential for gas separation which do is comprised of:
(a) an aromatic sulfone polymer; and
(b) a solvent system being capable of dissolving the hydrophobic polymer in amounts greater than 30% by weight, the solvent system being comprised of:
  (1) two non-solvents, being comprised of a weak non-solvent being a Lewis acid and having a $\Delta\sigma$ ($\sigma$ non-solvent-$\sigma$ polymer) of less than about $\pm 6$ cal$^{0.5}$/cm$^{1.5}$ and a strong non-solvent having a $\Delta\sigma$ greater than about $\pm 6$ cal$^{0.5}$/cm$^{1.5}$, the weak non-solvent and the strong non-solvent being present in amounts sufficient to lower the coagulation (g) value to less than about 2;
(2) one or more solvents being a Lewis base; and
(3) one or more complexes of solvents being a Lewis acid:-base complex.

---

### 5,013,768
### PHOTOPOLYMERIZABLE COATING COMPOSITION AND PROCESS FOR FORMING A COATING HAVING A STEREOSCOPIC PATTERN

**Yoshiyuki Kiriyama, Kobe; Kazuyuki Moriga, Ibaraki; Toshio Shinohara, Kyoto; Mitsuhiro Matsuda, Ibaraki, and Hiromi Maeda, Akashi, all of Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka, Japan**

**Filed Dec. 19, 1989, Ser. No. 152,587**

**Int. Cl.$^5$ C08F** *2/44, 2/50, 122/22*

**U.S. Cl. 522—64** **10 Claims**

1. A photopolymerizable coating composition comprising:
(A) 100 parts by weight of a vehicle consisting essentially of a urethaneacrylate oligomer;
(B) from 0.1 to 5 parts by weight of an acylphosphine oxide compound as a photoinitiator;
(C) from 1 to 100 parts by weight of a color pigment; and
(D) from 20 to 300 parts by weight of a transparent glass powder having an average particle size of not larger than 100 μm and an index of refraction which does not differ more than 0.3 from the index of refraction of the composition excluding the color pigment.

---

### 5,013,769
### METHOD OF MAKING A HYDROGEL-FORMING WOUND DRESSING OR SKIN COATING MATERIAL

**Douglas G. Murray, Willowdale; Dennis C. Smith, Toronto, and James E. Guillet, Don Mills, all of Canada, assignors to Medipro Sciences Limited, Ontario, Canada**

**Division of Ser. No. 234,726, Aug. 22, 1988, Pat. No. 4,920,158. This application Feb. 6, 1990, Ser. No. 475,884**

**Int. Cl.$^5$ C08L** *33/02, 29/04*

**U.S. Cl. 523—111** **19 Claims**

1. A method for making a hydrogel-forming wound dressing or skin coating material, said material comprising a first hydrophilic polymer selected from polymers of acrylic acid, a second hydrophilic polymer which is polyvinyl alcohol, and water, the method comprising:
(a) preparing a homogenous solution of the first hydrophilic polymer with the second hydrophilic polymer at an elevated temperature;
(b) diluting the solution produced in step (a) by mixing it with water and an organic solvent; and
(c) de-aerating the resultant mixture.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,770

### CROSS-LINKABLE SURFACE-MODIFIED MICACEOUS PARTICULATES AND COATING COMPOSITIONS CONTAINING THE SAME

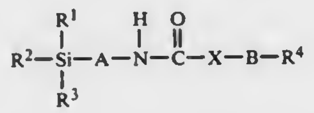
**Clint W. Carpenter, Plymouth, and Thomas G. Savino, Northville, both of Mich., assignors to BASF Corporation, Southfield, Mich.**

**Filed Jul. 27, 1989, Ser. No. 386,376**

**Int. Cl.$^5$ C08K** *3/34, 9/06*

**U.S. Cl. 523—213** **16 Claims**

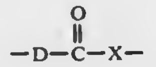
1. A composition of matter comprising particulates of micaceous materials surface modified with a compound comprising the formula



$$R^2-\underset{R^3}{\overset{R^1}{Si}}-A-\overset{H}{N}-\overset{O}{\overset{\|}{C}}-X-B-R^4$$

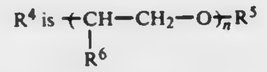
wherein

- R$^1$, R$^2$, and R$^3$ may be the same or different and are selected from
  - alkyl of from one to ten carbon atoms,
  - alkoxyl of from one to ten carbon atoms,
  - alkoxylalkoxyl of from two to ten carbon atoms,
  - alkanoyloxy of from two to ten carbon atoms, or
  - halogen,
- with the proviso that R$^1$, R$^2$, and R$^3$ may not all be alkyl;
- A is a divalent radical selected from straight or branched
  - alkylene of from one to twelve carbon atoms,
  - phenylene, or
  - phenylene substituted with
    - halogen,
    - alkyl of from one to four carbon atoms, or
    - alkoxyl of from one to four carbon atoms;
- X is a divalent radical selected from -O- or -NH-;
- B is a direct valence bond or is a divalent group having the formula



$$-D-\overset{O}{\overset{\|}{C}}-X-$$

wherein D is a residue derived from the hypothetical removal of the two isocyanate groups from a diisocyanate molecule, and X is a divalent group selected from -O- and -NH-;

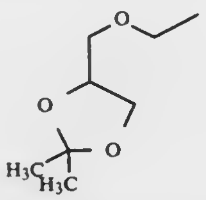


$$R^4 \text{ is } \left(\underset{R^6}{CH}-CH_2-O\right)_n R^5$$

wherein

n is an integer from about zero to one thousand,

R$^6$ is hydrogen, alkyl of from one to eight carbon atoms, or



R$^5$ is selected from

- polyols having at least one hydroxyl group, and
- blocked polyols wherein said hydroxy groups are blocked by hydroxy protecting groups.

---

### 5,013,771

### PROCESS FOR THE PRODUCTION OF GLASS FIBER REINFORCED COMPOSITE MATERIAL

**Antoine Guiliet, Divonne-les-Bains, France, and Fred D. Osterholtz, Pleasantville, N.Y., assignors to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.**

**Filed Dec. 21, 1989, Ser. No. 454,716**

**Int. Cl.$^5$ C08L** *83/00*

**U.S. Cl. 523—202** **34 Claims**

1. A process for the production of a glass fiber-reinforced composite material, which process comprises:

- treating glass fibers with a silane composition comprising silane molecules having amine functional groups and silane molecules having ethylenically-unsaturated functional groups;
- admixing the treated glass fibers with a polyolefin resin, and a fiber bonding agent comprising (a) from 0.05 to 15 weight percent of a polymerizable unsaturated organic compound having at least two polymerizable unsaturation groups and (b) from 0.05 to 5 weight percent of a vinyl-polymerizable unsaturated, hydrolyzable silane;
- the weight percentages of components (a) and (b) being based upon the total weight of the treated glass fibers;
- generating free radicals in the resulting mixture in an amount sufficient to cause bonding of the treated glass fibers with the polyolefin resin; and
- exposing the resultant mixture of glass fibers, polyolefin resin, and fiber bonding agent to conditions of temperature and pressure sufficient to cause the formation of a fiber-reinforced composite material.

---

### 5,013,772

### METHOD FOR THE PREPARATION OF SILICONE RUBBER COMPOSITION

**Hironao Fujiki, Takasaki, and Morio Oohashi, Annaka, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Jul. 28, 1989, Ser. No. 387,600**

**Claims priority, application Japan, Aug. 23, 1988, 63-208889**

**Int. Cl.$^5$ C08K** *9/06*

**U.S. Cl. 523—213** **15 Claims**

1. A method for the preparation of a curable organopolysiloxane composition which comprises the steps of:

(a) blending 100 parts by weight of a vinyl-containing organopolysiloxane having, in a molecule, at least two vinyl groups directly bonded to the silicon atoms, from 1 to 50 parts by weight of a finely divided silica filler having a hydrophobic surface and from 1 to 30 parts by weight of hexamethyl disilazane into a uniform mixture:

(b) subjecting the uniform mixture obtained in step (a) to a heat treatment at a temperature ranging from 120° C. to 180° C. for a length of time of at least 120 minutes; and

(c) admixing the heat-treated mixture with an organohydrogenpolysiloxane in an amount sufficient to provide from 0.4 to 4.0 moles of hydrogen atoms directly bonded to the silicon atoms per mole of the vinyl groups in the vinyl-containing organopolysiloxane and a catalytic amount of a platinum compound.

---

### 5,013,773

### THERMOPLASTIC RESIN COMPOSITION AND PROCESS FOR PRODUCING THE SAME

**Manabu Nomura, and Kaoru Wada, both of Ichihara, Japan, assignors to Idemitsu Petrochemical Company Limited, Tokyo, Japan**

**Filed Dec. 7, 1988, Ser. No. 280,794**

**Claims priority, application Japan, Dec. 8, 1987, 62-311192; Mar. 11, 1988, 63-58027**

**Int. Cl.$^5$ C08K** *7/08, 3/30;* **C08L** *23/10, 23/04*

**U.S. Cl. 523—222** **7 Claims**

1. A thermoplastic resin composition comprising 30 to 99 wt % of a thermoplastic resin and 1 to 70 wt % of granulated magnesium oxysulfate fibers dispersed therein, said granulated fibers having a bulk density of 0.15 to 0.4, and having been prepared by stirring agglomerates of magnesium oxysulfate fibers, said fibers having an average fiber diameter of 0.1 to 1 μm, an aspect ratio of 50 to 300 and an oil absorption of 400 ml/100 g, with water to open the agglomerates and disperse the fibers in the water; separating the fibers from the water; extruding the fibers in the form of a gel through a hole 0.3 to 5 mm in diameter; cutting the extrudate into granules; and drying the granules.

---

### 5,013,774

### THERMOPLASTIC METHACRYLIMIDE GROUP-CONTAINING RESIN COMPOSITION

**Kozi Nishida, and Mikiharu Watanabe, all of Toyama, Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan**

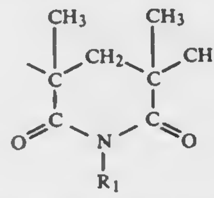
**Filed Mar. 7, 1989, Ser. No. 319,710**

**Claims priority, application Japan, Mar. 8, 1988, 63-54035**

**Int. Cl.$^5$ C08K** *5/34*

**U.S. Cl. 524—91** **7 Claims**

1. A thermoplastic methacrylimide group-containing resin composition which comprises 100 parts by weight of a methacrylimide group-containing polymer comprising 5 to 100% by weight of units of an imide ring structure represented by the following structural formula (I):



(I)

wherein R$_1$ stands for a hydrogen atom, a substituted or unsubstituted alkyl, cycloalkyl, aryl, alkaryl, aralkyl or allyl group having 1 to 20 atoms,

and 0 to 95% by weight of units derived from at least one monoethylenically unsaturated monomer, 0.01 to 10 parts by weight of a tetramethylpiperidine derivative, and 0.01 to 5.0 parts by weight, based on 100 parts by weight of the methacrylimide group-containing polymer, of a triazole type ultraviolet absorber selected from the group consisting 2(2H-benzotriazole-2-yl)-4-(1,1,3,3-tetramethylbutyl)-phenol and 2-(3,5-di-t-butyl-2-hydroxyphenyl)benzotriazole.

---

### 5,013,775

### SIZING COMPOSITION AND SIZING METHOD

**Hideo Oikawa, Iwakuni; Masatomi Ogawa, Ichihara; Kiyoshi Iwai, and Mayumi Narushima, both of Chiba, all of Japan, assignors to DIC-Hercules Chemicals, Inc., Tokyo, Japan**

**Filed Apr. 27, 1989, Ser. No. 343,903**

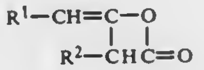
**Claims priority, application Japan, Apr. 28, 1988, 63-104204; Apr. 28, 1988, 63-104205**

**Int. Cl.$^5$ C08K** *5/15*

**U.S. Cl. 524—107** **13 Claims**

1. A paper sizing composition comprising

(a) 100 parts by weight of a ketene dimer compound represented by the formula



$$\begin{array}{l} R^1-CH=C-O \\ \qquad\quad\;\;\; | \quad\;\; | \\ \quad R^2-CH\;C=O \end{array}$$

wherein R$^1$ and R$^2$ are the same or different hydrocarbyl group having 8–30 carbon atoms, and

(b) 2–100 parts by weight of a hydrophilic polymer obtained by polymerizing or copolymerizing a hydrophilic vinyl monomer or monomers in the presence of an alkylmercaptan having 6–22 carbon atoms.

---

### 5,013,776

### FLAME-RETARDANT POLYCARBONATE RESIN COMPOSITION

**Kouji Ishihata, Sagamiha; Youichi Hironaka, Mihara; Hisanaga Shimizu, Mihara; Kazuo Kitamura, Mihara, and Takeshi Imagawa, Mihara, all of Japan, assignors to Teijin Chemicals, Ltd., Tokyo, Japan**

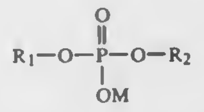
**Filed May 16, 1989, Ser. No. 352,340**

**Claims priority, application Japan, May 20, 1988, 63-122070; Aug. 9, 1988, 63-197093; Sep. 8, 1988, 63-223398**

**Int. Cl.$^5$ C08K** *5/527*

**U.S. Cl. 524—118** **6 Claims**

1. A flame-retardant polycarbonate resin composition comprising 100 parts by weight of at least one metal salt of an organic phosphoric acid ester represented by the following general formula



$$R_1-O-\underset{OM}{\overset{O}{\overset{\|}{P}}}-O-R_2$$

wherein R$_1$ and R$_2$, independently from each other, represent an aryl group which is unsubstituted or substituted by halogen or lower alkyl group and are bonded to each other through an alkylene group, and M represents an alkali metal.

---

### 5,013,777

### NOVEL SINGLE-FUNCTIONAL AND MIXTURES OF MULTI-FUNCTIONAL OLIGOMERIC PERFORMANCE ADDITIVE COMPOSITIONS AND THEIR USES

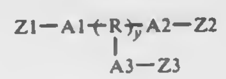
**Ronald E. MacLeay, Williamsville; Jose Sanchez, Grand Island, and Daryl L. Stein, Clarence, all of N.Y., assignors to Atochem North America, Inc., Philadelphia, Pa.**

**Filed Dec. 24, 1987, Ser. No. 137,989**

**Int. Cl.$^5$ C08K** *5/04, 5/12, 5/16, 5/20, 5/42;* **C07C** *271/42, 271/48, 271/54, 237/46, 309/58, 309/59, 309/57, 69/00*

**U.S. Cl. 524—159** **21 Claims**

1. A process for enhancing flame retardance of an engineering thermoplastic polymeric resin composition consisting essentially of mixing with the engineering thermoplastic polymeric resin composition, at about 100° C. to about 550° C., until intimately mixed, about 0.05% to about 10% by weight, based on the weight of the engineering thermoplastic polymeric resin composition, of an oligomeric flame retardant compound having the following structure D:

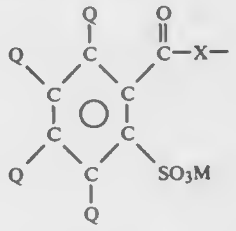


$$Z1-A1\left(\underset{A3-Z3}{R}\right)_y A2-Z2$$

D

where

- y=0 to 75,
- Z1, Z2 and Z3 are nothing, the same or different with the proviso that at least one of Z1, Z2 and Z3 is a flame retardant monoradical having a structure selected from the group consisting of structure (1), (2), (3) and (4):



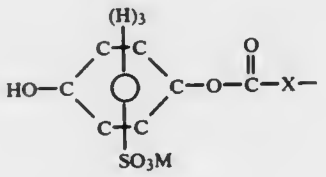
(1)

where

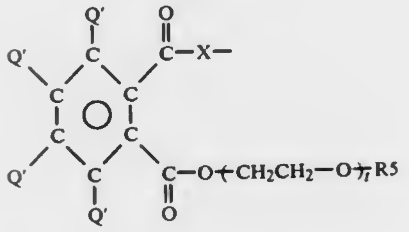
- Q is selected from the group consisting of H, Cl and Br,
- M is selected from the group consisting of H, an alkali metal and an alkaline earth metal and

VOL
1126
ISS
1
MY
7
1991
UMI

X is selected from the group consisting of NH and O;

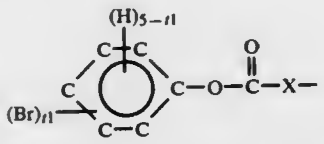


(2)



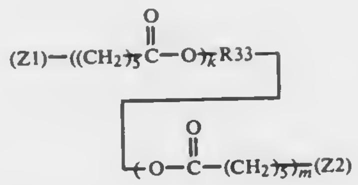
(3)

where
R5 is an alkyl radical of 1 to 12 carbons,
Q′ is selected from the group consisting of Cl and Br,
and
t is 0 to 15 and



(4)

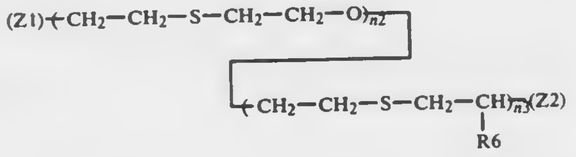
any other of Z1, Z2 and $Z_3$ is selected from the group consisting of H, at least one substituted radical and an unsubstituted radical, where the radical is selected from the group consisting of an alkoxy radical of 1 to 12 carbons, an alkylamino radical of 1 to 12 carbons, an acyloxy radical of 1 to 12 carbons, an acylamino radical of 1 to 12 carbons, an alkenoyloxy radical of 3 to 12 carbons, an alkenoylamino radical of 3 to 12 carbons, an aroyloxy radical of 7 to 15 carbons, an aroylamino radical of 7 to 15 carbons, a phthalimido radical, an alkoxycarbonyloxy radical of 2 to 13 carbons, an alkoxycarbonylamino radical o 2 to 13 carbons, an alkenyloxycarbonyloxy radical of 3 to 12 carbons, an alkenyloxycarbonylamino radical of 3 to 12 carbons, an aryloxycarbonyloxy radical of 7 to 15 carbons, an aryloxycarbonylamino radical of 7 to 15 carbons, an alkylaminocarbonyloxy radical of 2 to 13 carbons, an arylaminocarbonyloxy radical of 7 to 15 carbons, an aralkylaminocarbonyloxy radical of 7 to 16 carbons, an alkylsulfonyloxy radical of 1 to 8 carbons, an alkylsulfonylamino radical of 1 to 8 carbons, an arylsulfonyloxy radical of 6 to 11 carbons, an arylsulfonylamino radical of to 11 carbons, a perfluoroacyloxy radical of 2 to 14 carbons, and a perfluoroacylamino radical of 2 to 14 carbons; where the substituents thereof are selected from the group consisting of Cl, Br, an acetyl radical, an alkyl radical of 1 to 6 carbons, an alkenyl radical of 2 to 6 carbons, an aryl radical of 6 to 10 carbons, an alkoxy radical of 1 to 6 carbons, an aryloxy radical of 6 to 10 carbons, an alkoxycarbonyl radical of 2 to 13 carbons, a hydroxyalkoxycarbonyl radical of 3 to 13 carbons, a chlorohyroxyalkoxycarbonyl radical of 4 to 13 carbons, and an epoxyalkoxycarbonyl radical of 4 to 13 carbons;
A1, A2 and A3 are nothing, the same or different, with the proviso that when A3 is nothing, only one of A1 and A2 can be nothing, and
when y=0,
A2 is nothing, and
A1 is selected from the group consisting of diradicals (1), (2), (3) and (4):



(1)

$$(Z1)-(\!(CH_2)_5\overset{\overset{O}{\|}}{C}-O)_{k}R33-\;-(O-\overset{\overset{O}{\|}}{C}-(CH_2)_5)_{m}(Z2)$$

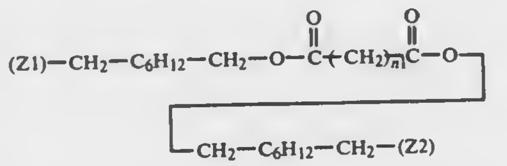
where
R33 is selected from the group consisting of an alkylene diradical of 2 to 8 carbons and an alkylene diradical of 2 to 8 carbons containing at least one atom selected from the group consisting of O, S and N atoms in the alkylene chain,
(Z1) and (Z2) show the relationship of the -A1-diradical to Z1 and Z2, respectively, and
the sum of k and m is 3 to 50;



(2)

$$(Z1)(CH_2-CH_2-S-CH_2-CH_2-O)_{n2}-\;(CH_2-CH_2-S-CH_2-\underset{\underset{R6}{|}}{CH})_{n3}(Z2)$$

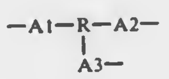
where
R6 is selected from the group consisting fof H and a methyl radical,
(Z1) and (Z2) show the relationship of the -A1-diradical to Z1 and Z2, respectively,
n2 is 2 to 15 and
n3 is 0 to 3;
(3) an oligomeric diradical selected from the group consisting of an oligomeric polybutadiene diradical, an oligomeric polycaprolactone diradical, an oligomeric aromatic polyester diradical, an oligomeric aliphatic polycarbonate diradical, an oligomeric aliphatic polyamide diradical, an oligomeric aliphatic polyurethane diradical, an oligomeric aliphatic polyurea diradical, an oligomeric bisphenol A polycarbonate diradical and an oligomeric bisphenol A polycarbonate diradical and an oligomeric bispherol A-tetrabromobisphenol A co-polycarbonate diradical; and



(4)

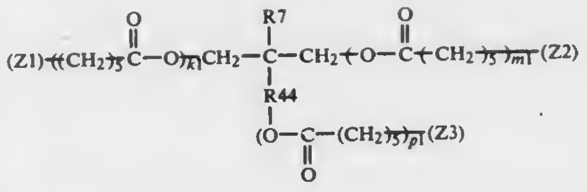
$$(Z1)-CH_2-C_6H_{12}-CH_2-O-\overset{\overset{O}{\|}}{C}(CH_2)_{n1}\overset{\overset{O}{\|}}{C}-O-\;-CH_2-C_6H_{12}-CH_2-(Z2)$$

where
(Z1) and (Z2) show the relationship of the -A1-diradical to Z1 and Z2, respectively, and
n1 is 5 to 20; and
when y is 1,
the triradical



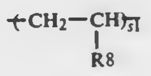
$$-A1-\underset{\underset{A3-}{|}}{R}-A2-$$

has a structure:



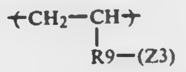
$$(Z1)(\!(CH_2)_5\overset{\overset{O}{\|}}{C}-O)_{k1}CH_2-\underset{\underset{\underset{\underset{(O-\underset{\underset{O}{\|}}{C}-(CH_2)_5)_{p1}(Z3)}{|}}{R44}}{|}}{\overset{\overset{R7}{|}}{C}}-CH_2(O-\overset{\overset{O}{\|}}{C}(CH_2)_5)_{m1}(Z2)$$

where
(Z1), (Z2) and (Z3) show the relationship of the triradical to Z1, Z2 and Z3, respectively,
R7 is selected from the group consisting of H and an alkyl radical of 1 to 6 carbons,
R44 is selected from the group consisting of nothing and an alkylene diradical of 1 to 6 carbons, and
the sum of k1, m1 and p1 is 2 to 20;
when y is 2 to 75,
A1 has a structure;



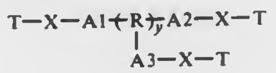
$$(CH_2-\underset{\underset{R8}{|}}{CH})_{s1}$$

where
R8 is selected from the group consisting of a phenyl radical and an acetoxy radical and
s1 is 4 to 25; and
when y is 2 to 75,
A2 and A3 are nothing, and
triradical R has a structure:



$$(CH_2-\underset{\underset{R9-(Z3)}{|}}{CH})$$

where
R9 is selected from the group consisting of nothing and a methylene diradical, (Z3) shows the relationship between the triradical R group and Z3;
the compound of Structure D being preparable from a compound of Structure B:

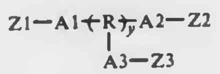


B

$$T-X-A1(\underset{\underset{A3-X-T}{|}}{R})_{y}A2-X-T$$

where
T is selected from the group consisting of H and a halocarbonyl radical;
where the compound of Structure B is reacted with a flame retardant compound possessing at least one co-reactive group selected from the group consisting of a hydroxy radical, an amino radical, an epoxide radical, a carboxylic acid cyclic anhydride radical, a sulfocarboxylic cyclic acid anhydride radical, a haloformate radical and an isocyanate radical.

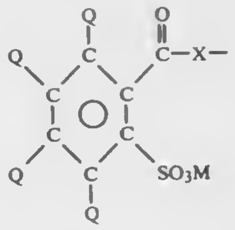
16. An oligomeric performance additive compound having at least one functional performance group, the compound having a Structure A:



A

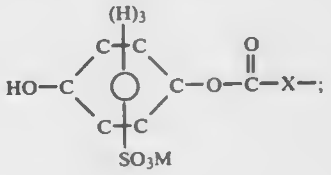
$$Z1-A1(\underset{\underset{A3-Z3}{|}}{R})_{y}A2-Z2$$

where
y=0 to 75,
Z1, Z2 and Z3 are nothing, the same or different with the proviso that at least one of Z1, Z2 and Z3 is a flame retardant monoradical having a structure selected from the group consisting of structures (1), (2), (3) and (4):

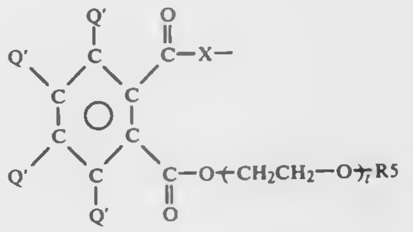


(1)

where
Q is selected from the group consisting of H, Cl and Br,
M is selected from the group consisting of H, an alkali metal and an alkaline earth metal, and
X is selected from the group consisting of NH and O;

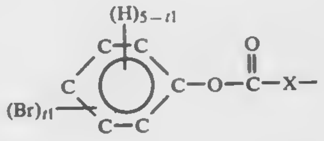


(2)



(3)

where
R5 is an alkyl radical of 1 to 12 carbons,
Q′ is selected from the group consisting of Cl and Br,
and
t is 0 to 15; and



(4)

where t1 is 1 to 5;
any other of Z1, Z2 and Z3 not selected from the group consisting of flame retardant monoradicals (1), (2), (3) and (4) is selected from the group consiting of H, at least one substituted radical and an unsubstituted radical, where the radical is selected from the group consisting of an alkoxy radical of 1 to 12 carbons, an alkylamino radical of 1 to 12 carbons, an acyloxy radical of 1 to 12 carbons, an acylamino radical of 1 to 12 carbons, an alkenoyloxy radical of 3 to 12 carbons, an alkenoylamino radical of 3 to 12 carbons, an aroyloxy radical of 7 to 15 carbons, an aroylamino radical of 7 to 15 carbons, a phthalimido radical, an alkoxycarbonyloxy radical of 2 to 13 carbons, an alkoxycarbonylamino radical of 2 to 13 carbons, an alkenyloxycarbonyloxy radical of 3 to 12 carbons, an alkenyloxycarbonylamino radical of 3 to 12 carbons, an aryloxycarbonyloxy radical of 7 to 15 carbons, an aryloxycarbonylamino radical of 7 to 15 carbons, an alkylaminocarbonyloxy radical of 2 to 13 carbons, an arylaminocarbonyloxy radical of 7 to 15 carbons, an aralkylaminocarbonyloxy radical of 7 to 16 carbons, an alkylsulfonyloxy radical of 1 to 8 carbons, an alkylsulfonylamino radical of 1 to 8 carbons, an arylsulfonyloxy radical of 6 to 11 carbons, an arylsulfonylamino radical of 6 to 11 carbons, a perfluoroacyloxy radical of 2 to 14

VOL
1126
ISS
1
MY
7
1991
UMI

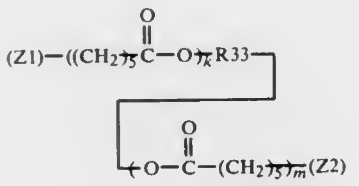
carbons and a perfluoroacylamino radical of 2 to 14 carbons; where the substituents thereof are selected from the group consisting of Cl, Br, an acetyl radical, an alkyl radical of 1 to 6 carbons, an alkenyl radical of 2 to 6 carbons, an aryl radical of 6 to 10 carbons, an alkoxy radical of 1 to 6 carbons, an aryloxy radical of 6 to 10 carbons, an alkoxycarbonyl radical of 2 to 13 carbons, a hydroxyalkoxycarbonyl radical of 3 to 13 carbons, a chlorohydroxyalkoxycarbonyl radical of 4 to 13 carbons and an epoxyalkoxycarbonyl radical of 4 to 13 carbons;

A1, A2 and A3 are nothing, the same or different, with the proviso that when A3 is nothing, only one of A1 and A2 can be nothing, and

when y=0,

A2 is nothing, and

A1 is selected from the group consisting of diradicals (1), (2) and (3):



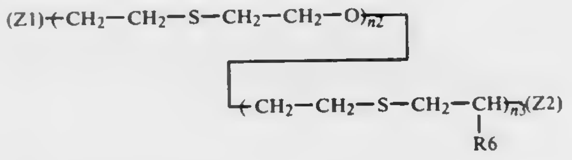
$(Z1){-}\left(\left(CH_2\right)_5\overset{\overset{O}{\|}}{C}{-}O\right)_k R33{-}\left(O{-}\overset{\overset{O}{\|}}{C}{-}\left(CH_2\right)_5\right)_m(Z2)$ (1)

where

R33 is selected from the group consisting of an alkylene diradical of 2 to 8 carbons and an alkylene diradical of 2 to 8 carbons containing at least one atom selected from the group consisting of O, S and N atoms in the alkylene chain,

(Z1) and (Z2) show the relationship of the -A1-diradical to Z1 and Z2, respectively, and

the sum of k and m is 3 to 50;



$(Z1)\left(CH_2{-}CH_2{-}S{-}CH_2{-}CH_2{-}O\right)_{n2}\left(CH_2{-}CH_2{-}S{-}CH_2{-}\underset{\underset{R6}{|}}{CH}\right)_{n3}(Z2)$ (2)

where

R6 is selected from the group consisting of H and a methyl radical,

(Z1) and (Z2) show the relationship of the -A1-diradical to Z1 and Z2, respectively,

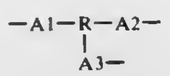
n2 is 2 to 15 and

n3 is 0 to 3;

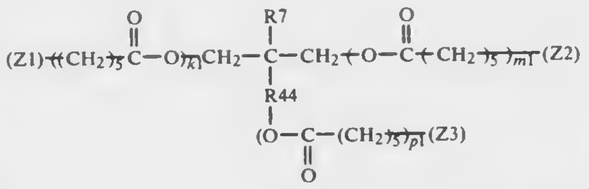
(3) an oligomeric diradical selected from the group consisting of an oligomeric polybutadiene diradical, an oligomeric polycaprolactone diradical, an oligomeric aliphatic polycarbonate diradical, an oligomeric bisphenol A polycarbonate diradical, an oligomeric tetrabromobisphenol A polycarbonate diradical and an oligomeric bisphenol A-tetrabromobisphenol A co-polycarbonate diradical;

when y is 1,

the triradical



$-A1{-}\underset{\underset{A3-}{|}}{R}{-}A2-$



$(Z1)\left(\left(CH_2\right)_5\overset{\overset{O}{\|}}{C}{-}O\right)_{k1}CH_2{-}\overset{\overset{R7}{|}}{\underset{\underset{R44-\left(O-\overset{\|}{\underset{O}{C}}-\left(CH_2\right)_5\right)_{p1}(Z3)}{|}}{C}}{-}CH_2\left(O{-}\overset{\overset{O}{\|}}{C}\left(CH_2\right)_5\right)_{m1}(Z2)$

where

(Z1), (Z2) and (Z3) show the relationship of the triradical to Z1, Z2 and Z3, respectively,

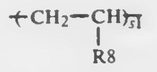
R7 is selected from the group consisting of H and an alkyl radical of 1 to 6 carbons.

R44 is selected from the group consisting of nothing and an alkylene diradical of 1 to 6 carbons, and

the sum of k1, m1 and p1 is 2 to 20;

when y is 2 to 75,

A1 has a structure



$\left(CH_2{-}\underset{\underset{R8}{|}}{CH}\right)_{s1}$

where

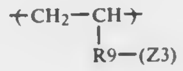
R8 is selected from the group consisting of a phenyl radical and an acetoxy radical and

s1 is 4 to 25; and

when y is 2 to 75,

A2 and A3 are nothing and

triradical R has a structure:

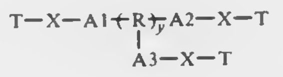


$\left(CH_2{-}\underset{\underset{R9-(Z3)}{|}}{CH}\right)$

where

R9 is selected from the group consisting of nothing and a methylene diradical, (Z3) shows the relationship between the triradical R group and Z3;

the compound of Structure A being preparable from a compound of Structure B:



$T{-}X{-}A1\left(\underset{\underset{A3-X-T}{|}}{R}\right)_y A2{-}X{-}T$ B

where

T is selected from the group consisting of H and a halocarbonyl radical;

where the compound of Structure B is reacted with a flame retardant compound possessing a flame retardant monoradical having a structure selected from the group consisting of structures (1), (2), (3) and (4), and at least one co-reactive group selected from the group consisting of a hydroxy radical, an amino radical, an epoxide radical, a carboxylic acid cyclic anhydride radical, an sulfocarboxylic cyclic acid anhydride radical, a haloformate radical, an acid halide radical and an isocyanate radical.

---

### 5,013,778

### COMPOSITION OF CARBOXYLIC ACID AND SULPHUR-CONTAINING ACIDS OR SALTS SUITABLE FOR INCORPORATION INTO OLEFIN POLYMERS

**Colin Bath, Summerseat, England, assignor to Imperial Chemical Industries PLC, London, England**

**Continuation-in-part of Ser. No. 249,876, Sep. 26, 1988, abandoned. This application Mar. 23, 1989, Ser. No. 328,009**

**Claims priority, application United Kingdom, Mar. 29, 1988, 8807393; Aug. 4, 1988, 8818562**

**Int. Cl.$^5$ C08K *5/41;* C09K *1/00***

**U.S. Cl. 524—173** **12 Claims**

1. A composition which comprises:

(a) a carboxylic acid compound which contains at least three carbon atoms and contains at least two carboxylic acid groups attached to an optionally substituted aliphatic hydrocarbon group or contains at least one carboxylic acid group attached to an optionally substituted saturated or unsaturated ring system; and

(b) an organic sulphur-containing acid or salt thereof of the general formula 1

$$RSO_nM \qquad 1$$

wherein:

R is an alkyl group or a substituted alkyl group;

M is a hydrogen atom or a cation; and

n is 2, 3 or 4.

---

### 5,013,779

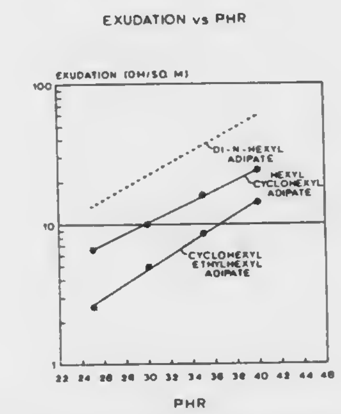
### PLASTICIZED POLYVINYL BUTYRAL AND INTERLAYER THEREOF

**Robert H. Fariss, Northampton, and Roland J. Tetreault, Springfield, both of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 447,951, Dec. 8, 1989. This application Jul. 9, 1990, Ser. No. 549,799**

**Int. Cl.$^5$ C08K *5/11***

**U.S. Cl. 524—314** **2 Claims**



1. A method of improving the color stability to UV light of a polyvinyl butyral interlayer plasticized with an adipate composition which comprises using in said adipate composition, a color-stabilizing effective amount of a pure or mixed adipate formed using a saturated cyclo ($C_4$ to $C_{10}$) alcohol.

---

### 5,013,780

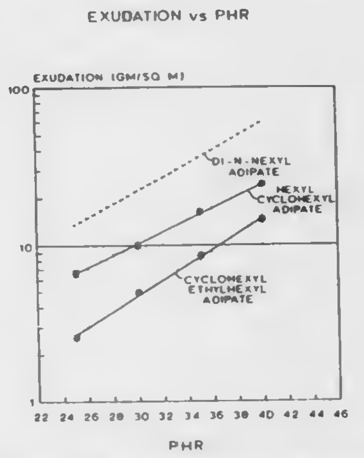
### PLASTICIZED POLYVINYL BUTYRAL AND INTERLAYER THEREOF

**Robert H. Fariss, Northampton, and Roland J. Tetreault, Springfield, both of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Dec. 8, 1989, Ser. No. 447,951**

**Int. Cl.$^5$ C08K *5/11***

**U.S. Cl. 524—314** **18 Claims**



1. A composition of matter comprising polyvinyl butyral resin plasticized with adipic acid diester in the form of a mixed adipate or a mixture of pure and mixed adipates made from:

(a) at least one $C_4$ to $C_9$ alkyl alcohol; and

(b) at least one cyclo ($C_4$ to $C_{10}$) alcohol;

wherein the proportions of (a) and (b) in parts by weight per 100 parts of (a) and (b) are:

(a) 10-90

(b) 90-10.

---

### 5,013,781

### GASKET/PACKING MATERIAL WITH EXCELLENT ADHESIVENESS AND RESISTANCE TO COOLANTS

**Taro Koshii, Chiba, and Tetsuo Amemiya, Ichihara, both of Japan, assignors to Dow Corning Toray Silicone Company, Ltd., Tokyo, Japan**

**Filed Aug. 13, 1987, Ser. No. 85,051**

**Claims priority, application Japan, Aug. 25, 1986, 61-198380**

**Int. Cl.$^5$ C09L *83/06***

**U.S. Cl. 524—864** **2 Claims**

1. A room temperature-curing composition consisting essentially of a product obtained by mixing

(i) 100 weight parts of an essentially linear polydimethylsiloxane having silicon-bonded hydroxyl group at the molecular terminals and having a viscosity of 0.005 to 0.05 $m^2/s$ at 25° C.,

(ii) 10 to 45 weight parts organopolysiloxane composed of $R'_3SiO_{0.5}$, $R'_2SiO$, and $SiO_2$ units where each R' represents methyl, and in which the $R'_3SiO_{0.5}$ unit/$R'_2SiO$/-$SiO_2$ unit molar ratio is 0.7–1:0.01–0.5:1,

(iii) 10 to 150 weight parts inorganic filler,

(iv) 1 to 3 weight parts alkoxysilane selected from the group consisting of methyltrimethyoxysilane, vinyltrimethyoxysilane, gamma-glycidoxypropyltrimethyoxysilane, di(-methyl ethyl ketoxime)diethoxysilane, and gamma-mercaptopropyltrimethoxysilane, and

(v) 10 to 25 weight parts of a silicon compound selected from the group consisting of vinyltris(methyl ethyl ketoxime)silane, methyltris(methyl ethyl ketoxime)silane, tetrakis(methyl ethyl ketoxime)silane, and mixtures thereof

to make compositions curable at room temperature to elastomeric solids which exhibit resistance to loss of properties upon exposure to radiator coolant.

VOL
1126
ISS
1
MY
7
1991
UMI

5,013,782

### FLAME RETARDANT RIGID OR FLEXIBLE CHLORINE-CONTAINING RESIN COMPOSITION

**Izuru Tateno, Toyama, Japan, assignor to Nippon Carbide Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 24, 1989, Ser. No. 342,027**

**Claims priority, application Japan, Apr. 22, 1988, 63-98399**

**Int. Cl.$^5$ C08K** *3/32*

U.S. Cl. 524—417 29 Claims

1. A chlorine-containing resin composition comprising a chlorine-containing resin selected from the group consisting of a vinyl chloride polymer, a chlorinated vinyl chloride polymer, a chlorinated polyolefin and a chlorinated rubber and (a) 5 to 200 parts by weight, per 100 parts by weight of the chlorine-containing resin, of a phosphate glass containing at least 30% by weight of phosphorus as $P_2O_5$ and (b) 5 to 200 parts by weight, per 100 parts by weight of the chlorine-containing resin, of at least one flame- and fire-retardant agent selected from hydroxides and oxides of metals belonging to Groups II to V of the periodic table.

---

5,013,783

### HEAT-STABLE RUBBER COMPOSITIONS BASED ON HYDROGENATED NITRILE RUBBER

**Joachim Thörmer; Ernst Rohde, both of Leverkusen, Fed. Rep. of Germany, and Zsolt Szentivanyi, Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany**

**Filed Jun. 11, 1990, Ser. No. 536 J23**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1989, 3920466**

**Int. Cl.$^5$ C08K** *3/34*

U.S. Cl. 524—450 6 Claims

1. Rubber compositions, based on hydrogenated nitrile rubber with a degree of hydrogenation of at least 80%, comprising 20 to 200% by weight of sodium aluminium silicate, the weight percent based on the hydrogenated nitrile rubber.

---

5,013,784

### INTERNAL RESIN-TACKIFIED ACRYLIC POLYMERS CONTAINING CROSSLINKABLE COMONOMERS

**Henry W. Yang, Kingwood, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.**

**Continuation-in-part of Ser. No. 367,829, Jun. 19, 1989, abandoned. This application Dec. 1, 1989, Ser. No. 444,460**

**Int. Cl.$^5$ C08K** *5/01*

U.S. Cl. 524—458 8 Claims

1. A tackified acrylic copolymer composition comprising:

a hydrogenated hydrocarbon resin, having a molecular weight of from about 500 to about 5000 and an aromatic content of at least 10% by weight; and

an acrylic copolymer formed by free radical initiated polymerization of a polymerizable monomer mixture emulsified in an aqueous medium, said monomer mixture comprising alkyl(meth)acrylate and (meth)acrylic acid monomers having dissolved therein from about 10 to about 100 parts of the resin per 100 parts polymerizable monomer, said polymerizable monomer mixture including an effective amount of a crosslinking monomer.

---

5,013,785

### PRESSURE-SENSITIVE ADHESIVE COMPOSITION COMPRISING POLY-4-METHYL-1-PENTENE AS TACKIFIER

**Kinya Mizui, Ichihara, Japan, assignor to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**PCT No. PCT/JP87/00760, § 371 Date Aug. 8, 1988, § 102(e) Date Aug. 8, 1988, PCT Pub. No. WO88/02767, PCT Pub. Date Apr. 21, 1988**

**PCT Filed Oct. 8, 1987, Ser. No. 210,492**

**Claims priority, application Japan, Oct. 8, 1986, 61-238035**

**Int. Cl.$^5$ C08K** *5/01;* **C08L** *23/20;* **C09J** *11/08*

U.S. Cl. 524—490 3 Claims

1. A pressure-sensitive adhesive composition comprising a rubbery hydrocarbon polymer or polychloroprene as a base resin and from 20 to 200 parts by weight of a tackifier per 100 parts by weight of the base resin, the improvement wherein said tackifier comprises a cationically polymerized poly-4-methyl-1-pentene having a number average molecular weight (Mn) of from 200 to 40,000 and a glass transition point of from −75° C. to +10° C.

---

5,013,786

### FILLER-CONTAINING POLYAMIDE MOLDING MATERIALS HAVING AN IMPROVED SURFACE AND IMPROVED COATABILITY

**Robert Payne, Ludwigshafen; Walter Goetz, Kaiserslautern, and Uwe Wolf, Heidelberg, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Feb. 10, 1989, Ser. No. 308,458**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 3804392**

**Int. Cl.$^5$ C08L** *77/00*

U.S. Cl. 524—514 5 Claims

1. A filler-containing thermoplastic molding material having an improved surface and improved coatability, and containing, as essential components,

(A) from 42 to 90% by weight of a thermoplastic polyamide,

(B) from 9.5 to 55% by weight of fibrous or particulate fillers or mixtures of these and

(C) from 0.5 to 3% by weight of a rubber impact modifier having reactive groups.

---

5,013,787

### COPOLYMERS AS THICKENERS AND MODIFIERS FOR LATEX SYSTEMS

**Milagros C. Barron, Red Bank, Tenn.; Ronald L. Swope, Fort Oglethorpe, Ga., and John M. Wilkerson, III, Hixson, Tenn., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.**

**Division of Ser. No. 318,140, Mar. 2, 1989, which is a continuation-in-part of Ser. No. 46,458, May 6, 1987. This application Dec. 29, 1989, Ser. No. 458,862**

**Int. Cl.$^5$ C08K** *39/00*

U.S. Cl. 524—555 7 Claims

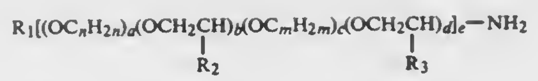
1. A dry copolymer product useful for thickening and improving the rheology and dry tensile strength of latex systems comprising a copolymer having as monomeric units:

(A) about 79–99 percent of (meth)acrylic acid salt of sodium, potassium or ammonium;

(B) about 0–20 percent of (meth)acrylic acid;

(C) about 0–20 percent of lower alkyl ester of (meth)acrylic acid;

(D) about 1–21 percent of surfactant monomer which is the urea reaction product of a monoethylenically unsaturated monoisocyanate with a nonionic surfactant having the formula



$$R_1[(OC_nH_{2n})_a(OCH_2\underset{R_2}{\underset{|}{CH}})_b(OC_mH_{2m})_c(OCH_2\underset{R_3}{\underset{|}{CH}})_d]_e-NH_2$$

where $R_1$ is a $C_8$ to $C_{20}$ alkyl or a $C_8$ to $C_{20}$ alkylphenyl or a di($C_8$ to $C_{20}$ alkyl)phenyl, n and m are independently selected from 2 to 4, a and c are independently selected from the range of 0 to 100, provided that a+c is within the range of 2 to 100; $R_2$ and $R_3$ are independently selected from $CH_3$ or $CH_2CH_3$, b and d are independently selected from the range of 0 to 50, provided that b+d is within the range of 0 to 50; and e is form 1 to 50; wherein the sum of a+c is always greater than the sum of b+d;

(E) about 0–1 percent of copolymerizable polyethylenically unsaturated monomer, said percentages being by weight based on the total weight of monomeric units in said copolymer.

---

5,013,788

### LIQUID COATING COMPOSITION AND COATING METHOD FOR FORMING HARD-COAT FILM ON PLASTICS

**Toshikazu Nagashima; Haruki Kuramashi; Yoshihiro Nishida, all of Matsusaka, and Masahiro Hirukawa, Ise, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan**

**Filed Dec. 14, 1989, Ser. No. 450,811**

**Claims priority, application Japan, Dec. 28, 1988, 63-329120**

**Int. Cl.$^5$ C08K** *5/05*

U.S. Cl. 524—767 6 Claims

1. A liquid coating composition, comprising:

(A) 100 parts by weight of a first organotrialkoxysilane represented by the formula $R^1Si(OR^2)_3$, wherein $R^1$ is an alkyl group having not more than 2 carbon atoms, and $R^2$ is an alkyl group having not more than 3 carbon atoms;

(B) 5–20 parts by weight of a second organotrialkoxysilane represented by the formula $R^3Si(OR^2)_3$, wherein $R^3$ is an organic group containing epoxy group, and $R^2$ is an alkyl group having not more than 3 carbon atoms;

(C) 50–200 parts by weight of an aqueous sol of colloidal silica in which the content of $SiO_2$ is 10 to 40 wt %; and

(D) 0.5–3 parts by weight of a dicarboxylic acid represented by the formula $(CF_2)_n(COOH)_2$, wherein n is an integer from 1 to 5.

---

5,013,789

### PROCESS FOR PRODUCING THERMOPLASTIC RESIN COMPOSITIONS

**Masato Sakuma; Yuji Fujita; Kissho Kitano; Yukihiko Yagi; Masao Sakaizawa, all of Saitama, and Noburo Yamamoto, Tokyo, all of Japan, assignors to Tonen Sekiyukagaku, Tokyo, Japan**

**Continuation of Ser. No. 143,156, Feb. 1, 1988, abandoned. This application Dec. 16, 1988, Ser. No. 285,438**

**Claims priority, application Japan, Apr. 14, 1986, 61-8426386**

**Int. Cl.$^5$ C08L** *77/00*

U.S. Cl. 525—66 3 Claims

1. A process for producing a thermoplastic resin composition which comprises preparing a component consisting essentially of 1 to 49 parts by weight of a modified polypropylene or polypropylene-based polymer (A) obtained by adding an unsaturated carboxylic acid or a derivative thereof to a first crystalline polypropylene or polypropylene-based polymer, 1 to 98 parts by weight of a second crystalline polypropylene or polypropylene-based polymer (b), and 1 to 98 parts by weight of a polyamide (C), provided that (A)+(B)+(C)=100 parts by weight; mixing the component or the molten component with at least one metal compound (D) selected from the group consisting of hydroxides, carboxylates and oxides of a metal from Group I, II or III of the Periodic Table in an amount of 0.5 to 5 times the molar quantity of the acid added to the modified polyolefin (A), and subsequently melt-mixing the mixture.

---

5,013,790

### POLYMER BLENDS OF TAPERED STYRENE-BUTADIENE TRIBLOCK THERMOPLASTIC ELASTOMERS

**Lu H. Tung, Midland, and Joseph J. Randazzo, Berkley, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 5, 1989, Ser. No. 375,552**

**Int. Cl.$^5$ C08L** *21/00, 25/06, 35/06, 53/02*

U.S. Cl. 525—99 7 Claims

1. A thermoplastic blend comprising:

(1) a thermoplastic polymer; and

(2) a tapered triblock elastomer of the formula A-B-A wherein B is a polymer of butadiene and each A block is a polymer of a monovinylidene aromatic monomer and at least one junction between the A and B blocks is tapered so as to include in copolymerized form increasing amounts of butadiene toward B block, said tapered triblock elastomer having a ratio of monovinylidene aromatic monomer:butadiene of 10:90 to 40:60 a melt index (condition 200/5.0 ASTM method D1238-82) of 0.5 to 60; and an average molecular weight Mw of 50,000–150,000;

the quantity of component (2) being sufficient to improve the impact resistance of the blend.

---

5,013,791

### BETA-HYDROXYALKYLAMIDE CURED ACID POLYMER/POLYEPOXIDE POWDER COATING

**Paul R. Kerr; Paul H. Pettit, Jr., both of Allison Park, and William S. Ewing, Tarentum, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 139,489, Dec. 30, 1987, Pat. No. 4,889,890. This application Aug. 22, 1989, Ser. No. 396,708**

**Int. Cl.$^5$ C08L** *33/08, 67/02*

U.S. Cl. 525—113 2 Claims

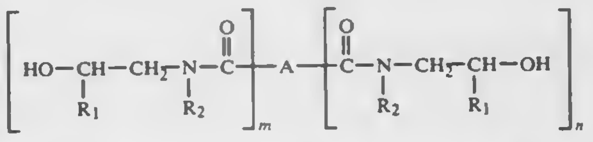
1. A thermosetting powder coating composition comprising:

(1) a co-reactable particulate mixture of:

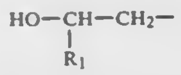
(a) from about 35 to about 85 percent by weight based on weight of resin solids of a carboxylic acid group-containing polymer having a Tg in the range of about 35° C. to 100° C.;

(b) from about 2 to about 45 percent by weight based on weight of resin solids of a polyepoxide having a 1,2-epoxy equivalency of greater than 1.0; and

(c) a beta-hydroxyalkylamide of the structure:



where $R_1$ is H or $C_1$–$C_5$ alkyl; $R_2$ is H, $C_1$–$C_5$ alkyl or



$$HO-\underset{R_1}{\underset{|}{CH}}-CH_2-$$

where $R_1$ is as described above and A is a chemical bond or monovalent or polyvalent organic radical derived from saturated, unsaturated or aromatic hydrocarbon radicals including substituted hydrocarbon radicals containing from 2 to 20 carbon atoms, m equals 1 to 2, n equals 0 to 2 and m+n is at least 2, and the equivalent ratio of beta-hydroxyalkylamide equivalents plus epoxy equivalents to carboxylic acid equivalents being within the range of 0.6 to 1.6:1; and

VOL
1126
ISS
1
MY
7
1991
UMI

(2) a crystalline carboxylic acid group-containing material selected from the group consisting of an aliphatic polycarboxylic acid containing from 4 to 20 carbon atoms, a polymeric polyanhydride other than carboxylic acid group-containing polymer (a), a polyester other than carboxylic acid group-containing polymer (a), having a number average molecular weight from about 300 to about 1,500 and an acid equivalent weight of from about 150 to about 750, and mixtures thereof

---

### 5,013,792
### PROCESSING AID FOR POLYMERS

**George R. Chapman, Jr., Media, Pa.; Donnan E. Priester, Wilmington, and Charles W. Stewart, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 461,093, Jan. 4, 1990, abandoned, which is a continuation-in-part of Ser. No. 216,421, Jul. 8, 1988, Pat. No. 4,904,735. This application Aug. 29, 1990, Ser. No. 572,921**

**Int. Cl.$^5$ C08L** *67/00, 71/00, 23/08, 27/16, 27/18, 25/04*

**U.S. Cl. 525—166** **41 Claims**

1. Polymer blend composition having improved processibility and comprising:

(a) a major portion of a difficultly melt-processible polymer selected from the group consisting of vinyl aromatic polymers; copolymers of alpha-olefins and vinyl esters, (meth-)acrylic esters, acrylonitrile, and (meth)acrylic acids and their (ionomeric) metal salts; chlorinated polyethylene; polyvinyl chloride; polyester and polyamide, and

(b) a minor portion of:

(1) at least an effective amount, to improve processibility, of a fluorocarbon copolymer which at the melt-processing temperature of (a) is either in a melted form if crystalline, or is above its glass transition temperature if amorphous, and

(2) at least an effective amount, to improve processibility, of at least one tetrafluoroethylene homopolymer or copolymer of tetrafluoroethylene and at least one monomer copolymerizable therewith, wherein the mole ratio of fluorine to hydrogen is at least 1:1, and which is solid at the melt-processing temperature of (a).

---

### 5,013,793
### DYNAMICALLY CURED THERMOPLASTIC OLEFIN POLYMERS AND PROCESS FOR PRODUCING THE SAME

**Hsien C. Wang, Edison; Kenneth W. Powers, Berkeley Heights; Robert C. Puydak, Cranbury, and Narayanaswami R. Dharmarajan, Highland Park, all of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.**

**Filed Jul. 26, 1990, Ser. No. 558,698**

**Int. Cl.$^5$ C08L** *23/26, 25/08, 23/18, 23/10*

**U.S. Cl. 525—195** **34 Claims**

1. A thermoplastic composition comprising a dynamically vulcanized polymer blend of a thermoplastic olefinic resin, and an elastomeric halogen-containing copolymer of a C$_4$ to C$_7$ isomonoolefin and a paraalkylstyrene.

---

### 5,013,794
### POLYMERS OF DIISOBUTYLENE-SULFONATE ALKANE MALEIC ACID DERIVATIVES

**Günter Sackmann, Leverkusen; Joachim König, Odenthal, and Heinz Bäumgen, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Division of Ser. No. 312,089, Feb. 17, 1989, Pat. No. 4,931,510. This application Feb. 6, 1990, Ser. No. 475,623**

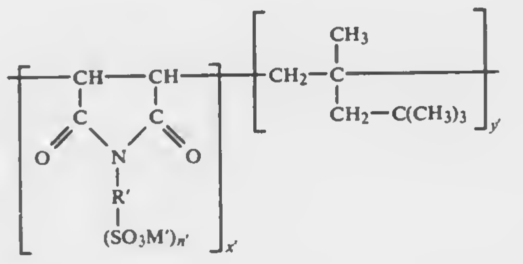
**Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807097**

**Int. Cl.$^5$ C08L** *41/00;* **C08F** *228/02*

**U.S. Cl. 525—203** **6 Claims**

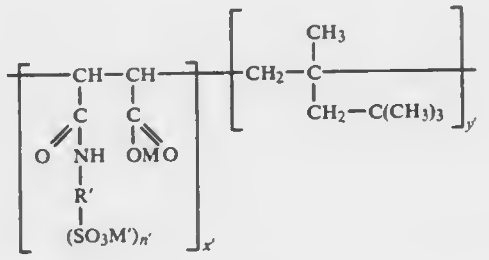
1. Polymer consisting of recurring units of the formulae

V



and/or

VI



in which

M′ signifies a cation-forming radical,

n′ signifies 1 or 2,

R′ signifies an aliphatic radical having 1 to 10 carbon atoms and

x′, y′ are selected such that the weight average of the molecular weight of polymers V and VI is 5,000 to 500,000, the ratio of x′:y′ being 1:1.5 to 1.5:1.

---

### 5,013,795
### AZLACTONE GRAFT COPOLYMERS

**Patrick L. Coleman, and Richard J. Rolando, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

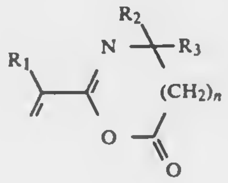
**Filed Apr. 10, 1989, Ser. No. 335,284**

**Int. Cl.$^5$ C08F** *255/02, 255/08, 257/02, 226/06;* **C08G** *63/91;* **G01N** *33/563*

**U.S. Cl. 525—279** **8 Claims**

1. A graft copolymer comprising a poly-alpha-olefin base polymer that does not undergo substantial crosslinking under polymer melt conditions in the presence of a free radical initiator, having grafted thereon a monomeric 2-alkenyl azlactone of the formula

I



wherein

R$_1$ is hydrogen, or methyl;

R$_2$ and R$_3$ are independently alkyl having 1 to 14 carbon atoms, cycloalkyl having 3 to 14 carbon atoms, aryl having 5 to 12 ring atoms, arenyl having 6 to 26 carbon, and 0 to 3 S, N, or nonperoxidic O atoms, or R$_2$ and R$_3$ taken together with the carbon to which they are joined can form a carbocyclic ring containing 4 to 12 ring atoms, and

n is an integer 0 or 1.

---

### 5,013,796
### NITRILE GROUP-CONTAINING HIGHLY SATURATED COPOLYMER RUBBER AND RUBBER COMPOSITION HAVING IMPROVED COLD RESISTANCE

**Sachio Hayashi, Tokyo; Yoichiro Kubo, Kanagawa; Noboru Watanabe, Kanagawa, and Yoshiaki Aimura, Kanagawa, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 543,013, Jun. 25, 1990, which is a division of Ser. No. 326,862, Mar. 21, 1989, Pat. No. 4,956,417. This application Aug. 31, 1990, Ser. No. 575,702**

**Claims priority, application Japan, Mar. 24, 1988, 63-70454**

**Int. Cl.$^5$ C08F** *8/04*

**U.S. Cl. 525—326.2** **12 Claims**

1. A nitrile group-containing, highly saturated copolymer rubber, the copolymer chain of which comprises, based on the weight of the copolymer chain, (1) 5 to 40% by weight of units of an unsaturated nitrile monomer, (2) 1 to 80% by weight of units of a fluorine-containing vinyl monomer and (3) up to 20% by weight of units of a conjugated diene monomer, with the balance being (4) units of a hydrogenated conjugated diene monomer, wherein the sum of the contents of the monomer units (1) and (2) is 30 to 90% by weight and the sum of the contents of the monomer units (3) and (4) is 10 to 70% by weight.

---

### 5,013,797
### NITRILE GROUP-CONTAINING HIGHLY SATURATED COPOLYMER RUBBER AND RUBBER COMPOSITION HAVING IMPROVED COLD RESISTANCE

**Sachio Hayashi, Inagi; Yoichiro Kubo, Yokohama; Noboru Watanabe, Yokohama, and Yoshiaki Aimura, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 326,862, Mar. 21, 1989, Pat. No. 4,956,417. This application Jun. 25, 1990, Ser. No. 543,013**

**Claims priority, application Japan, Mar. 24, 1989, 63-70454**

**Int. Cl.$^5$ C08F** *8/04*

**U.S. Cl. 525—328.3** **12 Claims**

1. A nitrile group-containing, highly saturated copolymer rubber, the copolymer chain of which comprises, based on the weight of the copolymer chain, (1) 5 to 40% by weight of units of an unsaturated nitrile monomer, (2) 1 to 80% by weight of units of an aminoalkyl ester of an ethylenically unsaturated carboxylic acid, having 1 to 12 carbon atoms in the aminoalkyl group, and (3) up to 20% by weight of units of a conjugated diene monomer, with the balance being (4) units of a hydrogenated conjugated diene monomer, wherein the sum of the contents of the monomer units (1) and (2) is 30 to 90% by weight and the sum of the contents of the monomer units (3) and (4) is 10 to 70% by weight.

---

### 5,013,798
### HYDROGENATION CATALYST AND HYDROGENATION PROCESS WHEREIN SAID CATALYST IS USED

**Ronald J. Hoxmeier, Houston, and Lynn H. Slaugh, Cypress, both of Tex., assignors to Shell Oil Corporation, Houston, Tex.**

**Filed May 24, 1990, Ser. No. 527,924**

**Int. Cl.$^5$ C08F** *8/04*

**U.S. Cl. 525—338** **19 Claims**

1. A method for hydrogenating a polymer containing ethylenic and/or aromatic unsaturation comprising the steps of:

(a) contacting said polymer with hydrogen in a suitable solvent and in the presence of a catalyst prepared by combining a Group VIIIA metal compound with a hydrocarbyl-substituted silicon alumoxane;

(b) maintaining the contact in step (a) for a sufficient period of time to permit conversion of at least a portion of the ethylenic and/or aromatic unsaturation contained in said polymer; and

(c) recovering an at least partially hydrogenated polymer.

---

### 5,013,799
### POLYETHERIMIDE-POLYAMIDE BLENDS

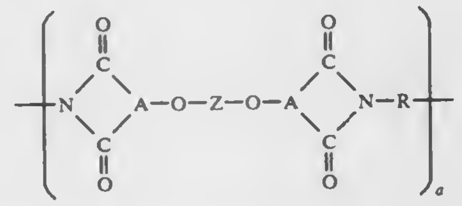
**Harold F. Giles, Jr., Wilshire Dr., Cheshire, Mass. 01225, and Dwain M. White, 2334 St. Joseph Dr., Schenectady, N.Y. 12309**

**Continuation of Ser. No. 53,540, May 26, 1987, abandoned, which is a continuation of Ser. No. 883,844, Jul. 9, 1986, abandoned, which is a continuation of Ser. No. 574,464, Jan. 27, 1984, abandoned, which is a continuation-in-part of Ser. No. 359,256, Mar. 18, 1982, abandoned. This application Sep. 21, 1988, Ser. No. 248,326**

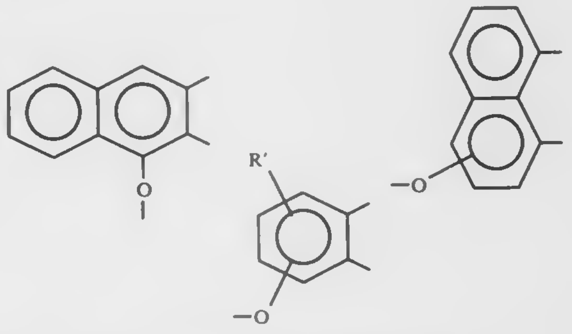
**Int. Cl.$^5$ C08L** *77/00*

**U.S. Cl. 525—432** **6 Claims**

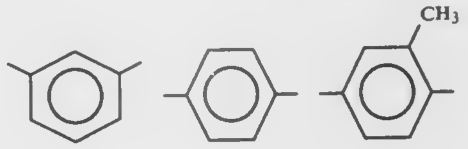
1. A composition comprising a blend of (a) a polyetherimide and (b) a polyamide, wherein the polyetherimide is present in a flexural strength-increasing concentration of from about 40% to about 70% of the blend by weight and the polyetherimide has the formula



wherein a represents a whole number in excess of 1, the group —O—A< is selected from:

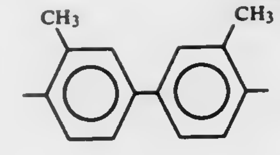


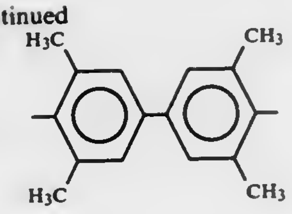
wherein R′ is hydrogen, lower alkyl or lower alkoxy, Z is a member selected from the group consisting of (1)

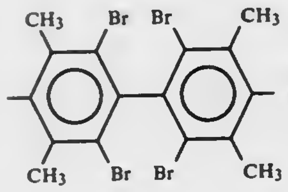


VOL 1126 ISS 1 MY 7 1991 UMI

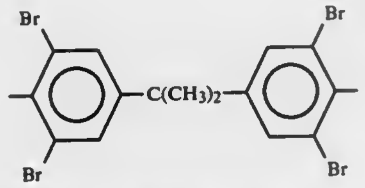
-continued



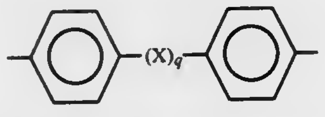




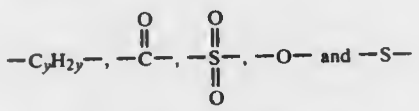
and



and (2) divalent organic radicals of the general formula:

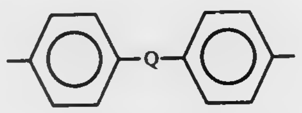


wherein X is a member selected from the group consisting of

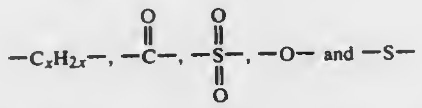


$$-C_yH_{2y}-,\ -\overset{\overset{O}{\|}}{C}-,\ -\underset{\underset{O}{\|}}{\overset{\overset{O}{\|}}{S}}-,\ -O-\ \text{and}\ -S-$$

wherein q is 0 or 1, y is a whole number from 1 to 5, and R is a divalent organic radical selected from the group consisting of (1) aromatic hydrocarbon radicals having from 6–20 carbon atoms and halogenated derivatives thereof, (2) alkylene radicals and cycloalkylene radicals having from 2–10 carbon atoms, and $C_{(2-8)}$ alkylene terminated polydiorganosiloxane, and (3) divalent radicals included by the formula



wherein Q is a member selected from the group consisting of



$$-C_xH_{2x}-,\ -\overset{\overset{O}{\|}}{C}-,\ -\underset{\underset{O}{\|}}{\overset{\overset{O}{\|}}{S}}-,\ -O-\ \text{and}\ -S-$$

wherein x is a whole number from 1 to 5 inclusive; and wherein the polyamide is selected from the group consisting of polyhexamethylene adipamide, polypyrrolidone, polycaprolactam, polyheptolactam, polycapryllactam, polynonanolactam, polyundecanolactam, polydodecanolactam, polyhexamethylene azelaiamide, polyhexamethylene sebacamide, polyhexamethylene isophthalamide, polymetaxylylene adipamide, polyamide of hexamethylenediamine and n-dodecanedioic acid, polyamide of dodecamethylenediamine and n-dodecanedioic acid, hexamethylene adipamide/caprolactam copolymer, hexamethylene adipamide/hexamethylene-isophthalamide copolymer, hexamethylene adipamide/hexamethyleneterephthalamide copolymer, trimethylhexamethylene oxamide/hexamethylene oxamide copolymer, hexamethylene adipamide/hexamethylene-azelaiamide copolymer, hexamethylene adipamide/hexamethyleneazelaiamide/caprolactam copolymer and the reaction product of dimethyl ester of terephthalic acid and a mixture of isomeric trimethylhexamethylenediamine.

---

**5,013,800**

### ROOM TEMPERATURE-CURABLE ORGANOPOLYSILOXANE-BASED COATING COMPOSITION

**Yoshio Inoue, Gunma, Japan, assignor to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Oct. 23, 1989, Ser. No. 425,267**

**Claims priority, application Japan, Oct. 28, 1988, 63-272644**

**Int. Cl.$^5$ C08F *283/00***

**U.S. Cl. 525—477** **5 Claims**

1. A room temperature-curable organopolysiloxane-based composition which comprises, in admixture:

(A) 100 parts by weight of an organopolysiloxane block copolymer consisting essentially of

(a) from 50 to 85% by moles of diorganosiloxane units represented by the general formula

$R^1_2SiO$,

in which each $R^1$ is a substituted or unsubstituted monovalent hydrocarbon group having 1 to 6 carbon atoms, and

(b) from 50 to 15% by moles of trifunctional organosiloxane units represemnted by the general formula

$R^2SiO_{1.5}$,

in which $R^2$ is a phenyl group, a 2-(perfluoroalkyl)ethyl group of the general formula

$C_nF_{2n+1}C_2H_4-$,

in which the subscript n is a positive integer not exceeding 8, or a fluorine-containing substituted propyl group represented by the general formula

$C_mF_{2m+1}—O—(—CFCF_3—CF_2—O—)_p—C_3H_6—$,

in which the subscript m is a positive integer not exceeding 8 and the subscript p is a positive integer not exceeding 3;

(B) from 1 to 100 parts by weight of an organosilane compound represented by the general formula

$R^3_aSiX_{4-a}$,

in which $R^3$ is a substituted or unsubstituted monovalent hydrocarbon group, X is a hydrolyzable organic group selected from the class consisting of alkoxy groups, ketoxime groups, acyloxy groups, alkenyloxy groups, substituted amino groups, substituted aminoxy groups and amide groups and the subscript a is zero or 1; and

(C) from 1 to 100 parts by weight of an oxyalkylene group-containing organopolysiloxane represented by the general formula

$(Me_3SiO—)_2SiR^4—C_3H_6—(—O—R^5—)_b—O—SiR^6_aX_{3-a}$,

in which Me is a methyl group, $R^4$ is a methyl group or trimethylsiloxy group, $R^5$ is an ethylene group or propylene group, $R^6$ is a monovalent hydrocarbon group, X has the same meaning as defined above, the subscript a has the same meaning as defined above and the subscript b is a positive integer not exceeding 50.

**5,013,801**

### MOLECULAR WEIGHT DISTRIBUTION MODIFICATION IN A TUBULAR REACTOR

**Charles Cozewith, 264 W. Dudley Ave., Westfield, N.J. 07090; Shiaw Ju, 23 Independence Dr., Edison, N.J. 08820, and Gary W. Verstrate, 25 Balmoral Ave., Matawan, N.J. 07747**

**Division of Ser. No. 840,562, Dec. 26, 1985, Pat. No. 4,789,714, which is a continuation-in-part of Ser. No. 681,951, Dec. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 504,582, Jun. 15, 1983, Pat. No. 4,540,753. This application Aug. 2, 1988, Ser. No. 227,625**

**Int. Cl.$^5$ C08F *2/00***

**U.S. Cl. 526—64** **35 Claims**

1. In a polymerization process for producing copolymer from a reaction mixture comprised of catalyst and a monomer feed comprising ethylene and at least one other alpha-olefin monomer, the improvement which comprises producing a polymodal MWD copolymer by conducting the polymerization:

(a) in at least one reactor, said reactor being a substantially mix free reactor;

(b) with essentially one active catalyst species;

(c) using at least one reaction mixture which is essentially transfer-agent free;

(d) in such a manner and under conditions sufficient to initiate propagation of essentially all copolymer chains simultaneously;

(e) withdrawing a part of the reaction mixture containing copolymer from the reactor at, at least two predetermined times after the start of polymerization; and

(f) blending the polymer withdrawn at each such predetermined time;

thereby producing a polymodal MWD copolymer comprising at least two different molecular weight modes wherein each mode has a narrow MWD and at least one of two characteristics, (1) a $\overline{M}_w/\overline{M}_n$ of less than 2 and (2) a $\overline{M}_z/\overline{M}_w$ of less than 1.8.

---

**5,013,802**

### PROCESS FOR PREPARING ETHYLENE POLYMERS

**Yoshio Tajima, Tokyo; Kazutosi Nomiyama, Akishima; Yoshinori Nishikitani; Nobuyuki Kuroda, both of Yokohama, and Kazuo Matsuura, Tokyo, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan**

**Continuation of Ser. No. 22,378, Mar. 5, 1987, abandoned. This application Oct. 25, 1989, Ser. No. 427,941**

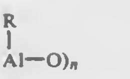
**Claims priority, application Japan, Mar. 7, 1986, 61-48525**

**Int. Cl.$^5$ C08F *2/14, 10/02***

**U.S. Cl. 526—86** **5 Claims**

1. A process for preparing an ethylene polymer by a two-stage polymerization of ethylene or ethylene and an α-olefin having 3 to 6 carbon atoms in an inert hydrocarbon at 50–100° C. using a coordination polymerization catalyst containing a solid component and an organoaluminum compound, said solid component containing a transition metal compound, which process comprises:

(a) in a first stage, producing 10–90% by weight based on the total polymer quantity of a polymer having a melt index in the range of 0.0001 to 0.5 g/10 min as measured according to ASTM D 1238-73, Condition E, using as said solid component a solid product obtained by supporting chromium trioxide or a compound which on calcining forms chromium oxide at least partially, on an inorganic oxide carrier selected from the group consisting of silica, alumina, silica-aluminum, titania, zirconia, thoria and mixtures thereof followed by calcining in a substantially water-free non-reducing atmosphere at a temperature in the range of 450° to 900° C. for 0.5 to 10 hours, and using as said organoaluminum compound a compound of the general formula



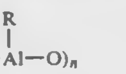
$$(\!-\!\overset{\overset{R}{|}}{Al}-O)_n$$

wherein R is an alkyl group having 1 to 18 carbon atoms and n is $2 \leqq n \leqq 100$; and

(b) in a second stage, producing 90–10% by weight based on the total polymer quantity of a polymer having a melt index in the range of 0.01 to 50 g/10 min as measured according to ASTM D 1238-73, Condition E, using as said solid component a solid material containing at least magnesium and titanium, and using as said organoaluminum compound a compound of the general formula $AlR'_pX_{3-p}$ wherein R′ is an alkyl group having 1 to 20 carbon atoms, X is halogen and/or alkoxy and p is $0 < p \leqq 3$, in the presence of the polymer obtained in the first stage.

2. A process for preparing an ethylene polymer by a two-stage polymerization of ethylene or ethylene and an α-olefin having 3 to 6 carbon atoms in an inert hydrocarbon at 50–100° C. using a coordination polymerization catalyst containing a solid component and an organoaluminum compound, said solid component containing a transition metal compound, which process comprises:

(a) in a first stage, producing 10–90% by weight based on the total polymer quantity of a polymer having a melt index in the range of 0.0001 to 0.5 g/10 min as measured according to ASTM D 1238-73, Condition E, using as said solid component a solid product and a solid material containing at least magnesium and titanium, said solid product being obtained by supporting chromium trioxide or a compound which on calcining forms chromium oxide at least partially, on an inorganic oxide carrier selected from the group consisting of silica, alumina, silica-alumina, titania, zirconia, thoria and mixtures thereof followed by calcining in a substantially water-free non-reducing atmosphere at a temperature in the range of 450° to 900° C. for 0.5 to 10 hours, and using as said organoaluminum compound a compound of the general formula



$$(\!-\!\overset{\overset{R}{|}}{Al}-O)_n$$

wherein R is an alkyl group having 1 to 18 carbon atoms and n is $2 \leqq n \leqq 100$; and

(b) in a second stage, producing 90–10% by weight based on the total polymer quantity of a polymer having a melt index in the range of 0.01 to 50 g/10 min, by adding a compound of the general formula $AlR'_pX_{3-p}$ wherein R′ is an alkyl group having 1 to 20 carbon atoms, X is halogen and/or alkoxy and p is $0 < p \leqq 3$, after completion of the first-stage polymerization.

---

**5,013,803**

### HOMOGENEOUS OR SUPPORT VANADIUM CATALYST OLEFIN POLYMERIZATION PROCESS

**Steven A. Best, Houston, Tex., assignor to Exxon Chemical Patents, Inc., Linden, N.J.**

**Division of Ser. No. 276,978, Nov. 28, 1988, Pat. No. 4,954,471. This application Mar. 23, 1990, Ser. No. 498,302**

**Int. Cl.$^5$ C08F *4/68***

**U.S. Cl. 526—128** **15 Claims**

1. A process for the polymerization of ethylene and α-olefins having from 1 to 20 carbon atoms or mixtures of ethylene, α-olefins and diolefins which process comprises polymerizing one or more olefins in the presence of a catalyst system comprising a vanadium catalyst component produced by the process comprising the steps of:

(i) forming a hydrocarbon insoluble reaction product from a silicon alkoxide, a hydrocarbon soluble vanadium compound and a trialkylaluminum; and

VOL
1126
ISS
1
MY
7
1991
UMI

(ii) reacting said hydrocarbon insoluble reaction product with an alkylaluminum dihalide to form a hydrocarbon soluble vanadium containing composition which is active for the polymerization of olefins to polyolefins.

---

### 5,013,804
### CURABLE MIXTURES CONTAINING A BISMALEIMIDE AND A PROPENYL COMPOUND

**Andreas Kramer, Düdingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

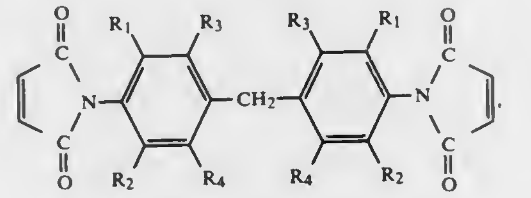
**Filed Apr. 3, 1990, Ser. No. 505,097**

**Claims priority, application Switzerland, Apr. 14, 1989, 1423/89**

**Int. Cl.$^5$ C08F** *26/00, 22/40;* **C08G** *73/10*

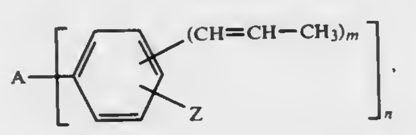
**U.S. Cl. 526—262** **10 Claims**

1. A curable composition comprising
(a) an aromatic bismaleimide of formula



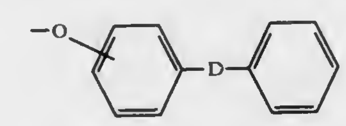
(I)

wherein $R_1$ and $R_2$ are identical or different and each is $C_1$–$C_4$alkyl, and $R_3$ and $R_4$ are each independently of the other a hydrogen or halogen atom, and (b) a propenyl compound of formula II

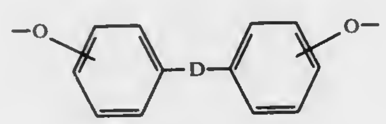


(II)

wherein m and n are each independently of the other 1 or 2, Z is a hydrogen atom or $C_1$–$C_4$alkoxy, and A is a radical of formula IIa, IIb or IIc

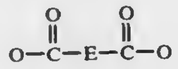


(IIa)



(IIb)

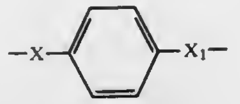
or



(IIc)

$$O-\overset{O}{\overset{\|}{C}}-E-\overset{O}{\overset{\|}{C}}-O$$

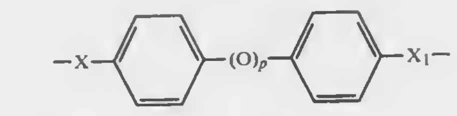
wherein D is —$SO_2$— or —CO— or is a radical of formula



(III)

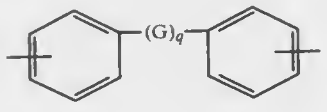
or

-continued



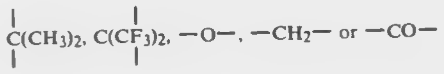
(IV)

wherein X and $X_1$ are each independently of the other —CO—, —$SO_2$— or —O—, and p is 0 or 1, E is phenylene or a radical of formula V



(V)

wherein G is



$$\overset{|}{\underset{|}{C}}(CH_3)_2,\ \overset{|}{\underset{|}{C}}(CF_3)_2,\ —O—,\ —CH_2—\ \text{or}\ —CO—$$

and q is 0 or 1.

10. A crosslinked, infusible product obtained by curing a composition as claimed in claim 1.

---

### 5,013,805
### CURED RESIN PRODUCTS

**Pen C. Wang, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 324,870, Mar. 17, 1989, abandoned, which is a continuation-in-part of Ser. No. 245,433, Sep. 16, 1988, Pat. No. 4,847,388. This application May 26, 1989, Ser. No. 357,156**

**Int. Cl.$^5$ C08F** *26/06*

**U.S. Cl. 526—264** **26 Claims**

1. The crosslinked product obtained by heating an unsaturated ether or ester derivative of a hydroxyaryl-substituted spirodilactam, said spirodilactam having nitrogen atoms in the 1- and 6-positions of the spiro ring system and having a hydroxyaryl substituent on each spiro ring nitrogen atom, said derivatives being unsaturated moiety derivatives of the oxyaryl residue of each hydroxyaryl substituent, the unsaturated moiety of the ether or ester having up to 10 carbon atoms and carbon-carbon unsaturation at least adjacent to the carbon atom through which the unsaturated ether or ester moiety is bound to an oxyaryl residue of the hydroxyaryl substituent.

---

### 5,013,806
### BUTADIENE MONOEPOXIDE/MALEIC ANHYDRIDE COPOLYMERS

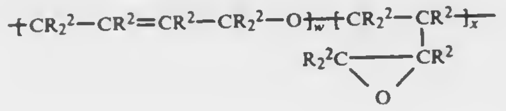
**Richard W. Blevins, Rochester, and S. Richard Turner, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 23, 1990, Ser. No. 498,183**

**Int. Cl.$^5$ C08F** *34/02*

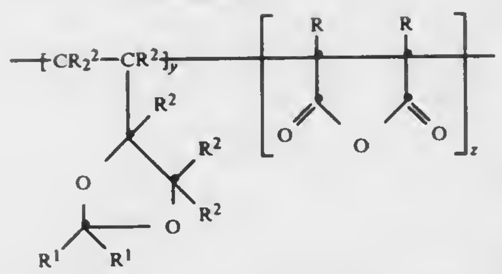
**U.S. Cl. 526—271** **8 Claims**

1. A copolymer having repeating units of the formula:



$$\left[CR_2^2-CR^2=CR^2-CR_2^2-O\right]_w\left[CR_2^2-\underset{R_2^2C\overset{\diagdown O \diagup}{\text{———}}CR^2}{\underset{|}{CR^2}}\right]_x$$

-continued



wherein each R is independently selected from hydrogen, chlorine, and lower alkyl groups of 1–4 carbons such that the sum of the carbon atoms in each repeating unit in which R appears is up to about 12, and each $R^1$ is independently selected from alkyl and aryl radicals having up to about ten carbons or when taken together are a divalent organic radical having up to about 20 carbon atoms, each radical indicated by $R^2$ is hydrogen or an alkyl group having one to four carbon atoms such that the total number of carbon atoms in each unit having an $R^2$ group is up to about 8, z is equal to 1 and each of w, x and y is equal to about 0.1 to about 0.9 such that $(w+x+y)$ is equal to $1\pm0.2$.

---

### 5,013,807
### ROOM-TEMPERATURE CURABLE COMPOSITION

**Chiyuki Shimizu, and Tamio Yoshida, both of Gunma, Japan, assignors to Toshiba Silicone Co., Ltd., Tokyo, Japan**

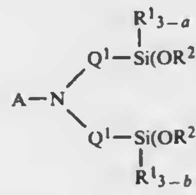
**Filed May 18, 1989, Ser. No. 353,413**

**Claims priority, application Japan, May 19, 1988, 63-122827**

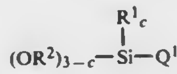
**Int. Cl.$^5$ C08G** *77/06*

**U.S. Cl. 528—17** **5 Claims**

1. A room-temperature curable composition comprising
(A) 100 parts by weight of a polymer having a hydrolyzable silyl group at the terminal of the molecular chain, the main chain being substantially a polyether,
(B) from 0.01 to 20 parts by weight of an organic silicon compound represented by the general formula



wherein two $R^1$s, which may be the same or different, each represents a monovalent hydrocarbon group; two $R^2$s, which may be the same or different, each represents an unsubstituted hydrocarbon group having from 1 to 6 carbon atoms; two $Q^1$s, which may be the same or different, each represents a divalent hydrocarbon group; a and b each represents 2 or 3; and A represents a hydrogen atom, a monovalent hydrocarbon group, or a monovalent group shown by the formula



$$(OR^2)_{3-c}-\overset{R^1_c}{\overset{|}{Si}}-Q^1-.$$

wherein $R^1$, $R^2$ and $Q^1$ have the same meaning as defined above and c represents 2 or 3; and
(C) from 0.01 to 10 parts by weight of a curing catalyst.

### 5,013,808
### METHOD OF PREPARING ALKOXY SILANE AND A SILICONE CONTAINING RESIN

**Charles Piskoti, Grand Blanc, Mich., assignor to Genesee Polymers Corporation, Flint, Mich.**

**Continuation of Ser. No. 13,364, Feb. 11, 1987, abandoned. This application Jun. 7, 1988, Ser. No. 205,559**

**Int. Cl.$^5$ C08G** *77/04*

**U.S. Cl. 528—23** **13 Claims**

1. A method of preparing an alkoxysilane and a silicone resin consisting essentially of the steps of: combining a cyclic or straight chain siloxane A having a first boiling point with a catalyst in a reaction vessel and a silane monomer B having tri or tetra alkoxy functionality and a second boiling point; distilling from the vessel an alkoxysilane product of a rearrangement reaction having a boiling point which is lower than the boiling point of the mixture of the siloxane A and the silane monomer B to drive the reaction towards completion; and recovering from the vessel a silicone resin having alkoxy functionality and no active silanol functionality.

---

### 5,013,809
### ORGANOSILICON COMPOSITIONS

**Raymond T. Leibfried, Sr., Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.**

**Continuation-in-part of Ser. No. 79,740, Jul. 30, 1987, Pat. No. 4,900,779, which is a continuation-in-part of Ser. No. 901,092, Aug. 27, 1986, abandoned. This application Oct. 10, 1989, Ser. No. 419,429**

**The portion of the term of this patent subsequent to Feb. 12, 2007, has been disclaimed.**

**Int. Cl.$^5$ C08L** *83/04*

**U.S. Cl. 524—862** **24 Claims**

1. An organosilicon prepolymer composition which is the reaction product of (a) at least one cyclic polysiloxane or tetrahedral siloxysilane containing at least two ≡SiH groups and (b) at least one polycyclic polyene having at least two non-aromatic, non-conjugated carbon-carbon double bonds in its rings, wherein the total ratio of the non-aromatic, non-conjugated carbon-carbon double bonds in the rings of (b) to ≡SiH groups in (a) is greater than 1.8:1 and either (a) or (b) has more than two reactive sites.

---

### 5,013,810
### IMPACT ABSORBING MEDIA

**Ashok M. Sarpeshkar, New Martinsville, and Charles S. Gracik, McMechen, both of W. Va., assignors to Mobay Corporation, Pittsburgh, Pa.**

**Filed Feb. 9, 1990, Ser. No. 478,103**

**Int. Cl.$^5$ C08G** *18/10, 18/32, 18/40, 18/75*

**U.S. Cl. 528—59** **6 Claims**

1. A solid polyurethane composition having a glass transition temperature of from −20 C. to 0° C., having a Bayshore rebound of less than about 20, and having a Shore A hardness of less than 80, and being prepared by reacting:
- (a) an isocyanate terminated prepolymer having an isocyanate group content of from about 5 to about 25%, said prepolymer being prepared by reacting:
  - (i) a cycloaliphatic diisocyanate with
  - (ii) a polyhydroxyl compound selected from the group consisting of
    - (1) diols having molecular weights of from about 450 to about 4000,
    - (2) triols having molecular weights of from about 4000 to about 6000, and
    - (3) mixtures thereof, with
- (b) a hydroxyl functional compound selected from the group consisting of
  - (i) one or more diols having molecular weights of from 62 to about 1000,
  - (ii) one or more triols having molecular weights of from about 500 to about 2000, and

VOL
1126
ISS
1
MY
7
1991
UMI

(iii) a mixture of
  (1) one or more triols having molecular weights of from more than 300 to about 3000, and
  (2) one or more diols having molecular weights of from about 200 to about 3000,
 with the weight ratio component (iii)1) to component (iii)2) being from 1:0.1 to 1:3,
(c) no more than 10% by weight based on component (b) of one or more triols having molecular weights of 300 or less, the isocyanate to hydroxyl equivalent ratio being from 0.95:1 to 1.2:1, and the weight ratio of component (a) to component (b) being from 10:1 to 1:1.5.

---

### 5,013,811

### USE OF MODIFIED DIISOCYANATES FOR PREPARING LINEAR THERMOPLASTIC POLYURETHANE ELASTOMERS HAVING IMPROVED PROPERTIES

**Bert A. Ross, Spartanburg, S.C., assignor to Reeves Brothers, Inc., Spartanburg, S.C.**

**Filed Mar. 20, 1989, Ser. No. 326,183**

**The portion of the term of this patent subsequent to Mar. 19, 2008, has been disclaimed.**

**Int. Cl.$^5$ C08G** *18/10*

**U.S. Cl. 528—60** **36 Claims**

1. In the preparation of a linear thermoplastic polyurethane elastomer composition from a polyol component, a diisocyanate compound, a first extender component having a molecular weight of less than about 500 and a second extender component, the improvement which comprises lowering the processing temperature of said polyurethane by reacting the diisocyanate compound with said first extender in a molar ratio of above 2:1 to form a modified diisocyanate component having a functionality of about 2 prior to reacting the modified diisocyanate component with the polyol and second extender components, thus forming a linear thermoplastic polyurethane elastomer composition having lower temperature processing characteristics compared to similar compositions wherein the diisocyanate compound is not modified.

---

### 5,013,812

### POLYBIURETS

**George P. Speranza, and Wei-Yang Su, both of Austin, Tex., assignors to Texaco Chemical Company, White Plains, N.Y.**

**Filed Dec. 11, 1989, Ser. No. 448,416**

**Int. Cl.$^5$ C08G** *18/10*

**U.S. Cl. 528—60** **19 Claims**

1. Polybiuret compositions comprising the reaction products of polyoxyalkylene polyureas and polyisocyanates.

---

### 5,013,813

### POLYUREA ELASTOMER WITH RAPID DRY TIME

**Robert L. Zimmerman, Austin, and Dudley J. Primeaux, II, Elgin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.**

**Filed Dec. 18, 1989, Ser. No. 452,158**

**Int. Cl.$^5$ C08G** *18/32*

**U.S. Cl. 528—60** **16 Claims**

1. A polyurea elastomer comprising an (A) component which includes an isocyanate and a (B) component which includes (1) an amine terminated polytetrahydrofuran and (2) a chain extender.

---

### 5,013,814

### ARALIPHATIC SULFONIUM SALTS AND THEIR USE

**Martin Roth, Giffers, and Beat Müller, Marly, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

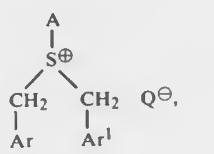
**Filed Jan. 9, 1990, Ser. No. 462,252**

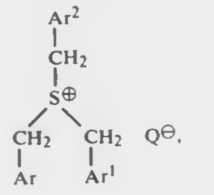
**Claims priority, application Switzerland, Jan. 16, 1989, 129/89; Oct. 6, 1989, 3649/89**

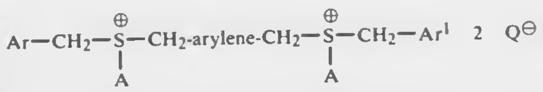
**Int. Cl.$^5$ C08F** *4/20;* **C08G** *59/68, 8/04, 63/08*

**U.S. Cl. 528—90** **8 Claims**

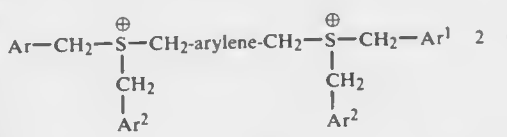
1. A curable mixture containing (a) at least one sulfonium salt of the formula I, II, III or IV


(I)


(II)


(III)

$$Ar{-}CH_2{-}\overset{\oplus}{\underset{A}{S}}{-}CH_2\text{-arylene-}CH_2{-}\overset{\oplus}{\underset{A}{S}}{-}CH_2{-}Ar^1 \quad 2\ Q^{\ominus} \quad \text{and}$$


(IV)

$$Ar{-}CH_2{-}\overset{\oplus}{\underset{\underset{Ar^2}{CH_2}}{S}}{-}CH_2\text{-arylene-}CH_2{-}\overset{\oplus}{\underset{\underset{Ar^2}{CH_2}}{S}}{-}CH_2{-}Ar^1 \quad 2\ Q^{\ominus},$$

in which A is $C_1$–$C_{12}$alkyl, $C_3$–$C_8$cycloalkyl, $C_4$–$C_{10}$cycloalkylalkyl, phenyl which is unsubstituted or mono- or polysubstituted by $C_1$–$C_8$alkyl, $C_1$–$C_4$alkoxy, halogen, nitro, phenyl, phenoxy, alkoxycarbonyl having 1–4 C atoms in the alkoxy radical or acyl having 1–12 C atoms, Ar, $Ar^1$ and $Ar^2$, independently of one another, are each phenyl which is unsubstituted or mono- or polysubstituted by $C_1$–$C_8$alkyl, $C_1$–$C_4$alkoxy, halogen, nitro, phenyl, phenoxy, alkoxycarbonyl having 1–4 C atoms in the alkoxy radical or acyl having 1–12 C atoms or is naphthyl which is unsubstituted or mono-or polysubstituted by $C_1$–$C_8$alkyl, $C_1$–$C_4$alkoxy, halogen, nitro, phenyl, phenoxy, alkoxycarbonyl having 1–4 C atoms in the alkoxy radical or acyl having 1–12 C atoms, each arylene is phenylene which is unsubstituted or mono- or polysubstituted by $C_1$–$C_8$alkyl, $C_1$–$C_4$alkoxy, halogen, nitro, phenyl, phenoxy, alkoxycarbonyl having 1–4 C atoms in the alkoxy radical or acyl having 1–12 C atoms or naphthylene which is unsubstituted or mono-or polysubstituted by $C_1$–$C_8$alkyl, $C_1$–$C_4$alkoxy, halogen, nitro, phenyl, phenoxy, alkoxycarbonyl having 1–4 C atoms in the alkoxy radical or acyl having 1–12 C atoms and $Q^{\ominus}$ is $SbF_6^-$, $AsF_6^-$ or $SbF_5OH^-$ and (b) at least one cationically polymerizable organic material.

---

### 5,013,815

### AROMATIC POLYETHER SULFONES, A PROCESS FOR THEIR PRODUCTION AND THEIR USE

**Joachim Genz, Krefeld, and Hans-Rudolf Dicke, Bestwig, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Jul. 10, 1989, Ser. No. 378,684**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825148**

**Int. Cl.$^5$ C08G** *75/00*

**U.S. Cl. 528—171** **3 Claims**

1. Polyether sulfones of high molecular weight containing

2′,2″-dihydroxy-m-quaterphenyl incorporated in a concentration of from 1% to 100%, based on the total quantity of bisphenol component used.

---

### 5,013,816

### PREPARATION OF PARTICULATE POLYMERS

**Hendrikus Bobbink, Neuhofen; Hermann Fischer, Limburgerhof; Gerhard Heinz; Klaus Matthias, both of Weisenheim; Joachim Seibring, Lambsheim, and Wolfgang Stegmaier, Hassloch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

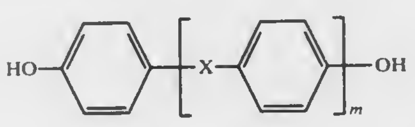
**Filed Dec. 16, 1987, Ser. No. 133,643**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644464**

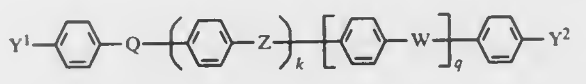
**Int. Cl.$^5$ C08G** *8/02, 75/20;* **C08F** *3/00*

**U.S. Cl. 528—173** **5 Claims**

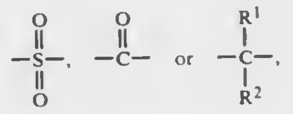
1. A process for the preparation of a particulate polymer having a mean particle size of 400 μm to 4 mm, obtainable by polycondensation of a diol of the formula I


I

or one of its $C_1$-$C_6$-alkyl, $C_1$-$C_6$-alkoxy, aryl, cyano, Cl or F derivatives substituted in the nucleus, with a dihalogen compound of the formula II

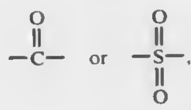

II

or one of its $C_1$-$C_6$-alkyl, $C_1$-$C_6$-alkoxy, aryl, chlorine or fluorine derivatives substituted in the nucleus, where X and Z are each a chemical bone, —O—, —S—,



$$-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-, \quad -\overset{\overset{O}{\|}}{C}- \quad \text{or} \quad -\overset{R^1}{\underset{R^2}{C}}-,$$

$Y^1$ and $Y^2$ are each Cl or F, Q and W each



$$-\overset{\overset{O}{\|}}{C}- \quad \text{or} \quad -\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-,$$

$R^1$ and $R^2$ are each hydrogen, alkyl or alkoxy, each of 1 to 6 carbon atoms, or aryl or their halogenated derivatives, and k, m and q are each 0 or 1, wherein

(A) a solution of the polymer is allowed to emerge under pressure of from 0.1 to 8 bar from a nozzle in a plurality of liquid jets,

(B) the liquid jet is caused to divide into drops having a narrow particle size distribution by setting the nozzle into longitudinal or transverse vibration or by pulsation of the liquid in the nozzle or by providing a distance between the point of emergence from the nozzle and the point of entry into a precipitation bath,

(C) the drops produced are precipitated by introduction into a precipitation bath which contains a liquid in which the polymer is insoluble, and

(D) solvent residues and other impurities present in the polymer particles are removed.

---

### 5,013,817

### PROCESS FOR PREPARING A POLYIMIDE AND A COMPOSITE MATERIAL CONTAINING THE SAME

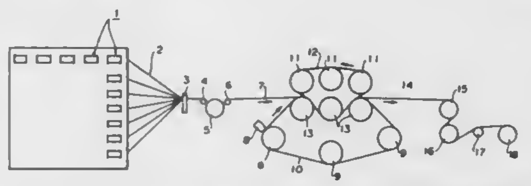
**Masahiro Ohta; Saburo Kawashima; Shoji Tamai; Hideaki Oikawa; Akihiro Yamaguchi; Tomohito Koba; Toshiyuki Nakakura; Hideo Sakai; Misao Masuda; Satoru Kishi, and Chiaki Maruko, all of Kanagawa, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan**

**Filed Nov. 3, 1988, Ser. No. 266,678**

**Claims priority, application Japan, Nov. 5, 1987, 62-278193; Nov. 7, 1987, 62-280310; Nov. 16, 1987, 62-287552; Nov. 25, 1987, 62-295315**

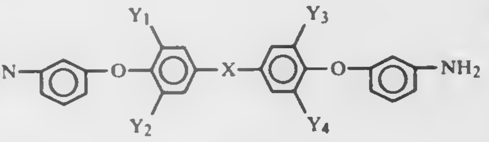
**Int. Cl.$^5$ C08G** *8/02, 63/00, 75/00*

**U.S. Cl. 528—183** **37 Claims**



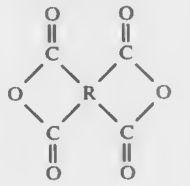
1. A process for preparing a thermoplastic polyimide comprising reacting

(a) at least one aromatic diamine represented by the formula (I)


(I)

wherein X represents a direct bond or a radical selected from the group consisting of a $C_1$–$C_{10}$ divalent hydrocarbon radical, a hexafluorinated isopropylidene radical, a carbonyl radical, a thio radical and a sulfonyl radical; and $Y_1$, $Y_2$, $Y_3$ and $Y_4$ may be the same or different and represent a radical selected from the group consisting of a hydrogen atom, a lower alkyl radical, a lower alkoxy radical, a chlorine atom and a bromine atom;

(b) at least one tetracarboxylic dianhydride represented by the formula (II)


(II)

wherein R represents a tetravalent radical selected from the group consisting of an aliphatic radical having at least two carbon atoms, a cyclic aliphatic radical, a monocyclic aromatic radical, a fused polycyclic aromatic radical, a polycyclic aromatic radical wherein the aromatic rings are linked together directly or by a bridged member; and

(c) at least one monoamine represented by the formula (III)

$$Z{-}NH_2 \qquad \text{(III)}$$

wherein Z represents a monovalent radical selected from the group consisting of an aliphatic radical, a cyclic aliphatic radical,.a monocyclic aromatic radical, a fused polycyclic aromatic radical and a polycyclic aromatic radical wherein the aromatic rings are linked together directly or via a bridged member, to form a polyamic acid, and dehydrating or imidizing said polyamic acid to form a thermoplastic polyimide.

VOL
1126
ISS
1
MY
7
1991
UMI

## 5,013,818

### MODIFIED POLYARYLATE RESIN AND COMPOSITION COMPRISING THE SAME

**Kazuya Takemura; Kenji Yoshino, and Tadahiro Wakui, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan**

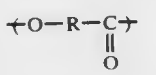
**Filed Dec. 12, 1989, Ser. No. 449,595**

**Claims priority, application Japan, Dec. 15, 1988, 63-317109**

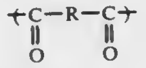
**Int. Cl.$^5$ C08G** *63/02*

**U.S. Cl. 528—193** **7 Claims**

1. An improved polyarylate which comprise the following units (I) to (IV)

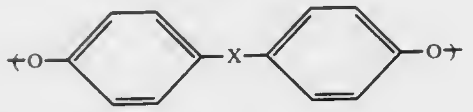


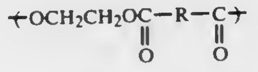
$$+O-R-\underset{\underset{O}{\|}}{C}+ \qquad (I)$$



$$+\underset{\underset{O}{\|}}{C}-R-\underset{\underset{O}{\|}}{C}+ \qquad (II)$$

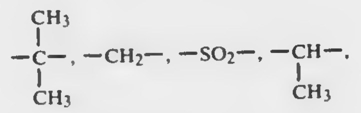
(III)



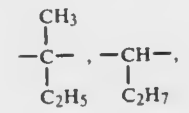


$$+OCH_2CH_2O\underset{\underset{O}{\|}}{C}-R-\underset{\underset{O}{\|}}{C}+ \qquad (IV)$$

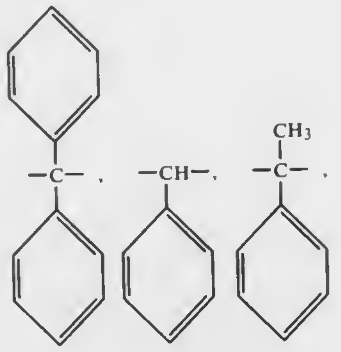
wherein each R in the units (I), (II) and (IV) independently represents a paraphenylene group, a metaphenylene group, a 4,4'-biphenylene group or a 2,6-naphthalene group, and X represents

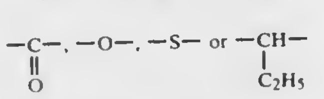


$$-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-,\ -CH_2-,\ -SO_2-,\ -\underset{\underset{CH_3}{|}}{CH}-,$$



$$-\overset{\overset{CH_3}{|}}{\underset{\underset{C_2H_5}{|}}{C}}-,\ -\underset{\underset{C_2H_7}{|}}{CH}-,$$





$$-\underset{\underset{O}{\|}}{C}-,\ -O-,\ -S-\text{ or }-\underset{\underset{C_2H_5}{|}}{CH}-$$

provided that any hydrogen atom directly joined to the aromatic ring of each of the units (I) to (IV) is unsubstituted or is substituted with an alkyl group having from 1 to 6 carbon atoms or an alkoxy group having from 1 to 6 carbon atoms and the units (I) to (IV) have one or more R, and X or more than one X respectively, the units (I) being contained in an amount of from 3 to 30 mole %, the units (II) being contained in an amount of not less than 30 mole %, the units (III) being contained in an amount of not less than 30 mole %, and the units (IV) being contained in an amount of not larger than 25 mole %, each based on the total moles of the units (I) to (IV).

---

## 5,013,819

### LIQUID-CRYSTALLINE, THERMOTROPIC AROMATIC POLYESTERS

**Alfredo Coassolo; Marco Foa', and L. Lawrence Chapoy, all of Novara, Italy, assignors to Montedison S.P.A., Milan, Italy**

**Continuation of Ser. No. 280,644, Dec. 6, 1988, abandoned. This application Nov. 2, 1989, Ser. No. 430,942**

**Claims priority, application Italy, Dec. 10, 1987, 22930 A/87**

**Int. Cl.$^5$ C08G** *63/02, 63/18*

**U.S. Cl. 528—193** **12 Claims**

1. A liquid-crystalline, thermotropic, aromatic polyester which comprises:
   - (a) units derived from at least one aromatic or cycloaliphatic dicarboxy acid;
   - (b) units derived from a mixture of at least two hydroquinones mono-substituted with aralkyl groups containing at least 7 carbon atoms;
   - (c) optionally units derived from at least one hydroquinone di-substituted with the aralkyl groups as defined under (b).

---

## 5,013,820

### PREPARATION OF POLY(ETHLENE-2,6-NAPHTHALENE DICARBOXYLATE) FROM DIMETHYL-2,6-NAPHTHALENE DICARBOXYLATE AND METHYL HYDROGEN 2,6-NAPHTHALENE DICARBOXYLATE

**Jimmy R. Trotter, and Bobby J. Sublett, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 12, 1989, Ser. No. 337,231**

**Int. Cl.$^5$ C08G** *63/20*

**U.S. Cl. 528—272** **8 Claims**

1. A process for producing a poly(ethylene-2,6-naphthalene dicarboxylate) product from a mixture of dimethyl-2,6-naphthalene dicarboxylate and methyl hydrogen 2,6-naphthalene dicarboxylate, comprising:
   - a. esterifying a mixture containing at least 90 wt % of dimethyl-2,6-naphthalene dicarboxylate and not more than 10 wt % of methyl hydrogen 2,6-naphthalene dicarboxylate with ethylene carbonate in the presence of an amine or an ammonium catalyst to obtain an esterified mixture, wherein said ethylene carbonate is present in an amount of at least 2 molar equivalents relative to said methyl hydrogen 2,6-naphthalene dicarboxylate; and
   - b. polyesterifying/polycondensing said esterified mixture with ethylene glycol in the presence of a polyesterification catalyst to obtain said poly(ethylene-2,6-naphthalene dicarboxylate).

---

## 5,013,821

### ORTHO AND THIO-ORTHO ESTER POLYMER

**Jorge Heller, Woodside; Steve Y. W. Ng, San Francisco, and Donald W. H. Penhale, Menlo Park, all of Calif., assignors to Pharmaceutical Delivery Systems, Inc., Menlo Park, Calif.**

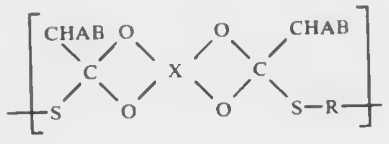
**Filed Jun. 15, 1989, Ser. No. 348,059**

**Int. Cl.$^5$ C08G** *67/00*

**U.S. Cl. 528—376** **29 Claims**

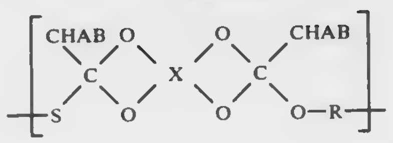
1. An ortho ester polymer containing a combination of the following mer units (I), (II), (III) or (IV):

(I)

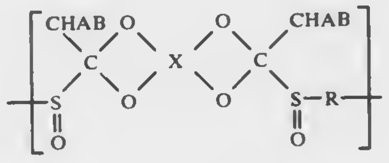


-continued

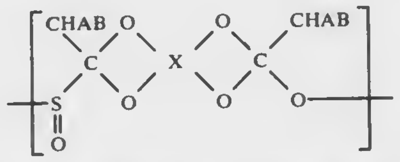
(II)



(III)



(IV)



wherein X is a quadrivalent organic grouping, A and B are independently selected from the group consisting of hydrogen and lower alkyl, and R is hydrocarbylene or oxyhydrocarbylene of 1 to 14 carbon atoms, when oxyhydrocarbylene, containing 1 to 4 oxy groups, and are either aliphatic or aryl, unsubstituted or substituted with one or more lower alkyl, amino, nitro or halogen moieties.

---

## 5,013,822

### PROCESS FOR PREPARING POLY(ARYLENE SULFIDE SULFONE) WITH IN-SITU PREPARATION OF ALKALI METAL CARBOXYLATE

**Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Dec. 7, 1989, Ser. No. 447,348**

**Int. Cl.$^5$ C08G** *75/16*

**U.S. Cl. 528—388** **18 Claims**

1. A process for the production of poly(arylene sulfide) sulfone comprising contacting:
   - (a) at least one dihaloaromatic sulfone,
   - (b) at least one organic amide,
   - (c) at least one sulfur-containing compound,
   - (d) water, and
   - (e) at least one alkali metal carboxylate, wherein the said alkali metal carboxylate is prepared in-situ by contacting at least one carboxylic acid with at least one alkali metal hydroxide.

---

## 5,013,823

### POLY(ARYLENE SULFIDE) SHEET AND PRODUCTION PROCESS THEREOF

**Toshiya Mizuno; Yoshikichi Teramoto, both of Tsuchiura; Juichi Wakabayashi, Ibaraki, and Takeshi Saito, Tsuchiura, all of Japan, assignors to Kureha Kagaku Kogyo K.K., Japan**

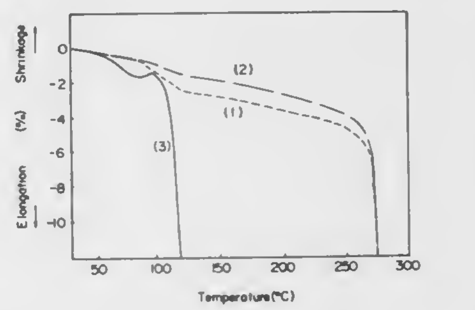
**Filed Nov. 28, 1989, Ser. No. 442,109**

**Claims priority, application Japan, Dec. 2, 1988, 63-304167; Feb. 22, 1989, 1-40289**

**Int. Cl.$^5$ C08G** *75/00, 75/32*

**U.S. Cl. 528—388** **4 Claims**

1. In a poly(arylene sulfide) sheet excellent in planarity and smoothness, said sheet being formed of a poly(arylene sulfide) having a melt viscosity, $\eta^*$ of 1,000–25,000 poises as measured at 310° C. and a shear rate of 200 $\sec^{-1}$, and a melt crystallization temperature, $Tc_2$ of 170°-240° C. wherein $Tc_2$ is an exothermic peak temperature of crystallization which appears upon the measurement by a differential scanning calorimeter at a cooling rate of 10° C./min after the polymer is heated from 23° C. to 380° C. at a rate of 10° C./min and then held for 3 minutes at 380° C., the improvement wherein:
   - (a) the surface roughness, Ra of at least one side of the sheet is 0.09 μm or less;
   - (b) the degree of crystallization of the sheet is at least 5%; and
   - (c) the number of flexings to break, Y of the sheet satisfies the following equation (I):



$$\log Y \geqq 7.11 - 2.34 \log t \qquad (I)$$

wherein t means a thickness (μm) of the sheet.

---

## 5,013,824

### HUMAN INTERLEUKIN-4 PEPTIDES AND CONJUGATES THEREOF

**John S. Abrams, Belmont; Takashi Yokota, Palo Alto; Frank Lee, Palo Alto, and Ken-ichi Arai, Palo Alto, all of Calif., assignors to Schering Corporation, Kenilworth, N.J.**

**Continuation-in-part of Ser. No. 881,553, Jul. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 843,958, Mar. 25, 1986, which is a continuation-in-part of Ser. No. 799,668, Nov. 19, 1985, abandoned. This application Sep. 19, 1986, Ser. No. 909,520**

**Int. Cl.$^5$ C07K** *13/00;* **A61K** *39/00, 45/02*

**U.S. Cl. 530—300** **6 Claims**

1. A peptide consisting of 6–40 consecutive amino acids which are identical to the human interleukin-4 amino acid sequence [$His_1$—$Ser_{129}$] and which peptide further comprises relatively high average hydrophilicity and is capable of inducing the production of antibodies specific to IL-4 when conjugated to an immunogenic carrier and administered to the host.

---

## 5,013,825

### SULFATION OF LIGNIN

**Peter Dilling, Isle of Palms, S.C., assignor to Westvaco Corporation, New York, N.Y.**

**Filed Feb. 22, 1990, Ser. No. 483,394**

**Int. Cl.$^5$ C08H** *5/02*

**U.S. Cl. 530—500** **9 Claims**

1. A method of producing sulfated lignin comprising the steps of dissolving lignin in an aqueous alkaline solution, adding an organic amine-sulfur trioxide complex to the dissolved lignin, and reacting the amine-sulfur trioxide complex with the lignin under conditions to sulfate the same wherein the lignin concentration in solution is at least 25% solids by weight and the reaction is carried out for up to about one hour.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,826
### AZO DYES CONTAINING 5-CYCLOHEXYLCARBONYL-THIOPHENE DIAZO COMPONENTS AND 1,2,3,4-TETRAHYDROQUINOLINE COUPLING COMPONENTS

**Harald Walter, Basel, Switzerland, assignor to Ciba-Giegy Corporation, Ardsley, N.Y.**

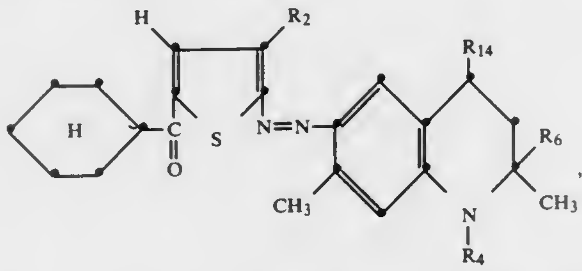
**Filed Feb. 21, 1989, Ser. No. 312,789**

**Claims priority, application Switzerland, Feb. 26, 1988, 729/88; Apr. 18, 1988, 1414/88**

**Int. Cl.⁵ C09B** *29/033, 29/44;* **D06P** *3/24*

**U.S. Cl. 534—768** **2 Claims**

1. An azo dye of the formula



(3)

in which when $R_2$ is $-COOCH_3$, then $R_4$ is sulfoethyl, $R_6$ is hydrogen or methyl and $R_{14}$ is methyl, or in which when $R_2$ is $-CONHCH_2CH_2OSO_3H$, then $R_4$ is ethyl, isopropyl, β-methoxyethyl or β-ethyoxyethyl, $R_6$ is hydrogen or methyl or $R_{14}$ is methyl.

2. An azo dye of claim 1 in which when $R_2$ is $-COOCH_3$, then $R_4$ is sulfoethyl, $R_6$ is methyl and $R_{14}$ is methyl, or in which when $R_2$ is $CONGHCH_2OSO_3H$, then $R_4$ is ethyl, $R_6$ is methyl and $R_{14}$ is methyl.

---

### 5,013,827
### ENHANCED CHEMILUMINESCENCE FROM 1,2-DIOXETANES THROUGH ENERGY TRANSFER TO TETHERED FLUORESCERS

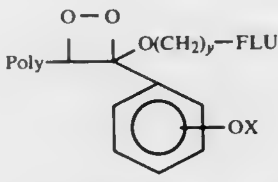
**Arthur P. Schaap, Detroit, Mich., assignor to Board of Governors of Wayne State University, Detroit, Mich.**

**Division of Ser. No. 289,837, Dec. 27, 1986, which is a continuation-in-part of Ser. No. 887,139, Jul. 17, 1986. This application Nov. 13, 1989, Ser. No. 435,177**

**Int. Cl.⁵ C07C** *321/00*

**U.S. Cl. 536—17.3** **21 Claims**

1. In a process for preparing a dioxetane compound (I) of the formula:

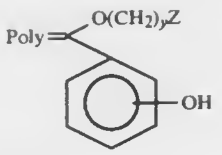


(I)

wherein Poly is a spirofused polycyclic alkylene group wherein y is an integer between 1 and 14 and wherein Flour is a fluorescent molecule group,

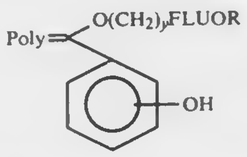
wherein X is a leaving group, which when removed by an activating agent produces an oxide intermediate of the dioxetane compound which spontaneously decomposes to form light because of FLUOR, which comprises:

(a) reacting in an organic solvent, a compound (II) of the formula:



(II)

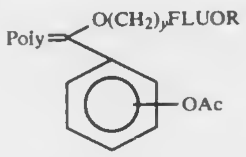
wherein Z is a reactive group, with FLUORA, wherein A is reactive with Z to form a compound (III) of the formula:



(III)

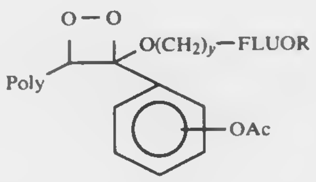
wherein Z can be part of FLUOR;

(b) reacting the compound (III) with acetyl chloride to form the compound (IV) of the formula:



(IV)

(c) reacting oxygen with compound (IV) to form a dioxetane compound of the formula:



wherein Ac is acetyl; and

(d) optionally converting compound (IV) to compound (I) where X is other than Ac.

---

### 5,013,828
### PREPARATION OF DIACYL DERIVATIVES OF 2′-DEOXY-5-FLUOROURIDINE VIA NOVEL INTERMEDIATE COMPOUND

**Yoshiyuki Kikuchi, Tokyo, and Akihiro Ishii, Kawagoe, both of Japan, assignors to Central Glass Company, Limited, Ube, Japan**

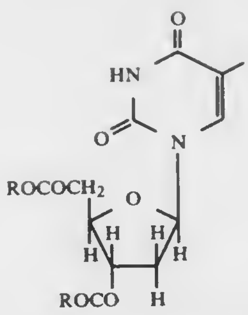
**Filed Apr. 21, 1989, Ser. No. 342,350**

**Claims priority, application Japan, Apr. 21, 1988, 63-96821; Apr. 25, 1988, 63-102189**

**Int. Cl.⁵ C07H** *19/06;* **C07D** *239/54*

**U.S. Cl. 536—23** **12 Claims**

1. A process of preparing a diacyl compound of 2′-deoxy-5-fluorouridine represented by the formula (I),



(I)

wherein R represents an alkyl group having not more than 20 carbon atoms, the process comprising the steps of:

(i) fluorinating 2′-deoxyuridine in the form of an aqueous solution with fluorine gas at a temperature in the range from 0° C. to room temperature in the presence of a salt of a fatty acid having not more than 4 carbons atoms, the molar ratio of said salt to said 2′-deoxyuridine being not lower than 1, said salt being selected from the group consisting of alkali metal salts, alkaline earth metal salts and ammonium salt; and

(ii) reacting a fluorinated intermediate formed at step (i) with a compound represented by the formula (II),

$$R-CO-X \qquad (II)$$

wherein R is as defined above with respect to the formula (I), and X is an acyloxy group represented by $RCO_2$ (where R is the same as R in the formula (II)) or a halogen atom.

---

### 5,013,829
### STABLE CONGENER OF 2′,3′-DIDEOXYADENOSINE

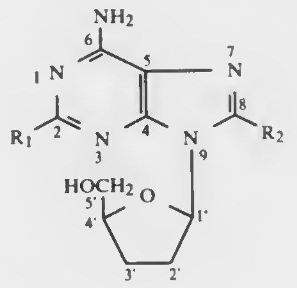
**Vasu Nair, and Greg S. Buenger, both of Iowa City, Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa**

**Filed Apr. 26, 1989, Ser. No. 343,334**

**Int. Cl.⁵ C07H** *19/173*

**U.S. Cl. 536—26** **5 Claims**

1. A stable congener of 2′,3′-dideoxyadenosine of the formula:



wherein $R_1$ is H and $R_2$ is OH.

---

### 5,013,830
### COMPOUNDS FOR THE CLEAVAGE AT A SPECIFIC POSITION OF RNA, OLIGOMERS EMPLOYED FOR THE FORMATION OF SAID COMPOUNDS, AND STARTING MATERIALS FOR THE SYNTHESIS OF SAID OLIGOMERS

**Eiko Ohtsuka; Hideo Inoue, both of Sappro; Hirokazu Morisawa, Kawasaki; Susumu Shibahara, Kawasaki; Sachiko Mukai, Kawasaki, and Tohru Nishihara, Kurashiki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Continuation of Ser. No. 92,198, Sep. 2, 1987, abandoned. This application Feb. 12, 1990, Ser. No. 478,741**

**Claims priority, application Japan, Sep. 8, 1986, 61-211157; Jan. 23, 1987, 62-13726**

**Int. Cl.⁵ C07H** *21/00*

**U.S. Cl. 536—27** **17 Claims**

1. A compound having a double chain and which is composed of an RNA (+chain) and a complementary DNA (−chain), wherein at least one portion of said DNA (−chain) has been replaced by a 2′-O-substituted RNA, wherein said 2′-O-substituted RNA has at least one substituted 2′-hydroxyl group on the ribose moieties of said 2′-O-substituted RNA, and wherein, when said compound is subjected to the action of an enzyme having ribonuclease H activity, the RNA (+chain) is cleaved at a position corresponding to the unreplaced portion of the DNA (−chain).

---

### 5,013,831
### DETECTABLE MOLECULES, METHOD OF PREPARATION AND USE

**Jannis G. Stavrianopoulos, New York, N.Y., assignor to Enzo Biochem, Inc., New York, N.Y.**

**Continuation of Ser. No. 43,668, Apr. 28, 1987, Pat. No. 4,952,685, which is a division of Ser. No. 575,396, Jan. 30, 1984, Pat. No. 4,707,440. This application May 8, 1990, Ser. No. 521,762**

**Int. Cl.⁵ C07H** *15/12*

**U.S. Cl. 536—27** **2 Claims**

1. A detectable molecule of the formula

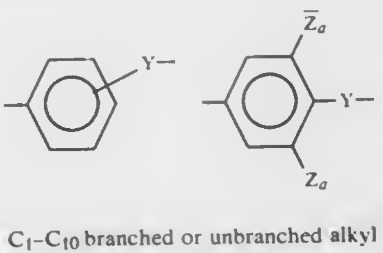
$$A^{3}-(-X-R^{1}-E-Det^{b})m$$

where

$A^3$ is an oligo- or polynucleotide having at least one modifiable reactive group which is attached to the 6 position of the base, when the base selected is adenine, to the 4 position of the base, when the base selected is cytosine, or to the 2 position of the base, when the base selected is guanine, which reactive group consists of amino, hydroxy, cis OH, halide, aryl, imidazoly, carbonyl, carboxyl, thio or a residue comprising an activated carbon;

—X— is selected from the group consisting of: $-NH-CO-$, $-NH-C(NH)-$, $-N{=}N-$, $-NH-SO_2-$, $-OSO_2-$, $-NH-N{=}N-$, $-NH-CH_2-$, $-CH_2-NH-$, $-O-CO-$, $-NH-CO-CH_2-S-$, $-NH-CO-CH_2-NH-$, $-O-CO-CH_2-$, $-S-CH_2-$, $-O-CO-NH-$

—$R^1$— is



a $C_1$–$C_{10}$ branched or unbranched alkyl or aralkyl which may be substituted by —OH;

—Y— is a direct bond to —E—, or —Y— is —E—$R^2$— wherein —$R^2$— is a $C_1$–$C_{10}$ branched or unbranched alkyl;

VOL
1126
ISS
1
MY
7
1991
UMI

$Z_a$ is chlorine, bromine or iodine;

—E— is O, NH or an acyclic divalent sulfur atom;

$Det^b$ is a chemical moiety capable of being detected, comprising biotin or a substituted metal chelator or a compound cable of yielding a metal chelator; and

m is an integer from 1 to the total number of modified reactive groups on said oligo- or polynucleotide.

---

### 5,013,832
## PROCESS FOR WORKING UP WATER-SOLUBLE CELLULOSE DERIVATIVES HAVING HIGH FLOCCULATION POINTS

**Wilfried Raehse, Kolhagenstrasse 44, 4000 Duesseldorf 13, Fed. Rep. of Germany; Willi Wuest, Fasanenring 32, 4030 Ratingen, Fed. Rep. of Germany, and Guenther Just, Verdistrasse 48, 4010 Hilden, Fed. Rep. of Germany**

**Filed Aug. 17, 1987, Ser. No. 86,439**

**Claims priority, application Fed. Rep. of Germany, Aug. 25, 1986, 3628826**

**Int. Cl.$^5$ C08B** *11/193, 11/08, 11/12, 11/02*

**U.S. Cl. 536—90** **1 Claim**

1. In a process for the preparation of a water-soluble cellulose derivative comprising the steps of soaking cellulose with alkalis to open up the lattice structure, etherification thereof, removal of relatively volatile components from the resulting crude reaction mixture, and suspension of the crude product in hot water followed by separation of the suspended product from the hot water, the improvement wherein the suspension of the crude product in hot water and separation of the suspended product from the hot water are both carried out at a pressure above 1 bar and a temperature of from 105° C. to about 120° C. and said water soluble cellulose derivative has a flocculation point above 75° C. and is selected from the group consisting of methyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, carboxymethyl cellulose and methyl hydroxyethyl cellulose.

---

### 5,013,833
## PROCESS FOR PREPARING CEFUROXIME AXETIL

**Harold A. Crisp, Harrow Weald; John C. Clayton, Eastcote; Leonard G. Elliott, Great Urswick, and Edward M. Wilson, St. John's Close, all of England, assignors to Glaxo Group Limited, England**

**Division of Ser. No. 938,140, Dec. 4, 1986, Pat. No. 4,820,833, which is a continuation of Ser. No. 781,505, Sep. 30, 1985, abandoned, which is a continuation of Ser. No. 711,559, Mar. 14, 1985, abandoned, which is a continuation of Ser. No. 635,797, Jul. 30, 1984, abandoned, which is a continuation of Ser. No. 518,671, Jul. 29, 1983, abandoned. This application Oct. 18, 1988, Ser. No. 258,908**

**Claims priority, application United Kingdom, Jul. 30, 1982, 8222019**

**Int. Cl.$^5$ C07D** *501/02*

**U.S. Cl. 540—222** **3 Claims**

1. A process for the preparation of highly pure cefuroxime axetil containing less than 5% m/m impurities and in predominantly amorphous form which comprises recovering cefuroxime axetil from a solution thereof which contains an organic solvent selected from the group consisting of ketones, alcohols, acetonitrile, tetrahydrofuran, dioxan, esters, chlorinated solvents, homogeneous mixtures of at least two of the aforesaid solvents and homogeneous mixtures of at least one of the aforementioned solvents and water, by solvent precipitation.

---

### 5,013,834
## PROCESS FOR THE PREPARATION OF AN OPTICALLY ACTIVE BENZOTHIAZEPINONE

**Fulvio L. Piselli, Milan, Italy, assignor to Industria Chimica Profarmaco S. p. A., Milan, Italy**

**Division of Ser. No. 297,993, Jan. 17, 1989, Pat. No. 4,931,578. This application May 21, 1990, Ser. No. 527,029**

**Claims priority, application Italy, Jan. 28, 1988, 19234 A/88**

**Int. Cl.$^5$ C07D** *281/10;* **A61K** *31/55*

**U.S. Cl. 540—491** **1 Claim**

1. A process for the preparation of 2S-cis-hydroxy-2,3-dihydro-2-(4-methoxyphenyl)-1,5-benzothiazepin-4-(5H)-one, in which (2S,3S)-2-hydroxy-3-(4-methoxyphenyl)-3-(2-acetylaminophenylthio)propionic acid (I) is subjected to prolonged ebollition with 1 to 5 moles of mineral acid which is diluted with water in 1:25 to 1:50 ratios.

---

### 5,013,835
## METHOD OF PREPARING (+)-(2S,3S)-3-HYDROXY-2-(4-METHOXYPHENYL)2,3-DIHYDRO-5H-1,5-BENZOTHIAZEPINE-4-ONE

**Guy Rossey, Voisins-Le-Bretonneux; Isaac Chekroun, Epinay; Antonio Ugolini, Le Pecq; Alexander Wick, St. Nom La Breteche; Bernard Gerin, Mantes La Jolie; Andre Bourbon, Mantes La Jolie, and Jean-Baptiste Graux, Mantes La Ville, all of France, assignors to Synthelabo, Paris, France**

**Filed Sep. 14, 1989, Ser. No. 408,042**

**Int. Cl.$^5$ C07D** *281/02*

**U.S. Cl. 540—491** **2 Claims**

1. A method of preparing (+)-(2S,3S) -3-hydroxy-2-(4-methoxyphenyl)-2,3-dihydro-5H-1,5-benzothiazepine-4-one, comprising:

(a) reacting 2-aminothiophenol with (−) -(2R,3S)-2,3-epoxy-3-(4-methoxyphenyl)methylpropionate to yield the intermediate (2S, 3S)-3-[2-aminophenyl)thiol -2-hydroxy-3-(4-methoxyphenyl)methylpropionate; and then, without isolating said intermediate,

(b) cyclizing said intermediate in the presence of acid, wherein said reacting and cyclizing steps are performed in the presence of chlorobenzene, whereby step (b) is performed without isolation of said intermediate.

---

### 5,013,836
## PROCESS FOR METHYLATING A HINDERED NITROGEN ATOM IN A POLYSUBSTITUTED DIAZACYCLOALKAN-2-ONE

**John T. Lai, Broadview Heights, Ohio, assignor to The B. F. Goodrich Company, Brecksville, Ohio**

**Filed Nov. 21, 1989, Ser. No. 439,408**

**Int. Cl.$^5$ C07D** *241/08, 241/44, 243/10, 243/14*

**U.S. Cl. 540—512** **21 Claims**

1. A process for methylating a complex amine including at least one polysubstituted diazacycloalkan-2-one ring containing a hindered nitrogen atom, comprising,

(a) reacting (i) said complex amine with (ii) formaldehyde or paraformaldehye, in amounts such that the molar ratio of NH groups : HCHO is in the range from about 1:1 to 1:1.5, and (iii) at least sufficient formic acid to dissolve said complex amine under the conditions of reaction;

(b) maintaining a temperature above about 60° C. but below a temperature at which more than 10% by weight of said complex amine is converted to byproducts, so as to form a solution of methylated complex amine in the reaction mass;

(c) neutralizing unreacted formic acid with an excess of aqueous alkaline solution so as to separate methylated complex amine as product;

(d) separating said product from said aqueous alkaline solution; and,

(e) washing water-soluble impurities from said product;

whereby said hindered nitrogen atom is essentially stoichiometrically quantitatively methylated.

---

### 5,013,837
## 3-ARYLCARBONYL-1H-INDOLE-CONTAINING COMPOUNDS

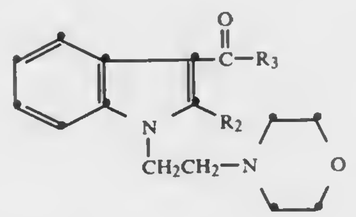
**Susan J. Ward, and Malcolm R. Bell, both of East Greenbush, N.Y., assignors to Sterling Drug Inc., New York, N.Y.**

**Division of Ser. No. 490,201, Mar. 8, 1990. This application Aug. 3, 1990, Ser. No. 562,366**

**Int. Cl.$^5$ C07D** *413/06, 413/14*

**U.S. Cl. 544—143** **11 Claims**

1. A member of the group consisting of (A) compounds having the formula:



wherein:

$R_2$ is hydrogen or lower-alkyl; and

$R_3$ is lower-alkoxymethylphenyl, benzyl, lower-alkoxystyryl, (1H-imidazol-1-yl)-naphthyl, 2-(1-naphthyl)ethenyl, 1-(1,2,3,4-tetrahydronaphthyl), anthryl, phenanthryl or pyrenyl; and (B) acid-addition salts thereof.

---

### 5,013,838
## POLYISOCYANATES CONTAINING ISOCYANURATE GROUPS AND A PROCESS FOR THEIR PRODUCTION

**Hans-Joachim Scholl, Cologne, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**

**Filed Jan. 19, 1990, Ser. No. 467,822**

**Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902078**

**Int. Cl.$^5$ C07D** *211/40;* **C08G** *18/08;* **C08K** *5/34*

**U.S. Cl. 544—193** **24 Claims**

1. A process for the production of an isocyanurate group-containing polyisocyanate which comprises

(a) partially reacting the isocyanate groups of an organic diisocyanate containing aliphatically and/or cycloaliphatically bound isocyanate groups in the presence of an ammonium or phosphonium fluoride trimerization catalyst,

(b) introducing carbon dioxide into the reaction mixture at least periodically during the reaction and

(c) terminating the reaction at the desired degree of conversion.

11. A polyisocyanate mixture containing isocyanurate and oxadiazinetrione rings in a ratio of 0.01 to 10 oxadiazinetrione rings for each isocyanurate ring which is prepared by a process which comprises

(a) partially reacting the isocyanate groups of an organic diisocyanate containing aliphatically and/or cycloaliphatically bound isocyanate groups in the presence of an ammonium or phosphonium fluoride trimerization catalyst,

(b) introducing carbon dioxide into the reaction mixture at least periodically during the reaction and

(c) terminating the reaction at the desired degree of conversion.

---

### 5,013,839
## PROCESS FOR OPTICALLY ACTIVE 2-ALKYL-2,5-DIAZABICYCLO(2.2.1) HEPTANES

**Tamim F. Braish, Ledyard, and Darrell E. Fox, Pawcatuck, both of Conn., assignors to Pfizer Inc., New York, N.Y.**

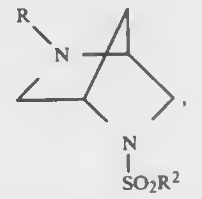
**Continuation of Ser. No. 412,072, Sep. 25, 1989, abandoned. This application Dec. 21, 1989, Ser. No. 453,365**

**Int. Cl.$^5$ C07D** *207/46, 487/08*

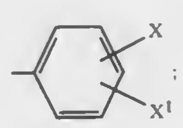
**U.S. Cl. 544—349** **7 Claims**

1. A process for the preparation of an optically active (1S, 4S)-2,5-diazabicyclo[2.2.1]heptane of the formula

(VIII)

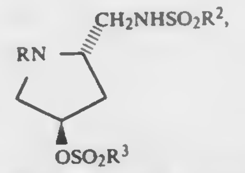


wherein R is $(C_1–C_6)$alkyl; $R^2$ is $(C_1–C_6)$alkyl, trifluoromethyl or



and X and $X^1$ are each independently hydrogen, $(C_1–C_6)$alkyl, bromo, chloro, trifluoromethyl, methoxy or nitro; which comprises contacting an optically active sulfonamide of the formula

(VII)



wherein R and $R^2$ are as defined above and $R^3$ is $(C_1–C_6)$alkyl, with at least one molar equivalent of an alkali metal carbonate in a reaction inert solvent until the desired conversion is substantially complete.

---

### 5,013,840
## POLYAMIC ACID OR POLYIMIDE

**Takuma Teshirogi, Fujisawa, Japan, assignor to Polyplastics Co., Ltd., Osaka, Japan**

**Division of Ser. No. 261,079, Oct. 21, 1988, Pat. No. 4,910,308. This application Dec. 20, 1989, Ser. No. 454,031**

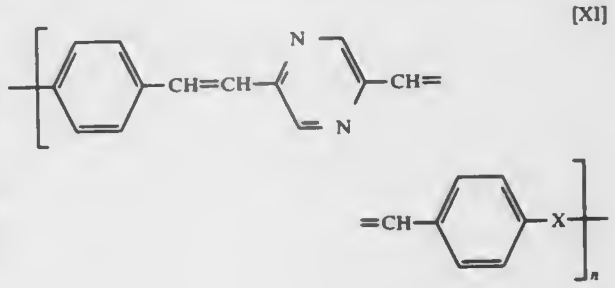
**Claims priority, application Japan, Oct. 23, 1987, 62-267989; Oct. 23, 1987, 62-267990**

**Int. Cl.$^5$ C07D** *241/02*

**U.S. Cl. 544;357** **3 Claims**

1. A polyamic acid or a polyimide represented by the following formula [XI]

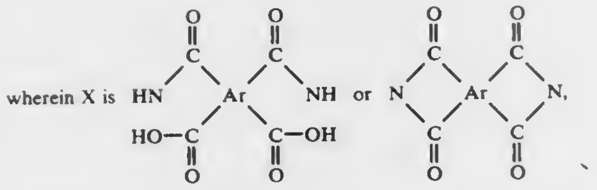
[XI]



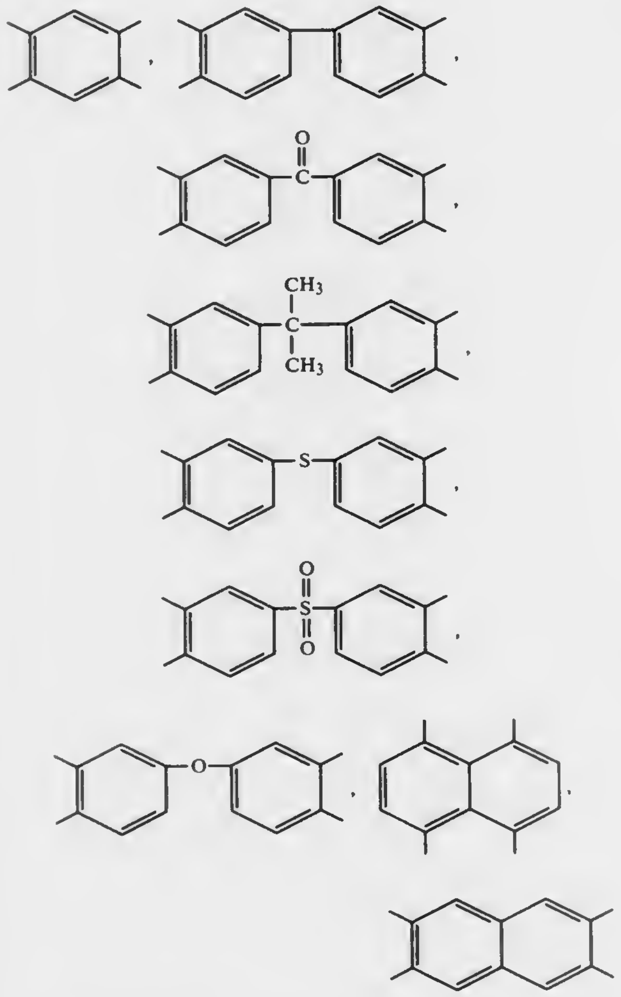
VOL
1126
ISS
1
MY
7
1991
UMI

-continued

wherein X is



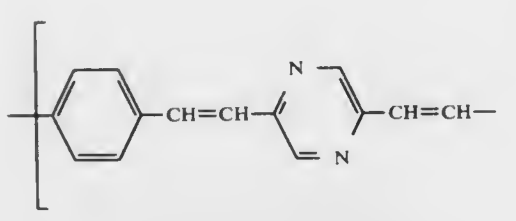
Ar is an aromatic tetrafunctional residue selected from the group consisting of



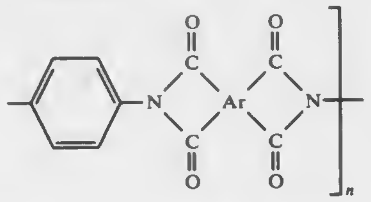
and a mixture thereof,
and n is an integer of 2 to 50.

3. A polyimide represented by the following formula [XV]

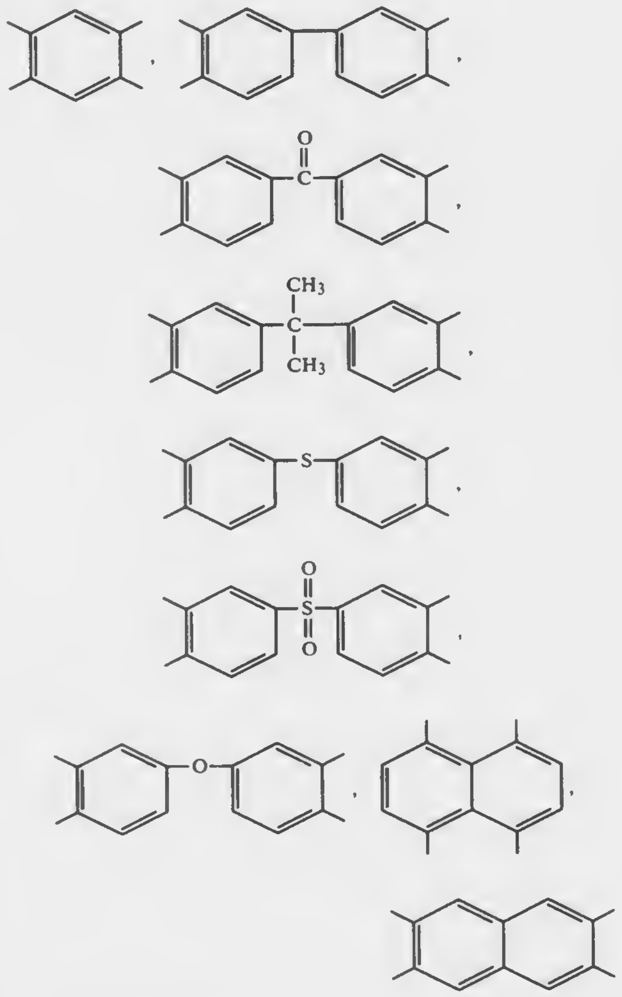
[XV]



-continued



wherein Ar is an aromatic tetrafunctional residue selected from the group consisting of



and a mixture thereof,
and n is an integer of 2 to 50.

---

### 5,013,841
### OXO QUINOLINE DERIVATIVES

**Jun-ichi Matsumoto, Ikoma; Akira Minamida, Takaishi; Masahiro Fujita, Kobe; Tohru Hirose, Kishiwada; Junji Nakano, Ikoma, and Shinichi Nakamura, Takatsuki, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan**

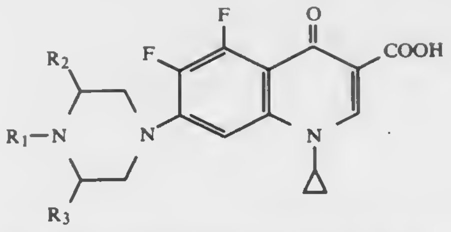
**Division of Ser. No. 258,613, Oct. 17, 1988. This application Aug. 4, 1989, Ser. No. 389,900**

**Claims priority, application Japan, Oct. 16, 1987, 62-262441; Apr. 30, 1988, 63-108840**

**Int. Cl.⁵ C07D** *401/00*

**U.S. Cl. 544—363** **4 Claims**

1. A quinoline compound of the formula



wherein $R_1$ represents a hydrogen atom, and $R_2$ and $R_3$ are the same or different and each represents a hydrogen atom or a methyl group, or an ester thereof or a salt of the compound or ester thereof.

---

### 5,013,842
### SYNTHESIS OF CHIRAL PYRROLIDINE AND PIPERIDINE GLYCOSIDASE INHIBITORS

**George W. J. Fleet, and David R. Witty, both of Oxford, United Kingdom, assignors to Monsanto Company, St. Louis, Mo.**

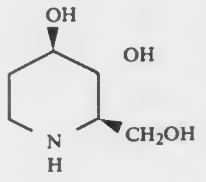
**Filed Jan. 22, 1990, Ser. No. 468,341**

**Int. Cl.⁵ C07D** *207/12, 211/22*

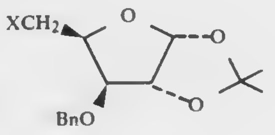
**U.S. Cl. 546—220** **4 Claims**

3. A method for the synthesis of fagomine (3) comprising carrying out the following stepwise reactions in solution phase and in about stoichiometric proportions of reactants in which compound numbers in parenthesis refer to compounds shown by chemical structure:

(a) esterifying 3-O-benzyl-1,2-O-isopropylidene-α-D-lyxofuranose (8) at the free hydroxyl with triflic anhydride to give the triflate (18),

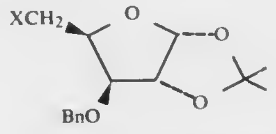


(3)



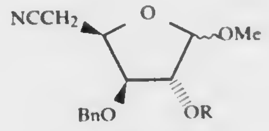
(8) X = OH

(b) reacting the triflate (18) with alkali metal cyanide to give the nitrile (19),



(18) X = $OSO_2CF_3$
(19) X = CN

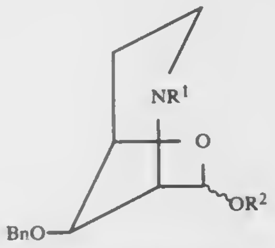
(c) converting the nitrile (19) to the methyl furanosides (20) as a mixture of their α and β anomers by treatment with methanolic hydrogen chloride,



(20αβ) R = H
(21αβ) R = $SO_2CF_3$

(d) converting the methyl furanosides (20) to the triflates (21) by esterifying with triflic anhydride,

(e) reducing the triflates (21) with borane-dimethyl sulfide to the corresponding 6-amino sugar followed by treatment with alkali metal carbonate to give the bicyclic amines (22),

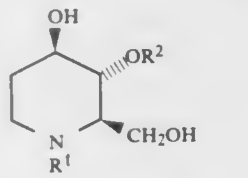


(22αβ) $R^1$ = H; $R^2$ = Me
(23αβ) $R^1$ = Z; $R^2$ = Me
(24αβ) $R^1$ = Z; $R^2$ = H

(f) converting the bicyclic amines (22) to the carbamates (23) by reaction with benzyl chloroformate,

(g) subjecting the carbamates (23) to hydrogenolysis to give the lactol (24),

(h) reducing the lactol (24) with sodium borohydride to give a diol (25) from which the protecting groups are removed by hydrogenolysis to give the desired fagomine (3)



(25) $R^1$ = Z; $R^2$ = Bn
(3) $R^1$ = $R^2$ = H

wherein Bn = $CH_2Ph$ and Z = $COOCH_2Ph$.

---

### 5,013,843
### HIGH YIELD OF PYRIDINE AND/OR ALKYLPYRIDINE(S) IN CONDENSATION REACTION OF TERNARY ALDEHYDES AND/OR KETONES WITH AMMONIA

**David Feitler, New Windsor, and Henry Wetstein, Monroe, both of N.Y., assignors to Nepera, Inc., Harriman, N.Y.**

**Filed Jun. 7, 1990, Ser. No. 535,239**

**Int. Cl.⁵ C07D** *213/8, 213/9, 213/10*

**U.S. Cl. 546—251** **17 Claims**

1. In a process for preparing pyridine, one or more alkylpyridines or a mixture thereof by reacting, continuously and on a large scale, a binary reactant mixture of carbonyl-containing compounds, each of which is an aldehyde or a ketone, with ammonia in contact with an effective amount of a zeolitic catalyst for the reaction to produce a total molar yield (binary yield) of pyridine and/or alkylpyridine(s), said catalyst being a crystalline aluminosilicate zeolite in the acidic form having a constraint index from about 1 to about 12,

the improvement wherein a third aldehyde or ketone is added to said binary mixture without a break in reaction continuity, the amount of said third aldehyde or ketone being from (a) an amount thereof whereby the resultant total molar yield (ternary yield) of pyridine and/or alkylpyridine(s) is substantially not decreased with respect to said binary yield, to (b) an amount thereof whereby the resultant ternary yield is about 97% of said binary yield and wherein in said binary mixture, one of said carbonyl-containing compounds is used in excess and serves as a hydrogen acceptor and wherein for said ternary mixture, the following molar ratio is maintained:

VOL
1126
ISS
1
MY
7
1991
UMI

$$\frac{\text{hydrogen-absorbing component}}{\text{sum of other saturated carbonyl reactants}} \geqq 1.$$

---

### 5,013,844
## PYRIDINIUM ARYL HYDRAZIDE COMPOUNDS

**Reinhold Rüger, Rödermark, Fed. Rep. of Germany, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

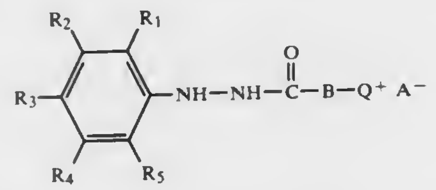
**Division of Ser. No. 393,651, Aug. 14, 1989, Pat. No. 4,937,160. This application Dec. 15, 1989, Ser. No. 451,000**

**Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 3829078; Jun. 28, 1989, 3921134**

**Int. Cl.$^5$ C07D** *213/20*

**U.S. Cl. 546—332** **8 Claims**

1. Aryl hydrazides of the formula:


(II)

wherein

$R_1$ to $R_5$, which can be the same or different, are hydrogen, alkyl, alkoxy, hydroxyalkyl, haloalky, alkylamino, or aliphatic acylamino each with 1 to 20 carbon atoms, or cyloalkyl with 3 to 20 carbon atoms, aryl, aryloxy or aromatic acylamino, each with 6 to 10 carbon atoms, aralky, or aralkoxy with 1 to 3 carbon atoms in the alkylene chain or an aliphatic acylamino radical with 1 to 4 carbon atoms substituted by a phenoxy radical which may be substituted by one or more alkyl radicals with 1 to 10 carbon atoms with the proviso that at least one of $R_1$ to $R_5$ is not hydrogen.

$Q^+$ is pyridinium-1-yl, N-alkylpyridinium-x-yl where x is a whole number of 2, 3 or 4, in which the heterocyclic rings may be substituted by additional alkyl radicals, and in which all alkyl groups of a radical $Q^+$ may be the same or different and may be substituted by hydroxyl or sulfyl acid groups, each alkyl group having no more than 12 carbon atoms, but in the case of trialkylammonium, two of them may also form with the quaternary nitrogen a ring with 3 to 12 members,

B is a bridge which may be composed of 1 to 3 methylene groups, each of which may be substituted by methyl or ethyl, or if $Q^+$ is N-alkylpyridinium-x-yl may also be an oxygen atom or a single bond, and

$A^-$ denotes an anion which is not present when $Q^+$ contains a sulfo group.

---

### 5,013,845
## PROCESS FOR PREPARING OPTICALLY ACTIVE 2-OXOIMIDAZOLIDINE DERIVATIVES

**Kimiaki Hayashi, Suita, and Hitoshi Kubota, Ashiya, both of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan**

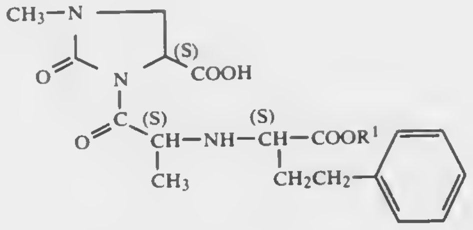
**Filed Dec. 4, 1989, Ser. No. 445,060**

**Claims priority, application Japan, Dec. 16, 1988, 63-318745**

**Int. Cl.$^5$ C07D** *233/30*

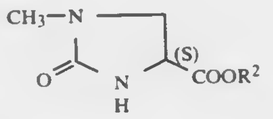
**U.S. Cl. 548—320** **9 Claims**

1. A process for preparing an optically active 2-oxoimidazolidine derivative of the formula:

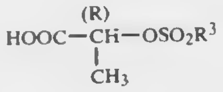

(I)

wherein $R^1$ represents hydrogen atom or a lower alkyl group,

which comprises reacting a 2-oxoimidazolidine-4-carboxylic acid ester derivative having (S) configuration of the formula:

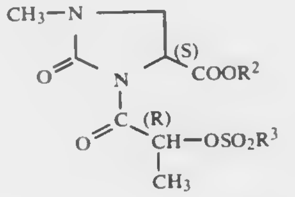

(II)

wherein $R^2$ represents a tert-butyl group or a benzyl group, with a reactive derivative at the carboxyl group of a propionic acid compound having (R) configuration of the formula:



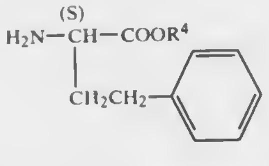
$$\mathrm{HOOC{-}\overset{(R)}{\underset{\substack{|\\ CH_3}}{CH}}{-}OSO_2R^3}$$
(III)

wherein $R^3$ represents a lower alkyl group or an aryl group to form a 3-acyl-2-oxoimidazolidine-4-carboxylic acid ester derivative having (S, R) configuration of the formula:


(IV)

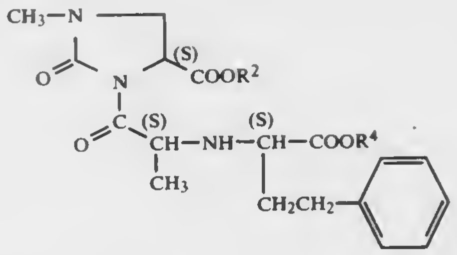
wherein $R^2$ and $R^3$ have the same meanings as defined above,

and reacting, in the presence of an organic tertiary amine, said compound (IV) with an amino acid ester having (S) configuration of the formula:


(V)

wherein $R^4$ represents a lower alkyl group or a benzyl group,

to form a 2-oxoimidazolidine diester derivative having (S, S, S) configuration of the formula:


(VI)

wherein $R^2$ and $R^4$ have the same meanings as defined above,

and subsequently eliminating $R^2$ from said compound and also when $R^4$ is a benzyl group further eliminating said benzyl group.

---

### 5,013,846
## PROCESS FOR PREPARING SUBSTITUTED IMIDAZOLINE FABRIC CONDITIONING COMPOUNDS

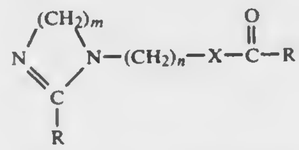
**Darlene R. Walley, Loveland, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 148,808, Jan. 27, 1988, abandoned. This application Dec. 21, 1988, Ser. No. 288,044**

**Int. Cl.$^5$ C07D** *239/06, 233/04, 243/04, 245/02*

**U.S. Cl. 548—352** **15 Claims**

1. A process for making a substituted imidazoline compound having the formula:



wherein R and $R^1$ are, independently, $C_{11}$–$C_{21}$ aliphatic hydrocarbon groups, and m and n are, independently, from about 2 to about 6, and X is O, NH, or S, said process comprising the following steps:

(a) reacting a fatty acid of the formula RCOOH, where R is a $C_{11}$–$C_{21}$ aliphatic hydrocarbon group, with a polyamine having the formula $NH_2\text{-}(CH_2)_m\text{—}NH\text{—}(CH_2)_n\text{—}X\text{—}H$, wherein m and n are, independently, from about 2 to about 6, and X is O, NH, or S, for a period of from about 2 to about 24 hours at a temperature of from about 100° C. to about 210° C., the molar ratio of the fatty acid to the polyamine being from about 0.5:1 to about 1:1 (fatty acid: polyamine); and

(b) reacting the ester of a fatty acid having the formula $R^1COOR^2$, wherein $R^1$ is a $C_{11}$–$C_{21}$ aliphatic hydrocarbon group and $R^2$ group is a $C_1$–$C_4$ alkyl group, with the mixture formed in step (a), for a period of from about 1 to about 24 hours at a temperature of from about 120° C. to about 210° C. under a vacuum of from about 0.02 mm Hg to about 10 mm Hg, the molar ratio of the fatty acid ester to the fatty acid starting material used in step (a) being from about 0.5:1 to about 1.5:1 (fatty ester:fatty acid).

---

### 5,013,847
## PHENOXYALKYL-SUBSTITUTED HETEROAROMATICS AND A METHOD FOR CONTROLLING PESTS

**Joachim Leyendecker, Ladenburg; Hans-Juergen Neubauer, Muenster-Hiltrup; Uwe Kardorff, Mannheim; Christoph Kuenast, Otterstadt; Wolfgang Krieg, Weingarten, and Peter Hofmeister, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

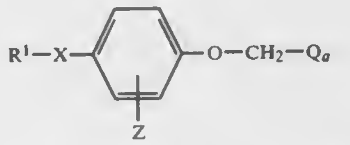
**Filed Jul. 14, 1989, Ser. No. 379,956**

**Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825821; Jul. 29, 1988, 3825822**

**Int. Cl.$^5$ C07D** *233/66, 233/54, 231/12, 231/18*

**U.S. Cl. 548—378** **9 Claims**

1. Phenoxyalkyl-substituted heteroaromatics of the formula Ia


(Ia)

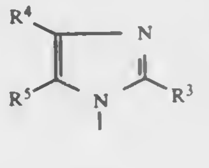
where the substituents have the following meanings:

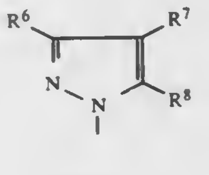
$R^1$ $C_1$–$C_{12}$-alkyl, $C_2$–$C_{12}$-alkenyl, $C_2$–$C_{12}$-alkynyl, $C_1$–$C_{12}$-haloalkyl, $C_2$–$C_{12}$-haloalkenyl, $C_2$–$C_{12}$-haloalkynyl, $C_3$–$C_{12}$-alkoxyalkyl, $C_3$–$C_8$-cycloalkyl, $C_4$–$C_{12}$-cycloalkylalkyl, $C_3$–$C_8$-halocycloalkyl, $C_4$–$C_{12}$-halocycloalkylalkyl, $C_4$–$C_{12}$-cycloalkylhaloalkyl or $C_4$–$C_{12}$-halocycloalkylhaloalkyl;

X O, S, $SO_2$;

Z hydrogen, halogen, $C_1$–$C_8$-alkyl, $C_1$–$C_8$-alkoxy, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-haloalkoxy, $C_3$–$C_{10}$-cycloalkyl, nitro or cyano;

$Q_a$ unsubstituted or substituted azole radical of the formula IIa or IIb


(IIa)


(IIb)

where

$R^3$ is hydrogen, and

$R^4$ to $R^8$ are hydrogen, halogen, $C_1$–$C_8$-alkyl, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-alkoxy, $C_3$–$C_{10}$-cycloalkyl or aryl which is unsubstituted or mono- to trisubstituted by halogen, $C_1$–$C_8$-alkoxy, $C_1$–$C_4$-haloalkyl or $C_1$–$C_4$-haloalkoxy.

---

### 5,013,848
## AROMATIC BISMALEIMIDE DERIVATIVES AND PROCESS FOR PREPARING SAME

**Yukihiro Yoshikawa, Zushi; Midori Yamazaki, Hiratsuka; Keizaburo Yamaguchi, Kawasaki; Kenichi Sugimoto; Yoshimitsu Tanabe, both of Yokohama, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan**

**PCT No. PCT/JP86/00641, § 371 Date Jul. 22, 1987, § 102(e) Date Jul. 22, 1987, PCT Pub. No. WO87/03871, PCT Pub. Date Jul. 2, 1987**

**PCT Filed Dec. 18, 1986, Ser. No. 87,255**

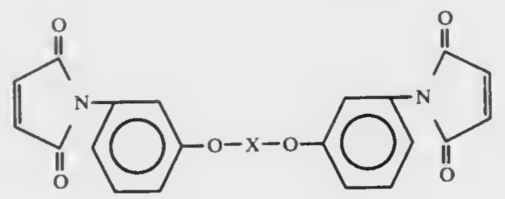
**Claims priority, application Japan, Dec. 26, 1985, 60-292087; Dec. 27, 1985, 60-292881; Dec. 27, 1985, 60-292882**

**Int. Cl.$^5$ C07D** *207/452*

**U.S. Cl. 548—522** **1 Claim**

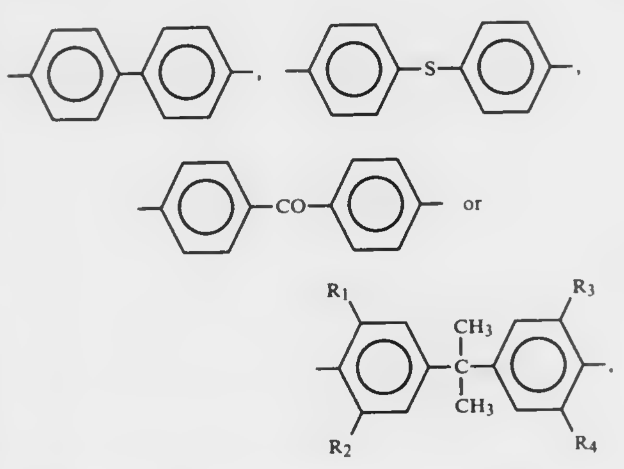
1. An aromatic bismaleimide compound of the formula (I):

VOL 1126
ISS 1
MY 7 1991
UMI



(I)

wherein X is



where $R_1$, $R_2$, $R_3$ and $R_4$ are hydrogen atom or a methyl group.

---

### 5,013,849
## DERIVATIVES OF 4H-THIOPYRAN-1,1-DIOXIDES USEFUL AS ELECTRON-TRANSPORT AGENTS IN ELECTROPHOTOGRAPHIC ELEMENTS

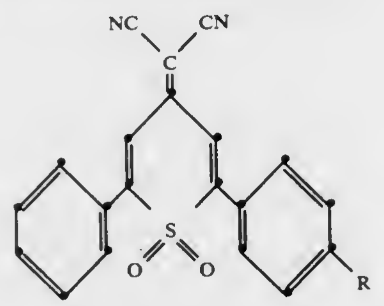
**Norman G. Rule, and Teh-Ming Kung, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 22, 1989, Ser. No. 455,660**

**Int. Cl.$^5$ C07D** *335/02*

**U.S. Cl. 549—28** **2 Claims**

I. A chemical compound having the structure



wherein R is alkyl having 1 to 3 carbon atoms.

---

### 5,013,850
## 4-ETHYL AND 4-ETHENYL-5-HYDROXY-2(5H)-FURANONES SUBSTITUTED ON ALPHA CARBON OF THE ETHYL OR ETHENYL SIDE CHAIN WITH A LONG CHAIN ALKYL GROUP AND ON THE BETA CARBON WITH A POLAR GROUP, AS ANTI-INFLAMMATORY AGENTS

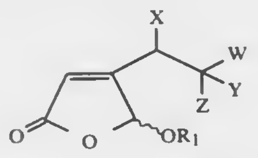
**Gary C. M. Lee, Laguna Hills, Calif., assignor to Allergan, Inc., Irvine, Calif.**

**Filed Mar. 30, 1990, Ser. No. 502,208**

**Int. Cl.$^5$ C07F** *9/28;* **C07D** *305/12*

**U.S. Cl. 549—222** **53 Claims**

I. A compound of the Formula



where

$R_1$ is H or alkyl of 1 to 20 carbons, CO—$R_1^*$, CO—O—$R_1^*$, CO—NH—$R_1^*$ or $PO(OR_1^*)_2$ or $PO(OR_1^*)R_1^*$ where $R_1^*$ independently is alkyl of 1 to 20 carbons, or phenyl;

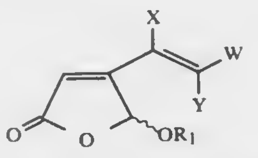
X is long chain alkyl having 5 to 25 carbon atoms, long chain alkyl of 5 to 25 carbons substituted with an aryl group, or long chain alkyl of 5 to 25 carbons substituted with a fluoro substituted aryl group;

Y is COOH, $COOR_2$, $CONH_2$, $CONHR_2$, $CON(R_2)_2$, CHO, $COR_2$, $COCF_3$, $COCHF_2$, $CH{=}NR_2$, $CR_2{=}N{-}R_2$, $CH{=}N{-}NHR_2$, $CH{=}N{-}N(R_2)_2$, $CH{=}NOH$, $CR_2{=}N{-}OH$, $CH{=}NOR_2$, $CR_2{=}NOR_2$, $CR_2{=}N{-}NHR_2$, $CR_2{=}N{-}N(R_2)_2$ , $CH_2OH$, $CHR_2OH$, $C(R_2)_2OH$, $CH_2OR_2^*$, $CHR_2OR_2^*$, $C(R_2)_2OR_2^*$, $SO_2R_2$, $PO(OR_3)_2$, and $PS(OR_3)_2$, where $R_2$ independently is lower alkyl, or phenyl, $R_2^*$ is lower alkyl, phenyl, alkanoyl having 1 to 6 carbons, or aroyl, and $R_3$ is H, lower alkyl, or phenyl;

W is H, lower alkyl, phenyl, COOH, $COOR_4$, $CONHR_4$, $CON(R_4)_2$, where $R_4$ is lower alkyl, and

Z is H or lower alkyl, or a pharmaceutically acceptable salt thereof.

11. A compound of the Formula



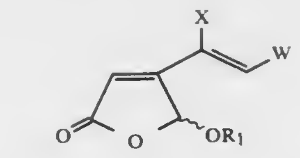
where $R_1$ is H or alkyl of 1 to 20 carbons, CO—$R_1^*$, CO—O—$R_1^*$, CO—NH—$R_1^*$ or $PO(OR_1^*)_2$ or $PO(OR_1^*)R_1^*$ where $R_1^*$ independently is alkyl of 1 to 20 carbons, or phenyl;

X is long chain alkyl having 5 to 25 carbon atoms, long chain alkyl of 5 to 25 carbons substituted with an aryl group, or long chain alkyl of 5 to 25 carbons substituted with a fluoro substituted aryl group;

Y is COOH, $COOR_2$, $CONH_2$, $CONHR_2$, $CON(R_2)_2$, CHO, $COR_2$; $COCF_3$, $COCHF_2$, $CH{=}NR_2$, $CR_2{=}N{-}R_2$, $CH{=}N{-}NHR_2$, $CH{=}N{-}N(R_2)_2$, $CH{=}NOH$, $CR_2{=}N{-}OH$, $CH{=}NOR_2$, $CR_2{=}NOR_2$, $CR_2{=}N{-}NHR_2$, $CR_2{=}N{-}N(R_2)_2$, $CH_2OH$, $CHR_2OH$, $C(R_2)_2OH$, $CH_2OR_2^*$, $CHR_2OR_2^*$, $C(R_2)_2OR_2^*$, $SO_2R_2$, $PO(OR_3)_2$, and $PS(OR_3)_2$, where $R_2$ independently is lower alkyl, or phenyl, $R_2^*$ is lower alkyl, phenyl, alkanoyl having 1 to 6 carbons, or aroyl, and $R_3$ is H, lower alkyl, or phenyl, and

W is H, lower alkyl, phenyl, COOH, $COOR_4$, $CONHR_4$, $CON(R_4)_2$, where $R_4$ is lower alkyl or a pharmaceutically acceptable salt thereof.

20. A compound of the Formula



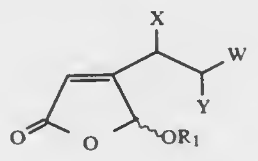
where

$R_1$ is H or alkanoyl having 1 to 6 carbons;

X is long chain alkyl having 5 to 25 carbon atoms, long chain alkyl of 5 to 25 carbons substituted with an aryl group, or long chain alkyl of 5 to 25 carbons substituted with a fluoro substituted aryl group;

Y is $COR_2$; $COCF_3$, $COCHF_2$, $PO(OR_3)_2$, and $PS(OR_3)_2$, where $R_2$ independently is lower alkyl, or phenyl, $R_3$ is lower alkyl or a pharmaceutically acceptable salt thereof.

27. A compound of the Formula



where

$R_1$ is H or alkanoyl having 1 to 6 carbons;

X is long chain alkyl having 5 to 25 carbon atoms, long chain alkyl of 5 to 25 carbons substituted with an aryl group, or long chain alkyl of 5 to 25 carbons substituted with a fluoro substituted aryl group;

Y is COOH, $COOR_2$, $CONH_2$, $COR_2$, $COCF_3$, $COCHF_2$, $CH{=}N{-}NHR_2$, $CH{=}NOH$, $CR_2{=}N{-}OH$, $CH{=}NOR_2$, $CR_2{=}NOR_2$, $C(R_2)_2OH$, $SO_2R_2$, $PO(OR_3)_2$, and $PS(OR_3)_2$, where $R_2$ independently is lower alkyl, and $R_3$ independently is lower alkyl, and

W is H, lower alkyl or $COOR_4$ where $R_4$ is H or lower alkyl, or a pharmaceutically acceptable salt thereof.

---

### 5,013,851
## INTERMEDIATES FOR THE PRODUCTION OF PODOPHYLLOTOXIN AND RELATED COMPOUNDS

**Takushi Kaneko, and Henry S. L. Wong, both of Fayetteville, N.Y., assignors to Bristol-Myers Company, New York, N.Y.**

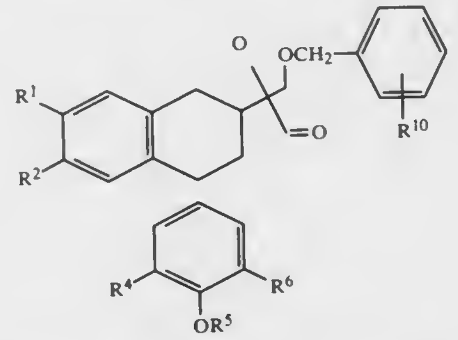
**Division of Ser. No. 129,795, Dec. 7, 1987, Pat. No. 4,845,248, which is a division of Ser. No. 805,484, Dec. 5, 1985, Pat. No. 4,734,512. This application Feb. 1, 1989, Ser. No. 304,634**

**Int. Cl.$^5$ C07D** *407/04*

**U.S. Cl. 549—298** **2 Claims**

1. A compound of the formula

VIII



wherein $R^1$ and $R^2$ each are independently hydrogen or (lower)alkoxy, or $R^1$ and $R^2$, taken together, is methylenedioxy; $R^4$ and $R^6$ each are independently hydrogen or (lower)alkoxy; $R^5$ is hydrogen or a phenol-protecting group; and $R^{10}$ is hydrogen, lower(alkyl), lower(alkoxy) or nitro.

---

### 5,013,852
## 3-FLAVONE CARBOXYLIC ACID COMPOUNDS

**Rainer Walenta, Wedemark; Reiner Müller-Peddinghaus, Bergisch-Gladbach; Ivan Ban, Hanover; Michael Wurl, Garbsen, and Ulf Preuschoff, Laatzen, all of Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Hanover, Fed. Rep. of Germany**

**Division of Ser. No. 180,401, May 5, 1988, Pat. No. 4,886,806. This application May 18, 1989, Ser. No. 353,606**

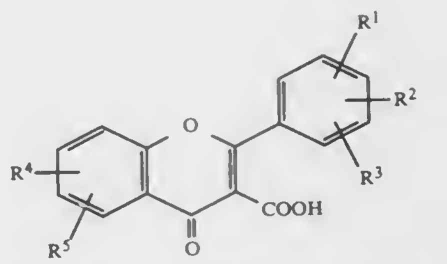
**Claims priority, application Fed. Rep. of Germany, May 12, 1987, 3715779**

**Int. Cl.$^5$ C07D** *311/30*

**U.S. Cl. 549—362** **I Claim**

I. A 3-flavone carboxylic acid compound corresponding to the Formula II

II



wherein $R^1$, $R^2$ and $R^3$ are in the 3′-, 4′- and 5′-positions, and

$R^1$ represents hydrogen, lower alkyl, halogen hydroxy, lower alkylcarbonyloxy or an $R^9$-O group, wherein $R^9$ represents an alkyl or alkenyl group with up to 20 carbon atoms,

$R^2$ represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an $R^9$-O group, wherein $R^9$ has the above meaning, and

$R^3$ represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an $R^9$-O group, wherein $R^9$ has the above meaning, or

two of the substituent groups $R^1$ to $R^3$ are bonded to adjacent carbon atoms and together represent an alkylene dioxy group with 1–2 carbon atoms,

with the proviso that if more than one of the substituent groups $R^1$ to $R^3$ represent oxygen-containing groups, these groups are identical,

$R^4$ represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an $R^9$-O group, wherein $R^9$ has the above meaning, and

$R^5$ represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an $R^9$-O group, wherein $R^9$ has the above meaning, or

$R^4$ and $R^5$ are bonded to adjacent carbon atoms and together form an alkylene chain with 1 or 2 carbon atoms,

wherein if $R^4$ and $R^5$ represent oxygen-containing groups, these groups are identical, and, if $R^1$, $R^2$ or $R^3$ represents hydroxy, oxygen-containing groups $R^4$ or $R^5$ also represent hydroxy, and at least one of the substituents $R^1$ to $R^5$ being other than hydrogen, and if $R^1$, $R^2$ and $R^3$ represent hydrogen and $R^4$ represents 5-methyl, $R^5$ is other than 7-methyl,

or a salt thereof.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,853
### CHROMAN DERIVATIVES

**Rolf Gericke, Seeheim; Manfred Baumgarth; Ingeborg Lues, both of Darmstadt; Rolf Bergmann, Reichelsheim, and Jacques De Peyer, Pfungstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft MIT Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany**

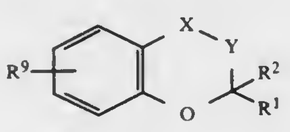
**Filed May 5, 1989, Ser. No. 347,710**

**Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815504; Oct. 14, 1988, 3835011**

**Int. Cl.⁵ C07D** ***311/22***

**U.S. Cl. 549—401** **4 Claims**

1. A compound of the formula



wherein

—X—Y— is (a) —CO—CR$^{10}$—, or (b) —CH═CR$^8$—

R$^9$ is CHO, ACO, AOOC, $NO_2$, CN, Br, $H_2NCO$ or $H_2NCS$,

A is alkyl having 1-6 carbon atoms,

R$^{10}$ is alkylidene having 1-6 C atoms,

R$^1$ and R$^8$ are in each case independently A,

R$^2$ is H or A, or

R$^1$ and R$^2$ together are alkylene having 3-6 C atoms.

---

### 5,013,854
### PROCESS FOR PREPARING ACID HALIDES

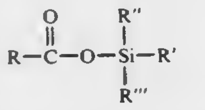
**Charles A. Bunnell, Lafayette, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Feb. 2, 1989, Ser. No. 35,145**

**Int. Cl.⁵ C07C** ***51/58;*** **C07F** ***7/08***

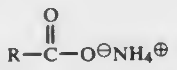
**U.S. Cl. 549—496** **8 Claims**

1. A process for preparing trialkylsilyl esters of the formula



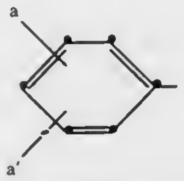
$$R-\overset{\overset{\displaystyle O}{\|}}{C}-O-\underset{\underset{\displaystyle R'''}{|}}{\overset{\overset{\displaystyle R''}{|}}{Si}}-R'$$

which comprises reacting a compound of the formula



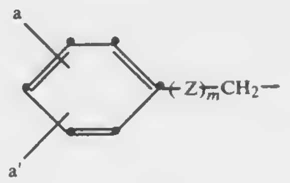
$$R-\overset{\overset{\displaystyle O}{\|}}{C}-O^{\ominus}NH_4^{\oplus}$$

with a trialkylsilylating reagent in an inert solvent in the presence of a silylation catalyst, wherein R is hydrogen; $C_1$-$C_6$ alkyl, $C_1$-$C_6$ alkyl substituted by cyano, carboxy, halogen, amino, $C_1$-$C_4$ alkoxy, $C_1$-$C_4$ alkylthio, or trifluoromethylthio; a phenyl or substituted phenyl group represented by the formula



wherein a and a' independently are hydrogen, halogen, hydroxy, $C_1$-$C_4$ alkoxy, $C_1$-$C_4$ alkanoyloxy, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ alkylthio, amino, $C_1$-$C_4$ alkanoylamino, $C_1$-$C_4$ alkylsulfonylamino, carboxy, carbamoyl, aminosulfonyl, hydroxymethyl, aminomethyl, or carboxymethyl;

a group represented by the formula



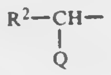
wherein a and a' have the same meanings as defined above, Z is O or S, and m is 0 or 1;

a heteroarylmethyl group represented by the formula

*$R^1$—$CH_2$—*

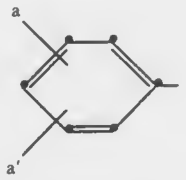
wherein R$^1$ is thienyl, furyl, benzothienyl, benzofuryl, pyridyl, 4-pyridylthio pyrimidyl, pyridazinyl, indolyl, pyrazolyl, imidazolyl, triazolyl, tetrazolyl, oxazolyl, thiazolyl, oxadiazolyl, thiadiazolyl, and such heteroaryl groups substituted by amino, hydroxy, halogen, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ alkoxy, $C_1$-$C_4$ alkylsulfonylamino;

a substituted methyl group represented by the formula

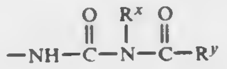


$$R^2-\underset{\underset{\displaystyle Q}{|}}{CH}-$$

wherein R$^2$ is cyclohex-1,4-dienyl, or a phenyl group or substituted phenyl group represented by the formula

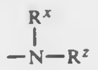


wherein a and a' have the above defined meanings, or R$^2$ is R$^1$ as defined above, and Q is hydroxy, $C_1$-$C_4$ alkanoyloxy, carboxy, sulfo, amino, sulfoamino or a substituted amino group represented by the formula



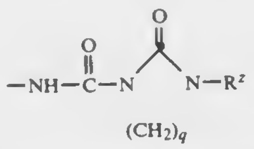
$$-NH-\overset{\overset{\displaystyle O}{\|}}{C}-\overset{\overset{\displaystyle R^x}{|}}{N}-\overset{\overset{\displaystyle O}{\|}}{C}-R^y$$

wherein R$^x$ or $C_1$-$C_3$ alkyl, R$^y$ is $C_1$-$C_4$ alkyl, furyl, thienyl, phenyl, halophenyl, nitrophenyl, styryl, halostyryl, nitrostyryl or a group

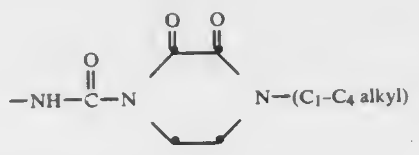


$$-\overset{\overset{\displaystyle R^x}{|}}{N}-R^z$$

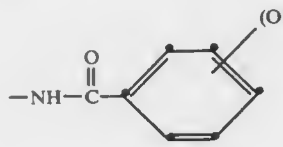
wherein R$^x$ is hydrogen or $C_1$-$C_3$ alkyl, and R$^z$ is hydrogen, $C_1$-$C_3$ alkylsulfonyl, $C_1$-$C_3$ alkyl, or $C_1$-$C_4$ alkanoyl; or Q is a substituted amino group represented by the formula



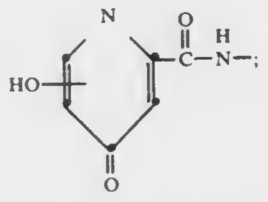
wherein R$^z$ has the same meanings as defined above and q is 2 or 3; or Q is a substituted amino group represented by the formula



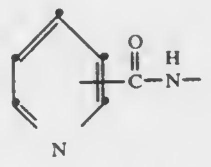
a benzamido group represented by the formula



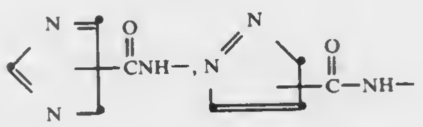
wherein t is 1 to 3; a pyridone or hydroxy-substituted pyridone group represented by the formula



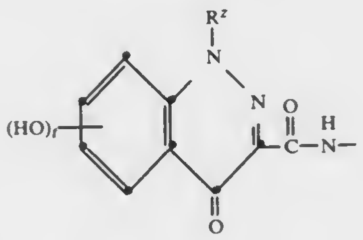
a pyridyl group represented by the formula

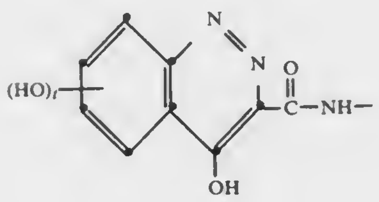


and such pyridyl group substituted by $C_1$-$C_4$ alkyl, amino, carboxy, hydroxy or halogen; an imidazoyl or pyrazolyl group represented by the formulae

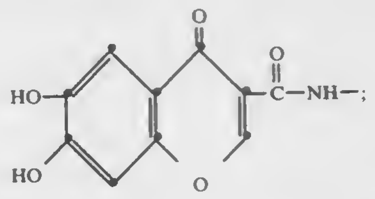


and such groups substituted by $C_1$-$C_4$ alkyl, carboxy, amino or halogen; a benzpyridazin-4-one-3-ylcarbonylamino group represented by the formulae

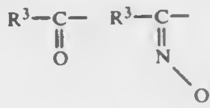




wherein R$^z$ is hydrogen or $C_1$-$C_4$ alkyl; and t is 1-3; or Q is a substituted amino group represented by the formula

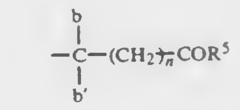


or R is a keto group or an oximino-substituted group represented by the formulae



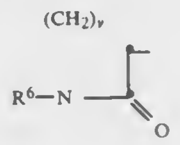
$$R^3-\underset{\underset{\displaystyle O}{\|}}{C}-\quad R^3-\underset{\underset{\displaystyle N\diagdown OR^4}{\|}}{C}-$$

wherein R$^3$ is R$^1$ or R$^2$ as defined above and R$^4$ is hydrogen, $C_1$-$C_4$ alkyl, $C_1$-$C_4$ alkyl substituted by halogen, a carboxy-substituted alkyl or cycloalkyl group represented by the formula



$$-\underset{\underset{\displaystyle b'}{|}}{\overset{\overset{\displaystyle b}{|}}{C}}-(CH_2)_n COR^5$$

wherein b and b' independently are hydrogen, or $C_1$-$C_3$ alkyl, n is 0, 1, 2, or 3; and b and b' when taken together with the carbon to which they are bonded form a 3- to 6-membered carbocyclic ring, and R$^5$ is hydroxy, $C_1$-$C_4$ alkoxy, amino, $C_1$-$C_4$ alkylamino, or di($C_1$-$C_4$ alkyl)amino; or R$^4$ is a cyclic lactam represented by the formula



wherein v is 2, 3, or 4; and R$^6$ is hydrogen or $C_1$-$C_3$ alkyl; or R$^4$ is a heteroarylmethyl group represented by the formula

*$R^1$—$CH_2$—*

R$^1$ has the same meanings as defined hereinabove and R', R'' and R''' are individually $C_1$-$C_6$ alkyl groups.

8. A process according to claim 1 which comprises the additional step of chlorination with phosgene to provide a compound of the formula

---

### 5,013,855
### PROCESS FOR THE PREPARATION OF AROMATIC ETHERS

**Bernard Botannet, Vienne; Isidore Le Fur, Thiais; Viviane Massonneau, and Michel Mulhauser, both of Ecully, all of France, assignors to Rhone-Poulenc Sante, Antony, France**

**Filed May 22, 1990, Ser. No. 526,703**

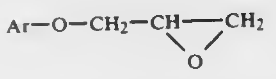
**Claims priority, application France, May 23, 1989, 89 06701**

**Int. Cl.⁵ C07D** ***301/02, 303/23***

**U.S. Cl. 549—539** **4 Claims**

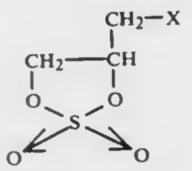
1. A process for the preparation of aromatic ethers of general formula:

VOL
1126
ISS
1
MY
7
1991
UMI



$$Ar-O-CH_2-\underset{\diagdown O \diagup}{CH-CH_2}$$

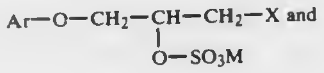
in which Ar denotes an aromatic radical or a heterocyclic aromatic radical, optionally substituted, in which a 3-halo-1,2-propanediol sulfate of general formula:



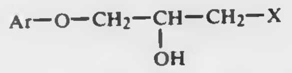
in which X denotes a halogen atom chosen from chlorine and bromine, is reacted with a phenol of general formula:

Ar-OH

in which Ar is defined as above, passing intermediately via the products of general formula:



$$Ar-O-CH_2-\underset{\displaystyle O-SO_3M}{\underset{|}{CH}}-CH_2-X \text{ and} \qquad (IV)$$



$$Ar-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-X \qquad (V)$$

in which Ar and X are defined as above and M denotes a hydrogen atom or an alkali metal atom or an ammonium ion, which it is unnecessary to isolate, the operation being carried out in water or in an organic solvent or in a hydroorganic medium in the presence of a base.

---

### 5,013,856

## 1,5-DIAZIDO-3-NITRAZAPENTANE AND METHOD OF PREPARATION THEREOF

**Joseph E. Flanagan, Woodland Hills; Edgar R. Wilson, Glendale, and Milton B. Frankel, Tarzana, all of Calif., assignors to Rockwell International Corporation**

**Filed Jun. 4, 1981, Ser. No. 270,453**

**Int. Cl.$^5$ C07C** *247/02*

U.S. Cl. 552—11 **6 Claims**

1. A composition of matter comprising 1,5-diazido-3-nitrazapentane.

3. A method of preparing 1,5-diazido-3-nitrazapentane, comprising the steps of:

combining 1,5-dinitrato-3-nitrazapentane with an ionic azide selected from the group consisting of $NaN_3$, $KN_3$, and $LiN_3$, in a dipolar aprotic solvent selected from the group consisting of dimethylformamide and dimethylsulfoxide to form a reaction system;

heating said reaction system to a temperature ranging from about 25° C. to about 95° C.;

maintaining said reaction system within said temperature range;

reacting said 1,5-dinitrato-3-nitrazapentane with said ionic azide; and

separating said 1,5-diazido-3-nitrazapentane from said reaction by-products.

---

### 5,013,857

## PROCESS FOR THE PREPARATION OF SULPHO-FREE TRIPHENYL-METHANE DYESTUFFS

**Horst Berneth, and Roderich Rane, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

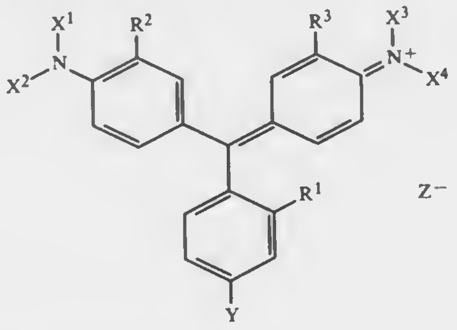
**Filed Dec. 11, 1989, Ser. No. 449,035**

**Claims priority, application Fed. Rep. of Germany, Dec. 14, 1988, 3842014**

**Int. Cl.$^5$ C09B** *11/10;* **C07C** *50/04*

U.S. Cl. 552—110 **8 Claims**

1. A process for the preparation of a sulpho-free triphenylmethane dyestuff of the formula



in which

$R^1$-$R^3$ denote hydrogen, $C_1$-$C_6$-alkyl, or halogen,

Y denotes hydrogen or $NX^5X^6$,

$X^1$-$X^6$ denote hydrogen, $C_1$-$C_6$-alkyl, benzyl or phenyl and

$Z^-$ denotes an anion by oxidation of their leuco products with manganese dioxide, wherein after the oxidation is complete manganese hydroxide or manganese carbonate and the carbinol base of the dyestuff are formed by the addition of hydroxide or carbonate, during or after which the carbinol base is taken up in a water-immiscible solvent, separated off from the manganese hydroxide or manganese carbonate and from the water phase, the solution is mixed with the acid HZ which may have been mixed with water, the solvent is either distilled off before the mixing or separated or distilled off after the mixing, and the dyestuff is isolated as a solution or in solid form after evaporation or crystallization

---

### 5,013,858

## STABLIZED POLYORGANOSILOXANES AND THEIR USE AS A POWER TRANSMISSION MEDIUM

**Gerwig Marquardt, Odenthal, and Peter Preiss, Wuppertal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Apr. 25, 1990, Ser. No. 514,381**

**Claims priority, application Fed. Rep. of Germany, May 9, 1989, 3915066**

**Int. Cl.$^5$ C07F** *7/08*

U.S. Cl. 556—401 **4 Claims**

1. Polyorganosiloxanes having improved resistance to oxidation and heat, said polyorganosiloxanes containing an effective amount of a mixture of anthraquinone compounds and methyl hydrogen siloxanes.

---

### 5,013,859

## IODOPHOR

**Alfred R. Globus, 26-53 210th St., Bayside, N.Y. 11360**

**Continuation of Ser. No. 184,250, Apr. 21, 1988, Pat. No. 4,873,354. This application Sep. 20, 1989, Ser. No. 413,772**

**Int. Cl.$^5$ C07C** *143/68*

U.S. Cl. 558—51 **2 Claims**

1. Method of preparing a biocidally active iodophor which comprises forming a mixture of polyethylene glycol, an alkylarylsulfonate wherein aryl designates benzene, naphthalene, toluene or xylene, iodine, propylene glycol and water, refluxing said mixture to form the iodophors and recovering the resulting iodophor.

---

### 5,013,860

## OXYDEHYDROGENATION OF DINITRILES

**Harold W. Young, Jr., Baton Rouge, La., and William P. Dianis, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 193,440, May 12, 1988, which is a continuation of Ser. No. 859,179, May 2, 1986, abandoned. This application Nov. 4, 1988, Ser. No. 267,474**

**Int. Cl.$^5$ C07C** *253/30*

U.S. Cl. 558—383 **15 Claims**

1. A process for the preparation of an unsaturated dinitrile selected from the group consisting of fumaronitrile and substituted fumaronitrile and maleonitrile and substituted maleonitrile corresponding to the formula:

$$N{\equiv}CCR^1{=}CR^2C{\equiv}N$$

wherein $R^1$ and $R^2$ are separately at each occurrence hydrogen or methyl by the oxydehydrogenation of succinonitrile corresponding to the formula:

$$N{\equiv}CCHR^1{-}CHR^2C{\equiv}N$$

wherein $R^1$ and $R^2$ are separately at each occurrence hydrogen or methyl, said process comprising contacting, in the presence of water, oxygen and the saturated dinitrile in a mole ratio of $O_2$ to unsaturated dinitrile in the in the range of about 0.1:1 to about 5:1 and with a water content of the feed in the range of form about 3 to about 90 weight percent, said contact being in the presence of a catalyst selected from the group consisting of strontium nickel phosphate and calcium nickel phosphate and at a temperature above about 50° C. and below about 600° C. and a pressure in the range of from about 0.5 to about 10 atmosphere.

---

### 5,013,861

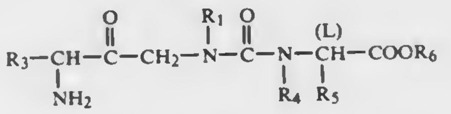
## ESTER SUBSTITUTED AMINOALKANOYLUREIDO AMINO AND IMINO ACID AND ESTER COMPOUNDS

**Harold N. Weller, III, and Eric M. Gordon, both of Pennington, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J. Division of Ser. No. 707,123, Feb. 28, 1985, Pat. No. 4,638,010. This application Oct. 6, 1986, Ser. No. 915,592**

**Int. Cl.$^5$ C07C** *229/28, 229/30*

U.S. Cl. 560—34 **6 Claims**

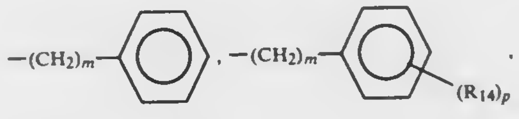
1. A compound of the formula



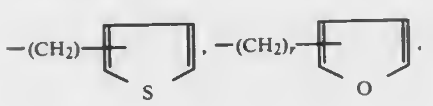
$$R_3-\underset{\displaystyle NH_2}{\underset{|}{CH}}-\overset{\displaystyle O}{\overset{\|}{C}}-CH_2-\overset{\displaystyle R_1}{\overset{|}{N}}-\overset{\displaystyle O}{\overset{\|}{C}}-\underset{\displaystyle R_4}{\underset{|}{N}}-\underset{\displaystyle R_5}{\underset{|}{\overset{(L)}{CH}}}-COOR_6$$

including a pharmaceutically acceptable salt thereof wherein:

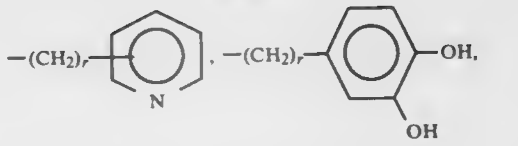
$R_1$ is hydrogen, lower alkyl, halo substituted lower alkyl,

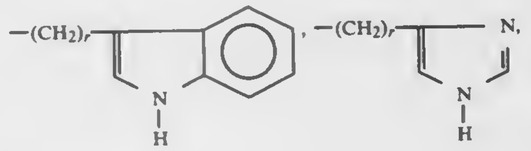


$-(CH_2)_m$-cycloalkyl, $-(CH_2)_2-NH_2$, $-(CH_2)_3-NH_2$, $-(CH_2)_4-NH_2$,

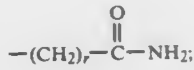


-continued





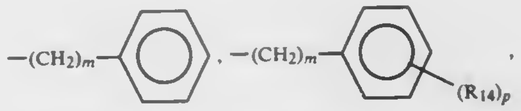
$-(CH_2)_r-SH$, or

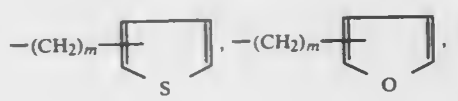


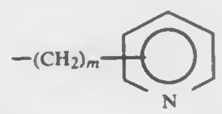
$$-(CH_2)_r-\overset{\displaystyle O}{\overset{\|}{C}}-NH_2;$$

r is an integer from 1 to 4;

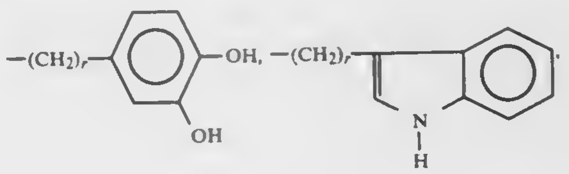
$R_3$ is hydrogen, lower alkyl



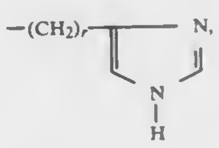




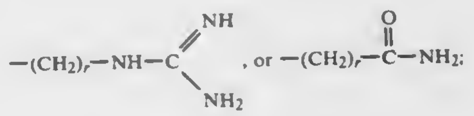
halo substituted lower alkyl, $-(CH_2)_m$-cycloalkyl,



$-(CH_2)_r-OH$,



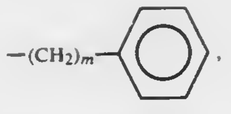
$-(CH_2)_r-NH_2$, $-(CH_2)_r-SH$, $-(CH_2)_r-S-$lower alkyl,



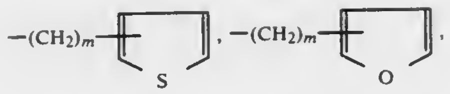
$$-(CH_2)_r-NH-C\begin{matrix}\diagup\!\!\!\!= NH\\ \diagdown NH_2\end{matrix}, \text{ or } -(CH_2)_r-\overset{\displaystyle O}{\overset{\|}{C}}-NH_2;$$

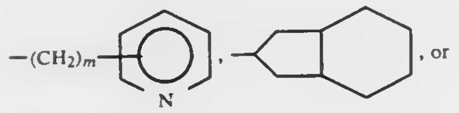
$R_4$ is hydrogen, lower alkyl,

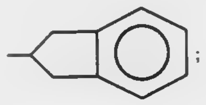
VOL
1126
ISS
1
MY
7
1991
UMI



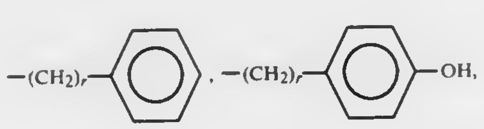
—$(CH_2)_m$-cycloalkyl,



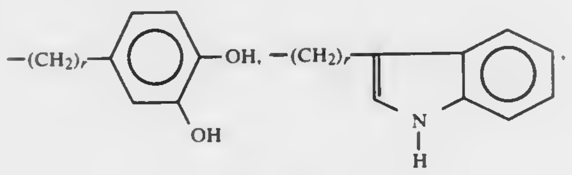


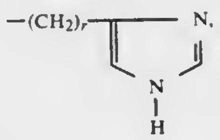


$R_5$ is hydrogen, lower alkyl,

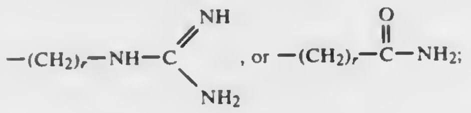


—$(CH_2)_r$—OH,



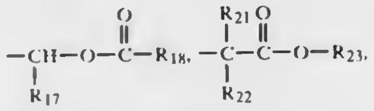


—$(CH_2)_r$—$NH_2$, —$(CH_2)_r$—SH, —$(CH_2)_r$-S-lower alkyl,



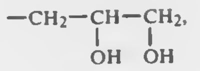
$-(CH_2)_r-NH-C(=NH)-NH_2$, or $-(CH_2)_r-C(=O)-NH_2$;

$R_{14}$ is lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, chloro, bromo, fluoro, trifluormethyl or hydroxy;
m is zero, one, two, three, or four;
p is one, two or three provided that p is more than one only if $R_{14}$ is methyl, methoxy, chloro, or fluoro;
$R_6$ is hydrogen, lower alkyl, benzyl, benzhydryl,



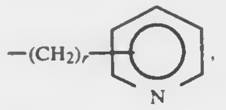
$-CH(R_{17})-O-C(=O)-R_{18}$, $-C(R_{21})(R_{22})-C(=O)-O-R_{23}$,

—CH—$(CH_2$—$OH)_2$,



$-CH_2-CH(OH)-CH_2(OH)$,

—$(CH_2)_2$—$N(CH_3)_2$,



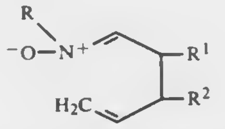
or a pharmaceutically acceptable salt forming ion;
$R_{17}$ is hydrogen, lower alkyl, cycloalkyl, or phenyl;
$R_{18}$ is hydrogen, lower alkyl, lower alkoxy or phenyl;
$R_{21}$ and $R_{22}$ are independently selected from hydrogen and lower alkyl; and
$R_{23}$ is lower alkyl.

---

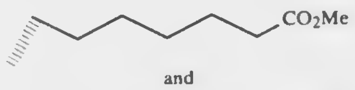
## 5,013,862
## PROSTANOIDS AND SYNTHESIS THEREOF

**Jih R. Hwu, and Jeffrey A. Robl, both of Baltimore, Md., assignors to The Johns Hopkins University, Baltimore, Md.**
**Division of Ser. No. 44,322, Apr. 30, 1987, Pat. No. 4,855,437. This application Jun. 1, 1989, Ser. No. 360,086**
**Int. Cl.⁵ C07C** *251/00*
**U.S. Cl. 560—60** **1 Claim**

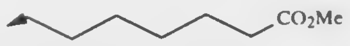
1. A nitrone-alkene of the formula:



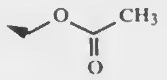
where R is phenyl and $R^1$ and $R^2$ each represent the atoms necessary to complete prostaglandin 8- and 12-side chains or fragments thereof, said $R^1$ being selected from the group consisting of

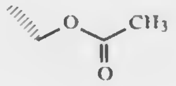


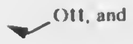
and



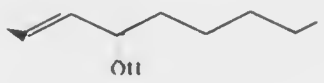
and said $R^2$ being selected from the group consisting of







OH, and

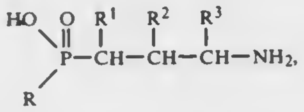


---

## 5,013,863
## SUBSTITUTED PROPANE-PHOSPHINIC ACID COMPOUNDS

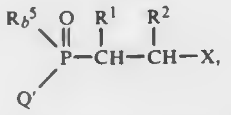
**Eric K. Baylis, Stockport, England; Helmut Bittiger, Freiburg, Fed. Rep. of Germany; Wolfgang Froöstl, Basel, Switzerland; Roger G. Hall, Flixton, England; Ludwig Maier, Arlesheim, Switzerland; Stuart J. Mickel, Muttenz, Switzerland, and Hans-Rudolf Olpe, Bottmingen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Continuation-in-part of Ser. No. 275,882, Nov. 25, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 378,887**
**Claims priority, application United Kingdom, Dec. 4, 1987, 8728483**
**Int. Cl.⁵ C07F** *9/30;* **A61K** *31/66, 31/13, 31/045*
**U.S. Cl. 562—11** **4 Claims**

1. A process for the manufacture of a compound of formula I



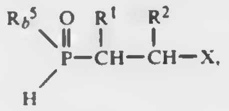
$HO(R)P(=O)-CH(R^1)-CH(R^2)-CH(R^3)-NH_2$, (I)

wherein R denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic radical having 2 or more carbon atoms, and wherein one of the groups $R^1$, $R^2$ and $R^3$ represents hydrogen or an aliphatic, cycloaliphatic, araliphatic or aromatic radical, another one of the groups $R^1$, $R^2$ and $R^3$ is hydrogen or in the case of $R^1$ and $R^2$, is hydroxy, and the remaining one of $R^1$, $R^2$ and $R^3$ is hydrogen, and salts thereof, wherein a compound of the formula XIV



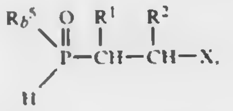
$R_b^5(Q')P(=O)-CH(R^1)-CH(R^2)-X$, (XIV)

wherein $R^5_b$ denotes a $C_1$–$C_4$alkyl radical, X denotes cyano or carbamoyl and Q' denotes a group of the formula —$C(OR^8)(OR^9)(OR^{10})$ (XIVa) in which $R^8$ represents hydrogen or lower alkyl and $R^9$ and $R^{10}$, independently of each other, represent lower alklyl or together represent lower alkylene and $R^1$ and $R^2$ are defined hereinabove, is treated with trimethylsilylchloride in technical chloroform that contains ethanol, resulting in a compound of the formula XV



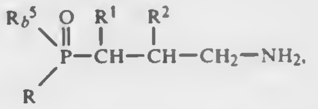
$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X$, (XV)

wherein $R^1$, $R^2$, $R^5_b$ and X are defined hereinabove, which compound is reacted with an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic aldehyde or ketone of the formula $(R')(R'')C=O$ (XIIa) or with a compound of the formulae $R'''-CH=CH_2$(XIIb) or R-Hal (XIIc), wherein R' denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic hydrocarbon radical, R'' represents hydrogen or an aliphatic hydrocarbon radical, R''' denotes an aliphatic, cycloaliphatic or aromatic group and R is defined hereinabove, resulting in a compound of the formula VI



$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X$, (XV)

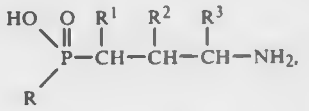
wherein $R^1$, $R^2$, $R^5_b$ R and X are defined hereinabove, the cyano or carbamoyl group X is reduced to a group of the formula —$CH_2NH_2$, resulting in a compound of the formula IIa



$R_b^5(R)P(=O)-CH(R^1)-CH(R^2)-CH_2-NH_2$, (IIa)

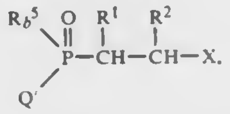
wherein R, $R^1$, $R^2$, $R^3$ and $R^5_b$ are defined hereinabove, which compound is converted into the corresponding compound of the formula I and, if a free compound is required, the resulting salt is converted into the free compound or, if a salt is required, the resulting free compound is converted into a salt and, if an individual isomer is required, the resulting mixture of isomers is separated into the individual isomers.

2. A process for the manufacture of a compound of the formula I



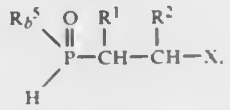
$HO(R)P(=O)-CH(R^1)-CH(R^2)-CH(R^3)-NH_2$, (I)

wherein R denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic radical having 2 or more carbon atoms, and wherein one of the groups $R^1$, $R^2$ and $R^3$ represents hydrogen or an aliphatic, cycloaliphatic, araliphatic or aromatic radical, another one of the groups $R^1$, $R^2$ and $R^3$ is hydrogen or in the case of $R^1$ and $R^2$ is hydroxy, and the remaining one of $R^1$, $R^2$ and $R^3$ is hydrogen, and salts thereof, wherein a compound of the formula XIV



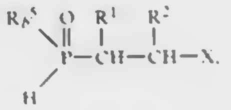
$R_b^5(Q')P(=O)-CH(R^1)-CH(R^2)-X$, (XIV)

wherein $R^5_b$ denotes a $C_1$–$C_4$alkyl radical, X denotes a group of the formula —$CH(R^3)$—$Z^o$ (XVa) in which $Z^o$ represents a protected amino group and Q' denotes a group of the formula —$C(OR^8)(OR^9)(OR^{10})$(XIVa) in which $R^8$ denotes hydrogen or lower alkyl and $R^9$ and $R^{10}$, independently of each other, represent lower alkyl or together represent lower alkylene and $R^1$ and $R^2$ are defined hereinabove, which compound is treated with trimethylsilylchloride in technical chloroform that contains ethanol, resulting in a compound of the formula XV



$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X$, (XV)

wherein $R^1$, $R^2$, $R^5_b$ and X are defined hereinabove, which compound is reacted with an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic aldehyde or ketone of the formula $(R')(R'')C=O$(XIIa) or with a compound of the formula $R'''-CH=CH_2$(XIIb) or R-Hal (XIIc), wherein R' denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic hydrocarbon radical, R'' represents hydrogen or an aliphatic hydrocarbon radical, R''' denotes an aliphatic, cycloaliphatic or aromatic group and R is defined hereinabove, resulting in a compound of the formula VI

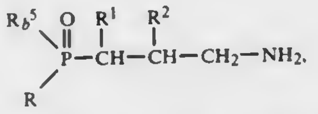


$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X$, (XV)

wherein $R^1$, $R^2$, $R^5_b$ R and X are defined hereinabove, and

VOL
1126
ISS
1
MY
7
1991
UMI

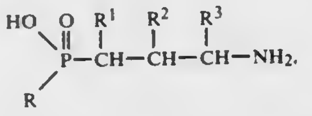
wherein in the group of the formula —CH($R^3$)—$Z^o$(XVa)$Z^o$ denotes protected amino, the group $Z^o$ is converted into amino resulting in a compound of the formula IIa


(IIa)

$$R_b^5(R)P(=O)-CH(R^1)-CH(R^2)-CH_2-NH_2,$$

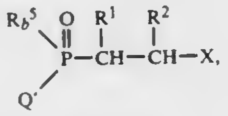
wherein R, $R^1$, $R^2$, $R^3$ and $R^5{}_b$ are defined hereinabove, which compound is converted into the corresponding compound of the formula I and, if a free compound is required, a resulting salt is converted into the free compound or, if a salt is required, a resulting free compound is converted into a salt and, if an individual isomer is required, a resulting mixture of isomers is separated into the individual isomers.

3. A process for the manufacture of a compound of the formula I


(I)

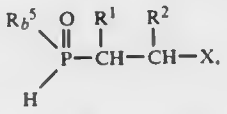
$$HO(R)P(=O)-CH(R^1)-CH(R^2)-CH(R^3)-NH_2,$$

wherein R denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic radical having 2 or more carbon atoms, and wherein one of the groups $R^1$, $R^2$ and $R^3$ represents hydrogen or an aliphatic, cycloaliphatic, araliphatic or aromatic radical, another one of the groups $R^1$, $R^2$ and $R^3$ is hydrogen or in the case of $R^1$ and $R^2$ is hydroxy, and the remaining one of $R^1$, $R^2$ and $R^3$ is hydrogen, and salts thereof, wherein a compound of the formula XIV


(XIV)

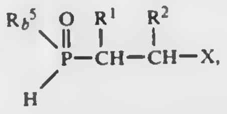
$$R_b^5(Q')P(=O)-CH(R^1)-CH(R^2)-X,$$

wherein $R^5{}_b$ denotes a $C_1$-$C_4$alkyl radical, X denotes a group of the formula —CH($R^3$)—$Z^o$ (XVa) in which $Z^o$ represents a nitro or azido group and Q' denotes a group of the formula —C($OR^8$)($OR^9$)($OR^{10}$) (XIVa) in which $R^8$ denotes hydrogen or lower alkyl and $R^9$ and $R^{10}$, independently of each other, represent lower alkyl or together represent lower alkylene and $R^1$, $R^2$ and $R^3$ are defined hereinabove, is treated with trimethylsilylchloride in technical chloroform that contains ethanol, resulting in a compound of the formula XV


(XV)

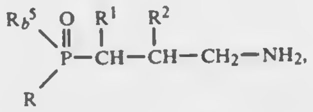
$$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X,$$

wherein $R^1$, $R^2$, $R^5{}_b$ and X are defined hereinabove, which compound is reacted with an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic aldehyde or ketone of the formula (R')(R")C=O (XIIa) or with a compound of the formula R'''—CH=$CH_2$ (XIIb) or R-Hal (XIIc), wherein R' denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic hydrocarbon radical, R" represents hydrogen or an aliphatic hydrocarbon radical, R''' denotes an aliphatic, cycloaliphatic or aromatic group and R is defined hereinabove, resulting in a compound of the formula VI


(XV)

$$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X,$$

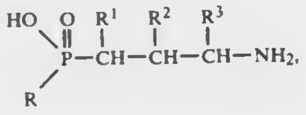
wherein $R^1$, $R^2$, $R^5{}_b$, R and X are defined hereinabove and wherein in the group of the formula —CH($R^3$)—$Z^o$ (XVa) in which $Z^o$ denotes nitro or azido, $Z^o$ is reduced to amino resulting in a compound of the formula IIa


(IIa)

$$R_b^5(R)P(=O)-CH(R^1)-CH(R^2)-CH_2-NH_2,$$

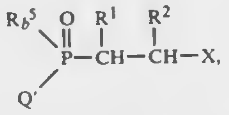
wherein R, $R^1$, $R^2$, $R^3$ and $R^5{}_b$ are defined hereinabove, which compound is converted into the corresponding compound of the formula I and, if a free compound is required, a resulting salt is converted into the free compound or, if a salt is required, a resulting free compound is converted into a salt and, if an individual isomer is required, a resulting mixture of isomers is separated into the individual isomers.

4. A process for the manufacture of a compound of the formula I


(I)

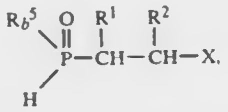
$$HO(R)P(=O)-CH(R^1)-CH(R^2)-CH(R^3)-NH_2,$$

wherein r denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic radical having 2 or more carbon atoms, and wherein one of the groups $R^1$, $R^2$ and $R^3$ represents hydrogen or an aliphatic, cycloaliphatic, araliphatic or aromatic radical, another one of the groups $R^1$, $R^2$ and $R^3$ is hydrogen or in the case of $R^1$ and $R^2$, is hydroxy, and the remaining one of $R^1$, $R^2$ and $R^3$ is hydrogen, and salts thereof, wherein a compound of the formula XIV


(XIV)

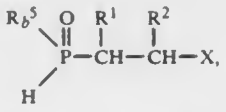
$$R_b^5(Q')P(=O)-CH(R^1)-CH(R^2)-X,$$

wherein $R^5{}_b$ denotes a $C_1$-$C_4$alkyl radical, X denotes a group of the formula —C($R^3$)=Y (XVb) in which Y represents an optionally acetalized, thioacetalized, ketalized or thioketalized oxo group and Q' denotes a group of the formula —C($OR^8$)($OR^9$)($OR^{10}$) (XIVa) in which $R^8$ denotes hydrogen or lower alkyl and $R^9$ and $R^{10}$, independently of each other, represent lower alkyl or together represent lower alkylene and $R^1$, $R^2$ and $R^3$ are defined hereinabove, is treated with trimethylsilylchloride in technical chloroform that contains ethanol, resulting in a compound of the formula XV


(XV)

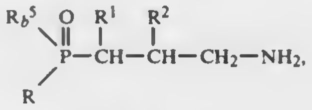
$$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X,$$

wherein $R^1$, $R^2$, $R^5{}_b$ and X are defined hereinabove, which compound is reacted with an aliphatic, cycloaliphatic,cycloaliphatic-aliphatic or araliphatic aldehyde or ketone of the formula (')(R")C=O (XIIa) or with a compound of the formulae R'''—CH=$CH_2$ (XIIb) or R-Hal (XIIc), wherein R' denotes an aliphatic, cycloaliphatic, cycloaliphatic-aliphatic or araliphatic hydrocarbon radical and R" represents hydrogen or an aliphatic hydrocarbon radical, R''' denotes an aliphatic, cycloaliphatic or aromatic group and R is defined hereinabove, resulting in a compound of the formula VI


(XV)

$$R_b^5(H)P(=O)-CH(R^1)-CH(R^2)-X,$$

wherein $R^1$, $R^2$, $R^5{}_b$, R and X are defined hereinabove, the group of the formula —C($R^3$)=Y (XVb) is reductively aminated, resulting in a compound of the formula IIa


(IIa)

$$R_b^5(R)P(=O)-CH(R^1)-CH(R^2)-CH_2-NH_2,$$

wherein R, $R^1$, $R^2$, $R^3$ and $R^5{}_b$ are defined hereinabove, which compound is converted into the corresponding compound of the formula I and, if a free compound is required, a resulting salt is converted into the free compound or, if a salt is required, a resulting free compound is converted into a salt and, if an individual isomer is required, a resulting mixture of isomers is separated into the individual isomers.

---

### 5,013,864

### PROCESS FOR PREPARATION OF α-ALKOXY ACETIC ACIDS AND THEIR SALTS

**Arthur L. Campbell, Glenview; Richard A. Mueller, Glencoe; John S. Ng, Chicago, and Richard A. Partis, Evanston, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

**Filed Dec. 8, 1989, Ser. No. 447,766**

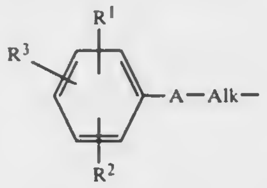
**Int. Cl.⁵ C07C** *51/02*

**U.S. Cl. 562—426** **24 Claims**

1. A process for preparing a compound of the formula

RO—$CH_2$COOH (I)

or a salt thereof, wherein R is straight or branched chain alkyl, substituted alkyl having one or more substituents selected from the group consisting of alkoxy, cycloalkyl, aryloxy, arylthio, phenyl, and, substituted phenyl having one or more substituents selected from the group consisting of halo, hydroxy, phenyl, lower alkyl, and lower alkoxy, cycloalkyl, substituted cycloalkyl having one or more substituents selected from the group consisting of halo, hydroxy, lower alkyl and lower alkoxy, cycloalkyl substituted cycloalkyl alkyl wherein the cycloalkyl is substituted by one or more substituents selected from the group consisting of halo, hydroxy, lower alkyl, and lower alkoxy, or a group of the formula



wherein $R^1$, $R^2$ and $R^3$ can be the same or different and can be hydrogen, alkyl of 1 to 10 carbon atoms, lower alkoxy, halo, phenyl, substituted phenyl having one or more substituents selected from the group consisting of halo, hydroxy, phenyl, lower alkyl and lower alkoxy, or hydroxy; A can be sulfur, oxygen, or —$CH_2$—; and Alk can be straight or branched chain lower alkylene; which comprises:

(a) reacting a compound of the formula

R—OH

wherein R is defined as hereinbefore with a base in an aprotic organic solvent to form an alkoxide;

(b) removing the organic solvent;

(c) reacting the alkoxide with a salt of a monohaloacetic acid in an aprotic polar solvent to give an alkoxyacetate salt; and

(d) optionally reacting the alkoxyacetate salt with an acid.

---

### 5,013,865

### PROCESS FOR THE PREPARATION OF 2,4,6-TRIIODO-5-AMINO-N-ALKYLISOPHTHALAMIC ACID AND 2,4,6-TRIIODO-5-AMINO-ISOPHTHALAMIDE COMPOUNDS

**Gregory D. Cross, Kansas City, and Robert C. Chapman, Manchester, both of Mo., assignors to Mallinckrodt, Inc., St. Louis, Mo.**

**Continuation-in-part of Ser. No. 178,245, Apr. 6, 1988, abandoned. This application Jul. 24, 1989, Ser. No. 383,634**

**Int. Cl.⁵ C07C** *229/00*

**U.S. Cl. 562—456** **49 Claims**

1. In a process for the preparation of a compound selected from the group consisting of 2,4,6-triiodo-5-amino-N-alkylisophthalamic acid, salts thereof, esters thereof, 2,4,6-triiodo-5-amino-isophthalamide, 2,4,6-triiodo-5-amino-N-hydroxyalkyl-isophthalamide and 2,4,6-triiodo-5-amino-N,N'-bishydroxyalkyl-isophthalamide, comprising reaction of a substrate selected from the group consisting of 5-amino- N-alkylisophthalamic acid, salts thereof, esters, thereof, 5-amino-isophthalamide, 5-amino-N-hydroxyalkyl-isophthalamide and 5-amino-N,N'-bishydroxyalkyl-isophthalamide, with an iodine halide in an aqueous reaction medium, the improvement which comprises adding said substrate and a source of said iodine halide to said reaction medium at such respective rates that, at any instant substantially throughout the addition cycle, said substrate is present in stoichiometric excess over said iodine halide, but the arithmetic difference between the cumulative amount of said substrate that has been added to said medium at said instant, expressed as a proportion of the total ultimate charge of said substrate, and the cumulative amount of said source of iodine halide that has been added to said medium at said instant, expressed as a proportion of the total ultimate charge of said source of iodine halide, does not exceed about 10%, provided that when said substrate is 5-amino-isophthalamide, 5-amino-N-hydroxyalkyl-isophthalamide or 5-amino-N,N'-bishydroxyalkyl-isophthalamide, the cumulative amount of said iodine halide may be in stoichiometric excess of not more than about 10% over said substrate, computed on the same basis.

---

### 5,013,866

### PHARMACEUTICAL GRADE 3,5-DIBROMOSALICYLIC ACID AND METOHD FOR SYNTHESIZING SAME

**Ton T. Hai, Lake Villa, and Deanna J. Nelson, Libertyville, both of Ill., assignors to Baxter International Inc., Deerfield, Ill.**

**Filed Nov. 28, 1989, Ser. No. 442,039**

**Int. Cl.⁵ C07C** *65/00*

**U.S. Cl. 562—474** **6 Claims**

1. A purified 3,5-dibromosalicylic acid:

(a) being substantially homogeneous by chromatographic analysis; and

(b) which sublimes completely at a temperature greater than 180° C.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,013,867
### LIQUID OXIDATIVELY MODIFIED ETHYLENIC RANDOM COPOLYMER, PROCESS OF MAKING AND USE

**Tatsuo Kinoshita, Yamaguchi; Shuji Minami, Hiroshima; Kinya Mizui, and Ryousuke Kaneshige, both of Chiba, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Division of Ser. No. 173,102, Mar. 28, 1988, Pat. No. 4,943,658. This application Mar. 9, 1990, Ser. No. 491,195**

**Int. Cl.$^5$ C07C** *27/10*

**U.S. Cl. 562—512.2** **1 Claim**

1. A process for preparing a liquid oxidatively modified ethylenic random copolymer comprising:
  contacting a liquid ethylenic random copolymer comprising 20 to 80 mol % of ethylene and 80 to 20 mol % of α-olefin and having a number average molecular weight $(\overline{M}n)$ in the range of from 200 to 10,000 as measured by a vapor pressure osmometer, and a molecular weight distribution $(\overline{M}w/\overline{M}n)$ given as weight average molecular weight $(\overline{M}w)$ divided by number average molecular weight $(\overline{M}n)$ in the range of up to 4 as measured by gel permeation chromatography with a gas containing molecular oxygen, ozone or a mixture thereof at a temperature of from 100° to 250° C. to oxidize the copolymer until an oxygen content in the range of from 0.1 to 20% by weight is reached.

---

### 5,013,868
### PROCESS FOR TREATING AMPHOTERIC AMINO ACIDS

**Eva C. Eskilsson, Mölnlycke, Sweden, assignor to Lejus Medical Aktiebolag, Molndal, Sweden**

**Filed Jan. 13, 1988, Ser. No. 143,392**

**Claims priority, application Sweden, Jan. 15, 1987, 8700136**

**Int. Cl.$^5$ C07C** *321/00*

**U.S. Cl. 562—557** **17 Claims**

1. A process for treating amphoteric amino acids comprising:
  introducing an amphoteric amino acid mass of acetyl cysteine, methyl dopa, L-dopa, or carboxymethyl cysteine into a fluid bed and adding at least 0.2% by weight of amphoteric amino acid mass of cetanol, stearic acid, stearyl alcohol, hydrolyzed castor oil, Na-stearyl fumarate, mono-, di- or triesters of palmitinic acid with glycerin or mono-, di- or triesters of stearic acid with glycerin or a mixture thereof.

---

## ELECTRICAL

### 5,013,869
### HIGH-FREQUENCY-IMPERVIOUS SHIELDING DOOR

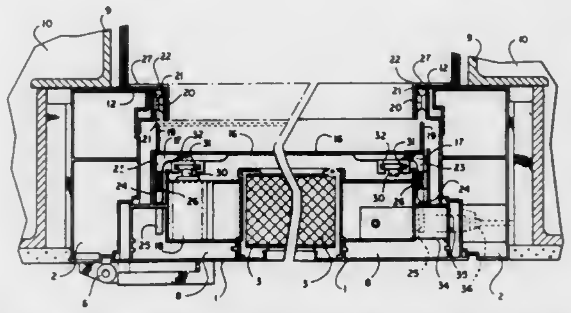
**Albert Breithaupt, Uersfeld/Bhf, Fed. Rep. of Germany, assignor to Trube & Kings KG, Fed. Rep. of Germany**

**Filed Jan. 5, 1989, Ser. No. 293,947**

**Claims priority, application Fed. Rep. of Germany, Jan. 8, 1988, 8800132[U]**

**Int. Cl.$^5$ H05K** *9/00*

**U.S. Cl. 174—35 MS** **18 Claims**



8. Highfrequency-impervious shielding door for shielding a room with an installed room shield, comprising:
  a shrouded door panel and a door frame on which the door panel is hinged;
  a contact arrangement for establishing an electrical connection, when the door is closed, between the shroud and the room shield terminating at the door frame;
  a sheet-metal shroud **(16)** paralleling the door panel **(1)** and displaceably fixed between two end positions relative to the door panel;
  a contact arrangement **(20)** associated with the door frame in facing relation with the shroud **(16)**; and
  means selectively operative independently of closure of the door to actively move the shroud **(16)** to a first end position relatively remote from the door panel in the closed position, so as to move the shroud into an electrically conductive connection with the contact arrangement in that first end position, or to a second end position relatively near the door panel so as to actively move the shroud away from said electrically conductive connection with the contact arrangement.

---

### 5,013,870
### BOX FOR CONTAINING ELECTRICAL MECHANISMS

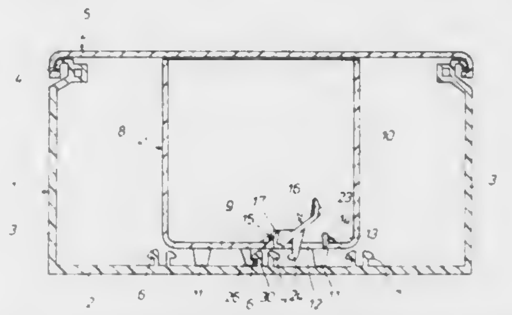
**Juan M. B. Navazo, Barcelona, Spain, assignor to Aparellaje Electrico, S.A., Barcelona, Spain**

**Filed Apr. 2, 1990, Ser. No. 502,682**

**Claims priority, application Spain, Apr. 14, 1989, 8901307**

**Int. Cl.$^5$ H01J** *5/00*

**U.S. Cl. 174—50** **5 Claims**



1. A box for containing electrical mechanisms which may be installed in channel-like duct members for electrical wiring or the like which comprise a bottom with which there is associated at least one first and one second oppositely facing harpoon-shaped projections, which are attached to the bottom by at least one rib portion, said box having a base and side walls, said box being formed by a single piece comprising: legs for supporting on the bottom of the channel-like duct member; a fixed positioning appendage adapted to engage below said first harpoon-shaped projection; an aperture in said base defining first and second opposed edges; a neb-like ridge adjacent said first edge having first locking means; a wall portion adjacent said second edge; and a locking tab hingedly connected to said wall portion, capable of pivoting between a lower locking position and an upper free position, said tab comprising in turn: an upper portion having second locking means complementary to said first locking means adapted jointly removeably to retain said tab in said lower locking position; and a lower portion having a retaining appendage adapted to engage below said second harpoon-shaped projection when said tab is in said lower locking position.

---

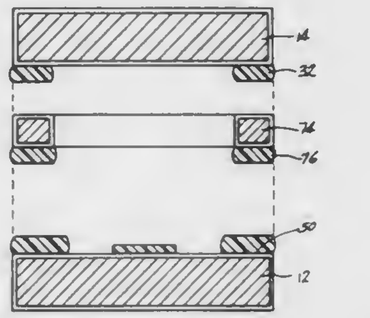
### 5,013,871
### KIT FOR THE ASSEMBLY OF A METAL ELECTRONIC PACKAGE

**Deepak Mahulikar, Meriden; Jacob Crane, Woodbridge, both of Conn., and Jeffrey S. Braden, Milpitas, Calif., assignors to Olin Corporation, New Haven, Conn.**

**Continuation-in-part of Ser. No. 154,544, Feb. 10, 1988, Pat. No. 4,897,508. This application Jan. 8, 1990, Ser. No. 461,861**

**Int. Cl.$^5$ H01L** *23/02*

**U.S. Cl. 174—52.4** **15 Claims**



1. A kit for the assembly of an adhesively sealed package designed to encase an electronic device, which kit comprises:
  a metallic base component selected from the group consisting of aluminum and aluminum based alloys, said base component having a first surface and an opposing second surface, said first surface having at least selected portions thereof adapted to receive a polymeric adhesive by coating with an anodization layer; and
  a metallic cover component selected from the group consisting of aluminum and aluminum based alloys, said cover component having a bonding surface for bonding to the first surface of said base component and an opposing surface, said bonding surface having an outer ring portion and an inner depressed portion bordered by said ring portion, said ring portion adapted to receive a polymeric adhesive and coated with an anodization layer.

---

### 5,013,872
### CABLE CLAMP

**Alan C. Lockwood, Rosemead, and Myron G. Bloom, Santa Ana, both of Calif., assignors to Masco Building Products Corp., Taylor, Mich.**

**Filed May 12, 1989, Ser. No. 351,351**

**Int. Cl.$^5$ H02G** *3/08*

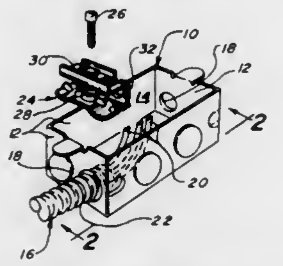
**U.S. Cl. 174—65 R** **15 Claims**

1. A cable clamp for clampingly retaining an end of an electrical cable within an electrical connection box said clamp mountable within the box adjacent an opening in a wall of the box for receiving the cable, said cable clamp comprising
  a pair of opposing clamping walls in spaced apart relation for selectively retaining the cable therebetween for retention

VOL
1126
ISS
1
MY
7
1991
UMI

within the connection box, said clamping walls including an upper clamping wall including a bendable clamping flange forming a portion thereof engageable with the cable, said clamping flange connected at a first end to said upper clamping wall and including a stiffener flange formed at a second free end of said clamping flange substantially perpendicular thereto;

an abutment wall integrally formed with and extending between said clamping walls, said abutment wall having at least one aperture through which the cable may extend; and



fastening means for mounting said clamp within the box for clampingly compressing said clamping walls against the electrical cable thereby securing the cable within the connection box, said fastening means being adapted to compressing said clamping flange against the electrical cable to retain the cable within said clamp.

---

### 5,013,873

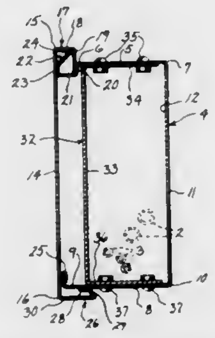
### WIREWAY FOR ENCLOSING ELECTRICAL CONDUCTORS

**Charles Deibele, and Albert Deibele, Jr., both of Keil, Wis., assignors to Houshold Utilities, Inc., Kiel, Wis.**

**Filed May 18, 1989, Ser. No. 353,878**

**Int. Cl.$^5$ H02G** *3/04*

**U.S. Cl. 174—101** **10 Claims**



1. A wireway for enclosing electrical conductors, comprising:

a longitudinally extending housing including a top wall having a front edge and a rear edge, a bottom wall spaced from said top wall and having a front edge and a rear edge, and a rear wall interconnecting the rear edges of said top and bottom walls, said top, bottom and rear walls defining an interior compartment for receiving electrical conductors and said front edges defining a front opening for providing access to said compartment;

a longitudinally extending removable cover member for closing said front opening, said cover member having a top edge and a bottom edge disposed adjacent the respective front edges of said top and bottom walls;

hinge means cooperable between the top edge of said cover member and the front edge of said top wall for providing swinging movement of said cover member between an open position away from said housing wherein said cover member may be removed from said housing and a closed position covering said front opening, said hinge means comprising an L-shaped leaf member having a first leg projecting rearwardly from the top edge of said cover member and a second leg projecting downwardly from said first leg, and a U-shaped leaf member having a third leg projecting downwardly from said front edge of said top wall, a fourth leg projecting forwardly from said third leg and a fifth leg projecting upwardly from said fourth leg, said fifth leg including a first straight portion projecting upwardly from said fourth leg and a second angled portion projecting rearwardly and upwardly from said first portion to a height above the front edge of said top wall to form a tool-retaining lip;

lock means cooperable between the bottom edge of said cover member and the front edge of said bottom wall for securing said cover member in its closed position; and

cover retaining means on said bottom wall for retaining said cover member on said housing after said cover member is removed from said housing, said cover retaining means comprising a flange projecting upwardly from the front edge of said bottom wall.

---

### 5,013,874

### APPARATUS FOR RECORDING AND VERIFYING HANDWRITING, IN PARTICULAR SIGNATURES

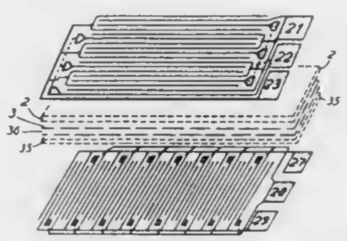
**Pieter de Bruyne, Zurich, and Andre Kunz, Kloten, both of Switzerland, assignors to Ellett Brothers, Chapin, S.C.**

**Filed Mar. 7, 1989, Ser. No. 319,696**

**Claims priority, application Switzerland, Mar. 7, 1988, 00919/88**

**Int. Cl.$^5$ G08C** *21/00*

**U.S. Cl. 178—18** **9 Claims**



1. Apparatus for producing electrical signals representative of the movement of a hand-held stylus, the apparatus comprising a first piezo-electric membrane upon which the stylus is pressed during its movement, said membrane comprising a solid reference electrode on a first surface and a system of narrow and parallel linear electrodes on a second surface, characterized in that the electrodes are connected together as at least three interleaved sets.

---

### 5,013,875

### CONTACT CONFIGURATION WITH AN ARCING HORN AND AN ARC CONDUCTING PIECE

**Andreas Cardinal, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich and Berlin, Fed. Rep. of Germany**

**PCT No. PCT/DE88/00693, § 371 Date May 24, 1990, § 102(e) Date May 24, 1990, PCT Pub. No. WO89/05036, PCT Pub. Date Jun. 1, 1989**

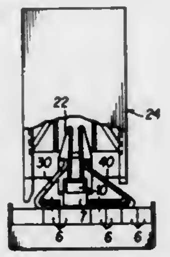
**PCT Filed Nov. 4, 1988, Ser. No. 477,959**

**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1988, 8715757[U]**

**Int. Cl.$^5$ H01H** *33/12*

**U.S. Cl. 200—146 R** **3 Claims**

1. A contact configuration for low-voltage circuit-breakers having main contacts for conducting a continuous current and arcing contacts for igniting an arc in the entrance region of an arc quench chamber, and also having at least one arcing horn for carrying over the arc into the arc quench chamber, and having an arc conducting piece made of ferromagnetic material for carrying an arc occurring on the main contacts over to the arcing horn, characterized in that the arc conducting piece (**30**) designed as a one-piece, stamped, flexural part has a base shank (**31**) extending more or less parallel to the row of main contacts (**6**), and an arc conducting shank (**36**), which originates at the end of the base shank (**31**) that is distant from the arcing horn (**22**), and is linked up at an angle to this end.



---

### 5,013,876

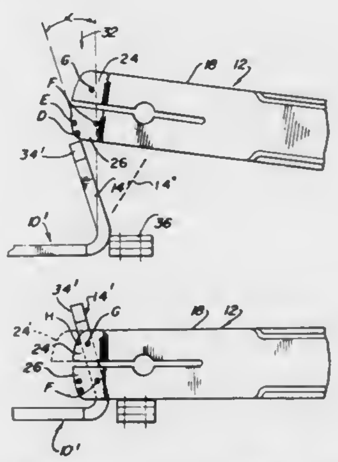
### SWITCH CONTACTS WITH IMPROVED FAULT-CLOSING CAPABILITY

**Leonard V. Chabala, Maywood, Ill., assignor to S&C Electric Company, Chicago, Ill.**

**Filed Sep. 12, 1988, Ser. No. 242,989**

**Int. Cl.$^5$ H01H** *1/42, 1/60*

**U.S. Cl. 200—254** **11 Claims**



1. A contact arrangement for a medium- or high-voltage switch including two contact surfaces that are generally parallel and relatively movable via a predetermined path between open and closed positions, the movement along the predetermined path generally defining a first direction during movement to the closed position, during closing, said two contact surfaces defining predetermined areas of relative engagement between said two contact surfaces, the improvement comprising configuring, orienting and arranging said two contact surfaces relative to each other and said first direction such that, during closing, the relative engagement between the two contact surfaces defines a locus along each contact surface that is non-parallel to said first direction and such that the areas of relative engagement that are defined for each of said two contact surfaces are totally independent of and different from said predetermined areas of relative engagement in said closed position.

---

### 5,013,877

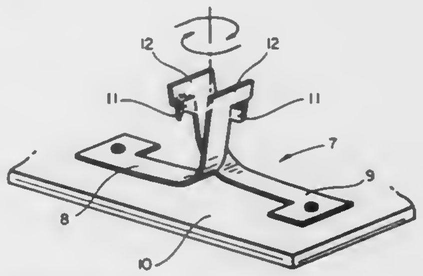
### DEVICES FOR ELECTRICAL CONNECTION

**James E. Jervis, Atherton, Calif., assignor to Raychem Corporation, Menlo Park, Calif.**

**Continuation-in-part of Ser. No. 153,188, Feb. 8, 1988. This application May 2, 1988, Ser. No. 189,087**

**Int. Cl.$^5$ H01H** *1/26*

**U.S. Cl. 200—523** **21 Claims**



1. An electrical switch which comprises:

(a) a resilient first conductor to which a first wire can be electrically connected; and

(b) a resilient second conductor to which a second wire can be electrically connected;

the switch is capable of having two stable configurations in the absence of continued interaction by a third body, namely;

(i) a first stable configuration in which the first and second conductors are held in electrical contact at least in part by the resilient bias of the first and second conductors; and

(ii) a second stable configuration in which the first and second conductors are held apart at least in part by the resilience of the first and second conductors, configuration (ii) being reached from configuration (i) at least in part by the relaxation of said resilient bias and the rotation of at least one of said first and second conductors about an axis located between the first and second conductors in configuration (i), and wherein the axis is substantially perpendicular to the force exerted between the first and second conductors when in configuration (i).

---

### 5,013,878

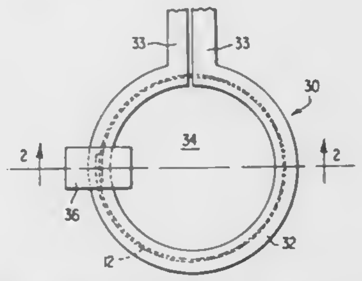
### INDUCTION HEAT SEALING LAP-SEAMED CONTAINERS TO NON-METALLIC CLOSURES

**Carl J. Fries, Jr., Holland, Pa., assignor to International Paper Company, Purchase, N.Y.**

**Filed Dec. 20, 1988, Ser. No. 286,824**

**Int. Cl.$^5$ H05B** *6/40*

**U.S. Cl. 219—10.43** **18 Claims**



1. A method of induction sealing an end closure to a tubular container, the end closure including a peripheral skirt extending into the container, the skirt being in contact with the interior wall of the container, the tubular container formed from a rectangular blank of paperboard including a metal foil layer and a thermoplastic layer on at least its interior surface, the tubular container having a lapped seam contacted by said skirt,

VOL
1126
ISS
1
MY
7
1991
UMI

the method including the step of placing an induction heating coil adjacent the container end closure to thereby heat said metal foil and thereby heat and partially melt and fuse the container thermoplastic to the end closure skirt, the induction heating accompanied by simultaneously intensifying the field of the induction heating coil at that portion of the end closure skirt surface in contact with the container interior which is adjacent the lapped seam of the container, whereby the end closure skirt is sealed to the interior of the tubular container at an inside corner of the container adjacent the lapped seam.

---

### 5,013,879
## MECHANISM FOR FEEDING TRANSVERSE REINFORCEMENT ROD TO A WELDING MACHINE

**Torvald Lind, Kumla, Sweden, assignor to Ytong AG, Fed. Rep. of Germany**

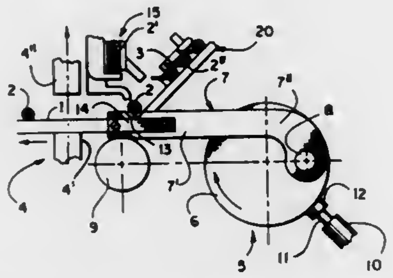
**PCT No. PCT/EP87/00816, § 371 Date Dec. 1, 1988, § 102(e) Date Dec. 1, 1988, PCT Pub. No. WO88/04590, PCT Pub. Date Jun. 30, 1988**

**PCT Filed Dec. 22, 1987, Ser. No. 354,401**

**Claims priority, application Sweden, Dec. 22, 1986, 8605526-6**

**Int. Cl.$^5$ B23K** *11/00*

**U.S. Cl. 219—56** **6 Claims**



1. A feeding mechanism for feeding transversal reinforcement rods (2) of two different types (2', 2") to a welding machine comprising a set of welding electrodes (4', 4") arranged in pairs and operative to spot-weld said transversal reinforcement rods to a number of longitudinal reinforcement rods (1) while forming a reinforcement netting, at least one type (2") of said transversal reinforcement rods having an attachment plate (3) projecting tangentially therefrom, said feeding mechanism comprising:

- at least one rotatable wheel (6) disposed in the area below two magazines (15, 20) for storing and dispensing said transversal reinforcement rods (2', 2");
- a crank arm (7) connected to said wheel (6) by a hinge (8) located at a certain radial distance from the center of revolution of said wheel;
- support means (9) disposed between said wheel (6) and said set of welding electrodes (4', 4") to support said crank arm at a point spaced apart from said wheel;
- an upwardly opening seat (13) in said crank arm (7) for receiving an individual transversal reinforcement rod (2', 2") from one of said magazines (15, 20); and
- a stop member (14) on said crank arm (7) for retaining said attachment plate (3) of an associated rod (2,2') in a repeatable, predetermined welding position when the crank arm (7) is transferred from an initial position in which said seat (13) is positioned below said magazine, to a delivering position in which said seat is positioned close to said set of welding electrodes (4',4"), said transfer being effectuated by rotating said wheel (6) half of a revolution.

---

### 5,013,880
## PROCESS FOR WELDING A FOLLOWER PIPE TO A BURIED PIPE STRING

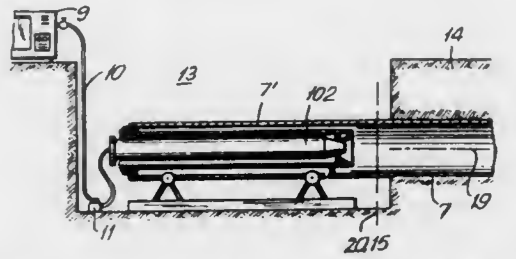
**Franz-Josef Püttmann, Lennestadt, Fed. Rep. of Germany, assignor to Dipl.-Ing. Paul Schmidt, Lennestadt, Fed. Rep. of Germany**

**Filed Nov. 16, 1989, Ser. No. 438,349**

**Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839633**

**Int. Cl.$^5$ B23K** *9/00*

**U.S. Cl. 219—61** **5 Claims**



5. A process for welding a follower pipe to a pipe string driven horizontally into the ground, comprising the steps of:

- locating the follower pipe at a free end of the pipe string protruding from the ground;
- tacking the follower pipe to the free end of the pipe string at several circumferentially distributed points;
- rotating the pipe string together with the follower pipe; and
- welding the follower pipe to the pipe string while rotating the follower pipe and pipe string.

---

### 5,013,881
## WIRE-EXTENSION END DETECTOR

**Toshiyuki Aso, and Yasuo Arakawa, both of Yamanashi, Japan, assignors to Fancu Ltd., Minamitsuru, Japan**

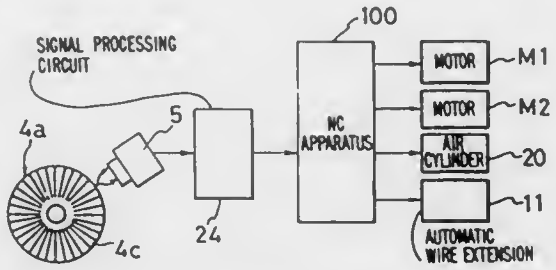
**PCT No. PCT/JP88/01089, § 371 Date Jun. 21, 1989, § 102(e) Date Jun. 21, 1989, PCT Pub. No. WO89/03743, PCT Pub. Date May 5, 1989**

**PCT Filed Oct. 27, 1988, Ser. No. 378,195**

**Claims priority, application Japan, Oct. 27, 1987, 62-269344**

**Int. Cl.$^5$ B23H** *7/10*

**U.S. Cl. 219—69.12** **9 Claims**



1. A wire-extension end detector provided in a wire-cut electric discharge machine having a wire conveyor device including wire drive means for running a wire delivered by automatic wire extension means, comprising:

- a rotary member arranged facing a wire travel path and rotatively driven by the wire which is driven by the wire drive means;
- detection means, arranged in a non-contact relation with said rotary member, for generating an output indicating that said rotary member is rotating when said rotary member is rotated; and
- discrimination means, responsive to an operation of the wire drive means, and an operation of the automatic wire extension means, and connected to receive the output of said detection means, said discrimination means detecting the end of a wire extension when an output of said detection means is generated before a predetermined time passes after the start of the automatic wire extension means, during the operation of the wire drive means.

---

### 5,013,882
## LABYRINTH FILTER FOR DIELECTRIC OF SPARK EROSION SYSTEMS

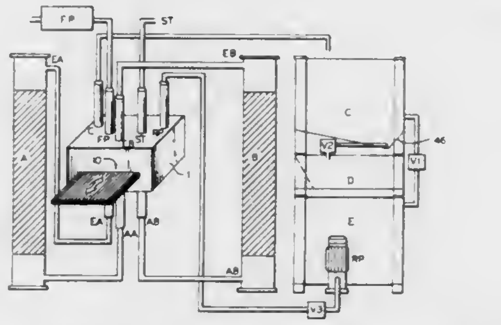
**Max Stricker, Tobel, Switzerland, assignor to A.G. für industrielle Elektronik, Losone, Switzerland**

**Filed Jun. 29, 1988, Ser. No. 214,326**

**Claims priority, application Switzerland, Jun. 29, 1987, 2434/87; European Pat. Off., Oct. 15, 1987, 87810593.1**

**Int. Cl.$^5$ B23H** *1/10;* **B01D** *24/12*

**U.S. Cl. 219—69.14** **11 Claims**



1. A labyrinth filter to remove small spherical metal particles from a dielectric used in spark erosion equipment comprising:

- a liquid tight receptacle, said receptacle having an inlet and an outlet;
- first and second grain barrier means disposed within said receptacle near said receptacle inlet and said receptacle outlet respectively for preventing filter grains from leaving said receptacle while permitting dielectric flow in either direction within and through said receptacle;
- filter grains of non-uniform size and shape loosely disposed within said receptacle between said first and second grain barrier means filling a portion of said receptacle forming a filter grain column within said receptacle, the upper surface of said grain column providing an intake surface, and an outlet surface supported on said second grain barrier;
- filter pump means attached to the inlet of said receptacle for generating a flow of dielectric through said filter grain column which creates low pressure zones behind the filter grains for trapping the metal particles, said grain column intake surface diameter, said grain column effective height between the intake surface and the outlet surface, and said pump means being matched to one another to ensure that the dielectric flow through the filter exceeds 2 meters per minute.

---

### 5,013,883
## PLASMA SPRAY DEVICE WITH EXTERNAL POWDER FEED

**Anthony J. Fuimefreddo, Bellmore; John E. Nerz, Seldon; Martin E. Hacker, Lake Ronkonkoma, and Gunther Hain, Dix Hills, all of N.Y., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**

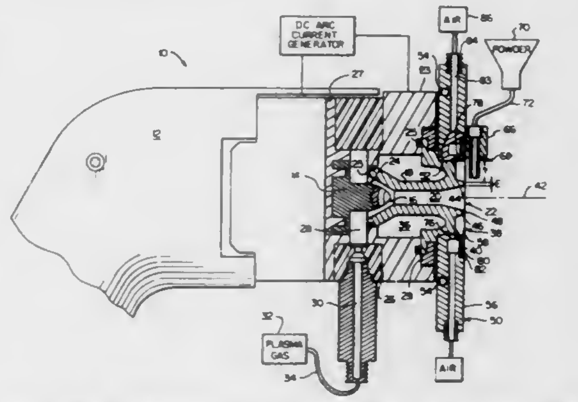
**Filed May 18, 1990, Ser. No. 526,091**

**Int. Cl.$^5$ B23K** *9/00*

**U.S. Cl. 219—121.47** **12 Claims**

1. A plasma spray device comprising:

- a cylindrical anode nozzle member having an axial bore therethrough with an inlet end and an outlet end, the inlet end being cooperative with a cathode member to generate an arc plasma stream to issue from the outlet end, the nozzle member further having a nozzle face at the outlet end with a coaxial annular recess therein proximate to the bore, the recess being bounded radially inwardly by an extended portion of the nozzle member, the recess having a radial thickness and a depth about equal to or less than the radial thickness; and
- powder injection means for injecting powder radially into the plasma stream external to the nozzle member proximate the outlet end;



such that entrainment of surrounding atmosphere by the plasma stream drives a toroidal vortex anchored in the recess, the vortex effecting a wiping flow on the nozzle face so as to inhibit powder from depositing on the nozzle face.

---

### 5,013,884
## WATER TABLE FOR A THERMAL-CUTTING MACHINE, ESPECIALLY FOR PROCESSING ALUMINUM, WITH AN UNDERWATER PLASMA-BASED CUTTING SYSTEM

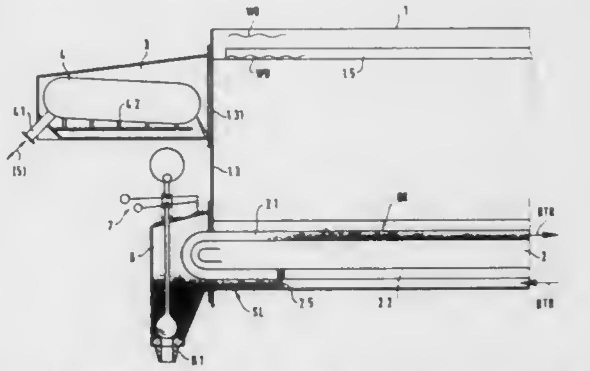
**Hans J. Hahn, Emstal, Fed. Rep. of Germany, assignor to Wegman & Co. GmbH, Kassel, Fed. Rep. of Germany**

**Filed Oct. 11, 1990, Ser. No. 596,178**

**Claims priority, application Fed. Rep. of Germany, Oct. 19, 1989, 3934822**

**Int. Cl.$^5$ B23K** *9/00*

**U.S. Cl. 219—121.48** **12 Claims**



1. In a water table for a thermal-cutting machine, having a surface for supporting material, means forming a main tank receiving the table to immerse the surface and means for raising and lowering the level of the water in the tank, the improvement wherein the means forming the main tank comprises a bottom, a front wall, side walls with inner surfaces sloping in below the surface that supports the material, a forwarding gutter extending along the bottom of the main tank and accommodating an apron-type conveyor having an upper strand extending through the front wall of the main tank and up through a water-tight duct to a container for accommodating coarser particles and a sludge trough positioned below the gutter at an end that a bottom strand of the conveyor travels toward, and wherein the means for raising and lowering the

VOL
1126
ISS
1
MY
7
1991
UMI

level of the water comprises an inflatable cushion in the main tank and under the water.

---

5,013,885

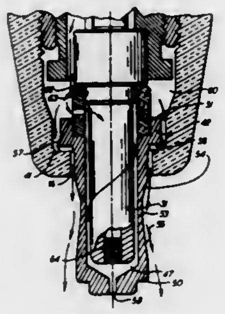
### PLASMA ARC TORCH HAVING EXTENDED NOZZLE OF SUBSTANTIALLY HOURGLASS

**Donald W. Carkhuff; Jeffrey S. Everett, Florence, and Jule Conner, Marion, all of S.C., assignors to ESAB Welding Products, Inc., Florence, S.C.**

**Filed Feb. 28, 1990, Ser. No. 486,070**

**Int. Cl.⁵ B23K** *9/00*

**U.S. Cl. 219—121.5** **17 Claims**



1. A nozzle adapted for use with a plasma arc torch of the type having a nozzle in surrounding relation with the discharge end of an electrode extending longitudinally along the axis of a torch head, and having a first gas flow within the nozzle for engaging the electrode and generating a plasma and a second gas flow in surrounding engagement to the outer surface of the nozzle for aiding in heat transfer from the nozzle and torch, said nozzle comprising

(a) an elongate substantially cylindrical body member having an internal cavity defining a longitudinal axis, and having a closed forward end portion and open rear portion,

(b) an axial bore extending coaxially through the forward end portion of the body member and aligned with said longitudinal axis for allowing plasma discharge therefrom, and

(c) an outer surface having a converging rear conical surface and forward diverging conical surface to define a reduced diameter portion at a medial location along its length so that said nozzle is of substantially hourglass configuration in longitudinal cross-section for providing a surface on which a gas being discharged therealong can remain in close contact to provide an efficient heat transfer from the nozzle and torch to the surrounding gas stream.

---

5,013,886

### REAL-TIME MAGNETIC-FLUX BREAKTHROUGH DETECTION METHOD AND SYSTEM FOR LASER DRILLING

**Rudolph A. A. Koegl, Niskayuna, and Richard A. Hogle, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jul. 23, 1990, Ser. No. 556,687**

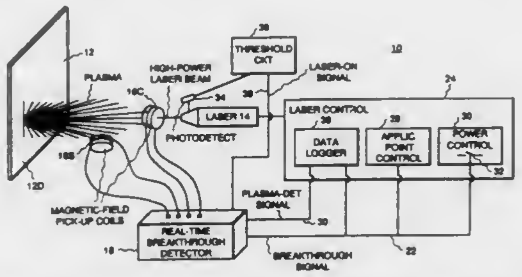
**Int. Cl.⁵ B23K** *26/02*

**U.S. Cl. 219—121.83** **20 Claims**

1. A method of applying a laser beam to a workpiece comprising the steps of

placing at least one magnetic field pick-up coil adjacent a surface on a front of a workpiece;

applying a laser beam to an application point on said surface to drill a hole in said surface, said laser beam causing a magnetic field in an ionized plasma of particles escaping from said surface; and



using said magnetic field pick-up coil to sense magnetic field change occurring upon breakthrough of said surface by the laser beam.

---

5,013,887

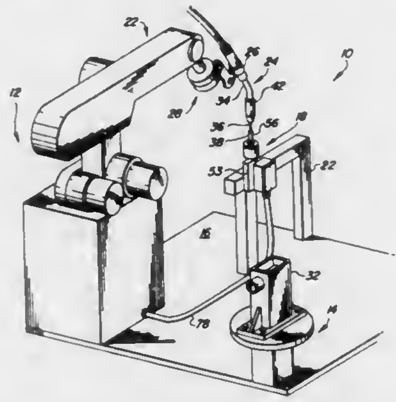
### TORCH ALIGNMENT VERIFICATION METHOD AND APPARATUS

**Raymond D. Gold, Waukee, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Jun. 29, 1990, Ser. No. 547,643**

**Int. Cl.⁵ B23K** *9/10*

**U.S. Cl. 219—124.34** **20 Claims**



1. In a robotic welder having a torch with a wire tip for welding a workpiece at a workstation, a device for checking the alignment of the torch comprising:

a contact area;

means yieldingly supporting the contact area at the workstation in a preselected location in the path of the torch for contact by the wire tip, when the tip is properly aligned, as the torch moves along the path;

means for moving the torch toward the contact area; and

means for providing an alignment signal indicative of the torch being in the proper position for welding at the workstation when the wire tip contacts the contact area and moves the contact area from the preselected location.

---

5,013,888

### SELF-CLEANING PLATE SHAPED DEVICE

**Shoji Okada, Toyota; Naofumi Fujie, Nagoya; Tomoaki Imaizumi, Hoi; Koji Ito, Kariya; Yuji Ichikawa, and Kazumi Hayashi, both of Okazaki, all of Japan, assignors to Alsin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Sep. 25, 1989, Ser. No. 412,000**

**Claims priority, application Japan, Sep. 27, 1988, 63-241756; Sep. 30, 1988, 63-248362**

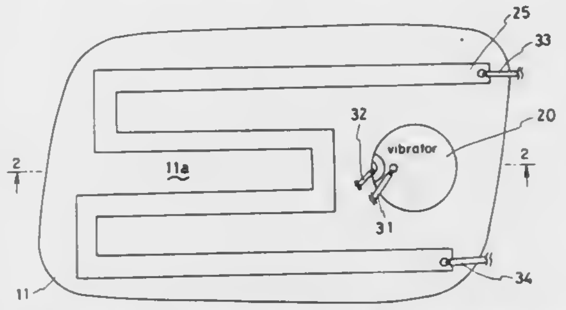
**Int. Cl.⁵ H05B** *3/26*

**U.S. Cl. 219—219** **5 Claims**

1. A self-cleaning plate shaped device comprising:

a generally planar plate member;

vibrating means, disposed on the plate member, for propagating oscillations in the plate member substantially entirely parallel to the plane of the plate member by genera-



tion of radial contractions and expansions, and removing foreign substances from the plate member; and

heating means disposed on the plate member for distributing heat substantially entirely throughout the plate member.

---

5,013,889

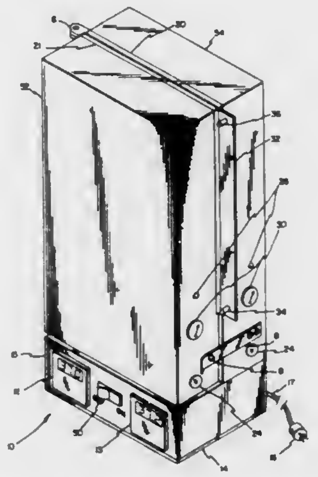
### ELECTRIC BLOOD WARMER UTILIZING HEATING BY CONDENSATION

**Allan P. Bakke, 609 19th Ave., S.W., Rochester, Minn. 55902**

**Continuation-in-part of Ser. No. 367,182, Jun. 16, 1989, abandoned. This application Jan. 5, 1990, Ser. No. 461,532**

**Int. Cl.⁵ H05B** *3/20*

**U.S. Cl. 392—470** **19 Claims**



1. An apparatus for warming blood for transfusion comprising:

(A) at least one heating unit including:

(1) a rigid metal housing having walls, vertically disposed, enclosing a hermetically sealed air-free space having a lower liquid phase evaporation region containing an evaporatable liquid and an upper vapor phase condensation region, one flat wall adjacent said condensation region functioning as a heating plate by transferring heat from vapor therein,

(2) external etched foil electric heating means adjacent said evaporation region for generating vapor from said liquid, and

(3) temperature sensing means adjacent said condensation region for sensing the temperature of vapor therein,

(B) means for connecting said etched foil electric heating means to a source of electric power,

(C) control means responsive to said temperature sensing means to control the amount of heat supplied by said eldered foil electric heating means to said heating unit liquid phase evaporation region, and

(D) means for passing blood in conductive heat transference contact with said heating plate.

---

5,013,890

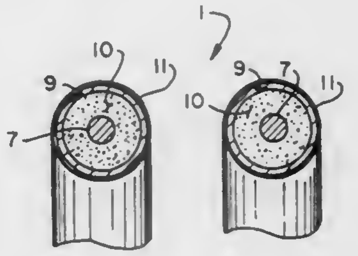
### IMMERSION HEATER AND METHOD OF MANUFACTURE

**Bobby G. Gamble, Watertown, Tenn., assignor to Emerson Electric Co., St. Louis, Mo.**

**Filed Jul. 24, 1989, Ser. No. 383,626**

**Int. Cl.⁵ H05B** *3/04, 3/48, 3/78*

**U.S. Cl. 392—497** **5 Claims**



1. In an immersion heater for use in a chemically corrosive environment, the heater comprising an electrically conductive heating element and a metallic sheath covering the element, the improvement comprising a protective coating baked onto the sheath and capable of maintaining its protective properties when the heater is operating in the environment, current flow through the heating element produces a watt-density of at least 30 watts per square inch, and the temperature of the environment exceeds the boiling point of water the coating being a fluoropolymer powder material which is 5 to 10 mils thick about the sheath.

---

5,013,891

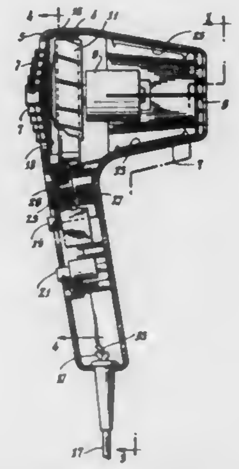
### PERSONAL APPLIANCE HAVING SHOCK PROTECTION CIRCUITRY

**Richard E. Shoemaker, Milford, Conn., assignor to Conair Corporation, Stamford, Conn.**

**Filed Jul. 6, 1987, Ser. No. 69,896**

**Int. Cl.⁵ H02H** *3/16*

**U.S. Cl. 219—385** **5 Claims**



1. In a personal appliance adapted for shock hazard protection and having a two-section housing, electrical units mounted within the housing, a power cord leading to said housing, an IDCI on said power cord, and a sensing wire leading from said housing to said IDCI, that improvement including

electroconductive coating on substantial portions of the

VOL
1126
ISS
1
MY
7
1991
UMI

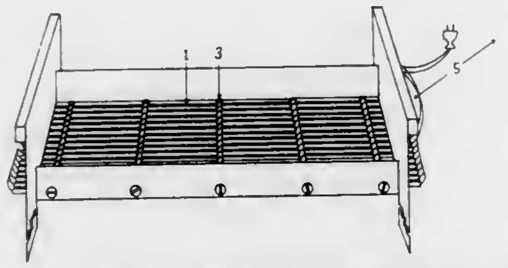
internal surfaces of said housing sections, means for interconnecting said coating on each of said surfaces, and said sensing wire being connected to said coating,

whereby water contacting said coating and said power cord or any of said electrical units will cause a voltage in said sensing wire and thereby trigger said IDCI.

---

### 5,013,892
## ELECTRICAL MELTING APPARATUS OF CONFECTIONERY PRODUCTS

**Anthony Monti, 28 Dogwood La., Irvington, N.Y. 10533**
**Filed Aug. 18, 1988, Ser. No. 233,816**
**Int. Cl.$^5$ H05B** *3/22, 3/42*
**U.S. Cl. 219—421** **1 Claim**

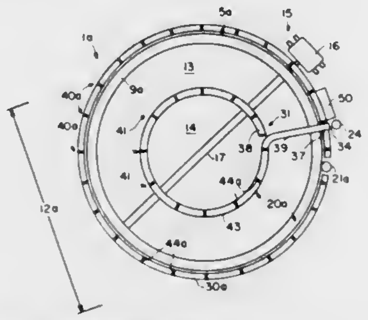


1. An electrical melting apparatus for confectionery production consisting of a single monolayer of adjacent electrical heating rods in the order of 0.2" in diameter, spaced apart to form gaps between the rods that are narrow enough to prevent the free flow of unmelted foodstuffs thru the gaps and wide enough to allow the free flow of the molten foodstuffs thru the gaps after the heat of the rods has melted the foodstuffs, the gaps being in the order of 0.05" wide, said rods forming a porous bottom of a open top container that serves both as a support for the rods and a reservoir for unmelted foodstuffs.

---

### 5,013,893
## HEATING DEVICE

**Gerhard Goessler, Oberderdingen, and Ortwin Schau, Eppingen-Elsenz, both of Fed. Rep. of Germany, assignors to E.G.O. Elektro-Gerate Blanc u. Fischer, Fed. Rep. of Germany**
**Filed Sep. 14, 1989, Ser. No. 407,205**
**Claims priority, application Fed. Rep. of Germany, Sep. 14, 1989, 3831233**
**Int. Cl.$^5$ H05B** *3/74*
**U.S. Cl. 219—453** **51 Claims**

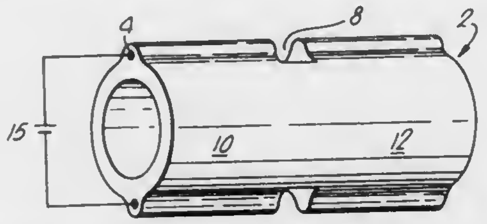


1. A heating device comprising:
at least one front member providing a heater screen;
at least one heater having at least one heating element supported by a heater carrier and defining at least one heating field;
at least one display means for a state indication provided for indicating a state of said heating device, said display means having at least one light source and at least one illuminatable display field in a vicinity of said heater screen and, connected by means of a light beam path to the light source, wherein said beam path is formed by at least one light guide separate from but at least partially directly adjacent to said heater screen, and light guide having at least one light exit for at least one said at least one display field and at least one light inlet associated with at least one said at least one light source.

---

### 5,013,894
## CONDUCTIVE POLYMERIC ARTICLE

**Per J. T. Jensen, Slangerup, Denmark, and George M. J. Gansbuehler, Swindon, England, assignors to Raychem Corporation, Menlo Park, Calif.**
**Filed Sep. 8, 1988, Ser. No. 241,658**
**Claims priority, application United Kingdom, Sep. 9, 1987, 8721179; Sep. 9, 1987, 8721180; Sep. 9, 1987, 8721181; Oct. 9, 1987, 8723752; Oct. 9, 1987, 8723761; Dec. 14, 1987, 8729120; Dec. 14, 1987, 8729122; Jun. 21, 1988, 8814688**
**Int. Cl.$^5$ H05B** *3/12*
**U.S. Cl. 219—548** **16 Claims**



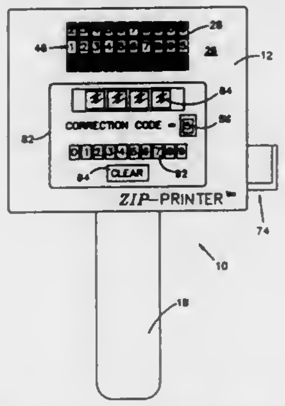
1. A radially heat-shrinkable tubular article which comprises
(1) a component comprising a conductive polymer, and
(2) at least three spaced-apart elongate electrodes, each of which extends at least part way along the length of the component and is connectable to an electrical power source, the electrodes being placed so that
(a) a first set of two or more selected electrodes can be connected to a suitable electrical power source and thus cause electrical current to pass in a circumferential direction through a first part only of the component, and to generate heat within that first part which causes radial shrinkage along a first length of the article only; and
(b) a second set of two or more selected electrodes can be connected to a suitable electrical power source and thus cause electrical current to pass in a circumferential direction through a second part only of the component and to generate heat within that second part.

---

### 5,013,895
## PERSONAL POSTNET BARCODE PRINTERS

**Jerry R. Iggulden, 21600 Cleardale St., Santa Clarita, Calif. 91321, and Donald A. Streck, 832 Country Dr., Ojai, Calif. 93023**
**Filed Oct. 23, 1989, Ser. No. 425,301**
**Int. Cl.$^5$ G06C** *27/00*
**U.S. Cl. 235—110** **15 Claims**

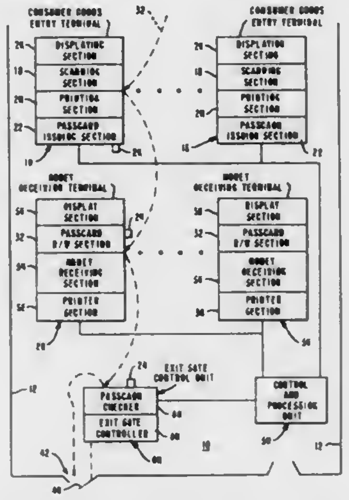
1. A self-contained and stand-alone printer for printing a ten digit Postnet barcode on an envelope comprising:
(a) a hollow case;
(b) input means carried by said case for a user to manually input digits comprising a ZIP+4 Code of an addressee;
(c) calculator means carried by said case for calculating a tenth digit representing a check value associated with said digits of said ZIP+4 Code; and,
(d) printer means carried by said case for printing a sequence of Postnet barcode characters corresponding to respective ones of said digits of said ZIP+4 Code and said tenth digit preceded and followed by single long bars indicating a start and end of the ten digit Postnet barcode.



---

### 5,013,896
## CASHIERLESS CHECKOUT SYSTEM USING CUSTOMER PASSCARD

**Tsutomu Ono, and Masaru Nogami, both of Odawara, Japan, assignors to NCR Corporation, Dayton, Ohio**
**Filed Nov. 9, 1988, Ser. No. 269,813**
**Claims priority, application Japan, Dec. 28, 1987, 62-330403**
**Int. Cl.$^5$ G06F** *15/21*
**U.S. Cl. 235—381** **8 Claims**



1. A cashierless checkout system in a checkout area comprising a

plurality of consumer goods entry terminals each including a scanning section for scanning code data indicated on consumer goods to be purchased, a displaying section and a printing section for displaying and for printing information corresponding to the consumer goods code data thus scanned, and an issuing section for issuing a passcard on which are recorded an identification number of a customer and an amount of money owed corresponding to the value of the scanned goods, a

plurality of money receiving terminals which are separated from said consumer goods entry terminals, each of said money receiving terminals including a passcard read/write section for performing reading and writing of data on said passcard upon insertion thereof into said money receiving terminal, a money receiving section for receiving an amount of money for the scanned goods, a printer section for issuing a receipt, and a display section for displaying amount data and other information thereon, said passcard being dispensed from said money receiving terminal and said passcard further including money receiving data written from said passcard read/write section after the reception of said received amount of money, an

exit gate control unit which is provided in the vicinity of an exit of said checkout area and including a passcard checker for checking said passcard to check whether or not the amount of money received is equal to the amount of money owed and an exit gate controller for controlling an exit gate under the control of said passcard checker to enable customers to pass through said exit gate, and a

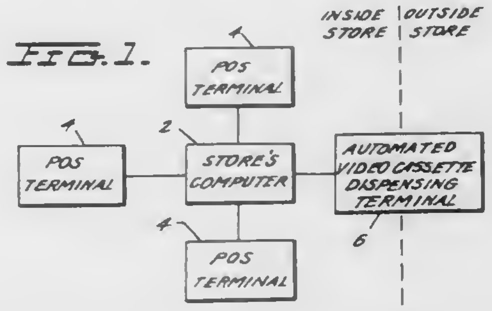
control and processing unit coupled to said consumer goods entry terminals, to said money receiving terminals and to said exit gate control unit to control the operations of said terminals and said control unit thus coupled therewith and to store sold goods data, whereby the reception of said amount of money owed is ensured by checking said passcard and enabling the customer to pass through said checkout area and past said consumer goods entry terminals, said money receiving terminals and said exit gate control unit.

---

### 5,013,897
## AUTOMATED VIDEOCASSETTE DISPENSING TERMINAL COUPLED TO STORE'S COMPUTERIZED RENTAL SYSTEM

**Robert R. Harman, Seaford, Del., and Bruce. C. Joslyn, Madison, Conn., assignors to Thru-The-Wall Corporation, Westport, Conn.**
**Filed Aug. 3, 1988, Ser. No. 227,618**
**Int. Cl.$^5$ G06F** *15/21, 15/24*
**U.S. Cl. 235—381** **18 Claims**

FIG. 1.



1. A system for renting videocassettes, comprising:
(a) a host computer in a point-of-sale management system of a video store for compiling and storing information relating to a customer list and videocassette inventory and customer rental information of the video store based upon rental information received as well as time of rental and return, said rental information comprising customer identification information and videocassette identification information for each videocassette rented;
(b) at least one manned point of sale terminal for renting and returning videocassettes which communicates to said host computer said rental information entered at said point of sale terminal by a store clerk for each videocassette rented to or returned by a customer at said point of sale terminal; and
(c) at least one automated videocassette dispensing terminal for renting videocassettes which communicates to said host computer and operates in accordance with said information relating to said customer list and said videocassette inventory and customer rental information which is centrally stored in said host computer, said automated videocassette dispensing terminal communicating to said host computer said rental information entered by a customer for each videocassette dispensing terminal communicating to said host computer said rental information entered by a

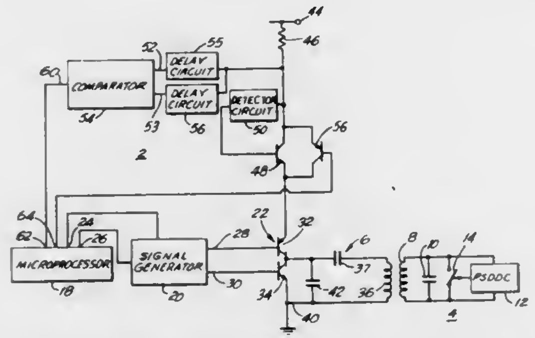
VOL
1126
ISS
1
MY
7
1991
UMI

customer for each videocassette rented at said automated videocassette dispensing terminal;
wherein said host computer processes said rental information with said time of rental and return to calculate a proper rental fee for each returned videocassette and to update said videocassette inventory information which is centrally stored in said host computer.

---

### 5,013,898
## DATA DETECTION, POWER TRANSFER AND POWER REGULATION FOR DATA STORAGE DEVICES

**Andrew J. K. Glasspool, Addlestone, United Kingdom, assignor to Mars Incorporated, McLean, Va.**
**PCT No. PCT/GB87/00778, § 371 Date Aug. 22, 1988, § 102(e) Date Aug. 22, 1988, PCT Pub. No. WO88/03684, PCT Pub. Date May 19, 1988**
**PCT Filed Nov. 3, 1987, Ser. No. 211,857**
**Claims priority, application United Kingdom, Nov. 3, 1986, 8626233**
**Int. Cl.⁵ G06K** *7/08*
**U.S. Cl. 235—449** 32 Claims



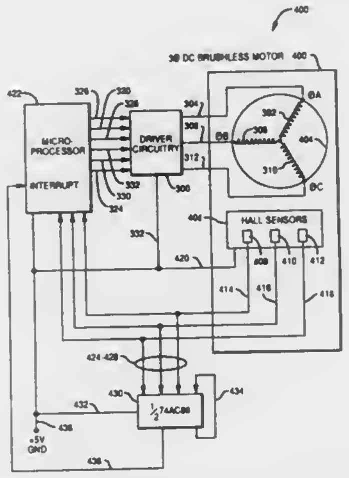
1. Apparatus for communicating with a data-storing device in a contactless manner, the apparatus comprising a resonant circuit having an inductive component which is arranged for inductive coupling to an inductor in the device for delivering power to the device, data detection means coupled to the resonant circuit for sensing changes in the combined impedances of the resonant circuit and the device to detect data transmitted by changes in the impedance of the device, and means for supporting the device such that the inductances of the apparatus and the device are separated by a distance D, wherein D can vary from a minimum of D1, wherein the impedance of the resonant circuit $Z_i = R_i + jX_i$, wherein the reflected impedance of the device in the resonant circuit $Z_t = R_t + jX_t$, and wherein, when D=D1, $R_t > R_i$.

---

### 5,013,899
## SCANNING SYSTEM HAVING LOW QUIESCENT CURRENT SCANNING MIRROR MOTOR DRIVER CIRCUITRY

**Donald A. Collins, Jr., Ithaca, N.Y., assignor to NCR Corporation, Dayton, Ohio**
**Filed Jul. 28, 1989, Ser. No. 387,191**
**Int. Cl.⁵ H02K** *29/08*
**U.S. Cl. 235—462** 10 Claims

1. A laser scanning system capable of reading the likes of a bar code comprising:
a motor having a maximum operating current of 10 milliamps;
a movable scanning element coupled to said motor;
a laser for producing a laser beam for focus upon and deflection by said scanning element, said laser beam being able to scan the likes of a bar code;
sensor means coupled to said motor for outputting signals corresponding to scanning element movement; and

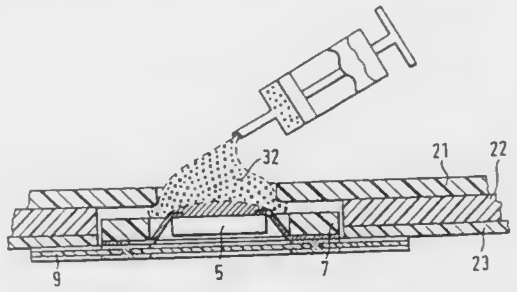


motor drive circuitry for driving said motor in response to output signals from said sensor means, and having a maximum quiescent current of 5 microamps.

---

### 5,013,900
## IDENTIFICATION CARD WITH INTEGRATED CIRCUIT

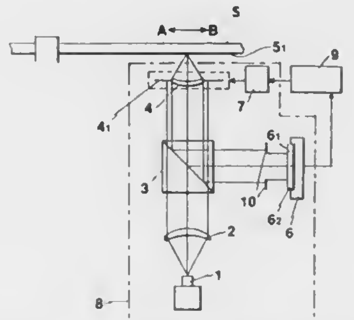
**Joachim Hoppe, Munich, Fed. Rep. of Germany, assignor to GAO Gesellschaft fur Automation und Organisation mbH, Fed. Rep. of Germany**
**Continuation of Ser. No. 53,040, May 22, 1987, Pat. No. 4,843,225, which is a division of Ser. No. 910,351, Sep. 24, 1986, Pat. No. 4,746,392, which is a continuation of Ser. No. 562,217, Dec. 16, 1983, abandoned. This application Jan. 23, 1989, Ser. No. 299,654**
**Claims priority, application Fed. Rep. of Germany, Dec. 28, 1982, 3248385**
**The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.**
**Int. Cl.⁵ G06K** *19/00*
**U.S. Cl. 235—492** 14 Claims



1. A multilayer card construction comprising:
(a) at least one layer having an opening for accommodating an IC module;
(b) at least one layer having space for receiving elastic material;
(c) an IC module positioned in said opening; and
(d) an elastic material filling at least a portion of said space for receiving elastic material in an amount effective for protecting said IC module and minimizing disturbance in said card construction.

### 5,013,901
## TRACKING CONTROL METHOD FOR ELIMINATING A TRACKING ERROR DUE TO A MOVEMENT OF AN OBJECTIVE LENS

**Gohji Uchikoshi, Higashimurayama, Japan, assignor to Nakamichi Corporation, Kodaira, Japan**
**Filed May 18, 1989, Ser. No. 354,147**
**Claims priority, application Japan, May 18, 1988, 63-121401**
**Int. Cl.⁵ G05B** *1/00*
**U.S. Cl. 250—202** 3 Claims

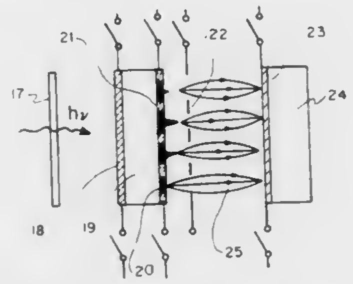


1. A tracking control method for eliminating a tracking error due to a movement of an objective lens comprising the steps of converting an incident parallel beam into a laser convergent beam of spot diameter defined by λ/NA by said objective lens and detecting reflected light quantities of reflected beam obtained by irradiating said laser convergent beam on an optical disk having grooves formed at a predetermined tracking pitch by means of respective detectors having a detection range divided in a radius direction of said optical disk in such a manner that said reflected light quantities are detected at a predetermined region about an optical axis of said reflected beam when said objective lens is located at a reference position where a center of said objective lens is consistent with an optical axis of said incident parallel beam whereby said objective lens is moved in a controlled manner in said radius direction of said optical disk relative to said detectors on an error information of said detected light quantities of said reflected light;
characterized in that a diameter of said laser convergent beam obtained by said objective lens is so set as to be smaller than that of said incident parallel beam and also to be more than said track pitch and that a range of said reflected beam is a predetermined range symmetrical relative to a division line of said detectors in spite of an optical path of said reflected beam moving in accordance with movement of said objective lens in said radius direction.

---

### 5,013,902
## MICRODISCHARGE IMAGE CONVERTER

**Edward F. Allard, 7830 Greeley Blvd., Springfield, Va. 22152**
**Filed Aug. 18, 1989, Ser. No. 395,596**
**Int. Cl.⁵ H01J** *31/50*
**U.S. Cl. 250—213 VT** 11 Claims

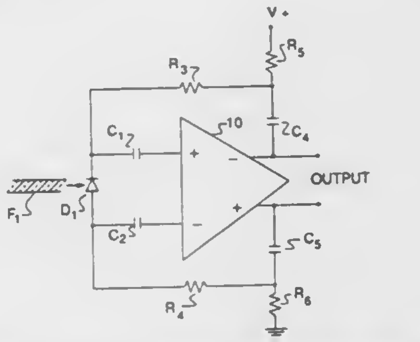


1. A proximity focused direct view, electro-optical converter for converting a target scene lying within the visible to far infrared region of the electro-magnetic spectrum into an enhanced visible image, comprising:
photon detector means having input and output surfaces responsive to a preselected band of frequencies;
means for focusing a photon image of a target scene onto the input surface of said detector, whereby the photons excite said detector to generate and store charge carriers commensurate with the intensity and location of photons falling upon the input surface;
means for generating an electric field;
an electron to photon converter means, whereby said electric field generating means causes a discharge of said charge carriers from the output surface of said detector, in the form of electrons, which are focused onto and strike said electron to photon converter means for effecting thereon an enhanced image of the target scene.

---

### 5,013,903
## LIGHTWAVE RECEIVER HAVING DIFFERENTIAL INPUT

**Bryon L. Kasper, Allentown, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Feb. 26, 1990, Ser. No. 485,195**
**Int. Cl.⁵ H01J** *40/14*
**U.S. Cl. 250—214 A** 7 Claims



1. A lightwave receiver comprising a photodetector capacitively coupled to first and second differential inputs of an amplifier having first and second outputs.
and further comprising means for supplying a DC bias voltage to said photodetector; characterized in that said means for supplying a DC bias voltage comprises a first feedback resistor connected from said first input to a first output of said amplifier, and a second feedback resistor connected from said second input to a second output of said amplifier.

---

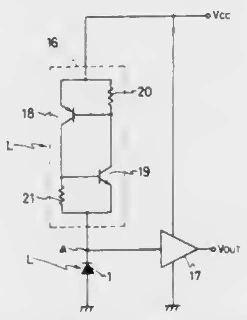
### 5,013,904
## INTEGRATED PHOTODETECTOR WITH HYSTERESIS

**Hideo Muro, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokogama, Japan**
**Filed Nov. 7, 1988, Ser. No. 267,946**
**Claims priority, application Japan, Nov. 5, 1987, 62-169601**
**Int. Cl.⁵ H01J** *40/14*
**U.S. Cl. 250—214 R** 7 Claims

1. An integrated photodetector with hysteresis, comprising:
a photodiode means for detecting the intensity of light; and
optically controlled switch means switched on or off by the light, the photodiode means and the optically controlled switch means being integrated on a single chip, the optically controlled switch means connected in series to a power source and to the photodiode means at a connection point, the ON-level and OFF-level of the optically controlled switch means being determined by trigger level

VOL
1126
ISS
1
MY
7
1991
UMI

and holding current, respectively, thereof, to output one of low and high level signals from the connection point

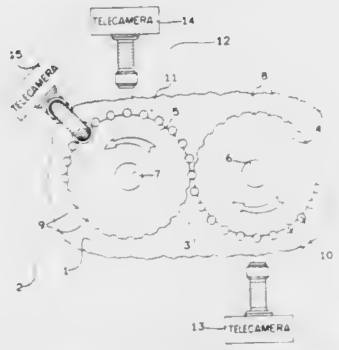


according to a comparison result between the intensity of the light and the trigger level/holding current.

---

## 5,013,905
## METHOD OF ELECTRO-OPTICALLY INSPECTING CIGARETTES

**Armando Neri, Bologna, Italy, assignor to G.D Societa' per Azioni, Bologna, Italy**
**Filed May 25, 1989, Ser. No. 357,429**
**Claims priority, application Italy, May 31, 1988, 3483 A/88**
**Int. Cl.⁵ G01N** *9/04*
**U.S. Cl. 250—223 R** **7 Claims**

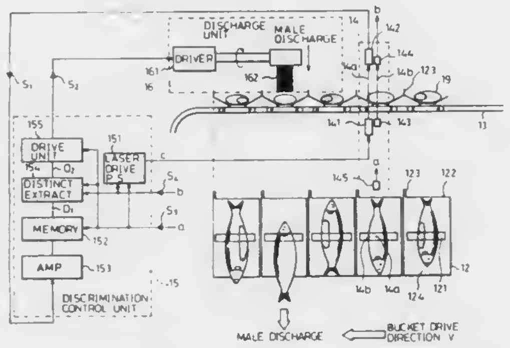


1. A method of electro-optically inspecting cigarettes comprising:
successively feeding cigarettes (**10**) along a route defined by two counter-rotating conveyors (**4,5**), each conveyor having substantially cylindrical peripheral seats (**8,9**) designed to cooperate with respective opposite halves of the lateral outer surface of the cigarettes (**10**);
inspecting the exposed surface portion of each cigarette (**10**) by means of an image producing electro-optical device (**13,14**) as each cigarette (**10**) travels over each conveyor (**4,5**);
inspecting the ends of each cigarette (**10**) by transmitting to another single electro-optical device (**15**) a first image showing one end and a second image showing an opposite end of each said cigarette (**10**);
comparing the images produced by the electro-optical devices (**13,14,15**) with a specimen image; and
employing the result of said comparison for determining acceptance or rejection of each cigarette (**10**).

---

## 5,013,906
## FISH SEX DISCRIMINATION EQUIPMENT AND METHOD

**Tatsuo Miyakawa, Kawasaki; Osamu Kato, Inagi; Yusuke Koike, Tokyo; Keisuke Matsunami, Yokohama, and Naoyuki Sekiya, Kawasaki, all of Japan, assignors to Fujitsu Automation Limited, Kawasaki, Japan**
**Filed Sep. 6, 1989, Ser. No. 403,471**
**Claims priority, application Japan, Sep. 13, 1988, 63-229493**
**Int. Cl.⁵ G01N** *9/04*
**U.S. Cl. 250—223 R** **11 Claims**



1. Fish sex discrimination equipment comprising:
an automatic supplying unit for separating and supplying fish to be discriminated,
buckets on which the fish are put,
a bucket conveyor for carrying the buckets,
a light projection and reception detection means for projecting light onto a genital gland area of the fish and for detecting transmission light from the fish, the transmission light being scanned in a direction from belly to back or from back to belly in the fish by the movement of the bucket,
a discrimination control means for discriminating whether the fish are male or female based on data of the detected transmission light,
a discharge means for discharging the discriminated fish having the same sex, and
a first conveyor means and a second conveyor means for carrying the discriminated and separated male and female fish, respectively,
wherein the fish to be discriminated are automatically supplied and the sex of the fish is discriminated and the fish are separated.

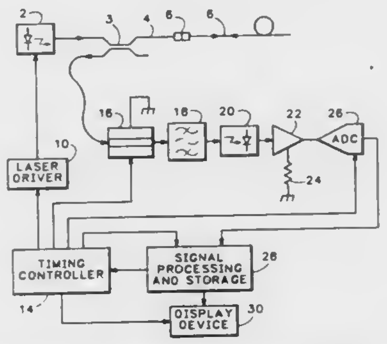
---

## 5,013,907
## OPTICAL TIME DOMAIN TESTING INSTRUMENT

**Glenn Bateman, Redmond, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**
**Filed Mar. 27, 1990, Ser. No. 500,156**
**Int. Cl.⁵ H01J** *5/16*
**U.S. Cl. 250—227.12** **10 Claims**

1. An optical time domain testing instrument comprising:
a laser light source,
means for optically coupling the laser light source to an optical fiber under test,
means for energizing the laser light source to launch a light pulse into the fiber under test,
an optical amplifier,
means for optically coupling the optical amplifier to the fiber under test,
a photodetector,

means for optically coupling the optical amplifier to the photodetector, and

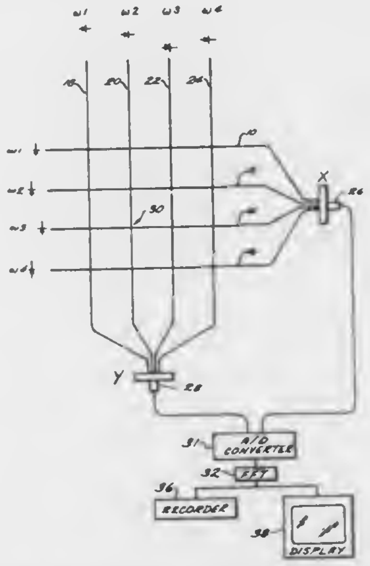


means for selectively adjusting the gain of the optical amplifier as a function of the time following launch of a light pulse.

---

## 5,013,908
## BREAK DETECTION SYSTEM USING OPTICAL FIBERS HAVING UNIQUE FREQUENCY MODULATED LIGHT

**James Chang, Colorado Springs, Colo., assignor to Kaman Sciences Corporation, Colorado Springs, Colo.**
**Filed Nov. 28, 1988, Ser. No. 276,629**
**Int. Cl.⁵ G08B** *13/12*
**U.S. Cl. 250—227.15** **19 Claims**

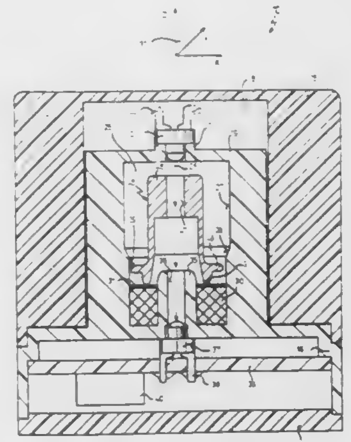


1. Fiber optic detection system comprising:
a plurality of fiber optic elements, each element having an input end and an output end;
light inputting means for inputting modulated encoded light to each of said input ends of said fiber optic elements wherein each fiber optic element receives a light code having a unique modulated frequency so that each fiber optic element will be assigned a different pre-selected frequency;
light detecting means for interrogating the output ends of said fiber optic elements wherein the absence of one or more unique light codes indicates a break in at least one of said fiber optic elements.

---

## 5,013,909
## OPTO-ELECTRICAL ACCELERATION SENSOR HAVING A MECHANICAL TILTING ELEMENT

**Manfred Sondergeld, and Claus Wissig, both of St. Georgen, Fed. Rep. of Germany, assignors to Gebr. Schmidt Fabrik fuer Feinmechanik, St. Georgen, Fed. Rep. of Germany**
**Filed Jun. 8, 1989, Ser. No. 363,207**
**Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819759**
**Int. Cl.⁵ G01D** *5/34*
**U.S. Cl. 250—231.1** **8 Claims**



1. An acceleration sensor comprising:
a light emitting element for emitting a beam of light along a vertical first axis;
a light receiving element arranged at a distance from said light emitting element and positioned for receiving said beam of light and for generating an electrical signal when said beam of light impinges on said light receiving element;
a tilting element arranged between said light emitting element and said light receiving element, and being of axially symmetrical design with respect to a second axis, and being provided with a bore along said second axis, said tilting element having a horizontal bottom surface, and having a radially projecting collar arranged at a distance above said bottom surface, said collar having a peripheral edge constituting a location for a center of tilting movement of said tilting element between a first operational position with said axis arranged substantially coaxial with said first axis to enable said beam of light to pass through said bore and impinge on said light receiving element and a second operational position with said second axis being tilted relative to said first axis to interrupt said beam of light and prevent same from impinging on said light receiving element, said tilting element being designed with a three-dimensional mass distribution and, hence, an axial position of its center of gravity such that the quotient of a lift-off acceleration acting on said tilting element in said first operational position when sufficiently high to lift said tilting element off against gravity along said first axis divided by a tilting acceleration acting on said tilting element in a direction perpendicular to said first axis when sufficiently high to tilt said tilting element about said center of tilting movement, is greater than unity;
guide means arranged around said tilting element and having a horizontal first support surface extending generally perpendicularly to said first axis for receiving said bottom surface and having a cylindrical second support surface extending generally coaxially with said first axis and surrounding said collar with radial spacing to allow said collar to bear against said second support surface when said tilting element tilts from said first operational position into said second operational position in a limited tilting movement;

VOL
1126
ISS
1
MY
7
1991
UMI

magnetic holding means being axially polarized and acting between said bottom surface and said first support surface to exert a vertically directed holding force on said tilting element.

---

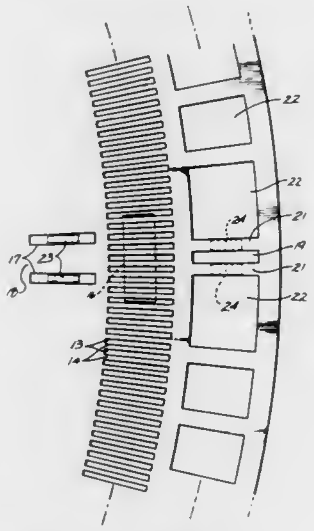
## 5,013,910
## SHAFT ANGLE ENCODER WITH A SYMMETRICAL CODE WHEEL

**Howard C. Epstein, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 16, 1989, Ser. No. 422,111**

**Int. Cl.⁵ G01D *5/34***

**U.S. Cl. 250—231.17 24 Claims**



1. A position encoder comprising:
a source of illumination;
at least one data photodetector;
a movable code member between the source of illumination and the data photodetector including a data track of alternating windows and spokes for alternately illuminating and occulting the data photodetector upon movement of the code member;
a first index track on the code member beside the data track and having a pair of windows spaced apart from each other by an opaque area, the windows being symmetrical in a longitudinal direction with respect to the data track;
a second index track on the code member beside the data track and having at least a pair of windows spaced apart from each other by an opaque area, the opaque area being symmetrical in a longitudinal direction with respect to the windows in the first index track;
a first pair of index photodetectors adjacent to the first index track and arranged to be illuminated by way of the windows in the first index track when the code member is in an index position; and
a second pair of index photodetectors adjacent to the second index track and arranged to be occulted by the opaque area in the second index track when the code member is in the index position, the relative positions of the windows and opaque areas in the first and second index tracks being such that illumination of any photodetector for the first index track is offset from occulting of any photodetector for the second index track except in the index position.

---

## 5,013,911
## OPTICAL SENSOR UNIT WITH SEALED OPTICAL ELEMENT AND CABLE CONNECTOR

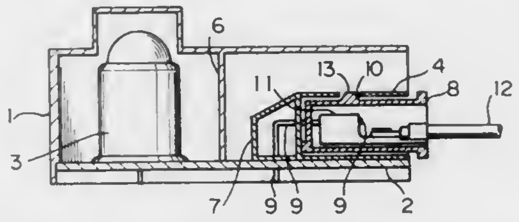
**Yoshinori Koshida; Kemmi Ayukai, and Shin-ichi Suto, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed May 25, 1989, Ser. No. 357,136**

Claims priority, application Japan, May 27, 1988, 63-130987; May 27, 1988, 63-130988

**Int. Cl.⁵ H01J *5/02***

**U.S. Cl. 250—239 5 Claims**



1. An optical sensor unit comprising:
an optical element for detecting a predetermined object to be detected;
a case, formed of a single member, covering the optical element so that the optical element is tight sealed as a whole;
a connector positioned adjacent to the optical element for connecting the optical element to a wiring cable of external equipment, and for separating the optical element and the wiring cable from each other; and
a printed circuit board having a predetermined wiring thereon for connecting the optical element to the connector.

---

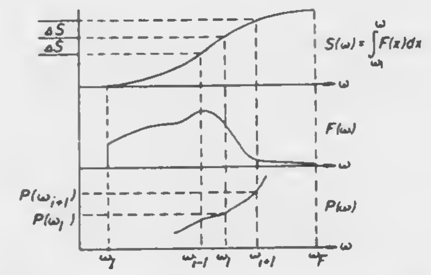
## 5,013,912
## GENERAL PHASE MODULATION METHOD FOR STORED WAVEFORM INVERSE FOURIER TRANSFORM EXCITATION FOR FOURIER TRANSFORM ION CYCLOTRON RESONANCE MASS SPECTROMETRY

**Shenheng Guan, and Patrick R. Jones, both of Stockton, Calif., assignors to University of the Pacific, Stockton, Calif.**

**Filed Jul. 14, 1989, Ser. No. 380,849**

**Int. Cl.⁵ H01J *49/26***

**U.S. Cl. 250—282 5 Claims**



1. A method for generating an FT-ICR excitation signal having reduced dynamic range over a given time duration comprising the steps of:
providing a desired excitation spectral magnitude function defined over a given frequency interval starting at a first frequency and ending at a second frequency;
dividing the desired excitation spectral magnitude function into a predetermined number of frequency segments of equal area;
utilizing the uncertainty principle of the Fourier transform to determine the approximate width, W, of the frequency segments in the time domain;
forming a phase function over said given frequency interval having a constant slope in each frequency segment, with the magnitude of the constant slope in a given frequency segment equal to n, with n being an integer indicating one more than the number of frequency segments disposed between the given frequency segment and said first frequency, multiplied by W;
performing the IFT of said desired excitation magnitude function and said defined phase function to generate an excitation function characterized by said desired excitation magnitude function having a dynamic range reduced by a factor about equal to said predetermined number and having nearly uniform excitation power over the time duration of the excitation signal and applying said excitation signal to excitation plates in an ion cyclotron resonance mass spectrometer.

---

## 5,013,913
## METHOD OF ILLUMINATING AN OBJECT IN A TRANSMISSION ELECTRON MICROSCOPE

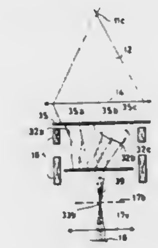
**Gerd Benner, Aalen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany**

**Filed Jul. 24, 1989, Ser. No. 384,273**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825103**

**Int. Cl.⁵ H01J *29/46***

**U.S. Cl. 250—307 15 Claims**



1. Method of illuminating an object in a transmission electron microscope including an electron source and a plurality of condenser lenses for generating an electron beam travelling along an optical axis, a single-field condenser objective lens (SFCO lens) mounted on said optical axis downstream of said plurality of condenser lenses and a deflection system arranged on said optical axis upstream of said SFCO lens, the method comprising the steps of:
exciting at least two of said condenser lenses to image said electron source with a varying, pregiven demagnification;
magnifying the object to a predetermined magnification with the aid of imaging stages disposed downstream of said plurality of condenser lenses;
shaping the electron beam to a different size by means of at least two diaphragm units arranged in respective planes upstream of said SFCO lenses in dependence upon said magnification;
deflecting at least a component of the shaped beam back into the optical axis; and,
said electron beam being shaped by said diaphragms in dependence upon said magnification so as to cause only one area of the object to be illuminated which is not significantly larger than the imaged area.

---

## 5,013,914
## METHOD AND APPARATUS FOR GENERATING ELECTRON CHANNELING PATTERNS

**Tadashi Otaka, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

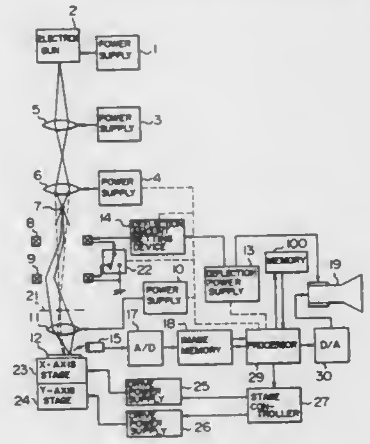
**Filed Jul. 17, 1990, Ser. No. 553,405**

**Claims priority, application Japan, Jul. 21, 1989, 1-187351**

**Int. Cl.⁵ H01J *37/26*; G01N *23/225***

**U.S. Cl. 250—310 18 Claims**

1. An apparatus for generating respective electron channeling patterns from a plurality of grains on a sample, comprising:
means for irradiating particles onto the sample to obtain from the sample an information signal characterizing the sample and specifying representative positions of the grains on the basis of the information signal;
means for storing said specified representative positions of the grains;
means for comparing a predetermined position of a collimated electron beam for detecting the electron channeling patterns with said representative positions of the grains to cause said representative positions of the grains to coincide with said predetermined position of said collimated electron beam; and
means for angularly scanning said collimated electron beam in the predetermined position thereof to obtain the electron channeling patterns from the grains which are successively positioned to said predetermined position of said collimated electron beam.



---

## 5,013,915
## TRANSMISSION TYPE ELECTRON MICROSCOPE

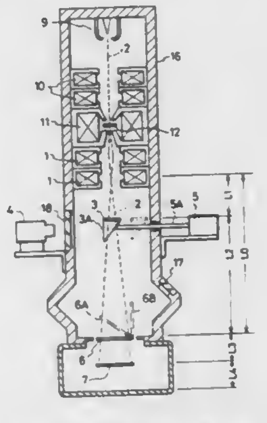
**Shigeto Isakozawa, and Toshiyuki Ohashi, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**PCT No. PCT/JP88/00482, § 371 Date Jan. 11, 1989, § 102(e) Date Jan. 11, 1989**

**PCT Filed May 20, 1988, Ser. No. 298,886**

**Int. Cl.⁵ H01J *37/26***

**U.S. Cl. 250—311 11 Claims**



1. A transmission type electron microscope, comprising:
means for generating an electron beam;
means for irradiating a sample with the electron beam so as to transmit the electron beam through the sample;
means for projecting the transmitted electron beam onto a predetermined plane to form an image of the transmitted electron beam on the predetermined plane;

VOL
1126
ISS
1
MY
7
1991
UMI

- a fluorescent screen disposed on the predetermined plane for converting the image of the transmitted electron beam into a visible image;
- an electron beam illuminant removably disposed at a first position between the electron beam projecting means and the fluorescent screen so as to be exposed to the transmitted electron beam, thereby producing a light image of the transmitted electron beam;
- means for receiving and displaying the light image of the transmitted electron beam whereby the light image is produced before the transmitted electron beam reaches the predetermined plane;
- means for shifting the electron beam illuminant from the first position to a second position at which the electron beam illuminant is prevented from being exposed to the transmitted electron beam.

---

### 5,013,916
### METHOD AND APPARATUS FOR RECORDING AND READING OUT RADIATION IMAGES

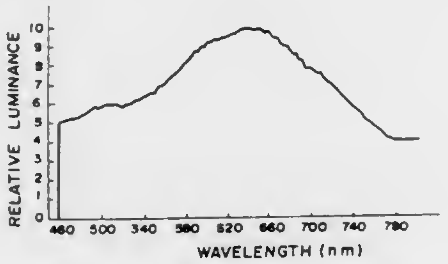
**Chiyuki Umemoto; Takashi Nakamura; Kenji Takahashi, and Yuichi Hosoi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 27, 1990, Ser. No. 499,755**

**Claims priority, application Japan, Mar. 27, 1989, 1-74710; Jun. 23, 1989, 1-161028**

**Int. Cl.$^5$ G01N *23/04;* C09K *11/86***

**U.S. Cl. 250—327.2** **17 Claims**



1. A radiation image recording and read-out method comprising the steps of:

(i) exposing a recording material to radiation carrying image information in order to store a radiation image thereon, said recording material being provided with a stimulable phosphor layer constituted of a cerium activated lanthanum oxyhalide phosphor which is represented by the general formula

LaOX:xCe

where X is at least one halogen selected from the group consisting of Cl, Br, and I, and x is a number satisfying the condition $0<x\leqq 0.2$, and in which the atomic ratio X/La satisfies the condition

$$0.50<X/La\leqq 0.998$$

(ii) thereafter exposing said recording material to stimulating rays, which cause said recording material to emit light in proportion to the amount of energy stored thereon during its exposure to radiation, and photoelectrically detecting the emitted light in order to obtain an image signal,

(iii) carrying out a primary erasing operation in order to release energy remaining on said recording material after the image signal has been obtained therefrom, and

(iv) immediately before a next radiation image is stored on said recording material which has been erased during said primary erasing operation, carrying out a secondary erasing operation in order to release energy which was stored on said recording material after said primary erasing operation was carried out thereon.

---

### 5,013,917
### IMAGING LIDAR SYSTEM USING NON-VISIBLE LIGHT

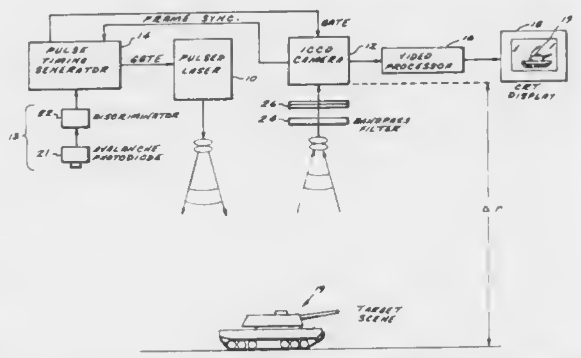
**Bobby L. Ulich, Tuscon, Ariz., assignor to Kaman Aerospace Corporation, Bloomfield, Conn.**

**Continuation-in-part of Ser. No. 216,087, Jul. 7, 1988, and a continuation-in-part of Ser. No. 216,341, Jul. 7, 1988, Pat. No. 4,862,257. This application Oct. 12, 1988, Ser. No. 256,778**

**The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.**

**Int. Cl.$^5$ H04N *7/18***

**U.S. Cl. 250—330** **32 Claims**



1. A method of detecting and imaging an object at night or where atmospheric propagation of visible light is severely hampered by fog, dust, smoke, haze or snow including the steps of:

- selectively generating pulses of non-visible light;
- projecting said pulses of non-visible light at an object at night or where atmospheric propagation of visible light is severely hampered by fog, dust, smoke, haze or snow;
- detecting said pulses of light reflected back from said object after a time delay corresponding to the round-trip propagation time of said light pulses to and from said object using at least one camera means;
- detecting the leading edge of light reflected back from said object using glint detection means;
- gating said at least one camera means on one pulse after said glint detection means detects the leading edge of the reflected light; and
- converting the detected pulses of non-visible light to a video image of said object.

---

### 5,013,918
### MULTICOLOR INFRARED PHOTODETECTOR

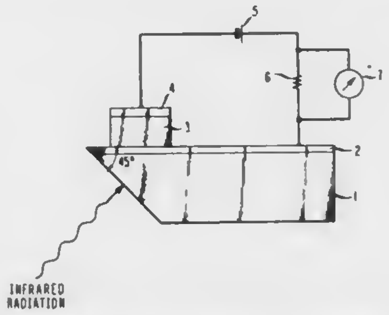
**Kwong-Kit Choi, Tinton Falls, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 2, 1990, Ser. No. 503,015**

**Int. Cl.$^5$ H01J *40/14***

**U.S. Cl. 250—338.4** **3 Claims**

1. An infrared-radiation detection device comprising a semiconductor superlattice consisting of a plurality of quantum well units, each unit composed of a thick barrier, a thick quantum well having two confined states $E_1$ and $E_2$, a thin barrier, and a thin quantum well having one confined state $E_1$, adjusted to be very close to $E_2$ when the wells are considered in isolation, such that the thick quantum well and the thin quantum well are brought close enough together that the wells become coupled and the level structure becomes common to both wells, and contact means for electrically biasing said superlattice and for sensing an electrical signal in response to radiation incident on said superlattice.



---

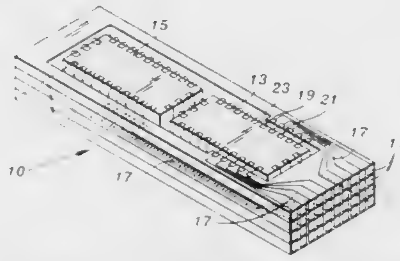
### 5,013,919
### DETECTOR ELEMENT SIGNAL COMPARATOR SYSTEM

**Allen L. Solomon, Fullerton, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Oct. 17, 1989, Ser. No. 422,731**

**Int. Cl.$^5$ G01J *5/02***

**U.S. Cl. 250—349** **17 Claims**



1. A noise reduction circuit for an infrared detector module having a plurality of infrared detector elements, the circuit comprising:

(a) a comparator circuit contained within the module and in electrical communication with said detector elements; and

(b) wherein said comparator circuit is operative to compare an output from a first selected detector element to an output from any other selected detector element of the module.

---

### 5,013,920
### INFRARED ANALYZER WITH IMPROVED CALIBRATION

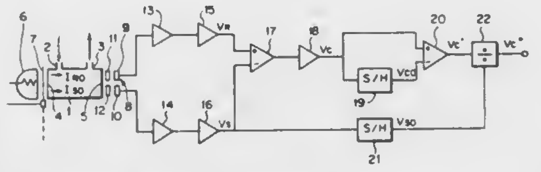
**Ichiro Asano, Kouka; Kennosuke Kojima, Ohtsu, and Aritoshi Yoneda, Otokuni, all of Japan, assignors to Horiba, Ltd., Kyoto, Japan**

**Filed May 18, 1990, Ser. No. 526,242**

**Claims priority, application Japan, May 20, 1989, 1-127597**

**Int. Cl.$^5$ G01D *18/00;* G01N *21/61***

**U.S. Cl. 250—343** **7 Claims**



1. An infrared analyzer comprising:

- a sample cell for holding a specimen gas to be analyzed to determine the amount of a predetermined gas, if any;
- a source of infrared rays, for passing through the sample cell;
- means for measuring the infrared rays that have passed through the sample cell to provide one measurement signal indicative of absorption of infrared rays, and another comparative signal indicative of the intensity of infrared rays through the sample cell;
- a subtracter circuit for providing an output difference signal between the measured signal and the comparator signal;
- means connected to the output of said subtracter circuit for storing an output difference signal when a zero gas condition relative to the specimen gas is established in the sample cell;
- means connected to the measurement means for holding the zero gas measurement signal, and
- means for processing the output difference signal with a sample gas in the cell by modifying the output difference signal with the zero gas difference signal and the zero gas measurement signal to provide an output signal representative of the concentration of the predetermined gas.

---

### 5,013,921
### X-RAY DETECTOR

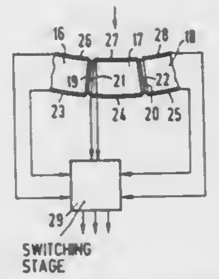
**Horst Bruening, Goessweinstein, and Wolfgang Schubert, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Sep. 8, 1989, Ser. No. 404,635**

**Claims priority, application European Pat. Off., Sep. 26, 1988, 88115837**

**Int. Cl.$^5$ G01T *1/20***

**U.S. Cl. 250—370.11** **2 Claims**



1. A detector for radiation propagating in a propagation direction comprising:

- a scintillation element having a radiation entry face and a radiation exit face disposed in succession in the direction of radiation propagation; and
- first and second amorphous hydrogenated silicon semiconductor layers respectively disposed on and in optical contact with each of said entry face and said exit face of said scintillation element.

---

### 5,013,922
### REDUCED THICKNESS RADIATION WINDOW FOR AN IONIZATION DETECTOR

**Francis H. Little, and Douglas E. Ingram, both of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio**

**Filed Mar. 13, 1990, Ser. No. 492,169**

**Int. Cl.$^5$ G01T *1/18***

**U.S. Cl. 250—385.1** **12 Claims**

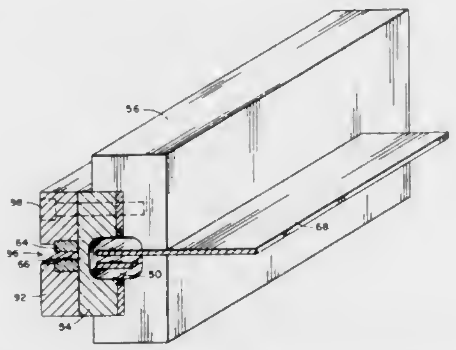
7. Apparatus for increasing response to low intensity radiation in a radiation detector having a housing surrounding a chamber, a window adjoining the chamber and a slot formed in one side of the chamber for admitting at least one circuit board into the chamber, the board supporting an array of elongated detector elements on a surface thereof, at least one electrically conductive plate within the chamber and substantially parallel with the array of detector elements, sealant means in the slot surrounding the circuit board for providing a gas impervious seal, an ionizable gas contained in the chamber under high pressure and a collimator mounted in a collimator support and

VOL
1126
ISS
1
MY
7
1991
UMI

positioned outside the chamber for directing ionizing radiation through the window for detection, the collimator, comprising:

a pair of spaced radiation attenuating bars defining a silt therebetween, the bars being fastened within a recess in the collimator support;

the collimator support having a slot formed therein and extending through the support from the slit; and

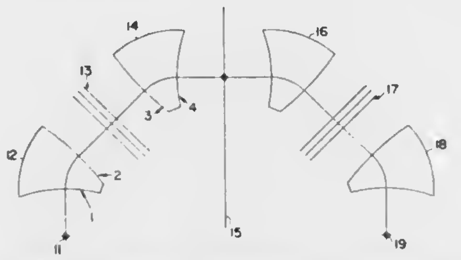


means clamping the collimator support to the housing and against the window such that a major portion of the window abuts the collimator support and is extremely support thereby to prevent the window from being distorted by the high pressure ionizable gas, the window having a thickness less than that required to withstand the gas pressure in the chamber without distorting.

---

### 5,013,923
## MASS RECOMBINATOR FOR ACCELERATOR MASS SPECTROMETRY

**Albert E. Litherland, Toronto, and Linas R. Kilius, Thornhill, both of Canada, assignors to University of Toronto Innovations Foundation, Toronto, Canada**
**Filed Mar. 1, 1990, Ser. No. 487,207**
**Int. Cl.$^5$ H01J *3/12***
**U.S. Cl. 250—396 R** **5 Claims**

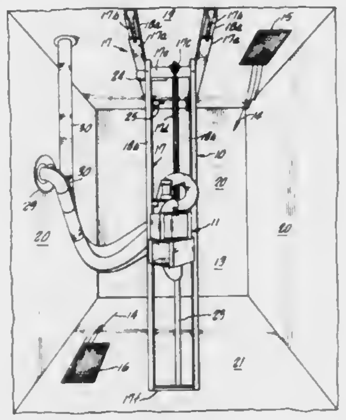


1. A mass recombinator, comprising in combination means for producing a beam of ions including ions of a plurality of masses so that the ions in said beam follow a family of trajectories including central trajectories, magnetic means for bending said ion beam in a bending plane, said magnetic means also focusing said ion beam in the bending plane but causing no primary focusing in planes perpendicular to (orthogonal to) said bending plane, electric means for focusing said ion beam in the non-bending plane (defined as a plane which is transverse to the bending plane and includes the beam trajectory in the area of focusing action), said magnetic means including at least two pairs of deflecting magnets traversed in sequence by the ion beam, the boundary faces of said magnets being normal to the central trajectories of the ion beam as they traverse the boundary, said electric means comprising an electric lens between the members of each pair of magnets.

---

### 5,013,924
## CURING COMPOSITIONS WITH ULTRAVIOLET LIGHT

**Tom Armstrong, Van Nuys; Alex Bimanand, Burbank; Dennis M. Jacques, Sr., Palmdale, and John A. Raffo, Simi Valley, all of Calif., assignors to Sierracin Corporation, Sylmar, Calif.**
**Filed Mar. 3, 1988, Ser. No. 163,701**
**Int. Cl.$^5$ H01J *37/20***
**U.S. Cl. 250—504 R** **15 Claims**

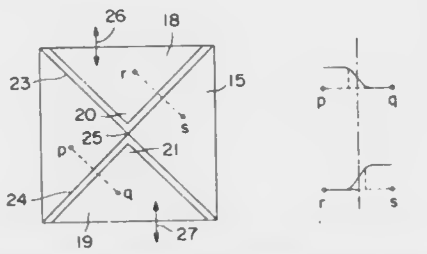


1. Apparatus for curing a composition on a unit by ultraviolet light comprising an ultraviolet light generator, a mobile mounting for the generator, means for selectively moving the generator on its mounting relative to the unit in at least three directions relative to the unit and according to a prerequisite procedure, wherein the mounting is a gantry, the generator being movable backwards and forwards in a first direction in relation to the unit, upwardly and downwardly in a second direction in relation to the unit, and being oscillatible sideways in a third direction in relation to the unit.

---

### 5,013,925
## COLLIMATING MARK DEVICE

**Nicolaas P. Elshoud, Delft, Netherlands, assignor to B.V. Optische Industrie "De Oude Delft" , Delft, Netherlands**
**PCT No. PCT/EP88/00391, § 371 Date Oct. 23, 1989, § 102(e) Date Oct. 23, 1989, PCT Pub. No. WO88/08953, PCT Pub. Date Nov. 17, 1988**
**PCT Filed May 3, 1988, Ser. No. 424,265**
**Claims priority, application Netherlands, May 7, 1987, 8701074**
**Int. Cl.$^5$ G02B *23/00***
**U.S. Cl. 250—505.1** **21 Claims**

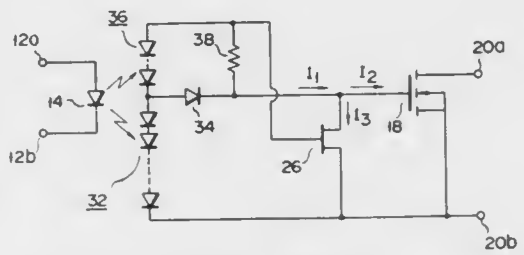


21. An adjustment assembly for aligning a line of direction of an infrared sight and firing direction of a gun, which comprises a collimating mark device comprising means for forming an infrared collimating mark having two essentially V-shaped intensity distributions with points of said V-shaped intensity distributions directed to each other, said collimating mark representing the firing direction of said gun, means for imaging said collimating mark in visible form in a sight means for adjusting said sight to coincidence said visible image with a fixed alignment mark in said sight.

---

### 5,013,926
## PHOTOCOUPLER APPARATUS CAPABLE OF SHORTENING SWITCHING TIME OF OUTPUT CONTACT

**Yoshiaki Aizawa, Machida, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed May 16, 1990, Ser. No. 523,877·**
**Claims priority, application Japan, May 17, 1989, 1-123611**
**Int. Cl.$^5$ G02B *27/00***
**U.S. Cl. 250—551** **16 Claims**



1. A photocoupler apparatus comprising:

a light-emitting element for emitting light by an input signal;

a first photoelectromotive force diode array for generating photoelectromotive force upon reception of an optical signal from said light-emitting element;

a rectifying element having one end connected in series to one end of said first photoelectromotive force diode array;

an output MOSFET having a gate connected to the other end of said rectifying element and a substrate connected to the other end of said first photoelectromotive force diode array;

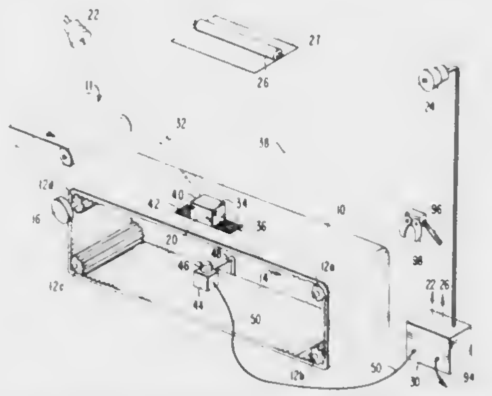
a series circuit connected between both ends of said rectifying element and including a second photoelectromotive force diode array for generating photoelectromotive force upon reception of an optical signal from said light-emitting element and an impedance element; and

a normally-ON drive transistor having a control electrode connected to a junction between said second photoelectromotive force diode array and said impedance element, and having an energizing electrode having one end and the other end connected to said gate and substrate of said output MOSFET.

---

### 5,013,927
## OBJECT LOCATION APPARATUS

**Constantine J. Tsikos, West Berlin, and Jerome P. Rosenfeld, Collingswood Township, Camden County, both of N.J., assignors to General Electric Company, Moorestown, N.J.**
**Filed Apr. 27, 1990, Ser. No. 515,834**
**Int. Cl.$^5$ G01N *21/86***
**U.S. Cl. 250—561** **17 Claims**



1. An apparatus adapted for receiving an object and for determining the location of at least one portion of the object, said apparatus comprising:

a support surface including first and second sides, and adapted for supporting objects on said first side of said surface;

at least non-diffuse first and second sources of electromagnetic radiation, the wavelength of which is selected so that said support surface is translucent thereto and said object is expected to be opaque thereto, said first and second sources being located at predetermined first and second separate positions, spaced away from and directing radiation toward said first side of said surface, whereby, if an object is present on said support surface, at least one shadow of said object is cast upon said surface by said object;

imaging means spaced away from said second side of said support surface for viewing said second side and for generating image signals representing illuminated and shadowed portions of said second side of said support surface;

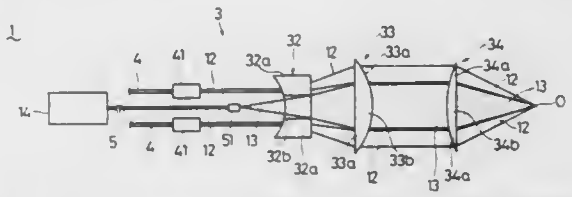
memory means for storing memory signals representative of at least the relative locations of said first and second sources, said support surface and said imaging means; and

signal processing means coupled to said imaging means and to said memory means for processing said image signals and said memory signals and for generating signals representative of the location of at least one portion of an object located on said support surface.

---

### 5,013,928
## OPTICAL EQUIPMENT OF FIBER LASER DOPPLER VELOCIMETER

**Yuji Ikeda, Maison de Cascade Rokko 205, 111-1 Miyasaka, Suishasindenaza, Nada-ku, Kobe-shi, Hyogo-ken, and Tsuyoshi Nakajima, 3-9 Mefuyamate, Takarazuka-shi, Hyogo-ken, both of Japan**
**Filed Feb. 28, 1990, Ser. No. 486,483**
**Claims priority, application Japan, Mar. 27, 1989, 1-76078**
**Int. Cl.$^5$ G01N *15/06;* G01P *3/36***
**U.S. Cl. 250—574** **10 Claims**



1. An optical equipment of fiber laser Doppler velocimeter, comprising:

transmitting fibers to transmit laser power,

a receiving fiber to transmit light scattered; and

a probe wherein the transmitting fibers and the receiving fiber are connected:

the probe, comprising:

- a fiber connector of the receiving fiber. fiber connectors of the transmitting fibers.
- a first expand lens mounted in front of the fiber connectors.
- a second expand lens mounted in front of the first expand lens in the same axis; and
- a front lens mounted in front of the second expand lens in the same axis.

the first expand lens. having

- a perforated part to introduce a scattered light from a measurement volume to the receiving fiber end; and
- an outer part to expand incident beam diameters and its distance.

the second expand lens. having

- an outer part to collimate the expanded beam diameter and introduce to the front lens; and an inner part to

VOL
1126
ISS
1
MY
7
1991
UMI

focus the light scattered from the measurement volume on the receiving fiber end,
the front lens, having
an outer part to focus the beams and make the measurement volume; and
an inner part to collect the light scattered from the measurement volume.

---

### 5,013,929

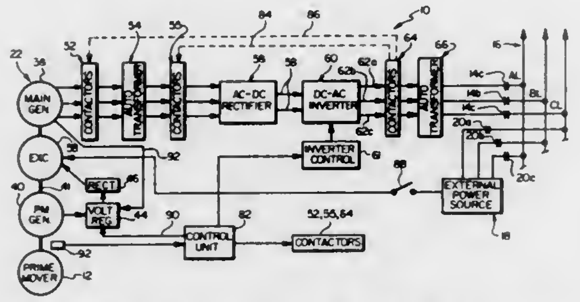
## POWER CONVERSION SYSTEM HAVING PRIME MOVER START CAPABILITY

**P. John Dhyanchand, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Nov. 22, 1989, Ser. No. 440,273**

**Int. Cl.$^5$ F02N** *11/04*

**U.S. Cl. 290—31** **9 Claims**



1. A power conversion system operable in a generating mode to convert motive power into electrical power and in a starting mode to convert electrical power into motive power utilizing an external power source and a generator having armature windings, comprising:
an AC/DC power rectifier;
a DC/AC inverter;
a DC link coupling said rectifier with said inverter;
said rectifier having an input and said inverter having an output;
a first transformer and a second transformer;
first means operable when in said generating mode to couple the armature windings to said first transformer and operable when in said starting mode to couple the armature windings to said output;
said first means further being operable when in said generating mode to couple said first transformer to said input;
said first means still further being operable when in said generating mode to couple said output to said second transformer; and
second means operable when in said generating mode to couple said second transformer to an AC load and when in said starting mode to couple said second transformer to the external power source.

---

### 5,013,930

## REMOTE CONTROL LEVER MODULE

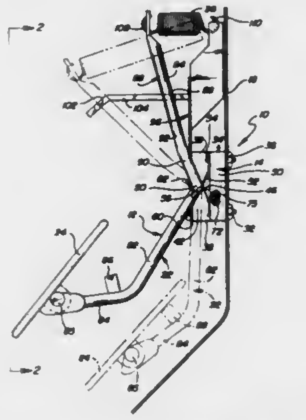
**Joseph G. Spakowski, Rochester, and Donald D. Stoltman, Henrietta, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 29, 1989, Ser. No. 330,251**

**Int. Cl.$^5$ B60L** *1/00*

**U.S. Cl. 307—10.1** **20 Claims**

1. A remote control lever module comprising:
a support means including a pedal base and a bearing means, said bearing means being supported on said pedal base;
a lever including a shaft pivotably supported by said bearing means for oscillation about the shaft axis between a nonactuating position and various actuating positions, an actuating arm extending from said shaft at an angle thereto for moving said shaft between said nonactuating position and said various actuating positions, and return means acting on said lever when said shaft is in said various actuating positions to urge said shaft toward said nonactuating position;
a magnet means fixed on said shaft and movable therewith to provide a movable magnetic field of varying strength in an effective zone adjacent one side of said shaft, said effective zone being adjacent to said pedal base; and



a magnetic field sensor fixed to said pedal base adjacent to said shaft in the effective zone of the magnetic field and operative to sense the variation in strength of said magnetic field at said nonactuating position and said various actuating positions of said shaft and to form a readable output signal proportional to said variations for indicating the angular position of said shaft.

---

### 5,013,931

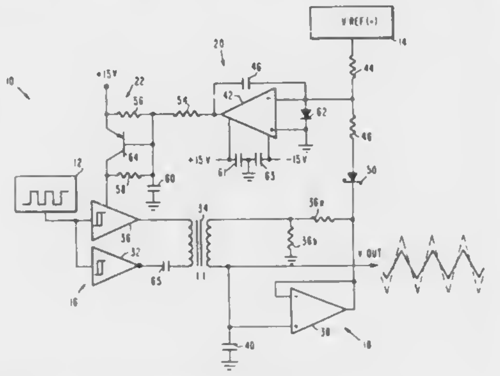
## PROGRAMMABLE TRIANGLE WAVE GENERATOR

**Earl M. Estes, Jr., Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Nov. 15, 1988, Ser. No. 271,475**

**Int. Cl.$^5$ H03K** *5/00*

**U.S. Cl. 307—261** **9 Claims**



1. A triangle wave generator comprising:
a source of square wave input signals;
a source of variable reference voltage signals;
first amplifier means coupled to the square wave input source for amplifying the square wave input signals therefrom and a transformer means coupled to the first amplifier means for transmitting the amplified square wave output signals therefrom to an output of the transformer means:
resistor and capacitor means coupled to the transformer means for generating a triangle wave signal; at the transformer means output, in response to the transmitted square wave output signals;
second amplifier means coupled to the transformer for buffering and amplifying the triangle wave signal;
said resistor and capacitor means including an attenuator means for preventing oscillation of the second amplifier; and
third amplifier means for sampling and comparing the amplitude of the buffered and amplified triangle wave output signals to the amplitude of the variable reference voltage signals to generate output error signals in response thereto.

---

### 5,013,932

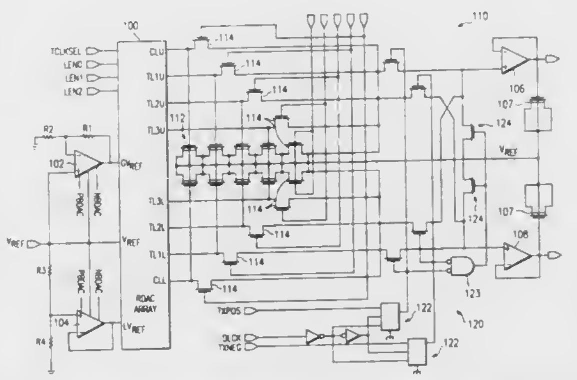
## WAVESHAPING SUBSYSTEM USING CONVERTER AND DELAY LINES

**Michael D. Smith, Lewisville, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.**

**Filed Jun. 26, 1989, Ser. No. 371,465**

**Int. Cl.$^5$ H03K** *5/01. 12/00*

**U.S. Cl. 307—268** **23 Claims**



17. A method for transmitting data in accordance with a predetermined protocol which requires loading-dependent voltage levels, comprising the steps of:
providing a transmit line interface unit, which includes
delay stages which provide predetermined signals on a plurality of control lines, in accordance with time-domain boundaries of a waveform compatible with the predetermined protocol, and
a voltage generator circuit, connected to receive said control lines, and configured to output a voltage which is selected, in accordance with the instantaneous state of said control lines, from a set of plural possible voltages;
programming said voltage generator circuit, to change said set of possible voltages, in accordance with load characteristics of a particular installation;
and repeatedly clocking said delay lines stages to produce said compatible waveform at the output of said voltage generator circuit.

---

### 5,013,933

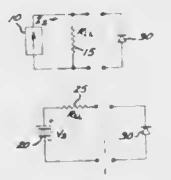
## BIAS CIRCUIT FOR SOLID STATE DEVICES

**Robert L. Eisenhart, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 16, 1985, Ser. No. 809,638**

**Int. Cl.$^5$ H03K** *3/01. 3/313;* **H03B** *5/12*

**U.S. Cl. 307—296.1** **5 Claims**



1. A bias circuit for supplying bias power to a solid state power device for generating output energy at RF frequencies, comprising:
a power supply; and
a resistive element coupled to said power supply, said resistive element having a value selected to provide a predetermined bias loadline which causes said solid state device to generate constant output power.

---

### 5,013,934

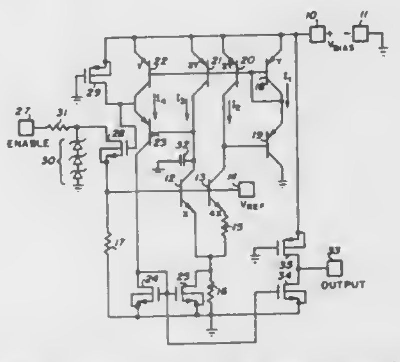
## BANDGAP THRESHOLD CIRCUIT WITH HYSTERESIS

**Stephen W. Hobrecht, Los Altos, and Michael C. L. Chow, San Mateo, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed May 8, 1989, Ser. No. 350,354**

**Int. Cl.$^5$ H03K** *3/01, 3/26, 3/29;* **G05F** *3/16*

**U.S. Cl. 307—296.7** **5 Claims**



1. A voltage reference circuit that can be switched on and off in response to an enable signal, that produces a voltage insensitive to temperature, voltage BIAS, and enabling voltage input variations, said circuit comprising:
voltage reference means having an input coupled to receive said enable signal and having a pair of transistors operating at different current densities whereby a differential base to emitter voltage is developed to be proportional to absolute temperature;
means responsive to said enable signal for turning said voltage reference means off and on;
means for controlling said current densities to maintain a constant ratio independent of temperature; and
means responsive to said enable signal for providing positive feedback around said voltage reference means whereby hysteresis is introduced into the switching thereof.

---

### 5,013,935

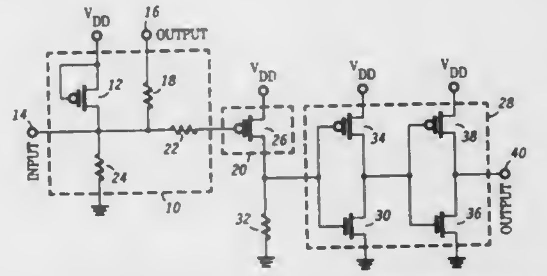
## CMOS LEVEL DETCTOR CIRCUIT

**John K. Mahabadi, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 18, 1989, Ser. No. 451,899**

**Int. Cl.$^5$ H03K** *5/153*

**U.S. Cl. 307—350** **29 Claims**



1. A voltage level detector circuit for providing a plurality of output functions responsive to a voltage input signal applied to an input thereof, comprising:
input means coupled to the input for transferring the voltage input signal to a first output of the voltage level detector circuit when the input signal is within a predetermined voltage range;

VOL
1126
ISS
1
MY
7
1991
UMI

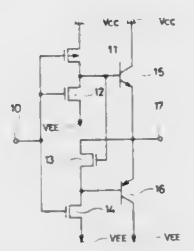
detection means including a field oxide device transistor coupled to the input for providing a detection signal at an output thereof responsive when said voltage input signal exceeds a predetermined level in a predetermined sense; and

a buffer stage coupled between said output of said detection means and a second output of the voltage level detector circuit for providing a first binary logic state at said second output responsive to said detection signal.

---

### 5,013,936
### BICMOS LOGIC CIRCUIT USING COMPLEMENTARY BIPOLAR TRANSISTORS HAVING THEIR EMITTERS CONNECTED TOGETHER

**Toru Shiomi, and Kimio Ueda, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Jul. 12, 1990, Ser. No. 551,359**
**Claims priority, application Japan, Jan. 31, 1990, 2-22932**
**Int. Cl.$^5$ H03K** *19/02*
**U.S. Cl. 307—446** **6 Claims**



1. A semiconductor logic circuit carrying out a prescribed logical arithmetic operation on a signal inputted to an input terminal (**10**, **100**) to output a resultant signal at an output terminal (**17**), comprising:

a first bipolar transistor (**15**; **28**; **38**) having a collector of a first conductivity type connected to a first reference potential, an emitter of said first conductivity type connected to said output terminal, and a base of a second conductivity type;

a second bipolar transistor (**16**; **29**; **39**) having an emitter of said second conductivity type connected to said output terminal, a collector of said second conductivity type connected to a second reference potential, and a base of said first conductivity type;

at least one first insulated gate type field effect transistor (**11**; **21**, **22**; **31**, **32**) of the second conductivity type provided between said base of said first bipolar transistor and said first reference potential for selectively coupling said base of said first bipolar transistor and said first reference potential in response to the signal applied to said input terminal;

at least one second insulated gate type field effect transistor (**12**; **23**, **24**; **33**, **34**) provided between said base of said first bipolar transistor and said second reference potential for selectively coupling said base of said first bipolar transistor and said second reference potential in response to said signal applied to said input terminal;

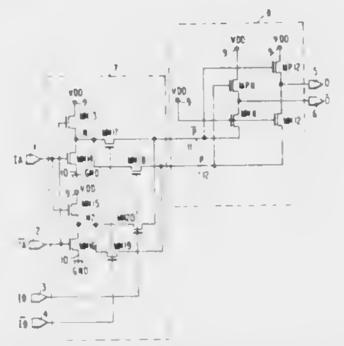
at least one third insulated gate field effect transistor (**14**; **26**, **27**; **36**, **37**) provided between said base of said second bipolar transistor and said second reference potential, for selectively coupling said base of said second bipolar transistor and said second reference potential in response to said signal applied to said input terminal; and

impedance means (**13**; **25**; **35**; **18**; **30**; **40**) for coupling said base of said second bipolar transistor and said output terminal.

---

### 5,013,937
### COMPLEMENTARY OUTPUT CIRCUIT FOR LOGIC CIRCUIT

**Yasushi Aoki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**
**Filed May 15, 1989, Ser. No. 351,346**
**Claims priority, application Japan, May 13, 1988, 63-116583**
**Int. Cl.$^5$ H03K** *19/017, 19/02, 19/21*
**U.S. Cl. 307—448** **11 Claims**

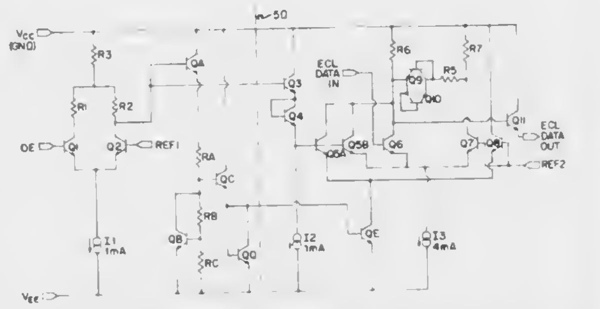


1. A transistor circuit comprising a first terminal supplied with a data signal having a logic high level lower than a first power voltage and a logic low level substantially equal to a second power voltage, a second terminal supplied with an inverted signal of said data signal, a third terminal from which an output signal is derived, a potential terminal supplied with said first power voltage, a first insulated gate transistor of a first channel type having a source-drain path connected between said potential terminal and said third terminal and a gate connected to said second terminal, and a second insulated gate transistor of a second channel type having a source-drain path connected between said first terminal and said third terminal and a gate connected to said potential terminal.

---

### 5,013,938
### ECL CUTOFF DRIVER CIRCUIT WITH REDUCED STANBY POWER DISSIPATION

**Julio R. Estrada, South Portland, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.**
**Filed Nov. 1, 1989, Ser. No. 430,431**
**Int. Cl.$^5$ H03K** *3/01*
**U.S. Cl. 307—455** **19 Claims**



1. A cutoff driver circuit having an OE cutoff driver gate coupled to receive output enable (OE) signals of high and low potential, said OE cutoff driver gate being operatively coupled to an ECL logic gate for holding the ECL logic gate in the cutoff state in response to one of said high and low OE signals, an OE signal circuit for providing OE signals of high and low potential to the OE cutoff driver gate, and an OE cutoff driver current sink for sinking current from the OE cutoff driver gate, comprising:

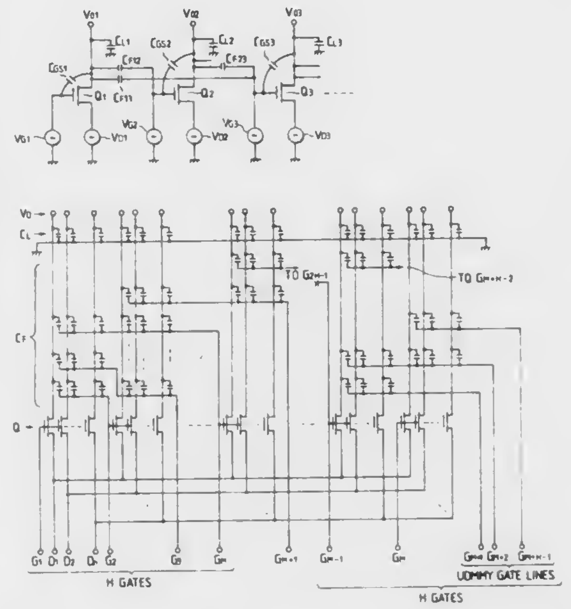
a current switch circuit operatively coupled to the OE cutoff driver current sink for switching sinking current on and off in phase with the OE signals, said current switch circuit being coupled to switch on sinking current when the OE cutoff driver gate is holding the ECL logic gate int he cutoff state, and to switch off sinking current for reducing power dissipation when the ECL logic gate is out of the cutoff state;

and a current switch signal circuit for providing current switch signals of high and low potential in phase with the OE signals, said current switch signal circuit being operatively coupled between the OE signal circuit and said current switch circuit.

---

### 5,013,939
### THIN-FILM TRANSISTOR ARRAY

**Yoshihide Satoh, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan**
**Filed Sep. 11, 1989, Ser. No. 405,536**
**Claims priority, application Japan, Sep. 12, 1988, 63-228188**
**Int. Cl.$^5$ H03K** *19/094, 17/84, 17/693;* **H01L** *29/78*
**U.S. Cl. 307—468** **6 Claims**



1. A thin-film transistor array comprising:

an array of thin-film transistors;

one or a plurality of data lines for providing a data signal to said thin-film transistors;

a plurality of gate lines for providing gate signals to said thin-film transistors, respectively; and

a plurality of feed-through correction capacitances each connected between an output terminal of one of said thin-film transistors and one of said gate lines which is for gating a thin-film transistor located subsequent to said one thin-film transistor; wherein

a first predetermined number of said feed-through capacitances are connected to an output terminal of each of said thin-film transistors.

---

### 5,013,940
### MULTI STAGE SLEW CONTROL FOR AN IC OUTPUT CIRCUIT

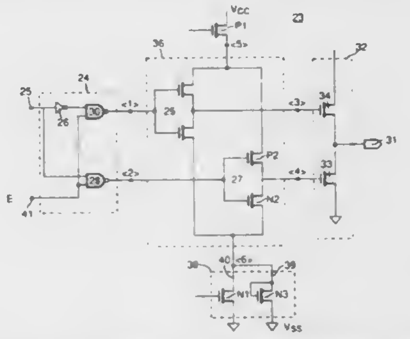
**George M. Ansel, Starkville, Miss., assignor to Cypress Semiconductor Corporation, San Jose, Calif.**
**Filed Nov. 3, 1989, Ser. No. 431,479**
**Int. Cl.$^5$ H03K** *17/16, 17/687*
**U.S. Cl. 307—473** **27 Claims**

1. An output circuit for an IC chip having a two stage slew control for reducing di/dt in the output current thereof, comprising:

slew means having an input node and a slew node, the slew means responsive to input signals on the input node for controlling a slew voltage on the slew node,

the slew means also having a power supply node for electrical connection to one terminal of a power supply, and having a current node for connection to the other terminal of the power supply;

output switch means connected to said slew node for controlling the output current of an output circuit, having a low impedance state and a high impedance state, and responsive to the slew voltage on the slew node for switching between said low and high impedance states;



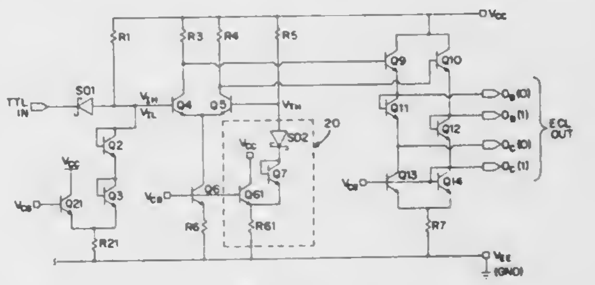
a first slew control stage connected between said current node and said other terminal of the power supply, providing an initial low impedance path for conducting high current levels between the slew node and the other terminal of the power supply to rapidly slew the slew voltage on the slew node during an initial stage of a slew period before said output switch means starts to switch impedance states in response to the changing slew voltage; and

a second slew control stage connected between said current node and said other terminal of the power supply, for providing a high impedance path for conducting low current levels between the slew node and the other terminal of the power supply during said initial stage and to slowly slew the slew voltage on the slew node during the final stage of the slew period when the output switch means is switching impedance states.

---

### 5,013,941
### TTL TO ECL/CML TRANSLATOR CIRCUIT

**Lars G. Jansson, Long Island, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.**
**Filed Aug. 17, 1989, Ser. No. 395,259**
**Int. Cl.$^5$ H03K** *19/08*
**U.S. Cl. 307—475** **19 Claims**



19. A TTL to ECL/CML translator circuit having an ECL base differential gate operatively coupled between relatively high and low potential power rails $V_{CC}$, $V_{EE}$ comprising:

an input transistor element (Q4);

an input clamp circuit (Q21, Q3, Q2, SD1) coupled between a base node of the input transistor element (Q4) and the

VOL
1126
ISS
1
MY
7
1991
UMI

low potential power rail $V_{EE}$ for receiving TTL input signals and applying at the base node of the input transistor element logic high and low potential levels $V_{IH}$, $V_{IL}$, referenced to the low potential power rail $V_{EE}$;
a reference transistor element (Q5);
a threshold clamp circuit (Q61, Q7, SD2) coupled between a base node of the reference transistor element (Q5) and the low potential power rail $V_{EE}$ for applying at the base node of the reference transistor element a threshold signal voltage level $V_{TH}$ referenced to the low potential power rail $V_{EE}$;
at least one current sink having a first current source transistor element, a first tail resistor element coupled to an emitter node of the first current source transistor element, and a temperature compensated current source voltage supply coupled to a base node of the first current source transistor element and supplying a temperature compensated current source voltage level $V_{CS}$ referenced to the low potential power rail $V_{EE}$;
said threshold clamp circuit (Q61, Q7, SD2) being operatively coupled between the temperature compensated current source voltage level $V_{CS}$ and the base node of the reference transistor element (Q5) for applying a temperature compensated threshold voltage signal level $V_{TH}$ referenced to the temperature compensated current source voltage level $V_{CS}$ at the base node of the reference transistor element, said threshold voltage signal level $V_{TH}$ thereby being referenced to the low potential power rail $V_{EE}$ through said temperature compensated current source voltage level $V_{CS}$;
said input clamp circuit (Q21, Q3, Q2) being coupled between the temperature compensated current source voltage level $V_{CS}$ and the base node of the input transistor element (Q4) for applying at the base node of the input transistor element a temperature compensated logic high signal potential level $V_{IH}$ referenced to the temperature compensated current source voltage level $V_S$, said logic high signal potential level $V_{IH}$ thereby also being referenced to the low potential power rail $V_{EE}$ through said temperature compensated current source voltage level $V_{CS}$.

---

### 5,013,942

### CLOCK SUPPLY CIRCUIT HAVING ADJUSTMENT CAPACITANCE

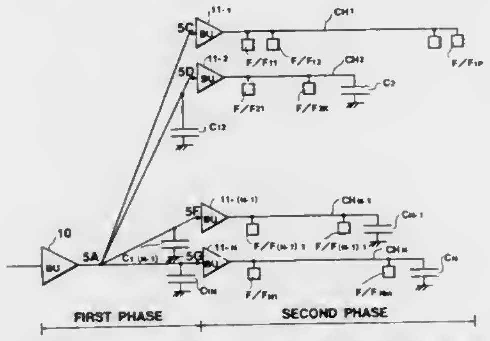
**Akira Nishimura, Yokohama; Hiroyuki Watanabe, Tokyo, and Eiji Masuda, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Aug. 17, 1989, Ser. No. 394,803**

**Claims priority, application Japan, Aug. 19, 1988, 63-205868**

**Int. Cl.⁵ H07K** *17/14*

**U.S. Cl. 307—480** **6 Claims**



3. A series connected clock supply circuit operating in at least two phases including a first phase and a second phase, comprising:
a first buffer operating in said first phase;
a plurality of second buffers coupled in a plurality of channels operating in said second phase, respectively;
a plurality of flip-flips as load circuits for to each of said second buffers in each of said channels operating in said second phase;
a plurality of first connections connected between an output terminal of said first buffer and an input terminal of each of said second buffers operating in said second phase;
a plurality of second connections connected between said flip-flops and an output terminal of each of said second buffers in each of said channels; and
first adjustment capacitance means for adjusting a RC delay of each of said first connections to be substantially the same as each other for said circuit,
each of said second buffers has an equal drive ability;
the number of said flip-flops in each of said channels is different;
the length of each of said second connections is different; and
second adjustment capacitance means is provided in each of said channels for further adjusting any difference of said RC delay among said channels to be substantially same as each other except for a specific channel having a maximum load comprising a combination of a number of said flip-flops and a wiring length of said specific channel.

---

### 5,013,943

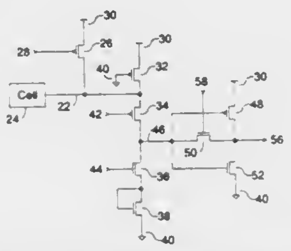
### SINGLE ENDED SENSE AMPLIFIER WITH IMPROVED DATA RECALL FOR VARIABLE BIT LINE CURRENT

**Ryan T. Hirose, Colorado Springs, Colo., assignor to Simtek Corporation, Colorado Springs, Colo.**

**Filed Aug. 11, 1989, Ser. No. 393,489**

**Int. Cl.⁵ H03K** *17/16;* **H03F** *3/45*

**U.S. Cl. 307—530** **14 Claims**



1. A single ended sense amplifier connected to a bit line conductor of a memory array of the type having a plurality of memory cells which each represent a first logical state by conducting current from the bit line conductor and a second logical state by not conducting current from the bit line conductor, comprising:
first stage amplifying means connected to the bit line conductor and operative for establishing a first bias signal at a predetermined level at a node when the memory cell conducts current in one logical state and for establishing a second bias signal at a different predetermined level at the node when the memory cell does not conduct current from the bit line conductor in the other logical state; and
second stage amplifying means connected to the node and operative in response to the first and second bias signals to supply an output signal at an output terminal of the sense amplifier which has two predetermined levels which relate in a predetermined manner to the predetermined levels of the first and second bias signals at the node,
said second stage amplifying means having a high gain bias point at which a relatively small change in the signal at the node causes the output signal to change between the two predetermined levels, the high gain bias point being intermediate the predetermined levels of the first and second bias signals at the node, and
said second stage amplifying means comprising an equalizing means for selectively connecting the node and the output terminal to establish the high gain bias point at the node and to override the first or second bias signal at the node and for thereafter selectively disconnecting the node and the output terminal to allow the predetermined level of the first or second bias signal to drive the second amplifying means to supply the output signal related to the first or second bias signal.

---

### 5,013,944

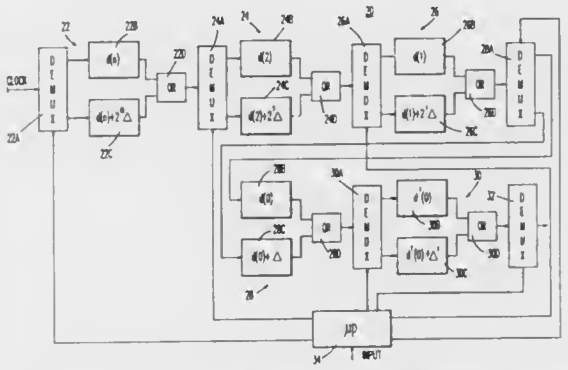
### PROGRAMMABLE DELAY LINE UTILIZING MEASURED ACTUAL DELAYS TO PROVIDE A HIGHLY ACCURATE DELAY

**Jeffrey H. Fischer, Poughkeepsie, N.Y.; Lawrence J. Grasso, Austin, Tex.; Dale E. Hoffman, Stormville, N.Y.; Daniel E. Skooglund, and Diane K. Young, both of Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 20, 1989, Ser. No. 340,999**

**Int. Cl.⁵ H03K** *5/159*

**U.S. Cl. 307—603** **21 Claims**



1. A method of operating a delay circuit to impose a selected delay on an electric signal, said delay circuit comprising a plurality of delay stages and means for directing said electronic signal serially through selected ones of said delay stages, said method comprising the steps of:
providing said plurality of delay stages each having at least one substantially fixed but not precisely known delay;
measuring the actual signal delay through each of said delay stages; and selecting, based on the signal delays obtained in said measuring step, the delay stages through which said electronic signals is directed.

---

### 5,013,945

### LINEARLY OPERATING MOTOR

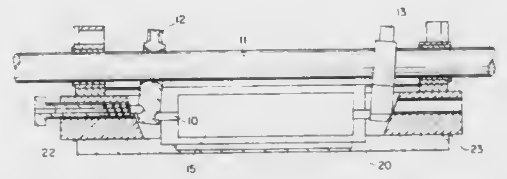
**Rune Adolfsson, BorÅs, Sweden, assignor to SKF Nova AB, Goteborg, Sweden**

**Filed Oct. 2, 1989, Ser. No. 416,390**

**Claims priority, application Sweden, Oct. 13, 1988, 8803659**

**Int. Cl.⁵ G21C** *7/14;* **H01L** *41/06, 41/12*

**U.S. Cl. 310—26** **4 Claims**



3. A linearly operating motor for stepwise advance of a driven member (11), such as a shaft, comprising an elongated body (10) with length variable properties, and means for changing the length of said body (10), said driven member (11) being provided with at least a first locking means (12), said first locking means (12), upon length increase of said body (10), being adapted to be brought into engagement with said driven member (11) by means of said length increase and said body (10) being adapted to act upon the first locking means (12) in such a manner that said locking means and thereby also said driven member (11) are displaced at length increase of the body (10), said locking means comprising a first pivotally arranged element (24) and a friction element (25) connected thereto and intended for engagement with the driven member (11), whereby the elongated body (10) at its length increase is arranged to swing the first element (24) in a direction towards said driven member (11) by first forcing the friction element (25) to abutment against the driven member (11) and then advancing the driven member (11).

---

### 5,013,946

### MINIATURE MOTOR WITH A FREQUENCY GENERATOR

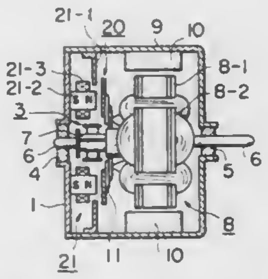
**Nobuyuki Sata, Matsudo, Japan, assignor to Mabuchi Motor Co., Ltd., Matsudo, Japan**

**Filed Apr. 26, 1989, Ser. No. 343,790**

**Claims priority, application Japan, May 11, 1988, 63-61897[U]**

**Int. Cl.⁵ H02K** *19/24, 11/00, 27/28;* **G01P** *3/48*

**U.S. Cl. 310—40 MM** **6 Claims**



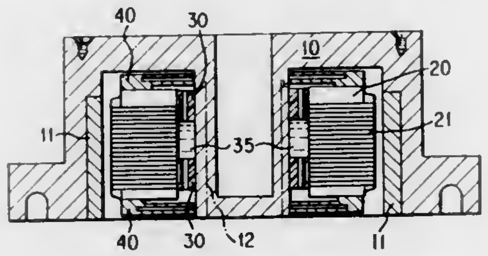
1. A miniature motor and frequency generator arrangement, comprising: a bell-shaped housing portion; an end plate portion connected to an open end of said bell-shaped housing; a first motor shaft bushing connected to said bell-shaped housing; a second motor shaft bushing connected to said end plate; a motor shaft supported by said first housing and said second bushing for rotation; a rotor core support on said rotor shaft; a stator including a permanent magnet connected to said bell-shaped housing; said stator being positioned radially outwardly of said rotor core; rotor windings wound on said rotor core to form a rotor; a commutator positioned on said rotor shaft within said bell-shaped housing; brushes supported in said bell-shaped housing extending to engage said commutator by making sliding contact with said commutator; a disk-shaped frequency generator rotor portion formed of soft magnetic material, said disk-shaped frequency generator rotor including magnetic-pole teeth on an outer periphery thereof; an annular disk internal-gear core, formed of a soft magnetic material, an outer periphery of said annular-disk internal-gear core being connected to and supported by said bell-shaped housing, said annular-disk internal gear core having an inner periphery defining a plurality of magnetic-pole teeth, said annular-disk internal gear core magnetic-pole teeth being positioned facing said disk-shaped frequency generator rotor magnetic-pole teeth, said annular-disk internal gear core magnetic-pole teeth being spaced away from said disc-shaped frequency generator rotor magnetic-pole teeth to define a gap; at least one frequency generator stator permanent magnet positioned adjacent said gap, said at least one frequency generator stator permanent magnet being connected to said end plate for defining a magnetic field between said disc-shaped frequency generator rotor and said annular-disc internal gear core magnetic-pole teeth; and, a frequency generator stator including frequency-detecting coils for detecting the changes in magnetic flux and generating an induced voltage proportional to the revolution

of the rotor, said frequency generator is disposed in a space defined by said brushes and said motor housing.

---

### 5,013,947
### LOW-PROFILE DISK DRIVE MOTOR

**Russell Ide, 28 Daniel Dr., Coventry, R.I. 02816**
**Filed Mar. 16, 1990, Ser. No. 494,415**
**Int. Cl.$^5$ H02K *21/22;* G11B *5/012***
**U.S. Cl. 310—67 R** **18 Claims**



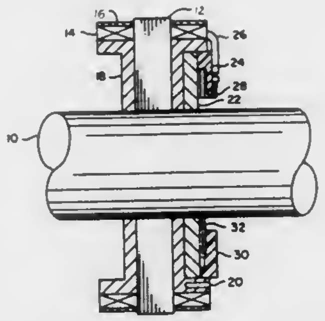
1. A motor for driving a magnetic disk comprising;
- a rotor casing, the rotor casing having at least one permanent magnet mounted thereon and including a cup-shaped portion having a cylindrical outer wall, a closed end, and an inner portion having a cylindrical outer periphery extending from the closed end, the inner portion being substantially coaxial with the cylindrical outer wall so as to define a cylindrical space between the cylindrical outer wall and the inner portion;
- a stator, the stator including laminations and windings and the stator having at least a portion thereof mounted in the cylindrical space provided in the rotor;
- at least one support member extending between the stator and the rotor for supporting the rotor for rotation with respect to the stator;
- wherein the inner portion is a hollow cylindrical extension having an inner wall on which the permanent magnet is mounted, the inner portion surrounding the stator windings; and the stator comprising a cup-like casing portion having a cylindrical outer periphery defined by an axially extending cylindrical wall having a radial dimension which allows it to be nested between the outer periphery of the inner portion of the rotor and the interior of the cylindrical outer walls of the rotor.

---

### 5,013,948
### HIGH POWER ROTATING RECTIFIER ASSEMBLY

**John J. Tumpey, Oakhurst, and Richard J. Becker, Brick, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**
**Continuation-in-part of Ser. No. 370,930, Jun. 23, 1989, which is a continuation-in-part of Ser. No. 212,759, Jun. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 45,930, May 4, 1987, Pat. No. 4,794,048, which is a continuation-in-part of Ser. No. 371,362, Jun. 26, 1989, Pat. No. 4,959,572. This application Dec. 22, 1989, Ser. No. 455,214**
**Int. Cl.$^5$ H02K *9/22;* F28F *9/08***
**U.S. Cl. 310—68 D** **25 Claims**

1. A rotating rectifier assembly in an electric machine for rectifying an ac signal generated by windings in a exciter rotor disposed about a rotatable shaft for rotation therewith, comprising:
- a substrate disposed about the shaft for rotation therewith, said substrate having a metal core and a ceramic coating;
- rectifying means secured to said substrate for rectifying the ac signal;
- ac conductor means having a first end connected to the windings and a second end for supplying the ac signal to the rectifying means; and

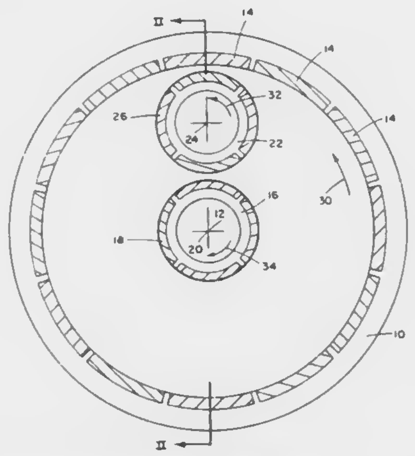


- conductor means secured to said substrate on which a DC signal is provided upon rotation of the shaft and the rotating rectifier assembly.

---

### 5,013,949
### MAGNETIC TRANSMISSION

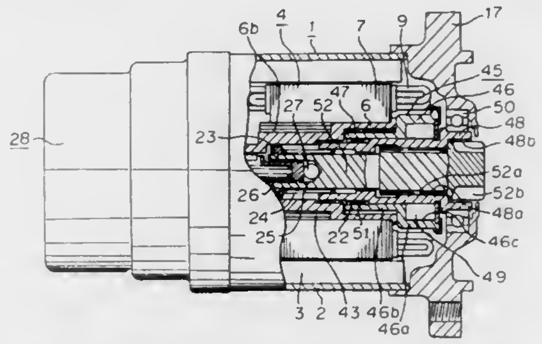
**William J. Mabe, Jr., Thornton, Colo., assignor to Sundstrand Corporation, Rockford, Ill.**
**Filed Jun. 25, 1990, Ser. No. 543,247**
**Int. Cl.$^5$ H02K *49/10***
**U.S. Cl. 310—83** **12 Claims**



1. A magnetic transmission, comprising:
- a first rotatable member having a first plurality of magnetic poles, said first rotatable member being generally annular and supported for rotation about a first axis;
- a second rotatable member having a second plurality of magnetic poles, said second rotatable member being supported for rotation about a second axis; and
- a third rotatable member having a third plurality of magnetic poles, said third rotatable member being supported for rotation about a third axis, said third rotatable member being disposed between said first and second rotatable members, said third rotatable member being disposed in noncontact magnetic torque transmitting relation with said first rotatable member, said second rotatable member being disposed in noncontact magnetic torque transmitting relation with said third rotatable member.

### 5,013,950
### COAXIAL STARTER WITH RECESSED PINION

**Shuzou Isozumi, Himeji, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan**
**Filed May 31, 1990, Ser. No. 531,488**
**Claims priority, application Japan, May 31, 1989, 1-137966; May 31, 1989, 1-137967; May 31, 1989, 1-137968**
**Int. Cl.$^5$ H02K *5/15;* F02N *15/06***
**U.S. Cl. 310—83** **2 Claims**



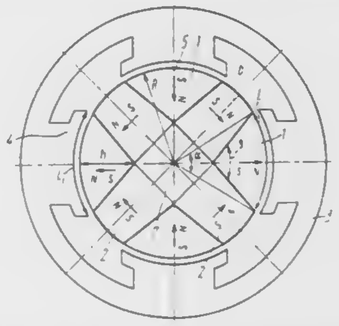
1. A coaxial type starter which comprises:
- a motor having a tubular armature rotary shaft,
- an armature core on which an armature coil is wound, said armature core having an inner circumferential portion,
- an electromagnetic switch which is located at a rear part of the motor and which has an operating shaft arranged in axial alignment with the armature rotary shaft,
- an overrunning clutch device having an inner member and an outer member for transmitting a rotating force only in one direction, and
- a pinion shaft which is disposed in the armature rotary shaft to receive the rotating force of the armature rotary shaft through the overrunning clutch device; wherein a front end portion of the clutch inner member in the overrunning clutch device is supported by a bearing which is fitted to a front bracket; the pinion shaft is so arranged that it is engaged with the inner circumference of the clutch inner member through a spline means, and a pinion teeth portion formed at a front end portion shaft is overlapped in its radial direction with the bearing; a clutch outer main body portion of the overrunning clutch device is disposed in the inner circumferential portion of a front part of the armature core; and a rear portion of the clutch outer member is disposed in and engaged with the armature rotary shaft so as to be rotatable with the armature rotary shaft.

---

### 5,013,951
### MULTIPOLAR ROTOR FOR ELECTRIC MACHINE WITH INTERPOLAR AND POLAR MAGNETS

**Ivan P. Stadnik, ulitsa Kievskaya, 134-A, kv. 18; Nikolai I. Klevets, ulitsa Z. Kosmodemyanskoi, 16, both of Simferopol; Alexandr I. Gridnev, ulitsa Gorkogo, 85-B, kv. 31, Vladimir; Nikolai A. Kelin, ulitsa Frunze, 34, kv. 54, Vladimir, and Anatoly F. Sitnikov, ulitsa Rastopchina, 59-B, kv. 31, Vladimir, all of U.S.S.R.**
**PCT No. PCT/SU88/00159, § 371 Date Apr. 19, 1990, § 102(e) Date Apr. 19, 1990, PCT Pub. No. WO90/02434, PCT Pub. Date Mar. 8, 1990**
**PCT Filed Aug. 19, 1988, Ser. No. 477,816**
**Int. Cl.$^5$ H02K *21/08, 21/14***
**U.S. Cl. 310—156** **6 Claims**

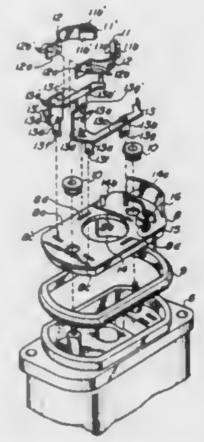
1. A multipole rotor for an electric machine, substantially in the form of a circular cylinder comprising:
- a group of pole magnets whose number is even and equal to at least four, which are disposed uniformly around a circle with a center and a periphery, the pole magnets having pole faces facing the center of the circle and other pole faces facing the periphery of the circle, each pole magnet having a substantially radial plane of symmetry, each pole magnet being magnetized parallel to the plane of symmetry and forming in cross-section a part of a circle enclosed by a peripheral arc of the circle and segments of chords of the circle, and a group of interpole magnets adjoining the pole magnets and having planes of symmetry and lateral surfaces, the lateral surfaces of the interpole magnets facing the periphery of the circle and the center of the circle, the interpole magnets having substantially radial planes of symmetry and being magnetized perpendicularly thereto, lateral surfaces of the interpole magnets in combination with the other poles of the pole magnets forming an outermost cylindrical surface of the rotor and each interpole magnet forming in cross-section a geometrical figure symmetrical about the plane of symmetry, said figure having opposite sides contiguous and coterminal with said segments of said chords of adjacent pole magnets.



---

### 5,013,952
### PRECISION BRUSH MOUNTING ASSEMBLY FOR SMALL ELECTRIC MOTOR

**Shuji Sekine; Takeo Furuya, and Naoto Harada, all of Yokohama, Japan, assignors to Jidosha Denki Kogyo K.K., Kanagawa, Japan**
**Filed Feb. 21, 1990, Ser. No. 482,571**
**Claims priority, application Japan, Feb. 22, 1989, 1-20063[U]**
**Int. Cl.$^5$ H02K *5/14;* H01R *39/39***
**U.S. Cl. 310—239** **2 Claims**



1. A precision brush mounting assembly for a small electric motor having a motor casing substantially surrounding a motor and a gear case secured at one end to said motor casing, said assembly comprising:
- a holder base supported on said gear case by grommet-shaped damper means and provided with a plurality of terminal receiving holes;
- a terminal having a projection with bendable means on the end thereof, said projection extending into said terminal receiving hole and being secured therein by said bendable means being bent into contact with said holder base, said

VOL 1126 ISS 1 MY 7 1991 UMI

VOL
1126
ISS
1
MY
7
1991
UMI

terminal being further provided with brush holder engaging means having a plurality of first positioner means; and

a brush holder having a brush thereon for supplying an electric current to an armature of the motor through a commutator, said brush holder having terminal engaging means having a plurality of second positioner means thereon complementary to said first positioner means with said first and second positioner means being engaged and secured to each other by deformation of one of said positioning means relative to the other positioning means.

---

### 5,013,953

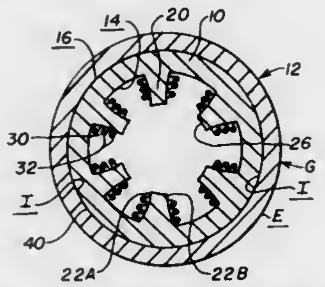
### STATOR ASSEMBLY FOR A NON-STATIC COGGING BRUSHLESS DC MOTOR AND METHOD OF FABRICATING THE SAME

**Daniel M. C. Odell, Aiken, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 28, 1989, Ser. No. 317,231**

**Int. Cl.⁵ H02K *1/12, 3/46***

**U.S. Cl. 310—254** **2 Claims**



1. A stator assembly for a non-static cogging brushless DC motor comprising:

a hollow support member having an exterior and an interior surface, the support member being fabricated of a magnetic material, the interior surface of the support member being smooth and having a predetermined interior dimension:

a hollow coil forming member of a predetermined axial length, the coil forming member being fabricated of a nonconductive and nonmagnetic material, the coil forming member having an array of generally radially extending teeth, each tooth having a pair of generally radially extending sidewalls, the teeth extending radially inwardly of the coil forming member, the sidewalls extending substantially the entire axial length of the coil forming member, the exterior surface of the coil forming member being smooth and having a predetermined dimension that is substantially equal to the interior dimension of the support member, the exterior surface of the coil forming member being mounted on the interior surface of the support member; and

a plurality of coils wound on the teeth of the coil forming member, the coils being disposed in surrounding relationship with respect to the radially extending sidewalls of the teeth.

---

### 5,013,954

### ELECTROSTATIC MICRO-MOTOR APPARATUS

**Narito Shibaike, Hirakata, and Shinji Uchida, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 11, 1990, Ser. No. 535,566**

**Claims priority, application Japan, Jun. 16, 1989, 1-155365**

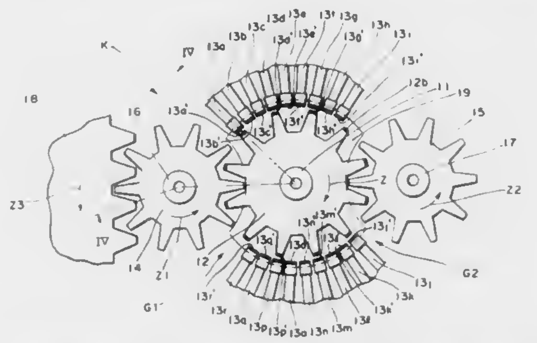
**Int. Cl.⁵ H02N *1/00;* F16H *1/12***

**U.S. Cl. 310—309** **6 Claims**

1. An electrostatic micro-motor apparatus capable of transmitting driving force of an electrostatic micro-motor, comprising:

a rotor having a plurality of gear teeth;

a first circumferential region around said rotor and a second circumferential region around said rotor defined by said first circumferential region, wherein said first circumferential region comprises a plurality of electrodes disposed opposite said gear teeth of said rotor and said second circumferential region comprises a circumferential gap; and



a transmission gear in said circumferential gap for engagement with said rotor.

---

### 5,013,955

### DRIVE SYSTEM OF ACTUATOR HAVING PIEZOELECTRIC DEVICE FOR USE IN MOTOR VEHICLE

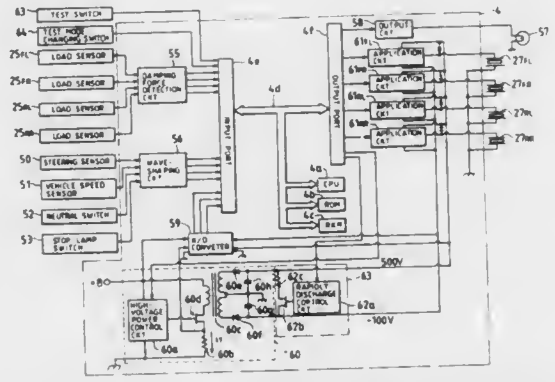
**Yoshimichi Hara, Kuwana; Eiju Matsunaga, Anjo; Hiroyuki Kawata, Chiryu; Akira Hukami, Okazaki; Yutaka Suzuki, Nishio; Makoto Shiozaki, Kariiya; Yuji Yokoya, Toyota, and Yasuhiro Tsutsumi, Susono, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Jun. 7, 1990, Ser. No. 535,194**

**Claims priority, application Japan, Jun. 7, 1989, 1-144865; Jun. 7, 1989, 1-144868**

**Int. Cl.⁵ H01L *41/08***

**U.S. Cl. 310—316** **12 Claims**



1. A drive system of a piezo-type actuator for use in a motor vehicle, said piezo-type actuator being constructed with a piezoelectric device which is expandable and contractible in accordance with application of a voltage thereto, said drive system comprising:

voltage-increasing means for increasing an output voltage of a power source mounted on said motor vehicle so as to develop a drive voltage for said piezo-type actuator;

application means for applying to said piezoelectric device of said piezo-type actuator said drive voltage developed by said voltage-increasing means;

abnormality detection means for detecting an abnormality of said drive voltage developed by said voltage-increasing means;

prohibition means for prohibiting the output of said drive voltage from said voltage-increasing means to said piezoelectric device thereof in response to the detection of the drive voltage abnormality; and

discharging means for discharging charges accumulated in said piezoelectric device thereof in response to the detection of the drive voltage abnormality.

---

### 5,013,956

### LINING MATERIAL AND ULTRASONIC WAVE DRIVEN MOTOR USING LINING MATERIAL

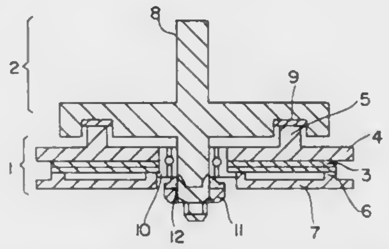
**Seiji Kurozumi, Kadoma; Shigenori Uda, Osaka; Masatake Hirai, Katano; Katuhiro Murano, Ootu; Takeo Kimura, and Nobuyuki Yamamoto, both of Ibaragi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd. and Teijin Limited, both of Osaka, Japan**

**Filed Mar. 20, 1989, Ser. No. 336,960**

**Claims priority, application Japan, Jul. 21, 1987, 62-181542**

**Int. Cl.⁵ H01L *41/08***

**U.S. Cl. 310—323** **6 Claims**



1. A lining material composed of a meta-type aramid fibrid and meta-type aramid fiber as main components.

---

### 5,013,957

### MOTOR WITH TOOTHED DISK TO SECURE THE STATOR CORE

**Gunter Wrobel, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Papst-Motoren & Co., KG, Fed. Rep. of Germany**

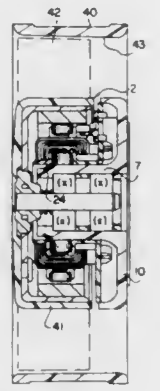
**PCT No. PCT/EP88/01115, § 371 Date Aug. 9, 1989, § 102(e) Date Aug. 9, 1989, PCT Pub. No. WO89/05537, PCT Pub. Date Jun. 15, 1989**

**PCT Filed Dec. 7, 1988, Ser. No. 382,628**

**Claims priority, application Fed. Rep. of Germany, Oct. 12, 1987, 8716288**

**Int. Cl.⁵ H02K *1/06, 11/00, 5/16, 5/00***

**U.S. Cl. 310—217** **32 Claims**



1. An electric motor having:

a fastening flange;

a bearing support part made of deformable material;

a rotor surrounding a stator;

the stator having winding end plates and an iron core axially secured about an outer diameter of the bearing support part at a side facing away from the fastening flange;

a toothed disk having a central bore surrounding the diameter of the bearing support part and having radially inwardly projecting projection means which are in external contact with the bearing support part to axially fasten the stator to the bearing support part;

wherein the toothed disk has at least one tongue means protruding beyond an outer edge thereof for connecting and aligning the toothed disk to the stator; and

wherein the toothed disk is held between a winding end plate and the iron core of the stator by an electrical winding.

---

### 5,013,958

### X-Y STAGE WITH ULTRASONIC ACTUATOR

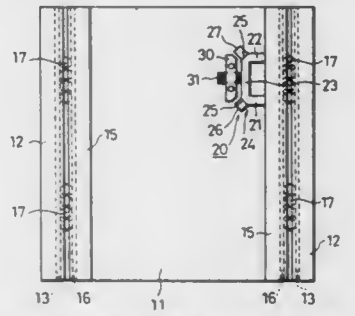
**Kazumasa Ohnishi; Koichi Naito, and Toru Nakazawa, all of Nagaoka, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Oct. 17, 1989, Ser. No. 423,480**

**Claims priority, application Japan, Oct. 18, 1988, 63-262009**

**Int. Cl.⁵ H01L *41/08***

**U.S. Cl. 310—323** **2 Claims**



1. An X-Y stage comprising a fixed plate, a moving plate adapted to linearly reciprocatively move relative to said fixed plate, and an ultrasonic linear motor for driving said X-Y stage provided on one of said fixed plate and said moving plate, said ultrasonic linear motor comprising a vibrating member which comprises (i) two leg portions oriented in a direction perpendicular to the moving direction of said moving plate, each of said two leg portions having a base end and an oppositely extending free end, (ii) a body portion for connecting said base ends of said leg portions, and (iii) a pair of vibration sources for vibrating said leg portions and said body portion, said pair of vibration sources being mounted adjacent said base ends on said body portion, said free ends of said leg portions pressing against the other one of said fixed plate and said moving plate.

---

### 5,013,959

### HIGH-POWER RADIATOR

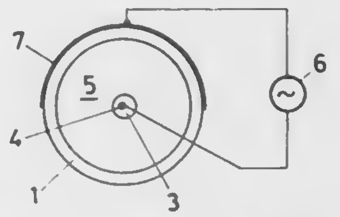
**Ulrich Kogelschatz, Hausen, Switzerland, assignor to Asea Brown Boveri Limited, Baden, Switzerland**

**Filed Feb. 27, 1990, Ser. No. 485,544**

**Claims priority, application Switzerland, Feb. 27, 1989, 720/89**

**Int. Cl.⁵ H01J *7/24, 61/04, 65/04;* H01S *3/097***

**U.S. Cl. 313—36** **16 Claims**



1. A high-power radiator, especially for ultraviolet light, comprising a discharge space (5), which is filled with a fill-gas that emits radiation under discharge conditions, and of which

VOL
1126
ISS
1
MY
7
1991
UMI

the walls are formed by a first tubular dielectric (**1**) and a second dielectric (**3**) that is provided on its surfaces averted from the discharge space (**5**) with first (**2, 7**) and second electrodes (**4**), and comprising an alternating current source (**6**) connected to the first and second electrodes for feeding the discharge, wherein inside the first tubular dielectric (**1**) a rod (**3**) of dielectric material is arranged in the interior of which an electrical conductor (**4**) that forms the second electrode is inserted or embedded.

---

## 5,013,960

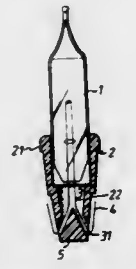
## CHRISTMAS TREE LIGHT WITH SEPARATION WEDGE

**Jeow N. Tseng, No. 539, Sec. 4, Chung Hua Rd., Hsin Chu City, Taiwan R.O.C.**

**Filed May 4, 1990, Ser. No. 519,411**

**Int. Cl.$^5$ H01J** *5/48*

**U.S. Cl. 313—318** **1 Claim**



1. A Christmas tree light comprising a bulb (**1**) with two leads extending from a lower end thereof and a hollow seat (**2**), said hollow seat (**2**) comprising a substantially cylindrical upper seat (**21**) and a substantially rectangular lower seat (**22**), the improvement comprising:
   (a) a lengthwise slot (**3**) extending to two lateral sides of said lower seat (**22**); and
   (b) a substantially triangular separation wedge (**5**) which frictionally engages in said lengthwise slot (**3**) so as to form respective openings (**31**) at said lateral sides of said lower seat (**22**).

---

## 5,013,961

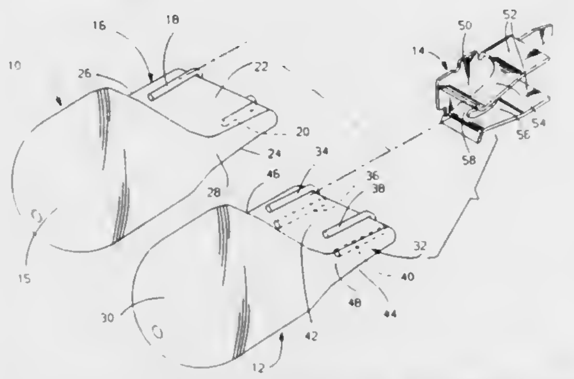
## COMMON GROUND TERMINAL FOR USE WITH SINGLE FILAMENT AND DUAL FILAMENT WEDGEBASE LAMP BULBS

**Patrick J. Reedy, Youngstown, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 24, 1989, Ser. No. 342,208**

**Int. Cl.$^5$ H01J** *5/50*

**U.S. Cl. 313—318** **2 Claims**



1. A common ground terminal for use with either a single filament lamp bulb or a dual filament lamp bulb which has a wedgebase having contact wires emerging from an end of the base and extending over opposite sides of the wedgebase, the common ground terminal comprising:
   a base plate which has a pair of vertically spaced support tabs which are integrally connected to opposite longitudinal side edges of the base plate;
   the common ground terminal further having a pair of opposed, upper and lower spring contact arms which are integrally attached to lateral side edges of the respective vertically spaced support tabs and which extend forwardly from the support tabs in cantilever fashion;
   the spring contact arms converging toward each other in the forward direction so as to biasingly engage opposite sides of a wedgebase when it is inserted into the space between the spring contact arms; and
   the lower spring contact arm being in the form of a compound spring which has a second spring tab which is formed out of the inner part of the lower spring arm which is adjacent to the base plate;
   the spring tab extending rearwardly toward the support tabs and converging toward the upper spring contact arm in the rearward direction so as to engage one side of a wedgebase when it is inserted into the space between the spring contact arms and provide a space between the lower spring contact arm and the one side of the wedgebase to accommodate the presence of a contact wire on the one side of the wedgebase whereby the spring contact arms are deflected outwardly by substantially the same amount regardless of whether a single filament or a dual filament lamp bulb is being used.

---

## 5,013,962

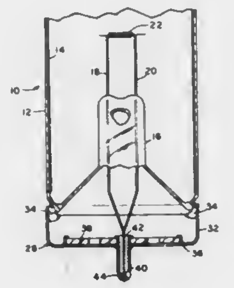
## SINGLE PIN LAMP BASE AND FLUORESCENT LAMP INCLUDING SAME

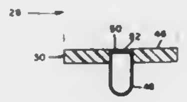
**Raymond G. Desclos, Ipswich, Mass., assignor to GTE Products Corporation, Danvers, Mass.**

**Filed Dec. 26, 1989, Ser. No. 457,227**

**Int. Cl.$^5$ H01J** *5/50;* **H01K** *1/44*

**U.S. Cl. 313—318** **13 Claims**





1. A single pin base for a lamp having at least one lead-in wire extending from an end thereof, said base comprising:
   a first base member including a shell, a first disk of insulating material secured to or formed from said shell, and a contact member centrally mounted on said first disk and adapted to receive and electrically engage said at least one lead-in wire from said lamp; and
   a second base member including a second disk of insulating material, a single contact pin centrally mounted on said second disk, a metal disk located within and secured to said single contact pin, said metal disk having an aperture formed therein for receiving said contact member of said first base member and adapted to frictionally engage said contact member whereby said second base member is retained on said first base member.

---

## 5,013,963

## IN-LINE TYPE ELECTRON GUN

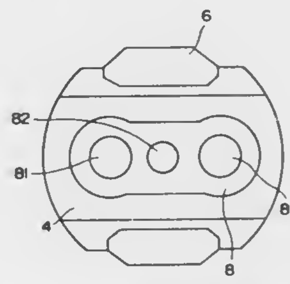
**Kazunori Ikegami; Souitirou Okuda, both of Amagasaki; Eishou Nosaka, and Tadahisa Yoshida, both of Nagaoka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 16, 1986, Ser. No. 907,823**

**Claims priority, application Japan, Sep. 20, 1985, 60-209422; Sep. 20, 1985, 60-209423**

**Int. Cl.$^5$ H01J** *29/51*

**U.S. Cl. 313—414** **3 Claims**



1. An in-line type electron gun having a lower voltage electrode disposed in spaced opposition to a higher voltage electrode, said electrodes forming a main focusing lens, the lower voltage electrode having a depression, and three lens holes in the bottom of said depression, the lens holes having centers which are colinear in an array direction for passing electron beams therethrough,
   wherein the middle lens hole of said three lens holes has a diameter smaller than the diameters of the other two lens holes, and a width of said depression in a crosswise direction perpendicular to the array direction is smaller at a central part of the depression as compared with widths in the crosswise direction of other parts of the depression, the central part of the depression being between the centers of the other two lens holes.

---

## 5,013,964

## METHOD OF MANUFACTURING A SADDLE-SHAPED DEFLECTION COIL FOR A PICTURE DISPLAY TUBE AND DISPLAY TUBE COMPRISING A DEFLECTION SYSTEM USING SADDLE-SHAPED DEFLECTION COILS

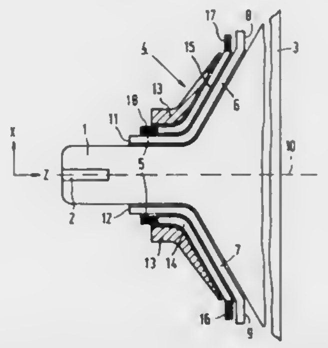
**Nicolaas G. Vink; Franciscus C. A. J. Jacobs, and Franciscus M. P. P. Doomernik, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 2, 1989, Ser. No. 416,185**

**Claims priority, application Netherlands, Oct. 27, 1988, 8802641**

**Int. Cl.$^5$ H01J** *29/70;* **H01H** *1/00*

**U.S. Cl. 313—440** **5 Claims**



1. A deflection system for a picture display tube, comprising at least first and second saddle shaped deflection coils flaring out from a rear end toward a front end and arranged symmetrically relative to a longitudinal axis of the system, each of said coils including a flange connection portion extending transversely to the longitudinal axis at the front end, a connection portion at the rear end, and a plurality of longitudinal parts extending between said front and rear ends and formed by a plurality of winding sections of said coil, characterized in that each of said sections includes transition portions between the longitudinal parts and the front end of the respective coil, a first plurality of said transition portions located at first preselected angular positions around the longitudinal axis forming linear faces which are substantially transverse to the flange shaped connection portion, and a second plurality of said transition portions located at second preselected angular positions around the longitudinal axis forming linear faces which are substantially transverse to the longitudinal parts.

---

## 5,013,965

## ELECTRON GUN CATHODE AND MANUFACTURING METHOD THEREFOR

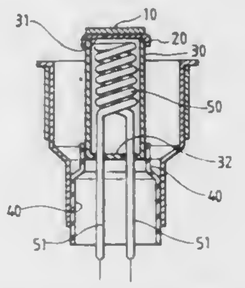
**Suk-bong Shon, Suwon, and Woo-young Na, Changweon, both of Rep. of Korea, assignors to Samsung Electron Devices Co., Ltd., Rep. of Korea**

**Filed Oct. 31, 1989, Ser. No. 430,645**

**Claims priority, application Rep. of Korea, Nov. 2, 1988, 88-14402**

**Int. Cl.$^5$ H01J** *29/04, 29/48, 9/04*

**U.S. Cl. 313—446** **5 Claims**



1. An electron gun cathode comprising:
   a cathode material for emitting electrons;
   a base on which said cathode material is disposed;
   a heater; and
   a unitary cylindrical sleeve on which said base is mounted and enclosing the heater, said sleeve including a bottom having through-holes for the passage of terminals of said heater, said heater being disposed in a closed space formed by said sleeve and said base.

---

## 5,013,966

## DISCHARGE LAMP WITH EXTERNAL ELECTRODES

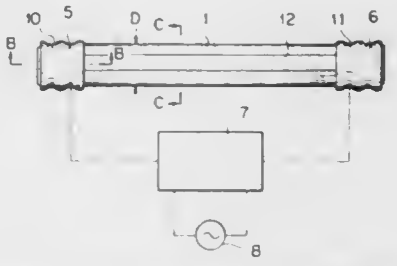
**Takeo Saikatsu; Takehiko Sakurai, and Yoshinori Anzai, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 15, 1989, Ser. No. 311,350**

**Claims priority, application Japan, Feb. 17, 1988, 63-34322; Mar. 10, 1988, 63-56664; Jun. 6, 1988, 63-138923; Jun. 6, 1988, 63-138924**

**Int. Cl.$^5$ H01J** *61/30, 61/42, 61/067*

**U.S. Cl. 313—493** **3 Claims**



1. A discharge lamp comprising a substantially straight glass

VOL
1126
ISS
1
MY
7
1991
UMI

bulb having a discharge gas charged therein and an electrode provided at each longitudinal end portion of said bulb on an outer surface thereof, and a light emitting portion of said bulb located between said electrodes, said discharge lamp having a high frequency voltage applied across said electrodes, said each end portion having an outer surface which forms ridges and furrows, said electrodes being conformed to said ridges and furrows.

---

### 5,013,967
## ELECTROLUMINESCENCE LAMP AND METHOD OF USE THEREOF

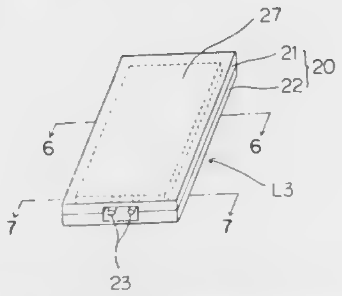
**Ito Hirotaka; Taniguchi Jinichi; Kuzushita Hirokazu, all of Amagasaki, and Ohhori Atsushi, Arida, all of Japan, assignors to Mitsubishi Cable Industries Ltd., Hyogo, Japan**

**Filed Aug. 2, 1988, Ser. No. 227,256**

**Claims priority, application Japan, Aug. 7, 1987, 62-122006[U]; Aug. 27, 1987, 62-130352[U]; Aug. 27, 1987, 62-130353[U]; Feb. 24, 1988, 63-23134[U]; Feb. 24, 1988, 63-23135[U]; Feb. 24, 1988, 63-23136[U]; Feb. 24, 1988, 63-23137[U]; Feb. 24, 1988, 63-23138[U]**

**Int. Cl.$^5$ H05B** *33/02*

**U.S. Cl. 313—512** **14 Claims**



1. A flat plate-shaped electroluminescence lamp, comprising:

an electroluminescence light emitting part having two activating electrodes;

a connector part which is connected to said electrodes and has a shape for making it attachable to and detachable from a power supply outlet; and

a reinforcement engaged with said light emitting part such that said light emitting part and said reinforcement together have a mechanical strength sufficient to endure a bending load of at least 80 kg according to JIS K-6911 during repeated attaching and detaching of said lamp to and from an outlet by handling of the reinforced light emitting part;

wherein said reinforcement is a casing, said casing comprises a relatively rigid front plate and a relatively rigid rear plate extending in a longitudinal direction and connected together about their respective peripheral edges, said front plate is made of a light transmitting material, and said rear plate is made of a non-light-transmitting material; and

wherein said casing is flat and has two opposite ends, said connector part being disposed at one of said opposite ends and extending in said longitudinal direction such that said connector part is attached and detached from a power supply outlet in said longitudinal direction of said casing.

---

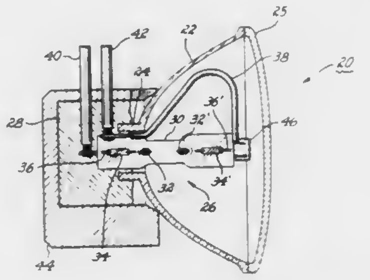
### 5,013,968
## REPROGRAPHIC METAL HALIDE LAMPS HAVING LONG LIFE AND MAINTENANCE

**Timothy D. Russell, Huntsburg; Carl H. Hess, Mentor-on-the-Lake; Paul G. Hlahol, South Euclid, and Charles N. Stewart, Chagrin Falls, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Mar. 10, 1989, Ser. No. 322,146**

**Int. Cl.$^5$ H01J** *61/18, 61/22*

**U.S. Cl. 313—641** **26 Claims**



1. A metal halide arc discharge lamp emitting primarily in the blue, green and red portions of the visible light spectrum and not continuously across the visible spectrum and with at least a portion of the blue emission at a wavelength of about 450 nm, said lamp comprising a light transmissive, vitreous, hermetically sealed arc chamber enclosing a pair of electrodes therein which protrude into said arc chamber, said arm chamber further containing mercury, an inert gas, at least one halogen, zinc, indium, lithium, thallium, and at least one rare earth metal, wherein the amount of indium present is no greater than about 25 mole % of the total of said indium, lithium and thallium and wherein said at least one halogen is present in an amount sufficient to insure that at least said indium, lithium, thallium and at least a portion of said zinc are present as metal halides during operation of said lamp, but not in excess of that amount required for said indium, lithium, thallium, zinc and rear earth metal to be present as metal halide during operation of said lamp.

---

### 5,013,969
## PROTECTIVE DEVICE FOR NEUTRON TUBES

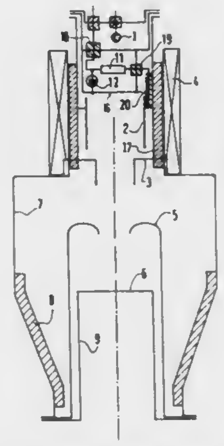
**Pierre Bach, Maisons Alfort, and Henri Bernardet, Saint Michel Sur Orge, both of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Aug. 23, 1989, Ser. No. 398,103**

**Claims priority, application France, Aug. 26, 1988, 88 11259**

**Int. Cl.$^5$ H05B** *41/36*

**U.S. Cl. 315—61** **11 Claims**



1. In a neutron tube comprising a target, an ion source for producing an ion beam, and means for accelerating the ion beam toward the target, said tube having predefined operating current and operating voltage magnitudes, the improvement comprising protective means for limiting at least the operating current to said predefined magnitude when a supply voltage is applied to first and second connection means of the tube, said protective means including at least a current limiter device electrically connected to said first and second connection means and contained in the neutron tube such that the tube cannot be made operable above at least said predefined current magnitude without opening the tube.

---

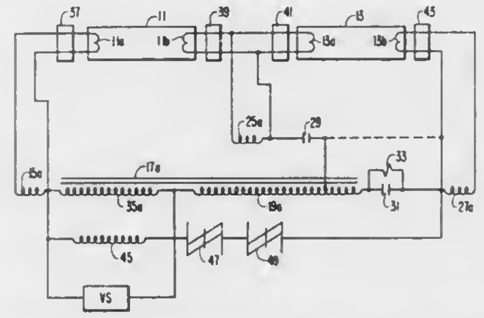
### 5,013,970
## PEAK VOLTAGE REDUCER CIRCUIT FOR FLUORESCENT LAMPS

**Joseph A. Crawford, Chicago, Ill., assignor to North American Philips Corporation, New York, N.Y.**

**Filed Dec. 28, 1988, Ser. No. 290,925**

**Int. Cl.$^5$ H05B** *41/14, 41/36*

**U.S. Cl. 315—106** **2 Claims**



1. A rapid start fluorescent lamp system including a source of voltage and at least two fluorescent lamps connected in series for operation, each lamp having a pair of electrodes, a pair of terminals for each lamp, each pair of terminals being connected to an associated pair of electrodes and connecting its associated pair of electrodes to said source of voltage, a plurality of electrode heater windings connected to said source of voltage and to said electrodes to heat said electrodes, a ballast transformer with a primary winding and a secondary winding connected in series, said ballast transformer windings being connected in parallel with said lamps, a starting capacitor and a predetermined amount of impedance connected in series, said starting capacitor and said predetermined amount of impedance being connected in parallel with one of said lamps, said predetermined amount of impedance being a predetermined number of turns of said ballast secondary winding, said predetermined number of turns being selected so that said starting capacitor and said predetermined number of turns in combination comprise a voltage reduction means which functions to maintain the voltage on the terminals of the lamps below a prescribed maximum upon removal of one of the lamps from connection with its terminals during operation.

---

### 5,013,971
## TEMPERATURE STABILIZATION OF LASER DIODES AND LIGHT EMITTING DIODES

**Michael de La Chapelle, Canoga Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 53,914, May 26, 1987, abandoned. This application Jul. 21, 1989, Ser. No. 360,491**

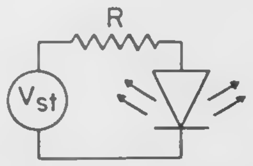
**Int. Cl.$^5$ H05B** *41/36;* **H03F** *3/04*

**U.S. Cl. 315—149** **6 Claims**

1. A nonfeedback stabilized bias circuit for an optical energy emitting semiconductor diode producing a predetermined constant optical energy output over a given temperature range, comprising:

a DC voltage source having a constant voltage value substantially equal to the zero current intercept of a best-fit straight line for a plurality of bias points on a voltage-current graph of said diode for producing the predetermined optical energy output at respectively different temperatures; and

a fixed value resistor serially interconnected with said constant voltage source and said diode, said resistor having a value in ohms equal to a change in voltage over a certain portion of said best-fit straight line divided by the change in current over said certain portion;



the current through the optical energy emitting diode being maintained solely by said resistor within the necessary range to produce said predetermined constant optical energy output.

---

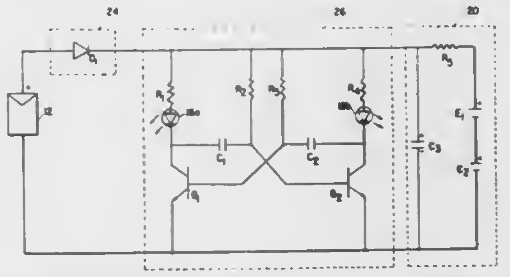
### 5,013,972
## DUAL-POWERED FLICKERING SYMBOLIC OR RELIGIOUS LIGHT (ELECTRONIC YAHRZEIT)

**Moshe Malkieli, and Israel Apel, both of Bnei Braq, Israel, assignors to Samuel Kaner, Tel Aviv, Israel, a part interest**

**Filed Jun. 29, 1988, Ser. No. 212,898**

**Int. Cl.$^5$ H05B** *41/36*

**U.S. Cl. 315—209 R** **11 Claims**



1. A flickering symbolic religious light simulating an operating candle comprising:

a photovoltaic cell unit having a first terminal and a secod terminal;

a rechargeable electrical energy source having a first terminal and a second terminal;

an overcharge protection unit having a first terminal and a second terminal;

said first terminal of said overcharge protection unit being connected to said first terminal of said photovoltaic cell unit;

said second terminal of said protection unit being connected to said first terminal of said rechargeable electrical energy source;

said second terminal of said rechargeable source being connected to said second terminal of said cell unit, wherein said first terminal of said protection unit is (a) passing current to said second terminal of said protection unit while a voltage at said first terminal of said protection unit is greater than a voltage at said second terminal of said protection unit, and (b) is not passing current otherwise;

a 2-cell flip-flop means having a left cell, a right cell, a first terminal, and a second terminal;

each of said cells having a time constant means, a lamp, and a transistor/gated switch; each of said lamps being in an output switching path of each said switch; each said time constant means of each of said cells being connected between said first terminal of said flip-flop means and a gate of said transistor/gated switch of said other cell; said

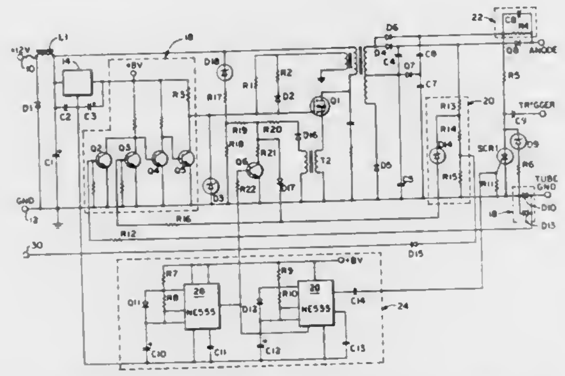
VOL
1126
ISS
1
MY
7
1991
UMI

time constant means of each cell determining a gating-OFF time of said switch of said other cell;
wherein said first terminal of said flip-flop means is connected to said first terminal of said rechargeable electrical energy source; said second terminal of said flip-flop means is connected to said second terminal of said rechargeable electrical energy source;
a housing enclosing said lamps and having at least one flickering candle appearance opening and at least one candle symbol; said photovoltaic cell unit being mounted atop said housing; each lamp of said cell pair being located so as to be proximate the other lamp and viewable through said opening; and
each said time constant means has a time constant in the fraction of a second range to thereby cause said lamps to be alternatingly ON to continuously simulate a flickering appearance of an operating candle.

---

## 5,013,973
## POWER SUPPLY FOR INTERMITTENTLY OPERATED LOADS

**James L. Stopa, Old Saybrook, Conn., assignor to Whelen Technologies, Inc., Chester, Conn.**
**Filed Sep. 6, 1989, Ser. No. 403,379**
**Int. Cl.⁵ H05B *41/14***
**U.S. Cl. 315—241 R** **18 Claims**

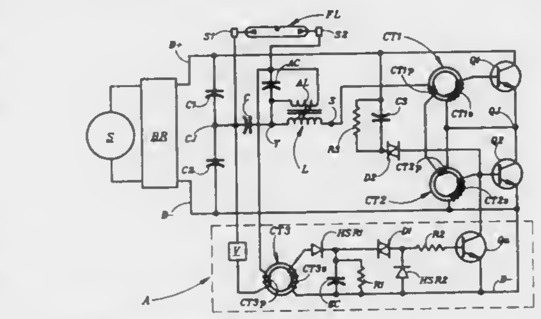


1. Apparatus for providing power for the operation of a gaseous discharge tube, the tube having an anode and a cathode and containing an ionizable gas, the tube further having trigger means for exciting the gas therein whereby an electrical current may flow between the anode and the cathode thereof, said apparatus comprising:
a source of direct current;
means defining a primary anode voltage source for the tube, said primary voltage source defining means comprising a first capacitance which is connected to and charged from said direct current source;
means defining a secondary anode voltage source for the tube, said secondary voltage source defining means comprising a second capacitance which is connected to and charged from said direct current source;
means for connecting said primary voltage source to the flash tube anode, said connecting means preventing the feedback of energy from the tube anode to said primary voltage source;
means for coupling said secondary voltage source to the tube anode, said coupling means impeding the delivery of energy from said secondary voltage source to the tube when current is flowing between the anode and cathode thereof; and
means for generating and applying packets of trigger pulses to the tube trigger means whereby the tube gas will periodically be ionized and said primary anode voltage source means capacitance will discharge therethrough, said trigger pulse packets each comprising a plurality of closely spaced trigger pulses.

---

## 5,013,974
## ELECTRONIC BALLAST WITH IMPROVED LAMP CURRENT CREST FACTOR

**Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010**
**Filed Aug. 24, 1987, Ser. No. 88,717**
**Int. Cl.⁵ H05B *41/16***
**U.S. Cl. 315—244** **24 Claims**

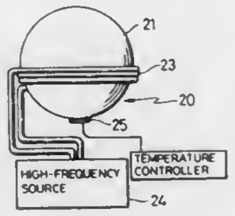


1. An arrangement comprising:
a first current source operative to provide a substantially sinusoidal current of a first frequency;
a second current source operative to provide a substantially sinusoidal current of a second frequency;
a gas discharge lamp; and
connect and matching means operative to connect the gas discharge lamp in circuit with both the first and the second current source, thereby to cause a lamp current to flow through the lamp, the lamp current comprising a first component of sinusoidal current of the first frequency and a second component of sinusoidal current of the second frequency.

---

## 5,013,975
## ELECTRODELESS DISCHARGE LAMP

**Shin Ukegawa; Masaki Shinomiya; Masahiro Higashikawa; Tadao Uetsuki, and Koichi Kobayashi, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan**
**Filed Nov. 21, 1989, Ser. No. 439,873**
**Claims priority, application Japan, Dec. 22, 1988, 63-324024; May 23, 1989, 1-129244; Jun. 15, 1989, 1-153118**
**Int. Cl.⁵ H05B *41/16***
**U.S. Cl. 315—248** **12 Claims**

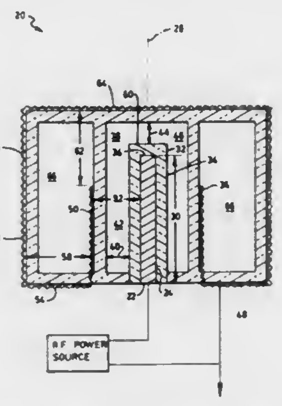


1. An electrodeless discharge lamp comprising a lamp tube formed of a light transmitting material, an induction coil means in proximity to an outer periphery of said lamp tube which conducts a high frequency electric current upon excitation by a high frequency source, a fluorescent material applied to an inner surface of said lamp tube, mercury vapor in said lamp tube having an excitation luminescence upon conduction of high frequency current by said induction coil means and a rare gas in said lamp tube which together with said mercury vapor generates an excitation luminescence of the same series of color as the color series of the visible light emitted by said fluorescent material, said fluorescent material and said gaseous composition being capable of sustaining substantially stable luminescence and substantially stable color over a wide range of ambient temperatures.

---

## 5,013,976
## ELECTRODELESS GLOW DISCHARGE LAMP

**Scott J. Butler, Auburn, Mass., assignor to GTE Products Corporation, Danvers, Mass.**
**Filed Dec. 26, 1989, Ser. No. 456,715**
**Int. Cl.⁵ H05B *41/24***
**U.S. Cl. 315—248** **21 Claims**

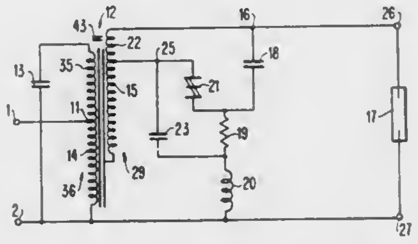


1. An electrodeless lamp to receive power from a radio frequency power source, comprising:
(a) a conductive coupling probe having an axial extension from an input end to a radiant end,
(b) a conductive outer conductor surrounding and offset from the coupling probe having at least a portion formed from a light transmissive, electrically conductive structure, and having (i) a sheath portion surrounding, and separated from the axial extension of the probe by a radial electrode gap, and (ii) a vessel portion surrounding the radiant end of the probe defining a re-entrant cavity around the radiant end, and having a cap axially separated from the radiant end by an axial electrode gap.

---

## 5,013,977
## IGNITOR FOR HIGH PRESSURE ARC DISCHARGE LAMPS

**Joseph S. Droho, Chicago, Ill., assignor to North American Philips Corporation, New York, N.Y.**
**Filed Mar. 9, 1990, Ser. No. 491,363**
**Int. Cl.⁵ H05B *37/00***
**U.S. Cl. 315—289** **14 Claims**

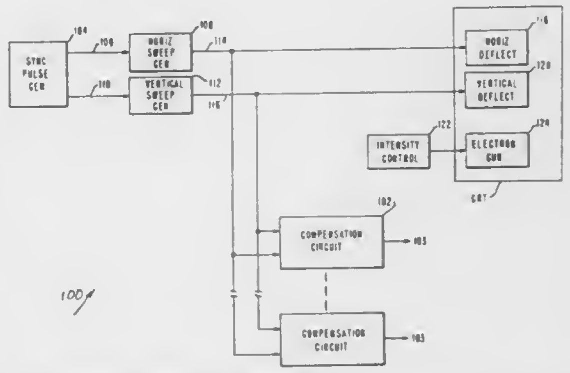


1. Apparatus for igniting and operating a high pressure discharge lamp comprising:
a pair of input terminals for connection to a source of low frequency AC supply voltage,
a pair of output terminals for connection to the electrodes of the high pressure discharge lamp,
inductance means having a winding coupled to at least one of said output terminals,
a first capacitor,
an impedance means including a resistor and an inductor in a first series circuit,
means connecting said first capacitor and said impedance means in a second series circuit,
additional means coupling said second series circuit to said input terminals by way of a part of said inductance means,
a voltage sensitive switching element coupled to said first capacitor and to said inductance means and operable to at least partly discharge said first capacitor when the voltage across said first capacitor equals a predetermined breakdown voltage of the switching element,
a second capacitor, and
further means coupling said second capacitor to said inductance means and to a junction point between said resistor and said inductor of said impedance means.

---

## 5,013,978
## COMPENSATION ARRANGEMENT FOR DISPLAY SYSTEMS

**Malcolm Macaulay, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**
**Filed Sep. 6, 1989, Ser. No. 403,965**
**Int. Cl.⁵ G09G *1/04;* H01J *29/70, 29/51***
**U.S. Cl. 315—367** **4 Claims**



1. A display system comprising:
a sweep circuit for generating a sweep signal;
a compensation circuit for generating a compensation signal in response to the sweep signal generated by said sweep circuit;
an electron gun for generating an electron beam;
a display media responsive to said electron beam;
a deflection arrangement for sweeping the electron beam generated by said electron gun across said display media under control of the sweep signal generated by said sweep circuit and for exciting the display media under control of the compensation signal generated by said compensation circuit; said display media displaying an image in response to the electron beam swept thereacross under control of the sweep signal generated by said sweep circuit and under control of the compensation signal generated by said compensation circuit;
said sweep circuit including a ramp generator for generating the sweep signal as a ramp sweep signal having a predetermined rate of ramp sweeps per second;
said compensation circuit including:
(a) an analog to digital converter coupled to the output of said ramp generator for generating a digital ramp signal in response to the ramp sweep signal,
(b) a memory address register coupled to the output of said analog to digital converter for storing a memory address in response to the digital ramp signal generated by said analog to digital converter,
(c) a DRAM coupled to said memory address register for storing a plurality of compensation parameters and for outputting an addressed one of the plurality of compensation parameters under control of the memory address stored by said memory address register,

VOL
1126
ISS
1
MY
7
1991
UMI

(d) an output register coupled to said DRAM for storing the compensation parameter output by said DRAM,

(e) an interpolation circuit coupled to said output register for generating a plurality of interpolated compensation parameters in response to the compensation parameter stored by said output register, and

(f) a digital to analog converter coupled to said interpolation circuit and to said deflection arrangement for applying the compensation signal to said deflection arrangement in response to the interpolated compensation parameters generated by said interpolation circuit.

---

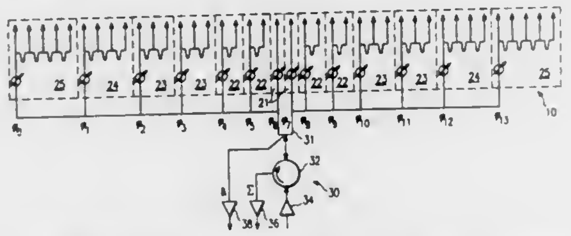
### 5,013,979
## PHASED FREQUENCY STEERED ANTENNA ARRAY

**Stanley V. Birleson, Rowlett, Tex., assignor to Texas Instrument Incorporated, Dallas, Tex.**

**Filed Dec. 29, 1989, Ser. No. 459,002**

**Int. Cl.⁵ H01Q** ***3/22***

**U.S. Cl. 342—375** **25 Claims**



1. A phased frequency steered antenna array for transmitting or receiving RF signals, comprising:

multiple phase-shift/time-delay modules, each including a phase-shift component RF-coupled to associated phase-shift and time-delay aperture elements;

each phase shift component introducing a respective selected phase shift to an RF signal that is input to such component;

each phase shift component being RF-coupled to a phase-shift aperture element; and

each phase shift component being RF-coupled to at least one time-delay aperture element for introducing a selected time-delay phase shift to an RF signal input to such element;

such that the array includes a selected distribution of phase-shift and time-delay aperture elements.

---

### 5,013,980
## VOLTAGE REGULATOR IN A TELEVISION APPARATUS

**Joseph C. Stephens, and Enrique Rodriguez-Cavazos, both of Indianapolis, Ind., assignors to Thomson Consumer Electronics, Inc., Indianapolis, Ind.**

**Filed Nov. 1, 1988, Ser. No. 265,846**

**Int. Cl.⁵ H01J** ***29/70;*** **H04N** ***5/63***

**U.S. Cl. 315—411** **36 Claims**

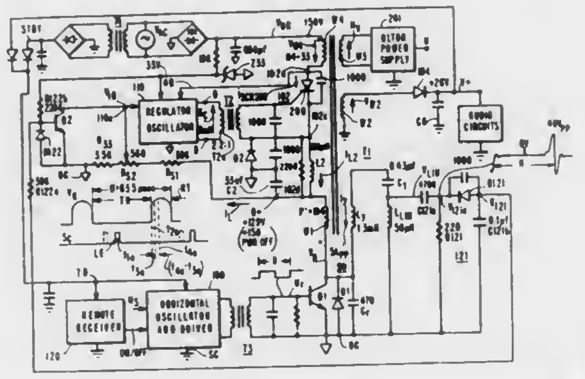
1. A television apparatus, comprising:

a source of an input signal at a frequency that is related to a deflection frequency;

a deflection circuit output stage, including a deflection current linearity element, responsive to said input signal for generating an alternating current first signal in said linearity element with an alternating current magnitude during a power-on operation but not during a power-off operation of said television deflection apparatus;

means coupled to said linearity element and responsive to said first signal for producing in accordance with said alternating current magnitude thereof a power-on/power-off control signal that exhibits a power-on state during said power-on and

a utilization circuit of said television apparatus responsive to said power-on/power-off control signal that causes said utilization circuit to operate in a mode of operation that corresponds to said level of said control signal.



---

### 5,013,981
## CONTROL MECHANISM FOR A DRIVE MOTOR OR THE LIKE

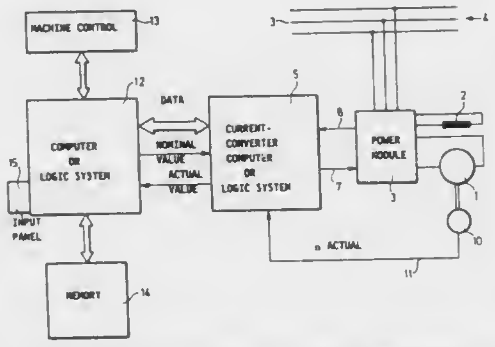
**Anton Rodi, Leimen, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Continuation of Ser. No. 934,309, Nov. 24, 1986, abandoned. This application May 18, 1989, Ser. No. 355,091**

**Claims priority, application Fed. Rep. of Germany, Nov. 22, 1985, 3541277**

**Int. Cl.⁵ H02P** ***7/68***

**U.S. Cl. 318—67** **16 Claims**



1. A combination comprising a control arrangement, at least one electric motor connected to a machine which, in accordance with at least one nominal value fed thereto, controls at least one power control element, connected to an electrical network and the electric motor, data transmission means in the form of a computer device for applying to the control arrangement data received by the computer device from a memory wherein the data are stored; wherein said memory has means for containing parameters of a plurality of different motors, and including means for entering the type of the at least one electric motor and the machine, and parameter selecting means for selecting said parameters.

---

### 5,013,982
## CIRCUIT FOR DRIVING ULTRASONIC MOTOR

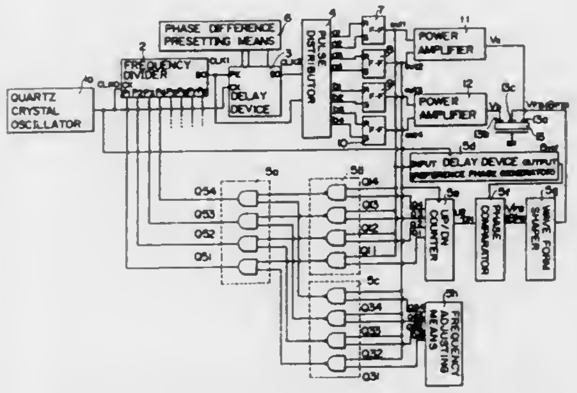
**Toyoji Sasaki, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Japan**

**Filed Apr. 23, 1990, Ser. No. 512,983**

**Claims priority, application Japan, May 2, 1989, 1-113103; Dec. 20, 1989, 1-330161; Dec. 26, 1989, 1-337024**

**Int. Cl.⁵ H02N** ***2/00***

**U.S. Cl. 318—114** **28 Claims**



1. A circuit for driving an ultrasonic motor by applying two phase alternating voltages to said motor, comprising:

a digital oscillator for providing an output signal having an oscillation frequency higher than that of said alternating voltages;

first means for presetting a frequency dividing ratio;

means for dividing the oscillation frequency of the digital oscillator in accordance with the frequency dividing ratio preset by the first means to provide a first clock signal;

second means for presetting a delay time which is an integer multiple of the period of the oscillation frequency of the digital oscillator;

means for delaying the first clock signal in accordance with the delay time preset by said second means to provide a second clock signal;

means for converting the first and second clock signals into first and second alternating voltages, respectively; and

means for applying the first and second alternating voltages to said ultrasonic motor, wherein said second alternating voltage is delayed with respect to the first alternating voltage by said delay time.

25. A method for controlling the operation of an ultrasonic motor which employs first and second alternating voltages having a predetermined phase relationship, comprising the steps of:

generating a first pulse train having a first predetermined frequency;

counting the pulses of the first pulse train;

generating a second pulse train in which the pulses thereof are produced each time a first preselected number of the pulses of said first pulse train is counted;

generating a third pulse train by counting pulses in said first pulse train each time a pulse in said second pulse train is generated;

said third pulse train having pulses which are delayed with respect to said second pulse train by a preselected delay time;

generating first and second alternating voltage signals from said second and third pulse trains; and

applying the first and second alternating voltage signals to said ultrasonic motor.

---

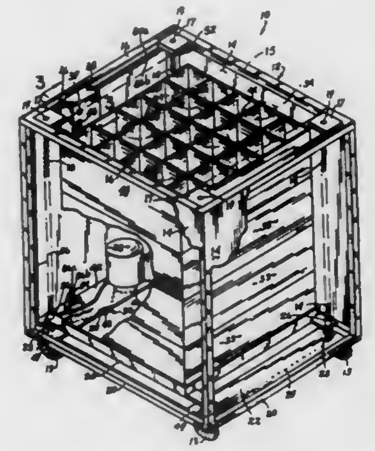
### 5,013,983
## SELF LEVELING DISPENSER

**Max G. Futch, 322 Wilton Dr., Baton Rouge, La. 70895, and Ronald H. Drushel, Baton Rouge, La., assignors to Max G. Futch, Baton Rouge, La.**

**Division of Ser. No. 264,089, Oct. 28, 1988. This application Sep. 25, 1989, Ser. No. 411,687**

**Int. Cl.⁵ B65G** ***1/07;*** **A47F** ***10/06***

**U.S. Cl. 318—480** **2 Claims**



1. A method of adjusting the level of a rack that supports stacked trays such that at least one of dishware and food product in a top tray are accessible at a desired dispensing height, said method comprising the steps of:

providing a lower signal to a motor drivably connected to said rack to lower said rack relative to ground upon sensing the presence of a tray at an upper level, said rack being lowered until the tray presence at the upper level is no longer sensed, and

providing a raise signal to said motor to raise said rack relative to ground upon sensing the absence of a tray at a lower level below said upper level, said rack being raised until said absence is no longer sensed, said raise and lower signals automatically and continuously causing said motor to reposition said rack to place a top tray of said stacked trays at a desired dispensing height.

---

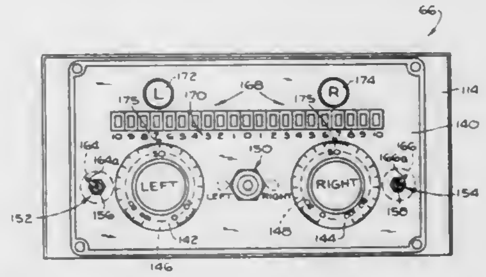
### 5,013,984
## INDICATOR FOR A RECIPROCATING MEMBER

**Joseph A. Armond, River Grove, and Juanito Rodenas, Carol Stream, both of Ill., assignors to Electro-Matic Products Co., Chicago, Ill.**

**Division of Ser. No. 370,198, Jun. 22, 1989, Pat. No. 4,947,090. This application Apr. 23, 1990, Ser. No. 513,116**

**Int. Cl.⁵ G01R** ***29/00***

**U.S. Cl. 318—490** **9 Claims**



1. Apparatus for controlling a machine having a reciprocating table, movable throughout a predetermined maximum range, and driving means for moving the table, comprising,

a series of visual signal elements spaced along a line corresponding to the line of movement of the table, and

VOL
1126
ISS
1
MY
7
1991
UMI

means actuated by the movement of the table operable for energizing the signal elements selectively according to the movement of the table, and thereby indicating the positions of the table in said maximum range of movement according to the identity of the signal elements energized.

6. Apparatus for signaling the movements of a reciprocating member movable along a main line in a predetermined maximum range, in operable association with driving means for driving the reciprocating member, comprising,

a series of visual signal elements spaced along a signal line corresponding to the main line,

voltage controlled means for energizing the signal elements individually,

first means for developing a first voltage in response to movement of the reciprocating member, and

second means for manually adjustably predetermining a second voltage in opposition to the first voltage and thereby for energizing the signal elements along said signal line to indicate the position of the reciprocating member along its said main line.

---

### 5,013,985
### MICROCOMPUTER WITH MOTOR CONTROLLER CIRCUIT

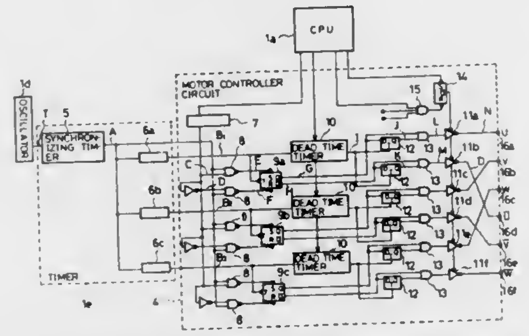
**Mitsuhiro Itoh, and Hideo Matsui, both of Suita, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 25, 1990, Ser. No. 514,390**

**Claims priority, application Japan, Aug. 3, 1989, 1-203215**

**Int. Cl.$^5$ H02P** *6/02;* **H02M** *7/48*

**U.S. Cl. 318—558** **7 Claims**



1. A microcomputer with a motor controller circuit, which comprises:

a microcomputer including a central processing unit, a memory, a timer, and a clock for generating clock pulses, said timer including:

a rise pulse generator in response to said clock pulses to generate rise pulses; and

three three-phase inverter waveform generation timers responsive to said rise pulses to generate output pulses; and

a motor controller circuit incorporated in said microcomputer, said motor controller circuit including:

a register in which said CPU sets start levels for said three-phase inverter waveform generation timers;

three pairs of NAND circuits for producing a logical product of said rise pulse and said start level; and

three flip-flop circuits responsive to start level set signals from said NAND circuits and an output pulse from said three-phase inverter waveform generation timer to generate a three-phase inverter waveform.

---

### 5,013,986
### ACTUATING DRIVE FOR POSITIONING A ROTARY ELEMENT

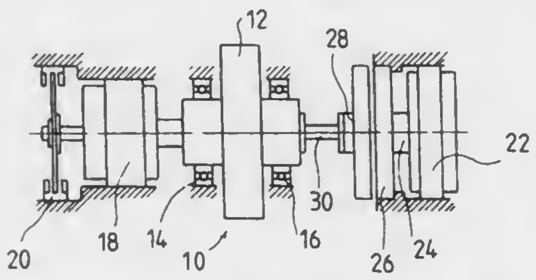
**Roland Gauggel, Waldstrabe, Fed. Rep. of Germany, assignors to Bodenseewerk Geratetechnik GmbH, Uberlinger/Bodensee, Fed. Rep. of Germany**

**Filed May 2, 1989, Ser. No. 346,420**

**Claims priority, application Fed. Rep. of Germany, May 2, 1988, 3814810**

**Int. Cl.$^5$ G05B** *11/18*

**U.S. Cl. 318—593** **15 Claims**



1. An actuating drive for positioning a rotary element to a position determined by a desired value signal, comprising the combination of

(a) an angle pick-off, which provides an actual value signal indicative of the position of the rotary element,

(b) a first controller, to which a difference of said actual value signal and said desired value signal is applied as error signal and which provides a first controller output signal,

(c) a first torque motor,

a rotor of which is directly connected with said rotary element, and

to which said first controller output signal from said first controller is applied,

(d) a second controller, to which the difference of said actual value signal and said desired value signal is applied as error signal and which provides a second controller output signal,

(e) a second torque motor, to which the second controller output signal from said second controller is applied,

(f) a step down system, an input member of which is connected to said second torque motor and an output member of which is in driving connection with said rotary element, and

(g) means for linking control loops of said first and second controllers such that said second torque motor through said step down system provides for coarse positioning of said rotary element to be positioned, and said first torque motor provides for fine positioning after such coarse positioning.

---

### 5,013,987
### CONTROL SYSTEM FOR MAGNETIC BEARING

**Shinji Wakui, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan**

**Filed Jul. 18, 1989, Ser. No. 381,506**

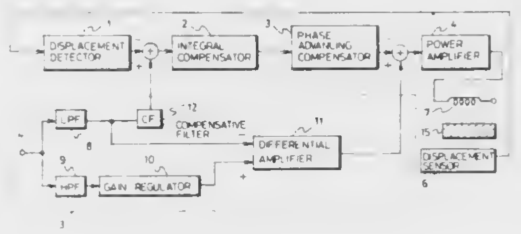
**Int. Cl.$^5$ G05B** *5/01;* **F16C** *39/06*

**U.S. Cl. 318—632** **8 Claims**

1. A control device for controlling displacement of a magnetically supported moving member according to a command, comprising:

a feedback circuit for detecting the displacement of the moving member to control the moving member to ensure stability and robustness of the magnetic support in response to the detected displacement, the feedback circuit comprising a closed loop composed of a displacement detector receptive of an output from a displacement sensor, an integral compensator coupled to the displacement sensor, a phase advancing compensator coupled to the integral compensator, and an electrical power amplifier coupled to the phase advancing compensator for effecting the magnetic support; and

a feedforward circuit having an input terminal receptive of a command and an output terminal connected to the feedback circuit, and cooperative with the feedback circuit without disturbing the stability and robustness of the magnetic support for controlling the displacement of the moving member according to the command.



---

### 5,013,988
### ABSOLUTE POSITION ENCODER

**Tetsuro Sakano, Minamitsuru, Japan, assignor to Fanuc Ltd, Minamitsuru, Japan**

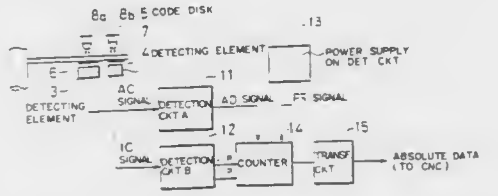
**PCT No. PCT/JP88/01061, § 371 Date Jun. 23, 1989, § 102(e) Date Jun. 23, 1989, PCT Pub. No. WO89/03976, PCT Pub. Date May 5, 1989**

**PCT Filed Oct. 18, 1988, Ser. No. 382,784**

**Claims priority, application Japan, Oct. 29, 1987, 62-274406**

**Int. Cl.$^5$ G05B** *23/02*

**U.S. Cl. 318—602** **9 Claims**



1. An apparatus for position encoding, said apparatus comprising:

a code encoder to output an absolute code and an incremental code, the incremental code output in a set of at least one incremental code signal;

a position indicator to updata an indicated position by a predetermined value for every predetermined set of at least one incremental code signal output by said code encoder; and

a reset circuit to set the indicated position of the position indicator to a value representative of the absolute code output by said code encoder when a power-up occurs.

7. A method of position encoding, said method comprising the steps of:

(a) indicating and outputting from a code encoder an absolute code and an incremental code, the incremental code output in a set of at least one incremental code signal;

(b) updating an indicated position by a predetermined value for every predetermined set of at least one incremental code signal output of the code encoder; and

(c) setting the indicated position to a value representative of the absolute code output by the code encoder when a reset occurs upon a power-up.

---

### 5,013,989
### NUMERICAL CONTROL APPARATUS FOR MULTIPLE-AXIS AND MULTIPLE-CHANNEL MACHINE TOOL

**Mitsuo Kurakake, Hino, and Jiro Kinoshita, Minamitsuru, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**

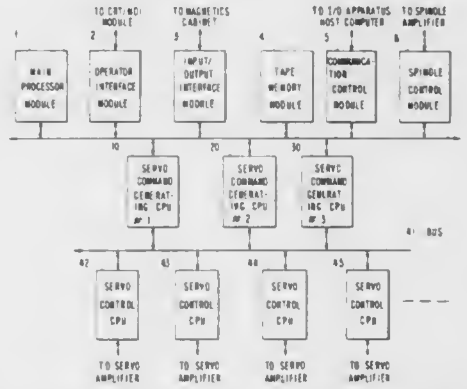
**PCT No. PCT/JP89/00157, § 371 Date Oct. 10, 1989, § 102(e) Date Oct. 10, 1989, PCT Pub. No. WO89/08288, PCT Pub. Date Sep. 8, 1989**

**PCT Filed Feb. 16, 1989, Ser. No. 427,846**

**Claims priority, application Japan, Feb. 26, 1988, 63-043962**

**Int. Cl.$^5$ G05B** *11/32*

**U.S. Cl. 318—625** **10 Claims**



1. In a numerical control apparatus for controlling a multiple-axis and multiple-channel machine tool by controlling multiple axes through multiple channels, said numerical control apparatus comprising:

a main processor for executing data processing other than servo system processing;

a first bus connected to said main processor;

a second bus for transferring servo command data;

a plurality of servo command generating processors, connected to said first bus and said second bus, for processing input data to produce a servo command for each channel; and

a plurality of servo control processors, connected to said second bus, for controlling a servomotor.

---

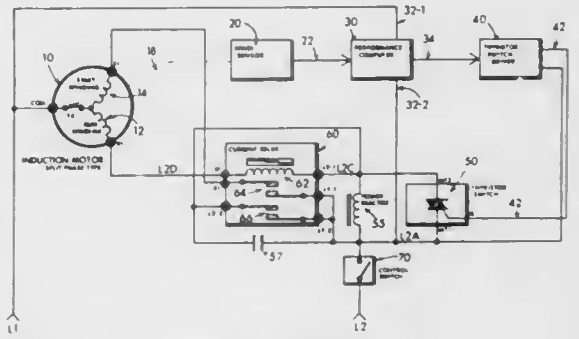
### 5,013,990
### ENERGY CONSERVING ELECTRIC MOTOR POWER CONTROL METHOD AND APPARATUS

**Harold J. Weber, 313 Washington St., P.O. Box 6161, Holliston, Mass. 01746-6161**

**Filed Oct. 16, 1989, Ser. No. 422,079**

**Int. Cl.$^5$ H02P** *7/622*

**U.S. Cl. 318—814** **20 Claims**



17. Energy conserving means comprising:

source of alternating current power;

induction motor means coupled with the a.c. power source;

VOL
1126
ISS
1
MY
7
1991
UMI

means for producing a reactive voltage drop between the source and the motor means;

means for producing substantially inconstant mechanical loading of the motor means;

means for determining the motor loading produced by the mechanical load producing means; and,

means for reducing the reactive voltage drop in response to a determined increase in motor loading above a predetermined level.

---

5,013,991

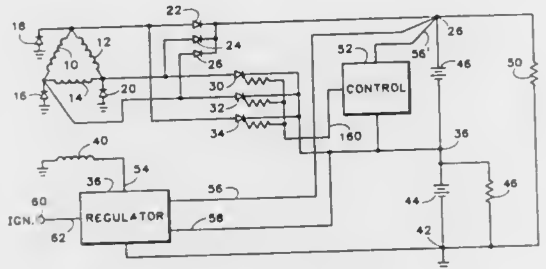
## MULTI-VOLTAGE ALTERNATOR WITH INTEGRAL BANK SWITCHED BRIDGE

**Lyle R. Brune, Beaverton, Oreg., assignor to Sure Power, Inc., Tualatin, Oreg.**

**Filed Apr. 27, 1989, Ser. No. 344,269**

**Int. Cl.⁵ H02J** *7/14, 7/00*

**U.S. Cl. 320—15** **3 Claims**



1. A multi-voltage alternator, comprising

(a) a plurality of interconnected alternator stator coils,

(b) a rectifier bridge connected to the stator coils and arranged for connection across a battery system which includes batteries of higher and lower voltages,

(c) controlled switching means forming a half bridge connected to the stator coils and arranged for connection to a lower voltage

(d) electrical switching control means having an output connected to the control electrodes of the controlled switching means and an input arranged for connection across only a higher voltage battery, and

(e) voltage regulator means having a sensing input and a field supply input, the sensing input being connected across the lower voltage battery and the field supply input being connected across the higher or lower voltage battery and an output connected to the alternator field coil.

---

5,013,992

## MICROPROCESSOR CONTROLLED BATTERY CHARGER

**Jimmy N. Eavenson, Augusta, and Donovan M. Pugh, Hephziba, both of Ga., assignors to E-Z-Go Division of Textron, Augusta, Ga.**

**Filed Oct. 12, 1988, Ser. No. 256,779**

**Int. Cl.⁵ H02J** *7/04*

**U.S. Cl. 320—31** **4 Claims**

1. A battery charger comprising:

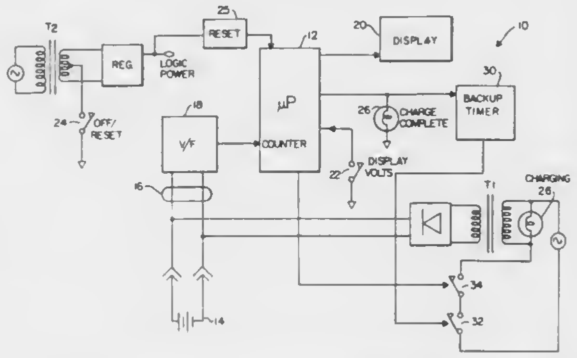
means for providing electrical power for charging a battery to a predetermined voltage potential;

means, coupled to the battery, for determining a magnitude of a voltage potential across the battery; and

means, having a first input signal coupled to said determining means and a first output signal coupled to said power providing means, for controlling the operation of said power providing means for charging the battery, said controlling means being responsive to the determined magnitude of the voltage potential for activating said power providing means when the magnitude of the voltage potential is greater than a predetermined minimum voltage potential and less than a predetermined maximum voltage potential; wherein

said controlling means is comprised of timer means for maintaining a time expressive of an interval of time that said power providing means is activated; wherein

said controlling means is operable for deactivating said



power providing means if the magnitude of the battery voltage potential exceeds a first reference voltage potential within a first predetermined interval of time; and wherein

said first reference voltage potential is approximately 42.4 volts and wherein said first predetermined interval of time is approximately 30 minutes.

---

5,013,993

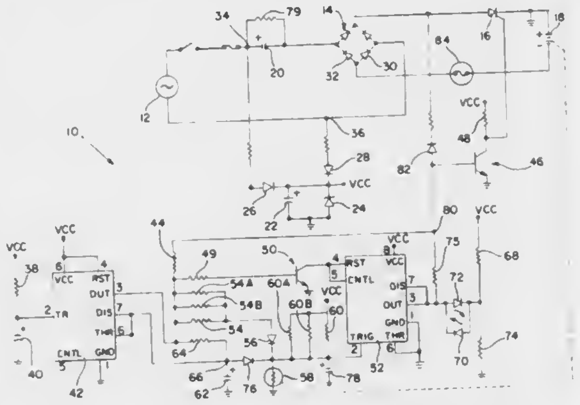
## THERMALLY RESPONSIVE BATTERY CHARGER

**Pradeep M. Bhagwat, Baltimore, Md.; Daniel S. Daniel, Knoxville, Tenn., and Samuel G. Woods, Baltimore, Md., assignors to Black & Decker Inc., Newark, Del.**

**Continuation-in-part of Ser. No. 93,435, Sep. 4, 1987. This application Aug. 29, 1988, Ser. No. 237,962**

**Int. Cl.⁵ H02J** *7/00*

**U.S. Cl. 320—35** **16 Claims**



1. A battery charger, which comprises:

a charging circuit for supplying charge current to a battery;

a first control circuit connectable to the charging circuit and the operable independently of the charging circuit and the supplying of charge current thereby for delaying the supply of current to the battery for a prescribed period prior to charging the battery;

a thermally-responsive device located adjacent the battery for providing an indication of the temperature of the battery at any time prior to and during the charging of the battery;

means responsive to the thermally-responsive device indicating at the end of the prescribed period that the battery temperature is at or below a battery-cool temperature at which the charger would normally enter a charging mode for operating the charging circuit to initiate the charging of the battery;

a second control circuit responsive to the thermally-responsive device indicating that the battery temperature is at or below a charge-stop temperature representative of the battery being fully charged for terminating operation of the charging circuit upon reaching the charge-stop temperature; and

means responsive to the battery being fully charged for preventing the charger from operating in a charging mode even though the temperature of the battery may decrease to or below the battery-cool temperature.

---

5,013,994

## ELECTRICAL SYSTEM FOR AUTOMOTIVE VEHICLE

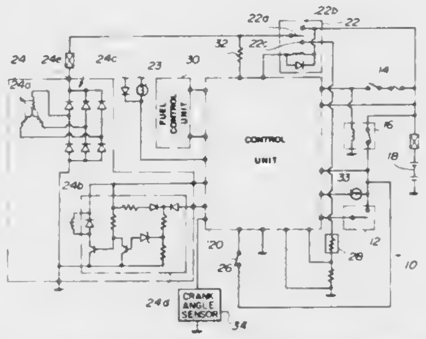
**Hiromichi Takatsuka, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Nov. 29, 1989, Ser. No. 442,558**

**Claims priority, application Japan, Nov. 29, 1988, 63-154277[U]**

**Int. Cl.⁵ B60L** *1/02*

**U.S. Cl. 322—8** **5 Claims**



1. An electrical system for an automotive vehicle, said electrical system having a normal operation mode wherein a first output of a generator is applied to a storage battery, and a defog operation mode wherein a second output of the generator being higher than said first output is applied to a heater element for a vehicle window, said electrical system comprising:

selector means for selecting said normal operation mode or said defog operation mode;

first means, responsive to the selection of the defog operation mode by said selector means, for deactivating said defog operation mode when an engine speed is below or no more than a predetermined level;

second means for detecting a starting of a vehicle engine when the engine speed is below or no more than said predetermined level;

third means, responsive to the detection of said starting of the vehicle engine by said second means, for activating said defog operation mode after a predetermined lapse of time.

---

5,013,995

## PROGRAMMABLE CURRENT LIMIT CURVE

**Abdul Rashid, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Oct. 30, 1989, Ser. No. 429,787**

**Int. Cl.⁵ H02P** *9/00*

**U.S. Cl. 322—25** **13 Claims**

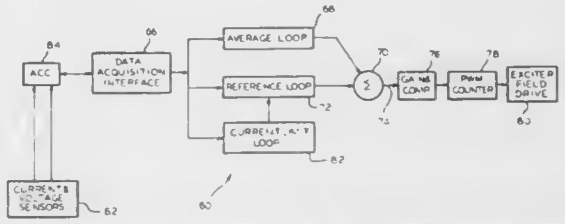
1. A voltage regulator for a generating system having a main generator and an exciter providing field current to the main generator, comprising:

voltage sensing means for sensing generator output voltage;

current sensing means for sensing generator output current;

voltage reference means of developing a setpoint representing desired generator output voltage;

voltage control means responsive to said voltage sensing means and said voltage reference means for controlling the exciter to regulate the output voltage of the main generator; and



current limit means responsive to said current sensing means and coupled to said voltage reference means for reducing said setpoint at one of two distinct rates, the rate used being selected according to a level that the sensed current is above a first current limit value.

---

5,013,996

## VOLTAGE REGULATOR FOR A GENERATOR

**Gerhard Conzelmann, Leinfelden-Echterdingen; Karl Nagel, Gomaringen, and Walter Kohl, Bietigheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Fed. Rep. of Germany**

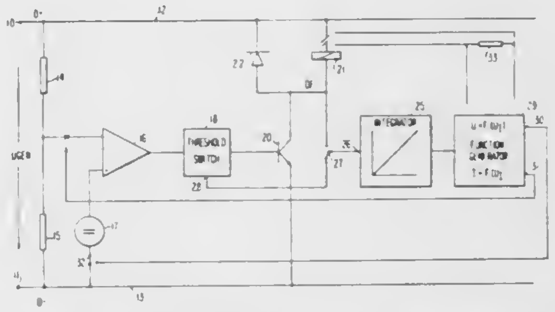
**PCT No. PCT/DE87/00147, § 371 Date Jan. 25, 1989, § 102(e) Date Jan. 25, 1989, PCT Pub. No. WO88/01110, PCT Pub. Date Feb. 11, 1988**

**PCT Filed Apr. 3, 1987, Ser. No. 314,578**

**Claims priority, application Fed. Rep. of Germany, Jul. 25, 1986, 3625211**

**Int. Cl.⁵ H02J** *7/14;* **H02P** *9/30*

**U.S. Cl. 322—28** **4 Claims**



1. A voltage regulator for a generator, particularly for use in motor vehicles, comprising a control loop; means for generating a mean field current in an exciter winding of the generator and including means for switching on and off the current flowing through the exciter winding to keep the generator voltage approximately constant, independently of load and rotational speed; means for generating from a relative operating time (T) of the mean field current generating means an integral signal component; means for feeding back the integral signal component to the control loop; and means for continously and proportionally varying the integral signal component in accordance with the relative operating time.

---

5,013,997

## LIQUID COOLED, HIGH POWER, FERRITE PHASE SHIFTER FOR PHASED ARRAY ANTENNAS

**Robert M. Reese, Philadelphia, Pa., assignor to General Electric Company, Moorestown, N.J.**

**Filed Jan. 2, 1990, Ser. No. 459,864**

**Int. Cl.⁵ H01P** *1/18*

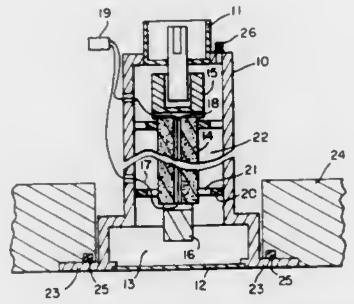
**U.S. Cl. 323—212** **6 Claims**

1. A high power ferrite phase shifter comprising:

(a) a hermetically sealed housing;

VOL
1126
ISS
1
MY
7
1991
UMI

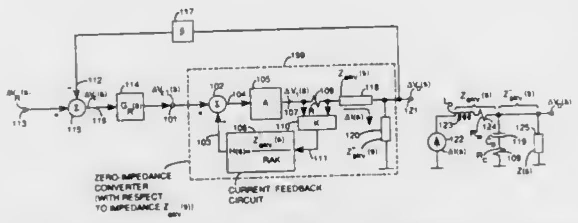
(b) means for mounting a ferrite phase shifter element in said housing;
(c) means adapted for coupling RF energy to said housing and said ferrite;
(d) means for applying a magnetic field to said ferrite for selectively shifting the phase of said RF energy in response to said magnetic field;



(e) means for symmetrically removing heat from said ferrite including a thermally conductive liquid sealed in said housing surrounding said ferrite to transmit heat from said ferrite to said housing; and
(f) radiating means coupled to said phase shifter element.

---

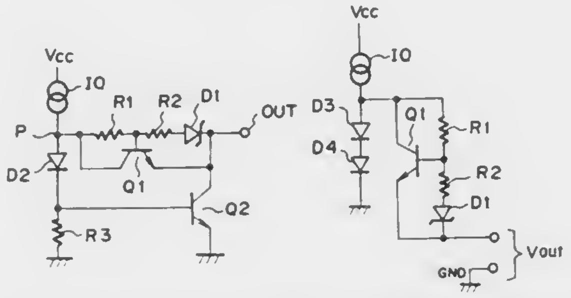
### 5,013,998
## SYNTHESIS OF ZERO-IMPEDANCE CONVERTER
**Ljubomir D. Varga, Deskaseva 6, 11000 Beograd, Yugoslavia, and Novica A. Losic, 7802-23 Ave., Kenosha, Wis. 53140**
**Filed Dec. 18, 1989, Ser. No. 452,000**
**Int. Cl.⁵ H02M *3/335***
**U.S. Cl. 323—285** **7 Claims**



1. A method for synthesizing zero-impedance converter comprising:
accepting a source of electrical energy of a constant voltage or a feedforward compensated voltage at an input,
coupling through an output filter to a load to be energized at an output,
controlling a power flow from said input to said output,
modulating a power converter for the control of said power flow in a pulse width modulation manner,
supplying a resulting control voltage for modulating said power converter,
sampling a voltage across said load,
sensing a current through an output filter inductor,
feeding back the sampled voltage signal in a negative feedback loop with respect to a reference voltage and summing the two voltages,
passing a signal obtained as the algebraic sum of the sampled voltage and said reference voltage through a stabilizing network; thereby producing a voltage loop processed error signal proportional to a difference between the two voltages,
feeding back the sensed current signal through a current feedback circuit in a positive feedback loop with respect to said voltage loop processed error signal and summing the two signals,
supplying said resulting control voltage, obtained as the sum of said voltage loop processed error signal and the current signal fed through said current feedback circuit, for modulating said power converter for the control of the flow of power from the input source to the output load, whereby impedance of said output filter inductor is being forced to zero making said voltage across said load independent of said load and of variations of a parallel output filter capacitor and making a transfer function of the zero-impedance converter independent of a parameters of said output filter and said load.

---

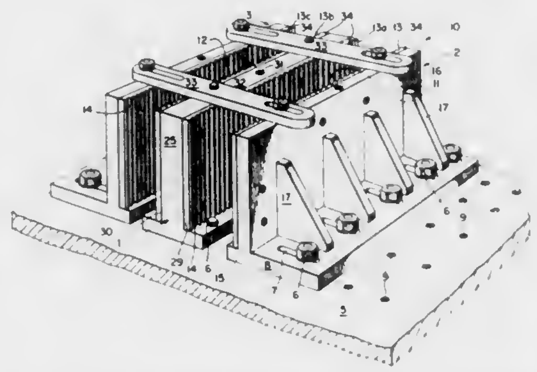
### 5,013,999
## VOLTAGE GENERATING CIRCUIT USING A SCHOTTKY BARRIER DIODE
**Kazuyoshi Yamada, Tokyo, Japan, assignor to NEC Corporation, Japan**
**Filed Jan. 11, 1990, Ser. No. 463,423**
**Claims priority, application Japan, Jan. 20, 1989, 1-11323**
**Int. Cl.⁵ G05F *3/22***
**U.S. Cl. 323—313** **4 Claims**



1. In combination of a voltage generating circuit with an output stage of a logical circuit including a bipolar transistor having its base connected to a voltage divider and its collector connected to an output terminal of the output stage, said voltage generating circuit comprising another bipolar transistor, a first resistor connected between the collector and the base of said another bipolar transistor and a series circuit composed of a second resistor and a Schottky barrier diode and connected between the base and the emitter of said another bipolar transistor, one end terminal of said divider circuit and the collector of said another circuit being coupled to a current source, and the emitter of said another bipolar transistor being coupled to said output terminal.

---

### 5,014,000
## VIBRATORY SCREENING FIXTURE
**Jerry G. Schlagheck, 8256 Lakeshore Dr., West Chester, Ohio**
**Filed Jun. 23, 1989, Ser. No. 370,900**
**Int. Cl.⁵ G01R *31/02;* G01N *29/00***
**U.S. Cl. 324—158 F** **19 Claims**

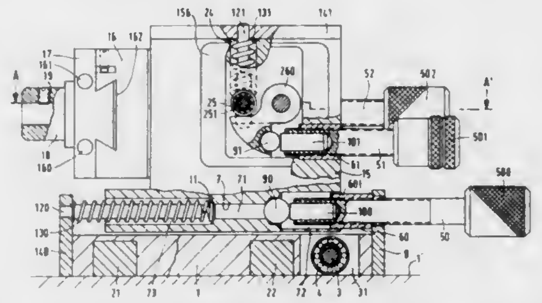


1. A fixture for securing one or more of circuit boards during vibratory testing, said fixture comprising:

a first end fixture member, said first end fixture member having a first wall surface;
a second end fixture member spaced from said first end fixture member, said second end fixture member having a second wall surface facing said first wall surface, said first and second end fixture members being relatively movable so as to vary the spacing between said first and second wall surfaces, each of said first and second wall surfaces including a plurality of spaced parallel notches for securing the edge of a circuit board, each of said notches having resilient means for accomodating dimensional variations between similar circuit boards and an included angle in a range of 110 to 130 degrees to secure a circuit board so that it is free to vibrate in a free-free manner during said vibratory testing; and
means for rigidly securing said fixture to a source of vibratory movement capable of providing one or more predetermined frequencies of vibration.

---

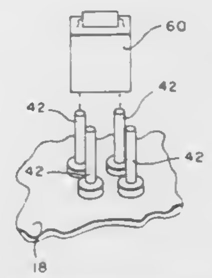
### 5,014,001
## TEST PROBE MANIPULATOR FOR WAFER-PROBING APPARATUS
**Hans Schmidt, Auggen, and Helmut Günter, Freiburg-Munzingen, both of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany**
**Filed May 14, 1990, Ser. No. 522,717**
**Claims priority, application European Pat. Off., Jun. 10, 1989, 89110553.8**
**Int. Cl.⁵ G01R *31/02, 7/28***
**U.S. Cl. 324—158 F** **19 Claims**



1. A test-probe manipulator for use with wafer probing apparatus for performing independent translations of said apparatus along X, Y, and Z axes, comprising:
a base (**1**);
a compound rest (**15**) attached to said base and movable in the direction of the X-axis, a hole (**7**) defined in said compound rest and having two end portions (**72** and **73**) and a center portion (**71**), the diameter of the center portion of the hole being less than that of the two end portions, portion (**73**) having a spring bearing surface (**11**), a groove (**24**) being defined in compound rest (**15**);
a vertical slide (**16**), said base moveably connected with said vertical slide;
a cross slide (**17**) having a groove defined therein and having two spaced apart holes (**160,161**) arranged one above the other in the direction of the Z-axis, said vertical slide supporting said cross slide (**17**);
a receptacle (**18**) for test-probe holders attached to said cross slide;
first, second, and third adjusting spindles (**50,51,52**) arranged at on a selected narrow side of the manipulator and extending parallel to each other in the direction of the X-axis;
a spindle nut (**60**) for receiving said first adjusting spindle (**50**);
a nut holder (**8**) attached to said spindle nut, said spindle nut extending into end portion (**72**) of hole (**7**) in compound rest (**15**);
a contact ball (**90**) disposed in hole (**7**);
a thrust bolt (**100**), adjusting spindle (**50**) acting via thrust bolt (**100**) on a contact ball (**90**) which is fixed at the end of the central portion (**71**) of the hole (**7**) directed toward the thrust bolt (**100**);
a first pin holder (**140**) coupled to base (**1**);
a spring-guiding pin (**120**) mounted at one end in first pin holder (**140**) attached to the base (**1**) extending into hole (**7**);
a compression spring (**130**) telescopically supported by spring-guiding pin (**120**), spring (**130**) resting both against first pin holder (**140**) and against spring-bearing surface (**11**) formed by the enlargement of the diameter of the hole (**7**) toward the first pin holder (**140**);
a spindle nut (**61**) fitted in the compound rest (**15**) for receiving second adjusting spindle (**51**);
a contact ball (**91**);
a thrust bolt (**101**) acting on a contact ball (**91**);
a first follower (**260**) which is pivoted to a cover plate, said contact ball (**91**) fixed at said first follower (**260**);
a ball bearing (**251**) contacted by said first follower (**260**);
a driving pin (**25**) acted upon by ball bearing (**251**) attached to vertical slide (**16**) and movable in a groove (**24**) of the compound rest (**15**);
a compression spring (**131**) in contact with vertical slide (**16**);
a spring-guiding pin (**121**) for telescopically guiding compression spring (**131**);
a second pin holder (**141**) resting against compression spring (**131**) on the one hand and against driving pin (**25**) on the other;
a spindle nut (**62**) for receiving third adjusting spindle (**52**) in vertical slide (**16**);
a second follower (**261**) acted upon by third adjusting spindle (**52**) and pivoted to vertical slide (**16**);
a ball bearing (**171**) acted upon by third adjusting spindle and fixed in said groove of cross slide (**17**);
a third pin holder (**142**) attached to the vertical slide (**16**);
a spring-guiding pin (**122, 123**) having one end fixed in third pin holder (**142**); and
a compression spring (**132,133**) disposed in each of said two spaced apart holes (**160,161**) and telescopically disposed around spring-guiding pin (**122.123**) which has one end fixed in third pin holder (**142**).

---

### 5,014,002
## ATE JUMPER PROGRAMMABLE INTERFACE BOARD
**Paul C. Wiscombe, Fremont, and Arie Shavit, Cupertino, both of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.**
**Filed Apr. 18, 1989, Ser. No. 340,109**
**Int. Cl.⁵ G01R *1/02, 1/04***
**U.S. Cl. 324—158 F** **9 Claims**



1. A jumper programmable interface board providing manually programmable electrical interconnections between automated test equipment and the terminals of an integrated circuit device under test (DUT), said jumper programmable interface board comprising:
an interface board having a plurality of conductive paths formed thereupon, wherein the integrated circuit DUT is mounted on a major surface of said interface board, wherein jumper terminals are located in close proximity to said DUT, wherein the jumper terminals which are associ-

VOL
1126
ISS
1
MY
7
1991
UMI

ated with an array for a particular terminal of a DUT are grouped together, wherein adjacent terminals of an array of said jumper terminals are spaced apart by a predetermined distance, wherein one or more of said conductive paths is a signal path adapted to be coupled to said automated test equipment, wherein one or more of said conductive paths is coupled to a power supply source for said DUT, and wherein one or more of said conductive paths is coupled to a circuit ground potential;

means for selectably connecting one or more of the various ones of said conductive paths of said interface board simultaneously to each of the various terminals of said DUT, said connecting means including:

a plurality of arrays of said jumper terminals, each of said arrays being located on said interface circuit board and associated with a respective DUT terminal, wherein certain ones of said jumper terminals of each array are connected to certain ones of said conductive paths and wherein other ones of said jumper terminals of each array are connected to the terminals of said DUT; and

means for manually programming interconnections between said conductive paths and said terminals of said DUT, said manual programming means including a plurality of groups of removable pin-and-socket jumper means, each group of jumper means being associated with a respective DUT terminal for simultaneously coupling each of the jumper terminals, which are connected to the respective DUT terminal, to jumper terminal which are within the same array of jumper terminals associated with a respective DUT terminal and which are connected to said conductive paths.

---

## 5,014,003

## CONDUCTIVE PATTERN FOR ELECTRIC TEST OF SEMICONDUCTOR CHIPS

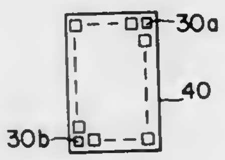
**Michihiro Ishikawa, Kitakami, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jan. 23, 1989, Ser. No. 299,336**

**Claims priority, application Japan, Jan. 20, 1988, 63-10030**

**Int. Cl.$^5$ G01R** *31/02, 31/28*

**U.S. Cl. 324—158 P** **9 Claims**



1. A conductive pattern for electric test of a semiconductor chip with which probes are in contact, comprising:

a plurality of probing pads formed on a layer of said semiconductor chip for carrying out electric testing of said semiconductor chip by contacting said probing pads with said probes; and

at least two unit continuity check patterns provided on said layer of said semiconductor chip at predetermined locations relative to said probing pads for judging whether said probes and said probing pads are in precise alignment, each of said unit continuity check patterns comprising a plurality of conductive pads and a conductive line connecting said pads.

---

## 5,014,004

## SPRUNG CONTACT PIN FOR TESTING TESTPIECES

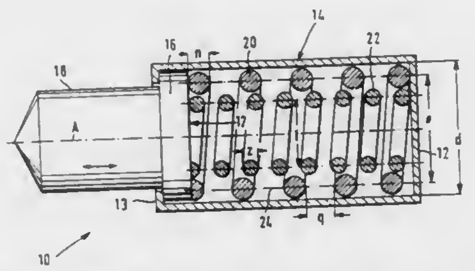
**Ralf Kreibich, Constance, and Michael Topp, Friedrichshafen, both of Fed. Rep. of Germany, assignors to Ingun Prufmittelbau GmbH, Constance, Fed. Rep. of Germany**

**Filed Jul. 20, 1989, Ser. No. 382,391**

**Int. Cl.$^5$ G01R** *1/06*

**U.S. Cl. 324—158 P** **11 Claims**

1. A spring contact pin for testing electrical components, comprising a casing, a coil spring disposed therein, a testing tip disposed within said casing, a portion of said testing tip projecting axially out of the casing, wherein said testing tip is carried by and is moveable with a piston disposed in the casing, said piston and tip being moveable against the force of said coil spring and at least one further force storage means associated with the coil spring for enhancing the service life of said contact pin wherein the total force against which the tip and piston is moveable is the sum of the force of the coil spring and the further force storage means.



---

## 5,014,005

## HALL-EFFECT SENSOR WITH COMPONENT POSITIONING ELEMENT FOR DETECTING CRANKSHAFT ANGLE

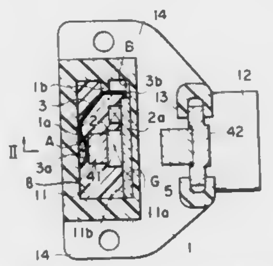
**Shigemi Murata, and Masayuki Ikeuchi, both of Himeji City, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 8, 1990, Ser. No. 490,236**

**Claims priority, application Japan, Mar. 9, 1989, 1-54914; Mar. 15, 1989, 1-60705**

**Int. Cl.$^5$ G01B** *7/30;* **F02P** *7/00;* **G01P** *3/44*

**U.S. Cl. 324—207.20** **12 Claims**



1. A Hall-effect sensor device for generating an electrical signal in response to a variation of magnetic flux caused by a magnetic shutter, comprising:

an integrally molded frame of a resin material defining a box-shaped cavity (**11**) open in one direction, and a magnetic flux guide holder (**13**) disposed opposite a side wall of the cavity across a predetermined gap;

a Hall-effect sensor element (**2**,**2***a*) for converting a variation of magnetic flux caused by the magnetic shutter into an electrical signal, said sensor element being disposed within said cavity of the integrally molded frame;

positioning means disposed within said cavity and engaging both a wall thereof and said sensor element for establishing a desired mounting position of the Hall-effect sensor element with respect to said frame;

a first magnetic flux guide (**41**) made of a magnetic material, disposed in said cavity of the frame in a fixed positional relation with respect to said frame and in engagement with said Hall-effect sensor element;

a second magnetic flux guide (**42**) held by said magnetic flux guide holder of the frame in a fixed positional relation with respect to said frame; and

a magnet (**5**) adhered to said second magnetic flux guide so as to oppose said Hall-effect sensor element across said predetermined gap through which the magnetic flux shutter is translated to cause the variation of the magnetic flux that passes through the Hall-effect sensor element, said flux guides establishing a magnetic circuit loop and serving to channel magnetic flux in said loop through said sensor element.

---

## 5,014,006

## THIN FILM MAGNETIC CORE DEVICE WITH A PAIR OF MAGNETIC CIRCUITS FOR MEASURING A WEAK MAGNETIC FLUX

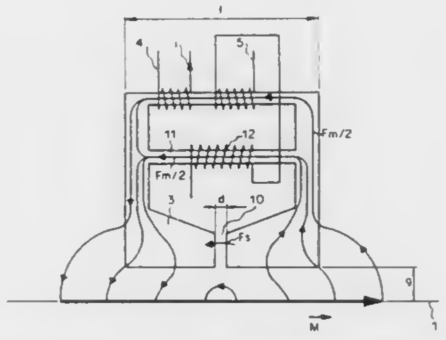
**Thomas Seitz, Zug, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland**

**Division of Ser. No. 353,233, May 17, 1989, Pat. No. 4,967,156, which is a division of Ser. No. 121,536, Nov. 17, 1987, Pat. No. 4,864,238. This application Jun. 12, 1990, Ser. No. 537,072**

**Claims priority, application Switzerland, Nov. 25, 1986, 04711/86; Aug. 20, 1987, 03201/87**

**Int. Cl.$^5$ G01R** *33/05;* **G07D** *7/00;* **G11B** *5/33*

**U.S. Cl. 324—249** **3 Claims**



1. A device for measuring a weak magnetic flux comprising a substrate,

a magnetic core formed as a surface film on a layer supported by said substrate and through which flows a magnetic flux to be measured,

a first coil coupled to said magnetic core for receiving an input signal,

a second coil coupled to said magnetic core,

said magnetic core including fist and second magnetic circuits having a common connecting portion, the first of said magnetic circuits having a magnetic discontinuity and the second of said magnetic circuits having no magnetic discontinuity, said first and second coils being located on said second magnetic circuit,

said device further including a third coil located on'said connecting portion of said core and connected in series with said second coil so that the signals produced by said second and third coils add together to form an output signal corresponding to the magnetic flux to be measured,

said first, second, and third coils each being formed at least in part by one or more flat conductors located between the top of said substrate and the layer on which said core is formed.

---

## 5,014,007

## NUCLEAR MAGNETIC RESONANCE IMAGING METHOD AND APPARATUS

**Koichi Sano; Shimbu Yamagata, both of Yokohama; Tetsuo Yokoyama, Tokyo, and Hideaki Koizumi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 133,069, Dec. 15, 1987, Pat. No. 4,870,362, which is a continuation of Ser. No. 826,250, Feb. 5, 1986, abandoned. This application Sep. 25, 1989, Ser. No. 412,219**

**Int. Cl.$^5$ G01R** *33/20*

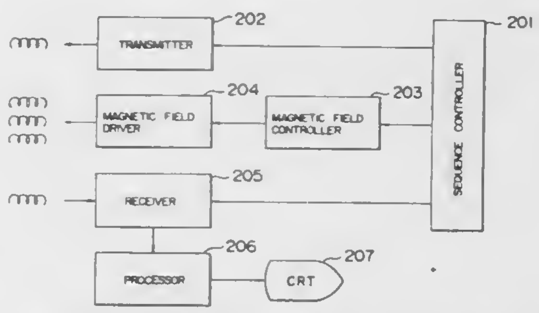
**U.S. Cl. 324—309** **30 Claims**

1. A nuclear magnetic resonance imaging method comprising the steps of:

detecting, by use of a predetermined pulse sequence of a detection system, a nuclear magnetic resonance signal corresponding to an image for a region to be examined;

reconstructing image date on the basis of said detected signal, wherein said reconstructing step includes the steps of:

estimating, by use of a part of said detected signal, a phase shift due to a deviation of an origin of a sampling time of said detected signal or due to both of said deviation and a characteristic of said detection system;



eliminating said estimated phase shift from said detected signal; and

displaying said reconstructed data as an image.

---

## 5,014,008

## SYSTEM FOR DETECTING THE LOCATION AND ORIENTATION OF A TEMPORARILY INACCESSIBLE OBJECT

**Peter M. Flowerdew, Bristol, United Kingdom, assignor to Radiodetection Limited, Bristol, United Kingdom**

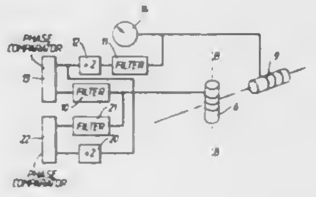
**PCT No. PCT/GB89/00723, § 371 Date Feb. 27, 1990, § 102(e) Date Feb. 27, 1990, PCT Pub. No. WO90/00259, PCT Pub. Date Jan. 11, 1990**

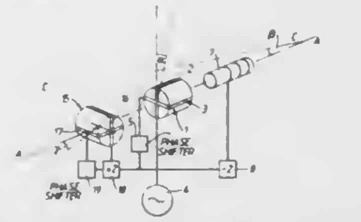
**PCT Filed Jun. 26, 1989, Ser. No. 465,135**

**Claims priority, application United Kingdom, Jun. 28, 1988, 8815313**

**Int. Cl.$^5$ G01V** *3/08. 3/10;* **E21B** *25/16. 47/02*

**U.S. Cl. 324—326** **10 Claims**





1. A system for detecting the location and orientation of a temporarily inaccessible object, such as a boring mole or a locator unit in an underground pipeline, comprising providing that object with first means (**1**) for generating a rotating electromagnetic field, and detecting the presence of the object from the electromagnetic radiation by coil aerial means (**6**) at a receiver, characterised in that the object is further provided with second means (**7**) for generating a further electromagnetic field of frequency and phase related to the rotary field, and in that the receiver is further provided with means (**9**) for deriving from the further field a reference frequency and with means (**13**) for relating to that reference frequency the signal from the rotating field as received by an aerial (**6**) of the coil aerial means having a set orientation, the phase difference

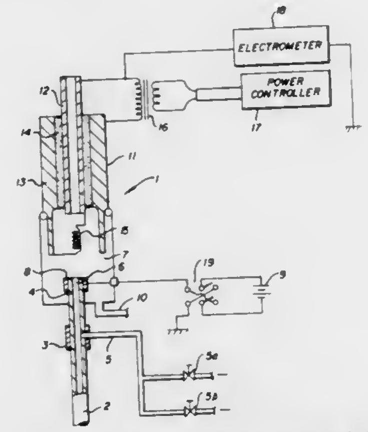
VOL
1126
ISS
1
MY
7
1991
UMI

being indicative of the departure (α) of the first generating means, and hence of said object, from a base orientation.

---

## 5,014,009
## DETECTOR FOR GAS CHROMATOGRAPH FOR DETECTING AMMONIA AND AMINE COMPOUNDS

**Hiromi Arimoto, Kyoto, and Toshihiro Fujii, Tokyo, both of Japan, assignors to Shimadzu Corporation, Kyoto, Japan**
**Continuation-in-part of Ser. No. 363,392, Jun. 6, 1989, abandoned, which is a continuation of Ser. No. 22,445, Jan. 13, 1987, abandoned. This application Jan. 25, 1990, Ser. No. 471,675**
**Claims priority, application Japan, May 17, 1985, 60-106243; Aug. 20, 1985, 60-183441**
**Int. Cl.$^5$ G01L *21/32;* G01N *30/00***
**U.S. Cl. 324—468** **2 Claims**



1. A detector device for a gas chromatograph for selectively analyzing ammonia and amine compounds in a sample by subjecting such sample to contact with a heated metallic electrode to form ionized sample components thereon, said device comprising:

a heated metallic electrode having a larger work function than the ammonia or amine compound in the same component to be analyzed and being maintained at a temperature of 500°-600° C., wherein at least part of the surface of the metallic electrode is formed of a metallic substance selected from the group consisting of platinum, rhenium, iridium, oxides of the three metals, and a combination of said metals with oxides;

a nozzle for directing sample gases, separated in the gas chromatograph, together with oxygen-containing carrier gases, to contact said heated metallic electrode to form ionized sample components thereon; and

a pair of electrodes, including a nozzle electrode located at said nozzle and having a negative polarity, and a collector electrode located near said heated metallic electrode, and having a positive polarity.

---

## 5,014,010
## DUAL FREQUENCY MICROWAVE WATER CUT MONITORING MEANS AND METHOD

**David A. Helms; Michael G. Durrett, and Gregory J. Hatton, all of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.**
**Filed Apr. 10, 1989, Ser. No. 337,017**
**Int. Cl.$^5$ G01R *27/04***
**U.S. Cl. 324—640** **12 Claims**

1. A petroleum stream microwave water cut monitor comprising:

temperature sensing means for sensing the temperature of the petroleum stream and providing a temperature signal corresponding thereto,

source means for providing microwave energies at two different frequencies,

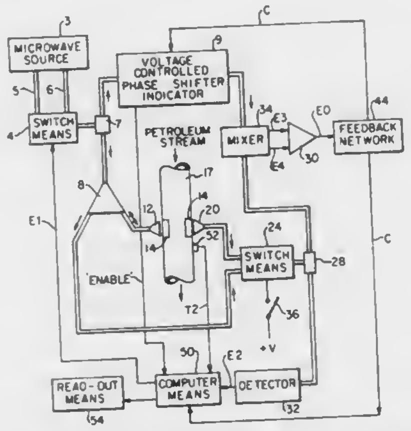
antenna means for providing the petroleum stream with the microwave energies at the two frequencies and for receiving reflected microwave energies back from the stream,

circulating means connected to the source means and to the antenna means for providing the microwave energy from the source means to the antenna means for providing the reflected microwave energies from the antenna means as test microwave energies,

detector means connected to the circulating means for detecting the intensities of the test microwave energies and providing an intensity signal corresponding thereto, and

indicator means connected to the temperature sensing means, to the circulating means, to the source means and to the detector means for providing an indication of the water cut of the petroleum stream in accordance with the temperature signal, the intensity signal and the phase difference between one of the microwave energies provided by the source means and its corresponding test microwave energy; and

in which the indicator means includes:



a voltage controlled phase shifter receiving the microwave energies from said source means for phase shifting the microwave energies from the source means in accordance with a phase shift signal to provide reference microwave energies and to provide an enabling signal when the phase shifting is completed,

phase shift signal means receiving the reference microwave energies and the test microwave energies for providing the phase shift signal to the phase shifter until there is substantially a 90° phase difference between a reference microwave energy and its corresponding test microwave energy, and

water cut means connected to the temperature sensing means, to the phase shifter, to the detector means and to the phase shift signal means and responsive to the enabling signal from the phase shifter for determining the water cut of the petroleum stream in accordance with the temperature signal, the intensity signal and one of the phase shifts, and providing water cut signals corresponding thereto.

---

## 5,014,011
## CAPACITANCE MEASURING APPARATUS WITH MEANS FOR NULLING THE RESISTIVE COMPONENT

**Alex D. Colvin, Oak Park, Mich., assignor to Ford Motor Company, Dearborn, Mich.**
**Filed May 31, 1988, Ser. No. 200,284**
**Int. Cl.$^5$ G01R *27/26***
**U.S. Cl. 324—663** **4 Claims**

1. An apparatus for measuring the capacitance of a medium independently of the resistivity of the medium, comprising:

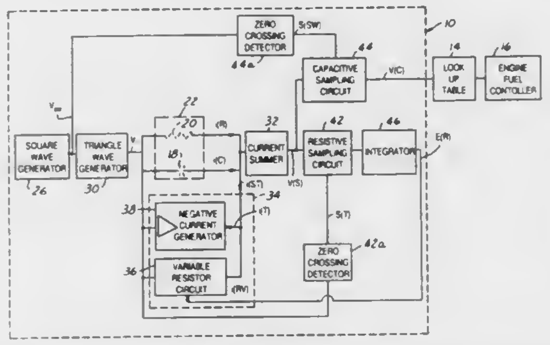
means for applying a periodic voltage to the medium to generate both a resistive current component flowing through the medium in phase with said periodic voltage and a capacitive current component flowing through the medium in phase with a time derivative of said periodic voltage;

a negative current generator coupled to said periodic voltage applying means for generating a negative current proportional to and $\pi$ radians out of phase with said periodic voltage independently of the medium, said current generator including phase alignment means for aligning phase transitions of said negative current with phase transitions of said periodic voltages;

a variable light sensitive resistor coupled to said periodic voltage and having a resistive value proportional to amplitude of a radiant signal for producing a variable current related to both said periodic voltage and said radiant signal, said variable light sensitive resistor producing said variable current in phase alignment with said periodic voltage wherein said phase alignment is independent of said amplitude;

radiant energy emitting means for emitting said radiant signal in proportion to an electronic signal;

current summing means coupled to the medium and said current generating means and said variable resistor for summing said negative current and said variable current and said resistive current component and said capacitive current component;



sampling means for sampling said summed current over a time period in phase with said resistive current component;

averaging means coupled to said sampling means for averaging said capacitive current component to zero and for averaging said resistive current component plus said variable current less said negative current to define said electronic signal;

means for coupling said electronic signal to said variable resistor so that said variable current less said negative current is substantially equal to said resistive current component and $\pi$ radians out of phase with said periodic voltage and said resistive current component thereby nulling said resistive current component from said summed current; and

detecting means coupled to said summing means and in phase with said capacitive current component for detecting said capacitive current component independently of said resistive current component.

---

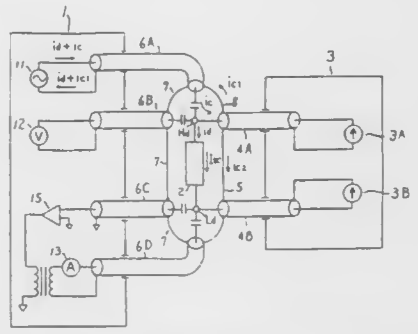
## 5,014,012
## D.C. BIASING APPARATUS

**Yoichi Kuboyama, and Koichi Yanagawa, both of Hachiojishi, Japan, assignors to Hewlett-Packard Co., Palo Alto, Calif.**
**Filed Jun. 30, 1989, Ser. No. 374,117**
**Claims priority, application Japan, Jul. 6, 1988, 63-167910**
**Int. Cl.$^5$ G01R *27/00***
**U.S. Cl. 324—720** **4 Claims**

1. A D.C. biasing apparatus which applies D.C. bias to a device under test for measuring impedance thereof, characterized in that:

there are provided at least one impedance unit connected between one terminal of said device under test and a connecting point and at least one impedance unit connected between said connecting point and another terminal of said device under test;

at least one of said impedance units is a D.C. bias power source; and

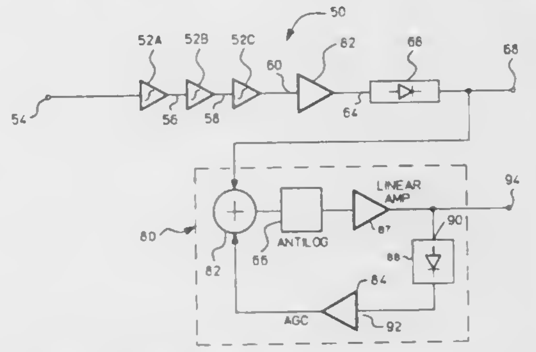


said connecting point is connected to a guard line for removing effects on impedance measurement of an A.C. measuring current which flows in other than said device under test.

---

## 5,014,013
## ANTILOG CIRCUIT WITH AUTOMATIC GAIN CONTROL

**Brian R. Kotzian, Santa Rosa, Calif., assignor to Hewlett-Packart Company, Palo Alto, Calif.**
**Filed Oct. 6, 1989, Ser. No. 418,295**
**Int. Cl.$^5$ G06G *7/24, 7/16;* G06F *7/556, 1/02***
**U.S. Cl. 328—145** **20 Claims**



1. An antilog circuit comprising:

antilog means for converting a first signal to a second signal such that said second signal is an exponential function of said first signal;

amplifier means for amplifying said second signal to provide an output signal;

feedback means for detecting the peak amplitude of said output signal and providing an error signal when said peak amplitude exceeds a reference voltage; and

means for summing an input signal and said error signal to provide said first signal to said antilog means.

---

## 5,014,014
## PLANE WAVE TRANSFORMER LINAC STRUCTURE

**Donald A. Swenson, Albuquerque, N. Mex., assignor to Science Applications International Corporation, San Diego, Calif.**
**Filed Jun. 6, 1989, Ser. No. 361,942**
**Int. Cl.$^5$ H01J *25/10, 9/00;* H05H *9/04***
**U.S. Cl. 328—233** **24 Claims**

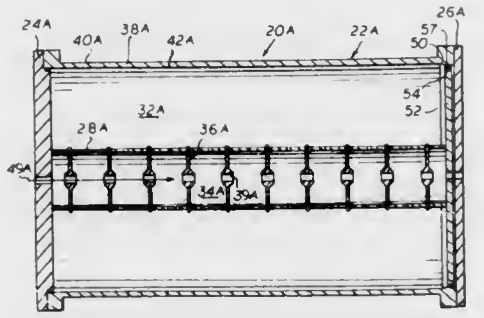
1. A plane wave transformer linear accelerator structure for accelerating charged particles to velocities close to the speed of light, said accelerator including a tank section comprising:

VOL
1126
ISS
1
MY
7
1991
UMI

a generally cylindrical tank wall having an inner surface, an outer surface, a first end and a second end;

a first end plate supported adjacent said first end of said tank wall, and a second end plate supported adjacent said second end of said tank wall, said end plates being substantially symmetrical about a central axis, said end plates each having a central aperture for accommodating the passage of a charged particle beam;

support means extending intermediate said first and said second end plates and partially defining at least one axially extending outer cavity and at least one axially extending



inner cavity, said outer cavity being substantially disposed between said outer tank wall and said support means, said inner cavity being substantially disposed inside said outer cavity; and

a plurality of discrete, axially-spaced washers held inside said tank wall, said washers supported by said support means, said washers each containing a central aperture, said apertures together defining a charged particle beam acceleration path through said tank section, said apertures situated substantially on said central axis of said tank section, said support means comprising a plurality of support rods.

---

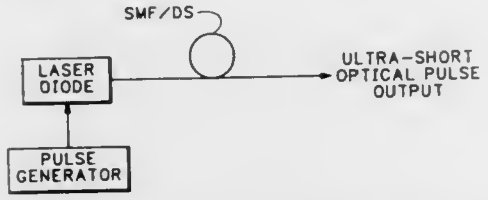
## 5,014,015
## ULTRA-SHORT OPTICAL PULSE SOURCE

**R. Thomas Hawkins, II, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Dec. 5, 1989, Ser. No. 446,515**

**Int. Cl.$^5$ G02B *27/44;* G02F *1/16***

**U.S. Cl. 330—4.3** **6 Claims**



1. An ultra-short optical pulse source comprising:

a gain-switched laser diode to produce an output optical pulse, the gain-switched laser diode having all time-averaged satellite spectral intensity features at least twenty decibels below the peak intensity of a principal spectral component; and

means for dispersively delaying the output optical pulse to produce an ultra-short optical pulse without a satellite temporal pulse.

---

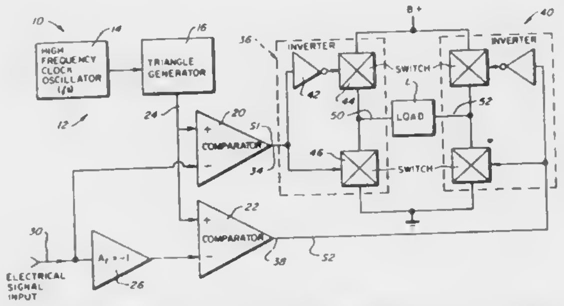
## 5,014,016
## SWITCHING AMPLIFIER

**James R. Anderson, Chicago, Ill., assignor to Beltone Electronics Corporation, Chicago, Ill.**

**Filed Apr. 13, 1989, Ser. No. 337,261**

**Int. Cl.$^5$ H03F *3/38***

**U.S. Cl. 330—10** **63 Claims**



10. A high efficiency switching amplifier for providing an amplified representation of an input signal to a load comprising:

first means for providing a first modulated pulse waveform in response to the input signal;

second means for providing a second modulated pulse waveform modulated out of phase with respect to said first means in response to a representation of the input signal; and

switching means coupled to said first and said second means for providing an amplified, representation of the input signal to the load.

---

## 5,014,017
## POWER-SAVING LOW-FREQUENCY POWER AMPLIFIER

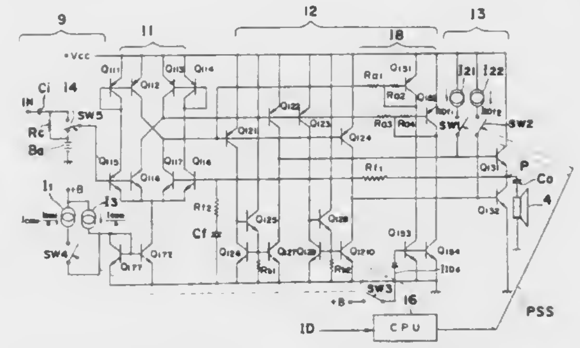
**Kazuhisa Ishiguro, Nitta, and Yutaka Sekiguchi, Oora, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Aug. 10, 1989, Ser. No. 392,365**

**Claims priority, application Japan, Aug. 12, 1988, 63-202226**

**Int. Cl.$^5$ H03F *3/183***

**U.S. Cl. 330—51** **9 Claims**



1. A power saving low frequency power amplifier comprising:

a first stage amplifier for receiving and amplifying a data signal, said first stage amplifier being operated in response to a driving current to produce an output;

a second stage amplifier for amplifying the output of said first stage amplifier, said second stage amplifier receiving a first idling current via a path for obtaining a predetermined amplification to produce another output;

a power amplifier for amplifying the another output of said second amplifier, said power amplifier receiving a second idling current via another path for obtaining a predetermined amplification;

switching means for making and breaking at least one of said paths for said first and second idling currents;

control means for producing a power save signal to said switching means for causing said switching means to effect said breaking when said power save signal is present; and

another switching means for cutting off the data signal and for supplying a stable DC voltage to said first stage amplifier when said power save signal is present.

---

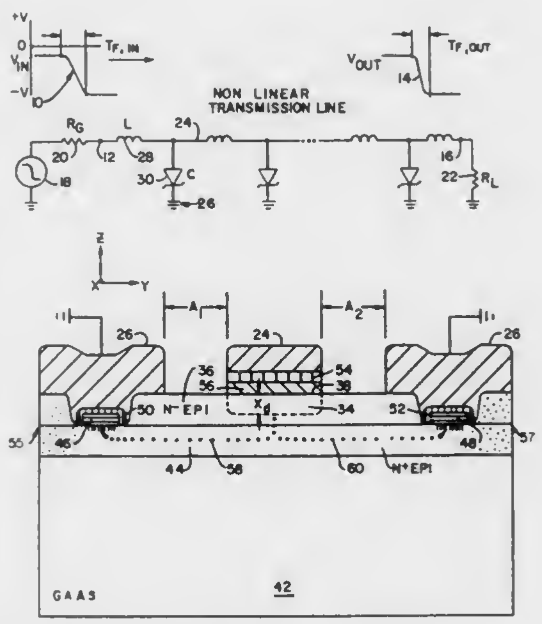
## 5,014,018
## NONLINEAR TRANSMISSION LINE FOR GENERATION OF PICOSECOND ELECTRICAL TRANSIENTS

**Mark J. W. Rodwell, Palo Alto, and David M. Bloom, Portola Valley, both of Calif., assignors to Stanford University, Stanford, Calif.**

**Filed Oct. 6, 1987, Ser. No. 106,554**

**Int. Cl.$^5$ H03K *3/313***

**U.S. Cl. 333—20** **17 Claims**



1. An apparatus comprising:

a coplanar waveguide nonlinear transmission line for compressing the fall time of an input signal applied to an input thereof to generate an output signal at an output having a shorter fall time than said input signal, said nonlinear transmission line being integrated on a substrate of semiconductor material having islands of doped, conductive semiconductor along said transmission line surrounded by areas of said substrate which have been rendered nonconductive, said transmission line having a center conductor of constant width and at least two ground plane conductors spaced apart from said center conductor on either side of said center conductor, said center conductor-to-ground plane conductor spacing alternating between a first dimension and a second larger dimension at selected points along said transmission line, said first dimension being the smallest allowable spacing permitted by the design rules under which the integrated transmission line is fabricated, said second dimension selected in conjunction with the size and spacing of said islands to yield a desired, selected characteristic impedance of said transmission line which results in a usable, not excessive attenuation value for attenuation of signals propagating along said transmission line;

means integrated in said substrate coupled to said transmission line for causing the group velocity for propagation of said input signal toward said output to be voltage dependent at each point along said transmission line including a buried layer of heavily doped semiconductor under said islands.

---

## 5,014,019
## AMPLIFIER CIRCUIT OPERABLE AT LOW POWER SOURCE VOLTAGE

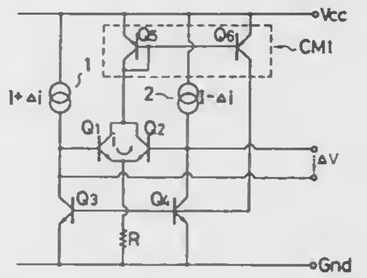
**Tatsuo Tanaka, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Feb. 8, 1990, Ser. No. 476,836**

**Claims priority, application Japan, Feb. 20, 1989, 1-39810**

**Int. Cl.$^5$ H03F *3/45***

**U.S. Cl. 330—257** **10 Claims**



1. A transistor circuit for outputting an output voltage which corresponds to a difference between a first and a second input current, said circuit being responsive to a first and a second power source voltages, comprising:

a first node supplied with the first power source voltage;

a second node supplied with the second power source voltage;

a first transistor having an emitter electrode, a base electrode and a collector electrode;

a second transistor having an emitter electrode connected to the emitter electrode of the first transistor, a collector electrode connected to the collector electrode of the first transistor and a base electrode;

input signal supplying means for supplying the first input current to the base electrode of the first transistor and for supplying the second input current to the base electrode of the second transistor;

a third transistor having an emitter electrode connected to the first node, a collector electrode connected to the base electrode of the first transistor and a base electrode;

a fourth transistor having an emitter electrode connected to the first node, a base electrode connected to the base electrode of the third transistor and a collector electrode connected to the base electrode of the second transistor;

current supplying means for supplying a current to the base electrodes of the third and the fourth transistors, the current being proportional to the sum of currents which flow from the collector electrodes of the first and the second transistors, whereby the base electrodes of the first and the second transistors form outputs of the differential amplifier circuit.

---

## 5,014,020
## AMPLIFIER FOR OUTPUTTING MOTOR CONTROLLING SIGNAL IN MOTOR CONTROLLING CIRCUIT

**Michihiko Hayashi, and Kenzi Ohtani, both of Kyoto, Japan, assignors to Rohm Co., Ltd., Kyoto, Japan**

**Filed Dec. 12, 1989, Ser. No. 448,953**

**Claims priority, application Japan, Dec. 20, 1988, 63-165523[U]**

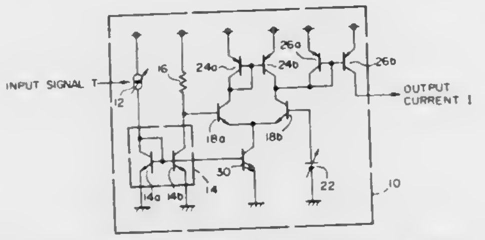
**Int. Cl.$^5$ H03F *3/45***

**U.S. Cl. 330—257** **4 Claims**

1. An amplifier for outputting a DC motor controlling signal in a motor controlling circuit, comprising:

VOL
1126
ISS
1
MY
7
1991
UMI

an input current regulator for controlling the current flowing thereacross in response to an input signal;
a current regulator for controlling the current flowing thereacross in response to the amount of the current flowing across said input current regulator;
amplifying means for amplifying said input signal, said amplifying means being connected to said current regulator;



and wherein the current outputting capability of said amplifying means is changed in accordance with the amount of the current flowing across said current regulator so that said current outputting capability is changed in such a manner as to become small when the level of the input signal is small and to become large when the level of the input signal is large.

---

### 5,014,021

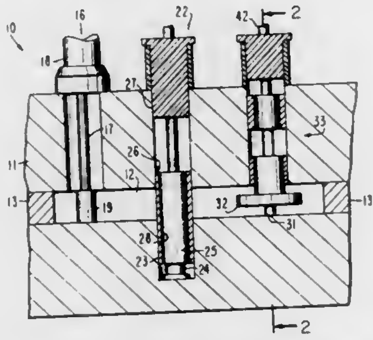
### FREQUENCY LINEARIZATION CIRCUIT FOR A MICROWAVE VCO IN RIDGED WAVEGUIDE

**Ralston S. Robertson, Jr., Northridge, and John N. Poelker, Simi Valley, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Feb. 8, 1990, Ser. No. 476,991**

**Int. Cl.$^5$ H03B** *7/14*

**U.S. Cl. 331—96** **9 Claims**



1. A frequency linearized microwave voltage controlled oscillator circuit comprising:
a ridged waveguide having adjustable waveguide shorts disposed at opposite ends thereof to form a cavity;
a negative resistance device disposed within the waveguide and adapted to generate microwave frequencies;
a coaxial output line coupled to an antenna probe disposed within the waveguide for coupling power to a load;
a frequency control module disposed in the waveguide having a top portion adapted to couple to a source of adjustable biasing voltage and having a disc resonator disposed on its bottom most portion; and
a variable capacitance device disposed within the waveguide coupled to the bottom waveguide wall and the bottom most portion of the disc resonator as a source of microwave impedance.

---

### 5,014,022

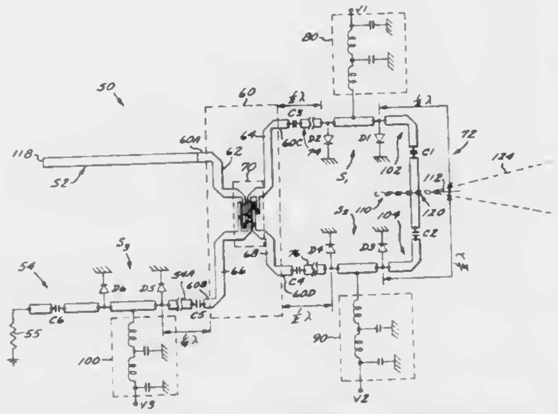
### SWITCHED-LOOP/180 DEGREE PHASE BIT WITH APERTURE SHUTTER CAPABILITIES

**Ronald I. Wolfson, Los Angeles, and Clifton Quan, Arcadia, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 13, 1989, Ser. No. 450,131**

**Int. Cl.$^5$ H01P** *1/18, 1/185*

**U.S. Cl. 333—161** **16 Claims**



1. A microwave device for coupling microwave energy between the device and a first transmission medium, the device providing a 180 degree selective phase bit function as well as energy reflection and absorption functions, and comprising:
a phase sifter port;
a conductive loop extending generally orthogonally to a coupling region in a first transmission medium and being coupled to said phase shifter port;
said device further being characterized by an aperture port, wherein said device coupled microwave energy between said phase shifter port and said aperture port;
means operable in a first device mode for establishing a first direction of current in said loop for coupling energy between said phase shifter port and said aperture port with a reference phase shift;
means operable in a second device mode for establishing a second direction of current in said loop which is reverse to the first direction for coupling energy between said phase shifter port and said aperture port with a phase shift substantially 180 degrees out-of-phase with said reference phase;
means operable in a third device mode for shorting said conductive loop adjacent said coupling region so as to reflect incident microwave energy incident on said aperture port from either said transmission medium or said phase shifter port;
means operable in a fourth device mode for absorbing microwave energy incident on the aperture port from said transmission medium in a load; and
means for selecting said first, second, third or fourth device operating mode.

---

### 5,014,023

### NON-DISPERSIVE VARIABLE PHASE SHIFTER AND VARIABLE LENGTH TRANSMISSION LINE

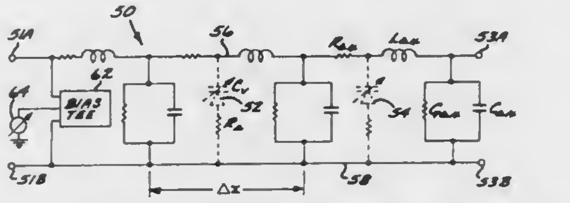
**John E. Mantele, Laguna Niguel, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Mar. 29, 1989, Ser. No. 329,997**

**Int. Cl.$^5$ H03H** *11/20;* **H01Q** *3/22*

**U.S. Cl. 333—164** **22 Claims**

1. A low-loss, non-dispersive microwave frequency variable phase shift device operable over a wide frequency bandwidth, wherein the amount of phase shift is selectable over a predetermined range by an external voltage control signal and is linearly proportional to frequency, comprising:
a length of transmission line comprising first and second conductors, said transmission line having an intrinsic distributed capacitance;
a plurality of varactor diodes, each characterized by an anode and a cathode, connected periodically in parallel between said first and second conductors, said varactor diodes connected anode to cathode between said first and second transmission conductors, thereby placing the diodes in parallel with the intrinsic distributed capacitance of the transmission line and wherein said varactor diodes are characterized by a "Q" of at least 70,000 at 50 MHz;
means for applying an external voltage control signal to said diodes to provide a reverse bias on said diodes, said means for applying a selectable reverse bias level within a predetermined reverse bias range, whereby changing the reverse bias applied to the varactor diodes changes the capacitance of the diodes, thereby also producing a corresponding change in the phase constant of the transmission line and providing a relative phase shift; and
wherein said means for applying said external control signal is operated to limit the magnitude of the capacitance change to limit the magnitude of changes in the characteristic impedance to prevent significant impedance mismatches between the phase shift device and circuitry to which the phase shift device is connected.



---

### 5,014,024

### BANDPASS FILTER AND METHOD OF TRIMMING RESPONSE CHARACTERISTICS THEREOF

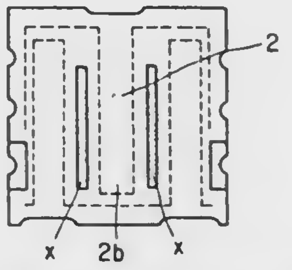
**Hiroyuki Shimizu; Kenji Ito, and Naomasa Wakita, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan**

**Filed Jul. 27, 1990, Ser. No. 559,200**

**Claims priority, application Japan, Aug. 31, 1989, 1-227169**

**Int. Cl.$^5$ H01P** *1/203, 1/205*

**U.S. Cl. 333—203** **4 Claims**



1. A bandpass filter comprising a pair of opposing, first and second dielectric substrates each having an outer surface provided with a ground conductor, and conducting resonator means provided between said first and second dielectric substrates and including a plurality of parallel resonator fingers each having an open circuit end and a base end electrically connected to said ground conductor, characterized in that a part of said ground conductor is removed to form an opening therein between adjacent two fingers, thereby to increase the bandwidth of frequency to which said filter responds.

---

### 5,014,025

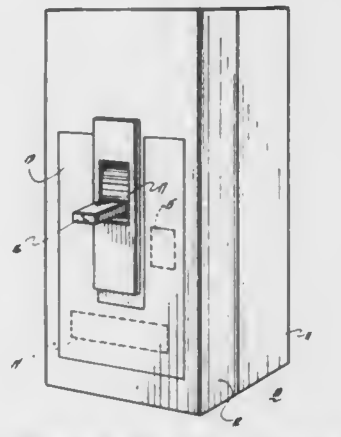
### ACTUATOR-ACCESSORY RESET ARRANGEMENT FOR MOLDED CASE CIRCUIT INTERRUPTER OR ELECTRIC SWITCH

**Thomas F. Papallo, Jr., Plainville, and Roger N. Castonguay, Terryville, both of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed May 3, 1990, Ser. No. 518,672**

**Int. Cl.$^5$ H01H** *9/20*

**U.S. Cl. 335—167** **9 Claims**



1. A molded case circuit interrupter or electric switch comprising:
a plastic interrupter case and cover;
an actuator unit or accessory unit within said interrupter cover;
an operating mechanism contained between a pair of opposing sideframes within said interrupter case and arranged for separating a pair of contacts;
an externally accessible operating handle connecting with said operating mechanism through a handle yoke arrangement for moving said operating mechanism between CLOSED and OPEN positions;
a sequential resetting arrangement intermediate said actuator unit or accessory unit and said operating mechanism for resetting said actuator unit or accessory unit before latching said operating mechanism, said sequential resetting arrangement including a sequence driver connected to a cradle pivot pin within said operating mechanism, a sequence lever pivotally attached to one of said sideframes intermediate said sequence driver lever and a trip cam on said actuator unit; and an actuator latch on said actuator unit arranged for capturing a latch pin on said trip cam and thereby latch said actuator unit when said actuator unit is electrically energized.

---

### 5,014,026

### FILTER DEVICE

**Franz E. G. Wanjura, Kungskängen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed Feb. 26, 1990, Ser. No. 484,808**

**Claims priority, application Sweden, Mar. 13, 1989, 8900882**

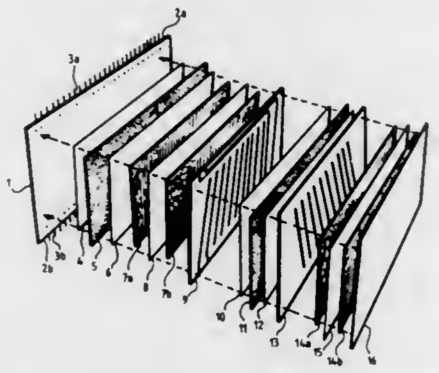
**Int. Cl.$^5$ H03H** *7/00*

**U.S. Cl. 333—185** **11 Claims**

1. A filter device for suppressing radio-frequency interferences on a plurality of pairs of transmission lines, including for each transmission-line pair a filter facility which comprises an inductance arranged in series with a respective line of said transmission-line pair and a capacitance connected between said line and ground, characterized in that a plurality of filter facilities are constructed on a carrier which includes along two mutually opposing sides thereof rows of connector pins for the plurality of pairs of transmissions lines, wherein each filter facility includes two pairs of capacitor layers with intermediate insulation therebetween, one capacitor layer in each pair being

VOL
1126
ISS
1
MY
7
1991
UMI

connected to a respective connector pin of a pair of transmission lines and the other capacitor layer being connected to a ground pin, and two inductance layers having conductive paths thereon and an intermediate ferrite layer therebetween, said conductive paths in said two inductance layers together forming the inductances arranged in series with the pair of transmission lines, which conductive paths are connected to respective connector pins for said pair of transmission lines, wherein said inductance and capacitor layers are mutually superimposed on the carrier between the opposing rows of connector pins.



---

### 5,014,027
### ELECTROMAGNETIC CONTACTOR

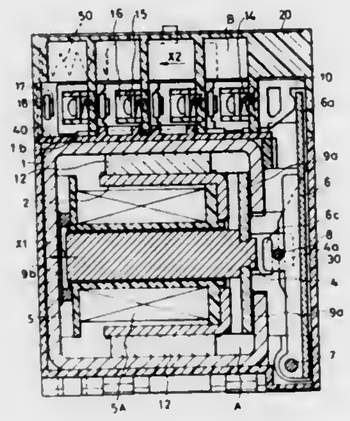
**Shigeharu Ootsuka, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 22, 1990, Ser. No. 497,204**

**Claims priority, application Japan, Mar. 24, 1989, 1-72681**

**Int. Cl.⁵ H01H** *67/02*

**U.S. Cl. 335—132** **5 Claims**



1. An electromagnetic contactor comprising:

a casing;

a plurality of fixed contacts fixedly mounted to said casing;

a crossbar which is slidably mounted to said casing and has a plurality of movable contacts to move in and out of contact with said fixed contacts;

an electromagnet unit including an electromagnet fixedly mounted to said casing and a movable iron core which is movably mounted to said casing to move said crossbar, said electromagnet having a fixed iron core which is disposed along a moving direction of said movable contacts sufficiently close to each gap between said fixed contacts and said movable contacts to attract electric arcs generated between said fixed contacts and said movable contacts when said movable contacts are moved out of contact with said fixed contacts; and

a shielding sheet which is provided between said movable contacts and said fixed iron core to insulate from each other.

---

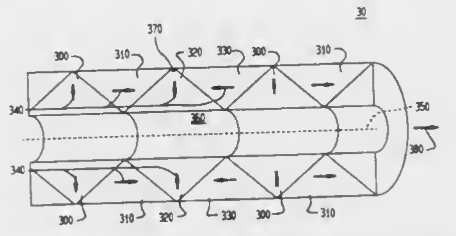
### 5,014,028
### TRIANGULAR SECTION PERMANENT MAGNETIC STRUCTURE

**Herbert A. Leupold, Eatontown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 25, 1990, Ser. No. 514,474**

**Int. Cl.⁵ H01F** *7/00*

**U.S. Cl. 335—210** **10 Claims**



1. A permanent magnet structure for focusing charged particle beams disposed along an axis, said permanent magnet structure comprising:

a series of magnets, said series forming a hollow cylinder which has an outer and inner portion and which is longitudinally aligned along said axis, each magnet being annular in shape where the cross-sectional configuration of said magnet is triangular, each magnet having a base and being aligned so as to complement an adjacent magnet and form said inner and outer portions of said cylinder, and each magnet having a magnetization which is oriented in a direction perpendicular to adjacent magnets wherein the magnetic orientation of said magnets rotates continually in one direction in increments of $\pi/2$ radians from end of the permanent magnet structure to the other and wherein the magnets forming the inner portion of said cylinder have a magnetization perpendicular to said axis and the magnets forming the outer portion of said cylinder have a magnetization parallel to said axis.

---

### 5,014,029
### DEFLECTION YOKE FOR CATHODE RAY TUBE

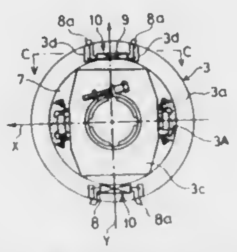
**Takeo Kawaguchi, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Kyoto, Japan**

**Filed Jul. 5, 1989, Ser. No. 376,382**

**Claims priority, application Japan, Jul. 6, 1988, 63-89793[U]**

**Int. Cl.⁵ H01F** *7/00*

**U.S. Cl. 335—210** **29 Claims**



1. A deflection yoke assembly for use on a cathode ray tube comprising an evacuated envelope having a funnel section, a faceplate at one end of the funnel section and a neck section at the opposite end of the funnel section, a coil separator mounted exteriorly on the evacuated envelope at a location corresponding to the boundary between the funnel section and the neck section and having a generally conical portion of a shape following an outer contour of the evacuated envelope, a radially outwardly flanged front end portion at one end of the conical portion and a radially outwardly flanged rear end portion at the opposite end of the conical portion, a pair of horizontal deflection coils and a pair of vertical deflection coils both wound on the coil separator, said deflection yoke assembly comprising:

vertical deflection distortion correcting means including two electromagnetic devices mounted on said radially outwardly flanged front end portion of the coil separator in alignment with a vertical axis perpendicular to the longitudinal axis of the evacuated envelope while spaced 180° circumferentially about the longitudinal axis of the evacuated envelope, said electromagnetic devices generating magnetic fluxes in a direction substantially perpendicular to the vertical axis when electrically energized in synchronism with the cycle of vertical deflection exercised by the vertical deflection coils.

---

### 5,014,030
### ELECTROMAGNETICALLY ACTIVATED MECHANISMS

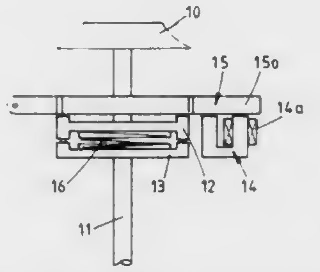
**Walter J. Aston, Dudley, United Kingdom, assignor to Yale Security Products Ltd., Willenhall, England**

**Filed Nov. 27, 1989, Ser. No. 441,520**

**Claims priority, application United Kingdom, Nov. 30, 1988, 8827906**

**Int. Cl.⁵ E05B** *47/06;* **G05G** *5/06;* **F16D** *23/00;* **H01F** *7/18*

**U.S. Cl. 335—228** **8 Claims**



1. An electromagnetically activated mechanism comprising:

mechanical input and output members coupled together for movement in unison;

a profiled part mounted on one of said input and output members for movement therewith;

a shaped profile on said profiled part;

an electromagnet; and

an independently movable element mounted for attraction by said electromagnetic to prevent movement of said movable element when said electromagnet is energized, said independently movable element co-acting with said profile so that movement of said profiled part displaces said independently movable element when said electromagnet is deenergized, said displacement of said movable element producing variation of a gap between said movable element and said electromagnet, said gap being at a minimum when said input and output members are in a rest position;

said displacement of said independently movable element limiting movement of said output member, said independently movable element being engageable with said profiled part to arrest movement of said profiled part.

---

### 5,014,031
### ULTRA PRECISION PRESSURE REGULATOR

**Heinz Nusser, 4 Greenridge Dr., Brookfield, Conn. 06804**

**Filed Jul. 21, 1989, Ser. No. 382,943**

**Int. Cl.⁵ H01F** *7/08*

**U.S. Cl. 335—230** **8 Claims**

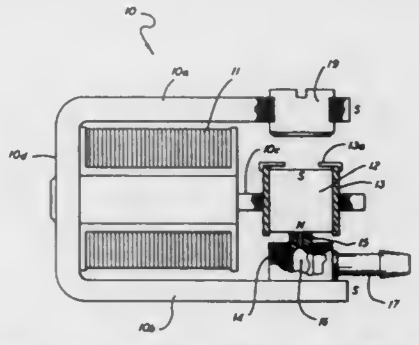
1. An electromagnet comprising:

an armature of magnetic material having an inner pole piece disposed between two outer pole pieces;

permanent magnet means fixed to said inner pole piece and movable relative thereto;

means forming an orifice in one of said outer pole pieces disposed opposite a pole of said permanent magnet means at a distance such that said magnet is normally attracted to said one outer pole piece for holding said permanent magnet means against said orifice;

adjustable means associated with the other of said outer pole pieces for controlling the magnetic force at which said permanent magnet means is held against said orifice.



---

### 5,014,032
### CYLINDRICAL PERMANENT MAGNET WITH LONGITUDINAL INDUCED FIELD

**Guy Aubert, Grenoble, France, assignor to Centre National de la Recherche Scientifique, Paris, France**

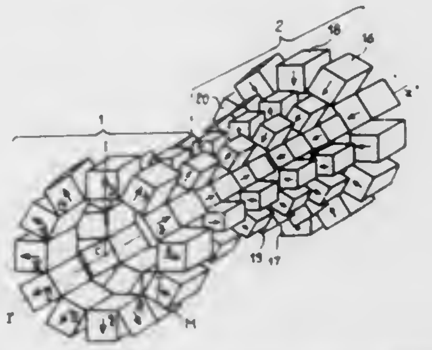
**PCT No. PCT/FR87/00393, § 371 Date Apr. 14, 1989, § 102(e) Date Apr. 14, 1989, PCT Pub. No. WO88/02924, PCT Pub. Date Apr. 21, 1988**

**PCT Filed Oct. 13, 1987, Ser. No. 353,640**

**Claims priority, application France, Oct. 17, 1986, 86 14418**

**Int. Cl.⁵ H01F** *7/02*

**U.S. Cl. 335—306** **12 Claims**



1. A cylindrical permanent magnet with a cylindrical entrance along the axis of said cylinder and with a longitudinal induced field comprising two annular structures, placed on either side of the center of a zone of interest of the magnet, magnetized radially with respect to the cylinder axis with a magnetization which is divergent in one structure and convergent in the other, the structures each comprising several rings adjacent along said axis of said cylinder and, in each ring, several magnetic blocks, distributed on the rim of said rings, characterized in that the size of the blocks increases as their position is axially further away from the zone of interest.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,033
## DIELECTRIC LIQUID COMPOSITIONS CONTAINING HYDROXYBENZALDEHYDE

**Pierre Jay, Saint-Didier Au Mont D'Or, and Noelle Berger, Ecully, both of France, assignors to Atochem, Puteaux, France**

**Filed Sep. 27, 1989, Ser. No. 413,189**

**Claims priority, application France, Sep. 30, 1988, 88 12843**

**Int. Cl.$^5$ H01F** *27/12;* **H01G** *4/22;* **H01B** *3/20*

**U.S. Cl. 336—94** **19 Claims**

1. A composition of matter comprising at least one electrical insulating oil (A) in an amount effective for use as an electrical insulator, and at least one aldehyde (B) in an amount effective to improve the dielectric properties of said oil wherein said aldehyde is 3-methoxy-4-hydroxybenzaldehyde, 4-methoxy-3-hydroxybenzaldehyde, 3-ethoxy-4-hydroxybenzaldehyde or mixtures thereof.

---

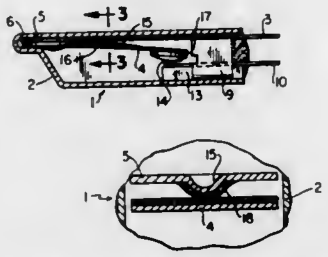
### 5,014,034
## THERMOSTATIC SWITCH WITH INSULATED CALIBRATION DIMPLE

**Brandon L. Wehl, North Canton, Ohio, assignor to Portage Electric Products, Inc., North Canton, Ohio**

**Filed Dec. 4, 1989, Ser. No. 445,436**

**Int. Cl.$^5$ H01H** *37/12, 37/54, 37/04*

**U.S. Cl. 337—368** **12 Claims**



5. In a thermostatic switch having an electrically conducting casing with an open end, at least one bimetallic member cantilever supported by a contact strip mounted in said casing, said bimetallic member having a first contact at an end thereof, a second contact disposed within the casing and being contactable by the first contact, with the bimetallic member being so formed as to provide at appropriate temperatures for electrical and mechanical contact between the contacts, a calibration dimple formed in the electrically conducting casing and bearing against the bimetallic member, the improvement comprising:

insulation means disposed over the surface of the calibration dimple to prevent current leakage therethrough.

---

### 5,014,035
## BIMETALLIC CIRCUIT BREAKER WITH INSULATED TERMINAL ASSEMBLY

**Yonenori Hamada, and Eiji Senbokuya, both of Yokohama, Japan, assignors to Jidosha Denki Kogyo K.K. and Yugen Kaisha Senbokuya, both of Kanagawa, Japan**

**Filed Jan. 16, 1990, Ser. No. 465,861**

**Claims priority, application Japan, Jan. 17, 1989, 1-3595[U]**

**Int. Cl.$^5$ H01H** *37/04, 37/52*

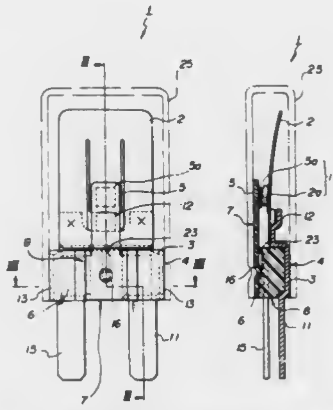
**U.S. Cl. 337—372** **6 Claims**

1. A circuit breaker comprising:

an E-shaped bimetal having a central portion provided with a movable contact and end portions on both sides of said central portion;

a first conductive plate having a base part fixed to said E-shaped bimetal and having a connecting terminal protruding from said base part in a direction opposite from said bimetal;

a second conductive plate having a base part provided with a support having a fixed contact thereon in a position opposed to said movable contact on said central portion of said bimetal and provided with a connecting terminal protruding from said base part in a direction opposite from said support; and



insulator means disposed between said first and second conductive plates with said second conductive plate being secured in said insulator means by a pair of lug plates on said first conductive plate which are wrapped around said insulating means.

---

### 5,014,036
## THERMAL AND CURRENT SENSING SWITCH

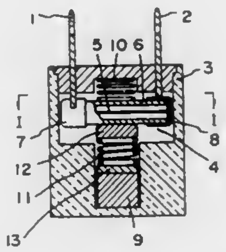
**Kazumasa Komoto, Oita, Japan, assignor to Orient Co., Ltd., Oita, Japan**

**Filed Jan. 22, 1990, Ser. No. 468,396**

**Claims priority, application Japan, Jan. 25, 1989, 1-17020**

**Int. Cl.$^5$ H01H** *37/76, 85/00*

**U.S. Cl. 337—407** **7 Claims**



1. A thermal and current sensing switch comprising:

a housing having a cavity;

a pair of fixed conductors fixed to said housing, said fixed conductors having base ends extending in said cavity of said housing;

a current fuse placed within said cavity of said housing, said current fuse having opposite terminals in contact respectively with said base ends of said fixed conductors;

a separating elastic member biasing said current fuse away from said fixed conductors;

a pressing elastic member providing a resilient pressing force pressing said opposite terminals of said current fuse in opposition to the bias of said elastic member and pressing said opposite terminals of said current fuse against said base ends of said fixed conductors; and

a thermal sensing element which reduces the resilient pressing force of said pressing elastic member when the temperature of said thermal sensing element rises beyond a predetermined temperature to permit said current fuse to be separated from said fixed conductors.

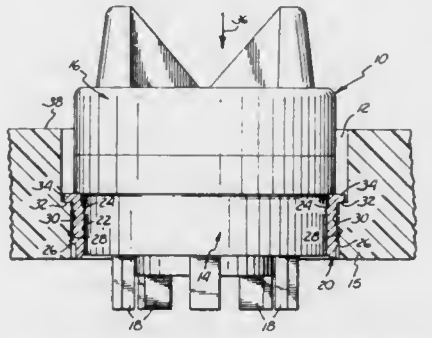
### 5,014,037
## POTENTIOMETER MOUNTING MECHANISM

**Gerald H. McDonald, 11892 NW. Evergreen Cr., Coon Rapids, Minn. 55433**

**Division of Ser. No. 127,446, Dec. 2, 1987, Pat. No. 4,835,333. This application Mar. 10, 1989, Ser. No. 331,646**

**Int. Cl.$^5$ H01C** *10/32*

**U.S. Cl. 338—163** **7 Claims**



1. A potentiometer for mounting within an aperture of a hearing aid base comprising:

a potentiometer housing; and

a metallic band circumferentially surrounding a portion of the housing and internally secured thereon, said band having external surface means for mechanically engaging a surface of the aperture such that the housing is securable within the aperture.

---

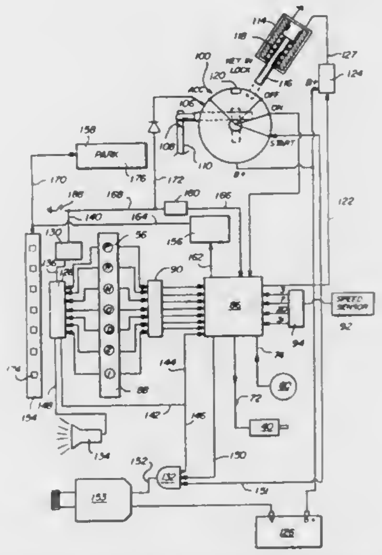
### 5,014,038
## MOTOR VEHICLE CONTROL SYSTEM

**Keith V. Leigh-Monstevens, Troy; David C. Peterson, Walled Lake, and Brian Mabee, Warren, all of Mich., assignors to Automotive Products (USA) Inc., Sterling Heights, Mich.**

**Continuation-in-part of Ser. No. 95,856, Sep. 14, 1987, Pat. No. 4,841,793. This application Mar. 15, 1989, Ser. No. 323,825**

**Int. Cl.$^5$ B60R** *25/10;* **G08B** *21/00*

**U.S. Cl. 340—430** **32 Claims**



7. A control system for a motor vehicle of the type including a transmission having a plurality of shift positions, said control system including:

(A) a transmission shift assembly including a plurality of operator-selected positions corresponding respectively to said transmission shift positions;

(B) generator means operative in response to operator selection of a shift assembly position to generate an operator signal representative of the selected shift assembly position;

(C) operator-actuated means for generating an anti-theft code signal; and

(D) control means, including a control logic receiving said operator shift signals and said anti-theft code signal, operative upon receipt of an operator-selected position signal and said anti-theft code signal to shift said transmission to the shift position corresponding to the operator-selected position and inoperative to shift the transmission in the absence of recept of said anti-theft code signal.

---

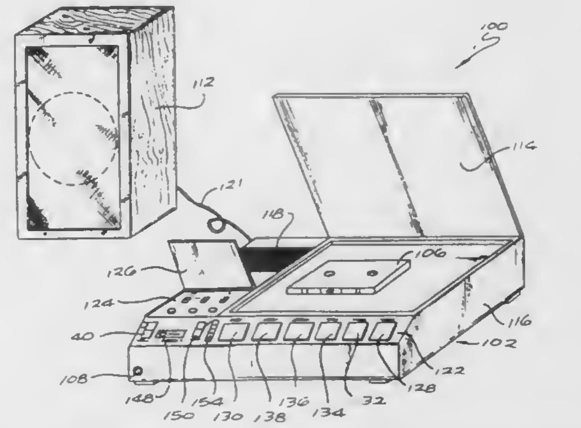
### 5,014,039
## DOOR ANSWERING AND INTRUDER ALERT APPARATUS AND METHOD

**Jerry L. Zelenka, 4410 N. Henley Ct., Westlake Village, Calif. 91361**

**Filed Oct. 16, 1989, Ser. No. 422,099**

**Int. Cl.$^5$ G08B** *13/00*

**U.S. Cl. 340—565** **18 Claims**



1. An apparatus for responding to noise generated externally to a monitored area, said apparatus comprising, in combination:

means for recording a plurality of discrete messages on a magnetic tape and means for playing a selected one of said plurality of discrete messages when said apparatus is activated by a noise intercepted from outside said monitored area;

means for controlling said intercepted noise, said controlling means including means for receiving said intercepted noise for converting said noise to an electrical signal, said controlling means in electrical communication with said playing means;

means for adjusting the sensitivity of said apparatus to the level of said intercepted noise, said adjusting means in electrical communication with said receiving means;

means for disabling said receiving means after said noise has been intercepted, said disabling means including a control switch for controlling an electrical socket mounted within said apparatus, said disabling means in electrical communication with said receiving means; and

means for actuating said playing means of said apparatus, said actuating means including a plurality of control switches for determining the mode of operation of said playing means, said actuating means being time synchronized with means for stopping said apparatus at the end of each discrete message, said acluating means and said stopping means being in communication with said controlling means, with said selected message of said plurality of discrete messages recorded on said magnetic tape being completely played without interruption after the interception of said noise from outside said monitored area, and said stopping means terminating the operation of said apparatus for resetting the controlling means.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,040
### PERSONAL LOCATOR TRANSMITTER

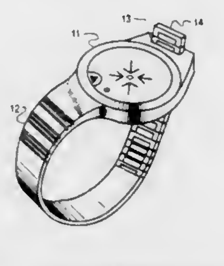
**Philip W. Weaver, Kanata; Kamal Fakhry, Ottawa, and Shin Saito, North Vancouver , all of Canada, assignors to Instantel Inc., Canata, Canada**

**Filed Oct. 16, 1989, Ser. No. 422,028**

**Claims priority, application Canada, Oct. 14, 1989, 580282**

**Int. Cl.$^5$ G08B** *13/14*

**U.S. Cl. 340—572** **6 Claims**



1. A personal locator device adapted to be worn on the wrist and having the size and appearance of a conventional wristwatch and including a molded casing and an integral strap extending therefrom, said casing containing a programmable memory, a transmitter controlled by said programmable memory, an omni-directional antenna, a back plane, and a battery, said integral wrist strap having a free end, said free end being adapted for insertion through a slot in said casing, a metal strip extending from said casing through said integral strap, means for locking said free end in said casing, said locking means including an electrical contact for contacting said metal strip when said free end is engaged therein, to complete a circuit, interruption of said circuit causing an alarm code to be transmitted by said transmitter.

---

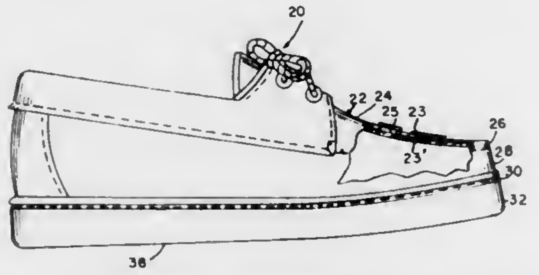
### 5,014,041
### SHOE FITTING SYSTEM

**Henri E. Rosen, 229 Coolidge Ave., Watertown, Mass. 02172**

**Continuation of Ser. No. 348,261, May 5, 1989, Pat. No. 4,931,773. This application Apr. 6, 1990, Ser. No. 505,931**

**Int. Cl.$^5$ G08B** *21/00*

**U.S. Cl. 340—573** **4 Claims**



1. A shoe fitting system comprising shoe containing therein a light producing means for generating a visual signal when a foot inserted in the shoe begins to outgrow the shoe.

---

### 5,014,042
### ICE DETECTOR, ESPECIALLY FOR AIRCRAFT

**Vincent Michoud, and Gérard Beigbeder, both of Paris, France, assignors to Thomson CSF, Paris, France**

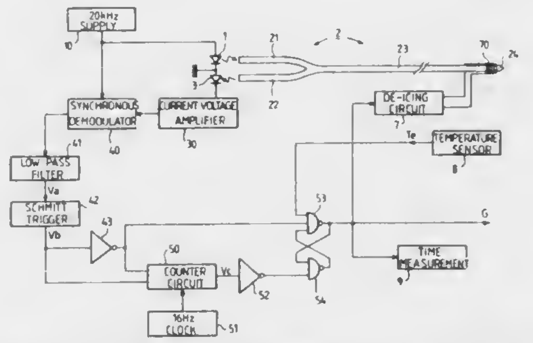
**Filed Apr. 27, 1990, Ser. No. 515,874**

**Claims priority, application France, Apr. 28, 1989, 89 05675**

**Int. Cl.$^5$ G08B** *21/00*

**U.S. Cl. 340—583** **4 Claims**

1. A detector comprising a light source, an optical channel having a wall, a part of which forms an interface with an external environment, a receiver coupled to the source by the channel, a comparison circuit coupled to the receiver to receive a signal from it and to give, at an output, a logic signal having levels 1 and 0 which respectively correspond to values of the signal, that it receives, greater than a first reference value and smaller than a second reference value, and, in order to be capable of working as an ice detector, a detection circuit coupled to the output of the comparison circuit to determine whether the logic signal has had a level 0 for at least a period of time of a pre-determined value and to give a detection signal.



---

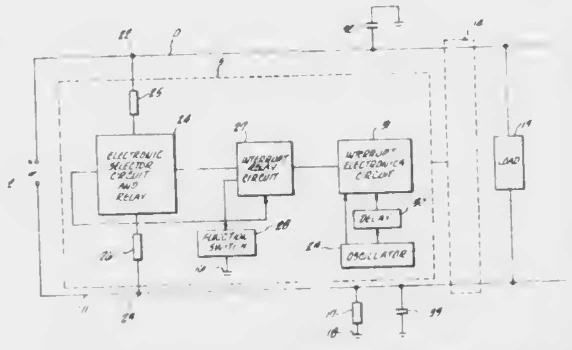
### 5,014,043
### CURRENT SENSING

**Juan P. Lopetrone, Palos Verdes, and Oliver Valdes, West Covina, both of Calif., assignors to Southern California Edison, Rosemead, Calif.**

**Continuation-in-part of Ser. No. 129,160, Dec. 7, 1987, Pat. No. 4,837,517. This application Nov. 29, 1988, Ser. No. 277,551**

**Int. Cl.$^5$ G01R** *31/02, 19/00*

**U.S. Cl. 340—664** **60 Claims**



3. A current sensing device comprising at least two sets of laminations of a magnetic material, means for magnetically separating the sets, the laminations being for location about an electrical conductor so that a second lamination set is closer to the conductor than a first set, the laminations having opposite free ends, a magnetic sensor for location adjacent the first set of laminations when the free ends are located adjacently, means for securing the free ends of the lamination set in adjacency, one set of laminations being structurally constituted by elongated strips of magnetic material, the strips having a thickness and a width, the thickness being substantially less than the width, and the width being for general alignment with a longitudinal axis of the electrical conductor, and wherein the second set is structurally similar to the first set of laminations and the second set is located inside the first set and acts as a magnetic filter of the magnetic field emanating from the conductor to the first set of laminations.

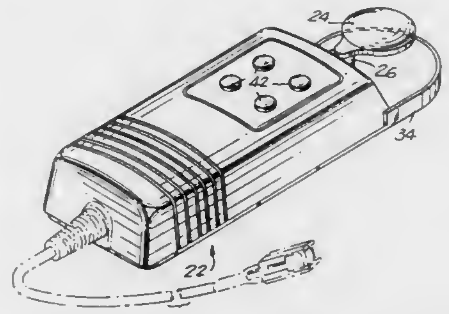
### 5,014,044
### MAGNIFICATION ASSEMBLY FOR DIGITIZER CURSOR

**Wayne J. Murray, Bridgeport, Conn., assignor to Summagraphics Corporation, Seymour, Conn.**

**Filed May 27, 1988, Ser. No. 199,674**

**Int. Cl.$^5$ G09G** *5/08*

**U.S. Cl. 340—710** **23 Claims**



1. An assembly utilizable with a digitizer cursor for increasing the accuracy of position determinations of said cursor, said cursor having cross-hairs for facilitating positioning of said cursor at a desired point on a digitizing surface, comprising in combination:

a magnifying lens;

mounting means including first means attachable to said cursor and second means connected to said lens for removably mounting said magnifying lens to said first means, said first means being attachable to said cursor to mount said lens to said cursor in alignment with said cross-hairs of said cursor;

said first and second means cooperating such that said magnifying lens may be swung out of alignment with said cross-hairs of said cursor while said magnifying lens remains mounted to said first means.

---

### 5,014,045
### RADIATION IMAGE READ-OUT APPARATUS USING MENU

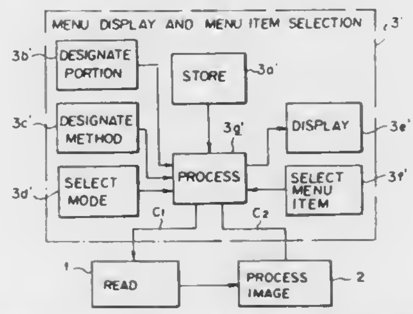
**Kazuo Shimura, and Yuuma Adachi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 30, 1989, Ser. No. 330,833**

**Claims priority, application Japan, Mar. 31, 1988, 63-80069**

**Int. Cl.$^5$ G09F** *3/02, 15/00;* **G01T** *1/11;* **H04N** *5/32*

**U.S. Cl. 340—712** **4 Claims**



1. A radiation image read-out apparatus comprising:

(i) read-out means for scanning with a light beam an image recording sheet on which a radiation image of an object has been stored, detecting light representing said radiation image emitted from said image recording sheet, and converting said detected light into an image signal,

(ii) image processing means for receiving said image signal from said read-out means and carrying out image processing of said image signal, and

(iii) menu item display and selection means for displaying at least some of a large number of menu items classified in accordance with image recording conditions used at the time said radiation image of the object was recorded such that each menu item corresponds to a specific read-out condition and/or image processing condition to be used at the time of obtaining said image signal, enabling selection of a single menu item from among said menu items, and forwarding to said read-out means and/or said image processing means a read-out condition and/or image processing condition corresponding to said selected menu item, as one of said image read-out conditions

wherein said menu item display and selection means is constituted of:

(a) a storage section for storing said large number of menu items and said large number of read-out conditions and/or image processing conditions corresponding to said menu items,

(b) an object portion designation section for designating, as one of said image recording conditions, said portion of the object whose image was recorded,

(c) an image recording method designation section for designating, as one of said image recording conditions, said image recording method by which said image was recorded,

(d) a routine designation section for designating one or more routine menu items selected and registered in advance from among said large number of menu items,

(e) a display section for displaying menu items,

(f) a selection section for selecting a required one of the menu items displayed on said display section, and

(g) a processing section for, at the time of receiving an object portion designation from said object portion designation section and an image recording method designation from said image recording method designation section, reading from said storage section said menu items relating to said designated object portion and image recording method and forwarding said read-out menu items to said display section, for, at the time of receiving a routine menu item designation, reading said routine menu item or items from said storage section and forwarding the same to said display, and for, at the time of receiving a required menu item selection from said selection section, forwarding to said read-out means and/or said image processing means said read-out condition and/or said image processing condition corresponding to said required menu item.

---

### 5,014,046
### DISPLAY PAGER WITH SUPPLEMENTAL DISPLAY MEANS

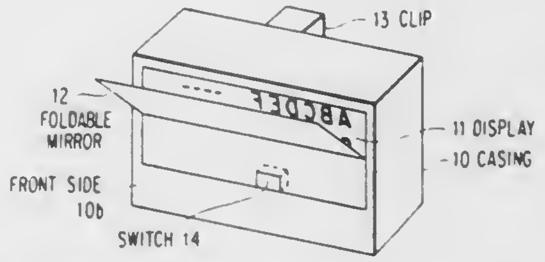
**Yoichiro Minami, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Mar. 22, 1989, Ser. No. 327,458**

**Claims priority, application Japan, Mar. 22, 1988, 63-36323[U]**

**Int. Cl.$^5$ G09G** *1/06;* **H04Q** *1/30;* **H04B** *1/08*

**U.S. Cl. 340—727** **18 Claims**



1. A pager comprising:

casing means for accommodating said pager;

display means mounted on the front side of said casing means for displaying a message;

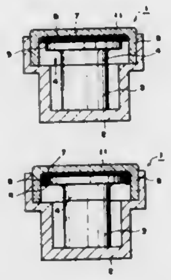
VOL
1126
ISS
1
MY
7
1991
UMI

clip means mounted on the back side of said casing means;
mirror means foldably attached to said front side for reflecting a message displayed on said display means;
switch means for providing a switch signal in response to the movement of said mirror means; and
control means responsive to said switch signal for causing said display means to produce an inverted display of said message.

---

### 5,014,047
### DISPLAY ELEMENT, DISPLAY METHOD AND APPARATUS USING SAID ELEMENT

**Hirosato Takeuchi, and Yasuo Kazama, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan**
**Filed May 23, 1989, Ser. No. 355,412**
**Claims priority, application Japan, May 31, 1988, 63-134185**
**Int. Cl.⁵ G09G *3/34***
**U.S. Cl. 340—763** **9 Claims**

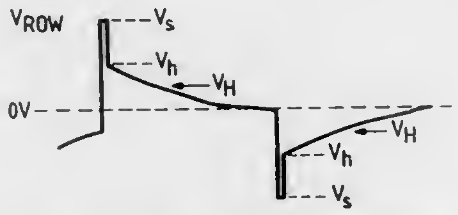


1. A display element comprising:
a casing having a window;
a transparent member for closing the window;
a flat display member having a face with a single color or three primary colors;
a flat light absorbent shield member comprising a pouch having light absorbent liquid contained therein, said pouch sandwiched between said transparent member and said flat display member such that said flat display member is shielded in a normal state,
at least one pressure element adapted, upon extension, to push said flat display member toward said transparent member to thereby press said flat light absorbent shield member against said transparent member and to force said move light absorbent liquid toward peripheral portions of said pouch so that light reflected by said flat display member can pass through said transparent member, and to restore said light absorbent liquid to said normal state upon retraction of said at least one pressure element.

---

### 5,014,048
### MATRIX DISPLAY SYSTEMS

**Alan G. Knapp, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Oct. 24, 1988, Ser. No. 262,565**
**Claims priority, application United Kingdom, Dec. 7, 1987, 8728538**
**Int. Cl.⁵ G09G *3/36***
**U.S. Cl. 340—784** **23 Claims**

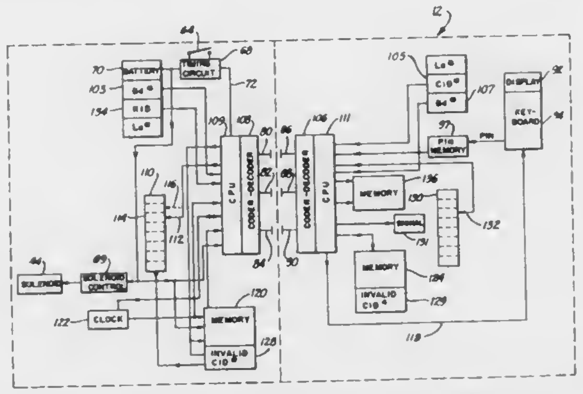


1. A matrix display system comprising a plurality of row and column conductors, a plurality of picture elements each comprising a liquid crystal display element connected in series with an associated two terminal non-linear resistance element exhibiting a threshold characteristic between a row conductor and a column conductor, and drive signal generating means for applying drive signals to the row and column conductors for driving the display elements, the drive signal supplied to one of the two conductors associated with each picture element, the drive signal consisting of a selection signal portion during which the display element is set to a desired display condition and a sustain signal portion for sustaining that display condition during a subsequent interval prior to the picture element receiving a further selection signal portion, characterized in that the sustain signal portion voltage supplied by the drive signal generating means is decreased in magnitude over its duration.

---

### 5,014,049
### ELECTRONIC LOCK SYSTEM

**Denis V. Bosley, Rancho Palos Verdes, Calif., assignor to Multacc Corporation, Torrance, Calif.**
**Filed Apr. 21, 1989, Ser. No. 341,414**
**Int. Cl.⁵ H04B *1/00***
**U.S. Cl. 340—825.310** **30 Claims**

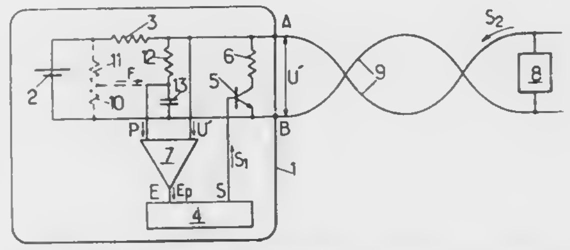


1. An electric lock system comprising a plurality of locks and a plurality of card keys, each of said card keys being arranged for opening any of said locks;
each of said locks and each of said card keys having at least one related communication port thereon so that when a card key is positioned with respect to one of said locks, said communication ports are positioned for communication;
means in each said card key for electronic storage therein of a unique card key identification number;
means in each said card key for receiving and storing a personal identification number of a card key user;
an invalid card key identification number register in each said lock and an invalid card key identification number register in each said card key;
means for updating said invalid card key identification number register in said lock from said invalid card key identification number register in said card key when said card key is placed in communication with said lock;
means for updating said invalid card key identification number register in said card key from said invalid card key identification number register in said lock;
means for inhibiting access to all functions including opening of said lock by a card key when its card key identification number is listed in said invalid card key identification number register in said lock;
a security number register in each said lock and a security number register in each said card key, each said security number register having successive security states;
means for advancing said security number register in said lock from one state to the next in one direction only when said security number register in said card key is ahead of said security number register in said lock;
means for erasing said invalid card key identification number register in said lock and in said card key when said security number register is advanced;
means for inhibiting access to all functions including opening of said lock when said security number 'register of said lock is advanced beyond said security number register of said card key;
means for determining the correctness of a correlation between the personal identification number stored in the card key and the personal identification number entered by the user, as a condition for allowing access to all allowed functions and for signaling an unlocking signal when the correlation is correct; and
means responsive to the unlocking signal to permit unlocking of said lock.

---

### 5,014,050
### ELECTRONIC INTERROGATION CIRCUITS

**Jacques Lewiner, 5, rue Bory d'Arnex, 92210 Saint-Cloud; Claude Hennion, 14, rue de la Glacière, 75013 Paris, and Eugeniusz Smycz, Saint-Cloud, all of France, assignors to Jacques Lewiner and Claude Hennion, both of, France**
**Filed Mar. 29, 1989, Ser. No. 330,184**
**Claims priority, application France, Mar. 31, 1988, 88 04294**
**Int. Cl.⁵ G05B *11/26***
**U.S. Cl. 340—870.19** **2 Claims**



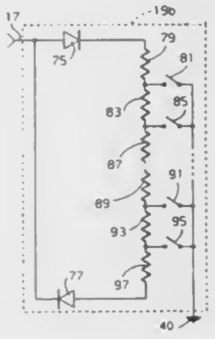
1. Electronic circuit for remote interrogation of a receiver through a two wire line and for detecting the response signals emitted by this receiver, said circuit comprising low-band pass filtering means for low band-pass filtering the actual voltage defining said response signals to produce a reference voltage comprising a weighted variable voltage, and means for comparing said reference voltage with said actual voltage and for only retaining the portions of said actual voltage which exceed said reference voltage in a predetermined direction.

---

### 5,014,051
### INCREASED RESOLUTION SENSOR CIRCUIT

**Raymond Lippmann, Ann Arbor; Michael J. Schnars, Clarkston, and James R. Chintyan, Davison, all of Mich., assignors to Delco Electronics Corporation, Kokomo, Ind.**
**Filed Dec. 26, 1989, Ser. No. 457,061**
**Int. Cl.⁵ G08C *19/00, 15/00;* G01F *23/36***
**U.S. Cl. 340—870.38** **14 Claims**

1. A circuit for determining high resolution upon a serial array of switching mechanisms, the switching mechanisms having open and closed states, each being connected at one end to a common line and at the other end to intermediate points in a series of resistors, the array having first and second ends, the circuit comprising:
means for referencing the array to a threshold voltage;
first measurement means for applying a voltage above the threshold to the array and referencing means, and measuring a first output signal from the array and referencing means to determine which switching mechanism closest to the first end of the array is closed;
second measurement means for applying a voltage below the threshold to the array and referencing means, and measuring a second output signal from the array and referencing means to determine which switching mechanism closest to the second end of the array is closed; and

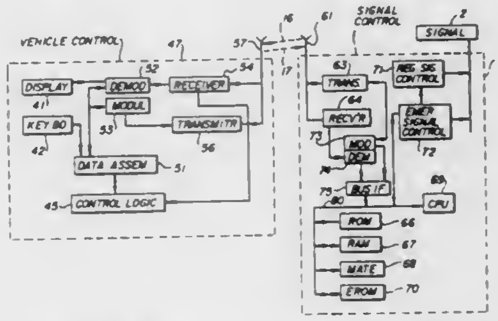


relational means for determining a measure of the parameter based on the first and second output signals.

---

### 5,014,052
### TRAFFIC SIGNAL CONTROL FOR EMERGENCY VEHICLES

**Carl J. Obeck, Pompano Beach, Fla., assignor to Bourse Trading Company, Ltd., Philadelphia, Pa.**
**Continuation of Ser. No. 96,295, Sep. 9, 1987, abandoned, which is a continuation of Ser. No. 783,408, Oct. 28, 1985, abandoned, which is a division of Ser. No. 487,242, Apr. 21, 1983, Pat. No. 4,573,049. This application Nov. 4, 1988, Ser. No. 267,308**
**Int. Cl.⁵ G08G *1/07***
**U.S. Cl. 340—906** **22 Claims**



1. Traffic signal light control system for emergency vehicles comprising:
at least one traffic signal light for directing traffic through a street intersection;
at least one emergency vehicle having a driver and a vehicle identity code;
emergency vehicle traffic control apparatus disposed in said emergency vehicle;
traffic signal light control apparatus disposed in the vicinity of said traffic signal light for controlling it;
two-way radio communications link which includes a vehicle radio receiver-transmitter in the emergency vehicle connected with the emergency vehicle traffic control apparatus, and a fixed radio receiver-transmitter disposed in the vicinity of said traffic signal light, operatively connected with the traffic signal light control apparatus, both receivers and transmitters using the same frequency, operatively connecting said emergency vehicle traffic control apparatus with said traffic signal light control apparatus;
an emergency vehicle control disposed in said emergency vehicle having means for operatively engaging said emergency vehicle traffic control apparatus, and keyboard means for transmitting to said traffic signal light control apparatus a first command which includes the vehicle's identity code, and a request for a driver-selected branch of ingress and egress of the intersection;
said signal control apparatus including a central processing

VOL
1126
ISS
1
MY
7
1991
UMI

unit and electronic memory for storing said first command, and for storing at least one selected signal pattern being responsive to said first command and a control program stored in said electronic memory, said signal control apparatus being responsive to said first command from said emergency vehicle to the traffic control apparatus for activating said selected signal pattern for guiding the emergency vehicle through the intersection through said driver-selected branch of ingress and egress.

### 5,014,053

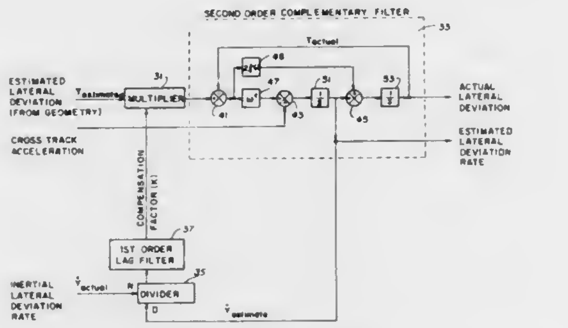
### METHOD AND APPARATUS FOR DETERMINING ACTUAL LATERAL DEVIATION FROM RUNWAY CENTERLINE

**Dung D. Nguyen, Edmonds, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Jan. 18, 1990, Ser. No. 467,004**

**Int. Cl.$^5$ G01C** *21/00*

**U.S. Cl. 340—979** **15 Claims**



1. A method of determining the actual lateral deviation from a runway centerline of an aircraft located outside of the region normally covered by a glideslope beam that has captured the localizer beam associated with the runway, determined the actual lateral deviation rate of the aircraft from the runway centerline and estimated the lateral deviation of the aircraft from the runway centerline, said method comprising the steps of:

scaling the estimated lateral deviation value by a compensation factor;

complementary filtering the scaled estimated lateral deviation value to produce an actual lateral deviation value and an estimated lateral deviation rate value; and

dividing the actual lateral deviation rate value determined by the aircraft by the estimated lateral deviation rate value to produce the compensation factor used to scale the estimated lateral deviation value.

### 5,014,054

### DIGITAL-TO-ANALOG CONVERTER OF THE RESISTOR STRING TYPE

**Koji Oshita, Kuwana, and Takuya Harada, Okazaki, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jul. 22, 1988, Ser. No. 223,049**

**Claims priority, application Japan, Jul. 22, 1987, 62-183039**

**Int. Cl.$^5$ H03M** *1/68*

**U.S. Cl. 341—145** **9 Claims**

1. A digital-to-analog converter of the resistor string type for converting a digital signal into an analog signal, comprising:

a string of resistors for dividing a reference voltage into a series of divided voltages; and

switch matrix circuit means coupled with said resistors for selectively generating the divided voltages as the analog signal when activated in response to the digital signal;

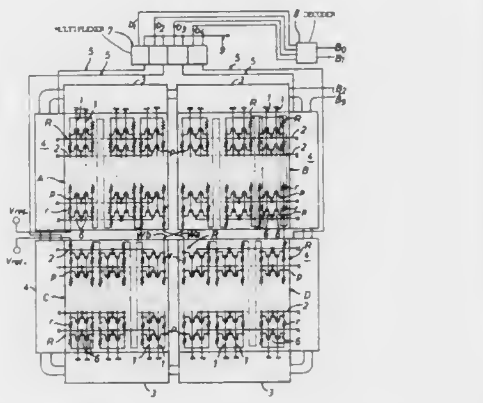
wherein said string of resistors are divided into four square arrays, one of said four square arrays being arranged diagonally to another of said four square arrays respectively; and

wherein said switch matrix circuit means includes:

four switching means, coupled to said four square arrays, for generating respective divided voltages from said four square arrays when activated respectively;

four decoder means coupled with said four switching means for activating said four switching means in response to the digital signal respectively and for generating the respective divided voltages from said four switching means in relation to a portion of the digital signal respectively; and

selection means responsive to the digital signal for selecting one of the respective divided voltages from said four decoder means in relation to the remaining portion of the digital signal to generate the selected one divided voltage as the analog signal.



### 5,014,055

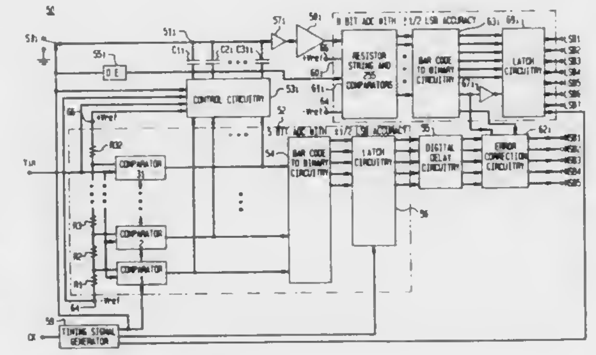
### ANALOG-TO-DIGITAL CONVERTER AND METHOD OF USE UTILIZING CHARGE REDISTRIBUTION

**Andrew G. F. Dingwall, Princeton, and Fu-Lung Hsueh, Plainsboro, both of N.J., assignors to Harris Corporation, Melbourne, Fla.**

**Filed May 24, 1989, Ser. No. 356,084**

**Int. Cl.$^5$ H03M** *1/36*

**U.S. Cl. 341—159** **25 Claims**


8 BIT ADC WITH ±1/2 LSB ACCURACY
CONTROL CIRCUITRY
RESISTOR STRING AND 255 COMPARATORS
BAR CODE TO BINARY CIRCUITRY
LATCH CIRCUITRY
COMPARATOR
BAR CODE TO BINARY CIRCUITRY
LATCH CIRCUITRY
DIGITAL DELAY CIRCUITRY
ERROR CORRECTION CIRCUITRY
TIMING SIGNAL GENERATOR
+Vref
-Vref

1. 1. In combination:

an n bit analog-to-digital converter (ADC) means adapted to receive an input analog signal and being responsive thereto for generating a digital output representation corresponding to said analog signal; and

capacitive means, which is coupled to the n bit ADC means, which is adapted to receive the analog signal and which comprises a plurality of capacitors, for selectively storing a voltage level, referred to as V1, of the analog signal and for subsequently subtracting therefrom via charge redistribution in the capacitors, a voltage level, referred to as V2 and corresponding to said digital output representation generated by the n bit ADC means, so as to generate a difference voltage referred to as V3, where $V3 = V1 - V2$.

### 5,014,056

### A/D CONVERTER WITH A MAIN RANGE UP/DOWN COUNTER AND A SUBRANGE A/D CONVERTER

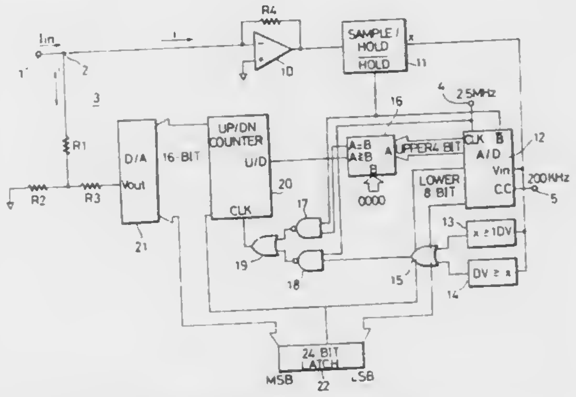
**Ikuo Moriwaki, Kawasaki, Japan, assignor to Analog Devices KK, Tokyo, Japan**

**Filed May 2, 1989, Ser. No. 346,511**

**Claims priority, application Japan, May 11, 1988, 63-114136; Nov. 24, 1988, 63-297026**

**Int. Cl.$^5$ H03M** *1/40, 1/36, 1/46*

**U.S. Cl. 341—161** **21 Claims**



1. An A/D converter circuit comprising:

an up/down counter for counting clock pulses and generating upper bits of conversion data;

a D/A converter for converting an output from said up/-down counter into an analog value;

a subtractor for subtracting an output of said D/A converter from an analog input signal to be converted and outputting a remainder;

an A/D converter for converting an output from said subtractor into a digital value and generating lower bits to be linked to the upper bits; and

a count controller for discriminating a polarity and a magnitude of a remainder obtained by said subtractor and performing count direction control and count stop when the remainder enters a range of the lower bits.

### 5,014,057

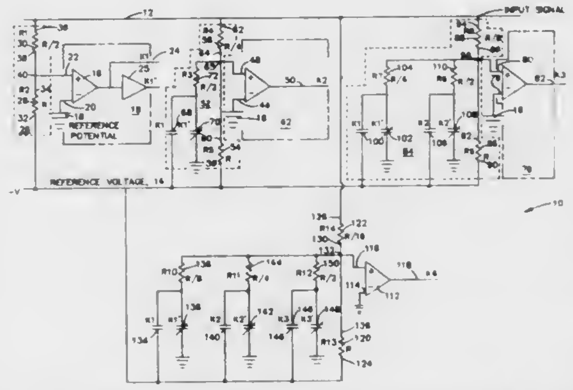
### CLOCKLESS A/D CONVERTER

**Lester Mintzer, Santa Ana, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Nov. 13, 1989, Ser. No. 435,905**

**Int. Cl.$^5$ H03M** *1/42*

**U.S. Cl. 341—161** **11 Claims**



9. A clockless analog to digital converter circuit responsive to an input signal of a first polarity and to a reference voltage of a second polarity measured with respect to a reference potential comprising:

a first stage comparator having a first polarity input connected to the reference potential, a second polarity input, and an output terminal, the most significant binary bit signal being provided at the output terminal;

a first stage divider having a first and second resistor, each resistor having a first and second terminal, the first resistor first terminal being connected to the reference voltage, the second resistor first terminal being connected to the input voltage, the first and second resistors' second terminals being connected to a first stage common terminal and connected to the comparator second polarity input, the first stage divider first resistor having a resistance substantially equal to two times the resistance of the first stage divider second resistor;

a second stage comparator having a first polarity input connected to the reference potential, a second polarity input, and an output terminal, the second most significant binary bit signal being provided at the second stage comparator output terminal;

a second stage divider having a first and second resistor, each resistor having a first and second terminal, the second stage divider first resistor having a resistance substantially equal to four times the value of the resistance of the second stage divider second resistor, the first resistor first terminal being connected to the reference voltage, the second resistor first terminal being connected to the input signal, the first and second resistors' second terminals being connected to a second stage common terminal and to the second stage comparator second polarity input;

a second stage switching means responsive to the first stage common terminal having a voltage in excess of the reference potential for connecting a second stage divider third resistor between the reference voltage and the second stage divider common terminal, the second stage first resistor having a resistance substantially equal to two times the resistance of the second stage divider third resistor;

at least a third stage comparator having a first polarity input connected to the reference potential, a second polarity input, and an output terminal, the third most significant binary bit signal being provided at the third stage comparator output terminal;

a third stage divider having a first and second resistor, each resistor having a first and second terminal, the third stage divider first resistor having a resistance substantially equal to eight times the value of the resistance of the third stage divider second resistor, the first resistor first terminal being connected to the reference voltage, the second resistor first terminal being connected to the input signal, the first and second resistors' second terminals being connected to a third stage common terminal and connected to the comparator second polarity input; and.

a third stage switching means responsive to the first stage common terminal having a voltage in excess of the reference potential for connecting a third stage divider third resistor between the reference voltage and the third stage divider common terminal, the third stage third resistor having a resistance substantially equal to one fourth the resistance of the third stage divider first resistor.

### 5,014,058

### METHOD AND ARRANGEMENT FOR EVALUATING A MEASURABLE ANALOG ELECTRICAL QUANTITY

**Klaus Horn, Braunschweig, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**PCT No. PCT/DE88/00210, § 371 Date Dec. 1, 1989, § 102(e) Date Dec. 1, 1989, PCT Pub. No. WO88/07658, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 31, 1988, Ser. No. 425,212**

**Int. Cl.$^5$ H03M** *1/50*

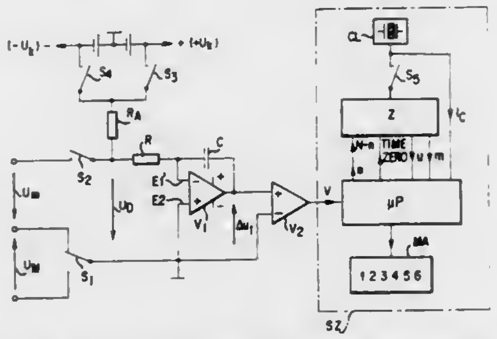
**U.S. Cl. 341—166** **13 Claims**

1. A method for evaluating an analog electrical signal comprising the steps of:

VOL
1126
ISS
1
MY
7
1991
UMI

converting the analog signal to a digital signal with an analog-digital converter operating in accordance with the time divider principle and having a time divider period (T),

said step of converting comprising first and second steps, the first step comprising forming an analog control deviation signal ($\Delta U_i$) corresponding to a mean deviation between an actual and a reference value of a time divider ratio ($\alpha_1$) during a first time divider timing period ($T_1$), and the second step comprising using the control deviation signal ($\Delta U_i$) for correcting a time divider timing ratio ($\alpha_2$) in a succeeding time divider timing period ($T_2$).



---

### 5,014,059
## ANALOG-TO-DIGITAL CONVERTER SYSTEM

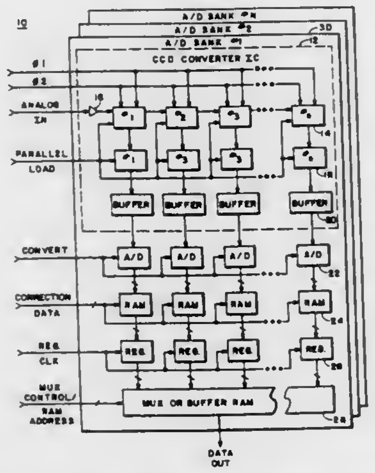
**Michael C. Seckora, Gervais, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Continuation of Ser. No. 206,975, Jun. 13, 1988, Pat. No. 4,906,997, which is a continuation of Ser. No. 77,952, Jul. 28, 1987, abandoned, which is a continuation of Ser. No. 733,000, May 13, 1985, abandoned. This application Mar. 1, 1990, Ser. No. 488,185**

**The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.**

**Int. Cl.$^5$ G11C** *19/28*

U.S. Cl. 341—172 10 Claims



1. An analog-to-digital conversion system including a storage device adapted for converting signal formats, comprising:

a plurality of first storage elements connected together to form a first linear array and operative for receiving an analog signal and continually shifting the analog signal along the array in accordance with sequences of clock pulses;

a plurality of second storage elements arranged in a second linear array and operative for holding discrete analog data transferred in parallel at end of each sequence of clock pulses from the first storage elements, the second storage elements having parallel output conductors and each of the second storage elements providing on its output conductor a discrete analog datum not held by any other of the second storage elements; and

a plurality of multiple bit analog-to-digital converters each one of which is coupled to a different one of said parallel outputs of the second storage elements and which are operative for concurrently converting the discrete analog data into digital data, each datum of the digital data representing a multiple bit digital weighted value of a discrete analog datum held by one of the second storage elements.

---

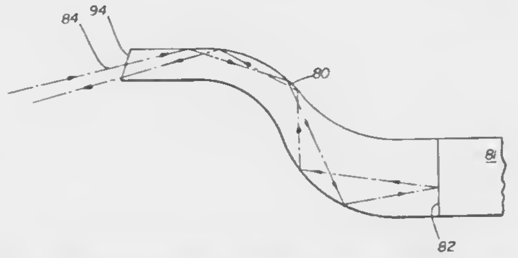
### 5,014,060
## AIRCRAFT CONSTRUCTION

**Philip F. Novak; Robert D. Shannon, both of Wichita, Kans.; Robert L. Pinckney, Cheyney, Pa., and James R. Humphreys, Jr., Wichita, Kans., assignors to The Boeing Company, Seattle, Wash.**

**Division of Ser. No. 295,644, Jul. 17, 1963, Pat. No. 4,924,228. This application Oct. 13, 1989, Ser. No. 421,491**

**Int. Cl.$^5$ H01Q** *17/00*

U.S. Cl. 342—2 4 Claims



1. In combination with an aircraft, an elongated engine air inlet duct defining an interior air flow passage communicating between an inlet end oriented toward the forward end of the aircraft, and an engine end positioned adjacent the face of an engine, and having first and second opposed bends along its length to form an elongated "S" shape for minimizing the reflection back to its source, of any microwave energy originating within the hemisphere of space forward of the aircraft, which microwave energy enters the engine air inlet duct interior flow passage at the inlet end and strikes the engine face.

---

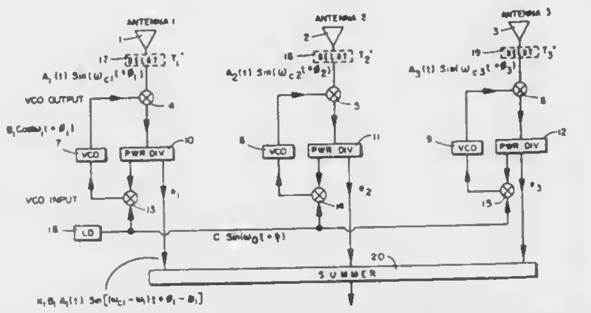
### 5,014,061
## ADAPTIVE MULTIFREQUENCY SIGNAL COMBINING SYSTEM

**Rabindra N. Ghose, Los Angeles, Calif., assignor to Technology Research International, Calabasas, Calif.**

**Filed Apr. 24, 1989, Ser. No. 341,844**

**Int. Cl.$^5$ G01S** *13/78*

U.S. Cl. 342—45 12 Claims



1. An adaptive closed-loop controlled, signal combining system for multi-carrier-frequency signals, each having the same modulation, enhancing thereby the signal-to-noise ratio of the combined signal with respect to that of any individual signal comprising:

(a) a sensor that receives signals radiated from a plurality of sources, each signal having a different carrier frequency, but a common modulation;

(b) a plurality of bandpass filters, same in number as the number of said sources, each filter having an input and an output, the input of each filter being connected to said sensor such that the output of each filter corresponds to the radiated signal from only one of said sources;

(c) means for changing, automatically, said carrier frequency and the carrier phase of the signal at the output of each said filter, to a common carrier frequency and a common phase without affecting the modulation; and

(d) means for summing the signal at each filter line after its carrier frequency and phase are changed to a common carrier frequency and a common phase to effect coherent addition of modulation of each of said signals.

---

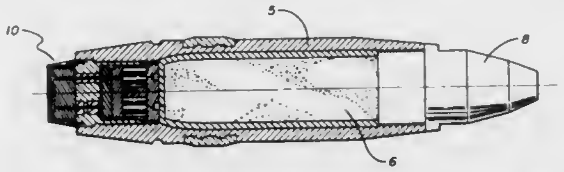
### 5,014,062
## ELECTRONIC PROJECTILE IMPACT SPOTTING DEVICE

**David A. Schriner, King George, and Albert W. Lauer III, Fredericksburg, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 23, 1973, Ser. No. 420,758**

**Int. Cl.$^5$ H01S** *13/00;* **F42C** *11/02*

U.S. Cl. 342—68 7 Claims



1. An electronic device adapted to be incorporated into a projectile and operable upon projectile impact to emit an electro-magnetic signal marking the point of projectile impact comprising:

an electrically conductive housing adapted to form the end plug of a projectile;

piezoelectric means disposed within said housing;

an electrically conductive inertial mass disposed within said housing in engagement with one terminal of said piezoelectric means and operable upon projectile impact to force the other terminal of said piezoelectric means against said housing and generate a voltage across said piezoelectric means;

an antenna;

a first lead electrically connecting said antenna to said inertial mass; and

a second lead electrically connected to said antenna and disposed adjacent a portion of said housing to define a spark gap whereby said antenna will resonate and emit an RF pulse train when the voltage generated across said piezoelectric means exceeds the breakdown voltage of said spark gap.

---

### 5,014,063
## INTEGRATED ALTIMETER AND DOPPLER VELOCITY SENSOR ARRANGEMENT

**John Studenny, Montreal, Canada, assignor to Canadian Marconi Company, Montreal, Canada**

**Filed Jan. 11, 1990, Ser. No. 463,415**

**Int. Cl.$^5$ G01S** *13/38*

U.S. Cl. 342—130 7 Claims

1. An integrated altimeter and Doppler velocity sensor arrangement for use in an airborne vehicle, comprising:

a transmitter section including an altimeter transmitter and a Doppler transmitter;

altitude modulator means, comprising a linear-FM modulator, for frequency-modulating said altimeter transmitter to produce an altimeter frequency-modulated transmission signal;

Doppler modulator means, comprising a sine-FM modulator, for frequency-modulating said Doppler transmitter to produce a Doppler frequency-modulated transmission signal;

a transmitting and receiving antenna system;

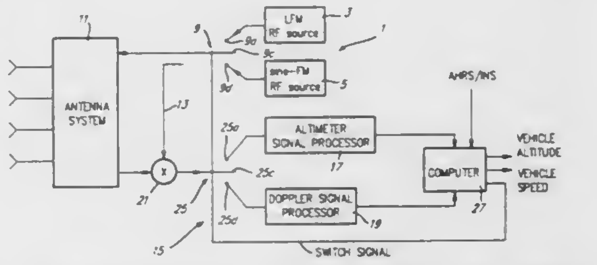
first means for connecting said altimeter transmitter and said Doppler transmitter to said antenna system in a predetermined Doppler cycle/altimeter cycle sequence;

whereby, said altimeter frequency-modulated transmission signal and said Doppler frequency-modulated transmission signal are transmitted, in said predetermined sequence, from said antenna system;

a receiver section, including:

mixer means having two inputs and one output, one of said inputs being coupled to said antenna system to receive return signals therefrom in said predetermined sequence;

coupler means having an input and an output, said input being connected to said first means for connecting and said output being connected to the other input of said mixer means whereby to provide said altimeter frequency-modulated transmission signal and said Doppler frequency-modulated transmission signal to said other input of said mixer means in said predetermined Doppler cycle/altimeter cycle sequence;



an altimeter signal processor having an input and an output and a Doppler signal processor having an input and an output;

second means for connecting said output of said mixer means to said input of said altimeter signal processor and said input of said Doppler signal processor in said predetermined Doppler cycle/altimeter cycle sequence;

said first means for connecting and said second means for connecting being ganged for synchronous operation;

said outputs of said signal processors being connected to a computer means;

wherein, said altimeter frequency-modulated transmission signal is different from said Doppler frequency-modulated transmission signal.

---

### 5,014,064
## MONOPULSE TRACKING APPARATUS AND METHOD OF OPERATING SAME

**George R. Spencer, Bedford, N.H.; Bernard J. Thompson, Concord, Mass.; Malcolm E. Skinner, Andover, Mass., and Philip L. Sullivan, Acton, Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed Jul. 10, 1989, Ser. No. 382,971**

**Int. Cl.$^5$ G01S** *13/00*

U.S. Cl. 342—152 8 Claims

1. In the operation of a monopulse receiver, such receiver having a first and a second output terminal and a first and a second amplifier channel wherein the monopulse sum signal, S, the pitch error signal, p, and the yaw error signal, y, may be derived simultaneously from corresponding receiver signals, the method of:

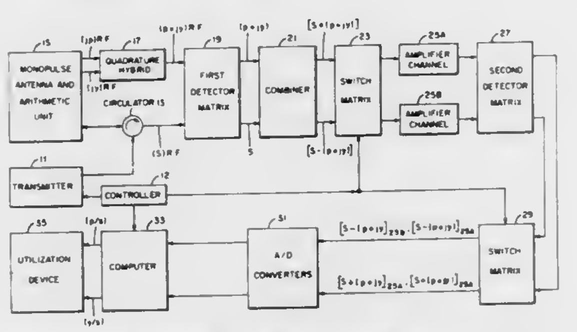
(a) forming a pair of composite signals defined as $[S+(p+jy)]$ and $[S-(p+jy)]$;

(b) during a first interval, passing the composite signal $[S+(p+jy)]$ through the first amplifier channel to the first

OL
126
SS
1
MY
7
1991
UMI

output terminal and the composite signal [S−(p+jy)] through the second amplifier channel to the second output terminal;

(c) during a second interval following the first interval, passing the composite signal [S+(p+jy)] through the second amplifier channel to the first output terminal and the composite signal [S−(p+jy)] through the first amplifier channel to the second output terminal;



(d) repeating steps (a), (b) and (c) during successively occurring intervals to provide an even number of successively amplified composite signals [S+(p+jy)] at the first output terminal and a like even number of successively amplified composite signals [S−(p+jy)] at the second output terminal; and

(e) separately averaging each even number of successively amplified composite signals [S+(p+jy)], [S−(p+jy)].

---

## 5,014,065
## METHOD FOR THE ON-LINE TESTING OF A RADAR INFORMATION DISPLAY DEVICE, AND IMPLEMENTATION OF THIS METHOD

**Jean-Pierre Andrieu, Paris; Jean-Claude Henri, Boulogne Billancourt, and Dominique Gault, Ville D'Avray, all of France, assignors to Thomson-CSF, Puteaux, France**

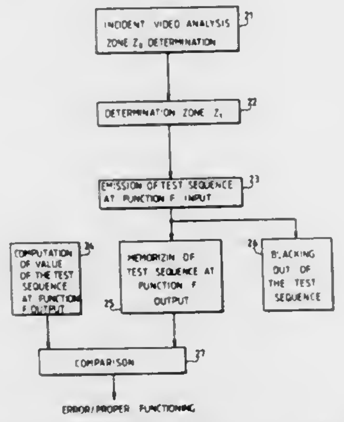
**PCT No. PCT/FR88/00228, § 371 Date Nov. 14, 1989, § 102(e) Date Nov. 14, 1989, PCT Pub. No. WO88/08987, PCT Pub. Date Nov. 17, 1988**

**PCT Filed May 10, 1988, Ser. No. 455,439**

**Claims priority, application France, May 15, 1987, 87 06846**

**Int. Cl.$^5$ G01S *7/40***

**U.S. Cl. 342—165** **6 Claims**


INCIDENT VIDEO ANALYSIS ZONE Z0 DETERMINATION
31
DETERMINATION ZONE Z1
32
EMISSION OF TEST SEQUENCE AT FUNCTION F INPUT
33
COMPUTATION OF VALUE OF THE TEST SEQUENCE AT FUNCTION F OUTPUT
36
MEMORIZING OF TEST SEQUENCE AT FUNCTION F OUTPUT
35
34
BLACKING OUT OF THE TEST SEQUENCE
37
COMPARISON
ERROR/PROPER FUNCTIONING

1. Method for the on-line testing of an image digital converter used for the display of radar information, the converter receiving the radar video signal obtained by successive scans of a predefined zone by rotation of an antenna and comprising, in a processing chain, at least one first sub-assembly wherein a first determined function is performed;

the method being characterized in that it comprises the following steps:

analysis of the radar video signal received corresponding to a first scan to determine a first zone ($Z_0$) the video signal of which is below a predefined detection threshold;

determination of a second zone ($Z_1$), located inside the first zone, wherein the video signal will be below the predefined detection threshold a the following scan, called the second scan;

emission, during the second scan and instead of the radar video signal received corresponding to the second zone, of a series of signals forming a test sequence;

execution by the first sub-assembly of the first function on the test sequence;

memorizing of the test sequence at output of the first sub-assembly;

comparison of the memorized sequence with a predetermined, theoretical value and emission of a piece of information of error in case of difference; and

blacking out of the test sequence after its passage through the first sub-assembly, with respect to the sequence of the processing chain.

---

## 5,014,066
## SYSTEM FOR SIMULTANEOUSLY DERIVING POSITION INFORMATION FROM A PLURALITY OF SATELLITE TRANSMISSIONS

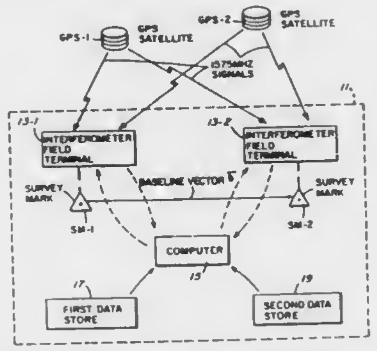
**Charles C. Counselman, III, Belmont, Mass., assignor to Western Atlas International, Inc., Houston, Tex.**

**Continuation of Ser. No. 895,148, Aug. 11, 1986, Pat. No. 4,870,422, which is a continuation of Ser. No. 353,331, Mar. 1, 1982, Pat. No. 4,667,203. This application Jul. 20, 1989, Ser. No. 382,291**

**The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.**

**Int. Cl.$^5$ G01S *5/04;* H04B *7/185***

U.S. Cl. 342—352 12 Claims



1. A method of determining position information from a composite of spread spectrum, suppressed carrier signals transmitted simultaneously at the same frequencies by a plurality of orbiting satellites and received simultaneously from different directions by an antenna, comprising:

(a) forming a digital representation of said composite;

(b) applying said digital representation to a plurality of logic circuits, each said logic circuit being responsive to the signal transmitted by a different selected satellite and operating synchronously in response to a common clock;

(c) deriving simultaneously, in each said logic circuit, data representing the signal transmitted by the satellite to which each said logic circuit is responsive; and

(d) combining the simultaneously derived data from a plurality of said logic circuits to determined position information.

---

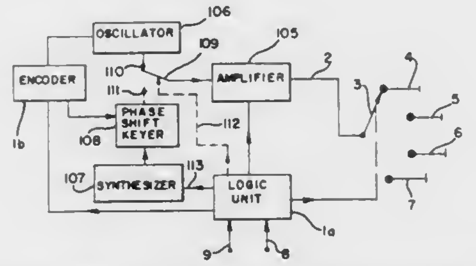
## 5,014,067
## INTEGRATED LANDING SYSTEM

**John P. Chisholm, Olympic Valley, Calif., assignor to Sundstrand Data Control, Inc., Redmond, Wash.**

**Filed Mar. 12, 1990, Ser. No. 493,044**

**Int. Cl.$^5$ G01S *1/08***

U.S. Cl. 342—407 **7 Claims**



1. An integrated fixed beam landing system suitable for guiding an aircraft equipped with guidance systems that utilize signals encoded in a microwave landing system (MLS) format as well as aircraft equipped with guidance systems that utilize signals encoded in a precision tactical approach guidance (PTAG) format along an approach path to a landing site, comprising

a plurality of ground based fixed beam antennas disposed near the landing site and oriented so that the fixed beams of the antennas overlap along the approach path;

means coupled to said fixed beam antennas for generating microwave energy for transmission by said fixed beam antennas;

first means for generating guidance signals in the microwave landing system (MLS) format;

second means for generating guidance signals in the precision tactical approach guidance (PTAG) format; and

sequencing means coupled to said microwave energy generating means and to said first and second guidance signal generating means for causing said microwave energy generating means sequentially to generate microwave energy in the microwave landing system (MLS) format and in the precision tactical approach guidance (PTAG) format.

---

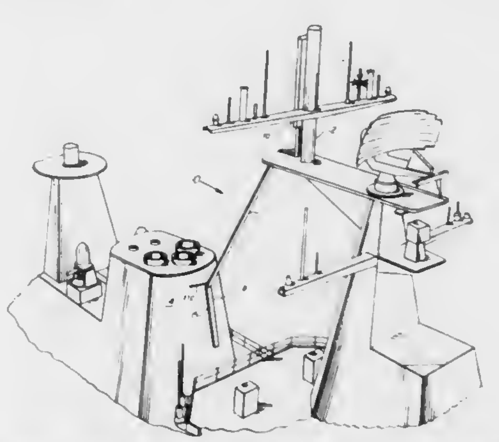
## 5,014,068
## TRANSMISSION COUPLER ANTENNA

**Robert S. Abramo, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 19, 1990, Ser. No. 467,833**

**Int. Cl.$^5$ H01Q *1/34***

U.S. Cl. 343—710 **7 Claims**



1. A survivable broadband transmit HF communications antenna for a ship comprising:

an elongate flat conductive strip provided with an integral end section at opposite ends, each said end section capacitively coupled to said ship, and an integral intermediate section coupled to an antenna feed cable that extends to internal antenna driving circuitry, said elongate flat conductive strip having a sufficient length to extend between portions of the superstructure of said ship to function as an exciter for the entire said ship with an acceptable VSWR;

a dielectric layer contiguously mounted on each said integral end section of said elongate flat conductive strip; and

means for providing a portion of said superstructure of said ship disposed adjacent each contiguously mounted dielectric layer on each said integral end section to excite the entire ship to function as said broadband transmit HF communications antenna.

---

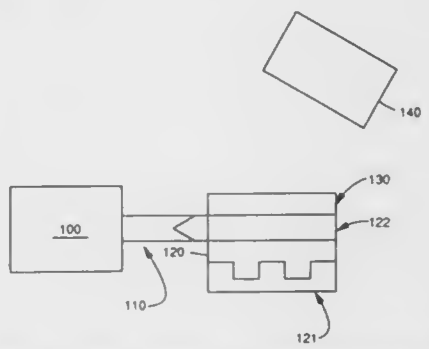
## 5,014,069
## PHOTOCONDUCTIVE ANTENNA MODULATOR

**Milton R. Seiler, Worthington, and Kenneth J. Walcott, Dayton, both of Ohio, assignors to The United States of America as Represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Sep. 15, 1989, Ser. No. 407,837**

**Int. Cl.$^5$ H01Q *13/00***

**U.S. Cl. 343—785** **6 Claims**



1. A light-activated modulator for use with a radar system, said radar system having a radar transmitter which emits a carrier radio frequency signal, a dielectric waveguide antenna which transmits said carrier radio frequency signal, and a metallic waveguide which conducts said carrier radio frequency signal from said radar transmitter to said dielectric waveguide antenna, said light-activated modulator comprising:

an illumination source which emits an optical modulating signal; and

a photoconductor layer which is placed adjacent to said dielectric waveguide antenna, and which receives said optical modulating signal from said illumination source, wherein said photoconductor layer comprises Si, and wherein said light-activated modulator emits said optical modulating signal with variable intensities such that said optical modulating signal has a wavelength of about $\lambda_c$ where $\lambda_c$ is given by:

$$\lambda c = \frac{1.24}{E_g} \text{ microns,}$$

where: $E_g$ is an energy gap which is measured in electron volts for Si and equals about 1.12 electron volts, said optical modulating signal thereby decreasing said photoconductor layer's transparency to said carrier radio frequency signal as said optical modulating signal increases in intensity, said optical modulating signal allowing said photoconductor layer's transparency to increase as said optical modulating signal decreases in intensity, said light-activated modulator thereby optically modulating said carrier radio frequency signal.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,070
### RADAR CAMOUFLAGE MATERIAL

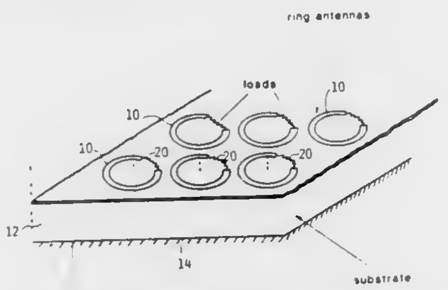
**Don J. R. Stock, Lonsee, and Eberhard Eckert, Bonn, both of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Frankfurt, Fed. Rep. of Germany**

**Filed Jul. 8, 1988, Ser. No. 216,578**

**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722793**

**Int. Cl.$^5$ H01Q** *1/38, 13/08, 19/06, 3/22*

**U.S. Cl. 343—700 MS** **8 Claims**



1. A radar camouflage material for reducing the radar backscatter cross section of a target object, said material comprising a layer of dielectric material having a plurality of spaced minimum-scatter type antenna elements disposed thereon, with said minimum-scatter type antenna elements each being terminated in a purely reactive manner such that a received wave reflected at the termination substantially cancels the corresponding scattered wave; and wherein: said antenna type elements are each a ring antenna type element configured as an open ring whose ends are connected with a line section of a length to cause said substantial cancellation; each said ring antenna type element is formed as an open ring shaped conductive film disposed on one surface of said layer of dielectric material; and the open portions of said rings are oriented in random directions in the plane of said one surface.

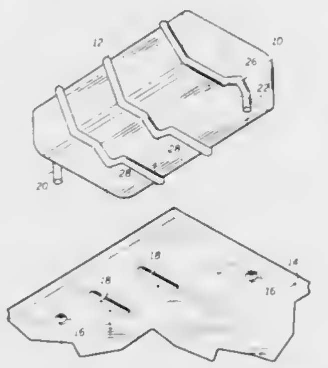
### 5,014,071
### FERRITE ROD ANTENNA

**Jeffrey S. King, Boynton Beach, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jun. 30, 1989, Ser. No. 374,012**

**Int. Cl.$^5$ H01Q** *7/080, 7/000;* **H05K** *7/020;* **H01R** *9/000*

**U.S. Cl. 343—788** **2 Claims**



1. An antenna having provision for mounting to a printed circuit board having receiving apertures therein, said antenna comprising:

a core;

an electrically conductive coil having at least one turn extending around said core and having first and second end portions for retaining said core between said first and second end portions, said first and second end portions forming leads for insertion into first and second ones of said receiving apertures, said at least one turn having a portion which is bent to form a protrusion away from said core for insertion into a third one of said receiving apertures.

### 5,014,072
### THERMAL PRINTING APPARATUS

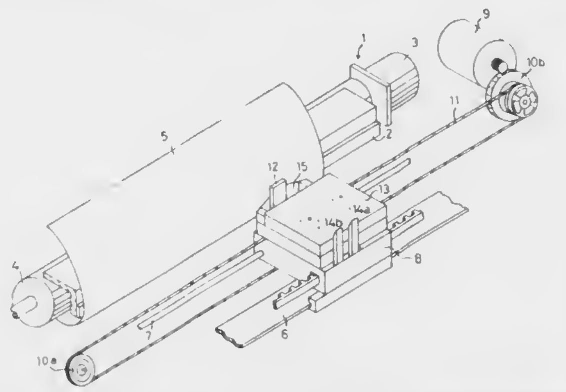
**Koshiro Yamaguchi, Inuyama, and Hiroshi Hattori, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Sep. 27, 1989, Ser. No. 413,220**

**Claims priority, application Japan, Oct. 5, 1988, 63-251390**

**Int. Cl.$^5$ G01D** *15/10;* **B41J** *2/00*

**U.S. Cl. 346—76 PH** **15 Claims**



1. A thermal printing apparatus having driving means for moving a carriage along a platen at a printing speed, thermo-transfer ribbon means coated with a thermo-melting ink, and a thermal head supported on the carriage and operative to heat the thermo-transfer ribbon means to print a desired character on a print medium, wherein a first printing operation is performed by transferring a thermo-melting ink to the print medium and at least one subsequent printing operation may be performed by transferring a thermo-melting ink to the previously transferred ink on the print medium in a superposed fashion, said thermal printing apparatus comprising:

determining means for determining whether a printing operation to be performed is said first printing operation or said at least one subsequent printing operation; and

controlling means responsive to said determining means for controlling said driving means so that a printing speed of said carriage during said at least one subsequent printing operation is different from a printing speed of said carriage during said first printing operation.

### 5,014,073
### SHIFTING MECHANISM FOR THERMAL HEAD OF A PRINTER

**Masakazu Sone, and Kozo Kawakita, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Nov. 15, 1989, Ser. No. 436,753**

**Claims priority, application Japan, Nov. 28, 1988, 63-299940**

**Int. Cl.$^5$ G01D** *15/10;* **B41J** *2/315*

**U.S. Cl. 346—76 PH** **9 Claims**

1. A thermal printing apparatus, comprising:

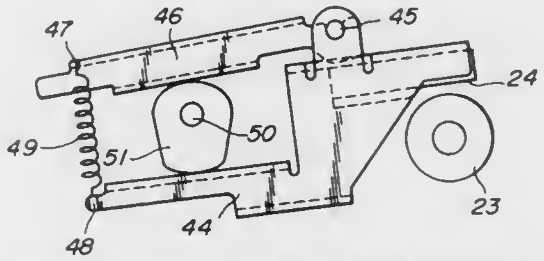
a thermal head pivot member having first and second ends and a pivot point intermediate the first and second ends where the thermal head pivot member pivots about a fixed pivot point;

a thermal head means at said first end of the pivot member for printing an image onto a printing medium;

a platen roller positioned adjacent to said thermal head means;

spring means for biasing said thermal head means against said platen roller for printing;

rotatable cam means together with said spring means acting on said thermal head pivot member such that in a first position of the cam means said thermal head means is spaced a given distance from the platen roller, in a third position of the cam means the thermal head means being pressed against the platen roller with a first pressure sufficient to hold the sheet to be printed in position but not great enough to cause a significant compression set on the platen roller when not printing, and in a second position of the cam means the thermal head means being pressed against said platen roller with a second pressure greater than said first pressure sufficient for printing; and



another pivot member pivotably attached at a first end to a fixed pivot point and a second opposite end to one end of the spring means, an opposite end of the spring means attaching to said second end of said thermal head pivot member, and said cam means being positioned to abut against said another pivot member so as to pivotably position it in three different angular positions in accordance with the first, second, and third positions of the cam means.

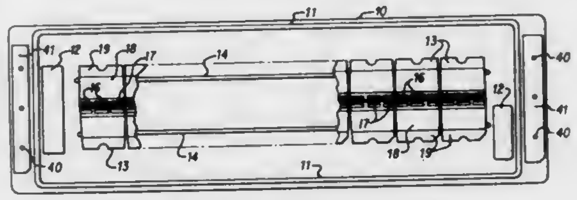
### 5,014,074
### LIGHT EMITTING DIODE PRINT HEAD ASSEMBLY

**Joseph W. Dody, Mountain View; Richard J. Klinke, Sunnyvale; Christopher A. Lowery, Fremont; Vera D. Vallentin-Price, Sunnyvale; Gary D. Sasser, and William P. Sullivan, both of San Jose, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Division of Ser. No. 256,001, Oct. 11, 1988, Pat. No. 4,942,405. This application Jan. 5, 1990, Ser. No. 461,610**

**Int. Cl.$^5$ G01D** *15/14;* **B41J** *2/45*

**U.S. Cl. 346—107 R** **8 Claims**



1. An LED print head assembly comprising:

a rigid metal mother plate;

a plurality of metal tiles secured with an adhesive in a row to the front face of the mother plate, each tile having at least one exposed area on its front face, with the exposed areas on the front faces of all of the tiles being fixed in a predetermined reference plane and with one lateral edge of all the tiles being aligned along a predetermined straight line; and

a plurality of LED dice secured with an adhesive in a row to the front face of each tile, each LED die comprising a row of light emitting diodes, the rows of LED dice on adjacent tiles being aligned parallel to said lateral edge at a predetermined distance from said lateral edge of the tile, and the front faces of all of the LED dice being substantially coplanar.

### 5,014,075
### MULTIBEAM RECORDER USING MIRROR REFLECTED PARALLEL SCAN LINES

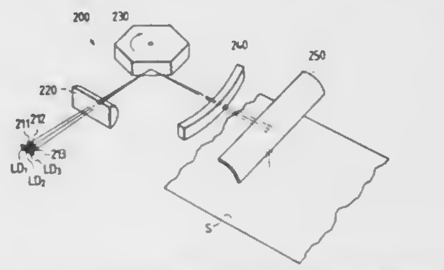
**Yoshiharu Okino, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 246,115, Sep. 19, 1988, abandoned. This application May 14, 1990, Ser. No. 524,686**

**Claims priority, application Japan, Sep. 18, 1987, 62-232682**

**Int. Cl.$^5$ G01D** *15/16*

**U.S. Cl. 346—108** **11 Claims**



1. An image recording apparatus for recording an image by controlling the scanning and irradiation of a photosensitive material with a plurality of separate non-co-linear optical beams, each of the optical beams having a different wavelength, the apparatus comprising:

light emitting means disposed in a common plane, for respectively radiating the plurality of separate non-co-linear optical beams from said light emitting means to the photosensitive material, thereby scanning and exposing the photosensitive material;

wherein said light emitting means are arranged close to one another such that each of the reflecting faces of said mirror is irradiated with the optical beams at a substantially common point thereof and the optical exposure positions on said photosensitive material are aligned on the same scanning line.

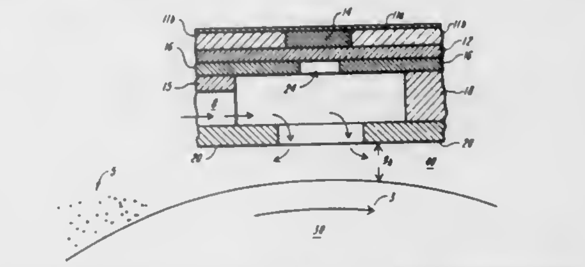
### 5,014,076
### PRINTER WITH HIGH FREQUENCY CHARGE CARRIER GENERATION

**Wendell J. Caley, Jr., Quincy; William R. Buchan, Pocasset, and Robert A. Moore, Waquoit, all of Mass., assignors to Delphax Systems, Randolph, Mass.**

**Filed Nov. 13, 1989, Ser. No. 434,425**

**Int. Cl.$^5$ G01D** *15/06*

**U.S. Cl. 346—159** **28 Claims**



25. A method of printing with an ionographic printer of the type wherein an array of electrode structures are provided opposite a dielectric member, each electrode structure of the array including a first electrode set for generating a charge breakdown region and a second electrode set for extracting charge carriers from said charge breakdown region and depositing charge on the dielectric member, wherein said second electrode set is maintained at a negative potentional with respect to said dielectric member, and said array is operated to inhibit ions so that electrons deposit said charge on the dielectric member.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,077
### CAMERA WITH VARIABLE FOCAL LENGTH OPTICAL SYSTEM

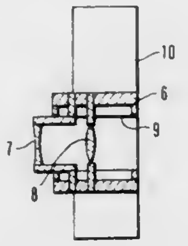
**Shinya Yomogizawa, and Hideo Ikari, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 366,328, Jun. 14, 1989, abandoned, which is a continuation of Ser. No. 298,766, Jan. 17, 1989, abandoned, which is a continuation of Ser. No. 214,929, Jun. 30, 1988, abandoned, which is a continuation of Ser. No. 862,680, May 13, 1986, abandoned. This application Nov. 9, 1989, Ser. No. 436,084**

**Claims priority, application Japan, May 15, 1985, 60-071880**

**Int. Cl.$^5$ G03B** *17/02, 1/18, 17/04*

**U.S. Cl. 354—187** **179 Claims**



1. A camera having a focal length variable optical system, comprising:

(a) a focal length variable optical system: (b) a focal length varying guide part for varying the focal length of said optical system, said optical system being arranged to vary the focal length thereof by shifting its position along said guide part; and

(c) a barrel sinking guide part extending from said focal length varying guide so as to bring said optical system into the body of the camera by continuous operation from the varying of the focal length, said optical system being arranged to be stowed into the camera body by shifting the position thereof along said barrel sinking guide part.

---

### 5,014,078
### PSEUDO FOCAL LENGTH CAMERA

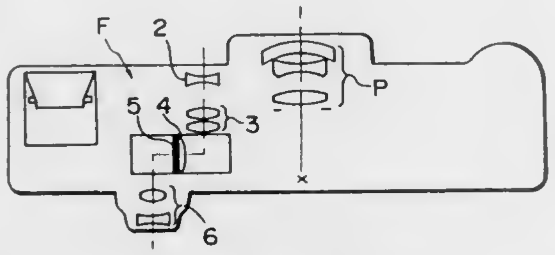
**Yoshinobu Kudo; Masataka Hamada; Yoshiaki Hata; Hiroshi Ootsuka; Manabu Inoue; Shigeru Wada, and Yoshihiro Tanaka, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed May 29, 1990, Ser. No. 530,119**

**Claims priority, application Japan, May 30, 1989, 1-136552**

**Int. Cl.$^5$ G03B** *13/12*

**U.S. Cl. 354—195.1** **19 Claims**



1. A pseudo focal length camera comprising:

a view finder, having a view area, for displaying an image formed by a lens system in the view finder in the view area;

a manual operating member;

means for designating a pseudo focal length;

means for displaying an index in the view area to indicate a portion of the image corresponding to the designated pseudo focal length; and

means, in response to the operation of the manual operating member, for moving the lens system in the view finder to change the state of the view finder from a first state in which the image to be photographed is shown in the view area to a second state in which the portion of the image corresponding to the designated pseudo focal length is shown as the whole view area.

---

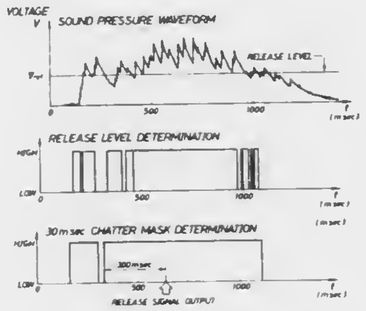
### 5,014,079
### CAMERA

**Yasutsugu Nakagawa, and Tohru Horiuchi, both of Hachioji, Japan, assignors to Konica Corporation, Shinjuku, Japan**

**Filed Dec. 22, 1989, Ser. No. 454,907**

**Int. Cl.$^5$ G03B** *17/40*

**U.S. Cl. 354—266** **5 Claims**



2. A camera comprising:

sound pressure detecting means for detecting a sound pressure level of an input sound;

timer means for measuring a time interval between release operations;

reference sound pressure level control means for setting a reference sound pressure level to be a predetermined value, raising the reference sound pressure level by a predetermined amount when the time interval between release operations which is detected by said timer means is shorter than a first predetermined time, and lowering the reference sound pressure level by a predetermined amount when a release operation is not performed for longer than a second predetermined time;

release determining means for outputting a release signal when the sound pressure level detected by said sound pressure detecting means is equal to or higher than the reference sound pressure level set by said reference sound pressure level control means for a third predetermined time; and

shutter driving means for performing a release operation in response to the release signal from said release determining means.

---

### 5,014,080
### ACTIVE AF CAMERA HAVING REMOTE CONTROL APPARATUS

**Shunichi Miyadera, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

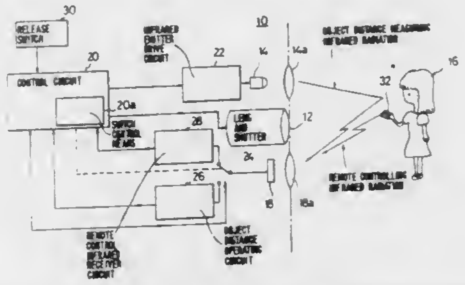
**Filed Feb. 8, 1990, Ser. No. 476,773**

**Claims priority, application Japan, Feb. 16, 1989, 1-36998**

**Int. Cl.$^5$ G03B** *13/36*

**U.S. Cl. 354—403** **13 Claims**

1. An active AF camera comprising an active object distance measuring device including a first emitter which emits a first signal transmitting wave medium for measuring an object distance of an object to be photographed and a first receiver which receives the signal transmitting wave medium reflected from the object, and remote control means including a second emitter and a remote control receiver which receives a second signal transmitting wave medium emitted from said second emitter of said remote control means for remotely controlling the camera, wherein said first receiver and the remote control receiver comprise a single common receiver.


30
RELEASE SWITCH
20
CONTROL CIRCUIT
INFRARED EMITTER DRIVE CIRCUIT
22
10
14
14a
OBJECT DISTANCE MEASURING INFRARED RADIATION
16
32
20a
12
24
26
18
18a
REMOTE CONTROLLING INFRARED RADIATION
REMOTE CONTROL INFRARED RECEIVER CIRCUIT
OBJECT DISTANCE OPERATING CIRCUIT

---

### 5,014,081
### METERING SYSTEM

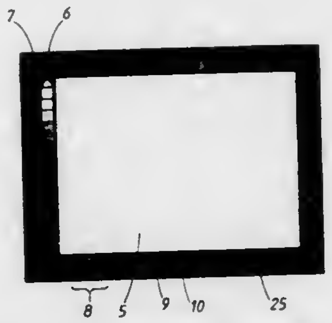
**Peter J. P. Molloy, 3 Brown Street, Ponsonby, Acukland, New Zealand**

**Filed Sep. 13, 1988, Ser. No. 243,760**

**Claims priority, application New Zealand, Sep. 14, 1987, 221793**

**Int. Cl.$^5$ G03B** *15/05, 17/20*

**U.S. Cl. 354—416** **17 Claims**



1. A method of reproducing subject tone in a photograph in a manner as predetermined by the photographer using a camera with a through-the-lens flash apparatus or a light meter therefor, said method comprising the steps of:

(i) assessing the tonality of a subject with reference to a tonal scale by simultaneously viewing both the subject and the tonal scale through a viewfinder of a camera or light meter; and

(ii) adjusting the exposure parameters of the camera or light meter and/or varying the flash emission time of the flash apparatus to ensure accurate reproduction of the tonality of the subject as assessed by the photographer with the aid of the tonal scale.

---

### 5,014,082
### METHOD AND APPARATUS FOR COMPENSATING FOR SHUTTER SPEED VARIATIONS

**David L. Farrington, Boxborough, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 4, 1989, Ser. No. 445,443**

**Int. Cl.$^5$ G03B** *7/08*

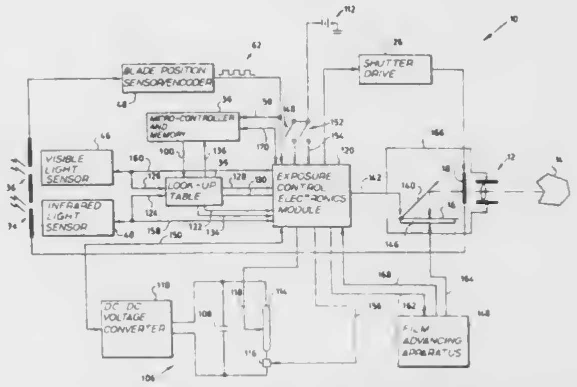
**U.S. Cl. 354—437** **9 Claims**

1. A control system that compensates for variations in the response time of a blade mechanism in a photographic camera comprising:

a blade mechanism comprising a pair of overlapping shutter blade elements with each shutter blade element having an aperture therein that cooperatively define an exposure aperture, said blade mechanism being mounted for movement between a blocking arrangement in which said blade mechanism is in light blocking relation with respect to an optical path so as to preclude scene light from being transmitted along the optical path to a film plane and an unblocking arrangement in which said blade mechanism is in light unblocking relation with respect to the optical path so as to allow the passage of scene light to the film plane through said exposure aperature when said blade mechanism is actuated between its said light blocking and unblocking arrangements to produce an exposure interval;

means for sensing the relative speed of said shutter blade elements with respect to one another including changes in the magnitude of said relative speed and for generating a signal representative thereof;

means responsive to said shutter blade elements relative speed signal for establishing a percentage of exposure aperture size reference signal representative of a predetermined percentage of the exposure aperture required to produce a particular photographic exposure;



means for sensing ambient scene light during an exposure interval and for generating a signal representative thereof;

means for integrating said ambient scene light signal and for generating a signal representative of the magnitude of the sensed ambient scene light at any particular time during said exposure interval;

means for comparing said percentage of exposure aperture size reference signal with the integrated magnitude of said ambient scene light signal and for generating an end of exposure signal when said percentage of exposure aperture size reference signal and the instantaneous magnitude of the integrated ambient scene light signal are equal; and

drive means connected to said blade mechanism for actuating said blade mechanism to initiate an exposure interval and responsive to said end of exposure signal for terminating said exposure interval.

---

### 5,014,083
### DISPLAY DEVICE FOR USE IN A CAMERA

**Shuji Izumi, Sakai; Masaaki Nakai, Kawachinagano; Manabu Inoue, Kobe; Akihiko Fujino, Saki; Kunio Kawamura, Sakai; Yuji Takarabe, Saki, and Masatake Niwa, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaishi, Osaka, Japan**

**Continuation of Ser. No. 195,896, May 19, 1988, abandoned, which is a division of Ser. No. 808,251, Dec. 12, 1985, abandoned. This application Mar. 19, 1990, Ser. No. 496,154**

**Claims priority, application Japan, Dec. 14, 1984, 59-264940; Apr. 2, 1985, 60-70619; Apr. 2, 1985, 60-70620; Apr. 2, 1985, 60-70621; Apr. 18, 1985, 60-84198; Apr. 19, 1985, 60-84197; Apr. 23, 1985, 60-88304; Apr. 23, 1985, 60-88305; Apr. 24, 1985, 60-89595; Apr. 24, 1985, 60-89596; Apr. 25, 1985, 60-90217; Sep. 6, 1985, 60-198244**

**Int. Cl.$^5$ G03B** *17/18*

**U.S. Cl. 354—471** **7 Claims**

1. A device for use in a camera, comprising:

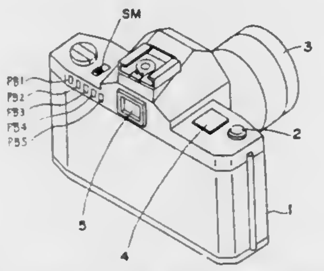
a first operable member manually operable to changeover between an ON state and an OFF state of the camera;

a second operable member manually operable to change

VOL
1126
ISS
1
MY
7
1991
UMI

from a first state in which the camera is not in operation to a second state in which the camera is in operation; and

display means for displaying photographic information, said display means being selectively operable in a first display mode with said first operable member being in the OFF state irrespective of the state of said second operable member, a second display mode with said first operable member being in the ON state and said second operable member being in the first state, and a third display mode with said first operable member being in the ON state and said second operable member being in the second state.



---

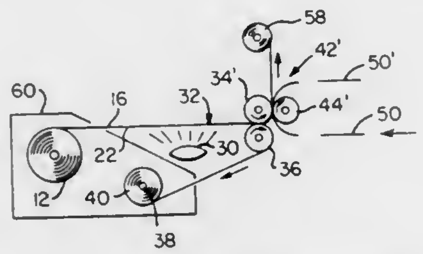
## 5,014,084
## APPARATUS FOR FORMING IMAGES ON PLAIN PAPER

**George F. Tirone, Miamisburg, Ohio, assignor to The Mead Corporation, Dayton, Ohio**

**Filed Jan. 18, 1990, Ser. No. 467,061**

**Int. Cl.⁵ G03B** *27/32*

**U.S. Cl. 355—27** **7 Claims**



1. An apparatus for forming an image on plain paper comprising:

a continuous web of imaging sheet having a support with a layer of photosensitive microcapsules on a surface thereof, said microcapsules containing a photohardenable or photosoftenable composition and a color precursor;

a continuous web of intermediate developer sheet having a substrate with a layer on a surface thereof of a thermoplastic developer resin, said resin being capable of reacting with said color precursor to form an image;

said webs of said imaging and intermediate developer sheets being juxtaposed into a laminate and spirally wound into a coil such that windings thereof are alternately said imaging sheet and said intermediate developer sheet;

means for rotatably mounting said coil on said apparatus and paying out said laminate from said coil;

means for image-wise exposing said imaging sheet component of said payed-out laminate;

means for applying a uniform rupturing force to said image-wise exposed laminate sufficient to cause said microcapsules to rupture and transfer an image-wise pattern of said color precursor to said developer layer, thereby forming an image thereof, said applying means including a pair of pressure rollers;

means for separating said laminate into said imaging sheet and said intermediate developer sheet bearing said image; and

means for assembling said intermediate developer sheet bearing said image with a non-reactive support and applying sufficient heat energy to said intermediate developer sheet and said non-reactive support to transfer said resin layer of said intermediate developer sheet to said non-reactive support, said assembling means including a pair of fuser rollers, both of which are heated and at least one of which is common with said pressure rollers.

---

## 5,014,085
## LENS SHUTTLE MECHANISM FOR MICROFILM CAMERA

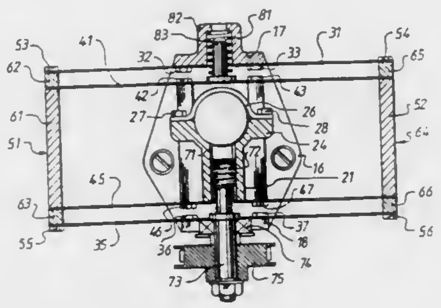
**L. Vallance, W. Lothiam, United Kingdom, assignor to Unisys Corporation, Blue Bell, Pa.**

**Filed Mar. 22, 1990, Ser. No. 497,488**

**Claims priority, application United Kingdom, Jun. 7, 1989, 89 13123**

**Int. Cl.⁵ G03B** *27/32, 27/52*

**U.S. Cl. 355—64** **9 Claims**



1. A shuttle mechanism comprising;

a base member;

a shuttle member;

a first pair of spaced apart leaf springs, each spring of said first pair attached to said base member with the ends of said spring extending away from said base member in opposite directions and with each end of said spring respectively secured to a spacer at or in the region of its free end; a second pair of spaced apart leaf springs, each spring of said second pair attached to said shuttle member with the ends of said spring extending away from said shuttle in opposite directions and with each end of said spring respectively secured to a spacer at or in the region of its free end; and

means to produce selective reciprocating movement between said shuttle member and said base member.

---

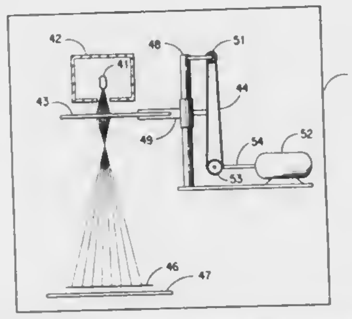
## 5,014,086
## ADJUSTABLE DOT GAIN SIMULATION FOR COLOR PROOFING

**Robert C. Barry, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 31, 1989, Ser. No. 331,994**

**Int. Cl.⁵ G03B** *27/72*

**U.S. Cl. 355—71** **12 Claims**



1. In a system for controlling dot gain during exposure of a proof film, including a light source, an aperture plate through which a cone of said light is light, and said proof film placed adjacently parallel to said master pattern so that said cone of light passes through non-opaque sections of said master pattern onto said proof of film, wherein the improvement comprises:

diffuser means placed in said cone of light between said aperture and said master pattern for altering the degree of collimation of the light striking said master pattern by changing the apparent size of said light source.

---

## 5,014,087
## PHOTOTOOL WITH HINGE ASSEMBLY

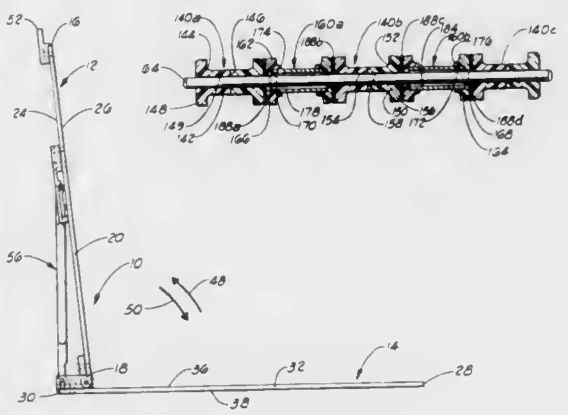
**Thomas L. Byers, 5840 Stewart Dr., Mustang, Okla. 73064**

**Filed Sep. 28, 1988, Ser. No. 250,602**

**The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.**

**Int. Cl.⁵ G03B** *27/00*

**U.S. Cl. 355—72** **18 Claims**



1. A phototool comprising:

a first frame assembly;

a second frame assembly;

at least one hinge assembly hingedly connecting the first frame assembly to the second frame a assembly, each hinge assembly comprising:

a first hinge plate having a portion connectable to the second frame assembly;

a second hinge plate having a portion connectable to the first frame assembly;

a metal hinge shaft for connecting the first hinge plate to the second hinge plate;

first means connected to the first hinge plate and having a portion engaging the hinge shaft so that the hinge shaft substantially is not rotatable within said first means and so that the first hinge plate substantially is not movable in said first means in axial or radial directions relative to the hinge shaft, comprising:

at least three protrusions, each protrusion having one end connected to the first hinge plate and each protrusion extending a distance from the first hinge plate terminating with an opposite end, each protrusion having a first side and a second side and an opening extending therethrough intersecting the first and the second sides;

at least three non-rotating inserts, each non-rotating insert being constructed of plastic and being insertable with an interference fit generally through the opening formed in each protrusion connected to the first hinge plate and each non-rotating insert having an opening extending therethrough, each opening in each non-rotating insert having an diameter about the same as the diameter of the hinge shaft and the opening in each non-rotating insert being sized to receive a portion of the hinge shaft extending therethrough, the hinge shaft being substantially non-rotatable within the opening in each non-rotating insert and the interference fit being established between each non-rotating insert and the hinge shaft;

second means connected to the second hinge plate and having a portion engaging the hinge shaft so that the second hinge plate substantially is not movable in axial or radial directions, the hinge shaft extending through the first means connected to the first hinge plate and through the second means connected to the second hinge plate for connecting the first hinge plate to the second hinge plate, comprising:

at least two protrusions connected to the second hinge plate, each protrusion having one end connected to the second hinge plate and extending a distance therefrom terminating with the opposite end, each protrusion being disposable generally between two of the protrusions on the first hinge plate, and each protrusion having a first side and a second side, each protrusion connected to the second hinge plate being disposed generally adjacent two of the protrusions connected to the first hinge plate and each protrusion connected to the second hinge plate having an opening extending therethrough intersecting the first and the second sides thereof; and

at least two rotating inserts, each rotating insert being constructed of plastic and being insertable with an interference fit generally within the opening in one of the protrusions connected to the second hinge plate and each rotating insert having an opening extending therethrough sized to receive a portion of the hinge shaft, the opening in each rotating insert having a diameter about the same as the diameter of the hinge shaft and adapted so the hinge shaft substantially is rotatable without movement in radial directions in the openings in the rotating inserts.

---

## 5,014,088
## INHIBITABLE IMAGE FORMING APPARATUS INCLUDING ENTERED CODE DATA RELEASE MEANS

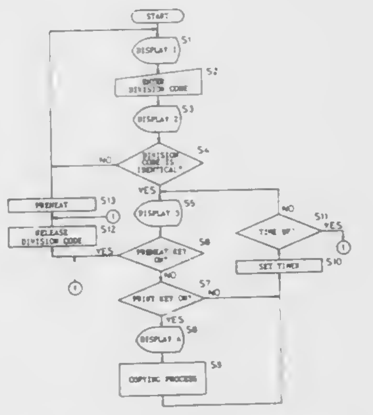
**Takahiro Wakikaido, Yao; Toshio Yoshiyama, Sakai, and Ken Yoshizuka, Nagaokakyo, all of Japan, assignors to Mita Industrial Co., Ltd., Japan**

**Filed Nov. 9, 1989, Ser. No. 433,793**

**Claims priority, application Japan, Nov. 19, 1988, 63-293234**

**Int. Cl.⁵ G03G** *21/00*

**U.S. Cl. 355—201** **3 Claims**



1. An image forming apparatus comprising:

memory means having stored code data;

VOL
1126
ISS
1
MY
7
1991
UMI

code data input means;

control means for inhibiting image forming by said apparatus unless code data are entered through said code data input means and entered code data are identical with code data previously stored in said memory means;

preheat changeover means for switching a heat source in said apparatus to either a preheat mode or an operation ready mode; and

entered code data release means, responsive to switching of said said heat source to said preheat mode by said preheat changeover means, for releasing entered code data whereby said control means inhibits image forming by said apparatus.

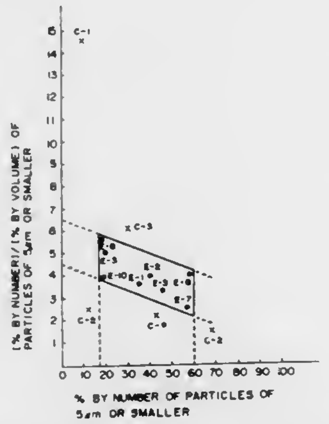
---

### 5,014,089

## DEVELOPER IN AN IMAGE FORMING DEVICE HAVING A BINDING RESIN AND MAGNETIC POWDER

**Kiichiro Sakashita, Inagi; Toshiaki Nakahara, Tokyo; Hirohide Tanikawa, Yokohama; Naoki Matsushige; Satoshi Yoshida, both of Kawasaki; Masatsugu Fujiwara, and Yasuo Mitsuhashi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 261,987, Oct. 25, 1988, Pat. No. 4,957,840.**
**This application May 25, 1990, Ser. No. 528,472**
**Claims priority, application Japan, Oct. 26, 1987, 62-271119**
**Int. Cl.$^5$ G03G *15/09***
**U.S. Cl. 355—251** **3 Claims**



1. An image forming device for developing electrostatic images held on an electrostatic image holding member, comprising:

a developer chamber containing a developer for developing the electrostatic images, comprising a magnetic toner comprising a binder resin and magnetic powder, said developer containing 17–60 % by number of magnetic toner particles having a particle size of 5 microns or smaller, containing 1–23 % by number of magnetic toner particles having a particle size of 8–12.7 microns, and containing 2.0 % by volume or less of magnetic toner particles having a particle size of 16 microns or larger; wherein the magnetic toner has a volume-average particle size of 4–9 microns, and the magnetic toner particles having a particle size of 5 microns or smaller has a particle size distribution satisfying the following formula:

$$N/V = -0.04N + k,$$

wherein N denotes the percentage by number of magnetic toner particles having a particle size of 5 micron or smaller, V denotes the percentage by volume of magnetic toner particles having a particle size of 5 microns or smaller, k denotes a positive number of 4.5–6.5, and N denotes a positive number of 17–60;

toner-carrying means having a surface to hold a toner layer thereon and to carry the toner layer to a developing zone; the toner layer being formed of the magnetic toner particles supplied from the developer chamber, said toner-carrying means being made of a non-magnetic material;

magnetic means for generating a stationary magnetic field at the developing zone through the non-magnetic toner-carrying means toward the surface of the electrostatic image-holding member;

means for forming the layer of the magnetic toner particles of substantially uniform thickness on the surface of the toner-carrying means; and

means for maintaining a space between the toner-carrying means and the electrostatic image-holding member at the developing zone within a predetermined range to form a space gap between the electostatic image-holding member and the surface of the layer of the magnetic toner particles on said toner-carrying means.

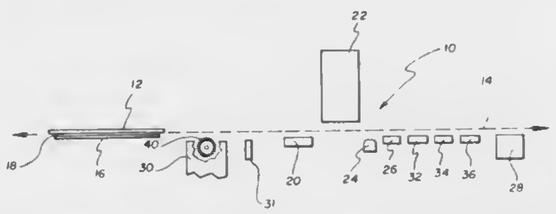
---

### 5,014,090

## METHOD AND APPARATUS FOR IMPROVING A MULTI-COLOR ELECTROPHOTOGRAPHIC IMAGE USING VAPOR FUSING

**Domenic Santilli, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 28, 1990, Ser. No. 500,430**
**Int. Cl.$^5$ G03G *15/01, 21/00***
**U.S. Cl. 355—256** **9 Claims**



1. In an apparatus for producing a multi-stage electrophotographic image comprising means for providing an electrophotographic medium on a carrier therefor, means for translating the carrier and medium together over a predetermined path, means for charging the medium, means for exposing the medium to a first light-borne image, means for toning the image bearing charged region of the medium to produce a first color visible image, and means for returning the carrier to the starting position to repeat the foregoing steps of charging said medium, exposing it to a second light-borne image and toning said medium to produce a second visible image, the improvement comprising means for treating the surface of the first toned image after said first toning step and prior to said second charging step with a toner binder solvent vapor to smooth the toned image and prevent unwanted toner particles from adhering to the first toned image.

---

### 5,014,091

## PAPER JOGGING AND ALIGNING APPARATUS WITH STAPLING CAPABILITIES FOR A COPYING MACHINE

**Tadao Koike; Koichi Noguchi, both of Tokyo; Hiroshi Takahashi, Kawasaki, and Koichi Tsunoda, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

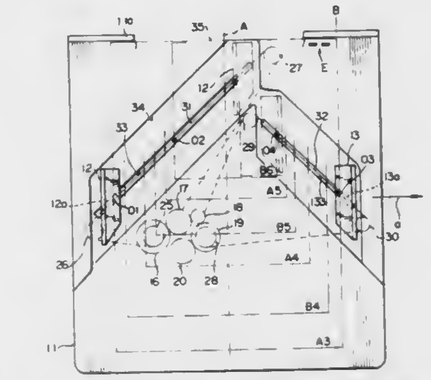
**Filed Dec. 6, 1989, Ser. No. 446,724**
**Claims priority, application Japan, Dec. 7, 1988, 63-309559**
**Int. Cl.$^5$ G03G *21/00***
**U.S. Cl. 355—321** **4 Claims**

1. A paper handling device for an image forming apparatus, comprising:

a tray for receiving a plurality of paper sheets sequentially driven out of said image forming apparatus while being positioned with the widthwise center of said paper sheets being located at a center reference; and

a pair of paper guide members movable relative to said tray;

said pair of paper guide members being moved symmetrically toward each other with respect of said widthwise center along convergent guide paths which converge toward one transverse edge of said paper sheets to accommodate paper sheets of different sized widths and lengths, and to locate the paper sheets on said tray at a center reference position while moving said paper sheets in a direction for truing up one longitudinal edge of said paper sheets;



either one of said pair of paper guide members moving, when a plurality of paper sheets have been fully discharged, said paper sheets such that one lateral edge of said paper sheets coincides with a one-side reference position which is common to all paper sizes, while the other paper guide member moving away form said one lateral edge.

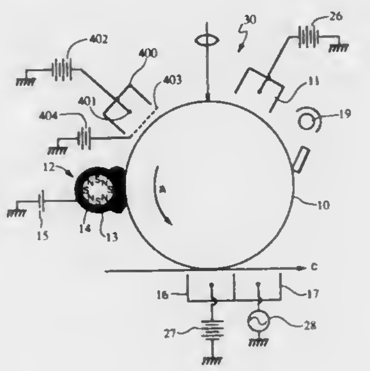
---

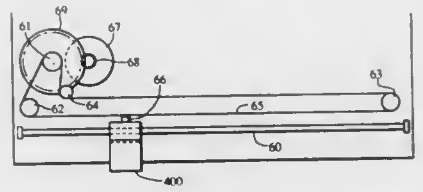
### 5,014,092

## IMAGE FORMING APPARATUS WITH A BINDING FUNCTION

**Naoki Kubo; Takuma Ishikawa; Toshio Matsui; Fumitoshi Atsumi, and Yasuhiko Doi, all of Osaka, Japan, assignors to Minolta Camera Co., Ltd., Osaka, Japan**

**Filed Jun. 1, 1989, Ser. No. 360,239**
**Claims priority, application Japan, Jun. 4, 1988, 63-137933; Jun. 4, 1988, 63-137934; Jun. 4, 1988, 63-137935; Jun. 14, 1988, 63-147159; Nov. 11, 1988, 63-286110; Nov. 11, 1988, 63-286111**
**Int. Cl.$^5$ G03G *15/00***
**U.S. Cl. 355—324** **17 Claims**





1. An image forming apparatus with a binding function comprising:

an image carrier rotatable by rotating means;

means for forming an electrostatic latent image onto the image carrier;

means for forming a charged region onto the image carrier ar the margin of the electrostatic latent image and including a charger disposed at a position corresponding to the charged region in the direction perpendicular to the rotating direction of the image carrier, wherein the charger charges the image carrier in accordance with the rotation of the image carrier, thereby the charged region is formed parallel to the rotating direction of the image carrier;

means for forming toner images corresponding to the electrostatic latent image and the charged region;

means for transferring and fixing the toner images formed on the image carrier onto a sheet;

means for stacking a plurality of sheets having fixed toner images in an overlying relationship; and

means for binding the stacked sheets at their margins corresponding to the charged region by fusing between adjacent sheets.

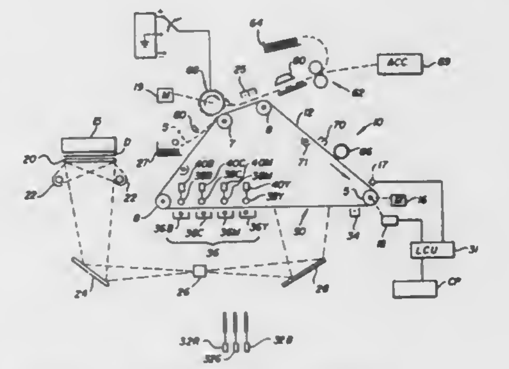
---

### 5,014,093

## COLOR COPYING APPARATUS AND METHOD WITH IMPROVED PRODUCTIVITY

**Yee S. Ng, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 23, 1990, Ser. No. 527,454**
**Int. Cl.$^5$ G03G *15/01***
**U.S. Cl. 355—326** **20 Claims**



1. Apparatus for making copy comprising:

an electrophotographic recording member;

means for electrostatically charging said recording member;

means for supporting a document sheet for exposure;

means for directing an optical image of the image on the document sheet upon the recording member to imagewise modulate the electrostatic charge;

means for sensing the color content of the image on the document sheet for distinguishing between a document sheet containing a colored original image and a document sheet containing only black original images on the document sheet and generating a signal in accordance with the type of document sheet sensed;

means for developing electrostatic images with differently colored toners including a black only toner;

means responsive to said signal for controlling the number of images of said document sheet imaged upon said recording member wherein when said signal indicates a document sheet containing a colored image, a plural number of images are recorded, and when said signal indicates a document sheet containing only black images, fewer images than said number are recorded;

means responsive to said signal for developing electrostatic images copied from document sheets containing colored images with differently colored toners and for developing electrostatic images copied from document sheets containing only black images with black toner; and

means for transferring one or more developed images to a copy sheet.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,094
## PROCESS UNIT AND A MULTI-COLOR IMAGE FORMING APPARATUS USING THE SAME

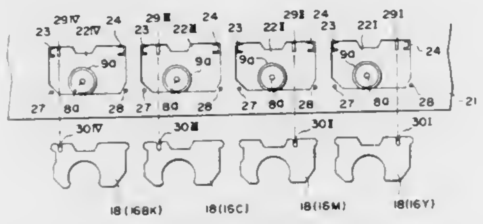
**Joji Amitani, Yokohama, and Osamu Hoshino, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 253,893, Oct. 5, 1988, abandoned, which is a continuation of Ser. No. 875,966, Jun. 19, 1986, abandoned, which is a continuation of Ser. No. 521,832, Aug. 10, 1983, abandoned. This application Apr. 30, 1990, Ser. No. 515,347**

**Claims priority, application Japan, Aug. 17, 1982, 57-142313; Oct. 4, 1982, 57-174271**

**Int. Cl.$^5$ G03G** *15/01*

**U.S. Cl. 355—326** **13 Claims**



1. A color image forming apparatus comprising:

plural color image forming stations for forming images of different colors;

a plurality of process units, each detachably mountable into an associated one of said plural color image forming stations respectively, each said process unit including process means for image formation in a different one of the different colors, said process means including at least developing means for developing images formed by said process means, each said process means of said plurality of process units being constructed substantially identically with the other said process means, each color image forming station including a guide for guiding the mounting of the associated unit into said image forming station;

interfering means provided at each said color image forming station, wherein said interfering means and said process units function interrelatedly for receiving only that one of the process units which is for the same color as the color in which said color image forming station is operated;

transporting means for transporting a transfer material for superposedly receiving images at said color image forming stations; and

image transferring means corresponding to respective color image forming stations for transferring images at said color image forming stations superposedly.

---

### 5,014,095
## COLOR IMAGE FORMING APPARATUS

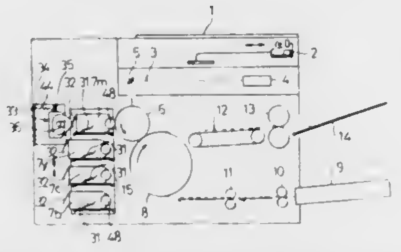
**Takanobu Yamada, Osaka, Japan, assignor to Minolta Camera Co., Ltd., Osaka, Japan**

**Filed Mar. 29, 1989, Ser. No. 330,120**

**Claims priority, application Japan, Apr. 1, 1988, 63-81976**

**Int. Cl.$^5$ G03G** *15/01*

**U.S. Cl. 355—327** **6 Claims**



1. A color image forming apparatus having developing units of four colors for developing an electrostatic latent image on an image holding member thereby making it into a toner image and capable of forming a colored image composed of each colored toner image, comprising:

a reciprocative movement holding member for holding each developing unit of four colors arranged in the direction of reciprocating movement;

a positioning means for positioning the reciprocative movement holding member at the position where each developing unit faces the image holding member from any direction in the direction of the reciprocating movement;

a control means for developing an electrostatic latent image corresponding to each color by using the developing units of four colors in a predetermined order of development wherein a black developing unit is arranged to function last in order of development; and

an image composing means for composing each colored toner image prior to transferring the image onto a transfer material or when transfer is performed, wherein the black developing unit is disposed at either one of the farthest ends of the reciprocative movement holding member in the direction of its reciprocating movement, and the second developing unit in order of development is disposed at the other farthest end.

---

### 5,014,096
## OPTOELECTRONIC INTEGRATED CIRCUIT WITH OPTICAL GATE DEVICE AND PHOTOTRANSISTOR

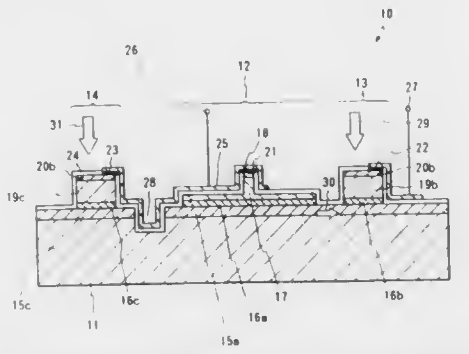
**Kenichi Matsuda, and Jun Shibata, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Feb. 1, 1990, Ser. No. 473,562**

**Claims priority, application Japan, Feb. 9, 1989, 1-30548**

**Int. Cl.$^5$ H01L** *31/12*

**U.S. Cl. 357—19** **12 Claims**



1. An optoelectronic integrated circuit including an optical bistable circuit comprising:

(a) an optical gate device responsive to a current injected to an active layer thereof and to a first light ray transmitted through said active layer for emitting a second light ray and for controlling an intensity of said first light ray in accordance with said current; and

(b) a first phototransistor serially connected with said optical gate device so arranged to receive said second light ray for causing said current to flow through said optical gate device in response to said second light ray and a set signal light ray, said first phototransistor holding flowing of said current when said second light ray is emitted.

---

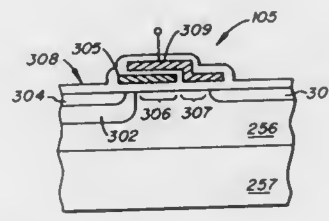
### 5,014,097
## ON-CHIP HIGH VOLTAGE GENERATOR AND REGULATOR IN AN INTEGRATED CIRCUIT

**Reza Kazerounian, Alameda; Syed Ali, Cupertino, and Boaz Eitan, Sunnyvale, all of Calif., assignors to WaferScale Integration, Inc., Fremont, Calif.**

**Filed Dec. 24, 1987, Ser. No. 137,782**

**Int. Cl.$^5$ H01L** *29/68, 29/10, 27/02*

**U.S. Cl. 357—23.5** **9 Claims**



1. A voltage multiplier comprising:

an output lead;

means for providing an output voltage on said output lead; and

transistor means for discharging said output lead and thereby substantially reducing the voltage at said output lead, said transistor means comprising:

a first region of semiconductor material of a first conductivity type;

a second region of semiconductor material of a second conductivity type formed in said first region, said second region being coupled to said output lead;

a third region of semiconductor material of said second conductivity type formed within said first region and spaced apart from said second region, a channel region extending between said second and third regions;

a floating gate formed over a first portion of said channel region but not a second portion of said channel region; and

a control gate extending over said floating gate and said second portion of said channel region, so that if the voltage at said second region rises, and the voltage at said floating gate rises due to capacitive coupling between said floating gate and said second region, an inversion region will not form extending from said second region to said third region independently of the voltage at said control gate.

---

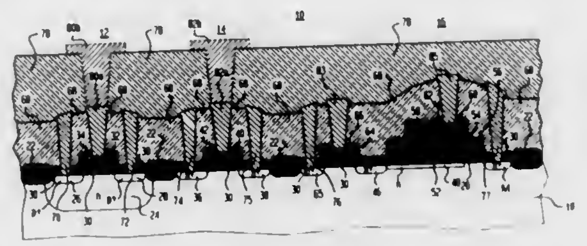
### 5,014,098
## CMOS INTEGRATED CIRCUIT WITH EEPROM AND METHOD OF MANUFACTURE

**John R. Schlais; Randy A. Rusch, and Thomas H. Simacek, all of Kokomo, Ind., assignors to Delco Electronic Corporation, Kokomo, Ind.**

**Filed Feb. 26, 1990, Ser. No. 484,829**

**Int. Cl.$^5$ H01L** *27/01*

**U.S. Cl. 357—23.5** **7 Claims**



1. An integrated circuit comprising:

a substrate of a semiconductor material having a surface;

an MOS transistor in said substrate at said surface and having a gate electrode with a feature size of no greater than about two microns and having a maximum voltage capability; and

an EEPROM in said substrate at said surface, said EEPROM being capable of being programmed at voltages which are compatible with the maximum voltage capability of the MOS transistor, and the EEPROM having a control gate and a floating gate with a ratio of capacitance of the floating gate to control gate to capacitance of the floating gate to substrate of at least about two.

---

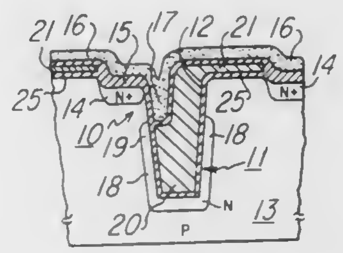
### 5,014,099
## DYNAMIC RAM CELL WITH TRENCH CAPACITOR AND TRENCH TRANSISTOR

**David J. McElroy, Rosenberg, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 198,896, May 26, 1988, abandoned. This application Mar. 8, 1990, Ser. No. 494,878**

**Int. Cl.$^5$ H01L** *29/68, 29/40, 25/04*

**U.S. Cl. 357—23.6** **9 Claims**



1. A one-transistor dynamic random-access memory cell formed in the face of a monocrystalline semiconductor body of a first conductivity type comprising:

a trench region having a bottom portion in the semiconductor body and a wall portion extending from the face into the semiconductor body to the bottom portion;

a first capacitor region of a second conductivity type formed along the trench wall portion and extending from the bottom portion to a position along the wall portion and spaced from the face of the semiconductor body;

a conductive plug filling most of the trench;

a conductive layer formed over and in electrical contact with the conductive plug, said layer extending away from the trench region and positioned between the wordline and the face to provide a field plate over a portion of the face adjoining the trench region;

a dielectric material providing electrical isolation between the capacitor region and the conductive plug;

a first source/drain region of the second conductivity type formed in the semiconductor body on the face or on the wall portion, said first source/drain region separated from the first capacitor region by a channel region or the first conductivity type along the wall portion, a portion of the first capacitor region including a second source/drain region adjoining the channel region;

a minor recess formed in the trench adjacent the channel region and extending from the face to the first capacitor region; and

a wordline along the face and including a gate layer positioned in the recess to selectively render the channel region conductive.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,100
### IMAGE SENSOR FREE FROM UNDESIRABLE INCIDENT LIGHT RAYS WHICH HAVE NOT BEEN REFLECTED IN THE SURFACE BEARING THE IMAGE TO BE SENSED

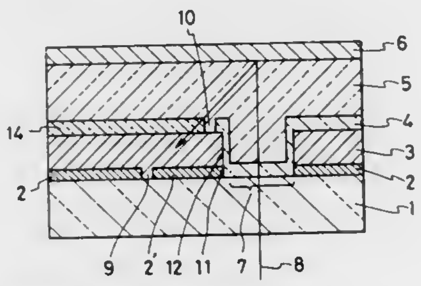
**Takesbi Fukada, Ebina; Mitsufumi Codama, Atsugi; Mitsunori Sakama, Hiratsuka; Nobumitsu Amachi, Atsugi; Naoya Sakamoto, Atsugi, and Icbiro Takayama, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Filed Dec. 16, 1988, Ser. No. 285,419**

**Claims priority, application Japan, Dec. 18, 1987, 62-321688; Dec. 18, 1987, 62-321689**

**Int. Cl.$^5$ H01L** *27/14*

**U.S. Cl. 357—30** **2 Claims**



1. An image sensor comprising:
- a transparent substrate;
- a light blocking electrode formed on said transparent substrate, said electrode having a first groove by which said electrode is isolated into two parts;
- a photosensitive semiconductor layer formed on said substrate;
- a light window formed in said light blocking electrode and said photosensitive semiconductor layer;
- a transparent electrode formed on said photosensitive semiconductor layer, the inside surface of said light window and the substrate in said light window, wherein said light blocking electrode and said transparent electrode contact each other at said light window; and
- a second groove formed on said transparent electrode for isolating said transparent electrode into two portions, said second groove being positioned near the light window so that a sensing region is defined in said semiconductor layer between said first and second grooves.

---

### 5,014,101
### SEMICONDUCTOR IGBT WITH IMPROVED TURN-OFF SWITCHING TIME

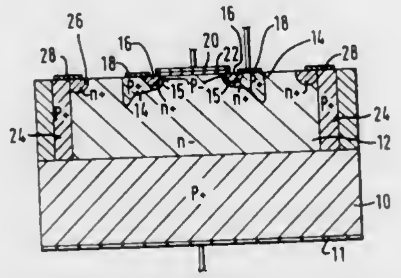
**Adrian D. Finney, Birmingham, England, assignor to Lucas Industries Public Limited Company, Birmingham, England**

**Filed Jan. 18, 1990, Ser. No. 466,946**

**Claims priority, application United Kingdom, Jan. 21, 1989, 8901342**

**Int. Cl.$^5$ H01L** *29/00, 29/72, 29/74, 29/747*

**U.S. Cl. 357—37** **9 Claims**



1. An insulated gate bipolar transistor, comprising a body of semiconductor material, emitter and collector electrodes disposed on said body of semiconductor material, said body of semiconductor material having four regions of alternate conductivity type disposed between said emitter and collector electrodes including an emitter region adjacent the emitter electrode, and a base region adjacent the emitter region, the device further comprising an insulated gate for establishing charge carrier flow to said base region to turn the device on for flow of current between the emitter and collector electrodes, and a conductive path enabling charge carriers to flow from the emitter region to the base region upon turn-off.

---

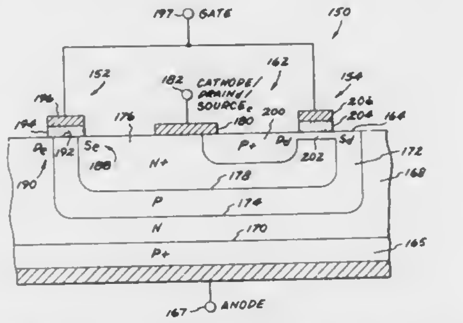
### 5,014,102
### MOSFET-GATED BIPOLAR TRANSISTORS AND THYRISTORS WITH BOTH TURN-ON AND TURN-OFF CAPABILITY HAVING SINGLE-POLARITY GATE INPUT SIGNAL

**Michael S. Adler, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 1, 1982, Ser. No. 364,294**

**Int. Cl.$^5$ H01L** *29/10, 29/74, 27/02;* **H03K** *3/26*

**U.S. Cl. 357—38** **14 Claims**



1. A MOSFET-gated thyristor integrated device having single polarity turn-on and turn-off control, said integrated device comprising:
- a four-layer semiconductor switching device including, in order, an anode region layer of P conductivity type, a first base region layer of N conductivity type, a second base region layer of P conductivity type, and a cathode region layer of N conductivity type;
- an enhancement mode MOSFET having a gate electrode and having one main electrode connected to said cathode region layer and another main electrode connected to said first base region layer for biasing said switching device into conduction when said enhancement mode MOSFET is conducting; and
- a depletion mode MOSFET having a gate electrode and having one main electrode connected to said second base region layer and another main electrode connected to said cathode region layer for turning off said switching device when said depletion mode MOSFET is conducting.

---

### 5,014,103
### DYNAMIC RANDOM ACCESS MEMORY HAVING IMPROVED LAYOUT AND METHOD OF ARRANGING MEMORY CELL PATTERN OF THE DYNAMIC RANDOM ACCESS MEMORY

**Taiji Ema, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

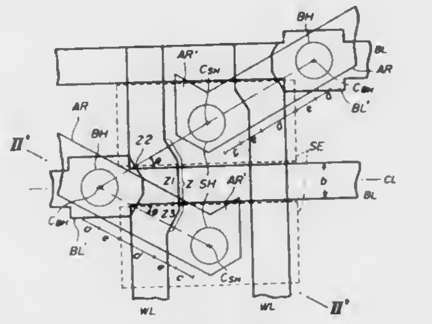
**Filed Jul. 11, 1990, Ser. No. 551,237**

**Claims priority, application Japan, Jan. 20, 1989, 1-9924**

**Int. Cl.$^5$ H01L** *27/02, 29/68, 27/10, 23/48*

**U.S. Cl. 357—41** **35 Claims**

1. A dynamic random access memory comprising:
- a semiconductor substrate having an active region including first and second diffusion regions of a transfer transistor;
- an insulating layer formed on said semiconductor substrate and having first and second contact holes;
- a stacked capacitor having a storage electrode which is electrically coupled to said first diffusion region through said first contact hole formed in said insulating layer and an opposed electrode;
- a word line electrically isolated from said semiconductor substrate; and
- a bit line electrically isolated from said semiconductor substrate and electrically coupled to said second diffusion region through said second contact hole formed in said insulating layer,



- said second contact hole being approximately positioned at a center (CL) of said bit line, and
- said word line having a bent portion located between said first and second contact holes so that said word line is separated from said second contact hole at a predetermined distance.

---

### 5,014,104
### SEMICONDUCTOR INTEGRATED CIRCUIT HAVING CMOS INVERTERS

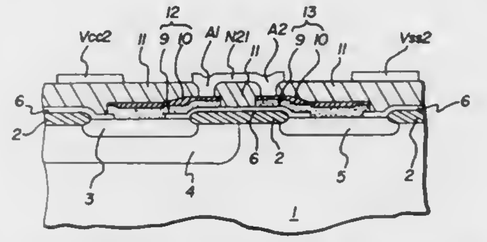
**Taiji Ema, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 297,359, Jan. 13, 1989, abandoned. This application Oct. 22, 1990, Ser. No. 600,278**

**Claims priority, application Japan, Jan. 14, 1988, 63-005954**

**Int. Cl.$^5$ H01L** *27/02*

**U.S. Cl. 357—42** **8 Claims**



1. A semiconductor integrated circuit having a complementary metal oxide semiconductor type inverter, said inverter comprising:
- first and second voltage source lines for supplying source voltage to said inverter; and
- a pair of p-channel and n-channel metal oxide semiconductor type field effect transistors, said MOS FETs are connected to each other in series between said first and second voltage source lines, gates of each of said MOS FETs are connected to each other with a gate electrode for commonly receiving an input signal, source region of said p-channel MOS FET is connected to said first voltage source line, source region of said n-channel MOS FET is connected to said second voltage source line, and drains of said p-channel MOS FET and n-channel MOS FET are connected to each other,
- wherein one of said drains of p-channel MOS FET and n-channel MOS FET is contacted to a separate drain contact electrode, wherein another one of said drains of p-channel MOS FET and n-channel MOS FET is contacted to another separate drain contact electrode, wherein said drain contact electrodes comprise a conductor material including a silicide of high melting point metal, and wherein said drain contact electrodes are connected to each other with a conductor metal; and
- wherein said first and second voltage source lines, and said conductor material are arranged over an insulation layer covering other elements of the inverter.

---

### 5,014,105
### SEMICONDUCTOR DEVICE OF COMPLEMENTARY INTEGRATED CIRCUIT

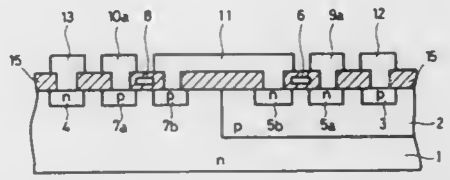
**Masayuki Hata, and Tsunenori Umeki, both of Hyogo, Japan, assignors to Mitsubisbi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 213,496, Jun. 30, 1988, abandoned. This application May 31, 1990, Ser. No. 529,762**

**Claims priority, application Japan, Jun. 30, 1987, 62-164305**

**Int. Cl.$^5$ H01L** *27/02, 23/48*

**U.S. Cl. 357—42** **17 Claims**



1. A semiconductor device of a complementary integrated circuit, comprising:
- an n-semiconductor substrate;
- a p-well formed with said n-semiconductor substrate;
- an n-channel FET (field effect transistor) formed on said p-well, said n-channel FET including an n-source connected to a first grounded line and an n-drain connected to an output line;
- a p-channel FET formed on said n-semiconductor substrate, said p-channel FET including a p-source connected to a first voltage source line and a p-drain connected to said output line;
- a contact p-region formed on said p-well for providing electrical connection between said p-well and a second grounded line; and
- a contact n-region formed on said n-semiconductor substrate for providing electrical connection between said n-semiconductor substrate and a second voltage source line.

---

### 5,014,106
### SEMICONDUCTOR DEVICE FOR USE IN A HYBRID LSI CIRCUIT

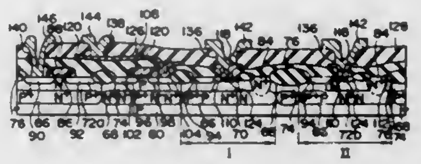
**Takeo Maeda, Tokyo, and Masayoshi Higashizono, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 7, 1990, Ser. No. 489,896**

**Claims priority, application Japan, Mar. 14, 1989, 1-61638**

**Int. Cl.$^5$ H01L** *27/02*

**U.S. Cl. 357—43** **24 Claims**



1. A semiconductor device for use in a hybrid LSI circuit, said semiconductor device comprising:
- a semiconductor substrate of a first conductivity type;
- a MOSFET section having a buried layer of a specified

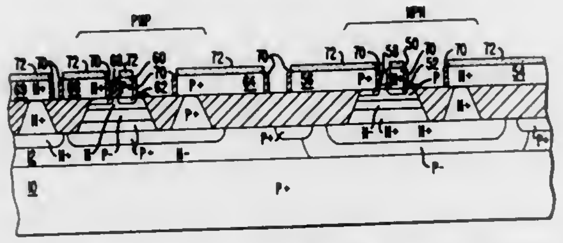
VOL
1126
ISS
1
MY
7
1991
UMI

conductivity type formed on said semiconductor substrate, a well region of the same conductivity type as the buried layer and which is formed in the buried layer, a current path having first and second terminals, and a control electrode; and

at least first and second bipolar transistors formed on said semiconductor substrate, each of said at least first and second bipolar transistors having a base, a collector, and an emitter, the collector of said first transistor comprising a buried layer of a second conductivity type and a well region of the second conductivity type formed on said buried layer of the second conductivity type, and the collector of said second transistor comprising said buried layer of the second conductivity type and an epitaxial layer of the second conductivity type formed on said buried layer of the second conductivity type, the collectors of said bipolar transistors having different impurity concentration profiles.

---

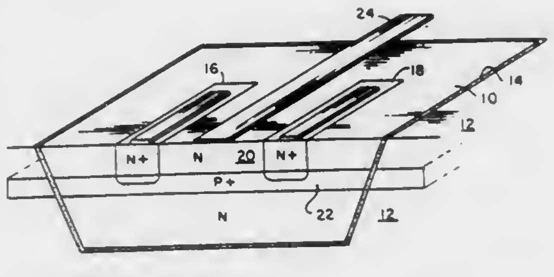
### 5,014,107
## PROCESS FOR FABRICATING COMPLEMENTARY CONTACTLESS VERTICAL BIPOLAR TRANSISTORS
**Madhukar B. Vora, Los Gatos, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.**
**Continuation of Ser. No. 79,626, Jul. 29, 1987, abandoned. This application Aug. 29, 1989, Ser. No. 401,523**
**Int. Cl.$^5$ H01L** *27/02, 29/72, 27/12*
**U.S. Cl. 357—44** **8 Claims**



1. A complementary vertical bipolar transistor structure comprising:
a substrate of a first conductivity type;
a first epitaxial layer upon said substrate, a first region thereof being of the first conductivity type and electrically integrated with said substrate, and a second region thereof being of an opposite conductivity type, said first region comprising an aluminum dopant;
a first epitaxial silicon island defined in a second epitaxial layer over the first region of said first epitaxial layer, said first island being underlaid by a first buried layer of the opposite conductivity type and having a first polysilicon emitter of the opposite conductivity type and a base region of the first conductivity type extending between said first emitter and said first buried layer; and
a second epitaxial silicon island defined in said second epitaxial layer over the second region of said first epitaxial layer, said second island being underlaid by a second buried layer of the first conductivity type and having a second polysilicon emitter of the first conductivity type and a base region of the opposite conductivity type extending between said second emitter and said second buried layer.

---

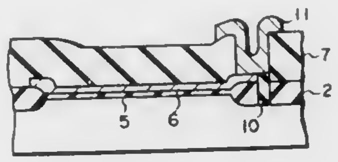
### 5,014,108
## MESFET FOR DIELECTRICALLY ISOLATED INTEGRATED CIRCUITS
**William E. O'Mara, Jr., Kingston, N.H., and James D. Beasom, Melbourne Village, Fla., assignors to Harris Corporation, Melbourne, Fla.**
**Filed May 15, 1990, Ser. No. 523,427**
**Int. Cl.$^5$ H01L** *27/12, 29/48, 29/56, 29/80*
**U.S. Cl. 357—49** **13 Claims**



1. A MESFET comprising:
an island of a first conductivity type isolated by dielectric isolation from a substrate;
source and drain regions of said first conductivity type spaced in said island and separated by a channel region of said island;
a bottom gate region of a second conductivity type in said island below a top surface of said island and extending laterally in all directions at least to said dielectric isolation to define a bottom of said channel region;
a top gate forming a Schottky barrier with said top surface of said island and extending across said channel beyond two opposing sides of said dielectric isolation at two points onto said substrate.

---

### 5,014,109
## MINIATURIZATION OF A CONTACT HOLE IN A SEMICONDUCTOR DEVICE
**Takayoshi Higuchi, Sendai, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Aug. 1, 1989, Ser. No. 388,037**
**Claims priority, application Japan, Aug. 5, 1988, 63-194572**
**Int. Cl.$^5$ H01L** *23/48, 29/44, 29/52, 29/62*
**U.S. Cl. 357—68** **10 Claims**

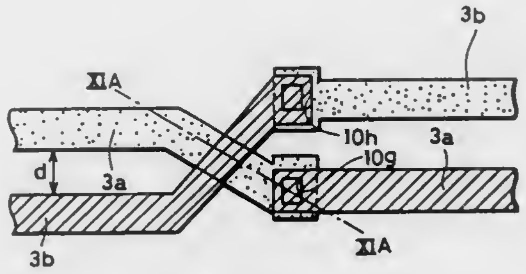


1. A semiconductor structure providing for connection between wiring layers, comprising:
a semiconductor substrate;
a first insulating layer formed on said substrate;
a first wiring layer formed on said first insulating layer;
a second insulating layer formed on said first wiring layer and having a contact hole, said contact hole being provided with a hole portion formed directly under a bottom of said contact hole, said hole portion passing through said first insulating layer and said first wiring layer and reaching said substrate;
means filling said hole portion of said contact hole for preventing said first wiring layer from contacting said semiconductor substrate; and
a second wiring layer filling said contact hole and formed on said second insulating layer and said means filling said hole portion, and connected to said first wiring layer;

wherein said contact hole serves solely to connect said first wiring layer to said second wiring layer and said means filling said hole portion of said contact hole prevents short-circuiting of the device.

---

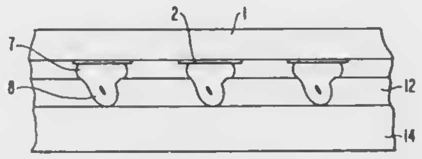
### 5,014,110
## WIRING STRUCTURES FOR SEMICONDUCTOR MEMORY DEVICE
**Shinichi Satoh, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Apr. 12, 1989, Ser. No. 337,723**
**Claims priority, application Japan, Jun. 3, 1988, 63-138003; Aug. 9, 1988, 63-199139**
**Int. Cl.$^5$ H01L** *23/48*
**U.S. Cl. 357—68** **19 Claims**



1. A semiconductor memory comprising:
a semiconductor substrate having a major surface;
word lines and bit lines intersecting each other on the major surface of said substrate, said bit lines arranged in the form of parallel bit line pairs;
memory cells arranged at intersections of said word lines and said bit lines; and
sense amplifier means for sensing voltage differentials of each bit line pair;
corresponding portions of each bit line of each bit line pair alternating laterally and being located in different planes parallel to the surface of said substrate;
the total length of said each bit line located in any one of said different planes parallel to the surface of said substrate being equal to the total length of the other bit line of said bit line pair located in the same plane of said substrate.

---

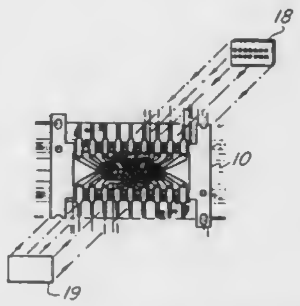
### 5,014,111
## ELECTRICAL CONTACT BUMP AND A PACKAGE PROVIDED WITH THE SAME
**Toshio Tsuda, Habikino; Yasuhiko Horio, Osaka; Yoshihiro Bessho, Kadoma, and Toru Ishida, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Dec. 2, 1988, Ser. No. 279,101**
**Claims priority, application Japan, Dec. 8, 1987, 62-309805; Jul. 25, 1988, 63-184936**
**Int. Cl.$^5$ H01L** *23/48, 29/44, 29/52, 29/60*
**U.S. Cl. 357—68** **24 Claims**



1. An electrical contact bump formed on an electrode pad formed on a substrate, comprising:
a first raised portion made of an electrically conductive material and attached to the electrode pad; and
a second raised portion formed on the first raised portion and having a cross sectional area in a plane parallel to the surface of the electrode pad smaller than that of the first raised portion in a plane parallel to the surface of the electrode pad, said second raised portion being made of the same electrically conductive material as that of said first raised portion, and the ratio of a height of said first raised portion to that of said second raised portion being in a range of $\frac{1}{2}$ to 2/1.

---

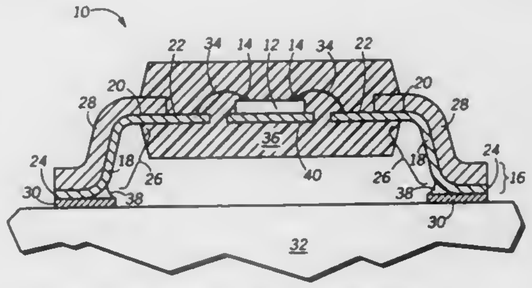
### 5,014,112
## SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING MIRROR IMAGE CIRCUIT BARS BONDED ON OPPOSITE SIDES OF A LEAD FRAME
**Tito Gelsomini, Rieti, Italy, assignor to Texas Instruments Incorporated, Dallas, Tex.**
**Continuation of Ser. No. 797,270, Nov. 12, 1985, abandoned. This application Jun. 29, 1988, Ser. No. 213,463**
**Int. Cl.$^5$ H01L** *29/52*
**U.S. Cl. 357—70** **25 Claims**



1. A semiconductor integrated circuit device comprising:
a pair of semiconductor circuit bars having active faces and having a plurality of spaced apart second level bonding pads, a plurality of spaced apart second level bonding lands and second level leads interconnecting said second level pads and second level lands formed on said active faces of said bars, the layout of said second level bonding lands on each of said bars being the same while the layout of said second level bonding pads on each of said bars are mirror images of one another such that juxtaposing said active faces of said pair of bars aligns corresponding ones of said second level bonding pads; and
a lead frame having a plurality of pins and having a plurality of frame bonding pads interconnected with corresponding respective pins, said lead frame being sandwiched between said active faces of said pair of bars with said frame pads being bonded to corresponding second level bonding pads of said pair of bars.

---

### 5,014,113
## MULTIPLE LAYER LEAD FRAME
**James J. Casto, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**
**Filed Dec. 27, 1989, Ser. No. 457,444**
**Int. Cl.$^5$ H01L** *23/48, 23/54*
**U.S. Cl. 357—70** **16 Claims**



1. A packaged electronic device comprising:

VOL 1126 ISS 1 MY 7 1991 UMI

an electronic component having a plurality of bonding pads thereon;

a multiple layer lead frame having

a first frame layer with leads having proximal ends near the electronic component, distal ends away from the electronic component and a lead body between the proximal and distal ends; and

a second frame layer bonded and electrically coupled to the first frame layer and coextensive with a majority of the distal end thereof and at least a portion of the lead body, where the second frame layer is absent from the proximal ends of the first frame layer;

electrical connections between the bonding pads of the electronic component and the proximal ends of the first frame layer; and

a package body encapsulating the electronic component, the proximal ends, and a portion of the lead body, where the distal ends extend from the package body.

---

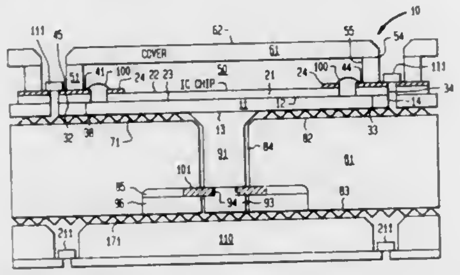
### 5,014,114
## HIGH SPEED, HIGH DENSITY SEMICONDUCTOR MEMORY PACKAGE WITH CHIP LEVEL REPAIRABILITY

**Douglas E. Heckaman, Indialantic, and Roger H. Higman, Palm Bay, both of Fla., assignors to Harris Corporation, Melbourne, Fla.**

**Filed Sep. 30, 1988, Ser. No. 251,886**

**Int. Cl.⁵ H01L** *39/02, 23/48;* **HO1K** *7/20*

**U.S. Cl. 357—74** **30 Claims**



1. An arrangement for packaging a plurality of circuit modules comprising:

a thermally and electrically conductive support member having a plurality of attachment locations through which a plurality of said circuit modules may be retained in electrical and thermal communication with said support member;

each circuit module comprising a first surface upon a first portion of which is disposed an integrated circuit chip, and a plurality of electrical connection regions distributed along second, edge portions of said first surface of said module, and an arrangement of electrical interconnection links interconnecting electrical connection locations of said chip and said electrical connection regions, and means for attaching a second surface of said module, spaced apart from said first surface thereof, to a respective attachment location of said support member, such that said second surface of said module is in electrical and thermal communication with said support member; and wherein

a plurality of said modules are attached to respective attachment locations of said support member, so as to be disposed adjacent to one another with the electrical connection regions thereof being aligned with one another in edge-to-edge relationship; and

electrical interconnect links, unsupported by said support member and being spaced apart from said support member by said circuit module therebetween, but being supported by and joining electrical connection regions of adjacent modules that are aligned with one another in said edge-to-edge relationship.

---

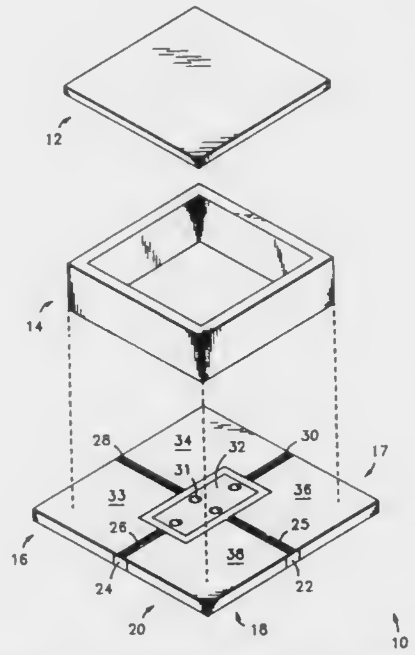
### 5,014,115
## COPLANAR WAVEGUIDE SEMICONDUCTOR PACKAGE

**Lester J. Moser, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 121,720, Nov. 16, 1987, abandoned. This application Mar. 23, 1990, Ser. No. 501,388**

**Int. Cl.⁵ H01L** *23/12, 23/14, 23/48*

**U.S. Cl. 357—74** **21 Claims**



1. A coplanar waveguide package for a semiconductor device which package is suitable for abutting against an adjacent coplanar waveguide structure having an edge with a predetermined shape so that electrical connection can be made therewith and so that the resulting structure takes up a minimal amount of space, the coplanar waveguide package including in combination:

base means having a first surface, a second surface and at least one edge having a shape adapted for abutting against the edge of the adjacent coplanar waveguide structure;

first conductive means provided on said first surface of said base means, said first conductive means adapted to extend to but not overlap said at least one edge, said first conductive means thereby being adapted to facilitate electrical contact with the adjacent coplanar waveguide structure;

first ground plane means also provided on said first surface of said base means, said first ground plane means being coplanar with and adjacent said first conductive means, said ground plane means and said first conductive means providing a coplanar waveguide means;

semiconductor die means coupled to said first conductive means;

semiconductor die pad means provided on said first surface of said base means, said semiconductor die pad means being adapted to receive said semiconductor die means;

frame means affixed to said base means and surrounding said semiconductor die means and said semiconductor die pad means;

cover means covering said frame means and said semiconductor die means and said semiconductor die pad means, said cover means being adapted to be affixed to said frame means; and

said base means and said frame means and said cover means being adapted to enclose and protect said semiconductor die means.

### 5,014,116
## COLOR TELEVISION SYSTEM

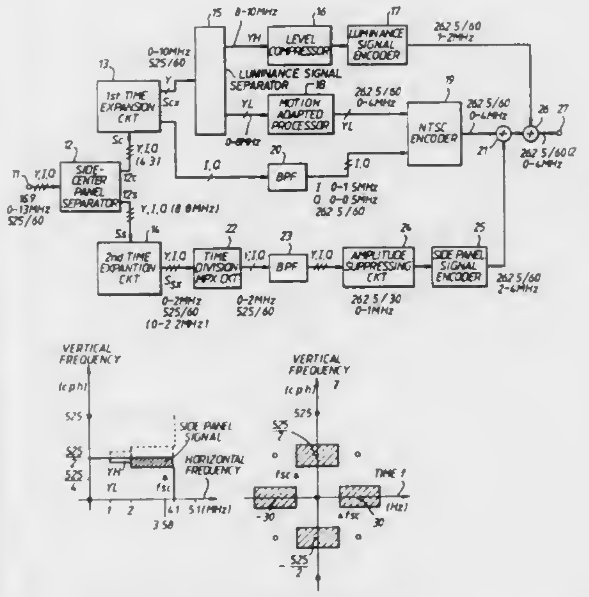
**Kiyoyuki Kawai, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Mar. 10, 1989, Ser. No. 321,120**

**Claims priority, application Japan, Mar. 10, 1988, 63-56848; Mar. 10, 1988, 63-56850**

**Int. Cl.⁵ H04N** *11/14, 11/06*

**U.S. Cl. 358—12** **4 Claims**



1. A color television system comprising:

means for generating a wide aspect ratio screen color television signal with a predetermined two-dimensional frequency band;

means for separating the color television signal into at least a first television signal relating to a relatively narrow aspect ratio and a second television signal relating to an excess portion thereover, said first television signal having a high frequency region and a low frequency region and said second television signal having a high frequency region and a low frequency region;

means for eliminating a prescribed portion of said high frequency region of the two-dimensional frequency band of the first television signal to obtain a resulting signal;

means for time expanding both the high and low frequency regions of the second television signal;

means for suppressing the frequency band of both the high and low frequency regions of the second television signal;

means for multiplexing the suppressed second television signal onto the two-dimensional resulting signal and low frequency region of said first television signal; and

means for motion adapted processing of the low frequency region of the first television signal.

---

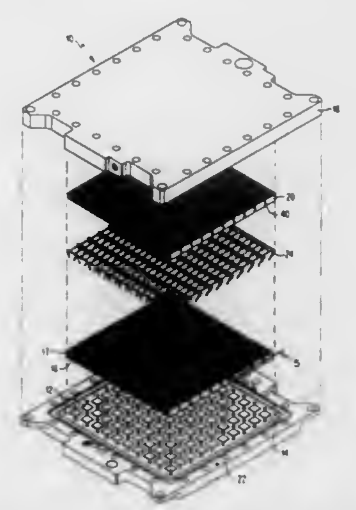
### 5,014,117
## HIGH CONDUCTION FLEXIBLE FIN COOLING MODULE

**Joseph L. Horvath, Poughkeepsie; Robert G. Biskeborn, Pawling, and Carl Yakubowski, Hyde Park, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 30, 1990, Ser. No. 503,503**

**Int. Cl.⁵ F28F** *5/00, 7/00*

**U.S. Cl. 357—81** **35 Claims**



1. An apparatus for removing heat from a heat generating device comprising:

at least one heat conductive thermal device insert comprising a base having at least one first fin on a first surface and a second surface which is flat;

a second heat conductive thermal device having a plurality of second fins;

said at least one first fin being interspersed and overlapped with said second fins;

wherein at least one of said first and second fins is of a thermally conductive, flexible material so that a gap otherwise existing between said overlapped and interspersed fins is eliminated over at least a portion of said overlap and wherein at least a portion of said first and second fins are biased against one another.

---

### 5,014,118
## LUMINANCE SIGNAL PROCESSING CIRCUIT USING 3 LINE LOGICAL COMB FILTER

**Mitsuzou Shirai, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Jun. 29, 1990, Ser. No. 545,750**

**Claims priority, application Japan, Jun. 30, 1989, 1-170319**

**Int. Cl.⁵ H04N** *9/78*

**U.S. Cl. 358—31** **7 Claims**

1. A luminance signal processing circuit comprising:

means ($T_1$) for providing a color video signal including a luminance signal and a chrominance signal during recording,

means ($T_4$) for providing a reproduced luminance signal during reproduction,

logical comb filter means, said logical comb filer means including

a first input terminal ($I_1$),

a first filter means (20) for extracting the signal components of the chrominance signal band from the input signal applied to said first input terminal,

a first 1 H delay means (15) for delaying said input signal by 1 horizontal period,

a second filter means (21) for extracting the signal compo-

VOL
1126
ISS
1
MY
7
1991
UMI

nents of the chrominance signal band from the output of said first 1 H delay means,

a second 1 H delay means (**18**) for delaying the output of said first 1 H delay means by 1 horizontal period,

a third filter means (**22**) for extracting the signal components of the chrominance signal band from the output of said second 1 H delay means,

vertical correlator means (**23**) for providing the chrominance signal components having the comb type frequency characteristic by logically processing the outputs of said first, second, and third filter means, and

a first subtraction means (**27**) for subtracting the output of said vertical correlator means from the output of said first 1 H delay means,

signal processing means forming a non-correlation component enhancement circuit during recording, and a line correlation noise reduction circuit during reproduction, said signal processing means including

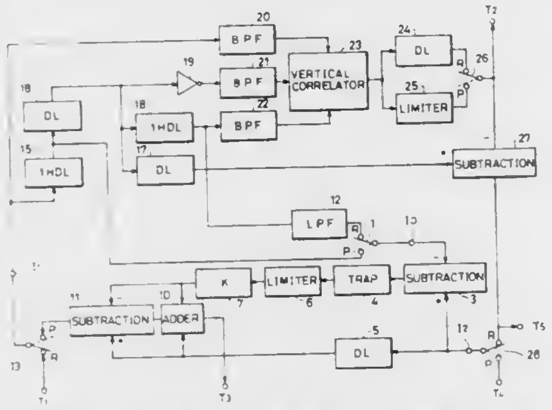
a second input terminal ($I_2$),

a delay input terminal ($I_D$),

a second subtraction means (**3**) for subtracting the signal applied to said delay input terminal from the signal applied to said second input terminal,

a first limiter means (**6**) for controlling the amplitude of the output of said second subtraction means, and

operation means (**10, 11**) for adding the output of said first limiter means to the signal applied to said second input terminal during recording, and for subtracting the output of said first limiter means from the signal applied to said second input terminal during reproduction,



a first switching means (**13**) switching so as to select said color video signal during recording and the subtraction output of said operation means (**11**) during reproduction, to apply to said first input terminal ($I_1$) of said logical comb filter means,

a second switching means (**28**) switching so as to select the output of said first subtraction means (**27**) during recording and said reproduced luminance signal during reproduction, to apply said second input terminal ($I_2$) of said signal processing means,

a third switching means (**1**) switching so as to select the output of said second 1 H delay means during recording and the output of said first 1 H delay means during reproduction, to apply to said delay input terminal ($I_D$) of said signal processing means,

means ($T_2$) for providing the output of said vertical correlator means (**23**) as the chrominance signal during recording,

means ($T_3$) for providing the addition output of said operation means (**10**) as the luminance signal during recording, and

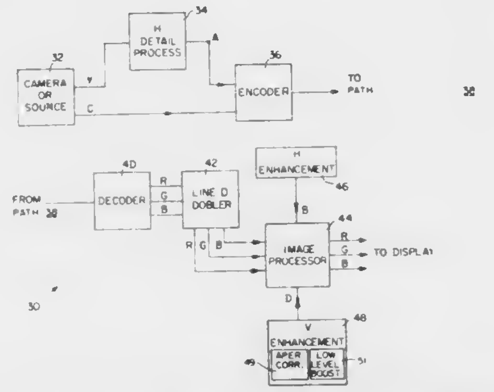
means ($T_5$) for providing the output of said first subtraction means (**27**) as the luminance signal during reproduction.

### 5,014,119
## HORIZONTAL AND VERTICAL TRANSITION LEVEL ENHANCEMENT WITHIN TELEVISION SYSTEM

**Yves C. Faroudja, 26595 Anacapa Dr., Los Altos Hills, Calif. 94022**

**Filed Aug. 25, 1989, Ser. No. 398,786**
**Int. Cl.$^5$ H04N** *9/64*

**U.S. Cl. 358—37** **5 Claims**



1. Apparatus for providing cooperative horizontal enhancements and a vertical enhancement to a television video image signal passing through a system including a video source, a degrading path such as transmission or recording, and a display, without using a pilot tone, the apparatus including:

horizontal domain low transition level detail processor means connected between the video source and the degrading path for enhancing horizontal transitions below about 40 IRE units in accordance with a predetermined low level detail enhancement curve prior to passage of the signal through the degrading path,

line doubler means between the degrading path and an image processor means for doubling the number of scan lines within the signal,

the image processor means for processing the doubled number of scan lines and for delivering said processed lines to the display,

horizontal domain large transition level enhancement processor means connected to the image processor means for enhancement horizontal transitions above about 20 IRE units following passage of the signal through the degrading path in accordance with a predetermined large level enhancement curve which is substantially complementary to the enhancement curve followed by the horizontal domain low transition level detail processor means so that a resultant overall horizontal domain signal enhancement is substantially constant for all horizontal domain signal levels, and

vertical domain transition enhancement processor means connected to the image processor means for performing at least one of vertical domain aperture correction and low level boost enhancement upon the doubled scan lines.

---

### 5,014,120
## METHOD FOR PROCESSING PICTURE TO BE REPRODUCED ON COLOR PICTURE TUBE AND PROCESSOR THEREFOR

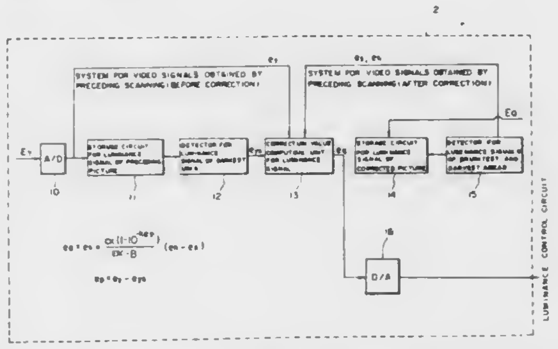
**Takashi Numakura, and Iwao Numakura, both of Tokyo, Japan, assignors to Yamatoya & Co., Ltd., Tokyo, Japan**

**Filed Jul. 10, 1989, Ser. No. 377,449**
**Claims priority, application Japan, Jul. 15, 1988, 63-175081**
**Int. Cl.$^5$ H04N** *9/64*

**U.S. Cl. 358—39** **5 Claims**

1. A method for processing a first picture to be reproduced on a color picture tube, which comprises:

(i) subtracting a value $e_{ys}$ of a luminance signal for a shadow S of a second picture, which has been obtained from a preceding scanning operation, from a value $e_y$ of a luminance signal for a desired pixel P out of video signals received, to thereby determine a value $e_p$ of a base luminance signal;


2
SYSTEM FOR VIDEO SIGNALS OBTAINED BY PRECEDING SCANNING (BEFORE CORRECTION)
SYSTEM FOR VIDEO SIGNALS OBTAINED BY PRECEDING SCANNING (AFTER CORRECTION)
Ey
A/D
Eo
D/A
10
11
12
13
14
15
16
LUMINANCE CONTROL CIRCUIT

(ii) setting luminance signal values $e_s$ and $e_h$ respectively for a shadow S and a highlight H among pixels of the first picture to be reproduced on the color picture tube;

(iii) determining a value $e_q$ of a luminance signal for the pixel P from the signal values $e_p$, $e_s$ and $e_h$ in accordance with the following correction formula:

$$e_q = e_s + \frac{\alpha(1 - 10^{-ke_p})}{\alpha - \beta}(e_h - e_s)$$

wherein k, $\alpha$ and $\beta$ are factors for contrast adjustment and k and $\beta$ are correlated as follows:

$$K = \gamma/(e_h - e_s)$$

$$\beta = 10^{-\gamma}$$

$\gamma$ = desired factor; and

(iv) adjusting the luminance for each pixel, which is to be reproduced on the color picture tube, in accordance with the value $e_q$ of the corresponding luminance signal thus determined.

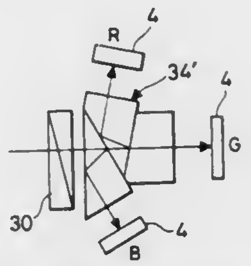
---

### 5,014,121
## HIGH IMAGE RESOLUTION IMAGE PICKUP SYSTEM WITH COLOR DISPERSION MEANS

**Akira Hasegawa; Susumu Takahashi, both of Hachiouji; Koyoshi Tsuji, Tanashi; Kimihiko Nishioka, Hachiouji, and Hiroshi Matsui, Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 35,013, Apr. 6, 1987, Pat. No. 4,882,619.**
**This application Aug. 21, 1989, Ser. No. 396,223**
**Claims priority, application Japan, Apr. 7, 1986, 61-79421; Apr. 25, 1986, 61-96554**
**Int. Cl.$^5$ H04N** *9/097*

**U.S. Cl. 358—55** **31 Claims**



1. A high resolution image pickup system with color dispersion means comprising:

illuminating means capable of sequentially irradiating three kinds of color lights different from each other onto an object under observation;

an objective lens system forming images of said object with said color lights coming from said object irradiated by said illuminating means;

a three-color separating optical system having light-emitting ends and being disposed to receive the images of said object formed by said objective lens system and separate the images for individual colors so as to emanate therefrom via said ends;

three solid-state image sensors disposed to face light-emitting ends, respectively, of said three-color separating optical system so that each of the ends receives one color image; and

signal processing means producing a color image of said object based on electric signals supplied from said image sensors, wherein:

color dispersion means is disposed between said objective lens system and said three-color separating optical system to thereby shift a position of incidence of said color image on each of said solid-state image sensors.

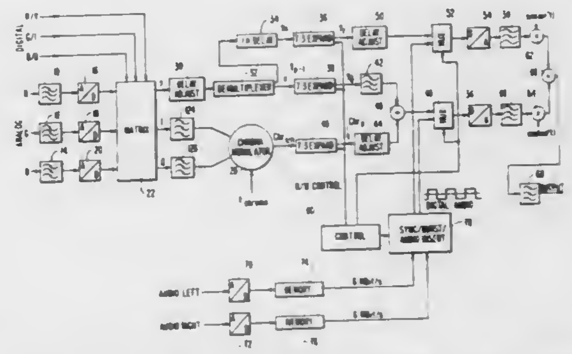
---

### 5,014,122
## METHOD AND APPARATUS FOR ENCODING AND TRANSMISSION OF VIDEO SIGNALS

**Detlev Otto, Knoxville, Tenn., assignor to North American Philips Corporation, New York, N.Y.**

**Filed Jul. 7, 1989, Ser. No. 377,365**
**Int. Cl.$^5$ H04N** *11/00, 11/08*

**U.S. Cl. 358—12** **5 Claims**



1. A method for encoding and transmitting video signals, said video signals comprising consecutively arranged scanning lines forming a picture frame, said scanning lines having an active video portion having a time duration less than the time duration of said scanning line, and said active video portion including a luminance component and at least one chrominance component, said method comprising the steps:

separating said video signals into consecutive base intervals, each base interval having a predetermined time duration, wherein said base intervals comprise said scanning lines and said predetermined time duration comprises the time duration of each of said scanning lines;

time delaying every other one of said base intervals for said predetermined time duration whereby consecutive pairs of said base intervals are available in parallel;

suppressing said chrominance component in respective ones of said base intervals in said consecutive pares of base intervals;

time expanding by a factor of two each of said consecutive pairs of base intervals thereby reducing the bandwidth of said base intervals by one-half, said time expanding of said base intervals being performed by time expanding by a factor of 7:3 said active video portion of each of said scanning lines; and

amplitude modulating in quadrature the base intervals in each of said time expanded consecutive pairs of base

VOL
1126
ISS
1
MY
7
1991
UMI

intervals onto a carrier having a frequency located in a transmission band.

---

### 5,014,123
## FILM IMAGE READING SYSTEM

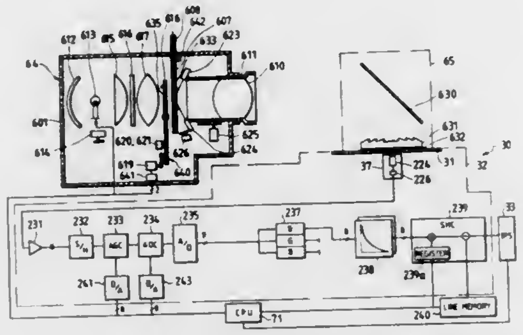
**Yosbiya Imoto, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Filed Oct. 27, 1989, Ser. No. 427,371**

**Claims priority, application Japan, Nov. 25, 1988, 63-299359**

**Int. Cl.$^5$ H04N** *1/46*

**U.S. Cl. 358—75** **13 Claims**



1. A film image reading system for reading an image recorded on an original sheet film, the image having a density and the original sheet having a deviation of density, comprising:

- a projector means for projecting said image recorded on said original sheet film; and
- a film image reading body having an imaging unit means for reading said projected image and for photo-electrically converting said image into an image signal corresponding to said density of said image, an amplifier means for amplifying said image signal in accordance with a gain of said amplifier means, and a gain control circuit means for controlling the gain of said amplifier in accordance with said deviation of density of said original sheet film.

---

### 5,014,124
## DIGITAL IMAGE PROCESSING APPARATUS

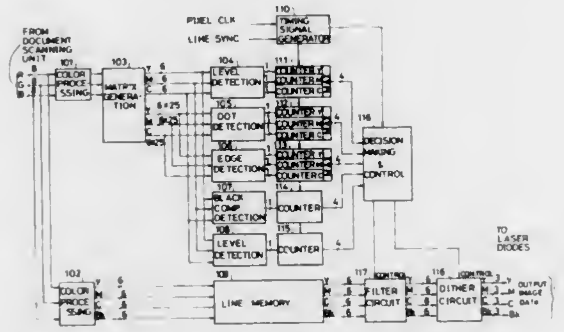
**Tetsuo Fujisawa, Urawa, Japan, assignor to Ricoh Company, Ltd., Japan**

**Filed Feb. 23, 1989, Ser. No. 314,637**

**Claims priority, application Japan, Feb. 25, 1988, 63-40612; Feb. 29, 1988, 63-47097; Jun. 14, 1988, 63-144785; Oct. 12, 1988, 63-254818**

**Int. Cl.$^5$ H04N** *1/46;* **G03F** *3/08*

**U.S. Cl. 358—75** **8 Claims**



1. A digital image processing apparatus comprising:

- dividing means for dividing digital input image data of an image into a plurality of blocks, each of said blocks defining an area having a predetermined size and pixel data forming said image;
- edge detecting means, coupled to said dividing means, for detecting an edge of said image for every pixel of each of said blocks and for outputting a first signal when the edge of said image is detected;
- dot image detecting means, coupled to said dividing means, for detecting pixel data forming a dot image contained in said image for every pixel of each of said blocks and for outputting a second signal when said pixel data forming the dot image is detected;
- level detecting means, coupled to said dividing means, for detecting pixel data forming a continuous image portion of said image for every pixel of each of said blocks and for outputting a third signal when said pixel data forming the continuous image portion is detected;
- counter means, coupled to said dividing means, said edge detecting means, said dot image detecting means and said level detecting means, for respectively counting said first signal, said second signal and said third signal and for outputting a control signal based on results of counting said first signal, said second signal and said third signal;
- image processing means, coupled to said counter means, for providing a plurality of different edge emphasizing processes, a plurality of different smoothing processes and a plurality of different dither processes; and
- control means, coupled to said counter means and said image processing means, for selecting one of said different emphasizing processes, one of said different smoothing processes and one of said different dither processes on the basis of said control signal output by said counter means and for subjecting said digital input image data to said one of said different emphasizing processes, said one of said different smooth processes and said one of said different dither processes.

---

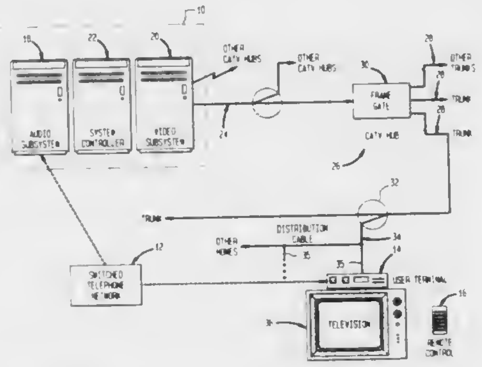
### 5,014,125
## TELEVISION SYSTEM FOR THE INTERACTIVE DISTRIBUTION OF SELECTABLE VIDEO PRESENTATIONS

**Terrence H. Pocock, Delaware; Rick McNorgan, London; Peter Coumons, London, and Allan Lodberg, London, all of Canada, assignors to Cableshare, Inc., London, Canada**

**Filed May 5, 1989, Ser. No. 347,732**

**Int. Cl.$^5$ H04N** *7/10*

**U.S. Cl. 358—86** **56 Claims**



2. An interactive television system, comprising a centrally located presentation system for transmitting video presentations via a television distribution network over at least one channel on said network, where each presentation includes a plurality of individual images and an optional audio segment, and a plurality of remotely located terminals for receiving the video presentations transmitted over said network and for transmitting information to said presentation system via telephone lines designating desired presentations to be transmitted, said presentation system comprising:

- a storage system for storing, in digital form, individual images and audio segments;
- an audio system for receiving the information transmitted from said remote terminals via the telephone lines and for receiving audio segments from said storage system and transmitting said audio segments to the remote terminals via said telephone lines;
- a video system including means for retrieving individual images stored in said storage system, means for encoding each image with an identification code, and means for transmitting said encoded images via said network; and
- means responsive to the information received by said audio system for controlling said audio system and said video system to retrieve selected audio segments and images, respectively, from said storage system and to transmit the retrieved segments and images to designated terminals;

each of said remote terminals comprising:

- means for receiving television signals transmitted via said network;
- means for examining video images transmitted over said one channel to determine whether they are encoded with a designated identification code and for storing individual images encoded with said designated identification code;
- means for retrieving an image stored in said storing means at a standard television frame rate and forming a continuous, still-frame, video signal;
- means for connecting said terminal to a telephone line;
- means for transmitting information to said presentation system via the telephone line in response to viewer commands, including a telephone interface circuit which automatically dials a telephone number associated with the presentation system in response to a viewer command to thereby establish a telephone connection with said presentation system, and means responsive to the establishment of said telephone connection for transmitting, to the presentation system, a transmission path identification which defines a particular transmission path in said network for transmitting video information from said presentation system to the remote terminal;
- means for receiving audio segments transmitted via the telephone lines from said presentation system; and
- means for combining said continuous, still-frame, video signal with received audio segments to form a composite television signal for presentation to a television receiver.

---

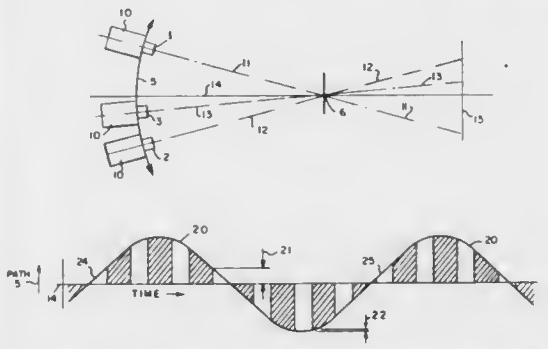
### 5,014,126
## METHOD AND APPARATUS FOR RECORDING IMAGES WITH A SINGLE IMAGE RECEIVER FOR AUTOSTEREOSCOPIC DISPLAY

**Eric K. Pritchard, Berkley Springs, W. Va., and Christopher A. Mayhew, McLean, Va., assignors to Vision III Imaging, Inc., McLean, Va.**

**Filed Oct. 23, 1989, Ser. No. 425,232**

**Int. Cl.$^5$ H04N** *13/00*

**U.S. Cl. 358—91** **42 Claims**



1. A method of recording images for a time sequence autostereoscopic display of a scene, comprising:

- choosing a convergence point; and
- recording, using a single image receiver, a plurality of scanning images, greater than two per scanning cycle for a plurality of scanning cycles, as viewed along an optical axis substantially intersecting said convergent point and along a scanning path which is approximately a constant optical distance from said convergence point.

---

### 5,014,127
## METHOD OF GENERATING A SERIES OF DPCM CODE WORDS, METHOD OF STORING COLOR IMAGE DATA, OPTICAL DISC WHEREON IMAGE DATA ARE STORED, AND DISPLAY APPARATUS

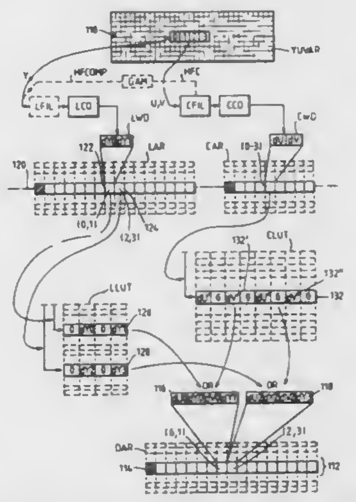
**Norman D. Richards, Horsham, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 12, 1990, Ser. No. 509,682**

**Claims priority, application United Kingdom, Apr. 14, 1989, 8908442**

**Int. Cl.$^5$ H04N** *11/04*

**U.S. Cl. 358—133** **20 Claims**



1. A method of generating in a display apparatus a series of differential pulse code modulation (DPCM) code words of a standard format, each standard code word of the series comprising a plurality of delta codes including at least one standard luminance delta code and one standard chrominance delta code defining, by reference to a standard set or respective standard sets of differential values, respective luminance and chrominance values for one or more of a corresponding series of pixels forming one line of a colour image at a display luminance resolution and a display chrominance resolution respectively, the method comprising the steps of:

- (a) receiving from an image source at a source resolution luminance and chrominance values for a source series of pixels forming a line of a source image;
- (b) differentially encoding at a first resolution the luminance values of the source series of pixels using a first predetermined (luminance) set of quantisation levels to generate a first series of code words comprising delta codes representing only luminance values, the first resolution being equal, in a line scan ("horizontal") direction, to the display luminance resolution divided by a first integer factor $H_L$ (one or greater);
- (c) differentially encoding at a second resolution at least one chrominance value for each pixel of the source series of pixels using a second (chrominance) predetermined set of quantisation levels to generate a second series of code words comprising delta codes representing only chrominance values the second resolution being equal, in the horizontal direction, to the display chrominance resolution divided by a second integer factor $H_C$, $H_C$ being greater than $H_L$; the method further comprising performing, within the display apparatus, the steps of:
- (d) receiving via a data channel the first and second series of codes generated in the steps (b) and (c);
- (e) generating from the first (luminance) series of code

VOL
1126
ISS
1
MY
7
1991
UMI

words received via the data channel, and from information stored in the display apparatus defining the first resolution in terms of the display luminance resolution and the first set of quantisation levels in terms of the or the respective standard set of differential values, a series of standard luminance delta codes defining luminance values for a series of pixels at the display luminance resolution;

(f) generating from the second (chrominance) series of code words received via the data channel, and from information stored in the display apparatus defining the second resolution in terms of the display chrominance resolution and the second set of quantisation levels in terms of the or the respective set or sets of differential values, a series of standard chrominance delta codes defining chrominance values for a series of pixels at the display chrominance resolution; and

(g) combining the generated standard luminance delta codes with the generated standard chrominance delta codes to generate the said series of standard code words.

---

### 5,014,128

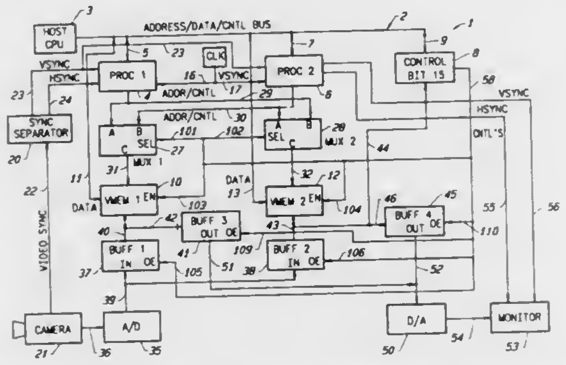
## VIDEO INTERFACE CIRCUIT FOR DISPLAYING CAPTURING AND MIXING A LIVE VIDEO IMAGE WITH COMPUTER GRAPHICS ON A VIDEO MONITOR

**Ben W. Chen, Fremont, Calif., assignor to Atronics International Inc., Milpitas, Calif.**

**Filed Apr. 24, 1989, Ser. No. 342,740**

**Int. Cl.$^5$ H04N *5/14***

**U.S. Cl. 358—160** **12 Claims**



1. A video interface circuit for displaying a video camera image on a video monitor comprising:

a first and a second video memory;

a first and a second processor adapted to receive signals from a central processing unit;

means for storing data corresponding to video signals from a video camera in said first video memory under the control of said first processor during a first time period;

means for transferring data from said second video memory for displaying a video image thereof on a video monitor under the control of said second processor during said first time period;

means for storing data corresponding to video signals from said video camera in said second video memory under the control of said first processor during a second time period; and

means for transferring data from said first video memory for displaying a video image thereof on said video monitor under the control of said second processor during said second time period.

---

### 5,014,129

## VIDEO SIGNAL PROCESSING APPARATUS FOR CONVERTING COMPOSITE IMAGE INPUT SIGNALS INTO OUTPUT SIGNALS HAVING INCREASED SCAN LINES

**Yasuo Imanishi, Hino, Japan, assignor to Yokogawa Medical Systems, Limited, Tokyo, Japan**

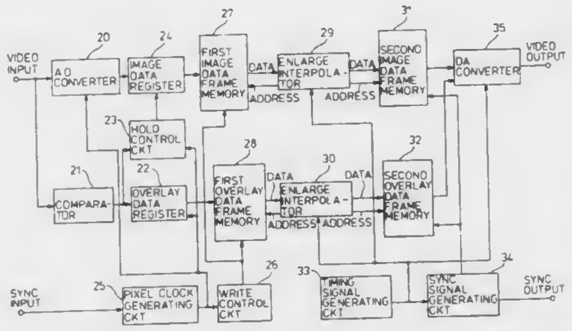
**PCT No. PCT/JP88/00326, § 371 Date Sep. 21, 1989, § 102(e) Date Sep. 21, 1989, PCT Pub. No. WO88/07726, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 30, 1988, Ser. No. 415,276**

**Claims priority, application Japan, Mar. 31, 1987, 62-78402**

**Int. Cl.$^5$ H04N *5/14***

**U.S. Cl. 358—166** **4 Claims**


VIDEO INPUT
AD CONVERTER
IMAGE DATA REGISTER
FIRST IMAGE DATA FRAME MEMORY
DATA
ENLARGE INTERPOLATOR
ADDRESS
SECOND IMAGE DATA FRAME MEMORY
DA CONVERTER
VIDEO OUTPUT
HOLD CONTROL CKT
COMPARATOR
OVERLAY DATA REGISTER
FIRST OVERLAY DATA FRAME MEMORY
SECOND OVERLAY DATA FRAME MEMORY
SYNC INPUT
PIXEL CLOCK GENERATING CKT
WRITE CONTROL CKT
TIMING SIGNAL GENERATING CKT
SYNC SIGNAL GENERATING CKT
SYNC OUTPUT

1. A video signal processing apparatus for converting an input analog video signal, whose number of scanning lines is given, including a variable-density image signal and a two-state image signal overlaid on the variable-density image signal into an output analog video signal whose number of scanning lines is larger than that of the input analog video signal, comprising

variable-density image signal extracting means for extracting the variable-density image signal from the input analog video signal, a portion of the extracted variable-density image signal corresponding to the two-state image signal being replaced with a variable-density image signal portion immediately before the beginning of the two-state image signal,

two-state image signal extracting means for extracting the two-state image signal from the input analog video signal,

first memory means for storing the output signal, corresponding to at least one frame, of the variable-density image signal extracting means and the output signal, corresponding to at least one frame, of the two-state image signal extracting means in the form of digital image data,

variable-density image data enlarge-interpolating means for performing an enlarge interpolation processing on the variable-density image data stored in the first memory means to generate variable-density image data whose number of scanning lines is larger than the corresponding stored image,

two-state image data enlarge-interpolating means for performing an enlarge interpolation processing on the two-state image data stored in the first memory means to generate two-state image data whose number of scanning lines is larger than the corresponding stored image,

second memory means for storing the output data, corresponding to at least one frame, of the variable-density image data enlarge-interpolating means and the output data, corresponding to at least one frame, of the two-state image data enlarge-interpolating means, and

analog video data output means for concurrently reading out the variable-density image data and the two-state image data stored in the second memory means and combining these read-out data to provide the output analog video signal.

---

### 5,014,130

## SIGNAL LEVEL CONTROL CIRCUIT HAVING ALTERNATELY SWITCHED CAPACITORS IN THE FEEDBACK BRANCH

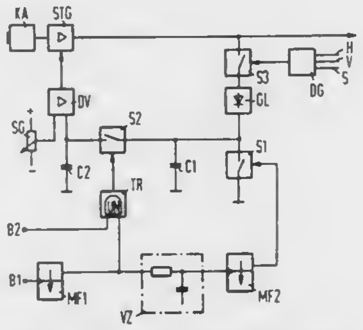
**Heinz Heister, Karlsruhe, and Wolfango Jann, Buckenhof, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jul. 24, 1990, Ser. No. 557,532**

**Claims priority, application Fed. Rep. of Germany, Jul. 31, 1989, 3925329**

**Int. Cl.$^5$ H04N *5/18***

**U.S. Cl. 358—173** **4 Claims**



1. An amplitude controlling circuit for video signals output on a video signal path, the video signals providing image frequency pulses during a frame flyback sequence, comprising:

(a) a first control device coupled in line with the video signal path and having a video signal output;

(b) a second control device providing an actual value of an input signal to said first device, the input signal being derived from the video signal output;

(c) a first capacitor charged by the video signal;

(d) a first switch coupled in parallel with the first capacitor;

(e) a second capacitor having a charging voltage substantially equal to the actual value of the input signal;

(f) a second switch coupled in series between the first and second capacitors wherein at least two consecutive control pulses are generated from the image frequency pulses, the first of said control pulses closing the second switch while the first switch is open and the second of said control pulses closing the first switch while the second switch is open.

---

### 5,014,131

## VECTOR FILTER FOR OPTICAL MOVING TARGET DETECTION

**Irving S. Reed, Santa Monica; Irving Sperling, Costa Mesa, and William A. Bundy, Redondo Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Aug. 27, 1981, Ser. No. 296,658**

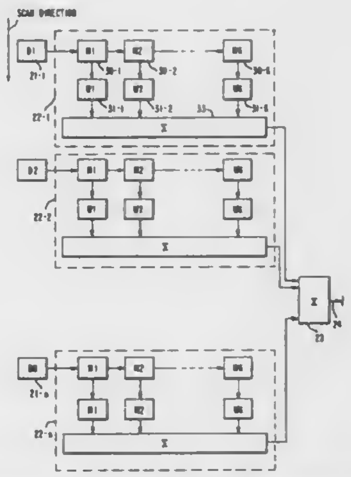
**Int. Cl.$^5$ H04N *3/12;* H01J *40/14***

**U.S. Cl. 358—212** **8 Claims**

1. A signal processing arrangement comprising:

a plurality of detector elements which view an image scene;

a plurality of transversal filters coupled to said plurality of detector elements in one-to-one correspondence therewith for amplitude weighting output signals provided thereby as a function of time, each of said transversal filters having a predetermined impulse response which is different from those of each of said other transversal filters; and



summing means coupled to each of said transversal filters for combining output signals provided thereby to provide a single output signal of said arrangement.

---

### 5,014,132

## CCD IMAGER

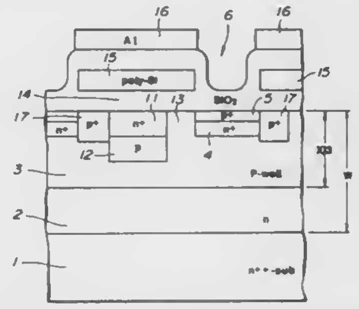
**Tetsuro Kumesawa, Kanagawa; Yasuo Kanou; Osamu Nishima, both of Tokyo; Masaaki Isobe, and Hiromichi Matsui, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jul. 21, 1989, Ser. No. 383,179**

**Claims priority, application Japan, Jul. 30, 1988, 63-191470**

**Int. Cl.$^5$ H04N *3/14***

**U.S. Cl. 358—213.19** **6 Claims**



1. A CCD imager for outputting an image information comprising:

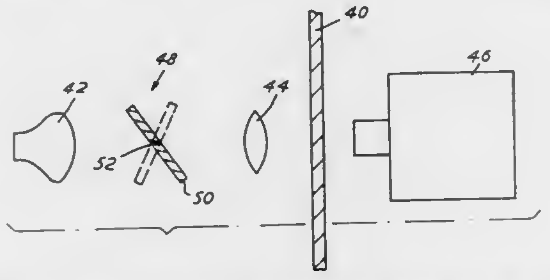
a plurality of light receiving sections each including a semiconductor surface region of a second conductivity type, a first semiconductor region of a first conductivity type, a semiconductor region of said second conductivity type and a second semiconductor region of said first conductivity type, in this sequence, when seen from the surface along the depth thereof,

said second semiconductor region consisting of a low concentration semiconductor region of said first conductivity type on the bottom side of said semiconductor region of said second conductivity type and a high concentration semiconductor region of said first conductivity type on the bottom side of said low concentration semiconductor region.

VOL 1126
ISS 1
MY 7 1991
UMI

### 5,014,133
### TELECINE WITH IMPROVED BLEMISH CONCEALMENT

**Ronald W. J. Mumford, Hitchin, United Kingdom, assignor to Rank Cintel Limited, England**
**Continuation of Ser. No. 157,327, Feb. 17, 1988, abandoned. This application Oct. 27, 1989, Ser. No. 428,115**
**Claims priority, application United Kingdom, Mar. 6, 1987, 8705336**
**Int. Cl.$^5$ H04N** *3/30, 5/335, 9/04, 9/07*
**U.S. Cl. 358—214** **13 Claims**

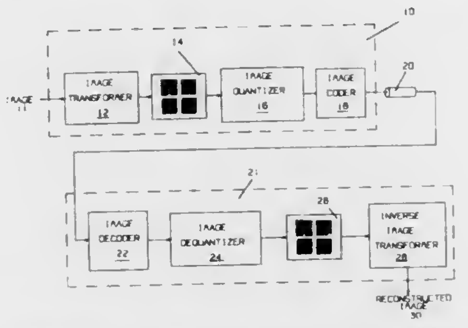


4. Apparatus for use in converting an image into an electronic video signal, the apparatus comprising:
- CRT scanning means having a screen;
- a film gate;
- an objective lens for focussing light from the CRT scanning means onto said film gate; and
- deflection means disposed in the light path between said CRT scanning means and said objective lens; said deflection means being operable to sequentially deflect light from respective ones of a plurality of different areas of the screen of the CRT scanning means along the same path into the objective lens;
- photosensitive means for receiving said sequentially deflected light and for generating successive output signals as a function thereof; and
- recursive filter storage means for combining said successive output signals.

---

### 5,014,134
### IMAGE COMPRESSION METHOD AND APPARATUS

**Wayne M. Lawton, Somerville, Mass.; John C. Huffman, Windham, N.H., and William R. Zettler, Jr., Brookline, Mass., assignors to Aware, Inc., Cambridge, Mass.**
**Filed Sep. 11, 1989, Ser. No. 405,469**
**Int. Cl.$^5$ H04N** *1/419*
**U.S. Cl. 358—261.3** **11 Claims**



1. An apparatus for compressing an image comprising a two dimensional array of pixels organized as a plurality of rows and columns, said apparatus comprising:
- means for transforming said image to form a plurality of component images, said component images representing different spatial frequency components of said image and comprising two dimensional arrays of pixels; and
- quantizer means for assigning integer values to the pixels of said component images,

wherein said transforming means comprises means for generating two vectors, $y_L$ and $y_H$, from a linear array, x(i), of M pixels, and wherein $y_L$ and $y_H$ have components defined by

$$y_L(m) = \sum_{k=0}^{N-1} a(k)x(2m - N + k)$$

$$y_H(m) = \sum_{k=0}^{N-1} a(k)\,(-1)^{k+1}x(2m + 1 - k)$$

and wherein the a(k) satisfy the conditions

$$\sum_{i=0}^{N-1} a^2(i) = 1$$

and

$$\sum_{i=0}^{N-1} a(i)a(i + k) = 0 \text{ for } k \text{ equal to any non-zero even integer}$$

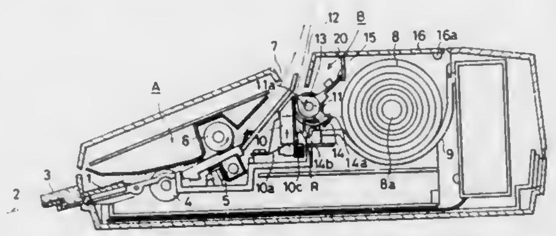
wherein $a(k)=0$ for $k<0$ or $k>(N-1)$ and N is an even number greater than 4 and less than 30, and

$$\sum_{i=0}^{N-1} a(i) = \sqrt{2}\ .$$

---

### 5,014,135
### FACSIMILE APPARATUS HAVING A THERMAL IMAGE RECORDING HEAD RETRACTABLE FROM A RECORDING POSITION

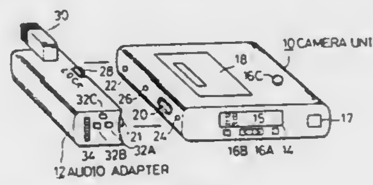
**Kazuya Ijuin, Tokyo; Shinnichiro Otsuki, Yokohama; Yuji Nakano, Yokosuka, and Hiroshi Ogushi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 201,163, Jun. 2, 1988, abandoned. This application Jul. 5, 1990, Ser. No. 547,335**
**Claims priority, application Japan, Jun. 12, 1987, 62-89676; Jun. 12, 1987, 62-145200**
**Int. Cl.$^5$ H04N** *1/23;* **B41J** *2/32;* **G01D** *15/10*
**U.S. Cl. 358—296** **36 Claims**



1. An image recording apparatus for recording an image onto a medium to be recorded, comprising:
- a recording head for recording the image onto said medium to be recorded, said recording head moveable between a recording position for recording and a retracted position retracted from said recording position;
- a rotary member for conveying the medium to be recorded;
- a guide member for guiding the medium to be recorded along the peripheral surface of said rotary member;
- means for supporting said guide member in such a manner that said guide member is movable between an inserting position for inserting said recording medium by hand between said rotary member and said guide member and a guiding position for guiding said recording medium to record; and
- means for displacing the recording head and the guide member in cooperation.

### 5,014,136
### ELECTRONIC STILL CAMERA DEVICE

**Nobuya Sakai, Kawagoe, and Harumi Aoki, Iruma, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Oct. 26, 1988, Ser. No. 262,834**
**Claims priority, application Japan, Oct. 29, 1987, 62-166088[U]; Oct. 29, 1987, 62-274385; Oct. 30, 1987, 62-274824**
**Int. Cl.$^5$ H04N** *5/76*
**U.S. Cl. 358—341** **25 Claims**

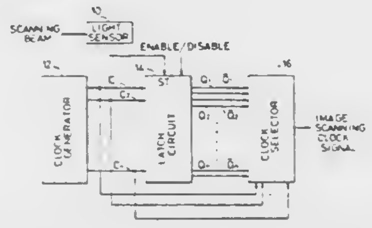


25. A camera system, comprising:
- an electronic still camera, comprising:
  - means for storing video signals and audio signals; and
  - means for controlling said storing means; and
- an audio recording device that is selectively connectable to said electronic still camera, comprising:
  - a microphone for receiving audio data;
  - a memory for temporarily storing said received audio data, said temporarily stored audio data being transferred at a later time from said memory in said audio recording device to said storing means of said electronic still camera, wherein said controlling means of said electronic still camera controls a transfer of said audio data temporarily stored in said memory to said storing means of said electronic still camera.

---

### 5,014,137
### METHOD OF GENERATING AN IMAGE SCANNING CLOCK SIGNAL FOR AN OPTICAL SCANNING DEVICE BY SELECTING ONE OF A PLURALITY OF OUT-OF-PHASE CLOCK SIGNALS

**Kazuyuki Shimada, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**
**Filed Dec. 24, 1985, Ser. No. 813,059**
**Claims priority, application Japan, Dec. 25, 1984, 59-278338; Dec. 25, 1984, 59-278341**
**Int. Cl.$^5$ A04M** *1/36*
**U.S. Cl. 358—410** **3 Claims**



1. A method of generating an image scanning clock signal in an optical scanning device in which a scanning region of a given surface is scanned with a light beam cyclically deflected by a rotating light deflector, and the light beam is detected by a light sensor which is located outside of the scanning region and which generates a synchronizing signal upon detection of the light beam, said method comprising the steps of:
- generating a reference clock signal having a frequency f equal to that of the image scanning clock signal with a reference clock generator, and corrective clock signals having a frequency Nf (N is a natural number of at least 2) with a corrective clock generator;
- applying said reference clock signal and said corrective clock signals to shift registers to enable the shift registers to generate a plurality of out-of-phase clock signals having said frequency f;
- applying said plurality of clock signals from said shift registers to a latch circuit to latch the clock signals therein in response to the synchronizing signal from said light sensor for enabling the latch circuit to output signals corresponding to the respective latched clock signals;
- applying the latched clock signals from said latch circuit and the clock signals from said shift registers to a clock selector; and
- effecting an arithmetic operation on said latched clock signals from said latch circuit to output one of said clock signals from said shift registers as the image scanning clock signal from said clock selector.

---

### 5,014,138
### PROCESS FOR RECORDING SEMIHALFTONE IMAGES AND DEVICE FOR CONVERSION OF IMAGE DOT TONAL VALUE DATA

**Gerhard Fischer, Offenbach, and Helmut Quabeck, Babenhausen, both of Fed. Rep. of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**
**Division of Ser. No. 204,155, May 31, 1988, Pat. No. 4,939,589. This application Feb. 14, 1990, Ser. No. 480,353**
**Claims priority, application Fed. Rep. of Germany, Jun. 3, 1987, 3718521**
**Int. Cl.$^5$ H04N** *1/23, 1/46*
**U.S. Cl. 358—448** **15 Claims**

1. Apparatus for reproducing a continuous tone original image on a recording medium using a plurality of recording elements with a tonal value of "print" (or "on") or "no-print" (or "off"), characterized in that the apparatus consists of:
- an input switching network adapted to receive image dot tonal value data representative of the original image and to compile the data into data blocks corresponding to a subdivision of scan fields of the original into a plurality of subfields, the subfields comprising individual scan elements, each of the scan fields being subdivided successively into higher order subfields and then into smallest subfields of a predetermined size equal to at least two of the recording elements, the scan fields and the subfields selected such that for each one of the smallest subfields and for each of the successively higher order subfields to which the smallest subfield belongs there is at least one, once only selected, preselected recording element which can be turned "on" or "off",
- an arithmetic processor connected with the input switching network to receive the data blocks, the processor adapted to emit an output signal for each one of the blocks when an average tonal value determined for each one of the smallest subfields and for each of the higher order subfields from the tonal values of the scan elements in the subfields considered is greater than a predetermined reference value, and
- an output switching network connected with the arithmetic processor, the output switching network adapted to plot the recording image dot data or the distribution of the recording image dot data corresponding to the tonal value "print" and to the tonal value "no-print" as a function of the output signals of the arithmetic processor.

---

### 5,014,139
### REFERENCE TRACK DETECTION FOR A DISC STORAGE UNIT

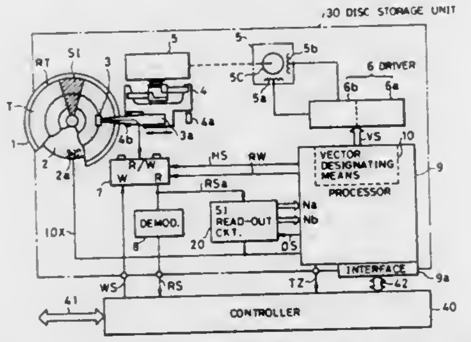
**Takashi Miyashita, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan**
**Filed Dec. 21, 1988, Ser. No. 287,094**
**Claims priority, application Japan, Dec. 29, 1987, 62-335390**
**Int. Cl.$^5$ G11B** *5/55, 21/08*
**U.S. Cl. 360—78.14** **8 Claims**

1. In combination with a disc storage unit comprising a disk having a plurality of tracks, including a reference track, defined on the surface thereof; a head displaceable with respect to said disc; a polyphase head driving motor mechanically coupled to said head for displacement thereof relative to said disc; vector designating means for designating a plurality of even and odd numbered vectors defined by polyphase currents flowing through said head driving motor; and servo informa-

VOL
1126
ISS
1
MY
7
1991
UMI

tion read-out means for reading out servo information sensed by said head, said servo information corresponding to each track and being written onto the surface of said disc for detecting the position of said head; the method of detecting said reference track comprising the steps of:

- writing said servo information into a servo information area defined as a sector formed by partially interrupting circumferentially said plurality of tracks within a radial area of said surface in which said head is displaceable, the radially outermost track among said plurality of tracks being designated as said reference track, servo information not being written onto a blank area defined as radially outward of said reference track within said radial area, a boundary being thereby established between said servo information area and said blank area;
- sequentially designating vectors to said head driving motor by said vector designating means to sequentially displace said head in a predetermined radial direction;



- reading out said servo information by said servo information read-out means sensed by said head while said head is being displaced sequentially in said predetermined radial direction;
- detecting said boundary between said servo information area and said blank area by determining whether or not servo information is read out by the preceding step; and
- computing the position of said reference track in the radial direction based upon said boundary detected in the preceding step to detect said reference track, whereby said tracks are defined at positions in the radial direction corresponding to even-numbered vectors formed by said polyphase currents flowing through said head driving motor, said servo information is written at the positions in the radial direction corresponding to odd-numbered vectors formed by said polyphase currents flowing through said head driving motor and, in the case of the detection of said boundary between said servo information area and said blank area, said head is sequentially displaced in the radial direction corresponding to said odd-numbered vectors.

---

### 5,014,140

## APPARATUS FOR DRAWING OUT TAPE FROM A CASSETTE

**Ikuo Nishida, Katsuta; Shinichi Hanawa, Mito, and Hideyuki Kawase, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 189,819, May 3, 1988, abandoned, Division of Ser. No. 843,670, Mar. 25, 1986, Pat. No. 4,757,398. This application Feb. 14, 1990, Ser. No. 480,379**

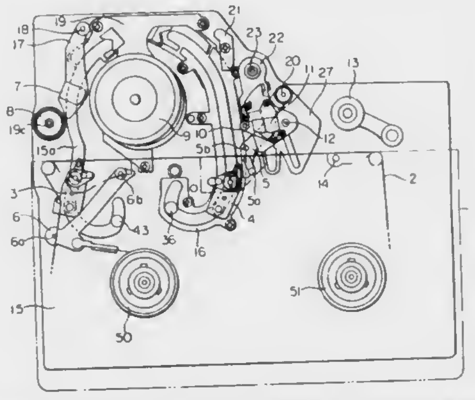
**Claims priority, application Japan, Mar. 27, 1985, 60-60579**

**Int. Cl.$^5$ G11B** *15/665*

**U.S. Cl. 360—85** 3 Claims

1. A magnetic recording and reproducing apparatus for winding a magnetic tape in a predetermined range around a rotary magnetic head unit to perform record and/or reproduction, comprising:

- a first tape guide means operable to be at a first position in a space occupied by a loaded cassette when the tape is not drawn for loading and to be at a supplying position facing one supplying position side of the rotary magnetic head unit when drawing the tape,
- a second tape guide means operable to be at a second position in the space occupied by the loaded cassette when the tape is not drawn for loading and to be at a take-up position facing one take-up position side of the rotary magnetic head unit when drawing the tape,
- a first draw-out means for moving said first and second tape guide means from said first and second positions to said supplying and take-up sides of the rotary magnetic head unit, respectively,
- an audio control head for recording and reproducing an audio signal and a control pulse signal on and from the tape, said audio control head being located in a tape path when the tape is loaded;



- a third tape guide means operable to be at a third position in the space occupied by the loaded cassette when the tape is not drawn for loading and to be at a fourth position between said second tape guide means and said audio control head when drawing the tape, said third tape guide means being inclined with respect to the bottom surface of said cassette at said third and fourth positions, and
- a second draw-out means for moving said third tape guide means from said third position to said fourth position while maintaining an inclined attitude of said third tape guide means with respect to the bottom surface of said cassette.

---

### 5,014,141

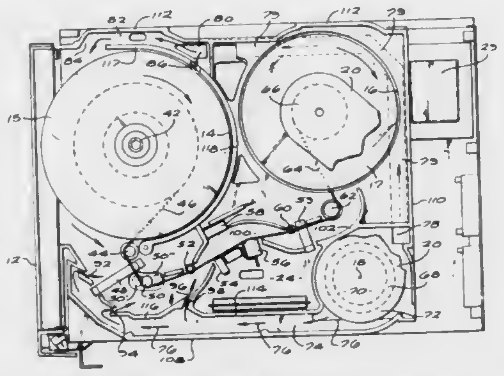
## LOW PROFILE, HIGH-CAPACITY STREAMING TAPE DRIVE

**William J. Gervais, Northridge, and Richard A. Nelson, Burbank, both of Calif., assignors to Qualstar Corporation, Northridge, Calif.**

**Filed Oct. 13, 1989, Ser. No. 421,404**

**Int. Cl.$^5$ G11B** *15/38*

**U.S. Cl. 360—96.1** 22 Claims



1. A low profile, high-capacity tape drive system of the rack-mounted type, comprising:

- a main base plate;
- a blower;
- a take-up reel, said take-up reel having a central hub;
- hub means for receiving a supply reel;
- means including a first brushless DC motor for rotatably driving said take-up reel;
- a second brushless DC motor for driving said hub means and an associated supply reel;
- a third brushless DC motor for rotating said blower;
- each of said motors having a stator, a permanent magnet rotor, and a central drive shaft;
- said main base plate having first, second, and third short, downwardly extending, integral tubes for mounting said first, second and third motors;
- means for mounting the stator of each of said motors on the outer surface of one of said tubes;
- bearing means for supporting the drive shaft of each of said motors from the inner surface of one of said tubes;
- means for mounting each of said permanent magnet rotors from the lower end of said drive shaft, and in coupling proximity with said stator;
- means including a tape drive enclosure for automatically threading tape from a supply reel mounted on said supply reel hub onto said take-up reel, said threading means including air ducts integral with said base plate on the upper and lower surfaces thereof for directing air from said blower to blow the end of a tape from a supply reel into engagement with the hub of said take-up reel; and
- said hub of said take-up reel having openings in it coupled to the intake of said blower, and constituting means for holding the end of the tape onto said hub of said take-up reel.

---

### 5,014,142

## MAGNETIC DISK APPARATUS WITH HEAD SUPPORTING STRUCTURES OF DIFFERENT PROPER OSCILLATIONS

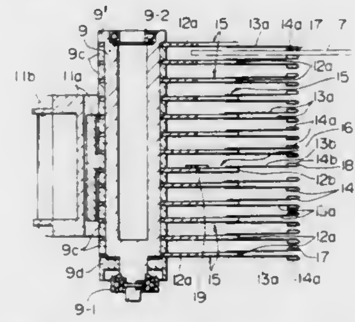
**Eiji Nakanishi, Kanagawa; Toshio Suzuki, Chigasaki; Masato Furusaki, Odawara; Kiyoji Morita, Odawara; Hiroshi Sakurai, Odawara; Hiroshi Daito, Kanagawa, and Mikio Takahashi, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 22, 1989, Ser. No. 327,130**

**Claims priority, application Japan, Mar. 24, 1988, 63-71667**

**Int. Cl.$^5$ G11B** *5/596*

**U.S. Cl. 360—98.01** 13 Claims



1. A magnetic disk apparatus comprising:

- a disk assembly including a servo disk on which servo information is recorded in advance and at least one data disk for recording and reproduction of information;
- a servo head so disposed relative to said servo disk as to read out said servo information;
- a data head so disposed relative to said data disk as to effect recording and reproduction of information;
- an actuator for positioning said data head and said servo head at desired positions on said data disk and servo disk, respectively, on the basis of said servo information;
- a servo-head supporting structure for supporting said servo head;
- a data-head supporting structure for supporting said data head;
- each of said servo-head supporting structure and said data-head supporting structure having an arm fixed at one end to said actuator, a leaf spring fixed at one end to the other end of said arm, and a core slider fixed to the other end of said leaf spring and supporting one of said servo head and said data head; and
- said leaf springs of said servo-head supporting structure and said data-head supporting structure having different widths to provide said servo-head and data-head supporting structures with different proper oscillations.

---

### 5,014,143

## DATA RECORDING DISK CHUCK MECHANISM

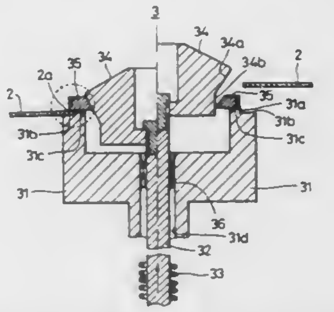
**Kyoichi Mori, Hiratsuka; Kuniaki Toda, Sagamihara; Nobuyuki Iizuka; Tsutomu Hongo, both of Kanagawa, and Tsutomu Nakadai, Yokohama, all of Japan, assignors to Hitachi Electronics Engineering Co., Ltd., Tokyo, Japan**

**Filed Mar. 28, 1990, Ser. No. 500,454**

**Claims priority, application Japan, Mar. 31, 1989, 1-81018; Dec. 21, 1989, 1-147608[U]**

**Int. Cl.$^5$ G11B** *25/04*

**U.S. Cl. 360—99.12** 11 Claims



1. In a data recording disk chuck mechanism comprising a first chuck member having a stepped-down portion on its outer periphery, said stepped-down portion being used for receiving an inner periphery of a disk along an opening provided in the central part thereof, a spindle coupled to said first chuck member and used for driving said first chuck member to rotate, and an operating shaft passed through the central part of said spindle and that of said first chuck member in such a manner that said operating shaft is movable in the axial direction, said chuck mechanism further comprising

- a chuck head fixed to the leading end of said operating shaft passed through said first chuck member, said chuck head having a maximum diameter smaller than the diameter of the opening provided in the central part of said disk and having an outer periphery opposite to said first chuck member, said outer periphery being inclined so that the diameter thereof decreases in the direction of said first chuck member,
- a biasing member for biasing said chuck head to make an inclined side face of said outer periphery move toward said first chuck member, and
- a second chuck member disposed between said first chuck member and said chuck head, said second chuck member having a cut in part and containing at least a ring part whose diameter enlarges outwardly with respect to its axis on mating with said inclined side face of said chuck head to receive pressure therefrom correspondingly when said chuck head is biased to moved onto said first chuck member, said ring part being kept biased in the direction in which its diameter contracts, characterized in that
- the inner periphery of said disk is chucked in between said ring part of said second chuck member and said stepped-down portion of said first chuck member when said second chuck member moves up to a position where said second chuck member is positioned opposite to said

VOL
1126
ISS
1
MY
7
1991
UMI

stepped-down portion of said first chuck member as the diameter of said ring part enlarges.

---

## 5,014,144

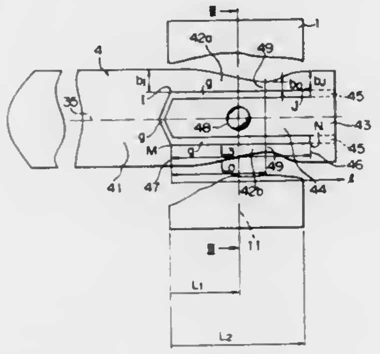
### MAGNETIC HEAD SLIDER SUPPORTING APPARATUS

**Taichi Sato, Ishioka; Yoshiharu Mouri, Ibaraki; Kihachiro Tanaka, Ushiku; Yokuo Saitoh; Hiroshi Daito, both of Kanagawa; Tetsuo Masukawa, Odawara; Yoshinori Takeuchi, Ibaraki; Yuzo Yamaguchi, Tsuchiura, and Satomitsu Imai, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 13, 1989, Ser. No. 366,612**

**Int. Cl.$^5$ G11B** *5/48*

**U.S. Cl. 360—104** **11 Claims**



1. An apparatus for supporting and reciprocating a magnetic head slider above a rotating magnetic disk comprising a carrying arm having a free and a flexible member, said flexible member including:

a flexible base having opposite ends, said flexible base being connected at one end thereof to said free end of said supporting arm;

a pair of flexible fingers extending from the other end of said flexible base parallel to an axis of said carrying arm and defining therebetween a space;

a traverse bar connecting two free ends of said fingers;

a flexible tongued member on which said magnetic head slider is to be mounted, one end of said tongued member being connected to said traverse bar and the other end thereof extending into said space with gaps between said tongued member and said fingers and said base; and

a reduced part of a minimum cross-section provided in each of said fingers, said reduced part being located between said one end of said tongued member and a center between said one end of said tongued member and said other end of said base.

---

## 5,014,145

### HEAD ARM STRUCTURE MOUNTING A CIRCUIT ELEMENT IN A MAGNETIC DISC DEVICE

**Haruhiko Hosokawa; Asao Sasamoto; Hideaki Amano; Toshio Shiono; Akio Takatsuka; Sigeru Okamoto; Munesige Maeda, and Chikayuki Sogabe, all of Odawara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 1, 1988, Ser. No. 214,679**

**Claims priority, application Japan, Jul. 10, 1987, 62-170901**

**Int. Cl.$^5$ G11B** *33/12, 33/14*

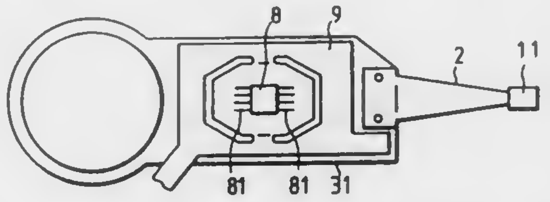
**U.S. Cl. 360—104** **9 Claims**

1. A head arm structure in a magnetic disc device comprising:

a magnetic head for recording/reproducing signals to or from a magnetic disc;

a head arm supporting said magnetic head and made of a first material, said arm including first and second arm regions, said second arm region having a boundary nearly surrounding the second arm region and separating said second arm region from said first arm region, said second arm region being connected to said first arm region by a small area;

a flexible circuit having a first region mounted on said first arm region and a second region mounted on said second arm region, said first region being connected to said second region; and



a circuit element amplifying the signals reproduced from said magnetic head, said circuit element being mounted on said second region of said flexible circuit.

---

## 5,014,146

### MAGNETIC HEAD MOUNTING ARM HAVING ASYMMETRICAL CONFIGURATION

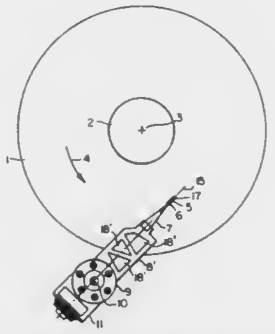
**Akio Takatsuka; Asao Sasamoto, both of Odawara; Yoshihiro Moribe, Chigasaki; Toshio Shiono, Odawara; Chikayuki Sogabe, Odawara, and Haruhiko Hosokawa, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 26, 1989, Ser. No. 301,712**

**Claims priority, application Japan, Jan. 27, 1988, 63-14573**

**Int. Cl.$^5$ G11B** *5/55*

**U.S. Cl. 360—106** **42 Claims**



1. Apparatus for retrieving data from a data storage disc, comprising:

means for rotatably mounting the data storage disc for rotation about a disc axis and in a plane;

a transducer head having a flying surface for flying at a height above the surface of the disc during rotating of the disc relative to the head;

a gimbal spring mounting said transducer head thereon;

an elongated cantilevered load spring having an outer end mounting thereon said gimbal soring and said transducer head, and an inner end;

an elongated generally flat cantilevered head arm mounting on its outer end the inner end of said load spring and having an inner end;

means rotatably mounting said inner end of said head arm about an arm axis generally parallel to the disc axis and closely adjacent to said disc;

a rotary actuator for selectively rotating said head arm about the arm axis to swing said transducer head in an arcuate path across and parallel to the surface of the disc for reading and/or writing data from and/or to said disc;

only a single said transducer head, said gimbal spring and only a single said load spring transducing from the flying surface and being fixedly connected together on said head arm so that they together completely define a closed outer edge periphery, as viewed in said plane, for including in said closed outer edge periphery all of a line drawn from the center of said flying surface of said transducer head to said arm axis parallel to said plane; and

said head arm outer edge periphery being asymmetrical with respect to said line such that the upstream, with respect to the wind produced by rotation of the disc, edge outer periphery being shaped differently from the corresponding downstream edge of said head arm so that said head arm is asymmetrical with respect to said line, and further to provide upstream edge means for said head arm having less wind resistance than the downstream edge with respect to a corresponding load wind traveling in the opposite peripheral direction, to thereby reduce the loading on said arm caused by rotation of the disc during operation of the disc drive unit.

19. Apparatus for retrieving data from a data storage disc, comprising:

means for rotatably mounting the data storage disc for rotation about a disc axis and in a plane;

a transducer head having a flying surface for flying at a height above the surface of the disc during rotation of the disc relative to the head;

a gimbal spring mounting said transducer head thereon;

an elongated cantilevered load spring having an outer end mounting thereon said gimbal spring and said transducer head, an an inner end;

an elongated generally flat cantilevered head arm mounting on its outer end the inner end of said load spring and having an inner end;

means rotatably mounting said inner end of said head arm about an arm axis generally parallel to the disc axis and closely adjacent to the disc;

a rotary actuator for selectively rotating head arm about the arm axis to swing said transducer head in an arcuate path across and parallel to the surface of the disc for reading and/or writing data from and/or to said disc;

only a single said transducer head, said gimbal spring and only a single said load spring transducing from the flying surfacr and being fixedly connected together on said head arm so that they together completely define a closed outer edge periphery, as viewed in said plane, for including in said closed outer edge periphery all of a line drawn from the center of said flying surface of said transducer head to said arm axis, parallel to said plane; and

a plurality of through holes in said head arm extending in a direction perpendicular to said plane for forming an upstream and a downstream beam, the area of said holes as viewed in said plane being asymmetrical with respect to said line for inertially balancing.

---

## 5,014,147

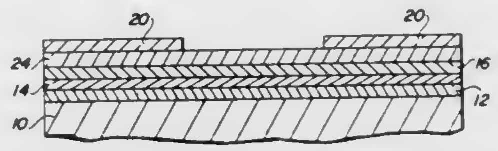
### MAGNETORESISTIVE SENSOR WITH IMPROVED ANTIFERROMAGNETIC FILM

**Stuart S. P. Parkin; Kevin P. Roche, and Virgil S. Speriosu, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 31, 1989, Ser. No. 429,678**

**Int. Cl.$^5$ G11B** *5/39, 5/30*

**U.S. Cl. 360—113** **15 Claims**



1. An improved magnetoresistive sensor of the type having an antiferromagnetic layer in direct contact with a magnetoresistive ferromagnetic layer for inducing a longitudinal bias in the ferromagnetic layer, wherein the improvement is an antiferromagnetic layer comprising an alloy of manganese (Mn) and iron (Fe), $Fe_{(1-x)}Mn_x$, where x is within the range of 0.3 to 0.4.

---

## 5,014,148

### PERPENDICULAR MAGNETIC RECORDING AND REPRODUCING HEAD

**Junji Numazawa; Yoshiro Yoneda, both of Tokyo, and Fusayoshi Aruga, Shimosuwa, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo and Kabushiki Kaisha Sankyo Seiki Seisakusho, Shimosuwa, both of, Japan**

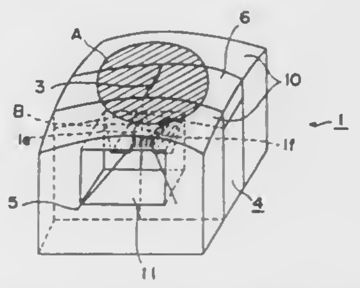
**PCT No. PCT/JP87/00668, § 371 Date Mar. 8, 1989, § 102(e) Date Mar. 8, 1989, PCT Pub. No. WO88/02166, PCT Pub. Date Mar. 24, 1988**

**PCT Filed Sep. 9, 1987, Ser. No. 329,780**

**Claims priority, application Japan, Sep. 11, 1986, 61-215457; Dec. 19, 1986, 61-301420; Feb. 2, 1987, 62-20453**

**Int. Cl.$^5$ G11B** *5/127*

**U.S. Cl. 360—125** **10 Claims**



1. A perpendicular magnetic recording and reproducing head, which includes a main magnetic pole, an auxiliary magnetic pole block which is provided with a main magnetic pole holding portion holding a part of said main magnetic pole and having wound thereon a coil, a non-magnetic block which is joined to the auxiliary magnetic pole block on the side thereof near a perpendicular magnetic recording medium with holding a part of said main magnetic pole and forms a surface opposed to the recording medium, wherein said non-magnetic block and the auxiliary magnetic pole block constitute a support block holding the main magnetic pole, and at least one magnetic block which is provided on a side of the support block in the widthwise direction of recording tracks of the recording medium, perpendicular to their lengthwise direction, wherein said magnetic block protrudes toward the perpendicular magnetic recording medium from the plane in which the auxiliary magnetic pole block and the non-magnetic block are joined together, in order that said main magnetic pole, said non-magnetic block and said magnetic block form an area opposed to the perpendicular magnetic recording medium.

---

## 5,014,149

### THIN FILM MAGNETIC HEAD

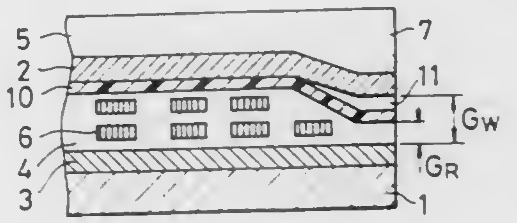
**Atsushi Ibaraki, Nakanoshima, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Aug. 25, 1989, Ser. No. 398,359**

**Claims priority, application Japan, Dec. 23, 1988, 63-325507**

**Int. Cl.$^5$ G11B** *5/147*

**U.S. Cl. 360—126** **3 Claims**



1. A thin magnetic head comprising:

VOL
1126
ISS
1
MY
7
1991
UMI

two magnetic layers each formed of a magnetic material;
a magnetic insulating layer formed of a non-magnetic material, said magnetic insulating layer being sandwiched between said two magnetic layers;
an intermediate magnetic layer formed to be thinner than said magnetic layers and within said magnetic insulating layer along one of said two magnetic layers; and
an intermediate magnetic insulating layer formed in the vicinity of at least a gap surface between said intermediate magnetic layer and one of said magnetic layers, wherein said intermediate magnetic layer has a lower saturated magnetic flux density than does either of said two magnetic layers.

---

### 5,014,150
### MAGNETIC TAPE CASSETTE HAVING OUTER APPEARANCE MODIFIED BY SURFACE PRINTING

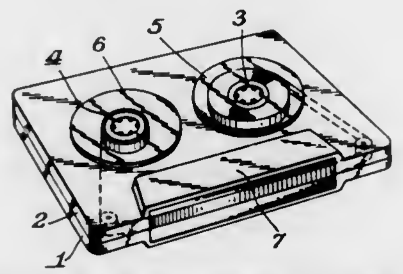
**Rudolf Breuer, Munich; Gottfried Lutz, Seefeld; Albert Pertzsch, Munich, and Helmut Schultz, Gauting, all of Fed. Rep. of Germany, assignors to Reel/Frame: 5061/0928 Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Apr. 7, 1989, Ser. No. 335,041**

**Claims priority, application Fed. Rep. of Germany, Apr. 21, 1988, 3813359**

**Int. Cl.$^5$ G11B** *23/087*

**U.S. Cl. 360—132** **5 Claims**



1. Magnetic tape cassette, consisting of two adjacent hubs. onto which magnetic tape is wound, which are mounted rotatably in a housing between two opposite transparent housing walls and the housing walls including transparent or slightly coloured and untransparent regions, characterized in that the untransparent regions are produced by printing over the surface area of the cassette walls.

---

### 5,014,151
### MECHANISM FOR OPENING AND CLOSING A SHUTTER OF MAGNETIC DISC CASSETTE

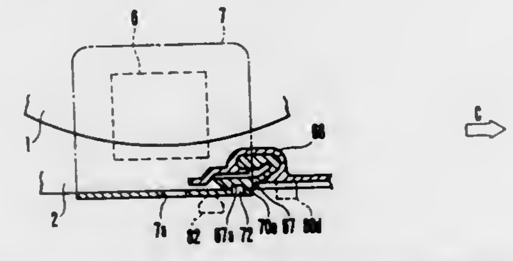
**Tsukasa Uehara, and Shigeki Okauchi, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 298,285, Jan. 13, 1989, abandoned. This application Sep. 11, 1989, Ser. No. 405,559**

**Claims priority, application Japan, Sep. 9, 1985, 60-197660; Sep. 9, 1985, 60-197661; Sep. 9, 1985, 60-197662**

**Int. Cl.$^5$ G11B** *23/04, 17/02*

**U.S. Cl. 360—133** **10 Claims**



1. A mechanism for opening and closing a magnetic type disc cassette shutter, comprising:
(a) a holder for accommodating said cassette, said holder means defining an insertion path along which the cassette is loaded therein and unloaded therefrom, and a support portion for supporting said cassette when loaded in the holder; and
(b) an elastic member supported at a portion on said holder, and having an extended portion elastically projected into said insertion path, said elastic member elastically abutting on said shutter of said cassette and holding said shutter when said cassette is in said insertion path, urging the shutter in an opening direction as said cassette is inserted into said holder, and urging said shutter in a closing direction as said cassette is pulled out of said holder.

---

### 5,014,152
### FLEXIBLE MAGNETIC DISC WITH A SPRING PLATE IN THE HUB

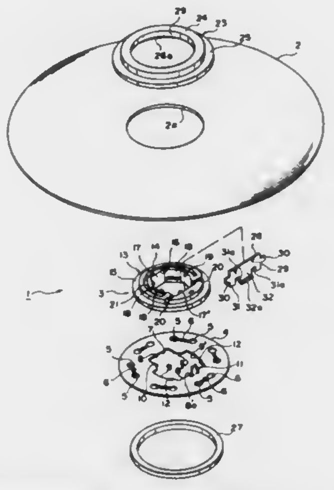
**Kazuo Sasaki, Miyagi, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed May 31, 1989, Ser. No. 360,140**

**Claims priority, application Japan, Jun. 14, 1988, 63-786187[U]**

**Int. Cl.$^5$ G11B** *17/022, 5/012*

**U.S. Cl. 360—135** **4 Claims**



1. A flexible magnetic disc, comprising:
a flexible magnetic sheet having a circular outer periphery;
an elongated metal spring plate having a main portion and support portions at opposed ends of said main portion;
a hub structure secured to said flexible magnetic sheet at the center and having an opening extending axially therethrough, said hub structure having a pair of positioning surfaces at locations spaced apart from each other about a central axis of said opening, said hub structure including a pair of seating means for receiving said support portions of said elongated metal spring plate thereon to mount said elongated metal spring plate on said hub structure so that said main portion of said elongated metal spring plate is positioned in an opposing relationship with said pair of positioning surfaces;
said metal spring plate including a portion contiguous with, and extending along a lower edge of said main portion and which is bent away from said central axis of said opening.

---

### 5,014,153
### TRANSFORMER DIFFERENTIAL RELAY

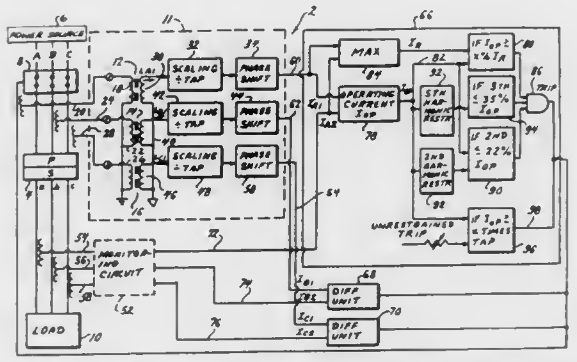
**Timothy M. Wilkerson, Highland, Ill., assignor to Basler Electric Company, Highland, Ill.**

**Filed Feb. 1, 1989, Ser. No. 305,479**

**Int. Cl.$^5$ H02H** *7/045*

**U.S. Cl. 361—36** **56 Claims**

43. An apparatus for monitoring phased currents in a first winding magnetically coupled to a second winding of a transformer and for disconnecting the transformer from a power source supplying the transformer when a difference between the magnitude of the current in the first winding and the magnitude of the current in the second winding indicates a fault, the apparatus comprising: means for generating first and second current signals each having a phase and magnitude which is a function of the phase and magnitude of the phased currents in the first and second windings, respectively;



means having a variable resistance for scaling the magnitude of the first current signal in accordance with a scaling factor;
means for detecting a difference between the magnitude of the scaled first current signal and the magnitude of the second current signal; and
means for disconnecting the transformer from the power source when the detected difference indicates the fault.

---

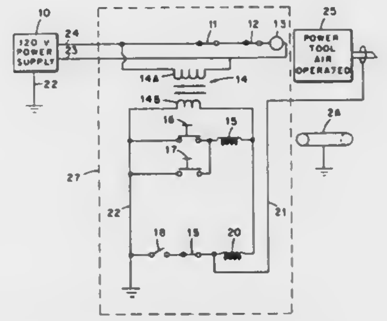
### 5,014,154
### ELECTRICAL SAFETY DEVICE

**David B. White, Greenock, Pa., assignor to United States Department of Energy, Washington, D.C.**

**Filed Sep. 6, 1990, Ser. No. 578,155**

**Int. Cl.$^5$ H02H** *3/16*

**U.S. Cl. 361—49** **5 Claims**



1. An electrical safety device comprising:
a transformer having a primary winding connected to a power supply and a secondary winding connected to a power input side of a first and second relay means and to a building ground,
said first relay means for discontinuing operation of a power tool having a first contact normally closed and connected to a power lead of said power supply, a second contact normally open and connected to said building ground, a first side connected to said secondary winding of said transformer, and a second side connected to said power tool through a grounding wire and to said building ground through said second contact,
said second relay means for reactivating said operation of said power tool having a first contact normally closed and connected between said first contact of said first relay means and said power supply a second contact normally closed and connected between said second contact of said first relay means and said second side of said first relay means, a first side connected to said secondary winding of said transformer, and a second side connected to said building ground through a momentary contact switch,
means for completing an electrical circuit through said grounding wire when said power tool makes contact with a conductive material, whereby said first relay means is energized and said first contact thereof is opened and said second contact thereof is closed, so that operation of said power tool is discontinued by cutting off power thereto and output from said first relay means passes to said building ground, and
means for reactivating said power tool by depressing said momentary-contact switch, whereby said second relay means is energized and said first and second contacts thereof are momentarily opened, so that said first relay means is de-energized and said first contact thereof is closed and said second contact thereof is opened for returning power to said power tool.

---

### 5,014,155
### CIRCUIT FOR PROTECTING INPUT OF SEMICONDUCTOR DEVICE

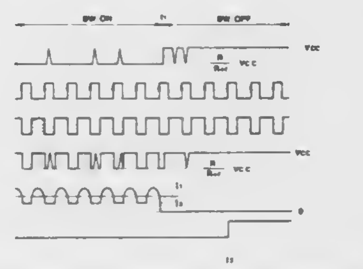
**Noriyuki Abe; Takashi Kimura, and Norio Fujiki, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokoyama, Japan**

**Filed Jun. 13, 1989, Ser. No. 365.466**

**Claims priority, application Japan, Jun. 13, 1988, 63-143652; Jun. 13, 1988, 63-143653**

**Int. Cl.$^5$ H02H** *1/04*

**U.S. Cl. 361—56** **22 Claims**



1. An input protection circuit for an electronic circuit comprising:
switching means operable between an ON state and an OFF state for generating an input provided for said electronic circuit through a first resistor;
a first circuit responsive to an excess level of said input for forming a clamping circuit across said first resistor for shunting an excess level input;
a second circuit monitoring said input from said switching means for detecting a state of said switching means for producing an ON/OFF signal depending upon a detected state of said switching means, said second circuit including a second resistor which forms a series circuit with said first resistor and said switching means while said switching means is in said ON state;
said switching means being operated to said ON state for establishing said series circuit for setting an input level at a predetermined minimum level and to said OFF state for opening said series circuit for setting an input level at a predetermined maximum level; and
said second circuit being set at a threshold level to be compared with an input level for detecting a state of said switching means, said threshold level being set at a level higher than said minimum level and lower than said maximum level in a range satisfying

$$R \cdot Vcc/(R+r) < Vth < Vcc$$

wherein
Vcc: power source voltage

R: resistance of said first resistor
r: resistance of said second resistor,
so as to assure detection of a state of said switching means.

---

### 5,014,156
## FUSED ELECTRICAL SAFETY BARRIER FOR PROTECTION OF AN ELECTRICAL LOAD PLACED IN A POTENTIALLY HAZARDOUS LOCATION

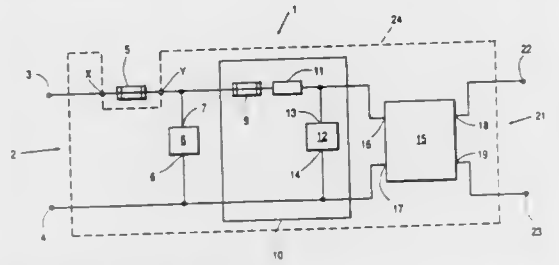
**Peter Bruch, Waldenburg, and Anton Schimmele, Neckarsulm, both of Fed. Rep. of Germany, assignors to R. Stahl Schaltgeräte GmbH, Künzelsau, Fed. Rep. of Germany**

**Filed Aug. 31, 1989, Ser. No. 401,636**

**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1988, 3832068**

**Int. Cl.$^5$ H02H *5/04***

**U.S. Cl. 361—58** **15 Claims**



1. Safety barrier having
an input (**2**) including two input terminals (**3, 4**) and an output (**21**) including two output terminals (**22, 23**), and a barrier circuit (**10, 15**) limiting the voltage across the output and the current flowing through the output,
wherein at least part of said barrier circuit forms a sealed, encapsulated unit (**24**);
said barrier circuit comprising
a first voltage limiting circuit (**12**);
a first current limiting circuit (**15**) serially connected between the voltage limiting circuit and at least one (**22**) of the output terminals; and
an in-line fuse (**9**) located within said sealed unit (**24**) and inaccessible from the outside thereof, serially connected between one (**3**) of the input terminals, and the voltage limiting circuit (**12**),
wherein means are provided for protecting said encapsulated unit against overvoltages and surges, comprising
a series circuit including
an externally accessible high current interrupting means (**5, 26, 27**) connected to one of the input terminals and
a second voltage limiting circuit (**6**);
said first voltage limiting circuit (**10**) having an input which is connected to said second voltage limiting circuit (**6**);
said high current interrupting means (**5, 26, 27**) being connected between said second voltage limiting circuit (**6**) and one (**3**) of the input terminals and thereby connecting said first voltage limiting circuit through said high current interrupting means (**5, 26, 27**) to said one (**3**) of the input terminals; wherein the current interruption threshold of the externally accessible high current interrupting means (**5, 26, 27**) is at least as high as the interruption threshold of said in-line encapsulated fuse (**9**); and
wherein said high current interrupting means (**5, 26, 27**) is accessible externally of said sealed, encapsulated unit (**24**).

---

### 5,014,157
## APPARATUS FOR CONTROLLING AND TESTING AN ELECTRIC INSTALLATION

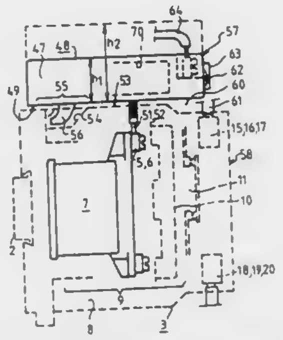
**Dominique Moreau, Saint Germain En Laye, France, assignor to Telemecanique, France**

**Filed May 22, 1989, Ser. No. 354,669**

**Claims priority, application France, May 20, 1988, 88 06767**

**Int. Cl.$^5$ H01H *47/00***

**U.S. Cl. 361—187** **9 Claims**



1. An apparatus for controlling an electric installation, said device being constituted by assembling of a removable modular control device on a contactor means comprising a housing having a upper wall and a front wall, and, lodged in the said housing, power switching means actuated by an electromagnet having a coil, the two ends of which are respectively connected to two respective control terminals adapted to receive external electric conductors passing through a first pair of openings formed in the upper wall and to clamp said conductors by means of clamping means accessible through a second pair of openings formed in the front wall, said removable modular control device comprising an insulating case having an upper face, a front face and a lower face which is provided with first and second rigid projecting pins located so as to be engaged and clamped in the control terminals of the contactor, thus providing both electrical and mechanical connection thereto, the first projecting pin being connected to a first input terminal, and the said second projecting pin being connected to at least a second input terminal by means of a series electronic timing circuit which is tripped on the appearance of a control signal applied on said second input terminal, said first and second input terminals each having an input orifice formed in the upper face of the case and a clamping screw accessible through an opening formed in the front face of the case.

---

### 5,014,158
## LAMINATED CERAMIC CAPACITOR

**Tsutomu Nishimura, Uji; Seiichi Nakatani, Hirakata; Satoru Yuhaku, Osaka; Yasuhiko Hakotani, Nishinomiya, and Tatsuro Kikuchi, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 11, 1990, Ser. No. 507,568**

**Claims priority, application Japan, Apr. 11, 1989, 1-91302; Sep. 25, 1989, 1-248327**

**Int. Cl.$^5$ H01G *4/10, 7/00***

**U.S. Cl. 361—321** **5 Claims**

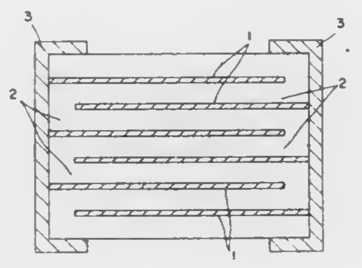
1. A laminated ceramic capacitor comprising a plurality of inner electrode layers for developing a capacitance, dielectric layers sandwiched with the inner electrode layers, and a pair of outer electrodes coupled to their associated inner electrode layers for output of the capacitance, the inner electrode layers being made of Ni, and the dielectric layers being made of a dielectric ceramic composition having a structural formula of:

$$\{Ba_m(Ti_{1-x}Zr_x)O_{2+m}\}_{1-\alpha-\beta}-\{MnO_2\}_\alpha-\{X\}_\beta$$

where X is at least one of $Yb_2O_3$, $Dy_2O_3$, and $ThO_2$ and m, x, α, and β are expressed as:

$0.98 \leqq m \leqq 1.02$

$0 \leqq x \leqq 0.2$



$0.005 \leqq \alpha \leqq 0.05$

$0.001 \leqq \beta \leqq 0.02.$

---

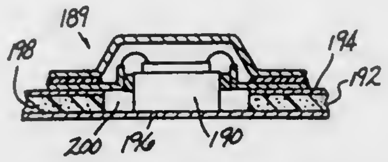
### 5,014,159
## SEMICONDUCTOR PACKAGE

**Sheldon H. Butt, Godfrey, Ill., assignor to Olin Corporation, New Haven, Conn.**

**Division of Ser. No. 643,530, Aug. 23, 1984, which is a continuation of Ser. No. 390,081, Jun. 21, 1982, which is a continuation-in-part of Ser. No. 369,785, Apr. 19, 1982, abandoned. This application Apr. 4, 1989, Ser. No. 332,912**

**Int. Cl.$^5$ H05H *7/20***

**U.S. Cl. 361—386** **10 Claims**



1. A semiconductor package for mounting a chip comprising:
- a substrate member having inner and outer surfaces with sides disposed therebetween, said inner surface adapted for mounting the chip thereon;
- a lead frame disposed adjacent to at least one side of said substrate, said lead frame comprised of inner and outer lead ends wherein said outer lead end extends outwardly from said outer surface of said substrate and said inner lead end is angularly displaced to extend along at least one side of said substrate;
- a cover member having an indentation adapted to receive the chip;
- means for bonding both said inner lead end of said lead frame to at least one side of said substrate and said outer lead end of said lead frame to said cover member.

---

### 5,014,160
## EMI/RFI SHIELDING METHOD AND APPARATUS

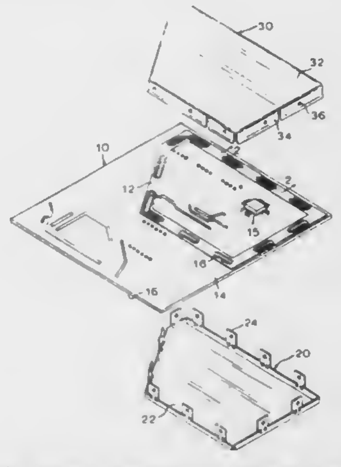
**John F. McCoy, Jr., Windham, N.H., assignor to Digital Equipment Corporation, Maynard, Mass.**

**Filed Jul. 5, 1989, Ser. No. 375,642**

**Int. Cl.$^5$ H05K *9/00***

**U.S. Cl. 361—424** **21 Claims**

1. Apparatus for providing EMI/RFI shielding of selected electronic components mounted on a circuit board, said apparatus comprising:
- a reference plane of said circuit board, said reference plane defined by conductive portions on said board;
- a plurality of plated-through elongate slots formed through said conductive portions in conductive relation with said reference plane and arranged to define a path surrounding the selected components;
- a shallow, shell-shaped half enclosure made of electrically conductive material having a plurality of tabs with at least one tang configured, dimensioned and arranged for electrically conductive engagement with respective ones of said plated-through slots; and



second shield means co-acting frictionally and electrically with said plated-through slots, thereby providing encapsulation of the selected components.

---

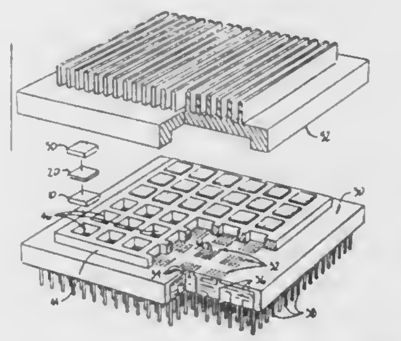
### 5,014,161
## SYSTEM FOR DETACHABLY MOUNTING SEMICONDUCTORS ON CONDUCTOR SUBSTRATE

**James C. K. Lee, Los Altos Hills; Gene M. Amdahl, Atherton; Richard Beck, Cupertino; Chune Lee, San Francisco, and Edward Hu, Sunnyvale, all of Calif., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation of Ser. No. 328,726, Mar. 22, 1989, abandoned, which is a continuation of Ser. No. 860,725, May 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 757,600, Jul. 22, 1985, Pat. No. 4,729,166. This application Feb. 7, 1990, Ser. No. 477,133**

**Int. Cl.$^5$ H05K *7/20***

**U.S. Cl. 361—388** **20 Claims**



1. A semiconductor die mounting system comprising:
- a) a conductor substrate having an array of substrate contacts on a substrate face thereof;
- b) at least one semiconductor die having first and second opposed die faces and a plurality of die contacts on the first die face thereof disposed in alignment with corresponding substrate contacts on the conductor substrate;
- c) a conductor pad disposed between the substrate and the die having first and second opposed pad surfaces in contact with the substrate and first die faces, respectively, the conductor pad including a plurality of mutually electrically isolated electrically conductive elements extending between the first and second surfaces thereof in the direction of alignment between the substrate and die contacts so as to provide electrical conduction between

VOL 1126 ISS 1 MY 7 1991 UMI

the pad surfaces, adjacent conductive elements being spaced apart by less than the minimum width of the contacts; and

d) means for holding the semiconductor die and the conductor substrate in contact with the conductor pad so that the corresponding die and substrate contacts are in alignment.

---

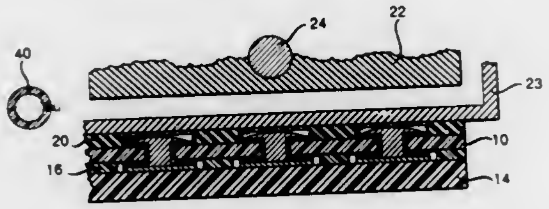
### 5,014,162
### SOLDER ASSEMBLY OF COMPONENTS

**William A. Clark, Randolph; Michael A. Oien, Chatham, and Walter Pelosi, Randolph, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jun. 27, 1989, Ser. No. 372,400**

**Int. Cl.⁵ H05K** *1/11*

**U.S. Cl. 361—412** **5 Claims**



1. A device comprising:

first and second components with pad areas on facing surfaces which are soldered together, at least one of said components including metalized holes in the pad areas which are soldered and the pad areas of the other of said components being essentially flat and not extending into said holes; and

solder fillets formed between pad areas on said facing surfaces and extending through said holes to associated pad areas on the surface of said one component opposite to the facing surface of said one component so that the fillets on said associated pad areas can be inspected.

---

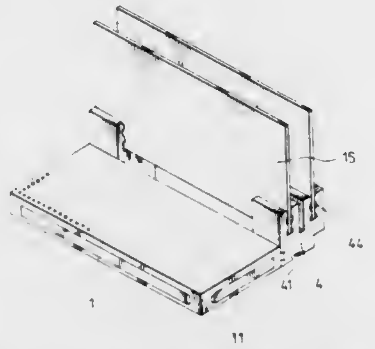
### 5,014,163
### STRUCTURE OF CIRCUIT BOARD ASSEMBLY

**John Lin, 5F., No. 15-1, Feng Tse Wei St., San Chung City, Taipei Hsien, Taiwan**

**Filed Jan. 30, 1990, Ser. No. 472,499**

**Int. Cl.⁵ H05K** *1/14*

**U.S. Cl. 361—415** **16 Claims**



1. A circuit board assembly comprising, a basic solderless circuit board of generally rectangular configuration including opposite faces and four elongated sides extending between said faces, each of said sides on the basic solderless circuit board having a length and a width and having an elongated projection extending outwardly thereof and extending along the length of the associated side, each projection having a generally dovetail cross-sectional configuration, a connector means for connecting said basic solderless circuit board with further means, said connector means having a plurality of sides, one of said sides of the connector means having an elongated groove formed therein of generally dovetail cross-sectional configuration complementary to the configuration of said elongated projections and receiving one of said elongated projections, another of said sides of the connector means having a further groove formed therein, and further means supported in said further groove for supporting said basic solderless circuit board and said further means in a predetermined position relative to one another.

---

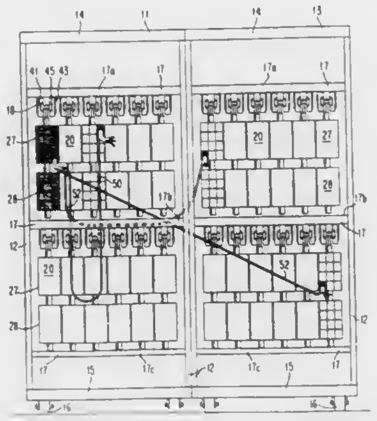
### 5,014,164
### CABLE ORGANIZER

**Gene E. Casa, Ruby, and Joseph W. Gernon, Kingston, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 8, 1989, Ser. No. 405,614**

**Int. Cl.⁵ H02B** *1/20*

**U.S. Cl. 361—428** **10 Claims**



1. A connector system for a computer system comprising:

plural self-standing system frames joined side by side to each other with each system frame having multiple first connectors generally coplanar and facing a same given one face of said system frames;

a separate cable organizer frame having second connectors and cables between said second connectors fixedly mounted to and supported and housed by said cable frame with said second connectors at each end of said cables facing a given one face of said cable frame and facing said given one face of said system frames when joined to said system frames, said second connectors being arranged to align with the first connectors on said system frames when said given one face of the system frames is joined with said given one face of said cable frame, said cables and said second connectors being further arranged for interconnecting between selected said first connectors within a given system frame and selected said first connectors in a different frame of said system frames when said system frames are joined to said cable frame; and

means for aligning and joining said cable frame to said system frames at said given one faces to provide simultaneous cable connection of said system frames and said cable frame at said first and second connectors.

---

### 5,014,165
### GLASS-MADE LENS

**Masahito Naganawa, Shizuoka, Japan, assignor to Koito Manufacturing Co., Ltd., Shizuoka, Japan**

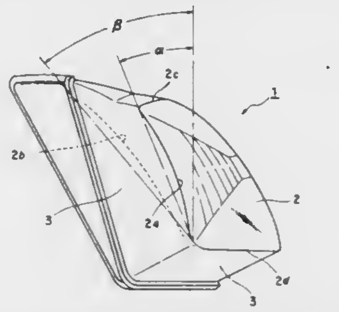
**Filed Dec. 14, 1989, Ser. No. 450,889**

**Claims priority, application Japan, Dec. 22, 1988, 63-321983**

**Int. Cl.⁵ B60Q** *1/00;* **F21V** *7/00*

**U.S. Cl. 362—61** **6 Claims**

1. In a glass lens comprising a front portion, and a side wall portion formed integrally with said front portion, said side portion projecting rearwardly from the circumference of said front portion, the improvement wherein said front is curved, and a top edge of said front portion is offset rearwardly with respect to a bottom edge of said front portion so that a top part of said front portion slopes rearwardly with respect to a bottom part of said front portion, angle of inclination along one lateral edge of said front portion with respect to a vertical line being smaller than an angle of inclination along the opposing lateral edge of said front portion such that said front portion is twisted.



---

### 5,014,166
### LIGHT UNIT

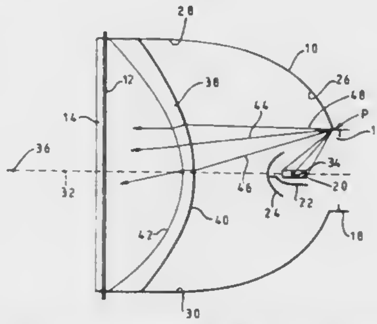
**Geoffrey Draper, Lichfield; Hayden James, Staffs, and Kevin Carlton, Stafford, all of England, assignors to Carello Lighting plc, Staffordshire, England**

**Filed Oct. 10, 1989, Ser. No. 419,576**

**Claims priority, application United Kingdom, Oct. 15, 1988, 8824206**

**Int. Cl.⁵ B60Q** *1/04*

**U.S. Cl. 362—61** **7 Claims**



1. A motor vehicle headlamp comprising a dished reflector body having means defining a front opening; an internal reflective surface in said body, said reflective surface being ellipsoidal with inner and outer focal points and a major axis extending through said front opening so that the outer focal point is disposed externally of said dished reflector body; and a correcting lens system extending transversely of said dished reflector body between said inner and outer focal points, said correcting lens system having the properties of a divergent meniscus lens whose convex surface faces said inner focal point.

---

### 5,014,167
### VISUAL SIGNALING APPARATUS

**John K. Roberts, Sheboygan, Wis., assignor to K. W. Muth Company, Inc., Sheboygan, Wis.**

**Filed Feb. 20, 1990, Ser. No. 482,254**

**Int. Cl.⁵ F21V** *7/22;* **B60Q** *1/00*

**U.S. Cl. 362—83.1** **14 Claims**

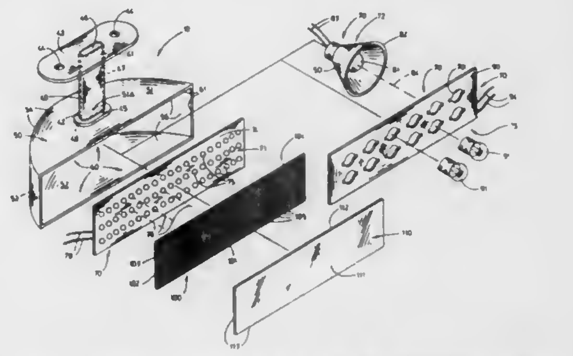
9. A visual signalling apparatus for use by an operator, comprising:

an enclosure having an aperture;

a dichroic mirror borne by the enclosure and adapted selectively to transmit a predetermined narrow band of visible light and simultaneously reflect a broad band of visible light;

a light source borne by the enclosure for emitting light including wavelengths transmitted by the dichroic mirror; and

a baffle assembly borne by the enclosure and operable to guide light emitted by the light source along a predetermined transmission path, and wherein the operator by viewing from a position in non-coaxial alignment relative to the transmission path cannot see the light emitted by the light source by may simultaneously employ the apparatus as a mirror to view an area of interest in the vicinity of the transmission path.



---

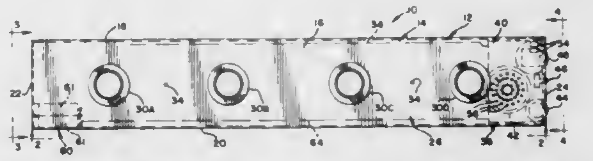
### 5,014,168
### RADIO-LIGHT FIXTURE

**Hugh P. Kelly, Winnetka, Ill., assignor to Erie Glass Manufacturing Company, Park Ridge, Ill.**

**Filed Jul. 9, 1990, Ser. No. 549,769**

**Int. Cl.⁵ H04M** *1/22*

**U.S. Cl. 362—86** **1 Claim**



1. A combination light fixture and radio adapted for use in areas of high humidity, steam and the like and adapted for substantially permanent safety mounting upon a wall surface, said fixture comprising a case made of a metal material and having a front wall and a back wall, a plurality of apertures located in said front wall, substantially permanent mounting means on said back wall, at least one socket attached to and extending through an exterior surface of said front wall and located adjacent said apertures, said socket being adapted to receive and activate an electrical heat and light generating source, an electrically operated radio disposed substantially within said case adjacent said apertures and in close and operable proximity to said source, said radio including an on-off dial, a tuning dial and an on-off switch, said on-off dial, tuning dial and on-off switch extending partially through a sidewall of said case to facilitate operation thereof from the exterior of said case and an antenna operably connected to said radio and extending within said case, whereby said source is operably effective to heat said case, said radio and said antenna and to maintain said radio and antenna in a heated and dry state to thereby provide operable conditions for said radio and antenna so that the mounting and use of said fixture in an area of substantial wetness will not adversely effect the operation of said radio.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,169
## SUN VISOR

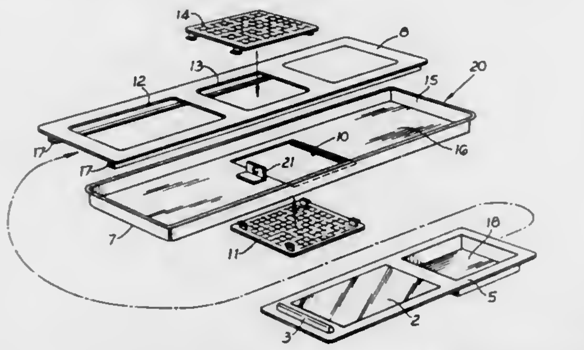
Howard L. Chetwynd, Atherstone, United Kingdom, assignor to Rover Group Limited, England

Filed Jun. 26, 1990, Ser. No. 543,457

Claims priority, application United Kingdom, Jun. 28, 1989, 8914824

Int. Cl.⁵ F21V *33/00*

U.S. Cl. 362—142 7 Claims



1. A sun vizor for a motor vehicle in which the sun vizor is movable from an in use position to a stored position the sun vizor including a vanity mirror viewable when the sun vizor is in its in-use position and illumination means to selectively provide additional illumination of a user of the vanity mirror, wherein the illumination means is arranged also selectively to supply illumination for the interior of the motor vehicle at least when the sun vizor is in its stowed position.

---

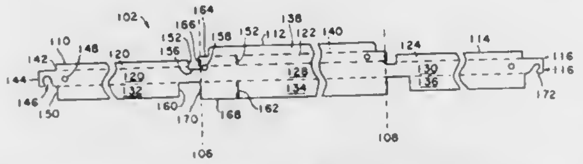
### 5,014,170
## FLUORESCENT LUMINAIRE LENS FRAME

Mahmoud A. Gawad, and John Graudins, both of Montreal, Canada, assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 26, 1989, Ser. No. 456,999

Int. Cl.⁵ F21K *1/00;* F21S *3/00*

U.S. Cl. 362—260 19 Claims



1. A fluorescent luminaire lens frame comprising:

(a) a single piece U shaped element formed from folded sheet metal having an inside surface and an opposite outside surface, the inside surface including supports for a lens panel, further including in sequence a first, second, and third sides substantially formed from a single piece,

(i) with the first side having a first free end, and an opposite second end, the free end of the first side having hinging means formed thereon,

(ii) with the second side having a first end and an opposite second end, the second side coupled at its first end at a right angle to the second end of the first side, and

(iii) with the third side having a first end, and an opposite second free end, the third side being coupled at its first end at a right angle to the second side, to be parallel and opposite the first side, the free end of the third side having hinging means formed thereon, and

(b) a cross bar formed from folded sheet metal having an inside surface and outside surface, the inside surface having surface features for supporting a lens panel, and coupling to the first side, near the free end of the first side, and coupling at an opposite end near the free end of the third side to be parallel and opposite the second side.

---

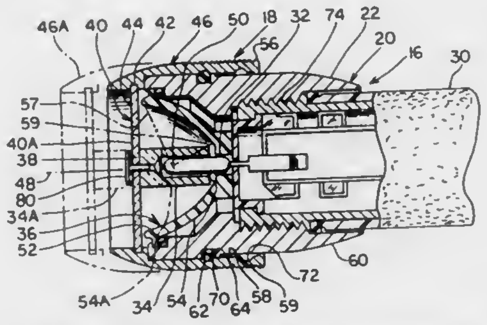
### 5,014,171
## COLOR CHANGEABLE FLASHLIGHT

George T. Price, III, 2223 E. 37th St., Los Angeles, Calif. 90058

Filed Nov. 7, 1989, Ser. No. 432,986

Int. Cl.⁵ F21V *9/00*

U.S. Cl. 362—277 6 Claims



1. A flashlight comprising: a main section which includes a frame with front and rear portions forming a battery compartment, a lamp at said frame front portion, a reflector lying about said lamp, and a switch which connects batteries in said compartment to said lamp, said lamp having a light emitting part;

a hood of light passing filter material which passes primarily light of a selected color;

a select member moveably mounted on said main section and coupled to said hood to support said hood in movement between a color mode wherein said hood lies about said lamp so most of the light passing in paths between said lamp and reflector passes through said material of said hood, and a white light mode wherein most of said filter material of said hood lies away from said paths so most of the light passing between said lamp and reflector does not pass through said filter material of said hood; and

a lens lying forward of said lamp;

said hood being mounted on said lens, and said select member supporting said lens in movement between a rearward lens position wherein said hood is in said color mode and a forward lens position wherein said lens is forward of said rearward lens position and supports said hood in said white light mode.

---

### 5,014,172
## SPACE LIGHTING

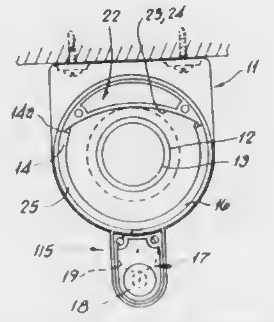
Michael Burn, Woodbridge, and Colin Adby, Oxford, both of England, assignors to Light Years Ahead Limited, Woodbridge, England

Division of Ser. No. 297,837, Jan. 17, 1989. This application May 14, 1990, Ser. No. 523,327

Claims priority, application United Kingdom, Jan. 20, 1988, 8801221; Mar. 1, 1988, 8804847

Int. Cl.⁵ F21V *13/06*

U.S. Cl. 362—284 8 Claims



1. A space lighting fitting for illuminating a space and comprising

support means for attaching the fitting to a wall or ceiling surface which borders the space;

lamp holder means connected to the fitting for holding an elongated lamp therein, the lamp having a longitudinal axis;

light directing means adjustable between first and second positions giving direct and indirect light respectively to the space and comprising a generally turbular member extending along said longitudinal axis and rotatable thereabout;

said generally tubular member comprising a major arcuate portion of translucent material having a first inside curvature centered on said axis and a minor arcuate portion comprising a reflector and having a reflecting surface having a second inside curvature less than said first inside curvature, and, in said first position transmitting light from the lamp directly into said space through said translucent material and in said second position reflecting light from said lamp off of said wall or ceiling surface.

---

### 5,014,173
## LOW BEAM OR FOG HEADLAMP FOR MOTOR VEHICLES

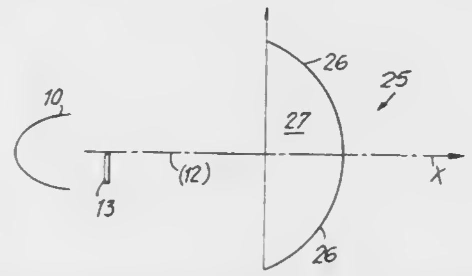
Gerhard Lindae, Leonberg; Richard Loewe, Gerlingen, and Peter Perthus, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Division of Ser. No. 926,960, Nov. 3, 1986, Pat. No. 4,796,171. This application Aug. 23, 1988, Ser. No. 236,008

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1985, 3539452; Jan. 26, 1986, 3602262

Int. Cl.⁵ F21V *7/00, 5/04*

U.S. Cl. 362—309 2 Claims



1. A low beam or fog neadlamp for motor vehicles, comprising a reflector defining an optical axis, a light source arranged on the axis to generate in cooperation with the reflector a light beam propagating along the optical axis, a light shield arranged in the path of propagation of the light beam and having an optically effective edge, an objective concentrically arranged on the optical axis to project a partial light beam delimited by said edge as a light-dark boundary zone on a driveway, optical means formed as an integral part of said objective to adjust light distribution and/or to correct color fringes of said partial light beam, said optical means including an aspheric surface formed on at least one side of the objective, said one side of the objective having a rotationally asymmetrical configuration with respect to said optical and consecutive axial sections of said one side continuously change according to a continuous change of at least one parameter of the lens formula

$$x = \frac{c \cdot y^2}{1 + \sqrt{1 - q \cdot c^2 \cdot y^2}}$$

wherein c is the curvature of said one side, q is a correction factor, and x is the height of the arc of said one side defined as a function of a vertical distance y from said optical axis.

---

### 5,014,174
## REFLECTION SHEET FOR LIGHTING OR COLOR-LIGHTING

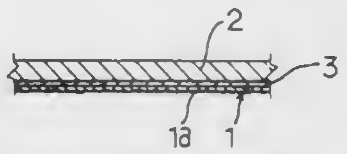
Joung H. Won, 462-14 Cahl Hyun Dong, Eun pyung Ku, and Eun Y. Kim, both of Seoul, Rep. of Korea, assignors to Joung H. Won, Seoul, Rep. of Korea

Filed Feb. 6, 1989, Ser. No. 306,710

Claims priority, application Rep. of Korea, Feb. 6, 1988, 1115

Int. Cl.⁵ F21V *7/12, 13/04*

U.S. Cl. 362—309 3 Claims



1. A reflection sheet for lighting or color-lighting and capable of being flexed into desired reflection body shape, said sheet including a first polyester resin film, an aluminum coating disposed over one side of said film and having an exposed side remote from said first film, a second transparent polyester resin film overlying and adhered to the exposed side of said aluminum coating, the side of said first polyester film remote from said coating having minute, uneven random reflection permeable faces thereon for reduction of dazzling and temporal eyesight problems resulting from direct light reflection.

---

### 5,014,175
## LUMINAIRE HAVING A REFLECTOR CONTAINING ASYMMETRICAL RIDGES FOR DISTRIBUTING LIGHT OUTPUT ASYMMETRICALLY

Mitchell M. Osteen, Zirconia, and Samuel L. Baldwin, E. Flat Rock, both of N.C., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 378,348, Jul. 11, 1989, Pat. No. 4,943,901. This application Oct. 17, 1989, Ser. No. 422,467

Int. Cl.⁵ F21V *7/04*

U.S. Cl. 362—348 6 Claims

1. In a luminaire, a generally dome-shaped reflector having a top and bottom and, extending between said top and bottom, a central axis substantially on which a light source is adapted to be positioned between said top and bottom, said reflector being formed by a metal wall having an inner surface extending about said central axis and defining a bottom opening through which said inner surface reflects light received from said source, means for controlling the angular distribution of the light reflected by said inner surface through said bottom opening comprising a plurality of elongated facets on said inner surface extending in a top-to-bottom direction with respect to the reflector, the reflector being further characterized by

(a) said facets being arranged about said axis in side-by-side relationship, with juxtaposed facets being at an angle with

VOL
1126
ISS
1
MY
7
1991
UMI

respect to each other so as to form alternating ridges and grooves between the juxtaposed facets,

(b) the individual ridges when viewed in transverse crosssection, each including two of said facets intersecting at an apex that is located on a reference line for each ridge extending radially outward from said central axis, and

(c) the individual ridges that are located in predetermined sectors of the inner surface each having one of its two facets disposed at a much smaller angle with respect to its said reference line than the other of said two facets so that such ridge is highly bilaterally asymmetrical with respect to said reference line, and in which:

(d) said metal wall, considered apart from all the ridges and grooves on the inner surface thereof, is substantially radially symmetrical with respect to said central axis,

(e) said reflector is made by a spinning operation in which a blank constituted by a sheet of metal is spun into said dome-shaped form about a mandrel that has grooves therein conforming to the shape of said ridges on the inner surface of the reflector, the spinning operation rotating said blank and said mandrel about an axis of rotation substantially coinciding with said central axis,

(f) said ridges are characterized by being of extruded metal forced into said mandrel grooves and by a height at their apices that is less than the thickness of the metal sheet constituting such blank.

---

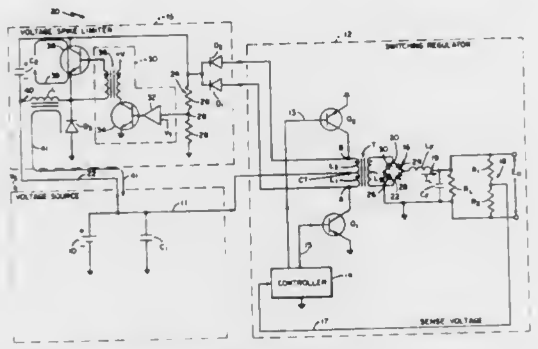
### 5,014,176
## SWITCHING CONVERTER WITH SPIKE LIMITING CIRCUIT

**John J. Kelleher, Jr., Peabody, and Donald W. Shute, Burlington, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed Feb. 21, 1989, Ser. No. 312,797**

**Int. Cl.⁵ H02M *3/337***

U.S. Cl. 363—26 **10 Claims**



1. A switching circuit comprising:

(a) means for providing a DC voltage;

(b) a transformer having a pair of inductively coupled, serially connected, primary windings;

(c) means for electrically coupling the DC voltage means across a first one of the pair of windings during a first portion of a cycle and for inducing a voltage in a second one of the pair of windings during such first portion of the cycle, and for electrically coupling the DC voltage means across the second one of the pair of windings during a second, subsequent portion of the cycle and for inducing a voltage in the first one of the pair of windings during such second portion of the cycle;

(d) means, responsive to an excess voltage corresponding to a level of the voltage induced in the pair of windings exceeding a predetermined voltage, for directing energy related to said excess voltage back to the DC voltage means, said directing means comprising:

a capacitor fed by the excess voltage;

inductive means for storing energy;

switching means, responsive to a control signal, for electrically coupling the capacitor to the inductive means to transfer energy corresponding to the excess voltage stored in the capacitor to said inductive means, for electrically decoupling the capacitor from the inductive means to the DC voltage means to transfer the energy stored in the inductive means to the DC voltage means; and

means for controlling the switching means comprising:

a voltage divider connected in shunt with the capacitor, fed by the excess voltage, to provide a voltage proportional to the excess voltage stored in the capacitor; and

means, coupled to the voltage divider and fed by a reference voltage, for producing the control signal in response to changes in the excess voltage stored in the capacitor relative to said reference voltage.

---

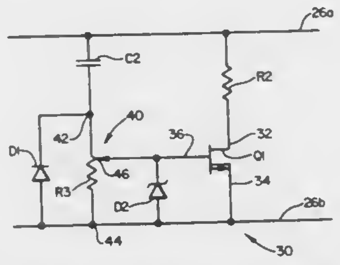
### 5,014,177
## DC-LINK RIPPLE REDUCTION CIRCUIT

**Paul E. Nuechterlein, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Dec. 19, 1989, Ser. No. 452,347**

**Int. Cl.⁵ H02M *1/14***

U.S. Cl. 363—45 **8 Claims**



1. A ripple reduction circuit for reducing ripple inn DC power carried by first and second conductors, comprising:

a controllable switch having main current path electrodes and a control electrode;

an impedance coupled to one of the main current path electrodes such that the controllable switch and the impedance together form a series combination which is coupled between the first and second conductors; and

gating circuitry coupled between one of the conductors and the control electrode for closing the controllable switch when AC ripple power is carried by the conductors whereby at least a portion of the AC ripple power is removed from the conductors and delivered to the impedance, wherein the gating circuitry includes a capacitor coupled to the first conductor and a potentiometer having a first and coupled to the capacitor, a second end coupled to the second conductor and a wiper coupled to the control electrode of the controllable switch.

---

### 5,014,178
## SELF POWERING TECHNIQUE FOR INTEGRATED SWITCHED MODE POWER SUPPLY

**Balu Balakrishnan, Saratoga, Calif., assignor to Power Integrations, Inc., Mountain View, Calif.**

**Filed May 14, 1990, Ser. No. 522,557**

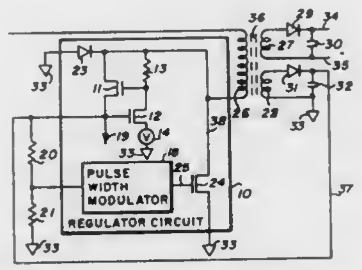
**Int. Cl.⁵ H02M *3/335***

U.S. Cl. 363—49 **7 Claims**

1. A regulator circuit connected to a transformer, the transformer having a first terminal of a primary winding connected to a rectified D.C. voltage signal, and a feedback winding, a feedback capacitor in series with a rectifier diode being coupled across the feedback winding of the transformer, the regulator circuit comprising:

a high voltage switching transistor, having a gate and a drain, the drain being coupled to a second terminal of the primary winding of the transformer;

switching means, coupled to the gate of the high voltage switching transistor, for switching the high voltage switching transistor on and off at a duty cycle, the duty cycle varying with a voltage level across the feedback capacitor; and,



high voltage power up transistor having a drain coupled to the drain of the high voltage switching transistor, having a gate, coupled through a resistance to the drain of the high voltage power up transistor, and having a source coupled to the feedback coupler.

---

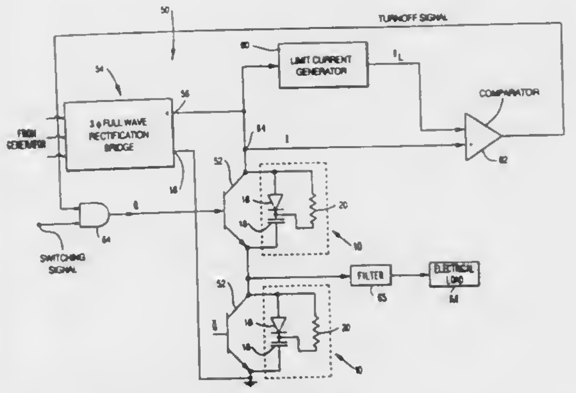
### 5,014,179
## TRANSISTOR LOAD-LINE CONTROLLER

**Thomas S. Latos, Huntley, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Oct. 11, 1989, Ser. No. 419,947**

**Int. Cl.⁵ H02M *3/335***

U.S. Cl. 363—56 **12 Claims**



1. A transistor circuit comprising:

a bipolar transistor having a base and an emitter and collector coupled to a source of variable DC potential;

an electrical load coupled between the source of variable DC potential and one of the emitter and collector;

means, responsive to the variable DC potential, for producing a signal specifying a maximum current limit as a function of collector to emitter voltage during turning off which the transistor may switch without damage;

a current sensor, coupled to the transistor circuit, for sensing current flow to the load from the source of DC potential; and

a comparator, responsive to the current limit and the current flow to the load, for providing on an output a turnoff signal to the base of the transistor when the current flow exceeds the current limit.

---

### 5,014,180
## LOSSLESS SNUBBER CIRCUIT

**Paul E. Nuechterlein, Rockford, Ill., assignor to Sundstrand Corporation, Arlington Heights, Ill.**

**Filed Dec. 11, 1989, Ser. No. 448,312**

**Int. Cl.⁵ H02H *7/122***

U.S. Cl. 363—56 **9 Claims**

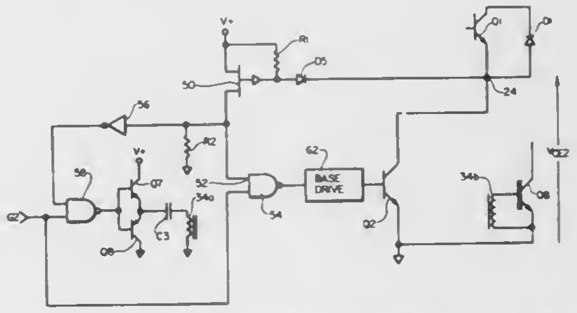
1. A snubber circuit for a power switch having main current path electrodes and a control electrode and alternately operated in on and off states in response to a gating signal, comprising:

a capacitor coupled across the main current path electrodes;

an inductor having a first end coupled to one of the main current path electrodes of the power switch and a second end;

a controllable switch operable in on and off states and having a first main current path electrode coupled to the second end of the inductor, a second main current path electrode coupled to the other main current path electrode of the power switch and a control electrode; and

means coupled to the control electrodes of the power switch and the controllable switch and responsive to the gating signal and a voltage across the main current path electrodes of the power switch for operating the switches whereby the controllable switch is turned on when the gating signal is commanding turn on of the power switch and the voltage across the main current path electrodes of the power switch is above a certain level so that the capacitor is discharged through the inductor and whereby the controllable switch is subsequently turned off and the power switch turned on when the gating signal is commanding turn-on of the latter switch and the voltage across the main current path electrodes thereof falls below the certain level.



---

### 5,014,181
## MAGNETIC AMPLIFIER PACKAGE AND METHOD OF COOLING THE SAME

**W. Kyle Anderson, Rockford; Merle L. Bennett, Cherry Valley, both of Ill.**

**Filed Nov. 6, 1989, Ser. No. 431,827**

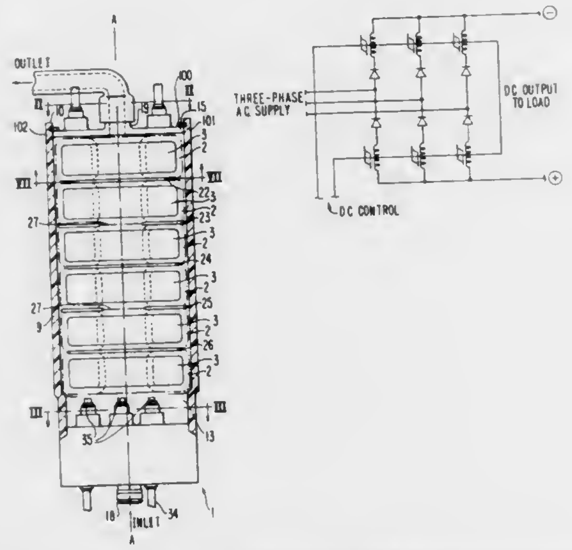
**Int. Cl.⁵ H02M *7/06***

U.S. Cl. 363—126 **14 Claims**

1. A magnetic amplifier package comprising a diode rectifier, a plurality of saturable reactors arranged along a longitudinal axis of the package, means for housing the diode rectifier and the saturable reactors, said means for housing including an inlet for cooling fluid and an outlet for cooling fluid, wherein passage means are provided for circulating coolant between

VOL
1126
ISS
1
MY
7
1991
UMI

said inlet and said outlet for cooling both said diode rectifier and said saturable reactors and wherein said saturable reactors



are in the form of toroids which are arranged in stacked relation along the longitudinal axis of the package.

---

### 5,014,182
## HIGH FREQUENCY SELF-OSCILLATING INVERTER WITH NEGLIGIBLE SWITCHING LOSSES

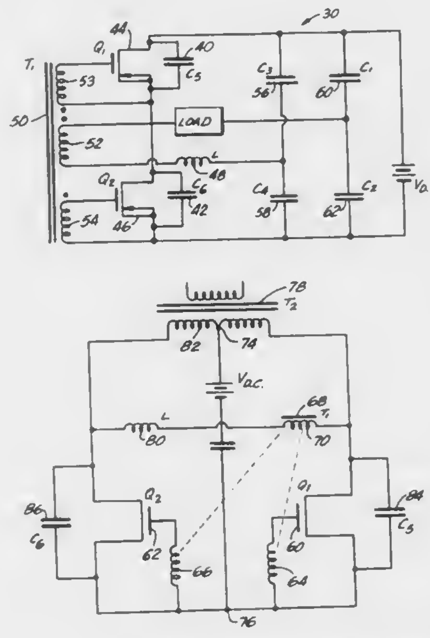
**Itzchak Cohen, Dix Hills, N.Y., assignor to Lambda Electronics Inc., Melville, N.Y.**

**Filed Apr. 19, 1989, Ser. No. 340,279**

**Int. Cl.$^5$ H02M** *7/5383*

**U.S. Cl. 363—132** **6 Claims**

1. A high frequency self oscillating inverter having a low switching loss characteristic, said inverter comprising:
  (1) a source of d.c. power;
  (2) a load circuit;
  (3) a switching circuit between said source and said load for supplying alternating current to said load circuit; said switching circuit including:
    (a) first and second switching devices for alternately switching said alternating current, said devices being alternately switched to a conductive state separated by a dead period when neither is conductive;
  (4) a snubber circuit associated with said switching circuit for reducing both turn-on and turn-off switching losses, said snubber circuit comprising a resonant circuit which includes:
    (a) first and second snubber capacitance means respectively shunting said first and second switching devices;
    (b) resonating inductance for forming with said snubber capacitance means, said resonant circuit;
    (c) means for effectively disabling said resonant circuit except for dead periods between the conduction times of said first and second switching devices, whereby a voltage level exchange between said snubber capacitances means occurs during said dead periods.



---

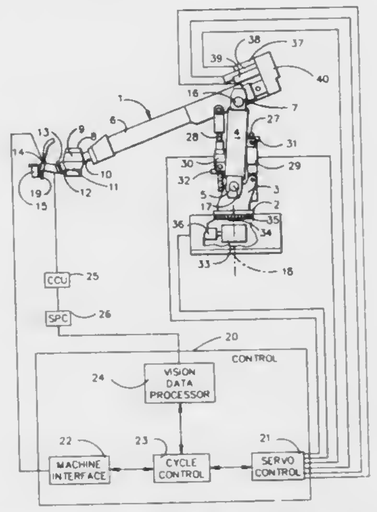
### 5,014,183
## METHOD AND MEANS FOR PATH OFFSETS MEMORIZATION AND RECALL IN A MANIPULATOR

**Kurtis R. Carpenter, and Joseph W. Schnelle, both of Greenwood City, S.C., assignors to Cincinnati Milacron, Inc., Cincinnati, Ohio**

**Filed Oct. 31, 1988, Ser. No. 264,350**

**Int. Cl.$^5$ G06F** *15/46*

**U.S. Cl. 364—167.01** **10 Claims**



1. In a method for controlling motion of a tool center point along a predetermined path between two predetermined points, the tool center point being associated with a function element carried by a manipulator and the motion being effected by repeated production of intermediate point coordinate signals representing intermediate points along the predetermined path and translation by the manipulator of the tool center point from one intermediate point to another, the improvement comprising the steps of:

  a. producing coordinate adjust signals during an initial pass of the tool center point along the predetermined path, the coordinate adjust signals representing coordinate offset values equal to a displacement of a desired location of the tool center point from an intermediate point;
  b. periodically memorizing the coordinate adjust signals at a predetermined distance interval measured along the predetermined path; and
  c. during a subsequent pass along the predetermined path, modifying the intermediate point coordinate signals in response to the memorized coordinate adjust signals to cause the tool center point to traverse a desired path displaced from the predetermined path.

---

### 5,014,184
## DATA INPUT APPARATUS AND CONTROL METHOD THEREFOR

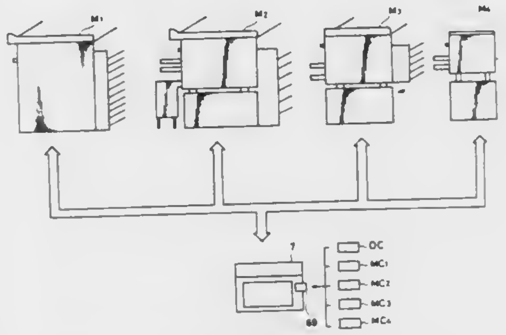
**Masazumi Ito, and Kimihiko Higashio, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 29, 1988, Ser. No. 291,953**

**Claims priority, application Japan, Dec. 29, 1987, 62-333312; Dec. 29, 1987, 62-333313; Dec. 29, 1987, 62-333314; Dec. 29, 1987, 62-333315; Dec. 29, 1987, 62-333316; Apr. 1, 1988, 63-81608**

**Int. Cl.$^5$ G03G** *15/00;* **G05B** *19/04*

**U.S. Cl. 364—188** **24 Claims**



4. A data input apparatus comprising:
attachable memory means which can be attached to and detached from said data input apparatus as well as a plurality of types of machines which are separate from said data input apparatus;
first input means for inputting desired machine control data;
first memory means, located in said data input apparatus, for storing said input desired machine control data;
second input means for inputting a plurality of capacity data each corresponding to said plurality of machines;
second memory means for storing said input capacity data;
comparing means for comparing said desired machine data with said plurality of capacity data;
display means for displaying any one of said machines capable of operating based on said input desired machine control data in accordance with the comparing result of said comparing means; and
recording means for recording said desired control data stored in said first memory means on said attachable memory means.

---

### 5,014,185
## LOOP CONTROL APPARATUS

**Takashi Saito; Hideyuki Fujiwara, and Kenji Kubo, all of Kanagawa, Japan, assignors to Japan Tobacco, Inc., Japan**

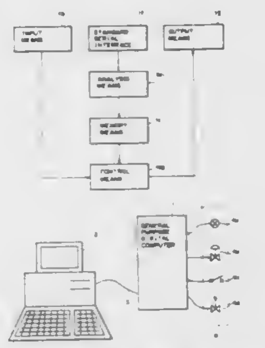
**Filed Mar. 20, 1989, Ser. No. 325,831**

**Claims priority, application Japan, Apr. 27, 1988, 63-102587**

**Int. Cl.$^5$ G06F** *15/46*

**U.S. Cl. 364—188** **5 Claims**

1. A loop control apparatus comprising:
input means for receiving process values from a system under control;
output means for outputting manipulate values to said system under control;
a serial interface for communicating with external devices;
analytical means for performing word analysis and syntax analysis of information in the form of trains of characters which are inputted through said serial interface, and for providing output information including instrument design information and loop control function information;
memory means including an instrument information area for storing instrument parameters associated with a plurality of control elements and an operational equation area for storing said loop control function information;



control means for processing said process value in accordance with said loop control function information to provide said manipulative value to thereby perform the loop control of said system,
said analytical means including:
  instrument design means providing said instrument design information for defining and registering a plurality of parameters for a plurality of control elements, assigning names of the control elements, setting control parameters and setting ranges for engineering quantities corresponding to ranges of said process values, and
  operational equation design means providing said loop control function information for establishing a loop control function for said control means.

---

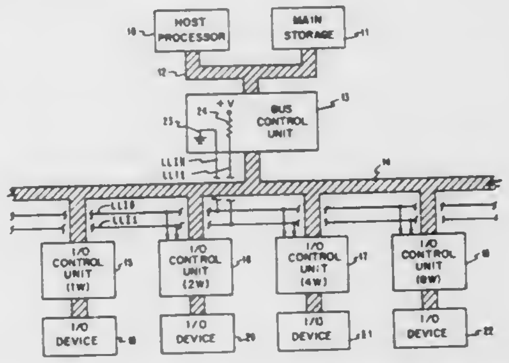
### 5,014,186
## DATA-PROCESSING SYSTEM HAVING A PACKET TRANSFER TYPE INPUT/OUTPUT SYSTEM

**Douglas R. Chisholm, Delray Beach, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 891,845, Aug. 1, 1986, abandoned. This application Sep. 27, 1988, Ser. No. 250,996**

**Int. Cl.$^5$ G06F** *3/00, 13/00*

**U.S. Cl. 364—200** **8 Claims**



1. In a data processing system having a system bus coupling I/O units which I/O units transmit data word packets to a system storage unit with a predetermined data work line size

VOL
1126
ISS
1
MY
7
1991
UMI

through a bus control unit for passing the data word packets between the storage system and the I/O units, the improvement comprising:

means for supplying to the I/O units a line size signal representing the data word line size of the system storage unit;

and means located in at least one of the I/O units and responsive to the data word line size signal for adjusting the data words per packet size of the I/O unit to match the system storage unit data word line size;

whereby the words per packet transferred from or to the I/O unit match the data word line size of the system storage unit.

### 5,014,187
### ADAPTING DEVICE FOR ACCOMMODATING DIFFERENT MEMORY AND BUS FORMATS

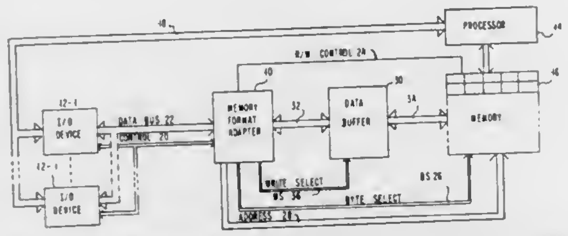
**Jean-Claude Debize, Nice; Yves Hartmann, Vence; Pierre Huon, St. Laurent Du Var, and Michel Peyronnenc, St. Jeannet, all of France, assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed May 13, 1988, Ser. No. 193,867**

**Claims priority, application European Pat. Off., Aug. 20, 1987, 8748008.9**

**Int. Cl.$^5$ G06F** *12/00*

**U.S. Cl. 364—200** **10 Claims**



1. Memory access control device to be used to access a memory organized in $2^n$ byte words and having the capability of addressing each byte in a word under control of byte select signals (BS), through a m-byte wide data bus, with $2^n/m$ being an integer k, where k is higher than 1, to write data byte bursts comprising a variable count of bytes, characterized in that it comprises:

clocking means (**60**, **70**, **76**) which provide a number equal to said integer k of non-overlapping pulse streams (T1, T2) having the same period T; and

memory format adapting means comprising:

$2^n$ gating means making up a number equal to said integer k of sets of gating means, each set being responsive to one of said k non-overlapping pulse streams, each gating means of each set being connected so as to receive a data byte from said data bus to provide it on its output when activated by the pulse stream;

$2^n$ register means (**40**), each register means being connected to the output of a gating means in such a way that at the end of a T period, $2^n$ bytes are stored in the register means,

buffering means (**30**) comprising successive locations of $2^n$ positions, each position being able to store one byte under control of a write select signal,

alignment and control means (**42**) which are active for a memory write operation and are responsive to the values of n least significant bits of the starting memory address which determine the byte location within the memory words, to the byte count and to the non-overlapping pulse streams to selectively activate the write select signals relative to each buffer byte position and to write the register means contents in parallel in the selected positions of successive buffer locations in such a way that the buffer content maps the arrangement of the data burst which is to be written into the memory; and

end of loading detecting means responsive to the count of bytes in the burst and to one pulse stream among the k pulse streams to generate an end of loading signal indicative that the burst is loaded into the buffering means; and

memory writing control means (**192**,**168**) responsive to the end of loading signal to selectively activate the byte select signals (BS) as a function of the least significant bits of the starting memory address so as to transfer the buffer content to the memory from the byte location in the first word defined by the starting memory address.

### 5,014,188
### CACHE MEMORY CONTROLLOR ASSOCIATED WITH MICROPROCESSOR

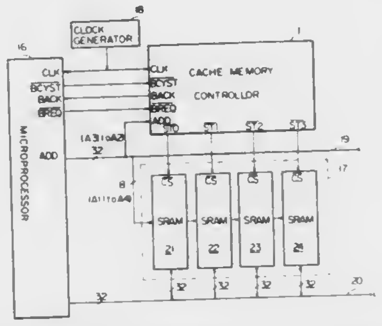
**Eiji Kawamura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Apr. 12, 1989, Ser. No. 337,004**

**Claims priority, application Japan, Apr. 12, 1988, 63-90510**

**Int. Cl.$^5$ G06F** *13/28*

**U.S. Cl. 364—200** **11 Claims**



1. A cache memory controllor used in a data processing system including a cache memory provided with a plurality of memory devices, a main memory and a data processing unit providing an external address partially to the cache memory and partly to the cache memory controllor, said cache memory controllor being selectively shifted in response to request signals from the data processing unit, in a burst transmission mode and a discrete transmission mode, comprising:

(a) a controlling circuit supplied with high-order bits of said external address signal fed from said data processing unit and producing a hit signal when data words stored in respective addresses partially represented by the high-order bits are stored in said cache memory, said controlling circuit further being shifted into a swapping mode so as to swap data words between said main memory and said cache memory if said data words are not stored in the cache memory;

(b) an address generating circuit for storing low-order bits of said external address signal in the presence of a first activation signal and producing internal address bits indicative of one of said memory devices in said discrete transmission mode, means in said address generating circuit for incrementing said internal address bits in the presence of a second activation signal in said burst transmission mode so as to sequentially indicate said memory chips;

(c) a strobe signal producing circuit responsive to said second activation signal and producing a single strobe signal on the basis of said internal address bits received from the address generating circuit for activating one of said memory devices in said discrete transmission mode, said strobe signal producing circuit sequentially producing strobe signals on the basis of said internal address bits incremented in value in the presence of said second activation signal for activating said memory devices in succession; and

(d) a timing generating circuit producing said first activation signal in the presence of said hit signal and a bus cycle signal, said timing generating circuit further producing said second activation signal in the presence of said bus cycle signal, said second activation signal being maintained for a predetermined time period in the presence of a request signal for said burst transmission-mode fed from said data processing unit for allowing said internal address bits to be incremented in value.

### 5,014,189
### PROCESSOR ARRAY COMPRISING PROCESSORS CONNECTED SELECTIVELY IN SERIES OR IN PARALLEL

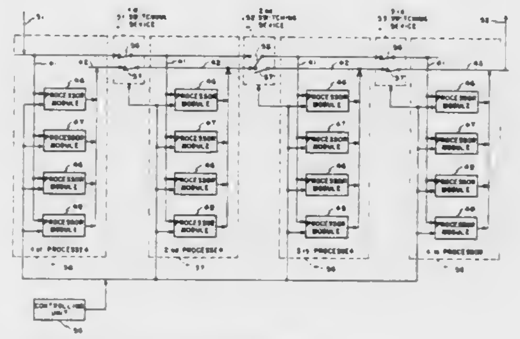
**Ichiro Tamitani, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Continuation of Ser. No. 67,377, Jun. 26, 1987, abandoned. This application Jan. 17, 1990, Ser. No. 465,529**

**Claims priority, application Japan, Jun. 27, 1986, 61-149438; Oct. 31, 1986, 61-258386**

**Int. Cl.$^5$ G06F** *15/80, 15/16*

**U.S. Cl. 364—200** **10 Claims**



1. A processor array comprising:

an array input bus;

an array output bus;

first through N-th processors, N being representative of a predetermined integer which is at least two, each processor comprising a processor input bus, a processor output bus, and at least one processor module means coupled between said processor input and output buses, the processor input bus of said first processor being connected to said array input bus, the processor output bus of said N-th processor being connected to said array output bus;

first through (N-1)-th switching devices, each switching device being physically located between a preceding and a succeeding processor of two consecutively numbered ones of said first through said N-th processors, each of said first through said (N-1)-th switching devices comprising a first and a second switching unit, each of which is physically located between said preceding and said succeeding processors; and

controlling means for controlling the first switching unit of each of said first through said (N-1)-th switching devices so that one of the processor input and output buses of said preceding processor is selectively and physically connected to the processor input bus of said succeeding processor, said controlling means for further controlling the second switching unit of said each of said first through said (N-1)-th switching devices sot that the processor output bus of said preceding processor is coupled to the processor output bus of said succeeding processor only when said controlling means controls the first switching unit of said each of said first through said (N-1)-th switching devices so that the processor input bus of said preceding processor is connected to the processor input bus of said succeeding processor.

### 5,014,190
### DATA PROCESSING SYSTEM

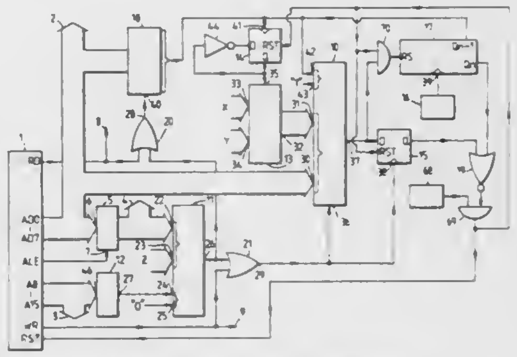
**Nigel L. Johnson, Wisbech, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 2, 1987, Ser. No. 116,414**

**Claims priority, application United Kingdom, Nov. 3, 1986, 8626198**

**Int. Cl.$^5$ G06F** *11/00*

**U.S. Cl. 364—200** **15 Claims**



1. A digital data processing system comprising:

(a) a watch-dog circuit, which circuit comprises:
  (i) timer means; and
  (ii) a reset signal input coupled to the timer means; said watch-dog circuit generating:
  (iii) an output signal when
    (A) a time interval between successive resets of said timer means exceed a predetermined length; or
    (B) a reset signal is supplied to said reset signal input while a further signal is absent; and
  (iv) the further signal, at time intervals which do not exceed said predetermined length; and
(b) a system program for:
  (i) supplying a reset signal to said reset signal input, and thereby resetting the timer means, during each occurrence of said further signal; and
  (ii) responding to said output signal by assuming a predetermined state, wherein said system is further for:
  (iii) periodically testing for the presence of said further signal,
  (iv) responding to such presence being detected by supplying a reset signal to said reset signal input while said further signal is still present, and
  (v) performing program steps unrelated to the watchdog circuit between each detection of the presence of said further signal and the subsequent supply of the reset signal in response.

### 5,014,191
### SECURITY FOR DIGITAL SIGNAL PROCESSOR PROGRAM MEMORY

**Ajay J. Padgaonkar, 9617 S. 43rd Pl., Phoenix, Ariz. 85044, and Sumit K. Mitra, 8860 S. Drea La., Tempe, Ariz. 85284**

**Filed May 2, 1988, Ser. No. 189,189**

**Int. Cl.$^5$ G06F** *12/14*

**U.S. Cl. 364—200** **3 Claims**

1. A microprocessor adapted to provide security with respect to information contained in internal processor memory during execution from an external program memory, comprising

internal program memory means for storing a program to be executed by said processor with respect to incoming signals to said processor, said internal program memory means being adapted to be reprogrammed and read repeatedly in response to receipt of write and read instructions therefor,

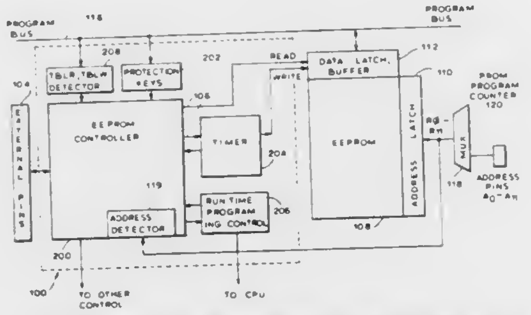
processing means for receiving and processing said incoming signals in accordance with said program, and

VOL
1126
ISS
1
MY
7
1991
UMI

security means for providing two levels of security against access to information contained in said internal program memory, said security means including

means for generating a security signal when the internal program memory is to be made secure,

means responsive to said security signal for selectively preventing access to said internal program memory upon receipt of write or read instructions therefor by said microprocessor from a source external to said microprocessor, and



means further responsive to said security signal for selectively disabling execution of any program from a source external to said microprocessor.

---

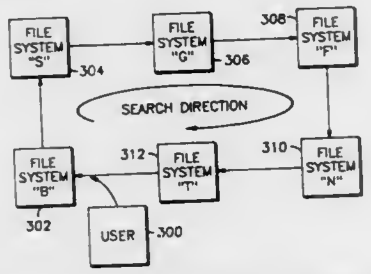
## 5,014,192
## SYSTEM FOR LOCATING A FILE IN A LOGICAL RING BY SEQUENTIALLY FORWARDING ACCESS REQUEST WITH FILE SYSTEM NAME AND FILE NAME

**Bruce M. Mansfield, Kent, Wash.; Frank C. Kolnick, and Andrew I. Kun, both of Willowdale, Canada, assignors to Motorola Computer X, Inc., Kent, Wash.**

**Continuation of Ser. No. 110,614, Oct. 19, 1987, abandoned, which is a continuation of Ser. No. 730,929, May 6, 1985, abandoned. This application Jan. 19, 1989, Ser. No. 300,687**

**Int. Cl.⁵ G061** *13/42*

**U.S. Cl. 364—200** **8 Claims**



5. A data management system for use in a data processing system comprising:

at least one processor for executing instructions;

at least one memory storage unit coupled to said at least one processor, said memory storage unit storing instructions and data;

a plurality of individual file systems contained in said at least one memory storage unit;

means responsive to the execution of an instruction by said at least one processor for generating an access request for a file having a given file name in at least one of said file systems having a specified file system name, said access request specifying said file name and said file system name;

means responsive to said access request generating means for transmitting said access request to one of said file systems;

first means responsive to the receipt of said access request for determining whether said one file system has said specified file system name, and, if so, generating a first control signal, but if not, generating a second control signal;

second means responsive to said first control signal for determining whether said access request can be satisfied by said file system having said specified file system name, and, if so, for satisfying said access request and generating a first indication of a successful access to said file directly to said at least one processor, and, if not, for generating a second indication of an unsuccessful access to said file;

third means responsive to said access request generating means, to said second control signal, and to said second indication for automatically forwarding said access request to successive, different file systems whereby:

(a) if said access request is forwarded to a file system having said specified file system name, said first control signal is generated by said first means, in which case said second means either generates said first indication or said second indication, depending upon whether said file is successfully or unsuccessfully accessed, respectively, and

(b) if said access request is forwarded to a file system not having said specified file system name, said first means generates said second control signal,

said third means ceasing to forward said access request after all of said file systems have been unsuccessful accessed and generating a third indication of an unsuccessfully access to said file directly to said at least one processor.

---

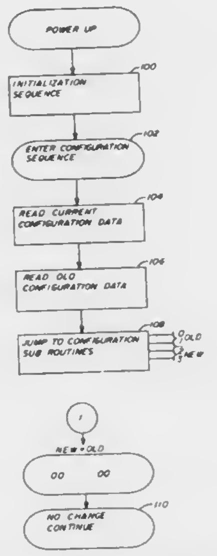
## 5,014,193
## DYNAMICALLY CONFIGURABLE PORTABLE COMPUTER SYSTEM

**Paul M. Garner, The Woodlands; Carrie Boone, and Darren J. Cepulis, both of Houston, all of Tex., assignors to Compaq Computer Corporation, Houston, Tex.**

**Filed Oct. 14, 1988, Ser. No. 258,148**

**Int. Cl.⁵ G06F** *11/00*

**U.S. Cl. 364—200** **9 Claims**


POWER UP
100
INITIALIZATION SEQUENCE
102
ENTER CONFIGURATION SEQUENCE
104
READ CURRENT CONFIGURATION DATA
106
READ OLD CONFIGURATION DATA
108
JUMP TO CONFIGURATION SUB ROUTINES
OLD
NEW
1
NEW • OLD
00
00
110
NO CHANGE CONTINUE

1. In a computer system including a processor, system memory, a housing, provisions for connecting one or more peripheral devices such as disk drives, serial printers, or modems into the computer system internal or external to the housing and peripheral status data storage means for storing data relating to any connected peripheral devices, a dynamic configuration means for automatically initializing system peripheral configuration data on system power-up, said dynamic configuration means comprising:

(a) system configuration status means for storing data indicative of internal and external peripheral device status;

(b) former status means for storing data indicative of the status of internal and external peripheral devices when the system was last used;

(c) current status means for determining the current status of internal and external peripheral devices and developing data indicative thereof;

(d) means coupled to said former status means and said current status means for determining differences between said data of said former status means and said current status means; and

(e) means coupled to said difference determining means and said system configuration status means for automatically updating said data stored in said system configuration status means based upon said determined differences between said former status data and said current status data.

---

## 5,014,194
## SYSTEM FOR REDUCING I/O CONTROLLER OVERHEAD BY USING A PERIPHERAL CONTROLLER FOR PRODUCING READ, WRITE, AND ADDRESS TRANSLATION REQUEST SIGNALS

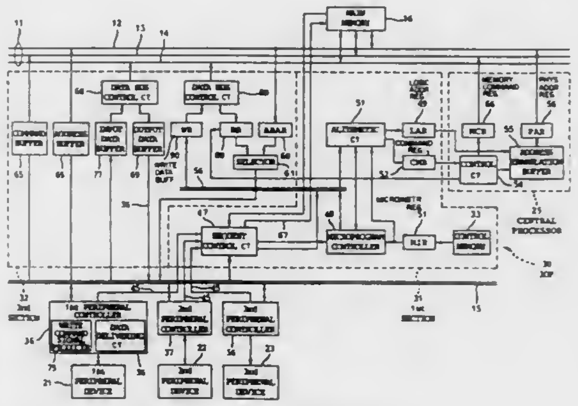
**Kouichi Itoh, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Aug. 27, 1987, Ser. No. 89,785**

**Claims priority, application Japan, Aug. 28, 1986, 61-200186**

**Int. Cl.⁵ G06F** *13/12, 13/14, 9/312, 12/10*

**U.S. Cl. 364—200** **3 Claims**



1. A data processing system comprising:

a first and a second bus;

an input-output processor connected to said first and said second buses;

a main memory comprising a program area and a data area, said program and said data areas being connected to said first bus, said program area storing a channel program including command and address bits representative of a channel command and of a logical data address;

a peripheral controller comprising memory means connected to said second bus and translation request signal producing means connected to said second bus and to said memory means;

said memory means storing said command and address bits which are received from said program area through said first bus, said input-output processor, and said second bus with said channel command and said logical data address stored as a stored command and a stored data address, said memory means being furthermore for delivering stored data address signals representative of said stored data address to said second bus;

said translation request signal producing means being for producing a translation request signal and for delivering said translation request signal to said second bus when supplied from said memory means with a stored command signal representative of said stored command and moreover when data transfer is indicated by said stored command; and

a central processor which comprises translating means connected to said first bus and coupled to said second bus through said input-output processor, said translating means being for translating said stored data address to a physical data address and for delivering a physical data address signal representative of said physical data address to said first bus in response to said translation request and said stored data address signals which are received from said second bus under control of said input-output processor;

said data transfer being carried out between the physical data address of said data area and said peripheral controller through said input-output processor and said first and said second buses in response to said physical data address signal which is delivered to said first bus;

said peripheral controller further comprising read command signal producing means connected to said second bus and to said memory means, said read command signal producing means being for producing a read command signal and for delivering said read command signal to said second bus in response to said physical data address signal which is received from said first bus through said input-output processor and said second bus;

said input-output processor comprising data reading means connected to said first and said second buses and to said data area, said data reading means being responsive to said read command signal received from said second bus for reading data from the physical data address of said data area through said first bus and for delivering said data to said second bus; and

said peripheral controller operating in response to data received from said second bus.

---

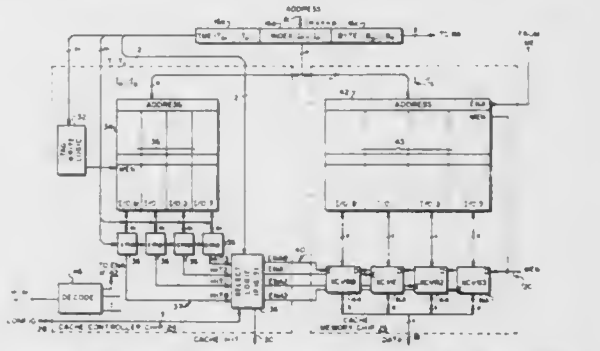
## 5,014,195
## CONFIGURABLE SET ASSOCIATIVE CACHE WITH DECODED DATA ELEMENT ENABLE LINES

**James A. Farrell, Marlboro, and Richard L. Sites, Boylston, both of Mass., assignors to Digital Equipment Corporation, Inc., Mass.**

**Filed May 10, 1990, Ser. No. 522,503**

**Int. Cl.⁵ G11C** *13/00*

**U.S. Cl. 364—200** **7 Claims**



1. A set associative cache for operating on an input main memory address, the input main memory address including a tag field and index field, comprising:

A. a tag array providing, in response to the index field, a plurality of tag elements in parallel, the plurality of tag elements being equal to a predetermined maximum set size into which the cache can be configured;

B. a plurality of tag comparators, each tag comparator arranged to receive a corresponding one of the tag elements and the tag field, and each tag comparator asserting a corresponding tag hit signal when its received tag element matches the tag field;

C. a data array providing, in response to the index field, a plurality of data elements, the plurality of data elements being equal to the predetermined maximum set size;

D. a data element select logic circuit providing, in response to the tag field and the plurality of tag hit signals, a plurality of decoded data element enable signals, the plurality of

VOL
1126
ISS
1
MY
7
1991
UMI

decoded data element enable signals being equal to the predetermined maximum set size; and

E. multiplexing means, arranged to receive the plurality of data elements and the plurality of decoded data element enable signals, for enabling access to a selected one of the data elements.

---

### 5,014,196
## VECTOR OPERATION INSTRUCTION ACTIVATION CONTROLLER FOR VECTOR ARITHMETIC UNITS HAVING ARITHMETIC FUNCTIONS WITH DIFFERENT NUMBERS OF PIPELINE STAGES

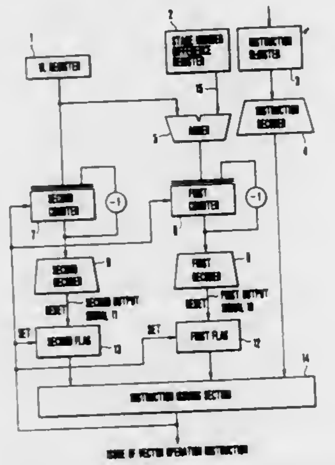
**Hideo Hayashi, Tokyo, and Makoto Omata, Yamanashi, both of Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Feb. 28, 1989, Ser. No. 316,962**

**Claims priority, application Japan, Mar. 4, 1988, 63-50755**

**Int. Cl.⁵ G06F** *9/38, 15/347*

**U.S. Cl. 364—200** **5 Claims**



1. A vector operation instruction issue control method for activating a vector operation instruction in a vector arithmetic unit including two arithmetic functions having different number of pipeline stages, comprising the steps of:

measuring, using a first counter, a first time period corresponding to a sum of both a number of vector elements of a vector operation instruction and a difference between the number of pipeline stages of the two arithmetic functions,

measuring, using a second counter, a second time period corresponding to the number of vector elements of the vector operation instruction whenever the vector operation is issued;

simultaneously activating said first and second counters whenever a vector operation instruction using an arithmetic function having a larger number of pipeline stages is issued to said vector arithmetic until; and

activating said second counter whenever a vector operation instruction using an arithmetic function having a smaller number of pipeline stages is issued, said vector operation instruction being activated in said vector arithmetic unit whenever at least one of said first and second counters measures said first and second time period respectively.

---

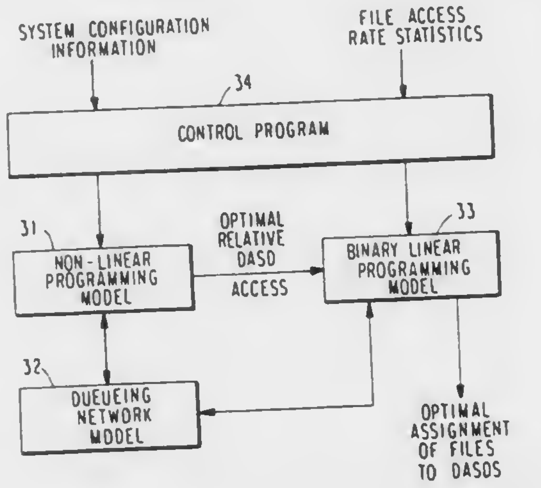
### 5,014,197
## ASSIGNMENT OF FILES TO STORAGE DEVICE USING MACRO AND MICRO PROGRAMMING MODEL WHICH OPTIMIZED PERFORMANCE OF INPUT/OUTPUT SUBSYSTEM

**Joel L. Wolf, Goldens Bridge, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 2, 1988, Ser. No. 240,029**

**Int. Cl.⁵ G06F** *9/22, 13/10*

**U.S. Cl. 364—200** **6 Claims**


SYSTEM CONFIGURATION INFORMATION
FILE ACCESS RATE STATISTICS
34
CONTROL PROGRAM
31
NON-LINEAR PROGRAMMING MODEL
OPTIMAL RELATIVE DASD ACCESS
33
BINARY LINEAR PROGRAMMING MODEL
32
QUEUEING NETWORK MODEL
OPTIMAL ASSIGNMENT OF FILES TO DASDS

1. In a data processing system having one or more central processing units and a plurality of direct access storage devices, said direct access storage devices being grouped in a plurality of collections with the direct access storage devices in each collection being connected serially to a respective one of a plurality of head of strings, said head of strings each being attached to one or more storage directors of a controller, said storage directors each being attached to one or more channels which are, in turn, connected to one of said central processing units, said channels, storage directors, head of strings and direct access storage devices constituting a computer input-/output subsystem a method performed by said data processing system for improving the performance of said computer input-/output subsystem, said method including a macro model and a micro model and comprising steps of:

inputing to a non-linear programming model configuration and performance characteristics of said data processing system down through the direct access storage device level;

based on the data processing system configuration and using the non-linear programming model, determining optimal relative access rates of said direct access storage devices, said optimal relative access rates being evaluated by using a queuing network model, said inputing and determining steps comprising said macro model;

using said macro model only on initial configuration or reconfiguration of said data processing system;

using a binary linear programming model, measuring for each direct access storage device the distance between the optimal relative access rates as determined by said macro model and the sum of individual file access rates for data files assigned to that direct access storage device, and then summing measured distances for each direct access storage device across all direct access storage devices in the data processing system, said measuring and summing steps comprising said micro model;

using said micro model on a periodic basis to maintain optimal performance of said input/output subsystems; and

assigning filed to the direct access storage devices based on the results of said measuring and summing steps.

---

### 5,014,198
## IMAGE INFORMATION COMPRESSION APPARATUS

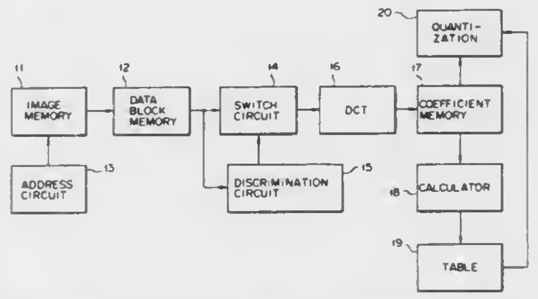
**Yoshiyuki Umemura, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 140,679, Jan. 4, 1988, abandoned. This application Apr. 3, 1990, Ser. No. 503,126**

**Claims priority, application Japan, Jan. 13, 1987, 62-3969**

**Int. Cl.⁵ G06F** *15/42, 15/62*

**U.S. Cl. 364—413.13** **11 Claims**



1. An image information compression apparatus comprising:

original image data output means for outputting original image data, including a region of interest and a region of non-interest, said region of interest having various densities;

orthogonal transformation means for orthogonally transforming said image data provided from said output means to obtain orthogonally-transformed coefficients;

bit allocation table means having a bit allocation table for determining bit assignments for the receptive orthogonally transformed coefficients;

table generating means for producing said bit allocation table, said table generating means including:

dividing means for dividing the original image data into a plurality of image data blocks,

discriminating means for excluding said image data blocks containing the region of non-interest and passing said image data blocks containing the region of interest, and

bit allocation transforming means for forming said bit allocation table from orthogonally-transformed coefficients which are produced from said orthogonal transformation means, in accordance with the image data blocks from said discriminating means so that said bit assignments for he respective oroghtogonally-transformed coefficients are adapted from only the image data containing the region of interest; and

quantizing means for quantizing said orthogonally-transformed coefficients for said image data blocks containing both the region of non-interest and the region of interest provided from said orthogonal transformation means in accordance with said bit allocation table means; and

switching means for deactivating said discriminating means when said quantizing means is activated.

---

### 5,014,199
## HEIGHT CONTROL SYSTEM IN AUTOMOTIVE SUSPENSION SYSTEM PREVENTIVE OF UNCOMFORTABLE HEIGHT ADJUSTMENT UPON ON-SET OF POWER SUPPLY

**Junkichi Konishi, and Yasuhiro Shiraishi, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed May 4, 1988, Ser. No. 190,073**

**Claims priority, application Japan, Jun. 13, 1987, 62-90971[U]**

**Int. Cl.⁵ B60G** *11/26*

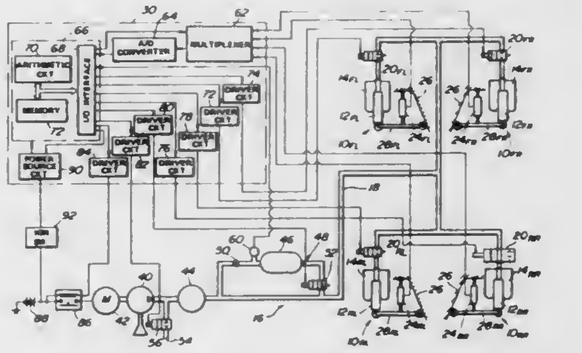
**U.S. Cl. 364—424.05** **17 Claims**

1. A height control system for an automotive suspension system, comprising:

a suspension system disposed between a vehicle body and a suspension member rotatably supporting a road wheel, said suspension system including means for varying suspension force to be exerted between said vehicle body and said suspension member;

a sensor monitoring a relative distance between said vehicle body and said suspension member for producing a height indicative sensor signal; and

a controlling means, connected to an electric power source, for receiving said sensor signal, and checking the value of said sensor signal with respect to a predetermined value for deriving a control signal to operate said varying means to adjust said suspension force for maintaining said relative distance between said vehicle body and said suspension member, said controlling means being responsive to turning OFF of a power supply switch interposed between said electric power source and said controlling means, for increasing said predetermined value by a given magnitude to perform suspension control for a given period of time to control said relative distance at a height corresponding to the increased predetermined value.



---

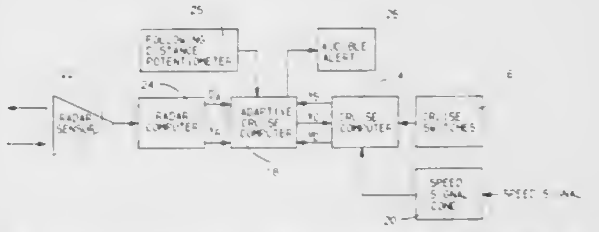
### 5,014,200
## ADAPTIVE CRUISE SYSTEM

**William J. Chundrlik, Rochester, and Pamela I. Labuhn, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 20, 1990, Ser. No. 481,261**

**Int. Cl.⁵ G06F** *15/50*

**U.S. Cl. 364—426.04** **4 Claims**



4. An adaptive cruise control method for controlling the distance from a source vehicle to a target vehicle, the system comprising the steps of:

sensing the speed $V_S$ of the source vehicle;

sensing the distance $D_A$ from the source vehicle to the target vehicle;

sensing the relative velocity $V_R$ between the source vehicle and the target vehicle;

providing an operator controlled signal representing an operator controlled reaction time $T_r$;

determining an alert distance $D_{alert}$ in accord with the expression

$$D_{alert}=(V_S^2/K_1)-\{(V_S-V_R)^2/K_2\}+T_rV_S.$$

where $K_1$ and $K_2$ are deceleration rate constants;

determining a desired trailing distance $D_D$ from the source vehicle to the target vehicle in accord with the expression

$$D_D=D_{alert}+X$$

VOL
1126
ISS
1
MY
7
1991
UMI

where X is a constant distance;
- determining a source vehicle command speed $V_C$ in accord with the expression

$$V_C=K_p(D_D-D_A)+(V_S-V_R)$$

where $K_p$ is a gain factor; and
- controlling the speed of the source vehicle to the source vehicle command speed $V_C$, whereby the speed of the source vehicle is controlled to maintain the distance to the target vehicle at the desired trailing distance $D_D$ that varies in accord with the operator controlled reaction time.

---

### 5,014,201

## AUTOMATIC CAR-SPEED CONTROLLER WITH DETECTION OF ABNORMALITY OF THE ELECTROMAGNETIC CLUTCH

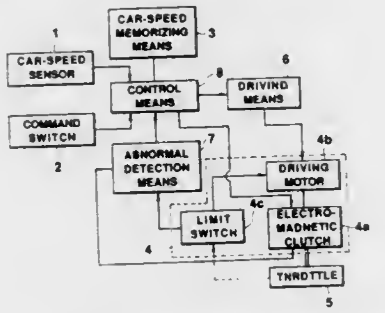
**Akihiko Tsukahara; Toshio Iwaoka; Yuichi Yamaguchi, and Tsutomu Danzaki, all of Yokohama, Japan, assignors to Jidosha Denki Kogyo K.K., Kanagawa, Japan**

**Filed Jan. 26, 1990, Ser. No. 470,661**

**Claims priority, application Japan, Jan. 27, 1989, 1-19233**

**Int. Cl.$^5$ G06F** *7/70;* **F02D** *31/00;* **B60K** *31/00. 31/14*

**U.S. Cl. 364—426.04** **4 Claims**



1. A speed control system for a vehicle having a vehicle throttle means comprising:
- a speed sensor producing a pulse train, the frequency of which is related to present vehicle speed;
- an operator actuable command switch for establishing a cruising operation;
- actuator means having a motor rotatable in forward and reverse directions and an electromagnetic clutch for transmitting the rotation torque of said motor to the vehicle throttle means;
- a driving circuit for driving said motor of said actuator means;
- controlling means connected to said speed sensor, said command switch, said actuator means and said driving circuit, said controlling means controlling said actuator means through said driving circuit corresponding to the operation mode selected by said command switch and to the frequency of the pulse train from said speed sensor;
- an exciting circuit connected between said controlling means and said electromagnetic clutch of said actuator means and means for exciting said electromagnetic clutch; and
- a cancel switch means connected to said controlling means and said exciting circuit, said cancel switch means producing a cancelling signal to deenergize said electromagnetic clutch of said actuator means;
- wherein said controlling means includes abnormality detecting means for detecting an abnormality in said electromagnetic clutch of said actuator means; and
- prevent means for preventing the energization of said electromagnetic clutch of said actuator means, which prevents the working of said actuator means, when said abnormality detecting means detects an abnormality in said electromagnetic clutch of said actuator means.

---

### 5,014,202

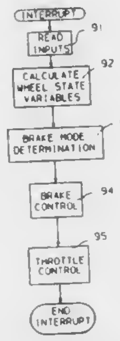
## VEHICLE TRACTION CONTROL SYSTEM

**David A. Thatcher, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 11, 1989, Ser. No. 350,242**

**Int. Cl.$^5$ B60K** *31/00*

**U.S. Cl. 364—426.03** **10 Claims**



1. A method of limiting spin of a wheel of a vehicle having an engine for applying a driving torque to the wheel, the system comprising the steps of:
- determining an excessive spin condition of the wheel resulting from an excessive driving torque applied thereto from the engine;
- sensing a predetermined wheel condition representing an initial wheel spin recovery condition;
- applying an initial control braking force to the wheel having a value increasing at a rate determined from a predetermined schedule of rates as a function of values of a predetermined engine torque related parameter; and
- terminating the initial control braking force to the wheel when the predetermined wheel condition representing an initial wheel spin recovery condition is sensed, whereby the initial control braking force is adaptive to the engine torque related parameter.

---

### 5,014,203

## ABNORMALITY DETECTING DEVICE FOR AN EGR SYSTEM

**Masaaki Miyazaki, and Hajime Kako, both of Himeji, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan**

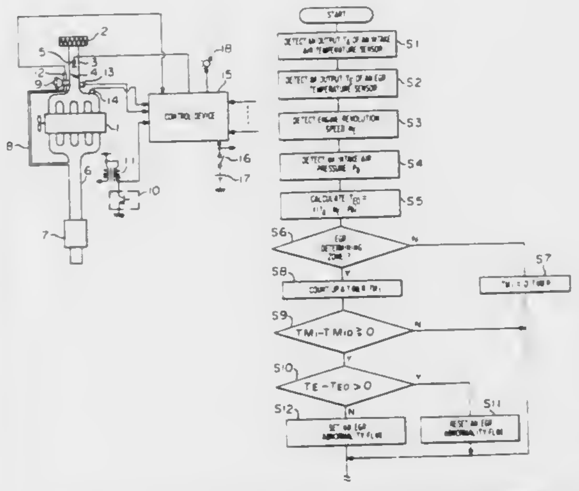
**Filed May 17, 1989, Ser. No. 353,279**

**Claims priority, application Japan, May 19, 1988, 63-124227**

**Int. Cl.$^5$ F02M** *25/07;* **G08B** *21/00*

**U.S. Cl. 364—431.06** **6 Claims**

1. An abnormality detecting device for an exhaust gas recirculation (EGR) system which comprises:
- an EGR valve disposed in an EGR passage to control a flow rate of exhaust gas recirculated therethrough,
- a first temperature detecting means disposed in said EGR passage to detect the temperature thereof,
- a second temperature detecting means disposed in an intake air passage of an internal combustion engine,
- an operational condition detecting means, coupled to said engine and said air intake air passage, to output parameters of said engine as signals indicating operational conditions of said system;
- an EGR abnormality determining zone discriminating means for discriminating, based upon an input from said operational condition detecting means, that said operational conditions are in a predetermined EGR abnormality determining zone in the operable area of said engine in which recirculation of the exhaust gas is controlled by said EGR valve, and
- an abnormality determining means for determining abnormality in the EGR system, based on said output from said EGR abnormality determining zone discriminating means and on a quantitative relation between a value of an EGR abnormality determining temperature which is obtained by the calculation of said operational conditions and an output signal of said second temperature detecting means,



and a value of the temperature of the EGR passage detected by said first temperature detecting means.

---

### 5,014,204

## SYSTEM FOR DETECTING POSITION OF MOVING VEHICLE AND SYSTEM FOR DETECTING REFERENCE POINTS THEREFOR

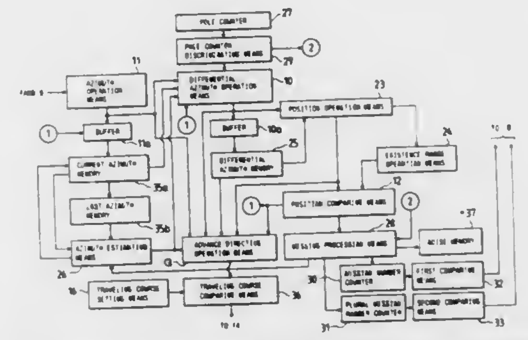
**Kenji Kamimura, and Sadachika Tsuzuki, both of c/o Kabushikigaisha Honda Gijutsu Kenkyusho 4-1, Chuo 1-chome, Wako-shi, Saitama-ken, Japan**

**Filed Dec. 22, 1989, Ser. No. 454,821**

**Claims priority, application Japan, Jan. 7, 1989, 1-1867**

**Int. Cl.$^5$ G06F** *15/50*

**U.S. Cl. 364—449** **12 Claims**



1. A system for detecting reference points to calculate a position of a moving vehicle wherein the position of the moving vehicle is detected by scanning the light beam generated from the moving vehicle in the circular direction centering around itself and receiving the light reflected by light-reflecting means disposed at at least three reference points, the system comprising:
- a means for detecting an azimuth of each said light-reflecting means in respect of the moving vehicle on the basis of a receiving interval of the reflected light from the light-reflecting means,
- a means for calculating the current position of the moving vehicle on the basis of the azimuths detected in the azimuth detecting means,
- a means for calculating the available existence area in which the moving vehicle is predicted to exist at the next azimuth detection time, on the basis of the current position of the moving vehicle calculated in the current position calculating means,
- a means for comparing the position of the moving vehicle calculated on the basis of the detected azimuth at the next azimuth detection time with the available existence area. and
- a judging means for judging that the detected azimuth is that of the light-reflecting means disposed at an expected reference point if the calculated moving vehicle position is in the available existence area, while the detected azimuth is not that of the light-reflecting means disposed at the expected reference point if the calculated moving vehicle position is not in the available existence area.

---

### 5,014,205

## VEHICLE HAVING AN ON-BOARD NAVIGATION SYSTEM

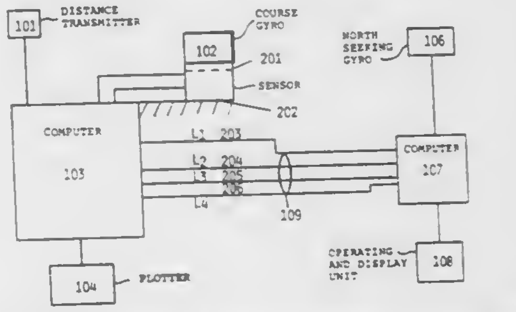
**Rainer Sindlinger, Hirschberg, and Peter Kocks, Heidelberg, both of Fed. Rep. of Germany, assignors to Teldix GmbH, Heidelberg, Fed. Rep. of Germany**

**Filed Apr. 21, 1989, Ser. No. 341,396**

**Claims priority, application Fed. Rep. of Germany, May 3, 1988, 3814958**

**Int. Cl.$^5$ G06F** *15/50*

**U.S. Cl. 364—449** **17 Claims**



1. A vehicle including a vehicle orientation system which comprises
- a distance transmitter and
- a course gyro as the direction reference, and
- wherein navigation is effected with a required precision by correcting the orientation system when known positions are reached, and orientation of the course gyro relative to north is calculated from the deviation from a known position;
- a device, such as a weapon or radar, carried by the vehicle and having a north-seeking system, said north-seeking system including a north-seeking gyro on-board said device for orienting said device; and data exchange means connecting the vehicle orientation system and the north-seeking system for facilitating the transmitting of at least any information that can be utilized in one system obtained from the other system,
- whereby, the precision characteristics of at least the one system may be improved.

VOL 1126 ISS 1 MY 7 1991 UMI

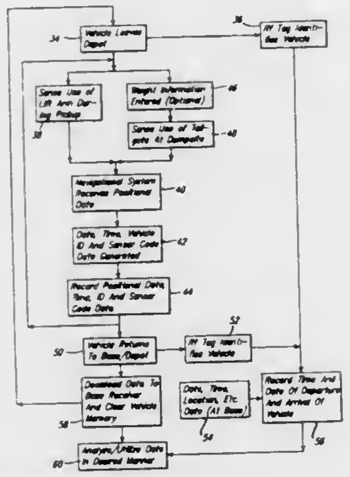
### 5,014,206
### TRACKING SYSTEM

**James R. Scribner, Waterford; Raymond J. Nicholson, Rochester; Thomas G. Brown, Waterford, and Anthony Caracciolo, Jr., Troy, all of Mich., assignors to FaciliTech International Incorporated, Birmingham, Mich.**

**Filed Aug. 22, 1988, Ser. No. 234,543**

**Int. Cl.$^5$ G06F** *15/50*

U.S. Cl. 364—449 12 Claims


Vehicle Leaves Depot
34
RF Tag Identifies Vehicle
36
Sense Use of Lift Arm During Pickup
38
Weight Information Entered (Optional)
46
Sense Use of Tailgate At Dumpsite
48
Navigational System Receives Positional Data
40
Date, Time, Vehicle ID And Sensor Code Data Generated
42
Record Positional Data, Time, ID And Sensor Code Data
44
Vehicle Returns To Base/Depot
50
RF Tag Identifies Vehicle
52
Download Data To Base Receiver And Clear Vehicle Memory
58
Date, Time, Location, Etc. Data (At Base)
54
Record Time And Date Of Departure And Arrival Of Vehicle
56
Analyze/Utilize Data In Desired Manner
60

5. An apparatus for determining and recording the location of a garbage truck during the loading and unloading of said garbage truck comprising:

a tracking system on said garbage truck for receiving positional information from an existing external navigational transmitter;

first sensing means that is responsive to the motion of a lift arm on said garbage truck when waste is picked up by said garbage truck;

second sensing means responsive to the motion of a door on said garbage truck when waste is removed from said garbage truck, said tracking system being responsive to changes in the state of said first and second sensing means; and

data collector unit located within said garbage truck and coupled to said tracking system, said first and second sensing means causing said tracking system to send said positional information to said data collector unit upon the occurrence of picking up or removal of waste by said garbage truck.

---

### 5,014,207
### SOLID IMAGING SYSTEM

**John A. Lawton, Landenberg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 21, 1989, Ser. No. 341,517**

**Int. Cl.$^5$ G06F** *15/62;* **B23K** *26/02*

U.S. Cl. 364—468 28 Claims

1. A process for maintaining a constant exposure level during fabrication of an integral three-dimensional rigid object from successive thin layers of a liquid photohardenable composition comprising the steps of:

storing graphic data, corresponding to the shape of the rigid object desired to be fabricated, in a first computer control means,

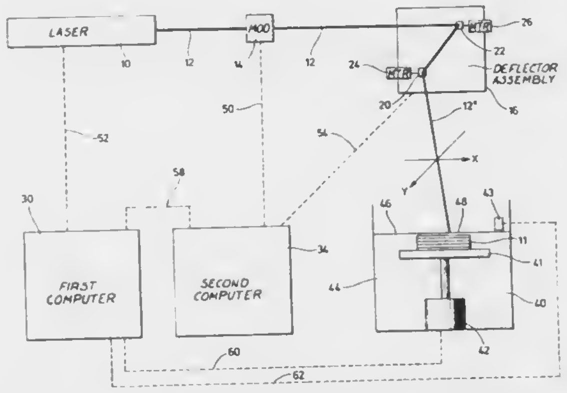
placing the liquid photohardenable composition in a vessel,

generating a radiation beam having an intensity by using radiaton means,

using said first computer control means,

controllably deflecting said radiation beam in a vector scanning mode to predetermined positions on the successive thin layers in order to induce photohardening of preselected portions of the liquid photohardenable composition to a depth of photohardening, and also deflecting the radiation beam with an acceleration from zero level to a maximum accelertion, and with a velocity from zero level to a maximum velocity by using deflection means,

coupling a second computer control means with, said deflection means, and said first computer control means, said second computer control means being used in conjunction with a modulation means for controllably modulating the intensity of the radiation beam from a substantially zero intensity level to a maximum intensity, in proportion to the velocity of said beam, thereby providing a substantially constant exposure level, said exposure level being substantially independent of the velocity of said beam, on the predetermined portions of the liquid photohardenable composition in order to achieve substantially constant depth of photohardening within each successive thin layer,



supporting the rigid object on a movable substantially flat table within the vessel,

controllably moving the flat table by using placement means, the placement means being controlled by the first computer control means, and

forming the successive thin layers of the liquid photohardenable composition by layer forming means, the layer forming means being controlled also by the first computer control means.

---

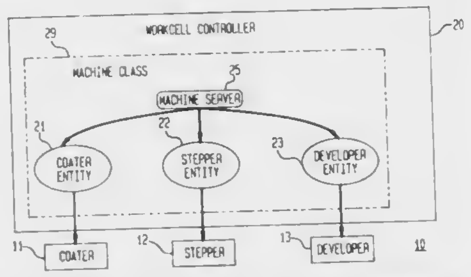
### 5,014,208
### WORKCELL CONTROLLER EMPLOYING ENTITY-SERVER MODEL FOR PHYSICAL OBJECTS AND LOGICAL ABSTRACTIONS

**Charles D. Wolfson, Langhorne, Pa., assignor to Siemens Corporate Research, Inc., Princeton, N.J.**

**Filed Jan. 23, 1989, Ser. Nu. 299,283**

**Int. Cl.$^5$ G06F** *15/46*

U.S. Cl. 364—468 20 Claims



1. A computer operated controller for controlling and/or monitoring a plurality of physical objects and a plurality of logical abstractions related to said physical objects in order to perform steps of a process in an overall system, comprising:

a plurality of physical object entities respectively representing corresponding ones of said plurality of physical objects, each physical object entity being a separate programming object including data specific to its corresponding physical object and a script describing a specific behavior of and being dependent upon a specific state of said corresponding physical object in performing a step of the process in the overall system;

a plurality of logical abstraction entities respectively representing corresponding ones of said plurality of logical abstractions, each logical abstraction entity being a separate programming object including data specific to its corresponding logical abstraction and a script describing the behavior of said corresponding logical abstraction for controlling and/or monitoring the performance of a step by a physical object in the process in the overall system but being independent of the specific state of any specific physical object; and

entity activity control means, including an executable computer program of said controller and exchanging of messages among said logical abstraction entities and said physical object entities, for controlling the execution of the respective scripts of said physical object entities and said logical abstraction entities to perform the steps of the process in the overall system.

---

### 5,014,209
### METHOD OF FORMING CONFIGURATION DATA FOR CNC MACHINING APPARATUS

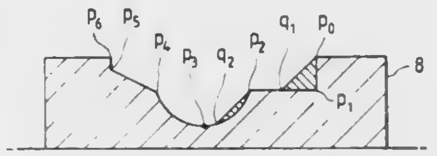
**Shigeki Nankaku, and Shigeru Koikawa, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 3, 1988, Ser. No. 252,213**

**Claims priority, application Japan, Oct. 2, 1987, 62-249222; Oct. 2, 1987, 62-249223**

**Int. Cl.$^5$ G05B** *19/403*

U.S. Cl. 364—474.35 6 Claims



1. A method of forming configuration data for a computerized numerical control (CNC) machine having a CNC unit comprising a central processing unit (CPU), a memory, input-/output means, servo drive means and a cutting tool driven by the drive means, comprising:

(a) inputting to said CNC unit first data related to a final workpiece configuration and second data representing the edge configuration of said cutting tool;

(b) forming by said CNC unit on the basis of said first data a first data block train for a final workpiece configuration;

(c) forming by said CNC unit on the basis of said first data block train and said second data a second data block train comprising edge-corrected configuration data; and

(d) forming from said second data block train and said first data block train remainder data defining a remainder which is created in said workpiece because of the edge configuration correction.

---

### 5,014,210
### MICROPROCESSOR CONTROLLED SOLDERING STATION

**Lester B. Postlewait, 7 Chatham Trace, and Paul L. Urban, 209 Fund Erburk Dr., both of Cheraw, S.C. 29520**

**Filed Mar. 6, 1989, Ser. No. 319,603**

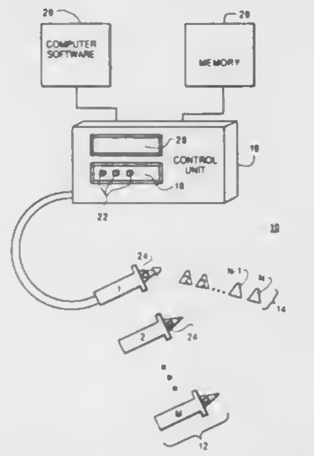
**Int. Cl.$^5$ H05B** *1/02;* **G06F** *15/46*

U.S. Cl. 364—477 14 Claims

1. A soldering system comprising:

(a) M soldering tools, where $M \geqq 1$ and is an integer, N soldering tips, where $N \geqq 1$ and is an integer, with one of the N tips attached to one of the M soldering tools, each of the N tips have an identity, and each of the M tools having an identity; and

(b) a control circuit including a memory containing data having thermodynamic properties with respect to the M tools and the N tips, said control circuit connected to the one tool having the one tip attached to it, said control circuit maintaining the one tip at a desired temperature, said control circuit having input means for inputting the desired temperature at which the control circuit maintains the temperature of the one tip, said control circuit maintaining the one tip attached to the one tool at a desired temperature which is inputted into the control circuit through the input means, said control circuit identifying which one of the N tips is attached to the one tool being inputted into the control circuit through the input means, and wherein the control circuit has means for determining the identity of the one tool connected to the control circuit, the control circuit further including a memory containing data having thermodynamic properties with respect to the M tools and N tips such that when the identity of the one tool connected to the control circuit is identified by the determining means and the one tip is identified through the input means, the control circuit maintains the tip at the desired temperature based on the thermodynamic properties of the one tool and the one tip that is connected to the one tool.



---

### 5,014,211
### MICROPROCESSOR CONTROLLED LIQUID CHEMICAL DELIVERY SYSTEM AND METHOD

**James R. Turner, Aptos; Stephen G. Hosking, and James W. Livingston, both of Santa Cruz, all of Calif., assignors to Diversey Corporation, Mississauga, Canada**

**Filed Jun. 16, 1989, Ser. No. 367,244**

**Int. Cl.$^5$ G05D** *11/13;* **D06F** *39/02*

U.S. Cl. 364—478 17 Claims

13. A liquid chemical delivery system comprising:

a manifold for mixing chemical solutions;

a plurality of chemical pumps coupled to said manifold, each chemical pump having means for pumping a corresponding chemical into said manifold;

a liquid distribution line coupled to said manifold.

transport pump means, coupling said manifold to said distribution line, for pumping liquid in said manifold into said distribution line;

water supply means coupled to said manifold for supplying water to said manifold; said water supply means including water metering means for measuring the amount of water supplied to said manifold; and

a controller coupled to said chemical pumps, to said transport pump means and to said water metering means, said controller including

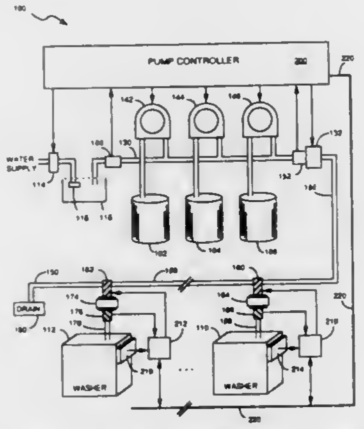
means for enabling a selected chemical pump so as to

VOL
1126
ISS
1
MY
7
1991
UMI

pump a corresponding specified chemical into said manifold;

means for determining the amount of water supplied by said water supply means to said manifold;

means for determining the amount of diluted chemical mixture pumped by said transport pump from said manifold into said distribution line; and



means for substantially continuously, while dispensing a specified chemical, computing the difference between the amount of said chemical mixture pumped into said distribution line and the amount of water supplied to said manifold, and shutting off said selected chemical pump when said difference is equal to a specified amount;

whereby said specified amount of said specified chemical is metered and delivered to a selected output port.

---

### 5,014,212

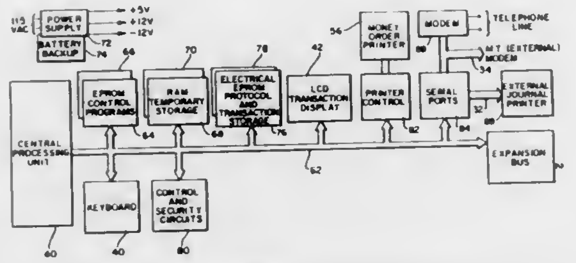
### APPARATUS FOR DISPENSING MONEY ORDERS

**Lawrence G. Smith, Orlando, Fla., assignor to Republic Money Orders, Inc., Dallas, Tex.**

**Continuation of Ser. No. 406,979, Sep. 13, 1989, abandoned, which is a continuation of Ser. No. 121,074, Nov. 16, 1987, Pat. No. 4,870,596, which is a continuation of Ser. No. 60,762, Jun. 8, 1987, Pat. No. 4,812,986, which is a division of Ser. No. 877,539, Oct. 31, 1986, Pat. No. 4,699,532, which is a division of Ser. No. 596,291, Apr. 3, 1984, Pat. No. 4,625,275. This application Jul. 27, 1990, Ser. No. 558,671**

**Int. Cl.$^5$ G06F** *15/21, 15/30*

**U.S. Cl. 364—479** **4 Claims**



1. A money order dispenser for dispensing money orders at a retail establishment comprising:

a digital processor for controlling the operation of the dispenser;

a keyboard connected to the digital processor for entering transaction data, control data for managing the operation of the dispenser, a first security code authorizing access to the dispenser to enable entry of said control data, and a second security code authorizing the printing of a money order;

a display connected to the digital processor for displaying the transaction and control data entered on the keyboard;

a memory associated with the digital processor for storing the transaction data and control data;

a printer controlled by said digital processor for receiving a money order and printing alphanumeric indicia thereon;

means for detecting entry of the first and second security codes via the keyboard;

control means responsive to the detecting means for inhibiting entry of the control data via the keyboard when the first security code is not properly entered on the keyboard and for inhibiting operation of the dispenser when the second security code is not properly entered on the keyboard; and

said money orders having a relatively long longitudinal side and a relatively short transverse side and having indicia pre-printed on the longitudinal side, said printer including a dot matrix printer extending across said transverse side of said money orders for receiving the money orders and printing said alphanumeric indicia thereon.

---

### 5,014,213

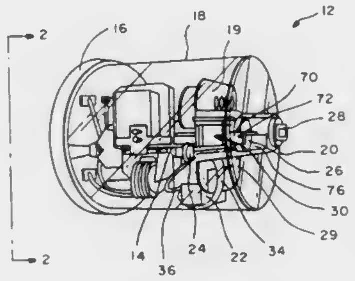
### SYSTEM FOR USE WITH POLYPHASE UTILITY METERS FOR RECORDING TIME OF ENERGY USE

**Cree A. Edwards, Redwood City, and Larsh M. Johnson, San Francisco, both of Calif., assignors to Domestic Automation Company, Inc., San Carlos, Calif.**

**Filed Apr. 20, 1988, Ser. No. 183,826**

**Int. Cl.$^5$ G06F** *15/56;* **G01R** *1/02*

**U.S. Cl. 364—483** **27 Claims**



1. A system for recording time of energy use for use with a polyphase electric meter having a rotatable disc, the system comprising:

a substantially optically transparent cup-shaped cover removably securable to a base of the meter to provide an enclosure for the meter;

sensor means disposed within the confines of said cover and positioned for detecting rotation of the disc and generating a signal in response thereto;

a first module disposed within the confines of said cover and secured to the structure of the meter and electrically connected to said sensor means, said first module including means for providing power for operation of the system; and

a second module releasably mounted to said cover such that disassembly from said cover can be accomplished without the use of tools, said second module including circuit means for determining time of energy use information and storing the same, and for optically transmitting said time of energy use information to a location external of said meter.

---

### 5,014,214

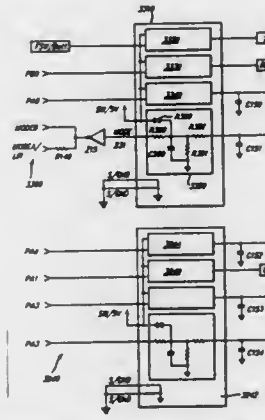
### USE OF DIODES IN AN INPUT CIRCUIT TO TAKE ADVANTAGE OF AN ACTIVE PULL-DOWN NETWORK PROVIDED IN A DUAL REGULATOR

**Thomas Glowczewski, Washington Township, Macomb County, and Keith B. Carle, Hartland, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**

**Continuation of Ser. No. 188,593, Apr. 29, 1988, abandoned. This application Jun. 13, 1990, Ser. No. 537,227**

**Int. Cl.$^5$ G01B** *7/10*

**U.S. Cl. 364—483** **2 Claims**



1. In an automatic transmission control system including a transmission having a plurality of gears for transmitting power from a prime mover to a load device over desired ranges of torque and speed, and an assembly of friction elements with hydraulic fluid associated therewith, the friction elements for selectively disengaging and engaging the gears, means for controlling the flow of hydraulic fluid to the friction elements, input sensors for providing signals indicative of measurement data for predetermined conditions of the transmission, and a control system comprising a microcomputer unit (MCU), a supply voltage, peripheral circuitry, a voltage regulator for regulating voltage outputs, where at least one voltage output is switchable, and a conditioning circuit for conditioning input signals to the MCU comprising:

means for limiting the voltage potential of input signals to the MCU to a predetermined level;

a diode connected between the limiting means and the switched voltage output from the voltage regulator, the switched voltage output being thereafter connected to ground, the diode clamping the input signals to ground during a condition of unwanted high voltage;

whereby, during an unwanted high voltage condition, the voltage regulator actively pulls down the switched voltage output to ground and the diode prevents unwanted high voltage from feeding through to the MCU.

---

### 5,014,215

### PROCESS FOR EVALUATING SIGNALS FROM AN INCREMENTAL TRANSMITTER

**Friedrich Füldner, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany**

**PCT No. PCT/EP88/00407, § 371 Date Jan. 6, 1989, § 102(e) Date Jan. 6, 1989, PCT Pub. No. WO88/09481, PCT Pub. Date Dec. 1, 1988**

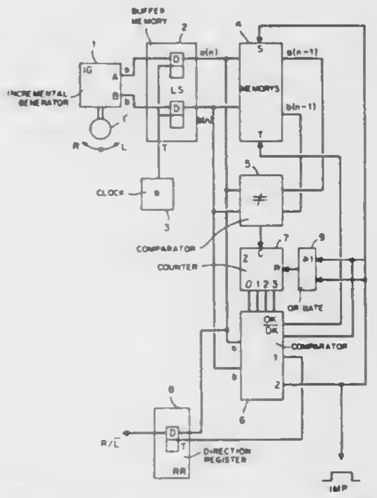
**PCT Filed May 10, 1988, Ser. No. 299,804**

**Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717473.8**

**Int. Cl.$^5$ G01R** *29/02*

**U.S. Cl. 364—486** **11 Claims**

1. A method for distinguishing between a signal pulse and a noise pulse emitted by an incremental generator supplying noise pulses contained within signal pulses, comprising the steps: adjusting an incremental generator to supply a sequence of pulses at output terminals of said generator so that said pulses have a signal frequency dependent on operation of said generator; comparing states of successive pairs of pulse sequences emitted from said output terminals of said generator; and testing with logic means the states of said pulse sequences at said output terminals to determine whether said pulse sequences correspond to a predetermined sequence a pulse in a pulse sequence being identified as a signal pulse first after the pulse sequence corresponds to the predetermined sequence to distinguish from a noise pulse, periodically polling the states at said output terminals of said generator; temporarily storing polled output states of said generator in a first memory; and releasing the states stored in said first memory to a second memory when the pulse sequence corresponds to said predetermined sequence.



---

### 5,014,216

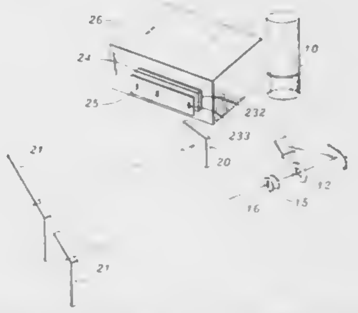
### CONCENTRATION DETERMINATION WITH MULTIPLE WAVELENGTH FLASH PHOTOMETERS

**Roger A. Stafford, Orange; Roy W. Aday, Jr., Trona; Robert L. Schmidt, Yorba Linda, and Myron L. McCollum, Anaheim, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Jul. 19, 1988, Ser. No. 221,476**

**Int. Cl.$^5$ G01N** *21/00*

**U.S. Cl. 364—496** **48 Claims**



1. A method of measuring the concentration of at least one chromophore substance in a sample comprising:

(a) flashing a lamp to generate a flashing light beam to pass through the sample containing the chromophore substance;

(b) measuring absorbance values by the sample at different wavelengths;

(c) determining the absorbance values at the different wavelengths thereby to obtain a measure of the chromophore concentration; and

VOL
1126
ISS
1
MY
7
1991
UMI

(d) wherein errors in absorbance values are mutually correlated at different wavelengths, and the linear combination of the absorbance values at different wavelengths is determined in terms of this correlation.

---

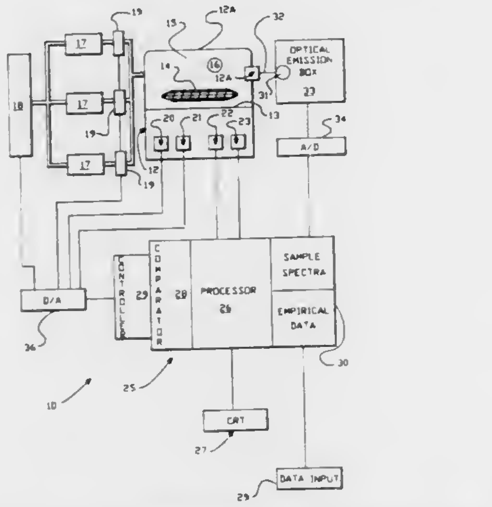
### 5,014,217
## APPARATUS AND METHOD FOR AUTOMATICALLY IDENTIFYING CHEMICAL SPECIES WITHIN A PLASMA REACTOR ENVIRONMENT

**Richard N. Savage, Livermore, Calif., assignor to S C Technology, Inc., Livermore, Calif.**

**Filed Feb. 9, 1989, Ser. No. 308,570**

**Int. Cl.$^5$ H01L** *21/306;* **C23F** *1/02;* **G06F** *15/20*

**U.S. Cl. 364—498** **19 Claims**



1. In a method to control the environment of a plasma chamber containing at least one chemical species during a semiconductor fabrication procedure, comprising the steps of:
generating a sample spectrum indicative of the chemical species in the plasma;
providing a library containing a multiplicity of predefined spectral patterns, each spectral pattern being indicative of a particular chemical species;
automatically correlating said spectrum with said predefined spectral patterns in said library, and yielding a correlation value for each libraried spectrum pattern;
identifying the chemical species in the plasma based on the highest correlation values, and generating an identifier list indicating the chemical species and abundances thereof in the plasma.

---

### 5,014,218
## USING A REMOTE CONTROL COMPUTER CONNECTED TO A VOCAL CONTROL COMPUTER AND A MONITOR COMPUTER

**Stephen F. Crain; Mark A. Clark, and Edward L. Woodall, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.**

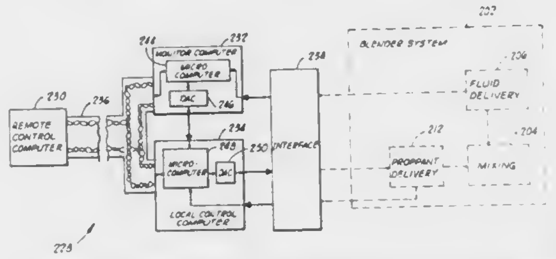
**Division of Ser. No. 947,099, Dec. 24, 1986, Pat. No. 4,916,631. This application Jul. 25, 1989, Ser. No. 384,819**

**The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.**

**Int. Cl.$^5$ G06F** *15/46;* **G05D** *11/08, 11/02;* **G06G** *7/58*

**U.S. Cl. 364—502** **2 Claims**

1. A process control system, comprising:
a remote control computer;
a local control computer;
a monitor computer;
two pairs of electrical conductors connecting said remote control computer to both said local control computer and said monitor computer; and wherein:
said remote control computer includes means for entering control information, for computing at least one set point from said control information, and for transmitting said at least one set point to said local control computer over at least one of said two pairs of electrical conductors;
said local control computer includes:
means for receiving feedback information from a controlled characteristic of the process; and
means for providing, in response to said at least one set point and said feedback information, a control signal to control the controlled characteristic of the process; and
said monitor computer includes:
means for receiving real time information from monitored characteristics of the process and providing said monitored characteristics to said remote control computer over at least one of said two pairs of electrical conductors;
means for providing real time information, received from said means for receiving real time information, about an operating characteristic of the process; and
means for transmitting said real time information to said local control computer, said means for transmitting operating separately from said two pairs of electrical conductors;
wherein said real time information is communicated to said local control computer so that the control signal is provided also in response to the real time information.



---

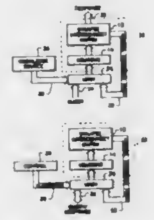
### 5,014,219
## MASK CONTROLED NEURAL NETWORKS

**James A. White, 1757 20th Ave., New Brighton, Minn. 55112**

**Filed May 6, 1988, Ser. No. 191,308**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 364—513** **12 Claims**



12. A method for mask controlling a neural network having a plurality neurons, having summation inputs, having outputs, and having an interconnect matrix interconnecting said summation input and said outputs variously with weighted connections having weighting values that signify the strength of interconnections among the neurons, and having threshold inputs, comprising:
determining goal of said neural network;
setting a control algorithm to provide variable, specified importance values for accomplishment of the goal;
providing the variable, specified importance values to a mask;
holding in the mask the variable, specified importance values; and
inputting from the mask the variable importance values to the threshold inputs thereby affecting thresholds of said neurons, controlling said neural network and causing said network to attain the goal.

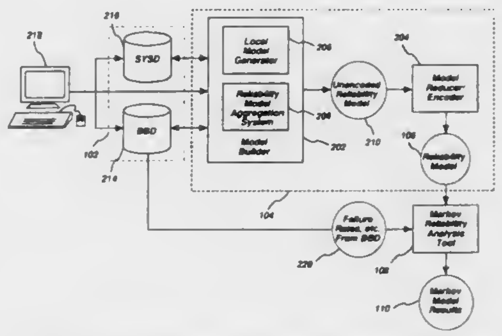
### 5,014,220
## RELIABILITY MODEL GENERATOR

**Catherine M. McMann, Renton, and Gerald C. Cohen, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Sep. 6, 1988, Ser. No. 241,540**

**Int. Cl.$^5$ G06F** *15/18, 13/14*

**U.S. Cl. 364—513** **23 Claims**



1. A computer system for generating reliability models comprising, in combination:
a first memory having stored therein a first knowledge base for storing a plurality of low level reliability models which represent the reliability characteristics for low level system components;
a second memory having stored therein a second knowledge base for storing definitions of the interrelationship of said low level models based on a desired system configuration; and
means for aggregating the low level reliability models stored in said first knowledge base into a single reliability model based on the system configuration definitions stored in said second knowledge base.

---

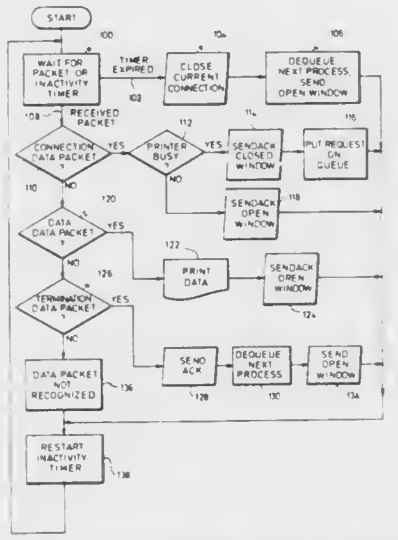
### 5,014,221
## MECHANISM FOR ARBITRATING CLIENT ACCESS TO A NETWORKED PRINT SERVER

**Jeffrey C. Mogul, Palo Alto, Calif., assignor to Digital Equipment Corporation, Maynard, Mass.**

**Filed Jan. 29, 1988, Ser. No. 149,420**

**Int. Cl.$^5$ G06F** *3/12*

**U.S. Cl. 364—519** **11 Claims**



1. A printer having printing means for printing data, memory means for storing data before the data is printed, and a print server for communicating with a local area network having at least one remote device for performing processes remote from the print server communicating by way of data packets, said remote device having (1) sending means for sending data packets to other processes on the local area network, said data packets including print request data packets for indicating to the print server when said remote processes have data to be printed, and (2) means for receiving data packets from other processes on the local area network,
said print server comprising the combination of:
(a) print request receiving means for receiving said print request data packets from said remote device;
(b) determining means responsive to the reception of said print request data packets by said print request receiving means for determining the amount of said memory means available for data to be printed;
(c) print request acknowledgment means responsive to the determination of available memory by said determining means, said print request acknowledgement means including means for (i) sending a connection-open return data packet to the requesting remote process for establishing a logical connection between the requesting remote process and the print server if there is available memory, said connection-open return data packet including data representing the amount of available memory, (ii) sending a connection-open return data packet to the requesting remote process and queuing the print request if there is no available memory, said connection-open return data packet including data representing zero available memory and, (iii) dequeuing the print request and sending a return data packet to the requesting remote process when memory becomes available.

---

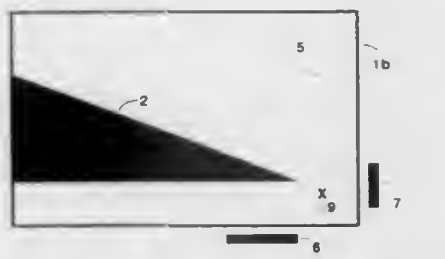
### 5,014,222
## METHOD OF MANIPULATING IMAGES LARGER THAN A VIEWPORT

**Thomas J. Donahue, Hudson, Mass., assignor to Bull HN Information Systems Inc., Billerica, Mass.**

**Filed Jun. 30, 1989, Ser. No. 374,520**

**Int. Cl.$^5$ G06K** *15/00*

**U.S. Cl. 364—521** **2 Claims**



1. In a data processing system including display terminals and having provision for displaying graphic images on the terminals and manipulating the graphic images from the terminals, the terminals being equipped with pointing devices for informing the system of the coordinates within a graphic image of any point therein selected by a user, in which system elements which are to be manipulated are designated by enclosing them within a graphic depiction of a rectangle, and in which a graphic image may be too large or complex for viewing all of it at the terminal simultaneously,
a method of specifying a rectangle for designating elements within it as object of manipulation regardless of whether the rectangle can be viewed in its entirety at a given time, the method comprising the steps of:
(a) accepting from the pointing device and storing first image coordinates selected by the user for a first corner of the rectangle;
(b) moving a different portion of the image to the screen display;
(c) accepting from the pointing device and storing second image coordinates selected by the user for a second corner of the rectangle;
(d) constructing in the graphic image the image of the rect-

VOL 1126
ISS 1
MY 7
1991
UMI

angle defined by the first and second image coordinates regarded as being at two diagonally opposite corners.

---

### 5,014,223
### METHOD OF FILLING INNER REGION OF A GRAPHIC WITH TRACES OF IMAGING SPOT

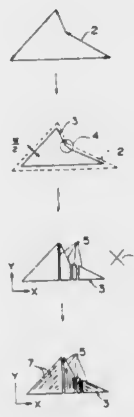
**Masayuki Tanimori, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan**

**Filed Mar. 22, 1989, Ser. No. 327,350**

**Claims priority, application Japan, Mar. 22, 1988, 63-68988**

**Int. Cl.⁵ G06F** *15/62, 3/153*

**U.S. Cl. 364—521** **10 Claims**



1. A method of filling an inner region of a graphic with traces of an imaging spot having a predetermined spot size, on an image plane of said graphic, said method comprising the steps of:
   (a) preparing graphic data which define border lines of said graphic,
   (b) on the basis of said graphic data, dividing said graphic into convex loops only along lines which are parallel to a predetermined direction,
   (c) detecting respective longitudinal directions of said convex loops,
   (d) with respect to each of said convex loops, generating an array of vectors convering an inner region of each such convex loop, with vectors belonging to said array having components in a longitudinal direction of said convex loop and being spacedly arrayed in a direction transverse to said vectors, the spacing between said vectors corresponding to said spot size, and
   (e) serially moving said imaging spot on said image plane along said vectors to thereby fill said inner region of said graphic.

---

### 5,014,224
### TACTILE SENSOR

**Richter Hans, Augsburg, Fed. Rep. of Germany, assignor to Blomberg Robotertecknik GmbH, Ahlen, Fed. Rep. of Germany**

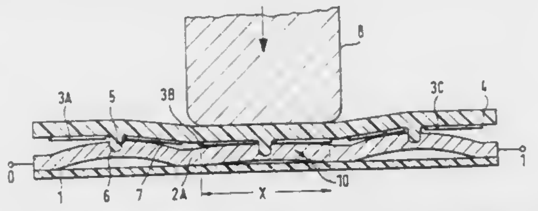
**Filed Jul. 13, 1989, Ser. No. 379,211**

**Claims priority, application Fed. Rep. of Germany, Jul. 14, 1988, 8809052[U]; Sep. 29, 1988, 3832974; Feb. 2, 1989, 3903094**

**Int. Cl.⁵ H01C** *10/10*

**U.S. Cl. 338—99** **17 Claims**

1. A tactile sensor comprised of at least two parallel plates, at least one of the plates being elastic, the plates being formed into a number of pressure-sensitive measuring cells, each cell having a first conductive path on one plate and a second conductive path on the other plate, one of the two conductive paths being comprised of good electrically conducting material, the other conductive path being comprised of electrically resistive material, the two conductive paths of each cell extending in the same direction, at least one of the conductive paths being in the form of a uniformly curved surface, means for retaining the two conductive paths of a cell adjacent each other whereby when pressure is exerted resulting in deformation of the elastic material of the elastic plate the conductive paths come into contact with each other in a cell with the length of the contact being proportionate to the pressure, thus causing variation of the resistance of the other conductive path, allowing the pressure at the location at which the pressure is exerted to be determined by measurement of the resistance of said other conductive path.



---

### 5,014,225
### APPARATUS AND METHOD FOR DETERMINING PLANT FLUORESCENCE

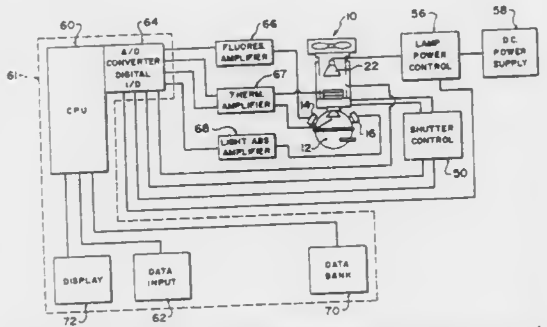
**William Vidaver, West Vancouver; Peter Toivonen, Chilliwack, and Sylvain Dube, Vancouver, all of Canada, assignors to Simon Fraser University, Burnaby, Canada**

**Filed Aug. 8, 1989, Ser. No. 390,905**

**Claims priority, application Canada, Aug. 9, 1988, 574252-8**

**Int. Cl.⁵ G01N** *33/48*

**U.S. Cl. 364—550** **33 Claims**



21. An apparatus for determining the photosynthetic activity of a plant, comprising:
   (a) a chamber having light impermeable walls, for housing a plant, said chamber having a conduit for admitting light into the chamber;
   (b) illuminating means for illuminating the plant through the conduit;
   (c) controlling means for controlling the intensity of the illuminating means;
   (d) monitoring means, responsive to the intensity of light in the chamber and communicating with the controlling means, for monitoring the intensity of light in the chamber at predetermined time intervals and for adjusting the controlling means based on the monitored light intensity to maintain the light intensity in the chamber within a predetermined intensity range; and
   (e) photosynthesis measuring means connected to the chamber for measuring the photosynthetic activity of the plant induced by light from said illuminating means, comprising light intensity measuring means for measuring the light intensity in the chamber corresponding to the wavelengths of light which are characteristic of fluorescence emission from a plant;
   (f) light selecting means for allowing only light of wavelengths corresponding to the wavelengths characteristics of plant fluorescence emission to pass to said light intensity measuring means.

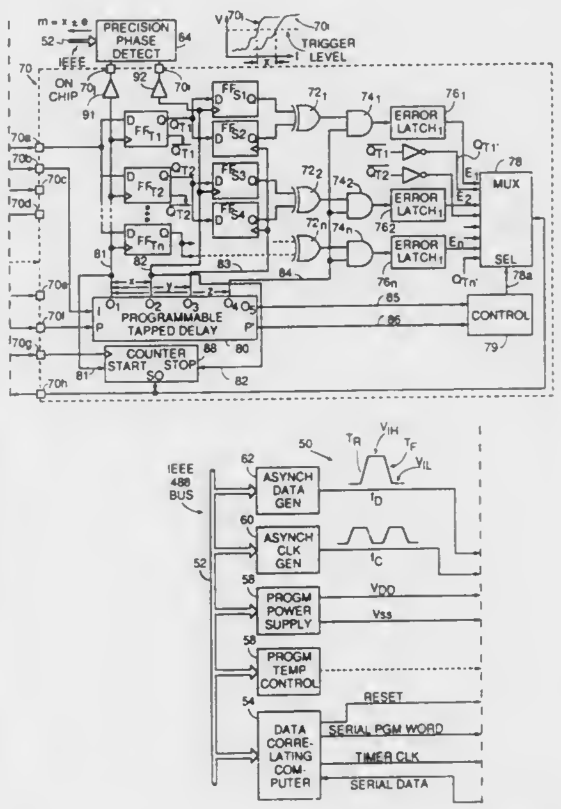
### 5,014,226
### METHOD AND APPARATUS FOR PREDICTING THE METASTABLE BEHAVIOR OF LOGIC CIRCUITS

**Jens U. Horstmann, Sunnyvale; Robert L. Coates, San Jose, both of Calif., and Hans W. Eichel, Braunschweig, Fed. Rep. of Germany, assignors to LSI Logic Corporation, Milpitas, Calif.**

**Filed Sep. 29, 1988, Ser. No. 251,619**

**Int. Cl.⁵ G06F** *11/00;* **G01D** *21/00*

**U.S. Cl. 364—551.01** **15 Claims**



I. A circuit for detecting metastable behavior in multistable logic systems comprising:
- a substrate;
- one or more multistable devices integrally formed on the substrate, each of the one or more multistable devices including an actuating input terminal for receiving an actuation signal to actuate said each multistable device, a gating input terminal for receiving a strobe signal which gates the actuating effect of the actuation signal, and a digital decision output terminal for producing a decision signal in response to the received actuation and strobe signals;
- sampling means, coupled to the respective decision output terminal of each of the one or more multistable devices, for detecting a decision state at the respective decision output terminal of each of the one or more multistable devices at a first point and a second point in time; and
- digitally programmable time delay means, integrally formed on the substrate and operatively coupled to the respective gating input terminal of each of the one or more multistable devices and to the sampling means, for programmably establishing a delay time between a first strobe signal supplied to the gating input terminal of at least one of the one or more multistable devices and a second strobe signal supplied to the sampling means, the second strobe signal activating the sampling means to detect the decision state at the decision output terminal of the at least one of the one or more multistable devices.

---

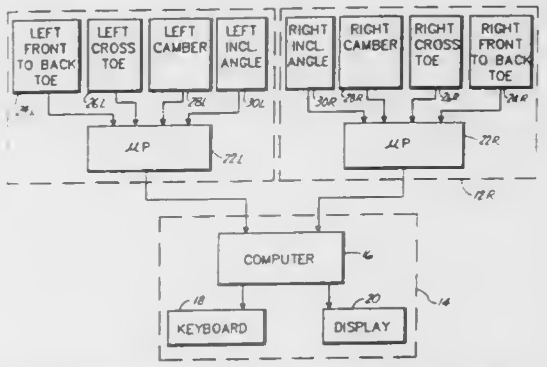
### 5,014,227
### CASTER AND STEERING AXIS INCLINATION MEASUREMENT TECHNIQUE

**Michael J. Kling, Mequon; John M. Surwillo, Milwaukee; Peter A. Puetz, Waukesha, and Robert T. Braun, Milwaukee, all of Wis., assignors to Bear Automotive Service Equipment Company, Milwaukee, Wis.**

**Filed Jul. 17, 1989, Ser. No. 380,635**

**Int. Cl.⁵ G06F** *15/20*

**U.S. Cl. 364—559** **23 Claims**



1. A method for accurately measuring caster and steering axis inclination (SAI) of left and right steerable wheels of a vehicle based upon measurements taken with the wheels in less than four different positions, the method comprising:
- mounting a left head unit on the left steerable wheel of the vehicle;
- mounting a right head unit on the right steerable wheel of the vehicle;
- turning the wheels to a first position;
- making toe, camber and inclination angle measurements for each of the wheels with the left head unit and the right head unit while the wheels are in the first position;
- turning the wheels to a second position;
- making toe, camber and inclination angle measurements for each of the wheels while with the left head unit and the right hand unit while the wheels are in the second position; and
- calculating caster and SAI of each wheel using the toe, camber and inclination angle measurements made for that wheel at the first and second positions.

---

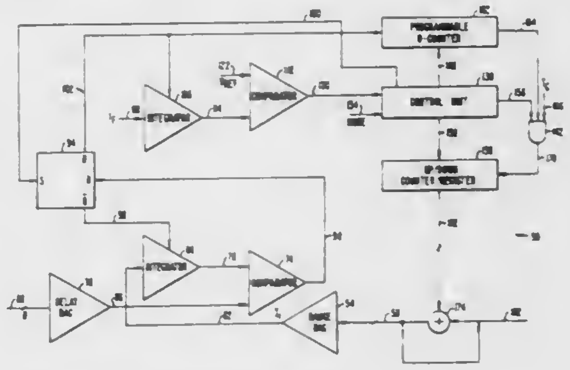
### 5,014,228
### METHOD AND APPARATUS FOR CALIBRATING LINEAR DELAY LINES

**Hung-Wah A. Lau, Los Altos, Calif., assignor to Schlumberger Technologies, Inc., San Jose, Calif.**

**Filed Sep. 21, 1989, Ser. No. 410,763**

**Int. Cl.⁵ G01R** *35/00*

**U.S. Cl. 364—571.01** **33 Claims**



1. A calibrating circuit comprising:

VOL
126
ISS
1
MY
7
1991
UMI

first voltage generating means for generating a first ramp voltage;

oscillating means, coupled to the first voltage generating means, for causing the first voltage generating means to generate the first ramp voltage periodically at a first frequency in response to a first reference voltage, and for causing the voltage generating means to generate the first ramp voltage periodically at a second frequency in response to a second reference voltage:

ramp counting means, coupled to the first voltage generating means, for counting a selected number of first ramp voltages generated at the first and second frequencies; and

rate adjusting means, coupled to the first voltage generating means and to the ramp counting means, for adjusting the rate of change of the first ramp voltage in response to the number of first ramp voltages counted by the counting means.

---

### 5,014,229

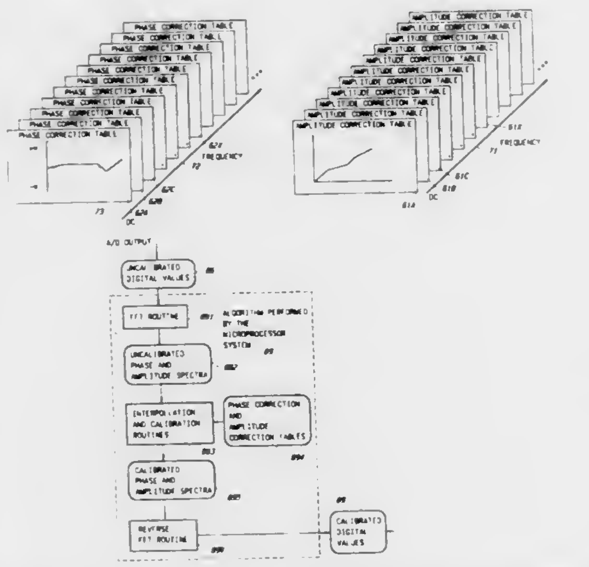
### METHOD AND APPARATUS FOR CALIBRATING TRANSDUCER/AMPLIFIER SYSTEMS

**Alexander Mofachern, Oakland, Calif., assignor to Basic Measuring Instruments, Foster City, Calif.**

**Filed Feb. 8, 1989, Ser. No. 308,305**

**Int. Cl.⁵ G01D** *18/00*

**U.S. Cl. 364—571.04** **14 Claims**


FREQUENCY
A/D OUTPUT
UNCALIBRATED DIGITAL VALUES
FFT ROUTINE
ALGORITHM PERFORMED BY THE MICROPROCESSOR SYSTEM
UNCALIBRATED PHASE AND AMPLITUDE SPECTRA
INTERPOLATION AND CALIBRATION ROUTINES
PHASE CORRECTION AND AMPLITUDE CORRECTION TABLES
CALIBRATED PHASE AND AMPLITUDE SPECTRA
REVERSE FFT ROUTINE
CALIBRATED DIGITAL VALUES
DC

1. A method for calibrating a measuring system comprising the steps of:

(a) storing a plurality of correction tables with respect to a range of frequencies in the frequency domain each table having a plurality of values for a given parameter;

(b) sensing a time domain signal;

(c) transforming the time domain signal into a plurality of uncalibrated frequency domain signals;

(d) comparing each of the uncalibrated frequency domain signals to an appropriate value for a corresponding one of the plurality of corrections tables for forming a plurality of calibration signals;

(e) operating on each of the uncalibrated frequency domain signals with an appropriate calibration signal to form a plurality of calibrated frequency domain signals; and

(f) converting the plurality of calibrated frequency domain signals into a calibrated time domain signal.

---

### 5,014,230

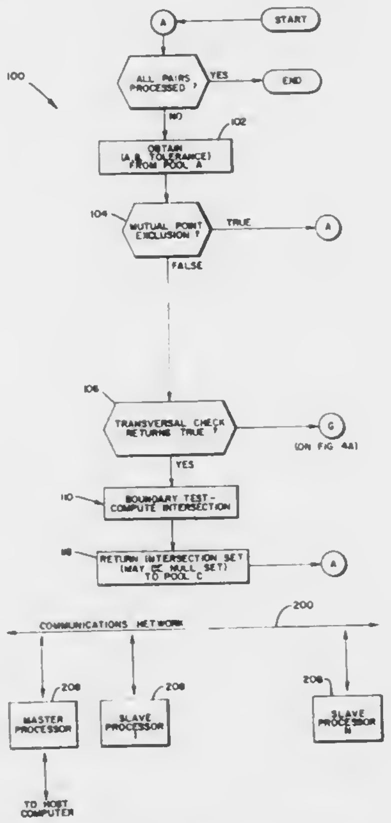
### SOLID-MODELING SYSTEM USING TOPOLOGY DIRECTED SUBDIVISION FOR DETERMINATION OF SURFACE INTERSECTIONS

**Pradeep Sinha, and Turhan F. Rahman, both of Ithaca, N.Y., assignors to XOX Corporation, Apple Valley, Minn.**

**Division of Ser. No. 308,975, Feb. 9, 1989, Pat. No. 4,890,242, which is a continuation of Ser. No. 871,091, Jun. 6, 1986, abandoned. This application Dec. 22, 1989, Ser. No. 455,500**

**Int. Cl.⁵ G06F** *15/16, 15/72*

**U.S. Cl. 364—578** **1 Claim**



1. A solid-modeling system including means for performing recursive subdivision, comprising:

storage means;

master processor means;

a plurality of slave processor means;

means for connecting said master processor means and said slave processor means;

said system operational to identify intersections between the surfaces of a pair of solid models A and B represented by digital data surface descriptions stored in said storage means, said digital data surface descriptions produced by computer-aided design, said models representing, for example, articles of manufacture, machine parts or the path described by the movement thereof through space, each said surface description of each said model subdivided into a plurality of surface patches S each represented by a corresponding digital data surface patch description stored in a first pool of surface patch description pairs in said storage means, each said pair including one surface patch description from each of said models A and B, said system operational for determining by recursive subdivision which said surface patch description pairs in said first pool are transversal to produce a second pool of surface patch description pairs each known to be transversal, said system further determining when each of said pair of surface patch descriptions in said first pool have been subdivided to a limit specified by a predetermined criterion to produce a third pool of surface patch description pairs wherein both surface patch descriptions of said pair are known to meet said predetermined criterion;

said master processor means including means for obtaining from said first pool, a pair of digital data patch descriptions representing, respectively, a pair of surface patches $S_A$ and $S_B$ of said models A and B, and for passing said pair to one of said slave processor means;

each said slave processor means including means for:

(a) operating on said patch descriptions received from said master processor means to perform a mutual point exclusion test for said surface patches $S_A$ and $S_B$ and if no mutual points exist terminating further intersection identifying processing on said pair and signaling said master processor means that no mutual points exist for said pair;

(b) operating on said received patch descriptions to determine if said pair of surface patches $S_A$ and $S_B$ are transversal, provided mutual points exist for said pair, and if transversal signaling said master processor means said pair is transversal, said master processor means including means for retrieving said pair and storing it in said second pool;

(c) operating on said retrieved pair of patch descriptions to test each of said received surface patches $S_A$ and $S_B$ against a predetermined criterion, provided said pair is not transversal and mutual points exist, and if said criterion is met for both said surface patches signaling said master processor means that said pair has met said criterion whereby said pair can be classified in said third pool and the intersection set of said pair can be approximated and further subdivision of said surface patches $S_A$ and $S_B$ can be terminated, said means for retrieving said pair and storing it in said third pool; and

(d) operating on said received patch descriptions to subdivide one or both of said surface patches $S_A$ and $S_B$ if they do not meet said predetermined criterion, said patch or patches subdivided into a further plurality of patches to create a plurality of new surface patch pairs representing new patch descriptions, and signaling said master processor to retrieve said descriptions representing said new pairs, said means for retrieving said new pairs and storing them in said first pool for further processing.

---

### 5,014,231

### RANDOMIZED DIGITAL/ANALOG CONVERTER DIRECT DIGITAL SYNTHESIZER

**Victor S. Reinhardt, Rancho Palos Verdes; Kim V. Gould, Hermosa Beach, and Kevin M. McNab, Redondo Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 124,539, Nov. 23, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 380,786**

**Int. Cl.⁵ G06F** *1/02*

**U.S. Cl. 364—718** **42 Claims**

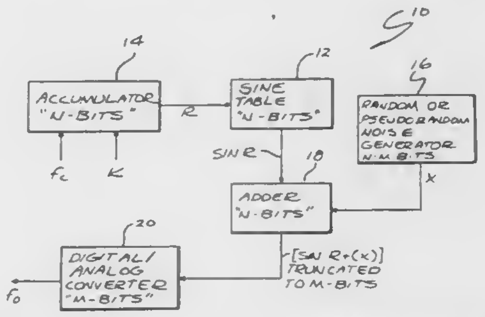
1. A randomized synthesizing apparatus for reducing the spurious sidebands of a synthesized signal comprising, in combination:

accumulating means within said synthesizing apparatus, receiving an incremental input signal, for generating a phase angle and for providing a periodic output register value in synchronism with said phase angle;

mathematical reference means connected to said accumulating means for receiving said periodic output register value and for providing a mathematical reference for said register value;

noise generating means within said synthesizing apparatus for generating a random word;

summing means in communication with said mathematical reference means and said noise generating means for summing said mathematical reference of said register value and said random word to provide a sum output digital signal, said sum output digital signal being truncated; and


10
14
ACCUMULATOR "N-BITS"
R
12
SINE TABLE "N-BITS"
16
RANDOM OR PSEUDORANDOM NOISE GENERATOR N-M BITS
$f_c$
K
SIN R
18
ADDER "N-BITS"
X
20
DIGITAL/ ANALOG CONVERTER "M-BITS"
[SIN R+(X)] TRUNCATED TO M-BITS
$f_0$

converting means connected to said summing means for receiving said truncated sum output digital signal and converting said truncated sum for a digital signal to an analog signal, said random word converting said spurious sidebands to broad band phase noise by destroying the coherence of said sidebands and by randomizing the periodic behavior of said truncation process.

---

### 5,014,232

### ADAPTIVE DIGITAL FILTER HAVING NON-RECURSIVE AND RECURSIVE FILTER ELEMENTS

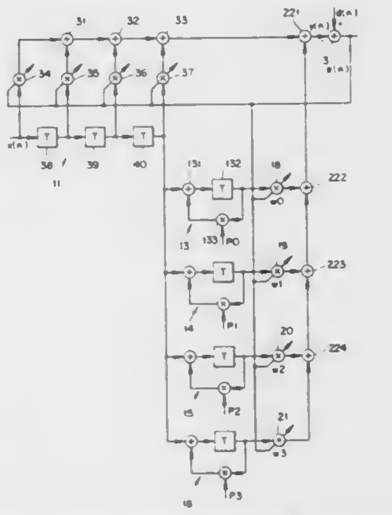
**Tore M. André , Bandhagen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed Apr. 7, 1989, Ser. No. 334,712**

**Claims priority, application Sweden, Jun. 3, 1988, 8802076**

**Int. Cl.⁵ G06F** *15/31*

**U.S. Cl. 364—724.19** **12 Claims**



1. An adaptive digital filter for filtering digital input signals, comprising:

non-recursive filtering means for non-recursively filtering said input signals;

recursive filtering means for recursively filtering said input signals, said recursive filtering means including:

a plurality of preset recursive filters each recursive filter having a different impulse response characteristic;

VOL
1126
ISS
1
MY
7
1991
UMI

a plurality of multiplication means, associated with said plurality of recursive filters, for multiplying an output signal of each recursive filter by a corresponding adaptive multiplication factor; and

summing means for forming a linear combination of output signals from said multiplication means;

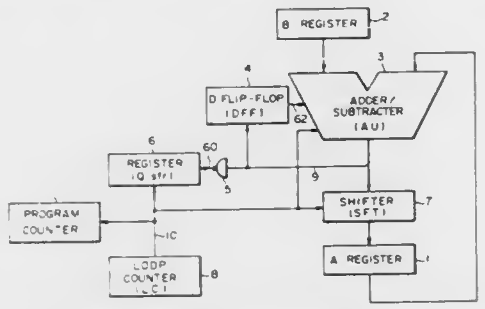
means for generating an update signal on the basis of an output signal from said summing means and an output from said non-recursive filtering means; and

updating means for updating both said non-recursive filtering means and said adaptive multiplication factors in accordance with said update signal.

---

### 5,014,233
## DIVIDER FOR CARRYING OUT HIGH SPEED ARITHMETIC OPERATION

**Kouichi Kihava, and Kazushige Yamamoto, both of Tokyo, Japan, assignors to OKI Electric Industry Co., Ltd., Japan**
**Filed Jan. 19, 1990, Ser. No. 467,689**
**Claims priority, application Japan, Jan. 24, 1989, 1-13191**
**Int. Cl.⁵ G06F** *7/52*
U.S. Cl. 364—766 12 Claims



1. A divider for producing a quotient by dividing a dividend by a divisor, comprising:

first holding means for holding dividend data representative of the dividend;

second holding means for holding divisor data representative of the divisor;

operating means for producing either one of a sum and a difference between the dividend data held in said first holding means and the divisor data stored in said second holding means;

third holding means for holding sign bit data which is included in result data representative of a result of operation produced by said operating means;

inverting means for inverting the sign bit data to produce inverted sign bit data;

first shifting means for sequentially shifting, every time the inverted sign bit data from said inverting means is inputted, said inverted sign bit data from a least significant bit (LSB) position while holding said inverted sign bit data;

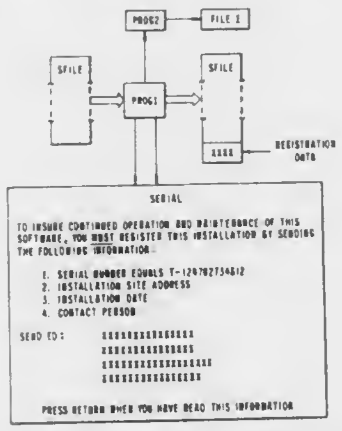
second shifting means for arithmetically shifting the result data produced by said operating means one bit to the left while storing a (logical) ZERO in an LSB position, and feeding resultant data to said first holding means; and

control means for controlling said operating means, said first shifting means and said second shifting means such that iterative processing for division is repetitively executed.

---

### 5,014,234
## SYSTEM WITH SOFTWARE USAGE TIMER AND COUNTER FOR ALLOWING LIMITED USE BUT PREVENTING CONTINUED UNAUTHORIZED USE OF PROTECTED SOFTWARE

**Gordon L. Edwards, Jr., Easley, S.C., assignor to NCR Corporation, Dayton, Ohio**
**Filed Aug. 25, 1986, Ser. No. 900,206**
**Int. Cl.⁵ G06F** *12/14, 11/34, 7/02;* **H04L** *9/32*
U.S. Cl. 364—900 9 Claims



TO INSURE CONTINUED OPERATION AND MAINTENANCE OF THIS SOFTWARE, YOU MUST REGISTER THIS INSTALLATION BY SENDING THE FOLLOWING INFORMATION

1. SERIAL NUMBER EQUALS T-124782734612
2. INSTALLATION SITE ADDRESS
3. INSTALLATION DATE
4. CONTACT PERSON

SEND TO:

PRESS RETURN WHEN YOU HAVE READ THIS INFORMATION

1. A method for preventing continued unauthorized use of protected computer software in a data processing system including a clock, storage means and a counter comprising the steps of:

providing an initial time setting for said clock at the time of installation of the software in said data processing system;

providing a constant representing a predetermined amount of time in said storage means at the time of installation of the software;

incrementing the counter each time that the protected software is operated;

making a first determination whenever the protected software is operated as to whether the constant has been provided in the data processing system;

making a second determination as to whether the counter has reached a predetermined value;

making a third determination as to whether the current time sensed from said clock exceeds the time when the software was installed by an amount equal to or greater than said constant;

if any of the first, second or third determinations are true, sending a warning message to the software user indicating unauthorized use, setting the constant to a predetermined multiple of the current time setting, and switching the counter to cause it to commence decrementing from the setting at which it stood when switched;

decrementing the counter each further time that the software is subsequently operated; and

causing the software to be disabled when the counter has been decremented to a second predetermined value.

---

### 5,014,235
## CONVOLUTION MEMORY

**Steven G. Morton, 39 Old Good Hill Rd., Oxford, Conn. 06483, assignor to Steven G. Morton, Oxford, Conn.**
**Filed Dec. 15, 1987, Ser. No. 133,011**
**Int. Cl.⁵ G06F** *7/52*
U.S. Cl. 364—900 20 Claims

1. A convolution memory chip comprising:

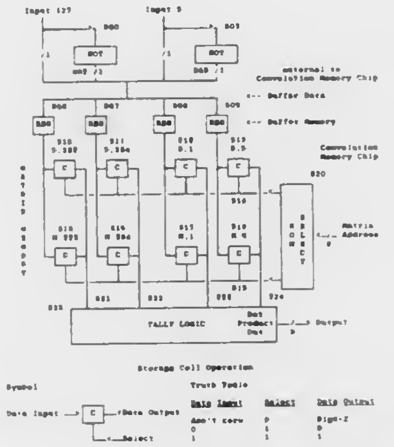
a matrix memory, the matrix memory comprising:

(a) matrix memory row address logic (**1221**), having a matrix address input, a matrix address control input, a matrix row address latch (**1311**) having an input coupled to the matrix address input and controlled by the matrix address control

input for storing a matrix row address presented on the matrix address input, a matrix row address decoder (**1313**) having a plurality (R) of matrix row select outputs, the matrix row address decoder being coupled to the matrix row address latch and operable for activating one of the R matrix row select outputs in response to a content of the matrix address latch;

(b) a matrix memory cell array (**1220**), comprising a matrix of R rows by C columns of memory cells, the matrix memory cell array having matrix column buses coupled thereto, the matrix memory cell array being coupled to the R matrix row select outputs and responsive to an activation of one of the R matrix row select outputs for coupling each memory cell an associated one of the R rows to an associated one of the matrix column buses,

(c) matrix memory column sense amplifiers and read/write logic (**1223**) coupled to the matrix memory cell array through the matrix column buses and having a matrix data port for receiving and transmitting matrix data to means external to the convolution memory chip, logic (**1223**) further having an input for receiving the matrix column buses and producing in response to information conveyed by the matrix column buses C signals upon a matrix memory bus, logic (**1223**) further having having a column decoder (**1354**) coupled to the matrix address and responsive to a matrix column address being input thereon for decoding the matrix column address and asserting a corresponding matrix column select signal for selecting a memory cell corresponding to the row address latched in the matrix row address latch, the operation of the column decoder causing a transfer of N bits of information between the selected row of the matrix memory cell array and the matrix data port,



a buffer memory, the buffer memory comprising:

(d) buffer memory row logic (**1232**) having a buffer address input coupled to a buffer address, a buffer address control input, a buffer row address latch (**1511**) coupled to the buffer address input and controlled by the buffer address control input for latching a buffer row address appearing on the buffer address, a buffer row address decoder (**1513**) having an input coupled to an output of the buffer row address latch and responsive to a buffer row address latched therein for activating one of a plurality (V) of buffer row select outputs of the decoder,

(e) a transpose buffer memory cell array (**1231**), comprising a matrix of V rows by T columns of memory cells, the transpose buffer memory cell array having buffer memory column buses coupled thereto, and, in response to an activation of one of the V buffer row select outputs, connecting each memory cell in an associated one of the V rows to an associated buffer memory column bus for transferring W bits of information between one column of the buffer memory cell array and a buffer data port,

(f) buffer memory column sense amplifiers and read/write logic (**1229**) having an input coupled to the buffer address and responsive to a buffer column address appearing thereon for selecting a column of the buffer memory cell array for transferring information between the buffer data port and the buffer memory cell array, and also for receiving the buffer column bus and producing in response to signals appearing thereon T signals upon a buffer memory bus,

the convolution memory chip further comprising processor logic, the processor logic being coupled between the matrix memory bus and the buffer memory bus and comprising:

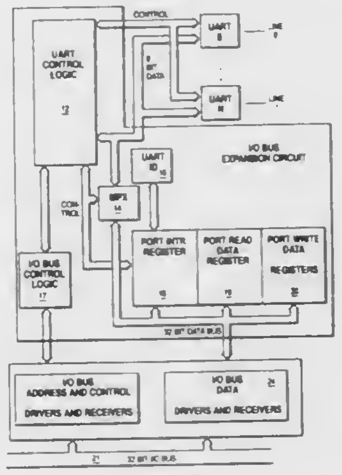
(g1) processor logic cells (**1225**) coupled to the matrix memory bus and to the buffer memory bus for performing operations upon data received from the matrix memory bus and the buffer memory bus, the processor logic cells having an output coupled to a processor cell bus for expressing thereon data resulting from the operations, and

(g2) global logic (**1227**), coupled to and receiving the processor cell bus for performing operations upon the data received from the processor cell bus and producing an output expressive of the performed operations.

---

### 5,014,236
## INPUT/OUTPUT BUS EXPANSION INTERFACE

**James S. Pogorzelski, Georgetown, and Craig H. Shempert, Austin, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed Jan. 29, 1988, Ser. No. 149,796**
**Int. Cl.⁵ G06F** *3/00, 13/12, 13/32*
U.S. Cl. 364—900 10 Claims


CONTROL
UART CONTROL LOGIC
UART
UART
I/O BUS EXPANSION CIRCUIT
CONTROL
PORT WRITE REGISTER
PORT READ DATA REGISTER
PORT WRITE DATA REGISTERS
I/O BUS CONTROL LOGIC
32 BIT DATA BUS
I/O BUS ADDRESS AND CONTROL DRIVERS AND RECEIVERS
I/O BUS DATA DRIVERS AND RECEIVERS
32 BIT IO BUS

1. An interface for communication between an I/O device connected to an n-bit I/O data bus and a processor connected to an m times n-bit processor I/O data bus, comprising:

first register means for temporarily storing a group of fields of information, said information including at least one control field from said I/O device; and

control logic means for (a) fetching said at least one control field from said I/O device, (b) decoding the content of said at least one control field, (c) fetching, a field at a time, a particular group of said fields of said information responsive to the result of said decoding the content of said at least one control field from said I/O device on said n-bit I/O data bus, (d) storing said particular group of fields of said information in said first register means including said at least one control field and (e) allowing simultaneous access to said particular group of fetched field stored in said first register means on said m times n-bit processor I/O data bus in a single m times n-bit read by said processor.

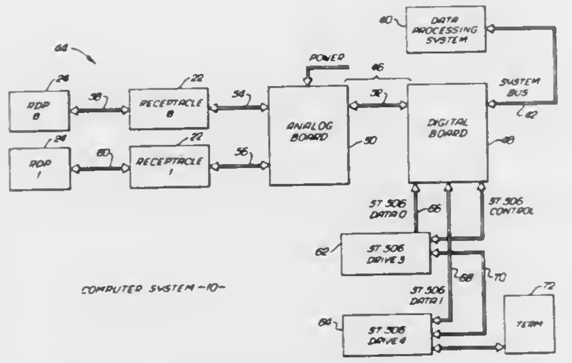
VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,237

## DISK DRIVE CONTROLLER SYSTEM WITH ENHANCED COMMUNICATIONS INTERFACE

**John R. Masters, Aptos, and Dennis R. Briscoe, Scotts Valley, both of Calif., assignors to Tandon Corporation, Moorpark, Calif.**

**Filed Oct. 31, 1988, Ser. No. 264,756**
**Int. Cl.⁵ G06F** *3/06, 13/00*
**U.S. Cl. 364—900** **23 Claims**



1. A method of communications between an enhanced peripheral controller and an enhanced peripheral disk drive device over a standard interface while retaining compatibility between an enhanced controller and a standard peripheral device wherein the standard interface includes:

at least one device select signal that is asserted by a controller to select one peripheral device from among a plurality of peripheral devices,

a plurality of component select signals that are asserted to select in combination one of a plurality of components at a pre-selected peripheral device, one state of the combination of component select signals being a query state that does not correspond to a selected peripheral device component and that is ignored by a standard peripheral device,

a first status signal that is asserted by a standard peripheral device while the at least one device select signal presents a state corresponding to the standard peripheral device,

a second status signal that is asserted by a selected standard peripheral device when the device is not in the process of executing a previously received command, and

a third status signal that is asserted by a selected standard peripheral device when the device is operational,

the method comprising the steps of:

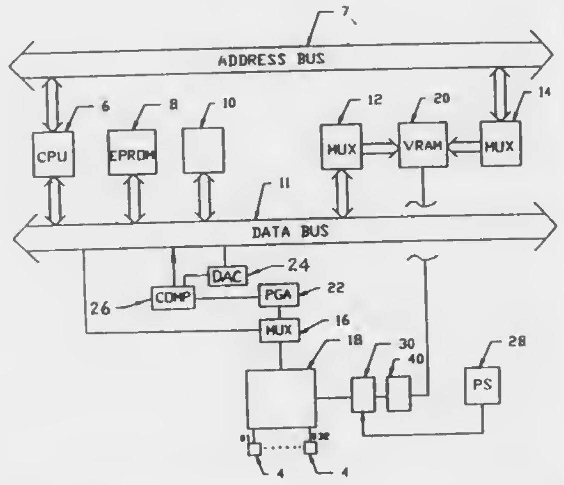
querying a given peripheral device by asserting the plurality of component select signals with the query state and asserting the at least one device select signal with a state corresponding to a given peripheral device then asserting the first status signal at the given peripheral device and asserting the second status signal at the given peripheral device within a predetermined time period only if the given peripheral device is an enhanced peripheral device; and if the given peripheral device asserts the first and second status signals, communicating information from an enhanced peripheral controller to the given peripheral device using said signals that are asserted by the peripheral controllers.

### 5,014,238

## UNIVERSAL INPUT/OUTPUT DEVICE

**Anthony B. McLeish, Mississauga; Anthony Hill, Holland Landing; Jim Darling, and David M. M. Dean, both of Oakville, all of Canada, assignors to Distributed Matrix Controls Inc., Rexdale, Canada**

**Continuation of Ser. No. 76,538, Jul. 22, 1987, abandoned. This application Nov. 28, 1989, Ser. No. 442,255**
**Int. Cl.⁵ G06F** *13/00, 9/00*
**U.S. Cl. 364—900** **10 Claims**



1. In a universal device for sequentially sensing input signals from field devices or providing control output signals for controlling said field devices on a plurality of channels, comprising:

(a) signal conditioning circuitry means connected to said field devices;

(b) programmable memory means for storing data defining:
  (i) each said field device connected to said signal conditioning circuitry means;
  (ii) one of said channels as an input signal to said signal conditioning circuitry means from one of said field devices;
  (iii) one of said channels as an output signal from said universal devices to said one of said field devices;

(c) microprocessing means for storing and accessing said programmable memory means;

(d) first multiplexer means connected to said microprocessing means and in response to control signals from said microprocessing means for selectively transmitting said data stored in said programmable memory means corresponding to said input signals or said output signals;

(e) bit stream generating means connected to said first multiplexer means and in response to said selected data from said multiplexer means for generating a selected digital bit stream corresponding to said data representing said input signal or said output signal;

(f) means for translating said digital bit streams to an analogue signal for each sequentially selected input signal and output signal;

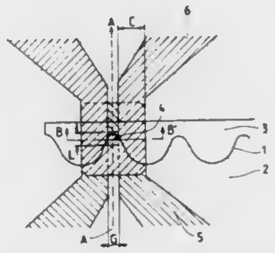
(g) said signal conditioning circuitry means activated by said analogue signal for sensing said input signals or providing said output signals, whereby said device is programmed so that said different input signals are monitored from said field devices or for providing different output signals to said field devices by said signal conditioning circuitry means on each said channels respectively by varying the data stored in said programmable memory means without changing said signal condition circuitry means.

### 5,014,239

## MAGNETIC BUBBLE GENERATOR USING PLURAL CONDUCTORS WITH COMMON CURRENT SOURCE

**Masatoshi Takeshita, Hachiouji; Toshihiro Sato, Kokubunji; Takashi Toyooka, Sayama, and Ryo Suzuki, Hachiouji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 9, 1989, Ser. No. 308,081**
**Claims priority, application Japan, Feb. 24, 1988, 63-39388**
**Int. Cl.⁵ G11C** *19/08*
**U.S. Cl. 365—11** **8 Claims**



1. A magnetic bubble generator comprising an ion-implanted track and two conductor patterns superposed and insulated from each other by an insulating means, wherein said two conductor patterns are of a hairpin type and include their respective gaps whose fore ends are disposed in the vicinity of a cusp of the ion-implanted track and wherein said two conductor patterns of a hairpin type are electrically connected to each other by a conducting through hole formed in said insulating means and to a single current pulse supply.

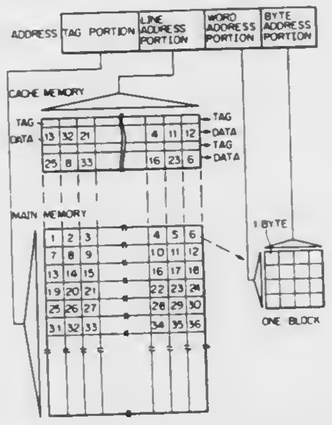
---

### 5,014,240

## SEMICONDUCTOR MEMORY DEVICE

**Atsushi Suzuki, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 79,066, Jul. 29, 1987, abandoned. This application Aug. 14, 1990, Ser. No. 569,597**
**Claims priority, application Japan, Aug. 1, 1986, 61-181567; Aug. 1, 1986, 61-181568**
**Int. Cl.⁵ G11C** *7/00, 8/00, 15/00, 15/04*
**U.S. Cl. 365—49** **12 Claims**



1. A semiconductor memory device for a data processing system having a main memory, a cache memory, and a central processor unit, said main memory comprising N memory sets, each of said memory sets being constituted by a plurality of memory blocks, said cache memory to store data of n memory sets where n is smaller than N, said semiconductor memory device comprising:

memory means for storing address data of upper address portions each of which designates a memory set of data stored in an address in said cache memory, said address data being stored in an address in said memory device corresponding to said address in said cache memory, both the addresses designating a memory block in said designated memory set;

storage means for storing validity bits which indicate a valid/invalid state of address data in each address of said memory means; and

an initialization circuit for loading each of said validity bits in each address of said memory means with information indicating said invalid state upon a switching on of a power source of said device.

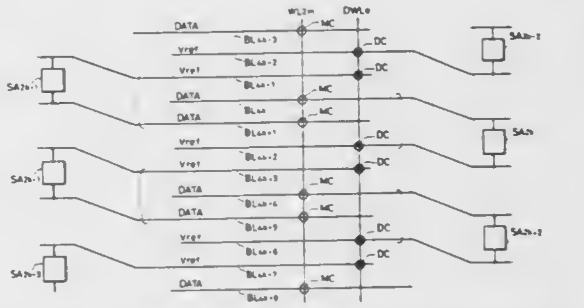
---

### 5,014,241

## DYNAMIC SEMICONDUCTOR MEMORY DEVICE HAVING REDUCED SOFT ERROR RATE

**Mikio Asakura; Kazuyasu Fujishima, and Yoshio Matsuda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 12, 1989, Ser. No. 337,219**
**Claims priority, application Japan, May 12, 1988, 63-117707**
**Int. Cl.⁵ G11C** *5/02, 5/06, 7/00*
**U.S. Cl. 365—51** **12 Claims**



1. A dynamic semiconductor memory device comprising:

a plurality of word lines,

a plurality of bit lines arranged intersecting with said plurality of word lines,

a plurality of memory cells respectively provided at intersections of said plurality of word lines and said plurality of bit lines,

a plurality of reference potential supplying means each for applying a reference potential to each of said plurality of bit lines,

a plurality of sense amplifier means each coupled to a corresponding pair of bit lines, having a first bit line onto which information stored in a memory cell is read out and a second bit line to which said reference potential is applied, out of said plurality of bit lines for amplifying a potential difference between said corresponding pair of bit lines, and

switch means causing each of said plurality of sense amplifier means to be coupled to its corresponding first and second bit lines such that between the first and second bit lines thereof is another bit line onto which information stored in another memory cell is read out.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,242

## SEMICONDUCTOR DEVICE FOR A RAM DISPOSED ON CHIP SO AS TO MINIMIZE DISTANCES OF SIGNAL PATHS BETWEEN THE LOGIC CIRCUITS AND MEMORY CIRCUIT

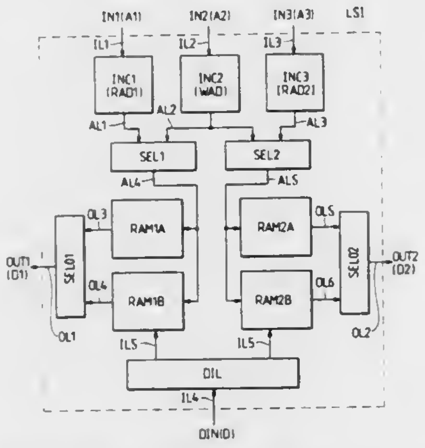
**Kazuhiro Akimoto, Tokorozawa; Masami Usami, Tokyo; Katsumi Ogiue, Tokyo; Hiroshi Murayama, Hadano; Hitoshi Abe, Hadano; Masamori Kashiyama, Hadano; Yoshikuni Kobayashi, Tokyo; Satoru Isomura, Tokyo, and Kinya Mitsumoto, Tokyo, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering Ltd., both of Tokyo, Japan**

**Filed Dec. 8, 1988, Ser. No. 281,399**

**Claims priority, application Japan, Dec. 10, 1987, 62-313010; Dec. 29, 1987, 62-335998; Mar. 17, 1988, 63-64086**

**Int. Cl.$^5$ G11C *5/02***

**U.S. Cl. 365—63** **15 Claims**



1. A semiconductor integrated circuit device formed on a single chip, said semiconductor integrated circuit device comprising:

a first memory circuit for reading and writing data;

a second memory circuit for reading and writing data;

a first logic circuit for generating a first address signal for the read operation of said first memory circuit;

a second logic circuit for generating a second address signal for the read operation of said second memory circuit;

a third logic circuit for generating a third address signal for the write operation of said first and second memory circuits;

a fourth logic circuit for selectively supplying one of said first and third address signals to said first memory circuit;

a fifth logic circuit for selectively supplying one of said second and third address signals to said second memory circuit;

a first signal line connected between said first memory circuit and said fourth logic circuit;

a second signal line connected between said second memory circuit and said fifth logic circuit;

a third signal line connected between said first logic circuit and said fourth logic circuit, for supplying said first address signal to said fourth logic circuit;

a fourth signal line connected between said third logic circuit and said fourth logic circuit, for supplying said third address signal to said fourth logic circuit;

a fifth signal line connected between said second logic circuit and said fifth logic circuit, for supplying said second address signal to said fifth logic circuit; and

a sixth signal line connected between said third logic circuit and said fifth logic circuit, for supplying said third address signal to said fifth logic circuit;

wherein the length of said third, fourth, fifth and sixth signal lines is substantially the same.

---

### 5,014,243

## PROGRAMMABLE READ ONLY MEMORY (PROM) HAVING CIRCULAR SHAPED EMITTER REGIONS

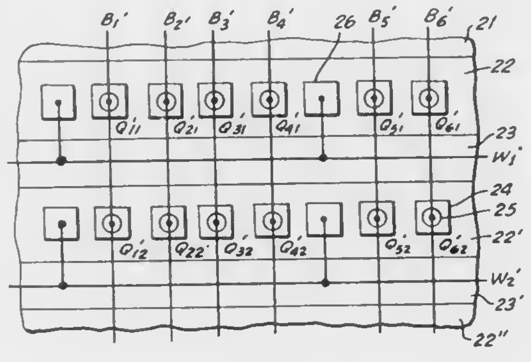
**Naruaki Takada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

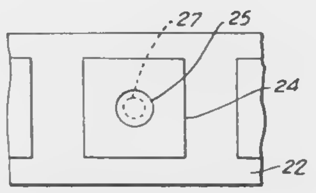
**Filed Nov. 28, 1988, Ser. No. 276,913**

**Claims priority, application Japan, Nov. 26, 1987, 62-299110**

**Int. Cl.$^5$ G11C *17/14;* H01L *29/06***

**U.S. Cl. 365—96** **8 Claims**





1. A programmable read-only memory circuit of a junction destruction-type, comprising a plurality of collector regions formed in one main surface of a semiconductor substrate having one type of conductivity, said plurality of collector regions having an opposite type of conductivity to that of the substrate, a plurality of base regions having said one type of conductivity and being arranged in line in each of said collector regions, emitter regions having said opposite type of conductivity and being of a circular shape and being provided in each of said base regions, word lines respectively connected to each of said collector regions, and bit lines which are commonly connected to the emitter regions which are formed in said collector regions, respectively, whereby integration density of the memory circuit is highly increased.

---

### 5,014,244

## INTEGRATED MEMORY CIRCUIT WITH PARALLEL AND SERIAL INPUT AND OUTPUT

**Judocus A. M. Lammerts, Eindhoven, Netherlands; Richard C. Foss, Kanata, Canada, and Roelof H. W. Salters, Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

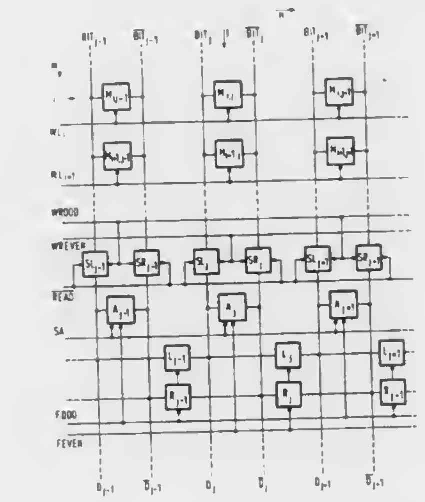
**Filed Aug. 25, 1989, Ser. No. 398,816**

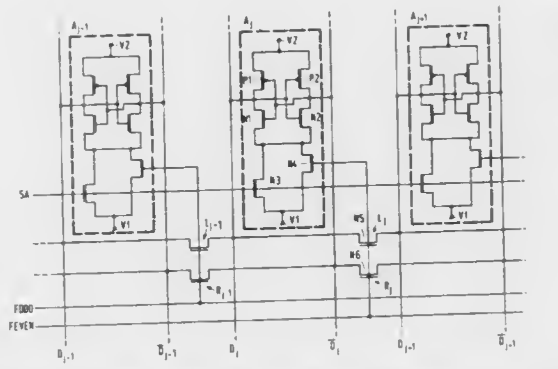
**Claims priority, application Netherlands, Aug. 29, 1988, 8802125**

**Int. Cl.$^5$ G11C *7/06***

**U.S. Cl. 365—189.05** **13 Claims**

1. An integrated memory circuit, comprising a matrix having rows and columns in which each column comprises its own sense amplifier circuit for forming an externally-presentable output signal on a respective sense amplifier circuit output, characterized in that each sense amplifier circuit has a latch function and selection means are provided for selecting a number of sense amplifier circuits, each of which forms part of a respective pair of sense amplifier circuits, and transfer means for directly replacing information in one sense amplifier circuit within the relevant pair, the information in said one sense amplifier circuit thereby being destroyed.





---

### 5,014,245

## DYNAMIC RANDOM ACCESS MEMORY AND METHOD FOR WRITING DATA THERETO

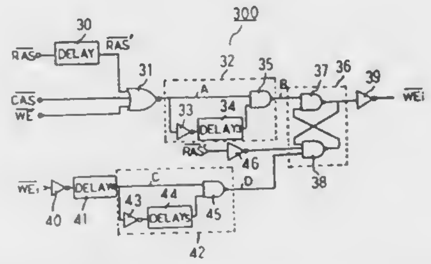
**Kazuyoshi Muroka; Takashi Ohsawa, and Tohru Furuyama, all of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Jun. 20, 1990, Ser. No. 540,770**

**Claims priority, application Japan, Jul. 20, 1989, 1-188304**

**Int. Cl.$^5$ G11C *7/00***

**U.S. Cl. 365—194** **8 Claims**



1. A dynamic random access memory device in which a write operation is performed responsive to an internal write enable signal generated from a row address strobe signal, a column address strobe signal and an external write enable signal, comprising:

memory cell means for storing a data;

first and second bit lines being coupled to the memory cell means;

sensing means for sensing the voltage difference between the bit lines;

switching means connected between the sensing means and the memory cell means, for transferring the data stored in the memory cell means to the sensing means;

first circuit means for generating a first control signal for making the switching means non-conductive during a first predetermined period;

input means for inputting a data to the memory cell means through the bit lines responsive to the internal write enable signal; and

second circuit means for generating the internal write enable signal, including delay means for delaying the termination of the internal write enable signal for a prescribed time after the termination of the first predetermined period if the external write enable signal occurs before the column address signal.

---

### 5,014,246

## SEMICONDUCTOR MEMORY DEVICE HAVING SHARED SENSE AMPLIFIER AND OPERATING METHOD THEREOF

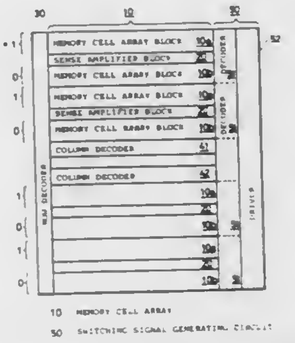
**Takahiro Komatsu; Masaki Kumanoya; Yasuhiro Konishi; Katsumi Dosaka, and Yoshinori Inoue, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 14, 1989, Ser. No. 435,901**

**Claims priority, application Japan, Dec. 7, 1988, 63-310324**

**Int. Cl.$^5$ G11C *11/34***

**U.S. Cl. 365—230.03** **19 Claims**



1. A semiconductor memory device comprising:

a memory cell array comprising a plurality of word lines, a plurality of bit lines provided to intersect with said plurality of word lines, and a plurality of memory cells provided at the intersections of said plurality of word lines and said plurality of bit lines, said plurality of bit lines forming a plurality of bit line pairs;

said memory cell array being divided into a plurality of memory cell array blocks;

sense amplifier means commonly provided for said plurality of memory cell array blocks, for amplifying potential differences on said plurality of bit line pairs included in each of said plurality of memory cell array blocks;

a plurality of switching means connected between said plurality of memory cell array blocks and said sense amplifier means for selectively connecting said sense amplifier means to each memory cell array block;

driving signal generating means for generating a driving signal having a prescribed potential, and

decoding means responsive to a prescribed selecting signal for supplying said driving signal from said driving signal generating means to any selected one of said plurality of switching means;

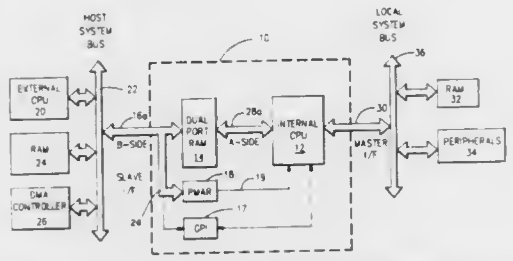
each of said plurality of switching means being conductive responsive to said driving signal.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,247
## SYSTEM FOR ACCESSING THE SAME MEMORY LOCATION BY TWO DIFFERENT DEVICES

**Rudolph J. Albachten, III, and Robert W. O'Dell, both of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Dec. 19, 1988, Ser. No. 286,200**
**Int. Cl.⁵ G11C** *8/00*
**U.S. Cl. 365—230.05** **20 Claims**



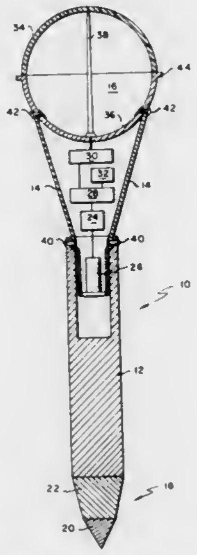
1. A dual port random access memory (RAM) device comprising:
(a) a memory location defined by a multiple interface means comprising at least two address interfaces each of which communicate with respective ones of dual ports of a RAM for allowing at least two devices to access said memory location approximately at the same time, said memory location being subdivided into at least two portions, one of said portions being a source and one of said portions being a destination; and
(b) shadow updating means operatively connected to each of said memory location portions for allowing data stored in one of said memory location portions to be copied into the others of said memory location portions.

---

### 5,014,248
## AIR-DELIVERABLE, ICE-PENETRATING SONOBUOY

**Louis V. Feltz; Eric W. Reece; Clarence W. Young, all of Albuquerque, N. Mex., and Thigpen Lewis, Dracut, Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 5, 1974, Ser. No. 441,202**
**Int. Cl.⁵ H04B** *1/59*
**U.S. Cl. 367—4** **10 Claims**



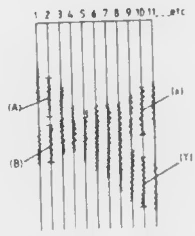
1. An air-deliverable sonobuoy comprising;
a penetrator;
an instrument housing having a maximum width greater than the maximum width of the penetrator;
an antenna housing having a maximum width greater than the maximum width of the instrument housing;
means for normally connecting said penetrator to said instrument housing and said instrument housing to said antenna housing, and responsive to impact forces on said instrument housing and antenna housing to allow separation of said penetrator, instrument housing and antenna housing; and
means originally mounted within the sonobuoy for receiving and transmitting signals.

---

### 5,014,249
## METHOD IN A REAL TIME CONTROL SYSTEM FOR SEISMIC INTERFERENCE

**Mundy Brink, Drammen, Norway, assignor to Geco A.S., Sankvika, Norway**

**Filed Mar. 9, 1990, Ser. No. 491,103**
**Claims priority, application Norway, Mar. 17, 1989, 891184**
**Int. Cl.⁵ G01V** *1/28, 1/30*
**U.S. Cl. 367—63** **14 Claims**

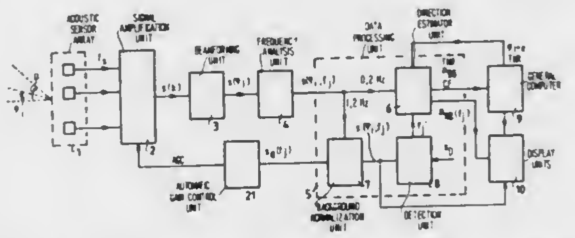


1. A method in a real time control system for seismic interference between separate seismic surveys carried out simultaneously in the same survey area, to indicate an acceptable level of interference in relation to amplitude, angle of incidence and frequency of seismic reflection signal, based on a trial recording or previous recording and to remove from the survey signals loaded with interference above said level of acceptance, in which a coverage of a point of reflection is determined by the number of shots reflected or the separation between the shot points and the number and distribution of detector arrays or channels in the seismic streamer, and in which the seismic survey comprises a number of recording series for the respective points of reflection, the method comprising:
(a) predetermining values of lower limits of coverage before each series of recordings, said lower limits of coverage being a selected minimum number of different shots contributing to the reflection from a single reflection point in a previous recording from the same survey area;
(b) identifying interference and amplitude anomaly in the recorded reflection signal, and comparing the amplitude characteristic of the recorded reflection signal with an expected value of the amplitude characteristic of the signal;
(c) estimating said expected value of the amplitude characteristic of the signal on the basis of recorded amplitude characteristics of recorded signals from at least one of the previous recordings, the identification of interference and amplitude anomaly being made in given time windows;
(d) marking those time windows in which interference and/or amplitude anomaly is identified;
(e) generating a table of the number of times a certain time window was marked in recordings which form part of the series of recordings of the same point of reflection;
(f) assigning limits of the number of interference events to differently marked time windows with different limits being possible for different time windows; and
(g) removing those time windows in which the number of interference events exceeds the assigned limits from the recording.

### 5,014,250
## ACOUSTIC DETECTION DEVICE

**Johannes N. Hadderingh, Goor, Netherlands, assignor to Hollandse Signaalapparaten B. V., Hengelo, Netherlands**

**Filed Apr. 13, 1990, Ser. No. 509,254**
**Claims priority, application Netherlands, Apr. 20, 1989, 8900985**
**Int. Cl.⁵ G01S** *3/80*
**U.S. Cl. 367—124** **15 Claims**



1. An acoustic detection device for receiving and processing acoustic signals, which comprises:
k acoustic detectors for the detection and conversion of acoustic signals into electrical signals s(k);
beamforming means and a frequency analysis unit which uses the signals s(k) to generate signals $s(\phi_i, f_j)$ which represent acoustic signals with n frequencies $f_j (j=1 \ldots n)$ received from m beam reception directions $\phi_i (i=1 \ldots m)$; and
a data processing unit suitable for processing the signals $s(\phi_i, f_j)$;
characterised in that the data processing unit comprises a direction estimator unit which generates for each of the n frequencies $f_j$ $(j=1 \ldots n)$, where a predetermined detection criterion set by the direction estimator unit is met, on the basis of at least a selection of the signals $s(\phi_i, f_j)$ $(i=1 \ldots m)$, corresponding to each frequency $f_j$ from the beam reception directions $\phi_i$, a narrowband estimation $\Omega_{NB}(f_j)$ of a direction $\Omega$ of an acoustic signals generating source and where subsequently the direction estimator unit, on the basis of the narrowband estimations $\Omega_{NB}(f_j)$, generated for at least a selection of the frequencies $f_j$, generates a broadband estimation $\Omega_{BB}$ of the direction $\Omega$.

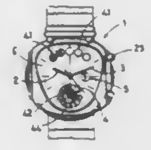
---

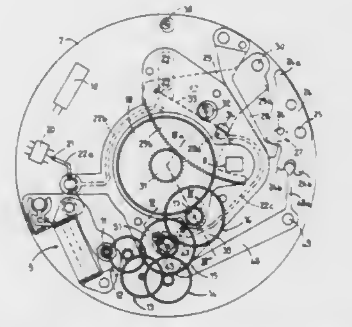
### 5,014,251
## DEVICE PRODUCING STOPPING OF A MOVABLE ELEMENT IN A DETERMINED POSITION AND A TIMEPIECE HAVING A COUNTING INDICATOR OF A FINITE DURATION

**Michiel Groothuis, Saint-Imier, and Francois Nikles, Cressier, both of Netherlands, assignors to Conseilray S.A., Switzerland**

**Filed Mar. 2, 1990, Ser. No. 487,582**
**Claims priority, application Switzerland, Mar. 7, 1989, 831/89**
**Int. Cl.⁵ G04B** *19/04;* **G04F** *8/00*
**U.S. Cl. 368—80** **9 Claims**

1. A device for stopping a movable element in a determined position comprising:
an electric motor;
a movable element driven by said electric motor and which has to be able to run at least once past a stopping position without stopping thereat;
a circuit for driving said motor including a terminal post which, when put to a determined polarity, produces the stopping of said motor;
a first switch mounted along a path and connecting said terminal post of said circuit to said polarity in which said movable element closed, at each of its passages at said position, said first switch;
a second switch mounted in series with said first switch in said path; and
a movable member positively connected through gearing to said movable element and controlling said second switch mounted in series with said first switch in said path, so that said movable member occupies the position in which it closes said second switch at the moment the movable element reaches the position of the end of its running, the simultaneous closing of the two switches resulting in stopping of the motor and, consequently, stopping of the movable element.





---

### 5,014,252
## OVER WRITE CAPABLE MAGNETOOPTICAL RECORDING METHOD USING TWO BEAMS, AND MAGNETOOPTICAL RECORDING APPARATUS THEREFOR

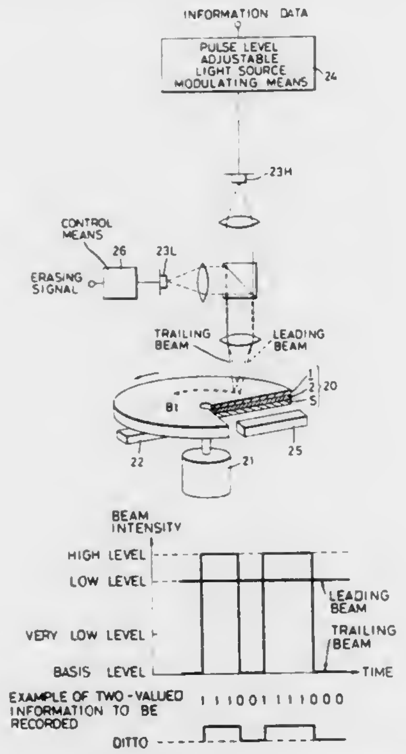
**Hideki Akasaka, Yokohama, and Masatoshi Sato, Tokyo, both of Japan, assignors to Nikon Corporation, Tokyo, Japan Continuation of Ser. No. 449,337, Dec. 12, 1989, abandoned, which is a continuation of Ser. No. 353,389, May 17, 1989, abandoned, which is a division of Ser. No. 104,421, Oct. 5, 1987, Pat. No. 4,855,975. This application Aug. 22, 1990, Ser. No. 570,978**

**Claims priority, application Japan, Oct. 8, 1986, 61-239852**
**Int. Cl.⁵ G11B** *13/04, 11/12*
**U.S. Cl. 369—13** **6 Claims**

1. An over write capable magnetooptical recording method for recording data using a bit having upward-magnetization and a bit having downward-magnetization on a recording layer of a magnetooptical recording medium,
said method comprising the steps of:
(a) using, as the medium, a multilayered magnetic recording medium comprising a first layer having a perpendicular magnetic anisotropy and having upward and downward magnetizations, arbitrarily acting as a recording layer, and a second layer having a perpendicular magnetic anisotropy acting as a reference layer;
(b) moving said medium;
(c) applying an initial field so that, before recording, the direction of magnetization of the first layer is left unchanged, and that of the second layer is oriented either upward or downward;
(d) radiating a leading erasing laser beam and an adjacent trailing writing laser beam onto said medium;
(e) applying the leading erasing laser beam to said medium with a low intensity level without modulating, so as to orient the direction of magnetization of said first layer either upward or downward by utilizing magnetization of said second layer; and
(f) applying the trailing writing laser beam to said medium, while pulse modulating the trailing writing laser beam, in accordance with information to be recorded, between a high intensity level that is higher than said low intensity level and a basis intensity level that is equal to or lower

VOL
1126
ISS
1
MY
7
1991
UMI

than said low intensity level, so as to form in said first layer bits having respective upward and downward directions of magnetization in accordance with said pulse modulated writing laser beam.



---

### 5,014,253
### OPTICAL PICK-UP FOR SELECTIVE PLAYBACK AND RECORDING ON A MAGNETO-OPTICALLY RECORDED MEDIUM

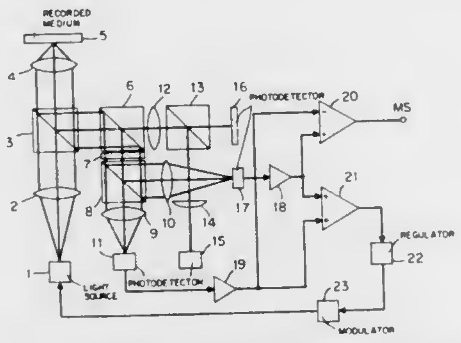
**Yasuaki Morimoto; Friedheim Zucker, and Christian Büchler, all of Villingen-Schwenningen, Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany**

**Filed Sep. 28, 1988, Ser. No. 250,777**

**Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732874**

**Int. Cl.$^5$ G11B** *13/04, 11/10, 11/12*

**U.S. Cl. 369—13** **3 Claims**



1. An optical pick-up for selective playback and recording on a magneto-optically re-recording medium, comprising: a source of light for projecting light onto said re-recording medium, said light having a direction of polarization; first and second photodetectors; said light being reflected from said re-recording medium; a polarizing beam divider for deflecting the reflected light onto a predetermined one of said first and second photodetectors depending on the direction of polarization of the light, said reflected light having an intensity, said reflected light having different noise components for different re-recording media due to different optical properties of different re-recording media and due to variations of said light, different re-recording media with different noise components requiring different adjustments of said deflecting means due to said different noise components when said different re-recording media are used with said optical pick-up; and means for holding the intensity of said reflected light constant to substantially minimize said different noise components in said reflected light without requiring precise readjustment of said deflecting means to each of the different re-recording media; said holding means comprising: a first lens, a first prism beam divider, and a second lens, light from said source of light being focused onto said re-recording medium through said first lens, said first prism beam divider, and said second lens, said reflected light travelling back through said second lens and to said first prism beam divider; a second prism beam divider, a third lens, and a third prism beam divider, as well as a third photodetector, said second prism beam divider receiving deflected light from said first prism beam divider and deflecting the received light onto said third photodetector through said third lens and said third prism beam divider; said third photodetector having an output signal for generating a tracking error signal for a tracking circuit; a fourth lens and a fourth photodetector, said third prism beam divider receiving a beam of light from said second prism beam divider through said third lens and deflecting the received beam of light onto said fourth photodetector through said fourth lens; said fourth photodetector having an output signal for generating a focusing error signal for a focusing circuit; a half-wavelength plate, and a fifth lens, said second prism beam divider deflecting a beam of light received from said first prism beam divider onto said first photodetector through said plate, said polarizing beam divider, and said fifth lens; said polarizing beam divider deflecting a beam of light received from said second prism beam divider onto said second photodetector; a first amplifier, a summation amplifier having an input, and a differential amplifier having a subtraction input, said first photodetector having an output connected through said first amplifier to said input of said summation amplifier and to said subtraction input of said differential amplifier; a second amplifier, said second photodetector having an output connected through said second amplifier too a second input of said summation amplifier and to an adding input of said differential amplifier; a regulator connected to a modulator, said summation amplifier having an output connected through said regulator to an input of said modulator; said modulator having an output connected to a control input of said source of light; said differential amplifier having an output corresponding to a data signal containing data stored in magnetic domains of said re-recording medium.

---

### 5,014,254
### MAGNETO-OPTICAL RECORDING METHOD AND MAGNETO-OPTICAL RECORDING APPARATUS

**Gerard E. Van Rosmalen; Bernardus A. J. Jacobs, and Johannes H. M. Spruit, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

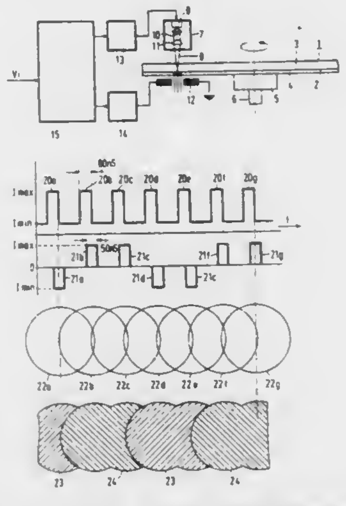
**Filed Dec. 15, 1988, Ser. No. 285,184**

**Claims priority, application Netherlands, May 9, 1988, 8801205**

**Int. Cl.$^5$ G11B** *11/12, 13/04*

**U.S. Cl. 369—13** **13 Claims**

· 1. A method of recording information on a record carrier having a magneto-optical recording layer, a pattern of magnetic domains having a first direction and a second direction of magnetization being formed in the recording layer by scanning the recording layer with a radiation beam in order to temporarily heat portions of the recording layer locally, the heated portions of the recording layer being exposed to a magnetic field which is directed substantially perpendicularly to the recording layer and which is generated by means of a coil, the coil being energized with an energizing current which is modulated in conformity with an information signal, characterized in that the radiation beam is pulse modulated, in that the coil is energized with energizing current pulses of a first polarity and a second polarity, a phase relationship between the radiation pulses and the energizing current pulses being such that cooling of the heated portions of the recording layer takes place substantially during the generation of the energizing-current pulses wherein the energizing-current pulses are energized after the radiation pulses are energized.



---

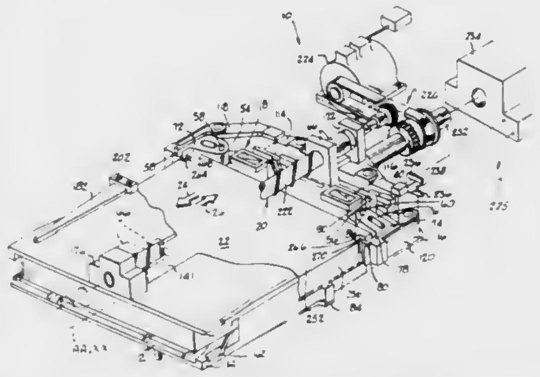
### 5,014,255
### OPTICAL DISK CARTRIDGE HANDLING APPARATUS WITH PASSIVE CARTRIDGE ENGAGEMENT ASSEMBLY

**Mark E. Wanger; Jennifer L. Methlie; David P. Jones, and Donald J. Stavely, all of Fort Collins, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Feb. 2, 1989, Ser. No. 305,898**

**Int. Cl.$^5$ G11B** *17/22, 33/02*

**U.S. Cl. 369—36** **16 Claims**



1. A cartridge handling apparatus comprising:

(a) guide means having a forward end and a rear end for guiding a cartridge engaging means along a longitudinally extending cartridge movement path;

(b) longitudinally displacement means for displacing said cartridge engaging means along said cartridge movement path;

(c) said cartridge engaging means for latchingly engaging a cartridge, longitudinally displacing said cartridge, and unlatchingly releasing said cartridge; said cartridge engaging means having:

(i) a go-get operating mode wherein said engaging means moves forwardly without a cartridge;

(ii) a retrieve operating mode wherein said engaging means moves rearwardly with an engaged cartridge;

(iii) a put operating mode wherein said engaging means moves forwardly with an engaged cartridge;

(iv) a return operating mode wherein said engaging means moves rearwardly without a cartridge; and

(v) said engaging means being adapted to latchingly engage a cartridge positioned adjacent said forward end of said guide means at the ned of said go-get operating mode, and being adapted to unlatchingly release a cartridge at the end of said put operating mode;

said cartridge engaging means comprising:

- carriage means guidingly mounted on said guide means for enabling guided movement of said cartridge engaging means along said guide means; and
- latch means deflectably mounted on said carriage means for latchingly engaging and unlatchingly releasing cartridge catch means;

said latch means comprising a first latching member having a first end portion attached to said carriage means and a second end portion having a latching surface therein adapted to latchingly engage a first catch surface of said cartridge catch means.

---

### 5,014,256
### PHOTODISC APPARATUS WITH GAIN CONTROL OF TRACKING SERVO LOOP

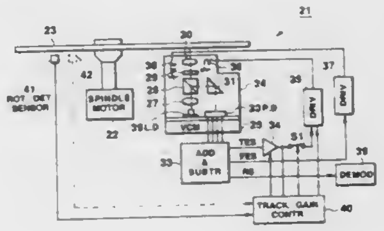
**Yuji Horie, and Shoji Yoshikawa, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 26, 1990, Ser. No. 515,015**

**Claims priority, application Japan, Apr. 27, 1989, 1-108034**

**Int. Cl.$^5$ G11B** *7/09, 7/095*

**U.S. Cl. 369—44.35** **8 Claims**



1. A loop gain control device for a tracking servo system, comprising:

- a beam generating means for generating a light beam for recording or reproduction of information in and from an optical recording medium having information recording tracks;
- an objective lens applying said light beam to said optical recording medium;
- lens actuator means for driving said objective lens in a direction to cross said tracks in response to an input signal;
- a photosensing means for receiving the light beam reflected from said optical recording medium;
- tracking error signal generating means for generating, from an output of said photosensing means, a tracking error signal indicative of an offset of a beam spot, formed by said light beam on said optical recording medium, from an object track;
- variable gain means for amplifying said tracking error signal with a variable gain;
- drive signal generating means for generating a drive signal which enables said lens actuator means to drive said objective lens in a direction to cross said tracks;
- switching means which, when turned on, enables an output from said variable gain means to be delivered to said lens actuator means to set up a tracking servo which causes said beam spot to trace said object track;
- amplitude detection means for picking up said tracking error signal and for detecting an amplitude of said tracking

VOL
1126
ISS
1
MY
7
1991
UMI

error signal when said switching means is turned off to enable said drive signal to be delivered to said lens actuator means so that a velocity of said beam spot crossing the tracks is larger than a crossing velocity of said beam spot crossing the tracks caused by eccentricity of said optical recording medium; and

gain control means for controlling the gain of said variable gain means to a predetermined value in accordance with the detected amplitude.

---

**5,014,257**

### OPTICAL READOUT CIRCUIT FOR PRODUCING WAVEFORMS HAVING SHARP EDGES

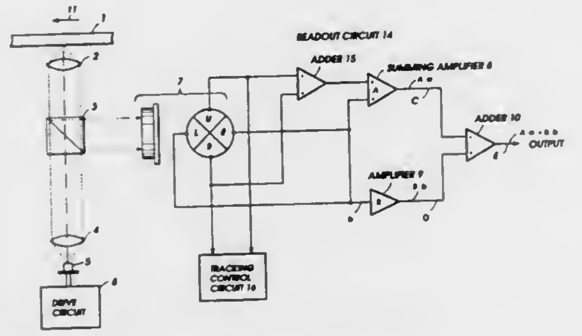
**Yutaka Tanahashi, and Toshihiko Takahashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Oct. 20, 1988, Ser. No. 260,095**

**Claims priority, application Japan, Oct. 20, 1987, 62-265598**

**Int. Cl.$^5$ G11B** *7/00*

**U.S. Cl. 369—59** **6 Claims**



1. An optical reading apparatus comprising:

means for irradiating a laser beam onto an optical recording medium in which binary signals are recorded in the form of pits arranged on a track;

photodetector means having equally divided first, second, third and fourth segments arranged in a path of light reflected from said recording medium, said first and second segments being aligned in a direction parallel to said track and said third and fourth segments being aligned in a direction perpendicular to said track; and

a readout circuit for deriving an output signal A·a + B·b as representative of said recorded binary signals from said first, second, third and fourth segments, where A and B represent constant values, a represents a summed value of output signals of said first, second, third and fourth segments and b represents a summed value of output signals of said first and second segments.

---

**5,014,258**

### DISC PLAYER HAVING MEANS FOR PREVENTING DISC MAGAZINE FROM BEING INSERTED UPSIDE DOWN

**Kaoru Takemasa; Akira Takahashi; Masahiko Kawamura; Sigeo Maruyama, and Tokushige Kon, all of Kawagoe, Japan, assignors to Pioneer Electronic Corp., Tokyo, Japan**

**Filed Jun. 15, 1989, Ser. No. 366,391**

**Claims priority, application Japan, Oct. 3, 1988, 63-247518; Oct. 31, 1988, 63-273338**

**Int. Cl.$^5$ G11B** *23/03*

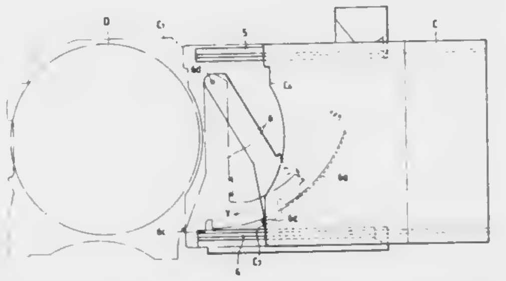
**U.S. Cl. 369—178** **4 Claims**

1. A device for preventing a disc magazine from being inserted upside down into a disc player, the disc player including a magazine holder, the magazine supporting at least one disc tray for placing a disc thereon, the magazine being insertable into the magazine holder, means for taking the disc tray out of the magazine which is inserted in the magazine holder, a turntable, and playback means for playing back the disc; the device comprising:

a magazine ejector arm (6) pivotally disposed in said magazine holder (3);

biasing means (6*b*) connected to said magazine ejector arm (6) for normally urging said arm (6) to a direction to eject said magazine (C) out of said magazine holder (3), and

said magazine (C) being provided with a front end having one portion formed with a surface ($C_7$) slidingly contactable with the magazine ejector arm (6) and another portion formed with a step ($C_6$), said ejector arm (6) providing a full pivoting stroke upon slide contact with said surface ($C_7$) against the biasing force of said biasing means (6*b*) to allow the magazine (C) to be fully inserted into said magazine holder, and said magazine ejector arm (6) having means for engaging said step ($C_6$) at an intermediate pivot position of said magazine ejector arm (6) so as to be in locking engagement with said step ($C_6$) for preventing the magazine (C) from being further inserted into said magazine holder (3).



---

**5,014,259**

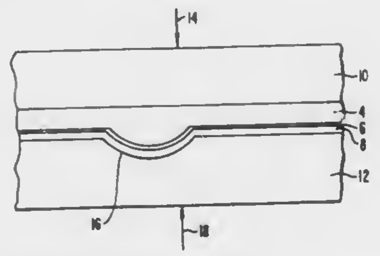
### RECORDING MEDIUM HAVING AN INSULATING LAYER

**Paul R. Goldberg, Palo Alto; Bryan K. Clark, Sunnyvale; Joel D. Finegan, Campbell, and Robert Guerra, Santa Clara, all of Calif., assignors to Tandy Corporation, Ft. Worth, Tex.**

**Division of Ser. No. 294,723, Jan. 10, 1989, abandoned, which is a continuation-in-part of Ser. No. 153,288, Feb. 5, 1988, abandoned. This application Oct. 2, 1989, Ser. No. 416,283**

**Int. Cl.$^5$ G11B** *5/84;* **G01D** *9/00*

**U.S. Cl. 369—284** **15 Claims**



1. A recording medium comprising:

a first layer, said first layer absorptive of a first wavelength of light to form a detectable deformation in said first layer when heated by said first wavelength of light;

a second insulating layer adjacent said first layer; and

a third layer adjacent said second layer, opposite said first layer, said third layer holding said deformation in said first layer upon cooling before said first layer cools to a relaxed state wherein said insulating layer thermally isolates said first and said third layers such that said first layer may be expanded and said third layer may be heated to its glass transition temperature substantially independently.

**5,014,260**

### METHOD AND APPARATUS FOR PREVENTING TRANSMISSION OF DATA PACKETS WITH A GREATER INTENSITY THAN A PREDETERMINED VALUE ON ANY ONE OF A NUMBER OF CHANNELS ON A COMMON TRANSMISSION LINK

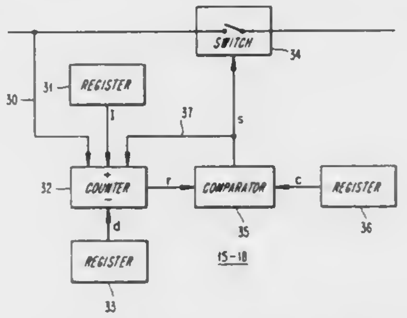
**Rolf G. Wicklund, Sollentuna, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed Oct. 18, 1989, Ser. No. 422,906**

**Claims priority, application Sweden, Oct. 28, 1988, 8803875**

**Int. Cl.$^5$ H04J** *1/16, 3/14, 3/24*

**U.S. Cl. 370—13** **34 Claims**



1. A method of preventing transmission of data packets when a number of data packets per unit time exceeds a predetermined value associated with each one of a plurality of channels on a common transmission link, comprising:

(a) associating with each channel a variable first value;

(b) increasing said associated first value for a given channel by a predetermined second value when a data packet arrives at said given channel; and

(c) selectively activating a switch to prohibit transmission of data packets that arrive at a channel whose associated first value exceeds said predetermined value.

---

**5,014,261**

### SYSTEM FOR SWITCHING FROM WORKING UNITS TO STAND-BY UNITS

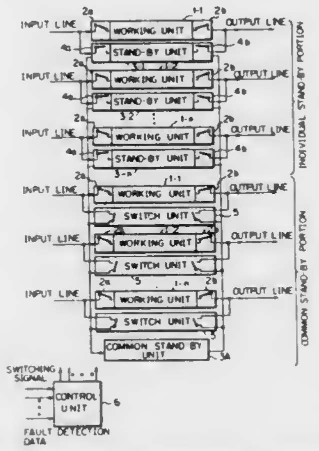
**Masahiro Shinbashi, Kawasaki, and Takashi Wakabayashi, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 1,029, Jan. 7, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 336,614**

**Claims priority, application Japan, Jan. 7, 1986, 61-000306**

**Int. Cl.$^5$ H04J** *03/14*

**U.S. Cl. 370—16** **6 Claims**



1. A switching system for switching between at least one unit in a working state and at least one stand-by unit in a stand-by state, said system selectively operating each of the at least one stand-by unit as one of an individual stand-by unit and a common stand-by unit accessed by an individual switching unit, comprising:

input/output lines for transmitting data;

individual units, each comprising one from among the individual stand-by unit and the individual switching unit, each individual stand-by unit and each individual switching unit including first switches connected to said input/output lines;

working units, each including second switches operatively connected to said input/output lines, each of said working units corresponding to one of said individual units in a pair arrangement;

failure detection means for providing fault detection signals indicating faults in said working units; and

a control unit, operatively connected to said working and individual units and said failure detection means, for controlling switching between one of said working units and the corresponding one of said individual units based on the fault detection signals from said failure detection means, upon occurrence of a failure in the one of said working units, said second switches disconnecting said input/output lines from the one of said working units, said first switches connecting said input/output lines to the corresponding one of said individual units and, when the corresponding one of said individual units is the individual switching unit, said first switches connecting said input/output lines to the common stand-by unit.

---

**5,014,262**

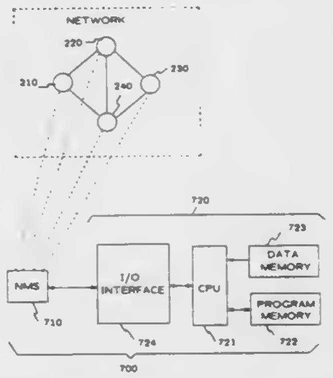
### APPARATUS AND METHOD FOR DETECTING AND ELIMINATING CALL LOOPING IN A NODE-BY-NODE ROUTING NETWORK

**Paramasiv Harshavardhana, Freehold, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jan. 2, 1990, Ser. No. 459,924**

**Int. Cl.$^5$ H04J** *3/14;* **H04M** *7/00*

**U.S. Cl. 370—16** **22 Claims**



1. Apparatus for detecting call looping in a node-by-node data routing network including a plurality of nodes for routing data calls, each node having routing information for directing data calls over multiple paths to multiple destinations, said apparatus comprising:

means for identifying those nodes in the network that are involved in call looping for data calls directed to specific destinations; and

means for modifying the routing information in at least one node involved in the call looping, the modifying means altering a routing path for a data call to a specific destination in a manner that prevents the data call from looping among the identified nodes.

VOL
1126
ISS
1
MY
7
1991
UMI

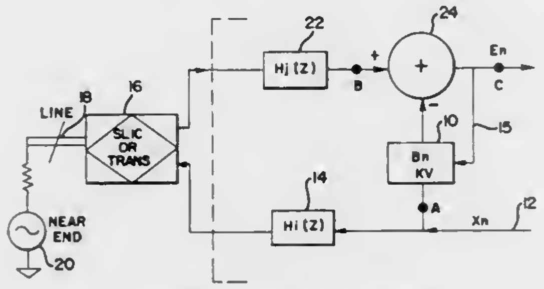
### 5,014,263
## ADAPTIVE ECHO-CANCELLER WITH DOUBLE-TALKER DETECTION

**Kannan P. Vairavan, and Paul McLeod, both of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Continuation of Ser. No. 327,358, Mar. 23, 1989, abandoned, which is a continuation of Ser. No. 104,320, Oct. 2, 1987, abandoned. This application Aug. 29, 1989, Ser. No. 401,497**

**Int. Cl.⁵ H04B *3/23***

U.S. Cl. 370—32.1 5 Claims



1. An apparatus adaptable for use in a communication system at a communication station having a receive line for receiving an incoming signal and a transmit line for transmitting an outgoing signal, the apparatus comprising:

a summer means for summing said outgoing signal with an echo correction signal and producing a corrected output signal representative of said outgoing signal on an output line; and

a digital filter means for producing said echo correction signal;

said digital filter means being operatively connected to said receive line, said summer means, and said output line;

said digital filter means comparing said incoming signal with said corrected output signal to determine said echo correction signal representing the difference between said incoming signal and said corrected output signal;

said digital filter means employing a canonic signed digit algorithm to incrementally alter said echo correction signal to produce a first iteration echo correction signal;

said incoming signal comprising a plurality of incoming signal bits;

said digital filter means effecting said incremental alteration by applying a respective incoming signal bit of said plurality of incoming signal bits to a respective filter tap, each said respective filter tap altering its respective incoming signal bit according to a respective filter tap coefficient,

a value for each said respective filter tap coefficient being defined by said canonic signal digit algorithm;

said digital filter means continuing said comparison and said incremental alteration until said corrected output signal is within a predetermined value of zero.

---

### 5,014,264
## CIRCUIT CONFIGURATION FOR TELECOMMUNICATION SWITCHING SYSTEMS, IN PARTICULAR PCM TIME DIVISION MULTIPLEX TELEPHONE SWITCHING SYSTEMS WITH A CENTRAL SWITCHING NETWORK AND PERIPHERAL SUB-SWITCHING NETWORKS CONNECTED TO IT

**Werner Nagler, Hohenschaeftlarn, and Ludwig Schoenauer, Sauerlach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Dec. 16, 1988, Ser. No. 285,472**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742687**

**Int. Cl.⁵ H04Q *11/04***

U.S. Cl. 370—58.1 4 Claims

1. A circuit configuration for centrally-controlled telephone switching installations comprising:

a central switching network together with a central processor;

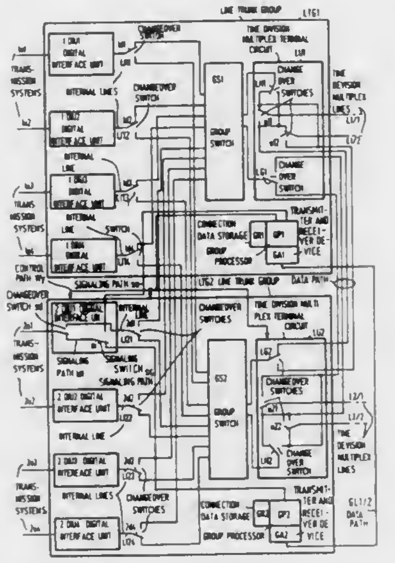
a plurality of peripheral line groups equipped with one sub-switching network each for the external connection of connection and/or subscriber lines and with one peripheral control unit; wherein:

the line groups are assigned to each other in pairs and mutually represent partner line groups;

in each of these line group pairs, internal terminals of the sub-switching network associated with each partner is selectively switchably connected to the terminals of its central switching network and, via link lines, to the terminals of the central switching network and the internal terminals of the sub-switching network of the other partner;

each of the line units of the line groups in a partner pair are alternatively switchably connected to the external terminals of their sub-switching network and, via internal lines, to the external terminals of the sub-switching network of the partner line group;

whereupon for connections which extend via a line unit of a first partner of a pair of line groups and via the internal lines to the sub-switching network of the second line group of the pair, appropriate switching signal processing as well as sub-switching network setting may be carried out by the control unit of the second line group of the pair;



the connection circuits of the network each support a message channel and a signal channel;

in preparation for shunting a lien unit to a partner's sub-switching network via an internal line, each of the two control units outputs connection data which, with respect to all message path sub-connections existing via its particular sub-switching network, indicates which external sub-switching network connections are connected with which internal sub-switching network connections to a particular partner control unit and, in conjunction with such received connection data, establishes individual message path sub-connections via the sub-switching network of its own line group, and, specifically, between such sub-switching network connections with which the internal lines of the particular partner line group are connectable through shunting a line unit, and such sub-switching network connections which through this shunting the link lines of the particular partner line group are to be connected via the external sub-switching network connections and message path sub-connection;

the internal lines carry only a message channel and within one rerouting phase are all changed over without delay

in contrast to the signaling paths which lead within each line group to their control unit and only those connection paths which are free are switched over from their control unit to the partner line group as well as those connections paths via which connections between subscribers are completely through-connected due to the particular called party having answered.

---

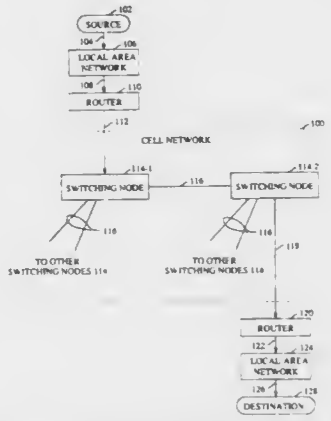
### 5,014,265
## METHOD AND APPARATUS FOR CONGESTION CONTROL IN A DATA NETWORK

**Ellen L. Hahne, Westfield; Charles R. Kalmanek, Hoboken, and Samuel P. Morgan, Morris Township, Morris County, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Nov. 30, 1989, Ser. No. 443,975**

**Int. Cl.⁵ H04J *3/26***

U.S. Cl. 370—60 26 Claims



1. A method employed to control congestion of data cells in switching nodes of a network wherein one or more virtual circuits for transferring the data cells between endpoints pass through one or more of the switching nodes, said method comprising the steps of

assigning an initial cell buffer to the virtual circuit at each node through which it passes,

storing incoming cells for the virtual circuit in its buffer and removing cells from the buffers for forward routing, characterized by

dynamically allocating buffer space for the virtual circuit in the nodes in response to signals from at least one of the endpoints requesting an increased or decreased data window in the nodes.

---

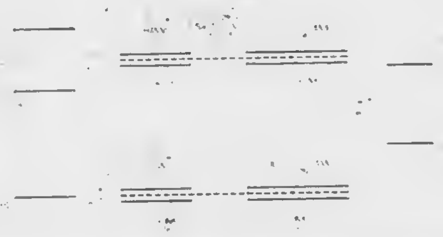
### 5,014,266
## CIRCUIT SWITCHING SYSTEM FOR INTERCONNECTING LOGICAL LINKS BETWEEN PACKET SWITCHING NETWORKS

**Bruce M. Bales, Louisville, and Paul E. Miller, Northglenn, both of Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 290,930, Dec. 28, 1988, abandoned. This application Jun. 26, 1990, Ser. No. 544,083**

**Int. Cl.⁵ H04Q *11/04;* H04M *11/00***

U.S. Cl. 370—60.1 17 Claims



1. A circuit switching system interconnected to at least one of a plurality of types of end point systems by a plurality of communication facilities for establishing logical calls in logical channels in said plurality of communication facilities between at least one of said plurality of types of end point systems to communicate logical calls between at least one of said plurality of types of end point systems, comprising:

means responsive to a first setup request from a first one of said one of said plurality of types of endpoint systems for a logical call to a second one of said one of said plurality of types of end point systems received via a first logical channel for connecting said first logical channel from said first one of said one of said plurality of types of endpoint systems to a second logical channel from said second one of said one of said plurality of types of endpoint systems with said logical call being communicated on said first and second logical channels;

said connecting means further responsive to a second setup request from said first one of said one of said plurality of types of endpoint systems received via said first logical channel to said second end of said one of said plurality of types of end point systems for signaling said latter one of said one of said plurality of types of end point systems that communication is to be established for another logical call via said second logical channel from said second one of said one of said plurality of types of end point systems with said other logical call also being communicated on said first and second logical channels; and

said connecting means further responsive to a third setup request received via said first logical channel from said first one of said one of said plurality of types of end point systems for a logical call to a third one of said one of said plurality of types of end point systems for denying said third setup request.

---

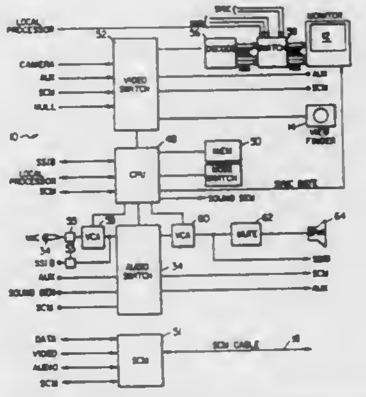
### 5,014,267
## VIDEO CONFERENCING NETWORK

**E. Neal Tompkins, Atlanta, Ga.; Thomas C. Arends, Eugene, Oreg., and Michael W. Barry, Duluth, Ga., assignors to Datapoint Corporation, San Antonio, Tex.**

**Filed Apr. 6, 1989, Ser. No. 335,211**

**Int. Cl.⁵ H04Q *11/04***

U.S. Cl. 370—62 8 Claims



1. A communication network for integrating video and data, said network comprising:

a plurality of network ports;

a plurality of video terminals each associated with one of said network ports for transmitting and receiving real time video signals and network control data messages, one of said video terminals being configured to originate a call, and one of said video terminals being configured as a destination of said call, a user associated with said call destination terminal;

means, coupled between said call origination terminal and said call destination terminal, for transmitting a video image encoded as a video signal and for transmitting an

VOL
1126
ISS
1
MY
7
1991
UMI

incoming call data message to said call destination terminal;

means, coupled to said call destination terminal, for displaying said video image at said call destination terminal to provide video information to a user of said call destination terminal prior to establishing said call; and

means, coupled to said call destination terminal, for sending a call answered data message from said call destination terminal to said call origination terminal after the displaying of said video image at said call destination terminal and at the discretion of said call destination terminal user to establish said call.

---

### 5,014,268

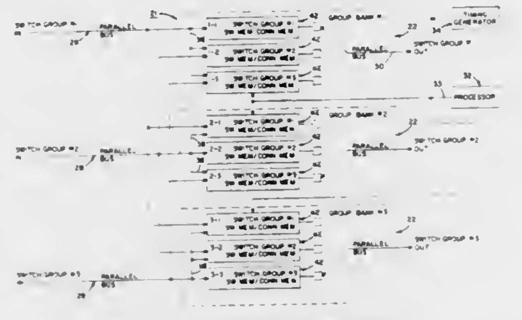
### PARALLEL TIME SLOT INTERCHANGER MATRIX AND SWITCH BLOCK MODULE FOR USE THEREWITH

**Raymond E. Tyrrell, Wake Forest; Milton R. Briscoe; Joseph E. Sutherland, both of Raleigh, all of N.C., and Raymond E. Tyrrell, Wake Forest, all of N.C., assignors to Alcatel NA, Inc., Hickory, N.C.**

**Filed Jan. 11, 1989, Ser. No. 295,887**

**Int. Cl.$^5$ H04Q** *11/04*

**U.S. Cl. 370—68** **54 Claims**



PARALLEL TSI WITH DISTRIBUTED CONNECT MEMORY

1. A parallel time slot interchanger for the exchange of data between up to N times P channels, where N and P are both integers equal to or greater than oe and N times P is an integer greater than one, where data and address information, if present, regarding each channel j of every switch group i, where j is an integer whic increments from zero toP−1 and i is any integer in a groupof integers ranging fromone to N, is synchronously repetitively transferred to a corresponding parallel switch group input bus i during time slot j; nad wherein data representing any channel j previously placed on any switch groupinput bus i can be placed on a parallel switch group output bus k, where k is an integer from one to N, during time slot j, whereinthe parallel time slot interchanger comprises up to N$^2$ switch blocks, arranged in N grup banks, eachh group bank i corresponding to a switch group i, with up to N switch blocks coirresponding to any switch groupi so that anyswitch block is identifiable as switchblock$_{i,m}$, where m is an integer from1 to N, wherein each switch block $_{i,m}$ comprises:

(1) means for uniquely identifying the switch block from all other switch blocks in group bank i;

(2) an addressable switch memory, the switch memory comrising at least P addressable memory locations for the storage of channel data information from switch group m;

(3) means, interconnected to the parallel switch group input bus m, for writing data from channel j of switchgroup m based upon the address information regarding channel j, into a corresponding address of the switch memory;

(4) an addressable connect memory for the storage of switch memory address information for the switch memory ofhtesame switch block, the connect memory comprising at lesat P addressable memory locations for the storage of this switch memory address information;

(5) means for reading data from an addressable location of the connect memory based upon the address information of channel j of switch group i;

(6) means, interconnected to the parallel switch group output bus i, for reading the switch memory data stored at the address location of the switch memory defined by the switch memory address information read from the connect memory; and

(7) means for placing the read switch memory data on the parallel switch group output bus i if a portion of the read connect memory data favorably compares to the switch block identifying means.

---

### 5,014,269

### MICROCOMPUTER INTEGRATING A DIGITAL SUBSCRIBER TERMINAL FOR AN INTEGRATED SERVICE DIGITAL NETWORK

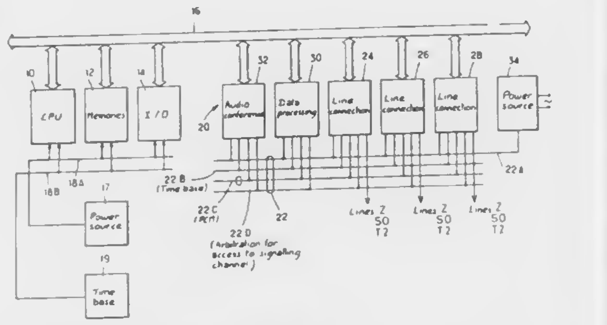
**Jean A. Picandet, Paris, France, assignor to J. S. Telecommunications, Louveciennes, France**

**Filed Jun. 30, 1989, Ser. No. 374,132**

**Claims priority, application France, Jul. 8, 1988, 88 09352**

**Int. Cl.$^5$ H04Q** *3/00*

**U.S. Cl. 370—85.11** **12 Claims**



1. A microcomputer comprising:

first electronic circuit boards on which are fitted first circuits for carrying out central processing unit, memory, and input/output functions, and which are interconnected by a first bus, and

at least one second electronic circuit board having interface circuits for connecting a plurality of terminals to an Integrated Service Digital Network (ISDN) through line means,

means being provided for switching of data transmitted over said line means so as to constitute an ISDN Digital Subscriber Terminal (DST) integrated within the microcomputer,

wherein management and switching of data transmission over said line means and signalling required for exchanging said data are carried out by means of management and switching circuits provided on said at least one second electronic circuit board without calling on the resources of the central processing unit of the microcomputer.

---

### 5,014,270

### DEVICE FOR SYNCHRONIZING A PSEUDO-BINARY SIGNAL WITH A REGENERATED CLOCK SIGNAL HAVING PHASE JUMPS

**E. Thierry Sillere, Paris, France, assignor to SAT (Société Anonyme de Telecommunications), Paris, France**

**Filed Apr. 26, 1990, Ser. No. 515,048**

**Claims priority, application France, May 3, 1989, 89 5905**

**Int. Cl.$^5$ H04J** *3/06*

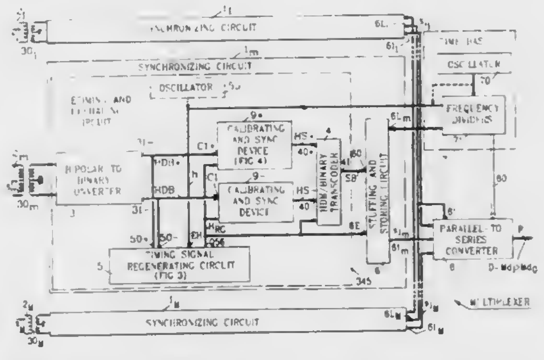
**U.S. Cl. 370—101** **12 Claims**

1. A device for synchronizing a pseudo-binary signal with a clock signal into an outgoing synchronized signal,

said pseudo binary signal having a nominal period and comprising first and second binary elements, each of said first binary elements being signalled by first and second complementary logic levels respectively substantially during first and second successive nominal half-periods, and each of said second binary elements being signalled by said second logic level substantially during a nominal period, a first binary element always being flanked by two second binary elements, thereby defining logic level transitions from said second logic level to said first logic level located between successive second and first binary elements,

said clock signal having a period substantially lower than said nominal period and offering periodical phase jumps for said clock signal to have a mean period equal to said nominal period, thereby defining active clock transitions from one of said logic levels to the other logic level at the beginning of said period of said clock signal, and

said clock signal phase jumps having a constant amplitude that is at most substantially equal to said clock signal period,


SYNCHRONIZING CIRCUIT
SYNCHRONIZING CIRCUIT
OSCILLATOR
TIME BASE
OSCILLATOR
FREQUENCY DIVIDERS
CALIBRATING AND SYNC DEVICE (FIG 4)
CALIBRATING AND SYNC DEVICE
BIPOLAR TO BINARY CONVERTER
HDB
TIMING SIGNAL REGENERATING CIRCUIT (FIG 3)
PARALLEL-TO SERIES CONVERTER
MULTIPLEXER
SYNCHRONIZING CIRCUIT
30₁
30m
30M
345
70
8

said device comprising:

means receiving said pseudo-binary signal for providing a first logic signal having states alternately in said second and first logic levels in response to said logic level transitions in said pseudo-binary signal,

means controlled by the clock signal for phasing said logic level transitions in said first logic signal with active clock transitions in said clock signal, thereby deriving a phased logic signal, and

means controlled by said clock signal for supplying said outgoing synchronized signal with pulses which are at said first logic level and which have a width calibrated as a function of the period of said clock signal and which are respectively derived in response to the logic level transitions in said phased logic signal.

---

### 5,014,271

### PULSE INSERTION CIRCUIT

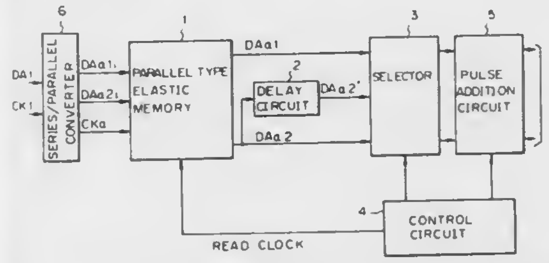
**Naonobu Fujimoto, Yokohama; Yukio Suda, Tochiga, and Katsutoshi Miyaji, Utsunomiya, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Mar. 15, 1989, Ser. No. 323,944**

**Claims priority, application Japan, Mar. 25, 1988, 63-069336**

**Int. Cl.$^5$ H04J** *3/06*

**U.S. Cl. 370—102** **8 Claims**



1. A pulse insertion circuit for selectively inserting pulses into series input data to be processed for subsequent multiplexing and transmission at a predetermined data clocking rate, comprising:

means for alternately distributing and thereby converting the series input data to parallel, first and second input data each at one-half the predetermined data clocking rate;

a parallel type elastic memory having first and second input terminals and first and second output terminals;

means for supplying to the memory a read clock signal at a rate which is one-half the predetermined data clocking rate;

means for applying the parallel, first and second input data to the respective first and second input terminals of the memory and for selectively and synchronously writing same into and reading same from the memory and producing corresponding first and second input data, as read from the memory at the read clock rate, at the respective first and second memory output terminals;

means for receiving the second input data from the corresponding second output terminal of the memory and for delaying same by one bit and producing the one-bit delayed, second input data as an output therefrom;

selection means having first, second and third input terminals respectively receiving the first input data and the second input data, both as read from the memory, and the one-bit delayed second input data as output by the delay means and first and second output terminals, the selection means being selectively operable for selecting one of the second and third input terminals and for switching between and establishing, as to the first input terminal and the selected one of the second and third input terminals, straight connections thereof respectively to the first and second output terminals or cross-connections thereof respectively to the second and first output terminals and thereby producing corresponding, selected and parallel, first and second input data at the first and second output terminals thereof;

means for requesting the addition of a pulse to a specified one of the selected and parallel, first and second input data;

pulse addition means having first and second input terminals, respectively connected to the first and second output terminals of the selection means, and first and second output terminals, the pulse addition means being selectively operable for adding a pulse to the specified one of the selected and parallel, first and second input data received thereby and supplying the selected and parallel, first and second input data, including the pulse added to the specified one thereof, at the respective first and second output terminals thereof; and

control means, responsive to receipt of a pulse insertion request from the requesting means, for inhibiting application of the read clock signal to the elastic memory for one memory read clock period and, during the inhibited memory read clock period, for controlling the selection means to select the delayed, second input data and to switch between and establish the alternate one of the straight and cross connections and for controlling the pulse addition means to add the pulse to the specified one of the selected and parallel, first and second input data received thereby.

---

### 5,014,272

### FRAME SYNCHRONIZER FOR DETECTING MISFRAMES WITH DIFFERENT SHIFT PATTERNS

**Norio Yoshida, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Aug. 11, 1989, Ser. No. 392,349**

**Claims priority, application Japan, Aug. 11, 1988, 63-201598; Dec. 12, 1988, 63-313115; Dec. 12, 1988, 63-313116; Dec. 12, 1988, 63-313117**

**Int. Cl.$^5$ H04J** *3/06*

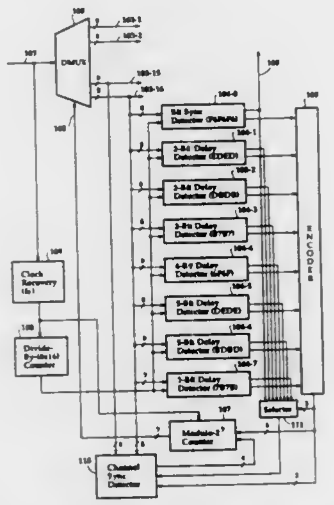
**U.S. Cl. 370—106** **16 Claims**

1. A frame synchronizer adapted to receive an incoming high-speed TDM (time division multiplex) frame signal containing a sync field and a data field, said sync field containing a sequence of at least n synchronization codes of identical bit

VOL
1126
ISS
1
MY
7
1991
UMI

patterns and said data field containing a sequence of data segments of equal bit length, said frame synchronizer comprising:

demultiplexer means for decomposing the high speed TDM frame signal into the synchronization codes and the data segments and forming n low-speed frames each containing a respective one of the decomposed synchronization codes and a respective one of the decomposed data segments when timing of the demultiplexer means is in sync with said incoming TDM frame signal;



a plurality of bit pattern detector means for respectively detecting different bit patterns which are successively obtained by said demultiplexer means when the timing of the demultiplexer means is successively delayed or advanced with respect to the incoming TDM frame signal; and

means for controlling the timing of said demultiplexer means in accordance with a bit pattern detected by said plural bit pattern detector means.

---

### 5,014,273
### BAD DATA ALGORITHM

**Michael A. Gagliardo, Shrewsbury; Paul M. Goodwin, Worcester, and Donald W. Smelser, Bolton, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed Jan. 27, 1989, Ser. No. 303,574**

**Int. Cl.$^5$ G06F** ***11/10***

**U.S. Cl. 371—37.7** **14 Claims**

1. For a digital computer system including a memory system with a read-modify-write operation mode having a plurality of stored data words, each stored data word having a plurality of data bit positions and a plurality of error correction code (ECC) bit positions, a method of identifying data words as bad data words which have uncorrectable errors, including the steps of:

allocating a bit of said ECC bit positions in each of said data words to indicate that said data has been determined uncorrectable;

generating a mark bit for each of said data words in said allocated bit position;

generating check bits for each of said data words according to an error correction code (ECC) to fill the remainder of said ECC bit positions;

inverting said generated check bits for each of said bad data words to form a plurality of corresponding inverted check bits;

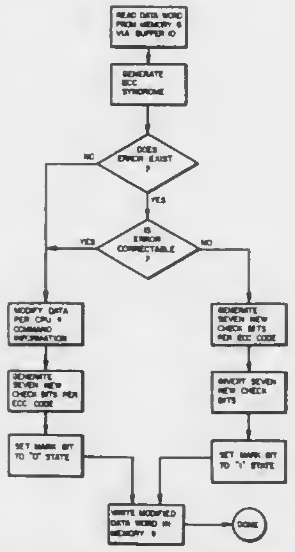
writing said data for each of said data words into its corresponding data bit positions;

writing said inverted check bits for each of said bad data words into their corresponding ECC bit positions;

writing said mark bit for each of said data words into said allocated bit position;

reading each of said written data words;

generating new check bits for each of said read data words according to said ECC;


READ DATA WORD FROM MEMORY VIA BUFFER
GENERATE ECC SYNDROME
DOES ERROR EXIST ?
NO
YES
IS ERROR CORRECTABLE ?
YES
NO
MODIFY DATA PER CPU COMMAND INFORMATION
GENERATE SEVEN NEW CHECK BITS PER ECC CODE
GENERATE SEVEN NEW CHECK BITS PER ECC CODE
INVERT SEVEN NEW CHECK BITS
SET MARK BIT TO "0" STATE
SET MARK BIT TO "1" STATE
WRITE MODIFIED DATA WORD IN MEMORY
DONE

comparing said read data generated check bits with said corresponding written check bits in an exclusive OR relationship to develop an ECC syndrome; and

correlating said ECC syndrome with said mark bit in each of said read data words to identify that each of said bad data words contain uncorrectable errors.

---

### 5,014,274
### CODE-ERROR CORRECTING DEVICE

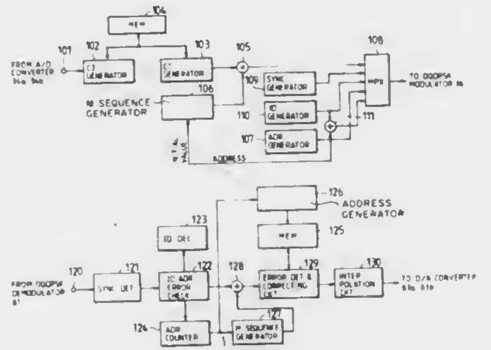
**Seiji Higurashi, Tokyo, and Takuya Tsushima, Kamakura, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Apr. 7, 1989, Ser. No. 334,493**

**Claims priority, application Japan, Apr. 8, 1988, 63-86868**

**Int. Cl.$^5$ H03M** ***13/00;*** **G06F** ***11/10***

**U.S. Cl. 371—40.1** **7 Claims**



1. A code-error correcting device for use in an apparatus for transmitting digital information as well as address information, said code-error correcting device comprising:

an address generating circuit for generating an address information signal indicating address information or data block information relating to address information;

a pseudo-random-function generating circuit for receiving the address information signal as indicating an initial value for computing pseudo-random functions and responsive to the address information signal for generating pseudo-random functions; and

an adder circuit for computing the EXCLUSIVE OR of the digital information and an output of the pseudo-random function generating circuit and further supplying the value of the EXCLUSIVE OR to a digital modulator as an input thereof.

---

### 5,014,275
### SEQUENTIAL DECODER

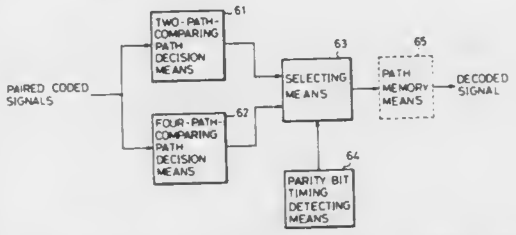
**Kaneyasu Shimoda, Kawasaki, and Yuzo Ageno, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Aug. 25, 1989, Ser. No. 398,501**

**Claims priority, application Japan, Aug. 25, 1988, 63-209512**

**Int. Cl.$^5$ G06F** ***11/10***

**U.S. Cl. 371—43** **5 Claims**


61
TWO-PATH-COMPARING PATH DECISION MEANS
PAIRED CODED SIGNALS
63
SELECTING MEANS
65
PATH MEMORY MEANS
DECODED SIGNAL
62
FOUR-PATH-COMPARING PATH DECISION MEANS
64
PARITY BIT TIMING DETECTING MEANS

1. A sequential decoder for decoding a systematic and convolutional code signal having a code rate greater than ½ and carrying out error correction coding of said code signal, comprising:

path decision means for determining a local most likely path in a plurality of possible paths for a newly received information bit by calculating a branch metric indicating likelihood of each of said plurality of possible paths in accordance with a predetermined algorithm, said path decision means comprising:

two-path comparing path decision means for receiving a pair of bits comprised of an information bit and a parity bit at one time and determining a local most likely path between two possible paths for said information bit;

four-path comparing path decision means for receiving a pair of information bits at one time and determining a local most likely path among four possible paths for said pair of information bits;

parity bit timing detecting means for detecting a timing of an input of said pair of bits comprised of an information bit and a parity bit; and

selecting means for selecting an output of said two-path comparing path decision means when said input timing of said pair of bits comprised of an information bit and a parity bit is detected, and selecting an output of said four-path comparing path decision means when said pair of information bits is received.

---

### 5,014,276
### CONVOLUTIONAL ENCODER AND SEQUENTIAL DECODER WITH PARALLEL ARCHITECTURE AND BLOCK CODING PROPERTIES

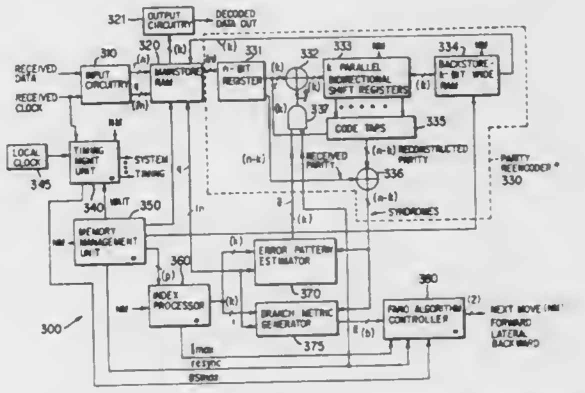
**Aubrey M. Bush, Atlanta, and John F. Schimm, Jr., Norcross, both of Ga., assignors to Scientific Atlanta, Inc., Atlanta, Ga.**

**Continuation of Ser. No. 307,170, Feb. 6, 1989, abandoned, which is a continuation of Ser. No. 72,639, Jul. 13, 1987, abandoned. This application Aug. 27, 1990, Ser. No. 572,461**

**Int. Cl.$^5$ G06F** ***11/10***

**U.S. Cl. 371—43** **18 Claims**

1. An encoder/decoder pair for use in a communication system, said encoder comprising means for encoding data according to a convolutional code and according to a block code, and said decoder comprising means for determining the number of transmission errors in a particular quantity of data received from said encoder, means for correcting errors up to a minimum predetermined number t of errors in blocks of data using said block code, and means for correcting greater than t



errors in said quantities of data by employment of sequential decoding.

---

### 5,014,277
### LASER MODE-COUPLING VIA A PULSED MODULATOR

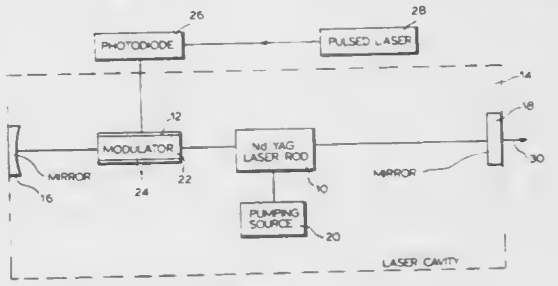
**Henry M. Van Driel, Clarksville Ct., Mississauga, Ontario, Canada L5A 1G8 , and Giampiero Giuliani, Via Padova, 65, Rome, Italy 00165**

**Filed Jun. 5, 1989, Ser. No. 361,645**

**Claims priority, application Canada, Apr. 21, 1989, 597439**

**Int. Cl.$^5$ H01S** ***3/098***

**U.S. Cl. 372—18** **14 Claims**



1. A laser system comprising:

(a) an optical resonant cavity,

(b) means including a laser gain medium, means for pumping the laser gain medium located in the cavity for producing a beam circulating in the cavity with a cavity round trip time, and laser light output means to provide a portion of said circulating beams as a laser output beam,

(c) modulator means located in the cavity, and

(d) pulse generator means connected to the modulator means to provide a pulsed electrical switching signal having spaced short pulses which cause mode coupling of the circulating beam to produce said laser output beam having spaced short pulses with a period equal to the round trip time of the cavity, the width of the spaced pulses of the mode-coupled output beam and the switching signal being considerably shorter than the cavity round trip time.

---

### 5,014,278
### METHOD FOR THE FREQUENCY STABILIZATION OF INTERNAL MIRROR TYPE HELIUM-NEON LASER OSCILLATING AT WAVELENGTH OF 543 NM

**Kyoichi Deki, Kakogawa, Japan, assignor to Ushio Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 12, 1989, Ser. No. 406,060**

**Claims priority, application Japan, Sep. 22, 1988, 63-236374; Sep. 22, 1988, 63-236375; Sep. 22, 1988, 63-236376; Sep. 22, 1988, 63-236377**

**Int. Cl.$^5$ H01S** ***3/13***

**U.S. Cl. 372—32** **8 Claims**

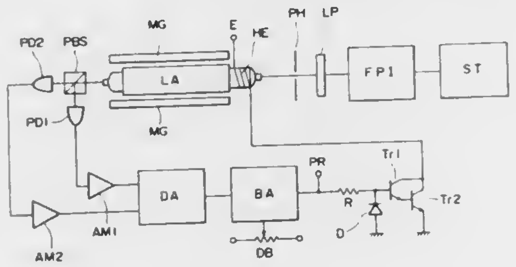
1. A method for the frequency stabilization of a laser beam

VOL
1126
ISS
1
MY
7
1991
UMI

produced by an internal mirror type helium-neon laser device having a laser capillary disposed in a laser tube and an oscillation wavelength of 543 nm, said laser beam having a direction of a characteristic polarization, a Zeeman splitting frequency and spaced axial modes, said method comprising:

applying into the laser capillary a static magnetic field so that:

(1) the direction of the static magnetic field is perpendicular to the axis of the capillary tube and so that the angle between the direction of the static magnetic field and the direction of a characteristic polarization of the laser tube is equal to 30°–42°;



(2) the magnitude of the static magnetic field is such that the Zeeman splitting frequency equals an axial mode spacing; and

(3) the magnitude of the static magnetic field is substantially uniformly distributed along the axis of the laser capillary, so as to keep adjacent axial modes orthogonally polarized in a whole oscillation region, thereby preventing polarization flipping.

---

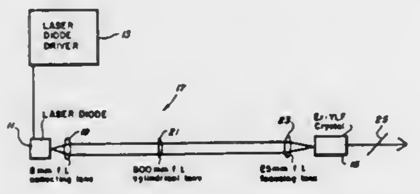
## 5,014,279
## LASER DIODE PUMPED, ERBIUM-DOPED, SOLID STATE LASER WITH HIGH SLOPE EFFICIENCY

**Leon Esterowitz, Springfield; Roger E. Allen, Alexandria, both of Va., and Gregory J. Kintz, Mountain View, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 31, 1989, Ser. No. 429,426**

**Int. Cl.⁵ H01S *3/16***

**U.S. Cl. 372—41** **30 Claims**



1. A laser diode-pumped, solid-state laser for producing a laser emission at a wavelength of substantially 2.8 microns, said laser comprising:

laser diode means for emitting a pump beam at a preselected wavelength;

a crystal; and

a laser cavity defined by first and second reflective elements at opposing ends of said crystal to form a reflective path therebetween;

said crystal having a preselected host material doped with a predetermined percent concentration of erbium activator ions sufficient to produce a laser emission at substantially 2.8 microns when said crystal is pumped by said pump beam, a portion of said laser emission at substantially 2.8 microns being outputted from one of said first and second reflective elements at a slope efficiency of at least substantially 5 percent when said crystal is pumped by said pump beam.

---

## 5,014,280
## OPTICAL BISTABLE LASER DIODE AND A METHOD FOR CONTROLLING THE SAME

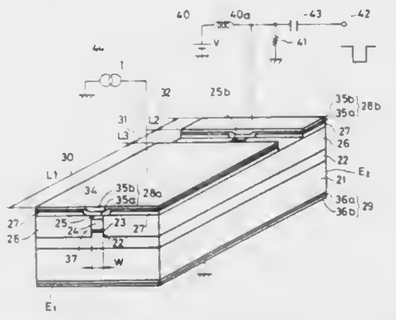
**Tatsuyuki Sanada, Yokohama, and Tetsufumi Odagawa, Ebina, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Sep. 28, 1989, Ser. No. 413,745**

**Claims priority, application Japan, Sep. 30, 1988, 63-248323**

**Int. Cl.⁵ H01S *3/19***

**U.S. Cl. 372—45** **18 Claims**



1. A method for controlling an optical bistable laser diode having an active layer sandwiched between a pair of clad layers with a gain region defined in the active layer for producing optical radiation, a saturable absorption region defined in the active layer adjacent to the gain region for transmitting the optical radiation produced in the gain region and having variable loss characteristics which change responsive to the power of the optical radiation, and a control region defined in the active layer adjacent to the saturable absorption region for receiving the optical radiation from the saturable absorption region and transmitting it with a controlled gain, comprising steps of:

injecting a predetermined drive current to the gain region at a level capable of causing bistable operation of the laser diode to establish said optical radiation in the gain region;

applying a predetermined finite voltage to the control region at a level equal to or lower than the characteristic voltage level above which the current flow through the control region is increased steeply and below which substantially no current flows through the control region and thereby inducing an optical loss in the control region;

switching the laser diode to a turn-on state by injecting an optical pulse to the active layer;

and switching the laser diode to a turn-off state by applying a voltage lower than said predetermined finite voltage to the control region in the form of a reset voltage pulse.

---

## 5,014,281
## GAS LASER

**Hartmuth Hecht, Southbridge, Mass.; Wolfgang Paul, Schlagenhofen, and Anton Baumgartner, Niederroth, both of Fed. Rep. of Germany, assignors to Coherent, Inc., Palo Alto, Calif.**

**Filed Dec. 19, 1989, Ser. No. 452,756**

**Claims priority, application European Pat. Off., Dec. 21, 1988, 88121412**

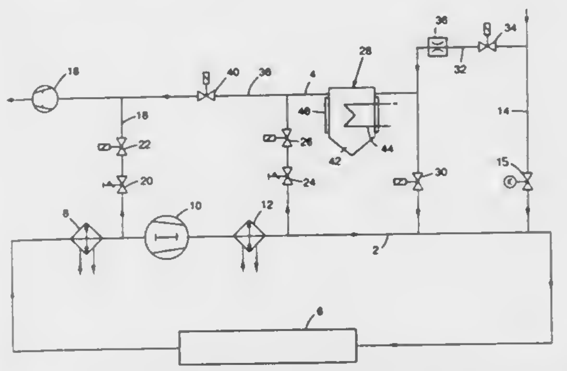
**Int. Cl.⁵ H01S *3/22***

**U.S. Cl. 372—59** **9 Claims**

1. A gas laser comprising:

a laser resonator;

gas circuit means for circulating a lasing gas through the laser resonator, said gas circuit means including a by-pass line having an inlet and an outlet connected to said gas circuit means; and



means for condensing and removing water vapor from the lasing gas in the gas circuit means, said condenser means being located in said by-pass line.

---

## 5,014,282
## GAS LASER

**Gerd Herziger, Roetgen-Rott; Peter Loosen, Aachen; Otto Marten, Aachen, and Hartwig Böning, Aachen, all of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V., Fed. Rep. of Germany**

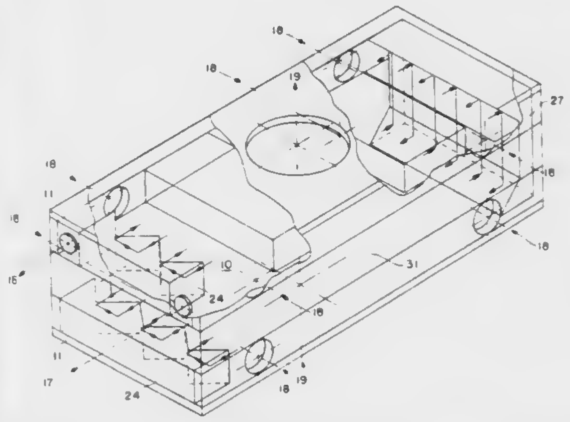
**PCT No. PCT/DE88/00303, § 371 Date Jan. 23, 1989, § 102(e) Date Jan. 23, 1989, PCT Pub. No. WO88/09578, PCT Pub. Date Dec. 1, 1988**

**PCT Filed May 20, 1988, Ser. No. 306,029**

**Claims priority, application Fed. Rep. of Germany, May 20, 1987, 3716873**

**Int. Cl.⁵ H01S *3/081***

**U.S. Cl. 372—93** **10 Claims**



1. A gas laser comprising:

a rectangular gas discharge chamber having first and second end faces;

roof edge mirrors disposed at said end faces, said roof edge mirrors having reflector surfaces that multiply fold a laser beam generated in said gas discharge chamber on a beam path that is substantially U-shaped, said roof edge mirrors at one of said end faces comprising a plurality of bolt-shaped reflectors having reflector surfaces in at least first and second superimposed planes of the gas discharge chamber, and at least one roof edge mirror positioned on an edge at another of said end faces and having first and second mirror surfaces to fold the beam path between the first and second superimposed planes of said bolt-shaped reflectors, the first mirror surface of said roof edge mirror positioned on an edge being at a level of the first superimposed plane and the second mirror surface of said roof edge mirror positioned on an edge being at a level of the second superimposed plane;

a voltage source applying a potential between a first dielectric electrode and a second center dielectric electrode, said first dielectric electrode forming a surface of said gas discharge chamber, and said second center dielectric electrode subdividing said gas discharge chamber into parallel longitudinal flow channels; and

openings in said gas discharge chamber for providing an inflow and an outflow of gas through said longitudinal flow channels, thereby providing stability of the beam reflectance which results in an improved beam quality.

---

## 5,014,283
## ARRANGEMENT FOR EQUALIZING AND DEMODULATING BINARY CONTINUOUS-PHASE ANGLE-MODULATED DATA SIGNALS WITH MODULATION INDEX 0.5

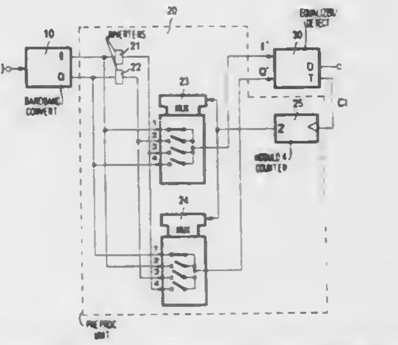
**Alfred Baier, Eckental, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 7, 1989, Ser. No. 377,367**

**Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823374**

**Int. Cl.⁵ H04L *5/12***

**U.S. Cl. 375—15** **20 Claims**



1. An arrangement for equalizing and demodulating a binary continuous-phase angle-modulated data signal with a modulation index h=0.5 received from a channel, said arrangement comprising:

a baseband converter means for producing at its outputs a first pair of baseband quadrature components representing a received modulated data signal containing a binary data signal;

a preprocessing means havings inputs coupled to the outputs of the baseband converter means for producing at its outputs a second pair of baseband quadrature components from said first pair by performing a signal processing which corresponds to a phase rotation of the modulated data signal represented by the first pair of baseband quadrature components by progressing in discrete phase steps of 90°, in the same sense, per bit interval of the binary data signal; and

an equalizer/detector means, fed by the outputs of said preprocessing means, for recovering said binary data signal.

---

## 5,014,284
## DISCRETE SLOPE DELTA MODULATION WITH RECOVERY MEANS

**Alois A. Langer, and Khalil J. Mealouf, both of Pittsburgh, Pa., assignors to Cardiac Telecom Corporation, Pittsburgh, Pa.**

**Filed Jun. 30, 1989, Ser. No. 373,913**

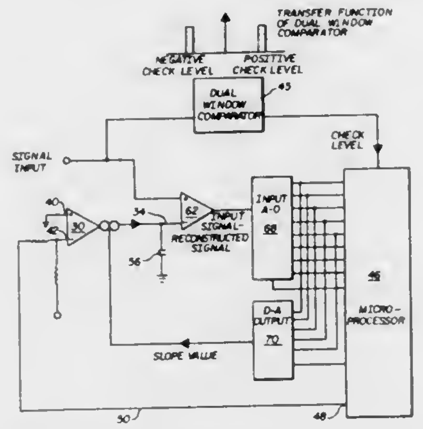
**Int. Cl.⁵ H04B *14/06***

**U.S. Cl. 375—30** **31 Claims**

1. A method of processing an electrical signal by delta modulation comprising

VOL
1126
ISS
1
MY
7
1991
UMI

converting said electrical signal into compressed digital information by delta modulation,
employing a plurality of slope tables each having a plurality of slope values in establishing said compressed digital information, and
effecting said compression by employing a code having a different value for each said slope value.



---

### 5,014,285

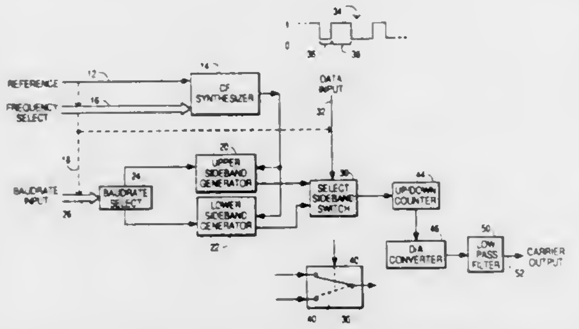
### FREQUENCY SHIFT KEYING COMMUNICATION SYSTEM WITH SELECTABLE CARRIER FREQUENCIES

**Philip C. Basile, Turnersville, N.J., and Bruce E. Kabernagel, Levittown, Pa., assignors to General Electric Company, Camden, N.J.**

**Filed Sep. 27, 1989, Ser. No. 413,415**

**Int. Cl.$^5$ H04L** *27/12*

**U.S. Cl. 375—62** **10 Claims**



1. A frequency shift keying system for transmitting a signal representing supplied binary data, comprising in combination:
means responsive to the maximum baud rate of said supplied binary data for producing signals at first and second frequencies $f_1$ and $f_2$ that differ by an amount which is a function of the value of said maximum baud rate;
means for alternately counting up and down between two preselected counts which differ by value N, successive counts being at said first frequency when said data is at one of said binary values and successive counts being at said second frequency when said data is at the other of said binary values; and
means responsive to the count in said means for counting as a function of time for producing said signal for transmission, the frequency of said transmission signal corresponding to $f_1/N$ or $f_2/N$ depending on the value of said supplied data.

---

### 5,014,286

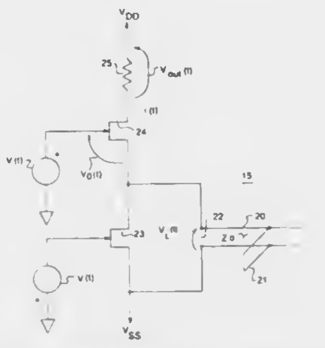
### DELAY GENERATOR

**Johannes G. Ransijn, Wyomissing Hills, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Oct. 10, 1989, Ser. No. 419,427**

**Int. Cl.$^5$ H03H** *5/159*

**U.S. Cl. 375—110** **17 Claims**



15. A method of delaying an input signal, characterized by the steps of:
impressing across a first end of a delay line, of predetermined length and terminated at the second end thereof by an impedance different from the characteristic impedance thereof, a signal substantially equal to the input signal; and,
subtracting the signal across the first end of the delay line from the input signal, the result thereof being the delayed version of the input signal;
wherein the amount of delay is substantially determined by the round-trip delay time of the delay line and the delay line is terminated at its first end with an impedance substantially equal to the characteristic impedance of the delay line.

---

### 5,014,287

### PORTABLE X-RAY FLUORESCENCE SPECTROMETER FOR ENVIRONMENTAL MONITORING OF INORGANIC POLLUTANTS

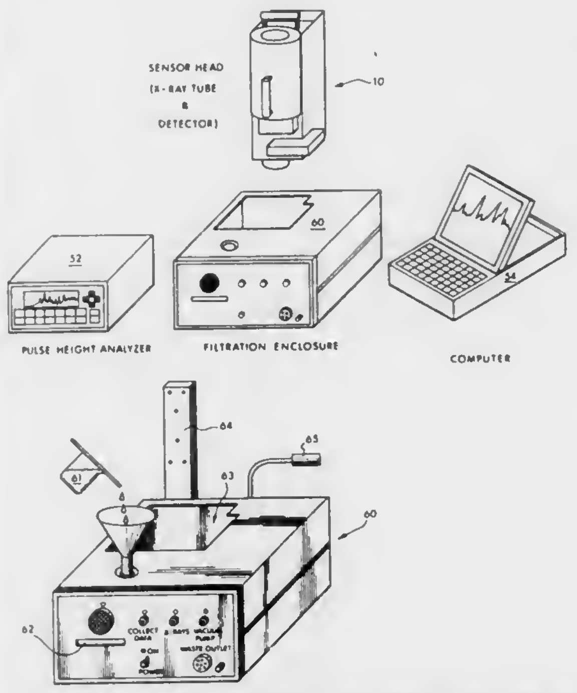
**Michael G. Thornton, 10073 Jasmine Ct., Littleton, Colo. 80125, and Benton C. Clark, III, 10890 Park Range Rd., Littleton, Colo. 80127**

**Filed Apr. 18, 1990, Ser. No. 510,572**

**Int. Cl.$^5$ G01N** *23/223*

**U.S. Cl. 378—45** **22 Claims**

1. A portable x-ray fluorescence spectrometer comprising:
a portable sensor unit having:
(a) a battery;
(b) a high voltage power supply powered by said battery;
(c) an x-ray tube powered by said high voltage power supply and producing a beam of x-ray radiation direction toward an external sample located in a predetermined spatial relationship with respect to said sensor unit;
(d) detector means adapted to detect the energy level of fluorescent x-rays produced by said sample;
a pulse height analyzer in electrical connection with said detector means, adapted to generate a spectrum of data for each sample consisting of the number of fluorescent x-rays detected by said detector means as a function of the energy level of said fluorescent x-rays, and further adapted to store such data for a number of samples;
a processing unit that can be removably attached to said pulse height analyzer, adapted to provide an analysis of the elemental composition of the sample by comparing the peaks in said spectrum against previously stored patterns of peaks for each of a plurality of chemical elements; and
a filtration unit having:
filtration means adapted to filter particles suspended in a fluid sample and collect said particles in a filtration medium; and



positioning means adapted to removably secure said sensor unit to said filtration unit and position said sensor unit with respect to said filtration medium to permit analysis of said particles.

---

### 5,014,288

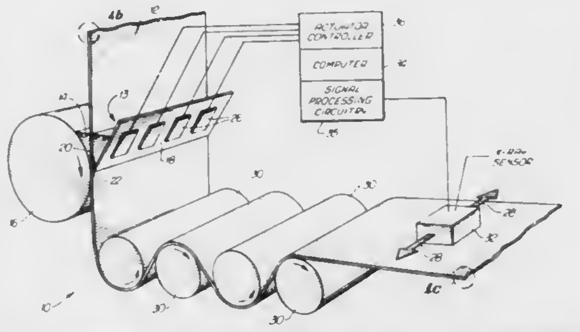
### X-RAY COATING WEIGHT CONTROLLER AND SENSOR

**Lee M. Chase, Los Gatos, and John D. Goss, San Jose, both of Calif., assignors to Measurex Corporation, Cupertino, Calif.**

**Filed Apr. 20, 1989, Ser. No. 341,639**

**Int. Cl.$^5$ G01N** *23/083*

**U.S. Cl. 378—53** **15 Claims**



1. An apparatus for measuring a 3 component first material associated with a second material, the apparatus comprising:
source means for directing first, second and third x-ray beams through the first and second materials;
detector means for detecting the three x-ray beams after they are transmitted through the first and second materials and for producing first, second and third signals in response to the first, second and third beams respectively;
a computer, operatively coupled to the detector means for receiving the first, second and third signals, the computer being programmed to substantially continuously determine the amount of the first material associated with second material based upon the first signal, the substantially continuous determination being periodically adjusted based upon changes in the second and third signals.

---

### 5,014,289

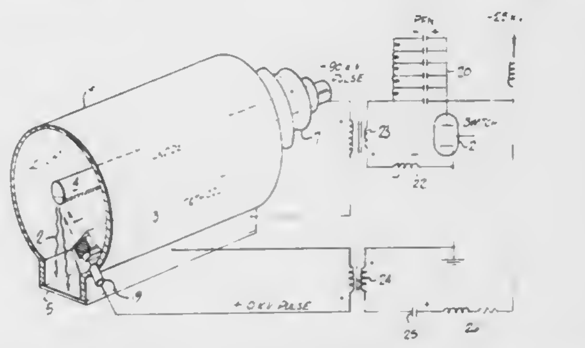
### LONG LIFE ELECTRODES FOR LARGE-AREA X-RAY GENERATORS

**Dietmar E. Rothe, Cardiff, Calif., assignor to Lasertechnics, Inc., Albuquerque, N. Mex.**

**Filed Feb. 27, 1989, Ser. No. 316,475**

**Int. Cl.$^5$ H01J** *35/04*

**U.S. Cl. 378—122** **22 Claims**



1. A cold cathode x-ray generator comprising:
a generally cylindrical vacuum chamber having a window region through which x-rays generated within the vacuum chamber are transmitted;
anode means positioned within the vacuum chamber, said anode means having a target surface for focusing x-rays onto the window region;
corona plasma cathode means positioned within the vacuum chamber, said corona plasma cathode means being spaced apart from said anode means and being generally coextensive therewith, said corona plasma cathode means comprising an elongate conductive metal bar, a flat perforated metal screen having a metal bead around the periphery thereof and being positioned in spaced apart parallel relationship with said elongate conductive metal bar and generally coextensive therewith, and a high permittivity dielectric material sandwiched between said elongate conductive metal bar and said flat perforated metal screen, said flat perforated metal screen comprising nickel and said high permittivity dielectric material comprising a plurality of spaced apart discs sandwiched between said elongate conductive metal bar and said flat perforated metal screen; and
pulse generating means for simultaneously applying high voltage pulses to said anode means and said corona plasma cathode means, whereby, in response to application of said high voltage pulses, a corona plasma is created over a surface of said flat perforated metal screen to provide a source of ions for generating an electron beam that strikes the target surface of said anode means, thereby producing x-rays that are focused onto said window region.

---

### 5,014,290

### METHOD AND APPARATUS FOR GENERATING RADIATION BLOCKERS

**Robert M. Moore, 100 Twin Lake La., Richmond, Va. 23229, and Robert L. Smith, 9900 Lumlay Rd., Richmond, Va. 23236**

**Filed Oct. 28, 1988, Ser. No. 264,112**

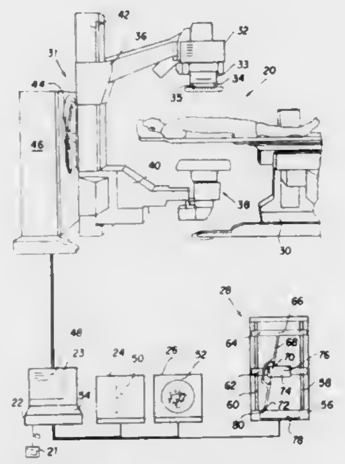
**Int. Cl.$^5$ G21K** *1/00, 3/00*

**U.S. Cl. 378—145** **45 Claims**

1. A system for generating radiation blockers, said system including a fluoroscopic simulator for generating a fluoroscopic image of a patient and comprising:
cutter means;
computer means for digitized processing of said image and

VOL
1126
ISS
1
MY
7
1991
UMI

control of said system, said computer means including image grabbing means for grabbing and processing said fluoroscopic image to convert said fluoroscopic image to a computer-handleable image to further process said image and, to generate cutter control signals;



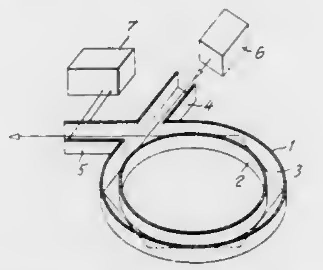
means for delivering said cutter control signals to said cutter means, said cutter means being operative in response to said cutter control signals for cutting a blocker or blocker pattern corresponding to said image.

---

### 5,014,291
### DEVICE FOR AMPLIFICATION OF X-RAYS

**Nicola Castellano, 32-3, Via G.B. D'Albertis, I-16148 Genova, Italy**

**Filed Apr. 13, 1989, Ser. No. 337,421**
**Int. Cl.⁵ G21K** *1/00*
**U.S. Cl. 378—145** **11 Claims**



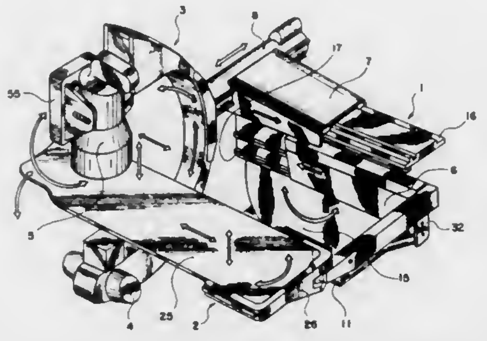
1. An X-ray amplifying device comprising means defining an annular space; an exciting gas in said annular space; internal and external circular concentric rings of suitable metallic material circumscribing said annular space and spaced apart to form a channel between them, at least one of said rings forming an X-ray reflection electrode, an entrance and an exit port in said channel, means for applying a suitable difference of electrical potential to the said metallic rings so as to bring them into an excited state favourable to X-ray emission, a suitable X-ray source providing a primary X-ray beam directed so as to enter said entrance port striking against said reflection electrode so as to be reflected at least once before leaving said channel through said exit port so as to cause the X-rays, emitted from the reflection electrode by induced emission, to be superimposed on the X-ray reflected by said reflection electrode thus inceasing the intensity of the X-ray beam leaving the device.

---

### 5,014,292
### TILTABLE X-RAY TABLE INTEGRATED WITH CARRIAGE FOR X-RAY SOURCE AND RECEPTOR

**Bernard W. Siczek, and Aldona A. Siczek, both of 1252 Chinook Way, Boulder, Colo. 80303**

**Filed Jan. 29, 1990, Ser. No. 471,623**
**Int. Cl.⁵ H05G** *1/02*
**U.S. Cl. 378—196** **7 Claims**



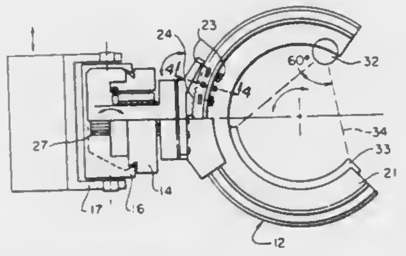
7. An X-ray table assembly comprising in combination:
a patient table supported by an overhanging support structure extending from and secured to a support means, said overhanging support structure comprising: a bracket supporting said patient table, an elongated member with one extremity pivotably secured to said support means and the other extremity pivotably secured to said bracket; a first elongated actuator member with one extremity pivotably secured to said support means and the other extremity pivotable secured to said bracket, a second elongated actuator member with one extremity pivotably secured to said support means and the other extremity pivotably secured to said elongated member disposed in an angled relationship to said first elongated actuator member.

---

### 5,014,293
### COMPUTERIZED TOMOGRAPHIC X-RAY SCANNER SYSTEM AND GANTRY ASSEMBLY

**Douglas P. Boyd, San Francisco, Calif., and Giovanni Lanzara, Rome, Italy, assignors to Imatron, Inc., South San Francisco, Calif.**

**Filed Oct. 4, 1989, Ser. No. 416,921**
**Int. Cl.⁵ A61B** *6/00, 6/02;* **H05G** *1/02*
**U.S. Cl. 378—197** **4 Claims**

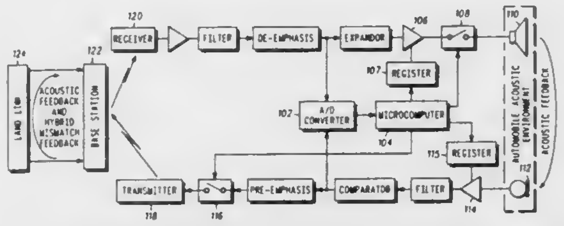


1. A scanner assembly comprising
a support head,
a C-shaped gantry,
means for supporting said gantry in said support head for rotating movement,
an x-ray source mounted on one side of said gantry for independent movement with respect to a detector array along said gantry, said x-ray source projecting x-rays across said gantry, and
a detector array mounted on the other side of a gantry for independent movement with respect to said x-ray source along said gantry, said detector array serving to receive said projected x-rays.

### 5,014,294
### SPEAKERPHONE FOR CELLULAR TELEPHONES WITH HOWL PREVENTION, DETECTION, ELIMINATION AND DETERMINATION

**Susan C. Kromenaker, Palatine; James D. Lefebvre, Cary, and Charles P. Binzel, Hoffman Estates, all of, assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Feb. 1, 1990, Ser. No. 473,294**
**Int. Cl.⁵ H04M** *11/00;* **H04B** *1/00*
**U.S. Cl. 379—58** **8 Claims**



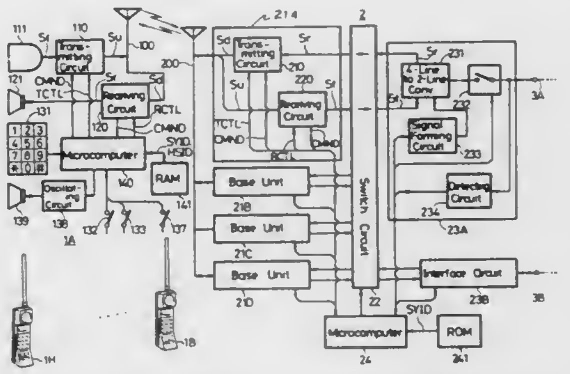
1. A speakerphone having a duplex mode and a simplex mode for a radiotelephone for communicating voice signals by way of a radio channel, said radiotelephone including radio means for transmitting a first signal including voice signals on the radio channel and receiving a second signal including voice signals from the radio channel, said speakerphone comprising:
microphone means for producing the first signal;
speaker means for emitting the second signal;
first amplifying means having an input coupled to said microphone means and an output coupled to said radio means and being responsive to first digital control signals for selecting one of a plurality of gain settings and amplifying the first signal;
first switch means coupled between the output of said first amplifying means and said radio means and being responsive to a third control signal for substantially muting the first signal;
second amplifying means having an input coupled to said radio means and an output coupled to said speaker means and being responsive to second digital control signals for selecting one of a plurality of gain settings and amplifying the second signal;
second switch means coupled between the output of said second amplifying means and said speaker means and being responsive to a fourth control signal for substantially muting the second signal;
converting means for producing first and second digital samples of the output of the first amplifying means and the input of the second amplifying means, respectively; and
processing means coupled to the first and second digital samples of said converting means for detecting voice signals in the first and second signals, respectively; in response to detection of voice signals in one of the first and second signals, said processing means producing in the duplex mode the first and second digital control signals for adjusting the gain settings of said first amplifying means and said second amplifying means such that the gain setting for said one of the first and second signals is decreased by a first predetermined gain; in response to detection of voice signals in one of the first and second signals, said processing means producing in the simplex mode the third and fourth control signals for muting one of the first and second signals, respectively; and said processing means monitoring a predetermined number of consecutive second digital samples and reducing the first predetermined gain by a second predetermined gain if the predetermined number of consecutive second digital samples have magnitudes differing by less than a third predetermined gain and said first predetermined gain has not been reduced, and switching to the simplex mode if the predetermined number of consecutive second digital samples have magnitudes differing by less than a third predetermined gain and said first predetermined gain has been reduced at least one time.

---

### 5,014,295
### MULTI-CHANNEL ACCESS CORDLESS TELEPHONE SYSTEM

**Takushi Kunihiro, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Oct. 25, 1989, Ser. No. 426,447**
**Claims priority, application Japan, Oct. 28, 1988, 63-272396; Dec. 1, 1988, 63-304639**
**Int. Cl.⁵ H04B** *7/204*
**U.S. Cl. 379—61** **22 Claims**



1. A method of establishing a communication channel between a master station and one of plural remote stations in a multi-channel access cordless telephone system, comprising the steps of: transmitting from said master station to said remote stations at the same time access data including station identifying data for designating a selected remote station as a representative station and calling data for seeking a response from said representative station; changing said station identifying data to designate a different remote station as the representative station in the absence of a response to said calling data from the previously designated representative station; polling said remote stations, in sequence, if a designated representative station responds to said calling data and inviting a reply from each polled station; and establishing a communication channel between said master station and a polled station that replies to said polling by the steps of including in said access data channel identifying data for identifying the communication channel to be established, connecting each remote station operably capable of communication with said master station to the identified communication channel, re-connecting said each remote station to a control channel in the absence of a response to said calling data from the previously designated representative station, connecting said master station to said identified communication channel if a designated representative station responds to said calling data, and transmitting over said identified communication channel from said master station to said remote stations a signal indicating that polling is to begin.

---

### 5,014,296
### FACSIMILE TERMINAL DEVICE HAVING VOICE MESSAGE RECORDING CAPABILITY

**Masahiro Saigano, Chikushino, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Feb. 4, 1988, Ser. No. 152,426**
**Claims priority, application Japan, Feb. 4, 1987, 62-24080**
**Int. Cl.⁵ H04M** *1/64, 11/00*
**U.S. Cl. 379—67** **6 Claims**

1. A terminal device comprising:
interface means for interfacing with a telephone line;
first switching means, coupled to said interface means, for selectively connecting the telephone line to said interface means and a telephone set;

VOL
1126
ISS
1
MY
7
1991
UMI

signal detecting means, coupled to said interface means, for detecting and identifying a received signal on the telephone line;

incoming message recording means for recording a voice message received on the telephone line;

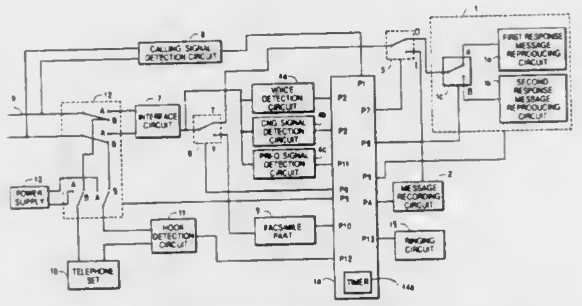
image signal receiving means for receiving and processing an image signal received on the telephone line;

second switching means, coupled to said interface means and said incoming message recording means and said image signal receiving means, for selectively connecting said interface means to said incoming message recording means and said image signal receiving means;

ringer connecting means for connecting to a ringing device;

hook detecting means, having means for connection to the telephone set, for detecting an off-hook condition of the telephone set; and,

control means, coupled to said first and second switching means and said signal detecting means and said incoming message recording means and said image signal receiving means and said hook detecting means and said ringer connecting means, for causing said first and second switching means to connect the telephone line to said image signal receiving means when the received signal is identified by said signal detecting means as an image signal; and, upon receipt of the image signal, for causing the first switching means to connect the telephone line to the telephone set and for activating the ringing device when the received signal is identified by said signal detecting means as an operator intervention signal, the operator intervention signal being received after the image signal and denoting a request to establish a voice connection; and for causing said first and second switching means to connect the telephone line to said incoming message recording means when the telephone set remains on-hook for a predetermined period of time upon activation of the ringing device.


CALLING SIGNAL DETECTION CIRCUIT
FIRST RESPONSE MESSAGE REPRODUCING CIRCUIT
SECOND RESPONSE MESSAGE REPRODUCING CIRCUIT
VOICE DETECTION CIRCUIT
INTERFACE CIRCUIT
POWER SUPPLY
HOOK DETECTION CIRCUIT
FACSIMILE PART
MESSAGE RECORDING CIRCUIT
RINGING CIRCUIT
TELEPHONE SET
TIMER

---

## 5,014,297
## TELEPHONE ANSWERING DEVICE WITH AUTOMATIC RETURN TO INCOMING MESSAGE MODE

**Akio Morita, and Yoshitomo Nakano, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Dec. 17, 1985, Ser. No. 809,776**

**Claims priority, application Japan, Dec. 28, 1984, 59-279323**

**Int. Cl.$^5$ H04M *1/64;* G11B *15/52***

U.S. Cl. 379—82 3 Claims

1. An auto telephone answering apparatus for playing an outgoing message recorded on a magnetic tape and sending the outgoing message to a calling party and for recording an incoming message from the calling party on said magnetic tape, comprising:

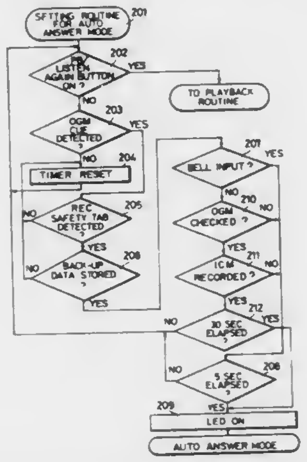
cassette loading detecting means for detecting that a cassette housing said magnetic tape is loaded in an operative position in the apparatus and providing an output in response thereto;

magnetic head means having a record mode and a playback mode for recording a signal on, and reproducing a signal from said magnetic tape in said operative position;

tape driving means operative in said record and playback modes for driving said magnetic tape in a forward direction, and in a rewind mode for driving the tape in a reverse direction, and being inoperative in a stop mode;

switch means for selectively establishing said record, playback, rewind and stop modes of the apparatus;

auto answer setting means being selectively operative for automatically and successively connecting telephone lines to said auto telephone answering apparatus upon detection of an incoming call from a calling party, establishing said rewind mode for returning the tape to a position near the beginning of said outgoing message followed by the establishment of said playback mode independently of said switch means for reproducing the outgoing message recorded on said magnetic tape, and sending the same to the calling party, and then setting an incoming call wait state in which said record mode is established for recording an incoming message from the calling party on said magnetic tape at a position after said outgoing message;



means for effecting playback of each said incoming message recorded on said magnetic tape;

end of playback detecting means for detecting an end of said playback of incoming messages from said magnetic tape and automatically generating an incoming message-end signal upon detecting said end of playback of incoming messages; and

control means which selectively renders said auto answer setting means operative in response to said output from said cassette loading detecting means and in response to said incoming message-end signal from said end of playback detecting means.

---

## 5,014,298
## VOICE-DATA TELEPHONIC CONTROL SYSTEM

**Ronald A. Katz, Los Angeles, Calif., assignor to First Data Resources Inc., Omaha, Nebr.**

**Continuation-in-part of Ser. No. 312,792, Feb. 21, 1989, which is a continuation-in-part of Ser. No. 194,258, May 16, 1988, Pat. No. 4,845,739, which is a continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned. This application Feb. 20, 1990, Ser. No. 481,403**

**Int. Cl.$^5$ H04M *1/64***

U.S. Cl. 379—93 8 Claims

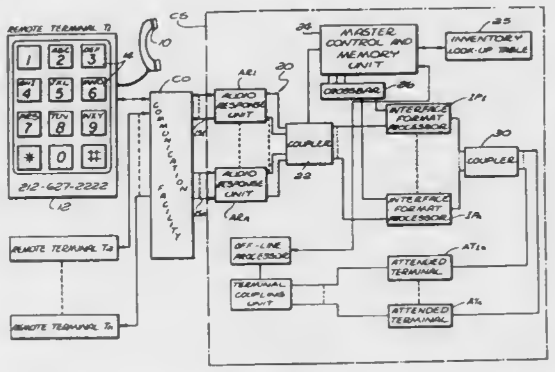
1. A voice-data control system of use with a communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means for providing audio response signals and digital input means for providing digital response signals, said control system comprising:

cue means for cueing select ones of said terminals to prompt selective operation of said voice communication means and said digital input means at said terminals to provide responsive signals;

status means to selectively indicate responsive signals from each select terminal as digital control signals, digital data signal or audio signals;

memory means for storing individual caller data;

means for retrieving individual caller data from said memory means in response to control signals from said digital input means;



control means for actuating said cue means and said status means to cue and identify responsive signals in relation to the operation selectively prompted by said cue means; and

means for storing audio signals for reproducing audio caller voice data and responsive to cueing by said cue means under control of said status means.

---

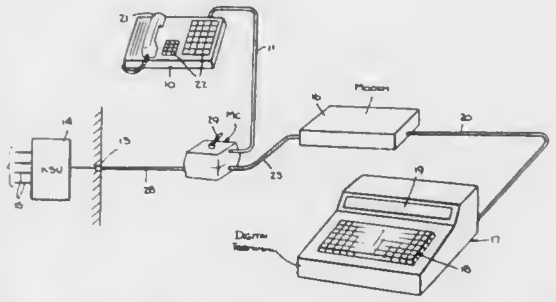
## 5,014,299
## MODEM COUPLER FOR MULTI-LINE KEY TELEPHONE SYSTEM

**Christopher Klupt, 48 Van Nostrand Ave., Great Neck, N.Y. 11024, and Jerald Zupnick, 15 Hampton Rd., Port Washington, N.Y. 11050**

**Filed Jul. 20, 1989, Ser. No. 382,227**

**Int. Cl.$^5$ H04M *11/00***

U.S. Cl. 379—98 4 Claims



1. A self-sufficient modem coupler making it possible for a modem coupled to a digital data processing terminal to access a key service unit of an analog telephone communication system directly from a multi-line key telephone set having a set cord terminating in a plug that is normally inserted in a station jack to connect the set to the key service unit of the system, said modem coupler being provided with ring, tip and at least one pair of data terminals and comprising:

(a) a coupler cord for connecting the modem coupler to the modem;

(b) a phone jack to receive the plug of the telephone set for connecting the set to the coupler;

(c) a line jack to receive a line cord to connect the terminals of the coupler to the station jack, whereby the coupler is then connected to corresponding terminals in the key service unit; and

(d) a double-pole, double-throw switch having one operative position that puts the modem coupler in a voice communication mode and in another operative position, puts the modem coupler in a data communication mode, said switch in said one position connecting the multi-line telephone set to said station jack and in doing so connects said set to said key service unit, said switch in said other position connecting said modem to said station jack and in doing so giving the modem access to an outside line.

---

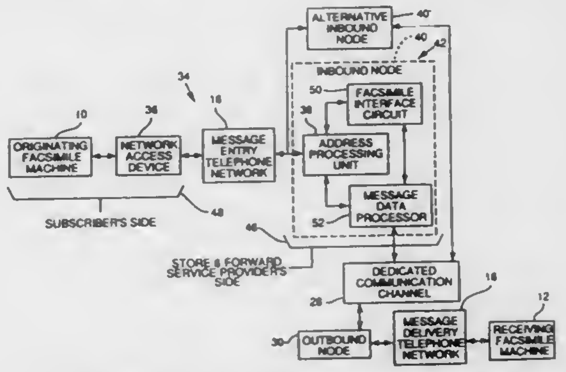
## 5,014,300
## METHOD AND APPARATUS FOR ACCESSING A FACSIMILE STORE AND FORWARD NETWORK

**Steven J. Harvath; Vernon O. Kilgore, and Raymond K. Zapp, all of Portland, Oreg., assignors to Atlas Telecom, Inc., Portland, Oreg.**

**Continuation of Ser. No. 229,213, Aug. 5, 1988, abandoned. This application Nov. 20, 1989, Ser. No. 441,346**

**Int. Cl.$^5$ H04M *11/00;* H04N *1/32***

U.S. Cl. 379—100 14 Claims


ALTERNATIVE INBOUND NODE
INBOUND NODE
FACSIMILE INTERFACE CIRCUIT
ADDRESS PROCESSING UNIT
MESSAGE DATA PROCESSOR
ORIGINATING FACSIMILE MACHINE
NETWORK ACCESS DEVICE
MESSAGE ENTRY TELEPHONE NETWORK
SUBSCRIBER'S SIDE
STORE & FORWARD SERVICE PROVIDER'S SIDE
DEDICATED COMMUNICATION CHANNEL
OUTBOUND NODE
MESSAGE DELIVERY TELEPHONE NETWORK
RECEIVING FACSIMILE MACHINE

1. In a facsimile store and forward network that includes an inbound node that communicates with a first public switched telephone network and is accessed by a first public switched telephone network address signal for receiving message data generated by a first facsimile machine and for directing the message data to a second facsimile machine that communicates with a second public switched telephone network and is accessed by a second public switched telephone network address signal, a method of transmitting the message data from the first facsimile machine to the second facsimile machine, comprising:

directing the second public switched telephone network address signal from the first facsimile machine to a network access device disposed in data communication between the first facsimile machine and the first public switched telephone network;

transmitting the first public switched telephone network address signal from the network access device to the first public switched telephone network to access the inbound node;

transmitting a nodal identification signal to the network access device from an address processing unit within the inbound node and in data communication with the first public switched telephone network, the nodal identification signal comfirming that the inbound node has been accessed;

transmitting from the network access device to the address processing unit the second public switched telephone network address signal and a subscriber identification signal identifying the first facsimile machine as a subscriber to the facsimile store and forward network;

providing a data communication connection between the first facsimile machne and the inbound node for transmitting the message data from the first fascimile machine to the inbound node;

transmitting the second public switched telephone network address signal and message data from the inbound node to an outbound node of the facsimile store and forward network;

VOL
1126
ISS
1
MY
7
1991
UMI

transmitting the second public switched telephone network address signal from the outbound node to the second public switched telephone network to access the second facsimile machine; and

upon accessing the second facsimile machine, transmitting the message data from the outbound node to the second facsimile machine.

---

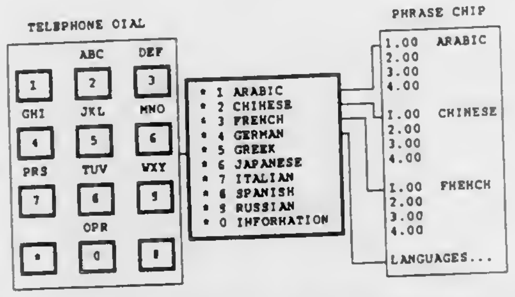
### 5,014,301
### INTERNATIONAL SPEAKER TELEPHONE

**Alexander Maltezos, 909 Third Ave., New York, N.Y. 10022-0544**

**Filed Mar. 10, 1989, Ser. No. 306,797**

**Int. Cl.$^5$ H04M** *17/00*

**U.S. Cl. 379—155** **1 Claim**



1. A payphone which includes a keypad or dial and a digital voice device for providing a user of said payphone voice instructions as to the operation of said payphone; the improvement comprising:

a directory listing next to said keypad or dial including a list of languages with a corresponding coded numeral found on said keypad or dial; and

said digital voice device further comprising multilingual voice instructions selectively controlled by the actuation of said keypad or dial such that the numeral actuated on said keypad provides instructions in the language which corresponds in said directory listing.

---

### 5,014,302
### TELEPHONE

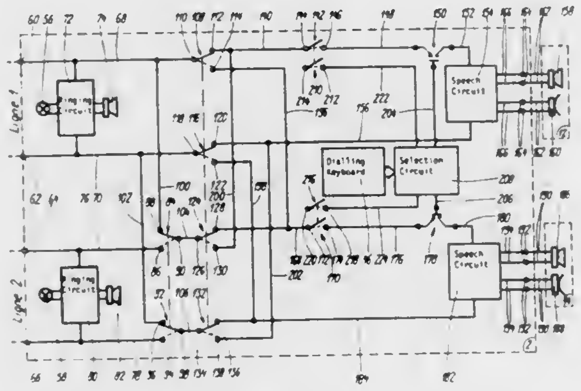
**Markus Kappeler, Solothurn, and Beat Voser, Grenchen, both of Switzerland, assignors to ETA SA Fabriques d'Ebauches, Switzerland and ETA SA Fabriques d'Ebauches, Switzerland**

**Filed Jun. 12, 1990, Ser. No. 536,100**

**Claims priority, application France, Jun. 22, 1989, 89 08437**

**Int. Cl.$^5$ H04M** *1/72*

**U.S. Cl. 379—165** **15 Claims**



1. A telephone comprising:

at least first and second pairs of terminals for connection to first and second telephone lines respectively;

first and second sets each including an earpiece and a microphone;

ringing means;

number selection means for dialing call numbers;

first and second control means respectively associated with said first and second sets and able to be actuated at will to cause each of said sets to be operational or not;

line selection means;

first change-over switching means on which said first and second control means and said line selection means can act to selectively connect said number selection means and said first and second sets to said first and second pairs of terminals; and

adapter means which, when in a first state, enable said number selection means and said first and second sets to be connected by said first change-over switching means to said second pair of terminals and which prevent them from doing so when in a second state.

---

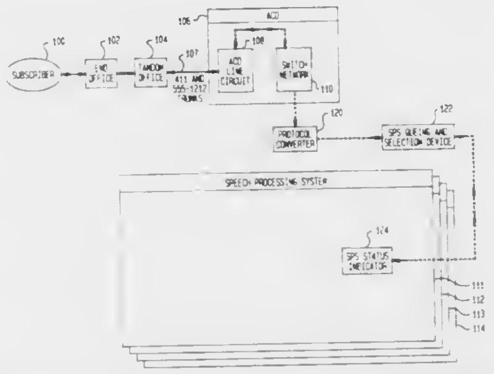
### 5,014,303
### OPERATOR SERVICES USING SPEECH PROCESSING

**George A. Velius, Township of Morris, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.**

**Filed Dec. 18, 1989, Ser. No. 452,567**

**Int. Cl.$^5$ H04M** *3/42*

**U.S. Cl. 379—201** **11 Claims**



1. A method for processing a directory assistance call comprising the steps of

receiving a call from a subscriber at an automatic call distributor via an incoming trunk,

utilizing said automatic call distributor to connect said call to a speech processing system,

receiving at said speech processing system an initial request for a telephone listing spoken by said subscriber and processing said initial request to shorten the time it takes for an operator to hear the initial request, and

connecting said speech processing system via said automatic call distributor to a specific operator out of a plurality of operators and playing for said specific operator said initial request as processed by said speech processing system.

---

### 5,014,304
### METHOD OF RECONSTRUCTING AN ANALOG SIGNAL, PARTICULARLY IN DIGITAL TELEPHONY APPLICATIONS, AND A CIRCUIT DEVICE IMPLEMENTING THE METHOD

**Germano Nicollini, Piacenza, Italy, and Daniel Senderowicz, Berkeley, Calif., assignors to SGS-Thomson Microelectronics S.r.L., Milan, Italy**

**Continuation of Ser. No. 139,014, Dec. 29, 1987, abandoned. This application Jan. 24, 1990, Ser. No. 469,759**

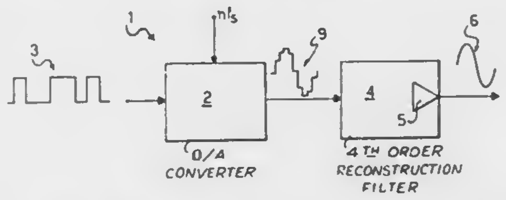
**Int. Cl.$^5$ H04M** *1/00*

**U.S. Cl. 379—399** **8 Claims**

4. A circuit for reconstructing an analog signal previously converted by pulse code modulation to a digital signal in digital telephony, comprising:

a digital-to-analog converter having an input for receiving the digital signal and producing at an output a first reconstruction of the analog signal, said digital-to-analog converter introducing into the frequency spectrum of the first reconstruction a distortion component whose amplitude decreases with increasing frequency,

a low-pass reconstruction filter having an input for receiving the analog signal from the converter, said reconstruction filter having only four integrators with a cut-off frequency $F_t$ producing at an output a second reconstruction of the analog signal, the integrators present in said reconstruction filter functioning to remove the distortion component in the first reconstruction, the frequency response of the introduced amplitude distortion component functioning to attenuate the signal above the cut-off frequency $F_t$.



---

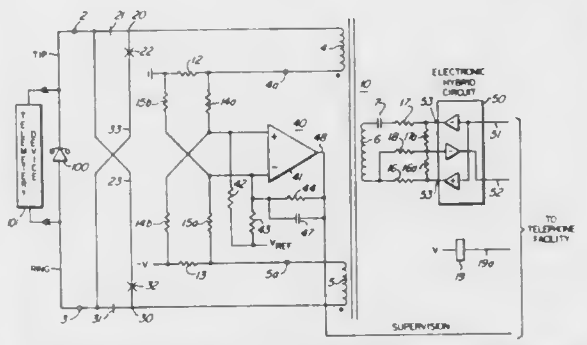
### 5,014,305
### LINE INTERFACE CIRCUIT

**Mihail S. Moisin, Toronto, Canada, assignor to Northern Telecom Limited, Montreal, Canada**

**Continuation of Ser. No. 324,124, Mar. 16, 1989, abandoned. This application May 31, 1990, Ser. No. 530,483**

**Int. Cl.$^5$ H04B** *1/58*

**U.S. Cl. 379—402** **4 Claims**



1. A line interface circuit for energizing tip and ring leads of a communication line with direct current from a power source and for coupling alternating current signals between the communication line and a hybrid circuit associated with a telephone facility, with a characteristic impedance substantially corresponding to a predetermined impedance comprising:

tip and ring terminals for connection to the tip and ring lead;

first and second battery terminals for connection to the power source;

tip and ring feed resistors each connected to respective one of the battery terminals, the tip and ring feed resistors being of similar ohmic values;

a transformer having tip and ring primary windings being connected in series between the tip terminal and the tip feed resistor and the ring terminal and the ring feed resistor respectively, said tip and ring primary windings so connected being poled such that a flow of energizing current is of a magnetically aiding effect in the transformer, the transformer also having a secondary winding for connection to the hybrid circuit;

a resistive capacitive network being connected between the secondary winding and the hybrid circuit, and including,

a capacitive reactance device connected to the secondary winding and being of a predetermined value, whereby voice band alternating currents in the primary winding are transformer coupled with a predetermined complex impedance, and

a resistive element being connected serially with the capacitive reactance device and the hybrid circuit, and at least another resistive element being connected between the secondary winding and the hybrid circuit, the resistive elements being of values whereby the coupling of alternating current signals within a voice band range of frequencies is effected at said characteristic impedance.

---

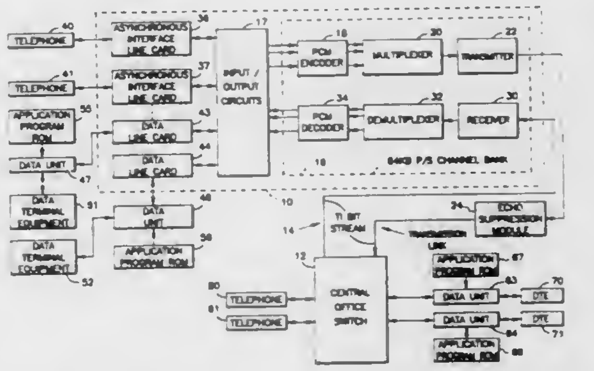
### 5,014,306
### VOICE AND DATA TELEPHONE COMMUNICATION SYSTEM AND METHOD

**Donald E. Rodgers, Moorpark; Jacob Y. Chen, Canoga Park, and Prafulla K. Padhi, Agoura, all of Calif., assignors to Transtream, Inc., Agoura Hills, Calif.**

**Filed Nov. 14, 1988, Ser. No. 271,087**

**Int. Cl.$^5$ H04M** *1/00*

**U.S. Cl. 379—407** **11 Claims**



1. A digital communications network including digital switch systems incorporating channel banks providing multiple channels for multiplexing encoded messages in transmitting channels from voice and data devices into a high data rate bit stream, and demultiplexing a received high data rate bit stream into separate receiving channels for the voice and data devices, comprising:

encoder means in the transmitting channels of the channel banks for converting inputted voice signals to a pulse modulated code;

echo suppression means responsive to transmitted messages for suppressing echos in voice transmissions between calling and called parties, the echo suppression means including means operative in the individual channels and responsive to a predetermined analog signal for disabling the echo suppression function; and

data units coupling the data devices to the channel banks, the data units being responsive to the readiness of associated data devices to initiate data transmissions to undertake preparatory echo suppression sequences, wherein the data units include means for transmitting repetitive digital patterns simulative of a predetermined analog signal to disable the echo suppression function in the channel prior to the data transmission, and means for exchanging preparatory data to establish a common data transfer rate.

VOL
1126

ISS
1

MY
7
1991

UMI

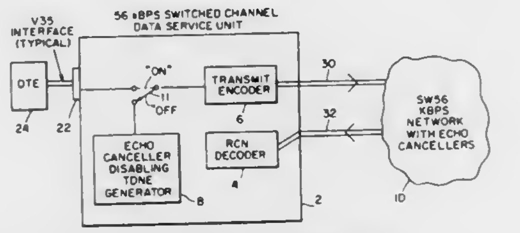
## 5,014,307
## METHOD AND APPARATUS FOR ECHO CANCELER DISABLEMENT

**Daniel M. Joffe, North Plainfield, and Charles R. Eberle, Jr., Rockaway, both of N.J., assignors to Integrated Network Corporation, Bridgewater, N.J.**

**Continuation-in-part of Ser. No. 373,895, Jun. 29, 1989. This application Nov. 14, 1989, Ser. No. 436,485**

**Int. Cl.$^5$ H04M** *1/00*

**U.S. Cl. 379—410** **36 Claims**


V35 INTERFACE (TYPICAL)
56 KBPS SWITCHED CHANNEL DATA SERVICE UNIT
DTE
"ON"
"OFF"
11
TRANSMIT ENCODER
6
30
32
SW56 KBPS NETWORK WITH ECHO CANCELLERS
24
22
ECHO CANCELLER DISABLING TONE GENERATOR
8
RCN DECODER
4
2
10

6. A telecommunications system comprising:

(a) a byte-synchronous transmission circuit;

(b) an echo canceler including disabling means responsive to a range of frequencies of digitally encoded tones for disabling operation of the echo canceler upon receipt of a digitally encoded tone having sufficient energy in the range of frequencies, said echo canceler including means for framing digitally encoded tones into data frames; and

(c) remote signalling means for transmitting less than three different patterns of samples of digitally encoded tones to the disabling means wherein each pattern is a bit-shifted replica of the other patterns, said remote signalling means comprising means for sequentially transmitting the patterns of samples of digitally encoded tones, and wherein one of the patterns disables the echo canceler no mater how frames at the byte-synchronous digital transmission circuit.

---

## 5,014,308
## CIRCUIT ARRANGEMENT FOR PROVIDING POWER FOR AN IC CHIP IN A TELEPHONE SUBSET

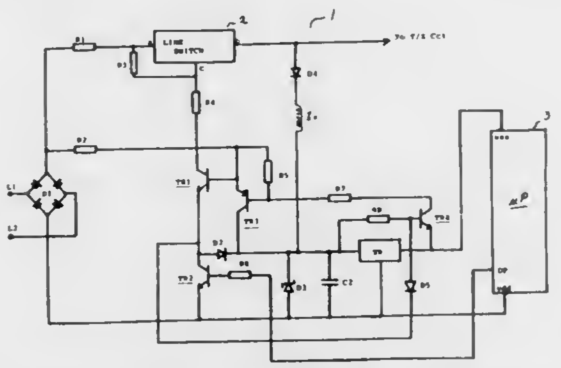
**Ronald C. S. Fox, Randwick, Australia, assignor to Alcatel, N.V., Amsterdam, Netherlands**

**Filed Feb. 5, 1990, Ser. No. 475,175**

**Claims priority, application Australia, Feb. 9, 1989, PJ2619**

**Int. Cl.$^5$ H04M** *19/00, 19/08*

**U.S. Cl. 379—413** **11 Claims**



1. In a first telephone subset of the high voltage type incorporating line terminal means, at least one processor means having a power terminal means, and a controllable semiconductor line switch means, a circuit arrangement for providing power, derived from line current connected to the line terminal means, to said processor means when said first telephone subset is in an on-hook mode and voltage dropped across said line terminal means is either above a predetermined magnitude when a second high voltage subset connected across said line terminal means is in an on-hook mode, or is below said predetermined magnitude as a result of said second subset being in an off-hook mode, said circuit arrangement comprising:

a storage capacitor means coupled across said power terminal means of said processor means,

a first capacitor charging circuit for operating said line switch means for a short predetermined initial period when said subset is in the on-hook mode and connecting said line current via the operated line switch means to said storage capacitor means to initially charge said storage capacitor means to a first predetermined voltage,

a second capacitor charging circuit for thereafter maintaining the charge on said storage capacitor at said first predetermined voltage while said line switch means is no longer being operated and said first and second telephone subsets remain in the on-hook mode, by coupling said line current to said storage capacitor means independently of said line switch means, and

a third capacitor charging circuit which is coupled to said storage capacitor means only when said voltage dropped across the said line terminal means is below said predetermined magnitude as a result of the second subset being in its off-hook mode, said third capacitor charging means maintaining a charge of a second predetermined voltage, of less magnitude than said first predetermined voltage, across said storage capacitor means to power said processor means, while the first subset remains in its on-hook mode and the second subset remains in its off-hook mode.

---

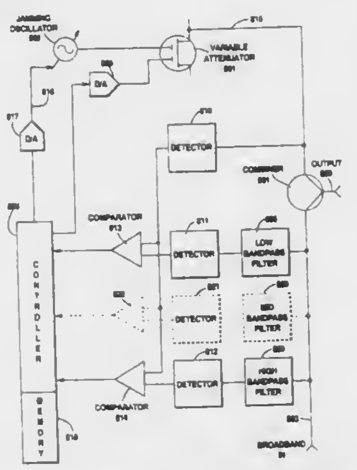
## 5,014,309
## OFF-PREMISES CABLE TELEVISION CHANNEL INTERDICTION METHOD AND APPARATUS

**Lamar E. West, Jr., Maysville, Ga., assignor to Scientific-Atlanta, Inc., Atlanta, Ga.**

**Continuation-in-part of Ser. No. 166,302, Mar. 10, 1988, Pat. No. 4,912,760. This application Dec. 5, 1988, Ser. No. 279,619**

**Int. Cl.$^5$ H04N** *7/167*

**U.S. Cl. 380—7** **76 Claims**



12. Gain control apparatus for use in a television premium channel interdiction system for selectively jamming unauthorized premium programs on a broadband signal transmitted to a subscriber, comprising:

jamming oscillator means for generating a jamming signal;

variable attenuator means for attenuating the jamming signal in accordance with a control signal to produce an attenuated jamming signal;

combiner means for combining the attenuated jamming signal with the broadband signal to produce a jammed signal;

first comparator means for comparing a magnitude of the attenuated jamming signal with the broadband signal; and

controller means for determining and providing the control signal to said variable attenuator means in accordance with a predetermined function of a frequency of said jamming oscillator.

---

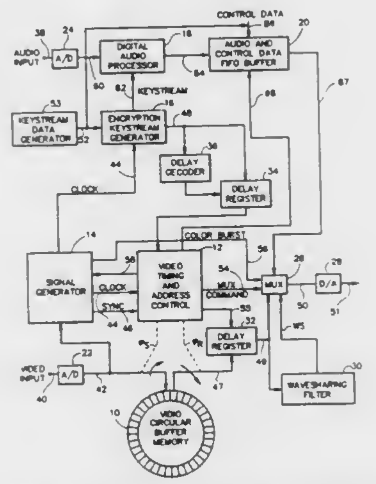
## 5,014,310
## VIDEO SCRAMBLING AND DESCRAMBLING BY VARYING SEQUENCE OF SEGMENTS IN ADJACENT VIDEO INFORMATION LINES

**Gordon K. Walker, Escondido; William A. Shumate, and Krishnanand Kelkar, both of San Diego, all of Calif., assignors to General Instrument Corporation, New York, N.Y.**

**Filed Dec. 18, 1989, Ser. No. 455,554**

**Int. Cl.$^5$ H04N** *7/16*

**U.S. Cl. 380—10** **15 Claims**



1. A system for scrambling video information lines in a television signal containing a plurality of sequential video information lines for a video frame, comprising

a memory;

means for simultaneously storing in the memory a group of video information lines for a video frame, including both sequentially odd and even video information lines, wherein each video information line contains luminance information and chrominance information which is modulated at a given color subcarrier frequency, wherein each video information line includes a given even number of video information samples for each chrominance information cycle as defined by the color subcarrier frequency, and wherein the chrominance information cycle of said stored odd video information lines is out of phase with the chrominance information cycle of said stored even video information lines; and

means for forming scrambled video information lines by retrieving from the memory a segment of one of said stored odd video information lines followed by a segment of one of said stored even video information lines to form a scrambled video information line, and by shifting the phase of one of the retrieved segments of the scrambled video information line in relation to the other retrieved segment of said scrambled video information line by an odd multiple of one-half said given even number of video information samples.

---

## 5,014,311
## INTEGRATED CIRCUIT WITH AN ACCESS-CONTROLLED DATA MEMORY

**Hartmut Schrenk, Haar, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

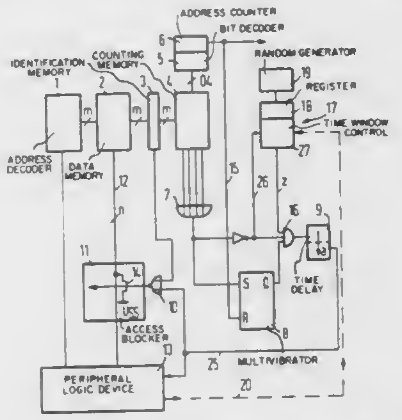
**Filed Sep. 26, 1989, Ser. No. 412,601**

**Continuation of Ser. No. 881,078, July 2, 1986, abandoned.**

**Claims priority, application Fed. Rep. of Germany, Jul. 3, 1985, 3523842**

**Int. Cl.$^5$ G06F** *12/14*

**U.S. Cl. 380—23** **19 Claims**



1. A method for protecting data stored in a data memory of a data carrier, from analysis which may allow drawing conclusions as to the content of the memory from signals at the outputs of the memory while the data carrier is connected to a peripheral logic device, wherein an identification code is fed into the data carrier to effect data transfer through the outputs of the memory into the peripheral logic device, and wherein the data transfer from the data memory to the peripheral logic device is normally blocked, the method comprising the steps of:

(a) activating a timer after an affirmative result of a checking action has been reached;

(b) releasing the blocking of the data transfer from the memory to said peripheral logic device during a predetermined time window which is adjusted such as to allow only one single comparison action of the stored data;

(c) including in the checking action a check of the entered identification code for correctness; and initiating a start of the time period by the end of writing a storage cell.

---

## 5,014,312
## SECURITY SYSTEM FOR THE PROTECTION OF PROGRAMMING ZONES OF A CHIP CARD

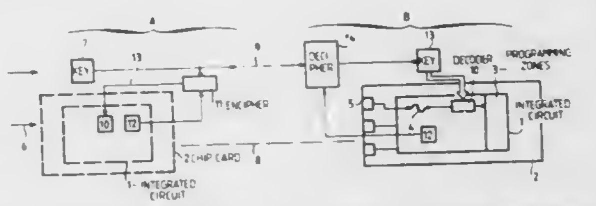
**Gilles Lisimaque, Peynier, and Yvon Bahout, Fuveau, both of France, assignors to SGS-Thomson Microelectronics SA, Gentilly, France**

**Filed Jan. 13, 1989, Ser. No. 297,079**

**Claims priority, application France, Jan. 20, 1988, 88 00594**

**Int. Cl.$^5$ H04L** *9/00;* **G06F** *15/20. 7/04*

**U.S. Cl. 380—25** **6 Claims**



1. A security system to protect zones of a chip card, said system comprising in the card, a logic lock which is open

VOL
1126
ISS
1
MY
7
1991
UMI

before programming of said zone and which can be shut after programming, said system further comprising:

- first and second means for producing, respectively, a first and second enciphered key from a programming key,
- means for introducing in said card said first enciphered key,
- in said card, an access circuit for enabling the programming of said zones, said circuit being responsive to application to the card of said second enciphered key only if it corresponds to said first enciphered key present in the card.

---

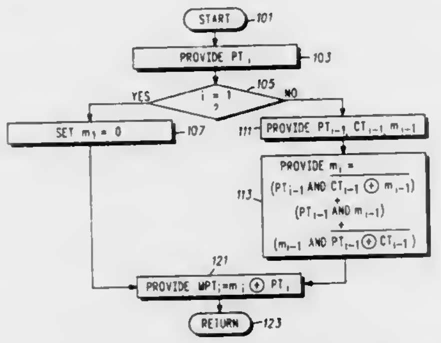
### 5,014,313
## TEXT MODIFIER

**Michael D. Kotzin, Buffalo Grove, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 7, 1989, Ser. No. 376,776**

**Int. Cl.$^5$ H04K** *9/00*

**U.S. Cl. 380—28** **9 Claims**



1. A method for processing a plain text ("PT") bit stream for a binary encryption device having an input and an output so that an input bit stream applied to the input causes an output bit stream of ciphered text ("CT") to appear at the output, said plain text ("PT") bit stream comprising PT words, each PT word having n bits of increasing order, each bit designated $PT_i$, where i varies from 1 to n, each word having a first bit ($PT_1$) that is least significant and a last bit ($PT_n$) that is most significant, comprising the steps of:

- forming a modified plain text ("MPT") bit stream and applying said MPT bit stream to said input of said binary encryption device, said MPT bit stream formed by the following method:
- for the current PT bit ($PT_i$), computing a current MPT bit ($MPT_i$) based at least in part on said $PT_i$ EXCLUSIVE OR a current modifier bit ("$M_i$"),
- said $M_i$, where i is not equal to 1, based on:
- the quantity $PT_{i-1}$ AND the inverse of the quantity $CT_{i-1}$ EXCLUSIVE OR $M_{i-1}$,
- OR the quantity $PT_{i-1}$ AND $M_{i-1}$,
- OR the quantity $M_{i-1}$ AND the inverse of the quantity $PT_{i-1}$ EXCLUSIVE OR $CT_{i-1}$,

wherein $M_1$=logic zero (0).

---

### 5,014,314
## METHOD FOR DEVELOPING AND TRANSMITTING USAGE CONTEXT INFORMATION IN AN RF COMMUNICATION SYSTEM

**Keith I. Mulford, Palatine, and Paul M. Bocci, Roselle, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Apr. 27, 1990, Ser. No. 515,399**

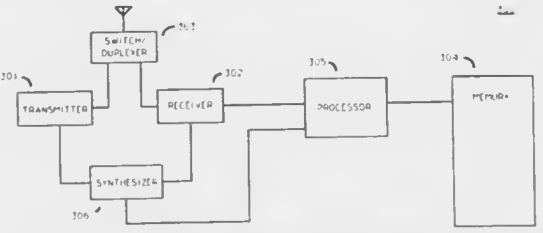
**Int. Cl.$^5$ H04L** *9/00*

**U.S. Cl. 380—43** **9 Claims**

1. In an RF communication system having a plurality of communication resources that provide a capability to communicate information signals among a plurality of communication units, a method for developing and communicating usage context information, the method comprising the steps of:

(a) determinig usage context information relating to communication units and associated communication resources currently being used to communicate information signals; and

(b) retransmitting, over at least one communication resource, the usage context information determined in step (a), interleaved with the information signals, thus enabling a communication unit to selectively monitor communications involving other communication units matching at least one characteristic embodied in received usage context information.



---

### 5,014,315
## DIGITAL TELEPHONE SYSTEM

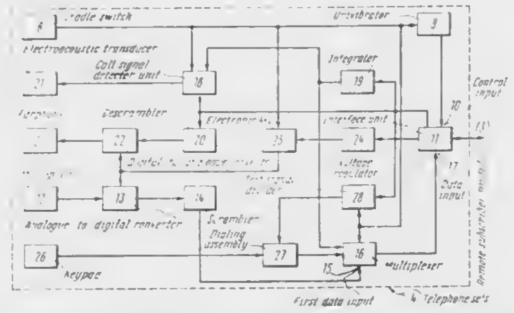
**Mark U. Polyak, Naberezhnaya M. Gorkogo, 32/34, kv. 66; Gely P. Abugov, ulitsa Kosinskaya, 26, Korpus 2, kv. 116, and Vladimir B. Belyak, prospekt Mira, 11, kv. 48, all of Moscow, U.S.S.R.**

**Filed Jul. 18, 1989, Ser. No. 381,774**

**Claims priority, application U.S.S.R., Jul. 20, 1988, 4449343**

**Int. Cl.$^5$ H04M** *3/00;* **H04L** *9/00*

**U.S. Cl. 380—49** **9 Claims**



1. A digital telephone system for digitally coded information interchange, comprising:

- groups of digital telephone sets performing analogue-to-digital and digital-to-analogue conversion of transmitted and received information respectively;
- each of said telephone sets having an input/output to receive and transmit digitally coded information;
- remote subscriber modules, one per each of said groups of said telephone sets;
- said remote subscriber modules multiplexing signals arriving from said telephone sets of the digital telephone system;
- a digital individual subscriber line;
- each of said remote subscriber modules having individual inputs/outputs connected via said digital individual subscriber line to said inputs/outputs of all telephone sets of a corresponding group, and a group subscriber input/output;
- subscriber concentration modules to concentrate traffic from said telephone sets of the digital telephone system;
- each of said subscriber concentration modules having group subscriber inputs/outputs connected to said group subscriber input/output of respective remote sutscriber modules, and having intermediate inputs/outputs;
- a through-switching module having one group of inputs-/outputs constituting connection inputs/outputs of said digital telephone system and groups of intermediate inputs/outputs, the number of said groups being equal to that of said subscriber concentration modules;
- said intermediate inputs/outputs of each group of said through-switching module being connected to said intermediate inputs/outputs of corresponding subscriber concentration modules.

---

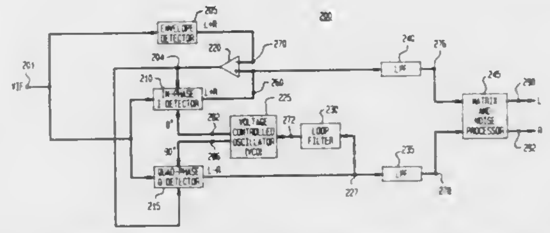
### 5,014,316
## COMPATIBLE QUADRATURE AMPLITUDE MODULATION DETECTOR SYSTEM

**Jeffrey J. Marrah; Gregory J. Manlove, both of Kokomo, and Richard A. Kennedy, Russiaville, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.**

**Filed Mar. 21, 1990, Ser. No. 500,837**

**Int. Cl.$^5$ H04H** *5/00*

**U.S. Cl. 381—15** **24 Claims**



22. An audio detector circuit for producing L+R and L−R audio signals from a compatible quadrature amplitude modulated signal having an L+R amplitude modulation component, L+R and L−R phase modulation components and a cosine component comprising:

- means for receiving the compatible quadrature amplitude modulated signal;
- an envelope detector responsive to the amplitude modulation of the received compatible quadrature amplitude modulated signal for forming a first audio signal;
- an in-phase detector responsive to the received compatible quadrature amplitude modulated signal for forming an output signal having L+R audio signal component;
- a quadrature phase detector responsive the received compatible quadrature amplitude modulated signal for forming an output signal including an L−R audio signal component;
- means responsive to the first audio signal from the envelope detector and the output signal from the in-phase detector for generating a signal representative of the cosine component of the received compatible quadrature amplitude modulated signal; and
- means responsive to the output signal of the quadrature phase detector for generating an in-phase clock signal and a quadrature phase clock signal at the carrier frequency of the rate of the received compatible quadrature amplitude modulated signal;

wherein the in-phase detector comprises:

- a first amplifier including input means and output means;
- first controllable impedance means coupled between the means for receiving the compatible quadrature amplitude modulated signal and the amplifier input means;
- means responsive to in-phase clock signal for switching the first controllable impedance means between first and second values at a rate corresponding to the carrier frequency;
- second controllable impedance means coupled between the input and output means of the amplifier; and
- means responsive to the cosine component representative signal for controlling the value of the second controllable impedance means.

---

### 5,014,317
## RECORDING/REPRODUCING APPARATUS WITH VOICE RECOGNITION FUNCTION

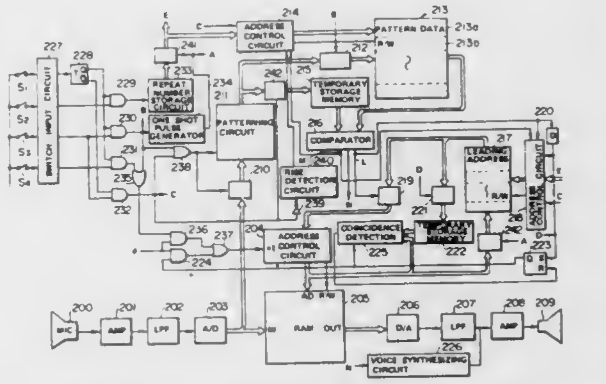
**Kazunori Kita, Oome, and Eiji Nakazawa, Akishima, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 226,943, Aug. 1, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 485,755**

**Claims priority, application Japan, Aug. 7, 1987, 62-120511; Jun. 22, 1988, 63-154100**

**Int. Cl.$^5$ G10L** *7/08*

**U.S. Cl. 381—43** **7 Clalms**



1. A recording and reproducing apparatus, comprising:

- time counting means for counting a reference signal to obtain present time data;
- voice data output means for receiving an externally supplied voice schedule which includes an alarm time and message, and for outputting voice schedule data including voice alarm time data and voice message data;
- voice data storage means coupled to said voice data output means for storing said voice schedule data including the voice alarm time data and voice message data;
- address data output means coupled to said voice data storage means for supplying address data to said voice data storage means;
- leading address data storage means coupled to said address data output means for storing first address data of the voice schedule data including the voice alarm time data and voice message data stored in said voice data storage means;
- voice alarm time recognition means for receiving the voice schedule data output from said voice data output means and recognizing the voice alarm time data included in said voice schedule data;
- alarm time data storage means for storing numerical alarm time data corresponding to the voice alarm time data recognized by said voice alarm time recognition means;
- coincidence detection means for detecting a coincidence between the numerical alarm time data stored in said alarm time data storage means and the present time data obtained by said time counting means;
- reading out control means for transmitting, when a coincidence has been detected by said coincidence detection means, the first address data of the voice schedule data including the voice alarm time data and voice message data, stored in said leading address data storage means to said address data output means, and for reading out the stored voice schedule data including the voice alarm time data and voice message data from said voice data storage means; and
- voice reproducing means for audibly reproducing the voice schedule data including the voice alarm time data and voice message data which are read out from said voice data storage means by said reading out control means.

VOL
1126
ISS
1
MY
7
1991
UMI

### 5,014,318

### APPARATUS FOR CHECKING AUDIO SIGNAL PROCESSING SYSTEMS

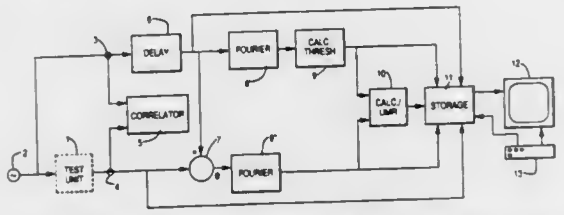
**Hartmut Schott; Dieter Seitzer, both of Erlangen; Heinz Gerhäuser, Waischenfeld; Karlheinz Brandenburg, Erlangen; Ernst Eberlein, Erlangen; Stefan Krägeloh, Erlangen; Rolf Kapust, Erlangen, and Harald Popp, Tuchenbach, all of Fed. Rep. of Germany, assignors to Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e. v., Fed. Rep. of Germany**

**PCT No. PCT/DE89/00110, § 371 Date Oct. 25, 1989, § 102(e) Date Oct. 25, 1989, PCT Pub. No. WO89/08357, PCT Pub. Date Sep. 8, 1989**

**PCT Filed Feb. 25, 1989, Ser. No. 439,394**

**Int. Cl.$^5$ G10L** *5/00*

**U.S. Cl. 381—47** **22 Claims**



1. An apparatus for checking an audio signal processing system comprising:
first input means for receiving an input signal to an audio processing system to be checked;
second input means for receiving an output signal of the audio processing system to be checked;
correlator means for determining an operating time of the audio processing system and determining a signal delay time therebetween;
time delay means for delaying the input signal by the operating time of the audio processing system to produce a delayed input signal;
signal subtraction means for subtracting the output signal of the audio processing system for the delayed input signal to produce a difference signal for a given time interval;
spectral analysis means for ascertaining the spectral composition of the input signal and the difference signal for the given time interval;
hearing threshold determining means for determining an ascertained hearing threshold of a human ear from the spectral composition of the input signal for the given time interval; and
comparator means for comparing the ascertained hearing threshold with the difference signal for the given time interval to provide an error signal.

---

### 5,014,319

### FREQUENCY TRANSPOSING HEARING AID

**Vadim Leibman, Nof Haemak, Israel, assignor to AVR Communications Ltd., Haifa, Israel**

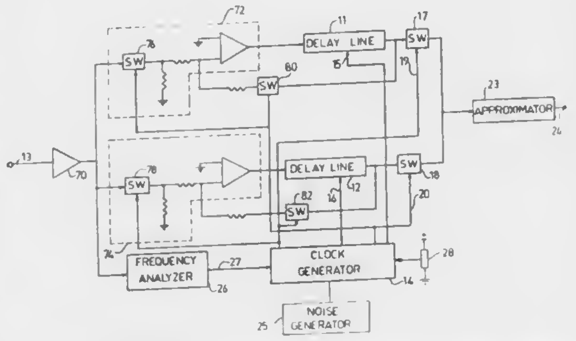
**Filed Dec. 13, 1988, Ser. No. 283,971**

**Claims priority, application Israel, Feb. 15, 1988, 85417; Sep. 19, 1988, 87814; Oct. 6, 1988, 87956**

**Int. Cl.$^5$ H04R** *25/00;* **H03G** *5/00*

**U.S. Cl. 381—68.2** **21 Claims**

11. Hearing aid apparatus comprising:
converting means for converting inputted audio frequency sounds to electrical input signals;
storage means for storing information associated with said electrical input signals;
and control means for controlling the storage means to store information at a predetermined information storage rate and to output the stored information at a predetermined information retrieval rate;
said control means comprising a frequency analyzer for classifying incoming audio frequency sounds according to their frequency, and recirculating means for recirculating information originally stored in the storage means back to the storage means.



---

### 5,014,320

### DRIVING APPARATUS, AND CONTROL INFORMATION STORAGE BODY AND PROTECTION CIRCUIT THEREFOR

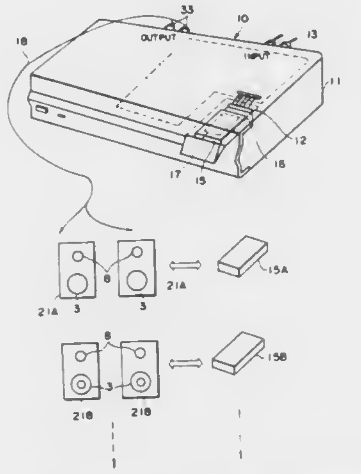
**Katsuo Nagi; Kazunari Furukawa, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan**

**Filed May 17, 1989, Ser. No. 353,444**

**Claims priority, application Japan, May 25, 1988, 63-125637; Jun. 1, 1988, 63-132606**

**Int. Cl.$^5$ H04R** *3/00*

**U.S. Cl. 381—96** **7 Claims**



1. An apparatus for driving an electro-acoustic transducer having a vibrating body, comprising:
a power amplifier for supplying drive power to said electro-acoustic transducer; and
a feedback circuit for detecting a magnitude of one of an input and output of said transducer and transmitting a detected result to an input side of said amplifier, wherein said feedback circuit has determining means for determining transmission characteristics of said feedback circuit, said determining means being separated into a main body portion connected to said amplifier and a control information storage body which stores control information for setting the transmission characteristics and is freely separable from and connectable to said main body portion;
wherein said amplifier cancels a counteraction from surrounding portions with respect to the vibrating body of said transducer in accordance with said detected result.

### 5,014,321

### WIDE PASSBAND OMNIDIRECTIONAL LOUDSPEAKER

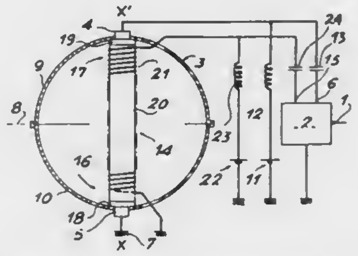
**Siegfried Klein, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris, France**

**Filed Oct. 5, 1989, Ser. No. 417,251**

**Claims priority, application France, Oct. 11, 1988, 88 13357; Oct. 11, 1988, 88 13358**

**Int. Cl.$^5$ H04R** *3/00*

**U.S. Cl. 381—111** **13 Claims**



1. Wide passband omnidirectional loudspeaker able to supply deep, medium and sharp tones, correspondingly to low, medium or high frequencies of an electric signal, said loudspeaker comprising a rigid magnetostrictive spherical diaphragm, the spherical diaphragm constituting a sound wave unidirectional transducer in the direction normal to the surface of the sphere, a medium and high frequency electric control means connected to terminals located at two diametrically opposite points of the diaphragm so as to create, in the vicinity of the diaphragm, a homogeneous magnetic field proportional to the electric signal, which electric signal is applied to the terminals of the control means after passing through filter which eliminates low frequencies, and a d.c. polarization means for the diaphragm, said loudspeaker further comprising a low frequency electric control means for receiving said electric signal after filtering eliminating the medium and high frequencies, said low frequency electric control means extending longitudinally along an axis (X'X) of the diaphragm and having two ends respectively integral with two opposite zones of said diaphragm traversed by said axis (X'X).

---

### 5,014,322

### DIAPHRAGM UNIT OF A CONDENSER MICROPHONE, A METHOD OF FABRICATING THE SAME, AND A CONDENSER MICROPHONE

**Mamoru Yasuda, and Hitoshi Toda, both of Kobe, Japan, assignors to Hosiden Electronics Co., Ltd., Osaka, Japan**

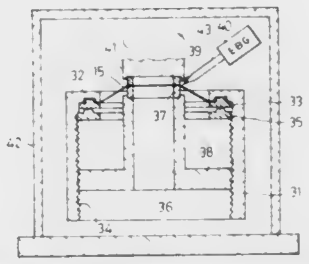
**PCT No. PCT/JP88/00236, § 371 Date Oct. 19, 1988, § 102(e) Date Oct. 19, 1988, PCT Pub. No. WO88/06832, PCT Pub. Date Sep. 7, 1988**

**PCT Filed Mar. 3, 1988, Ser. No. 320,333**

**Claims priority, application Japan, Mar. 4, 1987, 62-51018; Jul. 22, 1987, 62-113223; Jul. 22, 1987, 62-113224**

**Int. Cl.$^5$ H04R** *19/00*

**U.S. Cl. 381—174** **23 Claims**



1. A diaphragm unit for a condenser microphone in which a metallic diaphragm is clamped at its peripheral portion between metallic first and second rings, said diaphragm being held with predetermined tension and welded to said rings through electron beam welding.

---

### 5,014,323

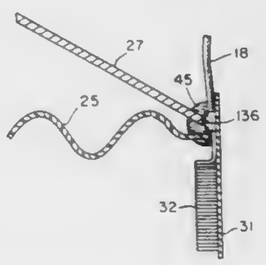
### VOICE COIL LEAD DRESSING

**Mitch A. Markow, Natick; Dale O. Moody, Leominster, and Hal P. Greenberger, Hopedale, all of Mass., assignors to Bose Corporation, The Mountain, Framingham, Mass.**

**Filed Jul. 28, 1989, Ser. No. 387,239**

**Int. Cl.$^5$ H04R** *9/04*

**U.S. Cl. 381—194** **13 Claims**



1. A moving coil loudspeaker comprising
a bobbin,
a cone secured to said bobbin by cement,
a spider secured to said bobbin by said cement,
a voice coil including a first electrical wire that is wrapped around said bobbin and has ends supported by said bobbin, and
flexible second and third electrical wires for making electrical connection of said first electrical wire to external circuitry,
said second and third wires being connected to said ends of said first wire by connections that are anchored on said bobbin by said cement securing said spider and said cone to said bobbin.

---

### 5,014,324

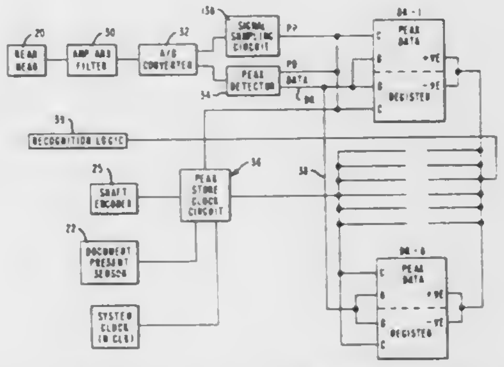
### MICR CHARACTER READER USING MAGNETIC PEAKS TO UPDATE TIMING CLOCKS

**Ali T. Mazumder, Waterloo, Canada, assignor to NCR Corporation, Dayton, Ohio**

**Continuation-in-part of Ser. No. 136,069, Dec. 21, 1987. This application Jun. 6, 1988, Ser. No. 202,849**

**Int. Cl.$^5$ G06K** *9/00, 7/08, 19/06*

**U.S. Cl. 382—7** **5 Claims**



1. An apparatus for use in reading MICR characters on a carrier, with each said character having a waveform which starts with a positive peak value, and with the waveforms of said characters being comprised of predetermined patterns of positive peak values, negative peak values, and substantially zero values occurring at predetermined clocking periods to

VOL
1126
ISS
1
MY
7
1991
UMI

identify a particular waveform as representing a particular character; said system comprising:

a MICR reader for generating said waveform when a carrier with said characters thereon is moved in reading relationship with said MICR reader;

converting means for converting a waveform from said MICR reader into said positive peak, negative peak, and substantially zero values and for placing these values on data lines associated with said converting means;

data register means coupled to said data lines for storing said positive peak, negative peak, and substantially zero values when clocked therein;

a clocking circuit for clocking said positive negative, and substantially zero values into said data register means while taking into account the speed at which the carrier on which the MICR characters are located is moving in reading relationship with the MICR reader;

said clocking circuit comprising:

first means, including a shaft encoder, for generating a first count which reflects the speed of said carrier as it is moved in reading relationship with said MICR reader, with said first count varying in accordance with the speed of said carrier as determined by said shaft encoder;

second means including an up counter for developing a nominal time period equivalent to said first count and also for generating a nominal clock signal which is used to clock a value on said data lines into said data register means; and

third means coupled to said second means to shorten said nominal time period when said positive or negative peak value comes before the end of said nominal time period to generate an adjusted clock signal to clock the value on said data lines into said data register means, and also to lengthen said nominal time period when a said positive or negative peak value comes after the end of said nominal time period to generate an adjusted clock signal to clock the value on said data lines into said data register means;

said shaft encoder producing successive outputs which are related to the speed of said carrier; and

said first means including first and second counters for generating said first count and also includes third and fourth counters coupled to said first and second counters, respectively, to limit the count on said first and second counters to that which occurs between successive outputs from said shaft encoder.

---

### 5,014,325

### APPARATUS FOR DISCRIMINATING SPECIFIED SORTS OF PRINTED MATTERS

**Shigeru Moritomo, Toyonaka, Japan, assignor to Nihon Eiwan Denshikiki Co., Ltd. and I.M. Electronics Co., Ltd., both of Osaka, Japan**

**Filed Sep. 30, 1985, Ser. No. 781,660**

**Claims priority, application Japan, Feb. 1, 1985, 60-18996**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—7** **8 Claims**

1. An apparatus for discriminating printed matter having an identification pattern printed in magnetic ink, comprising:

(a) an input passage having a printed matter-inserting port;

(b) feeding means for feeding the printed matter inserted in the inserting port into the passage;

(c) magnetic sensor means for magnetically scanning the printed matter fed into the passage along a given path thereof, and producing an analog pattern signal corresponding to the identification pattern thereon;

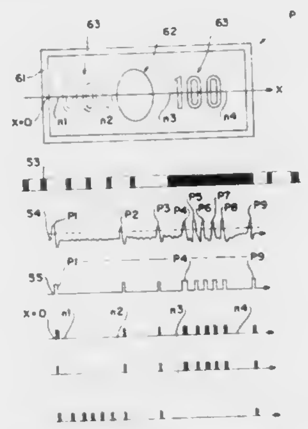
(d) timing signal generating means for producing a timing signal with a time interval proportional to the feed speed of the feeding means;

(e) standard memory means for storing a standard signal including at least a series of digital reference data; and

(f) control means including means for,

sampling and digitizing said analog pattern signal in response to said timing signal for producing a series of digital sample data indicative of the amplitudes of the analog pattern signal,

comparing the digital reference data with the digital sample data respectively a plurality of times wherein the series of reference data is successively shifted relative to the series of sample data by a datum corresponding to the time interval of the timing signal, for the occurrence of a coincidence in reference positions of the sample data and reference data,



counting the number of coincidences or non-coincidences of the respective data occurring in the comparison for each data-shifted time,

determining a coincidence or non-coincidence of the series of the sample data and the series of the reference data by the number of coincidences or non-coincidences counted each time, and

outputting an output signal indicative of the determined coincidence or non-coincidence of the series of the sample data and the series of the reference data.

---

### 5,014,326

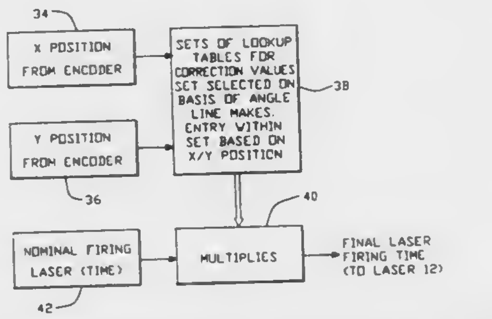
### PROJECTED IMAGE LINEWIDTH CORRECTION APPARATUS AND METHOD

**James B. Turner, Menlo Park, and Roderick J. McInnis, Milpitas, both of Calif., assignors to Greyhawk Systems, Inc., Milpitas, Calif.**

**Filed Mar. 3, 1989, Ser. No. 318,736**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—8** **13 Claims**


34
X POSITION FROM ENCODER
SETS OF LOOKUP TABLES FOR CORRECTION VALUES SET SELECTED ON BASIS OF ANGLE LINE MAKES. ENTRY WITHIN SET BASED ON X/Y POSITION
38
Y POSITION FROM ENCODER
36
40
NOMINAL FIRING LASER (TIME)
MULTIPLIES
FINAL LASER FIRING TIME (TO LASER 12)
42

1. An apparatus for correction linewidth deviations in a projected image formed by an image projection system, comprising:

means for impinging a pulse width modulated laser on an image receiving surface to create a test image of a specific number of test points on said image receiving means, each of said test points having a plurality of lines of specific width;

means for determining the differences between the linewidth of the plurality of lines at each test point of said test image as created and a standard reference image;

means for generating a correction coefficient for each of said test points based on said determined differences;

means for interpolating said correction coefficients so that an entire area of said image receiving means is provided with a correction coefficient; and

means for modifying the pulse width of said laser when said laser is impinging on a specific area of said image receiving means by the correction coefficient for said specific area means for storing said correction coefficients; and laser location positioning means connected at least to said storing means and said modifying means for indicating the position of said laser so that said storing means can transfer stored correction coefficients for a particular location to said modifying means.

---

### 5,014,327

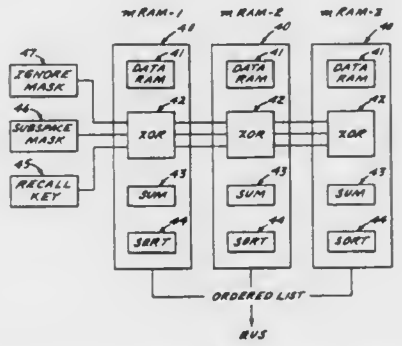
### PARALLEL ASSOCIATIVE MEMORY HAVING IMPROVED SELECTION AND DECISION MECHANISMS FOR RECOGNIZING AND SORTING RELEVANT PATTERNS

**Terry W. Potter, Acton, and Glen C. Worrell, Auburn, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation-in-part of Ser. No. 62,473, Jun. 15, 1987, abandoned. This application Feb. 16, 1988, Ser. No. 156,542**

**Int. Cl.$^5$ G06K** *9/62*

**U.S. Cl. 382—14** **24 Claims**



1. A method of recognizing patterns, said method comprising the steps of:

storing a plurality of recognition patterns in at least one memory, and storing in said memory respective parameters defining respective radii of attraction for the recognition patterns;

receiving a recall pattern;

comparing certain bits of said recall pattern to certain bits of said plurality of recognition patterns and rejecting certain of the recognition patterns based on the bit-wise comparison;

correlating said recall pattern with at least said plurality of recognition patterns in said memory which are not rejected to determine respective measures of closeness for the recognition patterns which are not rejected, wherein said correlating includes adjusting the respective correlations by the respective parameters to determine the respective measure of closeness for the recognition patterns which are not rejected; and

inspecting said measures of closeness to identify at least one closest one of the recognition patterns which are not rejected.

---

### 5,014,328

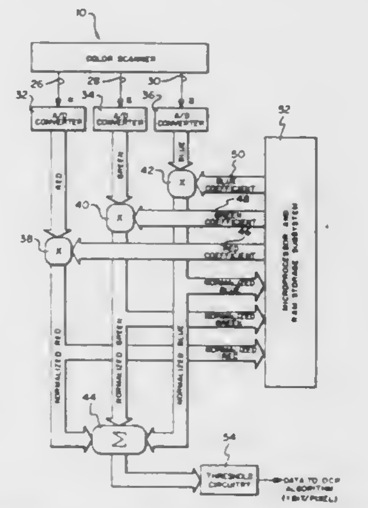
### AUTOMATIC DETECTION AND SELECTION OF A DROP-OUT COLOR USED IN CONJUNCTION WITH OPTICAL CHARACTER RECOGNITION OF PREPRINTED FORMS

**Peter Rudak, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 24, 1990, Ser. No. 557,293**

**Int. Cl.$^5$ G06K** *9/00;* **H04N** *1/46*

**U.S. Cl. 382—17** **7 Claims**



1. An apparatus for reading the image information of a colored original, comprising:

means for scanning a colored original and outputting at least two separate color analog signals for each scan line;

means for converting said analog signals into color digital video signals on a pixel by pixel basis;

means for storing at least a portion of a scan line of color digital video signals for each color;

means for analyzing each of said stored scan lines in order to classify the color of each pixel based on the color components of the corresponding color signals in each pixel;

means for compensating each pixel within a scan line for amplitude and color response by varying coefficients associated with each color component;

means for determining an average color value for a group of said classified pixels; and

means for calculating color coefficients for said compensating means so as to implement an electronic filter to filter out said average color.

---

### 5,014,329

### AUTOMATIC DETECTION AND SELECTION OF A DROP-OUT COLOR USING ZONE CALIBRATION IN CONJUNCTION WITH OPTICAL CHARACTER RECOGNITION OF PREPRINTED FORMS

**Peter Rudak, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 24, 1990, Ser. No. 557,291**

**Int. Cl.$^5$ G06K** *9/00;* **H04N** *1/46*

**U.S. Cl. 382—17** **7 Claims**

1. An apparatus for processing a color form having a color calibration zone in a predetermined location, said apparatus comprising:

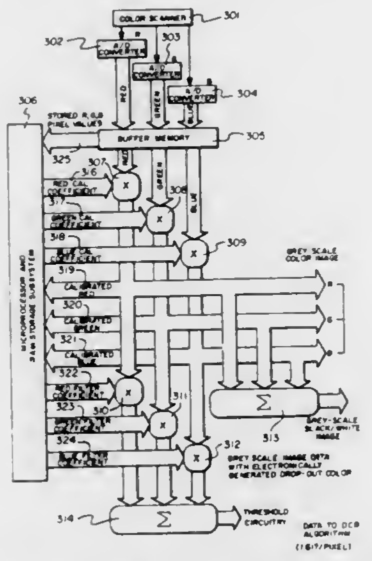
means for scanning said form and generating a plurality of different analog grey-scale color signals;

means for converting said grey-scale color signals into color digital video signals on a pixel by pixel basis;

means for storing a plurality of scan lines containing said color grey-scale digital information for said calibration zone;

VOL 1126
ISS 1
MY 7
1991
UMI

means for accessing said stored scan lines in said memory to analyze the pixel data in said calibration zone;
means for analyzing the color grey-scale information for the pixels within said calibration zone so as to calculate the average color value within said calibration zone;

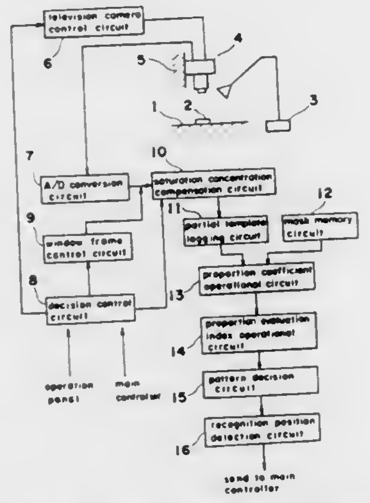


digital multipliers associated with each color signal and controlled by adjustable coefficients; and
means for calculating color coefficients of said digital multipliers for each color signal so as to form an electronic filter to filter said average color.

---

### 5,014,330
## PATTERN POSITION RECOGNIZING APPARATUS

**Akira Kobayashi, Osaka; Nobutaka Taira, Hirakata, and Hideshi Ueda, Yao, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Dec. 5, 1989, Ser. No. 446,284**
**Claims priority, application Japan, Dec. 9, 1988, 63-312239**
**Int. Cl.$^5$ G06K** *9/00*
**U.S. Cl. 382—30** **5 Claims**

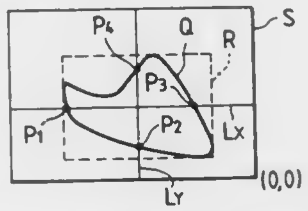

television camera control circuit
6
4
5
1
2
3
7
A/D conversion circuit
10
saturation concentration compensation circuit
11
partial template logging circuit
12
mask memory circuit
9
window frame control circuit
13
proportion coefficient operational circuit
8
decision control circuit
14
proportion evaluation index operational circuit
15
pattern decision circuit
16
recognition position detection circuit
operation panel
main controller
send to main controller

1. A pattern recognition apparatus for detecting a coincidence between an input image pattern and a target pattern, said apparatus comprising:
means for receiving input image data $f_{ij}$, wherein $f_{ij}$ denotes a concentration of the input image pattern at a picture element i,j on a two-dimensional plane of the input image pattern;
means for storing mask data $g_{uv}$, wherein $g_{uv}$ denotes a concentration of the target pattern at a point u,v on a two-dimensional plane of the target pattern;
means for scanning the mask data $g_{uv}$ with respect to the input image data $f_{ij}$ and for computing a proportional coefficient corresponding to each picture element i,j on the two-dimensional plane of the input image pattern, wherein the proportional coefficient denotes a ratio between the concentration of the input image data $f_{ij}$ and the concentration of the mask data $g_{uv}$;
means for dividing the input image data $f_{ij}$ into a plurality of partial templates each denoting a two-dimensional subsection of the input image pattern;
means for calculating for each partial template a proportional evaluation index $\sigma_{ij}$ corresponding to each picture element i,j of the two-dimensional plane of the input image pattern, the proportional evaluation index $\sigma_{ij}$ denoting a degree of dispersion of the proportional coefficients within each partial template; and,
means for detecting, as a candidate partial template, a partial template having a proportional evaluation index $\sigma_{ij}$ of a minimum value.

---

### 5,014,331
## METHOD OF DETECTING AN INTERNAL POINT WITHIN A CLOSED AREA

**Toshio Kurogane, and Daiji Nagaoka, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan**
**Filed Nov. 16, 1989, Ser. No. 437,183**
**Claims priority, application Japan, Nov. 18, 1988, 63-150862[U]**
**Int. Cl.$^5$ G06K** *9/00*
**U.S. Cl. 382—48** **6 Claims**

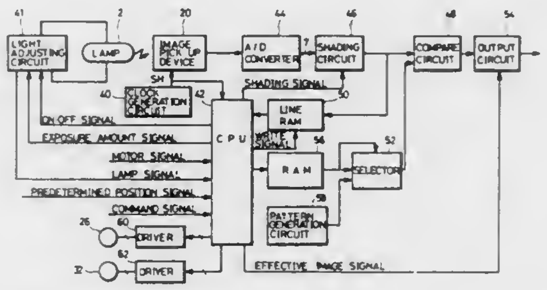


1. A method of determining an internal point within a closed area, the method performed by a data processing system including a bit map memory and comprising the steps of:
inputting a circumference of the closed area into the bit map memory as circumference bits corresponding to a plurality of successive picture elements; and
calculating coordinates of a bit in said bit map memory that corresponds to an internal point of said closed area on the basis of maximizing and minimizing in the horizontal and vertical axial directions of coordinates of the circumference bits, the calculating step further including the steps of:
determining a rectangle in the bit map memory that circumscribes said closed area;
setting one or more axes in the bit map memory extending parallel to each side of said rectangle; and
calculating the coordinates of the bit corresponding to the internal point within said closed area on a basis of coordinates and conditions of intersections between said axes and said circumference of said closed area.

---

### 5,014,332
## IMAGE READER

**Akio Nakajima, and Munehiro Nakatani, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Mar. 29, 1988, Ser. No. 174,820**
**Claims priority, application Japan, Mar. 31, 1987, 62-78855; Mar. 31, 1987, 62-78856**
**Int. Cl.$^5$ G06K** *9/38*
**U.S. Cl. 382—50** **10 Claims**



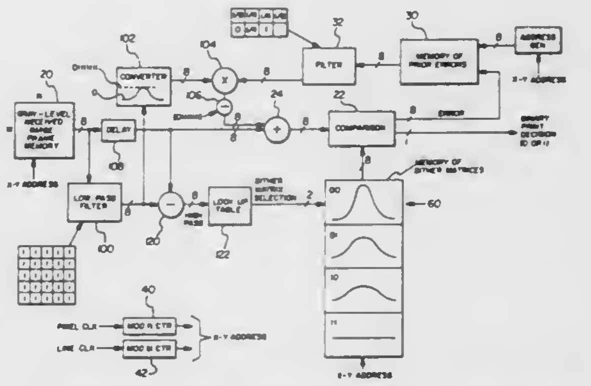
1. An image reader comprising:
a platen for mounting an original having a background portion and a character portion;
scanning means for scanning said original mounted on said platen, including an exposure lamp for illuminating said original, a line image sensor with light receiving means for receiving reflected light from said exposure lamp reflected at the surface of said original for outputting analog image data corresponding to the amount of light received by said light receiving means, and a projection lens for projecting an image of said original on said line image sensor;
analog-to-digital converting means for converting said analog image data into digital multilevel image data;
memory means for storing said digital multilevel image data;
image density level extracting means for extracting the image density level corresponding to the background portion of said original based on said digital multilevel image data;
arithmetic means for comparing the image density level extracted by said image density level extracting means with a predetermined reference density level to find a difference;
light amount adjusting means for adjusting the amount of light from said exposure lamp based on the difference obtained by said arithmetic means;
binary converting means for converting said digital multilevel image data into binary image data; and
parallel processing control means for carrying out said light amount adjustment by said light amount adjusting means and the conversion of data by said binary converting means in parallel.

---

### 5,014,333
## IMAGE PROCESSOR WITH SMOOTH TRANSITIONING BETWEEN DITHER AND DIFFUSION PROCESSES

**Rodney L. Miller, Rochester, and Roger R. A. Morton, Penfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Filed Jul. 21, 1988, Ser. No. 222,610**
**Int. Cl.$^5$ G06K** *9/40*
**U.S. Cl. 382—54** **9 Claims**

1. An image processor comprising:
image memory means for storing an image comprising a frame of M columns and N rows of multi-gray level pixels;
adder means for forming successive input amplitudes from successive ones of said pixel so as to form a current input amplitude corresponding to the current one of said pixels;
means for comparing said current input amplitude with a dithered threshold so as to generate:
a. a binary print/no print decision,
b. a feedback error;
means for attenuating said feedback error so as to produce an attenuated error, said attenuating means responsive to the average gray level of a local neighborhood of pixels surrounding said current pixel so as to attenuate said feedback error proportionately as said average gray level approaches a light or dark limit;
means for transmitting said attenuated error to said adder means so that said adder means adds said attenuated error to the next one of said successive pixels to form the next one of said successive input amplitudes; and
means for transmitting said dithered threshold to said comparator means, comprising:
a. means for storing a plurality of ordered dither matrices, each of said matrices defining plural patterns of dithered thresholds as individual elements in each of said matrices, each of said patterns characterized by dither threshold amplitudes for each of said M ×N pixels spatially modulated with a contour of a characteristic sharpness,

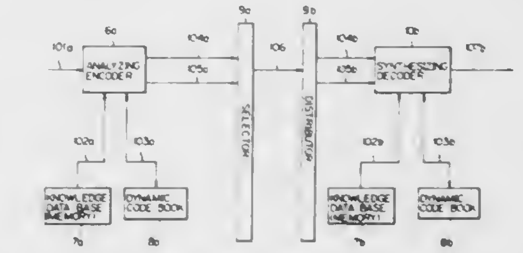


b. means for sensing the amplitude of the high spatial frequency content of said local neighborhood,
c. means for selecting one of said plurality of ordered dither matrices whereby the characteristic sharpness of the one ordered dither matrix so selected is inversely proportional to the amplitude of the high spatial frequency content of said local neighborhood, and
d. means for selecting for said dithered threshold an element within the one selected ordered dither matrix corresponding to the position of the current one of said successive pixels stored in said image storing means, whereby an ordered dither process is provided which is attenuated in proportion to the amplitude of the high spatial frequency content of the local neighborhood surrounding each successive one of said M ×N pixels.

---

### 5,014,334
## SIGNAL ENCODING AND DECODING SYSTEM

**Takahiro Fukuhara, and Tokumichi Murakami, both of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed May 10, 1990, Ser. No. 521,578**
**Claims priority, application Japan, May 11, 1989, 1-117928**
**Int. Cl.$^5$ G06K** *9/00*
**U.S. Cl. 382—86** **5 Claims**



1. An encoding/decoding system comprising:

VOL 1126 ISS 1 MY 7 1991 UMI

an analyzing encoder for inputting image signals, outputting encoded image information signals or parameter information signals;

a synthesizing decoder for inputting the encoded image information signals and parameter information signals and outputting decoded image signals;

first and second knowledge databases connected to the encoder and decoder respectively, each of the databases having knowledge, three-dimensional model data of a feature image represented by input image signals, shape and position information of feature image elements; and

first and second dynamic codebooks connected to the encoder and decoder respectively, each of the codebooks for storing luminance information vectors of the polygons constituting three-dimensional model and cancelling such a luminance information vector stored that the corresponding polygon seldom appears afterwards.

---

### 5,014,335
## METHOD OF CONTROLLING AT LEAST ONE ELECTRIC MOTOR ON AN OFFSET PRINTING MACHINE

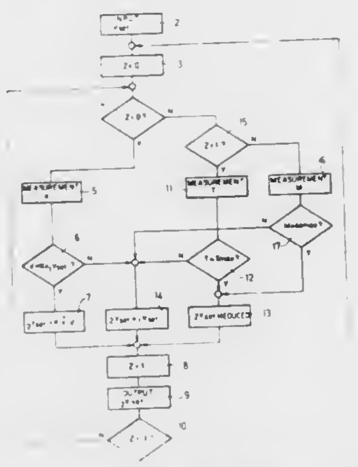
**Rodi Anton, Leimen, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Continuation of Ser. No. 870,227, Jun. 3, 1986, Pat. No. 4,810,942. This application Nov. 29, 1988, Ser. No. 277,257**

**Claims priority, application Fed. Rep. of Germany, Jun. 3, 1985, 3519840**

**Int. Cl.⁵ H02P** *7/00*

**U.S. Cl. 388—815** **5 Claims**



1. Method for controlling at least one electric motor for an offset printing press, comprising the steps of:

(a) setting a rotational speed set point in a device for controlling the rotational speed of said electric motor;

(b) irreversibly reducing said rotational speed set point to a lower value upon exceeding a boundary of critical conditions characteristic for said printing press.

---

### 5,014,336
## MOTOR CONTROL

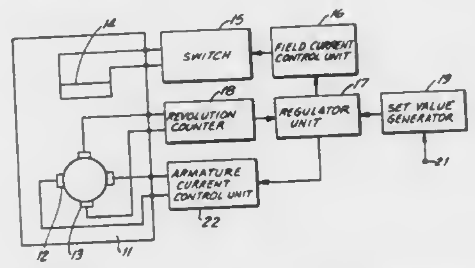
**Alfred Grassl, Richterswil, Switzerland, and Erhard Knorr, Wiesloch, Fed. Rep. of Germany, assignors to Kontron Instruments Holdings NV, Schottegatwegoost, Netherlands Antilles**

**Continuation of Ser. No. 328,796, Mar. 27, 1989, abandoncd, which is a continuation of Ser. No. 225,656, Jul. 15, 1988, abandoned, which is a continuation of Ser. No. 126,644, Dec. 1, 1987, abandoned. This application Feb. 9, 1990, Ser. No. 478,734**

**Claims priority, application Switzerland, Dec. 4, 1986, 4847/86**

**Int. Cl.⁵ H02P** *1/18*

**U.S. Cl. 388—843** **5 Claims**



1. An apparatus for controlling a shunt wound d.c. motor for driving centrifuges comprising:

first control means for controlling field current; second control means for controlling armature current;

regulation means for regulating said first and second control means with a presettable slope signal and a full excitation signal;

means for presetting said slope signal and for delivering acceleration and deceleration data to said regulation means; and

counter means for determining motor speed and for feedback of said speed data to said regulation means.

4. A method of controlling a shunt wound d.c. motor with armature and field current for driving centrifuges comprising:

starting the motor with a presettable slope armature current until a predetermined speed is reached;

applying a maximum excitation current to accelerate said motor upon said motor reaching said predetermined speed;

decelerating said motor by applying the field current to the same amount of excitation current as applied during motor acceleration by reversing the field polarity applied to said motor;

braking said motor with said presettable slope signal applied to the field current upon said motor speed falling to said predetermined speed.

---

### 5,014,337
## ELECTRO-PORTABLE APPARATUS FOR THE PRODUCTION OF STEAM, PARTICULARLY FOR UNGLUING WALL COATINGS

**Robert Desage, Verneuil/Seine, France, assignor to A.R.M.I.N.E.S., Paris, France**

**PCT No. PCT/FR88/00636, § 371 Date Aug. 21, 1989, § 102(e) Date Aug. 21, 1989, PCT Pub. No. WO89/05941, PCT Pub. Date Jun. 29, 1989**

**PCT Filed Dec. 22, 1989, Ser. No. 416,313**

**Claims priority, application France, Dec. 24, 1987, 87 18142**

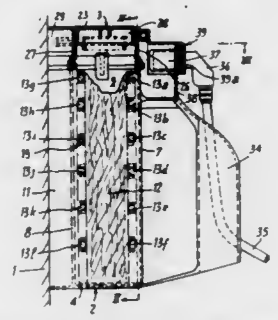
**Int. Cl.⁵ F24F** *6/08;* **A61H** *33/12*

**U.S. Cl. 392—395** **20 Claims**

1. Electro-portable apparatus for producing steam applied to a surface **1**, usable more particularly but not exclusively for ungluing wall coatings, comprising:

a housing **2, 3** containing a porous body **12** impregnated with a liquid to be vaporized solely in impregnated form directly in the porous body without the formation of a permanent layer in the housing, and means for heating this liquid up to its temperature of vaporization;

a partition wall **8, 27**, subdividing said housing **2, 3** into two compartments, namely a rear closed compartment **9, 28** containing a steam generator **12, 13** consisting of the porous body **12** impregnated with liquid and the means **13** for heating said liquid, and a front compartment **11, 29** forming a vapor cavity or "steam plate", open to the outside, defined by a peripheral edge able to be applied on the surface **1** adapted to receive the vapor; and



openings **31** provided through the partition wall **27** to allow the passage of the steam, produced in the rear compartment **9, 28** towards and into the front compartment **11, 29** constituting the vapor cavity or "steam plate".

---

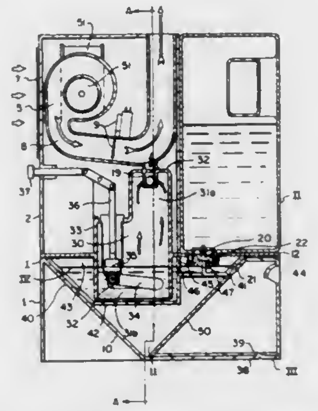
### 5,014,338
## PORTABLE AIR HUMIDIFIER

**Dov Z. Glucksman, 137 Larch Row, Wenham, Mass. 01984**

**Filed Dec. 21, 1988, Ser. No. 287,330**

**Int. Cl.⁵ F24F** *3/14*

**U.S. Cl. 392—405** **13 Claims**



1. A portable, warm-air humidifier comprising:

a housing, containing the components of said humidifier consisting of a base and a top portion, said base protruding beyond one side of said top portion;

an evaporation chamber containing a steam-escape port and heater;

an open tray comprising a main compartment of larger horizontal dimensions than said evaporation chamber and accommodating the bottom portion of said evaporation chamber, and a filling compartment communicating with said main compartment, said filling compartment serving to accommodate the neck of an inverted jug and positioned over the protruding base portion so that water flows out of said jug into said filling compartment to a height defined by the lower rim of said neck;

a removable drawer positioned in said base of said housing and having a sloping wall opposite a sloping wall of said housing, said two walls forming a V-shaped trough supporting said open tray by its side walls which are inclined similarly to said sloping walls;

a motor-driven blower positioned in said housing; and a duct, communicating with said steam escape port of said evaporation chamber and with said blower.

---

### 5,014,339
## DEVICE FOR HEATING UP A FLOW OF GAS

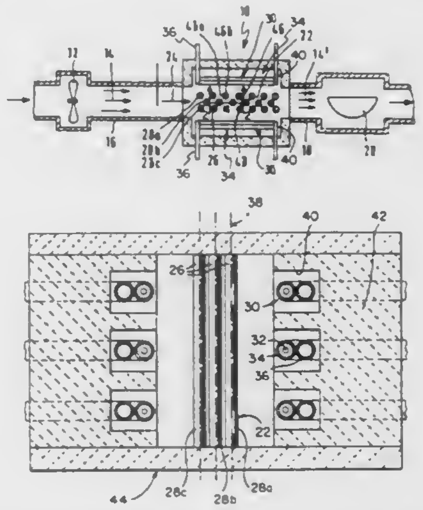
**Peter Tattermusch, Altdorf, Fed. Rep. of Germany, assignor to Deutsche Forschungsanstalt fur Luft- und Raumfahrt e.V., Bonn, Fed. Rep. of Germany**

**Filed Dec. 20, 1988, Ser. No. 287,451**

**Claims priority, application Fed. Rep. of Germany, Dec. 30, 1987, 3744498**

**Int. Cl.⁵ H05B** *1/00;* **F24H** *3/02*

**U.S. Cl. 392—491** **26 Claims**



1. Device for heating up a flow of substantially pure gas flowing in a flow direction to temperatures above about 600° C., comprising:

chamber means having walls defining a closed housing have an inlet and an outlet;

means establishing a flow of gas in a given direction through the housing from the inlet to the outlet thereof;

a heat exchanger in said housing having a heat exchanger surface extending transversely to said flow direction into the path of the gas flow whereby said substantially pure gas flows across said heat exchanger surface, said heat exchanger surface being made of infrared-absorbing ceramic material capable of heating the pure gas without contaminating the gas flow; and

at least one infrared radiation source in said housing arranged parallel to the gas flow direction but outside a direct flow path to the heat exchanger of pure gas, said at least one radiation source being positioned in a groove in a wall of said housing and arranged to irradiate said heat exchanger surface to a temperature above about 600° C.

---

### 5,014,340
## EMERGENCY LOCATING TRANSMITTER

**Paul E. Wren, Severna Park, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Division of Ser. No. 921,576, Oct. 21, 1986, Pat. No. 4,777,658. This application Sep. 9, 1988, Ser. No. 242,254**

**Int. Cl.⁵ H04K** *3/00*

**U.S. Cl. 455—1** **10 Claims**

1. A distress transmitter comprising:

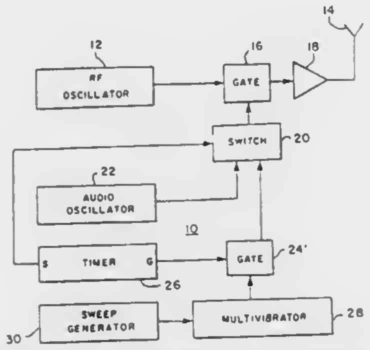
means for generating a radio frequency carrier;

means for generating a first audio signal to indicate a distress condition;

means for generating a second audio signal, which differs from said first audio signal.

VOL
1126
ISS
1
MY
7
1991
UMI

means for modulating said radio frequency carrier with said first and second audio signals as well as for providing a period during which said radio frequency carrier is unmodulated; and

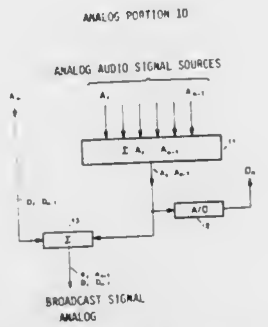


means for sequentially transmitting a periodic signal containing said first audio signal modulated carrier, said second audio signal modulated carrier and said unmodulated carrier, each with predetermined durations.

---

### 5,014,341
## HYBRID MASTER CONTROL DESK FOR ANALOG AND DIGITAL AUDIO SIGNALS

**Bertram Bittel, Kappelstrodeck, Fed. Rep. of Germany, assignor to Werbung im Südwestfunk GmbH, Baden, Fed. Rep. of Germany**
**PCT No. PCT/EP89/00270, § 371 Date Nov. 2, 1989, § 102(e) Date Nov. 2, 1989, PCT Pub. No. WO89/08955, PCT Pub. Date Sep. 21, 1989**
**PCT Filed Mar. 14, 1989, Ser. No. 439,351**
**Claims priority, application Fed. Rep. of Germany, Mar. 17, 1988, 3808876**
**Int. Cl.$^5$ H04H** *1/00, 5/00*
**U.S. Cl. 455—3** **4 Claims**

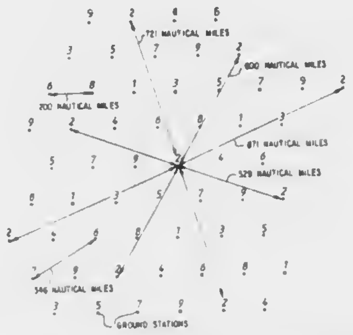


1. Master control desk for audio signals comprising:
an analog device including means for receiving and processing a plurality of analog channel signals to produce a sum, analog to digital means connected to the output of the analog processing means and for converting the sum of the analog channel signals into a digital signal, and analog summing means having two inputs for summing signals received through its inputs to produce an analog broadcast signal, where one input of the analog summing means receives the output of the analog processing means and the other input receives a further analog signal; and
a digital device including means for receiving and processing a plurality of digital channel signals to produce a sum, digital to analog means connected to the output of the digital processing means and for converting the sum of the digital channel signals into the further analog signal which is received by the analog summing means, and digital summing means having two inputs for summing signals received through its inputs to produce a digital broadcast signal, where one input of the digital summing means receives the output of the digital processing means and the other input receives the digital signal obtained from the conversion of the sum of the analog channel signals so that the digital device produces a digital broadcast signal having the same modulation context as the analog broadcast signal.

---

### 5,014,342
## COMMUNICATION SYSTEM EMPLOYING A NINE CHANNEL PATTERN ALLOCATION TO ELIMINATE INTERFERENCE

**David G. Pudsey, Essex, United Kingdom, assignor to GEC-Marconi Limited, Stanmore, United Kingdom**
**Filed Jun. 14, 1989, Ser. No. 365,575**
**Claims priority, application United Kingdom, Jun. 15, 1988, 8814176**
**Int. Cl.$^5$ H04B** *7/00*
**U.S. Cl. 455—33** **1 Claim**



1. A communication system, comprising: a plurality of ground stations disposed in first, second, and third substantially parallel rows, the ground stations being substantially evenly spaced within each row and the spacing between the ground stations being substantially the same for all the rows, the rows being disposed so that a pair of adjacent ground stations in the first row, a pair of adjacent ground stations in the third row, and two ground stations in the second row which are separatated by an intervening ground station of the second row are disposed substantilly at the vertices of a regular hexagon, wherein each ground station is assigned a channel selected from the set consisting of channel number 1, channel number 2, channel number 3, channel number 4, channel number 5, channel number 6, channel number 7, channel number 8, and channel number 9, wherein the ground stations in each row are assigned channel number in accordance with the repeating sequence 1, 3, 5, 7, 9, 2, 4, 6, 8, and wherein the channel assignments for the ground stations of each row are offset so that the intervening ground station in the second row, and the closest ground stations in the first and third rows which have the same channel number as that of the intervening ground station, lie substantially along a straight line which is disposed at an angle of about 20° with respect to the rows.

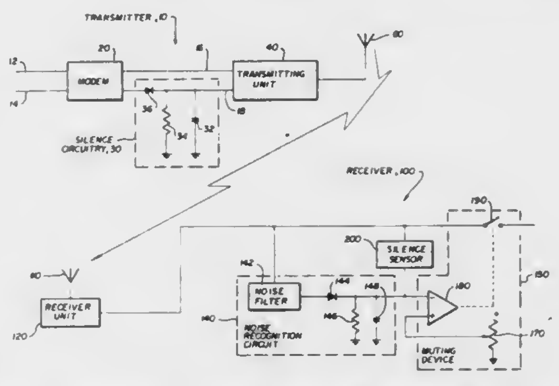
---

### 5,014,343
## SQUELCH-TAIL ELIMINATOR

**Richard A. Place, Canandaigua, N.Y., assignor to Microwave Data Systems, Inc., Rochester, N.Y.**
**Filed Jul. 25, 1988, Ser. No. 223,335**
**Int. Cl.$^5$ H04B** *1/10*
**U.S. Cl. 455—38** **11 Claims**

1. In a data communication system for transmitting and receiving a data signal, said system having squelching means for muting a squelch-tail, the improvement comprising means to add a period of silence following the transmitted data signal

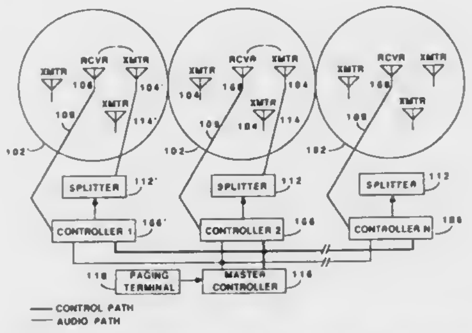
and means to activate said squelching means in response to the detection of said period of silence following the received data signal, said period of silence being an unmodulated carrier signal.



---

### 5,014,344
## METHOD FOR SYNCHRONIZING THE TRANSMISSIONS IN A SIMULCAST TRANSMISSION SYSTEM

**Steven J. Goldberg, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**
**Filed Mar. 19, 1990, Ser. No. 495,819**
**Int. Cl.$^5$ H04B** *1/00*
**U.S. Cl. 455—51** **8 Claims**

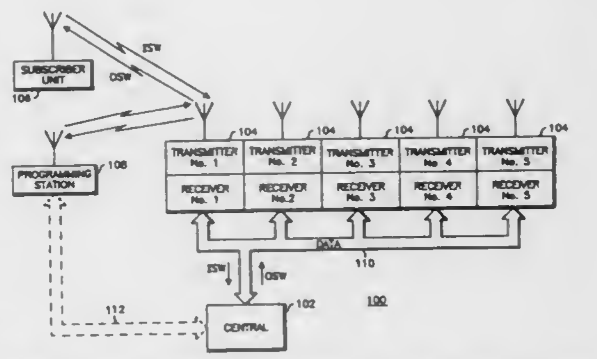


1. A method for synchronizing message transmissions in a simulcast transmitter system, the system comprising at least two transmission regions, each transmission region having at least one regional receiver coupled to a regional controller for receiving delay measurement signals, each transmission region further having a plurality of regional transmitters having adjustable transmission delays, the regional transmitters being responsive to the regional controllers, for transmitting the messages and the delay measurement signals, the system further comprising a master controller coupled to each regional controller, for enabling the message transmissions, and further for initiating the transmission of delay measurement signals for the measurement of propagation delays, said method comprising the steps of:
generating a first delay measurement signal at the master controller;
transmitting the first delay measurement signal from a selected one of the plurality of regional transmitters operating within a first transmission region;
measuring the propagation delay of the first delay measurement signal with the regional controller controlling the transmissions within the first transmission region;
generating a second delay measurement signal at the master controller;
transmitting the second delay measurement signal from a selected one of the plurality of regional transmitters operating within a transmission region adjacent the first transmission region;
measuring the propagation delay of the second delay measurement signal with the regional controller controlling the transmissions within the first transmission region;
computing a intra-regional differential propagation delay from the propagation delay measurements derived from the transmission of the first and second delay measurement signals;
computing the transmission delays required to equalize the transmissions of each of the plurality of transmitters within the first and second transmission regions in accordance with said step of computing the intra-regional differential propagation delay measurements; and
adjusting the transmission delays for each of the regional transmitters operating within the first and second transmission regions.

---

### 5,014,345
## METHOD FOR DYNAMICALLY REGROUPING SUBSCRIBERS ON A COMMUNICATIONS SYSTEM

**Richard A. Comroe, Dundee; Kenneth J. Zdunek, Schaumburg; Michael D. Sasuta, Palatine; Daniel J. Coombes, Winfield, all of Ill., and Jaime A. Borras, Hialeah, Fla., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Oct. 20, 1988, Ser. No. 260,537**
**Int. Cl.$^5$ H04B** *1/10*
**U.S. Cl. 455—54** **15 Claims**



14. In a subscriber unit for use in a two-way wireless communication system, wherein the two-way wireless communication system includes at least one reprogramming station that is constructed and arranged to:
request access to a wireless communication channel;
receive a grant to use the wireless communication channel; and
transmit, over the wireless communication channel, reprogramming information; and wherein the subscriber unit has operational information, including at least an identification code, stored therein, a method for dynamically reprogramming the subscriber unit, comprising the steps of:
(A) receiving from the wireless communication channel at least the reprogramming information;
(B) replacing at least a portion of the operational information with said reprogramming information;
(C) acknowledging through the wireless communication channel at least receipt of the reprogramming information.

VOL
1126
ISS
1
MY
.7
1991
UMI

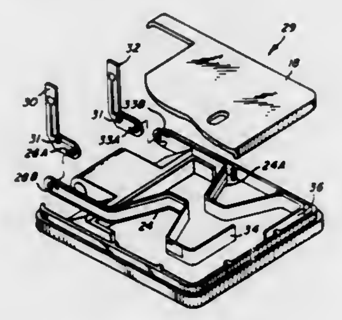
### 5,014,346
### ROTATABLE CONTACTLESS ANTENNA COUPLER AND ANTENNA

**James P. Phillips, Lake In The Hills; Robert M. Johnson, Jr., Palatine, and Michael W. Zurek, St. Charles, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jan. 4, 1988, Ser. No. 140,523**

**Int. Cl.$^5$ H04B *1/18;* H01Q *1/24***

**U.S. Cl. 455—89** **16 Claims**



1. A portable radio comprising:
- a housing;
- a hinged flip portion attached to said housing by hinge means for permitting rotation about an axis formed by said hinge means and said housing;
- signal processing means for processing RF signals disposed within said housing;
- a first antenna disposed within said hinged flip portion; and
- coupling means for coupling R.F. signal between said first antenna and said signal processing means partially disposed coaxially within said hinge means, said coupling means comprising a first transformer having a primary coil means and secondary coil means, said primary coil means coupled to said signal processing means, said secondary coil means coupled to said first antenna, said primary coil means and said secondary coil means being positioned coaixally with said hinge means such that substantially constant inductive coupling there between is maintain over a range of rotation and substantially constant signal coupling between said fist antenna and said signal processing means occurs regardless of rotation.

---

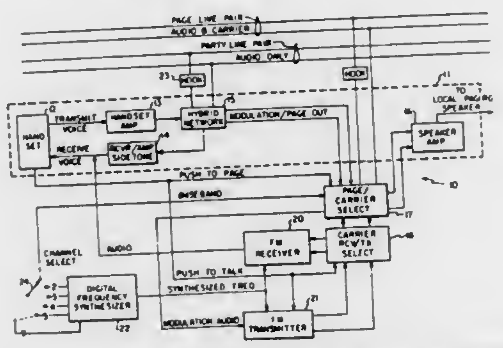
### 5,014,347
### FIELD TELEPHONE SYSTEM

**Edwin G. Cox, Jamestown, and David T. Ritter, High Point, both of N.C., assignors to Gulton Industries Inc., Femco Division, High Point, N.C.**

**Division of Ser. No. 157,051, Feb. 16, 1988, Pat. No. 4,847,888. This application Apr. 11, 1989, Ser. No. 336,247**

**Int. Cl.$^5$ H04B *1/02, 1/40***

**U.S. Cl. 455—110** **19 Claims**



1. A narrow band FM carrier system where a plurality of carrier signals are used and wherein harmonics of the lower frequency carrier signals are within the frequency range of higher frequency carrier signals so that elimination of disturbing harmonics of said carrier signals by filiering of the carrier signals is not practible and where a carrier signal of low distortion is desired, comprising the combination of
- (a) means for producing at least one of said lower-frequency carriers, comprising:
  - means for generating a first signal having a frequency which is substantially higher than said desired carrier frequency;
  - means for generating a second signal having a frequency which is substantially higher than said desired carrier frequency and is different from said first frequency;
  - means for frequency mixing said first and second signals to produce four resulting signals, namely, said first and second signals, a third signal having a frequency which is the sum of the frequencies of the first and second signals and a fourth signal which is the difference between the frequencies of said first and second signals; and
  - means for removing said first, second and third signals to derive said fourth signal as the desired FM carrier signal, and
- (b) modulating means for frequency modulating one of said first or second signals before mixing to provide a modulated carrier output.

---

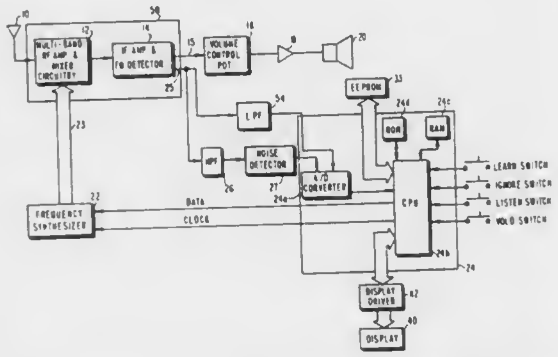
### 5,014,348
### SELF-PROGRAMMING SCANNING RADIO RECEIVER

**Joseph E. Boone, Indianapolis, and Ben F. McCormick, II, Noblesville, both of Ind., assignors to Uniden America Corporation, Ft. Worth, Tex.**

**Filed Apr. 1, 1988, Ser. No. 176,657**

**Int. Cl.$^5$ H04B *1/16***

**U.S. Cl. 455—165** **24 Claims**



1. A self-programming scanning radio receiver, comprising:
- heterodyne receiver means for frequency conversion and detection of a signal modulated on an RF carrier;
- frequency synthesizer means for supplying a local tuning oscillator signal to said heterodyne receiver, said frequency synthesizer means having a frequency code input;
- frequency code generation means for supplying frequency codes to said frequency code input, said frequency code generation means including means operative during a first mode for supplying frequency codes corresponding to a predetermined set of tunable frequencies, and means operative during a second mode for supplying frequency codes in response to indicia of valid frequencies in said predetermined set of tunable frequencies;
- frequency validation means for analyzing a detected signal on a frequency corresponding to one of said frequency codes supplied to said frequency code input, said frequency validation means including means for determining valid frequencies by automatically recognizing signals representing voice information and, in response thereto, generating indicia of the valid frequencies; and
- memory means for storing said indicia of the frequencies determined to be valid by said frequency validation means, said memory means having an input coupled to said frequency validation means and an output coupled to said frequency code generation means.

---

### 5,014,349
### TELEVISION TUNER FOR COMMON USE IN BS/UV

**Kazuhiko Kubo, Mishima; Akira Usui, Takatsuki; Seiji Sakashita, Yahata; Hiroaki Ozeki, Neyagawa, and Ippei Kanno, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

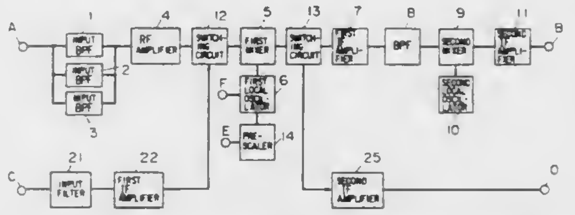
**PCT No. PCT/JP88/01313, § 371 Date Aug. 14, 1989, § 102(e) Date Aug. 14, 1989, PCT Pub. No. WO89/06072, PCT Pub. Date Jun. 29, 1989**

**PCT Filed Dec. 23, 1988, Ser. No. 397,451**

**Claims priority, application Japan, Dec. 23, 1987, 62-325863**

**Int. Cl.$^5$ H04B *17/02***

**U.S. Cl. 455—189** **5 Claims**



1. A tuner for receiving a television signal having a first input terminal to which at least one of television signals of VHF/UHF band or a CATV signal is input as a first input signal and a second input terminal to which a BSIF signal which was obtained by frequency converting a satellite television broadcasting signal is input as a second input signal, said tuner comprising:
- a first local oscillator for generating a first local oscillation signal for converting said first input signal into a first intermediate frequency signal of 900 to 1000 MHz, said first intermediate frequency signal having a frequency higher than a frequency of the first input signal, and for converting said second input signal into a second intermediate frequency signal having a frequency lower than a frequency of the second input signal;
- a first mixer which, responsive to receipt of the first input signal, mixes and converts said first input signal and said first local oscillation signal into said first intermediate frequency signal and, responsive to receipt of said second input signal, mixes and converts said second input signal and the first local oscillation signal into the second intermediate frequency signal;
- a first switching circuit for selectively supplying said first and second input signals to said first mixer;
- a second local oscillator and a second mixer for converting the first intermediate frequency signal of an output of a frequency lower than the frequency of the first intermediate frequency signal when the first input signal is received;
- a first output terminal for outputting said third intermediate frequency signal;
- a second output terminal for outputting the second intermediate frequency signal which was output from the first mixer when the second input signal is received; and
- a second switching circuit for switching between the first intermediate frequency signal which is output to the second mixer and said second intermediate frequency signal which is output to the second output terminal.

---

### 5,014,350
### APPARATUS FOR AND METHOD OF IMPROVING THE AFC OF A TELEVISION BROADCAST SATELLITE RECEIVER

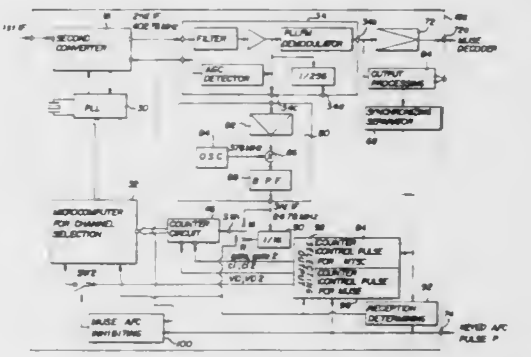
**Yasuhiko Nezu, Takarazuka, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Apr. 25, 1989, Ser. No. 343,458**

**Claims priority, application Japan, Apr. 28, 1988, 63-106833; Aug. 9, 1988, 63-198421**

**Int. Cl.$^5$ H04N *7/20***

**U.S. Cl. 455—258** **22 Claims**



1. A broadcasting receiving apparatus for demodulating an FM signal converted into a first intermediate frequency, comprising:
- first oscillating means for generating a first oscillation signal of a first frequency;
- first converting means for converting said FM signal of said first intermediate frequency into an FM signal of a second intermediate frequency by mixing said FM signal of said first intermediate frequency with said first oscillation signal of said first frequency;
- FM demodulating means for demodulating said FM signal of said second intermediate frequency;
- second converting means for converting said demodulated FM signal of said second intermediate frequency into an output signal having a third intermediate frequency which is lower than said second intermediate frequency by a frequency mixing system;
- counting means for counting the output signal, having said third intermediate frequency, directly or after frequency division; and
- adjusting means for adjusting the frequency of said first oscillation signal to be generated from said first oscillating means based on an output of said counting means.

---

### 5,014,351
### METHOD AND APPARATUS FOR REDUCING ALTERNATOR NOISE

**Hugene McMurtre, Fort Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 361,153, Jun. 5, 1989, abandoned. This application Nov. 9, 1990, Ser. No. 610,738**

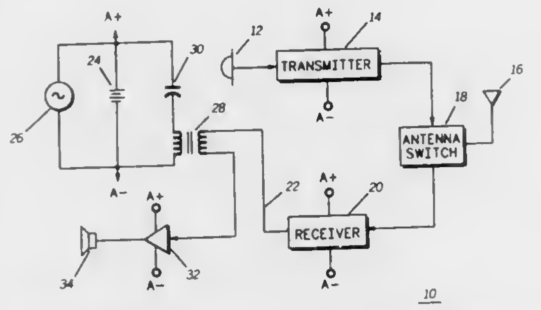
**Int. Cl.$^5$ H04B *1/10***

**U.S. Cl. 455—297** **7 Claims**

1. A method for reducing alternator noise in a received signal, comprising the steps of:
- (a) receiving a signal to provide a received signal;
- (b) processing the received signal to provide a recovered audio signal, the recovered audio signal being at least

VOL
126
ISS
1
MY
7
1991
UMI

partially corrupted by a low frequency alternator noise signal;



(c) injecting a phase shifted version of the low frequency alternator noise signal by a transformer into the recovered audio signal.

---

### 5,014,352
### FREQUENCY DIFFERENCE DETECTOR (FDD) AND A CARRIER MODULATED RECEIVER INCLUDING SUCH A FDD

**Kah-Seng Chung, Bull Creek, Australia, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 23, 1988, Ser. No. 249,630**

**Claims priority, application United Kingdom, Oct. 5, 1987, 8723312**

**Int. Cl.$^5$ H04B** ***1/16***

**U.S. Cl. 455—314** **17 Claims**

1. A frequency difference detector comprising:

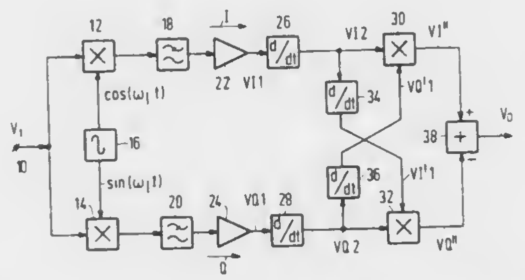
a first signal input terminal, a local oscillator, and first and second mixers,

means coupling the first signal input terminal to first inputs of the first and second mixers and the local oscillator to second inputs of the first and second mixers,

a 90° phase shifter provided in the signal path to one of the inputs of the first and second mixers whereby the first and second mixers produce first and second orthogonally related outputs, respectively,

first and second frequency selecting means provided in the output circuits of the first and second mixers, respectively, for passing respective in-band signal components in a selected frequency band,

a first electrical path connecting the first frequency selecting means to a first input of a third mixer, a second electrical path connecting the first frequency selecting means to a second input of a fourth mixer, a third electrical path connecting the second frequency selecting means to a first input of the fourth mixer, and a fourth electrical path connecting the second frequency selecting means to a second input of the third mixer, and



signal subtracting means connected to outputs of the third and fourth mixers,

wherein the first to fourth electrical paths include differential means, the differential means in two of said paths being of a lower order than the differential means in the other two paths, the differential means in the first and third electrical paths being a same order, said differential means of lower order in one of said paths including a differentiator arranged such that, at frequencies within said selected frequency band, said differentiator provides an output signal $-\frac{1}{2}E(\Delta\omega)\sin(\Delta\omega)t$ in response to a signal $\frac{1}{2}E\cos(\Delta\omega)t$.

---

# DESIGNS

MAY 7, 1991

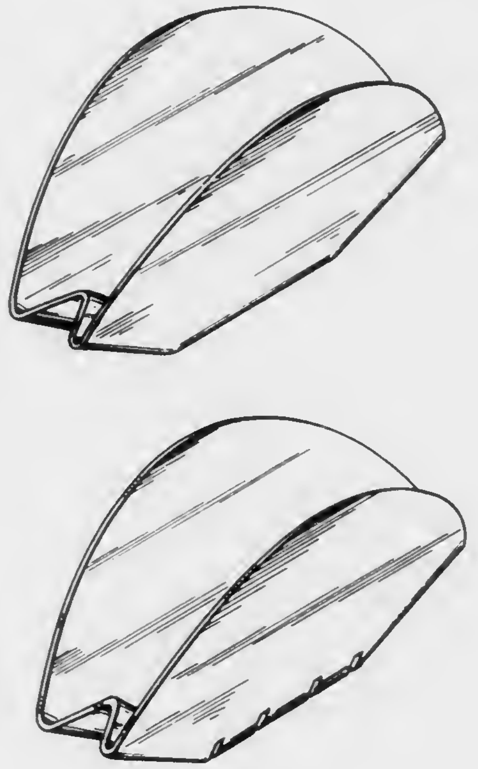
### 316,622
### EDIBLE PASTRY SHELL

**Jerry L. Popiel, 11932 W. 74th Dr., Arvada, Colo. 80005**

**Filed Jun. 13, 1988, Ser. No. 205,906**

**Term of patent 14 years**

U.S. Cl. D1—122



---

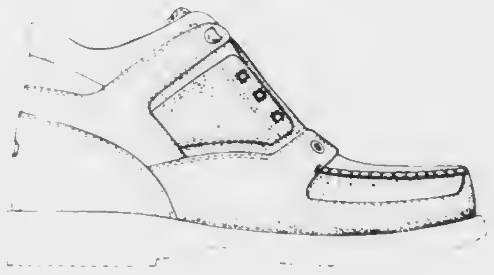
### 316,623
### SHOE UPPER

**William Bianchini, Elwood, Mass., assignor to The Rockport Company, Inc., Marlboro, Mass.**

**Filed Apr. 5, 1990, Ser. No. 504,899**

**Term of patent 14 years**

U.S. Cl. D2—314



---

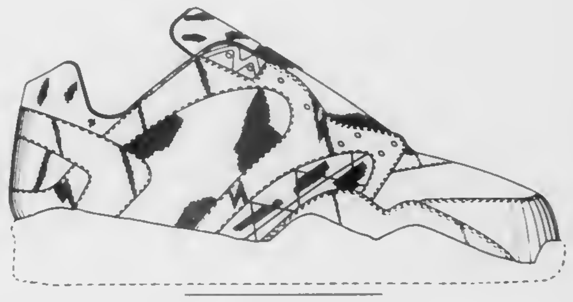
### 316,624
### SHOE UPPER

**Tinker L. Hatfied, and Wilson W. Smith III, both of Portland, Oreg., assignors to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.**

**Filed Jun. 15, 1990, Ser. No. 538,504**

**Term of patent 14 years**

U.S. Cl. D2—314



---

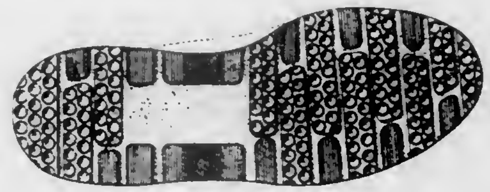
### 316,625
### SHOE OUTSOLE

**William Bianchini, Elmwood; Robert Infantino, Newton, and Anthony Post, Attleboro, all of Mass., assignors to The Rockport Company, Marlboro, Mass.**

**Filed Apr. 5, 1990, Ser. No. 504,898**

**Term of patent 14 years**

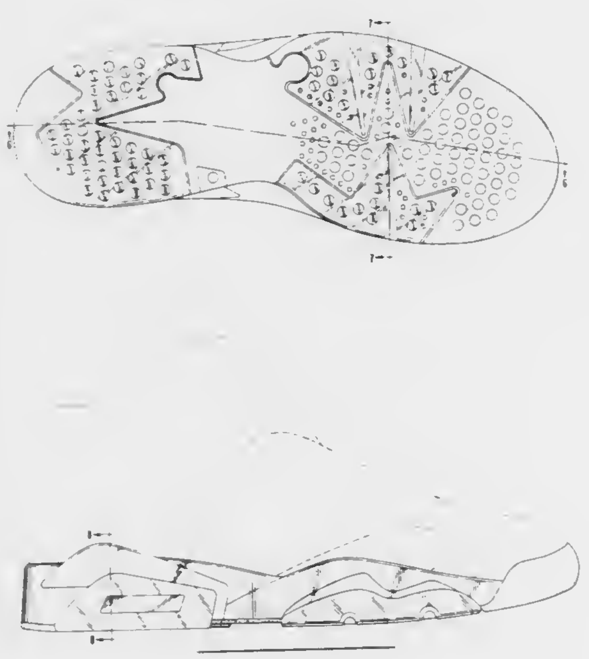
U.S. Cl. D2—320



### 316,626
### CUPSOLE OF A SHOE

Tinker L. Hatfield, Portland, Oreg., assignor to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.
Filed Jun. 15, 1990, Ser. No. 539,047
Term of patent 14 years

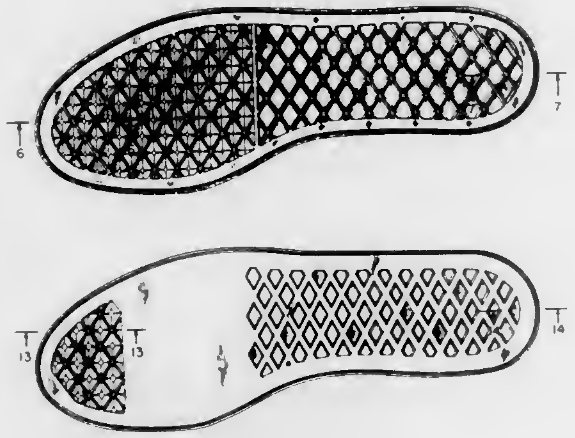
U.S. Cl. D2—320



### 316,627
### SHOE SOLE

Jules Schneider, New York, N.Y., assignor to What's What, Inc., New York, N.Y.
Continuation of Ser. No. 272,657, Nov. 17, 1988, abandoned. This application Jun. 19, 1990, Ser. No. 540,468
Term of patent 14 years

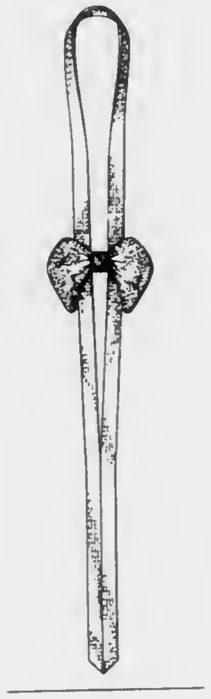
U.S. Cl. D2—320



### 316,628
### NECKTIE

Walter W. Haines, Sr., 1511 W. Oakdale St., Philadelphia, Pa. 19132
Division of Ser. No. 95,995, Sep. 14, 1987, Pat. No. D. 307,511. This application Feb. 2, 1990, Ser. No. 473,698
Term of patent 14 years

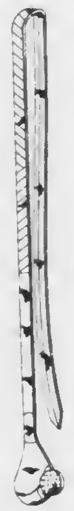
U.S. Cl. D2—606



### 316,629
### NECKTIE

Bruce Johnson, 613 Guadalajara Cir., Irving, Tex. 75062
Filed Jun. 27, 1988, Ser. No. 211,675
Term of patent 14 years

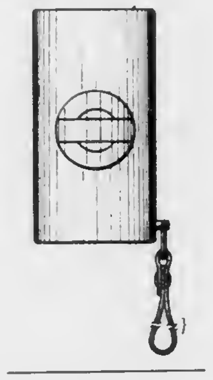
U.S. Cl. D2—608



### 316,630
### UMBRELLA HANDLE DESIGN

Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Aug. 20, 1990, Ser. No. 571,431
Term of patent 14 years

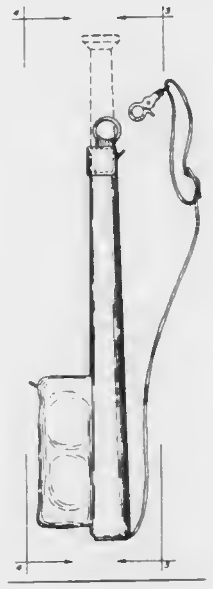
U.S. Cl. D3—12



### 316,631
### SPORTS BAG FOR BAT AND BALLS

Anna J. Hammons, 824 Pace, Mt. Vernon, Ill. 62864
Filed Aug. 8, 1988, Ser. No. 229,545
Term of patent 14 years

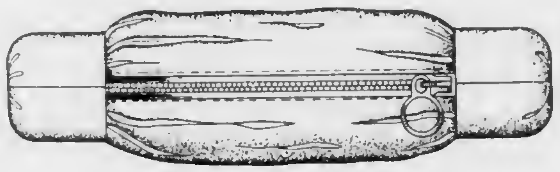
U.S. Cl. D3—36



### 316,632
### POUCH FOR A STUFFED TOY

Jerrilyn C. Kiyokane, Long Beach, Calif., assignor to Namkung Promotions, Inc., Costa Mesa, Calif.
Filed Mar. 31, 1987, Ser. No. 33,542
Term of patent 14 years

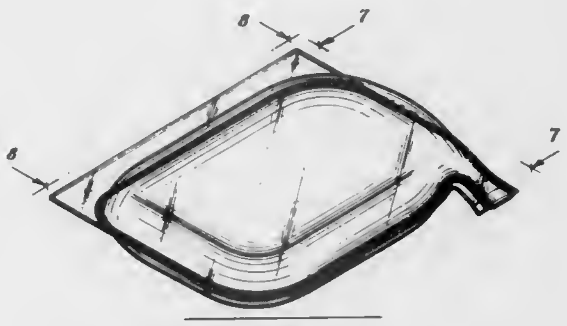
U.S. Cl. D3—53



### 316,633
### INFLATABLE INSERTS FOR HAND BAGS OR SIMILAR ARTICLES

Edward A. Markowitz, 277 Prospect Ave., Hackensack, N.J. 07602
Filed Apr. 4, 1988, Ser. No. 177,025
Term of patent 14 years

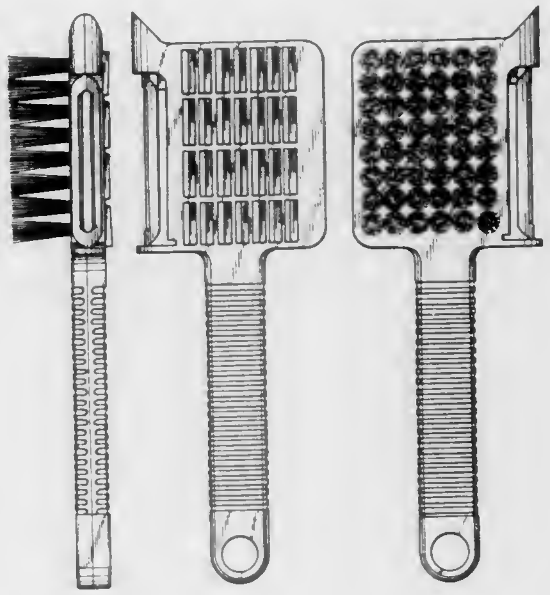
U.S. Cl. D3—54



### 316,634
### COMBINED BRUSH, PEELER AND SCRAPER FOR CLEANING VEGETABLES

Roland Vetter, Giengen-Sachsenhausen, Fed. Rep. of Germany, assignor to Schwaebische Buerstenfabrik Hans Haug KG, Koenigsbrunn, Fed. Rep. of Germany
Filed Jul. 29, 1988, Ser. No. 226,290
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 4777
Term of patent 14 years

U.S. Cl. D4—116



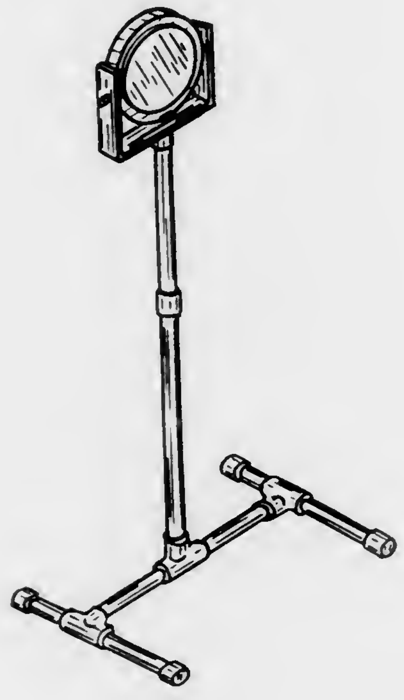
VOL 1126 ISS 1 MY 7 1991 UMI

**316,635**

### TAKE-APART STAND WITH POSITIONABLE MIRROR

Randall L. Smith, Rt. 1, Box 12, Scottville, N.C. 28672
Filed Jan. 9, 1989, Ser. No. 294,668
Term of patent 14 years

U.S. Cl. D6—309

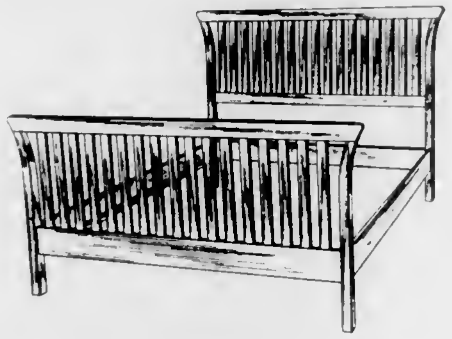


**316,636**

### BEDSTEAD

William J. Fisher, Rockland, Me., assignor to Imagineering, Inc., Rockland, Me.
Filed Mar. 11, 1987, Ser. No. 24,546
Term of patent 14 years

U.S. Cl. D6—395

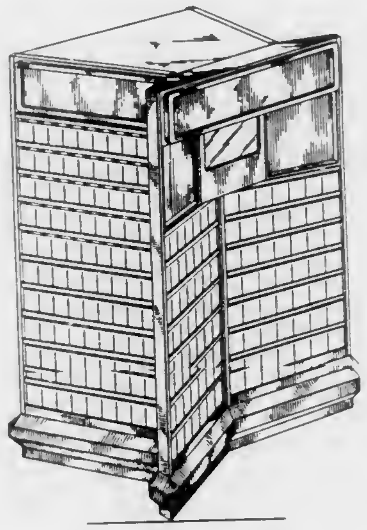


**316,637**

### MERCHANDISING DISPLAY OR SIMILAR ARTICLE

Thomas Hartwick, Palatine, Ill., assignor to Lakewood Licensing Corp., New York, N.Y.
Filed Jul. 14, 1987, Ser. No. 72,963
Term of patent 14 years

U.S. Cl. D6—397

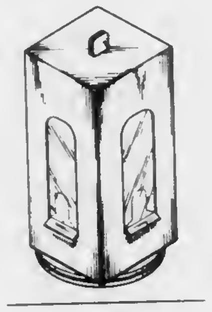


**316,638**

### PACKET DISPENSER

Dennis Oldorf, P.O. Box 1883, Cedar Rapids, Iowa 52406
Filed Feb. 21, 1989, Ser. No. 314,666
Term of patent 14 years

U.S. Cl. D6—408

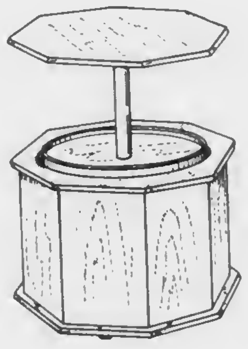


**316,639**

### ADJUSTABLE TABLE

Josef H. Adler, Martinez, Calif., assignor to Nesher Industries, Inc., Concord, Calif.
Filed Apr. 30, 1987, Ser. No. 44,551
Term of patent 14 years

U.S. Cl. D6—429

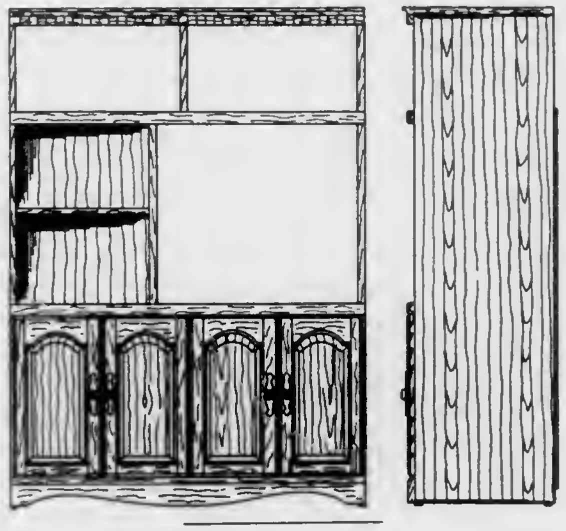


**316,640**

### ENTERTAINMENT CENTER

Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Jan. 26, 1988, Ser. No. 151,326
Term of patent 14 years

U.S. Cl. D6—436

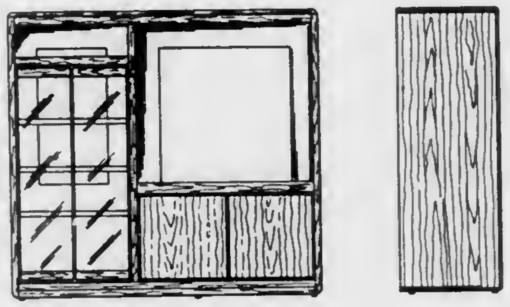


**316,641**

### ENTERTAINMENT CENTER

Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Aug. 8, 1988, Ser. No. 229,551
Term of patent 14 years

U.S. Cl. D6—436

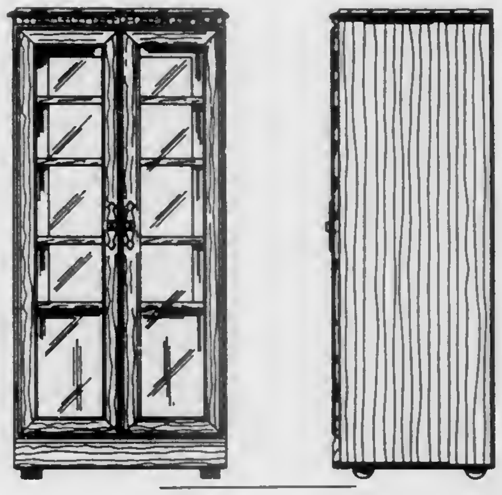


**316,642**

### ENTERTAINMENT CABINET

Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed May 2, 1988, Ser. No. 189,598
Term of patent 14 years

U.S. Cl. D6—446

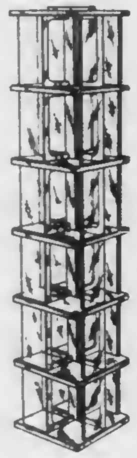


**316,643**

### DISPLAY RACK

Colin R. Cheetham, Hoddesdon, England, assignor to Gressco, Ltd., Madison, Wis.
Filed May 8, 1987, Ser. No. 48,063
Term of patent 14 years

U.S. Cl. D6—461



VOL 1126 ISS 1 MY 7 1991 UMI

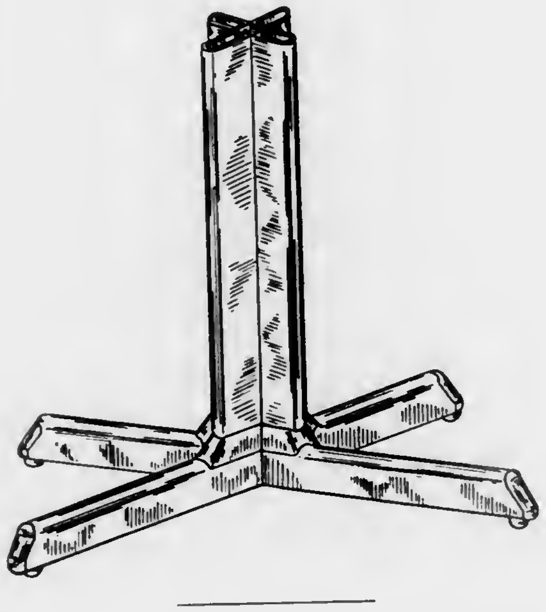
### 316,644
### TABLE LEG

Niels Diffrient, 879 N. Salem Rd., Ridgefield, Conn. 06877

Filed Jul. 6, 1988, Ser. No. 215,937

Term of patent 14 years

U.S. Cl. D6—498



### 316,645
### PAPER DISPENSER

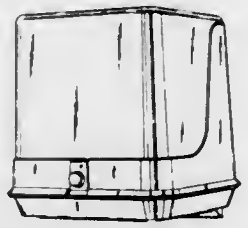
Carl-Arne Breger, Malmö, Sweden, assignor to Metsä-Serla Oy, Mänttä, Finland

Filed Sep. 21, 1988, Ser. No. 247,421

Claims priority, application Sweden, Mar. 22, 1988, 88-0735

Term of patent 14 years

U.S. Cl. D6—515



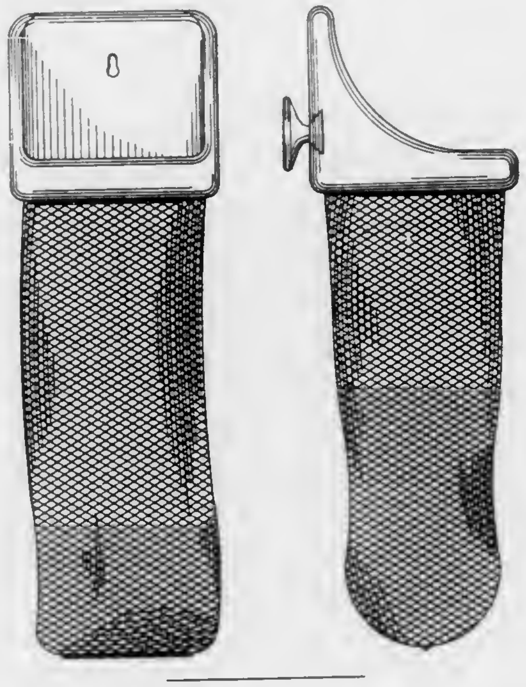
### 316,646
### BATHTUB CADDY

Lafayette P. Cunningham, 126 Ringdahl Ct. Apt. #3, Rome, N.Y. 13440

Filed Sep. 2, 1988, Ser. No. 239,839

Term of patent 14 years

U.S. Cl. D6—525



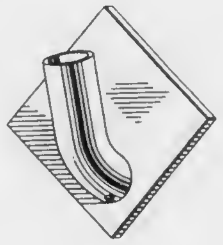
### 316,647
### TOOTHBRUSH HOLDER

Steven C. Mentzer, 218H S. Sporting Hill Rd., Mechanicsburg, Pa. 17055

Filed May 18, 1989, Ser. No. 353,511

Term of patent 14 years

U.S. Cl. D6—534



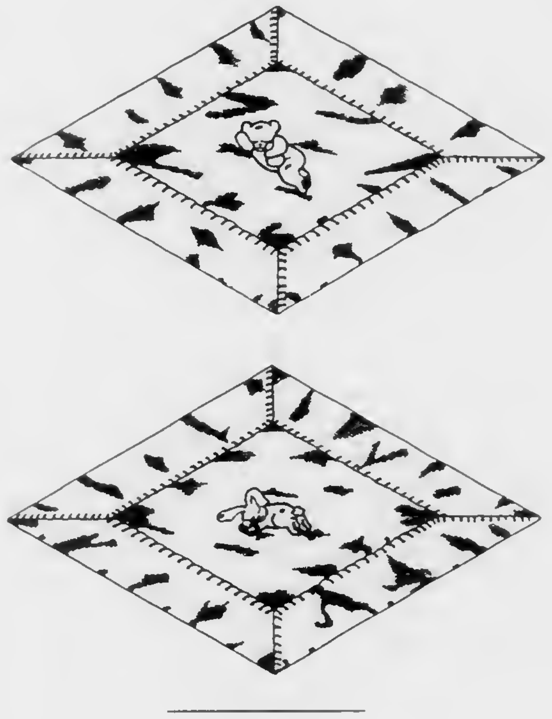
### 316,648
### CHILD'S CLOTH COMFORTER

Colleen M. McHale, 12237 Chadwick La., Eden Prairie, Minn. 55344, and Deborah K. Mack, 4656 Nine Oak Cir., Bloomington, Minn. 55437

Filed Jun. 29, 1989, Ser. No. 373,775

Term of patent 14 years

U.S. Cl. D6—603



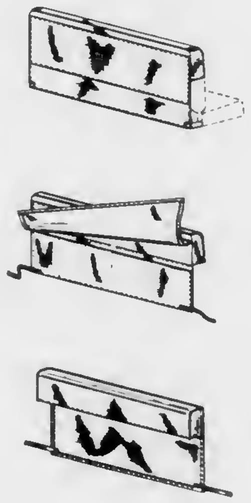
### 316,649
### AUTOMOBILE REAR SEAT ORGANIZER

James A. Swanner, 4 Sheridan, Irvine, Calif. 92720

Filed Jun. 22, 1989, Ser. No. 369,917

Term of patent 14 years

U.S. Cl. D6—611



### 316,650
### DEEP FRYER

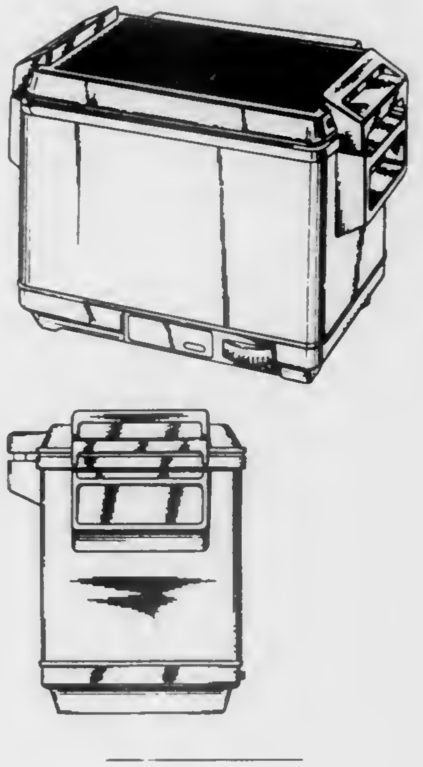
Hans E. Slany, and Reinhard Renner, both of Esslingen, Fed. Rep. of Germany, assignors to ITT Industries Belgium S.A., Brussels, Belgium

Division of Ser. No. 891,973, Jul. 29, 1986, Pat. No. D. 308,000. This application Feb. 13, 1990, Ser. No. 479,551

Claims priority, application World Int. Prop. O., Jan. 30, 1986, DM/006411

Term of patent 14 years

U.S. Cl. D7—360



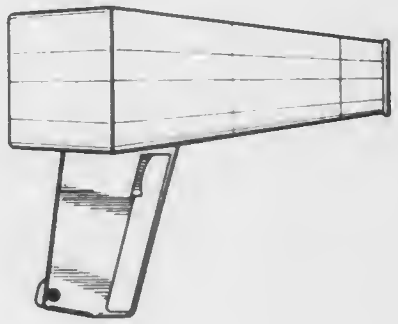
### 316,651
### AMBIENT AIR IMPELLER FOR IGNITING BRIQUETS, OR THE LIKE

Christopher D. Williams, 14019 Calmont Dr., Houston, Tex. 77070

Continuation-in-part of Ser. No. 33,255, Apr. 2, 1987. This application Jun. 6, 1988, Ser. No. 202,443

Term of patent 14 years

U.S. Cl. D7—416



VOL
1126
ISS
1
MY
7
1991
UMI

### 316,652
### INFANT'S DRINKING CUP

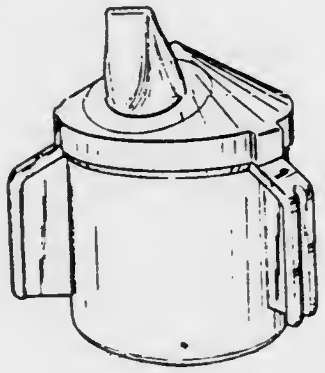
Murray Hunter, Balmain, Australia, assignor to Jackel International Pty. Ltd., Sefton, Australia

Filed Sep. 17, 1986, Ser. No. 908,524

Claims priority, application Australia, Mar. 17, 1986, 4504/86

Term of patent 14 years

U.S. Cl. D7—510



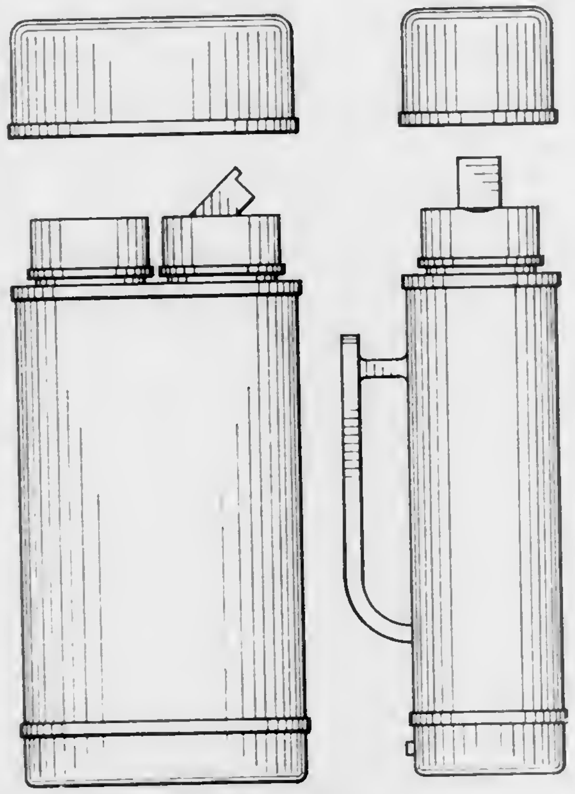
### 316,653
### DUAL INSULATED BEVERAGE CONTAINER

James W. Spencer, 703 E. Washington, Box 400, Tolono, Ill. 61880

Filed Jan. 31, 1989, Ser. No. 304,337

Term of patent 14 years

U.S. Cl. D7—605



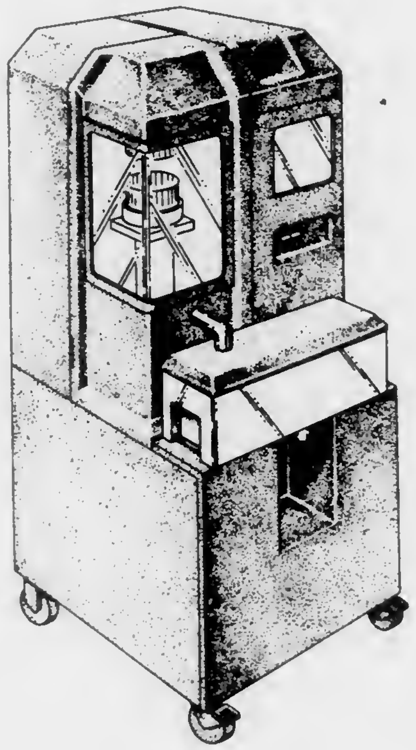
### 316,654
### STAND ALONE SINGLE HEAD JUICE EXTRACTOR

David N. Anderson, Lakeland, Fla., and Paul D. Eckstedt, San Jose, Calif., assignors to FMC Corporation, Chicago, Ill.

Filed Mar. 6, 1989, Ser. No. 319,784

Term of patent 14 years

U.S. Cl. D7—665



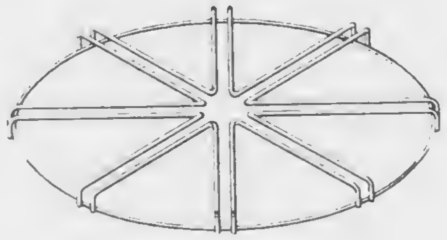
### 316,655
### PIZZA PIE CUTTING GUIDE

Gene Buday, Laguna Niguel, Calif., assignor to Pro-Process Corporation, Paramount, Calif.

Filed May 17, 1989, Ser. No. 352,910

Term of patent 14 years

U.S. Cl. D7—673



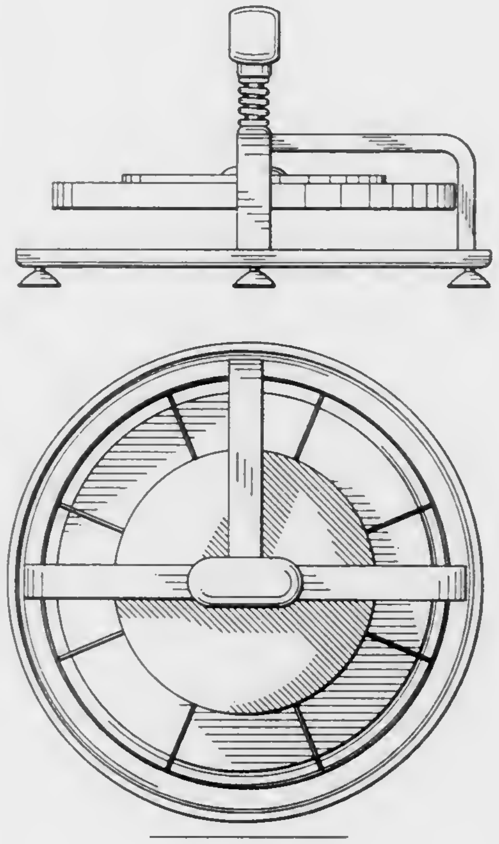
### 316,656
### MULTIPLE SLICE PIZZA CUTTER

Jonathan T. Hall, 5016 Fairwood Blvd. NE., #214, Tacoma, Wash. 98422

Filed May 23, 1989, Ser. No. 355,378

Term of patent 14 years

U.S. Cl. D7—673



### 316,657
### BAGEL SLICING GUIDE

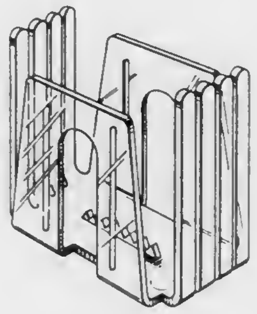
Hubert F. Mulherin, 279 Victoria Street, Edmundston, New Brunswick, Canada E3V 2J1

Filed Jun. 19, 1989, Ser. No. 369,542

Claims priority, application Canada, Apr. 3, 1989, 0304895

Term of patent 14 years

U.S. Cl. D7—673



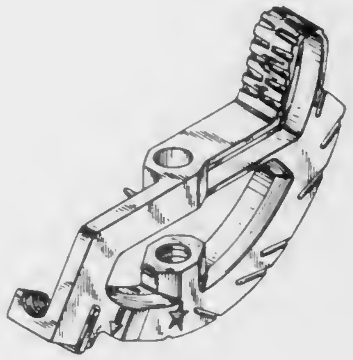
### 316,658
### TUBE BENDING TOOL

Vernon Wanner, Belvidere, Ill., and Orville W. Larsen, Lake Geneva, Wis., assignors to Greenlee Textron Inc., Rockford, Ill.

Filed Jul. 22, 1988, Ser. No. 223,212

Term of patent 14 years

U.S. Cl. D8—14



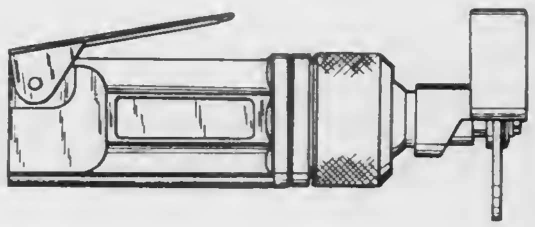
### 316,659
### PNEUMATIC CUTTER

Edward R. Neff, Hacketstown, N.J., assignor to American Pneumatic Technologies, Inc., O'Fallon, Mo.

Filed Mar. 15, 1988, Ser. No. 168,334

Term of patent 14 years

U.S. Cl. D8—61



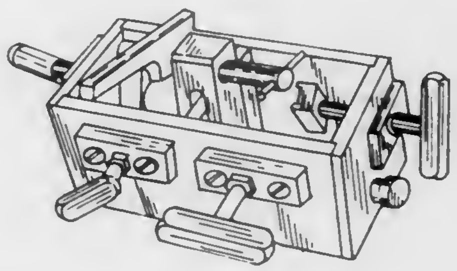
### 316,660
### GOLF CLUB GRIPPING JIG

Viktor Cukon, 1902 Golden Circle Dr., Escondido, Calif. 92026

Filed Jul. 25, 1988, Ser. No. 223,751

Term of patent 14 years

U.S. Cl. D8—71



VOL 1126 ISS 1 MY 7 1991 UMI

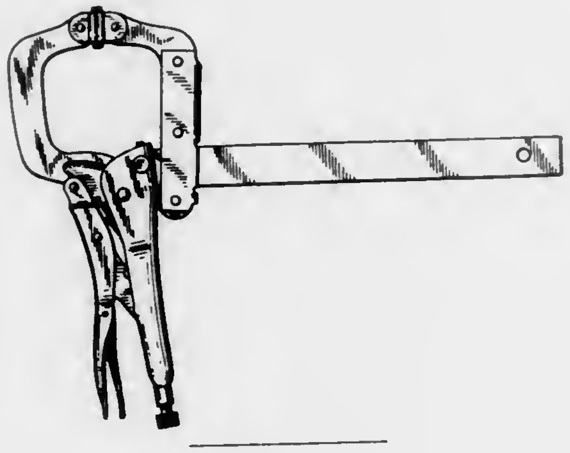
### 316,661
### ADJUSTABLE LOCKING HAND TOOL

Burrell T. Burney, DeWitt, Nebr., assignor to Petersen Manufacturing Co., Inc., Nebr.

Filed Jan. 26, 1988, Ser. No. 149,062

Term of patent 14 years

U.S. Cl. D8—72



### 316,662
### KNIFE SHARPENER

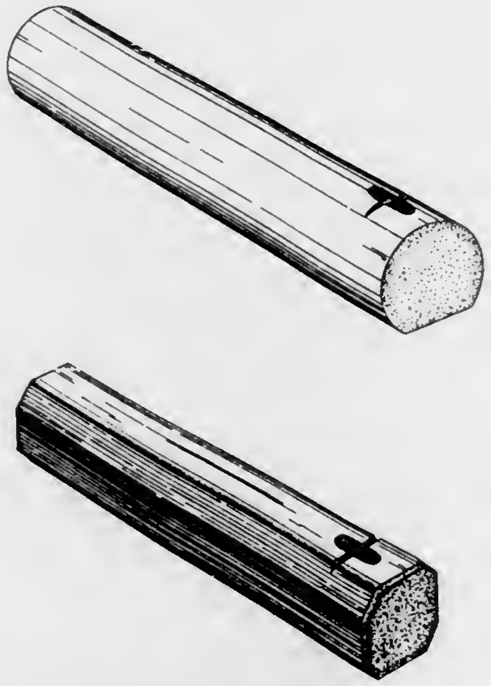
Steve Cherniak, P.O. Box 2084, Lacombe, Alberta, Canada T0C 1S0

Filed Apr. 29, 1988, Ser. No. 187,880

Claims priority, application Canada, Nov. 5, 1987, 05-11-87-13

Term of patent 14 years

U.S. Cl. D8—93



### 316,663
### TABLE ATTACHED TWO PIECE BRACKET FOR HOLDING A SWING ARM SUPPORT

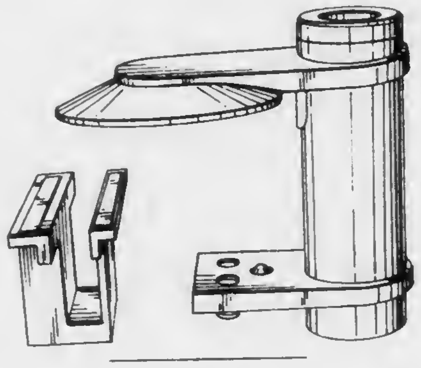
Kurt Scherrer, Münsingen, Switzerland, assignor to U. Schärer Söhne AG(USM)

Filed Apr. 7, 1987, Ser. No. 35,297

Claims priority, application Switzerland, Oct. 8, 1986, 115,459

Term of patent 14 years

U.S. Cl. D8—354



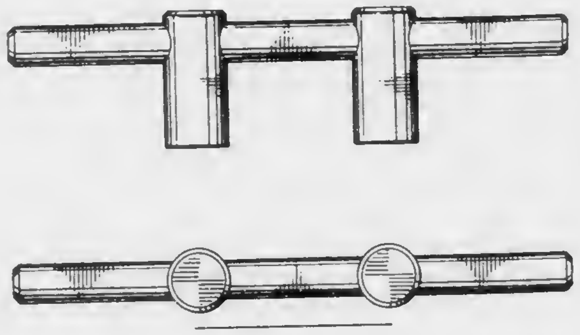
### 316,664
### ROPE CLEAT FOR POWER BOATS OR THE LIKE

Raymond S. Tuli, Freeport, N.Y., assignor to Atlantic Fabricators, Inc., Freeport, N.Y.

Filed Jul. 7, 1988, Ser. No. 216,187

Term of patent 14 years

U.S. Cl. D8—356



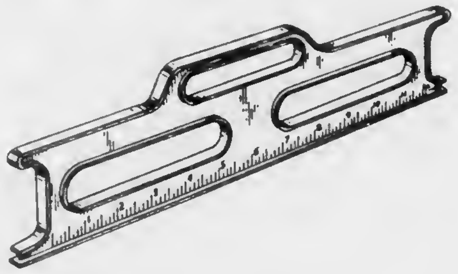
### 316,665
### COMBINED LINE WINDER AND RULER

Richard H. Lueth, 19715 Streit Rd., Harvard, Ill. 60033

Filed Apr. 28, 1988, Ser. No. 187,417

Term of patent 14 years

U.S. Cl. D8—358



### 316,666
### CORD REEL

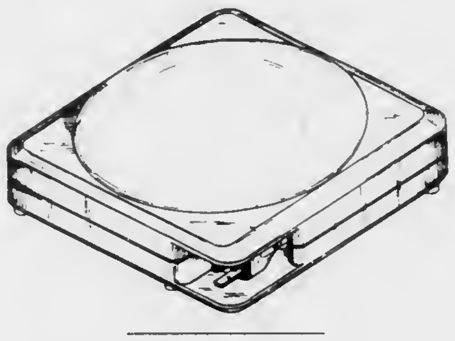
Atsushi Ishimaru, Tsubame, Japan, assignor to Twinbird Industrial Company Limited, Japan

Filed Oct. 3, 1989, Ser. No. 416,443

Claims priority, application Japan, Apr. 12, 1989, 1-13469

Term of patent 14 years

U.S. Cl. D8—358



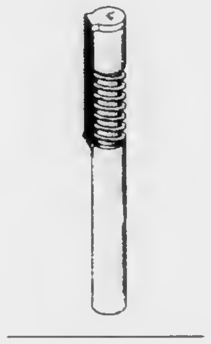
### 316,667
### SPRAY DISPENSER

Garfield G. Litton, Glen Rock, N.J., assignor to Revlon, Inc., New York, N.Y.

Filed Apr. 27, 1989, Ser. No. 354,587

Term of patent 14 years

U.S. Cl. D9—300



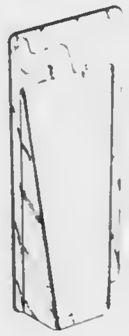
### 316,668
### LIQUID DISPENSING POUCH

Russell B. Wortley, and Fred L. Billman, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Feb. 2, 1989, Ser. No. 305,991

Term of patent 14 years

U.S. Cl. D9—306



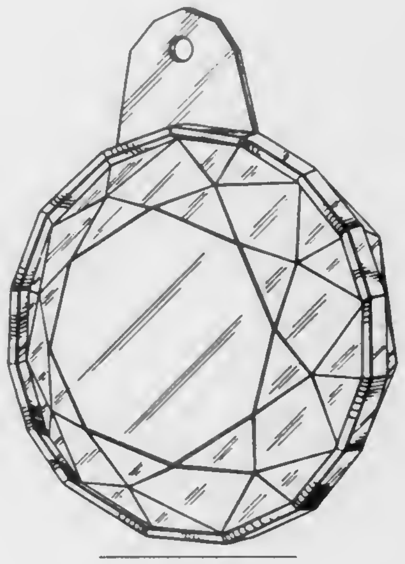
### 316,669
### DISPLAY CONTAINER

J. Winslow Young, 803 E. Center St., Centerville, Utah 84014

Filed Jan. 13, 1989, Ser. No. 297,235

Term of patent 14 years

U.S. Cl. D9—307



### 316,670
### BOTTLE

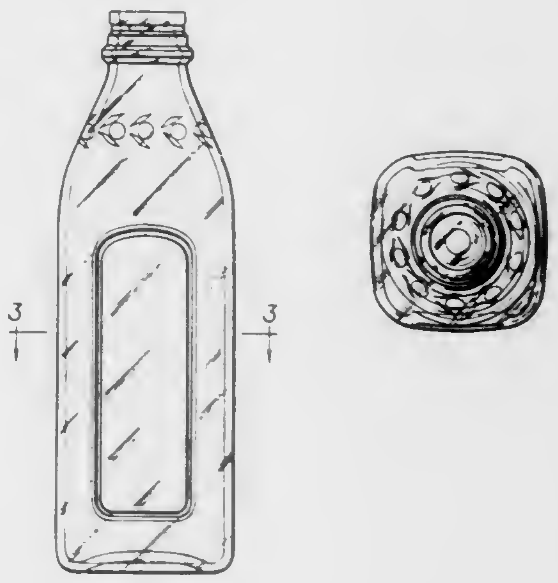
Francisco A. S. Alemany, Madrid, Spain, assignor to Salgado & Cia., S.A., Madrid, Spain

Filed Feb. 5, 1988, Ser. No. 152,918

Claims priority, application Spain, Aug. 7, 1987, 113.709

Term of patent 14 years

U.S. Cl. D9—335



VOL
126
ISS
1
MY
7
1991
UMI

### 316,671
### COMBINED JAR AND APPLICATOR

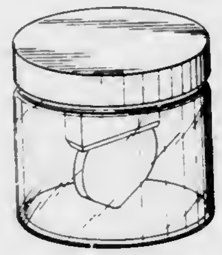
Jürgen Rohmeder, Erhartinger Strasse 9, D-8266 Töging/Inn, Fed. Rep. of Germany

Filed Mar. 29, 1989, Ser. No. 331,568

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1988, G 88 12 344.8

Term of patent 14 years

U.S. Cl. D9—338



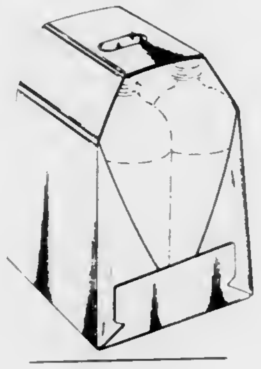
### 316,672
### BOTTLE CARTON

Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Feb. 3, 1989, Ser. No. 305,997

Term of patent 14 years

U.S. Cl. D9—346



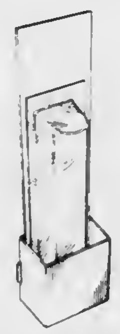
### 316,673
### DISPLAY PACKAGE

Sheldon Rysner, Evanston, Ill.; Thomas Ramey, Appleton, and Thomas Foster, Manitenol, both of Wis., assignors to Kaytee Products, Incorporated, Chilton, Wis.

Filed Jul. 27, 1989, Ser. No. 386,853

Term of patent 14 years

U.S. Cl. D9—415



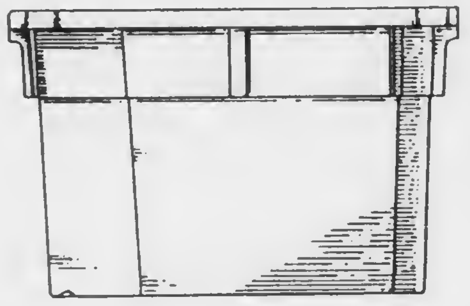
### 316,674
### CONTAINER

Charles Poirier, Cte Bellechasse, Canada, assignor to IPL Inc., St.Damien, Canada

Filed May 1, 1989, Ser. No. 345,729

Term of patent 14 years

U.S. Cl. D9—424



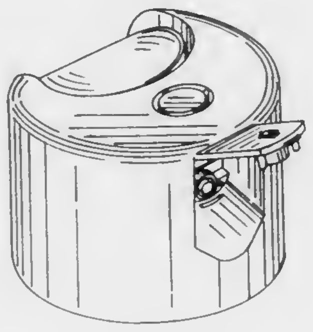
### 316,675
### AEROSOL ACTUATOR

Ronald G. Cramer, Mt. Pleasant, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Dec. 19, 1989, Ser. No. 452,895

Term of patent 14 years

U.S. Cl. D9—448



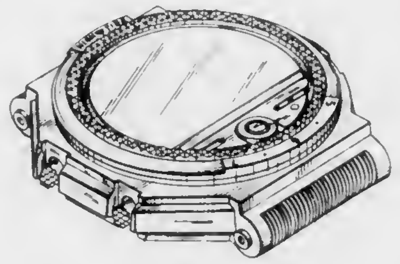
### 316,676
### WRIST WATCH

John T. Houlihan, Watertown, and Judith Reichel, Southbury, both of Conn., assignors to Timex Corporation, Middlebury, Conn.

Filed Aug. 26, 1988, Ser. No. 236,976

Term of patent 14 years

U.S. Cl. D10—32



---

### 316,677
### WRISTWATCH

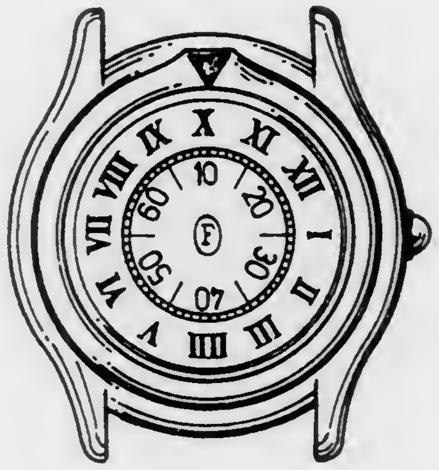
Florian Favre, 74, route de Valavran, 1293 - Bellevue, Switzerland

Filed Sep. 9, 1987, Ser. No. 94,533

Claims priority, application Int'l Pat. Institute, Mar. 9, 1987, DM/008295

Term of patent 14 years

U.S. Cl. D10—39



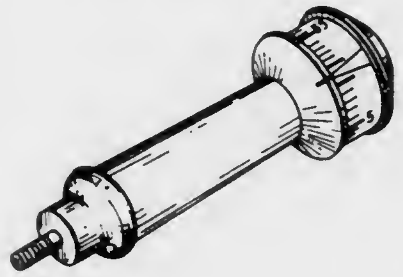
### 316,678
### HANDLE WITH TIMER

Walter Koziol, Antioch, Ill., assignor to Modern Home Products Corp., Antioch, Ill.

Filed Nov. 16, 1987, Ser. No. 121,571

Term of patent 14 years

U.S. Cl. D10—40



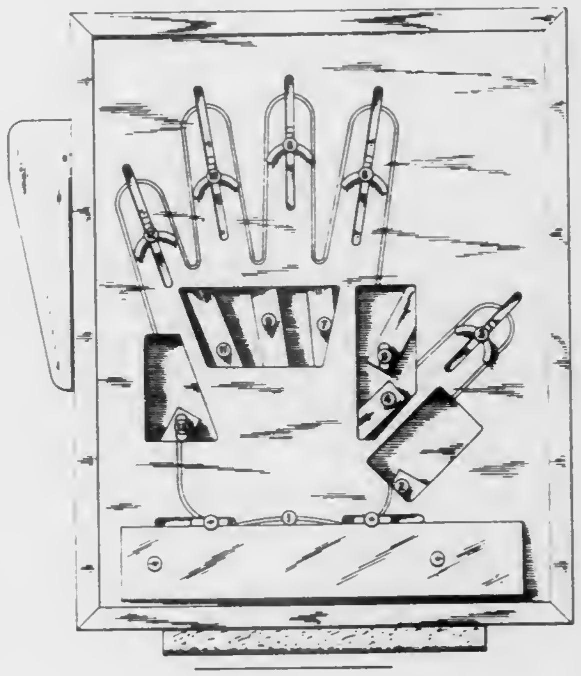
### 316,679
### HAND MEASUREMENT INSTRUMENT

George T. Tepley, Chattanooga, Tenn., assignor to TGC Corporation, Chattanooga, Tenn.

Filed Jun. 9, 1989, Ser. No. 363,950

Term of patent 14 years

U.S. Cl. D10—46



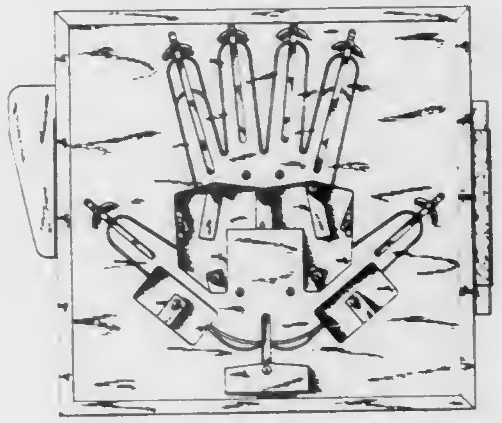
### 316,680
### DOUBLE HAND MEASUREMENT INSTRUMENT

George T. Tepley, Chattanooga, Tenn., assignor to TGC Corporation, Chattanooga, Tenn.

Filed Nov. 21, 1989, Ser. No. 439,577

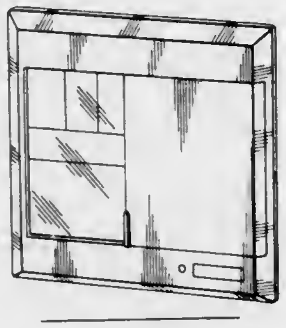
Term of patent 14 years

U.S. Cl. D10—46

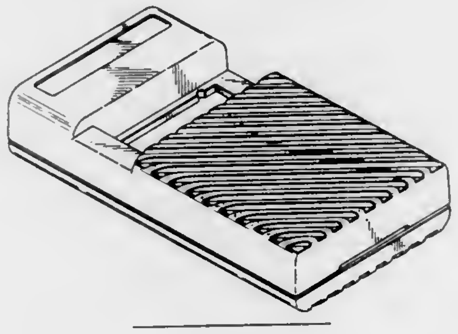


VOL
1126
ISS
1
MY
7
1991
UMI

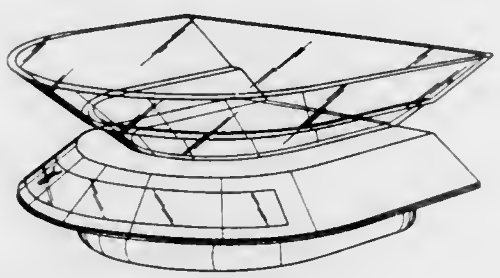
**316,681**
**REMOTE CONTROL UNIT FOR AN AIR CONDITIONER**
**Masahito Takasuna, Tokyo, and Takuma Watanabe, Kanagawa, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Jan. 28, 1988, Ser. No. 149,620**
**Claims priority, application Japan, Aug. 20, 1987, 62-33549**
**Term of patent 14 years**
U.S. Cl. D10—49



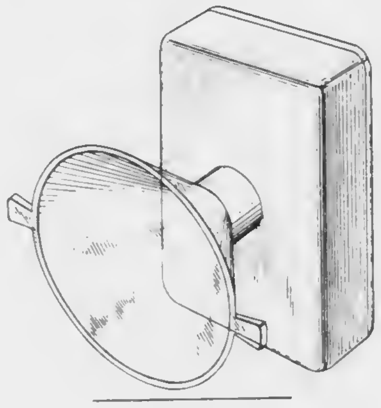
**316,682**
**INSTRUMENT CASE FOR ELECTRONIC TEST AND TROUBLESHOOTING EQUIPMENT**
**Edmond C. Eng, Lynnwood, and Joseph V. Ferrante, Redmond, both of Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.**
**Filed Oct. 7, 1988, Ser. No. 255,147**
**Term of patent 14 years**
U.S. Cl. D10—75



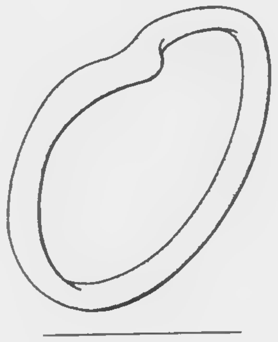
**316,683**
**HOUSEHOLD SCALE**
**Furio Minuti, Macerata, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy**
**Filed Jan. 17, 1989, Ser. No. 297,748**
**Claims priority, application Italy, Aug. 18, 1988, 21751B/88**
**Term of patent 14 years**
U.S. Cl. D10—91



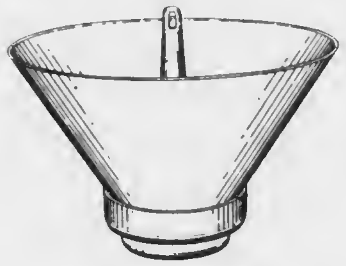
**316,684**
**EMERGENCY LIGHT WITH INTEGRAL SUCTION CUP FOR ATTACHMENT TO VEHICLE WINDOW**
Peter Bonadonna, Rockville Centre, N.Y., assignor to Stick On Safety Light, Inc., Commack, N.Y.
Filed Apr. 25, 1988, Ser. No. 185,807
Term of patent 14 years
U.S. Cl. D10—114



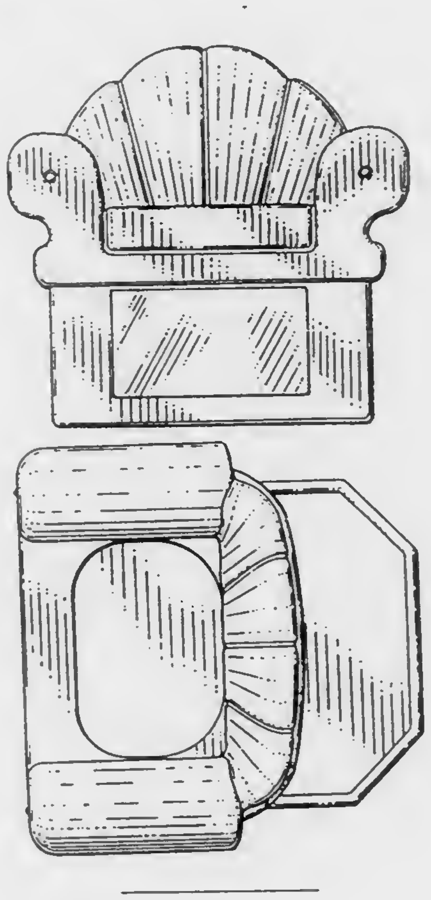
**316,685**
**BRACELET**
Christine Royer, New York, N.Y., assignor to Revlon, Inc., New York, N.Y.
Filed Jun. 1, 1989, Ser. No. 360,165
Term of patent 14 years
U.S. Cl. D11—4



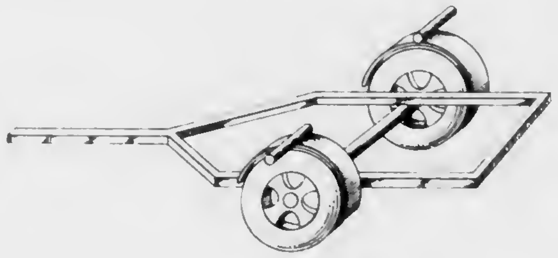
**316,686**
**COMBINED FLOWER POT AND HANGING SUPPORT**
**Pierre Tardif, Longueuil, Canada, assignor to Plastique DCN Inc., Warwick, Canada**
Filed Oct. 24, 1988, Ser. No. 261,190
Term of patent 14 years
U.S. Cl. D11—148



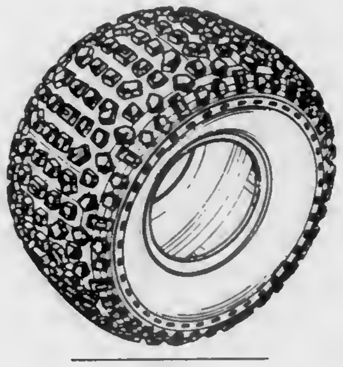
**316,687**
**PLANTER**
Alan T. Wilby, c/o Barrigar & Oyen, 480 - 601 W. Cordova St., Vancouver, British Columbia, Canada V6B 1G1
**Filed Mar. 13, 1989, Ser. No. 322,245**
**Term of patent 14 years**
U.S. Cl. D11—149



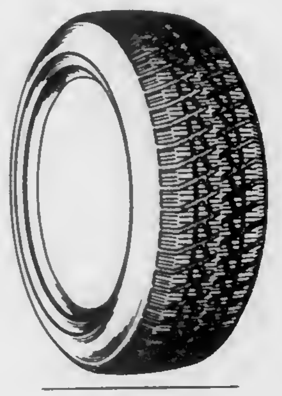
**316,688**
**TRAILER WITH VISUAL GUIDE RODS**
Larry Barginear, 2111 Dolores St., Space 28, Carson, Calif. 90745
**Filed Feb. 29, 1988, Ser. No. 161,653**
**Term of patent 14 years**
U.S. Cl. D12—101



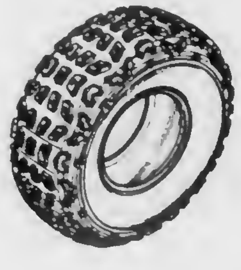
**316,689**
**AUTOMOBILE TIRE**
**Tetsushi Fujiki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**
**Filed Mar. 24, 1989, Ser. No. 328,554**
**Claims priority, application Japan, Oct. 20, 1988, 63-41175**
**Term of patent 14 years**
U.S. Cl. D12—140



**316,690**
**AUTOMOBILE TIRE**
**Kenji Tagashira, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**
**Filed Mar. 27, 1989, Ser. No. 329,076**
**Claims priority, application Japan, Sep. 28, 1988, 63-37937**
**Term of patent 14 years**
U.S. Cl. D12—146

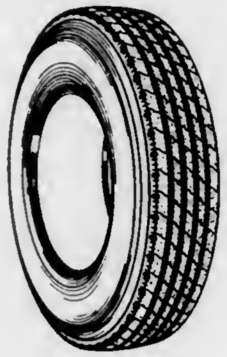


**316,691**
**AUTOMOBILE TIRE**
**Tetsushi Fujiki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**
**Filed Apr. 17, 1989, Ser. No. 338,651**
**Claims priority, application Japan, Oct. 20, 1988, 63-41174**
**Term of patent 14 years**
U.S. Cl. D12—146

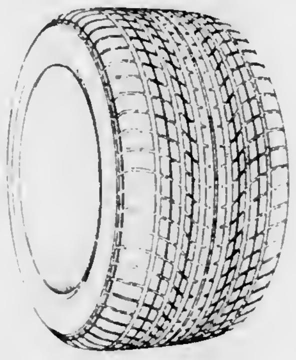


VOL
1126
ISS
1
MY
7
1991
UMI

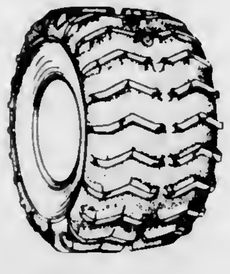
316,692
AUTOMOBILE TIRE
Tetsuhiro Fukumoto, Hyogo. Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Jul. 19, 1989, Ser. No. 381,934
Claims priority, application Japan, Jan. 24, 1989, 1-2250
Term of patent 14 years
U.S. Cl. D12—146



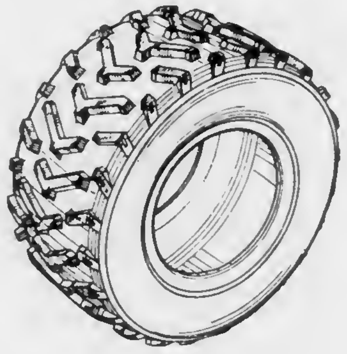
316,693
AUTOMOBILE TIRE
Misao Kawabata, Saitama; Hisao Ushikubo, Tokyo; Kazunori Shinohara, Tokyo, and Katsuhiko Kinoshita, Tokyo, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Oct. 25, 1988, Ser. No. 262,361
Claims priority, application Japan, May 27, 1988, 63-20686
Term of patent 14 years
U.S. Cl. D12—147



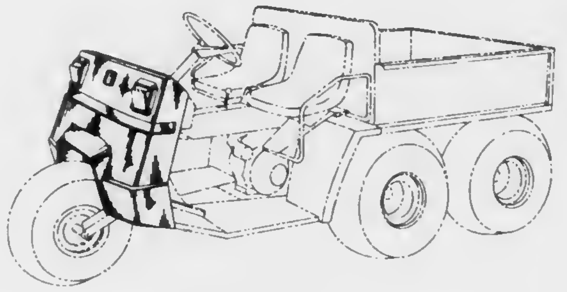
316,694
AUTOMOBILE TIRE
Eiji Nakasaki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Jan. 18, 1989, Ser. No. 298,007
Claims priority, application Japan, Jul. 21, 1988, 63-29163
Term of patent 14 years
U.S. Cl. D12—147



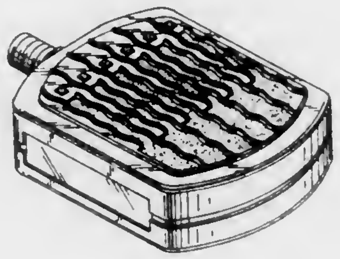
316,695
AUTOMOBILE TIRE
Tetsushi Fujiki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Apr. 18, 1989, Ser. No. 340,159
Claims priority, application Japan, Oct. 20, 1988, 63-41173
Term of patent 14 years
U.S. Cl. D12—149



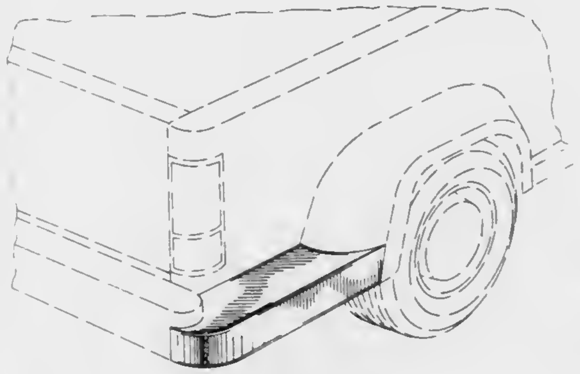
316,696
VEHICLE COWLING
Peter C. Haag, Fonthill; Donald G. Jones, Wainfleet, both of Canada; William E. Crookes, Waldwick, N.J., and Cristian J. Felix, Flushing, N.Y., assignors to Deere & Company, Moline, Ill.
Filed Sep. 16, 1988, Ser. No. 244,427
Term of patent 14 years
U.S. Cl. D12—196



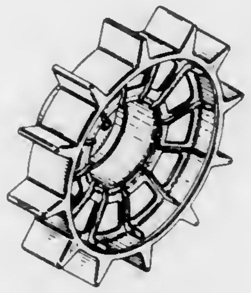
316,697
BICYCLE PEDAL
Wayne Beiser, Fairfield, Ohio, assignor to Huffy Corporation, Dayton, Ohio
Filed Apr. 28, 1989, Ser. No. 345,504
Term of patent 14 years
U.S. Cl. D12—125



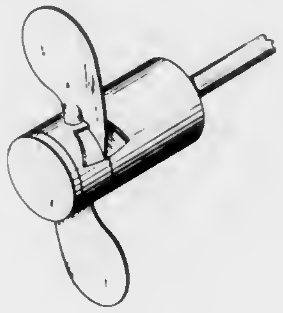
316,698
VEHICLE REAR BUMPER EXTENSION
Steven D. Hensley, and Barney D. Hensley, both of P.O. Box 486, Aztec, N. Mex. 87410
Filed Feb. 12, 1988, Ser. No. 155,643
Term of patent 14 years
U.S. Cl. D12—172



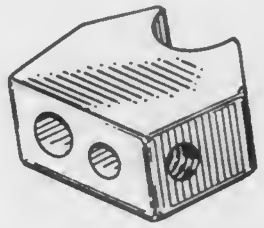
316,699
TRACTION ATTACHMENT FOR A VEHICLE WHEEL
Gust F. Johnson, 280 Monte-Aberdeen Rd., Montesano, Wash. 98563
Filed Sep. 15, 1988, Ser. No. 244,357
Term of patent 14 years
U.S. Cl. D12—213



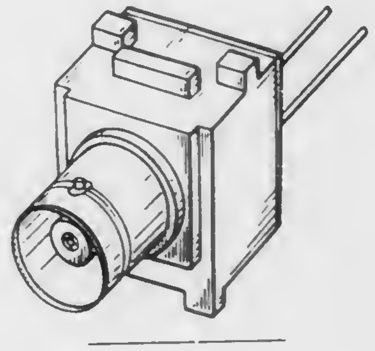
316,700
PROPELLER BLADES AND HUB
Douglas M. Morrison, Box 733A, Hwy. 304, Thibodaux, La. 70301
Filed May 19, 1989, Ser. No. 354,078
Term of patent 14 years
U.S. Cl. D12—214



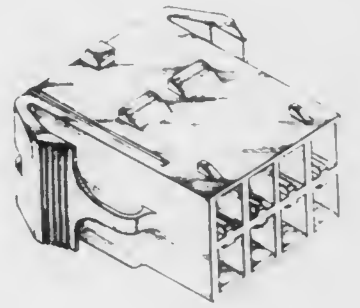
316,701
PLUG FOR A BATTERY TERMINAL CONNECTOR
Jeremy C. Hill, 603½ Orchid Ave., Corona del Mar, Calif. 92628, assignor to Ronald G. Slagle, Laguna Beach and Jeremy C. Hill, Corona del Mar, both of, Calif.
Filed Sep. 19, 1988, Ser. No. 246,377
Term of patent 14 years
U.S. Cl. D13—120



316,702
TELECOMMUNICATIONS CONNECTOR
Jay Gartwhaite, Coupeville, Wash., assignor to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Dec. 7, 1988, Ser. No. 281,314
Term of patent 14 years
U.S. Cl. D13—133



316,703
HOUSING FOR AN ELECTRICAL CONNECTOR
Hidenori Eto; Toshihiro Maki; Yukio Ohta, and Toru Matsunaga, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan
Filed Jan. 11, 1988, Ser. No. 142,901
Claims priority, application Japan, Jul. 10, 1987, 62-27947; Jul. 10, 1987, 62-27948; Jul. 10, 1987, 62-27949; Jul. 10, 1987, 62-27950
Term of patent 14 years
U.S. Cl. D13—147



VOL
1126
ISS
1
MY
7
1991
UMI

316,704

### HOUSING FOR AN ELECTRICAL CONNECTOR

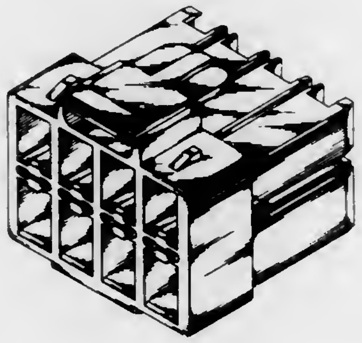
Hidenori Eto; Toshihiro Maki; Yukio Ohta, and Toru Matsunaga, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan

Filed Jan. 11, 1988, Ser. No. 142,407

Claims priority, application Japan, Jul. 10, 1987, 62-27943; Jul. 10, 1987, 62-27944; Jul. 10, 1987, 62-27945; Jul. 10, 1987, 62-27946

Term of patent 14 years

U.S. Cl. D13—147



316,705

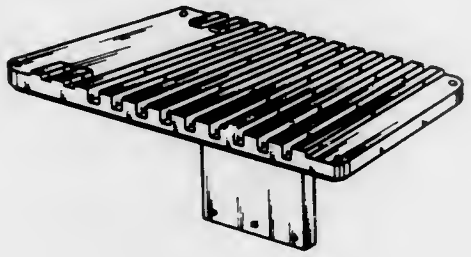
### COMBINED HEAT SINK AND RADIATOR FOR ELECTRONIC EQUIPMENT

David V. Dickey, San Luis Obispo, Calif., assignor to Product R&D Corporation, San Luis Obispo, Calif.

Filed Jan. 13, 1989, Ser. No. 297,535

Term of patent 14 years

U.S. Cl. D13—179



316,706

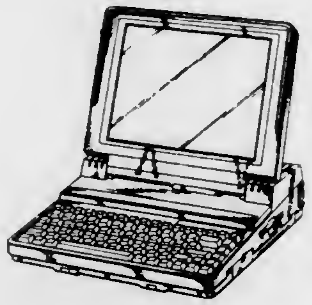
### PORTABLE LAPTOP COMPUTER

Tetsuya Imamura, Osaka; Yoshihiko Sugiyama, Nara, and Benito Mishiro, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 18, 1989, Ser. No. 353,735

Term of patent 14 years

U.S. Cl. D14—106



316,707

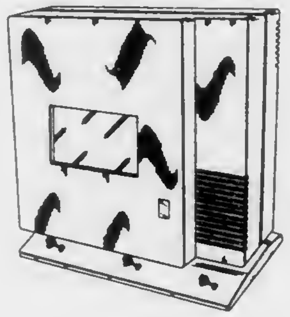
### BAR CODE SCANNER OR SIMILAR ARTICLE

David M. J. Allgeier, Cumberland, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed May 19, 1989, Ser. No. 354,335

Term of patent 14 years

U.S. Cl. D14—107



316,708

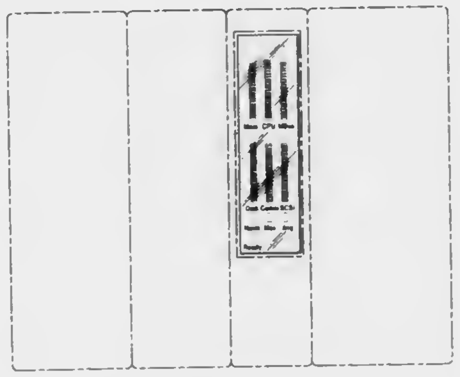
### ACTIVITY DISPLAY PANEL FOR A DATA PROCESSOR OR THE LIKE

Jack M. King, Towanda, and Robert T. Harvey, Wichita, both of Kans., assignors to NCR Corporation, Dayton, Ohio

Filed Mar. 10, 1989, Ser. No. 322,819

Term of patent 14 years

U.S. Cl. D14—113



316,709

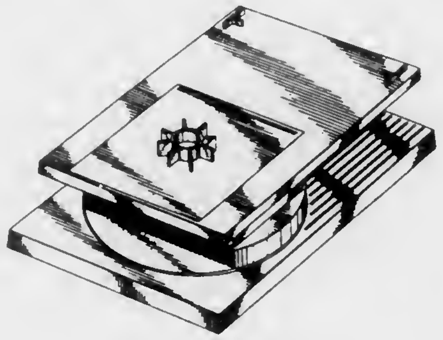
### MONITOR STAND

Robert A. Howard, Palo Alto, and Sigmar Willnauer, San Francisco, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Filed Jun. 17, 1988, Ser. No. 209,048

Term of patent 14 years

U.S. Cl. D14—114



316,710

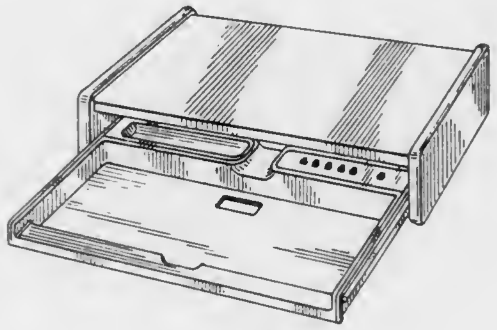
### COMPUTER SUPPORT SHELF WITH POWER CONTROLS

Craig D. Drake, Muscatine, Iowa, and Phillip Ting, Chicago, Ill., assignors to Ring King Visibles, Muscatine, Iowa

Filed Oct. 21, 1988, Ser. No. 260,668

Term of patent 14 years

U.S. Cl. D14—114



316,711

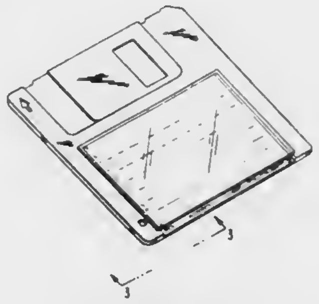
### COMPUTER DISC WITH TRANSPARENT WINDOW FOR SLIP-IN LABEL

Lawrence L. Kantrowitz, 1480 Pleasant Valley Way, West Orange, N.J. 07052

Filed Jan. 18, 1989, Ser. No. 298,502

Term of patent 14 years

U.S. Cl. D14—114



316,712

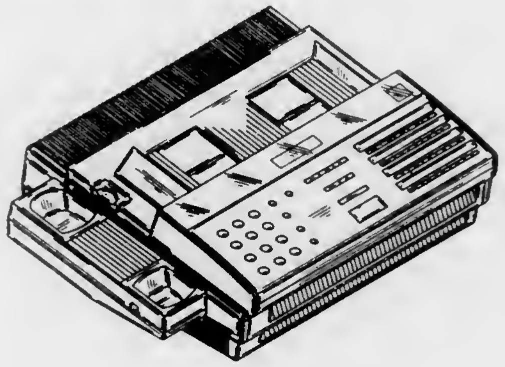
### FACSIMILE MACHINE

Akira Tsukada, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Jan. 13, 1989, Ser. No. 297,065

Term of patent 14 years

U.S. Cl. D14—118



316,713

### REEL HUB FOR MAGNETIC TAPE

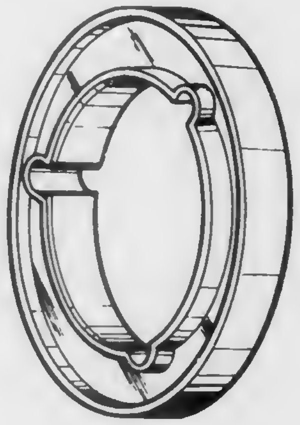
Hong Sun Kag, Chungcheongnam, Rep. of Korea, assignor to SKC Limited, Kongki, Rep. of Korea

Filed Feb. 4, 1988, Ser. No. 152,065

Claims priority, application Rep. of Korea, Sep. 28, 1987, 87-14774

Term of patent 14 years

U.S. Cl. D14—122



316,714

### TELEVISION RECEIVER

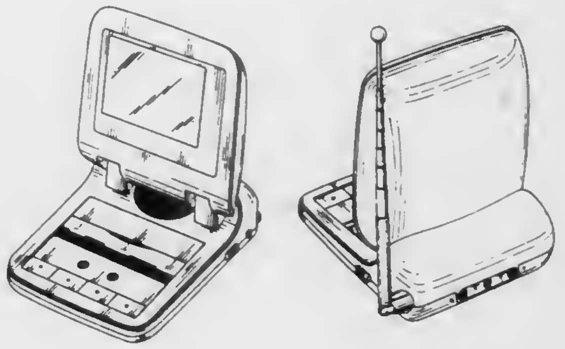
Hiroko Matsumoto, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 20, 1989, Ser. No. 269,088

Claims priority, application Japan, Dec. 21, 1988, 63-49472

Term of patent 14 years

U.S. Cl. D14—126



VOL 1126 ISS 1 MY 7 1991 UMI

### 316,715
### COMBINED RECORD PLAYER, RADIO AND TAPE RECORDER

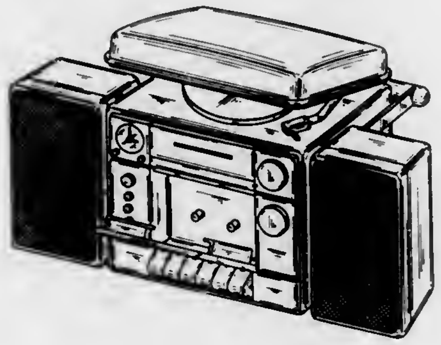
Hirokazu Shibata, Osaka, Japan, assignor to Sharp Corporation Osaka, Japan

Filed Aug. 30, 1988, Ser. No. 238,881

Claims priority, application Japan, Mar. 18, 1988, 63-11139

Term of patent 14 years

U.S. Cl. D14—169



### 316,716
### AMPLIFIER

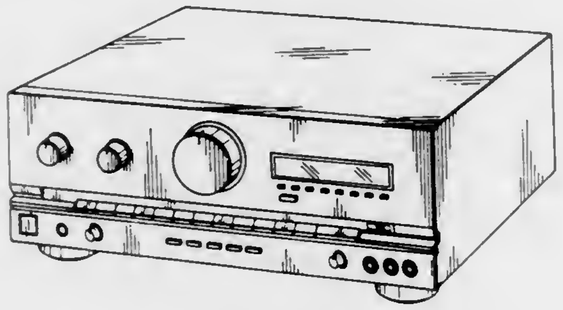
Shunsaku Nagata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 16, 1988, Ser. No. 207,443

Claims priority, application Japan, Dec. 17, 1987, 62-51283

Term of patent 14 years

U.S. Cl. D14—188



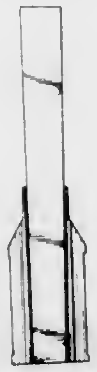
### 316,717
### REVERSIBLE VANE FOR A THROWING WHEEL

James H. Carpenter, and Haven L. Keller, both of Hagerstown, Md., assignors to Pangborn Corporation, Hagerstown, Md.

Filed Jan. 28, 1988, Ser. No. 149,616

Term of patent 14 years

U.S. Cl. D15—126



### 316,718
### COMBINED VIDEO CAMERA AND A VIDEO CASSETTE RECORDER

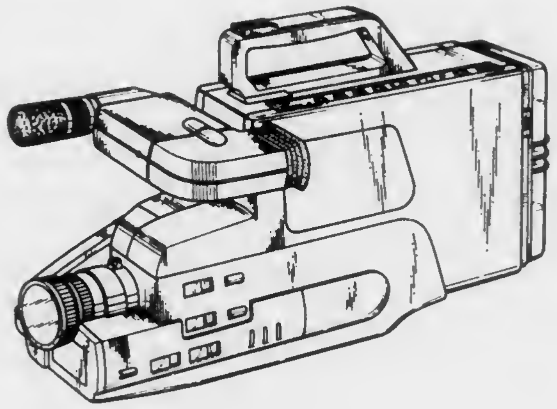
Kue S. Shim, Seoul, Rep. of Korea, assignor to Gold Star Co. Ltd., Seoul, Rep. of Korea

Filed Jun. 9, 1989, Ser. No. 365,026

Claims priority, application Rep. of Korea, Dec. 22, 1988, 17447/1988

Term of patent 14 years

U.S. Cl. D16—202



### 316,719
### COMBINED VIDEO CAMERA AND VIDEO TAPE RECORDER

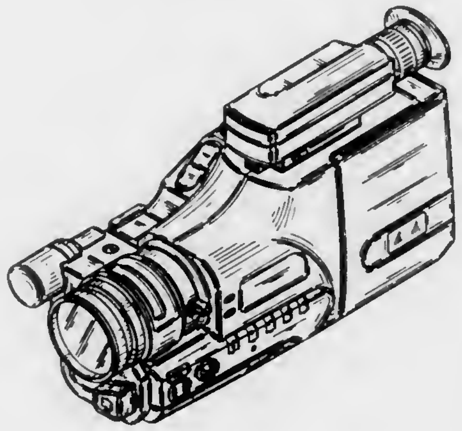
Hiroshi Ooi, and Fumitoshi Sakata, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Jun. 21, 1988, Ser. No. 209,776

Claims priority, application Japan, Dec. 26, 1987, 62-53652

Term of patent 14 years

U.S. Cl. D16—202



### 316,720
### MAGNETIC DISC STILL CAMERA

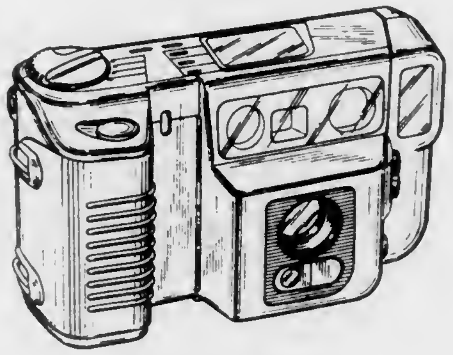
Hiroshi Sano, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 25, 1988, Ser. No. 275,799

Claims priority, application Japan, May 26, 1988, 63-20758

Term of patent 14 years

U.S. Cl. D16—202



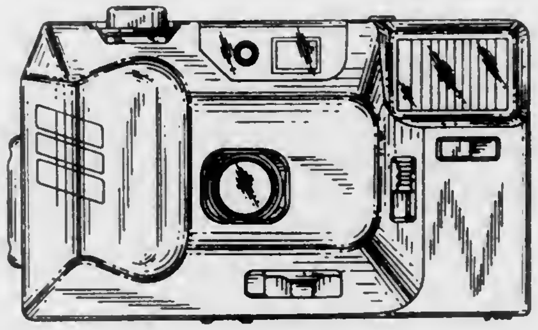
### 316,721
### 35 MM CAMERA

Fang-Hsiang Lue, and Chung-Song Won, both of Taipei Hsieng, Taiwan, assignors to Platon Precision Industries Co., Ltd., Taiwan

Filed Sep. 2, 1988, Ser. No. 241,541

Term of patent 14 years

U.S. Cl. D16—209



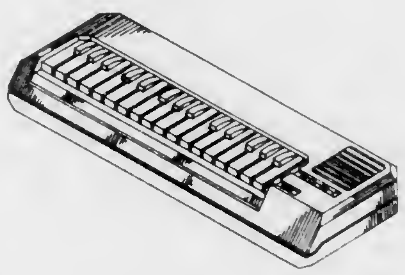
### 316,722
### KEYBOARD

Karl D. Lerch, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 11, 1988, Ser. No. 256,286

Term of patent 14 years

U.S. Cl. D17—1



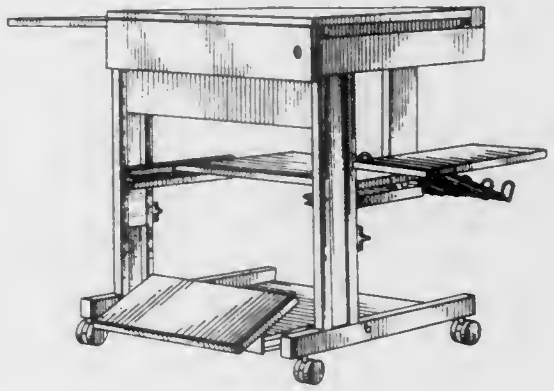
### 316,723
### COMPUTER TABLE

Michael C. M. Ng, and Kheng L. Tan, both of Block 29, #01-132 Defu Lane 10, Singapore 1953, Singapore

Filed Jan. 29, 1988, Ser. No. 149,867

Term of patent 14 years

U.S. Cl. D18—23



### 316,724
### COPYING MACHINE

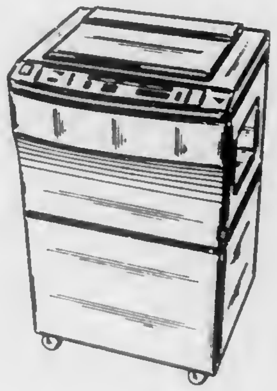
Mikio Kosako; Atsuko Hattori, and Yasuhiko Mano, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Aug. 7, 1989, Ser. No. 390,677

Claims priority, application Japan, Feb. 9, 1989, 1-4723

Term of patent 14 years

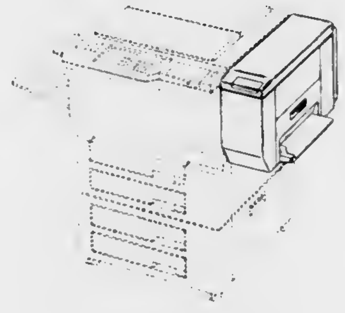
U.S. Cl. D18—39



VOL
1126
ISS
1
MY
7
1991
UMI

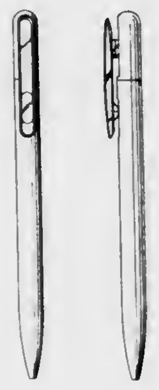
### 316,725
### AUTOMATIC DEVELOPER EXCHANGING DEVICE FOR A PHOTOCOPIER

Minoru Aoyama, Tokyo, and Takeshi Komada, Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 19, 1988, Ser. No. 259,621
Claims priority, application Japan, Apr. 20, 1988, 63-15972
Term of patent 14 years
U.S. Cl. D18—40



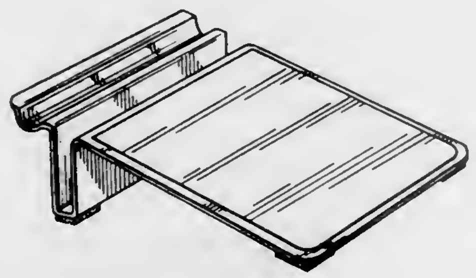
### 316,726
### BALL POINT PEN

Kunio Itoh, Funabashi, Japan, assignor to Pentel Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 23, 1988, Ser. No. 211,416
Claims priority, application Japan, Dec. 25, 1987, 62-52997
Term of patent 14 years
U.S. Cl. D19—51



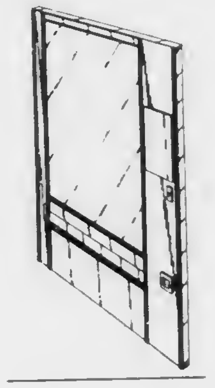
### 316,727
### COMBINED WRITING BOARD AND HOLDER

Randy S. Greenspahn, Wilmette, Ill., assignor to Vertiflex Company, Chicago, Ill.
Filed Nov. 2, 1987, Ser. No. 116,502
Term of patent 14 years
U.S. Cl. D19—52



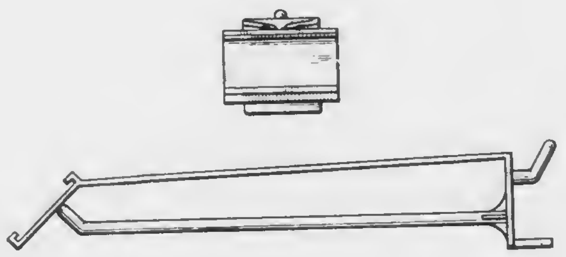
### 316,728
### FOOD VENDING MACHINE FRONT PANEL

Walter L. Koch, Ormond Beach, Fla., assignor to Gross-Given Manufacturing Company, St. Paul, Minn.
Filed May 9, 1988, Ser. No. 192,308
Term of patent 14 years
U.S. Cl. D20—8



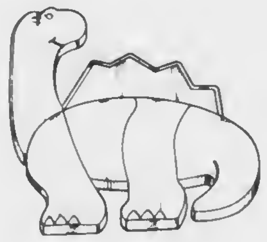
### 316,729
### COMBINED PEGBOARD MERCHANDISE DISPLAY HOOK AND LABEL HOLDER

Joseph Crowley, 9639 Wystone Ave., Northridge, Calif. 91324
Filed Mar. 28, 1989, Ser. No. 329,507
Term of patent 14 years
U.S. Cl. D20—43



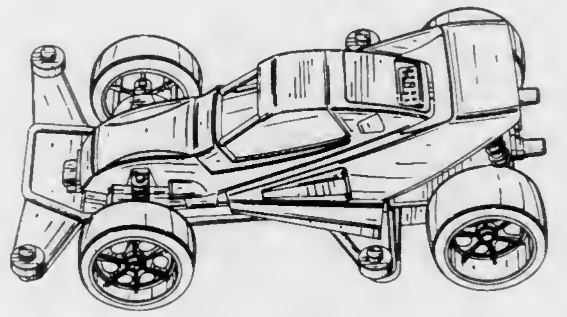
### 316,730
### PUZZLE CRAYON

Masamichi Yoshida, Omiya, Japan, assignor to Buncho Corporation, Tokyo, Japan
Filed Jan. 29, 1988, Ser. No. 150,330
Term of patent 14 years
U.S. Cl. D21—107



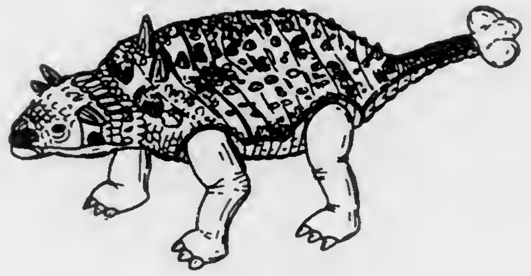
### 316,731
### TOY RACING CAR

Hirotsugu Tsuchiya, Shizuoka, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan
Filed Jul. 5, 1989, Ser. No. 375,522
Claims priority, application Japan, Feb. 17, 1989, 1-5592
Term of patent 14 years
U.S. Cl. D21—137



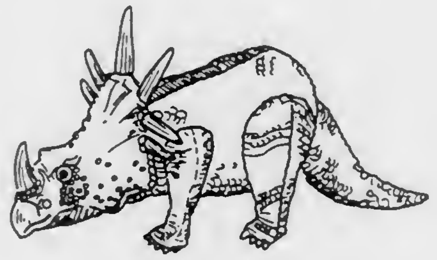
### 316,732
### TOY FIGURE

Leo S. Volpe, Mt. Laurel, N.J., and Frederick W. Kruger, Jr., Levittown, Pa., assignors to Tyco Industries, Inc., Mt. Laurel, N.J.
Filed May 25, 1988, Ser. No. 198,417
Term of patent 14 years
U.S. Cl. D21—148



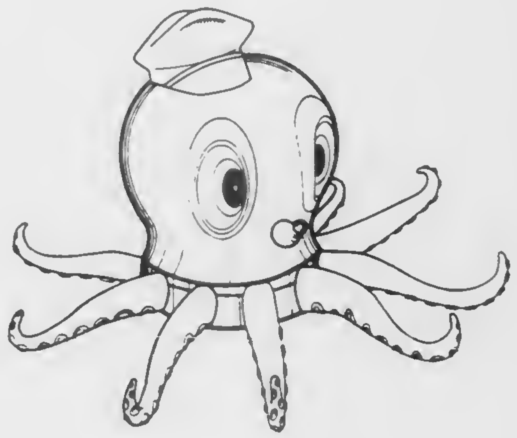
### 316,733
### TOY FIGURE

Leo S. Volpe, Mt. Laurel, N.J., and Frederick W. Kruger, Jr., Levittown, Pa., assignors to Tyco Industries, Inc., Mt. Laurel, N.J.
Filed May 25, 1988, Ser. No. 199,394
Term of patent 14 years
U.S. Cl. D21—148



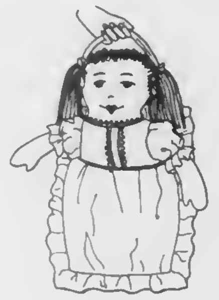
### 316,734
### TOY OCTOPUS

Hui W. Tak, Kowloon, Hong Kong, assignor to Gentile Limited, Kowloon, Hong Kong
Filed Sep. 7, 1988, Ser. No. 241,324
Claims priority, application United Kingdom, Mar. 10, 1988, 1049093
Term of patent 14 years
U.S. Cl. D21—157



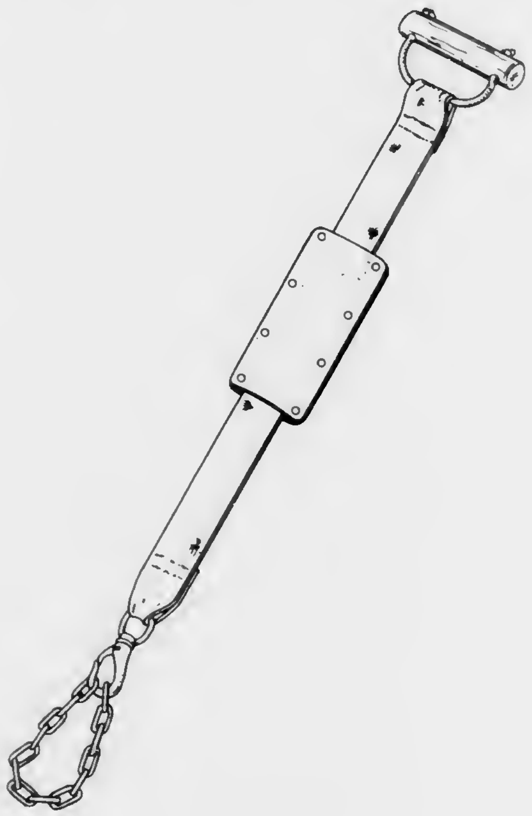
### 316,735
### COMBINED DOLL AND PILLOW CARRYING CASE

Ronald D. Burnette, 5111 Terrell La., Hampton, Va. 23666, and Mildred M. Burnette, 1109 Blair Ave., Hampton, Va. 23669
Filed Jun. 15, 1988, Ser. No. 208,283
Term of patent 14 years
U.S. Cl. D21—167

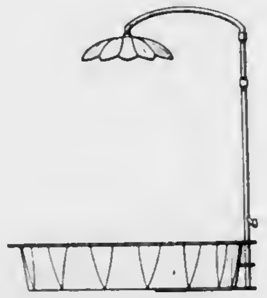


VOL
1126
ISS
1
MY
7
1991
UMI

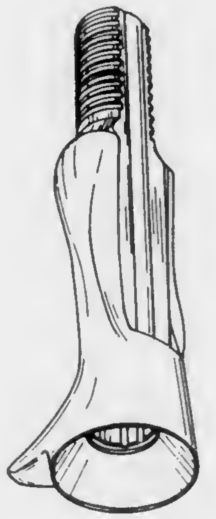
**316,736**
**PHYSICAL EXERCISER**
Teddy R. Montgomery, P.O. Box, Incline Village, Nev. 89450
Filed Feb. 26, 1988, Ser. No. 161,146
Term of patent 14 years
U.S. Cl. D21—191



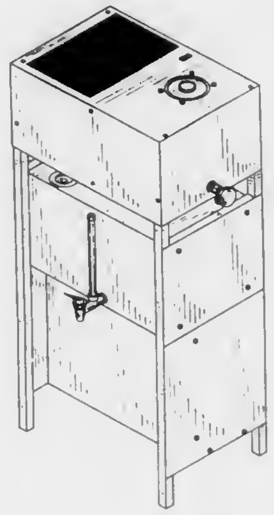
**316,737**
**CHILDRENS POOL AND SHOWER**
Janie E. Warren, and James E. Warren, both of Rte. 1, Box 755, Webers Falls, Okla. 74470
Filed Jun. 5, 1989, Ser. No. 361,581
Term of patent 14 years
U.S. Cl. D21—252



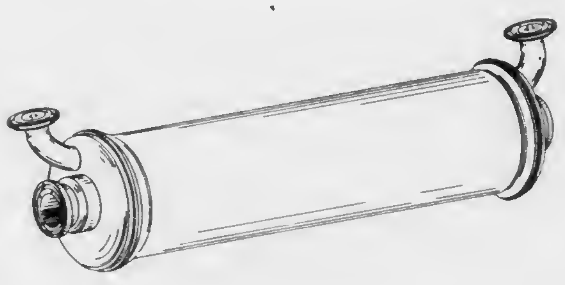
**316,738**
**REEL SEAT FOR FISHING ROD**
Mitsuyoshi Oyama, Musashino, Japan, assignor to Daiwa Seiko, Inc., Higashi-kurume, Japan
Filed Jul. 13, 1989, Ser. No. 379,160
Claims priority, application Japan, Jan. 18, 1989, 1-1305; Apr. 21, 1989, 1-14936; May 2, 1989, 1-16396
Term of patent 14 years
U.S. Cl. D22—142



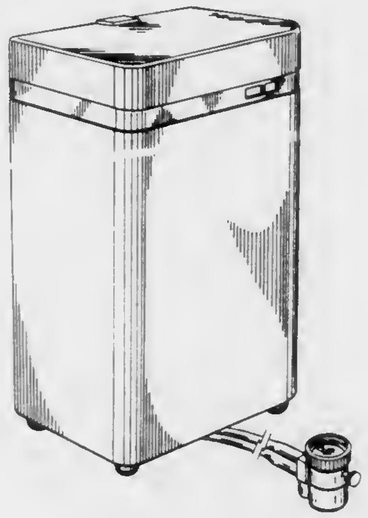
**316,739**
**WATER DISTILLING UNIT**
Theodore B. Erickson; Ivan F. Reed, and Harold D. Johnson, all of Lincoln, Nebr., assignors to Pure Water, Inc., Lincoln, Nebr.
Filed Mar. 19, 1990, Ser. No. 495,845
Term of patent 14 years
U.S. Cl. D23—207



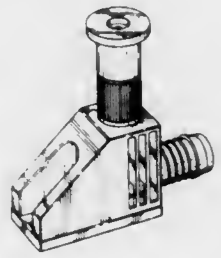
**316,740**
**FILTER HOUSING**
Henry B. Kopf, 108 Coatbridge Cir., Cary, N.C. 27511
Filed Jun. 9, 1989, Ser. No. 365,032
Term of patent 14 years
U.S. Cl. D23—209



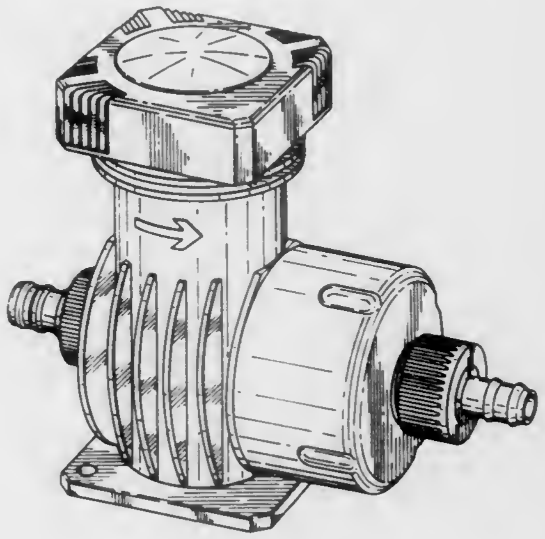
**316,741**
**WATER FILTER**
Mark Kurth, and Andrew Alger, both of Chicago, Ill., assignors to Omni Corporation, Hammond, Ind.
Filed Jan. 19, 1990, Ser. No. 467,214
Term of patent 14 years
U.S. Cl. D23—209



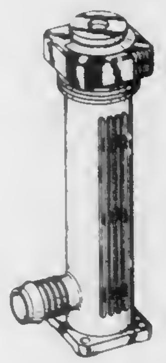
**316,742**
**SPRINKLER**
Franco Clivio, Zürich, Switzerland, assignor to Gardena Kress-+Kastner GmbH, Fed. Rep. of Germany
Filed Aug. 7, 1989, Ser. No. 390,673
Term of patent 14 years
U.S. Cl. D23—214



**316,743**
**SPRINKLER**
Franco Clivio, Zürich, Switzerland, assignor to Gardena Kress-+Kastner GmbH, Fed. Rep. of Germany
Filed Aug. 23, 1989, Ser. No. 397,571
Term of patent 14 years
U.S. Cl. D23—214



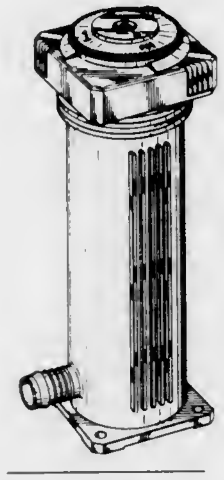
**316,744**
**SPRINKLER**
Franco Clivio, Zürich, Switzerland, assignor to Gardena Kress-+Kastner GmbH, Fed. Rep. of Germany
Filed Aug. 7, 1989, Ser. No. 390,670
Term of patent 14 years
U.S. Cl. D23—218



VOL
126
SS
. 1
MY
7
1991
UMI

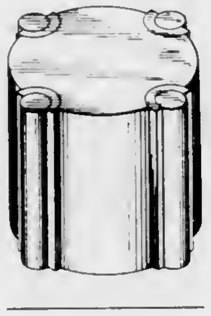
**316,745**
**SPRINKLER**

**Franco Clivio, Zürich, Switzerland, assignor to Gardena Kress-+Kastner GmbH, Fed. Rep. of Germany**
**Filed Aug. 7, 1989, Ser. No. 390,675**
**Term of patent 14 years**
U.S. Cl. D23—218



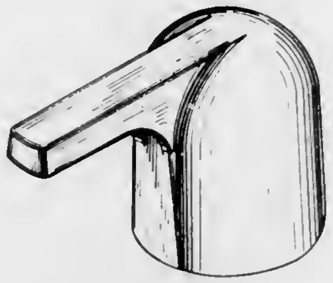
**316,746**
**FAUCET HANDLE OR THE LIKE**

**Christian Ragonot, Paris, France, assignor to Jacob Delafon, Paris, France**
**Filed Nov. 30, 1988, Ser. No. 278,311**
**Claims priority, application France, Sep. 5, 1988, 885,473**
**Term of patent 14 years**
U.S. Cl. D23—250



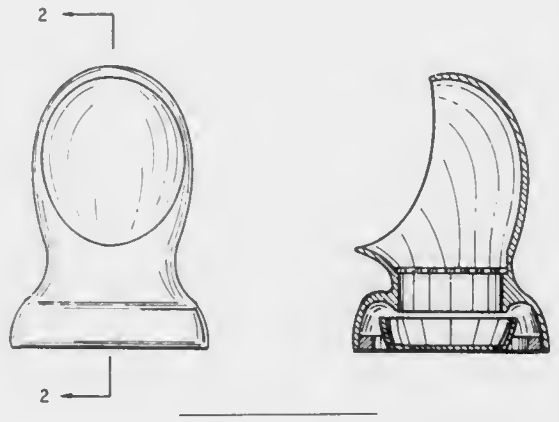
**316,747**
**HANDLE**

**Gary A. Fleischmann, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.**
**Filed Jan. 6, 1988, Ser. No. 141,347**
**Term of patent 14 years**
U.S. Cl. D23—252



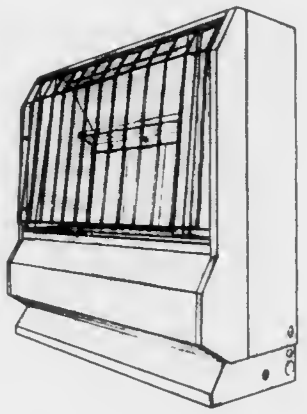
316,748
TODDLER'S URINAL

Diane E. Penn, 119 LeMoyne Ave., Washington, Pa. 15301
Filed Mar. 26, 1987, Ser. No. 30,096
Term of patent 14 years
U.S. Cl. D23—302



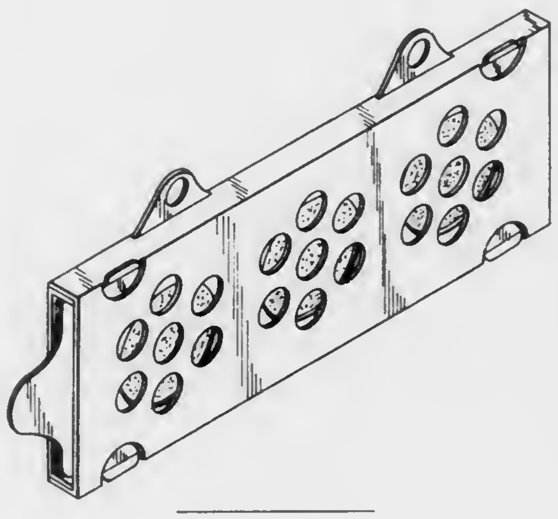
316,749
GAS FIRED HEATER

**Jeffery R. Tonks, Haymills; Mark D. Humphries, Quarry Bank, and Paul A. Gillam, Great Barr, all of England, assignors to Valor Heating Limited, London, England**
Filed Oct. 14, 1988, Ser. No. 257,668
Claims priority, application United Kingdom, Apr. 20, 1988, 1050125
Term of patent 14 years
U.S. Cl. D23—339



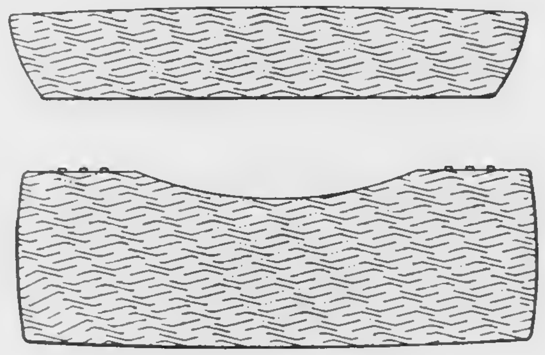
**316,750**
**AIR SAMPLING FILTER**

**Robert P. Savastano, Manhasset Hills, N.Y., assignor to Air Ventilation Observer, Inc., Manhasset Hills, N.Y.**
**Filed Jun. 15, 1988, Ser. No. 206,851**
**Term of patent 14 years**
U.S. Cl. D23—365



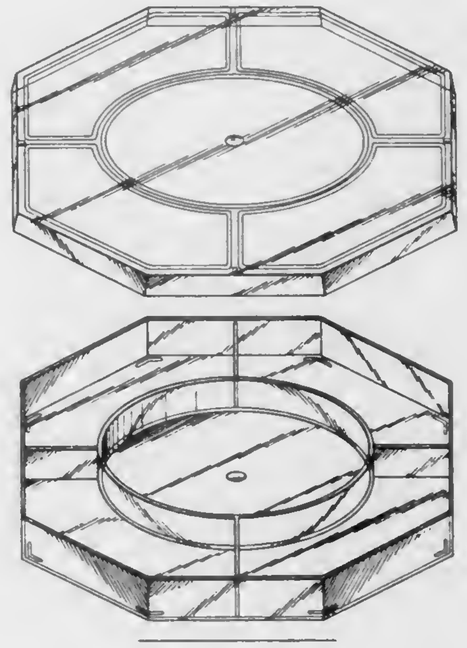
**316,751**
**PADDED HEARTH COVER**

**Cathie S. France, and David L. France, both of 4009 River Valley, Las Vegas, Nev. 89107**
**Filed May 23, 1989, Ser. No. 355,370**
**Term of patent 14 years**
U.S. Cl. D23—403



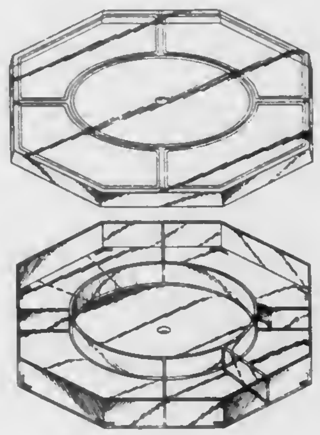
316,752
CULTURE DISH

**Robert A. Ricketts, Rochester, Mich., assignor to Troy Biologicals, Inc., Troy, Mich.**
**Filed Aug. 2, 1988, Ser. No. 227,321**
**The portion of the term of this patent subsequent to May 7, 2005, has been disclaimed.**
**Term of patent 14 years**
U.S. Cl. D24—8



316,753
CULTURE DISH

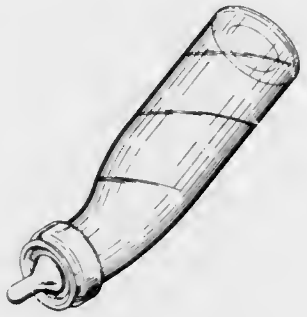
**Robert A. Ricketts, Rochester, Mich., assignor to Troy Biologicals, Inc., Troy, Mich.**
**Filed Aug. 19, 1988, Ser. No. 234,132**
**The portion of the term of this patent subsequent to May 7, 2005, has been disclaimed.**
**Term of patent 14 years**
U.S. Cl. D24—8



VOL
1126
ISS
1
MY
7
1991
UMI

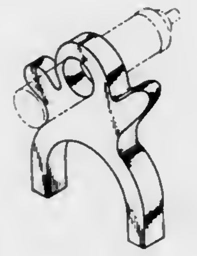
### 316,754
### NURSING BOTTLE

Wynn C. Lau, 8108 W. 102nd St., Bloomington, Minn. 55438
Filed Oct. 18, 1989, Ser. No. 423,106
Term of patent 14 years
U.S. Cl. D24—47



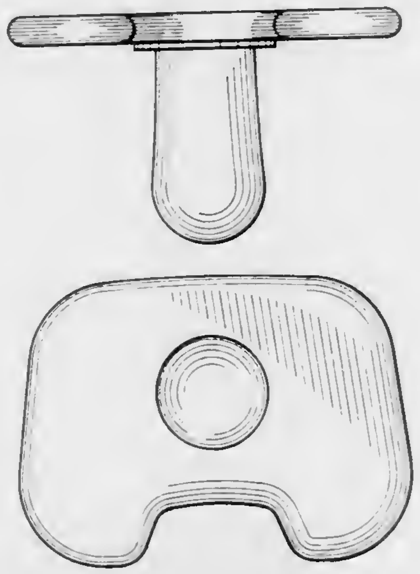
### 316,755
### BABY BOTTLE PROP

John Paino, 563 Bay Fifth St., West Islip, N.Y. 11795
Filed Aug. 29, 1988, Ser. No. 237,574
Term of patent 14 years
U.S. Cl. D24—48



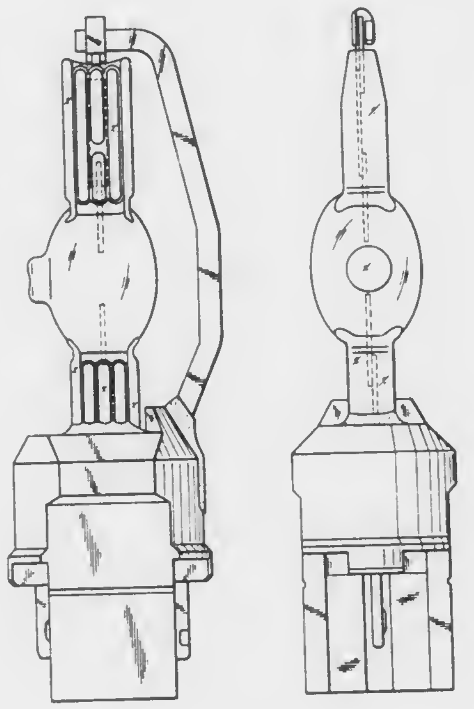
### 316,756
### FECAL BAG FOR INCONTINENT PATIENTS

Bill D. Robbins, Star Rte. Box 1-C, Chatham, Va. 24531
Filed Sep. 2, 1988, Ser. No. 240,110
Term of patent 14 years
U.S. Cl. D24—58



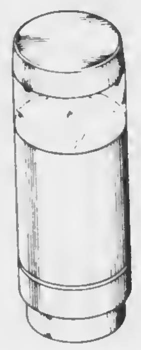
### 316,757
### HIGH-PRESSURE DISCHARGE LAMP

Wolfgang Greiler, Unterhaching, Fed. Rep. of Germany, assignor to OSRAM GmbH, Munich, Fed. Rep. of Germany
Filed Jan. 18, 1989, Ser. No. 298,640
Claims priority, application Int'l Pat. Institute, Jul. 21, 1988, DM/011399
Term of patent 14 years
U.S. Cl. D26—2



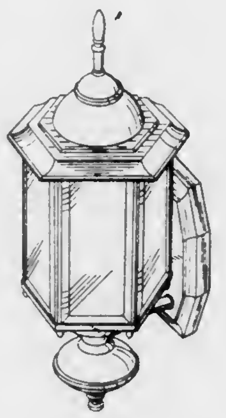
### 316,758
### OUTDOOR BOLLARD LIGHTING FIXTURE

Hiroshi Kira, Westlake Village, Calif., assignor to Lumiere Design and Manufacturing, Inc., Westlake, Calif.
Filed Oct. 13, 1989, Ser. No. 421,397
Term of patent 14 years
U.S. Cl. D26—68



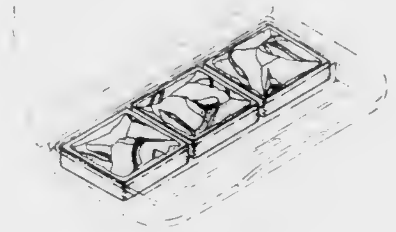
### 316,759
### WALL LANTERN

Young Jae Choi, Jugong Apt. 403-701 Dunchon-dong, Kangdong-Ku, Seoul, Rep. of Korea
Filed May 26, 1989, Ser. No. 357,446
Term of patent 14 years
U.S. Cl. D26—87



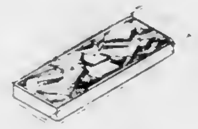
### 316,760
### SET OF COSMETIC BLOCKS

Annette M. Golden, and Maria L. Corbiscello, both of New York, N.Y., assignors to Revlon, Inc., New York, N.Y.
Filed Feb. 2, 1989, Ser. No. 305,360
Term of patent 14 years
U.S. Cl. D28—4



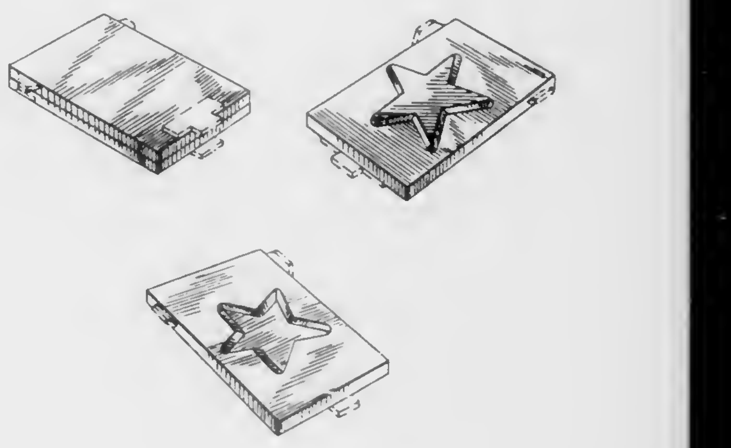
### 316,761
### COSMETIC BLOCK

Annette M. Golden, and Maria L. Corbiscello, both of New York, N.Y., assignors to Revlon, Inc., New York, N.Y.
Filed Feb. 2, 1989, Ser. No. 308,717
Term of patent 14 years
U.S. Cl. D28—4



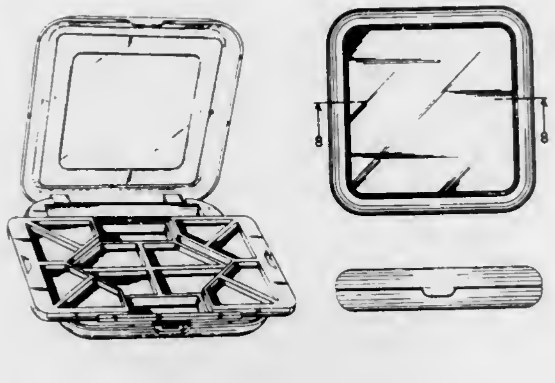
### 316,762
### HAIR CRIMPING HEAD APPLIANCE

Leandro P. Rizzuto, Greenwich; Frank Lindsey, Stratford, both of Conn., and Anthony Leung, North Point, Hong Kong, assignors to Conair Corporation, Stamford, Conn.
Filed Jul. 27, 1989, Ser. No. 385,791
Term of patent 14 years
U.S. Cl. D28—35

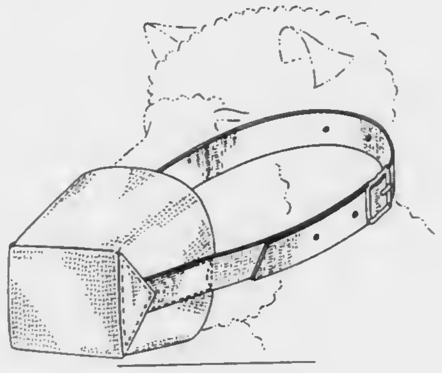


VOL
1126
ISS
1
MY
7
1991
UMI

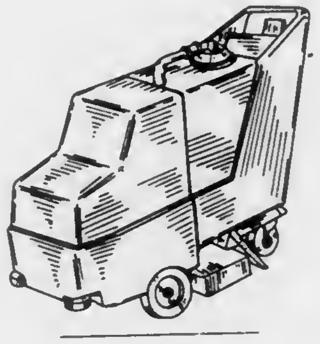
316,763
**PACKAGE FOR COSMETIC PRODUCTS**
Dario Ferrari, Milan, Italy, assignor to Intercos Italia S.p.A., Italy
Filed May 16, 1988, Ser. No. 195,168
Claims priority, application Italy, Nov. 20, 1987, 2274/87[U]
Term of patent 14 years
U.S. Cl. D28—83



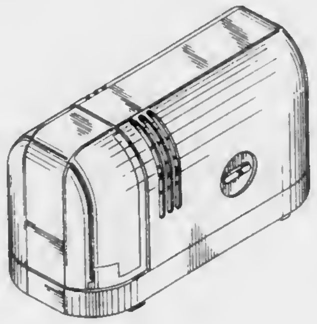
316,764
**MUZZLE FOR A SHEEP OR COW**
Dorothy S. Edwards, 15754 Del Mar Way, Penn Valley, Calif. 95946
Filed Oct. 14, 1986, Ser. No. 918,793
Term of patent 14 years
U.S. Cl. D30—152



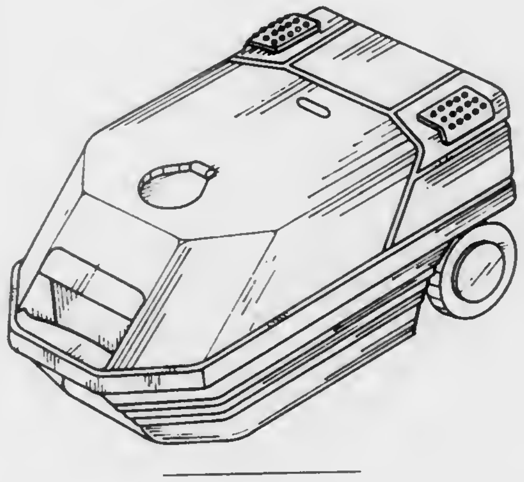
316,765
**CLEANING MACHINE**
Richard F. Wulff, Maple Plain, Minn., assignor to Castex Industries, Inc., Holland, Mich.
Filed Feb. 29, 1988, Ser. No. 161,609
Term of patent 14 years
U.S. Cl. D32—21



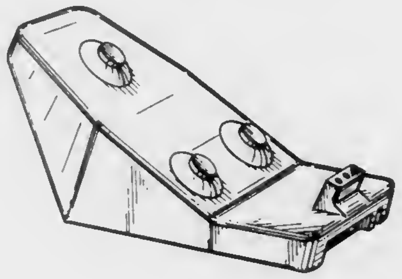
316,766
**BATTERY OPERATED VACUUM CLEANER**
Cheung Chi Ho, 13/F., Man King Bldg., 36, Ferrt Point, Kowloon, Hong Kong
Filed Jul. 27, 1988, Ser. No. 224,840
Claims priority, application United Kingdom, May 18, 1988, 1050816
Term of patent 14 years
U.S. Cl. D32—21



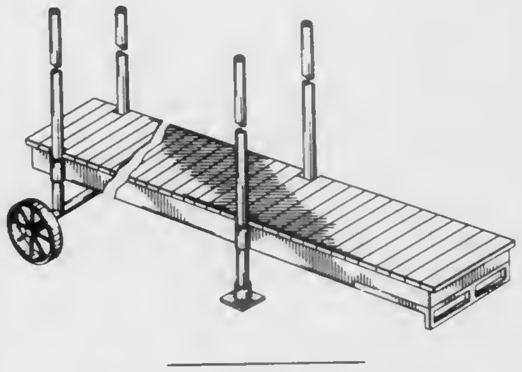
316,767
**VACUUM CLEANER**
Nam C. Suh, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Oct. 3, 1989, Ser. No. 416,437
Claims priority, application Rep. of Korea, Apr. 29, 1989, 5735/1989
Term of patent 14 years
U.S. Cl. D32—21



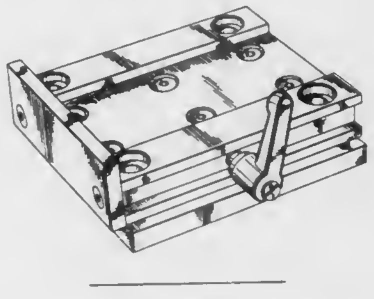
316,768
**STAND FOR AN IRON**
Michael N. Komar, Shropshire, England, assignor to Russell Hobbs Tower Limited, United Kingdom
Filed Aug. 5, 1988, Ser. No. 229,103
Claims priority, application United Kingdom, Feb. 5, 1988, 1048309
Term of patent 14 years
U.S. Cl. D32—73



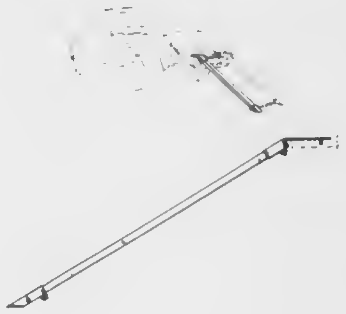
316,769
**MOBILE DOCK**
Gerald F. Roberts, and Ernest M. Roberts, both of 1048 Boyne Rd., Box 19, East Jordan, Mich. 49727
Filed May 15, 1987, Ser. No. 51,033
Term of patent 14 years
U.S. Cl. D34—28



316,770
**TOOL SHIFTER FOR A ROBOT FOR USE IN A MATERIAL HANDLING**
Ingmar Arvidsson, Kristianstad, Sweden, assignor to Tollo Systems AB, Kristianstad, Sweden
Filed Nov. 17, 1988, Ser. No. 272,681
Claims priority, application Sweden, May 30, 1988, 88-1325
Term of patent 14 years
U.S. Cl. D34—28



316,771
**VEHICLE LOADING RAMP**
Frank E. Murray, 7468 Fortman Ave., Fountain, Colo. 80817
Filed May 18, 1989, Ser. No. 353,506
Term of patent 14 years
U.S. Cl. D34—32



# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 7TH DAY OF MAY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A. Ahlstrom Corporation: *See—*
  - Elvander, Hans I.; and Malmstrom, Rolf E., 5,013,355, Cl. 75-23.000.
  - Hynninen, Pertti, 5,013,454, Cl. 210-718.000.
  - Isaksson, Juhani; and Russell, Dave B., 5,013,341, Cl. 55-302.000.
- A.R.M.I.N.E.S.: *See—*
  - Desage, Robert, 5,014,337, Cl. 392-395.000.
- A. Rifkin Co.: *See—*
  - Williams, George W.; and Rifkin, Arnold S., 5,013,162, Cl. 383-97.000.
- AB A. Svensson & Co.: *See—*
  - Hannerstig, Christer, 5,012,851, Cl. 160-348.000.
- Abadi, Khodabandeh; and Hunt, Craig A., to Abadi, Khodabandeh. Apparatus for control of hard water scale in evaporative coolers. 5,013,488, Cl. 261-70.000.
- ABB Atom AB: *See—*
  - Granath, Goran; and Wikmark, Gunnar, 5,013,522, Cl. 376-310.000.
- Abbott Laboratories: *See—*
  - Kim, Yung D., 5,013,645, Cl. 435-7.920.
  - Whitsett, Jeffrey A., 5,013,720, Cl. 514-12.000.
- ABC/Sebrn TechCorp.: *See—*
  - Shannon, Joseph W., 5,012,955, Cl. 222-61.000.
- Abe, Hitoshi: *See—*
  - Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
- Abe, Kiyoshi: *See—*
  - Ogawa, Masahide; Sato, Teiji; Abe, Kiyoshi; Tsuchida, Hisashi; Inoue, Hiroo; and Saito, Mitsuo, 5,013,709, Cl. 503-225.000.
- Abe, Mitsutoshi: *See—*
  - Kyohzuka, Takahiro; Fujii, Masaki; Kikuchi, Toshiyuki; Abe, Mitsutoshi; and Matsuno, Yuji, 5,012,695, Cl. 74-859.000.
- Abe, Noriyuki; Kimura, Takashi; and Fujiki, Norio, to Nissan Motor Company, Limited. Circuit for protecting input of semiconductor device. 5,014,155, Cl. 361-56.000.
- Abe, Tetsushi: *See—*
  - Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi, 5,013,725, Cl. 514-99.000.
- Abe, Yoneji: *See—*
  - Sato, Goro; Komatsu, Michio; Hirai, Toshiharu; Abe, Yoneji; and Senjyuu, Noboru, 5,013,607, Cl. 428-426.000.
- Abe, Yoshihisa: *See—*
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Abner, Jerry L. Mini-ambulance. 5,012,880, Cl. 180-89.110.
- Abramo, Robert S., to United States of America, Navy. Transmission coupler antenna. 5,014,068, Cl. 343-710.000.
- Abrams, John S.; Yokota, Takashi; Lee, Frank; and Arai, Ken-ichi, to Schering Corporation. Human interleukin-4 peptides and conjugates thereof. 5,013,824, Cl. 530-300.000.
- Abrams, Robert S.; and Smith, H. Carl, to Abrams, Robert S. Tamper-proof container and cap assembly. 5,012,941, Cl. 215-250.000.
- Absil, Robert P. L.; Degnan, Thomas F.; Han, Scott; Marler, David O.; Socha, Richard F.; and Stapleton, Michael R., to Mobil Oil Corp. Catalytic hydrocracking process. 5,013,422, Cl. 208-27.000.
- Abu-Isa, Ismat A.; Moran, Susan C.; and Roy, Michael A., to General Motors Corporation. Thin profile integrated suspension and seat trim cover. 5,013,089, Cl. 297-452.000.
- Abugov, Gely P.: *See—*
  - Polyak, Mark U.; Abugov, Gely P.; and Belyak, Vladimir B., 5,014,315, Cl. 380-49.000.
- Aburaya, Toshio: *See—*
  - Yonekawa, Takashi; Onuma, Toshio; Buma, Shuuichi; Ikemoto, Hiroyuki; Ohashi, Kaoru; Aburaya, Toshio; and Sato, Kinihito, 5,013,062, Cl. 280-707.000.
- Acker, John N.; and Andreae, Bradley M., to Therma-Tron-X, Inc. Intermittent work conveying apparatus. 5,012,918, Cl. 198-465.400.
- Ackerman, Myron H. Dimple forming necktie and method of making the same. 5,012,530, Cl. 2-144.000.
- Acree, William M.; and Black, John W., to American Home Products Corporation. Canine corona virus vaccine. 5,013,663, Cl. 435-237.000.
- Acrowood Corporation: *See—*
  - Artiano, Adrian, 5,012,933, Cl. 209-671.000.
- Action Industries, Inc.: *See—*
  - May, Teddy J., 5,013,084, Cl. 297-85.000.
- Adachi, Keiichi: *See—*
  - Ohno, Shigeru; Jimbo, Yoshihiro; Adachi, Keiichi; and Kuwashima, Shigeru, 5,013,636, Cl. 430-522.000.
- Adachi, Yuuma: *See—*
  - Shimura, Kazuo; and Adachi, Yuuma, 5,014,045, Cl. 340-712.000.
- Adaka, Tamio: *See—*
  - Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, 5,013,466, Cl. 252-42.700.
- Adams, Craig F.: *See—*
  - Peebles, Richard J.; Michna, Richard J.; Monat, David E.; Bartholomew, Stephen W.; and Adams, Craig F., 5,012,741, Cl. 102-275.400.
- Adamson, John W.; Eschbach, Joseph W.; Downing, Michael R.; and Egrie, Joan C., to Amgen, Inc. Method for treating iron overload using EPO. 5,013,718, Cl. 514-8.000.
- Aday, Roy W., Jr.: *See—*
  - Stafford, Roger A.; Aday, Roy W., Jr.; Schmidt, Robert L.; and McCollum, Myron L., 5,014,216, Cl. 364-496.000.
- Adby, Colin: *See—*
  - Burn, Michael; and Adby, Colin, 5,014,172, Cl. 362-284.000.
- Addison, Thomas E., to Qualtech of Racine, Inc. Quality control work station. 5,013,103, Cl. 312-250.000.
- Adeka ARgus Chemical Co., Ltd.: *See—*
  - Shibata, Toshihiro; Kimura, Masaki; and Kurosawa, Norio, 5,013,475, Cl. 252-299.610.
- Adin, Anthony: *See—*
  - Muenter, Annabel; Adin, Anthony; Parton, Richard L.; Pightling, Nicholas A.; and Beaumond, David, 5,013,642, Cl. 430-574.000.
- Adkins, Keith W. Ski pole holder. 5,013,066, Cl. 280-809.000.
- Adler, Michael S., to General Electric Company. MOSFET-gated bipolar transistors and thyristors with both turn-on and turn-off capability having single-polarity gate input signal. 5,014,102, Cl. 357-38.000.
- Adolfsson, Rune, to SKF Nova AB. Linearly operating motor. 5,013,945, Cl. 310-26.000.
- Adolph Coors Company: *See—*
  - Marsh, Ralph Z., 5,012,547, Cl. 15-304.000.
- Advanced Diversified Technology, Inc.: *See—*
  - Lin, Yeong C., 5,013,588, Cl. 427-397.700.
- Advanced Micro Devices, Inc.: *See—*
  - Albachten, Rudolph J., III; and O'Dell, Robert W., 5,014,247, Cl. 365-230.050.
  - Shen, Lewis; Hadiizadeh-Amini, Zahra; Wang, Hsingya A.; and Hsu, James J., 5,013,675, Cl. 437-44.000.
  - Vairavan, Kannan P.; and McLeod, Paul, 5,014,263, Cl. 370-32.100.
- AEG Westinghouse Industrial Automation Corporation: *See—*
  - Peterson, Robert S.; and Larsen, John A., 5,012,660, Cl. 72-8.000.
- AEG Westinghouse Transportation Systems Inc.: *See—*
  - Burg, Thomas J.; Ziegler, Ronald H.; Cooper, William K.; Kapala, John W.; and Anderson, Robert J., 5,012,747, Cl. 104-130.000.
- Aerospatiale Societe Nationale Industrielle: *See—*
  - Allaert, Francois; Faurie, Pierre; Roques, Serge; and Segol, Sylvain, 5,013,197, Cl. 410-77.000.
- Affarsverket FFV: *See—*
  - Medin, Gunnar; Olsson, Erik; Lennart, Sjoo; and Lundgren, Roger, 5,012,721, Cl. 89-36.170.
- Agency of Industrial Science & Technology: *See—*
  - Hata, Hajime; Kitamura, Takao; Sakane, Kohji; Wada, Hideo; and Sogabe, Seiji, 5,013,523, Cl. 419-19.000.
- Ageno, Yuzo: *See—*
  - Shimoda, Kaneyasu; and Ageno, Yuzo, 5,014,275, Cl. 371-43.000.
- AGFA-Gevaert, N.V.: *See—*
  - Kok, Piet; Vanmaele, Luc J.; Tavernier, Serge M.; and De Deyne, Hedwig E., 5,013,628, Cl. 430-110.000.
  - Roosen, Raymond A.; de Meyer, Marcellus H.; and Monbaliu, Marcel J., 5,013,138, Cl. 350-339.00F.
- Aichi Steel Works, Limited: *See—*
  - Tanaka, Yoshinobu; Iwama, Yoshiro; Honkura, Yoshinobu; Arai, Kazuo; and Watarai, Aki, 5,013,243, Cl. 433-189.000.
- Aiello, Richard E.; Allgood, Christopher L.; Stillie, Donald G.; and Sykora, Allan J., to AMP Incorporated. Fluorescent light connector assembly. 5,013,253, Cl. 439-235.000.
- Aigner, Robert C.: *See—*
  - Beaufoy, Jeffrey J.; Aigner, Robert C; and Burke, Steven A., 5,013,333, Cl. 55-21.000.
- Aigo, Seiichiro. Support frame for supporting a semiconductor wafer carrier. 5,012,935, Cl. 211-41.000.
- Aiken, Judd M.: *See—*
  - Severson, David W.; and Aiken, Judd M., 5,013,644, Cl. 435-6.000.
- Aimura, Yoshiaki: *See—*
  - Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,796, Cl. 525-326.200.
  - Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,797, Cl. 525-328.300.

OL
126
SS
1
MY
7
1991
UMI

Air Products and Chemicals, Inc.: *See—*
Anand, Madhu; Costello, Christine A.; and Campbell, Keith D., 5,013,338, Cl. 55-158.000.
Hochberg, Arthur K.; O'Meara, David L.; and Roberts, David A., 5,013,690, Cl. 437-233.000.
Surnamer, Andrew D.; and Tien, Chao-Fong, 5,013,332, Cl. 55-16.000.

Airfoil Textron Inc.: *See—*
Bailey, Carlos; and Spain, Raymond G., 5,013,216, Cl. 416-230.000.

Aisin Aw Co., Ltd.: *See—*
Hayakawa, Youichi; Hosono, Chihiro; and Ogasawara, Yasuhito, 5,013,287, Cl. 475-61.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Nakagawa, Takashi; and Suyama, Tetsuya, 5,013,220, Cl. 417-310.000.
Nishii, Michiharu; Mizuno, Genji; Mizukoshi, Hideo; Ishida, Satoshi; and Hata, Kyousuke, 5,013,094, Cl. 303-52.000.
Okada, Shoji; Fujie, Naofumi; Ito, Koji; and Imaizumi, Tomoaki, 5,012,593, Cl. 34-69.000.
Okada, Shoji; Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; Ichikawa, Yuji; and Hayashi, Kazumi, 5,013,888, Cl. 219-219.000.

Aitken, Brian L.: *See—*
Lorier, Michel A.; and Aitken, Brian L., 5,013,568, Cl. 426-332.000.

Aizawa, Yoshiaki, to Kabushiki Kaisha Toshiba. Photocoupler apparatus capable of shortening switching time of output contact. 5,013,926, Cl. 250-551.000.

Ajinomoto Co., Inc.: *See—*
Ohtsuka, Eiko; Inoue, Hideo; Morisawa, Hirokazu; Shibahara, Susumu; Mukai, Sachiko; and Nishihara, Tohru, 5,013,830, Cl. 536-27.000.

Akasaka, Akio; Suga, Seiji; Fukuda, Yasuo; and Sawada, Takanori, to Atsugi Motor Parts Company, Limited. Intake- and/or exhaust-valve timing control system for internal combustion engine. 5,012,773, Cl. 123-90.170.

Akasaka, Hideki; and Sato, Masatoshi, to Nikon Corporation. Over write capable magnetooptical recording method using two beams, and magnetooptical recording apparatus therefor. 5,014,252, Cl. 369-13.000.

Akasaka, Nobuhiro: *See—*
Hattori, Tomoyuki; Akasaka, Nobuhiro; and Yamanishi, Toru, 5,013,126, Cl. 350-96.230.

Akashi, Shunji, to Yoshida Kogyo K. K. Method of making a slider for use in a slide fastener. 5,013,511, Cl. 264-242.000.

Akatsu, Yohsuke: *See—*
Fujimura, Itaru; Fukushima, Naoto; Fukunaga, Yukio; and Akatsu, Yohsuke, 5,013,061, Cl. 280-707.000.

Akesaka, Toshio, to Kabushiki Kaisha Iseki Kaihatsu Koki. Intermediate pipe-jacking apparatus. 5,013,189, Cl. 405-184.000.

Akhtar, Masyood, to Johnson Matthey Inc. Sealing glass compositions. 5,013,697, Cl. 501-46.000.

Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, to Hitachi, Ltd.; and Hitachi Microcomputer Engineering Ltd. Semiconductor device for a ram disposed on chip so as to minimize distances of signal paths between the logic circuits and memory circuit. 5,014,242, Cl. 365-63.000.

Akita, Masahiko: *See—*
Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, 5,012,715, Cl. 84-724.000.

Akiyama, Eitetsu: *See—*
Oono, Tetsuya; and Akiyama, Eitetsu, 5,012,882, Cl. 180-197.000.

Akiyama, Koichi, to Kowa Company Limited. Opthalmological measurement apparatus. 5,013,146, Cl. 351-208.000.

Akiyama, Shigeru: *See—*
Yokoyama, Yoshiharu; Akiyama, Shigeru; Nakayama, Hironori; and Kamiya, Tsuyoshi, 5,012,781, Cl. 123-353.000.

A.G. fur industrielle Elektronik: *See—*
Stricker, Max, 5,013,882, Cl. 219-69.140.

Akzo N.V.: *See—*
Sluma, Heinz-Dieter; and Huff, Dieter, 5,013,765, Cl. 521-27.000.

Albachten, Rudolph J., III; and O'Dell, Robert W., to Advanced Micro Devices, Inc. System for accessing the same memory location by two different devices. 5,014,247, Cl. 365-230.050.

Albers, Martin: *See—*
Grieb, Hubert; Simon, Burkhard; and Albers, Martin, 5,012,638, Cl. 60-224.000.

Albertson, Douglas E.: *See—*
Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 5,012,823, Cl. 131-31.000.

Alcatel NA Cable Systems Inc.: *See—*
Nilsson, Richard C.; and Barker, Jeffrey S., 5,013,125, Cl. 350-96.230.

Alcatel NA, Inc.: *See—*
Tyrrell, Raymond E.; Briscoe, Milton R.; Sutherland, Joseph E.; and Tyrrell, Raymond E., 5,014,268, Cl. 370-68.000.

Alcatel, N.V.: *See—*
Fox, Ronald C. S., 5,014,308, Cl. 379-413.000.

Alcon Laboratories, Inc.: *See—*
Gerson, Steven H.; and Han, Wesley W., 5,013,751, Cl. 514-448.000.

Alcudia, Ezra R.: *See—*
Whyte, Robert E., Jr.; and Alcudia, Ezra R., 5,012,989, Cl. 242-186.000.

Alexander, Ronnie L.: *See—*
St. John, Michael R.; and Alexander, Ronnie L., 5,013,456, Cl. 210-734.000.

Alfred Teves GmbH: *See—*
Ocvirk, Norbert; and Weise, Lutz, 5,013,096, Cl. 303-116.000.

Ali, Syed: *See—*
Kazerounian, Reza; Ali, Syed; and Eitan, Boaz, 5,014,097, Cl. 357-23.500.

Allaert, Francois; Faurie, Pierre; Roques, Serge; and Segol, Sylvain, to Aerospatiale Societe Nationale Industrielle. Locking bolt for equipment support. 5,013,197, Cl. 410-77.000.

Allard, Edward F. Microdischarge image converter. 5,013,902, Cl. 250-213.0VT.

Allen Group Inc., The: *See—*
Passage, Robert D., Jr., 5,012,749, Cl. 104-297.000.

Allen, Robert H.; and Ibrahim, Jameel, to Ethyl Corporation. Preparation of high purity boron. 5,013,604, Cl. 428-402.000.

Allen, Roger E.: *See—*
Esterowitz, Leon; Allen, Roger E.; and Kintz, Gregory J., 5,014,279, Cl. 372-41.000.

Allergan, Inc.: *See—*
Chandraratna, Roshantha A. S., 5,013,744, Cl. 514-345.000.
Lee, Gary C. M., 5,013,850, Cl. 549-222.000.

Allgood, Christopher L.: *See—*
Aiello, Richard E.; Allgood, Christopher L.; Stillie, Donald G.; and Sykora, Allan J., 5,013,253, Cl. 439-235.000.

Allied-Signal Inc.: *See—*
Downes, Carville M., 5,013,199, Cl. 411-544.000.
Moody, Mark D.; and DuCharme, Robert T., 5,012,902, Cl. 188-73.350.
Swamikannu, A. Xavier, 5,013,448, Cl. 210-642.000.
Tumpey, John J.; and Becker, Richard J., 5,013,948, Cl. 310-68.00D.

Almond, Arthur W., II. Body lotion applicator apparatus. 5,013,171, Cl. 401-6.000.

Alps Electric Co., Ltd.: *See—*
Ibaraki, Atsushi, 5,014,149, Cl. 360-126.000.
Ohnishi, Kazumasa; Naito, Koichi; and Nakazawa, Toru, 5,013,958, Cl. 310-323.000.

Aluminium Pechiney: *See—*
Jonville, Christian; and Nicollin, Jean-Robert, 5,013,503, Cl. 264-117.000.

Aluminum Company of America: *See—*
Kempf, Timothy W.; Corcoran, Robert F.; and Sikora, Dennis C., 5,013,336, Cl. 55-71.000.

Amachi, Nobumitsu: *See—*
Fukada, Takeshi; Codama, Mitsufumi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; and Takayama, Ichiro, 5,014,100, Cl. 357-30.000.

Amada Company, Limited: *See—*
Catti, Alberto A.; Sartorio, Franco; and Vergano, Stefano, 5,012,661, Cl. 72-21.000.

Amano, Hideaki: *See—*
Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.

Ambac Automation Corp.: *See—*
Hoskins, Robert G.; and Johns, Steve P., 5,012,570, Cl. 29-467.000.

Amdahl, Gene M.: *See—*
Lee, James C. K.; Amdahl, Gene M.; Beck, Richard; Lee, Chune; and Hu, Edward, 5,014,161, Cl. 361-388.000.

Amemiya, Tetsuo: *See—*
Koshii, Taro; and Amemiya, Tetsuo, 5,013,781, Cl. 524-864.000.

American Cyanamid: *See—*
Guerro, Gerald J.; and Singh, Balwant, 5,013,598, Cl. 428-283.000.

American Cyanamid Company: *See—*
Tseng, Shin S.; Epstein, Joseph W.; and Levin, Jeremy I., 5,013,737, Cl. 514-267.000.

American Home Products Corporation: *See—*
Acree, William M.; and Black, John W., 5,013,663, Cl. 435-237.000.
Malis, Michael J.; and Jones, Flave L., 5,012,811, Cl. 128-642.000.

American Laundry Machinery, Inc.: *See—*
Oberley, Gene; and Downie, Barbara, 5,012,962, Cl. 223-57.000.

Amgen, Inc.: *See—*
Adamson, John W.; Eschbach, Joseph W.; Downing, Michael R.; and Egrie, Joan C., 5,013,718, Cl. 514-8.000.

Amigues, Pierre: *See—*
Nocca, Jean-Luc; Leonard, Jacques; Gaillard, Jean-Ferdinand; and Amigues, Pierre, 5,013,407, Cl. 202-158.000.

Amitani, Joji; and Hoshino, Osamu, to Canon Kabushiki Kaisha. Process unit and a multi-color image forming apparatus using the same. 5,014,094, Cl. 355-326.000.

Amoco Corporation: *See—*
Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., 5,013,702, Cl. 502-120.000.
Koller, Glenn R.; and Trout, Matt F., 5,012,675, Cl. 73-432.100.
Millheim, Keith K.; Mount, Houston B., II; Rai, Chandra S.; and Sondergeld, Carl H., 5,012,674, Cl. 73-153.000.
Slama, Francis J., 5,013,463, Cl. 252-18.000.
Winters, Warren J.; and Burton, Michael B., 5,012,877, Cl. 175-80.000.

Amoco Corportion: *See—*
Mosby, James F.; Peck, Lawrence B.; Taylor, James L.; and Beaton, William I., 5,013,427, Cl. 208-211.000.

AMP Incorporated: *See—*
Aiello, Richard E.; Allgood, Christopher L.; Stillie, Donald G.; and Sykora, Allan J., 5,013,253, Cl. 439-235.000.
Brown, Thomas E.; and Davis, Thomas F., 5,013,248, Cl. 439-66.000.
Buchter, Randolph L.; and Huss, John P., Jr., 5,013,265, Cl. 439-724.000.
Gallagher, Robert E., Sr., 5,012,925, Cl. 206-332.000.
Korsunsky, Iosif; and Schroepfer, Richard C., 5,013,257, Cl. 439-326.000.
Savitsky, Wallace R.; Schaffer, Ronald R.; and Warner, Gary N., 5,013,122, Cl. 350-96.200.

Amper, S.A.: *See—*
Martin, Emilio B., 5,012,734, Cl. 101-91.000.

Ampsco Corporation: *See—*
Kennedy, Ralph, deceased; and Kennedy, Ralph W., 5,012,873, Cl. 173-22.000.

Amtrol Inc.: *See—*
Hunley, Eugene C., Jr.; and Jozwiak, Terry H., 5,012,833, Cl. 137-15.000.

Analog Devices KK: *See—*
Moriwaki, Ikuo, 5,014,056, Cl. 341-161.000.

Anand, Madhu; Costello, Christine A.; and Campbell, Keith D., to Air Products and Chemicals, Inc. Plasma-assisted polymerization of monomers onto polymers and gas separation membranes produced thereby. 5,013,338, Cl. 55-158.000.

Anchia, Carlos. Exercise apparatus. 5,013,036, Cl. 272-137.000.

Andersen, Phillip J.: *See—*
Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., 5,013,324, Cl. 623-23.000.

Anderson, James R., to Beltone Electronics Corporation. Switching amplifier. 5,014,016, Cl. 330-10.000.

Anderson, Kyle, to Sundstrand Corporation. Magnetic amplifier package and method of cooling the same. 5,014,181, Cl. 363-126.000.

Anderson, Llewellan, to Robbins Company, The. Rock boring machine drive head with up and down drilling capability. 5,012,878, Cl. 175-162.000.

Anderson, Robert J.: *See—*
Burg, Thomas J.; Ziegler, Ronald H.; Cooper, William K.; Kapala, John W.; and Anderson, Robert J., 5,012,747, Cl. 104-130.000.

Ando, Koki: *See—*
Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,012,795, Cl. 126-262.000.

Andre, Tore M., to Telefonaktiebolaget L M Ericsson. Adaptive digital filter having non-recursive and recursive filter elements. 5,014,232, Cl. 364-724.190.

Andreae, Bradley M.: *See—*
Acker, John N.; and Andreae, Bradley M., 5,012,918, Cl. 198-465.400.

Andrew Jergens Company, The: *See—*
Tubesing, David R.; and Truax, Maxine L., 5,013,763, Cl. 514-772.000.

Andrieu, Jean-Pierre; Henri, Jean-Claude; and Gault, Dominique, to Thomson-CSF. Method for the on-line testing of a radar information display device, and implementation of this method. 5,014,065, Cl. 342-165.000.

Anelva Corporation: *See—*
Samukawa, Seiji; Sasaki, Masami; and Mori, Sumio, 5,013,401, Cl. 156-643.000.

Annen, Oskar; and Schlick, Bernhard, to Sandoz Ltd. Aftertreatment of dyed substrates. 5,013,328, Cl. 8-442.000.

Ansel, George M., to Cypress Semiconductor Corporation. Multi stage slew control for an IC output circuit. 5,013,940, Cl. 307-473.000.

Anton, Mark A.; and Johnson, Wayne A. Optical fiber storage container. 5,013,121, Cl. 350-96.200.

Anton, Rodi, to Heidelberger Druckmaschinen AG. Method of controlling at least one electric motor on an offset printing machine. 5,014,335, Cl. 388-815.000.

Antrim, James K.: *See—*
Grassi, David; and Antrim, James K., 5,012,753, Cl. 114-39.100.

Anzai, Yoshinori: *See—*
Saikatsu, Takeo; Sakurai, Takehiko; and Anzai, Yoshinori, 5,013,966, Cl. 313-493.000.

Aoki, Harumi: *See—*
Sakai, Nobuya; and Aoki, Harumi, 5,014,136, Cl. 358-341.000.

Aoki, Katashi. Injection stretching and blow molding process including a secondary treatment operation. 5,013,515, Cl. 264-513.000.

Aoki, Takashi; Sekine, Noboru; Ozawa, Shigeo; and Shimada, Takamichi, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for controlling gearshifts in automatic transmission. 5,012,699, Cl. 74-869.000.

Aoki, Takayoshi: *See—*
Matsumura, Yasuo; Aoki, Takayoshi; Nagatsuka, Ikutaroh; and Mochiauki, Masao, 5,013,626, Cl. 430-106.600.

Aoki, Yasushi, to NEC Corporation. Complementary output circuit for logic circuit. 5,013,937, Cl. 307-448.000.

Aoshima, Hiroaki. Process for producing integrated structures of synthetic corundum single-crystals. 5,013,380, Cl. 156-250.000.

Aoto, Teruaki: *See—*
Nakaoda, Toshinori; Aoto, Teruaki; Aoyama, Nagara; Nakamura, Tsuyoshi; and Nishimura, Ritsuo, 5,013,211, Cl. 414-789.600.

Aoyama, Nagara: *See—*
Nakaoda, Toshinori; Aoto, Teruaki; Aoyama, Nagara; Nakamura, Tsuyoshi; and Nishimura, Ritsuo, 5,013,211, Cl. 414-789.600.

Aparellaje Electrico, S.A.: *See—*
Navazo, Juan M. B., 5,013,870, Cl. 174-50.000.

APD Cryogenics, Inc.: *See—*
Longsworth, Ralph, 5,012,650, Cl. 62-51.200.

Apel, Israel: *See—*
Malkieli, Moshe; and Apel, Israel, 5,013,972, Cl. 315-209.00R.

Applied Magnetics Corporation: *See—*
Matsuzawa, Soichiro; and Takeya, Fuminori, 5,012,572, Cl. 29-603.000.

Arabino, Domenico: *See—*
Piccinini, Dino; and Arabino, Domenico, 5,012,615, Cl. 49-477.000.

Arai, Fuminori; and Takayama, Takeshi, to Fuji Photo Film Co., Ltd. Integral multilayer analytical element for analysis of albumin. 5,013,527, Cl. 422-56.000.

Arai, Kazuo: *See—*
Tanaka, Yoshinobu; Iwama, Yoshiro; Honkura, Yoshinobu; Arai, Kazuo; and Watarai, Aki, 5,013,243, Cl. 433-189.000.

Arai, Ken-ichi: *See—*
Abrams, John S.; Yokota, Takashi; Lee, Frank; and Arai, Ken-ichi, 5,013,824, Cl. 530-300.000.

Arai, Kiyotaka: *See—*
Himeji, Tooru; Arai, Kiyotaka; and Murakami, Masahiro, 5,013,025, Cl. 271-164.000.

Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, to Sony Corporation; and Mitsubishi Chemical Industries Limited. Liquid crystal display device. 5,013,474, Cl. 252-299.100.

Arakawa, Yasuo: *See—*
Aso, Toshiyuki; and Arakawa, Yasuo, 5,013,881, Cl. 219-69.120.

Arends, Thomas C.: *See—*
Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., 5,014,267, Cl. 370-62.000.

Arikawa, Shiro; and Yonehara, Takao, to Canon Kabushiki Kaisha. Photoelectric converter. 5,013,670, Cl. 437-2.000.

Arimoto, Hiromi; and Fujii, Toshihiro, to Shimadzu Corporation. Detector for gas chromatograph for detecting ammonia and amine compounds. 5,014,009, Cl. 324-468.000.

Arita, Koji: *See—*
Nakatani, Kazuo; Ikoma, Mitsuhiro; Yoshida, Yuji; Tomizawa, Takeshi; Arita, Koji; and Tagashira, Minoru, 5,012,651, Cl. 62-149.000.

Armco, Inc.: *See—*
Block, Wayne F., 5,013,373, Cl. 148-113.000.
Block, Wayne F.; and Wright, Wade S., 5,013,374, Cl. 148-113.000.

Armond, Joseph A.; and Rodenas, Juanito, to Electro-Matic Products Co. Indicator for a reciprocating member. 5,013,984, Cl. 318-490.000.

Armstrong, Tom; Bimanand, Alex; Jacques, Dennis M., Sr.; and Raffo, John A., to Sierracin Corporation. Curing compositions with ultraviolet light. 5,013,924, Cl. 250-504.00R.

Arnold, Samuel C. Groove protector and spout. 5,012,960, Cl. 222-570.000.

Arnould, Jean C.; and Bird, Thomas G. C., to ICI-PHARMA. Cephem derivatives. 5,013,730, Cl. 514-202.000.

Arnould, Jean C.; Lohmann, Jean J.; and Pasquet, Georges, to ICI Pharma. Cephalosporin compounds. 5,013,731, Cl. 514-202.000.

Artiano, Adrian, to Acrowood Corporation. Machine and method for sorting out over-thick wood chips. 5,012,933, Cl. 209-671.000.

Aruga, Fusayoshi: *See—*
Numazawa, Junji; Yoneda, Yoshiro; and Aruga, Fusayoshi, 5,014,148, Cl. 360-125.000.

Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., to Amoco Corporation. Olefin polymerization catalyst. 5,013,702, Cl. 502-120.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Miyadera, Shunichi, 5,014,080, Cl. 354-403.000.
Sakai, Nobuya; and Aoki, Harumi, 5,014,136, Cl. 358-341.000.

Asai, Keniti; Ito, Hideaki; Nakagawa, Yoji; Shihara, Yasutaka; Hodate, Toshiaki; and Nakazaki, Akikazu. Decarbonization apparatus for coke oven chamber. 5,013,408, Cl. 202-241.000.

Asakawa, Kazuo, to Fujitsu Limited. Force controlling system. 5,012,591, Cl. 33-832.000.

Asakura, Mikio; Fujishima, Kazuyasu; and Matsuda, Yoshio, to Mitsubishi Denki Kabushiki Kaisha. Dynamic semiconductor memory device having reduced soft error rate. 5,014,241, Cl. 365-51.000.

Asano, Ichiro; Kojima, Kennosuke; and Yoneda, Aritoshi, to Horiba, Ltd. Infrared analyzer with improved calibration. 5,013,920, Cl. 250-343.000.

Asea Brown Boveri Limited: *See—*
Kogelschatz, Ulrich, 5,013,959, Cl. 313-36.000.

Ashida, Satoshi: *See—*
Kobayashi, Katsuyuki; Inui, Masaki; Ashida, Satoshi; Nakamura, Keiichi; and Yamamoto, Masaji, 5,012,908, Cl. 192-57.000.

Ashikawa, Yoshiaki: *See—*
Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.

Ashworth, Anthony J. Plotting and drafting apparatus with magnetic guide. 5,012,586, Cl. 33-430.000.

Aso, Toshiyuki; and Arakawa, Yasuo, to Fancu Ltd. Wire-extension end detector. 5,013,881, Cl. 219-69.120.

Asperger, Robert G.: *See—*
Thompson, Neil E. S.; and Asperger, Robert G., 5,013,451, Cl. 210-708.000.

Asten Group, Inc.: *See—*
Durkin, Thomas B.; and Biasone, Frank, 5,013,330, Cl. 51-297.000.

Aston, Walter J., to Yale Security Products Ltd. Electromagnetically activated mechanisms. 5,014,030, Cl. 335-228.000.

VOL
1126
ISS
1
MY
7
1991
UMI

AT&T Bell Laboratories: *See—*
- Atkins, Robert M.; Peterson, George E.; and Tuminaro, Raymond D., 5,013,130, Cl. 350-96.300.
- Bales, Bruce M.; and Miller, Paul E., 5,014,266, Cl. 370-60.100.
- Chiu, Tien-Heng; Cunningham, John E.; and Goossen, Keith W., 5,013,685, Cl. 437-184.000.
- Clark, William A.; Oien, Michael A.; and Pelosi, Walter, 5,014,162, Cl. 361-412.000.
- Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., 5,013,119, Cl. 350-96.160.
- Hahne, Ellen L.; Kalmanek, Charles R.; and Morgan, Samuel P., 5,014,265, Cl. 370-60.000.
- Harshavardhana, Paramasiv, 5,014,262, Cl. 370-16.000.
- Kasper, Bryon L., 5,013,903, Cl. 250-214.00A.
- Lory, Earl R.; and Olmer, Leonard J., 5,013,691, Cl. 437-238.000.
- Ransijn, Johannes G., 5,014,286, Cl. 375-110.000.

Atkins, Christopher J.: *See—*
- Zeilinski, Adam; and Atkins, Christopher J., 5,012,817, Cl. 128-744.000.

Atkins, Robert M.; Peterson, George E.; and Tuminaro, Raymond D., to AT&T Bell Laboratories. Method of making a carbon coated optical fiber. 5,013,130, Cl. 350-96.300.

Atkinson, Charles E., to Du Pont de Nemours, E. I., and Company. Animal repellant LLDPE. 5,013,551, Cl. 424-412.000.

Atlas Telecom, Inc.: *See—*
- Harvath, Steven J.; Kilgore, Vernon O.; and Zapp, Raymond K., 5,014,300, Cl. 379-100.000.

Atochem: *See—*
- Jay, Pierre; and Berger, Noelle, 5,014,033, Cl. 336-94.000.

Atochem North America, Inc.: *See—*
- MacLeay, Ronald E.; Sanchez, Jose; and Stein, Daryl L., 5,013,777, Cl. 524-159.000.

Atronics International Inc.: *See—*
- Chen, Ben W., 5,014,128, Cl. 358-160.000.

Atsugi Motor Parts Company, Limited: *See—*
- Akasaka, Akio; Suga, Seiji; Fukuda, Yasuo; and Sawada, Takanori, 5,012,773, Cl. 123-90.170.

Atsumi, Fumitoshi: *See—*
- Kubo, Naoki; Ishikawa, Takuma; Matsui, Toshio; Atsumi, Fumitoshi; and Doi, Yasuhiko, 5,014,092, Cl. 355-324.000.

Atsushi, Ohhori: *See—*
- Hirotaka, Ito; Jinichi, Taniguchi; Hirokazu, Kuzushita; and Atsushi, Ohhori, 5,013,967, Cl. 313-512.000.

Aubert, Guy, to Centre National de la Recherche Scientifique. Cylindrical permanent magnet with longitudinal induced field. 5,014,032, Cl. 335-306.000.

Augat, Inc.: *See—*
- Murphy, Robert F.; and Shek, Thompson, 5,013,266, Cl. 439-741.000.

Ausimont S.R.L.: *See—*
- Marraccini, Antonio; Perego, Gabriele; and Guastalla, Giovanni, 5,013,472, Cl. 252-78.100.

Austoft Industries Limited: *See—*
- Baker, Malcolm J.; and Warren, James R., 5,013,207, Cl. 414-489.000.

Australian Electro Optics Pty Ltd.: *See—*
- Hughes, John L., 5,013,151, Cl. 356-152.000.

Automated Agriculture Associates, Inc.: *See—*
- Ignatius, Ronald W.; Martin, Todd S.; Bula, Raymond J.; Morrow, Robert C.; and Tibbitts, Theodore W., 5,012,609, Cl. 47-58.000.

Automotion, Inc.: *See—*
- Berends, Howard; and Garzelloni, Thomas L., 5,012,914, Cl. 198-372.000.

Automotive Moulding Company: *See—*
- Stevens, William T., 5,013,077, Cl. 296-96.210.

Automotive Products (USA) Inc.: *See—*
- Leigh-Monstevens, Keith V.; Peterson, David C.; and Mabee, Brian, 5,014,038, Cl. 340-430.000.

Autotyp S.A.: *See—*
- Metraux, Michel, 5,012,848, Cl. 152-218.000.

Averette, Julius P., to Dynatech Precision Sampling Corporation. Fluid injector. 5,012,845, Cl. 141-329.000.

AVR Communications Ltd.: *See—*
- Leibman, Vadim, 5,014,319, Cl. 381-68.200.

Aware, Inc.: *See—*
- Lawton, Wayne M.; Huffman, John C.; and Zettler, William R., Jr., 5,014,134, Cl. 358-261.300.

Awazu, Kenzo, deceased: *See—*
- Matsunaga, Kazu; Okuda, Hiroshi; and Awazu, Kenzo, deceased, 5,013,480, Cl. 252-301.40H.

Awazu, Setsuko, legal representative: *See—*
- Matsunaga, Kazu; Okuda, Hiroshi; and Awazu, Kenzo, deceased, 5,013,480, Cl. 252-301.40H.

Ayukai, Kemmi: *See—*
- Koshida, Yoshinori; Ayukai, Kemmi; and Suto, Shin-ichi, 5,013,911, Cl. 250-239.000.

Azarian, Garo, to Novatome. Internal shell of a fast-neutron nuclear reactor comprising a thermal protection device. 5,013,521, Cl. 376-290.000.

Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A.: *See—*
- De Gregorio, Mauro, 5,013,484, Cl. 252-542.000.

Azzani, Roberto; Dori, Lino M.; and Scaglietti, Oscar, to Ferrari Engineering S.p.A. Process for the construction of hollow monolithic elements of composite material, particularly carbon fibres. 5,013,514, Cl. 264-512.000.

B. F. Goodrich Company, The: *See—*
- Lai, John T., 5,013,836, Cl. 540-512.000.

Babler, Fridolin: *See—*
- Leimer, Marius; von der Crone, Jost; Babler, Fridolin; and Neuschutz, Heinz, 5,013,455, Cl. 210-729.000.

Bach, Pierre; and Bernardet, Henri, to U.S. Philips Corporation. Protective device for neutron tubes. 5,013,969, Cl. 315-61.000.

Bagchi, Pranab; McSweeney, Gary J.; and Sargeant, Steven J., to Eastman Kodak Company. Preparation of low viscosity small-particle photographic dispersions in gelatin. 5,013,640, Cl. 430-546.000.

Baggio, Giorgio; and De Bortoli, Giuseppe, to Nordica S.r.l. Foot securing device with automatic release, particularly for rear-entry ski boots. 5,012,598, Cl. 36-119.000.

Bahout, Yvon: *See—*
- Lisimaque, Gilles; and Bahout, Yvon, 5,014,312, Cl. 380-25.000.

Baier, Alfred, to U.S. Philips Corporation. Arrangement for equalizing and demodulating binary continuous-phase angle-modulated data signals with modulation index 0.5. 5,014,283, Cl. 375-15.000.

Baier, Manfred, to Richard Wolf GmbH. Insufflation device for endoscopic intervention. 5,013,294, Cl. 604-26.000.

Baigas, Joseph F., Jr.; and Haynes, John T., Jr., to Kem-Wove Incorporated. Incontinent pad with high absorbent packet. 5,013,309, Cl. 604-368.000.

Bailey, Carlos; and Spain, Raymond G., to Airfoil Textron Inc. Composite blade perform with divergent root. 5,013,216, Cl. 416-230.000.

Bailey, James R.; and Schrock, C. Robert, to International Equipment & Supply Corp. Portable dental apparatus. 5,013,240, Cl. 433-77.000.

Baird, William C., Jr.; and Shoukry, Ehsan I., to Exxon Research and Engineering Company. Novel platinum-rhenium-alumina catalysts for reforming. 5,013,704, Cl. 502-241.000.

Baker, Harold L.: *See—*
- Nordstrom, Duane M.; and Baker, Harold L., 5,012,972, Cl. 229-162.000.

Baker, Malcolm J.; and Warren, James R., to Austoft Industries Limited. Crop transporter. 5,013,207, Cl. 414-489.000.

Baker, Peter E.; Warren, Michael G.; and White, David G. W., to British Petroleum Company, p.l.c., The. Latching mechanism. 5,013,178, Cl. 403-330.000.

Baker, Quentin A.; Mecredy, Henry E.; and O'Neal, Glenn B. Internal combustion engine. 5,012,777, Cl. 123-254.000.

Bakke, Allan P. Electric blood warmer utilizing heating by condensation. 5,013,889, Cl. 392-470.000.

Balakrishnan, Balu, to Power Integrations, Inc. Self powering technique for integrated switched mode power supply. 5,014,178, Cl. 363-49.000.

Baldassarri, Agostino: *See—*
- Delprato, Ivano; and Baldassarri, Agostino, 5,013,639, Cl. 430-546.000.

Baldwin, Samuel L.: *See—*
- Osteen, Mitchell M.; and Baldwin, Samuel L., 5,014,175, Cl. 362-348.000.

Bales, Bruce M.; and Miller, Paul E., to AT&T Bell Laboratories. Circuit switching system for interconnecting logical links between packet switching networks. 5,014,266, Cl. 370-60.100.

Ball, Donald L.; and Boateng, Daniel A. D., to Cominco Ltd. Method for the recovery of mercury from mercury-containing material. 5,013,358, Cl. 75-742.000.

Balzers Aktiengesellschaft: *See—*
- Kunz, Anton, 5,013,268, Cl. 439-807.000.

Ban, Ivan: *See—*
- Walenta, Rainer; Muller-Peddinghaus, Reiner; Ban, Ivan; Wurl, Michael; and Preuschoff, Ulf, 5,013,852, Cl. 549-362.000.

Bandi, Gianluigi: *See—*
- Passarotti, Carlos; Fossati, Antonio; Valenti, Mauro; and Bandi, Gianluigi, 5,013,554, Cl. 424-440.000.

Bando, Noboru: *See—*
- Takahashi, Keizo; and Bando, Noboru, 5,013,223, Cl. 417-413.000.

Banerjee, Santimoy; Karns, Jeffrey S.; and Chakrabarty, Ananda M., to University of Illinois, The Board of Trustees of the. Production of emulsifying agents and surfactants. 5,013,654, Cl. 435-72.000.

Barbaro, Joseph L.: *See—*
- Naso, Joseph I.; Barbaro, Joseph L.; and Howard, John, 5,012,765, Cl. 119-166.000.

Barbierato, Roberto: *See—*
- Falletta, Angelo; and Barbierato, Roberto, 5,012,964, Cl. 224-153.000.

Barco, Inc.: *See—*
- Goering, Kenneth J.; and Eslick, Robert F., 5,013,561, Cl. 426-28.000.

Bargues, Michel; Boya, Didier; Gaillard, Dominique; and Netter, Pierre, to Comurhex Societe pour la Conversion de l'Uranium en Metal et Hexafluorure. Process for restoring locally damaged parts, particularly anticathodes. 5,013,274, Cl. 445-2.000.

Barker, Jeffrey S.: *See—*
- Nilsson, Richard C.; and Barker, Jeffrey S., 5,013,125, Cl. 350-96.230.

Barkey, Kevin C.: *See—*
- DeClair, Brian G.; and Barkey, Kevin C., 5,012,599, Cl. 37-117.500.

Barnes, Wilson R.: *See—*
- Howard, Robert A.; and Barnes, Wilson R., 5,013,533, Cl. 423-133.000.

Barnett, Anthony M.; and Hallbery, David A., to Eastman Kodak Company. Photographic silver halide element containing small amounts of bromide ions. 5,013,638, Cl. 430-539.000.

Barnett & Casbarian, Inc.: *See—*
- Casbarian, Aramis O. P.; and Dewalt, Kenneth M., 5,012,875, Cl. 175-9.000.

Baroid Technology, Inc.: *See—*
- Bond, John A., 5,012,854, Cl. 166-363.000.

Barron, Milagros C.; Swope, Ronald L.; and Wilkerson, John M., III, to National Starch and Chemical Investment Holding Corporation. Copolymers as thickeners and modifiers for latex systems. 5,013,787, Cl. 524-555.000.

Barrows, Thomas H., to Minnesota Mining and Manufacturing Company. Semiabsorbable bone plate spacer. 5,013,315, Cl. 606-71.000.

Barry, Leon: *See—*
- Espeut, Kenneth W.; and Barry, Leon, 5,012,862, Cl. 165-133.000.

Barry, Michael W.: *See—*
- Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., 5,014,267, Cl. 370-62.000.

Barry, Robert C., to Du Pont de Nemours, E. I., and Company. Adjustable dot gain simulation for color proofing. 5,014,086, Cl. 355-71.000.

Bartholomew, Stephen W.: *See—*
- Peebles, Richard J.; Michna, Richard J.; Monat, David E.; Bartholomew, Stephen W.; and Adams, Craig F., 5,012,741, Cl. 102-275.400.

Bartlett, Thomas C. Buoyant body surfing suit. 5,013,271, Cl. 441-65.000.

BASF Aktiengesellschaft: *See—*
- Bobbink, Hendrikus; Fischer, Hermann; Heinz, Gerhard; Matthias, Klaus; Seibring, Joachim; and Stegmaier, Wolfgang, 5,013,816, Cl. 528-173.000.
- Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Krieg, Wolfgang; and Hofmeister, Peter, 5,013,847, Cl. 548-378.000.
- Payne, Robert; Goetz, Walter; and Wolf, Uwe, 5,013,786, Cl. 524-514.000.
- Schwalge, Barbara; Plath, Peter; Eicken, Karl; Meyer, Norbert; and Wuerzer, Bruno, 5,013,354, Cl. 71-95.000.

BASF Corporation: *See—*
- Carpenter, Clint W.; and Savino, Thomas G., 5,013,770, Cl. 523-213.000.

Basic Measuring Instruments: *See—*
- Mofachern, Alexander, 5,014,229, Cl. 364-571.040.

Basile, Philip C.; and Kabernagel, Bruce E., to General Electric Company. Frequency shift keying communication system with selectable carrier frequencies. 5,014,285, Cl. 375-62.000.

Basler Electric Company: *See—*
- Wilkerson, Timothy M., 5,014,153, Cl. 361-36.000.

Bateman, Glenn, to Tektronix, Inc. Optical time domain testing instrument. 5,013,907, Cl. 250-227.120.

Bates, Michael R. Baseball practice mechanism. 5,012,790, Cl. 124-81.000.

Bath, Colin, to Imperial Chemical Industries PLC. Composition of carboxylic acid and sulphur-containing acids or salts suitable for incorporation into olefin polymers. 5,013,778, Cl. 524-173.000.

Bauer, Keith A.: *See—*
- Ben-Bassat, Arie; Bauer, Keith A.; Chang, Shing; and Chang, Sheng-Yung, 5,013,662, Cl. 435-212.000.

Baum, Lloyd; and Fischer, Dan E. Child walker-trainer. 5,013,032, Cl. 272-70.300.

Baumgarth, Manfred: *See—*
- Gericke, Rolf; Baumgarth, Manfred; Lues, Ingeborg; Bergmann, Rolf; and De Peyer, Jacques, 5,013,853, Cl. 549-401.000.

Baumgartner, Anton: *See—*
- Hecht, Hartmuth; Paul, Wolfgang; and Baumgartner, Anton, 5,014,281, Cl. 372-59.000.

Baumgen, Heinz: *See—*
- Sackmann, Gunter; Konig, Joachim; and Baumgen, Heinz, 5,013,794, Cl. 525-203.000.

Baxter, Anthony D.: *See—*
- Coates, Ian H.; Oxford, Alexander W.; North, Peter C.; Miller, Thomas; Baxter, Anthony D.; and Hammond, Kevin I., 5,013,733, Cl. 514-213.000.

Baxter International Inc.: *See—*
- Hai, Ton T.; and Nelson, Deanna J., 5,013,866, Cl. 562-474.000.

Bayer Aktiengesellschaft: *See—*
- Berneth, Horst; and Raue, Roderich, 5,013,857, Cl. 552-110.000.
- Genz, Joachim; and Dicke, Hans-Rudolf, 5,013,815, Cl. 528-171.000.
- Harnisch, Horst; and Raue, Roderich, 5,013,627, Cl. 430-110.000.
- Jelich, Klaus; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,013,351, Cl. 71-92.000.
- Joseph, Werner; and Schittenhelm, Hans-Joachim, 5,013,362, Cl. 501-24.000.
- Marquardt, Gerwig; and Preiss, Peter, 5,013,858, Cl. 556-401.000.
- Nielinger, Werner; Bockmann, August; Brinkmeyer, Hermann; and Schulte, Helmut, 5,013,518, Cl. 264-564.000.
- Rademachers, Jakob; Bockelmann, Wolfgang; Burow, Wilfried; and Schafer, Kurt, 5,013,365, Cl. 106-456.000.
- Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Jungverdorben, Hermann Josef; and Dross, Joachim, 5,013,502, Cl. 264-103.000.
- Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,013,504, Cl. 264-130.000.
- Sackmann, Gunter; Konig, Joachim; and Baumgen, Heinz, 5,013,794, Cl. 525-203.000.
- Scholl, Hans-Joachim, 5,013,838, Cl. 544-193.000.
- Schwirtlich, Ingo; and Woditsch, Peter, 5,013,393, Cl. 156-616.200.
- Thormer, Joachim; Rohde, Ernst; and Szentivanyi, Zsolt, 5,013,783, Cl. 524-450.000.

Bayer, Thomas; Buchholz, Rainer; Deger, Hans-Matthias; and Wink, Joachim, to Hoechst Aktiengesellschaft. Process for the preparation of colorants or monacolin K in a sterile fluidized bed of low water content. 5,013,655, Cl. 435-119.000.

Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpe, Hans-Rudolf, to Ciba-Geigy Corporation. Substituted propane-phosphinic acid compounds. 5,013,863, Cl. 562-11.000.

Bayne, Steven T.: *See—*
- Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., 5,013,324, Cl. 623-23.000.

Bear Automotive Service Equipment Company: *See—*
- Kling, Michael J.; Surwillo, John M.; Puetz, Peter A.; and Braun, Robert T., 5,014,227, Cl. 364-559.000.

Beasom, James D.: *See—*
- O'Mara, William E., Jr.; and Beasom, James D., 5,014,108, Cl. 357-49.000.

Beaton, William I.: *See—*
- Mosby, James F.; Peck, Lawrence B.; Taylor, James L.; and Beaton, William I., 5,013,427, Cl. 208-211.000.

Beaufoy, Jeffrey J.; Aigner, Robert C.; and Burke, Steven A., to Tennant Company. Unattended air cleaning system for surface maintenance machine. 5,013,333, Cl. 55-21.000.

Beaumond, David: *See—*
- Muenter, Annabel; Adin, Anthony; Parton, Richard L.; Pightling, Nicholas A.; and Beaumond, David, 5,013,642, Cl. 430-574.000.

Becher, Yona, to Israel Aircraft Industries Ltd. Centrifugal brake and gyroscopes including same. 5,012,904, Cl. 188-185.000.

Beck, Richard: *See—*
- Lee, James C. K.; Amdahl, Gene M.; Beck, Richard; Lee, Chune; and Hu, Edward, 5,014,161, Cl. 361-388.000.

Beck, Robert L.: *See—*
- Nienhuis, James H.; Clark, Jeffrey L.; De Pree, Michael L.; and Beck, Robert L., 5,013,252, Cl. 439-215.000.

Becker, Lane T. Carrying bag for skis, boots thereon and poles. 5,012,921, Cl. 206-315.100.

Becker, Richard J.: *See—*
- Tumpey, John J.; and Becker, Richard J., 5,013,948, Cl. 310-68.00D.

Beckman Instruments, Inc.: *See—*
- Stafford, Roger A.; Aday, Roy W., Jr.; Schmidt, Robert L.; and McCollum, Myron L., 5,014,216, Cl. 364-496.000.

Becton, Dickinson and Company: *See—*
- Solomon, Donald D.; and Byron, M. Parke, 5,013,306, Cl. 604-265.000.
- Solomon, Donald D.; Taller, Robert A.; and Williamitis, Victor A., 5,013,717, Cl. 514-56.000.
- Zaragoza, Robert; McLinden, Thomas V.; and O'Connell, James A., 5,013,161, Cl. 374-208.000.

Bedard, Robert L.; Vail, Lawrence D.; Wilson, Stephen T.; and Flanigen, Edith M., to UOP. Process for separating a mixture of molecular species using crystalline microporous metal sulfide compositions. 5,013,337, Cl. 55-75.000.

Bedard, Robert L.; Patton, Robert L.; and Wilson, Stephen T., to UOP. Stabilized aluminophosphate compositions and process for preparing same. 5,013,535, Cl. 423-277.000.

Bedbrook, John R.; Chaleff, Roy S.; Falco, Saverio C.; Mazur, Barbara J.; Somerville, Christopher R.; and Yadav, Narendra S., to Du Pont de Nemours, E. I., and Company. Nucleic acid fragment encoding herbicide resistant plant acetolactate synthase. 5,013,659, Cl. 435-172.300.

Beedle, Edward E.; Robertson, David W.; and Wong, David T., to Eli Lilly and Company. Serotonin antagonists. 5,013,761, Cl. 514-650.000.

Beguin, Jean-Yves: *See—*
- Rolland, Jean-Luc; Beguin, Jean-Yves; Magna, Henriette; Jacobelli, Alain; and Penot, Maurice, 5,013,394, Cl. 156-627.000.

Beidler, Florence L.: *See—*
- Eckerd, Roger C.; and Beidler, Florence L., 5,013,078, Cl. 296-100.000.

Beigbeder, Gerard: *See—*
- Michoud, Vincent; and Beigbeder, Gerard, 5,014,042, Cl. 340-583.000.

Bell Communications Research, Inc.: *See—*
- Velius, George A., 5,014,303, Cl. 379-201.000.

Bell, Malcolm R., to Sterling Drug Inc. 3-arylcarbonyl- and 3-cycloalkyl-carbonyl-1-aminoalkyl-1H-indoles. 5,013,732, Cl. 514-210.000.

Bell, Malcolm R.: *See—*
- Ward, Susan J.; and Bell, Malcolm R., 5,013,837, Cl. 544-143.000.

Bell, Weldon K.; Haag, Werner O.; Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corporation. Conversion of light hydrocarbons to ether rich gasoline. 5,013,329, Cl. 44-448.000.

Bellos, Thomas J.; and Keating, Richard D., to Petrolite Corporation. Resolution of emulsions formed in the production of pharmaceuticals. 5,013,452, Cl. 210-708.000.

Beloit Corporation: *See—*
- Hergert, Richard R., 5,013,406, Cl. 162-343.000.

Beltone Electronics Corporation: *See—*
- Anderson, James R., 5,014,016, Cl. 330-10.000.

Belyak, Vladimir B.: *See—*
- Polyak, Mark U.; Abugov, Gely P.; and Belyak, Vladimir B., 5,014,315, Cl. 380-49.000.

Ben-Bassat, Arie; Bauer, Keith A.; Chang, Shing; and Chang, Sheng-Yung, to Cetus Corporation. Bacterial methionine n-terminal peptidase. 5,013,662, Cl. 435-212.000.

VOL
126
ISS
1
MY
7
1991
UMI

Bendix France: *See—*
Gauthier, Jean-Pierre, 5,012,723, Cl. 91-369.210.
Gautier, Jean-Pierre; and Verbo, Pedro, 5,012,998, Cl. 248-225.200.
Maligne, Jean-Charles; and Magnaval, Jean-Louis, 5,012,903, Cl. 188-79.540.

Benedict, Morgan D. Information shapes. 5,013,245, Cl. 434-170.000.

Beneke, Ulrich; Gross, Jurgen; Oepping, Wilfried; Schnelle, Manfred; and Sundermeier, Gunter, to Paul Hettich Gmbh & Co. Furniture hinge. 5,012,551, Cl. 16-49.000.

Benfaremo, Nicholas, to Texaco Inc. Dispersant/antioxidant VII lubricant additive. 5,013,468, Cl. 252-47.500.

Benfaremo, Nicolas, to Texaco Inc. Antioxidant VII lubricant additive. 5,013,470, Cl. 252-47.500.

Benner, Gerd, to Carl-Zeiss-Stiftung. Method of illuminating an object in a transmission electron microscope. 5,013,913, Cl. 250-307.000.

Bennett, Jean: *See—*
Bennett, William R., Jr.; and Bennett, Jean, 5,012,815, Cl. 128-715.000.

Bennett, William R., Jr.; and Bennett, Jean, to Yale University. Dynamic spectral phonocardiograph. 5,012,815, Cl. 128-715.000.

Benninger AG: *See—*
Gironi, Fabrizio; Iten, Jakob; Koslowski, Gerhard; and Probst, Willy, 5,012,564, Cl. 28-193.000.

Benzur, Yoram. Rocker. 5,013,086, Cl. 297-272.000.

Berends, Howard; and Garzelloni, Thomas L., to Automotion, Inc. Diverter assembly for article conveyor. 5,012,914, Cl. 198-372.000.

Bergemont, Albert, to SGS-Thomson Microelectronics S.A. A method of manufacturing integrated circuits comprising EPROM memory and logic transistors. 5,013,674, Cl. 437-43.000.

Berger, Noelle: *See—*
Jay, Pierre; and Berger, Noelle, 5,014,033, Cl. 336-94.000.

Bergmann, Rolf: *See—*
Gericke, Rolf; Baumgarth, Manfred; Lues, Ingeborg; Bergmann. Rolf; and De Peyer, Jacques, 5,013,853, Cl. 549-401.000.

Bergounhon, Rene . Oven for dehydrating pulverulents, sand or granules. 5,013,237, Cl. 432-100.000.

Berhow, Steven W.: *See—*
Parins, David J.; Szczech, Gerald S.; Nicoloff, Demitre M.; and Berhow, Steven W., 5,013,312, Cl. 606-37.000.

Beriger, Ernst; and Eckhardt, Wolfgang, to Ciba-Geigy Corporation. Nematicidal compositions. 5,013,745, Cl. 514-364.000.

Berman, Elizabeth F.; Buckwalter, Brian L.; Cupps, Thomas L.; and Gardner, Joseph H., to Procter & Gamble Company, The. Compounds and compositions having anti-inflammatory and analgesic activity. 5,013,759, Cl. 514-622.000.

Bernard, Werner, to Siecor Corporation. Flexible fiber optic distribution cable. 5,013,127, Cl. 350-96.230.

Bernardet, Henri: *See—*
Bach, Pierre; and Bernardet, Henri, 5,013,969, Cl. 315-61.000.

Berndt, Mitchell J.: *See—*
Christolini, Ben A.; Le, Kimanh T.; Berndt, Mitchell J.; and Howe Steven E., 5,013,428, Cl. 208-415.000.

Berneth, Horst; and Raue, Roderich, to Bayer Aktiengesellschaft. Process for the preparation of sulpho-free triphenyl-methane dyestuffs. 5,013,857, Cl. 552-110.000.

Bertin & Cie: *See—*
Viannay, Stephane G. J.; Roth, Bernard M.; Mirigay, Solange M. V.; and Chastang, Georges J. B., 5,012,980, Cl. 239-423.000.

Bertok, Bela: *See—*
Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.

Bertot, Maurice M., to ECIA - Equipements Et Composants Pour L'Industrie Automobile. Cluster of molded gears with helical teeth. 5,012,691, Cl. 74-434.000.

Bessho, Yoshihiro: *See—*
Tsuda, Toshio; Horio, Yasuhiko; Bessho, Yoshihiro; and Ishida, Toru, 5,014,111, Cl. 357-68.000.

Bessinger, Stephen L.; and Nelson, Michael G., to Consolidation Coal Company. Method of indirect measurement of cowl position on a longwall shearer. 5,013,091, Cl. 299-1.000.

Best, Donald F.: *See—*
Vassilakis, James G.; and Best, Donald F., 5,013,699, Cl. 502-73.000.

Best, Steven A., to Exxon Chemical Patents, Inc. Homogeneous or support vanadium catalyst olefin polymerization process. 5,013,803, Cl. 526-128.000.

Betzler, Mark H., to Dresser Industries, Inc. Fluid flow indicator system. 5,012,840, Cl. 137-559.000.

Beutler, Hans J.; Gahrs, Hans J.; Lenhard, Ulrich; and Lurken, Franz, to Messer Griesheim GmbH. Process for the extraction of organic components from solid materials. 5,012,827, Cl. 131-297.000.

BFD, Inc.: *See—*
Russell, John P.; Carroll, Terry; and Miller, Sam, 5,013,304, Cl. 604-167.000.

Bhagwat, Pradeep M.; Daniel, Daniel S.; and Woods, Samuel G., to Black & Decker Inc. Thermally responsive battery charger. 5,013,993, Cl. 320-35.000.

Biasone, Frank: *See—*
Durkin, Thomas B.; and Biasone, Frank, 5,013,330, Cl. 51-297.000.

Bienek, Richard J.; and Ford, Henry E. Self-propelled jacking apparatus for factory constructed buildings. 5,012,879, Cl. 180-6.480.

Bihari, Bernard; and Drury, Finvola. Method of treating chronic fatigue syndrome using an opiate receptor antagonist. 5,013,739, Cl. 514-282.000.

Bihlmaier, John A., to Sundstrand Corporation. Process for making articles with smooth complex internal geometries. 5,012,853, Cl. 164-75.000.

Biles, Jonathan R. Polarization selective holographic optical element. 5,013,107, Cl. 350-3.700.

Bimanand, Alex: *See—*
Armstrong, Tom; Bimanand, Alex; Jacques, Dennis M., Sr.; and Raffo, John A., 5,013,924, Cl. 250-504.00R.

Binzel, Charles P.: *See—*
Kromenaker, Susan C.; Lefebvre, James D.; and Binzel, Charles P., 5,014,294, Cl. 379-58.000.

Bionostics, Incorporated: *See—*
Chiang, Ching, 5,013,666, Cl. 436-11.000.

Bird, Thomas G. C.: *See—*
Arnould, Jean C.; and Bird, Thomas G. C., 5,013,730, Cl. 514-202.000.

Birleson, Stanley V., to Texas Instrument Incorporated. Phased frequency steered antenna array. 5,013,979, Cl. 342-375.000.

Bischoff, Linda L. Athletic protector. 5,012,802, Cl. 128-158.000.

Biskeborn, Robert G.: *See—*
Horvath, Joseph L.; Biskeborn, Robert G.; and Yakubowski, Carl, 5,014,117, Cl. 357-81.000.

Bittel, Bertram, to Werbung im Sudwestfunk GmbH. Hybrid master control desk for analog and digital audio signals. 5,014,341, Cl. 455-3.000.

Bittiger, Helmut: *See—*
Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpe, Hans-Rudolf, 5,013,863, Cl. 562-11.000.

Bjork, Anders K., to Pharmacia AB. Method of treating therapy-resistant schizophrenia with amperozide (N-ethyl-4-(4',4'-bis(p-fluorophenyl)butyl)-1-piperazine-carboxamide. 5,013,735, Cl. 514-255.000.

Black & Decker Inc.: *See—*
Bhagwat, Pradeep M.; Daniel, Daniel S.; and Woods, Samuel G , 5,013,993, Cl. 320-35.000.

Black, John W.: *See—*
Acree, William M.; and Black, John W., 5,013,663, Cl. 435-237.000.

Blackhurst, Michael L. Barrier assembly. 5,012,852, Cl. 160-351.000.

Blackman, Steven; and Ralske, Irene, to Thames Pharmacal Co., Inc. Aqueous gels containing topical medicaments. 5,013,545, Cl. 424-81.000.

Blenkers, Johannes: *See—*
Coosmans, Luc M. C.; Blenkers, Johannes; and Loontjens, Jacobus, 5,013,701, Cl. 502-110.000.

Blevins, Richard W.; and Turner, S. Richard, to Eastman Kodak Company. Butadiene monoepoxide/maleic anhydride copolymers. 5,013,806, Cl. 526-271.000.

Blochle, Hans; and Stooss, Paul, to Robert Bosch GmbH. Compass saw. 5,012,583, Cl. 30-392.000.

Block, Wayne F., to Armco, Inc. Method for treating electrical steel by electroetching and electrical steel having permanent domain refinement. 5,013,373, Cl. 148-113.000.

Block, Wayne F.; and Wright, Wade S., to Armco Inc. Permanent domain refinement by aluminum deposition. 5,013,374, Cl. 148-113.000.

Blomberg Robotertecknik GmbH: *See—*
Hans, Richter, 5,014,224, Cl. 338-99.000.

Bloom, David M.: *See—*
Rodwell, Mark J. W.; and Bloom, David M., 5,014,018, Cl. 333-20.000.

Bloom, Myron G.: *See—*
Lockwood, Alan C.; and Bloom, Myron G., 5,013,872, Cl. 174-65.00R.

Bloothoofd, William B., to Hercules, Incorporated. Printing plate locking device. 5,012,738, Cl. 101-415.100.

Blumberg, Lawrence R.; Coolbaugh, Douglas D.; Kurowski, John A.; and Stromecki, Eugene A., to International Business Machines Corporation. Continuous regeneration of acid solution. 5,013,395, Cl. 156-627.000.

Board of Governors of Wayne State University: *See—*
Schaap, Arthur P., 5,013,827, Cl. 536-17.300.

Board of Regents, The University of Texas System, The: *See—*
Munford, Robert S.; and Hall, Catherine L., 5,013,661, Cl. 435-197.000.
Redburn, Dianna A., 5,013,540, Cl. 424-10.000.

Board of Trustees Operating Michigan State University: *See—*
Putnam, Alan R.; Mishra, Saroj K.; and Nair, Muraleedharan G., 5,013,549, Cl. 424-116.000.

Boateng, Daniel A. D.: *See—*
Ball, Donald L.; and Boateng, Daniel A. D., 5,013,358, Cl. 75-742.000.

Bobbink, Hendrikus; Fischer, Hermann; Heinz, Gerhard; Matthias, Klaus; Seibring, Joachim; and Stegmaier, Wolfgang, to BASF Aktiengesellschaft. Preparation of particulate polymers. 5,013,816, Cl. 528-173.000.

BOC, Inc.: *See—*
Kudzma, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., 5,013,742, Cl. 514-329.000.

Bocci, Paul M.: *See—*
Mulford, Keith I.; and Bocci, Paul M., 5,014,314, Cl. 380-43.000.

Bockelmann, Wolfgang: *See—*
Rademachers, Jakob; Bockelmann, Wolfgang; Burow, Wilfried; and Schafer, Kurt, 5,013,365, Cl. 106-456.000.

Bockmann, August: *See—*
Nielinger, Werner; Bockmann, August; Brinkmeyer, Hermann; and Schulte, Helmut, 5,013,518, Cl. 264-564.000.

---

Bodenseewerk Geratetechnik GmbH: *See—*
Nesheiwat, Afif M.; and Drake, Charles A., 5,013,986, Cl. 318-593.000.

Bodor, Janos; Schoenmakers, Albert W.; and Verhue, Walter M., to Van den Bergh Foods Co., Division of Conop-Co, Inc. Spreads having a good microbiological stability and a fresh dairy taste. 5,013,573, Cl. 426-602.000.

Boehler Gesellschaft M.B.H.: *See—*
Leban, Karl, 5,013,524, Cl. 420-87.000.

Boehringer Mannheim GmbH: *See—*
Town, Michael-Harold; Siedel, Joachim; and Ziegenhorn, Joachim, 5,013,647, Cl. 435-25.000.

Boeing Company, The: *See—*
Haworth, John, 5,012,668, Cl. 73-24.060.
Julien, Gerald J.; Robinson, Steven P.; and Bondy, Ronald H., 5,013,507, Cl. 264-219.000.
Nguyen, Dung D., 5,014,053, Cl. 340-979.000.
Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,014,060, Cl. 342-2.000.
Pinson, George T., 5,012,991, Cl. 244-3.120.
Smith, Catherine M.; and Cohen, Gerald C., 5,014,220, Cl. 364-513.000.

Bogucki-Land, Bodgan, to Karl Mayer Textilmaschinenfabrik GmbH. Stretching arrangement for stretching of plastic threads. 5,012,563, Cl. 28-172.100.

Boguslavsky, Alexandr M.: *See—*
Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.

Bolduc, Lee R. Aerosol dispenser and method. 5,012,978, Cl. 239-304.000.

Boller, Arthur; Buchecker, Richard; Fromm, Hans-Jurgen; Kelly, Stephen; Schadt, Martin; and Villiger, Alois, to Hoffmann-La Roche Inc. Liquid crystal compounds and indicating device employing same. 5,013,476, Cl. 252-299.610.

Bonato, Marc: *See—*
Follet, Michel; and Bonato, Marc, 5,013,756, Cl. 514-544.000.

Bond, Irvin D. Workpiece transfer apparatus with folding arms. 5,013,210, Cl. 414-744.600.

Bond, John A., to Baroid Technology, Inc. Pressure release valve for a subsea blowout preventer. 5,012,854, Cl. 166-363.000.

Bondy, Ronald H.: *See—*
Julien, Gerald J.; Robinson, Steven P.; and Bondy, Ronald H., 5,013,507, Cl. 264-219.000.

Boning, Hartwig: *See—*
Herziger, Gerd; Loosen, Peter; Marten, Otto; and Boning, Hartwig, 5,014,282, Cl. 372-93.000.

Boon, John R.: *See—*
Simpson, Sharon M.; and Boon, John R., 5,013,622, Cl. 430-550.000.

Boone, Carrie: *See—*
Garner, Paul M.; Boone, Carrie; and Cepulis, Darren J., 5,014,193, Cl. 364-200.000.

Boone, Joseph E.; and McCormick, Ben F., II, to Uniden America Corporation. Self-programming scanning radio receiver. 5,014,348, Cl. 455-165.000.

Borchardt, Jurgen: *See—*
Wullenweber, Heinz; and Borchardt, Jurgen, 5,013,418, Cl. 204-253.000.

Borden, Inc.: *See—*
Proffitt, James R.; and Richardson, Dale S., 5,012,928, Cl. 206-508.000.

Bormann, Uwe; Matzko, Ekkehard; and Gorner, Dieter, to Wampfler GmbH. Conveying device. 5,012,746, Cl. 104-93.000.

Borras, Jaime A.: *See—*
Comroe, Richard A.; Zdunek, Kenneth J.; Sasuta, Michael D.; Coombes, Daniel J.; and Borras, Jaime A., 5,014,345, Cl. 455-54.000.

Borrione, Pierluigi A. V.: *See—*
Morris, Gregory J. E.; Borrione, Pierluigi A. V.; and Leoni, Umberto, 5,013,414, Cl. 204-98.000.

Borst, Rodney D., to Placon Corporation. Reclosable thermoformed blister card display package. 5,012,927, Cl. 206-470.000.

Borst, Willi; and Wooge, Christian, to Bostik, Inc. Method of operating a hot melt dispenser. 5,012,953, Cl. 222-1.000.

Bosch, Sieds, to U.S. Philips Corp. Shaving apparatus. 5,012,577, Cl. 30-43.600.

Bose Corporation: *See—*
Markow, Mitch A.; Moody, Dale O.; and Greenberger, Hal P., 5,014,323, Cl. 381-194.000.

Bosley, Denis V., to Multacc Corporation. Electronic lock system. 5,014,049, Cl. 340-825.310.

Bostik, Inc.: *See—*
Borst, Willi; and Wooge, Christian, 5,012,953, Cl. 222-1.000.

Bostom Metal Products Corp.: *See—*
Kessler, Gerald, 5,013,596, Cl. 428-100.000.

Botannet, Bernard; Le Fur, Isidore; Massonneau, Viviane; and Mulhauser, Michel, to Rhone-Poulenc Sante. Process for the preparation of aromatic ethers. 5,013,855, Cl. 549-539.000.

Botar, Sandor: *See—*
Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.

Bothe, Lothar; Gribbin, John D.; and Dinter, Peter, to Hoechst Aktiengesellschaft. Self-supporting sheet-like article with superior antistatic characteristics. 5,013,601, Cl. 428-323.000.

Bourbon, Andre: *See—*
Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, 5,013,835, Cl. 540-491.000.

Bournonville, Jean-Paul: *See—*
Dang Vu, Quang; Bournonville, Jean-Paul; and Le Page, Jean-Francois, 5,013,426, Cl. 208-134.000.

Bourse Trading Company, Ltd.: *See—*
Obeck, Carl J., 5,014,052, Cl. 340-906.000.

Bowlin, Terry L., to Merrell Dow Pharmaceuticals Inc. Method of effecting immunosuppression. 5,013,719, Cl. 514-11.000.

Boy, Max W. Rotary cleaning and polishing pad. 5,012,545, Cl. 15-230.120.

Boya, Didier: *See—*
Bargues, Michel; Boya, Didier; Gaillard, Dominique; and Netter, Pierre, 5,013,274, Cl. 445-2.000.

Boyd, Douglas P.; and Lanzara, Giovanni, to Imatron, Inc. Computerized tomographic x-ray scanner system and gantry assembly. 5,014,293, Cl. 378-197.000.

Braden, Jeffrey S.: *See—*
Mahulikar, Deepak; Crane, Jacob; and Braden, Jeffrey S., 5,013,871, Cl. 174-52.400.

Brady, Robert V.: *See—*
Buntaine, James R.; and Brady, Robert V., 5,013,641, Cl. 430-569.000.

Braish, Tamim F.; and Fox, Darrell E., to Pfizer Inc. Process for optically active 2-alkyl-2,5-diazabicyclo(2.2.1) heptanes. 5,013,839, Cl. 544-349.000.

Brandenburg, Karlheinz: *See—*
Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.

Brandstetter, Rudi, to L. Schuler GmbH. Press installation having several presses for the working of sheet-metal parts. 5,012,665, Cl. 72-405.000.

Braun, Robert T.: *See—*
Kling, Michael J.; Surwillo, John M.; Puetz, Peter A.; and Braun, Robert T., 5,014,227, Cl. 364-559.000.

Breco Kunststoffverarbeitungs-GmbH & Co. KG: *See—*
Breher, Rudolf, 5,013,286, Cl. 474-205.000.

Breda Packaging B.V.: *See—*
Van Oord, Jan J. J., 5,012,628, Cl. 53-448.000.

Breher, Rudolf, to Breco Kunststoffverarbeitungs-GmbH & Co. KG. Belt drive comprising a toothed belt and a toothed pulley. 5,013,286, Cl. 474-205.000.

Breithaupt, Albert, to Trube & Kings KG. High-frequency-impervious shielding door. 5,013,869, Cl. 174-35.0MS.

Breuer, Rudolf; Lutz, Gottfried; Pertzsch, Albert; and Schultz, Helmut, to Reel/Frame: 5061/0928 Agfa-Gevaert Aktiengesellschaft. Magnetic tape cassette having outer appearance modified by surface printing. 5,014,150, Cl. 360-132.000.

Bridges, Jack E., to Uentech Corporation. Corrosion inhibition method and apparatus for downhole electrical heating in mineral fluid wells. 5,012,868, Cl. 166-248.000.

Bridgestone Corporation: *See—*
Miyazaki, Tadaaki; Ogino, Takao; Masuda, Yoshitomo; Wada, Hiroaki; and Kawagoe, Takahiro, 5,013,620, Cl. 429-194.000.

Bridgestone Cycle Co., Ltd.: *See—*
Ishibashi, Hideyuki, 5,012,900, Cl. 188-24.120.

Brink, Mundy, to Geco A.S. Method in a real time control system for seismic interference. 5,014,249, Cl. 367-63.000.

Brinkmeyer, Hermann: *See—*
Nielinger, Werner; Bockmann, August; Brinkmeyer, Hermann; and Schulte, Helmut, 5,013,518, Cl. 264-564.000.

Briscoe, Dennis R.: *See—*
Masters, John R.; and Briscoe, Dennis R., 5,014,237, Cl. 364-900.000.

Briscoe, Milton R.: *See—*
Tyrrell, Raymond E.; Briscoe, Milton R.; Sutherland, Joseph E.; and Tyrrell, Raymond E., 5,014,268, Cl. 370-68.000.

Bristol-Myers Company: *See—*
Kaneko, Takushi; and Wong, Henry S. L., 5,013,851, Cl. 549-298.000.

Bristol, Steven L.; and Casanueva, Joseph D., to Bristol and Williams. Hand-held, battery-operated rotary blade saw. 5,012,582, Cl. 30-391.000.

Bristol and Williams: *See—*
Bristol, Steven L.; and Casanueva, Joseph D., 5,012,582, Cl. 30-391.000.

British Aerospace Public Limited Company: *See—*
Miller, Lee D., 5,012,718, Cl. 89-1.816.

British Petroleum Company, p.l.c., The: *See—*
Baker, Peter E.; Warren, Michael G.; and White, David G. W., 5,013,178, Cl. 403-330.000.
Cayless, Richard A.; and Hazell, Leonard B., 5,013,381, Cl. 156-281.000.

British Telecommunications public limited company: *See—*
Healey, Peter; and Mallinson, Stephen R., 5,013,140, Cl. 350-347.00E.
Kashyap, Raman, 5,013,115, Cl. 350-96.140.

Brodeur, Bernard R.; Hamel, Josee; and Montplaisir, Serge. Common protein of *Haemophilus influenzae* type b identified by a monoclonal antibody. 5,013,664, Cl. 435-7.320.

VOL
1126
ISS
1
MY
7
1991
UMI

Broga, Martin J.: *See*—

Rogers, David J.; and Broga, Martin J., 5,012,839, Cl. 137-341.000.

Broida, Marna. Absorbent pad for an ostomy appliance. 5,013,307, Cl. 604-338.000.

Brooks, Mark L.; and Wilson, Keith E., to GenCorp Inc. Cohesive bonding process for forming a laminate of a wear resistant thermoplastic and a weather resistant rubber. 5,013,379, Cl. 156-244.110.

Brother Kogyo Kabushiki Kaisha: *See*—

Murata, Kunihiko; Morii, Satoshi; Mitsui, Hiroyuki; Takemura, Toru; Iwasaki, Toshiaki; and Suzuki, Takaaki, 5,012,752, Cl. 112-121.120.

Yamaguchi, Koshiro; and Hattori, Hiroshi, 5,014,072, Cl. 346-76.0PH.

Brown, Ian G.; MacGill, Robert A.; and Galvin, James E., to University of California. Apparatus for coating a surface with a metal utilizing a plasma source. 5,013,578, Cl. 427-37.000.

Brown, Paul: *See*—

DiSimone, John; Brown, Paul; and Huntington, Christopher, 5,012,568, Cl. 29-402.080.

Brown, Philip A. Spray boom. 5,012,608, Cl. 47-1.700.

Brown, Robert J.: *See*—

Luxenberg, Robert A.; and Brown, Robert J., 5,013,038, Cl. 273-439.000.

Brown, Robert L., to Gillette Company. Method of bending a ball point pen tip. 5,012,663, Cl. 72-369.000.

Brown, Rodney A.: *See*—

Farmer, John B.; Ince, Francis; Brown, Rodney A.; and Dixon, John, 5,013,760, Cl. 514-649.000.

Brown, Thomas E.; and Davis, Thomas F., to AMP Incorporated. Multicircuit connector assembly. 5,013,248, Cl. 439-66.000.

Brown, Thomas G.: *See*—

Scribner, James R.; Nicholson, Raymond J.; Brown, Thomas G.; and Caracciolo, Anthony, Jr., 5,014,206, Cl. 364-449.000.

Bruch, Peter; and Schimmele, Anton, to R. Stahl Schaltgerate GmbH. Fused electrical safety barrier for protection of an electrical load placed in a potentially hazardous location. 5,014,156, Cl. 361-58.000.

Bruchmiller, Tod T., to Dresser Industries, Inc. Rotary drill bit providing separation of liquid from gas. 5,012,876, Cl. 175-69.000.

Bruderreck, Hartmut: *See*—

Schramm, Bernhard; Kern, Jurgen; Schwahn, Harald; Preuss, August-Wilhelm; Gottlieb, Klaus; and Bruderreck, Hartmut, 5,013,706, Cl. 502-309.000.

Bruening, Horst; and Schubert, Wolfgang, to Siemens Aktiengesellschaft. X-ray detector. 5,013,921, Cl. 250-370.110.

Brun, Milivoj K.: *See*—

Greskovich, Charles D.; Minnear, William P.; Brun, Milivoj K.; and Riedner, Robert J., 5,013,696, Cl. 501-153.000.

Brune, Lyle R., to Sure Power, Inc. Multi-voltage alternator with integral bank switched bridge. 5,013,991, Cl. 320-15.000.

Bryan, Philip N.; and Pantoliano, Michael W. Subtilisin mutations. 5,013,657, Cl. 435-172.300.

Bubello, Robert: *See*—

Ream, Jeffrey L.; and Bubello, Robert, 5,012,639, Cl. 60-226.100.

Buchan, William R.: *See*—

Caley, Wendell J., Jr.; Buchan, William R.; and Moore, Robert A., 5,014,076, Cl. 346-159.000.

Buchanan, Steven O., to Dwyer Struments, Inc. Overpressure relief safty plug for pressure gauges. 5,012,678, Cl. 73-738.000.

Buchecker, Richard; and Schadt, Martin, to Hoffmann-La Roche Inc. Alkenylbicyclohexane liquid crystals. 5,013,477, Cl. 252-299.630.

Buchecker, Richard: *See*—

Boller, Arthur; Buchecker, Richard; Fromm, Hans-Jurgen; Kelly, Stephen; Schadt, Martin; and Villiger, Alois, 5,013,476, Cl. 252-299.610.

Buchholz, Juergen; and Maier, Martin, to Robert Bosch GmbH. Perforated plate for a fuel injection valve. 5,012,983, Cl. 239-590.500.

Buchholz, Rainer: *See*—

Bayer, Thomas; Buchholz, Rainer; Deger, Hans-Matthias; and Wink, Joachim, 5,013,655, Cl. 435-119.000.

Buchler, Christian: *See*—

Morimoto, Yasuaki; Zucker, Friedheim; and Buchler, Christian, 5,014,253, Cl. 369-13.000.

Buchter, Randolph L.; and Huss, John P., Jr., to AMP Incorporated. Connector for mating blade-shaped members. 5,013,265, Cl. 439-724.000.

Buck, Orval F.: *See*—

Jackson, David P.; and Buck, Orval F., 5,013,366, Cl. 134-1.000.

Buckberg, Gerald D.; and Todd, Robert J., to Research Medical, Inc. Antegrade cardioplegia cannula. 5,013,296, Cl. 604-44.000.

Buckwalter, Brian L.: *See*—

Berman, Elizabeth F.; Buckwalter, Brian L.; Cupps, Thomas L.; and Gardner, Joseph H., 5,013,759, Cl. 514-622.000.

Buenger, Greg S.: *See*—

Nair, Vasu; and Buenger, Greg S., 5,013,829, Cl. 536-26.000.

Buerger, Reinhard: *See*—

Trapp, Hans-Juergen; and Buerger, Reinhard, 5,012,919, Cl. 198-474.100.

Buffalini, Jerry E.: *See*—

McGarvey, David C.; and Buffalini, Jerry E., 5,012,949, Cl. 220-455.000.

Bugamelli, Ralph, to Coltec Industries Inc. Stand alone fuel injection system. 5,012,780, Cl. 123-339.000.

Bugg, Charles E.: *See*—

Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C., Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., 5,013,531, Cl. 422-245.000.

Bula, Raymond J.: *See*—

Ignatius, Ronald W.; Martin, Todd S.; Bula, Raymond J.; Morrow, Robert C.; and Tibbitts, Theodore W., 5,012,609, Cl. 47-58.000.

Bulanda, John J.: *See*—

Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 5,013,260, Cl. 439-535.000.

Bulgrien, Garth H., to Ford New Holland, Inc. Programmable shuttle shifting in transmissions. 5,012,690, Cl. 74-335.000.

Bull HN Information Systems Inc.: *See*—

Donahue, Thomas J., 5,014,222, Cl. 364-521.000.

Bull, John W. Exercise apparatus. 5,013,031, Cl. 272-70.000.

Buma, Shuuichi: *See*—

Yonekawa, Takashi; Onuma, Toshio; Buma, Shuuichi; Ikemoto, Hiroyuki; Ohashi, Kaoru; Aburaya, Toshio; and Sato, Kinihito, 5,013,062, Cl. 280-707.000.

Bundy, William A.: *See*—

Reed, Irving S.; Sperling, Irving; and Bundy, William A., 5,014,131, Cl. 358-212.000.

Bunnell, Charles A., to Eli Lilly and Company. Process for preparing acid halides. 5,013,854, Cl. 549-496.000.

Buntaine, James R.; and Brady, Robert V., to Eastman Kodak Company. Formation of tabular silver halide emulsions utilizing high pH digestion. 5,013,641, Cl. 430-569.000.

Buralli, Dale A.; and Morris, G. Michael, to University of Rochester, The. Diffractive optical imaging lens systems. 5,013,133, Cl. 350-162.110.

Burg, Thomas J.; Ziegler, Ronald H.; Cooper, William K.; Kapala, John W.; and Anderson, Robert J., to AEG Westinghouse Transportation Systems, Inc. Rotary guideway switch having guidebeam and/or electric rail structure located above and between guideway tire paths. 5,012,747, Cl. 104-130.000.

Burke, Steven A.: *See*—

Beaufoy, Jeffrey J.; Aigner, Robert C.; and Burke, Steven A., 5,013,333, Cl. 55-21.000.

Burn, Michael; and Adby, Colin, to Light Years Ahead Limited. Space lighting. 5,014,172, Cl. 362-284.000.

Burnet, Jacques, to SMP2 SA. Bush mounting for a floating chuck. 5,013,054, Cl. 279-16.000.

Burnett, David R.: *See*—

Pleasants, Charles W.; Burnett, David R.; and Head, Donald W., 5,012,871, Cl. 166-386.000.

Burow, Wilfried: *See*—

Rademachers, Jakob; Bockelmann, Wolfgang; Burow, Wilfried; and Schafer, Kurt, 5,013,365, Cl. 106-456.000.

Burton, Michael B.: *See*—

Winters, Warren J.; and Burton, Michael B., 5,012,877, Cl. 175-80.000.

Bush, Aubrey M.; and Schimm, John F., Jr., to Scientific Atlanta, Inc. Convolutional encoder and sequential decoder with parallel architecture and block coding properties. 5,014,276, Cl. 371-43.000.

Butler, John D.; and Chandler, Jon A., to Federal-Mogul Corporation. Oil seal having attached thereto two aligned polytetrafluoroethylene pieces forming seal lips. 5,013,052, Cl. 277-153.000.

Butler, Scott J., to GTE Products Corporation. Electrodeless glow discharge lamp. 5,013,976, Cl. 315-248.000.

Butt, Sheldon H., to Olin Corporation. Semiconductor package. 5,014,159, Cl. 361-386.000.

Butts, James N. Rug cleaning apparatus. 5,013,367, Cl. 134-9.000.

Butz, Dieter; Erbach, Franz; and Muller, Kurt, to Deere & Company. Drive for motor vehicles. 5,012,887, Cl. 180-305.000.

B.V. Optische Industrie "De Oude Delft" : *See*—

Elshoud, Nicolaas P., 5,013,925, Cl. 250-505.100.

Byers, Thomas L. Kit for making a phototool. 5,012,555, Cl. 16-342.000.

Byers, Thomas L. Phototool with hinge assembly. 5,014,087, Cl. 355-72.000.

Byron, M. Parke: *See*—

Solomon, Donald D.; and Byron, M. Parke, 5,013,306, Cl. 604-265.000.

Cableshare, Inc.: *See*—

Pocock, Terrence H.; McNorgan, Rick; Coumons, Peter; and Lodberg, Allan, 5,014,125, Cl. 358-86.000.

Caldwell Manufacturing Company: *See*—

Dense, Brian S., 5,012,554, Cl. 16-197.000.

Caldwell, Michael D.: *See*—

Moden, James R.; Caldwell, Michael D.; and Moden. Robert D., 5,013,298, Cl. 604-93.000.

Caley, Wendell J., Jr.; Buchan, William R.; and Moore, Robert A., to Delphax Systems. Printer with high frequency charge carrier generation. 5,014,076, Cl. 346-159.000.

Camco International Inc.: *See*—

Daly, Jeffrey E., 5,012,701, Cl. 76-108.200.

Cameron Iron Works, Inc.: *See*—

Nance, James G., 5,013,005, Cl. 251-1.300.

Campbell, Arthur L.; Mueller, Richard A.; Ng, John S.; and Partis, Richard A., to G. D. Searle & Co. Process for preparation of α-alkoxy acetic acids and their salts. 5,013,864, Cl. 562-426.000.

Campbell, David B.; and Campbell, Donald N. Process for replacing a length of buried pipe. 5,013,188, Cl. 405-184.000.

Campbell, Donald N.: *See*—

Campbell, David B.; and Campbell, Donald N., 5,013,188, Cl. 405-184.000.

Campbell, Keith D.: *See*—

Anand, Madhu; Costello, Christine A.; and Campbell, Keith D., 5,013,338, Cl. 55-158.000.

Campbell, Roy; and Price, Anthony G., to Lucas Industries public limited company. Self-energizing disc brakes. 5,012,901, Cl. 188-71.400.

Canadian Marconi Company: *See*—

Studenny, John, 5,014,063, Cl. 342-130.000.

Canela, Heriberto. Vanity and hair brush combination. 5,012,831, Cl. 132-313.000.

Canon Kabushiki Kaisha: *See*—

Amitani, Joji; and Hoshino, Osamu, 5,014,094, Cl. 355-326.000.

Arikawa, Shiro; and Yonehara, Takao, 5,013,670, Cl. 437-2.000.

Furukawa, Hideaki, 5,013,027, Cl. 271-290.000.

Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 5,014,135, Cl. 358-296.000.

Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 5,014,089, Cl. 355-251.000.

Sakata, Hajime, 5,013,141, Cl. 350-348.000.

Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, 5,013,137, Cl. 350-333.000.

Uehara, Tsukasa; and Okauchi, Shigeki, 5,014,151, Cl. 360-133.000.

Yomogizawa, Shinya; and Ikari, Hideo, 5,014,077, Cl. 354-187.000.

Caracciolo, Anthony, Jr.: *See*—

Scribner, James R.; Nicholson, Raymond J.; Brown, Thomas G.; and Caracciolo, Anthony, Jr., 5,014,206, Cl. 364-449.000.

Carballo, Jose. Emergency escape frame for building apertures. 5,012,610, Cl. 49-57.000.

Cardiac Telecom Corporation: *See*—

Langer, Alois A.; and Maalouf, Khalil J., 5,014,284, Cl. 375-30.000.

Cardinal, Andreas, to Siemens Aktiengesellschaft. Contact configuration with an arcing horn and an arc conducting piece. 5,013,875, Cl. 200-146.00R.

Carello Lighting plc: *See*—

Draper, Geoffrey; James, Hayden; and Carlton, Kevin, 5,014,166. Cl. 362-61.000.

Carkhuff, Donald W.; Everett, Jeffrey S.; and Conner, Jule, to ESAB Welding Products, Inc. Plasma arc torch having extended nozzle of substantially hourglass. 5,013,885, Cl. 219-121.500.

Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co.: *See*—

Meyer, Emil; and Eichinger, Johann, 5,012,906, Cl. 192-56.00F.

Carl-Zeiss-Stiftung: *See*—

Benner, Gerd, 5,013,913, Cl. 250-307.000.

Carle, Keith B.: *See*—

Glowczewski, Thomas; and Carle, Keith B., 5,014,214, Cl. 364-483.000.

Carlton, Kevin: *See*—

Draper, Geoffrey; James, Hayden; and Carlton, Kevin, 5,014,166, Cl. 362-61.000.

Carlyle, James P. Chain control apparatus. 5,013,285, Cl. 474-80.000.

Carpenter, Clint W.; and Savino, Thomas G., to BASF Corporation. Cross-linkable surface-modified micaceous particulates and coating compositions containing the same. 5,013,770, Cl. 523-213.000.

Carpenter, Kurtis R.; and Schnelle, Joseph W., to Cincinnati Milacron, Inc. Method and means for path offsets memorization and recall in a manipulator. 5,014,183, Cl. 364-167.010.

Carrier Corporation: *See*—

Dudley, Kevin F., 5,012,652, Cl. 62-192.000.

Carroll, Terry: *See*—

Russell, John P.; Carroll, Terry; and Miller, Sam, 5,013,304, Cl. 604-167.000.

Carter, Alexander B., III: *See*—

Hutter, Charles G., III; and Carter, Alexander B., III, 5,013,391, Cl. 156-578.000.

Carter, Daniel C.: *See*—

Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C.; Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., 5,013,531, Cl. 422-245.000.

Carty, Christine E., to Merck & Co., Inc. Increased fermentation yield of expressed protein. 5,013,650, Cl. 435-69.100.

Casa, Gene E.; and Gernon, Joseph W., to International Business Machines Corporation. Cable organizer. 5,014,164, Cl. 361-428.000.

Casagrande, Cesare; and Santangelo, Francesco, to Simes. Prodrugs of dopamine. 5,013,753, Cl. 514-512.000.

Casanueva, Joseph D.: *See*—

Bristol, Steven L.; and Casanueva, Joseph D., 5,012,582, Cl. 30-391.000.

Casbarian, Aramis O. P.; and Dewalt, Kenneth M., to Barnett & Casbarian, Inc. Method and apparatus for protecting a shallow-water well. 5,012,875, Cl. 175-9.000.

Case, Laura K., deceased (by Case, Leslie C., executor); Gajria, Chandrasen; Loftin, Rachel M.; and Peper, Henry, to Gillette Company, The. Ball-point writing instrument containing an aqueous ink composition. 5,013,361, Cl. 106-22.000.

Case, Leslie C., executor: *See*—

Case, Laura K., deceased; Gajria, Chandrasen; Loftin, Rachel M.; and Peper, Henry, 5,013,361, Cl. 106-22.000.

Case, Patti L.: *See*—

Worcester, Samuel A.; and Case, Patti L., 5,013,357, Cl. 75-622.000.

Casio Computer Co., Ltd.: *See*—

Kita, Kazunori; and Nakazawa, Eiji, 5,014,317, Cl. 381-43.000.

Yarita, Yoshio; and Kawamura, Yoshihiro, 5,013.402, Cl. 156-645.000.

Caskey, Terrence L.: *See*—

Trimmer, Johnny L.; Caskey, Terrence L.; and Jorgensen, Janine L., 5,013,437, Cl. 210-321.780.

Castagnoli, Claude, to Tractel S. A. Stress gauge force sensing device. 5,012,680, Cl. 73-862.390.

Castellani, Frederico, to S.I.M.A.C. S.p.A. Apparatus for packing profiles with the assistance of an electromagnetic transfer hanging mechanism. 5,013,212, Cl. 414-791.400.

Castellano, Nicola. Device for amplification of x-rays. 5,014,291, Cl. 378-145.000.

Casto, James J., to Motorola, Inc. Multiple layer lead frame. 5,014,113, Cl. 357-70.000.

Castonguay, Roger N.: *See*—

Papallo, Thomas F., Jr.; and Castonguay, Roger N., 5,014,025, Cl. 335-167.000.

Catallo, Frank. Compressive shrinking apparatus utilizing an improved impact blade for the shrinking of fabric. 5,012,562, Cl. 26-18.600.

Catalysts & Chemicals Industries Co., Ltd.: *See*—

Sato, Goro; Komatsu, Michio; Hirai, Toshiharu; Abe, Yoneji; and Senjyuu, Noboru, 5,013,607, Cl. 428-426.000.

Cattanach, John F. Vaginal douche. 5,013,297, Cl. 604-55.000.

Catti, Alberto A.; Sartorio, Franco; and Vergano, Stefano, to Amada Company, Limited. Sheet workpiece bending machine. 5,012,661, Cl. 72-21.000.

Cavazza, Gilbert, to Societe Anonyme dite: Sulzer Electro-Technique "S.E.T." . Method and device for the uniformly even application of a resin coating on a substrate. 5,013,586, Cl. 427-240.000.

Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., to Panduit Corp. Communication box assembly. 5,013,260, Cl. 439-535.000.

Cayless, Richard A.; and Hazell, Leonard B., to British Petroleum Company p.l.c., The. Process for the treatment of a metal oxide layer, a process for bonding a metal object comprising a metal oxide layer and structures produced therefrom. 5,013,381, Cl. 156-281.000.

CCA, Inc.: *See*—

Williams, Leslie P., 5,012,979, Cl. 239-416.500.

Cebal: *See*—

Druesne, Guy; and Michaud, Joel, 5,012,942, Cl. 215-253.000.

Central Glass Company, Limited: *See*—

Kikuchi, Yoshiyuki; and Ishii, Akihiro, 5,013,828, Cl. 536-23.000.

Nagashima, Toshikazu; Kuramashi, Haruki; Nishida, Yoshihiro; and Hirukawa, Masahiro, 5,013,788, Cl. 524-767.000.

Central Research Institute of Electric Power Industry: *See*—

Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.

Centre National de la Recherche Scientifique: *See*—

Aubert, Guy, 5,014,032, Cl. 335-306.000.

Century Laboratories, Inc.: *See*—

Rubin, David, 5,013,569, Cl. 426-585.000.

Cepulis, Darren J.: *See*—

Garner, Paul M.; Boone, Carrie; and Cepulis, Darren J., 5,014,193, Cl. 364-200.000.

Cetinkaya, Ismail B., to UOP. Conversion of side by side FCC unit. 5,013,425, Cl. 208-113.000.

Cetus Corporation: *See*—

Ben-Bassat, Arie; Bauer, Keith A.; Chang, Shing; and Chang, Sheng-Yung, 5,013,662, Cl. 435-212.000.

Chabala, Leonard V., to S&C Electric Company. Switch contacts with improved fault-closing capability. 5,013,876, Cl. 200-254.000.

Chakrabarty, Ananda M.: *See*—

Banerjee, Santimoy; Karns, Jeffrey S.; and Chakrabarty, Ananda M., 5,013,654, Cl. 435-72.000.

Chaleff, Roy S.: *See*—

Bedbrook, John R.; Chaleff, Roy S.; Falco, Saverio C.; Mazur, Barbara J.; Somerville, Christopher R.; and Yadav, Narendra S., 5,013,659, Cl. 435-172.300.

Champlin, George B., to New England Braiding Company, Inc. Universal seal cage lantern ring with double-sided slotted land structure. 5,013,053, Cl. 277-215.000.

Chan, Chuen: *See*—

Watson, Nigel S.; Chan, Chuen; and Ross, Barry C., 5,013,749, Cl. 514-397.000.

Chance, Randal W.: *See*—

Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.

Chandler, Jon A.: *See*—

Butler, John D.; and Chandler, Jon A., 5,013,052, Cl. 277-153.000.

Chandraratna, Roshantha A. S., to Allergan, Inc. Acetylenes disubstituted with a pyridinyl group and a substituted phenyl group having retinoid like activity. 5,013,744, Cl. 514-345.000.

Chang, James, to Kaman Sciences Corporation. Break detection system using optical fibers having unique frequency modulated light. 5,013,908, Cl. 250-227.150.

Chang, Robert W. H.: *See*—

Norbury, Robert J.; Chang, Robert W. H.; and Zeller, Lowell C., 5,013,473, Cl. 252-174.130.

Chang, Sheng-Yung: *See*—

Ben-Bassat, Arie; Bauer, Keith A.; Chang, Shing; and Chang, Sheng-Yung, 5,013,662, Cl. 435-212.000.

Chang, Shing: *See*—

Ben-Bassat, Arie; Bauer, Keith A.; Chang, Shing; and Chang, Sheng-Yung, 5,013,662, Cl. 435-212.000.

Chantler, Eric N.; and Elstein, Max, to Victoria University of Manchester, The. Contraceptive methods and compositions. 5,013,544, Cl. 424-78.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Chapman, Charles B., to Hewlett-Packard Company. Epoxy adhesive for use with thermal ink-jet printers. 5,013,383, Cl. 156-307.300.
- Chapman, George R., Jr.; Priester, Donnan E.; and Stewart, Charles W., to Du Pont de Nemours, E. I., and Company. Processing aid for polymers. 5,013,792, Cl. 525-166.000.
- Chapman, Robert C.: *See*—
  - Cross, Gregory D.; and Chapman, Robert C., 5,013,865, Cl. 562-456.000.
- Chapoy, L. Lawrence: *See*—
  - Coassolo, Alfredo; Foa', Marco; and Chapoy, L. Lawrence, 5,013,819, Cl. 528-193.000.
- Charette, Marc F.: *See*—
  - Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.
- Chase, Lee M., to Measurex Corporation. Process for continuous determination of paper strength. 5,013,403, Cl. 162-49.000.
- Chase, Lee M.; and Goss, John D., to Measurex Corporation. X-ray coating weight controller and sensor. 5,014,288, Cl. 378-53.000.
- Chastang, Georges J. B.: *See*—
  - Viannay, Stephane G. J.; Roth, Bernard M.; Mirigay, Solange M. V.; and Chastang, Georges J. B., 5,012,980, Cl. 239-423.000.
- Chatterton, Philip. Filling assembly for ice trays. 5,012,655, Cl. 62-340.000.
- Chau, Hin-Leung: *See*—
  - Wise, Kensall D.; and Chau, Hin-Leung, 5,013,396, Cl. 156-628.000.
- Chekroun, Isaac: *See*—
  - Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, 5,013,835. Cl. 540-491.000.
- Chemetrics, Inc.: *See*—
  - Rybak, Franklyn M., 5,013,155, Cl. 356-408.000.
- Chen, Ben W., to Atronics International Inc. Video interface circuit for displaying capturing and mixing a live video image with computer graphics on a video monitor. 5,014,128, Cl. 358-160.000.
- Chen, Chen: *See*—
  - Stubbers, Ron; Chen, Chen; and Skolnick, Malcolm, 5,012,808, Cl. 128-419.00R.
- Chen, Ching-Jen: *See*—
  - Chen, Ching-Wen; and Chen, Ching-Jen, 5,012,666, Cl. 72-410.000.
- Chen, Ching-Wen; and Chen, Ching-Jen. Crimp tool with adjustable jaw. 5,012,666, Cl. 72-410.000.
- Chen, Jacob Y.: *See*—
  - Rodgers, Donald E.; Chen, Jacob Y.; and Padhi, Prafulla K., 5,014,306, Cl. 379-407.000.
- Chen, Nai Y.; Dessau, Ralph M.; Partride, Randall D.; and Valyocsik, Ernest W., to Mobil Oil Corporation. Reforming and dehydrocyclization. 5,013,423, Cl. 208-64.000.
- Cheney, Barry D., executor: *See*—
  - Kennedy, Ralph, deceased; and Kennedy, Ralph W., 5,012,873, Cl. 173-22.000.
- Cheng, J. Joseph, to Libbey-Owens-Ford Co. Infrared radiation absorbing glue glass composition. 5,013,487, Cl. 252-587.000.
- Cherukuri, Subraman R.; Wong, Lucy L.; and Faust, Steven M., to Warner-Lambert Company. Unpleasant taste masking compositions and methods for preparing same. 5,013,716, Cl. 514-23.000.
- Chetwynd, Howard L., to Rover Group Limited. Sun visor. 5,014,169, Cl. 362-142.000.
- Chevakin, Ivan V.; Zharov, Nikolai P.; Popov, Oleg V.; Pesin, Abram I.; and Radchenko, Petr A. Power actuator. 5,012,649, Cl. 60-527.000.
- Chiang, Ching, to Bionostics, Incorporated. Control for blood gas/calcium analysis instrumentation. 5,013,666, Cl. 436-11.000.
- Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt.: *See*—
  - Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.
- Chintyan, James R.: *See*—
  - Lippmann, Raymond; Schnars, Michael J.; and Chintyan, James R., 5,014,051, Cl. 340-870.380.
- Chisholm, Douglas R., to International Business Machines Corporation. Data-processing system having a packet transfer type input/output system. 5,014,186, Cl. 364-200.000.
- Chisholm, John P., to Sundstrand Data Control, Inc. Integrated landing system. 5,014,067, Cl. 342-407.000.
- Chiu, Tien-Heng; Cunningham, John E.; and Goossen, Keith W., to AT&T Bell Laboratories. Method of making a non-alloyed ohmic contact to III-V semiconductors-on-silicon. 5,013,685, Cl. 437-184.000.
- Chiyoda Corporation: *See*—
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Choay, Jean: *See*—
  - Petitou, Maurice; and Choay, Jean, 5,013,724, Cl. 514-54.000.
- Choi, Kwong-Kit, to United States of America, Army. Multicolor infrared photodetector. 5,013,918, Cl. 250-338.400.
- Choi, Kyu-Hyun; Lee, Heyung-Sub; and Lee, Jung-Hwan, to SamSung Electronics Co., Ltd. Method of making semiconductor devices having ohmic contact. 5,013,686, Cl. 437-194.000.
- Chong, Joseph: *See*—
  - Fehr, Amos; and Chong, Joseph, 5,012,726, Cl. 99-450.600.
- Chow, Kirk K., to National Hand Tool Corporation. Ratchet wrench with manually removable core. 5,012,705, Cl. 81-63.000.
- Chow, Michael C. L.: *See*—
  - Hobrecht, Stephen W.; and Chow, Michael C. L., 5,013,934, Cl. 307-296.700.
- Christian, Everett R.; Christian, Michael E.; and Christian, Theodore Z. Rotary cross-banding veneer dryer. 5,012,595, Cl. 34-187.000.
- Christian, Michael E.: *See*—
  - Christian, Everett R.; Christian, Michael E.; and Christian, Theodore Z., 5,012,595, Cl. 34-187.000.
- Christian, Theodore Z.: *See*—
  - Christian, Everett R.; Christian, Michael E.; and Christian, Theodore Z., 5,012,595, Cl. 34-187.000.
- Christiansen, Steven H.; Littleton, Teresa; and Patton, Robert T., to Dow Chemical Company, The. Process for alkaline peroxide bleaching of wood pulp using a quaternary amine as additive. 5,013,404, Cl. 162-72.000.
- Christolini, Ben A.; Le, Kimanh T.; Berndt, Mitchell J.; and Howe, Steven E., to Union Oil Company of California. Recovery of oil from a shale containing the same. 5,013,428, Cl. 208-415.000.
- Christy, Paul G.: *See*—
  - Christy, Robert W., Sr.; and Christy, Paul G., 5,013,458, Cl. 210-751.000.
- Christy, Robert W., Sr.; and Christy, Paul G., to RDP Company. Process and apparatus for pathogen reduction in waste. 5,013,458, Cl. 210-751.000.
- Chrysler Corporation: *See*—
  - Glowczewski, Thomas; and Carle, Keith B., 5,014,214, Cl. 364-483.000.
- Chundrlik, William J.; and Labuhn, Pamela I., to General Motors Corporation. Adaptive cruise system. 5,014,200, Cl. 364-426.040.
- Chung, Kah-Seng, to U.S. Philips Corporation. Frequency difference detector (FDD) and a carrier modulated receiver including such a FDD. 5,014,352, Cl. 455-314.000.
- Ciba-Geigy Corporation: *See*—
  - Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpe, Hans-Rudolf, 5,013,863, Cl. 562-11.000.
  - Beriger, Ernst; and Eckhardt, Wolfgang, 5,013,745, Cl. 514-364.000.
  - Kramer, Andreas, 5,013,804, Cl. 526-262.000.
  - Leimer, Marius; von der Crone, Jost; Babler, Fridolin; and Neuschutz, Heinz, 5,013,455, Cl. 210-729.000.
  - Maier, Ludwig, 5,013,559, Cl. 424-605.000.
  - O'Neil, Robert M., 5,013,482, Cl. 252-395.000.
  - Pastor, Stephen D.; and Odorisio, Paul A., 5,013,510, Cl. 564-301.000.
  - Phaff, Rox; and Zink, Rudolf, 5,013,707, Cl. 503-212.000.
  - Roth, Martin; and Muller, Beat, 5,013,814, Cl. 528-90.000.
- Ciba-Giegy Corporation: *See*—
  - Walter, Harald. 5,013,826, Cl. 534-768.000.
- Cielo Industries, Inc.: *See*—
  - Naso, Joseph I.; Barbaro, Joseph L.; and Howard, John, 5,012,765, Cl. 119-166.000.
- Cincinnati Milacron, Inc.: *See*—
  - Carpenter, Kurtis R.; and Schnelle, Joseph W., 5,014,183, Cl. 364-167.010.
- Cipa Manufacturing Corporation: *See*—
  - Sun, Donald J. C.; and Tai, Wen J., 5,013.041, Cl. 273-164.000.
- Citizen Watch Company, Ltd.: *See*—
  - Ikehata, Tsutomu; Yasunaga, Makoto; and Suzuki, Hirofumi, 5,013,169, Cl. 400-124.000.
- Clark, Benton C., III: *See*—
  - Thornton, Michael G.; and Clark, Benton C., III, 5,014,287, Cl. 378-45.000.
- Clark, Bryan K.: *See*—
  - Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,014,259, Cl. 369-284.000.
- Clark, Jeffrey L.: *See*—
  - Nienhuis, James H.; Clark, Jeffrey L.; De Pree, Michael L.; and Beck, Robert L., 5,013,252, Cl. 439-215.000.
- Clark, Kenneth G. Sludge treatment apparatus. 5,013,489, Cl. 261-77.000.
- Clark, Mark A.: *See*—
  - Crain, Stephen F.; Clark, Mark A.; and Woodall, Edward L., 5,014,218, Cl. 364-502.000.
- Clark, William A.; Oien, Michael A.; and Pelosi, Walter, to AT&T Bell Laboratories. Solder assembly of components. 5,014,162, Cl. 361-412.000.
- Clark, William C. Syringe resheathing device. 5,013,299, Cl. 604-114.000.
- Clarke, Paul F.: *See*—
  - Hayes, Ernest B.; and Clarke, Paul F., 5,012,828, Cl. 131-341.000.
- Clavensjo, Bertil: *See*—
  - Eriksson, Bengt; and Clavensjo, Bertil, 5,013,183, Cl. 405-59.000.
- Clayton, John C.: *See*—
  - Crisp, Harold A.; Clayton, John C.; Elliott, Leonard G.; and Wilson, Edward M., 5,013,833, Cl. 540-222.000.
- Clement Clarke International Limited: *See*—
  - Stockwell, Henry J., 5,012,812, Cl. 128-652.000.
- Close, Frank: *See*—
  - MacIntyre, Brian; Close, Frank; and McAvoy, Sean, 5,013,187, Cl. 405-169.000.
- Coad, Joseph P.: *See*—
  - Rickerby, David S.; Whitmell, Derek S.; Coad, Joseph P.; and Nelson, Richard S., 5,013,419, Cl. 204-298.050.
- Coal Industry (Patents) Limited: *See*—
  - Mills, Peter S.; and Daly, Ivor K., 5,013,157, Cl. 366-13.000.

- Coassolo, Alfredo; Foa', Marco; and Chapoy, L. Lawrence, to Montedison S.P.A. Liquid-crystalline, thermotropic aromatic polyesters. 5,013,819, Cl. 528-193.000.
- Coates, Ian H.; Oxford, Alexander W.; North, Peter C.; Miller, Thomas; Baxter, Anthony D.; and Hammond, Kevin I., to Glaxo Group Limited. Lactam derivatives. 5,013,733, Cl. 514-213.000.
- Coates, Robert L.: *See*—
  - Horstmann, Jens U.; Coates, Robert L.; and Eichel, Hans W., 5,014,226, Cl. 364-551.010.
- Codama, Mitsufumi: *See*—
  - Fukada, Takeshi; Codama, Mitsufumi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; and Takayama, Ichiro, 5,014,100, Cl. 357-30.000.
- Codenoll Technology Corporation: *See*—
  - Focht, J. Richard, 5,013,124, Cl. 350-96.210.
- Cohen, Charles M.: *See*—
  - Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.
- Cohen, Gerald C.: *See*—
  - Smith, Catherine M.; and Cohen, Gerald C., 5,014,220, Cl. 364-513.000.
- Cohen, Itzchak, to Lambda Electronics Inc. High frequency self-oscillating inverter with negligible switching losses. 5,014,182, Cl. 363-132.000.
- Coherent, Inc.: *See*—
  - Hecht, Hartmuth; Paul, Wolfgang; and Baumgartner, Anton, 5,014,281, Cl. 372-59.000.
- Cohn, Bernard. Golf club rake. 5,012,872, Cl. 172-380.000.
- Colclough, Terence, to Exxon Chemical Patents, Inc. Dithiophosphates. 5,013,465, Cl. 252-32.70E.
- Cole, Danny R. Sports training apparatus. 5,013,039, Cl. 273-55.00R.
- Cole, J. Dean; and Durham, A. Glenn, to Smith & Nephew Richards Inc. Medical drill assembly transparent to X-rays and targeting drill bit. 5,013,317, Cl. 606-96.000.
- Coleman, Patrick L.; Kotnour, Thomas A.; and Rolando, Richard J., to Minnesota Mining and Manufacturing Company. Azlactone graft copolymers. 5,013,795, Cl. 525-279.000.
- Colgate - Palmolive Company: *See*—
  - Grodberg, Marcus G., 5,013,728, Cl. 514-171.000.
  - Joshi, David, 5,013,486, Cl. 252-559.000.
- Collins, Amy L. T. Agent for desensitizing man and/or animals against an allegen. 5,013,555, Cl. 424-450.000.
- Collins, Donald A., Jr., to NCR Corporation. Scanning system having low quiescent current scanning mirror motor driver circuitry. 5,013,899, Cl. 235-462.000.
- Coltec Industries Inc.: *See*—
  - Bugamelli, Ralph, 5,012,780, Cl. 123-339.000.
- Colvin, Alex D., to Ford Motor Company. Capacitance measuring apparatus with means for nulling the resistive component. 5,014,011, Cl. 324-663.000.
- Combined Optical Industries Limited: *See*—
  - Pasco, Ian K., 5,013,143, Cl. 350-432.000.
- Cominco Ltd.: *See*—
  - Ball, Donald L.; and Boateng, Daniel A. D., 5,013,358, Cl. 75-742.000.
- Commissariat a l'Energie Atomique: *See*—
  - Klein, Siegfried, 5,014,321, Cl. 381-111.000.
- Compagnie de Raffinage et de Distribution Total France: *See*—
  - Maroy, Pierre; Patureaux, Thierry; Freychet, David; and Loutaty, Roben, 5,013,368, Cl. 134-22.110.
- Compagnie Europeenne de Composants Electroniques LCC: *See*—
  - Gillet, Robert, 5,012,565, Cl. 29-25.420.
  - Rolland, Jean-Luc; Beguin, Jean-Yves; Magna, Henriette; Jacobelli, Alain; and Penot, Maurice, 5,013,394, Cl. 156-627.000.
- Compagnie Europeenne du Zirconium Cezus of Tour Manhattan: *See*—
  - Lamaze, Airy-Pierre; and Paillere, Patrick, 5,013,413, Cl. 204-64.00R.
- Compaq Computer Corporation: *See*—
  - Garner, Paul M.; Boone, Carrie; and Cepulis, Darren J., 5,014,193, Cl. 364-200.000.
- Comroe, Richard A.; Zdunek, Kenneth J.; Sasuta, Michael D.; Coombes, Daniel J.; and Borras, Jaime A., to Motorola, Inc. Method for dynamically regrouping subscribers on a communications system. 5,014,345, Cl. 455-54.000.
- Comurhex Societe pour la Conversion de l'Uranium en Metal et Hexafluorure: *See*—
  - Bargues, Michel; Boya, Didier; Gaillard, Dominique; and Netter, Pierre, 5,013,274, Cl. 445-2.000.
- Conair Corporation: *See*—
  - Shoemaker, Richard E., 5,013,891, Cl. 219-385.000.
- Conan, Annie; D'Incan, Esther; Perichon, Jacques; and Sibille, Soline, to Societe Nationale des Poudres et Explosies (SNPE). Process for the electrosynthesis of a beta,gamma-unsaturated ester. 5,013,412, Cl. 204-59.00R.
- Conner, Jule: *See*—
  - Carkhuff, Donald W.; Everett, Jeffrey S.; and Conner, Jule, 5,013,885, Cl. 219-121.500.
- Conoco Inc.: *See*—
  - Gergely, John S.; and Evens, F. Monte, 5,013,120, Cl. 350-96.180.
  - Whitfill, Donald L.; and Whitebay, Lee E., 5,012,869, Cl. 166-285.000.
- Conopco, Inc.: *See*—
  - Elliott, David L.; and Howie, Catherine L., 5,013,541, Cl. 424-52.000.
- Conseilray S.A.: *See*—
  - Groothuis, Michiel; and Nikles, Francois, 5,014,251, Cl. 368-80.000.
- Consolidation Coal Company: *See*—
  - Bessinger, Stephen L.; and Nelson, Michael G., 5,013,091, Cl. 299-1.000.
- Conver-OSR Ozean Service-Reparatur-Ingenieurtechnik GmbH: *See*—
  - Janke, Thomas; and Wielenberg, Johannes, 5,012,560, Cl. 24-287.000.
- Conway, Timothy F.: *See*—
  - Cozzi, Joseph J.; Conway, Timothy F.; LaFleur, John A.; Rusnak, Eileen M.; and Johnson, Neil H., 5,012,971, Cl. 229-120.070.
- Conzelmann, Gerhard; Nagel, Karl; and Kohl, Walter, to Robert Bosch GmbH. Voltage regulator for a generator. 5,013,996, Cl. 322-28.000.
- Cook, John A.; Park, Geroge B.; McLoughlin, Robert H.; and Whitcher, William J., to Scimat Limited. Method for making a polymeric electrolyte. 5,013,619, Cl. 429-189.000.
- Cook Pacemaker Corporation: *See*—
  - Goode, Louis; and Shipko, Frederick J., 5,013,310, Cl. 606-1.000.
- Coolbaugh, Douglas D.: *See*—
  - Blumberg, Lawrence R.; Coolbaugh, Douglas D.; Kurowski, John A.; and Stromecki, Eugene A., 5,013,395, Cl. 156-627.000.
- Coombes, Daniel J.: *See*—
  - Comroe, Richard A.; Zdunek, Kenneth J.; Sasuta, Michael D.; Coombes, Daniel J.; and Borras, Jaime A., 5,014,345, Cl. 455-54.000.
- Cooper Industries, Inc.: *See*—
  - MacIntyre, Brian; Close, Frank; and McAvoy, Sean, 5,013,187, Cl. 405-169.000.
- Cooper, William K.: *See*—
  - Burg, Thomas J.; Ziegler, Ronald H.; Cooper, William K.; Kapala, John W.; and Anderson, Robert J., 5,012,747, Cl. 104-130.000.
- Coosmans, Luc M. C.; Blenkers, Johannes; and Loontjens, Jacobus, to Stamicarbon, B.V. Catalyst system for high-temperature (co) polymerization of ethylene. 5,013,701, Cl. 502-110.000.
- Corcoran, Robert F.: *See*—
  - Kempf, Timothy W.; Corcoran, Robert F.; and Sikora, Dennis C., 5,013,336, Cl. 55-71.000.
- Cornwall, Mickey: *See*—
  - Stern, Theodore G.; and Cornwall, Mickey, 5,013,128, Cl. 350-96.240.
- Corsini, Tullio: *See*—
  - Olper, Marco; Corsini, Tullio; and Fracchia, Pierluigi, 5,013,356, Cl. 75-586.000.
- Cosmo Instruments Co., Ltd.: *See*—
  - Furuse, Akio, 5,013,006, Cl. 251-8.000.
- Costello, Christine A.: *See*—
  - Anand, Madhu; Costello, Christine A.; and Campbell, Keith D., 5,013,338, Cl. 55-158.000.
- Cottingham, Brent R. Energy transfer unit having at least three adjacent piston members. 5,012,769, Cl. 123-51.00R.
- Couch, Joseph H., IIII: *See*—
  - Santos, Virgil, 5,012,895, Cl. 182-204.000.
- Coudurier, Gisele: *See*—
  - Patarin, Joel; Guth, Jean-Louis; Kessler, Henri; Coudurier, Gisele; and Raatz, Francis, 5,013,537, Cl. 423-328.000.
- Coulvonvaux, Paul R.; and VandeVeire, Eric L., to Donaldson Company, Inc. Self-adjusting mounting-band assembly. 5,013,182, Cl. 403-30.000.
- Coumons, Peter: *See*—
  - Pocock, Terrence H.; McNorgan, Rick; Coumons, Peter; and Lodberg, Allan, 5,014,125, Cl. 358-86.000.
- Counselman, Charles C., III, to Western Atlas International, Inc. System for simultaneously deriving position information from a plurality of satellite transmissions. 5,014,066, Cl. 342-352.000.
- Cox, Edwin G.; and Ritter, David T., to Gulton Industries Inc., Femco Division. Field telephone system. 5,014,347, Cl. 455-110.000.
- Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., to AT&T Bell Laboratories. Fabrication of an integrated optical fiber bus. 5,013,119, Cl. 350-96.160.
- Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W. Molecular weight distribution modification in a tubular reactor. 5,013,801, Cl. 526-64.000.
- Cozzi, Joseph J.; Conway, Timothy F.; LaFleur, John A.; Rusnak, Eileen M.; and Johnson, Neil H., to Restaurant Technology, Inc. Food container and method. 5,012,971, Cl. 229-120.070.
- Craig, Jim M.: *See*—
  - McElroy, Arthur H., II; and Craig, Jim M., 5,013,376, Cl. 156-64.000.
- Craig, John R. Lounge chair canopy construction. 5,013,085, Cl. 297-184.000.
- Craighead, Lawrence W.: *See*—
  - Strand, Jerome E.; Craighead, Lawrence W.; and Niven, Clarence A., 5,012,810, Cl. 128-640.000.
- Crain, Stephen F.; Clark, Mark A.; and Woodall, Edward L., to Halliburton Company. Using a remote control computer connected to a vocal control computer and a monitor computer. 5,014,218, Cl. 364-502.000.
- Crane, Jacob: *See*—
  - Mahulikar, Deepak; Crane, Jacob; and Braden, Jeffrey S., 5,013,871, Cl. 174-52.400.
- Crawford, Joseph A., to North American Philips Corporation. Peak voltage reducer circuit for fluorescent lamps. 5,013,970, Cl. 315-106.000.

VOL 126
ISS 1
MY 7 1991
UMI

- Crea, Roberto: *See—*
  - Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.
- Creative Biomolecules, Inc.: *See—*
  - Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.
- Crisp, Harold A.; Clayton, John C.; Elliott, Leonard G.; and Wilson, Edward M., to Glaxo Group Limited. Process for preparing cefuroxime axetil. 5,013,833, Cl. 540-222.000.
- Croll, Theodore P. Eyeglasses with liquid-filled lenses. 5,013,145, Cl. 351-52.000.
- Cronce, Gary M.; Reid, Ronald W.; Stapleton, Craig A.; and Zauner, Robert S., to Huron/St. Clair Incorporated. Vehicle spoiler construction. 5,013,081, Cl. 296-180.100.
- Cross, Gregory D.; and Chapman, Robert C., to Mallinckrodt, Inc. Process for the preparation of 2,4,6-triiodo-5-amino-N-alkylisophthalamic acid and 2,4,6-triiodo-5-amino-isophthalamide compounds. 5,013,865, Cl. 562-456.000.
- Crownshaw, John C., to Renishaw plc. Interchangeable interferometric optical mounting elements. 5,013,152, Cl. 356-345.000.
- Crozier, Douglas E.: *See—*
  - Staniulis, Mark T.; Crozier, Douglas E.; Risch, Alan P.; and Pai, Jenny L., 5,013,703, Cl. 502-241.000.
- Crum, Peter, to Oscar Meyer Foods Corporation. Merchandiser assembly. 5,012,936, Cl. 211-59.300.
- Cruse, Clint A.: *See—*
  - Malon, Raymond F.; and Cruse, Clint A., 5,013,767, Cl. 521-64.000.
- Cruver, Michael, to Formost Packaging Machines, Inc. Article group-segregating apparatus and method. 5,012,916, Cl. 198-419.300.
- Cruz, Exequiel D.: *See—*
  - Foley, Martin P.; and Cruz, Exequiel D., 5,012,803, Cl. 128-200.230.
  - Foley, Martin P.; and Cruz, Exequiel D., 5,012,804, Cl. 128-200.230.
- Culmo, Robert F.: *See—*
  - Norem, Stanley D.; Ferranti, Richard T.; and Culmo, Robert F., 5,013,528, Cl. 422-94.000.
- Culpepper, Ronnie. Multi-layered plaque and its method of preparation. 5,013,592, Cl. 428-46.000.
- Cummings, Donald P.: *See—*
  - Fletcher, William D.; Mallalieu, David H.; and Cummings, Donald P., 5,012,581, Cl. 30-162.000.
- Cunningham, John E.: *See—*
  - Chiu, Tien-Heng; Cunningham, John E.; and Goossen, Keith W., 5,013,685, Cl. 437-184.000.
- Cuomo, Frank P.: *See—*
  - Kaganowicz, Grezgorz; Cuomo, Frank P.; and Vieland, Leon J., 5,013,139, Cl. 350-340.000.
- Cupples Paper Bag Company: *See—*
  - DeMatteis, Robert B., 5,013,290, Cl. 493-196.000.
- Cupps, Thomas L.: *See—*
  - Berman, Elizabeth F.; Buckwalter, Brian L.; Cupps, Thomas L.; and Gardner, Joseph H., 5,013,759, Cl. 514-622.000.
- Curtis, Trevor G., to Ford Motor Company. Seal installation. 5,013,050, Cl. 277-9.500.
- Cypress Semiconductor Corporation: *See—*
  - Ansel, George M., 5,013,940, Cl. 307-473.000.
- Czor, Doug. Electrodeposition process. 5,013,409, Cl. 204-6.000.
- Da Costa, Cai Mario F. N., to Empresa Brasileira de Compressores. Lubricating system for rotary horizontal crankshaft hermetic compressor. 5,012,896, Cl. 184-6.160.
- Dahlgren, Steven W. Method and apparatus for installing wire anchors for suspended ceilings. 5,012,624, Cl. 52-484.000.
- Dai Nippon Insatsu Kabushiki Kaisha: *See—*
  - Egashira, Noritaka; Suto, Kenichiro; and Muro, Atsushi, 5,013,711, Cl. 503-227.000.
  - Kanto, Jumpei; and Saito, Hitoshi, 5,013,710, Cl. 503-227.000.
- Dai Nippon Toryo Co., Ltd.: *See—*
  - Kiriyama, Yoshiyuki; Moriga, Kazuyuki; Shinohara, Toshio; Matsuda, Mitsuhiro; and Maeda, Hiromi, 5,013,768, Cl. 522-64.000.
- Daidousanso Co., Ltd.: *See—*
  - Tahara, Masaaki; Tomoda, Takakazu; Kitano, Kenzo; and Minato, Teruo, 5,013,371, Cl. 148-16.600.
- Daimler-Benz AG: *See—*
  - Scheurenbrand, Dieter; and Wawra, Helmut, 5,012,944, Cl. 220-677.000.
  - Strauber, Hans-Jurgen; Niklas, Robert; Ohlendorf, Rolf; and Speier, Wolfgang, 5,012,774, Cl. 123-90.170.
- Dainippon Pharmaceutical Co., Ltd.: *See—*
  - Matsumoto, Jun-ichi; Minamida, Akira; Fujita, Masahiro; Hirose, Tohru; Nakano, Junji; and Nakamura, Shinichi, 5,013,841, Cl. 544-363.000.
- Dainippon Screen Mfg. Co., Ltd.: *See—*
  - Tanimori, Masayuki, 5,014,223, Cl. 364-521.000.
- Dais, Brian C.: *See—*
  - Porchia, Jose; McCree, John O.; and Dais, Brian C., 5,012,561, Cl. 24-576.000.
- Daito, Hiroshi: *See—*
  - Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, 5,014,142, Cl. 360-98.010.
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- Dalebout, William T.: *See—*
  - Watterson, Scott R.; Dalebout, William T.; and Standing, Donald J., 5,013,033, Cl. 272-72.000.
- Dallas Semiconductor Corporation: *See—*
  - Smith, Michael D., 5,013,932, Cl. 307-268.000.
- Dalton, Howard: *See—*
  - Suzuki, Motoshi; Dalton, Howard; Richards, Anthony O.; and Stanley, Stephen H., 5,013,665, Cl. 435-244.000.
- Daly, Ivor K.: *See—*
  - Mills, Peter S.; and Daly, Ivor K., 5,013,157, Cl. 366-13.000.
- Daly, Jeffrey E., to Camco International Inc. Method of making a threaded retainer ring for a roller cutter on a drill bit. 5,012,701, Cl. 76-108.200.
- D'Andrea, Ermanno: *See—*
  - D'Andrea, Nicola; and D'Andrea, Ermanno, 5,012,710, Cl. 82-1.200.
- D'Andrea, Nicola; and D'Andrea, Ermanno, to D'Andrea S.p.A. Device for the automatic engagement of the feed movement and of the return movement of the tool slide of a boring head. 5,012,710, Cl. 82-1.200.
- D'Andrea S.p.A.: *See—*
  - D'Andrea, Nicola; and D'Andrea, Ermanno, 5,012,710, Cl. 82-1.200.
- Dang Vu, Quang; Bournonville, Jean-Paul; and Le Page, Jean-Francois, to Institut Francais Du Petrole. A Catalytic reforming method with flow of a heat-carrying fluid through a plurality of hollow internal spaces. 5,013,426, Cl. 208-134.000.
- Danho, Waleed; Madison, Vincent S.; and Triscari, Joseph, to Hoffmann-LaRoche Inc. Cholecystokinin analogs for controlling appetite. 5,013,722, Cl. 514-16.000.
- Daniel, Daniel S.: *See—*
  - Bhagwat, Pradeep M.; Daniel, Daniel S.; and Woods, Samuel G., 5,013,993, Cl. 320-35.000.
- Danley, Dennis E., to Pfizer Inc. Method for improving production of viscous crude oil. 5,013,462, Cl. 252-8.554.
- Danzaki, Tsutomu: *See—*
  - Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 5,014,201, Cl. 364-426.040.
- Da Re, Mario, to Fiat Auto S.p.A. Method and device for cleaning die plates. 5,013,600, Cl. 428-316.600.
- Darling, Jim: *See—*
  - McLeish, Anthony B.; Hill, Anthony; Darling, Jim; and Dean, David M. M., 5,014,238, Cl. 364-900.000.
- Data Devices International: *See—*
  - Jeffries, Stuart W., 5,012,548, Cl. 15-308.000.
- Data Tech Servies, Inc.: *See—*
  - Marin, Thomas C., 5,013,088, Cl. 283-81.000.
- Datapoint Corporation: *See—*
  - Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., 5,014,267, Cl. 370-62.000.
- Dauny, Gerard: *See—*
  - Graf, Henry; and Dauny, Gerard, 5,012,798, Cl. 128-78.000.
- David, Jean-Marie, to Renault Automation. Machine for measuring by coordinates. 5,012,587, Cl. 33-503.000.
- Davidson, Jeffrey L. Colorimetric scale for correlating a shade two blended colors with the sun protection factor of a sun screening agent. 5,013,244, Cl. 434-81.000.
- Davis, Andrew, to Mount Sinai School of Medicine of the City University of New York. Apparatus and method for cornea marking. 5,013,319, Cl. 606-166.000.
- Davis, Clark C.: *See—*
  - Jacobsen, Stephen C.; Iversen, Edwin K.; Knutti, David F.; and Davis, Clark C., 5,012,836, Cl. 137-83.000.
- Davis Electric Wallingford Corporation: *See—*
  - Pepe, David, 5,012,985, Cl. 242-25.00A.
- Davis, H. Forbes; and Harshman, James P., to Davis Water & Waste Industries, Inc. Aerobic wastewater treatment with alkalinity control. 5,013,442, Cl. 210-614.000.
- Davis, James E., to Du Pont de Nemours, E. I., and Company. Capacitive liquid interface sensor. 5,012,683, Cl. 73-864.240.
- Davis, Shelby W.: *See—*
  - Marras, William S.; Davis, Shelby W.; Miller, Robert J.; and Mirka, Gary A., 5,012,819, Cl. 128-781.000.
- Davis, Steven S.: *See—*
  - Ernst, Guenter; and Davis, Steven S., 5,013,206, Cl. 414-483.000.
- Davis, Thomas F.: *See—*
  - Brown, Thomas E.; and Davis, Thomas F., 5,013,248, Cl. 439-66.000.
- Davis Water & Waste Industries, Inc.: *See—*
  - Davis, H. Forbes; and Harshman, James P., 5,013,442, Cl. 210-614.000.
- de La Chapelle, Michael, to Hughes Aircraft Company. Temperature stabilization of laser diodes and light emitting diodes. 5,013,971, Cl. 315-149.000.
- Dean, David M. M.: *See—*
  - McLeish, Anthony B.; Hill, Anthony; Darling, Jim; and Dean, David M. M., 5,014,238, Cl. 364-900.000.
- De Bellis, Ferruccio. Implantations for cardiac stimulation by pacemaker. 5,012,806, Cl. 128-419.00P.
- Debize, Jean-Claude; Hartmann, Yves; Huon, Pierre; and Peyronnenc, Michel, to International Business Machines Corp. Adapting device for accommodating different memory and bus formats. 5,014,187, Cl. 364-200.000.
- De Bortoli, Giuseppe: *See—*
  - Baggio, Giorgio; and De Bortoli, Giuseppe, 5,012,598, Cl. 36-119.000.

- de Bruyne, Pieter; and Kunz, Andre, to Ellett Brothers. Apparatus for recording and verifying handwriting, in particular signatures. 5,013,874, Cl. 178-18.000.
- DeClair, Brian G.; and Barkey, Kevin C. Protective pad assembly for the loader bucket of a backhoe. 5,012,599, Cl. 37-117.500.
- De Deyne, Hedwig E.: *See—*
  - Kok, Piet; Vanmaele, Luc J.; Tavernier, Serge M.; and De Deyne, Hedwig E., 5,013,628, Cl. 430-110.000.
- Deere & Company: *See—*
  - Butz, Dieter; Erbach, Franz; and Muller, Kurt, 5,012,887, Cl. 180-305.000.
  - Gold, Raymond D., 5,013,887, Cl. 219-124.340.
  - Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., 5,012,632, Cl. 56-11.600.
  - Romans, William W.; and Lukehart, Dudley L., 5,012,526, Cl. 15-256.500.
  - Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., 5,012,634, Cl. 56-13.600.
  - Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., 5,012,635, Cl. 56-13.600.
- Deger, Hans-Matthias: *See—*
  - Bayer, Thomas; Buchholz, Rainer; Deger, Hans-Matthias; and Wink, Joachim, 5,013,655, Cl. 435-119.000.
- Degnan, Thomas F.: *See—*
  - Absil, Robert P. L.; Degnan, Thomas F.; Han, Scott; Marler, David O.; Socha, Richard F.; and Stapleton, Michael R., 5,013,422, Cl. 208-27.000.
- De Gregorio, Mauro, to Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A. Method of treating contact lenses. 5,013,484, Cl. 252-542.000.
- Degussa Aktiengesellschaft: *See—*
  - Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Voelker, Herbert, 5,013,705, Cl. 502-262.000.
- Deibele, Albert, Jr.: *See—*
  - Deibele, Charles; and Deibele, Albert, Jr., 5,013,873, Cl. 174-101.000.
- Deibele, Charles; and Deibele, Albert, Jr., to Houshold Utilities, Inc. Wireway for enclosing electrical conductors. 5,013,873, Cl. 174-101.000.
- Deki, Kyoichi, to Ushio Denki Kabushiki Kaisha. Method for the frequency stabilization of internal mirror type helium-neon laser oscillating at wavelength of 543 nm. 5,014,278, Cl. 372-32.000.
- Delco Electronic Corporation: *See—*
  - Schlais, John R.; Rusch, Randy A.; and Simacek, Thomas H., 5,014,098, Cl. 357-23.500.
- Delco Electronics Corporation: *See—*
  - Lippmann, Raymond; Schnars, Michael J.; and Chintyan, James R., 5,014,051, Cl. 340-870.380.
  - Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., 5,014,316, Cl. 381-15.000.
- Delonis, Michael E.: *See—*
  - Rehman, Warren C.; and Delonis, Michael E., 5,012,629, Cl. 53-453.000.
- Delphax Systems: *See—*
  - Caley, Wendell J., Jr.; Buchan, William R.; and Moore, Robert A., 5,014,076, Cl. 346-159.000.
- Delprato, Ivano; and Baldassarri, Agostino, to Minnesota Mining and Manufacturing Company. Incorporation of hydrophobic photographic additives into hydrophilic colloid compositions. 5,013,639, Cl. 430-546.000.
- DeLucas, Lawrence J.: *See—*
  - Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C.; Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., 5,013,531, Cl. 422-245.000.
- DeMatteis, Robert B., to Cupples Paper Bag Company. Serial dispensing bags which open automatically. 5,013,290, Cl. 493-196.000.
- de Meyer, Marcellus H.: *See—*
  - Roosen, Raymond A.; de Meyer, Marcellus H.; and Monbaliu, Marcel J., 5,013,138, Cl. 350-339.00F.
- DeMichele, Mardon; and Patout, Jules G., to Towing Technologies, Inc. Wheel lift towing dolly. 5,013,209, Cl. 414-563.000.
- Denis, Jean-Paul; and Neuforge, Marc, to Fabrique National Herstal, en abrege FN, societe anonyme. High-performance projectile. 5,012,743, Cl. 102-514.000.
- Dennison, Charles H.: *See—*
  - Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.
- Dennison Manufacturing Company: *See—*
  - Lane, Donald A., 5,012,711, Cl. 83-92.000.
- Denora Permelec S.p.A.: *See—*
  - Morris, Gregory J. E.; Borrione, Pierluigi A. V.; and Leoni, Umberto, 5,013,414, Cl. 204-98.000.
- Dense, Brian S., to Caldwell Manufacturing Company. Automatic anchoring system for window spring. 5,012,554, Cl. 16-197.000.
- De Peyer, Jacques: *See—*
  - Gericke, Rolf; Baumgarth, Manfred; Lues, Ingeborg; Bergmann, Rolf; and De Peyer, Jacques, 5,013,853, Cl. 549-401.000.
- De Pree, Michael L.: *See—*
  - Nienhuis, James H.; Clark, Jeffrey L.; De Pree, Michael L.; and Beck, Robert L., 5,013,252, Cl. 439-215.000.
- DeRosa, Thomas F.; Nalesnik, Theodore E.; and Kaufman, Benjamin J., to Texaco Inc. VI improver, dispersant, and anti-oxidant additive and lubricating oil composition containing same. 5,013,469, Cl. 252-47.500.
- Desage, Robert, to A.R.M.I.N.E.S. Electro-portable apparatus for the production of steam, particularly for ungluing wall coatings. 5,014,337, Cl. 392-395.000.
- Desclos, Raymond G., to GTE Products Corporation. Single pin lamp base and fluorescent lamp including same. 5,013,962, Cl. 313-318.000.
- Dessau, Ralph M.: *See—*
  - Chen, Nai Y.; Dessau, Ralph M.; Partride, Randall D.; and Valyocsik, Ernest W., 5,013,423, Cl. 208-64.000.
- Deutsche Forschungsanstalt fur Luft- und Raumfahrt e.V.: *See—*
  - Tattermusch, Peter, 5,014,339, Cl. 392-491.000.
- Deutsche ITT Industries GmbH: *See—*
  - Schmidt, Hans; and Gunter, Helmut, 5,014,001, Cl. 324-158.00F.
- Deutsche Thomson-Brandt GmbH: *See—*
  - Fuldner, Friedrich, 5,014,215, Cl. 364-486.000.
  - Morimoto, Yasuaki; Zucker, Friedheim; and Buchler, Christian, 5,014,253, Cl. 369-13.000.
- Dewalt, Kenneth M.: *See—*
  - Casbarian, Aramis O. P.; and Dewalt, Kenneth M., 5,012,875, Cl. 175-9.000.
- DewEze Manufacturing, Inc.: *See—*
  - Hostetler, Dewey L.; Lansdowne, David L.; and Hostetler, Delmar, 5,012,631, Cl. 53-588.000.
- Dexsil Corporation: *See—*
  - Lynn, Theodore R.; and Finch, Stephen R., 5,013,667, Cl. 436-126.000.
- Dharmarajan, Narayanaswami R.: *See—*
  - Wang, Hsien C.; Powers, Kenneth W.; Puydak, Robert C.; and Dharmarajan, Narayanaswami R., 5,013,793, Cl. 525-195.000.
- Dhyanchand, P. John, to Sundstrand Corporation. Power conversion system having prime mover start capability. 5,013,929, Cl. 290-31.000.
- Diamond S.A.: *See—*
  - Marazzi, Silvio, 5,013,110, Cl. 350-96.200.
- Dianis, William P.: *See—*
  - Young, Harold W., Jr.; and Dianis, William P., 5,013,860, Cl. 558-383.000.
- Diaz, Thomas P., to General Electric Company. Method for localization of tensile residual stress and product produced thereby. 5,013,370, Cl. 148-13.000.
- DiBiagio, Anthony J., to Holiday Rambler Corporation. Awning spring winder. 5,012,707, Cl. 81-124.200.
- DIC-Hercules Chemicals, Inc.: *See—*
  - Oikawa, Hideo; Ogawa, Masatomi; Iwai, Kiyoshi; and Narushima, Mayumi, 5,013,775, Cl. 524-107.000.
- Dick, Pearce; and Mehta, Vinay, to Hunter Fan Company. Window air conditioning unit having a built-in programmable thermostat with remote temperature sensor. 5,012,973, Cl. 236-46.00R.
- Dicke, Hans-Rudolf: *See—*
  - Genz, Joachim; and Dicke, Hans-Rudolf, 5,013,815, Cl. 528-171.000.
- Diehl, Carl E., to Wetterau Incorporated. Blowers for freezer system and methods of installation thereof. 5,013,215, Cl. 416-178.000.
- Diffracto Ltd.: *See—*
  - Pryor, Timothy R., 5,012,574, Cl. 29-888.060.
- Digital Equipment Corporation: *See—*
  - Gagliardo, Michael A.; Goodwin, Paul M.; and Smelser, Donald W., 5,014,273, Cl. 371-37.700.
  - Lee, James C. K.; Amdahl, Gene M.; Beck, Richard; Lee, Chune; and Hu, Edward, 5,014,161, Cl. 361-388.000.
  - McCoy, John F., Jr., 5,014,160, Cl. 361-424.000.
  - Mogul, Jeffrey C., 5,014,221, Cl. 364-519.000.
  - Potter, Terry W.; and Worrell, Glen C., 5,014,327, Cl. 382-14.000.
- Digital Equipment Corporation, Inc.: *See—*
  - Farrell, James A.; and Sites, Richard L., 5,014,195, Cl. 364-200.000.
- Dilling, Peter, to Westvaco Corporation. Sulfation of lignin. 5,013,825, Cl. 530-500.000.
- DiMaggio, Charlie J. Laser plumb-bob apparatus. 5,012,585, Cl. 33-286.000.
- D'Incan, Esther: *See—*
  - Conan, Annie; D'Incan, Esther; Perichon, Jacques; and Sibille, Soline, 5,013,412, Cl. 204-59.00R.
- Dingwall, Andrew G. F.; and Hsueh, Fu-Lung, to Harris Corporation. Analog-to-digital converter and method of use utilizing charge redistribution. 5,014,055, Cl. 341-159.000.
- Dinter, Peter: *See—*
  - Bothe, Lothar; Gribbin, John D.; and Dinter, Peter, 5,013,601, Cl. 428-323.000.
- Dipl.-Ing. Paul Schmidt: *See—*
  - Puttmann, Franz-Josef, 5,013,880, Cl. 219-61.000.
- Disch, Rolf; and Hartig, Wolfgang, to Erwin Sick GmbH Optik-Elektronik. Interferometric gas component measuring apparatus for small gas molecules. 5,013,153, Cl. 356-346.000.
- DiSimone, John; Brown, Paul; and Huntington, Christopher, to Husky Injection Molding Systems Ltd. Method for installing and replacing parts in an injection molding machine. 5,012,568, Cl. 29-402.080.
- Disimone, John: *See—*
  - Schad, Robert D.; Disimone, John; and Philips, Terry, 5,013,513, Cl. 264-328.800.
- Dissaux, Antoine; and Le Loarer, Jean-Luc, to Rhone-Poulenc Chimie. Morphologically improved rare earth trifluorides. 5,013,534, Cl. 423-263.000.
- Distributed Matrix Controls Inc.: *See—*
  - McLeish, Anthony B.; Hill, Anthony; Darling, Jim; and Dean, David M. M., 5,014,238, Cl. 364-900.000.
- Diversey Corporation: *See—*
  - Turner, James R.; Hosking, Stephen G.; and Livingston, James W., 5,014,211, Cl. 364-478.000.

OL
126
SS
1
MY
7
1991
UMI

Dixon, Anthony J.; and Manning, Peter R. J., to Monogram Models, Inc. Diorama toy kit. 5,013,278, Cl. 446-73.000.

Dixon, Brian: *See—*
Frenier, Wayne; Growcock, Fred; Lopp, Victoria R.; and Dixon, Brian, 5,013,483, Cl. 252-396.000.

Dixon, John: *See—*
Farmer, John B.; Ince, Francis; Brown, Rodney A.; and Dixon, John, 5,013,760, Cl. 514-649.000.

DLMA Transportation Inc.: *See—*
Hilden, Gilbert R., 5,012,885, Cl. 180-254.000.

DNA Plant Technology Corporation: *See—*
Dooner, Hugo; Jones, Jonathan; and Maliga, Pal, 5,013,658, Cl. 435-172.300.

Dobbins, John P. Prevention and treatment of alcoholism by the use of dietary chromium. 5,013,752, Cl. 514-505.000.

Dr. Schwab Gesellschaft fur Technologieberatung mbH: *See—*
Schwab, Gunther, 5,013,047, Cl. 273-238.000.

Dody, Joseph W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., to Hewlett-Packard Company. Light emitting diode print head assembly. 5,014,074, Cl. 346-107.00R.

Doets, Albert R., to Meyn Machinefabriek, B.V. Apparatus for anaerobic purification of waste water. 5,013,431, Cl. 210-188.000.

Doi, Yasuhiko: *See—*
Kubo, Naoki; Ishikawa, Takuma; Matsui, Toshio; Atsumi, Fumitoshi; and Doi, Yasuhiko, 5,014,092, Cl. 355-324.000.

Domer, Michel, to Hutchinson. Torsion bar bearing. 5,013,166, Cl. 384-220.000.

Domesle, Rainer: *See—*
Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Voelker, Herbert, 5,013,705, Cl. 502-262.000.

Domestic Automation Company, Inc.: *See—*
Edwards, Cree A.; and Johnson, Larsh M., 5,014,213, Cl. 364-483.000.

Donahue, Thomas J., to Bull HN Information Systems Inc. Method of manipulating images larger than a viewport. 5,014,222, Cl. 364-521.000.

Donaldson Company, Inc.: *See—*
Coulvonvaux, Paul R.; and VandeVeire, Eric L., 5,013,182, Cl. 403-30.000.

Donate, Felipe A.; and Papajesk, James G., to Dow Chemical Company, The. Stabilized 1,1,1-trichloroethane. 5,013,364, Cl. 106-311.000.

Donnard, Rene, to Lohr Industrie, S.A. Locking assembly with retractable integrated pin for load-supporting structure. 5,012,999, Cl. 248-685.000.

Doomernik, Franciscus M. P. P.: *See—*
Vink, Nicolaas G.; Jacobs, Franciscus C. A. J.; and Doomernik, Franciscus M. P. P., 5,013,964, Cl. 313-440.000.

Dooner, Hugo; Jones, Jonathan; and Maliga, Pal, to DNA Plant Technology Corporation. Transposon tagging of genes in transformed plants. 5,013,658, Cl. 435-172.300.

Dori, Lino M.: *See—*
Azzani, Roberto; Dori, Lino M.; and Scaglietti, Oscar, 5,013,514, Cl. 264-512.000.

Doryokuro Kakunenryo Kaihatsu Jigyodan: *See—*
Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.

Dosaka, Katsumi: *See—*
Komatsu, Takahiro; Kumanoya, Masaki; Konishi, Yasuhiro; Dosaka, Katsumi; and Inoue, Yoshinori, 5,014,246, Cl. 365-230.030.

Dow Chemical Company, The: *See—*
Christiansen, Steven H.; Littleton, Teresa; and Patton, Robert T., 5,013,404, Cl. 162-72.000.
Donate, Felipe A.; and Papajesk, James G., 5,013,364, Cl. 106-311.000.
Garcia-Huidobro, Gonzalo; and Greminger, Douglas C., 5,013,449, Cl. 210-672.000.
Mahoney, Robert D.; and Lundgard, Richard A., 5,013,339, Cl. 55-158.000.
Morris, Gregory J. E.; Borrione, Pierluigi A. V.; and Leoni, Umberto, 5,013,414, Cl. 204-98.000.
Porchia, Jose; McCree, John O.; and Dais, Brian C., 5,012,561, Cl. 24-576.000.
Trimmer, Johnny L.; Caskey, Terrence L.; and Jorgensen, Janine L., 5,013,437, Cl. 210-321.780.
Tung, Lu H.; and Randazzo, Joseph J., 5,013,790, Cl. 525-99.000.
Young, Harold W., Jr.; and Dianis, William P., 5,013,860, Cl. 558-383.000.

Dow Corning Corporation: *See—*
Gettings, Richard L.; and White, William C., 5,013,459, Cl. 210-764.000.
Wright, Antony P.; and Varaprath, Padmakumari J., 5,013,577, Cl. 427-35.000.

Dow Corning Toray Silicone Company, Ltd.: *See—*
Koshii, Taro; and Amemiya, Tetsuo, 5,013,781, Cl. 524-864.000.

Dowa Mining Co., Ltd.: *See—*
Sugimura, Kentaro; Hasimoto, Shoji; and Ono, Takayuki, 5,013,464, Cl. 252-26.000.

DowElanco: *See—*
Markley, Lowell D.; Hamilton, Christopher T.; Swisher, Beth A.; and Secor, Jacob, 5,013,352, Cl. 71-94.000.

Dowell Schlumberger Incorporated: *See—*
Frenier, Wayne; Growcock, Fred; Lopp, Victoria R.; and Dixon, Brian, 5,013,483, Cl. 252-396.000.

Downes, Carville M., to Allied-Signal Inc. Stripline launcher spring washer. 5,013,199, Cl. 411-544.000.

Downie, Barbara: *See—*
Oberley, Gene; and Downie, Barbara, 5,012,962, Cl. 223-57.000.

Downing, Michael R.: *See—*
Adamson, John W.; Eschbach, Joseph W.; Downing, Michael R.; and Egrie, Joan C., 5,013,718, Cl. 514-8.000.

Downum, Daniel L.; and LaFond, Robert L. Overhead projection highlighting device and method of use. 5,013,149, Cl. 353-122.000.

Doyle, Nancy L. C. Method of promoting self-esteem by assembling a personalized kit. 5,013,246, Cl. 434-236.000.

Drake, Charles A., to Phillips Petroleum Company. Process for preparing poly(arylene sulfide sulfone) with in-situ preparation of alkali metal carboxylate. 5,013,822, Cl. 528-388.000.

Drake, Charles A.: *See—*
Nesheiwat, Afif M.; and Drake, Charles A., 5,013,986, Cl. 318-593.000.

Draper, Geoffrey; James, Hayden; and Carlton, Kevin, to Carello Lighting plc. Light unit. 5,014,166, Cl. 362-61.000.

Dresher, Incorporated: *See—*
Timm, Robert, 5,012,538, Cl. 5-200.100.

Dresser Industries, Inc.: *See—*
Betzler, Mark H., 5,012,840, Cl. 137-559.000.
Bruchmiller, Tod T., 5,012,876, Cl. 175-69.000.

Driessen, Pieter J.; and Klok, Jan, to U.S. Philips Corp. Stand for electric iron. 5,013,003, Cl. 248-117.600.

Droho, Joseph S., to North American Philips Corporation. Ignitor for high pressure arc discharge lamps. 5,013,977, Cl. 315-289.000.

Dronge & Rapoport Inc.: *See—*
Pagelli, Claudio, 5,012,716, Cl. 84-727.000.

Dropczynski, Hartmut. Drum-type winder for winding a web of material, especially a web of paper or cardboard, on cores. 5,012,987, Cl. 242-56.00R.

Drori, Mordeki. Regeneration method of filter device having filter aid material and piston apparatus. 5,013,461, Cl. 210-777.000.

Dross, Joachim: *See—*
Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Jungverdorben, Hermann Josef; and Dross, Joachim, 5,013,502, Cl. 264-103.000.

Druesne, Guy; and Michaud, Joel, to Cebal. Easily cut aluminium closure capsule. 5,012,942, Cl. 215-253.000.

Drug Delivery Systems Inc.: *See—*
Sibalis, Dan, 5,013,293, Cl. 604-20.000.

Drury, Finvola: *See—*
Bihari, Bernard; and Drury, Finvola, 5,013,739, Cl. 514-282.000.

Drushel, Ronald H.: *See—*
Futch, Max G.; and Drushel, Ronald H., 5,013,983, Cl. 318-480.000.

Dubay, William G.: *See—*
Zelan, Donald J.; and Dubay, William G., 5,013,109, Cl. 350-96.100.

Dube, Sylvain: *See—*
Vidaver, William; Toivonen, Peter; and Dube, Sylvain, 5,014,225, Cl. 364-550.000.

Dubin, Murray L.; and Smith, Linda J., to General Electric Company. Method and apparatus for detecting stalls. 5,012,637, Cl. 60-39.020.

Dubroff, Seymour. Syringe for use in cataract surgery. 5,013,295, Cl. 604-38.000.

DuCharme, Robert T.: *See—*
Moody, Mark D.; and DuCharme, Robert T., 5,012,902, Cl. 188-73.350.

Dudley, Kevin F., to Carrier Corporation. Crankcase heater control for hermetic refrigerant compressors. 5,012,652, Cl. 62-192.000.

Duke University: *See—*
Haynes, Barton F.; and Palker, Thomas J., 5,013,548, Cl. 424-89.000.

Dumesnil, Maurice E.: *See—*
Finkelstein, Leo; Dumesnil, Maurice E.; and Tetschlag, Richard R., 5,013,360, Cl. 106-1.230.

Dumont, Lawrence C.: *See—*
Peters, Donald F., Jr.; and Dumont, Lawrence C., 5,013,669, Cl. 436-518.000.

Du Pont de Nemours, E. I., and Company: *See—*
Atkinson, Charles E., 5,013,551, Cl. 424-412.000.
Barry, Robert C., 5,014,086, Cl. 355-71.000.
Bedbrook, John R.; Chaleff, Roy S.; Falco, Saverio C.; Mazur, Barbara J.; Somerville, Christopher R.; and Yadav, Narendra S., 5,013,659, Cl. 435-172.300.
Chapman, George R., Jr.; Priester, Donnan E.; and Stewart, Charles W., 5,013,792, Cl. 525-166.000.
Davis, James E., 5,012,683, Cl. 73-864.240.
Edwards, Donald W.; and Etienne, Billy J., 5,013,331, Cl. 55-16.000.
Fischer, Gerhard; and Quabeck, Helmut, 5,014,138, Cl. 358-448.000.
Guckert, Joseph R.; and Lim, Hyun S., 5,013,599, Cl. 428-286.000.
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; and Yngve, Paul W., 5,012,636, Cl. 57-204.000.
Lawton, John A., 5,014,207, Cl. 364-468.000.
Odell, Daniel M. C., 5,013,953, Cl. 310-254.000.
Ruger, Reinhold, 5,013,844, Cl. 546-332.000.
Weber, Andrew M., 5,013,632, Cl. 430-281.000.

Durcan, D. Mark: *See—*
Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.

Durham, A. Glenn: *See—*
Cole, J. Dean; and Durham, A. Glenn, 5,013,317, Cl. 606-96.000.

Durkin, Thomas B.; and Biasone, Frank, to Asten Group, Inc. Multilayered papermakers fabric for thru-dryer application. 5,013,330, Cl. 51-297.000.

Durrett, Michael G.: *See—*
Helms, David A.; Durrett, Michael G.; and Hatton, Gregory J., 5,014,010, Cl. 324-640.000.

Dwyer, Stephen H.: *See—*
Hunder, Ray A.; Miles, Alden R.; Dwyer, Stephen H.; and Thompson, Dorman N., 5,013,200, Cl. 412-6.000.

Dwyer Struments, Inc.: *See—*
Buchanan, Steven O., 5,012,678, Cl. 73-738.000.

Dykes, Norman L.: *See—*
Holcombe, Cressie E.; and Dykes, Norman L., 5,013,694, Cl. 501-98.000.

Dynatech Precision Sampling Corporation: *See—*
Averette, Julius P., 5,012,845, Cl. 141-329.000.

E.G.O. Elektro-Gerate Blanc u. Fischer: *See—*
Goessler, Gerhard; and Schau, Ortwin, 5,013,893, Cl. 219-453.000.

E-mu Systems, Inc.: *See—*
Rossum, John R., Jr., 5,013,105, Cl. 312-263.000.

E. R. Squibb & Sons, Inc.: *See—*
Weller, Harold N., III; and Gordon, Eric M., 5,013,861, Cl. 560-34.000.

E-Z Division of Textron: *See—*
Eavenson, Jimmy N.; and Pugh, Donovan M., 5,013,992, Cl. 320-31.000.

Eastman Kodak Company: *See—*
Bagchi, Pranab; McSweeney, Gary J.; and Sargeant, Steven J., 5,013,640, Cl. 430-546.000.
Barnett, Anthony M.; and Hallbery, David A., 5,013,638, Cl. 430-539.000.
Blevins, Richard W.; and Turner, S. Richard, 5,013,806, Cl. 526-271.000.
Buntaine, James R.; and Brady, Robert V., 5,013,641, Cl. 430-569.000.
Miller, Rodney L.; and Morton, Roger R. A., 5,014,333, Cl. 382-54.000.
Muenter, Annabel; Adin, Anthony; Parton, Richard L.; Pightling, Nicholas A.; and Beaumond, David, 5,013,642, Cl. 430-574.000.
Ng, Yee S., 5,014,093, Cl. 355-326.000.
Rudak, Peter, 5,014,328, Cl. 382-17.000.
Rudak, Peter, 5,014,329, Cl. 382-17.000.
Rule, Norman G.; and Kung, Teh-Ming, 5,013,849, Cl. 549-28.000.
Santilli, Domenic, 5,014,090, Cl. 355-256.000.
Trotter, Jimmy R.; and Sublett, Bobby J., 5,013,820, Cl. 528-272.000.
Whitehead, Frank R.; and Sander, Ingolf, 5,013,136, Cl. 350-286.000.
Whyte, Robert E., Jr.; and Alcudia, Ezra R., 5,012,989, Cl. 242-186.000.

Eavenson, Jimmy N.; and Pugh, Donovan M., to E-Z Division of Textron. Microprocessor controlled battery charger. 5,013,992, Cl. 320-31.000.

Eberle, Charles R., Jr.: *See—*
Joffe, Daniel M.; and Eberle, Charles R., Jr., 5,014,307, Cl. 379-410.000.

Eberlein, Ernst: *See—*
Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.

ECIA - Equipements Et Composants Pour L'Industrie Automobile: *See—*
Bertot, Maurice M., 5,012,691, Cl. 74-434.000.
Roth, Robert, 5,013,072, Cl. 285-233.000.

Eckerd, Roger C.; and Beidler, Florence L. Topper with pivoting roof panels. 5,013,078, Cl. 296-100.000.

Eckert, Eberhard: *See—*
Stock, Don J. R.; and Eckert, Eberhard, 5,014,070, Cl. 343-700.0MS.

Eckhardt, Wolfgang: *See—*
Beriger, Ernst; and Eckhardt, Wolfgang, 5,013,745, Cl. 514-364.000.

Edwards, Cree A.; and Johnson, Larsh M., to Domestic Automation Company, Inc. System for use with polyphase utility meters for recording time of energy use. 5,014,213, Cl. 364-483.000.

Edwards, Donald W.; and Etienne, Billy J., to Du Pont de Nemours, E. I., and Company. Permeator with selectable flow rates. 5,013,331, Cl. 55-16.000.

Edwards, Gordon L., Jr., to NCR Corporation. System with software usage timer and counter for allowing limited use but preventing continued unauthorized use of protected software. 5,014,234, Cl. 364-900.000.

EFFEM GmbH: *See—*
Gideon, Jurgen; Krieger, Dieter; and Mengel, Eirch, 5,012,958, Cl. 222-306.000.

EG&G Sealol, Inc.: *See—*
Hilaris, John A.; and Waring, George D., 5,013,051, Cl. 277-89.000.

Egashira, Noritaka; Suto, Kenichiro; and Muro, Atsushi, to Dai Nippon Insatsu Kabushiki Kaisha. Image-receiving sheet. 5,013,711, Cl. 503-227.000.

Egrie, Joan C.: *See—*
Adamson, John W.; Eschbach, Joseph W.; Downing, Michael R.; and Egrie, Joan C., 5,013,718, Cl. 514-8.000.

Eguchi, Yoshiaki: *See—*
Tanimoto, Shigemi; and Eguchi, Yoshiaki, 5,013,490, Cl. 261-87.000.

Eichel, Hans W.: *See—*
Horstmann, Jens U.; Coates, Robert L.; and Eichel, Hans W., 5,014,226, Cl. 364-551.010.

Eichinger, Johann: *See—*
Meyer, Emil; and Eichinger, Johann, 5,012,906, Cl. 192-56.00F.

Eicken, Karl: *See—*
Schwalge, Barbara; Plath, Peter; Eicken, Karl; Meyer, Norbert; and Wuerzer, Bruno, 5,013,354, Cl. 71-95.000.

Eisenhart, Robert L., to Hughes Aircraft Company. Bias circuit for solid state devices. 5,013,933, Cl. 307-296.100.

Eisermann, Armin, to Schulte-Schlagbaum Aktiengesellschaft. Locking device with key-coded printer connection. 5,012,659, Cl. 70-276.000.

Eitan, Boaz: *See—*
Kazerounian, Reza; Ali, Syed; and Eitan, Boaz, 5,014,097, Cl. 357-23.500.

Elcock, Kenneth W. A., to Esselte Letraset Limited. Sign systems. 5,012,603, Cl. 40-605.000.

Electro-Matic Products Co.: *See—*
Armond, Joseph A.; and Rodenas, Juanito, 5,013,984, Cl. 318-490.000.

Elf France: *See—*
Nocca, Jean-Luc; Leonard, Jacques; Gaillard, Jean-Ferdinand; and Amigues, Pierre, 5,013,407, Cl. 202-158.000.

Eli Lilly and Company: *See—*
Beedle, Edward E.; Robertson, David W.; and Wong, David T., 5,013,761, Cl. 514-650.000.
Bunnell, Charles A., 5,013,854, Cl. 549-496.000.

Ellett Brothers: *See—*
de Bruyne, Pieter; and Kunz, Andre, 5,013,874, Cl. 178-18.000.

Elliott, David L.; and Howie, Catherine L., to Conopco, Inc. Poly(alpha-hydroxy acrylic acid) and derivatives as antitartar actives in oral compositions. 5,013,541, Cl. 424-52.000.

Elliott, Leonard G.: *See—*
Crisp, Harold A.; Clayton, John C.; Elliott, Leonard G.; and Wilson, Edward M., 5,013,833, Cl. 540-222.000.

Ellis, Malcolm P. Sizing apparatus and proportional spacing mechanism. 5,012,688, Cl. 74-89.150.

Elm, Oskar: *See—*
Knoppel, Hans-Martin; Elm, Oskar; and Munch, Udo, 5,013,104, Cl. 312-254.000.

Elmore, Rex. Golf club swing exercising and training apparatus and method. 5,013,045, Cl. 273-186.00R.

Elshoud, Nicolaas P., to B.V. Optische Industrie "De Oude Delft" . Collimating mark device. 5,013,925, Cl. 250-505.100.

Elstein, Max: *See—*
Chantler, Eric N.; and Elstein, Max, 5,013,544, Cl. 424-78.000.

Eltoukhy, Atef H.: *See—*
Price, Rick C.; Eltoukhy, Atef H.; and Mehmandoust, Yassin, 5,012,618, Cl. 51-140.000.

Elvander, Hans I.; and Malmstrom, Rolf E., to A. Ahlstrom Corporation. Method and apparatus for producing matte and/or metal. 5,013,355, Cl. 75-23.000.

EM Diagnostic Systems, Inc.: *See—*
Pasqua, John; and Law, Wai T., 5,013,648, Cl. 435-25.000.

Ema, Taiji, to Fujitsu Limited. Dynamic random access memory having improved layout and method of arranging memory cell pattern of the dynamic random access memory. 5,014,103, Cl. 357-41.000.

Ema, Taiji, to Fujitsu Limited. Semiconductor integrated circuit having CMOS inverters. 5,014,104, Cl. 357-42.000.

Emerson Electric Co.: *See—*
Gamble, Bobby G., 5,013,890, Cl. 392-497.000.

Emert, Jacob; and Waddoups, Malcolm, to Exxon Chemical Patents Inc. Novel oleaginous composition additives for improved rust inhibition. 5,013,467, Cl. 252-46.400.

Emhart Industries, Inc.: *See—*
Hylwa, William, 5,012,968, Cl. 227-156.000.

Emoto, Kazuhiro: *See—*
Itoh, Akira; Haino, Kozo; Okaji, Makoto; Emoto, Kazuhiro; and Kodera, Tatsuya, 5,013,623, Cl. 430-59.000.

Empresa Brasileira de Compressores: *See—*
Da Costa, Cai Mario F. N , 5,012,896, Cl. 184-6.160.

Engitec Impianti S.p.A.: *See—*
Olper, Marco; Corsini, Tullio; and Fracchia, Pierluigi, 5,013,356, Cl. 75-586.000.

Engler, Bernd: *See—*
Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Voelker, Herbert, 5,013,705, Cl. 502-262.000.

Eniricerche S.p.A.: *See—*
Sisto, Alessandro; and Verdini, Antonio, 5,013,723, Cl. 514-19.000.

Enomec S.p.A.: *See—*
Pesente, Narciso, 5,012,727, Cl. 99-470.000.

Enomoto, Masao; Yamamoto, Masami; Nagayama, Yoshiro; and Yamauchi, Yoshinori, to Ichikoh Industries, Ltd. Drive mechanism for rear-view mirror assembly of motor-driven folding type. 5,012,693, Cl. 74-502.100.

Enright, David J., to Vernon E. Faulconer, Inc. Wellhead apparatus involving a free fall plunger in a well. 5,012,864, Cl. 166-70.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Ensign-Bickford Company, The: *See—*
  - Peebles, Richard J.; Michna, Richard J.; Monat, David E.; Bartholomew, Stephen W.; and Adams, Craig F., 5,012,741, Cl. 102-275.400.
- Environmental Dynamics, Inc.: *See—*
  - Tharp, Charles E., 5,013,493, Cl. 261-122.000.
- Enzo Biochem, Inc.: *See—*
  - Stavrianopoulos, Jannis G., 5,013,831, Cl. 536-27.000.
- Epler, John E.; and Paoli, Thomas L., to Xerox Corporation. Buried disordering sources in semiconductor structures employing photo induced evaporation enhancement during in situ epitaxial growth. 5,013,684, Cl. 437-129.000.
- Eppendorf-Netheler-Hinz GmbH, Firma: *See—*
  - Sabloewski, Horst, 5,012,682, Cl. 73-864.180.
- Epstein, Howard C., to Hewlett-Packard Company. Shaft angle encoder with a symmetrical code wheel. 5,013,910, Cl. 250-231.170.
- Epstein, Joseph W.: *See—*
  - Tseng, Shin S.; Epstein, Joseph W.; and Levin, Jeremy I., 5,013,737, Cl. 514-267.000.
- Erbach, Franz: *See—*
  - Butz, Dieter; Erbach, Franz; and Muller, Kurt, 5,012,887, Cl. 180-305.000.
- Erbamont, Inc.: *See—*
  - Sweet, Frederick; and Rosik, Leonard O., 5,013,547, Cl. 424-85.910.
- Erie Glass Manufacturing Company: *See—*
  - Kelly, Hugh P., 5,014,168, Cl. 362-86.000.
- Eriksson, Bengt; and Clavensjo, Bertil. Apparatus for drawing off ground air. 5,013,183, Cl. 405-59.000.
- Ernst, Guenter; and Davis, Steven S. Guide mounted boat trailer. 5,013,206, Cl. 414-483.000.
- Ervin, Julie M.; Ingerman, Mark M.; and Jones, Ronald E., to International Business Machines Corporation. Bounded word replace function for an electronic typewriter erasing a zone bounded by erroneous characters. 5,013,167, Cl. 400-63.000.
- Erwin Sick GmbH Optik-Elektronik: *See—*
  - Disch, Rolf; and Hartig, Wolfgang, 5,013,153, Cl. 356-346.000.
- ESAB Welding Products, Inc.: *See—*
  - Carkhuff, Donald W.; Everett, Jeffrey S.; and Conner, Jule, 5,013,885, Cl. 219-121.500.
- Eschbach, Joseph W.: *See—*
  - Adamson, John W.; Eschbach, Joseph W.; Downing, Michael R.; and Egrie, Joan C., 5,013,718, Cl. 514-8.000.
- Eskilsson, Eva C., to Lejus Medical Aktiebolag. Process for treating amphoteric amino acids. 5,013,868, Cl. 562-557.000.
- Eslick, Robert F.: *See—*
  - Goering, Kenneth J.; and Eslick, Robert F., 5,013,561, Cl. 426-28.000.
- Espeut, Kenneth W.; and Barry, Leon, to JW Aluminum Company. Hydrophilic fins for a heat exchanger. 5,012,862, Cl. 165-133.000.
- Esselte Letraset Limited: *See—*
  - Elcock, Kenneth W. A., 5,012,603, Cl. 40-605.000.
- Esterowitz, Leon; Allen, Roger E.; and Kintz, Gregory J., to United States of America, Navy. Laser diode pumped, erbium-doped, solid state laser with high slope efficiency. 5,014,279, Cl. 372-41.000.
- Estes, Earl M., Jr., to Hughes Aircraft Company. Programmable triangle wave generator. 5,013,931, Cl. 307-261.000.
- Estrada, Julio R., to National Semiconductor Corporation. ECL cutoff driver circuit with reduced stanby power dissipation. 5,013,938, Cl. 307-455.000.
- ETA SA Fabriques d'Ebauches: *See—*
  - Kappeler, Markus; and Voser, Beat, 5,014.302, Cl. 379-165.000.
  - Kappeler, Markus; and Voser, Beat. 5,014,302, Cl. 379-165.000.
- Ethyl Corporation: *See—*
  - Allen, Robert H.; and Ibrahim, Jameel, 5,013,604, Cl. 428-402.000.
  - Niebylski, Leonard M., 5,013,609, Cl. 428-447.000.
- Etienne, Billy J.: *See—*
  - Edwards, Donald W.; and Etienne, Billy J., 5,013,331, Cl. 55-16.000.
- Etspuler, Angelika: *See—*
  - Suhr, Harald; Etspuler, Angelika; Feurer, Ernst; and Oehr, Christian, 5,013,581, Cl. 427-41.000.
- Evens, F. Monte: *See—*
  - Gergely, John S.; and Evens, F. Monte, 5,013,120, Cl. 350-96.180.
- Everest Medical Corporation: *See—*
  - Parins, David J.; Szczech, Gerald S.; Nicoloff, Demitre M.; and Berhow, Steven W., 5,013,312, Cl. 606-37.000.
- Everett, Jeffrey S.: *See—*
  - Carkhuff, Donald W.; Everett, Jeffrey S.; and Conner, Jule, 5,013,885, Cl. 219-121.500.
- Ewing, William S.: *See—*
  - Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., 5,013,791, Cl. 525-113.000.
- Exergen Corporation: *See—*
  - Pompei, Francesco; and Gaudet, Philip R., Jr., 5,012,813, Cl. 128-664.000.
- Exxon Chemical Patents, Inc.: *See—*
  - Best, Steven A., 5,013,803, Cl. 526-128.000.
  - Colclough, Terence, 5,013,465, Cl. 252-32.70E.
  - Emert, Jacob; and Waddoups, Malcolm, 5,013,467, Cl. 252-46.400.
  - Wang, Hsien C.; Powers, Kenneth W.; Puydak, Robert C.; and Dharmarajan, Narayanaswami R., 5,013,793, Cl. 525-195.000.
  - Yang, Henry W., 5,013,784, Cl. 524-458.000.
- Exxon Research and Engineering Company: *See—*
  - Baird, William C., Jr.; and Shoukry, Ehsan I., 5,013,704, Cl. 502-241.000.
  - Keenan, Gordon A., 5,012,945, Cl. 220-89.100.
  - Vaughan, David E. W.; and Strohmaier, Karl G., 5,013,536, Cl. 423-328.000.
- Fabrique National Herstal, en abrege FN, societe anonyme: *See—*
  - Denis, Jean-Paul; and Neuforge, Marc, 5,012,743, Cl. 102-514.000.
- Face Construction Technologies, Inc.: *See—*
  - Face, Samuel A., III, 5,012,588, Cl. 33-533.000.
- Face, Samuel A., III, to Face Construction Technologies, Inc. Self-recording readout system for surface measurement device. 5,012,588, Cl. 33-533.000.
- FaciliTech International Incorporated: *See—*
  - Scribner, James R.; Nicholson, Raymond J.; Brown, Thomas G.; and Caracciolo, Anthony, Jr., 5,014,206, Cl. 364-449.000.
- Fair, Byron D.: *See—*
  - Fick, Therese A.; and Fair, Byron D., 5,012,764, Cl. 119-106.000.
- Fair, Kenneth J.; Van Weert, Gezinus; and Schneider, John C., to Hydrochem Developments Ltd. Process for recovering gold from refractory sulfidic ores. 5,013,359, Cl. 75-744.000.
- Fairchild Semiconductor Corporation: *See—*
  - Vora, Madhukar B., 5,014,107, Cl. 357-44.000.
- Fakhry, Kamal: *See—*
  - Weaver, Philip W.; Fakhry, Kamal; and Saito, Shin, 5,014,040, Cl. 340-572.000.
- Falco, Saverio C.: *See—*
  - Bedbrook, John R.; Chaleff, Roy S.; Falco, Saverio C.; Mazur, Barbara J.; Somerville, Christopher R.; and Yadav, Narendra S., 5,013,659, Cl. 435-172.300.
- Falletta, Angelo; and Barbierato, Roberto. Amphibious backpack. 5,012,964, Cl. 224-153.000.
- Falth, Lars. Method of producing sealuminised zeolite Y of high hydrophobicity. 5,013,700, Cl. 502-79.000.
- Fancu Ltd.: *See—*
  - Aso, Toshiyuki; and Arakawa, Yasuo, 5,013,881, Cl. 219-69.120.
- Fanuc Ltd.: *See—*
  - Kurakake, Mitsuo; and Kinoshita, Jiro, 5,013,989, Cl. 318-625.000.
- Fanuc Ltd: *See—*
  - Sakano, Tetsuro, 5,013,988, Cl. 318-602.000.
- Farah Incorporated: *See—*
  - Farah, William F., 5,013,378, Cl. 156-226.000.
- Farah William F., to Farah Incorporated. Pleated trouser crease-forming method and machine improvements therefor. 5,013,378, Cl. 156-226.000.
- Fariss, Robert H.; and Tetreault, Roland J., to Monsanto Company. Plasticized polyvinyl butyral and interlayer thereof. 5,013,779, Cl. 524-314.000.
- Fariss, Robert H.; and Tetreault, Roland J., to Monsanto Company. Plasticized polyvinyl butyral and interlayer thereof. 5,013,780, Cl. 524-314.000.
- Farmaceutisk Laboratorium Ferring A/S: *See—*
  - Halskov, Soren, 5,013,727, Cl. 514-166.000.
- Farmer, John B.; Ince, Francis; Brown, Rodney A.; and Dixon, John, to Fisons plc. Phenylethylamine derivatives and pharmaceutical use. 5,013,760, Cl. 514-649.000.
- Faroudja, Yves C. Horizontal and vertical transition level enhancement within television system. 5,014,119, Cl. 358-37.000.
- Farrell, James A.; and Sites, Richard L., to Digital Equipment Corporation, Inc. Configurable set associative cache with decoded data element enable lines. 5,014,195, Cl. 364-200.000.
- Farrington, David L., to Polaroid Corporation. Method and apparatus for compensating for shutter speed variations. 5,014,082, Cl. 354-437.000.
- Fatheree, John D., to General Dynamics Corporation. Mechanically actuated swing clamp. 5,013,015, Cl. 269-24.000.
- Faurel, Jacques, to Societe Cooperative de Production Bourgeois. Oven closure device. 5,012,794, Cl. 126-197.000.
- Faurie, Pierre: *See—*
  - Allaert, Francois; Faurie, Pierre; Roques, Serge; and Segol, Sylvain, 5,013,197, Cl. 410-77.000.
- Faust, Steven M.: *See—*
  - Cherukuri, Subraman R.; Wong, Lucy L.; and Faust, Steven M., 5,013,716, Cl. 514-23.000.
- Fazan, Pierre C.: *See—*
  - Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.
- Federal-Mogul Corporation: *See—*
  - Butler, John D.; and Chandler, Jon A., 5,013,052, Cl. 277-153.000.
- Fehr, Amos; and Chong, Joseph. Food production apparatus, the production of food and novel food product. 5,012,726, Cl. 99-450.600.
- Fehrenbach, Siegfried, to Robert Bosch GmbH. Pressure regulator device and fuel line receptor therefor. 5,012,784, Cl. 123-463.000.
- Feitler, David; and Wetstein, Henry, to Nepera, Inc. High yield of pyridine and/or alkylpyridine(s) in condensation reaction of ternary aldehydes and/or ketones with ammonia. 5,013,843, Cl. 546-251.000.
- Feldinger, Martin, to VDO Adolf Schindling AG. Fuel-air mixture-forming device for internal combustion engines. 5,012,788, Cl. 123-545.000.
- Feltz, Louis V.; Reece, Eric W.; Young, Clarence W.; and Thigpen Lewis, to United States of America, Navy. Air-deliverable, ice-penetrating sonobuoy. 5,014,248, Cl. 367-4.000.
- Ferag AG: *See—*
  - Reist, Walter, 5,012,988, Cl. 242-59.000.
- Feret, Ronald M., to Johnson & Johnson Consumer Products, Inc. Low friction film dressing. 5,012,801, Cl. 128-155.000

- Ferranti, Richard T.: *See—*
  - Norem, Stanley D.; Ferranti, Richard T.; and Culmo, Robert F., 5,013,528, Cl. 422-94.000.
- Ferrari Engineering S.p.A.: *See—*
  - Azzani, Roberto; Dori, Lino M.; and Scaglietti, Oscar, 5,013,514, Cl. 264-512.000.
- Ferrazzi, Francesco, to Fiat Auto S.p.A. Cylinder head for an internal combustion engine with five valves per cylinder. 5,012,783, Cl. 123-432.000.
- Ferrera, John. Z-shaped dual-compartment resealable dispensing container. 5,012,931, Cl. 206-631.100.
- Feurer, Ernst: *See—*
  - Suhr, Harald; Etspuler, Angelika; Feurer, Ernst; and Oehr, Christian, 5,013,581, Cl. 427-41.000.
- Fiat Auto S.p.A.: *See—*
  - Da Re, Mario, 5,013,600, Cl. 428-316.600.
  - Ferrazzi, Francesco, 5,012,783, Cl. 123-432.000.
  - Garrone, Angelo; and Masoero, Marco, 5,013,080, Cl. 296-180.100.
  - Maggioni, Virginio; and Torrielli, Vittorino, 5,012,647, Cl. 60-413.000.
- Fiber Tech, Inc.: *See—*
  - Zelan, Donald J.; and Dubay, William G., 5,013,109, Cl. 350-96.100.
- Fick, Therese A.; and Fair, Byron D., to Minnesota Mining and Manufacturing Company. Animal protective collar. 5,012,764, Cl. 119-106.000.
- Field Controls Company, The: *See—*
  - Guzorek, Steven E., 5,012,793, Cl. 126-85.00B.
- Fields, Bernard, to Imperial Chemical Industries PLC. Method of estimating a cumulative exposure to a compound of a gas and apparatus therefor. 5,013,668, Cl. 436-168.000.
- Finch, Stephen R.: *See—*
  - Lynn, Theodore R.; and Finch, Stephen R., 5,013,667, Cl. 436-126.000.
- Finegan, Joel D.: *See—*
  - Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,014,259, Cl. 369-284.000.
- Finkelstein, Leo; Dumesnil, Maurice E.; and Tetschlag, Richard R., to VLSI Packaging Materials, Inc. Sealing glass compositions. 5,013,360, Cl. 106-1.230.
- Finney, Adrian D., to Lucas Industries Public Limited Company. Semiconductor IGBT with improved turn-off switching time. 5,014,101, Cl. 357-37.000.
- Firica, Andrei; Manof, Alexandru I. B.; and Gheorghiu, Dragos, to Intreprinderea Industria Tehnico-Medicala. Instrumentation and method for inserting flexible implants into fractured bones. 5,013,314, Cl. 606-64.000.
- First Data Resources Inc.: *See—*
  - Katz, Ronald A., 5,014,298, Cl. 379-93.000.
- Fischer, Christian M. M.; and Holm, Helmut, to Koenig & Bauer Aktiengesellschaft. Web-fed rotary printing machine with one printing couple for flying plate change. 5,012,735, Cl. 101-177.000.
- Fischer, Dan E.: *See—*
  - Baum, Lloyd; and Fischer, Dan E., 5,013,032, Cl. 272-70.300.
- Fischer, Gerhard; and Quabeck, Helmut, to Du Pont de Nemours, E. I., and Company. Process for recording semihalftone images and device for conversion of image dot tonal value data. 5,014,138, Cl. 358-448.000.
- Fischer, Hermann: *See—*
  - Bobbink, Hendrikus; Fischer, Hermann; Heinz, Gerhard; Matthias, Klaus; Seibring, Joachim; and Stegmaier, Wolfgang, 5,013,816, Cl. 528-173.000.
- Fischer, Jeffrey H.; Grasso, Lawrence J.; Hoffman, Dale E.; Skooglund, Daniel E.; and Young, Diane K., to International Business Machines Corporation. Programmable delay line utilizing measured actual delays to provide a highly accurate delay. 5,013,944, Cl. 307-603.000.
- Fischer, John G.: *See—*
  - Sokol, James M.; Lochmann, Robert L.; and Fischer, John G., 5,013,222, Cl. 417-366.000.
- Fischer, Richard L.: *See—*
  - Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 5,013,260, Cl. 439-535.000.
- fischerwerke Artur Fischer GmbH & Co. Kg.: *See—*
  - Nehl, Wolfgang, 5,012,922, Cl. 206-387.000.
- Fisher, Harold M.; and Leone, Daniel E., to Hoechst Celanese Corporation. Microporous membranes having increased pore densities and process for making the same. 5,013,439, Cl. 210-500.230.
- Fisons plc: *See—*
  - Farmer, John B.; Ince, Francis; Brown, Rodney A.; and Dixon, John, 5,013,760, Cl. 514-649.000.
- Flanagan, Joseph E.; Wilson, Edgar R.; and Frankel, Milton B., to Rockwell International Corporation. 1,5-diazido-3-nitrazapentane and method of preparation thereof. 5,013,856, Cl. 552-11.000.
- Flanigen, Edith M.: *See—*
  - Bedard, Robert L.; Vail, Lawrence D.; Wilson, Stephen T.; and Flanigen, Edith M., 5,013,337, Cl. 55-75.000.
- Flannery, Matt W. Rope tightener. 5,012,559, Cl. 24-71.300.
- Fleet, George W. J.; and Witty, David R., to Monsanto Company. Synthesis of chiral pyrrolidine and piperidine glycosidase inhibitors. 5,013,842, Cl. 546-220.000.
- Fleischer, David: *See—*
  - Goldstein, Yeshayahu S. A.; Tidman, Derek A.; and Fleischer, David, 5,012,719, Cl. 89-8.000.
- Fleming, Brent P.: *See—*
  - Wright, Richard B.; Vozenilek, Theodore M.; and Fleming, Brent P., 5,012,706, Cl. 81-121.100.
- Fletcher, William D.; Mallalieu, David H.; and Cummings, Donald P., to Hyde Manufacturing Co. Universal utility knife. 5,012,581, Cl. 30-162.000.
- Flowerdew, Peter M., to Radiodetection Limited. System for detecting the location and orientation of a temporarily inaccessible object. 5,014,008, Cl. 324-326.000.
- FMC Corporation: *See—*
  - Leon, Michael A., 5,013,204, Cl. 414-347.000.
- Foa', Marco: *See—*
  - Coassolo, Alfredo; Foa', Marco; and Chapoy, L. Lawrence, 5,013,819, Cl. 528-193.000.
- Focht, J. Richard, to Codenoll Technology Corporation. Method and apparatus for connecting optical fibers. 5,013,124, Cl. 350-96.210.
- Foley, Martin P.; and Cruz, Exequiel D., to Trudell Medical. Modular medication inhaler. 5,012,803, Cl. 128-200.230.
- Foley, Martin P.; and Cruz, Exequiel D., to Trudell Medical. Medication inhaler with adult mask. 5,012,804, Cl. 128-200.230.
- Follet, Michel; and Bonato, Marc, to Societe de Conseils de Recherches et d'Application Scientifiques (S.C.R.A.S). Catechol derivatives, a process of preparation thereof, and therapeutical compositions containing the same. 5,013,756, Cl. 514-544.000.
- Ford, Henry E.: *See—*
  - Bienek, Richard J.; and Ford, Henry E., 5,012,879, Cl. 180-6.480.
- Ford Motor Company: *See—*
  - Colvin, Alex D., 5,014,011, Cl. 324-663.000.
  - Curtis, Trevor G., 5,013,050, Cl. 277-9.500.
  - Hayden, William L., 5,013,175, Cl. 403-24.000.
  - Hunt, Thomas K.; and Novak, Robert F., 5,013,612, Cl. 428-552.000.
- Ford New Holland, Inc.: *See—*
  - Bulgrien, Garth H., 5,012,690, Cl. 74-335.000.
- Formost Packaging Machines, Inc.: *See—*
  - Cruver, Michael, 5,012,916, Cl. 198-419.300.
- Forsyth Dental Infirmary for Children: *See—*
  - Hay, Donald I.; Gibbons, Ronald J.; and Moreno, Edgard G., 5,013,542, Cl. 424-54.000.
- Foss, Richard C.: *See—*
  - Lammerts, Judocus A. M.; Foss, Richard C.; and Salters, Roelof H. W., 5,014,244, Cl. 365-189.050.
- Fossati, Antonio: *See—*
  - Passarotti, Carlos; Fossati, Antonio; Valenti, Mauro; and Bandi, Gianluigi, 5,013,554, Cl. 424-440.000.
- Fotheringham, Ulrich, to Schott Glaswerke. Single-mode optical, fiber and process for its production. 5,013,131, Cl. 350-96.310.
- Foundation of River & Basin: *See—*
  - Omachi, Toshikatsu, 5,013,184, Cl. 405-85.000.
- Fox, Anthony, to Fox, Marcella M. Trash compactor for sanitary handling of solid waste. 5,012,732, Cl. 100-35.000.
- Fox, Darrell E.: *See—*
  - Braish, Tamim F.; and Fox, Darrell E., 5,013,839, Cl. 544-349.000.
- Fox, Marcella M.: *See—*
  - Fox, Anthony, 5,012,732, Cl. 100-35.000.
- Fox, Ronald C. S., to Alcatel, N.V. Circuit arrangement for providing power for an IC chip in a telephone subset. 5,014,308, Cl. 379-413.000.
- Fracchia, Pierluigi: *See—*
  - Olper, Marco; Corsigi, Tullio; and Fracchia, Pierluigi, 5,013,356, Cl. 75-586.000.
- Frankel, Milton B.: *See—*
  - Flanagan, Joseph E.; Wilson, Edgar R.; and Frankel, Milton B., 5,013,856, Cl. 552-11.000.
- Franz, Leo J. Lid and cup dispenser having an elongated yieldable tension element secured by a transversely adjustable anchoring block disposed astride the dispensing opening. 5,012,952, Cl. 221-36.000.
- Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V.: *See—*
  - Herziger, Gerd; Loosen, Peter; Marten, Otto; and Boning, Hartwig, 5,014,282, Cl. 372-93.000.
  - Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg. Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.
- Frenier, Wayne; Growcock, Fred; Lopp, Victoria R.; and Dixon, Brian, to Dowell Schlumberger Incorporated. Process and composition for inhibiting iron and steel corrosion. 5,013,483, Cl. 252-396.000.
- Freychet, David: *See—*
  - Maroy, Pierre; Patureaux, Thierry; Freychet, David; and Loutaty, Roben, 5,013,368, Cl. 134-22.110.
- Friderich, Raimund, to Otto Manner. Stack injection molding melt transfer apparatus. 5,013,235, Cl. 425-564.000.
- Friegang, William R. Scribing accessory for offset router. 5,013,196, Cl. 409-182.000.
- Fries, Carl J., Jr., to International Paper Company. Induction heat sealing lap-seamed containers to non-metallic closures. 5,013,878, Cl. 219-10.430.
- Frins, John J. Exercise device. 5,013,030, Cl. 272-67.000.
- Fritz Hartmann Geratebau GmbH & Co. KG: *See—*
  - Schulz, Erhard, 5,013,250, Cl. 439-79.000.
- Fritzsche Dodge & Olcott Inc.: *See—*
  - Hassel, James E., 5,013,574, Cl. 426-612.000.
- Froeschke, Reinhard, to Santrade Ltd. Method and apparatus for producing pastilles. 5,013,498, Cl. 264-8.000.
- Fromm, Hans-Jurgen: *See—*
  - Boller, Arthur; Buchecker, Richard; Fromm, Hans-Jurgen; Kelly, Stephen; Schadt, Martin; and Villiger, Alois, 5,013,476, Cl. 252-299.610.

VOL
1126
ISS
1
MY
7
1991
UMI

- Froostl, Wolfgang: *See—*
  - Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpc, Hans-Rudolf, 5,013,863, Cl. 562-11.000.
- Fuhrmann, Castor: *See—*
  - Poertzgen, Gregor; Fuhrmann, Castor; and Hosan, Hans-Josef, 5,012,996, Cl. 248-161.000.
- Fuimefreddo, Anthony J.; Nerz, John E.; Hacker, Martin E.; and Hain, Gunther, to Perkin-Elmer Corporation, The. Plasma spray device with external powder feed. 5,013,883, Cl. 219-121.470.
- Fuji Electric Co., Ltd.: *See—*
  - Miyashita, Takashi, 5,014,139, Cl. 360-78.140.
- Fuji Jukogyo Kabushiki Kaisha: *See—*
  - Kawase, Toshirou; Saito, Shiro; and Miyake, Masanobu, 5,012,838, Cl. 137-202.000.
  - Mine, Atsushi; Kamimura, Katsuyoshi; and Hiwatashi, Yutaka, 5,013,067, Cl. 280-840.000.
  - Miyawaki, Motohisa, 5,012,696, Cl. 74-866.000.
  - Miyawaki, Motohisa, 5,012,910, Cl. 192-4.00A.
- Fuji Photo Film Co., Ltd.: *See—*
  - Arai, Fuminori; and Takayama, Takeshi, 5,013,527, Cl. 422-56.000.
  - Harada, Akinori; and Okazaki, Yoji, 5,013,129, Cl. 350-96.290.
  - Matsuzawa, Hideki; Yabe, Masao; Irie, Tadashi; Watanabe, Seiichi; and Ishihara, Yusuke, 5,013,593, Cl. 428-64.000.
  - Mizuta, Akira, 5,012,569, Cl. 29-417.000.
  - Ohno, Shigeru; Jimbo, Yoshihiro; Adachi, Keiichi; and Kuwashima, Shigeru, 5,013,636, Cl. 430-522.000.
  - Okino, Yoshiharu, 5,014,075, Cl. 346-108.000.
  - Shimura, Kazuo; and Adachi, Yuuma, 5,014,045, Cl. 340-712.000.
  - Uesugi, Akio; Kakei, Tsutomu; and Minato, Shinichiro, 5,013,399, Cl. 156-643.000.
  - Umemoto, Chiyuki; Nakamura, Takashi; Takahashi, Kenji; and Hosoi, Yuichi, 5,013,916, Cl. 250-327.200.
  - Yamazaki, Nobuo; Inaba, Hiroo; and Masaki, Kouichi, 5,013,602, Cl. 428-323.000.
- Fuji Xerox Co., Ltd.: *See—*
  - Imoto, Yoshiya, 5,014,123, Cl. 358-75.000.
  - Kurogane, Toshio; and Nagaoka, Daiji, 5,014,331, Cl. 382-48.000.
  - Matsumura, Yasuo; Aoki, Takayoshi; Nagatsuka, Ikutaroh; and Mochiauki, Masao, 5,013,626, Cl. 430-106.600.
  - Satoh, Yoshihide, 5,013,939, Cl. 307-468.000.
- Fujie, Naofumi: *See—*
  - Okada, Shoji; Fujie, Naofumi; Ito, Koji; and Imaizumi, Tomoaki, 5,012,593, Cl. 34-69.000.
  - Okada, Shoji; Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; Ichikawa, Yuji; and Hayashi, Kazumi, 5,013,888, Cl. 219-219.000.
- Fujii, Masaki: *See—*
  - Kyohzuka, Takahiro; Fujii, Masaki; Kikuchi, Toshiyuki; Abe, Mitsutoshi; and Matsuno, Yuji, 5,012,695, Cl. 74-859.000.
- Fujii, Toshihiro: *See—*
  - Arimoto, Hiromi; and Fujii, Toshihiro, 5,014,009, Cl. 324-468.000.
- Fujiki, Hironao; and Oohashi, Morio, to Shin-Etsu Chemical Co., Ltd. Method for the preparation of silicone rubber composition. 5,013,772, Cl. 523-213.000.
- Fujiki, Norio: *See—*
  - Abe, Noriyuki; Kimura, Takashi; and Fujiki, Norio, 5,014,155, Cl. 361-56.000.
- Fujikura Ltd.: *See—*
  - Itoh, Kenichiroh; Yoshinuma, Nikio; Suzuji, Naomichi; Yamada, Takeshi; and Taya, Hiroyuki, 5,013,345, Cl. 65-4.200.
- Fujimaki, Yoshihide: *See—*
  - Takizawa, Yoshio; Sigeta, Kunio; Takeuchi, Shigeki; Yoshioka, Hiroshi; and Fujimaki, Yoshihide, 5,013,625, Cl. 430-64.000.
- Fujimoto, Hiroaki: *See—*
  - Hatada, Kenzo; and Fujimoto, Hiroaki, 5,012,969, Cl. 228-104.000.
- Fujimoto, Naonobu; Suda, Yukio; and Miyaji, Katsutoshi, to Fujitsu Limited. Pulse insertion circuit. 5,014,271, Cl. 370-102.000.
- Fujimoto, Ryoichi: *See—*
  - Tajima, Akio; and Fujimoto, Ryoichi, 5,013,028, Cl. 271-305.000.
- Fujimura, Itaru; Fukushima, Naoto; Fukunaga, Yukio; and Akatsu, Yohsuke, to Nissan Motor Company, Limited. Hydraulic circuit for actively controlled automotive suspension system with fail-safe system. 5,013,061, Cl. 280-707.000.
- Fujino, Akihiko: *See—*
  - Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 5,014,083, Cl. 354-471.000.
- Fujioka, Hisatake; Horikawa, Tokio; and Yanagawa, Nobuhide, to Kubota Corp. Transmission for separately drivable right and left wheels. 5,012,907, Cl. 192-13.00R.
- Fujisawa, Tetsuo, to Ricoh Company, Ltd. Digital image processing apparatus. 5,014,124, Cl. 358-75.000.
- Fujishima, Kazuyasu: *See—*
  - Asakura, Mikio; Fujishima, Kazuyasu; and Matsuda, Yoshio, 5,014,241, Cl. 365-51.000.
- Fujita, Masahiko; Shishido, Yuuji; Suzuki, Yuzuru; and Okamoto, Masato, to Minebea Co. Ltd. Method of manufacturing spirally layered and aligned printed-circuit armature coil. 5,012,571, Cl. 29-598.000.
- Fujita, Masahiro: *See—*
  - Matsumoto, Jun-ichi; Minamida, Akira; Fujita, Masahiro; Hirose, Tohru; Nakano, Junji; and Nakamura, Shinichi, 5,013,841, Cl. 544-363.000.
- Fujita, Shigeru; Kanno, Hiroshi; and Kamiyama, Takashi, to Toshiba Kikai Kabushiki Kaisha. Control systems for injection molding machines. 5,013,231, Cl. 425-145.000.
- Fujita, Taira: *See—*
  - Hayashi, Yoshiaki; and Fujita, Taira, 5,013,712, Cl. 503-227.000.
- Fujita, Toshihiko: *See—*
  - Nakazawa, Takeharu; and Fujita, Toshihiko, 5,012,859, Cl. 165-42.000.
- Fujita, Yuji: *See—*
  - Sakuma, Masato; Fujita, Yuji; Kitano, Kissho; Yagi, Yukihiko; Sakaizawa, Masao; and Yamamoto, Noburo, 5,013,789, Cl. 525-66.000.
- Fujitsu Automation Limited: *See—*
  - Miyakawa, Tatsuo; Kato, Osamu; Koike, Yusuke; Matsunami, Keisuke; and Sekiya, Naoyuki, 5,013,906, Cl. 250-223.00R.
- Fujitsu Limited: *See—*
  - Asakawa, Kazuo, 5,012,591, Cl. 33-832.000.
  - Ema, Taiji, 5,014,103, Cl. 357-41.000.
  - Ema, Taiji, 5,014,104, Cl. 357-42.000.
  - Fujimoto, Naonobu; Suda, Yukio; and Miyaji, Katsutoshi, 5,014,271, Cl. 370-102.000.
  - Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Haruhiko; and Nagai, Takeshi, 5,012,858, Cl. 165-1.000.
  - Sanada, Tatsuyuki; and Odagawa, Tetsufumi, 5,014,280, Cl. 372-45.000.
  - Shimoda, Kaneyasu; and Ageno, Yuzo, 5,014,275, Cl. 371-43.000.
  - Shinbashi, Masahiro; and Wakabayashi, Takashi, 5,014,261, Cl. 370-16.000.
  - Suzuki, Atsushi, 5,014,240, Cl. 365-49.000.
- Fujiwara, Hideyuki: *See—*
  - Saito, Takashi; Fujiwara, Hideyuki; and Kubo, Kenji, 5,014,185, Cl. 364-188.000.
- Fujiwara, Masatsugu: *See—*
  - Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 5,014,089, Cl. 355-251.000.
- Fukada, Takeshi; Codama, Mitsufumi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; and Takayama, Ichiro, to Semiconductor Energy Laboratory Co., Ltd. Image sensor free from undesirable incident light rays which have not been reflected in the surface bearing the image to be sensed. 5,014,100, Cl. 357-30.000.
- Fukai, Masayuki: *See—*
  - Nigawara, Seiitsu; Ikematsu, Takehiko; and Fukai, Masayuki, 5,012,766, Cl. 122-504.000.
- Fukao, Kaname; Hamanaka, Toshiyuki; and Harada, Takashi, to NGK Insulators, Ltd. Method of proudcing ceramic manifolds for thermally insulating exhaust channels. 5,013,501, Cl. 264-67.000.
- Fukuda, Yasuo: *See—*
  - Akasaka, Akio; Suga, Seiji; Fukuda, Yasuo; and Sawada, Takanori, 5,012,773, Cl. 123-90.170.
- Fukuhara, Takahiro; and Murakami, Tokumichi, to Mitsubishi Denki Kabushiki Kaisha. Signal encoding and decoding system. 5,014,334, Cl. 382-86.000.
- Fukui, Wataru; and Iwata, Toshio, to Mitsubishi Denki K.K. Engine rotation control device. 5,012,779, Cl. 123-339.000.
- Fukuma, Masumi, to Sumitomo Electric Industries, Ltd. Method for manufacturing a fiber type coupler. 5,013,117, Cl. 350-96.150.
- Fukumoto, Testuhiro; and Yamahira, Atsushi, to Sumitomo Rubber Industries, Ltd. Pneumatic tire having tread pattern with reduced stone biting. 5,012,847, Cl. 152-209.00R.
- Fukunaga, Yukio: *See—*
  - Fujimura, Itaru; Fukushima. Naoto; Fukunaga, Yukio; and Akatsu, Yohsuke, 5,013,061, Cl. 280-707.000.
- Fukushima, Jiro: *See—*
  - Yamamoto, Isamu; and Fukushima, Jiro, 5,013,689, Cl. 437-229.000.
- Fukushima, Naoto: *See—*
  - Fujimura, Itaru; Fukushima, Naoto; Fukunaga, Yukio; and Akatsu, Yohsuke, 5,013,061, Cl. 280-707.000.
- Fukuzawa, Soichi: *See—*
  - Shikamori, Tamotsu; Toshimitsu, Hiroyuki; Ohsugi, Hiroshi; Hiyama, Isao; and Fukuzawa, Soichi, 5,012,658, Cl. 68-12.010.
- Fuldner, Friedrich, to Deutsche Thomson-Brandt GmbH. Process for evaluating signals from an incremental transmitter. 5,014,215, Cl. 364-486.000.
- Funahashi, Makoto: *See—*
  - Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,012,700, Cl. 74-869.000.
- Funatsu, Ryoji: *See—*
  - Mitsui, Susumu; Funatsu, Ryoji; and Kurose, Shigeru, 5,013,755, Cl. 514-533.000.
- Furrow, Roger W., to Gilbarco, Inc. Fluid filter cartridge support housing. 5,013,434, Cl. 210-232.000.
- Furukawa, Hideaki, to Canon Kabushiki Kaisha. Sheet sorter. 5,013,027, Cl. 271-290.000.
- Furukawa, Kazunari: *See—*
  - Nagi, Katsuo; and Furukawa, Kazunari, 5,012,890, Cl. 181-160.000.
  - Nagi, Katsuo; Furukawa, Kazunari; and Noro, Masao, 5,014,320, Cl. 381-96.000.
- Furusaki, Masato: *See—*
  - Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, 5,014,142, Cl. 360-98.010.
- Furuse, Akio, to Cosmo Instruments Co., Ltd. Micro-leakage regulating valve. 5,013,006, Cl. 251-8.000.
- Furuya, Takeo: *See—*
  - Sekine, Shuji; Furuya, Takeo; and Harada, Naoto, 5,013,952, Cl. 310-239.000.

- Furuyama, Tohru: *See—*
  - Muroka, Kazuyoshi; Ohsawa, Takashi; and Furuyama, Tohru, 5,014,245, Cl. 365-194.000.
- Fuse, Genshu, to Matsushita Electric Industrial Co., Ltd. Implantation method for uniform trench sidewall doping by scanning velocity correction. 5,013,673, Cl. 437-38.000.
- Futch, Max G.; and Drushel, Ronald H., to Futch, Max G. Self leveling dispenser. 5,013,983, Cl. 318-480.000.
- G. D. Searle & Co.: *See—*
  - Campbell, Arthur L.; Mueller, Richard A.; Ng, John S.; and Partis, Richard A., 5,013,864, Cl. 562-426.000.
- G.D Societa' per Azioni: *See—*
  - Neri, Armando, 5,013,905, Cl. 250-223.00R.
- G.K.I.: *See—*
  - Schaef, Irving W., 5,013,258, Cl. 439-347.000.
- G. Siempelkamp GmbH & Co.: *See—*
  - Ufermann, Werner; and Kieser, Jurgen, 5,013,229, Cl. 425-83.100.
- Gagliardo, Michael A.; Goodwin, Paul M.; and Smelser, Donald W., to Digital Equipment Corporation. Bad data algorithm. 5,014,273, Cl. 371-37.700.
- Gagnon, Mario: *See—*
  - Pernicka, Martin; and Gagnon, Mario, 5,012,528, Cl. 2-10.000.
- Gahrs, Hans J.: *See—*
  - Beutler, Hans J.; Gahrs, Hans J.; Lenhard, Ulrich; and Lurken, Franz, 5,012,827, Cl. 131-297.000.
- Gaillard, Dominique: *See—*
  - Bargues, Michel; Boya, Didier; Gaillard, Dominique; and Netter, Pierre, 5,013,274, Cl. 445-2.000.
- Gaillard, Jean-Ferdinand: *See—*
  - Nocca, Jean-Luc; Leonard, Jacques; Gaillard, Jean-Ferdinand; and Amigues, Pierre, 5,013,407, Cl. 202-158.000.
- Gajari, Antal: *See—*
  - Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.
- Gajria, Chandrasen: *See—*
  - Case, Laura K., deceased; Gajria, Chandrasen; Loftin, Rachel M.; and Peper, Henry, 5,013,361, Cl. 106-22.000.
- Galan, Mario A.; Perez, Bernardo A.; and Gonzalez, Jose R. P., to Investronica, S.A. Marking tool drive system for a drawing machine or similar type of machine. 5,012,584, Cl. 33-18.100.
- Gallagher, Robert E., Sr., to AMP Incorporated. Package for slidably housing components. 5,012,925, Cl. 206-332.000.
- Galle, Nicola, to Nykon Products Inc. Support handle. 5,013,074, Cl. 294-33.000.
- Galvin, James E.: *See—*
  - Brown, Ian G.; MacGill, Robert A.; and Galvin, James E., 5,013,578, Cl. 427-37.000.
- Gamble, Bobby G., to Emerson Electric Co. Immersion heater and method of manufacture. 5,013,890, Cl. 392-497.000.
- Games Workshop Limited: *See—*
  - Thornthwaite, John B.; and Naismith, Robert, 5,013,228, Cl. 425-2.000.
- Ganon, Michael H., to R. G. Barry Corporation. Slipper and method of making same. 5,012,541, Cl. 12-142.00G.
- Gansbuehler, George M. J.: *See—*
  - Jensen, Per J. T.; and Gansbuehler, George M. J., 5,013,894, Cl. 219-548.000.
- GAO Gesellschaft fur Automation und Organisation mbH: *See—*
  - Hoppe, Joachim, 5,013,900, Cl. 235-492.000.
- Garcia-Huidobro, Gonzalo; and Greminger, Douglas C., to Dow Chemical Company, The. Process for solute recovery utilizing recycle liquids having a stored concentration profile. 5,013,449, Cl. 210-672.000.
- Gardner, Joseph H.: *See—*
  - Berman, Elizabeth F.; Buckwalter, Brian L.; Cupps, Thomas L.; and Gardner, Joseph H., 5,013,759, Cl. 514-622.000.
- Garfinkel, Henry A. Animated doll. 5,013,276, Cl. 446-14.000.
- Garland, John R.; and Thomas, Melvin L. Picture frame assembly. 5,012,601, Cl. 40-152.000.
- Garner, Paul M.; Boone, Carrie; and Cepulis, Darren J., to Compaq Computer Corporation. Dynamically configurable portable computer system. 5,014,193, Cl. 364-200.000.
- Garnes, Joseph. Golf putting practice device. 5,013,042, Cl. 273-184.00A.
- Garrone, Angelo; and Masoero, Marco, to Fiat Auto S.p.A. Device for compensating for slewing induced in a moving motor vehicle by gusts of cross-wind. 5,013,080, Cl. 296-180.100.
- Garzelloni, Thomas L.: *See—*
  - Berends, Howard; and Garzelloni, Thomas L., 5,012,914, Cl. 198-372.000.
- Gassaway, Mark M. Security mounting. 5,013,000, Cl. 248-551.000.
- Gatti, Stefano. Means for cooling drinks, especially in cans, in correspondence of air gratings of motor-vehicle passenger compartments. 5,012,654, Cl. 62-244.000.
- Gaudet, Philip R., Jr.: *See—*
  - Pompei, Francesco; and Gaudet, Philip R., Jr., 5,012,813, Cl. 128-664.000.
- Gault, Dominique: *See—*
  - Andrieu, Jean-Pierre; Henri, Jean-Claude; and Gault, Dominique, 5,014,065, Cl. 342-165.000.
- Gauthier, Jean-Pierre, to Bendix France. Brake booster. 5,012,723, Cl. 91-369.210.
- Gautier, Jean-Pierre; and Verbo, Pedro, to Bendix France. Device for assembling a servomotor on a vehicle bulkhead. 5,012,998, Cl. 248-225.200.
- Gawad, Mahmoud A.; and Graudins, John, to GTE Products Corporation. Fluorescent luminaire lens frame. 5,014,170, Cl. 362-260.000.
- Gay, George A.; and Miller, Robert H., to Munters Corporation. Arrangement for contact bodies for liquid and gas. 5,013,492, Cl. 261-112.200.
- GBE International PLC: *See—*
  - Ray, Eric T., 5,012,824, Cl. 131-118.000.
- Gebhard Satzinger GmbH & Co.: *See—*
  - Jorissen, Bernd, 5,012,897, Cl. 184-39.000.
- Gebr. Schmidt Fabrik fuer Feinmechanik: *See—*
  - Sondergeld, Manfred; and Wissig, Claus, 5,013,909, Cl. 250-231.100.
- Gebruder Welger GmbH & Co. Kommanditgesellschaft: *See—*
  - Staudinger, Ingo, 5,012,733, Cl. 100-2.000.
- GEC-Marconi Limited: *See—*
  - Pudsey, David G., 5,014,342, Cl. 455-33.000.
- Geco A.S.: *See—*
  - Brink, Mundy, 5,014,249, Cl. 367-63.000.
- Gelsomini, Tito, to Texas Instruments Incorporated. Semiconductor integrated circuit device having mirror image circuit bars bonded on opposite sides of a lead frame. 5,014,112, Cl. 357-70.000.
- GenCorp Inc.: *See—*
  - Brooks, Mark L.; and Wilson, Keith E., 5,013,379, Cl. 156-244.110.
- General Ceramics, Inc.: *See—*
  - Sisolak, Robert J., 5,013,615, Cl. 428-668.000.
- General Dynamics Corporation: *See—*
  - Fatheree, John D., 5,013,015, Cl. 269-24.000.
- General Dynamics Corporation, Convair Division: *See—*
  - Stern, Theodore G.; and Cornwall, Mickey, 5,013,128, Cl. 350-96.240.
  - Van Den Bergh, Hugo H., 5,012,948, Cl. 220-437.000.
- General Electric Company: *See—*
  - Adler, Michael S., 5,014,102, Cl. 357-38.000.
  - Basile, Philip C.; and Kabernagel, Bruce E., 5,014,285, Cl. 375-62.000.
  - Diaz, Thomas P., 5,013,370, Cl. 148-13.000.
  - Dubin, Murray L.; and Smith, Linda J., 5,012,637, Cl. 60-39.020.
  - Greskovich, Charles D.; Minnear, William P.; Brun, Milivoj K.; and Riedner, Robert J., 5,013,696, Cl. 501-153.000.
  - Kaganowicz, Grezgorz; Cuomo, Frank P.; and Vieland, Leon J., 5,013,139, Cl. 350-340.000.
  - Koegl, Rudolph A. A.; and Hogle, Richard A., 5,013,886, Cl. 219-121.830.
  - Little, Francis H.; and Ingram, Douglas E., 5,013,922, Cl. 250-385.100.
  - Osteen, Mitchell M.; and Baldwin, Samuel L., 5,014,175, Cl. 362-348.000.
  - Papallo, Thomas F., Jr.; and Castonguay, Roger N., 5,014,025, Cl. 335-167.000.
  - Reese, Robert M., 5,013,997, Cl. 323-212.000.
  - Russell, Timothy D.; Hess, Carl H.; Hlahol, Paul G.; and Stewart, Charles N., 5,013,968, Cl. 313-641.000.
  - Tsikos, Constantine J.; and Rosenfeld, Jerome P., 5,013,927, Cl. 250-561.000.
- General Electric Company, p.l.c., The: *See—*
  - Young, Terence P., 5,013,114, Cl. 350-96.140.
- General Instrument Corporation: *See—*
  - Walker, Gordon K.; Shumate, William A.; and Kelkar, Krishnanand, 5,014,310, Cl. 380-10.000.
- General Motors Corporation: *See—*
  - Abu-Isa, Ismat A.; Moran, Susan C.; and Roy, Michael A., 5,013,089, Cl. 297-452.000.
  - Chundrlik, William J.; and Labuhn, Pamela I., 5,014,200, Cl. 364-426.040.
  - Karklins, Elgin J.; Scroggie, Stephen J.; Tracht, Steven L.; and Striker, Mark W., 5,012,977, Cl. 239-284.100.
  - Landmesser, Franklin D., 5,013,082, Cl. 296-202.000.
  - Long, David L.; Mitchell, Mark A.; and Sczomak, David P., 5,012,785, Cl. 123-467.000.
  - Miller, Gregory A.; and Pearson, Jeffery L., 5,013,064, Cl. 280-730.000.
  - Reedy, Patrick J., 5,013,961, Cl. 313-318.000.
  - Sokol, James M.; Lochmann, Robert L.; and Fischer, John G., 5,013,222, Cl. 417-366.000.
  - Spakowski, Joseph G.; and Stoltman, Donald D., 5,013,930, Cl. 307-10.100.
  - Thatcher, David A., 5,014,202, Cl. 364-426.030.
  - Van Maanen, Keith D., 5,013,289, Cl. 475-286.000.
  - Ward, Robert W.; and Jablonski, Robert A., 5,012,995, Cl. 248-68.100.
  - Way, Terrance, 5,013,232, Cl. 425-192.00R.
- General Signal Corporation: *See—*
  - Kurasaki, Howard S.; Westlund, Barbara F.; Nulty, James E.; and Vowles, E. John, 5,013,400, Cl. 156-643.000.
  - Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 5,013,385, Cl. 156-345.000.
- Genesee Polymers Corporation: *See—*
  - Piskoti, Charles, 5,013,808, Cl. 528-23.000.
- Genetics Institute, Inc.: *See—*
  - Wang, Elizabeth A.; Wozney, John M.; and Rosen, Vicki, 5,013,649, Cl. 435-69.100.

Genex Corporation: *See—*
Strausberg, Robert L.; and Strausberg, Susan L., 5,013,652, Cl. 435-69.200.

Genz, Joachim; and Dicke, Hans-Rudolf, to Bayer Aktiengesellschaft. Aromatic polyether sulfones, a process for their production and their use. 5,013,815, Cl. 528-171.000.

George, David L., Jr. Preform mask for painting vehicles. 5,012,760, Cl. 118-505.000.

Gergely, John S.; and Evens, F. Monte, to Conoco Inc. Monochromator to fiber-cable coupling system. 5,013,120, Cl. 350-96.180.

Gerhauser, Heinz: *See—*
Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.

Gericke, Rolf; Baumgarth, Manfred; Lues, Ingeborg; Bergmann, Rolf; and De Peyer, Jacques, to Merck Patent Gesellschaft MIT Beschrankter Haftung. Chroman derivatives. 5,013,853, Cl. 549-401.000.

Gerin, Bernard: *See—*
Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, 5,013,835, Cl. 540-491.000.

Gernon, Joseph W.: *See—*
Casa, Gene E.; and Gernon, Joseph W., 5,014,164, Cl. 361-428.000.

Gerson, Steven H.; and Han, Wesley W., to Alcon Laboratories, Inc. (+) Suprofen esters and amides as opthalmic anti-inflammatory agents. 5,013,751, Cl. 514-448.000.

Gervais, William J.; and Nelson, Richard A., to Qualstar Corporation. Low profile, high-capacity streaming tape drive. 5,014,141. Cl. 360-96.100.

Gettings, Richard L.; and White, William C., to Dow Corning Corporation. Opthalmic fluid dispensing method. 5,013,459, Cl. 210-764.000.

Getz, Carl R., Jr. Drilling and expanding tool for removing carburetor seal plugs. 5,012,566, Cl. 29-265.000.

Gheorghiu, Dragos: *See—*
Firica, Andrei; Manof, Alexandru I. B.; and Gheorghiu, Dragos, 5,013,314, Cl. 606-64.000.

Ghose, Rabindra N., to Technology Research International. Adaptive multifrequency signal combining system. 5,014,061, Cl. 342-45.000.

Giamello, Bruno. Radial piston hydraulic motor of variable cylinder capacity. 5,012,724, Cl. 91-497.000.

Giant Resource Recovery Company, Inc.: *See—*
Kirlin, William M., 5,012,751, Cl. 110-346.000.

Gibbons, Ronald J.: *See—*
Hay, Donald I.; Gibbons, Ronald J.; and Moreno, Edgard G., 5,013,542, Cl. 424-54.000.

Gideon, Jurgen; Krieger, Dieter; and Mengel, Eirch, to EFFEM GmbH. Apportioning unit for a filling system for the filling of food cans. 5,012,958, Cl. 222-306.000.

Gilbarco, Inc.: *See—*
Furrow, Roger W., 5,013,434, Cl. 210-232.000.

Gilbert, Arthur; Gottstein, Norbert; and Rostock, Joachim, to Mannesmann Aktiengesellschaft. Transport apparatus for an assembly line. 5,012,917, Cl. 198-465.200.

Giles, Harold F., Jr.; and White, Dwain M. Polyetherimide-polyamide blends. 5,013,799, Cl. 525-432.000.

Gillet, Robert, to Compagnie Europeenne de Composants Electroniques LCC. Method for the manufacture of layered capacitors having a thickness of inactive layers. 5,012,565, Cl. 29-25.420.

Gillette Company: *See—*
Brown, Robert L., 5,012,663, Cl. 72-369.000.
Case, Laura K., deceased; Gajria, Chandrasen; Loftin, Rachel M.; and Peper, Henry, 5,013,361, Cl. 106-22.000.

Gilmore, Peter: *See—*
Marabotto, Eduardo J.; and Gilmore, Peter, 5,013,174, Cl. 403-11.000.

Gironi, Fabrizio; Iten, Jakob; Koslowski, Gerhard; and Probst, Willy, to Benninger AG. Method and apparatus for loading the bobbin creel of a winding installation. 5,012,564, Cl. 28-193.000.

Giuliani, Giampiero: *See—*
Van Driel, Henry M.; and Giuliani, Giampiero, 5,014,277, Cl. 372-18.000.

GKN Technology Limited: *See—*
Spedding, Colin E., 5,013,013, Cl. 267-165.000.

Glasspool, Andrew J. K., to Mars Incorporated. Data detection, power transfer and power regulation for data storage devices. 5,013,898, Cl. 235-449.000.

Glaxo Group Limited: *See—*
Coates, Ian H.; Oxford, Alexander W.; North, Peter C.; Miller, Thomas; Baxter, Anthony D.; and Hammond, Kevin I., 5,013,733, Cl. 514-213.000.
Crisp, Harold A.; Clayton, John C.; Elliott, Leonard G.; and Wilson, Edward M., 5,013,833, Cl. 540-222.000.
Watson, Nigel S.; Chan, Chuen; and Ross, Barry C., 5,013,749, Cl. 514-397.000.

Globus, Alfred R. Iodophor. 5,013,859, Cl. 558-51.000.

Glover, Hillel. Method for treating emotional numbness and coma. 5,013,740, Cl. 514-282.000.

Glowczewski, Thomas; and Carle, Keith B., to Chrysler Corporation. Use of diodes in an input circuit to take advantage of an active pull-down network provided in a dual regulator. 5,014,214, Cl. 364-483.000.

Glucksman, Dov Z. Portable air humidifier. 5,014,338, Cl. 392-405.000.

Goble, E. Marlowe; and Somers, W. Karl. Soft tissue anchor system. 5,013,316, Cl. 606-72.000.

Godbey, David J.; Hughes, Harold L.; and Kub, Francis J., to United States of America, Navy. Method of producing a thin silicon-on-insulator layer. 5,013,681, Cl. 437-86.000.

Goddard Valve Corporation: *See—*
Nelson, Donald R., 5,013,009, Cl. 251-357.000.

Goering, Kenneth J.; and Eslick, Robert F., to Barco, Inc. Process for recovery of products from waxy barley. 5,013,561, Cl. 426-28.000.

Goessler, Gerhard; and Schau, Ortwin, to E.G.O. Elektro-Gerate Blanc u. Fischer. Heating device. 5,013,893, Cl. 219-453.000.

Goettker, Bernhardt P. Actuator/coupler. 5,013,059, Cl. 280-446.100.

Goetz, Walter: *See—*
Payne, Robert; Goetz, Walter; and Wolf, Uwe, 5,013,786, Cl. 524-514.000.

Gohzu, Shunichi; Horie, Misao; and Inouye, Kuniyo, to Tosoh Corporation. Method for separating immunoglobulin G. subclasses. 5,013,445, Cl. 210-635.000.

Gojny, Francis J.; Greene, Guy S.; Stahl, Roswell L., Jr.; and Street, Charles Z., to Rohr Industries, Inc. Reinforcing rings for honeycomb panels and method and apparatus for making them. 5,013,613, Cl. 428-593.000.

Gold, Raymond D., to Deere & Company. Torch alignment verification method and apparatus. 5,013,887, Cl. 219-124.340.

Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, to Tandy Corporation. Recording medium having an insulating layer. 5,014,259, Cl. 369-284.000.

Goldberg, Steven J., to Motorola, Inc. Method for synchronizing the transmissions in a simulcast transmission system. 5,014,344, Cl. 455-51.000.

Goldstein, Yeshayahu S. A.; Tidman, Derek A.; and Fleischer, David, to GT-Devices. Method of and apparatus for generating hydrogen and projectile accelerating apparatus and method incorporating same. 5,012,719, Cl. 89-8.000.

Gomez, Luis. Method and solid material body for the purification of fluids such as water, aqueous fluids and liquid fuels. 5,013,450, Cl. 210-687.000.

Gonzalez, Fernando: *See—*
Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.

Gonzalez, Jose R. P.: *See—*
Galan, Mario A.; Perez, Bernardo A.; and Gonzalez, Jose R. P., 5,012,584, Cl. 33-18.100.

Goode, Louis; and Shipko, Frederick J., to Cook Pacemaker Corporation. Method and apparatus for removing an implanted pacemaker lead. 5,013,310, Cl. 606-1.000.

Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., to Monarch Marking Systems, Inc. Hand-held labeller. 5,013,387, Cl. 156-384.000.

Goodwin, Brent E.; Mistyurik, John D.; and Seale, Mark A., to Monarch Marking Systems, Inc. Hand-held labeler. 5,013,388, Cl. 156-384.000.

Goodwin, Paul M.: *See—*
Gagliardo, Michael A.; Goodwin, Paul M.; and Smelser, Donald W., 5,014,273, Cl. 371-37.700.

Goossen, Keith W.: *See—*
Chiu, Tien-Heng; Cunningham, John E.; and Goossen, Keith W., 5,013,685, Cl. 437-184.000.

Gordon, Eric M.: *See—*
Weller, Harold N., III; and Gordon, Eric M., 5,013,861, Cl. 560-34.000.

Gordon, Michael D.: *See—*
Massey, Darryl D.; and Gordon, Michael D., 5,013,160, Cl. 374-151.000.

Gordon, Robert L., to International Paper Company. Pour spout and carton construction. 5,012,959, Cl. 222-535.000.

Gordon, William; and Minter, Mark A. Modular electrical connector structure. 5,013,263, Cl. 439-630.000.

Gorner, Dieter: *See—*
Bormann, Uwe; Matzko, Ekkehard; and Gorner, Dieter, 5,012,746, Cl. 104-93.000.

Goronszy, Mervyn C. Biological nutrient removal with sludge bulking control in a batch activated sludge system. 5,013,441, Cl. 210-605.000.

Gosdowski, Gerhard; and Rappold, Roland, to Robert Bosch GmbH. Linear unit for manipulation devices and the like. 5,013,163, Cl. 384-38.000

Goss, John D.: *See—*
Chase, Lee M.; and Goss, John D., 5,014,288, Cl. 378-53.000.

Gottlieb, A. Arthur; and Sizemore, Robert C., to Imreg, Inc. Methods for modulating antibody production in treating patients with AIDS, ARC and other diseases. 5,013,546, Cl. 424-85.100.

Gottlieb, Klaus: *See—*
Schramm, Bernhard; Kern, Jurgen; Schwahn, Harald; Preuss, August-Wilhelm; Gottlieb, Klaus; and Bruderreck, Hartmut, 5,013,706, Cl. 502-309.000.

Gottstein, Norbert: *See—*
Gilbert, Arthur; Gottstein, Norbert; and Rostock, Joachim, 5,012,917, Cl. 198-465.200.

Gould, Kim V.: *See—*
Reinhardt, Victor S.; Gould, Kim V.; and McNab, Kevin M., 5,014,231, Cl. 364-718.000.

Goulter, Victor H. Macadamia nutcracker employing sliding force arm driven by lever with fixed end and floating intermediate pivots. 5,012,580, Cl. 30-120.500.

Govenius, Karl-Jan. Method for the generation of smoke for use in smoke-curing of foods. 5,013,567, Cl. 426-314.000.

Grace GmbH: *See—*
Schafer, Dietrich M.; and Kleijmeer, Simon, 5,013,589, Cl. 428-35.900.

Gracik, Charles S.: *See—*
Sarpeshkar, Ashok M.; and Gracik, Charles S., 5,013,810, Cl. 528-59.000.

Graf, Henry; and Dauny, Gerard. Orthesis for the tridimensional reduction of scolioses. 5,012,798, Cl. 128-78.000.

Granath, Goran; and Wikmark, Gunnar, to ABB Atom AB. Method for analysis of particulate compounds. 5,013,522, Cl. 376-310.000.

Granger, Maurice. Device destined to automatically dispense wiping materials of a concertina form consisting of rolled up strips. 5,013,291, Cl. 493-357.000.

Grassi, David; and Antrim, James K. Mechanism for tensioning a fabric platform. 5,012,753, Cl. 114-39.100.

Grassl, Alfred; and Knorr, Erhard, to Kontron Instruments Holdings NV. Motor control. 5,014,336, Cl. 388-843.000.

Grasso, Lawrence J.: *See—*
Fischer, Jeffrey H.; Grasso, Lawrence J.; Hoffman, Dale E.; Skooglund, Daniel E.; and Young, Diane K., 5,013,944, Cl. 307-603.000.

Grathoff, Hartmut; and Hubel, Werner, to MAN Gutehoffnungshutte. Traveling conveyor arrangement. 5,013,201, Cl. 414-139.400.

Graton, Michel; and Lewandowski, Richard, to Valeo. Monobloc hub, particularly for an automotive vehicle. 5,013,281, Cl. 464-68.000.

Graudins, John: *See—*
Gawad, Mahmoud A.; and Graudins, John, 5,014,170, Cl. 362-260.000.

Graushar, William T., to Quad/Tech, Inc. Apparatus and method for assembling signatures. 5,013,022, Cl. 270-56.000.

Graux, Jean-Baptiste: *See—*
Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, 5,013,835, Cl. 540-491.000.

Great Lakes Chemical Corporation: *See—*
Smith, Roger E.; Thornburgh, Scott; and Rodriquez-Kabana, Rodrigo, 5,013,762, Cl. 514-740.000.

Great Plains Industries, Inc.: *See—*
Kruse, Richard M., 5,012,667, Cl. 73-1.00R.

Green, Horace L., Jr.: *See—*
Stringer, Ralph S.; and Green, Horace L., Jr., 5,013,251, Cl. 439-94.000.

Green, James A.; and Young, Donald C., to Union Oil Company of California. Stabilized thiocarbonate solutions. 5,013,350, Cl. 71-65.000.

Green, Paul W. Devices for lifting and supporting a structure and method. 5,013,190, Cl. 405-230.000.

Greenberger, Hal P.: *See—*
Markow, Mitch A.; Moody, Dale O.; and Greenberger, Hal P., 5,014,323, Cl. 381-194.000.

Greene, Guy S.: *See—*
Gojny, Francis J.; Greene, Guy S.; Stahl, Roswell L., Jr.; and Street, Charles Z., 5,013,613, Cl. 428-593.000.

Greenslade, Joe E. Fastener dimension measuring machine. 5,012,592, Cl. 33-833.000.

Greminger, Douglas C.: *See—*
Garcia-Huidobro, Gonzalo; and Greminger, Douglas C., 5,013,449, Cl. 210-672.000.

Greskovich, Charles D.; Minnear, William P.; Brun, Milivoj K.; and Riedner, Robert J., to General Electric Company. Preparation of high uniformity polycrystalline ceramics by presintering, hot isostatic pressing and sintering and the resulting ceramic. 5,013,696, Cl. 501-153.000.

Greyhawk Systems, Inc.: *See—*
Turner, James B.; and McInnis, Roderick J., 5,014,326, Cl. 382-8.000.

Gribbin, John D.: *See—*
Bothe, Lothar; Gribbin, John D.; and Dinter, Peter, 5,013,601, Cl. 428-323.000.

Gridnev, Alexandr I.: *See—*
Stadnik, Ivan P.; Klevets, Nikolai I.; Gridnev, Alexandr I.; Kelin, Nikolai A.; and Sitnikov, Anatoly F., 5,013,951, Cl. 310-156.000.

Grieb, Hubert; Simon, Burkhard; and Albers, Martin, to MTU Motoren- Und Turbinen-Union Munchen GmbH. Fuel feed method and apparatus for a turboramjet engine. 5,012,638, Cl. 60-224.000.

Grieshop, Maurice, to J & M Manufacturing Co., Inc. Grain wagon with unload mechanism. 5,013,208, Cl. 414-526.000.

Griffith, John D., to Sulzer Brothers Limited. Weft yarn threading device for a jet loom. 5,012,844, Cl. 139-452.000.

Grigg, Ellen S. Inflatable multi-purpose medical support pillow. 5,012,539, Cl. 5-431.000.

Grimes, Gary J.: *See—*
Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., 5,013,119, Cl. 350-96.160.

Gritz, David N.; and Miska, Herbert A. Cordierite-type glass-ceramic with controlled coloration. 5,013,605, Cl. 428-410.000.

Grodberg, Marcus G., to Colgate - Palmolive Company. Composition for treating osteoporosis and hormonal imbalance. 5,013,728, Cl. 514-171.000.

Groothuis, Michiel; and Nikles, Francois, to Conseilray S.A. Device producing stopping of a movable element in a determined position and a timepiece having a counting indicator of a finite duration. 5,014,251, Cl. 368-80.000.

Gross, Jurgen: *See—*
Beneke, Ulrich; Gross, Jurgen; Oepping, Wilfried; Schnelle, Manfred; and Sundermeier, Gunter, 5,012,551, Cl. 16-49.000.

Growcock, Fred: *See—*
Frenier, Wayne; Growcock, Fred; Lopp, Victoria R.; and Dixon, Brian, 5,013,483, Cl. 252-396.000.

Grumman Aerospace Corporation: *See—*
Solomon, Allen L., 5,013,687, Cl. 437-209.000.
Solomon, Allen L., 5,013,919, Cl. 250-349.000.

GT-Devices: *See—*
Goldstein, Yeshayahu S. A.; Tidman, Derek A.; and Fleischer, David, 5,012,719, Cl. 89-8.000.
Tidman, Derek A., 5,012,720, Cl. 89-8.000.

GTE Products Corporation: *See—*
Butler, Scott J., 5,013,976, Cl. 315-248.000.
Desclos, Raymond G., 5,013,962, Cl. 313-318.000.
Gawad, Mahmoud A.; and Graudins, John, 5,014,170, Cl. 362-260.000.
Yale, Ramon L., 5,013,582, Cl. 427-65.000.

Guan, Shenheng; and Jones, Patrick R., to University of the Pacific. General phase modulation method for stored waveform inverse fourier transform excitation for fourier transform ion cyclotron resonance mass spectrometry. 5,013,912, Cl. 250-282.000.

Guastalla, Giovanni: *See—*
Marraccini, Antonio; Perego, Gabriele; and Guastalla, Giovanni, 5,013,472, Cl. 252-78.100.

Guckel, Henry; and Sniegowski, Jeffry, to Wisconsin Alumni Research Foundation. Formation of microstructures with removal of liquid by freezing and sublimation. 5,013,693, Cl. 437-248.000.

Guckert, Joseph R.; and Lim, Hyun S., to Du Pont de Nemours, E. I., and Company. Composite fibrous polyethylene sheet. 5,013,599, Cl. 428-286.000.

Guerra, Robert: *See—*
Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,014,259, Cl. 369-284.000.

Guerricabeitia, Jose J.: *See—*
Long, Paul D.; and Guerricabeitia, Jose J., 5,013,398, Cl. 156-643.000.

Guerro, Gerald J.; and Singh, Balwant, to American Cyanamid. Method of manufacturing a sag-resistant bonded particulate article. 5,013,598, Cl. 428-283.000.

Guest, Allen M.; Preus, Martin W.; and Lewis, William, to Swedlow, Inc. Highly tintable abrasion resistant coatings. 5,013,608, Cl. 428-436.000.

Guillet, Antoine; and Osterholtz, Fred D., to Union Carbide Chemicals and Plastics Technology Corporation. Process for the production of glass fiber reinforced composite material. 5,013,771, Cl. 523-202.000.

Guillet, James E.: *See—*
Murray, Douglas G.; Smith, Dennis C.; and Guillet, James E., 5,013,769, Cl. 523-111.000.

Guittet, Dominique; Taberlet, Eric; and Vuillermoz, Jean-Francois, to Societe Anonyme dite: Alcatel Cit. Multistage roots pump and a method of assembling such a pump. 5,013,227, Cl. 418-206.000.

Gulton Industries Inc., Femco Division: *See—*
Cox, Edwin G.; and Ritter, David T., 5,014,347, Cl. 455-110.000.

Gunji, Minoru: *See—*
Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio, Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.

Gunji, Takahiro: *See—*
Takahashi, Tsuneo; Nishio, Tomoyuki; Ikegami, Masayuki; and Gunji, Takahiro, 5,012,676, Cl. 73-497.000.

Gunter, Helmut: *See—*
Schmidt, Hans; and Gunter, Helmut, 5,014,001, Cl. 324-158.00F.

Gurzhy, Ivan K.: *See—*
Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.

Guth, Jean-Louis: *See—*
Patarin, Joel; Guth, Jean-Louis; Kessler, Henri; Coudurier, Gisele; and Raatz, Francis, 5,013,537, Cl. 423-328.000.

Gutzeit, Reinhard; and Jonner, Wolf-Dieter, to Robert Bosch GmbH. Anti-skid apparatus for a vehicle brake system. 5,013,097, Cl. 303-116.000.

Guzorek, Steven E., to Field Controls Company, The. Power vented direct vent system. 5,012,793, Cl. 126-85.00B.

H.G. Weber & Co., Inc.: *See—*
Kristola, Jay L.; and Prettie, John, 5,012,915, Cl. 198-411.000.

H. J. Langen & Sons Limited: *See—*
Langen, Jacobus J.; Langen, John H. J.; and Langen, Bernard A., 5,012,728, Cl. 99-533.000.

H.T. Chemicals, Inc.: *See—*
Shalon, Yehuda, 5,013,433, Cl. 210-198.200.

Haag, Werner O.: *See—*
Bell, Weldon K.; Haag, Werner O.; Harandi, Mohsen N.; and Owen, Hartley, 5,013,329, Cl. 44-448.000.

Haas, Lawrence J.: *See—*
Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., 5,013,119, Cl. 350-96.160.

Haberey, Martin: *See—*
Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Haberey, Martin; Schillinger, Ekkehard; and Town, Michael H., 5,013,758, Cl. 514-573.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Hacker, Martin E.: *See—*
  - Fuimefreddo, Anthony J.; Nerz, John E.; Hacker, Martin E.; and Hain, Gunther, 5,013,883, Cl. 219-121.470.
- Hadderingh, Johannes N., to Hollandse Signaalapparaten B. V. Acoustic detection device. 5,014,250, Cl. 367-124.000.
- Hadiizadeh-Amini, Zahra: *See—*
  - Shen, Lewis; Hadiizadeh-Amini, Zahra; Wang, Hsingya A.; and Hsu, James J., 5,013,675, Cl. 437-44.000.
- Haefner, Hans W., to Pfister GmbH. Optical sensor. 5,012,679, Cl. 73-800.000.
- Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, to Robert Bosch GmbH. Fuel injection system. 5,012,787, Cl. 123-470.000.
- Haftmann, Johannes; and Schmeykal, Rudolf, to TA TRIUMPH ADLER Aktiengesellschaft. Plastic platen for typewriters or similar office equipment. 5,013,170, Cl. 400-659.000.
- Hahn, Hans J., to Wegman & Co. GmbH. Water table for a thermal-cutting machine, especially for processing aluminum, with an underwater plasma-based cutting system. 5,013,884, Cl. 219-121.480.
- Hahne, Ellen L.; Kalmanek, Charles R.; and Morgan, Samuel P., to AT&T Bell Laboratories. Method and apparatus for congestion control in a data network. 5,014,265, Cl. 370-60.000.
- Hai, Ton T.; and Nelson, Deanna J., to Baxter International Inc. Pharmaceutical grade 3,5-dibromosalicylic acid and metohd for synthesizing same. 5,013,866, Cl. 562-474.000.
- Hain, Gunther: *See—*
  - Fuimefreddo, Anthony J.; Nerz, John E.; Hacker, Martin E.; and Hain, Gunther, 5,013,883, Cl. 219-121.470.
- Haino, Kozo: *See—*
  - Itoh, Akira; Haino, Kozo; Okaji, Makoto; Emoto, Kazuhiro; and Kodera, Tatsuya, 5,013,623, Cl. 430-59.000.
- Hakamatsuka, Yasuharu; and Watanabe, Kazuhiro, to Olympus Optical Co., Ltd. Mold for the casting of glass ceramic. 5,013,363, Cl. 106-38.300.
- Hakotani, Yasuhiko: *See—*
  - Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; Hakotani, Yasuhiko; and Kikuchi, Tatsuro, 5,014,158, Cl. 361-321.000.
- Hall, Catherine L.: *See—*
  - Munford, Robert S.; and Hall, Catherine L., 5,013,661, Cl. 435-197.000.
- Hall, Roger G.: *See—*
  - Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpe, Hans-Rudolf, 5,013,863, Cl. 562-11.000.
- Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; and Yngve, Paul W., to Du Pont de Nemours, E. I., and Company. Apparatus and process for forming alternate twist plied yarn and product therefrom. 5,012,636, Cl. 57-204.000.
- Hallbery, David A.: *See—*
  - Barnett, Anthony M.; and Hallbery, David A., 5,013,638, Cl. 430-539.000.
- Haller, Gordon A.: *See—*
  - Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.
- Hallihurton Company: *See—*
  - Crain, Stephen F.; Clark, Mark A.; and Woodall, Edward L., 5,014,218, Cl. 364-502.000.
- Halliday, Walter. Game. 5,013,043, Cl. 273-258.000.
- Halloway, Lowell E. Self-deploying stabilizing jack. 5,013,011, Cl. 254-423.000.
- Halskov, Soren, to Farmaceutisk Laboratorium Ferring A/S. Pharmaceutical composition and method for the treatment of colitis ulcerosa and Crohn's disease by oral administration. 5,013,727, Cl. 514-166.000.
- Hamada, Kaneaki; Tsubota, Kazuichi; and Muraoka, Tomoki, to Sanyo Special Steel Co., Ltd.; and Nippon Seiko Kabushiki Kaisha. Steel for corrosion-resistant rolling part and rolling part. 5,013,525, Cl. 420-104.000.
- Hamada, Masataka: *See—*
  - Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, 5,014,078, Cl. 354-195.100.
- Hamada, Yasuhiko: *See—*
  - Kato, Nobuhide; and Hamada, Yasuhiko, 5,012,670, Cl. 73-31.050.
- Hamada, Yonenori; and Senbokuya, Eiji, to Jidosha Denki Kogyo K.K.; and Yugen Kaisha Senbokuya. Bimetallic circuit breaker with insulated terminal assembly. 5,014,035, Cl. 337-372.000.
- Hamanaka, Toshiyuki; Harada, Takashi; and Hattori, Fumio, to NGK Insulators, Ltd. Process for producing hollow ceramic articles. 5,013,500, Cl. 264-40.400.
- Hamanaka, Toshiyuki: *See—*
  - Fukao, Kaname; Hamanaka, Toshiyuki; and Harada, Takashi, 5,013,501, Cl. 264-67.000.
- Hamel, Josee: *See—*
  - Brodeur, Bernard R.; Hamel, Josee; and Montplaisir, Serge, 5,013,664, Cl. 435-7.320.
- Hamel, Yvette: *See—*
  - Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.
- Hamilton, Christopher T.: *See—*
  - Markley, Lowell D.; Hamilton, Christopher T.; Swisher, Beth A.; and Secor, Jacob, 5,013,352, Cl. 71-94.000.
- Hamlin Transmission Corporation: *See—*
  - Leonard, George H., 5,013,284, Cl. 474-52.000.
- Hammond, Kevin I.: *See—*
  - Coates, Ian H.; Oxford, Alexander W.; North, Peter C.; Miller, Thomas; Baxter, Anthony D.; and Hammond, Kevin I., 5,013,733, Cl. 514-213.000.
- Han, Scott: *See—*
  - Absil, Robert P. L.; Degnan, Thomas F.; Han, Scott; Marler, David O.; Socha, Richard F.; and Stapleton, Michael R., 5,013,422, Cl. 208-27.000.
- Han, Wesley W.: *See—*
  - Gerson, Steven H.; and Han, Wesley W., 5,013,751, Cl. 514-448.000.
- Hanawa, Shinichi: *See—*
  - Nishida, Ikuo; Hanawa, Shinichi; and Kawase, Hideyuki, 5,014,140, Cl. 360-85.000.
- Haneishi, Tatsuo; Okazaki, Takao; Torikata, Akio; and Nakajima, Mutsuo, to Sankyo Company Limited. Antibiotics called "chloropolysporins B and C", a process for their preparation, and their therapeutic and veterinary use. 5,013,550, Cl. 424-117.000.
- Hannerstig, Christer, to AB A. Svensson & Co. Holder for draping curtains, arrangement of holders and process for draping curtains. 5,012,851, Cl. 160-348.000.
- Hans, Richter, to Blomberg Robotertecknik GmbH. Tactile sensor. 5,014,224, Cl. 338-99.000.
- Hansen, Gerald M., to Nekoosa Packaging Corporation. One-piece, self-locking computer software container. 5,012,930, Cl. 206-620.000.
- Hanson Group Ltd., The: *See—*
  - Rogers, David J.; and Broga, Martin J., 5,012,839, Cl. 137-341.000.
- Hanusa, Lotar H., to Mobay Corporation. Closed cell, rigid polyurethane foam. 5,013,766, Cl. 521-137.000.
- Hanyu, Yukio: *See—*
  - Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, 5,013,137, Cl. 350-333.000.
- Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Drive system of actuator having piezoelectric device for use in motor vehicle. 5,013,955, Cl. 310-316.000.
- Harada, Akinori; and Okazaki, Yoji, to Fuji Photo Film Co., Ltd. Optical wavelength converter device and method of manufacturing same. 5,013,129, Cl. 350-96.290.
- Harada, Naoto: *See—*
  - Sekine, Shuji; Furuya, Takeo; and Harada, Naoto, 5,013,952, Cl. 310-239.000.
- Harada, Takashi: *See—*
  - Fukao, Kaname; Hamanaka, Toshiyuki; and Harada, Takashi, 5,013,501, Cl. 264-67.000.
  - Hamanaka, Toshiyuki; Harada, Takashi; and Hattori, Fumio, 5,013,500, Cl. 264-40.400.
- Harada, Takuya: *See—*
  - Oshita, Koji; and Harada, Takuya, 5,014,054, Cl. 341-145.000.
- Harakawa, Yoshio: *See—*
  - Masumoto, Tsuyoshi; Inoue, Akihisa; Oguchi, Masahiro; and Harakawa, Yoshio, 5,013,346, Cl. 65-21.200.
- Harandi, Mohsen N.: *See—*
  - Bell, Weldon K.; Haag, Werner O.; Harandi, Mohsen N.; and Owen, Hartley, 5,013,329, Cl. 44-448.000.
- Hardigg Industries, Inc.: *See—*
  - Hardigg, James S.; and Lewandowski, Stanley W., Jr., 5,012,553, Cl. 16-126.000.
- Hardigg, James S.; and Lewandowski, Stanley W., Jr., to Hardigg Industries, Inc. Lightweight handle. 5,012,553, Cl. 16-126.000.
- Hardin, James D. Golf scorecard. 5,013,069, Cl. 283-48.100.
- Hardt, Lee R., to United States of America, Navy. Electrorheologically damped impact system. 5,012,740, Cl. 102-216.000.
- Harger, Clifford T.: *See—*
  - Ingram, Keith W.; Schoenlein, Mark J.; and Harger, Clifford T., 5,012,630, Cl. 53-490.000.
- Harkrader, Ronald J.: *See—*
  - Southard, G. Lee; and Harkrader, Ronald J., 5,013,553, Cl. 424-426.000.
- Harman, Robert R.; and Joslyn, Bruce. C., to Thru-The-Wall Corporation. Automated videocassette dispensing terminal coupled to store's computerized rental system. 5,013,897, Cl. 235-381.000.
- Harnisch, Horst; and Raue, Roderich, to Bayer Aktiengesellschaft. Electrophotographic toners with cationic charge increasing additive. 5,013,627, Cl. 430-110.000.
- Harris Corporation: *See—*
  - Dingwall, Andrew G. F.; and Hsueh, Fu-Lung, 5,014,055, Cl. 341-159.000.
  - Heckaman, Douglas E.; and Higman, Roger H., 5,014,114, Cl. 357-74.000.
  - O'Mara, William E., Jr.; and Beasom, James D., 5,014,108, Cl. 357-49.000.
- Harrison, George M. Traffic lane marking device. 5,013,181, Cl. 404-12.000.
- Harrison, Jeffrey B.; and Yang, Chau-Hwa, to Texaco Inc. Catalyst and method for producing lower aliphatic alcohols. 5,013,764, Cl. 518-714.000.
- Harshavardhana, Paramasiv, to AT&T Bell Laboratories. Apparatus and method for detecting and eliminating call looping in a node-by-node routing network. 5,014,262, Cl. 370-16.000.
- Harshman, James P.: *See—*
  - Davis, H. Forbes; and Harshman, James P., 5,013,442, Cl. 210-614.000.

- Hartig, Wolfgang: *See—*
  - Disch, Rolf; and Hartig, Wolfgang, 5,013,153. Cl. 356-346.000.
- Hartmann, Yves: *See—*
  - Debize, Jean-Claude; Hartmann, Yves; Huon, Pierre; and Peyronnenc, Michel, 5,014,187, Cl. 364-200.000.
- Harvath, Steven J.; Kilgore, Vernon O.; and Zapp, Raymond K., to Atlas Telecom, Inc. Method and apparatus for accessing a facsimile store and forward network. 5,014,300, Cl. 379-100.000.
- Hasegawa, Akira; Takahashi, Susumu; Tsuji, Koyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, to Olympus Optical Co., Ltd. High image resolution image pickup system with color dispersion means. 5,014,121, Cl 358-55.000.
- Hashimoto, Kazuhiko: *See—*
  - Oda, Hiroyuki; Tanaka, Toshimitsu; Yamagata, Naoyuki; and Hashimoto, Kazuhiko, 5,012,771, Cl. 123-52.0MB.
- Hashimoto, Toshiharu; Shibata, Kazuhiko; and Kobayashi, Makoto, to Oki Electric Industry Co., Ltd. Temporary slip stacking apparatus operable in a first-in first-out mode. 5,013,023, Cl. 271-3.100.
- Hasimoto, Shoji: *See—*
  - Sugimura, Kentaro; Hasimoto, Shoji; and Ono, Takayuki, 5,013,464, Cl. 252-26.000.
- Hassel, James E., to Fritzsche Dodge & Olcott Inc. Edible dispersion containing a tartaric acid ester of mono- and diglycerides and an edible fat. 5,013,574, Cl. 426-612.000.
- Hata, Hajime; Kitamura, Takao; Sakane, Kohji; Wada, Hideo; and Sogabe, Seiji, to Agency of Industrial Science & Technology; and Shikoku Chemicals Corporation. Metal-based composite material and process for preparation thereof. 5,013,523, Cl. 419-19.000.
- Hata, Kyousuke: *See—*
  - Nishii, Michiharu; Mizuno, Genji; Mizukoshi, Hideo; Ishida, Satoshi; and Hata, Kyousuke, 5,013,094, Cl. 303-52.000.
- Hata, Masayuki; and Umeki, Tsunenori, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device of complementary integrated circuit. 5,014,105, Cl. 357-42.000.
- Hata, Yoshiaki: *See—*
  - Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, 5,014,078, Cl. 354-195.100.
- Hatada, Kenzo; and Fujimoto, Hiroaki, to Matsushita Electric Industrial Co., Ltd. Method of connecting electrodes. 5,012,969, Cl. 228-104.000.
- Hatton, Gregory J.: *See—*
  - Helms, David A.; Durrett, Michael G.; and Hatton, Gregory J., 5,014,010, Cl. 324-640.000.
- Hattori, Akio: *See—*
  - Machida, Satoshi; and Hattori, Akio, 5,012,909, Cl. 192-3.570.
- Hattori, Fumio: *See—*
  - Hamanaka, Toshiyuki; Harada, Takashi; and Hattori, Fumio, 5,013,500, Cl. 264-40.400.
- Hattori, Hiroshi: *See—*
  - Yamaguchi, Koshiro; and Hattori, Hiroshi, 5,014,072, Cl. 346-76.0PH.
- Hattori, Tomoyuki; Akasaka, Nobuhiro; and Yamanishi, Toru, to Sumitomo Electric Industries Ltd. Waterproof optical fiber cable. 5,013,126, Cl. 350-96.230.
- Haushofer, Bert; Scherp, Ernst; Schumacher, Wilfried; and Sabau, Petru, to Rutgerswerke Aktiengesellschaft. Building sheeting and method of its manufacture. 5,013,591, Cl. 428-40.000.
- Havemann, Robert H., to Texas Instruments Incorporated. Process for reduced emitter-base capacitance in bipolar transistor. 5,013,671, Cl. 437-31.000.
- Hawkins, R. Thomas, II, to Tektronix, Inc. Ultra-short optical pulse source. 5,014,015, Cl. 330-4.300.
- Haworth, John, to Boeing Company, The. Inclined electrode surface acoustic wave substance sensor. 5,012,668, Cl. 73-24.060.
- Haws, Lewis A.: *See—*
  - Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 5,012,823, Cl. 131-31.000.
- Hay, Bruce A., to Pfizer Inc. Methods for making tetrahydroisoalpha and hexahydroisoalpha acids. 5,013,571, Cl. 426-600.000.
- Hay, Bruce A., to Pfizer Inc. Steam stripping of odor forming impurities from hop flavors. 5,013,572, Cl. 426-600.000.
- Hay, Donald I.; Gibbons, Ronald J.; and Moreno, Edgard G., to Forsyth Dental Infirmary for Children. Method to inhibit adhesion of disease-causing microorganisms to teeth. 5,013,542, Cl. 424-54.000.
- Hayakawa, Youichi; Hosono, Chihiro; and Ogasawara, Yasuhito, to Aisin Aw Co., Ltd. Automatic transmission with stator shaft mounting structure. 5,013,287, Cl. 475-61.000.
- Hayasaki, Koichi, to Nissan Motor Co., Ltd. Range selection control arrangement for automatic automotive transmission. 5,012,698, Cl. 74-866.000.
- Hayashi, Hideo; and Omata, Makoto, to NEC Corporation. Vector operation instruction activation controller for vector arithmetic units having arithmetic functions with different numbers of pipeline stages. 5,014,196, Cl. 364-200.000.
- Hayashi, Kazumi: *See—*
  - Okada, Shoji; Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; Ichikawa, Yuji; and Hayashi, Kazumi, 5,013,888, Cl. 219-219.000.
- Hayashi, Kimiaki; and Kubota, Hitoshi, to Tanabe Seiyaku Co., Ltd. Process for preparing optically active 2-oxoimidazolidine derivatives. 5,013,845, Cl. 548-320.000.
- Hayashi, Michihiko; and Ohtani, Kenzi, to Rohm Co., Ltd. Amplifier for outputting motor controlling signal in motor controlling circuit. 5,014,020, Cl. 330-257.000.
- Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, to Nippon Zeon Co., Ltd. Nitrile group-containing highly saturated copolymer rubber and rubber composition having improved cold resistance. 5,013,796, Cl. 525-326.200.
- Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, to Nippon Zeon Co., Ltd. Nitrile group-containing highly saturated copolymer rubber and rubber composition having improved cold resistance. 5,013,797, Cl. 525-328.300.
- Hayashi, Yoshiaki; and Fujita, Taira, to Sumitomo Chemical Company, Ltd. Magenta dye-donor element used in thermal transfer and thermal transfer sheet using it. 5,013,712, Cl. 503-227.000.
- Hayashida, Hitoshi: *See—*
  - Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.
- Hayden, William L., to Ford Motor Company. Windshield wiper anti-roll connector. 5,013,175, Cl. 403-24.000.
- Hayes, Ernest B.; and Clarke, Paul F. Tobacco smoke filter containing particulate additive. 5,012,828, Cl. 131-341.000.
- Hayes, Robert. Subdivided flare-holding container. 5,012,923, Cl. 206-443.000.
- Haynes, Barton F.; and Palker, Thomas J., to Duke University. Production of antibodies to HIV. 5,013,548, Cl. 424-89.000.
- Haynes, John T., Jr.: *See—*
  - Baigas, Joseph F., Jr.; and Haynes, John T., Jr., 5,013,309, Cl. 604-368.000.
- Hazell, Leonard B.: *See—*
  - Cayless, Richard A.; and Hazell, Leonard B., 5,013,381, Cl. 156-281.000.
- Head, Donald W.: *See—*
  - Pleasants, Charles W.; Burnett, David R.; and Head, Donald W., 5,012,871, Cl. 166-386.000.
- Healey, Peter; and Mallinson, Stephen R., to British Telecommunications public limited company. Optical space switch. 5,013,140, Cl. 350-347.00E.
- Health Habit Developments Limited: *See—*
  - March, Adrian A. C.; and Laskey, Graham C., 5,013,034, Cl. 272-132.000.
- Hecht, Hartmuth; Paul, Wolfgang; and Baumgartner, Anton, to Coherent, Inc. Gas laser. 5,014,281, Cl. 372-59.000.
- Heckaman, Douglas E.; and Higman, Roger H., to Harris Corporation. High speed, high density semiconductor memory package with chip level repairability. 5,014,114, Cl. 357-74.000.
- Hegedus, Agnes: *See—*
  - Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.
- Heidelberger Druckmaschinen AG: *See—*
  - Anton, Rodi, 5,014,335, Cl. 388-815.000.
  - Loos, Gerhard; and Spiegel, Nikolaus, 5,012,739, Cl. 101-425.000.
  - Rodi, Anton, 5,013,981, Cl. 318-67.000.
  - Stoll, Norbert, 5,013,020, Cl. 270-49.000.
- Heideman, Robert J. Method of securing a wheel assembly to an associated body structure. 5,012,575, Cl. 29-894.300.
- Heinz, Gerhard: *See—*
  - Bobbink, Hendrikus; Fischer, Hermann; Heinz, Gerhard; Matthias, Klaus; Seibring, Joachim; and Stegmaier, Wolfgang, 5,013,816, Cl. 528-173.000.
- Heister, Heinz; and Jann, Wolfango, to Siemens Aktiengesellschaft. Signal level control circuit having alternately switched capacitors in the feedback branch. 5,014,130, Cl. 358-173.000.
- Heitmann, Uwe: *See—*
  - Lindemann, Rolf; and Heitmann, Uwe, 5,012,825, Cl. 131-281.000.
- Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., to Pharmaceutical Delivery Systems, Inc. Ortho and thio-ortho ester polymer. 5,013,821, Cl. 528-376.000.
- Hellwig, John, to Teknion Furniture Systems Inc. Combined fiber optic conduits and office panel. 5,013,112, Cl. 350-96.100.
- Helms, David A.; Durrett, Michael G.; and Hatton, Gregory J., to Texaco Inc. Dual frequency microwave water cut monitoring means and method. 5,014,010, Cl. 324-640.000.
- Hembree, David R., to Micron Technology, Inc. Progressive form die. 5,012,664, Cl. 72-404.000.
- Henkel Corporation: *See—*
  - Tull, Thomas W., 5,012,662, Cl. 72-42.000.
- Henkel Kommanditgesellschaft auf Aktien: *See—*
  - Wahle, Bernd; and Selen, Faize, 5,013,327, Cl. 8-125.000.
- Hennion, Claude: *See—*
  - Lewiner, Jacques; Hennion, Claude; and Smycz, Eugeniusz, 5,014,050, Cl. 340-870.190.
- Henri, Jean-Claude: *See—*
  - Andrieu, Jean-Pierre; Henri, Jean-Claude; and Gault, Dominique, 5,014,065, Cl. 342-165.000.
- Hercules, Incorporated: *See—*
  - Bloothoofd, William B., 5,012,738, Cl. 101-415.100.
  - Leibfried, Raymond T., Sr., 5,013,809, Cl. 524-862.000.
- Hergert, Richard R., to Beloit Corporation. Trailing element device for a headbox. 5,013,406, Cl. 162-343.000.
- Hergesell, Wolfgang: *See—*
  - Stadler, Edwin; Hergesell, Wolfgang; and Pidner, Ernst, 5,013,575, Cl. 426-639.000.
- Herman Miller, Inc.: *See—*
  - Nienhuis, James H.; Clark, Jeffrey L.; De Pree, Michael L.; and Beck, Robert L., 5,013,252, Cl. 439-215.000.
- Hermann Boehler GmbH: *See—*
  - Menrath, Albert, 5,013,172, Cl. 401-133.000.

VOL
1126
ISS
1
MY
7
1991
UMI

Hermann, Klaus-Dieter. Hand-held labeller. 5,013,390, Cl. 156-577.000.
Herren, Blair J.: *See—*
Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C.; Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., 5,013,531, Cl. 422-245.000.
'Herripon, Bastiaan A., to Van Doorne's Transmissie B.V. Adjustable pulley with improved support structure. 5,013,283, Cl. 474-8.000.
Herron, Jeffrey W.: *See—*
Williams, Robert A.; and Herron, Jeffrey W., 5,013,254, Cl. 439-255.000.
Herth, Harro: *See—*
Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.
Herziger, Gerd; Loosen, Peter; Marten, Otto; and Boning, Hartwig, to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V. Gas laser. 5,014,282, Cl. 372-93.000.
Hess, Carl H.: *See—*
Russell, Timothy D.; Hess, Carl H.; Hlahol, Paul G.; and Stewart, Charles N., 5,013,968, Cl. 313-641.000.
Hesselbart, Frank C. Training device for golfers. 5,013,044, Cl. 273-186.00C.
Hewett, Richard H.; and Veerasekaran, Ponnan, to May & Baker Limited. Herbicidal method using diflufenican. 5,013,353, Cl. 71-94.000.
Hewi Heinrich Wilke GmbH: *See—*
Liese, Gerhard, 5,013,001, Cl. 248-551.000.
Hewlett-Packard Company: *See—*
Chapman, Charles B., 5,013,383, Cl. 156-307.300.
Dody, Joseph W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 5,014,074, Cl. 346-107.00R.
Epstein, Howard C., 5,013,910, Cl. 250-231.170.
Kuboyama, Yoichi; and Yanagawa, Koichi, 5,014,012, Cl. 324-720.000.
Silverglate, David E.; and Smestad, Greg P., 5,013,144, Cl. 350-435.000.
Wanger, Mark E.; Methlie, Jennifer L.; Jones, David P.; and Stavely, Donald J., 5,014,255, Cl. 369-36.000.
Hewlett-Packart Company: *See—*
Kotzian, Brian R., 5,014,013, Cl. 328-145.000.
Hicks, Douglas C.; and Pleass, Charles M., to University of Delaware, The. Positive displacement piston pump. 5,013,219, Cl. 417-269.000.
Hida, Tsuneaki: *See—*
Kanamaru, Tsuneo; Hida, Tsuneaki; and Muroi, Masayuki, 5,013,757, Cl. 514-568.000.
Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt. Insecticidal composition comprising more than one active ingredient. 5,013,754, Cl. 514-521.000.
Higami, Masanobu. Pressure-driven engine. 5,012,643, Cl. 60-369.000.
Higashidate, Sakae; Yamauchi, Yoshio; and Saito, Muneo, to Nihon Bunko Kogyo Kabushiki Kaisha. Extraction and separation method and apparatus using supercritical fluid. 5,013,443, Cl. 210-634.000.
Higashii, Takayuki: *See—*
Minai, Masayoshi; and Higashii, Takayuki, 5,013,479, Cl. 252-299.650.
Higashikawa, Masahiro: *See—*
Ukegawa, Shin; Shinomiya, Masaki; Higashikawa, Masahiro; Uetsuki, Tadao; and Kobayashi, Koichi, 5,013,975, Cl. 315-248.000.
Higashino, Hiroyuki: *See—*
Ohkawa, Hideki; Ozawa, Norio; Higashino, Hiroyuki; and Matsubara, Motonari, 5,013,635, Cl. 430-495.000.
Higashio, Kimihiko: *See—*
Ito, Masazumi; and Higashio, Kimihiko, 5,014,184, Cl. 364-188.000.
Higashizono, Masayoshi: *See—*
Maeda, Takeo; and Higashizono, Masayoshi, 5,014,106, Cl. 357-43.000.
Higman, Roger H.: *See—*
Heckaman, Douglas E.; and Higman, Roger H., 5,014,114, Cl. 357-74.000.
Higuchi, Takayoshi, to Kabushiki Kaisha Toshiba. Miniaturization of a contact hole in a semiconductor device. 5,014,109, Cl. 357-68.000.
Higurashi, Seiji; and Tsushima, Takuya, to Victor Company of Japan, Ltd. Code-error correcting device. 5,014,274, Cl. 371-40.100.
Hilaris, John A.; and Waring, George D., to EG&G Sealol, Inc. Single component seal. 5,013,051, Cl. 277-89.000.
Hilden, Gilbert R., to DLMA Transportation Inc. Rear wheel suspension and steering system. 5,012,885, Cl. 180-254.000.
Hill, Anthony: *See—*
McLeish, Anthony B.; Hill, Anthony; Darling, Jim; and Dean, David M. M., 5,014,238, Cl. 364-900.000.
Hill, Steven F. Impact tool. 5,012,567, Cl. 29-275.000.
Himeji, Tooru; Arai, Kiyotaka; and Murakami, Masahiro, to Mita Industrial Co., Ltd. Paper feeding device. 5,013,025, Cl. 271-164.000.
Hinterdorfer, Erwin: *See—*
Kunze, Volkmar; Zimmermann, Kurt; and Hinterdorfer, Erwin, 5,012,861, Cl. 165-47.000.
Hirai, Masatake: *See—*
Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, 5,013,956, Cl. 310-323.000.
Hirai, Toshiharu: *See—*
Sato, Goro; Komatsu, Michio; Hirai, Toshiharu; Abe, Yoneji; and Senjyuu, Noboru, 5,013,607, Cl. 428-426.000.
Hiraishi, Shigetoshi: *See—*
Sekine, Mikiya; and Hiraishi, Shigetoshi, 5,013,629, Cl. 430-138.000.
Hiramatsu, Kinuo, to Honda Giken Kogyo Kabushiki Kaisha. Air duct device for a motorcycle. 5,012,883, Cl. 180-225.000.
Hirano, Sadayuki: *See—*
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,012,697, Cl. 74-866.000.
Hirokazu, Kuzushita: *See—*
Hirotaka, Ito; Jinichi, Taniguchi; Hirokazu, Kuzushita; and Atsushi, Ohhori, 5,013,967, Cl. 313-512.000.
Hironaka, Youichi: *See—*
Ishihata, Kouji; Hironaka, Youichi; Shimizu, Hisanaga; Kitamura, Kazuo; and Imagawa, Takeshi, 5,013,776, Cl. 524-118.000.
Hirose, Naoki: *See—*
Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
Hirose, Ryan T., to Simtek Corporation. Single ended sense amplifier with improved data recall for variable bit line current. 5,013,943, Cl. 307-530.000.
Hirose, Tohru: *See—*
Matsumoto, Jun-ichi; Minamida, Akira; Fujita, Masahiro; Hirose, Tohru; Nakano, Junji; and Nakamura, Shinichi, 5,013,841, Cl. 544-363.000.
Hirose, Toshio: *See—*
Yada, Yukihiko; and Hirose, Toshio, 5,013,083, Cl. 296-213.000.
Hirota, Shinichiro, to Hoya Corporation. Mold assembly and methods for producing molded glass. 5,013,348, Cl. 65-102.000.
Hirotaka, Ito; Jinichi, Taniguchi; Hirokazu, Kuzushita; and Atsushi, Ohhori, to Mitsubishi Cable Industries Ltd. Electroluminescence lamp and method of use thereof. 5,013,967, Cl. 313-512.000.
Hirsch, Rolf B.: *See—*
Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,013,504, Cl. 264-130.000.
Hirsch, Rolf-Burkhard: *See—*
Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Jungverdorben, Hermann Josef; and Dross, Joachim, 5,013,502, Cl. 264-103.000.
Hirukawa, Masahiro: *See—*
Nagashima, Toshikazu; Kuramashi, Haruki; Nishida, Yoshihiro; and Hirukawa, Masahiro, 5,013,788, Cl. 524-767.000.
Hitachi Automotive Engineering Co., Ltd.: *See—*
Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, 5,012,982, Cl. 239-585.000.
Hitachi Electronics Engineering Co., Ltd.: *See—*
Mori, Kyoichi; Toda, Kuniaki; Iizuka, Nobuyuki; Hongo, Tsutomu; and Nakadai, Tsutomu, 5,014,143, Cl. 360-99.120.
Hitachi, Ltd.: *See—*
Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.
Isakozawa, Shigeto; and Ohashi, Toshiyuki, 5,013,915, Cl. 250-311.000.
Kobayashi, Nobuyoshi; Suzuki, Masayuki; Kondo, Seiichi; Matsui, Makoto; and Mukai, Kiichiro, 5,013,526, Cl. 420-430.000.
Minai, Masayoshi; and Higashii, Takayuki, 5,013,479, Cl. 252-299.650.
Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, 5,014,142, Cl. 360-98.010.
Nigawara, Seiitsu; Ikematsu, Takehiko; and Fukai, Masayuki, 5,012,766, Cl. 122-504.000.
Nishida, Ikuo; Hanawa, Shinichi; and Kawase, Hideyuki, 5,014,140, Cl. 360-85.000.
Otaka, Tadashi, 5,013,914, Cl. 250-310.000.
Sano, Koichi; Yamagata, Shimbu; Yokoyama, Tetsuo; and Koizumi, Hideaki, 5,014,007, Cl. 324-309.000.
Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
Shikamori, Tamotsu; Toshimitsu, Hiroyuki; Ohsugi, Hiroshi; Hiyama, Isao; and Fukuzawa, Soichi, 5,012,658, Cl. 68-12.010.
Shimada, Satoshi; Shimizu, Yasushi; and Ugai, Seiichi, 5,012,677, Cl. 73-721.000.
Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, 5,012,982, Cl. 239-585.000.
Takano, Yoshiya; and Hoshi, Yoshikazu, 5,012,673, Cl. 73-118.100.
Takatsuka, Akio; Sasamoto, Asao; Moribe, Yoshihiro; Shiono, Toshio; Sogabe, Chikayuki; and Hosokawa, Haruhiko, 5,014,146, Cl. 360-106.000.
Takeshita, Masatoshi; Sato, Toshihiro; Toyooka, Takashi; and Suzuki, Ryo, 5,014,239, Cl. 365-11.000.
Hitachi Maxwell, Ltd.: *See—*
Mizumura, Tetsuo; Ichijo, Minoru; Nakao, Ken-ichirou; Matsushima, Seiichi; and Tuburaya, Yoshitane, 5,013,594, Cl. 428-64.000.

Hitachi Microcomputer Engineering Ltd.: *See—*
Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
Hitosugi, Toshiaki, to Kabushiki Kaisha Toshiba. Compressing apparatus with extended variable capacity range and capacity control method thereof. 5,013,217, Cl. 417-26.000.
Hiwatashi, Yutaka: *See—*
Mine, Atsushi; Kamimura, Katsuyoshi; and Hiwatashi, Yutaka, 5,013,067, Cl. 280-840.000.
Hiyama, Isao: *See—*
Shikamori, Tamotsu; Toshimitsu, Hiroyuki; Ohsugi, Hiroshi; Hiyama, Isao; and Fukuzawa, Soichi, 5,012,658, Cl. 68-12.010.
Hlahol, Paul G.: *See—*
Russell, Timothy D.; Hess, Carl H.; Hlahol, Paul G.; and Stewart, Charles N., 5,013,968, Cl. 313-641.000.
HMT Technology Corporation: *See—*
Price, Rick C.; Eltoukhy, Atef H.; and Mehmandoust, Yassin, 5,012,618, Cl. 51-140.000.
Ho, Chao-Chuan. Telescopically-operated vehicle canopy. 5,013,079, Cl. 296-136.000.
Hobrecht, Stephen W.; and Chow, Michael C. L., to National Semiconductor Corporation. Bandgap threshold circuit with hysteresis. 5,013,934, Cl. 307-296.700.
Hochberg, Arthur K.; O'Meara, David L.; and Roberts, David A., to Air Products and Chemicals, Inc. Method for deposition of silicon films from azidosilane sources. 5,013,690, Cl. 437-233.000.
Hockaday, Susan D. Disposable sheet protective device. 5,012,540, Cl. 5-487.000.
Hodate, Toshiaki: *See—*
Asai, Keniti; Ito, Hideaki; Nakagawa, Yoji; Shihara, Yasutaka; Hodate, Toshiaki; and Nakazaki, Akikazu, 5,013,408, Cl. 202-241.000.
Hoechst Aktiengesellschaft: *See—*
Bayer, Thomas; Buchholz, Rainer; Deger, Hans-Matthias; and Wink, Joachim, 5,013,655, Cl. 435-119.000.
Bothe, Lothar; Gribbin, John D.; and Dinter, Peter, 5,013,601, Cl. 428-323.000.
Mildenberger, Hilmar; Lachhein, Stephen; Rittner, Siegbert; and Tetzlaff, Heribert, 5,013,444, Cl. 210-634.000.
Hoechst Celanese Corporation: *See—*
Fisher, Harold M.; and Leone, Daniel E., 5,013,439, Cl. 210-500.230.
Hoechst-Roussel Pharmaceuticals Incorporated: *See—*
Shutske, Gregory M., 5,013,741, Cl. 514-290.000.
Hoesch Metall & Kunststoffwerk GmbH & Co.: *See—*
Klotzbach, Manfred, 5,012,535, Cl. 4-541.000.
Hoffman, Dale E.: *See—*
Fischer, Jeffrey H.; Grasso, Lawrence J.; Hoffman, Dale E.; Skooglund, Daniel E.; and Young, Diane K., 5,013,944, Cl. 307-603.000.
Hoffmann-La Roche Inc.: *See—*
Boller, Arthur; Buchecker, Richard; Fromm, Hans-Jurgen; Kelly, Stephen; Schadt, Martin; and Villiger, Alois, 5,013,476, Cl. 252-299.610.
Buchecker, Richard; and Schadt, Martin, 5,013,477, Cl. 252-299.630.
Petrzilka, Martin, 5,013,478, Cl. 252-299.630.
Hoffmann-LaRoche Inc.: *See—*
Danho, Waleed; Madison, Vincent S.; and Triscari, Joseph, 5,013,722, Cl. 514-16.000.
Hofmeister, Peter: *See—*
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Krieg, Wolfgang; and Hofmeister, Peter, 5,013,847, Cl. 548-378.000.
Hogle, Richard A.: *See—*
Koegl, Rudolph A. A.; and Hogle, Richard A., 5,013,886, Cl. 219-121.830.
Holcombe, Cressie E.; and Dykes, Norman L., to Martin Marietta Energy Systems, Inc. Titanium diboride-chromium diboride-yttrium titanium oxide ceramic composition and a process for making the same. 5,013,694, Cl. 501-98.000.
Holiday Rambler Corporation: *See—*
DiBiagio, Anthony J., 5,012,707, Cl. 81-124.200.
Hollandse Signaalapparaten B. V.: *See—*
Hadderingh, Johannes N., 5,014,250, Cl. 367-124.000.
Holm, Helmut: *See—*
Fischer, Christian M. M.; and Holm, Helmut, 5,012,735, Cl. 101-177.000.
Holzgrefe, Volker; Simon, Nikolaus; and Ziegler, Ewald, to Robert Bosch GmbH. Injection valve. 5,012,981, Cl. 239-533.120.
Homayoun, Habib: *See—*
Mills, Gary N.; and Homayoun, Habib, 5,012,814, Cl. 128-691.000.
Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, to Kawasaki Steel Corporation. Semi-process non-oriented electromagnetic steel strip having low core loss and high magnetic permeability, and method of making. 5,013,372, Cl. 148-111.000.
Honda Giken Kabushiki Kaisha: *See—*
Ito, Kunio; Konno, Takeshi; and Tabata, Yutaka, 5,012,633, Cl. 56-12.900.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Aoki, Takashi; Sekine, Noboru; Ozawa, Shigeo; and Shimada, Takamichi, 5,012,699, Cl. 74-869.000.
Hiramatsu, Kinuo, 5,012,883, Cl. 180-225.000.
Oike, Ikuo, 5,012,775, Cl. 123-192.00B.
Oono, Tetsuya; and Akiyama, Eitetsu, 5,012,882, Cl. 180-197.000.
Sato, Makoto, 5,012,884, Cl. 180-244.000.
Takahashi, Tsuneo; Nishio, Tomoyuki; Ikegami, Masayuki; and Gunji, Takahiro, 5,012,676, Cl. 73-497.000.
Honda, Hisamitsu: *See—*
Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, 5,012,715, Cl. 84-724.000.
Hongo, Tsutomu: *See—*
Mori, Kyoichi; Toda, Kuniaki; Iizuka, Nobuyuki; Hongo, Tsutomu; and Nakadai, Tsutomu, 5,014,143, Cl. 360-99.120.
Honkura, Yoshinobu: *See—*
Tanaka, Yoshinobu; Iwama, Yoshiro; Honkura, Yoshinobu; Arai, Kazuo; and Watarai, Aki, 5,013,243, Cl. 433-189.000.
Hoppe, Joachim, to GAO Gesellschaft fur Automation und Organisation mbH. Identification card with integrated circuit. 5,013,900, Cl. 235-492.000.
Horiba, Ltd.: *See—*
Asano, Ichiro; Kojima, Kennosuke; and Yoneda, Aritoshi, 5,013,920, Cl. 250-343.000.
Horie, Misao: *See—*
Gohzu, Shunichi; Horie, Misao; and Inouye, Kuniyo, 5,013,445, Cl. 210-635.000.
Horie, Yuji; and Yoshikawa, Shoji, to Olympus Optical Co., Ltd. Photodisc apparatus with gain control of tracking servo loop. 5,014,256, Cl. 369-44.350.
Horigome, Osamu, to NEC Corporation. Structure of MIS-type field effect transistor and process of fabrication thereof. 5,013,676, Cl. 437-45.000.
Horikawa, Tokio: *See—*
Fujioka, Hisatake; Horikawa, Tokio; and Yanagawa, Nobuhide, 5,012,907, Cl. 192-13.00R.
Horio, Yasuhiko: *See—*
Tsuda, Toshio; Horio, Yasuhiko; Bessho, Yoshihiro; and Ishida, Toru, 5,014,111, Cl. 357-68.000.
Horiuchi, Tohru: *See—*
Nakagawa, Yasutsugu; and Horiuchi, Tohru, 5,014,079, Cl. 354-266.000.
Hork, Wee T.: *See—*
Seng, Chew E.; Hork, Wee T.; and Lee, Wong Y., 5,013,347, Cl. 65-43.000.
Horn, Klaus, to Siemens Aktiengesellschaft. Method and arrangement for evaluating a measurable analog electrical quantity. 5,014,058, Cl. 341-166.000.
Horning, Michael L.: *See—*
Wagner, G. Anthony; and Horning, Michael L., 5,012,590, Cl. 33-759.000.
Horstmann, Jens U.; Coates, Robert L.; and Eichel, Hans W., to LSI Logic Corporation. Method and apparatus for predicting the metastable behavior of logic circuits. 5,014,226, Cl. 364-551.010.
Horvath, Eduard, to Otto Bock Orthopadische Industrie Besitz- und Verwaltungs-KG. Artificial hand. 5,013,326, Cl. 623-64.000.
Horvath, Joseph L.; Biskeborn, Robert G.; and Yakubowski, Carl, to International Business Machines Corporation. High conduction flexible fin cooling module. 5,014,117, Cl. 357-81.000.
Hosan, Hans-Josef: *See—*
Poertzgen, Gregor; Fuhrmann, Castor; and Hosan, Hans-Josef, 5,012,996, Cl. 248-161.000.
Hoshi, Yoshikazu: *See—*
Takano, Yoshiya; and Hoshi, Yoshikazu, 5,012,673, Cl. 73-118.100.
Hoshide, Kaoru, to THK Co., Ltd. Ball screw. 5,012,687, Cl. 74-89.150.
Hoshino, Osamu: *See—*
Amitani, Joji; and Hoshino, Osamu, 5,014,094, Cl. 355-326.000.
Hosiden Electronics Co., Ltd.: *See—*
Sibano, Yasuji, 5,013,262, Cl. 435-610.000.
Yasuda, Mamoru; and Toda, Hitoshi, 5,014,322, Cl. 381-174.000.
Hosking, Stephen G.: *See—*
Turner, James R.; Hosking, Stephen G.; and Livingston, James W., 5,014,211, Cl. 364-478.000.
Hoskins, Robert G.; and Johns, Steve P., to Ambac Automation Corp. Method for robot assembly of computer hard disc onto a spindle. 5,012,570, Cl. 29-467.000.
Hosoi, Yuichi: *See—*
Umemoto, Chiyuki; Nakamura, Takashi; Takahashi, Kenji; and Hosoi, Yuichi, 5,013,916, Cl. 250-327.200.
Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, to Hitachi, Ltd. Head arm structure mounting a circuit element in a magnetic disc device. 5,014,145, Cl. 360-104.000.
Hosokawa, Haruhiko: *See—*
Takatsuka, Akio; Sasamoto, Asao; Moribe, Yoshihiro; Shiono, Toshio; Sogabe, Chikayuki; and Hosokawa, Haruhiko, 5,014,146, Cl. 360-106.000.
Hosokawa, Osamu: *See—*
Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
Hosono, Chihiro: *See—*
Hayakawa, Youichi; Hosono, Chihiro; and Ogasawara, Yasuhito, 5,013,287, Cl. 475-61.000.
Hostetler, Delmar: *See—*
Hostetler, Dewey L.; Lansdowne, David L.; and Hostetler, Delmar, 5,012,631, Cl. 53-588.000.

VOL 1126
ISS 1
MY 7
1991
UMI

- Hostetler, Dewey L.; Lansdowne, David L.; and Hostetler, Delmar, to DewEze Manufacturing, Inc. Bale wrapper. 5,012,631, Cl. 53-588.000.
- Houshold Utilities, Inc.: *See—*
  - Deibele, Charles; and Deibele, Albert, Jr., 5,013,873, Cl. 174-101.000.
- Howard, James R.: *See—*
  - Metersky, Morton L.; and Howard, James R., 5,012,717, Cl. 89-1.110.
- Howard, John: *See—*
  - Naso, Joseph I.; Barbaro, Joseph L.; and Howard, John, 5,012,765, Cl. 119-166.000.
- Howard, Robert A.; and Barnes, Wilson R. Process for recovering valuable metals from spent catalysts. 5,013,533, Cl. 423-133.000.
- Howe, Steven E.: *See—*
  - Christolini, Ben A.; Le, Kimanh T.; Berndt, Mitchell J.; and Howe, Steven E., 5,013,428, Cl. 208-415.000.
- Howell, Michael L., to Xerox Corporation. Sheet stacking and inverting apparatus. 5,013,026, Cl. 271-187.000.
- Howie, Catherine L.: *See—*
  - Elliott, David L.; and Howie, Catherine L., 5,013,541, Cl. 424-52.000.
- Hoxmeier, Ronald J.; and Slaugh, Lynn H., to Shell Oil Corporation. Hydrogenation catalyst and hydrogenation process wherein said catalyst is used. 5,013,798, Cl. 525-338.000.
- Hoya Corporation: *See—*
  - Hirota, Shinichiro, 5,013,348, Cl. 65-102.000.
- Hozumi, Hiroki, to Sony Corporation. Method for manufacture of semiconductor device. 5,013,677, Cl. 437-47.000.
- Hsu, James, to Lava Group Inc. Sealing mechanism for a window set. 5,012,611, Cl. 49-225.000.
- Hsu, James J.: *See—*
  - Shen, Lewis; Hadiizadeh-Amini, Zahra; Wang, Hsingya A.; and Hsu, James J., 5,013,675, Cl. 437-44.000.
- Hsueh, Fu-Lung: *See—*
  - Dingwall, Andrew G. F.; and Hsueh, Fu-Lung, 5,014,055, Cl. 341-159.000.
- Hu, Edward: *See—*
  - Lee, James C. K.; Amdahl, Gene M.; Beck, Richard; Lee, Chune; and Hu, Edward, 5,014,161, Cl. 361-388.000.
- Hubel, Werner: *See—*
  - Grathoff, Hartmut; and Hubel, Werner, 5,013,201, Cl. 414-139.400.
- Hudson, Wilbur N. Liquid purification system. 5,013,415, Cl. 204-152.000.
- Hufeld, Gerald R. Aerial toy. 5,013,277, Cl. 446-34.000.
- Huff, Dieter: *See—*
  - Sluma, Heinz-Dieter; and Huff, Dieter, 5,013,765, Cl. 521-27.000.
- Huffman, John C.: *See—*
  - Lawton, Wayne M.; Huffman, John C.; and Zettler, William R., Jr., 5,014,134, Cl. 358-261.300.
- Hughes Aircraft Company: *See—*
  - de La Chapelle, Michael, 5,013,971, Cl. 315-149.000.
  - Eisenhart, Robert L., 5,013,933, Cl. 307-296.100.
  - Estes, Earl M., Jr., 5,013,931, Cl. 307-261.000.
  - Jackson, David P.; and Buck, Orval F., 5,013,366, Cl. 134-1.000.
  - Macaulay, Malcolm, 5,013,978, Cl. 315-367.000.
  - Mantele, John E., 5,014,023, Cl. 333-164.000.
  - Reed, Irving S.; Sperling, Irving; and Bundy, William A., 5,014,131, Cl. 358-212.000.
  - Reinhardt, Victor S.; Gould, Kim V.; and McNab, Kevin M., 5,014,231, Cl. 364-718.000.
  - Robertson, Ralston S., Jr.; and Poelker, John N., 5,014,021, Cl. 331-96.000.
  - Salvatore, Jeremiah O., 5,012,992, Cl. 244-3.230.
  - Smith, Ronald T., 5,013,134, Cl. 350-174.000.
  - Virgadamo, Michael J., 5,013,392, Cl. 156-584.000.
  - Wolfson, Ronald I.; and Quan, Clifton, 5,014,022, Cl. 333-161.000.
  - Wreede, John E.; and Knobbe, Edward T., 5,013,584, Cl. 427-162.000.
- Hughes, Harold L.: *See—*
  - Godbey, David J.; Hughes, Harold L.; and Kub, Francis J., 5,013,681, Cl. 437-86.000.
- Hughes, John L., to Australian Electro Optics Pty Ltd. Variable beam width laser radar system. 5,013,151, Cl. 356-152.000.
- Hukami, Akira: *See—*
  - Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.
- Hume, Arthur S.: *See—*
  - Norris, James C.; and Hume, Arthur S., 5,013,539, Cl. 424-10.000.
- Hummel, Wolfgang, to Siemens Aktiengesellschaft. Apparatus for inserting fuel rods into a can. 5,013,520, Cl. 376-261.000.
- Humphreys, James R., Jr.: *See—*
  - Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,014,060, Cl. 342-2.000.
- Humphries, Benjamin T., to Westinghouse Electric Corp. Load deflection testing apparatus for generator slot wedges and ripple springs. 5,012,684, Cl. 73-865.800.
- Hunder, Ray A.; Miles, Alden R.; Dwyer, Stephen H.; and Thompson, Dorman N. Binding system. 5,013,200, Cl. 412-6.000.
- Hunley, Eugene C., Jr.; and Jozwiak, Terry H., to Amtrol Inc. Freezeproof hydrant. 5,012,833, Cl. 137-15.000.
- Hunt, Craig A.: *See—*
  - Abadi, Khodabandeh; and Hunt, Craig A., 5,013,488, Cl. 261-70.000.
- Hunt, Kenneth E.: *See—*
  - Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., 5,012,632, Cl. 56-11.600.
- Hunt, Thomas K.; and Novak, Robert F., to Ford Motor Company. Braze material for joining ceramic to metal and ceramic to ceramic surfaces and joined ceramic to metal and ceramic to ceramic article. 5,013,612, Cl. 428-552.000.
- Hunter Engineering Company: *See—*
  - Tsymberov, Anatoly, 5,012,898, Cl. 187-8.470.
- Hunter Fan Company: *See—*
  - Dick, Pearce; and Mehta, Vinay, 5,012,973, Cl. 236-46.00R.
- Huntington, Christopher: *See—*
  - DiSimone, John; Brown, Paul; and Huntington, Christopher, 5,012,568, Cl. 29-402.080.
- Huon, Pierre: *See—*
  - Debize, Jean-Claude; Hartmann, Yves; Huon, Pierre; and Peyronnenc, Michel, 5,014,187, Cl. 364-200.000.
- Huron/St. Clair Incorporated: *See—*
  - Cronce, Gary M.; Reid, Ronald W.; Stapleton, Craig A.; and Zauner, Robert S., 5,013,081, Cl. 296-180.100.
- Husky Injection Molding Systems Ltd.: *See—*
  - DiSimone, John; Brown, Paul; and Huntington, Christopher, 5,012,568, Cl. 29-402.080.
  - Schad, Robert D.; Disimone, John; and Philips, Terry, 5,013,513, Cl. 264-328.800.
- Huss, John P., Jr.: *See—*
  - Buchter, Randolph L.; and Huss, John P., Jr., 5,013,265, Cl. 439-724.000.
- Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., to Creative Biomolecules, Inc. Product and process for introduction of a hinge region into a fusion protein to facilitate cleavage. 5,013,653, Cl. 435-69.700.
- Hutchinson: *See—*
  - Domer, Michel, 5,013,166, Cl. 384-220.000.
  - Jouade, Pierre, 5,013,012, Cl. 267-140.100.
- Hutchison, V. James. Information display bracket for use in pegboard display systems. 5,012,997, Cl. 248-220.400.
- Hutter, Charles G., III; and Carter, Alexander B., III, to Physical Systems, Inc. Adhesive nutplate assembly for mounting. 5,013,391, Cl. 156-578.000.
- Hwu, Jih R.; and Robl, Jeffrey A., to Johns Hopkins University, The. Prostanoids and synthesis thereof. 5,013,862, Cl. 560-60.000.
- Hyde Manufacturing Co.: *See—*
  - Fletcher, William D.; Mallalieu, David H.; and Cummings, Donald P., 5,012,581, Cl. 30-162.000.
- Hydrochem Developments Ltd.: *See—*
  - Fair, Kenneth J.; Van Weert, Gezinus; and Schneider, John C., 5,013,359, Cl. 75-744.000.
- Hylwa, William, to Emhart Industries, Inc. Device for controlling access in fastener manipulation systems. 5,012,968, Cl. 227-156.000.
- Hynninen, Pertti, to A. Ahlstrom Corporation. Method of removing organic substances from effluents from pulp and paper manufacturing processes. 5,013,454, Cl. 210-718.000.
- I.M. Electronics Co., Ltd.: *See—*
  - Moritomo, Shigeru, 5,014,325, Cl. 382-7.000.
- Ibaraki, Atsushi, to Alps Electric Co., Ltd. Thin film magnetic head. 5,014,149, Cl. 360-126.000.
- Ibrahim, Jameel: *See—*
  - Allen, Robert H.; and Ibrahim, Jameel, 5,013,604, Cl. 428-402.000.
- Ichijo, Minoru: *See—*
  - Mizumura, Tetsuo; Ichijo, Minoru; Nakao, Ken-ichirou; Matsushima, Seiichi; and Tuburaya, Yoshitane, 5,013,594, Cl. 428-64.000.
- Ichikawa Woolen Textile Co., Ltd.: *See—*
  - Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, 5,012,843, Cl. 139-224.00A.
- Ichikawa, Yuji: *See—*
  - Okada, Shoji; Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; Ichikawa, Yuji; and Hayashi, Kazumi, 5,013,888, Cl. 219-219.000.
- Ichikoh Industries, Ltd.: *See—*
  - Enomoto, Masao; Yamamoto, Masami; Nagayama, Yoshiro; and Yamauchi, Yoshinori, 5,012,693, Cl. 74-502.100.
- ICI-PHARMA: *See—*
  - Arnould, Jean C.; and Bird, Thomas G. C., 5,013,730, Cl. 514-202.000.
  - Arnould, Jean C.; Lohmann, Jean J.; and Pasquet, Georges, 5,013,731, Cl. 514-202.000.
- Ide, Mikio: *See—*
  - Murase, Shigemitsu; Kakumoto, Kouji; Miyazaki, Shouji; Sugawa, Masaru; and Ide, Mikio, 5,013,506, Cl. 264-210.800.
- Ide, Russell. Low-profile disk drive motor. 5,013,947, Cl. 310-67.00R.
- Ide, Shigeaki; and Oki, Ichiroh, to Sharp Kabushiki Kaisha. Process for preparing a silicon nitride insulating film for semiconductor memory device. 5,013,692, Cl. 437-241.000.
- Idemitsu Kosan Company Limited: *See—*
  - Suzuki, Motoshi; Dalton, Howard; Richards, Anthony O.; and Stanley, Stephen H., 5,013,665, Cl. 435-244.000.
- Idemitsu Petrochemical Company Limited: *See—*
  - Nomura, Manabu; and Wada, Kaoru, 5,013,773, Cl. 523-222.000.
- Ieda, Chikara: *See—*
  - Nagahara, Michiko; Ieda, Chikara; Mimura, Mitsuo; Uchida, Katsuhiro; Sato, Soichiro; and Okumura, Makoto, 5,013,736, Cl. 514-255.000.
- Ienaga, Kazuharu: *See—*
  - Nakamura, Ko; and Ienaga, Kazuharu, 5,013,750, Cl. 514-401.000.

- Iggulden, Jerry R.; and Streck, Donald A. Personal postnet barcode printers. 5,013,895, Cl. 235-110.000.
- Ignatius, Ronald W.; Martin, Todd S.; Bula, Raymond J.; Morrow, Robert C.; and Tibbitts, Theodore W., to Automated Agriculture Associates, Inc. Method and apparatus for irradiation of plants using optoelectronic devices. 5,012,609, Cl. 47-58.000.
- Iguchi, Sadahiko; Kawamura, Masanori; and Miyamoto, Tsumoru, to Ono Pharmaceutical Co., Ltd. Novel esters of phenylalkanoic acid. 5,013,734, Cl. 514-231.500.
- IHT, Inc.: *See—*
  - McWhorter, Ronnie W., 5,012,534, Cl. 4-519.000.
- IIT Research Institute: *See—*
  - Sresty, Guggilam C., 5,013,532, Cl. 423-88.000.
- Iizuka, Nobuyuki: *See—*
  - Mori, Kyoichi; Toda, Kuniaki; Iizuka, Nobuyuki; Hongo, Tsutomu; and Nakadai, Tsutomu, 5,014,143, Cl. 360-99.120.
- Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, to Canon Kabushiki Kaisha. Facsimile apparatus having a thermal image recording head retractable from a recording position. 5,014,135, Cl. 358-296.000.
- Ikari, Hideo: *See—*
  - Yomogizawa, Shinya; and Ikari, Hideo, 5,014,077, Cl. 354-187.000.
- Ikawa, Yoji: *See—*
  - Kasuya, Takahiro; Ikawa, Yoji; Tsukakoshi, Motowo; and Kurata, Shunichi, 5,013,660, Cl. 435-173.000.
- Ikeda Bussan Co., Ltd.: *See—*
  - Matsuura, Ichiro, 5,013,090, Cl. 297-452.000.
- Ikeda, Kenichi: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Ikeda, Makinori: *See—*
  - Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.
- Ikeda, Yuji; and Nakajima, Tsuyoshi. Optical equipment of fiber laser Doppler velocimeter. 5,013,928, Cl. 250-574.000.
- Ikegami, Kazunori; Okuda, Souitirou; Nosaka, Eishou; and Yoshida, Tadahisa, to Mitsubishi Denki Kabushiki Kaisha. In-line type electron gun. 5,013,963, Cl. 313-414.000.
- Ikegami, Masayuki: *See—*
  - Takahashi, Tsuneo; Nishio, Tomoyuki; Ikegami, Masayuki; and Gunji, Takahiro, 5,012,676, Cl. 73-497.000.
- Ikehata, Motoshige; Mikami, Hiroyuki; Inayama, Naoto; and Odajima, Katsuhiko, to SMC Corporation. Nozzle flapper mechanism. 5,012,835, Cl. 137-82.000.
- Ikehata, Tsutomu; Yasunaga, Makoto; and Suzuki, Hirofumi, to Citizen Watch Company, Ltd. Print head having reduced noise and vibration characteristics. 5,013,169, Cl. 400-124.000.
- Ikematsu, Takehiko: *See—*
  - Nigawara, Seiitsu; Ikematsu, Takehiko; and Fukai, Masayuki, 5,012,766, Cl. 122-504.000.
- Ikemoto, Hiroyuki: *See—*
  - Yonekawa, Takashi; Onuma, Toshio; Buma, Shuuichi; Ikemoto, Hiroyuki; Ohashi, Kaoru; Aburaya, Toshio; and Sato, Kinihito, 5,013,062, Cl. 280-707.000.
- Iketani, Naomi: *See—*
  - Miyoshi, Motoyuki; Kojima, Kazuhisa; Sugiura, Katsuhiko; and Iketani, Naomi, 5,013,606, Cl. 428-412.000.
- Ikeuchi, Horoji; and Ikeuchi, Kiyoaki, to Kabushiki Kaisha Ikeuchi Tekkosho. Apparatus for making a shrimp-shaped food product. 5,013,230, Cl. 425-127.000.
- Ikeuchi, Kiyoaki: *See—*
  - Ikeuchi, Horoji; and Ikeuchi, Kiyoaki, 5,013,230, Cl. 425-127.000.
- Ikeuchi, Masayuki: *See—*
  - Murata, Shigemi; and Ikeuchi, Masayuki, 5,014,005, Cl. 324-207.200.
- Ikoma, Mitsuhiro: *See—*
  - Nakatani, Kazuo; Ikoma, Mitsuhiro; Yoshida, Yuji; Tomizawa, Takeshi; Arita, Koji; and Tagashira, Minoru, 5,012,651, Cl. 62-149.000.
- Imagawa, Takeshi: *See—*
  - Ishihata, Kouji; Hironaka, Youichi; Shimizu, Hisanaga; Kitamura, Kazuo; and Imagawa, Takeshi, 5,013,776, Cl. 524-118.000.
- Imai, Satomitsu: *See—*
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- Imaizumi, Tomoaki: *See—*
  - Okada, Shoji; Fujie, Naofumi; Ito, Koji; and Imaizumi, Tomoaki, 5,012,593, Cl. 34-69.000.
  - Okada, Shoji; Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; Ichikawa, Yuji; and Hayashi, Kazumi, 5,013,888, Cl. 219-219.000.
- Imamura, Eiyu, to Yamanashi Yagen Limited. Method of producing odorless ripe juice of houttuynia cordata. 5,013,570, Cl. 426-599.000.
- Imanishi, Yasuo, to Yokogawa Medical Systems, Limited. Video signal processing apparatus for converting composite image input signals into output signals having increased scan lines. 5,014,129, Cl. 358-166.000.
- Imatou, Shinji: *See—*
  - Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
- Imatron, Inc.: *See—*
  - Boyd, Douglas P.; and Lanzara, Giovanni, 5,014,293, Cl. 378-197.000.
- Imoto, Yoshiya, to Fuji Xerox Co., Ltd. Film image reading system. 5,014,123, Cl. 358-75.000.
- Imperial Chemical Industries PLC: *See—*
  - Bath, Colin, 5,013,778, Cl. 524-173.000.
  - Fields, Bernard, 5,013,668, Cl. 436-168.000.
- Imreg, Inc.: *See—*
  - Gottlieb, A. Arthur; and Sizemore, Robert C., 5,013,546, Cl. 424-85.100.
- IMTEC, Inc.: *See—*
  - Murphy, William J., 5,013,156, Cl. 356-432.000.
- Inaba, Hiroo: *See—*
  - Yamazaki, Nobuo; Inaba, Hiroo; and Masaki, Kouichi, 5,013,602, Cl. 428-323.000.
- Inaba, Koushiro: *See—*
  - Okumura, Shigeo; and Inaba, Koushiro, 5,012,648, Cl. 60-313.000.
- Inaba, Tatsuya: *See—*
  - Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, 5,012,715, Cl. 84-724.000.
- Inaba, Yutaka: *See—*
  - Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, 5,013,137, Cl. 350-333.000.
- Inayama, Naoto: *See—*
  - Ikehata, Motoshige; Mikami, Hiroyuki; Inayama, Naoto; and Odajima, Katsuhiko, 5,012,835, Cl. 137-82.000.
- Ince, Francis: *See—*
  - Farmer, John B.; Ince, Francis; Brown, Rodney A.; and Dixon, John, 5,013,760, Cl. 514-649.000.
- Industria Chimica Profarmaco S. p. A.: *See—*
  - Piselli, Fulvio L., 5,013,834, Cl. 540-491.000.
- Ingerman, Mark M.: *See—*
  - Ervin, Julie M.; Ingerman, Mark M.; and Jones, Ronald E., 5,013,167, Cl. 400-63.000.
- Ingram, Douglas E.: *See—*
  - Little, Francis H.; and Ingram, Douglas E., 5,013,922, Cl. 250-385.100.
- Ingram, Keith W.; Schoenlein, Mark J.; and Harger, Clifford T., to Owens-Illinois Closure Inc. Closure application system. 5,012,630, Cl. 53-490.000.
- Ingun Prufmittelbau GmbH: *See—*
  - Kreibich, Ralf; and Topp, Michael, 5,014,004, Cl. 324-158.00P.
- Inoue, Akihisa: *See—*
  - Masumoto, Tsuyoshi; Inoue, Akihisa; Oguchi, Masahiro; and Harakawa, Yoshio, 5,013,346, Cl. 65-21.200.
- Inoue, Hideo: *See—*
  - Ohtsuka, Eiko; Inoue, Hideo; Morisawa, Hirokazu; Shibahara, Susumu; Mukai, Sachiko; and Nishihara, Tohru, 5,013,830, Cl. 536-27.000.
- Inoue, Hiroo: *See—*
  - Ogawa, Masahide; Sato, Teiji; Abe, Kiyoshi; Tsuchida, Hisashi; Inoue, Hiroo; and Saito, Mitsuo, 5,013,709, Cl. 503-225.000.
- Inoue, Manabu: *See—*
  - Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 5,014.083, Cl. 354-471.000.
  - Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, 5,014,078, Cl. 354-195.100.
- Inoue, Yoshinori: *See—*
  - Komatsu, Takahiro; Kumanoya, Masaki; Konishi, Yasuhiro; Dosaka, Katsumi; and Inoue, Yoshinori, 5,014,246, Cl. 365-230.030.
- Inoue, Yoshio, to Shin-Etsu Chemical Co., Ltd. Room temperature-curable organopolysiloxane-based coating composition. 5,013,800, Cl. 525-477.000.
- Inouye, Kuniyo: *See—*
  - Gohzu, Shunichi; Horie, Misao; and Inouye, Kuniyo, 5,013,445, Cl. 210-635.000.
- Instantel Inc.: *See—*
  - Weaver, Philip W.; Fakhry, Kamal; and Saito, Shin, 5,014,040, Cl. 340-572.000.
- Institut De Recherche En Sante Et En . . .: *See—*
  - Pernicka, Martin; and Gagnon, Mario, 5,012,528, Cl. 2-10.000.
- Institut Francais Du Petrole: *See—*
  - Dang Vu, Quang; Bournonville, Jean-Paul; and Le Page, Jean-Francois, 5,013,426, Cl. 208-134.000.
  - Nocca, Jean-Luc; Leonard, Jacques; Gaillard, Jean-Ferdinand; and Amigues, Pierre, 5,013,407, Cl. 202-158.000.
  - Patarin, Joel; Guth, Jean-Louis; Kessler, Henri; Coudurier, Gisele; and Raatz, Francis, 5,013,537, Cl. 423-328.000.
- Institute of Gas Technology: *See—*
  - Khinkis, Mark J., 5,013,236, Cl. 431-10.000.
- Instromedix, Inc.: *See—*
  - Mills, Gary N.; and Homayoun, Habib, 5,012,814, Cl. 128-691.000.
- Integrated Network Corporation: *See—*
  - Joffe, Daniel M.; and Eberle, Charles R., Jr., 5,014,307, Cl. 379-410.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Interactive Network, Inc.: *See—*
  - Luxenberg, Robert A.; and Brown, Robert J., 5,013,038, Cl. 273-439.000.
- International Business Machines Corporation: *See—*
  - Blumberg, Lawrence R.; Coolbaugh, Douglas D.; Kurowski, John A.; and Stromecki, Eugene A., 5,013,395, Cl. 156-627.000.
  - Casa, Gene E.; and Gernon, Joseph W., 5,014,164, Cl. 361-428.000.
  - Chisholm, Douglas R., 5,014,186, Cl. 364-200.000.
  - Debize, Jean-Claude; Hartmann, Yves; Huon, Pierre; and Peyronnenc, Michel, 5,014,187, Cl. 364-200.000.
  - Ervin, Julie M.; Ingerman, Mark M.; and Jones, Ronald E., 5,013,167, Cl. 400-63.000.
  - Fischer, Jeffrey H.; Grasso, Lawrence J.; Hoffman, Dale E.; Skooglund, Daniel E.; and Young, Diane K., 5,013,944, Cl. 307-603.000.
  - Horvath, Joseph L.; Biskeborn, Robert G.; and Yakubowski, Carl, 5,014,117, Cl. 357-81.000.
  - Parkin, Stuart S. P.; Roche, Kevin P.; and Speriosu, Virgil S., 5,014,147, Cl. 360-113.000.
  - Pogorzelski, James S.; and Shempert, Craig H., 5,014,236, Cl. 364-900.000.
  - Watson, Joseph L., 5,013,247, Cl. 439-55.000.
  - Wolf, Joel L., 5,014,197, Cl. 364-200.000.
- International Equipment & Supply Corp.: *See—*
  - Bailey, James R.; and Schrock, C. Robert, 5,013,240, Cl. 433-77.000.
- International Fuel Cells Corporation: *See—*
  - Luczak, Francis J., 5,013,618, Cl. 429-44.000.
  - Scheffler, Glenn W., 5,013,617, Cl. 429-17.000.
- International Paper Company: *See—*
  - Fries, Carl J., Jr., 5,013,878, Cl. 219-10.430.
  - Gordon, Robert L., 5,012,959, Cl. 222-535.000.
  - Roosa, Paul D., 5,012,929, Cl. 206-602.000.
  - Sheely, Harold R.; Miserlis, Constantine D.; and Rosenblatt, Ivan L., 5,012,750, Cl. 110-245.000.
- International Servo Systems, Inc.: *See—*
  - McCormick, Joseph F., 5,012,722, Cl. 91-361.000.
- Interprovincial Pipe Line Company: *See—*
  - Savard, Donald D., 5,012,842, Cl. 138-161.000.
- Intreprinderea Industria Tehnico-Medicala: *See—*
  - Firica, Andrei; Manof, Alexandru I. B.; and Gheorghiu, Dragos, 5,013,314, Cl. 606-64.000.
- Inui, Masaki: *See—*
  - Kobayashi, Katsuyuki; Inui, Masaki; Ashida, Satoshi; Nakamura, Keiichi; and Yamamoto, Masaji, 5,012,908, Cl. 192-57.000.
- Inventio AG: *See—*
  - Power, Leslie; and Prewer, John, 5,012,621, Cl. 52-30.000.
- Investronica, S.A.: *See—*
  - Galan, Mario A.; Perez, Bernardo A.; and Gonzalez, Jose R. P., 5,012,584, Cl. 33-18.100.
- Irie, Tadashi: *See—*
  - Matsuzawa, Hideki; Yabe, Masao; Irie, Tadashi; Watanabe, Seiichi; and Ishihara, Yusuke, 5,013,593, Cl. 428-64.000.
- Isaberg AB: *See—*
  - Johansson, Mats, 5,012,967, Cl. 227-7.000.
- Isakozawa, Shigeto; and Ohashi, Toshiyuki, to Hitachi, Ltd. Transmission type electron microscope. 5,013,915, Cl. 250-311.000.
- Isaksson, Juhani; and Russell, Dave B., to A. Ahlstrom Corporation. Apparatus for separating particulate material from high-temperature gases. 5,013,341, Cl. 55-302.000.
- Ishibashi, Fumikazu: *See—*
  - Okamoto, Kazuhisa; and Ishibashi, Fumikazu, 5,012,770, Cl. 123-52.0MC.
- Ishibashi, Hideyuki, to Bridgestone Cycle Co., Ltd. Brake for bicycle. 5,012,900, Cl. 188-24.120.
- Ishida, Noriya: *See—*
  - Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
- Ishida, Satoshi: *See—*
  - Nishii, Michiharu; Mizuno, Genji; Mizukoshi, Hideo; Ishida, Satoshi; and Hata, Kyousuke, 5,013,094, Cl. 303-52.000.
- Ishida, Toru: *See—*
  - Tsuda, Toshio; Horio, Yasuhiko; Bessho, Yoshihiro; and Ishida, Toru, 5,014,111, Cl. 357-68.000.
- Ishiguro, Kazuhisa; and Sekiguchi, Yutaka, to Sanyo Electric Co., Ltd. Power-saving low-frequency power amplifier. 5,014,017, Cl. 330-51.000.
- Ishihara, Yusuke: *See—*
  - Matsuzawa, Hideki; Yabe, Masao; Irie, Tadashi; Watanabe, Seiichi; and Ishihara, Yusuke, 5,013,593, Cl. 428-64.000.
- Ishihata, Kouji; Hironaka, Youichi; Shimizu, Hisanaga; Kitamura, Kazuo; and Imagawa, Takeshi, to Teijin Chemicals, Ltd. Flame-retardant polycarbonate resin composition. 5,013,776, Cl. 524-118.000.
- Ishii, Akihiro: *See—*
  - Kikuchi, Yoshiyuki; and Ishii, Akihiro, 5,013,828, Cl. 536-23.000.
- Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, to Central Research Institute of Electric Power Industry; Mixed Air Jet Pump Kaihatsu Co., Ltd.; Nippon Oil and Fats Co., Ltd.; and Chiyoda Corporation. Process for production of coal-water mixture. 5,012,984, Cl. 241-16.000.
- Ishikawa, Hiroshi: *See—*
  - Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, 5,013,410, Cl. 204-27.000.
- Ishikawa, Michihiro, to Kabushiki Kaisha Toshiba. Conductive pattern for electric test of semiconductor chips. 5,014,003, Cl. 324-158.00P.
- Ishikawa, Takuma: *See—*
  - Kubo, Naoki; Ishikawa, Takuma; Matsui, Toshio; Atsumi, Fumitoshi; and Doi, Yasuhiko, 5,014,092, Cl. 355-324.000.
- Ishikawa, Tohru: *See—*
  - Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, 5,012,982, Cl. 239-585.000.
- Isobe, Masaaki: *See—*
  - Kumesawa, Tetsuro; Kanou, Yasuo; Nishima, Osamu; Isobe, Masaaki; and Matsui, Hiromichi, 5,014,132, Cl. 358-213.190.
- Isomura, Satoru: *See—*
  - Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
- Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi. Pharmaceutical compositions substituted aminomethylenebis(phosphonic acid) derivatives. 5,013,725, Cl. 514-99.000.
- Isozumi, Shuzoo: *See—*
  - Morishita, Akira; Isozumi, Shuzoo; and Tanaka, Toshinori, 5,012,686, Cl. 74-7.00A.
- Isozumi, Shuzou, to Mitsubishi Denki K.K. Coaxial starter with recessed pinion. 5,013,950, Cl. 310-83.000.
- Israel Aircraft Industries Ltd.: *See—*
  - Becher, Yona, 5,012,904, Cl. 188-185.000.
- Iten, Jakob: *See—*
  - Gironi, Fabrizio; Iten, Jakob; Koslowski, Gerhard; and Probst, Willy, 5,012,564. Cl. 28-193.000.
- Ito, Hideaki: *See—*
  - Asai, Keniti; Ito, Hideaki; Nakagawa, Yoji; Shihara, Yasutaka; Hodate, Toshiaki; and Nakazaki, Akikazu, 5,013,408, Cl. 202-241.000.
- Ito, Kazuyoshi, to Yoshida Kogyo K.K. Button applicator. 5,012,573, Cl. 29-798.000.
- Ito, Kenji: *See—*
  - Shimizu, Hiroyuki; Ito, Kenji; and Wakita, Naomasa, 5,014,024, Cl. 333-203.000.
- Ito, Koji: *See—*
  - Okada, Shoji; Fujie, Naofumi; Ito, Koji; and Imaizumi, Tomoaki, 5,012,593, Cl. 34-69.000.
  - Okada, Shoji; Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; Ichikawa, Yuji; and Hayashi, Kazumi, 5,013,888, Cl. 219-219.000.
- Ito, Kunio; Konno, Takeshi; and Tabata, Yutaka, to Honda Giken Kabushiki Kaisha. Lawn mower. 5,012,633, Cl. 56-12.900.
- Ito, Masazumi; and Higashio, Kimihiko, to Minolta Camera Kabushiki Kaisha. Data input apparatus and control method therefor. 5,014,184, Cl. 364-188.000.
- Ito, Yosuke: *See—*
  - Katayama, Sakae; Ito, Yosuke; and Nomura, Yasuhiro, 5,013,747, Cl. 514-367.000.
- Itoh, Akira; Haino, Kozo; Okaji, Makoto; Emoto, Kazuhiro; and Kodera, Tatsuya, to Mitsubishi Paper Mills Limited. Electrophotographic photoreceptor with stilbene compound. 5,013,623, Cl. 430-59.000.
- Itoh, Hiroshi: *See—*
  - Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,012,700, Cl. 74-869.000.
- Itoh, Kenichiroh; Yoshinuma, Nikio; Suzuji, Naomichi; Yamada, Takeshi; and Taya, Hiroyuki, to Fujikura Ltd. Method of fusion-splicing polarization maintaining optical fibers. 5,013,345, Cl. 65-4.200.
- Itoh, Kouichi, to NEC Corporation. System for reducing I/O controller overhead by using a peripheral controller for producing read, write, and address translation request signals. 5,014,194, Cl. 364-200.000.
- Itoh, Mitsuhiro; and Matsui, Hideo, to Mitsubishi Denki Kabushiki Kaisha. Microcomputer with motor controller circuit. 5,013,985, Cl. 318-558.000.
- Itoh, Teruaki. Apparatus for distributing sample liquid. 5,013,529, Cl. 422-100.000.
- ITT Composants et Instruments: *See—*
  - Juret, Bernard; and Janniere, Alain, 5,013,255, Cl. 439-260.000.
- Iversen, Edwin K.: *See—*
  - Jacobsen, Stephen C.; Iversen, Edwin K.; Knutti, David F.; and Davis, Clark C., 5,012,836, Cl. 137-83.000.
- Ivy, Jeffery W.; and Payne, Curtis E. External analgesic lotion containing active ingredients of methyl salicylate and camphor and menthol and method of making such lotion. 5,013,726, Cl. 514-159.000.
- Iwahi, Tomoyuki; and Satoh, Hiroshi, to Takeda Chemical Industries, Ltd. Selective antibacterial agent against campytobacter. 5,013,743, Cl. 514-338.000.
- Iwai, Kiyoshi: *See—*
  - Oikawa, Hideo; Ogawa, Masatomi; Iwai, Kiyoshi; and Narushima, Mayumi, 5,013,775, Cl. 524-107.000.
- Iwama, Yoshiro: *See—*
  - Tanaka, Yoshinobu; Iwama, Yoshiro; Honkura, Yoshinobu; Arai, Kazuo; and Watarai, Aki, 5,013,243, Cl. 433-189.000.
- Iwanami, Junko: *See—*
  - Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, 5,013,474, Cl. 252-299.100.

- Iwaoka, Toshio: *See—*
  - Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 5,014,201, Cl. 364-426.040.
- Iwasaki, Toshiaki: *See—*
  - Murata, Kunihiko; Morii, Satoshi; Mitsui, Hiroyuki; Takemura, Toru; Iwasaki, Toshiaki; and Suzuki, Takaaki, 5,012,752, Cl. 112-121.120.
- Iwata, Shigemi, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for controlling an elevator. 5,012,899, Cl. 187-101.000.
- Iwata, Toshio: *See—*
  - Fukui, Wataru; and Iwata, Toshio, 5,012,779, Cl. 123-339.000.
- Izard, David G., to USG Interiors, Inc. Method of making a low density frothed mineral wool. 5,013,405, Cl. 162-101.000.
- Izumi Industries, Ltd.: *See—*
  - Suzuki, Yoshihiro, 5,013,610, Cl. 428-545.000.
- Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, to Minolta Camera Kabushiki Kaishi. Display device for use in a camera. 5,014,083, Cl. 354-471.000.
- J. C. Parry & Sons Co., Inc.: *See—*
  - Parry, John C., 5,013,595, Cl. 428-77.000.
- J & M Manufacturing Co., Inc.: *See—*
  - Grieshop, Maurice, 5,013,208, Cl. 414-526.000.
- J. M. Voith GmbH: *See—*
  - Preisetanz, Johann; and Kotitschke, Gerhard, 5,012,594, Cl. 34-121.000.
  - Schiel, Christian, 5,012,730, Cl. 100-160.000.
- J. M. VoithGmbH: *See—*
  - Kunze, Volkmar; Zimmermann, Kurt; and Hinterdorfer, Erwin, 5,012,861, Cl. 165-47.000.
- J. S. Telecommunications: *See—*
  - Picandet, Jean A., 5,014,269, Cl. 370-85.110.
- Jablonski, Robert A.: *See—*
  - Ward, Robert W.; and Jablonski, Robert A., 5,012,995, Cl. 248-68.100.
- Jackson, David P.; and Buck, Orval F., to Hughes Aircraft Company. Cleaning process using phase shifting of dense phase gases. 5,013,366, Cl. 134-1.000.
- Jacobelli, Alain: *See—*
  - Rolland, Jean-Luc; Beguin, Jean-Yves; Magna, Henriette; Jacobelli, Alain; and Penot, Maurice, 5,013,394, Cl. 156-627.000.
- Jacobs, Bernardus A. J.: *See—*
  - Van Rosmalen, Gerard E.; Jacobs, Bernardus A. J.; and Spruit, Johannes H. M., 5,014,254, Cl. 369-13.000.
- Jacobs Brake Technology Corporation: *See—*
  - Pitzi, Vincent J., 5,012,778, Cl. 123-321.000.
- Jacobs, Franciscus C. A. J.: *See—*
  - Vink, Nicolaas G.; Jacobs, Franciscus C. A. J.; and Doomernik, Franciscus M. P. P., 5,013,964, Cl. 313-440.000.
- Jacobs, Paul G.: *See—*
  - Williams, William H.; and Jacobs, Paul G., 5,012,549, Cl. 15-320.000.
- Jacobs Suchard AG: *See—*
  - Stadler, Edwin; Hergesell, Wolfgang; and Pidner, Ernst, 5,013,575, Cl. 426-639.000.
- Jacobsen, Stephen C.; Iversen, Edwin K.; Knutti, David F.; and Davis, Clark C., to Sarcos Group. Servovalve apparatus for use in fluid systems. 5,012,836, Cl. 137-83.000.
- Jacques, Dennis M., Sr.: *See—*
  - Armstrong, Tom; Bimanand, Alex; Jacques, Dennis M., Sr.; and Raffo, John A., 5,013,924, Cl. 250-504.00R.
- Jaguar Cars Limited: *See—*
  - Parsons, Bryan N. V., 5,013,288, Cl. 475-166.000.
- Jakobsson, Rainer: *See—*
  - Vanninmaja, Pekka; and Jakobsson, Rainer, 5,013,057, Cl. 280-426.000.
- James, Hayden: *See—*
  - Draper, Geoffrey; James, Hayden; and Carlton, Kevin, 5,014,166, Cl. 362-61.000.
- James, Robert B., Jr.; Kalnes, Tom N.; and Lankton, Steven P., to UOP. Process for the simultaneous hydrogenation of a first feedstock comprising hydrocarbonaceous compounds and having a non-distillable component and a second feedstock comprising halogenated organic compounds. 5,013,424, Cl. 208-78.000.
- Jamison, David S., to W. R. Grace & Co.-Conn. Electrically conductive container. 5,012,926, Cl. 206-334.000.
- Janke, Thomas; and Wielenberg, Johannes, to Conver-OSR Ozean Service-Reparatur-Ingenieurtechnik GmbH. Coupling piece and a method for connecting containers. 5,012,560, Cl. 24-287.000.
- Jann, Wolfango: *See—*
  - Heister, Heinz; and Jann, Wolfango, 5,014,130, Cl. 358-173.000.
- Janniere, Alain: *See—*
  - Juret, Bernard; and Janniere, Alain, 5,013,255, Cl. 439-260.000.
- Janssen, Peter J. G. M.: *See—*
  - Mellink, Willem F.; Janssen, Peter J G. M.; Zwier, Jan; and Lotterman, Harm, 5,013,384, Cl. 156-345.000.
- Janssen Pharmaceutica N.V.: *See—*
  - Van Gestel, Jozef F. E.; Nys, Jan R.; and Ruelens, Paul F. M., 5,013,746, Cl. 514-365.000.
- Jansson, Lars G., to National Semiconductor Corporation. TTL to ECL/CML translator circuit. 5,013,941, Cl. 307-475.000.
- Japan Atomic Energy Research Institute: *See—*
  - Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, 5,013,466, Cl. 252-42.700.
- Japan Exlan Company Limited: *See—*
  - Tanaka, Koji, 5,013,349, Cl. 71-27.000.
- Japan Tobacco, Inc.: *See—*
  - Saito, Takashi; Fujiwara, Hideyuki; and Kubo, Kenji, 5,014,185, Cl. 364-188.000.
- Jay, Pierre; and Berger, Noelle, to Atochem. Dielectric liquid compositions containing hydroxybenzaldehyde. 5,014,033, Cl. 336-94.000.
- Jeffries, Stuart W., to Data Devices International. Magnetic tape cleaner. 5,012,548, Cl. 15-308.000.
- Jelich, Klaus; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Triazolopyrimidine-2-sulphonamides useful as herbicides. 5,013,351, Cl. 71-92.000.
- Jensen, Per J. T.; and Gansbuehler, George M. J., to Raychem Corporation. Conductive polymeric article. 5,013,894, Cl. 219-548.000.
- Jervis, James E., to Raychem Corporation. Devices for electrical connection. 5,013,877, Cl. 200-523.000.
- Jidosha Denki Kogyo K.K.: *See—*
  - Hamada, Yonenori; and Senbokuya, Eiji, 5,014,035, Cl. 337-372.000.
  - Sekine, Shuji, 5,012,613, Cl. 49-362.000.
  - Sekine, Shuji; Furuya, Takeo; and Harada, Naoto, 5,013,952, Cl. 310-239.000.
  - Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 5,014,201, Cl. 364-426.040.
- Jimbo, Yoshihiro: *See—*
  - Ohno, Shigeru; Jimbo, Yoshihiro; Adachi, Keiichi; and Kuwashima, Shigeru, 5,013,636, Cl. 430-522.000.
- Jingu, Toshihiro: *See—*
  - Yokota, Katsuyoshi; Jingu, Toshihiro; and Matsumoto, Kazunori, 5,013,168, Cl. 400-82.000.
- Jinichi, Taniguchi: *See—*
  - Hirotaka, Ito; Jinichi, Taniguchi; Hirokazu, Kuzushita; and Atsushi, Ohhori, 5,013,967, Cl. 313-512.000.
- Joffe, Daniel M.; and Eberle, Charles R., Jr., to Integrated Network Corporation. Method and apparatus for echo canceler disablement. 5,014,307, Cl. 379-410.000.
- Johannesson, Jimmie R. Personal hair trimmer. 5,012,576, Cl. 30-29.500.
- Johansson, Mats, to Isaberg AB. Electric tool for driving in fixing elements. 5,012,967, Cl. 227-7.000.
- Johdai, Akiyoshi; Kinoshita, Keichi; and Matsui, Toshio, to Minolta Camera Kabushiki Kaisha. Paper container with a paper binding function. 5,013,021, Cl. 270-53.000.
- Johns Hopkins University, The: *See—*
  - Hwu, Jih R.; and Robl, Jeffrey A., 5,013,862, Cl. 560-60.000.
- Johns, Steve P.: *See—*
  - Hoskins, Robert G.; and Johns, Steve P., 5,012,570, Cl. 29-467.000.
- Johnson, Bryce V.: *See—*
  - Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., 5,013,702, Cl. 502-120.000.
- Johnson, Jesse D. Method and apparatus for applying pregerminated plantlets. 5,012,974, Cl. 239-1.000.
- Johnson & Johnson Consumer Products, Inc.: *See—*
  - Feret, Ronald M., 5,012,801, Cl. 128-155.000.
- Johnson, Larsh M.: *See—*
  - Edwards, Cree A.; and Johnson, Larsh M., 5,014,213, Cl. 364-483.000.
- Johnson Matthey Inc.: *See—*
  - Akhtar, Masyood, 5,013,697, Cl. 501-46.000.
- Johnson, Neil H.: *See—*
  - Cozzi, Joseph J.; Conway, Timothy F.; LaFleur, John A.; Rusnak, Eileen M.; and Johnson, Neil H., 5,012,971, Cl. 229-120.070.
- Johnson, Nigel L., to U.S. Philips Corporation. Data processing system. 5,014,190, Cl. 364-200.000.
- Johnson, Robert M., Jr.: *See—*
  - Phillips, James P.; Johnson, Robert M., Jr.; and Zurek, Michael W., 5,014,346, Cl. 455-89.000.
- Johnson, Wayne A.: *See—*
  - Anton, Mark A.; and Johnson, Wayne A., 5,013,121, Cl. 350-96.200.
- Johnsonville Sausage, Inc.: *See—*
  - Southworth, William E., 5,013,279, Cl. 452-46.000.
- Joishy, Suresh K. Two in one bone marrow surgical needle. 5,012,818, Cl. 128-754.000.
- Jonas, Andre; and Jonas, Bernard. Self-guided mobile unit and cleaning apparatus such as a vacuum cleaner comprising such a unit. 5,012,886, Cl. 180-279.000.
- Jonas, Bernard: *See—*
  - Jonas, Andre; and Jonas, Bernard, 5,012,886, Cl. 180-279.000.
- Jones, David P.: *See—*
  - Wanger, Mark E.; Methlie, Jennifer L.; Jones, David P.; and Stavely, Donald J., 5,014,255, Cl. 369-36.000.
- Jones, Flave L.: *See—*
  - Malis, Michael J.; and Jones, Flave L., 5,012,811, Cl. 128-642.000.
- Jones, Jonathan: *See—*
  - Dooner, Hugo; Jones, Jonathan; and Maliga, Pal, 5,013,658, Cl. 435-172.300.
- Jones, Louis F., to United States of America, Navy. Proximity fuze. 5,012,742, Cl. 102-418.000.
- Jones, Patrick R.: *See—*
  - Guan, Shenheng; and Jones, Patrick R., 5,013,912, Cl. 250-282 000.
- Jones, Ronald E.: *See—*
  - Ervin, Julie M.; Ingerman, Mark M.; and Jones, Ronald E., 5,013,167, Cl. 400-63.000.

VOL 1126 ISS 1 MY 7 1991 UMI

Jonner, Wolf-Dieter: *See—*
Gutzeit, Reinhard; and Jonner, Wolf-Dieter, 5,013,097, Cl. 303-116.000.

Jonville, Christian; and Nicollin, Jean-Robert, to Aluminium Pechiney. Process for continuous production of carbonaceous paste. 5,013,503, Cl. 264-117.000.

Jorgensen, Janine L.: *See—*
Trimmer, Johnny L.; Caskey, Terrence L.; and Jorgensen, Janine L., 5,013,437, Cl. 210-321.780.

Jorissen, Bernd, to Gebhard Satzinger GmbH & Co. Device for the continuous supply of liquid or viscous mediums, in particular lubricants. 5,012,897, Cl. 184-39.000.

Joseph, Werner; and Schittenhelm, Hans-Joachim, to Bayer Aktiengesellschaft. Fluorine-free superopaque enamel frits. 5,013,362, Cl. 501-24.000.

Joshi, David, to Colgate-Palmolive Company. Detergent bar with improved stain removing and antibacterial properties. 5,013,486, Cl. 252-559.000.

Joslyn, Bruce. C.: *See—*
Harman, Robert R.; and Joslyn, Bruce. C., 5,013,897, Cl. 235-381.000.

Jouade, Pierre, to Hutchinson. Hydraulic anti-vibratory support sleeves. 5,013,012, Cl. 267-140.100.

Jozwiak, Terry H.: *See—*
Hunley, Eugene C., Jr.; and Jozwiak, Terry H., 5,012,833, Cl. 137-15.000.

Ju, Shiaw: *See—*
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 5,013,801, Cl. 526-64.000.

Judd, Lawrence M., Jr. Water purifier. 5,013,417, Cl. 204-228.000.

Jujo Paper Co., Ltd.: *See—*
Nishiyama, Fumio, 5,013,708, Cl. 503-213.000.

Julien, Gerald J.; Robinson, Steven P.; and Bondy, Ronald H., to Boeing Company, The. Method for producing an elongate passage within a component. 5,013,507, Cl. 264-219.000.

Jungverdorben, Hermann Josef: *See—*
Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Jungverdorben, Hermann Josef; and Dross, Joachim, 5,013,502, Cl. 264-103.000.
Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,013,504, Cl. 264-130.000.

Juret, Bernard; and Janniere, Alain, to ITT Composants et Instruments. Card connector and production method. 5,013,255, Cl. 439-260.000.

Just, Guenther: *See—*
Raehse, Wilfried; Wuest, Willi; and Just, Guenther, 5,013,832, Cl. 536-90.000.

JW Aluminum Company: *See—*
Espeut, Kenneth W.; and Barry, Leon, 5,012,862, Cl. 165-133.000.

K and M Electronics, Inc.: *See—*
Kominsky, Richard A., 5,013,154, Cl. 356-375.000.

K. W. Hochschorner GmbH: *See—*
Raffler, Dieter, 5,012,533, Cl. 2-420.000.

K. W. Muth Company, Inc.: *See—*
Roberts, John K., 5,014,167, Cl. 362-83.100.

Kaae, Svend S.: *See—*
Madsen, Jens; and Kaae, Svend S., 5,012,961, Cl. 222-643.000.

Kabayama, Yoshiaki, to Kabushiki Kaisha Daikin Seisakusho. Pull type clutch. 5,012,911, Cl. 192-89.00B.

Kabernagel, Bruce E.: *See—*
Basile, Philip C.; and Kabernagel, Bruce E., 5,014,285, Cl. 375-62.000.

Kabushiki Kaisha Daikin Seisakusho: *See—*
Kabayama, Yoshiaki, 5,012,911, Cl. 192-89.00B.
Tanaka, Teruhiko, 5,012,905, Cl. 188-250.00H.

Kabushiki Kaisha Ikeuchi Tekkosho: *See—*
Ikeuchi, Horoji; and Ikeuchi, Kiyoaki, 5,013,230, Cl. 425-127.000.

Kabushiki Kaisha Iseki Kaihatsu Koki: *See—*
Akesaka, Toshio, 5,013,189, Cl. 405-184.000.

Kabushiki Kaisha Kawai Gakki Seisakusho: *See—*
Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, 5,012,715, Cl. 84-724.000.

Kabushiki Kaisha Sankyo Seiki Seisakusho: *See—*
Numazawa, Junji; Yoneda, Yoshiro; and Aruga, Fusayoshi, 5,014,148, Cl. 360-125.000.

Kabushiki Kaisha Shinko: *See—*
Watanabe, Mistutoshi, 5,013,267, Cl. 439-821.000.

Kabushiki Kaisha Toshiba: *See—*
Aizawa, Yoshiaki, 5,013,926, Cl. 250-551.000.
Higuchi, Takayoshi, 5,014,109, Cl. 357-68.000.
Hitosugi, Toshiaki, 5,013,217, Cl. 417-26.000.
Ishikawa, Michihiro, 5,014,003, Cl. 324-158.00P.
Kawai, Kiyoyuki, 5,014,116, Cl. 358-12.000.
Kumagai, Jumpei; and Yoshikawa, Susumu, 5,013,679, Cl. 437-52.000.
Maeda, Takeo; and Higashizono, Masayoshi, 5,014,106, Cl. 357-43.000.
Muroka, Kazuyoshi; Ohsawa, Takashi; and Furuyama, Tohru, 5,014,245, Cl. 365-194.000.
Nishimura, Akira; Watanabe, Hiroyuki; and Masuda, Eiji, 5,013,942, Cl. 307-480.000.
Ohkawa, Hideki; Ozawa, Norio; Higashino, Hiroyuki; and Matsubara, Motonari, 5,013,635, Cl. 430-495.000.
Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.
Tanaka, Tatsuo, 5,014,019, Cl. 330-257.000.
Umemura, Yoshiyuki, 5,014,198, Cl. 364-413.130.

Kadich, Davorin. Portable water driven high velocity fan. 5,013,214, Cl. 415-202.000.

Kadkoy, Ghandi: *See—*
Roberts, David J.; and Kadkoy, Ghandi, 5,013,213, Cl. 414-798.900.

Kadowaki, Tatsuhiko: *See—*
Morichika, Toshiaki; Tani, Toshio; Tanaka, Nobuhiko; and Kadowaki, Tatsuhiko, 5,013,616, Cl. 428-694.000.

Kaganowicz, Grezgorz; Cuomo, Frank P.; and Vieland, Leon J., to General Electric Company. Alignment layer for liquid crystal devices and method of forming. 5,013,139, Cl. 350-340.000.

Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, to NKK Corporation. Method of manufacturing an aluminum-plated steel sheet for cans. 5,013,410, Cl. 204-27.000.

Kagechika, Hiroshi: *See—*
Yasue, Yoshihiko; and Kagechika, Hiroshi, 5,013,614, Cl. 428-651.000.

Kajimoto, Nobuyuki: *See—*
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,013,496, Cl. 264-2.300.

Kakei, Tsutomu: *See—*
Uesugi, Akio; Kakei, Tsutomu; and Minato, Shinichiro, 5,013,399, Cl. 156-643.000.

Kaken Pharmaceutical Co., Ltd.: *See—*
Nagahara, Michiko; Ieda, Chikara; Mimura, Mitsuo; Uchida, Katsuhiro; Sato, Soichiro; and Okumura, Makoto, 5,013,736, Cl. 514-255.000.

Kakizaki, Sadao, to Mitsubishi Jukogyo Kabushiki Kaisha. Cable ship. 5,013,186, Cl. 405-166.000.

Kako, Hajime: *See—*
Miyazaki, Masaaki; and Kako, Hajime, 5,014,203, Cl. 364-431.060.

Kakumoto, Kouji: *See—*
Murase, Shigemitsu; Kakumoto, Kouji; Miyazaki, Shouji; Sugawa, Masaru; and Ide, Mikio, 5,013,506, Cl. 264-210.800.

Kalas Manufacturing, Inc.: *See—*
Maurer, Terrence L., 5,013,259, Cl. 439-522.000.

Kali-Chemie Pharma GmbH: *See—*
Walenta, Rainer; Muller-Peddinghaus, Reiner; Ban, Ivan; Wurl, Michael; and Preuschoff, Ulf, 5,013,852, Cl. 549-362.000.

Kalmanek, Charles R.: *See—*
Hahne, Ellen L.; Kalmanek, Charles R.; and Morgan, Samuel P., 5,014,265, Cl. 370-60.000.

Kalnes, Tom N.: *See—*
James, Robert B., Jr.; Kalnes, Tom N.; and Lankton, Steven P., 5,013,424, Cl. 208-78.000.

Kalyani, Vinay J.: *See—*
Lee, Eric K.; Kalyani, Vinay J.; and Matson, Stephen L., 5,013,447, Cl. 210-640.000.
Lee, Eric K. L.; Kalyani, Vinay J.; and Matson, Stephen L., 5,013,436, Cl. 210-321.800.

KAMAG Transporttechnik GmbH & Co.: *See—*
Schardt, Volker, 5,013,205, Cl. 414-429.000.

Kaman Aerospace Corporation: *See—*
Ulich, Bobby L., 5,013,917, Cl. 250-330.000.

Kaman Sciences Corporation: *See—*
Chang, James, 5,013,908, Cl. 250-227.150.

Kamimura, Katsuyoshi: *See—*
Mine, Atsushi; Kamimura, Katsuyoshi; and Hiwatashi, Yutaka, 5,013,067, Cl. 280-840.000.

Kamimura, Kenji; and Tsuzuki, Sadachika. System for detecting position of moving vehicle and system for detecting reference points therefor. 5,014,204, Cl. 364-449.000.

Kamituma, Yasuo: *See—*
Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, 5,012,982, Cl. 239-585.000.

Kamiya, Tsuyoshi: *See—*
Yokoyama, Yoshiharu; Akiyama, Shigeru; Nakayama, Hironori; and Kamiya, Tsuyoshi, 5,012,781, Cl. 123-353.000.

Kamiyama, Takashi: *See—*
Fujita, Shigeru; Kanno, Hiroshi; and Kamiyama, Takashi, 5,013,231, Cl. 425-145.000.

Kamyr, Inc.: *See—*
Meredith, Michael D., 5,013,460, Cl. 210-770.000.

Kanamaru, Hisanobu: *See—*
Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, 5,012,982, Cl. 239-585.000.

Kanamaru, Tsuneo; Hida, Tsuneaki; and Muroi, Masayuki, to Takeda Chemical Industries, Ltd. Physiologically active substance Tan-931, its derivatives, their production and use. 5,013,757, Cl. 514-568.000.

Kaneko, Takushi; and Wong, Henry S. L., to Bristol-Myers Company. Intermediates for the production of podophyllotoxin and related compounds. 5,013,851, Cl. 549-298.000.

Kanemura, Yoshinobu: *See—*
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,013,496, Cl. 264-2.300.

Kaneshige, Ryousuke: *See—*
Kinoshita, Tatsuo; Minami, Shuji; Mizui, Kinya; and Kaneshige, Ryousuke, 5,013,867, Cl. 562-512.200.

Kanie, Toshihiro: *See—*
Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, 5,013,466, Cl. 252-42.700.

Kanno, Hiroshi: *See—*
Fujita, Shigeru; Kanno, Hiroshi; and Kamiyama, Takashi, 5,013,231, Cl. 425-145.000.

Kanno, Ippei: *See—*
Kubo, Kazuhiko; Usui, Akira; Sakashita, Seiji; Ozeki, Hiroaki; and Kanno, Ippei, 5,014,349, Cl. 455-189.000.

Kano, Hirofumi: *See—*
Kawata, Azuma; Koroku, Shuichiro; Kano, Hirofumi; and Miyao, Ichiro, 5,012,792, Cl. 125-15.000.

Kanou, Yasuo: *See—*
Kumesawa, Tetsuro; Kanou, Yasuo; Nishima, Osamu; Isobe, Masaaki; and Matsui, Hiromichi, 5,014,132, Cl. 358-213.190.

Kanto, Jumpei; and Saito, Hitoshi, to Dai Nippon Insatsu Kabushiki Kaisha. Heat transfer sheet. 5,013,710, Cl. 503-227.000.

Kao Corporation: *See—*
Tsukuda, Kazunori; Toda, Masakazu; Saito, Masami; and Tsumadori, Masaki, 5,013,485, Cl. 252-551.000.

Kapala, John W.: *See—*
Burg, Thomas J.; Ziegler, Ronald H.; Cooper, William K.; Kapala, John W.; and Anderson, Robert J., 5,012,747, Cl. 104-130.000.

Kappeler, Markus; and Voser, Beat, to ETA SA Fabriques d'Ebauches; and ETA SA Fabriques d'Ebauches. Telephone. 5,014,302, Cl. 379-165.000.

Kapust, Rolf: *See—*
Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.

KAR Enterprises, Inc.: *See—*
Roberts, David J.; and Kadkoy, Ghandi, 5,013,213, Cl. 414-798.900.

Karaki, Hiroshi: *See—*
Matsumoto, Misao, 5,012,579, Cl. 30-92.000.

Karayannis, Nicholas M.: *See—*
Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., 5,013,702, Cl. 502-120.000.

Kardorff, Uwe: *See—*
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Krieg, Wolfgang; and Hofmeister, Peter, 5,013,847, Cl. 548-378.000.

Karev, Alexandr A.: *See—*
Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.

Karklins, Elgin J.; Scroggie, Stephen J.; Tracht, Steven L.; and Striker, Mark W., to General Motors Corporation. Vehicle window washer with washer fluid temperature responsive pressure control. 5,012,977, Cl. 239-284.100.

Karl Mayer Textilmaschinenfabrik GmbH: *See—*
Bogucki-Land, Bodgan, 5,012,563, Cl. 28-172.100.

Karn, Donald L.: *See—*
Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,013,387, Cl. 156-384.000.

Karns, Jeffrey S.: *See—*
Banerjee, Santimoy; Karns, Jeffrey S.; and Chakrabarty, Ananda M., 5,013,654, Cl. 435-72.000.

Kashiyama, Masamori: *See—*
Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.

Kashyap, Raman, to British Telecommunications public limited company. Polarization insensitive optical frequency mixer. 5,013,115, Cl. 350-96.140.

Kasper, Bryon L., to AT&T Bell Laboratories. Lightwave receiver having differential input. 5,013,903, Cl. 250-214.00A.

Kasuya, Takahiro; Ikawa, Yoji; Tsukakoshi, Motowo; and Kurata, Shunichi, to Science and Technology Agency. Method of implanting living cells with a foreign substance. 5,013,660, Cl. 435-173.000.

Katayama Chemical, Inc.: *See—*
Katayama, Sakae; Ito, Yosuke; and Nomura, Yasuhiro, 5,013,747, Cl. 514-367.000.

Katayama, Sakae; Ito, Yosuke; and Nomura, Yasuhiro, to Katayama Chemical, Inc. Water-soluble antiseptic or antifungal composition. 5,013,747, Cl. 514-367.000.

Kato, Heizaburo, to Sankyo Manufacturing Company, Ltd. Positioning table. 5,013,016, Cl. 269-73.000.

Kato, Hiroshi. Method of cleaning bottom of feeding channel for fish and apparatus thereof. 5,013,369, Cl. 134-24.000.

Kato, Hiroshi; Yano, Shinsuke; Nonomura, Toshio; and Nishigaki, Susumu, to Narumi China Corporation. Dielectric ceramic composition. 5,013,695, Cl. 501-139.000.

Kato, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Industrial robot. 5,012,855, Cl. 164-155.000.

Kato, Nobuhide; and Hamada, Yasuhiko, to NGK Insulators, Ltd. Oxygen sensor. 5,012,670, Cl. 73-31.050.

Kato, Osamu: *See—*
Miyakawa, Tatsuo; Kato, Osamu; Koike, Yusuke; Matsunami, Keisuke; and Sekiya, Naoyuki, 5,013,906, Cl. 250-223.00R.

Katsuyama, Koji: *See—*
Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Haruhiko; and Nagai, Takeshi, 5,012,858, Cl. 165-1.000.

Katz, Ronald A., to First Data Resources Inc. Voice-data telephonic control system. 5,014,298, Cl. 379-93.000.

Kaufman, Benjamin J.: *See—*
DeRosa, Thomas F.; Nalesnik, Theodore E.; and Kaufman, Benjamin J., 5,013,469, Cl. 252-47.500.

Kautz, Allan D., to Zenith Electronics Corporation. Continuous laser beam FTM mounting for CRT. 5,013,275, Cl. 445-30.000.

Kawabata, Choji: *See—*
Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,012,795, Cl. 126-262.000.

Kawabe, Yozo, to Shimano Industrial Co., Ltd. Spinning reel. 5,012,990, Cl. 242-242.000.

Kawagishi, Hideyuki: *See—*
Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, 5,013,137, Cl. 350-333.000.

Kawagoe, Takahiro: *See—*
Miyazaki, Tadaaki; Ogino, Takao; Masuda, Yoshitomo; Wada, Hiroaki; and Kawagoe, Takahiro, 5,013,620, Cl. 429-194.000.

Kawaguchi, Takeo, to Mitsubishi Denki Kabushiki Kaisha. Deflection yoke for cathode ray tube. 5,014,029, Cl. 335-210.000.

Kawai, Kiyoyuki, to Kabushiki Kaisha Toshiba. Color television system. 5,014,116, Cl. 358-12.000.

Kawakita, Kozo: *See—*
Sone, Masakazu; and Kawakita, Kozo, 5,014,073, Cl. 346-76.0PH.

Kawamura, Eiji, to NEC Corporation. Cache memory controllor associated with microprocessor. 5,014,188, Cl. 364-200.000.

Kawamura, Isao: *See—*
Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Haruhiko; and Nagai, Takeshi, 5,012,858, Cl. 165-1.000.

Kawamura, Kunio: *See—*
Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 5,014,083, Cl. 354-471.000.

Kawamura, Masahiko: *See—*
Takemasa, Kaoru; Takahashi, Akira; Kawamura, Masahiko; Maruyama, Sigeo; and Kon, Tokushige, 5,014,258, Cl. 369-178.000.

Kawamura, Masanori: *See—*
Iguchi, Sadahiko; Kawamura, Masanori; and Miyamoto, Tsumoru, 5,013,734, Cl. 514-231.500.

Kawamura, Yoshihiro: *See—*
Yarita, Yoshio; and Kawamura, Yoshihiro, 5,013,402, Cl. 156-645.000.

Kawasaki Steel Corporation: *See—*
Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, 5,013,372, Cl. 148-111.000.
Takemura, Kazuya; Yoshino, Kenji; and Wakui, Tadahiro, 5,013,818, Cl. 528-193.000.

Kawase, Hideyuki: *See—*
Nishida, Ikuo; Hanawa, Shinichi; and Kawase, Hideyuki, 5,014,140, Cl. 360-85.000.

Kawase, Toshirou; Saito, Shiro; and Miyake, Masanobu, to Kyosan Denki Kabushiki Kaisha; and Fuji Jukogyo Kabushiki Kaisha. Solenoid valve incorporating liquid surface detecting valve. 5,012,838, Cl. 137-202.000.

Kawashima, Saburo: *See—*
Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.

Kawata, Azuma; Koroku, Shuichiro; Kano, Hirofumi; and Miyao, Ichiro, to Osaka Diamond Industrial Co., Ltd. Rotary blade and a rotary substrate for use in the rotary blade. 5,012,792, Cl. 125-15.000.

Kawata, Hiroyuki: *See—*
Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.

Kazama, Yasuo: *See—*
Takeuchi, Hirosato; and Kazama, Yasuo, 5,014,047, Cl. 340-763.000.

Kazerounian, Reza; Ali, Syed; and Eitan, Boaz, to WaferScale Integration, Inc. On-chip high voltage generator and regulator in an integrated circuit. 5,014,097, Cl. 357-23.500.

Keating, Richard D.: *See—*
Bellos, Thomas J.; and Keating, Richard D., 5,013,452, Cl. 210-708.000.

Keck, Peter C.: *See—*
Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.

Keefe, Richard. Variable width bag holder. 5,012,994, Cl. 248-558.000.

Keenan, Gordon A., to Exxon Research and Engineering Co. Rupture disk assembly. 5,012,945, Cl. 220-89.100.

Kelin, Nikolai A.: *See—*
Stadnik, Ivan P.; Klevets, Nikolai I.; Gridnev, Alexandr I.; Kelin, Nikolai A.; and Sitnikov, Anatoly F., 5,013,951, Cl. 310-156.000.

Kelkar, Krishnanand: *See—*
Walker, Gordon K.; Shumate, William A.; and Kelkar, Krishnanand, 5,014,310, Cl. 380-10.000.

VOL 1126 ISS 1 MY 7 1991 UMI

- Kelleher, John J., Jr.; and Shute, Donald W., to Raytheon Company. Switching converter with spike limiting circuit. 5,014,176, Cl. 363-26.000.
- Keller, Harold A., to Technic Tool Corporation. Extendible shaft assembly for portable tools. 5,013,282, Cl. 464-172.000.
- Kelly, Hugh P., to Erie Glass Manufacturing Company. Radio-light fixture. 5,014,168, Cl. 362-86.000.
- Kelly, Peter J. Escape ladder. 5,012,892, Cl. 182-84.000.
- Kelly, Stephen: *See—*
  - Boller, Arthur; Buchecker, Richard; Fromm, Hans-Jurgen; Kelly, Stephen; Schadt, Martin; and Villiger, Alois, 5,013,476, Cl. 252-299.610.
- Kem-Wove Incorporated: *See—*
  - Baigas, Joseph F., Jr.; and Haynes, John T., Jr., 5,013,309, Cl. 604-368.000.
- Kempf, Timothy W.; Corcoran, Robert F.; and Sikora, Dennis C., to Aluminum Company of America. Method and apparatus for emission control. 5,013,336, Cl. 55-71.000.
- Kennedy, Ralph, deceased (by Cheney, Barry D., executor); and Kennedy, Ralph W., to Ampsco Corporation. Device for forcing a reflective highway post into the ground. 5,012,873, Cl. 173-22.000.
- Kennedy, Ralph W.: *See—*
  - Kennedy, Ralph, deceased; and Kennedy, Ralph W., 5,012,873, Cl. 173-22.000.
- Kennedy, Richard A.: *See—*
  - Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., 5,014,316, Cl. 381-15.000.
- Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., to Philip Morris Incorporated. Tobacco processing. 5,012,823, Cl. 131-31.000.
- Kern, Jurgen: *See—*
  - Schramm, Bernhard; Kern, Jurgen; Schwahn, Harald; Preuss, August-Wilhelm; Gottlieb, Klaus; and Bruderreck, Hartmut, 5,013,706, Cl. 502-309.000.
- Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., to PPG Industries, Inc. Beta-hydroxyalkylamide cured acid polymer/-polyepoxide powder coating. 5,013,791, Cl. 525-113.000.
- Kesling, Christopher K., to TP Orthodontics Inc. Positioner with rotational control elements. 5,013,239, Cl. 433-6.000.
- Kessler, Gerald, to Bostom Metal Products Corp. Resilient strip and mounting member for flush fitting protective strip assembly. 5,013,596, Cl. 428-100.000.
- Kessler, Henri: *See—*
  - Patarin, Joel; Guth, Jean-Louis; Kessler, Henri; Coudurier, Gisele; and Raatz, Francis, 5,013,537, Cl. 423-328.000.
- Keystone International Holdings Corp.: *See—*
  - Kueffer, Max, 5,012,841, Cl. 137-625.390.
- Khelghatian, Habet M.: *See—*
  - Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., 5,013,702, Cl. 502-120.000.
- Khinkis, Mark J., to Institute of Gas Technology. Ultra-low pollutant emission combustion process and apparatus. 5,013,236, Cl. 431-10.000.
- Kibe, Hiroshi: *See—*
  - Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, 5,013,410, Cl. 204-27.000.
- Kienzle, Wolfgang: *See—*
  - Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.
- Kieser, Jurgen: *See—*
  - Ufermann, Werner; and Kieser, Jurgen, 5,013,229, Cl. 425-83.100.
- Kihava, Kouichi; and Yamamoto, Kazushige, to OKI Electric Industry Co., Ltd. Divider for carrying out high speed arithmetic operation. 5,014,233, Cl. 364-766.000.
- Kiilunen, David D.; and Sartor, David A., to Midwest Thermal Spray, Inc. Metal filler composition and method of employing same. 5,013,587, Cl. 427-383.700.
- Kikuchi, Tatsuro: *See—*
  - Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; Hakotani, Yasuhiko; and Kikuchi, Tatsuro, 5,014,158, Cl. 361-321.000.
- Kikuchi, Toshiyuki: *See—*
  - Kyohzuka, Takahiro; Fujii, Masaki; Kikuchi, Toshiyuki; Abe, Mitsutoshi; and Matsuno, Yuji, 5,012,695, Cl. 74-859.000.
- Kikuchi, Yoshiyuki; and Ishii, Akihiro, to Central Glass Company, Limited. Preparation of diacyl derivatives of 2'-deoxy-5-fluorouridine via novel intermediate compound. 5,013,828, Cl. 536-23.000.
- Kilgore, Marion D., to Otis Engineering Corporation. Well flow control system. 5,012,867, Cl. 166-188.000.
- Kilgore, Vernon O.: *See—*
  - Harvath, Steven J.; Kilgore, Vernon O.; and Zapp, Raymond K., 5,014,300, Cl. 379-100.000.
- Kilimnik, Oskar G.: *See—*
  - Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.
- Kilius, Linas R.: *See—*
  - Litherland, Albert E.; and Kilius, Linas R., 5,013,923, Cl. 250-396.00R.
- Kille, Norbert. Gate. 5,012,612, Cl. 49-254.000.
- Kim, Eun Y.: *See—*
  - Won, Joung H.; and Kim, Eun Y., 5,014,174, Cl. 362-309.000.
- Kim, Yung D., to Abbott Laboratories. Immunological methods and materials for detection of tumor associated antigens. 5,013,645, Cl. 435-7.920.
- Kimura, Masaki: *See—*
  - Shibata, Toshihiro; Kimura, Masaki; and Kurosawa, Norio, 5,013,475, Cl. 252-299.610.
- Kimura, Nariko: *See—*
  - Yoshizawa, Tomomi; Ogi, Keiji; and Kimura, Nariko, 5,013,633, Cl. 430-358.000.
- Kimura, Takashi: *See—*
  - Abe, Noriyuki; Kimura, Takashi; and Fujiki, Norio, 5,014,155, Cl. 361-56.000.
- Kimura, Takeo: *See—*
  - Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, 5,013,956, Cl. 310-323.000.
- King, Jeffrey S., to Motorola, Inc. Ferrite rod antenna. 5,014,071, Cl. 343-788.000.
- King, John R., to S&K Enterprises, Inc. Storage rack corner post. 5,012,938, Cl. 211-191.000.
- King, Nick. Segmented interlocking tracks produced by injection molds. 5,012,943, Cl. 220-4.320.
- Kinoshita, Jiro: *See—*
  - Kurakake, Mitsuo; and Kinoshita, Jiro, 5,013,989, Cl. 318-625.000.
- Kinoshita, Kazunori: *See—*
  - Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.
- Kinoshita, Keichi: *See—*
  - Johdai, Akiyoshi; Kinoshita, Keichi; and Matsui, Toshio, 5,013,021, Cl. 270-53.000.
- Kinoshita, Tatsuo; Minami, Shuji; Mizui, Kinya; and Kaneshige, Ryousuke, to Mitsui Petrochemical Industries, Ltd. Liquid oxidatively modified ethylenic random copolymer, process of making and use. 5,013,867, Cl. 562-512.200.
- Kintz, Gregory J.: *See—*
  - Esterowitz, Leon; Allen, Roger E.; and Kintz, Gregory J., 5,014,279, Cl. 372-41.000.
- Kiriyama, Yoshiyuki; Moriga, Kazuyuki; Shinohara, Toshio; Matsuda, Mitsuhiro; and Maeda, Hiromi, to Dai Nippon Toryo Co., Ltd. Photopolymerizable coating composition and process for forming a coating having a stereoscopic pattern. 5,013,768, Cl. 522-64.000.
- Kirlin, William M., to Giant Resource Recovery Company, Inc. Process and apparatus for treating solid refuse. 5,012,751, Cl. 110-346.000.
- Kiselewski, Donald L. Method for forming a tire clad concrete log. 5,013,509, Cl. 264-229.000.
- Kishi, Satoru: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Kisohara, Naoyuki: *See—*
  - Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.
- Kistner, John F., to Minnesota Mining and Manufacturing Company. One-part white reflective coating. 5,013,621, Cl. 430-11.000.
- Kita, Kazunori; and Nakazawa, Eiji, to Casio Computer Co., Ltd. Recording/reproducing apparatus with voice recognition function. 5,014,317, Cl. 381-43.000.
- Kitagawa, Seiho: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Kitamura, Kazuo: *See—*
  - Ishihata, Kouji; Hironaka, Youichi; Shimizu, Hisanaga; Kitamura, Kazuo; and Imagawa, Takeshi, 5,013,776, Cl. 524-118.000.
- Kitamura, Takao: *See—*
  - Hata, Hajime; Kitamura, Takao; Sakane, Kohji; Wada, Hideo; and Sogabe, Seiji, 5,013,523, Cl. 419-19.000.
- Kitanaka, Katsumi. Cast-in-place piling method and apparatus. 5,013,191, Cl. 405-233.000.
- Kitano, Kenzo: *See—*
  - Tahara, Masaaki; Tomoda, Takakazu; Kitano, Kenzo; and Minato, Teruo, 5,013,371, Cl. 148-16.600.
- Kitano, Kissho: *See—*
  - Sakuma, Masato; Fujita, Yuji; Kitano, Kissho; Yagi, Yukihiko; Sakaizawa, Masao; and Yamamoto, Noburo, 5,013,789, Cl. 525-66.000.
- Kitayama, Hiroyuki: *See—*
  - Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, 5,013,137, Cl. 350-333.000.
- Kitsu, Toshio: *See—*
  - Ogawa, Masahide; Sato, Teiji; Takahashi, Masao; Kitsu, Toshio; Takahashi, Seikichi; and Ono, Kinichi, 5,013,603, Cl. 428-331.000.
- Kleijmeer, Simon: *See—*
  - Schafer, Dietrich M.; and Kleijmeer, Simon, 5,013,589, Cl. 428-35.900.

- Klein, Siegfried, to Commissariat a l'Energie Atomique. Wide passband omnidirectional loudspeaker. 5,014,321, Cl. 381-111.000.
- Klevets, Nikolai I.: *See—*
  - Stadnik, Ivan P.; Klevets, Nikolai I.; Gridnev, Alexandr I.; Kelin, Nikolai A.; and Sitnikov, Anatoly F., 5,013,951, Cl. 310-156.000.
- Klimek, Wayne D.: *See—*
  - Van Kanegan, Eugene M.; and Klimek, Wayne D., 5,012,736, Cl. 101-211.000.
- Kling, Michael J.; Surwillo, John M.; Puetz, Peter A.; and Braun, Robert T., to Bear Automotive Service Equipment Company. Caster and steering axis inclination measurement technique. 5,014,227, Cl. 364-559.000.
- Klinke, Richard J.: *See—*
  - Dody, Joseph W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 5,014,074, Cl. 346-107.00R.
- Kloeckner-Humboldt-Deutz AG: *See—*
  - Roschinski, Dieter, 5,012,768, Cl. 123-41.490.
- Klok, Jan: *See—*
  - Driessen, Pieter J.; and Klok, Jan, 5,013,003, Cl. 248-117.600.
- Klotzbach, Manfred, to Hoesch Metall & Kunststoffwerk GmbH & Co. Whirlpool tub with automatic pre-flushing of the system. 5,012,535, Cl. 4-541.000.
- Klupt, Christopher; and Zupnick, Jerald. Modem coupler for multi-line key telephone system. 5,014,299, Cl. 379-98.000.
- Kmiecik-Lawrynowicz, Grazyna: *See—*
  - Ong, Beng S.; Kmiecik-Lawrynowicz, Grazyna; Yulo, Fernando; and Koch, Kayong, 5,013,630, Cl. 430-138.000.
- Knapp, Alan G., to U.S. Philips Corporation. Matrix display systems. 5,014,048, Cl. 340-784.000.
- Knapp, Heinrich: *See—*
  - Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.
- Knappe, Holger. Plastic container for liquids or gases. 5,012,950, Cl. 220-459.000.
- Knauf, Roland: *See—*
  - Seisz, Michael; Knauf, Roland; Schwarz, Dieter; and Weidner, Hans-Jurgen, 5,013,261, Cl. 439-581.000.
- Knepprath, Vernon E.; and Levine, Jules D., to Texas Instruments Incorporated. Method and apparatus for forming spheres. 5,012,619, Cl. 51-163.100.
- Knobbe, Edward T.: *See—*
  - Wreede, John E.; and Knobbe, Edward T., 5,013,584, Cl. 427-162.000.
- Knoppel, Hans-Martin; Elm, Oskar; and Munch, Udo, to Rittal-Werk Rudolf Loh GmbH & Co. KG. Control console comprising pedestal, console part and top. 5,013,104, Cl. 312-254.000.
- Knorr, Erhard: *See—*
  - Grassl, Alfred; and Knorr, Erhard, 5,014,336, Cl. 388-843.000.
- Knutti, David F.: *See—*
  - Jacobsen, Stephen C.; Iversen, Edwin K.; Knutti, David F.; and Davis, Clark C., 5,012,836, Cl. 137-83.000.
- Ko, Myung D. Raised pavement marking device. 5,013,180, Cl. 404-10.000.
- Ko, Seh D. Internal tire support wheel. 5,012,849, Cl. 152-520.000.
- Koba, Tomohito: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Kobayashi, Akira; Taira, Nobutaka; and Ueda, Hideshi, to Matsushita Electric Industrial Co., Ltd. Pattern position recognizing apparatus. 5,014,330, Cl. 382-30.000.
- Kobayashi, Katsuyuki; Inui, Masaki; Ashida, Satoshi; Nakamura, Keiichi; and Yamamoto, Masaji, to Toyota Jidosha Kabushiki Kaisha; and Toyoda Koki Kabushiki Kaisha. Control coupling for torque transmission. 5,012,908, Cl. 192-57.000.
- Kobayashi, Koichi: *See—*
  - Ukegawa, Shin; Shinomiya, Masaki; Higashikawa, Masahiro; Uetsuki, Tadao; and Kobayashi, Koichi, 5,013,975, Cl. 315-248.000.
- Kobayashi, Makoto: *See—*
  - Hashimoto, Toshiharu; Shibata, Kazuhiko; and Kobayashi, Makoto, 5,013,023, Cl. 271-3.100.
- Kobayashi, Masahiro; Tagai, Hideo; Kuroki, Yoshikatsu; Niwa, Shigeo; and Ono, Mikiya, to Mitsubishi Mining & Cement Co., Ltd. Implant material for replacing hard tissue of living body. 5,013,323, Cl. 623-16.000.
- Kobayashi, Nobuyoshi; Suzuki, Masayuki; Kondo, Seiichi; Matsui, Makoto; and Mukai, Kiichiro, to Hitachi, Ltd. Superconducting alloys comprising tungsten, molybdenum, silicon and oxygen. 5,013,526, Cl. 420-430.000.
- Kobayashi, Yoshikuni: *See—*
  - Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
- Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Voelker, Herbert, to Degussa Aktiengesellschaft. Platinum-free three-way catalyst. 5,013,705, Cl. 502-262.000.
- Koch, Kayong: *See—*
  - Ong, Beng S.; Kmiecik-Lawrynowicz, Grazyna; Yulo, Fernando; and Koch, Kayong, 5,013,630, Cl. 430-138.000.
- Koch, Tobias. Multiple mark golf ball and playing method. 5,013,046, Cl. 273-213.000.
- Kocks, Peter: *See—*
  - Sindlinger, Rainer; and Kocks, Peter, 5,014,205, Cl. 364-449.000.
- Kodera, Tatsuya: *See—*
  - Itoh, Akira; Haino, Kozo; Okaji, Makoto; Emoto, Kazuhiro; and Kodera, Tatsuya, 5,013,623, Cl. 430-59.000.
- Koegl, Rudolph A. A.; and Hogle, Richard A., to General Electric Company. Real-time magnetic-flux breakthrough detection method and system for laser drilling. 5,013,886, Cl. 219-121.830.
- Koehn, Jochen, to Zeller Plastik GmbH. Closure with originality guarantee. 5,012,940, Cl. 215-230.000.
- Koenig & Bauer Aktiengesellschaft: *See—*
  - Fischer, Christian M. M.; and Holm, Helmut, 5,012,735, Cl. 101-177.000.
- Kogelschatz, Ulrich, to Asea Brown Boveri Limited. High-power radiator. 5,013,959, Cl. 313-36.000.
- Kohl, Walter: *See—*
  - Conzelmann, Gerhard; Nagel, Karl; and Kohl, Walter, 5,013,996, Cl. 322-28.000.
- Koikawa, Shigeru: *See—*
  - Nanbaku, Shigeki; and Koikawa, Shigeru, 5,014,209, Cl. 364-474.350.
- Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, to Ricoh Company, Ltd. Paper jogging and aligning apparatus with stapling capabilities for a copying machine. 5,014,091, Cl. 355-321.000.
- Koike, Yusuke: *See—*
  - Miyakawa, Tatsuo; Kato, Osamu; Koike, Yusuke; Matsunami, Keisuke; and Sekiya, Naoyuki, 5,013,906, Cl. 250-223.00R.
- Koito Manufacturing Co., Ltd.: *See—*
  - Naganawa, Masahito, 5,014,165, Cl. 362-61.000.
- Koizumi, Hideaki: *See—*
  - Sano, Koichi; Yamagata, Shimbu; Yokoyama, Tetsuo; and Koizumi, Hideaki, 5,014,007, Cl. 324-309.000.
- Kojima, Kazuhisa: *See—*
  - Miyoshi, Motoyuki; Kojima, Kazuhisa; Sugiura, Katsuhiko; and Iketani, Naomi, 5,013,606, Cl. 428-412.000.
- Kojima, Kennosuke: *See—*
  - Asano, Ichiro; Kojima, Kennosuke; and Yoneda, Aritoshi, 5,013,920, Cl. 250-343.000.
- Kok, Piet; Vanmaele, Luc J.; Tavernier, Serge M.; and De Deyne, Hedwig E., to AGFA-Gevaert, N.V. Particulate toner material with charge control agent. 5,013,628, Cl. 430-110.000.
- Kolbenschmidt Aktiengesellschaft: *See—*
  - Kreuzer, Martin, 5,013,065, Cl. 280-743.000.
- Koller, Glenn R.; and Trout, Matt F., to Amoco Corporation. Integrating multiple mappable variables for oil and gas exploration. 5,012,675, Cl. 73-432.100.
- Kolnick, Frank C.: *See—*
  - Mansfield, Bruce M.; Kolnick, Frank C.; and Kun, Andrew I., 5,014,192, Cl. 364-200.000.
- Komatsu, Michio: *See—*
  - Sato, Goro; Komatsu, Michio; Hirai, Toshiharu; Abe, Yoneji; and Senjyuu, Noboru, 5,013,607, Cl. 428-426.000.
- Komatsu, Takahiro; Kumanoya, Masaki; Konishi, Yasuhiro; Dosaka, Katsumi; and Inoue, Yoshinori, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device having shared sense amplifier and operating method thereof. 5,014,246, Cl. 365-230.030.
- Komatsubara, Michiro: *See—*
  - Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, 5,013,372, Cl. 148-111.000.
- Kominsky, Richard A., to K and M Electronics, Inc. System for remotely reading an analog meter. 5,013,154, Cl. 356-375.000.
- Komori, Hideo: *See—*
  - Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, 5,012,843, Cl. 139-224.00A.
- Komoto, Kazumasa, to Orient Co., Ltd. Thermal and current sensing switch. 5,014,036, Cl. 337-407.000.
- Kon, Tokushige: *See—*
  - Takemasa, Kaoru; Takahashi, Akira; Kawamura, Masahiko; Maruyama, Sigeo; and Kon, Tokushige, 5,014,258, Cl. 369-178.000.
- Kondo, Seiichi: *See—*
  - Kobayashi, Nobuyoshi; Suzuki, Masayuki; Kondo, Seiichi; Matsui, Makoto; and Mukai, Kiichiro, 5,013,526, Cl. 420-430.000.
- Kondo, Tetsusai: *See—*
  - Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, 5,012,715, Cl. 84-724.000.
- Kongou, Akihiko, to Yamaha Corporation. Brass instrument. 5,012,714, Cl. 84-390.000.
- Konica Corporation: *See—*
  - Nakagawa, Yasutsugu; and Horiuchi, Tohru, 5,014,079, Cl. 354-266.000.
  - Takizawa, Yoshio; Sigeta, Kunio; Takeuchi, Shigeki; Yoshioka, Hiroshi; and Fujimaki, Yoshihide, 5,013,625, Cl. 430-64.000.
  - Tsukada, Kazuya, 5,013,637, Cl. 430-527.000.
  - Yoshizawa, Tomomi; Ogi, Keiji; and Kimura, Nariko, 5,013,633, Cl. 430-358.000.
- Konig, Joachim: *See—*
  - Sackmann, Gunter; Konig, Joachim; and Baumgen, Heinz, 5,013,794, Cl. 525-203.000.
- Konishi, Jin-emon, to Nippon Zoki Pharmaceutical Co., Ltd. Pharmaceutical treatments for cerebral and neuronal diseases. 5,013,558, Cl. 424-520.000.
- Konishi, Junkichi; and Shiraishi, Yasuhiro, to Nissan Motor Company, Limited. Height control system in automotive suspension system

VOL
1126
ISS
1
MY
7
1991
UMI

preventive of uncomfortable height adjustment upon on-set of power supply. 5,014,199, Cl. 364-424.050.

- Konishi, Yasuhiro: *See—*
  - Komatsu, Takahiro; Kumanoya, Masaki; Konishi, Yasuhiro; Dosaka, Katsumi; and Inoue, Yoshinori, 5,014,246, Cl. 365-230.030.
- Konno, Takeshi: *See—*
  - Ito, Kunio; Konno, Takeshi; and Tabata, Yutaka, 5,012,633, Cl. 56-12.900.
- Kontron Instruments Holdings NV: *See—*
  - Grassl, Alfred; and Knorr, Erhard, 5,014,336, Cl. 388-843.000.
- Korber AG: *See—*
  - Lindemann, Rolf; and Heitmann, Uwe, 5,012,825, Cl. 131-281.000.
  - Mushardt, Heinrich, 5,013,014, Cl. 269-7.000.
- Koroku, Shuichiro: *See—*
  - Kawata, Azuma; Koroku, Shuichiro; Kano, Hirofumi; and Miyao, Ichiro, 5,012,792, Cl. 125-15.000.
- Korsmeyer, Richard W., to Pfizer Inc. Apparatus and method for mixing and spraying a slurry. 5,012 975, Cl. 239-9.000.
- Korsunsky, Iosif; and Schroepfer, Richard C., to AMP Incorporated. Circuit board connector having improved latching system. 5,013,257, Cl. 439-326.000.
- Koshida, Kazunori: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Koshida, Yoshinori; Ayukai, Kemmi; and Suto, Shin-ichi, to Oki Electric Industry Co., Ltd. Optical sensor unit with sealed optical element and cable connector. 5,013,911, Cl. 250-239.000.
- Koshii, Taro; and Amemiya, Tetsuo, to Dow Corning Toray Silicone Company, Ltd. Gasket/packing material with excellent adhesiveness and resistance to coolants. 5,013,781, Cl. 524-864.000.
- Koslowski, Gerhard: *See—*
  - Gironi, Fabrizio; Iten, Jakob; Koslowski, Gerhard; and Probst, Willy, 5,012,564, Cl. 28-193.000.
- Kosuge, Tokuo: *See—*
  - Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, 5,012,982, Cl. 239-585.000.
- Kotitschke, Gerhard: *See—*
  - Preisetanz, Johann; and Kotitschke, Gerhard, 5,012,594, Cl. 34-121.000.
- Kotnour, Thomas A.: *See—*
  - Coleman, Patrick L.; Kotnour, Thomas A.; and Rolando, Richard J., 5,013,795, Cl. 525-279.000.
- Kotzian, Brian R., to Hewlett-Packart Company. Antilog circuit with automatic gain control. 5,014,013, Cl. 328-145.000.
- Kotzin, Michael D., to Motorola, Inc. Text modifier. 5,014,313, Cl. 380-28.000.
- Kowa Company Limited: *See—*
  - Akiyama, Koichi, 5,013,146, Cl. 351-208.000.
- Koyama, Itaru: *See—*
  - Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
- Koyata, Kazuo: *See—*
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Koyo Jidoki Company Limited: *See—*
  - Yamashita, Kyoichi, 5,012,745, Cl. 104-44.000.
- Kracke, Wilhelm, to Sony Corporation. Multi-layered sound-insulating panel for motor vehicles, or similar. 5,013,597, Cl. 428-141.000.
- Kraeger, Thomas F. Multi-purpose sawhorse. 5,012,893, Cl. 182-153.000.
- Kraft General Foods, Inc.: *See—*
  - Rehman, Warren C.; and Delonis, Michael E., 5,012,629, Cl. 53-453.000.
- Krageloh, Stefan: *See—*
  - Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.
- Kramer, Anatoly I., to R. J. Reynolds Tobacco Company. Method of expanding tobacco. 5,012,826, Cl. 131-291.000.
- Kramer, Andreas, to Ciba-Geigy Corporation. Curable mixtures containing a bismaleimide and a propenyl compound. 5,013,804, Cl. 526-262.000.
- Kramer, Norbert. Trough and process for separating bulk goods. 5,012,913, Cl. 193-2.00R.
- Kramer, Wolfgang: *See—*
  - Jelich, Klaus; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,013,351, Cl. 71-92.000.
- Krauss, Rudolf: *See—*
  - Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.
- Kreibich, Ralf; and Topp, Michael, to Ingun Prufmittelbau GmbH. Sprung contact pin for testing testpieces. 5,014,004, Cl. 324-158.00P.
- Kreuzer, Martin, to Kolbenschmidt Aktiengesellschaft. Gas bag apparatus for protection against an impact. 5,013,065, Cl. 280-743.000.
- Krieg, Wolfgang: *See—*
  - Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Krieg, Wolfgang; and Hofmeister, Peter, 5,013,847, Cl. 548-378.000.
- Krieger, Dieter: *See—*
  - Gideon, Jurgen; Krieger, Dieter; and Mengel, Eirch, 5,012,958, Cl. 222-306.000.
- Kristensen, Per H. Floating construction. 5,012,756, Cl. 114-265.000.
- Kristola, Jay L.; and Prettie, John, to H.G. Weber & Co., Inc. Method and apparatus for rotating an item. 5,012,915, Cl. 198-411.000.
- Kroemer, Herbert: *See—*
  - Petroff, Pierre M.; and Kroemer, Herbert, 5,013,683, Cl. 437-110.000.
- Krofta, Milos, to Lenox Institute for Research, Inc. Apparatus for stabilizing sludge. 5,013,429, Cl. 210-137.000.
- Kromenaker, Susan C.; Lefebvre, James D.; and Binzel, Charles P., to Motorola Inc. Speakerphone for cellular telephones with howl prevention, detection, elimination and determination. 5,014,294, Cl. 379-58.000.
- Kruger, Paul C. Variable wheel base trailer apparatus. 5,013,058, Cl. 280-429.000.
- Kruse, Richard M., to Great Plains Industries, Inc. Apparatus and method for calibrating a measuring device. 5,012,667, Cl. 73-1.00R.
- Krystal Cap Company Ltd.: *See—*
  - Krystal, Joseph, 5,012,532, Cl. 2-197.000.
- Krystal, Joseph, to Krystal Cap Company Ltd. Size adjustable cap. 5,012,532, Cl. 2-197.000.
- Kub, Francis J.: *See—*
  - Godbey, David J.; Hughes, Harold L.; and Kub, Francis J., 5,013,681, Cl. 437-86.000.
- Kubo, Katsuhiro; Sakai, Keiji; Kurata, Yukio; and Yamaoka, Hideyoshi, to Sharp Kabushiki Kaisha. Process for preparing blazed holograms. 5,013,494, Cl. 264-1.300.
- Kubo, Kazuhiko; Usui, Akira; Sakashita, Seiji; Ozeki, Hiroaki; and Kanno, Ippei, to Matsushita Electric Industrial Co., Ltd. Television tuner for common use in BS/UV. 5,014,349, Cl. 455-189.000.
- Kubo, Kenji: *See—*
  - Saito, Takashi; Fujiwara, Hideyuki; and Kubo, Kenji, 5,014,185, Cl. 364-188.000.
- Kubo, Naoki; Ishikawa, Takuma; Matsui, Toshio; Atsumi, Fumitoshi; and Doi, Yasuhiko, to Minolta Camera Co., Ltd. Image forming apparatus with a binding function. 5,014,092, Cl. 355-324.000.
- Kubo, Yoichiro: *See—*
  - Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,796, Cl. 525-326.200.
  - Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,797, Cl. 525-328.300.
- Kubota Corp.: *See—*
  - Fujioka, Hisatake; Horikawa, Tokio; and Yanagawa, Nobuhide, 5,012,907, Cl. 192-13.00R.
- Kubota, Hitoshi: *See—*
  - Hayashi, Kimiaki; and Kubota, Hitoshi, 5,013,845, Cl. 548-320.000.
- Kubota Ltd.: *See—*
  - Machida, Satoshi; and Hattori, Akio, 5,012,909, Cl. 192-3.570.
  - Morichika, Toshiaki; Tani, Toshio; Tanaka, Nobuhiko; and Kadowaki, Tatsuhiko, 5,013,616, Cl. 428-694.000.
- Kuboyama, Yoichi; and Yanagawa, Koichi, to Hewlett-Packard Co. D.C. biasing apparatus. 5,014,012, Cl. 324-720.000.
- Kucherer, Helmut, to Weidenhammer Packungen KG GmbH & Co. Cap with cutting ring for composite containers. 5,012,970, Cl 229-4.500.
- Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, to Minolta Camera Kabushiki Kaisha. Pseudo focal length camera. 5,014,078, Cl. 354-195.100.
- Kudzma, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., to BOC, Inc. 4-phenyl-4-N-(phenyl) amido piperidine derivatives and pharmaceutical compositions and method employing such compounds. 5,013,742, Cl. 514-329.000.
- Kueffer, Max, to Keystone International Holdings Corp. Pressure reducing and conditioning valves. 5,012,841, Cl. 137-625.390.
- Kuenast, Christoph: *See—*
  - Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Krieg, Wolfgang; and Hofmeister, Peter, 5,013,847, Cl. 548-378.000.
- Kuhbauch, Gerd, to Robert Bosch GmbH. Vehicle windshield wiper device. 5,012,525, Cl. 15-250.160.
- Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., to Deere & Company. Belt tensioner. 5,012,632, Cl. 56-11.600.
- Kulhawy, Nicholas. Surface stripping device. 5,013,092, Cl. 299-40.000.
- Kumagai, Jumpei; and Yoshikawa, Susumu, to Kabushiki Kaisha Toshiba. Cell capacitor of a dynamic random access memory and a method of manufacturing the same. 5,013,679, Cl. 437-52.000.
- Kumanoya, Masaki: *See—*
  - Komatsu, Takahiro; Kumanoya, Masaki; Konishi, Yasuhiro; Dosaka, Katsumi; and Inoue, Yoshinori, 5,014,246, Cl. 365-230.030.
- Kumesawa, Tetsuro; Kanou, Yasuo; Nishima, Osamu; Isobe, Masaaki; and Matsui, Hiromichi, to Sony Corporation. CCD imager. 5,014,132, Cl. 358-213.190.
- Kun, Andrew I.: *See—*
  - Mansfield, Bruce M.; Kolnick, Frank C.; and Kun, Andrew I., 5,014,192, Cl. 364-200.000.
- Kung, Teh-Ming: *See—*
  - Rule, Norman G.; and Kung, Teh-Ming, 5,013,849, Cl. 549-28.000.
- Kunihiro, Takushi, to Sony Corporation. Multi-channel access cordless telephone system. 5,014,295, Cl. 379-61.000.
- Kunz, Andre: *See—*
  - de Bruyne, Pieter; and Kunz, Andre, 5,013,874, Cl. 178-18.000.

- Kunz, Anton, to Balzers Aktiengesellschaft. Device for connecting a heating wire to a current conductor terminal. 5,013,268, Cl. 439-807.000.
- Kunze, Volkmar; Zimmermann, Kurt; and Hinterdorfer, Erwin, to J. M. VoithGmbH. Machine housing. 5,012,861, Cl. 165-47.000.
- Kunzler, Peter, to Tobler & Co. AG, Chemische Fabrik. Method and apparatus for the treatment of gliding surfaces on winter sports equipment. 5,012,758, Cl. 118-264.000.
- Kurakake, Mitsuo; and Kinoshita, Jiro, to Fanuc Ltd. Numerical control apparatus for multiple-axis and multiple-channel machine tool. 5,013,989, Cl. 318-625.000.
- Kuramashi, Haruki: *See—*
  - Nagashima, Toshikazu; Kuramashi, Haruki; Nishida, Yoshihiro; and Hirukawa, Masahiro, 5,013,788, Cl. 524-767.000.
- Kurasaki, Howard S.; Westlund, Barbara F.; Nulty, James E.; and Vowles, E. John, to General Signal Corporation. Dry etch process for forming champagne profiles, and dry etch apparatus. 5,013,400, Cl. 156-643.000.
- Kurata, Shunichi: *See—*
  - Kasuya, Takahiro; Ikawa, Yoji; Tsukakoshi, Motowo; and Kurata, Shunichi, 5,013,660, Cl. 435-173.000.
- Kurata, Yukio: *See—*
  - Kubo, Katsuhiro; Sakai, Keiji; Kurata, Yukio; and Yamaoka, Hideyoshi, 5,013,494, Cl. 264-1.300.
- Kureha Kagaku Kogyo K.K.: *See—*
  - Mizuno, Toshiya; Teramoto, Yoshikichi; Wakabayashi, Juichi; and Saito, Takeshi, 5,013,823, Cl. 528-388.000.
- Kurek, Paul R.: *See—*
  - St. Martin, Edward J.; Kurek, Paul R.; Schumacher, Elaine F.; and Rohrbach, Ronald P., 5,013,564, Cl. 426-250.000.
  - St. Martin, Edward J.; Kurek, Paul R.; and Schumacher, Elaine F., 5,013,565, Cl. 426-250.000.
- Kurita Water Industries, Ltd.: *See—*
  - Taya, Shiro, 5,013,481, Cl. 252-389.230.
- Kuroda, Nobuyuki: *See—*
  - Tajima, Yoshio; Nomiyama, Kazutosi; Nishikitani, Yoshinori; Kuroda, Nobuyuki; and Matsuura, Kazuo, 5,013,802, Cl. 526-86.000.
- Kurogane, Toshio; and Nagaoka, Daiji, to Fuji Xerox Co., Ltd. Method of detecting an internal point within a closed area. 5,014,331, Cl. 382-48.000.
- Kuroki, Junsuke: *See—*
  - Yokote, Masatsugu; Sugasawa, Fukashi; Mouri, Hiroshi; and Kuroki, Junsuke, 5,012,881, Cl. 180-140.000.
- Kuroki, Yoshikatsu: *See—*
  - Kobayashi, Masahiro; Tagai, Hideo; Kuroki, Yoshikatsu; Niwa, Shigeo; and Ono, Mikiya, 5,013,323, Cl. 623-16.000.
- Kurosawa, Norio: *See—*
  - Shibata, Toshihiro; Kimura, Masaki; and Kurosawa, Norio, 5,013,475, Cl. 252-299.610.
- Kurose, Shigeru: *See—*
  - Mitsui, Susumu; Funatsu, Ryoji; and Kurose, Shigeru. 5,013,755, Cl. 514-533.000.
- Kurowski, John A.: *See—*
  - Blumberg, Lawrence R.; Coolbaugh, Douglas D.; Kurowski, John A.; and Stromecki, Eugene A., 5,013,395, Cl. 156-627.000.
- Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, to Matsushita Electric Industrial Co., Ltd.; and Teijin Limited. Lining material and ultrasonic wave driven motor using lining material. 5,013,956, Cl. 310-323.000.
- Kuwabara, Syokichi; and Yoshioka, Toyotoshi, to Luwa Japan Limited. Loom cleaning apparatus. 5,012,546, Cl. 15-301.000.
- Kuwashima, Shigeru: *See—*
  - Ohno, Shigeru; Jimbo, Yoshihiro; Adachi, Keiichi; and Kuwashima, Shigeru, 5,013,636, Cl. 430-522.000.
- Kuwata, Satoshi: *See—*
  - Mori, Shigeru; and Kuwata, Satoshi, 5,013,715, Cl. 514-53.000.
- Kwik Clip: *See—*
  - Schrader, James E., 5,012,850, Cl 160-38.000.
- Kyohzuka, Takahiro; Fujii, Masaki; Kikuchi, Toshiyuki; Abe, Mitsutoshi; and Matsuno, Yuji, to Mazda Motor Corporation. Gear-shifting shock suppressing system for automatic transmission vehicle. 5,012,695, Cl. 74-859.000.
- Kyosan Denki Kabushiki Kaisha. *See—*
  - Kawase, Toshirou; Saito, Shiro; and Miyake, Masanobu, 5,012,838, Cl. 137-202.000.
- Kyowa Hakko Kogyo Co., Ltd.: *See—*
  - Takayama, Kenichiro; and Matsunaga, Tomoko, 5,013,656, Cl. 435-122.000.
- L. Schuler GmbH: *See—*
  - Brandstetter, Rudi, 5,012,665, Cl. 72-405.000.
- Labinal Components and Systems, Inc.: *See—*
  - Lindeman, Richard J.; and Smith, Robert J., II, 5,013,249, Cl. 439-66.000.
- Labrum, Randall C. Tool caddy with self-contained power. 5,013,055, Cl. 280-47.190.
- Labuhn, Pamela I.: *See—*
  - Chundrlik, William J.; and Labuhn, Pamela I., 5,014,200, Cl. 364-426.040.
- Lachhein, Stephen: *See—*
  - Mildenberger, Hilmar; Lachhein, Stephen; Rittner, Siegbert; and Tetz aff, Heribert, 5,013,444, Cl. 210-634.000.
- Lackman, Mark B. Ball valve seat distance measuring device and method of using same. 5,012,685, Cl. 73-866.500.
- LaFleur, John A.: *See—*
  - Cozzi, Joseph J.; Conway, Timothy F.; LaFleur, John A.; Rusnak, Eileen M.; and Johnson, Neil H., 5,012,971, Cl. 229-120.070.
- Lafond, Luc, to Tremco, Inc. Apparatus for laying strip on glass or like material. 5,013,377, Cl. 156-109.000.
- LaFond, Robert L.: *See—*
  - Downum, Daniel L.; and LaFond, Robert L., 5,013,149, Cl. 353-122.000.
- Lai, John T., to B. F. Goodrich Company, The. Process for methylating a hindered nitrogen atom in a polysubstituted diazacycloalkan-2-one. 5,013,836, Cl. 540-512.000.
- Laimbock, Franz. Exhaust system for two-stroke cycle internal combustion engines. 5,012,642, Cl. 60-299.000.
- Lamaze, Airy-Pierre; and Paillere, Patrick, to Compagnie Europeenne du Zirconium Cezus of Tour Manhattan. Apparatus for the continuous production of a polyvalent metal. 5,013,413, Cl. 204-64.00R.
- Lambda Electronics Inc.: *See—*
  - Cohen, Itzchak, 5,014,182, Cl. 363-132.000.
- Lammerts, Judocus A. M.; Foss, Richard C.; and Salters, Roelof H. W., to U.S. Philips Corp. Integrated memory circuit with parallel and serial input and output. 5,014,244, Cl. 365-189.050.
- Landmesser, Franklin D., to General Motors Corporation. Door opening system. 5,013,082, Cl. 296-202.000.
- Landoll Corporation: *See—*
  - Landoll, Donald R.; Williams, Kelly; and Peck, Ted, 5,013,056, Cl. 280-425.200.
- Landoll, Donald R.; Williams, Kelly; and Peck, Ted, to Landoll Corporation. Low load angle step deck trailer having shiftable undercarriage. 5,013,056, Cl. 280-425.200.
- Lane, Donald A., to Dennison Manufacturing Company. High speed cutting and stacking apparatus. 5,012,711, Cl. 83-92.000.
- Langen, Bernard A.: *See—*
  - Langen, Jacobus J.; Langen, John H. J.; and Langen, Bernard A., 5,012,728, Cl. 99-533.000.
- Langen, Jacobus J.; Langen, John H. J.; and Langen, Bernard A., to H. J. Langen & Sons Limited. Injection needles for injecting brine and the like into meat. 5,012,728, Cl. 99-533.000.
- Langen, John H. J.: *See—*
  - Langen, Jacobus J.; Langen, John H. J.; and Langen, Bernard A., 5,012,728, Cl. 99-533.000.
- Langer, Alois A.; and Maalouf, Khalil J., to Cardiac Telecom Corporation. Discrete slope delta modulation with recovery means. 5,014,284, Cl. 375-30.000.
- Lankton, Steven P.: *See—*
  - James, Robert B., Jr.; Kalnes, Tom N.; and Lankton, Steven P., 5,013,424, Cl. 208-78.000.
- Lansdowne, David L.: *See—*
  - Hostetler, Dewey L.; Lansdowne, David L.; and Hostetler, Delmar, 5,012,631, Cl. 53-588.000.
- Lanzara, Giovanni: *See—*
  - Boyd, Douglas P.; and Lanzara, Giovanni, 5,014,293, Cl. 378-197.000.
- Larsen, John A.: *See—*
  - Peterson, Robert S.; and Larsen, John A., 5,012,660, Cl. 72-8.000.
- Larson, David A.: *See—*
  - Morrell, Roger J.; and Larson, David A., 5,013,093, Cl. 299-67.000.
- Lasag AG: *See—*
  - Nouri, Taoufik, 5,013,311, Cl. 606-4.000.
- Lasertechnics, Inc.: *See—*
  - Rothe, Dietmar E., 5,014,289, Cl 378-122.000.
- Laskey, Graham C.: *See—*
  - March, Adrian A. C.; and Laskey, Graham C., 5,013,034, Cl. 272-132.000.
- Latos, Thomas S., to Sundstrand Corporation. Transistor load-line controller. 5,014,179, Cl. 363-56.000.
- Lau, Hung-Wah A., to Schlumberger Technologies, Inc. Method and apparatus for calibrating linear delay lines. 5,014,228, Cl. 364-571.010.
- Lauer, Albert W.: *See—*
  - Schriner, David A.; and Lauer, Albert W., 5,014,062, Cl. 342-68.000.
- Lava Group Inc.: *See—*
  - Hsu, James, 5,012,611, Cl 49-225.000.
- Law, Wai T.: *See—*
  - Pasqua, John; and Law, Wai T., 5,013,648, Cl. 435-25.000.
- Lawton, John A., to Du Pont de Nemours, E. I., and Company. Solid imaging system. 5,014,207, Cl. 364-468.000.
- Lawton, Wayne M.; Huffman, John C.; and Zettler, William R., Jr., to Aware, Inc. Image compression method and apparatus. 5,014,134, Cl. 358-261.300.
- Le, Kimanh T.: *See—*
  - Christolini, Ben A.; Le, Kimanh T.; Berndt, Mitchell J.; and Howe, Steven E., 5,013,428, Cl. 208-415.000.
- Leary, Richard C., to Rockwell International Corporation. Three position actuator for shifting a two speed transfer case. 5,012,725, Cl. 92-63.000.
- Leban, Karl, to Boehler Gesellschaft M B.H. Martensite-hardenable steel. 5,013,524, Cl. 420-87.000.
- Lederer, Gabor. Electronic acupuncture device. 5,012,816, Cl. 128-735.000.
- Lee, Brian: *See—*
  - Wilkins, Andre P.; and Lee, Brian, 5,013,004, Cl. 248-692.000.
- Lee, Chune: *See—*
  - Lee, James C. K.; Amdahl, Gene M.; Beck, Richard, Lee, Chune; and Hu, Edward, 5,014,161, Cl. 361-388.000.

VOL
1126
ISS
1
MY
7
1991
UMI

Lee, Eric K.; Kalyani, Vinay J.; and Matson, Stephen L., to Sepracor. Process of treating alcoholic beverages by vapor-arbitrated pervaporation. 5.013,447, Cl. 210-640.000.

Lee, Eric K. L.; Kalyani, Vinay J.; and Matson, Stephen L. Production of low-ethanol beverage by membrane extraction. 5,013,436, Cl. 210-321.800.

Lee, Frank: *See—*
Abrams, John S.; Yokota, Takashi; Lee, Frank; and Arai, Ken-ichi, 5,013,824, Cl. 530-300.000.

Lee, Gary C. M., to Allergan, Inc. 4-ethyl and 4-ethenyl-5-hydroxy-2(5H)-furanones substituted on alpha carbon of the ethyl or ethenyl side chain with a long chain alkyl group and on the beta carbon with a polar group, as anti-inflammatory agents. 5,013,850, Cl. 549-222.000.

Lee, Heyung-Sub: *See—*
Choi, Kyu-Hyun; Lee, Heyung-Sub; and Lee, Jung-Hwan, 5,013,686, Cl. 437-194.000.

Lee, James C. K.; Amdahl, Gene M.; Beck, Richard; Lee, Chune; and Hu, Edward, to Digital Equipment Corporation. System for detachably mounting semiconductors on conductor substrate. 5,014,161, Cl. 361-388.000.

Lee, Jung-Hwan: *See—*
Choi, Kyu-Hyun; Lee, Heyung-Sub; and Lee, Jung-Hwan, 5,013,686, Cl. 437-194.000.

Lee, Ruojia: *See—*
Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.

Lee, Sam S.: *See—*
Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., 5,013,702, Cl. 502-120.000.

Lee, Wong Y.: *See—*
Seng, Chew E.; Hork, Wee T.; and Lee, Wong Y., 5,013,347, Cl. 65-43.000.

Lee, Wylie I.: *See—*
Watts, Richard P.; Lee, Wylie I.; and Vorpahl, John W., 5,013,150, Cl. 356-73.000.

Lefebvre, James D.: *See—*
Kromenaker, Susan C.; Lefebvre, James D.; and Binzel, Charles P., 5,014,294, Cl. 379-58.000.

Lefferts, Scott R.; Stelzer, Dennis J., Sr.; and Weisenberger, Thomas V., to Pullman Company, The. Elastomeric clamp. 5,013,002, Cl. 248-74.100.

Le Fur, Isidore: *See—*
Botannet, Bernard; Le Fur, Isidore; Massonneau, Viviane; and Mulhauser, Michel, 5,013,855, Cl. 549-539.000.

Legoy, Annick: *See—*
Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.

Legoy, Auguste; and Quibel, Alain, to Legoy, Auguste; Quibel, Alain; Saillard, Marthe; Legoy, Claude; Legoy, Philippe; Legoy, Annick; Hamel, Yvette; Quibel, Anne-Sophie; Quibel, Pierre; and Quibel, Vincent. Modular navigation vessel equipped with rotating floats. 5,013,269, Cl. 440-100.000.

Legoy, Claude: *See—*
Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.

Legoy, Philippe: *See—*
Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.

Leibfried, Raymond T., Sr., to Hercules Incorporated. Organosilicon compositions. 5,013,809, Cl. 524-862.000.

Leibman, Vadim, to AVR Communications Ltd. Frequency transposing hearing aid. 5,014,319, Cl. 381-68.200.

Leigh-Monstevens, Keith V.; Peterson, David C.; and Mabee, Brian, to Automotive Products (USA) Inc. Motor vehicle control system 5,014,038, Cl. 340-430.000.

Leighton Industries, Inc.: *See—*
Sheikh, Ramsey U.; and Stavrou, Steve A., 5,012,767, Cl 122-511.000.

Leimer, Marius; von der Crone, Jost; Babler, Fridolin; and Neuschutz, Heinz, to Ciba-Geigy Corporation. Process for enhancing the filterability of organic pigments. 5,013,455, Cl. 210-729.000.

Lejus Medical Aktiebolag: *See—*
Eskilsson, Eva C., 5,013,868, Cl. 562-557.000

Le Loarer, Jean-Luc: *See—*
Dissaux, Antoine; and Le Loarer, Jean-Luc, 5,013,534, Cl. 423-263.000.

Lemay, Claude, to R. Laborie Medical Corporation. Surgical correction of female urinary stress incontinence and kit therefor. 5,013,292, Cl. 600-30.000.

Lembke, Manfred. *See—*
Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.

Lenhard, Ulrich: *See—*
Beutler, Hans J.; Gahrs, Hans J.; Lenhard, Ulrich; and Lurken, Franz, 5,012,827, Cl. 131-297.000.

Lennart, Sjoo : *See—*
Medin, Gunnar; Olsson, Erik; Lennart, Sjoo ; and Lundgren, Roger, 5,012,721, Cl. 89-36.170.

Lenox Institute for Research, Inc.: *See—*
Krofta, Milos, 5,013,429, Cl. 210-137.000.

Lentzen, Donald E. Sampling procedures and protective layers for the preservation of particulates obtained by filter collection and impingement operations. 5,012,681, Cl. 73-863.230.

Leon, Michael A., to FMC Corporation. Interface control and stop means for aircraft cargo loader platform. 5,013,204, Cl. 414-347.000.

Leonard, George H., to Hamlin Transmission Corporation. Variable ratio drive system. 5,013,284, Cl. 474-52.000.

Leonard, Jacques: *See—*
Nocca, Jean-Luc; Leonard, Jacques; Gaillard, Jean-Ferdinand; and Amigues, Pierre, 5,013,407, Cl. 202-158.000.

Leonard, Robert R., to Milliken Research Corporation Method and apparatus for producing an improved camouflage construction. 5,013,375, Cl. 156-61.000.

Leone, Daniel E.: *See—*
Fisher, Harold M.; and Leone, Daniel E., 5,013,439, Cl. 210-500.230.

Leoni, Umberto: *See—*
Morris, Gregory J. E.; Borrione, Pierluigi A. V.; and Leoni, Umberto, 5,013,414, Cl. 204-98.000.

Le Page, Jean-Francois: *See—*
Dang Vu, Quang; Bournonville, Jean-Paul; and Le Page, Jean-Francois, 5,013,426, Cl. 208-134.000.

Leupold, Herbert A., to United States of America, Army. Triangular section permanent magnetic structure. 5,014,028, Cl. 335-210.000.

Leussler, Wilhelm; Wurl, Robert; and Schlaffer, Herbert, to Metallgesellschaft Aktiengesellschaft. Centrifugal separator and granular filter unit. 5,013,342, Cl. 55-337.000.

Levendis, Yiannis A.: *See—*
Taslim, Mohammad E.; and Levendis, Yiannis A., 5,013,340, Cl 55-290.000.

Levin, Jeremy I.: *See—*
Tseng, Shin S.; Epstein, Joseph W.; and Levin, Jeremy I., 5,013,737, Cl. 514-267.000.

Levine, Jules D.: *See—*
Knepprath, Vernon E.; and Levine, Jules D., 5,012,619, Cl 51-163.100.

Lewandowski, Richard *See—*
Graton, Michel; and Lewandowski, Richard, 5,013,281, Cl. 464-68.000.

Lewandowski, Stanley W., Jr.: *See—*
Hardigg, James S.; and Lewandowski, Stanley W., Jr., 5,012,553, Cl. 16-126.000.

Lewiner, Jacques; Hennion, Claude; and Smycz, Eugeniusz, to Lewiner, Jacques; and Hennion, Claude. Electronic interrogation circuits. 5,014,050, Cl. 340-870.190.

Lewis, John, Sr. Athletic towel. 5,012,543, Cl. 15-209.00R.

Lewis, William: *See—*
Guest, Allen M.; Preus, Martin W.; and Lewis, William, 5,013,608, Cl. 428-436.000.

Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Krieg, Wolfgang; and Hofmeister, Peter, to BASF Aktiengesellschaft. Phenoxyalkyl-substituted heteroaromatics and a method for controlling pests. 5,013,847, Cl. 548-378.000.

LGZ Landis & Gyr Zug AG: *See—*
Seitz, Thomas, 5,014,006, Cl. 324-249.000.

Li, Yao-Tzu; and Yundt, Brad, to Y. T. Li Engineering, Inc. Chromatographic gel contactor and process. 5,013,446, Cl. 210-635.000.

Liang, Marc D.; and Narayanan, Krishna, to Montefiore Hospital Association of Western Pennsylvania. Method for removing skin wrinkles. 5,012,797, Cl. 128-24.00A.

Liao, Yin-Chieh. Fan assembly. 5,013,224, Cl. 417-423.500.

Libbey-Owens-Ford Co.: *See—*
Cheng, J. Joseph, 5,013,487, Cl. 252-587.000.

Licentia Patent-Verwaltungs GmbH: *See—*
Stock, Don J. R.; and Eckert, Eberhard, 5,014,070, Cl 343-700.0MS.

Liese, Gerhard, to Hewi Heinrich Wilke GmbH. Receptacle. 5,013,001, Cl. 248-551.000.

Life Technologies, Inc.: *See—*
Lorier, Michel A.; and Aitken, Brian L., 5,013,568, Cl. 426-332.000
Schuette, Michael W., 5,013,420, Cl 204-299.00R.

Light Years Ahead Limited: *See—*
Burn, Michael; and Adby, Colin, 5,014,172, Cl. 362-284.000.

Lim, Hyun S.: *See—*
Guckert, Joseph R.; and Lim, Hyun S., 5,013,599, Cl. 428-286.000

Lin, John. Structure of circuit board assembly. 5,014,163, Cl. 361-415.000

Lin, Yeong C., to Advanced Diversified Technology, Inc. Corrosion resistant silicon inorganic polymeric coatings 5,013,588, Cl. 427-397.700

Lind, Torvald, to Ytong AG. Mechanism for feeding transverse reinforcement rod to a welding machine. 5,013,879, Cl 219-56.000.

Lindae, Gerhard; Loewe, Richard, and Perthus, Peter, to Robert Bosch GmbH Low beam or fog headlamp for motor vehicles. 5,014,173, Cl. 362-309.000.

Lindeman, Richard J.; and Smith, Robert J., II, to Labinal Components and Systems, Inc. Electrical connectors 5,013,249, Cl. 439-66.000.

Lindemann, Rolf; and Heitmann, Uwe, to Korber AG. Apparatus for perforating running webs of wrapping material and cleaning devices therefor. 5,012,825, Cl. 131-281.000.

Lindstrom, Richard L.; and Skelnik, Debra Viscoelastic solution. 5,013,714, Cl. 514-4.000.

Liposome Technology, Inc.: *See—*
Woodle, Martin C.; Martin, Francis J.; Yau-Young, Annie; and Redemann, Carl T., 5,013,556, Cl. 424-450.000.

Lippmann, Raymond; Schnars, Michael J.; and Chintyan, James R., to Delco Electronics Corporation. Increased resolution sensor circuit 5,014,051, Cl. 340-870.380.

Lisimaque, Gilles; and Bahout, Yvon, to SGS-Thomson Microelectronics SA. Security system for the protection of programming zones of a chip card. 5,014,312, Cl. 380-25.000.

Litherland, Albert E.; and Kilius, Linas R., to University of Toronto Innovations Foundation. Mass recombinator for accelerator mass spectrometry. 5,013,923, Cl. 250-396.00R.

Littell, Edmund R. Vacuum cup construction. 5,013,075, Cl. 294-64.100.

Little, Francis H.; and Ingram, Douglas E., to General Electric Company. Reduced thickness radiation window for an ionization detector. 5,013,922, Cl. 250-385.100.

Littleton, Teresa: *See—*
Christiansen, Steven H.; Littleton, Teresa; and Patton, Robert T., 5,013,404, Cl. 162-72.000.

Liu, Yauh-Ching: *See—*
Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.

Livingston, James W.: *See—*
Turner, James R.; Hosking, Stephen G.; and Livingston, James W., 5,014,211, Cl. 364-478.000.

Loberg, Loren L., to Sybron Chemicals, Inc. Fluid driven tank cleaning apparatus. 5,012,976, Cl. 239-227.000.

Loblein, Eldon. Trash organizer. 5,013,102, Cl. 312-234.100.

Lochmann, Robert L.: *See—*
Sokol, James M.; Lochmann, Robert L.; and Fischer, John G., 5,013,222, Cl. 417-366.000.

Lockhart, Reed; and Spanier, Barry, to Neil Pryde Limited. Apparatus for tensioning a sail. 5,012,755, Cl. 114-103.000.

Lockwood, Alan C.; and Bloom, Myron G., to Masco Building Products Corp. Cable clamp. 5,013,872, Cl. 174-65.00R.

Lodberg, Allan: *See—*
Pocock, Terrence H.; McNorgan, Rick; Coumons, Peter; and Lodberg, Allan, 5,014,125, Cl. 358-86.000.

Loewe, Richard: *See—*
Lindae, Gerhard; Loewe, Richard; and Perthus, Peter, 5,014,173, Cl. 362-309.000.

Loftin, Rachel M.: *See—*
Case, Laura K., deceased; Gajria, Chandrasen; Loftin, Rachel M.; and Peper, Henry, 5,013,361, Cl. 106-22.000.

Lohmann, Jean J.: *See—*
Arnould, Jean C.; Lohmann, Jean J.; and Pasquet, Georges, 5,013,731, Cl. 514-202.000.

Lohr Industrie, S.A.: *See—*
Donnard, Rene, 5,012,999, Cl. 248-685.000.

Long, David L.; Mitchell, Mark A.; and Sczomak, David P., to General Motors Corporation. Fuel injection delivery valve with reverse flow venting. 5,012,785, Cl. 123-467.000.

Long, Paul D.; and Guerricabeitia, Jose J., to Micron Technology, Inc. Anisotropic etch method for a sandwich structure. 5,013,398, Cl. 156-643.000.

Longsworth, Ralph, to APD Cryogenics, Inc. Cryogen thermal storage matrix. 5,012,650, Cl. 62-51.200.

Longview Fibre Company: *See—*
Nordstrom, Duane M.; and Baker, Harold L., 5,012,972, Cl. 229-162.000.

Lonsinger, Deborah A.: *See—*
Lonsinger, Jack J.; and Lonsinger, Deborah A., 5,013,698, Cl. 502-27.000.

Lonsinger, Jack J.; and Lonsinger, Deborah A. Method of reducing carbon loss in regeneration process. 5,013,698, Cl. 502-27.000.

Loontjens, Jacobus: *See—*
Coosmans, Luc M. C.; Blenkers, Johannes; and Loontjens, Jacobus, 5,013,701, Cl. 502-110.000.

Loos, Gerhard; and Spiegel, Nikolaus, to Heidelberger Druckmaschinen AG. Washing device. 5,012,739, Cl. 101-425.000.

Loosen, Peter: *See—*
Herziger, Gerd, Loosen, Peter; Marten, Otto; and Boning, Hartwig, 5,014,282, Cl. 372-93.000.

Lopes, Jose F. Mechanical-metallurgic process for repairing machines or machine components damaged by cracks, fissures, wearings or squashes made of metallic material difficult to weld and of any forms. 5,012,800, Cl. 228-119.000.

Lopetrone, Juan P.; and Valdes, Oliver, to Southern California Edison. Current sensing. 5,014,043, Cl. 340-664.000.

Lopp, Victoria R.: *See—*
Frenier, Wayne; Growcock, Fred; Lopp, Victoria R.; and Dixon, Brian, 5,013,483, Cl. 252-396.000.

Lorier, Michel A.; and Aitken, Brian L., to Life Technologies, Inc. Method for treating fish with alpha-2-macroglobulin. 5,013,568, Cl. 426-332.000.

Lory, Earl R.; and Olmer, Leonard J., to AT&T Bell Laboratories. AWnisotropic deposition of silicon dioxide. 5,013,691, Cl. 437-238.000.

Losic, Novica A.: *See—*
Varga, Ljubomir D.; and Losic, Novica A., 5,013,998, Cl. 323-285.000.

Lotterman, Harm: *See—*
Mellink, Willem F.; Janssen, Peter J. G M.; Zwier, Jan; and Lotterman, Harm, 5,013,384, Cl. 156-345.000.

Loutaty, Roben: *See—*
Maroy, Pierre; Patureaux, Thierry; Freychet, David; and Loutaty, Roben, 5,013,368, Cl. 134-22.110.

Love, Phillip W. Apparatus for picking up, transporting and unrolling large bales of hay. 5,013,202, Cl. 414-24.500.

Lowery, Christopher A.: *See—*
Dody, Joseph W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 5,014,074, Cl. 346-107.00R.

Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., to Micron Technology, Inc. Process for fabricating a DRAM array having feature widths that transcend the resolution limit of available photolithography. 5,013,680, Cl. 437-52.000.

LRS, Inc.: *See—*
McGarvey, David C.; and Buffalini, Jerry E., 5,012,949, Cl. 220-455.000.

LSI Logic Corporation: *See—*
Horstmann, Jens U.; Coates, Robert L.; and Eichel, Hans W., 5,014,226, Cl. 364-551.010.

Lucas Industries public limited company: *See—*
Campbell, Roy; and Price, Anthony G., 5,012,901, Cl. 188-71.400.
Finney, Adrian D., 5,014,101, Cl. 357-37.000.

Luczak, Francis J., to International Fuel Cells Corporation. Ternary alloy fuel cell catalysts and phosphoric acid fuel cell containing the catalysts. 5,013,618, Cl. 429-44.000.

Lues, Ingeborg: *See—*
Gericke, Rolf; Baumgarth, Manfred; Lues, Ingeborg; Bergmann, Rolf; and De Peyer, Jacques, 5,013,853, Cl. 549-401.000.

Lukehart, Dudley L.: *See—*
Romans, William W.; and Lukehart, Dudley L., 5,012,526, Cl. 15-256.500.

Lundgard, Richard A.: *See—*
Mahoney, Robert D.; and Lundgard, Richard A., 5,013,339, Cl. 55-158.000.

Lundgren, Roger: *See—*
Medin, Gunnar; Olsson, Erik; Lennart, Sjoo ; and Lundgren, Roger, 5,012,721, Cl. 89-36.170.

Lundmark, Bo J. Construction process for multiple-story concrete building. 5,012,627, Cl. 52-741.000.

Lupinacci, Paul D.: *See—*
Vaccaro, John C.; and Lupinacci, Paul D., 5,012,830, Cl. 132-213.100.

Lurken, Franz: *See—*
Beutler, Hans J.; Gahrs, Hans J.; Lenhard, Ulrich; and Lurken, Franz, 5,012,827, Cl. 131-297.000.

Lutz, Gottfried: *See—*
Breuer, Rudolf; Lutz, Gottfried; Pertzsch, Albert; and Schultz, Helmut, 5,014,150, Cl. 360-132.000.

Luwa Japan Limited: *See—*
Kuwabara, Syokichi; and Yoshioka, Toyotoshi, 5,012,546, Cl. 15-301.000.

Luxenberg, Robert A.; and Brown, Robert J., to Interactive Network, Inc. method of evaluating data relating to a common subject. 5,013,038, Cl. 273-439.000.

Lynn, Theodore R.; and Finch, Stephen R., to Dexsil Corporation. Apparatus and method for measuring halogen content. 5,013,667, Cl. 436-126.000.

Lynn, William R. Mopping system. 5,012,542, Cl. 15-1.000.

Maalouf, Khalil J.: *See—*
Langer, Alois A.; and Maalouf, Khalil J., 5,014,284, Cl. 375-30.000.

Maass, Rudolf: *See—*
Precht, Hans-Jurgen; and Maass, Rudolf, 5,012,556, Cl. 16-366.000

Mabe, William J., Jr., to Sundstrand Corporation. Magnetic transmission. 5,013,949, Cl. 310-83.000.

Mabee, Brian: *See—*
Leigh-Monstevens, Keith V.; Peterson, David C.; and Mabee, Brian, 5,014,038, Cl. 340-430.000.

Mabuchi Motor Co., Ltd.: *See—*
Sata, Nobuyuki, 5,013,946, Cl. 310-40.0MM.

Macaluso, Howard C., to Tennessee Gas Pipeline Company. Muffler assembly. 5,012,891, Cl. 181-282.000.

Macaulay, Malcolm, to Hughes Aircraft Company. Compensation arrangement for display systems. 5,013,978, Cl. 315-367.000.

MacGill, Robert A.: *See—*
Brown, Ian G.; MacGill, Robert A.; and Galvin, James E., 5,013,578, Cl. 427-37.000.

Machen, Inc.: *See—*
Speer, Stephen R., 5,012,646, Cl. 60-728.000.

Machida, Satoshi; and Hattori, Akio, to Kubota Ltd. Change-speed control construction. 5,012,909, Cl 192-3.570.

MacInnis, Richard F. Shifting method and apparatus. 5,012,888, Cl 180-336.000.

MacIntyre, Brian; Close, Frank; and McAvoy, Sean, to Cooper Industries, Inc. Positioning components and energizing sealing assemblies therefor. 5,013,187, Cl. 405-169.000.

Mackowski, Jean-Marie: *See—*
Meunier, Paul-Louis; Mackowski, Jean-Marie; and Rolland, Jean-Luc, 5,013,580, Cl. 427-39.000.

MacLeay, Ronald E.; Sanchez, Jose; and Stein, Daryl L., to Atochem North America, Inc. Novel single-functional and mixtures of multifunctional oligomeric performance additive compositions and their uses. 5,013,777, Cl. 524-159.000.

MacVane, Benjamin F. Gel-dispensing pacifier. 5,013,321, Cl. 606-234.000.

Maddalena, Frederick L., to USX Corporation Flushing liquor decanter drag modification. 5,013,440, Cl. 210-526.000.

Madison, Vincent S.: *See—*
Danho, Waleed; Madison, Vincent S., and Triscari, Joseph, 5,013,722, Cl. 514-16.000.

VOL 1126 ISS 1 MY 7 1991 UMI

- Madsen, Jens; and Kaae, Svend S., to Milliken Research Corporation. Method of dispensing vapor to the air in a room and an apparatus for carrying out the method. 5,012,961, Cl. 222-643.000.
- Maeda, Hiromi: *See—*
  - Kiriyama, Yoshiyuki; Moriga, Kazuyuki; Shinohara, Toshio; Matsuda, Mitsuhiro; and Maeda, Hiromi, 5,013,768, Cl. 522-64.000.
- Maeda, Munesige: *See—*
  - Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.
- Maeda, Takeo; and Higashizono, Masayoshi, to Kabushiki Kaisha Toshiba. Semiconductor device for use in a hybrid LSI circuit. 5,014,106, Cl. 357-43.000.
- Maggioni, Virginio; and Torrielli, Vittorino, to Fiat Auto S.p.A. Throttle-controlled hydraulic power brake booster. 5,012,647, Cl. 60-413.000.
- Magna, Henriette: *See—*
  - Rolland, Jean-Luc; Beguin, Jean-Yves; Magna, Henriette; Jacobelli, Alain; and Penot, Maurice, 5,013,394, Cl. 156-627.000.
- Magnaval, Jean-Louis: *See—*
  - Maligne, Jean-Charles; and Magnaval, Jean-Louis, 5,012,903, Cl. 188-79.540.
- Magnetrol International: *See—*
  - Remion, Michel, 5,012,589, Cl. 33-720.000.
- Mahabadi, John K., to Motorola, Inc. CMOS level detctor circuit. 5,013,935, Cl. 307-350.000.
- Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., to General Signal Corporation. Quad processor. 5,013,385, Cl. 156-345.000.
- Mahoney, Robert D.; and Lundgard, Richard A., to Dow Chemical Company, The. Compositions useful for making microporous polyvinylidene fluoride membranes, and process. 5,013,339, Cl. 55-158.000.
- Mahulikar, Deepak; Crane, Jacob; and Braden, Jeffrey S., to Olin Corporation. Kit for the assembly of a metal electronic package. 5,013,871, Cl. 174-52.400.
- Maier, Ludwig, to Ciba-Geigy Corporation. Microbicides. 5,013,559, Cl. 424-605.000.
- Maier, Ludwig: *See—*
  - Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpe, Hans-Rudolf, 5,013,863, Cl. 562-11.000.
- Maier, Martin: *See—*
  - Buchholz, Juergen; and Maier, Martin, 5,012,983, Cl. 239-590.500.
- Maisonneuve, Yves. Device for pressing heterogeneous mixtures with regulated pressing force for separating liquid and solid fractions thereof, in particular fruit juices. 5,012,731, Cl. 100-110.000.
- Makino, Katsuaki; and Toyofuku, Toshihiro, to Mitsubishi Jukogyo Kabushiki Kaisha. Ink feeder with moisture removal. 5,012,737, Cl. 101-350.000.
- Maldonado, David J. Stretchable, water repellant book cover. 5,013,068, Cl. 281-31.000.
- Maliga, Pal: *See—*
  - Dooner, Hugo; Jones, Jonathan; and Maliga, Pal, 5,013,658, Cl. 435-172.300.
- Maligne, Jean-Charles; and Magnaval, Jean-Louis, to Bendix France. Automatically adjustable spacer for a drum brake. 5,012,903, Cl. 188-79.540.
- Malis, Michael J.; and Jones, Flave L., to American Home Products Corporation. Fetal electrode product with protective cap. 5,012,811, Cl. 128-642.000.
- Malkieli, Moshe; and Apel, Israel, to Samuel Kaner, a part interest. Dual-powered flickering symbolic or religious light (electronic yahrzeit). 5,013,972, Cl. 315-209.00R.
- Mallalieu, David H.: *See—*
  - Fletcher, William D.; Mallalieu, David H.; and Cummings, Donald P., 5,012,581, Cl. 30-162.000.
- Mallinckrodt, Inc.: *See—*
  - Cross, Gregory D.; and Chapman, Robert C., 5,013,865, Cl. 562-456.000.
- Mallinson, Stephen R.: *See—*
  - Healey, Peter; and Mallinson, Stephen R., 5,013,140, Cl. 350-347.00E.
- Malmstrom, Rolf E.: *See—*
  - Elvander, Hans I.; and Malmstrom, Rolf E., 5,013,355, Cl. 75-23.000.
- Malmstrom, Sven E. Method of manufacturing an elongated structural member. 5,013,512, Cl. 264-255.000.
- Malon, Raymond F.; and Cruse, Clint A., to Permea, Inc. Asymmetric gas separation membranes having improved strength. 5,013,767, Cl. 521-64.000.
- Maltezos, Alexander. International speaker telephone. 5,014,301, Cl. 379-155.000.
- MAN Gutehoffnungshutte: *See—*
  - Grathoff, Hartmut; and Hubel, Werner, 5,013,201, Cl. 414-139.400.
- Maney, Jerry R.: *See—*
  - Stentz, Laura L.; Maney, Jerry R.; and Sox, Thomas E., 5,013,560, Cl. 424-653.000.
- Manlove, Gregory J.: *See—*
  - Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., 5,014,316, Cl. 381-15.000.
- Mannesmann Aktiengesellschaft: *See—*
  - Gilbert, Arthur; Gottstein, Norbert; and Rostock, Joachim, 5,012,917, Cl. 198-465.200.
- Manning, Peter R. J.: *See—*
  - Dixon, Anthony J.; and Manning, Peter R. J., 5,013,278, Cl. 446-73.000.
- Manof, Alexandru I. B.: *See—*
  - Firica, Andrei; Manof, Alexandru I. B.; and Gheorghiu, Dragos, 5,013,314, Cl. 606-64.000.
- Mansfield, Bruce M.; Kolnick, Frank C.; and Kun, Andrew I., to Motorola Computer X, Inc. System for locating a file in a logical ring by sequentially forwarding access request with file system name and file name. 5,014,192, Cl. 364-200.000.
- Mantele, John E., to Hughes Aircraft Company. Non-dispersive variable phase shifter and variable length transmission line. 5,014,023, Cl. 333-164.000.
- Marabotto, Eduardo J.; and Gilmore, Peter, to Motorola, Inc. Dual function fastener. 5,013,174, Cl. 403-11.000.
- Marazzi, Silvio, to Diamond S.A. Optical fibre end piece for an optical fibre. 5,013,110, Cl. 350-96.200.
- March, Adrian A. C.; and Laskey, Graham C., to Health Habit Developments Limited. Exercise machine. 5,013,034, Cl. 272-132.000.
- Marco/Marvin Electric Manufacturing Co.: *See—*
  - Stringer, Ralph S.; and Green, Horace L., Jr., 5,013,251, Cl. 439-94.000.
- Marcus, Bonita K., to UOP. Process for sequestering ammonia and the odor associated therewith. 5,013,335, Cl. 55-70.000.
- Marin, Thomas C., to Data Tech Servies, Inc. Disintegratable masking label. 5,013,088, Cl. 283-81.000.
- Markley, Lowell D.; Hamilton, Christopher T.; Swisher, Beth A.; and Secor, Jacob, to DowElanco. Substituted pyridyl-cyclohexanediones and their herbicidal uses. 5,013,352, Cl. 71-94.000.
- Markow, Mitch A.; Moody, Dale O.; and Greenberger, Hal P., to Bose Corporation. Voice coil lead dressing. 5,014,323, Cl. 381-194.000.
- Marler, David O.: *See—*
  - Absil, Robert P. L.; Degnan, Thomas F.; Han, Scott; Marler, David O.; Socha, Richard F.; and Stapleton, Michael R., 5,013,422, Cl. 208-27.000.
- Marotta, Amy L.: *See—*
  - Marotta, Phillip, Jr.; Marotta, Debbie; and Marotta, Amy L., 5,013,301, Cl. 604-197.000.
- Marotta, Debbie: *See—*
  - Marotta, Phillip, Jr.; Marotta, Debbie; and Marotta, Amy L., 5,013,301, Cl. 604-197.000.
- Marotta, Phillip, Jr.; Marotta, Debbie; and Marotta, Amy L. Syringe holder. 5,013,301, Cl. 604-197.000.
- Maroy, Pierre; Patureaux, Thierry; Freychet, David; and Loutaty, Roben, to Compagnie de Raffinage et de Distribution Total France. Method and device for cleaning a tube in which a fluid-circulates, and their use in heat-exchanger tubes. 5,013,368, Cl. 134-22.110.
- Marquardt, Gerwig; and Preiss, Peter, to Bayer Aktiengesellschaft. Stablized polyorganosiloxanes and their use as a power transmission medium. 5,013,858, Cl. 556-401.000.
- Marraccini, Antonio; Perego, Gabriele; and Guastalla, Giovanni, to Ausimont S.R.L. Chlorotrifluoroethylene telomers. 5,013,472, Cl. 252-78.100.
- Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., to Delco Electronics Corporation. Compatible quadrature amplitude modulation detector system. 5,014,316, Cl. 381-15.000.
- Marras, William S.; Davis, Shelby W.; Miller, Robert J.; and Mirka, Gary A., to Marras, William S. Apparatus for monitoring the motion components of the spine. 5,012,819, Cl. 128-781.000.
- Mars Incorporated: *See—*
  - Glasspool, Andrew J. K., 5,013,898, Cl. 235-449.000.
- Marsh, Ralph Z., to Adolph Coors Company. Apparatus for removing fluid particles from containers. 5,012,547, Cl. 15-304.000.
- Marshall Air Systems, Inc.: *See—*
  - Stuck, Robert M., 5,013,563, Cl. 426-233.000.
- Marten, Otto: *See—*
  - Herziger, Gerd; Loosen, Peter; Marten, Otto; and Boning, Hartwig, 5,014,282, Cl. 372-93.000.
- Martin, Emilio B., to Amper, S.A. Device for printing endorsements of documents. 5,012,734, Cl. 101-91.000.
- Martin, Francis J.: *See—*
  - Woodle, Martin C.; Martin, Francis J.; Yau-Young, Annie; and Redemann, Carl T., 5,013,556, Cl. 424-450.000.
- Martin Marietta Energy Systems, Inc.: *See—*
  - Holcombe, Cressie E.; and Dykes, Norman L., 5,013,694, Cl. 501-98.000.
- Martin, Todd S.: *See—*
  - Ignatius, Ronald W.; Martin, Todd S.; Bula, Raymond J.; Morrow, Robert C.; and Tibbitts, Theodore W., 5,012,609, Cl. 47-58.000.
- Martin, William D. Storm door of tubular frame construction. 5,012,616, Cl. 49-501.000.
- Martindell, J. Richard. Depth locator apparatus for insert bit holders. 5,012,708, Cl. 81-429.000.
- Martinez-Mugica, Fernando. Filter system for liquids with particles in suspension. 5,013,432, Cl. 210-195.100.
- Maruko, Chiaki: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Marusen Co., Ltd.: *See—*
  - Mori, Toshifumi, 5,012,754, Cl. 114-36.000.
- Maruyama, Nobusato: *See—*
  - Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.

- Maruyama, Sigeo: *See—*
  - Takemasa, Kaoru; Takahashi, Akira; Kawamura, Masahiko; Maruyama, Sigeo; and Kon, Tokushige, 5,014,258, Cl. 369-178.000.
- Masaki, Kouichi: *See—*
  - Yamazaki, Nobuo; Inaba, Hiroo; and Masaki, Kouichi, 5,013,602, Cl. 428-323.000.
- Masco Building Products Corp.: *See—*
  - Lockwood, Alan C.; and Bloom, Myron G., 5,013,872, Cl. 174-65.00R.
- Masoero, Marco: *See—*
  - Garrone, Angelo; and Masoero, Marco, 5,013,080, Cl. 296-180.100.
- Masonek, Steven J.: *See—*
  - Rabo, Frederick N.; and Masonek, Steven J., 5,013,193, Cl. 408-201.000.
- Massey, Darryl D.; and Gordon, Michael D. Combined electronic clinical thermometer and pacifier. 5,013,160, Cl. 374-151.000.
- Massonneau, Viviane: *See—*
  - Botannet, Bernard; Le Fur, Isidore; Massonneau, Viviane; and Mulhauser, Michel, 5,013,855, Cl. 549-539.000.
- Masters, John R.; and Briscoe, Dennis R., to Tandon Corporation. Disk drive controller system with enhanced communications interface. 5,014,237, Cl. 364-900.000.
- Masuda, Eiji: *See—*
  - Nishimura, Akira; Watanabe, Hiroyuki; and Masuda, Eiji, 5,013,942, Cl. 307-480.000.
- Masuda, Fumitoshi, to Murata Manufacturing Co., Ltd. Method of molding a casing on a rotary electric component. 5,013,505, Cl. 264-130.000.
- Masuda, Misao: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Masuda, Yoshitomo: *See—*
  - Miyazaki, Tadaaki; Ogino, Takao; Masuda, Yoshitomo; Wada, Hiroaki; and Kawagoe, Takahiro, 5,013,620, Cl. 429-194.000.
- Masukawa, Tetsuo: *See—*
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- Masumoto, Tsuyoshi; Inoue, Akihisa; Oguchi, Masahiro; and Harakawa, Yoshio, to Teikoku Piston Ring Co., Ltd.; and Masumoto, Tsuyoshi. Method of making additive powders for coating materials or plastics. 5,013,346, Cl. 65-21.200.
- Matson, Stephen L.: *See—*
  - Lee, Eric K.; Kalyani, Vinay J.; and Matson, Stephen L., 5,013,447, Cl. 210-640.000.
  - Lee, Eric K. L.; Kalyani, Vinay J.; and Matson, Stephen L., 5,013,436, Cl. 210-321.800.
- Matsubara, Motonari: *See—*
  - Ohkawa, Hideki; Ozawa, Norio; Higashino, Hiroyuki; and Matsubara, Motonari, 5,013,635, Cl. 430-495.000.
- Matsuda, Kenichi; and Shibata, Jun, to Matsushita Electric Industrial Co., Ltd. Optoelectronic integrated circuit with optical gate device and phototransistor. 5,014,096, Cl. 357-19.000.
- Matsuda, Mitsuhiro: *See—*
  - Kiriyama, Yoshiyuki; Moriga, Kazuyuki; Shinohara, Toshio; Matsuda, Mitsuhiro; and Maeda, Hiromi, 5,013,768, Cl. 522-64.000.
- Matsuda, Yoshio: *See—*
  - Asakura, Mikio; Fujishima, Kazuyasu; and Matsuda, Yoshio, 5,014,241, Cl. 365-51.000.
- Matsui, Haruhiko: *See—*
  - Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, 5,012,715, Cl. 84-724.000.
- Matsui, Hideo: *See—*
  - Itoh, Mitsuhiro; and Matsui, Hideo, 5,013,985, Cl. 318-558.000.
- Matsui, Hiromichi: *See—*
  - Kumesawa, Tetsuro; Kanou, Yasuo; Nishima, Osamu; Isobe, Masaaki; and Matsui, Hiromichi, 5,014,132, Cl. 358-213.190.
- Matsui, Hiroshi: *See—*
  - Hasegawa, Akira; Takahashi, Susumu; Tsuji, Koyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, 5,014,121, Cl. 358-55.000.
- Matsui, Makoto: *See—*
  - Kobayashi, Nobuyoshi; Suzuki, Masayuki; Kondo, Seiichi; Matsui, Makoto; and Mukai, Kiichiro, 5,013,526, Cl. 420-430.000.
- Matsui, Toshio: *See—*
  - Johdai, Akiyoshi; Kinoshita, Keichi; and Matsui, Toshio, 5,013,021, Cl. 270-53.000.
  - Kubo, Naoki; Ishikawa, Takuma; Matsui, Toshio; Atsumi, Fumitoshi; and Doi, Yasuhiko, 5,014,092, Cl. 355-324.000.
- Matsumoto, Jun-ichi; Minamida, Akira; Fujita, Masahiro; Hirose, Tohru; Nakano, Junji; and Nakamura, Shinichi, to Dainippon Pharmaceutical Co., Ltd. Oxo quinoline derivatives. 5,013,841, Cl. 544-363.000.
- Matsumoto, Kazunori: *See—*
  - Yokota, Katsuyoshi; Jingu, Toshihiro; and Matsumoto, Kazunori, 5,013,168, Cl. 400-82.000.
- Matsumoto, Kozo: *See—*
  - Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.
- Matsumoto, Misao, to Karaki, Hiroshi. Cutting machine for synthetic resin pipes. 5,012,579, Cl. 30-92.000.
- Matsumura, Ko: *See—*
  - Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, 5,013,372, Cl. 148-111.000.
- Matsumura, Yasuo; Aoki, Takayoshi; Nagatsuka, Ikutaroh; and Mochiauki, Masao, to Fuji Xerox Co., Ltd. Carrier of a magnetic powder dispersed type. 5,013,626, Cl. 430-106.600.
- Matsunaga, Eiju: *See—*
  - Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.
- Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, to Kabushiki Kaisha Kawai Gakki Seisakusho. Sensor for an automatic piano player apparatus. 5,012,715, Cl. 84-724.000.
- Matsunaga, Kazu; Okuda, Hiroshi; and Awazu, Kenzo, deceased (by Awazu, Setsuko, legal representative), to Mitsubishi Denki Kabushiki Kaisha. Phosphor for cathode ray tube. 5,013,480, Cl. 252-301.40H.
- Matsunaga, Tomoko: *See—*
  - Takayama, Kenichiro; and Matsunaga, Tomoko, 5,013,656, Cl. 435-122.000.
- Matsunami, Keisuke: *See—*
  - Miyakawa, Tatsuo; Kato, Osamu; Koike, Yusuke; Matsunami, Keisuke; and Sekiya, Naoyuki, 5,013,906, Cl. 250-223.00R.
- Matsuno, Yuji: *See—*
  - Kyohzuka, Takahiro; Fujii, Masaki; Kikuchi, Toshiyuki; Abe, Mitsutoshi; and Matsuno, Yuji, 5,012,695, Cl. 74-859.000.
- Matsuoka, Noriyuki; and Uratsuji, Kazumi, to Yamaichi Electric Mfg. Co., Ltd. Socket for electric part. 5,013,256, Cl. 439-264.000.
- Matsushige, Naoki: *See—*
  - Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 5,014,089, Cl. 355-251.000.
- Matsushima, Seiichi: *See—*
  - Mizumura, Tetsuo; Ichijo, Minoru; Nakao, Ken-ichirou; Matsushima, Seiichi; and Tuburaya, Yoshitane, 5,013,594, Cl. 428-64.000.
- Matsushita Electric Industrial Co., Ltd.: *See—*
  - Fuse, Genshu, 5,013,673, Cl. 437-38.000.
  - Hatada, Kenzo; and Fujimoto, Hiroaki, 5,012,969, Cl. 228-104.000.
  - Kobayashi, Akira; Taira, Nobutaka; and Ueda, Hideshi, 5,014,330, Cl. 382-30.000.
  - Kubo, Kazuhiko; Usui, Akira; Sakashita, Seiji; Ozeki, Hiroaki; and Kanno, Ippei, 5,014,349, Cl. 455-189.000.
  - Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, 5,013,956, Cl. 310-323.000.
  - Matsuda, Kenichi; and Shibata, Jun, 5,014,096, Cl. 357-19.000.
  - Nakatani, Kazuo; Ikoma, Mitsuhiro; Yoshida, Yuji; Tomizawa, Takeshi; Arita, Koji; and Tagashira, Minoru, 5,012,651, Cl. 62-149.000.
  - Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; Hakotani, Yasuhiko; and Kikuchi, Tatsuro, 5,014,158, Cl. 361-321.000.
  - Ogawa, Kazufumi, 5,013,471, Cl. 252-62.520.
  - Saigano, Masahiro, 5,014,296, Cl. 379-67.000.
  - Shibaike, Narito; and Uchida, Shinji, 5,013,954, Cl. 310-309.000.
  - Tsuda, Toshio; Horio, Yasuhiko; Bessho, Yoshihiro; and Ishida. Toru, 5,014,111, Cl. 357-68.000.
  - Yamamura, Souhei, 5,013,135, Cl. 350-174.000.
- Matsushita Electric Works, Ltd.: *See—*
  - Ukegawa, Shin; Shinomiya, Masaki; Higashikawa, Masahiro; Uetsuki, Tadao; and Kobayashi, Koichi, 5,013,975, Cl. 315-248.000.
- Matsuura, Ichiro, to Ikeda Bussan Co., Ltd. Skin covered foamed plastic seat with identations. 5,013,090, Cl. 297-452.000.
- Matsuura, Kazuo: *See—*
  - Tajima, Yoshio; Nomiyama, Kazutosi; Nishikitani, Yoshinori; Kuroda, Nobuyuki; and Matsuura, Kazuo, 5,013,802, Cl. 526-86.000.
- Matsuzawa, Hideki; Yabe, Masao; Irie, Tadashi; Watanabe, Seiichi; and Ishihara, Yusuke, to Fuji Photo Film Co., Ltd. Information storage medium and process for producing the same. 5,013,593, Cl. 428-64.000.
- Matsuzawa, Hiroshi: *See—*
  - Yamaura, Michio; Yatabe, Toshiaki; and Matsuzawa, Hiroshi, 5,013,583, Cl. 427-131.000.
- Matsuzawa, Soichiro; and Takeya, Fuminori, to NGK Insulators, Ltd.; and Applied Magnetics Corporation. Method for producing a head core slider. 5,012,572, Cl. 29-603.000.
- Matthias, Klaus: *See—*
  - Bobbink, Hendrikus; Fischer, Hermann; Heinz, Gerhard; Matthias, Klaus; Seibring, Joachim; and Stegmaier, Wolfgang, 5,013,816, Cl. 528-173.000.
- Matzko, Ekkehard: *See—*
  - Bormann, Uwe; Matzko, Ekkehard; and Gorner, Dieter, 5,012,746, Cl. 104-93.000.
- Maude, Michael F., Sr., to Maude, Michael F., Sr. Golf score card with putting green grain indicia. 5,013,070, Cl. 283-49.000.
- Maurer, Richard T., to UOP. Methane purification by pressure swing adsorption. 5,013,334, Cl. 55-26.000.
- Maurer, Terrence L., to Kalas Manufacturing, Inc. Remote auxiliary terminal assembly. 5,013,259, Cl. 439-522.000.
- Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V.: *See—*
  - Mukherjee, Samar B., 5,012,860, Cl. 165-47.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- May & Baker Limited: *See—*
  - Hewett, Richard H.; and Veerasekaran, Ponnan, 5,013,353, Cl. 71-94.000.
- May, Teddy J., to Action Industries, Inc. Mechanism for high-leg reclining chair. 5,013,084, Cl. 297-85.000.
- Mayhew, Christopher A.: *See—*
  - Pritchard, Eric K.; and Mayhew, Christopher A., 5,014,126, Cl. 358-91.000.
- Mazda Motor Corporation: *See—*
  - Kyohzuka, Takahiro; Fujii, Masaki; Kikuchi, Toshiyuki; Abe, Mitsutoshi; and Matsuno, Yuji, 5,012,695, Cl. 74-859.000.
  - Oda, Hiroyuki; Tanaka, Toshimitsu; Yamagata, Naoyuki; and Hashimoto, Kazuhiko, 5,012,771, Cl. 123-52.0MB.
  - Tokuda, Shoji, 5,012,782, Cl. 123-425.000.
- Mazumder, Ali T., to NCR Corporation. MICR character reader using magnetic peaks to update timing clocks. 5,014,324, Cl. 382-7.000.
- Mazur, Barbara J.: *See—*
  - Bedbrook, John R.; Chaleff, Roy S.; Falco, Saverio C.; Mazur, Barbara J.; Somerville, Christopher R.; and Yadav, Narendra S., 5,013,659, Cl. 435-172.300.
- McAvoy, Sean: *See—*
  - MacIntyre, Brian; Close, Frank; and McAvoy, Sean, 5,01[illegible],187, Cl. 405-169.000.
- McCabe, George. Chafing dish burner. 5,012,791, Cl. 126-43.000.
- McCarthy, Theresa A., to Minnesota Mining & Manufacturing Company. Innerseal for a container and method of applying. 5,012,946, Cl. 220-258.000.
- McCollum, Myron L.: *See—*
  - Stafford, Roger A.; Aday, Roy W., Jr.; Schmidt, Robert L.; and McCollum, Myron L., 5,014,216, Cl. 364-496.000.
- McCormick, Ben F., II: *See—*
  - Boone, Joseph E.; and McCormick, Ben F., II, 5,014,348, Cl. 455-165.000.
- McCormick, Joseph F., to International Servo Systems, Inc. Floating coil servo valve. 5,012,722, Cl. 91-361.000.
- McCoy, John F., Jr., to Digital Equipment Corporation. EMI/RFI shielding method and apparatus. 5,014,160, Cl. 361-424.000.
- McCree, John O.: *See—*
  - Porchia, Jose; McCree, John O.; and Dais, Brian C., 5,012,561, Cl. 24-576.000.
- McDonald, Gerald H. Potentiometer mounting mechanism. 5,014,037, Cl. 338-163 000.
- McElroy, Arthur H., II; and Craig, Jim M., to McElroy Manufacturing, Inc. Programmable computer controlled pipe fusion device. 5,013,376, Cl. 156-64.000.
- McElroy, David J., to Texas Instruments Incorporated. Dynamic RAM cell with trench capacitor and trench transistor. 5,014,099, Cl. 357-23.600.
- McElroy Manufacturing, Inc.: *See—*
  - McElroy, Arthur H., II; and Craig, Jim M., 5,013,376, Cl. 156-64.000.
- McGarvey, David C.; and Buffalini, Jerry E., to LRS, Inc. Fire resistant tank construction. 5,012,949, Cl. 220-455.000
- McGrath, Stephen V., to United States of America, Energy. High speed flywheel. 5,012,694, Cl. 74-572.000.
- McGregor, Colin R., to Tenneco Canada Inc. Sparger system for discharge of bulk material from hopper cars. 5,013,530, Cl. 422-278.000.
- McInnis, Roderick J.: *See—*
  - Turner, James B.; and McInnis, Roderick J., 5,014,326, Cl. 382-8.000.
- McKee, John M., to United States of America, Energy. Hydrogen gas sensor and method of manufacture. 5,012,672, Cl. 73-31.070.
- McLeish, Anthony B.; Hill, Anthony; Darling, Jim; and Dean, David M. M., to Distributed Matrix Controls Inc. Universal input/output device. 5,014,238, Cl. 364-900.000.
- McLeod, Paul: *See—*
  - Vairavan, Kannan P.; and McLeod, Paul, 5,014,263, Cl. 370-32.100.
- McLeod, Roderick D. Annular and concentric flow wellhead isolation tool. 5,012,865, Cl. 166-90.000.
- McLinden, Thomas V.: *See—*
  - Zaragoza, Robert; McLinden, Thomas V.; and O'Connell, James A., 5,013,161, Cl. 374-208.000.
- McLoughlin, Robert H.: *See—*
  - Cook, John A.; Park, Geroge B.; McLoughlin, Robert H.; and Whitcher, William J., 5,013,619, Cl. 429-189.000.
- McMurtre, Hugene, to Motorola, Inc. Method and apparatus for reducing alternator noise. 5,014,351, Cl. 455-297.000.
- McNab, Kevin M.: *See—*
  - Reinhardt, Victor S.; Gould, Kim V.; and McNab, Kevin M., 5,014,231, Cl. 364-718.000.
- McNeil, Gary L., to Roto-Finish Company, Inc. Centrifugal finishing apparatus embodying improved seal and method. 5,012,620, Cl. 51-313.000.
- McNorgan, Rick: *See—*
  - Pocock, Terrence H.; McNorgan, Rick; Coumons, Peter; and Lodberg, Allan, 5,014,125, Cl. 358-86.000.
- McNulty, James F., Jr. Shotgun gunlock. 5,012,606, Cl. 42-70.110.
- McSweeney, Gary J.: *See—*
  - Bagchi, Pranab; McSweeney, Gary J.; and Sargeant, Steven J., 5,013,640, Cl. 430-546.000.
- McWhorter, Ronnie W., to IHT, Inc. Automatic hair and scalp treatment machines. 5,012,534, Cl. 4-519.000.
- Mead Corporation, The: *See—*
  - Tirone, George F., 5,014,084, Cl. 355-27.000.
- Measurex Corporation: *See—*
  - Chase, Lee M., 5,013,403, Cl. 162-49.000.
  - Chase, Lee M.; and Goss, John D., 5,014,288, Cl. 378-53.000.
- Mecredy, Henry E.: *See—*
  - Baker, Quentin A.; Mecredy, Henry E.; and O'Neal, Glenn B., 5,012,777, Cl. 123-254.000.
- Medin, Gunnar; Olsson, Erik; Lennart, Sjoo ; and Lundgren, Roger, to Affarsverket FFV. Reactive armor wall structure. 5,012,721, Cl. 89-36.170.
- Medipro Sciences Limited: *See—*
  - Murray, Douglas G.; Smith, Dennis C.; and Guillet, James E., 5,013,769, Cl. 523-111.000.
- Mehmandoust, Yassin: *See—*
  - Price, Rick C.; Eltoukhy, Atef H.; and Mehmandoust, Yassin, 5,012,618, Cl. 51-140.000.
- Mehta. Vinay: *See—*
  - Dick, Pearce; and Mehta, Vinay, 5,012,973, Cl. 236-46.00R.
- Meinan Machinery Works, Inc.: *See—*
  - Nakaoda, Toshinori; Aoto, Teruaki; Aoyama, Nagara; Nakamura, Tsuyoshi; and Nishimura, Ritsuo, 5,013,211, Cl. 414-789.600.
- Melchiorri, Pietro; and Negri, Lucia, to Zambon Group S.P.A. Anorexigenic and hypotensive peptides. 5,013,721, Cl. 514-13.000.
- Mellink, Willem F.; Janssen, Peter J. G. M.; Zwier, Jan; and Lotterman, Harm, to U.S. Philips Corporation. Vacuum system. 5,013,384, Cl. 156-345.000.
- Mengel, Eirch: *See—*
  - Gideon, Jurgen; Krieger, Dieter; and Mengel, Eirch, 5,012,958, Cl. 222-306.000.
- Menrath, Albert, to Hermann Boehler GmbH. Writing utensil with spacer ring. 5,013,172, Cl. 401-133.000.
- Mercado, Clara; and Shah, Amit R., to Revlon, Inc. Cosmetic eyeliner formulation. 5,013,543, Cl. 424-63.000.
- Merck & Co., Inc.: *See—*
  - Carty, Christine E., 5,013,650, Cl. 435-69.100.
- Merck Patent Gesellschaft MIT Beschrankter Haftung: *See—*
  - Gericke, Rolf; Baumgarth, Manfred; Lues, Ingeborg; Bergmann, Rolf; and De Peyer, Jacques, 5,013,853, Cl. 549-401.000.
- Meredith, Michael D., to Kamyr, Inc. Centrifugal washer for paper pulp with means to feed pulp as a thin sheet. 5,013,460, Cl. 210-770.000.
- Mergenthaler, Robert, to Robert Bosch GmbH. Method and apparatus for feedback-free ABS control. 5,013,098, Cl. 303-119.000.
- Merrell Dow Pharmaceuticals Inc.: *See—*
  - Bowlin, Terry L., 5,013,719, Cl. 514-11.000.
- Meschkat, Bodo. Add-on trigger with safety fastener for fishing rod reel. 5,012,607, Cl. 43-25.000.
- Messer Griesheim GmbH: *See—*
  - Beutler, Hans J.; Gahrs, Hans J.; Lenhard, Ulrich; and Lurken, Franz, 5,012,827, Cl. 131-297.000.
- Messerschmitt-Boelkow-Blohm GmbH: *See—*
  - Tilly, Bodo; and Rieger, Robert, 5,013,111, Cl. 350-96.200.
- Metallgesellschaft Aktiengesellschaft: *See—*
  - Leussler, Wilhelm; Wurl, Robert; and Schlaffer, Herbert, 5,013,342, Cl. 55-337.000.
  - Wullenweber, Heinz; and Borchardt, Jurgen, 5,013,418, Cl. 204-253.000.
- Metersky, Morton L.; and Howard, James R., to United States of America, Navy. Air-to-subsurface missile system. 5,012,717, Cl. 89-1.110.
- Methlie, Jennifer L.: *See—*
  - Wanger, Mark E.; Methlie, Jennifer L.; Jones, David P.; and Stavely, Donald J., 5,014,255, Cl. 369-36.000.
- Metraux, Michel, to Autotyp S.A. Antiskid device. 5,012,848, Cl. 152-218.000.
- Meunier, Paul-Louis; Mackowski, Jean-Marie; and Rolland, Jean-Luc, to Thomson-CSF. Video recording/play-back head, method for making it and apparatus applying said method. 5,013,580, Cl. 427-39.000.
- Meyer, Emil; and Eichinger, Johann, to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co. Apparatus for disengaging a friction clutch which couples an exhaust gas turbine to an internal combustion engine. 5,012,906, Cl. 192-56.00F.
- Meyer, Emilio, to Panametrics, Inc. Oxygen sensing method and apparatus. 5,012,669, Cl. 73-25.000.
- Meyer, Niels. Device for investigation of muscular contraction. 5,012,820, Cl. 128-782.000
- Meyer, Norbert: *See—*
  - Schwalge, Barbara; Plath, Peter; Eicken, Karl; Meyer, Norbert; and Wuerzer, Bruno, 5,013,354, Cl. 71-95.000.
- Meyers, Michael B.: *See—*
  - Tamari, Yehuda; and Meyers, Michael B., 5,013,303, Cl. 604-140.000.
- Meyn Machinefabriek, B.V.: *See—*
  - Doets, Albert R., 5,013,431, Cl. 210-188.000.
- Michaud, Joel: *See—*
  - Druesne, Guy; and Michaud, Joel, 5,012,942, Cl. 215-253.000.
- Michel, Lorraine M. Athletic nose guard. 5,012,527, Cl. 2-9.000.
- Michna, Richard J.: *See—*
  - Peebles, Richard J.; Michna, Richard J.; Monat, David E.; Bartholomew, Stephen W.; and Adams, Craig F., 5,012,741, Cl. 102-275.400.
- Michoud, Vincent; and Beigbeder, Gerard, to Thomson CSF. Ice detector, especially for aircraft. 5,014,042, Cl. 340-583.000.

- Mickel, Stuart J.: *See—*
  - Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpe, Hans-Rudolf, 5,013,863, Cl. 562-11.000.
- Micro-Pak, Inc.: *See—*
  - Yiournas, Costas; and Wallach, Donald F. H., 5,013,497, Cl. 264-4.100.
- Microelectronic Packaging Inc.: *See—*
  - Seng, Chew E.; Hork, Wee T.; and Lee, Wong Y., 5,013,347, Cl. 65-43.000.
- Micron Technology, Inc.: *See—*
  - Hembree, David R., 5,012,664, Cl. 72-404.000.
  - Long, Paul D.; and Guerricabeitia, Jose J., 5,013,398, Cl. 156-643.000.
  - Lowrey, Tyler A.; Chance, Randal W.; Durcan, D. Mark; Lee, Ruojia; Dennison, Charles H.; Liu, Yauh-Ching; Fazan, Pierre C.; Gonzalez, Fernando; and Haller, Gordon A., 5,013,680, Cl. 437-52.000.
- Microwave Data Systems, Inc.: *See—*
  - Place, Richard A., 5,014,343, Cl. 455-38.000.
- Miczka, Lothar. Hopper for pressurized container. 5,012,951, Cl. 220-626.000.
- Midwest Thermal Spray, Inc.: *See—*
  - Kiilunen, David D.; and Sartor, David A., 5,013,587, Cl. 427-383.700.
- Mihail, Stavros, to Promation Incorporated. Dispenser apparatus. 5,012,957, Cl. 222-190.000.
- Mikami, Hiroyuki: *See—*
  - Ikehata, Motoshige; Mikami, Hiroyuki; Inayama, Naoto; and Odajima, Katsuhiko, 5,012,835, Cl. 137-82.000.
- Mildenberger, Hilmar; Lachhein, Stephen; Rittner, Siegbert; and Tetzlaff, Heribert, to Hoechst Aktiengesellschaft. Process for separating off enol ethers from reaction mixtures containing alcohols. 5,013,444, Cl. 210-634.000.
- Miles, Alden R.: *See—*
  - Hunder, Ray A.; Miles, Alden R.; Dwyer, Stephen H.; and Thompson, Dorman N., 5,013,200, Cl. 412-6.000.
- Mileson, Ola. Device for separation and transport of waste material from polluted liquid. 5,013,430, Cl. 210-159.000.
- Miller, David M. Holster for a handgun. 5,012,965, Cl. 224-255.000.
- Miller, Gregory A.; and Pearson, Jeffery L., to General Motors Corporation. Occupant restraint system. 5,013,064, Cl. 280-730.000.
- Miller, Lee D., to British Aerospace Public Limited Company. Impingement pressure regulator. 5,012,718, Cl. 89-1.816.
- Miller, Mark W.: *See—*
  - Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 5,013,385, Cl. 156-345.000.
- Miller, Paul E.: *See—*
  - Bales, Bruce M.; and Miller, Paul E., 5,014,266, Cl. 370-60.100.
- Miller, Robert H.: *See—*
  - Gay, George A.; and Miller, Robert H., 5,013,492, Cl. 261-112.200.
- Miller, Robert J.: *See—*
  - Marras, William S.; Davis, Shelby W.; Miller, Robert J.; and Mirka, Gary A., 5,012,819, Cl. 128-781.000.
- Miller, Rodney L.; and Morton, Roger R. A., to Eastman Kodak Company. Image processor with smooth transitioning between dither and diffusion processes. 5,014,333, Cl. 382-54.000.
- Miller, Sam: *See—*
  - Russell, John P.; Carroll, Terry; and Miller, Sam, 5,013,304, Cl. 604-167.000.
- Miller, Thomas: *See—*
  - Coates, Ian H.; Oxford, Alexander W.; North, Peter C.; Miller, Thomas; Baxter, Anthony D.; and Hammond, Kevin I., 5,013,733, Cl. 514-213.000.
- Millheim, Keith K.; Mount, Houston B., II; Rai, Chandra S.; and Sondergeld, Carl H., to Amoco Corporation. Method of exploration for hydrocarbons. 5,012,674, Cl. 73-153.000.
- Milliken Research Corporation: *See—*
  - Leonard, Robert R., 5,013,375, Cl. 156-61.000.
  - Madsen, Jens; and Kaae, Svend S., 5,012,961, Cl. 222-643.000.
- Mills, Gary N.; and Homayoun, Habib, to Instromedix, Inc. Implantable-defibrillator pulse detection-triggered ECG monitoring method and apparatus. 5,012,814, Cl. 128-691.000.
- Mills, Peter S.; and Daly, Ivor K., to Coal Industry (Patents) Limited. Apparatus for producing aerated cementitious compositions. 5,013,157, Cl. 366-13.000.
- Mims, Ken, to Uddo-Mims International. Pressurized backwash filter. 5,013,457, Cl. 210-741.000.
- Mimura, Mitsuo: *See—*
  - Nagahara, Michiko; Ieda, Chikara; Mimura, Mitsuo; Uchida, Katsuhiro; Sato, Soichiro; and Okumura, Makoto, 5,013,736, Cl. 514-255.000.
- Minai, Masayoshi; and Higashii, Takayuki, to Sumitomo Chemical Company, Limited; and Hitachi, Ltd. Optically active ether derivatives, preparation process therefor, liquid crystal materials and an optical switching element. 5,013,479, Cl. 252-299.650.
- Minami, Shuji: *See—*
  - Kinoshita, Tatsuo; Minami, Shuji; Mizui, Kinya; and Kaneshige, Ryousuke, 5,013,867, Cl. 562-512.200.
- Minami, Yoichiro, to NEC Corporation. Display pager with supplemental display means. 5,014,046, Cl. 340-727.000.
- Minamida, Akira: *See—*
  - Matsumoto, Jun-ichi; Minamida, Akira; Fujita, Masahiro; Hirose, Tohru; Nakano, Junji; and Nakamura, Shinichi, 5,013,841, Cl. 544-363.000.
- Minato, Shinichiro: *See—*
  - Uesugi, Akio; Kakei, Tsutomu; and Minato, Shinichiro, 5,013,399, Cl. 156-643.000.
- Minato, Teruo: *See—*
  - Tahara, Masaaki; Tomoda, Takakazu; Kitano, Kenzo; and Minato, Teruo, 5,013,371, Cl. 148-16.600.
- Mine, Atsushi; Kamimura, Katsuyoshi; and Hiwatashi, Yutaka, to Fuji Jukogyo Kabushiki Kaisha. Method and apparatus for controlling vehicle height. 5,013,067, Cl. 280-840.000.
- Minebea Co. Ltd.: *See—*
  - Fujita, Masahiko; Shishido, Yuuji; Suzuki, Yuzuru; and Okamoto, Masato, 5,012,571, Cl. 29-598.000.
- Minnear, William P.: *See—*
  - Greskovich, Charles D.; Minnear, William P.; Brun, Milivoj K.; and Riedner, Robert J., 5,013,696, Cl. 501-153.000.
- Minnesota Mining and Manufacturing Company: *See—*
  - Barrows, Thomas H., 5,013,315, Cl. 606-71.000.
  - Coleman, Patrick L.; Kotnour, Thomas A.; and Rolando, Richard J., 5,013,795, Cl. 525-279.000.
  - Delprato, Ivano; and Baldassarri, Agostino, 5,013,639, Cl. 430-546.000.
  - Fick, Therese A.; and Fair, Byron D., 5,012,764, Cl. 119-106.000.
  - Kistner, John F., 5,013,621, Cl. 430-11.000.
  - McCarthy, Theresa A., 5,012,946, Cl. 220-258.000.
  - Norbury, Robert J.; Chang, Robert W. H.; and Zeller, Lowell C., 5,013,473, Cl. 252-174.130.
  - Patterson, Richard A., 5,013,123, Cl. 350-96.210.
  - Simpson, Sharon M.; and Boon, John R., 5,013,622, Cl. 430-550.000.
  - Strand, Jerome E.; Craighead, Lawrence W.; and Niven, Clarence A., 5,012,810, Cl. 128-640.000.
- Minolta Camera Co., Ltd.: *See—*
  - Kubo, Naoki; Ishikawa, Takuma; Matsui, Toshio; Atsumi, Fumitoshi; and Doi, Yasuhiko, 5,014,092, Cl. 355-324.000.
  - Yamada, Takanobu, 5,014,095, Cl. 355-327.000.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Ito, Masazumi; and Higashio, Kimihiko, 5,014,184, Cl. 364-188.000.
  - Johdai, Akiyoshi; Kinoshita, Keichi; and Matsui, Toshio, 5,013,021, Cl. 270-53.000.
  - Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, 5,014,078, Cl. 354-195.100.
  - Nakajima, Akio; and Nakatani, Munehiro, 5,014,332, Cl. 382-50.000.
- Minolta Camera Kabushiki Kaishi: *See—*
  - Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 5,014,083, Cl. 354-471.000.
- Minowa, Takehisa; and Yoshikawa, Masao, to Shin-Etsu Chemical Co., Ltd. Method for producing a corrosion resistant rare earth-containing magnet. 5,013,411, Cl. 204-29.000.
- Minter, Mark A.: *See—*
  - Gordon, William; and Minter, Mark A., 5,013,263, Cl. 439-630.000.
- Mintzer, Lester, to Rockwell International Corporation. Clockless A/D converter. 5,014,057, Cl. 341-161.000.
- Mirchevsky, Petr N.: *See—*
  - Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.
- Mirigay, Solange M. V.: *See—*
  - Viannay, Stephane G. J.; Roth, Bernard M.; Mirigay, Solange M. V.; and Chastang, Georges J. B., 5,012,980, Cl. 239-423.000
- Mirka, Gary A.: *See—*
  - Marras, William S.; Davis, Shelby W.; Miller, Robert J.; and Mirka, Gary A., 5,012,819, Cl. 128-781.000.
- Mirville, Francois J., to Societe Nationale D'etude et de Construction De Moteurs D'Aviation (S.N.E.C.M.A.). Combined air-hydrogen turbo-rocket power plant. 5,012,640, Cl. 60-246.000.
- Miserlis, Constantine D.: *See—*
  - Sheely, Harold R.; Miserlis, Constantine D.; and Rosenblatt, Ivan L., 5,012,750, Cl. 110-245.000.
- Mishima, Tadahiko: *See—*
  - Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, 5,013,410, Cl. 204-27.000.
- Mishra, Saroj K.: *See—*
  - Putnam, Alan R.; Mishra, Saroj K.; and Nair, Muraleedharan G., 5,013,549, Cl. 424-116.000.
- Miska, Herbert A.: *See—*
  - Gritz, David N.; and Miska, Herbert A., 5,013,605, Cl. 428-410.000.
- Mistyurik, John D.: *See—*
  - Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,013,387, Cl. 156-384.000.
  - Goodwin, Brent E.; Mistyurik, John D.; and Seale, Mark A., 5,013,388, Cl. 156-384.000.
- Mita Industrial Co., Ltd.: *See—*
  - Himeji, Tooru; Arai, Kiyotaka; and Murakami, Masahiro, 5,013,025, Cl. 271-164.000.
  - Wakikaido, Takahiro; Yoshiyama, Toshio; and Yoshizuka, Ken, 5,014,088, Cl. 355-201.000.
- Mitchell James L., to Ridewell Corporation. Air ride suspension system with rigid bolster beam and slipper load bushing. 5,013,063, Cl. 280-711.000.
- Mitchell, James W., to Monsanto Company. Prolonged release of biologically active somatotropin. 5,013,713, Cl. 514-2.000.

VOL 1126
ISS 1
MY 7 1991
UMI

- Mitchell, Mark A.: *See—*
  - Long, David L.; Mitchell, Mark A.; and Sczomak, David P., 5,012,785, Cl. 123-467.000.
- Mitra, Sumit K.: *See—*
  - Padgaonkar, Ajay J.; and Mitra, Sumit K., 5,014,191, Cl. 364-200.000.
- Mitsubishi Cable Industries Ltd.: *See—*
  - Hirotaka, Ito; Jinichi, Taniguchi; Hirokazu, Kuzushita; and Atsushi, Ohhori, 5,013,967, Cl. 313-512.000.
- Mitsubishi Chemical Industries Limited: *See—*
  - Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, 5,013,474, Cl. 252-299.100.
- Mitsubishi Denki K. K.: *See—*
  - Nishida, Mitsuhiro, 5,013,226, Cl. 418-55.100.
- Mitsubishi Denki K.K.: *See—*
  - Fukui, Wataru; and Iwata, Toshio, 5,012,779, Cl. 123-339.000.
  - Isozumi, Shuzou, 5,013,950, Cl. 310-83.000.
  - Miyazaki, Masaaki; and Kako, Hajime, 5,014,203, Cl. 364-431.060.
- Mitsubishi Denki Kabushiki Kaisha: *See—*
  - Asakura, Mikio; Fujishima, Kazuyasu; and Matsuda, Yoshio, 5,014,241, Cl. 365-51.000.
  - Fukuhara, Takahiro; and Murakami, Tokumichi, 5,014,334, Cl. 382-86.000.
  - Hata, Masayuki; and Umeki, Tsunenori, 5,014,105, Cl. 357-42.000.
  - Ikegami, Kazunori; Okuda, Souitirou; Nosaka, Eishou; and Yoshida, Tadahisa, 5,013,963, Cl. 313-414.000.
  - Itoh, Mitsuhiro; and Matsui, Hideo, 5,013,985, Cl. 318-558.000.
  - Iwata, Shigemi, 5,012,899, Cl. 187-101.000.
  - Kato, Hisao, 5,012,855, Cl. 164-155.000.
  - Kawaguchi, Takeo, 5,014,029, Cl. 335-210.000.
  - Komatsu, Takahiro; Kumanoya, Masaki; Konishi, Yasuhiro; Dosaka, Katsumi; and Inoue, Yoshinori, 5,014,246, Cl. 365-230.030.
  - Matsunaga, Kazu; Okuda, Hiroshi; and Awazu, Kenzo, deceased, 5,013,480, Cl. 252-301.40H.
  - Morishita, Akira; Isozumi, Shuzoo; and Tanaka, Toshinori, 5,012,686, Cl. 74-7.00A.
  - Murata, Shigemi; and Ikeuchi, Masayuki, 5,014,005, Cl. 324-207.200.
  - Nankaku, Shigeki; and Koikawa, Shigeru, 5,014,209, Cl. 364-474.350.
  - Ootsuka, Shigeharu, 5,014,027, Cl. 335-132.000.
  - Saikatsu, Takeo; Sakurai, Takehiko; and Anzai, Yoshinori, 5,013,966, Cl. 313-493.000.
  - Saioh, Shinichi, 5,014,110, Cl. 357-68.000.
  - Shiomi, Toru; and Ueda, Kimio, 5,013,936, Cl. 307-446.000.
  - Yamamoto, Isamu; and Fukushima, Jiro, 5,013,689, Cl. 437-229.000.
  - Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,012,697, Cl. 74-866.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
  - Kakizaki, Sadao, 5,013,186, Cl. 405-166.000.
  - Makino, Katsuaki; and Toyofuku, Toshihiro, 5,012,737, Cl. 101-350.000.
- Mitsubishi Kasei Corporation: *See—*
  - Miyoshi, Motoyuki; Kojima, Kazuhisa; Sugiura, Katsuhiko; and Iketani, Naomi, 5,013,606, Cl. 428-412.000.
- Mitsubishi Mining & Cement Co., Ltd.: *See—*
  - Kobayashi, Masahiro; Tagai, Hideo; Kuroki, Yoshikatsu; Niwa, Shigeo; and Ono, Mikiya, 5,013,323, Cl. 623-16.000.
- Mitsubishi Paper Mills Limited: *See—*
  - Itoh, Akira; Haino, Kozo; Okaji, Makoto; Emoto, Kazuhiro; and Kodera, Tatsuya, 5,013,623, Cl. 430-59.000.
  - Sekine, Mikiya; and Hiraishi, Shigetoshi, 5,013,629, Cl. 430-138.000.
- Mitsubishi Rayon Company, Ltd.: *See—*
  - Nishida, Kozi; and Watanabe, Mikiharu, 5,013,774, Cl. 524-91.000.
- Mitsuhashi, Yasuo: *See—*
  - Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 5,014,089, Cl. 355-251.000.
- Mitsui, Hiroyuki: *See—*
  - Murata, Kunihiko; Morii, Satoshi; Mitsui, Hiroyuki; Takemura, Toru; Iwasaki, Toshiaki; and Suzuki, Takaaki, 5,012,752, Cl. 112-121.120.
- Mitsui Petrochemical Industries, Ltd.: *See—*
  - Kinoshita, Tatsuo; Minami, Shuji; Mizui, Kinya; and Kaneshige, Ryousuke, 5,013,867, Cl. 562-512.200.
  - Mizui, Kinya, 5,013,785, Cl. 524-490.000.
- Mitsui, Susumu; Funatsu, Ryoji; and Kurose, Shigeru, to Somar Corporation. Germicidal composition. 5,013,755, Cl. 514-533.000.
- Mitsui Toatsu Chemicals, Inc.: *See—*
  - Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,013,496, Cl. 264-2.300.
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
  - Yoshikawa, Yukihiro; Yamazaki, Midori; Yamaguchi, Keizaburo; Sugimoto, Kenichi; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 5,013,848, Cl. 548-522.000.
- Mitsumoto, Kinya: *See—*
  - Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
- Miura, Konoe: *See—*
  - Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, 5,013,474, Cl. 252-299.100.
- Miura, Tohru: *See—*
  - Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,013,496, Cl. 264-2.300.
- Mixed Air Jet Pump Kaihatsu Co., Ltd.: *See—*
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Miyadera, Shunichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Active AF camera having remote control apparatus. 5,014,080, Cl. 354-403.000.
- Miyaji, Katsutoshi: *See—*
  - Fujimoto, Naonobu; Suda, Yukio; and Miyaji, Katsutoshi, 5,014,271, Cl. 370-102.000.
- Miyakawa, Tatsuo; Kato, Osamu; Koike, Yusuke; Matsunami, Keisuke; and Sekiya, Naoyuki, to Fujitsu Automation Limited. Fish sex discrimination equipment and method. 5,013,906, Cl. 250-223.00R.
- Miyake, Masanobu: *See—*
  - Kawase, Toshirou; Saito, Shiro; and Miyake, Masanobu, 5,012,838, Cl. 137-202.000.
- Miyamoto, Kouichi, to Ryobi, Ltd. Dust collector. 5,013,343, Cl. 55-395.000.
- Miyamoto, Tsumoru: *See—*
  - Iguchi, Sadahiko; Kawamura, Masanori; and Miyamoto, Tsumoru, 5,013,734, Cl. 514-231.500.
- Miyano, Toshiyuki: *See—*
  - Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.
- Miyao, Ichiro: *See—*
  - Kawata, Azuma; Koroku, Shuichiro; Kano, Hirofumi; and Miyao, Ichiro, 5,012,792, Cl. 125-15.000.
- Miyashita, Takashi, to Fuji Electric Co., Ltd. Reference track detection for a disc storage unit. 5,014,139, Cl. 360-78.140.
- Miyauchi, Otohiko: *See—*
  - Suzuki, Takashi; Yasuda, Tetsuo; Miyauchi, Otohiko; and Yotsuyanagi, Junji, 5,013,516, Cl. 264-130.000.
- Miyawaki, Motohisa, to Fuji Jukogyo Kabushiki Kaisha. Line pressure control system for a continuously variable transmission. 5,012,696, Cl. 74-866.000.
- Miyawaki, Motohisa, to Fuji Jukogyo Kabushiki Kaisha. Transmission ratio control system for a continuously variable transmission. 5,012,910, Cl. 192-4.00A.
- Miyazaki, Masaaki; and Kako, Hajime, to Mitsubishi Denki K.K. Abnormality detecting device for an EGR system. 5,014,203, Cl. 364-431.060.
- Miyazaki, Shouji: *See—*
  - Murase, Shigemitsu; Kakumoto, Kouji; Miyazaki, Shouji; Sugawa, Masaru; and Ide, Mikio, 5,013,506, Cl. 264-210.800.
- Miyazaki, Tadaaki; Ogino, Takao; Masuda, Yoshitomo; Wada, Hiroaki; and Kawagoe, Takahiro, to Bridgestone Corporation. Nonaqueous electrolyte secondary cell. 5,013,620, Cl. 429-194.000.
- Miyoshi, Motoyuki; Kojima, Kazuhisa; Sugiura, Katsuhiko; and Iketani, Naomi, to Mitsubishi Kasei Corporation. Film for a resistance layer for an electric-thermal print system. 5,013,606, Cl. 428-412.000.
- Mizui, Kinya, to Mitsui Petrochemical Industries, Ltd. Pressure-sensitive adhesive composition comprising poly-4-methyl-1-pentene as tackifier. 5,013,785, Cl. 524-490.000.
- Mizui, Kinya: *See—*
  - Kinoshita, Tatsuo; Minami, Shuji; Mizui, Kinya; and Kaneshige, Ryousuke, 5,013,867, Cl. 562-512.200.
- Mizukoshi, Hideo: *See—*
  - Nishii, Michiharu; Mizuno, Genji; Mizukoshi, Hideo; Ishida, Satoshi; and Hata, Kyousuke, 5,013,094, Cl. 303-52.000.
- Mizumura, Tetsuo; Ichijo, Minoru; Nakao, Ken-ichirou; Matsushima, Seiichi; and Tuburaya, Yoshitane, to Hitachi Maxwell, Ltd. Optical information recording medium and its production. 5,013,594, Cl. 428-64.000.
- Mizuno, Genji: *See—*
  - Nishii, Michiharu; Mizuno, Genji; Mizukoshi, Hideo; Ishida, Satoshi; and Hata, Kyousuke, 5,013,094, Cl. 303-52.000.
- Mizuno, Toshiya; Teramoto, Yoshikichi; Wakabayashi, Juichi; and Saito, Takeshi, to Kureha Kagaku Kogyo K.K. Poly(arylene sulfide) sheet and production process thereof. 5,013,823, Cl. 528-388.000.
- Mizusawa Industrial Chemicals, Ltd.: *See—*
  - Ogawa, Masahide; Sato, Teiji; Takahashi, Masao; Kitsu, Toshio; Takahashi, Seikichi; and Ono, Kinichi, 5,013,603, Cl. 428-331.000.
  - Ogawa, Masahide; Sato, Teiji; Abe, Kiyoshi; Tsuchida, Hisashi; Inoue, Hiroo; and Saito, Mitsuo, 5,013,709, Cl. 503-225.000.
- Mizuta, Akira, to Fuji Photo Film Co., Ltd. Method of assembling magnetic disk cartridge. 5,012,569, Cl. 29-417.000.
- Mobay Corporation: *See—*
  - Hanusa, Lotar H., 5,013,766, Cl. 521-137.000.
  - Sarpeshkar, Ashok M.; and Gracik, Charles S., 5,013,810, Cl. 528-59.000.
- Mobil Oil Corp.: *See—*
  - Absil, Robert P. L.; Degnan, Thomas F.; Han, Scott; Marler, David O.; Socha, Richard F.; and Stapleton, Michael R., 5,013,422, Cl. 208-27.000.
  - Bell, Weldon K.; Haag, Werner O.; Harandi, Mohsen N.; and Owen, Hartley, 5,013,329, Cl. 44-448.000.

  - Chen, Nai Y.; Dessau, Ralph M.; Partride, Randall D.; and Valyocsik, Ernest W., 5,013,423, Cl. 208-64.000.
- Mochiauki, Masao: *See—*
  - Matsumura, Yasuo; Aoki, Takayoshi; Nagatsuka, Ikutaroh; and Mochiauki, Masao, 5,013,626, Cl. 430-106.600.
- Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., to Surgical Engineering Associates, Inc. Laterally compressed septum assembly and implantable infusion port with laterally compressed septum. 5,013,298, Cl. 604-93.000.
- Moden, Robert D.: *See—*
  - Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., 5,013,298, Cl. 604-93.000.
- Mofachern, Alexander, to Basic Measuring Instruments. Method and apparatus for calibrating transducer/amplifier systems. 5,014,229, Cl. 364-571.040.
- Mogul, Jeffrey C., to Digital Equipment Corporation. Mechanism for arbitrating client access to a networked print server. 5,014,221, Cl. 364-519.000.
- Moisin, Mihail S., to Northern Telecom Limited. Line interface circuit. 5,014,305, Cl. 379-402.000.
- Molloy, Peter J. P. Metering system. 5,014,081, Cl. 354-416.000.
- Monarch Marking Systems, Inc.: *See—*
  - Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,013,387, Cl. 156-384.000.
  - Goodwin, Brent E.; Mistyurik, John D.; and Seale, Mark A., 5,013,388, Cl. 156-384.000.
- Monat, David E.: *See—*
  - Peebles, Richard J.; Michna, Richard J.; Monat, David E.; Bartholomew, Stephen W.; and Adams, Craig F., 5,012,741, Cl. 102-275.400.
- Monbaliu, Marcel J.: *See—*
  - Roosen, Raymond A.; de Meyer, Marcellus H.; and Monbaliu, Marcel J., 5,013,138, Cl. 350-339.00F.
- Monogram Models, Inc.: *See—*
  - Dixon, Anthony J.; and Manning, Peter R. J., 5,013,278, Cl. 446-73.000.
- Monsanto Company: *See—*
  - Fariss, Robert H.; and Tetreault, Roland J., 5,013,779, Cl. 524-314.000.
  - Fariss, Robert H.; and Tetreault, Roland J., 5,013,780, Cl. 524-314.000.
  - Fleet, George W. J.; and Witty, David R., 5,013,842, Cl. 546-220.000.
  - Mitchell, James W., 5,013,713, Cl. 514-2.000.
- Montedison S.P.A.: *See—*
  - Coassolo, Alfredo; Foa', Marco; and Chapoy, L. Lawrence, 5,013,819, Cl. 528-193.000.
- Montefiore Hospital Association of Western Pennsylvania: *See—*
  - Liang, Marc D.; and Narayanan, Krishna, 5,012,797, Cl. 128-24.00A.
- Monteith, John R.: *See—*
  - Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,013,387, Cl. 156-384.000.
- Montes, Juan D. System for producing stationary or moving three-dimensional images by projection. 5,013,147, Cl. 352-58.000.
- Monti, Anthony. Electrical melting apparatus of confectionery products. 5,013,892, Cl. 219-421.000.
- Montplaisir, Serge: *See—*
  - Brodeur, Bernard R.; Hamel, Josee; and Montplaisir, Serge, 5,013,664, Cl. 435-7.320.
- Moody, Dale O.: *See—*
  - Markow, Mitch A.; Moody, Dale O.; and Greenberger, Hal P., 5,014,323, Cl. 381-194.000.
- Moody, Mark D.; and DuCharme, Robert T., to Allied-Signal Inc. Caliper and retaining pin spacer. 5,012,902, Cl. 188-73.350.
- Moore, Robert A.: *See—*
  - Caley, Wendell J., Jr.; Buchan, William R.; and Moore, Robert A., 5,014,076, Cl. 346-159.000.
- Moore, Robert M.; and Smith, Robert L. Method and apparatus for generating radiation blockers. 5,014,290, Cl. 378-145.000.
- Moran, Susan C.: *See—*
  - Abu-Isa, Ismat A.; Moran, Susan C.; and Roy, Michael A., 5,013,089, Cl. 297-452.000.
- Moreau, Dominique, to Telemecanique. Apparatus for controlling and testing an electric installation. 5,014,157, Cl. 361-187.000.
- Moreno, Edgard G.: *See—*
  - Hay, Donald I.; Gibbons, Ronald J.; and Moreno, Edgard G., 5,013,542, Cl. 424-54.000.
- Morgan, Samuel P.: *See—*
  - Hahne, Ellen L.; Kalmanek, Charles R.; and Morgan, Samuel P., 5,014,265, Cl. 370-60.000.
- Mori, Kyoichi; Toda, Kuniaki; Iizuka, Nobuyuki; Hongo, Tsutomu; and Nakadai, Tsutomu, to Hitachi Electronics Engineering Co., Ltd. Data recording disk chuck mechanism. 5,014,143, Cl. 360-99.120.
- Mori, Shigeru; and Kuwata, Satoshi, to Shin-Etsu Chemical Co., Ltd. Pasty organopolysiloxane composition. 5,013,715, Cl. 514-53.000.
- Mori, Sumio: *See—*
  - Samukawa, Seiji; Sasaki, Masami; and Mori, Sumio, 5,013,401, Cl. 156-643.000.
- Mori, Toshifumi, to Marusen Co., Ltd. Open-bottom gravel dump boat. 5,012,754, Cl. 114-36.000.
- Moribe, Yoshihiro: *See—*
  - Takatsuka, Akio; Sasamoto, Asao; Moribe, Yoshihiro; Shiono, Toshio; Sogabe, Chikayuki; and Hosokawa, Haruhiko, 5,014,146, Cl. 360-106.000.
- Morichika, Toshiaki; Tani, Toshio; Tanaka, Nobuhiko; and Kadowaki, Tatsuhiko, to Kubota Ltd. Magnetic recording medium of thin metal film type. 5,013,616, Cl. 428-694.000.
- Moriga, Kazuyuki: *See—*
  - Kiriyama, Yoshiyuki; Moriga, Kazuyuki; Shinohara, Toshio; Matsuda, Mitsuhiro; and Maeda, Hiromi, 5,013,768, Cl. 522-64.000.
- Morii, Satoshi: *See—*
  - Murata, Kunihiko; Morii, Satoshi; Mitsui, Hiroyuki; Takemura, Toru; Iwasaki, Toshiaki; and Suzuki, Takaaki, 5,012,752, Cl. 112-121.120.
- Morimoto, Yasuaki; Zucker, Friedheim; and Buchler, Christian, to Deutsche Thomson-Brandt GmbH. Optical pick-up for selective playback and recording on a magneto-optically recorded medium. 5,014,253, Cl. 369-13.000.
- Morisawa, Hirokazu: *See—*
  - Ohtsuka, Eiko; Inoue, Hideo; Morisawa, Hirokazu; Shibahara, Susumu; Mukai, Sachiko; and Nishihara, Tohru, 5,013,830, Cl. 536-27.000.
- Morishita, Akira; Isozumi, Shuzoo; and Tanaka, Toshinori, to Mitsubishi Denki Kabushiki Kaisha. Pinion shifting mechanism of an engine starter. 5,012,686, Cl. 74-7.00A.
- Morita, Akio; and Nakano, Yoshitomo, to Sony Corporation. Telephone answering device with automatic return to incoming message mode. 5,014,297, Cl. 379-82.000.
- Morita, Kiyoji: *See—*
  - Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, 5,014,142, Cl. 360-98.010.
- Morita, Tetsuya: *See—*
  - Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, 5,013,474, Cl. 252-299.100.
- Moritomo, Shigeru, to Nihon Eiwan Denshikiki Co., Ltd.; and I.M. Electronics Co., Ltd. Apparatus for discriminating specified sorts of printed matters. 5,014,325, Cl. 382-7.000.
- Moriwaki, Ikuo, to Analog Devices KK. A/D converter with a main range up/down counter and a subrange A/D converter. 5,014,056, Cl. 341-161.000.
- Morrell, Roger J.; and Larson, David A., to United States of America, Interior. Universal ripper miner. 5,013,093, Cl. 299-67.000.
- Morris, G. Michael: *See—*
  - Buralli, Dale A.; and Morris, G. Michael, 5,013,133, Cl. 350-162.110.
- Morris, Gregory J. E.; Borrione, Pierluigi A. V.; and Leoni, Umberto, to Dow Chemical Company, The; and Denora Permelec S.p.A. Electrode structure for an electrolytic cell and electrolytic process used therein. 5,013,414, Cl. 204-98.000.
- Morrison, Michael L. Portable aquabrood. 5,012,763, Cl. 119-34.000.
- Morrow, Robert C.: *See—*
  - Ignatius, Ronald W.; Martin, Todd S.; Bula, Raymond J.; Morrow, Robert C.; and Tibbitts, Theodore W., 5,012,609, Cl. 47-58.000.
- Morton, Roger R. A.: *See—*
  - Miller, Rodney L.; and Morton, Roger R. A., 5,014,333, Cl. 382-54.000.
- Morton, Steven G., to Morton, Steven G. Convolution memory. 5,014,235, Cl. 364-900.000.
- Mosby, James F.; Peck, Lawrence B.; Taylor, James L.; and Beaton, William I., to Amoco Corportion. Resid hydrotreating with resins. 5,013,427, Cl. 208-211.000.
- Moser, Lester J., to Motorola, Inc. Coplanar waveguide semiconductor package. 5,014,115, Cl. 357-74.000.
- Moskvin, Gennady A. Device for determining the index of individual productivity and feed ration of animals. 5,012,762, Cl. 119-14.180.
- Motizuki, Takuo: *See—*
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Motorola Computer X, Inc.: *See—*
  - Mansfield, Bruce M.; Kolnick, Frank C.; and Kun, Andrew I., 5,014,192, Cl. 364-200.000.
- Motorola, Inc.: *See—*
  - Casto, James J., 5,014,113, Cl. 357-70.000.
  - Comroe, Richard A.; Zdunek, Kenneth J.; Sasuta, Michael D.; Coombes, Daniel J.; and Borras, Jaime A., 5,014,345, Cl. 455-54.000.
  - Goldberg, Steven J., 5,014,344, Cl. 455-51.000.
  - King, Jeffrey S., 5,014,071, Cl. 343-788.000.
  - Kotzin, Michael D., 5,014,313, Cl. 380-28.000.
  - Kromenaker, Susan C.; Lefebvre, James D.; and Binzel, Charles P., 5,014,294, Cl. 379-58.000.
  - Mahabadi, John K., 5,013,935, Cl. 307-350.000.
  - Marabotto, Eduardo J.; and Gilmore, Peter, 5,013,174, Cl. 403-11.000.
  - McMurtre, Hugene, 5,014,351, Cl. 455-297.000.
  - Moser, Lester J., 5,014,115, Cl. 357-74.000.
  - Mulford, Keith I.; and Bocci, Paul M., 5,014,314, Cl. 380-43.000.
  - Phillips, James P.; Johnson, Robert M., Jr.; and Zurek, Michael W., 5,014,346, Cl. 455-89.000.
- Mount, Houston B., II: *See—*
  - Millheim, Keith K.; Mount, Houston B., II; Rai, Chandra S.; and Sondergeld, Carl H., 5,012,674, Cl. 73-153.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Mount Sinai School of Medicine of the City University of New York: *See—*
  - Davis, Andrew, 5,013,319, Cl. 606-166.000.
- Mouri, Hiroshi: *See—*
  - Yokote, Masatsugu; Sugasawa, Fukashi; Mouri, Hiroshi; and Kuroki, Junsuke, 5,012,881, Cl. 180-140.000.
- Mouri, Yoshiharu: *See—*
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- MTU Motoren- Und Turbinen-Union Munchen GmbH: *See—*
  - Grieb, Hubert; Simon, Burkhard; and Albers, Martin, 5,012,638, Cl. 60-224.000.
- Muckerheide, Myron C. Surgical mask barrier apparatus. 5,012,805, Cl. 128-205.280.
- Mudbuster, Inc.: *See—*
  - Retti, Kahrl, 5,013,389, Cl. 156-526.000.
- Mueller, Richard A.: *See—*
  - Campbell, Arthur L.; Mueller, Richard A.; Ng, John S.; and Partis, Richard A., 5,013,864, Cl. 562-426.000.
- Muenter, Annabel; Adin, Anthony; Parton, Richard L.; Pightling, Nicholas A.; and Beaumond, David, to Eastman Kodak Company. Photographic element. 5,013,642, Cl. 430-574.000.
- Mukai, Kiichiro: *See—*
  - Kobayashi, Nobuyoshi; Suzuki, Masayuki; Kondo, Seiichi; Matsui, Makoto; and Mukai, Kiichiro, 5,013,526, Cl. 420-430.000.
- Mukai, Sachiko: *See—*
  - Ohtsuka, Eiko; Inoue, Hideo; Morisawa, Hirokazu; Shibahara, Susumu; Mukai, Sachiko; and Nishihara, Tohru, 5,013,830, Cl. 536-27.000.
- Mukherjee, Samar B., to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V. Actively cooled heat protective shield. 5,012,860, Cl. 165-47.000.
- Mulford, Keith I.; and Bocci, Paul M., to Motorola, Inc. Method for developing and transmitting usage context information in an RF communication system. 5,014,314, Cl. 380-43.000.
- Mulhauser, Michel: *See—*
  - Botannet, Bernard; Le Fur, Isidore; Massonneau, Viviane; and Mulhauser, Michel, 5,013,855, Cl. 549-539.000.
- Muller, Beat: *See—*
  - Roth, Martin; and Muller, Beat, 5,013,814. Cl. 528-90.000.
- Muller, Kurt: *See—*
  - Butz, Dieter; Erbach, Franz; and Muller, Kurt, 5,012,887, Cl. 180-305.000.
- Muller-Peddinghaus, Reiner: *See—*
  - Walenta, Rainer; Muller-Peddinghaus, Reiner; Ban, Ivan; Wurl, Michael; and Preuschoff, Ulf, 5,013,852, Cl. 549-362.000.
- Multacc Corporation: *See—*
  - Bosley, Denis V., 5,014,049, Cl. 340-825.310.
- Mumford, Ronald W. J., to Rank Cintel Limited. Telecine with improved blemish concealment. 5,014,133, Cl. 358-214.000.
- Munch, Udo: *See—*
  - Knoppel, Hans-Martin; Elm, Oskar; and Munch, Udo, 5,013,104, Cl. 312-254.000.
- Munford, Robert S.; and Hall, Catherine L., to Board of Regents, The University of Texas System, The. Lipopolysaccharide-specific acyloxyacyl hydrolase. 5,013,661, Cl. 435-197.000.
- Munters Corporation: *See—*
  - Gay, George A.; and Miller, Robert H., 5,013,492, Cl. 261-112.200.
- Murai, Hideaki. Baseball glove and interior core covering thereof. 5,012,529, Cl. 2-18.000.
- Murakami, Masahiro: *See—*
  - Himeji, Tooru; Arai, Kiyotaka; and Murakami, Masahiro, 5,013,025, Cl. 271-164.000.
- Murakami, Tokumichi: *See—*
  - Fukuhara, Takahiro; and Murakami, Tokumichi, 5,014,334, Cl. 382-86.000.
- Murakami, Yoshio: *See—*
  - Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, 5,013,466, Cl. 252-42.700.
- Murano, Katsuaki: *See—*
  - Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,012,697, Cl. 74-866.000.
- Murano, Katuhiro: *See—*
  - Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, 5,013,956, Cl. 310-323.000.
- Muraoka, Tomoki: *See—*
  - Hamada, Kaneaki; Tsubota, Kazuichi; and Muraoka, Tomoki, 5,013,525. Cl. 420-104.000.
- Murase, Shigemitsu; Kakumoto, Kouji; Miyazaki, Shouji; Sugawa, Masaru; and Ide, Mikio, to Unitika Ltd. Process for producing polyester fibers. 5,013,506, Cl. 264-210.800.
- Murata, Kunihiko; Morii, Satoshi; Mitsui, Hiroyuki; Takemura, Toru; Iwasaki, Toshiaki; and Suzuki, Takaaki, to Brother Kogyo Kabushiki Kaisha. Work piece setting apparatus with pattern matching. 5,012,752, Cl. 112-121.120.
- Murata Manufacturing Co., Ltd.: *See—*
  - Masuda, Fumitoshi, 5,013,505, Cl. 264-130.000.
- Murata, Shigemi; and Ikeuchi, Masayuki, to Mitsubishi Denki Kabushiki Kaisha. Hall-effect sensor with component positioning element for detecting crankshaft angle. 5,014,005, Cl. 324-207.200.
- Murayama, Hiroshi: *See—*
  - Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
- Murayama, Yoichi; and Nomachi, Tetsuya, to Tobi Col, Ltd.; and Murayama, Yoichi. Process for manufacturing transparent, conductive film. 5,013,416, Cl. 204-192.100.
- Muro, Atsushi: *See—*
  - Egashira, Noritaka; Suto, Kenichiro; and Muro, Atsushi, 5,013,711, Cl. 503-227.000.
- Muro, Hideo, to Nissan Motor Co., Ltd. Integrated photodetector with hysteresis. 5,013,904, Cl. 250-214.00R.
- Muroi, Masayuki: *See—*
  - Kanamaru, Tsuneo; Hida, Tsuneaki; and Muroi, Masayuki, 5,013,757, Cl. 514-568.000.
- Muroka, Kazuyoshi; Ohsawa, Takashi; and Furuyama, Tohru, to Kabushiki Kaisha Toshiba. Dynamic random access memory and method for writing data thereto. 5,014,245, Cl. 365-194.000.
- Murphy, Robert F.; and Shek, Thompson, to Augat, Inc. Twisted terminal for switching device. 5,013,266, Cl. 439-741.000.
- Murphy. Robert H., to R. H. Murphy Company, Inc. Carriers for integrated circuits and the like. 5,012,924, Cl. 206-331.000.
- Murphy, William J., to IMTEC, Inc. Optical density measurement apparatus in the context of labeling and other devices. 5,013,156, Cl. 356-432.000.
- Murray, Douglas G.; Smith, Dennis C.; and Guillet, James E., to Medipro Sciences Limited. Method of making a hydrogel-forming wound dressing or skin coating material. 5,013,769, Cl. 523-111.000.
- Murray, Wayne J., to Summagraphics Corporation. Magnification assembly for digitizer cursor. 5,014,044, Cl. 340-710.000.
- Mushardt, Heinrich, to Korber AG. Fixture for workpieces, particularly turbine blades. 5,013,014, Cl. 269-7.000.
- Muth, James C., to Spacesaver Corporation. Anti-tip apparatus for mobile storage units. 5,013,101, Cl. 312-201.000.
- Mydata Automation AB: *See—*
  - Stridsberg, Lennart, 5,012,874, Cl. 173-108.000.
- Myers, Virginia A.; Wenman, Daniel L.; and Phillips, James R. Apparatus for applying thin roll material to a surface. 5,013,386, Cl. 156-351.000.
- N.A. Taylor Company, Inc.: *See—*
  - Watkins, Richard, 5,013,272, Cl. 441-127.000.
- Na, Woo-young: *See—*
  - Shon, Suk-bong; and Na, Woo-young, 5,013,965, Cl. 313-446.000.
- Nagahara, Michiko; Ieda, Chikara; Mimura, Mitsuo; Uchida, Katsuhiro; Sato, Soichiro; and Okumura, Makoto, to Kaken Pharmaceutical Co., Ltd. Azaazulene compounds which are useful as antiallergic and antiinflammatory agents. 5,013,736, Cl. 514-255.000.
- Nagai, Kazukiyo, to Ricoh Company, Ltd. Optical information recording medium and nickel complex compounds employed in the same. 5,013,634, Cl. 430-495.000.
- Nagai, Takeshi: *See—*
  - Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Haruhiko; and Nagai, Takeshi, 5,012,858, Cl. 165-1.000.
- Naganawa, Masahito, to Koito Manufacturing Co., Ltd. Glass-made lens. 5,014,165, Cl. 362-61.000.
- Nagano, Masashi, to Shimano Industrial Company Limited. Change-speed lever apparatus for use in bicycle. 5,012,692, Cl. 74-475.000.
- Nagaoka, Daiji: *See—*
  - Kurogane, Toshio; and Nagaoka, Daiji, 5,014,331, Cl. 382-48.000.
- Nagasaka, Youetsu, to Shiroki Corporation. Seat having adjustable lumbar support. 5,013,087, Cl. 297-284.000.
- Nagashima, Toshikazu; Kuramashi, Haruki; Nishida, Yoshihiro; and Hirukawa, Masahiro, to Central Glass Company, Limited. Liquid coating composition and coating method for forming hard-coat film on plastics. 5,013,788, Cl. 524-767.000.
- Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, to Mitsui Toatsu Chemicals, Inc. Process for molding a highly-refractive plastic lens. 5,013,496, Cl. 264-2.300.
- Nagatsuka, Ikutaroh: *See—*
  - Matsumura, Yasuo; Aoki, Takayoshi; Nagatsuka, Ikutaroh; and Mochiauki, Masao, 5,013,626, Cl. 430-106.600.
- Nagayama, Yoshiro: *See—*
  - Enomoto, Masao; Yamamoto, Masami; Nagayama, Yoshiro; and Yamauchi, Yoshinori, 5,012,693, Cl. 74-502.100.
- Nagel, Karl: *See—*
  - Conzelmann, Gerhard; Nagel, Karl; and Kohl, Walter, 5,013,996, Cl. 322-28.000.
- Nagi, Katsuo; and Furukawa, Kazunari, to Yamaha Corporation. Acoustic apparatus. 5,012,890, Cl. 181-160.000.
- Nagi, Katsuo; Furukawa, Kazunari; and Noro, Masao, to Yamaha Corporation. Driving apparatus, and control information storage body and protection circuit therefor. 5,014,320, Cl. 381-96.000.
- Nagler, Werner; and Schoenauer, Ludwig, to Siemens Aktiengesellschaft. Circuit configuration for telecommunication switching systems, in particular PCM time division multiplex telephone switching systems with a central switching network and peripheral sub-switching networks connected to it. 5,014,264, Cl. 370-58.100.
- Nagy, Lajos: *See—*
  - Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.
- Nair, Muraleedharan G.: *See—*
  - Putnam, Alan R.; Mishra, Saroj K.; and Nair, Muraleedharan G., 5,013,549, Cl. 424-116.000.

- Nair, Vasu; and Buenger, Greg S., to University of Iowa Research Foundation. Stable congener of 2',3'-dideoxyadenosine. 5,013,829, Cl. 536-26.000.
- Naismith, Robert: *See—*
  - Thornthwaite, John B.; and Naismith, Robert, 5,013,228, Cl. 425-2.000.
- Naito, Koichi: *See—*
  - Ohnishi, Kazumasa; Naito, Koichi; and Nakazawa, Toru, 5,013,958, Cl. 310-323.000.
- Nakadai, Tsutomu: *See—*
  - Mori, Kyoichi; Toda, Kuniaki; Iizuka, Nobuyuki; Hongo, Tsutomu; and Nakadai, Tsutomu, 5,014,143, Cl. 360-99.120.
- Nakagawa, Takashi; and Suyama, Tetsuya, to Aisin Seiki Kabushiki Kaisha. Oil pump having regulator valve isolated from dynamic pressure of pumped oil. 5,013,220, Cl. 417-310.000.
- Nakagawa, Yasutsugu; and Horiuchi, Tohru, to Konica Corporation. Camera. 5,014,079, Cl. 354-266.000.
- Nakagawa, Yoji: *See—*
  - Asai, Keniti; Ito, Hideaki; Nakagawa, Yoji; Shihara, Yasutaka; Hodate, Toshiaki; and Nakazaki, Akikazu, 5,013,408, Cl. 202-241.000.
- Nakahara, Toshiaki: *See—*
  - Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 5,014,089, Cl. 355-251.000.
- Nakai, Masaaki: *See—*
  - Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 5,014,083, Cl. 354-471.000.
- Nakai, Satoru: *See—*
  - Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.
- Nakajima, Akio; and Nakatani, Munehiro, to Minolta Camera Kabushiki Kaisha. Image reader. 5,014,332, Cl. 382-50.000.
- Nakajima, Mutsuo: *See—*
  - Haneishi, Tatsuo; Okazaki, Takao; Torikata, Akio; and Nakajima, Mutsuo, 5,013,550, Cl. 424-117.000.
- Nakajima, Tsuyoshi: *See—*
  - Ikeda, Yuji; and Nakajima, Tsuyoshi, 5,013,928, Cl. 250-574.000.
- Nakakura, Toshiyuki: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Nakamichi Corporation: *See—*
  - Uchikoshi, Gohji, 5,013,901, Cl. 250-202.000.
- Nakamura, Akira, to Sankoshoki Corporation. Internal combustion engine. 5,012,772, Cl. 123-25.00C.
- Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Autonomous, decentralized fast breeder reactor system. 5,013,519, Cl. 376-179.000.
- Nakamura, Kazuyuki: *See—*
  - Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, 5,013,466, Cl. 252-42.700.
- Nakamura, Keiichi: *See—*
  - Kobayashi, Katsuyuki; Inui, Masaki; Ashida, Satoshi; Nakamura, Keiichi; and Yamamoto, Masaji, 5,012,908, Cl. 192-57.000.
- Nakamura, Ko; and Ienaga, Kazuharu, to Nippon Zoki Pharmaceutical Co., Ltd. Glycocyamidine derivatives. 5,013,750, Cl. 514-401.000.
- Nakamura, Nobutaka; Takeda, Haruo; and Take, Masafumi, to Seiko Instruments, Inc. Thermal analysis apparatus. 5,013,159, Cl. 374-12.000.
- Nakamura, Shinichi: *See—*
  - Matsumoto, Jun-ichi; Minamida, Akira; Fujita, Masahiro; Hirose, Tohru; Nakano, Junji; and Nakamura, Shinichi, 5,013,841, Cl. 544-363.000.
- Nakamura, Takashi: *See—*
  - Umemoto, Chiyuki; Nakamura, Takashi; Takahashi, Kenji; and Hosoi, Yuichi, 5,013,916, Cl. 250-327.200.
- Nakamura, Tsuyoshi: *See—*
  - Nakaoda, Toshinori; Aoto, Teruaki; Aoyama, Nagara; Nakamura, Tsuyoshi; and Nishimura, Ritsuo, 5,013,211, Cl. 414-789.600.
- Nakamura, Yasukazu: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, to Hitachi, Ltd. Magnetic disk apparatus with head supporting structures of different proper oscillations. 5,014,142, Cl. 360-98.010.
- Nakanishi Metal Works Co., Ltd.: *See—*
  - Wakabayashi, Takao, 5,013,203, Cl. 414-222.000.
- Nakano, Junji: *See—*
  - Matsumoto, Jun-ichi; Minamida, Akira; Fujita, Masahiro; Hirose, Tohru; Nakano, Junji; and Nakamura, Shinichi, 5,013,841, Cl. 544-363.000.
- Nakano, Yoshitomo: *See—*
  - Morita, Akio; and Nakano, Yoshitomo, 5,014,297, Cl. 379-82.000.
- Nakano, Yuji: *See—*
  - Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 5,014,135, Cl. 358-296.000.
- Nakao, Ken-ichirou: *See—*
  - Mizumura, Tetsuo; Ichijo, Minoru; Nakao, Ken-ichirou; Matsushima, Seiichi; and Tuburaya, Yoshitane, 5,013,594, Cl. 428-64.000.
- Nakaoda, Toshinori; Aoto, Teruaki; Aoyama, Nagara; Nakamura, Tsuyoshi; and Nishimura, Ritsuo, to Meinan Machinery Works, Inc. System for stacking veneer sheets conveyed from two different directions. 5,013,211, Cl. 414-789.600.
- Nakashima, Hideo: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Nakashita, Kazuhisa: *See—*
  - Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
- Nakatani, Kazuo; Ikoma, Mitsuhiro; Yoshida, Yuji; Tomizawa, Takeshi; Arita, Koji; and Tagashira, Minoru, to Matsushita Electric Industrial Co., Ltd. Heat pump apparatus. 5,012,651, Cl. 62-149.000.
- Nakatani, Munehiro: *See—*
  - Nakajima, Akio; and Nakatani, Munehiro, 5,014,332, Cl. 382-50.000.
- Nakatani, Seiichi: *See—*
  - Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; Hakotani, Yasuhiko; and Kikuchi, Tatsuro, 5,014,158, Cl. 361-321.000.
- Nakayama, Hironori: *See—*
  - Yokoyama, Yoshiharu; Akiyama, Shigeru; Nakayama, Hironori; and Kamiya, Tsuyoshi, 5,012,781, Cl. 123-353.000.
- Nakazaki, Akikazu: *See—*
  - Asai, Keniti; Ito, Hideaki; Nakagawa, Yoji; Shihara, Yasutaka; Hodate, Toshiaki; and Nakazaki, Akikazu, 5,013,408, Cl 202-241.000.
- Nakazawa, Eiji: *See—*
  - Kita, Kazunori; and Nakazawa, Eiji, 5,014,317, Cl. 381-43.000.
- Nakazawa, Shinzo; Tsukada, Taro; and Suzuki, Eiichi, to Tokyo Tanabe Company, Limited. Gourd powder composition. 5,013,576, Cl. 426-640.000.
- Nakazawa, Takeharu; and Fujita, Toshihiko, to Sanden Corporation. Automotive air conditioning system. 5,012,859, Cl. 165-42.000.
- Nakazawa, Toru: *See—*
  - Ohnishi, Kazumasa; Naito, Koichi; and Nakazawa, Toru, 5,013,958, Cl. 310-323.000.
- Nalco Chemical Company: *See—*
  - St. John, Michael R.; and Alexander, Ronnie L., 5,013,456, Cl. 210-734.000.
- Nalesnik, Theodore E.: *See—*
  - DeRosa, Thomas F.; Nalesnik, Theodore E.; and Kaufman, Benjamin J., 5,013,469, Cl. 252-47.500.
- Nalowaniec, Krzysztof; and Simmler, Kurt, to Paul Hartmann Aktiengesellschaft. Method of making an absorbent disposable article. 5,013,382, Cl. 156-298.000.
- Nance, James G., to Cameron Iron Works, Inc. Blowout preventer. 5,013,005, Cl. 251-1.300.
- Nankaku, Shigeki; and Koikawa, Shigeru, to Mitsubishi Denki Kabushiki Kaisha. Method of forming configuration data for CNC machining apparatus. 5,014,209, Cl. 364-474.350
- Napoli, Joseph D.: *See—*
  - Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 5,013,385, Cl. 156-345.000.
- Narayanan, Krishna: *See—*
  - Liang, Marc D.; and Narayanan, Krishna, 5,012,797, Cl. 128-24.00A.
- Narumi China Corporation: *See—*
  - Kato, Hiroshi; Yano, Shinsuke; Nonomura, Toshio; and Nishigaki, Susumu, 5,013,695, Cl. 501-139.000.
- Narushima, Mayumi: *See—*
  - Oikawa, Hideo; Ogawa, Masatomi; Iwai, Kiyoshi; and Narushima, Mayumi, 5,013,775, Cl. 524-107.000.
- Naso, Joseph I.; Barbaro, Joseph L.; and Howard, John, to Cielo Industries, Inc. Cat litter screening device. 5,012,765, Cl. 119-166.000.
- Nathaniel, Keithley M. Exercise device. 5,013,035, Cl. 272-136.000.
- National Hand Tool Corporation: *See—*
  - Chow, Kirk K., 5,012,705, Cl. 81-63.000.
- National Semiconductor Corporation: *See—*
  - Estrada, Julio R., 5,013,938, Cl. 307-455.000.
  - Hobrecht, Stephen W.; and Chow, Michael C. L., 5,013,934, Cl. 307-296.700.
  - Jansson, Lars G., 5,013,941, Cl. 307-475.000.
- National Starch and Chemical Investment Holding Corporation: *See—*
  - Barron, Milagros C.; Swope, Ronald L.; and Wilkerson, John M., III, 5,013,787, Cl. 524-555.000.
- Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Haruhiko; and Nagai, Takeshi, to Fujitsu Limited. Method of cooling a semiconductor device with a cooling unit, using metal sherbet between the device and the cooling unit. 5,012,858, Cl. 165-1.000.
- Natsumra Oil Research Corporation: *See—*
  - Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, 5,013,466, Cl. 252-42.700.

VOL
1126
ISS
1
MY
7
1991
UMI

Navazo, Juan M. B., to Aparellaje Electrico, S.A. Box for containing electrical mechanisms. 5,013,870, Cl. 174-50.000.

NCR Corporation: *See—*
- Collins, Donald A., Jr., 5,013,899, Cl. 235-462.000.
- Edwards, Gordon L., Jr., 5,014,234, Cl. 364-900.000.
- Mazumder, Ali T., 5,014,324, Cl. 382-7.000.
- Ono, Tsutomu; and Nogami, Masaru, 5,013,896, Cl. 235-381.000.
- Yokota, Katsuyoshi; Jingu, Toshihiro; and Matsumoto, Kazunori, 5,013,168, Cl. 400-82.000.

NEC Corporation: *See—*
- Aoki, Yasushi, 5,013,937, Cl. 307-448.000.
- Hayashi, Hideo; and Omata, Makoto, 5,014,196, Cl. 364-200.000.
- Horigome, Osamu, 5,013,676, Cl. 437-45.000.
- Itoh, Kouichi, 5,014,194, Cl. 364-200.000.
- Kawamura, Eiji, 5,014,188, Cl. 364-200.000.
- Minami, Yoichiro, 5,014,046, Cl. 340-727.000.
- Samukawa, Seiji; Sasaki, Masami; and Mori, Sumio, 5,013,401, Cl. 156-643.000.
- Takada, Naruaki, 5,014,243, Cl. 365-96.000.
- Tamitani, Ichiro, 5,014,189, Cl. 364-200.000.
- Tanahashi, Yutaka; and Takahashi, Toshihiko, 5,014,257, Cl. 369-59.000.
- Yamada, Kazuyoshi, 5,013,999, Cl. 323-313.000.
- Yamazaki, Shuntaro; and Ono, Takashi, 5,013,116, Cl. 350-96.150.
- Yoshida, Norio, 5,014,272, Cl. 370-106.000.

Needle, Lloyd H. Spare toilet tissue holder. 5,012,986, Cl. 242-55.300.

Negri, Lucia: *See—*
- Melchiorri, Pietro; and Negri, Lucia, 5,013,721, Cl. 514-13.000.

Nehl, Wolfgang, to fischerwerke Artur Fischer GmbH & Co. Kg. Container for receiving a cassette with a tape-like recording medium. 5,012,922, Cl. 206-387.000.

Neil Pryde Limited: *See—*
- Lockhart, Reed: and Spanier, Barry, 5,012,755, Cl. 114-103.000.

Nekoosa Packaging Corporation: *See—*
- Hansen, Gerald M., 5,012,930, Cl. 206-620.000.

Nelson, Deanna J.: *See—*
- Hai, Ton T.; and Nelson, Deanna J., 5,013,866, Cl. 562-474.000.

Nelson, Donald R., to Goddard Valve Corporation. Top entry valve. 5,013,009, Cl. 251-357.000.

Nelson, Kurt A. Scaffold erection structure. 5,012,894, Cl. 182-178.000.

Nelson, Michael G.: *See—*
- Bessinger, Stephen L.; and Nelson, Michael G., 5,013,091, Cl. 299-1.000.

Nelson, Richard A.: *See—*
- Gervais, William J.; and Nelson, Richard A., 5,014,141, Cl. 360-96.100.

Nelson, Richard S.: *See—*
- Rickerby, David S.; Whitmell, Derek S.; Coad, Joseph P.; and Nelson, Richard S., 5,013,419, Cl. 204-298.050.

Nepera, Inc.: *See—*
- Feitler, David; and Wetstein, Henry, 5,013,843, Cl. 546-251.000.

Nepomuceno, Jose G.: *See—*
- Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 5,012,823, Cl. 131-31.000.

Neppl, Franz: *See—*
- Winnerl, Josef; and Neppl, Franz, 5,013,678, Cl. 437-52.000.

Nerbe, Jurgen F.; and Wonne, Karl-Georg. Biochemical reaction receptacle. 5,013,590, Cl. 428-36.400.

Neri, Armando, to G.D Societa' per Azioni. Method of electro-optically inspecting cigarettes. 5,013,905, Cl. 250-223.00R.

Nerz, John E.: *See—*
- Fuimefreddo, Anthony J.; Nerz, John E.; Hacker, Martin E.; and Hain, Gunther, 5,013,883, Cl. 219-121.470.

Nesheiwat, Afif M.; and Drake, Charles A., to Bodenseewerk Geratetechnik GmbH. Actuating drive for positioning a rotary element. 5,013,986, Cl. 318-593.000.

Netter, Pierre: *See—*
- Bargues, Michel; Boya, Didier; Gaillard, Dominique; and Netter, Pierre, 5,013,274, Cl. 445-2.000.

Neubauer, Hans-Juergen: *See—*
- Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Krieg, Wolfgang; and Hofmeister, Peter, 5,013,847, Cl. 548-378.000.

Neuforge, Marc: *See—*
- Denis, Jean-Paul; and Neuforge, Marc, 5,012,743, Cl. 102-514 000.

Neuschutz, Heinz: *See—*
- Leimer, Marius; von der Crone, Jost; Babler, Fridolin; and Neuschutz, Heinz, 5,013,455, Cl. 210-729.000.

New England Braiding Company, Inc.: *See—*
- Champlin, George B., 5,013,053, Cl. 277-215.000.

Newhall, Robert J. Drainer for drying and storing kitchen and other utensils. 5,012,934, Cl. 211-41.000.

Newman, Paul, to Rolls-Royce plc. Self-acting air supported thrust bearing. 5,013,165, Cl. 384-122.000.

Nezu, Yasuhiko, to Sanyo Electric Co., Ltd. Apparatus for and method of improving the AFC of a television broadcast satellite receiver. 5,014,350, Cl. 455-258.000.

Ng, John S.: *See—*
- Campbell, Arthur L.; Mueller, Richard A.; Ng, John S.; and Partis, Richard A., 5,013,864, Cl. 562-426.000.

Ng, Steve Y. W.: *See—*
- Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., 5,013,821, Cl. 528-376.000.

Ng, Yee S., to Eastman Kodak Company. Color copying apparatus and method with improved productivity. 5,014,093, Cl. 355-326.000.

NGK Insulators, Ltd.: *See—*
- Fukao, Kaname; Hamanaka, Toshiyuki; and Harada, Takashi, 5,013,501, Cl. 264-67.000.
- Hamanaka, Toshiyuki; Harada, Takashi; and Hattori, Fumio, 5,013,500, Cl. 264-40.400.
- Kato, Nobuhide; and Hamada, Yasuhiko, 5,012,670, Cl. 73-31.050.
- Matsuzawa, Soichiro; and Takeya, Fuminori, 5,012,572, Cl. 29-603.000.

NGK Spark Plug Co., Ltd.: *See—*
- Shimizu, Hiroyuki; Ito, Kenji; and Wakita, Naomasa, 5,014,024, Cl. 333-203.000.

Nguyen, Dung D., to Boeing Company, The. Method and apparatus for determining actual lateral deviation from runway centerline. 5,014,053, Cl. 340-979.000.

Nichols, Walter A.: *See—*
- Thesing, Richard A.; and Nichols, Walter A., 5,012,829, Cl. 131-344.000.

Nicholson, Raymond J.: *See—*
- Scribner, James R.; Nicholson, Raymond J.; Brown, Thomas G.; and Caracciolo, Anthony, Jr., 5,014,206, Cl. 364-449.000.

Nicollin, Jean-Robert: *See—*
- Jonville, Christian; and Nicollin, Jean-Robert, 5,013,503, Cl. 264-117.000.

Nicollini, Germano; and Senderowicz, Daniel, to SGS-Thomson Microelectronics S.r.L. Method of reconstructing an analog signal, particularly in digital telephony applications, and a circuit device implementing the method. 5,014,304, Cl. 379-399.000.

Nicoloff, Demitre M.: *See—*
- Parins, David J.; Szczech, Gerald S.; Nicoloff, Demitre M.; and Berhow, Steven W., 5,013,312, Cl. 606-37.000.

Niebylski, Leonard M., to Ethyl Corporation. Ceramic products derived from polycarbosilanes and boroxines. 5,013,609, Cl. 428-447.000.

Nielinger, Werner; Bockmann, August; Brinkmeyer, Hermann; and Schulte, Helmut, to Bayer Aktiengesellschaft. Process for the production of polyamide sheet products. 5,013,518, Cl. 264-564.000.

Nienhuis, James H.; Clark, Jeffrey L.; De Pree, Michael L.; and Beck, Robert L., to Herman Miller, Inc. Electrified wall panel system. 5,013,252, Cl. 439-215.000.

Nigawara, Seiitsu; Ikematsu, Takehiko; and Fukai, Masayuki, to Hitachi, Ltd. Safeguard arrangement for plant. 5,012,766, Cl. 122-504.000.

Nihon Bunko Kogyo Kabushiki Kaisha: *See—*
- Higashidate, Sakae; Yamauchi, Yoshio; and Saito, Muneo, 5,013,443, Cl. 210-634.000.

Nihon Eiwan Denshikiki Co., Ltd.: *See—*
- Moritomo, Shigeru, 5,014,325, Cl. 382-7.000.

Niklas, Robert: *See—*
- Strauber, Hans-Jurgen; Niklas, Robert; Ohlendorf, Rolf; and Speier, Wolfgang, 5,012,774, Cl. 123-90.170.

Nikles, Francois: *See—*
- Groothuis, Michiel; and Nikles, Francois, 5,014,251, Cl. 368-80.000.

Nikon Corporation: *See—*
- Akasaka, Hideki; and Sato, Masatoshi, 5,014,252, Cl. 369-13.000.

Nilssen, Ole K. Electronic ballast with improved lamp current crest factor. 5,013,974, Cl. 315-244.000.

Nilsson, Richard C.; and Barker, Jeffrey S., to Alcatel NA Cable Systems Inc. Pulling eye assembly for connectorized optical fiber cables. 5,013,125, Cl. 350-96.230.

Ninkaplast GmbH: *See—*
- Twellmann, Guenter, 5,013,106, Cl. 312-330.100.

Nippon Carbide Kogyo Kabushiki kaisha: *See—*
- Tateno, Izuru, 5,013,782, Cl. 524-417.000.

Nippon Hoso Kyokai: *See—*
- Numazawa, Junji; Yoneda, Yoshiro; and Aruga, Fusayoshi, 5,014,148, Cl. 360-125.000.

Nippon Oil Company, Limited: *See—*
- Tajima, Yoshio; Nomiyama, Kazutosi; Nishikitani, Yoshinori; Kuroda, Nobuyuki; and Matsuura, Kazuo, 5,013,802, Cl. 526-86.000.

Nippon Oil and Fats Co., Ltd.: *See—*
- Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.

Nippon Piston Ring Co., Ltd.: *See—*
- Suzuki, Yasuo; and Takeguchi, Shunsuke, 5,013,611. Cl. 428-552.000.

Nippon Seiko Kabushiki Kaisha: *See—*
- Hamada, Kaneaki; Tsubota, Kazuichi; and Muraoka, Tomoki, 5,013,525, Cl. 420-104.000.
- Tsukada, Toru, 5,013,164, Cl. 384-45.000.

Nippon Zeon Co., Ltd.: *See—*
- Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,796, Cl. 525-326.200.
- Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,797, Cl. 525-328.300.

Nippon Zoki Pharmaceutical Co., Ltd.: *See—*
- Konishi, Jin-emon, 5,013,558, Cl. 424-520.000.
- Nakamura, Ko; and Ienaga, Kazuharu, 5,013,750, Cl. 514-401.000.

Nippondenso Co., Ltd.: *See—*
- Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.
- Oshita, Koji; and Harada, Takuya, 5,014,054, Cl. 341-145.000.

Nishida, Ikuo; Hanawa, Shinichi; and Kawase, Hideyuki, to Hitachi, Ltd. Apparatus for drawing out tape from a cassette. 5,014,140, Cl. 360-85.000.

Nishida, Kozi; and Watanabe, Mikiharu, to Mitsubishi Rayon Company, Ltd. Thermoplastic methacrylimide group-containing resin composition. 5,013,774, Cl. 524-91.000.

Nishida, Mitsuhiro, to Mitsubishi Denki K. K. Rotating scroll machine with balance weights. 5,013,226, Cl. 418-55.100.

Nishida, Yoshihiro: *See—*
- Nagashima, Toshikazu; Kuramashi, Haruki; Nishida, Yoshihiro; and Hirukawa, Masahiro, 5,013,788, Cl. 524-767.000.

Nishigaki, Susumu: *See—*
- Kato, Hiroshi; Yano, Shinsuke; Nonomura, Toshio; and Nishigaki, Susumu, 5,013,695, Cl. 501-139.000.

Nishihara, Tohru: *See—*
- Ohtsuka, Eiko; Inoue, Hideo; Morisawa, Hirokazu; Shibahara, Susumu; Mukai, Sachiko; and Nishihara, Tohru, 5,013,830, Cl. 536-27.000.

Nishii, Michiharu; Mizuno, Genji; Mizukoshi, Hideo; Ishida, Satoshi; and Hata, Kyousuke, to Aisin Seiki Kabushiki Kaisha. Hydraulic braking system. 5,013,094, Cl. 303-52.000.

Nishikitani, Yoshinori: *See—*
- Tajima, Yoshio; Nomiyama, Kazutosi; Nishikitani, Yoshinori; Kuroda, Nobuyuki; and Matsuura, Kazuo, 5,013,802, Cl. 526-86.000.

Nishima, Osamu: *See—*
- Kumesawa, Tetsuro; Kanou, Yasuo; Nishima, Osamu; Isobe, Masaaki; and Matsui, Hiromichi, 5,014,132, Cl. 358-213.190.

Nishimura, Akira; Watanabe, Hiroyuki; and Masuda, Eiji, to Kabushiki Kaisha Toshiba. Clock supply circuit having adjustment capacitance. 5,013,942, Cl. 307-480.000.

Nishimura, Keiji: *See—*
- Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, 5,013,372, Cl. 148-111.000.

Nishimura, Ritsuo: *See—*
- Nakaoda, Toshinori; Aoto, Teruaki; Aoyama, Nagara; Nakamura, Tsuyoshi; and Nishimura, Ritsuo, 5,013,211, Cl. 414-789.600.

Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; Hakotani, Yasuhiko; and Kikuchi, Tatsuro, to Matsushita Electric Industrial Co., Ltd. Laminated ceramic capacitor. 5,014,158, Cl. 361-321.000.

Nishio, Tomoyuki: *See—*
- Takahashi, Tsuneo; Nishio, Tomoyuki; Ikegami, Masayuki; and Gunji, Takahiro, 5,012,676, Cl. 73-497.000.

Nishioka, Jim Z. Trigger cover. 5,012,605, Cl. 42-70.070.

Nishioka, Kimihiko: *See—*
- Hasegawa, Akira; Takahashi, Susumu; Tsuji, Koyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, 5,014,121, Cl. 358-55.000.

Nishiyama, Fumio, to Jujo Paper Co., Ltd. Pressure-sensitive recording sheet and coating material therefor. 5,013,708, Cl. 503-213.000.

Nissan Motor Company, Limited: *See—*
- Abe, Noriyuki; Kimura, Takashi; and Fujiki, Norio, 5,014,155, Cl. 361-56.000.
- Fujimura, Itaru; Fukushima, Naoto; Fukunaga, Yukio; and Akatsu, Yohsuke, 5,013,061, Cl. 280-707.000.
- Hayasaki, Koichi, 5,012,698, Cl. 74-866.000.
- Konishi, Junkichi; and Shiraishi, Yasuhiro, 5,014,199, Cl. 364-424.050.
- Muro, Hideo, 5,013,904, Cl. 250-214.00R.
- Okamoto, Kazuhisa; and Ishibashi, Fumikazu, 5,012,770, Cl. 123-52.0MC.
- Takatsuka, Hiromichi, 5,013,994, Cl. 322-8.000.
- Yokote, Masatsugu; Sugasawa, Fukashi; Mouri, Hiroshi; and Kuroki, Junsuke, 5,012,881, Cl. 180-140.000.

Nissin Shokuhin Kabushiki Kaisha: *See—*
- Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,012,795, Cl. 126-262.000.

Nitto Kohki Co., Ltd.: *See—*
- Takeuchi, Hirosato; and Kazama, Yasuo, 5,014,047, Cl. 340-763.000.

Niven, Clarence A.: *See—*
- Strand, Jerome E.; Craighead, Lawrence W.; and Niven, Clarence A., 5,012,810, Cl. 128-640.000.

Niwa, Masatake: *See—*
- Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 5,014,083, Cl. 354-471.000.

Niwa, Shigeo: *See—*
- Kobayashi, Masahiro; Tagai, Hideo; Kuroki, Yoshikatsu; Niwa, Shigeo; and Ono, Mikiya, 5,013,323, Cl. 623-16.000.

NKK Corporation: *See—*
- Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, 5,013,410, Cl. 204-27.000.
- Yasue, Yoshihiko; and Kagechika, Hiroshi, 5,013,614, Cl. 428-651.000.

Noba, Kunihiro; Sakuraba, Yukio; and Urano, Katsuyoshi, to Tokai Rubber Industries, Ltd. Method of producing optical fiber connectors. 5,013,495, Cl. 264-1.500.

Nocca, Jean-Luc; Leonard, Jacques; Gaillard, Jean-Ferdinand; and Amigues, Pierre, to Institut Francais Du Petrole; and Elf France. Apparatus for reactive distillation. 5,013,407, Cl. 202-158.000.

Nogami, Masaru: *See—*
- Ono, Tsutomu; and Nogami, Masaru, 5,013,896, Cl. 235-381.000.

Noguchi, Koichi: *See—*
- Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, 5,014,091, Cl. 355-321.000.

Nomachi, Tetsuya: *See—*
- Murayama, Yoichi; and Nomachi, Tetsuya, 5,013,416, Cl. 204-192.100.

Nomiyama, Kazutosi: *See—*
- Tajima, Yoshio; Nomiyama, Kazutosi; Nishikitani, Yoshinori; Kuroda, Nobuyuki; and Matsuura, Kazuo, 5,013,802, Cl. 526-86.000.

Nomura, Manabu; and Wada, Kaoru, to Idemitsu Petrochemical Company Limited. Thermoplastic resin composition and process for producing the same. 5,013,773, Cl. 523-222.000.

Nomura, Yasuhiro: *See—*
- Katayama, Sakae; Ito, Yosuke; and Nomura, Yasuhiro, 5,013,747, Cl. 514-367.000.

Nonomura, Toshio: *See—*
- Kato, Hiroshi; Yano, Shinsuke; Nonomura, Toshio; and Nishigaki, Susumu, 5,013,695, Cl. 501-139.000.

Norbury, Robert J.; Chang, Robert W. H.; and Zeller, Lowell C., to Minnesota Mining and Manufacturing Company. Encapsulated cosmetic materials and process of making. 5,013,473, Cl. 252-174.130.

Nordica S.r.l.: *See—*
- Baggio, Giorgio; and De Bortoli, Giuseppe, 5,012,598, Cl. 36-119.000.

Nordquist, Bengt H., to Pullmax AB. Tool holder for punching tools. 5,012,712, Cl. 83-571.000.

Nordstrom, Duane M.; and Baker, Harold L., to Longview Fibre Company. Paperboard container with content indicating window. 5,012,972, Cl. 229-162.000.

Norem, Stanley D.; Ferranti, Richard T.; and Culmo, Robert F., to Perkin-Elmer Corporation, The. Analysis of organic material. 5,013,528, Cl. 422-94.000.

Noro, Masao: *See—*
- Nagi, Katsuo; Furukawa, Kazunari; and Noro, Masao, 5,014,320, Cl. 381-96.000.

Norris, James C.; and Hume, Arthur S. Method and composition for antagonism of sodium nitroprusside toxic effects. 5,013,539, Cl. 424-10.000.

North American Philips Corporation: *See—*
- Crawford, Joseph A., 5,013,970, Cl. 315-106.000.
- Droho, Joseph S., 5,013,977, Cl. 315-289.000.
- Otto, Detlev, 5,014,122, Cl. 358-12.000.

North, Peter C.: *See—*
- Coates, Ian H.; Oxford, Alexander W.; North, Peter C.; Miller, Thomas; Baxter, Anthony D.; and Hammond, Kevin I., 5,013,733, Cl. 514-213.000.

Northeastern University: *See—*
- Taslim, Mohammad E.; and Levendis, Yiannis A., 5,013,340, Cl. 55-290.000.

Northern Telecom Limited: *See—*
- Moisin, Mihail S., 5,014,305, Cl. 379-402.000.

Nosaka, Eishou: *See—*
- Ikegami, Kazunori; Okuda, Souitirou; Nosaka, Eishou; and Yoshida, Tadahisa, 5,013,963, Cl. 313-414.000.

Nouri, Taoufik, to Lasag AG. Envelope generator for a power beam. 5,013,311, Cl. 606-4.000.

Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., to Boeing Company, The. Aircraft construction. 5,014,060, Cl. 342-2.000.

Novak, Robert F.: *See—*
- Hunt, Thomas K.; and Novak, Robert F., 5,013,612, Cl. 428-552.000.

Novatome: *See—*
- Azarian, Garo, 5,013,521, Cl. 376-290.000.

Nuechterlein, Paul E., to Sundstrand Corporation. DC-link ripple reduction circuit. 5,014,177, Cl. 363-45.000.

Nuechterlein, Paul E., to Sundstrand Corporation. Lossless snubber circuit. 5,014,180, Cl. 363-56.000.

Nulty, James E.: *See—*
- Kurasaki, Howard S.; Westlund, Barbara F.; Nulty, James E.; and Vowles, E. John, 5,013,400, Cl. 156-643.000.

Numakura, Iwao: *See—*
- Numakura, Takashi; and Numakura, Iwao, 5,014,120, Cl. 358-39.000.

Numakura, Takashi; and Numakura, Iwao, to Yamatoya & Co., Ltd. Method for processing picture to be reproduced on color picture tube and processor therefor. 5,014,120, Cl. 358-39.000.

Numazawa, Junji; Yoneda, Yoshiro; and Aruga, Fusayoshi, to Nippon Hoso Kyokai; and Kabushiki Kaisha Sankyo Seiki Seisakusho. Perpendicular magnetic recording and reproducing head. 5,014,148, Cl. 360-125.000.

Nusser, Heinz. Ultra precision pressure regulator. 5,014,031, Cl. 335-230.000.

Nutter, Dale E. Apparatus for distributing liquid in gas-liquid contact apparatus, and method for making it. 5,013,491, Cl. 261-97.000.

Nykon Products Inc.: *See—*
- Galle, Nicola, 5,013,074, Cl. 294-33.000.

Nys, Jan R.: *See—*
- Van Gestel, Jozef F. E.; Nys, Jan R.; and Ruelens, Paul F. M., 5,013,746, Cl. 514-365.000.

Obeck, Carl J., to Bourse Trading Company, Ltd. Traffic signal control for emergency vehicles. 5,014,052, Cl. 340-906.000.

Oberley, Gene; and Downie, Barbara, to American Laundry Machinery, Inc. Indexing mechanism for a mannequin carriage having a slidable, pivotable support and index bar moveable by a fluid cylinder for movement between a dressing position and a garment press. 5,012,962, Cl. 223-57.000.

O'Connell, James A.: *See—*
- Zaragoza, Robert; McLinden, Thomas V.; and O'Connell, James A., 5,013,161, Cl. 374-208.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Ocvirk, Norbert; and Weise, Lutz, to Alfred Teves GmbH. Anti-lock brake system with traction slip control. 5,013,096, Cl. 303-116.000.
- Oda, Hiroyuki; Tanaka, Toshimitsu; Yamagata, Naoyuki; and Hashimoto, Kazuhiko, to Mazda Motor Corporation. Intake system for multi-cylinder engine. 5,012,771, Cl. 123-52.0MB.
- Odagawa, Tetsufumi: *See—*
  - Sanada, Tatsuyuki; and Odagawa, Tetsufumi, 5,014,280, Cl. 372-45.000.
- Odajima, Katsuhiko: *See—*
  - Ikehata, Motoshige; Mikami, Hiroyuki; Inayama, Naoto; and Odajima, Katsuhiko, 5,012,835, Cl. 137-82.000.
- Odell, Daniel M. C., to Du Pont de Nemours, E. I., and Company. Stator assembly for a non-static cogging brushless DC motor and method of fabricating the same. 5,013,953, Cl. 310-254.000.
- O'Dell, Robert W.: *See—*
  - Albachten, Rudolph J., III; and O'Dell, Robert W., 5,014,247, Cl. 365-230.050.
- Odorisio, Paul A.: *See—*
  - Pastor, Stephen D.; and Odorisio, Paul A., 5,013,510, Cl. 564-301.000.
- Oehr, Christian: *See—*
  - Suhr, Harald; Etspuler, Angelika; Feurer, Ernst; and Oehr, Christian, 5,013,581, Cl. 427-41.000.
- Oepping, Wilfried: *See—*
  - Beneke, Ulrich; Gross, Jurgen; Oepping, Wilfried; Schnelle, Manfred; and Sundermeier, Gunter, 5,012,551, Cl. 16-49.000.
- Ogasawara, Koji: *See—*
  - Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, 5,012,843, Cl. 139-224.00A.
- Ogasawara, Yasuhito: *See—*
  - Hayakawa, Youichi; Hosono, Chihiro; and Ogasawara, Yasuhito, 5,013,287, Cl. 475-61.000.
- Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Magnetic fluid, method for producing it and magnetic seal means using the same. 5,013,471, Cl. 252-62.520.
- Ogawa, Masahide; Sato, Teiji; Takahashi, Masao; Kitsu, Toshio; Takahashi, Seikichi; and Ono, Kinichi, to Mizusawa Industrial Chemicals, Ltd. Ink jet recording paper with amorphous silica filler. 5,013,603, Cl. 428-331.000.
- Ogawa, Masahide; Sato, Teiji; Abe, Kiyoshi; Tsuchida, Hisashi; Inoue, Hiroo; and Saito, Mitsuo, to Mizusawa Industrial Chemicals, Ltd. Pressure-sensitive recording paper and color developer therefor. 5,013,709, Cl. 503-225.000.
- Ogawa, Masatomi: *See—*
  - Oikawa, Hideo; Ogawa, Masatomi; Iwai, Kiyoshi; and Narushima, Mayumi, 5,013,775, Cl. 524-107.000.
- Ogi, Keiji: *See—*
  - Yoshizawa, Tomomi; Ogi, Keiji; and Kimura, Nariko, 5,013,633, Cl. 430-358.000.
- Ogihara, Tsutomu: *See—*
  - Shimizu, Takaaki; Ogihara, Tsutomu; and Takita, Masatoshi, 5,013,585, Cl. 427-220.000.
- Ogino, Takao: *See—*
  - Miyazaki, Tadaaki; Ogino, Takao; Masuda, Yoshitomo; Wada, Hiroaki; and Kawagoe, Takahiro, 5,013,620, Cl. 429-194.000.
- Ogiue, Katsumi: *See—*
  - Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
- Oguchi, Masahiro: *See—*
  - Masumoto, Tsuyoshi; Inoue, Akihisa; Oguchi, Masahiro; and Harakawa, Yoshio, 5,013,346, Cl. 65-21.200.
- Ogushi, Hiroshi: *See—*
  - Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 5,014,135, Cl. 358-296.000.
- Oh, Suk Y. Chicken egg having relatively high percentage of long chain fatty acids and method of reducing heart related disease in humans using such eggs. 5,012,761, Cl. 119-6.800.
- Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, to Japan Atomic Energy Research Institute; and Natsumra Oil Research Corporation. Lubricating grease. 5,013,466, Cl. 252-42.700.
- Ohashi, Kaoru: *See—*
  - Yonekawa, Takashi; Onuma, Toshio; Buma, Shuuichi; Ikemoto, Hiroyuki; Ohashi, Kaoru; Aburaya, Toshio; and Sato, Kinihito, 5,013,062, Cl. 280-707.000.
- Ohashi, Toshiyuki: *See—*
  - Isakozawa, Shigeto; and Ohashi, Toshiyuki, 5,013,915, Cl. 250-311.000.
- Ohhira, Hiroaki: *See—*
  - Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.
- Ohkawa, Hideki; Ozawa, Norio; Higashino, Hiroyuki; and Matsubara, Motonari, to Kabushiki Kaisha Toshiba. Information storage medium. 5,013,635, Cl. 430-495.000.
- Ohlendorf, Rolf: *See—*
  - Strauber, Hans-Jurgen; Niklas, Robert; Ohlendorf, Rolf; and Speier, Wolfgang, 5,012,774, Cl. 123-90.170.
- Ohnishi, Kazumasa; Naito, Koichi; and Nakazawa, Toru, to Alps Electric Co., Ltd. X-Y stage with ultrasonic actuator. 5,013,958, Cl. 310-323.000.
- Ohno, Shigeru; Jimbo, Yoshihiro; Adachi, Keiichi; and Kuwashima, Shigeru, to Fuji Photo Film Co., Ltd. Silver halide color photographic materials. 5,013,636, Cl. 430-522.000.
- Ohsawa, Takashi: *See—*
  - Muroka, Kazuyoshi; Ohsawa, Takashi; and Furuyama, Tohru, 5,014,245, Cl. 365-194.000.
- Ohsugi, Hiroshi: *See—*
  - Shikamori, Tamotsu; Toshimitsu, Hiroyuki; Ohsugi, Hiroshi; Hiyama, Isao; and Fukuzawa, Soichi, 5,012,658, Cl. 68-12.010.
- Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, to Mitsui Toatsu Chemicals, Inc. Process for preparing a polyimide and a composite material containing the same. 5,013,817, Cl. 528-183.000.
- Ohta, Wasaburo: *See—*
  - Yagawara, Shinji; and Ohta, Wasaburo, 5,012,671, Cl. 73-31.060.
- Ohtaki, Akira: *See—*
  - Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.
- Ohtani, Kenzi: *See—*
  - Hayashi, Michihiko; and Ohtani, Kenzi, 5,014,020, Cl. 330-257.000.
- Ohtsuka, Eiko; Inoue, Hideo; Morisawa, Hirokazu; Shibahara, Susumu; Mukai, Sachiko; and Nishihara, Tohru, to Ajinomoto Co., Inc. Compounds for the cleavage at a specific position of RNA, oligomers employed for the formation of said compounds, and starting materials for the synthesis of said oligomers. 5,013,830, Cl. 536-27.000.
- Oien, Michael A.: *See—*
  - Clark, William A.; Oien, Michael A.; and Pelosi, Walter, 5,014,162, Cl. 361-412.000.
- Oikawa, Hideaki: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Oikawa, Hideo; Ogawa, Masatomi; Iwai, Kiyoshi; and Narushima. Mayumi, to DIC-Hercules Chemicals, Inc. Sizing composition and sizing method. 5,013,775, Cl. 524-107.000.
- Oike, Ikuo, to Honda Giken Kogyo Kabushiki Kaisha. Two-cycle engine. 5,012,775, Cl. 123-192.00B.
- Oka, Toshio: *See—*
  - Matsunaga, Hiroshi; Honda, Hisamitsu; Matsui, Haruhiko; Akita, Masahiko; Inaba, Tatsuya; Kondo, Tetsusai; and Oka, Toshio, 5,012,715, Cl. 84-724.000.
- Okada, Shinjiro: *See—*
  - Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, 5,013,137, Cl. 350-333.000.
- Okada, Shoji; Fujie, Naofumi; Ito, Koji; and Imaizumi, Tomoaki, to Aisin Seiki Kabushiki Kaisha. Device for removing water droplets. 5,012,593, Cl. 34-69.000.
- Okada, Shoji; Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; Ichikawa, Yuji; and Hayashi, Kazumi, to Aisin Seiki Kabushiki Kaisha. Self-cleaning plate shaped device. 5,013,888, Cl. 219-219.000.
- Okaji, Makoto: *See—*
  - Itoh, Akira; Haino, Kozo; Okaji, Makoto; Emoto, Kazuhiro; and Kodera, Tatsuya, 5,013,623, Cl. 430-59.000.
- Okamoto, Kazuhisa; and Ishibashi, Fumikazu, to Nissan Motor Co., Ltd. Intake apparatus for internal combustion engine. 5,012,770, Cl. 123-52.0MC.
- Okamoto, Masato: *See—*
  - Fujita, Masahiko; Shishido, Yuuji; Suzuki, Yuzuru; and Okamoto, Masato, 5,012,571, Cl. 29-598.000.
- Okamoto, Sigeru: *See—*
  - Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.
- Okauchi, Shigeki: *See—*
  - Uehara, Tsukasa; and Okauchi, Shigeki, 5,014,151, Cl. 360-133.000.
- Okazaki, Koju: *See—*
  - Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru, Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,013,496, Cl. 264-2.300.
- Okazaki, Takao: *See—*
  - Haneishi, Tatsuo; Okazaki, Takao; Torikata, Akio; and Nakajima, Mutsuo, 5,013,550, Cl. 424-117.000.
- Okazaki, Yoji: *See—*
  - Harada, Akinori; and Okazaki, Yoji, 5,013,129, Cl. 350-96.290.
- Oki Electric Industry Co., Ltd.: *See—*
  - Hashimoto, Toshiharu; Shibata, Kazuhiko; and Kobayashi, Makoto, 5,013,023, Cl. 271-3.100.
  - Kihava, Kouichi; and Yamamoto, Kazushige, 5,014,233, Cl. 364-766.000.
  - Koshida, Yoshinori; Ayukai, Kemmi; and Suto, Shin-ichi, 5,013,911, Cl. 250-239.000.
- Oki, Ichiroh: *See—*
  - Ide, Shigeaki; and Oki, Ichiroh, 5,013,692, Cl. 437-241.000.
- Okino, Yoshiharu, to Fuji Photo Film Co., Ltd. Multibeam recorder using mirror reflected parallel scan lines. 5,014,075, Cl. 346-108.000.
- Okuda, Hiroshi: *See—*
  - Matsunaga, Kazu; Okuda, Hiroshi; and Awazu, Kenzo, deceased, 5,013,480, Cl. 252-301.40H.
- Okuda, Souitirou: *See—*
  - Ikegami, Kazunori; Okuda, Souitirou; Nosaka, Eishou; and Yoshida, Tadahisa, 5,013,963, Cl. 313-414.000.

- Okumura, Makoto: *See—*
  - Nagahara, Michiko; Ieda, Chikara; Mimura, Mitsuo; Uchida, Katsuhiro; Sato, Soichiro; and Okumura, Makoto, 5,013,736, Cl. 514-255.000.
- Okumura, Shigeo; and Inaba, Koushiro, to Sanshin Kogyo Kabushiki Kaisha. Exhaust system for two-stroke engine. 5,012,648, Cl. 60-313.000.
- Olin Corporation: *See—*
  - Butt, Sheldon H., 5,014,159, Cl. 361-386.000.
  - Mahulikar, Deepak; Crane, Jacob; and Braden, Jeffrey S., 5,013,871, Cl. 174-52.400.
  - Sowash, Robert P., 5,012,744, Cl. 102-523.000.
- Olmer, Leonard J.: *See—*
  - Lory, Earl R.; and Olmer, Leonard J., 5,013,691, Cl. 437-238.000.
- Olpe, Hans-Rudolf: *See—*
  - Baylis, Eric K.; Bittiger, Helmut; Froostl, Wolfgang; Hall, Roger G.; Maier, Ludwig; Mickel, Stuart J.; and Olpe, Hans-Rudolf, 5,013,863, Cl. 562-11.000.
- Olper, Marco; Corsini, Tullio; and Fracchia, Pierluigi, to Engitec Impianti S.p.A. Process for the processing of slag from aluminium scrap and waste melting, recovery of components thereof and treatment of gasses generated. 5,013,356, Cl. 75-586.000.
- Olsson, Erik: *See—*
  - Medin, Gunnar; Olsson, Erik; Lennart, Sjoo ; and Lundgren, Roger, 5,012,721, Cl. 89-36.170.
- Olympus Optical Co., Ltd.: *See—*
  - Hakamatsuka, Yasuharu; and Watanabe, Kazuhiro, 5,013,363, Cl. 106-38.300.
  - Hasegawa, Akira; Takahashi, Susumu; Tsuji, Koyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, 5,014,121, Cl. 358-55.000.
  - Horie, Yuji; and Yoshikawa, Shoji, 5,014,256, Cl. 369-44.350.
  - Sasaki, Toyoji, 5,013,982, Cl. 318-114.000.
- Omachi, Toshikatsu, to Toshikatsu Omachi; and Foundation of River & Basin. Lock using air chambers. 5,013,184, Cl. 405-85.000.
- O'Mara, William E., Jr.; and Beasom, James D., to Harris Corporation. MESFET for dielectrically isolated integrated circuits. 5,014,108, Cl. 357-49.000.
- Omata, Makoto: *See—*
  - Hayashi, Hideo; and Omata, Makoto, 5,014,196, Cl. 364-200.000.
- O'Meara, David L.: *See—*
  - Hochberg, Arthur K.; O'Meara, David L.; and Roberts, David A., 5,013,690, Cl. 437-233.000.
- Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, to Kabushiki Kaisha Toshiba. Paper sheet processing apparatus. 5,012,932, Cl. 209-534.000.
- O'Neal, Glenn B.: *See—*
  - Baker, Quentin A.; Mecredy, Henry E.; and O'Neal, Glenn B., 5,012,777, Cl. 123-254.000.
- O'Neil, Robert M., to Ciba-Geigy Corporation. Corrosion inhibition. 5,013,482, Cl. 252-395.000.
- Ong, Beng S.; Kmiecik-Lawrynowicz, Grazyna; Yulo, Fernando; and Koch, Kayong, to Xerox Corporation. Encapsulated toner compositions. 5,013,630, Cl. 430-138.000.
- Oniwa, Naoyuki: *See—*
  - Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, 5,013,410, Cl. 204-27.000.
- Ono, Kinichi: *See—*
  - Ogawa, Masahide; Sato, Teiji; Takahashi, Masao; Kitsu, Toshio; Takahashi, Seikichi; and Ono, Kinichi, 5,013,603, Cl. 428-331.000.
- Ono, Mikiya: *See—*
  - Kobayashi, Masahiro; Tagai, Hideo; Kuroki, Yoshikatsu; Niwa, Shigeo; and Ono, Mikiya, 5,013,323, Cl. 623-16.000.
- Ono Pharmaceutical Co., Ltd.: *See—*
  - Iguchi, Sadahiko; Kawamura, Masanori; and Miyamoto, Tsumoru, 5,013,734, Cl. 514-231.500.
- Ono, Takashi: *See—*
  - Yamazaki, Shuntaro; and Ono, Takashi, 5,013,116, Cl. 350-96.150.
- Ono, Takayuki: *See—*
  - Sugimura, Kentaro; Hasimoto, Shoji; and Ono, Takayuki, 5,013,464, Cl. 252-26.000.
- Ono, Tetsuo: *See—*
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Ono, Tsutomu; and Nogami, Masaru, to NCR Corporation. Cashierless checkout system using customer passcard. 5,013,896, Cl. 235-381.000.
- Onodera, Show: *See—*
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Onuma, Toshio: *See—*
  - Yonekawa, Takashi; Onuma, Toshio; Buma, Shuuichi; Ikemoto, Hiroyuki; Ohashi, Kaoru; Aburaya, Toshio; and Sato, Kinihito, 5,013,062, Cl. 280-707.000.
- Oohashi, Morio: *See—*
  - Fujiki, Hironao; and Oohashi, Morio, 5,013,772, Cl. 523-213.000.
- Oono, Tetsuya; and Akiyama, Eitetsu, to Honda Giken Kogyo Kabushiki Kaisha. Driving wheel slip control system for vehicles. 5,012,882, Cl. 180-197.000.
- Ootsuka, Hiroshi: *See—*
  - Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, 5,014,078, Cl. 354-195.100.
- Ootsuka, Shigeharu, to Mitsubishi Denki Kabushiki Kaisha. Electromagnetic contactor. 5,014,027, Cl. 335-132.000.
- Opie, Eric A.; and Silverstein, Fred E. Needle safety system and method. 5,013,305, Cl. 604-192.000.
- Oppermann, Hermann: *See—*
  - Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.
- Orbom, Eric W. Continuous connector. 5,013,176, Cl. 403-171.000.
- Orient Co., Ltd.: *See—*
  - Komoto, Kazumasa, 5,014,036, Cl. 337-407.000.
- Orito, Yoshihiro: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Ormco Corporation: *See—*
  - Sterrett, Terry L.; and Schmidt, Gerald W., 5,013,238, Cl. 433-2.000.
- Orpaz, Roni. Pacifier with lip clip. 5,013,320, Cl. 606-234.000.
- Osaka Diamond Industrial Co., Ltd.: *See—*
  - Kawata, Azuma; Koroku, Shuichiro; Kano, Hirofumi; and Miyao, Ichiro, 5,012,792, Cl. 125-15.000.
- Oscar Meyer Foods Corporation: *See—*
  - Crum, Peter, 5,012,936, Cl. 211-59.300.
- Oshita, Koji; and Harada, Takuya, to Nippondenso Co., Ltd. Digital-to-analog converter of the resistor string type. 5,014,054, Cl. 341-145.000.
- Osteen, Mitchell M.; and Baldwin, Samuel L., to General Electric Company. Luminaire having a reflector containing asymmetrical ridges for distributing light output asymmetrically. 5,014,175, Cl. 362-348.000.
- Osterholtz, Fred D.: *See—*
  - Guillet, Antoine; and Osterholtz, Fred D., 5,013,771, Cl. 523-202.000.
- Otaka, Tadashi, to Hitachi, Ltd. Method and apparatus for generating electron channeling patterns. 5,013,914, Cl. 250-310.000.
- Otis Engineering Corporation: *See—*
  - Kilgore, Marion D., 5,012,867, Cl. 166-188.000.
  - Pleasants, Charles W.; Burnett, David R.; and Head, Donald W., 5,012,871, Cl. 166-386.000.
- Otsuki, Shinnichiro: *See—*
  - Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 5,014,135, Cl. 358-296.000.
- Otto Bock Orthopadische Industrie Besitz- und Verwaltungs-KG: *See—*
  - Horvath, Eduard, 5,013,326, Cl. 623-64.000.
- Otto, Detlev, to North American Philips Corporation. Method and apparatus for encoding and transmission of video signals. 5,014,122, Cl. 358-12.000.
- Otto Manner: *See—*
  - Friderich, Raimund, 5,013,235, Cl. 425-564.000.
- Owen, Hartley: *See—*
  - Bell, Weldon K.; Haag, Werner O.; Harandi, Mohsen N.; and Owen, Hartley, 5,013,329, Cl. 44-448.000.
- Owens-Illinois Closure Inc.: *See—*
  - Ingram, Keith W.; Schoenlein, Mark J.; and Harger, Clifford T., 5,012,630, Cl. 53-490.000.
- Owens, Nancy. Greeting card display rack. 5,012,937, Cl. 211-189.000.
- Oxford, Alexander W.: *See—*
  - Coates, Ian H.; Oxford, Alexander W.; North, Peter C.; Miller, Thomas; Baxter, Anthony D.; and Hammond, Kevin I., 5,013,733, Cl. 514-213.000.
- Ozawa, Norio: *See—*
  - Ohkawa, Hideki; Ozawa, Norio; Higashino, Hiroyuki; and Matsubara, Motonari, 5,013,635, Cl. 430-495.000.
- Ozawa, Shigeo: *See—*
  - Aoki, Takashi; Sekine, Noboru; Ozawa, Shigeo; and Shimada, Takamichi, 5,012,699, Cl. 74-869.000.
- Ozawa, Tetsuo: *See—*
  - Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, 5,013,474, Cl. 252-299.100.
- Ozeki, Hiroaki: *See—*
  - Kubo, Kazuhiko; Usui, Akira; Sakashita, Seiji; Ozeki, Hiroaki; and Kanno, Ippei, 5,014,349, Cl. 455-189.000.
- Ozeki, Jiro, to Slidex Corporation. Projector for transparent file sheet. 5,013,148, Cl. 353-27.00R.
- Padgaonkar, Ajay J.; and Mitra, Sumit K. Security for digital signal processor program memory. 5,014,191, Cl. 364-200.000.
- Padhi, Prafulla K.: *See—*
  - Rodgers, Donald E.; Chen, Jacob Y.; and Padhi, Prafulla K., 5,014,306, Cl. 379-407.000.
- Pagelli, Claudio, to Dronge & Rapoport Inc. Rotatable pick-up head for electric guitar. 5,012,716, Cl. 84-727.000.
- Pai, Jenny L.: *See—*
  - Staniulis, Mark T.; Crozier, Douglas E.; Risch, Alan P.; and Pai, Jenny L., 5,013,703, Cl. 502-241.000.
- Paillere, Patrick: *See—*
  - Lamaze, Airy-Pierre; and Paillere, Patrick, 5,013,413, Cl. 204-64.00R.
- Palker, Thomas J.: *See—*
  - Haynes, Barton F.; and Palker, Thomas J., 5,013,548, Cl. 424-89.000.
- Panametrics, Inc.: *See—*
  - Meyer, Emilio, 5,012,669, Cl. 73-25.000.

VOL 1126 ISS 1 MY 7 1991 UMI

Panduit Corp.: *See—*
Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 5,013,260, Cl. 439-535.000.

Pantoliano, Michael W.: *See—*
Bryan, Philip N.; and Pantoliano, Michael W., 5,013,657, Cl. 435-172.300.

Paoli, Thomas L.: *See—*
Epler, John E.; and Paoli, Thomas L., 5,013,684, Cl. 437-129.000.

Pap, Laszlo : *See—*
Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.

Papajesk, James G.: *See—*
Donate, Felipe A.; and Papajesk, James G., 5,013,364, Cl. 106-311.000.

Papallo, Thomas F., Jr.; and Castonguay, Roger N., to General Electric Company. Actuator-accessory reset arrangement for molded case circuit interrupter or electric switch. 5,014,025, Cl. 335-167.000.

Paper Converting Machine Company: *See—*
Van Kanegan, Eugene M.; and Klimek, Wayne D., 5,012,736, Cl. 101-211.000.

Papst-Motoren & Co., KG: *See—*
Wrobel, Gunter, 5,013,957, Cl. 310-217.000.

Parins, David J.; Szczech, Gerald S.; Nicoloff, Demitre M.; and Berhow, Steven W., to Everest Medical Corporation. Bipolar scalpel for harvesting internal mammary artery. 5,013,312, Cl. 606-37.000.

Park, Geroge B.: *See—*
Cook, John A.; Park, Geroge B.; McLoughlin, Robert H.; and Whitcher, William J., 5,013,619, Cl. 429-189.000.

Park, Philip E. Solar heat collector. 5,012,796, Cl. 126-416.000.

Parkin, Stuart S. P.; Roche, Kevin P.; and Speriosu, Virgil S., to International Business Machines Corporation. Magnetoresistive sensor with improved antiferromagnetic film. 5,014,147, Cl. 360-113.000.

Parry, John C., to J. C. Parry & Sons Co., Inc. Stretch film with auxiliary band. 5,013,595, Cl. 428-77.000.

Parsons, Bryan N. V., to Jaguar Cars Limited. Transmission systems. 5,013,288, Cl. 475-166.000.

Partis, Richard A.: *See—*
Campbell, Arthur L.; Mueller, Richard A.; Ng, John S.; and Partis, Richard A., 5,013,864, Cl. 562-426.000.

Parton, Richard L.: *See—*
Muenter, Annabel; Adin, Anthony; Parton, Richard L.; Pightling, Nicholas A.; and Beaumond, David, 5,013,642, Cl. 430-574.000.

Partride, Randall D.: *See—*
Chen, Nai Y.; Dessau, Ralph M.; Partride, Randall D.; and Valyocsik, Ernest W., 5,013,423, Cl. 208-64.000.

Paschke, Werner: *See—*
Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.

Pasco, Ian K., to Combined Optical Industries Limited. Lens. 5,013,143, Cl. 350-432.000.

Pasqua, John; and Law, Wai T., to EM Diagnostic Systems, Inc. Enzymatic detection of monovalent anions. 5,013,648, Cl. 435-25.000.

Pasquet, Georges: *See—*
Arnould, Jean C.; Lohmann, Jean J.; and Pasquet, Georges, 5,013,731, Cl. 514-202.000.

Passage, Robert D., Jr., to Allen Group Inc., The. Radio controlled material handling apparatus. 5,012,749, Cl. 104-297.000.

Passarotti, Carlos; Fossati, Antonio; Valenti, Mauro; and Bandi, Gianluigi, to Prodotti Formenti s.r.l. Oral pharmaceutical compositions containing dextrophan salts. 5,013,554, Cl. 424-440.000.

Pastor, Stephen D.; and Odorisio, Paul A., to Ciba-Geigy Corporation. Process for preparing long chain N,N-dialkylhydroxylamines by direct oxidation. 5,013,510, Cl. 564-301.000.

Patarin, Joel; Guth, Jean-Louis; Kessler, Henri; Coudurier, Gisele; and Raatz, Francis, to Institut Francais du Petrole. Process for the synthesis of zeolites of the ferrisilicate type, products so obtained. 5,013,537, Cl. 423-328.000.

Patout, Jules G.: *See—*
DeMichele, Mardon; and Patout, Jules G., 5,013,209, Cl. 414-563.000.

Patterson, Richard A., to Minnesota Mining and Manufacturing Company. Stamped precision lightguide interconnect centering element. 5,013,123, Cl. 350-96.210.

Patton, Robert L.: *See—*
Bedard, Robert L.; Patton, Robert L.; and Wilson, Stephen T., 5,013,535, Cl. 423-277.000.

Patton, Robert T.: *See—*
Christiansen, Steven H.; Littleton, Teresa; and Patton, Robert T., 5,013,404, Cl. 162-72.000.

Patureaux, Thierry: *See—*
Maroy, Pierre; Patureaux, Thierry; Freychet, David; and Loutaty, Roben, 5,013,368, Cl. 134-22.110.

Paul Hartmann Aktiengesellschaft: *See—*
Nalowaniec, Krzysztof; and Simmler, Kurt, 5,013,382, Cl. 156-298.000.

Paul Hettich Gmbh & Co.: *See—*
Beneke, Ulrich; Gross, Jurgen; Oepping, Wilfried; Schnelle, Manfred; and Sundermeier, Gunter, 5,012,551, Cl. 16-49.000.

Paul, Wolfgang: *See—*
Hecht, Hartmuth; Paul, Wolfgang; and Baumgartner, Anton, 5,014,281, Cl. 372-59.000.

Payne, Curtis E.: *See—*
Ivy, Jeffery W.; and Payne, Curtis E., 5,013,726, Cl. 514-159.000.

Payne, Robert; Goetz, Walter; and Wolf, Uwe, to Basf Aktiengesellschaft. Filler-containing polyamide molding materials having an improved surface and improved coatability. 5,013,786, Cl. 524-514.000.

Pearson, Jeffery L.: *See—*
Miller, Gregory A.; and Pearson, Jeffery L., 5,013,064, Cl. 280-730.000.

Peck, Lawrence B.: *See—*
Mosby, James F.; Peck, Lawrence B.; Taylor, James L.; and Beaton, William I., 5,013,427, Cl. 208-211.000.

Peck, Ted: *See—*
Landoll, Donald R.; Williams, Kelly; and Peck, Ted, 5,013,056, Cl. 280-425.200.

Peebles, Richard J.; Michna, Richard J.; Monat, David E.; Bartholomew, Stephen W.; and Adams, Craig F., to Ensign-Bickford Company, The. Initiator for a transmission tube. 5,012,741, Cl. 102-275.400.

Pehr, Harold T. Automatic reset window latch. 5,013,073, Cl. 292-87.000.

Pelosi, Walter: *See—*
Clark, William A.; Oien, Michael A.; and Pelosi, Walter, 5,014,162, Cl. 361-412.000.

Penhale, Donald W. H.: *See—*
Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., 5,013,821, Cl. 528-376.000.

Penot, Maurice: *See—*
Rolland, Jean-Luc; Beguin, Jean-Yves; Magna, Henriette; Jacobelli, Alain; and Penot, Maurice, 5,013,394, Cl. 156-627.000.

Pepe, David, to Davis Electric Wallingford Corporation. Multiple station turret winding apparatus and method for winding wire onto reels. 5,012,985, Cl. 242-25.00A.

Peper, Henry: *See—*
Case, Laura K., deceased; Gajria, Chandrasen; Loftin, Rachel M.; and Peper, Henry, 5,013,361, Cl. 106-22.000.

Perego, Gabriele: *See—*
Marraccini, Antonio; Perego, Gabriele; and Guastalla, Giovanni, 5,013,472, Cl. 252-78.100.

Perez, Bernardo A.: *See—*
Galan, Mario A.; Perez, Bernardo A.; and Gonzalez, Jose R. P., 5,012,584, Cl. 33-18.100.

Perichon, Jacques: *See—*
Conan, Annie; D'Incan, Esther; Perichon, Jacques; and Sibille, Soline, 5,013,412, Cl. 204-59.00R.

Perkin-Elmer Corporation, The: *See—*
Fuimefreddo, Anthony J.; Nerz, John E.; Hacker, Martin E.; and Hain, Gunther, 5,013,883, Cl. 219-121.470.
Norem, Stanley D.; Ferranti, Richard T.; and Culmo, Robert F., 5,013,528, Cl. 422-94.000.

Permea, Inc.: *See—*
Malon, Raymond F.; and Cruse, Clint A., 5,013,767, Cl. 521-64.000.

Pernicka, Martin; and Gagnon, Mario, to Institut De Recherche En Sante Et En . . . Visor attachment for safety helmet. 5,012,528, Cl. 2-10.000.

Perrin,.Jean-Claude: *See—*
Rollin, Joel; and Perrin, Jean-Claude, 5,013,142, Cl. 350-422.000.

Perthus, Peter: *See—*
Lindae, Gerhard; Loewe, Richard; and Perthus, Peter, 5,014,173, Cl. 362-309.000.

Pertzsch, Albert: *See—*
Breuer, Rudolf; Lutz, Gottfried; Pertzsch, Albert; and Schultz, Helmut, 5,014,150, Cl. 360-132.000.

Pesente, Narciso, to Enomec S.p.A. Apparatus for the control of a pasteurizing process. 5,012,727, Cl. 99-470.000.

Pesin, Abram I.: *See—*
Chevakin, Ivan V.; Zharov, Nikolai P.; Popov, Oleg V.; Pesin, Abram I.; and Radchenko, Petr A., 5,012,649, Cl. 60-527.000.

Peters, Donald F., Jr.; and Dumont, Lawrence C., to SmithKline Diagnostics, Inc. Mass producible biologically active solid phase devices. 5,013,669, Cl. 436-518.000.

Peterson, David C.: *See—*
Leigh-Monstevens, Keith V.; Peterson, David C.; and Mabee, Brian, 5,014,038, Cl. 340-430.000.

Peterson, George E.: *See—*
Atkins, Robert M.; Peterson, George E.; and Tuminaro, Raymond D., 5,013,130, Cl. 350-96.300.

Peterson, Robert S.; and Larsen, John A., to AEG Westinghouse Industrial Automation Corporation. Control system and method for compensating for speed effect in a tandem cold mill. 5,012,660, Cl. 72-8.000.

Petitou, Maurice; and Choay, Jean, to Sanofi Societe Anonyme. Process for the sulfation of glycosaminoglycans, the sulfated glycosaminoglycans and their biological applications. 5,013,724, Cl. 514-54.000.

Petroff, Pierre M.; and Kroemer, Herbert, to University of California, The Regents of the. Method for growing tilted superlattices. 5,013,683, Cl. 437-110.000.

Petrolite Corporation: *See—*
Bellos, Thomas J.; and Keating, Richard D., 5,013,452, Cl. 210-708.000.
Thompson, Neil E. S.; and Asperger, Robert G., 5,013,451, Cl. 210-708.000.

Petrzilka, Martin, to Hoffmann-La Roche Inc. Liquid crystals. 5,013,478, Cl. 252-299.630.

Petter Refrigeration Limited: *See—*
Ryde, Michael J.; and Warwick, Peter J., 5,012,653, Cl. 62-203.000.

Pettit, Paul H., Jr.: *See—*
Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., 5,013,791, Cl. 525-113.000.

Peyronnenc, Michel: *See—*
Debize, Jean-Claude; Hartmann, Yves; Huon, Pierre; and Peyronnenc, Michel, 5,014,187, Cl. 364-200.000.

Pfister GmbH: *See—*
Haefner, Hans W., 5,012,679, Cl. 73-800.000.

Pfizer Inc.: *See—*
Braish, Tamim F.; and Fox, Darrell E., 5,013,839, Cl. 544-349.000.
Danley, Dennis E., 5,013,462, Cl. 252-8.554.
Hay, Bruce A., 5,013,571, Cl. 426-600.000.
Hay, Bruce A., 5,013,572, Cl. 426-600.000.
Korsmeyer, Richard W., 5,012,975, Cl. 239-9.000.
Volkmann, Robert A., 5,013,729, Cl. 514-195.000.

Phaff, Rox; and Zink, Rudolf, to Ciba-Geigy Corporation. Pressure- or heat-sensitive recording material. 5,013,707, Cl. 503-212.000.

Pharmaceutical Delivery Systems, Inc.: *See—*
Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., 5,013,821, Cl. 528-376.000.

Pharmacia AB: *See—*
Bjork, Anders K., 5,013,735, Cl. 514-255.000.

Philip Morris Incorporated: *See—*
Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 5,012,823, Cl. 131-31.000.
Thesing, Richard A.; and Nichols, Walter A., 5,012,829, Cl. 131-344.000.

Philips, Terry: *See—*
Schad, Robert D.; Disimone, John; and Philips, Terry, 5,013,513, Cl. 264-328.800.

Phillips, James P.; Johnson, Robert M., Jr.; and Zurek, Michael W., to Motorola, Inc. Rotatable contactless antenna coupler and antenna. 5,014,346, Cl. 455-89.000.

Phillips, James R.: *See—*
Myers, Virginia A.; Wenman, Daniel L.; and Phillips, James R., 5,013,386, Cl. 156-351.000.

Phillips Petroleum Company: *See—*
Drake, Charles A., 5,013,822, Cl. 528-388.000.

Physical Systems, Inc.: *See—*
Hutter, Charles G., III; and Carter, Alexander B., III, 5,013,391, Cl. 156-578.000.

Picandet, Jean A., to J. S. Telecommunications. Microcomputer integrating a digital subscriber terminal for an integrated service digital network. 5,014,269, Cl. 370-85.110.

Piccinini, Dino; and Arabino, Domenico, to SMAE - Societa' Meridionale Accessori Elastomerici S.p.A. Hermetically tight sealing device for motor vehicles. 5,012,615, Cl. 49-477.000.

Pidner, Ernst: *See—*
Stadler, Edwin; Hergesell, Wolfgang; and Pidner, Ernst, 5,013,575, Cl. 426-639.000.

Pightling, Nicholas A.: *See—*
Muenter, Annabel; Adin, Anthony; Parton, Richard L.; Pightling, Nicholas A.; and Beaumond, David, 5,013,642, Cl. 430-574.000.

Pinckney, Robert L.: *See—*
Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,014,060, Cl. 342-2.000.

Pinson, George T., to Boeing Company, The. Projectile with an obturator incorporating a motor. 5,012,991, Cl. 244-3.120.

Pioneer Electronic Corp.: *See—*
Takemasa, Kaoru; Takahashi, Akira; Kawamura, Masahiko; Maruyama, Sigeo; and Kon, Tokushige, 5,014,258, Cl. 369-178.000.
Yokoo, Toru; and Yamamoto, Hideki, 5,013,132, Cl. 350-128.000.

Piselli, Fulvio L., to Industria Chimica Profarmaco S. p. A. Process for the preparation of an optically active benzothiazepinone. 5,013,834, Cl. 540-491.000.

Piskoti, Charles, to Genesee Polymers Corporation. Method of preparing alkoxy silane and a silicone containing resin. 5,013,808, Cl. 528-23.000.

Pitman, Raymond F ; and Wacht, Raymond J., to Simon-RO Corporation. Color coded boom and chart system for proportionally extensible boom assembly. 5,012,939, Cl. 212-157.000.

Pitzi, Vincent J., to Jacobs Brake Technology Corporation. Externally driven compression release retarder. 5,012,778, Cl. 123-321.000.

Place, Richard A., to Microwave Data Systems, Inc. Squelch-tail eliminator. 5,014,343, Cl. 455-38.000.

Placon Corporation: *See—*
Borst, Rodney D., 5,012,927, Cl. 206-470.000.

Plath, Peter: *See—*
Schwalge, Barbara; Plath, Peter; Eicken, Karl; Meyer, Norbert; and Wuerzer, Bruno, 5,013,354, Cl. 71-95.000.

Pleasants, Charles W.; Burnett, David R.; and Head, Donald W., to Otis Engineering Corporation. Fluid flow control system, assembly and method for oil and gas wells. 5,012,871, Cl. 166-386.000.

Pleass, Charles M.: *See—*
Hicks, Douglas C.; and Pleass, Charles M., 5,013,219, Cl. 417-269.000.

Plumton, Donald L.; Tran, Liem T.; and Shih, Hung-Dah, to Texas Instruments Incorporated. Method for selective epitaxy using a $WS_2$ mask. 5,013,682, Cl. 437-89.000.

Pocock, Terrence H.; McNorgan, Rick; Coumons, Peter; and Lodberg, Allan, to Cableshare, Inc. Television system for the interactive distribution of selectable video presentations. 5,014,125, Cl. 358-86.000.

Poelker, John N.: *See—*
Robertson, Ralston S., Jr.; and Poelker, John N., 5,014,021, Cl 331-96.000.

Poertzgen, Gregor; Fuhrmann, Castor; and Hosan, Hans-Josef, to Stabilus GmbH. Length variable and lockable positioning device. 5,012,996, Cl. 248-161.000.

Pogorzelski, James S.; and Shempert, Craig H., to International Business Machines Corporation. Input/output bus expansion interface. 5,014,236, Cl. 364-900.000.

Polaroid Corporation: *See—*
Farrington, David L., 5,014,082, Cl. 354-437.000.

Polyak, Mark U.; Abugov, Gely P.; and Belyak, Vladimir B. Digital telephone system. 5,014,315, Cl. 380-49.000.

Polyplastics Co., Ltd.: *See—*
Teshirogi, Takuma, 5,013,840, Cl. 544;357-.

Pompei, Francesco; and Gaudet, Philip R., Jr., to Exergen Corporation. Radiation detector having improved accuracy. 5,012,813, Cl. 128-664.000.

Ponomarev, Viktor G.: *See—*
Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.

Popov, Oleg V.: *See—*
Chevakin, Ivan V.; Zharov, Nikolai P.; Popov, Oleg V.; Pesin, Abram I.; and Radchenko, Petr A., 5,012,649, Cl. 60-527.000.

Popp, Harald: *See—*
Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.

Popper, Peter: *See—*
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; and Yngve, Paul W., 5,012,636, Cl. 57-204.000.

Porchia, Jose; McCree, John O.; and Dais, Brian C., to Dow Chemical Company, The. Closure for reclosable thermoplastic containers. 5,012,561, Cl. 24-576.000.

Portage Electric Products, Inc.: *See—*
Wehl, Brandon L., 5,014,034, Cl. 337-368.000.

Postlewait, Lester B.; and Urban, Paul L. Microprocessor controlled soldering station. 5,014,210, Cl. 364-477.000.

Potter, Terry W.; and Worrell, Glen C., to Digital Equipment Corporation. Parallel associative memory having improved selection and decision mechanisms for recognizing and sorting relevant patterns. 5,014,327, Cl. 382-14.000.

Power Integrations, Inc.: *See—*
Balakrishnan, Balu, 5,014,178, Cl. 363-49.000.

Power, Leslie; and Prewer, John, to Inventio AG. Lift shaft apparatus. 5,012,621, Cl. 52-30.000.

Powers, Kenneth W.: *See—*
Wang, Hsien C.; Powers, Kenneth W.; Puydak, Robert C.; and Dharmarajan, Narayanaswami R., 5,013,793, Cl. 525-195.000.

PPG Industries, Inc.: *See—*
Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., 5,013,791, Cl. 525-113.000.

Precht, Hans-Jurgen; and Maass, Rudolf, to Robert Krups Stiftung & Co. KG. Hinge for covers in machines for making hot beverages. 5,012,556, Cl. 16-366.000.

Preisetanz, Johann; and Kotitschke, Gerhard, to J. M. Voith GmbH. Web drying unit. 5,012,594, Cl. 34-121.000.

Preiss, Peter: *See—*
Marquardt, Gerwig; and Preiss, Peter, 5,013,858, Cl. 556-401.000.

Prettie, John: *See—*
Kristola, Jay L.; and Prettie, John, 5,012,915, Cl. 198-411.000.

Preus, Martin W.: *See—*
Guest, Allen M.; Preus, Martin W.; and Lewis, William, 5,013,608, Cl. 428-436.000.

Preuschoff, Ulf: *See—*
Walenta, Rainer; Muller-Peddinghaus, Reiner; Ban, Ivan; Wurl, Michael; and Preuschoff, Ulf, 5,013,852, Cl. 549-362.000.

Preuss, August-Wilhelm: *See—*
Schramm, Bernhard; Kern, Jurgen; Schwahn, Harald; Preuss, August-Wilhelm; Gottlieb, Klaus; and Bruderreck, Hartmut, 5,013,706, Cl. 502-309.000.

Prewer, John: *See—*
Power, Leslie; and Prewer, John, 5,012,621, Cl. 52-30.000.

Prezmecky, Laszlo. Jaw implant. 5,013,242, Cl. 433-174.000.

Price, Anthony G.: *See—*
Campbell, Roy; and Price, Anthony G., 5,012,901, Cl. 188-71.400.

Price, George T., III. Color changeable flashlight. 5,014,171, Cl. 362-277.000.

Price, Rick C.; Eltoukhy, Atef H.; and Mehmandoust, Yassin, to HMT Technology Corporation. Magnetic disc surface treatment and apparatus. 5,012,618, Cl. 51-140.000.

Priester, Donnan E.: *See—*
Chapman, George R., Jr.; Priester, Donnan E.; and Stewart, Charles W., 5,013,792, Cl. 525-166.000.

Primeaux, Dudley J., II: *See—*
Zimmerman, Robert L.; and Primeaux, Dudley J , II, 5,013,813, Cl. 528-60.000.

Princeton University, The Trustees of: *See—*
Taylor, Edward C.; Schrader, Thomas H.; and Walensky, Loren D., 5,013,738, Cl. 514-272.000.

Print Controls Corporation: *See—*
Samuels, Michael D., 5,013,019, Cl. 270-1.100.

Pritchard, Eric K.; and Mayhew, Christopher A., to Vision III Imaging, Inc. Method and apparatus for recording images with a single image receiver for autostereoscopic display. 5,014,126, Cl. 358-91.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Probst, Willy: *See—*
  - Gironi, Fabrizio; Iten, Jakob; Koslowski, Gerhard; and Probst, Willy, 5,012,564, Cl. 28-193.000.
- Procter & Gamble Company, The: *See—*
  - Berman, Elizabeth F.; Buckwalter, Brian L.; Cupps, Thomas L.; and Gardner, Joseph H., 5,013,759, Cl. 514-622.000.
  - Stentz, Laura L.; Maney, Jerry R.; and Sox, Thomas E., 5,013,560, Cl. 424-653.000.
  - Walley, Darlene R., 5,013,846, Cl. 548-352.000.
- Prodotti Formenti s.r.l.: *See—*
  - Passarotti, Carlos; Fossati, Antonio; Valenti, Mauro; and Bandi, Gianluigi, 5,013,554, Cl. 424-440.000.
- Proffitt, James R.; and Richardson, Dale S., to Borden, Inc. Stackable food container with lid. 5,012,928, Cl. 206-508.000.
- Proform Fitness Products, Inc.: *See—*
  - Watterson, Scott R.; Dalebout, William T.; and Standing, Donald J., 5,013,033, Cl. 272-72.000.
- Progressive Service Die Company: *See—*
  - Schmitt, Thomas E., 5,012,713, Cl. 83-639.300.
- Promation Incorporated: *See—*
  - Mihail, Stavros, 5,012,957, Cl. 222-190.000.
- Propst, Robert L. Building enclosure system and method. 5,012,625, Cl. 52-241.000.
- Pryor, Timothy R., to Diffracto Ltd. Controlled machining of combustion chambers gears and other surfaces. 5,012,574, Cl. 29-888.060.
- Pudsey, David G., to GEC-Marconi Limited. Communication system employing a nine channel pattern allocation to eliminate interference. 5,014,342, Cl. 455-33.000.
- Puetz, Peter A.: *See—*
  - Kling, Michael J.; Surwillo, John M.; Puetz, Peter A.; and Braun, Robert T., 5,014,227, Cl. 364-559.000.
- Pugh, Donovan M.: *See—*
  - Eavenson, Jimmy N.; and Pugh, Donovan M., 5,013,992, Cl. 320-31.000.
- Pullman Company, The: *See—*
  - Lefferts, Scott R.; Stelzer, Dennis J., Sr.; and Weisenberger, Thomas V., 5,013,002, Cl. 248-74.100.
- Pullmax AB: *See—*
  - Nordquist, Bengt H., 5,012,712, Cl. 83-571.000.
- Putnam, Alan R.; Mishra, Saroj K.; and Nair, Muraleedharan G., to Board of Trustees Operating Michigan State University. Production, isolation, and identification of novel antifungal compounds. 5,013,549, Cl. 424-116.000.
- Puttmann, Franz-Josef, to Dipl.-Ing. Paul Schmidt. Process for welding a follower pipe to a buried pipe string. 5,013,880, Cl. 219-61.000.
- Puydak, Robert C.: *See—*
  - Wang, Hsien C.; Powers, Kenneth W.; Puydak, Robert C.; and Dharmarajan, Narayanaswami R., 5,013,793, Cl. 525-195.000.
- Quabeck, Helmut: *See—*
  - Fischer, Gerhard; and Quabeck, Helmut, 5,014,138, Cl. 358-448.000.
- Quad/Tech, Inc.: *See—*
  - Graushar, William T., 5,013,022, Cl. 270-56.000.
- Qualstar Corporation: *See—*
  - Gervais, William J.; and Nelson, Richard A., 5,014,141, Cl. 360-96.100.
- Qualtech of Racine, Inc.: *See—*
  - Addison, Thomas E., 5,013,103, Cl. 312-250.000.
- Quan, Clifton: *See—*
  - Wolfson, Ronald I.; and Quan, Clifton, 5,014,022, Cl. 333-161.000.
- Quibel, Alain: *See—*
  - Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.
- Quibel, Anne-Sophie: *See—*
  - Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.
- Quibel, Pierre: *See—*
  - Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.
- Quibel, Vincent: *See—*
  - Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.
- R. G. Barry Corporation: *See—*
  - Ganon, Michael H., 5,012,541, Cl. 12-142.00G.
- R. H. Murphy Company, Inc.: *See—*
  - Murphy, Robert H., 5,012,924, Cl. 206-331.000.
- R. I. Reynolds Tobacco Company: *See—*
  - Kramer, Anatoly I., 5,012,826, Cl. 131-291.000.
- R. Laborie Medical Corporation: *See—*
  - Lemay, Claude, 5,013,292, Cl. 600-30.000.
- R. Stahl Schaltgerate GmbH: *See—*
  - Bruch, Peter; and Schimmele, Anton, 5,014,156, Cl. 361-58.000.
- Raatz, Francis: *See—*
  - Patarin, Joel; Guth, Jean-Louis; Kessler, Henri; Coudurier, Gisele; and Raatz, Francis, 5,013,537, Cl. 423-328.000.
- Rabo, Frederick N.; and Masonek, Steven J. Closet flange reboring tool. 5,013,193, Cl. 408-201.000.
- Radchenko, Petr A.: *See—*
  - Chevakin, Ivan V.; Zharov, Nikolai P.; Popov, Oleg V.; Pesin, Abram I.; and Radchenko, Petr A., 5,012,649, Cl. 60-527.000.
- Rademachers, Jakob; Bockelmann, Wolfgang; Burow, Wilfried; and Schafer, Kurt, to Bayer Aktiengesellschaft. Iron oxide black pigments, processes for their preparation and their use. 5,013,365, Cl. 106-456.000.
- Radiodetection Limited: *See—*
  - Flowerdew, Peter M., 5,014,008, Cl. 324-326.000.
- Radtke, Damien; and Wozniak, Edmond, to Xylochimie. Emulsifiable biocidal concentrates for wood preservation. 5,013,748, Cl. 514-383.000.
- Raduechel, Bernd: *See—*
  - Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Haberey, Martin; Schillinger, Ekkehard; and Town, Michael H., 5,013,758, Cl. 514-573.000.
- Radvany, Erzsebet: *See—*
  - Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.
- Raehse, Wilfried; Wuest, Willi; and Just, Guenther. Process for working up water-soluble cellulose derivatives having high flocculation points. 5,013,832, Cl. 536-90.000.
- Raffler, Dieter, to K. W. Hochschorner GmbH. Helmet. 5,012,533, Cl. 2-420.000.
- Raffo, John A.: *See—*
  - Armstrong, Tom; Bimanand, Alex; Jacques, Dennis M., Sr.; and Raffo, John A., 5,013,924, Cl. 250-504.00R.
- Rahman, Turhan F.: *See—*
  - Sinha, Pradeep; and Rahman, Turhan F., 5,014,230, Cl. 364-578.000.
- Rai, Chandra S.: *See—*
  - Millheim, Keith K.; Mount, Houston B., II; Rai, Chandra S.; and Sondergeld, Carl H., 5,012,674, Cl. 73-153.000.
- Railhead Corporation: *See—*
  - Robertson, Harry G., 5,013,076, Cl. 295-42.200.
- Ralske, Irene: *See—*
  - Blackman, Steven; and Ralske, Irene, 5,013,545, Cl. 424-81.000.
- Randazzo, Joseph J.: *See—*
  - Tung, Lu H.; and Randazzo, Joseph J., 5,013,790, Cl. 525-99.000.
- Rank Cintel Limited: *See—*
  - Mumford, Ronald W. J., 5,014,133, Cl. 358-214.000.
- Ransijn, Johannes G., to AT&T Bell Laboratories. Delay generator. 5,014,286, Cl. 375-110.000.
- Rao, K. Jagan M.; and Rao, K. Savitri. Ion-selective electrodes. 5,013,421, Cl. 204-409.000.
- Rao, K. Savitri: *See—*
  - Rao, K. Jagan M.; and Rao, K. Savitri, 5,013,421, Cl. 204-409.000.
- Rappold, Roland: *See—*
  - Gosdowski, Gerhard; and Rappold, Roland, 5,013,163, Cl. 384-38.000.
- Rashid, Abdul, to Sundstrand Corporation. Programmable current limit curve. 5,013,995, Cl. 322-25.000.
- Raue, Roderich: *See—*
  - Berneth, Horst; and Raue, Roderich, 5,013,857, Cl. 552-110.000.
  - Harnisch, Horst; and Raue, Roderich, 5,013,627, Cl. 430-110.000.
- Ray, Eric T., to GBE International PLC. Cutting machines. 5,012,824, Cl. 131-118.000.
- Raychem Corporation: *See—*
  - Jensen, Per J. T.; and Gansbuehler, George M. J., 5,013,894, Cl. 219-548.000.
  - Jervis, James E., 5,013,877, Cl. 200-523.000.
- Raynet Corporation: *See—*
  - Sniadower, Lucjan, 5,013,118, Cl. 350-96.160.
- Raytheon Company: *See—*
  - Kelleher, John J., Jr.; and Shute, Donald W., 5,014,176, Cl. 363-26.000.
  - Spencer, George R.; Thompson, Bernard J.; Skinner, Malcolm E.; and Sullivan, Philip L., 5,014,064, Cl. 342-152.000.
- RDP Company: *See—*
  - Christy, Robert W., Sr.; and Christy, Paul G., 5,013,458, Cl. 210-751.000.
- Ream, Jeffrey L.; and Bubello, Robert, to United Technologies Corporation. Buffer region for the nacelle of a gas turbine engine. 5,012,639, Cl. 60-226.100.
- Redburn, Dianna A., to Board of Regents, The University of Texas System. Using NMDA receptor antagonists to reduce damage due to laser treatment. 5,013,540, Cl. 424-10.000.
- Redemann, Carl T.: *See—*
  - Woodle, Martin C.; Martin, Francis J.; Yau-Young, Annie; and Redemann, Carl T., 5,013,556, Cl. 424-450.000.
- Reece, Eric W.: *See—*
  - Feltz, Louis V.; Reece, Eric W.; Young, Clarence W.; and Thigpen Lewis, 5,014,248, Cl. 367-4.000.
- Reed, Irving S.; Sperling, Irving; and Bundy, William A., to Hughes Aircraft Company. Vector filter for optical moving target detection. 5,014,131, Cl. 358-212.000.
- Reedy, Patrick J., to General Motors Corporation. Common ground terminal for use with single filament and dual filament wedgebase lamp bulbs. 5,013,961, Cl. 313-318.000.
- Reel/Frame: 5061/0928 Agfa-Gevaert Aktiengesellschaft: *See—*
  - Breuer, Rudolf; Lutz, Gottfried; Pertzsch, Albert; and Schultz, Helmut, 5,014,150, Cl. 360-132.000.
- Reese, Robert M., to General Electric Company. Liquid cooled, high power, ferrite phase shifter for phased array antennas. 5,013,997, Cl. 323-212.000.
- Reeves Brothers, Inc.: *See—*
  - Ross, Bert A., 5,013,811, Cl. 528-60.000.
- Rehman, Warren C.; and Delonis, Michael E., to Kraft General Foods, Inc. Method for producing infusion coffee filter packs. 5,012,629, Cl. 53-453.000.
- Reid, Ronald W.: *See—*
  - Cronce, Gary M.; Reid, Ronald W.; Stapleton, Craig A.; and Zauner, Robert S., 5,013,081, Cl. 296-180.100.
- Reimer, Lawrence B.: *See—*
  - Spicuzza, Carol A.; and Reimer, Lawrence B., 5,012,789. Cl. 123-587.000.

- Reinbacher, Helmut. Cork removal apparatus. 5,012,703, Cl. 81-3.290.
- Reinecke, Erich, to Wabco Westinghouse Fahrzeugbremsen GmbH. Dual-circuit hydraulic brake circuit. 5,013,095, Cl. 303-113.000.
- Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Jungverdorben, Hermann Josef; and Dross, Joachim, to Bayer Aktiengesellschaft. Continuous production of acrylonitrile filaments and fibers from spinning material of low residual solvent content. 5,013,502, Cl. 264-103.000.
- Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, to Bayer Aktiengesellschaft. Dry spinning process with hot air and with spinning cell outputs greater than 20 kg per cell per hour. 5,013,504, Cl. 264-130.000.
- Reinhardt, Victor S.; Gould, Kim V.; and McNab, Kevin M., to Hughes Aircraft Company. Randomized digital/analog converter direct digital synthesizer. 5,014,231, Cl. 364-718.000.
- Reinhold, Klaus. Off-drawing apparatus for tubular webs of plastic film. 5,013,234, Cl. 425-327.000.
- Reiss Engineering Co. Ltd., The: *See—*
  - Wakefield, Brian N., 5,012,920, Cl. 198-781.000.
- Reist, Walter, to Ferag AG. Method of, and apparatus for, processing printed products, periodicals and the like. 5,012,988, Cl. 242-59.000.
- Remion, Michel, to Magnetrol International. Displacement servo gauge. 5,012,589, Cl. 33-720.000.
- Remmen, Werner G. Ingrown correcting toe nail appliance. 5,012,799, Cl. 128-81.00A.
- Renault Automation: *See—*
  - David, Jean-Marie, 5,012,587, Cl. 33-503.000.
- Renishaw plc: *See—*
  - Crownshaw, John C., 5,013,152, Cl. 356-345.000.
- Rennerfelt, Gustav. Artificial leg. 5,013,325, Cl. 623-38.000.
- Republic Money Orders, Inc.: *See—*
  - Smith, Lawrence G., 5,014,212, Cl. 364-479.000.
- Research Medical, Inc.: *See—*
  - Buckberg, Gerald D.; and Todd, Robert J., 5,013,296, Cl. 604-44.000.
- Restaurant Technology, Inc.: *See—*
  - Cozzi, Joseph J.; Conway, Timothy F.; LaFleur, John A.; Rusnak, Eileen M.; and Johnson, Neil H., 5,012,971, Cl. 229-120.070.
- Retti, Kahrl, to Mudbuster, Inc. Wallboard taping apparatus. 5,013,389, Cl. 156-526.000.
- Revlon, Inc.: *See—*
  - Mercado, Clara; and Shah, Amit R., 5,013,543, Cl. 424-63.000.
- Reynolds, Harold G., to United Technologies Corporation. Combustor liner construction for gas turbine engine. 5,012,645, Cl. 60-754.000.
- Rhodes, William T. Cutting tool guard for a cutting machine. 5,012,846, Cl. 144-145.00A.
- Rhone-Poulenc Chimie: *See—*
  - Dissaux, Antoine; and Le Loarer, Jean-Luc, 5,013,534, Cl. 423-263.000.
  - Seon, Francoise, 5,013,538, Cl. 423-608.000.
- Rhone-Poulenc Sante: *See—*
  - Botannet, Bernard; Le Fur, Isidore; Massonneau, Viviane; and Mulhauser, Michel, 5,013,855, Cl. 549-539.000.
- Richard Wolf GmbH: *See—*
  - Baier, Manfred, 5,013,294, Cl. 604-26.000.
- Richards, Anthony O.: *See—*
  - Suzuki, Motoshi; Dalton, Howard; Richards, Anthony O.; and Stanley, Stephen H., 5,013,665, Cl. 435-244.000.
- Richards, Norman D., to U.S. Philips Corporation. Method of generating a series of DPCM code words, method of storing color image data, optical disc whereon image data are stored, and display apparatus. 5,014,127, Cl. 358-133.000.
- Richardson, Craig A.: *See—*
  - Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., 5,012,634, Cl. 56-13.600.
  - Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., 5,012,635, Cl. 56-13.600.
- Richardson, Dale S.: *See—*
  - Proffitt, James R.; and Richardson, Dale S., 5,012,928, Cl. 206-508.000.
- Richardson, Hubert, Jr., to Tecumseh Products Company. Lubrication system for a scroll compressor. 5,013,225, Cl. 418-1.000.
- Rickerby, David S.; Whitmell, Derek S.; Coad, Joseph P.; and Nelson, Richard S., to United Kingdom Atomic Energy Authority. Coating apparatus. 5,013,419, Cl. 204-298.050.
- Ricoh Company, Ltd.: *See—*
  - Fujisawa, Tetsuo, 5,014,124, Cl. 358-75.000.
  - Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, 5,014,091, Cl. 355-321.000.
  - Nagai, Kazukiyo, 5,013,634, Cl. 430-495.000.
  - Shimada, Kazuyuki, 5,014,137, Cl. 358-410.000.
  - Yagawara, Shinji; and Ohta, Wasaburo, 5,012,671, Cl. 73-31.060.
- Rider, Allison L.; and Smith, Robert S., to Rider, Allison L. Clarifying system for liquids. 5,013,435, Cl. 210-262.000.
- Ridewell Corporation: *See—*
  - Mitchell James L., 5,013,063, Cl. 280-711.000.
- Ridge, Richard J.: *See—*
  - Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.
- Riedner, Robert J.: *See—*
  - Greskovich, Charles D.; Minnear, William P.; Brun, Milivoj K.; and Riedner, Robert J., 5,013,696, Cl. 501-153.000.
- Rieger, Robert: *See—*
  - Tilly, Bodo; and Rieger, Robert, 5,013,111, Cl. 350-96.200.
- Rifkin, Arnold S.: *See—*
  - Williams, George W.; and Rifkin, Arnold S., 5,013,162, Cl. 383-97.000.
- Rikker, Leslie D. Molding medium, method for making same and evaporative pattern casting process. 5,012,857, Cl. 164-529.000.
- Riloga-Werk Julius Schmidt GmbH & Co. KG.: *See—*
  - Wulf, Hubert J., deceased, 5,012,552, Cl. 16-87.40R.
- Risch, Alan P.: *See—*
  - Staniulis, Mark T.; Crozier, Douglas E.; Risch, Alan P.; and Pai, Jenny L., 5,013,703, Cl. 502-241.000.
- Rittal-Werk Rudolf Loh GmbH & Co. KG: *See—*
  - Knoppel, Hans-Martin; Elm, Oskar; and Munch, Udo, 5,013,104, Cl. 312-254.000.
- Ritter, David T.: *See—*
  - Cox, Edwin G.; and Ritter, David T., 5,014,347, Cl. 455-110.000.
- Rittner, Siegbert: *See—*
  - Mildenberger, Hilmar; Lachhein, Stephen; Rittner, Siegbert; and Tetzlaff, Heribert, 5,013,444, Cl. 210-634.000.
- Rivera, Antolin. Economic shower. 5,012,536, Cl. 4-605.000.
- Robbins Company, The: *See—*
  - Anderson, Llewellan, 5,012,878, Cl. 175-162.000.
- Robbins, Edward S., III. Method of blow molding integral press-lock container. 5,013,517, Cl. 264-515.000.
- Robert Bosch GmbH: *See—*
  - Blochle, Hans; and Stooss, Paul, 5,012,583, Cl. 30-392.000.
  - Buchholz, Juergen; and Maier, Martin, 5,012,983, Cl. 239-590.500.
  - Conzelmann, Gerhard; Nagel, Karl; and Kohl, Walter, 5,013,996, Cl. 322-28.000.
  - Fehrenbach, Siegfried, 5,012,784, Cl. 123-463.000.
  - Gosdowski, Gerhard; and Rappold, Roland, 5,013,163, Cl. 384-38.000.
  - Gutzeit, Reinhard; and Jonner, Wolf-Dieter, 5,013,097, Cl. 303-116.000.
  - Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.
  - Holzgrefe, Volker; Simon, Nikolaus; and Ziegler, Ewald, 5,012,981, Cl. 239-533.120.
  - Kuhbauch, Gerd, 5,012,525, Cl. 15-250.160.
  - Lindae, Gerhard; Loewe, Richard; and Perthus, Peter, 5,014,173, Cl. 362-309.000.
  - Mergenthaler, Robert, 5,013,098, Cl. 303-119.000.
- Robert Krups Stiftung & Co. KG: *See—*
  - Precht, Hans-Jurgen; and Maass, Rudolf, 5,012,556, Cl. 16-366.000.
- Roberts, David A.: *See—*
  - Hochberg, Arthur K.; O'Meara, David L.; and Roberts, David A., 5,013,690, Cl. 437-233.000.
- Roberts, David J.; and Kadkoy, Ghandi, to KAR Enterprises, Inc. Automatic denesting machine. 5,013,213, Cl. 414-798.900.
- Roberts, John K., to K. W. Muth Company, Inc. Visual signaling apparatus. 5,014,167, Cl. 362-83.100.
- Robertson, David W.: *See—*
  - Beedle, Edward E.; Robertson, David W.; and Wong, David T., 5,013,761, Cl. 514-650.000.
- Robertson, Harry G., to Railhead Corporation. Locking plate holder for railroad bearing end caps. 5,013,076, Cl. 295-42.200.
- Robertson, Ralston S., Jr.; and Poelker, John N., to Hughes Aircraft Company. Frequency linearization circuit for a microwave VCO in ridged waveguide. 5,014,021, Cl. 331-96.000.
- Robinson Nugent, Inc.: *See—*
  - Tondreault, Robert J., 5,013,264, Cl. 439-636.000.
- Robinson, Steven P.: *See—*
  - Julien, Gerald J.; Robinson, Steven P.; and Bondy, Ronald H., 5,013,507, Cl. 264-219.000.
- Robl, Jeffrey A.: *See—*
  - Hwu, Jih R.; and Robl, Jeffrey A., 5,013,862, Cl. 560-60.000.
- Roche, Kevin P.: *See—*
  - Parkin, Stuart S. P.; Roche, Kevin P.; and Speriosu, Virgil S., 5,014,147, Cl. 360-113.000.
- Rockwell International Corporation: *See—*
  - Flanagan, Joseph E.; Wilson, Edgar R.; and Frankel, Milton B., 5,013,856, Cl. 552-11.000.
  - Leary, Richard C., 5,012,725, Cl. 92-63.000.
  - Mintzer, Lester, 5,014,057, Cl. 341-161.000.
  - Sanderson, Harold; and Vande Walle, Larry J., 5,012,912, Cl. 192-133.000.
- Rodenas, Juanito: *See—*
  - Armond, Joseph A.; and Rodenas, Juanito, 5,013,984, Cl. 318-490.000.
- Rodgers, Donald E.; Chen, Jacob Y.; and Padhi, Prafulla K., to Transtream, Inc. Voice and data telephone communication system and method. 5,014,306, Cl. 379-407.000.
- Rodgers, Howard, to Rogersound Labs, Inc. Speaker enclosure. 5,012,889, Cl. 181-152.000.
- Rodi, Anton, to Heidelberger Druckmaschinen AG. Control mechanism for a drive motor or the like. 5,013,981, Cl. 318-67.000.
- Rodriguez-Cavazos, Enrique: *See—*
  - Stephens, Joseph C.; and Rodriguez-Cavazos, Enrique, 5,013,980, Cl. 315-411.000.
- Rodriquez-Kabana, Rodrigo: *See—*
  - Smith, Roger E.; Thornburgh, Scott; and Rodriquez-Kabana, Rodrigo, 5,013,762, Cl. 514-740.000.
- Rodwell, Mark J. W.; and Bloom, David M., to Stanford University. Nonlinear transmission line for generation of picosecond electrical transients. 5,014,018, Cl. 333-20.000.

VOL 1126 ISS 1 MY 7 1991 UMI

- Rogers, David J.; and Broga, Martin J., to Hanson Group Ltd., The. Heated plastic flow control valve. 5,012,839, Cl. 137-341.000.
- Rogers, Laurence B. Trigger assembly. 5,012,604, Cl. 42-69.030.
- Rogersound Labs, Inc.: *See—*
  - Rodgers, Howard, 5,012,889, Cl. 181-152.000.
- Rohde, Ernst: *See—*
  - Thormer, Joachim; Rohde, Ernst; and Szentivanyi, Zsolt, 5,013,783, Cl. 524-450.000.
- Rohm Co., Ltd.: *See—*
  - Hayashi, Michihiko; and Ohtani, Kenzi, 5,014,020, Cl. 330-257.000.
- Rohr Industries, Inc.: *See—*
  - Gojny, Francis J.; Greene, Guy S.; Stahl, Roswell L., Jr.; and Street, Charles Z., 5,013,613, Cl. 428-593.000.
- Rohrbach, Ronald P.: *See—*
  - St. Martin, Edward J.; Kurek, Paul R.; Schumacher, Elaine F.; and Rohrbach, Ronald P., 5,013,564, Cl. 426-250.000.
- Roland, Edward W. Water chamber baking pan. 5,012,947, Cl. 220-428.000.
- Rolando, Richard J.: *See—*
  - Coleman, Patrick L.; Kotnour, Thomas A.; and Rolando, Richard J., 5,013,795, Cl. 525-279.000.
- Rolland, Jean-Luc; Beguin, Jean-Yves; Magna, Henriette; Jacobelli, Alain; and Penot, Maurice, to Compagnie Europeenne de Composants Electroniques LCC. Method for detection of end of grinding of a thin layer magnetic head. 5,013,394, Cl. 156-627.000.
- Rolland, Jean-Luc: *See—*
  - Meunier, Paul-Louis; Mackowski, Jean-Marie; and Rolland, Jean-Luc, 5,013,580, Cl. 427-39.000.
- Rollin, Joel; and Perrin, Jean-Claude, to U.S. Philips Corp. Bifocal optical system. 5,013,142, Cl. 350-422.000.
- Rolls-Royce plc: *See—*
  - Newman, Paul, 5,013,165, Cl. 384-122.000.
- Romans, William W.; and Lukehart, Dudley L., to Deere & Company. Automatic tool compensator. 5,012,526, Cl. 15-256.500.
- Roosa, Paul D., to International Paper Company. Twin tray container. 5,012,929, Cl. 206-602.000.
- Roosen, Raymond A.; de Meyer, Marcellus H.; and Monbaliu, Marcel J., to AGFA-Gevaert N.V. Liquid crystal display. 5,013,138, Cl 350-339.00F.
- Ropper, Nelly: *See—*
  - von Gutfeld, Robert J.; and Ropper, Nelly, 5,013,241, Cl. 433-86.000.
- Roques, Serge: *See—*
  - Allaert, Francois; Faurie, Pierre; Roques, Serge; and Segol, Sylvain, 5,013,197, Cl. 410-77.000.
- Rosa, Daniele S. A. YAG compatible posterior chamber intraocular implant. 5,013,322, Cl. 623-6.000.
- Roschinski, Dieter, to Kloeckner-Humboldt-Deutz AG. Cooling system. 5,012,768, Cl. 123-41.490.
- Rosen, Henri E. Shoe fitting system. 5,014,041, Cl. 340-573.000.
- Rosen, Vicki: *See—*
  - Wang, Elizabeth A.; Wozney, John M.; and Rosen, Vicki, 5,013,649, Cl. 435-69.100.
- Rosenbaum, Patricia. Walker support tote bag. 5,012,963, Cl. 224-42.46R.
- Rosenblatt, Ivan L.: *See—*
  - Sheely, Harold R.; Miserlis, Constantine D.; and Rosenblatt, Ivan L., 5,012,750, Cl. 110-245.000.
- Rosenfeld, Jerome P.: *See—*
  - Tsikos, Constantine J.; and Rosenfeld, Jerome P., 5,013,927, Cl. 250-561.000.
- Rosik, Leonard O.: *See—*
  - Sweet, Frederick; and Rosik, Leonard O., 5,013,547, Cl. 424-85.910.
- Ross, Barry C.: *See—*
  - Watson, Nigel S.; Chan, Chuen; and Ross, Barry C., 5,013,749, Cl. 514-397.000.
- Ross, Bert A., to Reeves Brothers, Inc. Use of modified diisocyanates for preparing linear thermoplastic polyurethane elastomers having improved properties. 5,013,811, Cl. 528-60.000.
- Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, to Synthelabo. Method of preparing (+)-(2S,3S)-3-hydroxy-2-(4-methoxyphenyl)2,3-dihydro-5H-1,5-benzothiazepine-4-one. 5,013,835, Cl. 540-491.000.
- Rossum, John R., Jr., to E-mu Systems, Inc. Screwless electronic instrument enclosure. 5,013,105, Cl. 312-263.000.
- Rostock, Joachim: *See—*
  - Gilbert, Arthur; Gottstein, Norbert; and Rostock, Joachim, 5,012,917, Cl. 198-465.200.
- Roth, Bernard M.: *See—*
  - Viannay, Stephane G. J.; Roth, Bernard M.; Mirigay, Solange M. V.; and Chastang, Georges J. B., 5,012,980, Cl. 239-423.000.
- Roth, Martin; and Muller, Beat, to Ciba-Geigy Corporation. Araliphatic sulfonium salts and their use. 5,013,814, Cl. 528-90.000.
- Roth, Robert, to ECIA-Equipements et Composants Pour L'Industrie Automobile. Articulated tube connection, in particular for the exhaust pipework of a motor vehicle. 5,013,072, Cl. 285-233.000.
- Rothe, Dietmar E., to Lasertechnics, Inc. Long life electrodes for large-area x-ray generators. 5,014,289, Cl. 378-122.000.
- Rothmund, Rene . Box-shaped base consisting of two wedge-coupled shells. 5,013,179, Cl. 403-335.000.
- Roto-Finish Company, Inc.: *See—*
  - McNeil, Gary L., 5,012,620, Cl. 51-313.000.
- Rover Group Limited: *See—*
  - Chetwynd, Howard L., 5,014,169, Cl. 362-142.000.
- Roy, Michael A.: *See—*
  - Abu-Isa, Ismat A.; Moran, Susan C.; and Roy, Michael A., 5,013,089, Cl. 297-452.000.
- Rubin, David, to Century Laboratories, Inc. Infant formula. 5,013,569, Cl. 426-585.000.
- Rubin, Eduard A.: *See—*
  - Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.
- Rudak, Peter, to Eastman Kodak Company. Automatic detection and selection of a drop-out color used in conjunction with optical character recognition of preprinted forms. 5,014,328, Cl. 382-17.000.
- Rudak, Peter, to Eastman Kodak Company. Automatic detection and selection of a drop-out color using zone calibration in conjunction with optical character recognition of preprinted forms. 5,014,329, Cl. 382-17.000.
- Rueger, David C.: *See—*
  - Huston, James S.; Charette, Marc F.; Cohen, Charles M.; Crea, Roberto; Keck, Peter C.; Oppermann, Hermann; Rueger, David C.; and Ridge, Richard J., 5,013,653, Cl. 435-69.700.
- Ruelens, Paul F. M.: *See—*
  - Van Gestel, Jozef F. E.; Nys, Jan R.; and Ruelens, Paul F. M., 5,013,746, Cl. 514-365.000.
- Ruff, John D., to Thermadyne, Inc. Icemaker and water purifier with controlled condensing temperature. 5,013,344, Cl. 62-532.000.
- Ruger, Reinhold, to Du Pont de Nemours, E. I., and Company. Pyridinium aryl hydrazide compounds. 5,013,844, Cl. 546-332.000.
- Rule, Norman G.; and Kung, Teh-Ming, to Eastman Kodak Company. Derivatives of 4H-thiopyran-1,1-dioxides useful as electron-transport agents in electrophotographic elements. 5,013,849, Cl. 549-28.000.
- Rusch, Randy A.: *See—*
  - Schlais, John R.; Rusch, Randy A.; and Simacek, Thomas H., 5,014,098, Cl. 357-23.500.
- Rusnak, Eileen M.: *See—*
  - Cozzi, Joseph J.; Conway, Timothy F.; LaFleur, John A.; Rusnak, Eileen M.; and Johnson, Neil H., 5,012,971, Cl. 229-120.070.
- Russell, Dave B.: *See—*
  - Isaksson, Juhani; and Russell, Dave B., 5,013,341, Cl. 55-302.000.
- Russell, John P.; Carroll, Terry; and Miller, Sam, to BFD, Inc. Intravascular catheter assembly. 5,013,304, Cl. 604-167.000.
- Russell, Timothy D.; Hess, Carl H.; Hlahol, Paul G.; and Stewart, Charles N., to General Electric Company. Reprographic metal halide lamps having long life and maintenance. 5,013,968, Cl. 313-641.000.
- Rutgerswerke Aktiengesellschaft: *See—*
  - Haushofer, Bert; Scherp, Ernst; Schumacher, Wilfried; and Sabau, Petru, 5,013,591, Cl. 428-40.000.
- Rybak, Franklyn M., to Chemetrics, Inc. Portable spectrophotometric instrument having vial holder and light integrator. 5,013,155, Cl. 356-408.000.
- Ryde, Michael J.; and Warwick, Peter J., to Petter Refrigeration Limited. Multicompartment Temperature controlled road vehicles. 5,012,653, Cl. 62-203.000.
- Ryobi, Ltd.: *See—*
  - Miyamoto, Kouichi, 5,013,343, Cl. 55-395.000.
- S&C Electric Company: *See—*
  - Chabala, Leonard V., 5,013,876, Cl. 200-254.000.
- S C Technology, Inc.: *See—*
  - Savage, Richard N., 5,014,217, Cl. 364-498.000.
- S.I.M.A.C. S.p.A.: *See—*
  - Castellani, Frederico, 5,013,212, Cl. 414-791.400.
- S&K Enterprises, Inc.: *See—*
  - King, John R., 5,012,938, Cl. 211-191.000.
- Sabau, Petru: *See—*
  - Haushofer, Bert; Scherp, Ernst; Schumacher, Wilfried; and Sabau, Petru, 5,013,591, Cl. 428-40.000.
- Sabloewski, Horst, to Eppendorf-Netheler-Hinz GmbH, Firma. Pipetting device. 5,012,682, Cl. 73-864.180.
- Sackmann, Gunter; Konig, Joachim; and Baumgen, Heinz, to Bayer Aktiengesellschaft. Polymers of diisobutylene-sulfonate alkane maleic acid derivatives. 5,013,794, Cl. 525-203.000.
- Safan B. V.: *See—*
  - Slot, Teunis, 5,012,729, Cl. 100-278.000.
- Saigano, Masahiro, to Matsushita Electric Industrial Co., Ltd. Facsimile terminal device having voice message recording capability. 5,014,296, Cl. 379-67.000.
- Saikatsu, Takeo; Sakurai, Takehiko; and Anzai, Yoshinori, to Mitsubishi Denki Kabushiki Kaisha. Discharge lamp with external electrodes. 5,013,966, Cl. 313-493.000.
- Saillard, Marthe: *See—*
  - Legoy, Auguste; and Quibel, Alain, 5,013,269, Cl. 440-100.000.
- St. John, Michael R.; and Alexander, Ronnie L., to Nalco Chemical Company. Diallyldimethyl ammonium chloride polymers with anionic monomers for coagulating deinking process waters. 5,013,456, Cl. 210-734.000.
- St. Martin, Edward J.; Kurek, Paul R.; Schumacher, Elaine F.; and Rohrbach, Ronald P., to UOP. Reduced monascus pigment derivatives as yellow food colorants. 5,013,564, Cl. 426-250.000.
- St. Martin, Edward J.; Kurek, Paul R.; and Schumacher, Elaine F., to UOP. Water-soluble red pigments from monascorubrin and rubropunctatin as food colorants. 5,013,565, Cl. 426-250.000.
- Saito, Hitoshi: *See—*
  - Kanto, Jumpei; and Saito, Hitoshi, 5,013,710, Cl. 503-227.000.
- Saito, Masami: *See—*
  - Tsukuda, Kazunori; Toda, Masakazu; Saito, Masami; and Tsumadori, Masaki, 5,013,485, Cl. 252-551.000.

- Saito, Mitsuo: *See—*
  - Ogawa, Masahide; Sato, Teiji; Abe, Kiyoshi; Tsuchida, Hisashi; Inoue, Hiroo; and Saito, Mitsuo, 5,013,709, Cl. 503-225.000.
- Saito, Muneo: *See—*
  - Higashidate, Sakae; Yamauchi, Yoshio; and Saito, Muneo, 5,013,443, Cl. 210-634.000.
- Saito, Shin: *See—*
  - Weaver, Philip W.; Fakhry, Kamal; and Saito, Shin, 5,014,040, Cl. 340-572.000.
- Saito, Shiro: *See—*
  - Kawase, Toshirou; Saito, Shiro; and Miyake, Masanobu, 5,012,838, Cl. 137-202.000.
- Saito, Takashi; Fujiwara, Hideyuki; and Kubo, Kenji, to Japan Tobacco, Inc. Loop control apparatus. 5,014,185, Cl. 364-188.000.
- Saito, Takeshi: *See—*
  - Mizuno, Toshiya; Teramoto, Yoshikichi; Wakabayashi, Juichi; and Saito, Takeshi, 5,013,823, Cl. 528-388.000.
- Saito, Yutaka: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Saitoh, Yokuo: *See—*
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- Sakaba, Hideo: *See—*
  - Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshin; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.
- Sakai, Hideo: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Sakai, Keiji: *See—*
  - Kubo, Katsuhiro; Sakai, Keiji; Kurata, Yukio; and Yamaoka, Hideyoshi, 5,013,494, Cl. 264-1.300.
- Sakai, Nobuya; and Aoki, Harumi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Electronic still camera device. 5,014,136, Cl. 358-341.000.
- Sakaizawa, Masao: *See—*
  - Sakuma, Masato; Fujita, Yuji; Kitano, Kissho; Yagi, Yukihiko; Sakaizawa, Masao; and Yamamoto, Noburo, 5,013,789, Cl. 525-66.000.
- Sakama, Mitsunori: *See—*
  - Fukada, Takeshi; Codama, Mitsufumi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; and Takayama, Ichiro, 5,014,100, Cl. 357-30.000.
- Sakamoto, Naoya: *See—*
  - Fukada, Takeshi; Codama, Mitsufumi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; and Takayama, Ichiro, 5,014,100, Cl. 357-30.000.
- Sakamoto, Shuichi: *See—*
  - Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi, 5,013,725, Cl. 514-99.000.
- Sakane, Kohji: *See—*
  - Hata, Hajime; Kitamura, Takao; Sakane, Kohji; Wada, Hideo; and Sogabe, Seiji, 5,013,523, Cl. 419-19.000.
- Sakano, Tetsuro, to Fanuc Ltd. Absolute position encoder. 5,013,988, Cl. 318-602.000.
- Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, to Canon Kabushiki Kaisha. Developer in an image forming device having a binding resin and magnetic powder. 5,014,089, Cl. 355-251.000.
- Sakashita, Seiji: *See—*
  - Kubo, Kazuhiko; Usui, Akira; Sakashita, Seiji; Ozeki, Hiroaki; and Kanno, Ippei, 5,014,349, Cl. 455-189.000.
- Sakata, Hajime, to Canon Kabushiki Kaisha. Liquid crystal light modulation device. 5,013,141, Cl. 350-348.000.
- Sakuma, Masato; Fujita, Yuji; Kitano, Kissho; Yagi, Yukihiko; Sakaizawa, Masao; and Yamamoto, Noburo, to Tonen Sekiyukagaku. Process for producing thermoplastic resin compositions. 5,013,789, Cl. 525-66.000.
- Sakuraba, Yukio: *See—*
  - Noba, Kunihiro; Sakuraba, Yukio; and Urano, Katsuyoshi, 5,013,495, Cl. 264-1.500.
- Sakurai, Hiroshi: *See—*
  - Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, 5,014,142, Cl. 360-98.010.
- Sakurai, Takehiko: *See—*
  - Saikatsu, Takeo; Sakurai, Takehiko; and Anzai, Yoshinori, 5,013,966, Cl. 313-493.000.
- Sakuta, Masayuki: *See—*
  - Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo, Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.
- Salters, Roelof H. W.: *See—*
  - Lammerts, Judocus A. M.; Foss, Richard C.; and Salters, Roelof H. W., 5,014,244, Cl. 365-189.050.
- Salvatore, Jeremiah O., to Hughes Aircraft Company. Spin stabilization via momentum wheels or similar devices. 5,012,992, Cl. 244-3.230.
- Salz, Gilbert: *See—*
  - Sullivan, Mark; and Salz, Gilbert, 5,013,308, Cl. 604-349.000.
- Samir Amer, Moh.; and Tawashi, Rashad. Modified pollen grains for delivering biologically active substances to plants and animals. 5,013,552, Cl. 424-408.000.
- Sampson, Michael J. Process for obtaining improved yields from plants used for hay making by using a coating agent. 5,013,566, Cl. 426-302.000.
- Samsung Electron Devices Co., Ltd.: *See—*
  - Shon, Suk-bong; and Na, Woo-young, 5,013,965, Cl. 313-446.000.
- SamSung Electronics Co., Ltd.: *See—*
  - Choi, Kyu-Hyun; Lee, Heyung-Sub; and Lee, Jung-Hwan, 5,013,686, Cl. 437-194.000.
- Samuel Kaner: *See—*
  - Malkieli, Moshe; and Apel, Israel, 5,013,972, Cl. 315-209.00R.
- Samuels, Michael D., to Print Controls Corporation. Collating system and signature feeder with embedded printer. 5,013,019, Cl. 270-1.100.
- Samukawa, Seiji; Sasaki, Masami; and Mori, Sumio, to NEC Corporation; and Anelva Corporation. Microwave plasma etching method and apparatus. 5,013,401, Cl. 156-643.000.
- Sanada, Tatsuyuki; and Odagawa, Tetsufumi, to Fujitsu Limited. Optical bistable laser diode and a method for controlling the same. 5,014,280, Cl. 372-45.000.
- Sanchez, Jose: *See—*
  - MacLeay, Ronald E.; Sanchez, Jose; and Stein, Daryl L., 5,013,777, Cl. 524-159.000.
- Sanden Corporation: *See—*
  - Nakazawa, Takeharu; and Fujita, Toshihiko, 5,012,859, Cl. 165-42.000.
  - Tamura, Yasuji, 5,012,656, Cl. 62-498.000.
- Sander, Ingolf: *See—*
  - Whitehead, Frank R.; and Sander, Ingolf, 5,013,136, Cl. 350-286.000.
- Sanderson, Harold; and Vande Walle, Larry J., to Rockwell International Corporation. Safety interlock/latch assembly for a printing press. 5,012,912, Cl. 192-133.000.
- Sandoz Ltd.: *See—*
  - Annen, Oskar; and Schlick, Bernhard, 5,013,328, Cl. 8-442.000.
- Sankoshoki Corporation: *See—*
  - Nakamura, Akira, 5,012,772, Cl. 123-25.00C.
- Sankyo Company Limited: *See—*
  - Haneishi, Tatsuo; Okazaki, Takao; Torikata, Akio; and Nakajima, Mutsuo, 5,013,550, Cl. 424-117.000.
- Sankyo Manufacturing Company, Ltd.: *See—*
  - Kato, Heizaburo, 5,013,016, Cl. 269-73.000.
- Sano, Koichi; Yamagata, Shimbu; Yokoyama, Tetsuo; and Koizumi, Hideaki, to Hitachi, Ltd. Nuclear magnetic resonance imaging method and apparatus. 5,014,007, Cl. 324-309.000.
- Sano, Takeshi: *See—*
  - Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
- Sanofi Societe Anonyme: *See—*
  - Petitou, Maurice; and Choay, Jean, 5,013,724, Cl. 514-54.000.
- Sanshin Kogyo Kabushiki Kaisha: *See—*
  - Okumura, Shigeo; and Inaba, Koushiro, 5,012,648, Cl. 60-313.000.
- Santangelo, Francesco: *See—*
  - Casagrande, Cesare; and Santangelo, Francesco, 5,013,753, Cl. 514-512.000.
- Santel, Hans-Joachim: *See—*
  - Jelich, Klaus; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,013,351, Cl. 71-92.000.
- Santilli, Domenic, to Eastman Kodak Company. Method and apparatus for improving a multi-color electrophotographic image using vapor fusing. 5,014,090, Cl. 355-256.000.
- Santos, Virgil, to Couch, Joseph H., IIII, a part interest. Ladder stabilizer comprising top extension arms and attached stabilizer bars. 5,012,895, Cl. 182-204.000.
- Santrade Ltd.: *See—*
  - Froeschke, Reinhard, 5,013,498, Cl. 264-8.000.
- Sanyo Electric Co., Ltd.: *See—*
  - Ishiguro, Kazuhisa; and Sekiguchi, Yutaka. 5,014,017, Cl. 330-51.000.
  - Nezu, Yasuhiko, 5,014,350, Cl. 455-258.000.
  - Shirai, Mitsuzou, 5,014,118, Cl. 358-31.000.
- Sanyo Special Steel Co., Ltd.: *See—*
  - Hamada, Kaneaki; Tsubota, Kazuichi; and Muraoka, Tomoki, 5,013,525, Cl. 420-104.000.
- Sarcos Group: *See—*
  - Jacobsen, Stephen C.; Iversen, Edwin K.; Knutti, David F.; and Davis, Clark C., 5,012,836, Cl. 137-83.000.
- Sargeant, Steven J.: *See—*
  - Bagchi, Pranab; McSweeney, Gary J.; and Sargeant, Steven J., 5,013,640, Cl. 430-546.000.
- Sarpeshkar, Ashok M.; and Gracik, Charles S., to Mobay Corporation. Impact absorbing media. 5,013,810, Cl. 528-59.000.
- Sartor, David A.: *See—*
  - Kiilunen, David D.; and Sartor, David A., 5,013,587, Cl. 427-383.700.
- Sartorio, Franco: *See—*
  - Catti, Alberto A.; Sartorio, Franco; and Vergano, Stefano, 5,012,661, Cl. 72-21.000.

VOL 1126 ISS 1 MY 7 1991 UMI

- Sasagawa, Katsuyoshi: *See*—
  - Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,013,496, Cl. 264-2.300.
- Sasaki, Kazuo, to Sony Corporation. Flexible magnetic disc with a spring plate in the hub. 5,014,152, Cl. 360-135.000.
- Sasaki, Mari: *See*—
  - Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
- Sasaki, Masami: *See*—
  - Samukawa, Seiji; Sasaki, Masami; and Mori, Sumio, 5,013,401, Cl. 156-643.000.
- Sasaki, Toyoji, to Olympus Optical Co., Ltd. Circuit for driving ultrasonic motor. 5,013,982, Cl. 318-114.000.
- Sasamoto, Asao: *See*—
  - Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.
  - Takatsuka, Akio; Sasamoto, Asao; Moribe, Yoshihiro; Shiono, Toshio; Sogabe, Chikayuki; and Hosokawa, Haruhiko, 5,014,146, Cl. 360-106.000.
- Sasser, Gary D.: *See*—
  - Dody, Joseph W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 5,014,074, Cl. 346-107.00R.
- Sasuta, Michael D.: *See*—
  - Comroe, Richard A.; Zdunek, Kenneth J.; Sasuta, Michael D.; Coombes, Daniel J.; and Borras, Jaime A., 5,014,345, Cl. 455-54.000.
- SAT (Societe Anonyme de Telecommunications): *See*—
  - Sillere, E. Thierry, 5,014,270, Cl. 370-101.000.
- Sata, Nobuyuki, to Mabuchi Motor Co., Ltd. Miniature motor with a frequency generator. 5,013,946, Cl. 310-40.0MM.
- Sato, Goro; Komatsu, Michio; Hirai, Toshiharu; Abe, Yoneji; and Senjyuu, Noboru, to Catalysts & Chemicals Industries Co., Ltd. Transparent conductive ceramic-coated substrate processes for preparing same and uses thereof. 5,013,607, Cl. 428-426.000.
- Sato, Kinihito: *See*—
  - Yonekawa, Takashi; Onuma, Toshio; Buma, Shuuichi; Ikemoto, Hiroyuki; Ohashi, Kaoru; Aburaya, Toshio; and Sato, Kinihito, 5,013,062, Cl. 280-707.000.
- Sato, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Antilock braking method and apparatus for a four-wheel drive vehicle. 5,012,884, Cl. 180-244.000.
- Sato, Masatoshi: *See*—
  - Akasaka, Hideki; and Sato, Masatoshi, 5,014,252, Cl. 369-13.000.
- Sato, Soichiro: *See*—
  - Nagahara, Michiko; Ieda, Chikara; Mimura, Mitsuo; Uchida, Katsuhiro; Sato, Soichiro; and Okumura, Makoto, 5,013,736, Cl. 514-255.000.
- Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, to Hitachi, Ltd. Magnetic head slider supporting apparatus. 5,014,144, Cl. 360-104.000.
- Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, to Shimizu Construction Co., Ltd. Structural filler filled steel tube column. 5,012.622, Cl. 52-725.000.
- Sato, Teiji: *See*—
  - Ogawa, Masahide; Sato, Teiji; Takahashi, Masao; Kitsu, Toshio; Takahashi, Seikichi; and Ono, Kinichi, 5,013,603, Cl. 428-331.000.
  - Ogawa, Masahide; Sato, Teiji; Abe, Kiyoshi; Tsuchida, Hisashi; Inoue, Hiroo; and Saito, Mitsuo, 5,013,709, Cl. 503-225.000.
- Sato, Toshihiro: *See*—
  - Takeshita, Masatoshi; Sato, Toshihiro; Toyooka, Takashi; and Suzuki, Ryo, 5,014,239, Cl. 365-11.000.
- Satoh, Hiroshi: *See*—
  - Iwahi, Tomoyuki; and Satoh, Hiroshi, 5,013,743, Cl 514-338.000.
- Satoh, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Wiring structures for semiconductor memory device. 5,014,110, Cl. 357-68.000.
- Satoh, Yoshihide, to Fuji Xerox Co., Ltd. Thin-film transistor array. 5,013,939, Cl. 307-468.000.
- Sauer, Rudolf: *See*—
  - Hafner, Udo; Herth, Harro; Kienzle, Wolfgang; Knapp, Heinrich; Krauss, Rudolf; Lembke, Manfred; Paschke, Werner; and Sauer, Rudolf, 5,012,787, Cl. 123-470.000.
- Savage, Richard N., to S C Technology, Inc. Apparatus and method for automatically identifying chemical species within a plasma reactor environment. 5,014,217, Cl. 364-498.000.
- Savard, Donald D., to Interprovincial Pipe Line Company. Fluid actuated pipe clamp tightener. 5,012,842, Cl. 138-161.000.
- Savino, Thomas G.: *See*—
  - Carpenter, Clint W.; and Savino, Thomas G., 5,013,770, Cl. 523-213.000.
- Savitsky, Wallace R.; Schaffer, Ronald R.; and Warner, Gary N., to AMP Incorporated. Threaded crimping body for fiber optic termination. 5,013,122, Cl. 350-96.200.
- Sawada, Takanori: *See*—
  - Akasaka, Akio; Suga, Seiji; Fukuda, Yasuo; and Sawada, Takanori, 5,012,773, Cl. 123-90.170.
- Sawyer, Elmer E.: *See*—
  - Turner, Winnie M.; Sawyer, Elmer E.; and Sawyer, Marie, 5,012,966, Cl. 224-277.000.
- Sawyer, Marie: *See*—
  - Turner, Winnie M.; Sawyer, Elmer E.; and Sawyer, Marie, 5,012,966, Cl. 224-277.000.
- Scaglietti, Oscar: *See*—
  - Azzani, Roberto; Dori, Lino M.; and Scaglietti, Oscar, 5,013,514, Cl. 264-512.000.
- Schaap, Arthur P., to Board of Governors of Wayne State University. Enhanced chemiluminescence from 1,2-dioxetanes through energy transfer to tethered fluorescers. 5,013,827, Cl. 536-17.300.
- Schad, Robert D.; Disimone, John; and Philips, Terry, to Husky Injection Molding Systems Ltd. Method of removing gas from the cavity and stabilizing the core during injection molding. 5,013,513, Cl. 264-328.800.
- Schadt, Martin: *See*—
  - Boller, Arthur; Buchecker, Richard; Fromm, Hans-Jurgen; Kelly, Stephen; Schadt, Martin; and Villiger, Alois, 5,013,476, Cl. 252-299.610.
  - Buchecker, Richard; and Schadt, Martin, 5,013,477, Cl. 252-299.630.
- Schaef, Irving W., to G.K.I. Latching assembly for a light bulb and electrical socket. 5,013,258, Cl. 439-347.000.
- Schafer, Dietrich M.; and Kleijmeer, Simon, to Grace GmbH Process for the production of coated or lacquered metal containers and the use thereof. 5,013,589, Cl. 428-35.900.
- Schafer, Kurt: *See*—
  - Rademachers, Jakob; Bockelmann, Wolfgang; Burow, Wilfried; and Schafer, Kurt, 5,013,365, Cl. 106-456.000.
- Schaffer, Ronald R.: *See*—
  - Savitsky, Wallace R.; Schaffer, Ronald R.; and Warner, Gary N., 5,013,122, Cl. 350-96.200.
- Schafroth, Konrad. Gliding parachute. 5,012,993, Cl. 244-145.000.
- Schardt, Volker, to KAMAG Transporttechnik GmbH & Co. Towing vehicle for shunting aircraft on the ground. 5,013,205, Cl. 414-429.000.
- Schau, Ortwin: *See*—
  - Goessler, Gerhard; and Schau, Ortwin, 5,013,893, Cl. 219-453.000.
- Scheffler, Glenn W., to International Fuel Cells Corporation. Air ejector system for fuel cell passivation. 5,013,617, Cl. 429-17.000.
- Schering Aktiengesellschaft: *See*—
  - Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Haberey, Martin; Schillinger, Ekkehard; and Town, Michael H., 5,013,758, Cl. 514-573.000.
  - Suhr, Harald; Etspuler, Angelika; Feurer, Ernst; and Oehr, Christian, 5,013,581, Cl. 427-41.000.
- Schering Corporation: *See*—
  - Abrams, John S.; Yokota, Takashi; Lee, Frank; and Arai, Ken-ichi, 5,013,824, Cl. 530-300.000.
- Scherp, Ernst: *See*—
  - Haushofer, Bert; Scherp, Ernst; Schumacher, Wilfried; and Sabau, Petru, 5,013,591, Cl. 428-40.000.
- Scheurcnbrand, Dieter; and Wawra, Helmut, to Daimler-Benz AG. Multi-layered plastic container produced by coextrusion blow-molding. 5,012,944, Cl. 220-677.000.
- Schiechl, John J. Dice set and method for selecting a set of integers for playing a game of chance. 5,013,040, Cl. 273-146.000.
- Schiel, Christian, to J.M. Voith GmbH. Press roll for paper machines. 5,012,730, Cl. 100-160.000.
- Schiller, Joan E. Shoe. 5,012,596, Cl. 36-11.500.
- Schilling, Peter, to Westvaco Corporation. Aminated sulfonated or sulformethylated lignins as cement fluid loss control additives. 5,012,870, Cl. 166-293.000.
- Schillinger, Ekkehard: *See*—
  - Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Habercy, Martin; Schillinger, Ekkehard; and Town, Michael H., 5,013,758, Cl. 514-573.000.
- Schimm, John F., Jr.: *See*—
  - Bush, Aubrey M.; and Schimm, John F., Jr., 5,014,276, Cl. 371-43.000.
- Schimmele, Anton: *See*—
  - Bruch, Peter; and Schimmele, Anton, 5,014,156, Cl. 361-58.000.
- Schittenhelm, Hans-Joachim: *See*—
  - Joseph, Werner; and Schittenhelm, Hans-Joachim, 5,013,362, Cl. 501-24.000.
- Schlaffer, Herbert: *See*—
  - Leussler, Wilhelm; Wurl, Robert; and Schlaffer, Herbert, 5,013,342, Cl. 55-337.000.
- Schlagheck, Jerry G. Vibratory screening fixture. 5,014,000, Cl. 324-158.00F.
- Schlais, John R.; Rusch, Randy A.; and Simacek, Thomas H., to Delco Electronic Corporation. CMOS integrated circuit with EEPROM and method of manufacture. 5,014,098, Cl. 357-23.500.
- Schlick, Bernhard: *See*—
  - Annen, Oskar; and Schlick, Bernhard, 5,013,328, Cl. 8-442.000.
- Schlosser, Klaus, to Wicke GmbH & Co. Caster with brake. 5,012,550, Cl. 16-35.00R.
- Schlumberger Technologies, Inc.: *See*—
  - Lau, Hung-Wah A., 5,014,228, Cl. 364-571.010.
- Schmeykal, Rudolf: *See*—
  - Haftmann, Johannes; and Schmeykal, Rudolf, 5,013,170, Cl. 400-659.000.
- Schmidt, David A., to Schmidt Industries, Inc. Hypodermic needle sheath. 5,013,302, Cl. 604-198.000.

- Schmidt, Gerald W.: *See*—
  - Sterrett, Terry L.; and Schmidt, Gerald W., 5,013,238, Cl. 433-2.000.
- Schmidt, Hans; and Gunter, Helmut, to Deutsche ITT Industries GmbH. Test probe manipulator for wafer-probing apparatus. 5,014,001, Cl. 324-158.00F.
- Schmidt Industries, Inc.: *See*—
  - Schmidt, David A., 5,013,302, Cl. 604-198.000.
- Schmidt, Robert L.: *See*—
  - Stafford, Roger A.; Aday, Roy W., Jr.; Schmidt, Robert L.; and McCollum, Myron L., 5,014,216, Cl. 364-496.000.
- Schmidt, Robert R.: *See*—
  - Jelich, Klaus; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,013,351, Cl. 71-92.000.
- Schmitt, Thomas E., to Progressive Service Die Company. Die power pack for cutting apparatus. 5,012,713, Cl. 83-639.300.
- Schnars, Michael J.: *See*—
  - Lippmann, Raymond; Schnars, Michael J.; and Chintyan, James R., 5,014,051, Cl. 340-870.380.
- Schneider, John C.: *See*—
  - Fair, Kenneth J.; Van Weert, Gezinus; and Schneider, John C., 5,013,359, Cl. 75-744.000.
- Schnelle, Joseph W.: *See*—
  - Carpenter, Kurtis R.; and Schnelle, Joseph W., 5,014,183, Cl. 364-167.010.
- Schnelle, Manfred: *See*—
  - Beneke, Ulrich; Gross, Jurgen; Oepping, Wilfried; Schnelle, Manfred; and Sundermeier, Gunter, 5,012,551, Cl. 16-49.000.
- Schoenauer, Ludwig: *See*—
  - Nagler, Werner; and Schoenauer, Ludwig, 5,014,264, Cl. 370-58.100.
- Schoenlein, Mark J.: *See*—
  - Ingram, Keith W.; Schoenlein, Mark J.; and Harger, Clifford T., 5,012,630, Cl. 53-490.000.
- Schoenmakers, Albert W.: *See*—
  - Bodor, Janos; Schoenmakers, Albert W.; and Verhue, Walter M., 5,013,573, Cl. 426-602.000.
- Scholl, Hans-Joachim, to Bayer Aktiengesellschaft. Polyisocyanates containing isocyanurate groups and a process for their production. 5,013,838, Cl. 544-193.000.
- Schoonover, Richard L. Form retaining holder for visored cap. 5,012,531, Cl. 2-185.00B.
- Schott Glaswerke: *See*—
  - Fotheringham, Ulrich, 5,013,131, Cl. 350-96.310.
- Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, to Fraunhofer Gesellschaft zur Forderung der angewandten Forschung e. v. Apparatus for checking audio signal processing systems. 5,014,318, Cl. 381-47.000.
- Schrader, James E., to Kwik Clip. Valance clip. 5,012,850, Cl. 160-38.000.
- Schrader, Thomas H.: *See*—
  - Taylor, Edward C.; Schrader, Thomas H.; and Walensky, Loren D., 5,013,738, Cl. 514-272.000.
- Schramm, Bernhard; Kern, Jurgen; Schwahn, Harald; Preuss, August-Wilhelm; Gottlieb, Klaus; and Bruderreck, Hartmut, to Veba Oel Aktiengesellschaft. Metal oxide powders or their mixtures, and their use in catalytic dehydrogenation of hydrocarbons. 5,013,706, Cl. 502-309.000.
- Schrenk, Hartmut, to Siemens Aktiengesellschaft. Integrated circuit with an access-controlled data memory. 5,014,311, Cl. 380-23.000.
- Schriner, David A.; and Lauer, Albert W., to United States of America, Navy. Electronic projectile impact spotting device. 5,014,062, Cl. 342-68.000.
- Schrock, C. Robert: *See*—
  - Bailey, James R.; and Schrock, C. Robert, 5,013,240, Cl. 433-77.000.
- Schroepfer, Richard C.: *See*—
  - Korsunsky, Iosif; and Schroepfer, Richard C., 5,013,257, Cl. 439-326.000.
- Schubert, Wolfgang: *See*—
  - Bruening, Horst; and Schubert, Wolfgang, 5,013,921, Cl. 250-370.110.
- Schuette, Michael W., to Life Technologies Inc. Gel electrophoresis-/electro-blot apparatus. 5,013,420, Cl. 204-299.00R.
- Schulte, Helmut: *See*—
  - Nielinger, Werner; Bockmann, August; Brinkmeyer, Hermann; and Schulte, Helmut, 5,013,518, Cl. 264-564.000.
- Schulte-Schlagbaum Aktiengesellschaft: *See*—
  - Eisermann, Armin, 5,012,659, Cl. 70-276.000.
- Schultz, Helmut: *See*—
  - Breuer, Rudolf; Lutz, Gottfried; Pertzsch, Albert; and Schultz, Helmut, 5,014,150, Cl. 360-132.000.
- Schultz, Richard A. Air-hydraulic pump with auxiliary pumping means. 5,013,198, Cl. 417-287.000.
- Schulz, Erhard, to Fritz Hartmann Geratebau GmbH & Co. KG. Multi-pole connector plug. 5,013,250, Cl. 439-79.000.
- Schumacher, Elaine F.: *See*—
  - St. Martin, Edward J.; Kurek, Paul R.; Schumacher, Elaine F.; and Rohrbach, Ronald P., 5,013,564, Cl. 426-250.000.
  - St. Martin, Edward J.; Kurek, Paul R.; and Schumacher, Elaine F., 5,013,565, Cl. 426-250.000.
- Schumacher, Wilfried: *See*—
  - Haushofer, Bert; Scherp, Ernst; Schumacher, Wilfried; and Sabau, Petru, 5,013,591, Cl. 428-40.000.
- Schwab, Gunther, to Dr. Schwab Gesellschaft fur Technologieberatung mbH. Apparatus for determining the identity and position of game objects. 5,013,047, Cl. 273-238.000.
- Schwahn, Harald: *See*—
  - Schramm, Bernhard; Kern, Jurgen; Schwahn, Harald; Preuss, August-Wilhelm; Gottlieb, Klaus; and Bruderreck, Hartmut, 5,013,706, Cl. 502-309.000.
- Schwalge, Barbara; Plath, Peter; Eicken, Karl; Meyer, Norbert; and Wuerzer, Bruno, to BASF Aktiengesellschaft. 3-phenylpropionic acid derivatives. 5,013,354, Cl. 71-95.000.
- Schwarz, Dieter: *See*—
  - Seisz, Michael; Knauf, Roland; Schwarz, Dieter; and Weidner, Hans-Jurgen, 5,013,261, Cl. 439-581.000.
- Schwarz, Gerald R. Method for controlling urinary incontinence. 5,012,822, Cl. 128-885.000.
- Schwirtlich, Ingo; and Woditsch, Peter, to Bayer Aktiengesellschaft. Process for the melting and directional solidification of metals. 5,013,393, Cl. 156-616.200.
- Science Applications International Corporation: *See*—
  - Swenson, Donald A., 5,014,014, Cl. 328-233.000.
- Science and Technology Agency: *See*—
  - Kasuya, Takahiro; Ikawa, Yoji; Tsukakoshi, Motowo; and Kurata, Shunichi, 5,013,660, Cl 435-173.000.
- Scientific Atlanta, Inc.: *See*—
  - Bush, Aubrey M.; and Schimm, John F., Jr., 5,014,276, Cl. 371-43.000.
  - West, Lamar E., Jr., 5,014,309, Cl. 380-7.000.
- Scimat Limited: *See*—
  - Cook, John A.; Park, Geroge B.; McLoughlin, Robert H.; and Whitcher, William J., 5,013,619, Cl. 429-189.000.
- Sclavo S.p.A.: *See*—
  - Sisto, Alessandro; and Verdini, Antonio, 5,013,723, Cl. 514-19.000.
- Scott Investment Partners: *See*—
  - Scott, James J., 5,013,192, Cl. 405-259.000.
- Scott, James J., to Scott Investment Partners. Dynamic rock stabilizing fixture. 5,013,192, Cl. 405-259.000.
- Scribner, James R.; Nicholson, Raymond J.; Brown, Thomas G.; and Caracciolo, Anthony, Jr., to FaciliTech International Incorporated. Tracking system. 5,014,206, Cl. 364-449.000.
- Scroggie, Stephen J.: *See*—
  - Karklins, Elgin J.; Scroggie, Stephen J.; Tracht, Steven L.; and Striker, Mark W., 5,012,977, Cl. 239-284.100.
- Sczomak, David P.: *See*—
  - Long, David L.; Mitchell, Mark A.; and Sczomak, David P., 5,012,785, Cl. 123-467.000.
- Seale, Mark A.: *See*—
  - Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,013,387, Cl. 156-384.000.
  - Goodwin, Brent E.; Mistyurik, John D.; and Seale, Mark A., 5,013,388, Cl. 156-384.000.
- Seckora, Michael C., to Tektronix, Inc. Analog-to-digital converter system. 5,014,059, Cl. 341-172.000.
- Secor, Jacob: *See*—
  - Markley, Lowell D.; Hamilton, Christopher T.; Swisher, Beth A.; and Secor, Jacob, 5,013,352, Cl. 71-94.000.
- Segol, Sylvain: *See*—
  - Allaert, Francois; Faurie, Pierre; Roques, Serge; and Segol, Sylvain, 5,013,197, Cl. 410-77.000.
- Seibring, Joachim: *See*—
  - Bobbink, Hendrikus; Fischer, Hermann; Heinz, Gerhard; Matthias, Klaus; Seibring, Joachim; and Stegmaier, Wolfgang, 5,013,816, Cl. 528-173.000.
- Seiko Instruments, Inc.: *See*—
  - Nakamura, Nobutaka; Takeda, Haruo; and Take, Masafumi, 5,013,159, Cl. 374-12.000.
  - Wakui, Shinji, 5,013,987, Cl. 318-632.000.
- Seikosha Co., Ltd.: *See*—
  - Tajima, Akio; and Fujimoto, Ryoichi, 5,013,028, Cl. 271-305.000.
- Seiler, Milton R.; and Walcott, Kenneth J., to United States of America, Air Force. Photoconductive antenna modulator. 5,014,069, Cl. 343-785.000.
- Seisz, Michael; Knauf, Roland; Schwarz, Dieter; and Weidner, Hans-Jurgen, to U.S. Philips Corporation. Device for connecting a coaxial cable. 5,013,261, Cl. 439-581.000.
- Seitz, Thomas, to LGZ Landis & Gyr Zug AG. Thin film magnetic core device with a pair of magnetic circuits for measuring a weak magnetic flux. 5,014,006, Cl. 324-249.000.
- Seitzer, Dieter: *See*—
  - Schott, Hartmut; Seitzer, Dieter; Gerhauser, Heinz; Brandenburg, Karlheinz; Eberlein, Ernst; Krageloh, Stefan; Kapust, Rolf; and Popp, Harald, 5,014,318, Cl. 381-47.000.
- Sekiguchi, Yutaka: *See*—
  - Ishiguro, Kazuhisa; and Sekiguchi, Yutaka, 5,014,017, Cl. 330-51.000.
- Sckine, Mikiya; and Hiraishi, Shigetoshi, to Mitsubishi Paper Mills Limited. Color image recording material. 5,013,629, Cl. 430-138.000.
- Sekine, Noboru: *See*—
  - Aoki, Takashi; Sekine, Noboru; Ozawa, Shigeo; and Shimada, Takamichi, 5,012,699, Cl. 74-869.000.
- Sekine, Shuji, to Jidosha Denki Kogyo K.K. Power window apparatus. 5,012,613, Cl. 49-362.000.
- Sekine, Shuji; Furuya, Takeo; and Harada, Naoto, to Jidosha Denki Kogyo K.K. Precision brush mounting assembly for small electric motor. 5,013,952, Cl. 310-239.000.

VOL
1126
ISS
1
MY
7
1991
UMI

Sekiya, Naoyuki: *See—*
  Miyakawa, Tatsuo; Kato, Osamu; Koike, Yusuke; Matsunami, Keisuke; and Sekiya, Naoyuki, 5,013,906, Cl. 250-223.00R.
Selen, Faize: *See—*
  Wahle, Bernd; and Selen, Faize, 5,013,327, Cl. 8-125.000.
Semiconductor Energy Laboratory Co., Ltd.: *See—*
  Fukada, Takeshi; Codama, Mitsufumi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; and Takayama, Ichiro, 5,014,100, Cl. 357-30.000.
  Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
  Yamazaki, Shunpei, 5,013,579, Cl. 427-38.000.
Semmekrot, Gerardus J. M., to Universiteit Twente. Distributive mixer device. 5,013,233, Cl. 425-208.000.
Senbokuya, Eiji: *See—*
  Hamada, Yonenori; and Senbokuya, Eiji, 5,014,035, Cl. 337-372.000.
Senderowicz, Daniel: *See—*
  Nicollini, Germano; and Senderowicz, Daniel, 5,014,304, Cl. 379-399.000.
Seng, Chew E.; Hork, Wee T.; and Lee, Wong Y., to Microelectronic Packaging Inc. Glass bonding method. 5,013,347, Cl. 65-43.000.
Senjyuu, Noboru: *See—*
  Sato, Goro; Komatsu, Michio; Hirai, Toshiharu; Abe, Yoneji; and Senjyuu, Noboru, 5,013,607, Cl. 428-426.000.
Seon, Francoise, to Rhone-Poulenc Chimie. Preparation of alkaline earth metal titanates. 5,013,538, Cl. 423-608.000.
Sepracor: *See—*
  Lee, Eric K.; Kalyani, Vinay J.; and Matson, Stephen L., 5,013,447, Cl. 210-640.000.
Serafino, Anthony J.: *See—*
  Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., 5,013,119, Cl. 350-96.160.
Serracant-Clermont, Jose M.; and Serracant-Clermont, Juan. Machine for the continuous dynamic-fluid treatment of aggregated filiform materials. 5,012,657, Cl. 68-5.00E.
Serracant-Clermont, Juan: *See—*
  Serracant-Clermont, Jose M.; and Serracant-Clermont, Juan, 5,012,657, Cl. 68-5.00E.
Severnak, Sherry A.: *See—*
  Kudzma, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., 5,013,742, Cl. 514-329.000.
Severson, David W.; and Aiken, Judd M., to Wisconsin Alumni Research Foundation. Identification of africanized honey bees. 5,013,644, Cl. 435-6.000.
SGS-Thomson Microelectronics S.r.L.: *See—*
  Nicollini, Germano; and Senderowicz, Daniel, 5,014,304, Cl. 379-399.000.
  Zambrano, Raffaele, 5,013,672, Cl. 437-33.000.
SGS-Thomson Microelectronics SA: *See—*
  Lisimaque, Gilles; and Bahout, Yvon, 5,014,312, Cl. 380-25.000.
SGS-Thomson Microelectronics S.A.: *See—*
  Bergemont, Albert, 5,013,674, Cl. 437-43.000.
Shah, Amit R.: *See—*
  Mercado, Clara; and Shah, Amit R., 5,013,543, Cl. 424-63.000.
Shalon, Yehuda, to H.T. Chemicals, Inc. Zero void column end plate for chromatography. 5,013,433, Cl. 210-198.200.
Shannon, Joseph W., to ABC/Sebrn TechCorp. Syrup dispensing system. 5,012,955, Cl. 222-61.000.
Shannon, Robert D.: *See—*
  Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,014,060, Cl. 342-2.000.
Sharp Kabushiki Kaisha: *See—*
  Ide, Shigeaki; and Oki, Ichiroh, 5,013,692, Cl. 437-241.000.
  Kubo, Katsuhiro; Sakai, Keiji; Kurata, Yukio; and Yamaoka, Hideyoshi, 5,013,494, Cl. 264-1.300.
Shavit, Arie: *See—*
  Wiscombe, Paul C.; and Shavit, Arie, 5,014,002, Cl. 324-158.00F.
Shea, Gregory T. Blow-molded unitary thermoplastic threshold. 5,012,614, Cl. 49-468.000.
Sheely, Harold R.; Miserlis, Constantine D.; and Rosenblatt, Ivan L., to International Paper Company. Apparatus for recovery of constituents and heat from fluidized bed combustion. 5,012,750, Cl. 110-245.000.
Sheikh, Ramsey U.; and Stavrou, Steve A., to Leighton Industries, Inc. Heat exchanger tube spacers. 5,012,767, Cl. 122-511.000.
Shek, Thompson: *See—*
  Murphy, Robert F.; and Shek, Thompson, 5,013,266, Cl. 439-741.000.
Shell Oil Company: *See—*
  Wang, Pen C., 5,013,805, Cl. 526-264.000.
Shell Oil Corporation: *See—*
  Hoxmeier, Ronald J.; and Slaugh, Lynn H., 5,013,798, Cl. 525-338.000.
Shempert, Craig H.: *See—*
  Pogorzelski, James S.; and Shempert, Craig H., 5,014,236, Cl. 364-900.000.
Shen, Lewis; Hadiizadeh-Amini, Zahra; Wang, Hsingya A.; and Hsu, James J., to Advanced Micro Devices, Inc. Method of forming and removing polysilicon lightly doped drain spacers. 5,013,675, Cl. 437-44.000.
Shevchuk, George J.: *See—*
  Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., 5,013,119, Cl. 350-96.160.
Shibahara, Susumu: *See—*
  Ohtsuka, Eiko; Inoue, Hideo; Morisawa, Hirokazu; Shibahara, Susumu; Mukai, Sachiko; and Nishihara, Tohru, 5,013,830, Cl. 536-27.000.
Shibaike, Narito; and Uchida, Shinji, to Matsushita Electric Industrial Co., Ltd. Electrostatic micro-motor apparatus. 5,013,954, Cl. 310-309.000.
Shibata, Jun: *See—*
  Matsuda, Kenichi; and Shibata, Jun, 5,014,096, Cl. 357-19.000.
Shibata, Kazuhiko: *See—*
  Hashimoto, Toshiharu; Shibata, Kazuhiko; and Kobayashi, Makoto, 5,013,023, Cl. 271-3.100.
Shibata, Toshihiro; Kimura, Masaki; and Kurosawa, Norio, to Adeka ARgus Chemical Co., Ltd. Optically active ester compound and liquid crystal composition containing the same. 5,013,475, Cl. 252-299.610.
Shih, Hung-Dah: *See—*
  Plumton, Donald L.; Tran, Liem T.; and Shih, Hung-Dah, 5,013,682, Cl. 437-89.000.
Shihara, Yasutaka: *See—*
  Asai, Keniti; Ito, Hideaki; Nakagawa, Yoji; Shihara, Yasutaka; Hodate, Toshiaki; and Nakazaki, Akikazu, 5,013,408, Cl. 202-241.000.
Shikamori, Tamotsu; Toshimitsu, Hiroyuki; Ohsugi, Hiroshi; Hiyama, Isao; and Fukuzawa, Soichi, to Hitachi, Ltd. Full automatic washing machine. 5,012,658, Cl. 68-12.010.
Shikoku Chemicals Corporation: *See—*
  Hata, Hajime; Kitamura, Takao; Sakane, Kohji; Wada, Hideo; and Sogabe, Seiji, 5,013,523, Cl. 419-19.000.
Shimada, Kazuyuki, to Ricoh Company, Ltd. Method of generating an image scanning clock signal for an optical scanning device by selecting one of a plurality of out-of-phase clock signals. 5,014,137, Cl. 358-410.000.
Shimada, Satoshi; Shimizu, Yasushi; and Ugai, Seiichi, to Hitachi, Ltd. Differential pressure transmitter. 5,012,677, Cl. 73-721.000.
Shimada, Takamichi: *See—*
  Aoki, Takashi; Sekine, Noboru; Ozawa, Shigeo; and Shimada, Takamichi, 5,012,699, Cl. 74-869.000.
Shimadzu Corporation: *See—*
  Arimoto, Hiromi; and Fujii, Toshihiro, 5,014,009, Cl. 324-468.000.
Shimano Industrial Co., Ltd.: *See—*
  Kawabe, Yozo, 5,012,990, Cl. 242-242.000.
  Nagano, Masashi, 5,012,692, Cl. 74-475.000.
Shimizu, Chiyuki; and Yoshida, Tanio, to Toshiba Silicone Co., Ltd. Room-temperature curable composition. 5,013,807, Cl. 528-17.000.
Shimizu Construction Co., Ltd.: *See—*
  Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
Shimizu, Hiroyuki; Ito, Kenji; and Wakita, Naomasa, to NGK Spark Plug Co., Ltd. Bandpass filter and method of trimming response characteristics thereof. 5,014,024, Cl. 333-203.000.
Shimizu, Hisanaga: *See—*
  Ishihata, Kouji; Hironaka, Youichi; Shimizu, Hisanaga; Kitamura, Kazuo; and Imagawa, Takeshi, 5,013,776, Cl. 524-118.000.
Shimizu, Takaaki; Ogihara, Tsutomu; and Takita, Masatoshi, to Shin-Etsu Chemical Co., Ltd. Method for the preparation of surface-modified silica particles. 5,013,585, Cl. 427-220.000.
Shimizu, Yasushi: *See—*
  Shimada, Satoshi; Shimizu, Yasushi; and Ugai, Seiichi, 5,012,677, Cl. 73-721.000.
Shimoda, Kaneyasu; and Ageno, Yuzo, to Fujitsu Limited. Sequential decoder. 5,014,275, Cl. 371-43.000.
Shimura, Kazuo; and Adachi, Yuuma, to Fuji Photo Film Co., Ltd Radiation image read-out apparatus using menu. 5,014,045, Cl. 340-712.000.
Shin-Etsu Chemical Co., Ltd.: *See—*
  Fujiki, Hironao; and Oohashi, Morio, 5,013,772, Cl. 523-213.000.
  Inoue, Yoshio, 5,013,800, Cl. 525-477.000.
  Minowa, Takehisa; and Yoshikawa, Masao, 5,013,411, Cl. 204-29.000.
  Mori, Shigeru; and Kuwata, Satoshi, 5,013,715, Cl. 514-53.000.
  Shimizu, Takaaki; Ogihara, Tsutomu; and Takita, Masatoshi, 5,013,585, Cl. 427-220.000.
Shinbashi, Masahiro; and Wakabayashi, Takashi, to Fujitsu Limited System for switching from working units to stand-by units. 5,014,261, Cl. 370-16.000.
Shinohara, Toshio: *See—*
  Kiriyama, Yoshiyuki, Moriga, Kazuyuki; Shinohara, Toshio; Matsuda, Mitsuhiro; and Maeda, Hiromi, 5,013,768, Cl. 522-64.000.
Shinomiya, Masaki: *See—*
  Ukegawa, Shin; Shinomiya, Masaki; Higashikawa, Masahiro; Uetsuki, Tadao; and Kobayashi, Koichi, 5,013,975, Cl. 315-248.000.
Shiokawa, Hideyo: *See—*
  Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.

Shiomi, Toru; and Ueda, Kimio, to Mitsubishi Denki Kabushiki Kaisha. BiCMOS logic circuit using complementary bipolar transistors having their emitters connected together. 5,013,936, Cl. 307-446.000.
Shiono. Toshio: *See—*
  Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.
  Takatsuka, Akio; Sasamoto, Asao; Moribe, Yoshihiro; Shiono, Toshio; Sogabe, Chikayuki; and Hosokawa, Haruhiko, 5,014,146, Cl. 360-106.000.
Shioya, Masatoshi: *See—*
  Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.
Shiozaki, Makoto: *See—*
  Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.
Shipko, Frederick J.: *See—*
  Goode, Louis; and Shipko, Frederick J., 5,013,310, Cl. 606-1.000.
Shirai, Mitsuzou, to Sanyo Electric Co., Ltd. Luminance signal processing circuit using 3 line logical comb filter. 5,014,118, Cl. 358-31.000.
Shiraishi, Katsumune. Container for a cosmetic liquid. 5,013,173, Cl. 401-202.000.
Shiraishi, Yasuhiro: *See—*
  Konishi, Junkichi; and Shiraishi, Yasuhiro, 5,014,199, Cl. 364-424.050.
Shiroki Corporation: *See—*
  Nagasaka, Youetsu, 5,013,087, Cl. 297-284.000.
Shishido, Yuuji: *See—*
  Fujita, Masahiko; Shishido, Yuuji; Suzuki, Yuzuru; and Okamoto, Masato, 5,012,571, Cl. 29-598.000.
Shoemaker, Richard E., to Conair Corporation. Personal appliance having shock protection circuitry. 5,013,891, Cl. 219-385.000.
Shokawa, Tomoo: *See—*
  Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.
Shon, Suk-bong; and Na, Woo-young, to Samsung Electron Devices Co., Ltd. Electron gun cathode and manufacturing method therefor. 5,013,965, Cl. 313-446.000.
Shoukry, Ehsan I.: *See—*
  Baird, William C., Jr.; and Shoukry, Ehsan I., 5,013,704. Cl. 502-241.000.
Showa Aluminum Corporation: *See—*
  Tanimoto, Shigemi; and Eguchi, Yoshiaki, 5,013,490, Cl. 261-87.000.
Showa Denko K.K.: *See—*
  Suzuki, Takashi; Yasuda, Tetsuo; Miyauchi, Otohiko; and Yotsuyanagi, Junji, 5,013,516, Cl. 264-130.000.
Shulze, John E. Fiber optic catheter system with fluorometric sensor and integral flexure compensation. 5,012,809, Cl. 128-634.000.
Shumate, William A.: *See—*
  Walker, Gordon K.; Shumate, William A.; and Kelkar, Krishnanand, 5,014,310, Cl. 380-10.000.
Shute, Donald W.: *See—*
  Kelleher, John J., Jr.; and Shute, Donald W., 5,014,176, Cl. 363-26.000.
Shutske, Gregory M., to Hoechst-Roussel Pharmaceuticals Incorporated. N-[substituted alkylidene]-1,2,3,4-tetrahydro-9-acridinamines useful for enhancing the cholinergic function in a mammal. 5,013,741, Cl. 514-290.000.
Sibalis, Dan, to Drug Delivery Systems Inc. Pulsating transdermal drug delivery system. 5,013,293, Cl. 604-20.000.
Sibano, Yasuji, to Hosiden Electronics Co., Ltd. Multi-contact socket. 5,013,262, Cl. 439-610.000.
Sibille, Soline: *See—*
  Conan, Annie; D'Incan, Esther; Perichon, Jacques; and Sibille, Soline, 5,013,412, Cl. 204-59.00R.
Sicek, Bernard W.; and Siczek, Aldona A. Table positioning for X-ray examinations in plurality of positions. 5,013,018, Cl. 269-323.000.
Siczek, Aldona A.: *See—*
  Sicek, Bernard W.; and Siczek, Aldona A., 5,013,018, Cl. 269-323.000.
  Siczek, Bernard W.; and Siczek, Aldona A., 5,014,292, Cl. 378-196.000.
Siczek, Bernard W.; and Siczek, Aldona A. Tiltable x-ray table integrated with carriage for x-ray source and receptor. 5,014,292, Cl. 378-196.000.
Siecor Corporation: *See—*
  Bernard, Werner, 5,013,127, Cl. 350-96.230.
Siedel, Joachim: *See—*
  Town, Michael-Harold; Siedel, Joachim; and Ziegenhorn, Joachim, 5,013,647, Cl. 435-25.000.
Siefer, David A., to Warner-Lambert Company. One-piece razor with hinged sliding cap. 5,012,578, Cl. 30-84.000.
Siemens Aktiengesellschaft: *See—*
  Bruening, Horst; and Schubert, Wolfgang, 5,013,921, Cl. 250-370.110.
  Cardinal, Andreas, 5,013,875, Cl. 200-146.00R.
  Heister, Heinz; and Jann, Wolfango, 5,014,130, Cl. 358-173.000.
  Horn, Klaus, 5,014,058, Cl. 341-166.000.
  Hummel, Wolfgang, 5,013,520, Cl. 376-261.000.
  Nagler, Werner; and Schoenauer, Ludwig, 5,014,264, Cl. 370-58.100.
  Schrenk, Hartmut, 5,014,311, Cl. 380-23.000.
  Winnerl, Josef; and Neppl, Franz, 5,013,678, Cl. 437-52.000.
Siemens Corporate Research, Inc.: *See—*
  Wolfson, Charles D., 5,014,208, Cl. 364-468.000.
Siemens-Pacesetter, Inc.: *See—*
  Stutz, William H., Jr., 5,012,807, Cl. 128-419.00P.
Sierracin Corporation: *See—*
  Armstrong, Tom; Bimanand, Alex; Jacques, Dennis M., Sr.; and Raffo, John A., 5,013,924, Cl. 250-504.00R.
Sigeta, Kunio: *See—*
  Takizawa, Yoshio; Sigeta, Kunio; Takeuchi, Shigeki; Yoshioka, Hiroshi; and Fujimaki, Yoshihide, 5,013,625, Cl. 430-64.000.
Sigma Enterprises, Inc.: *See—*
  Spencer, Larry K., 5,013,218, Cl. 417-37.000.
Sikora, Dennis C.: *See—*
  Kempf, Timothy W.; Corcoran, Robert F.; and Sikora, Dennis C., 5,013,336, Cl. 55-71.000.
Sillere, E. Thierry, to SAT (Societe Anonyme de Telecommunications). Device for synchronizing a pseudo-binary signal with a regenerated clock signal having phase jumps. 5,014,270, Cl. 370-101.000.
Silverglate, David E.; and Smestad, Greg P., to Hewlett-Packard Company. Light source having a multiply conic lens. 5,013,144, Cl. 350-435.000.
Silverstein, Fred E.: *See—*
  Opie, Eric A.; and Silverstein, Fred E., 5,013,305, Cl. 604-192.000.
Simacek, Thomas H.: *See—*
  Schlais, John R.; Rusch, Randy A.; and Simacek, Thomas H., 5,014,098, Cl. 357-23.500.
Simes: *See—*
  Casagrande, Cesare; and Santangelo, Francesco, 5,013,753, Cl. 514-512.000.
Simmler, Kurt: *See—*
  Nalowaniec, Krzysztof; and Simmler, Kurt, 5,013,382. Cl. 156-298.000.
Simon, Burkhard: *See—*
  Grieb, Hubert; Simon, Burkhard; and Albers, Martin, 5,012,638, Cl. 60-224.000.
Simon Fraser University: *See—*
  Vidaver, William; Toivonen, Peter; and Dube, Sylvain, 5,014,225, Cl. 364-550.000.
Simon, Nikolaus: *See—*
  Holzgrefe, Volker; Simon, Nikolaus; and Ziegler, Ewald, 5,012,981, Cl. 239-533.120.
Simon-RO Corporation: *See—*
  Pitman, Raymond F.; and Wacht, Raymond J., 5,012,939, Cl. 212-157.000.
Simpson, Sharon M.; and Boon, John R., to Minnesota Mining and Manufacturing Company. Supersensitization of silver halide emulsions. 5,013,622, Cl. 430-550.000.
Simtek Corporation: *See—*
  Hirose, Ryan T., 5,013,943, Cl. 307-530.000.
Sindlinger, Rainer; and Kocks, Peter, to Teldix GmbH. Vehicle having an on-board navigation system. 5,014,205, Cl. 364-449.000.
Singh, Balwant: *See—*
  Guerro, Gerald J.; and Singh, Balwant, 5,013,598, Cl. 428-283.000.
Sinha, Pradeep; and Rahman, Turhan F., to XOX Corporation. Solid-modeling system using topology directed subdivision for determination of surface intersections. 5,014,230, Cl. 364-578.000.
Sisolak, Robert J., to General Ceramics, Inc. Glass to metal seal. 5,013,615, Cl. 428-668.000.
Sisto, Alessandro; and Verdini, Antonio, to Eniricerche S.p.A.; and Sclavo S.p.A. New thymopentin retro-inverso analogs and fragments thereof, a process of preparation of the new compounds and the intermediates obtained therein. 5,013,723, Cl. 514-19.000.
Sites, Richard L.: *See—*
  Farrell, James A.; and Sites, Richard L., 5,014,195, Cl. 364-200.000.
Sitnikov, Anatoly F.: *See—*
  Stadnik, Ivan P.; Klevets, Nikolai I.; Gridnev, Alexandr I.; Kelin, Nikolai A.; and Sitnikov, Anatoly F., 5,013,951, Cl. 310-156.000.
Sizemore, Robert C.: *See—*
  Gottlieb, A. Arthur; and Sizemore, Robert C., 5,013,546, Cl. 424-85.100.
Skelnik, Debra: *See—*
  Lindstrom, Richard L.; and Skelnik, Debra, 5,013,714, Cl. 514-4.000.
SKF Nova AB: *See—*
  Adolfsson, Rune, 5,013,945, Cl. 310-26.000.
Skinner, Malcolm E.: *See—*
  Spencer, George R.; Thompson, Bernard J.; Skinner, Malcolm E.; and Sullivan, Philip L., 5,014,064, Cl. 342-152.000.
Skipper, Uvon. Drill stem mud wiping apparatus. 5,012,866, Cl. 166-170.000.
Skolnick, Malcolm: *See—*
  * Stubbers, Ron; Chen, Chen; and Skolnick, Malcolm, 5,012,808, Cl. 128-419.00R.
Skooglund, Daniel E.: *See—*
  Fischer, Jeffrey H.; Grasso, Lawrence J.; Hoffman, Dale E.; Skooglund, Daniel E.; and Young, Diane K., 5,013,944, Cl. 307-603.000.
Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Haberey, Martin; Schillinger, Ekkehard; and Town, Michael H., to Schering Aktiengesellschaft. Novel carbacyclins, processes for their preparation and their use as medicinal agents. 5,013,758, Cl. 514-573.000.

VOL
1126
ISS
1
MY
7
1991
UMI

Slama, Francis J., to Amoco Corporation. Process for overbased petroleum oxidate. 5,013,463, Cl. 252-18.000.

Slaugh, Lynn H.: *See—*
Hoxmeier, Ronald J.; and Slaugh, Lynn H., 5,013,798, Cl. 525-338.000.

Slidex Corporation: *See—*
Ozeki, Jiro, 5,013,148, Cl. 353-27.00R.

Sloan Valve Company: *See—*
Whiteside, John F., 5,013,007, Cl. 251-40.000.

Slot, Teunis, to Safan B. V. Device for working plate-shaped material. 5,012,729, Cl. 100-278.000.

Sluma, Heinz-Dieter; and Huff, Dieter, to Akzo N.V. Method for sulfonating aromatic polyether sulfones. 5,013,765, Cl. 521-27.000.

SMAE - Societa' Meridionale Accessori Elastomerici S.p.A.: *See—*
Piccinini, Dino; and Arabino, Domenico, 5,012,615, Cl. 49-477.000.

SMC Corporation: *See—*
Ikehata, Motoshige; Mikami, Hiroyuki; Inayama, Naoto; and Odajima, Katsuhiko, 5,012,835, Cl. 137-82.000.

Smelser, Donald W.: *See—*
Gagliardo, Michael A.; Goodwin, Paul M.; and Smelser, Donald W., 5,014,273, Cl. 371-37.700.

Smestad, Greg P.: *See—*
Silverglate, David E.; and Smestad, Greg P., 5,013,144, Cl. 350-435.000.

Smith, Catherine M.; and Cohen, Gerald C., to Boeing Company, The. Reliability model generator. 5,014,220, Cl. 364-513.000.

Smith, Dennis C.: *See—*
Murray, Douglas G.; Smith, Dennis C.; and Guillet, James E., 5,013,769, Cl. 523-111.000.

Smith, H. Carl: *See—*
Abrams, Robert S.; and Smith, H. Carl, 5,012,941, Cl. 215-250.000.

Smith International, Inc.: *See—*
Springer, Johann, 5,012,863, Cl. 166-55.700.

Smith, Lawrence. Fluid filter medium including a tubular fabric member. 5,013,438, Cl. 210-455.000.

Smith, Lawrence G., to Republic Money Orders, Inc. Apparatus for dispensing money orders. 5,014,212, Cl. 364-479.000.

Smith, Linda J.: *See—*
Dubin, Murray L.; and Smith, Linda J., 5,012,637, Cl. 60-39.020.

Smith, Michael D., to Dallas Semiconductor Corporation. Waveshaping subsystem using converter and delay lines. 5,013,932, Cl. 307-268.000.

Smith & Nephew Richards Inc.: *See—*
Cole, J. Dean; and Durham, A. Glenn, 5,013,317, Cl. 606-96.000.

Smith, Robert J., II: *See—*
Lindeman, Richard J.; and Smith, Robert J., II, 5,013,249, Cl. 439-66.000.

Smith, Robert L.: *See—*
Moore, Robert M.; and Smith, Robert L., 5,014,290, Cl. 378-145.000.

Smith, Robert S.: *See—*
Rider, Allison L.; and Smith, Robert S., 5,013,435, Cl. 210-262.000.

Smith, Roger E.; Thornburgh, Scott; and Rodriquez-Kabana, Rodrigo, to Great Lakes Chemical Corporation. Method for the treatment of nematodes in soil using bromonitromethane. 5,013,762, Cl. 514-740.000.

Smith, Ronald T., to Hughes Aircraft Company. Ghost-free automotive head-up display employing a wedged windshield. 5,013,134, Cl. 350-174.000.

Smith, Steven R. Vehicle foot pedal actuator apparatus and method. 5,012,689, Cl. 74-89.170.

SmithKline Diagnostics, Inc.: *See—*
Peters, Donald F., Jr.; and Dumont, Lawrence C., 5,013,669, Cl. 436-518.000.

SMP2 SA: *See—*
Burnet, Jacques, 5,013,054, Cl. 279-16.000.

Smycz, Eugeniusz: *See—*
Lewiner, Jacques; Hennion, Claude; and Smycz, Eugeniusz, 5,014,050, Cl. 340-870.190.

Sniadower, Lucjan, to Raynet Corporation. Filtering high order modes of short wavelength signals propagating in long wavelength single mode fibers. 5,013,118, Cl. 350-96.160.

Sniegowski, Jeffry: *See—*
Guckel, Henry; and Sniegowski, Jeffry, 5,013,693, Cl. 437-248.000.

Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C.; Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., to United States of America, National Aeronautics and Space Administration. Macromolecular crystal growing system. 5,013,531, Cl. 422-245.000.

Socha, Richard F.: *See—*
Absil, Robert P. L.; Degnan, Thomas F.; Han, Scott; Marler, David O.; Socha, Richard F.; and Stapleton, Michael R., 5,013,422, Cl. 208-27.000.

Societe Anonyme dite: Alcatel Cit: *See—*
Guittet, Dominique; Taberlet, Eric; and Vuillermoz, Jean-Francois, 5,013,227, Cl. 418-206.000.

Societe Anonyme dite: Sulzer Electro-Technique "S.E.T." : *See—*
Cavazza, Gilbert, 5,013,586, Cl. 427-240.000.

Societe Cooperative de Production Bourgeois: *See—*
Faurel, Jacques, 5,012,794, Cl. 126-197.000.

Societe de Conseils de Recherches et d'Application Scientifiques (S.C.R.A.S): *See—*
Follet, Michel; and Bonato, Marc, 5,013,756, Cl. 514-544.000.

Societe Nationale des Poudres et Explosies (SNPE): *See—*
Conan, Annie; D'Incan, Esther; Perichon, Jacques; and Sibille, Soline, 5,013,412, Cl. 204-59.00R.

Societe Nationale D'etude et de Construction De Moteurs D'Aviation (S.N.E.C.M.A.): *See—*
Mirville, Francois J., 5,012,640, Cl. 60-246.000.

Soda, Takao: *See—*
Ohara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Soda, Takao; Kanie, Toshihiro; and Adaka, Tamio, 5,013,466, Cl. 252-42.700.

Sogabe, Chikayuki: *See—*
Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.
Takatsuka, Akio; Sasamoto, Asao; Moribe, Yoshihiro; Shiono, Toshio; Sogabe, Chikayuki; and Hosokawa, Haruhiko, 5,014,146, Cl. 360-106.000.

Sogabe, Seiji: *See—*
Hata, Hajime; Kitamura, Takao; Sakane, Kohji; Wada, Hideo; and Sogabe, Seiji, 5,013,523, Cl. 419-19.000.

Sokol, James M.; Lochmann, Robert L.; and Fischer, John G., to General Motors Corporation. Fuel pump for motor vehicle. 5,013,222, Cl. 417-366.000.

Sol, Jean-Jacques. Clamp for fastening a plate to a pipe. 5,013,177, Cl. 403-235.000.

Solomon, Allen L., to Grumman Aerospace Corporation. Framed chip hybrid stacked layer assembly. 5,013,687, Cl. 437-209.000.

Solomon, Allen L., to Grumman Aerospace Corporation. Detector element signal comparator system. 5,013,919, Cl. 250-349.000.

Solomon, Donald D.; and Byron, M. Parke, to Becton, Dickinson and Company. Anti-infective and antithrombogenic medical articles and method for their preparation. 5,013,306, Cl. 604-265.000.

Solomon, Donald D.; Taller, Robert A.; and Williamitis, Victor A., to Becton, Dickinson and Company. Blood compatible, lubricious article and composition and method therefor. 5,013,717, Cl. 514-56.000.

Somar Corporation: *See—*
Mitsui, Susumu; Funatsu, Ryoji; and Kurose, Shigeru, 5,013,755, Cl. 514-533.000.

Somers, W. Karl: *See—*
Goble, E. Marlowe; and Somers, W. Karl, 5,013,316, Cl. 606-72.000.

Somerville, Christopher R.: *See—*
Bedbrook, John R.; Chaleff, Roy S.; Falco, Saverio C.; Mazur, Barbara J.; Somerville, Christopher R.; and Yadav, Narendra S., 5,013,659, Cl. 435-172.300.

Somfai, Eva: *See—*
Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.

Somura, Katsuzo. Liquor included ice. 5,013,562, Cl. 426-66.000.

Sondergeld, Carl H.: *See—*
Millheim, Keith K.; Mount, Houston B., II; Rai, Chandra S.; and Sondergeld, Carl H., 5,012,674, Cl. 73-153.000.

Sondergeld, Manfred; and Wissig, Claus, to Gebr. Schmidt Fabrik fuer Feinmechanik. Opto-electrical acceleration sensor having a mechanical tilting element. 5,013,909, Cl. 250-231.100.

Sone, Masakazu; and Kawakita, Kozo, to Sony Corporation. Shifting mechanism for thermal head of a printer. 5,014,073, Cl. 346-76.0PH.

Sony Corporation: *See—*
Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, 5,013,474, Cl. 252-299.100.
Hozumi, Hiroki, 5,013,677, Cl. 437-47.000.
Kracke, Wilhelm, 5,013,597, Cl. 428-141.000.
Kumesawa, Tetsuro; Kanou, Yasuo; Nishima, Osamu; Isobe, Masaaki; and Matsui, Hiromichi, 5,014,132, Cl. 358-213.190.
Kunihiro, Takushi, 5,014,295, Cl. 379-61.000.
Morita, Akio; and Nakano, Yoshitomo, 5,014,297, Cl. 379-82.000.
Sasaki, Kazuo, 5,014,152, Cl. 360-135.000.
Sone, Masakazu; and Kawakita, Kozo, 5,014,073, Cl. 346-76.0PH.

Soos, Rudolf: *See—*
Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.

Soref, Richard A., to United States of America, Air Force. Lossless non-interferometric electro-optic III-V index-guided-wave switches and switching arrays. 5,013,113, Cl. 350-96.130.

Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Electromagnetic fuel injector. 5,012,982, Cl. 239-585.000.

Southard, G. Lee; and Harkrader, Ronald J., to Vipont Pharmaceutical, Inc. Drug delivery devices. 5,013,553, Cl. 424-426.000.

Southern California Edison: *See—*
Lopetrone, Juan P.; and Valdes, Oliver, 5,014,043, Cl. 340-664.000.

Southworth, William E., to Johnsonville Sausage, Inc. Apparatus for encasing a product in a curved casing. 5,013,279, Cl. 452-46.000.

Sowash, Robert P., to Olin Corporation. Sabot bullet. 5,012,744, Cl. 102-523.000.

Sox, Thomas E.: *See—*
Stentz, Laura L.; Maney, Jerry R.; and Sox, Thomas E., 5,013,560, Cl. 424-653.000.

Spacesaver Corporation: *See—*
Muth, James C., 5,013,101, Cl. 312-201.000.

Spain, Raymond G.: *See—*
Bailey, Carlos; and Spain, Raymond G., 5,013,216, Cl. 416-230.000.

Spakowski, Joseph G.; and Stoltman, Donald D., to General Motors Corporation. Remote control lever module. 5,013,930, Cl. 307-10.100.

Spanier, Barry: *See—*
Lockhart, Reed; and Spanier, Barry, 5,012,755, Cl. 114-103.000.

Special Devices Incorporated: *See—*
Spranza, Joseph J., III, 5,013,318, Cl. 606-102.000.

Spedding, Colin E., to GKN Technology Limited. Spring assemblies. 5,013,013, Cl. 267-165.000.

Speer, Stephen R., to Machen, Inc. Turbine engine having combustor air precooler. 5,012,646, Cl. 60-728.000.

Speier, Wolfgang: *See—*
Strauber, Hans-Jurgen; Niklas, Robert; Ohlendorf, Rolf; and Speier, Wolfgang, 5,012,774, Cl. 123-90.170.

Spelten, Hans. Structural bar. 5,012,626, Cl. 52-729.000.

Spencer, George R.; Thompson, Bernard J.; Skinner, Malcolm E.; and Sullivan, Philip L., to Raytheon Company. Monopulse tracking apparatus and method of operating same. 5,014,064, Cl. 342-152.000.

Spencer, H. Kenneth: *See—*
Kudzma, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., 5,013,742, Cl. 514-329.000.

Spencer, Larry K., to Sigma Enterprises, Inc. Submersible pneumatic pump for water table. 5,013,218, Cl. 417-37.000.

Speranza, George P.; and Su, Wei-Yang, to Texaco Chemical Company. Polybiurets. 5,013,812, Cl. 528-60.000.

Speriosu, Virgil S.: *See—*
Parkin, Stuart S. P.; Roche, Kevin P.; and Speriosu, Virgil S., 5,014,147, Cl. 360-113.000.

Sperling, Irving: *See—*
Reed, Irving S.; Sperling, Irving; and Bundy, William A., 5,014,131, Cl. 358-212.000.

Spezialmaschinenbau Steffel GmbH & Co. KG: *See—*
Steffel, Horst, 5,013,010, Cl. 254-50.200.

Spicuzza, Carol A.; and Reimer, Lawrence B., to SSI Technologies, Inc. Cold start by-pass valve. 5,012,789, Cl. 123-587.000.

Spiegel, Nikolaus: *See—*
Loos, Gerhard; and Spiegel, Nikolaus, 5,012,739, Cl. 101-425.000.

Spranza, Joseph J., III, to Special Devices Incorporated. Medical instrument for measuring depth of fastener hold in bone. 5,013,318, Cl. 606-102.000.

Springer, Johann, to Smith International, Inc. Pipe milling tool blade and method of dressing same. 5,012,863, Cl. 166-55.700.

Spruit, Johannes H. M.: *See—*
Van Rosmalen, Gerard E.; Jacobs, Bernardus A. J.; and Spruit, Johannes H. M., 5,014,254, Cl. 369-13.000.

Sresty, Guggilam C., to IIT Research Institute. Method for recycling electric arc furnace dust. 5,013,532, Cl. 423-88.000.

SSI Technologies, Inc.: *See—*
Spicuzza, Carol A.; and Reimer, Lawrence B., 5,012,789, Cl. 123-587.000.

Stabilus GmbH: *See—*
Poertzgen, Gregor; Fuhrmann, Castor; and Hosan, Hans-Josef, 5,012,996, Cl. 248-161.000.

Stadler, Edwin; Hergesell, Wolfgang; and Pidner, Ernst, to Jacobs Suchard AG. Process for producing a caramelized nut product. 5,013,575, Cl. 426-639.000.

Stadnik, Ivan P.; Klevets, Nikolai I.; Gridnev, Alexandr I.; Kelin, Nikolai A.; and Sitnikov, Anatoly F. Multipolar rotor for electric machine with interpolar and polar magnets. 5,013,951, Cl. 310-156.000.

Stafford, Roger A.; Aday, Roy W., Jr.; Schmidt, Robert L.; and McCollum, Myron L., to Beckman Instruments, Inc. Concentration determination with multiple wavelength flash photometers. 5,014,216, Cl. 364-496.000.

Stahl, Roswell L., Jr.: *See—*
Gojny, Francis J.; Greene, Guy S.; Stahl, Roswell L., Jr.; and Street, Charles Z., 5,013,613, Cl. 428-593.000.

Stahlecker, Fritz; and Stahlecker, Hans. Drafting unit with detachably mounted support components for bottom rollers. 5,012,557, Cl. 19-258.000.

Stahlecker, Hans: *See—*
Stahlecker, Fritz; and Stahlecker, Hans, 5,012,557, Cl. 19-258.000.

Stamicarbon, B.V.: *See—*
Coosmans, Luc M. C.; Blenkers, Johannes; and Loontjens, Jacobus, 5,013,701, Cl. 502-110.000.

Standing, Donald J.: *See—*
Watterson, Scott R.; Dalebout, William T.; and Standing, Donald J., 5,013,033, Cl. 272-72.000.

Stanford University: *See—*
Rodwell, Mark J. W.; and Bloom, David M., 5,014,018, Cl. 333-20.000.

Staniulis, Mark T.; Crozier, Douglas E.; Risch, Alan P.; and Pai, Jenny L., to UOP. Noble metal exchange of hydrophobic molecular sieves. 5,013,703, Cl. 502-241.000.

Stanley, Stephen H.: *See—*
Suzuki, Motoshi; Dalton, Howard; Richards, Anthony O.; and Stanley, Stephen H., 5,013,665, Cl. 435-244.000.

Stapleton, Craig A.: *See—*
Cronce, Gary M.; Reid, Ronald W.; Stapleton, Craig A.; and Zauner, Robert S., 5,013,081, Cl. 296-180.100.

Stapleton, Michael R.: *See—*
Absil, Robert P. L.; Degnan, Thomas F.; Han, Scott; Marler, David O.; Socha, Richard F.; and Stapleton, Michael R., 5,013,422, Cl. 208-27.000.

Staudinger, Ingo, to Gebruder Welger GmbH & Co. Kommanditgesellschaft. Method for binding of round bales of harvested agricultural crops. 5,012,733, Cl. 100-2.000.

Staunton, Harold F.: *See—*
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; and Yngve, Paul W., 5,012,636, Cl. 57-204.000.

Stavely, Donald J.: *See—*
Wanger, Mark E.; Methlie, Jennifer L.; Jones, David P.; and Stavely, Donald J., 5,014,255, Cl. 369-36.000.

Stavrianopoulos, Jannis G., to Enzo Biochem, Inc. Detectable molecules, method of preparation and use. 5,013,831, Cl. 536-27.000.

Stavrou, Steve A.: *See—*
Sheikh, Ramsey U.; and Stavrou, Steve A., 5,012,767, Cl. 122-511.000.

Steffel, Horst, to Spezialmaschinenbau Steffel GmbH & Co. KG. Apparatus for spreading apart vehicle tyres in the bead region. 5,013,010, Cl. 254-50.200.

Stegmaier, Wolfgang: *See—*
Bobbink, Hendrikus; Fischer, Hermann; Heinz, Gerhard; Matthias, Klaus; Seibring, Joachim; and Stegmaier, Wolfgang, 5,013,816, Cl. 528-173.000.

Stein, Daryl L.: *See—*
MacLeay, Ronald E.; Sanchez, Jose; and Stein, Daryl L., 5,013,777, Cl. 524-159.000.

Stelzer, Dennis J., Sr.: *See—*
Lefferts, Scott R.; Stelzer, Dennis J., Sr.; and Weisenberger, Thomas V., 5,013,002, Cl. 248-74.100.

Stentz, Laura L.; Maney, Jerry R.; and Sox, Thomas E., to Procter & Gamble Company, The. Microbially-stable bismuth-containing liquid pharmaceutical suspensions. 5,013,560, Cl. 424-653.000.

Stephens, Joseph C.; and Rodriguez-Cavazos, Enrique, to Thomson Consumer Electronics, Inc. Voltage regulator in a television apparatus. 5,013,980, Cl. 315-411.000.

Sterling Drug Inc.: *See—*
Bell, Malcolm R., 5,013,732, Cl. 514-210.000.
Ward, Susan J.; and Bell, Malcolm R., 5,013,837, Cl. 544-143.000.

Stermer, Todd. Physical therapy device. 5,013,037, Cl. 272-139.000.

Stern, Theodore G.; and Cornwall, Mickey, to General Dynamics Corporation, Convair Division. Fiber optic light guide with improved end-to-end efficiency. 5,013,128, Cl. 350-96.240.

Sterrett, Terry L.; and Schmidt, Gerald W., to Ormco Corporation. Aseptic orthodontic dispensing appliances. 5,013,238, Cl. 433-2.000.

Stevens, Robert E. Vertically adjustable stack feed mechanism. 5,013,024, Cl. 271-146.000.

Stevens, William T., to Automotive Moulding Company. Adjustable spacers for supporting front window glass in an automobile. 5,013,077, Cl. 296-96.210.

Stewart, Charles N.: *See—*
Russell, Timothy D.; Hess, Carl H.; Hlahol, Paul G.; and Stewart, Charles N., 5,013,968, Cl. 313-641.000.

Stewart, Charles W.: *See—*
Chapman, George R., Jr.; Priester, Donnan E.; and Stewart, Charles W., 5,013,792, Cl. 525-166.000.

Stillie, Donald G.: *See—*
Aiello, Richard E.; Allgood, Christopher L.; Stillie, Donald G.; and Sykora, Allan J., 5,013,253, Cl. 439-235.000.

Stock, Don J. R.; and Eckert, Eberhard, to Licentia Patent-Verwaltungs GmbH. Radar camouflage material. 5,014,070, Cl. 343-700.0MS.

Stockwell, Henry J., to Clement Clarke International Limited. Applanation tonometers. 5,012,812, Cl. 128-652.000.

Stoll, Norbert, to Heidelberger Druckmaschinen AG. Apparatus to guide copy segments in the folder of rotary printing presses. 5,013,020, Cl. 270-49.000.

Stoltman, Donald D.: *See—*
Spakowski, Joseph G.; and Stoltman, Donald D., 5,013,930, Cl. 307-10.100.

Stoody, William R. Squeeze bottle with bag, dispensing system. 5,012,956, Cl. 222-94.000.

Stooss, Paul: *See—*
Blochle, Hans; and Stooss, Paul, 5,012,583, Cl. 30-392.000.

Stopa, James L., to Whelen Technologies, Inc. Power supply for intermittently operated loads. 5,013,973, Cl. 315-241.00R.

Storey, Gerald T. Locking license plate holder. 5,012,602, Cl. 40-201.000.

Strand, Jerome E.; Craighead, Lawrence W.; and Niven, Clarence A., to Minnesota Mining and Manufacturing Company. Biomedical electrode construction. 5,012,810, Cl. 128-640.000.

Strang, Harry: *See—*
Jelich, Klaus; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,013,351, Cl. 71-92.000.

Strauber, Hans-Jurgen; Niklas, Robert; Ohlendorf, Rolf; and Speier, Wolfgang, to Daimler-Benz AG. Device for the relative angular adjustment of a camshaft. 5,012,774, Cl. 123-90.170.

Strausberg, Robert L.; and Strausberg, Susan L., to Genex Corporation. Composite yeast vectors. 5,013,652, Cl. 435-69.200.

Strausberg, Susan L.: *See—*
Strausberg, Robert L.; and Strausberg, Susan L., 5,013,652, Cl. 435-69.200.

Strazar, Frank. Router guide. 5,013,195, Cl. 409-180.000.

Streck, Donald A.: *See—*
Iggulden, Jerry R.; and Streck, Donald A., 5,013,895, Cl. 235-110.000.

Street, Charles Z.: *See—*
Gojny, Francis J.; Greene, Guy S.; Stahl, Roswell L., Jr.; and Street, Charles Z., 5,013,613, Cl. 428-593.000.

Stricker, Max, to A.G. fur industrielle Elektronik. Labyrinth filter for dielectric of spark erosion systems. 5,013,882, Cl. 219-69.140.

VOL
1126
ISS
1
MY
7
1991
UMI

- Stridsberg, Lennart, to Mydata Automation AB. Movable tool head for mounting machines and a rotatable, axially movable shaft therefor. 5,012,874, Cl. 173-108.000.
- Striker, Mark W.: *See—*
  - Karklins, Elgin J.; Scroggie, Stephen J.; Tracht, Steven L.; and Striker, Mark W., 5,012,977, Cl. 239-284.100.
- Stringer, Ralph S.; and Green, Horace L., Jr., to Marco/Marvin Electric Manufacturing Co. Adaptor and mechanism for grounding a track light system. 5,013,251, Cl. 439-94.000.
- Stroede, Andrew J.: *See—*
  - Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 5,013,260, Cl. 439-535.000.
- Strohmaier, Karl G.: *See—*
  - Vaughan, David E. W.; and Strohmaier, Karl G., 5,013,536, Cl. 423-328.000.
- Stromecki, Eugene A.: *See—*
  - Blumberg, Lawrence R.; Coolbaugh, Douglas D.; Kurowski, John A.; and Stromecki, Eugene A., 5,013,395, Cl. 156-627.000.
- Stubbers, Ron; Chen, Chen; and Skolnick, Malcolm, to Zion Educational Foundation. Pulse generation, parameter determination, and modification system. 5,012,808, Cl. 128-419.00R.
- Stuck, Robert M., to Marshall Air Systems, Inc. Conveyorized cooking method. 5,013,563, Cl. 426-233.000.
- Studenny, John, to Canadian Marconi Company. Integrated altimeter and doppler velocity sensor arrangement. 5,014,063, Cl. 342-130.000.
- Stuerzebecher, Claus-Steffen: *See—*
  - Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Haberey, Martin; Schillinger, Ekkehard; and Town, Michael H., 5,013,758, Cl. 514-573.000.
- Stutz, William H., Jr., to Siemens-Pacesetter, Inc. Multi-part molded pacemaker connector and method of making same. 5,012,807, Cl. 128-419.00P.
- Styles, Delbert G.; and Styles, Keunja. Tissue dispenser. 5,013,099, Cl. 312-37.000.
- Styles, Keunja: *See—*
  - Styles, Delbert G.; and Styles, Keunja, 5,013,099, Cl. 312-37.000.
- Su, Jen-Sung. Impact screw driver. 5,012,709, Cl. 81-466.000.
- Su, Wei-Fang A., to Westinghouse Electric Corp. Ultraviolet curable conformal coatings. 5,013,631, Cl. 430-271.000.
- Su, Wei-Yang: *See—*
  - Speranza, George P.; and Su, Wei-Yang, 5,013,812, Cl. 528-60.000.
- Sublett, Bobby J.: *See—*
  - Trotter, Jimmy R.; and Sublett, Bobby J., 5,013,820, Cl. 528-272.000.
- Suda, Yukio: *See—*
  - Fujimoto, Naonobu; Suda, Yukio; and Miyaji, Katsutoshi, 5,014,271, Cl. 370-102.000.
- Sudamet, Ltd.: *See—*
  - Willard, David C., 5,013,499, Cl. 264-30.000.
- Suddath, Fred L.: *See—*
  - Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C.; Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., 5,013,531, Cl. 422-245.000.
- Suga, Seiji: *See—*
  - Akasaka, Akio; Suga, Seiji; Fukuda, Yasuo; and Sawada, Takanori, 5,012,773, Cl. 123-90.170.
- Sugasawa, Fukashi: *See—*
  - Yokote, Masatsugu; Sugasawa, Fukashi; Mouri, Hiroshi; and Kuroki, Junsuke, 5,012,881, Cl. 180-140.000.
- Sugawa, Masaru: *See—*
  - Murase, Shigemitsu; Kakumoto, Kouji; Miyazaki, Shouji; Sugawa, Masaru; and Ide, Mikio, 5,013,506, Cl. 264-210.800.
- Sugimoto, Kenichi: *See—*
  - Yoshikawa, Yukihiro; Yamazaki, Midori; Yamaguchi, Keizaburo; Sugimoto, Kenichi; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 5,013,848, Cl. 548-522.000.
- Sugimura, Kentaro; Hasimoto, Shoji; and Ono, Takayuki, to Dowa Mining Co., Ltd. Liquid suspension composition containing gallium particles and process for producing the same. 5,013,464, Cl. 252-26.000.
- Sugiura, Katsuhiko: *See—*
  - Miyoshi, Motoyuki; Kojima, Kazuhisa; Sugiura, Katsuhiko; and Iketani, Naomi, 5,013,606, Cl. 428-412.000.
- Suhr, Harald; Etspuler, Angelika; Feurer, Ernst; and Oehr, Christian, to Schering Aktiengesellschaft. Method of making a polymer-metal compound having a predetermined electrical conductivity by depositing on a substrate from a glow discharge zone. 5,013,581, Cl. 427-41.000.
- Sullivan, Mark; and Salz, Gilbert. External male catheter. 5,013,308, Cl. 604-349.000.
- Sullivan, Philip L.: *See—*
  - Spencer, George R.; Thompson, Bernard J.; Skinner, Malcolm E.; and Sullivan, Philip L., 5,014,064, Cl. 342-152.000.
- Sullivan, William P.: *See—*
  - Dody, Joseph W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 5,014,074, Cl. 346-107.00R.
- Sulzer Brothers Limited: *See—*
  - Griffith, John D., 5,012,844, Cl. 139-452.000.
- Sumitomo Chemical Company, Ltd.: *See—*
  - Hayashi, Yoshiaki; and Fujita, Taira, 5,013,712, Cl. 503-227.000.
  - Minai, Masayoshi; and Higashii, Takayuki, 5,013,479, Cl. 252-299.650.
- Sumitomo Electric Industries, Ltd.: *See—*
  - Fukuma, Masumi, 5,013,117, Cl. 350-96.150.
  - Hattori, Tomoyuki; Akasaka, Nobuhiro; and Yamanishi, Toru, 5,013,126, Cl. 350-96.230.
- Sumitomo Rubber Industries, Ltd.: *See—*
  - Fukumoto, Testuhiro; and Yamahira, Atsushi, 5,012,847, Cl. 152-209.00R.
- Summagraphics Corporation: *See—*
  - Murray, Wayne J., 5,014,044, Cl. 340-710.000.
- Sun, Donald J. C.; and Tai, Wen J., to Cipa Manufacturing Corporation. Golf driver with variable weighting for changing center of gravity. 5,013,041, Cl. 273-164.000.
- Sundermeier, Gunter: *See—*
  - Beneke, Ulrich; Gross, Jurgen; Oepping, Wilfried; Schnelle, Manfred; and Sundermeier, Gunter, 5,012,551, Cl. 16-49.000.
- Sundstrand Corporation: *See—*
  - Anderson, Kyle, 5,014,181, Cl. 363-126.000.
  - Bihlmaier, John A., 5,012,853, Cl. 164-75.000.
  - Dhyanchand, P. John, 5,013,929, Cl. 290-31.000.
  - Latos, Thomas S., 5,014,179, Cl. 363-56.000.
  - Mabe, William J., Jr., 5,013,949, Cl. 310-83.000.
  - Nuechterlein, Paul E., 5,014,177, Cl. 363-45.000.
  - Nuechterlein, Paul E., 5,014,180, Cl. 363-56.000.
  - Rashid, Abdul, 5,013,995, Cl. 322-25.000.
- Sundstrand Data Control, Inc.: *See—*
  - Chisholm, John P., 5,014,067, Cl. 342-407.000.
- Sure Power, Inc.: *See—*
  - Brune, Lyle R., 5,013,991, Cl. 320-15.000.
- Surer, Patrick. Device for fixation of part on a support, especially of an implant on a bone. 5,013,313, Cl. 606-60.000.
- Surgical Engineering Associates, Inc.: *See—*
  - Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., 5,013,298, Cl. 604-93.000.
- Surnamer, Andrew D.; and Tien, Chao-Fong, to Air Products and Chemicals, Inc. Membranes formed from rigid polyarylates. 5,013,332, Cl. 55-16.000.
- Surwillo, John M.: *See—*
  - Kling, Michael J.; Surwillo, John M.; Puetz, Peter A.; and Braun, Robert T., 5,014,227, Cl. 364-559.000.
- Sutherland, Joseph E.: *See—*
  - Tyrrell, Raymond E.; Briscoe, Milton R.; Sutherland, Joseph E.; and Tyrrell, Raymond E., 5,014,268, Cl. 370-68.000.
- Suto, Kenichiro: *See—*
  - Egashira, Noritaka; Suto, Kenichiro; and Muro, Atsushi, 5,013,711, Cl. 503-227.000.
- Suto, Shin-ichi: *See—*
  - Koshida, Yoshinori; Ayukai, Kemmi; and Suto, Shin-ichi, 5,013,911, Cl. 250-239.000.
- Suyama, Tetsuya: *See—*
  - Nakagawa, Takashi; and Suyama, Tetsuya, 5,013,220, Cl. 417-310.000.
- Suzuji, Naomichi: *See—*
  - Itoh, Kenichiroh; Yoshinuma, Nikio; Suzuji, Naomichi; Yamada, Takeshi; and Taya, Hiroyuki, 5,013,345, Cl. 65-4.200.
- Suzuki, Atsushi, to Fujitsu Limited. Semiconductor memory device. 5,014,240, Cl. 365-49.000.
- Suzuki, Eiichi: *See—*
  - Nakazawa, Shinzo; Tsukada, Taro; and Suzuki, Eiichi, 5,013,576, Cl. 426-640.000.
- Suzuki, Hirofumi: *See—*
  - Ikehata, Tsutomu; Yasunaga, Makoto; and Suzuki, Hirofumi, 5,013,169, Cl. 400-124.000.
- Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,012,697, Cl. 74-866.000.
- Suzuki, Masayuki: *See—*
  - Kobayashi, Nobuyoshi; Suzuki, Masayuki; Kondo, Seiichi; Matsui, Makoto; and Mukai, Kiichiro, 5,013,526, Cl. 420-430.000.
- Suzuki, Motoshi; Dalton, Howard; Richards, Anthony O.; and Stanley, Stephen H., to Idemitsu Kosan Company Limited. Method for regenerating deactivated microorganisms. 5,013,665, Cl. 435-244.000.
- Suzuki, Ryo: *See—*
  - Takeshita, Masatoshi; Sato, Toshihiro; Toyooka, Takashi; and Suzuki, Ryo, 5,014,239, Cl. 365-11.000.
- Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, to Nissin Shokuhin Kabushiki Kaisha. Self-heating container. 5,012,795, Cl. 126-262.000.
- Suzuki, Takaaki: *See—*
  - Murata, Kunihiko; Morii, Satoshi; Mitsui, Hiroyuki; Takemura, Toru; Iwasaki, Toshiaki; and Suzuki, Takaaki, 5,012,752, Cl. 112-121.120.
- Suzuki, Takashi; Yasuda, Tetsuo; Miyauchi, Otohiko; and Yotsuyanagi, Junji, to Showa Denko K.K. Method of manufacturing container covers. 5,013,516, Cl. 264-130.000.
- Suzuki, Toshio: *See—*
  - Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, 5,014,142, Cl. 360-98.010.
- Suzuki, Yasuo; and Takeguchi, Shunsuke, to Nippon Piston Ring Co., Ltd. Camshaft composition. 5,013,611, Cl. 428-552.000.
- Suzuki, Yoshihiro, to Izumi Industries, Ltd. Heat resisting member reinforced locally by an inorganic fiber and a productive method of the same. 5,013,610, Cl. 428-545.000.
- Suzuki, Yutaka: *See—*
  - Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.

- Suzuki, Yuzuru: *See—*
  - Fujita, Masahiko; Shishido, Yuuji; Suzuki, Yuzuru; and Okamoto, Masato, 5,012,571, Cl. 29-598.000.
- Swamikannu, A. Xavier, to Allied-Signal Inc. Process for the preparation of chlorine-resistant polyester semipermeable membranes. 5,013,448, Cl. 210-642.000.
- Swann, Rex. Adaptable modular fixturing system. 5,013,017, Cl. 269-88.000.
- Swedlow, Inc.: *See—*
  - Guest, Allen M.; Preus, Martin W.; and Lewis, William, 5,013,608, Cl. 428-436.000.
- Sweet, Frederick; and Rosik, Leonard O., to Erbamont, Inc. Anticancer drug - antibody conjugates and method for preparing same. 5,013,547, Cl. 424-85.910.
- Swenson, Donald A., to Science Applications International Corporation. Plane wave transformer linac structure. 5,014,014, Cl. 328-233.000.
- Swisher, Beth A.: *See—*
  - Markley, Lowell D.; Hamilton, Christopher T.; Swisher, Beth A.; and Secor, Jacob, 5,013,352, Cl. 71-94.000.
- Swope, Ronald L.: *See—*
  - Barron, Milagros C.; Swope, Ronald L.; and Wilkerson, John M., III, 5,013,787, Cl. 524-555.000.
- Sybron Chemicals, Inc.: *See—*
  - Loberg, Loren L., 5,012,976, Cl. 239-227.000.
- Sykora, Allan J.: *See—*
  - Aiello, Richard E.; Allgood, Christopher L.; Stillie, Donald G.; and Sykora, Allan J., 5,013,253, Cl. 439-235.000.
- Syntex (U.S.A.) Inc.: *See—*
  - Watts, Richard P.; Lee, Wylie I.; and Vorpahl, John W., 5,013,150, Cl. 356-73.000.
- Synthelabo: *See—*
  - Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, 5,013,835, Cl. 540-491.000.
- Szabolcsi, Tamas: *See—*
  - Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.
- Szczech, Gerald S.: *See—*
  - Parins, David J.; Szczech, Gerald S.; Nicoloff, Demitre M.; and Berhow, Steven W., 5,013,312, Cl. 606-37.000.
- Szekely, Istvan: *See—*
  - Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.
- Szentivanyi, Zsolt: *See—*
  - Thormer, Joachim; Rohde, Ernst; and Szentivanyi, Zsolt, 5,013,783, Cl. 524-450.000.
- TA TRIUMPH ADLER Aktiengesellschaft: *See—*
  - Haftmann, Johannes; and Schmeykal, Rudolf, 5,013,170, Cl. 400-659.000.
- Tabata, Yutaka: *See—*
  - Ito, Kunio; Konno, Takeshi; and Tabata, Yutaka, 5,012,633, Cl. 56-12.900.
- Taberlet, Eric: *See—*
  - Guittet, Dominique; Taberlet, Eric; and Vuillermoz, Jean-Francois, 5,013,227, Cl. 418-206.000.
- Tagai, Hideo: *See—*
  - Kobayashi, Masahiro; Tagai, Hideo; Kuroki, Yoshikatsu; Niwa, Shigeo; and Ono, Mikiya, 5,013,323, Cl. 623-16.000.
- Tagashira, Minoru: *See—*
  - Nakatani, Kazuo; Ikoma, Mitsuhiro; Yoshida, Yuji; Tomizawa, Takeshi; Arita, Koji; and Tagashira, Minoru, 5,012,651, Cl. 62-149.000.
- Tahara, Masaaki; Tomoda, Takakazu; Kitano, Kenzo; and Minato, Teruo, to Daidousanso Co., Ltd. Method of nitriding steel. 5,013,371, Cl. 148-16.600.
- Tai, Anna W., to Warner-Lambert Company. Taste masking compositions comprising spray dried microcapsules containing sucralfate and methods for preparing same. 5,013,557, Cl. 424-493.000.
- Tai, Wen J.: *See—*
  - Sun, Donald J. C.; and Tai, Wen J., 5,013,041, Cl. 273-164.000.
- Taira, Nobutaka: *See—*
  - Kobayashi, Akira; Taira, Nobutaka; and Ueda, Hideshi, 5,014,330, Cl. 382-30.000.
- Tajima, Akio; and Fujimoto, Ryoichi, to Seikosha Co., Ltd. Device for changing a passageway of paper. 5,013,028, Cl. 271-305.000.
- Tajima, Yoshio; Nomiyama, Kazutosi; Nishikitani, Yoshinori; Kuroda, Nobuyuki; and Matsuura, Kazuo, to Nippon Oil Company, Limited. Process for preparing ethylene polymers. 5,013,802, Cl. 526-86.000.
- Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, to Toyota Jidosha Kabushiki Kaisha. Hydraulic control device for automatic transmission for vehicle having clutch disengage control means independent of clutch engage control means. 5,012,700, Cl. 74-869.000.
- Takada, Naruaki, to NEC Corporation. Programmable read only memory (PROM) having circular shaped emitter regions. 5,014,243, Cl. 365-96.000.
- Takahashi, Akira: *See—*
  - Takemasa, Kaoru; Takahashi, Akira; Kawamura, Masahiko; Maruyama, Sigeo; and Kon, Tokushige, 5,014,258, Cl. 369-178.000.
- Takahashi, Hiroshi: *See—*
  - Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, 5,014,091, Cl. 355-321.000.
- Takahashi, Hitoshi: *See—*
  - Omura, Hideo; Maruyama, Nobusato; Shioya, Masatoshi; Ashikawa, Yoshiaki; Kinoshita, Kazunori; Matsumoto, Kozo; Miyano, Toshiyuki; and Takahashi, Hitoshi, 5,012,932, Cl. 209-534.000.
- Takahashi, Keizo; and Bando, Noboru, to Takatsuki Electric Mfg. Co., Ltd. Diaphragm-type air pump. 5,013,223, Cl. 417-413.000.
- Takahashi, Kenji: *See—*
  - Umemoto, Chiyuki; Nakamura, Takashi; Takahashi, Kenji; and Hosoi, Yuichi, 5,013,916, Cl. 250-327.200.
- Takahashi, Masao: *See—*
  - Ogawa, Masahide; Sato, Teiji; Takahashi, Masao; Kitsu, Toshio; Takahashi, Seikichi; and Ono, Kinichi, 5,013,603, Cl. 428-331.000.
- Takahashi, Mikio: *See—*
  - Nakanishi, Eiji; Suzuki, Toshio; Furusaki, Masato; Morita, Kiyoji; Sakurai, Hiroshi; Daito, Hiroshi; and Takahashi, Mikio, 5,014,142, Cl. 360-98.010.
- Takahashi, Seikichi: *See—*
  - Ogawa, Masahide; Sato, Teiji; Takahashi, Masao; Kitsu, Toshio; Takahashi, Seikichi; and Ono, Kinichi, 5,013,603, Cl. 428-331.000.
- Takahashi, Susumu: *See—*
  - Hasegawa, Akira; Takahashi, Susumu; Tsuji, Koyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, 5,014,121, Cl. 358-55.000.
- Takahashi, Tokuyuki: *See—*
  - Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,012,700, Cl. 74-869.000.
- Takahashi, Toshihiko: *See—*
  - Tanahashi, Yutaka; and Takahashi, Toshihiko, 5,014,257, Cl. 369-59.000.
- Takahashi, Tsuneo; Nishio, Tomoyuki; Ikegami, Masayuki; and Gunji, Takahiro, to Honda Giken Kogyo Kabushiki Kaisha. Gas rate sensor system. 5,012,676, Cl. 73-497.000.
- Takami, Hiroaki: *See—*
  - Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, 5,012,843, Cl. 139-224.00A.
- Takano, Yoshiya; and Hoshi, Yoshikazu, to Hitachi, Ltd. Method and apparatus for detecting a rotation angle. 5,012,673, Cl. 73-118.100.
- Takarabe, Yuji: *See—*
  - Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 5,014,083, Cl. 354-471.000.
- Takatsuka, Akio; Sasamoto, Asao; Moribe, Yoshihiro; Shiono, Toshio; Sogabe, Chikayuki; and Hosokawa, Haruhiko, to Hitachi, Ltd. Magnetic head mounting arm having asymmetrical configuration. 5,014,146, Cl. 360-106.000.
- Takatsuka, Akio: *See—*
  - Hosokawa, Haruhiko; Sasamoto, Asao; Amano, Hideaki; Shiono, Toshio; Takatsuka, Akio; Okamoto, Sigeru; Maeda, Munesige; and Sogabe, Chikayuki, 5,014,145, Cl. 360-104.000.
- Takatsuka, Hiromichi, to Nissan Motor Company, Limited. Electrical system for automotive vehicle. 5,013,994, Cl. 322-8.000.
- Takatsuki Electric Mfg. Co., Ltd.: *See—*
  - Takahashi, Keizo; and Bando, Noboru, 5,013,223, Cl. 417-413.000.
- Takayama, Ichiro: *See—*
  - Fukada, Takeshi; Codama, Mitsufumi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; and Takayama, Ichiro, 5,014,100, Cl. 357-30.000.
- Takayama, Kenichiro; and Matsunaga, Tomoko, to Kyowa Hakko Kogyo Co., Ltd. Process for producing orotic acid by fermentation. 5,013,656, Cl. 435-122.000.
- Takayama, Takeshi: *See—*
  - Arai, Fuminori; and Takayama, Takeshi, 5,013,527, Cl. 422-56.000.
- Take, Masafumi: *See—*
  - Nakamura, Nobutaka; Takeda, Haruo; and Take, Masafumi, 5,013,159, Cl. 374-12.000.
- Takeda Chemical Industries, Ltd.: *See—*
  - Iwahi, Tomoyuki; and Satoh, Hiroshi, 5,013,743, Cl. 514-338.000.
  - Kanamaru, Tsuneo; Hida, Tsuneaki; and Muroi, Masayuki, 5,013,757, Cl. 514-568.000.
- Takeda, Haruo: *See—*
  - Nakamura, Nobutaka; Takeda, Haruo; and Take, Masafumi, 5,013,159, Cl. 374-12.000.
- Takeguchi, Shunsuke: *See—*
  - Suzuki, Yasuo; and Takeguchi, Shunsuke, 5,013,611, Cl. 428-552.000.
- Takemasa, Kaoru; Takahashi, Akira; Kawamura, Masahiko; Maruyama, Sigeo; and Kon, Tokushige, to Pioneer Electronic Corp. Disc player having means for preventing disc magazine from being inserted upside. 5,014,258, Cl. 369-178.000.
- Takemura, Kazuya; Yoshino, Kenji; and Wakui, Tadahiro, to Kawasaki Steel Corporation. Modified polyarylate resin and composition comprising the same. 5,013,818, Cl. 528-193.000.
- Takemura, Toru: *See—*
  - Murata, Kunihiko; Morii, Satoshi; Mitsui, Hiroyuki; Takemura, Toru; Iwasaki, Toshiaki; and Suzuki, Takaaki, 5,012,752, Cl. 112-121.120.
- Takeshita, Masatoshi; Sato, Toshihiro; Toyooka, Takashi; and Suzuki, Ryo, to Hitachi, Ltd. Magnetic bubble generator using plural conductors with common current source. 5,014,239, Cl. 365-11.000.

VOL 1126 ISS 1 MY 7 1991 UMI

- Takeuchi, Akira: *See—*
  - Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,012,795, Cl. 126-262.000.
- Takeuchi, Hirosato; and Kazama, Yasuo, to Nitto Kohki Co., Ltd. Display element, display method and apparatus using said element. 5,014,047, Cl. 340-763.000.
- Takeuchi, Makoto: *See—*
  - Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi, 5,013,725, Cl. 514-99.000.
- Takeuchi, Shigeki: *See—*
  - Takizawa, Yoshio; Sigeta, Kunio; Takeuchi, Shigeki; Yoshioka, Hiroshi; and Fujimaki, Yoshihide, 5,013,625, Cl. 430-64.000.
- Takeuchi, Yoshinori: *See—*
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- Takeya, Fuminori: *See—*
  - Matsuzawa, Soichiro; and Takeya, Fuminori, 5,012,572, Cl. 29-603.000.
- Taki, Osamu. Multi-shaft auger apparatus and process for fixation of soils containing toxic wastes. 5,013,185, Cl. 405-128.000.
- Takita, Masatoshi: *See—*
  - Shimizu, Takaaki; Ogihara, Tsutomu; and Takita, Masatoshi, 5,013,585, Cl. 427-220.000.
- Takizawa, Yoshio; Sigeta, Kunio; Takeuchi, Shigeki; Yoshioka, Hiroshi; and Fujimaki, Yoshihide, to Konica Corporation. Photoreceptor. 5,013,625, Cl. 430-64.000.
- Taller, Robert A.: *See—*
  - Solomon, Donald D.; Taller, Robert A.; and Williamitis, Victor A., 5,013,717, Cl. 514-56.000.
- Tamai, Shoji: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
- Tamari, Yehuda; and Meyers, Michael B. Constant pressure infusion device. 5,013,303, Cl. 604-140.000.
- Tamitani, Ichiro, to NEC Corporation. Processor array comprising processors connected selectively in series or in parallel. 5,014,189, Cl. 364-200.000.
- Tamura, Yasuji, to Sanden Corporation. Heat sink for a control device in an automobile air conditioning system. 5,012,656, Cl. 62-498.000.
- Tanabe Seiyaku Co., Ltd.: *See—*
  - Hayashi, Kimiaki; and Kubota, Hitoshi, 5,013,845, Cl. 548-320.000.
- Tanabe, Yoshimitsu: *See—*
  - Yoshikawa, Yukihiro; Yamazaki, Midori; Yamaguchi, Keizaburo; Sugimoto, Kenichi; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 5,013,848, Cl. 548-522.000.
- Tanahashi, Yutaka; and Takahashi, Toshihiko, to NEC Corporation. Optical readout circuit for producing waveforms having sharp edges. 5,014,257, Cl. 369-59.000.
- Tanaka, Kihachiro: *See—*
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- Tanaka, Koji, to Japan Exlan Company Limited. Soil conditioner and method of producing the same. 5,013,349, Cl. 71-27.000.
- Tanaka, Nobuhiko: *See—*
  - Morichika, Toshiaki; Tani, Toshio; Tanaka, Nobuhiko; and Kadowaki, Tatsuhiko, 5,013,616, Cl. 428-694.000.
- Tanaka, Tatsuo, to Kabushiki Kaisha Toshiba. Amplifier circuit operable at low power source voltage. 5,014,019, Cl. 330-257.000.
- Tanaka, Teruhiko, to Kabushiki Kaisha Daikin Seisakusho. Double wrap brake band and its manufacturing method. 5,012,905, Cl. 188-250.00H.
- Tanaka, Toshimitsu: *See—*
  - Oda, Hiroyuki; Tanaka, Toshimitsu; Yamagata, Naoyuki; and Hashimoto, Kazuhiko, 5,012,771, Cl. 123-52.0MB.
- Tanaka, Toshinori: *See—*
  - Morishita, Akira; Isozumi, Shuzoo; and Tanaka, Toshinori, 5,012,686, Cl. 74-7.00A.
- Tanaka, Yoshihiro: *See—*
  - Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, 5,014,078, Cl. 354-195.100.
- Tanaka, Yoshinobu; Iwama, Yoshiro; Honkura, Yoshinobu; Arai, Kazuo; and Watarai, Aki, to Aichi Steel Works, Limited. Denture attachment. 5,013,243, Cl. 433-189.000.
- Tandon Corporation: *See—*
  - Masters, John R.; and Briscoe, Dennis R., 5,014,237, Cl. 364-900.000.
- Tandy Corporation: *See—*
  - Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,014,259, Cl. 369-284.000.
- Tani, Toshio: *See—*
  - Morichika, Toshiaki; Tani, Toshio; Tanaka, Nobuhiko; and Kadowaki, Tatsuhiko, 5,013,616, Cl. 428-694.000.
- Taniguchi, Osamu: *See—*
  - Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, 5,013,137, Cl. 350-333.000.
- Tanikawa, Hirohide: *See—*
  - Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 5,014,089, Cl. 355-251.000.
- Tanimori, Masayuki, to Dainippon Screen Mfg. Co., Ltd. Method of filling inner region of a graphic with traces of imaging spot. 5,014,223, Cl. 364-521.000.
- Tanimoto, Shigemi; and Eguchi, Yoshiaki, to Showa Aluminum Corporation. Device for releasing and diffusing bubbles into liquid. 5,013,490, Cl. 261-87.000.
- Tarlow, Kenneth A. Self stirring vessel. 5,013,158, Cl. 366-251.000.
- Tarver, Charles W. Medical restraint apparatus. 5,012,821, Cl. 128-876.000.
- Taslim, Mohammad E.; and Levendis, Yiannis A., to Northeastern University. Rotating diesel particulate trap. 5,013,340, Cl. 55-290.000.
- Tateno, Izuru, to Nippon Carbide Kogyo Kabushiki kaisha. Flame retardant rigid or flexible chlorine-containing resin composition. 5,013,782, Cl. 524-417.000.
- Tatsumi, Takumi: *See—*
  - Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,012,697, Cl. 74-866.000.
- Tattermusch, Peter, to Deutsche Forschungsanstalt fur Luft- und Raumfahrt e.V. Device for heating up a flow of gas. 5,014,339, Cl. 392-491.000.
- Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor G.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M. Apparatus for hot gas spray deposition of coatings on products in the form of bodies of revolution. 5,012,759, Cl. 118-320.000.
- Tavernier, Serge M.: *See—*
  - Kok, Piet; Vanmaele, Luc J.; Tavernier, Serge M.; and De Deyne, Hedwig E., 5,013,628, Cl. 430-110.000.
- Tawashi, Rashad: *See—*
  - Samir Amer, Moh.; and Tawashi, Rashad, 5,013,552, Cl. 424-408.000.
- Taya, Hiroyuki: *See—*
  - Itoh, Kenichiroh; Yoshinuma, Nikio; Suzuji, Naomichi; Yamada, Takeshi; and Taya, Hiroyuki, 5,013,345, Cl. 65-4.200.
- Taya, Shiro, to Kurita Water Industries, Ltd. Boiler chemicals and method of preventing corrosion of boilers. 5,013,481, Cl. 252-389.230.
- Taylor, Duane F., to Taylor, Janet R. Methods of interlocking panels and panel structures useful therein. 5,012,623, Cl. 52-531.000.
- Taylor, Edward C.; Schrader, Thomas H.; and Walensky, Loren D., to Princeton University, The Trustees of. L-glutamic acid derivatives. 5,013,738, Cl. 514-272.000.
- Taylor, James L.: *See—*
  - Mosby, James F.; Peck, Lawrence B.; Taylor, James L.; and Beaton, William I., 5,013,427, Cl. 208-211.000.
- Taylor, Janet R.: *See—*
  - Taylor, Duane F., 5,012,623, Cl. 52-531.000.
- Taylor, John D., to Thor Hammer Company Limited. Split head hammers. 5,012,702, Cl. 81-25.000.
- Taylor, Julian S. Fluid pressure flare relief valve. 5,012,834, Cl. 137-70.000.
- Technic Tool Corporation: *See—*
  - Keller, Harold A., 5,013,282, Cl. 464-172.000.
- Technology Research International: *See—*
  - Ghose, Rabindra N., 5,014,061, Cl. 342-45.000.
- Teco Systems Oy: *See—*
  - Vanninmaja, Pekka; and Jakobsson, Rainer, 5,013,057, Cl. 280-426.000.
- Tecumseh Products Company: *See—*
  - Richardson, Hubert, Jr., 5,013,225, Cl. 418-1.000.
- Teijin Chemicals, Ltd.: *See—*
  - Ishihata, Kouji; Hironaka, Y[illegible]chi; Shimizu, Hisanaga; Kitamura, Kazuo; and Imagawa, Takeshi, 5,013,776, Cl. 524-118.000.
- Teijin Limited: *See—*
  - Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, 5,013,956, Cl. 310-323.000.
  - Yamaura, Michio; Yatabe, Toshiaki; and Matsuzawa, Hiroshi, 5,013,583, Cl. 427-131.000.
- Teikoku Piston Ring Co., Ltd.: *See—*
  - Masumoto, Tsuyoshi; Inoue, Akihisa; Oguchi, Masahiro; and Harakawa, Yoshio, 5,013,346, Cl. 65-21.200.
- Teknion Furniture Systems Inc.: *See—*
  - Hellwig, John, 5,013,112, Cl. 350-96.100.
- Tektronix, Inc.: *See—*
  - Bateman, Glenn, 5,013,907, Cl. 250-227.120.
  - Hawkins, R. Thomas, II, 5,014,015, Cl. 330-4.300.
  - Seckora, Michael C., 5,014,059, Cl. 341-172.000.
- Teldix GmbH: *See—*
  - Sindlinger, Rainer; and Kocks, Peter, 5,014,205, Cl. 364-449.000.
- Telefonaktiebolaget L M Ericsson: *See—*
  - Andre , Tore M., 5,014,232, Cl. 364-724.190.
  - Wanjura, Franz E. G., 5,014,026, Cl. 333-185.000.
  - Wicklund, Rolf G., 5,014,260, Cl. 370-13.000.
- Telemecanique: *See—*
  - Moreau, Dominique, 5,014,157, Cl. 361-187.000.
- Tennant Company: *See—*
  - Beaufoy, Jeffrey J.; Aigner, Robert C.; and Burke, Steven A., 5,013,333, Cl. 55-21.000.
- Tenneco Canada Inc.: *See—*
  - McGregor, Colin R., 5,013,530, Cl. 422-278.000.
- Tennessee Gas Pipeline Company: *See—*
  - Macaluso, Howard C., 5,012,891, Cl. 181-282.000.

- Teramoto, Yoshikichi: *See—*
  - Mizuno, Toshiya; Teramoto, Yoshikichi; Wakabayashi, Juichi; and Saito, Takeshi, 5,013,823, Cl. 528-388.000.
- Teshirogi, Takuma, to Polyplastics Co., Ltd. Polyamic acid or polyimide. 5,013,840, Cl. 544;357-.
- Tetreault, Roland J.: *See—*
  - Fariss, Robert H.; and Tetreault, Roland J., 5,013,779, Cl. 524-314.000.
  - Fariss, Robert H.; and Tetreault, Roland J., 5,013,780, Cl. 524-314.000.
- Tetschlag, Richard R.: *See—*
  - Finkelstein, Leo; Dumesnil, Maurice E.; and Tetschlag, Richard R., 5,013,360, Cl. 106-1.230.
- Tetzlaff, Heribert: *See—*
  - Mildenberger, Hilmar; Lachhein, Stephen; Rittner, Siegbert; and Tetzlaff, Heribert, 5,013,444, Cl. 210-634.000.
- Texaco Chemical Company: *See—*
  - Speranza, George P.; and Su, Wei-Yang, 5,013,812, Cl. 528-60.000.
  - Zimmerman, Robert L.; and Primeaux, Dudley J., II, 5,013,813, Cl. 528-60.000.
- Texaco Inc.: *See—*
  - Benfaremo, Nicholas, 5,013,468, Cl. 252-47.500.
  - Benfaremo, Nicolas, 5,013,470, Cl. 252-47.500.
  - DeRosa, Thomas F.; Nalesnik, Theodore E.; and Kaufman, Benjamin J., 5,013,469, Cl. 252-47.500.
  - Harrison, Jeffrey B.; and Yang, Chau-Hwa, 5,013,764, Cl. 518-714.000.
  - Helms, David A.; Durrett, Michael G.; and Hatton, Gregory J., 5,014,010, Cl. 324-640.000.
- Texas Instrument Incorporated: *See—*
  - Birleson, Stanley V., 5,013,979, Cl. 342-375.000.
- Texas Instruments Incorporated: *See—*
  - Gelsomini, Tito, 5,014,112, Cl. 357-70.000.
  - Havemann, Robert H., 5,013,671, Cl. 437-31.000.
  - Knepprath, Vernon E.; and Levine, Jules D., 5,012,619, Cl. 51-163.100.
  - McElroy, David J., 5,014,099, Cl. 357-23.600.
  - Plumton, Donald L.; Tran, Liem T.; and Shih, Hung-Dah, 5,013,682, Cl. 437-89.000.
- Thames Pharmacal Co., Inc.: *See—*
  - Blackman, Steven; and Ralske, Irene, 5,013,545, Cl. 424-81.000.
- Tharp, Charles E., to Environmental Dynamics, Inc. Staggered diffuser arrangement for waste water treatment systems. 5,013,493, Cl. 261-122.000.
- Thatcher, David A., to General Motors Corporation. Vehicle traction control system. 5,014,202, Cl. 364-426.030.
- Therma-Tron-X, Inc.: *See—*
  - Acker, John N.; and Andreae, Bradley M., 5,012,918, Cl. 198-465.400.
- Thermadyne, Inc.: *See—*
  - Ruff, John D., 5,013,344, Cl. 62-532.000.
- Thesing, Richard A.; and Nichols, Walter A., to Philip Morris Incorporated. Flavored cigarette filters, and methods and apparatus for making same. 5,012,829, Cl. 131-344.000.
- Thigpen Lewis: *See—*
  - Feltz, Louis V.; Reece, Eric W.; Young, Clarence W.; and Thigpen Lewis, 5,014,248, Cl. 367-4.000.
- THK Co., Ltd.: *See—*
  - Hoshide, Kaoru, 5,012,687, Cl. 74-89.150.
- Thomas, Melvin L.: *See—*
  - Garland, John R.; and Thomas, Melvin L., 5,012,601, Cl. 40-152.000.
- Thomasson, Robert. Shoe sole with twist flex feature. 5,012,597, Cl. 36-59.00C.
- Thompson, Bernard J.: *See—*
  - Spencer, George R.; Thompson, Bernard J.; Skinner, Malcolm E.; and Sullivan, Philip L., 5,014,064, Cl. 342-152.000.
- Thompson, Dorman N.: *See—*
  - Hunder, Ray A.; Miles, Alden R.; Dwyer, Stephen H.; and Thompson, Dorman N., 5,013,200, Cl. 412-6.000.
- Thompson, Neil E. S.; and Asperger, Robert G., to Petrolite Corporation. Methods for treating hydrocarbon recovery operations and industrial waters. 5,013,451, Cl. 210-708.000.
- Thomson Consumer Electronics, Inc.: *See—*
  - Stephens, Joseph C.; and Rodriguez-Cavazos, Enrique, 5,013,980, Cl. 315-411.000.
- Thomson-CSF: *See—*
  - Andrieu, Jean-Pierre; Henri, Jean-Claude; and Gault, Dominique, 5,014,065, Cl. 342-165.000.
  - Meunier, Paul-Louis; Mackowski, Jean-Marie; and Rolland, Jean-Luc, 5,013,580, Cl. 427-39.000.
  - Michoud, Vincent; and Beigbeder, Gerard, 5,014,042, Cl. 340-583.000.
- Thor Hammer Company Limited: *See—*
  - Taylor, John D., 5,012,702, Cl. 81-25.000.
- Thorman, Christopher S.: *See—*
  - Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., 5,012,632, Cl. 56-11.600.
- Thormer, Joachim; Rohde, Ernst; and Szentivanyi, Zsolt, to Bayer Aktiengesellschaft. Heat-stable rubber compositions based on hydrogenated nitrile rubber. 5,013,783, Cl. 524-450.000.
- Thornburgh, Scott: *See—*
  - Smith, Roger E.; Thornburgh, Scott; and Rodriquez-Kabana, Rodrigo, 5,013,762, Cl. 514-740.000.
- Thornthwaite, John B.; and Naismith, Robert, to Games Workshop Limited. Injection moulding apparatus. 5,013,228, Cl. 425-2.000.
- Thornton, Michael G.; and Clark, Benton C., III. Portable x-ray fluorescence spectrometer for environmental monitoring of inorganic pollutants. 5,014,287, Cl. 378-45.000.
- Thru-The-Wall Corporation: *See—*
  - Harman, Robert R.; and Joslyn, Bruce. C., 5,013,897, Cl. 235-381.000.
- Tibbitts, Theodore W.: *See—*
  - Ignatius, Ronald W.; Martin, Todd S.; Bula, Raymond J.; Morrow, Robert C.; and Tibbitts, Theodore W., 5,012,609, Cl. 47-58.000.
- Tidman, Derek A., to GT-Devices. Plasma projectile accelerator with valve means for preventing the backward flow of plasma in passage through which projectile is accelerated. 5,012,720, Cl. 89-8.000.
- Tidman, Derek A.: *See—*
  - Goldstein, Yeshayahu S. A.; Tidman, Derek A.; and Fleischer, David, 5,012,719, Cl. 89-8.000.
- Tien, Chao-Fong: *See—*
  - Surnamer, Andrew D.; and Tien, Chao-Fong, 5,013,332, Cl. 55-16.000.
- Tilly, Bodo; and Rieger, Robert, to Messerschmitt-Boelkow-Blohm GmbH. Method and device for mounting a laser diode and a light conductor. 5,013,111, Cl. 350-96.200.
- Timm, Robert, to Dresher, Incorporated. Platform bed frame. 5,012,538, Cl. 5-200.100.
- Tirone, George F., to Mead Corporation, The. Apparatus for forming images on plain paper. 5,014,084, Cl. 355-27.000.
- Tobi Col, Ltd.: *See—*
  - Murayama, Yoichi; and Nomachi, Tetsuya, 5,013,416, Cl. 204-192.100.
- Tobler & Co. AG, Chemische Fabrik: *See—*
  - Kunzler, Peter, 5,012,758, Cl. 118-264.000.
- Toda, Hitoshi: *See—*
  - Yasuda, Mamoru; and Toda, Hitoshi, 5,014,322, Cl. 381-174.000.
- Toda, Kuniaki: *See—*
  - Mori, Kyoichi; Toda, Kuniaki; Iizuka, Nobuyuki; Hongo, Tsutomu; and Nakadai, Tsutomu, 5,014,143, Cl. 360-99.120.
- Toda, Masakazu: *See—*
  - Tsukuda, Kazunori; Toda, Masakazu; Saito, Masami; and Tsumadori, Masaki, 5,013,485, Cl. 252-551.000.
- Todd, Robert J.: *See—*
  - Buckberg, Gerald D.; and Todd, Robert J., 5,013,296, Cl. 604-44.000.
- Toivonen, Peter: *See—*
  - Vidaver, William; Toivonen, Peter; and Dube, Sylvain, 5,014,225, Cl. 364-550.000.
- Tokai Kogyo Kabushiki Kaisha: *See—*
  - Yada, Yukihiko; and Hirose, Toshio, 5,013,083, Cl. 296-213.000.
- Tokai Rubber Industries, Ltd.: *See—*
  - Noba, Kunihiro; Sakuraba, Yukio; and Urano, Katsuyoshi, 5,013,495, Cl. 264-1.500.
- Tokuda, Shoji, to Mazda Motor Corporation. Engine control system. 5,012,782, Cl. 123-425.000.
- Tokyo Tanabe Company, Limited: *See—*
  - Nakazawa, Shinzo; Tsukada, Taro; and Suzuki, Eiichi, 5,013,576, Cl. 426-640.000.
- Tomaszewski, Joseph. Card game. 5,013,049, Cl. 273-292.000.
- Tomizawa, Takeshi: *See—*
  - Nakatani, Kazuo; Ikoma, Mitsuhiro; Yoshida, Yuji; Tomizawa, Takeshi; Arita, Koji; and Tagashira, Minoru, 5,012,651, Cl. 62-149.000.
- Tomoda, Takakazu: *See—*
  - Tahara, Masaaki; Tomoda, Takakazu; Kitano, Kenzo; and Minato, Teruo, 5,013,371, Cl. 148-16.600.
- Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., to Datapoint Corporation. Video conferencing network. 5,014,267, Cl. 370-62.000.
- Tondreault, Robert J., to Robinson Nugent, Inc. Edge card connector having preloaded contacts. 5,013,264, Cl. 439-636.000.
- Tonen Sekiyukagaku: *See—*
  - Sakuma, Masato; Fujita, Yuji; Kitano, Kissho; Yagi, Yukihiko; Sakaizawa, Masao; and Yamamoto, Noburo, 5,013,789, Cl. 525-66.000.
- Topp, Michael: *See—*
  - Kreibich, Ralf; and Topp, Michael, 5,014,004, Cl. 324-158.00P.
- Torikata, Akio: *See—*
  - Haneishi, Tatsuo; Okazaki, Takao; Torikata, Akio; and Nakajima, Mutsuo, 5,013,550, Cl. 424-117.000.
- Torrielli, Vittorino: *See—*
  - Maggioni, Virginio; and Torrielli, Vittorino, 5,012,647, Cl. 60-413.000.
- Toshiba Kikai Kabushiki Kaisha: *See—*
  - Fujita, Shigeru; Kanno, Hiroshi; and Kamiyama, Takashi, 5,013,231, Cl. 425-145.000.
- Toshiba Silicone Co., Ltd.: *See—*
  - Shimizu, Chiyuki; and Yoshida, Tamio, 5,013,807, Cl. 528-17.000.
- Toshikatsu Omachi: *See—*
  - Omachi, Toshikatsu, 5,013,184, Cl. 405-85.000.
- Toshimitsu, Hiroyuki: *See—*
  - Shikamori, Tamotsu; Toshimitsu, Hiroyuki; Ohsugi, Hiroshi; Hiyama, Isao; and Fukuzawa, Soichi, 5,012,658, Cl. 68-12.010.
- Tosoh Corporation: *See—*
  - Gohzu, Shunichi; Horie, Misao; and Inouye, Kuniyo, 5,013,445, Cl. 210-635.000.
- Towing Technologies, Inc.: *See—*
  - DeMichele, Mardon; and Patout, Jules G., 5,013,209, Cl. 414-563.000.

VOL
1126
ISS
1
MY
7
1991
UMI

- Town, Michael H.: *See—*
  - Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Haberey, Martin; Schillinger, Ekkehard; and Town, Michael H., 5,013,758, Cl. 514-573.000.
- Town, Michael-Harold; Siedel, Joachim; and Ziegenhorn, Joachim, to Boehringer Mannheim GmbH. Removal of interfering reducing substances with tetrazolium salts in redox measurement reactions. 5,013,647, Cl. 435-25.000.
- Toyoda Koki Kabushiki Kaisha: *See—*
  - Kobayashi, Katsuyuki; Inui, Masaki; Ashida, Satoshi; Nakamura, Keiichi; and Yamamoto, Masaji, 5,012,908, Cl. 192-57.000.
- Toyofuku, Toshihiro: *See—*
  - Makino, Katsuaki; and Toyofuku, Toshihiro, 5,012,737, Cl. 101-350.000.
- Toyooka, Takashi: *See—*
  - Takeshita, Masatoshi; Sato, Toshihiro; Toyooka, Takashi; and Suzuki, Ryo, 5,014,239, Cl. 365-11.000.
- Toyota Jidosha Kabushiki Kaisha: *See—*
  - Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.
  - Kobayashi, Katsuyuki; Inui, Masaki; Ashida, Satoshi; Nakamura, Keiichi; and Yamamoto, Masaji, 5,012,908, Cl. 192-57.000.
  - Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,012,700, Cl. 74-869.000.
- TP Orthodontics Inc.: *See—*
  - Kesling, Christopher K., 5,013,239, Cl. 433-6.000.
- Tracht, Steven L.: *See—*
  - Karklins, Elgin J.; Scroggie, Stephen J.; Tracht, Steven L.; and Striker, Mark W., 5,012,977, Cl. 239-284.100.
- Tractel S. A.: *See—*
  - Castagnoli, Claude, 5,012,680, Cl. 73-862.390.
- Tran, Liem T.: *See—*
  - Plumton, Donald L.; Tran, Liem T.; and Shih, Hung-Dah, 5,013,682, Cl. 437-89.000.
- Transgenic Sciences, Inc.: *See—*
  - Woiszwillo, James E., 5,013,646, Cl. 435-7.920.
- Transtream, Inc.: *See—*
  - Rodgers, Donald E.; Chen, Jacob Y.; and Padhi, Prafulla K., 5,014,306, Cl. 379-407.000.
- Trapp, Hans-Juergen; and Buerger, Reinhard, to Trapp, Hans-Juergen. Apparatus for storing piece goods. 5,012,919, Cl. 198-474.100.
- Travalee, Lucy M. Emissions control system for use in conjunction with an ic engine primary emissions control system. 5,012,641, Cl. 60-297.000.
- Tremaine, David K. Fingerprinting system. 5,013,071, Cl. 283-69.000.
- Tremco, Inc.: *See—*
  - Lafond, Luc, 5,013,377, Cl. 156-109.000.
- Trimmer, Johnny L.; Caskey, Terrence L.; and Jorgensen, Janine L., to Dow Chemical Company, The. Hollow fiber membrane fluid separation device adapted for boreside feed which contains multiple concentric stages. 5,013,437, Cl. 210-321.780.
- Triscari, Joseph: *See—*
  - Danho, Waleed; Madison, Vincent S.; and Triscari, Joseph, 5,013,722, Cl. 514-16.000.
- Troester, Guenther, to Troester, Guenther. Method for producing elastomer skins as lining material for plastic molded articles such as automobile dashboards. 5,013,508, Cl. 264-224.000.
- Trotter, Jimmy R.; and Sublett, Bobby J., to Eastman Kodak Company. Preparation of poly(ethlene-2,6-naphthalene dicarboxylate) from dimethyl-2,6-naphthalene dicarboxylate and methyl hydrogen 2,6-naphthalene dicarboxylate. 5,013,820, Cl. 528-272.000.
- Trout, Matt F.: *See—*
  - Koller, Glenn R.; and Trout, Matt F., 5,012,675, Cl. 73-432.100.
- Truax, Maxine L.: *See—*
  - Tubesing, David R.; and Truax, Maxine L., 5,013,763, Cl. 514-772.000.
- Trube & Kings KG: *See—*
  - Breithaupt, Albert, 5,013,869, Cl. 174-35.0MS.
- Trudell Medical: *See—*
  - Foley, Martin P.; and Cruz, Exequiel D., 5,012,803, Cl. 128-200.230.
  - Foley, Martin P.; and Cruz, Exequiel D., 5,012,804, Cl. 128-200.230.
- Tseng, Jeow N. Christmas tree light with separation wedge. 5,013,960, Cl. 313-318.000.
- Tseng, Shin S.; Epstein, Joseph W.; and Levin, Jeremy I., to American Cyanamid Company. 2,4,8-Trisubstituted-3H,6H-1,4,5A,8A-tetraazaacenaphtylene-3,5-(4H)-diones and 2,4-8-trisubstituted-4,5-dihydro-5-thioxo-3H,6H-1,4,5A,8A-tetrazaacenaphthylen-3-ones. 5,013,737, Cl. 514-267.000.
- Tsikos, Constantine J.; and Rosenfeld, Jerome P., to General Electric Company. Object location apparatus. 5,013,927, Cl. 250-561.000.
- Tsubota, Kazuichi: *See—*
  - Hamada, Kaneaki; Tsubota, Kazuichi; and Muraoka, Tomoki, 5,013,525, Cl. 420-104.000.
- Tsuboyama, Akira; Inaba, Yutaka; Kitayama, Hiroyuki; Okada, Shinjiro; Taniguchi, Osamu; Kawagishi, Hideyuki; and Hanyu, Yukio, to Canon Kabushiki Kaisha. Ferroelectric liquid crystal device having increased tilt angle. 5,013,137, Cl. 350-333.000.
- Tsuchida, Hisashi: *See—*
  - Ogawa, Masahide; Sato, Teiji; Abe, Kiyoshi; Tsuchida, Hisashi; Inoue, Hiroo; and Saito, Mitsuo, 5,013,709, Cl. 503-225.000.
- Tsuda, Toshio; Horio, Yasuhiko; Bessho, Yoshihiro; and Ishida, Toru, to Matsushita Electric Industrial Co., Ltd. Electrical contact bump and a package provided with the same. 5,014,111, Cl. 357-68.000.
- Tsuji, Koyoshi: *See—*
  - Hasegawa, Akira; Takahashi, Susumu; Tsuji, Koyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, 5,014,121, Cl. 358-55.000.
- Tsukada, Kazuya, to Konica Corporation. Silver halide photographic light-sensitive material. 5,013,637, Cl. 430-527.000.
- Tsukada, Taro: *See—*
  - Nakazawa, Shinzo; Tsukada, Taro; and Suzuki, Eiichi, 5,013,576, Cl. 426-640.000.
- Tsukada, Toru, to Nippon Seiko Kabushiki Kaisha. Constant pressure preload linear guide bearing apparatus. 5,013,164, Cl. 384-45.000.
- Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, to Jidosha Denki Kogyo K.K. Automatic car-speed controller with detection of abnormality of the electromagnetic clutch. 5,014,201, Cl. 364-426.040.
- Tsukakoshi, Hiroshi, to Yamaha Hatsudoki Kabushiki Kaisha. Printed circuit board and method of preparing same. 5,013,397, Cl. 156-631.000.
- Tsukakoshi, Motowo: *See—*
  - Kasuya, Takahiro; Ikawa, Yoji; Tsukakoshi, Motowo; and Kurata, Shunichi, 5,013,660, Cl. 435-173.000.
- Tsukuda, Kazunori; Toda, Masakazu; Saito, Masami; and Tsumadori, Masaki, to Kao Corporation. Liquid detergent composition containing terpene and calcium or magnesium salts. 5,013,485, Cl. 252-551.000.
- Tsumadori, Masaki: *See—*
  - Tsukuda, Kazunori; Toda, Masakazu; Saito, Masami; and Tsumadori, Masaki, 5,013,485, Cl. 252-551.000.
- Tsunoda, Koichi: *See—*
  - Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, 5,014,091, Cl. 355-321.000.
- Tsushima, Takuya: *See—*
  - Higurashi, Seiji; and Tsushima, Takuya, 5,014,274, Cl. 371-40.100.
- Tsutsumi, Yasuhiro: *See—*
  - Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.
- Tsuzuki, Sadachika: *See—*
  - Kamimura, Kenji; and Tsuzuki, Sadachika, 5,014,204, Cl. 364-449.000.
- Tsymberov, Anatoly, to Hunter Engineering Company. Control system for vehicle lift racks. 5,012,898, Cl. 187-8.470.
- Tubesing, David R.; and Truax, Maxine L., to Andrew Jergens Company, The. Wash-off-resistant skin preparation. 5,013,763, Cl. 514-772.000.
- Tuburaya, Yoshitane: *See—*
  - Mizumura, Tetsuo; Ichijo, Minoru; Nakao, Ken-ichirou; Matsushima, Seiichi; and Tuburaya, Yoshitane, 5,013,594, Cl. 428-64.000.
- Tuckey, Charles H., to Walbro Corporation. Rotary fuel pump with pulse modulation. 5,013,221, Cl. 417-365.000.
- Tull, Thomas W., to Henkel Corporation. Water soluble salt precoats for wire drawing. 5,012,662, Cl. 72-42.000.
- Tuminaro, Raymond D.: *See—*
  - Atkins, Robert M.; Peterson, George E.; and Tuminaro, Raymond D., 5,013,130, Cl. 350-96.300.
- Tumpey, John J.; and Becker, Richard J., to Allied-Signal Inc. High power rotating rectifier assembly. 5,013,948, Cl. 310-68.00D.
- Tung, Lu H.; and Randazzo, Joseph J., to Dow Chemical Company, The. Polymer blends of tapered styrene-butadiene triblock thermoplastic elastomers. 5,013,790, Cl. 525-99.000.
- Turck, Gunter: *See—*
  - Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,013,504, Cl. 264-130.000.
- Turner, J. Clark. Wind blocking screen. 5,012,832, Cl. 135-87.000.
- Turner, James B.; and McInnis, Roderick J., to Greyhawk Systems, Inc. Projected image linewidth correction apparatus and method. 5,014,326, Cl. 382-8.000.
- Turner, James R.; Hosking, Stephen G.; and Livingston, James W., to Diversey Corporation. Microprocessor controlled liquid chemical delivery system and method. 5,014,211, Cl. 364-478.000.
- Turner, Roy G. Game. 5,013,048, Cl. 273-242.000.
- Turner, S. Richard: *See—*
  - Blevins, Richard W.; and Turner, S. Richard, 5,013,806, Cl. 526-271.000.
- Turner, Winnie M.; Sawyer, Elmer E.; and Sawyer, Marie. Card holding device for use with shopping carts. 5,012,966, Cl. 224-277.000.
- Twellmann, Guenter, to Ninkaplast GmbH. Plinth drawer. 5,013,106, Cl. 312-330.100.
- Tyrrell, Raymond E.; Briscoe, Milton R.; Sutherland, Joseph E.; and Tyrrell, Raymond E,, to Alcatel NA, Inc. Parallel time slot interchanger matrix and switch block module for use therewith. 5,014,268, Cl. 370-68.000.
- Tyrrell, Raymond E.: *See—*
  - Tyrrell, Raymond E.; Briscoe, Milton R.; Sutherland, Joseph E.; and Tyrrell, Raymond E., 5,014,268, Cl. 370-68.000.
- Uchida, Katsuhiro: *See—*
  - Nagahara, Michiko; Ieda, Chikara; Mimura, Mitsuo; Uchida, Katsuhiro; Sato, Soichiro; and Okumura, Makoto, 5,013,736, Cl. 514-255.000.
- Uchida, Shinji: *See—*
  - Shibaike, Narito; and Uchida, Shinji, 5,013,954, Cl. 310-309.000.
- Uchikoshi, Gohji, to Nakamichi Corporation. Tracking control method for eliminating a tracking error due to a movement of an objective lens. 5,013,901, Cl. 250-202.000.

- Uda, Shigenori: *See—*
  - Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, 5,013,956, Cl. 310-323.000.
- Uddo-Mims International: *See—*
  - Mims, Ken, 5,013,457, Cl. 210-741.000.
- Ueda, Hideshi: *See—*
  - Kobayashi, Akira; Taira, Nobutaka; and Ueda, Hideshi, 5,014,330, Cl. 382-30.000.
- Ueda, Kimio: *See—*
  - Shiomi, Toru; and Ueda, Kimio, 5,013,936, Cl. 307-446.000.
- Uehara, Tsukasa; and Okauchi, Shigeki, to Canon Kabushiki Kaisha. Mechanism for opening and closing a shutter of magnetic disc cassette. 5,014,151, Cl. 360-133.000.
- Uentech Corporation: *See—*
  - Bridges, Jack E., 5,012,868, Cl. 166-248.000.
- Uesugi, Akio; Kakei, Tsutomu; and Minato, Shinichiro, to Fuji Photo Film Co., Ltd. Method of preparing support for lithographic printing plate. 5,013,399, Cl. 156-643.000.
- Uetsuki, Tadao: *See—*
  - Ukegawa, Shin; Shinomiya, Masaki; Higashikawa, Masahiro; Uetsuki, Tadao; and Kobayashi, Koichi, 5,013,975, Cl. 315-248.000.
- Ufermann, Werner; and Kieser, Jurgen, to G. Siempelkamp GmbH & Co. Mat-making apparatus for particleboard manufacture. 5,013,229, Cl. 425-83.100.
- Ugai, Seiichi: *See—*
  - Shimada, Satoshi; Shimizu, Yasushi; and Ugai, Seiichi, 5,012,677, Cl. 73-721.000.
- Ugolini, Antonio: *See—*
  - Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, 5,013,835, Cl. 540-491.000.
- Ukegawa, Shin; Shinomiya, Masaki; Higashikawa, Masahiro; Uetsuki, Tadao; and Kobayashi, Koichi, to Matsushita Electric Works, Ltd. Electrodeless discharge lamp. 5,013,975, Cl. 315-248.000.
- Ulich, Bobby L., to Kaman Aerospace Corporation. Imaging lidar system using non-visible light. 5,013,917, Cl. 250-330.000.
- Umeki, Tsunenori: *See—*
  - Hata, Masayuki; and Umeki, Tsunenori, 5,014,105, Cl. 357-42.000.
- Umemoto, Chiyuki; Nakamura, Takashi; Takahashi, Kenji; and Hosoi, Yuichi, to Fuji Photo Film Co., Ltd. Method and apparatus for recording and reading out radiation images. 5,013,916, Cl. 250-327.200.
- Umemura, Yoshiyuki, to Kabushiki Kaisha Toshiba. Image information compression apparatus. 5,014,198, Cl. 364-413.130.
- Underwood, Joanna L. Cleaning shield. 5,012,537, Cl. 4-658.000.
- Uniden America Corporation: *See—*
  - Boone, Joseph E.; and McCormick, Ben F., II, 5,014,348, Cl. 455-165.000.
- Union Carbide Chemicals and Plastics Technology Corporation: *See—*
  - Guillet, Antoine; and Osterholtz, Fred D., 5,013,771, Cl. 523-202.000.
- Union Oil Company of California: *See—*
  - Christolini, Ben A.; Le, Kimanh T.; Berndt, Mitchell J.; and Howe, Steven E., 5,013,428, Cl. 208-415.000.
  - Green, James A.; and Young, Donald C., 5,013,350, Cl. 71-65.000.
  - Walker, Douglas T., 5,013,453, Cl. 210-712.000.
- Unisys Corporation: *See—*
  - Vallance, L., 5,014,085, Cl. 355-64.000.
- United Kingdom Atomic Energy Authority: *See—*
  - Rickerby, David S.; Whitmell, Derek S.; Coad, Joseph P.; and Nelson, Richard S., 5,013,419, Cl. 204-298.050.
- United States of America
  - Air Force: *See—*
    - Seiler, Milton R.; and Walcott, Kenneth J., 5,014,069, Cl. 343-785.000.
    - Soref, Richard A., 5,013,113, Cl. 350-96.130.
  - Army: *See—*
    - Choi, Kwong-Kit, 5,013,918, Cl. 250-338.400.
    - Leupold, Herbert A., 5,014,028, Cl. 335-210.000.
  - Energy: *See—*
    - McGrath, Stephen V., 5,012,694, Cl. 74-572.000.
    - McKee, John M., 5,012,672, Cl. 73-31.070.
    - White, David B., 5,014,154, Cl. 361-49.000.
  - Interior: *See—*
    - Morrell, Roger J.; and Larson, David A., 5,013,093, Cl. 299-67.000.
  - National Aeronautics and Space Administration: *See—*
    - Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C.; Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., 5,013,531, Cl. 422-245.000.
    - Wren, Paul E., 5,014,340, Cl. 455-1.000.
  - Navy: *See—*
    - Abramo, Robert S., 5,014,068, Cl. 343-710.000.
    - Esterowitz, Leon; Allen, Roger E.; and Kintz, Gregory J., 5,014,279, Cl. 372-41.000.
    - Feltz, Louis V.; Reece, Eric W.; Young, Clarence W.; and Thigpen Lewis, 5,014,248, Cl. 367-4.000.
    - Godbey, David J.; Hughes, Harold L.; and Kub, Francis J., 5,013,681, Cl. 437-86.000.
    - Hardt, Lee R., 5,012,740, Cl. 102-216.000.
    - Jones, Louis F., 5,012,742, Cl. 102-418.000.
    - Metersky, Morton L.; and Howard, James R., 5,012,717, Cl. 89-1.110.
    - Schriner, David A.; and Lauer, Albert W., 5,014,062, Cl. 342-68.000.
- U.S. Philips Corporation: *See—*
  - Bach, Pierre; and Bernardet, Henri, 5,013,969, Cl. 315-61.000.
  - Baier, Alfred, 5,014,283, Cl. 375-15.000.
  - Bosch, Sieds, 5,012,577, Cl. 30-43.600.
  - Chung, Kah-Seng, 5,014,352, Cl. 455-314.000.
  - Driessen, Pieter J.; and Klok, Jan, 5,013,003, Cl. 248-117.600.
  - Johnson, Nigel L., 5,014,190, Cl. 364-200.000.
  - Knapp, Alan G., 5,014,048, Cl. 340-784.000.
  - Lammerts, Judocus A. M.; Foss, Richard C.; and Salters, Roelof H. W., 5,014,244, Cl. 365-189.050.
  - Mellink, Willem F.; Janssen, Peter J. G. M.; Zwier, Jan; and Lotterman, Harm, 5,013,384, Cl. 156-345.000.
  - Richards, Norman D., 5,014,127, Cl. 358-133.000.
  - Rollin, Joel; and Perrin, Jean-Claude, 5,013,142, Cl. 350-422.000.
  - Seisz, Michael; Knauf, Roland; Schwarz, Dieter; and Weidner, Hans-Jurgen, 5,013,261, Cl. 439-581.000.
  - Van Amstel, Willem D., 5,013,108, Cl. 350-6.100.
  - Van Rosmalen, Gerard E.; Jacobs, Bernardus A. J.; and Spruit, Johannes H. M., 5,014,254, Cl. 369-13.000.
  - Vink, Nicolaas G.; Jacobs, Franciscus C. A. J.; and Doomernik, Franciscus M. P. P., 5,013,964, Cl. 313-440.000.
- United Technologies Corporation: *See—*
  - Ream, Jeffrey L.; and Bubello, Robert, 5,012,639, Cl. 60-226.100.
  - Reynolds, Harold G., 5,012,645, Cl. 60-754.000.
- Unitika Ltd.: *See—*
  - Murase, Shigemitsu; Kakumoto, Kouji; Miyazaki, Shouji; Sugawa, Masaru; and Ide, Mikio, 5,013,506, Cl. 264-210.800.
- Universiteit Twente: *See—*
  - Semmekrot, Gerardus J. M., 5,013,233, Cl. 425-208.000.
- University of California: *See—*
  - Brown, Ian G.; MacGill, Robert A.; and Galvin, James E., 5,013,578, Cl. 427-37.000.
  - Petroff, Pierre M.; and Kroemer, Herbert, 5,013,683, Cl. 437-110.000.
- University of Delaware, The: *See—*
  - Hicks, Douglas C.; and Pleass, Charles M., 5,013,219, Cl. 417-269.000.
- University of Illinois, The Board of Trustees of the: *See—*
  - Banerjee, Santimoy; Karns, Jeffrey S.; and Chakrabarty, Ananda M., 5,013,654, Cl. 435-72.000.
- University of Iowa Research Foundation: *See—*
  - Nair, Vasu; and Buenger, Greg S., 5,013,829, Cl. 536-26.000.
- University of Michigan, The Regents of the: *See—*
  - Wise, Kensall D.; and Chau, Hin-Leung, 5,013,396, Cl. 156-628.000.
- University of Rochester, The: *See—*
  - Buralli, Dale A.; and Morris, G. Michael, 5,013,133, Cl. 350-162.110.
- University of the Pacific: *See—*
  - Guan, Shenheng; and Jones, Patrick R., 5,013,912, Cl. 250-282.000.
- University of Toronto Innovations Foundation: *See—*
  - Litherland, Albert E.; and Kilius, Linas R., 5,013,923, Cl. 250-396.00R.
- University of Victoria: *See—*
  - Zeilinski, Adam; and Atkins, Christopher J., 5,012,817, Cl. 128-744.000.
- UOP: *See—*
  - Bedard, Robert L.; Vail, Lawrence D.; Wilson, Stephen T.; and Flanigen, Edith M., 5,013,337, Cl. 55-75.000.
  - Bedard, Robert L.; Patton, Robert L.; and Wilson, Stephen T., 5,013,535, Cl. 423-277.000.
  - Cetinkaya, Ismail B., 5,013,425, Cl. 208-113.000.
  - James, Robert B., Jr.; Kalnes, Tom N.; and Lankton, Steven P., 5,013,424, Cl. 208-78.000.
  - Marcus, Bonita K., 5,013,335, Cl. 55-70.000.
  - Maurer, Richard T., 5,013,334, Cl. 55-26.000.
  - St. Martin, Edward J.; Kurek, Paul R.; Schumacher, Elaine F.; and Rohrbach, Ronald P., 5,013,564, Cl. 426-250.000.
  - St. Martin, Edward J.; Kurek, Paul R.; and Schumacher, Elaine F., 5,013,565, Cl. 426-250.000.
  - Staniulis, Mark T.; Crozier, Douglas E.; Risch, Alan P.; and Pai, Jenny L., 5,013,703, Cl. 502-241.000.
  - Vassilakis, James G.; and Best, Donald F., 5,013,699, Cl. 502-73.000.
- Urabe, Tetsuo: *See—*
  - Arai, Kunihiko; Urabe, Tetsuo; Morita, Tetsuya; Miura, Konoe; Ozawa, Tetsuo; and Iwanami, Junko, 5,013,474, Cl. 252-299.100.
- Urano, Katsuyoshi: *See—*
  - Noba, Kunihiro; Sakuraba, Yukio; and Urano, Katsuyoshi, 5,013,495, Cl. 264-1.500.
- Urata, Kazuo: *See—*
  - Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, 5,013,688, Cl. 437-210.000.
- Uratsuji, Kazumi: *See—*
  - Matsuoka, Noriyuki; and Uratsuji, Kazumi, 5,013,256, Cl. 439-264.000.
- Urban, Paul L.: *See—*
  - Postlewait, Lester B.; and Urban, Paul L., 5,014,210, Cl. 364-477.000.
- Usami, Masami: *See—*
  - Akimoto, Kazuhiro; Usami, Masami; Ogiue, Katsumi; Murayama, Hiroshi; Abe, Hitoshi; Kashiyama, Masamori; Kobayashi, Yoshikuni; Isomura, Satoru; and Mitsumoto, Kinya, 5,014,242, Cl. 365-63.000.
- USG Interiors, Inc.: *See—*
  - Izard, David G., 5,013,405, Cl. 162-101.000.

VOL 1126 ISS 1 MY 7 1991 UMI

Ushio Denki Kabushiki Kaisha: *See—*
Deki, Kyoichi, 5,014,278, Cl. 372-32.000.

Usui, Akira: *See—*
Kubo, Kazuhiko; Usui, Akira; Sakashita, Seiji; Ozeki, Hiroaki; and Kanno, Ippei, 5,014,349, Cl. 455-189.000.

USX Corporation: *See—*
Maddalena, Frederick L., 5,013,440, Cl. 210-526.000.

Vaccaro, John C.; and Lupinacci, Paul D. Hairstyling method and device. 5,012,830, Cl. 132-213.100.

Vail, Lawrence D.: *See—*
Bedard, Robert L.; Vail, Lawrence D.; Wilson, Stephen T.; and Flanigen, Edith M., 5,013,337, Cl. 55-75.000.

Vairavan, Kannan P.; and McLeod, Paul, to Advanced Micro Devices, Inc. Adaptive echo-canceller with double-talker detection. 5,014,263, Cl. 370-32.100.

Valdes, Oliver: *See—*
Lopetrone, Juan P.; and Valdes, Oliver, 5,014,043, Cl. 340-664.000.

Valenti, Mauro: *See—*
Passarotti, Carlos; Fossati, Antonio; Valenti, Mauro; and Bandi, Gianluigi, 5,013,554, Cl. 424-440.000.

Valeo: *See—*
Graton, Michel; and Lewandowski, Richard, 5,013,281, Cl. 464-68.000.

Vallance, L., to Unisys Corporation. Lens shuttle mechanism for microfilm camera. 5,014,085, Cl. 355-64.000.

Vallentin-Price, Vera D.: *See—*
Dody, Joseph W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 5,014,074, Cl. 346-107.00R.

Valyocsik, Ernest W.: *See—*
Chen, Nai Y.; Dessau, Ralph M.; Partride, Randall D.; and Valyocsik, Ernest W., 5,013,423, Cl. 208-64.000.

Van den Bergh Foods Co., Division of Conop-Co, Inc.: *See—*
Bodor, Janos; Schoenmakers, Albert W.; and Verhue, Walter M., 5,013,573, Cl. 426-602.000.

Van Doorne's Transmissie B.V.: *See—*
'Herripon, Bastiaan A., 5,013,283, Cl. 474-8.000.

Van Amstel, Willem D., to U.S. Philips Corporation. Optical scanning device and mirror correction system for use in such a device. 5,013,108, Cl. 350-6.100.

Van Andel, Chris M.; and Van Andel, Larry M. Apparatus for protecting a truck bed and side rails. 5,013,060, Cl. 280-477.000.

Van Andel, Larry M.: *See—*
Van Andel, Chris M.; and Van Andel, Larry M., 5,013,060, Cl. 280-477.000.

Van Den Bergh, Hugo H., to General Dynamics Corporation, Convair Division. Support arrangement for a space based cryogenic vessel. 5,012,948, Cl. 220-437.000.

VandeVeire, Eric L.: *See—*
Coulvonvaux, Paul R.; and VandeVeire, Eric L., 5,013,182, Cl. 403-30.000.

Vande Walle, Larry J.: *See—*
Sanderson, Harold; and Vande Walle, Larry J., 5,012,912, Cl. 192-133.000.

Van Driel, Henry M.; and Giuliani, Giampiero. Laser mode-coupling via a pulsed modulator. 5,014,277, Cl. 372-18.000.

Van Gestel, Jozef F. E.; Nys, Jan R.; and Ruelens, Paul F. M., to Janssen Pharmaceutica N.V. Imazalil containing synergistic compositions. 5,013,746, Cl. 514-365.000.

Van Kanegan, Eugene M.; and Klimek, Wayne D., to Paper Converting Machine Company. Sealing assembly for liquid fountain. 5,012,736, Cl. 101-211.000.

Van Maanen, Keith D., to General Motors Corporation. Power transmission. 5,013,289, Cl. 475-286.000.

Vanmaele, Luc J.: *See—*
Kok, Piet; Vanmaele, Luc J.; Tavernier, Serge M.; and De Deyne, Hedwig E., 5,013,628, Cl. 430-110.000.

Vanninmaja, Pekka; and Jakobsson, Rainer, to Teco Systems Oy. Method of controlling a transport means and a transport means for effecting the method. 5,013,057, Cl. 280-426.000.

Van Oord, Jan J. J., to Breda Packaging B.V. Method and apparatus for arranging articles. 5,012,628, Cl. 53-448.000.

Van Rosmalen, Gerard E.; Jacobs, Bernardus A. J.; and Spruit, Johannes H. M., to U.S. Philips Corporation. Magneto-optical recording method and magneto-optical recording apparatus. 5,014,254, Cl. 369-13.000.

Van Weert, Gezinus: *See—*
Fair, Kenneth J.; Van Weert, Gezinus; and Schneider, John C., 5,013,359, Cl. 75-744.000.

Varaprath, Padmakumari J.: *See—*
Wright, Antony P.; and Varaprath, Padmakumari J., 5,013,577, Cl. 427-35.000.

Varga, Ljubomir D.; and Losic, Novica A. Synthesis of zero-impedance converter. 5,013,998, Cl. 323-285.000.

Vassilakis, James G.; and Best, Donald F., to UOP. Novel zeolite compositions derived from zeolite Y. 5,013,699, Cl. 502-73.000.

Vaughan, David E. W.; and Strohmaier, Karl G., to Exxon Research and Engineering Company. ECR-18, method of its preparation, and uses for sorption and separation. 5,013,536, Cl. 423-328.000.

Vaux, Thomas M. Shock-attenuating seamless surface system for use on vertical takeoff and landing zones. 5,013,029, Cl. 272-3.000.

VDO Adolf Schindling AG: *See—*
Feldinger, Martin, 5,012,788, Cl. 123-545.000.

Veba Oel Aktiengesellschaft: *See—*
Schramm, Bernhard; Kern, Jurgen; Schwahn, Harald; Preuss, August-Wilheim; Gottlieb, Klaus; and Bruderreck, Hartmut, 5,013,706, Cl. 502-309.000.

Veerasekaran, Ponnan: *See—*
Hewett, Richard H.; and Veerasekaran, Ponnan, 5,013,353, Cl. 71-94.000.

Velius, George A., to Bell Communications Research, Inc. Operator services using speech processing. 5,014,303, Cl. 379-201.000.

Verbo, Pedro: *See—*
Gautier, Jean-Pierre; and Verbo, Pedro, 5,012,998, Cl. 248-225.200.

Verdini, Antonio: *See—*
Sisto, Alessandro; and Verdini, Antonio, 5,013,723, Cl. 514-19.000.

Vergano, Stefano: *See—*
Catti, Alberto A.; Sartorio, Franco; and Vergano, Stefano, 5,012,661, Cl. 72-21.000.

Verhue, Walter M.: *See—*
Bodor, Janos; Schoenmakers, Albert W.; and Verhue, Walter M., 5,013,573, Cl. 426-602.000.

Verhulst, Michael J.: *See—*
Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., 5,012,634, Cl. 56-13.600.
Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., 5,012,635, Cl. 56-13.600.

Vernon E. Faulconer, Inc.: *See—*
Enright, David J., 5,012,864, Cl. 166-70.000.

Verry, George H. Multipurpose bathing wiper construction. 5,012,544, Cl. 15-209.00R.

Verstrate, Gary W.: *See—*
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 5,013,801, Cl. 526-64.000.

Viannay, Stephane G. J.; Roth, Bernard M.; Mirigay, Solange M. V.; and Chastang, Georges J. B., to Bertin & Cie. Linear-spraying device. 5,012,980, Cl. 239-423.000.

Victor Company of Japan, Ltd.: *See—*
Higurashi, Seiji; and Tsushima, Takuya, 5,014,274, Cl. 371-40.100.

Victoria University of Manchester, The: *See—*
Chantler, Eric N.; and Elstein, Max, 5,013,544, Cl. 424-78.000.

Vidaver, William; Toivonen, Peter; and Dube, Sylvain, to Simon Fraser University. Apparatus and method for determining plant fluorescence. 5,014,225, Cl. 364-550.000.

Vieland, Leon J.: *See—*
Kaganowicz, Grezgorz; Cuomo, Frank P.; and Vieland, Leon J., 5,013,139, Cl. 350-340.000.

Villiger, Alois: *See—*
Boller, Arthur; Buchecker, Richard; Fromm, Hans-Jurgen; Kelly, Stephen; Schadt, Martin; and Villiger, Alois, 5,013,476, Cl. 252-299.610.

Vink, Nicolaas G.; Jacobs, Franciscus C. A. J.; and Doomernik, Franciscus M. P. P., to U.S. Philips Corporation. Method of manufacturing a saddle-shaped deflection coil for a picture display tube and display tube comprising a deflection system using saddle-shaped deflection coils. 5,013,964, Cl. 313-440.000.

Vipont Pharmaceutical, Inc.: *See—*
Southard, G. Lee; and Harkrader, Ronald J., 5,013,553, Cl. 424-426.000.

Virgadamo, Michael J., to Hughes Aircraft Company. Thin film delamination tool. 5,013,392, Cl. 156-584.000.

Vision III Imaging, Inc.: *See—*
Pritchard, Eric K.; and Mayhew, Christopher A., 5,014,126, Cl. 358-91.000.

VLSI Packaging Materials, Inc.: *See—*
Finkelstein, Leo; Dumesnil, Maurice E.; and Tetschlag, Richard R., 5,013,360, Cl. 106-1.230.

VLSI Technology, Inc.: *See—*
Wiscombe, Paul C.; and Shavit, Arie, 5,014,002, Cl. 324-158.00F.

Voelker, Herbert: *See—*
Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Voelker, Herbert, 5,013,705, Cl. 502-262.000.

Volkmann, Robert A., to Pfizer Inc. Diastereomeric 5R,6S-6-(1R-hydroxyethyl)-2-(cis-1-oxo-3-thiolanylthio)-2-penem-3-carboxylic acids. 5,013,729, Cl. 514-195.000.

von der Crone, Jost: *See—*
Leimer, Marius; von der Crone, Jost; Babler, Fridolin; and Neuschutz, Heinz, 5,013,455, Cl. 210-729.000.

von Gutfeld, Robert J.; and Ropper, Nelly. Ultrasonic jet dental tool and method. 5,013,241, Cl. 433-86.000.

Vora, Madhukar B., to Fairchild Semiconductor Corporation. Process for fabricating complementary contactless vertical bipolar transistors. 5,014,107, Cl. 357-44.000.

Vorbrueggen, Helmut: *See—*
Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Stuerzebecher, Claus-Steffen; Haberey, Martin; Schillinger, Ekkehard; and Town, Michael H., 5,013,758, Cl. 514-573.000.

Vorpahl, John W.: *See—*
Watts, Richard P.; Lee, Wylie I.; and Vorpahl, John W., 5,013,150, Cl. 356-73.000.

Voser, Beat: *See—*
Kappeler, Markus; and Voser, Beat, 5,014,302, Cl. 379-165.000.

Voss, James R. Diesel engine fuel injection system. 5,012,786, Cl. 123-467.000.

Vowles, E. John: *See—*
Kurasaki, Howard S.; Westlund, Barbara F.; Nulty, James E.; and Vowles, E. John, 5,013,400, Cl. 156-643.000.
Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 5,013,385, Cl. 156-345.000.

Vozenilek, Theodore M.: *See—*
Wright, Richard B.; Vozenilek, Theodore M.; and Fleming, Brent P., 5,012,706, Cl. 81-121.100.

Vuillermoz, Jean-Francois: *See—*
Guittet, Dominique; Taberlet, Eric; and Vuillermoz, Jean-Francois, 5,013,227, Cl. 418-206.000.

W. R. Grace & Co.-Conn.: *See—*
Jamison, David S., 5,012,926, Cl. 206-334.000.

Wabco Westinghouse Fahrzeugbremsen GmbH: *See—*
Reinecke, Erich, 5,013,095, Cl. 303-113.000.

Wacht, Raymond J.: *See—*
Pitman, Raymond F.; and Wacht, Raymond J., 5,012,939, Cl. 212-157.000.

Wada, Hideo: *See—*
Hata, Hajime; Kitamura, Takao; Sakane, Kohji; Wada, Hideo; and Sogabe, Seiji, 5,013,523, Cl. 419-19.000.

Wada, Hiroaki: *See—*
Miyazaki, Tadaaki; Ogino, Takao; Masuda, Yoshitomo; Wada, Hiroaki; and Kawagoe, Takahiro, 5,013,620, Cl. 429-194.000.

Wada, Kaoru: *See—*
Nomura, Manabu; and Wada, Kaoru, 5,013,773, Cl. 523-222.000.

Wada, Shigeru: *See—*
Kudo, Yoshinobu; Hamada, Masataka; Hata, Yoshiaki; Ootsuka, Hiroshi; Inoue, Manabu; Wada, Shigeru; and Tanaka, Yoshihiro, 5,014,078, Cl. 354-195.100.

Waddoups, Malcolm: *See—*
Emert, Jacob; and Waddoups, Malcolm, 5,013,467, Cl. 252-46.400.

WaferScale Integration, Inc.: *See—*
Kazerounian, Reza; Ali, Syed; and Eitan, Boaz, 5,014,097, Cl. 357-23.500.

Wagner, G. Anthony; and Horning, Michael L. Disposable layout tape. 5,012,590, Cl. 33-759.000.

Wahle, Bernd; and Selen, Faize, to Henkel Kommanditgesellschaft auf Aktien. Mercerizing and/or causticizing wetting agent: 2-ethyl-hexyl-sulfate and mixture of alkyl end-blocked polyethers. 5,013,327, Cl. 8-125.000.

Wakabayashi, Juichi: *See—*
Mizuno, Toshiya; Teramoto, Yoshikichi; Wakabayashi, Juichi; and Saito, Takeshi, 5,013,823, Cl. 528-388.000.

Wakabayashi, Takao, to Nakanishi Metal Works Co., Ltd. Electrically driven self-propelled truck and apparatus for changing course thereof. 5,013,203, Cl. 414-222.000.

Wakabayashi, Takashi: *See—*
Shinbashi, Masahiro; and Wakabayashi, Takashi, 5,014,261, Cl. 370-16.000.

Wakefield, Brian N., to Reiss Engineering Co. Ltd., The. Roller conveyor systems. 5,012,920, Cl. 198-781.000.

Wakikaido, Takahiro; Yoshiyama, Toshio; and Yoshizuka, Ken, to Mita Industrial Co., Ltd. Inhibitable image forming apparatus including entered code data release means. 5,014,088, Cl. 355-201.000.

Wakita, Naomasa: *See—*
Shimizu, Hiroyuki; Ito, Kenji; and Wakita, Naomasa, 5,014,024, Cl. 333-203.000.

Wakui, Shinji, to Seiko Instruments Inc. Control system for magnetic bearing. 5,013,987, Cl. 318-632.000.

Wakui, Tadahiro: *See—*
Takemura, Kazuya; Yoshino, Kenji; and Wakui, Tadahiro, 5,013,818, Cl. 528-193.000.

Walbro Corporation: *See—*
Tuckey, Charles H., 5,013,221, Cl. 417-365.000.

Walcott, Kenneth J.: *See—*
Seiler, Milton R.; and Walcott, Kenneth J., 5,014,069, Cl. 343-785.000.

Walensky, Loren D.: *See—*
Taylor, Edward C.; Schrader, Thomas H.; and Walensky, Loren D., 5,013,738, Cl. 514-272.000.

Walenta, Rainer; Muller-Peddinghaus, Reiner; Ban, Ivan; Wurl, Michael; and Preuschoff, Ulf, to Kali-Chemie Pharma GmbH. 3-flavone carboxylic acid compounds. 5,013,852, Cl. 549-362.000.

Walker, Douglas T., to Union Oil Company of California. Method for removing heavy metals from aqueous solutions by coprecipitation. 5,013,453, Cl. 210-712.000.

Walker, Gordon K.; Shumate, William A.; and Kelkar, Krishnanand, to General Instrument Corporation. Video scrambling and descrambling by varying sequence of segments in adjacent video information lines. 5,014,310, Cl. 380-10.000.

Wallach, Donald F. H.: *See—*
Yiournas, Costas; and Wallach, Donald F. H., 5,013,497, Cl. 264-4.100.

Walley, Darlene R., to Procter & Gamble Company, The. Process for preparing substituted imidazoline fabric conditioning compounds. 5,013,846, Cl. 548-352.000.

Walls, H. Wayne. River raft. 5,013,270, Cl. 441-45.000.

Walter, Harald, to Ciba-Giegy Corporation. Azo dyes containing 5-cyclohexylcarbonyl-thiophene diazo components and 1,2,3,4-tetrahydroquinoline coupling components. 5,013,826, Cl. 534-768.000.

Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., to Deere & Company. Cutterbar gear housing design for containing gear lubrication fluid. 5,012,634, Cl. 56-13.600.

Walters, James C.; Richardson, Craig A.; and Verhulst, Michael J., to Deere & Company. Modular cutterbar for rotary mower. 5,012,635, Cl. 56-13.600.

Wampfler GmbH: *See—*
Bormann, Uwe; Matzko, Ekkehard; and Gorner, Dieter, 5,012,746, Cl. 104-93.000.

Wang, Elizabeth A.; Wozney, John M.; and Rosen, Vicki, to Genetics Institute, Inc. DNA sequences encoding osteoinductive products. 5,013,649, Cl. 435-69.100.

Wang, Hsien C.; Powers, Kenneth W.; Puydak, Robert C.; and Dharmarajan, Narayanaswami R., to Exxon Chemical Patents Inc. Dynamically cured thermoplastic olefin polymers and process for producing the same. 5,013,793, Cl. 525-195.000.

Wang, Hsingya A.: *See—*
Shen, Lewis; Hadiizadeh-Amini, Zahra; Wang, Hsingya A.; and Hsu, James J., 5,013,675, Cl. 437-44.000.

Wang, Pen C., to Shell Oil Company. Cured resin products. 5,013,805, Cl. 526-264.000.

Wang, Thomas T. M. Frame fixation structure. 5,012,600, Cl. 40-152.000.

Wanger, Mark E.; Methlie, Jennifer L.; Jones, David P.; and Stavely, Donald J., to Hewlett-Packard Company. Optical disk cartridge handling apparatus with passive cartridge engagement assembly. 5,014,255, Cl. 369-36.000.

Wanjura, Franz E. G., to Telefonaktiebolaget L M Ericsson. Filter device. 5,014,026, Cl. 333-185.000.

Ward, Robert W.; and Jablonski, Robert A., to General Motors Corporation. Adjustable wiring harness clip. 5,012,995, Cl. 248-68.100.

Ward, Susan J.; and Bell, Malcolm R., to Sterling Drug Inc. 3-Arylcarbonyl-1H-indole-containing compounds. 5,013,837, Cl. 544-143.000.

Waring, George D.: *See—*
Hilaris, John A.; and Waring, George D., 5,013,051, Cl. 277-89.000.

Warner, Gary N.: *See—*
Savitsky, Wallace R.; Schaffer, Ronald R.; and Warner, Gary N., 5,013,122, Cl. 350-96.200.

Warner-Lambert Company: *See—*
Cherukuri, Subraman R.; Wong, Lucy L.; and Faust, Steven M., 5,013,716, Cl. 514-23.000.
Siefer, David A., 5,012,578, Cl. 30-84.000.
Tai, Anna W., 5,013,557, Cl. 424-493.000.

Warren, James R.: *See—*
Baker, Malcolm J.; and Warren, James R., 5,013,207, Cl. 414-489.000.

Warren, Michael G.: *See—*
Baker, Peter E.; Warren, Michael G.; and White, David G. W., 5,013,178, Cl. 403-330.000.

Warwick, Peter J.: *See—*
Ryde, Michael J.; and Warwick, Peter J., 5,012,653, Cl. 62-203.000.

Watanabe, Hiroyuki: *See—*
Nishimura, Akira; Watanabe, Hiroyuki; and Masuda, Eiji, 5,013,942, Cl. 307-480.000.

Watanabe, Isao: *See—*
Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Haruhiko; and Nagai, Takeshi, 5,012,858, Cl. 165-1.000.

Watanabe, Kazuhiro: *See—*
Hakamatsuka, Yasuharu; and Watanabe, Kazuhiro, 5,013,363, Cl. 106-38.300.

Watanabe, Mikiharu: *See—*
Nishida, Kozi; and Watanabe, Mikiharu, 5,013,774, Cl. 524-91.000.

Watanabe, Mistutoshi, to Kabushiki Kaisha Shinko. Electric connector. 5,013,267, Cl. 439-821.000.

Watanabe, Noboru: *See—*
Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,796, Cl. 525-326.200.
Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 5,013,797, Cl. 525-328.300.

Watanabe, Seiichi: *See—*
Matsuzawa, Hideki; Yabe, Masao; Irie, Tadashi; Watanabe, Seiichi; and Ishihara, Yusuke, 5,013,593, Cl. 428-64.000.

Watanabe, Yasushi: *See—*
Sato, Takanori; Watanabe, Yasushi; Kitagawa, Seiho; Shiokawa, Hideyo; Shokawa, Tomoo; Saito, Yutaka; Hosokawa, Osamu; Sano, Takeshi; Koshida, Kazunori; Nakamura, Yasukazu; Nakashima, Hideo; Ikeda, Kenichi; and Orito, Yoshihiro, 5,012,622, Cl. 52-725.000.

Watarai, Aki: *See—*
Tanaka, Yoshinobu; Iwama, Yoshiro; Honkura, Yoshinobu; Arai, Kazuo; and Watarai, Aki, 5,013,243, Cl. 433-189.000.

Watkins, Richard, to N.A. Taylor Company, Inc. Rafting cushion. 5,013,272, Cl. 441-127.000.

Watson, Joseph L., to International Business Machines Corporation. Fiber optic connector assembly adapted for providing circuit card charging. 5,013,247, Cl. 439-55.000.

Watson, Nigel S.; Chan, Chuen; and Ross, Barry C., to Glaxo Group Limited. Imidazole derivatives and their use as hypercholesterolemia and hyperlipoproteinemia agents. 5,013,749, Cl. 514-397.000

Watterson, Scott R.; Dalebout, William T.; and Standing, Donald J., to Proform Fitness Products, Inc. Rowing apparatus. 5,013,033, Cl. 272-72.000.

Watts, Richard P.; Lee, Wylie I.; and Vorpahl, John W., to Syntex (U.S.A.) Inc. Method for detection of fluorescence or light scatter. 5,013,150, Cl. 356-73.000.

Wawra, Helmut: *See—*
Scheurenbrand, Dieter; and Wawra, Helmut, 5,012,944, Cl. 220-677.000.

Way, Terrance, to General Motors Corporation. Extrusion die construction. 5,013,232, Cl. 425-192.00R.

VOL
1126
ISS
1
MY
7
1991
UMI

- Weaver, Philip W.; Fakhry, Kamal; and Saito, Shin, to Instantel Inc. Personal locator transmitter. 5,014,040, Cl. 340-572.000.
- Weber, Andrew M., to Du Pont de Nemours, E. I., and Company. Photopolymer film for holography. 5,013,632, Cl. 430-281.000.
- Weber, Harold J. Energy conserving electric motor power control method and apparatus. 5,013,990, Cl. 318-814.000.
- Wegman & Co. GmbH: *See—*
  - Hahn, Hans J., 5,013,884, Cl. 219-121.480.
- Wehl, Brandon L., to Portage Electric Products, Inc. Thermostatic switch with insulated calibration dimple. 5,014,034, Cl. 337-368.000.
- Weidenhammer Packungen KG GmbH & Co.: *See—*
  - Kucherer, Helmut, 5,012,970, Cl. 229-4.500.
- Weidner, Hans-Jurgen: *See—*
  - Seisz, Michael; Knauf, Roland; Schwarz, Dieter; and Weidner, Hans-Jurgen, 5,013,261, Cl. 439-581.000.
- Weise, Lutz: *See—*
  - Ocvirk, Norbert; and Weise, Lutz, 5,013,096, Cl. 303-116.000.
- Weisenberger, Thomas V.: *See—*
  - Lefferts, Scott R.; Stelzer, Dennis J., Sr.; and Weisenberger, Thomas V., 5,013,002, Cl. 248-74.100.
- Weller, Harold N., III; and Gordon, Eric M., to E. R. Squibb & Sons, Inc. Ester substituted aminoalkanoylureido amino and imino acid and ester compounds. 5,013,861, Cl. 560-34.000.
- Wenman, Daniel L.: *See—*
  - Myers, Virginia A.; Wenman, Daniel L.; and Phillips, James R., 5,013,386, Cl. 156-351.000.
- Werbung im Sudwestfunk GmbH: *See—*
  - Bittel, Bertram, 5,014,341, Cl. 455-3.000.
- West, Lamar E., Jr., to Scientific-Atlanta, Inc. Off-premises cable television channel interdiction method and apparatus. 5,014,309, Cl. 380-7.000.
- Western Atlas International, Inc.: *See—*
  - Counselman, Charles C., III, 5,014,066, Cl. 342-352.000.
- Westinghouse Electric Corp.: *See—*
  - Humphries, Benjamin T., 5,012,684, Cl. 73-865.800.
  - Su, Wei-Fang A., 5,013,631, Cl. 430-271.000.
  - Worcester, Samuel A.; and Case, Patti L., 5,013,357, Cl. 75-622.000.
- Westlund, Barbara F.: *See—*
  - Kurasaki, Howard S.; Westlund, Barbara F.; Nulty, James E.; and Vowles, E. John, 5,013,400, Cl. 156-643.000.
- Westvaco Corporation: *See—*
  - Dilling, Peter, 5,013,825, Cl. 530-500.000.
  - Schilling, Peter, 5,012,870, Cl. 166-293.000.
- Wetstein, Henry: *See—*
  - Feitler, David; and Wetstein, Henry, 5,013,843, Cl. 546-251.000.
- Wetterau Incorporated: *See—*
  - Diehl, Carl E., 5,013,215, Cl. 416-178.000.
- Whelen Technologies, Inc.: *See—*
  - Stopa, James L., 5,013,973, Cl. 315-241.00R.
- Whitcher, William J.: *See—*
  - Cook, John A.; Park, Geroge B.; McLoughlin, Robert H ; and Whitcher, William J., 5,013,619, Cl. 429-189.000.
- White, David B., to United States of America, Energy. Electrical safety device. 5,014,154, Cl. 361-49.000.
- White, David G. W.: *See—*
  - Baker, Peter E.; Warren, Michael G.; and White, David G. W., 5,013,178, Cl. 403-330.000.
- White, Dwain M.: *See—*
  - Giles, Harold F., Jr.; and White, Dwain M., 5,013,799, Cl. 525-432.000.
- White, James A. Mask controled neural networks. 5,014,219, Cl. 364-513.000.
- White, William C.: *See—*
  - Gettings, Richard L.; and White, William C., 5,013,459, Cl. 210-764.000.
- Whitebay, Lee E.: *See—*
  - Whitfill, Donald L.; and Whitebay, Lee E., 5,012,869, Cl. 166-285.000.
- Whitehead, Frank R.; and Sander, Ingolf, to Eastman Kodak Company. Method and apparatus for anamorphically shaping and achromatically deflecting electromagnetic beams. 5,013,136, Cl. 350-286.000.
- Whiteside, John F., to Sloan Valve Company. Flush valve refill ring. 5,013,007, Cl. 251-40.000.
- Whitfill, Donald L.; and Whitebay, Lee E., to Conoco Inc. Method for restricting gas influx during well cementing. 5,012,869, Cl. 166-285.000.
- Whitmell, Derek S.: *See—*
  - Rickerby, David S.; Whitmell, Derek S.; Coad, Joseph P.; and Nelson, Richard S., 5,013,419, Cl. 204-298.050.
- Whitsett, Jeffrey A., to Abbott Laboratories. SAP-6-Val proteins and methods. 5,013,720, Cl. 514-12.000.
- Whyte, Robert E., Jr.; and Alcudia, Ezra R., to Eastman Kodak Company. Apparatus and method for tape velocity and tension control in a capstanless magnetic tape transport. 5,012,989, Cl. 242-186.000.
- Wick, Alexander: *See—*
  - Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, 5,013,835, Cl. 540-491.000.
- Wicke GmbH & Co.: *See—*
  - Schlosser, Klaus, 5,012,550, Cl. 16-35.00R.
- Wicklund, Rolf G., to Telefonaktiebolaget L M Ericsson. Method and apparatus for preventing transmission of data packets with a greater intensity than a predetermined value on any one of a number of channels on a common transmission link. 5,014,260, Cl. 370-13.000.
- Wielenberg, Johannes: *See—*
  - Janke, Thomas; and Wielenberg, Johannes, 5,012,560, Cl. 24-287.000.
- Wiencek, Donald C.: *See—*
  - Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 5,013,260, Cl. 439-535.000.
- Wienhold, James L. Chuck assembly for tool bits. 5,013,194, Cl. 408-240.000.
- Wikmark, Gunnar: *See—*
  - Granath, Goran; and Wikmark, Gunnar, 5,013,522, Cl. 376-310.000.
- Wilkerson, John M., III: *See—*
  - Barron, Milagros C.; Swope, Ronald L.; and Wilkerson, John M., III, 5,013,787, Cl. 524-555.000.
- Wilkerson, Timothy M., to Basler Electric Company. Transformer differential relay. 5,014,153, Cl. 361-36.000.
- Wilkins, Andre P.; and Lee, Brian, to Wilkins, Andre Philip. Suspension pack and apparatus for producing suspension packs. 5,013,004, Cl. 248-692.000.
- Wilkins, Andre Philip: *See—*
  - Wilkins, Andre P.; and Lee, Brian, 5,013,004, Cl. 248-692.000.
- Will, Conrad A. Tire inflation system. 5,012,954, Cl. 222-5.000.
- Willard, David C., to Sudamet, Ltd. Method of flame spraying refractory material. 5,013,499, Cl. 264-30.000.
- Williamitis, Victor A.: *See—*
  - Solomon, Donald D.; Taller, Robert A.; and Williamitis, Victor A., 5,013,717, Cl. 514-56.000.
- Williams, Daniel. Multipurpose aquatic flotation device. 5,013,273, Cl. 441-130.000.
- Williams, George W.; and Rifkin, Arnold S., to A. Rifkin Co. Flexible-walled security containers. 5,013,162, Cl. 383-97.000.
- Williams Instruments, Inc.: *See—*
  - Williams, Robert A.; and Herron, Jeffrey W., 5,013,254, Cl. 439-255.000.
- Williams, James D. Apparatus for suction lipectomy surgery. 5,013,300, Cl. 604-119.000.
- Williams, James E. Automatic horn warning signal apparatus for use on boats. 5,012,757, Cl. 116-19.000.
- Williams, Kelly: *See—*
  - Landoll, Donald R.; Williams, Kelly; and Peck, Ted, 5,013,056, Cl. 280-425.200.
- Williams, Leslie P., to CCA, Inc. Adjustable foaming chamber stem for foam-applying nozzle. 5,012,979, Cl. 239-416.500.
- Williams, Robert A.; and Herron, Jeffrey W., to Williams Instruments, Inc. Latching mechanism for test probe apparatus. 5,013,254, Cl. 439-255.000.
- Williams, William H.; and Jacobs, Paul G. Side loading dual pail wet vacuum with flow divider. 5,012,549, Cl. 15-320.000.
- Willoughby, Henry D. Reuseable, multi-purpose, easy release pressure band. 5,012,558, Cl. 24-16.0PB.
- Wilson, Edgar R.: *See—*
  - Flanagan, Joseph E.; Wilson, Edgar R.; and Frankel, Milton B , 5,013,856, Cl. 552-11.000.
- Wilson, Edward M.: *See—*
  - Crisp, Harold A.; Clayton, John C.; Elliott, Leonard G.; and Wilson, Edward M., 5,013,833, Cl. 540-222.000.
- Wilson, Keith E.: *See—*
  - Brooks, Mark L.; and Wilson, Keith E., 5,013,379, Cl. 156-244.110.
- Wilson, Stephen T.: *See—*
  - Bedard, Robert L.; Vail, Lawrence D.; Wilson, Stephen T.; and Flanigen, Edith M., 5,013,337, Cl. 55-75.000.
  - Bedard, Robert L.; Patton, Robert L.; and Wilson, Stephen T., 5,013,535, Cl. 423-277.000.
- Wing, George S. Ball driver for a threaded collar. 5,012,704, Cl. 81-59.100.
- Wink, Joachim: *See—*
  - Bayer, Thomas; Buchholz, Rainer; Deger, Hans-Matthias; and Wink, Joachim, 5,013,655, Cl. 435-119.000.
- Winnerl, Josef; and Neppl, Franz, to Siemens Aktiengesellschaft. Method of making an integrated circuit comprising load resistors arranged on the field oxide zones which separate the active transistor zones. 5,013,678, Cl. 437-52.000.
- Winstanley, Ralph. Dual purpose grinding machine. 5,012,617, Cl. 51-3.000.
- Winters, Warren J.; and Burton, Michael B., to Amoco Corporation. Apparatus for deflecting a drill string. 5,012,877, Cl. 175-80.000.
- Wiscombe, Paul C.; and Shavit, Arie, to VLSI Technology, Inc. ATE jumper programmable interface board. 5,014,002, Cl. 324-158.00F.
- Wisconsin Alumni Research Foundation: *See—*
  - Guckel, Henry; and Sniegowski, Jeffry, 5,013,693, Cl. 437-248.000.
  - Severson, David W.; and Aiken, Judd M., 5,013,644, Cl. 435-6.000.
- Wise, Kensall D.; and Chau, Hin-Leung, to University of Michigan, The Regents of the. Method of making an ultraminiature pressure sensor. 5,013,396, Cl. 156-628.000.
- Wisecup, David R.: *See—*
  - Goodwin, Brent E., Karn, Donald L ; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,013,387, Cl. 156-384.000.
- Wissig, Claus: *See—*
  - Sondergeld, Manfred; and Wissig, Claus, 5,013,909, Cl. 250-231.100
- Witty, David R.: *See—*
  - Fleet, George W. J.; and Witty, David R., 5,013,842, Cl. 546-220.000.
- Woditsch, Peter: *See—*
  - Schwirtlich, Ingo; and Woditsch, Peter, 5,013,393, Cl. 156-616.200.

- Woiszwillo, James E., to Transgenic Sciences, Inc. TMB Formulation for soluble and precipitable HRP-ELISA. 5,013,646, Cl. 435-7.920.
- Wolf, Joel L., to International Business Machines Corporation. Assignment of files to storage device using macro and micro programming model which optimized performance of input/output subsystem. 5,014,197, Cl. 364-200.000.
- Wolf, Uwe: *See—*
  - Payne, Robert; Goetz, Walter; and Wolf, Uwe, 5,013,786, Cl. 524-514.000.
- Wolfson, Charles D., to Siemens Corporate Research, Inc. Workcell controller employing entity-server model for physical objects and logical abstractions. 5,014,208, Cl. 364-468.000.
- Wolfson, Ronald I.; and Quan, Clifton, to Hughes Aircraft Company. Switched-loop/180 degree phase bit with aperture shutter capabilities. 5,014,022, Cl. 333-161.000.
- Won, Joung H.; and Kim, Eun Y., to Won, Joung H. Reflection sheet for lighting or color-lighting. 5,014,174, Cl. 362-309.000.
- Wong, David T.: *See—*
  - Beedle, Edward E.; Robertson, David W.; and Wong, David T., 5,013,761, Cl. 514-650.000.
- Wong, Henry S. L.: *See—*
  - Kaneko, Takushi; and Wong, Henry S. L., 5,013,851, Cl. 549-298.000.
- Wong, Lucy L.: *See—*
  - Cherukuri, Subraman R.; Wong, Lucy L.; and Faust, Steven M., 5,013,716, Cl. 514-23.000.
- Wonne, Karl-Georg: *See—*
  - Nerbe, Jurgen F.; and Wonne, Karl-Georg, 5,013,590, Cl. 428-36.400.
- Woodall, Edward L.: *See—*
  - Crain, Stephen F.; Clark, Mark A.; and Woodall, Edward L., 5,014,218, Cl. 364-502.000.
- Woodle, Martin C.; Martin, Francis J.; Yau-Young, Annie; and Redemann, Carl T., to Liposome Technology, Inc. Liposomes with enhanced circulation time. 5,013,556, Cl. 424-450.000.
- Woods, Samuel G.: *See—*
  - Bhagwat, Pradeep M.; Daniel, Daniel S.; and Woods, Samuel G., 5,013,993, Cl. 320-35.000.
- Wooge, Christian: *See—*
  - Borst, Willi; and Wooge, Christian, 5,012,953, Cl. 222-1.000.
- Worcester, Samuel A.; and Case, Patti L., to Westinghouse Electric Corp. Direct production of niobium titanium alloy during niobium reduction. 5,013,357, Cl. 75-622.000.
- Worrell, Glen C.: *See—*
  - Potter, Terry W.; and Worrell, Glen C., 5,014,327, Cl. 382-14.000.
- Wozney, John M.: *See—*
  - Wang, Elizabeth A.; Wozney, John M.; and Rosen, Vicki, 5,013,649, Cl. 435-69.100.
- Wozniak, Edmond: *See—*
  - Radtke, Damien; and Wozniak, Edmond, 5,013,748, Cl. 514-383.000.
- Wreede, John E.; and Knobbe, Edward T., to Hughes Aircraft Company. Method of reducing the permeability of plastic optical articles. 5,013,584, Cl. 427-162.000.
- Wren, Paul E., to United States of America, National Aeronautics and Space Administration. Emergency locating transmitter. 5,014,340, Cl. 455-1.000.
- Wright, Antony P.; and Varaprath, Padmakumari J., to Dow Corning Corporation. Siloxane soluble $(CH_3)_3SiO_{1/2}/SiO_2$ (M/Q) resins with amine and amide organofunctionality. 5,013,577, Cl. 427-35.000.
- Wright, Richard B.; Vozenilek, Theodore M.; and Fleming, Brent P., to Wright Tool Company. Socket wrench opening. 5,012,706, Cl. 81-121.100.
- Wright Tool Company: *See—*
  - Wright, Richard B.; Vozenilek, Theodore M.; and Fleming, Brent P., 5,012,706, Cl. 81-121.100.
- Wright, Wade S.: *See—*
  - Block, Wayne F.; and Wright, Wade S., 5,013,374, Cl. 148-113.000.
- Wrobel, Gunter, to Papst-Motoren & Co., KG. Motor with toothed disk to secure the stator core. 5,013,957, Cl. 310-217.000.
- Wuerzer, Bruno: *See—*
  - Schwalge, Barbara; Plath, Peter; Eicken, Karl; Meyer, Norbert; and Wuerzer, Bruno, 5,013,354, Cl. 71-95.000.
- Wuest, Willi: *See—*
  - Raehse, Wilfried; Wuest, Willi; and Just, Guenther, 5,013,832, Cl. 536-90.000.
- Wulf, Hubert J., deceased (by Wulf, Maria A., nee Bothorn, heiress), to Riloga-Werk Julius Schmidt GmbH & Co. KG. Blind and carrier for vertical slats and/or curtains. 5,012,552, Cl. 16-87.40R.
- Wulf, Maria A., nee Bothorn, heiress: *See—*
  - Wulf, Hubert J., deceased, 5,012,552, Cl. 16-87.40R.
- Wullenweber, Heinz; and Borchardt, Jurgen, to Metallgesellschaft Aktiengesellschaft. Electrolyzer. 5,013,418, Cl. 204-253.000.
- Wurl, Michael: *See—*
  - Walenta, Rainer; Muller-Peddinghaus, Reiner; Ban, Ivan; Wurl. Michael; and Preuschoff, Ulf, 5,013,852, Cl. 549-362.000.
- Wurl, Robert: *See—*
  - Leussler, Wilhelm; Wurl, Robert; and Schlaffer, Herbert, 5,013,342, Cl. 55-337.000.
- Xerox Corporation: *See—*
  - Epler, John E.; and Paoli, Thomas L., 5,013,684, Cl. 437-129.000.
  - Howell, Michael L., 5,013,026, Cl. 271-187.000.
  - Ong, Beng S.; Kmiecik-Lawrynowicz, Grazyna; Yulo, Fernando; and Koch, Kayong, 5,013,630, Cl. 430-138.000.
  - Yu, Robert C.U., 5,013,624, Cl. 430-60.000.
- Xolox Corporation: *See—*
  - Zepp, Lawrence P., 5,012,837, Cl. 137-99.000.
- XOX Corporation: *See—*
  - Sinha, Pradeep; and Rahman, Turhan F., 5,014,230, Cl. 364-578.000.
- Xylochimie: *See—*
  - Radtke, Damien; and Wozniak, Edmond, 5,013,748, Cl. 514-383.000.
- Y. T. Li Engineering, Inc.: *See—*
  - Li, Yao-Tzu; and Yundt, Brad, 5,013,446, Cl. 210-635.000.
- Yabe, Masao: *See—*
  - Matsuzawa, Hideki; Yabe, Masao; Irie, Tadashi; Watanabe, Seiichi; and Ishihara, Yusuke, 5,013,593, Cl. 428-64.000.
- Yada, Yukihiko; and Hirose, Toshio, to Tokai Kogyo Kabushiki Kaisha. Roof molding for use with automobile and clips for securing the same. 5,013,083, Cl. 296-213.000.
- Yadav, Narendra S.: *See—*
  - Bedbrook, John R.; Chaleff, Roy S.; Falco, Saverio C.; Mazur, Barbara J.; Somerville, Christopher R.; and Yadav, Narendra S., 5,013,659, Cl. 435-172.300.
- Yagawara, Shinji; and Ohta, Wasaburo, to Ricoh Company, Ltd. Gas detecting device. 5,012,671, Cl. 73-31.060.
- Yagi, Yukihiko: *See—*
  - Sakuma, Masato; Fujita, Yuji; Kitano, Kissho; Yagi, Yukihiko; Sakaizawa, Masao; and Yamamoto, Noburo, 5,013,789, Cl. 525-66.000.
- Yakubowski, Carl: *See—*
  - Horvath, Joseph L.; Biskeborn, Robert G.; and Yakubowski, Carl, 5,014,117, Cl. 357-81.000.
- Yale, Ramon L., to GTE Products Corporation. Process for providing hydrolysis resistant phosphors. 5,013,582, Cl. 427-65.000.
- Yale Security Products Ltd.: *See—*
  - Aston, Walter J., 5,014,030, Cl. 335-228.000.
- Yale University: *See—*
  - Bennett, William R., Jr.; and Bennett, Jean, 5,012,815, Cl. 128-715.000.
- Yalkut, Mark B.: *See—*
  - Tatur, Alexandr D.; Kilimnik, Oskar G.; Yalkut, Mark B.; Rubin, Eduard A.; Ponomarev, Viktor U.; Mirchevsky, Petr N.; Gurzhy, Ivan K.; Karev, Alexandr A.; and Boguslavsky, Alexandr M., 5,012,759, Cl. 118-320.000.
- Yamada, Kazuyoshi, to NEC Corporation. Voltage generating circuit using a Schottky barrier diode. 5,013,999, Cl. 323-313.000.
- Yamada, Takanobu, to Minolta Camera Co., Ltd. Color image forming apparatus. 5,014,095, Cl. 355-327.000.
- Yamada, Takeshi: *See—*
  - Itoh, Kenichiroh; Yoshinuma, Nikio; Suzuji, Naomichi; Yamada, Takeshi; and Taya, Hiroyuki, 5,013,345, Cl. 65-4.200.
- Yamagata, Hiroshi, to Yamaha Hatsudoki Kabushiki Kaisha. Composite cylinder block assembly. 5,012,776, Cl. 123-193.00C.
- Yamagata, Naoyuki: *See—*
  - Oda, Hiroyuki; Tanaka, Toshimitsu; Yamagata, Naoyuki; and Hashimoto, Kazuhiko, 5,012,771, Cl. 123-52.0MB.
- Yamagata, Shimbu: *See—*
  - Sano, Koichi; Yamagata, Shimbu; Yokoyama, Tetsuo; and Koizumi, Hideaki, 5,014,007, Cl. 324-309.000.
- Yamaguchi, Akihiro: *See—*
  - Ohta, Masahiro; Kawashima, Saburo; Tamai, Shoji; Oikawa, Hideaki; Yamaguchi, Akihiro; Koba, Tomohito; Nakakura, Toshiyuki; Sakai, Hideo; Masuda, Misao; Kishi, Satoru; and Maruko, Chiaki, 5,013,817, Cl. 528-183.000.
  - Yoshikawa, Yukihiro; Yamazaki, Midori; Yamaguchi, Keizaburo; Sugimoto, Kenichi; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 5,013,848, Cl. 548-522.000.
- Yamaguchi, Keizaburo: *See—*
  - Yoshikawa, Yukihiro; Yamazaki, Midori; Yamaguchi, Keizaburo; Sugimoto, Kenichi; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 5,013,848, Cl. 548-522.000.
- Yamaguchi, Koshiro; and Hattori, Hiroshi, to Brother Kogyo Kabushiki Kaisha. Thermal printing apparatus. 5,014,072, Cl. 346-76.0PH.
- Yamaguchi, Yuichi: *See—*
  - Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 5,014,201, Cl. 364-426.040.
- Yamaguchi, Yuzo: *See—*
  - Sato, Taichi; Mouri, Yoshiharu; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Masukawa, Tetsuo; Takeuchi, Yoshinori; Yamaguchi, Yuzo; and Imai, Satomitsu, 5,014,144, Cl. 360-104.000.
- Yamaha Corporation: *See—*
  - Kongou, Akihiko, 5,012,714, Cl. 84-390.000.
  - Nagi, Katsuo; and Furukawa, Kazunari, 5,012,890, Cl. 181-160.000.
  - Nagi, Katsuo; Furukawa, Kazunari; and Noro, Masao, 5,014,320, Cl. 381-96.000.
- Yamaha Hatsudoki Kahushiki Kaisha: *See—*
  - Tsukakoshi, Hiroshi, 5,013,397, Cl. 156-631.000.
  - Yamagata, Hiroshi, 5,012,776, Cl. 123-193.00C.
  - Yokoyama, Yoshiharu; Akiyama, Shigeru; Nakayama, Hironori; and Kamiya, Tsuyoshi, 5,012,781, Cl. 123-353.000.
- Yamahira, Atsushi: *See—*
  - Fukumoto, Testuhiro; and Yamahira, Atsushi, 5,012,847, Cl. 152-209.00R.
- Yamaichi Electric Mfg. Co., Ltd.: *See—*
  - Matsuoka, Noriyuki; and Uratsuji, Kazumi, 5,013,256, Cl. 439-264.000.

VOL
1126
ISS
1
MY
7
1991
UMI

Yamamoto, Haruhiko: *See*—
Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Haruhiko; and Nagai, Takeshi, 5,012,858, Cl. 165-1.000.

Yamamoto, Hideki: *See*—
Yokoo, Toru; and Yamamoto, Hideki, 5,013,132, Cl. 350-128.000.

Yamamoto, Hiroaki: *See*—
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,012,697, Cl. 74-866.000.

Yamamoto, Isamu; and Fukushima, Jiro, to Mitsubishi Denki Kabushiki Kaisha. Method of forming a passivation film. 5,013,689, Cl. 437-229.000.

Yamamoto, Kazushige: *See*—
Kihava, Kouichi; and Yamamoto, Kazushige, 5,014,233, Cl. 364-766.000.

Yamamoto, Masaji: *See*—
Kobayashi, Katsuyuki; Inui, Masaki; Ashida, Satoshi; Nakamura, Keiichi; and Yamamoto, Masaji, 5,012,908, Cl. 192-57.000.

Yamamoto, Masami: *See*—
Enomoto, Masao; Yamamoto, Masami; Nagayama, Yoshiro; and Yamauchi, Yoshinori, 5,012,693, Cl. 74-502.100.

Yamamoto, Noburo: *See*—
Sakuma, Masato; Fujita, Yuji; Kitano, Kissho; Yagi, Yukihiko; Sakaizawa, Masao; and Yamamoto, Noburo, 5,013,789, Cl. 525-66.000.

Yamamoto, Nobuyuki: *See*—
Kurozumi, Seiji; Uda, Shigenori; Hirai, Masatake; Murano, Katuhiro; Kimura, Takeo; and Yamamoto, Nobuyuki, 5,013,956, Cl. 310-323.000.

Yamamura, Souhei, to Matsushita Electric Industrial Co., Ltd. Head-up display with two fresnel lenses. 5,013,135, Cl. 350-174.000.

Yamanashi Yagen Limited: *See*—
Imamura, Eiyu, 5,013,570, Cl. 426-599.000.

Yamanishi, Toru: *See*—
Hattori, Tomoyuki; Akasaka, Nobuhiro; and Yamanishi, Toru, 5,013,126, Cl. 350-96.230.

Yamaoka, Hideyoshi: *See*—
Kubo, Katsuhiro; Sakai, Keiji; Kurata, Yukio; and Yamaoka, Hideyoshi, 5,013,494, Cl. 264-1.300.

Yamashita, Kyoichi, to Koyo Jidoki Company Limited. Vehicle turntable. 5,012,745, Cl. 104-44.000.

Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, to Suzuki Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Revolution controller for a continuously variable transmission. 5,012,697, Cl. 74-866.000.

Yamatoya & Co., Ltd.: *See*—
Numakura, Takashi; and Numakura, Iwao, 5,014,120, Cl. 358-39.000.

Yamauchi, Kunio: *See*—
Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,012,795, Cl. 126-262.000.

Yamauchi, Yoshinori: *See*—
Enomoto, Masao; Yamamoto, Masami; Nagayama, Yoshiro; and Yamauchi, Yoshinori, 5,012,693, Cl. 74-502.100.

Yamauchi, Yoshio: *See*—
Higashidate, Sakae; Yamauchi, Yoshio; and Saito, Muneo, 5,013,443, Cl. 210-634.000.

Yamaura, Michio; Yatabe, Toshiaki; and Matsuzawa, Hiroshi, to Teijin Limited. Method of producing a magnetic recording medium. 5,013,583, Cl. 427-131.000.

Yamazaki, Midori: *See*—
Yoshikawa, Yukihiro; Yamazaki, Midori; Yamaguchi, Keizaburo; Sugimoto, Kenichi; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 5,013,848, Cl. 548-522.000.

Yamazaki, Nobuo; Inaba, Hiroo; and Masaki, Kouichi, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 5,013,602, Cl. 428-323.000.

Yamazaki, Shunepi; Urata, Kazuo; Koyama, Itaru; Ishida, Noriya; Sasaki, Mari; Imatou, Shinji; Nakashita, Kazuhisa; and Hirose, Naoki, to Semiconductor Energy Laboratory Co., Ltd. Method of manufacturing a semiconductor using plasma processing. 5,013,688, Cl. 437-210.000.

Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Microwave enhanced CVD method for coating mechanical parts for improved wear resistance. 5,013,579, Cl. 427-38.000.

Yamazaki, Shuntaro; and Ono, Takashi, to NEC Corporation. Polarization control of bidirectionally transmitted beams by a single polarization controller. 5,013,116, Cl. 350-96.150.

Yanagawa, Koichi: *See*—
Kuboyama, Yoichi; and Yanagawa, Koichi, 5,014,012, Cl. 324-720.000.

Yanagawa, Nobuhide: *See*—
Fujioka, Hisatake; Horikawa, Tokio; and Yanagawa, Nobuhide, 5,012,907, Cl. 192-13.00R.

Yanagioka, Hiroshi: *See*—
Ishikawa, Hiroshi; Koyata, Kazuo; Ono, Tetsuo; Motizuki, Takuo; Sakuta, Masayuki; Onodera, Show; Yanagioka, Hiroshi; and Abe, Yoshihisa, 5,012,984, Cl. 241-16.000.

Yang, Chau-Hwa: *See*—
Harrison, Jeffrey B.; and Yang, Chau-Hwa, 5,013,764, Cl. 518-714.000.

Yang, Henry W., to Exxon Chemical Patents Inc. Internal resin-tackified acrylic polymers containing crosslinkable comonomers. 5,013,784, Cl. 524-458.000.

Yano, Shinsuke: *See*—
Kato, Hiroshi; Yano, Shinsuke; Nonomura, Toshio; and Nishigaki, Susumu, 5,013,695, Cl. 501-139.000.

Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, to Ichikawa Woolen Textile Co., Ltd. Cop winding device with knot disalignment for shuttle loom. 5,012,843, Cl. 139-224.00A.

Yarita, Yoshio; and Kawamura, Yoshihiro, to Casio Computer Co., Ltd. Method of manufacturing double-sided wiring substrate. 5,013,402, Cl. 156-645.000.

Yasuda, Mamoru; and Toda, Hitoshi, to Hosiden Electronics Co., Ltd. Diaphragm unit of a condenser microphone, a method of fabricating the same, and a condenser microphone. 5,014,322, Cl. 381-174.000.

Yasuda, Tetsuo: *See*—
Suzuki, Takashi; Yasuda, Tetsuo; Miyauchi, Otohiko; and Yotsuyanagi, Junji, 5,013,516, Cl. 264-130.000.

Yasue, Yoshihiko; and Kagechika, Hiroshi, to NKK Corporation. Surface treated steel plate for cans. 5,013,614, Cl. 428-651.000.

Yasue, Yoshihiko: *See*—
Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, 5,013,410, Cl. 204-27.000.

Yasunaga, Makoto: *See*—
Ikehata, Tsutomu; Yasunaga, Makoto; and Suzuki, Hirofumi, 5,013,169, Cl. 400-124.000.

Yatabe, Toshiaki: *See*—
Yamaura, Michio; Yatabe, Toshiaki; and Matsuzawa, Hiroshi, 5,013,583, Cl. 427-131.000.

Yatabe, Toshio: *See*—
Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.

Yau-Young, Annie: *See*—
Woodle, Martin C.; Martin, Francis J.; Yau-Young, Annie; and Redemann, Carl T., 5,013,556, Cl. 424-450.000.

Yiournas, Costas; and Wallach, Donald F. H., to Micro-Pak, Inc. Method and apparatus for producing lipid vesicles. 5,013,497, Cl. 264-4.100.

Yngve, Paul W.: *See*—
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; and Yngve, Paul W., 5,012,636, Cl. 57-204.000.

Yokogawa Medical Systems, Limited: *See*—
Imanishi, Yasuo, 5,014,129, Cl. 358-166.000

Yokoo, Toru; and Yamamoto, Hideki, to Pioneer Electronic Corporation. Rear-projection television. 5,013,132, Cl. 350-128.000.

Yokota, Katsuyoshi; Jingu, Toshihiro; and Matsumoto, Kazunori, to NCR Corporation. Tandem station dot matrix printer. 5,013,168, Cl. 400-82.000.

Yokota, Takashi: *See*—
Abrams, John S.; Yokota, Takashi; Lee, Frank; and Arai, Ken-ichi, 5,013,824, Cl. 530-300.000.

Yokote, Masatsugu; Sugasawa, Fukashi; Mouri, Hiroshi; and Kuroki, Junsuke, to Nissan Motor Co., Ltd. Vehicle steering system with flow dividing valve. 5,012,881, Cl. 180-140.000.

Yokoya, Yuji: *See*—
Hara, Yoshimichi; Matsunaga, Eiju; Kawata, Hiroyuki; Hukami, Akira; Suzuki, Yutaka; Shiozaki, Makoto; Yokoya, Yuji; and Tsutsumi, Yasuhiro, 5,013,955, Cl. 310-316.000.

Yokoyama, Kunihiko: *See*—
Nakamura, Hisashi; Sakaba, Hideo; Yokoyama, Kunihiko; Hayashida, Hitoshi; Yatabe, Toshio; Ikeda, Makinori; Ohhira, Hiroaki; Kisohara, Naoyuki; Gunji, Minoru; Nakai, Satoru; and Ohtaki, Akira, 5,013,519, Cl. 376-179.000.

Yokoyama, Mizuho: *See*—
Souma, Masahiro; Kosuge, Tokuo; Ishikawa, Tohru; Kanamaru, Hisanobu; Yokoyama, Mizuho; and Kamituma, Yasuo, 5,012,982, Cl. 239-585.000.

Yokoyama, Tetsuo: *See*—
Sano, Koichi; Yamagata, Shimbu; Yokoyama, Tetsuo; and Koizumi, Hideaki, 5,014,007, Cl. 324-309.000.

Yokoyama, Yoshiharu; Akiyama, Shigeru; Nakayama, Hironori; and Kamiya, Tsuyoshi, to Yamaha Hatsudoki Kabushiki Kaisha. Gas engine. 5,012,781, Cl. 123-353.000.

Yomogizawa, Shinya; and Ikari, Hideo, to Canon Kabushiki Kaisha. Camera with variable focal length optical system. 5,014,077, Cl. 354-187.000.

Yomura, Yoshinori: *See*—
Kagechika, Hiroshi; Mishima, Tadahiko; Yomura, Yoshinori; Ishikawa, Hiroshi; Oniwa, Naoyuki; Yasue, Yoshihiko; and Kibe, Hiroshi, 5,013,410, Cl. 204-27.000.

Yoneda, Aritoshi: *See*—
Asano, Ichiro; Kojima, Kennosuke; and Yoneda, Aritoshi, 5,013,920, Cl. 250-343.000.

Yoneda, Yoshiro: *See*—
Numazawa, Junji; Yoneda, Yoshiro; and Aruga, Fusayoshi, 5,014,148, Cl. 360-125.000.

Yonehara, Takao: *See*—
Arikawa, Shiro; and Yonehara, Takao, 5,013,670, Cl. 437-2.000.

Yonekawa, Takashi; Onuma, Toshio; Buma, Shuuichi; Ikemoto, Hiroyuki; Ohashi, Kaoru; Aburaya, Toshio; and Sato, Kinihito. US-OS characteristic control system for a vehicle responding to turning state quantity and the changing rate thereof. 5,013,062, Cl. 280-707.000.

Yoshida Kogyo K. K.: *See*—
Akashi, Shunji, 5,013,511, Cl. 264-242.000.

Yoshida Kogyo K.K.: *See*—
Ito, Kazuyoshi, 5,012,573, Cl. 29-798.000.

Yoshida, Norio, to NEC Corporation. Frame synchronizer for detecting misframes with different shift patterns. 5,014,272, Cl. 370-106.000.

Yoshida, Satoshi: *See*—
Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 5,014,089, Cl. 355-251.000.

Yoshida, Tadahisa: *See*—
Ikegami, Kazunori; Okuda, Souitirou; Nosaka, Eishou; and Yoshida, Tadahisa, 5,013,963, Cl. 313-414.000.

Yoshida, Tamio: *See*—
Shimizu, Chiyuki; and Yoshida, Tamio, 5,013,807, Cl. 528-17.000.

Yoshida, Tokuichiro. Automatic speed changing apparatus. 5,012,644, Cl. 60-425.000.

Yoshida, Yuji: *See*—
Nakatani, Kazuo; Ikoma, Mitsuhiro; Yoshida, Yuji; Tomizawa, Takeshi; Arita, Koji; and Tagashira, Minoru, 5,012,651, Cl. 62-149.000.

Yoshikawa, Masao: *See*—
Minowa, Takehisa; and Yoshikawa, Masao, 5,013,411, Cl. 204-29.000.

Yoshikawa, Shoji: *See*—
Horie, Yuji; and Yoshikawa, Shoji, 5,014,256, Cl. 369-44.350.

Yoshikawa, Susumu: *See*—
Kumagai, Jumpei; and Yoshikawa, Susumu, 5,013,679, Cl. 437-52.000.

Yoshikawa, Yukihiro; Yamazaki, Midori; Yamaguchi, Keizaburo; Sugimoto, Kenichi; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Incorporated. Aromatic bismaleimide derivatives and process for preparing same. 5,013,848, Cl. 548-522.000.

Yoshino, Kenji: *See*—
Takemura, Kazuya; Yoshino, Kenji; and Wakui, Tadahiro, 5,013,818, Cl. 528-193.000.

Yoshinuma, Nikio: *See*—
Itoh, Kenichiroh; Yoshinuma, Nikio; Suzuji, Naomichi; Yamada, Takeshi; and Taya, Hiroyuki, 5,013,345, Cl. 65-4.200.

Yoshioka, Hiroshi: *See*—
Takizawa, Yoshio; Sigeta, Kunio; Takeuchi, Shigeki; Yoshioka, Hiroshi; and Fujimaki, Yoshihide, 5,013,625, Cl. 430-64.000.

Yoshioka, Toyotoshi: *See*—
Kuwabara, Syokichi; and Yoshioka, Toyotoshi, 5,012,546, Cl. 15-301.000.

Yoshiyama, Toshio: *See*—
Wakikaido, Takahiro; Yoshiyama, Toshio; and Yoshizuka, Ken, 5,014,088, Cl. 355-201.000.

Yoshizawa, Tomomi; Ogi, Keiji; and Kimura, Nariko, to Konica Corporation. Method for developing a silver halide color photographic light-sensitive material for color proof using a specified color developing agent. 5,013,633, Cl. 430-358.000.

Yoshizuka, Ken: *See*—
Wakikaido, Takahiro; Yoshiyama, Toshio; and Yoshizuka, Ken, 5,014,088, Cl. 355-201.000.

Yost, Vaughn H.: *See*—
Snyder, Robert S.; Herren, Blair J.; Carter, Daniel C.; Yost, Vaughn H.; Bugg, Charles E.; DeLucas, Lawrence J.; and Suddath, Fred L., 5,013,531, Cl. 422-245.000.

Yotsuyanagi, Junji: *See*—
Suzuki, Takashi; Yasuda, Tetsuo; Miyauchi, Otohiko; and Yotsuyanagi, Junji, 5,013,516, Cl. 264-130.000.

Young, Clarence W.: *See*—
Feltz, Louis V.; Reece, Eric W.; Young, Clarence W.; and Thigpen Lewis, 5,014,248, Cl. 367-4.000.

Young, Diane K.: *See*—
Fischer, Jeffrey H.; Grasso, Lawrence J.; Hoffman, Dale E.; Skooglund, Daniel E.; and Young, Diane K., 5,013,944, Cl. 307-603.000.

Young, Donald C.: *See*—
Green, James A.; and Young, Donald C., 5,013,350, Cl. 71-65.000.

Young, Harold W., Jr.; and Dianis, William P., to Dow Chemical Company, The. Oxydehydrogenation of dinitriles. 5,013,860, Cl. 558-383.000.

Young, Terence P., to General Electric Company, p.l.c., The. Optical switch apparatus. 5,013,114, Cl. 350-96.140.

Young, Timothy T. J. Sleighroad. 5,012,748, Cl. 104-134.000.

Ytong AG: *See*—
Lind, Torvald, 5,013,879, Cl. 219-56.000.

Yu, Robert C.U., to Xerox Corporation. Glassy metal oxide layers for photoreceptor applications. 5,013,624, Cl. 430-60.000.

Yugen Kaisha Senbokuya: *See*—
Hamada, Yonenori; and Senbokuya, Eiji, 5,014,035, Cl. 337-372.000.

Yuhaku, Satoru: *See*—
Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; Hakotani, Yasuhiko; and Kikuchi, Tatsuro, 5,014,158, Cl. 361-321.000.

Yulo, Fernando: *See*—
Ong, Beng S.; Kmiecik-Lawrynowicz, Grazyna; Yulo, Fernando; and Koch, Kayong, 5,013,630, Cl. 430-138.000.

Yundt, Brad: *See*—
Li, Yao-Tzu; and Yundt, Brad, 5,013,446, Cl. 210-635.000.

Zachary, Alain. Device for secondary separation of grain in a combine harvester. 5,013,280, Cl. 460-80.000.

Zafiropoulo, Arthur W.: *See*—
Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 5,013,385, Cl. 156-345.000.

Zambon Group S.P.A.: *See*—
Melchiorri, Pietro; and Negri, Lucia, 5,013,721, Cl. 514-13.000.

Zambrano, Raffaele, to SGS-Thomson Microelectronics s.r.l. Manufacturing process for high-frequency bipolar transistors. 5,013,672, Cl. 437-33.000.

Zapp, Raymond K.: *See*—
Harvath, Steven J.; Kilgore, Vernon O.; and Zapp, Raymond K., 5,014,300, Cl. 379-100.000.

Zaragoza, Robert; McLinden, Thomas V.; and O'Connell, James A., to Becton, Dickinson and Company. Electronic clinical thermometer. 5,013,161, Cl. 374-208.000.

Zauner, Robert S.: *See*—
Cronce, Gary M.; Reid, Ronald W.; Stapleton, Craig A.; and Zauner, Robert S., 5,013,081, Cl. 296-180.100.

Zdunek, Kenneth J.: *See*—
Comroe, Richard A.; Zdunek, Kenneth J.; Sasuta, Michael D.; Coombes, Daniel J.; and Borras, Jaime A., 5,014,345, Cl. 455-54.000.

Zecman, Kenneth P. Fluid cooled shot sleeve. 5,012,856, Cl. 164-312.000.

Zeilinski, Adam; and Atkins, Christopher J., to University of Victoria. Dolorimeter apparatus. 5,012,817, Cl. 128-744.000.

Zelan, Donald J.; and Dubay, William G., to Fiber Tech, Inc. Modular system for decorative lighting. 5,013,109, Cl. 350-96.100.

Zelenka, Jerry L. Door answering and intruder alert apparatus and method. 5,014,039, Cl. 340-565.000.

Zeller, Lowell C.: *See*—
Norbury, Robert J.; Chang, Robert W. H.; and Zeller, Lowell C., 5,013,473, Cl. 252-174.130.

Zeller Plastik GmbH: *See*—
Koehn, Jochen, 5,012,940, Cl. 215-230.000.

Zenith Electronics Corporation: *See*—
Kautz, Allan D., 5,013,275, Cl. 445-30.000.

Zepp, Lawrence P., to Xolox Corporation. Ratio device for dispensing liquids. 5,012,837, Cl. 137-99.000.

Zettler, William R., Jr.: *See*—
Lawton, Wayne M.; Huffman, John C.; and Zettler, William R., Jr., 5,014,134, Cl. 358-261.300.

Zharov, Nikolai P.: *See*—
Chevakin, Ivan V.; Zharov, Nikolai P.; Popov, Oleg V.; Pesin, Abram I.; and Radchenko, Petr A., 5,012,649, Cl. 60-527.000.

Zich, Bernhard. Multi-part shelf. 5,013,100, Cl. 312-200.000.

Ziegenhorn, Joachim: *See*—
Town, Michael-Harold; Siedel, Joachim; and Ziegenhorn, Joachim, 5,013,647, Cl. 435-25.000.

Ziegler, Ewald: *See*—
Holzgrefe, Volker; Simon, Nikolaus; and Ziegler, Ewald, 5,012,981, Cl. 239-533.120.

Ziegler, Ronald H.: *See*—
Burg, Thomas J.; Ziegler, Ronald H.; Cooper, William K.; Kapala, John W.; and Anderson, Robert J., 5,012,747, Cl. 104-130.000.

Zimmer, Inc.: *See*—
Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., 5,013,324, Cl. 623-23.000.

Zimmerman, Robert L.; and Primeaux, Dudley J., II, to Texaco Chemical Company. Polyurea elastomer with rapid dry time. 5,013,813, Cl. 528-60.000.

Zimmermann, Kurt: *See*—
Kunze, Volkmar; Zimmermann, Kurt; and Hinterdorfer, Erwin, 5,012,861, Cl. 165-47.000.

Zink, Rudolf: *See*—
Phaff, Rox; and Zink, Rudolf, 5,013,707, Cl. 503-212.000.

Zion Educational Foundation: *See*—
Stubbers, Ron; Chen, Chen; and Skolnick, Malcolm, 5,012,808, Cl. 128-419.00R.

Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., to Zimmer, Inc. Prosthetic implant with wrapped porous surface. 5,013,324, Cl. 623-23.000.

Zoltan, Sandor: *See*—
Hidasi, Gyorgy; Szekely, Istvan; Bertok, Bela; Zoltan, Sandor; Nagy, Lajos; Gajari, Antal; Somfai, Eva; Hegedus, Agnes; Pap, Laszlo ; Soos, Rudolf; Radvany, Erzsebet; Botar, Sandor; and Szabolcsi, Tamas, 5,013,754, Cl. 514-521.000.

Zucker, Friedheim: *See*—
Morimoto, Yasuaki; Zucker, Friedheim; and Buchler, Christian, 5,014,253, Cl. 369-13.000.

Zupnick, Jerald: *See*—
Klupt, Christopher; and Zupnick, Jerald, 5,014,299, Cl. 379-98.000.

Zurek, Michael W.: *See*—
Phillips, James P.; Johnson, Robert M., Jr.; and Zurek, Michael W., 5,014,346, Cl. 455-89.000.

Zwier, Jan: *See*—
Mellink, Willem F.; Janssen, Peter J. G. M.; Zwier, Jan; and Lotterman, Harm, 5,013,384, Cl. 156-345.000.

VOL
1126
ISS
1
MY
7
1991
UMI

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF MAY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

C.R. Bard, Inc.: *See—*

Lindgren, Per G., Re. 33,582, Cl. 128-754.000.

Foster, Clark B.: *See—*

Haber, Terry M.; Foster, Clark B.; and Smedley, William H., Re. 33,585, Cl. 604-198.000.

Fujitsu Limited: *See—*

Mimura, Takashi, Re. 33,584, Cl. 357-22.000.

Haber, Terry M.; Foster, Clark B.; and Smedley, William H., to Habley Medical Technology Corporation. Shielded safety syringe. Re. 33,585, Cl. 604-198.000.

Habley Medical Technology Corporation: *See—*

Haber, Terry M.; Foster, Clark B.; and Smedley, William H., Re. 33,585, Cl. 604-198.000.

Lindgren, Per G., to C.R. Bard, Inc. Tissue sampling device. Re. 33,582, Cl. 128-754.000.

Manzoni, Stephane, to Societe Manzoni Bouchot. Mechanism with torque-limiting device for controlling a rearview mirror. Re. 33,583, Cl. 350-633.000.

Mimura, Takashi, to Fujitsu Limited. High electron mobility single heterojunction semiconductor devices. Re. 33,584, Cl. 357-22.000.

Smedley, William H.: *See—*

Haber, Terry M.; Foster, Clark B.; and Smedley, William H., Re. 33,585, Cl. 604-198.000.

Societe Manzoni Bouchot: *See—*

Manzoni, Stephane, Re. 33,583, Cl. 350-633.000.

# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Dash Partners: *See—*

Rautenberg, Leonard J.; Gilbert, Milton M.; Wyner, James H.; and Wyner, Daniel M., B1 4,761,324, Cl. 428-198.000.

Gilbert, Milton M.: *See—*

Rautenberg, Leonard J.; Gilbert, Milton M.; Wyner, James H.; and Wyner, Daniel M., B1 4,761,324, Cl. 428-198.000.

Hemstreet, Harold S., to Hemstreet, Harold S. Method and apparatus for identifying letters, characters, symbols, and the like. B1 3,713,100, 5-7-91, Cl. 382-34.000.

Rautenberg, Leonard J.; Gilbert, Milton M.; Wyner, James H.; and Wyner, Daniel M., to Dash Partners. Elastic, laminated, water-proof, moisture-permeable fabric. B1 4,761,324, 5-7-91, Cl. 428-198.000.

Wyner, Daniel M.: *See—*

Rautenberg, Leonard J.; Gilbert, Milton M.; Wyner, James H.; and Wyner, Daniel M., B1 4,761,324, Cl. 428-198.000.

Wyner, James H.: *See—*

Rautenberg, Leonard J.; Gilbert, Milton M.; Wyner, James H.; and Wyner, Daniel M., B1 4,761,324, Cl. 428-198.000.

# LIST OF DESIGN PATENTEES

Adler, Josef H., to Nesher Industries, Inc. Adjustable table. 316,639, 5-7-91, Cl. D6-429.000.

Air Ventilation Observer, Inc.: *See—*

Savastano, Robert P., 316,750, Cl. D23-365.000.

Alemany, Francisco A. S., to Salgado & Cia., S.A. Bottle. 316,670, 5-7-91, Cl. D9-335.000.

Alger, Andrew: *See—*

Kurth, Mark; and Alger, Andrew, 316,741, Cl. D23-209.000.

Allgeier, David M. J., to NCR Corporation. Bar code scanner or similar article. 316,707, 5-7-91, Cl. D14-107.000.

American Pneumatic Technologies, Inc.: *See—*

Neff, Edward R., 316,659, Cl. D8-61.000.

Anderson, Bruce O.: *See—*

Bush, Paul; and Anderson, Bruce O., 316,640, Cl. D6-436.000.

Bush, Paul; and Anderson, Bruce O., 316,641, Cl. D6-436.000.

Bush, Paul; and Anderson, Bruce O., 316,642, Cl. D6-446.000.

Anderson, David N.; and Eckstedt, Paul D., to FMC Corporation. Stand alone single head juice extractor. 316,654, 5-7-91, Cl. D7-665.000.

Aoyama, Minoru; and Komada, Takeshi, to Canon Kabushiki Kaisha. Automatic developer exchanging device for a photocopier. 316,725, 5-7-91, Cl. D18-40.000.

Apple Computer, Inc.: *See—*

Howard, Robert A.; and Willnauer, Sigmar, 316,709, Cl. D14-114.000.

Arvidsson, Ingmar, to Tollo Systems AB. Tool shifter for a robot for use in a material handling. 316,770, 5-7-91, Cl. D34-28.000.

Atlantic Fabricators, Inc.: *See—*

Tull, Raymond S., 316,664, Cl. D8-356.000.

Barginear, Larry. Trailer with visual guide rods. 316,688, 5-7-91, Cl. D12-101.000.

Beiser, Wayne, to Huffy Corporation. Bicycle pedal. 316,697, 5-7-91, Cl. D12-125.000.

Bianchini, William, to Rockport Company, Inc., The. Shoe upper. 316,623, 5-7-91, Cl. D2-314.000.

Bianchini, William; Infantino, Robert; and Post, Anthony, to Rockport Company, The. Shoe outsole. 316,625, 5-7-91, Cl. D2-320.000.

Billman, Fred L.: *See—*

Wortley, Russell B.; and Billman, Fred L., 316,668, Cl. D9-306.000.

Bonadonna, Peter, to Stick On Safety Light, Inc. Emergency light with integral suction cup for attachment to vehicle window. 316,684, 5-7-91, Cl. D10-114.000.

Breger, Carl-Arne, to Metsa-Serla Oy. Paper dispenser. 316,645, 5-7-91, Cl. D6-515.000.

Bridgestone Corporation: *See—*

Kawabata, Misao; Ushikubo, Hisao; Shinohara, Kazunori; and Kinoshita, Katsuhiko, 316,693, Cl. D12-147.000.

Buday, Gene, to Pro-Process Corporation. Pizza pie cutting guide. 316,655, 5-7-91, Cl. D7-673.000.

Buncho Corporation: *See—*

Yoshida, Masamichi, 316,730, Cl. D21-107.000.

Burnett, Mildred M.: *See—*

Burnette, Ronald D.; and Burnett, Mildred M., 316,735, Cl. D21-167.000.

Burnette, Ronald D.; and Burnett, Mildred M. Combined doll and pillow carrying case. 316,735, 5-7-91, Cl. D21-167.000.

Burney, Burrell T., to Petersen Manufacturing Co., Inc. Adjustable locking hand tool. 316,661, 5-7-91, Cl. D8-72.000.

Bush Industries, Inc.: *See—*

Bush, Paul; and Anderson, Bruce O., 316,640, Cl. D6-436.000.

Bush, Paul; and Anderson, Bruce O., 316,641, Cl. D6-436.000.

Bush, Paul; and Anderson, Bruce O., 316,642, Cl. D6-446.000.

VOL 1126
ISS 1
MY 7 1991
UMI

- Bush, Paul; and Anderson, Bruce O., to Bush Industries, Inc. Entertainment center. 316,640, 5-7-91, Cl. D6-436.000.
- Bush, Paul; and Anderson, Bruce O., to Bush Industries, Inc. Entertainment center. 316,641, 5-7-91, Cl. D6-436.000.
- Bush, Paul; and Anderson, Bruce O., to Bush Industries, Inc. Entertainment cabinet. 316,642, 5-7-91, Cl. D6-446.000.
- Cain, Ann S., to 'totes', incorporated. Umbrella handle design. 316,630, 5-7-91, Cl. D3-12.000.
- Canon Kabushiki Kaisha: *See—*
  - Aoyama, Minoru; and Komada, Takeshi, 316,725, Cl. D18-40.000.
  - Sano, Hiroshi, 316,720, Cl. D16-202.000.
- Carpenter, James H.; and Keller, Haven L., to Pangborn Corporation. Reversible vane for a throwing wheel. 316,717, 5-7-91, Cl. D15-126.000.
- Castex Industries, Inc.: *See—*
  - Wulff, Richard F., 316,765, Cl. D32-21.000.
- Cheetham, Colin R., to Gressco, Ltd. Display rack. 316,643, 5-7-91, Cl. D6-461.000.
- Cherniak, Steve. Knife sharpener. 316,662, 5-7-91, Cl. D8-93.000.
- Chi Ho, Cheung. Battery operated vacuum cleaner. 316,766, 5-7-91, Cl. D32-21.000.
- Choi, Young Jae. Wall lantern. 316,759, 5-7-91, Cl. D26-87.000.
- Clivio, Franco, to Gardena Kress+Kastner GmbH. Sprinkler. 316,742, 5-7-91, Cl. D23-214.000.
- Clivio, Franco, to Gardena Kress+Kastner GmbH. Sprinkler. 316,743, 5-7-91, Cl. D23-214.000.
- Clivio, Franco, to Gardena Kress+Kastner GmbH. Sprinkler. 316,744, 5-7-91, Cl. D23-218.000.
- Clivio, Franco, to Gardena Kress+Kastner GmbH. Sprinkler. 316,745, 5-7-91, Cl. D23-218.000.
- Conair Corporation: *See—*
  - Rizzuto, Leandro P.; Lindsey, Frank; and Leung, Anthony, 316,762, Cl. D28-35.000.
- Corbiscello, Maria L.: *See—*
  - Golden, Annette M.; and Corbiscello, Maria L., 316,760, Cl. D28-4.000.
  - Golden, Annette M.; and Corbiscello, Maria L., 316,761, Cl. D28-4.000.
- Cramer, Ronald G., to S. C. Johnson & Son, Inc. Aerosol actuator. 316,675, 5-7-91, Cl. D9-448.000.
- Crookes, William E.: *See—*
  - Haag, Peter C.; Jones, Donald G.; Crookes, William E.; and Felix, Cristian J., 316,696, Cl. D12-196.000.
- Crowley, Joseph. Combined pegboard merchandise display hook and label holder. 316,729, 5-7-91, Cl. D20-43.000.
- Cukon, Viktor. Golf club gripping jig. 316,660, 5-7-91, Cl. D8-71.000.
- Cunningham, Lafayette P. Bathtub caddy. 316,646, 5-7-91, Cl. D6-525.000.
- Daiwa Seiko, Inc.: *See—*
  - Oyama, Mitsuyoshi, 316,738, Cl. D22-142.000.
- Deere & Company: *See—*
  - Haag, Peter C.; Jones, Donald G.; Crookes, William E.; and Felix, Cristian J., 316,696, Cl. D12-196.000.
- Delafon, Jacob: *See—*
  - Ragonot, Christian, 316,746, Cl. D23-250.000.
- Dickey, David V., to Product R&D Corporation. Combined heat sink and radiator for electronic equipment. 316,705, 5-7-91, Cl. D13-179.000.
- Diffrient, Niels. Table leg. 316,644, 5-7-91, Cl. D6-498.000.
- Drake, Craig D.; and Ting, Phillip, to Ring King Visibles. Computer support shelf with power controls. 316,710, 5-7-91, Cl. D14-114.000.
- Eckstedt, Paul D.: *See—*
  - Anderson, David N.; and Eckstedt, Paul D., 316,654, Cl. D7-665.000.
- Edwards, Dorothy S. Muzzle for a sheep or cow. 316,764, 5-7-91, Cl. D30-152.000.
- Eng, Edmond C.; and Ferrante, Joseph V., to John Fluke Mfg. Co., Inc. Instrument case for electronic test and troubleshooting equipment. 316,682, 5-7-91, Cl. D10-75.000.
- Erickson, Theodore B.; Reed, Ivan F.; and Johnson, Harold D., to Pure Water, Inc. Water distilling unit. 316,739, 5-7-91, Cl. D23-207.000.
- Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, to Yazaki Corporation. Housing for an electrical connector. 316,703, 5-7-91, Cl. D13-147.000.
- Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, to Yazaki Corporation. Housing for an electrical connector. 316,704, 5-7-91, Cl. D13-147.000.
- Favre, Florian. Wristwatch. 316,677, 5-7-91, Cl. D10-39.000.
- Felix, Cristian J.: *See—*
  - Haag, Peter C.; Jones, Donald G.; Crookes, William E.; and Felix, Cristian J., 316,696, Cl. D12-196.000.
- Ferrante, Joseph V.: *See—*
  - Eng, Edmond C.; and Ferrante, Joseph V., 316,682, Cl. D10-75.000.
- Ferrari, Dario, to Intercos Italia S.p.A. Package for cosmetic products. 316,763, 5-7-91, Cl. D28-83.000.
- Fisher, William J., to Imagineering, Inc. Bedstead. 316,636, 5-7-91, Cl. D6-395.000.
- Fleischmann, Gary A., to Kohler Co. Handle. 316,747, 5-7-91, Cl. D23-252.000.
- FMC Corporation: *See—*
  - Anderson, David N.; and Eckstedt, Paul D., 316,654, Cl. D7-665.000.
- Foster, Thomas: *See—*
  - Rysner, Sheldon; Ramey, Thomas; and Foster, Thomas, 316,673, Cl. D9-415.000.
- France, Cathie S.; and France, David L. Padded hearth cover. 316,751, 5-7-91, Cl. D23-403.000.
- France, David L.: *See—*
  - France, Cathie S.; and France, David L., 316,751, Cl. D23-403.000.
- Fratelli Guzzini S.p.A.: *See—*
  - Minuti, Furio, 316,683, Cl. D10-91.000.
- Fujiki, Tetsushi, to Sumitomo Rubber Industries, Ltd. Automobile tire. 316,689, 5-7-91, Cl. D12-140.000.
- Fujiki, Tetsushi, to Sumitomo Rubber Industries, Ltd. Automobile tire. 316,691, 5-7-91, Cl. D12-146.000.
- Fujiki, Tetsushi, to Sumitomo Rubber Industries, Ltd. Automobile tire. 316,695, 5-7-91, Cl. D12-149.000.
- Fukumoto, Tetsuhiro, to Sumitomo Rubber Industries, Ltd. Automobile tire. 316,692, 5-7-91, Cl. D12-146.000.
- Gardena Kress+Kastner GmbH: *See—*
  - Clivio, Franco, 316,742, Cl. D23-214.000.
  - Clivio, Franco, 316,743, Cl. D23-214.000.
  - Clivio, Franco, 316,744, Cl. D23-218.000.
  - Clivio, Franco, 316,745, Cl. D23-218.000.
- Gartwhaite, Jay, to Leviton Manufacturing Co., Inc. Telecommunications connector. 316,702, 5-7-91, Cl. D13-133.000.
- Gentile Limited: *See—*
  - Tak, Hui W., 316,734, Cl. D21-157.000.
- Gillam, Paul A.: *See—*
  - Humphries, Mark D.; and Gillam, Paul A., 316,749, Cl. D23-339.000.
- Gold Star Co. Ltd.: *See—*
  - Shim, Keu S., 316,718, Cl. D16-202.000.
- Golden, Annette M.; and Corbiscello, Maria L., to Revlon, Inc. Set of cosmetic blocks. 316,760, 5-7-91, Cl. D28-4.000.
- Golden, Annette M.; and Corbiscello, Maria L., to Revlon, Inc. Cosmetic block. 316,761, 5-7-91, Cl. D28-4.000.
- Goldstar Co., Ltd.: *See—*
  - Suh, Nam C., 316,767, Cl. D32-21.000.
- Greenlee Textron Inc.: *See—*
  - Wanner, Vernon; and Larsen, Orville W., 316,658, Cl. D8-14.000.
- Greenspahn, Randy S., to Vertiflex Company. Combined writing board and holder. 316,727, 5-7-91, Cl. D19-52.000.
- Greiler, Wolfgang, to OSRAM GmbH. High-pressure discharge lamp. 316,757, 5-7-91, Cl. D26-2.000.
- Gressco, Ltd.: *See—*
  - Cheetham, Colin R., 316,643, Cl. D6-461.000.
- Gross-Given Manufacturing Company: *See—*
  - Koch, Walter L., 316,728, Cl. D20-8.000.
- Haag, Peter C.; Jones, Donald G.; Crookes, William E.; and Felix, Cristian J., to Deere & Company. Vehicle cowling. 316,696, 5-7-91, Cl. D12-196.000.
- Haines, Walter W., Sr. Necktie. 316,628, 5-7-91, Cl. D2-606.000.
- Hall, Jonathan T. Multiple slice pizza cutter. 316,656, 5-7-91, Cl. D7-673.000.
- Hammons, Anna J. Sports bag for bat and balls. 316,631, 5-7-91, Cl. D3-36.000.
- Hartwick, Thomas, to Lakewood Licensing Corp. Merchandising display or similar article. 316,637, 5-7-91, Cl. D6-397.000.
- Harvey, Robert T.: *See—*
  - King, Jack M.; and Harvey, Robert T., 316,708, Cl. D14-113.000.
- Hatfied, Tinker L.; and Smith, Wilson, to Nike, Inc.; and Nike International Ltd. Shoe upper. 316,624, 5-7-91, Cl. D2-314.000.
- Hatfield, Tinker L., to Nike, Inc.; and Nike International Ltd. Cupsole of a shoe. 316,626, 5-7-91, Cl. D2-320.000.
- Hattori, Atsuko: *See—*
  - Kosako, Mikio; Hattori, Atsuko; and Mano, Yasuhiko, 316,724, Cl. D18-39.000.
- Hensley, Barney D.: *See—*
  - Hensley, Steven D.; and Hensley, Barney D., 316,698, Cl. D12-172.000.
- Hensley, Steven D.; and Hensley, Barney D. Vehicle rear bumper extension. 316,698, 5-7-91, Cl. D12-172.000.
- Hill, Jeremy C., to Slagle, Ronald G.; and Hill, Jeremy C. Plug for a battery terminal connector. 316,701, 5-7-91, Cl. D13-120.000.
- Houlihan, John T.; and Reichel, Judith, to Timex Corporation. Wrist watch. 316,676, 5-7-91, Cl. D10-32.000.
- Howard, Robert A.; and Willnauer, Sigmar, to Apple Computer, Inc. Monitor stand. 316,709, 5-7-91, Cl. D14-114.000.
- Huffy Corporation: *See—*
  - Beiser, Wayne, 316,697, Cl. D12-125.000.
- Humphries, Mark D.; and Gillam, Paul A., to Valor Heating Limited. Gas fired heater. 316,749, 5-7-91, Cl. D23-339.000.
- Hunter, Murray, to Jackel International Pty. Ltd. Infant's drinking cup. 316,652, 5-7-91, Cl. D7-510.000.
- Imagineering, Inc.: *See—*
  - Fisher, William J., 316,636, Cl. D6-395.000.
- Imamura, Tetsuya; Sugiyama, Yoshihiko; and Mishiro, Benito, to Matsushita Electric Industrial Co., Ltd. Portable laptop computer. 316,706, 5-7-91, Cl. D14-106.000.
- Infantino, Robert: *See—*
  - Bianchini, William; Infantino, Robert; and Post, Anthony, 316,625, Cl. D2-320.000.
- Intercos Italia S.p.A.: *See—*
  - Ferrari, Dario, 316,763, Cl. D28-83.000.
- IPL Inc.: *See—*
  - Poirier, Charles, 316,674, Cl. D9-424.000.
- Ishimaru, Atsushi, to Twinbird Industrial Company Limited. Cord reel. 316,666, 5-7-91, Cl. D8-358.000.
- Itoh, Kunio, to Pentel Kabushiki Kaisha. Ball point pen. 316,726, 5-7-91, Cl. D19-51.000.

- ITT Industries Belgium S.A.: *See—*
  - Slany, Hans E.; and Renner, Reinhard, 316,650, Cl. D7-360.000.
- Jackel International Pty. Ltd.: *See—*
  - Hunter, Murray, 316,652, Cl. D7-510.000.
- John Fluke Mfg. Co., Inc.: *See—*
  - Eng, Edmond C.; and Ferrante, Joseph V., 316,682, Cl. D10-75.000.
- Johnson, Bruce. Necktie. 316,629, 5-7-91, Cl. D2-608.000.
- Johnson, Gust F. Traction attachment for a vehicle wheel. 316,699, 5-7-91, Cl. D12-21[illegible].000.
- Johnson, Harold D.: *See—*
  - Erickson, Theodore B.; Reed, Ivan F.; and Johnson, Harold D., 316,739, Cl. D23-207.000.
- Jones, Donald G.: *See—*
  - Haag, Peter C.; Jones, Donald G.; Crookes, William E.; and Felix, Cristian J., 316,696, Cl. D12-196.000.
- Kabushiki Kaisha Tamiya Mokei: *See—*
  - Tsuchiya, Hirotsugu, 316,731, Cl. D21-137.000.
- Kabushiki Kaisha Toshiba: *See—*
  - Matsumoto, Hiroko, 316,714, Cl. D14-126.000.
  - Nagata, Shunsaku, 316,716, Cl. D14-188.000.
  - Takasuna, Masahito; and Watanabe, Takuma, 316,681, Cl. D10-49.000.
- Kantrowitz, Lawrence L. Computer disc with transparent window for slip-in label. 316,711, 5-7-91, Cl. D14-114.000.
- Kawabata, Misao; Ushikubo, Hisao; Shinohara, Kazunori; and Kinoshita, Katsuhiko, to Bridgestone Corporation. Automobile tire. 316,693, 5-7-91, Cl. D12-147.000.
- Kaytee Products, Incorporated: *See—*
  - Rysner, Sheldon; Ramey, Thomas; and Foster, Thomas, 316,673, Cl. D9-415.000.
- Keller, Haven L.: *See—*
  - Carpenter, James H.; and Keller, Haven L., 316,717, Cl. D15-126.000.
- King, Jack M.; and Harvey, Robert T., to NCR Corporation. Activity display panel for a data processor or the like. 316,708, 5-7-91, Cl. D14-113.000.
- Kinoshita, Katsuhiko: *See—*
  - Kawabata, Misao; Ushikubo, Hisao; Shinohara, Kazunori; and Kinoshita, Katsuhiko, 316,693, Cl. D12-147.000.
- Kira, Hiroshi, to Lumiere Design and Manufacturing, Inc. Outdoor bollard lighting fixture. 316,758, 5-7-91, Cl. D26-68.000.
- Kiyokane, Jerrilyn C., to Namkung Promotions, Inc. Pouch for a stuffed toy. 316,632, 5-7-91, Cl. D3-53.000.
- Koch, Walter L., to Gross-Given Manufacturing Company. Food vending machine front panel. 316,728, 5-7-91, Cl. D20-8.000.
- Kohler Co.: *See—*
  - Fleischmann, Gary A., 316,747, Cl. D23-252.000.
- Komada, Takeshi: *See—*
  - Aoyama, Minoru; and Komada, Takeshi, 316,725, Cl. D18-40.000.
- Komar, Michael N., to Russell Hobbs Tower Limited. Stand for an iron. 316,768, 5-7-91, Cl. D32-73.000.
- Kopf, Henry B. Filter housing. 316,740, 5-7-91, Cl. D23-209.000.
- Kosako, Mikio; Hattori, Atsuko; and Mano, Yasuhiko, to Sharp Corporation. Copy machine. 316,724, 5-7-91, Cl. D18-39.000.
- Koziol, Walter, to Modern Home Products Corp. Handle with timer. 316,678, 5-7-91, Cl. D10-40.000.
- Kruger, Frederick W., Jr.: *See—*
  - Volpe, Leo S.; and Kruger, Frederick W., Jr., 316,732, Cl. D21-148.000.
  - Volpe, Leo S.; and Kruger, Frederick W., Jr., 316,733, Cl. D21-148.000.
- Kurth, Mark; and Alger, Andrew, to Omni Corporation. Water filter. 316,741, 5-7-91, Cl. D23-209.000.
- Lakewood Licensing Corp.: *See—*
  - Hartwick, Thomas, 316,637, Cl. D6-397.000.
- Larsen, Orville W.: *See—*
  - Wanner, Vernon; and Larsen, Orville W., 316,658, Cl. D8-14.000.
- Lau, Wynn C. Nursing bottle. 316,754, 5-7-91, Cl. D24-47.000.
- Lerch, Karl D., to Quaker Oats Company, The. Keyboard. 316,722, 5-7-91, Cl. D17-1.000.
- Leung, Anthony: *See—*
  - Rizzuto, Leandro P.; Lindsey, Frank; and Leung, Anthony, 316,762, Cl. D28-35.000.
- Leviton Manufacturing Co., Inc.: *See—*
  - Gartwhaite, Jay, 316,702, Cl. D13-133.000.
- Lindsey, Frank: *See—*
  - Rizzuto, Leandro P.; Lindsey, Frank; and Leung, Anthony, 316,762, Cl. D28-35.000.
- Litton, Garfield G., to Revlon, Inc. Spray dispenser. 316,667, 5-7-91, Cl. D9-300.000.
- Lue, Fang-Hsiang; and Won, Chung-Song, to Platon Precision Industries Co., Ltd. 35 mm camera. 316,721, 5-7-91, Cl. D16-209.000.
- Lueth, Richard H. Combined line winder and ruler. 316,665, 5-7-91, Cl. D8-358.000.
- Lumiere Design and Manufacturing, Inc.: *See—*
  - Kira, Hiroshi, 316,758, Cl. D26-68.000.
- Mack, Deborah K.: *See—*
  - McHale, Colleen M.; and Mack, Deborah K., 316,648, Cl. D6-603.000.
- Maki, Toshihiro: *See—*
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,703, Cl. D13-147.000.
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,704, Cl. D13-147.000.
- Mano, Yasuhiko: *See—*
  - Kosako, Mikio; Hattori, Atsuko; and Mano, Yasuhiko, 316,724, Cl. D18-39.000.
- Markowitz, Edward A. Inflatable inserts for hand bags or similar articles. 316,633, 5-7-91, Cl. D3-54.000.
- Matsumoto, Hiroko, to Kabushiki Kaisha Toshiba. Television receiver. 316,714, 5-7-91, Cl. D14-126.000.
- Matsunaga, Toru: *See—*
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,703, Cl. D13-147.000.
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,704, Cl. D13-147.000.
- Matsushita Electric Industrial Co., Ltd.: *See—*
  - Imamura, Tetsuya; Sugiyama, Yoshihiko; and Mishiro, Benito, 316,706, Cl. D14-106.000.
- McHale, Colleen M.; and Mack, Deborah K. Child's cloth comforter. 316,648, 5-7-91, Cl. D6-603.000.
- Mead Corporation, The: *See—*
  - Wood, Prentice J., 316,672, Cl. D9-346.000.
- Mentzer, Steven C. Toothbrush holder. 316,647, 5-7-91, Cl. D6-534.000.
- Metsa-Serla Oy: *See—*
  - Breger, Carl-Arne, 316,645, Cl. D6-515.000.
- Minuti, Furio, to Fratelli Guzzini S.p.A. Household scale. 316,683, 5-7-91, Cl. D10-91.000
- Mishiro, Benito: *See—*
  - Imamura, Tetsuya; Sugiyama, Yoshihiko; and Mishiro, Benito, 316,706, Cl. D14-106.000.
- Modern Home Products Corp.: *See—*
  - Koziol, Walter, 316,678, Cl. D10-40.000.
- Montgomery, Teddy R. Physical exerciser. 316,736, 5-7-91, Cl. D21-191.000.
- Morrison, Douglas M. Propeller blades and hub. 316,700, 5-7-91, Cl. D12-214.000.
- Mulherin, Hubert F. Bagel slicing guide. 316,657, 5-7-91, Cl. D7-673.000.
- Murray, Frank E. Vehicle loading ramp. 316,771, 5-7-91, Cl. D34-32.000.
- Nagata, Shunsaku, to Kabushiki Kaisha Toshiba. Amplifier. 316,716, 5-7-91, Cl. D14-188.000.
- Nakasaki, Eiji, to Sumitomo Rubber Industries, Ltd. Automobile tire. 316,694, 5-7-91, Cl. D12-147.000.
- Namkung Promotions, Inc.: *See—*
  - Kiyokane, Jerrilyn C., 316,632, Cl. D3-53.000.
- NCR Corporation: *See—*
  - Allgeier, David M. J., 316,707, Cl. D14-107.000.
  - King, Jack M.; and Harvey, Robert T., 316,708, Cl. D14-113.000.
- Neff, Edward R., to American Pneumatic Technologies, Inc. Pneumatic cutter. 316,659, 5-7-91, Cl. D8-61.000.
- Nesher Industries, Inc.: *See—*
  - Adler, Josef H., 316,639, Cl. D6-429.000.
- Ng, Michael C. M.; and Tan, Kheng L. Computer table. 316,723, 5-7-91, Cl. D18-23.000.
- Nike, Inc.: *See—*
  - Hatfied, Tinker L.; and Smith, Wilson, 316,624, Cl. D2-314.000.
  - Hatfield, Tinker L., 316,626, Cl. D2-320.000.
- Nike International Ltd.: *See—*
  - Hatfied, Tinker L.; and Smith, Wilson, 316,624, Cl. D2-314.000.
  - Hatfield, Tinker L., 316,626, Cl. D2-320.000.
- Ohta, Yukio: *See—*
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,703, Cl. D13-147.000.
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,704, Cl. D13-147.000.
- Oldorf, Dennis. Packet dispenser. 316,638, 5-7-91, Cl. D6-408.000.
- Omni Corporation: *See—*
  - Kurth, Mark; and Alger, Andrew, 316,741, Cl. D23-209.000.
- Ooi, Hiroshi; and Sakata, Fumitoshi, to Sharp Corporation. Combined video camera and video tape recorder. 316,719, 5-7-91, Cl. D16-202.000.
- OSRAM GmbH: *See—*
  - Greiler, Wolfgang, 316,757, Cl. D26-2.000.
- Oyama, Mitsuyoshi, to Daiwa Seiko, Inc. Reel seat for fishing rod. 316,738, 5-7-91, Cl. D22-142.000.
- Paino, John. Baby bottle prop. 316,755, 5-7-91, Cl. D24-48.000.
- Pangborn Corporation: *See—*
  - Carpenter, James H.; and Keller, Haven L., 316,717, Cl. D15-126.000.
- Penn, Diane E. Toddler's urinal. 316,748, 5-7-91, Cl. D23-302.000.
- Pentel Kabushiki Kaisha: *See—*
  - Itoh, Kunio, 316,726, Cl. D19-51.000.
- Petersen Manufacturing Co., Inc.: *See—*
  - Burney, Burrell T., 316,661, Cl. D8-72.000.
- Plastique DCN Inc.: *See—*
  - Tardif, Pierre, 316,686, Cl. D11-148.000.
- Platon Precision Industries Co., Ltd.: *See—*
  - Lue, Fang-Hsiang; and Won, Chung-Song, 316,721, Cl. D16-209.000.
- Poirier, Charles, to IPL Inc. Container. 316,674, 5-7-91, Cl. D9-424.000.
- Popiel, Jerry L. Edible pastry shell. 316,622, 5-7-91, Cl. D1-122.000.
- Post, Anthony: *See—*
  - Bianchini, William; Infantino, Robert; and Post, Anthony, 316,625, Cl. D2-320.000.
- Pro-Process Corporation: *See—*
  - Buday, Gene, 316,655, Cl. D7-673.000.
- Product R&D Corporation: *See—*
  - Dickey, David V., 316,705, Cl. D13-179.000.

VOL 1126 ISS 1 MY 7 1991 UMI

- Pure Water, Inc.: *See—*
  - Erickson, Theodore B.; Reed, Ivan F.; and Johnson, Harold D., 316,739, Cl. D23-207.000.
- Quaker Oats Company, The: *See—*
  - Lerch, Karl D., 316,722, Cl. D17-1.000.
- Ragonot, Christian, to Delafon, Jacob. Faucet handle or the like. 316,746, 5-7-91, Cl. D23-250.000.
- Ramey, Thomas: *See—*
  - Rysner, Sheldon; Ramey, Thomas; and Foster, Thomas, 316,673, Cl. D9-415.000.
- Reed, Ivan F.: *See—*
  - Erickson, Theodore B.; Reed, Ivan F.; and Johnson, Harold D., 316,739, Cl. D23-207.000.
- Reichel, Judith: *See—*
  - Houlihan, John T.; and Reichel, Judith, 316,676, Cl. D10-32.000.
- Renner, Reinhard: *See—*
  - Slany, Hans E.; and Renner, Reinhard, 316,650, Cl. D7-360.000.
- Revlon, Inc.: *See—*
  - Golden, Annette M.; and Corbiscello, Maria L., 316,760, Cl. D28-4.000.
  - Golden, Annette M.; and Corbiscello, Maria L., 316,761, Cl. D28-4.000.
  - Litton, Garfield G., 316,667, Cl. D9-300.000.
  - Royer, Christine, 316,685, Cl. D11-4.000.
- Ricketts, Robert A., to Troy Biologicals, Inc. Culture dish. 316,752, 5-7-91, Cl. D24-8.000.
- Ricketts, Robert A., to Troy Biologicals, Inc. Culture dish. 316,753, 5-7-91, Cl. D24-8.000.
- Ring King Visibles: *See—*
  - Drake, Craig D.; and Ting, Phillip, 316,710, Cl. D14-114.000.
- Rizzuto, Leandro P.; Lindsey, Frank; and Leung, Anthony, to Conair Corporation. Hair crimping head appliance. 316,762, 5-7-91, Cl. D28-35.000.
- Robbins, Bill D. Fecal bag for incontinent patients. 316,756, 5-7-91, Cl. D24-58.000.
- Roberts, Ernest M.: *See—*
  - Roberts, Gerald F.; and Roberts, Ernest M., 316,769, Cl. D34-28.000.
- Roberts, Gerald F.; and Roberts, Ernest M. Mobile dock. 316,769, 5-7-91, Cl. D34-28.000.
- Rockport Company, The: *See—*
  - Bianchini, William; Infantino, Robert; and Post, Anthony, 316,625, Cl. D2-320.000.
- Rockport Company, Inc., The: *See—*
  - Bianchini, William, 316,623, Cl. D2-314.000.
- Rohmeder, Jurgen. Combined jar and applicator. 316,671, 5-7-91, Cl. D9-338.000.
- Royer, Christine, to Revlon, Inc. Bracelet. 316,685, 5-7-91, Cl. D11-4.000.
- Russell Hobbs Tower Limited: *See—*
  - Komar, Michael N., 316,768, Cl. D32-73.000.
- Rysner, Sheldon; Ramey, Thomas; and Foster, Thomas, to Kaytee Products, Incorporated. Display package. 316,673, 5-7-91, Cl. D9-415.000.
- S. C. Johnson & Son, Inc.: *See—*
  - Cramer, Ronald G., 316,675, Cl. D9-448.000.
  - Wortley, Russell B.; and Billman, Fred L., 316,668, Cl. D9-306.000.
- Sakata, Fumitoshi: *See—*
  - Ooi, Hiroshi; and Sakata, Fumitoshi, 316,719, Cl. D16-202.000.
- Salgado & Cia., S.A.: *See—*
  - Alemany, Francisco A. S., 316,670, Cl. D9-335.000.
- Sano, Hiroshi, to Canon Kabushiki Kaisha. Magnetic disc still camera. 316,720, 5-7-91, Cl. D16-202.000.
- Savastano, Robert P., to Air Ventilation Observer, Inc. Air sampling filter. 316,750, 5-7-91, Cl. D23-365.000.
- Scherrer, Kurt, to U. Scharer Sohne AG(USM). Table attached two piece bracket for holding a swing arm support. 316,663, 5-7-91, Cl. D8-354.000.
- Schneider, Jules, to What's What, Inc. Shoe sole. 316,627, 5-7-91, Cl. D2-320.000.
- Schwaebische Buerstenfabrik Hans Haug KG: *See—*
  - Vetter, Roland, 316,634, Cl. D4-116.000.
- Sharp Corporation: *See—*
  - Kosako, Mikio; Hattori, Atsuko; and Mano, Yasuhiko, 316,724, Cl. D18-39.000.
  - Ooi, Hiroshi; and Sakata, Fumitoshi, 316,719, Cl. D16-202.000.
  - Shibata, Hirokazu, 316,715, Cl. D14-169.000.
  - Tsukada, Akira, 316,712, Cl. D14-118.000.
- Shibata, Hirokazu, to Sharp Corporation. Combined record player, radio and tape recorder. 316,715, 5-7-91, Cl. D14-169.000.
- Shim, Keu S., to Gold Star Co. Ltd. Combined video camera and a video cassette recorder. 316,718, 5-7-91, Cl. D16-202.000.
- Shinohara, Kazunori: *See—*
  - Kawabata, Misao; Ushikubo, Hisao; Shinohara, Kazunori; and Kinoshita, Katsuhiko, 316,693, Cl. D12-147.000.
- SKC Limited: *See—*
  - Sun Kag, Hong, 316,713, Cl. D14-122.000.
- Slagle, Ronald G.: *See—*
  - Hill, Jeremy C., 316,701, Cl. D13-120.000.
- Slany, Hans E.; and Renner, Reinhard, to ITT Industries Belgium S.A. Deep fryer. 316,650, 5-7-91, Cl. D7-360.000.
- Smith, Randall L. Take-apart stand with positionable mirror. 316,635, 5-7-91, Cl. D6-309.000.
- Smith, Wilson: *See—*
  - Hatfied, Tinker L.; and Smith, Wilson, 316,624, Cl. D2-314.000.
- Spencer, James W. Dual insulated beverage container. 316,653, 5-7-91, Cl. D7-605.000.
- Stick On Safety Light, Inc.: *See—*
  - Bonadonna, Peter, 316,684, Cl. D10-114.000.
- Sugiyama, Yoshihiko: *See—*
  - Imamura, Tetsuya; Sugiyama, Yoshihiko; and Mishiro, Benito, 316,706, Cl. D14-106.000.
- Suh, Nam C., to Goldstar Co., Ltd. Vacuum cleaner. 316,767, 5-7-91, Cl. D32-21.000.
- Sumitomo Rubber Industries, Ltd.: *See—*
  - Fujiki, Tetsushi, 316,689, Cl. D12-140.000.
  - Fujiki, Tetsushi, 316,691, Cl. D12-146.000.
  - Fujiki, Tetsushi, 316,695, Cl. D12-149.000.
  - Fukumoto, Tetsuhiro, 316,692, Cl. D12-146.000.
  - Nakasaki, Eiji, 316,694, Cl. D12-147.000.
  - Tagashira, Kenji, 316,690, Cl. D12-146.000.
- Sun Kag, Hong, to SKC Limited. Reel hub for magnetic tape. 316,713, 5-7-91, Cl. D14-122.000.
- Swanner, James A. Automobile rear seat organizer. 316,649, 5-7-91, Cl. D6-611.000.
- Tagashira, Kenji, to Sumitomo Rubber Industries, Ltd. Automobile tire. 316,690, 5-7-91, Cl. D12-146.000.
- Tak, Hui W., to Gentile Limited. Toy octopus. 316,734, 5-7-91, Cl. D21-157.000.
- Takasuna, Masahito; and Watanabe, Takuma, to Kabushiki Kaisha Toshiba. Remote control unit for an air conditioner. 316,681, 5-7-91, Cl. D10-49.000.
- Tan, Kheng L.: *See—*
  - Ng, Michael C. M.; and Tan, Kheng L., 316,723, Cl. D18-23.000.
- Tardif, Pierre, to Plastique DCN Inc. Combined flower pot and hanging support. 316,686, 5-7-91, Cl. D11-148.000.
- Tepley, George T., to TGC Corporation. Hand measurement instrument. 316,679, 5-7-91, Cl. D10-46.000.
- Tepley, George T., to TGC Corporation. Double hand measurement instrument. 316,680, 5-7-91, Cl. D10-46.000.
- TGC Corporation: *See—*
  - Tepley, George T., 316,679, Cl. D10-46.000.
  - Tepley, George T., 316,680, Cl. D10-46.000.
- Timex Corporation: *See—*
  - Houlihan, John T.; and Reichel, Judith, 316,676, Cl. D10-32.000.
- Ting, Phillip: *See—*
  - Drake, Craig D.; and Ting, Phillip, 316,710, Cl. D14-114.000.
- Tollo Systems AB: *See—*
  - Arvidsson, Ingmar, 316,770, Cl. D34-28.000.
- 'totes', incorporated: *See—*
  - Cain, Ann S., 316,630, Cl. D3-12.000.
- Troy Biologicals, Inc.: *See—*
  - Ricketts, Robert A., 316,752, Cl. D24-8.000.
  - Ricketts, Robert A., 316,753, Cl. D24-8.000.
- Tsuchiya, Hirotsugu, to Kabushiki Kaisha Tamiya Mokei. Toy racing car. 316,731, 5-7-91, Cl. D21-137.000.
- Tsukada, Akira, to Sharp Corporation. Facsimile machine. 316,712, 5-7-91, Cl. D14-118.000.
- Tull, Raymond S., to Atlantic Fabricators, Inc. Rope cleat for power boats or the like. 316,664, 5-7-91, Cl. D8-356.000.
- Twinbird Industrial Company Limited: *See—*
  - Ishimaru, Atsushi, 316,666, Cl. D8-358.000.
- Tyco Industries, Inc.: *See—*
  - Volpe, Leo S.; and Kruger, Frederick W., Jr., 316,732, Cl. D21-148.000.
  - Volpe, Leo S.; and Kruger, Frederick W., Jr., 316,733, Cl. D21-148.000.
- U. Scharer Sohne AG(USM): *See—*
  - Scherrer, Kurt, 316,663, Cl. D8-354.000.
- Ushikubo, Hisao: *See—*
  - Kawabata, Misao; Ushikubo, Hisao; Shinohara, Kazunori; and Kinoshita, Katsuhiko, 316,693, Cl. D12-147.000.
- Valor Heating Limited: *See—*
  - Humphries, Mark D.; and Gillam, Paul A., 316,749, Cl. D23-339.000.
- Vertiflex Company: *See—*
  - Greenspahn, Randy S., 316,727, Cl. D19-52.000.
- Vetter, Roland, to Schwaebische Buerstenfabrik Hans Haug KG. Combined brush, peeler and scraper for cleaning vegetables. 316,634, 5-7-91, Cl. D4-116.000.
- Volpe, Leo S.; and Kruger, Frederick W., Jr., to Tyco Industries, Inc. Toy figure. 316,732, 5-7-91, Cl. D21-148.000.
- Volpe, Leo S.; and Kruger, Frederick W., Jr., to Tyco Industries, Inc. Toy figure. 316,733, 5-7-91, Cl. D21-148.000.
- Wanner, Vernon; and Larsen, Orville W., to Greenlee Textron Inc. Tube bending tool. 316,658, 5-7-91, Cl. D8-14.000.
- Warren, James E.: *See—*
  - Warren, Janie E.; and Warren, James E., 316,737, Cl. D21-252.000.
- Warren, Janie E.; and Warren, James E. Childrens pool and shower. 316,737, 5-7-91, Cl. D21-252.000.
- Watanabe, Takuma: *See—*
  - Takasuna, Masahito; and Watanabe, Takuma, 316,681, Cl. D10-49.000.
- What's What, Inc.: *See—*
  - Schneider, Jules, 316,627, Cl. D2-320.000.
- Wilby, Alan T. Planter. 316,687, 5-7-91, Cl. D11-149.000.
- Williams, Christopher D. Ambient air impeller for igniting briquets, or the like. 316,651, 5-7-91, Cl. D7-416.000.
- Willnauer, Sigmar: *See—*
  - Howard, Robert A.; and Willnauer, Sigmar, 316,709, Cl. D14-114.000.

- Won, Chung-Song: *See—*
  - Lue, Fang-Hsiang; and Won, Chung-Song, 316,721, Cl. D16-209.000.
- Wood, Prentice J., to Mead Corporation, The. Bottle carton. 316,672, 5-7-91, Cl. D9-346.000.
- Wortley, Russell B.; and Billman, Fred L., to S. C. Johnson & Son, Inc. Liquid dispensing pouch. 316,668, 5-7-91, Cl. D9-306.000.
- Wulff, Richard F., to Castex Industries, Inc. Cleaning machine. 316,765, 5-7-91, Cl. D32-21.000.
- Yazaki Corporation: *See—*
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,703, Cl. D13-147.000.
  - Eto, Hidenori; Maki, Toshihiro; Ohta, Yukio; and Matsunaga, Toru, 316,704, Cl. D13-147.000.
- Yoshida, Masamichi, to Buncho Corporation. Puzzle crayon. 316,730, 5-7-91, Cl. D21-107.000.
- Young, J. Winslow. Display container. 316,669, 5-7-91, Cl. D9-307.000.

# LIST OF PLANT PATENTEES

- California Florida Plant Company L.P.: *See—*
  - Jessel, Walter H., Jr., 7,514, Cl. 70.000.
- Jessel, Walter H., Jr., to California Florida Plant Company L.P. Carnation plant named CFPC Twilight. 7,514, 5-7-91, Cl. 70.000.
- VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Ocaso. 7,515, 5-7-91, Cl. 74.000.
- VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Chantal. 7,516, 5-7-91, Cl. 74.000.
- VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Nicole. 7,517, 5-7-91, Cl. 77.000.
- VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Perla. 7,518, 5-7-91, Cl. 77.000.
- VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Canela. 7,519, 5-7-91, Cl. 79.000.
- Yoder Brothers, Inc.: *See—*
  - VandenBerg, Cornelis P., 7,515, Cl. 74.000.
  - VandenBerg, Cornelis P., 7,516, Cl. 74.000.
  - VandenBerg, Cornelis P., 7,517, Cl. 77.000.
  - VandenBerg, Cornelis P., 7,518, Cl. 77.000.
  - VandenBerg, Cornelis P., 7,519, Cl. 79.000.

# LIST OF STATUTORY INVENTION REGISTRATIONS

## APPLICANTS TO WHOM

## STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 7TH DAY OF MAY, 1991

- Andrews, Mark A.; and Klaeren, Stephen A., to United States of America, Energy. Decarbonylation and dehydrogenation of carbohydrates. H918, 5-7-91, Cl. 549-497.000.
- Carson, Neill J., Jr.; Noland, Robert A.; and Ruther, Westly E., to United States of America, Energy. Method of removing cesium from steam. H920, 5-7-91, Cl. 376-313.000.
- Danforth, Richard L.: *See—*
  - Gergen, William P.; Lutz, Robert G.; and Danforth, Richard L., H917, Cl. 525-64.000.
- Ehm, Wm. Timothy: *See—*
  - Kirkland, Johnny P.; Ehm, Wm. Timothy; and Gilfrich, John V., H922, Cl. 378-45.000.
- Frank, Robert C.: *See—*
  - Leonard, Ralph A.; and Frank, Robert C., H914, Cl. 422-159.000.
- Gergen, William P.; Lutz, Robert G.; and Danforth, Richard L., to Shell Oil Company. Polymer blend. H917, 5-7-91, Cl. 525-64.000.
- Gibbs, Marylu B. Controlled macroporous copolymer properties by removal of impurities in the diluent. H915, 5-7-91, Cl. 521-25.000.
- Gilfrich, John V.: *See—*
  - Kirkland, Johnny P.; Ehm, Wm. Timothy; and Gilfrich, John V., H922, Cl. 378-45.000.
- Hershkowitz, Joseph, to United States of America, Army. Explosive devices for foxhole manufacture, demolition and urban warfare. H913, 5-7-91, Cl. 102-307.000.
- Kirkland, Johnny P.; Ehm, Wm. Timothy; and Gilfrich, John V., to United States of America, America. Method for analyzing materials using x-ray fluorescence. H922, 5-7-91, Cl. 378-45.000.
- Klaeren, Stephen A.: *See—*
  - Andrews, Mark A.; and Klaeren, Stephen A., H918, Cl. 549-497.000.
- Leonard, Ralph A.; and Frank, Robert C., to United States of America, Energy. Apparatus for supporting contactors used in extracting nuclear materials from liquids. H914, 5-7-91, Cl. 422-159.000.
- Lutz, Robert G.: *See—*
  - Gergen, William P.; Lutz, Robert G.; and Danforth, Richard L., H917, Cl. 525-64.000
- Marsella, John A. Process for producing polyamine boranes. H919, 5-7-91, Cl. 564-8.000.
- Mitsubishi Rayon Company Limited: *See—*
  - Nishida, Kozi, H916, Cl. 525-66.000.
- Nishida, Kozi, to Mitsubishi Rayon Company Limited. Thermoplastic resin composition. H916, 5-7-91, Cl. 525-66.000.
- Noland, Robert A.: *See—*
  - Carson, Neill J., Jr.; Noland, Robert A.; and Ruther, Westly E., H920, Cl. 376-313.000.
- Piper, Thomas C., to United States of America, Energy. Ultrasonic liquid-in-line detector for tubes. H912, 5-7-91, Cl. 73-592.000.
- Ruther, Westly E.: *See—*
  - Carson, Neill J., Jr.; Noland, Robert A.; and Ruther, Westly E., H920, Cl. 376-313.000.
- Shell Oil Company: *See—*
  - Gergen, William P.; Lutz, Robert G.; and Danforth, Richard L., H917, Cl. 525-64.000.
- Tuttle, John E. B., to United States of America, Army. Fiber optic link for detecting mechanical vibration in the presence of an electromagnetic field. H911, 5-7-91, Cl. 73-167.000.
- United States of America
  - America: *See—*
    - Kirkland, Johnny P.; Ehm, Wm. Timothy; and Gilfrich, John V., H922, Cl. 378-45.000.
  - Army: *See—*
    - Hershkowitz, Joseph, H913, Cl. 102-307.000.
    - Tuttle, John E. B., H911, Cl. 73-167.000.
    - Wannemacher, Robert L., Jr., H921, Cl. 361-400.000.
  - Energy: *See—*
    - Andrews, Mark A.; and Klaeren, Stephen A., H918, Cl. 549-497.000.
    - Carson, Neill J., Jr.; Noland, Robert A.; and Ruther, Westly E., H920, Cl. 376-313.000.
    - Leonard, Ralph A.; and Frank, Robert C., H914, Cl. 422-159.000.
    - Piper, Thomas C., H912, Cl. 73-592.000.
- Wannemacher, Robert L., Jr., to United States of America, Army. Stress controlling mounting structures for printed circuit boards. H921, 5-7-91, Cl. 361-400.000.

VOL
1126
ISS
1
MY
7
1991
UMI

# CLASSIFICATION OF PATENTS

ISSUED MAY 7, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

| | |
|---|---|
| **CLASS 2** | |
| 9 | 5,012,527 |
| 10 | 5,012,528 |
| 18 | 5,012,529 |
| 144 | 5,012,530 |
| 185 B | 5,012,531 |
| 197 | 5,012,532 |
| 420 | 5,012,533 |
| **CLASS 4** | |
| 519 | 5,012,534 |
| 541 | 5,012,535 |
| 605 | 5,012,536 |
| 658 | 5,012,537 |
| **CLASS 5** | |
| 200.1 | 5,012,538 |
| 431 | 5,012,539 |
| 487 | 5,012,540 |
| **CLASS 8** | |
| 125 | 5,013,327 |
| 442 | 5,013,328 |
| **CLASS 12** | |
| 142 G | 5,012,541 |
| **CLASS 15** | |
| 1 | 5,012,542 |
| 209 R | 5,012,543 |
| | 5,012,544 |
| 230.12 | 5,012,545 |
| 250.16 | 5,012,525 |
| 256.5 | 5,012,526 |
| 301 | 5,012,546 |
| 304 | 5,012,547 |
| 308 | 5,012,548 |
| 320 | 5,012,549 |
| **CLASS 16** | |
| 35 R | 5,012,550 |
| 49 | 5,012,551 |
| 87.4 R | 5,012,552 |
| 126 | 5,012,553 |
| 197 | 5,012,554 |
| 342 | 5,012,555 |
| 366 | 5,012,556 |
| **CLASS 19** | |
| 258 | 5,012,557 |
| **CLASS 24** | |
| 16 PB | 5,012,558 |
| 71.3 | 5,012,559 |
| 287 | 5,012,560 |
| 576 | 5,012,561 |
| **CLASS 26** | |
| 18.6 | 5,012,562 |
| **CLASS 28** | |
| 172.1 | 5,012,563 |
| 193 | 5,012,564 |
| **CLASS 29** | |
| 25.42 | 5,012,565 |
| 265 | 5,012,566 |
| 275 | 5,012,567 |
| 402.08 | 5,012,568 |
| 417 | 5,012,569 |
| 467 | 5,012,570 |
| 598 | 5,012,571 |
| 603 | 5,012,572 |
| 798 | 5,012,573 |
| 888.06 | 5,012,574 |
| 894.3 | 5,012,575 |
| **CLASS 30** | |
| 29.5 | 5,012,576 |
| 43.6 | 5,012,577 |
| 84 | 5,012,578 |
| 92 | 5,012,579 |
| 120.5 | 5,012,580 |
| 162 | 5,012,581 |
| 391 | 5,012,582 |
| 392 | 5,012,583 |
| **CLASS 33** | |
| 18.1 | 5,012,584 |
| 286 | 5,012,585 |
| 430 | 5,012,586 |
| 503 | 5,012,587 |
| 533 | 5,012,588 |
| 720 | 5,012,589 |
| 759 | 5,012,590 |
| 832 | 5,012,591 |
| 833 | 5,012,592 |
| **CLASS 34** | |
| 69 | 5,012,593 |
| 121 | 5,012,594 |
| 187 | 5,012,595 |
| **CLASS 36** | |
| 11.5 | 5,012,596 |
| 59 C | 5,012,597 |
| 119 | 5,012,598 |
| **CLASS 37** | |
| 117.5 | 5,012,599 |
| **CLASS 40** | |
| 152 | 5,012,600 |
| | 5,012,601 |
| 201 | 5,012,602 |
| 605 | 5,012,603 |
| **CLASS 42** | |
| 69.03 | 5,012,604 |
| 70.07 | 5,012,605 |
| 70.11 | 5,012,606 |
| **CLASS 43** | |
| 25 | 5,012,607 |
| **CLASS 44** | |
| 448 | 5,013,329 |
| **CLASS 47** | |
| 1.7 | 5,012,608 |
| 58 | 5,012,609 |
| **CLASS 49** | |
| 57 | 5,012,610 |
| 225 | 5,012,611 |
| 254 | 5,012,612 |
| 362 | 5,012,613 |
| 468 | 5,012,614 |
| 477 | 5,012,615 |
| 501 | 5,012,616 |
| **CLASS 51** | |
| 3 | 5,012,617 |
| 140 | 5,012,618 |
| 163.1 | 5,012,619 |
| 297 | 5,013,330 |
| 313 | 5,012,620 |
| **CLASS 52** | |
| 30 | 5,012,621 |
| 241 | 5,012,625 |
| 484 | 5,012,624 |
| 531 | 5,012,623 |
| 725 | 5,012,622 |
| 729 | 5,012,626 |
| 741 | 5,012,627 |
| **CLASS 53** | |
| 448 | 5,012,628 |
| 453 | 5,012,629 |
| 490 | 5,012,630 |
| 588 | 5,012,631 |
| **CLASS 55** | |
| 16 | 5,013,331 |
| | 5,013,332 |
| 21 | 5,013,333 |
| 26 | 5,013,334 |
| 70 | 5,013,335 |
| 71 | 5,013,336 |
| 75 | 5,013,337 |
| 158 | 5,013,338 |
| | 5,013,339 |
| 290 | 5,013,340 |
| 302 | 5,013,341 |
| 337 | 5,013,342 |
| 395 | 5,013,343 |
| **CLASS 56** | |
| 11.6 | 5,012,632 |
| 12.9 | 5,012,633 |
| 13.6 | 5,012,634 |
| | 5,012,635 |
| **CLASS 57** | |
| 204 | 5,012,636 |
| **CLASS 60** | |
| 39.02 | 5,012,637 |
| 224 | 5,012,638 |
| 226.1 | 5,012,639 |
| 246 | 5,012,640 |
| 297 | 5,012,641 |
| 299 | 5,012,642 |
| 313 | 5,012,648 |
| 369 | 5,012,643 |
| 413 | 5,012,647 |
| 425 | 5,012,644 |
| 527 | 5,012,649 |
| 728 | 5,012,646 |
| 754 | 5,012,645 |
| **CLASS 62** | |
| 51.2 | 5,012,650 |
| 149 | 5,012,651 |
| 192 | 5,012,652 |
| 203 | 5,012,653 |
| 244 | 5,012,654 |
| 340 | 5,012,655 |
| 498 | 5,012,656 |
| 532 | 5,013,344 |
| **CLASS 65** | |
| 4.2 | 5,013,345 |
| 21.2 | 5,013,346 |
| 43 | 5,013,347 |
| 102 | 5,013,348 |
| **CLASS 68** | |
| 5 E | 5,012,657 |
| 12.01 | 5,012,658 |
| **CLASS 70** | |
| 276 | 5,012,659 |
| **CLASS 71** | |
| 27 | 5,013,349 |
| 65 | 5,013,350 |
| 92 | 5,013,351 |
| 94 | 5,013,352 |
| | 5,013,353 |
| 95 | 5,013,354 |
| **CLASS 72** | |
| 8 | 5,012,660 |
| 21 | 5,012,661 |
| 42 | 5,012,662 |
| 369 | 5,012,663 |
| 404 | 5,012,664 |
| 405 | 5,012,665 |
| 410 | 5,012,666 |
| **CLASS 73** | |
| 1 R | 5,012,667 |
| 24.06 | 5,012,668 |
| 25 | 5,012,669 |
| 31.05 | 5,012,670 |
| 31.06 | 5,012,671 |
| 31.07 | 5,012,672 |
| 118.1 | 5,012,673 |
| 153 | 5,012,674 |
| 432.1 | 5,012,675 |
| 497 | 5,012,676 |
| 721 | 5,012,677 |
| 738 | 5,012,678 |
| 800 | 5,012,679 |
| 862.39 | 5,012,680 |
| 863.23 | 5,012,681 |
| 864.18 | 5,012,682 |
| 864.24 | 5,012,683 |
| 865.8 | 5,012,684 |
| 866.5 | 5,012,685 |
| **CLASS 74** | |
| 7 A | 5,012,686 |
| 89.15 | 5,012,687 |
| | 5,012,688 |
| 89.17 | 5,012,689 |
| 335 | 5,012,690 |
| 434 | 5,012,691 |
| 475 | 5,012,692 |
| 502.1 | 5,012,693 |
| 572 | 5,012,694 |
| 859 | 5,012,695 |
| 866 | 5,012,696 |
| | 5,012,697 |
| | 5,012,698 |
| 869 | 5,012,699 |
| | 5,012,700 |
| **CLASS 75** | |
| 23 | 5,013,355 |
| 586 | 5,013,356 |
| 622 | 5,013,357 |
| 742 | 5,013,358 |
| 744 | 5,013,359 |
| **CLASS 76** | |
| 108.2 | 5,012,701 |
| **CLASS 81** | |
| 3.29 | 5,012,703 |
| 25 | 5,012,702 |
| 59.1 | 5,012,704 |
| 63 | 5,012,705 |
| 121.1 | 5,012,706 |
| 124.2 | 5,012,707 |
| 429 | 5,012,708 |
| 466 | 5,012,709 |
| **CLASS 82** | |
| 1.2 | 5,012,710 |
| **CLASS 83** | |
| 92 | 5,012,711 |
| 571 | 5,012,712 |
| 639.3 | 5,012,713 |
| **CLASS 84** | |
| 390 | 5,012,714 |
| 724 | 5,012,715 |
| 727 | 5,012,716 |
| **CLASS 89** | |
| 1.11 | 5,012,717 |
| 1.816 | 5,012,718 |
| 8 | 5,012,719 |
| | 5,012,720 |
| 36.17 | 5,012,721 |
| **CLASS 91** | |
| 361 | 5,012,722 |
| 369.21 | 5,012,723 |
| 497 | 5,012,724 |
| **CLASS 92** | |
| 63 | 5,012,725 |
| **CLASS 99** | |
| 450.6 | 5,012,726 |
| 470 | 5,012,727 |
| 533 | 5,012,728 |
| **CLASS 100** | |
| 2 | 5,012,733 |
| 35 | 5,012,732 |
| 110 | 5,012,731 |
| 160 | 5,012,730 |
| 278 | 5,012,729 |
| **CLASS 101** | |
| 91 | 5,012,734 |
| 177 | 5,012,735 |
| 211 | 5,012,736 |
| 350 | 5,012,737 |
| 415.1 | 5,012,738 |
| 425 | 5,012,739 |
| **CLASS 102** | |
| 216 | 5,012,740 |
| 275.4 | 5,012,741 |
| 418 | 5,012,742 |
| 514 | 5,012,743 |
| 523 | 5,012,744 |
| **CLASS 104** | |
| 44 | 5,012,745 |
| 93 | 5,012,746 |
| 130 | 5,012,747 |
| 134 | 5,012,748 |
| 297 | 5,012,749 |
| **CLASS 106** | |
| 1.23 | 5,013,360 |
| 22 | 5,013,361 |
| 38.3 | 5,013,363 |
| 311 | 5,013,364 |
| 456 | 5,013,365 |
| **CLASS 110** | |
| 245 | 5,012,750 |
| 346 | 5,012,751 |
| **CLASS 112** | |
| 121.12 | 5,012,752 |
| **CLASS 114** | |
| 36 | 5,012,754 |
| 39.1 | 5,012,753 |
| 103 | 5,012,755 |
| 265 | 5,012,756 |
| **CLASS 116** | |
| 19 | 5,012,757 |
| **CLASS 118** | |
| 264 | 5,012,758 |
| 320 | 5,012,759 |
| 505 | 5,012,760 |
| **CLASS 119** | |
| 6.8 | 5,012,761 |
| 14.18 | 5,012,762 |
| 34 | 5,012,763 |
| 106 | 5,012,764 |
| 166 | 5,012,765 |
| **CLASS 122** | |
| 504 | 5,012,766 |
| 511 | 5,012,767 |
| **CLASS 123** | |
| 25 C | 5,012,772 |
| 41.49 | 5,012,768 |
| 51 R | 5,012,769 |
| 52 MB | 5,012,771 |
| 52 MC | 5,012,770 |
| 90.17 | 5,012,773 |
| | 5,012,774 |
| 192 B | 5,012,775 |
| 193 C | 5,012,776 |
| 254 | 5,012,777 |
| 321 | 5,012,778 |
| 339 | 5,012,779 |
| | 5,012,780 |
| 353 | 5,012,781 |
| 425 | 5,012,782 |
| 432 | 5,012,783 |
| 463 | 5,012,784 |
| 467 | 5,012,785 |
| | 5,012,786 |
| 470 | 5,012,787 |
| 545 | 5,012,788 |
| 587 | 5,012,789 |
| **CLASS 124** | |
| 81 | 5,012,790 |
| **CLASS 125** | |
| 15 | 5,012,792 |
| **CLASS 126** | |
| 43 | 5,012,791 |
| 85 B | 5,012,793 |
| 197 | 5,012,794 |
| 262 | 5,012,795 |
| 416 | 5,012,796 |
| **CLASS 128** | |
| 24 A | 5,012,797 |
| 78 | 5,012,798 |
| 81 A | 5,012,799 |
| 155 | 5,012,801 |
| 158 | 5,012,802 |
| 200.23 | 5,012,803 |
| | 5,012,804 |
| 205.28 | 5,012,805 |
| 419 P | 5,012,806 |
| | 5,012,807 |
| 419 R | 5,012,808 |
| 634 | 5,012,809 |
| 640 | 5,012,810 |
| 642 | 5,012,811 |
| 652 | 5,012,812 |
| 664 | 5,012,813 |
| 691 | 5,012,814 |
| 715 | 5,012,815 |
| 735 | 5,012,816 |
| 744 | 5,012,817 |
| 754 | Re.33,582 |
| | 5,012,818 |
| 781 | 5,012,819 |
| 782 | 5,012,820 |
| 876 | 5,012,821 |
| 885 | 5,012,822 |
| **CLASS 131** | |
| 31 | 5,012,823 |
| 118 | 5,012,824 |
| 281 | 5,012,825 |
| 291 | 5,012,826 |
| 297 | 5,012,827 |
| 341 | 5,012,828 |
| 344 | 5,012,829 |
| **CLASS 132** | |
| 213.1 | 5,012,830 |
| 313 | 5,012,831 |
| **CLASS 134** | |
| 1 | 5,013,366 |
| 9 | 5,013,367 |
| 22.11 | 5,013,368 |
| 24 | 5,013,369 |
| **CLASS 135** | |
| 87 | 5,012,832 |
| **CLASS 137** | |
| 15 | 5,012,833 |
| 70 | 5,012,834 |
| 82 | 5,012,835 |
| 83 | 5,012,836 |
| 99 | 5,012,837 |
| 202 | 5,012,838 |
| 341 | 5,012,839 |
| 559 | 5,012,840 |
| 625.39 | 5,012,841 |
| **CLASS 138** | |
| 161 | 5,012,842 |
| **CLASS 139** | |
| 224 A | 5,012,843 |
| 452 | 5,012,844 |
| **CLASS 141** | |
| 329 | 5,012,845 |
| **CLASS 144** | |
| 145 A | 5,012,846 |
| **CLASS 148** | |
| 13 | 5,013,370 |
| 16.6 | 5,013,371 |
| 111 | 5,013,372 |
| 113 | 5,013,373 |
| | 5,013,374 |
| **CLASS 152** | |
| 209 R | 5,012,847 |
| 218 | 5,012,848 |
| 520 | 5,012,849 |
| **CLASS 156** | |
| 61 | 5,013,375 |
| 64 | 5,013,376 |
| 109 | 5,013,377 |
| 226 | 5,013,378 |
| 244.11 | 5,013,379 |
| 250 | 5,013,380 |
| 281 | 5,013,381 |
| 298 | 5,013,382 |
| 307.3 | 5,013,383 |
| 345 | 5,013,384 |
| | 5,013,385 |
| 351 | 5,013,386 |
| 384 | 5,013,387 |
| | 5,013,388 |
| 526 | 5,013,389 |
| 577 | 5,013,390 |
| 578 | 5,013,391 |
| 584 | 5,013,392 |
| 616.2 | 5,013,393 |
| 627 | 5,013,394 |
| | 5,013,395 |
| 628 | 5,013,396 |
| 631 | 5,013,397 |
| 643 | 5,013,398 |
| | 5,013,399 |
| | 5,013,400 |
| | 5,013,401 |
| 645 | 5,013,402 |
| **CLASS 160** | |
| 38 | 5,012,850 |
| 348 | 5,012,851 |
| 351 | 5,012,852 |
| **CLASS 162** | |
| 49 | 5,013,403 |
| 72 | 5,013,404 |
| 101 | 5,013,405 |
| 343 | 5,013,406 |
| **CLASS 164** | |
| 75 | 5,012,853 |
| 155 | 5,012,855 |

VOL
1126
ISS
1
MY
7
1991
UMI

| | |
|---|---|
| 312 | 5,012,856 |
| 529 | 5,012,857 |

### CLASS 165

| | |
|---|---|
| 1 | 5,012,858 |
| 42 | 5,012,859 |
| 47 | 5,012,860 |
| | 5,012,861 |
| 133 | 5,012,862 |

### CLASS 166

| | |
|---|---|
| 55.7 | 5,012,863 |
| 70 | 5,012,864 |
| 90 | 5,012,865 |
| 170 | 5,012,866 |
| 188 | 5,012,867 |
| 248 | 5,012,868 |
| 285 | 5,012,869 |
| 293 | 5,012,870 |
| 363 | 5,012,854 |
| 386 | 5,012,871 |

### CLASS 172

| | |
|---|---|
| 380 | 5,012,872 |

### CLASS 173

| | |
|---|---|
| 22 | 5,012,873 |
| 108 | 5,012,874 |

### CLASS 174

| | |
|---|---|
| 35 MS | 5,013,869 |
| 50 | 5,013,870 |
| 52.4 | 5,013,871 |
| 65 R | 5,013,872 |
| 101 | 5,013,873 |

### CLASS 175

| | |
|---|---|
| 9 | 5,012,875 |
| 69 | 5,012,876 |
| 80 | 5,012,877 |
| 162 | 5,012,878 |

### CLASS 178

| | |
|---|---|
| 18 | 5,013,874 |

### CLASS 180

| | |
|---|---|
| 6.48 | 5,012,879 |
| 89.11 | 5,012,880 |
| 140 | 5,012,881 |
| 197 | 5,012,882 |
| 225 | 5,012,883 |
| 244 | 5,012,884 |
| 254 | 5,012,885 |
| 279 | 5,012,886 |
| 305 | 5,012,887 |
| 336 | 5,012,888 |

### CLASS 181

| | |
|---|---|
| 152 | 5,012,889 |
| 160 | 5,012,890 |
| 282 | 5,012,891 |

### CLASS 182

| | |
|---|---|
| 84 | 5,012,892 |
| 153 | 5,012,893 |
| 178 | 5,012,894 |
| 204 | 5,012,895 |

### CLASS 184

| | |
|---|---|
| 6.16 | 5,012,896 |
| 39 | 5,012,897 |

### CLASS 187

| | |
|---|---|
| 8.47 | 5,012,898 |
| 101 | 5,012,899 |

### CLASS 188

| | |
|---|---|
| 24.12 | 5,012,900 |
| 71.4 | 5,012,901 |
| 73.35 | 5,012,902 |
| 79.54 | 5,012,903 |
| 185 | 5,012,904 |
| 250 H | 5,012,905 |

### CLASS 192

| | |
|---|---|
| 3.57 | 5,012,909 |
| 4 A | 5,012,910 |
| 13 R | 5,012,907 |
| 56 F | 5,012,906 |
| 57 | 5,012,908 |
| 89 B | 5,012,911 |
| 133 | 5,012,912 |

### CLASS 193

| | |
|---|---|
| 2 R | 5,012,913 |

### CLASS 198

| | |
|---|---|
| 372 | 5,012,914 |
| 411 | 5,012,915 |
| 419.3 | 5,012,916 |
| 465.2 | 5,012,917 |
| 465.4 | 5,012,918 |
| 474.1 | 5,012,919 |
| 781 | 5,012,920 |

### CLASS 200

| | |
|---|---|
| 146 R | 5,013,875 |
| 254 | 5,013,876 |
| 523 | 5,013,877 |

### CLASS 202

| | |
|---|---|
| 158 | 5,013,407 |
| 241 | 5,013,408 |

### CLASS 204

| | |
|---|---|
| 6 | 5,013,409 |
| 27 | 5,013,410 |
| 29 | 5,013,411 |
| 59 R | 5,013,412 |
| 64 R | 5,013,413 |
| 98 | 5,013,414 |
| 152 | 5,013,415 |
| 192.1 | 5,013,416 |
| 228 | 5,013,417 |
| 253 | 5,013,418 |
| 298.05 | 5,013,419 |
| 299 R | 5,013,420 |
| 409 | 5,013,421 |

### CLASS 206

| | |
|---|---|
| 315.1 | 5,012,921 |
| 331 | 5,012,924 |
| 332 | 5,012,925 |
| 334 | 5,012,926 |
| 387 | 5,012,922 |
| 443 | 5,012,923 |
| 470 | 5,012,927 |
| 508 | 5,012,928 |
| 602 | 5,012,929 |
| 620 | 5,012,930 |
| 631.100 | 5,012,931 |

### CLASS 208

| | |
|---|---|
| 27 | 5,013,422 |
| 64 | 5,013,423 |
| 78 | 5,013,424 |
| 113 | 5,013,425 |
| 134 | 5,013,426 |
| 211 | 5,013,427 |
| 415 | 5,013,428 |

### CLASS 209

| | |
|---|---|
| 534 | 5,012,932 |
| 671 | 5,012,933 |

### CLASS 210

| | |
|---|---|
| 137 | 5,013,429 |
| 159 | 5,013,430 |
| 188 | 5,013,431 |
| 195.1 | 5,013,432 |
| 198.2 | 5,013,433 |
| 232 | 5,013,434 |
| 262 | 5,013,435 |
| 321.78 | 5,013,437 |
| 321.8 | 5,013,436 |
| 455 | 5,013,438 |
| 500.23 | 5,013,439 |
| 526 | 5,013,440 |
| 605 | 5,013,441 |
| 614 | 5,013,442 |
| 634 | 5,013,443 |
| | 5,013,444 |
| 635 | 5,013,445 |
| | 5,013,446 |
| 640 | 5,013,447 |
| 642 | 5,013,448 |
| 672 | 5,013,449 |
| 687 | 5,013,450 |
| 708 | 5,013,451 |
| | 5,013,452 |
| 712 | 5,013,453 |
| 718 | 5,013,454 |
| 729 | 5,013,455 |
| 734 | 5,013,456 |
| 741 | 5,013,457 |
| 751 | 5,013,458 |
| 764 | 5,013,459 |
| 770 | 5,013,460 |
| 777 | 5,013,461 |

### CLASS 211

| | |
|---|---|
| 41 | 5,012,934 |
| | 5,012,935 |
| 59.3 | 5,012,936 |
| 189 | 5,012,937 |
| 191 | 5,012,938 |

### CLASS 212

| | |
|---|---|
| 157 | 5,012,939 |

### CLASS 215

| | |
|---|---|
| 230 | 5,012,940 |
| 250 | 5,012,941 |
| 253 | 5,012,942 |

### CLASS 219

| | |
|---|---|
| 10.43 | 5,013,878 |
| 56 | 5,013,879 |
| 61 | 5,013,880 |
| 69.12 | 5,013,881 |
| 69.14 | 5,013,882 |
| 121.47 | 5,013,883 |
| 121.48 | 5,013,884 |
| 121.5 | 5,013,885 |
| 121.83 | 5,013,886 |
| 124.34 | 5,013,887 |
| 219 | 5,013,888 |
| 385 | 5,013,891 |
| 421 | 5,013,892 |
| 453 | 5,013,893 |
| 548 | 5,013,894 |

### CLASS 220

| | |
|---|---|
| 4.32 | 5,012,943 |
| 89.1 | 5,012,945 |
| 258 | 5,012,946 |
| 428 | 5,012,947 |
| 437 | 5,012,948 |
| 455 | 5,012,949 |
| 459 | 5,012,950 |
| 626 | 5,012,951 |
| 677 | 5,012,944 |

### CLASS 221

| | |
|---|---|
| 36 | 5,012,952 |

### CLASS 222

| | |
|---|---|
| 1 | 5,012,953 |
| 5 | 5,012,954 |
| 61 | 5,012,955 |
| 94 | 5,012,956 |
| 190 | 5,012,957 |
| 306 | 5,012,958 |
| 535 | 5,012,959 |
| 570 | 5,012,960 |
| 643 | 5,012,961 |

### CLASS 223

| | |
|---|---|
| 57 | 5,012,962 |

### CLASS 224

| | |
|---|---|
| 42.46 R | 5,012,963 |
| 153 | 5,012,964 |
| 255 | 5,012,965 |
| 277 | 5,012,966 |

### CLASS 227

| | |
|---|---|
| 7 | 5,012,967 |
| 156 | 5,012,968 |

### CLASS 228

| | |
|---|---|
| 104 | 5,012,969 |
| 119 | 5,012,800 |

### CLASS 229

| | |
|---|---|
| 4.5 | 5,012,970 |
| 120.07 | 5,012,971 |
| 162 | 5,012,972 |

### CLASS 235

| | |
|---|---|
| 110 | 5,013,895 |
| 381 | 5,013,896 |
| | 5,013,897 |
| 449 | 5,013,898 |
| 462 | 5,013,899 |
| 492 | 5,013,900 |

### CLASS 236

| | |
|---|---|
| 46 R | 5,012,973 |

### CLASS 239

| | |
|---|---|
| 1 | 5,012,974 |
| 9 | 5,012,975 |
| 227 | 5,012,976 |
| 284.1 | 5,012,977 |
| 304 | 5,012,978 |
| 416.5 | 5,012,979 |
| 423 | 5,012,980 |
| 533.12 | 5,012,981 |
| 585 | 5,012,982 |
| 590.5 | 5,012,983 |

### CLASS 241

| | |
|---|---|
| 16 | 5,012,984 |

### CLASS 242

| | |
|---|---|
| 25 A | 5,012,985 |
| 55.300 | 5,012,986 |
| 56 R | 5,012,987 |
| 59 | 5,012,988 |
| 186 | 5,012,989 |
| 242 | 5,012,990 |

### CLASS 244

| | |
|---|---|
| 3.12 | 5,012,991 |
| 3.23 | 5,012,992 |
| 145 | 5,012,993 |

### CLASS 248

| | |
|---|---|
| 68.1 | 5,012,995 |
| 74.1 | 5,013,002 |
| 117.6 | 5,013,003 |
| 161 | 5,012,996 |
| 220.4 | 5,012,997 |
| 225.2 | 5,012,998 |
| 551 | 5,013,000 |
| | 5,013,001 |
| 558 | 5,012,994 |
| 685 | 5,012,999 |
| 692 | 5,013,004 |

### CLASS 250

| | |
|---|---|
| 202 | 5,013,901 |
| 213 VT | 5,013,902 |
| 214 A | 5,013,903 |
| 214 R | 5,013,904 |
| 223 R | 5,013,905 |
| | 5,013,906 |
| 227.12 | 5,013,907 |
| 227.15 | 5,013,908 |
| 231.1 | 5,013,909 |
| 231.17 | 5,013,910 |
| 239 | 5,013,911 |
| 282 | 5,013,912 |
| 307 | 5,013,913 |
| 310 | 5,013,914 |
| 311 | 5,013,915 |
| 327.2 | 5,013,916 |
| 330 | 5,013,917 |
| 338.4 | 5,013,918 |
| 343 | 5,013,920 |
| 349 | 5,013,919 |
| 370.11 | 5,013,921 |
| 385.1 | 5,013,922 |
| 396 R | 5,013,923 |
| 504 R | 5,013,924 |
| 505.1 | 5,013,925 |
| 551 | 5,013,926 |
| 561 | 5,013,927 |
| 574 | 5,013,928 |

### CLASS 251

| | |
|---|---|
| 1.3 | 5,013,005 |
| 8 | 5,013,006 |
| 40 | 5,013,007 |
| 357 | 5,013,009 |

### CLASS 252

| | |
|---|---|
| 8.554 | 5,013,462 |
| 18 | 5,013,463 |
| 26 | 5,013,464 |
| 32.7 E | 5,013,465 |
| 42.7 | 5,013,466 |
| 46.4 | 5,013,467 |
| 47.5 | 5,013,468 |
| | 5,013,469 |
| | 5,013,470 |
| 62.52 | 5,013,471 |
| 78.1 | 5,013,472 |
| 174.13 | 5,013,473 |
| 299.1 | 5,013,474 |
| 299.61 | 5,013,475 |
| | 5,013,476 |
| 299.63 | 5,013,477 |
| | 5,013,478 |
| 299.65 | 5,013,479 |
| 301.4 H | 5,013,480 |
| 389.23 | 5,013,481 |
| 395 | 5,013,482 |
| 396 | 5,013,483 |
| 542 | 5,013,484 |
| 551 | 5,013,485 |
| 559 | 5,013,486 |
| 587 | 5,013,487 |

### CLASS 254

| | |
|---|---|
| 50.2 | 5,013,010 |
| 423 | 5,013,011 |

### CLASS 261

| | |
|---|---|
| 70 | 5,013,488 |
| 77 | 5,013,489 |
| 87 | 5,013,490 |
| 97 | 5,013,491 |
| 112.2 | 5,013,492 |
| 122 | 5,013,493 |

### CLASS 264

| | |
|---|---|
| 1.3 | 5,013,494 |
| 1.5 | 5,013,495 |
| 2.3 | 5,013,496 |
| 4.1 | 5,013,497 |
| 8 | 5,013,498 |
| 30 | 5,013,499 |
| 40.4 | 5,013,500 |
| 67 | 5,013,501 |
| 103 | 5,013,502 |
| 117 | 5,013,503 |
| 130 | 5,013,504 |
| | 5,013,505 |
| | 5,013,516 |
| 210.8 | 5,013,506 |
| 219 | 5,013,507 |
| 224 | 5,013,508 |
| 229 | 5,013,509 |
| 242 | 5,013,511 |
| 255 | 5,013,512 |
| 328.8 | 5,013,513 |
| 512 | 5,013,514 |
| 513 | 5,013,515 |
| 515 | 5,013,517 |
| 564 | 5,013,518 |

### CLASS 267

| | |
|---|---|
| 140.1 | 5,013,012 |
| 165 | 5,013,013 |

### CLASS 269

| | |
|---|---|
| 7 | 5,013,014 |
| 24 | 5,013,015 |
| 73 | 5,013,016 |
| 88 | 5,013,017 |
| 323 | 5,013,018 |

### CLASS 270

| | |
|---|---|
| 1.100 | 5,013,019 |
| 49 | 5,013,020 |
| 53 | 5,013,021 |
| 56 | 5,013,022 |

### CLASS 271

| | |
|---|---|
| 3.1 | 5,013,023 |
| 146 | 5,013,024 |
| 164 | 5,013,025 |
| 187 | 5,013,026 |
| 290 | 5,013,027 |
| 305 | 5,013,028 |

### CLASS 272

| | |
|---|---|
| 3 | 5,013,029 |
| 67 | 5,013,030 |
| 70 | 5,013,031 |
| 70.3 | 5,013,032 |
| 72 | 5,013,033 |
| 132 | 5,013,034 |
| 136 | 5,013,035 |
| 137 | 5,013,036 |
| 139 | 5,013,037 |

### CLASS 273

| | |
|---|---|
| 55 R | 5,013,039 |
| 146 | 5,013,040 |
| 164 | 5,013,041 |
| 184 A | 5,013,042 |
| 186 C | 5,013,044 |
| 186 R | 5,013,045 |
| 213 | 5,013,046 |
| 238 | 5,013,047 |
| 242 | 5,013,048 |
| 258 | 5,013,043 |
| 292 | 5,013,049 |
| 439 | 5,013,038 |

### CLASS 277

| | |
|---|---|
| 9.5 | 5,013,050 |
| 89 | 5,013,051 |
| 153 | 5,013,052 |
| 215 | 5,013,053 |

### CLASS 279

| | |
|---|---|
| 16 | 5,013,054 |

### CLASS 280

| | |
|---|---|
| 47.19 | 5,013,055 |
| 425.2 | 5,013,056 |
| 426 | 5,013,057 |
| 429 | 5,013,058 |
| 446.1 | 5,013,059 |
| 477 | 5,013,060 |
| 707 | 5,013,061 |
| | 5,013,062 |
| 711 | 5,013,063 |
| 730 | 5,013,064 |
| 743 | 5,013,065 |
| 809 | 5,013,066 |
| 840 | 5,013,067 |

### CLASS 281

| | |
|---|---|
| 31 | 5,013,068 |

### CLASS 283

| | |
|---|---|
| 48.1 | 5,013,069 |
| 49 | 5,013,070 |
| 69 | 5,013,071 |
| 81 | 5,013,088 |

### CLASS 285

| | |
|---|---|
| 233 | 5,013,072 |

### CLASS 290

| | |
|---|---|
| 31 | 5,013,929 |

### CLASS 292

| | |
|---|---|
| 87 | 5,013,073 |

### CLASS 294

| | |
|---|---|
| 33 | 5,013,074 |
| 64.1 | 5,013,075 |

### CLASS 295

| | |
|---|---|
| 42.2 | 5,013,076 |

### CLASS 296

| | |
|---|---|
| 96.21 | 5,013,077 |
| 100 | 5,013,078 |
| 136 | 5,013,079 |
| 180.1 | 5,013,080 |
| | 5,013,081 |
| 202 | 5,013,082 |
| 213 | 5,013,083 |

### CLASS 297

| | |
|---|---|
| 85 | 5,013,084 |
| 184 | 5,013,085 |
| 272 | 5,013,086 |
| 284 | 5,013,087 |
| 452 | 5,013,089 |
| | 5,013,090 |

### CLASS 299

| | |
|---|---|
| 1 | 5,013,091 |
| 40 | 5,013,092 |
| 67 | 5,013,093 |

### CLASS 303

| | |
|---|---|
| 52 | 5,013,094 |
| 113 | 5,013,095 |
| 116 | 5,013,096 |
| | 5,013,097 |
| 119 | 5,013,098 |

### CLASS 307

| | |
|---|---|
| 10.1 | 5,013,930 |
| 261 | 5,013,931 |
| 268 | 5,013,932 |
| 296.1 | 5,013,933 |
| 296.7 | 5,013,934 |
| 350 | 5,013,935 |
| 446 | 5,013,936 |
| 448 | 5,013,937 |
| 455 | 5,013,938 |
| 468 | 5,013,939 |
| 473 | 5,013,940 |
| 475 | 5,013,941 |
| 480 | 5,013,942 |
| 530 | 5,013,943 |
| 603 | 5,013,944 |

### CLASS 310

| | |
|---|---|
| 26 | 5,013,945 |
| 40 MM | 5,013,946 |
| 67 R | 5,013,947 |
| 68 D | 5,013,948 |
| 83 | 5,013,949 |
| | 5,013,950 |
| 156 | 5,013,951 |
| 217 | 5,013,957 |
| 239 | 5,013,952 |
| 254 | 5,013,953 |
| 309 | 5,013,954 |
| 316 | 5,013,955 |
| 323 | 5,013,956 |
| | 5,013,958 |

### CLASS 312

| | |
|---|---|
| 37 | 5,013,099 |
| 200 | 5,013,100 |
| 201 | 5,013,101 |
| 234.1 | 5,013,102 |
| 250 | 5,013,103 |
| 254 | 5,013,104 |
| 263 | 5,013,105 |
| 330.1 | 5,013,106 |

### CLASS 313

| | |
|---|---|
| 36 | 5,013,959 |
| 318 | 5,013,960 |
| | 5,013,961 |
| | 5,013,962 |
| 414 | 5,013,963 |
| 440 | 5,013,964 |
| 446 | 5,013,965 |
| 493 | 5,013,966 |
| 512 | 5,013,967 |
| 641 | 5,013,968 |

### CLASS 315

| | |
|---|---|
| 61 | 5,013,969 |
| 106 | 5,013,970 |
| 149 | 5,013,971 |
| 209 R | 5,013,972 |
| 241 R | 5,013,973 |
| 244 | 5,013,974 |
| 248 | 5,013,975 |
| | 5,013,976 |
| 289 | 5,013,977 |
| 367 | 5,013,978 |
| 411 | 5,013,980 |

### CLASS 318

| | |
|---|---|
| 67 | 5,013,981 |
| 114 | 5,013,982 |
| 480 | 5,013,983 |
| 490 | 5,013,984 |
| 558 | 5,013,985 |
| 593 | 5,013,986 |
| 602 | 5,013,988 |
| 625 | 5,013,989 |
| 632 | 5,013,987 |
| 814 | 5,013,990 |

### CLASS 320

| | |
|---|---|
| 15 | 5,013,991 |
| 31 | 5,013,992 |
| 35 | 5,013,993 |

### CLASS 322

| | |
|---|---|
| 8 | 5,013,994 |
| 25 | 5,013,995 |
| 28 | 5,013,996 |

### CLASS 323

| | |
|---|---|
| 212 | 5,013,997 |
| 285 | 5,013,998 |
| 313 | 5,013,999 |

### CLASS 324

| | |
|---|---|
| 158 F | 5,014,000 |

| | |
|---|---|
| | 5,014,001 |
| | 5,014,002 |
| 158 P | 5,014,003 |
| | 5,014,004 |
| 207.20 | 5,014,005 |
| 249 | 5,014,006 |
| 309 | 5,014,007 |
| 326 | 5,014,008 |
| 468 | 5,014,009 |
| 640 | 5,014,010 |
| 663 | 5,014,011 |
| 720 | 5,014,012 |

### CLASS 328

| | |
|---|---|
| 145 | 5,014,013 |
| 233 | 5,014,014 |

### CLASS 330

| | |
|---|---|
| 4.3 | 5,014,015 |
| 10 | 5,014,016 |
| 51 | 5,014,017 |
| 257 | 5,014,019 |
| | 5,014,020 |

### CLASS 331

| | |
|---|---|
| 96 | 5,014,021 |

### CLASS 333

| | |
|---|---|
| 20 | 5,014,018 |
| 161 | 5,014,022 |
| 164 | 5,014,023 |
| 185 | 5,014,026 |
| 203 | 5,014,024 |

### CLASS 335

| | |
|---|---|
| 132 | 5,014,027 |
| 167 | 5,014,025 |
| 210 | 5,014,028 |
| | 5,014,029 |
| 228 | 5,014,030 |
| 230 | 5,014,031 |
| 306 | 5,014,032 |

### CLASS 336

| | |
|---|---|
| 94 | 5,014,033 |

### CLASS 337

| | |
|---|---|
| 368 | 5,014,034 |
| 372 | 5,014,035 |
| 407 | 5,014,036 |

### CLASS 338

| | |
|---|---|
| 99 | 5,014,224 |
| 163 | 5,014,037 |

### CLASS 340

| | |
|---|---|
| 430 | 5,014,038 |
| 565 | 5,014,039 |
| 572 | 5,014,040 |
| 573 | 5,014,041 |
| 583 | 5,014,042 |
| 664 | 5,014,043 |
| 710 | 5,014,044 |
| 712 | 5,014,045 |
| 727 | 5,014,046 |
| 763 | 5,014,047 |
| 784 | 5,014,048 |
| 825.310 | 5,014,049 |
| 870.19 | 5,014,050 |
| 870.38 | 5,014,051 |
| 906 | 5,014,052 |
| 979 | 5,014,053 |

### CLASS 341

| | |
|---|---|
| 145 | 5,014,054 |
| 159 | 5,014,055 |
| 161 | 5,014,056 |
| | 5,014,057 |
| 166 | 5,014,058 |
| 172 | 5,014,059 |

### CLASS 342

| | |
|---|---|
| 2 | 5,014,060 |
| 45 | 5,014,061 |
| 68 | 5,014,062 |
| 130 | 5,014,063 |
| 152 | 5,014,064 |
| 165 | 5,014,065 |
| 352 | 5,014,066 |
| 375 | 5,013,979 |
| 407 | 5,014,067 |

### CLASS 343

| | |
|---|---|
| 700 MS | 5,014,070 |
| 710 | 5,014,068 |
| 785 | 5,014,069 |
| 788 | 5,014,071 |

### CLASS 346

| | |
|---|---|
| 76 PH | 5,014,072 |
| | 5,014,073 |
| 107 R | 5,014,074 |
| 108 | 5,014,075 |
| 159 | 5,014,076 |

### CLASS 350

| | |
|---|---|
| 3.7 | 5,013,107 |
| 6.1 | 5,013,108 |
| 96.1 | 5,013,109 |
| 96.10 | 5,013,112 |
| 96.13 | 5,013,113 |
| 96.14 | 5,013,114 |
| | 5,013,115 |
| 96.15 | 5,013,116 |
| | 5,013,117 |
| 96.16 | 5,013,118 |
| | 5,013,119 |
| 96.18 | 5,013,120 |
| 96.2 | 5,013,110 |
| | 5,013,111 |
| 96.20 | 5,013,121 |
| | 5,013,122 |
| 96.21 | 5,013,123 |
| | 5,013,124 |
| 96.23 | 5,013,125 |
| | 5,013,126 |
| | 5,013,127 |
| 96.24 | 5,013,128 |
| 96.29 | 5,013,129 |
| 96.3 | 5,013,130 |
| 96.31 | 5,013,131 |
| 128 | 5,013,132 |
| 162.11 | 5,013,133 |
| 174 | 5,013,134 |
| | 5,013,135 |
| 286 | 5,013,136 |
| 333 | 5,013,137 |
| 339 F | 5,013,138 |
| 340 | 5,013,139 |
| 347 E | 5,013,140 |
| 348 | 5,013,141 |
| 422 | 5,013,142 |
| 432 | 5,013,143 |
| 435 | 5,013,144 |
| 633 | Re.33,583 |

### CLASS 351

| | |
|---|---|
| 52 | 5,013,145 |
| 208 | 5,013,146 |

### CLASS 352

| | |
|---|---|
| 58 | 5,013,147 |

### CLASS 353

| | |
|---|---|
| 27 R | 5,013,148 |
| 122 | 5,013,149 |

### CLASS 354

| | |
|---|---|
| 187 | 5,014,077 |
| 195.1 | 5,014,078 |
| 266 | 5,014,079 |
| 403 | 5,014,080 |
| 416 | 5,014,081 |
| 437 | 5,014,082 |
| 471 | 5,014,083 |

### CLASS 355

| | |
|---|---|
| 27 | 5,014,084 |
| 64 | 5,014,085 |
| 71 | 5,014,086 |
| 72 | 5,014,087 |
| 201 | 5,014,088 |
| 251 | 5,014,089 |
| 256 | 5,014,090 |
| 321 | 5,014,091 |
| 324 | 5,014,092 |
| 326 | 5,014,093 |
| | 5,014,094 |
| 327 | 5,014,095 |

### CLASS 356

| | |
|---|---|
| 73 | 5,013,150 |
| 152 | 5,013,151 |
| 345 | 5,013,152 |
| 346 | 5,013,153 |
| 375 | 5,013,154 |
| 408 | 5,013,155 |
| 432 | 5,013,156 |

### CLASS 357

| | |
|---|---|
| 19 | 5,014,096 |
| 22 | Re.33,584 |
| 23.5 | 5,014,097 |
| | 5,014,098 |
| 23.6 | 5,014,099 |
| 30 | 5,014,100 |
| 37 | 5,014,101 |
| 38 | 5,014,102 |
| 41 | 5,014,103 |
| 42 | 5,014,104 |
| | 5,014,105 |
| 43 | 5,014,106 |
| 44 | 5,014,107 |
| 49 | 5,014,108 |
| 68 | 5,014,109 |
| | 5,014,110 |
| | 5,014,111 |
| 70 | 5,014,112 |
| | 5,014,113 |
| 74 | 5,014,114 |
| | 5,014,115 |
| 81 | 5,014,117 |

### CLASS 358

| | |
|---|---|
| 12 | 5,014,116 |
| | 5,014,122 |
| 31 | 5,014,118 |
| 37 | 5,014,119 |
| 39 | 5,014,120 |
| 55 | 5,014,121 |
| 75 | 5,014,123 |
| | 5,014,124 |
| 86 | 5,014,125 |
| 91 | 5,014,126 |
| 133 | 5,014,127 |
| 160 | 5,014,128 |
| 166 | 5,014,129 |
| 173 | 5,014,130 |
| 212 | 5,014,131 |
| 213.19 | 5,014,132 |
| 214 | 5,014,133 |
| 261.3 | 5,014,134 |
| 296 | 5,014,135 |
| 341 | 5,014,136 |
| 410 | 5,014,137 |
| 448 | 5,014,138 |

### CLASS 360

| | |
|---|---|
| 78.14 | 5,014,139 |
| 85 | 5,014,140 |
| 96.1 | 5,014,141 |
| 98.01 | 5,014,142 |
| 99.12 | 5,014,143 |
| 104 | 5,014,144 |
| | 5,014,145 |
| 106 | 5,014,146 |
| 113 | 5,014,147 |
| 125 | 5,014,148 |
| 126 | 5,014,149 |
| 132 | 5,014,150 |
| 133 | 5,014,151 |
| 135 | 5,014,152 |

### CLASS 361

| | |
|---|---|
| 36 | 5,014,153 |
| 49 | 5,014,154 |
| 56 | 5,014,155 |
| 58 | 5,014,156 |
| 187 | 5,014,157 |
| 321 | 5,014,158 |
| 386 | 5,014,159 |
| 388 | 5,014,161 |
| 412 | 5,014,162 |
| 415 | 5,014,163 |
| 424 | 5,014,160 |
| 428 | 5,014,164 |

### CLASS 362

| | |
|---|---|
| 61 | 5,014,165 |
| | 5,014,166 |
| 83.1 | 5,014,167 |
| 86 | 5,014,168 |
| 142 | 5,014,169 |
| 260 | 5,014,170 |
| 277 | 5,014,171 |
| 284 | 5,014,172 |
| 309 | 5,014,173 |
| | 5,014,174 |
| 348 | 5,014,175 |

### CLASS 363

| | |
|---|---|
| 26 | 5,014,176 |
| 45 | 5,014,177 |
| 49 | 5,014,178 |
| 56 | 5,014,179 |
| | 5,014,180 |
| 126 | 5,014,181 |
| 132 | 5,014,182 |

### CLASS 364

| | |
|---|---|
| 167.01 | 5,014,183 |
| 188 | 5,014,184 |
| | 5,014,185 |
| 200 | 5,014,186 |
| | 5,014,187 |
| | 5,014,188 |
| | 5,014,189 |
| | 5,014,190 |
| | 5,014,191 |
| | 5,014,192 |
| | 5,014,193 |
| | 5,014,194 |
| | 5,014,195 |
| | 5,014,196 |
| | 5,014,197 |
| 413.13 | 5,014,198 |
| 424.05 | 5,014,199 |
| 426.03 | 5,014,202 |
| 426.04 | 5,014,200 |
| | 5,014,201 |
| 431.06 | 5,014,203 |
| 449 | 5,014,204 |
| | 5,014,205 |
| | 5,014,206 |
| 468 | 5,014,207 |
| | 5,014,208 |
| 474.35 | 5,014,209 |
| 477 | 5,014,210 |
| 478 | 5,014,211 |
| 479 | 5,014,212 |
| 483 | 5,014,213 |
| | 5,014,214 |
| 486 | 5,014,215 |
| 496 | 5,014,216 |
| 498 | 5,014,217 |
| 502 | 5,014,218 |
| 513 | 5,014,219 |
| | 5,014,220 |
| 519 | 5,014,221 |
| 521 | 5,014,222 |
| | 5,014,223 |
| 550 | 5,014,225 |
| 551.01 | 5,014,226 |
| 559 | 5,014,227 |
| 571.01 | 5,014,228 |
| 571.04 | 5,014,229 |
| 578 | 5,014,230 |
| 718 | 5,014,231 |
| 724.19 | 5,014,232 |
| 766 | 5,014,233 |
| 900 | 5,014,234 |
| | 5,014,235 |
| | 5,014,236 |
| | 5,014,237 |
| | 5,014,238 |

### CLASS 365

| | |
|---|---|
| 11 | 5,014,239 |
| 49 | 5,014,240 |
| 51 | 5,014,241 |
| 63 | 5,014,242 |
| 96 | 5,014,243 |
| 189.05 | 5,014,244 |
| 194 | 5,014,245 |
| 230.03 | 5,014,246 |
| 230.05 | 5,014,247 |

### CLASS 366

| | |
|---|---|
| 13 | 5,013,157 |
| 251 | 5,013,158 |

### CLASS 367

| | |
|---|---|
| 4 | 5,014,248 |
| 63 | 5,014,249 |
| 124 | 5,014,250 |

### CLASS 368

| | |
|---|---|
| 80 | 5,014,251 |

### CLASS 369

| | |
|---|---|
| 13 | 5,014,252 |
| | 5,014,253 |
| | 5,014,254 |
| 36 | 5,014,255 |
| 44.35 | 5,014,256 |
| 59 | 5,014,257 |
| 178 | 5,014,258 |
| 284 | 5,014,259 |

### CLASS 370

| | |
|---|---|
| 13 | 5,014,260 |
| 16 | 5,014,261 |
| | 5,014,262 |
| 32.1 | 5,014,263 |
| 58.1 | 5,014,264 |
| 60 | 5,014,265 |
| 60.1 | 5,014,266 |
| 62 | 5,014,267 |
| 68 | 5,014,268 |
| 85.11 | 5,014,269 |
| 101 | 5,014,270 |
| 102 | 5,014,271 |
| 106 | 5,014,272 |

### CLASS 371

| | |
|---|---|
| 37.7 | 5,014,273 |
| 40.1 | 5,014,274 |
| 43 | 5,014,275 |
| | 5,014,276 |

### CLASS 372

| | |
|---|---|
| 18 | 5,014,277 |
| 32 | 5,014,278 |
| 41 | 5,014,279 |
| 45 | 5,014,280 |
| 59 | 5,014,281 |
| 93 | 5,014,282 |

### CLASS 374

| | |
|---|---|
| 12 | 5,013,159 |
| 151 | 5,013,160 |
| 208 | 5,013,161 |

### CLASS 375

| | |
|---|---|
| 15 | 5,014,283 |
| 30 | 5,014,284 |
| 62 | 5,014,285 |
| 110 | 5,014,286 |

### CLASS 376

| | |
|---|---|
| 179 | 5,013,519 |
| 261 | 5,013,520 |
| 290 | 5,013,521 |
| 310 | 5,013,522 |

### CLASS 378

| | |
|---|---|
| 45 | 5,014,287 |
| 53 | 5,014,288 |
| 122 | 5,014,289 |
| 145 | 5,014,290 |
| | 5,014,291 |
| 196 | 5,014,292 |
| 197 | 5,014,293 |

### CLASS 379

| | |
|---|---|
| 58 | 5,014,294 |
| 61 | 5,014,295 |
| 67 | 5,014,296 |
| 82 | 5,014,297 |
| 93 | 5,014,298 |
| 98 | 5,014,299 |
| 100 | 5,014,300 |
| 155 | 5,014,301 |
| 165 | 5,014,302 |
| 201 | 5,014,303 |
| 399 | 5,014,304 |
| 402 | 5,014,305 |
| 407 | 5,014,306 |
| 410 | 5,014,307 |
| 413 | 5,014,308 |

### CLASS 380

| | |
|---|---|
| 7 | 5,014,309 |
| 10 | 5,014,310 |
| 23 | 5,014,311 |
| 25 | 5,014,312 |
| 28 | 5,014,313 |
| 43 | 5,014,314 |
| 49 | 5,014,315 |

### CLASS 381

| | |
|---|---|
| 15 | 5,014,316 |
| 43 | 5,014,317 |
| 47 | 5,014,318 |
| 68.2 | 5,014,319 |
| 96 | 5,014,320 |
| 111 | 5,014,321 |
| 174 | 5,014,322 |
| 194 | 5,014,323 |

### CLASS 382

| | |
|---|---|
| 7 | 5,014,324 |
| | 5,014,325 |
| 8 | 5,014,326 |
| 14 | 5,014,327 |
| 17 | 5,014,328 |
| | 5,014,329 |
| 30 | 5,014,330 |
| 34 | B1 3,713,100 |
| 48 | 5,014,331 |
| 50 | 5,014,332 |
| 54 | 5,014,333 |
| 86 | 5,014,334 |

### CLASS 383

| | |
|---|---|
| 97 | 5,013,162 |

### CLASS 384

| | |
|---|---|
| 38 | 5,013,163 |
| 45 | 5,013,164 |
| 122 | 5,013,165 |
| 220 | 5,013,166 |

### CLASS 388

| | |
|---|---|
| 815 | 5,014,335 |
| 843 | 5,014,336 |

### CLASS 392

| | |
|---|---|
| 395 | 5,014,337 |
| 405 | 5,014,338 |
| 470 | 5,013,889 |
| 491 | 5,014,339 |
| 497 | 5,013,890 |

### CLASS 400

| | |
|---|---|
| 63 | 5,013,167 |
| 82 | 5,013,168 |
| 124 | 5,013,169 |
| 659 | 5,013,170 |

### CLASS 401

| | |
|---|---|
| 6 | 5,013,171 |
| 133 | 5,013,172 |
| 202 | 5,013,173 |

### CLASS 403

| | |
|---|---|
| 11 | 5,013,174 |
| 24 | 5,013,175 |
| 30 | 5,013,182 |
| 171 | 5,013,176 |
| 235 | 5,013,177 |
| 330 | 5,013,178 |
| 335 | 5,013,179 |

### CLASS 404

| | |
|---|---|
| 10 | 5,013,180 |
| 12 | 5,013,181 |

### CLASS 405

| | |
|---|---|
| 59 | 5,013,183 |
| 85 | 5,013,184 |
| 128 | 5,013,185 |
| 166 | 5,013,186 |
| 169 | 5,013,187 |
| 184 | 5,013,188 |
| | 5,013,189 |
| 230 | 5,013,190 |
| 233 | 5,013,191 |
| 259 | 5,013,192 |

### CLASS 408

| | |
|---|---|
| 201 | 5,013,193 |
| 240 | 5,013,194 |

### CLASS 409

| | |
|---|---|
| 180 | 5,013,195 |
| 182 | 5,013,196 |

### CLASS 410

| | |
|---|---|
| 77 | 5,013,197 |

### CLASS 411

| | |
|---|---|
| 544 | 5,013,199 |

### CLASS 412

| | |
|---|---|
| 6 | 5,013,200 |

### CLASS 414

| | |
|---|---|
| 24.5 | 5,013,202 |
| 139.4 | 5,013,201 |
| 222 | 5,013,203 |
| 347 | 5,013,204 |
| 429 | 5,013,205 |
| 483 | 5,013,206 |
| 489 | 5,013,207 |
| 526 | 5,013,208 |
| 563 | 5,013,209 |
| 744.6 | 5,013,210 |
| 789.6 | 5,013,211 |
| 791.4 | 5,013,212 |
| 798.9 | 5,013,213 |

### CLASS 415

| | |
|---|---|
| 202 | 5,013,214 |

### CLASS 416

| | |
|---|---|
| 178 | 5,013,215 |
| 230 | 5,013,216 |

### CLASS 417

| | |
|---|---|
| 26 | 5,013,217 |
| 37 | 5,013,218 |
| 269 | 5,013,219 |
| 287 | 5,013,198 |
| 310 | 5,013,220 |
| 365 | 5,013,221 |
| 366 | 5,013,222 |
| 413 | 5,013,223 |
| 423.5 | 5,013,224 |

### CLASS 418

| | |
|---|---|
| 1 | 5,013,225 |
| 55.1 | 5,013,226 |
| 206 | 5,013,227 |

### CLASS 419

| | |
|---|---|
| 19 | 5,013,523 |

### CLASS 420

| | |
|---|---|
| 87 | 5,013,524 |
| 104 | 5,013,525 |
| 430 | 5,013,526 |

### CLASS 422

| | |
|---|---|
| 56 | 5,013,527 |
| 94 | 5,013,528 |
| 100 | 5,013,529 |
| 245 | 5,013,531 |
| 278 | 5,013,530 |

### CLASS 423

| | |
|---|---|
| 88 | 5,013,532 |
| 133 | 5,013,533 |
| 263 | 5,013,534 |
| 277 | 5,013,535 |
| 328 | 5,013,536 |
| | 5,013,537 |
| 608 | 5,013,538 |

### CLASS 424

| | |
|---|---|
| 10 | 5,013,539 |
| | 5,013,540 |
| 52 | 5,013,541 |
| 54 | 5,013,542 |
| 63 | 5,013,543 |
| 78 | 5,013,544 |
| 81 | 5,013,545 |
| 85.1 | 5,013,546 |
| 85.91 | 5,013,547 |
| 89 | 5,013,548 |
| 116 | 5,013,549 |
| 117 | 5,013,550 |
| 408 | 5,013,552 |
| 412 | 5,013,551 |
| 426 | 5,013,553 |
| 440 | 5,013,554 |
| 450 | 5,013,555 |
| | 5,013,556 |
| 493 | 5,013,557 |
| 520 | 5,013,558 |
| 605 | 5,013,559 |
| 653 | 5,013,560 |

### CLASS 425

| | |
|---|---|
| 2 | 5,013,228 |
| 83.1 | 5,013,229 |

VOL
1126
ISS
1
MY
7
1991
UMI

# CLASSIFICATION OF PATENTS

| | |
|---|---|
| 127 | 5,013,230 |
| 145 | 5,013,231 |
| 192 R | 5,013,232 |
| 208 | 5,013,233 |
| 327 | 5,013,234 |
| 564 | 5,013,235 |
| **CLASS 426** | |
| 28 | 5,013,561 |
| 66 | 5,013,562 |
| 233 | 5,013,563 |
| 250 | 5,013,564 |
| | 5,013,565 |
| 302 | 5,013,566 |
| 314 | 5,013,567 |
| 332 | 5,013,568 |
| 585 | 5,013,569 |
| 599 | 5,013,570 |
| 600 | 5,013,571 |
| | 5,013,572 |
| 602 | 5,013,573 |
| 612 | 5,013,574 |
| 639 | 5,013,575 |
| 640 | 5,013,576 |
| **CLASS 427** | |
| 35 | 5,013,577 |
| 37 | 5,013,578 |
| 38 | 5,013,579 |
| 39 | 5,013,580 |
| 41 | 5,013,581 |
| 65 | 5,013,582 |
| 131 | 5,013,583 |
| 162 | 5,013,584 |
| 220 | 5,013,585 |
| 240 | 5,013,586 |
| 383.7 | 5,013,587 |
| 397.7 | 5,013,588 |
| **CLASS 428** | |
| 35.9 | 5,013,589 |
| 36.4 | 5,013,590 |
| 40 | 5,013,591 |
| 46 | 5,013,592 |
| 64 | 5,013,593 |
| | 5,013,594 |
| 77 | 5,013,595 |
| 100 | 5,013,596 |
| 141 | 5,013,597 |
| 198 | B1 4,761,324 |
| 283 | 5,013,598 |
| 286 | 5,013,599 |
| 316.6 | 5,013,600 |
| 323 | 5,013,601 |
| | 5,013,602 |
| 331 | 5,013,603 |
| 402 | 5,013,604 |
| 410 | 5,013,605 |
| 412 | 5,013,606 |
| 426 | 5,013,607 |
| 436 | 5,013,608 |
| 447 | 5,013,609 |
| 545 | 5,013,610 |
| 552 | 5,013,611 |
| | 5,013,612 |
| 593 | 5,013,613 |
| 651 | 5,013,614 |
| 668 | 5,013,615 |
| 694 | 5,013,616 |
| **CLASS 429** | |
| 17 | 5,013,617 |
| 44 | 5,013,618 |
| 189 | 5,013,619 |
| 194 | 5,013,620 |
| **CLASS 430** | |
| 11 | 5,013,621 |
| 59 | 5,013,623 |
| 60 | 5,013,624 |
| 64 | 5,013,625 |
| 106.6 | 5,013,626 |
| 110 | 5,013,627 |
| | 5,013,628 |
| 138 | 5,013,629 |
| | 5,013,630 |
| 271 | 5,013,631 |
| 281 | 5,013,632 |
| 358 | 5,013,633 |
| 495 | 5,013,634 |
| | 5,013,635 |
| 522 | 5,013,636 |
| 527 | 5,013,637 |
| 539 | 5,013,638 |
| 546 | 5,013,639 |
| | 5,013,640 |
| 550 | 5,013,622 |
| 569 | 5,013,641 |
| 574 | 5,013,642 |
| **CLASS 431** | |
| 10 | 5,013,236 |
| **CLASS 432** | |
| 100 | 5,013,237 |
| **CLASS 433** | |
| 2 | 5,013,238 |
| 6 | 5,013,239 |
| 77 | 5,013,240 |
| 86 | 5,013,241 |
| 174 | 5,013,242 |
| 189 | 5,013,243 |
| **CLASS 434** | |
| 81 | 5,013,244 |
| 170 | 5,013,245 |
| 236 | 5,013,246 |
| **CLASS 435** | |
| 6 | 5,013,644 |
| 7.32 | 5,013,664 |
| 7.92 | 5,013,645 |
| | 5,013,646 |
| 25 | 5,013,647 |
| | 5,013,648 |
| 69.1 | 5,013,649 |
| | 5,013,650 |
| 69.2 | 5,013,652 |
| 69.7 | 5,013,653 |
| 72 | 5,013,654 |
| 119 | 5,013,655 |
| 122 | 5,013,656 |
| 172.3 | 5,013,657 |
| | 5,013,658 |
| | 5,013,659 |
| 173 | 5,013,660 |
| 197 | 5,013,661 |
| 212 | 5,013,662 |
| 237 | 5,013,663 |
| 244 | 5,013,665 |
| **CLASS 436** | |
| 11 | 5,013,666 |
| 126 | 5,013,667 |
| 168 | 5,013,668 |
| 518 | 5,013,669 |
| **CLASS 437** | |
| 2 | 5,013,670 |
| 31 | 5,013,671 |
| 33 | 5,013,672 |
| 38 | 5,013,673 |
| 43 | 5,013,674 |
| 44 | 5,013,675 |
| 45 | 5,013,676 |
| 47 | 5,013,677 |
| 52 | 5,013,678 |
| | 5,013,679 |
| | 5,013,680 |
| 86 | 5,013,681 |
| 89 | 5,013,682 |
| 110 | 5,013,683 |
| 129 | 5,013,684 |
| 184 | 5,013,685 |
| 194 | 5,013,686 |
| 209 | 5,013,687 |
| 210 | 5,013,688 |
| 229 | 5,013,689 |
| 233 | 5,013,690 |
| 238 | 5,013,691 |
| 241 | 5,013,692 |
| 248 | 5,013,693 |
| **CLASS 439** | |
| 55 | 5,013,247 |
| 66 | 5,013,248 |
| | 5,013,249 |
| 79 | 5,013,250 |
| 94 | 5,013,251 |
| 215 | 5,013,252 |
| 235 | 5,013,253 |
| 255 | 5,013,254 |
| 260 | 5,013,255 |
| 264 | 5,013,256 |
| 326 | 5,013,257 |
| 347 | 5,013,258 |
| 522 | 5,013,259 |
| 535 | 5,013,260 |
| 581 | 5,013,261 |
| 610 | 5,013,262 |
| 630 | 5,013,263 |
| 636 | 5,013,264 |
| 724 | 5,013,265 |
| 741 | 5,013,266 |
| 807 | 5,013,268 |
| 821 | 5,013,267 |
| **CLASS 440** | |
| 100 | 5,013,269 |
| **CLASS 441** | |
| 45 | 5,013,270 |
| 65 | 5,013,271 |
| 127 | 5,013,272 |
| 130 | 5,013,273 |
| **CLASS 445** | |
| 2 | 5,013,274 |
| 30 | 5,013,275 |
| **CLASS 446** | |
| 14 | 5,013,276 |
| 34 | 5,013,277 |
| 73 | 5,013,278 |
| **CLASS 452** | |
| 46 | 5,013,279 |
| **CLASS 455** | |
| 1 | 5,014,340 |
| 3 | 5,014,341 |
| 33 | 5,014,342 |
| 38 | 5,014,343 |
| 51 | 5,014,344 |
| 54 | 5,014,345 |
| 89 | 5,014,346 |
| 110 | 5,014,347 |
| 165 | 5,014,348 |
| 189 | 5,014,349 |
| 258 | 5,014,350 |
| 297 | 5,014,351 |
| 314 | 5,014,352 |
| **CLASS 460** | |
| 80 | 5,013,280 |
| **CLASS 464** | |
| 68 | 5,013,281 |
| 172 | 5,013,282 |
| **CLASS 474** | |
| 8 | 5,013,283 |
| 52 | 5,013,284 |
| 80 | 5,013,285 |
| 205 | 5,013,286 |
| **CLASS 475** | |
| 61 | 5,013,287 |
| 166 | 5,013,288 |
| 286 | 5,013,289 |
| **CLASS 493** | |
| 196 | 5,013,290 |
| 357 | 5,013,291 |
| **CLASS 501** | |
| 24 | 5,013,362 |
| 46 | 5,013,697 |
| 98 | 5,013,694 |
| 139 | 5,013,695 |
| 153 | 5,013.696 |
| **CLASS 502** | |
| 27 | 5,013,698 |
| 73 | 5,013,699 |
| 79 | 5,013,700 |
| 110 | 5,013,701 |
| 120 | 5,013,702 |
| 241 | 5,013,703 |
| | 5,013,704 |
| 262 | 5,013,705 |
| 309 | 5,013,706 |
| **CLASS 503** | |
| 212 | 5,013,707 |
| 213 | 5,013,708 |
| 225 | 5,013,709 |
| 227 | 5,013,710 |
| | 5,013,711 |
| | 5,013,712 |
| **CLASS 514** | |
| 2 | 5,013,713 |
| 4 | 5,013,714 |
| 8 | 5,013,718 |
| 11 | 5,013,719 |
| 12 | 5,013,720 |
| 13 | 5,013,721 |
| 16 | 5,013,722 |
| 19 | 5,013,723 |
| 23 | 5,013,716 |
| 53 | 5,013,715 |
| 54 | 5,013,724 |
| 56 | 5,013,717 |
| 99 | 5,013,725 |
| 159 | 5,013,726 |
| 166 | 5,013,727 |
| 171 | 5,013,728 |
| 195 | 5,013,729 |
| 202 | 5,013,730 |
| | 5,013,731 |
| 210 | 5,013,732 |
| 213 | 5,013,733 |
| 231.5 | 5,013,734 |
| 255 | 5,013,735 |
| | 5,013,736 |
| 267 | 5,013,737 |
| 272 | 5,013,738 |
| 282 | 5,013,739 |
| | 5,013,740 |
| 290 | 5,013,741 |
| 329 | 5,013,742 |
| 338 | 5,013,743 |
| 345 | 5,013,744 |
| 364 | 5,013,745 |
| 365 | 5,013,746 |
| 367 | 5,013,747 |
| 383 | 5,013,748 |
| 397 | 5,013,749 |
| 401 | 5,013,750 |
| 448 | 5,013,751 |
| 505 | 5,013,752 |
| 512 | 5,013,753 |
| 521 | 5,013,754 |
| 533 | 5,013,755 |
| 544 | 5,013,756 |
| 568 | 5,013,757 |
| 573 | 5,013,758 |
| 622 | 5,013,759 |
| 649 | 5,013,760 |
| 650 | 5,013,761 |
| 740 | 5,013,762 |
| 772 | 5,013,763 |
| **CLASS 518** | |
| 714 | 5,013,764 |
| **CLASS 521** | |
| 27 | 5,013,765 |
| 64 | 5,013,767 |
| 137 | 5,013,766 |
| **CLASS 522** | |
| 64 | 5,013,768 |
| **CLASS 523** | |
| 111 | 5,013,769 |
| 202 | 5,013,771 |
| 213 | 5,013,770 |
| | 5,013,772 |
| 222 | 5,013,773 |
| **CLASS 524** | |
| 91 | 5,013,774 |
| 107 | 5,013,775 |
| 118 | 5,013,776 |
| 159 | 5,013,777 |
| 173 | 5,013,778 |
| 314 | 5,013,779 |
| | 5,013,780 |
| 417 | 5,013,782 |
| 450 | 5,013,783 |
| 458 | 5,013,784 |
| 490 | 5,013,785 |
| 514 | 5,013,786 |
| 555 | 5,013,787 |
| 767 | 5,013,788 |
| 862 | 5,013,809 |
| 864 | 5,013,781 |
| **CLASS 525** | |
| 66 | 5,013,789 |
| 99 | 5,013,790 |
| 113 | 5,013,791 |
| 166 | 5,013,792 |
| 195 | 5,013,793 |
| 203 | 5,013,794 |
| 279 | 5,013,795 |
| 326.2 | 5,013,796 |
| 328.3 | 5,013,797 |
| 338 | 5,013,798 |
| 432 | 5,013,799 |
| 477 | 5,013,800 |
| **CLASS 526** | |
| 64 | 5,013,801 |
| 86 | 5,013,802 |
| 128 | 5,013,803 |
| 262 | 5,013,804 |
| 264 | 5,013,805 |
| 271 | 5,013,806 |
| **CLASS 528** | |
| 17 | 5,013,807 |
| 23 | 5,013,808 |
| 59 | 5,013,810 |
| 60 | 5,013,811 |
| | 5,013,812 |
| | 5,013,813 |
| 90 | 5,013,814 |
| 171 | 5,013,815 |
| 173 | 5,013,816 |
| 183 | 5,013,817 |
| 193 | 5,013,818 |
| | 5,013,819 |
| 272 | 5,013,820 |
| 376 | 5,013,821 |
| 388 | 5,013,822 |
| | 5,013,823 |
| **CLASS 530** | |
| 300 | 5,013,824 |
| 500 | 5,013,825 |
| **CLASS 534** | |
| 768 | 5,013,826 |
| **CLASS 536** | |
| 17.3 | 5,013,827 |
| 23 | 5,013,828 |
| 26 | 5,013,829 |
| 27 | 5,013,830 |
| | 5,013,831 |
| 90 | 5,013,832 |
| **CLASS 540** | |
| 222 | 5,013,833 |
| 491 | 5,013,834 |
| | 5,013,835 |
| 512 | 5,013,836 |
| **CLASS 544** | |
| 143 | 5,013,837 |
| 193 | 5,013,838 |
| 349 | 5,013,839 |
| 363 | 5,013,841 |
| **CLASS 546** | |
| 220 | 5,013,842 |
| 251 | 5,013,843 |
| 332 | 5,013,844 |
| **CLASS 548** | |
| 320 | 5,013,845 |
| 352 | 5,013,846 |
| 378 | 5,013,847 |
| 522 | 5,013,848 |
| **CLASS 549** | |
| 28 | 5,013,849 |
| 222 | 5,013,850 |
| 298 | 5,013,851 |
| 362 | 5,013,852 |
| 401 | 5,013,853 |
| 496 | 5,013,854 |
| 539 | 5,013,855 |
| **CLASS 552** | |
| 11 | 5,013,856 |
| 110 | 5,013,857 |
| **CLASS 556** | |
| 401 | 5,013,858 |
| **CLASS 558** | |
| 51 | 5,013,859 |
| 383 | 5,013,860 |
| **CLASS 560** | |
| 34 | 5,013,861 |
| 60 | 5,013,862 |
| **CLASS 562** | |
| 11 | 5,013,863 |
| 426 | 5,013,864 |
| 456 | 5,013,865 |
| 474 | 5,013,866 |
| 512.2 | 5,013,867 |
| 557 | 5,013,868 |
| **CLASS 564** | |
| 301 | 5,013,510 |
| **CLASS 600** | |
| 30 | 5,013,292 |
| **CLASS 604** | |
| 20 | 5,013,293 |
| 26 | 5,013,294 |
| 38 | 5,013,295 |
| 44 | 5,013,296 |
| 55 | 5,013,297 |
| 93 | 5,013,298 |
| 114 | 5,013,299 |
| 119 | 5,013,300 |
| 140 | 5,013,303 |
| 167 | 5,013,304 |
| 192 | 5,013,305 |
| 197 | 5,013,301 |
| 198 | Re.33,585 |
| | 5,013,302 |
| 265 | 5,013,306 |
| 338 | 5,013,307 |
| 349 | 5,013,308 |
| 368 | 5,013,309 |
| **CLASS 606** | |
| 1 | 5,013,310 |
| 4 | 5,013,311 |
| 37 | 5,013,312 |
| 60 | 5,013,313 |
| 64 | 5,013,314 |
| 71 | 5,013,315 |
| 72 | 5,013,316 |
| 96 | 5,013,317 |
| 102 | 5,013,318 |
| 166 | 5,013,319 |
| 234 | 5,013,320 |
| | 5,013,321 |
| **CLASS 623** | |
| 6 | 5,013,322 |
| 16 | 5,013,323 |
| 23 | 5,013,324 |
| 38 | 5,013,325 |
| 64 | 5,013,326 |

# CLASSIFICATION OF DESIGNS

| | | |
|---|---|---|
| D1— | 122 | 316,622 |
| D2— | 314 | 316,623 |
| | | 316,624 |
| | 320 | 316,625 |
| | | 316,626 |
| | | 316,627 |
| | 606 | 316,628 |
| | 608 | 316,629 |
| D3— | 12 | 316,630 |
| | 36 | 316,631 |
| | 53 | 316,632 |
| | 54 | 316,633 |
| D4— | 116 | 316,634 |
| D6— | 309 | 316,635 |
| | 395 | 316,636 |
| | 397 | 316,637 |
| | 408 | 316,638 |
| | 429 | 316,639 |
| | 436 | 316,640 |
| | | 316,641 |
| | 446 | 316,642 |
| | 461 | 316,643 |
| | 498 | 316,644 |
| | 515 | 316,645 |
| | 525 | 316,646 |
| | 534 | 316,647 |
| | 603 | 316,648 |
| | 611 | 316,649 |
| D7— | 360 | 316,650 |
| | 416 | 316,651 |
| | 510 | 316,652 |
| | 605 | 316,653 |
| | 665 | 316,654 |
| | 673 | 316,655 |
| | | 316,656 |
| | | 316,657 |
| D8— | 14 | 316,658 |
| | 61 | 316,659 |
| | 71 | 316,660 |
| | 72 | 316,661 |
| | 93 | 316,662 |
| | 354 | 316,663 |
| | 356 | 316,664 |
| | 358 | 316,665 |
| | | 316,666 |
| D9— | 300 | 316,667 |
| | 306 | 316,668 |
| | 307 | 316,669 |
| | 335 | 316,670 |
| | 338 | 316,671 |
| | 346 | 316,672 |
| | 415 | 316,673 |
| | 424 | 316,674 |
| | 448 | 316,675 |
| D10— | 32 | 316,676 |
| | 39 | 316,677 |
| | 40 | 316,678 |
| | 46 | 316,679 |
| | | 316,680 |
| | 49 | 316,681 |
| | 75 | 316,682 |
| | 91 | 316,683 |
| | 114 | 316,684 |
| D11— | 4 | 316,685 |
| | 148 | 316,686 |
| | 149 | 316,687 |
| D12— | 101 | 316,688 |
| | 125 | 316,697 |
| | 140 | 316,689 |
| | 146 | 316,690 |
| | | 316,691 |
| | | 316,692 |
| | 147 | 316,693 |
| | | 316,694 |
| | 149 | 316,695 |
| | 172 | 316,698 |
| | 196 | 316,696 |
| | 213 | 316,699 |
| | 214 | 316,700 |
| D13— | 120 | 316,701 |
| | 133 | 316,702 |
| | 147 | 316,703 |
| | | 316,704 |
| | 179 | 316,705 |
| D14— | 106 | 316,706 |
| | 107 | 316,707 |
| | 113 | 316,708 |
| | 114 | 316,709 |
| | | 316,710 |
| | | 316,711 |
| | 118 | 316,712 |
| | 122 | 316,713 |
| | 126 | 316,714 |
| | 169 | 316,715 |
| | 188 | 316,716 |
| D15— | 126 | 316,717 |
| D16— | 202 | 316,718 |
| | | 316,719 |
| | | 316,720 |
| | 209 | 316,721 |
| D17— | 1 | 316,722 |
| D18— | 23 | 316,723 |
| | 39 | 316,724 |
| | 40 | 316,725 |
| D19— | 51 | 316,726 |
| | 52 | 316,727 |
| D20— | 8 | 316,728 |
| | 43 | 316,729 |
| D21— | 107 | 316,730 |
| | 137 | 316,731 |
| | 148 | 316,732 |
| | | 316,733 |
| | 157 | 316,734 |
| | 167 | 316,735 |
| | 191 | 316,736 |
| | 252 | 316,737 |
| D22— | 142 | 316,738 |
| D23— | 207 | 316,739 |
| | 209 | 316,740 |
| | | 316,741 |
| | 214 | 316,742 |
| | | 316,743 |
| | 218 | 316,744 |
| | | 316,745 |
| | 250 | 316,746 |
| | 252 | 316,747 |
| | 302 | 316,748 |
| | 339 | 316,749 |
| | 365 | 316,750 |
| | 403 | 316,751 |
| D24— | 8 | 316,752 |
| | | 316,753 |
| | 47 | 316,754 |
| | 48 | 316,755 |
| | 58 | 316,756 |
| D26— | 2 | 316,757 |
| | 68 | 316,758 |
| | 87 | 316,759 |
| D28— | 4 | 316,760 |
| | | 316,761 |
| | 35 | 316,762 |
| | 83 | 316,763 |
| D30— | 152 | 316,764 |
| D32— | 21 | 316,765 |
| | | 316,766 |
| | | 316,767 |
| | 73 | 316,768 |
| D34— | 28 | 316,769 |
| | | 316,770 |
| | 32 | 316,771 |

# CLASSIFICATION OF PLANTS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 70 | 7,514 | | 74 | 7,515 | | | 7,516 | | 77 | 7,517 | | | 7,518 | | 79 | 7,519 |

# STATUTORY INVENTION REGISTRATIONS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73— | 167 | H911 | 102— | 307 | H913 | 376— | 313 | H920 | 422— | 159 | H914 | 525— | 64 | H917 | 549— | 497 | H918 |
| | 592 | H912 | 361— | 400 | H921 | 378— | 45 | H922 | 521— | 25 | H915 | | 66 | H916 | 564— | 8 | H919 |

VOL
1126
ISS
1
MY
7
1991
UMI

# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

| | | | | | |
|---|---|---|---|---|---|
| Alabama | 1 | Kentucky | 21 | Oregon | 41 |
| Alaska | 2 | Louisiana | 22 | Pennsylvania | 42 |
| American Samoa | 3 | Maine | 23 | Puerto Rico | 43 |
| Arizona | 4 | Maryland | 24 | Rhode Island | 44 |
| Arkansas | 5 | Massachusetts | 25 | South Carolina | 45 |
| California | 6 | Michigan | 26 | South Dakota | 46 |
| Canal Zone | 7 | Minnesota | 27 | Tennessee | 47 |
| Colorado | 8 | Mississippi | 28 | Texas | 48 |
| Connecticut | 9 | Missouri | 29 | Utah | 49 |
| Delaware | 10 | Montana | 30 | Vermont | 50 |
| District of Columbia | 11 | Nebraska | 31 | Virginia | 51 |
| Florida | 12 | Nevada | 32 | Virgin Islands | 52 |
| Georgia | 13 | New Hampshire | 33 | Washington | 53 |
| Guam | 14 | New Jersey | 34 | West Virginia | 54 |
| Hawaii | 15 | New Mexico | 35 | Wisconsin | 55 |
| Idaho | 16 | New York | 36 | Wyoming | 56 |
| Illinois | 17 | North Carolina | 37 | U.S. Air Force | 57 |
| Indiana | 18 | North Dakota | 38 | U.S. Army | 58 |
| Iowa | 19 | Ohio | 39 | U.S. Navy | 59 |
| Kansas | 20 | Oklahoma | 40 | | |

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01 : 5,012,539
5,012,991
5,013,304
5,013,517
5,013,531
04 : 5,012,624
5,013,099
5,013,209
5,013,415
5,013,488
5,013,917
5,013,931
5,013,935
5,014,115
5,014,191
05 : 5,012,833
06 : Re.33,585
5,012,540
5,012,548
5,012,549
5,012,580
5,012,589
5,012,599
5,012,606
5,012,607
5,012,618
5,012,627
5,012,703
5,012,704
5,012,740
5,012,744
5,012,748
5,012,753
5,012,763
5,012,796
5,012,807
5,012,809
5,012,832
5,012,889
5,012,895
5,012,934
5,012,943
5,012,948
5,012,949
5,012,954
5,012,956
5,012,976
5,012,989
5,012,992
5,013,000
5,013,032
5,013,036
5,013,038
5,013,041
5,013,055
5,013,059
5,013,068
5,013,071
5,013,105
5,013,128
5,013,134
5,013,136
5,013,144
5,013,149
5,013,150
5,013,158
5,013,160
5,013,176
5,013,185
5,013,193
5,013,196
5,013,214
5,013,238
5,013,244
5,013,251
5,013,277
5,013,290
5,013,296
5,013,300
5,013,308
5,013,318
5,013,339
5,013,350
5,013,360
5,013,366
5,013,370
5,013,383
5,013,392
5,013,400
5,013,403
5,013,428
5,013,435
5,013,437
5,013,453
5,013,552
5,013,556
5,013,569
5,013,578
5,013,584
5,013,588
5,013,608
5,013,613
5,013,615
5,013,658
5,013,659
5,013,662
5,013,669
5,013,675
5,013,683
5,013,684
5,013,687
5,013,690
5,013,697
5,013,744
5,013,752
5,013,821
5,013,824
5,013,850
5,013,856
5,013,872
5,013,877
5,013,895
5,013,910
5,013,912
5,013,919
5,013,924
5,013,933
5,013,934
5,013,971
5,013,978
5,014,002
5,014,013
5,014,018
5,014,021
5,014,022
5,014,023
5,014,039
5,014,043
5,014,049
5,014,057
5,014,061
5,014,067
5,014,068
5,014,074
5,014,097
5,014,107
5,014,119
5,014,128
5,014,131
5,014,141
5,014,147
5,014,161
5,014,171
5,014,178
5,014,211
5,014,213
5,014,216
5,014,217
5,014,221
5,014,226
5,014,228
5,014,229
5,014,231
5,014,237
5,014,259
5,014,288
5,014,289
5,014,293
5,014,298
5,014,306
5,014,310
5,014,326
08 : 5,012,547
5,012,893
5,012,931
5,012,997
5,013,018
5,013,040
5,013,245
5,013,270
5,013,285
5,013,553
5,013,908
5,013,943
5,013,949
5,014,255
5,014,266
5,014,287
5,014,292
09 : 5,012,578
5,012.639
5,012,741
5,012,757
5,012,778
5,012,811
5,012,815
5,012,968
5,012,975
5,012,985
5,013,284
5,013,301
5,013,462
5,013,510
5,013,571
5,013,572
5,013,598
5,013,617
5,013,618
5,013,667
5,013,729
5,013,839
5,013,871
5,013,891
5,013,973
5,014,025
5,014,031
5,014,044
5,014.235
10 : 5,012,636
5,012,683
5,012,738
5,013,219
5,013,246
5,013,331
5,013,632
5,013,809
5,013,897
12 : 5,012,530
5,012,610
5,012,645
5,012,655
5,012,684
5,012,742
5,012,831
5,012,862
5,012,872
5,012,937
5,012,966
5,013,174
5,013,204
5,013,258
5,013,273
5,013,317
5,013,367
5,013,442
5,013,450
5,013,457
5,013,509
5,014,052
5,014,071
5,014,114
5,014,186
5,014,212
5,014,344
13 : 5,012,545
5,012,952
5,013,992
5,014,267
5,014,276
5,014,309
15 : 5,013,271
5,013,417
16 : 5,012,664
5,012,921
5,013,398
5,013,680
17 : 5,012,538
5,012,601
5,012,672
5,012,713
5,012,736
5,012,765
5,012,790
5,012,853
5,012,857
5,012,868
5,012,894
5,012,912
5,012,960
5,012,971
5,012,994
5,013,007
5,013,011
5,013,019
5,013,024
5,013,051
5,013,070
5,013,075
5,013,076
5,013,215
5,013,236
5,013,249
5,013,260
5,013,275
5,013,405
5,013,406
5,013,424
5,013,425
5,013,427
5,013,448
5,013,456
5,013,463
5,013,532
5,013,564
5,013,565
5,013,645
5,013,654
5,013,702
5,013,864
5,013,866
5,013,876
5,013,929
5,013,970
5,013,974
5,013,977
5,013,984
5,013,995
5,014,016

VOL 1126
ISS 1
MY 7
1991
UMI

5,014,153
5,014,159
5,014,168
5,014,177
5,014,179
5,014,180
5,014,181
5,014,294
5,014,313
5,014,314
5,014,345
5,014,346
18 5,012,678
5,012,707
5,012,837
5,012,902
5,013,239
5,013,240
5,013,324
5,013,336
5,013,379
5,013,761
5,013,762
5,013,854
5,013,980
5,014,098
5,014,316
5,014,348
19 5,012,526
5,012,634
5,012,635
5,013,078
5,013,386
5,013,829
5,013,887
20 5,012,631
5,012,667
5,012,939
5,013,056
5,013,073
5,014,060
21 5,012,559
5,012,846
5,013,069
5,013,167
5,013,264
5,013,763
22 5,012,845
5,012,864
5,012,875
5,012,945
5,013,321
5,013,438
5,013,546
5,013,604
5,013,609
5,013,704
5,013,860
5,013,983
23 5,012,688
5,013,102
5,013,938
5,013,941
24 5,012,719
5,012,840
5,012,986
5,013,155
5,013,199
5,013,295
5,013,389
5,013,595
5,013,652
5,013,657
5,013,681
5,013,862
5,013,993
5,014,340
25 5,012,544
5,012,553
5,012,581
5,012,637
5,012,663
5,012,711
5,012,722
5,012,750
5,012,786
5,012,813
5,012,839
5,013,009
5,013,053
5,013,113
5,013,154
5,013,340
5,013,361
5,013,385
5,013,429
5,013,436
5,013,446
5,013,447
5,013,542
5,013,646
5,013,649
5,013,653
5,013,666

5,013,728
5,013,779
5,013,780
5,013,799
5,013,962
5,013,976
5,013,990
5,014,041
5,014,066
5,014,076
5,014,082
5,014,134
5,014,176
5,014,195
5,014,222
5,014,273
5,014,281
5,014,323
5,014,327
5,014,338
26 : 5,012,561
5,012,575
5,012,602
5,012,608
5,012,620
5,012,630
5,012,662
5,012,725
5,012,749
5,012,780
5,012,785
5,012,856
5,012,885
5,012,891
5,012,914
5,012,938
5,012,974
5,013,037
5,013,077
5,013,081
5,013,082
5,013,089
5,013,175
5,013,210
5,013,216
5,013,221
5,013,222
5,013,225
5,013,232
5,013,252
5,013,289
5,013,302
5,013,352
5,013,364
5,013,396
5,013,459
5,013,577
5,013,587
5,013,592
5,013,612
5,013,770
5,013,790
5,013,808
5,013,827
5,014,011
5,014,038
5,014,051
5,014,200
5,014,202
5,014,206
5,014,214
27 : 5,012,732
5,012,764
5,012,799
5,012,946
5,013,093
5,013,121
5,013,194
5,013,200
5,013,312
5,013,315
5,013,333
5,013,473
5,013,621
5,013,622
5,013,639
5,013,714
5,013,795
5,013,889
5,014,037
5,014,219
28 : 5,012,769
5,013,084
5,013,940
29 : 5,012,761
5,012,898
5,012,963
5,013,063
5,013,192
5,013,433
5,013,451
5,013,452
5,013,493
5,013,547

5,013,698
5,013,713
5,013,767
5,013,865
30 : 5,013,549
5,013,561
32 : 5,013,049
5,013,391
33 : 5,012,542
5,012,852
5,012,924
5,013,156
5,013,266
5,014,064
5,014,108
5,014,160
34 : 5,012,629
5,012,801
5,013,030
5,013,119
5,013,130
5,013,139
5,013,213
5,013,263
5,013,319
5,013,329
5,013,421
5,013,422
5,013,423
5,013,469
5,013,486
5,013,492
5,013,497
5,013,536
5,013,541
5,013,543
5,013,557
5,013,648
5,013,685
5,013,691
5,013,716
5,013,722
5,013,737
5,013,738
5,013,741
5,013,742
5,013,793
5,013,801
5,013,822
5,013,861
5,013,918
5,013,927
5,013,948
5,014,028
5,014,055
5,014,162
5,014,262
5,014,265
5,014,285
5,014,303
5,014,307
35 : 5,012,708
5,013,409
5,014,014
5,014,248
36 : 5,012,554
5,012,562
5,012,570
5,012,585
5,012,590
5,012,641
5,012,652
5,012,816
5,012,830
5,012,923
5,012,929
5,012,941
5,012,947
5,012,959
5,013,124
5,013,133
5,013,161
5,013,241
5,013,247
5,013,272
5,013,276
5,013,293
5,013,303
5,013,334
5,013,335
5,013,337
5,013,395
5,013,467
5,013,468
5,013,470
5,013,528
5,013,535
5,013,545
5,013,574
5,013,605
5,013,624
5,013,640
5,013,641
5,013,642

5,013,696
5,013,699
5,013,703
5,013,732
5,013,739
5,013,740
5,013,764
5,013,777
5,013,806
5,013,831
5,013,837
5,013,843
5,013,849
5,013,851
5,013,859
5,013,883
5,013,886
5,013,892
5,013,899
5,013,930
5,013,944
5,014,090
5,014,093
5,014,102
5,014,117
5,014,164
5,014,182
5,014,197
5,014,230
5,014,299
5,014,301
5,014,328
5,014,329
5,014,333
5,014,343
3,713,100
4,761,324
37 : 5,012,681
5,012,793
5,012,826
5,012,926
5,012,978
5,013,085
5,013,125
5,013,127
5,013,253
5,013,309
5,013,434
5,013,439
5,013,548
5,014,175
5,014,268
5,014,347
39 5,012,531
5,012,541
5,012,596
5,012,614
5,012,706
5,012,819
5,012,873
5,012,880
5,012,928
5,012,930
5,012,955
5,012,962
5,012,977
5,012,995
5,013,002
5,013,042
5,013,044
5,013,052
5,013,058
5,013,064
5,013,181
5,013,208
5,013,306
5,013,373
5,013,374
5,013,387
5,013,388
5,013,487
5,013,560
5,013,596
5,013,717
5,013,719
5,013,720
5,013,759
5,013,836
5,013,846
5,013,922
5,013,961
5,013,968
5,014,000
5,014,034
5,014,069
5,014,084
40 : 5,012,555
5,012,604
5,012,674
5,012,675
5,012,834
5,012,869
5,012,877
5,012,965

5,013,039
5,013,120
5,013,190
5,013,376
5,013,483
5,013,491
5,014,087
5,014,218
41 : 5,012,567
5,012,595
5,012,605
5,012,623
5,012,814
5,012,822
5,012,888
5,013,107
5,013,109
5,013,460
5,013,907
5,013,991
5,014,015
5,014,059
5,014,300
42 5,012,558
5,012,566
5,012,650
5,012,660
5,012,690
5,012,717
5,012,747
5,012,760
5,012,767
5,012,797
5,012,841
5,012,925
5,013,017
5,013,046
5,013,088
5,013,122
5,013,145
5,013,162
5,013,248
5,013,257
5,013,259
5,013,265
5,013,310
5,013,332
5,013,338
5,013,440
5,013,458
5,013,582
5,013,631
5,013,650
5,013,766
5,013,791
5,013,792
5,013,878
5,013,903
5,013,997
5,014,086
5,014,154
5,014,207
5,014,208
5,014,284
5,014,286
43 : 5,012,536
44 : 5,013,298
5,013,307
5,013,947
45 : 5,012,751
5,012,870
5,013,375
5,013,563
5,013,811
5,013,825
5,013,885
5,013,953
5,014,183
5,014,210
5,014,234
47 : 5,012,534
5,012,694
5,012,791
5,012,821
5,012,973
5,013,202
5,013,299
5,013,694
5,013,787
5,013,820
5,013,890
5,014,122
48 : 5,012,543
5,012,582
5,012,592
5,012,619
5,012,689
5,012,701
5,012,705
5,012,777
5,012,808
5,012,854
5,012,866
5,012,867

5,012,871
5,012,876
5,012,979
5,013,005
5,013,015
5,013,045
5,013,123
5,013,218
5,013,254
5,013,378
5,013,404
5,013,533
5,013,540
5,013,551
5,013,661
5,013,663
5,013,671
5,013,682
5,013,726
5,013,751
5,013,784
5,013,798
5,013,803
5,013,805
5,013,812
5,013,813
5,013,932
5,013,979
5,014,010
5,014,099
5,014,113
5,014,193
5,014,236
5,014,247
5,014,263
5,014,351
49 : 5,012,616
5,012,836
5,013,033
5,013,206
5,013,316
5,013,357
51 5,012,527
5,012,588
5,012,685
5,012,720
5,012,823
5,012,829
5,013,171
5,013,344
5,013,420
5,013,555
5,013,599
5,013,902
5,014,062
5,014,279
5,014,290
53 : 5,012,597
5,012,625
5,012,646
5,012,668
5,012,878
5,012,879
5,012,916
5,012,933
5,012,957
5,012,972
5,013,029
5,013,031
5,013,060
5,013,066
5,013,282
5,013,305
5,013,507
5,013,539
5,013,718
5,014,053
5,014,192
5,014,220
54 : 5,013,091
5,013,810
5,014,126
55 : 5,012,537
5,012,609
5,012,632
5,012,789
5,012,805
5,012,810
5,012,915
5,012,918
5,012,927
5,012,936
5,013,022
5,013,101
5,013,103
5,013,198
5,013,279
5,013,330
5,013,644
5,013,693
5,013,873
5,014,167
5,014,227

# DESIGN PATENTS

04 : 316,698
06 : 316,632
316,639
316,649
316,655
316,660
316,688
316,701
316,705
316,709
316,729
316,758
316,764
08 : 316,622
316,771
09 : 316,644

316,676
316,762
12 : 316,654
316,728
13 : 316,672
17 : 316,631
316,637
316,653
316,658
316,665
316,673
316,678
316,727
316,741
19 : 316,638
316,710

20 : 316,708
22 : 316,700
23 : 316,636
24 : 316,717
25 : 316,623
316,625
26 : 316,752
316,753
316,769
27 : 316,648
316,754
316,765
31 : 316,661
316,739
32 : 316,736

316,751
34 : 316,633
316,659
316,667
316,711
316,732
316,733
36 : 316,627
316,640
316,641
316,642
316,646
316,664
316,684
316,685

316,722
316,750
316,755
316,760
316,761
37 : 316,635
316,740
39 : 316,630
316,697
316,707
40 316,737
41 : 316,624
316,626
42 : 316,628
316,647

316,748
47 : 316,679
316,680
48 : 316,629
316,651
49 : 316,669
51 : 316,735
316,756
53 : 316,656
316,682
316,699
316,702
55 : 316,668
316,675
316,747

# PLANT PATENTS

06 : 7,514
7,515
7,516
7,517
7,518
7,519

# STATUTORY INVENTION REGISTRATIONS

04 : H921
16 : H912
17 : H914
H920
26 H915
34 : H913
36 : H918
H922
42 : H919
48 : H917
51 : H911

VOL
1126
ISS
1
MY
7
1991
UMI

## CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY
STATE
ZIP CODE

**PLEASE PRINT OR TYPE**
(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

## SUBSCRIPTION ORDER FORM

**SUBSCRIPTION ORDER FORM**

**ENTER MY SUBSCRIPTION TO:**

**@ $ Domestic; @ $ Foreign.**

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY
STATE
ZIP CODE

**PLEASE PRINT OR TYPE**
(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ......................

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

VOL
1126

ISS
1

MY
7

1991

UMI

VOL
1126

ISS
1

MY
7

1991

UMI

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Harry F. Manbeck, Jr., *Commissioner*

VOL
1126

ISS
2

MY
14

1991

UMI

---

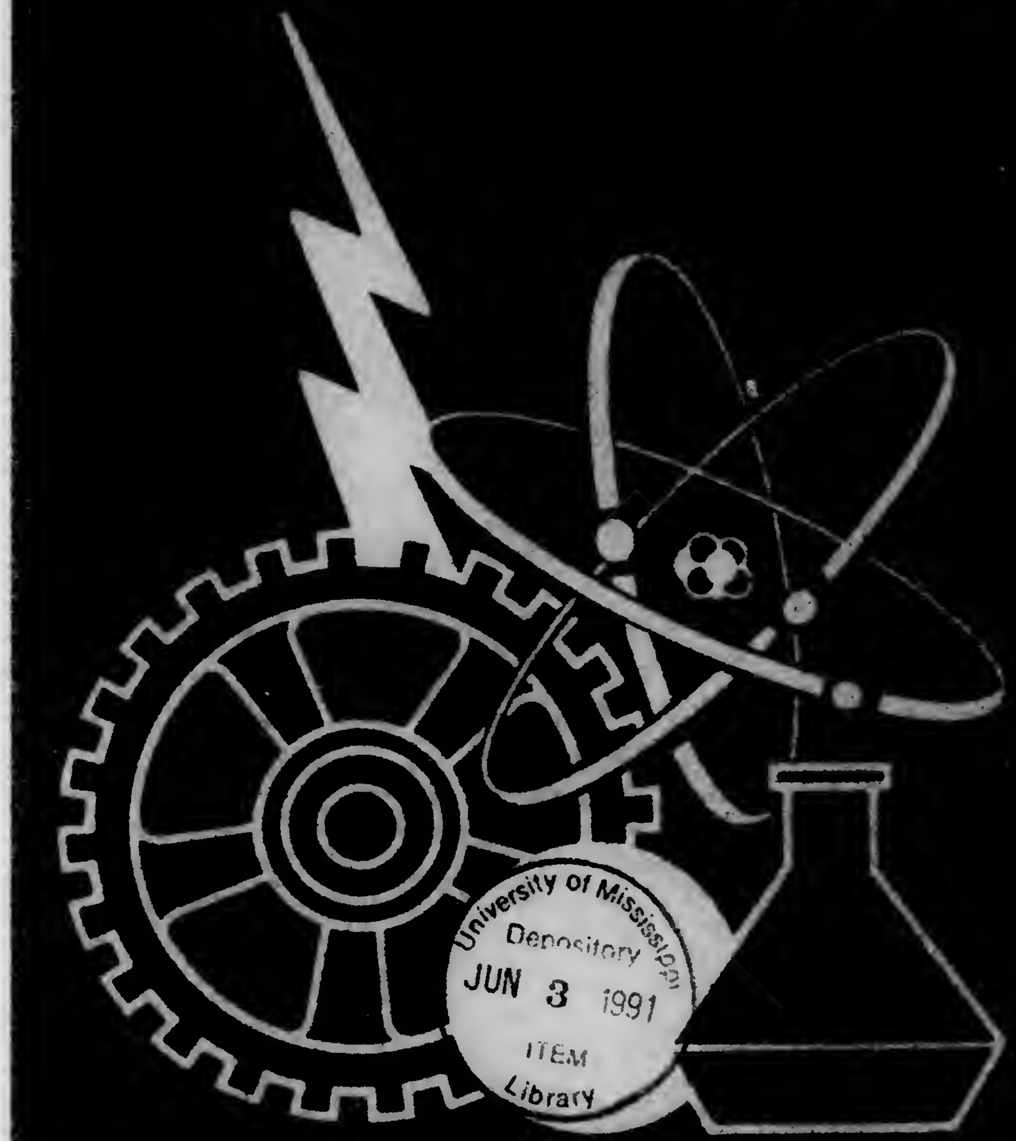
C 21.5:1126/2
Official Gazette, Patents, ...

Vol. 1126 Number 2

# OFFICIAL GAZETTE
## of the
## UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS
May 14, 1991



University of Mississippi
Depository
JUN 3 1991
ITEM
Library

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

VOL
1126
ISS
2
MY
14
1991
UMI

# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

May 14, 1991 Volume 1126 Number 2

## CONTENTS

Page

Patent and Trademark Office Notices

Patent Cooperation Treaty (PCT) Information ........ 1126 OG 16
Notice of Maintenance Fees Payable ........ 1126 OG 16
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees ........ 1126 OG 17
Reissue Applications Filed ........ 1126 OG 19
Requests for Reexaminations Filed ........ 1126 OG 19
Service by Publication ........ 1126 OG 19
Errata ........ 1126 OG 20
Service by Publication ........ 1126 OG 20
Patents Available for License or Sale ........ 1126 OG 20
New Telephone Numbers for PTO Organizations Located in North and South Tower Buildings ........ 1126 OG 21
Registration to Practice ........ 1126 OG 21
Patent Certificates of Correction ........ 1126 OG 22
Erratum ........ 1126 OG 22
Disclaimers ........ 1126 OG 22
Disclaimer and Dedication ........ 1126 OG 22
Special Boxes for Mail ........ 1126 OG 23
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries ........ 1126 OG 24
Patent Examining Corps ........ 1126 OG 26
Reexaminations ........ 655
Reissue Patents Granted ( 33,586 ) ........ 657
Plant Patents Granted ( 7,520 ) ........ 659

Patents Granted

General and Mechanical ( 5,014,353 ) ........ 661
Chemical ( 5,015,258 ) ........ 965
Electrical ( 5,015,800 ) ........ 1125
Design Patents Granted ( 316,772 ) ........ 1295
Index of Patentees ........ PI 1
Indices of Reissue, Reexamination, Design and Plant Patents ........ PI 83

Classification of

Patents (Including Reissues and Reexaminations) ........ PI 85
Designs, and Plants Applications ........ PI 89

Geographical Index of Residence of Inventors

Patents (Including Reissues and Reexaminations) ........ PI 91
Designs and Plant Applications ........ PI 93
Change of Address Form and Subscription Order Form ........ PI 95

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.
THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

VOL
1126
ISS
2
MY
14
1991
UMI

# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German marks and the exchange rate of the U.S. dollar in relation to the German mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees ( in U.S. dollars) is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed | 550.00 |
| —Corresponding prior U.S. national application filed | 380.00 |
| —Supplemental search fee, per additional invention | 150.00 |
| European Patent Office as ISA | 1492.00 |
| Preliminary examination fee | |
| USPTO as International Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as ISA | 400.00 |
| —Additional examination fee, per additional invention | 130.00 |
| —ISA not the USPTO | 600.00 |
| —Additional examination fee, per additional invention | 200.00 |
| International fees | |
| Basic fee | 559.00 |
| Basic Supplemental fee (for each page over 30) | 11.00 |
| Designation fee per country or region for the first 10 national or regional offices | 135.00 |
| Designation fee for 11th and subsequent designations | No Charge |
| Handling fee | 171.00 |

U.S. National Stage fees

| | Small Entity | Regular |
|---|---|---|
| USPTO was IPEA | 165.00 | 330.00 |
| USPTO was ISA but not IPEA | 185.00 | 370.00 |
| USPTO was neither ISA nor IPEA | 250.00 | 500.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 18.00 | 36.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 60.00 | 120.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) | 60.00 | 120.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) | 30.00 | 30.00 |

April 11, 1991

HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner of Patents and Trademarks.*

---

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on May 10, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,742,578 through 4,744,105
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 8, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,446,571 through 4,447,910
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant..............$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..............$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))..............$415.00
By other than a small entity..............$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))..............$835.00
By other than a small enttity..............$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982..............$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))..............$60.00
By other than a small entity..............$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable..............$550.00"

---

## Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MARCH 3, 1991 DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,375,108 | 06/229,199 | 3/01/83 |
| 4,375,115 | 06/309,183 | 3/01/83 |
| 4,375,119 | 06/232,992 | 3/01/83 |
| 4,375,125 | 06/241,306 | 3/01/83 |
| 4,375,132 | 06/265,850 | 3/01/83 |
| 4,375,135 | 06/240,276 | 3/01/83 |
| 4,375,136 | 06/288,533 | 3/01/83 |
| 4,375,139 | 06/382,564 | 3/01/83 |
| 4,375,140 | 06/256,773 | 3/01/83 |
| 4,375,148 | 06/339,773 | 3/01/83 |
| 4,375,155 | 06/334,416 | 3/01/83 |
| 4,375,161 | 06/256,071 | 3/01/83 |
| 4,375,173 | 06/252,236 | 3/01/83 |
| 4,375,177 | 06/253,772 | 3/01/83 |
| 4,375,183 | 06/224,928 | 3/01/83 |
| 4,375,186 | 06/277,964 | 3/01/83 |
| 4,375,211 | 06/221,463 | 3/01/83 |
| 4,375,212 | 06/226,116 | 3/01/83 |
| 4,375,214 | 06/241,006 | 3/01/83 |
| 4,375,215 | 06/228,523 | 3/01/83 |
| 4,375,227 | 06/229,280 | 3/01/83 |
| 4,375,230 | 06/273,279 | 3/01/83 |
| 4,375,234 | 06/308,217 | 3/01/83 |
| 4,375,245 | 06/223,879 | 3/01/83 |
| 4,345,250 | 06/249,257 | 3/01/83 |
| 4,345,255 | 06/251,149 | 3/01/83 |
| 4,375,258 | 06/253,096 | 3/01/83 |
| 4,375,259 | 06/290,769 | 3/01/83 |
| 4,375,263 | 06/244,798 | 3/01/83 |
| 4,375,272 | 06/279,491 | 3/01/83 |
| 4,375,278 | 06/300,124 | 3/01/83 |
| 4,375,281 | 06/248,744 | 3/01/83 |
| 4,375,288 | 06/267,514 | 3/01/83 |
| 4,375,310 | 06/250,975 | 3/01/83 |
| 4,375,314 | 06/225,001 | 3/01/83 |
| 4,375,316 | 06/237,592 | 3/01/83 |
| 4,375,344 | 06/280,157 | 3/01/83 |
| 4,345,367 | 06/255,910 | 3/01/83 |
| 4,675,368 | 06/313,058 | 3/01/83 |
| 4,375,371 | 06/273,128 | 3/01/83 |
| 4,375,379 | 06/260,294 | 3/01/83 |
| 4,375,380 | 06/280,103 | 3/01/83 |
| 4,375,390 | 06/357,947 | 3/01/83 |
| 4,375,400 | 06/250,981 | 3/01/83 |
| 4,375,401 | 06/265,425 | 3/01/83 |
| 4,375,402 | 06/295,891 | 3/01/83 |
| 4,375,415 | 06/265,104 | 3/01/83 |
| 4,375,417 | 06/315,570 | 3/01/83 |
| 4,375,418 | 06/315,825 | 3/01/83 |
| 4,375,419 | 06/263,535 | 3/01/83 |
| 4,375,431 | 06/334,619 | 3/01/83 |
| 4,375,456 | 06/353,668 | 3/01/83 |
| 4,375,462 | 06/302,909 | 3/01/83 |
| 4,375,473 | 06/336,797 | 3/01/83 |
| 4,375,478 | 06/354,117 | 3/01/83 |
| 4,375,480 | 06/275,633 | 3/01/83 |
| 4,375,488 | 06/368,744 | 3/01/83 |
| 4,375,490 | 06/321,765 | 3/01/83 |
| 4,375,493 | 06/338,851 | 3/01/83 |
| 4,375,513 | 06/309,965 | 3/01/83 |
| 4,375,518 | 06/248,577 | 3/01/83 |
| 4,375,529 | 06/289,637 | 3/01/83 |
| 4,375,538 | 06/219,125 | 3/01/83 |
| 4,375,543 | 06/288,200 | 3/01/83 |
| 4,375,555 | 06/278,102 | 3/01/83 |
| 4,375,562 | 06/238,348 | 3/01/83 |
| 4,375,566 | 06/264,391 | 3/01/83 |
| 4,375,568 | 06/231,406 | 3/01/83 |
| 4,375,582 | 06/231,579 | 3/01/83 |
| 4,375,583 | 06/252,431 | 3/01/83 |
| 4,375,592 | 06/218,153 | 3/01/86 |
| 4,375,594 | 06/224,604 | 3/01/83 |
| 4,375,604 | 06/238,895 | 3/01/83 |
| 4,375,605 | 06/264,234 | 3/01/83 |
| 4,375,622 | 06/255,408 | 3/01/83 |
| 4,375,633 | 06/241,844 | 3/01/83 |
| 4,375,660 | 06/230,997 | 3/01/83 |
| 4,646,364 | 06/788,851 | 3/03/87 |
| 4,646,367 | 06/753,121 | 3/03/87 |
| 4,646,371 | 06/825,548 | 3/03/87 |
| 4,646,376 | 06/811,513 | 3/03/87 |
| 4,646,382 | 06/812,355 | 3/03/87 |
| 4,646,393 | 06/759,585 | 3/03/87 |
| 4,646,399 | 06/832,159 | 3/30/87 |

VOL 1126 ISS 2 MY 14 1991 UMI

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,646,401 | 06/744,368 | 3/03/87 |
| 4,646,405 | 06/797,145 | 3/03/87 |
| 4,646,409 | 06/814,888 | 3/03/87 |
| 4,646,413 | 06/746,029 | 3/03/87 |
| 4,646,420 | 06/796,340 | 3/03/87 |
| 4,646,427 | 06/625,751 | 3/03/87 |
| 4,646,430 | 06/848,284 | 3/03/87 |
| 4,646,433 | 06/748,611 | 3/03/87 |
| 4,646,440 | 06/615,922 | 3/03/87 |
| 4,646,441 | 06/822,472 | 3/03/87 |
| 4,646,445 | 06/811,394 | 3/03/87 |
| 4,646,447 | 06/590,621 | 3/03/87 |
| 4,646,448 | 06/756,389 | 3/03/87 |
| 4,646,450 | 06/777,039 | 3/03/87 |
| 4,646,453 | 06/759,132 | 3/03/87 |
| 4,646,458 | 06/790,729 | 3/03/87 |
| 4,646,461 | 06/789,111 | 3/03/87 |
| 4,646,464 | 06/769,405 | 3/03/87 |
| 4,646,465 | 06/617,562 | 3/03/87 |
| 4,646,466 | 06/726,360 | 3/03/87 |
| 4,646,467 | 06/756,336 | 3/03/87 |
| 4,646,470 | 06/729,059 | 3/03/87 |
| 4,646,471 | 06/573,514 | 3/03/87 |
| 4,646,496 | 06/714,555 | 3/03/87 |
| 4,646,500 | 06/691,983 | 3/03/87 |
| 4,646,502 | 06/701,016 | 3/03/87 |
| 4,646,521 | 06/605,482 | 3/03/87 |
| 4,646,523 | 06/758,827 | 3/03/87 |
| 4,646,531 | 06/774,912 | 3/03/87 |
| 4,646,532 | 06/781,417 | 3/03/87 |
| 4,646,534 | 06/755,192 | 3/03/87 |
| 4,646,544 | 06/864,408 | 3/03/87 |
| 4,646,555 | 06/705,898 | 3/03/87 |
| 4,646,569 | 06/730,538 | 3/03/87 |
| 4,646,572 | 06/641,264 | 3/03/87 |
| 4,646,578 | 06/729,169 | 3/03/87 |
| 4,646,586 | 06/738,834 | 3/03/87 |
| 4,646,587 | 06/599,452 | 3/03/87 |
| 4,646,588 | 06/789,454 | 3/03/87 |
| 4,646,589 | 06/343,152 | 3/03/87 |
| 4,646,590 | 06/800,287 | 3/03/87 |
| 4,646,593 | 06/819,258 | 3/03/87 |
| 4,646,594 | 06/638,952 | 3/03/87 |
| 4,646,620 | 06/510,300 | 3/03/87 |
| 4,646,625 | 06/780,446 | 3/03/87 |
| 4,646,633 | 06/729,199 | 3/03/87 |
| 4,646,643 | 06/637,299 | 3/03/87 |
| 4,646,646 | 06/875,530 | 3/03/87 |
| 4,646,659 | 06/697,714 | 3/03/87 |
| 4,646,661 | 06/769,984 | 3/03/87 |
| 4,646,670 | 06/574,004 | 3/03/87 |
| 4,646,674 | 06/570,557 | 3/03/87 |
| 4,646,678 | 06/754,412 | 3/03/87 |
| 4,646,686 | 06/762,433 | 3/03/87 |
| 4,646,692 | 06/734,867 | 3/03/87 |
| 4,646,704 | 06/819,384 | 3/03/87 |
| 4,646,706 | 06/613,100 | 3/03/87 |
| 4,646,709 | 06/878,969 | 3/03/87 |
| 4,646,714 | 06/298,846 | 3/03/87 |
| 4,646,715 | 06/885,293 | 3/03/87 |
| 4,646,718 | 06/597,592 | 3/03/87 |
| 4,646,732 | 06/769,474 | 3/03/87 |
| 4,646,739 | 06/832,430 | 3/03/87 |
| 4,646,759 | 06/569,013 | 3/03/87 |
| 4,646,767 | 06/395,866 | 3/03/87 |
| 4,646,769 | 06/732,857 | 3/03/87 |
| 4,646,770 | 06/695,550 | 3/03/87 |
| 4,646,777 | 06/806,777 | 3/03/87 |
| 4,646,786 | 06/788,568 | 3/03/87 |
| 4,646,789 | 06/863,889 | 3/03/87 |
| 4,646,793 | 06/637,149 | 3/03/87 |
| 4,646,804 | 06/783,367 | 3/03/87 |
| 4,646,805 | 06/666,962 | 3/03/87 |
| 4,646,814 | 06/629,783 | 3/03/87 |
| 4,646,817 | 06/810,572 | 3/03/87 |
| 4,646,818 | 06/625,696 | 3/03/87 |
| 4,646,822 | 06/727,024 | 3/03/87 |
| 4,646,823 | 06/737,175 | 3/03/87 |
| 4,646,839 | 06/674,443 | 3/03/87 |
| 4,646,847 | 06/667,336 | 3/03/87 |
| 4,646,848 | 06/665,406 | 3/03/87 |
| 4,646,852 | 06/701,918 | 3/03/87 |
| 4,646,858 | 06/725,051 | 3/03/87 |
| 4,646,862 | 06/767,878 | 3/03/87 |
| 4,646,876 | 06/860,907 | 3/03/87 |
| 4,646,878 | 06/879,268 | 3/03/87 |
| 4,646,896 | 06/643,365 | 3/03/87 |
| 4,646,897 | 06/703,478 | 3/03/87 |
| 4,646,900 | 06/784,185 | 3/03/87 |
| 4,646,901 | 06/599,148 | 3/03/87 |
| 4,646,905 | 06/320,915 | 3/03/87 |
| 4,646,918 | 06/800,276 | 3/03/87 |
| 4,646,921 | 06/761,368 | 3/03/87 |
| 4,646,926 | 06/887,552 | 3/03/87 |
| 4,646,931 | 06/778,364 | 3/03/87 |
| 4,646,951 | 06/725,424 | 3/03/87 |
| 4,646,953 | 06/800,221 | 3/03/87 |
| 4,646,959 | 06/847,673 | 3/03/87 |
| 4,646,970 | 06/611,789 | 3/03/87 |
| 4,646,972 | 06/663,303 | 3/03/87 |
| 4,646,988 | 06/719,958 | 3/03/87 |
| 4,646,997 | 06/766,948 | 3/03/87 |
| 4,647,004 | 06/376,922 | 3/03/87 |
| 4,647,011 | 06/749,931 | 3/03/87 |
| 4,647,021 | 06/783,220 | 3/03/87 |
| 4,647,037 | 06/781,778 | 3/03/87 |
| 4,647,043 | 06/694,981 | 3/03/87 |
| 4,647,044 | 06/668,519 | 3/03/87 |
| 4,647,045 | 06/740,533 | 3/03/87 |
| 4,647,048 | 06/765,201 | 3/03/87 |
| 4,647,054 | 06/800,813 | 3/03/87 |
| 4,647,060 | 06/670,168 | 3/03/87 |
| 4,647,062 | 06/570,042 | 3/03/87 |
| 4,647,064 | 06/577,484 | 3/03/87 |
| 4,647,072 | 06/716,468 | 3/03/87 |
| 4,647,079 | 06/839,809 | 3/03/87 |
| 4,647,084 | 06/838,916 | 3/03/87 |
| 4,647,087 | 06/709,781 | 3/03/87 |
| 4,647,091 | 06/822,151 | 3/03/87 |
| 4,647,095 | 06/746,550 | 3/03/87 |
| 4,647,096 | 06/713,998 | 3/03/87 |
| 4,647,102 | 06/835,236 | 3/03/87 |
| 4,647,107 | 06/668,507 | 3/03/87 |
| 4,647,112 | 06/722,737 | 3/03/87 |
| 4,647,118 | 06/745,025 | 3/03/87 |
| 4,647,121 | 06/719,331 | 3/03/87 |
| 4,647,123 | 06/464,342 | 3/03/87 |
| 4,647,128 | 06/818,613 | 3/03/87 |
| 4,647,134 | 06/688,646 | 3/03/87 |
| 4,647,154 | 06/518,690 | 3/03/87 |
| 4,647,171 | 06/734,608 | 3/03/87 |
| 4,647,182 | 06/719,573 | 3/03/87 |
| 4.647,187 | 06/778,607 | 3/03/87 |
| 4,647,202 | 06/687,915 | 3/03/87 |
| 4,647,204 | 06/766,363 | 3/03/87 |
| 4,647,209 | 06/686,828 | 3/03/87 |
| 4,647,214 | 06/787,901 | 3/03/87 |
| 4,647,221 | 06/800,130 | 3/03/87 |
| 4,647,222 | 06/771,678 | 3/03/87 |
| 4,647,232 | 06/756,222 | 3/03/87 |
| 4,647,240 | 06/811,336 | 3/03/87 |
| 4,647,242 | 06/698,539 | 3/03/87 |
| 4,647,246 | 06/719,372 | 3/03/87 |
| 4,647,249 | 06/676,480 | 3/03/87 |
| 4,647,250 | 06/487,465 | 3/03/87 |
| 4,647,252 | 06/697,900 | 3/03/87 |
| 4,647,255 | 06/588,774 | 3/03/87 |
| 4,647,267 | 06/731,096 | 3/03/87 |
| 4,647,268 | 06/757,512 | 3/03/87 |
| 4,647,269 | 06/750,259 | 3/03/87 |
| 4,647,270 | 06/630,942 | 3/03/87 |
| 4,647,280 | 06/865,819 | 3/03/87 |
| 4,647,287 | 06/676,995 | 3/03/87 |
| 4,647,313 | 06/788,452 | 3/03/87 |
| 4,647,317 | 06/636,659 | 3/03/87 |
| 4,647,334 | 06/712,946 | 3/03/87 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,647,356 | 06/694,381 | 3/03/87 |
| 4,647,369 | 06/848,905 | 3/03/87 |
| 4,647,370 | 06/729,697 | 3/03/87 |
| 4,647,375 | 06/782,616 | 3/03/87 |
| 4,647,412 | 06/683,194 | 3/03/87 |
| 4,647,429 | 06/757,839 | 3/03/87 |
| 4,647,431 | 06/725,694 | 3/03/87 |
| 4,647,440 | 06/571,296 | 3/03/87 |
| 4,647,460 | 06/773,384 | 3/03/87 |
| 4,647,481 | 06/831,420 | 3/03/87 |
| 4,647,487 | 06/761,810 | 3/03/87 |
| 4,647,491 | 06/679,540 | 3/03/87 |
| 4,647,500 | 06/810,861 | 3/03/87 |
| 4,647,505 | 06/665,162 | 3/03/87 |
| 4,647,540 | 06/736,892 | 3/03/87 |
| 4,647,542 | 06/716,439 | 3/03/87 |
| 4,647,548 | 06/569,696 | 3/03/87 |
| 4,647,551 | 06/496,997 | 3/03/87 |
| 4,647,554 | 06/744,639 | 3/03/87 |
| 4,647,555 | 06/664,647 | 3/03/87 |
| 4,647,557 | 06/564,918 | 3/03/87 |
| 4,647,558 | 06/459,675 | 3/03/87 |
| 4,647,568 | 06/673,296 | 3/03/87 |
| 4,647,576 | 06/679,676 | 3/03/87 |
| 4,647,578 | 06/584,833 | 3/03/87 |
| 4,647,579 | 06/714,340 | 3/03/87 |
| 4,647,580 | 06/756,872 | 3/03/87 |
| 4,647,581 | 06/588,851 | 3/03/87 |
| 4,647,607 | 06/784,068 | 3/03/87 |
| 4,647,631 | 06/818,143 | 3/03/87 |
| 4,647,633 | 06/796,357 | 3/03/87 |
| 4,647,642 | 06/707,534 | 3/03/87 |
| 4,647,651 | 06/776,302 | 3/03/87 |
| 4,647,656 | 06/640,593 | 3/03/87 |
| 4,647,657 | 06/775,087 | 3/03/87 |
| 4,647,665 | 06/769,189 | 3/03/87 |
| 4,647,670 | 06/679,685 | 3/03/87 |
| 4,647,674 | 06/784,979 | 3/03/87 |
| 4,647,676 | 06/612,962 | 3/03/87 |
| 4,647,686 | 06/297,658 | 3/03/87 |
| 4,647,687 | 06/678,450 | 3/03/87 |
| 4,647,688 | 06/706,703 | 3/03/87 |
| 4,647,692 | 06/770,508 | 3/03/87 |
| 4,647,698 | 06/649,875 | 3/03/87 |
| 4,647,699 | 06/719,197 | 3/03/87 |
| 4,647,700 | 06/780,212 | 3/03/87 |
| 4,647,702 | 06/799,032 | 3/03/87 |
| 4,647,709 | 06/770,714 | 3/03/87 |
| 4,647,729 | 06/785,114 | 3/03/87 |
| 4,647,731 | 06/751,699 | 3/03/87 |
| 4,647,738 | 06/694,692 | 3/03/87 |
| 4,647,750 | 06/810,180 | 3/03/87 |
| 4,647,770 | 06/656,823 | 3/03/87 |
| 4,647,773 | 06/602,946 | 3/03/87 |
| 4,647,777 | 06/740,186 | 3/03/87 |
| 4,647,793 | 06/646,552 | 3/03/87 |
| 4,647,816 | 06/671,936 | 3/03/87 |
| 4,647,822 | 06/638,267 | 3/03/87 |
| 4,647,838 | 06/775,261 | 3/03/87 |
| 4,647,849 | 06/732,538 | 3/03/87 |
| 4,647,866 | 06/692,198 | 3/03/87 |
| 4,647,871 | 06/800,832 | 3/03/87 |
| 4,647,882 | 06/671,273 | 3/03/87 |
| 4,647,888 | 06/732,518 | 3/03/87 |
| 4,647,890 | 06/863,743 | 3/03/87 |
| 4,647,892 | 06/623,232 | 3/03/87 |
| 4,647,895 | 06/732,358 | 3/03/87 |
| 4,647,907 | 06/769,449 | 3/03/87 |
| 4,647,930 | 06/657,785 | 3/03/87 |
| 4,647,931 | 06/676,094 | 3/03/87 |
| 4,647,933 | 06/666,594 | 3/03/87 |
| 4,647,935 | 06/799,990 | 3/03/87 |
| 4,647,937 | 06/846,195 | 3/03/87 |
| 4,647,949 | 06/803,344 | 3/03/87 |
| 4,647,971 | 06/727,893 | 3/03/87 |
| 4,647,972 | 06/592,682 | 3/03/87 |
| 4,647,985 | 06/604,037 | 3/03/87 |
| 4,647,989 | 06/476,729 | 3/03/87 |
| 4,647,998 | 06/511,865 | 3/03/87 |
| 4,648,001 | 06/726,602 | 3/03/87 |
| 4,648,012 | 06/808,493 | 3/03/87 |
| 4,648,014 | 06/719,859 | 3/03/87 |
| 4,648,015 | 06/869,804 | 3/03/87 |
| 4,648,054 | 06/622,478 | 3/03/87 |
| 4,648,059 | 06/649,879 | 3/03/87 |
| 4,648,079 | 06/622,742 | 3/03/87 |
| 4,648,081 | 06/572,055 | 3/03/87 |
| 4,648,093 | 06/648,005 | 3/03/87 |
| 4,648,097 | 06/793,289 | 3/03/87 |
| 4,648,098 | 06/682,629 | 3/03/87 |
| 4,648,099 | 06/682,628 | 3/03/87 |
| 4,648,105 | 06/741,915 | 3/03/87 |
| 4,648,106 | 06/673,964 | 3/03/87 |
| 4,648,116 | 06/659,298 | 3/03/87 |
| 4,648,123 | 06/690,394 | 3/03/87 |
| 4,648,125 | 06/819,957 | 3/03/87 |
| 4,648,126 | 06/747,522 | 3/03/87 |
| 4,648,127 | 06/747,532 | 3/03/87 |
| 4,648,130 | 06/774,744 | 3/03/87 |

---

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

**4,838,552**, Re. S. N. 07/666,827, Filed Mar. 6, 1991, Cl. 273/138A, MULTILINE SLOT MACHINE, Takashi Hagiwara, Owner of Record: *Sigma Enterprises, Inc., Tokyo, Japan*, Attorney or Agent: David W. Heid, Ex. Gp.: 334

---

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

**4,276,789** Reexam. No. 90/002,315, Requested Apr. 5, 1991, Cl. 81/3.360, CORK EXTRACTOR, Herbert Allen, Owner of Record: *Hallen Co., Houston, Tex.*, Attorney or Agent: Browning, Bushman, Anderson & Brookhart, Ex. Gp.: 320, Requester: Owner

**4,344,327** Reexam. No. 90/002,313, Requested Apr. 2, 1991, Cl. 73/626, ELECTRONIC SCANNING ULTRASONIC DIAGNOSTIC SYSTEM, Yoshihiro Yoshikawa, et al., Owner of Record: *Aloka Co., Ltd., Tokyo, Japan*, Attorney or Agent: Koda & Androlia, Ex. Gp.: 260, Requester: Owner

**4,951,986**, Reexam. No. 90/002,314, Requested Apr. 5, 1991, Cl. 293/120, PLASTIC BUMPER, Kunio Hanafuss, et al., Owner of Record: *Minoru Industrial Co., Okayama, Japan*, Attorney or Agent: Kanesaka & Takeuchi, Ex. Gp.: 310, Requester: Owner

---

### Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceeding sent by

VOL
1126
ISS
2
MY
14
1991
UMI

certified mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Mod*Soft, Systems, Redwood City, Calif. Reg. No. 1,387,271, for the mark "THE INTEGRATOR", Canc. No. 18,717

Spindex Corp., Cherry Hill, N.J., Reg. No. 1,144,156, for the mark "SCHOOL TOOLS", Canc. No. 19,312

Pro Players, Inc., Phoenix, Ariz., Reg. No. 1,488,581, for the mark "AMERICA'S PRO PLAYERS", Canc. No. 19,399

Marketing Managment, Inc., Pelham, Ala., Reg. No. 954,648, for the mark "MMI" and design, Canc. No. 19,207.

JEAN BROWN
*Administrator, Trademark*
*Trial and Appeal Board*
For JEFFREY M. SAMUELS
*Assistant Commissioner*
*for Trademarks*

## Errata

"All reference to Patent No. D. 315,843 to Peter Thomsen of Brisbane, Calif. for `POUCH CONTAINING LIQUID SOAP OR THE LIKE FOR USE WITH A DIPENSER UNIT' appearing in the Official Gazette of Apr. 2, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,000,993 to Takashi Nakagawa, et al. of Japan for `PROCESS FOR PREPARATION OF RUBBER LAMINATES' appearing in the Official Gazette of Mar. 19, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,001,673 to Roger D.Norwood of Sugar Land, Tex. for `SEMICONDUCTOR DYNAMIC MEMORY DEVICE WITH MULTI-LEVEL SELECTION OF PAGE MODE OR NIBBLE MODE' appearing in the Official Gazette of Mar. 19, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,004,458 to Edward J. Sampson of Carlisle Mass. for `IMPLANTABLE DEVICE' appearing in the Official Gazette of Apr. 2, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,004,819 to Gerhard Epple of Germany for `PREPARATION OF 1-AMINO-2-BROMO-4-HYDROXYANTHRAQUINONE' appearing in the Official Gazette of Apr. 2, 1991 should be deleted since no patent was granted."

## Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceeding sent by registered mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Golden Kcarat Bakers, Burlingame, Calif., Reg. No. 1,486,301, for the mark "GOLDEN KCARAT AND DESIGN", Canc. No. 19,247

Harrison House, Inc. d/b/a Lean Life Resorts, Asheville, N.C., Reg. No. 1,544,934, for the mark "LEAN LIFE", Canc. No. 19,435

Gasply Marine Industries, Inc., Marysville, Wash., Reg. No. 1,447,360, for the mark "GLASPLY (STYLIZED)", Canc. No. 19,279

Gateway Computer Systems, Huntington Beach, Calif., Reg. No. 1,394,352, for the mark "GATEWAY", Canc. No. 19,380

Shadow Network, Inc., Union, N.J., Reg. No. 1,362,474, for the mark "METROSHADOW TRAFFIC", and Reg. No. 1,362,475, for the mark "SHADOWMETRO TRAFFIC", Canc. No. 19,245

JEAN BROWN
*Administrator, Trademark*
*Trial and Appeal Board*
For JEFFREY M. SAMUELS
*Assistant Commissioner*
*for Trademarks*

## Patents Available for License or Sale

D. 301,615 "THE INSULIN SHOT REMINDER TRAY" Jocelyne Liva, P.O. Box 90631, Honolulu, Hi. 96835

4,313,502 ROCK EXTRACTOR APPARATUS AND METHOD Perry Carvellas, Dan Nelson, 413 N. Washington St., Alexandria, Va. 22314

4,507,019 "METHOD AND APPARATUS FOR REPLACING BURIED PIPE" Alan E. Thompson, 1127 Tulip Trail, Mesquite, Tex. 75149

4,635,563 ADJUSTABLE SHELVING SYSTEM James L. Young, Esq., Kinney & Lange, P.A. Suite 1500, 652 Fourth Ave. South, Minneapolis, Minn. 55415-1659

4,659,250 IMPROVED PAVEMENT EXTRACTOR Perry Carvellas, Dan Nelson, 413 N. Washington St., Alexandria, Va. 22314

4,702,704 "TETRAHEDRAL CONDON STEREO TABLE" Leonard R. Svensson, Birch, Stewart, Kolasch & Birch, P.O. Box 747, Falls Church, Va. 22046

4,816,567 "RECOMBINANT IMMUNOGLOBIN PREPARATION" Nick Simon or Michael Johnson, Genentech Business Development, 460 Point San Bruno Ave. South, San Francisco, Calif. 94080

4,903,963 ABDOMINAL MUSCLE EXERCISER, Byran R. Garnett, 101 California St. Suite 980, San Francisco, Calif. 94111

4,930,985 "WIND POWER PLANT" Ferdinand Klute, Fixberg 6, Paderborn 4790, Fed. Republic of Germany

4,934,631 AMPHIBIOUS LIGHTER-THAN-AIR TYPE VEHICLE Lou Birbas, 2164 West 2000 North St., George, Utah 84770

4,960,371 "ROTARY COMPRESSOR FOR HEAVY DUTY GAS SERVICES" H. Eugene Bassett, 10507 Jody Crt., Houston, Tex. 77099

4,971,051 "NEUMATER CUSHION AND SEAL FOR CPAP AND ANESTHESIA MEDICAL AND INDUSTRIAL MARKES" Norman R. Toffolon, RFD 1 Box 356, Harrington, Me. 04643

4,980,057 APPARATUS FOR MASS SPECTROMETRIC ANALYSIS OF LIQUID CHROMATOGRAPHIC FRACTIONS, General Electric Co., P.O. Box 8, Bldg. K-1, Rm. 4A70, Schenetady, New York 12301

4,992,072 FLUTTERING TOY, William B. Leigh, 986 So. Main St., Cedar City, Utah 84720

4,999,608 "SCREEN FOR BURGLAR ALARM AND METHOD OF MAKING THE SAME" David E. Galomb, 1712-B Cedar St., Allentown, Pa. 18104

## New Telephone Numbers for Patent and Trademark Office Organizations Located in North and South Tower Buildings

With the exception of the Office of the Assistant Commissioner for Trademarks, all offices of the trademark section of the U.S. Patent and Trademark Office are relocating to buildings known as the South Tower and North Tower, respectively located at 2900 and 2800 Crystal Drive, Arlington, Va. 22202. New telephone numbers have been assigned to all of the relocated offices, as follows:

*SOUTH TOWER BUILDING*

| ORGANIZATION | FLOOR | TELEPHONE NUMBER |
|---|---|---|
| Director, Trademark Examining Operation | 10 | (703) 308-9000 |
| Law Office 3 | 4 | (703) 308-9103 |
| Law Office 4 | 5 | (703) 308-9104 |
| Law Office 5 | 5 | (703) 308-9105 |
| Law Office 6 | 5 | (703) 308-9106 |
| Law Office 7 | 6 | (703) 308-9107 |
| Law Office 8 | 6 | (703) 308-9108 |
| Law Office 9 | 6 | (703) 308-9109 |
| Law Office 10 | 7 | (703) 308-9110 |
| Law Office 11 | 7 | (703) 308-9111 |
| Law Office 12 | 7 | (703) 308-9112 |
| Law Office 13 | 8 | (703) 308-9113 |
| Law Office 14 | 8 | (703) 308-9114 |
| Law Office 15 | 8 | (703) 308-9115 |
| Trademark Trial and Appeal Board | 9 | (703) 308-9300 |
| Applications Section; Publication and Issue Section | 3 | (703) 308-9400 |
| ITU/Divisional Unit; Post-Registration Section; Trademark Services Division | 10 | (703) 308-9500 |
| Trademark Search Library | 2 | (703) 308-9800 |
| Trademark Assignment Search Room (for information on obtaining certified copies of trademark assignments) | 2 | (703) 308-9850 |
| (trademark assignment search information) | | (703) 308-9855 |

*NORTH TOWER BUILDING*

| ORGANIZATION | FLOOR | TELEPHONE NUMBER |
|---|---|---|
| Office of Trademark Quality Review | 9 | (703) 308-9600 |

Applicants and attorneys should continue to address correspondence to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, as the official address of the Office will remain the same. The telephone number for the Trademark Status Line, (703) 557-8747, is unchanged.

April 17, 1991

JEFFREY M. SAMUELS
*Assistant Commissioner*
*for Trademarks*

## Registration to Practice

The following list contains the names of persons who successfully passed the examination given on Oct. 10, 1990. Persons entitled at this time to recieve provisional recognition pursuant to 37 CFR § 10.9(a) have been given the same to prepare and prosecute patent applications before the Office until their registration certificates are mailed to them. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. 37 CFR § 10.7(a). Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished to the Director of Enrollment and Discipline on or before June 19, 1991.

Antolin, Stanislav, 338 Little Egypt Rd., Elkton, Md. 21921
Bachand, William R., 13532 SE 256th St., Kent, Wash. 98042
Collier, Kenneth J., 8780 Appleseed Dr., Cincinnati, Ohio 45249
Cseh, Carol L., 2000 S. Eads, #1225, Arlington, Va. 22202
Jones, Stephen A., 1500 W. 8th Terrace, #B-1, Laurence, Kans. 66044
Maginot, Paul J., 242 Penn Ln., Rochester, N.Y. 14625
Miller, John A., 1321 Orleans, #1813W, Detroit, Mich. 48207
Murphy, Brian P., 59 Lefurgy Ave., Hastings-On-Hudson, N.Y. 10706
Nowak, James S., 150 Devonhurst Dr., #A-2, Kettering, Ohio 45429
Walsh, Andrea C., 924 N. Country St., Waukegan, Ill. 60085
Weinberg, Howard L., 1008 Clark St., Davis, Calif. 95616

April 15, 1991

CAMERON WEIFFENBACH, *Director*
*Office of Enrollment and Discipline*

OL
126
SS
2
MY
14
1991
UMI

# PATENT NOTICES

**Certificates of Correction For Week of May 14, 1991**

D. 306,239
D. 306,659
D. 308,904
D. 309,337
PP. 7,000
Re. 32,875
Re. 33,476
4,662,946
4,689,241
4,724,431
4,726,235
4,735,632
4,755,339
4,758,463
4,768,216
4,787,188
4,795,917
4,801,611
4,805,609
4,809,762
4,810,720
4,814,139
4,815,730
4,816,561
4,817,508
4,822,344
4,823,791
4,824,749
4,825,025
4,826,815
4,827,073
4,828,769
4,829,183
4,830,917
4,832,832
4,833,190
4,838,434
4,838,851
4,840,671
4,841,078
4,841,088
4,845,328
4,849,156
4,851,143
4,854,309
4,855,359
4,856,540
4,857,408
4,858,253
4,858,645
4,859,514
4,860,000
4,860,640
4,861,697
4,861,758
4,862,541
4,862,790
4,862,862
4,863,184
4,863,837
4,863,975
4,864,326
4,864,507
4,865,392
4,865,962
4,866,641
4,870,158
4,870,711
4,871,952
4,872,094
4,872,849
4,875,363
4,876,983
4,877,648
4,878,775
4,879,175
4,880,240
4,880,737
4,882,064
4,884,500
4,884,745
4,885,225
4,888,604
4,888,772
4,890,441
4,891,065
4,891,125
4,891,910
4,892,564
4,892,581
4,892,737
4,893,160
4,893,471
4,893,782
4,893,789
4,893,867
4,893,868
4,896,495
4,899,058
4,899,175
4,899,204
4,899,390
4,899,680
4,899,937
4,901,893
4,902,378
4,902,950
4,903,277
4,904,063
4,904,248
4,904,439
4,904,567
4,904,706
4,904,765
4,905,567
4,906,331
4,906,438
4,906,593
4,907,047
4,909,338
4,909,662
4,910,165
4,910,803
4,910,842
4,910,951
4,911,115
4,911,938
4,913,707
4,914,005
4,914,023
4,914,877
4,916,055
4,916,573
4,916,661
4,917,047
4,919,164
4,920,574
4,920,654
4,920,911
4,921,062
4,923,879
4,923,932
4,926,479
4,930,147
4,930,227
4,930,815
4,930,847
4,931,018
4,932,918
4,932,925
4,933,691
4,933,832
4,934,182
4,934,444
4,935,390
4,936,369
4,936,512
4,937,229
4,937,361
4,938,099
4,938,440
4,939,330
4,945,902
4,958,236
4,984,265

### Erratum

In the Notice of Certificate of Correction appearing at 1125 O.G. 37, of Apr. 16, 1991, Patent No. 4,858,253 should be deleted since the name of the inventor appeared incorrectly.

### Disclaimers

Des. 313,378.—*Keith J. Hallam*, Norcross, Ga.; *Kenneth H. Smith*, Powder Springs, Ga. RAILROAD HOPPER CAR AND SLOPE COLLAR CASTING. Patent dated Jan. 1, 1991. Disclaimer filed Apr. 20, 1990, by the assignee, Thrall Car Manufacturing Co.

The term of this patent subsequent to Oct. 16, 2004, has been disclaimed.

4,588,897.—*Dan Inbar*; *Giora Gafni*, both of Haifa; *Ernest Grimberg*, Kiryat Bialick; *Jacob Koren*, Haifa, all of Israel. GAMMA CAMERA CORRECTION SYSTEM AND METHOD FOR USING THE SAME. Patent dated May 13, 1986. Disclaimer filed Jan. 24, 1991, by the assignee, Elscint Ltd.

The term of this patent subsequent to Jan. 4, 2001, has been disclaimed.

4,634,850.—*Gerald A. Pierce*, Redwood City; *James L. Buxton*, East Palo Alto, both of Calif. QUAD DENSITY DATA SYSTEM. Patent dated Jan. 6, 1987. Disclaimer filed Jan. 22, 1991, by the assignee Drexler Technology Corp.

Hereby enters this disclaimer to claims 9, 10, 11 and 12 of said patent.

4,793,699.—*Mitsuhiro Tokuhara*, Chigaski, Japan. PROJECTION APPARATUS PROVIDED WITH AN ELECTROMECHANICAL TRANSDUCER ELEMENT. Patent dated Dec. 27, 1988. Disclaimer filed Jan. 9, 1991, by the assignee, Canon Kabushiki Kaisha.

Hereby enters this disclaimer to claims 1-17 of said patent.

4,941,897.—*Clifton B. Vann, III*, Charlotte, N.C. MICROPOROUS FILTER AND METHOD. Patent dated July 17, 1990. Disclaimer filed Feb. 6, 1991, by the assignee, L & H Technologies, Inc.

The term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

4,956,352.—*Masakuni Okuhara; Hirokazu Tanaka; Toshio Goto*, all of Ibaraki; *Tohru Kino*, Tsuchiura; *Hiroshi Hatanka*, Ibaraki, all of Japan. TRICYCLO COMPOUNDS, A PROCESS FOR THEIR PRODUCTION AND A PHARMACEUTICAL COMPOSITION CONTAINING THE SAME. Patent dated Sept. 11, 1990. Disclaimer filed June 25, 1990, by the assignee, Fugisawa Pharmaceutical Co., Ltd.

The term of this patent subsequent to May 29, 2007, has been disclaimed.

4,959,682.—*Takemi Yamamoto*, *Ryohei Koniyi*, both of Nagoya; *Naoyuki Hatta*, Gamagori; *Ymio Matsumoto*, Kasugai; *Fumihiro Sunda*, Nagoya, all of Japan. COPYING APPARATUS. Patent dated Sept. 25, 1990. Disclaimer filed Jan. 2, 1991, by the assignee, Brother Kogyo Kabushiki Kaishi.

The term of this patent subsequent to Mar. 18, 2003, has been disclaimed.

4,989,297.—*Herzel B. Yecheskel*, Bat Yam; *Gan Alon*, Herzlia; *Eliezer Beck*, Rishon Lezion, all of Israel. TREATMENT OF COTTON. Patent dated Feb. 5, 1991. Disclaimer filed Feb. 6, 1991, by the assignee, Shenkar College of Textile Technology and Fashion.

The term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

4,993,566.—*Theodore F. Eberle*, Saline. Mich. SPIRAL CONTAINER BASE STRUCTURE FOR HOT FILL PET CONTAINER. Patent dated Feb. 19, 1991. Disclaimer filed Feb. 2, 1990, by the assignee, Hoover Universal Inc.

The term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

### Disclaimer and Dedication

4,382,026.—*Stevens S. Drake; Harold E. Filter*, both of Midland, Mich. PROCESS FOR ENCAPSULATING RADIOACTIVE ORGANIC LIQUIDS IN A RESIN. Patent dated May 3, 1983. Disclaimer and Dedication filed Dec. 18, 1989, by the assignee, The Dow Chemical Co.

Hereby disclaims and dedicates to the public all the claims of said patent.

---

## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box ______
Commissioner of Patents and Trademarks
Washington, D.C. 20231

| | |
|---|---|
| Box 3 | Mail for the Office of personel for NFC |
| Box 4 | Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs. |
| Box 5 | "No Fee" mail related to trademarks. |
| Box 6 | Mail for the Office of Procurement |
| Box 7 | Reissue applications for patents involved in litigation and subsequently filed related papers. |
| Box 8 | All papers for the Office of the Solicitor *except* communications relating to *pending litigation*; papers relating to pending litigation shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215 |
| Box 9 | Coupon orders for U.S. patent and trademark copies. |
| Box 10 | Orders for certified copies of patent and trademark applications. |
| Box 11 | Electronic Ordering Service (EOS). |
| Box 12 | Contributions to the Examiner Education Program. |
| Box 13 | Mail for the Employee and Labor Relations Division. |
| Box 14 | Invoices directed to the Office of Finance. |
| Box 15 | Mail for the Advisory Commission on Patent Law Reform. |
| Box 16 | Deposit Account Replenishment Checks |
| Box 171 | Vacancy Announcement Applications. |
| Box AF | Expedited procedure for processing amendments and other responses after final rejection. |
| Box Assignment | All assignment documents except those filed with new applications. |
| Box DD | Mail related to Disclosure Documents. |
| Box EEO | Mail for the Office of Equal Employment Programs. |
| Box FWC | Requests for File Wrapper Continuation Applications (under 37 CFR 1.62) |
| Box Interference | Communications relating to interferences and applications and patents involved in interference. |
| Box Issue Fee | All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee. |
| Box ITU | All intent to use documents, excluding the initial application and amendments to allege use. |
| Box M. Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box Non-Fee-Amendment | Non-fee amendments to patent applications. (Use Box AF for responses after final rejection). |
| Box OED | Mail for the Office of Enrollment and Discipline |
| Box PATENT APPLICATION | New patent application and associated papers and fees. |
| Box TRADEMARK | New trademark application and associated papers and APPLICATION fees. |
| Box Pat. Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Reexam | Requests for Reexamination for *original* request papers *only*. |
| Box Sequence | Submission of diskette for biotechnical application. |
| Box SN | For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application"). |

VOL
1126
ISS
2
MY
14
1991
UMI

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Alabama | Auburn University Libraries | (205) 844-1747 |
| | Birmingham Public Library | (205) 226-3680 |
| Alaska | Anchorage: Z. J. Loussac Public Library | (907) 261-2916 |
| Arizona | Tempe: Noble Library, Arizona State University | (602) 965-7607 |
| Arkansas | Little Rock: Arkansas State Library | (501) 682-2053 |
| California | Los Angeles Public Library | (213) 612-3273 |
| | Sacramento: California State Library | (916) 322-4572 |
| | San Diego Public Library | (619) 236-5813 |
| | Sunnyvale Patent Clearinghouse | (408) 730-7290 |
| Colorado | Denver Public Library | (303) 640-8847 |
| Connecticut | New Haven: Science Park Library | (203) 786-5447 |
| Delaware | Newark: University of Delaware Library | (302) 451-2965 |
| Dist. of Columbia | Washington: Howard University Libraries | (202) 806-7252 |
| Florida | Fort Lauderdale: Broward County Main Library | (305) 357-7444 |
| | Miami-Dade Public Library | (305) 375-2665 |
| | Orlando: University of Central Florida Libraries | (407) 823-2562 |
| | Tampa: Tampa Campus Library, University of South Florida | (813) 974-2726 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4508 |
| Hawaii | Honolulu: Hawaii State Public Library System | (808) 586-3477 |
| Idaho | Moscow: University of Idaho Library | (208) 885-6235 |
| Illinois | Chicago Public Library | (312) 269-2865 |
| | Springfield: Illinois State Library | (217) 782-5659 |
| Indiana | Indianapolis-Marion County Public Library | (317) 269-1741 |
| Iowa | Des Moines: State Library of Iowa | (515) 281-4118 |
| Kansas | Wichita: Ablah Library, Wichita State University | (316) 689-3155 |
| Kentucky | Louisville Free Public Library | (502) 561-8617 |
| Louisiana | Baton Rouge: Troy H. Middleton Library, Louisiana State University | (504) 388-2570 |
| Maryland | College Park: Engineering and Physical Sciences Library, University of Maryland | (301) 405-9157 |
| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
| Michigan | Ann Arbor: Engineering Transportation Library, University of Michigan | (313) 764-7494 |
| | Detroit Public Library | (313) 833-1450 |
| Minnesota | Minneapolis Public Library and Information Center | (612) 372-6570 |
| Misssissippi | Jackson: Mississippi Library Commission | Not Yet Operational |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 390 |
| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4281 |
| Nebraska | Lincoln: Engineering Library, University of Nebraska-Lincoln | (402) 472-3411 |
| Nevada | Reno: University of Nevada-Reno Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
| New Jersey | Newark Public Library | (201) 733-7782 |
| | Piscataway: Library of Science and Medicine, Rutgers University | (201) 932-2895 |
| New Mexico | Albuquerque: University of New Mexico General Library | (505) 277-4412 |
| New York | Albany: New York State Library | (518) 473-4636 |
| | Buffalo and Erie County Public Library | (716) 858-7101 |
| | New York Public Library (The Research Libraries) | (212) 714-8529 |
| North Carolina | Raleigh: D.H. Hill Library, North Carolina State University | (919) 737-3280 |
| North Dakota | Grand Forks: Chester Fritz Library, University of North Dakota | (701) 777-4888 |
| Ohio | Cincinnati and Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 292-6175 |
| | Toledo/Lucas County Public Library | (419) 259-5212 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 744-7086 |
| Oregon | Salem: Oregon State Library | (503) 378-4239 |
| Pennsylvania | Philadelphia, The Free Library of | (215) 686-5331 |
| | Pittsburgh, Carnegie Library of | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |

## Reference Collections of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Rhode Island | Providence Public Library | (401) 455-8027 |
| South Carolina | Charleston: Medical University of South Carolina Library | (803) 792-2372 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8876 |
| | Nashville: Stevenson Science Library, Vanderbilt University | (615) 322-2775 |
| Texas | Austin: McKinney Engineering Library, University of Texas at Austin | (512) 471-1610 |
| | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-2551 |
| | Dallas Public Library | (214) 670-1468 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext.2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
| Virginia | Richmond: James Branch Cabell Library, Virginia Commonwealth University | (804) 367-1104 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Library, University of Wisconsin Madison | (608) 262-6845 |
| | Milwaukee Public Library | (414) 278-3247 |

VOL
1126
ISS
2
MY
14
1991
UMI

## PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

| PATENT EXAMINING GROUPS | Phone Number Area Code 703 |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director. | 308-0661 |
| ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director | 308-1235 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director | 308-0651 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 308-2351 |
| BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director | 308-0196 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. KELLY, Director | 308-1782 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director | 308-0511 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—GERALD GOLDBERG, Director | 308-0754 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—CARLTON CROYLE Director | 308-0771 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, Director. | 308-0956 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director | 308-0962 |
| DESIGN, GROUP 290—ROBERT E. GARRETT, Director | 308-0511 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 308-1113 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director | 308-1148 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director | 308-0858 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—JOHN KITTLE, Director | 308-0861 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director | 308-0651 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

| | |
|---|---|
| Patents | Numbers 3,800,329 to 3,808,603 inclusive |
| Plant Patents | 3,535 to 3,540 inclusive |

---

# REEXAMINATIONS

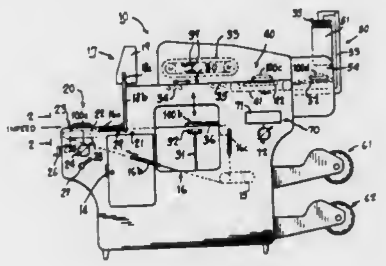
MAY 14, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

### B1 4,458,470 (1463rd)
### INTEGRATED STRETCH-WRAP PACKAGING SYSTEM

**Harvey A. Fine, Sayreville, N.J., assignor to Weldotron Corporation, Piscataway, N.Y.**
**Reexamination Request No. 90/002,196, Nov. 7, 1990.**
**Reexamination Certificate for Patent No. 4,458,470, issued Jul. 10, 1984, Ser. No. 245,283, Mar. 19, 1981.**
**Int. Cl.$^5$ B65B** *1/32*

**U.S. Cl. 53—502**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1, 5, 8, 9, 12, 13** and **16** are determined to be patentable as amended.

Claims **2–4, 6, 7, 10, 11, 14, 15** and **17**, dependent on an amended claim, are determined to be patentable.

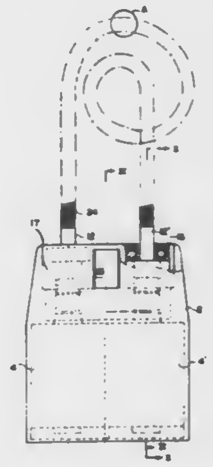
1. An integrated stretch-wrap weighing and wrapping machine comprising
an infeed station, including a first drive means, *and a weight sensing device* for *manually* receiving a product to be wrapped *to thereby immediately initiate the sensing of the weight of said product,*
a data processor including storage means,
[a] *said* weight sensing device [located in said infeed station for sensing the weight of said product to be wrapped and] supplying to said data processor an electrical signal indicative of [such] *the* weight *of said product,*
a wrapping station including a vertically movable product support table for receiving a product advanced from said infeed station by said first drive means, after it has been weighed, and for supporting said product while it is being wrapped,
said first drive means being adjacent to and aligned with said support table, when said support table is in a lowered position,
a labeling station including an outfeed conveyor disposed adjacent to said support table, when said support table is in a raised position, for receiving a product from said support table,
a printer for printing information on labels, and a label applicator for applying a printed label to the wrapped product while it is on the outfeed conveyor,
said first drive means, support table, and outfeed conveyor defining the path of movement of a product through said apparatus,
a supply of stretch film,
film-clamping means for withdrawing a length of film from said film supply and holding it above the product support table, when said table is in its lowered position,
second drive means for raising said product support table into said stretch film,
folding means, operative after said product support table has been raised into said film, for folding the edges of the film under a product on said table to thereby wrap said product in said stretch film,
third drive means for advancing said product wrapped in said stretch film onto said outfeed conveyor,
said weight sensing device weighing a second product after the first product has been advanced to the wrapping station, and weighing a third product after said first and second products have advanced to said labeling and wrapping stations, respectively,
said storage means storing a weight signal derived from each of said weighings,
signal control means associated with said data processor for selectively delivering from said storage means to said printer the stored signal corresponding to each product, to enable the printer to print a label and the label applicator to apply the correct label to each wrapped product as it is outputted by the outfeed conveyor,
said data processor producing a start signal upon its receipt of one of said weight signals, and said first drive means being responsive at least to said start signal to begin the advancement of a product from the infeed station to the wrapping station.

---

### B1 4,524,772 (1464th)
### APPARATUS FOR HAIR REMOVAL

**Yair Daar, Moshav Galia, and Shimon Yahav, Rehovot, both of Israel, assignors to Improver Corporation, Panama, Panama**
**Reexamination Request No. 90/001,970, Mar. 21, 1990.**
**Reexamination Certificate for Patent No. 4,524,772, issued Jun. 25, 1985, Ser. No. 516,699, Jul. 22, 1983.**
**Claims priority, application Israel, Aug. 20, 1982, 66595**
**Int. Cl.$^5$ A61B** *17/50*

**U.S. Cl. 606—133**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **5, 7, 8, 14–18, 28** and **30** is confirmed.

Claims **1, 19** and **25** are determined to be patentable as amended.

Claims **2–4, 6, 9–13,** and **20–24, 26, 27, 29,** dependent on an amended claim, are determined to be patentable.

OL
126
SS
2
MY
14
991
UMI

1. An electrically powered depilatory device comprising:
a hand held portable housing;
motor means disposed in said housing; and
a helical spring comprising a plurality of adjacent windings arranged to be driven by said motor means in rotational sliding motion relative to skin bearing hair to be removed, said helical spring including an arcuate hair engaging portion arranged to define a convex side whereat the windings are spread apart, and a concave side corresponding thereto whereat the windings are pressed together, the rotational motion of the helical spring producing continuous motion of the windings from a spread apart orientation at the convex side to a pressed together orientation at the concave side and for engagement and plucking of hair from the skin of the subject, whereby the surface velocities of the windings relative to the skin *are more than 900 r.p.m. and* greatly [exceeds] *exceed* the surface velocity of the housing relative thereto.

---

**B1 4,755,741 (1465th)**

**ADAPTIVE TRANSISTOR DRIVE CIRCUIT**

**Carl T. Nelson, San Jose, Calif., assignor to Linear Technology Corporation**

**Reexamination Request No. 90/002,035, Jun. 1, 1990.**

**Reexamination Certificate for Patent No. 4,755,741, issued Jul. 5, 1988, Ser. No. 932,014, Nov. 18, 1986.**

**Int. Cl.$^5$ G05F** *1/44*

U.S. Cl. 323—289

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-20**, **22-25** and **27-31** is confirmed.

Claims **21** and **32** are determined to be patentable as amended.

Claim **26**, dependent on an amended claim, is determined to be patentable.

1. In a circuit including a transistor for connection to a load, the transistor having a plurality of emitters, at least one collector and a base, and operable at a chosen point in saturation defined by a ratio of collector current to base current, a circuit for maintaining the transistor at an operating point within a desired operating range of the chosen point in saturation over a desired range of collector currents and operating temperatures, comprising:
means for generating a drive signal which is related to at least one of the instantaneous and peak current conducted by the transistor;
base drive means responsive to said drive signal for variably providing sufficient base current to the transistor to prevent the transistor from operating at a less saturated point outside the desired operating range; and
means including at least one emitter of the transistor connected to said base drive means for sensing the depth of saturation of the transistor, said emitter being adapted to conduct a current when the transistor reaches a predetermined depth of saturation whereby the current entering the base of the transistor is adjusted to prevent the transistor from operating at a more saturated point outside the desired operating range.

---

# REISSUES

MAY 14, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 33,586**

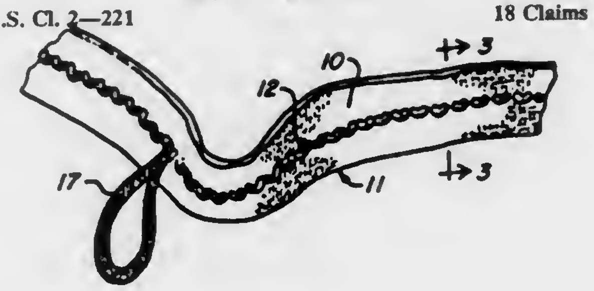
**ELASTIC WITH EMBEDDED PULL CORD**

**Paul Graff, Encino, Calif., assignor to NFA Corp., Chelsea, Mass.**

**Original No. 4,477,928, dated Oct. 23, 1984, Ser. No. 483,367, Apr. 8, 1983. Application for reissue Jul. 29, 1986, Ser. No. 891,365**

**Int. Cl.$^5$ A47D** *27/00*

U.S. Cl. 2—221 **18 Claims**



1. An elastic band comprising:
(A) an elongated web of material comprising interconnected elastic threads generally oriented in a longitudinal direction, said web being elastic in its longitudinal direction, and
(B) a pull cord extending in said longitudinal direction along a portion of said web, said cord being in the place of one of said elastic threads and having a length greater than the length in said longitudinal direction of said portion of said web in its unstretched condition, said pull cord being bunched at spaced intervals to allow said cord to be grasped and partially pulled out of said portion of said web.

5. A method of constructing a band comprising:
(A) forming an elongated web of material elastic in as longitudinal direction by interconnecting elastic threads having an orientation in said longitudinal direction;
(B) intermeshing with a portion of said web in said longitudinal direction a pull cord baving a length greater than the length of said portion of said web in said longitudinal direction in its unstretched condition; and
(C) bunching said pull cord at spaced intervals.

6. The method of claim **5** wherein said elastic threads are [interconnected by weaving them] *woven* into *a* cloth of warp and woof threads, said elastic threads being [said] warp threads.

---

**Re. 33,587**

**METHOD FOR (PREPOLARIZING AND CENTERING) OPERATING A PIEZOCERAMIC POWER SWITCHING DEVICE**

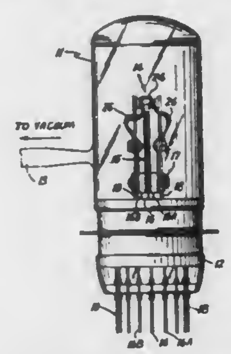
**John D. Harnden, Jr., Schenectady; William P. Kornrumpf, Albany, and George A. Farrall, Rexford, all of N.Y., assignors to General Electric Company, Fort Wayne, Ind.**

**Original No. 4,680,840, dated Jul. 21, 1987, Ser. No. 839,768, Mar. 14, 1986. Division of Ser. No. 685,109, Dec. 21, 1984, Pat. No. 4,670,682. Application for reissue Jul. 20, 1989, Ser. No. 383,316**

**Int. Cl.$^5$ H01L** *41/22*

U.S. Cl. 29—25.35 **17 Claims**

1. The method of prepolarizing and centering the movable piezoceramic bender member of a piezoceramic bender-type switching device contained within a protective gastight enclosure which comprises substantially completing the fabrication assembly of all of the major components of the piezoceramic switching device into a unitary structure mounted within the protective gastight enclosure and sealed closed, applying a [relativey] *relatively* high value prepolarization potential to the respective piezoceramic plate elements of the bender member while maintaining the plate elements near their Curie temperature to achieve dipole alignment of the dipoles of the piezoceramic material and simultaneously adjusting the relative magnitudes of the prepolarizing potential applied to the respective piezoceramic plate elements of the bender member to cause it to precisely position the movable switch contacts mounted thereon relative to fixed load current switch contacts of the switching device.



---

**Re. 33,588**

**DESK WITH AN ADDITIONAL LECTERN**

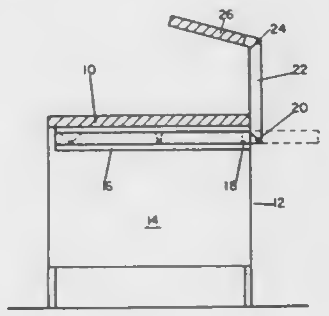
**Helmut Steinhilber, Vorrutiweg 12, CH-6052 Hergiswil, Switzerland**

**Original No. 4,802,714, dated Feb. 7, 1989, Ser. No. 129,735, Dec. 7, 1987. Continuation of Ser. No. 338,112, Apr. 14, 1989, abandoned. Application for reissue Apr. 11, 1990, Ser. No. 508,487**

**Claims priority, application Fed. Rep. of Germany, Dec. 13, 1986, 3642672; European Pat. Off., Aug. 29, 1987, 87112619.9**

**Int. Cl.$^5$ A47B** *17/00*

U.S. Cl. 312—196 **30 Claims**



*31. A desk,*
*a lectern, and*
*means for slidably guiding said lectern into a resting position under the top of said desk, and for enabling said lectern to be pulled from said resting position into a working position in which said lectern projects over said desktop at a height for use by a standing person, comprising:*
*(a) at least one extension;*
*(b) means secured to said desk beneath said desktop for slidably receiving said extension;*
*(c) supporting arm means for supporting said lectern in said working position;*
*(d) means for pivotally connecting said supporting arms to said extension; and*
*(e) means for connecting said lectern to said supporting arm and*

VOL 126 ISS 2 MY 14 1991 UMI

*for supporting said lectern in said resting position at a slope that is the same as the slope of said lectern relative to said supporting arm when in said working position; and*

*(f) said first mentioned means and said lectern being free of means for supporting said lectern by engaging said desk top;*

*whereby said lectern is supported in said working position by said supporting arm means, said extension and said receiving means.*

---

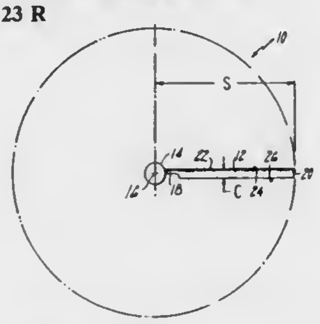
### Re. 33,589
### HELICOPTER BLADE AIRFOIL

**David A. Lednicer, and Stephen J. Owen, both of Redmond, Wash., assignors to United Technologies Corporation, Hartford, Conn.**

**Original No. 4,744,728, dated May 17, 1988, Ser. No. 903,169, Sep. 3, 1986. Application for reissue May 17, 1990, Ser. No. 526,251**

**Int. Cl.$^5$ B64C** *27/46*

**U.S. Cl. 416—223 R** **5 Claims**



4. A family of airfoil cross sections for a helicopter blade each having a leading edge and a trailing edge, an upper airfoil surface and a lower airfoil surface, each surface extending between the leading and trailing edges and characterized by the tabulation:

| X/C | $Y_u/t_{max}$ | $Y_l/t_{max}$ |
|---|---|---|
| 0.000000 | 0.000000 | 0.000000 |
| 0.004179 | 0.123145 | −0.076835 |
| 0.006589 | 0.159708 | −0.089264 |
| 0.011469 | 0.218559 | −0.107409 |
| 0.023818 | 0.323659 | −0.133720 |
| 0.048677 | 0.452873 | −0.168347 |
| 0.073637 | 0.530776 | −0.193105 |
| 0.098647 | 0.581361 | −0.212823 |
| 0.148716 | 0.638236 | −0.242540 |
| 0.198856 | 0.663468 | −0.269143 |
| 0.249026 | 0.672430 | −0.294345 |
| 0.299206 | 0.672722 | −0.315373 |
| 0.337529 | 0.669597 | −0.327762 |
| 0.377406 | 0.664083 | −0.336411 |
| 0.417281 | 0.655827 | −0.340736 |
| 0.437217 | 0.650313 | −0.341210 |
| 0.457152 | 0.643629 | −0.340565 |
| 0.477085 | 0.635635 | −0.338760 |
| 0.497018 | 0.626361 | −0.335726 |
| 0.536880 | 0.604103 | −0.326038 |
| 0.556810 | 0.591139 | −0.319355 |
| 0.576739 | 0.576895 | −0.311522 |
| 0.596668 | 0.561250 | −0.302611 |
| 0.636519 | 0.525323 | −0.281805 |
| 0.656445 | 0.504799 | −0.269950 |
| 0.676366 | 0.482470 | −0.257178 |
| 0.696288 | 0.458276 | −0.243518 |
| 0.736125 | 0.404395 | −0.213841 |
| 0.756042 | 0.374859 | −0.117349 |
| 0.775956 | 0.343801 | −0.181623 |
| 0.795871 | 0.311432 | −0.164829 |
| 0.835698 | 0.243609 | −0.130333 |
| 0.855611 | 0.208579 | −0.112702 |
| 0.875522 | 0.173165 | −0.094798 |
| 0.895435 | 0.137802 | −0.076613 |
| 0.935263 | 0.071300 | −0.040756 |
| 0.955180 | 0.044163 | −0.024718 |
| 0.975106 | 0.026028 | −0.012702 |
| 0.985074 | 0.022359 | −0.009194 |
| 0.995045 | 0.023841 | −0.008276 |
| 1.000000 | 0.026976 | −0.009063 |

wherein

X is the linear displacement along a chord line extending between the airfoil leading edge and the airfoil trailing edge;

C is the chordal length of the airfoil cross section measured between the leading and trailing edges;

$Y_u$ is the transverse displacement of the airfoil upper surface from the chord line;

$Y_l$ is the transverse displacement of the airfoil lower surface from the chord line; and

$t_{max}$ is the maximum transverse thickness achieved by the airfoil cross section.

---

# PLANT PATENTS

## GRANTED MAY 14, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

### 7,520
### ROSE PLANT NAMED DEVNOVIA

**Stanley G. Marciel, Aptos, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.**

**Filed Jul. 24, 1989, Ser. No. 383,615**

**Int. Cl.$^5$ A01H** *5/00*

**U.S. Cl. Plt.—19** **1 Claim**

1. The new and distinct rose variety, substantially as herein shown and described, characterized by its profuse and continuous production of generally magenta colored flowers of generally small size and by its vigorous upright and free branching growth habit as a greenhouse rose.

---

### 7,521
### MACADAMIA NAMED "HIDDEN VALLEY A16"

**Henry F. D. Bell; Margaret A. Bell, and David J. D. Bell, all of Box 6, Beerwah, Queensland 4519, Australia**

**Filed Apr. 26, 1989, Ser. No. 344,278**

**Claims priority, application Australia, Apr. 26, 1988, 88/002**

**Int. Cl.$^5$ A01H** *5/00*

**U.S. Cl. Plt.—30** **1 Claim**

1. A new and distinct hybrid *Macadamia integrifolia* × *tetraphylla* named Hidden Valley A16 substantially as shown and described.

---

### 7,522
### STRAWBERRY PLANT NAMED 'E26'

**Harold A. Johnson, Jr.; Thomas M. Sjulin; Amado Q. Amorao, and Joseph I. Espejo, Jr., all of Watsonville, Calif., assignors to Driscoll Strawberry Associates, Inc., Watsonville, Calif.**

**Filed Sep. 27, 1989, Ser. No. 413,491**

**Int. Cl.$^5$ A01H** *5/00*

**U.S. Cl. Plt.—49** **1 Claim**

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

---

### 7,523
### FORSYTHIA PLANT NAMED 'FIESTA'

**Harry D. Wilcox, Jr., 133 Ayrshire La., Avon, Conn. 06001**

**Filed Aug. 10, 1989, Ser. No. 392,024**

**Int. Cl.$^5$ A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinct variety of Forsythia as substantially shown and described herein, that is characterized particularly as a novelty by the unique combination of distinct foliage construction, pale yellow flowers, slow growth rate, reduced internodal length and a denser branching habit.

---

### 7,524
### KALANCHOE PLANT NAMED LITTLE FLAME

**Margaret M. Fleming, Soquel, Calif., assignor to The Plant Company, Soquel, Calif.**

**Filed Jul. 26, 1989, Ser. No. 385,161**

**Int. Cl.$^5$ A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct plant of kalanchoe named Little Flame, as described and illustrated.

---

### 7,525
### CARNATION NAMED HILDANCE

**Jan J. Hilverda, Aalsmeer, Netherlands, assignor to Hilverda b.v., Netherlands**

**Filed Feb. 10, 1989, Ser. No. 308,602**

**Int. Cl.$^5$ A01H** *5/00*

**U.S. Cl. Plt.—70** **1 Claim**

1. The new and distinct pot carnation, substantially as herein shown and described, characterized by its very small flowers of a very light pink color particularly distinguished by the flower petals having a dark violet area near the base and the plant being of short height with abundant, rather dense production of foliage.

VOL
126

SS
2

MY
14

1991

UMI

# PATENTS

## GRANTED MAY 14, 1991

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 173-039 | 5,014,542 |
| 128-064 | 5,014,681 |
| 116-272 | 5,014,786 |
| 434-185 | 5,015,179 |
| 556-474 | 5,015,624 |
| 310-335 | 5,015,929 |
| 365-233 | 5,016,226 |

VOL
1126
ISS
2
MY
14
1991
UMI

# PATENTS

## GRANTED MAY 14, 1991

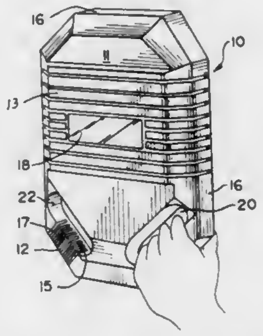
## GENERAL AND MECHANICAL

**5,014,353**

### FACE SHIELD

**Tobias Brown, Oak Park, and Burton L. Siegal, Skokie, both of Ill., assignors to Sellstrom Manufacturing Company, Palatine, Ill.**

**Filed Dec. 14, 1989, Ser. No. 451,516**
**Int. Cl.$^5$ A61F** *9/00*
U.S. Cl. 2—11 **4 Claims**



1. A face protecting device comprising a hand-held face shield having a generally concave body formed of a non-flammable material and with a projecting peripheral border thereon and provided with an observation window therein, said face shield being further provided with two spaced hand grips in the lower portion thereof angularly disposed to the vertical plane passing through the center of the face shield each handgrip defining an opening of a size and shape to allow the fingers of a hand to pass therethrough.

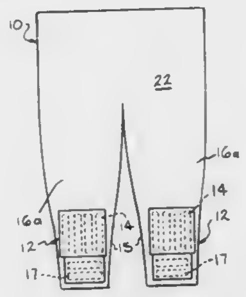
---

**5,014,354**

### ANTI-ABRASION PROTECTIVE DEVICE

**Allen D. Dumont, Ann Arbor, Mich., assignor to Mary A. Walker, Ann Arbor, Mich.**

**Continuation of Ser. No. 261,750, Oct. 24, 1988, abandoned. This application Jun. 26, 1990, Ser. No. 545,137**
**Int. Cl.$^5$ A41D** *13/00, 13/06*
U.S. Cl. 2—23 **3 Claims**



1. A directionally oriented abrasion prevention device in the form of a support member worn by a user for protecting a selected portion of the user's body from excessive frictional heat and abrasion caused by specific directional sliding contact with an abrading surface during physical activity, said support member comprising:

a base layer of stretch fabric positioned adjacent to the user's body, a plurality of elongated strips of a longitudinally distortable cushioning material fixably secured along their length to said base layer and covering said selected body portion, said strips being positioned substantially parallel in side-by-side relation specifically oriented on said base layer so as to longitudinally extend in the direction of purposeful and anticipated relative sliding motion between the abrading surface and the selection portion of the user's body, said strips being elastically yieldable in the direction of said purposeful relative sliding motion to absorb friction generated heat during said sliding motion, said base layer remaining substantially in position adjacent the user's body to protect the user's body from abrasion thereby preventing injury to said user, a cover layer over said elongated strips and means for attaching said cover layer to said base layer around said elongated strips, said cover layer being slidable relative said strips and said base layer to absorb a limited amount of frictional energy.

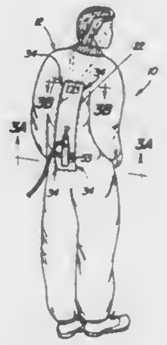
---

**5,014,355**

### DISPOSABLE ENVIRONMENTAL CONTROL SUIT

**Edward E. Vollenweider, II, Highland, Mich., assignor to Technical Innovations, Inc., Pontiac, Mich.**

**Filed Sep. 29, 1989, Ser. No. 415,039**
**Int. Cl.$^5$ A41D** *13/00*
U.S. Cl. 2—79 **15 Claims**



1. A disposable environmental control suit comprising:

a coverall suit portion made of an inexpensive disposable material which is substantially non-permeable to air, means on said suit for providing closure at the peripheral ends of the arms and legs and also an upper extremity of the user;

a manifold portion, said manifold portion including an inner layer and an outer layer defining a chamber therebetween, said manifold portion adapted for attachment to an air supply for injecting a cooled or heated air stream into said chamber, said manifold portion including air release passages for release of air injected into said chamber from the manifold into the interior of the suit substantially approximate a central back area of a user; and

a suspender means attached in the interior of the suit for support of the weight of said suit off of the shoulders of the user to ensure free flow of air through the shoulder area of said coverall suit, wherein said means for providing closure allows inflation of the suit in response to continual injection of a cooled or heated air stream, said inflation of the suit acting to hold the suit away from the skin away from the user, and said means for providing closure providing controlled release of air at said means for providing closure for maintaining said suit in the inflated position for maintaining the suit at a distance from the body and facilitating air flow throughout the entire inner periphery of the suit thereby providing circulation of air throughout the extremities of the suit without the necessity of individual air channels to the extremities of the suit.

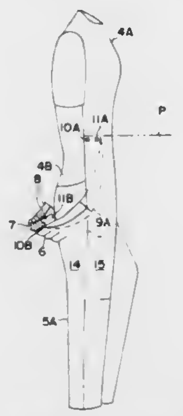
VOL
126
ISS
2
MY
14
1991
UMI

### 5,014,356
### DROPSEAT JUMPSUIT

**Mary J. Tomasi-Dubois, 121 Altura Vista, Los Gatos, Calif. 95030**

**Filed Sep. 14, 1989, Ser. No. 407,350**
**Int. Cl.$^5$ A41D** *1/06*

**U.S. Cl. 2—79** **7 Claims**



1. In an article of clothing in the nature of a one-piece jumpsuit including a bodice having a waist front and a back including a shirttail that extends below the waist front, and pants having a front portion attached to said waist front and depending from said bodice, the improvement comprising:

a) a dropseat panel having a transverse waistband portion intercepted by lateral side edges forming a back portion of said pants shiftable between closed and open positions and normally detachably secured to the waist front of said bodice when said dropseat is in closed position; and
b) means interposed between said dropseat and said front portion of said pants cooperating to form a utility pocket within the front portion of said pants accessible along a lateral side edge of said dropseat when it is in closed position and cooperating with said dropseat to enlarge the opening normally covered by said dropseat when said dropseat is detached from said waist front.

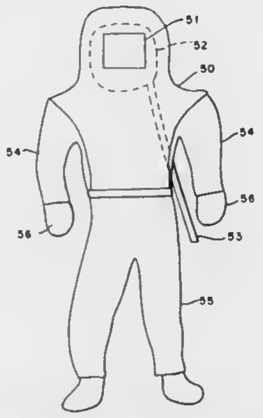
---

### 5,014,357
### COVERALL FOR PROTECTION AGAINST STEAM JETS

**Timothy R. Wiseman, Sr., Richmond, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 366,711, Jun. 15, 1989, abandoned. This application Apr. 18, 1990, Ser. No. 508,838**
**Int. Cl.$^5$ A41D** *13/00*

**U.S. Cl. 2—81** **20 Claims**



1. A coverall, particularly suited for protecting its wearer against jets of steam, comprising a woven fabric of poly(p-phenylene terephthalamide) continuous filament yarns weighing at least 230 g/m$^2$, the fabric being adhered to a layer of aluminum which forms the outer surface of the coverall.

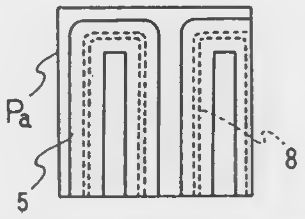
---

### 5,014,358
### SHOOTING COAT FOR ABSORBING SHOCK OF SHOOTING

**Shigeru Matumori, Imaizumi 30-1, Toyama-shi, Toyama-ken 939, Japan**

**Filed Jun. 30, 1989, Ser. No. 375,245**
**Claims priority, application Japan, Jun. 30, 1988, 63-87149[U]**
**Int. Cl.$^5$ A41D** *3/00*

**U.S. Cl. 2—94** **18 Claims**



1. A shooting coat for absorbing the shock of shooting, comprising:

an outer cloth;
a gun receiver pad attached to an inside surface of the outer cloth for receiving a shock of shooting by a gun;
a plurality of projections dispersed substantially uniformly on an outer surface of the gun receiver pad, each said projection having a wire thereinside, said projections together forming a wavelike shape; and
a lining cloth attached over the projections for covering the gun receiver pad.

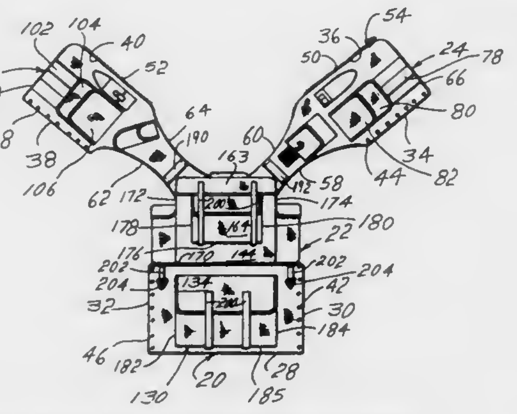
---

### 5,014,359
### VEST AND BACKPACK COMBINATION

**James M. Hanson, Quinhagak, Ak., assignor to Wally Miller, Olympia, Wash.**

**Filed Apr. 10, 1989, Ser. No. 336,203**
**Int. Cl.$^5$ A41D** *1/04*

**U.S. Cl. 2—94** **27 Claims**



1. A backpack and vest combination comprising:

A. a back panel;
B. a right front panel;
C. a left front panel;
D. said back panel, said right front panel, and said left front panel being of unitary construction;
E. said back panel, said right front panel, and said left front panel when laid out flat presenting a "Y" configuration;
F. said back panel having a side juxtapositioned to said right front panel;
G. said right front panel having a side juxtapositioned to said back panel;
H. a first mechanical means for attaching said side of said back panel juxtapositioned to said right front panel and said side of said right front panel juxtapositioned to said back panel adjacent to each other;
I. said back panel having a side juxtapositioned to said left front panel;
J. said left front panel having a side juxtapositioned to said back panel;
K. a second mechanical means for attaching said side of said back panel juxtapositioned to said left front panel and said side of said left front juxtapositioned to said back panel adjacent to each other;
L. said right front panel having a side juxtapositioned to said left front panel;
M. said left front panel having a side juxtapositioned to said right front panel;
N. a third mechanical means for attaching said side of said right front panel juxtapositioned to said left front panel and said side of said left front panel juxtapositioned to said right front panel adjacent to each other;
O. a first pocket on said back panel; and,
P. a second pocket on one of the front panels.

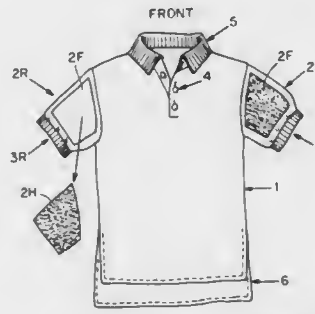
---

### 5,014,360
### REMOVING PERSPIRATION

**Eileen M. Smith, 437 Peakham Rd., and Henry I. Smith, 437 Peakham Rd., Sudbury, Mass. 01776**

**Filed Apr. 2, 1990, Ser. No. 503,389**
**Int. Cl.$^5$ A41B** *1/00, 1/08*

**U.S. Cl. 2—115** **16 Claims**



1. A jersey or shirt of lightweight material having left and right sleeves each having a front panel with moisture-absorbent material at least on the front panel of at least one sleeve covering at least the biceps region so that a person can easily use the moisture-absorbent material to wipe facial sweat,

the moisture absorbing capacity of said moisture-absorbent material being significantly greater than that of said lightweight material.

---

### 5,014,361
### POLYURETHANE ELASTIC GLOVE HAVING IMPROVED PUNCTURE AND TEAR RESISTANCE

**Norman Gray, Cary, N.C., assignor to Aukland (USA), Inc., Cary, N.C.**

**Division of Ser. No. 257,450, Oct. 13, 1988, Pat. No. 4,917,850. This application Feb. 15, 1990, Ser. No. 480,610**
**Int. Cl.$^5$ A41D** *19/00*

**U.S. Cl. 2—167** **6 Claims**

1. A medical or surgical glove having improved tear and puncture resistance made from a formed thermoplastic polyurethane composition which is the reaction product of an aliphatic diisocyanate, an aliphatic polyether diol having a molecular weight in the range of about 1,000 to about 5,000 and an aliphatic diol containing about 2 to about 6 carbon atoms.

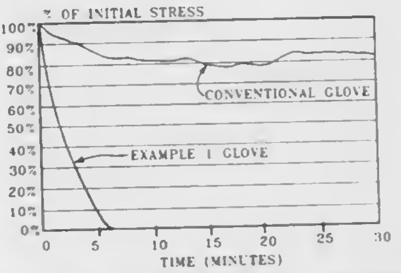
---

### 5,014,362
### ELASTOMERIC COVERING MATERIAL AND HAND GLOVE MADE THEREWITH

**Neil E. Tillotson, Dixville Notch, N.H., and Luc G. DeBecker, Vancleave, Miss., assignors to Tillotson Corporation, Boston, Mass.**

**Filed May 11, 1990, Ser. No. 522,390**
**Int. Cl.$^5$ A41D** *19/00*

**U.S. Cl. 2—168** **16 Claims**



1. A glove comprising a layer of elastomeric material having an initial configuration adapted to receive a hand and characterized by being substantially impermeable to water vapor and liquid water, having a tensile strength of at least about 1500 psi as measured according to ASTM D-412 on a sample of the elastomeric material having a thickness from about 4.0 to about 4.5 mils, and having elastic properties such that when stretched from the initial configuration to fit about the hand, the elastomeric material conforms to the configuration of the hand initially exerting a predetermined pressure on the hand and thereafter relaxing to exert on the hand a reduced pressure which is substantially less than about 80% of the predetermined pressure.

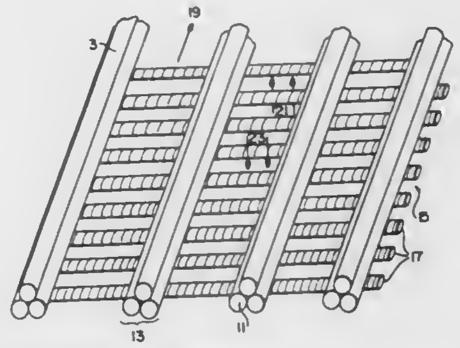
---

### 5,014,363
### WEARING APPAREL WITH VENTILATION MATERIAL

**Thorger Hubner, and Walter Bleimhofer, both of Putzbrunn, Fed. Rep. of Germany, assignors to W. L. Gore & Associates, Inc., Newark, Del.**

**Filed Jun. 12, 1989, Ser. No. 364,941**
**Claims priority, application Fed. Rep. of Germany, Jun. 13, 1988, 3820096; Jun. 13, 1988, 3820099; Jun. 13, 1988, 3820100**
**Int. Cl.$^5$ A41D** *31/00*

**U.S. Cl. 2—243 A** **5 Claims**



1. A wearing apparel comprising:

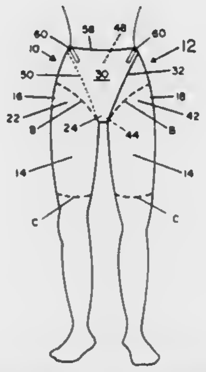
(a) a substantially air-impermeable outer wearing apparel material
(b) a second material adjacent the outer material, said second material comprising a lattice formed by a first layer of a series of parallel, longitudinally disposed plastic spacers; and a second layer of a series of parallel plastic cross spacers transversely disposed with respect to the first layer, said longitudinally disposed spacers being spaced from one another to provide longitudinal air ducts, and said transverse spacers spaced from one another to pro-

vide, with the longitudinal spacers, interstices between the transverse and the longitudinal spacers.

---

### 5,014,364
### GARMENT CROTCH STRUCTURE AND METHOD

**Donna R. Orr, 11609 Barchetta Dr., Austin, Tex. 78758-3757**
**Filed Dec. 22, 1989, Ser. No. 455,306**
**Int. Cl.$^5$ A41B *11/00***
**U.S. Cl. 2—408** **9 Claims**



1. A garment crotch structure comprising:

A. a right garment piece having a right leg opening, a first crotch portion adjacent to the right leg opening, and a first connecting section extending upwardly front and rear from the first crotch portion to both sides of the garment in the garment waist area, the first connecting section having a left edge that extends from the first crotch portion upwardly both front and rear to the left side waist area of the garment;

B. a left garment piece having a left leg opening, a second crotch portion adjacent to the left leg opening, and a second connecting section extending upwardly front and rear from the second crotch portion to both sides of the garment in the garment waist area, the second connecting section having a right edge that extends from the second crotch portion upwardly both front and rear to the right side waist area of the garment; and

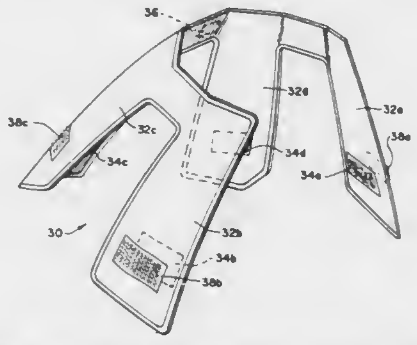
C. the right garment piece and the left garment piece being connected together only in the waist area of the garment with the first and second crotch portions being overlapped across substantially the entire crotch area of the garment, and with the left edge of the right garment piece and the right edge of the left garment piece both being free along substantially their entire length and being connected to the opposite garment piece only in the garment waist area at the left side and right side of the garment, respectively, so that the first and second crotch portions may be parted manually by the wearer to form a crotch opening.

---

### 5,014,365
### GAS-FITTED PROTECTIVE HELMET

**Arthur M. Schulz, Roselle, Ill., assignor to Maxpro Helmets, Inc., Chicago, Ill.**
**Filed Jan. 23, 1989, Ser. No. 300,329**
**Int. Cl.$^5$ A42B *3/02;* A63B *71/16***
**U.S. Cl. 2—412** **10 Claims**

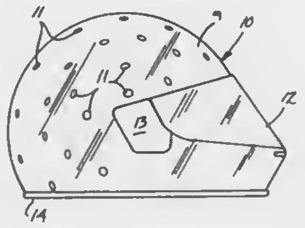
1. A protective helmet comprising an outer shell and an inflatable bladder mounted on the interior surface of said shell, said bladder consisting of four diagonally opposed inflatable cells extending downwardly from the crown of said outer shell, two of said cells extending to the lower rear octants of the wearer's head and the other two of said cells extending to the upper front octants of the wearer's head, said cells inflatable through a single valve, whereby inflation of said cells adjusts the position of the helmet to secure the helmet at the lower rear octants and to elevate the helmet from the head at the upper front octants.

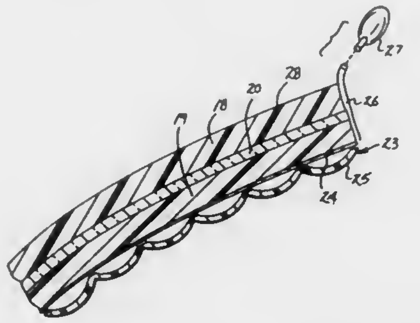


---

### 5,014,366
### ENHANCED VISIBILITY HELMET

**William R. Discipio, Sr., 40 Wheelwright Rd., Hampstead, N.H. 03841**
**Filed Feb. 26, 1990, Ser. No. 485,031**
**Int. Cl.$^5$ A42B *3/06***
**U.S. Cl. 2—424** **4 Claims**





1. A helmet construction comprising, in combination,

a helmet shell, the helmet shell including a forward facial opening, the facial opening including a visor mounted thereon, the visor including spaced, lateral edges, and the shell including first openings coextensive with the lateral edges of the visor, and

the helmet further including a matrix of through-extending apertures orthogonally directed through the shell, and

further including a forward, arcuate surface of the shell underlying the facial opening and including a plurality of vents directed through the arcuate surface, the vents being equally spaced about a center line of the shell, and

wherein the shell includes an outer polymeric transparent layer and an inner polymeric transparent layer, and each transparent layer is coextensive with the shell, and

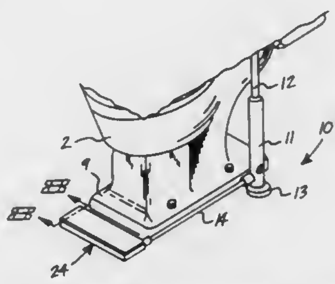
wherein the outer and inner layer are defined by a predetermined thickness, the thickness defined by a range from ten to twenty mil thickness, and

further including a central translucent photochromic layer coextensive with and laminated between the outer layer and the inner layer, the photochromic layer defined by a thickness range from a five to ten mil thickness.

---

### 5,014,367
### COMMODE SEAT LIFTING APPARATUS

**Tom D. Gamblin, 2704 S. Houston, Amarillo, Tex. 79103**
**Filed Feb. 28, 1990, Ser. No. 486,284**
**Int. Cl.$^5$ A47K *13/10***
**U.S. Cl. 4—251** **5 Claims**



1. A commode seat lifting apparatus in combination with a commode, the commode including a commode bowl defining an opening with a commode seat pivotally mounted overlying the bowl including a pivot structure positioned adjacent the bowl and mounted to a rear end portion of the seat, the commode further including a pedestal base mounting the commode to a support surface, the apparatus comprising,

a pneumatic cylinder, the pneumatic cylinder including a support plate integrally mounted to a lowermost end of the pneumatic cylinder, the support plate mounted to the support surface positioned adjacent a side portion of the pedestal base, and

a generally L-shaped piston rod reciprocatably mounted relative to the pneumatic cylinder and extending exteriorly of the pneumatic cylinder and upwardly thereof, the L-shaped piston rod including a horizontal extent rotatably receivable within a sleeve, the sleeve mounted to a bottom surface of the commode seat adjacent the pivot structure, and

a pneumatic conduit including a forward end in pneumatic communication with the pneumatic cylinder, and

a rear terminal end of the pneumatic conduit in pneumatic communication with a pneumatic chamber whereupon depressing of the pneumatic chamber directs the L-shaped piston rod exteriorly of the pneumatic cylinder to effect a lifting of the commode seat, and

wherein the piston rod includes a piston reciprocatably mounted within the pneumatic cylinder, the piston including a pressure relief valve mounted therewithin to effect a metered descent of the commode seat when directed to a lowered position relative to the commode bowl, and

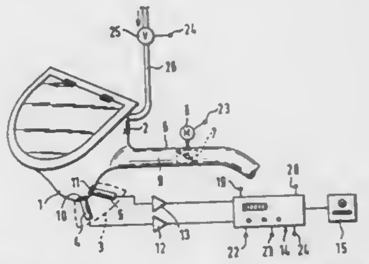
wherein the pneumatic chamber includes an elongate longitudinally aligned housing, the housing arranged parallel to a forward end of the pedestal base, and the housing further orthogonally oriented relative to the pneumatic conduit, and

wherein the housing is defined by a generally parallelepiped cross-sectional configuration and includes a floor underlying and parallel to a top wall, the top wall including a cushioned top surface laminated thereon, the cushioned top surface formed of a resilient frictionally engaging material to enhance engagement of an individual's foot with the top layer.

---

### 5,014,368
### METHOD FOR MONITORING THE DISCHARGE OF LIQUIDS AND APPARATUS THEREFOR

**Wolfgang Lehmann, Stutensee, Fed. Rep. of Germany, assignor to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany**
**Filed Sep. 8, 1989, Ser. No. 404,822**
**Claims priority, application Fed. Rep. of Germany, Sep. 10, 1988, 3830839**
**Int. Cl.$^5$ E03D *1/00;* G01N *21/01***
**U.S. Cl. 4—314** **10 Claims**



5. Apparatus for monitoring a liquid such as sanitary waste discharged intermittently into a drainage system from a discharge receptacle having a siphon interposed between the receptacle and the drainage system, the liquid being discharged from a facility wherein work is performed with open radioactive materials, the apparatus comprising:

radiation detection means adapted to be mounted at the siphon for measuring the level of radioactivity of the liquid;

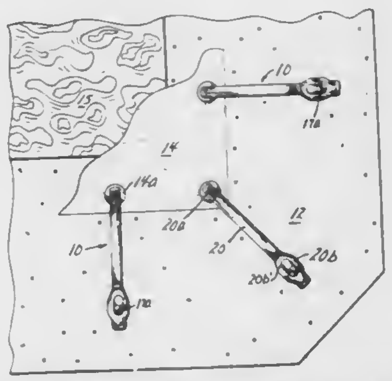
evaluation circuit means connected to said radiation detection means for determining if said level of radioactivity exceeds a predetermined radiation limit level; and,

said evaluation circuit means including control means for preventing the discharged liquid from being passed into the drainage system when said radiation limit level is exceeded.

---

### 5,014,369
### POOL COVER TIE-DOWN

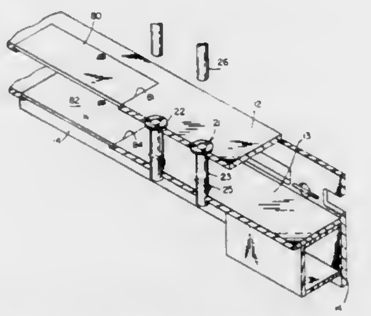
**John H. Daus, Evansville, Ind., assignor to Anchor Industries, Inc., Evansville, Ind.**
**Filed Apr. 11, 1990, Ser. No. 508,124**
**Int. Cl.$^5$ E04H *4/00;* A44B *1/04***
**U.S. Cl. 4—503** **7 Claims**



1. A tie-down arrangement comprising an elongated body made from durable and flexible material, an anchor and a cover presenting grommets along an edge thereof, where said body includes a keyhole slot at one end adapted to be secured to said anchor and a bifurcated opposite end receiving said edge and presenting means adapted to be selectively received in one of said grommets on said cover.

### 5,014,370
### SWIMMING POOL BULKHEAD

**Robert Stark, Sr., 735 NE. 198th, Seattle, Wash. 98155**
**Filed Apr. 26, 1989, Ser. No. 343,434**
**Int. Cl.$^5$ E04H *3/18***
**U.S. Cl. 4—505** **3 Claims**



1. A swimming pool bulkhead adapted to be positioned in a swimming pool and used to support swimming equipment for swimming activities in the pool, comprising:

an elongated, submersible hollow body having a top deck, front and rear side walls, end walls and a bottom;

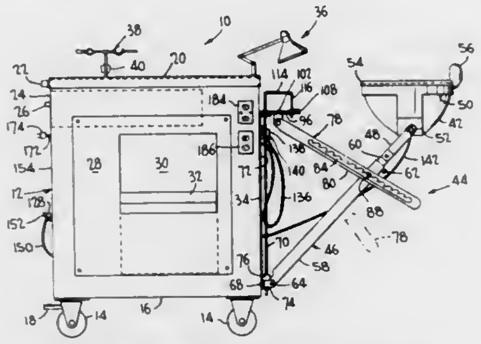
an intermediate platform spaced below the top deck; and

elongated, vertical hollow sockets fixed to the top deck and extending through the intermediate platform forming a box frame with the top deck, front wall, intermediate platform and the sockets, and adapted for receiving a diving platform or other swimming equipment, said sockets being flush with the top deck and having inserts therein for locating the diving platform therein.

---

### 5,014,371
### PORTABLE SALON UNIT

**Jurgen D. Heel, Alexandria, Va., assignor to Salon Care Services, Inc., Sterling, Va.**
**Filed Aug. 24, 1989, Ser. No. 398,384**
**Int. Cl.$^5$ A45D *19/04***
**U.S. Cl. 4—516** **21 Claims**



17. A portable salon unit comprising:

a movable cart having a top, sides, a bottom, and wheels below said bottom on which said cart is movable;

a wash basin located adjacent one said side of said cart and having a head rest;

a mounting means for adjustably mounting said basin to said cart such that said basin is adjustable vertically with respect to said cart, horizontally with respect to said one side of said cart, rotatably about a vertical axis adjacent said one side of said cart, about a vertical axis through said basin, and a horizontal axis through said basin, said mounting means including: (a) an upwardly extending brace means for vertically supporting said basin which said basin is provided at a distal end thereof and which said upwardly extending brace means is pivotally attached at a proximal end thereof adjacent to the bottom and said one side of said cart for rotation about a horizontal axis, said upwardly extending brace means including a first brace, a second brace telescopically received in said first brace, and a first locking means for releasably locking said second brace relative to said first brace at selected positions; (b) a downwardly extending brace means for holding said upwardly extending brace means at a desired inclination from said one side of said cart, said downwardly extending brace means being pivotally attached to said cart at a proximal end thereof adjacent said top of said cart for rotation about a horizontal axis; (c) a second locking means for releasably locking a portion of one of said first brace means and said second brace means along a length of the other of said first brace means and second brace means whereby the height of said basin and the horizontal distance of said basin from said cart are adjustable; (d) a rod disposed vertically adjacent said one side of said cart and having a perpendicular handle portion and a free end depending from said handle portion; (e) a guide means for mounting said rod for vertical movement adjacent said one side of said cart with the handle portion uppermost; (f) a plate having a rounded side extending horizontally from adjacent the top of said cart, said plate including a series of holes spaced adjacent said rounded side and an aperture through which said rod extends; (g) a retainer bar mounted below said plate, said retainer bar including a mounting aperture through which said rod extends to rotatably mount said retainer bar thereabout, an extension which wraps around said rounded side of said plate to hold said retainer bar adjacent said plate, a locking aperture extending through said extension and an underlying portion of said retainer bar which selectively aligns with said holes of said plate and through which the free end of said rod is extendable to lock said retainer bar relative to said plate at a selected angular position about said rod; (h) a limit means for limiting an upward movement of said rod to an uppermost position such that said free end in disengaged from said holes in said plate by raising said rod with said handle portion to the uppermost position but said free end remains in said aperture is said extension of said retainer bar; and wherein said upwardly extending brace means is pivotally attached about said rod and said downwardly extending brace means is attached to said retainer bar which is pivotally attached about said rod and slidable on said plate, and which said retainer bar is thus lockable against rotation where said free end is located through said locking aperture in said extension and in one of said holes;

a water supply means for supplying clean water from a pressurized water outlet to an object located in said basin, said water supply means including a first flexible supply hose which is connected at an end to the pressurized water outlet, a spray head, a second flexible supply hose which is connected to said spray head, and a supply reel means provided in said cart for mounting said first supply hose for winding and unwinding thereabout and for fluidly connecting said first supply hose to said second supply hose;

a water return means for returning water from said basin to a drain, said water return means including a pump means located in said cart for pumping water, a first flexible return hose connecting said basin with said pump means, a second flexible return hose, and a return reel means provided in said cart for mounting said second return hose for winding and winding thereabout and for fluidly connecting said pump means with said second return hose;

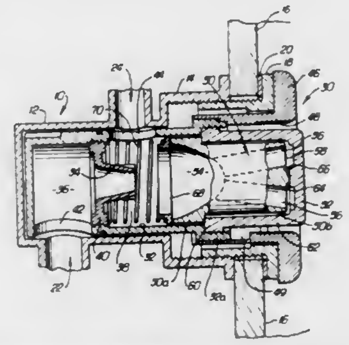
a water connection means for connecting said first supply line to the pressurized water outlet and for connecting said second return hose to the drain which is located adjacent said pressurized water outlet, said water connection means including (a) a first inlet which is connectable to the pressurized water outlet, (b) a first outlet which is fluidly connected to said first inlet and to which said first flexible supply hose is attached, (c) a second inlet to which said second flexible return hose is connected, (d) a second outlet located opposite said first inlet which is fluidly connected to said second inlet, and (e) a bypass means for selectively connecting said first inlet with said second outlet whereby flow from the pressurized water outlet is directed to said second outlet; and

an electrical supply means for supplying electrical power to said cart, said electrical supply means including an electrical cord having a male plug at a distal end thereof, an electrical outlet mounted to said cart and having a connection wire, and an electrical cord reel means provided in said cart for mounting electrical cord for winding and unwinding thereabout and for electrically connecting said electrical cord to said connection wire.

---

### 5,014,372
### SELF-ROTATING SPA JET ASSEMBLY

**Lawrence E. Thrasher, Simi Valley; Gordon E. Olson, Rancho Palos Verdes; Garrett J. Burkitt, III, Simi Valley; Timothy E. Schmidt, Camarillo; Elias M. Haddad, Thousand Oaks, and Susan Conti-Johnston, Simi Valley, all of Calif., assignors to KDI American Products, Inc., Moorpak, Calif.**
**Filed Oct. 13, 1989, Ser. No. 421,465**
**Int. Cl.$^5$ A61H *33/02;* E03C *1/02***
**U.S. Cl. 4—542** **27 Claims**



1. A water-driven rotatable hydrotherapy nozzle assembly, comprising:

a generally cylindrical hollow body, having an open forward end portion and a rear end portion having means for introducing water under pressure into the body;

a nozzle rotor having front and rear ends and a rear end portion of generally cylindrical shape, to be received into the front end portion of the body for rotation about a common cylindrical axis, and wherein the nozzle rotor has a concave cavity formed in its rear end portion and at least two passages extending from the concave cavity to the front end of the rotor, the passages being symmetrical about the rotor axis, both in radial distance and in angular spacing; and

a nozzle retainer cage, secured to the body and having at least one member that extends across the front end of the rotor and has a thrust plate to apply a purely axial retaining force to the rotor;

and wherein the nozzle rotor is rotated by the action of water passing through it, to produce rotation of the streams of water discharged from the passages in the nozzle rotor, whereby the symmetry of the passages results in cancellation of radial forces on the nozzle rotor, and avoids the need for cylindrical bearings.

---

### 5,014,373
### BATH PILLOW

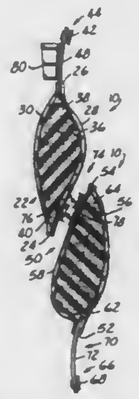
**Dwayne Dobine, 8145 Terry, Detroit, Mich. 48228**
**Filed Sep. 2, 1988, Ser. No. 239,916**
**Int. Cl.$^5$ A47G *9/00***
**U.S. Cl. 4—575** **18 Claims**

1. A bath pillow having a front and a back, said pillow being adapted to be supported by at least one of two supporting structures, including a bathtub-like structure and a wall structure, and to be anchored to at least one of said two supporting structures so that a user may rest at least a head of the user against the front of said bath pillow, the bath pillow comprising:

a first support cushion to support said head of the user, said first support cushion having a front face and a back face and a generally tear-shaped cross-section that is generally perpendicular to said front face and said back face of said first support cushion, said cross-section of said first support cushion having a rounded portion and a tear point;

first anchoring means;

first bridging means having a first attachment with said first support cushion, said first bridging means for bridging between said first attachment and said first anchoring means, said first anchoring means being connected to said first bridging means for anchoring the bath pillow to said at least one of two supporting structures;



a second support cushion to support a shoulder region of the back of the user, said second support cushion having a front face and a back face and a generally tear-shaped cross-section that is generally perpendicular to said front face and said back face of said second support cushion, said cross-section of said second support cushion having a rounded portion and a tear point;

second anchoring means connected to said second support cushion for anchoring the bath pillow to said at least one of two supporting structures; and

attaching means for attaching said first and second support cushions to one another in an overlapping relationship characterized by a portion of the back face of said first support cushion opposing a portion of the front face of said second support cushion and the tear points of said cross-section of said first and said second support cushions overlapping.

---

### 5,014,374
### RESTRAINT STRETCHER

**Gary R. Williams, 943 Daisy Ave., Carlsbad, Calif. 92009**
**Filed Feb. 24, 1989, Ser. No. 315,463**
**Int. Cl.$^5$ A61F *13/00;* A61G *1/00***
**U.S. Cl. 5—82 R** **12 Claims**

1. A stretcher for mounting upon an elongated backboard for supporting and immobilizing a person, the stretcher comprising:

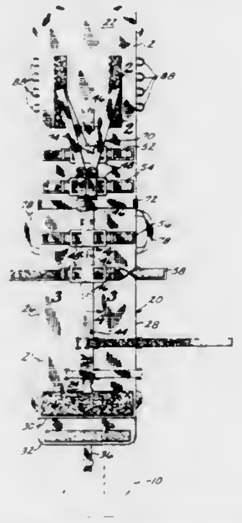
an elongated envelope adapted to slidably receive enclose a rigidifying backboard, and having a longitudinal centerline and opposite side edges;

retainer means extending longitudinally of and attached to one side of the envelope adjacent the longitudinal centerline at longitudinally spaced apart locations to define unattached sections of the retainer means; and

a plurality of transverse straps extending through the unattached sections, respectively, the transverse straps being

VOL 126
SS 2
MY 14 1991
UMI

of lesser widths than the sections whereby the transverse straps are adjustable longitudinally for adaptation to different sized persons, the transverse straps being laterally movable in the sections for removal and replacement.



---

5,014,375

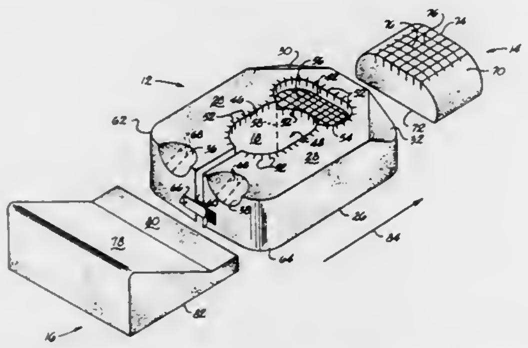
## SURGICAL PAD

Ralph W. Coonrad, Durham, and Carolyn R. Booth, Cary, both of N.C., assignors to Span-America Medical Systems, Inc., Greenville, S.C.

Filed Jan. 29, 1990, Ser. No. 472,043

Int. Cl.$^5$ A61G *13/00;* A47C *20/00*

U.S. Cl. 5—431 36 Claims



21. A surgical kit for cushioning and supporting a patient in a prone position during surgery, comprising:

resilient foam torso support means for resiliently supporting the torso of a patient, said torso support means having abdominal channel means formed therein for receiving a patient's abdomen generally in a free-hanging condition while the remainder of such torso is resiliently supported;

head support means for supporting the patient's head; and

lower limb support means for supporting the patient's lower limbs;

wherein said head support means and lower limb support means comprise respective foam members apart from said torso support means so as to be adjustably positioned relative thereto on an operating table or other primary support surface.

---

5,014,376

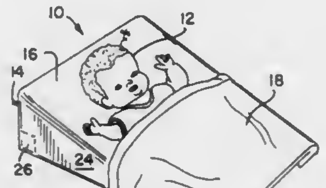
## APPARATUS FOR HOLDING AND SUPPORTING AN INFANT

Cheryl C. Doran, and Arthur J. Doran, both of 6038 S. Sawyer, Chicago, Ill. 60629

Filed Mar. 23, 1990, Ser. No. 498,229

Int. Cl.$^5$ A47D *7/00;* A47G *9/04*

U.S. Cl. 5—431 4 Claims



1. An apparatus for supporting and securely holding an infant, comprising:

a resilient wedge-shaped support member, said support member having an inclined support surface for the placement of an infant thereon, said support surface having a first lateral edge and a second lateral edge;

a blanket releasabiy attachable to said wedge-shaped support member for holding an infant on said inclined surface of said support member, said blanket being dimensioned to extend laterally beyond said first lateral edge and said second lateral edge when said blanket is attached to said support member; and

attachment means positioned on the bottom surface of said support member and adapted to cooperate with attachment means positioned on the lateral edge portions of said blanket, to releasably attach said blanket to the bottom surface of said wedge-shaped support member;

whereby, said blanket covers the lower portion of an infant's body when the infant is placed on said support surface and said blanket is attached to said support member.

---

5,014,377

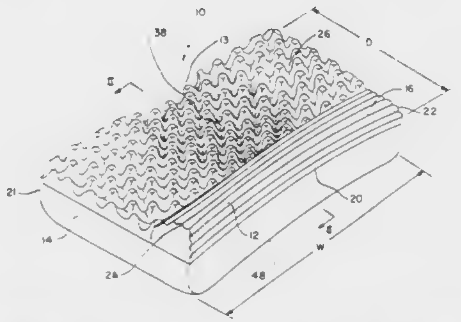
## PILLOW

Linda H. Dixon, Laurel, Calif., assignor to E. R. Carpenter Company Inc., Richmond, Va.

Continuation of Ser. No. 190,847, May 6, 1988, abandoned. This application Jun. 22, 1990, Ser. No. 542,810

Int. Cl.$^5$ A47C *20/02*

U.S. Cl. 5—434 34 Claims



1. An anti-snoring pillow for lessening the degree of blockage in a breathing passageway of a user of the pillow, comprising:

a base member having a front edge, a rear edge and a bottom and upper surface;

an elongated bolster, which provides support to the neck of the user and has a cross-sectional portion which is curved, said bolster being supported by said base member and said bolster being positioned closer to the front edge than said rear edge, and said rear edge being about 2 to 5 times higher than said front edge such that said upper surface slopes downward from said rear edge towards said front edge, said upper surface having a depression formed therein formed rearward of said bolster and said depression having a depth of between 1.0 to 4.0 inches, said bolster extending off of the upper surface of said base member for about 1.5 to 4.0 inches and being of a material higher in density and lower initial ILD value than said base member, and

wherein said base member, said bolster, and said depression, in combination, are dimensioned and arranged such that, when a user, having a head weight between 10 to 14 pounds, is in a supine position and the neck of the user is firmly supported by said bolster, an angle of between about 125° to 165° is formed between a plane passing along the lower, essentially planar surface of the mandible of the user and a horizontal plane lying on the chest of the user.

---

5,014,378

## PNEUMATIC MAT WITH SAFETY APPARATUS

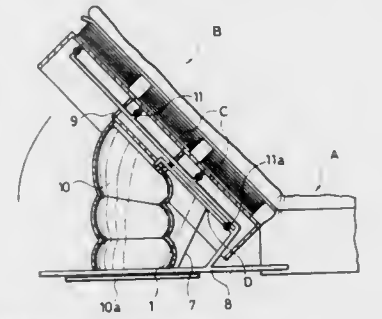
Hisashi Sato, Tokyo, Japan, assignor to Michiko Tsuchiya, Japan, a part interest

Filed Nov. 7, 1989, Ser. No. 432,539

The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.

Int. Cl.$^5$ A47C *27/08;* A61G *7/005*

U.S. Cl. 5—453 8 Claims



1. A pneumatic bed, comprising:

an inflatable member situated in an upper portion of said bed, for raising or lowering the same with respect to a lower portion of said bed,

a fixed member,

a valve,

a conduit supplying inflation gas to the inflatable member and having a port in which said valve is seated, said conduit normally confining inflation gas supplied to said inflatable member, said conduit normally being movable with respect to said fixed member upon inflation of said inflatable member, and

flexible member means extending between said fixed member and said valve, for unseating said valve when said conduit is moved beyond a predetermined point with respect to said fixed member when said inflatable member is inflated beyond a predetermined limit.

---

5,014,379

## COMBINATION TOOL

Harold L. Hull, 401 Canyon Way, Sp. 43, Sparks, Nev. 89434, and Robert D. Montgomery, 1685 W. 12th, Reno, Nev. 89503

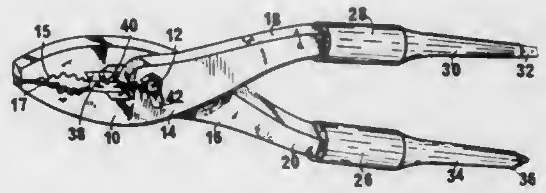
Filed Nov. 20, 1989, Ser. No. 439,245

The portion of the term of this patent subsequent to Feb. 26, 2008, has been disclaimed.

Int. Cl.$^5$ B25F *1/02*

U.S. Cl. 7—127 9 Claims

1. A combination tool comprising; a first and second plier member having a jaw section and a handle section, said jaw sections having cutting edges, said cutting edges being aligned so that they coact to cut an object placed between them when said jaw sections are pivotable displaced toward and away from each other, said plier members being pivotally attached together to allow said jaw sections to be pivotally displaced toward and away from each other by moving said handle sections to and away from each other, said handle section of said first plier member having at its distal end a phillips screwdriver point, said handle of said second plier member having at its distal end a slot screwdriver point, said handle sections being substantially parallel to each other when said plier members are in a first closed position, a gripping area, said gripping area being recessed into said handle section to form an abutment, said gripping area being cylindrical, said gripping area being covered by a sleeve, said sleeve being able to turn freely on said cylindrical area said handle being tapered from said abutment to the distal end of said handle, said gripping area cooperating with said handle sections to allow the thumb and fingers of a user to grasp said gripping area of said handle section of said first plier member to put substantial pressure on said phillips or said slot screwdriver points, while said handle section of said second plier member is pivotable to a second open position substantially perpendicular to said first plier member, and said plier members are interconnected so that when one of said screwdriver points associated with said plier member is in use, said second plier member may be used by said user to more easily apply torque to said screwdriver point.



---

5,014,380

## PROCESS AND INSTALLATION FOR HEAT TREATMENT OF TEXTILE THREADS

Robert Enderlin, Morschwiller-Le-Bas, France, assignor to Passap Knitting Machines, Inc., Salt Lake City, Utah

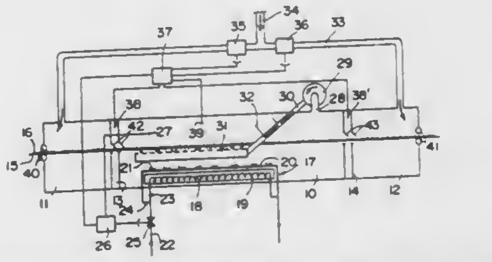
PCT No. PCT/FR88/00118, § 371 Date Aug. 15, 1989, § 102(e) Date Aug. 15, 1989, PCT Pub. No. WO88/06653, PCT Pub. Date Sep. 7, 1988

PCT Filed Mar. 2, 1988, Ser. No. 416,315

Claims priority, application France, Mar. 6, 1987, 87 03222

Int. Cl.$^5$ D06B *3/04*

U.S. Cl. 8—149.3 22 Claims



1. Continuous heat treatment process for textile threads comprising:

passing threads that are deposited on a conveyor belt through an installation having several consecutive chambers which are adjacent each other, with at least one of said several consecutive chambers being a steaming chamber;

causing a gradual increase in temperature of the threads in at least one of an upstream or downstream location from said at least one steaming chamber by imposing a predetermined temperature gradient along at least one portion of the conveyor belt while maintaining in several consecutive chambers or in consecutive compartments arranged in at least one of said several consecutive chambers, temperatures which are different and gradually graduated, to thereby reduce thermal shock sustained by treads entering said at least one steaming chamber; and

at least in a compartment preceding said at least one steaming chamber, withdrawing air from a top portion of a downstream zone of the compartment, and reinjecting the withdrawn air into a bottom portion of an upstream zone of the compartment.

9. Continuous heat treatment installation for textile threads, comprising:

several consecutive chambers adjacent to one another, of which at least one of said several consecutive chambers comprises a steaming chamber;

at least one conveyor belt capable of supporting threads for passage through said several consecutive chambers;

means for creating a gradual increase in the temperature of threads at least one of an upstream or downstream location from said at least one steaming chamber, to thereby reduce thermal shock sustained by the threads entering the at least one steaming chamber;

two cold chambers, with each of said two cold chambers being arranged on one side of said at least one steaming chamber, and two intermediate chambers, with one of said two intermediate chambers being located between an upstream cold chamber and said at least one steaming chamber, and the other of said two intermediate chambers being located between said at one steaming chamber and a downstream cold chamber, and wherein the upstream cold chamber has a length at least equal to that of the downstream cold chamber; and

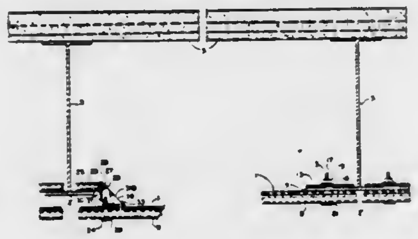
a first conduit arranged to connect said two cold chambers, with said first conduit being connected to a second feeding conduit adapted to be connected to a source of pressurized air, said first conduit including a valve controlled by a first regulator connected to temperature probes arranged in said two intermediate chambers, and to a pressure probe arranged in said at least one streaming chamber.

---

### 5,014,381
### ROLLING PLATFORM ASSEMBLY

**Jack E. Eddy, 5 Eddy La., Pelham, N.H. 03076**
**Filed Sep. 18, 1989, Ser. No. 408,254**
**Int. Cl.$^5$ E01D** *9/00*

**U.S. Cl. 14—17** **2 Claims**



1. A platform assembly for placement under a bridge, said bridge having at least two adjacent flanged girders, said platform assembly designed to prevent impediment of traffic below said bridge during installation of said platform assembly and during demolition of said bridge comprising;

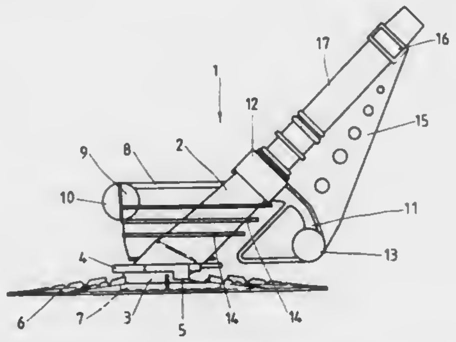
(a) a plurality of platforms, each platform having (1) a transverse width approximating the distance between said adjacent flanged girders, (2) opposed longitudinal edges and (3) opposed transverse edges;
(b) first means located on a said platform for attaching a hoisting means thereto;
(c) second means located on a said platform for attaching a pulling means thereto; and
(d) a plurality of roller assemblies located at spaced intervals along each of said longitudinal edges of a said platform, said roller assemblies adapted to roll a said platform along said adjacent girders,
(e) whereby said plurality of platforms are in close proximity to said flanged girders so as to prevent impediment of traffic below by bridge material falling below due to said demolition.

---

### 5,014,382
### SWIMMING POOL CLEANER

**Dieter H. F. Kallenbach, Chartwell, South Africa, assignor to BPH Patent Holding AG, Zug, Switzerland**
**Filed Aug. 14, 1989, Ser. No. 393,536**
**Claims priority, application South Africa, Aug. 15, 1988, 88/6015; Feb. 13, 1989, 89/1099**
**Int. Cl.$^5$ E04H** *3/20*

**U.S. Cl. 15—1.7** **10 Claims**



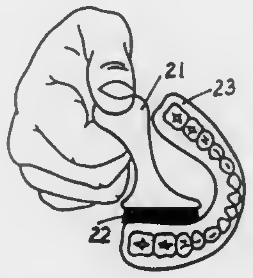
1. A swimming pool cleaner comprising:
(a) a forwardly inclined body having a flow passage therethrough;
(b) an inlet foot having a water inlet, the inlet foot being attached to the body and connected to the flow passage and when in use, is proximate to a surface to be cleaned;
(c) a flexible disc surrounding the water inlet and rotatably connected to the inlet foot and having a peripheral edge; and
(d) a stop for preventing upward flexing of the peripheral edge beyond a predetermined amount located forward of the body and above and substantially inward of the peripheral edge.

---

### 5,014,383
### OFFSET DENTURE BRUSH

**Donald G. Costar, P.O. Box 9905, Reno, Nev. 89507**
**Filed Mar. 20, 1990, Ser. No. 496,963**
**Int. Cl.$^5$ A46B** *5/02*

**U.S. Cl. 15—160** **3 Claims**



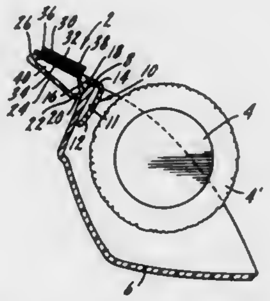
1. A denture scrubbing brush comprising a planar oval shaped member having first and second faces that are parallel to and opposite each other, a plurality of bristles affixed to and extending from said first face, a grasping handle affixed to said second face, said handle having one end attached to the second face and a spaced second end for grasping by the user, such that the user hand is inserted between the spaced second end and the brush second face when in use, the handle attachment to the brush being along the vertical centerline of the brush faces, and the spaced second end of the handle being offset to one side from the vertical centerline to a point where the second end projects beyond the edge of the planar faces, whereby said angle of attachment causes said grasping handle to become strategically placed parallel to, but offset from, a longitudinal plane perpendicular to said first face, such that when the brush bristles are in cleaning contact with denture surfaces, the user hand is offset from the denture which allows a user to safely and effectively clean said dentures by exercising a scrubbing motion on said denture surfaces.

---

### 5,014,384
### PAD ATTACHMENT FOR PAINT ROLLER ASSEMBLIES

**Michael W. Brezette, Naperville, Ill.; Robert A. Shaffer, Kenosha, Wis.; Fredrick B. Burns, South Milwaukee, Wis., and Howard R. Moon, Fort Atkinson, Wis., assignors to EZ Paintr Corporation, Milwaukee, Wis.**
**Continuation-in-part of Ser. No. 46,327, May 6, 1987, Pat. No. 4,829,628. This application May 15, 1989, Ser. No. 351,750**
**Int. Cl.$^5$ B05C** *17/02*

**U.S. Cl. 15—230.11** **6 Claims**



1. In combination with a yoke-like paint roller assembly having a shield, a painting pad attachment device comprising a pad support providing means for applying even pressure to a painting pad lying adjacent thereto,

said pad support including a support surface which is generally flat so as to receive and support a painting pad disposed adjacent thereto,

resilient means integrally formed with said support for removably attaching said device to the paint roller assembly, said resilient means comprising a clip extending from a position adjacent to said support surface, said clip having opposing legs which snap onto an edge of the shield in nonrotatable engagement therewith, whereby the paint roller assembly is useable, in the alternative, to apply paint with a shielded roller and with a pad.

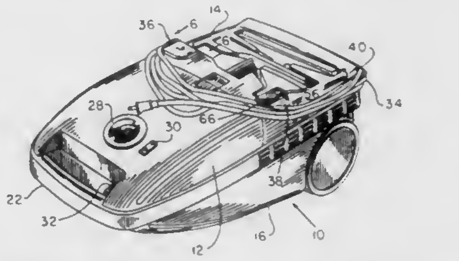
---

### 5,014,385
### CLEANER CORD WRAP

**Sidney H. Bradd, Solon, and Richard R. Tucker, Canton, both of Ohio, assignors to The Hoover Company, North Canton, Ohio**
**Filed Dec. 18, 1989, Ser. No. 451,616**
**Int. Cl.$^5$ A47L** *5/36*

**U.S. Cl. 15—323** **7 Claims**

1. A cord wrap arrangement for storing cord on a canister cleaner including;
(a) a switch for initiating at least one mode of operation of said canister cleaner,
(b) said switch being disposed generally within a shell of said canister cleaner,
(c) a manually operated pedal for operation of said switch at least partially extending away from said shell,
(d) said manually operated pedal utilized as a hook means for winding said stored cord,



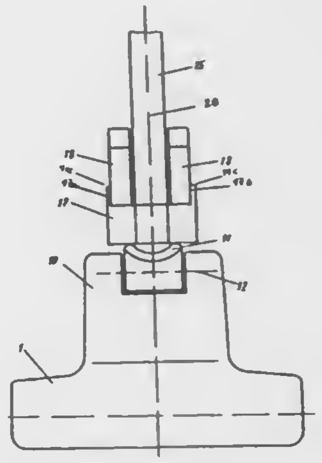
(e) said manually operated pedal being disposed in covering relationship to said switch at all times to thereby protect said switch from structural harm.

---

### 5,014,386
### SUCTION NOZZLE, WITH A BRUSH, FOR A VACUUM CLEANER

**Peter Worwag, Romanshorn, Switzerland, assignor to Düpro AG, Romanshorn, Switzerland**
**Filed Jan. 11, 1990, Ser. No. 463,613**
**Claims priority, application Fed. Rep. of Germany, Jan. 11, 1989, 3900577**
**Int. Cl.$^5$ A47L** *9/00*

**U.S. Cl. 15—339** **6 Claims**

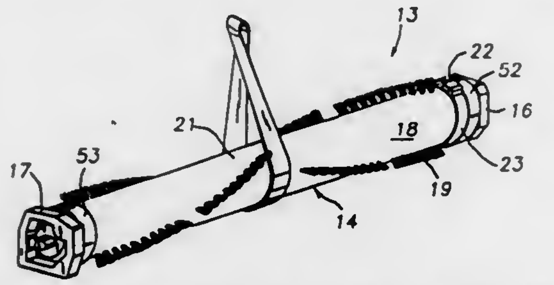


1. In a suction nozzle device for a vacuum cleaner comprising a hollow handle suction tube and a suction nozzle having a connecting socket, with a lower end of said handle suction tube being inserted into said connecting socket to achieve a plug connection between said suction nozzle and said handle suction tube, with said suction nozzle being in flow communication with said vacuum cleaner via a suction hose disposed at an upper end of said handle suction tube opposite said suction nozzle, with said suction nozzle enclosing a power driven rotary brush and a battery powered electric motor for operating said rotary brush, the improvement wherein:

a holding bracket is disposed at said handle suction tube in a vicinity of said connecting socket for holding at least one battery that is electrically connected to said electric motor via a supply lead.

### 5,014,387
### BRUSH ROLL MOUNTING

**Philip G. Hays, Westlake, Ohio, assignor to The Scott Fetzer Company, Westlake, Ohio**
**Filed Dec. 26, 1989, Ser. No. 456,327**
**Int. Cl.⁵ A47L *5/00***
**U.S. Cl. 15—339** **20 Claims**



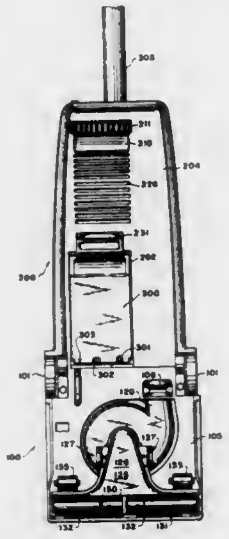
1. A brush roll assembly for an upright vacuum cleaner having a hollow rug nozzle adapted to receive a two-ended brush roll and a drive shaft and a drive belt for rotating the brush roll comprising a rigid roll body elongated in an axial direction and having bristles on an exterior of the body extending in a generally radial direction, the body including a cylindrical portion at its mid-length for receiving the belt in a friction drive relationship, bearing means at each end of the roll supporting the roll for rotation about its axis, a magnet adjacent one end of the roll body for energizing a sensing device in an associated end of the nozzle responsive to rotation of the magnet with the roll, mounting block means at each end of the roll body for reception in associated mounting block receivers in an interior of the nozzle, the mounting block means being arranged to support the roll body at multiple selectable positions, the positions being selected by orientation of the mounting block means in the nozzle receivers, the mounting block means at the end of the roll body associated with the magnet being smaller than the mounting block means associated with the opposite end of the roll body, the mounting block means having dimensions visually perceptively different from one another, the smaller mounting block means being adapted to be received in a receiving area in the nozzle closely sized to the smaller mounting block means and too small to receive the larger mounting block means whereby the brush roll assembly can only be assembled in the nozzle in a proper endwise orientation and whereby cleaning air flow is relatively unrestricted in areas within a nozzle outboard of the magnet.

---

### 5,014,388
### BATTERY POWERED VACUUM CLEANER

**Alfred Schiazza, Bloomington, and Arnold L. Sepke, Hudson, both of Ill., assignors to White Consolidated Industries, Inc., Cleveland, Ohio**
**Filed May 15, 1989, Ser. No. 352,210**
**Int. Cl.⁵ A47L *9/28***
**U.S. Cl. 15—339** **13 Claims**

1. A vacuum cleaner comprising:
- a floor engaging unit including a vacuum nozzle, and a vacuum pump;
- a handle assembly pivotally mounted to said floor engaging unit, said handle assembly including a housing having a removable cover, an externally accessible recess, electrical contacts in said recess, and a dirt tube in said housing having a port for removably receiving a porous dust bag;
- a flexible tube arrangement coupling said dirt tube to said vacuum pump whereby dirt-laden air is drawn by said pump from said nozzle to be directed through said port;
- means for connecting said electrical contacts to said vacuum pump;
- a battery assembly in said recess and having battery contacts releasably contacting said electrical contacts; and

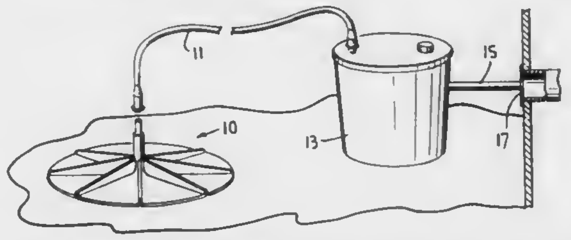


means for releasably holding said battery assembly in said recess.

---

### 5,014,389
### FOOT MANIPULATED SUCTION HEAD AND METHOD FOR EMPLOYING SAME

**Rick A. Ogilvie, Ancaster, Canada, and Rance A. Winkler, Largo, Fla., assignors to Concept Inc., Largo, Fla.**
**Filed Nov. 15, 1989, Ser. No. 436,774**
**Int. Cl.⁵ A47L *9/06***
**U.S. Cl. 15—353** **13 Claims**

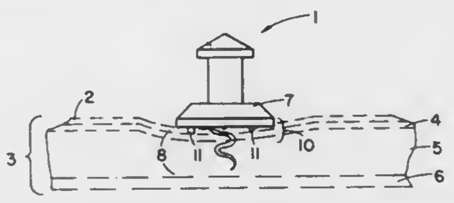


1. Apparatus for aspirating fluid from a floor comprising a suction head movable along the floor, said suction head including a mouth adapted to communicate with a source of suction, a periphery, a top surface, a bottom surface adapted to contact the floor, channel means communicating with said mouth and said periphery for aspirating fluid on the floor through said mouth and preventing said suction head from sealing against the floor, said channel means including a plurality of flow channels extending through said suction head from said mouth to said periphery adjacent said bottom surface, said suction head further including a suction supply port disposed on said top surface and adapted to be connected to said source of suction, said suction supply port communicating directly with said mouth through said section head, and structural means for imparting support to said suction head and preventing collapse and blockage of said flow channels, said structural means comprising support ribs disposed on said top surface in juxtaposition with said flow channels and having a width greater than said flow channels to distribute forces applied vertically thereto to portions of said bottom surface disposed adjacent said flow channels.

---

### 5,014,390
### DEVICE FOR ATTACHING A FLEXIBLE COVERING ELEMENT SUCH AS A PIECE OF A CARPETING OR A MAT TO ITS SUPPORT

**Gérard De Gastines, La Madeleine, France, assignor to Facam S.A., La Madeleine, France**
**Filed Apr. 18, 1990, Ser. No. 510,226**
**Claims priority, application France, Apr. 18, 1989, 89 05429**
**Int. Cl.⁵ A47G *27/04***
**U.S. Cl. 16—4** **5 Claims**

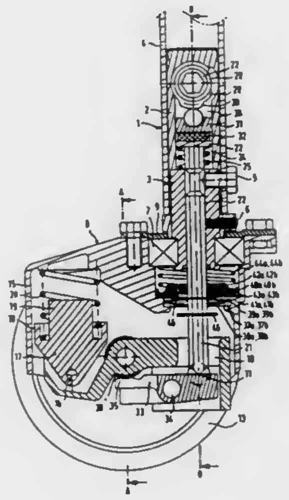


1. Device for attaching a flexible covering element such as a piece of carpeting or a mat to a support composed of a floor mat and an undercarpet all supported by a sheet of metal, said device comprising a collar under which is provided an anchoring device in the support composed of a short corkscrew, said device being characterized in that, to prevent loosening, it comprises tooth-shaped protuberances under said collar and in that said protuberances are inclined so as to slide in the tightening direction on the upper face of the piece to which the collar is applied and to become anchored in said face when loosening occurs.

---

### 5,014,391
### LOCKABLE CASTER WHEEL

**Arnolf Schulte, Friedenstrasse 8C, 5632 Wermalskirchen, Fed. Rep. of Germany**
**Filed Jan. 12, 1990, Ser. No. 464,251**
**Claims priority, application Fed. Rep. of Germany, Jan. 13, 1989, 3900889**
**Int. Cl.⁵ B60B *33/06***
**U.S. Cl. 16—35 R** **27 Claims**



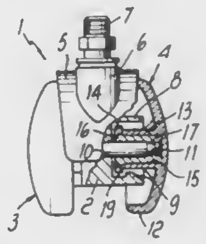
1. Lockable caster wheel, in particular for movable hospital beds, with
- a fastening pin (1, 50);
- a swivel arm (8, 52) adapted to be swivelled around the fastening pin (1, 50) in a swivel bearing (7, 53);
- a mechanism for fixing the swivelling motion of the swivel arm (8, 52);
- at least one rotatable wheel (13, 13'; 57),
- a tiltable brake lever (33, 63) to block the rotation of the wheel (13, 13'; 57); and
- a locking bolt (21, 68) arranged coaxially to the fastening pin (1, 50) and movable relative to said pin in the axial direction against the action of a lift spring (25, 72) for lockins the swivel arm (8, 52) as a function of its axial position and blocking rotation of the wheel (13, 13'; 57) by means of engagement with the brake lever (33, 63);

wherein:
- a wheel carrier (10, 54), which carries the wheel (13, 13'; 57) is pivoted on the swivel arm (8, 52),
- a flexible axle (11, 55) of the wheel carrier (10, 54) extends essentially parallel to the axis of rotation of the wheel (13, 13'; 57) and intersects the longitudinal axis of the locking bolt (21, 68);
- the brake lever (33, 68) is mounted in the wheel carrier (10, 54);
- an axis of tilt (34) of the brake lever (33, 63) is parallel to the flexible axle (11, 55) of the wheel carrier (10, 54); and
- the wheel carrier (10, 54) is resiliently biased relative to the swivel arm (8, 52) by means of a wheel spring (20, 61).

---

### 5,014,392
### SELF-ORIENTATABLE TWIN WHEEL OF THE KIND COMPRISING A PAIR OF COAXIAL WHEELS

**Francescantonio Melara, Bologna, Italy, assignor to Emilsider Meccanica S.p.A., Bologna, Italy**
**Filed Feb. 20, 1990, Ser. No. 482,108**
**Claims priority, application Italy, Feb. 28, 1989, 4751/89[U]**
**Int. Cl.⁵ B60B *33/00***
**U.S. Cl. 16—46** **11 Claims**



1. Self-orientatable twin wheel comprising a support, a pivot supported by said support, and a pair of wheels mounted on said pivot, each wheel of said wheels being provided with a hollow tang for mounting said each wheel on said pivot, said twin wheel further comprising for said each wheel a bush which is interposed between said tang and said pivot, said bush defining an inner surface facing said pivot and an outer surface facing said tang, said bush defining a first end and a second end, said bush being provided with a first collar protruding internally from its said inner surface at its said first end thereof, said pivot being provided with a pivot groove, said first collar of said bush engaging with said pivot groove of said pivot, said bush being further provided with a second collar protruding externally from its said outer surface at its said second end thereof, said second collar of said bush engaging with a tang groove provided in said tang.

---

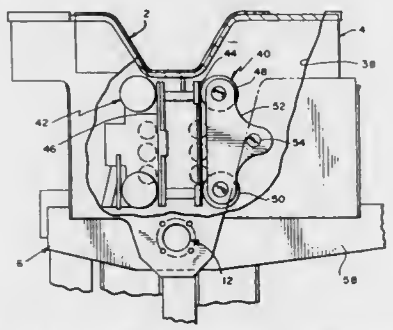
### 5,014,393
### VIBRATING MOLD ASSEMBLY

**Thomas J. Russo, Kingsville, Md., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.**
**Filed Jun. 14, 1989, Ser. No. 365,819**
**Int. Cl.⁵ B22D *11/04***
**U.S. Cl. 164—416** **12 Claims**

1. A continuous caster vibrating assembly for preventing molten steel from adhering to mold walls of a continuous caster mold table, comprising;
- (a) generator means for providing power to an eccentric oscillator;

(b) said eccentric oscillator is connected to a pair of lever arms to impart a vibrating motion to said lever arms;

(c) a mold table pivotally connected to said pair of lever arms;



(d) a pair of pivot pins for pivotally connecting said mold table to each of said lever arms; and,

(e) strain gauge means associated with said pivot pins.

---

## 5,014,394

### METHOD AND APPARATUS FOR MAKING REPRESENTATIVE SAMPLES OF TEXTILE FIBERS

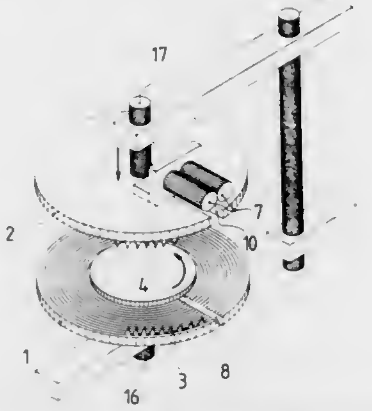
**René Gloor, Richterswil; Michael Müller, Wädenswil, and Alfred Beeler, Horgen, all of Switzerland, assignors to Siegfried Peyer AG, Wollerau, Switzerland**

**Filed Mar. 26, 1990, Ser. No. 498,766**

**Claims priority, application Switzerland, Apr. 10, 1989, 01340/89**

**Int. Cl.$^5$ D01G** *33/00*

**U.S. Cl. 19—98** **10 Claims**



1. A method for preparing representative samples of textile fibers comprising the steps of

providing two surfaces (1, 2) with sets of protrusions (3, 4),

positioning the surfaces (1, 2) so that they are parallel with each other and so that the sets of protrusions on each surface extend generally toward the other surface,

moving a web of fiber material (6) to be analyzed between the two parallel surfaces (1, 2) while holding the surfaces at a constant distance from each other and rotating the two surfaces about a common axis so that the protrusions enter the fiber material (6) and linearly resolve the fiber material (6) into its individual fibers to produce a random, orthogonal cross-sectional sample (11), and

removing the sample from between the surfaces.

---

## 5,014,395

### APPARATUS FOR AUTOMATICALLY COMPENSATING DENSITY OR THICKNESS VARIATIONS OF FIBER MATERIAL AT TEXTILE MACHINES, SUCH AS CARDS, DRAW FRAMES AND THE LIKE

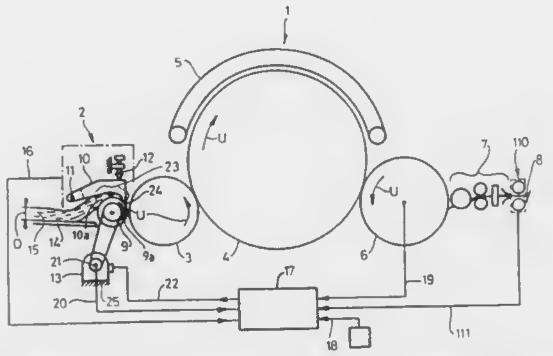
**Paul Stäheli, Wilen; Robert Demuth, Nürensdorf, and Peter Fritzsche, Winterthur, all of Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland**

**Division of Ser. No. 132,274, Dec. 10, 1987, Pat. No. 4,854,011. This application Oct. 19, 1988, Ser. No. 258,767**

**Claims priority, application Switzerland, Dec. 12, 1986, 04951/86**

**Int. Cl.$^5$ D01G** *15/36*

**U.S. Cl. 19—105** **31 Claims**



1. An apparatus for automatically compensating density variations of fiber material at a textile machine, comprising:

fiber infeed means for receiving a mass of fiber material whose density variations are to be detected;

said fiber infeed means comprising at least one driven fiber feed roll element for feeding the mass of fiber material to a textile machine;

said fiber infeed means further comprising at least one fiber infeed element;

said at least one driven fiber feed roll element forming in conjunction with said at least one fiber infeed element a nipping zone forming a passage for the mass of fiber material;

said nipping zone having a predeterminate substantially constant and essentially invariable size during detection of density variations of the received mass of fiber material passing through said nipping zone;

means coacting with one of said elements conjointly forming said nipping zone for generating measuring signals representative of density variations of the received mass of fiber material passing through the nipping zone;

means for generating signals representative of density variations of fiber material processed in the textile machine at an outlet side of said textile machine; and

control means for processing at least the generated signals representative of the density variations of the received mass of fiber material passing through said nipping zone, and the generated signals representative of density variations of the processed fiber material at the outlet side of the textile machine to obtain control signals for controlling the rotational speed of the driven fiber feed roll element to produce at the outlet side of the textile machine processed fiber material of essentially uniform density.

---

## 5,014,396

### NON-WOVEN ARTICLE MADE OF A HEAT-RESISTING MATERIAL, METHOD FOR MANUFACTURING THE ARTICLE AND APPARATUS FOR IMPLEMENTING THE METHOD

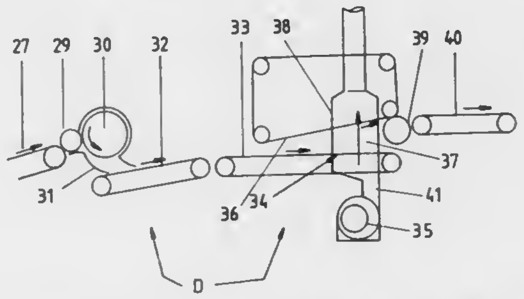
**Jorma Nieminen, Kankaanpää, Finland, assignor to Oy Scanwoven Ab, Kankaanpää, Finland**

**Filed Feb. 15, 1989, Ser. No. 311,501**

**Claims priority, application Finland, Feb. 17, 1988, 880755**

**Int. Cl.$^5$ B32B** *17/02, 18/00;* **D01G** *21/00;* **D04H** *1/54*

**U.S. Cl. 19—205** **8 Claims**



1. A method for manufacturing a discontinuous fiber-containing article from ceramic fibers, glass fibers, mineral fibres or a mixture thereof in which said fibers are couched into a mat of randomly oriented fibers having a uniform weight per unit area, said method comprising the steps of:

forming fibres into a substantially uniform fiber mat at a first conveying level which carries the fiber mat forward;

advancing the fiber mat into an air flow passed through the first conveying level to carry said fiber mat to a second conveying level, which at the air flow path is positioned opposite to the first level, and carries the fibres forward, so that the fibres are removed from the first conveying level and are randomly directed and settle as a fiber mat on the second conveying level, said fibre-carrying air flow being passed through the second conveying level.

---

## 5,014,397

### DETACHING ROLLER DRIVING MECHANISM FOR A COMBER EMPLOYING TWO DRIVING SYSTEMS

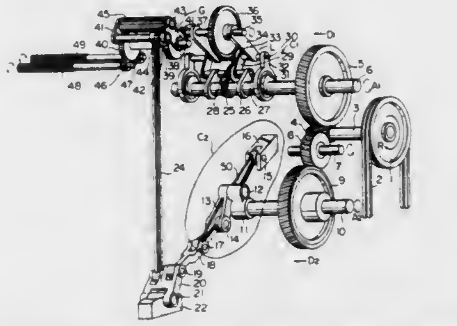
**Mutsuhiko Katori, Nagoya, and Kazuo Yamada, Anpachi, both of Japan, assignors to Kabushikikaisha Hara Shokki Seisakusho, Gifu, Japan**

**Filed May 22, 1990, Ser. No. 526,898**

**Claims priority, application Japan, Sep. 8, 1989, 1-231712**

**Int. Cl.$^5$ D01G** *19/20*

**U.S. Cl. 19—231** **1 Claim**



1. A detaching roller driving mechanism for driving the detaching rollers of a comber, comprising: a differential gear mechanism having an input shaft and a planet pinion; a first driving system for converting a constant-speed rotative motion of a drive transmitted thereto into a variable-speed rotative motion through a crank mechanism and a quadric crank mechanism, said first driving system transmitting the variable-speed rotative motion to the input shaft of the differential gear mechanism; and a second driving system for converting a constant-speed rotative motion transmitted thereto into a swing motion by a crank mechanism, for converting the swing motion into a reciprocating motion by connecting rods and linkage, and for transmitting the reciprocating motion to the planet pinion of the differential gear mechanism; and including a swing lever and a crankshaft having a crank mounted thereon, said swing lever having a swinging end and a pivotal end mounted on a first pin, said swinging end of the swing lever being swung on the first pin through a connecting rod by the crank, said swinging end of the swing lever being pivotally connected to one end of a connecting link by the crank pin, a swinging end of a lever supported at a pivotal end thereof for swinging motion on a second pin being connected pivotally to an opposite end of the connecting link by a joint pin, a point on a line passing through a terminating end of the locus of the circular motion of the lever and the first pin being located near an end of the locus of circular reciprocating motion of the crank pin, a connecting rod having one end pivotally joined to the swinging end of the lever by a joint pin and an opposite end connected to the planet pinion of the differential gear mechanism, and a point on a line passing through the second pin and a position of the input shaft of a planet gear of the differential gear mechanism farthest from the second pin coinciding with an end of the locus of the circular reciprocating motion of the joint pin of the lever.

---

## 5,014,398

### HIGH-DRAFT DRAFTING UNIT

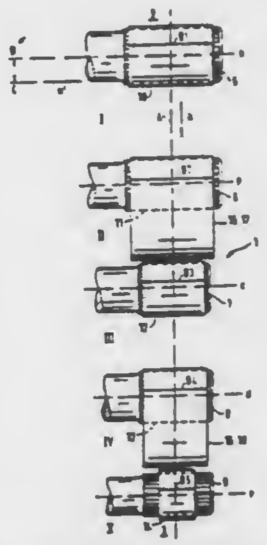
**Fritz Stahlecker, Josef-Neidhart-Str. 17, 7347 Bad Überkingen, FRG, Fed. Rep. of Germany, and Hans Stahlecker, Haldenstrasse 20, 7334 Süssen, FRG, Fed. Rep. of Germany, assignors to Fritz Stahlecker, Fed. Rep. of Germany and Hans Stahlecker, Fed. Rep. of Germany**

**Filed Feb. 23, 1990, Ser. No. 483,749**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905941**

**Int. Cl.$^5$ D01H** *5/70*

**U.S. Cl. 19—244** **23 Claims**



1. A high-draft drafting unit for a spinning machine having several drafting zones which are each delimited by two pairs of rollers formed of pressure rollers and bottom rollers and of which at least one is equipped with an apron assembly comprising a top apron and a bottom apron, the axial length of coverings of the pressure rollers and the apron width determining the respective working width of the pairs of rollers transversely to the moving direction of a sliver, wherein the working width in the travel direction of the sliver, is reduced in at least one step by reducing the axial length of the working

OL
126
SS
2
MY
14
991
UMI

widths of the pressure rollers and aprons following in comparison to the preceding drafting zones.

---

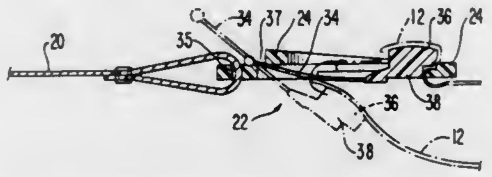
### 5,014,399
### SHEET FASTENING ASSEMBLY AND FASTENER THEREFOR

**Joseph P. Grisel, Tulsa, Okla., assignor to Blue Magic Products, Inc., Stockton, Calif.**

**Filed Aug. 9, 1989, Ser. No. 391,045**

**Int. Cl.⁵ A47C** *21/00*

**U.S. Cl. 24—72.5** **2 Claims**



1. A bedsheet fastening assembly comprising:

an anchoring means for anchoring a sheet fastening means to an underside of a mattress;

sheet fastening means for releasbly grasping a bedsheet;

said fastening means including a clasping member having a bedsheet receiving slot and a slidable sheet grasping member including projection means for releasably sliding within said slot and for releasably grasping the bedsheet therebetween;

interconnecting means for interconnecting said anchoring means to said fastening means;

said projecting means includes a neck portion and a relatively enlarged button portion extending from said neck portion, said projecting means being sized and shaped to allow the bedsheet to be fitted over said button portion and to fit in said slot as said projecting means slidably moves in said slot, said neck portion being slidable within said slot and allowing the bedsheet to be accommodated between a bottom of said button and said clasping member;

said interconnecting means is elastic and facilitates said assembly accommodating different sized bedsheets;

said grasping member is a thin and flexible member and having locking projections which lockingly engage locking slots formed in said grasping member;

said locking projections project laterally from said neck portions for releasable engagement with said locking slots formed in portions of walls defining said bedsheet receiving slot;

said grasping member has retaining tabs extending therefrom;

said grasping member has split retaining legs;

said clasping member has recesses which slidably engage projections on said split retaining legs; and,

said sheet grasping member is mounted for slidable and tiltable movement on said clasping member wherein said projection means can move between a position adjacent a top surface at said clasping member to a position adjacent a bottom surface of said clasping member to facilitate grasping and releasing of the bedsheet.

---

### 5,014,400
### ORNAMENTAL SNAP FASTENERS

**Tadahiko Ban, Tokyo, Japan, assignor to Kabushiki Kaisha Baarei, Tokyo, Japan**

**Filed Apr. 9, 1990, Ser. No. 506,474**

**Claims priority, application Japan, Apr. 12, 1989, 1-92055**

**Int. Cl.⁵ A44B** *1/38*

**U.S. Cl. 24—108** **6 Claims**

1. A snap fastener comprising:

a male component;

said male component including a fitting projection;

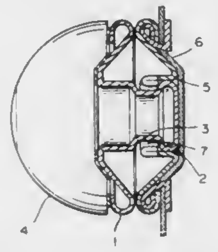
said fitting projection having a circular cross section;

a neck connecting said fitting projection to a remainder of said male component;

said neck having a non-circular cross section;

a female component;

a receptacle in said female component for receiving said fitting projection;



said receptacle having a circular cross section and including at least one element for engaging said neck; and

said at least one element including means for preventing said male component from rotating with respect to said receptacle.

---

### 5,014,401
### SEAT BELT SYSTEM

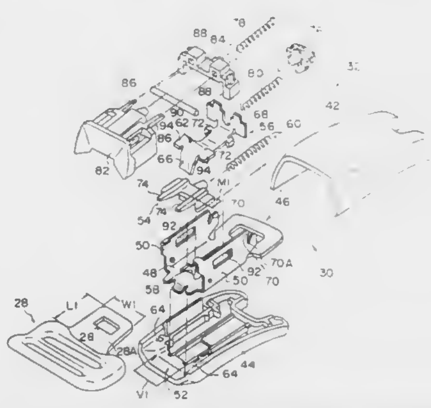
**Yasuho Kitazawa, Niwa, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki Seisakusho, Japan**

**Filed Aug. 22, 1989, Ser. No. 396,666**

**Claims priority, application Japan, Aug. 24, 1988, 63-110851[U]**

**Int. Cl.⁵ A44B** *11/26*

**U.S. Cl. 24—633** **17 Claims**



1. A seat belt system having a plurality of seat belt units with buckle apparatuses each including a tongue plate supporting a webbing and buckle body for locking said tongue plate, comprising:

a first tongue plate having a first insert portion;

a first buckle body having a first insertion path along which said first insert portion is inserted, a first ejector movable in the direction of insertion of said first insert portion by being pushed by said first insert portion thereby being inserted along said first insertion path, and a first lock plate operable by the movement of said first ejector so as to be engaged with said first insert portion thereby locking said first tongue plate;

a second tongue plate having a second insert portion;

a restricted portion provided in said first insertion path and having a width smaller than the width of said second insert portion; and

a second buckle unit having a second insertion path along which said second insert portion is inserted, a second ejector movable by a predetermined amount in the direction of insertion of said second insert portion by being pushed by said second insert portion thereby being inserted along said second insertion path, and a second lock plate operable by the movement of said predetermined amount of said second ejector so as to be engaged with said second insert portion thereby locking said second tongue plate, the length of said first insert portion in the direction of insertion and the length of said second ejector in the direction of movement of said second ejector being determined such that, when said first insert portion is inserted into said second insert path, the amount of movement of said second ejector caused by the insertion of said first insert portion is smaller than said predetermined amount.

---

### 5,014,402
### TENTER APPARATUS

**Wallace Cunningham, Newton Mearnes, United Kingdom, assignor to G. Bruckner GmbH and Bruckner-Maschinenbau Co. KG, both of, Fed. Rep. of Germany**

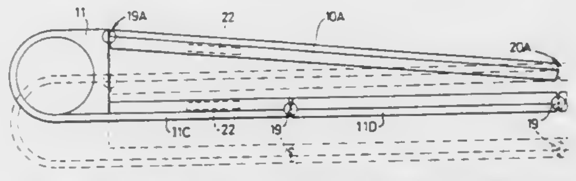
**PCT No. PCT/GB88/00506, § 371 Date Feb. 23, 1989, § 102(e) Date Feb. 23, 1989, PCT Pub. No. WO88/10189, PCT Pub. Date Dec. 29, 1988**

**PCT Filed Jun. 24, 1988, Ser. No. 334,979**

**Claims priority, application United Kingdom, Jun. 25, 1987, 8714935**

**Int. Cl.⁵ D06C** *3/02, 3/00*

**U.S. Cl. 26—91** **10 Claims**



1. Stenter apparatus for stretching a web to produce relatively thin film comprising:

a film treatment chamber having an inlet and an outlet;

first and second pairs of laterally spaced sprockets, each pair disposed respectively adjacent to said inlet and said outlet;

a laterally spaced pair of endless chains carried on rails by said first and second pairs of sprockets passing through said chamber and including an inner feed run and an outer return run, each of said chains including film clip holders running on said rails facing the inner feed runs defining a film conveying passage having in succession an outlet section, a diverging film stretching section and an outlet or relaxation section;

adjustment means for lateral displacement of the endless chains for varying the width of the conveying passage, said adjustment means including shifting means to provide adjustment movements of each of the feed runs in a lateral direction towards or away from the corresponding return run which is fixed laterally; and

pivot means to permit pivoting motions of portion of each of the return runs adjacent to the ends thereof to allow said adjustment movements of each of the feed runs.

---

### 5,014,403
### METHOD OF MAKING A STRETCHABLE ORTHOPAEDIC FIBERGLASS CASTING TAPE

**George J. Buese, East Brunswick, N.J., assignor to Johnson & Johnson Orthopaedics, Inc., New Brunswick, N.J.**

**Filed Feb. 7, 1990, Ser. No. 476,191**

**Int. Cl.⁵ D06H** *7/22;* **A61F** *5/04, 13/04*

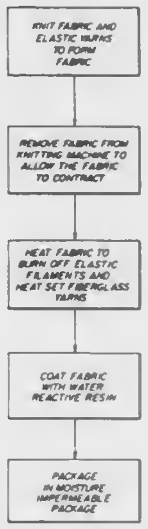
**U.S. Cl. 28—170** **6 Claims**

1. A method of forming an orthopedic casting tape comprising;

knitting a fabric employing fiberglass yarns in the chain stitch of the fabric, and elastic yarns in the length direction of the fabric, the elastic yarn being present in a sufficient quantity to give the fabric a stretch before heating of at least 70%;

removing the fabric from the knitting machine and allowing the power of the elastic filament to contract the fabric;

heating the contracted fabric to burn off the elastic fiber in the fabric and heat set the fiberglass yarns in the fabric;


KNIT FABRIC AND ELASTIC YARNS TO FORM FABRIC
REMOVE FABRIC FROM KNITTING MACHINE TO ALLOW THE FABRIC TO CONTRACT
HEAT FABRIC TO BURN OFF ELASTIC FILAMENTS AND HEAT SET FIBERGLASS YARNS
COAT FABRIC WITH WATER REACTIVE RESIN
PACKAGE IN MOISTURE IMPERMEABLE PACKAGE

coating the contracted fabric with a water reactive isocyanate terminated resin; and

packaging the coated fabric in a moisture impermeable package until ready for use.

---

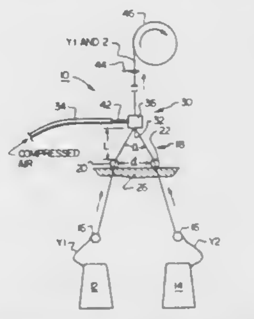
### 5,014,404
### AIR ENTANGLED YARN

**Kenneth M. Smith, 1702 Forest Valley Rd., Greensboro, N.C. 27410**

**Filed Jan. 12, 1989, Ser. No. 296,518**

**Int. Cl.⁵ D02G** *1/16;* **D02J** *1/08*

**U.S. Cl. 28—271** **20 Claims**



1. A method of combining at least two unlike yarn ends, at least one of said yarn ends being a spun yarn and at least one of said yarn ends being a continuous multi-filament yarn, to produce a composite yarn, comprising the steps of:

(a) removing each of the two yarn ends from respective supply packages under predetermined tensions at substantially the same speed;

(b) separating the yarn ends to maintain a predetermined included angle between the yarn ends;

(c) feeding the separated yarn ends substantially straight through an entangling jet to combine the yarn ends, the centerline of said jet falling within said predetermined included angle; and

(d) collecting the entangled yarn ends on a takeup package.

### 5,014,405
### JIG PALLET FOR AN AUTOMATIC ASSEMBLY DEVICE

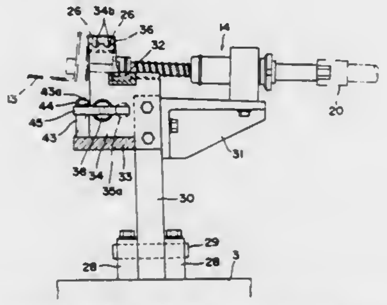
**Shinji Yamana, Nagoya; Mikio Nakamura, Toyota, and Akihiro Tsuzuki, Aichi, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 9, 1989, Ser. No. 393,697**

**Claims priority, application Japan, Aug. 22, 1988, 63-109146[U]**

**Int. Cl.$^5$ B23P** *19/00*

U.S. Cl. 29—33 R 5 Claims



1. A jig pallet for carrying and positioning parts relative to an assembled member, comprising:

a jig pallet main body;

fastener member holding means mounted on said jig pallet main body and driven by drive means separate from said main body, said drive means being operative to rotate said fastener member holding means to mount a said part to a said assembled member; and,

clip holding means for holding clips in engagement with said assembled member, said clip holding means being mounted adjacent said fastener member holding means, so that a fastener held in said fastener member holding means can be employed to mount a said clip to said assembled member.

---

### 5,014,406
### ELASTIC FIXING ROLLER AND METHOD OF PRODUCING THE SAME

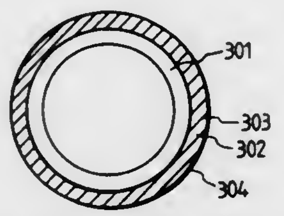
**Chiaki Kato; Masaya Nishi, and Toshiyuki Hatta, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Division of Ser. No. 259,729, Oct. 19, 1988, Pat. No. 4,887,394. This application Jun. 12, 1989, Ser. No. 364,307**

**Claims priority, application Japan, Oct. 20, 1987, 62-266127; Oct. 31, 1987, 62-276985; Nov. 20, 1987, 62-294740; Dec. 30, 1987, 62-335073; Dec. 30, 1987, 62-335074**

**Int. Cl.$^5$ B21B** *31/08*

U.S. Cl. 29—130 7 Claims



1. An elastic fixing roller for use in a fixing stage of a fixing apparatus such as a copying machine, comprising:

a roller core;

a layer provided on the outer surface of said roller core made of a reinforcing heat-resistant material impregnated with a reinforcing heat-resistant elastic material that has been hardened after impregnation; and

a thin film of a heat-resistant elastic material provided on the outer surface of said layer.

---

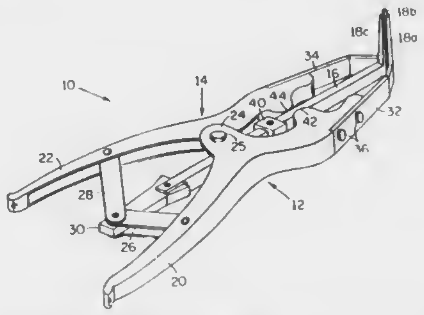
### 5,014,407
### TUBE EXPANDING DEVICE

**Larry R. Boughten; Christopher J. Evoniuk; James M. Scott, and Karen E. Staff, all of P.O. Box 33427, St. Paul, Minn. 55133-3427**

**Filed Sep. 28, 1989, Ser. No. 415,128**

**Int. Cl.$^5$ B23P** *19/02*

U.S. Cl. 29—235 9 Claims



1. A device for expanding an elastic tube, comprising:

first, second and third arm members each having a distal end;

first, second and third tip members disposed at said distal ends of said first, second and third arm members, respectively:

means for coupling said arm members together, said coupling means including means for moving said arm members between contracted and expanded states, said tip members being in close contact in said contracted state and separated in said expanded state; and means for adjustably limiting the separation between said tip members in said expanded state.

---

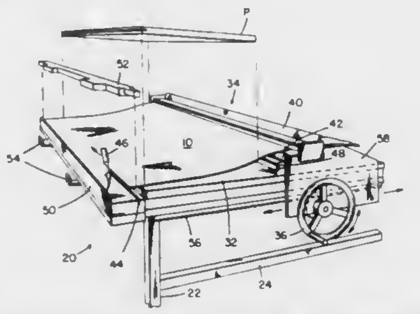
### 5,014,408
### MACHINE FOR WRAPPING DIVIDER PANELS OR THE LIKE

**Roger Radermacher, 10321 NE. 201st Place, Bothell, Wash. 98011**

**Filed Sep. 21, 1989, Ser. No. 410,293**

**Int. Cl.$^5$ B23P** *11/00*

U.S. Cl. 29—243.58 2 Claims



1. A machine for wrapping wall panels including a pair of parallel edges with fabric comprising:

a main table member having a main support, a roll of fabric at a first end and an operator's station at a second end, distributer means, said distributer means moveable in a first direction along a major portion of the length of the table, straddling the width of the table, said distributer means adapted to move the fabric from the roll to the desired position overlying the table member, and then moveable in a second reverse direction allowing the panel to be placed on top of the fabric and then moved in the first direction placing fabric, under tension, overlying the panel, guide means at the operator's station allowing the fabric to be cut along a straight line, and means at the operator's station to hold the fabric adjacent to the edge of the panel for securement thereto, whereby fabric may be taken directed from a roll and quickly and easily wrapped around a panel and secured in position.

---

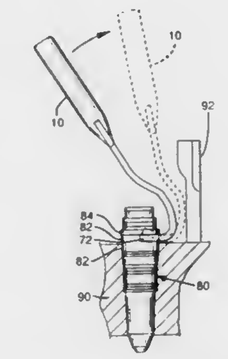
### 5,014,409
### FUEL INJECTOR PULLER

**Charles K. Hippach, Vancouver, Wash., assignor to Pro-Tool, Inc., Vancouver, Wash.**

**Filed Jul. 10, 1990, Ser. No. 551,428**

**Int. Cl.$^5$ B25B** *27/16*

U.S. Cl. 29—267 3 Claims



1. A fuel injector puller comprising:

an upper handle portion, said upper handle portion lying substantially in a straight line;

a lower portion for engaging a fuel injector seated in a head of an internal combustion engine, the engine having raised portions of the head proximate to the injector, said lower portion formed of substantially flat metal bar stock having a front side and a back side and the lower portion having a semicircular cut-out therein flanked on each side by generally parallel fingers, said semi-circular cut-out for partially surrounding a body of said fuel injector and said fingers for engaging a flange of said fuel injector, wherein said flange extends beyond said body of said fuel injector,

an intermediate portion also formed of substantially flat metal bar stock and having a front side and back side, the intermediate portion having a plurality of arcuate bends, said intermediate portion connecting said upper handle portion and said lower portion and the first arcuate bend being concave on the front side of the intermediate portion, located adjacent to the semi-circular cut-out, and the backside of the intermediate portion at the first bend forming a fulcrum to engage said head and provide a pivot point about which to rotate said puller to lift said fingers from said head to lift said fuel injector from said head,

the intermediate portion having a second arcuate bend concave on the front side and connected to the first bend, whereby the front side at the second bend does not engage the top of the fuel injector when the lower portion engages the injector flange, and the back side at the second bend does not contact the raised portion of the engine head before the injector has been sufficiently pulled from the engine; and

the intermediate portion having a third arcuate bend concave on the back side, connecting the second bend to the handle portion.

---

5,014,410

**Patent Not Issued For This Number**

---

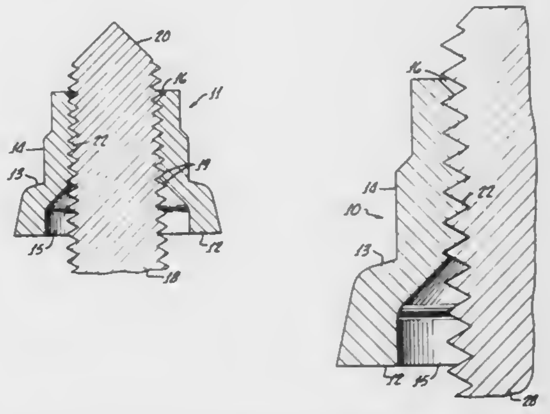
### 5,014,411
### METHOD OF FORMING A LOCKING NUT AND LOCKED THREADED CONNECTION

**James L. Bonstein, Long Beach, Calif., assignor to Deutsch Fastener Corporation, Lakewood, Calif.**

**Filed Jun. 1, 1989, Ser. No. 362,032**

**Int. Cl.$^5$ B23P** *19/06;* **B21D** *39/00, 53/24*

U.S. Cl. 29—525.1 5 Claims



1. The method of forming a locked threaded connection comprising the steps of

forming a substantially rigid unbendable body,

forming an opening in said body in the shape of a right cylinder,

then forming a thread in said opening which has substantially a full profile at a location adjacent one end of said opening and has a pitch diameter which tapers from said location toward opposite end of said opening at an included angle of from substantially 1° to 2°,

with the crest of said thread being of constant diameter and being truncated increasingly from said location to adjacent said opposite end of said opening,

forming an externally threaded member of constant pitch diameter, and

threading together said body and said externally threaded member,

said threads in said body and on said externally threaded member being formed so as to have relatively free relative rotation at said location to permit the start of a threaded connection, and interference adjacent said opposite end without substantially bending said body so as to create a locking effect resistant to vibrstion.

---

### 5,014,412
### STRIP CASTING INSTALLATION WITH ROTARY HEARTH FURNACE AND METHOD FOR PRODUCING HOT-ROLLED STEEL STRIP THEREFROM

**Dieter Nobis, Neuss; Friedrich Hollmann, Grevenbroich, and Horst Düster, Velbert, all of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany**

**Filed Jun. 23, 1989, Ser. No. 370,458**

**Claims priority, application Fed. Rep. of Germany, Jun. 23, 1988, 3821188**

**Int. Cl.$^5$ B21B** *1/46, 13/22;* **B22D** *11/12*

U.S. Cl. 29—527.7 13 Claims

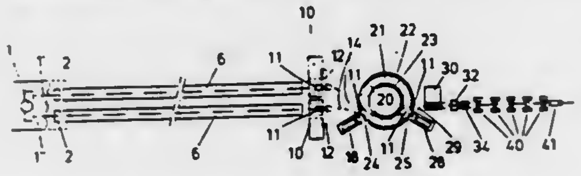
1. A method for producing a hot-rolled steel strip from continuously cast primary material, comprising the steps of:

dividing the continuously cast primary material into pieces of predetermined length after solidification;

bringing the pieces of primary material to hot rolling temperature in a soaking furnace;

removing the primary material and winding it up to form coils after reaching the hot rolling temperature;

intermediately storing the coils in a rotary hearth furnace;



recalling the coils as needed, and uncoiling the primary material; and

introducing the primary material into a finishing train for rolling out to form finished strips.

---

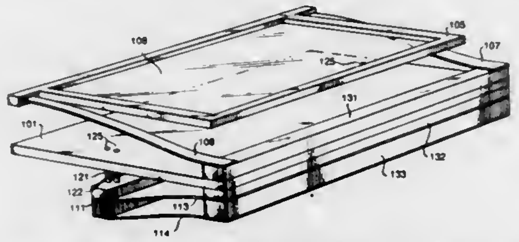
## 5,014,413
## METHOD AND APPARATUS FOR FACILITATING LOADING OF A PANEL PROCESSING MACHINE AND POSITIONING OF ARTWORK ON A WORK SURFACE THEREON

**Hans H. Ammann, Chester, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 15, 1989, Ser. No. 351,897**

**Int. Cl.$^5$ B23Q** *7/00*

**U.S. Cl. 29—559** **3 Claims**



1. A method of providing insertion and withdrawl of a panel onto and off of a work surface of a machine for processing the panel;

comprising the steps of:

attaching a panel locating mechanism to one end of a first flexible beam mechanism and connecting an opposite end of the first flexible beam mechanism to a structural member of the processing machine;

attaching a frame with included artwork to one of a second flexible beam mechanism and connecting an opposite end of the second flexible beam mechanism to the structural member of the processing machine;

moving the panel locating mechanism away from the work surface by application of a first force thereto, thereby flexing the first flexible beam mechanism and positioning the panel locking mechanism to prevent interference by the panel locating mechanism to loading a panel onto the work surface;

moving the frame and attached artwork away from the work surface by applying a second force thereto, thereby flexing the second flexible beam and positioning the frame and artwork to prevent interference by the frame and attached artwork to loading a panel onto the work surface;

loading a panel onto the work surface;

moving the panel locating mechanism by discontinuing application of the first force and applying an opposing force opposite the first force thereto, thereby relaxing the first flexible beam and positioning the panel locating mechanism to enable it to engage the panel and position it on the work surface, with the first flexible beam controlling a registration position of the panel locating mechanism;

moving the frame and attached artwork by discontinuing application of the second force and applying an opposing force opposite the first force thereto, thereby relaxing the second flexible beam and positioning the frame and attached artwork precisely on top of the panel, with the second flexible beam controlling a registration position of the frame and attached artwork;

performing processes on the panel;

moving the panel locating mechanism away from the work surface by application of a third force thereto, thereby flexing the first flexible beam mechanism and positioning the panel locating mechanism and its engaging elements to prevent interference by the panel locating mechanism with removing panels from the work surface;

moving the frame and attached artwork away from the work surface by applying a fourth force thereto, thereby flexing the second flexible beam and positioning the frame and attached artwork to prevent interference by the frame and attached artwork with removing panels from the work surface;

removing the panel from the work surface.

---

## 5,014,414
## METHOD FOR PRODUCING A MAGNETIC HEAD CORE

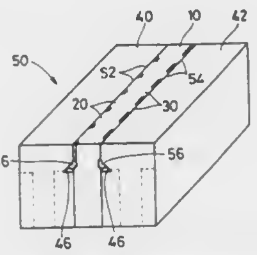
**Soichiro Matsuzawa, Kuwana; Fuminori Takeya, Nagoya, and Nobuhiro Terada, Kasugai, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan**

**Filed Apr. 12, 1989, Ser. No. 337,966**

**Claims priority, application Japan, Apr. 12, 1988, 63-89340**

**Int. Cl.$^5$ G11B** *5/42*

**U.S. Cl. 29—603** **8 Claims**



1. A method of producing a composite magnetic head core having a writing/reading track and two erasing tracks, comprising:

preparing a first, a second and a third ferrite block;

applying a first and a second pattern of etching masks, respectively, to opposite abutting surfaces of at least said first ferrite block, which are to be butted with respective abutting surfaces of said second ferrite block and said third ferrite block, said first etching mask pattern and said second etching mask pattern including at least one first rectangular etching mask and at least two second rectangular etching masks, respectively;

etching said opposite abutting surfaces of said first ferrite block, through said first etching mask pattern and said second etching mask pattern, respectively, to thereby form at least one first rectangular protrusion corresponding to said first rectangular etching mask on one of said opposite abutting surfaces, and at least two second rectangular protrusions corresponding to said second rectangular etching masks on the other abutting surface, each said first protrusion having a width defining a width of said writing/reading track, and a longitudinal end defining a depth of a writing/reading magnetic gap associated with said writing/reading track, and each of said second protrusions having a width defining a width of said erasing tracks, and a longitudinal end defining a depth of two erasing magnetic gaps associated with said erasing tracks, respectively; and

butting and bonding together said first ferrite block, said second ferrite block and said third ferrite block such that said first ferrite block is interposed between and bonded to

said second ferrite block and said third ferrite block, respectively, at said opposite abutting surfaces.

---

## 5,014,415
## MANUFACTURING METHOD OF A DETECTOR USING RESISTANCE ELEMENTS

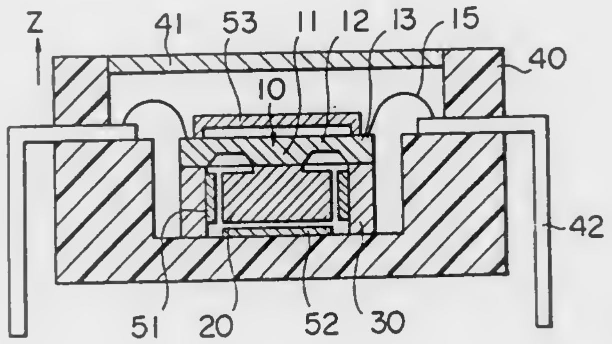
**Kazuhiro Okada, Ageo, Japan, assignor to Wacoh Corporation, Ageo, Japan**

**Filed May 22, 1990, Ser. No. 526,837**

**Claims priority, application Japan, May 29, 1989, 1-135539**

**Int. Cl.$^5$ H01C** *17/00*

**U.S. Cl. 29—621.1** **5 Claims**



1. A method of manufacturing a sensor using a resistance element, comprising:

a step of forming a resistance element within said flexible region on a first surface of said first substrate, tween,

a step forming a resistance element within said flexible region on a first surface of said first substrate,

a step of partially removing said first substrate in order to allow said flexible region to have flexibility,

a step of connecting a second substrate to a second surface of said first substrate, and

a step of cutting said second substrate to thereby form a working body connected to said working region of said first substrate and constituted by a portion of said second substrate and a pedestal connected to said fixed region of said first substrate and constituted by a portion of said second substrate.

---

## 5,014,416
## SINGLE LINE, AUTOMATIC KEY PROGRAMMING AND CONNECTOR TRANSFER SYSTEM

**Charles E. Reynolds, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Continuation of Ser. No. 168,789, Mar. 15, 1988, abandoned. This application Dec. 19, 1989, Ser. No. 453,076**

**Int. Cl.$^5$ B23P** *19/04*

**U.S. Cl. 29—701** **16 Claims**

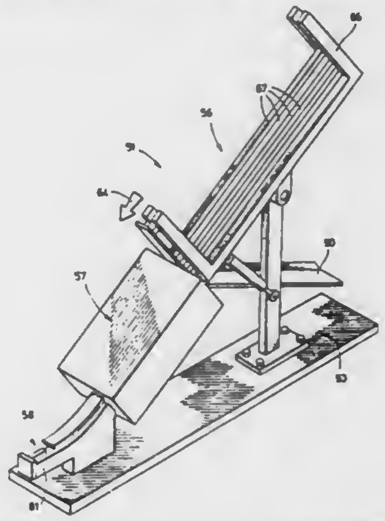
1. Apparatus for automatically programming keys of electrical connectors, comprising:

a supply station including a frame supporting a plurality of elongated tubes in a stack one above the other, each of said plurality of tubes carrying a plurality of electrical connectors having one or more keys secured thereto in an unprogrammed predetermined orientation;

a programming station including programming means for programming at least one of the one or more keys of said connectors to any one of a plurality of programmed orientations, in accordance with programming instructions applied thereto, by moving said at least one key out of the unprogrammed orientation and securing said at least one of said one or more keys in said any one of a plurality of programmed orientations;

control means for providing said programming instructions to said programming means;

an output station including means for receiving connectors having at least one of the one or more keys programmed to a desired orientation from said programming station;



first delivery means for delivering connectors having at least one of the one or more keys in an unprogrammed predetermined orientation one at a time from the lowermost tube in said stack to said programming station; and

second delivery means for delivering connectors having at least one of the one or more keys programmed to a desired orientation from said programming station to said output station.

---

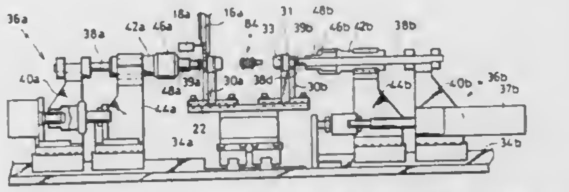
## 5,014,417
## APPARATUS FOR ASSEMBLING INK RIBBON FEEDER ROLLER ASSEMBLIES OF INK RIBBON CASSETTES

**Masayuki Saito, Sayama; Takenobu Fujimoto, Kamifukuoka, and Takuya Hagiwara, Kawagoe, all of Japan, assignors to Dynic Corporation, Kyoto, Japan**

**Filed Jun. 15, 1990, Ser. No. 538,856**

**Int. Cl.$^5$ B23P** *21/00*

**U.S. Cl. 29—783** **6 Claims**



1. An apparatus for automatically and successively assembling ribbon feeder roller assemblies of ink ribbon cassettes, comprising:

a fixed base;

shaft supplying means for supplying a horizontally positioned shaft to a first predetermined position on the fixed base;

a pair of roller supplying means for supplying a pair of elastic rollers to be fitted to the shaft to second predetermined positions on the fixed base where axes of the rollers are in parallel with an axis of the shaft and where the rollers are in axial alignment with each other;

a first reciprocating member supported on the fixed base and capable of reciprocating in a direction orthogonal to the axis of the shaft, the first reciprocating member comprising a shaft receiver and a pair of roller receivers, the shaft receiver having clamping means that receives a shaft supplied to the first predetermined position by the shaft supplying means, the roller receivers receiving a pair of elastic rollers supplied to the second predetermined positions by the roller supplying means;

a pair of second reciprocating members supported on the fixed base on each side of the first reciprocating member and capable of reciprocating in a direction orthogonal to the reciprocating direction of the first reciprocating member, each of the second reciprocating members comprising a piston rod and a ring pusher that is slidable relative to the piston rod; and

drive control means for controlling and driving the first and second reciprocating members in a predetermined synchronous such manner that the first reciprocating member moves between three stop positions in the reciprocating direction wherein, at the first stop position, the shaft receiver of the first reciprocating member is located under the shaft supplying means to receive a shaft supplied by the shaft supplying means and axes of a pair of elastic rollers received in the roller receivers are aligned with axes of the piston rods of the second reciprocating members, at the second stop position, an axis of the shaft received in the shaft receiver is aligned with the axes of the piston rods of the second reciprocating members and, at the third stop position, an intermediate position between the first and second stop positions, the roller receivers are located under the roller supplying means, to receive elastic rollers from the roller supplying means,

whereby when the first reciprocating member is at the first stop position, the second reciprocating members are moved toward each other and, front ends of the piston rods enter center holes of the rollers received in the roller receivers and, at the same time, the shaft receiver receives a shaft from the shaft supplying means and, thereafter, the second reciprocating members with their piston rods engaging with the rollers are moved away from each other and, first reciprocating member is moved backward to the second stop position, where the second reciprocating members are moved toward each other and the shaft receiver holding the shaft is held between the piston rods and, under this state, the first reciprocating member is moved to the third stop position with releasing of the clamping means of the shaft receiver and of the shaft from the shaft receiver and, at the third stop position, the ring pushers of the second reciprocating members are moved toward each other and the rollers held at the front ends of the piston rods are transferred from the piston rods to the shaft and, thereafter, the ring pushers are moved away from each other and the second reciprocating members are moved away from each other, thereby releasing the shaft fitted with the rollers from the piston rods, and the first reciprocating member is then moved to the first stop position.

---

## 5,014,418
## METHOD OF FORMING A TWO PIECE CHIP CARRIER

**John O. Wright, Warren, Pa., assignor to GTE Products Corporation, Stamford, Conn.**

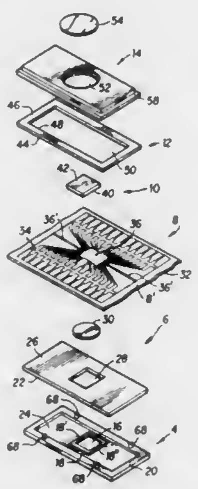
**Division of Ser. No. 381,622, Jul. 13, 1989. This application Jun. 11, 1990, Ser. No. 536,363**

**Int. Cl.$^5$ H01R** *43/00*

**U.S. Cl. 29—827** **2 Claims**

1. A method of forming a two-piece chip carrier for hermetically sealing a chip therein by adhering a chip to a die pad of a lead frame which forms part of one-piece of said chip carrier and electrically coupling said chip to said lead frame, clamping said one-piece of said chip carrier to a second-piece of said chip carrier, and heating to a predetermined curing temperature, comprising the steps of:

forming said one-piece of said chip carrier by (a) adhering a first surface of a first epoxy B-stage preform to a premolded plastic base by heating to a first predetermined temperature sufficient to cause said adhering without curing said first epoxy B-stage preform, and (b) adhering said lead frame to said pre-molded plastic base by clamping said lead frame to said pre-molded plastic base at an opposite second surface of said first epoxy B-stage preform and heating to a second predetermined temperature sufficient to cause said adhering and cure said first epoxy B-stage preform; and



forming said second-piece of said chip carrier by adhering a first surface of a second epoxy B-stage preform, having said predetermined curing temperature, to a metal cover, having an aperture therein closed by a pre-poured ultraviolet glass window, by heating to a third predetermined temperature sufficient to cause said adhering without curing said second epoxy B-stage preform.

---

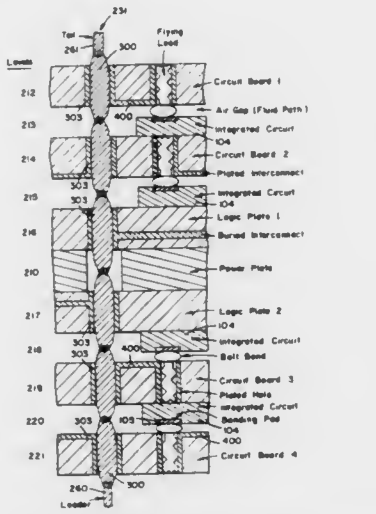
## 5,014,419
## TWISTED WIRE JUMPER ELECTRICAL INTERCONNECTOR AND METHOD OF MAKING

**Seymour R. Cray, and Nicholas J. Krajewski, both of Chippewa Falls, Wis., assignors to Cray Computer Corporation, Colorado Springs, Colo.**

**Continuation-in-part of Ser. No. 53,142, May 21, 1987. This application May 4, 1989, Ser. No. 347,507**

**Int. Cl.$^5$ H05K** *3/31*

**U.S. Cl. 29—830** **19 Claims**



1. Interconnection apparatus comprising:

a plurality of electronic assemblies positioned in a stack, each electronic assembly having an interconnection aperture, each interconnection aperture having an inner contact surface at the periphery of the aperture, the interconnection apertures of each electronic assembly aligning with the interconnection apertures of all the other electronic assemblies positioned in the stack; and

an elongated twisted wire jumper extending within the aligned interconnection apertures of the stacked electronic assemblies, the jumper having a plurality of cage members positioned therealong, each cage member resiliently and conductively engaging the inner contact surface to electrically interconnect and mechanically couple the electronic assemblies together in the stack.

---

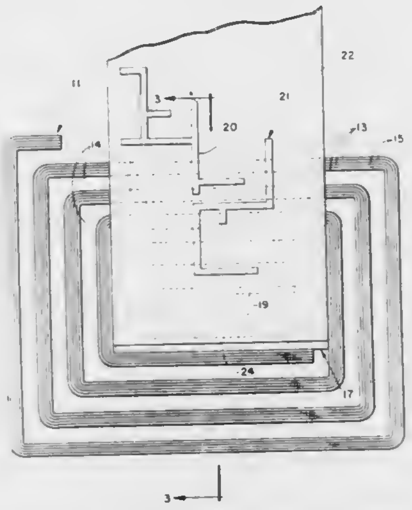
## 5,014,420
## FUSING TOGETHER METAL PARTICLES USING A HIGH-FREQUENCY ELECTROMAGNETIC FIELD

**Thomas A. Howard, Minneapolis, and Donovan E. McGee, Northfield, both of Minn., assignors to XPC, Incorporated, Burnsville, Minn.**

**Filed Jul. 11, 1989, Ser. No. 378,086**

**Int. Cl.$^5$ H05K** *3/02;* **B05B** *5/025*

**U.S. Cl. 29—846** **11 Claims**



1. A method for forming low resistivity particles into an electrical circuit, comprising the steps of:

generating an intense highly-concentrated high-frequency electromagnetic field and applying said field to the low resistivity particles layed out in an electrical circuit pattern for fusing the particles together.

11. Apparatus for use in fusing together miniature metal particles, comprising:

an electrical oscillator having a multiwinding air core coil for producing a high-intensity high-frequency electromagnetic field, said multiwinding coil comprising a thin sheet of electrically conductive metal wrapped around itself with each wrap insulated from the other wraps;

a slab of electrically conductive material substantially closing off one end of the core; said slab having a very narrow opening therethrough for concentrating the electromagnetic field passing through the core into a very narrow beam; and

means for applying said beam to a multitude of miniature metal particles to fuse together said particles.

---

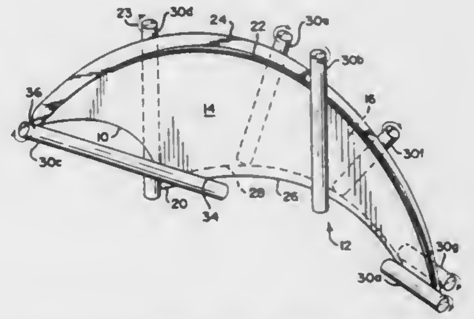
## 5,014,421
## CONTOURED BLADE EDGE CUTTING METHOD

**M. C. Swarden, Cambridge; W. Jansen, Weston, and John M. Griffith, Lexington, all of Mass., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Dec. 26, 1989, Ser. No. 457,225**

**Int. Cl.$^5$ B21K** *3/04*

**U.S. Cl. 29—889.7** **6 Claims**



1. A method of cutting a blade having a concave edge, first and second side faces, a tip profile and a root profile, each profile having a first and second profile side corresponding with the first and second side faces utilizing a single cutting apparatus with a substantially linear cutting contour, including the steps of:

positioning the cutting apparatus between the first root profile side and the first tip profile side;

following the tip profile and root profile with two axially separate cutter portions of the cutting apparatus along the first root and tip profile sides towards the concave edge to cut at least a portion of the first side face each cutter portion is displaceable along an axial length of the cutting apparatus as each cutter portion follows its respective root profile;

translating one of the cutter portions around to the second profile side before the other cutter portion is translated to the second profile side, causing the formation of the concave edge; and

following the tip and root profile with the cutting apparatus, along the second profile side, away from the concave edge to cut at least a portion of the second side face.

---

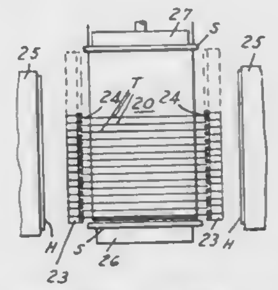
## 5,014,422
## METHOD AND APPARATUS FOR FORMING CORE ASSEMBLIES

**Bernard J. Wallis, 2215 Dacosta, Dearborn, Mich. 48128**

**Filed Jul. 2, 1990, Ser. No. 547,464**

**Int. Cl.$^5$ B21D** *53/02*

**U.S. Cl. 29—890.044** **9 Claims**



1. The method for forming core assemblies comprising

supporting a plurality of flattened tubes in horizontally spaced relationship, each of said tubes having opposed ends,

applying forces to the ends of the tubes to align the tubes,

interposing undulating fins between adjacent tubes,

providing a stop to hold along one end of said tubes any aligned ends of said tubes in alignment,
retracting the force on the opposite other ends of the tubes,
applying a compacting force to the array of tubes and undulating fins transversely of the tubes,
positioning a first header plate adjacent the other end of said tubes,
applying a force to said first header plate to force the other ends of the tubes through openings in said header plate,
deforming the ends of the tubes against the outer surface of the header plate to move any unaligned tubes into alignment with the remainder of the tubes against the stop,
retracting the stop,
maintaining the force on the first header plate,
positioning a second header plate adjacent the one ends of the said tubes,
applying a force on said second header plate to force the one ends of said tubes through openings in said second header plate,
applying a force to deform the other ends of the tubes onto said second header plate, and
removing the forceson said header plates.

4. The apparatus for forming core assemblies comprising
means for supporting a plurality of flattened tubes in horizontally spaced relationship such that undulating fins may be interposed between adjacent tubes, each of said tubes having opposed ends,
means providing a stop along one end of said tubes to hold any aligned ends in alignment,
means for applying a force to the opposite other ends of the tubes,
means for compacting the array of tubes and undulating fins transversely of the tubes,
means for forcing the other ends of the tubes through openings in a first header plate at one end,
means for deforming the other ends of the tubes against the outer surface of the first header plate to move any unaligned tubes into alignment with the remainder of the tubes against the stop,
means for retracting the stop,
means for forcing the one ends of the tubes through openings in a second header plate which maintains force on the first plate, and means for deforming the one ends of the tubes onto the second header plate.

---

### 5,014,423

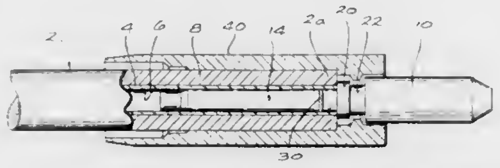
## METHOD FOR FORMING A SEALED COUPLING USING A HIGH PRESSURE HOSE FITTING WITH AN O-RING TYPE SEAL

**Chidambaram Raghavan, Renton, Wash., assignor to Flow Systems, Inc., Kent, Wash.**

**Filed Mar. 2, 1989, Ser. No. 318,631**

**Int. Cl.$^5$ B21D** *53/00*

**U.S. Cl. 29—890.144** **9 Claims**



1. A method for sealing a hose fitting to a high pressure hose of the type including an axially-extending, generally tubular non-metallic liner having an internal fluid-conducting passage, and a reinforcement layer generally circumventing the liner, the hose fitting being generally tubular in shape and including an axially-extending nipple portion adapted to be fit within one end of the hose,
the method comprising the steps of
placing a resilient annular member about the nipple portion in a circumferential groove formed therein;
placing an outer sleeve around the high pressure hose;
expanding the radial dimension of the passage via a generally reciprocal movement of a blanking tool having the same general shape as the nipple portion;
inserting the nipple portion and mounted annular member into the expanded passage of the liner;
compressing the outer sleeve radially inward about the hose and nipple portion with sufficient force to cause the liner material to flow into the groove and compress the resilient annular member therewithin.

---

### 5,014,424

## METHOD OF MAKING A CURVED PIPE

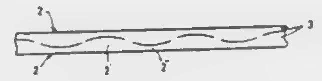
**Tamotsu Takasugi, Ibara, Japan, assignor to Kabushiki Kaisha Okada Seisakusho, Kabushiki Kaisha Duct Sangyo, Osaka and Fuji Kucho Kogyo Kabushiki Kaisha, Saitama, both of, Japan**

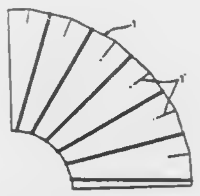
**Filed May 29, 1990, Ser. No. 530,172**

**Claims priority, application Japan, May 30, 1989, 1-137899**

**Int. Cl.$^5$ B21D** *53/00;* **B21C** *37/12*

U.S. Cl. 29—890.149 2 Claims





1. A method of making a curved pipe comprising:
providing a flat metal strip having one side edge extending in a straight line along the entire length of the strip such that the length of said one edge is equal to the length of the strip, and another side edge extending in an undulating line along the length of the strip so that a series of wide and narrow portions of the strip are defined between said edges in a direction transverse to the length of the strips and the wide and narrow portions are alternately disposed along the length of said strip,
securing said one side edge of the metal strip to and along said another side edge of the metal strip while juxtaposing said narrow portions so that said strip extends along a curved helical path to form a curved pipe.

---

### 5,014,425

## METHOD FOR MANUFACTURING A SPOKE WHEEL

**Cornelis C. Damman, Diemen, Netherlands, assignor to Holland Mechanics, B.V., Purmerend, Netherlands**

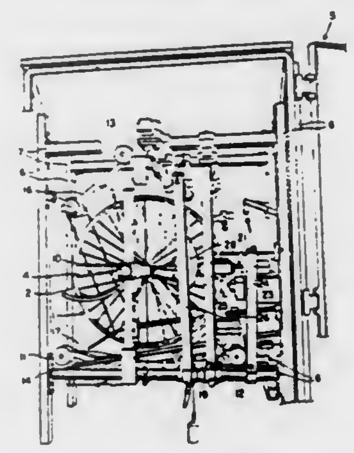
**Filed Sep. 19, 1989, Ser. No. 409,232**

**Claims priority, application Netherlands, Sep. 21, 1988, 8802341**

**Int. Cl.$^5$ B21F** *39/00*

**U.S. Cl. 29—894.333** **5 Claims**

1. A method of manufacturing a spoke wheel, having a coaxial hub and rim and a plurality of spokes interconnecting them, wherein premounted spokes, prior to finally tensioning them, are loaded under strain of tension by a substantial force and are subsequently unloaded again.



---

### 5,014,426

## BALANCING MACHINE SUPPORT AND METHOD

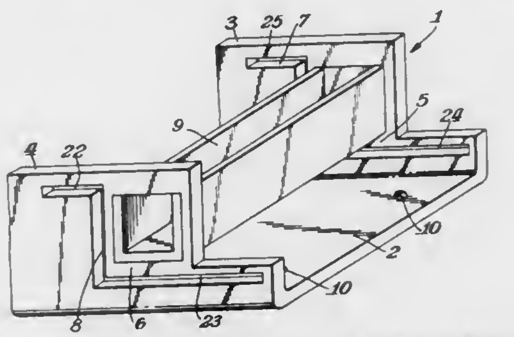
**Otfri-d Maus, Darmstadt, Fed. Rep. of Germany, assignor to Schenck Auto-Services-Gerate GmbH, Fed. Rep. of Germany**

**Filed Apr. 14, 1989, Ser. No. 337,911**

**Claims priority, application European Pat. Off., May 24, 1988, 88108247**

**Int. Cl.$^5$ B23P** *13/00*

**U.S. Cl. 29—897.3** **2 Claims**



1. A process of producing a support for a bearing shaft of a balancing machine comprising the steps of: taking a flat plate lying in a plane, forming two parallel sides that upwardly extend in the same direction from the plane of the flat plate, forming an angular slot in each of the two parallel sides, with the slots being mirror image duplicates of one another and defining a vibration-capable leg zone in each of the two parallel sides, each of the formed slots including at least a first portion parallel to the plane of the flat plate and a second portion at an angle thereto, and securing a support carrier having a U-shaped profile to and between the vibration-capable leg zones and parallel to the plane of the flat plate.

---

### 5,014,427

## DISPOSABLE SHAVER

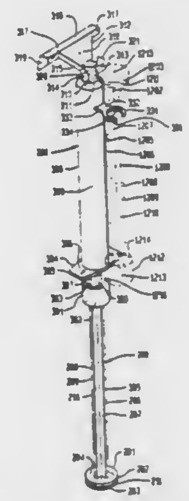
**James C. Byrne, 934 Stuyvesant Ave., Union, N.J. 08611**

**Filed Jan. 28, 1990, Ser. No. 486,254**

**Int. Cl.$^5$ B26B** *21/44*

**U.S. Cl. 30—41** **4 Claims**

1. A disposable shaver comprising:
a. a primary plunger structure and a handle-shaver head structure;
b. said handle-shaver head structure further comprising: a rotatable member including a flexible extension; a hollow handle member including pre-enclosed shaving gel and including a conduit; a primary plunger holder; and a shaver head including a rear conduit opening which is continuous with said hollow handle member conduit;
c. said primary plunger structure being initially in a pre-rotated position and being positionable in a post-rotated position, said primary plunger structure being rotatable about a transverse axis being defined by said rotatable member flexible extension such that said primary plunger structure is insertable within said hollow handle member;
d. said handle-shaver head structure further comprising a secondary plunger;
e. said secondary plunger being fully retracted within said hollow handle member when in the pre-packaged position and being fully inserted within said hollow handle member after full discharge of said pre-enclosed shaving gel;
f. said secondary plunger being fully inserted within said hollow handle member when said primary plunger is fully inserted within said hollow handle member and wherein said secondary plunger being fully retracted within said hollow handle member when said primary plunger is outside said hollow handle member; and
g. said primary plunger structure being pre-packaged external to said handle-shaver head structure and said secondary plunger structure being pre-packaged in the fully retracted position within said hollow handle member.



---

### 5,014,428

## ROTARY TYPE ELECTRIC RAZOR

**Yasuo Yamashita, Iizuka, Japan, assignor to Kyushu Hitachi Maxell, Ltd., Fukuoka, Japan**

**Filed Mar. 5, 1990, Ser. No. 487,839**

**Claims priority, application Japan, Mar. 6, 1989, 1-54240; Jan. 30, 1990, 2-21152**

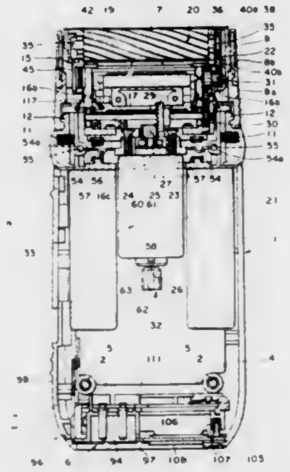
**Int. Cl.$^5$ B26B** *19/14, 19/20, 29/16*

**U.S. Cl. 30—43.6** **21 Claims**

1. A rotary type electric razor comprising:
a main body case;
an arch-shaped external cutting edge mounted to an upper portion of said main body case;
an internal operation unit mounted for vertical movement within said main body case;
said internal operation unit comprising an internal cutting edge unit, an internal cutting edge support frame, a motor, a transmission operatively connected to said motor, and a floating support means for mounting said internal cutting edge unit, said internal cutting edge support frame, and said motor for vertical movement together within said main body case;
said internal cutting edge unit comprising a cylindrical rotary internal cutting edge adapted to rotate in sliding

OL
126
SS
2
MY
14
991
JMI

contact with an internal face of said external cutting edge, and a shaft rotatably mounting said internal cutting edge to said internal cutting edge support frame; and

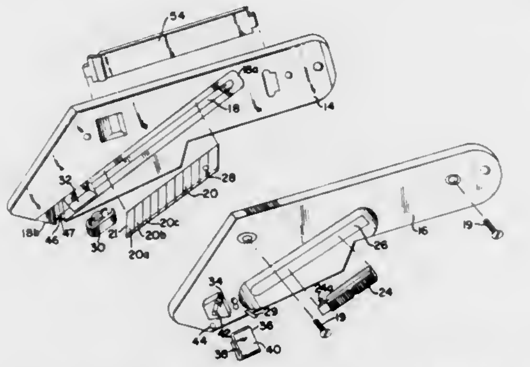


said transmission comprising transmitting means for transmitting drive from said motor to said internal cutting edge.

---

### 5,014,429
### MECHANISM FOR DETACHING BLADE SEGMENTS FROM A SEGMENTED KNIFE BLADE

**William J. McNamara, R.R. 3, Box 426A Pine Bank Rd., Flemington, N.J. 08822**
**Filed Feb. 23, 1990, Ser. No. 483,925**
**Int. Cl.⁵ B26B** *3/08, 1/00, 1/08*
**U.S. Cl. 30—162** **27 Claims**

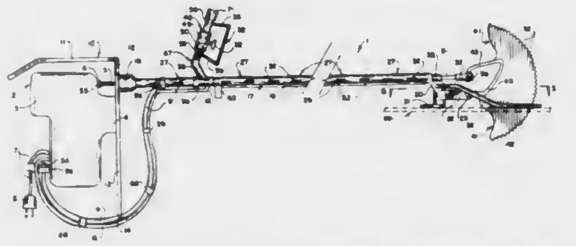


1. A mechanism for detaching blade segments along segmentation lines from a segmented knife blade contained within a housing comprising,
- means in said housing for supporting one longitudinal face of said knife blade, said support means having an edge disposed for substantial alignment with said segmentation lines of said knife blade,
- means for adjusting said knife blade so that at least one blade segment extends adjacent an unsupported region beyond said edge of said support means, and
- plunger means slidably disposed in said housing opposite said unsupported region to impart a lateral force upon said at least one extended blade segment to detach said at least one extended blade segment from said knife blade.

---

### 5,014,430
### PLYWOOD SAW

**Charles D. Wortham, Rt. 1 Box 428, Shongaloo, La. 71072**
**Filed Sep. 21, 1989, Ser. No. 410,276**
**Int. Cl.⁵ B23D** *45/00*
**U.S. Cl. 30—166.3** **16 Claims**

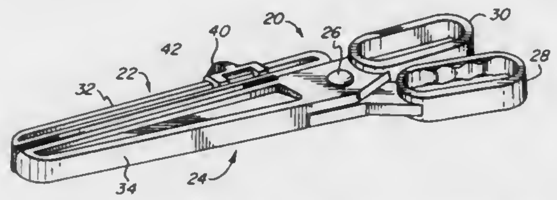


1. A saw for cutting wood sheeting comprising a jigsaw having a reciprocating element, an electric motor connected in reciprocating relationship to said reciprocating element, an elongated barrel having one end attached to said jigsaw and an opening provided in the opposite end of said barrel, a drive rod slidably disposed in said barrel, with one end of said drive rod carried by said reciprocating element and the opposite end of said drive rod projecting through said opening blade means pivotally carried by said opposite end of said drive rod and said opposite end of said barrel, first arm means carried by said barrel and an operating switch provided on said first arm means, said operating switch electrically connected to said electric motor for energizing said electric motor and operating said jigsaw and said blade means and second arm means carried by said barrel and a kill switch provided on said second arm means, said kill switch electrically connected to said electric motor for terminating operation of said electric motor and operation of said jigsaw and blade means, whereby reciprocation of said reciprocating element and said drive rod responsive to operation of said jigsaw causes rocking or oscillation of said blade means in an arc for cutting the wood sheeting.

---

### 5,014,431
### TOOL FOR HANDLING DISPOSABLE FOOD CONTAINING BAGS

**Arnim B. Jebe, 67 Blue Spruce Cir., Weston, Conn. 06883; Frank D. Flagg, Westport, Conn.; Harold W. Danser, III, New Canaan, Conn.; William Kobernus, New Milford, Conn., and George Schick, Easton, Conn., assignors to Arnim B. Jebe, Weston, Conn.**
**Filed Jul. 24, 1989, Ser. No. 384,311**
**Int. Cl.⁵ B25F** *3/00;* **B26B** *13/00;* **D06M** *11/26*
**U.S. Cl. 30—124** **6 Claims**

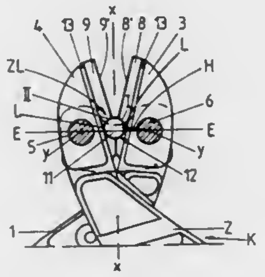


1. A tool for handling disposable food containing bags in which the food is cooked, comprising:
- first and second bag-gripping elements that are connected to each other at a pivot so as to form a manually-controllable hot bag handler, said elements having elongate tongs and having handles for opening and closing of the elongate tongs, said tongs having bag-gripping edges that face each other to hold a bag between them when the handles are moved towards a closed bag-gripping position, a bag cutter mounted on and operative along the bag-gripping edges so as to be able to sever a bag into separate portions, with one bag portion being held by first parts of bag-gripping edges that are to one side of the bag cutter and another bag portion being held by second parts of bag gripping edges edges that are on the other side of the bag cutter;
- wherein the bag-gripping edges, when the handles are moved to a closed position, frictionally engage the bag so as to hold it while enabling a sliding removal of one bag portion that has been severed by the cutter from the bag while the other bag portion remains to be held by one of said parts of bag-gripping edges;
- wherein the bag-gripping edges are further provided with elongate slots that are juxtaposed in alignment with each other when the tongs are moved to a bag-gripping position, said bag cutter being slidably mounted relative to said tongs and extending through one of said slots into the other slot to cut a bag held between the bag gripping edges; and wherein the cutter is slidably mounted to one of said tongs so as to operatively move from a home position along the elongate tone; and means pivotly affixed to said bag-gripping members at said pivot for preventing the first and second bag gripping members from being moved to an open position when the cutter is not at its home position.

---

### 5,014,432
### CENTER-CUTTERS

**Ralf Putsch, and Karl Putsch, both of Wuppertall, Fed. Rep. of Germany, assignors to Knipex-Werk C. Gustav Putsch, Wuppertal, Fed. Rep. of Germany**
**Filed Feb. 21, 1989, Ser. No. 314,475**
**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1988, 8803016[U]**
**Int. Cl.⁵ B26B** *12/00*
**U.S. Cl. 30—191** **10 Claims**



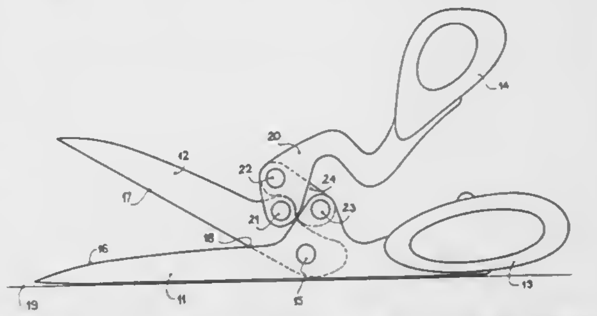
1. A center-cutters comprising
- two arm shaving at one of their ends two cutting jaws respectively mounted swingably around respective bearing pins of a mounting,
- said mounting being formed of straps behind a cutting-jaw region connecting the cutting jaws by said bearing pins and of a tooth-space engagement means fastening the two cutting jaws to each other,
- said arms cross over freely without joint pin, and
- said cutting jaws have cutting edges, said cutting edges of said cutting jaws extend up to an outer surface of the tooth-space engagement means, the latter comprising a cylindrical member extendign transversely to the cutting edges.

---

### 5,014,433
### SCISSORS FOR HOUSEHOLD AND MEDICAL USES

**Slobodan Tepic, Davos, Switzerland, assignor to Laboratorium für experimentelle Chirurgie, Davos, Switzerland**
**Filed Mar. 8, 1990, Ser. No. 490,346**
**Int. Cl.⁵ B26B** *3/26, 13/28, 13/06, 13/12*
**U.S. Cl. 30—248** **2 Claims**

1. Scissors for household and medical use comprising
upper and lower blades defining a distal region,
upper and lower handles defining a proximal region,
- said lower blade and lower handle being one piece, and
- said upper blade and upper handle being two separate pieces;
- means pivotally connecting said upper blade to said lower blade at a first pivot location;
- means pivotally connecting said upper blade to said upper handle at a second pivot location; and

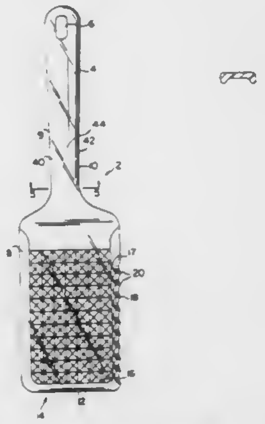


- a link bar pivotally connected to said upper handle and to said lower handle at third and fourth pivot locations, respectively, thereby forming a four-bar linkage movably linking said upper blade to said lower blade such that said upper blade is movable by said upper handle while leaving said one-piece lower blade and handle stationary.

---

### 5,014,434
### KITCHEN TOOL

**Robert Skerker, Buffalo, N.Y., and William Prindle, Santa Barbara, Calif., assignors to Robinson Knife Manufacturing Co., Inc., Springville, N.Y.**
**Continuation of Ser. No. 286,325, Dec. 19, 1988, Pat. No. 4,937,942. This application Jan. 2, 1990, Ser. No. 437,696**
**The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.**
**Int. Cl.⁵ A47J** *43/28*
**U.S. Cl. 30—345** **8 Claims**



1. A kitchen tool comprising a handle, a work end, a section connecting the handle and work end, wherein said handle work end and connecting section are integrally formed in a single piece consisting essentially of a polyetherimide.

---

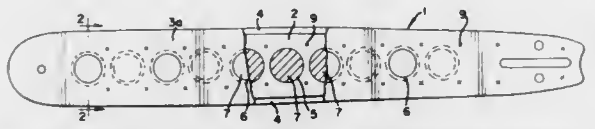
### 5,014,435
### CHAIN SAW GUIDE BAR

**Yozo Date, and Toshihiro Tsumura, both of Miki, Japan, assignors to Suehiro Seiko Kabushiki Kaisha, Miki, Japan**
**Filed Jul. 23, 1990, Ser. No. 556,612**
**Int. Cl.⁵ B27B** *17/02*
**U.S. Cl. 30—387** **6 Claims**

1. A chain saw guide bar comprising an inner plate having

OL
126
SS
2
MY
14
991
UMI

inner holes formed therethrough, outer plates sandwiching said inner plate and having outer holes formed therethrough,



said outer holes being smaller than said inner holes in the inner plate, each of said outer holes being aligned with one of said inner holes, and a lightweight material filling said holes.

---

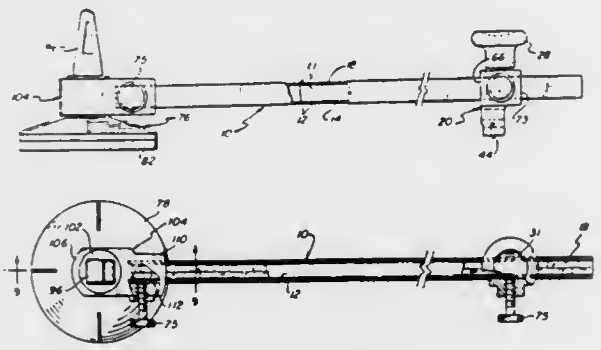
### 5,014,436
## CIRCLE CUTTING SYSTEM

**Vincent T. Kozyrski, and Claude R. Millett, both of Plainville, Conn., assignors to The Fletcher-Terry Company, Farmington, Conn.**

**Continuation-in-part of Ser. No. 231,728, Aug. 12, 1988, Pat. No. 4,916,820. This application Feb. 8, 1990, Ser. No. 476,630**

**Int. Cl.$^5$ B26D *3/08;* C03B *33/10***

**U.S. Cl. 33—27.03** **7 Claims**



1. A mechanical system for cutting circles from glass and the like, comprising:

a rigid, elongated, rectilinear rule having a scale with distance-indicating indicia thereon;

a reversible cutting head, including a body with a laterally extending passageway having opposite ends and configured to receive said rule, inserted longitudinally into said passageway, for slidably mounting said head on said rule, and means for disengageably securing said head on said rule at selected positions therealong, said body having registry elements thereon lying in lateral planes at said opposite ends of said passageway and adapted for readably registry with said indicia of said rule scale, said body also having a first and second cutting component-mounting means, each adapted for disengageably mounting a cutting component thereon, said first mounting means being adapted to mount a cutting component to act in a first plane of said body, said first plane lying nonsymmetrically between said lateral planes and being laterally spaced by a certain distance from one of said registry elements, said second mounting means being adapted to mount a cutting component to act in a second plane of said body, said second plane lying nonsymmetrically between said lateral plane and being laterally spaced by said certain distance from the other of said registry elements; and

a pivot base assembly, including a base adapted to provide stationary support for said system, and a coupling fixture rotatably mounted on said base and having means for disengageably securing an end portion of said rule for radial extension therefrom, whereby a cutting element, mounted to act in either said first plane or said second plane of said cutting head body, can be disposed in any selected plane, transverse to the longitudinal axis of said rule, by registry of said one or said other registry element of said cutting head body with a selected indicium of said scale.

---

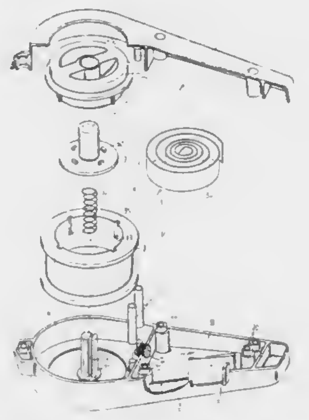
### 5,014,437
## STRUCTURE OF AN INK CUP

**Fu-Cheng Sun, No. 126, Pao Chung Road, Hsin Tien, Taipei Hsien, Taiwan**

**Filed Feb. 14, 1990, Ser. No. 480,150**

**Int. Cl.$^5$ B44D *3/38***

**U.S. Cl. 33—414** **2 Claims**



1. An ink cup for a striking line comprising:

(a) upper and lower cover bodies having partitions such that, when the cover bodies are attached together they define separate winding wheel, ink suction object and staining chambers;

(b) attaching means to attach the upper and lower cover bodies together;

(c) a thread winding wheel rotatably located in the winding wheel chamber, the thread winding wheel having a handle exteriorly of one of the upper and lower cover bodies to permit manual rotation of the thread winding wheel;

(d) a striking line thread wound on the thread winding wheel and extending through the ink suction object chamber and the staining chamber to the exterior of the cover bodies;

(e) an elongated fixed shaft extending into the winding wheel chamber from one of the upper and lower cover bodies so as to rotatably locate the thread winding wheel in the winding wheel chamber;

(f) a pressing disk member having a disk portion located within the winding wheel and a rod portion extending through the winding wheel handle to the exterior of the cover bodies; and

(g) spring biasing means acting on the pressing disk member to urge the disk portion into contact with the handle and to urge the handle into contact with one of the cover bodies.

---

### 5,014,438
## LAYOUT RULER

**Jean-Pierre Gravel, 607 Jean Avenue, Pembroke, Ontario, Canada K8A 5H7**

**Continuation of Ser. No. 360,222, Jun. 1, 1989, abandoned. This application May 22, 1990, Ser. No. 527,143**

**Claims priority, application Canada, Feb. 3, 1989, 591045**

**Int. Cl.$^5$ B43L *7/00***

**U.S. Cl. 33—494** **10 Claims**

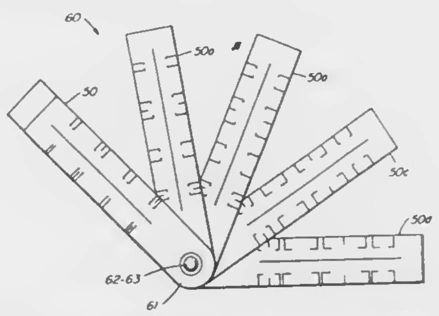
1. A layout ruler to perform flat layout patterns directly on sheet metal stock, and to mark the total length, or the shear cut size of the sheet metal stock and to mark the sight line for bending on the sheet metal stock comprising:

(a) a body member bearing a scale component along its central longitudinal axis; and

(b) a scale blade component provided with a plurality of spaced-apart transverse lines extending from at least one side edge of said body member, said scale blade component bearing:

(i) one pair of spaced-apart lines representative of the inside bend radius (R);

(ii) at least one pair of spaced-apart lines representative of the set back (SB);



(iii) one pair of spaced-apart lines representative of the bend allowance (BA); and

(iv) at least one pair of spaced-apart lines representative of the material deduction (MD);

whereby, upon use of said layout ruler, the total length or the shear cut size of the sheet metal stock can be determined, and the sight line or lines can be marked directly thereon.

---

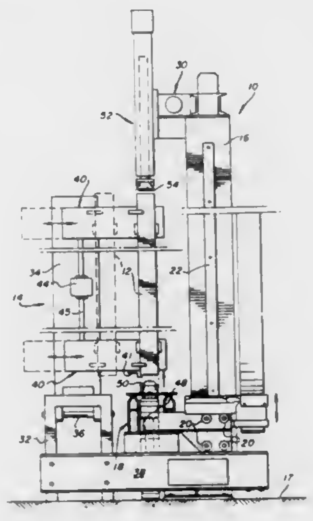
### 5,014,439
## QUALITY ASSURANCE APPARATUS FOR DIMENSIONALLY INSPECTING ELONGATED COMPONENTS

**Donald F. Butzin, Wilmington, N.C.; George W. Tunnell, Foster City, Calif.; Harold B. King, Jr., Wrightsville Beach, and Frederick C. Schoenig, Jr., Wilmington, both of N.C., assignors to General Electric Company, San Jose, Calif.**

**Filed Feb. 9, 1990, Ser. No. 477,372**

**Int. Cl.$^5$ G01B *5/04***

**U.S. Cl. 33—533** **10 Claims**



1. Apparatus for measuring the dimensional characteristics of an elongated component, said apparatus comprising in combination:

A. a column;

B. an upper centering member affixed in a reference position relative to said column;

C. a lower centering member affixed in a reference position vertically aligned with said upper centering member;

D. a measurement carriage supporting at least one dimension sensor and mounted by said column for vertical scanning movement between said upper and lower centering members; and

E. upender means for accepting the component in a substantially horizontal loading orientation, said upender means operating to manipulate the component into a upright measurement position where it is maintained by subsequent engagements of said upper and lower centering members with the upper and lower end portions, respectively, thereof, whereby, upon scanning movement of said measurement carriage along the length of the component, the dimensional characteristics of the component are obtained by said sensor.

---

### 5,014,440
## DEVICE AND METHOD FOR MEASURING THE DEFORMATIONS OF A SAMPLE

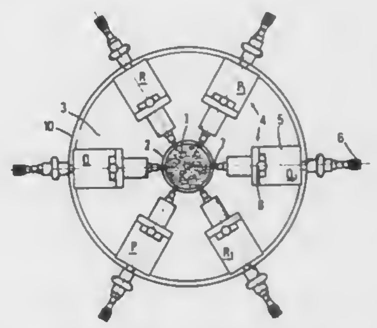
**Jacques Lessi, Maule; Philippe Perreau; Daniel Bary, both of Rueil Malmaison, and Guy Grard, Argenteuil, all of France, assignors to Institut Francais dn Petrole, Rueil Malmaison, France**

**Filed Jun. 29, 1988, Ser. No. 213,139**

**Claims priority, application France, Jun. 30, 1987, 8709265**

**Int. Cl.$^5$ G01B *5/02, 5/30, 3/00***

**U.S. Cl. 33—557** **17 Claims**



1. A device for measuring deformations of a sample, said deformations resulting from a relaxation of stresses to which the sample was subjected prior to a measurement, the sample having an axis corresponding to a main deformation direction, the device comprising at least five displacement sensor means for sensing a movement of the sample, and means for mounting the displacement sensor means so as to have a measurement direction, and wherein the measurement directions of said at least five displacement sensor means are substantially perpendicular to said axis of the sample.

8. A method of measuring deformations and movements of a sample, said deformations resulting from a relaxation of stresses to which the sample was subjected prior to a measurement, and the sample having an axis corresponding to a main deformation direction, the method comprising the steps of providing a measurement device with respect to which the movements of the sample are to be measured, and measuring displacements of a surface of the sample along at least five directions substantially perpendicular to said axis, said displacements of the surface resulting from said deformations and said movements.

---

### 5,014,441
## ANGLE MEASURING APPARATUS

**Jerry D. Pratt, 9333 Loma Vista Dr., Dallas, Tex. 75243**

**Filed Mar. 15, 1990, Ser. No. 493,656**

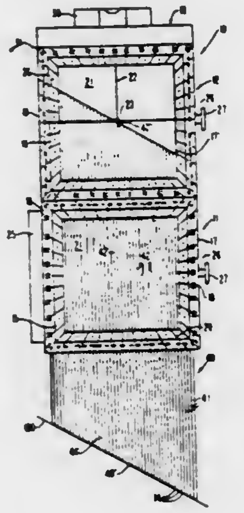
**Int. Cl.$^5$ G01B *5/20***

**U.S. Cl. 33—561.1** **11 Claims**

1. An angle measuring apparatus for determining the angular orientation of the external, surfaces of an article relative to a known reference plane including a horizontal reference plane and a vertical reference plane wherein the apparatus comprises:

VOL
1126
ISS
2
MY
14
1991
UMI

a first housing unit including a first hollow rectangular housing member having at least one enlarged opening wherein the portion of the said first housing member surrounding the enlarged opening is imprinted with indicia representative of an angular orientation relative to a first reference plane;



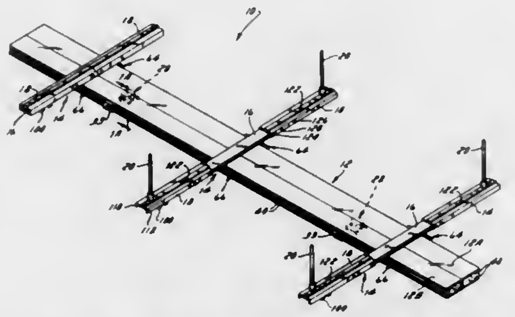
a plurality of profile conforming units including a stack of elongated strips slideably disposed within said first housing unit wherein each of the strips are slideable relative to one another and provided with discrete markings disposed at their midpoints.

---

### 5,014,442
### UNIVERSAL MEASURING SYSTEM

**Pierre N. LeGrand, Soumagne, Belgium; James G. Ballard, Waukesha, Wis.; Reinald D. Liegel, Waukesha, Wis., and Craig A. Wisner, Wauwatosa, Wis., assignors to Hein-Werner Corporation, Waukesha, Wis.**

**Filed Feb. 7, 1990, Ser. No. 476,964**
**Int. Cl.⁵ G01D *21/00;* G01B *5/20***
**U.S. Cl. 33—608** **31 Claims**



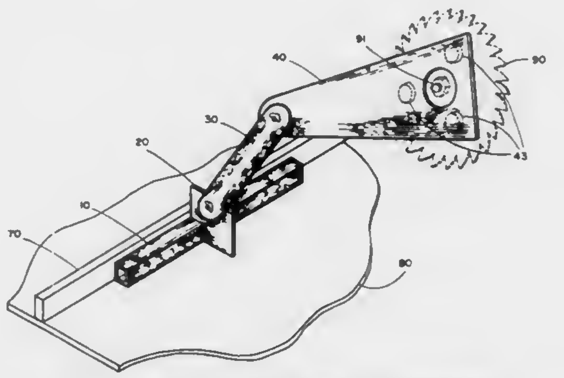
1. A universal measuring bridge for determining the misalignment of datum points on a damaged vehicle, said bridge comprising:
  a main beam,
  a slide arm, and
  means for supporting said slide arm for longitudinal movement with respect to said main beam, said slide arm supporting means including a fixed guide mounted on said slide arm, a movable guide mounted on said slide arm in a parallel spaced relation to said fixed guide and means for selectively moving said movable guide toward said fixed guide to clamp said slide arm onto the main beam.

---

### 5,014,443
### RADIAL ARM SAW ALIGNMENT DEVICE

**Richard T. Gibbens, III, 100 Palmetto St., Schriever, La.**

**Filed May 16, 1990, Ser. No. 524,649**
**Int. Cl.⁵ B27G *23/00;* G01B *5/25***
**U.S. Cl. 33—640** **3 Claims**



1. A radial arm saw alignment device comprising;
an elongated base member for engaging a fence slot or rip fence of a radial arm saw table, and
means for pivotally coupling the motor/blade assembly of a radial arm saw to said elongated base member in a plane perpendicular to both the longitudinal axis of said elongated base member and the rotational axis of the motor/-blade assembly of a radial arm saw, wherein said pivotally coupling means includes;
  a plurality of plates,
  securing means for pivotally joining said plates together in parallel planes,
  securing means for perpendicularly connecting one of said plates to said elongated base member, and
  securing means for attaching one of said plates to a radial arm saw blade, whereby said plate and the radial arm saw blade lie in parallel planes,
whereby the proper alignment of a radial arm saw is achieved by the transfer of the perpendicular and parallel relationships of the alignment device to a radial arm saw throughout the traversal of the motor/blade assembly along the radial arm.

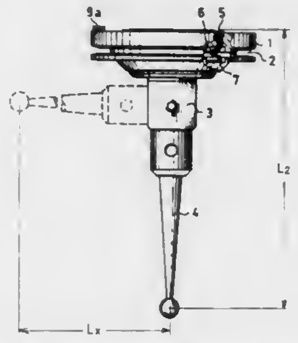
---

### 5,014,444
### PROBING DEVICE FOR A COORDINATE MEASURING APPARATUS

**Karl-Hermann Breyer, Heidenheim, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany**

**Filed Nov. 3, 1989, Ser. No. 431,570**
**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1988, 8813875[U]**
**Int. Cl.⁵ G01B *21/04***
**U.S. Cl. 33—702** **10 Claims**

10. A probing device for a coordinate measuring apparatus, the probing device comprising:
  said probing device being made of a given material;
  interface means fixed to said probing device for exchangeably mounting said probing device to said coordinate measuring apparatus;
  a temperature sensor having connecting terminals and being mounted in said probing device so as to be in thermal contact with said material of which said probing device is made for measuring the temperature of said material; and,
electrical contacts connected to said connecting terminals of said temperature sensor and mounted on said interface means for transmitting an electrical signal representing the



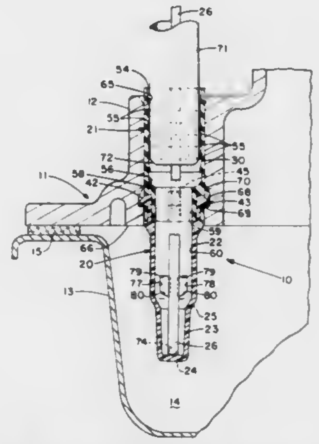
temperature of said probing device to said measuring apparatus.

---

### 5,014,445
### TRANSMISSION FLUID FILL REGULATOR AND SEAL ASSEMBLY

**David R. Martell, Manchester, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 13, 1990, Ser. No. 538,051**
**Int. Cl.⁵ G01F *23/04***
**U.S. Cl. 33—731** **18 Claims**



1. A fluid fill regulator and seal assembly, positionable within a bore provided in a case comprising: a semi-rigid regulator member having a cylindrical body closed at one end and opened at the other end; a flexible sealing member formed about said opened end of said regulator member and having an inner contour adapted to receive one end of a fluid filler tube; and teeth means, provided by said regulator member and extending radially from said sealing member to engage the bore in the case and prohibit axial movement of said assembly within said bore.

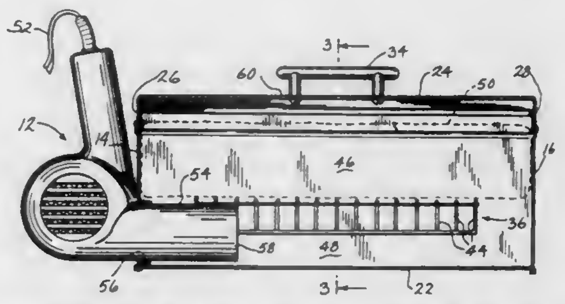
---

### 5,014,446
### APPARATUS FOR HEATING AN ARTICLE

**Russell B. Reesman, 561 Briody St., Burlington, Wis. 53105**

**Filed Mar. 5, 1990, Ser. No. 488,891**
**Int. Cl.⁵ F26B *9/06***
**U.S. Cl. 34—151** **6 Claims**

1. A device for heating an article, comprising:
an enclosure defined by a plurality of spaced walls;
access means associated with said enclosure for providing access to the interior thereof;
rack means extending between said spaced walls of said enclosure onto which said article is placeable, said rack means dividing at least a portion of said enclosure into an upper volume and a lower volume, said rack means being constructed so as to provide free communication between the upper and lower volumes of said enclosure when said article is not placed onto said rack means;
a nozzle extending into the lower volume of said enclosure for introducing under positive pressure heated air into the lower volume of said enclosure, wherein the end of said nozzle is disposed below said rack means for discharging heated air into the lower volume of said enclosure; and



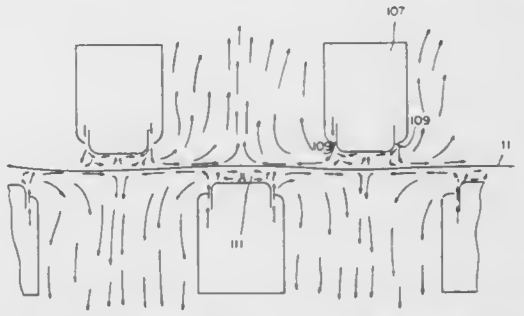
vent means associated with the upper volume of said enclosure for venting air therefrom;
wherein, when said article is placed onto said rack means, the free communication between the upper and lower volumes of said enclosure is cut off by said article so as to expose said article to heated air provided by said nozzle within the lower volume of said enclosure to heat said article.

---

### 5,014,447
### POSITIVE PRESSURE WEB FLOATER DRYER WITH PARALLEL FLOW

**Kenneth G. Hagen, Cape Elizabeth, Me., assignor to Thermo Electron Web Systems, Inc., Auburn, Mass.**

**Filed Feb. 10, 1988, Ser. No. 154,289**
**Int. Cl.⁵ F26B *13/00***
**U.S. Cl. 34—156** **2 Claims**



1. A dryer assembly for drying a moving flexible continuous web of material, said assembly including a plurality of nozzles, each of said nozzles comprising:
  (a) an elongated plenum chamber defined by a base plate, upstream and downstream vertical parallel side plates, and end closure plates,
  (b) a flat pressure plate adapted to form a gas flow zone with a moving web,
  (c) a primary jet of the airfoil Coanda type disposed at the upstream of the pressure plate continuously directing gas downstream along the face of the plate,
  (d) a single secondary jet of the impingement type disposed at the generally right angled downstream terminus of the pressure plate to continuously direct gas initially substantially perpendicularly to the web and to gas flowing downstream along the gas flow zone, wherein the preferred range of distance between nozzles has been found to be a continuum defined by the following points:
  (i) 75-125 mm where the length of the base plate is 50 mm;

VOL
1126
ISS
2
MY
14
1991
UMI

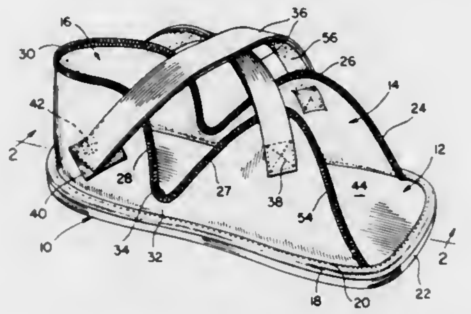
(ii) 125–200 mm where the length of the base plate is 75 mm;
(iii) 175–275 mm where the length of the base plate is 100 mm;
(iv) 225–325 mm where the length of the base plate is 125 mm;
(v) 275–350 mm where the length of the base plate is 150 mm;
(vi) 325–375 mm where the length of the base plate is 175 mm;
(vii) 375–400 mm where the length of the base plate is 200 mm or;
(viii) 425 mm where the length of the base plate is 225 mm, said nozzlės forming rows above and below and parallel to the web, wherein each nozzle on the upper row is between two nozzles on the bottom row of the web, with no more than 12.5 mm overlap.

---

### 5,014,448

### POST-SURGICAL SLIPPER

**Michael A. Perrone, 4103 Hillsboro Cir., Nashville, Tenn. 37215**
**Filed Oct. 24, 1989, Ser. No. 425,964**
**Int. Cl.⁵ A43B *11/00, 3/12***
**U.S. Cl. 36—110** **3 Claims**



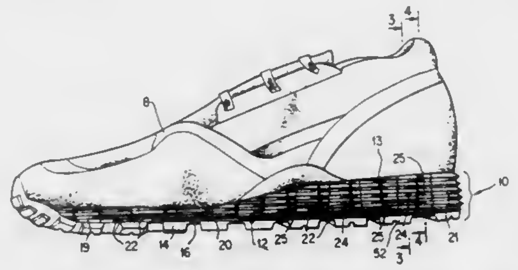
1. A post-surgical slipper comprising a sole constructed with sufficient flexibility to enable the sole to flex with the foot when walking normally, said sole having a constant thickness and constant flexibility characteristics throughout its length, said sole being open at the forward end and provided with flexible side edge flaps extending upwardly therefrom, said sole and flaps being symmetrically arranged in relation to a longitudinal axis to enable the slipper to be worn on either foot, said flaps having forward ends terminating adjacent to the forward end of the sole, the width and length of the sole and the position of the flaps enabling a bandaged foot to be supported without the bandaged foot extending beyond the periphery of the sole and means securing the flaps in overlying relation to the mid-tarsal area of the forefoot with the toes exposed, a heel counter of flexible construction extending upwardly from the heel portion of the sole, said heel counter being of unitary construction with the flaps, a juncture area between said side edge flaps and side portions of the heel counter, each juncture area being defined by a generally V-shaped recess extending to a point adjacent to but spaced above central side edge portions of the sole, each recess including downwardly curved convex edges on a forward edge of the heel counter and a rearward edge of the side edge flap, said convex edges diverging upwardly from a bottom apex of the recess, the bottom apex of the recess being spaced above the sole a distance substantially less than one half the height of the heel counter and flaps.

---

### 5,014,449

### SHOE SOLE CONSTRUCTION

**Daniel Richard, West Linn; Kenneth Kolman, Beaverton; Charles Case, Beaverton; Ronald Becker, Stayton, all of Oreg., and Alex Gross, Aspen, Colo., assignors to Avia Group International, Inc., Portland, Oreg.**
**Filed Sep. 22, 1989, Ser. No. 411,044**
**Int. Cl.⁵ A43B *13/18, 21/26***
**U.S. Cl. 36—114** **10 Claims**



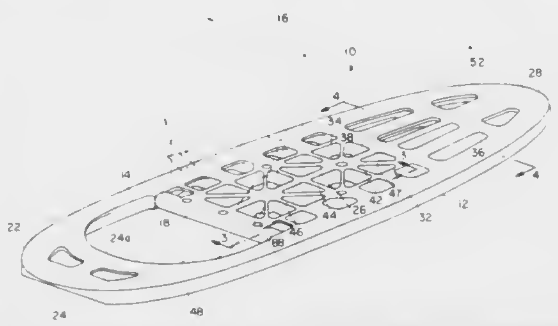
1. A shoe sole construction comprising
an intermediate layer for supporting the forces generated by a wearer, said intermediate layer including a hollow outer shell defined by a top surface and a bottom surface connected by an outer periphery; and
a plurality of convolutions arranged horizontally along a substantial portion of said outer periphery of said intermediate layer extending from said top surface to said bottom surface in independent vertical columns along said outer periphery of said intermediate layer with a recess formed between adjacent columns, whereby said convolution compress in an accordion-like fashion when force is applied thereto.

---

### 5,014,450

### SNOWSHOE

**James J. McGrath, P.O. Box 362, Great River, N.Y. 11739**
**Filed Aug. 21, 1989, Ser. No. 396,084**
**Int. Cl.⁵ A43B *5/04;* A63C *1/02***
**U.S. Cl. 36—124** **1 Claim**



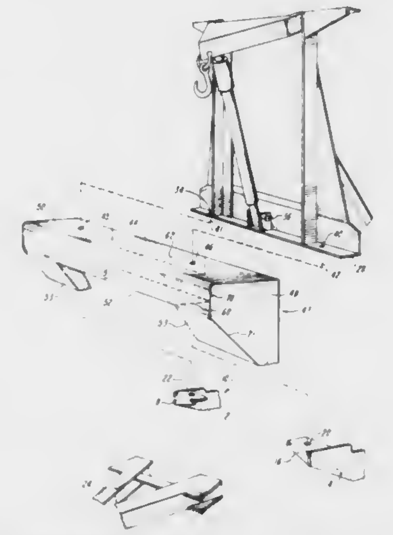
1. A snowshoe for use with a boot having a toe portion comprising a platform of single piece, rigid construction having a binding mounted thereon,
a. said platform comprising (i) a laterally extending main brace of circular cross section in outer regions and a circular forwardly facing section in a central region and forming the rear edge of a forward opening in said platform to accomodate the toe portion of said boot in said binding; (ii) a central rib extending rearwardly from said main brace to the rear of said platform along a central axis of said platform; and (iii) a plurality of intermediate, spaced laterally extending ribs located to the rear of said main brace, said laterally extending ribs being rectangular with a lip forming a L-shaped in cross section;
b. said binding having means pivoted on said main brace to support said boot to permit the toe of said boot to pass into said opening; and
c. said binding being constructed completely of a flexible material having an extended portion wrapped around said main brace, bolt means for attaching said extended portion to said main brace, side walls extending up to enclose a portion of said boot for supporting the latter, said binding including strap means joining a pair of lateral ribs in said platform passing over the instep of said boot to prevent the shin of the wearer from being impacted by the toe of said snowshoe.

---

### 5,014,451

### TRUCK MOUNTED SNOW PLOW SUPPORT CAP

**John H. Bandzul, 287 Oak St., Clinton, Mass. 02110**
**Continuation-in-part of Ser. No. 369,027, Jun. 20, 1989, abandoned. This application Apr. 17, 1990, Ser. No. 510,089**
**Int. Cl.⁵ E01H *5/04***
**U.S. Cl. 37—231** **12 Claims**



1. The combination comprising:
a motor vehicle having an end and a pair of plow support members extending outwardly from said end and terminating in respective spaced and aligned first ends thereof, said spaced and aligned first ends each having a portion including means for cooperating with means for securing said respective plow support members to a plow;
a hollow horizontally extending cap enclosing said spaced and aligned first ends, said hollow horizontally extending cap being spaced outwardly from said end; and
means for securing said hollow horizontally extending cap to said spaced and aligned first ends.

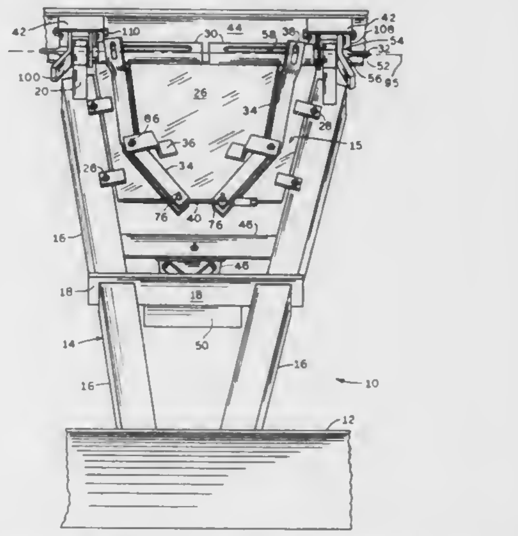
---

### 5,014,452

### PLOW MOUNTING APPARATUS

**Ray A. Berghefer, 435 Hecla St., Laurium, Mich. 49913**
**Filed Feb. 21, 1989, Ser. No. 313,027**
**Int. Cl.⁵ E01H *5/04***
**U.S. Cl. 37—235** **13 Claims**

1. Plow attaching apparatus, comprising:
(a) a base;
(b) first and second operating arms each having first and second ends;
(c) first and second pins mounted for axial movement to be extendable away from each other and to retract toward each other;
(d) connecting means connecting said operating arms to said pins;
(e) mounting means mounting said operating arms to said base for pivotal movement about said mounting means; and
(f) moving means connected to said operating arms, and adapted to move said ends of said operating arms (i) toward each other and (ii) away from each other thereby to extend and retract said pins through said connecting means,



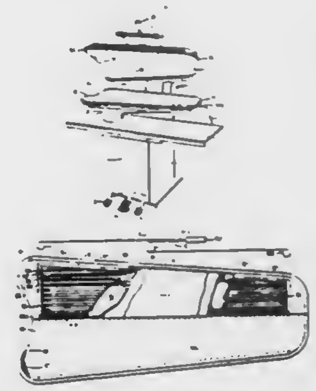
said connecting means including means between said pins and said arms for permitting sliding motion between said pins and said arms during movement of said arms.

---

### 5,014,453

### STEAM PRESS DRAWING AMBIENT AIR IN HEAT EXCHANGE WITH STEAM THROUGH A WORKPIECE AND HAVING TWO PRESSING POSITIONS AND HAVING MOVABLE SPLIT HEAD AND BACK PORTIONS

**Jack M. Gratsch, 6720 Britton, Cincinnati, Ohio 45227**
**Filed Oct. 23, 1989, Ser. No. 425,534**
**Int. Cl.⁵ D06F *71/00, 71/34, 71/12***
**U.S. Cl. 38—36** **20 Claims**



1. A head and buck for a fabric pressing machine, said head being shiftable between an open position spaced from said buck and either of a closed position against said buck exerting zero pressure thereagainst or a closed position against said buck exerting high pressure thereagainst, said head comprising at least one hollow casting divided internally into an upper steam chamber and a lower spray chamber, said head having a lower surface with a plurality of perforations therethrough leading from said head spray chamber, a normally closed steam valve mounted in said head and connecting said head steam chamber to said head spray chamber when open, a cowling surrounding and sealed to the exterior of said head steam chamber, said cowling having a plurality of air intake holes at one end thereof, a normally closed air valve mounted near the other end of said cowling directly connecting the interior of said

VOL
1126
ISS
2
MY
14
1991
UMI

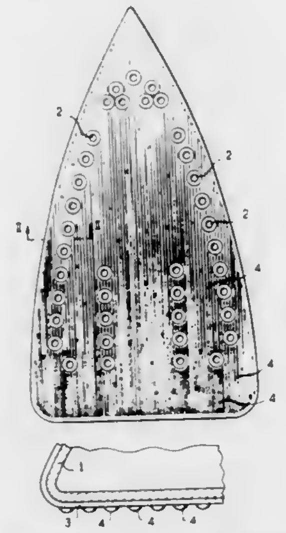
cowling to said head spray chamber when open, a resilient sealing element affixed about the periphery of said head spray chamber, said buck comprising a hollow casting divided internally into a lower steam chamber and an upper spray chamber, a normally closed vacuum valve mounted on said buck, said buck having an upper surface with a plurality of perforations formed therethrough leading from said buck spray chamber, a vacuum valve mounted on said buck and directly connecting said buck spray chamber to a source of vacuum when open, a peripheral rim on said buck positioned to be contacted by and form a seal with said sealing element of said head when said head is in either of said zero pressure or high pressure closed positions, whereby during the drying portion of a fabric pressing cycle said head is located in said zero pressure closed position and said air and vacuum valves are opened to draw ambient air through said cowling in heat exchange with said head steam chamber, through said head spray chamber, through a workpiece being pressed, and through said buck spray chamber to said vacuum valve.

---

**5,014,454**

### SMOOTHING IRON HAVING SCREEN PRINTED ENAMEL STRIPS WIDER AT THE FRONT AND NARROWER AT THE REAR OF THE PRESSING SOLE SURFACE

**Bruno Maurin, St Symphoriendozon, and Henri Piera, Annecy, both of France, assignors to SEB S.A., Selongey, France**
**Filed Jan. 5, 1990, Ser. No. 461,645**
**Claims priority, application France, Jan. 11, 1989, 89 00251**
**Int. Cl.$^5$ D06F** *75/30, 75/38*
**U.S. Cl. 38—93** **11 Claims**



1. A smoothing iron sole having a front and a rear and having a surface to be applied to articles to be ironed, wherein said surface comprises enamel strips (4) in relief which are substantially parallel and extend in a longitudinal direction of the sole, the strips (4) having a cross-section which diminishes gradually from the front towards the rear of the sole.

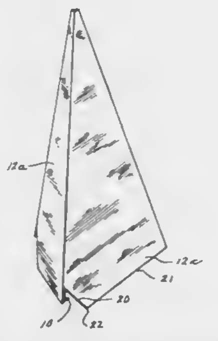
---

**5,014,455**

### THREE-DIMENSIONAL BOOK OR DISPLAY

**The Poet Desaderata, 13811 W. Capitol Dr., Ste. 128, Brookfield, Wis. 53005**
**Filed Oct. 18, 1989, Ser. No. 423,253**
**Int. Cl.$^5$ G09F** *1/08*
**U.S. Cl. 40—539** **8 Claims**

1. A three-dimensional book or display comprising an inner stationary pyramidal support member, said support member comprising three substantially identical panel members fixedly secured at their respective facing edges, each panel member being polygonal, said support member having a three-sided pyramidal upper portion and a base portion defined by corner edges of said polygonal panel member, three substantially identical polygonal outer panel members each defining a base edge and each outer panel member being hingedly connected at a lateral edge to a respective fixedly secured edge of said support member and overlying a respective inner panel member.

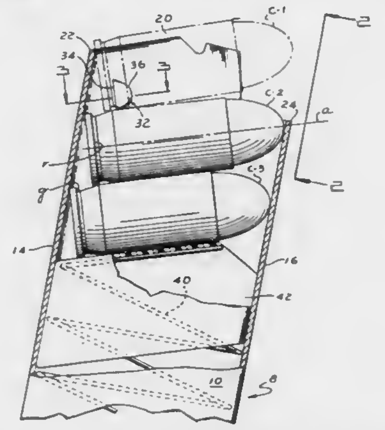


---

**5,014,456**

### CARTRIDGE MAGAZINE FOR SEMI-AUTOMATIC FIREARMS

**Robert L. Kurtz, Windsor, Conn.; Kevin G. Foley, Springfield, and Kurt J. Hindle, South Hadley, both of Mass., assignors to Smith & Wesson Corp., Springfield, Mass.**
**Filed Jan. 19, 1990, Ser. No. 467,414**
**Int. Cl.$^5$ F41A** *9/65*
**U.S. Cl. 42—50** **4 Claims**



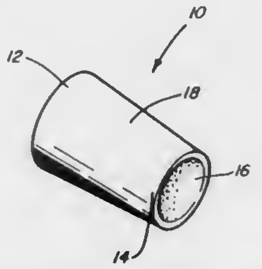
1. In a cartridge magazine for firearms having a generally rectangular cross-section, open at the top and defined by a pair of laterally-spaced side walls, a front wall having a cutout which defines the upper edge thereof and provides for cartridge feed therethrough, a rear wall and a coil spring follower for vertically advancing cartridges to be fed longitudinally in sequence into the bore of the firearm, each of the cartridges includes an extractor groove defined by an outwardly tapered conical surface which extends from the forward surface of the rear flange to the adjacent edge of the cylindrical surface of the cartridge casing, an improvement in said magazine comprising an inwardly extending guide member on each of said side walls disposed at a level medically of the upper edges of the rear wall and of the cutout of the front wall, each of said guide members having its maximum inward dimension disposed adjacent the rear wall of the magazine and being tapered outwardly from that dimension toward the front wall of the magazine to conform generally to the taper of the extractor groove, each of said guide members being adapted to engage the extractor groove of the penultimate cartridge in said magazine to hold the same against longitudinal movement toward said cutout as may be caused by recoil, and if necessary, to cam said penultimate cartridge toward the rear wall of the magazine as it is advanced by the follower to the uppermost position in the magazine.

---

**5,014,457**

### SAFE WEAPONS SYSTEM FOR A FIREARM

**Hogan G. Lewis, P.O. Box 58, Middle St., Kelford, and Charles E. Gregory, Jr., P.O. Box 31, Oak City, both of N.C. 27857**
**Filed May 15, 1989, Ser. No. 351,804**
**Int. Cl.$^5$ F41A** *17/44*
**U.S. Cl. 42—70.11** **12 Claims**



1. A self-wedging single piece firearm safety device specifically adapted to be inserted within a firing chamber having an elongated tapered inner cylindrical wall and opposed end portions that includes an ammunition inlet end, and wherein when inserted within the firing chamber the safety device renders the firearm inoperative, the firearm safety device comprising:

(a) a non-fireable single piece and self-wedging slug adapted to be received within the firing chamber such that the slug becomes stationed intermediately the opposed ends of the firing chamber and consequently prohibits the firing chamber from being chambered with a live ammunition round; and

(b) the non-fireable single piece slug having fore and aft ends with the fore end having a spherical depression formed therein, and a fixed non-expandable outer cylindrical tapered wall that is selectively tapered such that it functions independently to wedge and accordingly frictionally secures the singe piece slug within the firing chamber such that as the single piece slug is moved from the inlet end towards the opposite end of the firing chamber the same will become frictionally secured within the firing chamber so as to define an open space in the firing chamber between the slug and the inlet end of the firing chamber with the open space being so sized that a live ammunition round cannot be properly chambered within the firing chamber occupied by the slug.

---

**5,014,458**

### FISHING POLE HOLDER

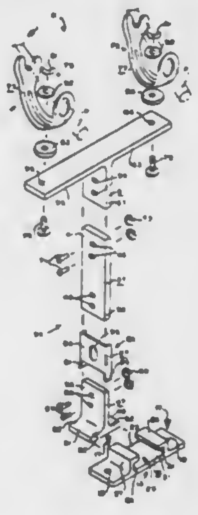
**Larry C. Wagner, 321 Manor Rd., Steele, Mo. 63877**
**Filed May 15, 1990, Ser. No. 523,476**
**Int. Cl.$^5$ A01K** *97/10*
**U.S. Cl. 43—21.2** **3 Claims**

3. The combination with a pair of fishing poles and boat having a floor, of a fishing pole holder for holding said fishing poles to said boat; said fishing pole holder comprising:

(a) base means for being fixedly and permanently attached to said floor of said boat; said base means having a channel therein; said channel of said base means having opposing first and second grooves; said base means including a bottom plate member having a first side and a second side;

(b) body means for being slidably and removably attached to said base means and for being for slidably received by said body means; said body means including a trunk member having a lower end and an upper end, a foot member attached to said lower end of said trunk member, and a head member attached to said upper end of said trunk member; said foot member of said body means including a first flange for slidably extending into said first groove of said channel of said base means and a second flange for slidably extending into said second groove of said channel of said base means; said head member of said body means having a first end and a second end; and

(c) fishing pole holder means for being attached to said body means and for holding said fishing pole to said body means; said fishing pole holder means including a first fishing pole holder member for being movably attached to said first end of said head member of said body means and including a second fishing pole holder member for being movably attached to said second end of said head member of said body means; and



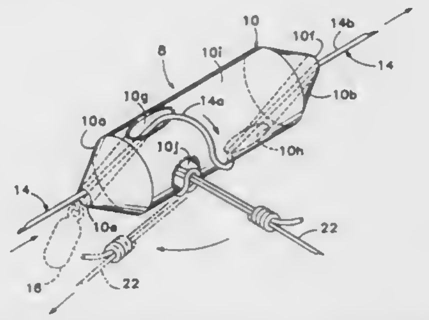
(d) lock means for locking said body means to said base means; said lock means including a slide member attached to said body means for movement between a first position in which said body means can be removed from said base means and a second position in which said body means is locked to said base means; said slide member including a first finger member for engaging said first side of said bottom plate member of said base means when said slide member is in said second position and including a second finger member for engaging said second side of said bottom plate member of said base means when said slide member is in said second position.

---

**5,014,459**

### ADJUSTABLE-DEPTH BAIT SLIDER

**Warner G. Sublet, 293 Aker Dr., Myrtle Creek, Oreg. 97457**
**Filed Jan. 25, 1990, Ser. No. 470,097**
**Int. Cl.$^5$ A01K** *91/04*
**U.S. Cl. 43—44.85** **7 Claims**



1. A device for positioning an auxiliary element along a main line having a predetermined maximum diameter comprising;
first means defining a first opening sized for freely receiving

VOL
1126
ISS
2
MY
14
1991
UMI

the main line for restraining lateral movement of a first portion of the main line while allowing substantially free longitudinal movement of the main line, the first opening-defining means being a first bore extending through the body;

second means defining a second opening spaced from the first opening for freely receiving the main line for restraining lateral movement of a second portion of the main line while allowing substantially free longitudinal movement of the main line, the second opening-defining means being a second bore spaced from the first bore and extending through the body;

a body coupled to and positioned between the first and second opening-defining means and having opposite ends and a convex surface defining a curved path along which the main line extends when extending between the first and second openings, the surface being curved about a longitudinal axis extending through the first and second openings such that friction is created between the curved surface and the main line when the main line is on the curved path, and as greater tension is applied to the main line, greater force is required to move the main line over the curved surface; and

means coupled to the body for securing the auxiliary element to the body for movement with the body when the body is moved relative to the main line whereby the body moves along the main line when sufficient force is applied to the securing means to overcome the friction between the main line and the curved surface;

the first and second bores extending from opposite respective ends of the body transversely through the body, relative to the longitudinal axis, to spaced locations on the curved surface, and the first and second openings being at respective opposite ends of the bores.

---

### 5,014,460

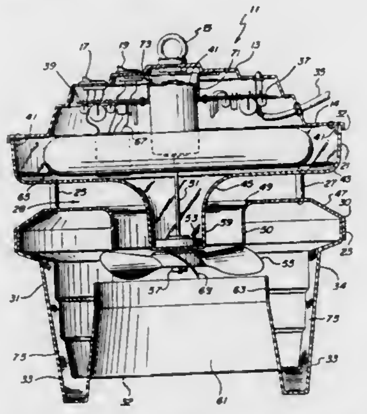
## COMBINATION LANTERN AND FLYING INSECT ERADICATOR

**Anthony G. Patti, San Gabriel; Larry L. DeHart, Sr., Placentia, and Larry L. DeHart, Jr., Walnut, all of Calif., assignors to All Tech Industries, Brea, Calif.**

**Filed Feb. 5, 1990, Ser. No. 475,014**

**Int. Cl.$^5$ A01M *1/04***

**U.S. Cl. 43—113** **17 Claims**



1. A combination lantern and flying insect eradicator, including a hood and a base, said combination comprising:

the hood having a top and bottom and containing a light source adjacent to said bottom, said bottom being translucent and contoured into a truncated cone around its symmetrical axis, the cone extending into an aperture in said base;

the base having a top and bottom, with the top contoured in a dome shape and an aperture therein at its symmetrical axis, the bottom having a larger exhaust aperture therein, said base being fixedly attached to and spaced from said hood so that the contoured bottom of said hood and the contoured top of said base are adjacent to each other; and

a motor driven fan blade rotatably mounted and supported by the contoured bottom of said hood and located below the aperture in the top of said base.

---

### 5,014,461

## STAND, IN PARTICULAR FOR CHRISTMAS TREES

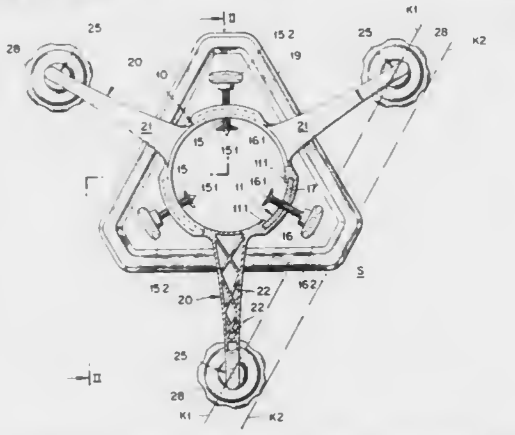
**Manfred vom Braucke, Bielefeld, and Hans vom Braucke, Vlotho, both of Fed. Rep. of Germany, assignors to Bielefelder Küchenmaschinen- und Transportgeräte-Fabrik vom Braucke GmbH, Bielefeld, Fed. Rep. of Germany**

**Filed Nov. 28, 1989, Ser. No. 442,646**

**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1988, 8814845**

**Int. Cl.$^5$ A01G *9/12***

**U.S. Cl. 47—40.5** **13 Claims**



1. A stand for holding plants and trees comprising a holder including an upright tubular portion injection molded of plastic and adapted to hold a lower end of a tree trunk, and at least three support legs joined to said tubular portion, said legs being circumferentially spaced apart by equal distances, each support leg including inner and outer portions, said inner leg portion projecting generally radially outwardly from an upper end of said tubular portion, said leg outer portion projecting downwardly, said legs arranged to spaced a lower end of said tubular portion above a support surface, said stand including a water container positioned beneath said tubular portion and communicating with a lower end of an interior of said tubular portion, upper and lower sets of circumferentially spaced fastening screws disposed in vertically spaced upper and lower planes, respectively, located adjacent respective ends of said tubular portion, such that radially inner ends of said sets of fastening screws are able to support and align a lower end of a tree trunk, said upper set of fastening screws being superimposed above said lower set, each fastening screw disposed approximately midway between two circumferentially adjacent ones of said legs, as said stand is viewed from above, a plurality of support plates joined to radially inner ends of respective ones of said fastening screws of said upper and lower sets, said tubular portion including a plurality of circumferentially spaced vertical grooves which open radially inwardly and are of wedge shape, a plurality of inserts being correspondingly wedge shaped and removably disposed in respective ones of said grooves, each insert including upper and lower threaded holes for receiving a fastening screw of each of said sets.

---

### 5,014,462

## SOIL AMENDMENT WITH RUBBER PARTICLES

**Robert C. Malmgren; Parviz N. Soltanpour, and Jan E. Cipra, all of Fort Collins, Colo., assignors to International Soil Systems, Inc., Fort Collins, Colo.**

**Filed Dec. 29, 1989, Ser. No. 458,968**

**Int. Cl.$^5$ A01C *1/04***

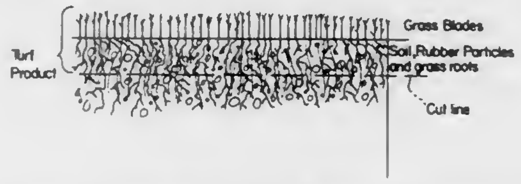
**U.S. Cl. 47—1.01** **19 Claims**

1. A method for preparing soil to improve porosity and prevent compaction thereof, the method comprising the steps of:

(a) loosening the top layer of said soil to a depth of at least three inches;

(b) mixing into said layer of soil a plurality of solid rubber particles; wherein said rubber particles comprise at least about 10% by volume of said layer; and

(c) mixing grass seed into said soil layer.



---

### 5,014,463

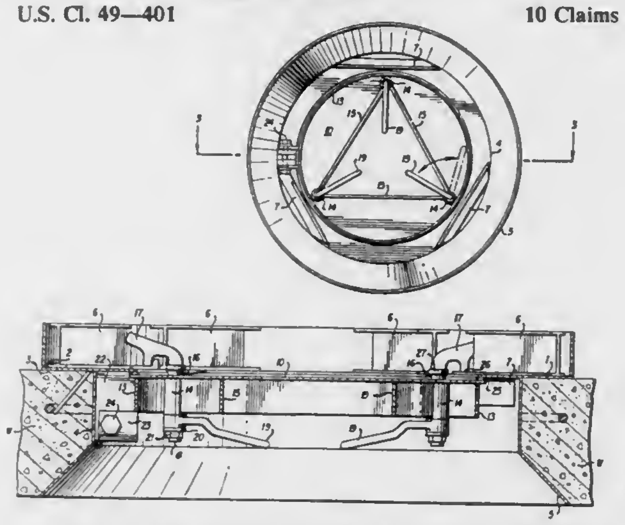
## COMBINATION DOOR AND DOOR FRAME

**Marcel M. Barbier, Herndon, Va., assignor to Marcel M. Barbier, Inc., Herndon, Va.**

**Filed Mar. 7, 1990, Ser. No. 489,626**

**Int. Cl.$^5$ E05D *7/00***

**U.S. Cl. 49—401** **10 Claims**



1. A combination door and door frame for mounting in an opening in a wall of a structure and adapted to withstand the force of high overpressure on the exterior side thereof, wherein

(a) said door frame comprises a perimetrical frame member adapted to line the perimeter of said opening in said wall and a plate member having an opening of predetermined size smaller than the size of said perimetrical frame member and secured to one end of said perimetrical frame member, such that said perimetrical frame member is spaced radially from the perimeter of said opening in said plate member, said plate member projecting transversely from said perimetrical frame member for contacting the exterior surface of said wall surrounding said opening;

(b) said door comprises a leaf having a predetermined size greater than said predetermined size of said opening in said plate member such that when said door is closed the exterior surface of said leaf adjacent the perimeter thereof overlaps the interior surface of said plate member adjacent the entire perimeter of said opening;

(c) a reinforcing frame structure secured to the interior surface of said leaf, said frame structure comprising a perimetrical rib adjacent the perimeter of said leaf and a plurality of further ribs extending across the interior surface of said leaf inside said perimetrical rib;

(d) locking means for securing said door in place in said door frame against said force of said overpressure on the exterior side thereof comprising a plurality of retractable dogs spaced from each other adjacent the periphery of said leaf and projecting from the exterior surface of said leaf for engaging the exterior surface of said plate member of said door frame, and control means connected to each of said dogs and operable from the interior side of said leaf for securing said dogs tightly against said exterior surface of said plate member such that said door is secured in place on said door frame and for releasing and withdrawing said dogs from said exterior surface and said plate member to permit said door to be opened inwardly; and

(e) the exterior surface of said plate member of said door frame comprising a plurality of wedge members, each wedge member being adjacent one of said retractable dogs on said leaf of said door;

(f) said locking means comprising a plurality of spindles, each of said retractable dogs being mounted on a spindle and each of said spindles being rotatably mounted in said reinforcing frame structure of said door, a plurality of handles, each handle being attached to the end of a spindle on the interior side of said door, whereby each of said spindles may be manually rotated from the interior side of said door to rotate each of said dogs into contact with the corresponding wedge means on said plate member and secure said door in place on said door frame;

(g) said door frame further comprising a pair of reinforcing frame members on opposite sides of each of said wedges in a line substantially tangent to said opening in said plate member on the exterior surface of said plate member, one end of each of said pair of reinforcing members being adjacent a wedge member and the opposite end of each of said pair of reinforcing members being adjacent the external perimeter of said plate member, and a connecting reinforcing member on the interior surface of said plate member substantially in line with said pair of reinforcing members on said exterior surface of said plate member and overlapping each of said pair of reinforcing members, whereby the pressure applied by each of said dogs to a wedge member and said plate member is distributed throughout said plate member.

---

### 5,014,464

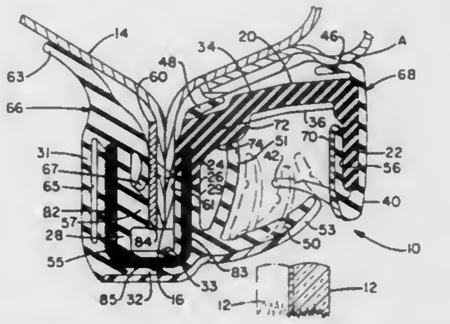
## WINDOW PANE SEALING STRIP HAVING A FLEXIBLE REINFORCED GLASS-RUN CHANNEL

**Ronald E. Dupuy, Wabash, Ind., and Donald P. Agee, Southfield, Mich., assignors to GenCorp Inc., Fairlawn, Ohio**

**Filed Mar. 1, 1989, Ser. No. 317,315**

**Int. Cl.$^5$ E06B *7/16***

**U.S. Cl. 49—440** **28 Claims**



1. A substantially S-shaped window sealing strip for a window opening having a flange member, comprising:

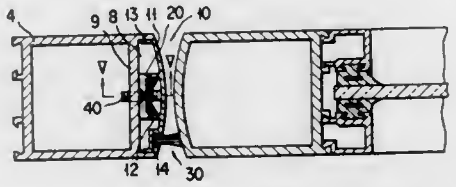
an inverted U-shaped flange seat comprised of an elastomer having a Shore hardness of from about 60 to about 80, and an encapsulated flexible carrier; and

a U-shaped glass-run channel comprising a harder elastomer having a Shore D hardness of from about 30 to about 50, said flange seat and said glass-run channel integrally forming a common wall and having at least a portion of said flexible reinforcing carrier therein, a portion of said carrier in said common wall encapsulated by said harder elastomer.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,014,465
### ADJUSTING DEVICE FOR USE IN WORK-WELL ATTACHMENT MOUNTED ON STILE

**Masayoshi Ishikawa, and Masami Takemura, both of Toyama, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan**
**Filed Oct. 2, 1989, Ser. No. 415,729**
**Int. Cl.⁵ E06B** *7/16*
**U.S. Cl. 49—482** **5 Claims**

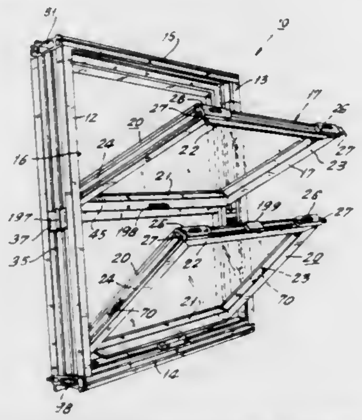


1. An adjusting device for use in a work-well attachment mounted on a stile of a door body of a door unit, comprising: a work-well attachment adapted to be mounted on one of the stiles of the door body so as to extend longitudinally along one end thereof, said work-well attachment having a longitudinally extending engaging groove formed substantially in a central area of a rear surface thereof, a plurality of fixing means for mounting said work-well attachment on a longitudinally extending support wall formed on one end of said stile through an intermediary of each of a plurality of thrusting members in such a manner that the distance and the degree of inclination therebetween may be adjusted freely, wherein each of said plurality of thrusting members is comprised of a first abutting piece means, formed at one end of said thrusting members, for abutting against a pair of hook members formed on said rear surface of said work-well attachment, a second abutting piece formed at the other end thereof and having a pair of engaging pieces formed by a punching operation so as to be fitted in the engaging groove formed in said rear surface of said work-well attachment, and a curved, resilient main portion formed integrally with and between the first and second abutting pieces.

---

### 5,014,466
### WINDOW ASSEMBLY

**Kurt Winner, 22 Fairmount Ave., Mahwah, N.J. 07430**
**Filed Jul. 28, 1989, Ser. No. 386,985**
**Int. Cl.⁵ E06B** *1/04*
**U.S. Cl. 49—504** **45 Claims**



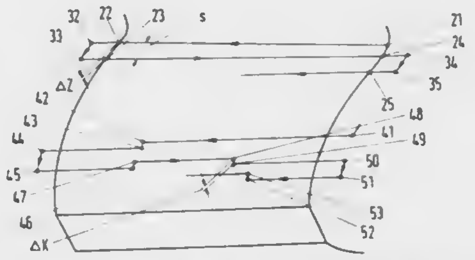
13. A window assembly including a frame, said frame defining a rectangular opening;
an outer sash unit mounted to said frame and an inner sash unit mounted to said frame;
said sash units being disposed in said rectangular opening;
said frame comprising a pair of opposed parallel jambs, a sill overlapping said jambs at their lower ends, and a header overlapping said jambs at their upper ends;
said jambs, said sill and said header each comprising extruded elements;
wherein a selected pair of first and second extruded elements of said frame, which are opposite to each other across said rectangular opening, each define a longitudinal channel; and
a metal beam-like reinforcing member is disposed within said channel so as to reinforce said selected pair of extruded elements;
in which the first and second extruded elements constitute said jambs, said jambs being longer than said sill and header, and each of the reinforcing members has a zig-zag cross-section.

---

### 5,014,467
### METHOD AND MACHINE FOR THE DISCONTINUOUS GENERATING GRINDING WITH INDEXING

**Udo Luhmer, Gröbenzell, and Udo Schapp, Wessling, both of Fed. Rep. of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany**
**Filed Oct. 13, 1988, Ser. No. 257,219**
**Claims priority, application Fed. Rep. of Germany, Oct. 14, 1987, 3734828**
**Int. Cl.⁵ B24B** *1/00*
**U.S. Cl. 51—287** **4 Claims**

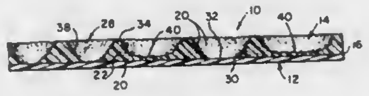
1. In a method for the machining of tooth flanks of gears through a generating grinding with indexing, in which a rotary movement component of a grinding wheel is associated with an incremental rolling movement and a pitch rotation of a workpiece, in which a translatory component of the grinding wheel is associated with the incremental rolling movement of the workpiece and a grinding-stroke movement of the grinding wheel along the workpiece tooth flanks, and in which, for producing tooth-flank corrections with the grinding wheel, controlled movements of the grinding wheel can be carried out relative to the tooth flanks to be machined during the individual grinding stokes, the improvement wherein the rotary movement component and the translatory component of the associated incremental rolling movement are controllably individually carried out, step-by-step, each between the individual grinding strokes, and wherein the controlled movements of the grinding wheel for producing tooth flank corrections are independently coordinated with the the translatory component of the grinding wheel.



---

### 5,014,468
### PATTERNED COATED ABRASIVE FOR FINE SURFACE FINISHING

**Sitaramaiah Ravipati, Latham; Eugene Zador; Wesley R. Kaczmarek, botb of Ballston Lake, N.Y.; Ernest A. Coleman, Stamford, Conn., and David Rostoker, Sturbridge, Mass., assignors to Norton Company, Worcester, Mass.**
**Filed May 5, 1989, Ser. No. 347,663**
**Int. Cl.⁵ B24B** *1/00*
**U.S. Cl. 51—295** **45 Claims**



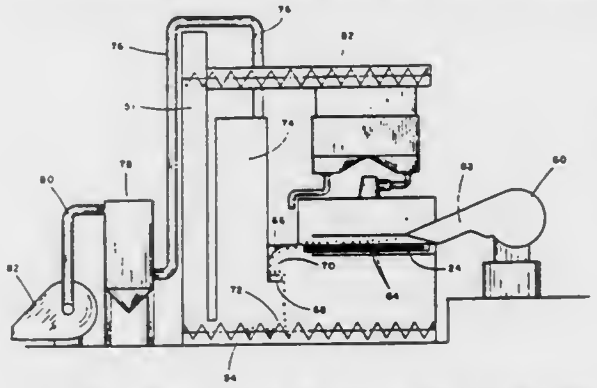
1. A coated abrasive material suitable for use in lapping operations comprising:
(a) a flexible and dimensionally stable backing member:
(b) an abrasive grain containing material adhered to one surface of the backing member, said material being configured in a plurality of elongated discrete three-dimensional formations interspersed with areas devoid of abrasive material such that the abrasive grain containing material forms a discontinuous surface opposite the backing member.

---

### 5,014,469
### SHOT REMOVAL SYSTEM

**W. David Watts, 4965 Highway 19 N., Alpharetta, Ga. 30201**
**Continuation-in-part of Ser. No. 42,464, Apr. 24, 1987, Pat. No. 4,872,294, whlcb is a continuation-in-part of Ser. No. 824,460, Jan. 31, 1986, abandoned. This application Aug. 30, 1989, Ser. No. 400,481**
**Int. Cl.⁵ B24C** *9/00*
**U.S. Cl. 51—425** **6 Claims**

1. An improved shot removal system disposed to receive a metal sheet workpiece from a blast chamber after cleaning by shot blast cleaning devices to remove shot deposited on the top of said workpiece, comprising:
a shot removal chamber;
means for moving said workpiece through said shot removal chamber;
shot collection means located at the bottom of said shot removal chamber;
a blower adapted to blow air into said shot removal chamber laterally across the top surface of said workpiece, said blower positioned perpendicular to the direction of movement of said workpiece within said shot removal chamber, said blower blowing air perpendicular to the direction of movement of said workpiece across the top surface of said workpiece; and
suction means disposed on the other side of the top surface of said workpiece from said blower, said suction means pulling large volumes of air and shot in the same direction as said blower is blowing shot, said shot being blown and sucked off the top of said workpiece to fall to the bottom of said shot removal chamber.

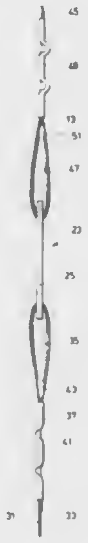


---

### 5,014,470
### MOBILE HOME STRAP EXTENDER

**George R. Lane, 4416 Springhill Dr., Hurst, Tex. 76054, and Frank M. McDuff, 7437 Yolanda Dr., Fort Worth, Tex. 76112**
**Filed Jul. 10, 1990, Ser. No. 550,646**
**Int. Cl.⁵ E04B** *7/00*
**U.S. Cl. 52—23** **6 Claims**

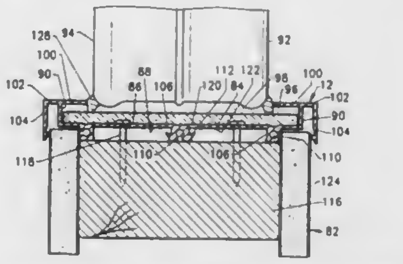
4. An apparatus for anchoring a mobile building; said mobile building having an upper structure and lower side edges; said mobile building having a steel overhead tie extending over the upper structure of the mobile building and downward past said lower side edges of the mobile building, wherein a shortened lower end of the overhead tie has been previously cut too short to connect to an anchor embedded in the ground, the apparatus comprising in combination:
a steel extender strap with an upper end and a lower end:
a steel extender plate having two slots;
the upper end of the extender strap being looped through one of the slots and crimped to secure the extender plate to the extender strap;
the shortened lower end of the overhead tie being looped through the other slot in the extender plate and crimped to secure the overhead tie to the extender plate; and
the lower end of the extender strap being connected to the anchor.



---

### 5,014,471
### EXTRUDED MOLDING FOR GLASS BLOCK STRUCTURES

**George Ballstadt, 4850 Richmond Ave., Fremont, Calif. 94536**
**Filed Mar. 31, 1989, Ser. No. 332,297**
**Int. Cl.⁵ E04C** *3/04*
**U.S. Cl. 52—98** **16 Claims**

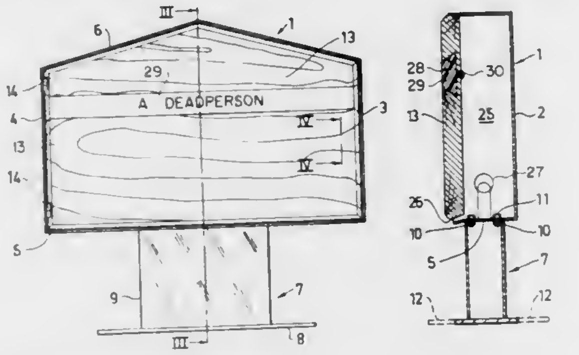


1. An extruded molding adapted to form a perimeter frame around wall structures of glass masonry block of two standard width sizes, the molding comprising a unitary, elongated extrusion formed with a wide, flat, base element having a seating side, a backing side and outside edges with flat side, elements projecting from the side edges of the seating side perpendicular to the base element, wherein a channel is formed in which a glass block structure of a first standard width is adapted to be seated, wherein at least one of the flat side elements has a distal end with a spacer element perpendicular to the side element directed toward the opposite side element with means for breaking the spacer element off the side element to accommodate glass block in the channel of a second standard width greater than the first standard width, and wherein the backing side of the base element includes a plurality of stiffening rails having bore means for interconnecting mitered ends of the molding into a rigid, continuous perimeter frame and for supporting the molding against a building structure.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,014,472
## TOMBSTONE

Sten Svensson, Trädgårdsgatan 4, S-912 00 Vilhelmina, Sweden
PCT No. PCT/SE87/00105, § 371 Date Oct. 28, 1987, § 102(e) Date Oct. 28, 1987, PCT Pub. No. WO87/05354, PCT Pub. Date Sep. 11, 1987
Continuation of Ser. No. 116,713, Oct. 28, 1987, abandoned.
This PCT application Mar. 4, 1986, Ser. No. 469,710
Claims priority, application Sweden, Mar. 6, 1986, 8601041
Int. Cl.$^5$ E04H *13/00*
U.S. Cl. 52—103 5 Claims



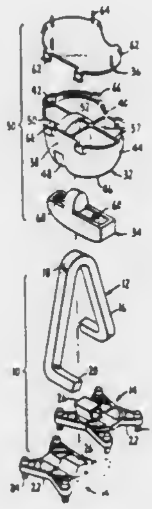
1. A tombstone, comprising:
a base;
a hollow, forwardly open sheet-metal casing mounted on said base and having a back wall, a roof wall, a bottom wall and two opposite side walls, said walls being joined to one another at respective edges and defining a chamber within said casing;
said base comprising a foot plate and an upright stand having a lower end secured to said foot plate and an upper end secured to said bottom wall of said casing, for supporting said casing above the ground;
an a first inscription plate formed of a material different from that of the casing, said inscription plate bearing an inscription relating to the decease of a being and constituting a front wall for the casing and being attached to said casing by hinge means which permit said front wall to be alternatively disposed in a closed position in which said inscription plate closes said chamber of the casing and an open position in which said chamber is accessible from externally of the tombstone;
a second inscription plate which is part of said first inscription plate, said second inscription plate bearing said inscription and being physically detachable from said first inscription plate when said front wall is in said open position; and
means for unlockably locking of said first inscription plate in said closed position.

---

## 5,014,473
## APPARATUS AND METHOD FOR LIFTING TILT-UP WALL CONSTRUCTIONS

David L. Kelly, and Steven A. Bennetts, both of Sacramento, Calif., assignors to The Burke Company, Sacramento, Calif.
Division of Ser. No. 327,313, Mar. 22, 1989, Pat. No. 4,930,269.
This application Feb. 20, 1990, Ser. No. 481,870
Int. Cl.$^5$ E02H *12/34*
U.S. Cl. 52—125.5 6 Claims

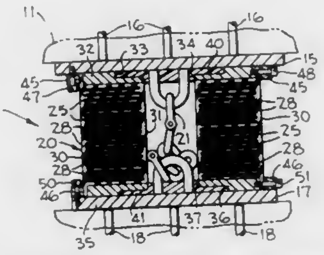
1. An anchor assembly for providing a lifting means in a concrete tilt-up slab, said assembly comprising:
a wire anchor of inverted V-shaped configuration having a first and a second leg joined at an apex and lying within a first plane, the legs having distal tips extending laterally out of the first plane; and
two anchor bases for supporting and positioning said wire anchor within the concrete slab, said anchor bases connected to said distal tips and lying in a second plane perpendicular to the first plane.



---

## 5,014,474
## SYSTEM AND APPARATUS FOR LIMITING THE EFFECT OF VIBRATIONS BETWEEN A STRUCTURE AND ITS FOUNDATION

Edward R. Fyfe, 1341 Ocean Ave., Del Mar, Calif. 92014, and James M. Kelly, 126 The Uplands, Berkeley, Calif. 94705
Filed Apr. 24, 1989, Ser. No. 342,351
Int. Cl.$^5$ E04B *1/98*
U.S. Cl. 52—167 27 Claims

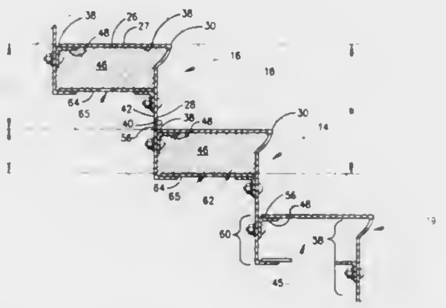


1. Means for limiting vibrational effects between a structure having an underside and its foundation, comprising:
(a) a plurality of first apparatuses, each of said first apparatuses having a first load bearing elastomeric element disposed between the underside of said structure and said foundation, said first load bearing elastomeric elements absorbing vertically and horizontally applied forces; and
(b) a plurality of second apparatuses, each of said second apparatuses having a second load bearing elastomeric low friction damping element sandwiched between the underside of said structure and said foundation, said second load bearing elastomeric elements absorbing forces which cause sliding motion between the structure and the foundation.

---

## 5,014,475
## STEP MODULE FOR USE IN CONSTRUCTING STAIRWAYS

Robert K. Anderson, Jr., Evergreen, and Ernest E. Tibbett, II, Arvada, both of Colo., assignors to Anderson Industries, Inc., Commerce City, Colo.
Filed Dec. 21, 1989, Ser. No. 454,750
Int. Cl.$^5$ E04F *11/00*
U.S. Cl. 52—19 29 Claims



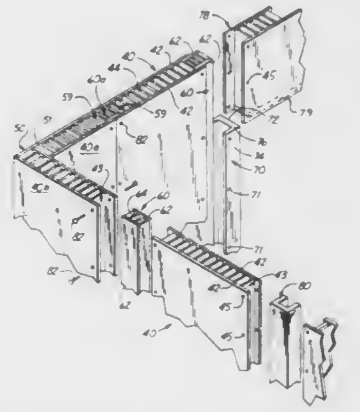
1. A step module adapted for use in constructing stairways and the like wherein a plurality of step modules are attached to one another as adjacent pairs of lower and upper step modules whereby a first one of the adjacent pair defines an upper step and a second one of the adjacent pair defines a lower step, said upper and lower steps respectively having upper and lower treads for said stairway, each said step module comprising:
a tread portion and a riser portion connected together to form a nosing, said tread portion having an upper surface, a lower surface and a distal tread edge opposite said nosing, said riser portion having a front surface, a rear surface and a distal riser edge opposite said nosing; and
a first shoulder means attachable to said riser portion for forming a shoulder support along the front surface thereof, said shoulder support being substantially parallel to said nosing and located a first distance below said nosing, said first shoulder means forming a tread seat whereby the distal tread edge of a lower step module may be supported by said first shoulder means and attached to said riser portion of an upper step module;
an attachment means attachable to the rear surface of the riser portion and located intermediate of the nosing and the distal riser edge.

---

## 5,014,476
## MULTICOMPONENT PANEL SYSTEM AND METHOD AS ASSEMBLY

Robert H. Leslie, Edina; Glynn F. Neumann, Lakeville, and Gene A. Pehrson, St. Paul, all of Minn., assignors to Bellcomb Technologies Incorporated, Minneapolis, Minn.
Filed Apr. 7, 1989, Ser. No. 334,925
Int. Cl.$^5$ E04B *2/32*
U.S. Cl. 52—220 2 Claims

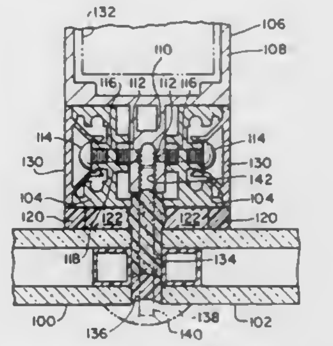
1. A prefabricated multicomponent panel system, comprising:
(a) a machined, one-piece plate having a generally T-shaped cross-section and including a stepped-up portion rectangular in cross-section and a base portion rectangular in cross-section, the base portion being of greater width than the stepped-up portion;
(b) a honeycomb panel structure having two spaced-apart, parallel sheets separated by a honeycomb structure intermediate thereof, the honeycomb structure defining a plurality of openings extending perpendicularly of the sheets, inside surfaces of the sheets of the honeycomb panel being machined along edge portions of the panel, the stepped-up portion of the plate being insertable intermediate of the sheets in a tight-fitting relationship;
(c) a machined panel corner structure comprising two honeycomb panels interconnected to form a ninety degree angle;
(d) a spline member being rectangular in cross-section and comprising two spaced-apart parallel sheets separated by a honeycomb structure, the outside surfaces of the spline member being machined to enable insertion of the spline member between the sheets of the honeycomb panel in a tight-fitting relationship; and
(e) a one-piece, solid, generally U-shaped trim member having a base intermediate of two parallel, spaced-apart sides, inner surfaces of the sides being machined to enable insertion of the spline between the sides of the trim member in a tight-fitting relationship.



---

## 5,014,477
## BUILDING FACADE

Michael W. MacDonald, 69 June Ave., Northport, N.Y. 11768
Filed May 29, 1990, Ser. No. 529,594
Int. Cl.$^5$ E04H *1/00*
U.S. Cl. 52—235 3 Claims



1. Improvements for a facade for a building front surface of the type constructed on site with plural mullions, each said mullion being of the type having an outwardly directed planar face having a single, centrally located forwardly projecting mullion support member for attachment thereto of a facade for said building, the improvements comprising an assembled facade unit consisting of a pair of identical spaced apart extrusions positioned forwardly of said one mullion with said mullion support member in an interposed position therebetween, each said extrusion being a c-shape defined by opposite legs and a connecting wall therebetween and having an operative position with each of said c-shapes in an outwardly facing relation to each other so as to locate one of said legs of each of said c-shapes against said planar face of said mullion, said connecting wall against said mullion support member, and said opposite leg in a spaced position from said mullion, a pair of facade panels in a side-by-side relation each of said panels adhesively attached to one each of said outer legs of said extru-

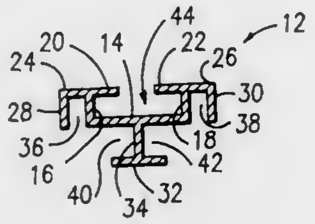
OL
126
SS
2
MY
14
1991
UMI

sions, plural cooperating screws connected in opposing directions and directed inwardly through said extrusions and into said mullion support member, whereby said facade unit is supported in covering relation over said building front by the screwed attachment thereof to said mullion support member.

---

### 5,014,478
### PANELS AND PANEL INTERLOCKING MEANS

**Richard C. Spring, Tampa, Fla., assignor to Insulated Panel Systems, Inc., Oldsmar, Fla.**
**Filed Sep. 22, 1989, Ser. No. 411,356**
**Int. Cl.⁵ E04B** *5/00*
**U.S. Cl. 52—281** **7 Claims**



1. A track member, comprising:

an elongate, flat bottom wall;

a pair of elongate, flat, forwardly extending side walls integral to opposite sides of said bottom wall, said side walls being parallel to one another and being at right angles to said bottom wall;

a pair of elongate, flat, inwardly extending top walls integral to respective distal free ends of said side walls, said inwardly extending top walls extending toward one another in parallelism to said bottom wall and at right angles to said side walls;

a pair of elongate, flat, outwardly extending top walls integral to respective distal free ends of said side walls, said outwardly extending top walls extending away from one another in parallelism to said bottom wall and at right angles to said side walls;

a pair of elongate, flat, rearwardly extending end walls integral to respective distal free ends of said outwardly extending top walls, said end walls extending in parallelism to one another and in parallelism to said side walls;

an elongate, flat interconnecting wall integral to said bottom wall at a mid-point thereof, said interconnecting wall extending rearwardly and at a right angle to said bottom wall, in parallelism to said side and end walls;

an elongate, flat anchor wall integral to said interconnecting wall and disposed at a right angle thereto in parallelism to said bottom wall and said inwardly and outwardly extending top walls; and p1 said inwardly and outwardly extending top walls being coplanar with one another.

---

### 5,014,479
### FLEXIBLE ASSEMBLING PARTITION MEANS

**Chia-Luan Yeh, and Ting-Kuo Chen, both of P.O. Box 10160, Taipel, Taiwan**
**Filed Apr. 2, 1990, Ser. No. 503,045**
**Int. Cl.⁵ E04B** *5/46;* **E04C** *1/42*
**U.S. Cl. 52—308** **12 Claims**

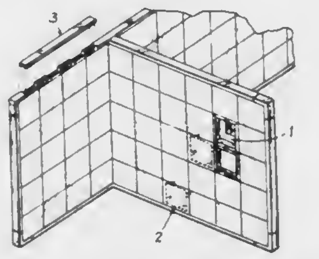
1. A flexible assembling partition means comprising:

a plurality of octagonal block units assembled with one another, each octagonal block unit being embedded with a face member therein, and at least a sheathing frame member for covering a plurality of side portions of assembled octagonal block units, characterized in that:

each side octagonal block unit includes a central square portion having four side walls for forming a square and defining a central square hole within said side walls, a plurality of side extensions and recesses circumferentially formed on all said side walls of said central square portion, each said recess following each said side extension, one said side extension of one said block unit being engageable with any adjacent said recess of another block unit for coupling two said block units;

said face member including a face plate operatively shielding each said block unit, a square extension formed on a central inside surface of said face plate engageable with all said side walls of said central square portion of said block unit for embedding said face member in said block unit; and

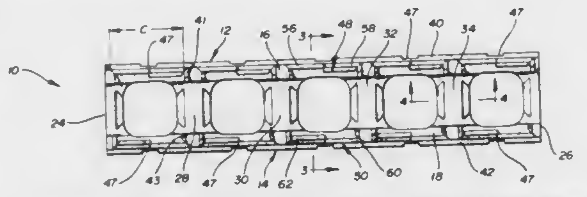
said sheathing frame member generally formed as a longitudinal sheath having a cross section of inversed U shape for covering all said side extensions of said block units.



---

### 5,014,480
### PLASTIC FORMS FOR POURED CONCRETE

**Theodore J. Guarriello, Warminster; Henry J. Guarriello, Jr., Richboro, and Joseph A. Guarriello, Upper Wakefield, all of Pa., assignors to Ron Ardes, Boonton, N.J., a part interest**
**Filed Jun. 21, 1990, Ser. No. 541,759**
**Int. Cl.⁵ E04C** *1/00*
**U.S. Cl. 52—309.12** **6 Claims**



1. In a hollow foamed plastic form for concrete having a pair of opposed parallel side walls with planar upper and lower faces, and a pair of opposed end members, the improvement which comprises:

(i) a lip coplanar with the outer surface of, and extending outwardly from the upper and lower faces of, each of said side walls and having a first height; and

(ii) a plurality of like, outwardly extending, elongated locking members defined in registered spaced relationship on the upper and lower faces of each of said side walls inside said lip, each locking member on one side wall being spaced from a corresponding locking member on the other side wall at a distance corresponding to the length of each locking member;

each of said locking members consisting of a pair of first and second elongated ribs of uniform thickness and a uniform height which height is nominally twice the said first height of said lip, said first rib having a length which is greater than that of the second rib by the width of said ribs, each rib having, in top view, a trapezoidal shape defined by

(a) first and second parallel vertical planar surfaces which surfaces are substantially parallel to the side walls of said form,

(b) a third vertical planar surface perpendicular to said first and second planar surface, and

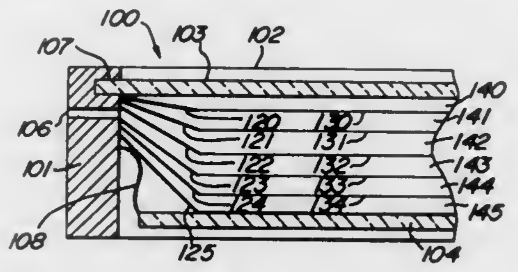
(c) a fourth vertical planar surface intersecting said first and second planar surfaces at angles of 45° and 135°, respectively,

said first rib of each pair being disposed more proximate to said lip than said second rib of the same pair with the third planar surfaces of the two ribs being coplanar and the second planar surface of said first rib being coplanar with the first planar surface of said second rib of that pair.

---

### 5,014,481
### PANEL CONFIGURABLE FOR SELECTIVE INSULATION OR HEAT TRANSMISSION

**Michael K. Moe, 1 Mann St., Irvine, Calif. 92715**
**Filed Mar. 13, 1989, Ser. No. 322,186**
**Int. Cl.⁵ E04B** *2/00*
**U.S. Cl. 52—406** **14 Claims**



1. A configurable thermal panel comprising:

a housing defining an interior cavity;

a plurality of generally planar foil members;

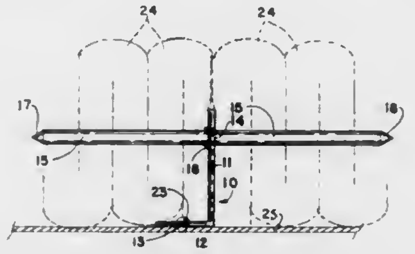
support means within said interior cavity supporting said foil members in either a separated spaced configuration or a collapsed tightly overlying configuration; and

support altering means for altering said support means to provide both said separated spaced configuration or said collapsed tightly overlying configuration and to switch therebetween.

---

### 5,014,482
### INSULATION RETAINING APPARATUS

**Michael E. Alexander, 3616 Ashbury, Ponca City, Okla. 74601**
**Filed Jun. 5, 1989, Ser. No. 361,360**
**Int. Cl.⁵ E04C** *1/40*
**U.S. Cl. 52—506** **2 Claims**



1. An insulation supporting apparatus for use in attaching blanket insulation to a surface comprising:

(a) a rectangular stud member having a longitudinal axis and a first and second end, means at said first end for attachment to a surface to be insulated, and openings means at said second end;

(b) and elongated cylindrical member, said elongated cylindrical member having a first and second end and wherein said first and second ends are tapered to a point;

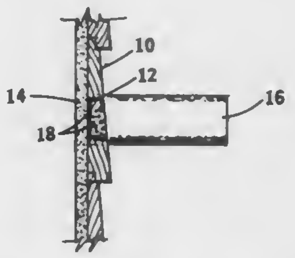
(c) means for retaining said elongated cylindrical member in said opening formed in said rectangular stud means at a location substantially midway along its length; and,

(d) wherein said means for retaining is a snap ring which is positioned over said elongated cylindrical member and biased against said elongated cylindrical member with a force sufficient to retain said elongated cylindrical member positioned with respect to said rectangular stud member.

---

### 5,014,483
### APPARATUS FOR REPAIRING HOLES IN WOOD

**Don L. Southern, 1918 Euharlee Rd., Kingston, Ga. 30145-2502**
**Filed Dec. 5, 1989, Ser. No. 446,089**
**Int. Cl.⁵ E02D** *37/00;* **B27G** *1/00*
**U.S. Cl. 52—514** **1 Claim**



1. An apparatus for repairing a piece of wood having a surface and a hole therein with a peripheral length, comprising:

a rod of closed cell polyethylene foam material having a moisture absorption of less than about five percent, and having a first end and a second end and having a curvilinear cross section and a circumferential length ten to twenty percent greater than said peripheral length of said hole, said rod being deformable so that said first end fits snugly into said hole with said second end protruding from said hole to be cut off flush with said surface of said wood, said rod expanding after being cut to conform to the shape of said hole.

---

### 5,014,484
### MODULE FOR EXPANDABLE TRUSS STRUCTURE AND EXPANDABLE TRUSS STRUCTURE EMPLOYING SAID MODULE

**Kazuo Tanizawa, and Jun Nakagawa, both of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Mar. 8, 1988, Ser. No. 165,518**
**Claims priority, application Japan, May 14, 1987, 62-117470; Jul. 7, 1987, 62-169119; Jul. 7, 1987, 62-169120; Jul. 8, 1987, 62-170006**
**Int. Cl.⁵ E04H** *12/18*
**U.S. Cl. 52—646** **35 Claims**

1. A module for an expandable truss structure which defines one unit of said structure and which is capable of being transformed from a folded state to a deployed state, said module comprising:

a stem having first and second ends;

a first coupler secured to said first end of said stem;

a slide hinge slidably mounted on said stem, said slide hinge being movable in an axial direction of said stem;

at least three ribs each pinned at a first end thereof to said slide hinge, said ribs being deployable radially about the axial direction of said stem and having a second end;

a second coupler pinned to the second end of each of said ribs;

slide hinge stop means for stopping said slide hinge at a predetermined position on said stem when said module is deployed;

an intermediate member connecting said first coupler and each of said second couplers, said intermediate member having a length sufficient to stop the corresponding rib so that the corresponding rib extends substantially at right angles to said stem when said module is deployed;

a tension member provided between each pair of adjacent second couplers in such a manner that said tension member is tensely stretched between said pair of adjacent second couplers when said module is deployed;

at least one of said second couplers having a second stem extending therefrom parallel to said stem.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,014,485

### CHAIR FOR REINFORCEMENT ROD

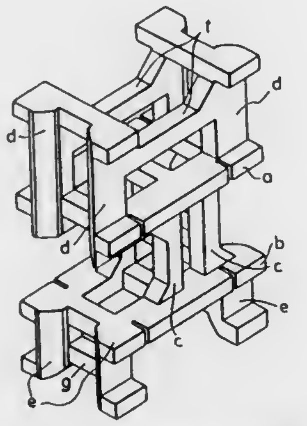
**Jyh-Chin Chang, 38, Kuang-Ming St., Pei-Chen Li, Lo-Tung, Yi-Lan Hsien, Taiwan**

**Continuation-in-part of Ser. No. 342,992, Apr. 24, 1989, Pat. No. 4,928,472. This application Apr. 6, 1990, Ser. No. 505,923**

**The portion of the term of this patent subsequent to May 29, 2007, has been disclaimed.**

**Int. Cl.$^5$ E04C** *5/16*

U.S. Cl. 52—678 2 Claims



1. A chair for concrete reinforcing rods comprising:

a body having a planar top frame member and a planar bottom frame member, each having a front side, a rear side, a left side and a right side, and two pairs of first connecting members placed between and connected to intermediate parts of said top and said bottom frame members;

said body further having two pairs of first leg members respectively extending upward from the corners of said top frame member, and two pairs of second leg members respectively extending downward from the corners of said bottom frame member;

said first connecting members and said top and said bottom frame members confining a left and a right first support seat adjacent said left and right sides of said top and said bottom frame members;

said first leg members and said bottom frame member confining a second support seat;

said second leg members and said bottom frame member confining a third support seat;

said second support seat being operative and said left and said right sides of said bottom frame member serving as an additional lower level supporting seat when said second leg members are placed downward, said third support seat being operative and said left and said right sides of said top frame member serving as an additional lower level supporting seat when said first leg members are placed downward, said first and said second leg members being different in length so that said second and said third support seats provide different supporting levels;

said left first support seat being operative when said right sides of said top and bottom frame members are placed downward, said right first support seat being operative when said left sides of said top and bottom frame members are placed downward;

said first connecting members having different distances from said left and right sides of said top and bottom frame members so that said left and right first support seats provide different supporting levels; and

improvements wherein each pair of said first connecting members has two bracing parts which interconnect said first connecting members and in turn are connected to said top and bottom frame members, respectively.

---

## 5,014,486

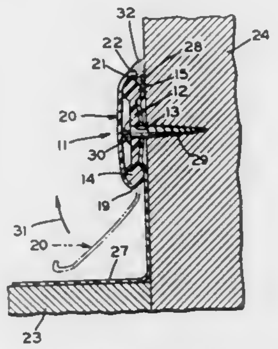
### ONE-PIECE SELF-COVERING TERMINATION BAR

**Robert L. Mayle, 601 N. Stone St., Fremont, Ohio 43420**

**Continuation-in-part of Ser. No. 271,726, Nov. 15, 1988. This application Jul. 24, 1990, Ser. No. 557,605**

**Int. Cl.$^5$ E04F** *19/02*

U.S. Cl. 52—717.1 10 Claims



1. A termination bar adapted to be secured to a building to cover an edge of a sheet of roofing material, comprising:

a longitudinally extending planar body having a generally planar central portion extending between a pair of edge portions thicker than said central portion, each of said edge portions extending below a lower surface of said central portion and a lower surface of said edge portions adapted to engage a surface to form a pair of sealing lines;

a longitudinally extending cover having a pair of generally parallel edges, one of said edges forming a first latching means and one of said edge portions forming a second latching means; and

a longitudinally extending hinge attached between the other one of said edge portions and the other one of said edges, said body, said cover and said hinge being formed of a flexible material whereby a continuous length of the termination bar can be wound in a coil, said cover can be pivoted about said hinge to superpose said cover on said body and at least one of said first and second latching means flexes under pressure to engage the other of said first and second latching means to maintain said cover in said superposed position.

---

## 5,014,487

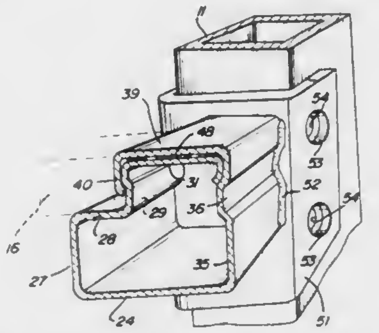
### RACK BEAMS AND METHOD OF MAKING SAME

**John R. King, West Bloomfield, Mich., assignor to S&K Enterprises, Inc., Detroit, Mich.**

**Filed Nov. 1, 1989, Ser. No. 429,971**

**Int. Cl.$^5$ A47F** *5/01;* **E04C** *3/07*

U.S. Cl. 52—731 9 Claims



1. A tubular beam formed of a single elongated bent sheet metal strip, comprising:

said sheet metal strip being bent into a roughly rectangular in cross section tube having a base, integral side walls, and

a two ply closure wall formed of the overlapping opposite edge portions of the sheet metal strip;

one of said edge portions forming an inner ply which extends from its side wall to the opposite side wall and having a flange on its free end in frictional engagement with an inner surface of the opposite side wall, and the other of said edge portion forming an outer ply that overlaps the inner ply with an end flange frictionally engaging a bulge portion in an outer surface of the opposite side wall;

the overlapping adjacent faces of the two plies being slightly spaced apart, and an adhesive material positioned within the space for adhesively laminating the plies together;

whereby the tube forms a unitary beam with a two ply laminated wall and three single ply walls.

---

## 5,014,488

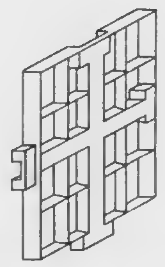
### METHOD FOR INSTALLATION OF BUILDING TILES WITHOUT ADHESIVE MATERIALS AND STANDARDIZED TILES FOR IMPLEMENTING THE SAME

**Grigoropoulos Evangelos, and Vallianatos Evangelos, both of P.O. Box 3884, GR-102 10 Athens, Greece**

**Filed Dec. 6, 1989, Ser. No. 446,623**

**Int. Cl.$^5$ E04B** *1/00;* **E04G** *21/00*

U.S. Cl. 52—746 5 Claims



1. Method for the installation of building tiles without adhesive materials, comprising the following stages:

mounting a vertically and horizontally oriented serial arrangement of plastic frame plates onto a bare unplastered planar or curved surface, each of said frame plates having longitudinally extending, vertically and horizontally oriented allignment channels, said channels alternately extending into mutually fitting protrusions and recessions forming said longitudinally extending channels, and

fitting a series of plastic standardized tiles upon said serial arrangement of frame plates, the external perimeter of each tile being formed with an arrangement of alternately extending protrusions and correspondingly shaped recessions, where in the assembly process each said protrusion is accurately inserted within said correspondingly shaped recession of an adjacent tile, thereby forming an overall planar tile-covered surface with vertically and horizontally running lines of cohesion, whereupon no waterproofing filler is required because of the broken-line section of each of said vertically and horizontally running lines of cohesion, where fitting of said series of plastic standardized tiles upon the previously installed said serial arrangement of plastic frame plates is performed when by means of a manually exerted slight pressure an arrangement of protrusions provided on the internal surface of each said tile is removably buttoned upon a corresponding arrangement of recessions provided on the external surface of each said frame plate.

---

## 5,014,489

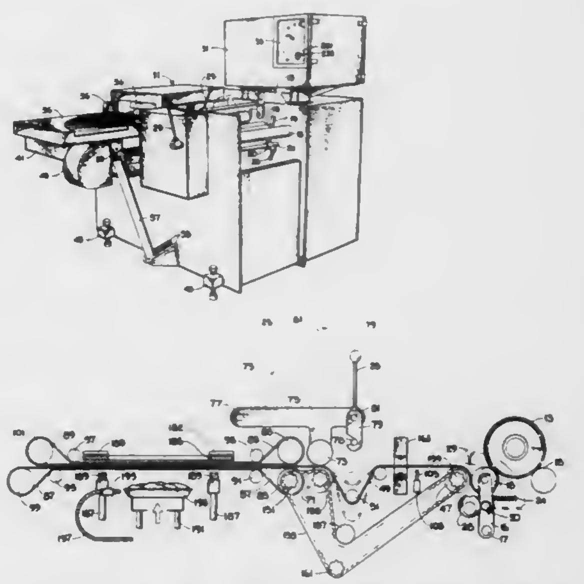
### FILM SHEET FEED FOR FOOD TRAY FILM WRAPPING MACHINE

**Frank Terminella; Emanuele Terminella, both of Fayetteville; William Stroud, Farmington, and Joseph E. Terminella, Fayetteville, all of Ark., assignors to Pacmac, Inc., Fayetteville, Ark.**

**Continuation-in-part of Ser. No. 404,215, Sep. 7, 1989. This application Jan. 19, 1990, Ser. No. 467,873**

**Int. Cl.$^5$ B65B** *11/18, 57/08, 57/16*

U.S. Cl. 53—51 12 Claims



1. In a tray package wrapper machine having means for supporting a roll of wrapping film, a wrapping station with motor driven elevator platform and folding arms for tucking film sheet edges under a tray on said platform, means for advancing trays to said wrapping station, and means for transporting trays away from said wrapping station, an improved film sheet feeding and perforating apparatus comprising

(a) a film feed motor separate from the motor for said elevator platform and folding arms, p1 (b) a film feed mechanism for advancing film drawn from said roll of wrapping film and connected to said film feed motor to move in direct relation to the movement of said motor,

(c) a plurality of rollers defining a path for film from said roll of wrapping film to said wrapping station, one roller of said plurality of rollers being mounted on a movable support and being provided with position adjusting means to allow lengthening and shortening of said path and two others of said rollers being driven rollers,

(d) a perforating knife for producing a line of perforations across said film, said knife being positioned upstream of said one roller and one of said driven rollers, but downstream from another of said driven rollers, and being operated in synchronism with said elevator platform and folding arms,

(e) a tray sensor for sensing presence of a tray to be wrapped,

(f) a mark sensor positioned upstream of said one roller for sensing an index mark on said sheet of film, and

(g) automatic motor control means for causing said film feed motor to rotate upon receiving signals from said tray sensor, and to stop rotating upon receiving a signal from said mark sensor in response to an index mark arriving at the mark sensor position.

### 5,014,490
## APPARATUS FOR THE FEEDING OF PACKAGING BLANKS TO A FOLDING UNIT

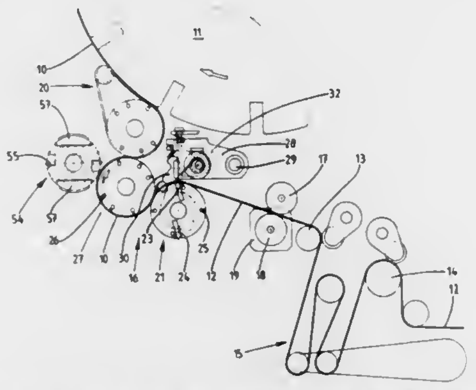
**Heinz Focke, Verden, and Jürgen Wach, Bremen, both of Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Fed. Rep. of Germany**

**Filed Sep. 20, 1989, Ser. No. 409,905**

**Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832533**

**Int. Cl.$^5$ B65B** *57/12*

**U.S. Cl. 53—73** **11 Claims**



1. An apparatus for feeding blanks of packaging material to a folding turret for wrapping groups of articles, comprising:
- (a) a blank severing station including a continuously rotatably driven cylindrical roller (**21**) mounting a pair of diametrically opposite cutting knives (**23, 24**), and a reciprocable counter knife (**22**) disposed for interaction with the cutting knives,
- (b) means for feeding a web (**12**) of packaging material to the severing station,
- (c) means for feeding blanks (**10**) severed from the web at the severing station to the folding turret, and
- (d) means responsive to an interruption of a supply of articles to be wrapped for intermittently moving the counter knife away from the roller in a cyclical manner, each time a cutting knife approaches and passes the counter knife, such that an end portion of the web is retained at the severing station, with the rotating cutting knives passing therealong, in position for an immediate resumption of blank severing and feeding operations upon a resumption of the supply of the articles.

---

### 5,014,491
## APPARATUS FOR SEAMING CAN END

**Shinichi Tsukada, Iwatsuki; Tsutomu Shinomiya; Eiichi Yoshino, both of Sapporo; Shigeki Yosbioka, Otaru, and Makoto Fujikawa, Sapporo, all of Japan, assignors to Hokkai Can Co., Ltd., Tokyo, Japan**

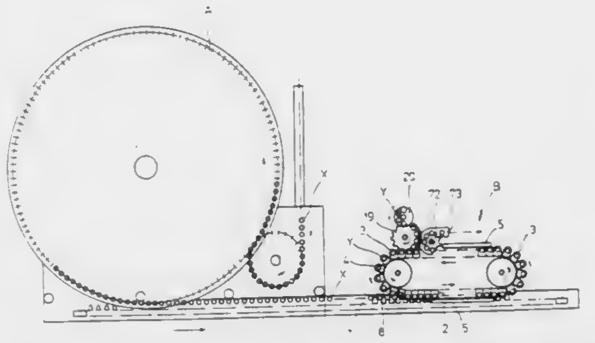
**Filed Apr. 27, 1989, Ser. No. 343,951**

**Claims priority, application Japan, Apr. 27, 1988, 63-102440; Jun. 10, 1988, 63-141482; Dec. 23, 1988, 63-323554**

**Int. Cl.$^5$ B65B** *7/28*

**U.S. Cl. 53—366** **42 Claims**

1. An apparatus for seaming a can end to a filled cylindrical can, comprising:
- can feed means for supporting the bottom of the can rotatably about its own axis and feeding the can linearly along a travel path at a predetermined speed;
- can end holder means for detachably holding the can end directly above said can feed means and holding the can end rotatably about its own axis;
- can end feed means for moving said can end holder means to feed the can end in synchronism with the can which is fed by said can feed means;
- lifting/lowering means for lowering said can end holder means to hold the can end held by said can end holder means against an open end of the can;
- seaming means extending linearly along said travel path for pressing an end hook of the can end and a flange of the can while the can against which the can end is held is being fed by said can feed means; and
- drive means for rotating said can end holder means and said can feed means to roll the can end and the can along said seaming means while the can is fed linearly along said travel path to seam the can end to the can while the end hook of the can end and the flange of the can are being pressed by said seaming means;



- wherein said filled cylindrical can and said can end are rotated in synchronism against said seaming means only subsequent to said can end being held against said filled cylindrical can.

---

### 5,014,492
## PROCESS AND APPARATUS FOR CLOSING A FLEXIBLE TUBE AFTER FILLING

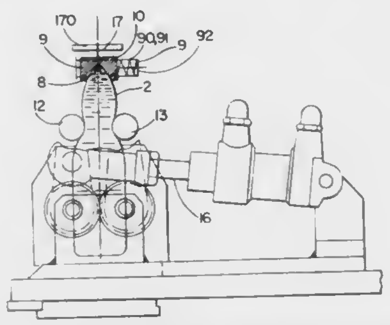
**Roland Fiorini, and Gérard Prayer, both of Sainte Menehould, France, assignors to Cebal, Clichy, France**

**Filed Nov. 22, 1989, Ser. No. 440,080**

**Claims priority, application France, Dec. 5, 1988, 88 17037**

**Int. Cl.$^5$ B65B** *7/06*

**U.S. Cl. 53—405** **12 Claims**



1. Process for sealing a flexible tube filled with a creamy or semi-pasty liquid product, comprising the steps of:
- disposing in an inverted position a tube skirt filled with said product to a predetermined level and open from the top of the tube as inverted;
- nipping said skirt by elastically tightening parallel surfaces above the predetermined level so as to provide an incomplete seal which permits the production of an end portion projecting beyond the incomplete seal at the top of the skirt as inverted, and causes the upper level of the product in the tube to rise and air to escape, said seal being obtained in the absence of an internal pressure;
- compressing said nipped skirt transversely to a longitudinal axis with respect to the skirt, and remote from the nipped portion, so as to locally reduce the internal cross-section of said skirt, said compression being limited such that the upper level of the product remains at a lower limit of or slightly below said incomplete seal;
- tightly sealing the end portion projecting beyond the incomplete seal, avoiding any pollution of the skirt by the product leading to a deterioration of said tightly sealed end portion; and
- removing the compression of said skirt.

---

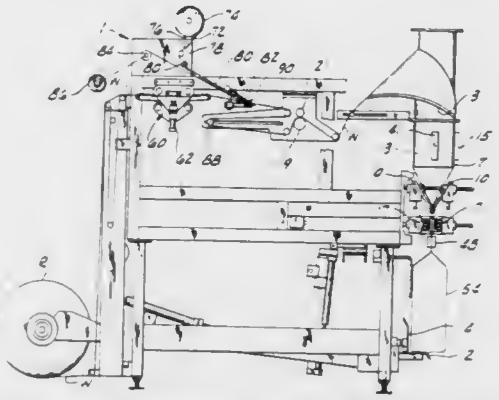
### 5,014,493
## FORM-FILL-SEAL PACKAGING

**George A. West, Mound, Minn., assignor to Bemis Company, Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 204,081, Jun. 8, 1988, abandoned. This application May 5, 1989, Ser. No. 347,079**

**Int. Cl.$^5$ B65B** *9/20, 61/00, 1/36, 1/40*

**U.S. Cl. 53—410** **36 Claims**



1. The method of bagging a fluent solid product, such as flour, comprising forming a web of flexible packaging material into tubing around a downwardly extending mandrel; intermittently feeding the tubing downwardly in bag length increments off the lower end of the mandrel with a dwell between each successive feed; transversely sealing the tubing at a level below the lower end of the mandrel during each dwell to form a top seal for a bag being completed and a bottom seal for the next bag; feeding an amount of product downwardly and out of the lower end of the mandrel during the interval between the formation of the bottom seal and the top seal for a bag, the amount being such as to fill the bag to a level somewhat below the top seal; and severing the tubing between each top and bottom seal; characterized in that, during each feed cycle, the tubing is fed downwardly off the lower end of the mandrel at a predetermined rate such that a predetermined volume of tubing is generated in a unit interval of time and in that product is fed downwardly and out of the lower end of the mandrel into the tubing at a predetermined rate so related to the rate of feed of the tubing that a predetermined volume of product substantially equal to said predetermined volume of tubing is fed into the tubing in said unit interval of time, wherein the web is fed from a supply to the mandrel and is provided at bag length intervals with air vents, one for each bag, along its path of travel from the supply to the mandrel, and wherein the air vents are provided by provided at least open opening in the web at a first station along the path of the web during each dwell of the web, the openings recurring at bag lengths intervals, and applying a path of filter material to the web over each opening at a second station downstream from the first, the web being formed into the tubing with the patches on the inside of the tubing.

---

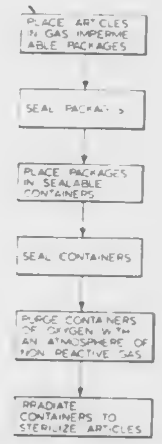
### 5,014,494
## METHOD OF STERILIZING MEDICAL ARTICLES

**Robert D. George, St. Charles, Mo., assignor to Sherwood Medical Company, St. Louis, Mo.**

**Filed Sep. 27, 1988, Ser. No. 249,979**

**Int. Cl.$^5$ B65B** *11/58, 31/00, 55/02*

**U.S. Cl. 53—425** **10 Claims**


PLACE ARTICLES IN GAS IMPERMEABLE PACKAGES
SEAL PACKAGES
PLACE PACKAGES IN SEALABLE CONTAINERS
SEAL CONTAINERS
PURGE CONTAINERS OF OXYGEN WITH AN ATMOSPHERE OF NON REACTIVE GAS
IRRADIATE CONTAINERS TO STERILIZE ARTICLES

1. A method of sterilizing medical articles which comprises:
- (a) placing the articles in gas permeable packages,
- (b) sealing the packages,
- (c) placing the packages in sealable containers,
- (d) sealing the containers,
- (e) pumping a non-reactive gas into the sealed containers,
- (f) permitting the packages to remain in the containers until the oxygen in the packages has been purged therefrom by the non-reactive gas, and
- (g) irradiating the packages and the articles to sterilize the latter while the packages are essentially purged of oxygen.

---

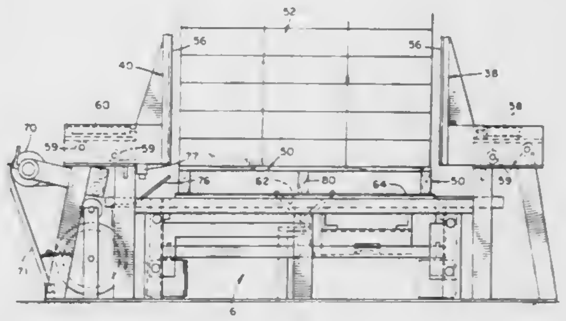
### 5,014,495
## METHOD AND APPARATUS FOR BAGGING PRODUCT UNITS

**Kevin J. Bolejack, 1514 Colusa Pl.; Frederick Forgnone, 270 San Benancho Canyon Rd., and Christopher McCoy, 710 Los Coches, all of Salinas, Calif. 93906**

**Filed Jan. 31, 1990, Ser. No. 473,919**

**Int. Cl.$^5$ B65B** *41/14, 11/50, 31/02, 67/12*

**U.S. Cl. 53—433** **33 Claims**



1. An apparatus comprising:
- squeezer means for temporarily supporting a load over a pallet while a plastic lining is deposited onto said pallet;
- liner depositing means for depositing said plastic lining onto said pallet;
- bag dispensing means for dispensing plastic bags over said load;
- positioner means for positioning a loaded said plastic-lined pallet beneath said bag dispensing means;

/OL
126
SS
2
MY
14
1991
UMI

VOL 126
ISS 2
MY 14
1991
UMI

sealing means for sealing said plastic-lined pallet to one of said plastic bags with said load inside said bag;

atmosphere replacing means for replacing the atmosphere inside a said sealed bag; and

means for moving a pallet from said squeezer and liner depositing means to said positioner means to said sealing means to said atmosphere replacing means.

---

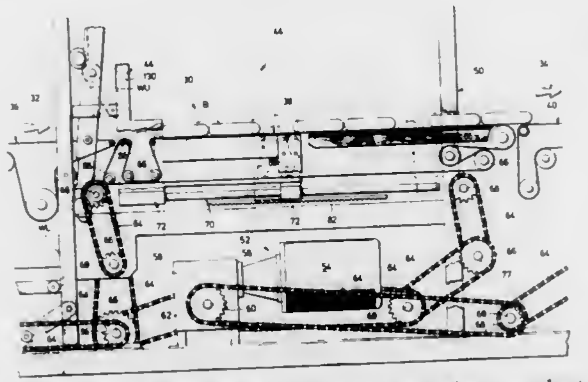
### 5,014,496
## METHOD OF AND APPARATUS FOR CONTINUOUS BAKERY PRODUCT WRAPPING

**Bill E. Davis, Irving; Eugene W. Myers, Allen; Richard B. Goodhart, Plano; William M. Paris, Highland Village, and James T. Borthwick, Jr., Dallas, all of Tex., assignors to Stewart Systems, Inc., Plano, Tex.**

**Filed Sep. 15, 1989, Ser. No. 408,103**

**Int. Cl.$^5$ B65B** *31/04, 9/02*

**U.S. Cl. 53—433** **29 Claims**



9. A method for continuous wrapping of bakery products with simultaneous sealing of the wrapping material into product packages as the bakery products continue uninterrupted progression along a bakery product path at a predetermined rate, comprising steps for:

feeding upper and lower lengths of wrapping material along the bakery product path;

conveying the bakery product groups between the upper and lower lengths of wrapping material;

providing jaws for sealing the wrapping material to effect transverse seals along the trailing edge of a first bakery product group and along the leading edge of a second bakery product group;

heating the jaws to effect the transverse seals;

moving the jaws along the bakery product path while effecting the transverse seals;

opening the jaws to release the wrapping material after the predetermined time required for effecting the transverse seals;

retracting the open jaws along the bakery product path to the point of beginning;

activating the jaws to effect the transverse seals of the trailing and leading edges of the next following bakery product groups;

removing the excess air from the bakery product packages having transverse seals; and

sealing the lateral edges of the bakery product packages after the excess air has been removed.

---

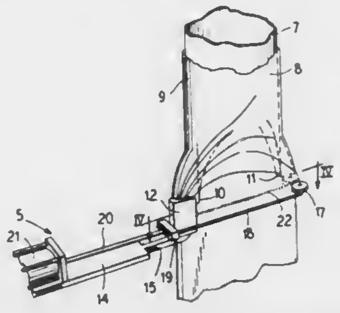
### 5,014,497
## METHOD AND APPARATUS FOR SMOOTHING OF BAG MAKING MATERIAL IN FORM, FILL AND SEAL MACHINES

**Michael J. McMahon, Palatine, Ill., assignor to Zip-Pak, Incorporated, Northbrook, Ill.**

**Filed Mar. 6, 1990, Ser. No. 490,839**

**Int. Cl.$^5$ B65B** *9/06*

**U.S. Cl. 53—451** **20 Claims**



19. A method of assuring substantial smoothness in bags formed from bag making film material on a form, fill and seal machine, comprising:

flattening the material below the discharge end of form fill nozzle means of the machine;

holding one edge of the flattened material against displacement; and

smoothing the material by running smoothing means across the flattened material from said held one edge of the flattened material to the opposite edge of the flattened material.

---

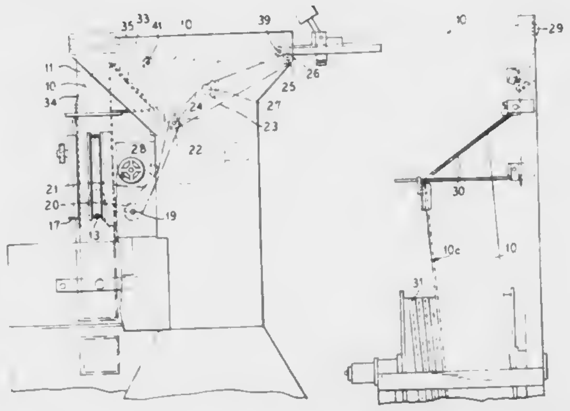
### 5,014,498
## WEB CONTROL MEANS AND METHOD FOR BAG MAKING MACHINE

**Michael J. McMahon, Palatine, Ill., assignor to Illinois Tool Works, Glenview, Ill.**

**Filed Jan. 12, 1990, Ser. No. 464,018**

**Int. Cl.$^5$ B65B** *9/08, 41/16;* **B31B** *1/84*

**U.S. Cl. 53—451** **22 Claims**



20. A method for making reclosable zipper bags on a form, fill and seal machine comprising the steps:

drawing a web of plastic film forwardly over a forming and filling tube for joining edges of the film to make a tubular container;

guiding the film over forming sboulders onto the tube;

and forming a tension-free bubble loop in the film in advance of the forming shoulders.

---

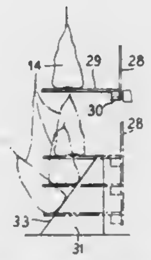
### 5,014,499
## STRETCH STRESS RELIEF FOR BAG THERMO-CROSS-SEALS IN VERTICAL FORM, FILL AND SEAL MACHINES

**Hugo Boeckmann, Arlington Heights, Ill., assignor to Zip-Pak, Incorporated, Northbrook, Ill.**

**Filed Mar. 15, 1990, Ser. No. 493,624**

**Int. Cl.$^5$ B65B** *9/20, 61/28*

**U.S. Cl. 53—451** **12 Claims**



1. In combination with a form, fill and seal package or bag making machine having a vertical forming and filling tube and means below the discharge end of said tube for cross-sealing a continuous tube of zipper profile equipped thermosealable bag making film for thermosealing the top edge of a filled bag and the lower edge of the next succeeding bag and pulling the film and bags downwardly a bag length distance and then releasing the filled bag to drop away from the next succeeding bag:

means for supporting the filled bag on a platform plate during cross-sealing to avoid stretch stress damage to its thermosealed top edge;

said platform plate having a slot;

and a push-off received in said slot with a cam edge for displacing the filled bag from the platform plate.

---

### 5,014,500
## DEVICE AND INSTALLATION FOR FORMING AND CLOSING TRAYS

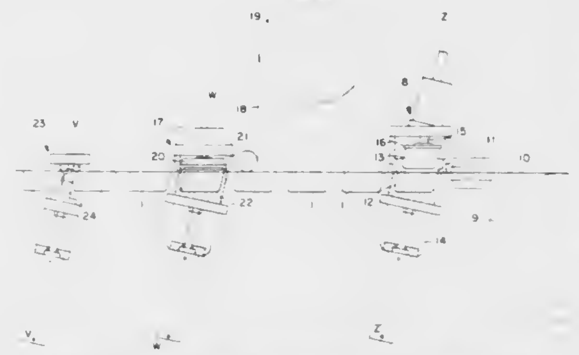
**Patrick Robache, Paris, France, assignor to Mecaplastic, Bagnolet, France**

**Filed Jun. 15, 1990, Ser. No. 538,701**

**Claims priority, application France, Jun. 16, 1989, 89 08005**

**Int. Cl.$^5$ B65B** *47/04, 47/02, 51/14*

**U.S. Cl. 53—559** **3 Claims**



1. A device for forming a packaging tray having two opposite parallel walls slanted in respect of a plane perpendicular to a sealing plane of said tray, in which two forming parts are carried on movable supports adapted for moving said parts along an axis parallel to slanted walls of said parts which form the slanted walls of the packaging tray which is to be produced, this displacement axis being also parallel to said slanted walls of said tray, said forming parts comprising an external female part and an internal punch.

---

### 5,014,501
## CARTONING MACHINE, FOR AUTOMATICALLY PLACING AN ARTICLE, IN PARTICULAR A BOTTLE, INTO A BOX

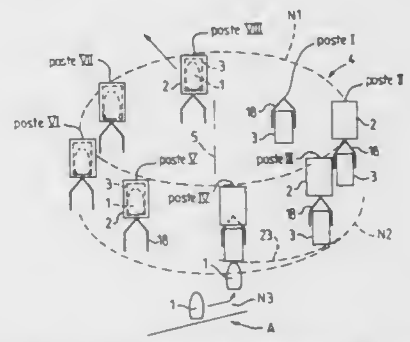
**Daniel Constantin; Jean-Jacques Fert, both of Paris, and Francine Mettivier, Cormeilles, all of France, assignors to L'Oreal, Paris and Etablissements Albert Aucouturier, Montreuil, both of, France**

**Filed Dec. 1, 1989, Ser. No. 444,199**

**Claims priority, application France, Dec. 2, 1988, 88 15847**

**Int. Cl.$^5$ B65B** *11/28, 21/24*

**U.S. Cl. 53—173** **16 Claims**



1. An apparatus for automatically placing an article into a container means comprising a turntable mounted to rotate about a substantially vertical axis in a plane defining a first level, said turntable having a plurality of receptacle means distributed about the periphery thereof each for receiving a container means in an open condition during movement past a first work station and for moving each container means incrementally through a plurality of successive work stations upon rotation of said turntable, a second level spaced vertically from said first level, means at said second level for moving an article vertically relative to a container means at one of said work stations, means for displacing the article at another work station vertically into the container means, a third level disposed intermediate said first and second levels and including means for supplying a sheet of wrapping material from a supply means for the sheets to sheet shaping means disposed at said third level for delivery to a corresponding receptacle means, said second level being disposed below said first level and said means for displacing operating to vertically raise the article for introduction into the container means, said receptacle means having a lower portion and said sheet shaping means including guide means extending from adjacent said third level to said lower portion of said receptacle means, said shaping means including contact means for engaging a ramp means for maintaining vertical movement of said shaper means, said shaping means being movable along said ramp means between said third and first levels for introduction into the container means.

---

### 5,014,502
## DOFFER ASSEMBLY FOR A HARVESTING UNIT OF A COTTON HARVESTER

**Kevin S. Richman, Aurora, and Jesse H. Orsborn, Hinsdale, both of Ill., assignors to J. I. Case Company, Racine, Wis.**

**Filed Apr. 19, 1990, Ser. No. 510,939**

**Int. Cl.$^5$ A01D** *46/14*

**U.S. Cl. 56—41** **17 Claims**

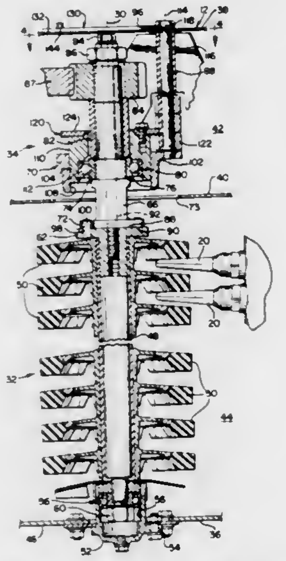
1. A cotton doffer assembly for a harvesting unit including a housing assembly wherein a picker rotor having a plurality of rows of picking spindles is rotatably mounted, said doffer assembly comprising:

a doffer unit disposed wholly within said housing assembly for rotation about a vertical axis and having a plurality of vertically spaced doffer pads positioned adjacent said spindles for removing cotton therefrom; and

an adjustable drive unit for imparting rotary motion to said doffer unit, said drive unit comprising a vertically mov-

VOL 1126 ISS 2 MY 14 1991 UMI

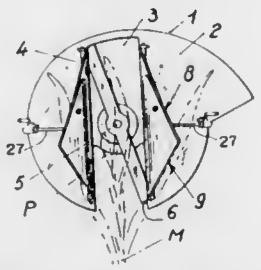
able drive shaft interconnected to and in axial alignment with the axis of said doffer unit for rotation about and movement along said vertical axis, operative means extending upwardly through said housing assembly and rotatable about a second vertical axis arranged adjacent said vertical axis of said doffer and drive units, and motion converting means arranged wholly within said housing assembly to reduce exposure to ambient environment in which said harvester operates for converting rotary motion of said operative means into linear movement of said shaft and thereby vertically locating the doffer pads of said doffer unit with respect to the spindles on the picker rotor.



---

### 5,014,503
### CORN STERILIZING MACHINE

**Marcel Morin, and Jacques Morin, both of Lailly En Val, France, assignors to Morin Freres, Lailly En Val, France**
**Filed Sep. 24, 1987, Ser. No. 100,616**
**Claims priority, application France, Oct. 3, 1986, 86 13801**
**Int. Cl.⁵ A01D** *27/00*
**U.S. Cl. 56—63** **20 Claims**

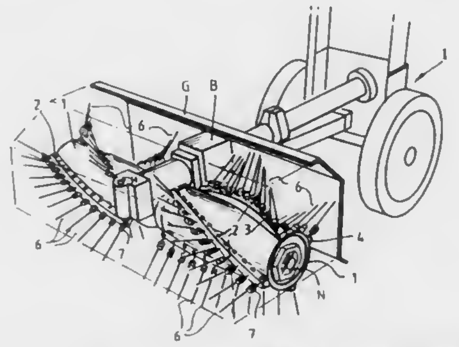


1. An apparatus for removing an upper portion of a plant comprising at least one castrating head, each said castrating head comprising:
- (a) at least one case having at least one surface;
- (b) a severing device located within each said case for severing said upper portion of said plant;
- (c) a slot located in said surface, being defined by at least two substantially vertical edges;
- (d) a shutter mounted proximate each of said edges, each said shutter comprising (1) a first ramp extending upwardly toward one of said edges and (2) a second ramp extending downwardly toward said one of said edges; and
- (e) a plant straightening device supported by said case.

---

### 5,014,504
### LAWN COMBER ATTACHMENT

**Walter Oechsle, 2 Halcyon Drive, Glen Waverley, Victoria, Australia 3150**
**Filed Jan. 4, 1990, Ser. No. 461,050**
**Int. Cl.⁵ A01D** *57/12*
**U.S. Cl. 56—372** **15 Claims**

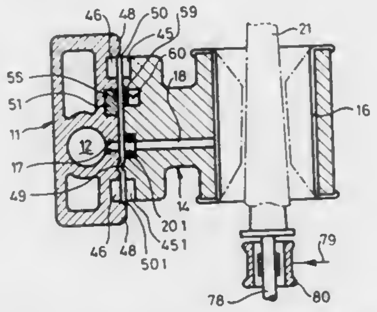


1. An implement for removing material lying on the ground comprising a drum supported for rotation in a generally horizontal orientation, said drum carrying a multiplicity of rows of radially extending tines extending from the surface of the drum, each row extending in a generally angular or helical path along the drum, each row being so spaced from its adjacent row that at least one of said tines is substantially always in contact with the ground in use whereby the tines act as a driving mechanism for the implement, each tine being formed such that it is resiliently flexible intermediate its ends.

---

### 5,014,505
### APPARATUS FOR CHANGING BOBBIN TUBES AND TUBE GRIPPER THEREFOR

**Joerg Wernli; Daniel Brennwalder; Markus Erni, all of Winterthur; Isidor Fritschi, Andelfingen, and Andreas Wanzenried, Wittenwil, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland**
**Division of Ser. No. 233,564, Aug. 18, 1988, abandoned. This application Feb. 27, 1990, Ser. No. 485,946**
**Claims priority, application Switzerland, Aug. 18, 1987, 3169/87**
**Int. Cl.⁵ D01H** *9/00*
**U.S. Cl. 57—275** **5 Claims**

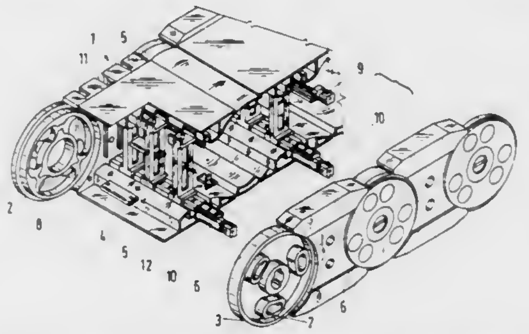


1. Apparatus for changing bobbin tubes on a textile machine comprising
- at least one doffer bar;
- a plurality of tube grippers individually removably connected laterally of said bar;
- an electrical conductor path having spaced apart breaks on said bar;
- bridging means on each gripper for bridging over a respective break in said conductor path; and
- means connected with said conductor path for responding to a current change therein in response to removal of a gripper from said bar.

---

### 5,014,506
### GUIDE CHAIN FOR GUIDING ENERGY LINES

**Werner Moritz, Siegen, Fed. Rep. of Germany, assignor to Kabelschlepp Gesellschaft mit beschränkter Haftung, Siegen, Fed. Rep. of Germany**
**Filed Aug. 3, 1990, Ser. No. 562,635**
**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1989, 3928234**
**Int. Cl.⁵ F16G** *13/16*
**U.S. Cl. 59—78.1** **8 Claims**

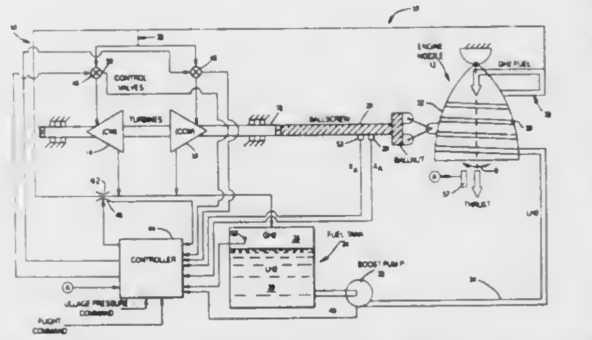


1. In a guide chain for energy lines comprising chain link members and having a separable strap between each two of said chain link members, with said strap comprising at least two crosspieces that are interconnected by separating members that extend transverse to said crosspieces and provided with openings, with said strap further comprising dividers that are disposed parallel to said crosspieces, the improvement comprising.
- perforated strips that are respectively disposed between one of said crosspieces and said separating members, with said separating members being provided with brackets that receive said perforated strips and being furthermore provided with pins to engage said perforated strips;
- insertion elements disposed in said openings of said separating members, with said dividers being mounted on said insertion elements;
- each of said dividers having a flat, C-shaped cross-sectional configuration with a longitudinal slot to permit axial as well as transverse placement of said divider on said insertion element.

---

### 5,014,507
### DIRECT DRIVE GASEOUS HYDROGEN TURBO ACTUATOR

**John N. Rice, and Richard W. Reynolds, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**
**Filed Dec. 14, 1989, Ser. No. 450,531**
**Int. Cl.⁵ F02K** *9/42*
**U.S. Cl. 60—204** **27 Claims**

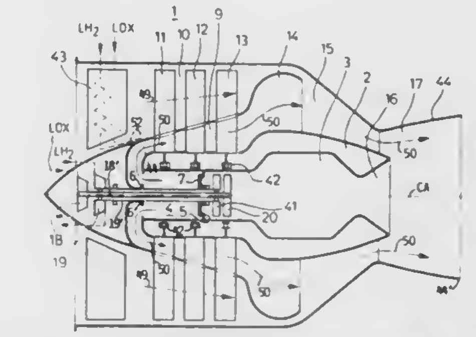


25. A method of generating a power output from a gas flowing in a gas circuit having parallel first and second paths to an ullage in a tank which stores a liquid form of the gas in a portion of the tank comprising:
- controlling a flow of gas in the first path in which is disposed at least one power generating device for providing a controlled power output from energy of the gas flowing in the first path; and
- controlling a flow of gas in the second path so that a controlled mass flow of gas to the ullage occurs through the gas circuit independent of variation of a mass of gas flow in the first and second paths.

---

### 5,014,508
### COMBINATION PROPULSION SYSTEM FOR A FLYING CRAFT

**Hans Lifka, Kochel, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany**
**Filed Mar. 16, 1990, Ser. No. 494,990**
**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1989, 3909050**
**Int. Cl.⁵ F02K** *9/78, 9/48, 3/02*
**U.S. Cl. 60—224** **11 Claims**



1. A combination propulsion system for a flying craft capable of flying at speeds within the range of subsonic speeds to hypersonic speeds, comprising a rocket engine section, a turbo air jet engine section coaxially surrounding said rocket engine section, said turbo air jet engine section including a compressor and at least one turbine independent of external atmospheric air, gas generator means (4, 24) operable with excess fuel for generating combustion gases, two valving mechanisms for controlling gas flow out of said gas generator means, said valving mechanisms being controllable for selectively providing a flow mechanical connection to a rocket combustion chamber (3, 23) or to said turbine of said turbo air jet engine section, said turbine and said compressor of said turbo air jet section each comprising several counter-rotating running wheels without any intermediate guide wheel, wherein each running wheel of said turbine forms with one running wheel of said compressor of said turbo air jet engine section a free wheeling rotor, and wherein said turbo air jet engine section comprises a turbo combustion chamber and gas distributor means leading from said turbine and compressor to said turbo combustion chamber of said turbo air jet engine section for mixing turbine propellant gases with inflowing outside air.

---

### 5,014,509
### DIESEL ENGINE WHITE SMOKE CONTROL SYSTEM

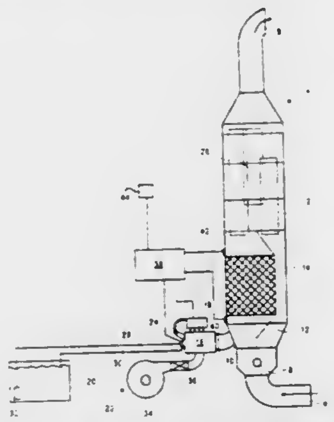
**Louis C. Broering, Hope, and Paul R. Miller, Columbus, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.**
**Filed Dec. 27, 1989, Ser. No. 457,965**
**Int. Cl.⁵ F01N** *3/02*
**U.S. Cl. 60—274** **12 Claims**

1. A method of reducing the emission of condensed unburned fuel from diesel engines including the steps of;
- determining ambient air temperature,
- determining exhaust gas temperature;

VOL 1126 ISS 2 MY 14 1991 UMI

comparing the determined ambient air temperature to a predetermined ambient air temperature;

comparing the determined exhaust gas temperature to a predetermined exhaust gas temperature; and

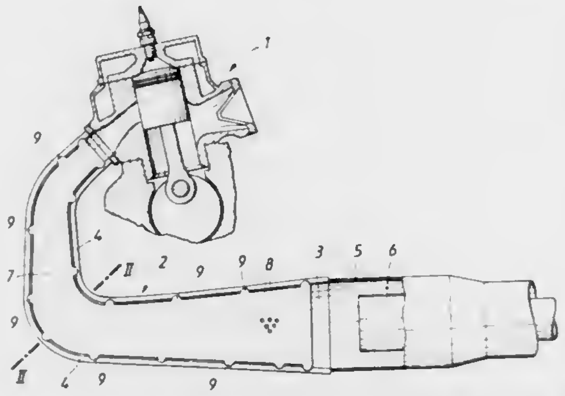


activating a heating means to heat said exhaust gas if said ambient air temperature is less than said predetermined ambient air temperature and said exhaust gas temperature is less than said predetermined exhaust gas temperature.

---

### 5,014,510
## EXHAUST SYSTEM, PARTICULARLY FOR TWO-STROKE CYCLE INTERNAL COMBUSTION ENGINES

**Franz Laimböck, Waldsdorfberg 86, A-8051 Graz-Thal, Austria**
**Filed May 8, 1990, Ser. No. 520,235**
**Claims priority, application Austria, Jun. 1, 1989, 1330/89**
**Int. Cl.$^5$ F01N** *3/18*
**U.S. Cl. 60—299** **11 Claims**



1. In an exhaust gas system for connection to an exhaust gas outlet of an internal combustion engine, which system comprises

a portion which is adapted to be connected to said exhaust gas outlet and consists of two sheet metal sections, which are connected by joints to form a shell having an inlet end and an outlet end, and

a catalytic converter contained in said shell,

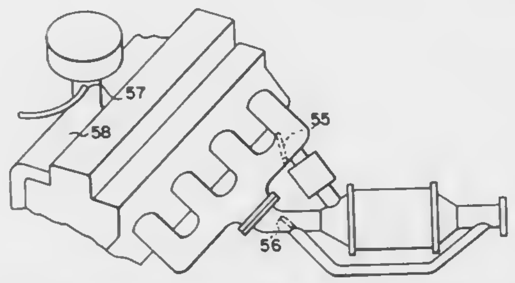
the improvement residing in that

said converter consists of a partition, which extends between said two shell sections in the direction from said inlet end to said outlet end and is coated with catalytic material.

---

### 5,014,511
## FILTRATION SYSTEM FOR DIESEL ENGINE EXHAUST-II

**Wallace R. Wade, Farmington Hills, and Vemulapalli D. N. Rao, Bloomfield Township, Oakland County, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**
**Division of Ser. No. 849,927, Apr. 9, 1986, Pat. No. 4,686,827. This application Mar. 4, 1987, Ser. No. 21,847**
**Int. Cl.$^5$ F01N** *3/02*
**U.S. Cl. 60—303** **3 Claims**



1. A regeneration system for a particulate filter used to collect particulates from the exhaust gas of a diesel engine, said engine having an intake manifold **58** and an exhaust manifold **52** for respectively introducing and extracting an engine gas flow to support engine operation, comprising:

(a) means **57** for selectively adding excess hydrocarbon fuel to the gas flow through the intake manifold **58** of said engine when regeneration is desired and while said engine is operating thereby to form only a hydrocarbon rich exhaust gas resulting from combustion;

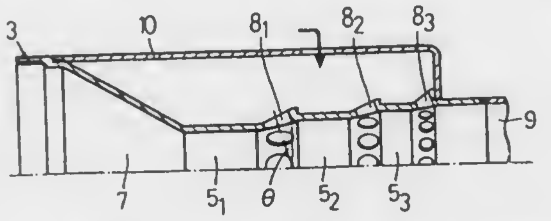
(b) a supplementary heated catalyst **17** located between said exhaust manifold and said filter **15** for acting upon the hydrocarbon rich exhaust gas flow from said engine, said catalyst being effective to bring about further ignition of said hydrocarbon rich exhaust gas and produce a heated exhaust gas at least at a temperature of 400°–700° C. high enough in temperature to ignite at least a portion of the particulates in said filter; and

(c) means **28/29** for sustaining oxidation of said particulates after being ignited until a desired portion of collected particulates have been oxidized.

---

### 5,014,512
## ACCELERATION DEVICE OF EXHAUST GAS STREAM FOR AN INTERNAL COMBUSTION ENGINE

**Yoshiaki Kakuta, 1-8-1, Hamakawado, Kasukabe-shi, Saitama-Ken, Japan**
**Filed Mar. 6, 1989, Ser. No. 319,286**
**Claims priority, application Japan, Nov. 1, 1988, 63-276926**
**Int. Cl.$^5$ F01N** *5/04*
**U.S. Cl. 60—319** **1 Claim**

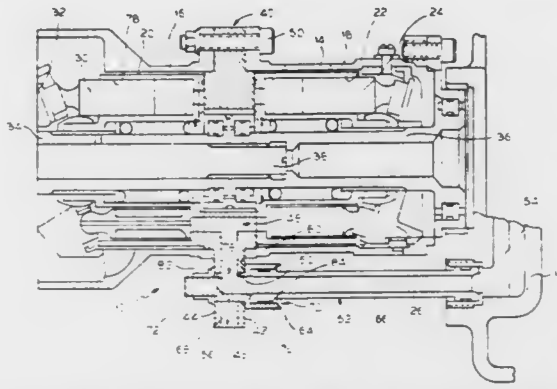


1. In combination with an internal combustion engine including an exhaust system pipe for discharging exhaust gasses from said engine into the air, said exhaust system pipe including an acceleration portion for self accelerating the flow velocity of the exhaust gas stream disposed in at least one stage in the downstream area of said exhaust system pipe, said pipe being loaded with the resistance of itself and a catalyzer and a muffler provided in said exhaust system pipe upstream from said acceleration portion, said acceleration portion comprising a throttle pipe throat for converting the kinetic energy of the exhaust gas stream into the flow velocity, said acceleration portion including sectional area decreasing means gradually decreasing the sectional area of the flow passage of said exhaust pipe, said acceleration portion defining a sectional zone of lowest section, the section of said lowest section being predetermined relative to the displacement of said engine and the expected operating speed range thereof, whereby said acceleration portion will not be so restrictive to gas flow therethrough during high engine speed operation to result in too large back pressure, but in case of low engine speed operation back pressure will be increased an amount to induce low speed torque, said acceleration portion thereby serving to modulate exhaust back pressures in said exhaust pipe system, said sectional area decreasing means including sectional area increasing means successively step-increasing said sectional area immediately downstream from said section of said lowest section, and educting means for educting gas into each sectional area of increasing sectional area between successive step-increased sectional areas.

---

### 5,014,513
## SELF-SEALING TRANSFER TUBE FOR PORT PLATE

**Vernon L. Sundstrom, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**
**Filed Aug. 30, 1989, Ser. No. 400,349**
**Int. Cl.$^5$ F04B** *39/12*
**U.S. Cl. 60—456** **11 Claims**



1. In a hydraulic machine of the displacement type including a port plate having opposite side walls connected by a peripheral edge wall and having port openings extending between said side walls to define hydraulic inlet and outlet ports, a means for communicating with a hydraulic supply comprising:

a first bore inwardly directed from the edge wall of said port plate and opening into one of said port openings;

a second bore through said port plate extending between said sidewalls and intersecting said first bore;

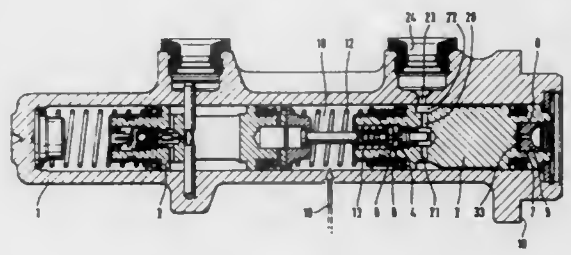
a transfer tube defining a tubular conduit having a sidewall, an open end for connection to a hydraulic supply, a closed end and an aperture through said sidewall adjacent to said closed end and opening into said conduit; and

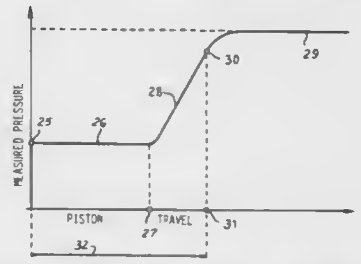
means mounting said transfer tube in said port plate second bore with said aperture aligned inwardly with said first bore to provide hydraulic communication between the one of said port openings and a hydraulic supply and with said side wall providing a seal between said edge wall and said second bore.

---

### 5,014,514
## METHOD FOR ASSEMBLING A PISTON-AND-CYLINDER UNIT WITH A FORCE TRANSMISSION ELEMENT

**Hans-Dieter Reinartz, Frankfurt am Main; Helmut Steffes, Hattersheim, and Holger V. Hayn, Bad Vilbel, all of Fed. Rep. of Germany, assignors to Alfred Treves GmbH, Frankfurt am Main, Fed. Rep. of Germany**
**Filed Jun. 16, 1989, Ser. No. 367,156**
**Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823630**
**Int. Cl.$^5$ F15B** *7/00*
**U.S. Cl. 60—533** **4 Claims**





1. The method of adjusting a brake system master cylinder unit to establish a predetermined distance of travel of a pressure means of said unit induced by an external force applying means from a rest position to a pressure applying position wherein said unit comprises a housing having a piston receiving bore therein having a closed forward end and an open rear end, means defining a supply passage in said housing opening into said bore at a location spaced forwardly from said rear end, a pressure piston slidably and sealingly received within said bore for forward and rearward movement relative to said housing in overlapping relationship to said supply passage and defining a pressure chamber in said bore at the forward end of said piston, a force transmitting member carried on the rearward end of said piston for engagement by said external force applying means, a spring seat in said pressure chamber spaced forwardly from said piston, first spring means engaged between said seat and said piston biasing said piston rearwardly relative to said spring seat to a rest position, valve means in said piston for controlling communication between said chamber and said supply passage and including a valve head movable forwardly and rearwardly relative to said piston and a valve seat located rearwardly of said head, second spring means biasing said valve head rearwardly of said piston toward said valve seat, and stop means on said valve head engageable with said spring seat limiting rearward movement of said valve head relative to said seat, said piston when in said rest position locating said valve head in forwardly spaced relationship to said valve seat to place said chamber in communication with said supply passage and being operable upon forward movement relative to said spring seat to enable said second spring means to shift said valve head onto said valve seat to block communication between chamber and said supply passage;

said method comprising the steps of advancing said piston forwardly from said rest position while continuously

VOL
1126
ISS
2
MY
14
1991
UMI

observing a parameter representative of the magnitude of the force resisting the forward movement of said piston, measuring the distance of travel of said piston from its rest position to a position at which a substantial variation of the observed parameter indicative of a sudden increase in the magnitude of the resisting force occurs, and adjusting the position of said force transmitting member rearwardly of said piston by an adjusting distance equal to the measured distance of travel minus said predetermined distance of travel.

---

### 5,014,515

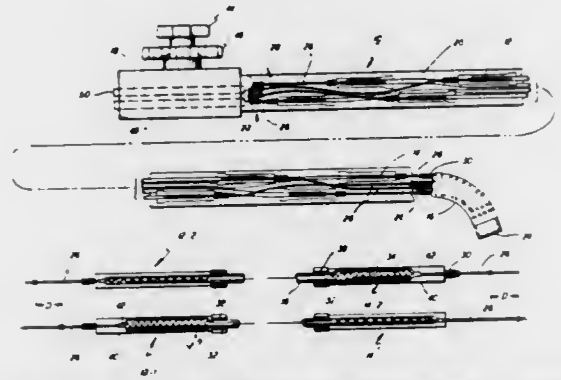
### HYDRAULIC MUSCLE PUMP

**Allan I. Krauter, Syracuse, N.Y., assignor to Welch Allyn, Inc., Skaneateles Falls, N.Y.**

**Division of Ser. No. 357,806, May 30, 1989, Pat. No. 4,962,751. This application Jun. 1, 1990, Ser. No. 531,529**

**Int. Cl.$^5$ F01B** *19/00;* **F16J** *3/00*

**U.S. Cl. 60—581** **3 Claims**



1. A hermetically sealed liquid actuation system for transferring tensive linear motion from a local to a remote device comprising a first liquid dynamic muscle disposed at the distal end of said actuation system, a second liquid dynamic muscle disposed at the proximal end of said liquid actuation system, and a tubular conduit connecting said first and second muscles for transferring liquid from one liquid dynamic muscle to the other each liquid dynamic muscle comprising:

a semi-rigid tubular sheath;

an elongated elastomeric bladder positioned within said tubular sheath,

a tubular braid member with proximal and distal ends disposed over said bladder within the said tubular sheath,

said braid formed of a plurality of flexible yet substantially inextensible filaments permitting said bladder therewithin to expand laterally when filled with liquid but restraining the bladder such that as said tubular braid increases in diameter, the braid contracts axially,

a liquid conduit hermetically sealed at one to said bladder in said distal liquid dynamic muscle and at the other end to said bladder in said proximal liquid dynamic muscle;

anchor means for anchoring one end of said tubular braid to one end of said tubular sheath of the distal liquid dynamic muscle;

anchor means for anchoring one end of the sheath to one end of said braid at the proximal liquid dynamic muscle;

a termination enclosing the other end of said tubular braid at each of said proximal and distal liquid dynamic muscles;

tendon means connected to said termination for carrying tensive force from said braid when said bladder and braid expand; and

a flexible sheath member disposed about said tendon means for providing compressive reaction forces to said tensive force connected to the other one end of said tubular sheath so that when a tensive force is applied to tendon means at the proximal fluid dynamic muscle, a proximal bladder and tubular braid is pulled to an elongated condition forcing liquid to the distal end of said liquid actuating system to cause the bladder and tubular braid member therein to expand in diameter and contract axially to apply a tensive force in an amount related to the distance the proximal tendon member was pulled to thereby transfer the proximal tensive linear motion to the distal end of the hydraulic actuation system so as to provide an elongated flexible actuation system for transferring linear tensive motion from an input actuator to a remote device.

---

### 5,014,516

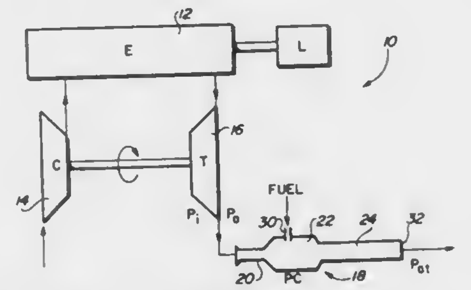
### TURBOCHARGER WITH DOWNSTREAM PRESSURE-GAIN COMBUSTOR

**Sanjay V. Sherikar, Phoenix, Ariz., assignor to Tiernay Turbines, Phoenix, Ariz.**

**Filed Mar. 13, 1989, Ser. No. 322,284**

**Int. Cl.$^5$ F02B** *37/00*

**U.S. Cl. 60—605.1** **3 Claims**



1. A turbocharger comprising:

(a) an internal combustion engine;

(b) a compressor located upstream of said internal combustion engine for increasing the inlet pressure of said internal combustion engine;

(c) a turbine located downstream of said internal combustion engine and mechanically coupled to said compressor for driving said compressor; and

(d) a pressure-gain combustor located downstream of said turbine for decreasing the outlet pressure of said internal combustion engine and thus increasing the turbine power output and improving the starting characteristics of said turbocharger.

---

### 5,014,517

### CRYOGENIC SORPTION PUMP

**Marxen P. Larin, prospekt Nauki, 29, kv. 78; Maxim L. Alexandrov, prospekt Engelsa, 63, korpus 3, kv. 89, and Valery I. Nikolaev, prospekt Rentgena, 15/31, kv. 8, all of, Leningrad, U.S.S.R.**

**PCT No. PCT/SU89/00036, § 371 Date Nov. 14, 1989, § 102(e) Date Nov. 14, 1989, PCT Pub. No. WO89/08781, PCT Pub. Date Sep. 21, 1989**

**PCT Filed Feb. 10, 1989, Ser. No. 439,366**

**Claims priority, application U.S.S.R., Mar. 10, 1988, 4391234**

**Int. Cl.$^5$ B01D** *8/00*

**U.S. Cl. 62—55.5** **2 Claims**

1. A cryogenic sorption pump, comprising:

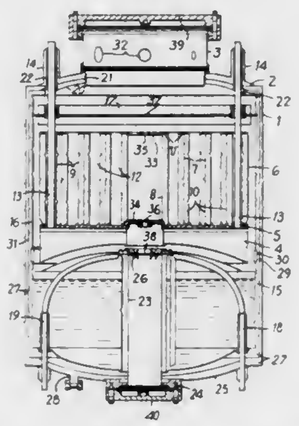
a cold radiation screen; and

a pumping element, encompassed by said cold radiation screen, comprising:

a vessel for cryogenic agent having an axis and a cover;

heat conductor shells mounted co-axially with said axis of said vessel, and secured to and in thermal contact with said cover of said vessel;

porous-screen shells secured to and in thermal contact with said cover of said vessel, and mounted co-axially with said heat conductor shells so that annular spaces are formed between each of said heat conductor shells and an adjacent porous-screen shell, said annular spaces being filled with an adsorbent.



---

### 5,014,518

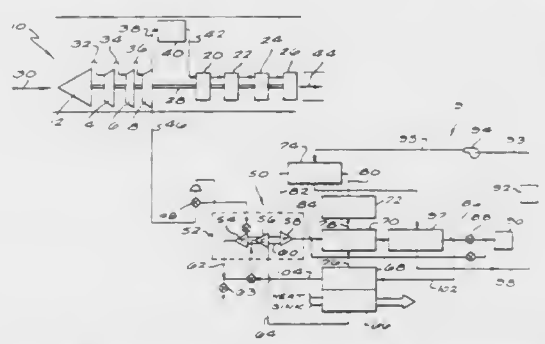
### ECS WITH ADVANCED AIR CYCLE MACHINE

**Mark W. Thomson, Ventura, and Dan S. Matulich, Rolling Hills Estates, Terence P. Emerson, Hermosa Beach, both of Calif., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Jun. 23, 1989, Ser. No. 370,539**

**Int. Cl.$^5$ F25B** *9/00;* **F25D** *9/00*

**U.S. Cl. 62—88** **24 Claims**



1. An air cycle machine for use within an environmental control system, comprising:

first turbine means for extracting useful work from a flow of high temperature gas;

compressor means for receiving said flow of gas from said first turbine means and re-pressurizing said flow of gas to a higher pressure;

second turbine means for receiving said flow of pressurized gas conducted within said environmental control system from said compressor means to said second turbine means. and for extracting useful work therefrom;

shaft means for interconnecting said first turbine means. said compressor means, and said second turbine means. said compressor means thereby directly driven by both of said first and second turbine means; and

housing means for enclosing and supporting said first and second turbine means. said compressor means. and said shaft means.

---

### 5,014,519

### AUTOMOTIVE AIR TEMPERING APPARATUS

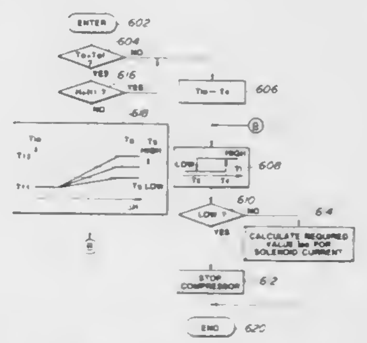
**Ikutaro Noji, Sagamihara City; Masaki Kato, Chigasaki City; Masaki Kaiju, Hadano City, and Ikuo Kinami, Fujisawa City, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan**

**Filed Apr. 17, 1990, Ser. No. 510,217**

**Claims priority, application Japan, Apr. 29, 1989, 1-110575**

**Int. Cl.$^5$ F25B** *29/00;* **B60H** *1/00*

**U.S. Cl. 62—176.3** **10 Claims**



1. An air tempering apparatus for use in an automotive vehicle having a duct through which air is directed into a passenger compartment, comprising:

air chilling means having a variable refrigerating capacity of chilling the air in the duct;

first sensor means provided in the duct downstream of the air chilling means for sensing chilled air temperature;

air reheating means provided in the duct downstream of the first sensor means, the air reheating means having a variable reheating capacity of reheating the chilled air in the duct;

first control means for controlling the refrigerating capacity of the air chilling means;

second control means for controlling the reheating capacity of the air reheating means to determine a final temperature of tempered air discharged into the passenger compartment, the second control means decreasing the reheating capacity of the air heating means as the sensed chilled air temperature increases;

second sensor means for sensing humidity in the passenger compartment;

third sensor means for producing a signal when the reheating capacity of the air reheating means is greater than a predetermined value; and

a control unit coupled to the first and second sensor means for producing a first command signal causing the first control means to decrease the refrigerating capacity of the air chilling means in response to the signal from the third sensor means when the sensed humidity is less than a predetermined value.

---

### 5,014,520

### CONTROL DEVICE HAVING A COILED COMPRESSION SHAPE MEMORY SPRING, REFRIGERATOR SYSTEM UTILIZING THE CONTROL DEVICE AND METHODS OF MAKING THE SAME

**Robert E. Orner, Stratford; Aurelio V. Cassarino, West Hartford, and Roger P. Sepso, Stratford, all of Conn., assignors to Robertshaw Controls Company, Richmond, Va.**

**Filed Apr. 6, 1990, Ser. No. 506,439**

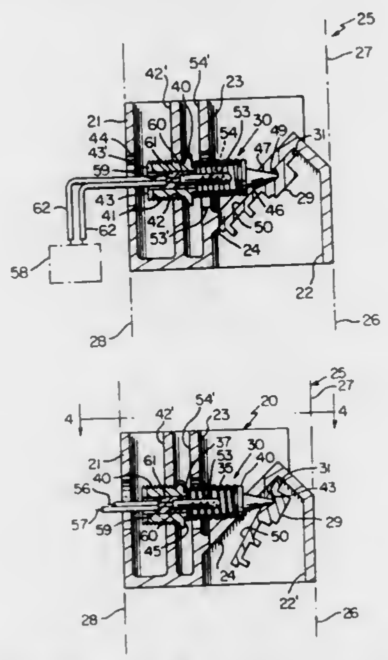
**Int. Cl.$^5$ F25D** *17/06*

**U.S. Cl. 62—187** **18 Claims**

16. In a method of making a control device comprising a housing means having a valve seat means and having an inlet means and an outlet means interconnected together by said valve seat means. a movable valve member carried by said housing means and being adapted to open and close said valve seat means by being respectively moved to an open position

VOL 1126
ISS 2
MY 14
1991
UMI

thereof and a closed position thereof, and a coiled compression shape memory spring means carried by said housing means and being operatively interconnected to said valve member to move said valve member to one of said positions thereof by said spring means axially expanding from a closed coil bound condition thereof upon said spring means sensing a temperature above a first temperature and to move said valve member to the other of said positions thereof by said spring means axially contracting into said closed coil bound condition thereof upon said spring means sensing a temperature below a second temperature, the improvement comprising the step of forming an electrically operated heater means to have at least a portion thereof disposed within the coils of said spring means when said spring means is in said closed coil bound condition thereof so as to heat said spring means to a temperature above said first temperature when said heater means has been energized for a certain time period.



---

### 5,014,521
### REFRIGERATION SYSTEM IN ICE MAKING MACHINE

**Tadashi Sakai, Toyoake; Katsunobu Minari, and Hideji Ohta, both of Nagoya, all of Japan, assignors to Hoshizaki Denki Kabushiki Kaisha, Aichi, Japan**

**Filed Mar. 6, 1990, Ser. No. 489,153**

**Claims priority, application Japan, Mar. 6, 1989, 1-53558**

**Int. Cl.$^5$ F25B *41/04***

U.S. Cl. 62—212 **2 Claims**

1. A refrigeration system in an ice making machine comprising:

a refrigerant compressor;

a condensing coil;

an evaporator coil connected at an inlet side thereof to an outlet of said refrigerant compressor through said condensing coil and connected at an outlet side thereof to an inlet of said refrigerant compressor;

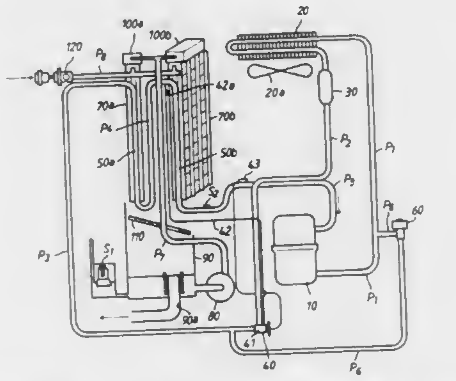
an externally equalized type of expansion valve interposed between said condensing coil and said evaporator coil to expand a liquified refrigerant applied thereto from said condensing coil and supply expanded liquified refrigerant into said evaporator coil;

a hot gas bypass line connected in parallel with said condensing coil and said expansion valve;

a normally closed type solenoid valve disposed within said hot gas bypass line to permit a flow of hot gas supplied therethrough from said refrigerant compressor into said evaporator coil when said solenoid valve has been energized;

an external equalizer pipe having an extremity connected to an intermediate portion of said evaporator coil between the inlet and outlet sides thereof and having another end connected to said expansion valve;

a return line between the outlet side of said evaporator coil and said refrigerant compressor; and



a thermostat bulb, located on said return line, filled with thermally expandable fluid an amount of which is determined to cause a maximum working pressure acting on said expansion valve higher than a pressure of refrigerant at the intermediate portion of said evaporator coil during a freezing cycle of the refrigeration system and lower than a pressure of hot gas at the intermediate portion of said evaporator coil during a defrost cycle of the refrigeration system.

---

### 5,014,522
### AUTOMOTIVE AIR TEMPERING APPARATUS

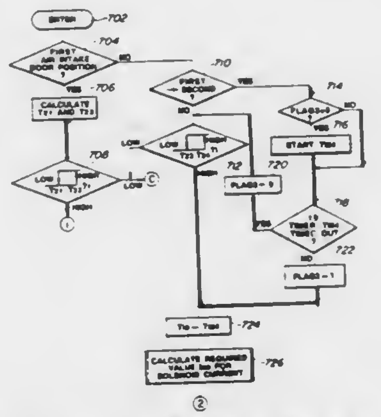
**Ikutaro Nojl, Sagamihara; Masaki Kaiju, Hadano; Hideyuki Sakamoto, Sagamihara, and Makoto Fukubayashi, Zama, all of, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Apr. 17, 1990, Ser. No. 510,236**

**Claims priority, application Japan, Apr. 29, 1989, 1-110577**

**Int. Cl.$^5$ F25B *1/00;* B60H *1/32***

U.S. Cl. 82—227 **3 Claims**



1. An air tempering apparatus for use in an automotive vehicle having a duct through which air is directed into a passenger compartment, comprising:

means for introducing air into the duct selectively from one of the atmosphere and the passenger compartment;

air chilling means including an evaporator provided in the duct and a compressor having a displacement variable for supplying a controlled amount of refrigerant to the evaporator for chilling the air in the duct;

first sensor means provided in the duct downstream of the evaporator for sensing chilled air temperature;

second sensor means for sensing refrigerant temperature;

third sensor means for producing a first signal when air is introduced into the duct from the atmosphere and a second signal when air is introduced into the duct from the passenger compartment; and

a control unit coupled to the first, second and third sensor means, the control unit including means responsive to the first signal for controlling the displacement of the compressor to bring the refrigerant temperature to a target value, the control unit including means responsive to the second signal for controlling the displacement of the compressor to bring the chilled air temperature to a target value.

---

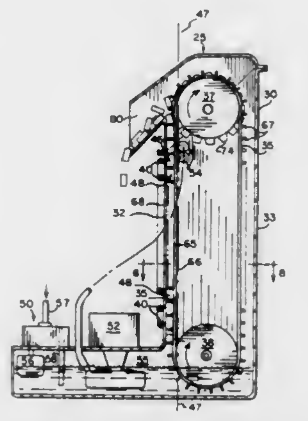
### 5,014,523
### ICE MACHINE

**Vance L. Kohl, Manitowoc, Wis., assignor to The Manitowoc Company, Inc., Manitowoc, Wis.**

**Filed Aug. 3, 1990, Ser. No. 563,099**

**Int. Cl.$^5$ F25C *1/12***

U.S. Cl. 62—347 **7 Claims**



7. An ice machine including, in combination, an ice cube freezing mechanism and an ice cube storage bin spaced laterally therefrom, said ice cube freezing mechanism comprising a housing forming a chamber having a substantially vertically oriented sidewall and an endless conveyor having a plurality of outwardly extending fingers, a portion of said conveyor and said sidewall defining a substantially vertically oriented ice forming mold disposed within said chamber, said mold being divided into a plurality of cube cells, a sump underlying said mold, means for selectively delivering water from said sump to the top of said mold so that water will flow downwardly through said mold and into said cells, refrigeration means for freezing water within the cells of said mold, and means for harvesting the formed ice, said ice harvesting means including means operably coupled with said conveyor for withdrawing the conveyor and the ice formed thereon from the top of said chamber and means for detaching said ice from said conveyor and directing said ice to the ice storage bin.

---

### 5,014,524
### FLAT BED KNITTING MACHINE HAVING PLURAL CARRIAGES

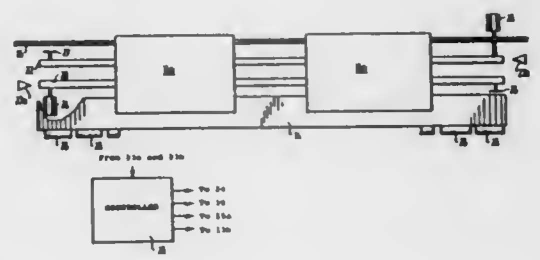
**Adrian Smilovici, 205 W. 57th St., #3DB, New York, N.Y. 10019**

**Filed Aug. 23, 1989, Ser. No. 397,515**

**Int. Cl.$^5$ D04B *15/99***

U.S. Cl. 66—64 **23 Claims**

1. A flat bed knitting apparatus comprising a needle bed and a plurality of carriages, each of said carriages being mounted for independent movement on the needle bed, said flat bed knitting apparatus further comprising a controller for controlling movement of said plurality of carriages, said controller including means for preventing said carriages from interfering with one another.



---

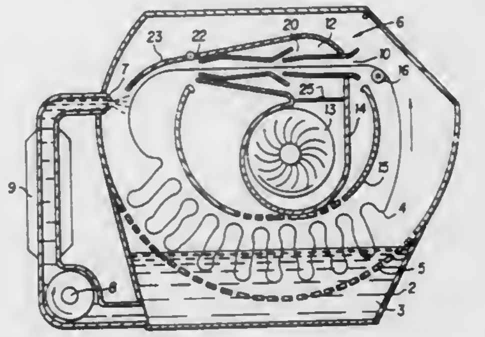
### 5,014,525
### MACHINE FOR DYEING FABRIC IN A ROPE

**Armand Bene, Saint Priest, France, assignor to Madinox S.A., Mi Plaine, France**

**Filed Oct. 24, 1989, Ser. No. 425,720**

**Int. Cl.$^5$ D06B *3/28***

U.S. Cl. 68—20 **12 Claims**



1. A machine for dyeing a rope of fabric, comprising a tunnel capable of being traversed axially by fabric rope, said tunnel being disposed inside a chamber, means for supplying pressurized air from an enclosure to said chamber, said tunnel communicating with said chamber through at least one opening inclined with respect to an axis of said tunnel in a direction of movement of the rope, said tunnel including several segments staggered axially, said at least one opening being provided between said segments, an upstream part of a first segment having a round cross-section, said first segment being in intake zone into which rope is drawn, a second segment located downstream of said first segment having a rectangular cross-section whose larger dimension is horizontal and smaller dimension vertical, said segments forming blowing zones in which rope can be entrained by air pressure, and dyeing means for contacting rope with a dye.

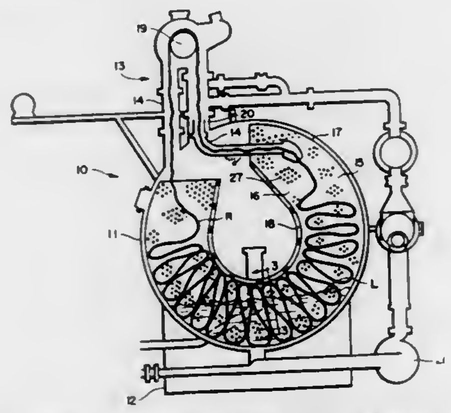
/OL 126
SS 2
MY 14
1991
UMI

### 5,014,526
### TEXTILE WET PROCESSING MACHINE HAVING FABRIC CIRCULATION CHAMBER WITH ADJUSTABLE INNER WALL

**George G. Hacker, Stanley; James K. Turner, Lincolnton; Paul L. Abernathy, Dallas; Bobby G. Payne, Alexis; Roy C. Killian, Stanley, and David G. Laws, Alexis, all of N.C., assignors to Gaston County Dyeing Machine Co., Stanley, N.C.**

**Filed Sep. 21, 1990, Ser. No. 586,260**
**Int. Cl.⁵ D06B** *3/28, 17/02*

U.S. Cl. 68—178 8 Claims



1. In a machine for wet processing of textile fabric in continuous cloth rope form, said machine having a vessel for containing processing liquid and a U-shaped chamber within said vessel for recirculation of the cloth rope therethrough in plug form, said U-shaped chamber having perforated side walls to permit liquid to flow therethrough and an outer wall for advance of the cloth plug therealong, the improvement comprising an inner wall for movable disposition between said side walls of said U-shaped chamber in spaced relation to said outer wall and means for selectively affixing said inner wall to said side walls at selected perforations of said side walls for adjustably spacing said inner wall from said outer wall.

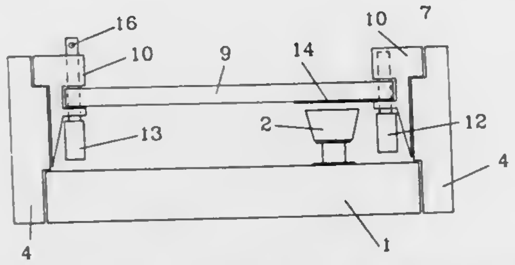
---

### 5,014,527
### KICKPROOFER

**Thomas H. Traller, 5200 Meadow Creek #2172, and Helene S. Lande, 15828 El Estado, both of Dallas, Tex. 75248**

**Filed Nov. 8, 1989, Ser. No. 434,016**
**Int. Cl.⁵ E05B** *65/00*

U.S. Cl. 70—94 15 Claims



1. A security apparatus for securing an inwardly opening door, having locking devices centrally located at one vertical side of the door, from the side of the door adjacent the door jam, comprising:
- a pair of mounting brackets mounted adjacent the vertical edges of the door on the door jams;
- a rigid plate mounted in the mouting brackets separated from, the locking devices on the door; and
- securing pins inserted in the mounting brackets and through the rigid plate only while the door is in an open position securing the rigid plate in place;
- whereby the rigid plate partially covers the region of the door adjacent to the locking devices and covers the central region of the door when the door is closed, preventing pressure from being applied to the central part of the door adjacent the locking devices.

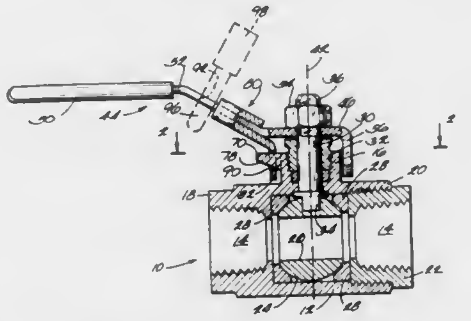
---

### 5,014,528
### TAMPER-PROOF LOCKING MECHANISM FOR QUARTER TURN VALVES

**John L. Roberts, West Milwaukee, Wis., assignor to Milwaukee Valve Company, Inc., Milwaukee, Wis.**

**Filed Aug. 27, 1990, Ser. No. 573,491**
**Int. Cl.⁵ F16K** *35/06*

U.S. Cl. 70—177 16 Claims



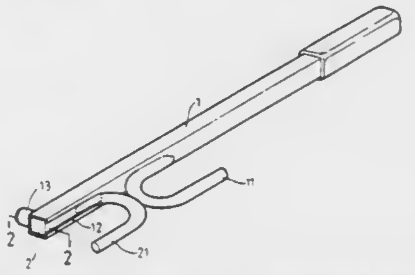
1. A rotatable control device including
- a body housing a control means and having an external boss;
- a control shaft journalled in said boss for rotation about an axis and having an internal portion connected to said control means and an external portion extending outwardly from said boss;
- an operating handle having an inner end portion connected to the external portion of said control shaft, a gripping end portion for rotating said control means between first and second positions and an intermediate portion;
- stop means on said body disposed in the rotational path of the inner end of said handle at locations corresponding to said first and second positions and engageable by the inner end portion of said handle to limit rotational movement of said control means between said first and second positions;
- a pair of circumferentially-spaced lugs on said boss extending radially outwardly relative to said axis at locations corresponding to the locations of the intermediate portion of said handle when said control means is in the first and second positions, each of said lugs having opposed side surfaces and a bottom surface;
- a slider member slidably mounted on the intermediate portion of said handle for reciprocative movement between locked and unlocked positions; and
- a latch element connected to said slider member and extending inwardly toward said body, said latch element having an open portion for receiving the corresponding one of said lugs when said handle is in the first or second position and said slider is in said locked position and which is spaced from said lugs when said slider member is in the unlocked position, said open portion having laterally spaced side walls for engaging the side surfaces of said lugs to restrain rotational movement of said handle when said slider member is in the locked position and a bottom wall for engaging the bottom surface of said lugs to restrain axial movement of said handle relative to said control shaft when said slider member is in the locked position.

### 5,014,529
### EXTENSIBLE CAR LOCK

**Wen-Yin Wu, 8F-2, No. 22, Chung Cheng 2nd Road, Kaohsiung, Taiwan**

**Filed Oct. 12, 1990, Ser. No. 596,944**
**Int. Cl.⁵ B60R** *25/02*

U.S. Cl. 70—209 2 Claims



1. An extensible car lock to be mounted on the steering wheel comprising;
- a lock handle having a cross-section of a hollow square or a circle or any other shape a hook having any shape for hooking on the steering wheel body at the front section, a lengthwise slot at the front end on the same side as the hook for a hook on an extensible rod to fit and move along therein, a lock provided near the front end on the side opposite to the hook and having its dead bolt able to extend in the interior of the lock handle;
- an extensible rod of the same shape as but of a smaller size than the lock handle to fit and move lengthwise to and fro in the interior of the lock handle having a hook of any shape at the front section to hook on the steering wheel body and aligned to the hook on the lock handle, a dead bolt hole near the front end on the side opposite to the hook and a plurality of dead bolt holes properly spaced apart in the middle and the rear section on the side opposte to the hook for the dead bolt of the lock to selectably stick in; and
- said extensible rod possible to be inserted and moved in the interior of the lock handle through its front opening so as to adjust the whole length of this car lock in mounting it on the steering wheel and then said lock possible to be locked with a key making the dead bolt extending in the dead bolt hole in the lock handle and one of the dead bolt holes in the extensible rod for locking the steering wheel immovable with help of the two hooks.

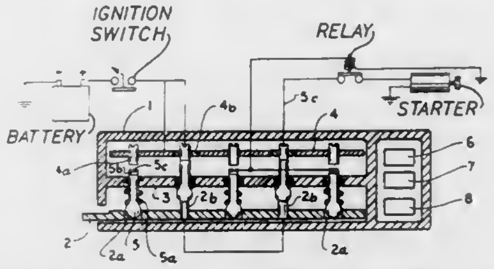
---

### 5,014,530
### AUTO ANTI-THEFT DEVICE

**Donald Humphries, Sr., 215 E. Jefferson St., Pittsburgh, Pa. 15212**

**Filed Jun. 27, 1990, Ser. No. 544,631**
**Int. Cl.⁵ E05B** *47/00*

U.S. Cl. 70—277 3 Claims



1. In an automotive circuit including a battery, ignition switch and starter connected in series, the improvement comprising an anti-theft device connected in series therewith comprising a housing enclosing a metallic adjusting screws contact pins plate, a spring-loaded contact pins plate underneath thereof, and a coded plastic card underneath said spring-loaded contact pins plate having a plurality of upstanding pins and a plurality of holes in vertical and horizontal alignment with openings in said spring-loaded contact pins plate.

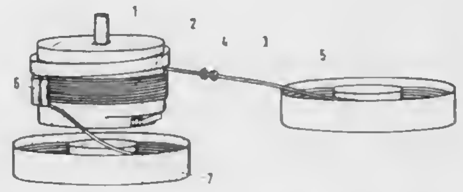
---

### 5,014,531
### METHOD FOR AUTOMATICALLY REDUCING THE DRAWING SPEED OF A TUBULAR MATERIAL DRAWING MACHINE

**Karl-Heinz Kemmerling, Mönchengladbach, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany**

**Filed Mar. 27, 1990, Ser. No. 500,041**
**Int. Cl.⁵ B21C** *1/12*

U.S. Cl. 72—9 9 Claims



1. Method of shaping tubular material comprising the steps of:
- first shaping a first tubular material by drawing the first tubular material through a tubular material shaper;
- measuring a first length of the first tubular material after said first shaping of the first tubular material from a first end to a second end
- first shaping a second tubular material by drawing the second tubular material through the tubular material shaper;
- measuring the length of the second tubular material after said first shaping of the second tubular material from a third end to a fourth end;
- second shaping the first tubular material by (a) drawing the first tubular material through the tubular material shaper at a first speed from the first end to a first intermediate location of the first tubular material, and (b) drawing the first tubular material through the tubular material shaper at a second speed from the first intermediate location to the second end;
- measuring a second length of the first tubular material after said second shaping of the first tubular material from the first end to the first intermediate location;
- measuring a third length of the first tubular material after said second shaping of the first tubular material from the first end to the second end;
- calculating a quotient by dividing said third length by said first length;
- calculating a difference by subtracting said second length from said third length;
- calculating a product by multiplying said length of the second tubular material after said first shaping of the second tubular material by said quotient;
- calculating an intermediate length by subtracting said difference from said product;
- defining a second intermediate location being the location along the second tubular material separated from the third end by said intermediate length;
- second shaping the second tubular material by: (a) drawing the second tubular material through the tubular material shaper at the first speed from the third end to the second intermediate location, and (b) drawing the second tubular material through the tubular material shaper at the second speed from the second intermediate location to the fourth end.

**5,014,532**

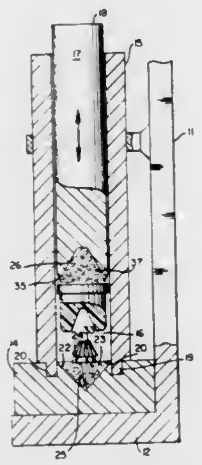
### DENTAL SWAGER

**Itzhak Shoher, 50 Shlomo-Hamelech St., Tel-Aviv, Israel 64386 , and Aharon E. Whiteman, 13 J.L. Perez St., Petach-Tikvah, Israel 49206**

**Continuation of Ser. No. 190,066, May 4, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 445,923**

**Int. Cl.⁵ B21D** *22/10*

U.S. Cl. 72—60 **3 Claims**



1. A dental swager for adapting a metal coping to a dental die comprising:

a base member for supporting the die of the tooth to be restored with said coping adapted to be placed over said die;

a male punch having a piston reciprocally mounted in an elongated cylinder vertically extending above said die with said piston having a top end extending from said cylinder for being hit by a hammer; a removable solid insert slidably mounted in said cylinder below said piston and in alignment therewith for engaging said die upon hitting said top end of said piston with such hammer; and shock absorber means having a putty-like consistency for separating said insert from said piston wherein said insert is composed of a solid, resilient material having an elastic memory and an indentation facing said die with the indentation having a shape in substantial conformity to the shape of the die for striking the metal coping.

---

**5,014,533**

### WIRE PROCESSING MACHINE

**Panagiotis A. Anagnostopoulos, Athens, Greece, assignor to Ergon S.A., Athens, Greece**

**Continuation of Ser. No. 182,666, Apr. 18, 1988, abandoned. This application Aug. 2, 1990, Ser. No. 562,431**

**Claims priority, application Greece, Jun. 3, 1987, 87.0865; Jun. 3, 1987, 87.0866**

**Int. Cl.⁵ B21D** *3/04, 7/24;* **B21F** *11/00*

U.S. Cl. 72—131 **25 Claims**

1. An apparatus for processing wire or rods, comprising:

a. a plurality of fixed driven rollers having working surfaces for engaging and for feeding wire or a rod in a feed direction, each fixed driven roller having an axis of rotation, said fixed driven rollers defining a first plane normal to their respective axes with a central axis of the wire or rod being processed being parallel with the first plane;

b. drive means for driving said plurality of fixed driven rollers;

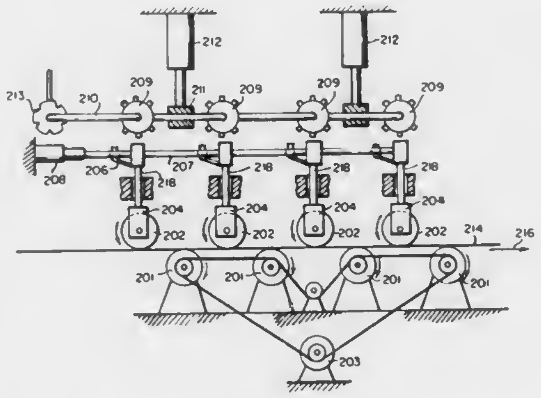
c. a plurality of adjustable non-driven rollers having working surfaces for engaging the wire or rod and imparting a plastic deformation thereto, each adjustable non-driven roller having an axis of rotation, said plurality of adjustable non-driven rollers defining a plurality of second planes normal to their respective axes of rotation;

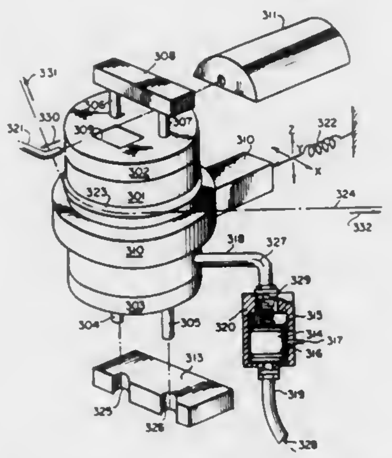
d. actuating means for moving said plurality of adjustable non-driven rollers from a first position out of engagement with the wire or rod to a second position engaging the wire or rod, and

e. means for independently adjusting said plurality of adjustable non-driven rollers so that the second planes defined by said plurality of adjustable non-driven rollers define desired angles with said first plane defined by said plurality of fixed driven rollers, whereby, when said plurality of adjustable non-driven rollers engage said wire or rod, a desired torsion is applied to the wire or rod.

20. An apparatus for processing wire or rods, comprising:

a. a plurality of fixed rollers for feeding wire or a rod in a feed direction, each fixed roller having an axis of rotation, said fixed rollers defining a first plane normal their respective axes and containing a central axis of the wire or rod to be processed;





b. drive means for driving said fixed rollers;

c. a plurality of adjustable rollers for engaging the wire or rod and imparting a plastic deformation thereto, each adjustable roller having an axis or rotation, said adjustable rollers defining a plurality of second planes normal to their respective axes of rotation;

d. first actuating means for moving said adjustable rollers from a first position out of engagement with the wire or rod to a second position engaging the wire or rod;

e. first means for independently adjusting said adjustable rollers so that the second planes defined by said adjustable rollers define desired angles with said first plane defined by the fixed rollers, whereby, when said adjustable rollers engage said wire or rod, a desired torsion is applied to the wire or rod;

means for bending the wire or rod before it is cut, said means for bending the wire or rod including:

1. a housing disposed after the stationary rollers in the feed direction;
2. a rotating body, rotatingly disposed in the housing, and having a top and a bottom;
3. means for rotating the body;
4. first and second bending pins disposed in the top of the body for bending the wire or rod; and
5. first and second pivot pins disposed in the bottom of the body for providing pivot points for said housing, each pivot pin being disposed substantially parallel to a corresponding bending pin, wherein, when the housing is rotated, the housing rotates about an axis parallel to one of first and second bending pins the other of said bending pins engages the wire or rod to bend the wire or rod; and

means for cutting the wire or rod after the wire or rod is fed past the stationary rollers in the feed direction, said cutting means including a movable cutter connected to said rotating body and disposed past said bending pins in the feed direction and substantially parallel to the bending pins, and a fixed cutter connected to said rotating body and disposed parallel to the bending pins, wherein the movable cutter is movable against the fixed cutter for shearing the wire or rod.

---

**5,014,534**

### FRAME-MOUNTED ENTRY GUIDE SYSTEM

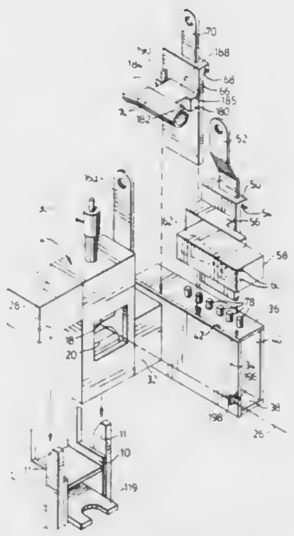
**John G. Maybrey, Carlisle, and George R. Harvey, Burlington, both of Canada, assignors to Stelco Inc., Ontario, Canada**

**Filed May 30, 1990, Ser. No. 530,353**

**Claims priority, application Canada, Jun. 20, 1989, 603373**

**Int. Cl.⁵ B21B** *39/16*

U.S. Cl. 72—250 **8 Claims**



1. In a hot rolling assembly for rolling a metal billet into a desired cross-section, the assembly including a plurality of roll stands and a frame means upstream of one of the roll stands, the improvement which comprises:

an entry guide mounting assembly removably mounted to the frame means between the latter and said one of the roll stands,

a slide bar fixed to and supported by the entry guide mounting assembly, the slide bar extending substantially parallel with the pass line but spaced laterally therefrom,

a guide box carriage removably secured to said slide bar,

a guide box supported by said guide box carriage, the guide box being on the pass line.

a bell mouth carriage removably secured to said slide bar between the guide box carriage and the frame means,

a bell mouth assembly removably secured to said bell mouth carriage, the bell mouth assembly being on the pass line,

the slide bar being a vertically oriented plate with a horizontal upper edge defining substantially a point in cross-section, and a horizontal bottom edge, each said carriage having a pointed groove complementary with said point, and also having gripping means for securely gripping the bottom of the said slide bar so as to firmly mount the respective carriage to the slide bar.

---

**5,014,535**

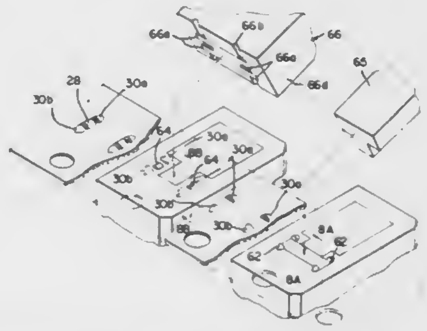
### APPARATUS FOR FORMING EMBOSSMENTS ON ELECTRICAL CONTACT TERMINALS

**Marpoe, Jr. Gary R., Kernersville, and Edward L. Pentz, Greensboro, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.**

**Division of Ser. No. 280,753, Dec. 6, 1988, Pat. No. 4,948,382. This application Mar. 12, 1990, Ser. No. 491,789**

**Int. Cl.⁵ B21D** *28/10*

U.S. Cl. 72—326 **1 Claim**



1. Apparatus for forming closely spaced embossments on a generally flat stamping, comprising:

a first die station at which at least one first embossment is formed, the first die station including a first insert and a first punch having a prescribed outline;

the first insert having a plurality of first convex members protruding above and around the periphery of a generally flat surface having a shape corresponding to the outline of at least a portion of the first punch insertable between the plurality first convex members so that said first embossment is produced by shearing of said flat stamping by the insertion of said first punch between said plurality of first convex members;

a second die station at which at least one second embossment is formed closely adjacent said first embossment, the second die station including a stationary die surface and a second punch;

a second convex member protruding above the stationary die surface;

a concave depression in the punch, the second convex member being insertable in the concave depression; and

a second insert in the second punch, the second insert having a plurality of ribs spanning the concave depression, each rib being dimensioned to fit between a first and second embossment when the second embossment is formed at the second die station said plurality of ribs cooperating with said second convex member so as to shear said flat stamping and form the second embossment.

---

**5,014,536**

### METHOD AND APPARATUS FOR DRAWING SHEET METAL CAN STOCK

**William T. Saunders, Weirton, W. Va., assignor to Weirton Steel Corporation, Weirton, W. Va.**

**Continuation-in-part of Ser. No. 712,238, Mar. 15, 1985, abandoned. This application Feb. 21, 1986, Ser. No. 831,624**

**Int. Cl.⁵ B21D** *22/20, 51/26*

U.S. Cl. 72—349 **20 Claims**

1. Apparatus for drawing pre-coated flat-rolled sheet metal

VOL
126
ISS
2
MY
14
1991
UMI

can stock into a one-piece cup for use in the manufacture of a two-piece cylindrical can, comprising

can stock supply means providing flat-rolled sheet metal of preselected gage coated on both its planar surfaces with an organic coating, such organic coating surfaces being lubricated with draw lubricant,

means for cutting a circular blank of predetermined diameter from such can stock,

cupping means including

draw die means disposed during usage on one planar surface side of such blank, and

cupping punch means and clamping ring means disposed during usage on the remaining opposite planar surface side of such blank;

such draw die means including

a cupping cavity having an internal side wall disposed in symmetrical relationship about the centerline axis of the cavity which intersects the geometrical center of such circular blank during cup forming operations,

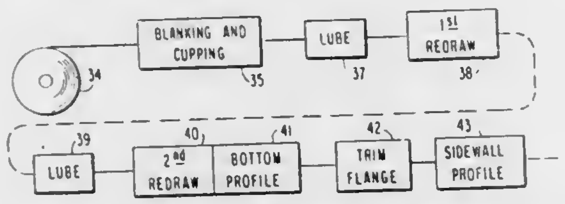
can stock clamping means limited to a planar clamping surface in perpendicularly transverse relationship to such centerline axis, and

a compound curvilinear cavity entrance zone between such planar clamping surface and such internal side wall surface,

such die means planar clamping surface being disposed radially exterior of and contiguous to such cavity entrance zone,

such cavity entrance zone including a compound curvilinear surface having a radius of curvature measured in a radial plane which includes such centerline axis of about five times nominal sheet metal starting gage,

such cupping punch means including



a cylindrical configuration punch which is aligned during usage for relative movement into such cupping cavity along a travel path in which its centerline axis is directionally coincident with the centerline axis of the cupping cavity,

such cylindrical configuration punch including

an end wall symmetrically disposed in relation to such centerline axis presenting a peripheral portion disposed in a plane which is perpendicularly transverse to the centerline axis of such punch,

a cylindrical configuration peripheral side wall symmetrically disposed with relation to the centerline axis of such punch, and

a curvilinear transition zone between such punch end wall and side wall,

such punch transition zone having a compound curvilinear surface area which is selected in relation to punch diameter to be as large as possible while avoiding forming buckles in such sheet metal of preselected gage during cup drawing operations;

such clamping ring means including

a toroidal configuration clamping ring circumscribing such punch with clamping means being limited to a planar clamping surface radially exterior of and contiguous to such punch for clamping such can stock in a plane which is perpendicularly transverse to the centerline axis of such punch;

such punch being moved during usage into such cupping cavity with such circular blank being clamped radially exterior of such punch and cavity solely between said planar clamping surfaces of the draw die means and clamping ring to form a cup-shaped work product,

such cup-shaped work product having

a closed end wall presenting a peripheral portion lying in a plane which is perpendicularly transverse to such centerline axis,

a substantially cylindrical side wall having a predetermined diameter which is about 25% to 40% less than such circular blank diameter,

such side wall having a uniform height in extending from such closed end wall toward the axially opposite open end of such cup-shaped work product,

flange metal extending about substantially the full periphery of such cup-shaped work product at its open end,

such flange metal being disposed in a plane which is substantially perpendicularly transverse to the centerline axis of such cup-shaped work product, and

a compound curvature juncture between such cup end wall and side wall having an interior surface area corresponding to the compound curvilinear surface area of such cupping punch transition zone.

---

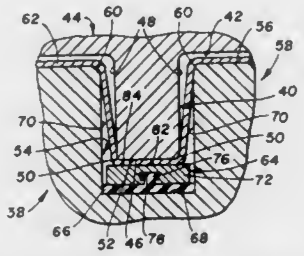
### 5,014,537
### CONVERTIBLE LOCKBEAD-DRAWBEAD

**Harmon D. Nine, Fraser, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 13, 1990, Ser. No. 538,052**

**Int. Cl.$^5$ B21D** *24/04*

**U.S. Cl. 72—350** **4 Claims**



1. A bead structure for a pair of die binders having binder faces which close relative to each other and to a blank during press operation comprising, in combination, an outwardly opening groove in one die binder having a base wall and side walls, the side walls being joined to the face of the one binder across arcuate shoulders, a bead projecting from the face of the other die binder and received within the groove, the bead including side walls spaced from the side walls of the groove and an outer wall joined to the bead side walls across arcuate shoulders, the bead outer wall being generally planar intermediate the arcuate bead shoulders, means roughening the outer wall of the bead intermediate the bead arcuate shoulders, a bead insert removably mounted in the groove and including a generally planar outer wall juxtaposed to the outer wall of the bead, the roughened outer wall of the bead and the outer wall of the bead insert clamping the blank therebetween to provide a lockbead during press operation, removal of the insert permitting the blank to slide over the shoulders of the groove, between the side walls of the groove and of the bead, and over the shoulders of the bead in spaced relationship to the roughened means on the outer wall of the bead to provide a drawbead during press operation.

### 5,014,538
### VEHICLE CHASSIS CLAMP

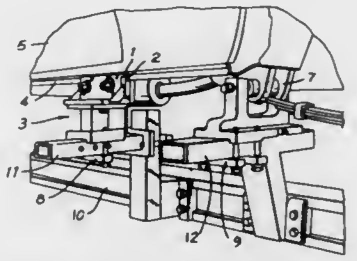
**Bjorn Eltvik, Arboga, Sweden, assignor to Car-O-Liner Company, Wixom, Mich.**

**Filed Sep. 1, 1987, Ser. No. 91,746**

**Claims priority, application Sweden, Sep. 3, 1986, 8603696**

**Int. Cl.$^5$ B21D** *1/12*

**U.S. Cl. 72—422** **5 Claims**



1. A clamp assembly for securing a vehicle chassis having an attachment with a bolt joint for vehicle parts to an alignment bench having a pair of longitudinally extending and laterally spaced apart beams, said clamp assembly comprising a support receivable on, movable longitudinally of, carried by and releasably secured to only one longitudinally extending beam of an alignment bench, a guide fixed to said support and extending transversely to the longitudinal beam of the bench to which such support is secured, a carrier slidably received on said guide, clamp means releasably securing said carrier to said guide, a stirrup having a pair of limbs fixed to said carrier and spaced apart sufficiently to receive between them a bolt joint and an adjacent portion of an associated attachment, a pair of threaded holes one in each limb which are substantially coaxial, a first bush having a threaded shank received in the threaded hole in one of said limbs and a socket opening toward the other limb and having a recess constructed and arranged to receive a portion of a bolt joint projecting from the attachment and movable axially by rotation of its associated shank, a second bush having a threaded shank received in the hole of the other limb and a socket with a recess opening toward such one limb and constructed and arranged to receive a second portion of the bolt joint projecting from the attachment and movable axially by rotation of its associated threaded shank, said stirrup and bushes when said bolt joint portions are received therein supporting said bolt joint and attachment in spaced apart relationship from said carrier and said associated beam of said alignment bench, each said clamp assembly being adjustable both longitudinally and transversely independently of all other clamp assemblies on said alignment bench, whereby the clamp assembly can be releasably secured to the vehicle chassis by rotating at least one of such bushes to receive and entrap the projecting portions of a bolt joint in said sockets.

---

### 5,014,539
### CRIMP PRESS

**Dieter K. Eich, Muhle CH-6260, Reiden, Switzerland**

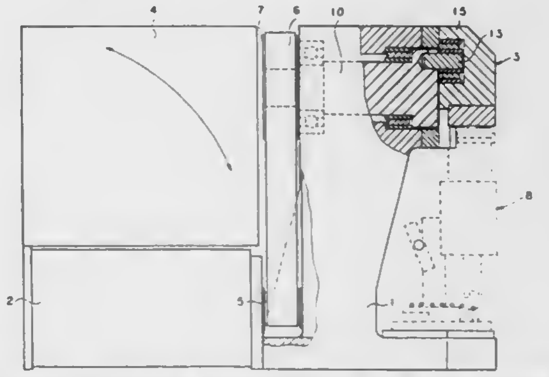
**Filed Jan. 11, 1990, Ser. No. 464,118**

**Claims priority, application Switzerland, Jan. 13, 1989, 111/89**

**Int. Cl.$^5$ B21J** *9/18*

**U.S. Cl. 72—452** **5 Claims**

1. In a crimp press for joining contact parts to a conductor, having an electric motor connected to a reduction gear, the reduction gear drives an eccentric shaft having an eccentric tang, the eccentric tang moves upon rotation of the eccentric shaft in a guide track, the guide track is set into a tappet, the movement of the tang in the guide track vertically reciprocates the tappet and a crimping tool, the improvement comprising: said guide track (15) having an upward arcuate slope, said tang movable within said guide track in a cycle starting from a central position, upon an initial 90° rotation of the eccentric shaft said tang first moving along said upward arcuate slope, and upon said initial 90° rotation said tappet starting from an uppermost position and moving downward through more than 75% of a complete downward stroke.



---

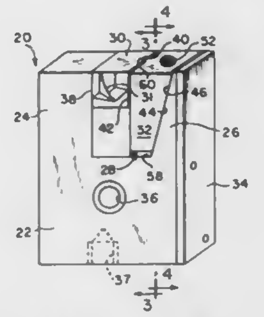
### 5,014,540
### JIG ASSEMBLY

**Pat Ferrante, 3438 Old Lebanon Rd., Campbellsville, Ky. 42718**

**Filed Mar. 28, 1990, Ser. No. 500,372**

**Int. Cl.$^5$ B21J** *13/03;* **B23G** *9/00;* **B21K** *1/44, 1/56*

**U.S. Cl. 72—481** **9 Claims**



1. A jig assembly for a screw cutting die comprising a body having front and rear faces and peripheral side walls, a top wall of said body being provided with a cavity defined by a pair of spaced inner walls, one of said inner walls having a flat surface extending perpendicular to the front and rear faces, the other of said inner walls having an inclined surface extending at an angle inwardly from the top wall; a die having a front and a rear face and peripheral walls, one of said peripheral walls being formed with a die head, said die head facing and extending horizontally outward from said front face of said body, a solitary die locking wedge vertically disposed in said cavity, said wedge having a flat perpendicular rear face and front face inclined at an angle conforming to that of said other inner wall, said die and die locking wedge being arranged within said cavity so that the rear face of said die abuts the perpendicular wall of said cavity and the rear face of said die locking wedge abuts the front face of said die and the inclined face of said die locking wedge abuts the inclined surface of said inner wall of said cavity; and screw means extending vertically through said wedge and into said body to clamp said wedge tightly to said die and secure said die in said cavity.

VOL 126 ISS 2 MY 14 1991 UMI

### 5,014,541
## CONTINUOUS AIR MONITORING APPARATUS AND METHOD

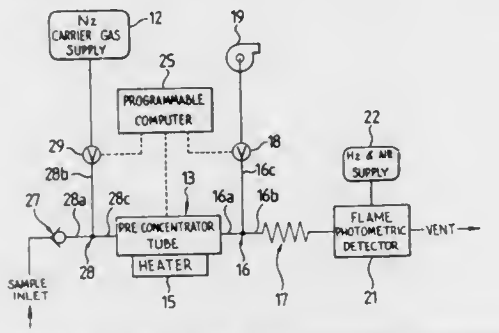
**Gary D. Sides, Alabaster, and Marion Cates, Pinson, both of Ala., assignors to CMS Research Corporation, Birmingham, Ala.**

**Continuation-in-part of Ser. No. 158,334, Feb. 22, 1988, Pat. No. 4,805,441. This application Feb. 21, 1989, Ser. No. 313,163**

**The portion of the term of this patent subsequent to Feb. 21, 2009, has been disclaimed.**

**Int. Cl.$^5$ G01N** *30/08*

**U.S. Cl. 73—23.41** **3 Claims**



1. Apparatus for use in gas chromatography comprising:

(a) a gas chromatographic column;

(b) a solid sorbent preconcentrator tube in communication with said gas chromatographic column;

(c) an inlet check valve connected to said solid sorbent preconcentrator tube to permit a sampling air stream therethrough in one direction and to prevent airflow in opposition to said sampling air stream;

(d) a reservoir of carrier gas, connected to said solid sorbent preconcentrator tube intermediate said preconcentrator tube and said inlet check valve to selectively pass carrier gas therethrough;

(e) means for selectively venting said carrier gas intermediate said preconcentrator tube and said gas chromatographic column; and

(f) means for desorbing sampled material from said preconcentrator tube into said carrier gas.

---

### 5,014,542
## AUTOMATIC MACHINE TOOL HEAD DESIGNED TO INCREASE THE NUMBER OF MACHINE OPERATING AXES

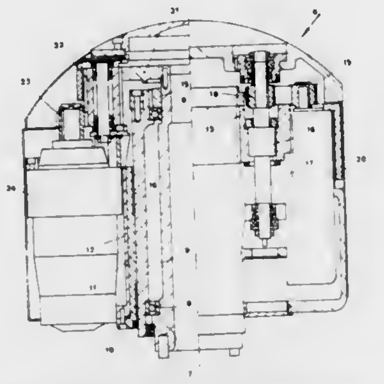
**Armando Corsi, Piacenza, Italy, assignor to JOBS S.p.A., Piacenza, Italy**

**Filed Feb. 21, 1989, Ser. No. 312,979**

**Claims priority, application Italy, Mar. 9, 1988, 44804 A/88**

**Int. Cl.$^5$ B25J** *11/00*

**U.S. Cl. 173—39** **6 Claims**



1. An automatic machine tool head, comprising:

a fork (**14**) adapted for movement in a plurality of degrees of freedom;

a tool unit assembly (**6**) mounted for rotation to said fork about a fork axis;

a bushing (**9**) mounted for axial movement to said tool unit assembly along a tool carrier axis;

a hollow tool carrier shaft (**7**) mounted for rotation around said tool carrier axis, to said bushing;

a crown gear (**21**) connected to said shaft for rotation with said shaft;

a support (**25**) connected at a hinge (**26**) to said tool unit assembly, for pivotal movement of said support toward and away from said crown gear;

a first pinion (**22**) mounted for rotation to said support and meshed with said crown gear for rotation of said crown gear with rotation of said first pinion;

a second pinion (**23**) mounted for rotation to said support and meshed with said first pinion for rotation of said first pinion with rotation of said second pinion;

a gear motor (**24**) mounted to said support and connected to said second pinion for rotating said second pinion;

axial drive means connected to said bushing and mounted to said tool unit assembly for moving said bushing axially along said tool carrier axis; and

biasing means (**27**) operatively engaged between said support and said tool unit assembly for biasing said support toward said crown gear to press said first pinion into meshing engagement with said crown gear to eliminate play between said first pinion and said crown gear.

---

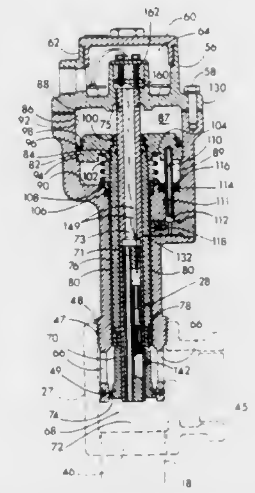
### 5,014,543
## LEAK DETECTOR

**Charles C. Franklin, 2827 Crescent Dr., McFarland, Wis. 53558, and Edward T. Gisske, 7256 Mineral Point Rd., Verona, Wis. 53593**

**Filed Jul. 14, 1988, Ser. No. 219,204**

**Int. Cl.$^5$ G01M** *3/28*

**U.S. Cl. 73—40.5 R** **19 Claims**



1. A leak detector for use with a fluid pump, a fluid dispenser including means to close off the dispenser, and a conduit connecting the fluid pump to the dispenser, wherein a pressurized fluid flows through a flow path in the conduit by means of the fluid pump, the leak detector comprising:

(a) a valve for isolating the pump from the dispenser, wherein the valve defines an inlet orifice and an outlet orifice in the conduit such that the flow path extends between the inlet orifice and the outlet orifice, the valve comprising means for closing off all but a portion of the fluid flow between the inlet orifice and the outlet orifice, the portion of fluid flow being used for leak detection purposes;

(b) an electronic flow measurement device for measuring the flow of the portion of the fluid; and

(c) means responsive to the electronic flow measurement device to electrically indicate a flow rate of the portion of the fluid.

---

### 5,014,544
## METHOD AND APPARATUS FOR DETECTING CRACKS IN HELICOPTER ROTOR BLADES

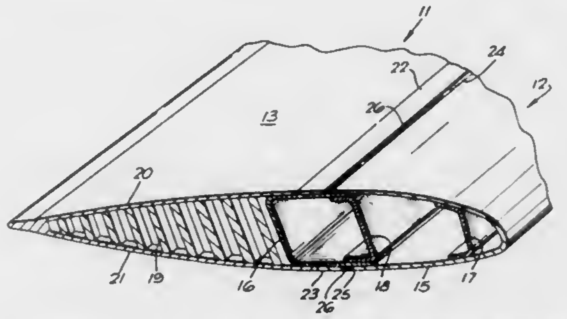
**Christopher N. West, Somerset, England, assignor to Westland Helicopters Limited, Somerset, England**

**Filed Jun. 26, 1989, Ser. No. 371,094**

**Claims priority, application United Kingdom, Jul. 4, 1988, 8815826**

**Int. Cl.$^5$ G01M** *3/22*

**U.S. Cl. 73—40.7** **9 Claims**



1. A method for detecting a crack in a main load bearing spar of a helicopter rotor blade which together with a trailing edge portion defines a blade chord, comprising attaching a capillary tube longitudinally along an external surface of the blade at a chord station within that defined by the spar and connecting the interior of the tube to a supply of coloured liquid contained in a reservoir at a root end of the blade whereby a crack occurring in the spar causes a corresponding crack in the capillary tube resulting in leakage of the coloured liquid to provide a visual indication that a crack has occurred.

---

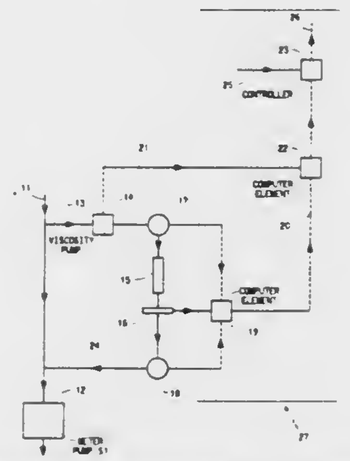
### 5,014,545
## APPARATUS FOR DETERMINING FLOW BEHAVIOR INDEX

**Sundar M. Rao, Seaford, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Sep. 19, 1990, Ser. No. 587,152**

**Int. Cl.$^5$ G01N** *11/04*

**U.S. Cl. 73—55** **3 Claims**



1. An apparatus for determining the Flow Behavior Index of a molten polymer having at a controlled temperature along a prescribed path, comprising:

(a) a capillary of known length and diameter in line with the prescribed path;

(b) means for successively diverting more than one small quantity of the molten polymer from the path to the capillary;

(c) means for successively moving each small quantity through the capillary at a different controlled rate and at a constant temperature;

(d) means for measuring the pressure drop across the capillary at each controlled rate;

(e) means for using the controlled rates, pressure drops, capillary length and diameter to calculate shear rate and shear stress;

(f) means for comparing shear rate and shear stress to determine the Flow Behavior Index.

---

### 5,014,546
## APPARATUS FOR DETERMINING THE DISTANCE BETWEEN A PAIR OF SURFACES IN COMMUNICATION WITH UPPER AND LOWER MOLD HALVES IN A PRESS

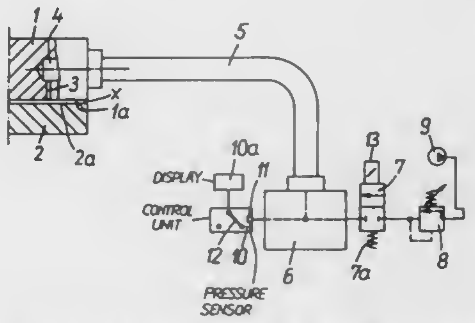
**Richard Brüssel, Sulzfeld, Fed. Rep. of Germany, assignor to Krupp Maschinentechnik Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany**

**Filed Dec. 4, 1989, Ser. No. 444,856**

**Claims priority, application Fed. Rep. of Germany, Dec. 8, 1988, 3841327**

**Int. Cl.$^5$ G01B** *13/12*

**U.S. Cl. 73—37.5** **17 Claims**



1. An apparatus for determining the distance between first and second surfaces as an object is being molded by first and second mold halves mounted in a press, the first surface having a fixed position with respect to the first mold half and the second surface having a fixed position with respect to the second mold half, the press moving at least one of the mold halves so that the relative position of the mold halves assumes an end value corresponding to the desired thickness of the molded object when the distance between the first and second mold halves has reached a predetermined limit value, said apparatus comprising:

nozzle means, on one of the first and second surfaces, for providing a nozzle oriented toward the other of the first and second surfaces;

a pressure source for a compressible flow medium;

conveying means for conveying the compressible flow medium from the pressure source to the nozzle means, the conveying means including

- reservoir means for providing a reservoir for the compressible flow medium, and
- isolating means, selectively movable between an open position and a closed position, for isolating the reservoir means form the pressure source when the isolating means is in the closed position; and

control means for measuring the pressure change in the reservoir means after the position of the isolating means has been changed,

wherein the control means includes a pressure sensor com-

VOL
1126
ISS
2
MY
14
1991
UMI

municating with the compressible flow medium in the reservoir means.

---

### 5,014,547
### APPARATUS FOR DETERMINING THE SURFACE ROUGHNESS OF A MATERIAL

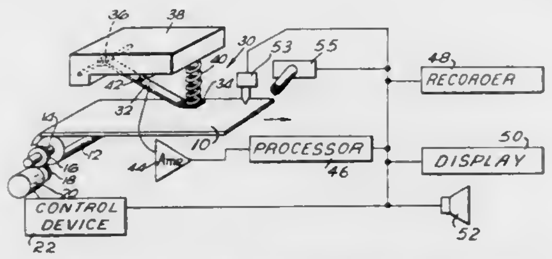
**Trevor J. Holroyd, Derby, England, assignor to Stresswave Technology Limited, Derby, England**

**Filed Oct. 6, 1989, Ser. No. 418,261**

**Claims priority, application United Kingdom, Nov. 15, 1988, 8826640**

**Int. Cl.⁵ G01B** *17/00, 21/30;* **G01N** *29/14*

**U.S. Cl. 73—105** **15 Claims**



1. An apparatus for determining the surface roughness of a material comprising at least one acoustic element arranged in contact with a surface of the material, means to cause relative movement between the at least one acoustic element and the material such that frictional contact between the at least one acoustic element and the material generates stress waves which propagate within the at least one acoustic element, the stress wave activity within the acoustic element being dependent upon the surface roughness of the material, acoustic emission transducer means acoustically coupled to the at least one acoustic element arranged to detect stress waves propagating in the at least one acoustic element and to produce at least one electrical signal, and means to determine from the at least one electrical signal the surface roughness of the material, said acoustic element being shaped and configured such that the stress waves propagating in the acoustic element have a relatively low decay rate at the frequency or frequencies being detected in order to create a diffuse stress wave field.

---

### 5,014,548
### METHOD AND APPARATUS FOR DETECTING DETERIORATION OF SUCKED AIR FLOW QUANTITY-DETECTING DEVICE OF ENGINE

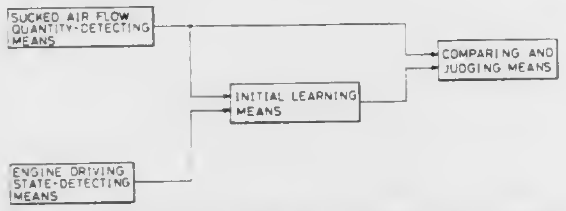
**Naoki Tomisawa, Isesaki, Japan, assignor to Japan Electronic Control Systems, Co., Ltd., Isesaki, Japan**

**Filed Jun. 20, 1990, Ser. No. 540,618**

**Claims priority, application Japan, Jun. 20, 1989, 1-155692**

**Int. Cl.⁵ G01M** *15/00*

**U.S. Cl. 73—118.1** **5 Claims**


SUCKED AIR FLOW QUANTITY-DETECTING MEANS
COMPARING AND JUDGING MEANS
INITIAL LEARNING MEANS
ENGINE DRIVING STATE-DETECTING MEANS

2. An apparatus for detecting deterioration of a sucked air flow quantity-detecting device of an engine, which comprises engine driving state-detecting means for detecting the driving state of the engine, initial learning means for learning the detected value of the sucked air flow quantity detected by the sucked air flow quantity-detecting device for each area of a predetermined range of the engine driving state during a predetermined period of the initial stage of use of the engine, and comparing means for comparing the detected value of the sucked air flow quantity detected by the sucked air flow quantity-detecting device with the learned value stored by the initial learning means in correspondence to the area of the detected engine driving state and judging deterioration when the difference is larger than a predetermined value.

---

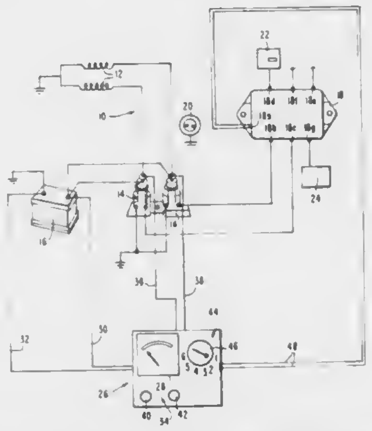
### 5,014,549
### TEST APPARATUS FOR AIR INTAKE MANIFOLD HEATER SYSTEM

**Lloyd F. Morley, II, Columbus, and Russell L. Harrod, Scottsburg, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.**

**Filed Feb. 9, 1990, Ser. No. 477,495**

**Int. Cl.⁵ G01M** *15/00*

**U.S. Cl. 73—118.1** **20 Claims**



1. A test apparatus for testing an electric manifold heating system of an internal combustion engine, said system including at least one heating element for heating intake air, a power supply for electrically powering the system, a temperature sensor for providing an electrical temperature signal representing a manifold temperature; and a controller connected with the temperature sensor, the power supply and the heating element for causing electrical energy from the power supply to be supplied to the heating element in accordance with a predetermined control schedule dependent on the electrical temperature signal, said test apparatus comprising:

- a. simulation means adapted to be operatively connected with the controller for simulating the temperature signal of the temperature sensor over a range of operating temperatures and for providing the simulated temperature signal to the controller; and
- b. actuation test means adapted to be operatively connected with the heating element for providing an indication that the heater element is being actuated in accordance with the predetermined control schedule.

---

### 5,014,550
### METHOD OF PROCESSING MASS AIR SENSOR SIGNALS

**Gregory P. Gee, Drayton Plains, Mich.; Edward J. Martin, Luxembourg-Belair, Luxembourg, and David P. Prawdzik, Holly, Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 3, 1990, Ser. No. 518,594**

**Int. Cl.⁵ G01M** *15/00*

**U.S. Cl. 73—118.2** **6 Claims**

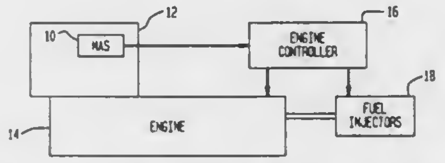
1. In an automotive vehicle, the method of processing the signal from a mass air flow sensor comprising:

establishing filter time constants as a function of the signal,

periodically sampling the signal to obtain sampled flow values and using each sampled flow value as an input,

determining the filter time constants for each input, and

calculating an output for each input as a function of the input values and the filter time constants for each input,



whereby the outputs more nearly represent the actual mass air flow rate than does the signal.

---

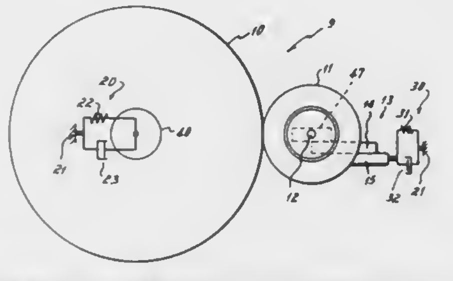
### 5,014,551
### DAMPED HIGH SPEED TIRE TESTING MACHINE

**James C. Beebe, Kent, and Barry D. Cargould, Hudson, both of Ohio, assignors to Illinois Tool Works Inc., Glenview, Ill.**

**Filed Sep. 22, 1989, Ser. No. 410,935**

**Int. Cl.⁵ G01M** *17/02*

**U.S. Cl. 73—146** **22 Claims**



1. A machine for measuring forces generated by a rotating tire, said machine comprising:

a roadwheel;

roadwheel mounting means for rotatably mounting said roadwheel;

a tire spindle rotatably mounted juxtaposed said roadwheel for supporting a tire under test;

means for rotating said tire and roadwheel in contact with one another;

force sensor mounting means;

force sensor means operably disposed in force sensing relation between said tire spindle and said force sensor mounting means for generating an electrical signal correlated with the forces transmitted to said force sensor means from said tire as it rotates in contact with said roadwheel, at least one of said force sensor mounting means and said roadwheel mounting means being subject during operation of the machine to resonance at one or more resonant frequencies lying within the measuring frequency range of the machine, and

damping means supporting at least one of said roadwheel mounting means and said force sensor mounting means for damping the amplitude resonant excursions occurring between said roadwheel and said force sensor mounting means when said resonance at said one or more resonant frequencies occurs.

---

### 5,014,552
### FLOW METER

**Shoji Kamiunten, Kamakura; Shigeru Aoshima, Chigasaki; Takashi Tsumura, Ebina; Kouichi Ochiai, and Takashi Inaba, both of Kamakura, Japan, assignors to Yamatake-Honeywell Co., Ltd., Tokyo, Japan**

**Filed Dec. 5, 1989, Ser. No. 446,375**

**Claims priority, application Japan, Dec. 15, 1988, 63-314935**

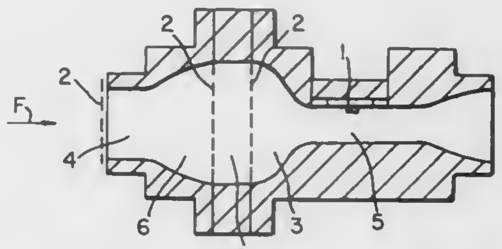
**Int. Cl.⁵ G01F** *1/68*

**U.S. Cl. 73—204.21** **6 Claims**

1. A flow sensor comprising:

a flow passage having an inlet, an enlarged portion relative to said inlet and a narrow portion relative to said inlet;

rectifying means arranged in said enlarged portion of said flow passage;



a flow passage reducing means for reducing the flow passage behind said rectifying means; and

a thermal flow sensor mounted on the inner wall of said narrow portion of said flow passage at a location immediately behind said reducing means.

---

### 5,014,553
### METHOD FOR MEASURING THE STATE OF A FLUID

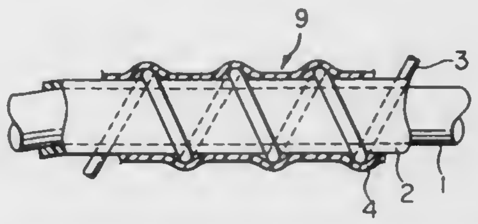
**Tomoshige Hori, Kitamoto, and Kensuke Itoh, Kodaira, both of Japan, assignors to Snow Brand Milk Products Co., Ltd., Hokkaido, Japan**

**Continuation-in-part of Ser. No. 356,465, May 25, 1989, abandoned, which is a continuation of Ser. No. 5,072, Jan. 20, 1987, abandoned. This application Apr. 3, 1990, Ser. No. 505,354**

**Claims priority, application Japan, Feb. 12, 1986, 61-28280**

**Int. Cl.⁵ G01F** *23/24;* **G01K** *13/02*

**U.S. Cl. 73—295** **8 Claims**



1. A method for determining the physical state of a fluid at a given temperature and pressure, comprising:

(a) thermally contacting at least one sensor with the fluid;

(b) supplying an electric current to said sensor to either heat or cool the sensor to a temperature substantially different from the temperature of the fluid, whereby heat transfers between the fluid and the sensor;

(c) determining the temperature of the sensor and measuring the temperature of the fluid, and calculating the difference in said temperatures;

(d) calculating the heat transfer between said sensor and said fluid by a heat transfer formula which uses as the essential variable (a) the said temperature difference; or (b) the said temperature difference and the fluid temperature; or (c) an index value, which index value is a function of (a) or (b); and

(e) comparing the said calculated heat transfer with similar prior calculations of heat transfers of the fluid when in other physical states, so as to determine by said comparison, the physical state of the fluid.

### 5,014,554
### ANGULAR RATE SENSOR

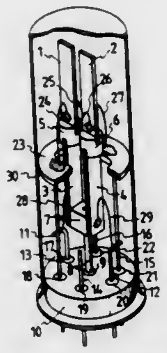
**Jiro Terada; Kazumitsu Ueda, both of Osaka; Hiroshi Takenaka, Ikoma; Mikio Nozu, Yamatokoriyama; Hiroshi Senda, Osaka; Yasuhito Osada, Kyoto; Toshihiko Ichinose, and Takahiro Manabe, both of Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Apr. 13, 1990, Ser. No. 508,639**

**Claims priority, application Japan, Apr. 14, 1989, 1-95720; May 19, 1989, 1-126968**

**Int. Cl.$^5$ G01C** *19/56;* **G01P** *9/04*

**U.S. Cl. 73—505** **3 Claims**



1. An angular rate sensor comprising a tuning fork structure composed of vibratory components which include:

a pair of parallel piezoelectric drive elements;

a pair of parallel piezoelectric detection elements;

said drive elements and said detection elements being joined together into a tuning fork configuration, said drive and detection elements lying in respective orthogonal planes;

a plurality of leads electrically connected to said drive and detection elements; and

a plurality of lead terminals electrically connected to said leads, respectively;

said vibratory components being covered with a coating which is of a material having a lower elasticity than the elasticities of the vibratory components.

---

### 5,014,555
### ROLL RATE SENSOR

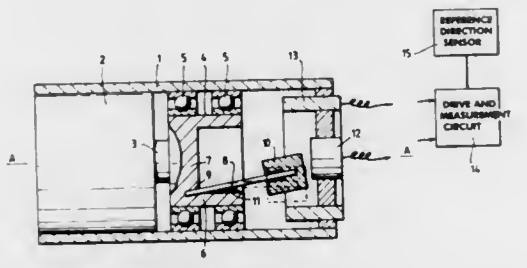
**Derrick J. Haines, Hatfield, United Kingdom, assignor to British Aerospace Public Limited Company, London, England**

**Filed Oct. 4, 1988, Ser. No. 253,257**

**Claims priority, application United Kingdom, Oct. 5, 1987, 8723324; Apr. 11, 1988, 8808451**

**Int. Cl.$^5$ G01P** *3/22*

**U.S. Cl. 73—518** **10 Claims**



1. A roll rate sensor comprising:

a rotatable support means;

a mass coupled to said support means by way of a resiliently deformable element;

said resiliently deformable element comprising a means for permitting the mass to be deflected relative to said support means in response to centrifugal force during rotation of said support means;

means for causing said mass to vibrate resonantly at a frequency determined by the stiffness of said resiliently deformable element;

said resiliently deformable element and said support means comprising a means permitting said stiffness to vary with said deflection of said mass; and

transducer means for, responsive to said frequency, for forming a roll rate signal, wherein said resiliently deformable element is positioned for contacting said support means said stiffness to vary with said deflection.

---

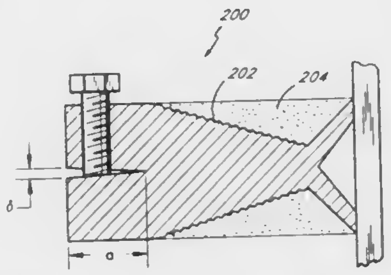
### 5,014,556
### ACOUSTIC EMISSION SIMULATOR

**Harold L. Dunegan, Laguna Niguel, Calif., assignor to Dunegan Engineering Consultants, Inc., Irvine, Calif.**

**Filed Jan. 16, 1990, Ser. No. 465,481**

**Int. Cl.$^5$ G01N** *29/00*

**U.S. Cl. 73—587** **17 Claims**



1. An apparatus for simulating a point source of acoustic emission signals into a structure undergoing a nondestructive test comprising:

a waveguide for attachment to said structure, said waveguide having a conical configuration to simulate a point source of acoustic emission signals,

a hydrogen charged bolt having a machined groove about its axis for providing a hydrogen charged specimen in which a crack may be induced under torque; and

a body having a mating threaded opening for holding the end face of said bolt in abutting contact with said waveguide so that as the bolt is rotated relative to said housing, the torque will induce a crack at said machined groove.

---

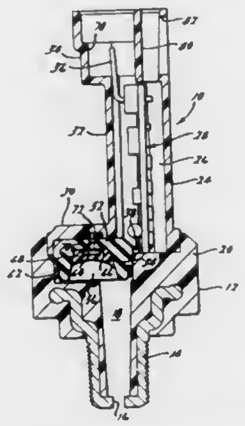
### 5,014,557
### COMPOSITE BASE FOR A PRESSURE TRANSDUCER

**Daniel F. Lawless, Hazel Green, Ala., assignor to Acustar, Inc., Troy, Mich.**

**Filed Jun. 6, 1990, Ser. No. 534,580**

**Int. Cl.$^5$ G01L** *7/00*

**U.S. Cl. 73—756** **9 Claims**



9. An improved composite base component for a transducer used to sense pressure of a fluid, comprising: a thin walled metal member having a generally cup-shaped configuration with a cylindrical end portion, a midportion and an open ended portion; means associated with the cylindrical end portion for connecting the base to a source of pressurized fluid; the open ended portion being formed by a radially outwardly extending flange thus creating an annularly shaped end, the flange defining a substantially continuous edge in the circumferential direction; an irregularly configured midportion characterized by alternately inwardly and outwardly directed features in the circumferential direction; an elastomeric plastic component of the composite base being hot molded about the midportion and open ended portion of the metal component, a relatively thick band of plastic material encircling the edge whereby as the hot plastic cools subsequent to molding, a strong radially inward force is developed between the plastic and the edge thereby forming a good fluid leak resistant seal; plastic material further being molded about the irregularly shaped midportion so that plastic extends between the inwardly and outwardly directed features whereby a strong mechanical connection is formed between the plastic and metal able to transmit significant torque loads between plastic and metal components.

---

### 5,014,558
### POLYURETHANE FOAM MODEL AND METHOD OF MEASURING STRESS DISTRIBUTION BY USING SUCH MODEL

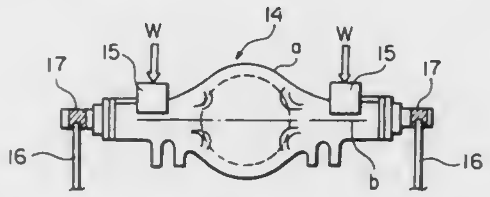
**Mitsuru Yano, Okagaki, and Hisashi Yasuda, Kitakyusyu, both of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan**

**Filed Nov. 8, 1989, Ser. No. 433,321**

**Claims priority, application Japan, Nov. 21, 1988, 63-151541[U]; Apr. 12, 1989, 1-92179**

**Int. Cl.$^5$ G01N** *19/00*

**U.S. Cl. 73—804** **11 Claims**



1. Apparatus for measuring stress distribution of a member comprising a light, integral polyurethane foam model having little unevenness in density, one or more undercoating layers attached to said polyurethane foam at predetermined model sites, with undercoating layers, to each of which a] one or more resistance wire strain gauges attached to each of said undercoating layers at said predetermined sites via an adhesive, each of said undercoating layers having a thickness of 50–300 μm and being made of a material which is unreactive with, hardly penetrable into and softer than the polyurethane foam of said model.

---

### 5,014,559
### ROTAMETER WITH READ-OUT DEVICE

**Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005**

**Filed Jul. 11, 1990, Ser. No. 551,065**

**Int. Cl.$^5$ G01F** *1/24*

**U.S. Cl. 73—861.56** **19 Claims**

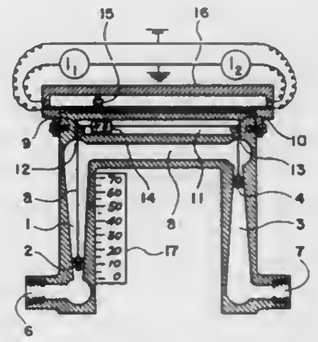
1. An apparatus for measuring fluid flow comprising in combination:

(a) a flow passage including a first vertical section with one extremity connected to an inlet port, a second vertical section with one extremity connected to an outlet port and a midsection connecting the other extremities of the first and second vertical sections of the flow passage to one another, wherein at least one of the first and second vertical sections of the flow passage has a tapered geometry with cross sectional area of the flow passage increasing from inlet end to outlet end thereof;

(b) a first flow obstructing member disposed within the first section of the flow passage movably along the length thereof, and a second flow obstructing member disposed within the second section of the flow passage movably along the length thereof, wherein the first and second flow obstructing members are connected to one another by a flexible elongated member;

(c) means for supporting a vertical section of said flexible elongated member suspending the first flow obstructing member and another vertical section of said flexible elongated member suspending the second flow obstructing member in a slidable arrangement; and

(d) means for indicating position of at least one of the first and second flow obstructing members along the lengthwise direction of the flow passage as a measure of the flow rate of a fluid moving through the flow passage.



---

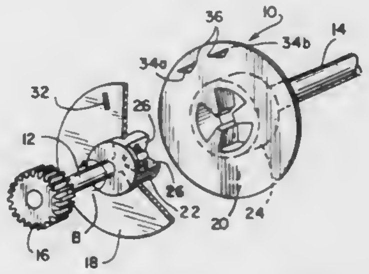
### 5,014,560
### TORQUE MEASURING APPARATUS

**Richard M. Hutchison, and David H. Hitt, both of Rockford, Ill., assignors to Sandstrand Corporation, Rockford, Ill.**

**Filed May 11, 1989, Ser. No. 350,644**

**Int. Cl.$^5$ G01L** *3/14*

**U.S. Cl. 73—862.33** **10 Claims**



1. A torque measuring apparatus, comprising:

first and second coaxial members;

elastic coupling means interconnecting the first and second coaxial members for allowing relative angular displacement therebetween in proportion to the magnitude of a torque load applied to one of the members;

first and second concentric apertures in the first and second coaxial members, respectively, for movement into overlapping relationship in response to said relative angular displacement of the members, the first aperture having a constant width in an angular direction and the second aperture having a varying width in an angular direction;

a light source for transmitting light through the apertures in both coaxial members when in said overlapping relationship whereby the transmitted light intensity is in proportion to the amount of overlap between the respective apertures; and

light intensity detecting means for receiving the light transmitted through the overlapping first and second apertures.

'OL
126
SS
2
MY
14
991
UMI

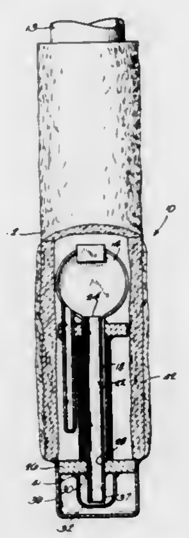
### 5,014,561
## METHOD AND APPARATUS FOR OBTAINING ACCURATE SAMPLE

**Richard A. Falk, Ft. Lauderdale, Fla.; Larry Janicsek, Waukesha, Wis.; Joseph Boron, Medina, Ohio, and James Colzani, Menomonee Falls, Wis., assignors to Midwest Instrument Co., Inc., Hartland, Wis.**

**Filed May 31, 1989, Ser. No. 359,849**

**Int. Cl.$^5$ G01N** *1/12*

U.S. Cl. 73—864.53 **13 Claims**



1. A method for obtaining an accurate low carbon reading from a steel melt comprising the steps of:

providing a sampler including sample mold parts which are de-contaminated prior to assembly to drive off impurities and providing a fused quartz fill tube to introduce a sample into the sample mold which fill tube is pre-ignited prior to assembly to remove impurities and surface contamination;

providing a low carbon cap for the fill tube, the cap having a carbon content approximate to the carbon content of the bath being sampled and said mold having an immersion vehicle including a carbon free coating to prevent the formation of carbon or carbon dioxide during immersion of the sampler in the molten metal in a zone around the fill tube entrance,

removing the sample from sampler, cleaning the surface to remove contamination and obtaining a sample from the cast sample for analysis.

---

### 5,014,562
## ENGINE STARTER WITH A SHORTENED OVER-RUNNING CLUTCH

**Takeshi Sugiyama, and Akira Morishita, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 2, 1990, Ser. No. 487,507**

**Claims priority, application Japan, Mar. 3, 1989, 1-52262**

**Int. Cl.$^5$ F02N** *11/00*

U.S. Cl. 74—6 **2 Claims**

1. An engine starter motor, comprising:

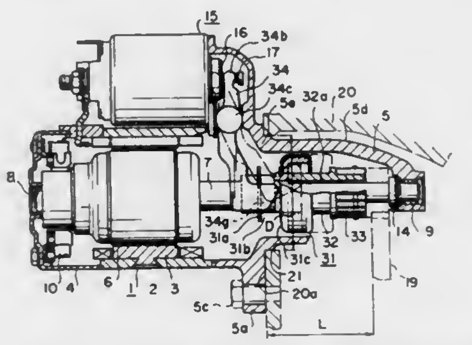
a d.c. motor having a yoke, an armature with an armature rotary shaft (**7**) and front and rear brackets rotatably supporting said armature rotary shaft;

an over-running clutch (**31**) axially slidably mounted on said armature rotary shaft for movement between a forward position and a rearward position, and including a clutch inner cylinder (**32**);

a pinion mounted on said clutch inner cylinder;

a solenoid switch for energizing said d.c. motor and for sliding said over-running clutch together with said pinion between said forward and rearward positions; and

a shift lever (**34**) having a main body, a first end portion operatively coupled to said solenoid switch and a second end portion operatively coupled to said over-running clutch, respectively, said second end portion of said shift lever being bifurcated into two tines (**34***e*), each of said tines having a forwardly extending arm (**34***f*) disposed substantially parallel to said rotary shaft and an engagement projection (**34***g*) extending radially inwardly from a forwardmost end of said arm for engagement with said over-running clutch, wherein each of said arms has an axial length (L1) such that said projections engage said clutch at a position forwardly remote from the main body of the shift lever by a distance substantially corresponding to said axial length, and an axial dimension of said clutch inner cylinder is decreased by said distance.



---

### 5,014,563
## ENGINE STARTER MOTOR

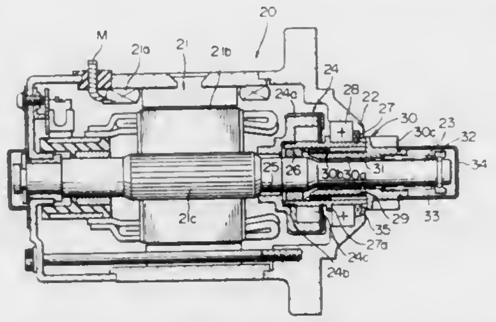
**Shuzoo Isozumi, Himeji City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 21, 1989, Ser. No. 410,569**

**Claims priority, application Japan, Sep. 21, 1988, 63-237110; Sep. 27, 1988, 63-126662[U]; Sep. 27, 1988, 63-126663[U]**

**Int. Cl.$^5$ F02N** *15/06*

U.S. Cl. 74—7 R **2 Claims**



1. An engine starter apparatus, comprising:

(a) an electric motor having a rotary armature shaft (**21***c*) including an integral, outwardly extending support shaft (**23**),

(b) an over-running clutch (**24**) coaxially surrounding the support shaft and including:

  (1) a clutch outer member (**24***a*) coupled to the support shaft by straight spline means (**25**) for rotation therewith,

  (2) a tubular clutch inner member (**24***b*, **27**) driven by the clutch outer member, coaxially surrounding the support shaft, and having a first helical splines (**29**) formed on an inner surface thereof,

(c) a tubular pinion (**30**) having a pinion gear (**30***c*) integrally formed on an outermost end thereof, and disposed in an annular space defined between the support shaft and the clutch inner member, the pinion shaft having a second helical splines formed on an outer surface meshing with the first helical splines, (d) first bearing means (**31**) disposed between the support shaft and an inner surface of the pinion shaft for rotatably and slidably supporting the pinion shaft.

(e) second bearing means (**28**) coaxially surrounding the first bearing means and disposed between an outer surface of the clutch inner member and a front housing (**22**) of the motor for rotatably supporting the clutch inner member, and

(f) means (**27***a*) for restraining the clutch against axial movement.

---

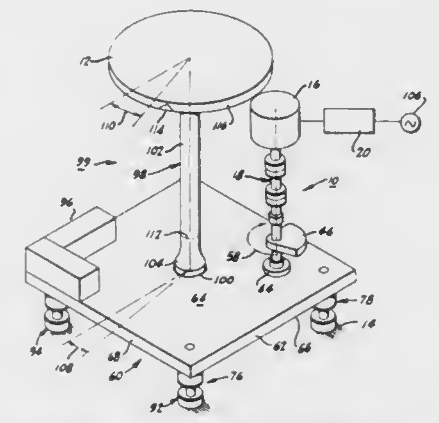
### 5,014,564
## ECCENTRIC DRIVE MECHANISM

**Joseph B. Culkin, Emeryville, Calif., assignor to Calvest Associates, Las Vegas, Nev.**

**Filed Mar. 27, 1990, Ser. No. 500,061**

**Int. Cl.$^5$ B06B** *1/16*

U.S. Cl. 74—61 **21 Claims**



1. A drive mechanism for a body possessing a predetermined weight and positioned relative a supporting surface comprising:

a. motor means for rotating an output shaft;

b. an eccentric weight connected to said rotating output shaft for rotation therewith;

c. a base weight, said eccentric weight being linked to said base weight and transmitting a oscillational motion along a dimension of said base weight; and

d. spring means for imparting oscillational motion to the body, said spring means being connected to and extending from said base weight and the body.

---

### 5,014,565
## VARIABLE RATIO TRANSMISSION

**Peter Stephenson, 26 Laingsberg Road, Eastvale, Springs, Transvaal, South Africa, assignor to Peter Stephenson and Jacobus Swanepoel, South Africa**

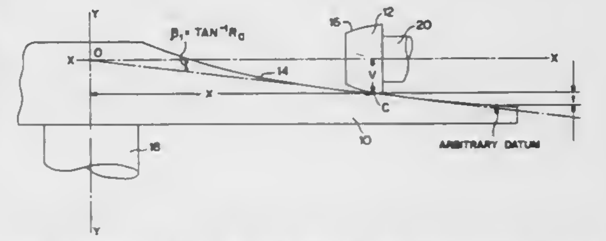
**Filed Jul. 27, 1989, Ser. No. 385,421**

**Claims priority, application South Africa, Jul. 27, 1988, 88/5485; Jul. 27, 1988, 88/5486**

**Int. Cl.$^5$ F16H** *55/34*

U.S. Cl. 74—190 **15 Claims**

1. A variable ratio transmission unit including at least one first transmission element mounted for rotation about a first axis, and at least one second transmission element in contact with the first transmission element and mounted for rotation about a second axis which defines a predetermined angle with the first axis, the second transmission element being axially slidable along the second axis to vary the distance between the point of contact of the transmission elements and the first axis, thereby to vary the effective transmission ratio, the first and second transmission elements being provided with complementary profiled faces so that the common tangent with respect to the profiles of the transmission elements at the point of contact between the transmission elements passes through the point of intersection of the first and second axes irrespective of the axial position of the second transmission element, relative movement between the transmission elements being substantially rolling movement.



---

### 5,014,566
## AUTOMATIC TRANSMISSION FOR A MOTOR VEHICLE

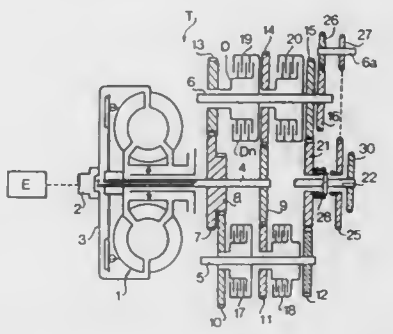
**Hajime Kashiwase, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 26, 1989, Ser. No. 358,247**

**Claims priority, application Japan, May 31, 1988, 63-133831**

**Int. Cl.$^5$ F16H** *3/08*

U.S. Cl. 74—331 **12 Claims**



1. An automatic transmission for transmitting power from an engine to wheels of a motor vehicle through a differential mechanism, said transmission being longitudinally mounted on the motor vehicle and operatively connected to said engine through a torque converter, the transmission having a main shaft connected to an output member of said torque converter, a first counter shaft and a second counter shaft, both said shafts being disposed horizontally and interposing said main shaft in parallel thereto, a drive shaft disposed under said main shaft in parallel thereto, first means for transmitting the power from said first and second counter shafts to said drive shaft, and second means for transmitting the power from said drive shaft to said wheels, the transmission further comprising:

a plurality of main gears secured to said main shaft;

a plurality of counter gears rotatably mounted on said first and second counter shafts and engaged with, to be driven by, corresponding of said main gears, respectively, forming engaging pairs of said counter gears and said corresponding main gears, each of said engaging pairs having gear ratios different from each other; and

a plurality of clutches mounted on said first and second counter shafts for selectively connecting corresponding of said counter gears to a corresponding of said counter shafts, respectively, respectively one of said clutches being operatable for connecting the corresponding counter gear to the corresponding counter shaft applying a corresponding one of said gear ratios.

VOL
126
ISS
2
MY
14
1991
UMI

### 5,014,567
### GEAR TYPE TRANSMISSION

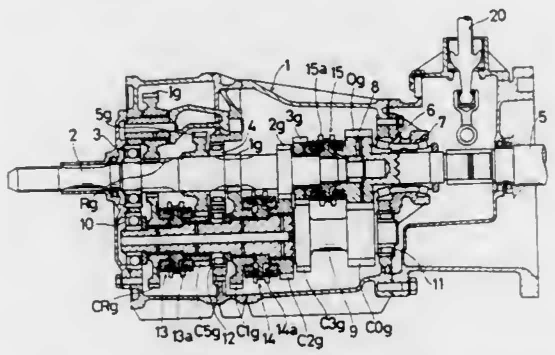
**Ichiro Horiuchi, Chiryu, and Shunichi Kawai, Nagoya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Sep. 28, 1989, Ser. No. 414,187**

**Claims priority, application Japan, Sep. 29, 1988, 63-244952**

**Int. Cl.$^5$ F16H** *3/08*

**U.S. Cl. 74—359** **2 Claims**



1. A gear type transmission comprising:

a casing provided with first and second bearing assemblies;

an input shaft supported by said casing; an output shaft coaxial to said input shaft and rotatably supported by said first and second bearing assemblies mounted in said casing, said first and second bearing assemblies positioned on one side of an output gear provided on said output shaft;

a counter shaft supported by said casing parallel to and axially offset from said input and output shafts and connected to said output shaft;

plural pairs of shift gears, one shift gear of each plural pair being mounted on each of said input and counter shafts for engagement with each other, including a low shift group;

an output gear on said counter shaft for engagement with said output gear on said output shaft;'

one gear of the low shift group of said plural pairs of shift gears being fixed to said input shaft for continuous rotation simultaneously with said input shaft;

another gear of the low shift group of said plural pairs of shift gears being rotatably attached to said counter shaft; and

synchronizing means on said counter shaft for rotating the other gear of the low shift group simultaneously with the counter shaft.

---

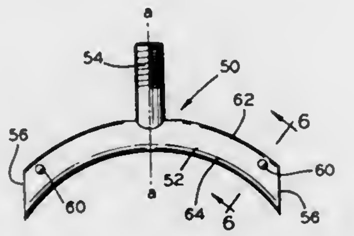
### 5,014,568
### DEFLECTOR FOR BALL SCREW AND NUT ASSEMBLY

**Theodore R. Schlenker, Troy, Mich., assignor to Dana Corporation, Toledo, Ohio**

**Filed Feb. 28, 1990, Ser. No. 486,626**

**Int. Cl.$^5$ F16H** *1/18, 55/00*

**U.S. Cl. 74—424.8 R** **10 Claims**



1. In a ball deflector for a recirculating ball screw and nut assembly, said deflector including an elongate body adapted for placement within a ball passage formed by a segment of cooperating helical grooves in a screw and a nut, said nut being movable along said screw, said deflector defining a body, a stem fixed to said body and adapted for securement of said body to said nut, said stem operative to maintain said body fixed relative to said nut; an improvement comprising said body including at least a pair of adjustable locator bosses disposed for engaging the groove of the nut, each boss disposed in adjacent quadrants on the circumference of said body.

---

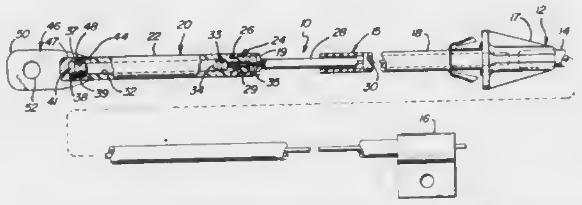
### 5,014,569
### MOTION TRANSMITTING REMOTE CONTROL ASSEMBLY AND METHOD FOR MAKING SAME

**Dixon L. Kelley, New Baltimore, Mich., assignor to Teleflex Incorporated, Limerick, Pa.**

**Filed Mar. 23, 1990, Ser. No. 497,616**

**Int. Cl.$^5$ F16C** *1/10*

**U.S. Cl. 74—502.4** **18 Claims**



1. A motion transmitting remote control assembly of the type for transmitting forces along a curved path by a motion transmitting core element, said assembly comprising:

conduit means (12) for establishing a path;

a flexible core element (30) moveably supported by said conduit means (12) with an enlarged end portion (34) extending from said conduit means (12),

a connector member (20, 20′) defining a pocket (32, 32′) therein with an opening (37) at one end of said pocket (32, 32′) for receiving said enlarged end portion (34) of said core element (30) into said pocket (32, 32′),

terminal means (46) disposed on said connector member (20, 20′) for connection to a control member,

characterized by including plug means (38) disposed in said opening (37) between said terminal means (46) and said pocket (32, 32′) for closing said pocket (32, 32′) to capture and retain said enlarged end portion (34) of said core element (30) within said pocket (32, 32′) and to prevent foreign matter from entering said pocket (32, 32′) through said opening (37) when said terminal means (46) is disconnected from said connector member (20, 20′).

---

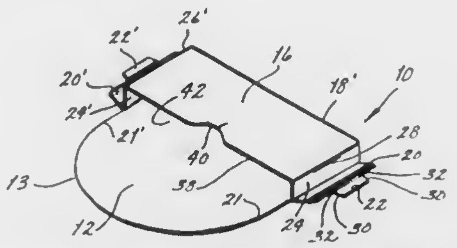
### 5,014,570
### STEERING WHEEL COVER

**Frank R. Fogertey, Jr., 18140 Melrose, Glencoe, Mo. 63038**

**Filed Oct. 30, 1989, Ser. No. 428,961**

**Int. Cl.$^5$ B62D** *1/06;* **B65D** *5/28*

**U.S. Cl. 74—558.5** **13 Claims**



1. A reusable, recyclable, reversible steering wheel cover of flat box construction with an open lower end, said steering wheel cover comprising:

(a) a front panel having a predetermined length commensurate with a diameter of the steering wheel and an arcuate exposed normally lower end;

(b) a back panel having a length approximately one-half the diameter of the steering wheel, an exposed lower edge and an arcuate indentation centered along said lower edge for accommodating a column of the steering wheel;

(c) a relatively shallow middle panel flexibly attached and positioned perpendicularly between said front panel and said back panel; and

(d) opposing sides normally planar and perpendicular to said front, back and middle panels.

---

### 5,014,571
### BICYCLE PEDAL WITH A RELEASABLE BINDING

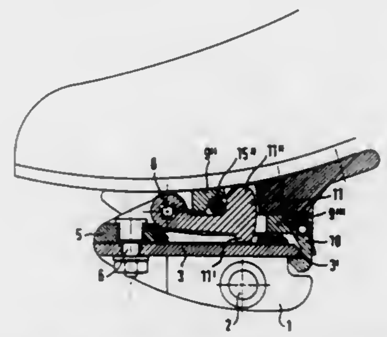
**Karl Dapezi, Kleinrotz, Austria, assignor to GEZE Sport International GmbH, Fed. Rep. of Germany**

**Filed Oct. 2, 1989, Ser. No. 415,605**

**Claims priority, application Fed. Rep. of Germany, Oct. 5, 1988, 3833790**

**Int. Cl.$^5$ G05G** *1/14*

**U.S. Cl. 74—594.6** **22 Claims**



15. A releasable binding arrangement for releasably securing a cycler's shoe at a bicycle pedal comprising:

holding part means mountable at a bicycle tread surface means for predetermined guided movement with respect to the tread surface means between a cycling position and release position,

shoeholder means mountable at the holding part means for predetermined guided movement with respect to the holding part means between a cycling position and a release position,

shoe locking part means fixedly attachable to a cycler's shoe and selectively engageable into and out of the shoeholder means,

shoeholder latching means for releasably latching the shoeholder means in said cycling position at the holding part means,

shoe locking part latching means for releasably latching the shoe locking part means in the cycling position fully inserted in the shoeholder means,

and binding release means for accommodating automatic release of said shoeholder latching means and said shoe locking part latching means, in response to predetermined forces exerted between the shoeholder means and the bicycle tread surface means,

wherein said shoe locking part means, shoeholder means, and binding release means are configured to accommodate engagement of the shoe locking part means and the shoeholding means independently of any resistance exerted by the binding release means, whereby the cycler can easily insert the shoe locking part means into the shoeholder means during mounting of the cycler on a bicycle utilizing the releasable binding arrangement.

---

### 5,014,572
### ASSEMBLED CRANKSHAFT

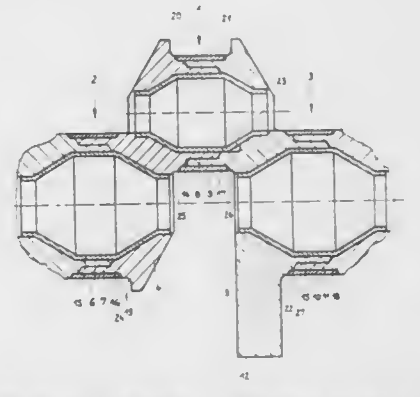
**Helmut Swars, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Emitec Gesellschaft für Emissionstechnologie mbH, Lohmar, Fed. Rep. of Germany**

**Filed Oct. 23, 1989, Ser. No. 425,811**

**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1988, 3837294**

**Int. Cl.$^5$ F16C** *3/04;* **B21K** *1/08*

**U.S. Cl. 74—595** **12 Claims**



1. An assembled crankshaft, comprising crank webs which on both sides are integrally connected to part of adjoining hollow pins so that two parts (8, 9; 6, 7; 11) of adjoining crank webs (4, 5) jointly form a shaft pin (1; 2; 3), the parts forming the shaft pin having at least partially stepped diameter and being insertable into each other so as to define an inner part and an outer part, a torsion-resistant, force-locking connecting being provided between the parts, only the two parts (6, 7; 8, 9; 10, 11) which are inserted into each other forming part of the connection, the inner part (6, 8, 10) being deformed beyond its limit elasticity and the outer part (7, 9, 11) being deformed purely elastically, the outer part (9, 7, 11) having a higher yield point than the inner part (8, 6, 10).

---

### 5,014,573
### DOUBLE TRANSITION UPSHIFT CONTROL IN AN AUTOMATIC TRANSMISSION

**Joseph H. Hunter, Carmel, and Jeffrey K. Runde, Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 11, 1989, Ser. No. 448,452**

**Int. Cl.$^5$ F16H** *59/46, 61/06*

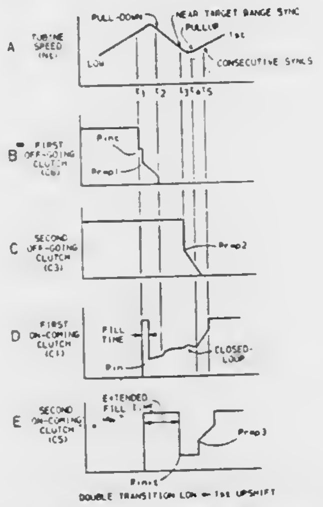
**U.S. Cl. 74—866** **10 Claims**

1. In a vehicular automatic transmission having an input and an output, a turbine connected to the input to couple driving torque thereto, in which an upshift from a first transmission speed ratio to a second transmission speed ratio is carried out through concurrent disengagement of first and second off-going fluid pressure operated torque transmitting means associated with the first of such speed ratios and engagement of first and second on-coming fluid pressure operated torque transmitting means associated with the second of such speed ratios, wherein a third speed ratio lower than the second speed ratio is effected when the first on-coming torque transmitting means is engaged while the second off-going torque transmitting means is still engaged, and further having turbine and output speed sensing means, a method of controlling the torque transmitting means to effect an upshifting from the first speed ratio to the second speed ratio comprising the steps of:

beginning a shift to the third speed ratio by releasing the first off-going torque transmitting means and gradually engaging the first on-coming torque transmitting means while the second off-going torque transmitting means is still engaged, so that the turbine speed gradually decreases relative to the output speed,

VOL
126
SS
2
MY
14
1991
UMI

determining from the turbine speed and the output speed when the relative speeds attain a predetermined relationship, and then



effecting the second ratio by releasing the second off-going torque transmitting means, engaging the second on-coming torque transmitting means and completing the engagement of the first on-coming torque transmitting means.

---

5,014,574

## SPEED CONTROL APPARATUS FOR A CONTINUOUSLY VARIABLE SPEED

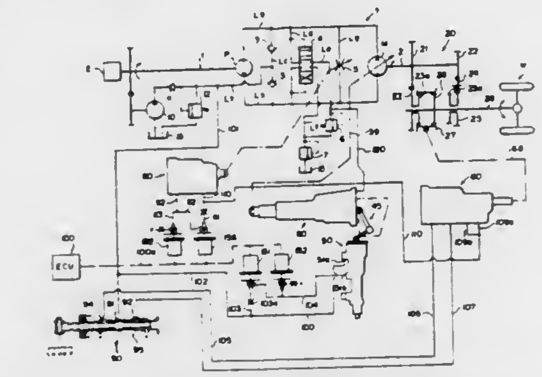
**Koji Sasajima, Tokyo; Kazuya Maki, Aichi, and Kouji Yamaguchi, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 4, 1988, Ser. Nn. 267,496**

**Claims priority, application Japan, Nov. 5, 1987, 62-279632**

**Int. Cl.⁵ B60K *41/12***

**U.S. Cl. 74—866** **9 Claims**



1. A speed control apparatus for a continuously variable speed transmission that variably transmits engine power to driving wheels of a vehicle, comprising:

ratio control means for controlling a speed reduction ratio of said continuously variable speed transmission;

range selecting means for selecting either of a running rate where the engine power is transmitted to the wheels through said continuously variable speed transmission and a neutral range where the engine power is prevented from being transmitted to the wheels; and

speed sensing means for detecting a vehicle speed;

characterized in that, while said neutral range is selected by said range selection means, the speed reduction ratio of said continuously speed variable transmission is controlled by said ratio control means so as to coincide with a reference speed reduction ratio determined corresponding to the vehicle speed; and

while the neutral range is selected the speed reduction ratio is maintained at a ratio appropriate for the vehicle speed at the moment so as to provide appropriate engine braking on reselecting the running range.

---

5,014,575

## CONTROL SYSTEMS FOR AUTOMATIC TRANSMISSIONS

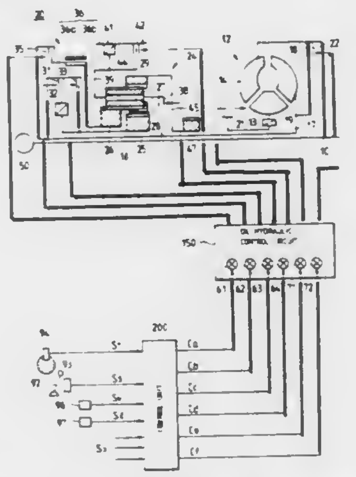
**Takuji Fujiwara, Minamitaisho; Koji Waseda, and Akio Matsumoto, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Jul. 25, 1988, Ser. No. 224,126**

**Claims priority, application Japan, Jul. 30, 1987, 62-191380; Jul. 30, 1987, 62-191390**

**Int. Cl.⁵ B60K *41/18***

**U.S. Cl. 74—866** **14 Claims**



1. A control system for an automatic transmission employed in a vehicle comprising:

first and second engaging friction elements provided in the automatic transmission for giving rise to a speed change,

operating oil pressure control means for applying operating oil pressure to each of said first and second engaging friction elements in accordance with a predetermined control characteristic so as to cause said first and second engaging friction elements to give rise to the speed change,

judging means for judging a termination of the speed change at dNT/dt∼O, where Nt is a turbine speed,

information detecting means for obtaining information as to whether the turbine speed of the automatic transmission is within a predetermined permissible condition or not when the judging means judges the termination of the speed change, and

timing control means for causing said operating oil pressure control means to be operative to adjust a time interval from a time at which said first engaging friction element is changed in its engaging condition to a later time at which said second engaging friction element is changed in its engaging condition in accordance with the information obtained from said information detecting means.

5,014,576

## LINE PRESSURE CONTROL DURING DOWNSHIFT

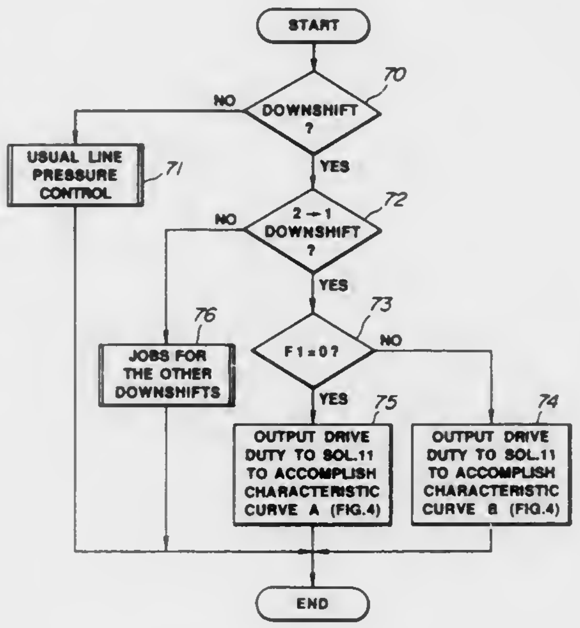
**Hiroshi Yamaguchi, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

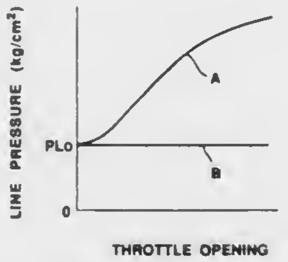
**Filed Aug. 8, 1989, Ser. No. 390,906**

**Claims priority, application Japan, Aug. 8, 1988, 63-196080**

**Int. Cl.⁵ F16H *59/70, 59/46***

**U.S. Cl. 74—866** **10 Claims**


START
DOWNSHIFT ?
70
NO
YES
USUAL LINE PRESSURE CONTROL
71
2→1 DOWNSHIFT ?
72
NO
YES
F1=0?
73
NO
YES
76
JOBS FOR THE OTHER DOWNSHIFTS
75
OUTPUT DRIVE DUTY TO SOL.11 TO ACCOMPLISH CHARACTERISTIC CURVE A (FIG.4)
74
OUTPUT DRIVE DUTY TO SOL.11 TO ACCOMPLISH CHARACTERISTIC CURVE B (FIG.4)
END



1. A line pressure control system for a drive system including an automatic transmission, the automatic transmission having an input shaft, an output shaft, and a plurality of friction elements which are adapted to be hydraulically activated by a line pressure, the automatic transmission being shiftable from one gear ratio to another lower gear ratio by releasing a first one of the plurality of friction elements and then engaging a second one of the plurality of friction elements, the line pressure control system comprising:

input revolution speed sensor means for detecting a revolution speed of the input shaft and for generating an input revolution speed indicative signal;

output revolution speed sensor means for detecting a revolution speed of the output shaft and for generating an output revolution speed indicative signal;

means for deriving a gear ratio from said input revolution speed indicative signal and said output revolution speed indicative signal and for generating a gear ratio indicative signal;

means for determining a target gear ratio predetermined for the another lower gear ratio; and

means for increasing the line pressure when said gear ratio indicative signal becomes greater than said target gear ratio.

---

5,014,577

## HYDRAULIC CONTROL DEVICE FOR AUTOMATIC TRANSMISSION FOR VEHICLE HAVING TWO PARALLEL INPUT CLUTCHES

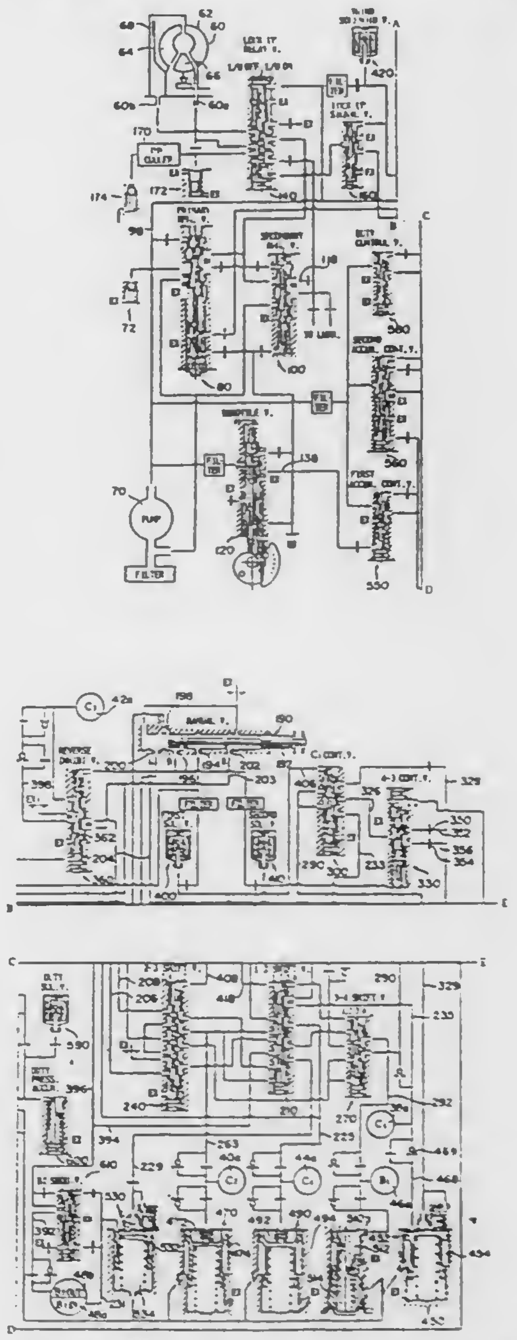
**Mitsuru Takada; Hiroshi Itoh, both of Toyota; Tokuyuki Takahashi, Aichi, and Makoto Funahashi, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Aug. 2, 1989, Ser. No. 388,485**

**Claims priority, application Japan, Aug. 2, 1988, 63-192965; Aug. 2, 1988, 63-192966**

**Int. Cl.⁵ B60K *41/16***

**U.S. Cl. 74—869** **6 Claims**



1. In an automatic transmission for a vehicle such as an automobile having a speed stage shifting mechanism including parallelly arranged first and second input clutches and adapted to selectively engage said first and second input clutches in three ways of engaging said first input clutch with said second input clutch being disengaged to provide a certain first forward speed stage, engaging said second input clutch with said

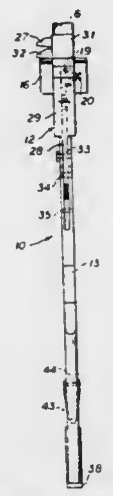
OL
126
SS
2
MY
14
1991
UMI

first clutch being disengaged to provide a certain second forward speed stage and engaging both said first and second clutches to provide a certain third forward speed stage, a hydraulic control device comprising:

- a first hydraulic pressure switching over valve having an input port to be supplied with an input hydraulic pressure, an output port connected with said first input clutch and a drain port, and adapted to be switched over between a first shift position of connecting said output port thereof with said input port thereof while isolating said output port thereof from said drain port thereof and a second shift position of connecting said output port thereof with said drain port thereof while isolating said output port thereof from said input port thereof;
- a second hydraulic pressure switching over valve having an input port to be supplied with an input hydraulic pressure, an output port connected with said second input clutch, a drain port and a fail safe port, and adapted to be switched over between a first shift position of connecting said output port thereof with said input port thereof on the one hand while connecting said fail safe port thereof with said drain port thereof on the other hand and a second shift position of connecting said output port thereof with said drain port thereof on the one hand while connecting said fail safe port thereof with said input port thereof on the other hand; and
- a first passage means for connecting said fail safe port of said second hydraulic pressure switching over valve with said first clutch when said first hydraulic pressure switching over valve is in said second shift position thereof and said second hydraulic pressure switching over valve is in said second shift position thereof.

---

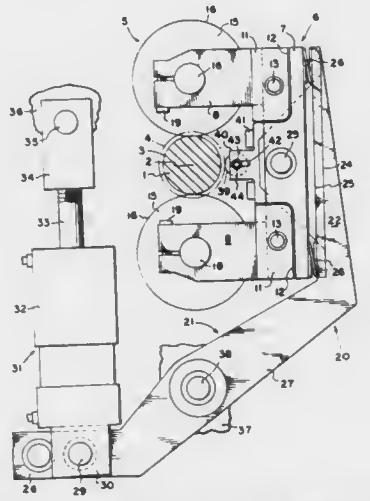
### 5,014,578
## PIPE TONGS
**Melvin L. Flentge, 941 FM 2502, Bellville, Tex. 77418**
**Filed Jan. 8, 1990, Ser. No. 462,047**
**Int. Cl.$^5$ B25B *7/12***
**U.S. Cl. 81—367** **23 Claims**



1. A pipe clamping device comprising
a fixed handle,
a removable pipe clamp at one end of and projecting laterally from said fixed handle
an adjustment screw at another end of said fixed handle,
a movable jaw member,
a removable pipe clamp at one end of and projecting laterally from said movable jaw member,
a movable handle pivotally connected at one end to said movable jaw member,
a movable latch and an operating lever therefor at another end of said movable handle,
a linkage connected between said movable handle and said adjustment screw to provide an adjustable toggle, locking mechanism for said handles and movable jaw member of said tongs,
a catch on said fixed handle engaged by said latch to secure said movable handle and movable jaw member in a locked, closed position, and
a pair of projections one on each of the outer ends of said fixed handle and said movable jaw member beyond said pipe clamps providing means to support said tongs on a well casing and to support a wire or cable spaced from the wall of a well casing while lowering pipe thereinto.

---

### 5,014,579
## TUBE CUTTING APPARATUS AND METHODS
**David A. Galonska, Saginaw, Mich., assignor to Arrow Paper Products Company, Saginaw, Mich.**
**Filed Feb. 27, 1989, Ser. No. 315,935**
**Int. Cl.$^5$ B23B *1/00***
**U.S. Cl. 82—47** **28 Claims**

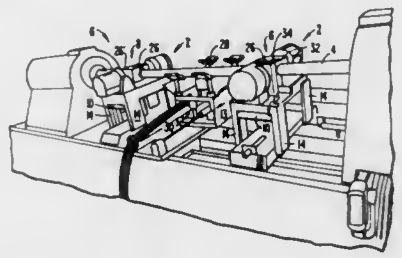


1. Apparatus for cutting the wall of a cylindrical tube supported on a mandrel rotatable about an axis, said apparatus comprising support means; means mounting said support means for movement transversely of said axis toward and away from said mandrel; at least one cutter having a cutting edge confronting said mandrel; and means mounting said cutter on said support means for movement therewith and in such position that as said support means moves transversely of said axis toward said mandrel the confronting edge of said cutter moves along a path that is spaced from said axis an amount corresponding substantially to half the thickness of said mandrel and substantially tangential to said mandrel, thereby effecting cutting of said wall.

---

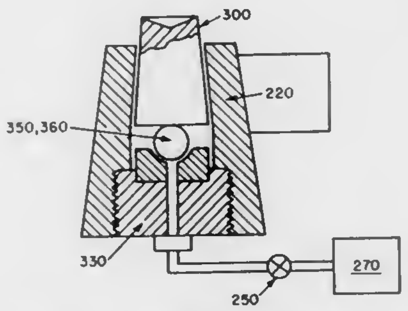
### 5,014,580
## CENTERING STAND FOR CYLINDER HOLDER
**Ronald J. Porter, Reno, Nev., assignor to Sierra Machinery, Inc., Sparks, Nev.**
**Filed Aug. 10, 1989, Ser. No. 392,234**
**Int. Cl.$^5$ B23B *25/00***
**U.S. Cl. 82—164** **15 Claims**

1. A centering stand for positioning a hollow cylinder for machining operations by a rotary tool, said stand comprising:
a vice including a pair of grips for retaining the cylinder in proper centered, aligned and non-rotatable position for rotary tool operations;
a base plate for supporting said vice so that the cylinder is non-rotatably retained in proper centered and aligned position;
said vice being movable with said base plate between a raised position for maintaining the cylinder in proper centered and aligned and non-rotatable position and a lowered position disengaged and spaced from the cylinder;
a plurality of guide members for guiding said base plate, each guide member including a track formed on an inner surface of said guide member for movement of said base plate in said track; and
means formed in at least one of said guide members for engaging said base plate at its raised position to ensure centering and alignment of the cylinder in proper position for rotary operations, thereby minimizing bowing of the cylinder.



---

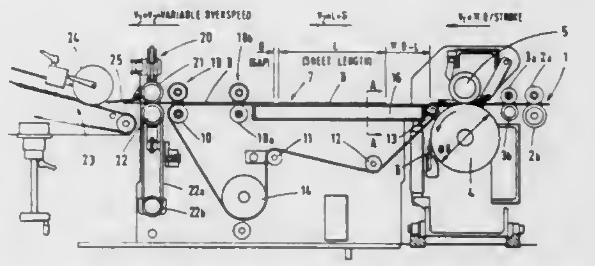
### 5,014,581
## APPARATUS FOR MACHINING
**Ranga Komanduri, Arlington, Va.; Branimer F. von Turkovich, Jericho, Vt., and Morton P. Casey, Jr., W. Sand Lake, N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**
**Filed Jul. 12, 1989, Ser. No. 378,746**
**Int. Cl.$^5$ B23B *27/12***
**U.S. Cl. 82—173** **2 Claims**



1. A rotary cutting tool for use in machining a workpiece and which is driven by motion of said workpiece, and which comprises:
a housing which has sides and a top and a bottom;
a spindle which is rotated in said housing by said workpiece, said spindle being attached a one end to a rotatable cutting disk which extends out of the top of said housing to machine said workpiece;
a means for providing a high pressure fluid into the bottom of said housing and around the spindle to separate the spindle from the bottom and the sides of the housing, said providing means adjustable providing said high pressure fluid at adjustable pressures, said providing means thereby causing said spindle and said cutting disk to float on said high pressure fluid in said housing during operation, and allowing the spindle and cutting disk to be quickly and easily removed from the housing when required;
a socket which is fixed to the bottom of said housing, said socket having a central aperture through which said providing means sprays said high pressure fluid into said housing, said socket having a curved indentation which surrounds said central aperture; and
a ball which rests on said curved indentation of said socket between said spindle and said socket, said ball thereby allowing said spindle to rotate on said ball as a hydrostatic ball bearing when said rotary cutting tool is in use.

---

### 5,014,582
## CARTON BLANK DECELERATION UNIT
**Goh B. Teik, Petaling Jaya, Malaysia, assignor to Komori-Chambon SA, Orleans, France**
**Filed Jan. 24, 1989, Ser. No. 301,355**
**Int. Cl.$^5$ B26D *7/32;* B31B *1/16;* B65H *29/66***
**U.S. Cl. 83—24** **13 Claims**



2. A machine assembly for producing and handling die-cut sheets of carton blanks, comprising:
a die-cutting machine for cutting a web into separate sheets of carbon blanks;
a waste-stripping unit for receiving the sheets of carton blanks from said die-cutting machine and for projecting the sheets at a predetermined speed and at spaced intervals sequentially onto a conveyor;
means for operating said conveyor at a speed which is less than the predetermined speed at which the sheets of carton blanks are projected onto said conveyor and which is so related to the predetermined speed at which the sheets are projected onto said conveyor that the spaced intervals between the sheets are substantially reduced;
suction means for bringing the sheets of carton blanks into contact with said conveyor to equalize the speed of the sheets with the speed of said conveyor and for positioning the sheets on said conveyor such that the spaced intervals between the sheets are substantially reduced without overlap of the sheets; and
separating means for separating the spaced sheets of carton blanks into individual carton blanks.

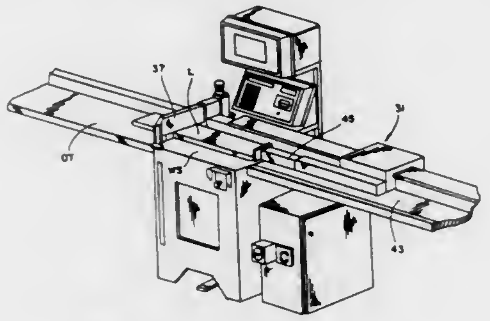
---

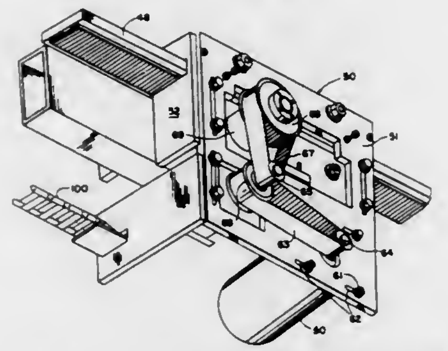
### 5,014,583
## PUSH FEED SYSTEM FOR A SAW
**William J. Webb, 35B Warminster Rd., Bathampton, Bath BA3 6SY, England, and Stoddard H. Pyle, 3955 SW. Brooklane Dr., Corvallis, Oreg. 97333**
**Filed Aug. 29, 1989, Ser. No. 399,967**
**Int. Cl.$^5$ B26D *7/06***
**U.S. Cl. 83—76.9** **24 Claims**

1. A push feed system for feeding successive articles a predetermined distance to a work station for performing work on the articles, comprising:
a movable push bar for engaging the articles to push them to the work station;
drive means connected with the push bar for moving it in a predetermined manner to successively engage the articles and advance each of them a predetermined distance to the work station, said drive means including a carriage slidable on a guide rail, said push bar being carried by said carriage for movement therewith, a stepper motor carried by said carriage and connected to drive a toothed belt, and a toothed rack matingly engaged with the belt, said carriage and thus said push bar being moved when the belt moves relative to the rack; and
control means for operating the stepper motor to move the toothed belt and rack a predetermined distance relative to one another for thereby moving the push bar a predetermined distance, whereby said push bar and the articles

VOL
1126
ISS
2
MY
14
1991
UMI

engaged thereby are accurately moved in increments according to the spacing of the teeth on the toothed belt and rack and the increments of movement of said stepper motor, and advancement of the articles is halted by cessation of operation of said stepper motor.





---

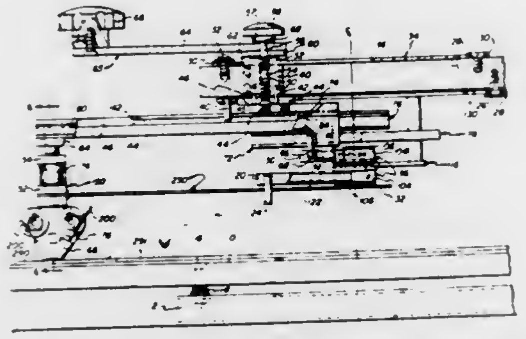
### 5,014,584
### MACHINE AND METHOD FOR CUTTING OVAL SHAPES

**Vincent T. Kozyrski, Plainville, and Alan R. Peters, Milford, both of Conn., assignors to The Fletcher-Terry Company, Farmington, Conn.**

**Filed Jul. 14, 1989, Ser. No. 380,217**

**Int. Cl.$^5$ B26D** *5/08*

U.S. Cl. 83—464 **20 Claims**



1. In a machine for cutting an oval shape in a planar workpiece, the combination comprising:

mounting means for mounting a cutting element having a cutting axis in general alignment with a first axis of said mounting means;

means supporting said mounting means for pivotal movement about a second axis generally perpendicular to said first axis;

a first mechanism for moving said supporting means so as to move said mounting means along an oval path in a plane substantially normal to said second axis and concentric with a centerline of the machine; and

means for pivoting said supporting means about said second axis as said supporting means moves along said oval path, said means for pivoting including a second mechanism, adapted to move a component along a circular path about said machine centerline, and coupling means comprising first and second components operatively attached to said second mechanism and said mounting means, respectively, said first and second components being operatively interconnected and adapted to translate unidirectional circular motion of said first component into reciprocating pivotal movement of said second component, so as to constantly maintain said first axis of said mounting means substantially tangent to said oval path.

---

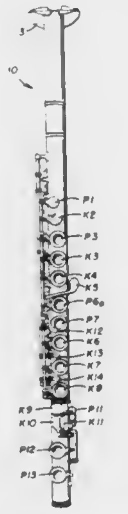
### 5,014,585
### END BLOWN FLUTE WITH STANDARD KEYING

**Sam Wesley, Sr., 52 Alvarado Ave., Pittsburg, Calif. 94565**

**Filed Aug. 24, 1989, Ser. No. 398,243**

**Int. Cl.$^5$ G10D** *7/02*

U.S. Cl. 84—384 **7 Claims**



1. An end-blown flute, comprising:

a hollow tube open at both ends,

an embouchure at one end of said tube to provide an end-blown free air-reed,

said tube having at least 13 tone holes through the side wall of said tube,

a plurality of manually operable keys mounted on said tube and positioned relative to each other in the same pattern as on a standard transverse flute,

means operable by said keys for selectively opening or closing said tone holes to enable said flute to be played with the same fingering system as used with a standard transverse flute,

said tone holes having a spacing along said tube and diameters such as to enable the same tones to be produced as those produced with the same fingering system as used with a standard transverse flute.

---

### 5,014,586
### CHORD SETTING APPARATUS AND ELECTRONIC WIND INSTRUMENT USING THE SAME

**Shigeo Sakashita, Hamura, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Jun. 9, 1989, Ser. No. 364,010**

**Claims priority, application Japan, Jun. 17, 1988, 63-80183[U]; Dec. 2, 1988, 63–305722**

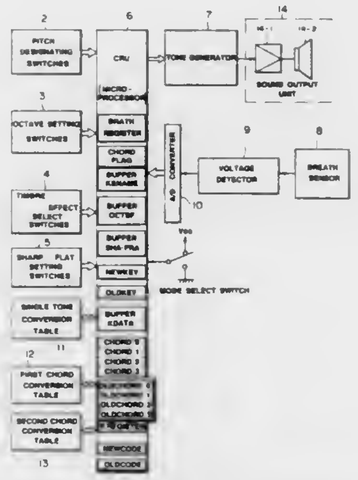
**Int. Cl.$^5$ G10H** *1/38*

U.S. Cl. 84—637 **31 Claims**

1. A chord setting apparatus comprising:

pitch designating means for designating only one pitch from among pitches in at least one octave range based on a combination of operational statuses of a plurality of pitch designating actuators;

type designating means for designating a type of a chord; and



chord setting means for setting a chord of a type designated by said type designating means, with a root being a pitch designated by said pitch designating means.

---

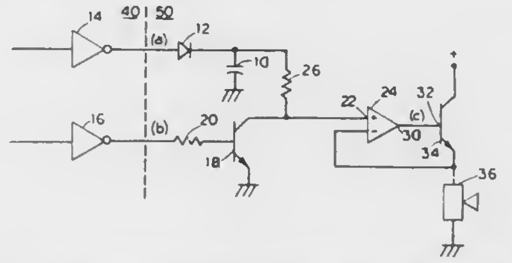
### 5,014,587
### ELECTRONIC PIANO TONE CIRCUIT

**William R. Taylor, Williamsville, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.**

**Filed Oct. 16, 1989, Ser. No. 421,775**

**Int. Cl.$^5$ G10H** *1/20, 1/32, 5/12*

U.S. Cl. 84—659 **22 Claims**



10. Apparatus for generating an enveloped tone signal comprising:

digital means for generating an alternating logical waveform at a selected tone frequency and a logic level start pulse for initiating the tone; and

analog means responsive to the alternating logical waveform and the start pulse comprising:

storage means responsive to the start pulse for storing a charge; and

switching means connected to the storage means, responsive to the alternating logical waveform for repeatedly bleeding off charge from the storage means in synchronization with the alternating logical waveform; and

transducer means connected to the storage means for producing the enveloped tone signal.

---

### 5,014,588
### ELECTRONIC STRINGED MUSICAL INSTRUMENT WITH A STRING VIBRATION DETECTING APPARATUS

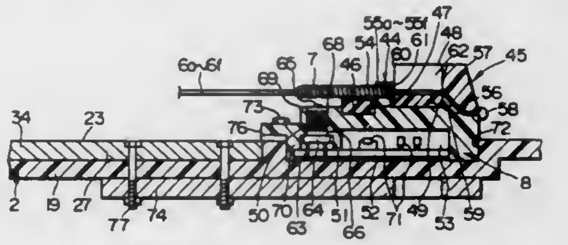
**Fumio Omata, Chofu; Katutosi Sakai, Akigawa, and Yoshio Nomura, Oome, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed May 31, 1989, Ser. No. 359,687**

**Claims priority, application Japan, Jun. 3, 1988, 63-74044[U]**

**Int. Cl.$^5$ G10H** *3/18*

U.S. Cl. 84—726 **9 Claims**



1. An electronic stringed musical instrument comprising:

a body unit;

at least one string stretched over said body unit;

a string supporting unit removably mounted on said body unit to support and fix at least one end of said at least one string;

string vibration detecting means, removably mounted on said string supporting unit, for detecting vibration of said at least one string and for generating an electrical signal corresponding to the detected vibration;

an electronic processing substrate removably mounted on a lower portion of said string supporting unit, and including an output terminal supporting portion which supports a plurality of output terminals for outputting the electrical signal generated by said string vibration detecting means; and

a cylindrical magnetic member having one end which is removably attached to said string supporting unit, and having another end which is fitted on said at least one string, and said cylindrical magnetic member having a center hole in which said at least one string is passed, said cylindrical magnetic member being flexible so as to follow a movement of said at least one string passed therein.

---

### 5,014,589
### CONTROL APPARATUS FOR ELECTRONIC MUSICAL INSTRUMENT FOR GENERATING MUSICAL TONE HAVING TONE PITCH CORRESPONDING TO INPUT WAVEFORM SIGNAL

**Katsuhiko Obata, Tachikawa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Mar. 27, 1989, Ser. No. 329,418**

**Claims priority, application Japan, Mar. 31, 1988, 63-76492**

**Int. Cl.$^5$ G10H** *1/06, 1/18, 1/46, 3/18*

U.S. Cl. 84—735 **14 Claims**

1. A control apparatus for an electrical musical instrument, comprising:

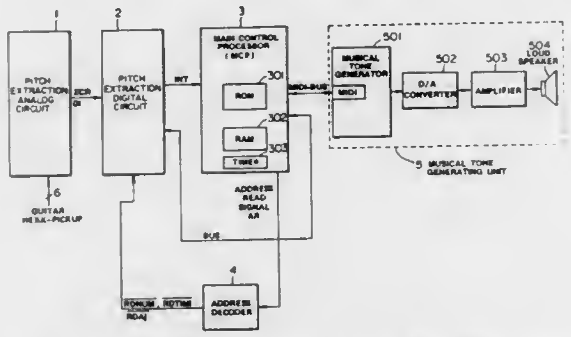
input means for receiving from said instrument an input signal which cyclically varies in amplitude;

intensity detection means connected to receive said input signal for detecting intensity values at a leading edge of said input signal by sensing the peak amplitude values thereof;

intensity change detection means connected to receive said sensed peak amplitude values for detecting changes in said intensity values; and

VOL
1126
ISS
2
MY
14
1991
UMI

a musical tone generating control means for controlling at least two characteristics of a musical tone in accordance



with said detected intensity values and said detected changes in intensity values.

---

## 5,014,590
## DEVICE FOR EJECTING SUBMUNITION

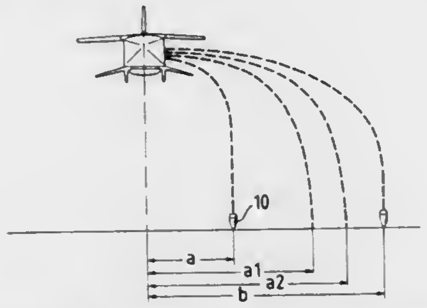
**Wolf-Dieter Moggert, Munich, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 118,771, Oct. 19, 1987, abandoned. This application Dec. 29, 1989, Ser. No. 466,710**

**Claims priority, application Fed. Rep. of Germany, Oct. 23, 1986, 3636055**

**Int. Cl.⁵ B64D** *1/04;* **F42B** *13/50*

U.S. Cl. 89—1.57 5 Claims



1. Device for the ejection of submunitions or individual projectiles from a scattering vessel comprising a plurality of ejecting tubes containing said submunitions, at least one compressed-gas producer and a compressed gas space in each of said ejecting tubes, wherein the improvement comprises a tube closing plate in one end of said ejecting tubes, means (**15, 16, 17**) for selectively reducing the pressure in each said compressed gas space (**12**), said means (**15, 16, 17**) being controlled with respect to time by a programming device (**18***b*) associated with each said ejecting tube (**R1–Rn**) at the tube closing plate (**14**) end thereof for one of the controlled uniform or variable ejection with respect to time of said submunitions in order to achieve a graduated dispensing of said submunitions.

---

## 5,014,591
## MULTIPLE ENCODER FUZE

**Frank K. Porter, Jr., Billerica, Mass., assignor to Raytheon Company, Lexington, Mass.**

**Filed Jan. 2, 1990, Ser. No. 459,617**

**Int. Cl.⁵ F42C** *9/14, 17/00*

U.S. Cl. 89—6 11 Claims

6. A time delay mechanism comprising:

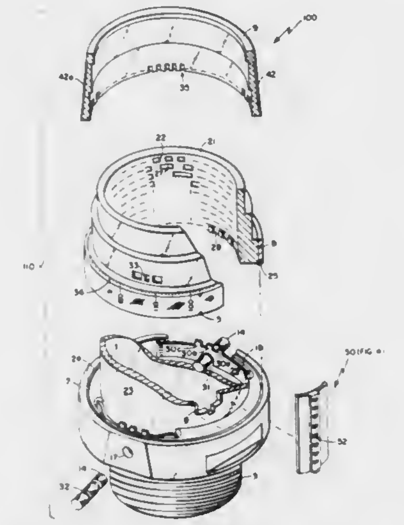
(a) an encoder ring with a predetermined mask pattern having a plurality of mask elements, each mask element corresponding to one of a plurality of timing settings;

(b) means for locking the encoder ring at one of the plurality of mask elements,

wherein said locking means comprises:

(i) a lock pin with a control groove;

(ii) a spring lock with a plurality of lock tangs and a recess, the recess engaged by the control groove of the lock pin: and



(iii) a plurality of locking teeth disposed on the encoder ring so that the plurality of locking teeth is engaged by the plurality of lock tangs such that the encoder ring is locked at one of the plurality of mask elements; and

(c) means for selectively changing the encoder ring from being locked at one to another one of the plurality of mask elements.

---

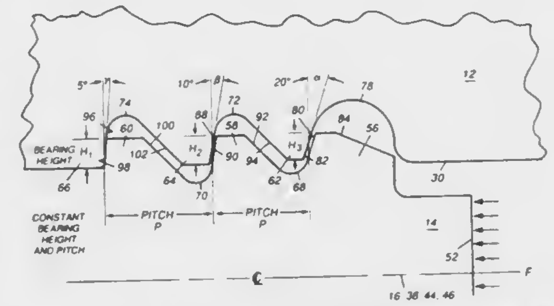
## 5,014,592
## MULTI-LUG BREECH MECHANISM

**John E. Zweig, Poestenkill; John P. Kehn, Troy, and Michael J. Glennon, Loudonville, all of N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jan. 2, 1990, Ser. No. 459,905**

**Int. Cl.⁵ F41A** *3/10*

U.S. Cl. 89—24 4 Claims



1. A breech mechanism comprising a breech ring and a sliding breech block;

said breech ring comprising a first body of material having a predetermined value of compliance, a longitudinal axis, front and rear surface areas disposed substantially perpendicular to said axis and two pairs of opposed spaced major surface areas disposed substantially parallel to said axes, said surface areas defining the outer surface area of the ring;

a plurality of walls formed in said body defining a cavity which extends entirely through said body from one major surface to the other major surface of one of the pairs of major opposed surfaces;

two of said plurality of walls being opposed to, and spaced from, each other and configured to define an interrupted internal thread of buttress form;

said sliding breech block comprising a second body of material having a predetermined value of compliance, a longitudinal axis, and an exterior surface comprising a front surface, a rear surface, a first pair of major opposed surfaces comprising top and bottom surfaces of said second body, and a second pair of major opposed surfaces comprising two side surfaces of said second body;

said side surfaces are configured to define a plurality of pairs of laterally extending lugs projecting outwardly from the center of said second body and configured to define an interrupted external thread of buttress form;

said sliding breech block is capable of slidable insertion into and slidable withdrawal from the cavity formed in the breech ring;

the pressure flank of each lug of at least one pair of said laterally extending lugs is spaced a predetermined distance from the pressure flank of a respective internal thread of said interrupted interal thread of the breech ring when the sliding block is inserted into the cavity of the breech ring and the breech mechanism is in a closed and locked condition prior to firing a cannon;

said pressure flank of each lug of said at least one pair of said laterally extending lugs and said pressure flank of said respective internal thread of said interrupted internal thread are in an abutting contact relationship with each other immediately after the firing of the cannon to transfer a predetermined portion of the load applied to the block by the forces generated by the firing of the cannon to a predetermined portion of the breech ring;

said pressure flanks of each lug of said at least one pair of said laterally extending lugs and said pressure flank of said respective internal thread of said interrupted thread return to their initial spaced predetermined distance relationship upon completion of firing the cannon, and

the pressure flank of each lug of at least one other pair of the plurality of pairs of laterally extending lugs of the slide block is in an abutting contact relationship with the pressure flank of another respective internal thread of said interrupted internal thread of the breech ring prior to, during, and after firing of the cannon.

---

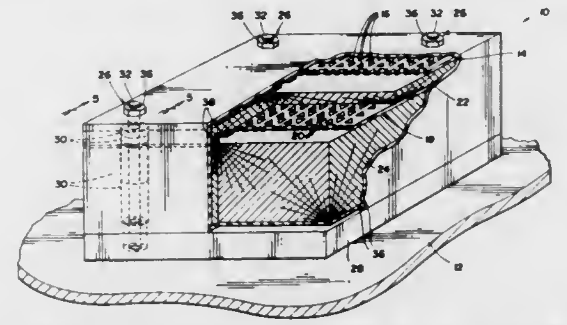
## 5,014,593
## PERFORATED PLATE ARMOR

**Richard A. Auyer, Troy; Robert J. Buccellato, Livonia; Andrew J. Gidynski, Sterling Heights; Richard M. Ingersoll, Troy, and Needangalam S. Sridharan, Ortonville, all of Mich., assignors to General Dynamics Land Systems, Inc., Troy, Mich.**

**Continuation of Ser. No. 162,555, Mar. 1, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,657**

**Int. Cl.⁵ F41H** *5/013, 5/04*

U.S. Cl. 89—36.02 9 Claims



1. Perforated plate armor comprising: an outer perforated steel plate having a pattern of spaced triangular holes an inner perforated steel plate having a pattern of spaced triangular holes; each of said outer and inner perforated steel plates having oppositely facing surfaces and having hole defining surfaces; the hole defining surfaces of each of said inner and outer steel plates extending between the oppositely facing surfaces of the associated plate about the entire periphery of each triangular hole therein; each of said outer and inner perforated steel plates being heat treated to have hardened surfaces and a more ductile core; an inner backing plate; each of said outer and inner perforated steel plates and said inner backing plate having mounting holes; connectors each of which includes a connector member that extends through a pair of said mounting holes in the outer and inner perforated steel plates and through one of said mounting holes in the inner backing plate; each of said connectors including spacers that are separate from each other and said spacers having openings through which the connector member thereof extends with at least one spacer of said spacers located between the outer and inner perforated steel plates and with at least one spacer of said spacers located between the inner perforated steel plate and inner backing plate; the connector member of each connector having a pair of ends where the connector member respectively extends through one mounting hole of said mounting holes of the outer perforated steel plate and through one mounting hole of said mounting holes of the inner backing plate to provide engagement of the outer and inner perforated steel plates and the inner backing plate with the spacers; and the connectors locating the outer and inner steel plates with the pattern of spaced triangular holes of the outer steel plate in an offset relationship to the pattern of spaced triangular holes of the inner steel plate to limit projectile penetration.

---

## 5,014,594
## UNBALANCE-COMPENSATING DEVICE FOR A WEAPONS SYSTEM ESPECIALLY A HEAVY WEAPON

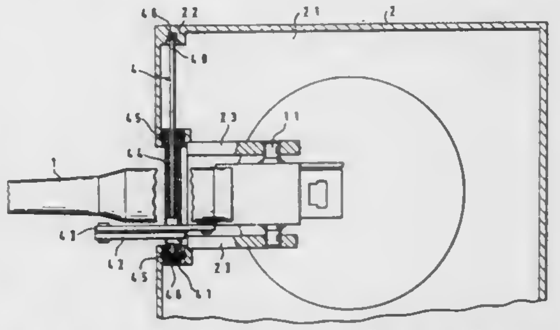
**Peter Mühlhausen, Ahnatal, and Adolf Nausester, Habichtswald, both of Fed. Rep. of Germany, assignors to Wegman & Co. GmbH, Kassel, Fed. Rep. of Germany**

**Filed Sep. 1, 1989, Ser. No. 402,275**

**Claims priority, application Fed. Rep. of Germany, Sep. 2, 1988, 3829860**

**Int. Cl.⁵ F41A** *27/06*

U.S. Cl. 89—37.08 9 Claims



1. In a weapons system having a stationary base and an assembly with a tube and means mounting the tube for pivotal movement in a direction of elevation including a trunnion having an axis of rotation and wherein the center of gravity of the assembly is outside the axis of rotation of the trunnion to effect a moment of unbalance and an imbalance-compensating device for generating a torque that opposes the movement of unbalance, the improvement wherein the device comprises at least one torsion-bar suspension mechanism positioned upstream of the trunnion along a direction of fire and below the assembly and positioned parallel to the axis of rotation of the trunnion and having a first end which is non-rotationally secured to the base and a transmission mechanism securing a second end of the torsion-bar suspension mechanism to the assembly, wherein the transmission mechanism has a lever that is non-rotationally secured to the second end of the torsion-bar

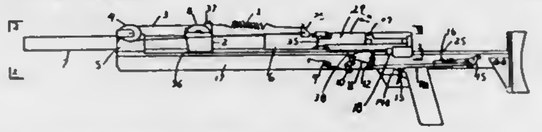
VOL
1126
ISS
2
MY
14
1991
UMI

suspension mechanism and articulated to a thrust rod that is in turn articulated to the assembly.

---

### 5,014,595
### REDIRECTED RECOIL MECHANISM

**Fredric D. Ducolon, Jr., 5303 Pacific Hwy. East, Ste. 172, Fife, Wash. 98424**
**Continuation-in-part of Ser. No. 194,526, Sep. 16, 1988, abandoned. This application Oct. 2, 1989, Ser. No. 415,851**
**Int. Cl.$^5$ F41A** *25/10*
**U.S. Cl. 89—44.01** **6 Claims**

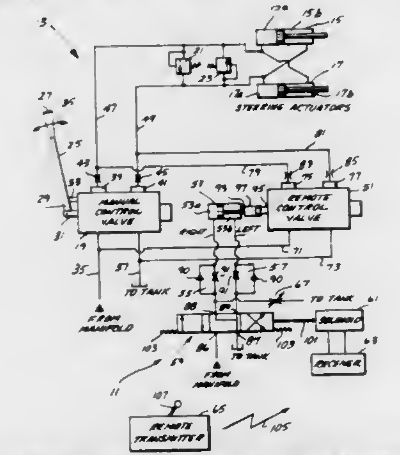


1. A recoil redirecting gun, comprising:
a frame;
a gun barrel assembly including a barrel and a receiver having a bolt therein;
said gun barrel assembly being slidably mounted to longitudinally reciprocate on said frame between a forwardmost position and rearwardmost position;
a means for firing said gun when said gun barrel assembly is substantially at its forwardmost position; and
a recoil redirecting mechanism including
a recoil-absorbing spring means,
a fixed pulley mounted on said frame,
a travelling pulley mounted on a longitudinally reciprocating block, said block being longitudinally slidable relative to said frame substantially parallel to and independent from said gun barrel assembly;
a cable means having a first end fixed relative to said frame, said cable means extending around and reversed in direction by said travelling pulley, further extending around and reversed in direction by said fixed pulley, and having a second end fixed to said gun barrel assembly; and
said spring means biasing said gun barrel assembly and said reciprocating block so that, when said gun is fired, said gun barrel assembly recoils rearwardly exerting rearwardly-directed force on said spring means and said second end of said cable means, said cable means in turn exerting force on said pulleys to thereby cause said block to slide forwardly and to exert forwardly-directed force on said spring means.

---

### 5,014,596
### REMOTE CONTROL MODIFICATION FOR MANUALLY CONTROLLED HYDRAULIC SYSTEMS

**Louis G. St. Martin, 970-1 Circle St., Wenatchee, Wash. 98801**
**Filed Jun. 28, 1989, Ser. No. 372,793**
**Int. Cl.$^5$ F01B** *25/02*
**U.S. Cl. 91—6** **19 Claims**

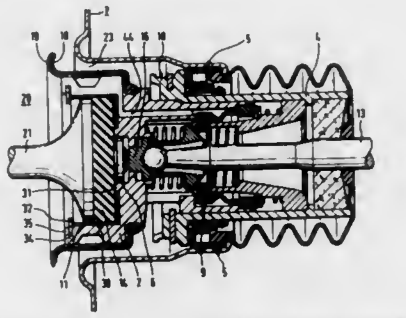


1. A hydraulic control system including a manual control valve having input and output ports for controlling the application of hydraulic pressure to one or more hydraulic actuators, the improvement comprising: a remote control modification, said remote control modification including:
(a) a remote control valve having input and output ports connected in parallel with the input and output ports of said manual control valve, the output ports of said remote control valve being smaller in size than the output ports of said manual control valve; and,
(b) an electro-hydraulic control system for controlling the operation of said remote control valve, said electro-hydraulic remote control system comprising:
(i) a slave hydraulic actuator including: (1) a piston moved shaft coupled to said remote control valve for controlling the position of said remote control valve; and (2) chambers located on opposite sides of said piston such that said shaft passes through one of said chambers but not the other chamber;
(ii) a three-position electrically actuated valve for controlling the flow of hydraulic fluid to said slave hydraulic actuator, said electrically actuated valve coupled to said slave hydraulic actuator such that: (1) hydraulic pressure is applied to the non-shaft chambers of said slave hydraulic actuator when said electrically actuated valve is in a first position; (2) hydraulic pressure is applied to the shaft chamber of said slave hydraulic actuator when said electrically actuated valve is in a second position; and (3) the shaft and non-shaft chambers of said slave hydraulic actuator are both connected to a hydraulic fluid reservoir when said electrically actuated valve is in said third position;
(iii) a receiver coupled to said electrically actuated valve for energizing said electrically actuated valve so as to position said electrically actuated valve in one of said first and second positions upon receipt of a suitable remotely generated radio frequency signal; and,
(iv) a remote transmitter for generating radio frequency signals suitable for causing said receiver to energize said electrically actuated valve so as to position said electrically actuated valve in one of said first and second positions.

---

### 5,014,597
### VACUUM BRAKE POWER BOOSTER WITH METAL CUP SUPPORTING REACTION DISK

**Manfred Rueffer, Sulzbach; Bernd Toepperwien, Rossdorf, both of Fed. Rep. of Germany, and Vladimir Dusil, Weiterstadt, Czechoslovakia, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**
**Filed Feb. 5, 1990, Ser. No. 474,914**
**Claims priority, application Fed. Rep. of Germany, Feb. 16, 1989, 3904641**
**Int. Cl.$^5$ B60T** *13/52;* **F15B** *9/10*
**U.S. Cl. 91—369.2** **16 Claims**



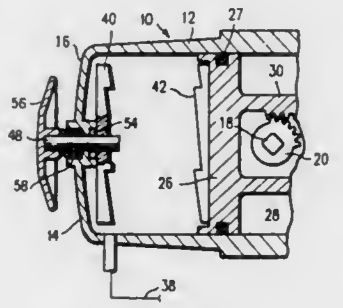
1. A vacuum brake power booster for automotive vehicles, comprising:
a housing;
a movable wall sealingly subdividing said housing into at least one vacuum chamber and at least one power chamber and movable forwardly and rearwardly of said housing along a central axis;

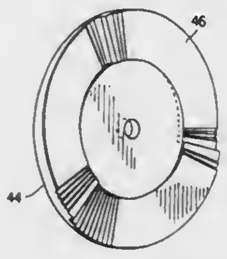
a return spring prestressing said wall;
control valve means for controlling the pressure differential between said power chamber and said vacuum chamber, and
including a control valve housing made of thermoplastic material mounted in said wall for movement therewith along said axis;
a generally cylindrical metal cup having a bottom engaging the front side of said control valve housing and projecting forwardly from said housing coaxially of said axis;
a reaction disc of high-elasticity material received within said metal cup;
a push rod abutted against said reaction disc within said cup, said push rod transmitting brake power to an actuating piston of a master brake cylinder positioned on a vacuum side of said housing; and
retaining means for retaining said metal cup in a positive locking fit with said control valve housing,
said retaining means comprising a retaining clip constituted by a U-shaped steel bracket having a central through opening for said push rod and arms with outer ends seated behind two radial rearwardly facing projections radially opposite each other on said control valve housing.

---

### 5,014,598
### FLUID PRESSURE ACTUATOR

**Raymond P. Champagne, Coventry, R.I., assignor to Neles-Jamesbury Corporation, Worcester, Mass.**
**Filed Dec. 30, 1988, Ser. No. 292,425**
**Int. Cl.$^5$ F01B** *31/14;* **F15B** *15/24*
**U.S. Cl. 92—13.005** **3 Claims**



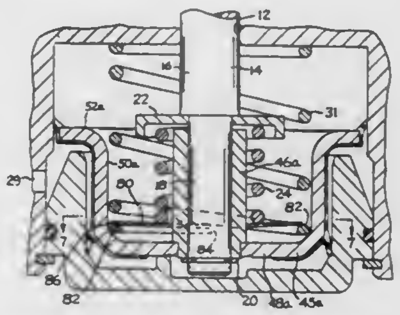


1. A fluid pressure actuator comprising:
a cylinder having an end wall,
a piston assembly reciprocally movable in said cylinder,
limit means proximate to said end wall for engaging said piston assembly and adjusting the stroke of said piston,
said limit means including first and second stop plate means rotatable with respect to each other, and a plurality of ramps formed on the facing surfaces of each of said first and second stop plate means which cooperate to change the combined thickness of said first and second stop plate means as a function of their rotation; and
means for rotating said first stop plate means with respect to said second stop plate means.

---

### 5,014,599
### TWO PIECE HYDRAULIC PISTON ASSEMBLY WITH SWAGED PISTON-SLEEVE JOINT

**Judith Kocsis; Joseph A. Stojkov, both of Farmington Hills, and Michael E. Towler, Ypsilanti, all of Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.**
**Filed Feb. 26, 1990, Ser. No. 484,954**
**Int. Cl.$^5$ F16J** *1/10, 9/12;* **F01B** *31/00;* **F16B** *9/00*
**U.S. Cl. 92—84** **13 Claims**



1. In combination, for use with a piston support rod:
an annular sleeve supported by the piston support rod; and a piston affixed to said sleeve for movement therewith; said sleeve having an external annular undercut extending axially from one of its ends to define a mandrel surface and a radial shoulder; said piston being formed as a sheet metal stamping that includes a radial end wall, an annular side wall extending axially from said end wall, and a flange extending radially outwardly from said side wall; an annular sealing lip bonded to said flange; said lip being connected to said flange such that the lip is radially movable beyond the outer edge of the flange; said radial end wall having a central hole extending therethrough, with the hole edge surface engaged against the mandrel surface; said radial end wall having a surface section thereof deformed toward the juncture between the mandrel surface and associated radial shoulder so that the edge surface of the hole has pressurized sealing engagement with the mandrel surface; said mandrel surface extending at an acute angle to the associated radial shoulder to define a retaining means for retention of the piston end wall on the sleeve.

---

### 5,014,600
### BISTEP TERMINATOR FOR HYDRAULIC OR PNEUMATIC MUSCLE

**Allan I. Krauter, Syracuse, and Robert L. Vivenzio, Auburn, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.**
**Filed Feb. 6, 1990, Ser. No. 475,822**
**Int. Cl.$^5$ F01B** *19/00;* **F16J** *3/00*
**U.S. Cl. 92—92** **17 Claims**

1. A terminator for a pneumatic or hydraulic muscle of the type that comprises an elongated elastomeric tubular bladder, an elongated tubular braid member disposed over said bladder, one or more generally cylindrical terminators disposed at one or both of a proximal end and a distal end of the muscle and each fitting into a respective end of the bladder and of the braid member for sealing the associated end of the muscle and providing a mechanical attachment point at each end of the muscle; wherein each said terminator has first annular land at one

VOL
1126
ISS
2
MY
14
1991
UMI

end thereof, a first annular recess adjacent said first land and onto which the end of the bladder is attached to form a fluid-tight seal, a second land adjacent said first recess, and a second annular recess adjacent the second land and axially spaced from said first recess and onto which the end of the braid member is secured, so that tensile forces on the terminator are transmitted directly to the braid member and are not applied directly to the end of the bladder.

---

**5,014,601**

### WORKING CYLINDER

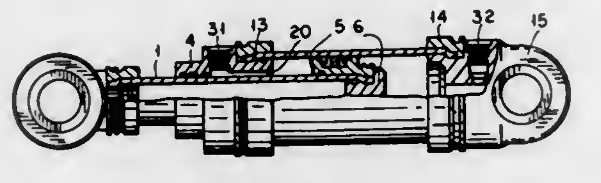
**Göran Sundholm, Magistervägen 34 B, SF-02700 Grankulla, Finland**

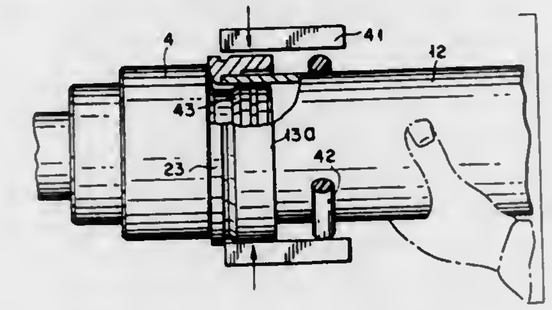
**Filed Jun. 9, 1989, Ser. No. 364,625**

**Claims priority, application Finland, Jun. 15, 1988, 882857; Jul. 18, 1988, 883410; Nov. 16, 1988, 885307; Feb. 3, 1989, 890518; Apr. 4, 1989, 891612**

**Int. Cl.$^5$ F01B** *31/00*

**U.S. Cl. 92—109** **15 Claims**





1. A working cylinder, comprising a cylinder unit having a front end part, a rear end part and cylinder tube connecting the front and rear end parts, a piston moveable in the cylinder tube and a piston rod secured to the piston and extending through the front end part, at least one of said front and rear end parts including a shoulder which bears against the inner surface of an overlying respective end portion of the cylinder tube and at least one compression ring having been compressed, for plastical deformation resulting in increased length axially around the respective end portion of the cylinder tube thereby to clamp the cylinder tube to the respective at least one end part, the or each compression ring being provided with a flange which is shaped whereby during the said compression of the compression ring the cylinder tube end portion is deformed by the flange and the deformed cylinder tube end portion is clamped between the flange and the shoulder.

---

**5,014,602**

### HYDRAULIC CYLINDER UNIT CAPABLE OF BEING SET IN THREE POSITIONS

**Yukio Iwata, Omiya, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan**

**Filed Jan. 16, 1990, Ser. No. 464,883**

**Claims priority, application Japan, Jan. 13, 1989, 1-4854**

**Int. Cl.$^5$ F01B** *15/02*

**U.S. Cl. 92—117 A** **5 Claims**

1. A fluid cylinder unit capable of being set in three set positions, comprising:

a piston rod including a main piston extending radially therefrom at a central position along said piston rod,

two auxiliary pistons slidably mounted on said piston rod, one on each side of said main piston, each of said auxiliary pistons having an annular projection extending radially therefrom at an end closest to said main piston,

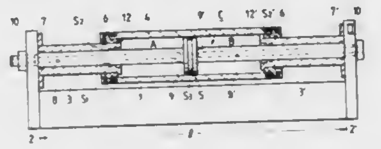
a cylinder arrangement, comprising;

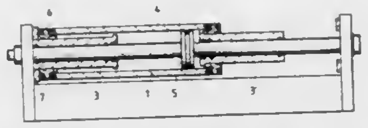
a tubular cylinder slidably mounted around said main piston and at least a portion of each of said auxiliary pistons;

two collars, one on each end of said cylinder, the inside diameter of said two collars being smaller than the outer diameter of said annular projections so as to prevent said auxiliary pistons from exiting said cylinder completely; and

two seals, one on each of said collars, fitted against each of said auxiliary pistons so as to define a fluid-tight chamber on the right side of said piston and a fluid-tight chamber on the left side of said main piston;

means for limiting the travel of said cylinder, relative to said piston rod, along the length of said piston rod; and;





pumping means for introducing fluid into, and draining fluid out of, each of said fluid tight chambers so as to cause said cylinder to be moved to an extreme right position until said cylinder encounters said means for limiting travel and said auxiliary piston on the right side to retreat into said cylinder when fluid is introduced into said fluid-tight chamber, on the right side and fluid is drained out of said fluid-tight chamber on the left side, said pumping means further causing said cylinder to be moved to an extreme left position unit said auxiliary piston on the left side to retreat into said cylinder, when fluid is introduced into said fluid-tight chamber on the left side and fluid is drained out of said fluid-tight chamber on the right side, said pumping means further causing said cylinder to be moved to a central position and said annular projections to be forced against said collars when fluid is introduced into both of said fluid-tight chambers under equal pressure.

---

**5,014,603**

### HYDRAULIC ACTUATOR HAVING FRANGIBLE OR DEFORMABLE COMPONENTS

**Carlos A. Navarette, Canoga Park, and Eric M. Mashita, Canyon Country, both nf Calif., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

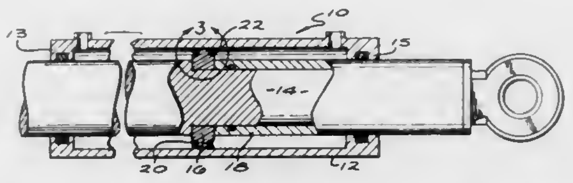
**Filed Nov. 2, 1989, Ser. No. 431,005**

**Int. Cl.$^5$ F16J** *15/16*

**U.S. Cl. 92—165 R** **12 Claims**

1. A linear hydraulic actuator including a metal cylindrical housing, having a rod end gland secured to said housing, a piston in said housing and a metal piston rod attached to said piston and extending through said rod end gland, the clearance between said rod and the interior of said housing being small relative to the diameter of said rod

characterized in that one of said piston and said rod end gland is of a frangible or deformable plastic material having a surface which is subjected to relative movement against an opposing metal surface, at least one seal groove is formed in said plastic material adjacent said opposing metal surface, said seal groove being formed at an outside edge of said material to thereby leave an uninterrupted width of plastic material adjacent said opposing metal surface, a dynamic seal of low friction fluorocarbon material at said groove having an interior passage and an exterior surface adapted to contact said opposing metal surface, and a resilient member in said interior passage urging said exterior surface against said opposing metal surface.



---

**5,014,604**

### PISTON FOR INTERNAL COMBUSTION ENGINE

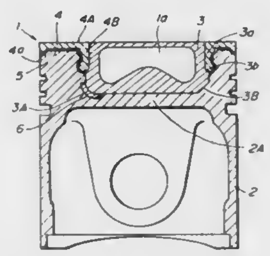
**Sumio Hirao; Masaji Matsunaga, and Yoshihiro Yamada, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited and Atsugi Unisia Corporation, both of, Japan**

**Filed Oct. 13, 1989, Ser. No. 421,106**

**Claims priority, application Japan, Oct. 14, 1988, 63-259030**

**Int. Cl.$^5$ F02F** *3/00*

**U.S. Cl. 92—212** **16 Claims**



1. A piston for an internal combustion engine, comprising:

a piston head made of heat resistant material;

a piston body made of an aluminum alloy; and

an aluminized layer formed on a surface of said piston head and interfacing between said piston head and said piston body to connect said piston head with said piston body to improve the mechanical strength of the bond therebetween,

wherein said piston head includes a first piston head member made of a ceramic and a second piston head member made of titanium or a titanium alloy, said first piston head member constituting a central portion of said piston head and said second piston head member constituting the periphery thereof, said second piston head member being engaged with said first piston head member by shrink fit bonding, said aluminized layer being formed on the surface of said second piston head member, and

wherein the edge of said first piston head member engaging with said piston body is chamfered to prevent said first head member from rotating relative to said piston body.

---

**5,014,605**

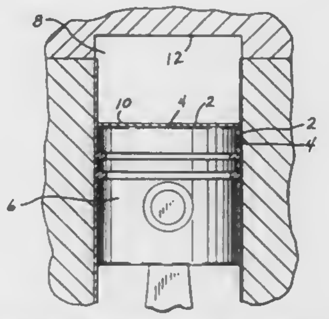
### MAGNESIUM PISTON COATED WITH A FUEL INGITION PRODUCTS ADHESIVE

**John D. Santi, West Allis, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.**

**Filed Feb. 21, 1990, Ser. No. 482,841**

**Int. Cl.$^5$ F02F** *3/00*

**U.S. Cl. 92—223** **4 Claims**



1. In an internal combustion engine of the type having at least one magnesium piston with a portion of a piston surface being exposed to fuel ignition products formed by fuel combustion in a combustion chamber, the improvement comprising:

an adhesive coating on said piston surface to which said fuel ignition products adhere during running of said engine, said fuel ignition products protecting said piston surface from adverse chemical reactions such as corrosion.

---

**5,014,606**

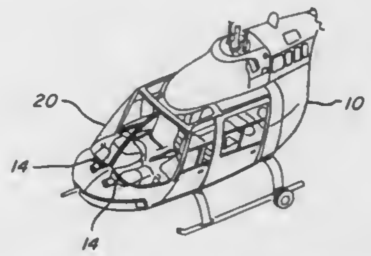
### WINDSHIELD DEFROSTER SYSTEM FOR THE BELL HELICOPTER TEXTRON, INC., MODEL 206 HELICOPTER AND MILITARY DERIVATIVES

**Norman F. Steiner, and James R. Steiner, both of 7421 Mt. Sherman, Longmont, Colo. 80501**

**Filed Nov. 23, 1987, Ser. No. 124,007**

**Int. Cl.$^5$ B60H** *1/00*

**U.S. Cl. 98—2.09** **2 Claims**



1. A helicopter windshield defogger and/or de-icer system connectable with a high pressure, high temperature air supply from the compression stage of a helicopter turbine engine, said system comprising a connecting line from said high pressure, high temperature air supply to a Coanda Ejector nozzle positioned adjacent to the helicopter windshield, said Coanda Ejector nozzle having means to distribute a mixture of high temperature air and aspirated cabin air to a position adjacent to the helicopter windshield to promote defrosting and/or deicing of said windshield.

---

**5,014,607**

### WINDOW WIND GUARD FOR MOTOR VEHICLES

**Michael K. Johnson, 1230 Monterey Blvd., San Francisco, Calif. 94127**

**Filed Feb. 16, 1990, Ser. No. 480,821**

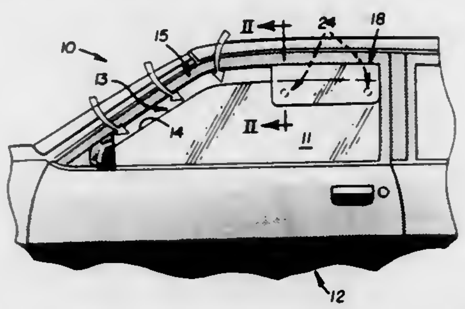
**Int. Cl.$^5$ B60H** *1/24*

**U.S. Cl. 98—2.13** **15 Claims**

15. In combination with a window having a frame of a motor vehicle, said window having a predetermined thickness and

VOL
1126
ISS
2
MY
14
1991
UMI

adjustably mounted for vertical movement between a lowered position to define an opening between an upper edge of said window and said frame and a raised position closing said opening, wind guard means mounted over the upper edge of said window for vertical adjustment thereon to selectively adjust the effective area of said opening comprising a pair of overlying, flexible plastic panels connected together only at upper ends thereof to define an inverted, generally U-shaped channel therebetween sized to slip-fit over said window, and means for releasably attaching at least one of said panels at a predetermined vertical position, relative to said window, comprising a suction cup or a pair of magnets each attached on a respective one of said panels in facing relationship relative to each other.



---

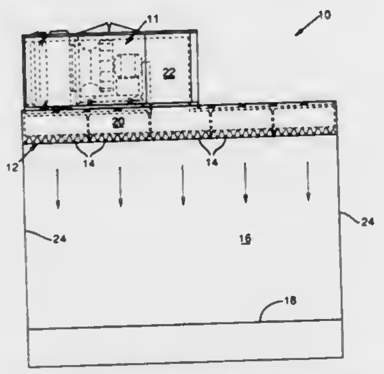
### 5,014,608
### CLEAN ROOM AIR SYSTEM

**David E. Benson, Aloha, and Michael T. Post, Lake Oswego, both of Oreg., assignors to Brod & McClung - Pace Co., Portland, Oreg.**

**Continuation of Ser. No. 344,273, Apr. 27, 1989, abandoned. This application Aug. 17, 1990, Ser. No. 569,234**

**Int. Cl.⁵ F24F** *7/10*

U.S. Cl. 98—33.1 **5 Claims**



5. A method for controlling the air flow in a clean room, the method comprising the steps:

- blowing air from a blower into a plenum;
- passing said air through air filter panels comprising the ceiling of the clean room; and
- controlling the rate of air flow to the room as a whole with a first control and controlling the rate of air flow through each of the individual ceiling panels with a plurality of second controls.

---

### 5,014,609
### INDUCTIVE AIR PASSAGE

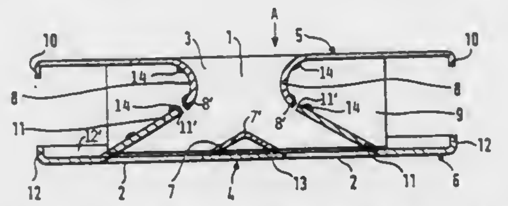
**Franz Weck, Herzogenrath, Fed. Rep. of Germany, assignor to H. Krantz GmbH & Co., Aachen, Fed. Rep. of Germany**

**Filed Aug. 20, 1990, Ser. No. 570,146**

**Claims priority, application Fed. Rep. of Germany, Aug. 23, 1989, 8910063**

**Int. Cl.⁵ F24F** *13/72*

U.S. Cl. 98—40.14 **14 Claims**



1. An inductive air passage for introducing air into a space, comprising a first sheet metal component including at least one longitudinal air inlet slot having curved lips bent out of said first sheet metal component, each of said curved lips having a lip edge, a second sheet metal component including at least two elongated air outlets, each of said air outlets having a tongue bent out of said second sheet metal component, each tongue extending at a slant toward the respective lip edge, and air baffle means arranged between said two elongated air outlets at a spacing from a plane defined by said air inlet slot in an air flow direction for deflecting air flowing through said air inlet slot into said air outlets.

---

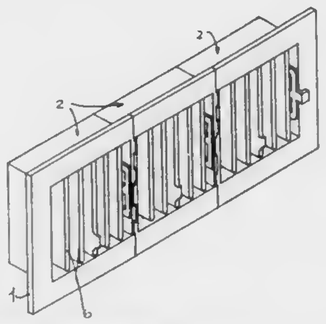
### 5,014,610
### AIR OUTLETS IN AIR CONDITIONING UNITS

**Israel Twito, 3 Rehov Shweldelson, Herzlia, Israel**

**Filed Sep. 22, 1989, Ser. No. 411,316**

**Int. Cl.⁵ F24F** *13/15*

U.S. Cl. 98—110 **8 Claims**



1. A louvre unit, comprising:

a plurality of sections having means for interconnecting said sections for common manipulation, wherein each of said sections include side faces having means for securely interconnecting vicinal sections.

---

### 5,014,611
### COFFEE MACHINE

**Ernesto Illy, and Furio Suggi Liverani, both of Trieste, Italy, assignors to Illycaffe' S.p.A., Trieste, Italy**

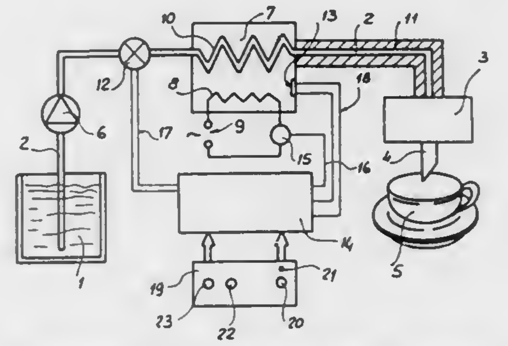
**Filed Dec. 22, 1989, Ser. No. 454,915**

**Claims priority, application Italy, Jan. 30, 1989, 19247 A/89**

**Int. Cl.⁵ A47J** *31/52, 31/54*

U.S. Cl. 99—280 **8 Claims**

1. A coffee machine adapted to deliver in a cup (5) coffee beverages that may have different volumes containing a water source (1), moving means (6) for moving water from said source (1) to an extraction chamber (3) through a heating means (7) adapted to convert immediately the source water into infusion water at a given starting temperature (90° C.–100° C.) and operation means (19) for a consumer characterised in that it comprises an assembly of control means wherein there is a meter (12, 24) for measuring the quantity (Q) of water moving to the extraction chamber (3), a temperature transducer (13) for the temperature of said moving water and a control means (14) adapted to receive the signals from said meter (12, 24) and temperature transducer (13) and to process said signals according to a given algorithm for controlling the temperature of said moving water as a function of the quantity of said moving water $/T=f(Q)/$.



---

### 5,014,612
### PROCESS FOR THE PRODUCTION OF DEALCOHOLIZED BEVERAGES, AS WELL AS A UNIT AND DEVICE FOR PERFORMING THE PROCESS

**Walter Gresch, Niederweningen, Switzerland, assignor to Bucher-Guyer AG Maschinenfabrik, Niederweningen, Switzerland**

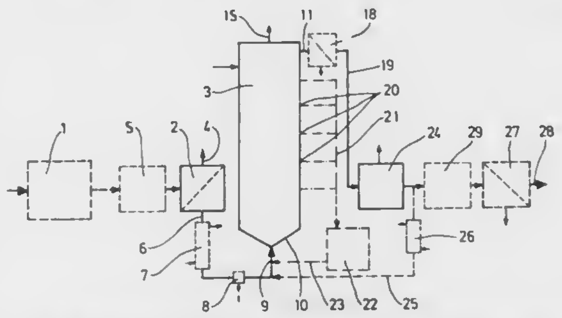
**PCT No. PCT/CH89/00012, § 371 Date Aug. 18, 1989, § 102(e) Date Aug. 18, 1989, PCT Pub. No. WO89/07132, PCT Pub. Date Aug. 10, 1989**

**PCT Filed Jan. 23, 1989, Ser. No. 415,317**

**Claims priority, application Switzerland, Jan. 27, 1988, 284/88**

**Int. Cl.⁵ C12M** *1/36*

U.S. Cl. 99—276 **3 Claims**



1. In an apparatus for the production of dealcoholized beverages by fermentation and dealcoholization of a substrate consisting of fruit or berry juices, grape juice or beer wort, comprising microfiltration means receiving a substrate for continuous clarification and sterilization of the substrate to form a clear substrate, a tower fermenter having a fluid bed therein and connected to said microfiltration means to receive said clear substrate therefrom, said clear substrate flowing through said tower fermenter, said tower fermenter containing inert support particles, and means within said tower fermenter for maintaining the substrate mixed in said tower fermenter in constant motion.

---

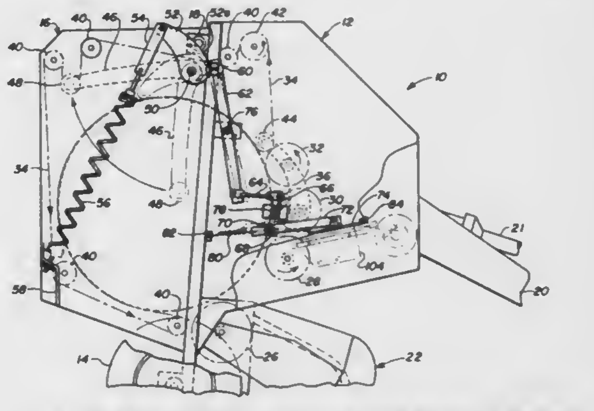
### 5,014,613
### TWINE WRAPPER TRIP MECHANISM

**John H. Merritt, III, New Holland, and Edwin O. Margerum, Paradise, both of Pa., assignors to Ford New Holland, Inc., New Holland, Pa.**

**Filed Jul. 30, 1990, Ser. No. 559,780**

**Int. Cl.⁵ B65B** *63/04, 13/20*

U.S. Cl. 100—5 **12 Claims**



1. In a roll baling machine having a main frame, a tailgate pivotally connected to said main frame, an apron extending around a plurality of guide members disposed in said main frame and said tailgate, a pair of take up arms rotatably mounted in said tailgate and carrying a further guide member around which said apron extends, said take up arms having a bale starting position, a lever connected to rotate with said take up arms, spring means connected to said lever for urging said take up arms into said bale starting position, a mechanism for automatically tripping a twine wrapper into operation comprising:

a cam surface on said lever engageable with a cam roller carried on a first link, said first link being rotatably mounted on said main frame and connected to a sliding member which is movable toward and away from a tripping position for automatically tripping said twine wrapper into operation.

---

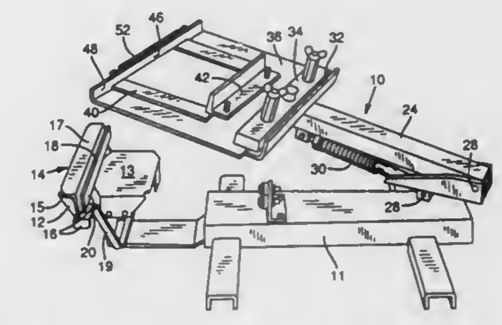
### 5,014,614
### CAP PRINTING DEVICE AND METHOD

**Gaylord G. Thieme, 298 Wellsian Way, Richland, Wash. 99352**

**Filed Jun. 30, 1989, Ser. No. 374,355**

**Int. Cl.⁵ B41F** *15/18, 17/00*

U.S. Cl. 101—35 **10 Claims**



1. Cap mounting apparatus for a cap printing device, the device including a platen for supporting a cap of the type having a front panel and a bill, the apparatus comprising;

a guide mechanism operatively attached to the platen for registering a cap on the platen, the guide mechanism including a pair of spaced-apart members defining a slot through which the cap bill is inserted to engage both sides of the cap bill for holding the bill in relation to the platen,

VOL
1126
ISS
2
MY
14
1991
UMI

one member of the pair operable to press against the front panel of the cap to clamp a first portion of the panel to the platen; and

a clamp operatively attached to one of the guide mechanism and platen and operable for clamping a second portion of the front panel of the cap to the platen.

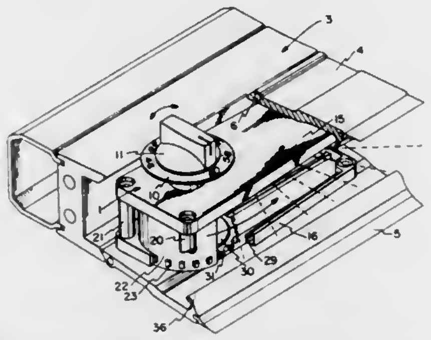
---

### 5,014,615
## WATER STOP MODULE
**Jiing-Kang Lin, and Thaddeus A. Niemiro, both of Lisle, Ill., assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Filed Oct. 10, 1989, Ser. No. 419,180**

**Int. Cl.$^5$ B41F** *7/30;* **B41L** *25/06*

**U.S. Cl. 101—147** **14 Claims**



1. A fluid stop device for use in a printing press comprising: at least one printing press dampener having at least one spray nozzle;

a flexible shield member;

guide means for directing said shield member into a path of fluid expelled from the at least one spray nozzle of the at least one press dampener;

drive means for extending said shield member along said guide and for at least partly winding up said flexible shield member to retract said flexible shield member from the path of the fluid; and

means for controlling the extension of said shield member along said guide means to regulate the blockage of fluid expelled from the at least one spray nozzle of the at least one press dampener.

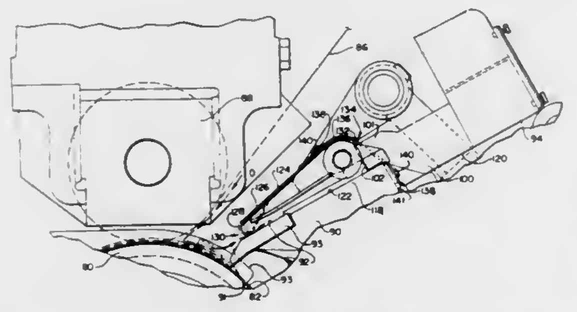
---

### 5,014,616
## SCAVENGER FOR A GRAVURE PRINTING PRESS
**Lee C. Tapper, Winona Lake, Ind., assignor to R.R. Donnelley & Sons Company, Chicago, Ill.**

**Filed Mar. 2, 1989, Ser. No. 317,759**

**Int. Cl.$^5$ B41F** *9/10, 9/16*

**U.S. Cl. 101—153** **3 Claims**



1. In a gravure press, having

a printing cylinder with a printing surface carrying a solvent-ink mixture,

an impression roller forming a pinch with the printing surface of said cylinder,

means directing a moving web through said pinch to transfer the solvent-ink mixture from the printing surface to the web.

a doctor blade and doctor blade table extending the length of said cylinder, adjacent said pinch with the doctor blade in engagement with the surface of the cylinder, and

a blade table cover on said table, said blade table cover having a front portion defining a solvent inlet adjacent said cylinder and a back portion defining an outlet,

an improved solvent scavenger, comprising:

a scavenger chamber on said doctor blade table;

plural discrete inlet nozzles extending forwardly from the scavenger chamber, over said doctor blade table and into the blade table cover outlet; and

an exhaust duct connected with said scavenger chamber for exhausting solvent scavenged through said inlet nozzles.

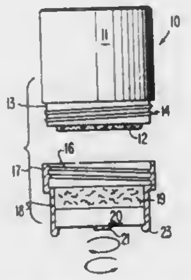
---

### 5,014,617
## SELF-STORING AND INKING STAMP
**Eugene Lesyk, 14161 Marine Dr., White Rock, British Columbia, Canada V4B 1A9**

**Filed Jun. 28, 1989, Ser. No. 372,697**

**Int. Cl.$^5$ B41K** *1/42*

**U.S. Cl. 101—333** **13 Claims**



1. A self-storing and inking stamp apparatus comprising a first unit containing a stamping die, a second unit containing and ink pad and arranged to be operatively engaged with the first unit such that the stamping die and ink pad are brought at least with proximity with each other, and means operatively associated with the second unit for pushing the ink pad toward the stamping die relative to the second unit and including a twisting bar for twisting the ink pad relative to the second unit to effect full inking of the stamping die.

---

### 5,014,618
## SENSOR BASED INKING CONTROL FOR A PRINTING PRESS
**Oded Zingher, Alzenau; Arno Wuhrl, Muhlheim am Main; Ullrich Behrendt, Dreieich; Ralf Schafer, Florsheim Wicker, and Günter Ziesing, Rodgau, all of Fed. Rep. of Germany, assignors to MAN Roland Druckmaschinen AG, Fed. Rep. of Germany**

**Filed Aug. 30, 1989, Ser. No. 400,569**

**Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829341**

**Int. Cl.$^5$ B41F** *31/00, 33/00*

**U.S. Cl. 101—365** **12 Claims**

1. A system for controlling ink adjusters in a printing press to print a predetermined form according to the requirements of an image on the form, the printing press having a plurality if ink adjusters for controlling ink feed in ink zones disposed across the press, the system comprising, in combination:

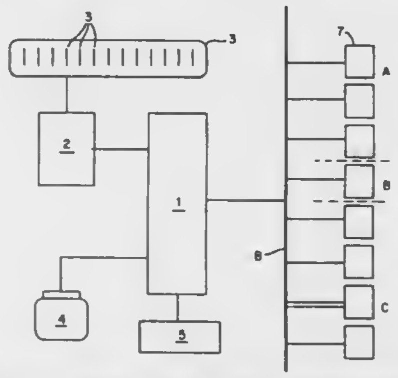
a localized image scanner manually positionable with respect to the printed form for obtaining measurements of image quality at selected positions on the printed form;

processor means for accepting and evaluating said measurements;

means associated with the processor means for segregating the image on the printed form into a plurality of discrete image zones for individualized control;

ink zone memory means cooperating with the processor means for relating the image zones on the printed form to the inking zones in the printing press which control the inking of the image zones;

the processor means further including operator interface means for directing use of the scanner for measurements to be taken in the respective image zones, evaluation means for evaluating the scanner measurements so-taken to determine any out-of-specification image zones, and output means for reading the image zone memories and driving the ink adjusters associated with the out-of-specification image zones to correct said last-mentioned zones; and,



the operator interface means being associated with the manually positionable scanner and including display means driven by the processor means for displaying to an operator the busy or ready status of the system for taking a measurement of a predetermined image zone, and means for displaying an identifier for the image zone next to be measured.

---

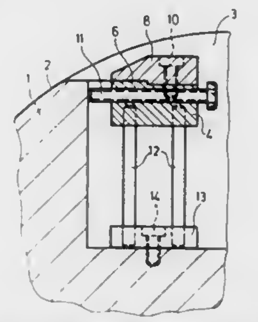
### 5,014,619
## DEVICE FOR TENSIONING FLEXIBLE PRINTING PLATES ON A PLATE CYLINDER OF A ROTARY PRINTING MACHINE
**Willi Jeschke, Bad Herrenalb, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed Feb. 28, 1989, Ser. No. 316,517**

**Claims priority, application Fed. Rep. of Germany, Mar. 1, 1988, 3806526**

**Int. Cl.$^5$ B41F** *1/28, 21/00*

**U.S. Cl. 101—415.1** **17 Claims**



2. In combination with a plate cylinder on a rotary printing machine, said plate cylinder having an axially extending cylinder channel which channel has side walls and a base formed therein; a device for tensioning a flexible printing plate on said plate cylinder for a rotary printing machine by means of tensioning rails; the flexible printing plate having two plate ends; said tensioning rails being mounted in said cylinder channel; said tensioning rails for respectively clamping the two plate ends of the printing plate; at least one of said tensioning rails being mounted in said cylinder channel for being moved independently of the other of said tensioning rails; said at least one tensioning rail including tensioning means for securing the printing plate in register and under tension in a circumferential direction of said plate cylinder; said device comprising:

spring means mounted in said cylinder channel;

said spring means comprising a plurality of spaced-apart spring elements;

said spring elements extending from said base of said cylinder channel, said spring elements having an extended end for supporting said at least one tensioning rail;

said plurality of said spaced-apart spring elements being mounted to extend between said base of said cylinder channel and said at least one tensioning rail, thereby maintaining said at least one tensioning rail in general parallel disposition with respect to at least a portion of said cylinder channel during relative movement therebetween; and

said spring elements comprising means for being deflectable in at least both of:

said circumferential direction of said plate cylinder and

an axial direction of said plate cylinder, said axial direction being substantially transverse to said circumferential direction.

---

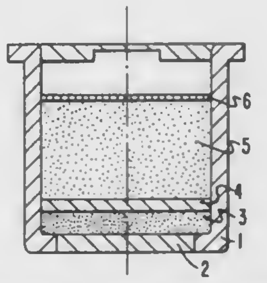
### 5,014,620
## DETONATOR/IGNITER ELEMENT WITH BLEACHABLE ABSORBER
**Wolfgang Leupacher, Menghofen, Fed. Rep. of Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany**

**Filed Feb. 14, 1990, Ser. No. 480,204**

**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1989, 3904276**

**Int. Cl.$^5$ F42B** *3/113*

**U.S. Cl. 102—201** **7 Claims**



1. A detonator/igniter element which comprises a housing containing an explosive charge which can be initiated directly by laser light, and means for defining an optical path to said explosive charge, said means comprising a bleachable absorber and exhibiting properties such that light below an intensity threshold in the range of from $10^7$ to $10^{12}$ W/cm$^2$ is weakened to such an extent that initiation of the explosive charge by this light is impossible, but initiation of the explosive charge by the laser light is possible.

---

### 5,014,621
## OPTICAL TARGET DETECTOR
**Thomas M. Fox, Gilbert, and Neal R. Anderson, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Apr. 30, 1990, Ser. No. 516,404**

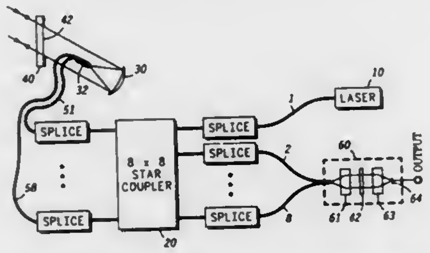
**Int. Cl.$^5$ F42C** *13/02;* **F41G** *7/26*

**U.S. Cl. 102—213** **14 Claims**

1. An optical target detector system for providing an output signal in response to detection of a target, said optical target detector system comprising:

VOL
126
ISS
2
MY
14
1991
UMI

laser light means for transmitting pulsed light beams;
star coupler means having a plurality of inputs and a plurality of outputs for automatically aligning light beams between said inputs and said outputs;
first fiber optic means connected between said laser light means and said star coupler means, said first fiber optic means transmitting said pulsed light beams to said star coupler means;
means for transmitting said pulsed light beams and for receiving returned pulsed light beams from a target;



second fiber optic means connected between said means for transmitting and for receiving and said star coupler means, said second fiber optic means for transmitting said pulsed light beams and for receiving said returned pulsed light beams;
detection means for receiving said returned pulsed light beams and providing said output signal in response to said returned pulsed light beams; and
third fiber optic means connected between said star coupler means and said detection means, said third fiber optic means for transmitting said returned pulsed light beams to said detection means.

---

## 5,014,622
## BLASTING SYSTEM AND COMPONENTS THEREFOR

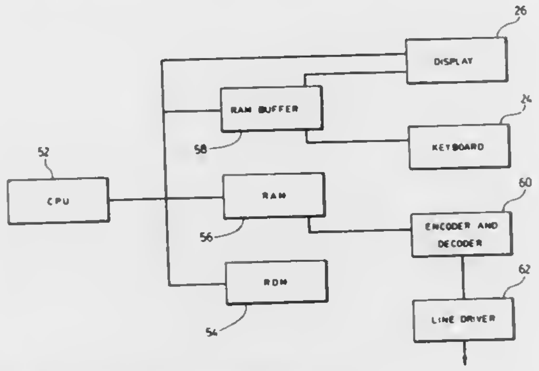
**Michel Jullian, 103 Scholle Road, Aylmer, Quebec, Canada J9H 5C9**

**Continuation of Ser. No. 221,435, Jul. 19, 1988, abandoned. This application Feb. 22, 1990, Ser. No. 483,363**

**Claims priority, application United Kingdom, Jul. 31, 1987, 8718202**

**Int. Cl.⁵ F42B** ***3/00***

**U.S. Cl. 102—312** **14 Claims**



1. A blasting device comprising:
an explosive charge;
electrically-operable igniter means for igniting the charge when the igniter means are actuated;
electrically-operable control means for controlling the actuation of the igniter means;
a communications terminal, a power receipt terminal and a reference terminal, each of the terminals being accessible externally of the explosive device;
chargeable power supply means for providing electric power to the control means and the igniter means, the power supply means being connected to the power receipt and reference terminals for receipt and storage of electric energy;
the control means comprising
(a) communication means connected to the communications and reference terminals for receipt of signals including a blasting delay signal specifying a required blasting delay and a blasting signal and connected to the communications and reference terminals for transmission of signals from the device,
(b) recording means for recording at least the specified blasting delay,
(c) timing means for determining when a time interval corresponding to the recorded blasting delay has expired following receipt of the blasting signal, and,
(d) means for actuating the igniter means to ignite the charge at least in part in response to expiry of the time interval.

---

## 5,014,623
## BINARY MUNITION SYSTEM

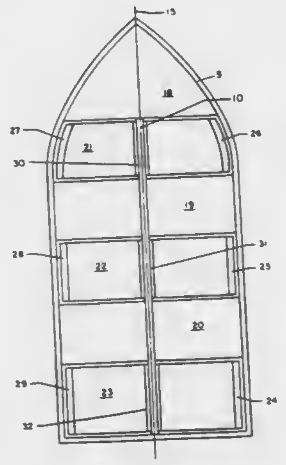
**Evan H. Walker, Aberdeen, and Warren W. Hillstrom, Bel Air, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 3, 1989, Ser. No. 416,803**

**The portion of the term of this patent subsequent to Aug. 7, 2007, has been disclaimed.**

**Int. Cl.⁵ F42B** ***12/02***

**U.S. Cl. 102—477** **12 Claims**



1. A munition comprising an outer shell and means for the separation and storage of an effective amount of two or more non-explosive ingredients which when combined chemically react to form a safe explosive;
wherein said means for separation and storage comprises at least two compartments running the length of the round of munition and located around a central axis;
wherein said compartments each contain a membrane, bag or container for the separate storage of said non-explosive ingredients; and
wherein said munition further comprises stator and rotor vanes positioned within said outer shell and along said central axis in a fashion which rupture the mebranes, bags or containers when said munition is launched or fired.

---

## 5,014,624
## DISCARDING SABOTS

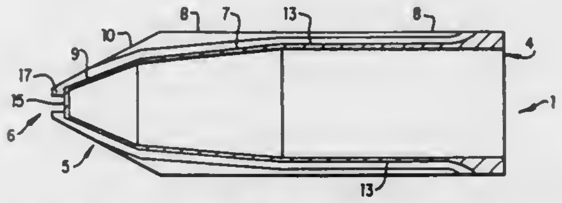
**James E. Baxter, Cheshire, and Robert D. Poole, Stoke-on-Trent, both of England, assignors to Royal Ordnance plc, London, England**

**Continuation of Ser. No. 135,249, Dec. 21, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 300,188**

**Claims priority, application United Kingdom, Dec. 24, 1986, 8630848**

**Int. Cl.⁵ F42B** ***10/34, 14/06***

**U.S. Cl. 102—503** **10 Claims**



1. A spin stabilised projectile assembly comprising a tubular projectile and a discarding sabot mechanically engaged on and embracing the tubular projectile to enclose the front end of the tubular projectile, said sabot comprising a closed front end portion having elongate lateral zones of weakness which meet at a front end surface of the sabot, thereby providing a continuous zone of weakness extending across the front end surface and joining together said elongate lateral zones to provide distinct fracture lines along which the sabot will break into substantially equal-sized petals.

---

## 5,014,625
## LINEAR MOTOR DRIVEN TROLLEY CONVEYOR

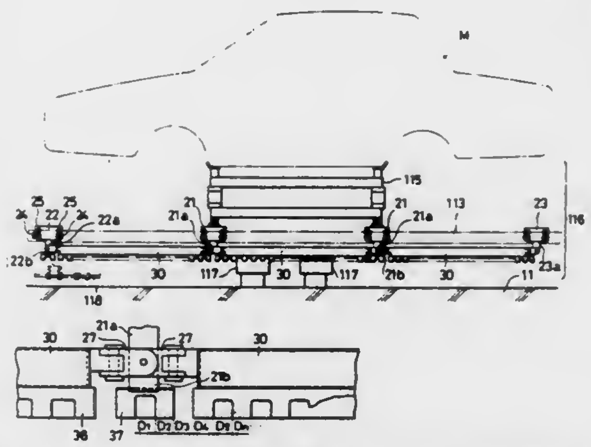
**Masasumi Murai, Tokorozawa; Koichi Mizuguchi, Higashiyamato, and Jun Nishiyama, Amagasaki, all of Japan, assignors to Tsubakimoto Chain Company, Osaka, Japan**

**Filed Jul. 5, 1989, Ser. No. 376,121**

**Claims priority, application Japan, Jul. 6, 1988, 63-89050**

**Int. Cl.⁵ H02K** ***41/02***

**U.S. Cl. 104—292** **8 Claims**



1. A linear motor driven trolley conveyor comprising a carrier rail and primary members, said primary members forming parts of a linear induction motor, a carrier including trolleys spaced along the longitudinal direction of the carrier rail and adapted to run along said carrier rail, connecting members pivotally interconnecting said trolleys, pivot means connecting respective ends of said connecting members with adjacent trolleys, said pivot means permitting the respective ends of the connecting members to pivot both vertically and horizontally relative to the adjacent trolleys, and lower surfaces of said connecting members each having a reaction plate of said linear induction motor.

---

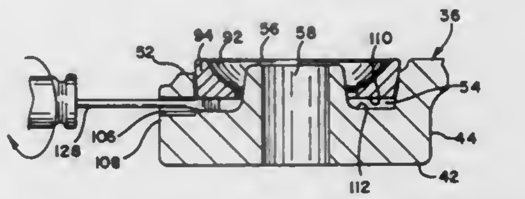
## 5,014,626
## FEMALE CONNECTING MEMBER WITH DISASSEMBLY FEATURE FOR ARTICULATED CONNECTION

**Thomas R. Schultz, Lynwood, Ill., assignor to Amsted Industries Incorporated, Chicago, Ill.**

**Filed Oct. 23, 1989, Ser. No. 425,026**

**Int. Cl.⁵ B61D** ***17/00;*** **F16C** ***43/02***

**U.S. Cl. 105—4.1** **16 Claims**



13. An improved method of removing a ring seat from an annular groove of a female connecting member of an articulated connection for joining adjacent railway cars in which a top surface of said ring seat provides support for a male connecting member received in an open end of said female connecting member, said method comprising: removal of said male connecting member from said ring seat; inserting a tool through an access passageway located between an exterior surface of said female connecting member and said annular groove; applying a force with said tool against an undersurface of said ring seat thereby ejecting said ring seat from said annular groove.

---

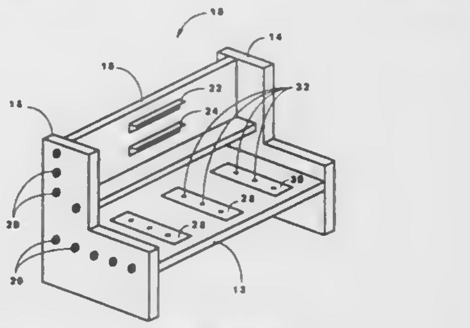
## 5,014,627
## STABLE INSTRUMENT BENCH WITH REPLICATED PRECISION SURFACE

**Larry Rosenberg, San Jose; Curt H. Chadwick, Los Gatos, and Alex Brudny, San Jose, all of Calif., assignors to KLA Instruments Corporation, San Jose, Calif.**

**Continuation of Ser. No. 243,268, Sep. 12, 1988, abandoned, which is a division of Ser. No. 158,252, Feb. 19, 1988, Pat. No. 4,889,676. This application Nov. 6, 1989, Ser. No. 433,386**

**Int. Cl.⁵ A47B** ***83/00***

**U.S. Cl. 108—50** **15 Claims**



1. A stable instrument bench comprising:
a precast concrete table portion having a substantially horizontal top surface;
at least one hardened plasstic pad having a top and a bottom surface, said bottom surface of said pad adhering to a portion of said top surface of said table portion and the top surface of said plastic pad having a replicated precision top surface with said replicated surface being other than a replication of the top surface of the table portion, said

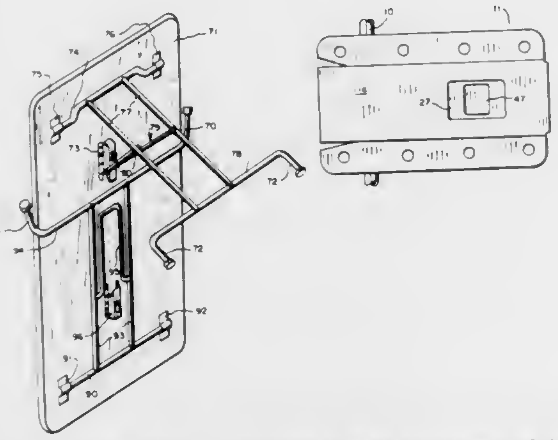
VOL 126
ISS 2
MY 14 1991
UMI

replicated surface of said pad being disposed to receive a selected instrument; and

precast concrete support means for supporting said table portion.

---

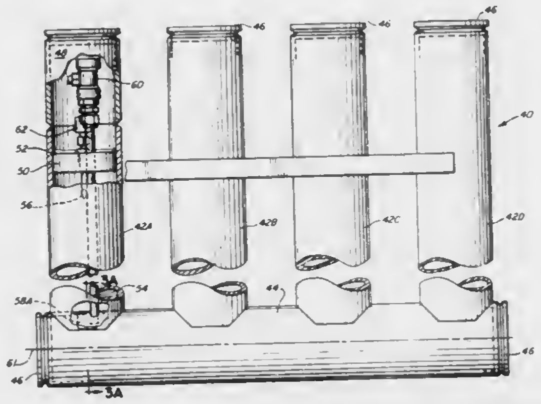
### 5,014,628
## LATCH MECHANISM
**Kent S. Roberts, 550 S. 100 W., American Fork, Utah 84003**
**Filed Dec. 18, 1989, Ser. No. 451,620**
**Int. Cl.⁵ A47B** *3/00*
**U.S. Cl. 108—133** **20 Claims**



**19**. A folding table, comprising a table top; a pair of dual table legs, which legs are interconnected by a latch bar; a latching mechanism for each pair of legs to hold the corresponding pair of legs in an upright, table-top-supporting position; each of the latching mechanisms comprising a latch-bar-receiving member having one or more notches for receiving, when it is in latching position, a corresponding latch bar; a latch-bar-securing member having a wedge formation adapted to slidingly engage the latch bar and continually press it into said notch or notches with forward movement of said wedge formation unlimited by other structure, so as to firmly secure said latch bar in said notch or notches of said latch-bar-receiving member when in the latching position; a spring which urges said latch-bar-securing member into said latching position; and means for an operator to unlatch said latch mechanism by manually opposing said spring and urging said latch-bar-securing member away from said latching position, thus releasing said latch bar from securement in said notch or notches of the latch-bar-receiving member.

---

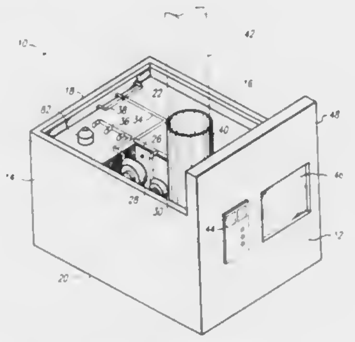
### 5,014,629
## PRESSURE VESSEL FOR DISPENSING MATERIALS AND METHOD FOR FILLING SAME
**Ronald E. Timm, Hickory Hills, Ill., assignor to R. E. Timm & Associates, Inc., Hindsale, Ill.**
**Filed Jun. 13, 1986, Ser. No. 874,234**
**Int. Cl.⁵ E05G** *1/00;* **G08B** *15/02*
**U.S. Cl. 109—34** **29 Claims**



**1**. A system for containing material under pressure comprising:
- a plurality of vessels containing the material to be delivered;
- one of the vessels comprising a common manifold interconnecting the remaining vessels;
- a pressurized cover gas contained within the system; and
- means, associated with said common manifold, for establishing and restoring discrete pressurized cover gas containing ullages in each of the vessels.

---

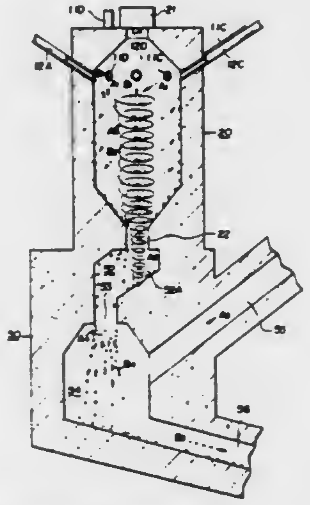
### 5,014,630
## CREMATOR
**Steve Looker, 2271 Ashbury Dr., Clearwater, Fla. 34624**
**Filed Mar. 29, 1990, Ser. No. 501,644**
**Int. Cl.⁵ F23G** *1/00*
**U.S. Cl. 110—194** **19 Claims**



**1**. A cremator apparatus, comprising:
- an upper chamber;
- a lower chamber;
- a passageway providing fluid communication between said upper chamber and said lower chamber;
- an afterburner being disposed at an upper end of said passageway and said afterburner being operative to drive gases in said upper chamber to flow downwardly into said lower chamber;
- a primary hearth;
- said primary hearth defining, at least in part, a bottom wall of said upper chamber and, at least in part, a top wall of said lower chamber;
- a secondary hearth;
- said secondary hearth defining at least in part, a bottom wall of said upper chamber and, at least in part, a top wall of said lower chamber;
- said secondary hearth being positioned at a trailing end of said primary hearth and being disposed in a plane parallel to and slightly downwardly of a plane of said primary hearth;
- said primary hearth being supported along at least a part of its longitudinal axis of symmetry by a longitudinally extending support wall;
- said upper chamber including a warm air chamber;
- said warm air chamber being positioned between said afterburner passageway that interconnects said upper and lower chambers and a chimney; and
- a partition wall in said upper chamber that separates said warm air chamber from a cremation chamber including said primary hearth.

---

### 5,014,631
## CYCLONE FURNACE
**Shiro Ikeda, Yokohama; Syoichi Yamada, Yokosuka; Satoshi Kawachi, Yokohama, and Masakatsu Ishizaka, Yokosuka, all of Japan, assignors to JGC Corporation, Tokyo, Japan**
**Filed Jun. 8, 1989, Ser. No. 363,154**
**Claims priority, application Japan, Jun. 9, 1988, 63-142454; Jul. 22, 1988, 63-182847**
**Int. Cl.⁵ F23D** *1/02*
**U.S. Cl. 110—264** **4 Claims**

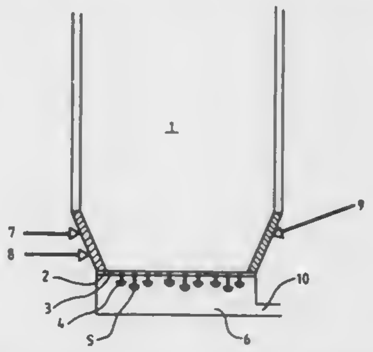


**1**. A cyclone furnace comprising:
- a first body, said first body including an elongated combustion chamber, said first body having a center axis, and having an ignition burner at one end thereof and an exhaust port at another end thereof;
- at least two air-supply pipes for generating a vortex around said center axis in said first body, said air-supply pipes opening at the internal peripheral surface of said furnace and opening directly into said chamber; and
- at least two powder-supply pipes for feeding powder to said first body, said powder-supply pipes opening at said internal surface of said first body and opening directly into said chamber, said powder-supply pipes disposed to be spaced apart from said air-supply pipes.

---

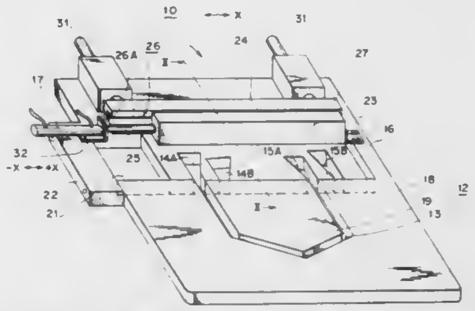
### 5,014,632
## DISTRIBUTOR PLATE IN A FLUIDIZED BED REACTOR
**Juhani Isaksson, Karhula, Finland, assignor to A. Ahlstrom Corporation, Karhula, Finland**
**Filed Aug. 16, 1988, Ser. No. 232,774**
**Int. Cl.⁵ F23D** *1/00;* **F27B** *15/02;* **B01J** *8/18*
**U.S. Cl. 110—347** **18 Claims**

**18**. A method of starting up a fluidized bed reactor having a reaction chamber, a wind box, a grid plate at an interface therebetween, and a plurality of nozzles through the grid plate for flowing fluidizing gas from the wind box to the reaction chamber, comprising the steps of providing at least two of said nozzles wherein each comprises a tube opening at its upper end through the upper surface of the grid plate for flowing fluidized gas into the reaction chamber and extending below the grid plate a predetermined length so that its lower end is disposed to open into the wind box of the reactor, the length below the grid plate of the tube of one of said at least two nozzles being different than the length below said grid plate of the tube of the other of said at least two nozzles, and initiating flow of gas through said nozzles sequentially in proportion to increasing initial pressure drops across said plate.



---

### 5,014,633
## WORKPIECE FABRIC HOLDING DEVICE FOR USE IN SEWING MACHINE
**Kunihiko Murata, Tsushima; Satoshi Morii; Toshiaki Iwasaki, both of Nagoya, and Hiroyuki Mitsui, Kasugai, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan**
**Filed Sep. 18, 1990, Ser. No. 584,166**
**Claims priority, application Japan, Oct. 27, 1989, 1-126183[U]**
**Int. Cl.⁵ D05B** *21/00*
**U.S. Cl. 112—121.12** **8 Claims**



**1**. A workpiece fabric holding device for pressing a workpiece fabric on a sewing table and for moving the workpiece relative to the sewing table to a needle position while maintaining the pressing state to the workpiece during sewing operation along a sewing locus, the workpiece holding device comprising;
- a base pressure plate (12) for holding a major part of the workpiece, the base pressure plate being formed with a major needle cut out (13) having a configuration corresponding to a major part of the sewing locus (3, 4) for allowing a needle to pass therethrough, the major needle cutout (13) having open ends, and the base pressure plate having a bottom surface (12A);
- a movable pressure plate (16) movable relative to the base pressure plate (12), the movable pressure plate (16) having a bottom surface (16A) being flush with the bottom surface (12A) of the base pressure plate (12), the movable pressure plate (16) being formed with at least two minor

VOL
1126
ISS
2
MY
14
1991
UMI

needle cut-outs (**14A**, **14B**, **15A**, **15B**) having configurations corresponding to minor parts of sewing loci (**5**, **6**, **7**, **8**) contiguous with the major sewing locus (**3**, **4**); and

a holding means (**17**,**27**,**23**) for selectively holding the movable pressure plate (**16**) at predetermined positions where at least one of the minor needle cut-outs (**14A**, **14B**, **15A**, **15B**) is aligned with the major needle cut-out (**13**).

---

### 5,014,634
### HOSIERY TOE CLOSING METHOD AND APPARATUS

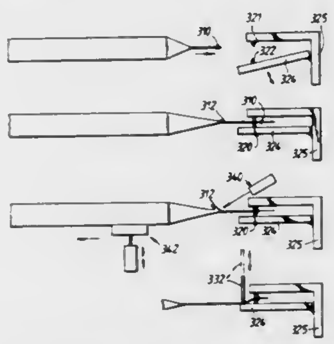
**Michael J. Hodges, and Sydney Beal, both of High Wycombe, England, assignors to Detexomat Machinery Limited, High Wycombe, England**

**Division of Ser. No. 283,966, Dec. 13, 1988, Pat. No. 4,903,621. This application Oct. 12, 1989, Ser. No. 420,180**

**Claims priority, application United Kingdom, Dec. 24, 1987, 8730199**

**Int. Cl.$^5$ D05B** *21/00*

**U.S. Cl. 112—262.2** **10 Claims**



1. A method of closing the toe end of a hose blank which terminates in a bead or barrier on a toe closing machine on which the toe end of the hose blank is transported past a seamer which generates a closing seam therein comprising the steps of:

providing a pair of initially open positioning jaws in a pre-set relation to a path of transport of the toe end of a hose blank past the seamer;

locating said toe end of said hose blank between said positioning jaws to locate the bead on one side of said positioning jaws;

causing movement of at least one of said positioning jaws relative to the other of said positioning jaws to close said jaws about said toe end of said hose blank;

moving said hose blank with respect to said closed jaws until said bead abuts at least one of said jaws, thereby positioning said toe end of said hose blank with respect to said seamer; and

transporting said toe end of said hose blank past said seamer and generating a closing seam thereacross while maintaining said position of said toe end.

---

### 5,014,635
### DEVICE FOR CONTROLLING FEEDING QUANTITY OF A SEWING MACHINE

**Moriya Ochi, and Masahiro Sahashi, both of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya City, Japan**

**Filed Nov. 24, 1989, Ser. No. 440,715**

**Claims priority, application Japan, Nov. 29, 1988, 63-302102; Nov. 29, 1988, 63-302103**

**Int. Cl.$^5$ D05B** *27/06, 27/08*

**U.S. Cl. 112—311** **7 Claims**

1. A device for controlling feeding quantity of a sewing machine, comprising:

driving means for driving an upper feed-dog and a lower feed-dog;

first setting means for setting a set value of the feeding quantity of the lower feed-dog;

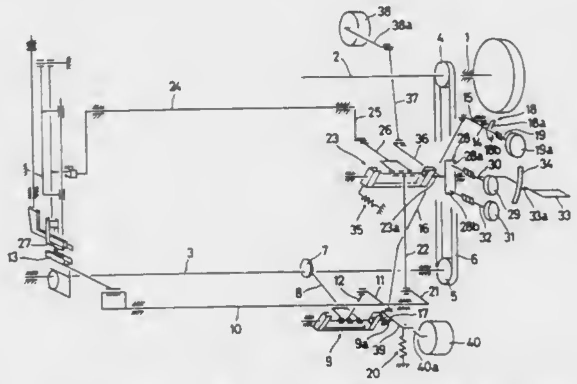
second setting means for setting a ratio of the feeding quantity of the upper feed-dog to that of the lower feed-dog;

first adjusting means for adjusting the feeding quantity of the lower feed-dog based on the set value at the first setting means; and

second adjusting means for adjusting the feeding quantity of the upper feed-dog based on the set value at the first setting means and the ratio set at the second setting means,

wherein said first adjusting means comprise:

(a) a feed control member pivoted about a pivot axis and operatively connected to the lower feed-dog for adjusting the feeding quantity of the lower feed-dog as a function of a pivot position of the feed control member,



(b) a controlling surface fixed to said pivoted feed control member and having at least one face extending oblique to said pivoted feed control member and non-tangent to a circle centered on the pivot axis of said feed control member,

(c) a threaded shaft mounted such that an end of said threaded shaft can abut said at least one face,

(d) a rotating dial mounted to said threaded shaft, and

(e) spring means for biasing said at least one face against said end of said threaded shaft, whereby axial movement of said threaded shaft due to rotation of said rotating dial causes pivoting of said feed control member and adjustment of the feeding quantity of said lower feed-dog.

---

### 5,014,636
### COMPOSITE PADDED FABRIC MATERIAL AND EDGE BINDING SYSTEM

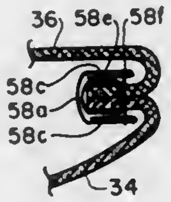
**Brett P. Seber, Laguna Niguel, Calif., assignor to McGuire-Nicholas Company, Inc., City of Commerce, Calif.**

**Filed May 11, 1989, Ser. No. 350,296**

**The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.**

**Int. Cl.$^5$ B32B** *7/08*

**U.S. Cl. 112—419** **5 Claims**



1. In the fabrication of trademen's work items including aprons and nail bags, tool pouches and tool holders, cordless tool holsters, and the like made of fabric sheet material and having inside edge seams including overlapping edge areas of two layers of the fabric sheet material and wherein the inside seams are subject to high abrasion and stress forces, the combination of:

a) two layers of like abrasion and tear resistant, high strength composite laminated padded fabric material wherein each layer of padded fabric material is comprised of first and second outer primary laminate layers of tight-woven threads of high-tenacity nylon fibers, and an intermediate synthetic polymer foam laminate layer coextensive with said outer primary laminate layers and permanently bonded to the threads thereof, the overlapping edge areas of said layers being initially joined by loop stitching thereof; and

b) edge binding and seaming fabric strip material comprised of tight-woven threads of high-tenacity nylon fibers, said strip material extending along the inside overlapping edge areas of the two layers of said laminated padded fabric material to protect said material from delamination at the edges thereof, said strip material being folded outwardly over adjacent edge areas of said overlapping layers of said laminated material on the outer sides thereof encompassing the loop stitching joining said layers in the overlapping edge areas thereof and back folded inwardly whereby the edges of said strip material on each outer side of said laminated material layers are aligned with the edges of said layers of said laminated material, and said folded and back folded strip material being permanently affixed to the edge areas of said layers of laminated material by linear stitches extending over the length of said strip material and applied through the back folds thereof and through the layers of said laminated material without intersecting said loop stitching.

---

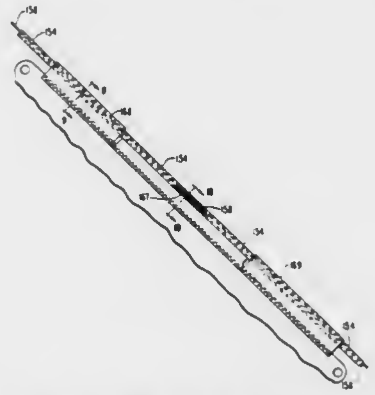
### 5,014,637
### ROLLER REEFING SYSTEM FOR SAILS AND THE LIKE

**William H. Stevenson, IV, Old Mill, 605 Talbot St., St. Michaels, Md. 21663**

**Continuation-in-part of Ser. No. 886,001, Jul. 16, 1986, abandoned. This application Feb. 29, 1988, Ser. No. 192,820**

**Int. Cl.$^5$ B63H** *9/08*

**U.S. Cl. 114—103** **33 Claims**



1. In a marine sail, the combination of

a sail body formed of flexible sheet material and having an elongated edge which includes an intermediate portion;

first securing means extending along only said intermediate portion of the elongated edge to attach said intermediate portion to an elongated rotatable support member, said first securing means being dimensioned to be placed substantially under tension when coupled between said intermediate portion of the elongated edge and the rotatable support member; and

second securing means secured to said elongated edge and constructed and arranged to surround the elongated support member over at least those portions of the support member to which said first securing means is not effectively attached, and to embrace the elongated support member sufficiently loosely to initially allow free rotation therebetween,

said second securing means being so dimensioned that, when the sail is attached to the rotatable support member by said first and second securing means, the rotatable support member is initially free to turn within said second securing means in those locations where the sail is not effectively attached to the support member by said first securing means, initial rotation of the support member then causing only said intermediate portion of the elongated edge of the sail to be rolled upon the support member while the support member turns freely within said second securing means in those locations where the sail is not effectively attached to the support member by said first securing means,

continued rotation of the support member then being effective to roll said second securing means and, if desired, the sail body on the support member.

---

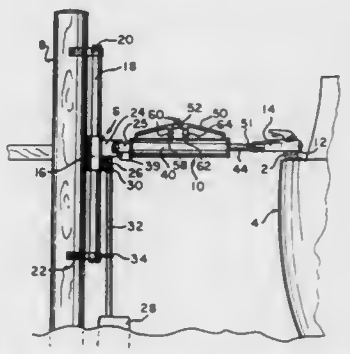
### 5,014,638
### MOORING CONSTRUCTION FOR A BOAT

**Juhani E. Ilves, 1418 Lakeview Dr., Lake Worth, Fla. 33461, and Unto A. Heikkilä, Taurintie 1, SF 20100 Turku, Finland**

**Filed Mar. 5, 1990, Ser. No. 488,203**

**Int. Cl.$^5$ B63B** *21/00*

**U.S. Cl. 114—230** **8 Claims**



1. A boat mooring construction for connecting a boat to a mooring location, a connecting unit having an attachment means on each end, said connecting unit comprising a cylinder having two ends, a piston mounted for movement in said cylinder, a piston rod connected to said piston, an opening in one end of said cylinder, said piston rod extending through said opening to a free end exterior of said cylinder, one attachment means being connected to the piston rod, the other attachment means being connected to the other end of the cylinder, first conduit means connecting one end of the cylinder to the other end, a valve means located in said first conduit means to control flow therethrough from one end of the cylinder to the other by allowing flow or preventing flow, second conduit means connecting said one end of the cylinder to a first location at an inner portion of the cylinder, third conduit means connecting said other end of the cylinder to a second location at an inner portion of the cylinder, a first check valve located in said second conduit means to permit flow only from said first location to the one end of the cylinder, and a second check valve located in said third conduit means to permit flow only from said first location to the other end of the cylinder.

---

### 5,014,639
### DETACHABLE WATER SCOOTER ASSEMBLY

**Yeu S. Day, 9-1, Lane 161, Hsing An Road Sec. 1, Taichung, Taiwan**

**Filed Jan. 31, 1990, Ser. No. 472,870**

**Int. Cl.$^5$ B63B** *7/04, 7/08*

**U.S. Cl. 114—352** **3 Claims**

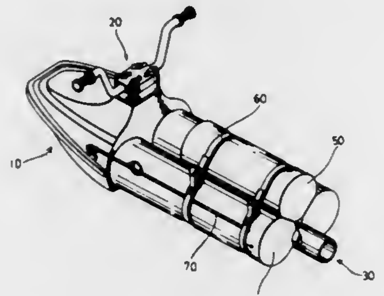
1. A detachable water scooter assembly comprising:

an engine compartment with a bill-shaped front hull;

two conical holes and a circular hole being positioned at the rear end of said engine compartment respectively;

an engine being located in said engine compartment;

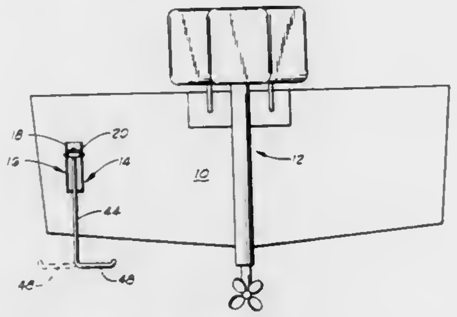
a central axle being connected to said engine and passed through said circular hole;
a driving assembly comprising a shaft, a universal joint, a driven axle, a propeller screw, and a rudder;
one end of said universal joint being connected to said central axle and the other end of said universal joint being connected to said driven axle;
one end of said shaft being inserted in said circular hole and the other end of said shaft being connected to said rudder;
a handle bar assembly being located on the rear top portion of said engine compartment;



said rudder and said handle bar assembly being connected by two parallel cords respectively;
two air chambers being inserted in said conical holes respectively;
a plenum chamber being disposed on the upper portion of each of said air chambers respectively;
said pipe being disposed at the lower portion of each of said air chambers respectively;
at least two securing belts binding said air chambers, said plenum chamber, and said shaft together.

---

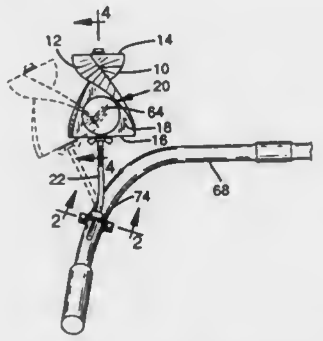
### 5,014,640
### STEP ASSEMBLY
**H. Drew Owen, Sr., 16 Bridlewood, Edmond, Okla. 73034**
**Filed Sep. 5, 1989, Ser. No. 402,763**
**Int. Cl.$^5$ K63B** *27/14*
**U.S. Cl. 114—362** **9 Claims**



1. A step assembly comprising:
a mounting base bracket;
an apertured pivot block pivotally mounted on said mounting base bracket;
an elongated step shaft extending slidably through the aperture in the pivot block and including a first end disposed on one side of the pivot block, and a second end disposed on the opposite side of the pivot block;
a step secured to the second end of said step shaft, and extending substantially normal to the longitudinal axis thereof; and
a stop plate secured to the first end of said step shaft and movable, upon axial sliding movement of said step shaft, from a first, freely rotating position above said base bracket, to a second, locked, non-rotative position in contact with said base bracket.

---

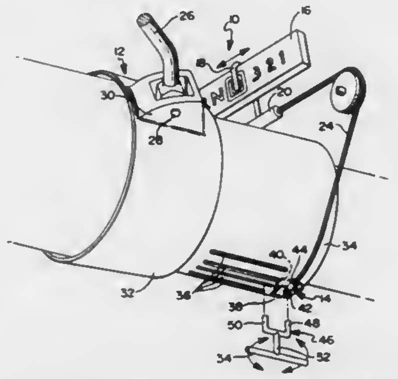
### 5,014,641
### HAZARD WARNING DEVICE FOR VEHICLES
**William M. Johnson, P.O. Box 70404, Eugene, Oreg. 97401**
**Filed Sep. 10, 1990, Ser. No. 580,126**
**Int. Cl.$^5$ B60Q** *1/26;* **G02B** *5/12*
**U.S. Cl. 116—28 R** **7 Claims**



1. A hazard warning device for vehicles comprising:
a body portion having upper and lower ends and opposite side surfaces,
a support stem having means for supporting said body portion rotatably and arranged for attachment to a vehicle,
blade means on said body portion arranged to rotatably drive said body portion when subject to air currents,
a rear view mirror on one of said side surfaces, and a reflector on the opposite side surface, wherein the support means includes locking means movable between a first position allowing free rotation of said body portion and a second position clamping said body portion in a stationary non-rotative condition.

---

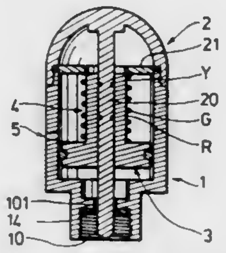
### 5,014,642
### ADJUSTMENT MECHANISM FOR A TRANSMISSION POSITION INDICATOR
**Marvin L. Owen, Grand Blanc, and Frederick D. Jacobs, Holland, both of Mich., assignors to Delco Electronics Corporation, Kokomo, Ind.**
**Filed Jul. 13, 1989, Ser. No. 379,467**
**Int. Cl.$^5$ G01D** *13/00*
**U.S. Cl. 116—28.1** **3 Claims**



2. A transmission position indicator and adjustment mechanism comprising: indicia and pointer means for indicating a selected transmission position including indicia for a plurality of transmission positions and a pointer; flexible means operatively connected with said indicia and pointer means; operator control means for selecting a desired transmission position including a cylindrical shroud member, and a plurality of spaced grooves formed in said shroud member; and clip means adjustably connected to said shroud member adjacent said grooves and secured to said flexible means for interconnecting said operator control means with said indicia and pointer means, said clip means having a centrally disposed tool engaging aperture means for cooperating with a tool and said grooves for permitting adjustment of said clip along the periphery of said cylindrical shroud.

---

### 5,014,643
### TIRE PRESSURE INDICATOR
**Tien-Tsai Huang, No. 4, Lane 30, Wu-Chang St., Pan-Chiao City, Taiwan**
**Filed Jan. 19, 1990, Ser. No. 467,496**
**Int. Cl.$^5$ B60C** *23/04;* **G01L** *19/12*
**U.S. Cl. 116—34 R** **7 Claims**

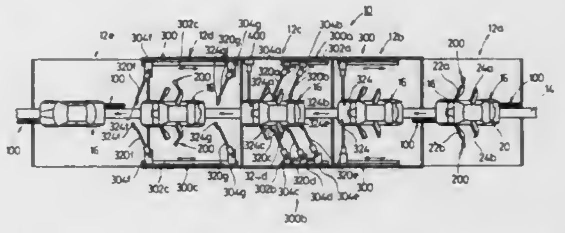


1. A pressure indicator for a tire with an inflating valve means, comprising:
a hollow casing having a first end and a second end, said first end is an open end which is adapted to join with the inflating valve means of the tire, and said second end has a central hole formed therethrough;
a piston member axially and slidably confined inside said hollow casing, said piston member having a circular base having a seal means for tightly contacting an interior wall of said hollow casing, and a vertical pole axially projecting from said circular base, in a direction from the first end toward the second end of said hollow casing, said vertical pole passing through said central hole when said piston member moves, said vertical pole having a height divided into several parts with each part having a color representing a tire pressure state, said circular base and said vertical pole further having an axial hole passing therethrough;
a biasing means installed between the circular base of said piston member and the second end of said hollow casing, allowing said piston member to move in a reciprocating manner in response to pressure from the first end of said hollow casing; and
a transparent cap member detachably joined with the second end of said hollow casing, said transparent cap member having a pin internally and axially protruding therefrom and passing through the central hole of the second end of said hollow casing, said pin being tightly but slidably inserted through said axial hole of said piston member, and said pin having a tip at the first end of said hollow casing for pushing siad inflating valve means into an open position when said first end of said hollow casing is joined with the inflating valve means.

---

### 5,014,644
### APPARATUS FOR COATING AUTOMOTIVE BODY
**Toru Yamamoto; Daizo Shiga; Kenichi Chujyo; Eiji Kikuchi; Masayuki Enomoto; Masaaki Syoji; Kiyohiro Ichinose, and Kyuya Yamazaki, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed May 23, 1989, Ser. No. 355,682**
**Int. Cl.$^5$ B05B** *1/14, 9/06*
**U.S. Cl. 118—314** **7 Claims**

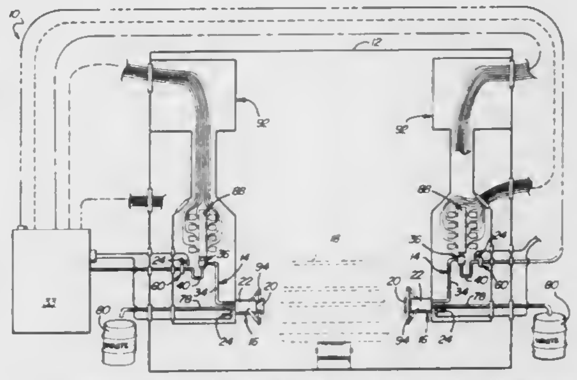
1. A coating apparatus for coating the automotive body of a 4-door automobile, comprising:
a coating station for coating the inner panels of the automotive body of said 4-door automobile, said automotive body being stopped in said coating station and having its doors open;
a plurality of coating robots positioned parallel to said automotive body alongside a direction of conveyance thereof, said coating robots being respectively positioned for coating the inner panels of the doors of said automotive body and the inner panels of the automotive body which correspond to said doors;
wherein each of said coating robots comprise:
a base;
a first arm supported on said base and angularly movably disposed along a first axis;



a second arm supported on a connecting means extending between said first arm and said second arm, said second arm being angularly movably disposed along a second axis;
a rotating means connected to said second arm and rotatably supporting a paint spray gun thereon.

---

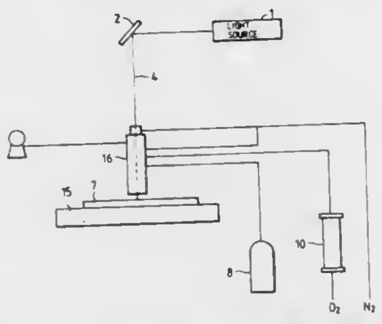
### 5,014,645
### ELECTROSTATIC SPRAY COATING SYSTEM
**Roger S. Cann, Mt. Clemens, and Richard M. Ostin, Farmington, both of Mich., assignors to Behr Industrial Equipment Inc., Rochester Hills, Mich.**
**Filed Mar. 17, 1989, Ser. No. 324,610**
**Int. Cl.$^5$ B05B** *12/14, 15/02;* **B08B** *3/04*
**U.S. Cl. 118—663** **21 Claims**



1. An electrostatic spray coating apparatus (10) of the type for applying liquid coating material onto a work part (18), said apparatus (10) comprising: a spray booth (12) defining an isolated internal spray zone; conduit means (14) for conducting flows of liquid and gas inside said spray booth (12); discharge means (16) disposed in said spray booth (12) and communicating with said conduit means (14) for discharging liquid coating material onto a work part (18); and characterized by including differentiator means (24) disposed exteriorly of said conduit means (14) at a predetermined location along said conduit means (14) to be energized from a source disposed outside of said spray booth (12) for differentiating between liquid and gas in said conduit means (14) at said predetermined location whereby the presence of liquid in said conduit means (14) is nonintrusively detected when the liquid flow reaches said predetermined location along said conduit means (14).

### 5,014,646
### METHOD AND APPARATUS FOR WRITING OXIDE FILM

**Yufuko Ito; Hideo Koseki; Toshio Kawamura, and Yasuhiko Tsukikawa, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**
**Filed Mar. 22, 1989, Ser. No. 327,466**
**Claims priority, application Japan, Mar. 25, 1988, 63-72442**
**Int. Cl.$^5$ C23C** *16/48*
**U.S. Cl. 118—725** **32 Claims**

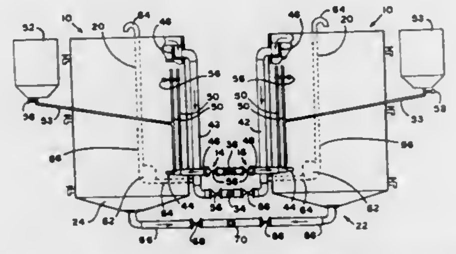


1. An apparatus for writing an oxide film, comprising:
means for supplying a gas of reactive material;
means for converting at least part of an oxygen gas into an ozone gas to generate an oxidizing gas including the ozone gas;
means for supplying the oxidizing gas including the ozone gas;
a substrate;
means for exposing the substrate to the supplied reactive material gas and the supplied oxidizing gas;
a laser generating a beam of laser light; and
means for applying the laser light beam to the substrate through the reactive material gas and the oxidizing gas;
wherein the laser light beam activates the oxidizing gas, and the activated oxidizing gas reacts with the reactive material gas to form an oxide deposited on the substrate.

---

### 5,014,647
### FISH CULTURE SYSTEM

**Robert B. Woltman, 44625 Tonopah St., Newberry Springs, Calif. 92365**
**Filed Mar. 21, 1988, Ser. No. 170,822**
**Int. Cl.$^5$ A01K** *63/04*
**U.S. Cl. 119—3** **7 Claims**

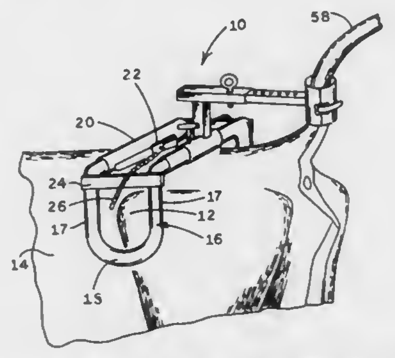


1. In a fish culture system, the combination comprising:
a plurality of fish culture silos,
means for circulating water through said silos including a pump having an intake and a discharge, a water return pipe connected to said intake, a water supply pipe connected to said discharge, an outlet connecting the top of each silo to said return pipe, and an inlet connecting said supply pipe to the bottom of each silo,
valves between each silo and said supply and return pipes, whereby each silo may be selectively isolated from said water circulating means, and
means associated with each silo for recirculating water through each silo independently of said first mentioned water circulating means
whereby water enters the bottom of each silo through the respective inlet, circulates upwardly through the silo, and emerges from the silo through the respective outlet.
4. In a fish culture system, the combination comprising:
a fish culture silo,
means for circulating water through said silo by injecting water into the bottom of the silo and withdrawing water from the top of the silo,
said means comprising a pump having an intake and a discharge, and piping connecting said intake to the top of said silo and said discharge to the bottom of said silo,
said system further comprising means including an aspirator connected to said piping for aspirating into the water entering said silo a substance comprising at least one of the following: oxygen, food, medicine,
said aspirating means comprising a container for containing at least one of the following: food, medicine, and
said aspirator having an inlet connected to said container for aspirating the contents of said container into the water entering said silo.

---

### 5,014,648
### COW ANTI-KICK APPARATUS, AND METHOD OF USE

**Frank Konitzer, Rte. 2, Oconto Falls, Wis. 54154**
**Filed Jan. 25, 1989, Ser. No. 302,379**
**Int. Cl.$^5$ A01K** *13/00*
**U.S. Cl. 119—105** **26 Claims**



1. Anti-kick apparatus adapted to mount on the hips of a cow, said apparatus comprising:
- (a) first and second clamping jaws that receive and grip a cow's hips and thereby mount said apparatus to the cow;
- (b) connecting means connecting said clamping jaws to each other;
- (c) tail holding means mounted in said apparatus, and adapted to hold the tail of a cow in an upright position; and
- (d) tightening means extending between said first and second clamping jaws for tightening said first and second clamping jaws with respect to a cow's hips,

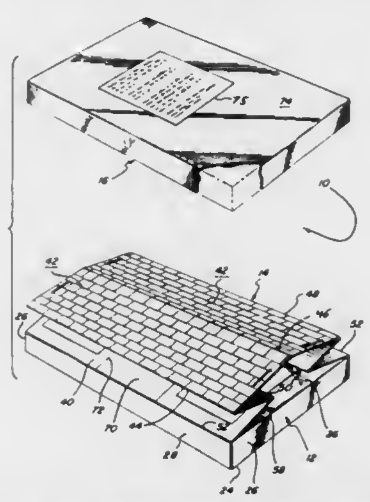
said anti-lock apparatus, when mounted on the hips of a cow, and including said tail holding means, being adapted to move with the hips of the cow.

---

### 5,014,649
### CAT LITTER BOX WITH INTEGRAL, COLLAPSIBLE ENCLOSURE

**Monte Taft, 5305 ½ Seashore Dr., Newport Beach, Calif. 92663**
**Filed May 10, 1988, Ser. No. 192,142**
**Int. Cl.$^5$ A01K** *1/035*
**U.S. Cl. 119—168** **14 Claims**

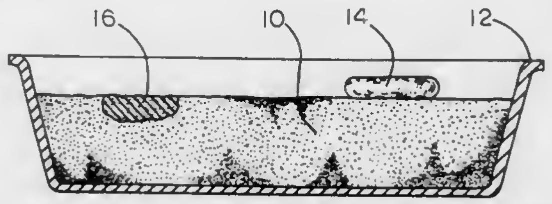
1. A cat litter box apparatus which comprises:
- (a) a relatively shallow litter box sized for holding a quantity of cat litter or the like, the litter box including ends with upper edge regions and sides with upper edge regions;
- (b) a collapsible enclosure attached to said litter box, said enclosure being configured for folding and unfolding between an extended, use position in which the enclosure at least substantially covers the cat litter box while permitting a cat to enter the enclosure and use the litter box; and, a collapsed, shipping, storage, and disposal condition in which the enclosure lies flat on top of, or in, the litter box, the enclosure including first and second end panels having lower edge regions, the lower edge regions of the end panels being foldably connected to corresponding upper edge regions of the ends of the litter box, and first and second side panels having upper and lower edge regions and a roof having side edge regions, the lower edge regions of the side panels being foldably connected to the corresponding upper edge regions of the sides of the litter box, and the side edge regions of the roof being foldably connected to corresponding upper edge regions of the side panels, so that the roof and side panels form one piece, the side panels including a longitudinal fold line enabling movement of the side panels and roof between extended and collapsed conditions, and the end panels being moveable between a downward collapsed position and an extended position engaged with end edge regions of the roof to support the roof and side panels in the extended condition.



---

### 5,014,650
### ANIMAL LITTER

**Cynthia W. Sowle, Mt. Pleasant, and Stephen W. Tobey, Midland, both of Mich., assignors to DowBrands Inc., Indianapolis, Ind.**
**Filed Dec. 28, 1989, Ser. No. 458,197**
**Int. Cl.$^5$ A01K** *1/015*
**U.S. Cl. 119—171** **7 Claims**

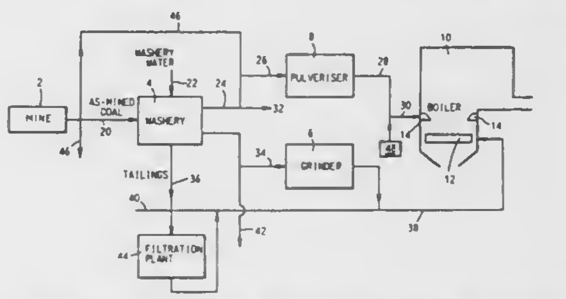


1. An animal litter capable of agglomerating animal urine to facilitate removal of the animal urine from the litter box containing the animal litter, said animal litter comprising:
- (a) a particulate, porous, inert solid substrate; and
- (b) a dry, particulate, cellulosic ether having sufficient intrinsic gel-forming capability sufficient to and being present in an amount sufficient to agglomerate animal urine deposited in the litter box and thereby form a gelled agglomerate having sufficient mechanical integrity to be conveyed from the litter box as a discrete entity.

---

### 5,014,651
### METHOD AND APPARATUS FOR IMPROVING UTILIZATION OF FUEL VALUES OF AS-MINED COAL IN PULVERIZED FUEL-FIRED BOILERS

**Donald R. Cummings, MacLean, New South Wales, Australia, assignor to D.U.T. Pty. Ltd., New South Wales, Australia**
**Filed Aug. 25, 1989, Ser. No. 399,117**
**Claims priority, application Australia, Aug. 25, 1988, PJ0113**
**Int. Cl.$^5$ F22B** *1/02;* **F23K** *3/02*
**U.S. Cl. 122—4 D** **18 Claims**



1. A method of improving the utilization of the fuel values in as-mined coal in the production of steam in a pulverized coal fired boiler, said method comprising the steps of:
- (i) providing a coal-fired boiler having a combustion chamber for the combustion of pulverized coal and a pulverized fuel burner system in said combustion chamber for the burning of pulverized coal in said combustion chamber:
- (ii) providing a fluidized bed combustor in said combustion chamber;
- (iii) supplying as the fuel to said pulverized fuel burner system a pulverized fuel selected from the group consisting of pulverized as-mined coal, pulverized washed coal and mixtures thereof, and
- (iv) supplying as the fuel to said fluidised bed combustor a fuel comprising coal washery tailings.

---

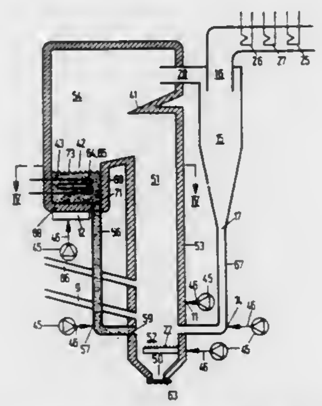
### 5,014,652
### FLUID BED COOLER, A FLUID BED COMBUSTION REACTOR AND A METHOD FOR THE OPERATION OF A SUCH REACTOR

**Niels J. Hyldgaard, Arden, Denmark, assignor to Aalborg Boilers A/S, Aalborg, Denmark**
**PCT No. PCT/DK89/00049, § 371 Date Jan. 3, 1990, § 102(e) Date Jan. 3, 1990, PCT Pub. No. WO89/08225, PCT Pub. Date Sep. 8, 1989**
**PCT Filed Mar. 3, 1989, Ser. No. 435,371**
**Claims priority, application Denmark, Mar. 4, 1988, 1202/88**
**Int. Cl.$^5$ B09B** *3/00;* **F22B** *1/00*
**U.S. Cl. 122—4 D** **20 Claims**

1. A fluid-bed cooler for particular material comprising:
a vessel having upwardly extending side walls, a substantially closed bottom and an open top;
particulate material in said vessel;
at least one opening in said bottom for discharge of said particulate material in said vessel;
heat transfer means in said vessel comprised of at least two separate heat transfer sections, each section comprising a heat transfer tube means conducting a heat transfer medium on the inside thereof and contacting particulate material flowing on the outside thereof;
a boundary region between said heat transfer sections wherein the particulate material is not fluidized;
inlets at said bottom for introduction of gas into said vessel for fluidization of particulate material in said vessel, said

OL
126
SS
2
MY
14
1991
UMI

inlets comprising separate sections of inlets corresponding to said at least two heat transfer sections; and



separate control means for controlling the flow of fluidizing gas into said vessel through each separate fluidizing gas inlet section.

---

### 5,014,653

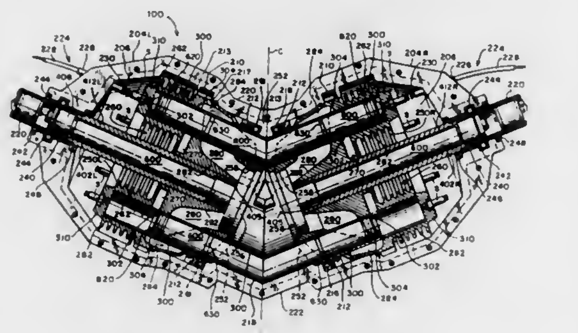
### ROTARY VEE ENGINE

**Robert W. Sullivan, Snyder; Tommie J. Holder, Mountain Park, and Max F. Buchanan, Roosevelt, all of Okla., assignors to Sullivan Engine Works, Inc., Snyder, Okla.**

**Division of Ser. No. 151,657, Feb. 3, 1988, Pat. No. 4,867,107. This application Jun. 28, 1989, Ser. No. 373,166**

**Int. Cl.$^5$ F02B** ***57/06***

**U.S. Cl. 123—43 A** **8 Claims**



1. In a rotary vee engine:

a housing having outer ends;

two cylinder blocks each having inner and outer ends and mounted in the housing for rotation of one cylinder block about a first rotational axis and rotation of the other cylinder block about a second rotational axis, said axes being angled to intersect adjacent the inner ends of said blocks at an included angle less than one hundred and eighty degrees;

each cylinder block having a plurality of cylinders positioned at a selected radial distance from the respective rotational axis and extending parallel to the axis to intersect the inner end of the cylinder block;

angled support shaft means for rotatably and axially supporting each of the cylinder blocks in the housing;

an air/fuel system for directing pressurized charges of air/fuel mixture radially inwardly into each of the cylinders during the operation of the engine including a central cavity formed by the housing between the inner ends of the cylinder blocks for receiving air/fuel mixture;

a plurality of angled pistons each having a portion disposed in a cylinder of one block and a portion disposed in a cylinder in the other block for orbital motion of the pistons coordinately with the rotation of the cylinder blocks;

each of said pistons reciprocating relative to the associated cylinder from an outer top dead center position to an inner bottom dead center position; and

sealing means for sealing the combustion chamber at the outer end of each cylinder from the central cavity of the air/fuel system comprising piston ring means provided around each piston adjacent the outer end and sealing means provided adjacent the intermediate portion of each piston spaced axially from the piston ring means, with the piston ring means and sealing means positioned to maintain sliding contact between the piston and the cylinder during the reciprocation of the piston in the cylinder between the top dead center and the bottom dead center position.

4. In a rotary vee engine:

a housing having outer ends;

two cylinder blocks each having inner and outer ends and mounted in the housing for rotation of one cylinder block about a first rotational axis and rotation of the other cylinder block about a second rotational axis, said axes being angled to intersect adjacent the inner ends of said blocks as an included angle less than one hundred and eighty degrees;

each cylinder block having a plurality of cylinders positioned at a selected radial distance from the respective rotational axis and extending parallel to the axis to intersect the inner end of the cylinder block;

angled support shaft means for rotatably and axially supporting each of the cylinder blocks in the housing;

a plurality of angled pistons each having a first portion disposed in a cylinder of one block and a second portion disposed in a cylinder in the other block for orbital motion of the pistons coordinately with the rotation of the cylinder blocks;

each of said pistons reciprocating relative to the associated cylinder from an outer top dead center position to an inner bottom dead center position in response to the rotation of the cylinder blocks;

each of the piston portions comprising a continuous hollow tubular piston body having a selected wall thickness and the piston bodies for each piston being joined at a selected angle less than one hundred and eighty degrees; and

a piston head connected to the outer axial end of each hollow piston body;

whereby the hollow piston bodies substantially reduce the inertial bearing loads caused by centrifugal forces applied to the angled pistons as the pistons orbit and rotate with respect to the cylinder blocks during the operation of the engine, and thereby minimizes the frictional wear and loads between the cylinders and pistons.

---

### 5,014,654

### INTAKE MANIFOLD FOR INTERNAL COMBUSTION ENGINE

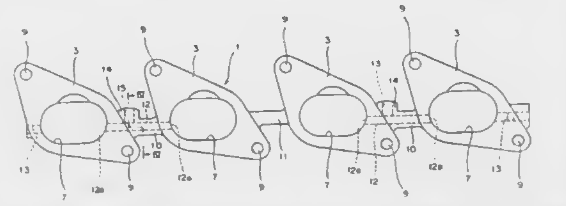
**Fumikazu Ishibasbi, Yamato, Japan, assignor to Nissan Motor Company, Ltd. of No. 2, Yokobama, Japan**

**Filed Feb. 8, 1990, Ser. No. 476,929**

**Claims priority, application Japan, Feb. 14, 1989, 1-15875**

**Int. Cl.$^5$ F02M** ***35/10***

**U.S. Cl. 123—52 MC** **14 Claims**



1. An intake manifold for an internal combustion engine, comprising:

a plurality of branch runners each of which is formed therein with an intake air passage, each branch runner having a flange section which is fixedly secured to a cylinder head of the engine;

a rib section for fixedly connecting each pair of flange sections of said branch runners which are located adjacent with each other;

means defining a gas passage in each said rib section, said gas passage communicating with said intake air passages of said adjacent branch runners; and

means defining a gas inlet opening in each rib section, said gas inlet opening communicating with the gas passage in said rib section so that is introduced through said gas inlet opening into said gas passage.

---

### 5,014,655

### CAMSHAFT DRIVE OF A MULTI-CYLINDER V-ENGINE

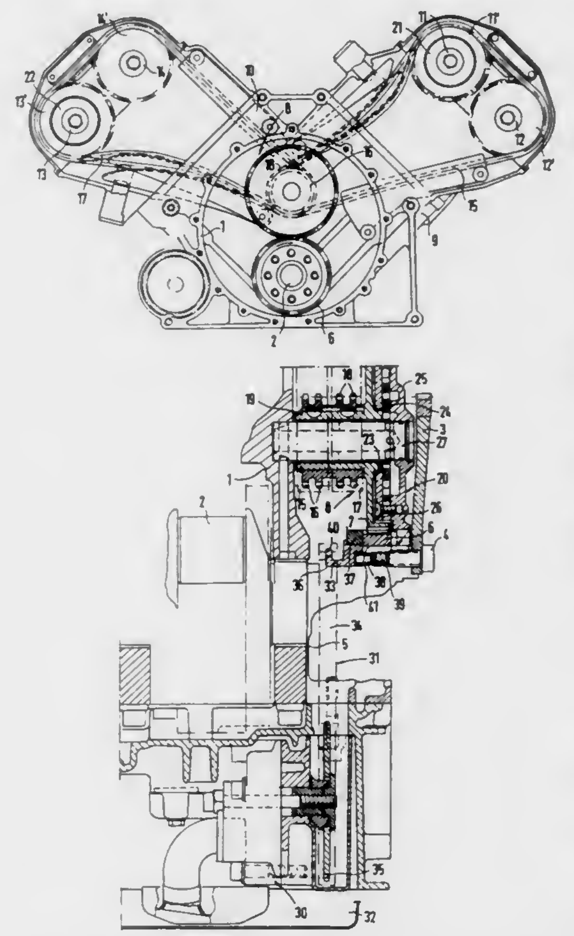
**Herbert Ampferer, Sachsenheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany**

**Filed Jul. 2, 1990, Ser. No. 546,881**

**Claims priority, application Fed. Rep. of Germany, Jul. 1, 1989, 3921716**

**Int. Cl.$^5$ F01L** ***1/04, 1/34;*** **F02B** ***75/22***

**U.S. Cl. 123—90.31** **6 Claims**



1. A camshaft drive for a multi-cylinder V-engine of the type where the valves are actuated by two camshafts respectively which are assigned to a cylinder bank, said camshafts being disposed overhead and being driven by the crankshaft by way of an intermediate timing gear wherein the camshaft drive is arranged close to an engine flywheel at an output end of the crankshaft, and wherein the intermediate timing gear has a gear wheel mating with a crankshaft gear wheel as well as two sprocket wheels, by means of which, in each case, the two camshafts of one cylinder bank are driven by means of a chain.

---

### 5,014,656

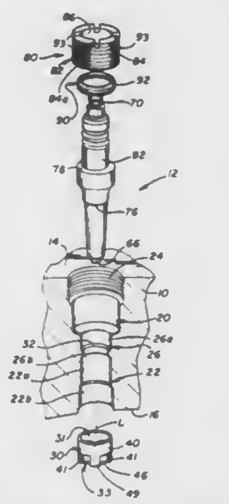
### INTERNAL COMBUSTION ENGINE HAVING A PERMANENT GROUND ELECTRODE AND REPLACEABLE CENTER ELECTRODE ELEMENT

**Joseph M. Leptich, Grand Blanc; Keith A. Penney, Davison, and Steve F. Lowe, Drayton Plains, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 25, 1990, Ser. No. 513,498**

**Int. Cl.$^5$ H01T** ***13/08, 13/32***

**U.S. Cl. 123—169 EL** **11 Claims**



1. An internal combustion engine comprising: (a) a cylinder head having an outer wall, an inner wall forming at least a portion of a combustion chamber, a spark plug bore extending between the outer and inner walls along an axis and including an intermediate transverse seat for engaging an element introduced through the outer wall against movement toward the inner wall, (b) a permanent ground electrode permanently affixed to the cylinder head at the inner wall proximate to the bore, (c) a spark plug center electrode element replaceably received in the bore through the outer wall and comprising a center electrode and a surrounding insulator body having a shoulder engaging the bore seat, said center electrode extending within the combustion chamber spaced apart from the ground electrode so as to cooperate therewith to define a spark gap, and (d) locking means removably attached to the cylinder head for clamping the insulator body against the bore seat to secure the center electrode element in the cylinder head bore in spark generating arrangement with the ground electrode.

---

### 5,014,657

### RECOIL STARTER

**Isao Tsunakawa; Nobuyoshi Rikihisa, and Kiyobiko Kato, all of Saitama, Japan, assignors to Sbowakiki Industry Co., Ltd., Saitama, Japan**

**Filed Mar. 19, 1990, Ser. No. 496,200**

**Claims priority, application Japan, Mar. 24, 1989, 1-32688; Jan. 30, 1990, 2-7160**

**Int. Cl.$^5$ F02N** ***3/02***

**U.S. Cl. 123—185 B** **10 Claims**

1. A recoil starter for starting a small-size engine, comprising:

a starter case **1**;

a center shaft **5** provided on and projected from the inside of said case **1**;

a reel **9** supported rotatably by said shaft **5**;

a rope groove **10** formed in the peripheral surface of said reel **9**;

a rope **11** wound in said rope groove **10** with one end thereof being fixed to said reel **9**;

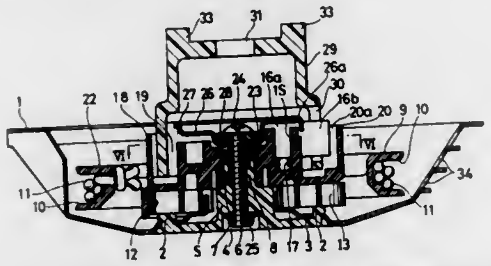
a recoil spring **13** for energizing said reel **9** in the winding direction thereof; and,

OL
126
SS
2
MY
14
991
JMI

- a dog **16** supported pivotably in a dog storage hole **15** formed in said reel **9** and, when an engine starting operation is performed, projectable externally of said reel **9** to come into engagement with an engaging opening **30** formed in a crank pulley **29** connected to said engine to thereby start the rotation of said pulley **29**; and wherein;

(a) a circular boss portion **9***a* is provided on and projected from the central portion of said reel **9**;

(b) said engaging opening **30** of said crank pulley **29** is disposed outside of said boss portion **9***a;*



(c) an engaging wall **20***a* having a flat engaging surface is provided on and projected from said reel **9** disposed outside of said crank pulley **29**;

(d) when said dog **16** is engaged with said crank pulley **29**, the leading end of said dog **16** is projected externally of said engaging opening **30** for engagement with said engaging wall **20***a*; and,

(e) in said engagement, one end of said dog **16** is supported by said engaging wall **20***a* and the other end thereof is supported by the inner surface of said dog storage hole **15**.

---

### 5,014,658

## PISTON ASSEMBLY HAVING A FUSIBLE CORE TO FORM A COOLING CHANNEL AND A METHOD FOR THE MANUFACTURE THEREOF

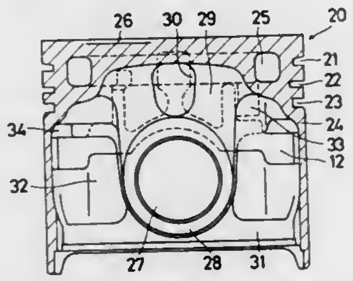
**Solchi Hara, and Hiroshi Kageyama, both of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Feb. 21, 1990, Ser. No. 482,655**

**Claims priority, application Japan, Feb. 22, 1989, 1-42154**

**Int. Cl.$^5$ F02F *3/00***

**U.S. Cl. 123—193 P** **7 Claims**



1. A piston assembly comprising:
- a cast piston having a crown and a peripherally depending skirt, said crown and skirt defining a cavity on a lower side of said crown;
- first, second and third cores removably positioned in the cavity, wherein said first and second cores are arranged to laterally enclose said third core, and wherein one of said first and second cores has undercut portions;
- a strut having engaging portions engaged in said undercut portions such that said strut is supported by said first, second and third cores, said strut also having keeping portions;
- a fusible core enclosed in said crown and fixed to said strut by said keeping portions; and
- inlet and outlet passages formed in said crown and extending between said fusible core and said cavity, whereby a cooling channel is left in said crown when said fusible core is dissolved by a dissolving liquid introduced through one of said inlet and outlet passages.

---

### 5,014,659

## REINFORCED STRUCTURE OF A CYLINDER BLOCK OF AN INTERNAL COMBUSTION ENGINE

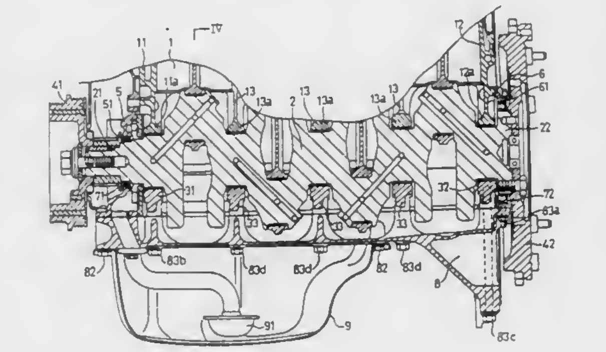
**Hirofumi Ohshima; Masanori Sato, and Kazuo Isayama, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

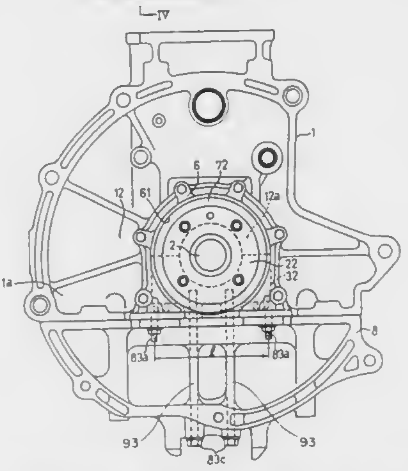
**Filed Jul. 19, 1990, Ser. No. 556,251**

**Claims priority, application Japan, Sep. 12, 1989, 1-107568[U]**

**Int. Cl.$^5$ F02F *7/00***

**U.S. Cl. 123—195 H** **5 Claims**





1. In an internal combustion engine having a cylinder block, a skirt portion integrally formed therewith at a lower portion thereof, a plurality of bearings received therein, a crank shaft journaled in the bearings, a plurality of bearing caps secured to the bearings, and front and rear covers formed at front and rear portions of the cylinder block, respectively, and having respective openings through which the crank shaft extends,
- said cylinder block having a reinforced structure comprising:
- a reinforcing member secured to a lower surface of said skirt portion of said cylinder block and to a lower surface of said rear cover;
- at least two first bolts, provided on opposite sides of said rear cover, for fastening said reinforcing member to the lower surface of said rear cover; and
- at least two second bolts for fastening said reinforcing member to a bearing cap for a rearmost bearing of said bearings, said second bolts being placed within a pitch of said first bolts in a direction transversely of said cylinder block.

### 5,014,660

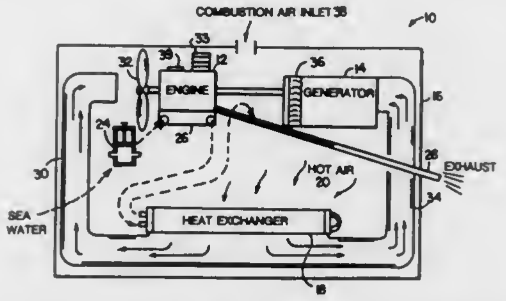
## COOLING SYSTEM FOR AN ENCLOSED HEAT SOURCE

**John H. Westerbeke, Jr., Milton, Mass., assignor to Westerbeke Corporation, Avon, Mass.**

**Filed Oct. 29, 1990, Ser. No. 605,529**

**Int. Cl.$^5$ F02B *77/00***

**U.S. Cl. 123—198 E** **17 Claims**



1. A cooling system for an enclosed power generating heat source, comprising:
- said heat source;
- an enclosure substantially enclosing said heat source;
- a heat exchanger positioned within said enclosure, said heat exchanger communicating through said enclosure for connection to an external source of cooling fluid and adapted for cooling air within said enclosure; and
- air circulation means within said enclosure adapted for circulating air from said heat exchanger past said heat source and said heat exchanger.

---

### 5,014,661

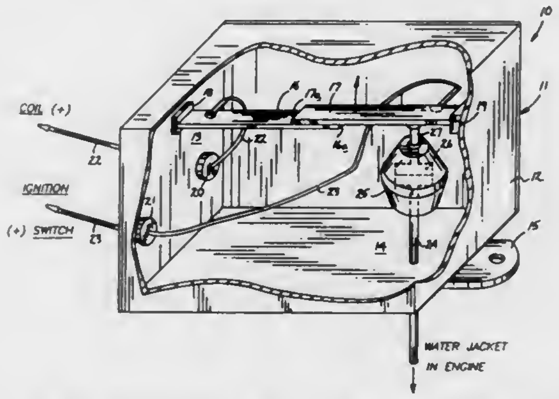
## AUTOMOTIVE THERMAL BREAKER APPARATUS

**John C. Ladner, Sr., and June C. Ladner, both of Rt 4, Box 354, Poplarville, Miss. 39470**

**Filed Jul. 9, 1990, Ser. No. 550,067**

**Int. Cl.$^5$ F02B *77/00***

**U.S. Cl. 123—198 D** **2 Claims**



1. An automotive thermal breaker apparatus comprising, in combination,
- a housing, the housing including a first switch plate, and a second switch plate, the first and second switch plates arranged for electrical communication in a first position and in a non-conductive electrical association in a second position, the first and second switch plates mounted within the housing,
- and
- the first switch plate in electrical communication with an automotive engine coil, and the second switch plate in electrical communication with an automotive engine ignition to direct electrical current to the engine coil when the first and second switch plates are in the first position,
- and
- a temperature sensor arranged for communication with a water jacket of an internal combustion engine to effect relative displacement of the second switch plate relative to the first switch plate to the second position,
- and
- wherein the housing includes a first side wall, a spaced second side wall, and a floor, the first switch plate mounted to the first side wall and including a first insulative mount to electrically isolate the first switch plate relative to the first side wall and the housing, and the second switch plate mounted to the second side wall, including a second insulative mount, wherein the second insulative mount is of a flexible memory retentent material to permit deflection of the second switch plate relative to the first switch plate,
- and
- wherein a first electrically conductive wire is in electrical association with the first switch plate and is directed through the housing to the coil, and a second electrically conductive wire is in electrical communication with the second switch plate and is directed through the housing to the automotive ignition, and the first and second switch plates are in contiguous overlapped relationship in the first position,
- and
- wherein the temperature sensor includes a sealed secondary housing, the sealed secondary housing includes a fixed sensor rod mounted to the floor of the housing and directed exteriorly of the housing in communication with the water jacket of the engine, and the secondary housing including a bi-metallic coupler mounted therewith, and the bi-metallic coupler including a reciprocatable rod mounted to the bi-metallic coupler, and the bi-metallic rod reciprocatably mounted within the secondary housing and extendible from a first rod positioned when the rod is attracted within the secondary housing to a second arm position when the rod is extended relative to the housing, and the reciprocatable rod mounted to the second switch plate at a forward end of the reciprocatable rod remote from the secondary housing to effect displacement of the second switch plate relative to the first switch plate when the reciprocatable rod is in the second rod position.

---

### 5,014,662

## DEVICE FOR CONTROLLING THE JET OF CARBURETTED MIXTURE DELIVERED BY A PNEUMATIC INJECTION SYSTEM

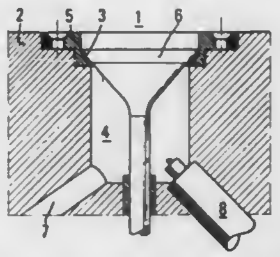
**Jean Trapy, Rueil Malmaison, France, assignor to Institut Francais du Petrole, Rueil Malmaison; Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly sur Seine, all of, France**

**Continuation of Ser. No. 814,883, Dec. 30, 1985, abandoned. This application Jul. 30, 1990, Ser. No. 559,072**

**Claims priority, application France, Dec. 28, 1984, 84 20058**

**Int. Cl.$^5$ F02M *61/18***

**U.S. Cl. 123—250** **6 Claims**



1. A device for controlling a jet of carburetted mixture supplied to a reciprocating internal combustion engine by a pneumatic injection system, the pneumatic injection system comprising injection prechamber means including an injection opening formed in a wall of a combustion chamber of the

VOL 1126 ISS 2 MY 14 1991 UMI

internal combustion engine for communicating said injection prechamber means with the combustion chamber, means for injecting liquid fuel into the injection prechamber means, an injection valve means for periodically opening and closing said injection opening, a ring-shaped valve seat element mounted in said injection opening so as to be substantially flush with the wall of the combustion chamber and cooperating with said injection valve means, deflector means provided on said valve seat element for deflecting the jet of carburetted mixture from the injection prechamber means through said injection opening directly into the combustion chamber.

---

### 5,014,663
## TWO-STROKE INTERNAL COMBUSTION ENGINE AND CYLINDER HEAD FOR THE LATTER

**Jean F. Melchior, 126 Bld du Montparnasse, 75014 Paris. France**

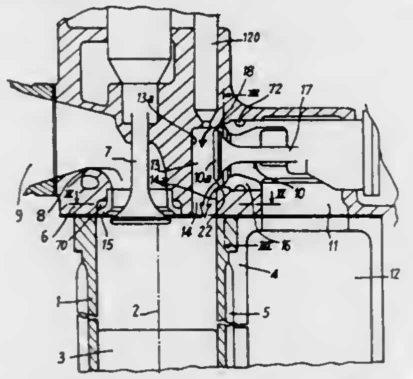
**Continuation of Ser. No. 72,244, filed as PCT FR86/00451 on Dec. 31, 1986, published as WO87/04217 on Jul. 16, 1987, Pat. 4,854,280. This application Aug. 7, 1989, Ser. No. 390,207**

**Claims priority, application France, Dec. 31, 1985, 85 19506**

**The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.**

Int. Cl.$^5$ F02B *25/18*

U.S. Cl. 123—257 16 Claims



1. A two stroke internal combustion engine, having:

a cylinder block (4) and a cylinder head (6) cooperating with at least one piston (3) reciprocably received in a cylinder (1) formed in said cylinder block to define at least one expansible work chamber,

at least one intake valve (10) slidably received in said cylinder head and cooperating with an intake valve seat (16) disposed in a wall (14*b*) of a scavenging and precombustion chamber (13) to control air flow from an intake pipe (11) into said precombustion chamber,

at least one exhaust valve (7) slidably received in said cylinder head and cooperating with an exhaust valve seat (15) to control gas flow from said work chamber to an exhaust pipe (8),

and means (150–158) for operating said intake and exhaust valves in proper timed sequence with the displacement of said piston, whereby both said valves are open while the piston is at its bottom dead center,

said precombustion chamber communicating with the cylinder through a transfer passageway (14) having a wall (14*a*) forming an extension of said wall (14*b*) of said precombustion chamber and extending at least partially substantially parallel to an axis (2) of said cylinder (1) and whose cross-section perpendicular to said axis opens at an outlet from said transfer passageway (14) to said cylinder (1) in the form a substantially oblong shape disposed with its radially outermost edge generally coincident with a surface of said cylinder (1) most remote from said exhaust valve (7),

said intake valve (10), said intake valve seat (16), said intake pipe (11), said precombustion chamber (13) and said transfer passageway (14) being so arranged and constructed to cause a progressively increasing non-uniform intake clearance opening oriented such that, in response to opening movement of the said intake valve, the largest intake orifice area is developed at least initially closest to that portion of said walls (14*a*, 14*b*) of said precombustion chamber and said transfer passageway most remote from said exhaust valve seat, so as to cause air to be directed from said intake pipe (11) into said precombustion chamber (13) toward said piston (3) and substantially along and parallel to said walls (14*b*, 14*a*) of said precombustion chamber and said transfer passageway and thence at least initially along said surface of said cylinder (1) upon opening of the intake valve (10) to thereby sheetwise scavenge said work chamber along a loop therein without substantial direct flow of air from the intake pipe (11) to the exhaust pipe (8) along said cylinder head (6).

---

### 5,014,664
## HEAT-INSULATING STRUCTURE OF SWIRL CHAMBER

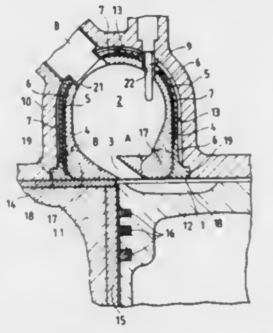
**Hiroshi Matsuoka, Yamato, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan**

**Filed Jul. 27, 1990, Ser. No. 558,374**

**Claims priority, application Japan, Jul. 27, 1989, 1-192590**

Int. Cl.$^5$ F02B *19/08, 19/16*

U.S. Cl. 123—271 10 Claims



1. In an internal combustion engine including a cylinder block having formed therein cylinders, a cylinder head fixed to said cylinder block and equipped with hole portions formed in such a manner as to correspond to said cylinders for forming swirl chambers and main combustion chambers formed inside said cylinders of said cylinder block, a heat-insulating structure of a swirl chamber comprising:

swirl chamber blocks having formed therein said swirl chambers and jet ports for establishing communication between said swirl chambers and said main combustion chambers;

heat-insulating layers made of a ceramic material and disposed on the outer surface of said swirl chamber blocks, said heat-insulating layers reducing the heat-insulating degree by said heat-insulating layers at high temperature portions of said swirl chambers much more than at low temperature portions thereof; and

outer blocks made of a metal and fixed by casting in such a manner as to cover the outer surfaces of said heat-insulating layers and the outer surfaces of said swirl chamber blocks where said heat-insulating layers do not exist, said outer blocks being fixed to said hole portions formed in said cylinder head.

---

### 5,014,665
## R.P.M. - LIMITING CIRCUIT OF AN I.C. ENGINE

**Sven I. Faijersson, Kållered, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden**

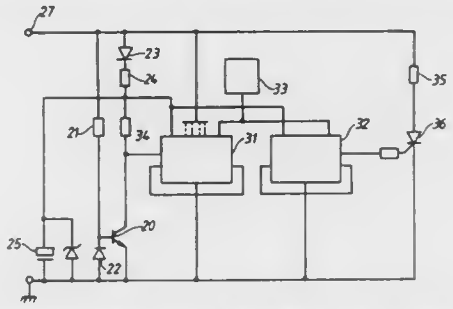
**Filed Jun. 4, 1990, Ser. No. 532,955**

**Claims priority, application Sweden, Jun. 12, 1989, 8902105**

Int. Cl.$^5$ F02P *5/00*

U.S. Cl. 123—329 4 Claims

1. R.p.m. limiting ignition circuit arrangement of an i.c. engine provided with two in series resettable, non-triggerable counters (31,32) of which the first one has counting to the pulse time $t_1$ and is triggered by a zero passage detector (16) sensing an induced primary voltage by magnetic induction in an ignition coil, and the second has counting to pulse time $t_2$ and is triggered by the end of the pulse time of the first counter and that the total times of the pulses $t_1$ and $t_2$ after said zero passage of a preceding engine revolution constitute the ignition time T



at a maximum speed to which a limitation is determined, which second counter's outlet is connected to a switch (36) for the purpose of changing over this one when the tie $t_2$ owing to exceeding r.p.m. overlaps the time T, which switch is directly or indirectly via a control component (26) connected in parallel to an ignition switch of the ignition circuit, characterized in that the counters are adapted to be controlled by a common crystal oscillator (33).

---

### 5,014,666
## LOAD ADJUSTMENT DEVICE

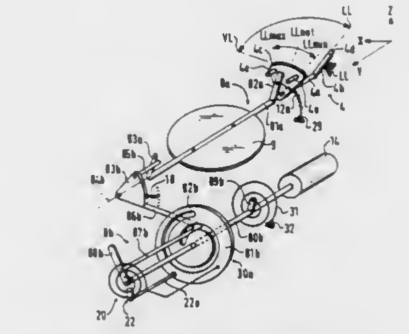
**Helmut Westenberger, Hofheim, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt/Main, Fed. Rep. of Germany**

**Filed Jul. 20, 1990, Ser. No. 556,884**

**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1989, 3927004**

Int. Cl.$^5$ F02D *33/00, 9/02, 1/02*

U.S. Cl. 123—339 12 Claims



1. A load adjustment device comprises

a setting member, and a control element which acts on the setting member to determine an output of an internal combustion engine;

an electronic control device, and an electric setting drive which cooperates with the electronic control device;

a driver, an accelerator pedal connected to the driver, said control element cooperating with the driver and, in addition, being controllable by the electric setting drive;

an idle stop, an idle spring, and an emergency operation spring; and

wherein an adjustment path of the driver in idling direction is limited by said idle stop;

upon a striking of the driver against said idle stop, the control element is moveable within an idling control range relative to the driver by means of the setting drive;

said control element includes a first control element part and a second control element part;

said first control element part cooperates with the driver;

said idle spring acts on said driver and urges said first control element part in a direction of minimum idle position over the entire idle control range;

said second control element part is controlled by means of said setting drive;

said emergency operation spring acts on said setting drive and urges said second control element part in the direction of the minimum idling position to an idling emergency position;

said first control element part extends on a side associated with the minimum idle position of the second control element part into a setting path thereof; and

said second control element part comprises a torque converter developed as a spiral for coupling mechanical movement of said second control element part to said first control element part.

---

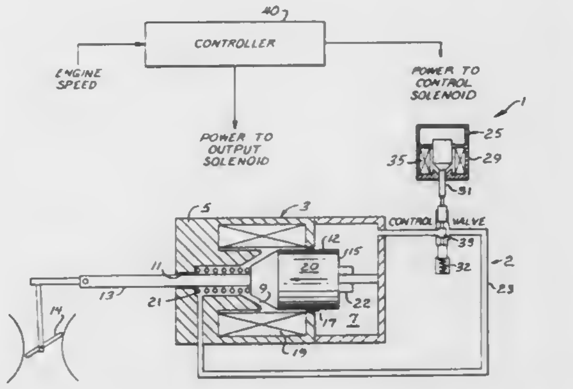
### 5,014,667
## ELECTRO-HYDRAULIC CONTROL SYSTEM FOR GOVERNORS

**Hal G. Meyer, Rockford, Ill., assignor to Precision Governors, Inc., Rockford, Ill.**

**Filed Aug. 6, 1990, Ser. No. 562,816**

Int. Cl.$^5$ F02D *9/10, 11/10*

U.S. Cl. 123—360 18 Claims



1. An electro-hydraulic governor for controlling operation of on external device comprising;

(a) an electronically operated actuator having a movable member where the position of the member controls said external device, said electronically operated actuator being located in a hydraulic circuit;

(b) a control valve connected in the hydraulic circuit with said actuator for controlling the rate of movement of said member, and for locking it against movement when correctly positioned;

(c) control means for comparing actual condition against desired condition and for controlling the movement of said control valve to regulate the movement of member.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,014,668
## METHOD AND SYSTEM FOR ADJUSTING THE LAMBDA VALUE

**Martin Klenk, Backnang; Ernst Linder, Mühlacker, and Winfried Moser, Ludwigsburg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

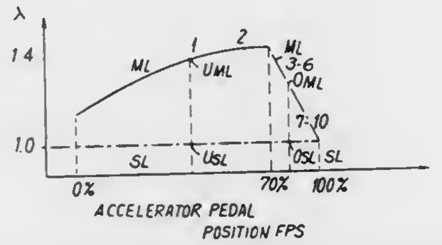
**PCT No. PCT/DE89/00099, § 371 Date Nov. 15, 1989, § 102(e) Date Nov. 15, 1989, PCT Pub. No. WO89/08777, PCT Pub. Date Sep. 21, 1989**

**PCT Filed Feb. 23, 1989, Ser. No. 445,857**

**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808696**

**Int. Cl.$^5$ F02D** *41/14*

U.S. Cl. 123—399 10 Claims



1. A method of adjusting a lambda value of an air-fuel mixture to be supplied to an internal combustion engine of a motor vehicle having an accelerator pedal, the internal combustion engine having a throttle flap actuator, said method comprising the step of adjusting the throttle flap actuator in accordance with a respective value of an accelerator pedal position signal in such a manner that an air volume to be supplied to the internal combustion engine provides for obtaining a lean air-fuel mixture when the respective value of the accelerator pedal position signal is below a threshold value of the accelerator pedal position signal, that is when the accelerator pedal is in a position corresponding to a lower load range of the internal combustion engine, and for obtaining a stoichiometric air-fuel mixture, at least during steady-state operation, when the respective value of the accelerator pedal position signal is above the threshold value of the accelerator pedal position signal, that is when the accelerator pedal is in a position corresponding to an upper load range of the internal combustion engine.

---

### 5,014,669
## SYSTEM AND METHOD FOR CONTROLLING IGNITION TIMING FOR INTERNAL COMBUSTION ENGINE HAVING CYLINDER BANKS

**Tadaoki Takasaki, and Shinsuke Nakazawa, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed May 18, 1990, Ser. No. 525,396**

**Int. Cl.$^5$ F02P** *5/15*

U.S. Cl. 123—414 10 Claims

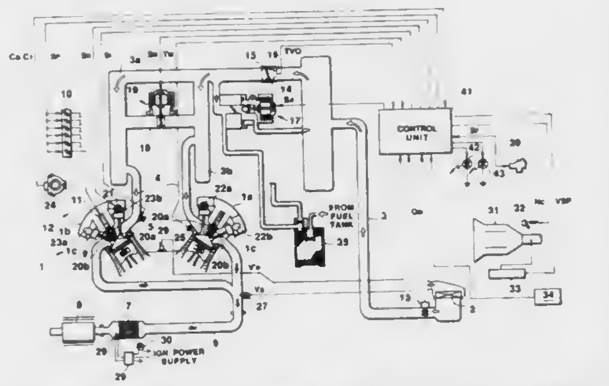
1. A system for controlling ignition timing for an internal combustion engine, comprising:

a) first means for detecting an engine load;

b) second means installed on at least any one camshaft on a cylinder bank row of the engine, the camshaft being rotated in synchronization with an engine crankshaft, for producing and outputting at least a reference signal whenever the corresponding camshaft on which the second means is located is rotated through a predetermined angle and a unit angle signal whenever the corresponding camshaft has rotated through the unit angle,

c) third means for deriving an optimum ignition timing angle on the basis of engine load and engine revolution speed derived on the basis of the unit angle signal output by the second means;

d) fourth means for identifying a number of a cylinder to be ignited from among the cylinders on the cylinder bank rows depending, at least, on which of the cylinder bank rows the number of the cylinder identified by the fourth means belongs to, determined on the basis of the reference signal derived by the second means; and



e) fifth means for deriving a value of difference caused between the different cylinder bank rows on the basis of a result of identification of the cylinder number and correcting the optimum ignition timing on the basis of the difference value derived by the third means.

---

### 5,014,670
## SPARK IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE ADAPTED TO MIXTURE FUEL OF MORE THAN ONE INDIVIDUAL FUELS WITH FAIL-SAFE FEATURE IN CASE OF FAILURE OF OPERATION OF SENSOR MONITORING CONCENTRATION OF ONE OF INDIVIDUAL FUEL IN MIXTURE FUEL

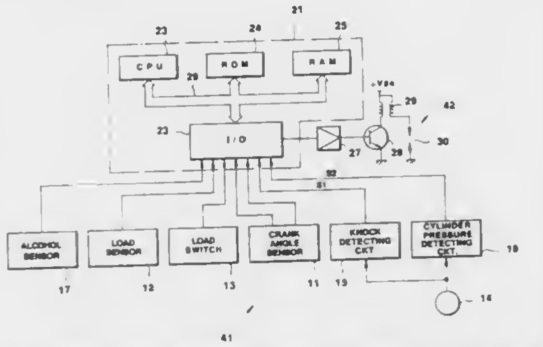
**Hisashi Mitsumoto, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed May 16, 1990, Ser. No. 524,313**

**Claims priority, application Japan, May 16, 1989, 1-123769**

**Int. Cl.$^5$ F02P** *5/14;* **F02M** *51/00;* **F02B** *13/00*

U.S. Cl. 123—425 5 Claims



1. A spark ignition timing control system for an internal combustion engine adapted for combustioning with a blended fuel composed of more than one mutually different fuels, comprising:

first sensor means for monitoring a preselected basic engine operating parameters to produce a first sensor signal representative of the monitored engine operating condition;

second sensor means for monitoring concentration of a specific one of fuels in the blended fuel to produce a specific fuel concentration indicative second sensor signal;

third sensor means for monitoring variation of internal pressure in an engine cylinder to produce a third sensor signal indicative of the monitored internal pressure;

fourth means for deriving a basic fuel advance angle on the basis of said fist sensor signal;

fifth means for deriving a first correction value on the basis of said third sensor signal;

sixth means for deriving a second correction value on the basis of the concentration of the specific fuel, said specific fuel concentration normally corresponding to said second sensor signal value;

seventh means for correcting said basic fuel advance angle with said first and second correction values for deriving a spark advance angle to control the spark ignition timing; and

eighth means for detecting lag period between spark ignition and occurrence of the maximum pressure in said engine cylinder to predict concentration of the specific fuel, and comparing the predicted specific fuel concentration with the specific fuel concentration represented by said second sensor signal for detecting failure of said second sensor means on the basis of the difference therebetween, said eighth means replacing said specific fuel concentration represented by said second sensor signal with a given value for derivation of said second correction value.

---

### 5,014,671
## HIGH PRESSURE FUEL INJECTION UNIT FOR ENGINES

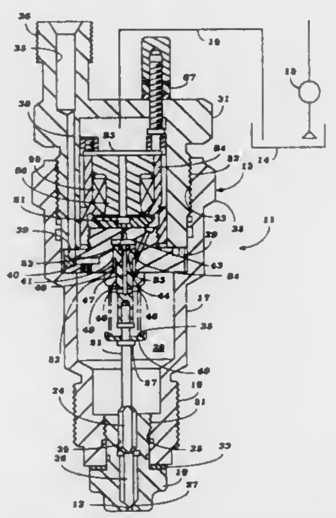
**Jun Taue, and Osamu Maeda, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Dec. 27, 1989, Ser. No. 457,550**

**Claims priority, application Japan, Dec. 29, 1988, 63-333510; Apr. 26, 1989, 1-104777**

**Int. Cl.$^5$ F02M** *47/02*

U.S. Cl. 123—447 6 Claims



1. An accumulator type of injection nozzle comprised of an outer housing defining an accumulator chamber adapted to be supplied with high pressure fuel, a nozzle port leading from said accumulator chamber, an injection valve moveable between a closed position and an opened position for controlling the discharge of fuel from said accumulator chamber through said nozzle port, a control chamber for receiving pressurized fuel, an actuating member supported for movement within said control chamber and a biasing spring acting on said actuating member in the injection valve closing direction, said actuating member and said biasing spring being associated with said injector valve for retaining said injector valve in its closed position when said control chamber is pressurized and for movement of said injector valve to its opened position when pressure is relieved in said control chamber, and relief valve movable between a closed position for maintaining pressure in said control chamber and an opened position for relieving said control chamber for effecting fuel discharge through said nozzle port, the improvement comprising the preload of said biasing spring being set within the following relationship:

$$PA(AP2-AZ-\tfrac{1}{4}AP1)-\tfrac{1}{4}PB\,AP1-KN\,hN<FSET<PA(AP2-AZ)-PB\,AP1-KN\,hN \qquad (1)$$

where

PA: pressure within accumulator chamber.

PB: pressure within control chamber **43** while relief port **61** is opened,

AP1: cross sectional area of larger diameter portion of injection valve **45**,

AP2: cross sectional area of smaller diameter portion of injection valve body **49**,

AZ: cross sectional area of fuel injection nozzle port **13**,

KN: spring constant spring **55**,

hN: spring deformation, and

FSET: preload for spring.

---

### 5,014,672
## FUEL SUPPLY CONTROLLER FOR AN INTERNAL COMBUSTION ENGINE

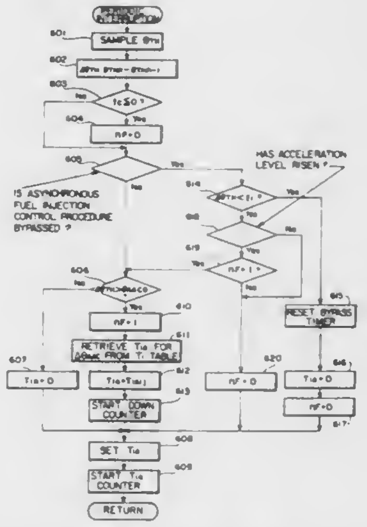
**Takaaki Fujii; Masahiko Abe, and Akio Kobayashi, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 253,783, Oct. 5, 1988, abandoned. This application Jun. 25, 1990, Ser. No. 542,807**

**Claims priority, application Japan, Oct. 7, 1987, 62-253980; Nov. 5, 1987, 62-280132; Nov. 5, 1987, 62-280133; Nov. 9, 1987, 62-283857**

**Int. Cl.$^5$ F02M** *51/00*

U.S. Cl. 123—492 5 Claims



1. A fuel supply controller comprising:

a synchronous injection time setting circuit having a map and means for selecting a synchronous injection time from said map depending upon instantaneous engine operating parameters;

means for measuring engine speed;

means for determining variation in throttle valve position;

a synchronous injection time setting circuit for setting a fuel injection time based at least on steady state engine speed;

an asynchronous injection time setting circuit, connected to said means for determining variation in throttle valve position and said means for measuring engine speed which selects a predetermined and fixed asynchronous injection time from a range of asynchronous injection times which decrease with increasing engine speed; and

means for determining a logical sum connected to said synchronous and asynchronous injection time setting circuits said asynchronous injection time setting circuit thereby avoiding oversupplying fuel with increasing engine speeds.

### 5,014,673

### FUEL FEED DEVICE FOR INTERNAL COMBUSTION ENGINE

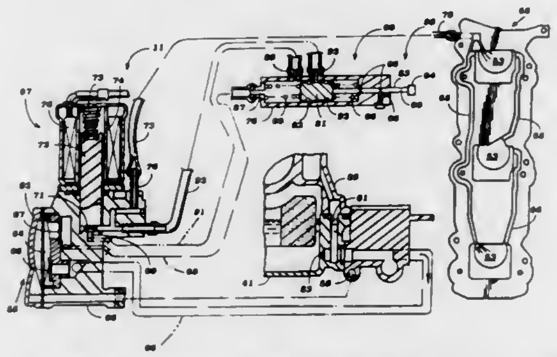
**Hiroaki Fujimoto, and Masaki Okazaki, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Oct. 18, 1989, Ser. No. 423,020**

**Claims priority, application Japan, Oct. 19, 1988, 63-263341**

**Int. Cl.$^5$ F02M** *1/08*

U.S. Cl. 123—512 **13 Claims**



1. A fuel feed system for an internal combustion engine comprising a fuel source, a fuel discharge for delivering fuel to said engine, automatic valve means for automatically controlling the communication of said fuel source with said fuel discharge for delivering fuel to said engine in response to a sensed condition, and manually operated valve means for selectively communicating said fuel source with said fuel discharge for fuel enrichment regardless of the condition of said automatic valve means and for precluding delivery of fuel from said source to said fuel discharge regardless of the condition of said automatic valve means for precluding any fuel enrichment.

### 5,014,674

### FUEL VAPOR CONTROL FOR AUTOMOTIVE VEHICLE ENGINE

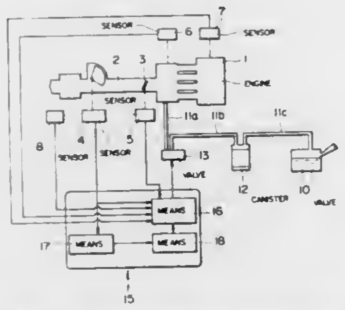
**Toshio Takeda, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Jan. 30, 1989, Ser. No. 303,341**

**Claims priority, application Japan, Jan. 30, 1988, 63-20778**

**Int. Cl.$^5$ F02M** *39/00*

U.S. Cl. 123—520 **15 Claims**



1. A vapor flow control apparatus for delivering fuel vapor from a vapor storage canister to an air intake chamber of an automotive vehicle engine, said apparatus comprising:

acceleration detecting means for detecting an increasing change of the amount of intake air conducted in an air intake pipe to thereby detect an accelerated of said automotive vehicle;

a vapor pipe connected between said vapor storage canister and said air intake chamber for delivering fuel vapor from said vapor storage canister to said air intake chamber;

vapor flow control means including electrically controlled valve means disposed in said vapor pipe for variably delivering fuel vapor according to said increasing change of the amount of intake air; and

control means for controlling said vapor flow control means to force an increasing delivery of fuel vapor to lag behind said increasing change of the amount of intake air conducted into said air intake chamber when said acceleration detecting means detects an acceleration of said automotive vehicle engine.

### 5,014,675

### IGNITION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

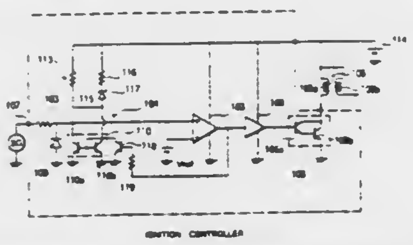
**Mitsuru Koiwa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 14, 1990, Ser. No. 522,777**

**Claims priority, application Japan, May 15, 1989, 1-118753; May 15, 1989, 1-118754**

**Int. Cl.$^5$ F02P** *3/045*

U.S. Cl. 123—609 **9 Claims**



1. An ignition apparatus for an internal combustion engine comprising:

a signal generator for generating an alternating output signal in synchrony with the rotation of the engine;

a wave form shaper connected to receive the output signal of said signal generator for shaping the generator output signal using a predetermined threshold, said wave form shaper generating an output signal when the output signal of said signal generator is greater than the predetermined threshold;

a resistor connected in series with said signal generator and said wave form shaper;

current absorbing means connected between said resistor and said wave form shaper for absorbing part of the output signal of said signal generator supplied to said wave form shaper through said resistor in response to the output signal of said wave form shaper;

an ignition coil having a primary winding and a secondary winding; and

a first switching element for controlling primary winding current of said ignition coil based on the output signal of said wave form shaper.

### 5,014,676

### IGNITION SYSTEM WITH REPETITIVE SPARKS

**Wesley D. Boyer, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Mar. 20, 1989, Ser. No. 325,817**

**Int. Cl.$^5$ F02P** *15/00, 3/045*

U.S. Cl. 123—637 **9 Claims**

1. A distributorless ignition system for an internal combustion engine including:

a spark plug having spark electrodes located in a combustion space;

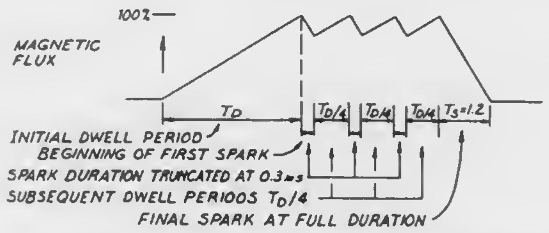
ignition spark generating apparatus coupled to the spark plug;

an ignition coil coupled to the spark plug;

an ignition control module coupled to the ignition coil;

an electronic engine control module coupled to the ignition module for determining desired spark advance; and

said ignition control module being adapted to stop current through the ignition coil before a complete collapse of the magnetic field surrounding the ignition coil has taken place, to repetitively fire the spark plug during one combustion event in a cylinder of the engine, to set the individual spark durations, before the last spark in a spark series, to a fixed time selected as a function of the ratio of a present duration of the first spark to the normal discharge time of the ignition coil, and to set dwell period, subsequent to an initial dwell period, to be a function of an initial measured dwell period.



### 5,014,677

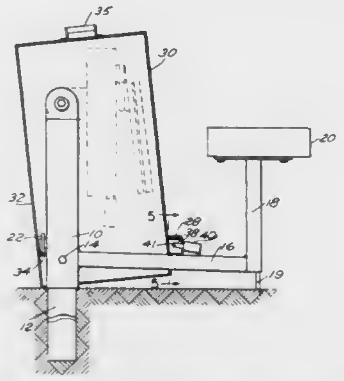
### PROTECTIVE DEVICE FOR TARGET THROWING APPARATUS

**Kenneth M. Gagnon, Sr., Cumberland, R.I., assignor to Quack Sporting Clays, Inc., Cumberland, R.I.**

**Filed Jan. 18, 1990, Ser. No. 466,778**

**Int. Cl.$^5$ F41B** *3/04*

U.S. Cl. 124—6 **5 Claims**



1. In a target throwing apparatus, a support post secured to the ground, a trap launcher fixed for rocking movement to the post, a lateral member extending from said post, a housing being a protective cover having a plurality of side and top walls fixed together enclosing the trap launcher, one wall having means engaging securance means on the post, the wall opposite said one wall having a mooring means to secure the wall to the lateral member.

### 5,014,678

### CUTTER

**Yusaku Matsuda, Yamatokoriyama, Japan, assignor to Sanwa Diamond Industrial Co., Ltd., Japan**

**Filed Mar. 9, 1990, Ser. No. 492,067**

**Claims priority, application Japan, Mar. 10, 1989, 1-58878**

**The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.**

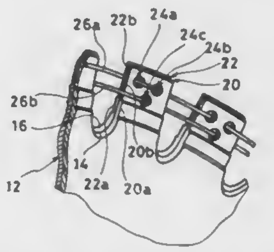
**Int. Cl.$^5$ B24D** *5/00;* **B28D** *1/04*

U.S. Cl. 125—15 **7 Claims**

1. A cutter comprising,

a base plate formed of two thin plates with through holes in them defining each said plate into a ring member and said two ring members being bonded together to form the plate;

a plurality of projections formed thinner than the thickness of the remainder of said base plate and disposed on the peripheral edge of said base plate, with slits projecting inward from said peripheral edge of said base plate defining said projections between neighboring ones of said slits; holes defined in said projections;



wires passing through said holes for connecting said projections; and

a ring-shaped cutting body including abrasive grains and formed around said projections, said cutting body extending radially inward a distance so as to expose a radially inward portion of said slits.

### 5,014,679

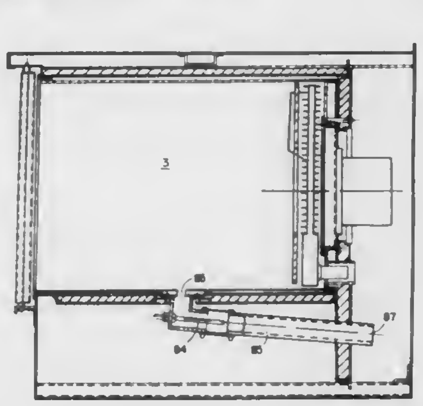
### GAS FIRED COMBINATION CONVECTION-STEAM OVEN

**Paul Childs, Swampscott; James R. Hurley, E. Weymouth, and Conrad J. Orcheski, Maynard, all of Mass., assignors to Tecogen, Inc., Waltham, Mass.**

**Filed Sep. 18, 1989, Ser. No. 408,691**

**Int. Cl.$^5$ F24C** *15/32*

U.S. Cl. 126—21 A **22 Claims**



1. An oven apparatus for heating a food article with steam, comprising:

an enclosure defining a heating chamber for holding an article to be heated;

atomizing means for producing an atomized water spray;

a source of a combustible gas mixture;

heating means for receiving and combusting said mixture, said heating means arranged to isolate hot combustion gases from said heating chamber and including a heat exchanger for receiving the hot combustion gases adapted to have external surface temperatures sufficient to convert water to steam; and

means for directing said atomized water spray over said external surface of said heat exchanger to produce steam for directing the steam to said heating chamber.

OL
126
SS
2
MY
14
991
UMI

**5,014,680**

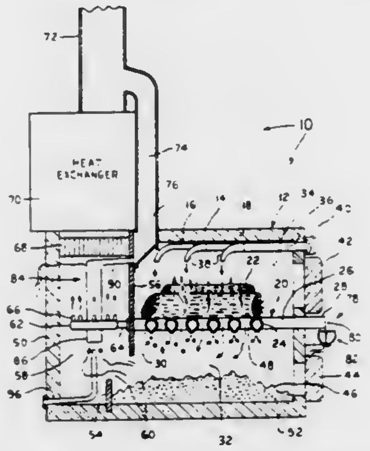
### SELF-POWERED AUTOMATIC SECONDARY AIR CONTROLLERS FOR WOODSTOVES AND SMALL FURNACES

**Darryl D. Siemer, Idaho Falls, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Mar. 15, 1989, Ser. No. 323,924**

**Int. Cl.$^5$ F24C *1/14***

**U.S. Cl. 126—77** **35 Claims**



1. A self-powered secondary air controller for a woodstove or the like having a secondary combustion chamber with a secondary air inlet as well as an outlet for the hot combustion products from primary and secondary combustion, said controller comprising:

sensor means including first and second bulbs filled with a fluid and located in the secondary combustion chamber remotely from the secondary air inlet,

a movable air valve for increasing and decreasing the amount of secondary air admitted into the chamber through the air inlet,

a differential pressure responsive actuator connected to said air valve for increasing the supply of secondary air in response to increasing differential fluid pressure,

first and second fluid-carrying tubes connected from the respective first and second bulbs to said actuator,

and combustion catalyst means for differentially heating said first bulb by catalytic combustion of combustible gases and vapors around said first bulb, said combustion catalyst means comprising a coating of a combustion catalyst on said first bulb,

the differential heating of said first bulb being effective to produce differential fluid pressure which is transmitted to said actuator and causes said actuator to increase the supply of secondary air, to produce a negative feedback control, in that the increased secondary air causes increased secondary combustion and thereby reduces the concentration of combustible gases and vapors available for catalytic combustion by said combustion catalyst means.

---

**5,014,681**

### METHOD AND APPARATUS FOR APPLYING INTERMITTENT COMPRESSION TO A BODY PART

**Avraham Heeman, Karkur, Israel, and Johannes H. Broeren, El Bovenkarspel, Netherlands, assignors to Mego Afek Industrial Measuring Instruments, Doar Na, Israel**

**Filed May 5, 1989, Ser. No. 347,706**

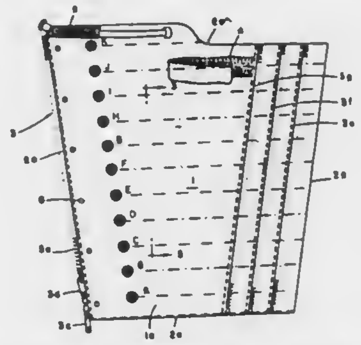
**Int. Cl.$^5$ A61H *9/00***

**U.S. Cl. 128—64** **6 Claims**

1. A method of treating a body part by applying an intermittent compression thereto using for this purpose an inflatable sleeve divided into n successively overlapping inflatable cells extending along one dimension of the sleeve wherein $n > 6$ comprising the steps of:

applying said sleeve to said body part of enclose same with said inflatable cells extending along one dimension of the sleeve; and

applying cyclically a pressurized fluid to successive groups of cells, wherein each group comprises m successive cells wherein $1 \leqq m \leqq 2$, so as successively to inflate each group whilst, at the same time, at least partially deflating the preceding group, and ensuring simultaneous deflation of all cells for a minimal time period between successive cycles.



---

**5,014,682**

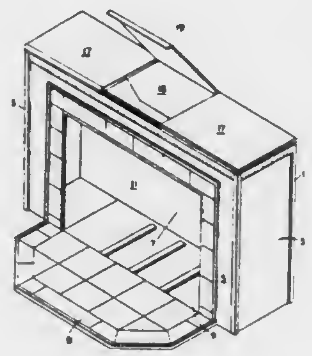
### PELLET STOVE MANTEL WITH INTEGRAL HOPPER

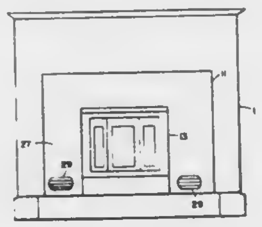
**Steven J. Payson, and John C. Lee, both of 3301 W. Hwy. 16, Ste. #1, Port Orchard, Wash. 98366**

**Filed May 14, 1990, Ser. No. 522,584**

**Int. Cl.$^5$ F24B *1/99***

**U.S. Cl. 126—501** **7 Claims**





1. A combination of a fuel storing and dispensing pellet stove mantel and an insert-type pellet stove, comprising:

(a) the pellet stove mantel having:

(1) an insert opening therein formed by a pair of sides and an upper portion,

(2) a mantel hopper in the upper portion and forming substantially the entire upper portion,

(3) a top opening in the upper portion for gaining access to and for filling the mantel hopper,

(4) a closure over the top opening,

(5) a bottom hopper opening above and adjacent to the insert opening; and

(b) the insert-type pellet stove positioned in the insert opening and having a stove hopper immediately adjacent to the bottom hopper opening for receiving fuel stored in the mantel hopper thereinto.

---

**5,014,683**

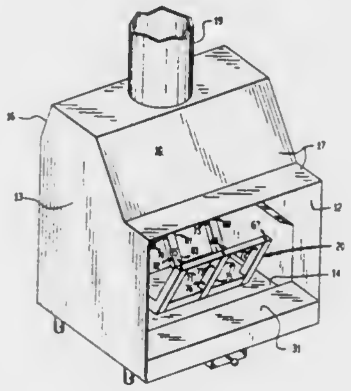
### HIGH EFFICIENCY FIREPLACE AND METHOD OF OPERATION

**Donald W. Wilkening, Rt. 2, Box 93A, Akeley, Minn. 56433**

**Filed Oct. 27, 1989, Ser. No. 427,745**

**Int. Cl.$^5$ F24B *1/189***

**U.S. Cl. 126—515** **11 Claims**



1. In combination with a fireplace of the class having a sealed firechamber disposed over a plenum connected to a source of combustion air and in communication with a flue for exhausting combustion products adjacent the top thereof;

(a) hollow fuel supporting means, operable to receive a quantity of fuel to be burned, and having a plurality of apertures disposed at different elevations with respect to the base of a firechamber and at different locations peripherally about said quantity of fuel whereby the air supplied to the lower peripheral portions of said quantity of fuel is cooler than the air supplied to the top peripheral portion.

---

**5,014,684**

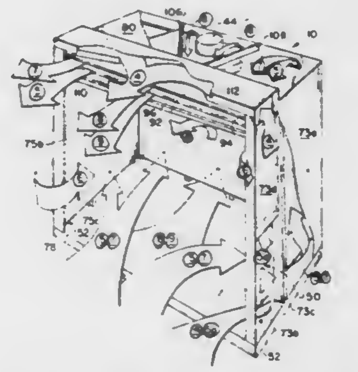
### WALL SHIELD AND CHIMNEY SUPPORT

**John G. Meeker, 24 Jamestown St., Sinclairville, N.Y. 14782-0568**

**Continuation-in-part of Ser. No. 366,281, Jun. 13, 1989, Pat. No. 4,957,098, which is a continuation of Ser. No. 203,853, Jun. 7, 1988, abandoned. This application Aug. 29, 1990, Ser. No. 574,989**

**Int. Cl.$^5$ F24B *1/188***

**U.S. Cl. 126—531** **18 Claims**



1. A wall shield and chimney support (WSCS) unit for insertion into a wall of a dwelling and for receiving a combustion unit, said WSCS unit comprising:

a box having a rear wall, two side walls, a top wall and a bottom wall, said rear, side, top and bottom walls defining a front opening to the interior of said box;

a chimney duct member extending through the top wall and adapted to mate with an associated chimney in the dwelling;

air inlets defined by the bottom, side and rear walls;

side ducting means defined by the side walls for ducting airflow from the air inlets near the bottom wall up along the side walls to the top wall, said side ducting means including side airflow separating means for providing two separate airflows from inlets near the bottom wall up the front lateral corners of the box, one of said two separate side airflows being interposed between the box interior and the other of said two separate side airflows, and

venting means associated with the top wall for venting said airflows from the front of the unit.

---

**5,014,685**

### BRAKE FOR BENDING CONTROL DEVICE OF ENDOSCOPE

**Nagashige Takahashi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 30, 1989, Ser. No. 373,529**

**Claims priority, application Japan, Jul. 13, 1988, 63-176082**

**Int. Cl.$^5$ A61B *1/00***

**U.S. Cl. 128—4** **12 Claims**

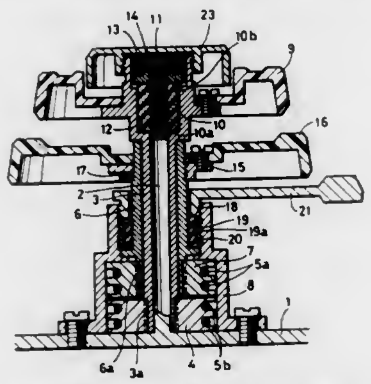
1. A brake for a bending control device of an endoscope comprising:

driving means rotatably provided in a control part for pulling a control wire;

a rotary shaft rotating together with said driving means;

a fixed shaft fixed in said control part in concentric relation to said rotary shaft;

a friction member accommodating chamber defined in an annular shape between said fixed and rotary shafts; and



a resilient friction member loaded within said friction member accommodating chamber in a compressed state.

---

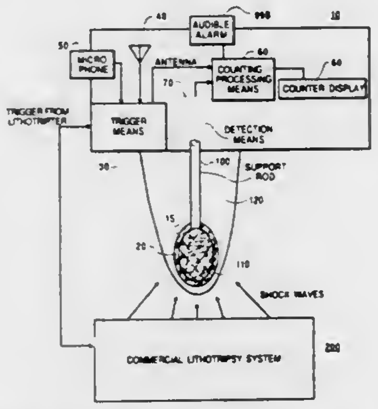
### 5,014,686
### PHANTOM KIDNEY STONE SYSTEM

**Mark E. Schafer, Blue Bell, Pa., assignor to International Sonic Technologies, Horsham, Pa.**

**Filed Aug. 31, 1989, Ser. No. 401,625**

**Int. Cl.$^5$ A61B *17/22***

**U.S. Cl. 128—24 EL** **20 Claims**



1. A phantom kidney stone system comprising:

a commercial lithotripsy system having a field of operation and an ECG input and outputting shock waves to crush a kidney stone, said shock waves being output within said field of operation, each shock wave breaking up said stone into a plurality of fragments of a certain size, a number of shock waves being necessary to break said stone up to a point where said stone is in a stone crushed condition, said stone crushed condition indicating that said fragments are of a predetermined size small enough to be excreted through a human urinary tract;

phantom kidney stone means for simulating a human kidney stone, said stone means being suspended into the field of operation of said commercial lithotripsy system;

trigger means, connected to receive a plurality of shock wave signals from said commercial lithotripsy system, each of said shock wave signals being representative of a shock wave output from said commercial lithotripsy system, for generating a plurality of trigger signals, one of said trigger signals being generated in response to each of said shock wave signals from said commercial lithotripsy system;

counting means, connected to receive each of said trigger signals, for counting the number of trigger signals representative of the number of shock waves output from said commercial lithotripsy system;

detection means, connected to said phantom kidney stone means, for producing a signal proportional to a detected size of said stone means at a given point of time and for comparing the detected size of said stone means to a predetermined reference size, said reference size being indicative of the stone crushed condition, said detection means generating an output signal at a time when said detected size of said stone means is less than said reference size;

processing means, connected to receive said output signal from said detection means and connected to said counting means, for outputting the number of trigger signals counted by said counting means at a time when said detection means generates said output signal;

display means, connected to said processing means, for indicating the number of shock waves output by said commercial lithotripsy system to reach said stone crushed condition.

---

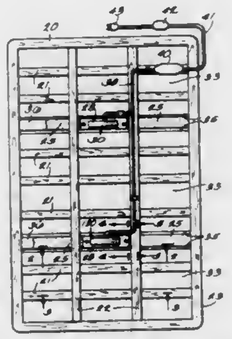
### 5,014,687
### MOUNTING FOR VIBRATING MOTOR

**Mark J. Raffel, Port Washington, Wis., assignor to Raffel Product Development Co., Port Washington, Wis.**

**Continuation-in-part of Ser. No. 135,900, Dec. 21, 1987, abandoned, Continuation-in-part of Ser. No. 897,238, Aug. 18, 1986, abandoned. This application Oct. 3, 1989, Ser. No. 418,793**

**Int. Cl.$^5$ A61H *1/00***

**U.S. Cl. 128—33** **11 Claims**



1. In combination, an article of furniture having flexible covering means defining a user contacting surface and at least one non-rotating vibrator motor having a coil and a movable pole piece and constructed and arranged to produce vibrations primarily perpendicular to the user contacting surface,

said article of furniture including frame means and at least two elongate resilient wire spring means disposed in a spaced apart, side-by-side relation below the covering means and on the side thereof opposite said user contacting surface,

said spring means being secured to said frame means and comprising a portion of a resilient user support disposed below said flexible covering means and extending in a direction generally parallel to said contacting surface,

support means for mounting said vibrator motor wherein said support means includes a resilient member, means rigidly securing said motor on said resilient member, said resilient member being secured on said resilient spring means for producing vibrations generally perpendicular to the user contacting surface and between said spring means whereby vibrations imparted by said motor to said spring means will be transferred by said spring means to the user through the flexible covering means.

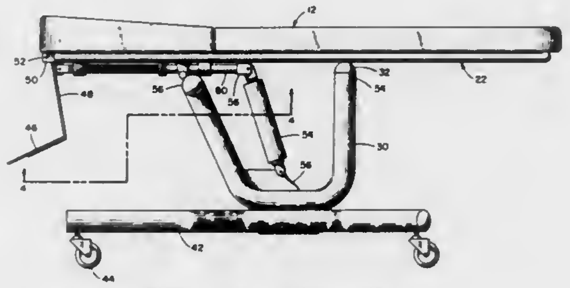
### 5,014,688
### PATIENT TREATMENT TABLE

**Duane Fast, Valley City, N. Dak., assignor to Tri W-G, Inc., Valley City, N. Dak.**

**Filed Sep. 6, 1990, Ser. No. 578,876**

**Int. Cl.$^5$ A61F *5/00;* A61G *7/005, 13/04***

**U.S. Cl. 128—70** **5 Claims**



1. A patient treatment table, comprising:

a bed including a cushion on a frame, said frame having a longitudinal vertical centered plane;

base means for supporting said bed;

first means for pivotally connecting said bed frame to said base means;

footboard means including a footboard and second means for pivotally connecting said footboard to said frame;

a push rod extending along said centered plane, said push rod having a free end to slidingly cam said footboard means;

means for retaining said push rod relative to said bed frame; and

means, attached to said push rod, for driving said push rod and causing pivoting at both said first and second connecting means.

---

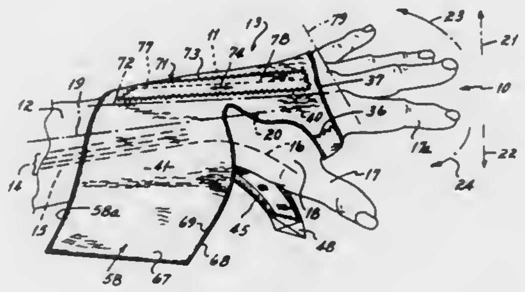
### 5,014,689
### HAND BRACE

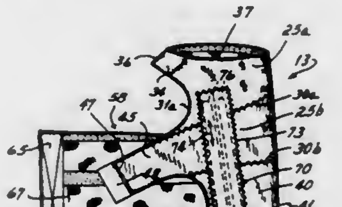
**Paul K. Meunchen, and Edward T. Durkin, both of Cincinnati, Ohio, assignora to The Kendall Company, Boston, Mass.**

**Filed Feb. 21, 1990, Ser. No. 482,876**

**Int. Cl.$^5$ A61F *5/10***

**U.S. Cl. 128—77** **19 Claims**





1. A hand brace comprising

a dorsal hand section and a palmar hand section, each hand section having a finger edge and a wrist edge, said hand sections being integral one with the other along a distal side of said brace from said finger edges to said wrist edges, said hand sections being connected along a proximal side of said brace by a web adjacent said finger edge, said web and said hand sections thereby defining a finger hole through which a user's fingers extend when said brace is being worn, said web lying between a user's thumb and forefinger when said brace is being worn,

a thumb strap integral with one of said dorsal and palmar hand sections, said thumb strap extending away from a proximal side edge portion of that hand section to which it is connected and being of a length sufficient to connect with the other of said dorsal and palmar hand section when said brace is being worn, said thumb strap thereby being adapted to draw said dorsal and palmar hand sections into a brace relationship one with the other about the thumb area of a user's hand,

a first fastener partially carried by said thumb strap and partially carried by said dorsal hand section for releasably connecting said thumb strap to said dorsal hand section, said first fastener being adjustably connectable to vary the tightness with which said dorsal and palmar hand sections are joined,

a dorsal wrist section and a palmar wrist section, each wrist section having a wrist edge and an elbow edge, said wrist edges of said wrist sections being integral with the adjacent wrist edges of said respective hand sections, said wrist sections being integral one with the other along one of a distal side and a proximal side of said brace from said wrist edges to said elbow edges, said wrist sections being connected along the other of said distal and proximal sides of said brace only when said brace is being worn,

a wrist strap integral with one of said dorsal and palmar wrist sections, said wrist strap extending away from a side edge portion of one of said wrist sections and being of a length sufficient to connect with the other of said wrist sections when said brace is being worn, said wrist strap being of a length such that it overlies the palmar side of a user's wrist but so that it does not extend substantially onto the dorsal side of a user's wrist when said brace is being worn, and

a second fastener partially carried by said wrist strap and partially carried by said palmar wrist section for releasably connecting said wrist strap to said palmar wrist section, said second fastener being adjustably connectable to vary the tightness with which said wrist strap and said palmar wrist section are joined.

---

### 5,014,690
### ADJUSTABLE SPLINT

**George R. Hepburn, 443 Gainsborongh Ct., Severna Park, Md. 21146, and Dror Paley, 2001 W. Rogers Ave., Baltimore, Md. 21209**

**Filed Feb. 22, 1990, Ser. No. 483,124**

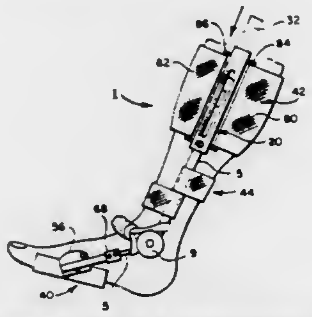
**Int. Cl.$^5$ A61F *3/00, 5/00***

**U.S. Cl. 128—80 H** **17 Claims**

1. An adjustable splint device for supporting the ankle of a wearer, said splint device comprising:

(a) a pair of strut assemblies adapted to be positioned on opposite sides of the ankle of a wearer, each of said strut assemblies comprising an upper strut, and a lower strut pivotably connected to said upper strut, one of the struts of at least one of said strut assemblies including at one end thereof a pivotably mounted heat portion defining a cam surface, and the strut connected to said one strut including an adjustable biasing means, mounted therein and biased into engagement with said cam surface, for applying a quantifiable force tending to align or approximate said upper and lower struts;

(b) foot support means, connected to said pair of strut assemblies, for supporting the foot of a wearer; said foot support means comprising a foot support device; pivot means for



pivotably connecting said foot support device to the lower struts of said strut assemblies; and adjustable locking means for selectively fixing the angular position of said foot support device relative to said lower struts so that the foot of a wearer is held in a predetermined position relative to the ankle of the wearer; and

(c) securing means for releasably securing said strut assemblies to the lower leg of the wearer.

---

### 5,014,691

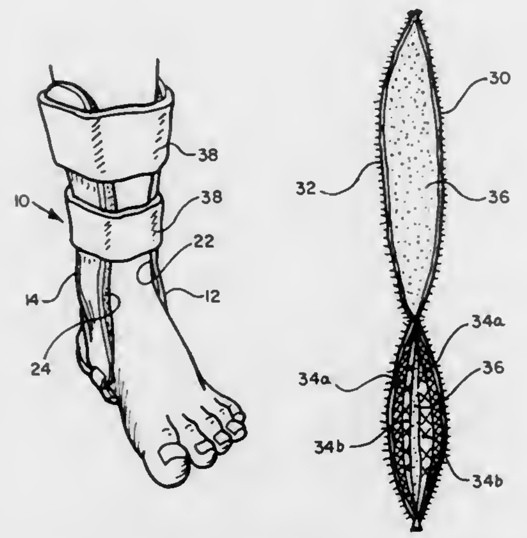
### ANKLE BRACE WITH DENSIFIED BATTING

**Glenn F. Cueman; Henry L. Richbourg, Jr., both of Charlotte, and Barnwell S. Ramsey, Statesville, all of N.C., assignors to Clintex Corporation, Huntersville, N.C.**

**Filed Jan. 16, 1990, Ser. No. 465,811**

**Int. Cl.$^5$ A61F** *5/00*

**U.S. Cl. 128—80 H** **11 Claims**



1. A brace for an ankle, said ankle having a medial portion and a lateral portion, comprising:

(a) means for stabilizing said ankle medially and laterally, while permitting dorsiflexion and plantarflexion, said stabilizing means including:
  (i) a first ankle guard for placement over said medial portion of said ankle;
  (ii) a second ankle guard for placement over said lateral portion of said ankle; and
  (iii) a foot sole piece connecting said first ankle guard to said second ankle guard;

(b) at least one densified batting pad attachable to said stabilizing means so that said densified batting pad is in contact with said medial and lateral portions of said ankle, wherein a first densified batting pad and a second densified batting pad is provided, said first densified batting pad being attached to said first ankle guard so that said first densified batting pad is in contact with said medial portion of said ankle, and said second densified batting pad being attached to said second ankle guard so that said second densified batting pad is in contact with said lateral portion of said ankle, wherein said first and second densified batting pads each comprise:
  (i) a non-densified batting pad of sufficient length to cover said medial or lateral portions of said ankle;
  (ii) two layers of densified batting, a soft densified batting surrounded by an outer layer of hard densified batting, positioned at one end of said non-densified batting pad;
  (iii) a first cover, covering both said densified and said non-densified batting;
  (iv) a second cover underneath said non-densified batting, adapted for attachment to hook and loop type closures; and
  (v) means for connecting said first cover and said second cover together to encase and segment said densified batting and said non-densified batting; and

(c) means for securing said brace to said ankle.

---

### 5,014,692

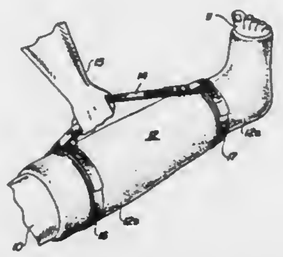
### SELF-MANIPULATABLE ASSEMBLY FOR MOVING A LEG IN A CAST

**Janice I. Rhoades, P.O. Box 1069, Estero, Fla. 33928-1069**

**Continuation of Ser. No. 380,461, Jul. 17, 1989, abandoned. This application Nov. 13, 1990, Ser. No. 611,455**

**Int. Cl.$^5$ A61F** *5/04*

**U.S. Cl. 128—83** **4 Claims**



1. A self-manipulatable assembly for moving a person's leg encased in a cast extending from the person's thigh to his foot comprising

an elongated first strap made entirely of flexible but non-stretchable fabric material extending from the ankle portion to the thigh portion of the cast,

said first strap forming at each of its ends a closed loop,

a second strap made entirely of flexible fabric material encircling the ankle portion of the cast and said strap itself passing through the closed loop on one end of the elongated first strap,

a third strap made entirely of flexible fabric material encircling the thigh portion of the cast and said strap itself passing through the closed loop on the opposite end of the elongated first strap,

the length of the elongated first strap between the second and third straps being somewhat longer than the distance between the second and third straps.

### 5,014,693

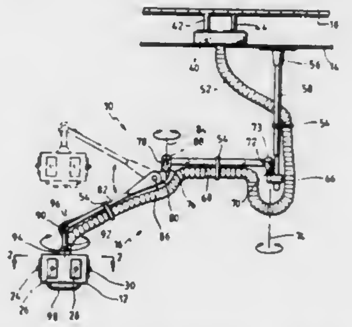
### CEILING-MOUNTED GAS DELIVERING UNIT FOR USE IN A CATHETER LABORATORY

**William B. Wright, II, Katy, and Dean D. Sauberli, Houston, both of Tex., assignors to St. Luke's Episcopal Hospital, Houston, Tex.**

**Filed Oct. 25, 1989, Ser. No. 427,866**

**Int. Cl.$^5$ A61M** *39/00*

**U.S. Cl. 128—204.18** **41 Claims**



1. A low-bulk gas delivering apparatus for use in a catheter laboratory, comprising:

a universally articulatable support arm having a first end and a second end, the first end being adapted to mount onto a ceiling;

a gas module being mounted onto the second end of said support arm for movement therewith, and being adapted to deliver gas; and

a hose connecting said gas module to a source of gas, said hose generally extending along said support arm and being disposed outside of said support arm.

---

### 5,014,694

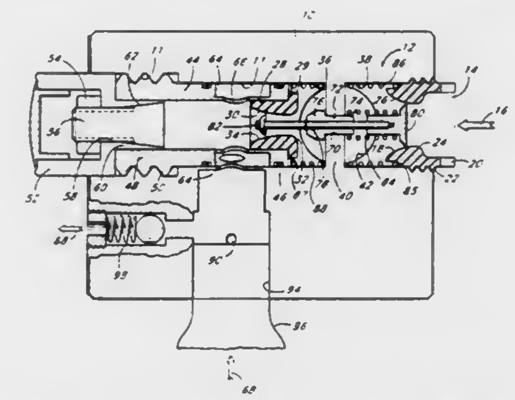
### AMBIENT PRESSURE AIR/OXYGEN BLENDER

**Douglas F. DeVries, Redland, Calif., assignor to Bird Products Corporation, Riverside, Calif.**

**Filed Oct. 15, 1990, Ser. No. 597,054**

**Int. Cl.$^5$ A61M** *16/12, 16/20*

**U.S. Cl. 128—205.24** **40 Claims**



1. A ventilator apparatus for use in respiratory and medical applications comprising a gas blender for blending ambient air with a gas from a pressurized source which has been reduced to substantially ambient pressure, said gas blender further comprising

a first valve seat in fluid communication with a first gas at substantially ambient pressure;

a second valve seat in fluid communication with a second gas at substantially ambient pressure;

a double ended poppet having a first poppet cooperating with the first valve seat to control the flow of the first gas through the first valve seat, and having a second poppet cooperating with the second valve seat to control the flow of the second gas through the second valve seat, the first and second valve seats being configured relative to their respective poppets such that movement of the poppets relative to their respective valve seats maintains a constant ratio of the first and second gases flowing through the opening between the valve seats and their respective poppets.

---

### 5,014,695

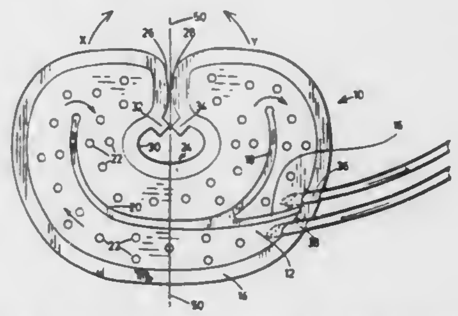
### KIDNEY COOLING JACKET

**Arnold M. Benak, 270 Evelyn Ave., Toronto, Ontario, Canada M6P 2Z9 , and Jaime V. Villamater, 3490 Nadine Crescent, Mississauga, Ontario, Canada L5A 3L6**

**Continuation-in-part of Ser. No. 212,307, Oct. 4, 1988, abandoned. This application Oct. 25, 1989, Ser. No. 426,180**

**Int. Cl.$^5$ A61F** *7/00, 7/12*

**U.S. Cl. 128—400** **4 Claims**



1. A heat exchange jacket comprising a pair of substantially flat, pliant, overlaid sheets having flush planar faces sealed together at peripheral margins thereby providing an interior compartment having a laminated sheet margin;

an inlet for introducing heat exchange fluid into the compartment;

an outlet for removing heat exchange fluid from the compartment;

an elongate weld between the paired sheets defining an elongate flow path for heat exchange fluid between the inlet and the outlet;

spot welds between the paired sheets in the flow path;

the paired sheets being separable except where sealed to make the jacket turgid by flowing heat exchange fluid therebetween, and being adapted for forming into a cone of variable size having an open wide top end and an open narrow end having an aperture, by overlaying variable opposing portions of the paired sheets; and

the paired sheets including a deep peripheral re-entrant bay having a narrowed mouth, the bay being located to form an edge of said open narrow end of said cone when the paired sheets are formed into said cone.

---

### 5,014,696

### ENDOCARDIAL DEFIBRILLATION ELECTRODE SYSTEM

**Rahul Mehra, Stillwater, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 3,358, Jan. 14, 1987, abandoned. This application Dec. 15, 1988, Ser. No. 284,957**

**Int. Cl.$^5$ A61N** *1/39*

**U.S. Cl. 128—419 D** **13 Claims**

1. A method of defibrillating a patient's heart, comprising:

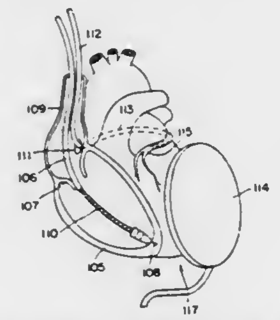
transvenously inserting a first elongated electrode into the right ventricle of said patient's heart;

transvenously inserting a second elongated electrode into the coronary sinus and great vein of said patient's heart;

inserting a third, large surface electrode subcutaneously at approximately the level of the ventricles of said patient's heart;

OL
126
SS
2
MY
14
991
UMI

coupling two of said first, second and third electrodes to one another so that they are electrically common; and

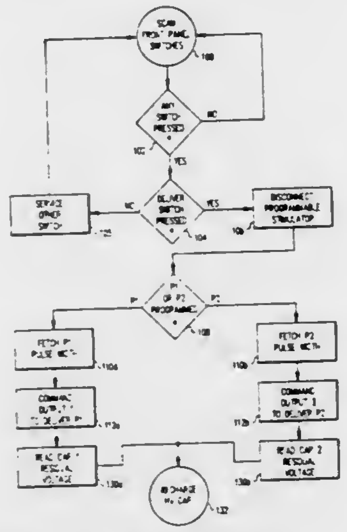


applying a defibrillation pulse between said coupled electrodes and the other of said first, second and third electrodes.

---

### 5,014,697
### PROGRAMMABLE DEFIBRILLATOR

**Benjamin Pless, Palo Alto; Michael Sweeney, Menlo Park, and Roger Winkle, Palo Alto, all of Calif., assignors to Ventritex, Sunnyvale, Calif.**
**Continuation of Ser. No. 301,729, Jan. 26, 1989, abandoned, which is a division of Ser. No. 863,181, May 14, 1986, Pat. No. 4,827,936. This application Jan. 11, 1990, Ser. No. 464,655**
**Int. Cl.$^5$ A61N *1/39***
U.S. Cl. 128—419 D 2 Claims

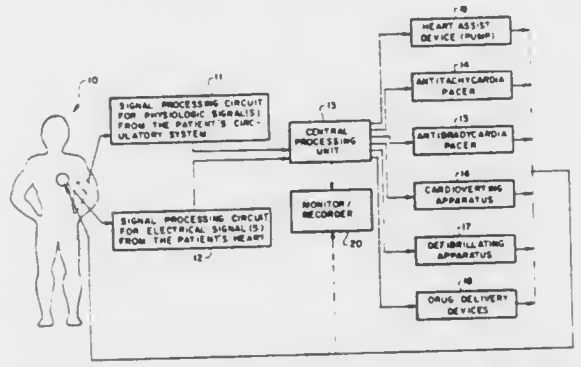


1. A defibrillation apparatus comprising:
first storage means for storing and generating a first high voltage defibrillation pulse;
second storage means for storing and generating a second high voltage defibrillation pulse;
input means for independently setting the voltage levels stored in said first and second storage means; and
means for selectively discharging the first and second storage means to provide successive, independent defibrillation pulses.

---

### 5,014,698
### METHOD OF AND SYSTEM FOR MONITORING AND TREATING A MALFUNCTIONING HEART

**Todd J. Cohen, Mountain View, Calif., assignor to Leonard Bloom, Towson, Md., a part interest**
**Continuation-in-part of Ser. No. 385,544, Jul. 27, 1989, Pat. No. 4,984,572, which is a continuation-in-part of Ser. No. 233,367, Aug. 18, 1988, Pat. No. 4,967,749, which is a continuation-in-part of Ser. No. 105,030, Oct. 6, 1987, Pat. No. 4,774,950. This application Oct. 2, 1989, Ser. No. 416,024**
**The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.**
**Int. Cl.$^5$ A61N *1/00***
U.S. Cl. 128—419 D 54 Claims


SIGNAL PROCESSING CIRCUIT FOR PHYSIOLOGIC SIGNAL(S) FROM THE PATIENT'S CIRCULATORY SYSTEM
SIGNAL PROCESSING CIRCUIT FOR ELECTRICAL SIGNAL(S) FROM THE PATIENT'S HEART
CENTRAL PROCESSING UNIT
MONITOR/RECORDER
HEART ASSIST DEVICE (PUMP)
ANTITACHYCARDIA PACER
ANTIBRADYCARDIA PACER
CARDIOVERTING APPARATUS
DEFIBRILLATING APPARATUS
DRUG DELIVERY DEVICES

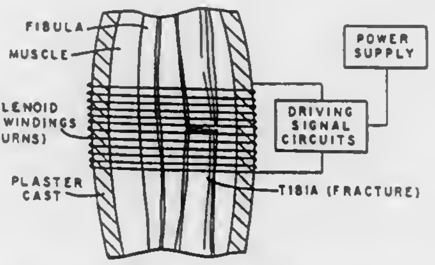
1. In a system for treating the malfunctioning heart of a patient, the combination of means for deriving at least one electrical signal from the patient's heart, means for deriving at least one physiologic signal from or related to the patient's circulatory system, a central processing unit for controlling delivery of selected heart-malfunction-corrective inputs to the patient, means for inputting the at least one electrical signal and the at least one physiologic signal to the central processing unit, and output means, including defibrillating means, controlled by the central processing unit for providing at least one heart-malfunction-corrective input to the patient from among a plurality of the heart-malfunction-corrective inputs, whereby malfunctions of the heart may be corrected.

---

### 5,014,699
### ELECTROMAGNETIC METHOD AND APPARATUS FOR HEALING LIVING TISSUE

**Solomon R. Pollack, Dresher; Carl T. Brighton, Malvern; David Pienkowski, Exton, all of Pa., and Neil J. Griffith, San Diego, Calif., assignors to Trustees of the University of Pennsylvania, Philadelphia, Pa.**
**Continuation-in-part of Ser. No. 313,332, Feb. 21, 1989, which is a continuation of Ser. No. 866,877, May 23, 1986, abandoned, and a continuation-in-part of Ser. No. 88,711, Aug. 24, 1987, abandoned, and a continuation-in-part of Ser. No. 192,012, May 9, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 443,741**
**The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.**
**Int. Cl.$^5$ A61N *1/00***
U.S. Cl. 128—419 F 81 Claims

1. A non-invasive electromagnetic therapeutic method to promote healing of tissue, said method comprising the steps of:
converting electrical potential into an electrical signal, said electrical signal comprising a series of substantially symmetric voltage cycles, each of said voltage cycles comprising a train of bursted pulses, each pulse having an average pulse width in the range of from 0.5 to 20 microseconds; and

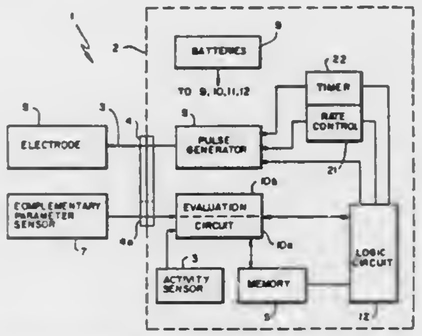


transducing said voltage cycles into an electromagnetic field in the vicinity of said tissue.

---

### 5,014,700
### RATE RESPONSIVE CARDIAC PACEMAKER

**Eckhard Alt, Ottobrunn, Fed. Rep. of Germany, assignor to Intermedics, Inc., Angleton, Tex.**
**Division of Ser. No. 94,875, Sep. 10, 1987, Pat. No. 4,926,863. This application Apr. 26, 1990, Ser. No. 514,410**
**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 3631155**
**Int. Cl.$^5$ A61N *1/00***
U.S. Cl. 128—419 PG 17 Claims



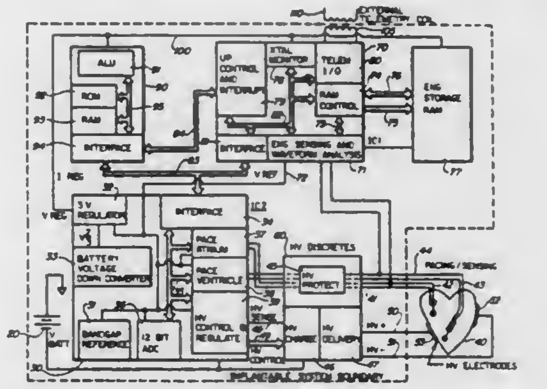
1. An implantable variable rate pacemaker adaptive to patient exercise, comprising
means for detecting movements of the patient,
means responsive to the detected movements for discriminating between those of said detected movements which are indicative of physical exercise by the patient and those of said detected movements which are attributable to other than physical exercise, and
means responsive to said detected movements indicative of physical exercise for incrementally adjusting the rate of said pacemaker according to the level of said physical exercise.

---

### 5,014,701
### IMPLANTABLE CARDIAC DEFIBRILLATOR EMPLOYING A DIGITAL WAVEFORM ANALYZER SYSTEM

**Benjamin D. Pless, Menlo Park, and Kenneth J. Carroll, San Jose, both of Calif., assignors to Ventritex, Inc., Sunnyvale, Calif.**
**Filed May 19, 1989, Ser. No. 354,138**
**Int. Cl.$^5$ A61N *1/00***
U.S. Cl. 128—419 PG 9 Claims

1. An implantable medical device comprising:
electrode means adapted to be coupled to a patient's heart;
sensing means having an input connected to said electrode means for sensing analog ECG heart signals;
analog-to-digital means for converting the analog ECG heart signal into a digitized ECG heart signal; and
waveform analyzer means responsive to said analog-to-digital converter means for performing signal conditioning and processing of the digitized ECG heart signal; and

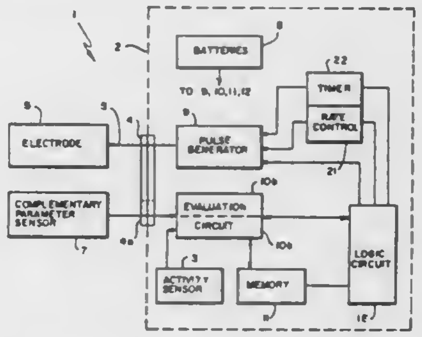


means for providing signals from said waveform analyzer means to a microprocessor.

---

### 5,014,702
### RATE RESPONSIVE CARDIAC PACEMAKER

**Eckhard Alt, Ottobrunn, Fed. Rep. of Germany, assignor to Intermedics, Inc., Angleton, Tex.**
**Division of Ser. No. 94,875, Sep. 10, 1987, Pat. No. 4,926,863. This application May 1, 1990, Ser. No. 517,298**
**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 3631155**
**Int. Cl.$^5$ A61N *1/00***
U.S. Cl. 128—419 PG 16 Claims



1. An implantable variable rate pacemaker adaptive to patient exercise characterized by levels of intensity, comprising
detecting means for detecting movements of the patient, some of which are related to physical exercise by the patient and others of which are not related to physical exercise,
discriminating means for discriminating between those of said detected movements which are related to physical exercise by the patient and those of said detected movements which are not related to physical exercise by the patient,
rate selecting means responsive to said detected movements which are related to physical exercise by the patient for selecting a rate of said pacemaker according to the level of said physical exercise by the patient indicated by the detected movements which are related to physical exercise,
confirming means responsive to a detectable parameter of the patient which varies in proportion to physical exercise but differs from direct detection of patient movement for generating an output representing the present state of physical exercise of the patient, and
adjustment means responsive to the presence or absence of confirmation, by the output of said confirming means, of physical exercise indicated by movements detected by

said sensing means for setting the rate of said pacemaker at said selected rate, or at a base rate consistent with said patient being in a state of rest, respectively.

---

### 5,014,703

### RATE RESPONSIVE CARDIAC PACEMAKER

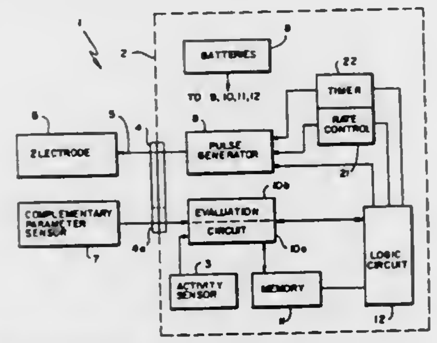
**Eckhard Alt, Ottobrunn, Fed. Rep. of Germany, assignor to Intermedics, Inc., Angleton, Tex.**

**Division of Ser. No. 94,875, Sep. 10, 1987, Pat. No. 4,926,863. This application Apr. 30, 1990, Ser. No. 516,812**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1988, 3631155**

**Int. Cl.⁵ A61N *1/00***

**U.S. Cl. 128—419 PG** **16 Claims**



1. An implantable variable rate pacemaker adaptive to patient exercise, comprising

means for detecting movements of the patient,

means responsive to the detected movements for discriminating between those of the detected movements which are related to physical exercise by the patient and those of the detected movements which are not related to physical exercise by the patient,

means for sampling the detected movements related to physical exercise in successive equal intervals of time to determine whether the physical exercise is more vigorous or less vigorous than was determined for prior time intervals, and

means responsive to the determination for adjusting the rate of said pacemaker accordingly.

---

### 5,014,704

### RATE RESPONSIVE CARDIAC PACEMAKER

**Eckhard Alt, Ottobrunn, Fed. Rep. of Germany, assignor to Intermedics, Inc., Angleton, Tex.**

**Division of Ser. No. 94,875, Sep. 10, 1987, Pat. No. 4,926,863. This application Apr. 27, 1990, Ser. No. 515,460**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 3631155**

**Int. Cl.⁵ A61N *1/00***

**U.S. Cl. 128—419 PG** **18 Claims**

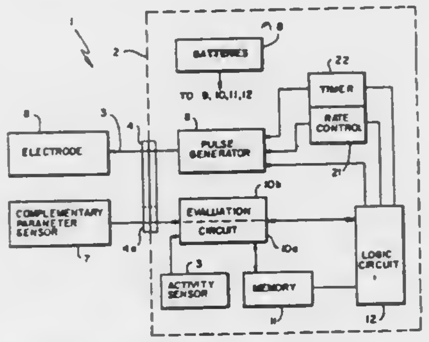
1. An implantable variable rate pacemaker adaptive to patient exercise, comprising

means for detecting movements of the patient;

means discriminating between those of said detected movements which are indicative of physical exercise by the patient and those of said detected movements which are attributable to other than physical exercise for producing an electrical signal substantially limited to and representative of said detected movements indicative of physical exercise, with a variable amplitude-determined value related to the instantaneous level of physical exercise;

means responsive to said amplitude-determined value of said electrical signal for maintaining the rate of said pacemaker at a base rate corresponding to a predetermined resting rate at times when said amplitude-determined value is less than a preestablished threshold value representative of a first level of physical exercise and for increasing the rate of said pacemaker to a rate higher than said base rate consistent with said first level of exercise when said amplitude-determined value exceeds said threshold value; and

means further responsive to said threshold value having been exceeded by said amplitude-determined value for setting said threshold value as the new baseline and setting a new higher threshold value representative of a second level of physical exercise which when exceeded by said amplitude-determined value will increase the rate of said pacemaker to a still higher rate consistent with said second level of physical exercise.



---

### 5,014,705

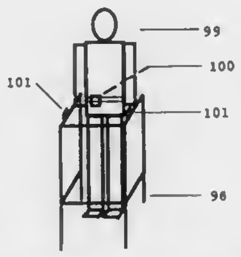
### MICROPROCESSOR-CONTROLLED MULTIPLEXED FUNCTIONAL ELECTRICAL STIMULATOR FOR SURFACE STIMULATION IN PARALYZED PATIENTS

**Daniel Graupe, Highland Park, and Amihadar Arber, Skokie, both of Ill., assignors to Sigmedics, Inc. of Delaware, Northfield, Ill.**

**Filed Apr. 7, 1989, Ser. No. 335,197**

**Int. Cl.⁵ A61N *1/00***

**U.S. Cl. 128—419 R** **95 Claims**



1. An electrical stimulation system, for coupling to a plurality of electrodes coupled to locations at the right and left side of a lower part of the body of a patient, said system comprising:

pulse generator means for selectively outputting trains of pulses having selectively variable duration and pulse repetition frequency responsive to a control signal;

memory for storing operational instructions and data;

control means for selectively outputting said control signal responsive to said memory and to input commands;

pulse amplifier means for selectively amplifying pulse amplitude and power responsive to said control means;

multiplexer means for selectively multiplexing outputs of said pulse amplifier means from said pulse generator means and alternatively between selected ones of said electrodes responsive to said control means;

a battery power supply;

wherein said electrodes are wired in pairs as channels, wherein there are at least 4 channels, one adapted contact to the right quadriceps muscle, one to the left quadriceps muscle, one to the right common peroneal nerve and one to the left common peroneal nerve.

---

### 5,014,706

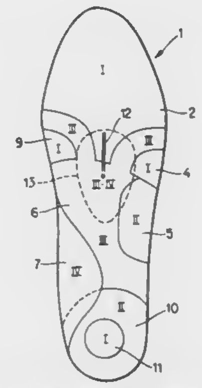
### ORTHOTIC INSOLE WITH REGIONS OF DIFFERENT HARDNESS

**Alexander Philipp, Garbsen, Fed. Rep. of Germany, assignor to C. Nicolai GmbH & Co. KG, Hanover, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 245,012, Sep. 15, 1988, abandoned. This application Jan. 10, 1990, Ser. No. 463,265**

**Int. Cl.⁵ A61F *5/14;* A43B *13/38***

**U.S. Cl. 128—581** **25 Claims**



1. An insole, comprising a support having a foot-like outline, said support having an elastically deformable first portion designed to underlie the big toe, an elastically deformable second portion designed to underlie the first metatarsal in the region of the head thereof, an elastically deformable third portion designed to underlie the fifth metatarsal in the region of the head thereof, an elastically deformable fourth portion designed to underlie the calcaneous and a fifth portion designed to underlie the metatarsal arch, each said portions having an approximately uniform hardness, and the hardness of said fifth portion exceeding that of each of the others of said portions, said support further having a sixth portion designed to underlie the medial longitudinal arch and means for enabling said sixth portion to be interchanged for changing the hardness of said sixth portion.

---

### 5,014,707

### APPARATUS FOR MEASURING AND EVALUATING THE INHERENT FLUORESCENT SPECTRA OF ORGANIC TISSUE SURFACES

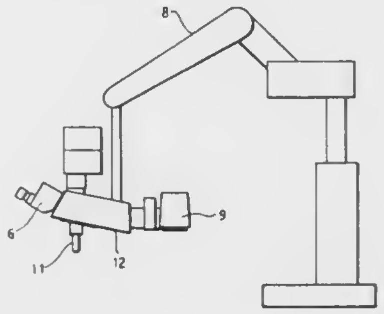
**Jürgen Schwarz, Oberkochen, and Wolfgang Lohmann, Giessen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany**

**Filed May 8, 1989, Ser. No. 348,417**

**Claims priority, application Fed. Rep. of Germany, May 7, 1988, 3815743**

**Int. Cl.⁵ A61B *6/08;* G01N *21/64***

**U.S. Cl. 128—633** **2 Claims**



1. In an arrangement for measuring and evaluating the inherent fluorescent spectra of the surface of an object defining an object plane, the object being in the form of an organic tissue specimen of a patient, the arrangement including: an evaluation device for determining the maximum intensity of the light reflected from said surface at a wavelength $\lambda_A$ and for determining the maximum intensity of the fluorescent light from said surface in the range of wavelengths longer than $\lambda_A$; and, a modified microscope photometer for illuminating the surface of the specimen and for transmitting the light from said surface to said evaluation device, the modified microscope photometer comprising:

a housing;

a stand for mounting said housing thereon;

movable structure means interposed between said stand and said housing for facilitating the movement of said housing with respect to the patient so as to place said housing next to said object;

illuminating light source means mounted in said housing for generating light at said wavelength $\lambda_A$ of between 250 nm and 550 nm;

imaging means for imaging said light source onto said object to stimulate the inherent fluorescence of the organic tissue of the object;

said imaging means including an objective for imaging an object plane and defining an optical axis transverse to said object plane;

said objective being capable of transmitting light in the ultra-violet wavelength range and being mounted on said optical axis so as to be movable relative to said object for focussing the reflected and fluorescent light from the latter and transmitting the same down said optical axis; and,

a spectrograph operatively connected to said evaluation device and mounted on said optical axis for detecting said light from said object in a wavelength range of 250 nm and 700 nm.

---

### 5,014,708

### RADIOACTIVE RAY DETECTING THERAPEUTIC APPARATUS

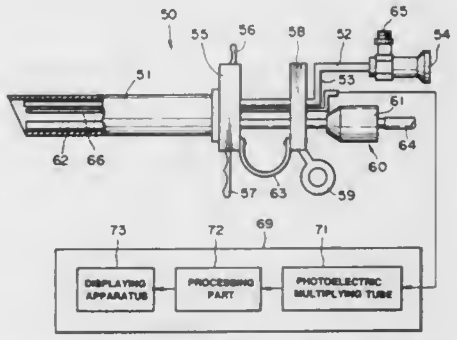
**Masaaki Hayashi; Kolchiro Ishihara; Yutaka Ohshima; Yutaka Yanagawa; Motoyuki Tagawa; Shuichi Takayama; Takashi Tsukaya; Makoto Inaba, all of Hachioji; Toshihiko Hashiguchi, Sagamihara; Hiroki Hibino, Hachioji, and Hiroyuki Sasa, Tokyo, all of Japan, assignors to Olympus Optical Co., Tokyo, Japan**

**Filed Dec. 28, 1988, Ser. No. 290,947**

**Claims priority, application Japan, Sep. 14, 1988, 63-231886**

**Int. Cl.⁵ A61B *1/00, 10/00, 6/12***

**U.S. Cl. 128—653 R** **29 Claims**



1. A radioactive ray detecting therapeutic apparatus comprising:

an insertable part to be inserted toward an effected part within a body;

a therapeutic means provided in a tip part of said insertable part for treating said affected part; and

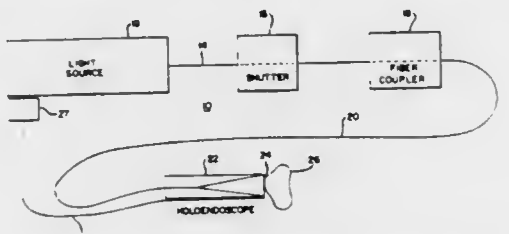
a radioactive ray detecting means in said insertable part for detecting radioactive rays discharged out of said affected part and providing signals by which to direct an operator to guide said therapeutic means to said affected part.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,014,709
### METHOD AND APPARATUS FOR HIGH RESOLUTION HOLOGRAPHIC IMAGING OF BIOLOGICAL TISSUE

**Hans Bjelkhagen, Chicago, Ill., and Marc D. Friedman, Watertown, Mass., assignors to Biologic Systems Corp., Mundelein, Ill.**

**Filed Jun. 13, 1989, Ser. No. 365,336**
**Int. Cl.$^5$ A61B** *6/00*
**U.S. Cl. 128—654** **78 Claims**



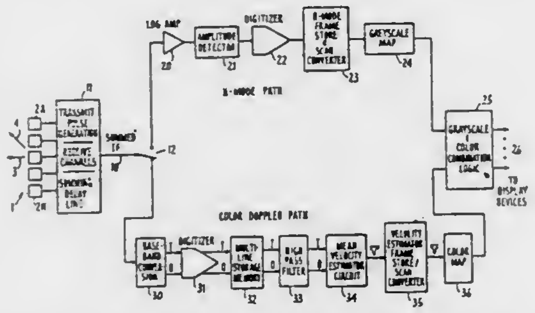
1. Medical apparatus for holographic examination of features of selected biological tissue, comprising:
- a light sensitive recording medium;
- means for producing contrast enhancement of selected portions of the selected biological tissue;
- placement means coupled to the means for producing contrast enhancement for positioning the recording medium within approximately 1 mm or less of the selected biological tissue; and
- a coherent light source for directing a beam of coherent light onto the recording medium and the selected biological tissue whereby a hologram of the selected biological tissue is recorded.

---

### 5,014,710
### STEERED LINEAR COLOR DOPPLER IMAGING

**Samuel H. Maslak, Redwood City; Donald J. Burch, Los Altos; John N. Wright, Menlo Park; Hugh G. Larsen, Palo Alto; Donald R. Langdon, Mountain View; Joel S. Chaffin, and D. Grant Fash, III, both of Saratoga, all of Calif., assignors to Acuson Corporation, Mountain View, Calif.**

**Filed Sep. 13, 1988, Ser. No. 243,820**
**Int. Cl.$^5$ A61B** *8/00*
**U.S. Cl. 128—660.05** **14 Claims**



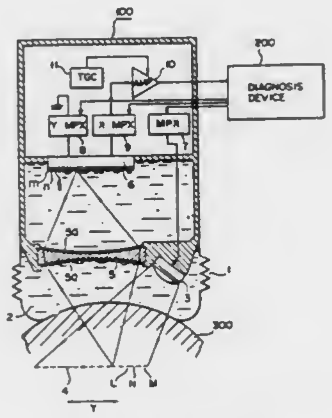
1. A dual mode ultrasound imaging system having an array of acoustic transducer elements, said array being a single linear array and comprising
- B-mode imaging means to produce an electronically scanned acoustic image of an organism under examination, said B-mode image substantially representing the intensity of echoes returned from said organism along multiple B-mode scan lines and being comprised of intensity data acquired by the array along parallel scan lines directed at a first angle to a line perpendicular to the transducer array race;
- Doppler imaging means to produce an electronically scanned Doppler image of said organism, said Doppler image representing estimates of velocity or variance of moving scatterers derived from Doppler-shifted echoes from said moving scatterers in said organism from multiple sample volumes acquired along the direction of multiple independently propagated Doppler scan lines with said Doppler scan lines directed at a preselected angle with respect to (end-para Doppler) said B-mode scan lines and being comprised of Doppler data acquired by the array along parallel scan lines directed at a second angle to said perpendicular line that is selectably different from said first angle; and
- a color display monitor displaying the B-mode image as a two dimensional image with echo intensities encoded using a first mapping function and simultaneously displaying the Doppler image as a two-dimensional image using a second and distinct mapping of red, green and blue components that is spatially coordinated with and superimposed upon said B-mode image.

---

### 5,014,711
### ULTRASONIC DIAGNOSIS APPARATUS

**Tatsuo Nagasaki, Musashino, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 155,843, Feb. 12, 1988, Pat. No. 4,945,915. This application Jan. 30, 1990, Ser. No. 475,790**
**Claims priority, application Japan, Feb. 20, 1987, 62-36931; Apr. 3, 1987, 62-82628**
**Int. Cl.$^5$ A61B** *8/00*
**U.S. Cl. 128—660.07** **5 Claims**

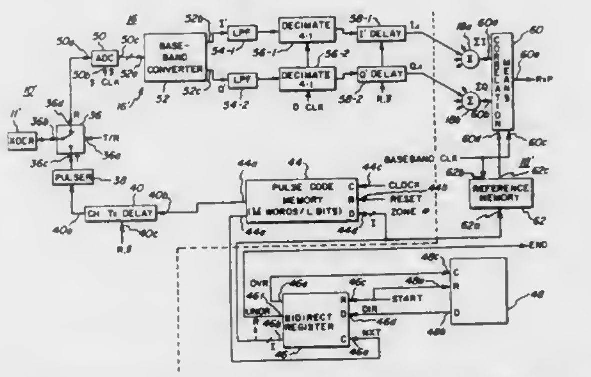


1. An ultrasonic diagnosis apparatus comprising:
- ultrasonic/electrical transducer means having a plurality of pixel electrodes arranged in a two-dimensional matrix, said pixel electrodes each corresponding to a given pixel, and being arranged facing a slice of a target body and parallel to said slice;
- an ultrasonic lens, arranged in parallel to said slice and to said transducer means, for converging an ultrasonic beam transmitted from each pixel electrode of said ultrasonic/electrical transducer means onto a corresponding point of said slice, and for converging an ultrasonic beam reflected at said points of said slice onto corresponding pixel electrodes of said ultrasonic/electrical transducer means;
- means for sequentially transmitting ultrasonic wave beams from said pixel electrodes of said ultrasonic/electrical transducer means;
- signal readout means for sequentially reading out an electrical signal from said pixel electrodes of said ultrasonic-/electrical transducer means which corresponds to an ultrasonic beam reflected at each of said points of said slice, after a predetermined time period after an operation of said transmission means; and
- imaging means for preparing image information of said slice from said electrical signal read out from said ultrasonic-/electrical transducer means by said signal read out means.

### 5,014,712
### CODED EXCITATION FOR TRANSMISSION DYNAMIC FOCUSING OF VIBRATORY ENERGY BEAM

**Matthew O'Donnell, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 26, 1989, Ser. No. 457,134**
**Int. Cl.$^5$ A61B** *8/00;* **G01N** *29/00*
**U.S. Cl. 128—661.01** **20 Claims**



1. A method for imaging a sample with a beam of vibratory energy from an array of a plurality N of transducers, comprising the steps of:
- (a) exciting the N transducers of the array with successive ones of a plurality M of coded excitation signal sets, each set being provided in a different one of a like number M of successive excitation time intervals and each different set having signals with a different one of a like plurality M of codes;
- (b) focusing an excitation beam, produced by the array, into the sample at successively smaller distances $R_i$, where $1 \leqq i \leqq M$, along a selected ray path from the array during each successive i-th one of the M excitation time intervals;
- (c) then focusing a reception beam produced by the array along the ray path and at a successively greater distance $R_{M-i}$ from a minimum distance, away from the array during each successive i-th one of a like plurality M of reception time intervals;
- (d) receiving during each reception time interval, return responsive signals reflected from the sample;
- (e) processing the received signals from each array transducer in a separate channel;
- (f) coherently summing all of the channel processed signals; and
- (g) correlating the summed signals with a set of reference signals derived from the coded signals of the set used for the associated i-th excitation time interval, to recover a response signal substantially only from a volume of the sample at that distance $R_i$ associated with that i-th time interval.

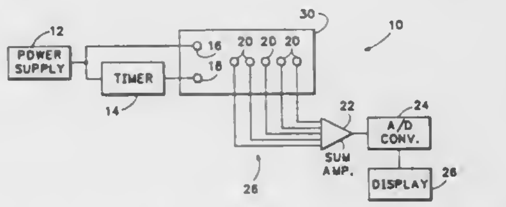
---

### 5,014,713
### METHOD AND APPARATUS FOR MEASURING THICKNESS OF FAT USING INFRARED LIGHT

**Alan Roper, Talent, and Keith O. Johnson, Medford, both of Oreg., assignors to Tarris Enterprises, Inc., White City, Oreg.**

**Filed Dec. 5, 1989, Ser. No. 446,054**
**Int. Cl.$^5$ A61B** *5/00;* **G01N** *21/00*
**U.S. Cl. 128—664** **8 Claims**

1. A device for measuring the thickness of a layer of fat, comprising:
- (a) a first infrared emitter means for emitting infrared light at a steady intensity;
- (b) a second infrared emitter means for periodically emitting pulses of infrared light;
- (c) a plurality of infrared detector means for detecting and sensing the magnitude of infrared light emitted by said first and second emitter means after transmission of said infrared light at least partially through said layer of fat and producing respective detection signals in response thereto, said plurality of infrared detector means and said first and second infrared emitter means being arrayed substantially in a single plane;



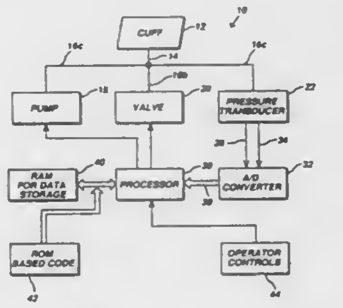
- (d) summing means for summing said detection signals and producing a composite signal corresponding to a summation of said detection signals; and
- (e) output means responsive to said composite signal for producing an indication corresponding to said composite signal and indicative of the thickness of said layer of fat.

---

### 5,014,714
### METHOD AND APPARATUS FOR DISTINGUISHING BETWEEN ACCURATE AND INACCURATE BLOOD PRESSURE MEASUREMENTS IN THE PRESENCE OF ARTIFACT

**Jack M. Millay, and Richard A. Walloch, both of Beaverton, Oreg., assignors to SpaceLabs, Inc., Redmond, Wash.**

**Filed Jul. 19, 1989, Ser. No. 383,207**
**Int. Cl.$^5$ A61B** *5/02*
**U.S. Cl. 128—672** **30 Claims**



1. A blood pressure monitor, comprising:
- a blood pressure cuff;
- an air pump pneumatically coupled to said blood pressure cuff;
- a valve pneumatically coupled to said blood pressure cuff;
- a pressure transducer pneumatically coupled to said blood pressure cuff, said pressure transducer generating a signal indicative of the air pressure in said blood pressure cuff and a signal corresponding to oscillometric pulses in said blood pressure cuff;
- processor means connected to said pressure transducer and receiving said signal indicative of the air pressure in said blood pressure cuff and said signal corresponding to oscillometric pulses in said blood pressure cuff, said processor means energizing said air pump to inflate said blood pressure cuff, periodically energizing said valve to incrementally reduce the air pressure in said blood pressure cuff, recording the cuff pressure at which each measurement is made and the amplitude of the oscillometric pulses at such cuff pressure, calculating the diastolic, mean arterial and systolic pressures from said table of cuff pressures and oscillometric pulse amplitudes, calculating the average of the diastolic, mean arterial and systolic pressures recorded in said table for a plurality of measurements, comparing the diastolic, mean arterial and systolic pressures recorded in said table for a current measurement to the average of

VOL
1126
ISS
2
MY
14
1991
UMI

the diastolic mean, arterial and systolic pressures, respectively, and then determining whether artifact has adversely affected the accuracy of any pressure recorded in said table for a current measurement by determining whether a predetermined number of said pressures recorded in said table for a current measurement deviates from their corresponding average pressures by a predetermined value.

---

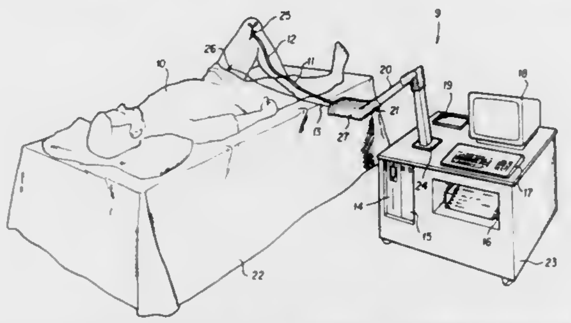
### 5,014,715
### DEVICE FOR MEASURING THE IMPEDANCE TO FLOW OF A NATURAL OR PROSTHETIC VESSEL IN A LIVING BODY

**Robert J. Chapolini, 9907 Forge Park Rd., Perry Hall, Md. 21128**

**Filed Nov. 22, 1988, Ser. No. 275,224**

**Int. Cl.$^5$ A61B** *5/02*

**U.S. Cl. 128—672** **23 Claims**



1. A device for measuring the impedance characteristics of a vessel in a living body, said device comprising:
an automatic injection means for injecting fluid into a vessel, flow of said fluid directly generating a change in luminal pressure in said vessel;
a pressure sensor means for measuring luminal pressure of said vessel;
a feedback control means, operably coupled to said automatic injection means and said pressure sensor means, for controlling fluid injection by said automatic injection means so as to maintain luminal pressure of said vessel at a selected value; and,
a means for determining the flow per unit time injected by said automatic injection means, whereby the flow rate necessary to maintain luminal pressure at the selected value can be determined.

---

### 5,014,716
### SPHYGMOMANOMETER AIR CONNECTOR

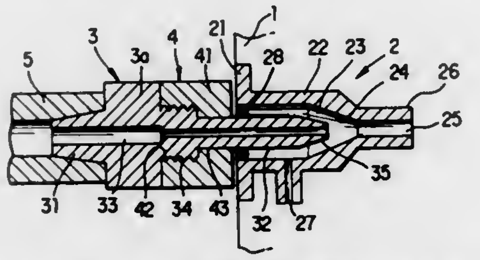
**Hiroshi Ogawa, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Sep. 22, 1989, Ser. No. 410,887**

**Claims priority, application Japan, Sep. 28, 1988, 63-127669[U]**

**Int. Cl.$^5$ A61B** *5/02*

**U.S. Cl. 128—685** **3 Claims**



1. An air connector for use in association with a sphygmomanometer body, comprising an air socket having an air plug acceptor and a pressure measuring air line and an exhaust air line each communicating with said air plug acceptor, an air supply plug having an air supply line wherein said air supply plug is removably connected to the air plug acceptor of said air socket and provided with an air tube joint at one end thereof and an insert cylinder at the other end movable within said air plug acceptor to define a first position with said air supply line in communication with said pressure measuring air line and said exhaust air line and a second position with said air supply line in communication only with said pressure measuring air line and a control cylinder which is removably connected to said insert cylinder of said air supply plug for maintaining said insert cylinder in said first position.

---

### 5,014,717
### PUNCH-BIOPSY APPARATUS WITH CANNULA-AIMING DEVICE

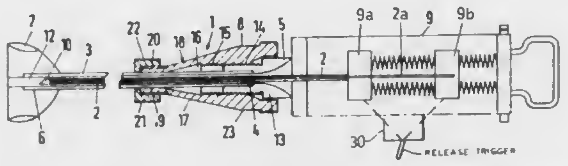
**Günter Lohrmann, Hagenstrasse 20, 2060 Bad Oldesloe, Fed. Rep. of Germany**

**Filed Feb. 12, 1990, Ser. No. 479,106**

**Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3903956**

**Int. Cl.$^5$ A61R** *10/00*

**U.S. Cl. 128—754** **10 Claims**



1. A punch-biopsy apparatus for prostate biopsy, comprising:
an elongated biopsy punch adapted to be cocked and triggerable for prostate biopsy;
a variable length trocar having a first extremity positionable adjacent an end of said punch and a second extremity opposite said first extremity engageable with a finger of a medical practitioner for alignment with a prostate region from which a biopsy is to be taken, said variable-length trocar having
a guide funnel formed with an external thread and braced against said end of said punch,
an adjustment sleeve surrounding said guide funnel, said adjustment sleeve having an internal thread threadedly engaging said external thread at a first end of said sleeve and rotatable relative to said guide funnel to adjust an effective length of said trocar, said adjustment sleeve being formed with an external screw thread at a second end thereof opposite said first end,
an elongated tube connecting said guide funnel to said second extremity, and
means engageable with said external thread at said second end of said adjustment sleeve for clamping said adjustment sleeve against said tube; and
a biopsy cannula having a cutting edge recessed inwardly of said second extremity in a cocked position of said punch and projecting from said second extremity by a predetermined penetration distance adjusted by adjustment of said effective length upon triggering of said punch, said biopsy cannula passing through said trocar into said punch and being displaceable thereby relative to said trocar.

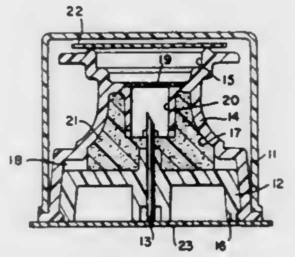
### 5,014,718
### BLOOD COLLECTION AND TESTING METHOD

**Joel R. Mitchen, Mundelein, Ill., assignor to Safety Diagnostics, Inc., Evanston, Ill.**

**Continuation-in-part of Ser. No. 147,138, Jan. 22, 1988, abandoned. This application Sep. 22, 1989, Ser. No. 411,083**

**Int. Cl.$^5$ A61B** *17/32*

**U.S. Cl. 128—771** **4 Claims**



1. A nominally invasive, safe method for the relatively painless collection, transportation and testing of blood components from a man or animal comprises pretreating a portion of the skin of the man or animal to make it antiseptic; piercing the skin in that area; bathing the area with a vehicle liquid and moisterizing a solid test medium; collecting and transporting a sample blood and the vehicle liquid from the pierced skin area with vacuum assistance onto the solid test medium which has been moistened; and then determining the test results.

---

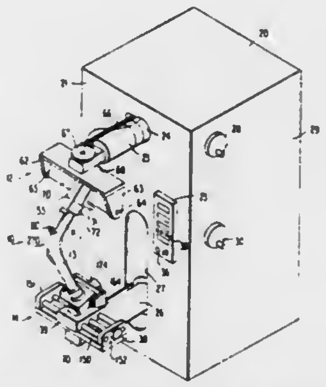
### 5,014,719
### KNEE LOADING AND TESTING APPARATUS AND METHOD

**Paul C. McLeod, 4 Echo Point, Little Rock, Ark. 72210**

**Continuation of Ser. No. 576,516, Feb. 2, 1984, abandoned. This application Dec. 6, 1985, Ser. No. 805,265**

**Int. Cl.$^5$ A61B** *5/11*

**U.S. Cl. 128—774** **33 Claims**



1. In a universal knee data machine having femural mounting assembly for the femur bone extending from a knee, tibial mounting assembly for the tibia bone extending from said knee, means for applying a body weight simulating load to said knee, and means for applying a quadriceps force to the knee tendon, the improvement comprising, means connected to said mounting assemblies for simultaneously rotating said femural and tibial mounting assemblies while applying said body weight simulating load and said quadriceps force to said knee.

---

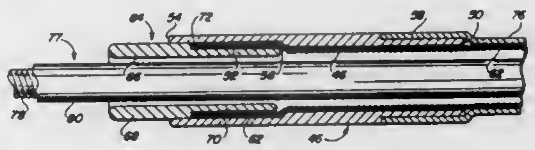
### 5,014,720
### LEAD TO ELECTRODE JOINT ASSEMBLY AND METHOD OF MANUFACTURE THEREOF

**James E. Barcel, Simi Valley, Calif., and Thomas M. Soukup, Lake Jackson, Tex., assignors to Siemens-Pacesetter, Inc., Sylmar, Calif.**

**Filed Jan. 8, 1990, Ser. No. 461,703**

**Int. Cl.$^5$ A61N** *1/05*

**U.S. Cl. 128—786** **9 Claims**



1. A joint assembly comprising:
a tubular electrode having a cylindrical outer surface, a first longitudinal bore therethrough, and a counterbore coaxial with said first longitudinal bore;
a lead conductor formed as a helically would coil having a coil outer diameter and a coil inner diameter, said coil outer diameter being smaller than the inner diameter of said first longitudinal bore; and
a cylindrical press tube having a second longitudinal bore with an inner diameter substantially equal to the coil inner diameter, a major end with a major outer peripheral surface having an outer diameter substantially equal to the inner diameter of said counterbore in said tubular electrode, a minor end with a minor outer peripheral surface having an outer diameter greater than the inner diameter of said first longitudinal bore, and an annular shoulder at the interface between said major outer surface and said minor outer surface;
said coil being fittingly received on said minor outer peripheral surface of said press tube, said press tube with said coil thereon being joined with said electrode such that said coil is positioned between said counterbore of said electrode and said minor outer peripheral surface of said press tube;
whereby said press tube with said coil thereon is fittingly joined with said electrode without disturbing said cylindrical outer surface of said electrode.

---

### 5,014,721
### BIPOLAR ELECTRODE LEAD FOR MEDICAL APPLICATIONS

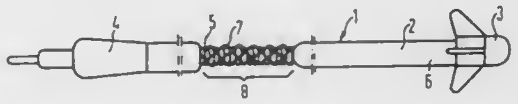
**Jakub Hirschberg, Taeby, Sweden, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Nov. 14, 1989, Ser. No. 436,356**

**Claims priority, application European Pat. Off., Nov. 14, 1988, 88118987**

**Int. Cl.$^5$ A61N** *1/05*

**U.S. Cl. 128—786** **3 Claims**



1. A bipolar electrode lead for delivering electrical stimulation to a patient, said electrode lead comprising:
at least two elongated electrical conductors including an outer conductor formed by a braided hose, at least one of said conductors terminating in an active electrode adapted for exposure to body tissue of a patient to electrically stimulate said body tissue; and
insulation surrounding said outer conductor having a gap therein exposing a portion of said braided hose to form a

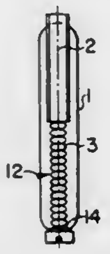
VOL 1126
ISS 2
MY 14 1991
UMI

flexible non-stretchable neutral electrode for said active electrode.

---

### 5,014,722
### INTRA-UTERINE PESSARY

**Hans A. Bauer, Marquardsenstrasse 8, D-8520 Erlangen, Fed. Rep. of Germany**
**PCT No. PCT/DE89/00171, § 371 Date Nov. 17, 1989, § 102(e) Date Nov. 17, 1989, PCT Pub. No. WO89/09038, PCT Pub. Date Oct. 5, 1989**
**PCT Filed Mar. 17, 1989, Ser. No. 445,691**
**Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810925; Mar. 1, 1989, 3906377**
**Int. Cl.$^5$ A61F** *6/06, 6/14*
**U.S. Cl. 128—830** **7 Claims**



1. In an intra-uterine contraceptive pessary having pats emitting ions in the uterine cavity, the pessary including two spreading arms which are in a folded configuration for insertion through the cervical canal and which assume an unfolded configuration for retention in the uterine cavity, wherein a change from the folded configuration into the unfolded configuration comprises an elastic deformation of the spreading arms, wherein the two spreading arms **(1)** form a substantially closed-loop structure in the folded configuration and in the unfolded configuration, the two spreading arms **(1)** being traversed by a third arm **(12)** which, at its one end, engages the spreading arms **(1)** and, at its other end, an abutment **(14)** mounted on the spreading arms, wherein for the purpose of changing the spreading arms **(1)** from the folded configuration into the unfolded configuration for retention, the length of the third arm is capable of being mechanically changed, wherein the improvement comprises that the two spreading arms **(1)** consist exclusively of a metal wire, the spreading arms **(1)** being straightened in the folded configuration and having an annular shape and being elastically bent in the unfolded configuration, the abutment **(14)** being a closure to which the third arm **(12)** is connected, further comprising means for finely controllably adjusting the length of the third arm **(12)** between the two ends acting on the spreading arms **(1)** with the spreading arms **(1)** being in the unfolded configuration.

---

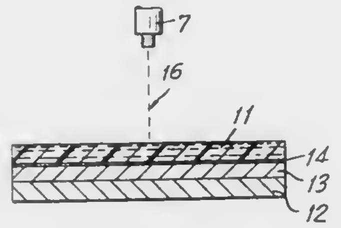
### 5,014,723
### ARTICLES FOR PROTECTION OF LIVING TISSUES

**Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11556**
**Continuation of Ser. No. 91,655, Sep. 1, 1987, abandoned, which is a continuation-in-part of Ser. No. 887,262, Jul. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 852,797, Apr. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 602,602, Apr. 20, 1984, Pat. No. 4,601,286. This application May 18, 1989, Ser. No. 355,086**
**The portion of the term of this patent subsequent to Jul. 22, 2003, has been disclaimed.**
**Int. Cl.$^5$ A61B** *19/08*
**U.S. Cl. 128—853** **32 Claims**

1. A formed article for use in laser beam-effected surgery and therapy on humans and animals which reduces or eliminates undesired exposure of objects such as humans animals and other articles to said lasers by interposition between stray laser beams, emitted during said surgery or therapy, from which said objects are to be protected and said objects wherein said article consists of at least two layers wherein

(a) the first layer, proximal to the stray laser beams consists of a xerogel consisting of at least one water-insoluble hydrophilic polymer; and

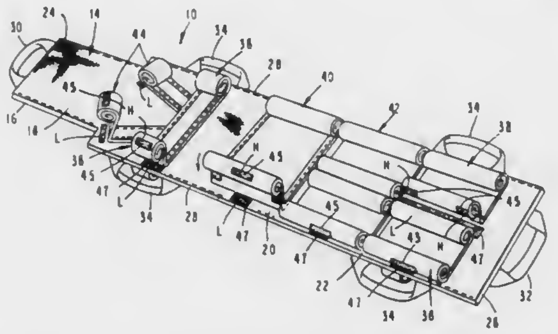
(b) a second layer, on the side of the first layer distal from the stray beams consisting of a metallic layer.



---

### 5,014,724
### PEDIATRIC IMMOBILIZATION DEVICE

**Larry C. Miller, P. O. Box 784, La Canada, Calif. 91011**
**Continuation of Ser. No. 345,765, May 1, 1989. This application May 29, 1990, Ser. No. 529,556**
**Int. Cl.$^5$ A61F** *5/37;* **A61G** *1/00*
**U.S. Cl. 128—870** **7 Claims**



1. A pediatric immobilization device for immobilization and transport of infants and small children, comprising:

(a) a body support having spaced apart sides, a top, a bottom and head, neck, chest, abdomen and upper and lower leg portions;

(b) carrying straps provided on said body support for use in lifting said device;

(c) a first set of transversely spaced flexible restraining straps provided on said body support proximate said chest portion thereof said straps being constructed and arranged for emplacement substantially directly over the chest of an infant or of a small child positioned on said body support with the head resting on said head portion of said body support;

(d) a second set of transversely spaced flexible restraining straps provided on said body support proximate said lower leg portion thereof;

(e) a third set of transversely spaced flexible restraining straps provided on said body support intermediate said first and second set of straps and proximate said abdominal portion, said third set of straps having a width greater than the width of said first set of straps and being so constructed and arranged such that said third set of straps are of a width to span a substantial portion of the legs and abdomen of an infant having the head resting on said head portion of said body support said third set of straps being spaced from said first set of straps so as to not interfere with normal breathing;

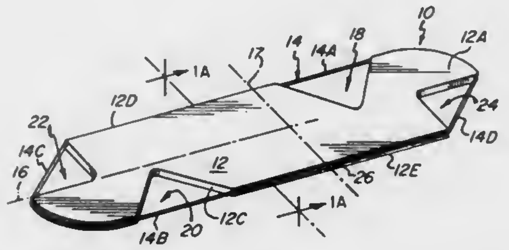
(f) a set of flexible shoulder straps provided on said support member proximate said first set of straps for restraining the shoulders of the infant or child;

(g) a fourth set of flexible restraining straps provided on said body support and disposed intermediate said second and third sets of straps said fourth set of straps being so constructed and arranged and being of a width such that said straps can be emplaced over a substantial portion of, and substantially cover, the legs of a small child having the head resting on said head portion of said body support.

---

### 5,014,725
### DENTAL FLOSS APPLICATOR

**Linda S. Patscot, 21 October La., Trumbull, Conn., and Harold H. Kawaguchi, Seattle, Wash., assignors to Linda S. Patscot, Fairfield, Conn.**
**Int. Cl.$^5$ A61C** *15/00*
**U.S. Cl. 132—324** **13 Claims**



1. A dental floss applicator comprising:

an elongated, planar support member having a longitudinal axis and a peripheral edge;

dental floss disposed about the peripheral edge of the support member;

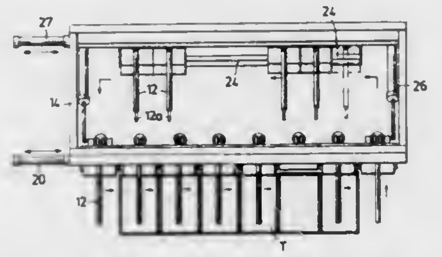
at least two notches disposed at one end of the support member and extending into said support member; the floss across one notch extending parallel to the longitudinal axis and the floss across the other notch extending at an angle to the longitudinal axis; and

at least two notches disposed at the other end of the support number and extending into said support member; the floss across one notch extending parallel to the longitudinal axis and the floss across the other notch extending at an angle to the longitudinal axis.

---

### 5,014,726
### APPARATUS FOR CONVEYING ARTICLE CARRIERS ALONG A SUCCESSION OF PROCESSING STATIONS

**Sture S. Lindvall, Henrik Palmes Allé 18, S-182 62 Djursholm, Sweden**
**PCT No. PCT/SE88/00513, § 371 Date Mar. 30, 1989, § 102(e) Date Mar. 30, 1989, PCT Pub. No. WO89/03355, PCT Pub. Date Apr. 20, 1989**
**PCT Filed Oct. 6, 1988, Ser. No. 469,421**
**Claims priority, application Sweden, Oct. 7, 1987, 8703860**
**Int. Cl.$^5$ B05C** *3/02*
**U.S. Cl. 134—76** **13 Clalms**



1. Apparatus for conveying article carriers along a succession of processing stations, particularly in an installation for dip treatment of articles supported by the article carriers, comprising:

means for stepwise displacement of the article carriers in succession on a processing track which supports the article carriers and along which the processing stations are positioned;

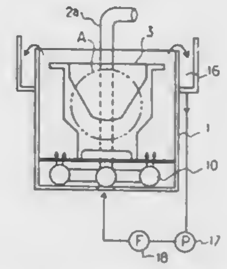
means for vertically displacing the article carriers individually between an upper and a lower position, said means including, for each processing station, an article carrier support which defines a separate section of the track and is movable between the upper position and the lower position together with an article carrier; and

control devices associated with respective ones of the article carrier supports and positioned along the processing track, the control devices being connected to said means for vertically displacing the article carriers and adapted to trigger the vertical displacement of the respective associated processing track section in response to an article carrier occupying a predetermined position on the processing track.

---

### 5,014,727
### BUBBLER DEVICE FOR WASHING SEMICONDUCTOR MATERIALS

**Seiichiro Aigo, 3-15-13, Negishi, Daito-ku, Tokyo, Japan**
**Filed Dec. 21, 1989, Ser. No. 452,746**
**Claims priority, application Japan, Feb. 27, 1989, 1-21644**[U]
**Int. Cl.$^5$ B08B** *3/08*
**U.S. Cl. 134—102** **4 Claims**



1. A bubbler device to be located near the bottom in a rinse vessel for washing semiconductor materials set in a carrier disposed above said bubbler device, said bubbler device comprising a main pipe through which pressurized gas is transferred, a suitable number of branch pipes connected with the main pipe and disposed on either side thereof, and bubbling portions located on the end of the respective branch pipes for the generation of bubbles, wherein each of said bubbling portions has a filter with a fine mesh of $0.1\mu$–$0.05\mu$, the filter being releasably mounted on an upper side of the bubbling portion, said branch pipes being of at least two different lengths alternately disposed longer and shorter along each side of said base pipe such that said bubbler portions are alternately disposed farther and nearer to said main pipe, to thereby generate fine bubbles through the respective filter so as to effectively stir a liquid and cause circulation thereof through said carrier in said vessel to promote the washing of the semiconductor materials without the penetration of liquid through the filter.

---

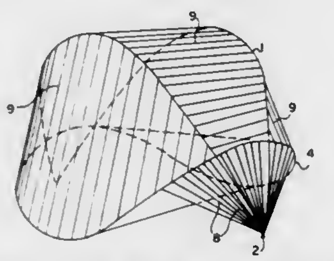
### 5,014,728
### TENT

**Felix Arnold, Schwabstr. 104, 7000 Stuttgart 1, Fed. Rep. of Germany**
**Filed Jan. 16, 1990, Ser. No. 464,517**
**Claims priority, application Fed. Rep. of Germany, Jan. 16, 1989, 3901086**
**Int. Cl.$^5$ E04H** *15/40*
**U.S. Cl. 135—104** **27 Claims**

1. A tent having a tarpaulin comprising a plurality of lengths of fabric with an integrated tent floor and a set of tent poles stretching out the tarpaulin and comprising a plurality of tent

VOL
126
ISS
2
MY
14
1991
UMI

poles that can be fitted together, the fitted-together tent poles form two tension frames, namely a floor frame (4) and a roof frame (1), which stretch out the lengths of fabric comprising the tarpaulin and support one another in a statically defined manner by means of lengths of material selected from a group consisting of fabric, ropes, and fabric and ropes, wherein the floor frame (4) stretches out a flat hollow body deforming the tent floor (3) into separate layers, while the roof frame (1) stretches out the roof and wall region (9) of the tarpaulin, which region connects with the tent bottom (3).



---

### 5,014,729
### EXPANSION DEVICE FOR A REFRIGERATION SYSTEM, PISTON THEREFOR AND METHODS OF MAKING THE SAME

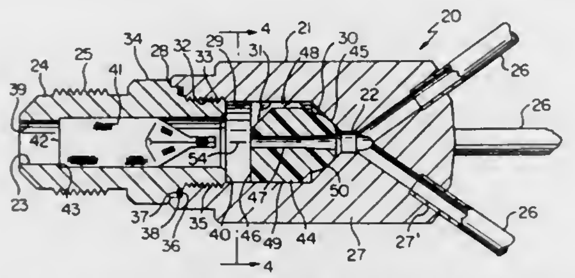
**Roger P. Sepso, Stratford, and John M. Halmose, Bridgeport, both of Conn., assignors to Robert Shaw Controls Company, Richmond, Va.**

**Division of Ser. No. 233,243, Aug. 17, 1988, Pat. No. 4,869,290, which is a division of Ser. No. 96,979, Sep. 14, 1987, Pat. No. 4,784,177. This application Aug. 2, 1989, Ser. No. 388,953**

**The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.**

**Int. Cl.$^5$ F16K *15/02***

U.S. Cl. 137—513.3 **8 Claims**



1. In a piston for an expansion device for a refrigeration system wherein the device has a housing means provided with opposed port means for coupling said device in said system and being separated from each other by an internal valve seat means of said housing means, said piston being adapted to be disposed in said housing means and have a first end surface means adapted to engage against said valve seat means to tend to close the same when said piston is dispose din a first position thereof in said housing means, said piston having a second end surface means adapted to engage against an annular shoulder means of said housing means when said piston is disposed in a second position thereof in said housing means, said piston having a passage means passing therethrough and through said end surface means thereof for interconnecting said opposed port means together in a restricted manner when said piston is in said first position thereof, said piston having an outer peripheral surface means interconnecting said end surface means together and being provided with a plurality of grooves therein for interconnecting said opposed port means together in a substantially nonrestricted manner when said piston is in said second position theeof, the improvement wherein said piston comprises a one-piece member of polymeric material and wherein said first end surface means of said piston comprises a substantially hemispherical section that is the part thereof that is adapted to engage said valve seat means when said piston is in said first position thereof, said grooves each interrupting said first end surface means and said second end surface means of said piston, said second end surface means of said piston being substantially flat and being disposed substantially transverse to a longitudinal axis of said piston, said grooves each having a bottom surface that has two substantially straight sections one of which is disposed substantially parallel with the axis of said piston as said one section extends from said first end surface means to the other section which is angled toward said axis of said piston as said other section extends from said one section thereof to said second end surface means of said piston.

---

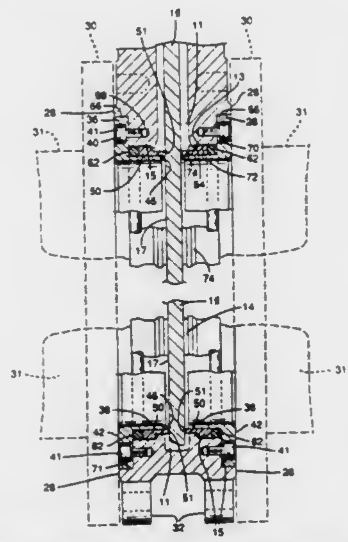
### 5,014,730
### KNIFE GATE VALVE

**Edward H. Fye, Milwaukie, Oreg., assignor to Familian Northwest, Portland, Oreg.**

**Filed Mar. 13, 1990, Ser. No. 477,487**

**Int. Cl.$^5$ F16K *3/02***

U.S. Cl. 137—454.2 **9 Claims**



1. A knife gate valve comprising; a body having a passageway therethrough, means for mounting the body into a flow line carrying a liquid media under pressure whereby the liquid media flows through the passageway in the body, a gate seat formed in the body and surrounding the passageway, a knife gate having a leading edge, said body having a guide opening for guiding the knife gate across the passageway and into seating engagement with the gate seat, control means for controlling movement of the knife gate in the guide opening to selectively close and open the passageway to the liquid media flow,

said gate seat being provided on a separate carrier portion of the body through which the passageway extends and said gate seat surrounding the passageway through the carrier portion, releasable fastening means independent of said mounting means for removably fastening said carrier portion to the body whereby removal and replacement of the carrier portion accomplishes replacement of the gate seat in the valve.

---

### 5,014,731
### METHOD FOR PREVENTING FREEZING IN PIPES, AND A PIPING SYSTEM FOR CARRYING OUT THE METHOD

**Anders Westerberg, Gnejsstigen 20, S-951 64 Luleå , Sweden**

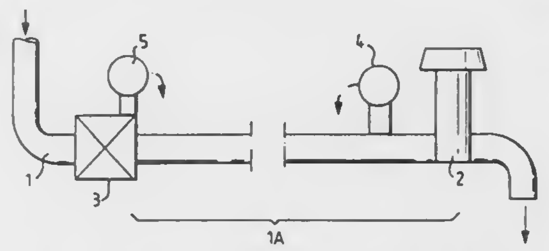
**PCT No. PCT/SE88/00133, § 371 Date Sep. 6, 1989, § 102(e) Date Sep. 6, 1989, PCT Pub. No. WO88/07109, PCT Pub. Date Sep. 22, 1988**

**PCT Filed Mar. 16, 1988, Ser. No. 399,496**

**Claims priority, application Sweden, Mar. 17, 1987, 8701098**

**Int. Cl.$^5$ E03B *7/10***

U.S. Cl. 137—59 **4 Claims**



1. Method of preventing freezing in a pipe (1, 1A) for conducting water from a supply of water, comprising mounting a pressure-tight non-return valve (3) upstream of an otherwise pressure-tight pipe portion (1A) which is to be protected against freezing, and a safety valve (4) downstream of said pipe portion, opening said safety valve (4) at a pressure exceeding by a predetermined value the normal pressure prevailing in said pipe portion, and maintaining said safety valve (4) open for a time at least sufficient to permit the water in said pipe portion (1A) between said non-return valve (3) and said safety valve (4) to leave by said safety valve (4) and be replaced in said pipe portion (1A) by water from said supply of water that has flowed through said non-return valve (3) while said safety valve (4) is open.

---

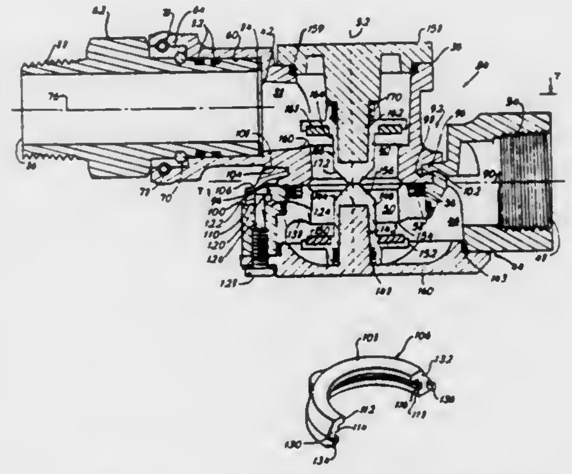
### 5,014,732
### FLUID-JOINT BREAKAWAY SWIVEL COUPLING

**Leonard R. Nitzberg, 1413 Buckeye La., Knoxville, Tenn. 37919**

**Filed May 2, 1990, Ser. No. 517,909**

**Int. Cl.$^5$ F16K *17/40;* F16L *37/28***

U.S. Cl. 137—68.1 **22 Claims**



1. In a fuel dispensing system including a liquid fuel dispensing station for receiving fuel from a remote location and supplying fuel to a rigid supply conduit, a flexible fuel line operatively connected in flow communication to said conduit, and a nozzle including operator actuating means operatively connected to said fuel line, a detachable safety device connected in said fuel line intermediate said nozzle and said conduit for coupling portions of said line together and for uncoupling when an excessive tensile force is exerted externally on said fuel line, said device comprising first and second body members, each of said body members having a diverted fluid passageway extending therethrough, each of said passageways having an outlet and an inlet, coupling means interconnecting said first and second body members together for pivotable movement about a swivel axis relative to one another with the outlet of said first body member in flow communication with the inlet of said second body member to permit fuel to flow therethrough when said body members are coupled, said coupling means having respective interlocking elements associated with each body member permitting sliding of said body members relatively to one another into and out of coupling engagement in a direction inclined relative to said swivel axis, said interlocking elements comprising a first interlocking member disposed about the outlet of said first body member and a second interlocking member disposed about the inlet of said second body member, an arcuate mortise slot formed in one of said interlocking members and an arcuate tenon defined in the other of said interlocking members having a portion cooperatively received within said mortise when said body members are coupled, a containment member having a configuration complementing said tenon for receiving the remaining portion of said tenon and including finger means receivable within said mortise slot when said body members are coupled to minimize relative bending between said mortise and said tenon, locking means for locking said containment member together with said interlocking members when said body members are coupled and for unlocking said containment member from said interlocking members when said external tensile force above a predetermined limit is applied to said fuel line to release said containment member and permit uncoupling of said body members, and valve means in the fluid passageway of each body member for shutting flow communication between said body members when uncoupled.

---

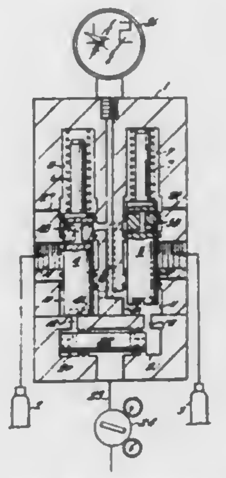
### 5,014,733
### AUTOMATIC SWITCHING VALVE

**Earl L. Wilson, 2163 Hayden Bridge Stub, Springfield, Oreg. 97477**

**Filed Jun. 14, 1990, Ser. No. 537,593**

**Int. Cl.$^5$ G05D *7/01***

U.S. Cl. 137—113 **3 Claims**



1. A valve for automatically communicating a fluid pressure source of multiple pressure sources to a common outlet line, said valve comprising,

VOL 126
ISS 2
MY 14 1991
UMI

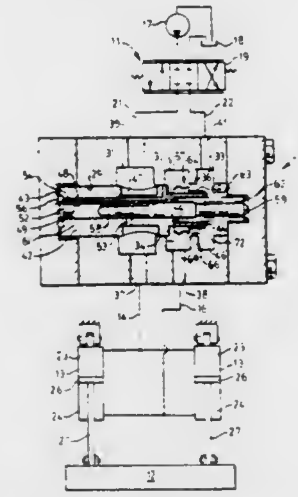
a valve body including first and second inlet ports each adapted for communication with a separate source of fluid pressure, first and second spool chambers in said valve body, each of said spool chambers including an end chamber,
first and second spools respectively in said chambers and each fluid biased to a closed position, first and second springs respectively biasing said spools to an open position,
passageways in said valve body receiving spool controlled fluid pressures and each terminating at an end chamber of said spool chambers,
each of said spools configured to transfer when in an open position a pressure flow from one of said inlet ports to one of said passageways serving the end chamber of the spool chamber of the remaining spool,
flow separator means in said valve body sequentially receiving pressure flows from said end chambers, said flow separator means including a spool responsive to said pressure flows from said end chambers, and
said flow separator means in communication with the common outlet line.

---

### 5,014,734
### QUICK DROP VALVE

**David P. Smith, Joliet, Ill., assignor to Caterpillar Inc., Peoria, Ill.**

**Filed Aug. 31, 1990, Ser. No. 576,033**
**Int. Cl.$^5$ F15B** *11/08*
**U.S. Cl. 137—117** **8 Claims**



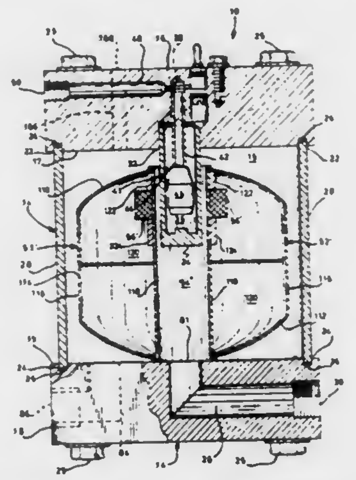
1. A quick drop valve comprising:
a housing having a bore and first, second and third annuluses communicating with and axially spaced along the bore;
a valve member slidably disposed in the bore and defining an actuating chamber between the valve member and the housing, the valve member being moveable between a first position at which the first annulus is blocked from the second annulus and a second position at which the second annulus communicates with the first annulus;
means for biasing the valve member to the first position;
means for continuously communicating the second annulus with the actuating chamber; and
valve means for defining a first orifice between the second and third annuluses when the valve member is at the first position, for defining a second, more restrictive orifice between the second and third annuluses when the valve member is at the second position and for providing substantially unrestricted fluid flow from the third annulus to the second annulus at the first position of the valve member.

---

### 5,014,735
### AUTOMATIC DRAIN VALVE

**Ernie W. Cummings, Louisville, Tenn., assignor to Drain-All, Inc., Louisville, Tenn.**

**Filed May 2, 1990, Ser. No. 517,809**
**Int. Cl.$^5$ F16K** *31/34*
**U.S. Cl. 137—195** **5 Claims**



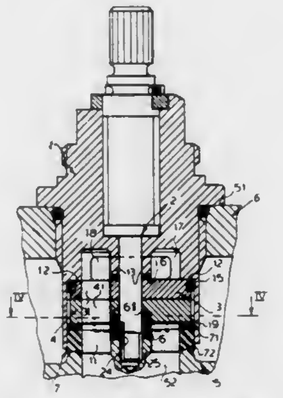
1. An automatic drain valve for selectively discharging accumulations of condensables and foreign materials from a pneumatic system, said automatic drain valve comprising:
a reservoir defining a reservoir volume for collecting said condensables and foreign materials, said reservoir including a head portion and a base portion, said base portion being provided with a first passageway defining an inlet for being placed in fluid communication with said pneumatic system and defining a mouth opening into said reservoir volume whereby said condensables and foreign materials are communicated to said reservoir volume, said reservoir further including a drainage conduit defining an outlet to facilitate the discharge of said condensables and foreign materials from said reservoir volume, whereby said first passageway and said drainage conduit provide flow-through communication with said pneumatic system;
a pneumatic valve operator;
a pilot valve housing mounted within said reservoir volume of said reservoir, said pilot valve housing defining a cavity, said cavity being sealed against communication with said reservoir volume;
a pilot valve mounted within said cavity of said pilot valve housing, said pilot valve including a sensor tube, a valve seat at a first end of said sensor tube, and an axial moving magnetic valve plug of one polarity for selectively engaging said valve seat;
a buoyant float respondable to liquid in said reservoir volume, said float having a convexed upper surface and a convexed lower surface, said float being provided with a hole for slidably receiving said pilot valve housing, said float being movable within said reservoir volume from a lower position to an upper position, said hole of said float being substantially coaxially aligned with said mouth of said first passageway such that said float does not obstruct the flow of said condensables and foreign materials into said reservoir volume and such that said condensables and foreign materials do not disrupt the operation of said float;
an annular magnet mounted in said float proximate said pilot valve housing said annular magnet normally having a polarity opposite the polarity of said magnetic valve plug;
a drainage valve for said reservoir, said drainage valve having an inlet and an outlet, said inlet communicating with said outlet of said drainage conduit of said reservoir;
a linkage means for connecting said pneumatic valve operator to said drainage valve, whereby said pneumatic valve operator selectively opens and closes said drainage valve; and
pneumatic means connected between said pilot valve and said valve operator whereby said valve operator quickly opens said drainage valve when said float reaches said upper position and quickly closes said drain valve when said float reaches said lower position, said pneumatic means comprising a first conduit connecting said cavity of said pilot valve housing in fluid communication with a source of filtered air and a second conduit connecting said sensor tube in fluid communication with said pneumatic valve operator.

---

### 5,014,736
### SHUT-OFF AND CONTROL VALVE

**Harald Körfgen, Fröndenberg; Heinz Hirsch, Soest; Vinzenz Grendel, Hemer; Friedrich Wagner, Endingen, and Walter Grau, Mahlberg, all of Fed. Rep. of Germany, assignors to Friedrich Grobe Armaturenfabrik GmbH & Co., Hemer, Fed. Rep. of Germany**

**Filed Aug. 10, 1989, Ser. No. 406,906**
**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828178**
**Int. Cl.$^5$ F16K** *43/00, 5/18, 47/14*
**U.S. Cl. 137—315** **12 Claims**



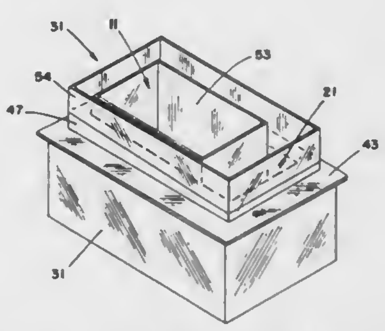
1. A shutoff and control valve, comprising:
a valve unit including:
an axially extending housing formed at one end with a first axially extending cavity and at an opposite end with an axially extending recess, said axially extending recess having inner and outer annular seats radially spaced from one another in a common plane perpendicular to an axis of said unit, and a radial outlet located between said plane and said first axially extending cavity,
a valve spindle extending axially in said housing through said first cavity and into said recess, said spindle being provided with means in said first cavity bracing said spindle against said housing,
an angularly fixed valve disk received in said recess and surrounding said spindle and having a first surface juxtaposed with said seats and a second surface facing away from said seats,
a rotatable control disk received in said recess, axially abutting said second surface, surrounding said spindle and formed with a second cavity opening in a direction facing away from said angularly fixed valve disk, said disks being provided with alignable holes permitting flow of fluid to said outlet through said recess and being axially movable relative to said housing, means being provided for sealing between said control disk and said spindle,
an element threadedly connected with an end of said spindle adjacent said control disk and formfittingly received in said second cavity for connecting said control disk to said apindle for rotation therewith and applying an axial force to said control disk toward said seats,
a compression spring member received in one of said cavities and resiliently braced against said spindle for axially biasing said control disk against said angularly fixed disk and said angularly fixed disk toward said seats,
inner and outer sealing rings sealingly compressed between said inner and outer seats and said angularly fixed disk, and
an annular seal received in said recess and projecting axially therefrom; and
a valve body having an axial inlet communicating with said recess, a radial outlet communicating with said outlet of said housing, and an annular seat engageable with said annular seal, receiving said unit whereby said housing, said spindle, said seals and said disks are insertable into and removable from said valve body as a unit.

---

### 5,014,737
### QUARTZ INTEGRATED TROUGH/SUMP RECIRCULATING FILTERED HIGH-PURITY CHEMICAL BATH

**Allan Berman, 1295 Forgewood Ave., Sunnyvale, Calif. 94089**

**Filed Nov. 13, 1989, Ser. No. 434,709**
**Int. Cl.$^5$ E03B** *7/07*
**U.S. Cl. 137—334** **8 Claims**

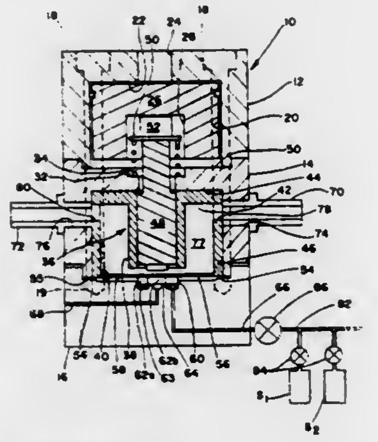


1. A recirculating, high purity chemical bath, including a first vessel for containing a liquid chemical bath, heater means for transmitting heat to said liquid chemical bath through the wall of said first vessel, a second vessel disposed directly adjacent to said first vessel and having an upper end situated below the level of the upper end of said first vessel, a first fluid fitting disposed in the bottom region of said first vessel and a second fluid fitting disposed in the bottom region of said second vessel, pump and filter means connected between said first and second fluid fittings for pumping a liquid chemical from said bottom region of said second vessel into said bottom region of said first vessel to create an upflow of filtered liquid chemical within said first vessel, a trough extending along the upper extent of at least one side of said first vessel and being inclined downwardly toward said upper end of said second vessel to direct overflow of the liquid chemical from said first vessel into said upper end of said second vessel by gravitational flow of said liquid chemical along said trough, whereby the liquid chemical fills said first vessel and a portion of said second vessel and the liquid chemical entering said first vessel from said pump and filter means causes overflow of the liquid chemical from said first vessel into said trough and thence along said trough and into said second vessel.

OL
126
SS
2
MY
14
1991
UMI

### 5,014,738
### VALVE

**David Jones, Winsford, England, assignor to C.J.S. Sciences Limited, Cheshire, England**
**Filed Jul. 10, 1989, Ser. No. 377,596**
**Claims priority, application United Kingdom, Jul. 12, 1988, 8816499**
**Int. Cl.⁵ F16K** *49/00*
U.S. Cl. 137—340 15 Claims

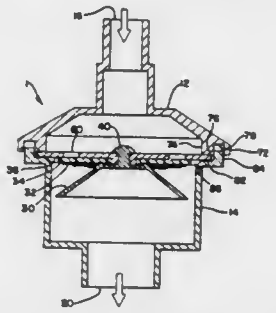


1. A valve comprising:
a valve housing;
a fluid inlet and a fluid outlet for the passage of fluid through said valve;
a valve closure member incorporating a diaphragm and disposed within said valve housing, the diaphragm being sealed about its periphery;
actuating means adapted to displace said valve closure member in a first direction;
a valve seat, disposed between said fluid inlet and said fluid outlet on a first side of said diaphragm, with which said valve closure member is engageable by displacement of said valve closure member in said first direction;
a cooling chamber within said valve housing located on the opposite side of said diaphragm from said valve seat and partly defined by said diaphragm;
an inlet in said valve housing for the ingress of cooling fluid into said cooling chamber and into contact with said diaphragm so as to cool fluid material in contact with said valve closure member on said first side of said diaphragm; and
an outlet in said valve housing for the egress of said cooling fluid from said cooling chamber.

### 5,014,739
### CHECK VALVE ASSEMBLY

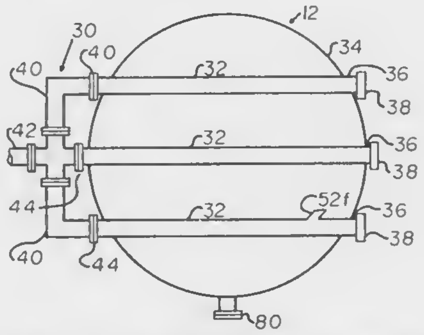
**Gabor Csaszar, McHenry, Ill., assignor to CED's, Inc., Addison, Ill.**
**Filed Oct. 10, 1989, Ser. No. 418,580**
**Int. Cl.⁵ F16K** *15/14*
U.S. Cl. 137—512.15 11 Claims

1. A valve assembly comprising:
a housing having an upper housing section and a lower housing section;
an inlet port extending through said upper housing section;
an outlet port extending through said lower housing section;
said upper housing section including a first axially downwardly extending outer rim portion and a platform portion inwardly adjacent the base of said first outer rim portion;
an axially downwardly extending inner annular seating ring inwardly adjacent said platform portion of said upper housing section and spaced from said first outer rim portion, said seating ring including a chamfered portion at the end of said seating ring and spaced from said platform portion to enhance the transfer of acoustic energy for sonic welding;
a disk-like valve seat having an annular outer portion against the end of said seating ring and spaced below said chamfered portion;
said lower housing section including a second axially upwardly extending outer rim portion of less diameter than said first outer rim portion;
said second outer rim portion extending upwardly between said first outer rim portion and said seating ring to about said platform portion when said upper and lower housing sections are joined to secure said valve seat against the end of said seating ring and form said housing, and to thereby form an annular space between the side of said second outer rim portion and said chamfered portion at the outside annular portion of said valve seat, with said annular space being located away from said platform portion and adjacent said valve seat annular outer portion;
said annular outer portion of said valve seat and the end portion of said seating ring being joined by melting and fusing together; and,
said second outer rim portion and said platform portion being joined by melting and fusing the second outer rim portion and the platform portion together, with the first outer rim portion of said upper housing section maintaining melted portions of said second outer rim portion and said platform portion within said upper housing section to prevent external formation of fusion burrs.



### 5,014,740
### DISTRIBUTOR FOR PACKED TOWER

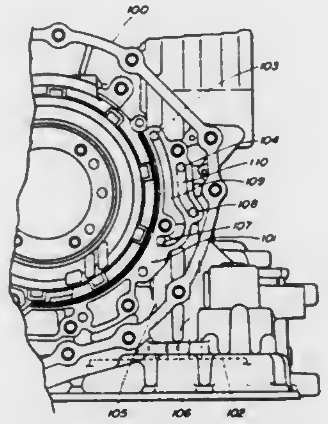
**Gordon M. Cameron, 4 Wellesbourne Crescent, Willowdale, Ontario, Canada M2H 1Y7**
**Filed May 21, 1990, Ser. No. 525,570**
**Int. Cl.⁵ B05B** *15/06, 1/20*
U.S. Cl. 137—561 A 9 Claims



1. Apparatus for distributing a liquid containing sulphuric acid across a packed tower, said tower having an external shell, said apparatus comprising a plurality of pipe means located in a substantially horizontal plane and each extending across said tower, each pipe means having first and second ends, each pipe means extending through said shell at said first end and extending at least to a position adjacent to said shell at said second end, said shell having a port therein adjacent said second end of each said pipe means, each pipe means further having multiple rows of holes therein, said holes of one row being oriented at a different angle to the vertical than the holes of another row, and a body of packing in said tower, said pipe means being spaced above said packing for said holes to distribute acid onto said packing, each pipe means having closure means removably coupled to said second end thereof for closing the interior of said pipe means from the environment external to said pipe, said closure means being located to be accessible at said ports, so that said closure means can be removed from outside said tower for removal of deposits accumulated in said pipe means during operation.

### 5,014,741
### OIL PASSAGE STRUCTURE IN TRANSMISSION CASING OF AN AUTOMATIC TRANSMISSION FOR AUTOMOTIVE VEHICLES

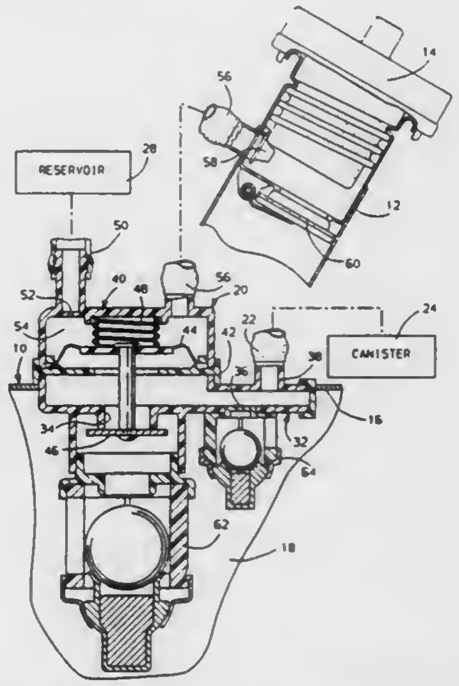
**Hiromi Taguchi, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan**
**Filed Jul. 18, 1989, Ser. No. 381,069**
**Claims priority, application Japan, Jul. 18, 1988, 63-93949[U]**
**Int. Cl.⁵ F01M** *11/00*
U.S. Cl. 137—565 5 Claims



1. An oil passage structure of a transmission casing for an automotive automatic transmission, said transmission casing having an outer peripheral surface thereon abutting with an outer periphery of an oil pump cover being employed in an oil pump assembly, said oil passage structure comprising:
intermediary oil passage means provided on said abutting surface of said transmission casing, for intercommunicating an oil channel defined in said transmission casing and communicated with a port of a control valve assembly of said transmission and an oil channel defined in the oil pump cover and communicated with a port of the oil pump assembly, said intermediary oil passage means including:
an opening defined in said transmission casing so as to be exposed to said abutting surface of said transmission casing, said opening being communicated with the port of the control valve assembly through the oil channel in said transmission casing; and
an intermediary oil groove defined on said abutting surface of said transmission casing, said oil intermediary groove including a point connecting with the oil channel in said oil pump cover, to intercommunicate said opening and said connecting point, whereby said intermediary oil groove allows a high degree of freedom of design in determining the placement of the oil channel in the transmission casing.

### 5,014,742
### VACUUM ACTUATED TANK VAPOR VENT VALVE

**Charles H. Covert, Manchester; Kenneth W. Turner, Webster; Carl H. Sherwood, Brockport; William E. Gifford, Hemlock, and Richard W. Wagner, Albion, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Apr. 5, 1990, Ser. No. 504,818**
**Int. Cl.⁵ F16K** *24/00*
U.S. Cl. 137—588 3 Claims

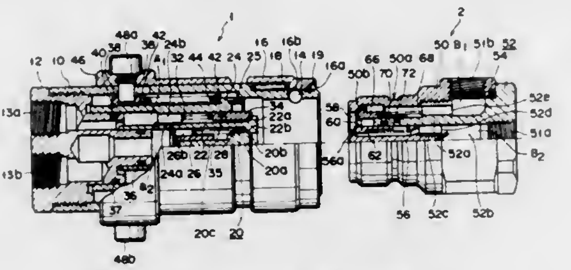


1. In a vehicle having a source of engine vacuum, a fuel tank having a fuel vapor collection space and a fuel tank filler neck with a closure cap that is removed when said tank is filled, and a fuel vapor storage canister, a valve assembly for selectively admitting to said canister the fuel fill vapors displaced from said tank when it is filled, comprising,
a valve housing secured to said fuel tank and opening into said vapor collection space across a valve seat of a size sufficient to pass said fuel fill vapors,
a canister line running between said valve housing and said canister,
a vacuum chamber located proximate to said valve seat,
a piston in said vacuum chamber movable between a closed position blocking said valve seat and an open position, said piston further having a resilient bias toward said open position,
a vacuum supply line running between said engine vacuum source and said vacuum chamber of a size sufficient to slowly evacuate said vacuum chamber to pull said piston to said closed position,
a vacuum relief line running between said vacuum chamber and said filler neck of a size sufficient to quickly refill said vacuum chamber, and,
a plug in said filler neck movable from a closed position blocking said vacuum exhaust line when said closure cap is in place to an open position when said closure cap is removed,
whereby, when said cap is in place, said vacuum chamber remains evacuated and said piston remains closed, and when said cap is removed to fill said tank, said vacuum chamber refills at a more rapid rate than said vacuum supply line can evacuate it, and said piston opens to allow fuel fill vapors to exit said tank to said canister through said valve seat.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,014,743
## DOUBLE-PIPE PIPE COUPLING

**Reichi Makishima, Tokyo, Japan, assignor to Nitto Kohki Co., Ltd., Tokyo, Japan**
**Filed Jul. 30, 1990, Ser. No. 559,324**
**Claims priority, application Japan, Aug. 3, 1989, 1-90998[U]**
**Int. Cl.$^5$ F16L** *29/04, 39/00*
**U.S. Cl. 137—614.03** **6 Claims**



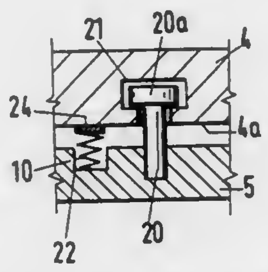
1. A double-pipe pipe coupling comprising:
a socket including a socket main cylinder having a front end portion on which taper holes are formed, locking balls housed in the taper holes and a sleeve on the outer periphery of the front end portion of the socket main cylinder;
a plug including a plug main cylinder on which an annular groove is formed,
said plug being connected with said socket in such a way that the locking balls are seated on the annular groove of the plug main cylinder by means of the sliding movement of the sleeve; wherein
said socket has a cylindrical slide ring and a collar cylinder arranged coaxial to each other, and first and second passages defined by the slide ring and the collar cylinder;
said slide ring includes a stop means for stopping the sliding of the slide ring in the axial direction of the socket main cylinder at a certain position and locking the movement of the sleeve when the slide ring advance, and a valve means having a slide valve arranged inside the slide ring and a valve body arranged inside the collar cylinder and serving to seal the front end of the plug when the plug is connected into the socket and independently close the first and the second passage by means of the slide valve and the valve body when the plug is not connected into the socket;
said plug includes a plug main cylinder, a partition means formed fixed to the plug main cylinder and located at a position which corresponds to the collar cylinder of the socket, first and second passages and which are partitioned by the partition means, a first slide valve arranged in the first passage and pushed by the collar cylinder of the socket to open the first passage when the socket and the plug are connected to each other, a valve stem arranged in the second passage to open the valve means which opens and closes the second passage in the socket when the plug is connected into the socket, and a second slide valve arranged in the second passage and pushed by the collar cylinder of the socket to separate from the valve seat of the valve stem when the plug is connected into the socket.

---

### 5,014,744
## SHUT-OFF DEVICE

**Klaus Zapke, Maintal, and Johannes Löffler, Bad Homburg, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**
**Filed Jan. 22, 1990, Ser. No. 468,474**
**Claims priority, application Fed. Rep. of Germany, Jan. 20, 1989, 3901576**
**Int. Cl.$^5$ F16K** *25/00*
**U.S. Cl. 137—614.21** **18 Claims**

1. A shut-of device for controlling a flowable material, comprising:
a housing;
means forming an inlet on said housing for admitting a flowable material to said housing;
means forming an outlet in said housing for discharging said flowable material, and defining in said housing an annular seat around said outlet;
a rotary plug member in said housing having a central passage and rotatable about a first axis relative to said housing between an open position wherein said passage communicates between said inlet and said outlet to permit flow of said material and a closed position blocking flow of said material between said inlet and said outlet and closing said inlet;

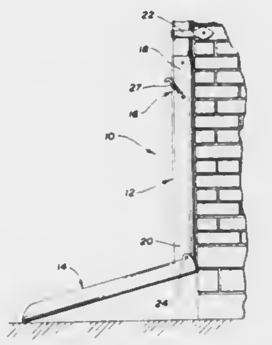


a sealing member rotatable relative to said plug member about a second axis generally at a right angle to said first axis, sealingly engageable with said seat in said closed position of said plug and rotated at least limitedly upon displacement of said plug member between said positions to vary orientation of said sealing member about said second axis relative to said seat; a compression spring braced between said members and having a spring axis spaced with a radial distance from said second axis so as to be wholly offset therefrom said spring being in slidable contact with at least one of said members.

---

### 5,014,745
## ARTICULATE DOWNSPOUT

**Paul G. Watt, 6811 Vaughan, Detroit, Mich. 48228**
**Filed Sep. 7, 1990, Ser. No. 578,946**
**Int. Cl.$^5$ F16L** *27/00*
**U.S. Cl. 137—615** **9 Claims**



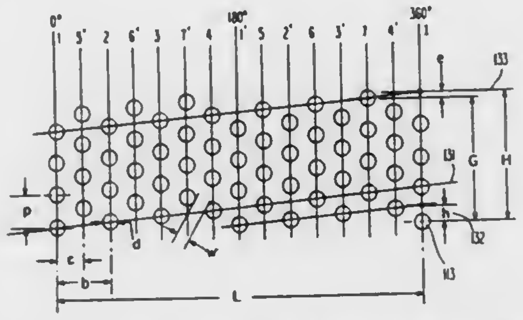
1. An articulated downspout comprising:
an upper fluid duct having an upper portion adapted to receive rainwater and a lower portion;
an elongated lower fluid duct pivotably connected to the lower portion of the upper fluid duct and being movable between a raised position in which the lower fluid duct lies substantially parallel to and proximate the upper fluid duct, and a lowered position in which the lower fluid duct lies below the lower portion of the upper fluid duct such that rainwater can be distributed therefrom, the lower portion of the upper fluid duct being spaced apart from the ground to enable the passage therebetween of horticultural equipment; and

a planar flap pivotably connected to the upper fluid duct such that at least a portion of the flap extends therewithin, the flap including:
a collection segment adapted to move downwardly from a substantially horizontal position in response to pressure exerted by the rainwater received by the upper fluid duct, and
a latch segment having an inner end connected to the collection segment and an outer end extending into selective engagement with the lower fluid duct when in the raised position thereof, the outer end of the latch segment being movable upwardly to disengage the lower fluid duct in response to pressure exerted by the rainwater upon the collection segment, thereby releasing the lower fluid duct from the raised position so that the lower fluid duct may pivot from the raised position thereof to the lowered position thereof without manual intervention.

---

### 5,014,746
## HOLE PATTERN FOR VALVE MUFFLER

**Frank J. Heymann, Winter Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Jan. 16, 1990, Ser. No. 465,699**
**Int. Cl.$^5$ F16K** *47/02, 47/14*
**U.S. Cl. 137—625.3** **12 Claims**



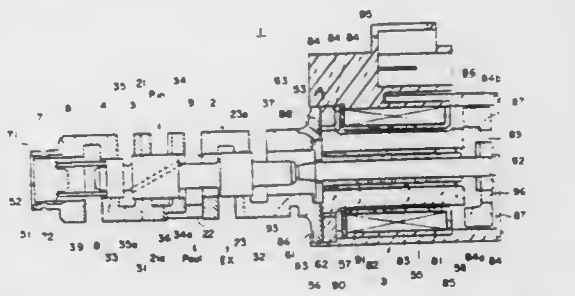
1. In a steam-driven electric power plant of the type including a steam control valve, the improvement comprising a muffler disposed within said steam control valve having a cylindrical wall, said cylindrical wall having a plurality of substantially circular apertures disposed therethrough, said apertures being spaced substantially equilaterally from one another within a portion of said cylindrical wall and disposed in adjacent loops of a single helix.

---

### 5,014,747
## PRESSURE CONTROL VALVE

**Akira Suzuki, and Katsuya Tanaka, both of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan**
**Filed Nov. 2, 1989, Ser. No. 430,365**
**Claims priority, application Japan, Nov. 9, 1988, 63-281414**
**Int. Cl.$^5$ F15B** *13/044*
**U.S. Cl. 137—625.65** **4 Claims**

1. A pressure control valve comprising:
(a) a valve sleeve having a supply port, an output port, and an exhaust port;
(b) an electromagnet connected to said valve sleeve for producing a load in response to an electric signal;
(c) a spool valve mounted in said valve sleeve for sliding motion responsive to said load produced by said electromagnet in a first direction, said spool valve having a first land portion, through which a feedback oil passage is formed diagonally, and second and third land portions, wherein said first and second land portions have the same first diameter and define a first space therebetween in fluid communication with said output port and wherein said third land portion has a second diameter smaller than said first diameter, said first and third land portions defining therebetween a closed second space to which output pressure is fed back to produce a feedback load acting on said spool valve in a second direction; and

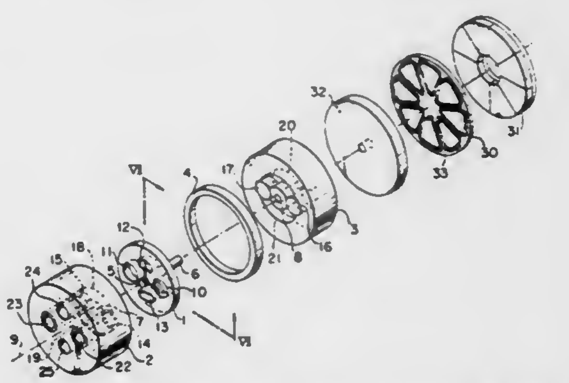


(d) a spring mounted in said valve sleeve for biasing said spool valve in said second direction.

---

### 5,014,748
## ROTARY VALVE

**Tadahiko Nogami, Mito; Ichiro Nakamura, Katsuta; Ichiro Maeno, and Ryobei Kinose, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Jan. 18, 1989, Ser. No. 302,816**
**Claims priority, application Japan, Jan. 18, 1988, 63-6868**
**Int. Cl.$^5$ F15B** *13/044*
**U.S. Cl. 137—625.65** **3 Claims**



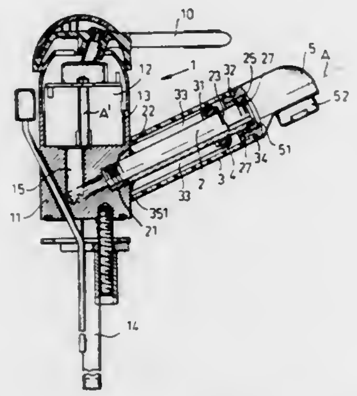
1. A rotary valve comprising valve body means, at least a pair of casing means rotatably clamping said valve body means from opposite sides thereof to cause a flow of fluid through the rotary valve to be controlled by relative motion between said valve body means and said casing means, said valve body means including at least one cylindrical hole means and at least one through hole means extending axially therethrough, one of said pair of casing means including at least one sleeve means for forming a control orifice in cooperation with said cylindrical hole means and a pair of flow paths formed to separated from each other by said sleeve means, a control port communicating with said sleeve means, a supply port and a discharge port respectively communicating with said pair of flow paths, the other of said pair of casing means including one of at least one sleeve means for forming another control orifice in cooperation with said cylindrical hole means and at least one plug means, the other of said pair of casing means further including a pair of flow paths formed to be separated from each other by said one of the sleeve means and the plug means of said other of said pair of casing means, one of said flow paths of said other of said pair of casing means being in communication with one of said flow paths of said one of said pair of casing means through said valve hole means, and drive means for driving said valve body means including a rotator means integrally formed with said valve body means, said drive means comprising a plurality of coil means having winding directions alter-

OL
126
SS
2
MY
14
1991
UMI

nating in a circumferential direction, said rotator means includes a disk-shaped rotator coupled with a part of said valve body means, a magnet means having polarities alternating in the circumferential direction and which has one of a circular and polygonal flat face, and a yoke having one of a circular and polygonal flat face.

---

### 5,014,749
## MIXING VALVE WITH DECORATIVE FAUCET
**Jurgen Humpert, Hemer, and Manfred Pawelzik, Soest, both of Fed. Rep. of Germany, assignors to Friedrich Grohe Armaturenfabrik GmbH & Co., Hemer, Fed. Rep. of Germany**
**Filed Mar. 9, 1990, Ser. No. 491,667**
**Claims priority, application Fed. Rep. of Germany, Mar. 10, 1989, 3907892**
**Int. Cl.$^5$ E03C** *1/04*
**U.S. Cl. 137—801** **16 Claims**

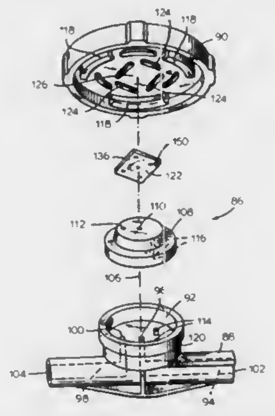


1. A valve assembly comprising:
a valve body having an nonplanar outer surface and formed with a threaded seat opening at the surface and with a passage opening into the seat;
valve means in the body for supplying water through the passage to the seat;
a metallic tube having a threaded inner end engaged tightly in the seat so as to form an extension of the passage and having an outer end;
a decorative sleeve engaged concentrically around the tube and having an inner end shaped to fit flush against the body outer surface and an outer end; and
retaining means engaged between the outer end of the tube and the sleeve for pressing the inner end of the sleeve against the body outer surface.

---

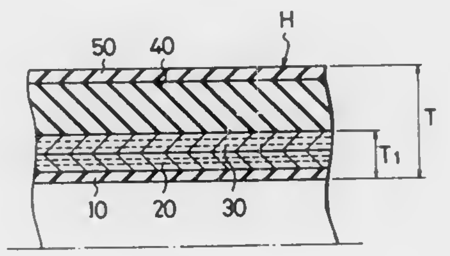
### 5,014,750
## SYSTEMS HAVING FIXED AND VARIABLE FLOW RATE CONTROL MECHANISMS
**David A. Winchell, Spring Grove, and Richard J. Mitchell, Lindenhurst, both of Ill., assignors to Baxter International Inc., Deerfield, Ill.**
**Continuation of Ser. No. 167,822, Mar. 14, 1988, abandoned.**
**This application Dec. 6, 1989, Ser. No. 449,232**
**Int. Cl.$^5$ F15D** *1/10;* **F16K** *47/04*
**U.S. Cl. 138—43** **5 Claims**

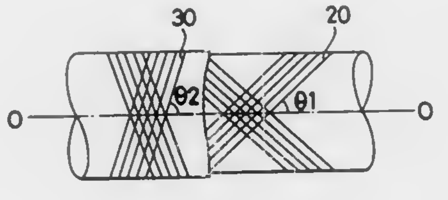
1. A fluid delivery system comprising
tubing means having an inlet connectable to a source of fluid and an outlet, said tubing means being operative for conveying fluid from the source to said outlet,
flow control means located between said inlet and said outlet and being operative for controlling the rate of fluid flow through said tubing within a range of at least two different discrete, preselected rates, said flow control means including a flow restrictor wafer having a substrate defining at least two enclosed restrictor paths, each path offering a different resistance to fluid flow corresponding with said discrete preselected flow rates, said flow restrictor wafer further including a wafer inlet and first and second openings, the first enclosed restrictor path extending between the wafer inlet and the first opening, the second enclosed restrictor path extending between the wafer inlet and the second opening, and
said flow control means further including selection mean for selectively directing fluid in said tubing means through a desired one of said flow restrictor paths, said selector means including a seal member which defines an inlet aperture in communication with said flow restrictor wafer inlet and said flow control means inlet and an outlet aperture in communication with said flow control means outlet, said seal member and said flow restrictor wafer being slidable relative to each other to maintain communication between said flow restrictor wafer inlet and said seal member inlet aperture and to selectively establish communication between said seal member outlet aperture and said flow restrictor wafer first or second opening.



---

### 5,014,751
## COMPOSITE HOSE CONSTRUCTION
**Masashi Wakabayashi, and Masuo Kuroda, both of Yokohama, Japan, assignors to Yokohama Rubber Co., Ltd., Japan**
**Filed Oct. 25, 1989, Ser. No. 426,431**
**Claims priority, application Japan, Oct. 28, 1988, 63-272093**
**Int. Cl.$^5$ F16L** *11/02, 11/08*
**U.S. Cl. 138—127** **3 Claims**

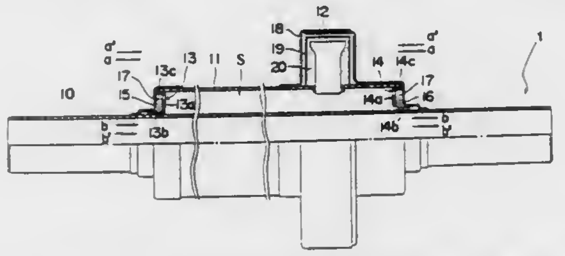




1. A composite hose comprising:
a core rubber tube;
a first reinforcing layer formed of fibrous cord of a synthetic fiber disposed on said core tube;
a second reinforcing layer formed of stranded steel metallic cord disposed on said first reinforcing layer;
a filler rubber disposed on said second reinforcing layer;
a rubber cover disposed on said filler rubber;
wherein the total thickness of said core tube and said first and second reinforcing layers is not greater than one-half the total thickness of said core tube, said first and second reinforcing layers, said filler rubber and said cover; and wherein said fibrous and metallic cords intersect each other, and said fibrous cord and said metallic cord are oriented at an angle of from 35 to 55 degrees and at an angle of from 70 to 90 degrees, respectively, with respect to the axial direction of said hose, with the difference of such angles being greater than 35 degrees.

---

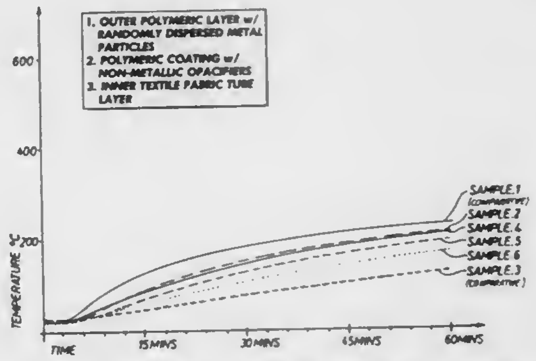
### 5,014,752
## NONFREEZING PIPE
**Takefumi Takenakajima, Yao; Kazuo Nishimura, Kyoto; Mamoru Fujiyama, Nara, and Toshihiro Fukushima, Kyoto, all of Japan, assignors to Zojirushi Vacuum Bottle Co., Ltd., Osaka, Japan**
**Continuation of Ser. No. 200,519, May 16, 1989, abandoned.**
**This application Oct. 19, 1989, Ser. No. 423,667**
**Claims priority, application Japan, Aug. 11, 1987, 62-12297; Aug. 19, 1987, 62-126595; May 27, 1989, 62-80178**
**Int. Cl.$^5$ F16L** *9/14*
**U.S. Cl. 138—149** **7 Claims**



1. A nonfreezing pipe, for use as a water supply pipe, comprising:
an inner shell having openings at its opposite ends and being provided on its outer surface with heat reflecting means;
an outer shell coextensive axially with said inner shell and extending around said inner shell to form a cylindrical space surrounding said inner shell, said outer shell being provided with a tip tube for evacuation;
at least one deformable end closure member arranged between said inner and outer shell to provide an end closure wall for said cylindrical space, said end closure member having inner and outer cylindrical portions joined respectively to an external wall of said inner shell and to an internal wall of said outer shell by welding, said cylindrical space formed between said inner and outer shells being evacuated of air through said tip tube;
at least one cylindrical cap fitted on the inner shell so as to cover said end closure member and tip tube, and form a space between said end closure member and cap, said space formed between said end closure member and cap being filled with a sealant; and
a cylindrical cap fitted on said outer shell to protect said tip tube in combination with said at least one cylindrical cap.

---

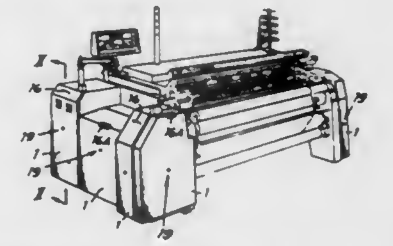
### 5,014,753
## RADIANT HEAT RESISTANT FLEXIBLE TUBE
**Leopold Rossignol, and Denis van Wassenhove, both of Crepy en Valois, France, assignors to Textilver SA, Crepy en Valois, France**
**Filed Nov. 28, 1989, Ser. No. 441,906**
**Claims priority, application United Kingdom, Dec. 2, 1988, 8828214.0**
**Int. Cl.$^5$ F16L** *59/08, 59/14*
**U.S. Cl. 138—149** **17 Claims**



1. An impermeable flexible tube for protecting electrical cables from radiant heat comprising:
an inner textile fabric tube layer coated with a flexible polymeric material to achieve at least external surface impregnation of said inner textile fabric tube layer; and
an outer, reinforcement-free layer of a flexible polymeric material,
wherein the polymeric material used to coat the inner textile fabric layer contains non-metallic opacifiers, and the polymeric material of the outer layer is at least translucent and contains randomly dispersed reflective metal particles defining a first means to reflect radiant heat in which some radiant heat may pass between said metal particles, and said non-metallic opacifiers defining a second means to stop radiant heat passing said first means and thereby minimize radiant heat transfer to the electrical cables.

---

### 5,014,754
## ATTACHMENT FOR GUARD PLATES IN WEAVING MACHINES
**Michel Vandeweghe, Wijtschate-Heuvelland, and Willy Vanheule, Ieper, both of Belgium, assignors to Picanol N.V., Ieper, Belgium**
**Filed Jul. 6, 1990, Ser. No. 549,082**
**Claims priority, application Belgium, Jul. 6, 1989, 8900737**
**Int. Cl.$^5$ D03D** *49/02*
**U.S. Cl. 139—1 R** **12 Claims**



1. An attachment for guard plates in weaving machines, comprising at least three couplings, each formed by a cylinder-shaped element which is attached to a guard plate, and corresponding seating means mounted to a frame of the weaving machine for closing flexibly around the cylinder-shaped element when the guard plate is coupled to the frame, wherein at least one of said couplings is situated at a top of the guard plate,

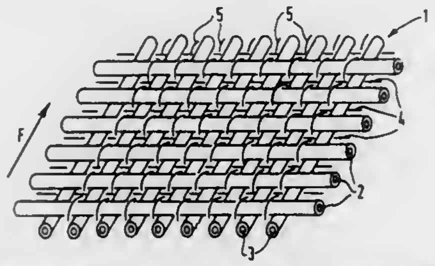
VOL
126
SS
2
MY
14
1991
UMI

the cylinder-shaped element of said top coupling having a substantially vertical axis, and wherein at least two of said couplings are situated at a bottom of the guard plate, the cylinder-shaped elements of said bottom couplings having substantially horizontal axes in line with each other.

---

### 5,014,755
## TEXTILE STRUCTURE WITH BINDING WEAVE FOR MULTIPLE LAYERS OF NON-INTERLACED FIT FILAMENTS

**Bruno Bompard, Lyons, and Jean Aucagne, La Tour du Pin, both of France, assignors to Brochier S.A., Decines, France**
**Filed Aug. 11, 1988, Ser. No. 231,209**
**Claims priority, application France, Aug. 11, 1987, 87 11429**
**Int. Cl.⁵ D03D** *15/00*
**U.S. Cl. 139—420 A** **13 Claims**

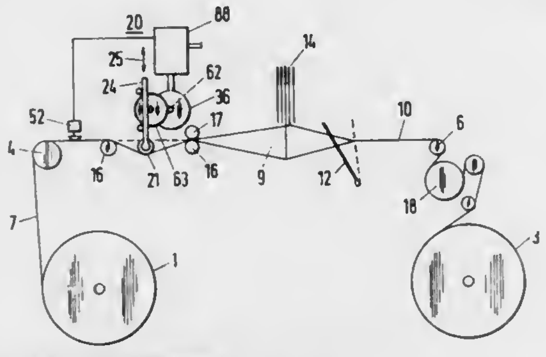


1. Textile structure comprising at least two stacked layers of FIT filaments, each of said filaments consisting of a core or reinforcement impregnated with or having a coating of thermoplastic material so as to be of relatively large diameter, the filaments in each of said layers extending parallel to one another and the filaments of each respective one of said layers being non-interlaced with the filaments of each of the other respective said layers so that said layers of FIT filaments exhibit a planar configuration, and the filaments of each one of said layers extending in a direction perpendicular to the direction in which the filaments of another of said layers extend, and a binding weave binding said layers of FIT filaments together, said binding weave consisting of a warp and a weft of threads having a diameter smaller than the diameter of said FIT filaments, said binding weave securing said filaments in position relative to one another in a manner in which the planer configuration exhibited by said layers of FIT filaments is maintained.

---

### 5,014,756
## PILE WARP TENSION CONTROL IN A LOOM

**Rudolf Vogel, Grut, and Anton Ruedisueli, Roti, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland**
**Filed Jun. 28, 1989, Ser. No. 372,325**
**Claims priority, application Switzerland, Jul. 8, 1988, 02623/88**
**Int. Cl.⁵ D03D** *49/12*
**U.S. Cl. 139—97** **26 Claims**

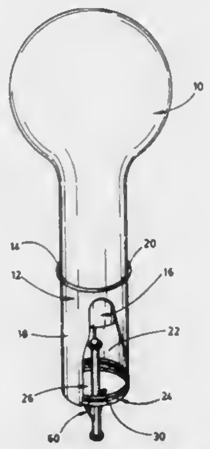


1. A loom comprising
at least one warp-tensioning element for moving into a path of warp yarns extending to and forming at least a top shed to deflect the warp yarns therefrom into a tensioned state;
a servomotor;
transmission means coupling said servomotor to said element for movement of said element into said path in response to selective operation of said servomotor; and
a circuit arrangement having a control connected to said servomotor for driving said servomotor to effect movement of said element and a control input connected to said control to deliver programmable signals to said control for actuating said servomotor to adjust the tension in said yarns of said top shed within a predetermined range.

---

### 5,014,757
## BALLOON INFLATING DEVICE

**Daniel J. Donaldson, 704 Hingham La., Schaumburg, Ill. 60193, and William K. Busch, 1233 Center St., DesPlaines, Ill. 60018**
**Filed May 8, 1990, Ser. No. 520,800**
**Int. Cl.⁵ B65B** *3/16, 1/04*
**U.S. Cl. 141—114** **4 Claims**

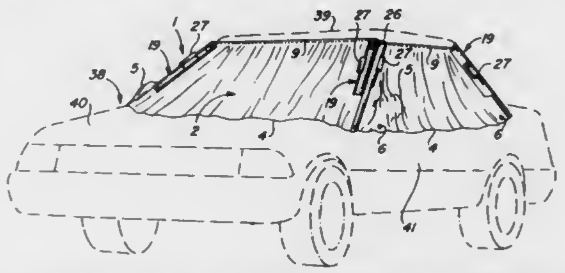


1. A balloon inflating device comprising:
an outer container having a bottom and a side wall and having a hole defined in said bottom, said side wall having a height and a top edge;
an inner container having a bottom and a side wall and having a hole defined through said inner container bottom to be aligned with the hole in said outer container bottom, said inner container side wall having a height which is less than said outer container wall height and a top edge, said inner container bottom being smaller than said outer container bottom and said inner container being mounted within said outer container to slide within said outer container from a first position with said inner container side wall extending above said outer container side wall to a second position with said inner container side wall top edge being no higher than co-level with said outer container top edge with respect to said outer container bottom;
a pressurized fluid container located within said inner container and including a rupturable wall;
mounting means mounting said pressurized fluid container on said inner container for movement therewith;
fluid passage means on said mounting means for conducting pressurized fluid past said pressurized fluid container out of said inner container;
rupturing means slidably mounted on said inner and outer container through said aligned holes and including a head located beneath said outer container bottom and a point located adjacent to said pressurized fluid container rupturable wall, said rupturing means being movable from a cocked position having said point spaced from said rupturable wall to a rupturing position having said point puncturing through said rupturable wall;
sealing means on said rupturing means for sealingly covering said inner container hole;
biasing means on said rupturing means and having one end thereof mounted on said rupturing means and another end thereof engaging said inner container bottom and biasing said inner container toward said first position and said rupturing means towards said cocked position; and
balloon closing means located to capture a balloon against said inner container side wall closely adjacent to said inner container side wall top edge and seal said balloon against said inner container side wall and against said outer container side wall when said inner container is in said first position.

---

### 5,014,758
## PROTECTIVE COVER FOR VEHICLE WINDOWS

**Charles W. Stinson, 506 Spencer St., Ruston, La. 71270**
**Filed Feb. 9, 1990, Ser. No. 477,556**
**Int. Cl.⁵ B60J** *11/00*
**U.S. Cl. 150—168** **17 Claims**



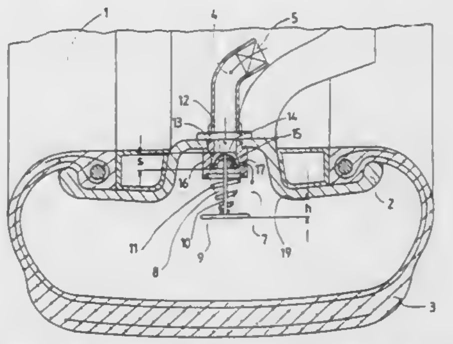
1. A protective cover for the windshield and windows of a vehicle having front door posts and rear window posts, comprising a flexible cover sheet for covering the windshield and windows and at least one clamp comprising an inside clamp panel and an outside clamp panel for removably securing said cover sheet to the front door posts and rear window posts respectively, and bias means connecting said inside clamp panel to said outside clamp panel for biasing said inside clamp panel and said outside clamp panel against said cover sheet and the front door posts and rear window posts respectively, and removably positioning said cover sheet over the windshield and windows of the vehicle.

---

### 5,014,759
## VEHICLE WHEEL HAVING VALVE MEANS TO PREVENT MISUSE

**Wolfgang Holzbach, Garbsen; Carsten Boltze, Wennigsen; Karl-Heinz Kramer, Hanover, and Heinrich Meier, Heessen, all of Fed. Rep. of Germany, assignors to Continental Aktiengesellschaft, Hanover, Fed. Rep. of Germany**
**Filed Jun. 2, 1989, Ser. No. 360,266**
**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819048**
**Int. Cl.⁵ B60C** *23/06, 29/06, 17/00;* **F16K** *15/20*
**U.S. Cl. 152—427** **3 Claims**

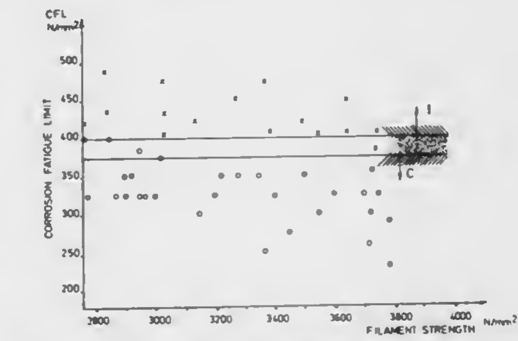
1. In a vehicle wheel that includes a valve which has check means, with said wheel being intended for use with a pneumatic tire, that-even when operating as a tire which is flat or has otherwise lost pressure-permits great distances to be covered at a reduced speed, the improvement wherein:
said valve is provided with a mechanism that prevents misuse by closing off a bore for reinflating said tire, with said mechanism being pneumatically disposed in series with said check means, and being installed in an open position and in such a way that said mechanism changes over into a closed position upon commencement of a flat-tire operation, said mechanism that prevents misuse having a radially outwardly disposed end that is provided with a mechanical sensor that in said open position of said mechanism is disposed further radially outwardly than is a radially outwardly disposed edge of a rim of said wheel, said mechanism that prevents misuse including a one-way blocking mechanism that permits a transition from said open position to said closed position, but not from said closed position to said open position; and a valve housing for said valve, with the interior of said valve housing being provided with a barbed stop means; said one-way blocking mechanism being embodied in a form-fitting manner and including a movable part in the form of a sealing sleeve that has a resiliently compressible collar that cooperates with said barbed stop means in said closed position of said mechanism that prevents misuse.



---

### 5,014,760
## STEEL WIRE FOR REINFORCING ELASTOMER ARTICLES WITH IMPROVED ADHESION PROMOTING LAYER

**Martin Bombeke, Moregemplein 11, B-9790 Wortegem-Petegem, and Paul Dambre, Lokerstraat 6, B-8949 Kemmel, both of Belgium**
**Filed Jan. 16, 1987, Ser. No. 3,950**
**Claims priority, application United Kingdom, Jan. 28, 1986, 8601986**
**Int. Cl.⁵ B60C** *9/00;* **C21D** *9/52;* **C25D** *7/06*
**U.S. Cl. 152—451** **8 Claims**

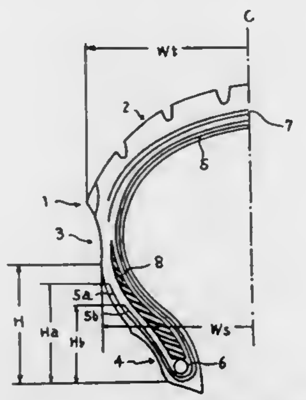


1. A steel wire for reinforcement of vulcanized elastomers drawn form carbon steel with a carbon content of at least 0.4% and a tensile strength of at least 2000 N/mm², the wire having a core of a work-hardened essentially pearlitic microstructure and an outer layer able to adhere to rubber, characterized in that said wire core is provided underneath said outer layer with a continuous surface region which is ferrous and substantially free of cementite and other precipitated phases, the surface region extending throughout for a depth of at least 0.5 μm and further characterized in that the rubber adherent layer is a brass layer.

VOL
126
SS
2
MY
14
1991
UMI

### 5,014,761
### RADIAL TIRE FOR MOTORCYCLE WITH IMPROVED METALLIC BELT CORD

**Hiroyuki Noma, Hyogo; Tadao Kouno, and Kazuo Kadomaru, both of Osaka, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**
**Filed Dec. 29, 1988, Ser. No. 291,595**
**Claims priority, application Japan, Jan. 8, 1988, 63-2675**
**Int. Cl.$^5$ B60C** *9/20, 3/04;* **D02G** *3/48*
**U.S. Cl. 152—527** **12 Claims**

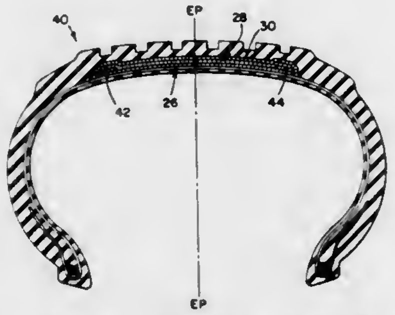


1. A radial tire for a motorcycle having improved steering stability at high speed and reduced ply separation at the breaker edges of the tire which comprises a radial carcass extending between bead portions of the tire; a tread disposed radially outside the carcass; and a breaker disposed between the carcass and the tread and having at least one ply of metallic cords coated with rubber; each metallic cord comprising a plurality of twisted strands; each strand consisting of at least three twisted filaments made of metal; the elongation of each metallic cord when loaded with 1.0 kgf/cord being in a range of 0.5 to 1.5%; the tangential modulus of elasticity of each metallic cord when loaded with 10 kgf/cord being in a range of 8,000 to 15,000 kgf/sq.mm.

---

### 5,014,762
### ANGLED OVERLAY BELT FOR TIRES

**Klaus Beer, Stow; Gary W. Richards, Clinton; Thomas R. Oare, Suffield; Thomas A. Brown, Akron, and Thomas H. Wells, Copley, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Filed May 26, 1989, Ser. No. 357,149**
**Int. Cl.$^5$ B60C** *9/18, 9/24, 9/28*
**U.S. Cl. 152—532** **16 Claims**

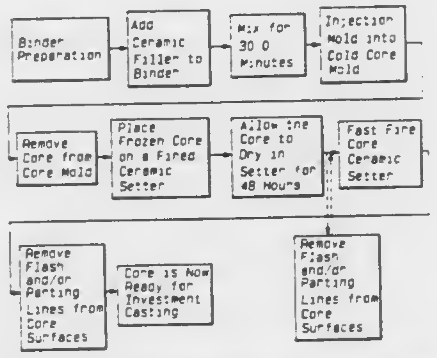


1. A pneumatic tire comprising a radial carcass, a tread portion and a belt reinforcing structure comprising reinforcing layers radially interposed between the carcass and the tread portion, and a reinforced overlay belt interposed between the belt reinforcing structure and the tread portion, the reinforced overlay belt comprising a plurality of parallel cords oriented at an angle of between 9° and 24° with respect to the equatorial plane of the tire and disposed within an elastomeric material wherein the axial width of said reinforced overlay is greater than or equal to the axial width of the belt reinforcing structure and wherein the parallel cords of the reinforced overlay belt are oriented in the same angular direction as cords of an adjacent radially outermost reinforcing layer of the belt reinforcing structure and wherein said overlay belt is spliced in said tire such that said splice is parallel to said parallel cords in said overlay belt.

---

### 5,014,763
### METHOD OF MAKING CERAMIC CORES

**Gregory R. Frank, Muskegon, Mich., assignor to Howmet Corporation, Greenwich, Conn.**
**Filed Nov. 30, 1988, Ser. No. 277,853**
**Int. Cl.$^5$ B22C** *1/16*
**U.S. Cl. 164—15** **27 Claims**


Binder Preparation
Add Ceramic Filler to Binder
Mix for 30 0 Minutes
Injection Mold into Cold Core Mold
Remove Core from Core Mold
Place Frozen Core on a Fired Ceramic Setter
Allow the Core to Dry in Setter for 48 Hours
Fast Fire Core Ceramic Setter
Remove Flash and/or Parting Lines from Core Surfaces
Core is Now Ready for Investment Casting
Remove Flash and/or Parting Lines from Core Surfaces

1. A method of making a ceramic core useful in the casting of molten metal therearound, comprising the steps of:

(a) forming a ceramic slurry of a freezable liquid, a ceramic powder and a gelling agent,

(b) forming the ceramic slurry into a core shaped body including:

  (1) shaping the ceramic slurry into a core shaped body by introducing the slurry into a core shaped mold cavity and reducing the temperature of the slurry at least to the freezing temperature of said liquid to freeze the slurry in the mold cavity and form a frozen core shaped body therein,

  (2) removing the frozen core shaped body from the mold cavity,

  (3) raising the temperature of the frozen core shaped body after removal from the mold cavity to an ambient temperature above the freezing temperature,

  (4) gelling the gelling agent and the liquid existing at a temperature above the freezing temperature such that a gel is present in the core shaped body at the ambient temperature to retain the freeze formed core shape at the ambient temperature, and

(c) heating the core shaped body after step (b) to form a sintered ceramic core.

---

### 5,014,764
### LOST-FOAM CASTING, OF ALUMINUM UNDER PRESSURE

**Michel Garat, Voiron, France, assignor to Aluminium Pechiney, Paris, France**
**Continuation-in-part of Ser. No. 334,530, Apr. 7, 1989, abandoned, which is a continuation-in-part of Ser. No. 116,213, Nov. 3, 1987, abandoned. This application Nov. 16, 1989, Ser. No. 437,103**
**Claims priority, application France, Nov. 17, 1986, 86 16415; Sep. 7, 1989, 89 11943**
**Int. Cl.$^5$ B22C** *9/04;* **B22D** *27/13, 21/04*
**U.S. Cl. 164—34** **4 Claims**

1. In a process for lost foam casting of aluminum and aluminum alloys comprising immersing an organic foam pattern of

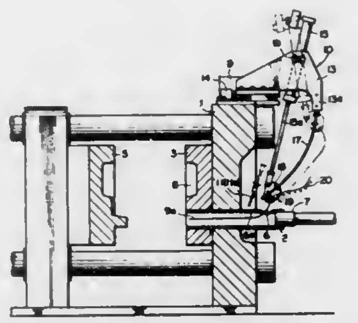
an article to be cast into a dry sand mold containing no binder, filling the mold with molten aluminum or aluminum alloy which replaces the foam pattern and gradually solidifies, and applying, at the earliest on completion of filling, an increasing isostatic gas pressure simultaneously to the mold and aluminum alloy,

the improvement wherein said isostatic gas pressure rises to a maximum value higher than 1.5 MPa and up to 10 MPa.

---

### 5,014,765
### HEAT RETAINING METHOD FOR MOLTEN METAL SUPPLIED INTO INJECTION SLEEVE, METHOD OF APPLYING HEAT INSULATING POWDER ONTO AN INNER SURFACE OF THE INJECTION SLEEVE, AND DEVICE THEREFOR

**Shunzo Aoyama, Wakoh; Kunio Yoshida, Fujimi; Hachiro Doi, Saitama, and Katsumi Sakamoto, Ohmiya, all of Japan, assignors to Ahresty Corporation, Tokyo, Japan**
**Filed May 24, 1989, Ser. No. 356,344**
**Claims priority, application Japan, May 25, 1988, 63-129367; May 25, 1988, 63-129368; Dec. 29, 1988, 63-171400; Jan. 31, 1989, 1-23440**
**Int. Cl.$^5$ B22D** *17/20*
**U.S. Cl. 164—72** **3 Claims**



3. A method of injection molding with a casting device that includes a cavity and an injection sleeve into which molten metal is supplied for injection into said cavity, said injection sleeve having an inner surface, said method comprising the steps of (a) supplying a heat insulating powder onto said injection sleeve, (b) simultaneously or subsequent to step (a), creating an electrostatic field within said injection sleeve such that said heat insulating powder will form a coating on said inner surface of said injection sleeve, (c) supplying molten metal into said injection sleeve, said heat insulating powder on the inner surface of said injection sleeve preventing too rapid cooling of the molten metal, (d) injecting said molten metal from said injection sleeve into said cavity to form a cast product, and (e) repeating steps (a), (b), (c) and (d) to produce another cast product.

---

### 5,014,766
### FOUNDRY CORE SHOOTER

**Andre Weber, Saverne, France, assignor to Kuhn S.A., Saverne, France**
**Filed Feb. 20, 1990, Ser. No. 481,211**
**Claims priority, application France, Feb. 24, 1989, 8902633**
**Int. Cl.$^5$ B22C** *11/04, 15/24, 19/04*
**U.S. Cl. 164—154** **8 Claims**

1. A core shooter comprising:

a shooting device;

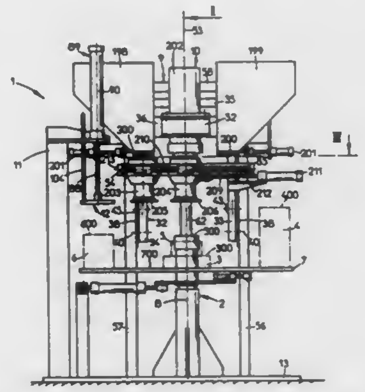
a sand supply means for supplying sand to said shooting device; and

a support means for core boxes, said support means being equipped with support elements which can simultaneously receive a plurality of core boxes, said support means being further equipped with means for alternatively bringing each one of said plurality of core boxes in a shooting zone opposite said shooting device;

wherein:

said shooting device comprises a plurality of shooting heads each formed by a metering device and a shooting unit, and which can be utilized during the same cycle of production, each one of said plurality of shooting heads having a metering device, whereas a shooting unit is common to at least some of said plurality of shooting heads; and

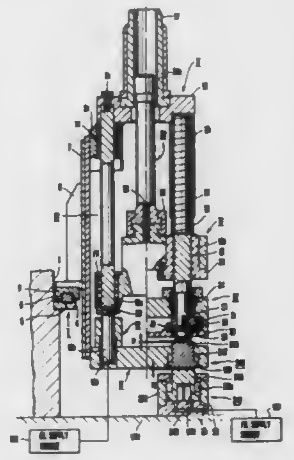
said sand supply means comprises a plurality of individual supplies of sand for supplying sand to said metering devices.



---

### 5,014,767
### MULTI-DRIVE INJECTION APPARATUS

**Toyoaki Ueno, Yamaguchi, Japan, assignor to UBE Industries, Ltd., Ube, Japan**
**Division of Ser. No. 295,520, Jan. 11, 1989, Pat. No. 4,980,394. This application Jan. 29, 1990, Ser. No. 471,379**
**Claims priority, application Japan, Jan. 30, 1989, 1-20053**
**Int. Cl.$^5$ B22D** *33/04, 17/00;* **B29C** *45/07*
**U.S. Cl. 164—312** **15 Claims**



1. An injection apparatus comprising:

a plunger supported at a substantially central portion of a supporting frame;

an injection sleeve, provided to be relatively movable upward/backward with respect to said supporting frame, for receiving a distal end portion of said plunger such that said distal end portion can move upward/backward;

first, moving means for vertically moving the injection sleeve upward/backward so as to be concentric with a mold;

a sleeve frame for supporting said injection sleeve;

a rotational-linear motion transmission mechanism, arranged

OL
126
SS
2
MY
14
1991
UMI

between a motor and said supporting frame, for converting a rotational motion into a linear motion;

second, moving means for vertically moving a screw shaft to generate a squeezing force via the plunger, said second moving means being adjacent to a lower end of said screw shaft

means for rotating said screw shaft to generate an injecting force, wherein rotation of said screw shaft in a first direction increase said injecting force, and rotation of said screw shaft in a second direction decreases said injecting force;

wherein said second moving means and said rotating means causes molten material within said injection sleeve to fill a cavity;

whereby flow of said molten material and filling of said cavity can be controlled smoothly, easily and accurately.

---

### 5,014,768
### CHILL PLATE HAVING HIGH HEAT CONDUCTIVITY AND WEAR RESISTANCE

**William J. Waters, Cleveland; George W. Leissler, Fairview Park, and Brian J. Edmonds, Cleveland, all of Ohio, assignors to Waters & Associates, Cleveland, Ohio**

**Filed Jun. 30, 1989, Ser. No. 373,495**

**Int. Cl.$^5$ B22D *11/00;* B22C *1/00***

**U.S. Cl. 164—418** **12 Claims**

1. A chill plate for continuous casting of high melting temperature metals comprising:

a copper substrate;

a coating applied to said substrate by plasma spray application of a coating composition, said coating composition comprising:

(i) copper powder having a mean particle size between about 44 microns and above 160 microns;

(ii) about 10% to about 20%, based on the volume of copper powder, of silicon carbide having a mean particle size between about 37 microns and about 62 microns; and

(iii) about 3% to about 7%, based on the volume of copper powder, of aluminum having a mean particle size between about 44 microns and about 90 microns.

---

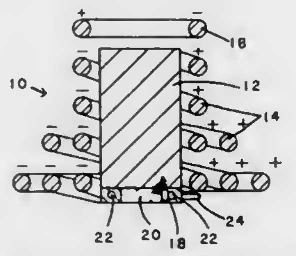
### 5,014,769
### INDUCTION MELTING OF METALS WITHOUT A CRUCIBLE

**Nagy H. El-Kaddah; Thomas S. Piwonka, both of Tuscaloosa, and John T. Berry, Northport, all of Ala., assignors to Inductotherm Corp., Rancocas, N.J.**

**Filed Apr. 17, 1989, Ser. No. 339,271**

**Int. Cl.$^5$ B22D *23/00, 45/00;* H05B *6/36***

**U.S. Cl. 164—493** **13 Claims**



1. Apparatus for inductively melting a quantity of metal without a container, comprising:

an induction coil having a plurality of turns defining a volume for receiving a quantity of metal, the induction coil being adapted to exert an electromagnetic force on the metal which increases toward the bottom portion of the metal;

means for energizing the coil;

a support means for supporting the metal from below and having an opening therethrough; and

means for maintaining the support means at a preselected temperature.

11. A method of inductively melting a quantity of metal without a container, comprising the steps of:

placing said quantity of metal within an induction coil;

producing an electromagnetic field within said induction coil, said electromagnetic field inducing eddy currents within said quantity of metal and electromagnetic forces against the surface of said quantity of metal, said electromagnetic force being stronger towards the lower portion of said quantity of metal, thereby causing said quantity of metal to melt from its top portion downwards;

melting said quantity of metal so that heat transfer from the liquid part of said quantity of metal will melt all of the remaining solid part of said quantity of metal except for a rim of solid metal in contact with a support means disposed at the bottom surface of said quantity of metal; and

further melting said quantity of metal so that said liquid part of said quantity of metal will flow through an opening in said rim of solid metal and an opening in said support means.

---

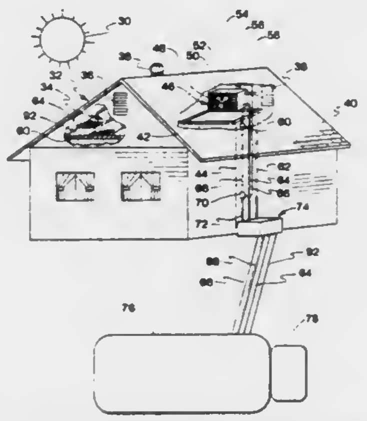
### 5,014,770
### ATTIC SOLAR ENERGY VEHICLE

**Edward G. Palmer, Elk River, Minn., assignor to Attic Technology, Inc., Elk River, Minn.**

**Filed Sep. 7, 1989, Ser. No. 404,192**

**Int. Cl.$^5$ F25B *29/00***

**U.S. Cl. 165—48.2** **3 Claims**



1. A solar energy collection and heat transfer means for heating a liquid, comprising:

(a) a substantially structurally unmodified roof means for collecting solar energy;

(b) a substantially structurally unmodified attic means adjacent said roof means, said attic means for receiving and storing the solar energy collected by said roof means;

(c) a forced air to liquid heat exchanger means within said attic means for transferring the stored solar energy from said attic means into a liquid, said liquid for receiving and absorbing the solar energy stored by said attic means, said forced air to liquid heat exchanger means further comprising:

(i) an air to liquid heat transfer coil, said coil comprising an inlet manifold, an outlet manifold, and a plurality of individual tubular members joined to form a plurality of coil circuits, said circuits interconnecting said manifolds and being substantially coplanar therewith;

(ii) fan means for drawing the air in said attic means into an air flow path having an úpstream direction and a down-stream direction, said fan means being adjacent to said coil and down-stream therefrom;

(iii) electric motor means operably connected to said fan means for driving said fan means;

(iv) venturi air flow means for directing said air; and

(v) housing means for housing said coil, fan means, motor means, and venturi air flow means, wherein said fan means, motor means, and venturi air flow means are substantially coplanar and down-stream from said coil; and

(d) a liquid system means for providing a controlled liquid flow path and for moving said liquid to and from said forced air to liquid heat exchanger means.

---

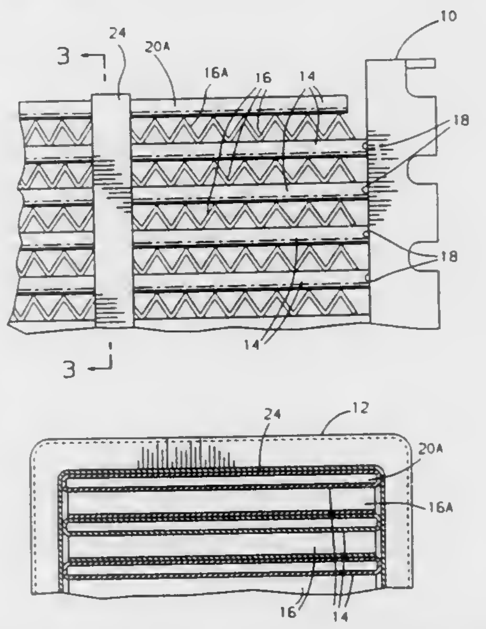
### 5,014,771
### HEAT EXCHANGER CORE REINFORCEMENT

**John F. Lederer, Lockport, Frederick Vincent Oddi, Orchard Park, both of New York, Corporation, Detroit, Mich., assignor to General Motors**

**Filed Sep. 17, 1990, Ser. No. 583,934**

**Int. Cl.$^5$ F28D *1/00***

**U.S. Cl. 165—76** **4 Claims**



1. A heat exchanger core as prepared for handling and heat bonding comprising a pair of headers, a row of oval shaped fluid carrying tubes received at opposite ends in slots in the respective headers, air centers arranged between and outboard of the outermost of said tubes, a pair of oval shaped reinforcement tubes shorter in length than said fluid carrying tubes, said reinforcement tubes arranged outboard of the respective outboard air centers and extending between but not received by said headers, and at least one processing strap having a lower thermal coefficient of expansion than said tubes wrapped about the core so as to tightly clamp the air centers and fluid carrying tubes together between the reinforcement tubes for handling and heat bonding.

---

### 5,014,772
### METHOD OF CIRCULATING A HEAT TRANSFER MEDIUM THROUGH A CATERPILLAR AND A PLATE TREATING APPARATUS USING THE CATERPILLAR

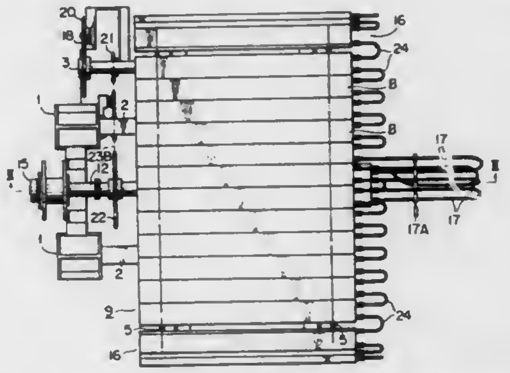
**Masao Ariga, Nagoya, Japan, assignor to Kabushiki Kaisha Taihei Seisakusho, Aichi, Japan**

**Filed Mar. 28, 1990, Ser. No. 500,746**

**Claims priority, application Japan, Mar. 30, 1989, 1-80286; Apr. 7, 1989, 1-89083; May 23, 1989, 1-129693; May 27, 1989, 1-133342**

**Int. Cl.$^5$ F28D *11/08;* F26B *25/00***

**U.S. Cl. 165—86** **32 Claims**



1. A method of circulating a heat transfer medium through a caterpillar, comprising the steps of:

arranging a heat transfer medium supplying rotary shaft within one side of the caterpillar in a transverse direction and a heat transfer medium discharging rotary shaft within the other side in alignment with the heat transfer medium supplying rotary shaft, the caterpillar including a group of strip-shaped hot plates disposed closely in parallel to each other, the caterpillar including opposite turning portions, each hot plate having a heat transfer medium passage formed therein, each heat transfer medium passage having an inlet and an outlet;

supporting proximal portions of both the heat transfer medium supplying rotary shaft and the heat transfer medium discharging rotary shaft on respective rotary joints;

sending the heat transfer medium through connecting tubes from the supplying rotary shaft to the inlets of the heat transfer medium passages and then from the outlets of the heat transfer medium passages to the discharging rotary shaft, the connecting tubes being-long enough to reach the turning portions of the caterpillar;

synchronously controlling the rotary shafts and the caterpillar in such a manner that each rotary shaft makes a revolution for a turn of the caterpillar.

---

### 5,014,773
### LIQUEFIED GAS BOILERS

**Carlo Beduz, and Ralph G. Scurlock, both of Southampton, England, assignors to The BOC Group plc, Windlesham, England**

**Filed Aug. 12, 1988, Ser. No. 232,394**

**Claims priority, application United Kingdom, Aug. 14, 1987, 8719349**

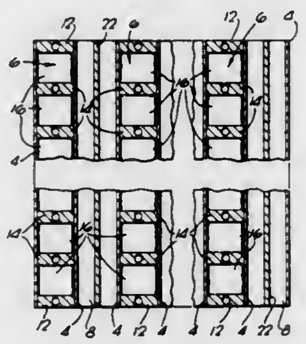
**Int. Cl.$^5$ F28D *5/02***

**U.S. Cl. 165—115** **4 Claims**

1. A boiler for liquefied gas comprising at least one heat transfer surface having an upper end and a lower end, means for creating a falling film of liquefied gas down the surface, means for heating the surface above the temperature at which the liquefied gas boils at the prevailing pressure, including a plurality of spaced, parallel, thermally conductive plates which define alternate passages for said liquefied gas and for fluid for heating the heat transfer surface present on the boiling side of the conductive plates, wherein each liquefied gas passage has a plurality of cooperating spacer members dividing

VOL
126
SS
2
MY
14
1991
UMI

said passage into three or more vertical channels, wherein each spacer member contains a plurality of spray orifices adapted to direct said liquefied gas at an associated heat transfer surface or surfaces, the orifices being in communication with a source of the liquefied gas, wherein said heat transfer surface has a multiplicity of non-regular interconnected vapor bubble nucleation sites.

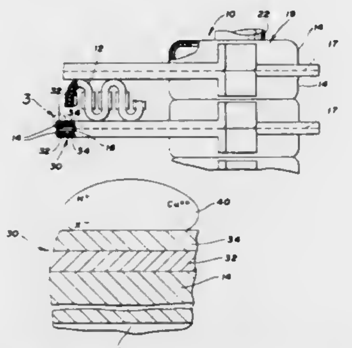


---

### 5,014,774
### BIOCIDAL COATED AIR CONDITIONING EVAPORATOR

**June-sang Siak, and Otto J. Klingenmaier, both of Warren, Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 2, 1989, Ser. No. 360,681**
**Int. Cl.$^5$ F28F** *13/18, 19/06*
**U.S. Cl. 165—133** **2 Claims**



1. An air conditioning system evaporator core formed of an aluminum alloy and having an exterior surface whereon aqueous condensate tends to accumulate during air cooling operations, said evaporator core having a coating applied to said surface substantially coextensive with it, said coating being adherent to said surface and thus adapted for extended time utility for inhibiting microbial growth in the aqueous condensate environment on said surface, said coating comprising a zinc layer deposited immediately onto said aluminum alloy and an outermost elemental copper plate overlying said zinc layer and suitable for reaction with said condensate to form cupric ions that are effective to inhibit microbial growth on said core.

---

### 5,014,775
### OIL COOLER AND MANUFACTURING METHOD THEREOF

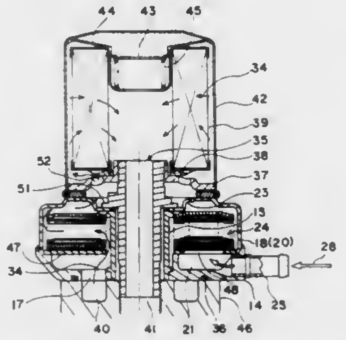
**Hiroshi Watanabe, Hadano, Japan, assignor to Toyo Radiator Co., Ltd., Tokyo, Japan**

**Filed May 15, 1990, Ser. No. 523,689**
**Int. Cl.$^5$ F28D** *9/00;* **F01M** *5/00, 11/03;* **F28F** *3/08*
**U.S. Cl. 165—167** **2 Claims**

2. A method of manufacturing an oil cooler, including a core of elements; and a casing housing said core, wherein said core is placed within said casing, said core being constructed by a plurality of flat and hollow doughtnut-like elements with fin members sandwiched between said doughnut-like elements, said doughnut-like elements each having a pair of cooling water flowing holes which are aligned with the adjacent cooling water flowing holes of the adjacent element just under or above the former one, said fin members respectively having corresponding holes formed therein being placed within each of said elements, cooling water flowing holes of the uppermost element of said core being closed by a closing member,

wherein each doughnut-like element consists of first and second metal plates having a flat doughnut shape, and an inner circumferential wall and an outer circumferential wall of the same height, said inner and outer circumferential walls being formed on the inner circumferential and the outer circumference of each of said metal plates, a partition ridge extending diametrically between said inner and outer circumferential walls and having thes ame height as that of said circumferential walls, said cooling water flowing holes being placed at first and second sides of the partition ridge and respectively have peripheral ring-like portions around each hole projected outward so as to form flanges used for braze treatment, said metal plates being stacked so as to face a concave face of a plate to an opposite and concave surface of an adjacent metal plate under or above said plate,

said casing consisting of a planar doughnut-shaped base, a central pipe having first and second ends, said central pipe attached to an inner perpheral edge of said base at said first end and passing therethrough, and a dish-like member having a central opening to which said second end of the central pipe is attached and having formed therein second oil openings around the circumferential edge of said central opening, said dish-like member is attached to the base through an outer pendent edge, a first gap being formed between the inner circumferential edge of the core and the outer wall of the central pipe and a second gap being formed between the outer circumferential edge of the core and the inner wall of said pendent portion of the dish-like member, the lower end of the first gap near the base being open to oil flow from said base and the upper end near the dish-like member being closed to oil flow, and the lower end of the second gap near the base being closed to oil flow and the upper end adjacent to the dish-like member being open to said second oil openings, and



the base having a pair of concavities, respectively formed therein so as to be opposite to the pair of cooling water flowing holes of an adjacent element, the base has a pair of cooling water flowing pipes, respectively leading to the concavities, said cooling water flowing pipes extending outward from the base, the peripheral edges of the stacked elements being connected to the peripheral edge of the base and a first oil hole is formed in the base so as to lead to the first gap, whereby oil flows from the first gap between the doughnut-like elements and out to the second gap,

wherein the structural parts making up said oil cooler are made of one of aluminum and its alloy materials, and coverings of braze material being previously applied to at least one of two structural parts to be adhered to each other, said method comprising the steps of:

removing said dish-like member constituting a part of the oil cooler casing,

placing an assembly of core elements on the base constituting another part of said casing,

melting the braze coverings applied to the elements in a high-temperature vacuum furnace,

solidifying said soft braze coverings to attach all parts or members including the base integrally, and

welding said outer pendent edge of the dish-like member to the outer circumferential edge of the base of the oil cooler casing, and welding said top portion of the center pipe to the central opening of the dish-like member,

fabricating said core by stacking a plurality of flat and hollow doughnut-like elements, inserting the fin members between two adjacent elements, making the cooling water flowing holes of an element correspond to the holes of the adjacent element, and closing the cooling water flowing holes of the top element by said closing means,

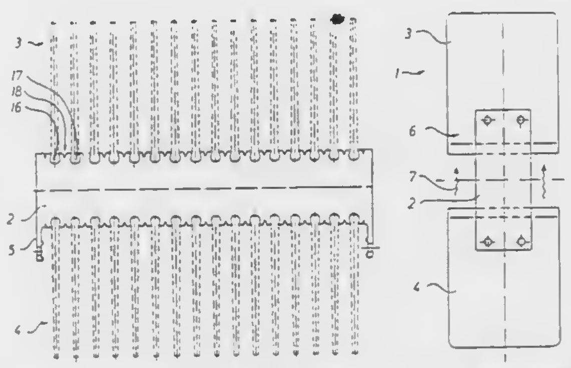
forming respective elements of a pair of flat and doughnut-like metal plates having an inner circumferential wall and an outer circumferential wall of the same height, respectively formed at the inner circumference and the outer circumference thereof, said pair of cooling water flowing holes are placed adjacently at both sides of the ridge extending in the radial direction of the metal plate and having the same height as that of the walls, projecting said flat and ring-like edges outward from said holes to form flanges and brazing to adhere these metal plates to each other in one of a back-to-back or front-to-front arrangement so as to make respective flowing holes correspond to adjacent flowing holes.

---

### 5,014,776
### HEAT EMITTING UNIT IN FORM OF A HEATER OR COOLER

**Joachim Hess, Schroeplerstrasse 35, D-8070 Ingolstadt, Fed. Rep. of Germany**

**Filed Mar. 22, 1989, Ser. No. 327,124**
**Claims priority, application Fed. Rep. of Germany, Apr. 27, 1988, 3814145**
**Int. Cl.$^5$ F28F** *7/00;* **B23P** *11/00*
**U.S. Cl. 165—185** **21 Claims**



1. A heat emitting unit having with a main body and a number of parallel generally flat ribs attached to at least one side of said main body protruding from said main body, comprising:

a plurality of channels extending generally parallel in said main body;

a plurality of intermediary ridges separating said channels;

said channels having a profile defined by generally flat surfaces on at least one side of each channel which extend at an angle relative to an outer surface of said main body so that said channels become wider towards an interior of said channels and create an undercut;

said channels having an open top which permits said ribs to protrude outwardly from said channels, and said channels having an open end which facilitates insertion of said ribs from said open end;

a foot profile formed on the ends of said ribs which generally corresponds to a cross-sectional profile of said channels, said foot profiles having a slightly smaller cross-sectional profile than said channels;

said foot profiles being insertable through said end opening so that said ribs and main body are assembled together; and

said ribs and main body being assembled together through pressure on said intermediary ridges which causes a deformation so that said foot profiles are pressed into place within said channels in said interior of said main body creating strong adherence and thermal conduction contact.

12. Heat transfer apparatus of the type having a main body and a plurality of parallel heat transfer ribs carried by said main body extending generally outwardly from said main body;

a plurality of open top channels formed in said main body having at least one open end in said main body;

said ribs including foot profiles which are slidably received from said open end through said channels in an axial direction;

at least one undercut formed by a cross-section which underlies at least in part said undercut;

said ribs and main body being assembled together by pressure on said undercut toward an interior of said main body which urges surfaces of said foot profiles and channels together in a fixed heat exchange contact;

and wherein said main body has a width defined by opposing sides in which said at least one open end of said channels is formed, and said ribs have a lateral width projecting beyond said width of said main body on at least one of said opposing sides thereof.

16. A method of assembling a main body and ribs in a heat transfer unit comprising:

providing a main body having a plurality of generally parallel channels extending through a surface of said main body, said channels having an open top and opposed open ends;

providing fins with foot profiles on a base of said ribs which may be slidably inserted into said channels from at least one of said open ends only;

providing intermediary ridges between said channels which define undercuts within said channels; and

press fitting said main body and ribs together by deforming said intermediary ridges inwardly to cause corresponding surfaces of said channels and foot profiles to be fitted together in fixed heat exchange contact.

---

### 5,014,777
### COOLING STRUCTURE

**Toshifumi Sano, Tokyo, Japan, assignor to NEC Corporation, Minato, Japan**

**Filed Sep. 19, 1989, Ser. No. 409,426**
**Claims priority, application Japan, Sep. 20, 1988, 63-237026; Dec. 21, 1988, 63-322333; Jan. 26, 1989, 1-19003**
**Int. Cl.$^5$ F28F** *7/00*
**U.S. Cl. 165—185** **20 Claims**

1. A cooling structure comprising:

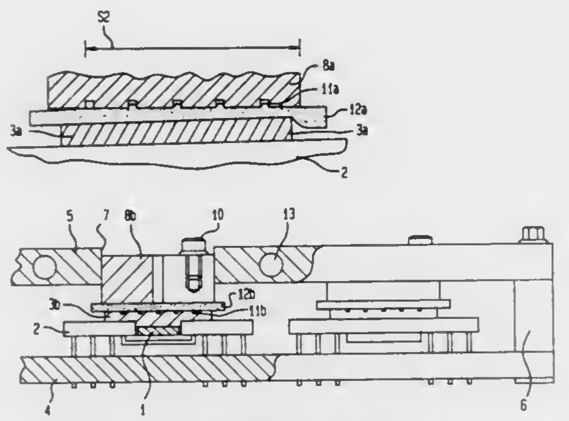
a substrate;

at least one heat generating member fixed on said substrate;

a heat radiating member provided above said heat generating member which is formed with grooves at least on the part opposite said heat generating member; and

OL
126
SS
2
MY
14
1991
UMI

an elastic heat transfer sheet provided between said heat generating member and said heat radiating member for



conducting heat generating in said heat generating member to said heat radiating member.

---

### 5,014,778

### MILLING TOOL FOR CUTTING WELL CASING

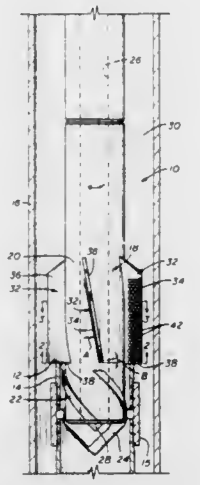
**Gerald D. Lynde, Bossier City; Kenneth W. Winterrowd, Shreveport, and Harold H. Harvey, Jr., Bossier City, all of La., assignors to Tri-State Oil Tools, Inc., Bossier City, La.**

**Continuation of Ser. No. 816,287, Jan. 6, 1986, Pat. No. 4,796,709. This application Mar. 18, 1988, Ser. No. 169,836**

**The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.**

**Int. Cl.$^5$ E21B *29/00***

**U.S. Cl. 166—55.6 36 Claims**



1. An oil field cutting tool adapted to be positioned and rotated downhole in a well bore for cutting metal casing previously positioned in the well bore, said tool comprising:
- a tool body adapted to be disposed at least in part within the metal casing to be cut during the cutting operation, and adapted to be detachably secured at its upper end to means for rotating the tool;
- an improved cutting structure on the tool body comprising:
  - a plurality of blades on the tool body at spaced intervals around the outer periphery thereof, each blade presenting a face extending outwardly from the tool body with respect to the longitudinal axis of rotation of the tool body, said face constituting a leading face of the blade with respect to the direction of the tool body; and
  - a plurality of cutting elements of hard, wear-resistant material of predetermined size and shape arranged and mounted on the leading face of the blades in a predetermined pattern, each cutting element having a generally planar front cutting face, an opposed back face secured to the leading face of the respective blade, and a peripheral surface extending from the back face to the front face defining a sharp cutting edge extending around the front face of said cutting element, the front cutting face and sharp cutting edge adapted to be engageable with the metal casing to be cut;
- said cutting elements in said predetermined pattern being arranged on the respective blade in closely spaced side-by-side relationship in a plurality of predetermined rows extending in a direction generally outwardly from the longitudinal axis of rotation of the tool body, and in a plurality of predetermined columns extending in a direction generally along the longitudinal axis of rotation of the tool body, with each row and each column having at least two cutting elements therein, whereby the cutting elements of the bottom row of cutting elements on each blade are engageable with the metal casing to be cut and present a generally continuous bottom cutting edge across the width of said row.

---

### 5,014,779

### DEVICE FOR EXPANDING PIPES

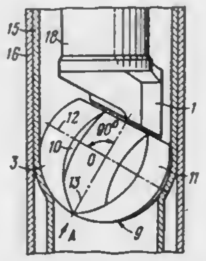
**Konstantin V. Meling, ulitsa Gafiatullina, 27, kv. 20, Bugulma, U.S.S.R.; Jury A. Safonov, ulitsa Alisha, 5, kv. 6I, Bugulma, U.S.S.R.; Gabdrashit S. Abdrakhmanov, ulitsa Gogolya, 66, kv. 7I, Bugulma, U.S.S.R.; Jury G. Mikhailin, ulitsa Osipenko, 4, kv. 2I2, Kuibyshev, U.S.S.R.; Rodion M. Bogomolov, ulitsa Malogvardeiskaya, I09/II5, kv.25, Kuibyshev, U.S.S.R.; Valentin V. Salomatin, ulitsa Skiyarenko, 3, kv.I4, Kuibyshev, U.S.S.R.; Almaz A. Mukhametshin, ulitsa Gafiatullina, 26, kv. 5I, Bugulma, U.S.S.R., and Salikhzyan M. Mingazov, ulitsa G.Uspenskogo, 69, kv.3, Bugulma, U.S.S.R.**

**PCT No. PCT/SU88/00238, § 371 Date Aug. 2, 1990, § 102(e) Date Aug. 2, 1990, PCT Pub. No. WO90/05831, PCT Pub. Date May 31, 1990**

**PCT Filed Nov. 22, 1988, Ser. No. 555,507**

**Int. Cl.$^5$ E21B *29/10***

**U.S. Cl. 166—55.7 1 Claim**



1. A device for expanding pipes, comprising a housing (1) having an expending member (3) mounted thereon in bearings (4, 5) on a journal (2) at an angle with respect to the longitudinal axis of the housing (1), characterized in that the expanding member (3) is shaped as a spherical segment (9) having its external surface defined by alternating portions of a spherical surface (10) and the lateral surfaces of cylinders (11) whose geometric axes (12) belong to a plane perpendicular to the axis (13) of the journal (2).

---

### 5,014,780

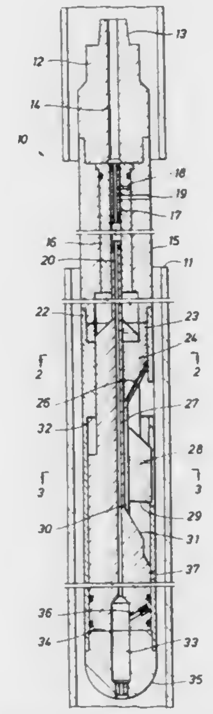
### LONG DISTANCE SECTION MILL FOR PIPE IN A BOREHOLE

**Uvon Skipper, 7409 S. Rice Ave., Bellaire, Tex. 77401**

**Filed May 3, 1990, Ser. No. 518,133**

**Int. Cl.$^5$ E21B *29/00***

**U.S. Cl. 166—55.8 9 Claims**



1. A miller for lowering into a cased well for milling a casing from the well, the miller comprises:
- (a) an elongate outer tubular body having an inner axial passage therealong and adapted to be connected at the upper end thereof to a pipe string in the casing for rotation and cutting the casing;
- (b) a movable inner mandrel within said outer body, said inner mandrel movable between an initial position in said outer body and an operative position relative to the initial position therein;
- (c) radially extending cutters moveably mounted relative to and extending from said outer body and having cutting edges for contact against surrounding casing wherein said cutters are constructed for cutting the casing on rotation of said outer body with the pipe string;
- (d) shoulder means movable with said inner mandrel for operatively moving said cutters radially outwardly into a cutting position;
- (e) chamber means within said outer body and having an extension volume located to relatively move said mandrel to operate said shoulder means with said cutters for moving radially outwardly for cutting of the casing in the well on rotation of the miller;
- (f) wherein said inner mandrel is positioned for telescoping movement within said outer tubular body and includes lengthwise slots formed therealong wherein said slots receive said cutters therein for radial movement outwardly, and said slots include means slideably engaging said cutters wherein said means comprises an interlocking dovetail connection; and
- (g) wherein said slots include a shoulder comprising said shoulder means for individually yet jointly moving said cutters to the radially outwardly extending position.

---

### 5,014,781

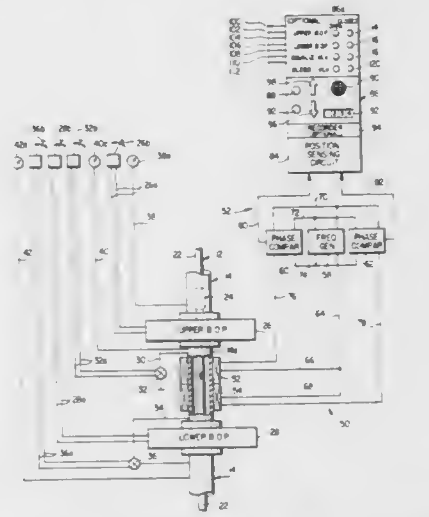
### TUBING COLLAR POSITION SENSING APPARATUS, AND ASSOCIATED METHODS, FOR USE WITH A SNUBBING UNIT

**Michael L. Smith, P.O. Box 249 (County Rd. 38), Banquete, Tex. 78339**

**Continuation of Ser. No. 391,488, Aug. 9, 1989, Pat. No. 4,964,462. This application Jul. 19, 1990, Ser. No. 555,948**

**Int. Cl.$^5$ E21B *47/09, 33/072;* G01B *7/00;* G01V *3/26***

**U.S. Cl. 166—66.5 13 Claims**



1. Apparatus for sensing the entry into a predetermined longitudinal section of a pipe extending downwardly into a well bore, of an anomaly of an elongated structure being axially moved through the interior of said pipe, said apparatus comprising:
- anomaly detecting means along said longitudinal section of said pipe, said anomaly detecting means for detecting variations in the longitudinal position of said anomaly relative to said longitudinal section of the pipe, and responsively generating output signal means indicative of the entry of said anomaly in said longitudinal section of the pipe; and
- isolating means for isolating the pipe interior above said section of pipe from the well bore pressure while permitting the axial passage of the elongated structure through the section of pipe.

---

### 5,014,782

### VENTING PACKER

**Ronald A. Daspit, 1301 E. Genie St., Chalmette, La. 70043**

**Filed Jan. 30, 1990, Ser. No. 472,257**

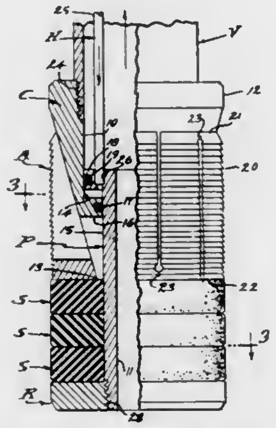
**Int. Cl.$^5$ E21B *33/126, 33/129***

**U.S. Cl. 166—120 16 Claims**

1. A venting packer for releasable anchored and sealed engagement in a pipe and positioned to isolate fluids in the pipe from an open end thereof under work conditions, and including;
- telescopically related body members having interconnecting bores, the bore of one body member opening toward said open end of the pipe and being extended by a vent tube, and the bore of the other body member being open away from said open end of the pipe and being in open communication with fluids within the pipe into which it is inserted, the two body members having inner and outer diameters separated by inwardly and outwardly turned flanges forming a cylinder and piston annulus therebetween,
- anchor means carried over said one body member to engageably grip an inner diameter wall of said pipe into which it is inserted,

VOL
126
SS
2
MY
14
1991
UMI

- a packer element carried by said other body member to engageably seal the interconnecting bores against said fluid within the pipe into which it is inserted,
- and operating means including a fluid pressure line carried by and extending from the said other body member and



opening into and exhausting from the cylinder and piston annulus and forceably shifting the body members relative to each other for simultaneous releasable actuation of the anchor means to engageably grip in the pipe and of the packer element to engageably seal in the pipe.

---

### 5,014,783
## SEQUENTIALLY FLOODING AN OIL-BEARING FORMATION WITH A SURFACTANT AND HOT AQUEOUS FLUID

**D. Craig McClure, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio**

**Continuation of Ser. No. 348,311, May 5, 1989, abandoned, which is a continuation-in-part of Ser. No. 192,454, May 11, 1988, Pat. No. 4,842,065. This application Aug. 28, 1990, Ser. No. 576,083**

**Int. Cl.$^5$ E21B *43/22***

**U.S. Cl. 166—252** **21 Claims**

1. A process for recovering oil from an oil-wet fractured subterranean oil-bearing formation having an ambient formation temperature and penetrated by at least two wells from the surface which are in fluid communication with said formation and with one another comprising:

- (a) injecting a first slug of a surfactant solution into said fractured formation via a first of said at least two wells, said surfactant solution capable of becoming the preferred wetting phase of an oil-wet matrix block in said fractured formation;
- (b) contacting a face of said oil-wet matrix block with said surfactant solution for a time sufficient for said surfactant solution to penetrate and become the preferred wetting phase of at least a portion of said matrix block thereby displacing oil from said portion of said matrix block toward said face of said matrix block;
- (c) injecting a second slug of a hot water having a temperature greater than said ambient formation temperature into said formation via a second of said at least two wells;
- (d) contacting said face of said matrix block with said hot water for a time sufficient for said hot water to penetrate and restore said portion of said matrix block to an oil-wet condition;
- (e) displacing said oil away from said face of said matrix block with said hot water toward said first well;
- (f) recovering said oil from said formation via said first well; and
- (g) repeating steps (a), (b), (c), (d), (e), and (f).

---

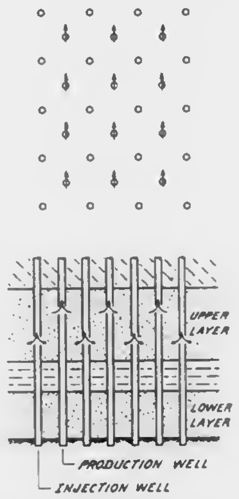
### 5,014,784
## STEAMFLOODING IN MULTI LAYERED RESERVOIRS

**Chin-Wen Shen, deceased, late of Houston, Tex. by Tze-Chien Shen, executor , assignor to Texaco Inc., White Plains, N.Y.**

**Filed Jan. 26, 1990, Ser. No. 470,463**

**Int. Cl.$^5$ E21B *43/00***

**U.S. Cl. 166—263** **4 Claims**



2. A method for improving efficiency in the recovery of hydrocarbon produt from multi-layered formations containing hydrocarbons, said formations all penetrated by a patterned array of wells, comprising the steps of:

- utilizing a first set of said wells as injection wells to inject steam into the lowermost of said layers;
- utilizing a second set of said wells as production wells to extract from said lowermost layer the hydrocarbon product generated by said steamflooding;
- utilizing at least some of said second set of wells as injection wells to inject steam into the next upper lowermost of said layers, the bottom portion of which was preheated by convection from the steamflooding of the lower layer; and
- utilizing at least some of said first set of wells as production wells to extract from said next upper layer the hydrocarbon product generated by said steamflooding.

---

### 5,014,785
## METHANE PRODUCTION FROM CARBONACEOUS SUBTERRANEAN FORMATIONS

**Rajen Puri, Tulsa, Okla., and Michael H. Stein, Houston, Tex., assignors to Amoco Corporation, Chicago, Ill.**

**Continuation-in-part of Ser. No. 249,810, Sep. 27, 1988, Pat. No. 4,883,122. This application Aug. 8, 1989, Ser. No. 391,212**

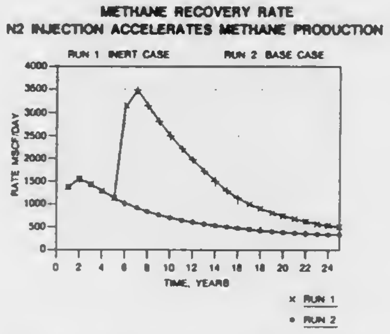
**The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.**

**Int. Cl.$^5$ E21B *43/16, 43/24, 43/30, 43/40***

**U.S. Cl. 166—263** **32 Claims**

1. A method for producing methane from a solid carbonaceous subterranean formation penetrated by at least one injection well and at least one production well, the method of production comprising the steps of:

- (a) injecting a gas, consisting essentially of an inert gas, through the injection well and into the solid carbonaceous subterranean formation; and



- (b) producing a composition comprising inert gas and methane from the production well.

---

### 5,014,786
## PRESSURE CHECKER

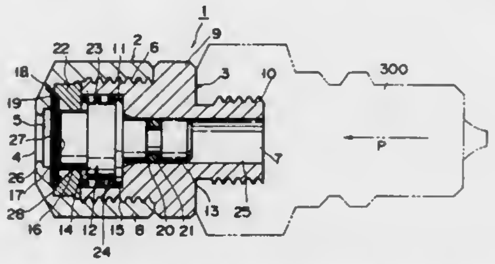
**Yoshikazu Kobayashi, Tokyo, Japan, assignor to Nitto Kohku Co., Ltd., Tokyo, Japan**

**Filed Mar. 5, 1990, Ser. No. 489,236**

**Claims priority, application Japan, Mar. 10, 1989, 1-58568**

**Int. Cl.$^5$ G01L *7/16***

**U.S. Cl. 116—272** **6 Claims**



1. A pressure checker for a fluid pressure source, comprising:

- a main unit including a hollow portion which can communicate with a fluid pressure source;
- a cap with a window fitted on said main unit;
- a spool reciprocally contained in the hollow portion of said main unit, said spool being provided with a front end portion with a defined pressure indication surface;
- a compression coil spring for biasing said spool against the pressure of said fluid pressure source; and
- a flat light-shielding member positioned in said window of said cap, said flat light-shielding member being provided with a bag made of a material which allows at least partial transmission of light, and a light-absorbing liquid sealed in said bag, characterized in that
- said flat light-shielding member transmits light through said window toward said defined pressure indication surface when said spool is removed by the pressure of said fluid pressure source against the biasing force of said compression coil spring, and can also transmit light reflected by said defined pressure indication surface to the outside,
- and wherein the hollow portion of said main unit includes a small diameter hole, a large diameter hole, and a stepped portion formed between the small and large diameter holes, and said spool includes a sliding guide positioned in the small diameter hole, a body positioned in the large diameter hole, a front end portion, and a collar which is positioned between said body and said guide and is urged against said stepped portion by the biasing force of said spring.

---

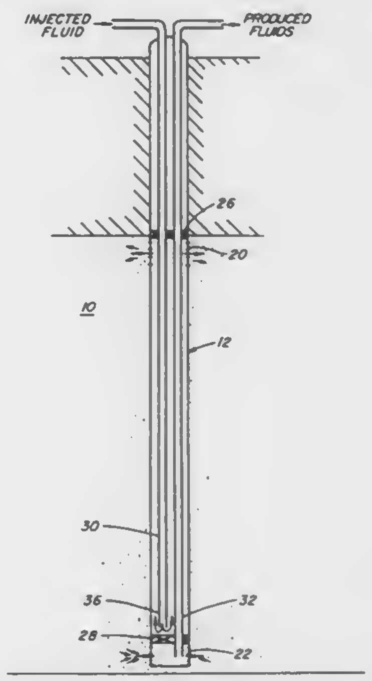
### 5,014,787
## SINGLE WELL INJECTION AND PRODUCTION SYSTEM

**John H. Duerksen, Fullerton, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed Aug. 16, 1989, Ser. No. 394,687**

**Int. Cl.$^5$ E21B *43/24***

**U.S. Cl. 166—303** **7 Claims**



1. A method for multiple string fluid injection and production of viscous hydrocarbons from a single wellbore having a casing traversing a subterranean formation, comprising the steps of:

- a. providing lower perforations to establish lower communication point between a lower portion of the formation and the inside of the casing;
- b. providing upper perforations to establish upper communication point between an upper portion of the formation and the inside of the casing;
- c. setting a single string packer within the casing above the lower point of communication to establish a production zone below the single string packer and a thermal zone above the single string packer;
- d. setting a dual-string packer above the upper point of communication, said dual-string packer defining the upper boundary of the thermal zone;
- e. introducing a first tubing string into the wellboro;
- f. terminating the first tubing string at the production zone;
- g. introducing a second tubing string paralleling the first tubing string into the wellboro;
- h. terminating the second tubing string in the lower portion of the thermal zone; and
- i. flowing a drive fluid into the second tubing string and through the upper perforations wherein prior to entering the formation the drive fluid transfers heat to the wellbore casing to create a thermal communication path within the formation adjacent to the wellbore casing between the upper and lower perforations, said thermal communication path acting to direct at least a portion of the viscous hydrocarbons in the formation near the wellbore to the lower perforations for recovery;
- j. simultaneous with step i., flowing a produced fluid from the production zone through the first tubing string for said recovery.

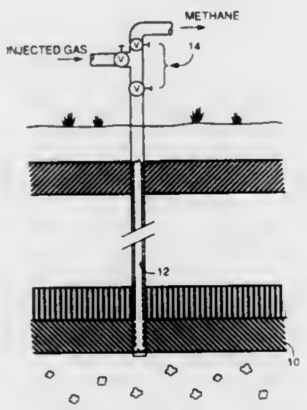
### 5,014,788
## METHOD OF INCREASING THE PERMEABILITY OF A COAL SEAM

**Rajen Puri; Dan Yee; Thomas S. Buxton, all of Tulsa, Okla., and Om Majahan, Wheaton, Ill., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Apr. 20, 1990, Ser. No. 511,497**

**Int. Cl.⁵ E21B** *43/25, 43/26, 43/27*

**U.S. Cl. 166—308** **31 Claims**



1. A method of increasing the rate of methane production from a subterranean coal seam penetrated by a wellbore, the method comprising:
   (a) introducing fluid that causes coal to swell into the subterranean coal seam through the wellbore at a pressure above ambient reservoir pressure at the wellbore and below a fracture pressure of the coal seam;
   (b) maintaining the injected fluid in the coal seam in a pressurized condition so that the fluid will contact the coal seam; and
   (c) relieving the pressure within the coal seam by permitting the fluid to flow out from the wellbore prior to the pressure within the coal seam decreasing to a stabilized pressure.

---

### 5,014,789
## METHOD FOR STARTUP OF PRODUCTION IN AN OIL WELL

**Neville Clarke, Unit 4, 481 Princes Highway, Narre Warren, 3805, Victoria, and Thomas H. Winter, Unit 3, 21/27 St. Vincent Street, Albert Park, 3206, Victoria, both of Australia**

**PCT No. PCT/AU87/00201, § 371 Date Feb. 27, 1989, § 102(e) Date Feb. 27, 1989, PCT Pub. No. WO88/00277, PCT Pub. Date Jan. 14, 1988**

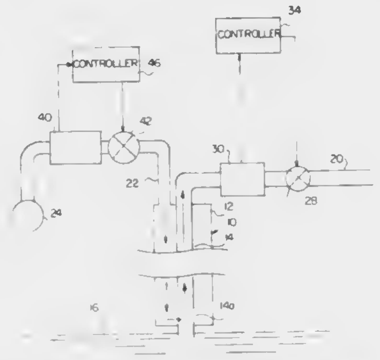
**PCT Filed Jul. 7, 1987, Ser. No. 299,831**

**Claims priority, application Australia, Jul. 7, 1986, PH6777/86**

**Int. Cl.⁵ E21B** *43/12, 43/18*

**U.S. Cl. 166—372** **6 Claims**

1. A method of startup of oil production in a continuous gas-lift oil well comprising the steps of:
   injecting gas into the well fluid to be recovered to reduce its effective density so as to facilitate lifting of the fluid;
   monitoring the flow rate of the fluid from the well;
   progressively opening valve means controlling the fluid flow from the well; and
   controlling said opening of the valve means such that the rate of opening thereof is varied to reduce the rate of opening on detection of an increase in monitored flow rate which is greater than a predetermined rate, whereby to reduce the tendency for slugging.



---

### 5,014,790
## METHOD AND APPARATUS FOR FIRE CONTROL

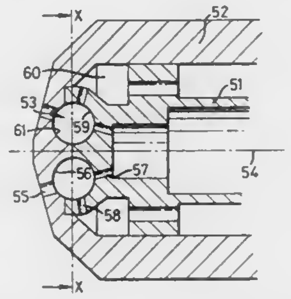
**Panayiotis G. Papavergos, Woking, England, assignor to The British Petroleum Company plc, London, England**

**Filed Oct. 18, 1988, Ser. No. 259,067**

**Claims priority, application United Kingdom, Oct. 24, 1987, 8724973**

**Int. Cl.⁵ A62C** *35/00*

**U.S. Cl. 169—44** **17 Claims**



1. A method of fire control by use of a spray nozzle, the method comprising the steps of(a) supplying to the spray nozzle separately and under pressure non-flammable gas, and non-flammable liquid, said spray nozzle having a mixing chamber with at least one gas inlet, at least one liquid inlet and at least one outlet, and said gas and liquid mixing in said mixing chamber with at least a part of the liquid being sheared and recirculated therein to produce a spray from said outlet and (b) directing said spray to control the fire.

---

### 5,014,791
## LAWN AERATOR

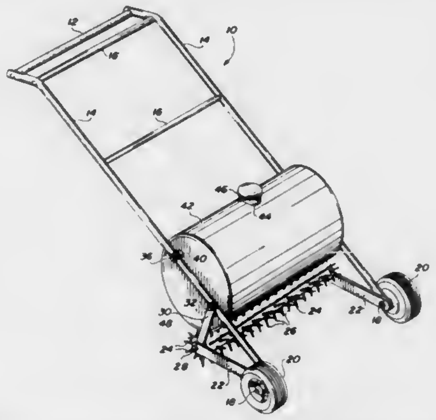
**William L. Kure, 401 E. Monte Cristo, Phoenix, Ariz. 85022**

**Filed Mar. 19, 1990, Ser. No. 495,604**

**Int. Cl.⁵ A01B** *1/24*

**U.S. Cl. 172—21** **20 Claims**

19. A lawn aerator, comprising:
   at least one frame member forming a substantially planar frame;
   at least one bracket member extending forward of, and attached to, said substantially planar frame;
   at least one brace member substantially perpendicular to, and attached to, said substantially planar frame, a forward end of said at least one brace member attached to said at least one bracket member;
   an aerator cylinder having a plurality of aerating pegs extending radially from said cylinder, said cylinder rotatable about its longitudinal axis and operatively connected to a rearward end of said at least one brace member;
   mounting means for relatively mounting at least one wheel member on a lower end of said substantially planar frame; and
   a hollow drum removably mounted on said substantially planar frame.



---

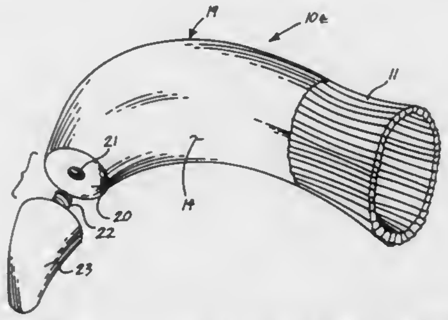
### 5,014,792
## GARDEN GLOVE TOOL

**Christian S. Gierloff, 187 Penzance Rd. P.O. Box 426, Woods Hole, Mass. 02543**

**Filed Apr. 4, 1990, Ser. No. 504,406**

**Int. Cl.⁵ A01B** *01/00, 01/06, 01/22*

**U.S. Cl. 172—371** **4 Claims**



1. A garden glove tool for receiving a hand, and fixing the hand in a generally "J" shaped configuration, wherein the tool comprises,
   an elongate "J" shaped rigid body, the body including a forward downwardly extending convex surface defining a concave bottom surface underlying a coextensively arranged convex top surface, the top surface and the bottom surface extending rearwardly and defining a rigid entrance opening, and
   a flexible skirt mounted coextensively to the entrance opening and rearwardly thereof, and
   wherein the skirt defines a truncated conical configuration and is formed of a flexible and resilient fabric to enclose the hand within the body, and
   wherein the convex top surface includes a threaded bore, the threaded bore receiving a threaded shank complementarily therewithin, and the threaded shank mounting an arcuate spike member thereon, the arcuate spike member terminating in a forwardly directed point.

---

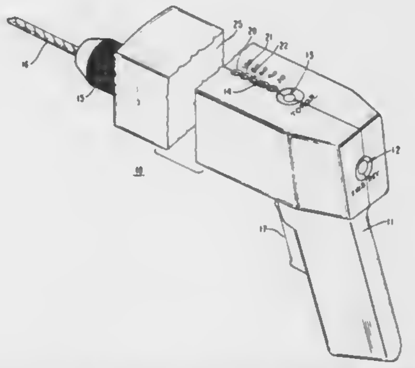
### 5,014,793
## VARIABLE SPEED DC MOTOR CONTROLLER APPARATUS PARTICULARLY ADAPTED FOR CONTROL OF PORTABLE-POWER TOOLS

**Damon Germanton, Kennalon, and Menahem Lehr, Teaneck, both of N.J., assignors to Measurement Specialties, Inc., Wayne, N.J.**

**Filed Apr. 10, 1989, Ser. No. 335,744**

**Int. Cl.⁵ B23Q** *5/00*

**U.S. Cl. 173—12** **16 Claims**



1. In a portable electric tool having a DC motor for driving a tool bit and for controlling the speed and torque at which said tool bit rotates, the improvement comprising:
   a zero displacement switch means coupled to said tool and operative to provide an output voltage proportional to the pressure applied directly to said switch via the hand of the user,
   control means coupled to said motor and responsive to said output voltage to variably control the speed of said motor according to the pressure applied to said displacement switch means,
   said control means including a pulse modulator for converting said output voltage to a pulse width modulated signal at an output of said modulator and means for applying said pulse width modulated signal to said motor for varying the speed of said motor according to said applied pressure, and
   switching means having first and second output electrodes and a control electrode, with said first output electrode coupled to one terminal of said motor and with said second output electrode coupled to a point of reference potential with said control electrode operative to switch said first and second output electrodes according to a control voltage applied thereto and with said control electrode coupled to said output of said pulse width modulator to operate said switch according to said pulse width modulated signal to therefore control the current through said DC motor and therefore the speed of said motor according to said pulse width modulated signal.

---

### 5,014,794
## POWER DRIVEN TOOL AND DRIVE SYSTEM THEREFOR

**Gunnar C. Hansson, Stockholm, Sweden, assignor to Atlas Copco AB, Stockholm, Sweden**

**Filed Jul. 7, 1989, Ser. No. 376,499**

**Claims priority, application Sweden, Jul. 8, 1988, 8802566**

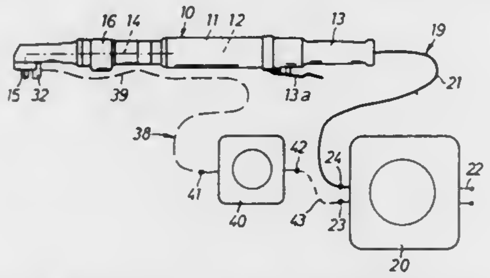
**Int. Cl.⁵ B25B** *23/151*

**U.S. Cl. 173—12** **10 Claims**

1. A power driven tool and drive system for tightening screw fasteners comprising: a portable housing; a rotary motor in said housing responsive to specific electrical input power having at least one particular drive parameter with a predetermined variation during tightening; a static converter means having an output and a control input, said converter means being connected to said motor so as to selectively provide from said output said specific electrical power having said at least

/OL
126
SS
2
MY
14
1991
UMI

one drive parameter; a first circuit means connecting said motor to said output of said static converter means; an output shaft on said housing in driven connection with said motor thereof; at least two screw fastener engaging members selectively connectable to said output shaft into working position on said housing to be driven by said motor and each demanding to receive from said static converter and motor, via code elements its own specific driving parameter and predetermined variation thereof for proper tightening of a screw fastener engaged by said member in its working position; a second circuit means connecting said housing to said control input of said converter means, said second circuit having a special identification means on said housing for identifying said members via said code elements: and said identification means being connected to electronic means in said second circuit to set said control input on said converter means so that said converter means is adjusted to generate the specific electrical power for said motor demanded by the member connected to said output shaft.



---

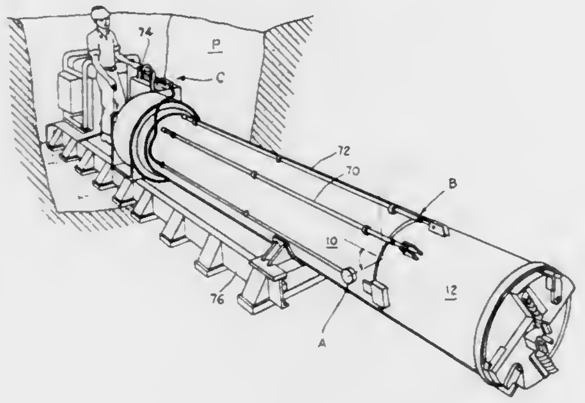
### 5,014,795
### PERCENT GRADE BORING AND MONITORING APPARATUS

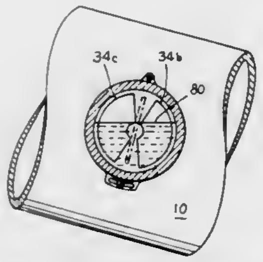
**Paul N. Gibson, Saluda, S.C., assignor to Augers Unlimited, Inc., Ashland, Ohio**

**Filed May 1, 1989, Ser. No. 345,907**

**Int. Cl.$^5$ E21B** *7/06, 47/024*

**U.S. Cl. 175—45** **25 Claims**





1. A combination of a boring tool for forming a bore underground at a desired percent of grade and a grade sensor for sensing said percent of grade as said bore is formed, said boring tool having a pipe casing, a casing head carried adjacent to said pipe casing having a cutting head which cuts said bore, means for steering said casing head up or down to correct the grade of said bore, and means for pushing said pipe casing through the bore as it is formed, said grade sensor comprising:

a sensor housing carried by a side wall of said casing;

variable capacitor sensor means carried by said sensor housing for sensing motion about a sensing axis in a pitch direction corresponding to changes in percent of grade, and generating variable capacitance signals in response to said motion about said sensing axis said sensing axis is arranged to extend between 65 and 110 degrees of a vertical axis intersecting the longitudinal axis of said casing; and

means for converting said variable capacitance signals into grade signals representing deviations in percent of grade to correct for deviations of said casing in grade as said bore is formed;

whereby said steering means may be controlled to return said casing to said desired percent of grade.

---

### 5,014,796
### DOWN HOLE DRILLS USING SPENT DRIVING FLUID FOR FLUSHING PURPOSES

**Per Gustafsson, 4, Chemin de Bouvreuiles, 1009 Pully, Switzerland**

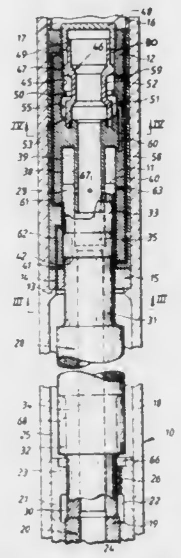
**Filed Jan. 8, 1990, Ser. No. 462,493**

**Continuation-in-part of PCT SE88/00370 filed Jul. 6, 1988, published as WO89/00638 on Jan. 26, 1989.**

**Claims priority, application Sweden, Jul. 14, 1987, 8702860**

**Int. Cl.$^5$ E21B** *4/14*

**U.S. Cl. 175—296** **22 Claims**



1. A hydraulic down-the-hole rock drill comprising:

a casing:

a piston hammer located in said casing:

said piston hammer having a major central portion and opposed end portions of reduced diameter;

means for guiding said end portions in said casing;

a central chamber being provided in said casing containing said major portion of said piston hammer; and

a clearance being provided between said major portion of said hammer and said casing to permit hydraulic fluid to bypass said major portion during reciprocation of said piston hammer in said central chamber.

---

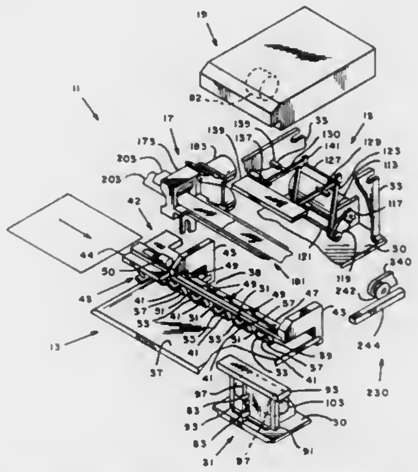
### 5,014,797
### MODULAR MAILING MACHINE

**Donald T. Dolan, Ridgefield; Robert T. Durst, Jr., Monroe; David W. Hubbard, Stamford, and Morton Silverberg, Westport, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Division of Ser. No. 134,625, Dec. 17, 1987, abandoned. This application Sep. 15, 1989, Ser. No. 408,015**

**Int. Cl.$^5$ G01G** *23/38, 19/40*

**U.S. Cl. 177—4** **8 Claims**



1. A mailing machine comprised of a plurality of modules, each of said modules mounted in said mailing machine to form a single process station, said mailing machine having a base and a plurality of support walls, wherein said mailing machine comprises:

an envelope support module having a plate for supporting an envelope and forming a portion of said process station;

support means for supporting said plate in vertically spaced relationship to the base of said mailing machine;

a transport module having means for positioning said envelope in said process station and ejecting said envelope from said process station including,

a frame,

positioning means for applying a friction force on said envelope to position said envelope on said plate, said positioning means being mounted to said frame,

frame support means for supporting said frame such that said frame selectively places said positioning means in a first position causing said positioning means to come into friction contact with said envelope or a second position such that said friction means is removed from contact with said envelope,

a meter module having a registration area and a printing means located in said registration area for imprinting an indicia on said envelope, said meter module forming a partial of said process station such that positioning of said envelope by said transport means causes a portion of said envelope to be in said registration area;

a platen module having,

a platen plate,

an elastomer member fixably mounted to a first surface of said platen plate,

platen support means for supporting said platen plate such that said elastomeric member is opposite said registration area of said meter module and such that said platen plate can be selectively positioned in a first position wherein said elastomeric member is in close proximity means of said meter module and a second position wherein said elastomeric member is positioned generally below said plate or said envelope support means, and

wherein said modules operate in a manner generally functionally independent of any other module, does not interfere with the operation of any other module and said modules can perform their respective function to said envelope while said envelope reside at said process station.

---

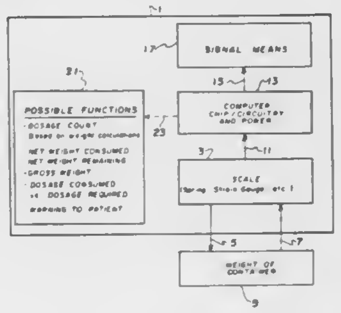
### 5,014,798
### PATIENT COMPLIANCE MEDICINE CAP

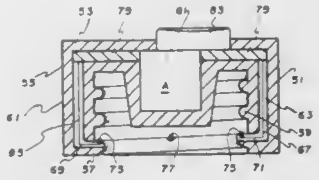
**Kenneth P. Glynn, Raritan Township, Hunterdon County, N.J., assignor to Tenax-Glynn Corporation, Flemington, N.J.**

**Filed Dec. 26, 1989, Ser. No. 457,177**

**Int. Cl.$^5$ G01G** *13/16, 23/18, 19/52;* **G06F** *15/42*

**U.S. Cl. 177—25.19** **16 Claims**





1. A cap for a medicine container for patient compliance monitoring, comprising:

(a) a cap frame having a top, sides and one or more ledges extending inwardly from said sides, said frame further including means for removably attaching said cap to a medicine container;

(b) scale means located at least in part on said ledges such that a medicine container to which said cap is removably attached, may be weighed by picking up said cap, with the gravitational pull of the hanging medicine container and its contents registering a weight on said scale means;

(c) a computer chip and essential circuitry connected to said scale means and located within said cap frame which is capable of generating medicine container content depletion data; and,

(d) signal means for communicating said medicine container content depletion data to a patient, said signal means being functionally connected to said computer chip and being located on or in said cap frame.

---

### 5,014,799
### MEASURING APPARATUS

**Akira Sato, Saitama; Kazuaki Hama, Tokyo; Makoto Nakao, Tokyo; Junichi Misawa, Tokyo, and Hiroyuki Suzuki, Kanagawa, all of Japan, assignors to Bridgestone Corporation and Misawa Shokai Co., Ltd., both of Tokyo, Japan**

**Filed Dec. 12, 1989, Ser. No. 449,674**

**Claims priority, application Japan, Dec. 19, 1988, 63-319972**

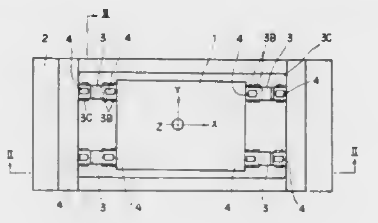
**Int. Cl.$^5$ G01G** *3/14;* **G01L** *1/22*

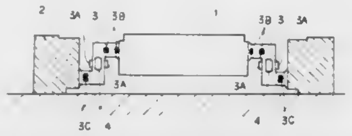
**U.S. Cl. 177—211** **5 Claims**

1. A measuring apparatus, comprising a load receiving plate; a frame member enclosing said load receiving plate; at least four beams coupling said load receiving plate and said frame member to each other, thereby supporting said load receiving plate; and strain gauges provided on said beams; said at least four beams being crank-shaped beams, each comprising two

OL
126
SS
2
MY
14
991
UMI

substantially parallel first portions and a second portion substantially perpendicular to and connecting said two first por-





tions, and said gauges being provided on each of said two first portions and said second portion.

---

5,014,800

### MOTOR DRIVING DEVICE PROVIDED WITH DECELERATOR AND ELECTRIC VEHICLE

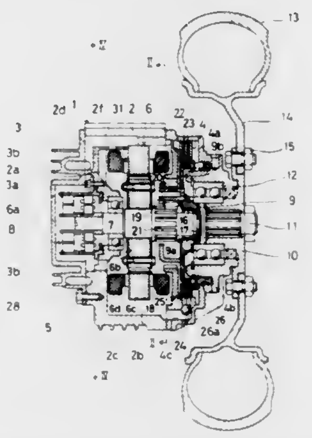
Mutsumi Kawamoto; Hidemitsu Inagaki, and Satoru Tanaka, all of Anjo, Japan, assignors to Aisin AW Co., Ltd., Aichi, Japan

Filed Dec. 27, 1988, Ser. No. 290,203

Claims priority, application Japan, Jun. 29, 1988, 63-161898

Int. Cl.$^5$ B60K *1/00*

U.S. Cl. 180—65.5 4 Claims



1. A motor driving vehicle provided with a decelerator, comprising

a casing,

an electric motor including a motor shaft with one end thereof rotatably supported on said casing, a rotor secured to said motor shaft, and a stator secured to said casing,

an output shaft coaxially arranged with said motor shaft, said output shaft having one end thereof rotatably supported on said casing, said motor shaft and output shaft rotatably supporting each other by a bearing providing between respective other ends thereof;

a planetary gear decelerator arranged between said motor shaft and output shaft having an input member connected to said motor shaft, an output member connected to said output shaft, and a reaction member fixed on said casing;

a wheel secured to said output shaft, and

brake disc means fixed to said casing, for braking said output shaft.

---

5,014,801

### METHOD AND DEVICE FOR REAR-WHEEL STEERING OF AUTOMOTIVE VEHICLE

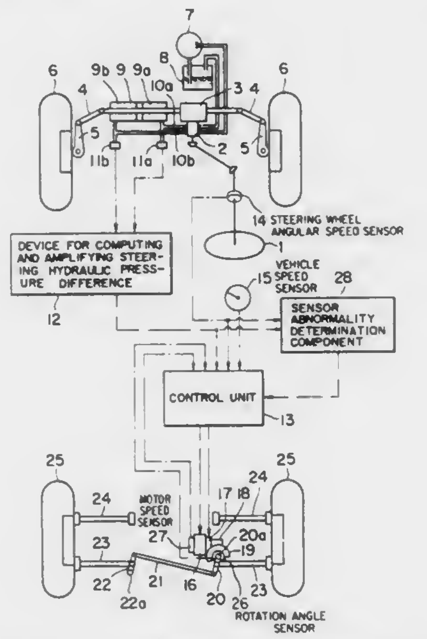
Kenji Hirose, Tokyo, Japan, assignor to Fuji Jikogyo Kabushiki Kaisha, Japan

Filed Feb. 9, 1989, Ser. No. 308,136

Claims priority, application Japan, Feb. 10, 1988, 63-29804

Int. Cl.$^5$ B62D *7/14*

U.S. Cl. 180—140 6 Claims


DEVICE FOR COMPUTING AND AMPLIFYING STEERING HYDRAULIC PRESSURE DIFFERENCE
14 STEERING WHEEL ANGULAR SPEED SENSOR
15 VEHICLE SPEED SENSOR
SENSOR ABNORMALITY DETERMINATION COMPONENT
CONTROL UNIT
MOTOR SPEED SENSOR
ROTATION ANGLE SENSOR

4. A rear-wheel steering device for an automotive vehicle having a front-wheel steering system and a rear-wheel steering system which steers the vehicle's rear wheels in accordance with a rear-wheel steering angle reference value and a rear-wheel steering speed value, said device comprising,

first means for detecting front-wheel steering force and generating a front-wheel steering force signal indicative thereof;

second means for detecting front-wheel steering speed and producing a steering speed signal indicative thereof;

third means for detecting a rear-wheel steering angle and providing a rear-wheel steering angle signal indicative thereof;

fourth means for detecting vehicle speed and producing a vehicle speed signal indicative thereof;

computing means responsive to outputs from said first through forth means for computing a rear-wheel steering angle reference value and a desired rear-wheel steering speed value for said rear-wheel steering system, and

abnormality determination means for determining an occurrence of an abnormality in either said first or second means based upon a difference between a front wheel steering force signal from said first means and a front-wheel steering speed signal detected by said second means;

said computing means computing (a) a rear-wheel steering angle reference value in response to front-wheel steering force and vehicle speed signals respectively transmitted from said first and fourth means, (b) a first reference value based upon front-wheel steering speed and vehicle speed signals from said second and fourth means, (c) a second reference value based upon said rear-wheel steering angle reference value and a rear wheel steering angle signal from said third means, and (d) a desired rear-wheel steering speed value for said rear-wheel steering system based upon said first and second reference values.

---

5,014,802

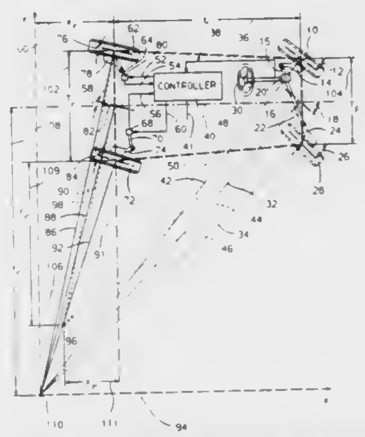
### REAR STEER CONTROLLER

Jeffrey G. Knoll, Orland Park, Ill., and Dennis T. Knnkel, West Bloomfield, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 4, 1990, Ser. No. 532,770

Int. Cl.$^5$ B62D *5/06*

U.S. Cl. 180—140 7 Claims



1. In a vehicle with a four wheel steering system, where each rear wheel is independently steerable and has a travel limit, and the steering system requiring that all wheels must be steered to turn about a single reference point in order for there to be zero Ackerman error, the improvement comprising:

a small angle steering means, using a predetermined reference point until one of the wheels reaches its travel limit, for steering all four wheels so they are turning about the predetermined reference point and

a large angle steering means, using the wheel that has reached its travel limit in part to define a secondary reference point for steering all four wheels so they are turning about the secondary reference point thereby limiting Ackerman error during all angles of turning.

---

5,014,803

### DEVICE CAPABLE OF SUCTION-ADHERING TO A WALL SURFACE AND MOVING THEREALONG

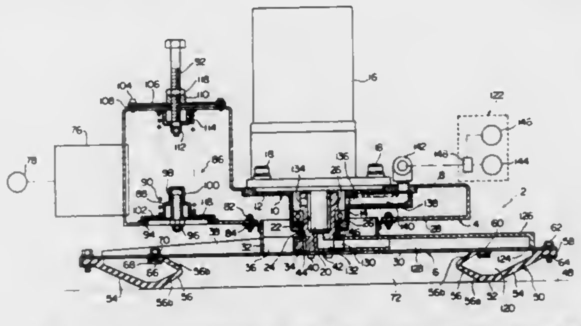
Fukashi Urakami, 5-21-204 Konandai 4-chome, Konan-ku, Yokohama, Japan

Division of Ser. No. 174,404, Mar. 25, 1988, Pat. No. 4,926,957. This application Nov. 20, 1989, Ser. No. 438,068

Claims priority, application Japan, Apr. 1, 1987, 62-80320

Int. Cl.$^5$ B62B *39/00*

U.S. Cl. 180—164 3 Claims



1. A device comprising a main body, moving means mounted on the main body, a partitioning member mounted on the main body for contacting a wall surface, said partitioning member defining a pressure reduction space in cooperation with the main body of the device and a wall surface, vacuum creating means for discharging a fluid from the pressure reduction space, said device being adapted to suction-adhere to the wall surface by the pressure of an ambient fluid acting on the main body of the device owing to the difference in fluid pressure between the inside and outside of the pressure reduction space and to move along the wall surface by the action of the moving means; wherein

the partitioning member has an outside wall portion, an inside wall portion, and a contacting portion which makes contact with the wall surface; said outside wall portion extending from the main body of the device to said contacting portion, said inside wall portion extending from said contacting portion to the main body of the device, and a lip portion provided in the contacting portion,

the lip portion has a main portion extending outwardly from the contacting portion along the wall surface and an extension means for facilitating movement of the lip over raised and depressed parts of a wall surface when the device is moved along a surface by the moving means, said extension means extending further outwardly from the main portion in a direction away from the wall surface, and

at least one of the outside wall portion and the inside wall portion including a stretchable and contractible portion capable of stretching toward the wall surface and contracting away from it.

---

5,014,804

### CONSTANT-SPEED TRAVELING EQUIPMENT

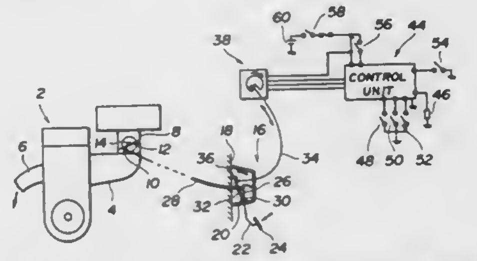
Fujiyuki Suzuki, Shizuoka, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Apr. 28, 1989, Ser. No. 345,469

Claims priority, application Japan, May 19, 1988, 63-122766

Int. Cl.$^5$ B60K *31/02*

U.S. Cl. 180—178 1 Claim



1. A vehicle cruise control apparatus for use with an acceleator having an acceleeator lever operatively connected to a throttle valve and to a return spring for urging the accelerator lever twoard a rest position corresponding to a closed throttle valve position, comprising:

control means for moving the accelerator lever to and maintaining it at a plurality of cruise positions corresponding to vehicle cruise speeds;

switching means for engaging and disengaging said control means; and

damping means for positively applying to said accelerator lever a damping force which damps closing mvoement of the accelerator lever while said accelerator lever is simultaneously being moved by the return spring from a respective said cruise position twoard said rest position, said damping means being responsive to said switching means and operable for a predetermined period of time after said control means is disengaged.

---

5,014,805

### SNOW VEHICLE

Hiroyuki Uchida, Torrance, Calif., assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,806

Int. Cl.$^5$ B62B *19/00*

U.S. Cl. 180—184 18 Claims

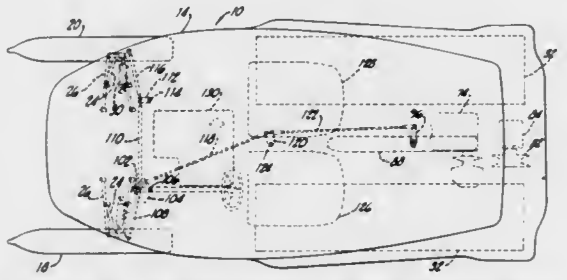
1. A snow vehicle comprising:

a frame

VOL
126
SS
2
MY
14
1991
UMI

steerable ski means supporting the forward end of said frame;

two laterally spaced crawler tracks supporting the rear end of said frame;



a steering ski pivotally mounted to said frame laterally intermediate said crawler tracks.

---

5,014,806

### THROTTLE CONTROL APPARATUS

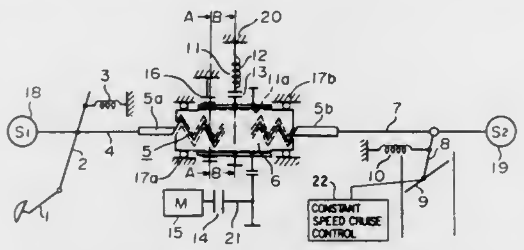
Tomohiro Hamada, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 176,748

Claims priority, application Japan, Apr. 6, 1987, 62-86235

Int. Cl.⁵ F16K *31/00;* B60K *31/00*

U.S. Cl. 180—197 12 Claims



1. A throttle control device for a motor vehicle, said motor vehicle having an accelerator pedal and a throttle valve, said throttle control device comprising:

a first movable means formed of a first part and second part which are separated, said first part having an end which is a first end of said first movable means and said second part having an end which is a second end of said first movable means;

a second movable means being circumferentially connected to and partially receiving said first and second parts of said first movable means so that said first end and said second end of said first movable means extend beyond said second movable means;

driving means for driving said second movable means, said driving means connected to such second movable means;

linking means for linking said accelerator pedal to said first end of said movable means;

connecting means for connecting said second end of said first movable means to said throttle valve.

---

5,014,807

### MOTORCYCLE

Satoru Horiike, Tokyo; Yasuhiko Nakano, Shiki; Shigetarou Okano, Tokorozawa; Shigeru Kimura, Asaka; Masanobu Matsuzaki, Tokyo; Toshiteru Yamamoto, Saitama; Kenji Ooki, Asaka; Eiji Hamano, Tokyo, and Mikio Kubo, Fujimi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

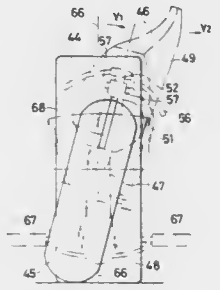
Continuation of Ser. No. 168,110, Mar. 11, 1988, abandoned.

This application Nov. 2, 1989, Ser. No. 432,417

Claims priority, application Japan, Mar. 13, 1987, 62-59236; Aug. 18, 1987, 62-203511; Aug. 19, 1987, 62-204163

Int. Cl.⁵ B62K *11/02*

U.S. Cl. 180—219 7 Claims



1. A motorcycle comprising:

a front wheel;

a rear wheel;

a frame assembly including

a front frame supporting said front wheel,

a main frame supporting said rear wheel, and

a connecting means interconnecting said front and main frames in a longitudinal direction of the frame assembly, said front frame being capable of banking laterally of a center line of the motorcycle about said connecting means, said rear wheel being capable of preventing said main frame from banking laterally; and

a seat frame separately swingably mounted on said front frame wherein said seat frame swings with respect to said front frame during turning.

---

5,014,808

### TWO WHEELED VEHICLE HAVING AN ADJUSTABLE CASTOR AND CASTOR ANGLE

Frank J. Savard, and Patrick A. Savard, both of 2 Rue de Launay, F-22360 Langueux, France

PCT No. PCT/FR88/00073, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO88/05743, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 9, 1988, Ser. No. 275,171

Claims priority, application France, Feb. 9, 1987, 87 01675; Mar. 4, 1987, 8703018; Nov. 12, 1987, 87 15818

Int. Cl.⁵ B62K *25/24;* B60B *1/00;* B62M *17/00*

U.S. Cl. 180—219 26 Claims

1. A vehicle comprising:

at least two wheels, said at least two wheels including a front steering wheel and a rear wheel;

a motor-framework unit, said motor-framework unit comprising a driving motor and a framework connected to said driving motor;

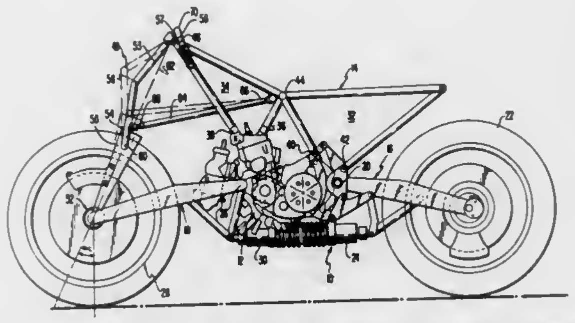
means for connecting said wheels to said motor-framework unit;

means for damping movement of said wheels relative to said motor-framework unit;

a steering assembly connected to said front steering wheel;

steering control means connected to said steering assembly;

transmission means for transmitting a driving force between said driving motor and at least one of said at least two wheels; and



a strut articulated at one end thereof to said motor-framework unit and articulated at the other end thereof to said steering assembly.

---

5,014,809

### DRIVING TORQUE DISTRIBUTION CONTROL SYSTEM FOR 4WD VEHICLE

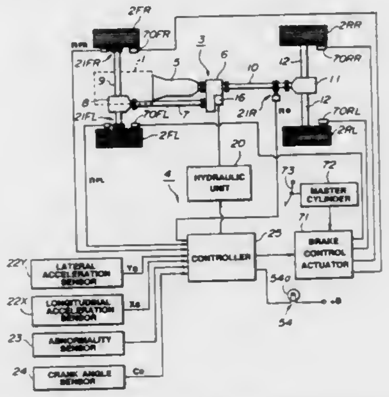
Toshiro Matsuda, Sagamihara City, Japan, assignor to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Aug. 31, 1989, Ser. No. 400,536

Claims priority, application Japan, Aug. 31, 1988, 63-217743

Int. Cl.⁵ B60K *17/344*

U.S. Cl. 180—248 20 Claims



1. A driving force distribution control system for a vehicle, comprising;

actuator means for varying a driving force distribution ratio of a driving force transmitted from an engine of said vehicle to secondary driving wheels of said vehicle to a driving force transmitted from said engine to primary driving wheels of said vehicle, in accordance with a driving force distribution control signal,

means for estimating an amount of engine braking applied on said vehicle, and

controller means for controlling said driving force distribution ratio by producing said control signal in accordance with said amount of engine braking estimated by said estimating means.

---

5,014,810

### METHOD FOR CONTROLLING THE RELEASE OF PASSENGER RESTRAINT SYSTEMS

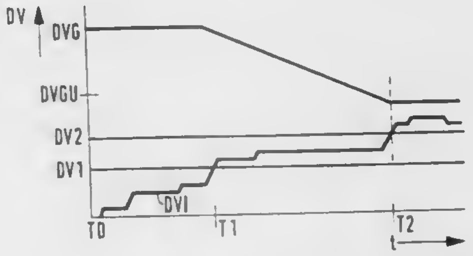
Bernhard Mattes, Sachsenheim; Werner Nitschke, Ditzingen; Willi Kühn, Markgröningen; Wolfgang Drobny, Besigheim; Hugo Weller, Oberriexingen; Peter Taufer, Renningen; Edmund Jeenicke, Schwieberdingen; Klaus Reischle; Michael Henne, both of Ditzingen-Schockingen, and Wilfried Burger, Hemmingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 28, 1989, Ser. No. 458,239

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1989, 3905052; Jul. 25, 1989, 3924507

Int. Cl.⁵ B60R *21/00*

U.S. Cl. 180—268 44 Claims



1. A method of controlling the release of a passenger restraint system in a vehicle comprising the following steps:

generating a first signal indicative of the acceleration of the vehicle,

integrating the first signal with respect to time to generate a second signal indicative of the velocity of the vehicle,

determining a first threshold value and adjusting the first threshold value based on the value of the first signal, and

comparing the value of the second signal to the first threshold value and releasing the passenger restraint system if the value of the second signal exceeds the first threshold value.

---

5,014,811

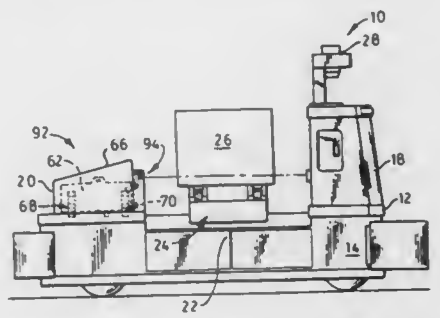
### BATTERY RETAINING SYSTEM

Terence E. Valencic, Mentor, and John E. Wible, Painesville, both of Ohio, assignors to Caterpillar Industrial Inc., Mentor, Ohio

Filed Jul. 5, 1990, Ser. No. 548,409

Int. Cl.⁵ B60K *28/00;* B60R *16/04*

U.S. Cl. 180—286 15 Claims



1. A system for retaining a battery on a frame of a vehicle, comprising:

sensing means for delivering electromagnetic radiation, for receiving electromagnetic radiation, and delivering a first control signal in response to receiving said electromagnetic radiation and a second control signal in the absence of receiving said electromagnetic radiation;

retaining means for selectively maintaining the battery on said frame, said retaining means being movable between a

VOL
126
ISS
2
MY
14
1991
UMI

first position at which said battery is maintained from moving in a passing relationship relative to a preselected location on the frame and a second position at which said battery is free to move in a passing relationship relative to said preselected frame location;

obstructing means for blocking electromagnetic radiation from being received by said sensing means in response to said retaining means being at said second position; and

controlling means for receiving said first and second control signals and disabling said vehicle in response to receiving said second control signal.

## 5,014,812
## DRIVE SYSTEM FOR VEHICLE

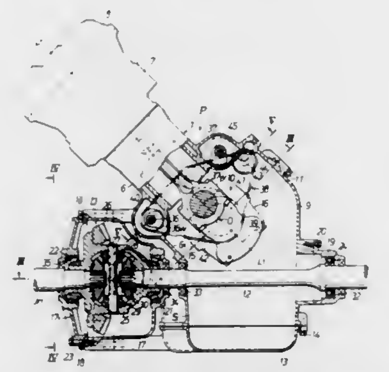
**Akio Kazama, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 26, 1989, Ser. No. 371,216**

**Claims priority, application Japan, Jun. 24, 1988, 63-157086**

**Int. Cl.$^5$ B60K** *1/00*

**U.S. Cl. 180—292** **8 Claims**



1. A drive system for a vehicle provided with an engine, a transmission and a differential device with the engine oriented with its crankshaft extending longitudinally of the vehicle for driving left and right wheels disposed on opposite sides of the engine, wherein said engine has a cylinder block with a cylinder axis inclined in one of either the left or right direction of the vehicle, an oil pan means being joined in the cylinder block at joining surfaces thereof on a plane perpendicular to said cylinder axis, and wherein said differential device is contained within a differential case which is connected to a lower side face of said engine on the side of inclination of the engine, and a power transmission shaft extending through both of opposite side portions of said oil pan means for operatively connecting said differential device and one said drive wheel located on the opposite side of the engine as the differential device, said differential case being connected to and supported by said cylinder block and said oil pan means.

## 5,014,813
## WATER-PROOF GEOPHONE HOUSING

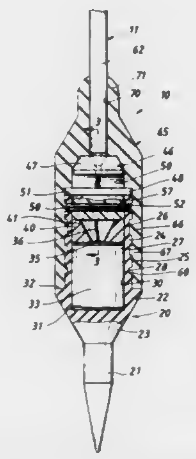
**Don L. Fussell, 16818 Bobcat, Cypress, Tex. 77429**

**Filed Dec. 27, 1988, Ser. No. 290,513**

**Int. Cl.$^5$ G01V** *1/06*

**U.S. Cl. 181—122** **18 Claims**

1. A seismic transducer housing assembly, comprising: upper and lower body members each made of an elastomeric material, said lower body member defining an internal cavity that is adapted to house a seismic transducer; a cap member located within said upper member and engaging said lower member to close the top of said cavity, said cap member being made of the same material as said upper and lower body members and having passage means; and conductor means extending through said passage means toward said seismic transducer, said upper body member being injection molded over said cap member and having a lower portion that is injection molded over an upper portion of said lower body member to provide a molecular bond at the interfaces between said upper housing member and said cap member and between said portions which prevents leakage of water into said cavity.



## 5,014,814
## SOUND-DAMPING MACHINE PARTS

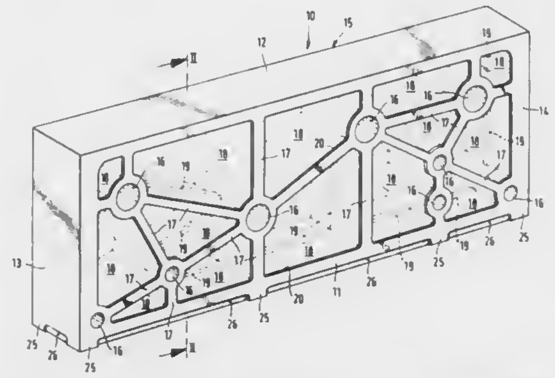
**Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co., Verden, Fed. Rep. of Germany**

**Filed Jul. 13, 1987, Ser. No. 72,481**

**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1986, 3624986**

**Int. Cl.$^5$ G10K** *11/04*

**U.S. Cl. 181—200** **11 Claims**



1. Machine part having longitudinal and transverse dimensions and comprising: a supporting plate (**10**) comprising a hollow body having a cavity and having longitudinally and transversely directed partition walls (**32**) forming subsidiary cavities (**22**) within said hollow body, said subsidiary cavities (**22**) being filled with a liquid sound-damping material; intermediate bores (**24**), in said partition walls (**32**), providing liquid communication among said subsidiary cavities (**22**); and a filling orifice (**23**) for introducing the liquid material into said cavity.

## 5,014,815
## ACOUSTIC LINER

**Noe Arcas, Plainview, and Charles A. Parente, Oyster Bay, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Jun. 26, 1989, Ser. No. 371,398**

**Int. Cl.$^5$ F01N** *1/02;* **F02K** *1/00*

**U.S. Cl. 181—213** **8 Claims**

1. An acoustic liner comprising:

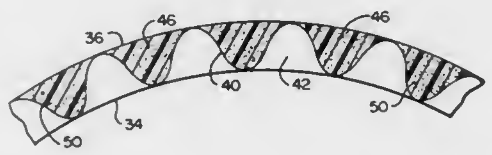
a sound permeable inside plate forming a first closed annulus and defining a liner axis;

a sound impermeable outside plate forming a second closed annulus located outside of and extending around the first closed annulus, the inside and outside plates being spaced apart and forming an annular chamber therebetween;

a core member secured in the annular chamber, between the inside and outside plates, the core member extending axially along and around the liner axis and forming a sine wave form in the annular direction around said axis, said sine wave form extending completely around the liner axis, wherein the core member and the inside plate form a multitude of varying depth sound absorption chambers to attenuate sound waves over a broad range of frequencies; and

a multitude of honeycomb structures located in the sound absorption chambers to further attenuate the sound waves; and

wherein the core member has an axial length; and in any plane perpendicular to the liner axis and along said axial length, the core member forms a sine wave form having a generally uniform height and wave length.



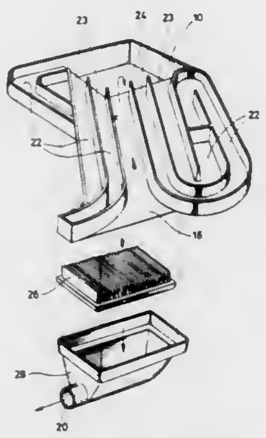
## 5,014,816
## SILENCER FOR GAS INDUCTION AND EXHAUST SYSTEMS

**Terrence A. Dear, Elkton, Md.; Karl U. Ingard, Kittery Point, Me., and Mark E. Schuchardt, Pleasant Ridge, Mich., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 9, 1989, Ser. No. 434,959**

**Int. Cl.$^5$ E02M** *35/00*

**U.S. Cl. 181—229** **10 Claims**



1. A silencer for use in gas induction and exhaust systems comprising:

a housing having incorporated therein a plurality of partitions defining multiple integrated channels arranged adjacent to each other in a labyrinth configuration, each channel having an open end and a closed end, the open end of said channels being in communication with a common zone in said housing and a flow duct provided in said housing in communication with said common zone, said flow duct having an inlet and an outlet to permit the passage of gas through said common zone and through said flow duct, said channels being tuned to provide selected resonance frequencies.

## 5,014,817
## ENGINE EXHAUST APPARATUS AND METHOD

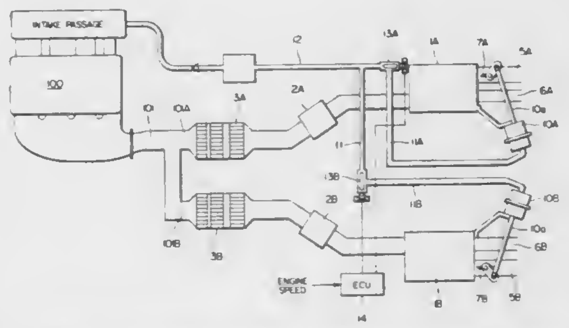
**Koji Takato, and Hironobu Chiba, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Jul. 25, 1989, Ser. No. 384,791**

**Claims priority, application Japan, Jul. 29, 1988, 63-101641[U]**

**Int. Cl.$^5$ F01N** *1/08*

**U.S. Cl. 181—254** **13 Claims**



1. An exhaust apparatus for an engine of a vehicle comprising:

a common exhaust passageway extending from the engine and being branched into first and second branch exhaust passageways;

a silencer, having a plurality of sound deadening passages, provided in each of said first and second branch exhaust passageways;

a plurality of exhaust outlet tubes extending from each silencer;

a shift valve mounted in one of the exhaust outlet tubes extending from each silencer and adapted to switch between a first state and a second state for changing an exhaust gas flow through at least one sound deadening passage, said first state being an open state in which pressure of the exhaust gas is decreased and said second state being a closed state in which pressure of the exhaust gas is increased;

switching control means for controlling switching of each shift valve responsive to a state of running of the engine to place each shift valve in the closed state when engine speed is in a low range, to place one shift valve mounted in one of said exhaust outlet tubes extending from one silencer in the open state and to place another shift valve mounted in one of said exhaust outlet tubes extending from another silencer in the closed state when engine speed is in a medium range and to place each shift valve in the open state when engine speed is in a high range.

7. Method of controlling exhaust from a vehicle comprising the steps of

sensing engine speed of a vehicle;

dividing exhaust gases flowing out of the engine into at least two flow paths;

passing exhaust gasses flowing through each path through a silencing zone having at least two exhaust channels;

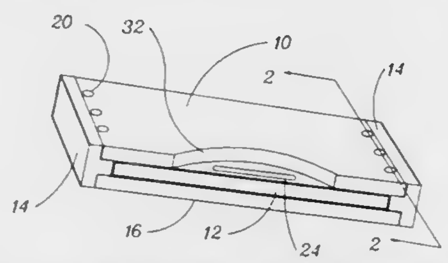
controlling the exhaust channels of the silencing zone responsive to engine speed to close one of said exhaust channels of each silencing zone when engine speed is in a low range, to close one of said exhaust channels of one of said silencing zones and to open said exhaust channels of the other of said silencing zones when engine speed is in a medium range and to open said exhaust channels of each silencing zone when engine speed is in a high range.

VOL
1126
ISS
2
MY
14
1991
UMI

**5,014,818**

### CHILDREN'S VANITY STEP-STOOL

**Kenneth Schulz, Scotts La., South Salem, N.Y. 10590**
**Filed Aug. 17, 1990, Ser. No. 568,755**
**Int. Cl.$^5$ A47B** *46/00*
**U.S. Cl. 182—90** **19 Claims**



1. Step stool apparatus comprising, in cooperating constructable combination and adapted to be put together as a pull-out cabinet step,

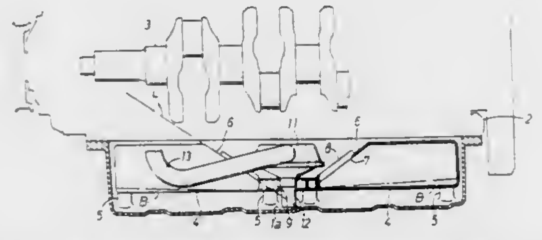
(1) a rectangular top shelf member,
(2) a rectangular bottom supporting member of substantially the same width from side to side as said top shelf member,
(3) a slidable middle platform member of less width from side to side than said top shelf member and said bottom supporting member and adapted to be slidably positioned below said top shelf member and above said bottom supporting member so as to form a step when pulled out along part of the length from back to front of said top shelf member and said bottom supporting member,
(4) two T-shaped spacer members when turned sideways having stems adapted to form ledges, one along one side of said slidable middle platform member and one along the other for supporting said top shelf member, whereby said middle platform member may slide inward and outward along part of the lengths of said bottoms of said stems of said T-shaped spacer members between said top shelf member and said bottom supporting member, said bottom supporting member being adapted to fit under said ledges on each side, and
(5) fasteners for assembling said members together as a step-stool and attaching them securely to a floor whereby said slidable middle platform member when pulled partway out becomes a step which will hold up the weight of a child.

---

**5,014,819**

### OIL PAN STRUCTURE FOR INTERNAL COMBUSTION ENGINE

**Tetsuo Gotou; Hiroo Shimada, and Katsunori Nakamura, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed May 31, 1989, Ser. No. 359,726**
**Claims priority, application Japan, May 31, 1988, 63-134173**
**Int. Cl.$^5$ F01M** *3/00*
**U.S. Cl. 184—6.2** **9 Claims**



1. An oil pan structure for joining to a cylinder block of an internal combustion engine for storing lubricating oil therein, said oil pan structure comprising:

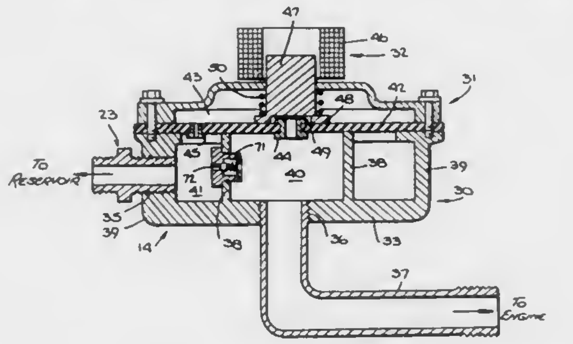
an oil pan having an oil inlet port therein;
a volume body housed inside said oil pan submergible at least partly below the oil level of the lubricating oil upon displacement of the lubricating oil to one side to a tilted condition in the oil pan resulting from a running condition of a motor vehicle having the engine with the oil pan structure; and
said volume body having an inlet opening positioned near an allowable upper limit oil level under a predetermined oil tilting condition for introducing into the volume body an amount of lubricating oil which exceeds said allowable upper limit oil level.

---

**5,014,820**

### ENGINE PRELUBRICATOR AND PRESSURIZED LUBRICANT RESERVOIR

**John W. Evans, Rte. 41, Sharon, Conn. 06069**
**Continuation of Ser. No. 296,331, Jan. 10, 1989, abandoned, which is a continuation of Ser. No. 817,784, Jan. 8, 1986, abandoned, which is a continuation of Ser. No. 557,397, Dec. 2, 1983, abandoned, which is a continuation-in-part of Ser. No. 331,371, Dec. 16, 1981, abandoned. This application Mar. 21, 1990, Ser. No. 498,459**
**Int. Cl.$^5$ F01M** *1/00*
**U.S. Cl. 184—6.3** **4 Claims**



1. An improved prelubricator and pressurized lubrication reservoir assembly for lubricating machinery, such as an internal combustion engine, when the lubricant pressure in the machinery is below a specified level, said assembly comprising:

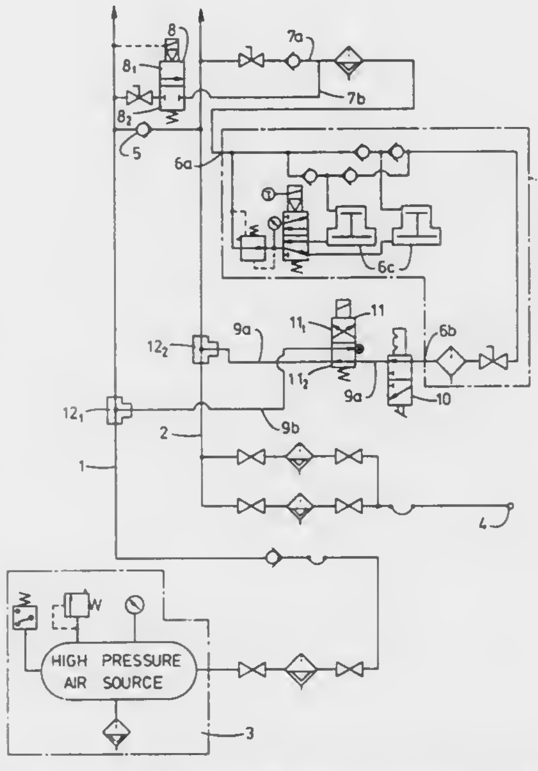
reservoir means comprising a container having an external wall for storing a quantity of lubricant under pressure;
conduit means for coupling said reservoir means and said machinery in fluid communication whereby lubricant flows in said conduit means in a first direction from said machinery to said reservoir means and in a second direction from said reservoir means to said machinery;
valve means disposed in said conduit means for selectively permitting flow of lubricant in said conduit means in said second direction when the lubricant pressure in said machinery is below said specified level and preventing flow of lubricant in said conduit means in said second direction when the lubricant pressure in said machinery is above said specified level; and
pressure relief valve means disposed within said valve means and in fluid communication with and responsive to the pressure of said lubricant stored in said reservoir means for selectively permitting flow of lubricant through said valve means and thereby through said conduit means in said second direction when the pressure of the lubricant stored in said reservoir means approaches the rupture strength of said container external wall.

---

**5,014,821**

### LUBRICATING SYSTEM FOR AIR FEED PIPE LINES LAID IN A FACTORY

**Kunio Nishita, Matto, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**
**Filed Sep. 6, 1989, Ser. No. 403,753**
**Int. Cl.$^5$ F16N** *7/34*
**U.S. Cl. 184—55.2** **3 Claims**



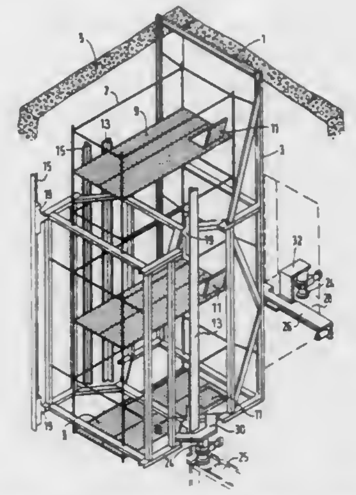
1. A lubricating system for air feed pipe lines laid in a factory and consisting of a high-pressure side air feed pipe line connected to a high-pressure air source performing ON-OFF operations and a low-pressure side air feed pipe line connected to a low-pressure air source; comprising a bypass air feed pipe line connected between a pipe line connecting said low-pressure side air feed pipe line with an inlet of lubricating oil injection means and said high-pressure side air feed pipe line, a swiching valve provided in said bypass air feed pipe line and switched to a communicating position when the high-pressure air source is ON but to a blocking position when the high-pressure air source is OFF, a second lubricating oil injected air pipe line arranged in parallel to a first lubricating oil injected air pipe line, said first lubricating oil injected air pipe line being caused to connect an outlet of said lubricating oil injection means with said low-pressure side air feed pipe line, and connected at one end thereof to said high-pressure side air feed pipe line, and another switching valve having one outlet port to which the other end of said second lubricating oil injected air pipe line is connected, another outlet port to which said first lubricating oil injected air pipe line is connected, and an inlet port to which the outlet of said lubricating oil injection means is connected through said first lubricating oil injected air pipe line, whereby the air injected with lubricating oil is made to flow into the high-pressure side air feed pipe line when said high-pressure air source is ON, while the air injected with lubricating oil is made to flow into the low-pressure side air feed pipe line when said high-pressure air source is OFF.

---

**5,014,822**

### METHOD FOR INSTALLING AN ELEVATOR INSIDE A BUILDING, AND ASSEMBLY JIGS USED THEREFOR

**Jean-Claude Chapelain, Sainte Genevieve des Bois; Patrice P. Masson, Paris; Gerard C. Dupoty, Bruyeres Suroise; Gerard Crenn, Bagneux, and Cloux, Jean-Noel, Les Choux, all of France, assignors to Otis Elevator Company, Farmington, Conn.**
**PCT No. PCT/FR88/00581, § 371 Date Jul. 26, 1989, § 102(e) Date Jul. 26, 1989, PCT Pub. No. WO89/04806, PCT Pub. Date Jun. 1, 1989**
**PCT Filed Nov. 28, 1988, Ser. No. 393,911**
**Claims priority, application France, Nov. 27, 1987, 87 16497**
**Int. Cl.$^5$ B66B** *7/02*
**U.S. Cl. 187—1 R** **7 Claims**



1. A method of assembling an elevator within a building including a support shaft either already constructed or to be constructed which comprises the steps of:

positioning and fixing the guide and equipment elements for the lift, on at least one jig means (1) of predetermined height, such that they are disposed geometrically within the space of the jig means with respect to each other in the position which they will occupy when finally mounted in the support shaft (5);
positioning and fixing the jig means (1) successively height-wise from the previously formed shaft bottom upwardly, in the support shaft (5);
fixing said guide and equipment elements (13, 15, 17) of the elevator carried by the jig means to the shaft
releasing said guide and equipment elements (13, 15, 17) from the jig means when they are fixed to the support shaft (5); and
removing the jig means from said support shaft (5).

---

**5,014,823**

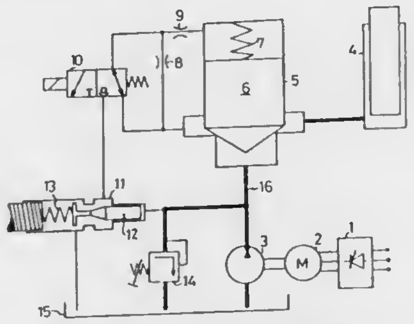
### APPARATUS FOR IMPROVING THE PERFORMANCE OF A MOTOR-CONTROLLED HYDRAULIC ELEVATOR

**Raimo Pelto-Huikko, Vantaa, Finland, assignor to Kone Elevator GmbH, Baar, Switzerland**
**Division of Ser. No. 266,608, Nov. 3, 1988. This application Aug. 29, 1989, Ser. No. 400,285**
**Claims priority, application Finland, Nov. 4, 1987, 874863**
**Int. Cl.$^5$ B66B** *11/04*
**U.S. Cl. 187—17** **4 Claims**

1. An apparatus for improving the performance of a motor-controlled hydraulic elevator, which apparatus comprises a hydraulic pump connected to an electric motor, an oil container, a main duct leading from the container to the pump and further to a lifting cylinder of the elevator, and a braking device which derives oil from the lifting cylinder through the hydraulic pump by way of the main duct during downward

VOL
1126
ISS
2
MY
14
1991
UMI

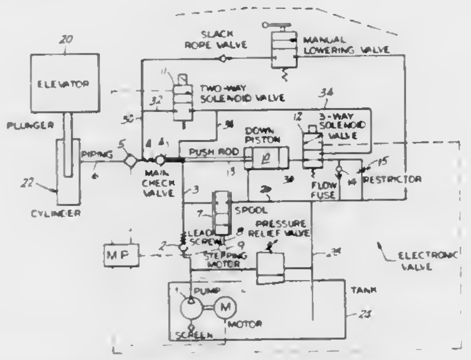
drive, the braking device includes a means for reducing oil pressure in the main duct and which utilizes a check valve, connecting the lifting cylinder and the main duct, and a pressure compensation valve connected to the check valve, the pressure compensation valve senses the pressure in the main duct and provides a means to control the flow of oil through the check valve so as to maintain the pressure in the hydraulic pump at a substantially constant predetermined level.



---

### 5,014,824
### HYDRAULIC ELEVATOR CONTROL VALVE

**Richard N. Fargo, Plainville, Conn., assignor to Otis Elevator Company, Farmington, Conn.**
**Filed Jan. 19, 1990, Ser. No. 467,445**
**Int. Cl.⁵ B66B** *11/04*
**U.S. Cl. 187—17** **4 Claims**

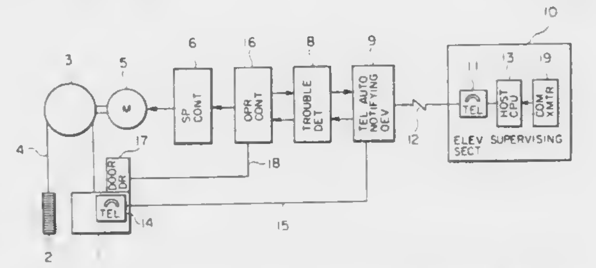


1. An hydraulic elevator system comprising:
(a) an elevator car;
(b) a piston/cylinder assembly for raising and lowering said elevator car;
(c) a supply of hydraulic fluid and a fluid pump for delivering hydraulic fluid to said piston/cylinder assembly;
(d) an adjustable metering valve for controlling hydraulic fluid flow to and from said piston/cylinder assembly;
(e) biased check valve means interposed between said piston/cylinder assembly and said metering valve said check valve means normally being closed by a positive fluid pressure differential on the piston/cylinder side thereof;
(f) fluid actuated means operable with fluid from said piston/cylinder assembly to selectively open said check valve means to allow withdrawal of hydraulic fluid from said piston/cylinder assembly during a downrun of said elevator car;
(g) bypass valve means interconnecting said piston/cylinder and said metering valve sides of said check valve means around said check valve means; and
(h) means for selectively opening said bypass valve means prior to commencement of a downrun of said elevator car to equalize fluid pressure on both sides of said check valve means whereby the latter remains closed solely by reason of its being biased.

---

### 5,014,825
### RESCUE OPERATING APPARATUS FOR ELEVATOR

**Shigebiko Suzuki, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Aug. 9, 1989, Ser. No. 391,033**
**Claims priority, application Japan, Aug. 11, 1988, 63-200710**
**Int. Cl.⁵ B66B** *13/24*
**U.S. Cl. 187—104** **2 Claims**

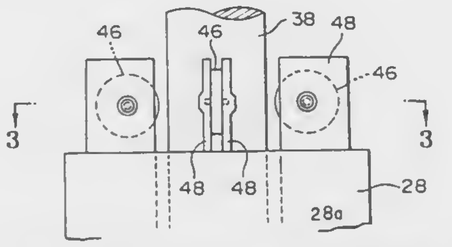


1. A rescue apparatus for an elevator including a cage operating between floors and having a door which normally can be opened only in a door zone defined relative to a floor, the rescue apparatus comprising:
a cage driver connected to the cage to move the cage up or down;
a door driver connected to the cage door to open or close the door;
an elevator supervising section which generates and transmits a cage door open/close command;
detecting means for detecting trouble regarding the operation of the cage when the cage position is out of the door zone;
notifying means connected between the detecting means and said elevator supervising section for notifying said elevator supervising section of the trouble and the door zone status of the cage; and
operation control means operable responsive to the door open/close command for controlling said door driver to open the door temporarily and then close the door when the cage position is out of the door zone and for then controlling said cage driver to move the cage up or down to a position in the door zone when said detecting means detects the trouble is cleared.

---

### 5,014,826
### APPARATUS FOR MAINTAINING AN AIR GAP IN A TOROIDAL TYPE LINEAR MOTOR

**Keiichiro Nakai, Tokyo, and Yoshinori Nakanishi, Shibayama, both of Japan, assignors to Otis Elevator Company, Farmington, Conn.**
**Filed Feb. 26, 1990, Ser. No. 494,057**
**Claims priority, application Japan, Feb. 28, 1989, 1-49722**
**Int. Cl.⁵ B66B** *1/06*
**U.S. Cl. 187—112** **3 Claims**



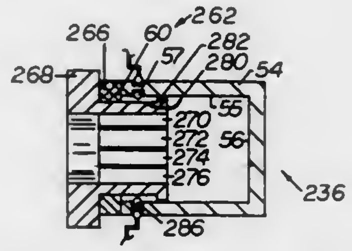
1. An apparatus for maintaining an air gap between a movable element and a stationary element in a toroidal type linear motor, the moveable element having a cylindrical opening for receiving the stationary element, said stationary element being spaced from said moveable element a distance A, said apparatus comprising;

a supporting member fixed to the moving element, said supporting member being spaced from said stationary member a distance B, said distance B being less than distance A, such that said supporting member does not contact said stationary member during normal operation and may contact said stationary member during abnormal operation or if power to said linear motor is shut off such that said air gap is not less than the difference between distance A and distance B.

---

### 5,014,827
### ACTUATION PISTON FOR DISC BRAKE WITH VIBRATION ATTENUATOR

**Yiren S. Wang, Birmingham; Seong K. Rhee, Northville, and Robert E. Jokisch, Utica, all of Mich., assignors to Allied-Signal Inc., Morristown, N.J.**
**Filed Jul. 20, 1989, Ser. No. 382,454**
**Int. Cl.⁵ F16D** *55/18, 65/78*
**U.S. Cl. 188—72.4** **2 Claims**



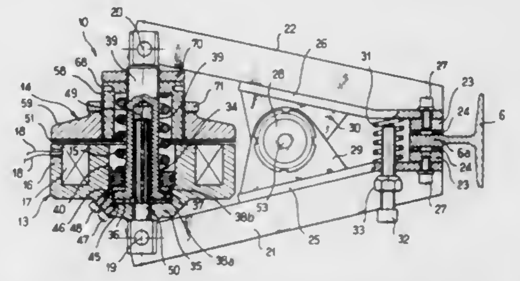
1. In a disc brake assembly having a caliper with a bore therein for retaining an actuation piston assembly, said piston assembly providing a force to move a pair of brake pads into engagement with a rotor, said pads and rotor on engagement creating vibrations that produce audible sounds, the improvement in the actuation piston assembly comprising:
a cylindrical member located in said bore and having a closed end and an opened end, said cylindrical member having an inwardly projecting flange adjacent said opened end;
an elastomeric ring located adjacent the opened end; and
an actuation ring which has a base member with a series of tabs that extend from a base, each of said tabs having an outwardly projecting flange, said inwardly projecting flange on said cylindrical member engaging said tabs for holding said elastomeric ring in alignment with said opened end, said actuation ring engaging one of said brake pads, said force being transmitted from said cylindrical member to said actuation ring through said elastomeric ring, said elastomeric ring permitting said actuation ring to move independently with respect to said cylindrical member by attenuating vibrations to reduce the creation of audible sounds.

---

### 5,014,828
### ELECTROMAGNETIC BRAKE WITH CLAMPING JAWS

**Ferdinand Baldassarre, Corbas, France, assignor to Moteurs Leroy-Somer, Angouleme, France**
**Filed Jun. 1, 1989, Ser. No. 360,201**
**Claims priority, application France, Jun. 8, 1988, 88 07632; Mar. 24, 1989, 89 03900**
**Int. Cl.⁵ B60T** *13/04*
**U.S. Cl. 188—173** **14 Claims**

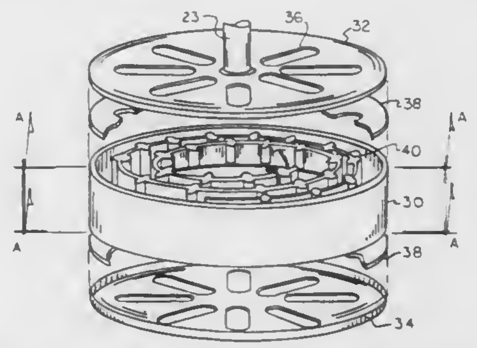
1. In an electromagnetic brake comprising an electromagnet and a movable armature attracted by this electromagnet when the latter is energized and separated from the latter by spring means when the said electromagnet is not energized, the electromagnet and the armature being each hingeably mounted between two pivoting arms carrying clamping jaws adapted to clamp an element when applying the brake, the brake comprising, moreover, a hydraulic damping device offering resistance to the movements of the armature relative to the electromagnet so as to control and slow down the speed at which the brake is applied and released, said damping device being disposed substantially axially of the electromagnet and of the armature and containing hydraulic liquid and comprising a body member and a piston member one of which is firmly attached to one of said electromagnet and armature, and the other to the other of said electromagnet and armature; the improvement wherein said body member of the damping device has an axial bore substantially axially of the electromagnet and the armature, and wherein said axial bore is closed by a bottom piece through which moves a shank of said piston member, said bottom piece being urged by the force of said spring means against an internal shoulder of internal walls of said bore.



---

### 5,014,829
### ELECTRO-RHEOLOGICAL SHOCK ABSORBER

**Nicholas S. Hare, Sr., 252 Pineville Rd., Monroeville, Ala. 36460**
**Continuation of Ser. No. 376,748, Jul. 3, 1989, abandoned, which is a continuation of Ser. No. 339,748, Apr. 18, 1989, abandoned.**
**This application Aug. 31, 1990, Ser. No. 577,060**
**Int. Cl.⁵ F16F** *9/30, 9/34*
**U.S. Cl. 188—267** **30 Claims**



1. An electro-rheological shock absorber comprising:
a generally cylindrical inner casing, said casing containing a chamber for holding an electro-rheological fluid;
a generally cylindrical outer casing supporting an arm extending into said outer casing, said outer casing reciprocating with said inner casing;
a dampening member coupled to an end of said arm and extending into said fluid within said chamber, said dampening member containing a plurality of perforations to permit the flow of electro-rheological fluid therethrough;
electro-rheological activating means integral with said dampening member communicating between at least one positive and one negative electrode means within said perforations for controlling the flow of fluid through each of said perforations;
wherein said electrode means when charged applies a variable dampening force within said chamber.

VOL
1126
ISS
2
MY
14
1991
UMI

**5,014,830**

### FASTENING DEVICES FOR STRAPS IN AN ARTICLE OF LUGGAGE

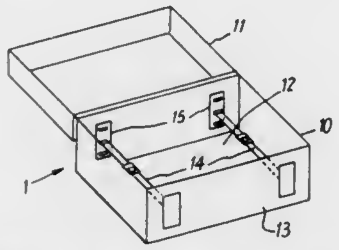
**Andre Seynhaeve, Senlis, France, assignor to Delsey, S.A., France**

**Filed Jan. 19, 1990, Ser. No. 467,557**

**Claims priority, application France, Jan. 20, 1989, 89 00642**

**Int. Cl.$^5$ A45C** *13/30*

**U.S. Cl. 190—36** **9 Claims**



1. In a luggage article including a shell having a bottom wall and opposed side and end walls defining a cavity for containing clothing and the like, the improvement comprising:
- a first elastic strap having opposed ends;
- a first attachment bracket fixed to each opposed side wall a predetermined distance from said bottom wall, each end of said strap being fixed to a respective one of said attachment brackets; and
- a first adjustment bracket fixed to each opposed side wall in spaced, vertically aligned relation to the respective attachment bracket, each adjustment bracket having an opening for removably receiving a portion of said strap when elastically stretched from the respective end thereof fixed to the respective attachment bracket.

---

**5,014,831**

### DEVICE FOR LOCKING AN ACTUATING LEVER OF A SHIFTING DEVICE

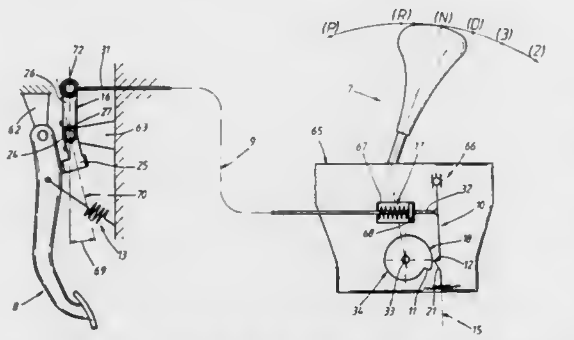
**Helmut Wawra, Korb; Wilhelm Albrecht, Vaihingen/Enz; Bernd Wagner, Kernen; Andreas Franke, Stuttgart, and Harald Gellner, Marbach, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Dec. 12, 1989, Ser. No. 448,996**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842333**

**Int. Cl.$^5$ B60K** *41/00*

**U.S. Cl. 192—4 A** **20 Claims**



1. A device for locking an actuating lever of a gear shifting device of a gear-change mechanism of a motor vehicle;
- the vehicle having brakes actuable by a brake pedal;
- wherein said device for locking includes a locking means provided to lock the actuating lever in a position associated with a particular shift state as a function of a position of the brake pedal;
- wherein the actuating lever is swivellably mounted on the vehicle;
- wherein the locking means is connected with the brake pedal via a mechanical adjusting linkage;
- wherein the locking means and the actuating lever are arranged in proximity to one another;
- wherein the locking means comprises positively engaging blocking and corresponding counter-blocking members;
- wherein one of the counter-blocking or blocking members moves with the actuating lever;
- wherein the mechanical adjusting linkage between the locking means and the brake pedal is moved by a restoring spring means, that holds the brake pedal in an unactuated rest position, into a locking position to hold the blocking and counter-blocking members in engagement by the brake pedal;
- wherein, when the brake pedal is depressed to actuate the brakes, a spring force of the restoring spring is overcome and the mechanical adjusting link is moved to adjust the locking means into a floating position bringing the blocking and counter-blocking members out of engagement;
- wherein the mechanical adjusting linkage includes a resiliently-acting intermediate lever means for changing an effective linkage length of the mechanical adjusting linkage;
- wherein the intermediate lever means is provided with a bias spring having a lower spring force than the restoring spring;
- wherein the actuating lever has nonlockable lever positions associated with other particular shift states;
- wherein in the unactuated position of the brake pedal, the locking means is held in its floating position by actuation of the actuating lever between nonlockable lever positions such that the spring bias force of the intermediate member is overcome and the mechanical linkage has its length changed so that the brake pedal remains essentially in its rest position;
- wherein the mechanical adjusting linkage is flexible;
- wherein one of the blocking and counter block members is swivellably mounted and actuable by a first resilient means into the floating position;
- wherein the resilient means has a spring force less than the bias spring force of the intermediate member;
- wherein the intermediate member has two levers which are mounted about a common swivelling axis and are held relative to one another by the bias spring in an end position of an angle of rotation determined by stop and counter-stop means;
- wherein one of the two levers of the intermediate member is brought into engagement with the brake pedal by the bias spring; and
- wherein a linkage end of the mechanical adjusting linkage cooperates with the other lever.

---

**5,014,832**

### CLUTCH CONTROL SYSTEM

**Yuji Satoh; Hiromi Kono; Hiroyuki Soda, and Masuhiro Otsuka, all of Saitama, Japan, assignors to Zexel Corporation, Tokyo, Japan**

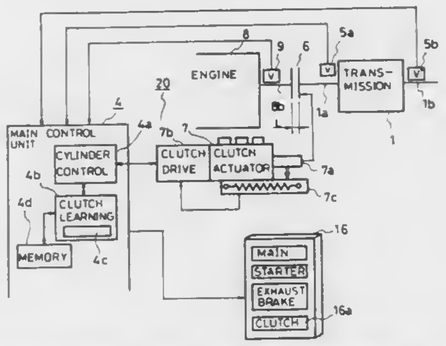
**Filed Sep. 24, 1990, Ser. No. 587,353**

**Claims priority, application Japan, Sep. 26, 1989, 1-112622[U]**

**Int. Cl.$^5$ F16D** *25/14, 43/00*

**U.S. Cl. 192—30 W** **5 Claims**

1. A clutch control unit comprising:
- a clutch;
- a first detector for detecting a first rate of rotation of an input of said clutch;
- a second detector for detecting a second rate of rotation of an output of said clutch;
- clutch learning means for determining a clutch position at which both of said first and second rates of rotation meet predetermined conditions when said clutch is moved toward engagement from a preset learning starting point and storing a clutch characteristic;
- signal generator means for generating a learning underway signal indicating that said clutch learning means is learning said clutch characteristic; and



- warning means responsive to said learning underway signal to provide a warning display or sound.

---

**5,014,833**

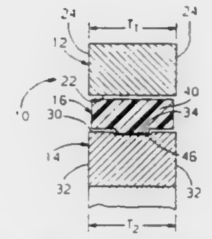
### ROLLER CLUTCH WITH IMPROVED INSTALLATION

**Albert D. Johnston, Huron, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 25, 1990, Ser. No. 543,502**

**Int. Cl.$^5$ F16P** *3/34*

**U.S. Cl. 192—45** **3 Claims**



1. An overrunning roller clutch assembly comprising,
- a generally annular pathway race having a cylindrical pathway,
- a generally annular cam race having a pair of axially opposed end faces and a surface disposed generally coaxial to said pathway and comprised of a circumferentially spaced plurality of cam ramps separated by a plurality of partially cylindrical bearing surfaces, at least one of said bearing surfaces also having a circumferentially extending installation groove therein located intermediate said cam race end faces,
- an integral roller clutch cage having a plurality of partially annular journal blocks separated by a plurality of pockets, said cage being sized so as to fit between said races in an installed position where said journal blocks and said cam race bearing surfaces are circumferentially aligned, said pockets further being sized to pass freely axially over said cam ramps when said journal blocks are circumferentially misaligned in one direction from said cam race bearing surfaces by an index facto, at least one of said journal blocks also having a circumferentially extending locking rib with a length slightly less than said index factor and sized to fit within said installation groove when said cage is in its installed position, and,
- a roller and energizing spring pair located in each cage pocket,
- whereby, said cage may be installed by sliding it axially over said cam race while circumferentially misaligned relative to said cam race by said index factor until said locking rib and installation groove are axially aligned, after which said cage may be turned in the opposite direction by said index factor, thereby moving said rib into said installation groove to axially retain said cage to said cam race with said cam race end faces unobstructed by said cage, after which said pathway race may be installed to complete said assembly.

---

**5,014,834**

### SPEED RESPONSIVE ONE-WAY CENTRIFUGAL CLUTCH

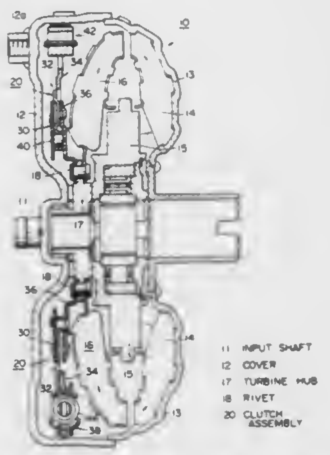
**Akimitsu Suzuki; Kozaburo Igari, and Hiroshi Yabe, all of Fujisawa, Japan, assignors to NSK-Warner Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 11, 1990, Ser. No. 508,332**

**Claims priority, application Japan, Apr. 12, 1989, 1-90559**

**Int. Cl.$^5$ F16D** *47/06*

**U.S. Cl. 192—48.3** **9 Claims**



1. A speed responsive one-way centrifugal clutch, comprising:
- a clutch plate which is approximately disc-shaped and which is fixedly attached to a rotating shaft;
- a damper plate which is supported to be rotatable relative to said clutch plate;
- a reaction ring which is supported to be rotatable over a predetermined angle range relative to said damper plate;
- a plurality of shoe assemblies which are supported by said reaction ring to be displasable radially outwardly due to centrifugal forces applied thereto; and
- a one-way clutch disposed between said clutch plate and said damper plate for transmitting a rotating force between said clutch plate and said damper only in a predetermined direction.

---

**5,014,835**

### POWER WORK-MACHINE

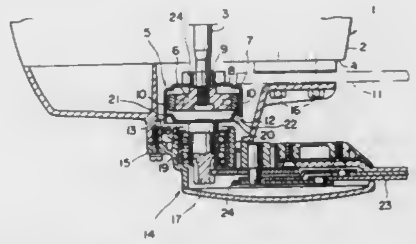
**Akira Nagashima, Kawasaki, and Hiroaki Koga, Sayama, both of Japan, assignors to Kioritz Corporation, Tokyo, Japan**

**Filed Apr. 6, 1990, Ser. No. 505,279**

**Claims priority, application Japan, Apr. 14, 1989, 1-43918[U]**

**Int. Cl.$^5$ F16D** *11/00, 43/14, 47/00*

**U.S. Cl. 192—48.5** **1 Claim**



1. A power work-machine comprising:
- a power unit having a main body, and an output shaft extending through a portion on a first side of said main body;

VOL 126
ISS 2
MY 14 1991
UMI

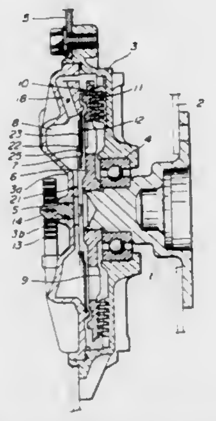
- a centrifugal clutch provided on one end of said output shaft, said clutch including a clutch drum having an axially extended out end portion;
- a plurality of peripheral notches formed on and circumferentially arranged on said outer end portion of said clutch drum;
- a work-machine attachment including a mounting portion attached to said portion on said first side of said main body; and
- a dog clutch provided on a drive shaft of said work-machine attachment, said dog clutch including clutch claws engaging with said peripheral notches of said clutch drum and centering portions projecting radially and circumferentially arranged to slide on the inner peripheral surface of said clutch drum.

---

**5,014,836**

### FAN DRIVE CLUTCH FOR INTERNAL COMBUSTION ENGINE

**Toshio Harima; Kenichi Sato, and Tatsuyuki Matsuya, all of Kanagawa, Japan, assignors to Atsugi Motor Parts Company, Limited, Kanagawa, Japan**
**Filed Jun. 5, 1989, Ser. No. 361,286**
**Claims priority, application Japan, Jun. 7, 1988, 63–75688[U]**
**Int. Cl.$^5$ F16D** *35/00*
**U.S. Cl. 192—58 B** **4 Claims**



1. An apparatus for coupling a first member with a second member connected to a drive source comprising;

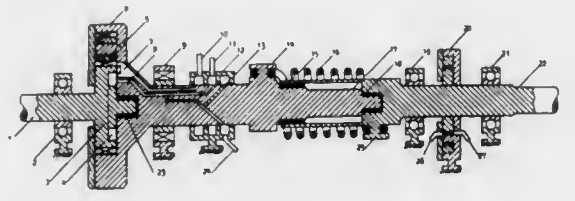
- a housing defining said first member engaging the second member therewithin;
- a plate for defining a fluid reservoir chamber and a working chamber in said housing, said plate having an opening for fluid communication therethrough so as to allow a working fluid to flow from the fluid reservoir chamber into the working chamber;
- a valve including a valve arm and a valve plate, said valve arm being supported by the first member via supporting means so that said valve plate slidably contacts with a surface of said plate in a circumferential direction with respect to said supporting means so as to open and close said opening;
- fluid coupling means, provided within said working chamber, for coupling the first member with the second member to transmit torque from the drive source of the second member to the first member in accordance with variations in the amount of working fluid within the working chamber due to the opening and closing of said valve;
- absorbing means for absorbing vibrations transmitted via said valve arm from the supporting means to said valve plate, said absorbing means being an elastic member connecting the valve plate to the valve arm so as to be elastically deformed by the vibrations to maintain the valve plate in contact with a surface of said plate without any clearance therebetween; and
- extending portions extending, with respect to a junction of said valve plate and said absorbing means, from an edge of the valve plate in a direction opposite a portion corresponding to said opening for preventing another edge of the valve plate, opposite said edge, from lifting away from said plate due to the pressing of said valve plate against said plate by said valve arm.

---

**5,014,837**

### IMPULSE TORQUE CONVERTER

**Kauko Kaari, Koroistentie 6 a, SF-00280 Helsinki, Finland**
**Filed Jun. 21, 1988, Ser. No. 209,489**
**Claims priority, application United Kingdom, Feb. 15, 1988, 8803412**
**Int. Cl.$^5$ F16D** *31/04, 31/06*
**U.S. Cl. 192—61** **12 Claims**



1. A torque converting device which comprises:

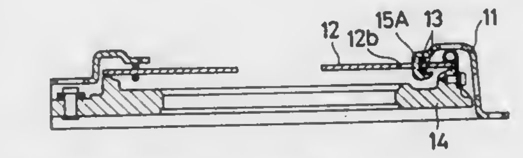
- an input shaft driven by an engine;
- an output shaft for driving a load;
- a middle shaft intermediate said input and output shafts;
- clutch means for transferring energy quanti from said input shaft to said output shaft for a the form of a series of impulses wherein the number of impulses in time unit is proportional to the difference between the revolution speeds of the input shaft and the output shaft and a torque larger than the average torque generated by the engine acts on said output shaft; and
- said clutch means engaging and disengaging said input shaft to and from said middle shaft with the momentary or continuous torque being transferred being a function of the pressure level acting in a pressure space of the clutch and with the torque being converted by the device increasing or decreasing in the same proportion as the pressure level in the pressure spacc rises or drops.

---

**5,014,838**

### DIAPHRAGM SPRING ARRANGEMENT FOR A CLUTCH

**Hiroshi Suzuki, Aichi, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**
**Filed Mar. 21, 1990, Ser. No. 496,635**
**Claims priority, application Japan, Mar. 31, 1989, 1-036422**
**Int. Cl.$^5$ F16D** *13/44*
**U.S. Cl. 192—89 B** **10 Claims**



1. A clutch apparatus comprising:

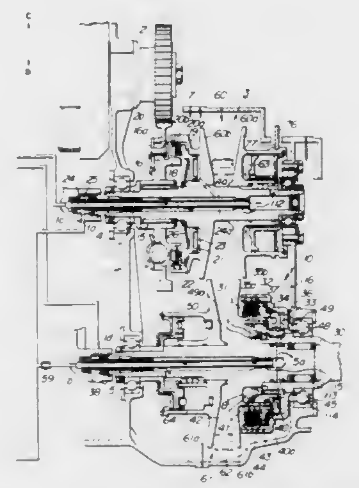
- a clutch fixed to a flywheel and connected to a pressure plate;
- a diaphragm spring disposed between said clutch cover and said pressure plate and provided with a slit;
- plural tabs integrally formed on an internal circumference of said clutch cover and bent toward said pressure plate, so as to extend through an opening portion provided at one end of said slit;
- said plural tabs including long wide tabs and short wide tabs shorter than said long wide tabs, the short wide tabs arranged between said long wide tabs and being of constant width from top end to base.

---

**5,014,839**

### DRIVE TRAIN OF A WHEELED VEHICLE AND METHOD FOR CONTROLLING THE SAME

**Kouhei Ohzono; Kazuhiro Takeuchi, both of Saitama; Shoichi Honda, and Takeshi Koyabu, both of Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 241,404, Sep. 6, 1988, abandoned. This application Sep. 26, 1990, Ser. No. 595,699**
**Claims priority, application Japan, Nov. 18, 1987, 62-175965[U]; Nov. 19, 1987, 62–292647**
**Int. Cl.$^5$ B60K** *41/28*
**U.S. Cl. 192—0.092** **15 Claims**



1. A clutch system of a wheeled vehicle having an engine and a driving wheel for driving said vehicle, the clutch system comprising:

- (a) a first clutch means connected to the engine for receiving driving force therefrom and outputting the driving force by varying a transfer ratio between rotational frequencies of the received driving force and outputted force according to an operation of a driver;
- (b) a transmission having an input member connected to the first clutch means for receiving the driving force therefrom and an output member for outputting the driving force by varying a transmission ratio; and
- (c) a second clutch means connected to the transmission for receiving the driving force from said transmission output member and transmitting the driving force to said driving wheel by automatically varying the transfer ratio thereof according to the rotational frequency of the output member of the transmission.

---

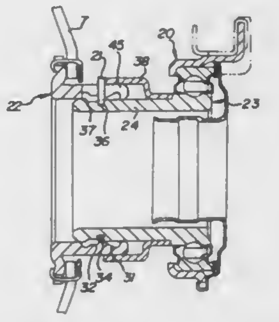
**5,014,840**

### RELEASE BEARING MECHANISM OF A CLUTCH

**Hiromi Tojima, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**
**Division of Ser. No. 336,352, Jan. 31, 1989, Pat. No. 4,947,975. This application Jul. 9, 1990, Ser. No. 549,984**
**Claims priority, application Japan, Jun. 4, 1987, 62-86857[U]; Jun. 4, 1987, 62–86858[U]; Feb. 9, 1988, 63–15912[U]**
**Int. Cl.$^5$ F16D** *23/14*
**U.S. Cl. 192—98** **3 Claims**

1. A release bearing mechanism of a clutch comprising:

- a release bearing to which an operation mechanism is connected for applying an operation force in an axially outward direction of the clutch thereto, said release bearing including an inner race provided with an axially inwardly extending cylindrical extension;
- a cylindrical lever plate fitted to said cylindrical extension and fixed to a diaphragm spring;
- said lever plate being provided at the inner peripheral surface with a first ring escape groove, a substantially tapered guide portion extending axially and radially inwardly from a bottom surface of said escape groove, a ring fitting portion located axially inside said guide portion and a second ring escape groove located axially inside said ring fitting portion;
- said extension being provided at the outer peripheral surface with a third ring escape groove and a ring fitting portion located axially inside said third ring escape groove;
- a radially elastically deflected connecting ring interposed between said lever plate and said extension;



- a pusher provided at said extension for axially inwardly pushing said connecting ring;
- said pusher having an end which is adapted to engage with the connecting ring, said end of said pusher being located radially outside the axially outer edge of said third ring escape groove and aligned to said edge in the radial direction;
- said first, second and third ring escape grooves having depth which permits axially relative movement between said lever plate and said extension when said connecting ring is accommodated in any of said grooves;
- said fitting portion of said lever plate being adapted to fit to radially and axially outer sides of said connecting ring; and
- said fitting portion of said extension being adapted to fit to radially and axially inner sides of said connecting ring.

---

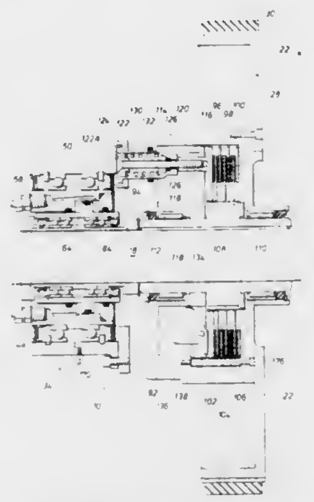
**5,014,841**

### CLUTCH ADJUSTMENT AND LOCKUP SYSTEM

**Joseph D. Gillespie, 3110 Westerland, Houston, Tex. 77063**
**Filed Nov. 1, 1989, Ser. No. 430,186**
**Int. Cl.$^5$ F16D** *43/12*
**U.S. Cl. 192—105 C** **11 Claims**

1. An improvement to a centrifugally actuated friction clutch adapted for use with a vehicle of the type wherein at least one clutch plate and one clutch disk is provided, wherein the disk is adjacent to and engagable with the plate, wherein a weight support member, having an aperture, is concentric with the plate and disk and is interlocked with the plate for rotation therewith, said weight support member having at least one pivotable weight means for loading the plate to frictionally engage the disk upon rotation of the weight support member, and wherein means for urging the plate to said weight support member is provided to restrain pivotal movement of the weight means to resist frictional engagement of the plate with the disk below a predetermined speed of rotation of the plate, wherein the improvement comprises

- a holder means for retaining the means for urging; and a hydraulic adjuster means fluidly coupled to the clutch to move the holder means relative to the clutch plate for adjusting the speed at which the plate operably engages the disk.



---

5,014,842

### TORSION DAMPING DEVICE FOR AN AUTOMOTIVE FRICTION CLUTCH DISC

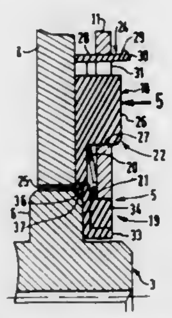
**Michel Graton, Paris, and André Dalbiez, Argenteuil, both of France, assignors to Valeo, Paris, France**

**Filed Feb. 5, 1990, Ser. No. 475,194**

**Claims priority, application France, Feb. 7, 1989, 89 01537**

**Int. Cl.⁵ F16D** *3/14, 3/66*

**U.S. Cl. 192—106.2** **10 Claims**



1. A torsion damping device defining an axis and comprising:
a hub;
at least one damper plate;
means mounting the damper plate or plates coaxially around the hub and defining a range of relative angular displacement between the hub and the damper plated;
two guide rings coaxially surrounding the hub and one of said guide rings being disposed axially on each side of said at least one damper plate;
first friction damping means comprising a first friction ring;
second friction damping means comprising a second friction ring, said friction rings being both disposed axially between one of the guide rings and said damper plate;
means centring the friction rings coaxially with the said axis, with the said first friction rnng surrounding the said second friction ring;
coupling means coupling at least one of said friction rigns with one of said guide rings or said damper plate for rotation therewith;
first circumferentially acting resilient means coupling said guide rings with said at least one damper plate, whereby the guide rings are moveable rotatably with respect to the latter against the action of said first friction mesan and first resilient means within the limits of an angular displacement; and
second circumferentially acting resilient means coupling the hub with said damper plate or plates, whereby the latter is moveable rotatably about the hub within the limits of the range of relative angular displacement, against the action of said second friction means and second resilient means,
wherein the device further comprises abutment means between a sub-assembly comprising one of said friction rings and an element selected from the group consisting of said at least one damper plate and the guide ring associated with said one friction ring for coupling together said sub-assembly, and axial retaining means between the two friction rings for retaining the two friction rings together in rotation.

---

5,014,843

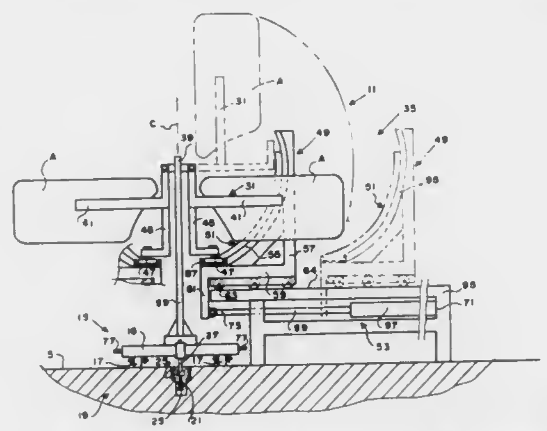
### CAM OPERATED FIXTURE FOR A CONVEYOR

**Leon Linton, and Michael L. Campbell, both of Memphis, Tenn., assignors to Southern Systems, Inc., Memphis, Tenn.**

**Filed Sep. 28, 1988, Ser. No. 250,265**

**Int. Cl.⁵ B65G** *47/24*

**U.S. Cl. 198—377** **10 Claims**



1. A cam operated fixture for a conveyor of the type including a movable carrier and power means for moving said carrier, said cam operated fixture comprising in combination:
(a) support post means fixedly mounted on said carrier;
(b) at least one product support means for attaching a product;
(c) means movably mounting said product support means on said support post means; and
(d) actuating means for being operably coupled to said product support means for movement of said product support means to various positions, said actuating means including a carriage, separate from the carrier, and means for moving said carriage between an engaged position in which said actuating means is operably coupled to said product support means and a disengaged position in which said actuating means is operably decoupled from said product support means.

---

5,014,844

### CONVEYOR BELT CLEANER

**Raine Anttonen, Naavakatu, Finland, assignor to Ronde Engineering, Lahti, Finland**

**Filed Sep. 9, 1988, Ser. No. 242,305**

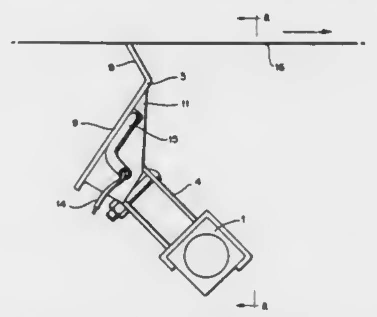
**Claims priority, application Finland, Sep. 14, 1987, 873976**

**Int. Cl.⁵ B65G** *45/00*

**U.S. Cl. 198—499** **7 Claims**

1. A conveyor belt cleaner comprising a body and cleaner elements attached side by side to the body, each cleaner element consisting of a blade, a blade holder attached to said body, a torsion spring element located between said blade and said blade holder, and heating element means disposed in

contact with each said blade, each said blade consisting of an upper part having an upper edge which is adapted to be pressed against the underside of a return belt of a conveyor belt, and a lower part having a lower edge, which lower part is disposed at an angle relative to said upper part and attached to said torsion spring element, each said blade being of uniform width from the lower edge to the upper edge thereof, and each said blade having a sheltered rear surface, said heating element means disposed i contact with said sheltered rear surface of each said blade.



---

5,014,845

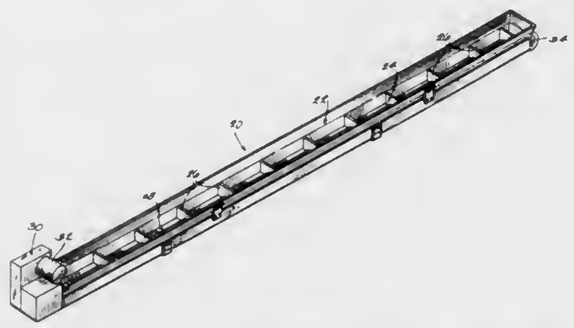
### CONVEYOR WITH RIGIDLY LOCKED SECTIONS

**Michael D. McCarthy, Kiel, Wis., assignor to Metko, Inc., New Holstein, Wis.**

**Filed May 8, 1989, Ser. No. 350,124**

**Int. Cl.⁵ B65G** *19/18*

**U.S. Cl. 198—735.2** **11 Claims**



1. A conveyor for conveying livestock feed, comprising:
a trough;
a conveying means residing in said trough;
drive means for moving said conveying means within said trough;
said trough being formed of an upper portion, and a lower portion attached to said upper portion, each said portion including segments, with transverse boundaries between said segment, and
connecting means for rigidly connecting the segments of each said portion together to thereby prevent any pivoting between adjacent segments and eliminate the need for support structure between the ends of the conveyor;
the lengths of said segments of both of said portions being chosen, and said segments being assembled together, such that said boundaries of said upper portion are non-aligned with said boundaries of said lower portion.

---

5,014,846

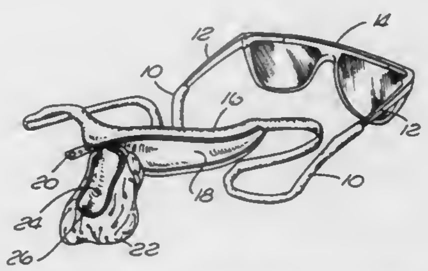
### PROTECTIVE COVER FOR EYEGLASSES

**Scott A. Walker, P.O. Box 651, Helendale, Calif. 92342, and Randy J. Walker, P.O. Box 1056, Inyokern, Calif. 93527**

**Filed Sep. 10, 1990, Ser. No. 579,571**

**Int. Cl.⁵ A45C** *11/04*

**U.S. Cl. 206—5** **16 Claims**



11. An improved cover for protecting eyeglasses having lenses and foldable arms adapted for retention behind one's ears, said cover comprising:
a hollow flexible body adapted to receive and cover the lenses of eyeglasses and shaped in conformity therewith and provided with edges that define an opening sufficiently large to pass the eyeglasses therethrough and including means for securing said edges about the lenses;
a pouch having an interior cavity defined therein, said flexible body being foldable to a compact profile suitable for storage within said pouch, said pouch including a mouth through which said interior cavity may be accessed, wherein portions of the pouch that define said mouth include closure means for fastening shut said pouch, said pouch further including means for removable attaching the pouch to an arm of a pair of eyeglasses; and
tether means for connecting said flexible body to an interior portion of said pouch.

---

5,014,847

### CONTAINER-DISPLAY UNIT FOR ARTICLES HANGING FROM RODS

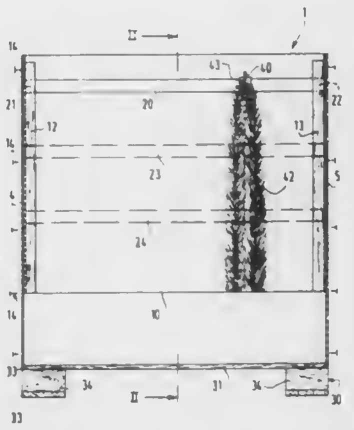
**Roland Droguet, Paris, France, assignor to Societe Anonyme dite: Droguet International, Paris, France**

**Filed Jul. 24, 1989, Ser. No. 383,405**

**Claims priority, application France, Jul. 28, 1988, 88 10181**

**Int. Cl.⁵ B65B** *85/18;* **A47F** *7/19*

**U.S. Cl. 206—279** **8 Claims**



1. Parallelepipedic display-container comprising:
a rectangular bottom wall made of cardboard delimited by four edges;
a front wall facing a rear wall and two side walls facing each other, each of said walls being made of cardboard and

VOL
1126
ISS
2
MY
14
1991
UMI

extending perpendicularly to said bottom wall from and along one of said bottom wall edges respectively;

four corners, each defined by an intersection of any of said front, rear and side walls with an adjacent one, each corner extending along said walls;

two wooden main uprights, each having several faces two of which define an angle, each main upright being disposed in one of two corners between said rear wall and said side walls so that said angle faces said corner and that said faces of the main upright defining said angle bear on said rear wall and side wall respectively and are fixed thereto all along said main upright, each main upright resting on said bottom wall;

main support means extending transversely between said two main uprights and having two ends each end of which is fixed to an upright;

several rods, each having a first end fixed to said main support means so as to extend substantially perpendicular to said rear wall, and a second free end so that several articles may be hung one behind the other on said rod, said front wall of the display-container being foldable or removable to give access to said articles.

---

## 5,014,848
## DEVICE FOR STORING TENNIS BALLS

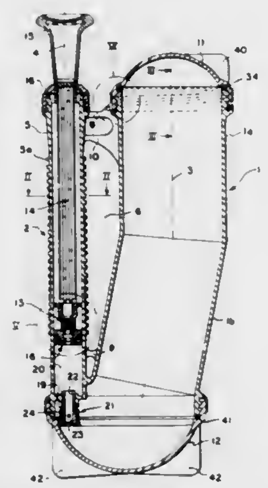
**Johann K. Wild, Augsburg, and Nicole Egloffstein, Stadtbergen, both of Fed. Rep. of Germany, assignors to PMC Patents Management & Consulting (Luxembourg) Holding S.A., Luxembourg, Fed. Rep. of Germany**

**PCT No. PCT/EP89/00995, § 371 Date Apr. 10, 1990, § 102(e) Date Apr. 10, 1990, PCT Pub. No. WO90/01973, PCT Pub. Date Mar. 8, 1990**

**PCT Filed Aug. 23, 1989, Ser. No. 474,009**

**Int. Cl.$^5$ B65D** *85/00*

U.S. Cl. 206—315.9 12 Claims



1. Device for storing tennis balls under pressure, comprising

(a) a tubular container (**1**) which is provided with a screwable cover (**11**) on at least one end,

(b) a piston pump (**2**) with a pump housing (**5**) arranged adjacent to the container (**1**) and connected to one end region of the container and with a piston (**13**) which is movable in the pump housing by means of a pump handle (**15**),

(c) a non-return valve (**21**) which connects the pump pressure chamber (**20**) to the interior of the container (**1**),

characterised by the following feature:

(d) the pump housing, which is constructed as a handle, is also connected to the other end region of the container (**10**) so that there is an opening (**6**) for a hand to reach through between the pump housing (**5**) and the container (**1**), and in the inserted state the pump handle (**15**) also projects over the container (**1**).

---

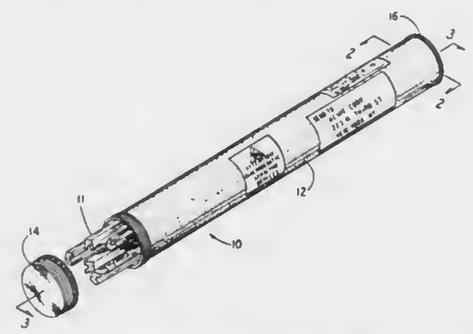
## 5,014,849
## ELECTRO-STATIC PROTECTIVE CONTAINER FOR ELECTRICAL COMPONENTS

**Raymond P. Becker, Gurnee, Ill., assignor to Conductive Containers, Inc., Northbrook, Ill.**

**Filed Feb. 5, 1990, Ser. No. 475,333**

**Int. Cl.$^5$ B65D** *73/02, 85/20;* **B65B** *11/58*

U.S. Cl. 206—328 22 Claims



1. A protective container for electrical components which are susceptible to damage from the discharge of electro-static charges, the container comprising;

a hollow body including a laminate of paperboard and a first layer of electrically conductive material adjacent the outside surface of the paperboard and a second layer of electrically conductive material adjacent the inside surface of the paperboard; and

a pair of electrically conductive end caps closing the opposite ends of the hollow elongated body, at least one of the end caps being removable, and at least one of the end caps making conductive contact with at least one of the conductive layers of the laminate.

---

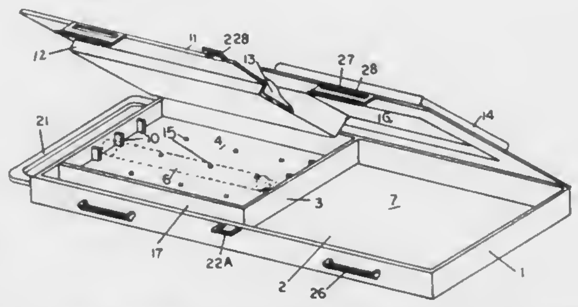
## 5,014,850
## UTILITIES STORAGE BOX

**Phyllis M. Huff, 809 Yenowine La., Georgetown, Ind. 47122**

**Filed Apr. 30, 1990, Ser. No. 516,319**

**Int. Cl.$^5$ B65D** *85/28;* **B05C** *17/00*

U.S. Cl. 206—371 3 Claims



1. A utility storage box useful for storage of selected items including: base enclosure means having a generally planar bottom with laterally upstanding side walls; lid means hinged along one side wall; upstanding dividing wall means located within the base defining a compartment therein; recess segment located within said lid means having a peripheral configuration generally approximating the peripherial configuration of said compartment defined within said base enclosure means; raised section in said lid to overly a section of said base enclosure outside said compartment so that selected items of differing mean diameter can be located in said base enclosure to be selectively contacted by said recessed and raised segments to hold said selected items in position.

---

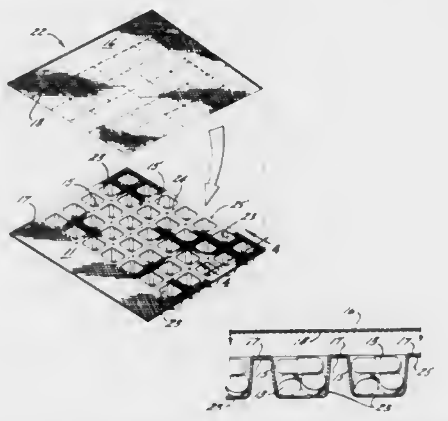
## 5,014,851
## PACKAGE ASSEMBLY FOR DISPENSING PHARMACEUTICAL MEDICATIONS AND METHOD OF MANUFACTURING THE SAME

**John J. Wick, Swanton, Vt., assignor to Multi-Comp, Inc., Lynchburg, Va.**

**Filed Jun. 16, 1989, Ser. No. 367,205**

**Int. Cl.$^5$ B65D** *83/04*

U.S. Cl. 206—539 15 Claims



1. A package assembly for dispensing pharmaceutical medications comprising

a blister sheet having a plurality of medication receiving blister recesses formed therein, with said sheet including substantially planar shoulder portions disposed between the blister recesses and along the peripheral portions of the sheet, a surface coating of a first cohesive composition provided on said shoulder portions of the sheet;

pharmaceutical medications positioned in at least some of said blister recesses of said blister sheet; and

a lidding sheet having one surface thereof coated with a second cohesive composition having a cohesive affinity for said first cohesive composition but having no affinity for said pharmaceutical medications, said lidding sheet being positioned in overlying relationship to said shoulder portions of said blister sheet with said second cohesive composition cohesively sealing the lidding sheet to said blister sheet along said shoulder portions to thereby close said blister recesses and encapsulate the medications therein.

---

## 5,014,852
## PAD OF BAGS

**Fox J. Herrington, Holcomb, N.Y., and James P. O'Sullivan, Sr., Fairfax, Va., assignors to Mobil Oil Corp., Fairfax, Va.**

**Continuation of Ser. No. 292,125, Dec. 30, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 467,294**

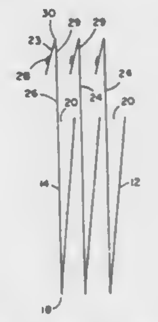
**Int. Cl.$^5$ B65D** *85/62*

U.S. Cl. 206—554 9 Claims

1. A pad of a plurality of sealable-unsealable bags comprising:

a stack of bags, each bag comprising:

- a front and rear wall closed at the sides and bottom and having a region of access to between said walls;
- a closure flap as an integral extension of said rear wall, said closure flap having an inside and an outside surface relative to said bag in its sealed condition the inside surface being that surface adjacent said front wall;
- an adhesive region located on a portion of the inside surface of said flap; and
- at least the adhesive-bearing portion of the flap of each bag being reverse-folded, outside surface-to-outside surface so that the adhesive-bearing portion of the inside surface of said closure flap is positioned in releasable adhesive contact with a non-adhesive bearing portion of an inside surface of another closure flap of a preceeding bag in said stack.



---

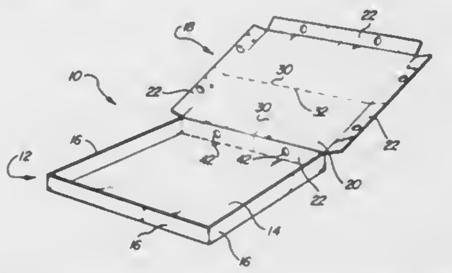
## 5,014,853
## FOOD DELIVERY BOX

**Eric T. Crockett, 3854 Clareridge, Toledo, Ohio 43623**

**Filed Aug. 2, 1990, Ser. No. 562,499**

**Int. Cl.$^5$ B65D** *5/54*

U.S. Cl. 206—602 16 Claims



1. A food container comprising a bottom portion defined by a base panel and at least one side panel positioned substantially perpendicular to the base panel forming a storage area for the receipt of food and a top portion having a top panel and downwardly extending flaps which are hingedly connected to the top panel and can be folded perpendicular to the top panel for receipt by the bottom portion adjacent said side panel when the top portion is closed, at least one of the flaps being hingedly attached to the bottom portion such that the top portion can be opened and closed with respect to the bottom portion to cover the storage area, the top portion having perforations at least along the extent of the top panel which define at least four sections that extend from a point substantially central to the top panel to the outer edges of the top portion intersecting the flaps, each of the sections including a portion of the top panel and a portion of at least two adjoining flaps such that the top portion can be separated into plates with each plane having a section of the top panel and a section of at least two flaps with the section of the top panel forming the bottom of the plate and the flaps forming the sides of the plate.

---

## 5,014,854
## EASY OPENING GABLE TOP CARTON AND BLANK THEREFOR

**Nestor A. Anderson, Parsippany, N.J., and Michael E. Walsh, Stamford, Conn., assignors to Champion International Corporation, Stamford, Conn.**

**Filed Jul. 5, 1990, Ser. No. 548,667**

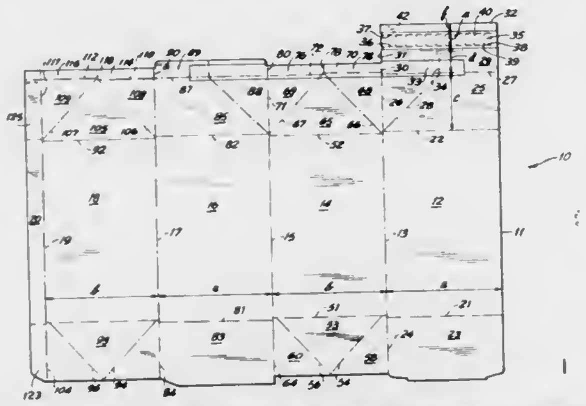
**Int. Cl.$^5$ B65D** *5/54*

U.S. Cl. 206—611 10 Claims

1. A blank for forming a gable topped carton having a flat easy opening top, said blank being formed from a single sheet of paperboard material comprising first through fourth rectangular side wall panels and a rectangular side glue panel consecutively articulated to one another along generally parallel fold

VOL
1126
ISS
2
MY
14
1991
UMI

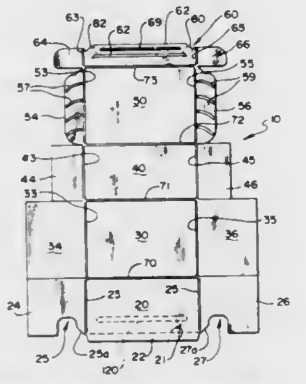
lines, first through fourth bottom wall panels articulated to the first through fourth side wall panels along first through fourth bottom fold lines respectively, first through fourth top wall panels articulated to the first through fourth side wall panels along first through fourth top fold lines respectively, a top glue panel articulated to the side glue panel, the first and third top wall panels and the top glue panel being generally rectangular, the second ad fourth top wall panels being of generally isosceles triangular configuration and being further defined by converging fold lines of approximately equal length, a first triangular web panel articulated to and extending between the first and second top wall panels, a second triangular web panel articulated to an extending between the second and third top wall panels, a third triangular web panel articulated to and extending between the third and fourth top wall panels and a fourth triangular web panel articulated to and extending between the fourth top wall panel and top glue panel, top seal panels articulated respectively to the first and third top wall panels and the first through fourth triangular web panels, the top seal panel articulated to the first top wall panel including a removable tear strip integral therewith and defined by a pair of spaced apart parallel perforation arrays, and an anti-seal material disposed on at least portions of said tear strip.



---

## 5,014,855
## FLIP TOP SEALED CARTON WITH TEAR FILAMENT

**Harry I. Roccaforte, Western Springs, Ill., assignor to Waldorf Corporation, St. Paul, Minn.**
**Filed Nov. 13, 1989, Ser. No. 434,176**
**Int. Cl.$^5$ B65D** *5/54*
**U.S. Cl. 206—616** **26 Claims**

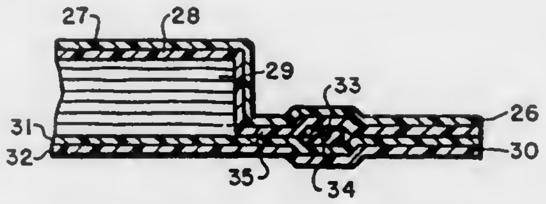


1. A rectangular box carton comprising:
(a) a front panel, a bottom panel, a back panel, a cover panel and a closure panel, said front, bottom, back, cover and closure panels being generally rectangular and consecutively joined at right angles at parallel fold lines and said closure panel having a free edge opposite the fold line between said cover and closure panels, said closure panel further being overlapped on and connected to said front panel adjacent said free edge to form a tube of generally rectangular cross section;
(b) left and right endwall means for closing each end of said tube, each endwall means comprising a hood flap attached to said cover panel and adapted to form with the cover and closure panels a hinged, hooded lid that is opened by breaking the connection between the closure panel and front panel and that is thereafter hinged to open and close to give access to contents of the carton; and
(c) a tear filament affixed to and across the inner surface of said closure panel substantially parallel to but spaced from the fold line between the cover and closure panels, said tear filament having opposed ends, opposed longitudinal edges between the ends and at least one tear tab associated with one of said ends of said tear filament, said at least one tear tab associated with the tear filament extending from the free edge of said closure panel toward one of said ends of said tear filament and comprising a pair of cuts in the closure panel, each said cut leading toward one of said ends of said tear filament.

---

## 5,014,856
## RECLOSABLE PACKAGE

**Ray H. Griesbach, Monona, and Gerald O. Hustad, McFarland, both of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.**
**Continuation of Ser. No. 218,388, Jul. 12, 1988, Pat. No. 4,823,961, which is a continuation of Ser. No. 841,916, Mar. 20, 1986, Pat. No. 4,782,951. This application Feb. 13, 1989, Ser. No. 309,645**
**The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.**
**Int. Cl.$^5$ B65D** *75/26, 81/20*
**U.S. Cl. 206—632** **10 Claims**

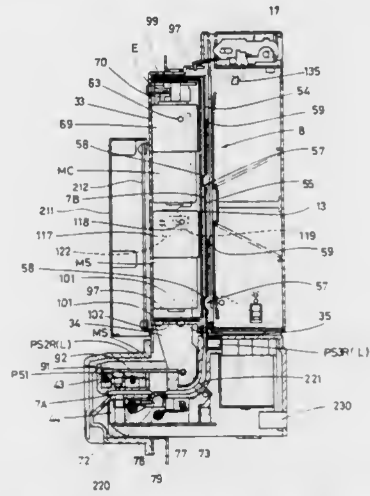


1. A reclosable hermetically sealed vacuum package comprising:
(a) two multi-layered oxygen barrier films having their inner layers in intimate face to face contact with each other forming a hermetic vacuum seal around a vacuum product cavity, each of said films comprising a plurality of layers, the inner layers of said films being capable of forming a hermetic vacuum peel seal when in intimate contact with each other;
(b) a food product in said vacuum product cavity;
(c) a portion of said hermetic vacuum seal on at least one side of the package being a hermetic vacuum peel seal formed between said inner layers; and
(d) reclosable, flexible, thermoplastic, interlocking closure strips attached respectively to said two films peripherally to said hermetic vacuum peel seal, said closure strips comprising one or more interlocking ribs and grooves extending along said one side of said package, said closure strips being adapted to reclose said package after said hermetic vacuum peel seal has been opened;
said hermetic vacuum peel seal being of sufficient opening force to withstand processing, handling and shipping and to maintain a vacuum, yet low enough to allow access to the product cavity and to ensure that the structural and functional integrity of the films, closure strips and remaining seals is maintained.

---

## 5,014,857
## DISCRIMINATING APPARATUS FOR PRINTED MATTER

**Hiroatsu Kondo, Osaka, Japan, assignor to I.M. Electronics Co., Ltd., Osaka, Japan**
**Filed Mar. 4, 1988, Ser. No. 164,206**
**Claims priority, application Japan, Jun. 24, 1987, 62-158710**
**Int. Cl.$^5$ B07B** *5/34;* **G06K** *9/68;* **G07D** *7/00*
**U.S. Cl. 209—534** **7 Claims**

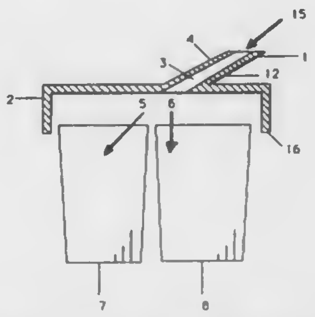


1. An apparatus for discriminating printed matter having a discriminating pattern thereon, comprising:
a passage with an inserting port for the printed matter;
transferring means for transferring the printed matter inserted in said inserting port;
sensor means including at least one sensor for scanning the printed matter while transferring and producing an analog signal corresponding to the discriminating pattern thereof;
timing means for generating periodic timing signals of predefined intervals, said intervals being in proportion to the transferring speed of the transferring means so that the timing signals correspond to regular short intervals on the printed matter;
trigger means for monitoring the output of said sensor means to detect a predetermined reference point on the printed matter and generating a trigger signal when detected;
digital sampling means triggered by said trigger signal to start sampling the analog signal at the intervals of said timing signals to produce a series of digital sampled data, said series of digital sampled data each designating the amplitude of the analog signal at an address based on said reference point;
reference data memorizing means stored therein with a reference comprising a plurality of reference data to be compared with said series of digital sampled data, said plurality of reference data each showing an allowable limit for the amplitude of the analog signal at a predetermined address based on said reference point, wherein said reference includes a plurality of references per one kind of printed matter, for a plurality of different scanning routes including a route on the center line of the printed matter, and routes located on both sides of said center line with minute spacings therebetween; and
control means including
  data comparing means for comparing the sampled data with the reference data,
  address shifting means for shifting the addresses of the reference data relative to the addresses of the sampled data to make a plurality of conditions in the comparison made by said data comparing means, and
  judging means for determining from results of the comparison whether the sampled data coincide with the reference,
said conditions including at least the following conditions:
a condition in which the addresses of the reference data substantially coincide with the addresses of the sampled data in terms of said reference points;
a condition in which the addresses of the reference data are shifted from the addresses of the sampled data by increasing the addresses of the reference data relative to the addresses of the sampled data; and
a condition in which the addresses of the reference data are shifted from the addresses of the sampled data by decreasing the addresses of the reference data relative to the addresses of the sampled data,
said comparing means comparing, in each condition, the reference datum at each of the addresses with the sampled datum at the corresponding address to determine whether the amplitude is within the allowable limit,
in each condition, when the amplitudes designated by the compared sampled data are within the limits shown by the compared reference data, said judging means judging that the sampled data collectively coincide with the reference data in that condition,
when the number of the coincidence between the sampled data and the reference data through the comparisons in said conditions is more than a predetermined number, said judging means judging that the sampled data wholly coincide with said reference, and outputting a signal indicating that the inserted printed matter is acceptable.

---

## 5,014,858
## REFUSE SEPARATOR

**Ernest T. Armstrong, 810 Fukuoka-shi, Chuo-ku, Jonai 9-10, Japan**
**Filed Mar. 19, 1990, Ser. No. 495,735**
**Int. Cl.$^5$ B07B** *13/10*
**U.S. Cl. 209—641** **11 Claims**

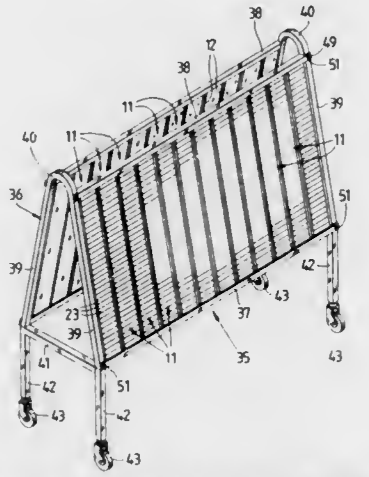


1. An apparatus for segregating waste materials comprising:
(a) at least two adjacently disposed receptacle means for receiving segregated waste materials;
(b) a cover means disposed in overlying relationship to said at least two adjacently disposed receptacle means;
(c) said cover means including an inlet opening for receiving waste materials and a downwardly inclined slide means for directing waste materials received through said inlet opening towards said at least two adjacently disposed receptacle means; and
(d) said slide means including a terminal end located above said at least two adjacently disposed receptacle means whereby received waste materials are segregated into respective ones of said at least two adjacently disposed receptacle means due to the different trajectories attained at said slide means terminal end.

/OL
126
SS
2
MY
14
1991
UMI

### 5,014,859
### INTERLOCKING CARD ORGANIZER

**Ron M. Johnson, Montgomery, Ala., assignor to P.O.S. Components, Montgomery, Ala.**
**Filed Dec. 18, 1989, Ser. No. 451,573**
**Int. Cl.$^{5}$ A47F *7/00***
U.S. Cl. 211—55 **7 Claims**

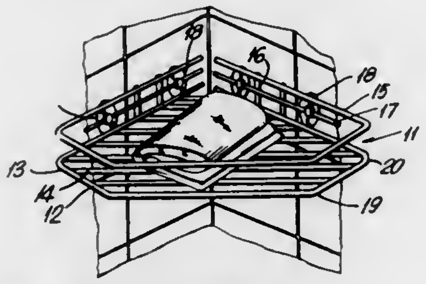


1. Apparatus for receiving, storing and organizing articles of relatively planar definition including sheets of paper or cards, comprising a plurality of interlocking slot plates held in secured orientation by a frame, wherein each said slot plate has a rigid elongated insertion bar located on a rearward side thereof and extending horizontally thereon and a rigid elongated receptacle located on a forward side thereof extending parallel to said insertion bar a predetermined vertical distance therebelow; wherein said insertion bar includes a cross-sectionally trapezoidal base integrally connected to said rearward side of said slot plate, and a cross-sectionally circular securing portion integrally connected to an coextensive with said cross-sectionally trapezoidal base, the diameter of said securing portion being significantly wider than the most narrow portion of said trapezoidal base and; wherein said receptacle includes a cylindrical securing channel coextensively defined therein having a diameter substantially equal to the diameter of said insertion bar and a securing slot extending coextensively and communicating with said securing channel, wherein said slot cross-sectionally mirrors said base in both shape and dimension and has a pair of angularly oriented sides to accommodate said base in sliding abutment therebetween.

---

### 5,014,860
### SHOWER CADDY

**William W. Emery, Berkeley Heights, N.J., assignor to Better Sleep Manufacturing Co., Berkeley Heights, N.J.**
**Filed Aug. 1, 1989, Ser. No. 388,236**
**Int. Cl.$^{5}$ A47F *5/00***
U.S. Cl. 211—106 **15 Claims**

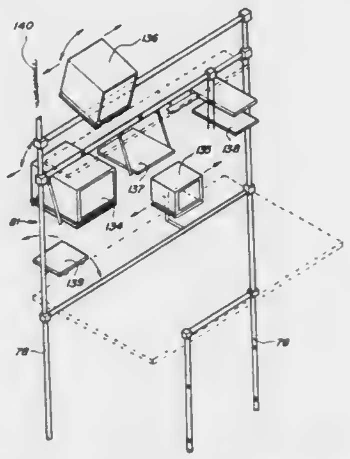


1. A caddy device for installation on a non-porous wall comprising:
- a frame having a horizontal arm element;
- a plurality of members attached perpendicularly to said horizontal element;
- a horizontal bar attached to said perpendicular members, with each end of said horizontal bar being open to receive a suction cup in slidable relation therewith; and
- connecting members fastened at each end to said frame to form a caddy device.

---

### 5,014,861
### MODULAR SYSTEM FOR SETTING UP FURNITURE, RACKS, FRAMEWORKS AND THE LIKE

**Marc-Michael Städtler, D-8205, Alte Rathausstr. 22, Kiefersfelden, Fed. Rep. of Germany**
**Filed Feb. 12, 1988, Ser. No. 155,617**
**Claims priority, application Fed. Rep. of Germany, Feb. 16, 1987, 3704831**
**Int. Cl.$^{5}$ A47F *5/14***
U.S. Cl. 211—182 **7 Claims**

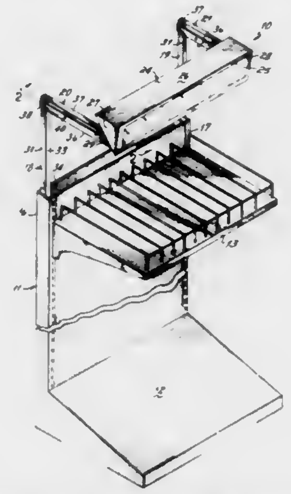


1. A modular system for setting up furniture, racks and frameworks, especially office workspace equipment, comprising:
- a plurality of components adapted to be interconnected;
- means interconnecting said plurality of components comprising supporting members and retaining members;
- wherein each retaining member comprises a plurality of parts forming a multi-part combinable nodal-point body and includes at least a pair of parallel through-bores, said parts being split along a common diametric plane extending centrally through said pair of parallel through-bores; and
- wherein each supporting member comprises a structural body having a longitudinal extent dimensioned to be inserted into one of said through-bores and clamped therein by said retaining member parts, thereby being securely joined to said nodal-point body;
- characterized in that the multi-part combinable nodal-point body is a cube divided along two mutually orthogonal planes into four equal parts, said cube on four of its six outer sides which oppose each other in pairs being formed with at least two respective parallel through-bores extending therethrough for accommodating therein at least one respective supporting member, said supporting members upon assembly of the four parts of the cube to form the nodal-body being securely joined thereto.

---

### 5,014,862
### ASSEMBLY FOR CANTILEVERED DISPLAY HEADER

**Rafael T. Bustos, Alpharetta, Ga., assignor to Leggett & Platt, Incorporated, Carthage, Mo.**
**Filed May 31, 1990, Ser. No. 531,007**
**Int. Cl.$^{5}$ A47F *5/00***
U.S. Cl. 211—193 **19 Claims**

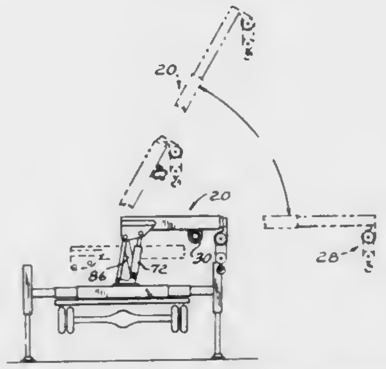


1. An assembly for cantilevered mounting of a display header upon a display rack comprising:
- a vertical upright adapted to extend upward from the display rack;
- a cantilevered arm rigidly connected to a top end of the vertical upright, the arm including upper and lower hingedly connected sections;
- means adapted to connect one side of a display header to a top portion of a free end of the upper section; and
- means associated with said arm for hingedly raising the upper section with respect to the lower section, thereby to enable one side of the connected display header to be adjustably supported at a desired height.

---

### 5,014,863
### VEHICLE MOUNTED CRANE

**James Vlaanderen, Garner, Iowa, assignor to Iowa Mold Tooling Company, Inc., Garner, Iowa**
**Filed Apr. 14, 1989, Ser. No. 339,067**
**Int. Cl.$^{5}$ B66C *23/00***
U.S. Cl. 212—182 **13 Claims**

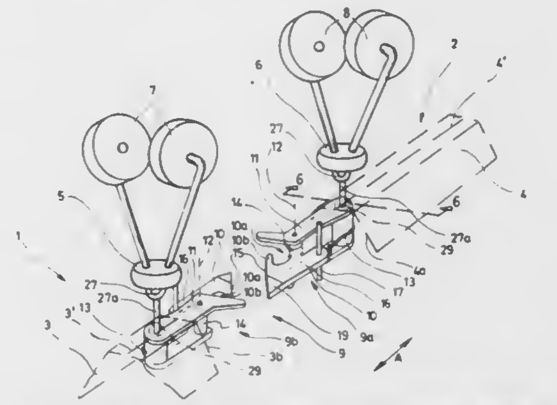


9. A vehicle mounted crane construction comprising:
- a base adapted to be mounted on a vehicle;
- a boom located above said base and including first and second, opposed ends;
- load lifting means on said boom at said first end; and
- a collapsible mast interconnecting said boom second end and said base, said mast including a rigid link pivoted at a first pivot to said base and at a second spaced pivot to said boom, a variable length link generally parallel to said rigid link and pivoted at a third pivot to said base and a fourth, spaced pivot to said boom and operable to raise or lower said boom on said mast, the distance between said first and third pivots, and said second and fourth pivots being substantially equal, said variable length link being configurable to have a length substantially equal to the length of said rigid link to define a parallelogram linkage and a motor for changing the distance between opposite corners of said parallelogram linkage;
- whereby said mast may be collapsed or extended on said base by operation of said motor and without changing the attitude of said boom relative to said base.

---

### 5,014,864
### CONVEYOR SYSTEM

**Peter Richter; Josef Hafner, and Rolf Schöpenberger, all of Landsberg/Lech, Fed. Rep. of Germany, assignors to Veit Transpo GmbH, Fed. Rep. of Germany**
**Filed Apr. 17, 1989, Ser. No. 338,667**
**Claims priority, application European Pat. Off., Apr. 18, 1988, 88106154**
**Int. Cl.$^{5}$ B65G *9/00***
U.S. Cl. 213—104 **23 Claims**



1. An overhead conveyor system comprising at least two transport units having free ends and being adapted to be moved on rollers and interconnected by a disconnectable coupling, said rollers being rotatably supported by operating means adjacent said free ends, the coupling including two identically formed hooks which are each provided with a hook opening, one of said hooks being arranged by an associated base member on a free end of one of the transport units to be coupled and the other hook being arranged by an associated base member on a free end of the other transport unit to be coupled in such a way that their hook openings face each other, each hook being loaded by a spring and being connected to its associated base member by means of a hub for rotation about an axis coinciding with a centerline of the hub, each hub forming a locking member by, in a coupled condition, being adapted to be engaged by the hook opening of the other hook, while the hooks, in an uncoupled condition, being adapted to engage each other, and to be rotated by this engagement under tensioning of the spring, when the two transport units are moved towards each other, until each hook opening faces one hub in order to allow the spring to rotate the hook opening into a locking engagement with the hub, each of said base members being connected to a cross arm of the associated transport unit through a second, essentially vertical axis of rotation characterized in that said base member and the operating means arranged adjacent said base member at the same free end are adapted to pivot relative to one another about a substantially horizontal axis extending transversely to the direction of the transport.

OL
1126
ISS
2
MY
14
1991
UMI

**5,014,865**

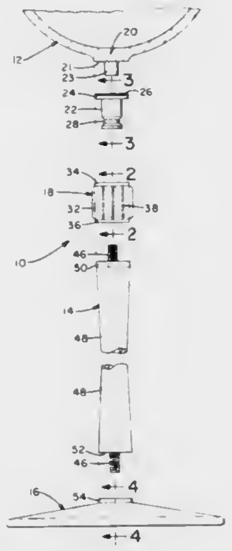
### STEM WARE

**Richard C. Sauber, 2575 27th St., Akron, Ohio 44314**

**Filed Mar. 26, 1990, Ser. No. 498,558**

**Int. Cl.$^5$ A47G** *19/22*

**U.S. Cl. 215—99.5** **12 Claims**



1. A drinking utensil, comprising:

a cup portion;

a stem portion, said stem portion being removably connected to said cup portion:

a ferrule connected to said cup portion, said ferrule engaging said stem portion, said ferrule having a threaded bore axially therein:

a threaded pin extending from an end of said stem portion for engagement with said threaded bore of said ferrule; and

a collar receiving and concealing said ferrule, and interposed between said cup portion and said stem portion, said collar having a partial depth bore receiving said ferrule, and a bottom portion having a bore passing therethrough and receiving said threaded pin, a top edge surface of said collar engaging a shoulder of said ferrule.

---

**5,014,866**

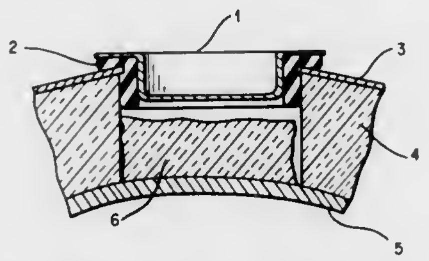
### INSULATION SEAL FOR INSPECTION HOLES

**Charles F. Moore, 13411 Butterfly La., Houston, Tex. 77079**

**Filed Dec. 11, 1989, Ser. No. 448,714**

**Int. Cl.$^5$ B65D** *39/00*

**U.S. Cl. 215—364** **1 Claim**



1. A seal for use in holes drilled in metal jacket covered insulation made while performing non-destructive tests and inspections composed of:

a. an elastomeric cylindrical sleeve having inner and outer walls and a flange extending outwardly from one end thereof;

b. said flange of said sleeve having a flat upper surface extending perpendicularly to said sleeve and a lower substantially convex surface extending from said outer wall of said sleeve to said upper surface of said flange;

c. a plug for insertion into said sleeve comprising a cylindrical wall and having a solid bottom at one end thereof and a flat flange extending perpendicularly to said cylindrical wall of said plug at the opposite end;

d. said cylindrical wall of said plug having an outside diameter larger than the inner diameter of said sleeve for radially expanding said cylindrical section of said sleeve to provide a secure seal when said sleeve and said plug are consecutively inserted into a hole in metal jacket covered insulation;

e. said flat flange of said plug being sized to fully cover and thereby protect said flat upper surface of said flange of said sleeve from weather and ultraviolet light.

---

**5,014,867**

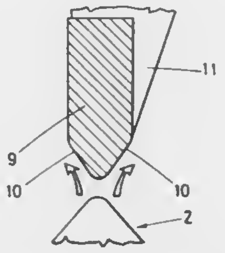
### CONTAINER

**Jean Van Melle, Schilde, Belgium, assignor to Tates, Antwerp, Belgium**

**Filed Apr. 12, 1989, Ser. No. 336,761**

**Int. Cl.$^5$ B65D** *21/02, 88/12*

**U.S. Cl. 220—1.5** **5 Claims**



1. In a container adapted to be stacked upon another container, and including at least a plurality of bottom beams forming at least one bottom corner of the container, and a lock receiving member located at said corner and forming a bottom opening to receive a head of a twistlock of said another container, the improvement comprising:

a buffer block secured to one of said bottom beams immediately adjacent the lock receiving member, and including at least a first surface slanting upwardly and laterally to guide the head of the twisterlock of said another container away from said one of the bottom beams when the container is lowered onto said another container.

---

**5,014,868**

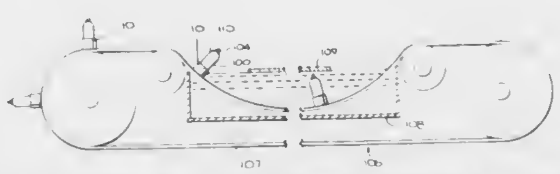
### HOLDING DEVICE FOR CONTAINERS

**Gary P. Wittig, Danville, Ill., and Tom Burpee, Grand Rapids, Mich., assignors to CCL Custom Manufacturing, Inc.**

**Continuation of Ser. No. 849,726, Apr. 8, 1986, abandoned. This application Jun. 25, 1987, Ser. No. 66,839**

**Int. Cl.$^5$ B65D** *90/12*

**U.S. Cl. 220—85 H** **20 Claims**



1. A holding device for releasably gripping a container comprising, receptacle means for receiving said container, biasing means detachably secured in said receptacle means for resiliently bearing against predetermined portions of said container, said biasing means, upon detachment from said receptacle means, being interchangeable in said receptacle means with other said biasing means, said receptacle means being formed of a first plastic material at a first durometer level characterized by relative rigidity and stability and said biasing means being formed of a second plastic material at a second durometer level, different from said first durometer level, characterized by relative resilience and flexibility.

---

**5,014,869**

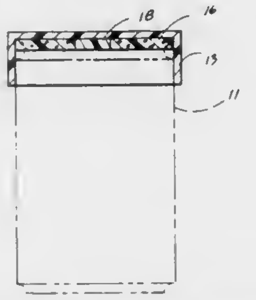
### SANITARY CAN SEAL ORGANIZATION

**David W. Hammond, 4171 Marquis Way, Salt Lake City, Utah 84124**

**Filed Mar. 26, 1990, Ser. No. 500,526**

**Int. Cl.$^5$ A47G** *19/22;* **B65D** *51/20*

**U.S. Cl. 220—90.2** **3 Claims**



1. A sanitary can seal organization comprising, in combination,

an elongate cylindrical beverage container, the beverage container including a consumable food component therewithin,

the beverage container including a top lid, wherein the top lid defines a continuous surface coaxially arranged relative to the beverage container,

further including a cup-shaped cap member mounted overlying the lid, wherein the cup-shaped cap member includes a top web, and the top web is of a generally annular configuration and includes a cylindrical downwardly depending skirt,

the downwardly depending skirt is formed in a heat sealed relationship overlying the top lid of the cylindrical beverage container,

the skirt includes a perforated tear strip directed through the skirt, and wherein the tear strip is arranged parallel to an access defined by the skirt,

the cup-shaped cap member is transparent,

the annular skirt is directed below the lid of the container surroundingly engaging the container, and

further including a cylindrical sponge, the cylindrical sponge including a germicidal fluid contained therewithin, and the cylindrical sponge mounted in contiguous and coextensive relationship to an interior surface of the top web interiorly of the skirt, and the sponge defined by an external diameter substantially equal to an internal diameter defined by the skirt.

---

**5,014,870**

### CONTAINER WITH A HANDLING DEVICE

**Alfred Kinshofer, Miesbach, Fed. Rep. of Germany, assignor to Kinshofer Greiftechnik GmbH, Miesbach, Fed. Rep. of Germany**

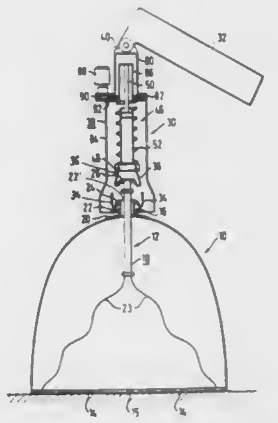
**Filed May 11, 1990, Ser. No. 522,547**

**Claims priority, application Fed. Rep. of Germany, May 12, 1989, 3915580**

**Int. Cl.$^5$ B65D** *43/00*

**U.S. Cl. 220—263** **15 Claims**

1. A container comprising a closing mechanism connected to discharge doors on said container, said closing mechanism having a first coupling member fixedly secured to a wall of said container and a second coupling member in the form of a pull bar which is adapted to run longitudinally in a guide bushing located on the wall of said container and which second coupling member is connected by flexible traction elements to said discharge doors, said flexible traction elements being relieved when said pull bar is in a retracted state and loaded when said pull bar is in an extended state and said discharge doors are shut, said first coupling member comprising a bushing handling a flange-like border, said bushing being centrally located on the top side of said container and constituting the guide bushing for said second coupling member, and said second coupling member having an upper flange-like border.



---

**5,014,871**

### CLOSABLE VESSEL

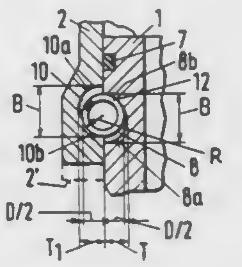
**Heinz Mutter, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Oct. 24, 1989, Ser. No. 426,404**

**Claims priority, application Switzerland, Nov. 1, 1988, 04062/88**

**Int. Cl.$^5$ B65D** *45/32*

**U.S. Cl. 220—315** **12 Claims**



1. A pressure vessel comprising

a first part defining a pressure chamber and having a first circumferential wall at one end of said chamber with an external groove having a radial depth which decreases over the longitudinal width thereof with the largest radial depth at an inner edge thereof;

a second part defining a cover over said chamber of said first part, said second part having a second circumferential wall concentric to said first wall with an internal groove facing said external groove and having a radial depth which decreases over the width thereof with the largest depth at an inner edge of said internal groove and a duct extending through said second wall in communication with said internal groove; and

a flexible rod-like closure part slidably mounted in said grooves to secure said parts together and extending into said duct for removal therethrough, said closure part having a cross-sectional diameter less than the width of at least one groove to permit relative axial movement between said first and said second parts, said diameter of said closure part being less than the sum of said largest depths

OL
126
SS
2
MY
14
1991
UMI

of said grooves and equal to the sum of the smallest depths of said grooves.

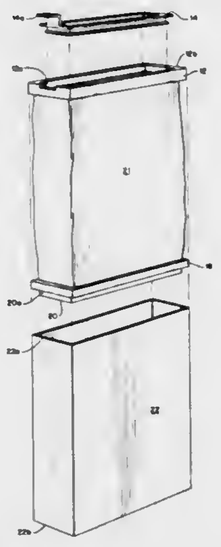
---

### 5,014,872
### SLEEVED CONTAINERS WITH THIN FILM LINING

**Edward S. Robbins, III, 204 N. Court St., Florence, Ala. 35630 Continuation-in-part of Ser. No. 288,237, Dec. 22, 1988, Pat. No. 4,930,644, and a continuation-in-part of Ser. No. 332,994, Apr. 4, 1989, abandoned. This application Jun. 29, 1989, Ser. No. 372,760**

**Int. Cl.$^5$ B65D** *25/14*

**U.S. Cl. 220—403** **22 Claims**



1. A container comprising:

an inner container body which is formed of a plastics material and which includes (i) upper and lower rigid portions separated from one another by a predetermined dimension, and (ii) a flexible tubular liner portion integrally connected at each of its respective ends to said upper and lower rigid portions; and

sleeve means positioned between said upper and lower rigid portions for maintaining said predetermined separation dimension of the same; wherein

said upper and lower rigid portions, and said flexible liner portion are formed as a one-piece container body structure;

said upper and lower rigid portions are of a thickness so as to be self-supporting and thereby capable of supporting their own weights; and wherein

said flexible tubular liner portion is sufficiently thin so as to non-self-supporting and thereby collapsible under its own weight.

---

### 5,014,873
### BARREL OF THERMOPLASTIC MATERIAL

**Werner Clemens, St. Augustin; Werner Daubenbüchel, Bergisch-Gladbach; Otto Eiselen, Königswinter; Erich Kiefer; Peter Klüsener, both of Bonn; Peter Teichmann, Siegburg-Kaldauen, and Dirk Wehrens, St. Augustin, all of Fed. Rep. of Germany, assignors to Krupp Kautex Maschinenbau GmbH, Fed. Rep. of Germany**

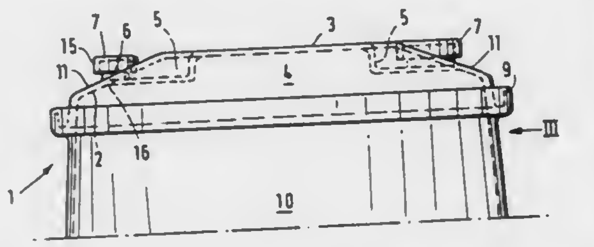
**Filed Aug. 20, 1990, Ser. No. 569,889**

**Claims priority, application Fed. Rep. of Germany, May 25, 1990, 4016785**

**Int. Cl.$^5$ B65D** *7/00*

**U.S. Cl. 220—601** **23 Claims**

1. A barrel of thermoplastic material comprising: an upper end part having at least one trough-like depression therein; at least one connecting portion providing an emptying opening and arranged in the respective trough-like depression in the upper end part; at least one ring extending around the barrel at a spacing from the upper end of the barrel; at least one inclined surface on the barrel portion between the upper end part and said ring in the region of the at least one emptying opening and intersecting the trough-like depression between the connecting portion and the ring laterally beside the trough-like depression, the at least one inclined surface being inclined towards the ring when the barrel is standing upright, and the extent of the inclined surface being so selected that in an emptying position of the barrel in which it is inclined through more than 90° relative to its upright position no point in the interior of the barrel is lower than the lowest region of the emptying opening, at the inside wall of the barrel.



---

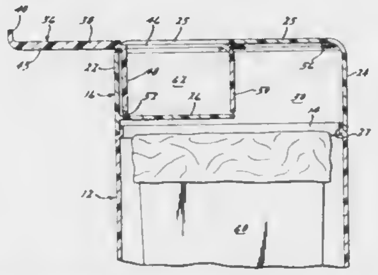
### 5,014,874
### REFUSE CONTAINER

**George G. Kitsos, 1220 E. Hawthorne Cir., Hollywood, Fla. 33021, and Christos G. Kitsos, Filiatra, Greece, assignors to George G. Kitsos, Hollywood, Fla.**

**Filed Sep. 29, 1989, Ser. No. 414,327**

**Int. Cl.$^5$ B65D** *83/10*

**U.S. Cl. 220—908** **17 Claims**



1. A refuse container comprising:

(a) body means defining an enclosure for storing refuse;

(b) a loading opening in said body means communicating with the interior thereof;

(c) slidable means, disposed within said body means for closing said opening when in a closed position and for defining a temporary refuse receiving chamber in communication with said opening when in an open position, said slidable means generally sealing said opening and chamber from the remaining interior of said body means when in an open position; and

(d) partition means on said slidable means for moving refuse in said chamber to the interior of said body means when said slidable means is moved from said open position to said closed position.

---

### 5,014,875
### MEDICATION DISPENSER STATION

**Carol F. McLaughlin, San Diego; Ronald R. Taylor, Rancho Santa Fe; William D. Williams, Solana Beach, and Patrick M. Steusloff, San Diego, all of Calif., assignors to Pyxis Corporation, San Diego, Calif.**

**Filed Mar. 1, 1989, Ser. No. 317,640**

**Int. Cl.$^5$ G07F** *11/00*

**U.S. Cl. 221—2** **25 Claims**

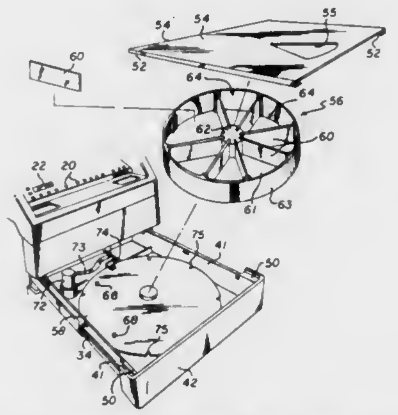
1. A medication station, comprising:

a station housing;

a plurality of drawers carried by said station housing, each of said drawers being movable between an open position and a closed position, each of said drawers defining at least one compartment for containing a pharmaceutical item, said compartment being accessible to the exterior of the station housing when the drawer associated therewith is in the open position; and

a control unit for selectively locking said drawers in the closed positions to prevent access to the drawer compartments, said control unit including keyboard entry means for entry of predetermined access data, lock means for selectively locking and unlocking said drawers, and controller means responsive to entry of said access data to selectively unlock at least one of said drawers while maintaining the remaining ones of said drawers in a locked condition to permit opening of said at least one of said drawers and access to the compartment defined thereby while preventing access to pharmaceutical items within said remaining ones of said drawers;

at least one of said drawers having a carousel tray mounted therein and defining an access opening to permit access to one of said tray compartments, said control unit further including means for rotating said carousel tray within said drawer to a selected position aligning a selected one of the tray compartments with said access opening, and means for locking said tray in said selected position when said at least one drawer is moved to the open position.



---

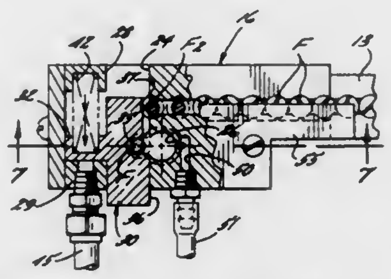
### 5,014,876
### FASTENER FEED ASSEMBLY

**Alfred Young, Hickory, and Fred E. Church, Newton, both of N.C., assignors to Design Tool, Inc., Hickory, N.C.**

**Filed Oct. 20, 1988, Ser. No. 260,239**

**Int. Cl.$^5$ B65H** *5/00*

**U.S. Cl. 221—233** **20 Claims**



1. A fastener feed assembly adapted for serially feeding fasteners of the type having a shank and an enlarged head at one end of the shank, and from a fastener delivery chute to a powered fastener driving device or the like, said feed assembly comprising

a body member having a longitudinal slot adapted to serially receive the fasteners from the delivery chute, a transverse slot communicating at right angles with said longitudinal slot, and a vertical discharge opening communicating with said transverse slot at a location transversely spaced from said longitudinal slot,

a slide mounted for transverse sliding movement in said transverse slot, said slide having a front transverse surface facing said longitudinal slot, and with said front transverse surface having a notch therein which is adapted to receive the shank of a fastener therein, and with said slide being transversely slidable between a first position wherein said notch is aligned with said longitudinal slot so as to be adapted to receive a fastener from said longitudinal slot, and a second position wherein said notch is aligned with said discharge opening,

spring biasing means for biasing said slide toward said second position,

first air line means for moving said slide toward said first position and against the force of said spring biasing means, said first air line means including means for directing a stream of air downwardly into said discharge opening concurrently with the moving of said slide toward said first position, and so that a fastener which has previously dropped into said discharge opening may be advanced to the powered fastener driving device when said slide is moved toward said first position,

second air line means which is separate from said first air line means for directing a stream of air into contact with a fastener held in said notch when said slide is in said second position and so as to move said fastener into said discharge opening, and

control means for selectively activating said first and second air line means so as to serially move said slide to said first position to receive a fastener in said notch, and then to said second position where the fastener in said notch is moved into said discharge opening by said second air supply means, and the fastener thus drops into said discharge opening.

---

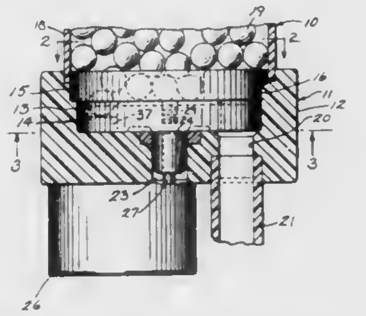
### 5,014,877
### PELLET DISPENSER

**William N. Roos, Colgate, Wis., assignor to Autotrol Corporation, Milwaukee, Wis.**

**Filed Oct. 30, 1989, Ser. No. 429,263**

**Int. Cl.$^5$ B65G** *59/00*

**U.S. Cl. 221—265** **8 Claims**



1. A dispensing device for pellets comprising:

a container means having a wall portion with an opening;

a pellet discharge means;

a rotor assembly operatively connected with said container wall opening and said pellet discharge means, said rotor assembly including a rotor member having at least one pellet carrying passage, said pellet carrying passage having a pellet entry portion and a pellet exit portion, said pellet carrying passage being in communication with said container wall opening and in a selected position being in communication with said pellet discharge means;

dam means positioned above said rotor member to eject excess pellets out of said pellet carrying passage;

VOL 126
ISS 2
MY 14
1991
UMI

drive means operatively associated with said rotor member to rotate said rotor member;

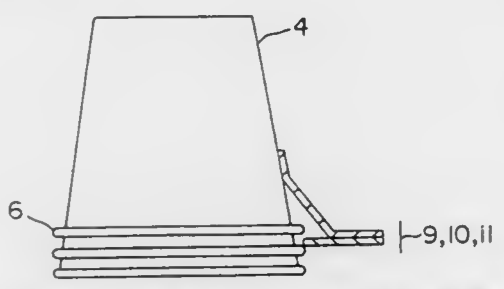
wherein said pellet discharge means is positioned adjacent the bottom of said rotor assembly when mounted in connection with the container means; and

wherein said rotor member includes escapement means in communication with said exit portion of said pellet carrying passage to permit smaller than average size pellets to enter when said rotor member is moved toward said pellet discharge means.

---

### 5,014,878
### FLEXIBLE CUP DISPENSING APPARATUS

**Ronald J. Janz, 3215 S. 95th St., Milwaukee, Wis. 53227**
**Filed Apr. 3, 1989, Ser. No. 332,696**
**Int. Cl.⁵ A47F *1/04;* B65G *59/10***
U.S. Cl. 221—279 **11 Claims**

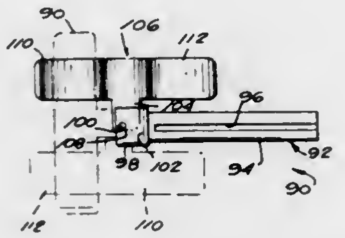


1. A cup dispenser for accommodating of a wide variety of cups having different diameters, comprising a tubular support unit for containing a stack of nested cups and having a discharge opening, a diaphragmed discharge unit secured to said support unit overlying said discharge opening, said discharge unit including an outer diaphragm unit and inner diaphragm unit, said outer diaphragm unit including a plurality of flat diaphragm fingers circumferentially spaced and having a substantially constant radial length projecting inwardly from an outer annular support and defining a plurality of flexible fingers for engaging the outermost cup of the stack of cups for all the different diameter of cups, and said inner diaphragm unit including a plurality of flat diaphragm fingers circumferentially spaced and having a length substantially less than the fingers of said outer diaphragm unit and said fingers of said inner diaphragm unit being of a substantially different lengths to accommodate and engage cups of widely differing diameters and thereby support the stack of nested cups during withdrawing of the outer cups.

---

### 5,014,879
### LOCKABLE TUBE ROLLER

**Robert Hill, 150 Robin Way, Los Gatos, Calif. 95030**
**Continuation of Ser. No. 637,745, Aug. 6, 1984, abandoned. This application Sep. 19, 1986, Ser. No. 910,254**
**Int. Cl.⁵ B65D *35/32***
U.S. Cl. 222—99 **3 Claims**

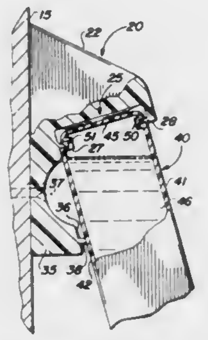


1. A device for winding up a collapsible tube having an openable end and a closed end to allow full expression of the contents from the closed end toward the openable end and to prevent unwinding of the wound tube; comprising: mandrel means, having an elongated body and a longitudinal axis, for taking up the tube as the mandrel means is rotated about said axis, and a handle having a rigid gripping portion and a mounting portion pivotally secured to said elongated body, said handle being movable at least between a first position where said gripping portion extends in the direction of the axis of and is horizontally offset from the elongated body of said mandrel means so that the wound up portion of the tube lies between said elongated body and said gripping portion and is prevented from unwinding, and a second position where said gripping portion is positioned substantially normal to said axis of said mandrel means so that the gripping portion can be used to wind the tube; said gripping portion including first and second wing members, each extending substantially radially in opposite directions from said mounting portion, and said handle is movable between a first position wherein said first wing member underlies said elongated body and extends generally therealong and in a direction of the axis thereof so as to be horizontally offset from said elongated body; a second position wherein each of said first and second wing members are positioned substantially normal to the axis of said mandrel means, and a third position wherein said second wing member overlies said elongated body and extends generally therealong and in the direction of the axis thereof so as to be horizontally offset from said elongated body.

---

### 5,014,880
### LIQUID DISPENSING ASSEMBLY

**John L. Loesel, Jr., San Clemente, and Channing W. Gilson, Pasadena, both of Calif., assignors to The Dial Corporation, Phoenix, Ariz.**
**Filed Mar. 13, 1989, Ser. No. 322,527**
**The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.**
**Int. Cl.⁵ B67D *5/06***
U.S. Cl. 222—181 **8 Claims**



1. An assembly for dispensing liquids comprising a wall mounting bracket and a container for said liquids and wherein said container is releasably secured in said bracket and maintained in a position so that an outlet of the container is disposed downwardly when said assembly is mounted to a vertical surface, said assembly comprising:

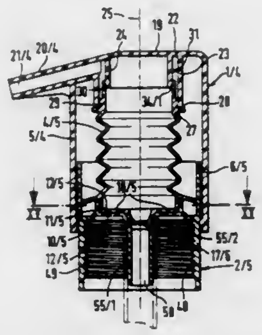
a container for said liquids having opposed front and back surfaces, opposed side surfaces, a bottom end and outlet means positioned away from said bottom end, said container having means which cooperate with means in said bracket for releasably securing said container to said bracket, said container means comprising a channel formed in each of said front and back surfaces, said channels being opposed to each other and positioned substantially parallel to said bottom end, and located near said bottom end of said container, and wherein the bottom end of said container is provided with shoulders adjacent the ends of said channels to prevent said container from being dislodged from said bracket by a sideways force; and

a wall mounting bracket comprising a stem and means for receiving and securing said container to said bracket, said bracket means comprising a pair of spaced apart lateral projections positioned above said stem, said projections being sized and positioned in said bracket such that a projection will engage each of said channels to thereby secured said container to said bracket, with a surface of said container positioned adjacent to a surface of said stem; said container being reversible about its vertical axis.

---

### 5,014,881
### METERING AND SPRAY PUMP FOR LIQUID AND LOW-VISCOSITY SUBSTANCES

**Raimund Andris, Tannbörnle 9, D-7730 Villingen-Schwenningen 22, Fed. Rep. of Germany**
**Filed Aug. 5, 1988, Ser. No. 229,302**
**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1987, 3728770**
**Int. Cl.⁵ B67D *5/08***
U.S. Cl. 222—207 **5 Claims**

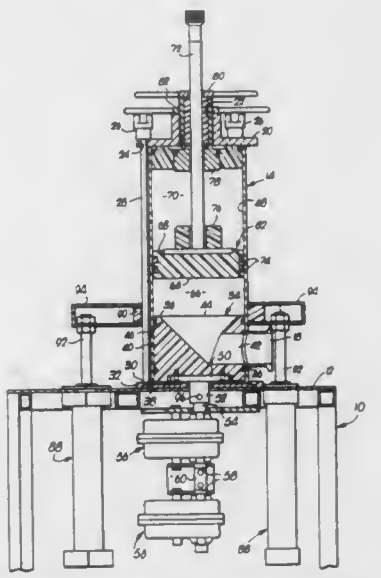


1. A pump for dispensing metered quantities of flowable materials from containers of the kind comprising a resilient, flexible, tubular plastics bellows, first and second rigid plastic housing parts telescopically coupled together trapping the bellows between them for reciprocating pumping movement of the first housing part towards and away from the second housing part between two stroke positions producing axial flexure of the bellows, the resiliency of which restores the first housing part away from the second housing part, the bellows having an intake end, provided with a pump valve with a movable closure member, which is arranged to be automatically opened in an intake direction and closed in a return direction during the respective pumping strokes of the first housing part away from and towards the second housing part, one housing part being provided with a dispensing mouthpiece and one housing part connecting to a container, wherein the improvement comprises an axially closed annular wall integrally molded on the first housing part, a radially flexible, annular wall section molded on the bellows extending axially from the other axial end thereof and enclosing the annular wall in sealing engagement with a perimetrical surface thereof during the pumping stroke of the first housing part away from the second housing part, and the second housing part having an end wall provided with at least one outlet opening and an end wall section integrally molded on the intake, axial end of the bellows, which end wall section has at least one opening for passage of flowable material and a valve closure member operable to close sealingly said at least one outlet opening, the end wall section of the bellows comprising an annular portion with a flexible hose socket integrally molded thereon, protruding into the intake end of the bellows, the end wall of the second housing part being formed with an upstanding annular wall which protrudes into the intake end of the bellows and is closed at an upper end by an end wall and is provided with radial passage openings, the hose socket releasably engaging the annular wall in a tight fit covering the radial passage openings.

---

### 5,014,882
### PIVOT-ACTION PORTIONING APPARATUS AND METHOD

**Wendell E. Dennis; Steven M. Sheeley, both of Overland Park, Kans.; Stephen M. Brown, Raytown, Mo.; Kevin A. Washam, Belton, Mo.; Lewis E. Alley, Kansas City, Mo., and Marvin D. Cain, Olathe, Kans., assignors to Marlen Research Corporation, Overland Park, Kans.**
**Filed May 19, 1989, Ser. No. 354,156**
**Int. Cl.⁵ G01F *11/06***
U.S. Cl. 222—309 **14 Claims**



1. A volumetric apparatus for portioning fluidic material into fractions of predetermined size, the apparatus comprising:

a housing defining a central axis and including first and second axial ends and an inlet and outlet located adjacent one of the axial ends;

inlet opening means for opening and closing the inlet;

outlet opening means for opening and closing the outlet;

a piston movable in the housing along the central axis and including first and second surfaces, the first surface defining a product portioning chamber in the housing and the second surface defining a compression chamber in the housing;

feeding means for feeding fluidic material into the product portioning chamber through the inlet under pressure when the inlet is open and the outlet is closed, the pressurized fluidic material forcing the piston from a first position adjacent the one axial end of the housing to a second position removed from the first position by a preset distance such that a predetermined volume of the fluidic material is fed into the product portioning chamber;

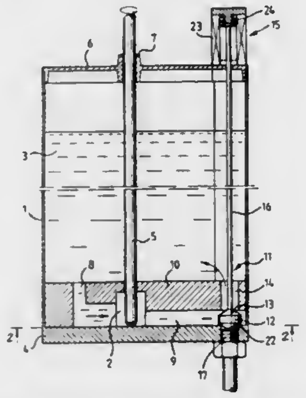
piston driving means for driving the piston from the second position when the inlet is closed and the outlet is open so as to deliver the fluidic material from the product portioning chamber through the outlet; and

a valve which forms a part of the inlet and outlet opening means, the valve including upper and lower surfaces separated by a peripheral side surface, and first and second openings, the first opening being provided in the peripheral side surface and extending through the valve to the second opening which is provided in the upper surface, the apparatus further comprising valve operating means for rotating the valve between a feeding position in which the first opening is aligned with the inlet of the housing and the outlet is blocked, and a delivery position in which the first opening is aligned with the housing outlet and the inlet is blocked.

VOL 126
ISS 2
MY 14 1991
UMI

### 5,014,883
### PAINT TONER DISPENSING MACHINE

**Pentti Airaksinen, Ulvila, Finland, assignor to Cimcorp Oy, Ulvila, Finland**
**PCT No. PCT/FI88/00038, § 371 Date Sep. 14, 1989, § 102(e) Date Sep. 14, 1989, PCT Pub. No. WO88/06979, PCT Pub. Date Sep. 22, 1988**
**PCT Filed Mar. 17, 1988, Ser. No. 401,437**
**Claims priority, application Finland, Mar. 20, 1987, 871240**
**Int. Cl.$^5$ B65D** *88/54*
U.S. Cl. 222—318 3 Claims



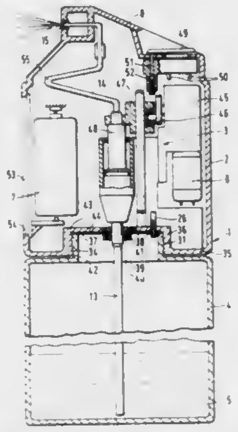
1. A paint toner dispensing machine comprising
at least one color paste container having a bottom, a side wall, a cover and a floor positioned in the container above the bottom;
a gear-type pump located between the bottom and the floor for pumping color paste for the dispensing and circulation thereof; and
a dispensing valve attached to the container for dispensing a desired amount of color paste, said dispensing valve being arranged in the paste container between the bottom and the floor thereof essentially below the surface of the color paste contained in the container, a paste feeding conduit to the dispensing valve being formed between the bottom and the floor, a paste circulating conduit and a paste dispensing conduit being formed in the floor and in the bottom, respectively;
said dispensing valve having a drive shaft which projects outside the paste container and goes through the floor via the paste circulating conduit, and a valve spindle having a first surface for closing the paste circulating conduit and a second surface for closing the paste dispensing conduit, a counter surface for the first surface of the spindle being formed in the floor and counter surface for the second surface of the spindle being formed in the paste container bottom.

---

### 5,014,884
### SPRAY CONTAINER

**Erich Wunsch, Forchenhalde 3, Bad Liebenzell, Fed. Rep. of Germany**
**Filed Oct. 25, 1989, Ser. No. 427,045**
**Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836290; May 17, 1989, 3916021**
**Int. Cl.$^5$ B65D** *83/00;* **B05B** *11/00;* **F04C** *13/00*
U.S. Cl. 222—333 17 Claims

1. A spray container including a spray mechanism for finely atomizing fluids through the intermediary of a hydraulically-operating pump; a housing for receiving said spray mechanism; a supply container for the spray fluid being connected with said housing by a locking closure, said spray mechanism including a gear pump, an electric motor for driving said pump, said pump having a suction line conducted through an opening in the bottom of the housing into the supply container, said container having a second opening in the bottom thereof for the through passage of an air conduit which is operatively connected with a motor switch for a motor of the spray mechanism, said opening having a cross section of about 2 to 5 mm, said container having a venting line, and said gear pump including a pressure line at the discharge end of the pump; and a fluid discharge nozzle being connected with said pressure line.

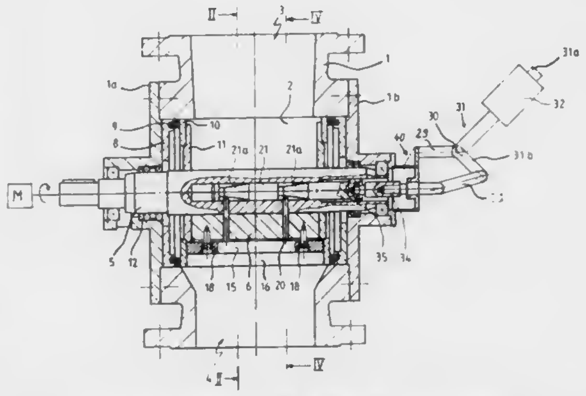


5. A spray container as claimed in claim 1, wherein said venting line has an outlet which is closable by a ball subjected to the biasing action of a spring, whereby a vacuum generated in the supply container upon the withdrawal of fluid overcomes the biasing force of said spring force to cause the ball to move away from the venting line outlet.

---

### 5,014,885
### APPARATUS FOR FEEDING BULK MATERIAL

**Dieter Heep, Bergatreute; Paul Vogel, Weingarten; Manfred Frey, Aulendorf-Zollenreute, and Joachim Schmalz, Ravensburg, all of Fed. Rep. of Germany, assignors to Waeschle Maschinenfabrik GmbH, Ravensburg, Fed. Rep. of Germany**
**Filed Dec. 6, 1988, Ser. No. 280,634**
**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1987, 3742519**
**Int. Cl.$^5$ G01F** *11/10*
U.S. Cl. 222—368 11 Claims

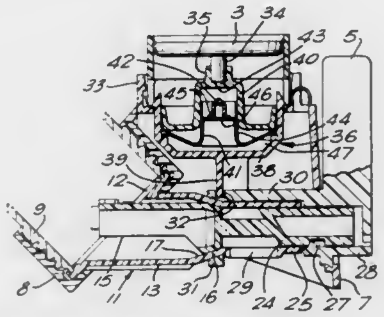


1. Apparatus for feeding bulk material; comprising:
a housing provided with inlet means and outlet means;
a rotor accommodated within said housing and having a shaft and a plurality of radially extending vanes supported on said shaft to define compartments for transporting the bulk material from said inlet means to said outlet means;
sealing means provided in said vanes for sealing said vanes against said housing;
adjusting means acting upon said sealing means for pressing said sealing means in radial direction against said housing, said adjusting means being axially shiftable within said shaft and including an adjusting bar with at least two conical surfaces spaced from each other in axial direction, and push rods provided in said vanes and cooperating with said conical surfaces such that one end thereof abuts said conical surfaces and the other end thereof is connected in force-locking manner with said sealing means; and
force-applying means acting directly on said adjusting bar for continuously maintaining a sufficient non-resilient contact pressure of said sealing means against said housing, said force-applying means including a lever assembly arranged outside of said housing and having one free end loaded by a weight and another end hinged to said adjusting bar via suitable intermediate links.

---

### 5,014,886
### DISPENSING VALVE

**Bernard Sams, London, England, assignor to Reed Packaging Limited, Kent, England**
**Filed May 17, 1989, Ser. No. 353,894**
**Claims priority, application United Kingdom, May 18, 1988, 8811758**
**Int. Cl.$^5$ B65D** *83/00*
U.S. Cl. 222—399 16 Claims



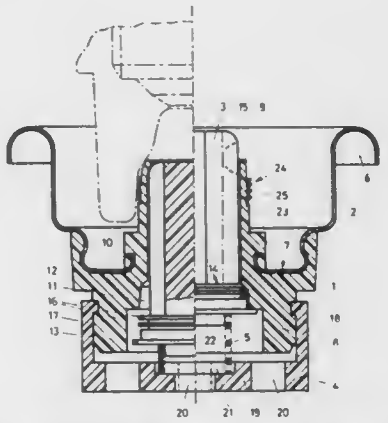
1. A dispensing valve unit for use in an organization for dispensing gasified beverage including a first container containing said beverage, a second container containing topping up gas for said first container, and an outlet valve controlling gas flow from said second container, said dispensing valve unit comprising:
a selectively movable valve unit operating member;
gas conducting means for placing said second container in flow circulating relation with said first container;
first means operated upon movement of said valve unit operating member to open said outlet valve for the release of topping up gas from said second container into said gas conducting means;
second means operated upon movement of said valve unit operating member to open said first container to dispense beverage therefrom and to release topping up gas from said gas conducting means into said first container; and
gas flow regulating means operative in response to pressure in said first container to control gas flow through said outlet valve, whereby the pressure of the topping up gas admitted to said first container corresponds to pressure within said first container.

---

### 5,014,887
### VALVE FOR A CONTAINER FOR DISPENSING A PRESSURIZED FLUID

**Volker Kopp, Esslingen, Switzerland, assignor to C. Ehrensperger AG, Erlenbach, Switzerland**
**Filed Jul. 14, 1989, Ser. No. 380,209**
**Claims priority, application Switzerland, Jul. 14, 1988, 2699/88**
**Int. Cl.$^5$ B65D** *83/48*
U.S. Cl. 222—402.1 20 Claims

10. A valve construction for a container dispensing a pressurized fluid, comprising:
a lid mounted on the container and having an aperture extending therethrough, said aperture being defined by an inner peripheral wall of said lid;
a tubular valve body extending through said lid, said valve body comprising:
  a first section extending into the container,
  a second section extending out of the container,
  a through bore which includes a valve seat on its inlet side, and

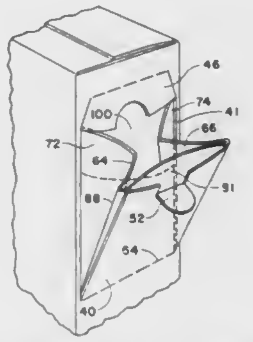


  an outer periphery into which an outwardly flaring annular projection of said inner peripheral wall of said lid is embedded;
a valve member adapted for reciprocation in said valve body through bore; and,
a resilient member for biasing said valve member against said valve seat of said valve body.

---

### 5,014,888
### CLOSURE FOR A CONTAINER

**William T. Bryan, 927 Garnoa Dr., Cincinnati, Ohio 45231**
**Filed May 26, 1989, Ser. No. 357,406**
**Int. Cl.$^5$ B65D** *47/10*
U.S. Cl. 222—541 30 Claims



1. A pour spout assembly for a container having a wall which comprises a tongue formed from the wall and hinged to the wall, the tongue being defined by a transverse slittable line of weakening in said wall and downwardly extending upright slittable lines of weakening in said wall at opposite ends of the transverse slittable line of weakening, the tongue being hinged to the wall at lower ends of the upright slittable lines of weakening, a web member having a central portion attached to an inner face of the tongue, outer glue panels attached to an inner face of the container adjacent the tongue and accordian pleat panels connecting the central portion and the outer glue panels, free edges of the central panel of the web being hinged to the accordian pleat panels, outer edges of the accordian pleat panels being hinged to the glue panels, the tongue swinging between a closed position in which the tongue is aligned with the wall and an upper portion of the central portion of the web

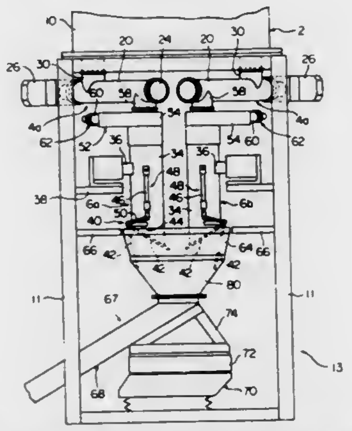
VOL
1126
ISS
2
MY
14
1991
UMI

overlaps a portion of the inward face of the wall above the tongue and covers and closes the transverse slit and an open position in which the tongue extends upwardly and outwardly from hinging means of the tongue when the slittable lines of weakening have been slit, the pour spout being closable by swinging the tongue from the open position past alignment with the wall to move the upper portion of the central portion of the web into the container and then outwardly to closed position secured by abutment of the upper portion of the central portion of the web with the inward face of the wall.

---

### 5,014,889
## POWDER FEEDING APPARATUS

**Tsunemi Hayashi, Shizuoka, Japan, assignor to Akatake Engineering Co., Ltd., Numazu and Shin-Etsu Chemical Co., Ltd., Tokyo, both of, Japan**
**Continuation of Ser. No. 132,238, Dec. 14, 1987, abandoned. This application Sep. 26, 1989, Ser. No. 412,595**
**Claims priority, application Japan, Dec. 24, 1986, 61-306569**
**The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.**
**Int. Cl.⁵ B67D *5/08;* G01G *13/18***
U.S. Cl. 222—644 6 Claims



1. A powder feeding apparatus comprising a holding hopper for holding a powder, a metering hopper for metering the powder fed from the holding hopper, hopper opening-closing means adapted to be selectively held at an opening position at which it opens a discharge opening in the metering hopper and a closing position at which it closes the discharge opening, control means for controlling the hopper opening-closing means so as to discharge the powder in intervals, and smoothening means for substantially smoothening the flow of powder discharged from the metering hopper, said smoothening means including a trough beneath the metering hopper and a vibration generator for vibrating the trough, said trough having a discharge and located downstream of the metering hopper, said vibration generator being operable to smoothen the flow of powder while it is transferred through the trough to the discharge end;

said control means comprising timer means for measuring time and user-adjustable means for setting a time period to be measured by the timer means; said control means producing a discharge signal when the time period measured by the timer means elapses to bring the hopper opening-closing means to its opening position so that the intervals of powder discharge can be increased by increasing the time period set in the timer means or decreased by decreasing the time period set in the timer means;

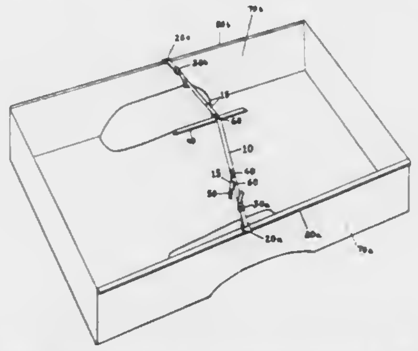
weight detecting means for detecting the weight of powder contained within the metering hopper, said weight detecting means being variable to control the amount of powder fed by the metering hopper so that the amount of powder fed by the metering hopper is controlled by both said timer means and said weight detecting means;

said powder feeding apparatus further comprising driving means for feeding powder into said metering hopper, and wherein said hopper opening-closing means includes a top shutter and a bottom shutter, and wherein said control means includes means for signalling for the activation of said driving means and signalling for said hopper opening-closing means to position said top shutter in an open position and said bottom shutter in a closed position, said control means further including means for signalling the deactivation of said driving means and the closing of said top shutter upon said weightdetecting means detecting a predetermined weight of powder in said hopper, and said control means further including means for signalling for the opening of said bottom shutter when said period measured by said timer means has elapsed.

---

### 5,014,890
## BICYCLE RACK FOR USE IN PICKUP TRUCKS

**Wayne Perry, 7020 Palm Ave., Fair Oaks, Calif. 95628**
**Filed Dec. 18, 1989, Ser. No. 451,923**
**Int. Cl.⁵ B60R *9/10***
U.S. Cl. 224—42.46 R 4 Claims



1. A rack mountable on a pickup truck bed to secure bicycles, said rack comprising:

(a) a strap having sufficient length to span a width of the truck bed and having a first side and a second side;
(b) anchoring means associated with said strap for mounting said rack to the truck bed;
(c) at least one clasping member for securing a portion of a bicycle, said at least one clasping member having a first end and a second end, said first end being attached to said first side of said strap;
(d) each said clasping member having associated therewith: a first fastening element and a second fastening element, said first fastening element being attached to said second side of said strap and said second fastening element being attached to said second end of said clasping member, an aperture in said strap positioned adjacent said second fastening element whereby said at least one clasping member is positioned on said strap to extend through said aperture such that said first and second fastening elements are secured together.

---

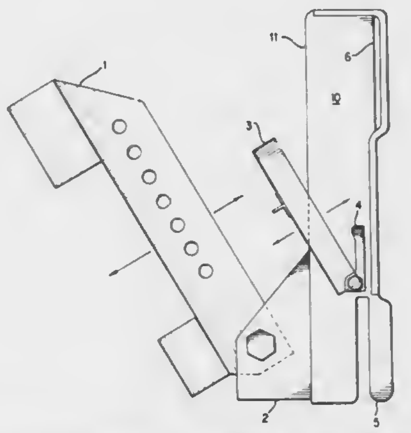
### 5,014,891
## FISHING AID

**J. D. King, 151 Darius Ave., Rangely, Colo. 81648, assignor to J. D. King, Rangely, Colo.**
**Filed May 14, 1990, Ser. No. 522,989**
**Int. Cl.⁵ A01K *97/10***
U.S. Cl. 224—200 1 Claim

1. A fishing aid to be worn by a user, comprising:

a substantially rectangular rigid plate having front and rear sides with top and bottom side edges, said plate including a pair of spaced slots extending therethrough adjacent said top edge, said slots being adapted to receive a belt to be secured around a user's torso above the waist, said plate further including a pair of downwardly extending tabs connected thereto and spaced from said rear side for receiving a waistband of a user therebetween;

a fishing rod holder adjustably mounted to the front side of said plate, said fishing rod holder having a substantially tubular portion adapted to receive an end of a fishing rod; and,



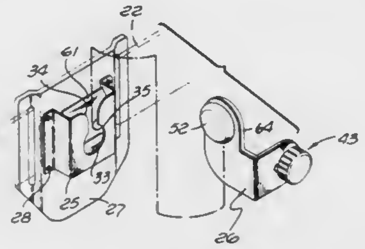
a clamp holder adjustably mounted to the front side of said plate spaced from said fishing rod holer, said clamp holder having a substantially tubular portion adapted to receive a clamp;

whereby said plate is worn by a user with said belt secured around the torso and with said tabs engaged between the torso and a waistband of the user.

---

### 5,014,892
## CAMERA BELT CLIP

**Anthony S. Copeland, 28 Sunset Ct., #14, Venice, Calif. 90291**
**Filed Sep. 11, 1989, Ser. No. 405,723**
**Int. Cl.⁵ A45F *5/00***
U.S. Cl. 224—271 5 Claims



1. In a camera carrying device, the combination of:

a first support plate with slot means defining a slot in said first plate, with said slot having a closed end and an open end joined by an intermediate section, with said intermediate section of lesser width than said closed end;

a second support plate joined to said first support plate in spaced relation to form a housing;

spring means carried in said housing between said support plates, with said first support plate having a substantially flat surface facing said spring means;

an angle plate having first and second arms, with one of said arms disposed at an angle to the other;

a first camera engaging stud carried in said first arm; and

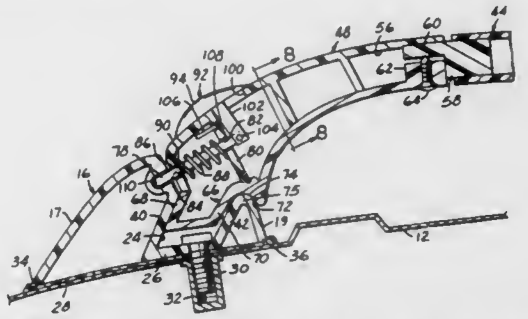
a second slot engaging stud carried in said second arm, with said second stud having an end section and an intermediate section, with said second stud end section larger than said slot, and with said second stud intermediate section slideable along said slot intermediate section, and

with said second stud end section having substantially flat parallel outer and inner faces for resting against said first support plate and said spring means for limiting rocking movement of said angle plate relative to said support plates.

---

### 5,014,893
## LUGGAGE RACK FOR A VEHICLE

**Darrel L. Morley, Rochester Hills; Wayne A. Pierce, Utica, and James A. Willyard, Livonia, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**
**Filed Apr. 2, 1990, Ser. No. 502,908**
**Int. Cl.⁵ B60R *9/00***
U.S. Cl. 224—321 4 Claims



1. A luggage rack for mounting on the roof of a vehicle, the luggage rack comprising a pair of elongated side rails, each side rail being securable to the roof of a vehicle adjacent to one side of the vehicle and extending fore and aft of the vehicle, each side rail having an elongated slot therein, each slot including a pair of substantially parallel spaced apart side walls interconnected by a bottom wall, each side rail having an outer edge and an inner edge, said side walls being angled towards one of the outer and inner edges of the side rail, a pair of stanchions, each stanchion having a fixed tongue, each tongue including an outer side wall and an inner side wall which are substantially parallel to each other, said side walls of each stanchion being angled in the same direction as the side walls of the elongated slot of one side rail and spaced apart a distance resulting in the tongue defined thereby being slightly less in width than the width of the elongated slot, the tongue of each stanchion being receivable in an elongated slot of a side rail and slidable therealong, a cross member securable between the stanchions after the tongue of each stanchion has been received in an elongated slot of one of the side rails, fastening means separate from the tongues for securing the stanchions to the crossmember to allow the stanchions and the crossmember to move as a single unit whereby the angulation of the stanchion tongues and elongated slots thereafter prevent removal of the stanchions from the side rails.

---

### 5,014,894
## AUTOMATIC RIVETING MACHINE

**Charles F. Smart, Danbury, Conn., assignor to Emhart Industries, Inc., Towson, Md.**
**Filed Dec. 1, 1989, Ser. No. 444,927**
**Int. Cl.⁵ B21J *15/10***
U.S. Cl. 227—6 3 Claims

1. An automatic riveting machine comprising

a rivet tool including a rivet receiving nose portion and a trigger for operating the tool,

rivet loading means including

  a nesting bushing,

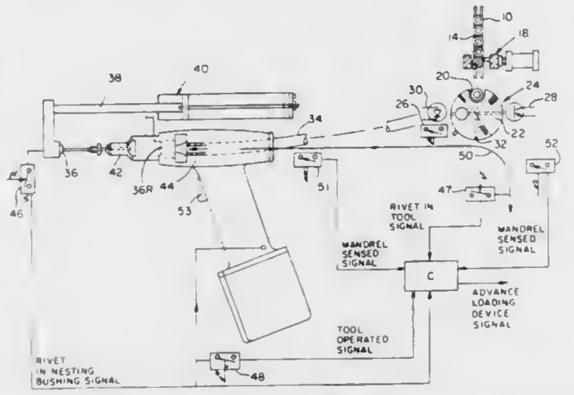
  means for displacing said nesting bushing between a rivet receiving position and a rivet transferring position, and

  means for transferring a rivet from said nesting bushing at said transferring position to said receiving nose portion,

means for operating said displacing means to displace said nesting bushing from said transferring position to said receiving position after a rivet has been transferred to said receiving nose portion,

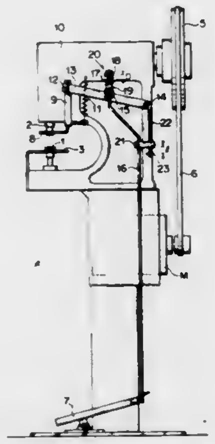
VOL
1126
ISS
2
MY
14
1991
UMI

feeding means for feeding a rivet to said nesting bushing at said receiving position,
means for enabling the operating of said displacing means to displace said nesting bushing with a rivet received therein from said receiving position to said transferring position following the setting of a rivet, and
means for enabling the operation of said displacing means to displace said nesting bushing with a rivet received therein from said receiving position to said transferring position following the manual removal of a rivet in said receiving nose portion including
means for sensing the presence or absence of a rivet in said receiving nose portion and
means for determining that a rivet received by said receiving nose portion has been removed without tool operation.



### 5,014,895
### BUTTON APPLICATOR WITH SAFETY APPARATUS

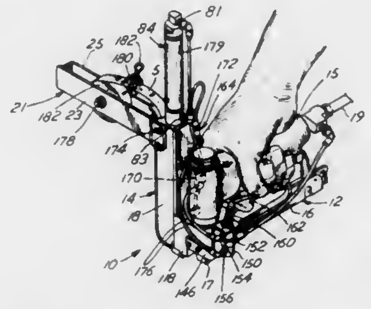
**Kazuyoshi Ito, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**
**Filed Apr. 3, 1990, Ser. No. 503,671**
**Claims priority, application Japan, Apr. 4, 1989, 1-39673[U]**
**Int. Cl.⁵ B21J** *15/10, 15/28*
U.S. Cl. 227—8 11 Claims



1. A button applicator having a one-rotation clutch which is actuated in conjunction with a foot pedal and which rotates by a connecting and disconnecting mechanism for caulking one button element gripped by a punch to another button element held on a die through a fabric piece by bringing down said punch when said clutch rotates, comprising
a swing lever which is linked to an operation rod connected to said foot pedal and which swings about one end of said swing lever,
a safety member which is provided between said punch and said die, which is linked to another end portion of said swing lever and which is urged upward, depression of said foot pedal causing said operation rod to move downward to a second position which swings said swing lever and moves said safety member downward to a predetermined position,
a means for allowing rotation of said clutch which is provided between said operation rod and said connecting and disconnecting mechanism and which is designed to release said one-rotation clutch from said connecting and disconnecting mechanism for the rotation of said one-rotation clutch when said foot pedal is further depressed causing said operation rod to be brought down from said second position by a predetermined interval, to a deeper third position, and
a means for shutting off said clutch which is provided between said operation rod and said swing lever and which urges upward said operation rod with a second predetermined interval.

### 5,014,896
### STAPLE GUN FOR ATTACHING LABELS

**Jerry Reitmeier, Goshen; Wayne Marquardt, South Bend; Mark Smith, Granger, all of Ind., and David Nethers, Union, Mich., assignors to Reit Distributing Corp., Goshen, Ind.**
**Filed Oct. 5, 1989, Ser. No. 417,600**
**Int. Cl.⁵ B25C** *5/06, 7/00*
U.S. Cl. 227—39 6 Claims

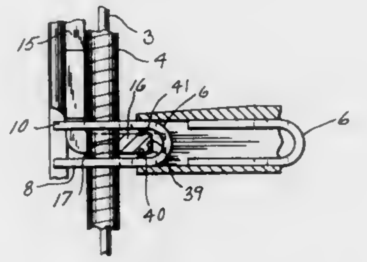


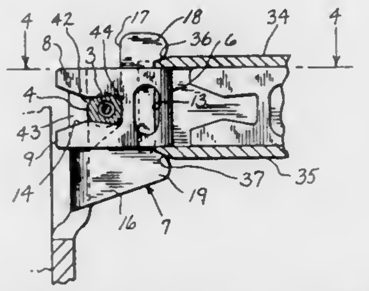
1. A stapler comprising a staple gun means for driving a staple into an aligned label to affix said label to said support surface, a continuous sequence of labels positioned adjacent to said staple gun means, advancing means for selectively urging a single label of said continuous sequence of labels into alignment with said staple gun means wherein the single label is affixed to said support surface, and cutting means shiftably carried by said advancing means for severing said single label from said continuous sequence of labels after said staple has been driven into said label by said staple gun means, said staple gun means including a staple exit, said advancing means including a housing, said housing defining a channel constituting means for guiding said continuous sequence of labels into alignment with said staple exit, an elongated slot defined in said housing in communicaiton with said guiding means, and means for engaging said continuous sequence of labels shiftably carried within said elongated slot, said engaging means including a body slidably accommodated within said housing elongated slot, said body being shiftable between first and second positions, said first and second positions being defined by longitudinal extremities of said slot, an insert shiftably carried by said body to engage said continuous sequence of labels as said body shifts from its first position to its second position, said insert being shifted away from said strip of labels when said body shifts from its second position to its first position.

---

### 5,014,897
### STAPLE GUN DRIVER GUIDE ASSEMBLY

**Arvo F. Uuskallio, Hartland, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.**
**Filed Nov. 20, 1989, Ser. No. 439,614**
**Int. Cl.⁵ B25C** *5/00*
U.S. Cl. 227—119 3 Claims



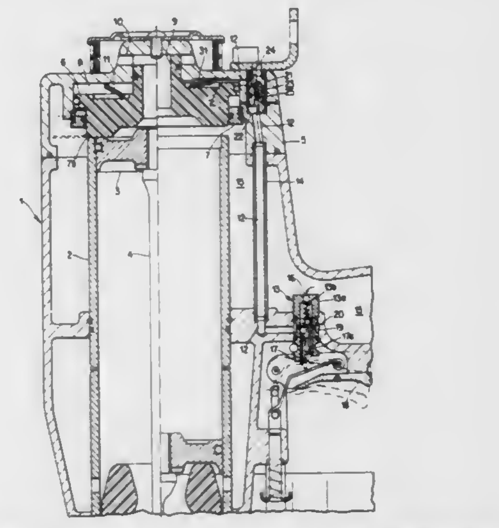


1. A tool for applying a fastener to a mounting bracket, comprising:
a housing;
fastener driving means in said housing for driving a fastener through a driveway;
a fastener magazine defining a longitudinal axis for holding and feeding fasteners;
fastener guide means aligned with said fastener driving means and having said driveway therein that receives fasteners from said fastener magazine, said fastener guide means including a head having a bottom face and a pair of opposite side faces, said fastener guide means also including:
longitudinal alignment means for longitudinally aligning said driveway relative to the mounting bracket; and
lateral alignment means for laterally aligning said driveway relative to the mounting bracket, said lateral alignment means comprising a pair of opposite beveled surfaces formed in said side faces tapering downwardly and inwardly from said side faces to said bottom face.

### 5,014,898
### PNEUMATICALLY OPERATED FASTENER DRIVING IMPLEMENT

**Theodor Heidrich, Hemmingen, Fed. Rep. of Germany, assignor to Haubold-Kihlberg GmbH, Hemmingen, Fed. Rep. of Germany**
**Filed Sep. 15, 1989, Ser. No. 407,892**
**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831607**
**Int. Cl.⁵ B25L** *1/04*
U.S. Cl. 227—130 16 Claims

1. A pneumatic implement for driving staples, nails and analogous fasteners, comprising a housing: a cylinder provided in said housing and having an open first end and a second end; a piston reciprocable in said cylinder and having means for driving a fastener in response to movement of the piston from said first toward said second end; a valve including a valving element adjacent said first end and movable in said housing between operative and inoperative positions in which said first end is respectively sealed and exposed, and means for biasing said element to said operative position, said biasing means comprising a ring-shaped spring and at least a portion of said spring consisting of polyurethane; a source of pressurized gaseous fluid, said element having a first surface which is acted upon by fluid to move said element to said inoperative position with attendant penetration of fluid into said cylinder and propulsion of said piston toward said second end, said element further having a second surface substantially opposite said first surface and said housing having a chamber adjacent said second surface; means for connecting said source to said chamber so that the fluid in said chamber assists said biasing means to maintain said element in said operative position; and means for establishing communication between said chamber and the atmosphere adjacent said chamber to thus reduce the pressure in said chamber and enable the fluid acting upon said first surface to move said element to said inoperative position.



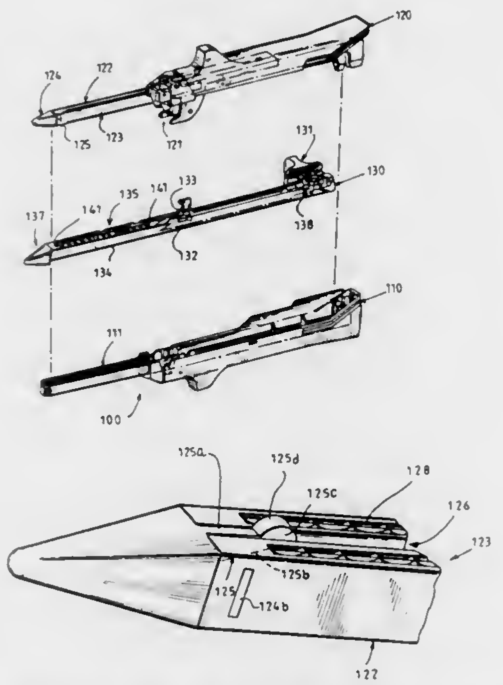
### 5,014,899
### SURGICAL STAPLING APPARATUS

**Dominic F. Presty, Shelton, and Thomas M. Tompkins, Trumbull, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.**
**Filed Mar. 30, 1990, Ser. No. 502,579**
**Int. Cl.⁵ A61B** *17/04*
U.S. Cl. 227—180 18 Claims

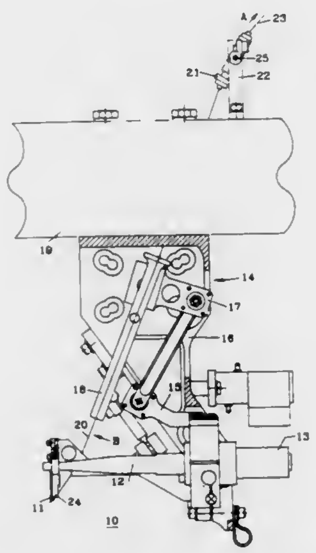
1. Apparatus for applying surgical fasteners to body tissue, which comprises:
first means for carrying a plurality of surgical fasteners;
second means adapted for effecting closure of a plurality of said fasteners; and,
at least one of said second fastener closure means and said first fastener carrying means having a resilient deflectable member with a raised portion movable relative to the tissue when said first and second means are positioned in adjacent relation with the tissue gripped therebetween,

VOL
1126
ISS
2
MY
14
1991
UMI

said raised portion engaging the tissue with force sufficient to maintain alignment of the tissue, and said resilient deflectable member being located within the periphery of at least one of said first or second means.



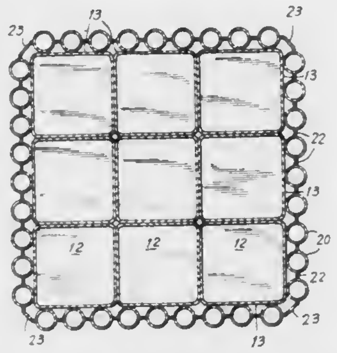
## 5,014,900
## DEEP ACCESS BOND HEAD
**Lowell R. Barton, Plano, and Henry L. Humphrey, The Colony, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**
**Filed Mar. 8, 1990, Ser. No. 491,377**
**Int. Cl.5 B23K *37/00***
U.S. Cl. 228—4.5 **14 Claims**



1. A wire bonder for bonding semiconductor packages requiring a deep access bond head, comprising:
a bonding tool;
a wire clamp device mounted adjacent the bonding tool; and
a bellows device for actuating the wire clamp device.

---

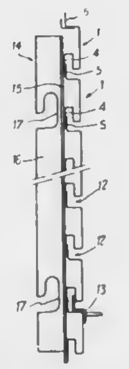
## 5,014,901
## ROTATABLE WELDING FIXTURE AND METHOD FOR METAL CLADDING TUBULAR MEMBRANE PANELS
**Edward Moran, St. Catharines, Canada, assignor to Foster Wheeler Energy Corporation, Clinton, N.J.**
**Filed Jun. 26, 1989, Ser. No. 371,171**
**Int. Cl.5 B23K *9/04***
U.S. Cl. 228—119 **16 Claims**



1. A rotatable welding fixture adapted for welding operations on elongated structures supported by the fixture, comprising:
(a) an elongated rigid central frame, said frame being provided by a plurality of adjacent rectangular-shaped tubes rigidly attached together and having at least one outer surface and having an end plate rigidly attached to each end of the frame so as to substantially cover each end of the frame;
(b) a cylindrical-shaped trunnion rigidly attached onto the outer side of each said end plate, said trunnions being in alignment with the longitudinal axis of said central frame, whereby the fixture can be rotated about its central longitudinal axis for performing welding operations on an elongated structure located around and rigidly supported by the welding fixture.

---

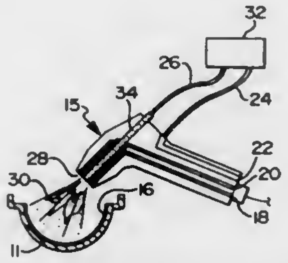
## 5,014,902
## METHOD OF MANUFACTURING A SUPPORT PANEL FORMING A DISPLAY UNIT AND PANEL OBTAINED BY THIS METHOD
**Bernard Heimendinger, Montmorency, France, assignor to Fapec, France**
**Filed Jul. 28, 1989, Ser. No. 386,091**
**Claims priority, application France, Jul. 29, 1988, 88 10247**
**Int. Cl.5 B23K *31/02***
U.S. Cl. 228—170 **9 Claims**



1. Method of manufacturing a support panel for the display of objects, comprising the steps of:
(a) cutting out identical metal sheet strips whose length corresponds to that of the panel to be formed,
(b) subjecting each strip thus obtained to successive forming operations so as to give i a profile having a cross-section such that its ends along the length of the strips are disposed substantially in the same plane and separated from each other by an intermediate projecting portion which is connected to one of said ends by an S portion, and
(c) assembling together the strips thus formed by applying, over the whole of the length, one end of one strip against the opposite end of the preceding strip and joining said strips by spot welding.

---

## 5,014,903
## HEAT-RETAINING EXHAUST COMPONENTS AND METHOD OF PREPARING SAME
**Frederick F. Cyb, 23351 Filmore, Taylor, Mich. 48180**
**Continuation of Ser. No. 350,336, May 11, 1989, abandoned, Continuation-in-part of Ser. No. 275,949, Nov. 25, 1988, Pat. No. 4,930,678. This application Apr. 12, 1990, Ser. No. 512,077**
**Int. Cl.5 F01N *7/10;* B23K *31/00***
U.S. Cl. 228—176 **17 Claims**

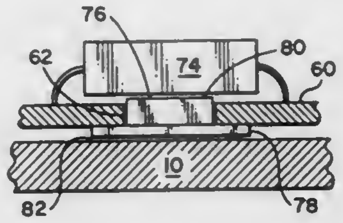


1. A method of lining a component of a vehicular exhaust system to render the component resistant to dissipation of heat therethrough, comprising the steps of:
(a) providing a first metal shell which is a first section of the exhaust system component, the shell having an inner surface and an outer surface;
(b) applying a thin layer of a heat-resistant compound to the inner surface of the first shell to form a first liner therein, the liner being substantially free of void spaces therewithin;
(c) bonding the first liner to the first shell;
(d) providing a second metal shell which is a second section of the exhaust system component, the second shell having an inner surface and an outer surface, the second shell being alignable with the first shell;
(e) applying a thin layer of a heat-resistant compound to the inner surface of the second shell to form a second liner therein, the second liner being substantially free of void spaces therewithin;
(f) bonding the second liner to the second shell; and
(g) joining the first and second shells together in an aligned configuration.

12. A heat-retaining exhaust pipe which is a product of a method which comprises the steps of:
(a) applying a heat-resistant compound to form a first liner on the inside of a first sheet-metal shell, the first shell comprising a first section of the exhaust pipe;
(b) adhesively bonding the first liner to the inside of the first sheet-metal shell;
(c) applying a heat-resistant compound to form a second liner on the inside of a second sheet metal shell, the second shell comprising a second section of the exhaust pipe; the second shell being alignable with the first shell;
(d) adhesively bonding the second liner to the inside of the second sheet-metal shell; and then
(e) joining the first and second shells together in an aligned configuration.

---

## 5,014,904
## BOARD-MOUNTED THERMAL PATH CONNECTOR AND COLD PLATE
**David M. Morton, Eau Claire, Wis., assignor to Cray Research, Inc., Minneapolis, Minn.**
**Filed Jan. 16, 1990, Ser. No. 464,909**
**Int. Cl.5 H05K *7/20***
U.S. Cl. 228—176 **15 Claims**

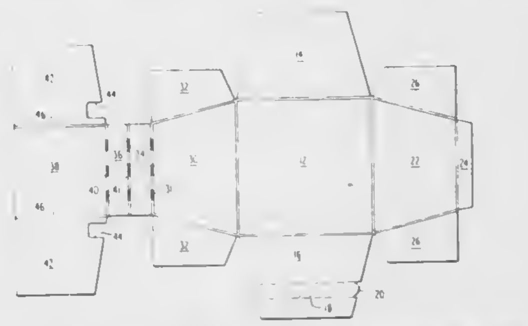


1. A heat dissipation apparatus for electronic devices, comprising:
at least one printed circuit board with a cold plate mounted adjacent thereto;
at least one aperture through said printed circuit board;
at least one thermal conductor pad engaged in said aperture; and
means for specifying an interference fit between said thermal conductor pad and said cold plate such that a thermal interface therebetween is minimized.

5. A method of installing a thermal conductor pad in a thermal path of a printed circuit board, comprising:
engaging the thermal conductor pad in an aperture of the printed circuit board;
depositing glue to a top surface of the thermal conductor pad; and
aligning and pressing an electronic device onto said top surface of the thermal conductor pad such that said electronic device is aligned with the thermal conductor pad and said electronic device is secured to the printed circuit board.

---

## 5,014,905
## TAPERED CARTON AND BLANK FOR FORMING IT
**Benjamin J. Cassidy, Waldwick, N.J., assignor to International Paper Company, Purchase, N.Y.**
**Filed Oct. 15, 1990, Ser. No. 597,231**
**Int. Cl.5 B65D *5/06, 5/54***
U.S. Cl. 229—113 **11 Claims**

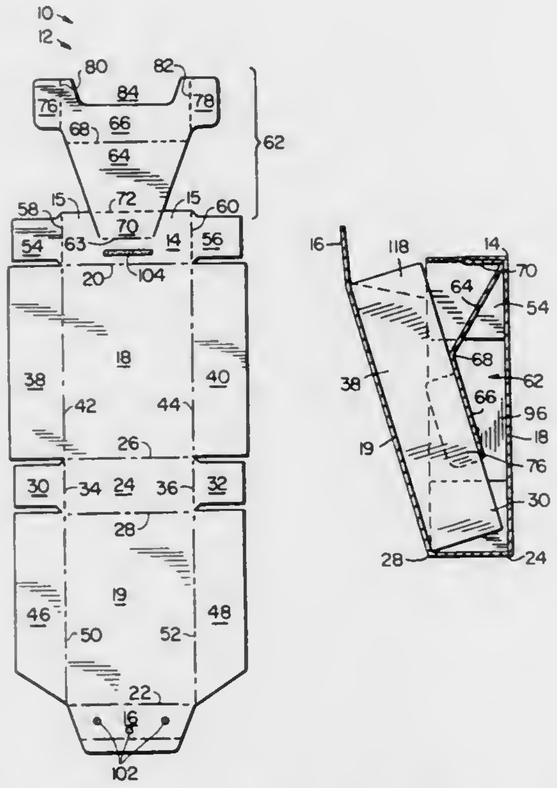


4. A unitary blank of stiff, resilient, and foldable sheet material, such as paperboard, said blank including six panels serially foldably joined to each other along parallel fold lines, the first panel being trapezoidal, the second panel being square, the third panel being trapezoidal, the fourth and fifth panels being rectangular, and the sixth panel being square, the length of said second panel being substantially equal to the combined length of said fourth, fifth and sixth panels as measured along said panels, the length of said first and third panels being equal, also as measured along said panels.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,014,906
## MULTIPLE PURPOSE DISPENSING PACKAGE AND BLANK

**Gabriel Gero, 306 Merry Mount St., Staten Island, N.Y. 10314**
**Filed Oct. 5, 1988, Ser. No. 254,271**
**Int. Cl.$^5$ B65D** *5/00*
U.S. Cl. 229—123 10 Claims



1. A multiple-purpose dispensing package comprising

an outer shell having a multi-edged bottom surface and a plurality of panels including side walls panels upstanding therefrom the number of side wall panels being at least one less than the number of edges of said bottom surface such that said outer shell includes an elongated opening therein; one of said side wall panels constituting an outer shell rear wall panel oppositely disposed with respect to said elongated opening,

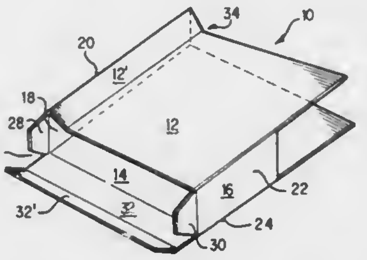
an inner shell including inner shell front and side wall panels, said inner shell front wall panel being integral with and pivotably connected to said outer shell along said bottom surface at said elongated opening, said inner shell being movable along said bottom surface and said inner shell front wall panel between a first position within said outer shell in which the interior of said inner shell is inaccessible and a second position partially out of the confines of said outer shell in which the interior of said inner shell is accessible, and

snap-lock means joining said inner shell with said outer shell for firmly seating said inner shell in either of said first and second positions, and for precluding said inner shell from being withdrawn completely out of the confines of said outer shell, said snap-lock means having upper and lower snap-lock portions connected at a fold line, and having at least one pair of connecting flaps connected to one of said snap-lock portions, and said snap-lock means further maintaining said inner shell rigid and precluding said inner shell from moving from either of its two positions accidentally.

---

## 5,014,907
## COLLAPSIBLE AND CONFORMABLE CONTAINER

**Milton B. Hollander, Stamford, and Louis Rivera, Branford, both of Conn., assignors to Omega Engineering, Inc., Stamford, Conn.**
**Filed May 31, 1990, Ser. No. 530,623**
**Int. Cl.$^5$ B65D** *5/42*
U.S. Cl. 229—117.01 4 Claims

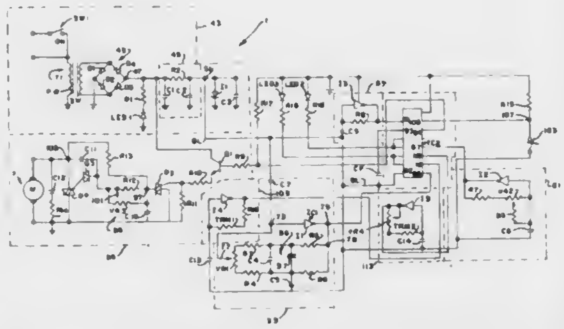


1. A collapsible container comprising: a plurality of side wall sections coupled together by a plurality of integrally formed hinge portions disposed in parallel spaced apart relationship, each hinge portion being positioned at a juncture between two adjacent side wall sections; said plurality of side wall sections together surrounding an interior space which may be varied in shape by varying the interior angles formed by the two adjacent wall sections on each side of each hinge portion; one of said hinge portions being specifically constructed to permit displacement to form an interior angle greater than one hundred eighty degrees; and the remaining ones of said hinge portions being constructed to resist displacement into interior angles greater than one hundred eighty degrees; said one of said hinge portions and a selected second one of said hinge portions being equally spaced on opposite sides of a selected third one of said hinge portions such that when the interior angle of said selected third hinge portion is reduced to substantially zero degrees, said one hinge portion and said selected second hinge portion will lie in substantially abutting, parallel relationship, and said one hinge portion may be displaced simultaneously with said second hinge portion to form an exterior angle at said one hinge which is substantially equal to the interior angle at said second hinge portion.

---

## 5,014,908
## CONTROL CIRCUIT USING A SULPHONATED FLUOROCARBON HUMIDITY SENSOR

**Karmen D. Cox, St. Peters, Mo., assignor to Emerson Electric Co., St. Louis, Mo.**
**Filed Nov. 27, 1989, Ser. No. 441,753**
**Int. Cl.$^5$ B01F** *3/02;* **G05D** *21/00*
U.S. Cl. 236—44 E 28 Claims



7. In an air humidifier having an air inlet and an air outlet, means for drawing air into the inlet and through to the outlet, a source of moisture, and means for imparting the moisture to air passing through the humidifier, a circuit for controlling operation of the humidifier comprising:

means for sensing the humidity of the air and including a capacitive sensor incorporating a sulphonated fluorocarbon material as the capacitor dielectric;

first oscillator means including the capacitive sensor for generating an output whose frequency is a function of the sensed humidity level;

second oscillator means for generating an output having a fixed frequency representing a preselected humidity value;

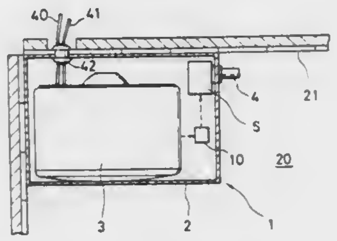
drive means for operating the air drawing means; and,

means for comparing the frequencies of the oscillator means and for providing a signal to the drive means to drive the air drawing means when the frequency comparison indicates the sensed air humidity differs from the preselected value.

---

## 5,014,909
## TELEVISION RECEIVER

**Takashi Yasuo, Aichi, Japan, assignor to Inax Corporation, Tokoname, Japan**
**Filed Mar. 9, 1990, Ser. No. 493,833**
**Claims priority, application Japan, Mar. 16, 1989, 1-30779[U]**
**Int. Cl.$^5$ G05D** *22/00*
U.S. Cl. 236—44 R 2 Claims



1. A television receiver to be installed in a high-humidity environment comprising:

a waterproof container case constructed so as to prevent penetration of water into an inside thereof;

a television receiver main body placed in said container case so that a faceplate can be viewed from outside,

a dehumidifier placed in said container case for removing moisture within the container case,

drain path means provided so as to conduct water of said dehumidifier to the outside of the container case, one end of said drain path means being connected to the dehumidifier, and the other end of said drain path means being placed externally of the container case, and

control means for operating said dehumidifier when said television main body is operated, said control means, when the operation of the television receiver main body is stopped, stopping the dehumidifier after elapse of predetermined time thereafter.

---

## 5,014,910
## PROCESS FOR OPERATING A MOTOR VEHICLE HEATING SYSTEM AND MOTOR VEHICLE HEATING SYSTEM

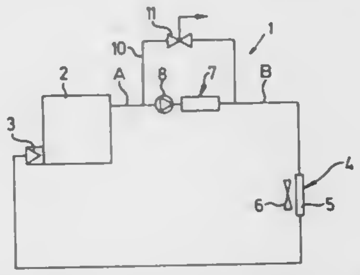
**Peter Koch; Peter Waas, both of Munich; Franz Neumeyer, Ascholding, and Georg Baechle, Germering, all of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany**
**Filed Dec. 11, 1989, Ser. No. 448,368**
**Claims priority, application Fed. Rep. of Germany, Jan. 5, 1989, 3900255**
**Int. Cl.$^5$ B60H** *1/02*
U.S. Cl. 237—2 A 12 Claims

1. Process for operating a motor vehicle heating system in a motor vehicle coolant circuit which contains a motor vehicle engine, a motor vehicle heater with a heat exchanger and an associated blower, and a fuel operated heating device that is operable independent of the vehicle engine and is connected upstream of the motor vehicle heater, comprising the steps of:

(A) circulating coolant through the complete motor vehicle coolant circuit until a first predetermined temperature of up to about 30° C. is reached;

(B) on reaching or exceeding of the first predetermined temperature, causing the coolant to bypass the motor vehicle engine and the motor vehicle heater and circulate between the intake and outlet of the fuel operated heating device, until a second predetermined temperature of up to about 70° to 80° C. is reached; and

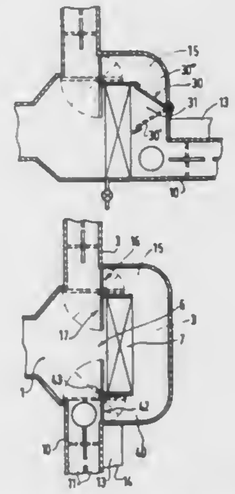
(C) upon reaching the second predetermined temperature, gradually increasing the circulation of coolant through the complete motor vehicle coolant circuit.



---

## 5,014,911
## HEATING AND/OR AIR CONDITIONING APPARATUS FOR AN AUTOMOTIVE VEHICLE

**Philippe Vincent, Epernon, France, assignor to Valeo, Paris, France**
**Filed Feb. 24, 1989, Ser. No. 315,144**
**Claims priority, application France, Feb. 26, 1988, 88 02347**
**Int. Cl.$^5$ F25B** *29/00;* **B60H** *1/04*
U.S. Cl. 237—12.3 B 10 Claims



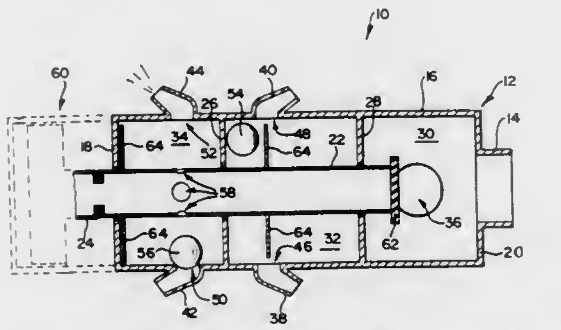
1. Air temperature regulating apparatus for an automotive vehicle, comprising a supply duct for supplying external air, said supply duct being divided into a first branch and a second branch, said first branch having first outlet means into the interior of the vehicle, said second branch comprising a heat exchanger for heating air passing through it, said second branch having a second outlet means for delivery of air into the interior of the vehicle, the apparatus further comprising junction means for communicating said first and second branches with each other, said junction means having a terminal edge proximal said heat exchanger and extending therefrom, and control means for adjusting the temperature of the air delivered from said first and second outlet means comprising a flap valve having two flaps joined for simultaneously movement

VOL
1126
ISS
2
MY
14
1991
UMI

and pivotable about an axis disposed transversely to the general direction of air flow said flap valve being situated in the said junction means and adjacent said terminal edge, said flap valve pivoting between one extreme position closing said junction means and partially masking the heat exchanger while allowing free flow of air through the said first branch, and a second extreme position closing said first branch while allowing free flow of air through said heat exchanger and junction means.

### 5,014,912
### DEVICE FOR DISPLACING A SUBMERGED ARTICLE

**David A. Brooks, Roodepoort, South Africa, assignor to Oakleigh, Ltd., St. Peter's Port, Channel Islands**
**Filed Dec. 5, 1988, Ser. No. 279,535**
**Claims priority, application South Africa, Dec. 3, 1987, 87/9088**
**Int. Cl.$^5$ B05B** *3/14, 17/04*
**U.S. Cl. 239—11** **17 Claims**

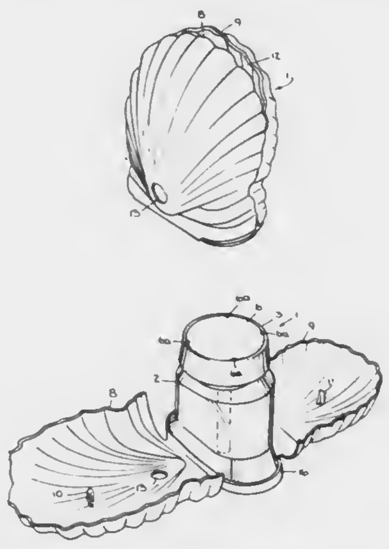


16. A method for moving an article through a pool of liquid with a randomly directed motion, comprising the steps of:
- providing the article with a hollow housing which defines at least two chambers, the housing having an inlet in fluid communication with the chambers, and each of the chambers having at least two outlets defined therein so as to direct pressurized fluid from the chamber to the exterior of the article in at least two different directions;
- connecting the inlet to a source of pressurized fluid capable of moving about the pool with the article;
- alternately directing the pressurized liquid from the inlet to each of the chambers; and
- intermittently closing the outlets of each of said chambers in a substantially random manner.

### 5,014,913
### AIR-FRESHENING DEVICE

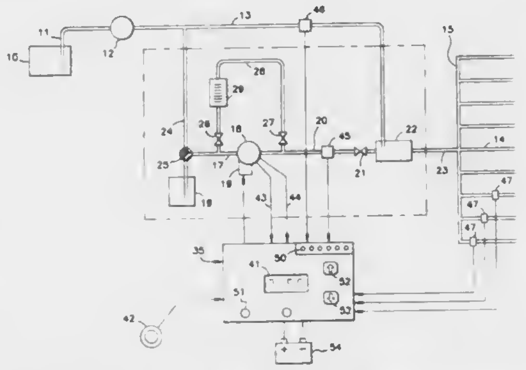
**Earl Hoyt, Franklin Lakes, and Manharbhai K. Patel, Saddle Brook, both of N.J., assignors to Reckitt & Colman Inc., Wayne, N.J.**
**Filed Feb. 12, 1990, Ser. No. 478,809**
**Int. Cl.$^5$ A61L** *9/12*
**U.S. Cl. 239—45** **11 Claims**

1. An air-freshening device comprising:
- an air-freshening fluid container having a removable cap with a wick support and said cap having a flange;
- a fluid-absorbent medium having an exposed surface on the cap;
- a wick for contacting an air freshening fluid within said container, said wick extending through said cap to said fluid-absorbent medium; and
- an outer closure support for said container having a pair of adjustable closure wings individually having bottoms, each wing having an internal locking arm for engaging said flange of said cap and said support also being attached to said container adjacent said wing bottoms, at least a portion of said closure wings being displaceable from said container and each other and defining a variable opening between said closure wings about said exposed surface for escape of said air freshening fluid.



### 5,014,914
### DOSE CONTROL APPARATUS FOR AGRICULTURAL TUBE SPRAYERS FOR SPREADING PESTICIDES ON FIELDS AND PLANTS

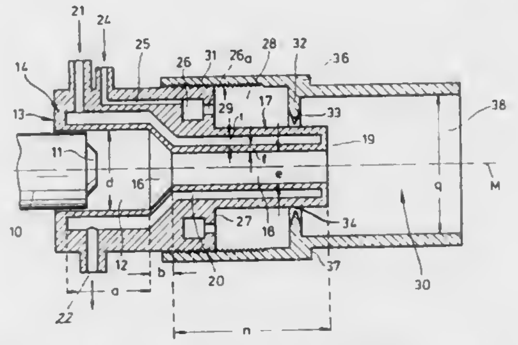
**Anders Wallenås, Karstorpsvägen 26, Lomma-S-234 00, Sweden S-234 00**
**PCT No. PCT/SE88/00103, § 371 Date Sep. 26, 1989, § 102(e) Date Sep. 26, 1989, PCT Pub. No. WO88/06404, PCT Pub. Date Sep. 7, 1988**
**PCT Filed Mar. 4, 1988, Ser. No. 399,456**
**Claims priority, application Sweden, Mar. 4, 1987, 8700893**
**Int. Cl.$^5$ A01M** *7/00*
**U.S. Cl. 239—62** **6 Claims**



1. Dose control apparatus for agricultural sprayers for spreading pesticides on fields and plants, comprising at least one pesticide container, at least one precision dosage pump of the radial type having a displacement control member, a step motor, a linear transmission between the step motor and the displacement control member, a mixing chamber having an axial inlet for pesticide at one end thereof and a tangential inlet for water adjacent said end to which the pesticide is to be added, and an axial outlet for the mixture of pesticide and water at the other end of the vessel, said outlet being adapted for connection to at least one nozzle ramp, a connection between the dosage pump and the mixing chamber, a pressure and check valve in said connection, and a control unit for controlling the pump flow in dependence of definite parameters, the driving speed being one, said control unit supplying control pulses directly to the step motor.

### 5,014,915
### APPARATUS FOR THE FLAME SPRAYING OF POWDER MATERIALS BY MEANS OF AN AUTOGENOUS FLAME

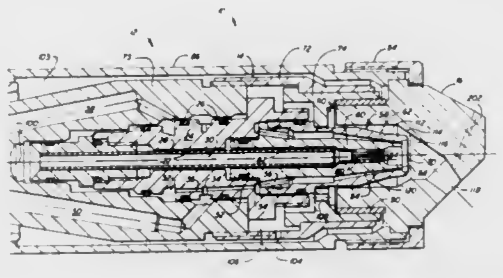
**Wolfgang Simm, Ecublens; Hans-Theo Steine, Cugy, both of Switzerland, and Karl P. Streb, Markt-Mömbris, Fed. Rep. of Germany, assignors to Castolin S.A., St. Sulpice, Switzerland**
**Filed Feb. 9, 1990, Ser. No. 477,634**
**Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3903887**
**Int. Cl.$^5$ B05B** *1/24, 1/28;* **B05C** *5/04*
**U.S. Cl. 239—79** **20 Claims**



1. An apparatus for flame spraying powder materials comprising a combustion chamber, a burner nozzle positioned in said combustion chamber for producing a flame, and means downstream of said combustion chamber for receiving and constricting the flame said means for constricting includes nozzle means, a gas source and passageway means for communicating said gas source with said nozzle means, and adjusting means for axially adjusting the position of said burner nozzle and said nozzle means relative to each other.

### 5,014,916
### ANGULAR GAS CAP FOR THERMAL SPRAY GUN

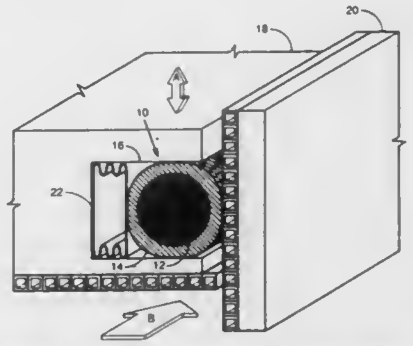
**Richard D. Trapani, Flushing; Martin E. Hacker, Lake Ronkonkoma; Melvyn E. Turner, Wantagh; Ronald Taylor, Fresh Meadows, and Anthony J. Rotolico, Hauppauge, all of N.Y., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**
**Filed Apr. 25, 1990, Ser. No. 514,648**
**Int. Cl.$^5$ B05B** *1/24*
**U.S. Cl. 239—85** **21 Claims**



1. An angular gas cap for a thermal spray gun, comprising a gas cap member having a passage extending therethrough with an inlet end and an outlet end, the passage being receptive of a spray stream of a thermal spray burner head from the inlet end, wherein:
- the passage includes an entrance channel extending from the inlet end, an exit channel extending to the outlet end, and an intermediate channel connecting between the entrance and exit channels;
- the entrance channel is symmetrical on an entrance axis, and the exit channel is symmetrical on an exit axis oriented at a selected angle to the entrance axis greater than zero, so that the entrance axis and the exit axis define a plane; and
- the intermediate channel is symmetrical to the plane and has a near portion and a far portion, the near portion being generally semicylindrical about a near axis lying in the plane contiguous to the entrance axis, and the far portion being generally semicylindrical about a far axis segment, the far axis segment lying in the plane offset from the near axis in a direction away from the outlet end and being oriented at an intermediate angle to the entrance axis between zero and the selected angle.

### 5,014,917
### HIGH-TEMPERATURE, FLEXIBLE, THERMAL BARRIER SEAL

**Paul J. Sirocky, Middleburg Hts., and Bruce M. Steinetz, Broadview Hts., both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**
**Filed Nov. 27, 1989, Ser. No. 441,672**
**Int. Cl.$^5$ B64D** *33/04;* **F16J** *15/46*
**U.S. Cl. 239—265.11** **20 Claims**



1. Apparatus for sealing a gap between a moveable structural panel and an adjacent sidewall spaced therefrom to inhibit leakage of fluids, said apparatus comprising
- an outer sheathing in said gap,
- a plurality of contiguous particles in said sheathing having surfaces in engagement with surfaces of adjacent particles, and the surfaces of the outermost particles being in engagement with the inner surface of said sheathing, and
- means for applying a lateral pressure toward said sidewall to a portion of the outer sheathing to form a seal between said sidewall and another portion of said sheathing.

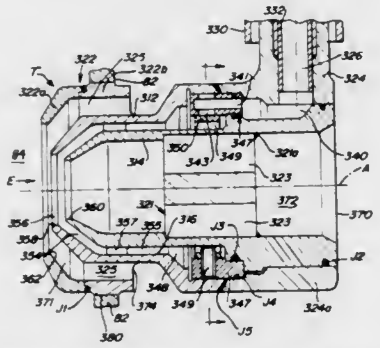
### 5,014,918
### AIRBLAST FUEL INJECTOR

**Robert M. Halvorsen, Birmingham, Mich., assignor to Fuel Systems Textron Inc., Walled Lake, Mich.**
**Filed Apr. 12, 1989, Ser. No. 336,856**
**Int. Cl.$^5$ B05B** *7/10*
**U.S. Cl. 239—410** **12 Claims**

1. An airblast fuel injector having a longitudinal axis and comprising inner and outer injector body means for forming about said axis an inner air chamber with a downstream inner air discharge orifice, an outer air chamber with a downstream outer air discharge orifice and a fuel chamber with a downstream fuel discharge orifice between the inner and outer air discharge orifices, a valve seat insert member disposed between the inner and outer injector body means and having an arcuate valve seat disposed in the fuel chamber, said valve seat including a fuel bore extending transversely of said axis and terminating in a fuel discharge port, and an arcuate spring valve disposed on said arcuate valve seat and having a free end portion overlying the fuel discharge port and biased against said valve seat over the fuel discharge port when the fuel

VOL
1126
ISS
2
MY
14
1991
UMI

pressure is below a minimum selected value and openable in a direction transverse to said axis when fuel pressure exceeds the selected value to allow fuel discharge from the fuel discharge port to the fuel chamber.



---

### 5,014,919

### SMALL HAND-HELD SHOWER HEAD FOR DOMESTIC SINKS CONNECTED TO A FAUCET

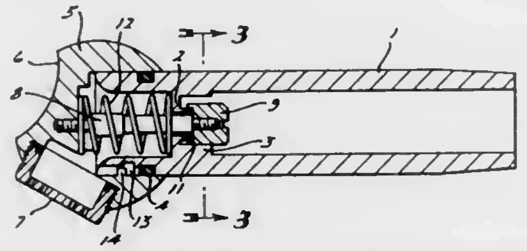
**Alfons Knapp, Biberach/Riss, Fed. Rep. of Germany, assignor to Masco Corporation, Taylor, Mich.**

**PCT No. PCT/US89/03187, § 371 Date Apr. 18, 1990, § 102(e) Date Apr. 18, 1990, PCT Pub. No. WO90/00935, PCT Pub. Date Feb. 8, 1990**

**PCT Filed Jul. 24, 1989, Ser. No. 477,906**

**Int. Cl.$^5$ B05B** *1/30*

U.S. Cl. 239—579 1 Claim



1. A small hand-held shower for residential sinks comprising:

a tubular shaft constructed to be connectable at one end to a pressurized water supply through flexible piping;

a shower head mounted at an end of said tubular shaft opposite said end at which said shaft is connectable to a water supply;

said shower head being substantially spherical and having a notch at its distal end so that it can be activated by a finger of a user's hand that is holding the shower;

a valve mounted in said tubular shaft which is normally closed to the flow of water and manually actuated to an open position and constructed to be automatically closed by itself when actuation forces are removed;

the shower head being slidably mounted and sealed on the tubular shaft and being connected through an internal stem to a valve element which cooperates with a valve seat formed by an internal shoulder in the tubular shaft located intermediate the valve element and shower head;

the valve element being removably mounted on said internal stem;

said valve element having an undercut seat to hold a sealing gasket;

said undercut seat, sealing gasket and internal stem being dimensioned such that the sealing gasket can be inserted into the undercut seat while the insertion of the internal stem impedes the abnormal passage of the gasket from its seat; and

a compression spring located between the shower head and the valve seat which biases the shower head toward an off position.

---

### 5,014,920

### PAPER SHREDDER

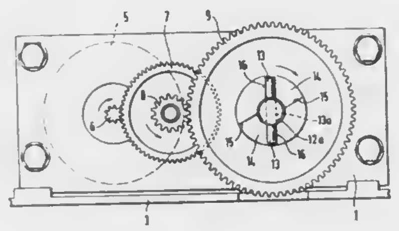
**Hermann Schwelling, Hartmnnweg 5, D-7777 Salem 2, Fed. Rep. of Germany**

**Filed Mar. 7, 1990, Ser. No. 489,950**

**Claims priority, application Fed. Rep. of Germany, Mar. 7, 1989, 3907316**

**Int. Cl.$^5$ B02C** *23/00*

U.S. Cl. 241—101.2 20 Claims



1. A shredder for shredding waste products, said shredder comprising;

shredding wheel means for cutting and shredding waste products;

motor means for driving said shredding wheel means;

transmission means disposed between said shredder wheel means and said motor means to supply torque from said motor means to said shredder wheel means;

said transmission means comprising;

a plurality of pin means disposed for driving said shredding wheel means by transferring torque from said motor means to said shredding wheel means;

each of said pin means having associated therewith a corresponding first surface means and a corresponding second surface means both disposed for making intermediate and selective contact with their associated pin means;

each said first surface means being disposed to make contact with its associated pin means for driving said shredding wheel means in a forward direction of rotation for shredding waste products;

each said second surface means being disposed to make contact with its associated pin means for driving said shredding wheel means in a reverse direction of rotation opposite the forward direction of rotation;

each said first surface and each said second surface being disposed for permitting the motor means to gain speed upon movement of their associated pin means between each said first surface means and each said second surface means;

at least one drive element for being driven by said motor means and for driving said shredding wheel means;

said at least one drive element having a first side and a second side opposite said first side;

a first and a second of said plurality of pin means, each with its associated first surface and second surface, being disposed, one on each of said first side and said second side of said drive element; and

said first and said second of said plurality of said pin means being disposed for distributing stress substantially evenly through portions of said drive element at least in the reverse direction of rotation.

---

### 5,014,921

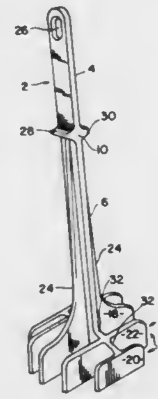
### POTATO MASHER

**Robert B. Skerker, Buffalo, N.Y., and William Prindle, Santa Barbara, Calif., assignors to Robinson Knife Manufacturing Co., Inc., Springville, N.Y.**

**Filed Mar. 16, 1990, Ser. No. 494,596**

**Int. Cl.$^5$ A47J** *42/00*

U.S. Cl. 241—169.2 9 Claims



1. A potato masher comprising a handle, connection section, mashing element comprised of a plurality of rigid strips, and mounting web extending transversely from the connection section, said strips including at least two outer strips, at least one center strip and two inner strips that extend in parallel spaced-apart relationship transversely from the web, and wherein said handle, connection section, mounting web and mashing element are integrally formed in a single piece.

---

### 5,014,922

### CONTROL MEANS FOR APPARATUS FOR CROSS-WINDING PACKAGES

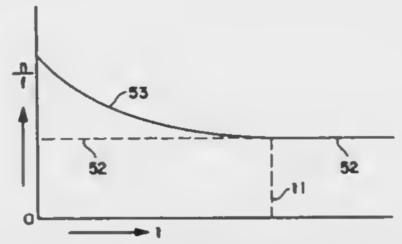
**Heinz Kamp, Wegberg; Peter Gerhards, and Siegfried Bruns, both of Monchen-Gladbach, all of Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Fed. Rep. of Germany**

**Continuation of Ser. No. 275,744, Nov. 23, 1988, abandoned. This application Feb. 16, 1990, Ser. No. 481,730**

**Claims priority, application Fed. Rep. of Germany, Nov. 27, 1987, 3740263**

**Int. Cl.$^5$ B65H** *54/02, 54/28*

U.S. Cl. 242—18 R 2 Claims



1. A method for cross-winding packages of textile material or the like through the axial traversal of the textile material during rotation of the package, the frequency of traversal (f) varying in a predetermined manner with the contemporaneous rate of rotation (n) of the package, comprising:

rotating the package at a selected rotational speed during a normal operation period;

controlling the frequency of traverse (f) during the normal operation period in correspondence with the selected rotational speed to achieve a predetermined normal speed ratio (n:f) of the selected rotational speed to the frequency of traverse;

increasing the rotational speed of the package from a relatively lower rotational speed to the selected rotational speed during an acceleration period prior to the normal operation period; and

controlling the frequency of traverse relative to the increasing rotational speed of the package during the acceleration period to achieve a predetermined higher speed ratio (n:f) during the acceleration period relative to the normal speed ratio (n:f) during the normal operation period.

---

### 5,014,923

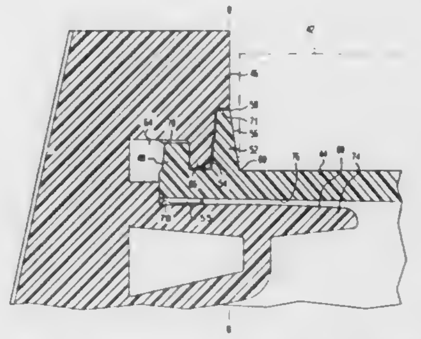
### WEB-SPOOL FOR A CARTRIDGE

**Jeffrey C. Robertson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 9, 1990, Ser. No. 505,962**

**Int. Cl.$^5$ B65H** *75/22;* **F16B** *1/00*

U.S. Cl. 242—55 8 Claims



1. A web-spool comprising: a cylindrical core having an outer peripheral surface onto which a web is wound, the core having at each end thereof at least one core lug and a core ring extending radially outwardly away from the peripheral surface and substantially perpendicular thereto in parallel, axially spaced relation to each other, to form a peripheral core groove therebetween at each core end; and a flange releasably secured to each core end, each flange having axially inner and outer surfaces with a throat extending from its inner surface toward its outer surface for receiving therein said at least one core lug and said core ring, each flange throat further having at least one radially inwardly extending flange lug with recesses adjacent to opposite sides thereof, said at least one flange lug being adapted to nest within said peripheral core groove, and said recesses being adapted to receive said at least one core lug and core ring, when said core end is inserted into said flange throat and said core and said flange are then rotated relative to each other, so that said at least one core lug lockingly engages said at least one flange lug to releasably secure said core end and said flange together.

---

### 5,014,924

### APPARATUS AND METHOD FOR ROLL CHANGING ON A CONTINUOUS WINDER

**Heinz K. Nowisch, and Richard S. Tetro, both of Fulton, N.Y., assignors to The Black Clawson Company, Middletown, Ohio**

**Filed Aug. 21, 1989, Ser. No. 396,191**

**Int. Cl.$^5$ B65H** *19/20, 35/04*

U.S. Cl. 242—56 R 6 Claims

1. In a winder for continuously winding a web material into rolls on successive cores, roll changing apparatus for cutting and transferring the web material from a full roll to an empty core, comprising:

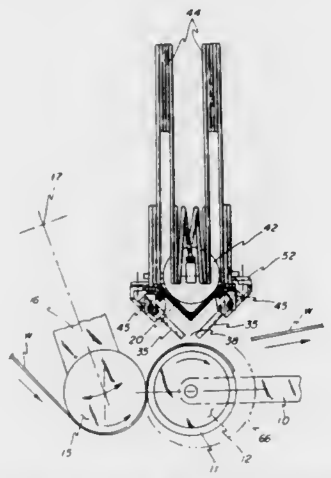
(a) means for carrying an empty core into engagement with a run of the web material to a winding roll and for causing said core to rotate at a surface speed substantially matching that of the web material,

(b) means including a least one nozzle on the opposite side of said web material from said core positioned to discharge a water jet toward a line of engagement between the web and said core, and

(c) means for moving each said nozzle lengthwise of said

OL
126
ISS
2
MY
14
1991
UMI

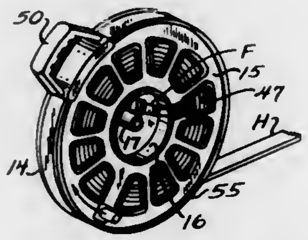
core while discharging said jet therefrom, whereby each said jet severs the web material and simultaneously wets the resulting leading edge thereof and the surface area of said core adjacent said web edge.



---

### 5,014,925
### REEL ASSEMBLY AND METHOD FOR LOADING A REEL

**Charles Cump, 261 Shore Ct., Burr Ridge, Ill. 60521**
**Filed Feb. 15, 1989, Ser. No. 310,627**
**Int. Cl.⁵ B65H** *75/38*
**U.S. Cl. 242—86** **16 Claims**

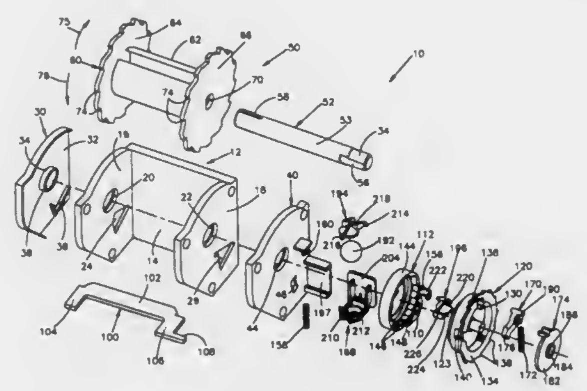


1. A reel assembly for winding, storing and transporting a length of material, said reel assembly comprising: a pair of spaced apart walls, a central body bridging and disposed inwardly radially from the periphery of said walls, said walls and body defining a channel open from the periphery of said walls for confining said length of material therein when wound on said body, grasping means on the periphery of said walls for holding said assembly and maintaining said walls in spaced apart relation at their peripheries, a first of said walls and said body being rotatable relative to said grasping means and adapted for rotation in one direction for winding up said length of material on said body and in a reverse direction for unwinding said length of material from said channel, cooperating means on said grasping means and on the periphery of said first wall permitting free movement of said first wall relative to said grasping means during such rotation, said body and said first wall having receiving means opening from a free edge of said first wall for entry and securing of one end of said length of material within said channel, said walls having bearing members engaged at their centers spaced inwardly radially from said body for low friction securement of said walls together.

---

### 5,014,926
### WEB SENSITIVE AND VEHICLE SENSITIVE RETRACTOR

**Robert J. Rumpf, Grosse Pointe; Ronald A. Willey, Port Huron, and Kevin Storck, Mt. Clemens, all of Mich., assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio**
**Filed Nov. 9, 1989, Ser. No. 434,024**
**Int. Cl.⁵ B60R** *22/38, 22/40*
**U.S. Cl. 242—107.4 A** **10 Claims**

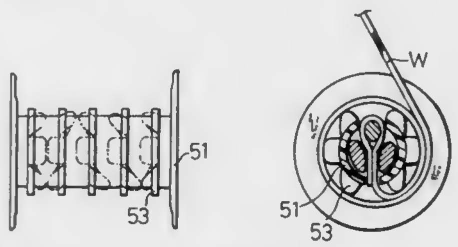


1. A vehicle seat belt retractor comprising:
- a housing;
- a spool on which seat belt webbing is wound and which is rotatable in belt withdrawal and belt retraction directions;
- at least one spool locking ratchet wheel fixed to said spool for rotation therewith;
- a first pawl supported on said housing and not rotatable with said spool and movable into a locking position in engagement with said spool locking ratchet wheel for transmitting spool locking force from said spool locking ratchet wheel to said housing to lock said spool locking ratchet wheel and said spool against rotation in the belt withdrawal direction, said first pawl having portions located in openings in said housing and which move in said openings when said first pawl moves;
- a first member spaced from said spool locking ratchet wheel and having external ratchet teeth thereon and rotatable with said spool;
- a second pawl carried by said first member and movable between first and second positions relative to said first member;
- a flywheel rotatable relative to said spool and driven by said second pawl, said flywheel lagging rotation of said spool upon acceleration of said spool in the belt withdrawal direction at a rate above a predetermined rate;
- means on said first member for supporting said second pawl for movement from its first position to its second position relative to said first member in response to lagging rotation of said flywheel relative to said spool;
- a second member movable in response to vehicle deceleration at a rate above a predetermined rate into engagement with said external ratchet teeth on said first member to be moved thereby; and
- actuator means supported on said first member for rotation relative to said housing and movable to move said first pawl into its locking position, said actuator means being moved by said second pawl when said second pawl is in its second position and by said second member when said second member is in engagement with said first member, said first member having an opening in which said second pawl moves when said second pawl moves to its second position.

---

### 5,014,927
### WEBBING RETRACTOR

**Eiji Ogawa, and Osamu Kawai, both of Fujisawa, Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 211,580, Jun. 27, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 462,960**
**Claims priority, application Japan, Jun. 30, 1987, 62-99327[U]; Jul. 13, 1987, 62-107485[U]; Jul. 15, 1987, 62-107519[U]**
**Int. Cl.⁵ B60R** *22/28*
**U.S. Cl. 242—107.40 R** **6 Claims**

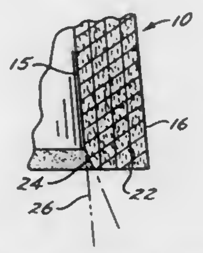


1. A webbing retractor, comprising:
- a base;
- a bobbin supported rotatably on the base and having a drum on which a webbing is wound;
- webbing-extension increasing means provided between the drum of the bobbin and an innermost winding of the webbing wound on the drum for allowing the webbing to extend over an increased length when a tensile force of at least a predetermined value is applied to the webbing, said webbing-extension increasing means comprising a plurality of cantilevered ribs provided at axial intervals along said drum and extending circumferentially about at least a part of the outer circumference of said drum, each of said cantilevered ribs being in independent contact with the innermost winding of the webbing, wherein said cantilevered ribs deform upon application of the tensile force of at least the predetermined value.

---

### 5,014,928
### YARN CARRIER AND METHOD AND APPARATUS FOR MANUFACTURING THE SAME

**Carroll E. Gandy, and Roland S. Watford, Jr., both of Hartsville, assignors to Sonoco Products Company, Hartsville, S.C.**
**Filed Mar. 26, 1990, Ser. No. 498,987**
**Int. Cl.⁵ B65H** *75/10, 75/18*
**U.S. Cl. 242—118.32** **4 Claims**

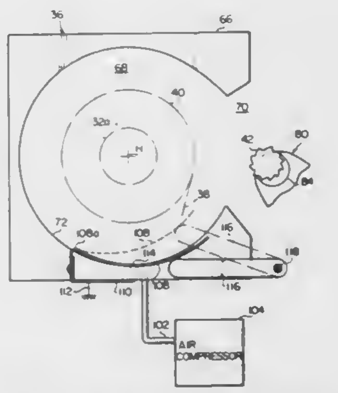


1. A yarn carrier of the type which is adapted to be mounted on a winding machine and have a yarn wound thereon to form a yarn package, and which is characterized by the ability to accommodate the tail of the yarn to be wound thereon between the carrier and the base plate of the winding machine without severing the yarn tail during winding of the package, said yarn carrier comprising
- a tubular body member composed of wound layers of paper and defining a central axis, parallel inner and outer wall surfaces, a base end portion, and an opposite end portion,
- said base end portion including a generally flat end surface disposed in a plane lying generally perpendicular to said central axis, and an annular surface segment disposed between said inner wall surface and said end surface and facing generally radially inwardly, said annular surface segment comprising a beveled end of relatively soft loosened fibers of non-compressed paper, at least the innermost layer of paper being partially removed to form said beveled end of loosened paper fibers, said beveled end being at a predetermined angle relative to the central axis of said tubular body so that substantially all of the loosened fibers lie in a plane radially outside a projection of the inner wall surface, said loosened fibers presenting a relatively soft surface to accommodate the yarn tail thereon.

---

### 5,014,929
### FILM STRIP FEEDING APPARATUS

**Osami Kato; Tsutomu Tsukamoto, and Takanori Saitoh, all of Osaka, Japan, assignors to Minolta Camera Co., Ltd., Osaka, Japan**
**Filed Jan. 27, 1989, Ser. No. 303,697**
**Claims priority, application Japan, Jan. 29, 1988, 63-20271; Jan. 29, 1988, 63-20272; Feb. 25, 1988, 63-44715; Dec. 19, 1988, 63-321678**
**Int. Cl.⁵ G03B** *1/06, 23/02;* **G11B** *23/08*
**U.S. Cl. 242—195** **9 Claims**



3. A film strip feeding apparatus for use with a film storage device detachably assembled into the film strip feeding apparatus and having an inner peripheral surface portion defining a generally circular central opening merging with a film outlet/inlet opening and having a roll of a film strip rotatably stored in the central opening, comprising
- a rockable member carrying a stripping roller engageable with the roll of film in said film storage device and operative to unwind and strip a leading end portion of the film strip from said roll of film and feeding the leading end portion of the film strip out of said film storage device through said film outlet/inlet opening, said rockable member being rockable about an axis fixed in the film strip feeding apparatus between a first angular position having said stripping roller disengaged from said roll of film and a second angular position having said stripping roller held in rollable engagement with said roll of film,
- a leaf spring of metal which is fixed at one end with respect to the film storage device assembled into the film strip feeding apparatus for removing electrostatic charges from the film strip, said leaf spring being arcuately curved inwardly in said circular opening in said film storage device and elastically deformable about the fixed end thereof radially within said circular central opening in said film storage device,
- a lever held in slidable engagement with said leaf spring and movable between a first position having said leaf spring located to have its surface portion substantially continuous to the inner peripheral surface portion of the film storage device and a second position having the leaf spring turned about its fixed end radially inwardly in the

VOL 126 ISS 2 MY 14 1991 UMI

circular central opening of said film storage device from said first position, and

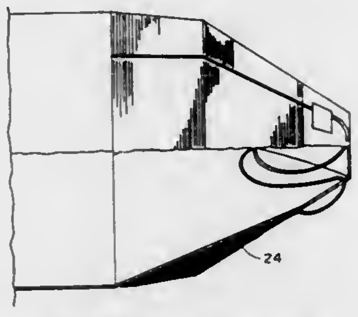
drive means for driving said lever between said first and second positions thereof.

---

### 5,014,930
### MISSILE FILAMENT DISPENSING ARRANGEMENT

**George W. LeCompte, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 23, 1989, Ser. No. 370,526**
**Int. Cl.⁵ F41G *7/32***
**U.S. Cl. 244—3.12** **5 Claims**



1. Dispensing apparatus for a filament used as data link between a missile having a tapered aft fairing and a mother vehicle from which the missile is launched, comprising:

means carried by the mother vehicle for dispensing a predetermined length of filament from an end portion thereof;

a filament pack wound on the missile tapered aft fairing from the other end portion of the filament;

a protective covering for receipt over the filament other end portion forming a leader; and

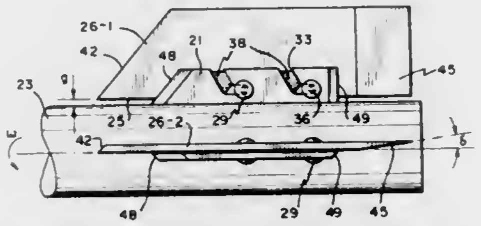
a drogue releasably mounted within the missile and secured to the leader for dispensing along with the leader.

---

### 5,014,931
### KINETIC ENERGY PROJECTILE WITH IMPACT-EJECTED FINS

**Ameer G. Mikhail, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Aug. 29, 1990, Ser. No. 574,337**
**Int. Cl.⁵ F42B *10/14***
**U.S. Cl. 244—3.25** **2 Claims**



1. A kinetic energy vehicle comprising a projectile body having a plurality of fins attached thereto to provide stability in flight;

means for causing the fins to be ejected from the body upon impact with a target, including means for restraining the fins on the projectile body in flight;

the restraining means comprising fin support means fastened to the projectile body and including locking means for releasable securing the fins thereto, the fins including means arranged and adapted to cooperate with said locking means in releasable securing the fins to the support means;

the locking means including a plurality of channels each having a closed end having cooperating means including a plurality of pins fastened to the fins for insertion in the channel up to the closed end thereof; and

a putty material positioned in the channel to prevent the premature ejection of the fins from the locking means of the fin support means;

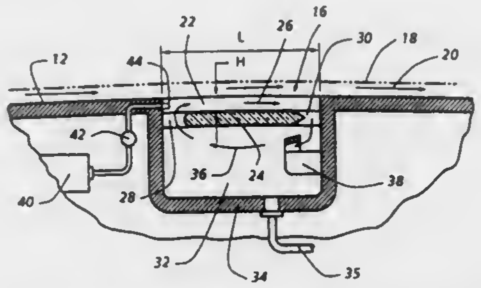
so that upon impact of the projectile on the target, the fins are ejected from the projectile.

---

### 5,014,932
### WINDOW COOLING FOR HIGH SPEED FLIGHT

**Richard T. Driftmyer, Bowie, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 27, 1990, Ser. No. 517,011**
**Int. Cl.⁵ B64C *1/38***
**U.S. Cl. 244—117 A** **8 Claims**



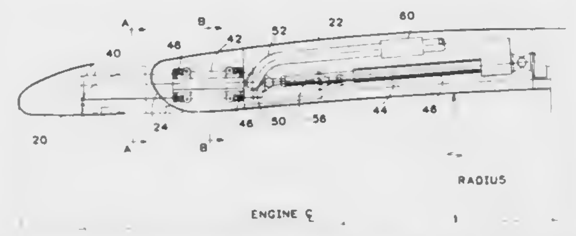
1. In combination with an surface exposed to a boundary layer of fluid during travel therethrough at high velocites, a system for cooling a window in the surface during said travel thereof, comprising means mounting the window within a portion of said surface for exposure to the boundary layer, cavity means connected to the surface for establishing a flow path isolated by the window from the boundary layer, flow controlling port means in said window mounting portion of the surface for establishing recirculated flow of the fluid between a buffering portion of said boundary layer along the window and the isolated flow path and heat sink means for extracting heat from the fluid during said recirculated flow thereof along the isolated low path to cool the window by heat exchange with the fluid within the buffering portion of the boundary layer.

---

### 5,014,933
### TRANSLATING LIP AIRCRAFT COWLING STRUCTURE ADAPTED FOR NOISE REDUCTION

**Dorson J. Harm, Seattle, and Joseph M. Zabinsky, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Apr. 27, 1989, Ser. No. 343,729**
**Int. Cl.⁵ B64D *33/02***
**U.S. Cl. 244—53 B** **13 Claims**



1. In a gas turbine engine for an aircraft having an air intake passageway defined by a cowling which functions for directing ambient air into said engine, a variable geometry inlet structure adapted for noise reduction, comprising:

an annular lip positioned at the front edge of said cowling for defining an aerodynamically sharp contour along the front edge of said cowling;

means for axially translating said lip forwardly from and backwardly to the front edge of said cowling including a set of circumferentially spaced struts for mounting said lip, said struts being exposed to airflow when they have translated said lip forwardly of the front edge of said cowling; and

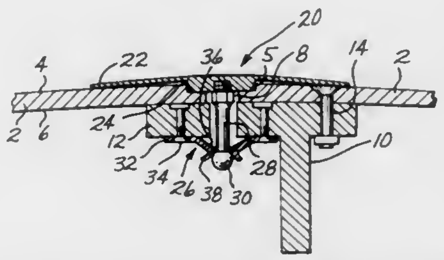
means for injecting pressurized air into the airflow along the trailing edges of said struts in order to suppress turbulence induced in said airflow by said struts and thereby reduce the noise produced as a result of the airflow past said struts.

---

### 5,014,934
### REMOVABLE SEAL FOR DISCONTINUITIES IN AIRCRAFT SKIN

**James K. McClaflin, Sumner, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Jun. 30, 1989, Ser. No. 374,529**
**Int. Cl.⁵ B64C *1/12, 1/14***
**U.S. Cl. 244—132** **12 Claims**



1. A removable seal for covering and sealing a discontinuity extending through an outer skin portion of an aircraft, said seal comprising:

a resilient sealing member having a use position in which it covers said discontinuity and overlaps the outer surface of said outer skin portion; and

a fastener having a first component secured to an inner surface of said outer skin portion and extending at least partially across said discontinuity, and a second component secured to said sealing member and dimensioned to extend inwardly into said discontinuity and engage said first component; said first and second components having portions that automatically releasably lock said components together, when inward pressure is exerted on said sealing member to urge said first component into engagement with said second component, to secure said sealing member in said use position and urge said sealing member into sealing engagement with said outer surface of said outer skin portion, and that are releasable when a lifting force is exerted on said sealing member to disengage said components from each other.

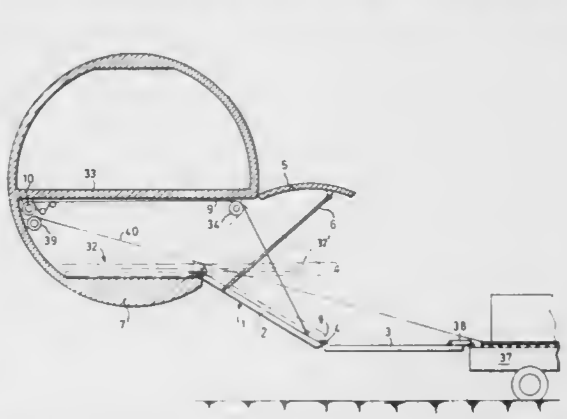
---

### 5,014,935
### AUTONOMOUS LOAD EMBARKING AND DISEMBARKING APPARATUS INTEGRATED IN AN AIRCRAFT

**Jacques M. Dalbera, Arcachon, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France**

**Filed Apr. 9, 1990, Ser. No. 506,027**
**Claims priority, application France, Apr. 21, 1989, 89 05329**
**Int. Cl.⁵ B64C *1/22***
**U.S. Cl. 244—137.1** **11 Claims**

1. Autonomous apparatus for embarking and disembarking loads for an aircraft, which aircraft comprises a luggage compartment having a floor, the apparatus comprising a lateral doorway in the aircraft having a threshold and a door for closing the doorway; a movable platform provided with balls for receiving the loads in the region of the doorway, rolling means extending longitudinally in the luggage compartment on each side of the platform, a foldable rolling track, means connected to the rolling track and to the door for shifting the rolling track transversely of the luggage compartment, in synchronism with the opening of the door, from a first folded storage position inside the luggage compartment in the region of the doorway to a second folded position entirely outside the luggage compartment; means for articulating an end of the rolling track in said second position thereof to the threshold of the doorway, and vice versa, guide means provided on the platform, the rolling track being movably rollable in the guide means, means for raising and lowering the rolling track in the second position thereof, and pulling means connected to the platform.

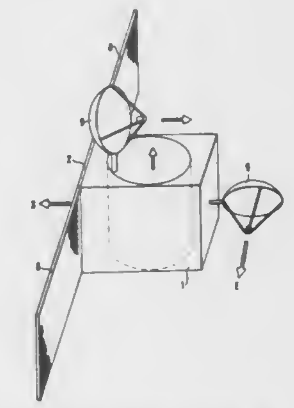


---

### 5,014,936
### SATELLITE SYSTEM HAVING VARIABLE CONFIGURATION

**Joachim Nauck, Bremen, Fed. Rep. of Germany, assignor to Erno Raumfahrttechnik GmbH, Bremen, Fed. Rep. of Germany**

**Continuation of Ser. No. 643,679, Aug. 24, 1984, abandoned. This application Jun. 13, 1986, Ser. No. 874,810**
**Claims priority, application European Pat. Off., Sep. 3, 1983, 83108702.8**
**The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.**
**Int. Cl.⁵ B64G *1/44***
**U.S. Cl. 244—158 R** **2 Claims**



1. Satellite system including at least one service module provided for power supply and at least one payload module comprising:

said service module being provided with solar panels extending laterally from opposite surfaces of said module and coplanar with a particular surface of the service module,

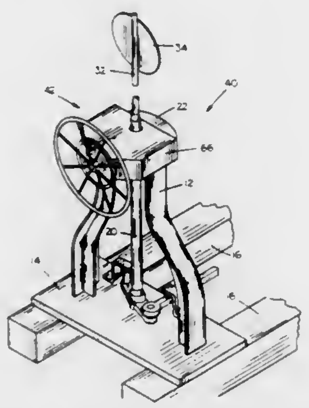
VOL
1126
ISS
2
MY
14
1991
UMI

the particular surface being likewise constructed as solar panel;
cable means for tensioning the panels individually and including means for distorting them to thereby change their effective surface;
means for orienting the particular surface of the service module towards end in relation to the sun during orbiting including means for operating the cable; and
coupling means for releasably connecting the payload module to the service module and permitting relative motion to the payload module in relation to the service module such that the payload module can be oriented towards the earth and independently from the orientation of the service module on its orbiting path.

---

### 5,014,937
### RAILWAY SWITCH STAND AND METHOD OF MODIFYING THE SAME

**Terry D. Peters, Rte. 4, Box 19, Elkhorn, Nebr. 68022**
**Filed Aug. 10, 1989, Ser. No. 392,060**
**Int. Cl.⁵ B61L *5/02***
**U.S. Cl. 246—406** **9 Claims**

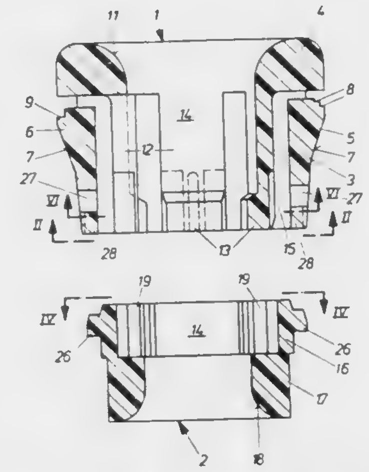


2. An adaptor for use on a railway switch stand, the switch stand of the type having a reciprocating connecting rod extending therefrom for operating a railway track switch between open and thrown positions, a throw crank operably mounted on a base and connected to the connecting rod to reciprocate the connecting rod, the throw crank including a vertically oriented shaft extending upwardly from the base and rotatable to reciprocate the connecting rod, a table mounted to the upper ends of generally vertical legs projecting upwardly from said base, said table supported above the base, and the throw crank shaft being journaled through an aperture in the table to project upwardly therefrom, said adaptor comprising:
gear works operably mounted within a housing;
said housing having fastening means for removably mounting said housing above said switch stand table;
a yoke means adapted for mounting on said shaft for rotation therewith and operably mounted to said gear works; and
handle means operably connected to said gear works so as to move said yoke, said gear works adapted to produce a mechanical advantage.

---

### 5,014,938
### DEVICE FOR RELIEVING THE STRAIN ON CABLES

**Peter Potzas, Am Rinnerborn 58, D-6305 Alten-Buseck, Fed. Rep. of Germany**
**PCT No. PCT/DE88/00078, § 371 Date Aug. 17, 1989, § 102(e) Date Aug. 17, 1989, PCT Pub. No. WO88/06352, PCT Pub. Date Aug. 25, 1988**
**PCT Filed Feb. 17, 1988, Ser. No. 399,542**
**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3705413**
**Int. Cl.⁵ F16L *5/00***
**U.S. Cl. 248—56** **14 Claims**



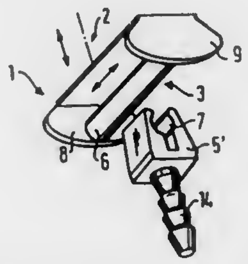
1. A device for relieving the strain on cables, in particular mains supply cables to housings of electrical equipment, consisting of two parts fitted into one another approximately concentrically, of which the outer part can be fastened in a housing opening and the inner part is mounted in the outer part so as to be rotatable around the lead-through opening for the cable, and also clamping fingers which protrude into the lead-through opening, the swivelling direction of said clamping fingers runs approximately transversely to the longitudinal axis of the cable lead-through opening and the clamping fingers can be swivelled into the lead-through opening by rotation of the inner part relative to the outer part and can be locked in a clamping position, wherein:
the clamping fingers are arranged on the outer part and lie approximately in the direction of the cable lead-through opening;
run-up lobes for actuating the clamping fingers sitting on the outer part are provided on the inner surface of the inner part; and
means for applying a gripping tool is formed on the end of the inner part protruding out of the outer part.

---

### 5,014,939
### HOLDING ELEMENT OF PLASTIC

**Willibald Kraus, Grunstadt, and Jürgen Hofmann, Eisenberg, both of Fed. Rep. of Germany, assignors to TRW United Carr GmbH & Co., Enkenbach-Alsenborn, Fed. Rep. of Germany**
**Filed Nov. 16, 1989, Ser. No. 437,167**
**Claims priority, application Fed. Rep. of Germany, Oct. 5, 1989, 3933305**
**Int. Cl.⁵ F16C *1/14***
**U.S. Cl. 248—70** **5 Claims**

1. A holding assembly formed of plastic connecting and holding cable, pipe, or similar elongated elements to a subjacent support surface, said assembly comprising:
a fastening element having means for permitting it to be connected to a subjacent support surface;
a holding element for connection to the cable, pipe, or similar element to be held; and,
connecting means joining said fastening element to said holding element, said connecting means including an elongated rod-like member having a longitudinal axis and resilient members defining an opening which resiliently grip around the rod-like member while permitting the rod-like member to be selectively moved longitudinally of its axis or rotated about its axis to thereby permit said holding element to be selectively positioned relative to said fastening element,

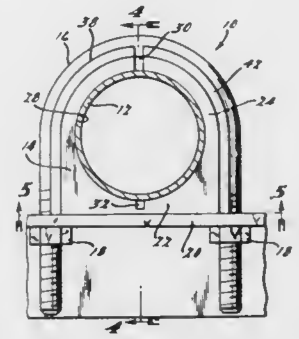


said connecting means further including an intermediate element positioned between said fastening element and said holding element, said intermediate element being connected to said fastening element by an elongated member which is resiliently gripped by a socket to allow selective adjustment in the spacing between said fastening element and said holding element.

---

### 5,014,940
### CLAMP ASSEMBLY

**Clarence A. Sherman, Birmingham, Mich., assignor to ZSI, Inc., Livonia, Mich.**
**Filed Aug. 28, 1989, Ser. No. 399,696**
**Int. Cl.⁵ F16L *3/00***
**U.S. Cl. 248—74.1** **12 Claims**

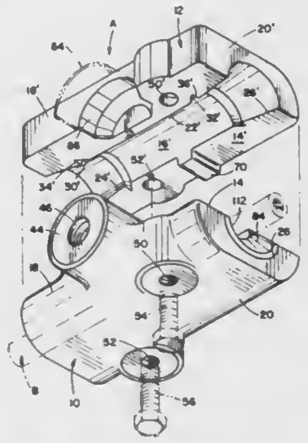


1. A clamp assembly for securing a cylindrical member, comprising:
a U-shaped rod member for attaching said clamp assembly to a support surface;
fastening means for retaining said rod member to said support surface; and
a cushion insert having a base portion and side walls that extend upwardly and inwardly to define a substantially circular passageway, said side walls having an outer surface comprising a saddle having a pair of raised portions forming an arcuate recess for retainably engaging said U-shaped rod member, such that said rod member exerts a substantially evenly distributed clamping force along the entire periphery of said insert, and an inner surface for engagement with said cylindrical member to absorb vibration and shock, means for allowing increased flexure of said side walls of said cushion insert to fit over and about said cylindrical member, said flexure means comprising a slot extending partially radially through and axially along the bottom of the inner surface of said cushion insert, and said cushion insert substantially surrounding said cylindrical member to prohibit contact of said U-shaped rod member with said cylindrical member.

---

### 5,014,941
### CABLE SUPPORT ASSEMBLY

**Thomas E. Sherman, Chagrin Falls, Ohio, assignor to Preformed Line Products Company, Cleveland, Ohio**
**Filed Mar. 11, 1988, Ser. No. 167,039**
**Int. Cl.⁵ F16L *3/00***
**U.S. Cl. 248—74.4** **9 Claims**



1. A cable support assembly adapted for securing a fiber optic cable to an associated structure, the cable support assembly comprising:
first and second selectively mating body members defining a body when connected together;
said first body member having an inner face with an elongated first arcuate recess defined thereon and extending from a first end to a second end thereof, first and second axially spaced grooves defined in said first recess adjacent said first and second ends, respectively;
said second body member having an inner face with an elongated second arcuate recess defined thereon and extending from a first end to a second end thereof, first and second axially spaced grooves defined in said second recess adjacent said first and second ends, respectively;
said first and second recesses cooperatively defining an aperture through said body, said aperture having tapered regions at said first and second ends of the body members;
means for selectively securing said first and second body members together;
a cushion member formed from a dielectric material substantially less rigid than said body members, said cushion member defined by mating first and second portions received in respective body member recesses, said first and second portions each having an arcuate inner surface for closely receiving the associated fiber optic cable therethrough; and,
first and second radially outward extending flanges defined on each cushion member portion for receipt in said body member grooves to limit relative axial movement between said cushion member and body.

---

### 5,014,942
### MEANS FOR HYGIENICALLY POSITIONING AN OUTLET OF AN APPLIANCE INDIRECT DRAIN CONDUIT

**Ronald L. Tungett, 4891 SW. 64 Way, Davie, Fla. 33314**
**Filed Sep. 15, 1989, Ser. No. 409,656**
**Int. Cl.⁵ A62C *23/04***
**U.S. Cl. 248—79** **15 Claims**

1. A means for hygienically positioning an outlet of an appli-

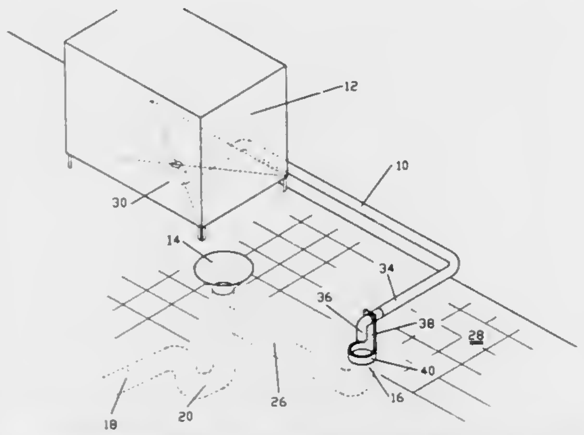
VOL
1126
ISS
2
MY
14
1991
UMI

ance indirect drain conduit, relative to an input of a drain, said positioning means comprising:

(a) a lower circumferential fitting proportioned for circumferential engagement with said input of said drain;

(b) an upright support element having an elongate axis substantially parallel with the gravity vector, said axis having a length said support element having an upper end and a lower end, said lower end projecting integrally upwardly from said lower circumferential fitting;

(c) an upper circumferential fitting having a fluid input and a fluid output, said input proportioned for complemental engagement with said outlet of said appliance indirect drain conduit, said output of said upper circumferential fitting having an axis disposed substantially parallel to the gravity vector and within an imaginary cylinder defined by the drain, in which said fluid output of said upper circumferential fitting is rigidly secured at said upper end of said upright support element at a height above the level of said drain, said height determined by the length of said elongate axis of said upright support element, whereby the possibility of bacterial communication between said appliance indirect drain conduit and said drain thereby minimized.



---

5,014,943

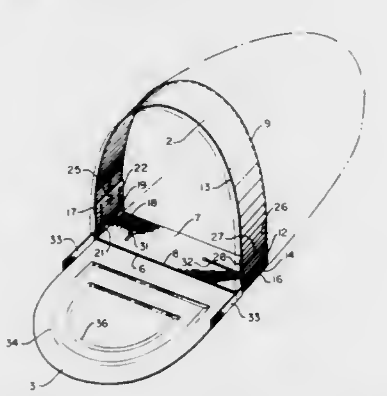
## TRASH BAG HOLDER

**Dean O. Nelson, and Richard W. Nelson, both of 1775 Hacienda Ave., Campbell, Calif. 95008**

**Filed Jun. 28, 1990, Ser. No. 544,986**

**Int. Cl.⁵ B65B** *67/04*

**U.S. Cl. 248—99** **5 Claims**



1. A trash bag holder formable from a flat blank of synthetic resinous material, which when formed, comprises:

(a) a hoop for retaining the mount of a trash bag in open position when the hoop is inserted thereinto, said hoop including:

(b) a flat rectangular rigid member defined by two long edges and two short edges and having an inner surface and an outer surface;

(c) a short rectangular inherently resilient segment having an inner surface and an outer surface, said short segment having first and second short edges, said first short edge integrally attached by a first flexible connection along a first short edge of said flat member, whereby the inner surface of said short segment may be brought into contact with the inner surface of said flat member by rotation of said short segment about said integral flexible connection, said second short edge of said short segment being unattached; and

(d) a long curved rectangular inherently resilient segment having an inner surface and an outer surface, said long segment having a first short edge adjustably interconnected to said flat member adjacent the end thereof remote from said first short edge thereof such that the surfaces of the flat member and long curved segment are perpendicular to each other at their interconnection and selectively slidable in relation to each other to vary the size of the hoop to fit different size trash bags, said long curved segment having a second short edge attached by a second integrally flexible connection to an intermediate portion of said short segment, said second integrally flexible connection being parallel to and spaced between the first integrally flexible connection of said short segment and said unattached second short edge of said short segment, whereby the outer surface of said short segment between the second hinged connection and the unattached second short edge of said short segment may press against the inner surface of said long segment thereby to provide a stop limiting outward movement of the second integral flexible connection to maintain a smooth curvature of the attached short and long segments between their respective attachments to said flat member, whereby a hoop structure is formed capable of being selectively transformed between:

(i) a contracted P-shaped mode wherein, by rotation about the first flexibly integral connection, said short segment lies in contact with said flat member and said short and long segments form a right angle at the second flexibly integral connection, thereby facilitating the placement of the opening of a trash bag around the outer surfaces of the flat member and short and long segments, and

(ii) an expanded D-shaped mode in which the flat member and short and long segments form an expanded periphery on which the trash bag is stretched and held firmly in place.

---

5,014,944

## WIRE HOLDER FOR PLASTIC BAG FOR TRASH

**James J. Malik, 6618 Bennington Dr., Parma Heights, Ohio 44130, and George J. Theodore, 16541 Timberline Dr., Strongsville, Ohio 44136**

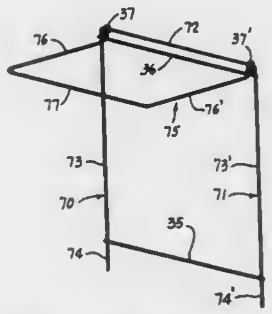
**Filed Apr. 1, 1985, Ser. No. 718,636**

**Int. Cl.⁵ B65B** *67/00*

**U.S. Cl. 248—99** **2 Claims**

1. A wire holder for a plastic bag for trash comprising a supporting frame, said supporting frame formed of a single piece of wire shaped generally into a "U" shape having a top portion intermediate two sides with said top portion being displaced in one direction in respect to the plane of the sides, a lateral support strut, said lateral support strut extending between said two sides affixed thereto generally parallel to and spaced from said top portion of said supporting frame, a stiffening strut, said stiffening strut extending between said two sides affixed thereto a spaced distance from the ends thereof, a bag holding frame, said bag holding frame formed of a single piece of wire shaped generally into a "U" shape having eyes formed in the ends thereof, said eyes of said bag holding frame loosely

surrounding said top of said supporting frame so as to allow said bag holding frame to rotate substantially 270 degrees about said top from a storage position lying generally parallel to said sides of said supporting frame to a use position supported by the bottom edge of said top and the top edge of said lateral support strut to extend outwards of said supporting frame substantially perpendicular to said plane of said sides in a direction opposite from the direction said top is displaced in respect to the plane of the sides.



---

5,014,945

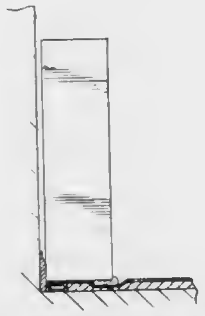
## WEDGIE

**Larry D. Miller, 7735 Frederick Rd., Hyattsville, Md. 20784, and Michael A. Billingsley, 6410 Old Landover Rd., Landover, Md. 20735**

**Filed Feb. 28, 1990, Ser. No. 486,203**

**Int. Cl.⁵ F16M** *11/00*

**U.S. Cl. 248—188.4** **6 Claims**



1. A leveling device for use with an article of furniture said furniture having a rear end and a front end and a horizontal surface said rear end placed adjacent a vertical wall and said horizontal surface at said end placed over flooring having a tack strip that engages said rear end said furniture extending from said wall being placed on carpeting overlying a soft padding surface engaging the flooring a plurality of inserts placed along said front end at spaced intervals between said furniture and said carpeting said inserts comprising plates having flat portions and vertical noses said vertical noses extending outwardly of said plates and adjacent said furniture said inserts having jacks embedded in said vertical noses to elevate said front end of said furniture to such extent that will place the furniture in a rigid stable postion, where in said jack comprises an inverted U-shaped pin having ends shaped to enable penetration of said carpeting and padding but not said flooring, said inserts being readily detechable from between furnitue and said rug by adjustment of the jack.

---

5,014,946

## HOLDING, RETAINING AND ADHERING MEANS

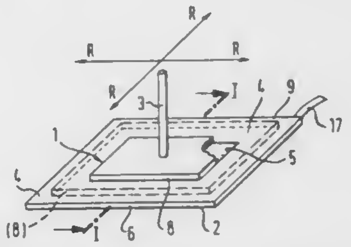
**Bruno Gruber, Ordenslandstrasse 39, 8037 Olching, Fed. Rep. of Germany**

**Filed Aug. 17, 1989, Ser. No. 395,684**

**Claims priority, application Fed. Rep. of Germany, Aug. 17, 1988, 3827832; Mar. 14, 1989, 3908278; Mar. 14, 1989, 3908279; May 9, 1989, 3915147; May 16, 1989, 3915908**

**Int. Cl.⁵ F16B** *47/00*

**U.S. Cl. 248—206.5** **24 Claims**



1. A holding, retaining and adhering means, comprising a rigid holding member having a bottom surface, a flexible and elastically-movable plate having a first surface adapted for engaging a base surface and a second surface with at least one fastening area at an inner portion thereof and arranged at a distance with respect to an edge of said plate, wherein said fastening area of said plate is connected to the bottom surface of said holding member such that a marginal projecting portion provided between said fastening area and said edge of said plate adheres to the base surface when a force traverse to the plane of the base surface is applied to said holding member.

---

5,014,947

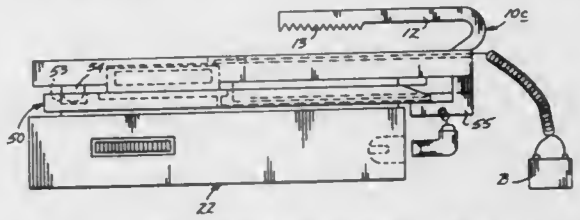
## VISOR MOUNTING APPARATUS FOR RADAR DETECTORS

**Frank Wang, 46-58 189th St., Flushing, N.Y. 11358**

**Filed Jun. 21, 1990, Ser. No. 541,397**

**Int. Cl.⁵ A47B** *96/06*

**U.S. Cl. 248—214** **7 Claims**



1. A mounting apparatus for securement to an automotive visor of an automobile for securement of a radar detector thereon, the radar detector including a top surface for securement to the apparatus, and wherein the apparatus comprises,

a planar support plate including a mounting means for mounting the support plate to the visor, the support plate further including a first and second conductive plate in electrical communication with the automobile, and

the first and second conductive plates further including a respective first and second magnetic means for magnetic securement to the top surface of the radar detector, and

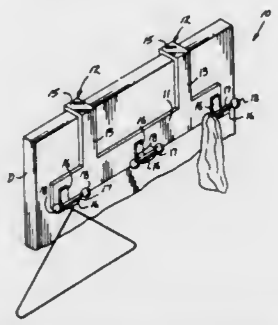
a first and second securement plate fixedly mounted to the top surface of the radar detector for respective securement to the respective first and second magnetic means, and

the first securement plate and the second securement plate in electrical communication with the radar detector, whereupon securement of the radar detector to the support plate provides electrical communication of the radar detector to the automobile.

OL
126
SS
2
MY
14
1991
UMI

## 5,014,948
## ARTICLE SUPPORT APPARATUS

**Stanley B. Asaro, and Toni J. Asaro, both of 74-607 Gary, Palm Desert, Calif. 92260**
**Filed Mar. 26, 1990, Ser. No. 500,535**
**Int. Cl.$^5$ A47B** *96/06*
**U.S. Cl. 248—215** **1 Claim**

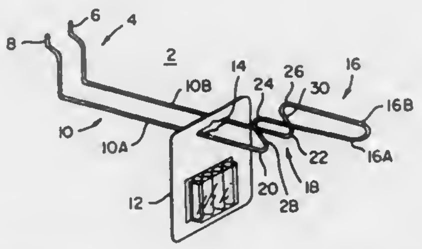


1. An article support apparatus comprising, in combination,
- an elongate longitudinally aligned support plate, the support plate including at least a forward planar face and an upper elongate edge, the upper elongate edge including a plurality of hanger members fixedly mounted thereto, each hanger member including a forward leg aligned in planar alignment with the support plate and each forward plate including a base leg extending rearwardly of the forward leg, and
- a rear leg extending downwardly relative to each base leg and each rear leg is arranged generally parallel to each forward leg, and
- a plurality of hook members mounted to the forward face of the support plate, and
- each hook member including a horizontally aligned support rod fixedly mounted within each hook member, and
- wherein each hook member is configured of a generally "J" shaped configuration including a forward end defining a concave interior surface, wherein each support rod is fixedly mounted within each concave surface adjacent the forward end arranged generally parallel to the support plate, and
- wherein each support rod includes a further support rod telescopingly slidable from within each support rod, wherein each further support rod includes a support sphere integrally and coaxially mounted at each terminal end of each further support rod, and wherein each of the further support rods are aligned coextensively relative to one another, and
- including a first covering sphere selectively securable about each support sphere, wherein the first covering sphere is defined by a resilient memory retentent material and includes an interior spherical cavity substantially complementary to that as defined by the support sphere to complementarily receive the support sphere interiorly of the first covering sphere, and wherein the first covering sphere includes a resilient and expandable annular opening to receive the support sphere therethrough, and with the annular opening defined by an annular opening diameter substantially equal to a diameter defined by the further support rod, and
- wherein the apparatus further includes a second covering sphere, and wherein the second covering sphere includes a second annular opening equal to the predetermined diameter, wherein the annular opening is in communication with the second covering sphere cavity defined interiorly of the second covering sphere, and wherein the second covering sphere includes a resilient shell, and wherein the resilient shell includes a covering coextensively of an exterior surface of the second covering sphere defined by the hook and loop fasteners.

---

## 5,014,949
## PRODUCT DISPENSER

**Mark A. Niven, Yonkers, N.Y., assignor to Goldring Display Group, Inc., Paramus, N.J.**
**Filed Jun. 18, 1990, Ser. No. 539,928**
**Int. Cl.$^5$ A47F** *7/00*
**U.S. Cl. 248—220.4** **3 Claims**

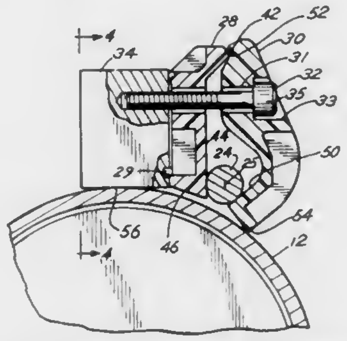


1. A dispenser for products encapsulated in product cards of the type having apertures near the tops thereof, the dispenser comprising:
- a mounting section for mounting the dispenser to a mounting surface;
- an elongated supporting section extending outwardly from the mounting section substantially normal to the mounting surface for supporting the product cards when the apertures in the cards engage the supporting section;
- an elongated dispensing section;
- a substantially S-shaped connecting section having a first outwardly extending arcuate portion extending from the supporting section and a second inwardly extending arcuate portion extending to the dispensing section, said second arcuate portion being above said first arcuate portion so that the elongated dispensing section extends outwardly from and above the elongated supporting section; and
- the cards requiring discrete manipulation from the supporting section to the dispensing section along the substantially S-shaped connecting section, with removal of the cards from the dispenser being thereby impeded.

---

## 5,014,950
## MOUNTING CLAMP FOR SECURING APPARATUS TO OUTSIDE OF TIE ROD CYLINDER

**Lachlan Ohman, Bryan, and Gary L. Meyer, Montpelier, both of Ohio, assignors to The ARO Corporation, Bryan, Ohio**
**Filed Apr. 28, 1989, Ser. No. 344,367**
**Int. Cl.$^5$ A47B** *96/06*
**U.S. Cl. 248—231.5** **4 Claims**

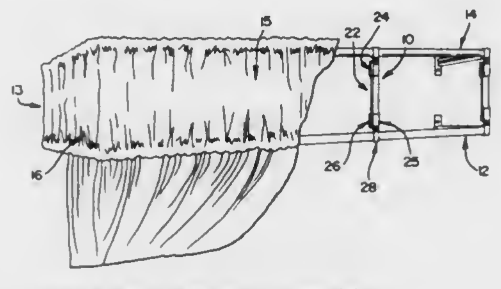


1. An improved clamp construction for attachment and support of a sensor to a tie rod or the like and against the outside surface of a cylinder, wherein the clamp construction has a universal size for use on cylinders having a wide range of cylinder diameters, said clamp construction comprising, in combination; a cylinder having an outside surface with a tie rod defining an axis radially spaced from the outside surface of the cylinder;
- a sensor body having a sensor surface for positioning against the outside surface of the cylinder adjacent a tie rod;
- a first clamp member cooperatively engaged with the sensor body, said first clamp member also having a first tie rod engaging surface generally parallel to the axis of the tie rod and cooperatively engageable with the tie rod along a line of contact also generally parallel to the tie rod axis, said first clamp member spaced radially outward from the cylinder and including a first clamp member pivot end also spaced radially outward from the cylinder beyond the radial position of the tie rod;
- a shaped second clamp member having a second pivot end and an opposite cylinder outside surface engaging end, said pivot end cooperative with the first clamp member pivot end, said shaped second clamp member also including a second tie rod engaging surface generally parallel to the tie rod axis and convergent with the first tie rod engaging surface of the first clamp member; and
- fastening means for attaching the shaped second clamp member to the sensor body and for simultaneously pivoting the shaped second member clamp about the second pivot end against the tie rod and defining means to engage both the first and second tie rod engaging surfaces in contact with the tie rod converging toward the cylinder to simultaneously force the body sensor surface and shaped second clamp member cylinder outside surface engaging end against the outside surface of the cylinder.

---

## 5,014,951
## VALANCE SPACER ASSEMBLY

**Daniel Bonk, 4859 N. Cumberland, Norridge, Ill. 60656**
**Filed Feb. 5, 1990, Ser. No. 475,029**
**Int. Cl.$^5$ F16L** *3/00*
**U.S. Cl. 248—231.8** **10 Claims**



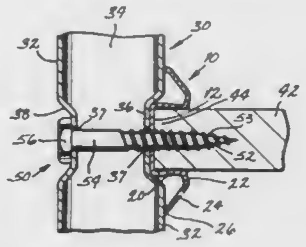
1. A valance spacer assembly comprising:
- a spacer bar having opposed ends;
- a first and second parallel spaced valance rods;
- a first and second clip, said first and second clip each having a first and second C-shaped collar, said first C-shaped collar and said second C-shaped collar having a corresponding first and second centrally located axis, said first and second axis being essentially perpendicular to one another, said first C-shaped collar adapted to engage a circumferential portion of said spacer bar, and said second C-shaped collar adapted to engage a circumferential portion of a valance rod.

---

## 5,014,952
## SHELF SUPPORT CLIP

**Dimitri Petrohilos, London, England, assignor to Adestia Corporation, Norfolk, Va.**
**Filed Feb. 6, 1990, Ser. No. 475,739**
**Int. Cl.$^5$ A47B** *57/30*
**U.S. Cl. 248—250** **11 Claims**

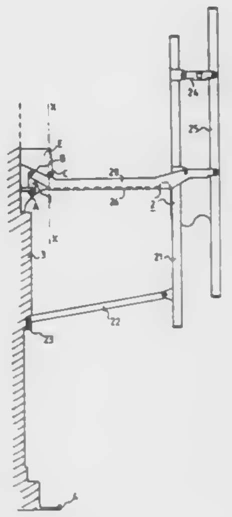
1. A one-piece shelf support clip formed from a flat blank; said shelf support clip comprising a base portion centrally penetrated by an aperture and having first and second opposing ends, said aperture and said first and second opposing base ends creating a plane; wall means extending from said first and second base ends and having outer ends; elbow portions extending outwardly relative to said base portion and respectively from the outer ends of said wall means and outwardly angled arms projecting from said elbow portions, away from said wall means, toward the plane created by said base portion and having detached ends; and clip ends projecting from the detached ends of said outwardly angled arms and through the plane created by said base portion.



---

## 5,014,953
## HINGED-ARM TYPE OF MECHANISM AND SONAR ANTENNA FITTED OUT WITH A MECHANISM SUCH AS THIS

**Francois Warnan, Rambouillet, and Joël Barbot, Wissous, both of France, assignors to Thomson-CSF, Puteaux, France**
**Filed Oct. 17, 1989, Ser. No. 422,545**
**Claims priority, application France, Oct. 21, 1988, 88 13831**
**Int. Cl.$^5$ H01Q** *1/08*
**U.S. Cl. 248—284** **4 Claims**



1. A mechanism comprising:
- a support,
- an arm having a first end and a second end,
- a connecting rod having a first end and a second end, the arm and connecting rod being movable in parallel planes,
- a first rotation pin defining an axis of rotation perpendicular to the parallel planes at the first end of the connecting rod, wherein the first pin is fixed with respect to the support,
- a second rotation pin defining an axis of rotation perpendicular to the parallel planes at the second end of the connecting rod and the first end of the arm,
- a third rotation pin defining an axis of rotation perpendicular to the parallel planes at a position of the arm located at a given distance from the first end thereof, and
- a driving device for providing a translational displacement of the third pin along two opposite directions so that the arm is moved between a lowered arm position and an

VOL
126
ISS
2
MY
14
1991
UMI

outstretched arm position during the translational displacement of the third pin, the translational motion being applied to the third pin perpendicularly to the axis of rotation of the third pin,

wherein, in the lowered arm position, the arm and the connecting rod form an obtuse angle, and

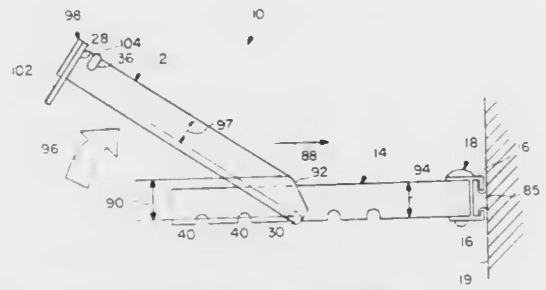
wherein the second end of the arm exerts a force against the support at a position adjacent to the lowered arm position.

---

### 5,014,954
## ADJUSTABLE DISPLAY ARM ASSEMBLY

**Milton Merl, New York, N.Y., assignor to Marlboro Marketing, Inc., New York, N.Y.**
**Filed Feb. 7, 1990, Ser. No. 477,064**
**Int. Cl.⁵ E04G *3/00***

U.S. Cl. 248—285 11 Claims



1. An adjustable arm assembly comprising:

an elongated outer arm having a substantially U-shaped cross section as viewed transversely to the length dimension of said arm, said U-shape including a pair of separated legs joined together by a connecting segment, said legs extending longitudinally beyond a rear edge of said connecting segment at one end of said elongated outer arm, pin means at said portion of said one end of said outer arm rearwardly of said rear edge of said connecting segment, said pin means extending into the gap between the separated legs of said U-shaped cross section;

an elongated inner arm having a substantially U-shaped cross section as viewed transversely to the length dimension of said inner arm, said U-shape including a pair of separated legs joined together by a connecting segment, said inner arm removeably nesting within the U-shape of said outer arm, a plurality of notches formed in the edges of said separated legs of said inner arm and spaced apart in the length direction of said inner arm, said notches being dimensioned for removeably receiving said pin means therein, the distance between said pin means and said rear edge of said connecting segment of said outer arm exceeding the height of said inner arm, said height being measured perpendicularly to the length dimension of said inner arm from said lower edge to the top surface thereof, said inner and outer arms being translatable relative to each other in the length direction when said outer arm is pivoted away from said inner arm, said pivoting being about said pin means, the vertical distance between said pin means and an imaginary extension of said connecting segment of said outer arm being less than the vertical height of the inner arm so that when nested translation movement can occur only in response to pivoting said outer arm, allowing said pin means to exit the notch; and

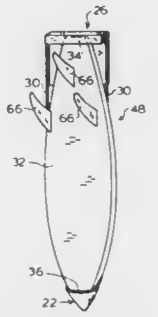
support means for connecting said inner arm at one end to a support structure of a plurality of rotated positions.

---

### 5,014,955
## SURFBOARD HOLDER

**Victor R. Thompson, P.O. Box 10007, Wilmington, N.C. 28405**
**Filed Aug. 2, 1990, Ser. No. 561,955**
**Int. Cl.⁵ A47F *7/00***

U.S. Cl. 248—309.1 6 Claims



1. A surfboard holder, comprising:

(a) a first piece having an enclosure for insertion of a first end of a surfboard;

(b) a second piece having an enclosure for insertion of a second end of a surfboard, said second piece being mountable on a vertical surface; and

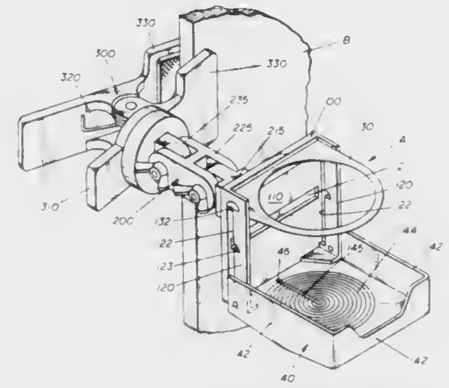
(c) a stretchable cord member having two sections, each of said sections extending from the sides of the first piece to the second piece, wherein when said second piece is mounted on a vertical surface, a surfboard may be hung on the surface between the first piece and the second piece with said first end of said surfboard being enclosed by the first piece and said second end of said surfboard being enclosed by said second piece, wherein the cord member is sufficiently stretchable so that the surfboard may be placed in or removed from the holder by pulling down on the first piece away from the second piece to stretch the cord member, and increasing the distance between the first piece and the second piece so that the second end of the surfboard may be placed in or removed from the mounted second piece when the first end is in the first piece.

---

### 5,014,956
## ADJUSTABLE DRINK HOLDER

**Nabil A. Kayali, Houston, Tex., assignor to NK Innovations, Inc., Houston, Tex.**
**Division of Ser. No. 317,964, Mar. 2, 1989, Pat. No. 4,887,784. This application Sep. 27, 1989, Ser. No. 414,136**
**The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.**
**Int. Cl.⁵ A47K *1/09***

U.S. Cl. 248—311.2 12 Claims



1. An apparatus for holding a beverage container, comprising:

a frame;

a base pivotably connected to the frame near a lower end of the frame to pivot between a closed position parallel to the frame and an opened position perpendicular to the frame; and

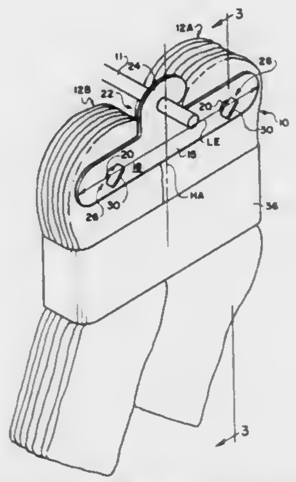
a hoop pivotably connected to the frame above the base to pivot between a closed position parallel to the frame and an opened position perpendicular to the frame wherein the pivot point of at least one of the opened hoop and the opened base is adjustable along the vertical axis of the frame.

---

### 5,014,957
## HOSIERY DISPLAY HANGER ASSEMBLY

**William H. Nichol, Jr., 123 W. 7th St., Hopkinsville, Ky. 42240**
**Filed May 23, 1989, Ser. No. 355,999**
**Int. Cl.⁵ B42F *13/00***

U.S. Cl. 248—340 4 Claims



1. A hosiery display hanger assembly for supporting at least two pairs of hosiery in a suspended disposition from a conventional hosiery retailing display fixture, comprising:

a main body having a longitudinal extent and a central hanging axis transverse to said longitudinal extent, said main body having a plurality of hosiery attachment locations spaced along said longitudinal extent in a balanced relation to said hanging axis;

a plurality of pairs of hosiery;

a plurality of fastener means corresponding in number to said plurality of hosiery attachment locations, each said fastener means attaching at least one hosiery pair to said main body at a respective one of said hosiery attachment locations for free suspension of each hosiery pair from said main body;

fixture attachment means associated with said main body in centered relation to said hanging axis and configured for mounting engagement with the display fixture for suspension of said main body and hosiery pairs therefrom with said longitudinal extent of said main body in a generally horizontal disposition;

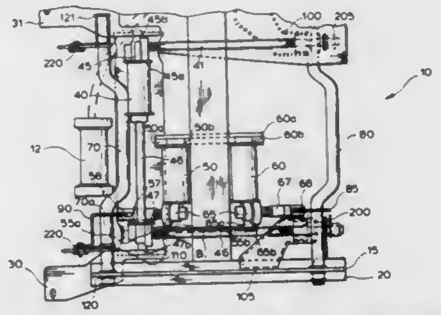
each said hosiery attachment location comprising an opening in said main body for receipt of one said fastener means, and each said fastener means including a plastic fastener having a thin elongate body for penetrating a hosiery pair without damage thereto and enlarged retainer portions at opposite ends of said elongate body.

---

### 5,014,958
## POWERED SIX-WAY SEAT ADJUSTOR AND MECHANISMS THEREFOR

**William J. Harney, Willowdale, Canada, assignor to Magna International Inc., Markam, Canada**
**Filed Jul. 12, 1988, Ser. No. 217,950**
**Claims priority, application Canada, Jul. 13, 1987, 541927**
**Int. Cl.⁵ B60N *1/00***

U.S. Cl. 248—394 54 Claims



1. A powered seat adjuster, the adjuster comprising a top, bottom, front, rear and two sides, the adjuster having disposed upon the bottom thereof anchor means for anchoring the seat adjuster to the floor of a vehicle; the anchor means having secured thereto a fixed rail of a seat track, the fixed rail being of generally U-shaped cross-section having two legs extending upwardly away from the anchor means, the upwardly extending legs each having a radially extending flange disposed at the end thereof of predetermined radius of curvature, the fixed rail having inserted therein a moveable rail, slideable within the fixed rail, the moveable rail being of a double "J" cross-section having upwardly extending flanges abutting the flanges of the fixed rail upon bearing surfaces disposed between the flanges of the fixed rail and flanges of the moveable rail; the seat adjuster having disposed at each side thereof a moveable and a fixed rail, the moveable and fixed rails being interconnected to form a seat track assembly within the adjuster, the seat tracks being joined together in part by tubular shafts enclosed and extending through tubular collars joined to the moveable rail at beaded joints for affixing the tubular shafts to corresponding openings within the moveable rail, such fastening being accomplished forwardly and rearwardly within the seat adjuster, the tubular shaft extending through a bell crank, at least one each disposed proximate the front and rear of the seat adjuster for vertically displacing the seat; the bell crank being fastened to a nut having an opening at the end remote the bell crank, the opening being threaded for the insertion of a compatible lead screw, the lead screw being driven by a first drive motor affixed to the seat adjuster for driving the bell crank pivotally and thereby effecting the vertical displacing of the seat, the seat adjuster having a second drive motor for driving at least two lead screws disposed in a substantially horizontal direction from front to rear of the seat adjuster at the sides thereof proximate the seat track, the at least two lead screws being in communication with the second drive motors through gear reduction means which allow the at least two lead screw to rotate at a predetermined speed, horizontally disposed each lead screw having disposed thereon a nut assembly, the assembly having an opening therethrough, the opening being threaded compatibly with the lead screw, the nut assembly having connected thereto a bracket having two ends, the bracket being affixed at one end to the nut assembly and at the other end thereof to the moveable rail of the seat track, thus movement of the nut assembly upon the horizontally disposed lead screws will cause the moveable track to slide within the fixed track, each of the at least two lead screws having disposed at the end thereof mounting means and at least one of the at least two lead screws having disposed at the end of the mounting means anchor means to sustain the rotation of the lead screw and movement of the nut assembly upon the lead screw, each drive motor having two ends and having disposed

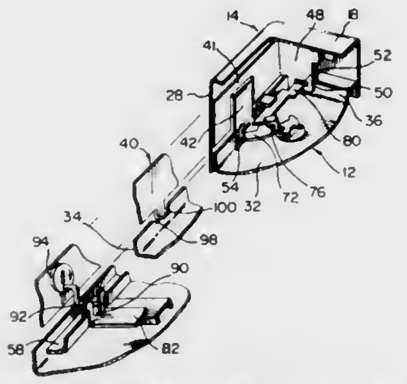
OL
126
SS
2
MY
14
1991
UMI

at one end thereof an integrally mounted gear reduction means from which a lead screw extends and having extending from the other end of the drive motor a shaft of predetermined length extending away from the drive motor towards the lead screw disposed on the other side of the seat adjuster, the shaft thereat connected to a slave gear reduction means for communication with a lead screw disposed thereat for movement at substantially the same rate as the lead screw disposed proximate the drive motor, the nut assembly comprising a first nut of predetermined load bearing capacity, the first nut being affixed to the bracket affixed to the seat track, a second nut affixed to the first nut, the second nut having disposed thereupon a collet, the collet being further affixed to the bracket affixed to the seat track, the second nut being of a predetermined load bearing ability much greater than that of the first nut, whereby when the first nut is subjected to a load which is less than or equal to load bearing capacity of the first nut, the first nut will travel along the extension of the lead screw and thus moving the bracket to which it is interconnected, the bracket being interconnected with the moveable track as well thus effecting the movement of the seat track in the horizontal direction; the second nut and the collet being interconnected with the nut assembly and thus moving along with the nut assembly but not interfering with the nut assembly; however, when the first nut is subjected to a load which is greater than the load bearing capacity of the first nut resulting in the failure of the first nut, such load will be transferred from the seat track to the bracket affixed to the collet, from the collet to the second nut, from the second nut to the lead screw, from the lead screw to the anchor means, from the anchor means to the mounting means, from the mounting means to the structure of the vehicle thereby resolving any loads disposed upon the seat track in a substantially horizontal direction by the nut assembly and the lead screw acting in communication.

---

## 5,014,959
## CLOSURES

**Marc P. Soubliere, London, Canada, assignor to Northern Telecom Limited, Montreal, Canada**
**Filed Jun. 14, 1990, Ser. No. 538,070**
**Int. Cl.⁵ H04M** *1/00*
U.S. Cl. 248—551 18 Claims

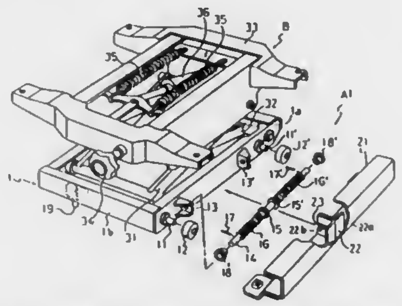


6. A closure comprising a first and second closure members and two shear locking members, the first closure member having an end wall and two receiving elements having apertures, each for receiving a respective locking member, the receiving elements outstanding from the end wall and disposed opposite to one another across the end wall, and the second closure member comprising two flexible tensile members, one associated with each receiving element, each flexible tensile member formed with an aperture for receiving a respective locking member, and upon assembly of the members, each flexible tensile member is disposed alongside an opposing face of a corresponding receiving element with the respective apertures aligned and with the respective locking member in a locking position extending through the aligned apertures to secure the closure members together, each flexible tensile member being shaped so that in the assembled condition of the closure members, the flexible tensile member extends in a direction from the end wall and beyond its respective receiving element to a position of flexure of the flexible tensile member on the other side of a plane occupied by the opposing face of the receiving element whereby any separation force applied to the assembled closure members places each of the locking members in shear and also tensions the flexible tensile members while flexing them about their positions of flexure to urge the flexible tensile members against the opposing surfaces of the receiving elements.

---

## 5,014,960
## FORE-AND-AFT SUSPENSION DEVICE FOR AUTOMOTIVE SEAT

**Takeo Kimura, Akishima, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan**
**Filed Oct. 5, 1988, Ser. No. 253,433**
**Claims priority, application Japan, Mar. 13, 1988, 63-43713**
**Int. Cl.⁵ F16M** *13/00*
U.S. Cl. 248—602 5 Claims



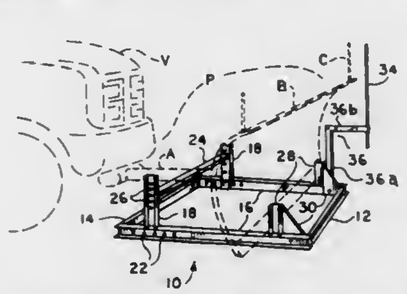
1. A fore-and-aft suspension device for an automotive seat, in which said seat includes a seat lower base frame, said fore-and-aft suspension device comprising:
- support means fixed on the side of a floor of an automobile, said support means being arranged so as to extend along a longitudinal direction of said seat lower base frame, and supports said seat lower base frame, said support means comprising a pair of guide rails of a channel shape in section having opened portions extending longitudinally thereof, disposed such that the respective opened portions thereof face toward each other, one of said guide rails being disposed at one side of said seat lower base frame and the other of said guide rails being disposed at the other of said seat lower base frame;
- movable means provided at said seat lower base frame, said movable means being adapted to permit forward-and-backward movement of said seat lower base frame along said support means, said movable means comprising at least two pairs of rollers, wherein one pair of said rollers is rotatably provided at one side of said seat lower base frame and the other pair of said rollers is rotatably provided at the other side of said seat lower base frame so that said at least two pairs of rollers are respectively disposed within said pair of guide rails in a rollable manner;
- at least one shaft provided at said seat lower base frame, such that said shaft extends between said seat lower base frame and said support means;
- at least one pair of coil springs wound around said at least one shaft; and
- at least one spring abutment member provided at said support means, in an opposite relation with said at least one shaft, such that said at least one spring abutment member extends towards said at least one shaft, spacing apart the coil springs of said at least one pair of coil springs from each other, so that the coil springs are at their respective ends abutted against said at least one spring abutment member,
- wherein said at least one shaft with said at least one pair of

coil springs wound therearound comprises two shafts provided at both sides of said seat lower base frame and two pairs of coils springs wound around a respective shaft, and wherein said at least one spring abutment member comprises one spring abutment member provided in each of said pair of guide rails, and said at least one shaft, around which said at least one pair of coil springs are wound, is disposed within respective ones of said guide rails,
- whereby, when a forward and backward load or jolting is applied to said seat, said seat lower base frame is moved along said support means, and each of said coil springs is compressed at said spring abutment member, giving a repercussive force against said forward and backward load or jolting, thereby absorbing same.

---

## 5,014,961
## SNOW PLOW STAND

**William H. Ferguson, P.O. Box 103, Nutting Lake, Mass. 01865**
**Filed Feb. 28, 1990, Ser. No. 486,224**
**Int. Cl.⁵ F16M** *13/00*
U.S. Cl. 248—670 8 Claims

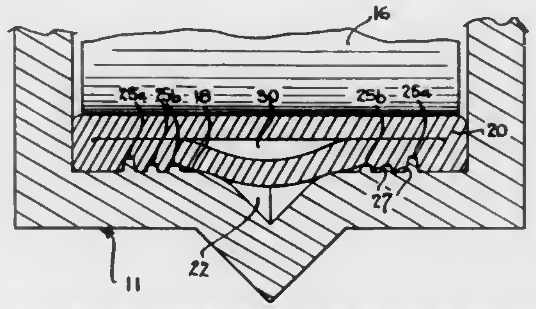


1. A support stand for the storage of vehicle attachable snow plow assemblies, said support stand comprising;
- a base of generally rectangular form,
- said base comprising a forward crossmember, a rear crossmember, and two side members,
- each of said side members having a vertical support attached to and extending upward from the rear portion of each of said side members,
- said vertical supports containing a horizontal support extending therebetween,
- each of said side members containing a blade stop attached to the forward portion of each of said side members,
- at least one of said blade stops supporting a guide rod support assembly extending upward therefrom, and
- the upper extremity of said guide rod support assembly supporting a guide rod.

---

## 5,014,962
## CLAMP FOR REGULATING FLUID FLOW THROUGH PLASTIC TUBING

**Marvin Adelberg, 16821 Oak View Dr., Encino, Calif. 91436**
**Filed Mar. 2, 1989, Ser. No. 318,129**
**Int. Cl.⁵ F16K** *7/06*
U.S. Cl. 251—6 10 Claims

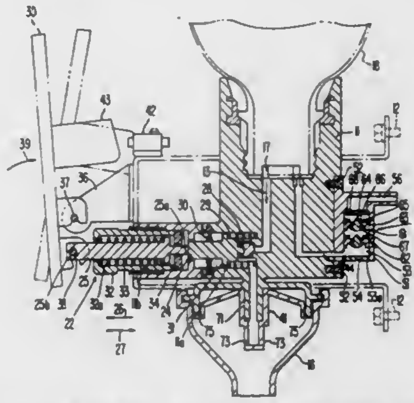


1. In a clamp for regulating fluid flow through plastic tubing having a body portion with a longitudinal clamping surface, a variable cross-section longitudinal channel being formed in or along said surface, a roller wheel mounted in said body for longitudinal motion substantially parallel to said surface and a plurality of distributed raised elements separated from each other by discrete valley portions formed in said clamping surface for locally gripping the tubing wall at given locations thereby restraining the tubing so as to reduce creep thereof, the tubing being clamped between the roller wheel and said surface, the improvement comprising:
- at least two of said raised elements being on one side of the channel, at least one of said raised elements most remote from said channel having a height substantially greater than the raised element closer to said channel, thereby to provide a more constant and controlled flow rate especially with thicker and harder walled tubing.

---

## 5,014,963
## VALVE APPARATUS FOR PREVENTING LEAKAGE OF A BEVERAGE

**Shunichi Nakayama, Takasaki, and Yasushi Takayanagi, Akabori, both of Japan, assignors to Sanden Corporation, Gunma, Japan**
**Filed Nov. 8, 1989, Ser. No. 433,266**
**Claims priority, application Japan, Nov. 8, 1988, 63-280467; Nov. 8, 1988, 63-280468**
**Int. Cl.⁵ F16K** *31/44*
U.S. Cl. 251—245 10 Claims



1. In a valve apparatus for use in a dispensing unit for dispensing a beverage through a beverage path having an intermediate portion, said valve apparatus including a valve body defining said beverage path, controlling means coupled to said intermediate portion for controlling a flow of said beverage in said intermediate portion, and operating means coupled to said valve body and said controlling means for operating said controlling means, said controlling means comprising:
- a valve member coupled to said valve body and movable, in a predetermined direction, between an open and a closed position to open and close said intermediate portion, said valve member having a first end facing said intermediate portion and a second end opposite said first end;
- a force transmission member coupled to said valve body and said operating means and movable in said predetermined direction, said force transmission member facing the second end of said valve member;
- urging means coupled to said valve body and said force transmission member for urging said force transmission member towards the second end of said valve member to locate said valve member at said closed position; and
- restriction means coupled to said valve body for restricting movement of said valve member in a direction opposite to said urging means, said restriction means determining said open position, and
- said valve body comprising:
  - a body member defining said beverage path; and

OL
126
SS
2
MY
14
1991
UMI

adjusting means coupled to said body member and said restriction means for adjusting a position of said restriction means in said predetermined direction, said adjusting means comprising a cylindrical portion defining a through hole extending in said predetermined direction, said force transmission member extending through said through hole, said urging means being placed in said through hole with ends which are in engagement with said adjusting means and said force transmission member, respectively.

---

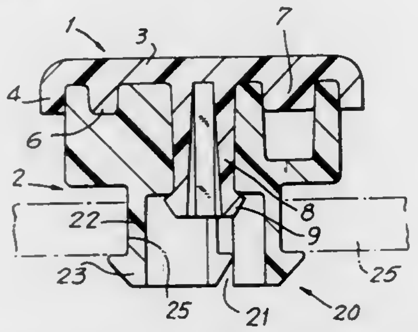
### 5,014,964
### VENT NOZZLE

**Walter K. Weber, Grand Rapids, Mich., assignor to K. B. Lighting Inc., Kentwood, Mich.**

**Continuation-in-part of Ser. No. 403,147, Sep. 1, 1989. This application Feb. 9, 1990, Ser. No. 478,255**

**Int. Cl.$^5$ F16K** *31/00*

**U.S. Cl. 251—352** **13 Claims**



1. An adjustable vent nozzle, comprising a first nozzle member; a second nozzle member, said nozzle members being turnable relative to one another, said first nozzle member having an inlet opening for communicating an interior of the nozzle with ambient atmosphere and also having a lower surface provided with guiding means, said second nozzle member having an outlet opening for communicating with an interior of a device to be vented and an air passage which is open in said outlet opening and formed to guide said guiding means of said first nozzle member so that in an assembled condition when one of said nozzle members is turned relative to another of said nozzle members said guiding means are guided in said air passage in a predetermined angular position of said nozzle members relative to one another they can be fixed relative to one another to define a predetermined length of said passage between said inlet opening and said outlet opening and therefore to adjust an air supply through the nozzle into an interior of said device to be vented and communicating with said outlet opening, said second nozzle member having means for mounting the vent nozzle on the device to be vented and including a transversely expansible projection arranged to expand through a hole of the wall of the device and anchor said second nozzle member in the device.

---

### 5,014,965
### PROCESS AND APPARATUS TO CLEAN A MOLTEN METAL OR SLAG CONVEYOR TROUGH

**Heinrich Kaiser, Salzgitter, Fed. Rep. of Germany, assignor to Stahlwerke Peine-Salzgitter AG, Peine, Fed. Rep. of Germany**

**Filed Apr. 4, 1990, Ser. No. 505,050**

**Int. Cl.$^5$ C21B** *9/10*

**U.S. Cl. 266—44** **16 Claims**

1. In a process for cleaning refractory-lined conveyor troughs for molten metals or slags by means of chains which are located on a rotating drum carried by a rail-guided undercarriage, the rotating drum driven by a motor and adjustable in height and lateral position relative to a surface of the trough, the improvement comprising:

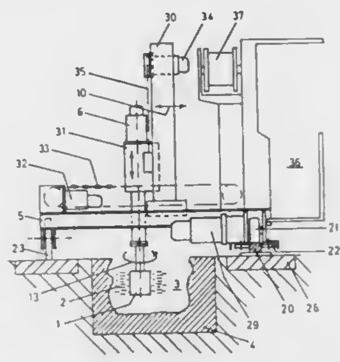
providing a motor for driving the drum, said motor being variably operable as a function of the load on the motor resulting from resistance offered to the chains by the material of the conveyor trough surface being contacted by the chains during rotation of the drum;

rotating the drum and the motor to provide contact of the chains with the material on the trough surface;

measuring the load on the motor offered to the chains by the material on the trough surface;

comparing the measured load to a predetermined load;

generating a signal as a result of the comparison to adjust the position of the drum relative to the trough surface; and



adjusting the position of the rotating drum relative to the surface of the conveyor trough a predetermined distance in response to said signal so as to achieve optimal cleaning of the conveyor surface, said adjusting the position of the drum relative to the surface comprising:

increasing the distance of the drum to the surface when the measured load is substantially greater than the predetermined load, and

decreasing the distance of the drum to the surface when the measured load is substantially less than the predetermined load.

---

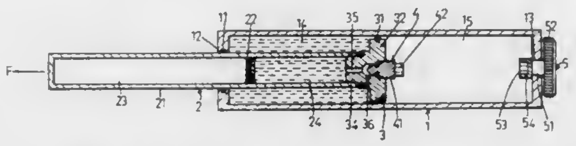
### 5,014,966
### ADJUSTABLE TELESCOPIC APPARATUS

**John Wang, No. 129, Tuan-Chu Lane, Tuan-Chu Li, Chiayi City, Taiwan**

**Filed Oct. 27, 1989, Ser. No. 428,211**

**Int. Cl.$^5$ F16F** *5/00*

**U.S. Cl. 267—64.26** **4 Claims**



1. An adjustable telescopic apparatus comprising:

a master pipe body having an axle opening formed at one end thereof with an oil seal provided on said axle opening, and a pivot opening located at the other end thereof for accommodation purposes;

an operating means adjustably installed at the other end of said master pipe body through the pivot opening thereof for making an adjustment therewith;

a slave pipe body, whose diameter is smaller than that of said master pipe body, with a closed end and an open end thereof movably disposed in said master pipe body through said axle opening thereof for effecting telescopic movements therein;

a movable piston member disposed in said slave pipe body for dividing the same into a gas chamber and an oil chamber;

a throttle means movably disposed in said master pipe body in connection with the open end of said slave pipe body for dividing said master pipe body into an oil containing portion and an air space portion thereof so as to enable said oil containing portion to be filled with sufficient hydraulic oil to effect compression and expansion therewith; and

a valve means threadedly connected with said throttle means in conjunction with said operating means for being turned to control the flow of said hydraulic oil between the oil containing portion of said master pipe body and and the oil chamber of said slave pipe body; whereby, the moving speed and force required to collapse said slave pipe body into said master pipe body can be optionally adjusted via said operating member for obtaining different telescopic operations.

---

### 5,014,967
### SPRING ELEMENT

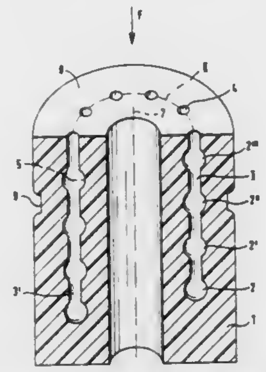
**Franz J. Wolf, and Hubert Pletsch, both of Bad Soden-Salmünster, Fed. Rep. of Germany, assignors to WOCO Franz-Josef Wolf & Co., Fed. Rep. of Germany**

**Filed Nov. 1, 1988, Ser. No. 265,605**

**Claims priority, application Fed. Rep. of Germany, Nov. 23, 1987, 3739638**

**Int. Cl.$^5$ F16F** *1/36;* **B60G** *11/22*

**U.S. Cl. 267—153** **7 Claims**



1. A spring element, comprising an elastomer block interspersed with cavities and channels, said cavities being substantially spherically-shaped cavities spaced from each other and intersecting said channels, said channels having a radial cross-sectional area in the range from about 25% to 75% of the cross-sectional area of the cavity intersected by the respective channel, wherein said

channels formed in the elastomer block are substantially parallel to each other and said cavities formed in the block are arranged in a staggered order as a cubic-face-centered sphere packing.

---

### 5,014,968
### PATIENT POSITIONING AND TRANSPORT SYSTEM

**Jan F. Lammers; Antonius J. L. M. Hoeks, and Frank D. S. Kennedy Van Dam, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 17, 1989, Ser. No. 439,215**

**Claims priority, application Netherlands, Nov. 22, 1988, 8802874**

**Int. Cl.$^5$ A61G** *13/00*

**U.S. Cl. 269—322** **18 Claims**

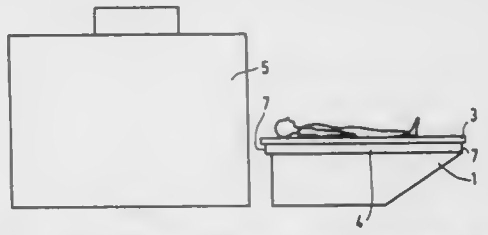
1. A patient table and positioning system for medical diagnostic purposes comprising;

a patient table having a table top support surface and at least one curved side wall having a plurality of spaced curved side wall portions;

a trolley including a plurality of table top support arms each having a guide face; and

a table top adapted to be carried on the patient table and on the support arms;

said guide faces being spaced for receiving and guiding the curved side wall portions of the patient table therebetween so that when the trolley guide faces are brought into contact with the table side wall portions, the table top support surface is aligned relative to said support arms.



---

### 5,014,969
### PATIENT SUPPORTING TABLE HAVING A SUPPORT PLATE PROVIDED WITH A CUT-OUT AND HAVING A BASE MEMBER CARRYING THE SUPPORT PLATE

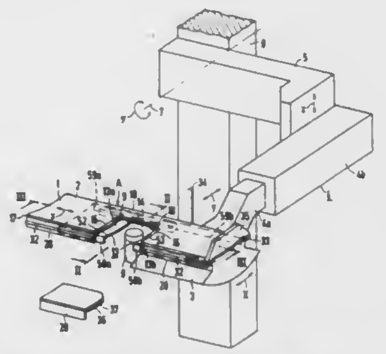
**Willi Schaefer, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jun. 18, 1990, Ser. No. 539,898**

**Claims priority, application European Pat. Off., Jun. 30, 1989, 89111995.0**

**Int. Cl.$^5$ A61G** *13/00*

**U.S. Cl. 269—322** **10 Claims**



1. A patient supporting table comprising:

a support plate with a seating surface for a patient and a cut-out through which the body surface of a patient lying on the seating surface is accessible; and

a base member that carries the support plate, the support plate being adjustable relative to the base member, the base member being positioned beneath the support plate and comprising an upper side that faces toward an underside of the support plate, the base member including an opening extending through the upper side thereof whose extent in an adjustment direction is less than a corresponding extent of the cut-out of the support plate, the support plate being positionable relative to the base member such that the cut-out of the support plate exposes the opening of the base member over the entire extent of the opening in the adjustment direction and the upper side of the base member forming an additional seating surface within the cut-out of the support plate.

---

### 5,014,970
### BODY MEMBER POSITIONER

**Vladimir W. Osipov, Barre, Mass., assignor to Walker Magnetics Group, Inc., Worcester, Mass.**

**Filed May 31, 1990, Ser. No. 531,911**

**Int. Cl.$^5$ A61G** *13/00*

**U.S. Cl. 269—328** **2 Claims**

1. Apparatus for clamping a subject's foot downwardly

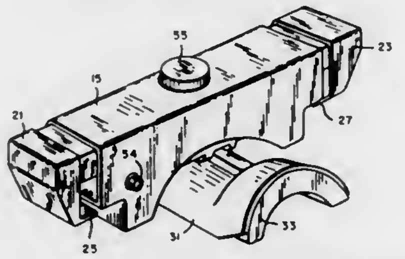
OL
126
SS
2
MY
14
1991
UMI

within a tray-like fixture having a cavity for receiving the foot, said apparatus comprising:

a shell member shaped to conform to a surface which is spaced from the nominal expected configuration of the upper portion of the patient's foot;

a compliant foam lining said shell member and having a relaxed thickness greater than said spacing;

an expandable housing containing said bladder, said housing



including a stationary bridge part adapted to be attached to said fixture spanning the tray cavity and a movable housing part to which said shell member is pivotally attached;

between said bridge part and said movable part, an inflatable bladder;

means for inflating said bladder thereby exerting a clamping pressure against a subject's foot positioned between said shell and said fixture.

---

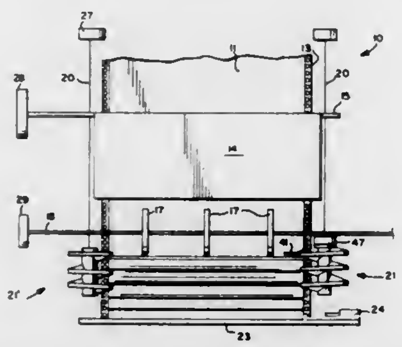
### 5,014,971
### WEB KNICKER

**James C. Folsom, Sanford, Me., assignor to Moore Business Forms, Inc., Grand Island, N.Y.**

**Filed Mar. 5, 1990, Ser. No. 488,951**

**Int. Cl.⁵ B41L *1/32***

U.S. Cl. 270—039 **20 Claims**



1. Apparatus for folding a web of continuous business forms interconnected by perforations, and occasionally separating the continuous web at a perforation between adjacent forms, comprising: a swing chute mounted for oscillating movement about a generally horizontal pivot, for receipt of a web of continuous business forms therein; a plurality of spirals mounted for rotation about vertical axes adjacent said swing chute, for receipt of the edges of the web after engagement by the swing chute; cutting means for selectively cutting the web along a perforation between adjacent forms to sever the adjacent forms from each other; and

cut initiating means for initiating a cut at the edge of a perforation between adjacent forms to be severed from each other so that said cutting means may easily completely sever the forms at the perforation.

---

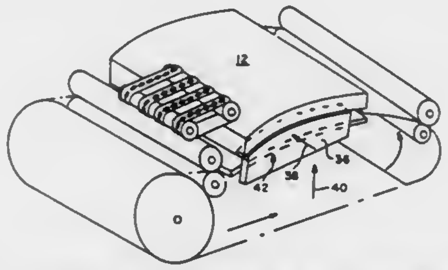
### 5,014,972
### RECIRCULATING AUTOMATIC DOCUMENT FEEDER

**Carl P. Anderson, San Mateo County, Calif., and Edward E. Mayer, Middlesex County, Conn., assignors to Ricoh Company Ltd., Japan and Ricoh Corporation, San Jose, Calif.**

**Continuation of Ser. No. 26,286, Mar. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 803,649, Dec. 2, 1985, Pat. No. 4,703,923. This application Feb. 24, 1989, Ser. No. 315,174**

**Int. Cl.⁵ B65H *5/22***

U.S. Cl. 271—3.1 **17 Claims**



1. Electrophotographic copying apparatus including means for successively feeding a stack of documents through said copying apparatus by successively moving each document from the top of said stack through said copying apparatus and thereafter returning each document to the bottom of said stack, the documents in said stack having a defined minimum width and a length, said copying apparatus comprising:

means for periodically raising and lowering said stack relative to a resting position of said stack and including a pair of lifting blades each having upright plate portions and shoulder blade panels carried on said plate portions, said lifting blades being movable from a first position at which said shoulder blade panels are spaced from and outside the edges of said stack, to a second position at which said shoulder blade panels are beneath the edges of the stack and at least one of said upright plate portions is spaced from the edges of said stack to lift the documents from said resting position,

means for removing the top document from said stack in a direction along the length of said stack,

means for returning the removed top document to the bottom of said stack in the same orientation in which it was removed, and

means coupled to move said lifting blades during removal and return of the removed top document, said means coupled to move said lifting blades, moving said lifting blades from said first position to said second position, and after return of the removed top document beneath the stack, said means coupled to move said lifting blades further moving said plate portions to a third position immediately adjacent the edges of said stack to align the removed top document with said stack while positioned beneath said stack.

---

### 5,014,973
### APPARATUS FOR GRIPPING AND DECOLLATING A BOTTOM BLANK OF A STACK OF BLANKS IN A BOOK COVERING MACHINE

**Eberhard Markert, Rechberghausen, Fed. Rep. of Germany, assignor to Michael Hörauf Maschinenfabrik GmbH & Co. KG, Donzdorf, Fed. Rep. of Germany**

**Filed Jul. 10, 1989, Ser. No. 377,100**

**Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827346; Apr. 26, 1989, 3913656**

**Int. Cl.⁵ B65H *3/10***

U.S. Cl. 271—100 **9 Claims**

1. Apparatus for gripping and decollating a bottom blank of a vertical stack of blanks, said apparatus comprising:

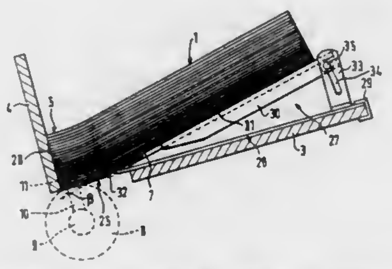
support means including a support surface upon which the stack is supported with the bottom blank thereof engaging said support surface, a front portion of said support surface including a recess,

suction gripping means arranged to grip the bottom blank through said recess,

an upright stop disposed forwardly of said recess and extending transversely of said support surface for engaging a front end of the stack,

adjusting means for adjusting the inclination of said support means and its support surface relative to said upright stop to vary the size of an angle defined between said support surface and said stop to compensate for stacks in which a stack front portion is bent relative to a stack rear portion, and

a flexible plate carried at a forward end of said support surface and projecting forwardly therebeyond to overlie a portion of said recess and underlie a portion of the bottom blank of the stack.



---

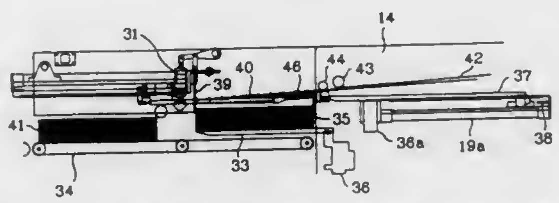
### 5,014,974
### IN-LINE, CONTINUOUS PAPER BATCHING SYSTEM

**Donald A. Jones, and Robert M. Jones, both of Terre Haute, Ind., assignors to Numerical Concepts, Inc., Terre Haute, Ind.**

**Filed Jan. 16, 1990, Ser. No. 464,970**

**Int. Cl.⁵ B65H *29/34***

U.S. Cl. 271—189 **10 Claims**



1. In a paper batching system for separating shingled signatures into stacks comprising:

a stationary frame;

a conveyor system for continuously conveying a stream of shingled signatures along a generally horizontal path;

a plurality of generally horizontally disposed batch forks;

a batch carriage slidably supporting the batch forks, said batch carriage being pivotally attached at its downstream end to the stationary frame to enable raising and lowering of the upstream ends of said batch forks simultaneously, or separately from, horizontal extension or retraction of said batch forks; and

a plurality of pivoting fingers, each being pivotally attached at its downstream end to one of said batch forks, said pivoting fingers extending generally horizontally in an upstream direction just above the stream of shingled signatures, and being adapted to rapidly press down a predetermined one of the incoming shingled signatures to separate the signature from the subsequent shingled signatures, said batch forks cooperating with the pivoting fingers to receive at least a partial stack of signatures diverted onto the batch forks by the pivoting fingers, whereby said shingled signatures are separated into batches of predetermined quantities.

---

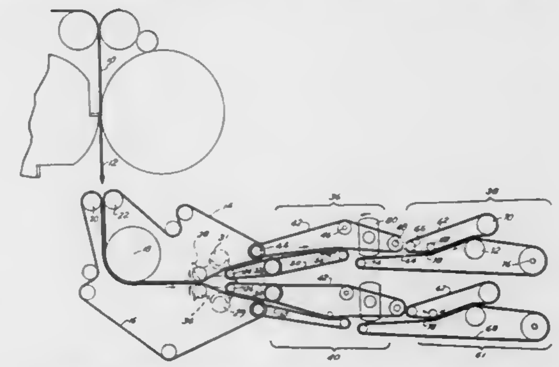
### 5,014,975
### SIGNATURE DELIVERY AND STACKING APPARATUS

**Kevin K. Hamricke, Des Moines, Iowa, assignor to Meredith-/Burda Company, Des Moines, Iowa**

**Continuation-in-part of Ser. No. 347,049, May 3, 1989, abandoned. This application Jnl. 31, 1989, Ser. No. 387,971**

**Int. Cl.⁵ B65H *29/66***

U.S. Cl. 271—202 **20 Claims**



1. An improved signature delivery apparatus for receipt of signatures at a relatively high speed and for reducing the speed of the signatures comprising, in combination:

(a) a first conveyor for delivering a continuous series of serially arranged signatures, said first conveyor having a signature discharge end for discharging signatures serially at the relatively high speed of the first conveyor;

(b) a first auxiliary conveyor aligned to receive signatures from the first conveyor at the same speed as that of the first conveyor;

(c) a second conveyor in general alignment with the discharge end of the first conveyor and in alignment with the first auxiliary conveyor to receive and transport signatures from the first auxiliary conveyor, said second conveyor having a reduced speed which is a fraction of the speed of the first conveyor;

(d) diverter means at the signature discharge end of the first conveyor for diverting selected signatures onto the first auxiliary conveyor for direction into the second conveyor as they are discharged from the first auxiliary conveyor; and

(e) said second conveyor including means to initially engage only a leading edge of a signature from the first auxiliary conveyor to positively transport the signature only at the reduced speed of the second conveyor.

---

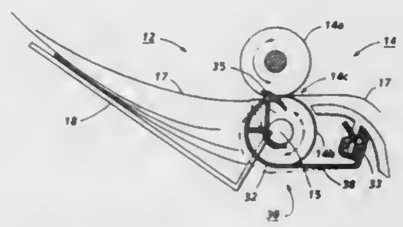
### 5,014,976
### EXIT ROLLER SHIELD FOR DUPLEX PRINTING

**Dennis N. Muck, Walworth; Dennis M. Ankrom, Williamson, and George B. Brown, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 4, 1990, Ser. No. 504,366**

**Int. Cl.⁵ B65H *31/26***

U.S. Cl. 271—220 **13 Claims**



1. In a reproduction apparatus with means for outputting copy sheets via nipped exit rollers and stacking the outputted

VOL
1126
ISS
2
MY
14
1991
UMI

copy sheets adjacent said exit rollers in a stacking tray, which exit rollers are reversible in their direction of rotation to feed selected sheets back into said reproduction apparatus in a return path via the nip of said exit rollers before the selected sheet is outputted, the improvement comprising;

automatic gate means for preventing previously outputted copy sheets from being recaptured by said reversed rotation exit rollers including sheet edge trapping means intermittently interposed adjacent the nip of said nipped exit rollers between the outputted sheets in said stacking tray and said nip of said exit rollers for preventing reacquisition of outputted copy sheets by said reversed rotation exit rollers,

said sheet edge trapping means being automatically pushed out of the way of a sheet being outputted from the nip of said nipped exit rollers by the outputted sheet itself.

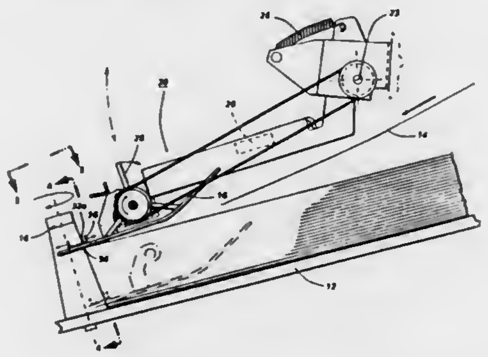
---

### 5,014,977
## SHEET STOPPING AND LATERAL REGISTRATION SYSTEM

**Kenneth P. Moore, Rochester; Brian R. Ford, Walworth, and Stephen B. Williams, Ontario, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed May 3, 1990, Ser. No. 518,367**
**Int. Cl.⁵ B65H** ***31/36***

U.S. Cl. 271—221 **8 Claims**



1. In sheet handling apparatus for providing an integral sheet stopping, stacking and lateral registration system, in which sequential incoming flimsy sheets of paper or the like are fed in a first direction of movement into a sheet supporting area by sheet input means and intermediately stopped at an edge registration position, and in which said sheets are also repositioned laterally by sheet lateral repositioning means in a transverse secondary direction of movement, which sheet lateral repositioning means engage the edges of sheets at said edge registration position, an improvement therein with improved protection against sheet edge distortion or damage, comprising movable sheet stopping means with partial sheet stopping surfaces partially shielding the incoming sheet lead edge from full engagement with said sheet lateral repositioning means by partially engaging the same sheet edge, but not preventing the lateral movement of the sheet by said sheet lateral repositioning means.

---

### 5,014,978
## METHOD AND APPARATUS FOR THE SEQUENTIAL HANDLING OF FLEXIBLE PRODUCTS

**David A. Smith, Midland, and Herb Geiger, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

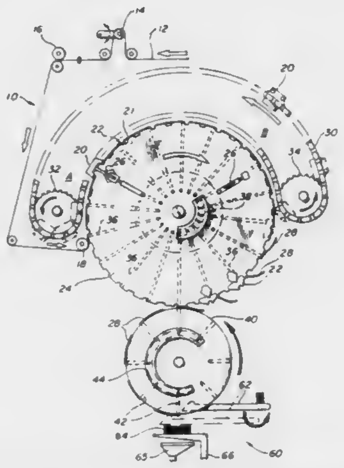
**Filed Dec. 19, 1988, Ser. No. 286,205**
**Int. Cl.⁵ B65H** ***29/54***

U.S. Cl. 271—308 **28 Claims**

1. An orbital packing apparatus for sequentially handling individual flexible products comprising:

a shaft mounted for orbital movement, including drive means for orbiting said shaft; and

a plurality of fingers secured to said shaft, said fingers having surfaces adapted to contact said flexible products, said surfaces including means for providing a selective frictional drag between said flexible products and said fingers such that there is a high degree of friction when said flexible products are moving at a high velocity relative to said finger surfaces and a low degree of friction when the velocity of said finger surfaces is increasing relative to the velocity of said flexible products.



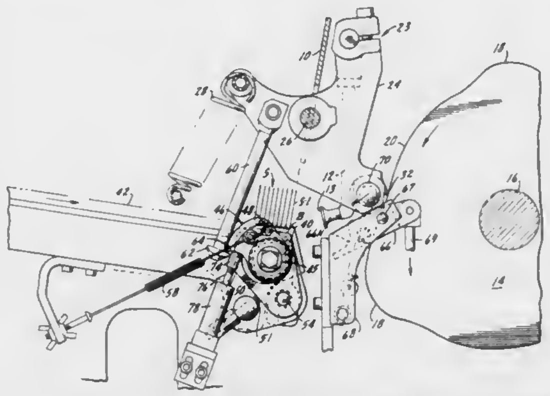
---

### 5,014,979
## SIGNATURE MACHINE

**George D. Higgins, Orland Park, and Thomas A. Nelson, Jr., Oak Lawn, both of Ill., assignors to McCain Manufacturing Corporation, Chicago, Ill.**

**Filed Apr. 25, 1990, Ser. No. 514,284**
**Int. Cl.⁵ B65H** ***5/10***

U.S. Cl. 271—104 **5 Claims**



1. In a cyclically operable signature machine having a supply hopper for a stack of vertically oriented signatures with the leadingmost signature positioned at the front of the hopper to be withdrawn in each cycle of the machine by a suction finger supported on a rocker which undergoes oscillation in each machine cycle first to present the finger to the leadingmost signature and then to withdraw the finger, an intermittently driven conveyor in the hopper incrementally operable in an indexing mode to advance the stack of signatures forwardly each time a signature is withdrawn, a one-way conveyor drive means operable from a restored position to an advanced position incrementally to advance the conveyor when a signature is withdrawn, a driving link supported by the rocker to be reciprocated thereby and having a detent pawl connection to a tooth on the one-way conveyor drive means thereby to index said one-way conveyor drive means to its advanced position during withdrawal of a signature and wherein the machine includes a latch which when actuated holds the suction finger in its withdrawing position during a machine cycle when a signature is not to be withdrawn from the hopper, the improvement characterized by means to separate the pawl connection to disable the one-way drive means when the suction finger is latched.

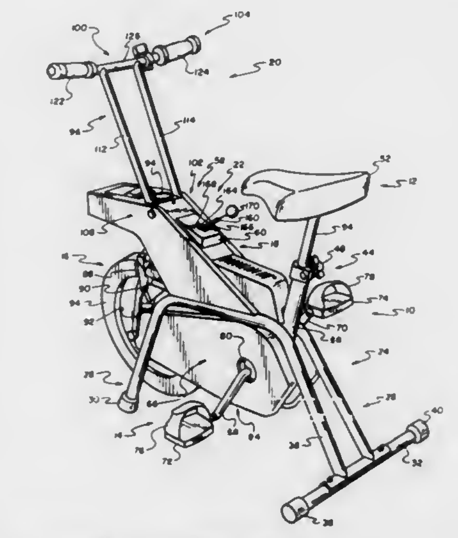
---

### 5,014,980
## EXERCISE CYCLE WITH LOCKING MECHANISM

**George B. Bersonnet, Riverheights, and Dante L. Schumway, Cove, both of Utah, assignors to Proform Fitness Products, Inc., Logan, Utah**

**Continuation of Ser. No. 328,625, Mar. 27, 1989, which is a continuation of Ser. No. 226,135, Jul. 29, 1988, Pat. No. 4,844,451. This application Oct. 19, 1990, Ser. No. 600,158**
**Int. Cl.⁵ A63B** ***21/00***

U.S. Cl. 272—73 **11 Claims**



1. An exercise cycle comprising:

frame means for positioning on a support surface;

seat means fixedly adapted to said frame means to support a user thereon;

drive means adapted to said frame means for operation by the feet of a user positioned upon said seat means;

first resistance means adapted to said frame means and drivingly interconnected to said drive means to resist movement of said drive means;

handle bar means having two spaced apart supports pivotally adapted at a lower end thereof to said frame means separate from said drive means and said first resistance means for pivotal exercise movements toward and away from the user positioned on the seat means, said handle bar means including handle means fixedly secured to both of said two spaced apart supports at the upper end thereof, said handle means being positioned for grasping and for pivotal movement by the user positioned on the seat means;

second resistance means interconnected to and between said handle bar means and said frame means to resist movement of said handle bar means;

a bar secured to and between said two spaced apart supports;

locking means adapted to said frame means for selectively engaging and disengaging said bar to prevent movement of said handle bar means and positioned for operation by a user positioned on said seat means between a first position disengaged from said bar in which said handle bar means is movable toward and away from the user and a second position engaged with said bar in which said handle bar means is locked in a preselected position and not movable; and

lever means connected to said locking means for operating said locking means between said first position and said second position, said lever means being positioned between said seat means and said handle bar means for operation by a user positioned on said seat means.

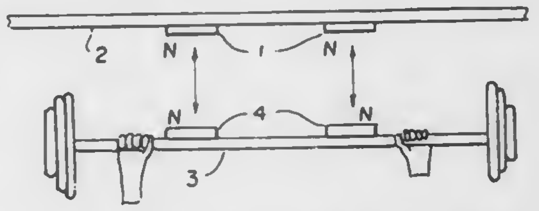
---

### 5,014,981
## EXERCISING DEVICES USING MAGNETIC RESISTANCE

**John G. Prelich, 200 Onyx Ave., Apt. 2, Pittsburgh, Pa. 15210**

**Filed Oct. 14, 1986, Ser. No. 917,844**
**Int. Cl.⁵ A63B** ***21/072***

U.S. Cl. 272—122 **10 Claims**



1. An exerciser comprising a pair of magnets capable of being aligned so that like poles are in confronting relationship so as to produce magnetic repulsion, protective means surrounding each magnet comprising a box surrounding each hand, having an opening on one side.

---

### 5,014,982
## MEMORY CARTRIDGE AND GAME APPARATUS USING THE SAME

**Satoru Okada, and Kenji Nishizawa, both of Kyoto, Japan, assignors to Nintendo Company Limited, Kyoto, Japan**

**Filed Aug. 24, 1988, Ser. No. 235,657**
**Claims priority, application Japan, Aug. 26, 1987, 62-212448**
**Int. Cl.⁵ A63F** ***9/22***

U.S. Cl. 273—435 **14 Claims**

1. A game apparatus, comprising:

a microprocessor;

a program memory connected to said microprocessor for storing a game program to be executed by said microprocessor;

a game terminating means provided in association with said microprocessor for terminating a game being executed by said microprocessor in accordance with said game program stored in said program memory;

a data storage;

a password generating means for generating a password based upon game status data being stored in said data storage at the time when the game has been terminated by said game terminating means;

a displaying means for displaying the password generated by said password generating means;

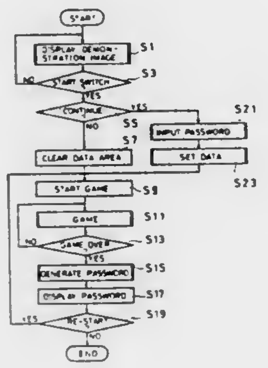
an instructing means for permitting an operator to instruct that the game be subsequently started at a point corresponding to the point when the game was terminated;

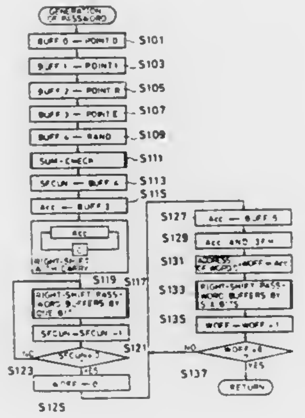
an inputting means for enabling an operator to input a password when starting of the game is instructed by said instructing means;

a data setting means for setting said game status data in said data storage based upon an inputted password, wherein said password generating means includes a modifying means for modifying said game status data stored in said data storage, and said data setting means includes a restoring means for restoring data obtained from the inputted password into the game status data stored in said data storage, wherein said data storage includes a data area for storing data used during password generation, wherein

OL
126
SS
2
MY
14
1991
UMI

said modifying means includes a shifting means for shifting the data being stored in said data area; and





means for generating a random number, wherein said shifting means includes a means for shifting the data being stored in said data area by a number of bits determined by the random number.

---

### 5,014,983
### PORTABLE OUTDOOR MULTI GAME APPARATUS

**Raymond Saunders, 1100 N. Banning Blvd. #111, Wilmington, Calif. 90744**

**Filed Mar. 29, 1989, Ser. No. 329,969**

**Int. Cl.⁵ A63B** *63/08*

U.S. Cl. 273—1.5 R **4 Claims**

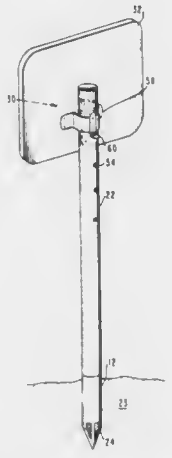
1. A portable kit for supporting multiple outdoor game activities, comprising:

a lower stake member;

a set of upper stake members each of said set of upper members having a lower end portion mateable with a corresponding upper medial portion of said lower stake member so that said lower stake member and each of said set of upper members can be securely joined together end to end, said lower member having a tapered lower end section so that said lower member and a first one of said set of members can be joined together end to end and driven into a ground surface to allow said lower member and said set to be utilized for playing multiple game activities;

a game structure having a backboard;

a bracket for attaching at least a second one of said set to said backboard so that said lower member and said second one of said set can support a game activity, said bracket being detachably connected to said backboard, said bracket being attached to said second one of said set at any one of selected locations in order to adjust the height of said second bracket and said game structure relative to the ground bracket and said game structure relative to the ground surface;



a brace connected to said bracket; and

means for securing said bracket to said second one of said set.

---

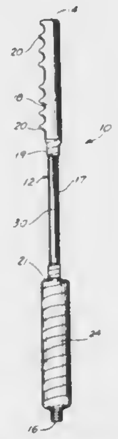
### 5,014,984
### BATTING APPARATUS

**Joseph Brockhoff, 535 Homestead Ave., Metairie, La. 70005**

**Filed Mar. 30, 1989, Ser. No. 330,609**

**Int. Cl.⁵ A63B** *69/40*

U.S. Cl. 273—26 B **4 Claims**



1. A practice baseball bat, comprising:

(a) an elongated rigid body portion, said body portion having a substantially constant diameter and having distal and proximal ends thereof;

(b) handle means at said proximal end for accommodating both hands of a batter when the hands are positioned in close relation to said proximal end of said body portion, said handle means further comprising means for visually indicating said rotation of the wrists of the batter from a first resting position, to a position when contact is made with a ball;

(c) an enlarged batting portion made of a material different from that of said rigid body portion, said batting portion being an enlarged area positioned near said distal end portion and extending a predetermined distance along the length of said rigid body portion, said enlarge portion representing that portion of said bat in which contact with a ball is to be made; and

(d) said elongated rigid body portion at said distal end portion extends past said enlarged batting portion to define a nub of said bat.

---

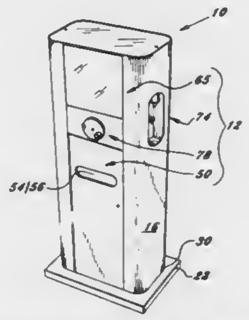
### 5,014,985
### GOLF QUEUING STATION

**Alan W. Capps, 7322 Blythwood La., Charlotte, N.C. 28215**

**Continuation-in-part of Ser. No. 443,355, Nov. 30, 1989. This application May 17, 1990, Ser. No. 525,190**

**Int. Cl.⁵ A63B** *47/04, 57/00*

U.S. Cl. 273—32 R **26 Claims**



1. A golf queuing station for use in the vicinity of a golf course teeing area, comprising:

(a) a base;

(b) a housing upstanding from said base, incorporating therein a set of golfing convenience devices, including,

(i) a refuse container positioned within said housing;

(ii) fluid dispensing means and fluid container dispensing means positioned within said housing;

(iii) golf ball washing means positioned within said housing; and

(iv) means positioned within said housing for storing materials;

(c) means in said housing for accessing the interior of said housing and said golfing convenience devices; and

(d) display means associated with at least one side of said housing for displaying information thereon.

---

### 5,014,986

**Patent Not Issued For This Number**

---

### 5,014,987
### FRAME FOR SPORTS RACKET

**Tsai C. Soong, 1839 Jackson Rd., Penfield, N.Y. 14526**

**Continuation of Ser. No. 424,459, Sep. 27, 1982, abandoned. This application Jun. 12, 1989, Ser. No. 364,630**

**Int. Cl.⁵ A63B** *49/06*

U.S. Cl. 273—73 C **4 Claims**

1. In a sports racket having a ball-hitting string network of longitudinal an transverse strings surrounded and supported by a hollow frame having a nose region, a throat region and two lateral side regions, the frame having a hollow structural form, the improvement wherein the frame has four sides: an outer peripheral side, an inner peripheral side and two opposed supporting sides extending on opposite sides of the plane of the string network and connecting the said outer peripheral side to said inner peripheral side; said supporting sides being formed with triangular-shaped openings leaving remaining panel sections of said sides inclined to form a truss configuration, whereby said outer peripheral side and said inner peripheral side will be supported by a plane truss on each side of the plane of the string network.

---

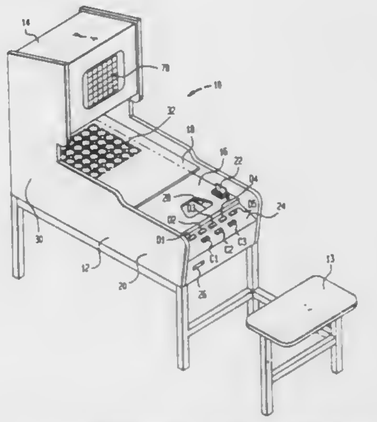
### 5,014,988
### POKER ROLL GAME

**Salvatore V. Mirando, Holmdel, and Walter Lee, Farmingdale, both of N.J., assignors to SMS Manufacturing Corporation, Lakewood, N.J.**

**Filed Dec. 15, 1989, Ser. No. 451,206**

**Int. Cl.⁵ A63F** *7/00*

U.S. Cl. 273—125 A **9 Claims**



1. An amusement/gaming device providing selective release of game pieces for replay, said amusement/gaming device comprising:

an array of positions, each position representing a score in a game, each position having means to hold a game piece in the position, and wherein each position includes a hole, and wherein said means to hold a game piece in the position includes an array of intersecting rotatable rods, each said rod having a plurality of arm members extending into said positions below said holes sufficiently to hold a game piece in said holes when in place therein and rotating away from said position when the rod on which it is attached is rotated;

means to identify residence of a game piece in the positions; and,

means for selectively releasing said game pieces from the position for replay.

---

### 5,014,989
### MECHANICAL LOTTERY

**Rafael Urrestarazu Borda, Po Oriamendi, Bo Ayete, San Sebastián, Spain 28009**

**Filed Jul. 12, 1989, Ser. No. 378,639**

**Claims priority, application Spain, Feb. 23, 1989, 8900664**

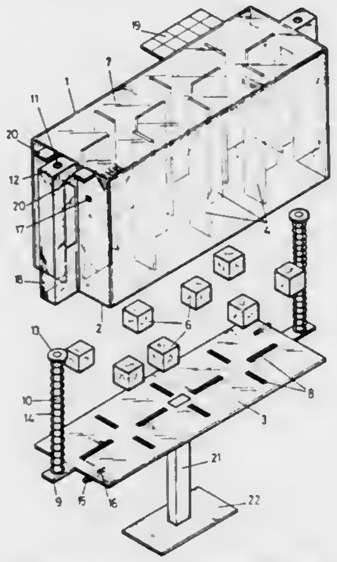
**Int. Cl.⁵ A63F** *9/04*

U.S. Cl. 273—145 C **6 Claims**

1. A mechanical lottery comprising a hollow, transparent, prismatic-rectangular body, open at one of its bases, in which body there are arranged a plurality of partitioned compartments open towards the same open base of the body, the body being completed with a transparent cover which closes the open base and the compartments, a die being disposed in each of the compartments, the cover being undetachable from the

OL
126
SS
2
MY
14
1991
UMI

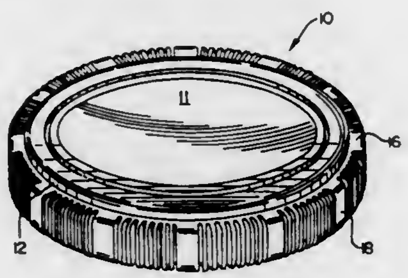
body, so that the compartments are completely inaccessible without breaking the assembled body and cover, so that a prize

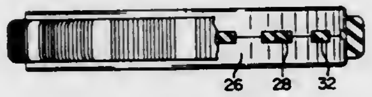


combination of the alphanumeric top faces of the dice can only be achieved by shaking the body-cover assembly.

### 5,014,990
### KICKING TOY

**Christopher K. Kaser, Chappaqua, and Gerald W. Cummings, Wantagh, both of N.Y., assignors to Big Ideas Toy and Game Development, Inc., New York, N.Y.**
**Filed Jan. 4, 1990, Ser. No. 461,047**
**Int. Cl.⁵ A63H** *27/00;* **A63B** *71/00, 65/02, 65/00*
**U.S. Cl. 273—128 R** **10 Claims**





1. A kicking toy for use in playing kicking games, comprising:

a central body, said central body defining a generally upstanding, peripheral surface, and a pair of opposite expansive surfaces between which peripheral surface extends, said central body including an outer wall defining said upstanding peripheral surface thereof, and a plurality of spaced openings therein; and

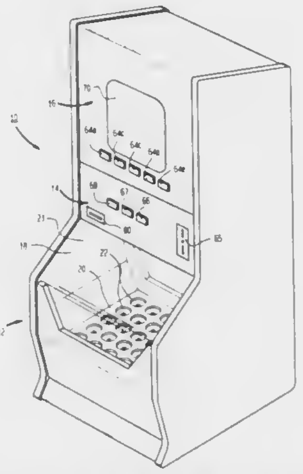
an annular shock-absorption means generally encircling said central body and juxtaposed to said peripheral surface of said central body, said shock-absorption means presenting an outwardly facing kicking region for contact with a player's foot when said toy is on an associated surface with one of its expansive surfaces in generally confronting relationship thereto,

said annular shock-absorption means comprising an outer, annular kicking portion positioned outside of and adjacent the peripheral surface of said outer wall, and inner retention means positioned inside of and adjacent said outer wall for retaining said shock-absorption means in position on said central body,

said inner retention means and said outer kicking portion of said shock-absorption means being integrally joined by a plurality of connector lugs extending therebetween and through said openings defined by said outer wall of said central body.

### 5,014,991
### AMUSEMENT GAME

**Salvatore V. Mirando, Holmdel, and Walter Lee, Farmingdale, both of N.J., assignors to SMS Manufacturing Co., Ltd., Lakewood, N.J.**
**Filed Dec. 15, 1989, Ser. No. 451,752**
**Int. Cl.⁵ A63B** *71/00;* **A63F** *7/00*
**U.S. Cl. 273—138 A** **9 Claims**



1. An amusement game having playing pieces comprising:

a playing field having a first plurality of playing positions thereon, each position having means for containing a playing piece;

a deflector mounted adjacent said playing field;

a second plurality of playing pieces randomly contained in said playing position, wherein said second plurality is less than said first plurality;

a plurality of playing-piece sensors each mounted adjacent one of said positions;

a plurality of playing-piece ejectors each mounted adjacent one of said positions;

a manual ejector enabling means connected to said sensors and said ejectors for permitting selective, manual enabling of one or more of said ejectors mounted adjacent said positions in which a playing piece is contained; and

a manual energization means for energizing those ejectors enabled by said enabling means for propelling the ejected pieces against said deflector for randomly deflecting said ejected pieces into said playing positions.

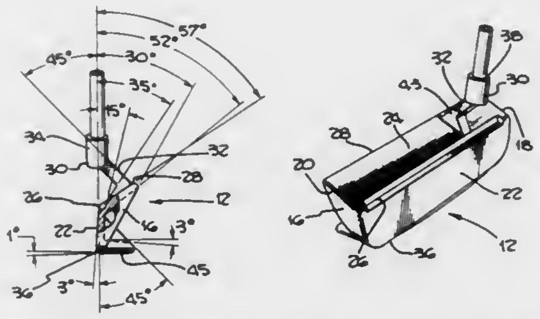
### 5,014,992
### GOLF PUTTER WITH SWING DIRECTING CUES

**John McCallister, 4141 Whitsett Ave., Studio City, Calif. 91604**
**Filed Dec. 8, 1989, Ser. No. 448,061**
**Int. Cl.⁵ A63B** *53/04*
**U.S. Cl. 273—164** **11 Claims**

1. A putter head adapted to provide a visual cue to a golfer which promotes a putting stroke having a vertical arc component, said putter comprising:

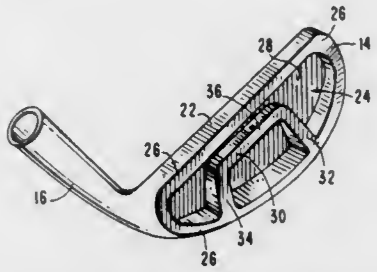
a putter head body having a heel portion, toe portion, a sole, a front face for contacting a golf ball and top face having a front edge at said front face and a rear edge wherein said top face slopes towards said bottom face from the rear edge of said top face to the front edge of said top face;

a hosel extending from said top face of said putter body, said hosel having a putter head body attachment end and a shaft attachment end, said hosel attachment end being attached directly to and extending forwardly with respect to the front face from said sloped putter head body top face, said hosel and sloped top face thereby providing a visual cue to said golfer which promotes a putting stroke having a vertical arc component.



### 5,014,993
### IRON TYPE GOLF CLUB HEAD

**Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204**
**Filed Apr. 24, 1990, Ser. No. 513,676**
**Int. Cl.⁵ A63B** *53/04*
**U.S. Cl. 273—169** **10 Claims**

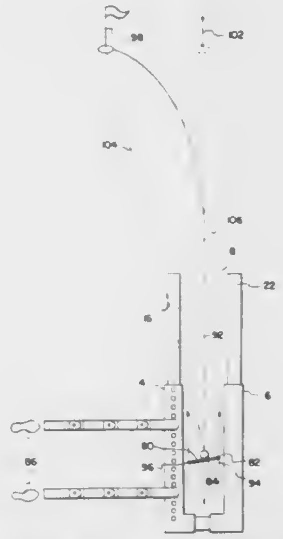


1. An iron type golf club head including a hosel, heel, toe, bottom sole, top ridge, rear surface, ball striking face having a center of gravity thereon, a peripheral mass formed on said rear surface along an entire outer periphery thereof and defining a centrally located cavity formed within said peripheral mass wherein the improvement comprises:

a U-shaped secondary weight member formed entirely within said cavity defined by a pair of leg elements and a base element connected in a U-shaped configuration, said leg elements having first ends integrally attached to the peripheral mass at two spaced points along said peripheral mass and said base element being spaced from said peripheral mass, said cavity being void both within, and outside of a perimeter defined by said U-shaped secondary weight member.

### 5,014,994
### GOLF TRAINER

**Dennis W. Peters, 709 Briar La., Morris, Ill. 60450**
**Filed Jul. 5, 1990, Ser. No. 548,400**
**Int. Cl.⁵ A63B** *69/36*
**U.S. Cl. 273—187 R** **10 Claims**



1. A golf training device comprising a longitudinally bounded guide path for placement of a golf ball therein to be struck by a golfer, said guide path having a longitudinal axis, first longitudinally extending boundary means on one side of said longitudinal axis and substantially parallel thereto to bound one side of said guide path, second longitudinally extending boundary means on the opposite side of said longitudinal axis and substantially parallel thereto to bound the opposite side of said guide path, width adjusting connecting means adjustably connecting said first boundary means to said second boundary means to enable moving said first and second boundary means closer together to narrow said guide path and farther apart to widen said guide path, foot positioning means to position a golfer's feet relative to said guide path, a one of said longitudinally extending boundary means including a plurality of spaced apart receiving cavities, said foot positioning means including insert means insertable into said receiving cavities, and adjustable foot positioning connecting means for adjustably connecting and holding said foot positioning means to a one of said longitudinally extending boundary means and against relative longitudinal movement thereof, to adjust the width a said golfer's feet are to be spread apart, said adjustable foot positioning connecting means comprising said insert means of said foot positioning means and said plurality of spaced apart receiving cavities of a one of said longitudinally extending boundary means, said insert means of said foot positioning means being receivable in any selected ones of said plurality of spaced apart receiving cavities of said one of said longitudinally extending boundary means.

### 5,014,995
### BOARD GAME APPARATUS

**Keith Woodward, Kettering, United Kingdom, assignor to Creative Crusade Limited, Kettering, United Kingdom**
**Filed Oct. 10, 1989, Ser. No. 418,515**
**Claims priority, application United Kingdom, Mar. 21, 1989, 8906434**
**Int. Cl.⁵ A63F** *3/02*
**U.S. Cl. 273—261** **18 Claims**

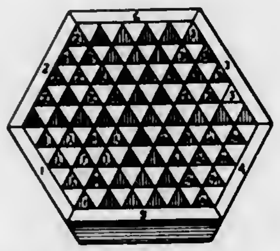
1. Game comprising:

(a) a game board having a playing configuration provided on the surface of the board, the playing configuration comprising an irregular hexagon subdivided into a tessellated

OL
1126
ISS
2
MY
14
1991
UMI

arrangement of equilateral triangles which alternate in type along rows thereof, each edge of each triangle, being parallel to a pair of respective opposed sides of said hexagon, the hexagon being such that only one axis passing through non-adjacent vertices of the hexagon is parallel to any of the sides of the hexagon; and

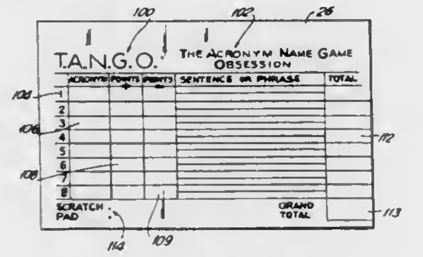
(b) two to four sets of playing pieces, each set comprising at least seven said pieces.

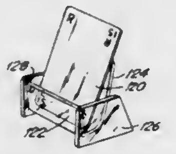


---

### 5,014,996
### WORD CARD GAME

**Harold von Braunhut, P.O. Box 809, Bryans Road, Md. 20616**
**Division of Ser. No. 183,645, Apr. 19, 1988, Pat. No. 4,877,255.**
**This application Oct. 6, 1989, Ser. No. 409,105**
**The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.**
**Int. Cl.⁵ A63F** *1/04*
**U.S. Cl. 273—299** **9 Claims**



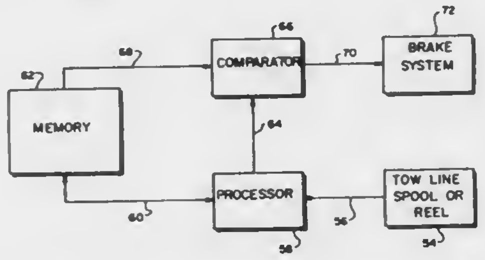


5. A word game comprising a deck comprising:
a plurality of playing cards, the playing cards representing letters and having point values,
a central playing surface for receiving piles of the playing cards for use by the players,
individual playing surfaces for retaining the playing cards in use by the individual players,
individual card storage holders for storing the cards used by the individual players, and
scoring sheets for scoring the point value of words formed by groups of the playing cards,
said playing cards being invertible and each having a letter designation in each of two diagonally opposite corners of the card and a letter designation being different in an upper left hand corner in each of two inverted positions of the card, an information section in each of two other diagonally opposite corners of the card for advising in each position of the card the letter designation in the inverted position of the card, said information section including an information letter corresponding to the letter designation being advised on, and a point value designation located adjacent to each information letter whereby each card can be selectively positioned in either of the two inverted positions thereof to form a word from the letter designations of the cards used by an individual player even if the cards are placed in a fanned position.

---

### 5,014,997
### BRAKE-CONTROL SYSTEM FOR ACCELERATING FREELY FALLING OBJECTS TO A MOVING CRAFT'S SPEED

**John A. Smith, Bedford, and Mark A. Carlson, Hanover, both of Mass., assignors to Sanders Associates, Inc., Nashua, N.H.**
**Continuation of Ser. No. 326,148, Mar. 20, 1989, abandoned.**
**This application Feb. 22, 1990, Ser. No. 483,107**
**Int. Cl.⁵ F41J** *9/10*
**U.S. Cl. 273—360** **7 Claims**

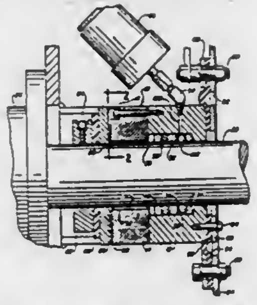


1. A method of controlling the deployment of a towline connecting a moving craft to an ejected object, the method comprising the steps of:
a. allowing the object to fall freely from the craft;
b. continuously monitoring the velocity and the total deployed distance of the object relative to the moving craft as it is falling freely;
c. continuously determining whether a point in a velocity-distance state-space plane defined by the monitored velocity and the monitored total deployed distance of the object has reached a switching curve, the switching curve comprising a locus of points of intersection of a plurality of free-fall trajectories of the object with a corresponding plurality of brake trajectories of the object, each of the plurality of free-fall trajectories being the trajectory followed by the object at a different velocity of the moving craft, each of the plurality of brake trajectories being the trajectory followed by the object, for a different craft speed, when a given brake system is engaged to retard the deployment of the towline; and
d. in response to a determination that the point in the velocity-distance state-space plane defined by the monitored velocity and total deployed distance has reached the switching curve, engaging the given brake system to retard the deployment of the towline.

---

### 5,014,998
### SHAFT SEAL

**Kenneth W. Lauridsen, Lake Forest, Ill., assignor to United Conveyor Corporation, Deerfield, Ill.**
**Continuation of Ser. No. 173,762, Mar. 28, 1988, abandoned.**
**This application Mar. 26, 1990, Ser. No. 501,324**
**Int. Cl.⁵ F16J** *15/10, 15/18*
**U.S. Cl. 277—30** **10 Claims**



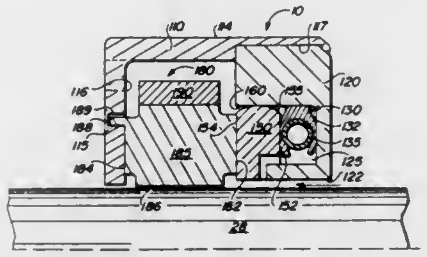
1. A shaft seal for sealing a rotating shaft subject to shaft run-out relative to a panel having an opening through which

the shaft extends and with the opening having a size greater than the diameter of the shaft comprising, a tubular housing surrounding a section of the shaft and having a packing gland with shaft packing, a shaft bushing fixed in a bore of the tubular housing for causing said tubular housing to orbit slightly as shaft rut-out occurs, and annular flexible means connectable between the tubular housing and said panel spanning said opening and providing a floating support for the tubular housing and closing said opening.

---

### 5,014,999
### PRESSURE ENHANCED SELF ALIGNING SEAL

**Mark Makhobey, Phoenix, Ariz., assignor to Car-Graph, Inc., Tempe, Ariz.**
**Filed Mar. 6, 1989, Ser. No. 319,332**
**Int. Cl.⁵ F16J** *15/16, 15/54*
**U.S. Cl. 277—3** **18 Claims**



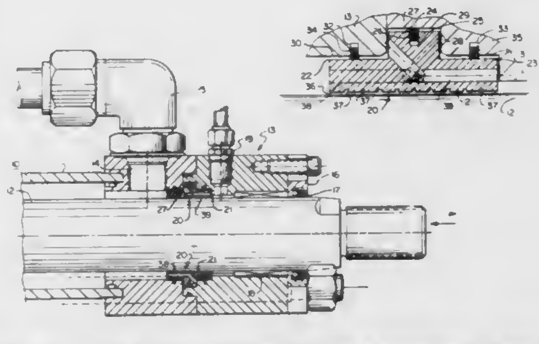
1. A self aligning mechanical seal for sealing fluid flow between a high pressure area and a low pressure area along a stator member and an axially extending relatively rotatable member, said seal comprising:
(a) a housing member extending circumferentially about said rotatable member having a retainer surface and an axially extending bearing surface;
(b) a static resilient seal engaging said retainer surface;
(c) an annular seal plate in said housing member having a first sealing surface engaging said static resilient seal and an opposite second sealing face spaced relatively from said first sealing face, said seal plate having an outer peripheral edge engaging said bearing surface and configured to permit the seal plate at least limited radial displacement relative to said bearing surface; and
(d) a ring seal assembly in said housing member extending annularly about said rotatable member in close tolerance thereto, said ring seal assembly having opposite end faces, one of which is in sealing engagement with said second sealing face whereby misalignment of said rotatable member will be transferred to said static seal via said ring seal assembly and said seal plate to maintain substantially full sealing contact at the said one end face and second sealing face and whereby fluid is sealed at said static seal.

---

### 5,015,000
### FLOATING SEAL ARRANGEMENT

**Richard J. Perini, Holland, N.Y., assignor to Moog Controls, Inc., East Aurora, N.Y.**
**Filed Jun. 28, 1990, Ser. No. 544,988**
**Int. Cl.⁵ F16J** *15/00, 15/16;* **F01B** *31/00*
**U.S. Cl. 277—16** **8 Claims**

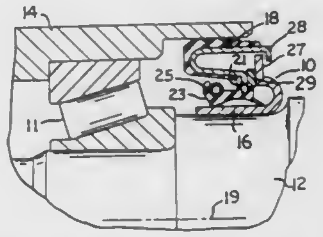
1. A rod seal for a linear hydraulic or pneumatic actuator cylinder of the type in which a piston rod of circular cross section extends through a radial support bearing at a distal end of the housing and in which a hydraulic port is disposed at a distal end of the housing to apply or withdraw air or hydraulic fluid to actuate the cylinder and move the rod axially, wherein said rod seal comprises a rod seal ring disposed between said port and said radial support bearing, the rod seal ring having an inner diameter that closely matches the diameter of the rod, proximal and distal cylindrical portions of predetermined diameters, a central annular flange having a predetermined diameter greater than the diameters of said proximal and distal portions, an annular recess in said central annular flange, a central ring seal having an outer diameter greater than that of the central annular flange and enjoying at least a limited amount of radial play in said annular recess; a generally cylindrical seat for said rod seal ring formed at the distal end of said cylinder housing and having proximal and distal cylindrical portions to receive the proximal and distal portions of said rod seal ring and defining a radial clearance therebetween, an annular void between the proximal and distal portions of said seat to receive said annular flange and having a generally cylindrical face that defines at least a limited radial clearance with respect to said annular flange and against which said central ring seal abuts; proximal and distal annular recesses in said proximal and distal cylindrical portions of said seat in which are received proximal and distal ring seals, respectively, which enjoy at least a limited amount of radial play in their respective recesses and which have inner faces that abut the proximal and distal portions of the rod seal ring, respectively; first pressure balance means communicating fluid pressure from proximally of the rod seal ring to a first space defined between said central ring seal and said distal ring seal; and second pressure balance means communicating fluid pressure from distally of the rod seal to a second space defined between said proximal ring seal and the central ring seal.



---

### 5,015,001
### LOW FRICTION SEAL ASSEMBLY

**Richard D. Jay, Plymouth, Mich., assignor to Mather Seal Company, Milan, Mich.**
**Filed Jul. 23, 1990, Ser. No. 556,684**
**Int. Cl.⁵ B65D** *53/00;* **F16J** *15/32*
**U.S. Cl. 277—37** **11 Claims**



1. A lubricant seal assembly comprising an outer annular case member and a cooperating inner annular case member, said case members being rotatable relative to one another; an annular sealing element carried by one of said case members for rotary sliding engagement with the other member, said inner and outer case members having confronting surfaces; and, an annular bumper element located between said confronting surfaces, such that an installation force applied to one of said case members will cause said bumper element to be in pressure engagement with said confronting surfaces; said bumper element being formed of a material which is a solid at room temperature, but which undergoes a friction-induced phase

OL
126
SS
2
MY
14
1991
UMI

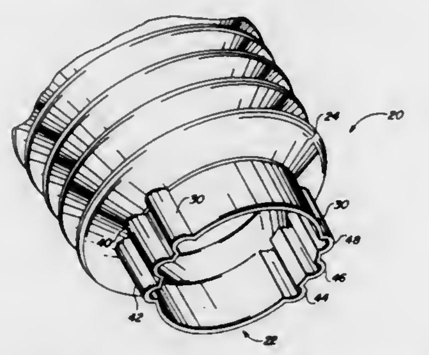
change at an elevated transition temperature associated with break-in operation of the seal assembly.

---

### 5,015,002
### PROTECTIVE BELLOWS

**Clarence R. Goodman, Peoria, and Jerry R. Presley, Lake Havasu City, both of Ariz., assignors to Daystar, Inc., Glendale, Ariz.**

**Filed Jun. 29, 1990, Ser. No. 546,246**
**Int. Cl.⁵ B61F** ***15/22***
**U.S. Cl. 277—212 FB** **18 Claims**



1. A bellows for protecting an extensible device, said bellows comprising in combination:

(a) a cuff extending from one end of said bellows for encircling an element of the extensible device; and

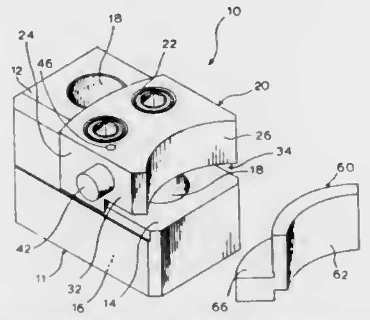
(b) at least one axial bellows formed in said cuff, said axial bellows being flattenable commensurate with the degree of elongation of said cuff resulting from encircling attachment of said cuff with the element of the extensible device.

---

### 5,015,003
### TOP JAW ASSEMBLY WITH REPLACEABLE WORK HOLDING PADS

**Valdas S. Ramunas, Euclid, Ohio, assignor to Kennametal Inc., Latrobe, Pa.**

**Continuation-in-part of Ser. No. 227,944, Aug. 3, 1988, abandoned. This application Apr. 2, 1990, Ser. No. 509,434**
**Int. Cl.⁵ B23B** ***31/12***
**U.S. Cl. 279—123** **20 Claims**



1. A top jaw assembly having replaceable work holding pads comprising:

(a) a top jaw adapted to be mounted on a master jaw of a chuck rotatable about a central axis, the top jaw including a first support surface lying in an axial plane and a second support surface concentric with the central axis of the chuck;

(b) an arcuate shaped work holding pad releasably secured to the top jaw and having concentric inner and outer surfaces, the outer surface being adapted to seat against the second support surface of the top jaw assembly and the inner surface being adapted to grip a workpiece;

(c) clamping means for releasably securing the work holding pad to the top jaw, the clamping means including a locking element for engaging the work holding pad so as to urge the work holding pad downwardly against the first support surface to axially locate the pad and rearwardly against the second support surface to maintain the inner surface of the pad concentric with the central axis; and

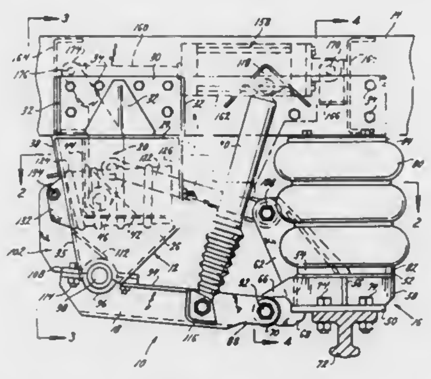
(d) locating means for indexing the work holding pad on the top jaw assembly.

---

### 5,015,004
### ELEVATING, REVERSIBLE SELF-STEERING SUSPENSION SYSTEM

**James L. Mitchell, Springfield, Mo., assignor to Ridewell Corporation, Springfield, Mo.**

**Filed Dec. 28, 1989, Ser. No. 458,556**
**Int. Cl.⁵ B62D** ***61/12***
**U.S. Cl. 280—81.6** **20 Claims**



1. An elevating, reversible, self-steering vehicle axle suspension assembly for a vehicle having a chassis and at least one axle, the assembly comprising:

a hanger means adapted to be attached to a vehicle chassis;

an axle seat means adapted to support a vehicle axle;

a first linkage means pivotally connected to the axle seat means and the hanger means and arranged to selectively raise and lower the axle seat means relative to a vehicle chassis; and

a second linkage means pivotally connected to the axle seat means and the hanger means and adapted to be pivotally connected to a vehicle chassis, the second linkage means being arranged to selectively adjust an orientation of a vehicle axle supported by the axle seat means between a forward caster and a rearward caster.

---

### 5,015,005
### FRONT-PIECE FOR A SAFETY SKI-BINDING

**Heinz Hornschemeyer, Oberammergau, and Anton Emert, Oberau, both of Fed. Rep. of Germany, assignors to Marker Deutschland GmbH, Eschenlohe, Fed. Rep. of Germany**

**Division of Ser. No. 122,461, Nov. 19, 1987, Pat. No. 4,913,456, which is a division of Ser. No. 871,065, Jun. 5, 1986, Pat. No. 4,735,435. This application Jan. 12, 1990, Ser. No. 452,196**
**Int. Cl.⁵ A63C** ***9/08***
**U.S. Cl. 280—630** **3 Claims**

1. A front piece for a safety ski-binding, said front piece comprising:

a sole holder for supporting a ski-boot sole laterally and from the front, said sole holder being rotatable about a pivot axis;

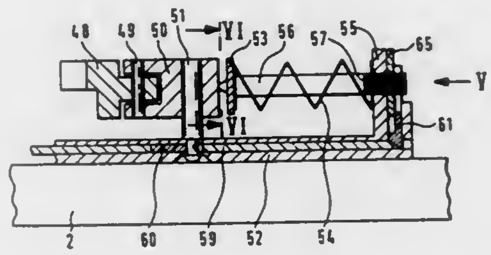
biasing means for applying a biasing force to said sole holder to pivot said sole holder away from said sole when the force on a boot supported in the front piece reaches a predetermined critical amount dangerous to the skier, said biasing force acting on said sole holder relative to the pivot axis thereof and exerting a first resistance to releasing said boot;

pedal means responsive to the force exerted by said boot on said ski from the ball of the skier's foot, said force creating a second resistance to releasing said boot;

control means adjustable by said pedal means to maintain the total release resistance approximately constant; and,

means for adjusting the relative position of said biasing means with respect to said sole holder in response to adjustment of said control means to effect a change in the force exerted therron to compensate for changes in the pressure on said pedal means; wherein:

said sole holder is centrally located and includes a base plate and a support member pivotally mounted on a vertical axis;



said biasing means is comprised of a spring and a rotatable pressure member, said spring biasing said pressure member against said support member, said pressure member including two pressure transmitting points engaging said support member symmetrically about the center of said support member with respect to a vertical longitudinal plane which includes said vertical axis, said pressure member being rotatable about a horizontally located longitudinal axis; and,

said control means comprises rotation means associated with said control means, said rotation means effecting rotation of said pressure member to reduce the spacing between said points relative to said vertical longitudinal plane.

---

### 5,015,006
### SUSPENSION APPARATUS OF A VEHICLE

**Shin Takehara, and Toshiki Morita, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Jun. 26, 1990, Ser. No. 543,407**
**Claims priority, application Japan, Jun. 27, 1989, 1-164614; Jun. 27, 1989, 1-164615; Jun. 27, 1989, 1-164616**
**Int. Cl.⁵ B60G** ***17/08***
**U.S. Cl. 280—707** **30 Claims**

1. A suspension apparatus of a vehicle, comprising:

a cylinder unit interposed at each wheel between a sprang weight and an unsprung weight for displacing a ride height by supplying or discharging an operating liquid;

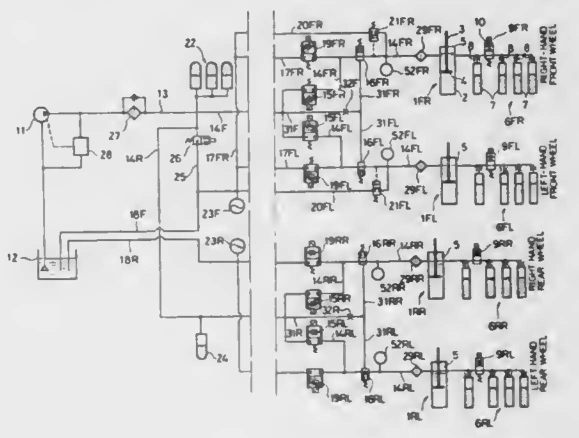
a supply/discharge control valve for independently supplying to or discharging from the cylinder unit;

a plurality of ride height detecting means for independently detecting a ride height of a vehicle body at a position of each wheel;

a status amount determining means for determining an actual status amount of a posture of the vehicle body on the basis of the ride height at the position of each wheel detected by the ride height detecting means;

a posture controlling means for controlling the supply/discharge control valve so as to allow the actual status amount of the posture of the vehicle body determined by the status amount determining means to reach a given target value;

a driving state detecting means for detecting a driving state which changes acceleration of the vehicle body; and



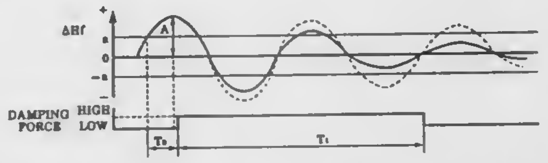
a target value correcting means for correcting the target value so as to cause the posture of the vehicle body to displace in a direction opposite to a direction in which the posture of the vehicle body is caused to displace due to a change of the acceleration of the vehicle body when the driving state which changes acceleration of the vehicle body is detected by the driving state detecting means.

---

### 5,015,007
### DAMPING FORCE CONTROL SYSTEM FOR SHOCK ABSORBER VARIABLE WITH AMPLITUDE OF VEHICLE HEIGHT DIFFERENCE EXCEEDING LIMIT VALUE

**Hiromitsu Uchiyama; Masayuki Kawamoto, both of Toyota, and Yoriko Inada, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushik Kaisha, Aichi, Japan**

**Filed Jul. 19, 1989, Ser. No. 381,867**
**Claims priority, application Japan, Jul. 29, 1988, 63-191226**
**Int. Cl.⁵ B60G** ***17/015, 17/08***
**U.S. Cl. 280—707** **2 Claims**



1. A damping force control system for a shock absorber mounted between a vehicle wheel and a vehicle body of a vehicle such as an automobile and adapted to selectively provide a high damping force operation or a low damping force operation, comprising a vehicle height difference detecting means for detecting a vehicle height difference of the vehicle body relative to the vehicle wheel, and a shock absorber con-

VOL 126
ISS 2
MY 14 1991
UMI

trol means for controlling said shock absorber to provide said high damping force operation or said low damping force operation, wherein said shock absorber control means controls said shock absorber to provide said high damping force operation for a determinate time duration after the lapse of a predetermined delay period from a time point at which said vehicle height difference exceeds a determinate limit value, said delay period being determined so as to start said high damping force operation approximately when the vehicle height difference reaches a peak amplitude of variation thereof, said determinate time duration being determined to be longer as said peak amplitude of said vehicle height difference exceeding said determinate limit value is larger.

---

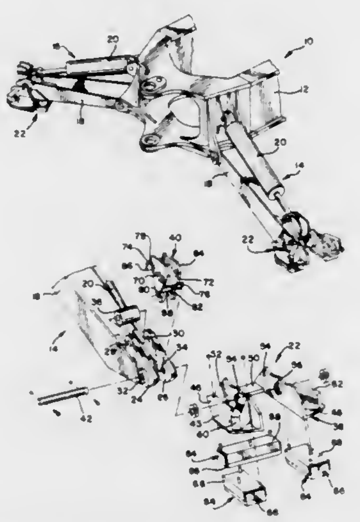
### 5,015,008
## STABILIZER PAD ASSEMBLY FOR AN EARTH MOVING APPARATUS

**Jesse L. Schupback, West Burlington, Iowa, assignor to J. I. Case Company, Racine, Wash.**

**Filed Apr. 9, 1990, Ser. No. 506,625**

**Int. Cl.$^5$ B60S** *9/02*

U.S. Cl. 280—764.1 **10 Claims**



1. A stabilizer pad assembly connected to a support arm of an earth moving apparatus including a driver for vertically moving said support arm with the stabilizer pad connected thereto, said stabilizer pad assembly comprising:

stabilizer pad means for supporting the earth moving apparatus on ground surfaces of different textures, said pad means having a plate-like configuration defining a cut-out opening and two opposed sides, with each side defining a ground engaging surface, said pad means being connected to a distal end of said support arm for pivotable movement through substantially one-half revolution between a first position wherein a first side of said pad means engages said ground surface and a second alternate position wherein a second side of said pad means engages said ground surface; and

pad limiting means connected to said pad means and said support arm for limiting movement of said pad means toward said driver and thereby inhibiting damage to said driver from said pad means being moved between alternate positions, said pad limiting means being configured with surfaces adapted to engage and wedge between at least a portion of said pad means and an upper surface of the support arm such that when the support arm is lifted toward a raised position and said pad means is pivotably moved toward the driver, impact forces resulting from limiting movement of said pad means toward said driver are transferred through said pad limiting means and distributed across the engaging surfaces.

---

### 5,015,009
## ACTIVE SUSPENSION SYSTEM AND METHOD FOR CONTROLLING SAME

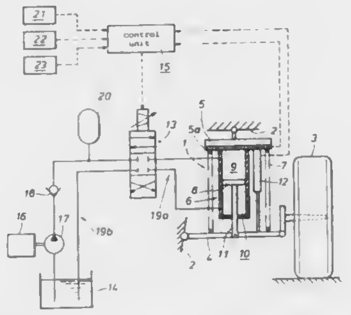
**Yasuharu Ohyama; Masaki Izawa; Katsuji Watanabe, and Tetsuro Hamada, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 5, 1990, Ser. No. 474,620**

**Claims priority, application Japan, Feb. 6, 1989, 1-27100**

**Int. Cl.$^5$ B62D** *9/02*

U.S. Cl. 280—772 **7 Claims**



1. An active suspension system for a vehicle having a first wheel set and a second wheel set which bears a smaller load than said first wheel set under a static condition, each wheel set including a right wheel and a left wheel, comprising:

wheel supporting means pivotably coupling each of a plurality of wheels of a vehicle with a vehicle body so as to support the associated wheel in a vertically moveable manner;

a power actuator interposed between said vehicle body and each of said wheels;

sensor means for detecting turning maneuver of said vehicle and for outputting vehicle turning data; and

control means for controlling operation of said actuators according to said data received from said sensor means so as to reduce a vertical load acting on one of the wheels of said second wheel set which acts as an inner wheel during a vehicle turn when said sensor means detects that said vehicle is undergoing a turning maneuver which gives rise to a lateral acceleration exceeding a certain limit.

---

### 5,015,010
## SEAT INTEGRATED SEAT BELT SYSTEM

**Ronald F. Homeier, Plainfield; Allan R. Lortz, Carmel; William L. Clifton, III, Lebanon, and Jeffrey L. Williams, Zionsville, all of Ind., assignors to Indiana Mills & Manufacturing, Inc., Westfield, Ind.**

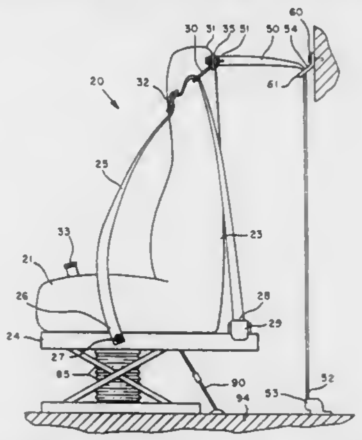
**Filed Mar. 12, 1990, Ser. No. 491,537**

**Int. Cl.$^5$ B60R** *21/16*

U.S. Cl. 280—808 **16 Claims**

1. A tether for holding a vehicle passenger seat with a back portion comprising:

a tether assembly mountable to a vehicle and a passenger seat therein, said tether assembly including an extendable and retractable web extending between said passenger seat in said vehicle with said tether assembly being operable via said web to allow relative motion between said passenger seat in said vehicle during passenger adjustment but limiting relative motion during emergency stops, said tether assembly including an emergency locking retractor mounted to said vehicle with said web extendable and retractable from said emergency locking retractor, said web including an outer end portion secured to said back portion of said passenger seat, said tether assembly including web guide means positioned above said emergency locking retractor and behind said back portion, said web guide means operable to guide said web upwardly from said emergency locking retractor and forwardly toward said back portion.



---

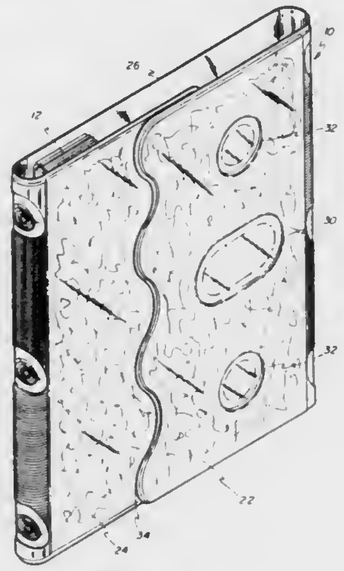
### 5,015,011
## BINDER WITH OBSERVATION WINDOW

**Brian K. York, Beavercreek, Ohio, assignor to The Mead Corporation, Dayton, Ohio**

**Filed Jul. 23, 1990, Ser. No. 555,959**

**Int. Cl.$^5$ B42D** *3/00*

U.S. Cl. 281—18 **10 Claims**



1. A binder comprising:

a transparent thermoplastic outer sheet;

a rear panel support board centrally positioned on said outer sheet;

an outer panel support board positioned on said outer sheet facing said rear panel support board and spaced therefrom to define a first hinge portion;

an inner panel support board positioned on said outer sheet facing said rear panel support board opposite said outer panel support board and spaced apart from said rear panel support board to define a second hinge portion;

a transparent thermoplastic inner sheet covering said outer panel support board opposite said outer sheet to define an outer panel depending from said first hinge portion;

thermoplastic liner sheet means covering said rear panel support board and said inner panel support broad to define a rear panel and an inner panel joined along said second hinge portion;

binding means mounted interiorly of said binder;

said inner panel and said outer panel being of sufficient length for covering materials retained by said binding means;

said outer panel board being provided with a window aperture and said inner sheet and said outer sheet being joined together inside said aperture to define an observation window.

---

### 5,015,012

**Patent Not Issued For This Number**

---

### 5,015,013
## CONNECTOR FITTING FOR CONNECTING CORRUGATED CONDUIT SECTIONS

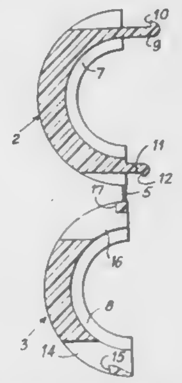
**Léonard Nadin, L'Union, France, assignor to Labinal S. A., Montigny Le Bretonneux, France**

**Filed Jan. 17, 1990, Ser. No. 466,479**

**Claims priority, application France, Feb. 8, 1989, 89 01607**

**Int. Cl.$^5$ F16L** *3/00*

U.S. Cl. 285—64 **5 Claims**



1. A connector fitting for corrugated conduit comprising:

complementary first and second parts together defining a cylindrical body molded in one piece;

a strip forming a hinge which links said first and second parts;

at least one rib on each of said first and second parts disposed in a plane perpendicular to the longitudinal axis of the part;

a first locking member at a free end of said first part opposite that adjoining said strip forming a hinge, and a complementary second locking member at a free end of said second part opposite that adjoining said hinge;

a third locking member on an edge of said first part adjoining said hinge, and a complementary fourth locking member on an edge of said second part adjoining said hinge;

said first locking member comprising a first bar and an outwardly facing first hook at an end of said first bar, said third locking member comprising a second bar and an outwardly facing second hook at the end of said second bar, said second part comprises two openings in corresponding edges adapted to receive said first and second bars and having flats at their outer edges adapted to cooperate with said first and second hooks; and

wherein one of said first and second parts includes means provided on the outer circumference for fixing to a male member.

---

### 5,015,014
## PLASTIC PIPE SECTION

**Gerald T. Sweeney, Puyallup, Wash., assignor to Aardvark Corporation, Inc., Puyallup, Wash.**

**Filed Jun. 19, 1989, Ser. No. 368,236**

**Int. Cl.$^5$ F16L** *00/00*

U.S. Cl. 285—81 **30 Claims**

6. In the combination of a pair of male/female pipe sections

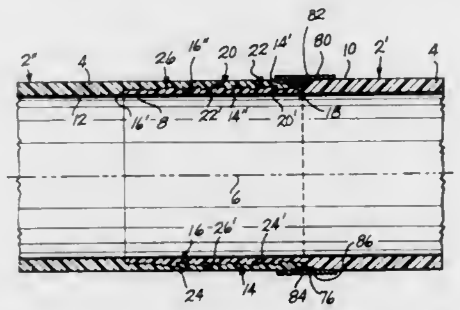
OL
126
SS
2
MY
14
1991
UMI

of semi-rigid but resiliently distensible plastic material, which are arranged end-to-end of one another along a common axis and have relatively outer and inner peripheral surfaces thereon, and annular rabbets formed on the adjacent end portions thereof at the relatively outer and inner peripheral surfaces thereof, respectively, so that the end portion of the male pipe section can be slideably inserted within the end portion of the female pipe section to form a male/female joint therebetween when the pipe sections are reciprocated relatively toward one another along the axis to be joined together, the improvement wherein:

the rabbets have surfaces which are disposed relatively transverse the axis, and surfaces which extend relatively lengthwise of the axis,

the axially extending surfaces of the rabbets have cooperatively engageable retainer means thereon comprising successive sets of axially successive and axially contiguous ribs and grooves relatively raised thereon and recessed therein, respectively, the respective crests and bottoms of which ribs and grooves extend in full circles about the axis of the pipe sections,

the crests of the respective ribs of the male pipe section and the bottoms of the respective grooves of the female pipe section extend at their centers in axially spaced relatively outer circles coinciding substantially with a common relatively outer cylindrical surface of revolution about the axis, and the bottoms of the respective grooves of the male pipe section and the crests of the respective ribs of the female pipe section extend at their centers in axially spaced relatively inner circles coinciding substantially with a common relatively inner cylindrical surface of revolution about the axis spaced relatively inwardly thereof from the relatively outer cylindrical surface of revolution thereabout,



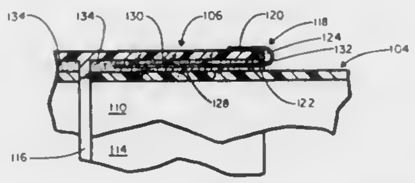
the axial spacing between the relatively outer circles is the same both between the crests of adjacent ribs on the male pipe section and between the bottoms of adjacent grooves on the female pipe section, and the axial spacing between the relatively inner circles is the same both between the bottoms of adjacent grooves on the male pipe section and between the crests of adjacent ribs on the female pipe section, and the shape and size of the ribs is the same on both the male and female pipe sections, and the grooves on the respective male and female pipe sections correspond in shape and size to the ribs thereof, so that when the end portion of the male pipe section is slideably inserted within the end portion of the female pipe section in forming the joint, each rib on the male pipe section progressively cooperatively engages, first with that groove on the female pipe section which is axially adjacent the end of the female pipe section, and then with each successive groove thereafter on the female pipe section, and in so doing, the body of each rib on the male pipe section substantially fills, first the aforesaid end adjacent groove on the female pipe section and then each successive groove thereafter, until the ends of the respective pipe sections abut the transversely disposed surfaces of the rabbets and the sets of ribs and grooves are interlocked in succession with one another to complete the joint,

the respective ribs of the respective male and female pipe sections have leading flanks thereon which are disposed on those sides of the respective ribs oriented axially toward the respective ends of the respective pipe sections, and the leading flanks are conical and tapered toward the axis from the crests of the respective ribs for a distance sufficiently greater than the aforesaid spacing between the relatively inner and outer cylindrical surfaces of revolution about the axis, that the leading flanks form cam surfaces of sufficiently low acuity to the axis that when the end portion of the male pipe section is slideably inserted within the end portion of the female pipe section in forming the joint, the end portion of the female pipe section is progressively distended about the axis by the end portion of the male pipe section when the sets of ribs and grooves advance across one another from set to set, to enable the end portions of the pipe sections to be ratcheted together in successive stages in which the sets of ribs and grooves cooperatively engage one another as recited hereinabove, and alternately, advance across one another form set to set as the end portion of the female pipe section distends to accommodate the advance, and

the respective ribs of the respective male and female pipe sections have trailing flanks thereon which are disposed on the opposing sides thereof oriented axially toward the respective transversely disposed surfaces of the respective rabbets on the respective end portions thereof, and the trailing flanks of the respective ribs are inclined to the axis from the crests of the respective ribs at substantially a common angle thereto adapted so that when the ends of the respective pipe sections abut the transversely disposed surfaces of the rabbets and the sets of ribs and grooves interlock in succession with one another to complete the joint, the end portions of the pipe sections are sufficiently interengaged to preserve the joint for use.

---

### 5,015,015
## CLIP SECURING ARRANGEMENT FOR VENTILATION SYSTEMS
**David M. Fetters, Holland, Mich., assignor to Hart & Cooley, Inc., Holland, Mich.**
**Filed May 30, 1990, Ser. No. 530,610**
**Int. Cl.$^5$ F16L** *13/04*
**U.S. Cl. 285—114** **20 Claims**



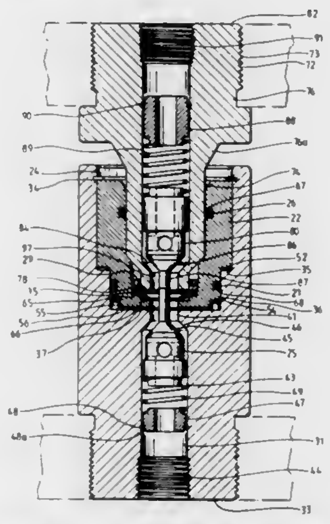
1. In an interconnection arrangement for structurally interconnecting together at least two pipe segments, said arrangement comprising a first pipe segment, a second pipe segment and a coupling device adapted to be interposed between said first and second pipe segments for structurally coupling together said pipe segments, the improvement wherein said interconnection arrangement further comprises a plurality of clips, each of said clips comprising:

a first portion externally located relative to said coupling device and having means thereon adapted to engage said coupling device to retain said clip on said coupling device; and

a second portion coupled to said first portion having embedding means adapted to be at least partially embedded within said coupling device and within a selected one of said first and second pipe segments, for rigidly securing together said coupling device to said selected one of said first and second pipe segments, in a manner such that said embedding means is substantially hidden from external view.

---

### 5,015,016
## INTERNAL PRESSURE LOADED V-SEAL CONNECTOR
**Robert E. Smith, III, Stafford, Tex., assignor to National Coupling Company, Inc., Stafford, Tex.**
**Filed Apr. 3, 1989, Ser. No. 332,545**
**Int. Cl.$^5$ F16L** *29/00*
**U.S. Cl. 285—108** **9 Claims**



1. An undersea hydraulic coupling having a central axis, comprising:

a female member having a first bore therethrough, the first bore having a first circumferential shoulder therein;

a sleeve-like member for sliding insertion into the first bore and being positionable on the first circumferential shoulder, the sleeve-like member having a second bore therethrough, the second bore having a wall and a second circumferential shoulder therein;

a male member having a leading face, the male member adapted for sealing insertion into the sleeve-like member; and

a first generally ring-shaped metal seal positionable in the second bore between the male member leading face and the second circumferential shoulder, the first metal seal adapted to expand longitudinally in response to fluid pressure in the coupling to form a fluid seal between the second circumferential shoulder and the male member leading face; and

wherein the sleeve-like member is adapted to slide away from the first shoulder and toward the leading face of the male member to enhance the fluid seal in response to fluid pressure in the coupling, the sleeve-like member having a groove about its outer circumference and a second generally ring-shaped metal seal positionable in the groove.

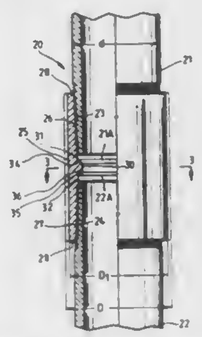
---

### 5,015,017
## THREADED TUBULAR COUPLING
**George B. Geary, 955 E. Bunker Hill, Houston, Tex. 77024**
**Continuation of Ser. No. 28,189, Mar. 19, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 223,678**
**Int. Cl.$^5$ F16L** *25/00*
**U.S. Cl. 285—333** **9 Claims**

1. A tubular coupling for joining together externally API threaded ends of two pipes comprising:

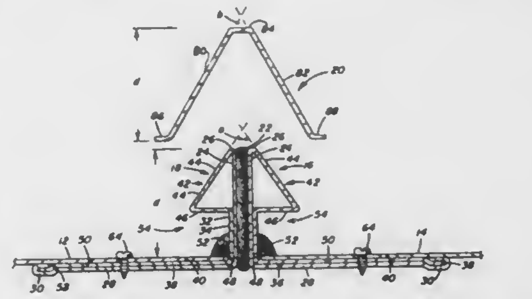
opposing first and second internally API threaded end sections, the internally threaded end sections dimensioned to induce high contact pressure in the threads;

an unthreaded thickened and lengthened center section having first and second tapered internal shoulders joining the first and second end sections, the shoulders having a non-interlocking and non-sealing relationship with the pipe ends.



---

### 5,015,018
## DUCT CONNECTOR
**Peter J. Arnoldt, Clairton, Pa., assignor to Ductmate Industries, Inc., Monongahela, Pa.**
**Continuation-in-part of Ser. No. 218,807, Jul. 13, 1988, Pat. No. 4,867,490, which is a continuation-in-part of Ser. No. 205,305, Jun. 10, 1988, Pat. No. 4,881,762. This application Jul. 28, 1989, Ser. No. 387,338**
**The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.**
**Int. Cl.$^5$ F16L** *23/00*
**U.S. Cl. 285—367** **18 Claims**



1. A duct joint frame for connecting the end portions of a generally circular duct comprising,

a circular frame member arranged to be secured to an end portion of a circular duct, said circular duct having an end portion with an inner surface and a circular edge portion, said circular frame member having free end portions and a circumferential dimension less than the circumferential dimension of the inner surface of said circular duct end portion,

said frame member including;

an inner vertical wall with a top edge portion and an angularly extending bottom flange, a rigidifying means extending from said inner vertical wall adjacent said top edge portion,

an outer vertical wall extending downwardly from said rigidifying means and having an angularly extending top flange with an upper surface, said outer vertical wall angularly extending top flange abutting said inner vertical wall angularly extending bottom flange,

said top flange upper surface arranged to be positioned in abutting relation with the inner surface of said circular duct end portion,

means to form a gap in said frame member between said free end portions and expose a portion of said circular duct edge portion when said circular duct end portion is positioned on said circular frame member,

/OL
126
SS
2
MY
14
1991
UMI

said frame member having a surface arranged to receive a circular seal member, and

means to urge said frame member outwardly against said circular duct inner surface and secure said frame top and bottom flanges to the end portion of said circular duct.

---

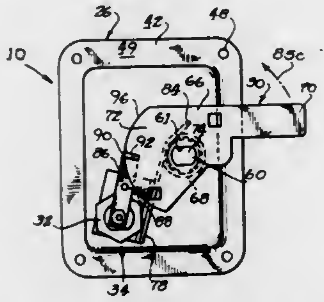
### 5,015,019
### LOCKING MECHANISM FOR EQUIPMENT CABINET

**Robert Razdolsky, Wheeling, Ill., assignor to Reliance Comm/-Tec Corporation, Cleveland, Ohio**

**Filed Apr. 19, 1990, Ser. No. 510,941**

**Int. Cl.$^5$ E05B** *5/02*

**U.S. Cl. 292—200** **16 Claims**



1. A locking mechanism comprising an escutcheon plate having a first side and a second side, a handle portion movably attached to said first side of said escutcheon plate and latch means mounted to said second side of said escutcheon plate and operatively coupled to said handle means; said latch means including catch means mounted to said second side of said escutcheon plate and having an operating portion extending through said escutcheon plate for operation from said first side of said escutcheon plate, said catch means being engageable with said latch means for releasably retaining said latch means in a predetermined position, biasing means for releasably biasing said catch means into engagement with said latch means when said latch means are moved into said predetermined position; a handle locking member for releasably locking said handle portion in an operable position and a blocking portion formed on said handle portion for selectively preventing operational access to said operating portion of said catch means from said first side of said escutcheon plate.

---

### 5,015,020
### VEHICULAR DOOR LOCKIING DEVICE

**Tetsuro Mizuki, Nirasaki, Japan, assignor to Mitsui Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan**

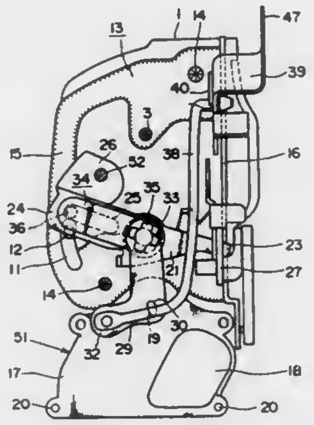
**Filed Jan. 8, 1990, Ser. No. 461,904**

**Claims priority, application Japan, Jan. 11, 1989, 1-3974; Jan. 12, 1989, 1-5443**

**Int. Cl.$^5$ E05C** *3/26*

**U.S. Cl. 292—216** **2 Claims**

1. A vehicular door locking device comprising a locking device body fixed to a door; a latch fastened pivotably to said device body via a shaft and adapted to be engaged with a striker fixed to a chassis; a ratchet fastened pivotably to said device body via a first shaft, adapted to prevent the reverse turning of said latch, and having a first projection; an opening lever mounted pivotably on said first shaft, connected to a door handle, and having an elongated bore extending radially with respect to said first shaft; an actuator joined to said device body; an L-shaped locking lever mounted fixedly on an output shaft of said actuator, adapted to be turned between a locking position and an unlocking position, and having a first arm to which one end portion of a rod extending to a sill knob on said door is connected, and a second arm; and an interlocking member connected pivotably to said second arm via a second shaft and having a second projection engaged with said elongated bore, said first and second shafts being aligned with each other with said first and second projections positioned in a mutually opposed state when said locking lever is in said unlocking position.



---

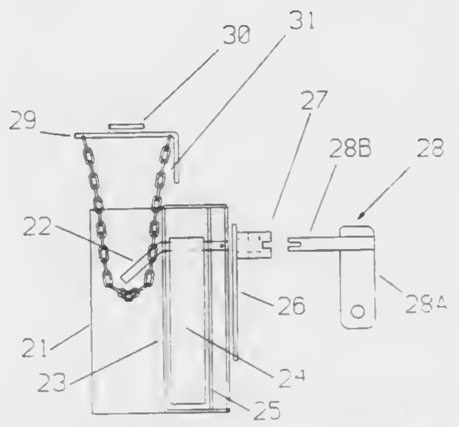
### 5,015,021
### TRASH DUMPSTER LOCK WITH GRAVITY OPERATED RELEASE

**Daniel Wyson, 11637 S. High Mountain Dr., Sandy, Utah 84092, and Travis L. Hendrickson, 45 E. 600 North, Logan, Utah 84321**

**Filed Jan. 30, 1990, Ser. No. 472,040**

**Int. Cl.$^5$ E05C** *3/00*

**U.S. Cl. 292—230** **1 Claim**



1. A locking device for trash dumpsters comprising;

(a) a two part locking device wherein a top part includes a free hanging latch attached to the underside of a dumpster lid, and a bottom part including a weighted latch attached to a side of a dumpster directly beneath said top part; wherein said top and bottom parts are inaccessible from the outside of said dumpster when said dumpster lid is closed except for a small access hole in the dumpster through which a key type device is inserted;

(b) means by wich said parts are engaged when said lid is closed, and disengaged when said dumpster is tipped by means of the rotation of said weighted latch; (c) means by which said weighted latch may be disengaged from said top latch through manual rotation by one authorized to open said dumpster, wherein rotation is accomplished by use of said key type device inserted through said access hole; and

(d) means by which said weighted latch may be locked in the open position.

---

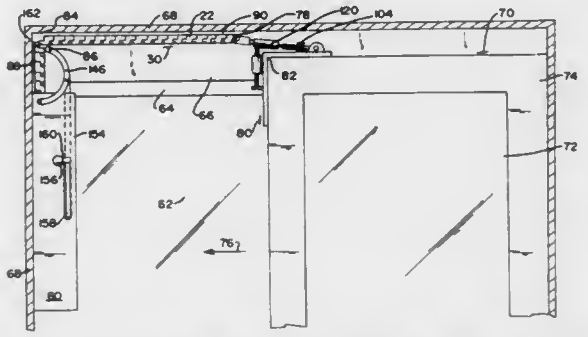
### 5,015,022
### CHAIN LOCK FOR SLIDING DOOR

**Michael D. McGuire, 116 Larchmont Acres West, Larchmont, N.Y. 10538**

**Filed Apr. 28, 1989, Ser. No. 345,129**

**Int. Cl.$^5$ E05C** *17/04*

**U.S. Cl. 292—278** **7 Claims**



1. A lock for a sliding panel comprising chain means for bending in only one direction, said chain means comprising:

a plurality of links;

pin means for joining said links in the chain; and

blocking means, overlying a plane formed by said pin means, for preventing each link from pivoting, with respect to its adjacent link, in a direction of the blocking means;

means for attaching one end of the chain means to the sliding panel;

latching means for holding a portion of the chain means against a corner of a frame;

the attachment means comprising:

bracing means for attaching the end of the chain means to a corner of the sliding panel and for applying resistance to an openward edge of said panel;

horizontal adjustment means for adjusting the position of the chain links in an openward direction; and

vertical adjustment means for adjusting the clearance of the chain to the frame.

---

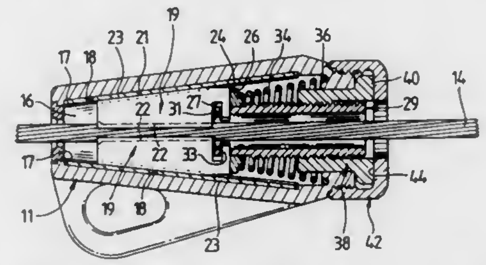
### 5,015,023
### AUTOMATIC CABLE GRIPPING DEVICE

**Gaddis G. Hall, P.O. Box 835, Trussville, Ala. 35173**

**Filed Dec. 11, 1989, Ser. No. 420,170**

**Int. Cl.$^5$ B66C** *1/44;* **F16G** *11/10*

**U.S. Cl. 294—102.1** **25 Claims**



1. Apparatus for gripping a cable or the like comprising:

(a) a housing having an axial bore which tapers from a larger first end to a smaller second end;

(b) a pair of spaced apart planar slide plates mounted to the interior of said housing in opposition;

(c) cable engaging members having opposing cable engaging faces and planar outer faces mounted in sliding contact with said pair of planar slide plates for relative movement therealong said cable engaging faces terminating in a beveled surface which allows insertion of said cable therebetween; and

(d) means for urging said cable engaging members toward said second end such that said opposing cable engaging faces are urged toward abutment with each other, including an annular bearing member positioned within said housing and slidably received within said cable engaging members and a compression spring mounted within said housing and bearing against said annular bearing member to urge said cable engaging members toward said second end.

---

### 5,015,024
### CARRIAGE FOR A STRETCHER

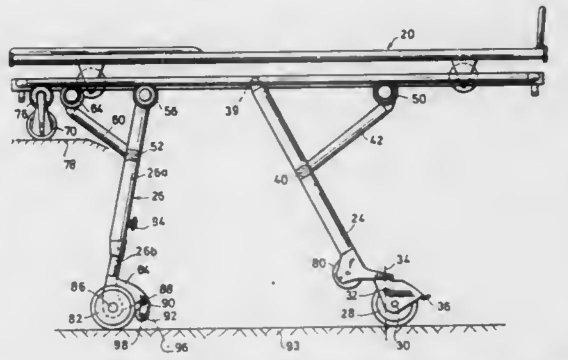
**Guenter Bloemer, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Stollenwerk Fabrik fur Sanitatsaustungen Hans Stollenwerk & Cie GmbH & Co., Fed. Rep. of Germany**

**Filed Aug. 17, 1990, Ser. No. 568,988**

**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1989, 3927484**

**Int. Cl.$^5$ A61G** *1/02*

**U.S. Cl. 296—20** **12 Claims**



1. A carriage for supporting a stretcher, said carriage comprising:

(a) frame means, front legs pivotally mounted to the frame means, and means for locking the front legs in at least two pivotal positions with respect to the frame means,

(b) the front legs including first front roller means mounted to carry the frame means long a first directional path and front steering roller means mounted to carry the frame means along a plurality of directional paths transverse to the first directional path, and

(c) the location of the front roller means and the front steering roller means with respect to each other on the front legs being effective to cause only the first front roller means to support the frame means when the front legs are in one of the pivotal positions and to cause only the front steering roller means to support the frame means when the front legs are in the other pivotal position.

---

### 5,015,025
### VEHICULAR STORAGE DEVICE

**Kenneth R. Henriquez, 4924 Chariton Ave., Tampa, Fla. 33603**

**Filed Jun. 7, 1990, Ser. No. 534,493**

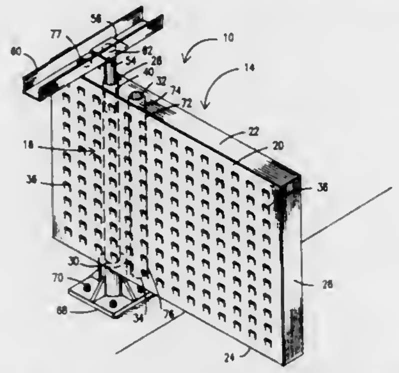
**Int. Cl.$^5$ B60R** *11/06*

**U.S. Cl. 296—37.6** **9 Claims**

1. A vehicular storage device for use in a van or the like comprising a storage panel selectively movable between a first and second position rotatably mounted to the interior of the van by a storage panel support and a storage panel securing mechanism movable between a first and second position such that when said storage panel securing mechanism is in said first position said storage panel securing mechanism secures said storage panel from movement when in said first position and when said storage panel securing mechanism is moved from said first to the second position said storage panel is moved from said first to said second position, said storage panel comprises a pair of substantially vertical storage panel members held in spaced parallel relationship relative to each other by a storage panel frame, said storage panel frame comprising an

OL
126
SS
2
MY
14
1991
UMI

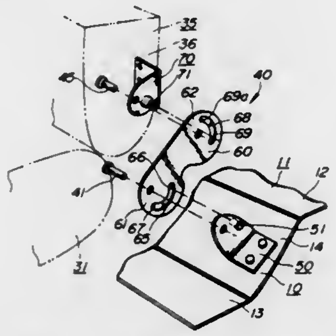
upper and lower substantially horizontal frame member held in spaced relationship relative to each other by at least two substantially vertical frame members, a first upper and lower concentrically aligned aperture is formed through said upper and lower substantially horizontal frame members respectively adjacent one end thereof to operatively receive said storage panel support.



---

### 5,015,026
### AUTOMOBILE SEAT HINGE

**Takayuki Mouri, Kanagawa, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan**
**Filed Jul. 18, 1989, Ser. No. 381,371**
**Claims priority, application Japan, Jul. 21, 1988, 63-96485[U]**
**Int. Cl.⁵ B60N** *2/20*
U.S. Cl. 296—65.1 **7 Claims**



1. In a seat assembly for a vehicle, said seat assembly including a seat cushion which is movable between a riding position in which said seat cushion rests in a predetermined receiving space defined by a vehicular floor and an escaped position in which said seat cushion is removed from said receiving space, leaving said receiving space vacant, and a seat back which is movable between a standing position in which said seat back stands, a stacked position in which said seat back lays on a top surface of said seat cushion when said seat cushion assumes said riding position, and a sunken position in which said seat back occupies said receiving space when said receiving space is evacuated by said seat cushion, and

a hinge mechanism comprising:

a body bracket secured to secured vehicular floor;

a seat back bracket secured to said seat back;

a connector link having a base end portion pivotally connected through a first pivot pin to said body bracket and an upper end portion pivotally connected through a second pivot pin to said seat back bracket, a first arcuate slot located in one of said base end portion of said connector link and said body bracket concentric with said first pivot pin, and a second arcuate slot in one of said upper end portion of said connector link and said seat back bracket concentric with said second pivot pin;

a first stopper pin secured to the other of said base end portion and said body bracket, and slidably engageable with said first arcuate slot; and

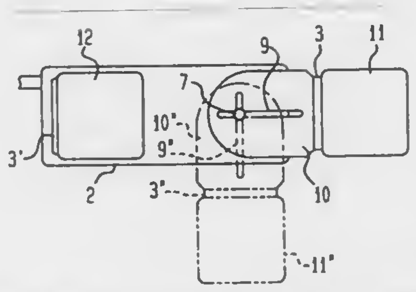
a second stopper pin secured to the other of said upper end portion and seat back bracket, and slidably engageable with said second arcuate slot;

wherein said first and second stopper pins allow said connector link to pivot freely about said first and second pivot pins, respectively.

---

### 5,015,027
### SUN VISOR

**Mahassen S. Rifaat, 636 Valley Rd., Watchung, N.J. 07060**
**Continuation of Ser. No. 250,765, Sep. 28, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 517,406**
**Int. Cl.⁵ B60J** *3/02*
U.S. Cl. 296—97.6 **3 Claims**



1. A visor assembly for a vehicle, said visor assembly comprising:

a first visor body;

a second visor body, said first and second visor bodies being substantially planar;

means for coupling said first and second visor bodies, wherein said means for coupling comprises slidable coupling means and rotatable coupling means;

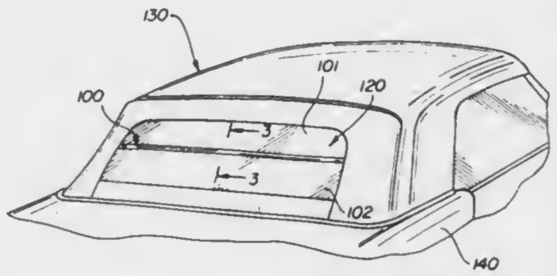
a third visor body; and

further rotatable coupling means coupling said second and third visor bodies for rotation of said third visor body about an axis substantially parallel to the plane of said second visor body.

---

### 5,015,028
### HINGE FOR A FOLDING WINDOW

**Roy E. Bonnett, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.**
**Filed Apr. 3, 1990, Ser. No. 504,368**
**Int. Cl.⁵ B60J** *1/14*
U.S. Cl. 296—107 **18 Claims**



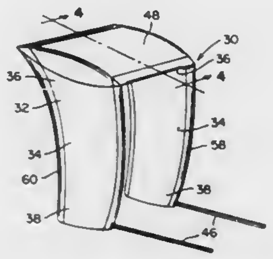
1. A folding window for use in an automobile vehicle having a fold-down convertible top comprising:

a pair of window panes; and

pliable strip means for flexibly connecting together said pair of window panes, said pliable strip means including means for adhering said strip means to said window panes, said pliable strip means allowing said panes to move toward one another in either a first or second opposite folding position.

### 5,015,029
### VEHICLE WITH INTEGRAL COVER

**Jerry D. Kramer, 3880 The Ascent, Atlanta, Ga. 30319**
**Filed Sep. 20, 1990, Ser. No. 585,506**
**Int. Cl.⁵ E04H** *15/06*
U.S. Cl. 296—180.1 **12 Claims**

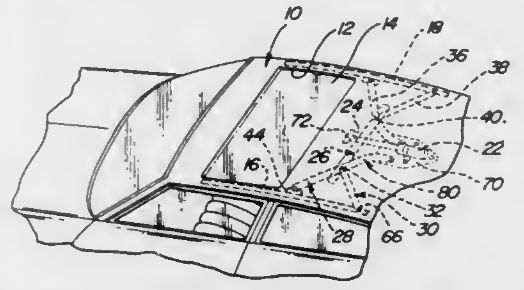


1. In combination a vehicle including front and rear portions and opposite longitudinal sides extending between said front and rear portions and including lower marginal portions, and an inverted, generally U-shaped and hollow housing arch assembly including a pair of upstanding legs having upper and lower ends and an upper transverse portion extending between and interconnecting the upper ends of said legs, the lower ends of said legs being supported relative to generally longitudinal mid-portions of said lower marginal portions of said sides, said housing assembly including a forwardly opening forward portion and a rearwardly opening rear portion, front and rear sets of inverted U-shaped supports bows shiftably supported within said forward and rear portions of said housing arch assembly for movement between retracted positions recessed within said forward and rear portions of said housing arch assembly and extended positions with said forward support bows displaced forwardly out of said front portion and at least some of said front support bows swung forwardly and downwardly over said front portion of said vehicle and said rear support bows swung rearwardly and downwardly over said rear portion, elongated front and rear flexible cover portions of said housing arch assembly supported from said front and rear sets of bows and having rear and front ends, respectively, anchored in said front and rear portions and front and rear ends, anchored to a forwardmost and a rearmost bows, respectively, of said forward and rear sets of bows, said forwardmost and rearmost-bows including closure cap portions for removably closing the front and rear portions of said housing arch assembly.

---

### 5,015,030
### DRIVE LINKAGE FOR AUTOMOBILE SUNROOF

**Clement A. Detloff, Southfield, Mich., assignor to General Motors Corporation, Detroit, Mich.**
**Filed Apr. 7, 1989, Ser. No. 334,638**
**Int. Cl.⁵ B60J** *7/05, 7/057*
U.S. Cl. 296—223 **4 Claims**



1. A drive mechanism for moving a sunroof panel fore and aft along a pair of laterally spaced tracks mounting the sunroof panel in a vehicle body roof, comprising:

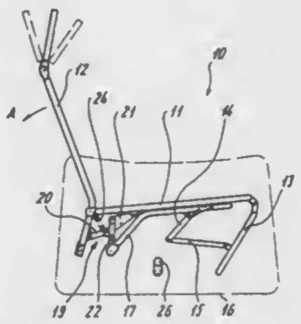
a drive linkage including a first link and a second link each having an outboard end respectively connected to the sunroof panel and to the roof and each having an inboard end pivoted together to define an apex,

and drive means acting between the roof and the apex of the drive linkage to drive the apex fore and aft along an arcuate path between a rearward position in which the drive linkage establishes the sunroof panel at a rearward opened position and a forward position in which the drive linkage establishes the sunroof panel at a forward closed position.

---

### 5,015,031
### RECLINING CHAIR

**Franz Horenkamp, Bielefeld, Fed. Rep. of Germany, assignor to Ferdinand Lusch GmbH & Co. KG., Bielefeld, Fed. Rep. of Germany**
**Filed Aug. 23, 1989, Ser. No. 398,044**
**Claims priority, application Fed. Rep. of Germany, Apr. 20, 1989, 8904979**
**Int. Cl.⁵ A47C** *1/02*
U.S. Cl. 257—84 **4 Claims**



1. A reclining chair, comprising a seat formed as a tubular frame and having a front end; a backrest formed as a tubular frame and directly pivotally connected with said seat; a footrest formed as a tubular frame and directly pivotally connected with said front end of said seat, said footrest being pivotable relative to said seat between a non-use position in which said footrest is located under said seat, and a use position in which it is located approximately at a height of said seat; opposite side walls; stationary braces fixedly arranged on said side walls for supporting said seat and said footrest; hinge bars pivotally connected to said braces and to said footrest for pivoting said foot rest between the non-use and use positions thereof; a multi-partite pivoting fixture for pivotally connecting said brackrest with said seat and said braces; said multi-partite pivoting fixture including a first bar having opposite ends and being pivotally connected to a lower end of said backrest at one of said opposite ends, a second bar pivotally connected to another of said opposite ends of said first bar and to said seat, a pivoting lever pivotally connected to said second bar and one of said braces and first and second abutment pins secured to said first and second bar, respectively, for limiting pivotal movement of said second bar relative to said first bar and of said pivoting lever relative to said second bar; and an end abutment mounted on said braces for limiting a pivotal angle of said hinge bars to thereby limit pivotal movement of said footrest relative to said seat.

---

### 5,015,032
### CHAISE LOUNGE WITH ADJUSTABLE CANOPY

**Gerald J. Felling, 230 Arroyo Rd., P.O. Box 294, Lagunitas, Calif. 94938**
**Continuation-in-part of Ser. No. 482,190, Feb. 20, 1990, which is a continuation-in-part of Ser. No. 385,057, Jul. 26, 1989, abandoned. This application Mar. 20, 1990, Ser. No. 496,520**
**Int. Cl.⁵ A47C** *7/62*
U.S. Cl. 297—184 **18 Claims**

1. A sheltering lounge chair usable for sun bathing and the like comprising

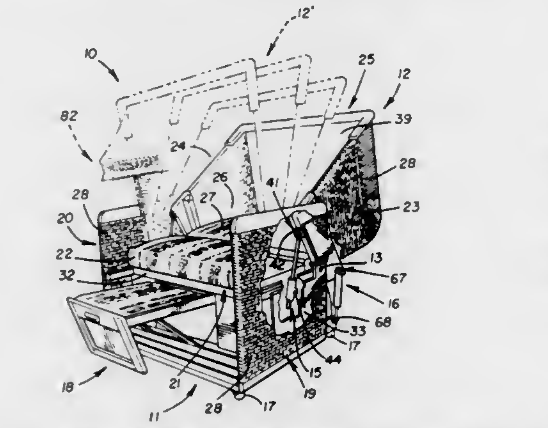
a base frame having laterally spaced and vertically disposed

VOL 1126
ISS 2
MY 14
1991
UMI

sides and a horizontally disposed top adapted to retain a seating cushion thereon,

a normally upright canopy frame having laterally spaced and vertically disposed sides, a top and a normally upright back all secured together to form a hood open on its frontal side,

pivot means for pivotally mounting a rearward end of each side of said canopy frame on a rearward and upper end of a respective one of the sides of said base frame for permitting said canopy frame to be moved through an infinite number of positions between its normal upright position to



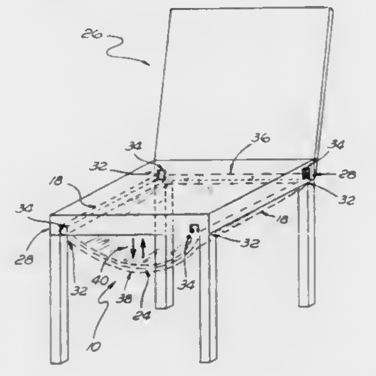
form a seating arrangement and a fully lowered position placing the back of said canopy frame in at least general horizontal alignment with the top of said base frame to form a bed, and

combined holding and locking means pivotally interconnected, forwardly of said pivot means, between a lower forward end of each of the sides of said canopy frame and a respective side of said base frame for selectively and releasably holding and locking said canopy frame in a selected lowered position between its upright and fully lowered positions.

---

### 5,015,033
### UNDERSEAT RECEPTACLE FOR PURSES AND OTHER POSSESSIONS

**Deana Winters, 2015 Ahlin Dr., La Canada, Calif. 91011**
**Filed Dec. 20, 1989, Ser. No. 453,766**
**Int. Cl.$^5$ A47C** *7/62*
U.S. Cl. 297—192 1 Claim



1. An article holder for attachment to a piece of furniture having an accessible underside surface with empty space proximate thereto, such as a chair, or the like, said holder comprising:

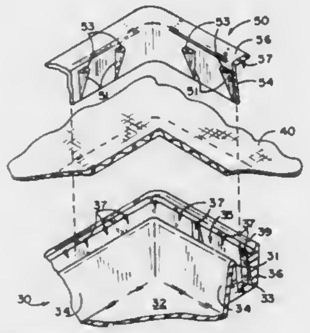
a piece of flexible material having a perimeter and having an elastic cord, or the like, (disposed along at least a portion of its) which extends around the entire perimeter of said flexible material, wherein said elastic cord has opposite ends joined to form a continuous length which is slightly shorter than the perimeter of the piece of flexible material such that the elastic memory of the cord contracts said cord about the perimeter of the material, thereby causing the material to gather together; and

means for attaching the material to a selected piece of furniture, wherein said attaching means are disposed about the perimeter of the piece of material such that (said) at least a portion of the perimeter associated with said cord is downwardly pullable away from said underside surface, thereby creating between said underside surface and the material, an opening through which articles are introduced into and removed from the holder.

---

### 5,015,034
### UPHOLSTERY SYSTEM

**Alan L. Kindig; Kenneth M. Lindberg, and Bradford J. Burrows, all of Holland, Mich., assignors to Prince Corporation, Holland, Mich.**
**Continuation of Ser. No. 408,084, Sep. 15, 1989, abandoned, which is a continuation-in-part of Ser. No. 276,917, Nov. 25, 1988, Pat. No. 4,890,883. This application Oct. 9, 1990, Ser. No. 595,798**
**Int. Cl.$^5$ A47C** *7/54*
U.S. Cl. 297—227 5 Claims



1. A vehicle accessory comprising:

a substrate having a generally U-shaped channel along an edge thereof and including at least one tab gripping surface along at least one side of said generally U-shaped channel;

upholstery material overlying said substrate and having an edge extending over said channel; and

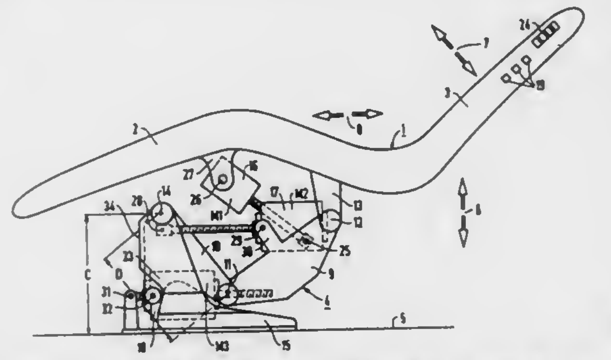
'a trim member having a first portion and a second portion joined along a common edge, a plurality of spaced locking tabs on at least one surface of said first portion, and a plurality of spaced elongated upholstery engaging pins extending from a surface of said second portion parallel to and spaced from said first portion of said trim member, said locking tabs on said first portion of said trim member lockably engage said tab engaging surface on said substrate to hold said trim member in place in said U-shaped channel and said pins on said second portion of said trim member grip said upholstery material holding it in place in said U-shaped channnel.

---

### 5,015,035
### DENTAL PATIENT CHAIR

**Klaus Stoeckl, and Bernd Becker, both of Bensheim, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**
**Filed Dec. 14, 1989, Ser. No. 450,618**
**Claims priority, application European Pat. Off., Dec. 14, 1988, 88120938.1**
**Int. Cl.$^5$ A47C** *1/02*
U.S. Cl. 297—345 14 Claims

1. In a dental patient chair having a seat with a backrest and position means for adjusting a seat height, an inclined position of the seat and backrest, as well as the position of the seat and backrest with reference to a longitudinal direction of the chair to a base on a standing plane, the improvements comprising said position means including two articulated arms pivotably connected to one another to form a first pivot, a first of said two arms having a free end connected to a pedestal at a point above the standing plane to form a second pivot, said second of said two articulated arms having a free end pivotably con-

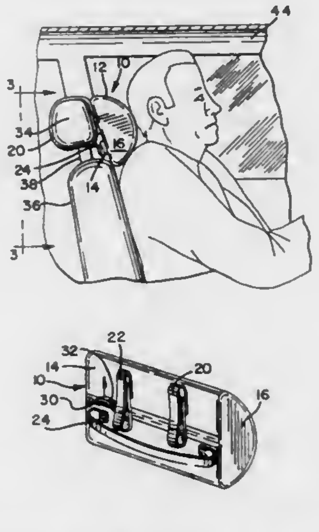


nected to a member connected to said seat to form a third pivot, separately controllable adjustment drive means being provided for adjusting the articulated arms and control means for actuating the adjustment drive means for the purpose of changing the chair position, said adjustment drive means having a first adjustment drive means for adjusting the first articulated arm with regard to the second articulated arm, a second adjustment drive means for adjusting the first articulated arm with regard to the pedestal and a third adjustment drive means for adjusting the seat with regard to the second arm.

---

### 5,015,036
### APPARATUS FOR USE AS HEADREST

**B. Christine Fergie, Anaheim, Calif., assignor to Decorator Discount DBA Decor Resource, Fullerton, Calif.**
**Filed Oct. 20, 1986, Ser. No. 920,592**
**Int. Cl.$^5$ A47C** *1/10*
U.S. Cl. 297—397 13 Claims



1. An apparatus useful as a headrest in conjunction with a first seat having a back of a given width having a latitudinal axis and a head support extending generally upwardly from said first seat and having a width smaller than the width of said first seat back or with a second seat having a back with a latitudinal axis and a head support extending generally upwardly from said second seat back, said apparatus comprising:

pillow means defined by mutually opposing end walls, a curved sidewall and an opposing sidewall, and adapted to be removably secured to said head support of said first seat or said second seat so that the head or neck of a human person seated in said first seat or said second seat contacts said curved sidewall;

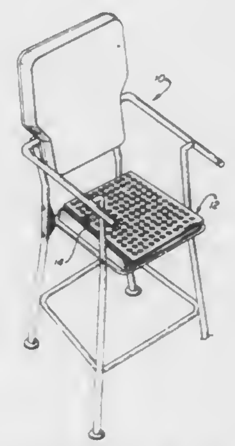
at least one first securement means affixed to said pillow means and capable of being placed around said head support of said first seat substantially parallel to the latitudinal axis of said first seat back to removably secure said pillow means to said head support of said first seat; and

at least two second securement means affixed to said pillow means and capable of being placed around said head support of said second seat substantially transverse to the latitudinal axis of said second seat back to removably secure said pillow means to said head support of said second seat.

---

### 5,015,037
### CHAIR ASSEMBLY HAVING NON-SLIP SEAT

**Elizabeth Giblin, and Jay P. Giblin, both of 85 Bradley Ave., Meriden, Conn. 06450**
**Filed Nov. 28, 1989, Ser. No. 442,163**
**Int. Cl.$^5$ A47C** *7/02*
U.S. Cl. 297—452 13 Claims



1. A chair assembly comprising, in combination:

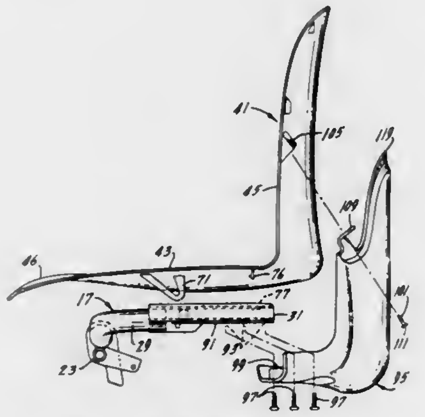
a chair, including a seat portion having a smooth upper surface; and

a thin, flat, compliant pad dimensioned and configured to substantially cover said upper surface of said seat portion, said pad being freely disposed upon said seat portion surface with one face thereof lying in direct contact therewith, said pad being about 0.06 to 0.125 inch thick, and being devoid of covering layers and integrally formed, as a single piece, from a solid, rubbery material having a durometer value of about 30 to 50, a tensile strength of at least about 2000 pounds per square inch, and a coefficient of friction of at least about unity, as determined in combination with a smooth surface of wood, said pad having an array of apertures formed therethrough and arranged substantially entirely thereover, each of said apertures being defined by a sharp peripheral edge at the juncture thereof with the other face of said pad, and providing an opening of about 0.05 to 0.3 square inch, said apertures cumulatively defining an open area constituting about 20 to 30 percent of the total area of said pad, whereby said pad inherently exhibits high levels of conformability to, and slip resistance with, said seat portion surface, good mechanical interengagability with supple members pressed upon said other face thereof, and good strength and durability characteristics.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,038
### ERGONOMIC SEAT AND BACK STRUCTURE FOR A CHAIR

**Walter C. Mrotz, III, North Muskegon, Mich., assignor to The Shaw-Walker Company, Muskegon, Mich.**
**Continuation of Ser. No. 364,965, Jun. 12, 1989, abandoned. This application Sep. 10, 1990, Ser. No. 581,069**
**Int. Cl.$^5$ A47C** *7/02*
U.S. Cl. 297—457 **8 Claims**

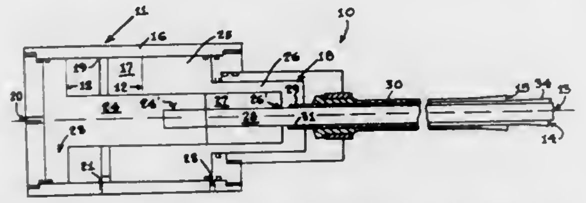


1. A chair construction, including:
a flexible, resilient inner shell formed of a plastic and having a seat portion with side edges,
a pair of supports formed separately from said inner shell and located below said seat portion of said inner shell, each of said supports engaging and supporting said seat portion along a side edge of said seat portion,
means attaching said seat portion of said inner shell to said supports to limit upwardly, laterally, rearwardly and forwardly movement of said seat portion of said inner shell relative to said supports when no weight is applied to said seat portion while not interfering with the downwardly flexing of said seat portion relative to said supports when weight is applied to said seat portion,
said means including loops extending from said seat portion and mounted for limited downward movement relative to said supports as the seat portion flexes downwardly when weight is applied thereto.

---

### 5,015,039
### HYDRAULICALLY ACTUATED MECHANICAL ROCK EXCAVATOR

**Sterling J. Anderson, Maple Grove, Minn., assignor to The United States of America as represented by the Department of the Interior, Washington, D.C.**
**Filed Jan. 8, 1990, Ser. No. 461,950**
**Int. Cl.$^5$ E21C** *37/02*
U.S. Cl. 299—22 **3 Claims**

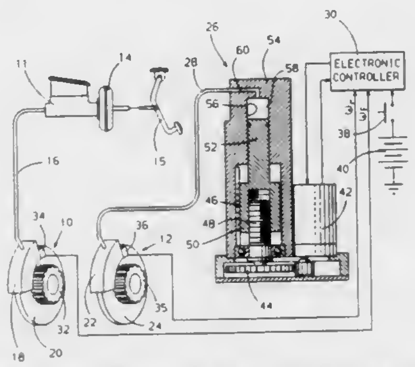


3. A hydraulically actuated mechanical excavating apparatus adapted to enter a drill hole in a hard compact material, such as rock, and place the adjacent material into a state of axial tension by combined affect of radial and axial loads to effect the breaking and excavation of material from the surrounding means; wherein, the apparatus comprises:
a cylinder housing member with a stop element and a plurality of ports;
a first piston head member disposed on one side of said stop element and a second piston head member disposed on the opposite side of said stop element;
a thrust rod member operatively secured with said first piston head member and projecting through said cylinder housing member;
a wedge unit comprising an elongated generally hollow cylindrical wedge member operatively secured on one end to said second piston head member and projecting through the cylinder housing member in a surrounding relationship relative to said thrust rod member; and,
a feather unit comprising an elongated generally hollow cylindrical feather member secured on one end to the cylinder housing member and being disposed in a surrounding relationship relative to the thrust rod member and the wedge member; wherein, the other end of the feather member is provided with a plurality of feather segments; wherein, the other end of the wedge member is provided with an outwardly extending conical bearing surface; and, the inner periphery of the other end of the feather segments are provided with a conical recess which coincides with the conical bearing surface on the wedge member when the wedge has been withdrawn.

---

### 5,015,040
### ELECTRONIC CONTROL DYNAMIC BRAKE PROPORTIONING

**William C. Lin, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.**
**Filed Nov. 9, 1989, Ser. No. 433,806**
**Int. Cl.$^5$ B60T** *8/82*
U.S. Cl. 303—93 **3 Claims**

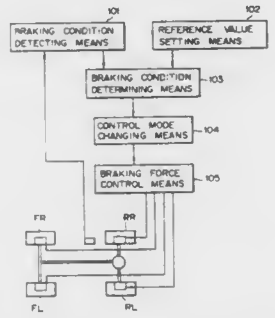


1. A brake control method for a vehicle having a front wheel brake unit for applying a brake torque to the front wheel in accord with a vehicle operator braking demand and a rear wheel brake unit for applying a brake torque to the rear wheel, the method comprising the steps of:
sensing the rotational speed of the front wheel;
sensing the rotational speed of the rear wheel;
sensing the vehicle operator braking demand;
determining a normalization factor, in the absence of a sensed vehicle operator braking demand, for normalizing the sensed rotational speed of the rear wheel to the sensed rotational speed of the front wheel;
normalizing the sensed rotational speed of the rear wheel to the sensed rotational speed of the front wheel in accord with the determined normalization factor when a vehicle operator braking demand is sensed;
comparing the rotational speed of the front wheel and the normalized sensed rotational speed of the rear wheel;
controlling the rear wheel brake unit when a vehicle operator braking demand is sensed to (A) increase the applied brake torque to the rear wheel while the normalized sensed rotational speed of the rear wheel is greater than the sensed rotational speed of the front wheel and (B) decrease the applied brake torque to the rear wheel the normalized sensed rotational speed of the rear wheel is less than the sensed rotational speed of the front wheel, whereby the normalized sensed speed of the rear wheel is maintained substantially at the sensed rotational speed of the front wheel.

---

### 5,015,041
### ANTI-SKID CONTROL SYSTEM FOR AN AUTOMOTIVE VEHICLE

**Kazutaka Kuwana, Toyota; Tsuyoshi Yoshida, Oobu; Kenji Tozu, Kariya, and Shinsuke Sakane, Toyota, all of Japan, assignors to Aisin Seiki K.K., Aichi, Japan**
**Filed Dec. 21, 1989, Ser. No. 454,253**
**Claims priority, application Japan, Dec. 24, 1988, 63-327424**
**Int. Cl.$^5$ B60T** *8/58*
U.S. Cl. 303—95 **7 Claims**


101
102
BRAKING CONDITION DETECTING MEANS
REFERENCE VALUE SETTING MEANS
BRAKING CONDITION DETERMINING MEANS
103
CONTROL MODE CHANGING MEANS
104
BRAKING FORCE CONTROL MEANS
105
FR
RR
FL
RL

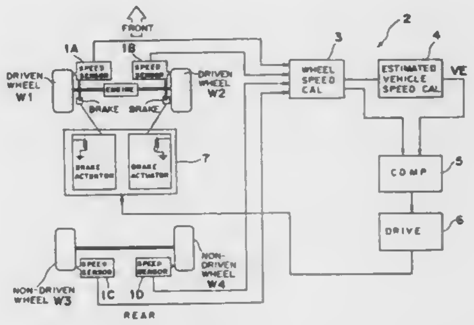
1. An anti-skid control system for controlling a braking force applied to road wheels of a vehicle, comprising:
braking condition detecting means for detecting at least one running condition of said vehicle in a braking operation and producing a detached signal corresponding to said running condition;
reference value setting means for setting a reference value representing a predetermined running condition of said vehicle corresponding to said one running condition;
braking condition determining means for comparing said detected signal with said reference value and producing a braking condition signal in response to a result of comparison;
control mode changing means for selectively providing one control mode of a simultaneous control mode for controlling simultaneously a braking force applied to both of a pair of right and left rear road wheels and an independent control mode for controlling independently a braking force applied to each of said right and left rear road wheels in response to said braking condition signal; and
braking force control means for controlling said braking force applied to said road wheels in accordance with said control mode provided by said control mode changing means.

---

### 5,015,042
### ANTILOCK CONTROL DEVICE

**Masato Yoshino, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**
**Filed Dec. 20, 1989, Ser. No. 454,003**
**Claims priority, application Japan, Dec. 21, 1988, 63-322832**
**Int. Cl.$^5$ B60T** *8/60*
U.S. Cl. 303—96 **10 Claims**

1. A small diameter wheel detecting system used in a vehicle comprising:
sensor means for sensing wheel speed of each of wheels mounted in said vehicle and for detecting a highest wheel speed, a second highest wheel speed and a lowest wheel speed;
first detector means for detecting a first condition such that a difference between the second highest wheel speed and the lowest wheel speed is greater than a first threshold and, at the same time, a difference between the highest wheel speed and the second highest wheel speed is greater than a second threshold;
a first timer for counting a first predetermined time period; and

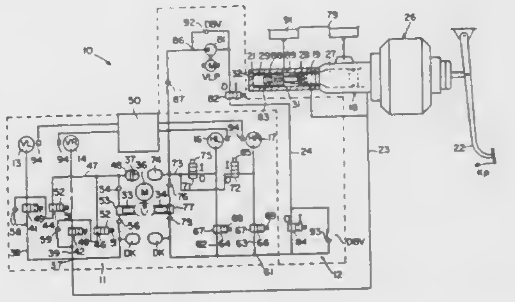


an identifying means for identifying, when said first condition lasts longer that said first predetermined time period, the wheel with said highest wheel speed as a small diameter wheel.

---

### 5,015,043
### DRIVE-SLIP CONTROL DEVICE (ASR) ON A ROAD VEHICLE ALSO EQUIPPED WITH AN ANTI-LOCK SYSTEM (ABS)

**Reinhard Resch, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany**
**Filed Dec. 26, 1989, Ser. No. 457,294**
**Claims priority, application Fed. Rep. of Germany, Jan. 13, 1989, 3900851**
**Int. Cl.$^5$ B60T** *8/34, 8/48, 8/44*
U.S. Cl. 303—100 **19 Claims**



1. A drive-slip control (ASR) for a wheel brake system of a road vehicle having driving and driven wheels and equipped with an anti-lock system (ABS) and having a hydraulic dual-circuit static brake system, in which one static brake circuit is assigned to the driving vehicle wheels and another static brake circuit to the driven vehicle wheels and which two brake circuits are each connected to a respective outlet-pressure space of a brake unit provided for brake actuation;
wherein at least on the brake circuit (II) of the driven vehicle wheels, the ABS works on the return-flow principle wherein during pressure-reduction phases of the anti-lock control, a quantity of brake fluid, corresponding to a quantity of brake fluid flowing off from the wheel brake(s) undergoing the ABS control, is fed into a return line connected to a buffer accumulator and is pumped back into the brake unit by a return pump means which has an

VOL
1126
ISS
2
MY
14
1991
UMI

inlet side connected to the buffer accumulator and an outlet side connected to the brake unit;

wherein the ASR works on the principle of decelerating a vehicle wheel tending to spin by subjecting its wheel brake to pressure from an auxiliary-pressure source so that its drive slip remains within a value range compatible with a sufficient dynamic stability of the vehicle;

wherein for the drive-slip control mode, the return pump means of the ABS, returning brake fluid from the brake circuit of the driven vehicle wheels, is utilized as the auxiliary-pressure source from which pressure is supplied to the wheel brake(s) is pressure build-up phases;

wherein there is an ASR control valve means which can be changed over from a basic position, said basic position being a valve position in which brake fluid can be positively displaced into the wheel-brake cylinders of the brakes of the driven vehicle wheels as a result of the actuation of the brake unit during a normal braking mode, into an alternative functional position, said alternative functional position being a valve position in which brake fluid is prevented from flowing off from the main brake line of the brake circuit of the driven vehicle wheels towards the respective outlet-pressure space of the brake unit;

wherein a supply flow path leads from a brake fluid reservoir of the brake unit through a piston of the brake unit and a delivery outlet of the pressure space of the brake unit to the inlet of the return pump means; and

wherein an inlet control valve is connected in the supply path between the delivery outlet and the inlet of the return line of the brake circuit and which is changed over from a basic position assigned to a braking mode to a functional position assigned to the ASR mode for the duration of control cycles of the drive-slip control.

---

### 5,015,044
### BRAKING PRESSURE REGULATING DEVICE

**Dieter Kircber, Frankfurt am Main; Peter Volz, Darmstadt, and Hans Wupper, Friedrichsdorf, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt, Fed. Rep. of Germany**

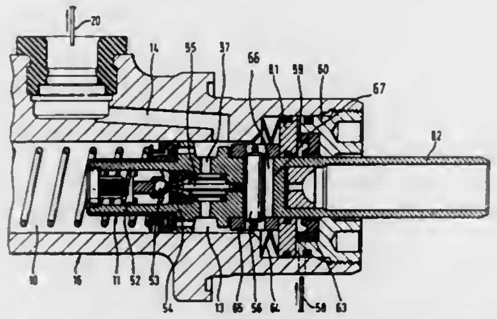
**PCT No. PCT/EP88/00587, § 371 Date May 8, 1989, § 102(e) Date May 8, 1989, PCT Pub. No. WO89/01890, PCT Pub. Date Mar. 9, 1989**

**PCT Filed Jul. 4, 1988, Ser. No. 359,750**

**Claims priority, application Fed. Rep. of Germany, Aug. 25, 1987, 3728307; Feb. 19, 1988, 3805218**

**Int. Cl.⁵ B60T *8/44***

**U.S. Cl. 303—114** **14 Claims**



1. A braking pressure regulating anti-lock control and traction slip control device for hydraulic brake systems of automotive vehicles, comprising in combination: a master cylinder with at least one working piston, and at least one working chamber, a supply reservoir for pressure fluid, a pressure modulator for the variation of the hydraulic pressure in the wheel cylinders of the wheel brakes during the braking pressure control mode, said pressure modulator including inlet and outlet valves for the wheel cylinders, an electronic control unit for the control of the valves of the modulator, at least one motor-driven pump for generating a hydraulic pressure, the working chamber of the master cylinder being applied by pump pressure in the braking pressure control mode and the working piston of the master cylinder being movable in the direction of its initial position caused by the pump pressure, a regulating valve being provided in at least one working piston which, in the braking pressure control mode, regulates the pressure fluid flow in the hydraulic fluid cycle composed of the at least one pump, the at least one working chamber of the master cylinder and the supply reservoir, including means for displacing the switching positions of the regulating valve incorporated in the working piston into the master cylinder in the braking pressure control mode.

---

### 5,015,045
### HYDRAULIC BRAKING SYSTEM

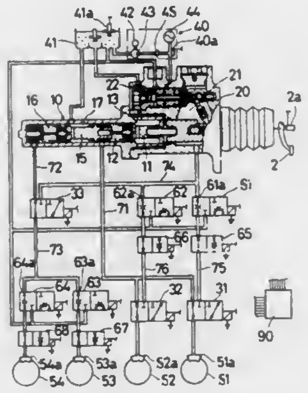
**Michiharu Nishii, Aichi, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan**

**Filed Oct. 2, 1989, Ser. No. 415,790**

**Claims priority, application Japan, Sep. 30, 1988, 63-248496**

**Int. Cl.⁵ B60T *13/12, 8/48***

**U.S. Cl. 303—114** **8 Claims**



1. A hydraulic braking system comprising;

a hydraulic pressure generator means for generating a hydraulic braking pressure in response to depression of a brake pedal,

a plurality of wheel cylinders communicating with the hydraulic pressure generator via at least one hydraulic conduit of a plurality of circuits,

an anti-lock control apparatus disposed between the hydraulic pressure generator and a wheel cylinder of at least one of said plurality of circuits and communicating with a supplementary pressure source via at least one orifice means and regulating the hydraulic pressure supplied to the wheel cylinder of at least one circuit of said plurality of circuits to prevent a locking condition of the road wheels by selective change over between a first operation position and a second operation position, and

a changeover valve disposed between the wheel cylinder of at least one circuit of said plurality of circuits and the orifice means and selectively changed over between a first operation position for communicating the wheel cylinder of at least one circuit of said plurality of circuits with the hydraulic pressure generator and for blocking the communication to the orifice means in the conventional braking operation so that the hydraulic pressure from the hydraulic pressure generator is supplied directly to the wheel cylinder via the changeover valve independent of the operation position of the anti-lock-control apparatus, and a second operation position for blocking the wheel cylinder from the hydraulic pressure generator and for communicating with the orifice means in the anti-lock control operation.

---

### 5,015,046
### FLUID CONTROL DEVICE AND BRAKING SYSTEM

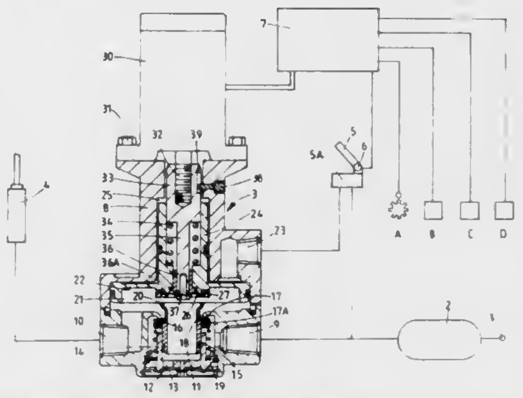
**Martin Bissell, Birmingham, Great Britain, assignor to Lucas Industries Public Limited Company, Birmingham, England**

**Filed May 23, 1989, Ser. No. 355,350**

**Claims priority, application United Kingdom, May 25, 1988, 8812360**

**Int. Cl.⁵ B60T *13/68***

**U.S. Cl. 303—118** **17 Claims**



1. A fluid control device comprising:

a first fluid flow path having fluid inlet port means and fluid outlet port means;

first valve means for controlling fluid flow in said first flow path between said inlet and outlet port means;

a second fluid flow path including said fluid outlet port means and an exhaust port means;

second valve means for controlling fluid flow in said second flow path between said outlet port means and said exhaust port means;

a movable valve control member operatively associated with said first and second valve means so that movement of said valve control member in one direction operates said first valve means to allow fluid pressure to be applied through said first flow path from said fluid inlet port means through said outlet port means, and movement of said valve control member in a direction reverse to said one direction causes said second valve means to operate to allow fluid pressure to be applied through said second flow path from said outlet port means through said exhaust port means;

electrical stepper motor means operatively connected to said valve control member for positively moving said valve control member in both of said one and reverse directions; and

control signal means operatively connected to said stepper motor means for operating said stepper motor means and controlling said movements of said valve control member.

---

### 5,015,047
### DRAWER SUPPORT ASSEMBLY

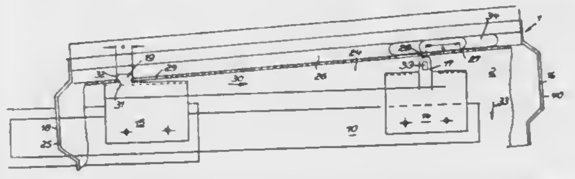
**Hans Nock, Rohrdorf, Fed. Rep. of Germany, assignor to Hafele KG, Nagold, Fed. Rep. of Germany**

**Filed Dec. 26, 1989, Ser. No. 456,332**

**Claims priority, application Fed. Rep. of Germany, Dec. 31, 1988, 8816223**

**Int. Cl.⁵ A47B *88/00***

**U.S. Cl. 312—335** **13 Claims**



1. Support assembly for a drawer, a drawer frame or the like comprising laterally spaced guide rails extending in a first direction, a drawer is detachably mounted on said rails, means for displacing said drawer relative to said guide rails in the first direction, said means comprises two spaced side pieces extending in the first direction, means for selectively supporting said side pieces on said guide rails in at least two different positions spaced apart in the first direction with two different positions spaced a distance apart, said selectively supporting means comprises a part on one of said side pieces and said guide rails engageable in at least two different spaced positions in the other one of said side pieces and guide rails, said part comprises a plug-in member engageable in an opening in the other one of said side pieces and guide rails, said guide rails each comprise a stationery rail and a movable rail displaceable in the first direction relative to said stationery rail, said plug-in connection comprises a first bracket and a second bracket spaced apart in the first direction and secured to said movable rail, said brackets project upwardly from said movable rail, said opening for said first bracket comprises two cut-out portions in said side pieces with said cut-out portions spaced a distance a apart so that said first bracket can be selectively inserted into one of said cut-out portions, and said opening for said second bracket comprises a slot elongated in the first direction and formed in said side piece with said slot having a length a+b, and said bracket has a base with a length equal to b and said slot has ends spaced apart in the first direction and serving alternatively as abutments for a first edge and a second edge facing in the first direction of said second bracket.

---

### 5,015,048
### CLOSING DEVICE FOR DRAWERS

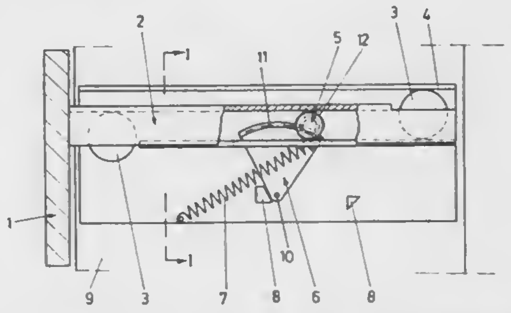
**Eberhard Brunnert, Elchingen, Fed. Rep. of Germany, assignor to Julius Blnm Gesellschaft m.b.H., Hochst, Austria**

**Filed Dec. 15, 1989, Ser. No. 450,995**

**Claims priority, application Austria, Dec. 23, 1988, 3144/88**

**Int. Cl.⁵ A47B *88/00, 95/00***

**U.S. Cl. 312—319** **32 Claims**



1. A closing device, for use in an article of furniture including a furniture body and a drawer slidable in opposite directions into and out of the furniture body, for moving the drawer to a fully inserted position within the furniture body, said closing device comprising:

a holding member to be pivotally mounted with respect to one of the drawer or the furniture body, said holding member having a contact zone in the shape of a circular arc;

a tension pinion member to be rotatably mounted at a fixed position on the same one of the drawer or the furniture body on which said holding member is to be pivotably mounted;

said pinion member having first means for engagement with a portion of the other of the furniture body or the drawer that extends parallel to the directions of movement of the drawer into and out of the furniture body, such that as the drawer is moved into and out of the furniture body engagement between such portion and said first means causes rotation of said pinion member;

said pinion member having second means engaging said

VOL
1126
ISS
2
MY
14
1991
UMI

contact zone of said holding member such that rotation of said pinion member causes pivotal movement of said holding member; and

spring means acting on said holding member such that:

as the drawer is moved in a direction outwardly of the furniture body, said first means causes rotation of said pinion member in a first direction of rotation and said second means thereby causes pivoting of said holding member against the force of said spring means in a first direction of pivoting, thus storing energy in said spring means; and

upon release of the force of movement of the drawer in the direction outwardly of the furniture body, the stored energy in said spring means pivots said holding member in a second direction of pivoting opposite to said first direction of pivoting, said second means thereby causes rotation of said pinion member in a second direction of rotation opposite to said first direction of rotation, and said first means thereby is operable to cause the drawer to slide in a direction into the furniture body to the fully inserted position.

---

### 5,015,049

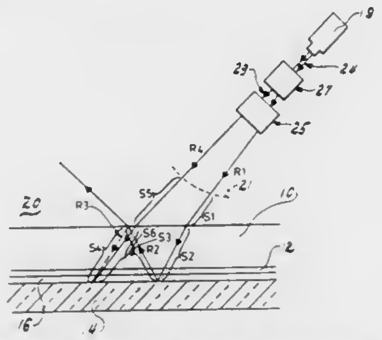
## METHOD OF FORMING HOLOGRAPHIC OPTICAL ELEMENTS FREE OF SECONDARY FRINGES

**Byung J. Chang, Ann Arbor, Mich., assignor to Kaiser Optical Systems, Ann Arbor, Mich.**

**Continuation of Ser. No. 927,341, Nov. 4, 1986, abandoned, which is a continuation of Ser. No. 613,901, May 24, 1984, abandoned. This application Nov. 23, 1988, Ser. No. 277,466**

**Int. Cl.$^5$ G03H *1/04***

U.S. Cl. 350—3.81 6 Claims



1. The method of constructing a reflection holographic optical element free of secondary interference fringes comprising:

forming a planar transparent supporting substrate having a predetermined thickness and first and second surfaces;

disposing a layer of transparent photosensitive material on said second surface of said transparent supporting substrate, said layer of photosensitive material having a first surface in contact with said second surface of said transparent supporting substrate and a second surface;

forming a first light beam from a polychromatic point source having a predetermined spectral bandwidth, said predetermined spectral bandwidth forming an effective coherence length inversely proportional thereto;

illuminating said transparent supporting substrate and said layer of photosensitive material through said first surface of said transparent supporting substrate with said first light beam;

reflecting said first light beam after it passes through said layer of photosensitive material from a reflecting surface disposed in immediate proximity to said second surface of said layer of photosensitive material, thereby forming a second light beam which passes through said layer of photosensitive material and said transparent supporting substrate; and

developing said layer of photosensitive material;

whereby said predetermined spectral bandwidth of said first beam is selected having an effective coherence length greater than the distance along the light path from said first surface of said photosensitive material to said reflecting surface and reflected to said first surface of said photosensitive material such that the intersection of said first light beam and said second light beam forms interference fringes of high contrast throughout said layer of photosensitive material and said predetermined spectral bandwidth of said first light beam is selected having an effective coherence length less than the distance along the light path from said second surface of said photosensitive material to said reflecting surface, reflected to said first surface of said supporting substrate and further reflected to said second surface of said photosensitive material such that the intersection of said first light beam and a third light beam formed by the reflection of said second light beam from said first surface of said transparent supporting substrate caused by the difference in index of refraction between said transparent supporting substrate and the ambient media beyond said first surface of said transparent supporting substrate does not form interference fringes of high contrast anywhere within said layer of photosensitive material.

---

### 5,015,050

## Fθ LENS SYSTEM IN OPTICAL SCANNER

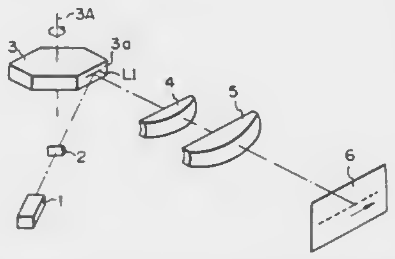
**Akihisa Itabashi, Mitaka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,691**

**Claims priority, application Japan, Dec. 22, 1988, 63-324383; Mar. 20, 1989, 64-67924; Mar. 28, 1989, 64-76355; May 31, 1989, 64-137805; Jun. 19, 1989, 64-156554; Aug. 24, 1989, 64-218055; Nov. 15, 1989, 64-297170**

**Int. Cl.$^5$ G02B *26/08, 3/04***

U.S. Cl. 350—6.8 6 Claims



1. An fθ lens system in an optical scanner in which a light beam from a light source is formed as a linear image extending in a main scanning corresponding direction and is deflected at an equiangular velocity by a rotary polygon mirror having a reflecting face in the vicinity of an image forming position of the linear image and is then formed by an image forming lens system in the shape of a spot on a scanned face to optically scan the scanned face, said fθ lens system focusing and forming the light beam deflected by the rotary polygon mirror as an image on the scanned face, said fθ lens system having a function for connecting a reflecting position of the rotary polygon mirror and the scanned face in an approximately conjugate relation in geometrical optics with respect to a secondary scanning direction, and having an fθ function with respect to a main scanning direction,

said fθ lens system comprising two groups of first and second lenses sequentially arranged from the side of the rotary polygon mirror toward the scanned face side,

said lenses having first to fourth lens faces provided from the side of said rotary polygon mirror and having shapes on a deflecting plane sequentially composed of an arc, a straight line, a straight line and an arc from the first to fourth lens faces, said first lens having negative refracting power on a plane parallel to the deflecting plane, and second lens having positive retracting power on the plane parallel to the deflecting plane,

said first to fourth lens faces being respectively constructed by a concave barrel type toric face having a radius of curvature on a deflecting perpendicular plane reduced as this face is separated from an optical axis, a convex cylindrical or planar face having a refracting power on only the deflecting perpendicular plane, a concave cylindrical face having a refracting power on only the deflecting perpendicular plane, and a convex toric face having a large curvature on the deflecting perpendicular plane, a center of curvature on a generatrix of said barrel type toric face being situated on an opposite side to said generatrix with respect to a rotation axis of said barrel type toric face,

a combined focal distance $f_S$ on the deflecting perpendicular plane and a radius $r'_3$ of curvature of the third lens face on the deflecting perpendicular plane satisfying the following condition,

$$1.6 \leqq |r'_3/f_S| \leqq 3.1.$$

---

### 5,015,051

## INTEGRATED SINGLE-MODE ISOLATOR WAVEGUIDE AND APPLICATION TO A SEMICONDUCTOR LASER

**Jean-Paul Castera, Orsay; Paul-Louis Meunier, Paris; Alain Carenco, Fontenay-Aux-Roses; Jean-Marie Dupont, Les Ulis, and Pierre Friez, Paris, all of France, assignors to Thomson-CSF, Paris and Etat Francais, Issy Les Moulineaux, both of, France**

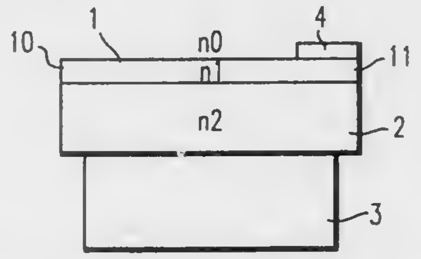
**PCT No. PCT/FR88/00166, § 371 Date Dec. 7, 1988, § 102(e) Date Dec. 7, 1988, PCT Pub. No. WO88/08148, PCT Pub. Date Oct. 20, 1988**

**PCT Filed Apr. 5, 1988, Ser. No. 301,890**

**Claims priority, application France, Apr. 7, 1987, 87 04890**

**Int. Cl.$^5$ G02B *6/10***

U.S. Cl. 350—96.12 11 Claims



1. Integrated, single-mode isolator waveguide comprising:

a substrate,

a guide layer (1), implanted in the substrate, the guide layer having an input and an output,

a polarizing device (4) placed at one end (11) of the guide layer and oriented so as to eliminate a polarization mode of an entering beam from the output, and

at least one heating means (3) associated with the guide layer.

---

### 5,015,052

## OPTICAL MODULATION AT MILLIMETER-WAVE FREQUENCIES

**Richard W. Ridgway, Westerville; Milton R. Seiler, Worthington, and Van E. Wood, Delaware, George T. Ruck, Worthington, all of Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio**

**Filed Jul. 20, 1989, Ser. No. 383,399**

**Int. Cl.$^5$ G02B *6/10***

U.S. Cl. 350—96.13 17 Claims

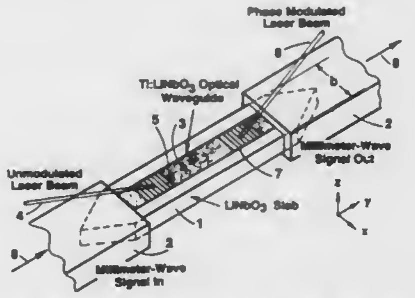
1. Apparatus for modulation of optical signals at millimeter-wave frequencies comprising

a thin elongate slab of dielectric material having such thickness as to partially confine, and propagate as a guided wave therein, a polarized electrical signal at millimeter-wave frequencies,

a thinner optical waveguide to substantially confine and guide therein an optical signal, having at least one elongate surface adjacent to an elongate surface of the dielectric slab,

means for directing a polarized optical signal into the optical waveguide to propagate in a lengthwise direction therein,

means for directing the optical signal out of the topical waveguide after it has traversed a predetermined distance therein, and


Phase Modulated Laser Beam
6
8
Ti:LiNbO3 Optical Waveguide
5
3
b
2
Millimeter-Wave Signal Out
7
Unmodulated Laser Beam
4
LiNbO3 Slab
1
z
y
x
8
2
Millimeter-Wave Signal In

means for directing an electrical signal into the dielectric slab in the same direction as that of the optical signal in the optical waveguide, and at a center frequency such that it propagates at a phase velocity substantially matching the phase velocity of the optical signal;

the apparatus being free of electrically conductive material in the proximity of the dielectric slab and the optical waveguide in the region thereof that is traversed by the optical signal, thereby providing efficient electrooptic modulation.

---

### 5,015,053

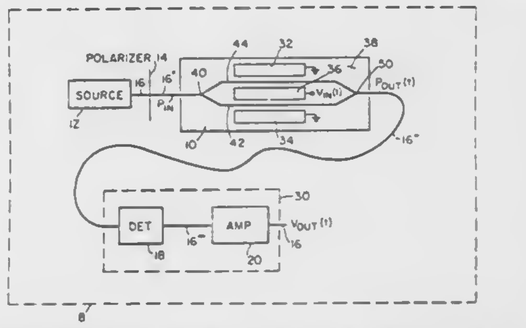
## REDUCTION OF MODULATOR NON-LINEARITIES WITH INDEPENDENT BIAS ANGLE CONTROL

**Leonard M. Johnson, Carlisle, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 343,039, Apr. 25, 1989. This application Sep. 8, 1989, Ser. No. 404,755**

**Int. Cl.$^5$ G02B *6/10;* G02F *1/01***

U.S. Cl. 350—96.14 43 Claims



1. A method for reducing intermodulation distortion caused by cubic modulator non-linearity in a modulation system comprising the steps of:

(a) providing a carrier wave having an intensity and first and second polarization components;

(b) adjusting the magnitude of the first polarization component relative to the magnitude of the second polarization component;

(c) setting the modulator phase biases of the first polarization component and the second polarization component; and

(d) modulating the intensity of the carrier wave with an electrical signal such that the cubic modulator non-

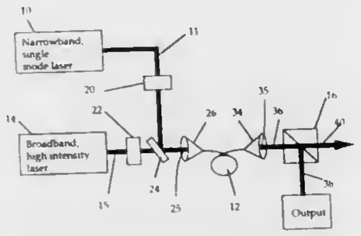
VOL
1126
ISS
2
MY
14
1991
UMI

linearity of the first polarization component cancels the cubic modulator non-linearity of the second polarization component, thereby reducing intermodulation distortion.

### 5,015,054
### APPARATUS AND METHOD FOR INCREASING THE BANDWIDTH OF A LASER BEAM

**Paul H. Chaffee, Bolina, Calif., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Feb. 26, 1990, Ser. No. 484,304**
**Int. Cl.$^5$ G02B *6/26***
**U.S. Cl. 350—96.15** **23 Claims**

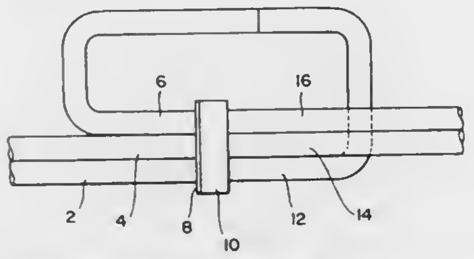

10
Narrowband, single mode laser
11
20
22
14
Broadband, high intensity laser
26
34
35
36
16
40
24
15
25
12
38
Output

1. An optical modulation apparatus, comprising:
a first laser having a narrowband beam output;
a second laser having a broadband beam output;
a birefringent optical material having a first principal axis and a second principal axis extending from an optical entrance to an optical exit;
a means for coupling a single polarization of the narrowband laser beam into the entrance of the birefringent optical material along the first principal axis;
a means for coupling a single polarization of the broadband laser beam into the entrance of the birefringent laser material along the second principal axis;
a means for coupling an output beam from the exit of the birefringent optical material; and,
a means for selecting a single polarization of the output beam from the optical material, so that the polarization selected corresponds to the first principal axis of the optical material.

### 5,015,055
### POLARIZATION COUPLER

**Hisashi Takamatsu, Kawasaki; Norihisa Naganuma, Yokohama, and Kenichi Abe, Yamato, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan**

**Filed Jun. 18, 1990, Ser. No. 539,220**
**Claims priority, application Japan, Jun. 19, 1989, 1-154661**
**Int. Cl.$^5$ G02B *6/26***
**U.S. Cl. 350—96.15** **11 Claims**

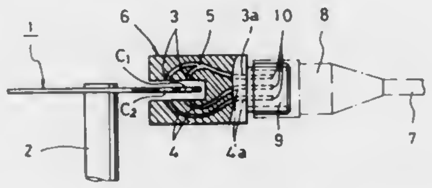


1. A polarization coupler, comprising:
a first polarization maintaining fiber for transmitting first input light therethrough while maintaining a polarization plane of the same;
a second polarization maintaining fiber having a geometrical center axis disposed in parallel to a geometrical center axis of said first polarization maintaining fiber for transmitting therethrough second input light having a polarization plane perpendicular to the polarization plane of the first input light while maintaining the polarization plane of the second input light;
a third polarization maintaining fiber having a geometrical center axis disposed in parallel to the geometrical center axes of said first and second polarization maintaining fibers on a plane including the geometrical center axes of said first and second polarization maintaining fibers:
a rotator for rotating the polarization planes of light outputted from said first, second and third polarization maintaining fibers by a predetermined angle in a same direction:
a birefringent plate for separating light having polarization planes rotated by said rotator individually into ordinary rays of light and extraordinary rays of light;
a fourth polarization maintaining fiber having a geometrical center axis disposed on an extension line of the geometrical center axis of said first polarization maintaining fiber for introducing the ordinary ray of light originating from the first input light into said third polarization maintaining fiber while maintaining the polarization plane of the ordinary ray of light;
a fifth polarization maintaining fiber having a geometrical center axis disposed on an extension line of the geometrical center axis of said second polarization maintaining fiber for transmitting therethrough the extraordinary ray of light originating from the first input light and the ordinary ray of light originating from the second input light while maintaining the polarization planes of the same; and
a sixth polarization maintaining fiber having a geometrical center axis disposed on an extension line of the geometrical center axis of said third polarization maintaining fiber for transmitting therethrough the extraordinary ray of light originating from the second input light and the ordinary ray of light originating from light outputted from said third polarization maintaining fiber while maintaining the polarization planes of the same.

### 5,015,056
### PHOTOINTERRUPTOR FOR USE IN LIGHT-TRANSMISSION TYPE ROTARY ENCODER

**Kazuo Yamaguchi; Yoshi Kurosawa; Seiichi Sato, all of Tokyo; Atsushi Ueda, and Masami Matsumura, both of Hyogo, all of Japan, assignors to Optec D.D. Melco Laboratory Co., Ltd.; Optec Dai-Ichi Denko Co., Ltd., both of Higashikurume and Mitsubishi Denki Kabushiki Kaisha, Tokyo, all of, Japan**

**Filed Sep. 11, 1990, Ser. No. 580,645**
**Claims priority, application Japan, Sep. 12, 1989, 1-106131[U]**
**Int. Cl.$^5$ G02B *6/26, 6/40;* G06K *7/10***
**U.S. Cl. 350—96.15** **1 Claim**

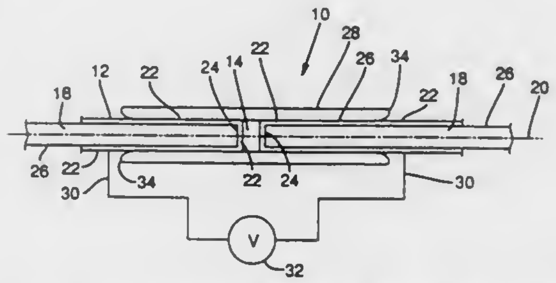


1. A photointerruptor for use in a light transmission type rotary encoder comprising:
(A) a photointerruptor main body having:
a plurality pair of light emitting optical fibers and light receiving optical fibers resin-molded therein, each pair of light emitting and light receiving optical fibers being disposed such that their end faces are opposed with each other on both sides of each of a plurality of code patterns formed circumferentially on a pulse scale,
said light emitting optical fibers which are joined by way of an optical branching device into a light input end and said light receiving optical fibers being extended in parallel with each other through said photointerruptor and,
(B) an adaptor integrally formed to said photointerruptor main body and through which the light input end of said light emitting optical fibers and the light emitting ends of said light receiving optical fibers are extended and arranged such that they are collectively connected with corresponding core wires of a multi-cored transmission optical fiber cable by way of a light connector respectively.

### 5,015,057
### LIQUID CRYSTAL FIBER OPTIC ATTENUATOR AND PROCESS FOR MAKING SAME

**Scott H. Rumbaugh, Lake Oswego; Michael D. Jones, Portland; Friedrich Scheu, Bend, and Philip J. Bos, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.**

**Filed Sep. 21, 1989, Ser. No. 410,565**
**Int. Cl.$^5$ G02B *6/26;* C09K *19/00, 19/52;* G02F *1/13***
**U.S. Cl. 350—96.15** **23 Claims**



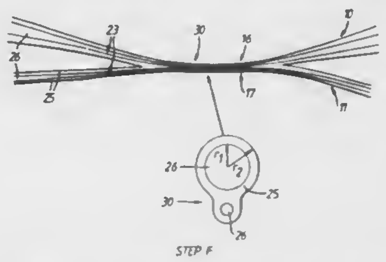
1. In a system including an optical fiber having multiple sections, a liquid crystal optical attenuator for selectively changing the intensity of a light beam propagating along an optical path through the optical fiber, comprising:
a liquid crystal film disposed between adjacent sections of the optical fiber, the liquid crystal film including liquid crystal material contained within substantially disk-shaped microdroplets having a greater portion of their surface areas disposed generally perpendicularly to the optical path, the liquid crystal material having a molecular orientation in a relaxed state that scatters a large proportion of the light beam out of the optical path;
retaining means including a tubular housing for retaining the liquid crystal film between the adjacent sections of the optical fiber; and
field means for generating within the liquid crystal film an electric field of a character that alters the orientation of the liquid crystal material to change its light scattering properties and thereby controllably modulate the intensity of the light beam propagating through the optical fiber.

### 5,015,058
### ASYMMETRIC FIBRE OPTIC COUPLERS AND THEIR FABRICATION

**David A. Thorncraft, Isabella Plains; Peter R. A. Lyons, Kaleen; Scott C. Rashleigh, Waniassa; Johnathan A. Maine, Mawson, and John D. Love, Flynn, all of Australia, assignors to The Commonwealth of Australia, Australia**

**PCT No. PCT/AU88/00174, § 371 Date Feb. 2, 1989, § 102(e) Date Feb. 2, 1989, PCT Pub. No. WO88/09943, PCT Pub. Date Dec. 15, 1988**
**PCT Filed Jun. 6, 1988, Ser. No. 334,381**
**Claims priority, application Australia, Jun. 5, 1987, PI2342/87; Dec. 4, 1987, PI5750/87**
**Int. Cl.$^5$ G02B *6/26***
**U.S. Cl. 350—96.15** **15 Claims**

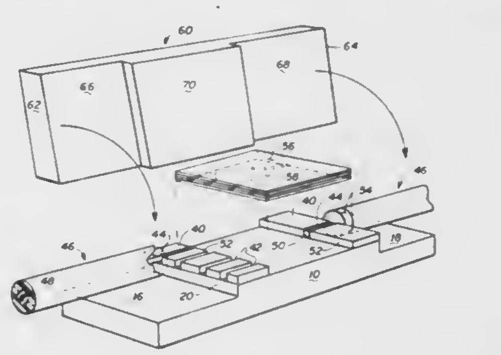
15. An asymmetric multi-mode fiber optic coupler having at least four optical fiber branches of at least two different core and cladding diameters but substantially equal cladding refractive indices, wherein the fiber branches further have substantially equal effective refractive indices for their respective highest order cladding modes.



### 5,015,059
### OPTICAL FIBER CONNECTOR ASSEMBLIES AND METHODS OF MAKING THE ASSEMBLIES

**Bruce L. Booth, West Chester, Pa., and Joseph E. Marchegiano, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 144,002, Jan. 15, 1988, Pat. No. 4,883,743. This application Jun. 1, 1989, Ser. No. 360,048**
**Int. Cl.$^5$ G02B *6/30***
**U.S. Cl. 350—96.17** **15 Claims**

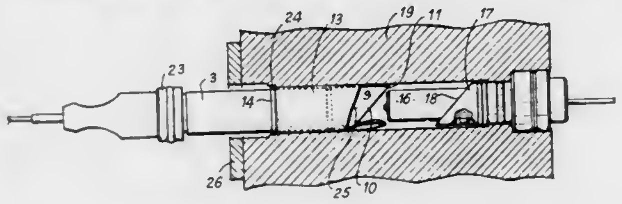


6. An optical fiber connector assembly for connecting optical fibers having a core, cladding and a jacket in an optical fiber system comprising:
a pedestal having two ends, a surface adjacent each of the ends, each of the surfaces for contacting the jacket of one of the optical fibers, and a raised step between the surfaces;
means for receiving the core and the cladding of the optical fibers on two end portions of the step near the pedestal surfaces; and
an optical waveguide device on the step between the end portions, the device having a buried waveguide having an optical axis, wherein the buried waveguide has five ends adapted to input and output light, each one of the waveguide ends are connected to the other waveguide ends, one of the waveguide ends is adjacent one of the two end portions of the step, the other four waveguide ends are adjacent to the other one of the two end portions of the step, such that light injected into the one waveguide end is divided in the waveguide and exits through the other four waveguide ends and light injected into each of the other four waveguide ends exits through the one waveguide end,
such that when the cores and the claddings are in the means for receiving on the two end portions of the step, optical axes of the cores are substantially in alignment with the optical axis of the buried waveguide.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,060
### CONNECTOR FOR OPTICAL FIBRE CABLES

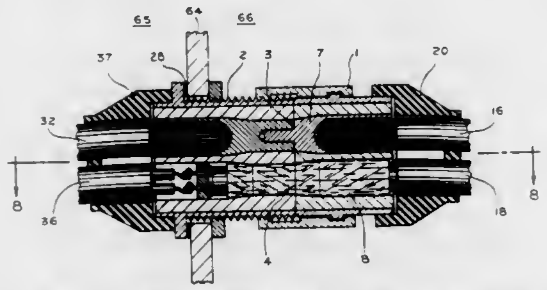
**Didier Y. F. Tamagno, Rocbaron; Georges L. J. M. Mas, Saint-Tropez, and Alain F. E. A. Navelier, La Garde, all of France, assignors to Societe ECA, Assnieres, France**
**Filed Jan. 5, 1990, Ser. No. 461,388**
**Claims priority, application France, Jan. 10, 1989, 89 00207**
**Int. Cl.$^5$ G02B** *6/36*
**U.S. Cl. 350—96.20** **12 Claims**



1. A connector for cables, such as cables having optical fibres, comprising a body having a bore, a male element and a female element which are interconnected within the body, said elements each comprising means for obtaining a mutual angular positioning of said elements by an inclined surface surrounding the respective elements, a tearable protective hood covering the female element means in the body for immobilizing the hood in the body; and means provided on an end portion of the female element for cutting and tearing the hood from inside the hood during connection of said male and female elements.

### 5,015,061
### OPTICAL CONNECTOR

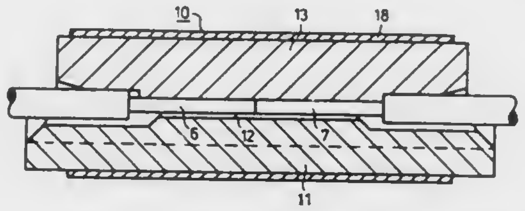
**Gabriel M. Giannini, 51555 Madison St., Indio, Calif. 92201**
**Continuation of Ser. No. 130,468, Dec. 9, 1987, Pat. No. 4,844,582. This application May 8, 1989, Ser. No. 348,951**
**Int. Cl.$^5$ G02B** *6/26, 6/36*
**U.S. Cl. 350—96.20** **7 Claims**



1. A pair of mating connectors for transferring optical signals from at least one fiber-optic cable to another optical device which comprises:
- each of said connectors having a mating interface shaped and dimensioned to intimately contact the mating interface of the other connector;
- means, for transferring said optical signals, comprising at least one optical terminal in optical alignment with said cable and with said other optical device when said mating interfaces are brought together; and
- at least one channel in each of said connectors opening into said interface, each of said channels having a frusto-oconical area tapering towards said mating interface, wherein each of said terminals occupies one of said channels each said terminals has a corresponding frustroconical sections dimensioned to intimately rest within said frustroconical area and to prevent any axial movement of said terminal toward said interfaces;
- wherein each of said channels has an hexagonal, radial cross-section; and
- wherein each of said terminal comprises a spherical lens in two half sections; said sections being housed in two opposite channels of said connectors so that the two half sections abut each other in a complete spherical lens configuration when said mating interfaces are brought together.

### 5,015,062
### SPLICE UNION FOR THE MECHANICAL JOINING OF TWO LIGHT WAVEGUIDES

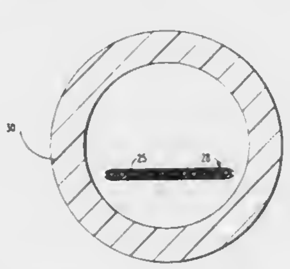
**Lothar Finzel, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**
**Filed Nov. 28, 1989, Ser. No. 442,544**
**Claims priority, application Fed. Rep. of Germany, Dec. 2, 1988, 3841081; Aug. 1, 1989, 3925826**
**Int. Cl.$^5$ G02B** *6/38*
**U.S. Cl. 350—96.21** **5 Claims**



1. A splicing device for the mechanical joining of two light waveguides at a joint, said device having a bottom part for fixing the position of ends of the light waveguides to be joined and a cover part to be pressed on the bottom part over the light waveguide ends, further comprising a metal sleeve, which is slipped onto the cover and bottom parts and is deformed in the slipped-on state by radially oriented external forces which permanently deform the metal sleeve into at least one space disposed in the region of the joint.

### 5,015,063
### OPTICAL FIBER CABLE CORE

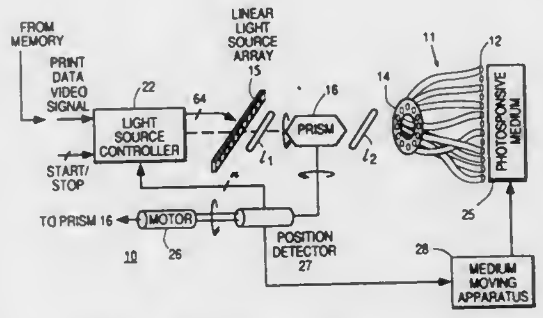
**Andrew J. Panuska, Buford, and Parbhubhai D. Patel, Dunwoody, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Oct. 25, 1989, Ser. No. 427,061**
**Int. Cl.$^5$ G02B** *6/44*
**U.S. Cl. 350—96.23** **17 Claims**



1. An optical fiber cable core, which has a longitudinally extending centrally disposed axis, said optical fiber cable core including:
- at least one optical fiber transmission medium; and
- a tubular member which has a length and a circular cross section and which encloses said at least one optical fiber transmission medium, said at least one optical fiber transmission medium having a length in excess over the length of the tubular member wherein the excess length and the cross sectional area of the optical fiber transmission medium in said tubular member and the inner diameter of said tubular member being such as to avoid bending losses caused by excessive curvature in the optical fiber transmission medium and by excessive interactive engagement of the optical fiber transmission medium with an inner wall of the tubular member and wherein said tubular member comprises a plastic material which is characterized by a relationship between applied load and strain which is substantially linear up to a strain corresponding to the excess length of the optical fiber transmission medium at a given temperature.

### 5,015,064
### ELECTRONIC PRINTER OR SCANNER USING A FIBER OPTIC BUNDLE

**Robert H. Detig, Berkeley Heights; Michael Sidey, Middletown, and Li-Shin Wang, Highland Park, all of N.J., assignors to Photon Imaging Corp., Edison, N.J.**
**Filed Apr. 5, 1990, Ser. No. 505,031**
**Int. Cl.$^5$ G02B** *6/04*
**U.S. Cl. 350—96.24** **13 Claims**

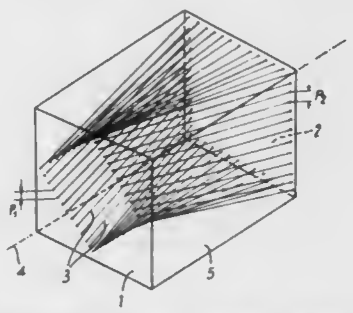


1. Apparatus including a plurality of optical fibers; said fibers; having first and second ends thereof organized in a linear array and in an annulus or ring array several fibers deep; in first and second faces respectively, means for selectively generating a pattern of light and means for moving an image of said pattern of light through a succession of positions on said annulus constituting a complete revolution thereabout, and wherein said plurality of fibers comprises a bundle of optical fibers and said means for selectively generating said pattern of light comprises a linear array of light sources and video signal means for controlling the on-off states of said sources for each of said positions.

### 5,015,065
### OPTICAL ANAMORPHOSER AND METHOD OF MANUFACTURE

**Jean Pollard, Villebois-sur-Yvette; Robert Duchamp, Montpellier, and Patrick Truchot, Champs-Sur-Marne, all of France, assignors to Societe d'Etudes et de Recherches de l'Ecole Nationale Superieure d'Arts et Metiers, Paris, France**
**PCT No. PCT/FR88/00307, § 371 Date Dec. 14, 1989, § 102(e) Date Dec. 14, 1989, PCT Pub. No. WO88/10439, PCT Pub. Date Dec. 29, 1988**
**PCT Filed Jun. 14, 1988, Ser. No. 458,753**
**Claims priority, application France, Jun. 18, 1987, 87 08513**
**Int. Cl.$^5$ G02B** *6/04*
**U.S. Cl. 350—96.24** **5 Claims**

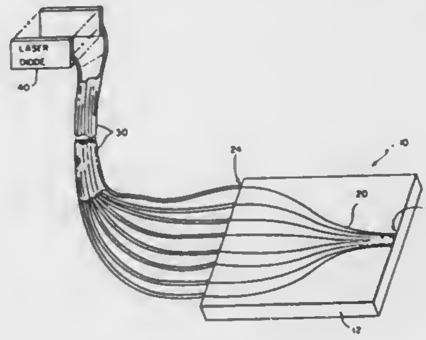
1. A method of manufacturing an optical anamorphoser having a plurality of light guides of individually constant diameter where each light guide defines one pixel and wherein the light guides extend in an embedding solid body between a first surface in which one ends of the light guides defines a regular first geometrical arrangement of pre-determined first pitch and a second surface in which the other ends of the light guides define a second geometrical arrangement similar to said first geometrical arrangement, but at a second pitch which is scaled relative to said first pitch, comprising:
- (1) forming fibers having individually the same diameter as said light guides into a bundle of fibers where the fibers of the bundle are spaced apart from each other such that the spacing disposes the fibers in said first geometrical arrangement having a longitudinal axis of the bundle of fibers;
- (2) fixing one ends of the fibers in a first plate and fixing the other ends of the fibers in a second plate, with said plates being disposed perpendicular to the longitudinal axis of the bundle of fibers and being spaced apart a pre-determined distance;
- (3) rotating at least one of said plates relative to the other plate through a pre-determined angular amplitude so as to twist said bundle of fibers about its longitudinal axis;



- (4) maintaining said twisted bundle of fibers and fixing at least a portion of the twisted bundle of fibers in that twisted configuration by embedding said twisted bundle of fibers in a hardenable resin;
- (5) allowing the resin to harden into a solid body; and
- (6) slicing the solid body perpendicularly to the said longitudinal axis of the bundle of fibers so as to form at least two parallel planes, which plates are positioned relative to said longitudinal axis so as to form said first and second surfaces.

### 5,015,066
### MULTICHANNEL WAVEGUIDE PRINT HEAD WITH SYMMETRIC OUTPUT

**Paul J. Cressman, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**
**Filed May 29, 1990, Ser. No. 529,303**
**Int. Cl.$^5$ G02B** *6/08, 27/00*
**U.S. Cl. 350—96.27** **6 Claims**



1. A multichannel waveguide print head comprising:
- a substrate;
- a plurality of optical waveguides formed in a fan pattern, having a narrow end and a wide end, on a surface of said substrate, with each of said plurality of waveguides having a width different from its adjacent neighbor;
- a plurality of optical fibers, each having a first end and a second end, with said first end coupled to an associated one of said optical waveguides adjacent the wide end of said fan pattern; and
- a plurality of light sources each coupled to an associated one of said plurality of optical fibers at said second end, whereby light from said light sources causes a printing on

VOL
1126
ISS
2
MY
14
1991
UMI

a medium when the narrow end of the fan pattern is adjacent to the medium.

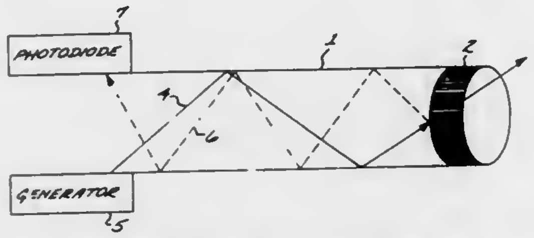
### 5,015,067
## OPTICAL FIBER POWER OUTPUT MEASURING MEANS

**Jeffrey I. Levatter, San Diego, Calif., assignor to Acculase, Inc., San Deigo, Calif.**

**Continuation of Ser. No. 144,181, Jan. 15, 1988, abandoned. This application Jan. 6, 1989, Ser. No. 294,989**

**Int. Cl.$^5$ G02B** *6/02, 6/16*

**U.S. Cl. 350—96.29** **5 Claims**



1. An optical fiber assembly adapted for use with a system for measuring the intensity of light transmitted by the assembly, comprising:

an optical fiber including a light-transmitting core and a protective cladding, wherein the fiber has a proximal end and a distal end; and

a fluorescent material encircling the core of the optical fiber at or near the fiber's distal end, the fluorescent material absorbing a small portion of light transmitted along the fiber to its distal end and generating fluorescent light in response, substantially independent of any material located adjacent to the fiber's distal end, a portion of the fluorescent light being transmitted back along the optical fiber, from the fiber's distal end to the proximal end.

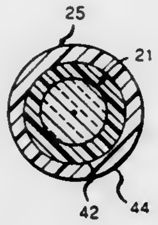
### 5,015,068
## COATED OPTICAL FIBER AND METHODS OF MAKING

**James R. Petisce, Norcross, Ga., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Feb. 15, 1990, Ser. No. 480,414**

**Int. Cl.$^5$ G02B** *6/10*

**U.S. Cl. 350—96.30** **9 Claims**



1. A coated optical fiber, comprising:

an optical glass fiber;

an inner coating material which engages and encloses the optical glass fiber; and

an outer coating material which engages and which encloses the inner coating material, the coating materials being ones which are characterized as being curable upon exposure to different portions of the light spectrum in that one of coating materials absorbs light energy in the visible light spectrum and the other in the ultraviolet light spectrum.

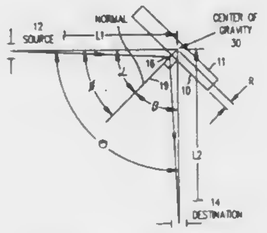
### 5,015,069
## OFF AXIS ROTATION OF DIFFRACTION GRATING

**Raymond G. Bryan, and Louis Hlousek, both of Reno, Nev., assignors to Linear Instruments, Reno, Nev.**

**Filed Feb. 17, 1989, Ser. No. 312,537**

**Int. Cl.$^5$ G02B** *5/18, 26/06*

**U.S. Cl. 350—162.17** **10 Claims**



1. An optical system comprising:

a substrate;

a diffraction grating formed on a surface of the substrate;

means for rotating the substrate on an axis of rotation which intersects the substrate at a point other than at the surface on which is formed the diffraction grating.

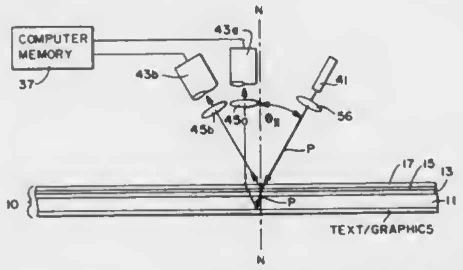
### 5,015,070
## REFERENCE GRID FOR OPTICAL SCANNER

**James R. Montgomery, Menlo Park, and Larry L. Mohr, Pleasanton, both of Calif., assignors to Mouse Systems Corporation, Fremont, Calif.**

**Filed Mar. 14, 1989, Ser. No. 323,424**

**Int. Cl.$^5$ G02B** *27/00;* **G01V** *9/04*

**U.S. Cl. 350—163** **45 Claims**



37. An optical scanner system for reading images, text or characters positioned on a text/graphics sheet, the system comprising:

a scanner pad that is positioned adjacent to the text/graphics sheet, that is at least partly transparent when viewed by light at a first wavelength $\lambda_1$ in the visible range, and that is highly reflective when viewed by light produced by a light source of a second wavelength $\lambda_2$, the pad comprising:

a layer of optical coating that is at least partly transparent when viewed by light at wavelength $\lambda_1$ and is substantially fully reflective when viewed by light at wavelength $\lambda_2$.

a grid of lines, positioned between the light source and the optical coating, where the grid lines are visible when viewed by light at wavelength $\lambda_2$; and

a base layer of plastic or glass material, positioned adjacent to at least one of the grid of lines and the optical coating, that is transparent when viewed by light at wavelength $\lambda_1$, the thickness of this layer being at least two mils;

memory means for storing text or graphics that are read from the text/graphics sheet:

a radiation source capable of producing a light beam having a wavelength component $\lambda_1$ and a light beam having a wavelength component of $\lambda_2$, positioned above the scanner pad to produce and direct a small beam of light, alternatingly having a wavelength component of $\lambda_1$ and having a wavelength component of $\lambda_2$, along an incident light beam path toward the scanner pad, which is positioned between the radiation source and the text/graphics sheet, where the beam of light having a wavelength component $\lambda_2$ illuminates only a portion of the grid of lines; and

radiation detector means for receiving light of wavelength $\lambda_1$ from the radiation source after reflection of such light from said text/graphics sheet, for sensing and storing in the memory means the text or graphics that are illuminated by the beam of light at a first sequence of times, for receiving light of wavelength $\lambda_2$ from the radiation source after reflection of such light from the optical coating, and for sensing the position of the portion of the grid of lines that is illuminated by the beam of light at a second sequence of times, where the portion of the grid lines that is illuminated by the beam of light of wavelength $\lambda_2$ controls the locations in the memory means used for storage of the text or graphics on the text/graphics sheet that are presently being read by the radiation detector means, and where the times in the first sequence and the times in the second sequence alternate with one another.

### 5,015,071
## LIGHT DISTRIBUTOR FOR AN X-RAY DIAGNOSTICS INSTALLATION

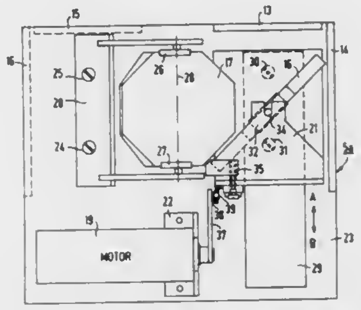
**Helmut Richter, Baiersdorf, and Adelbert Kupfer, Poxdorf, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Nov. 20, 1989, Ser. No. 438,871**

**Claims priority, application European Pat. Off., Dec. 23, 1988, 88121550.3**

**Int. Cl.$^5$ G02B** *27/14, 7/18*

**U.S. Cl. 350—171** **5 Claims**



1. A light distributor for an x-ray diagnostics installation comprising:

a housing having a light input port and first and second sets of light output ports, the sets of light output ports being disposed mirror-symmetrically relative to each other; and

a mirror system in said housing consisting of a first and a second mirror and one set of mounting means for detachably locating said first and second mirrors in a respective first position in said housing to direct light from said light input port to said first set of light output ports and for detachably locating said first and second mirrors in a respective second position which is mirror-symmetrical to said first position in said housing to direct light from said light input port to said second set of light output ports.

### 5,015,072
## GLARE REDUCTION SHIELD

**Jesse A. Howell, Charlottesville, Va., assignor to Sperry Marine Inc., Charlottesville, Va.**

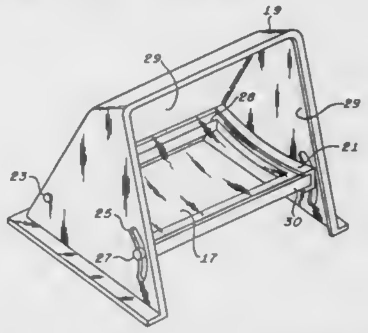
**Filed Nov. 29, 1989, Ser. No. 445,590**

**Int. Cl.$^5$ G02B** *27/00*

**U.S. Cl. 350—276 R** **9 Claims**

1. A glare reduction shield comprising:

shade means, having parallel side walls, enclosing a predetermined volume for shading a stationary display surface area at a base of said volume; and



glare reducing means coupled to said shade means and positioned at an adjustable height above said display surface area for reducing glare from said display surface area.

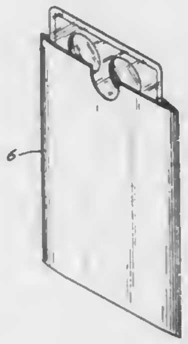
### 5,015,073
## OVER THE EYEPIECE POCKET FILTER CARD

**Richard D. Cole, 311 Oleander Dr., San Jacinto, Calif. 92383**

**Filed Jan. 13, 1989, Ser. No. 261,015**

**Int. Cl.$^5$ G02B** *5/22*

**U.S. Cl. 350—317** **1 Claim**



1. An over-the-eyepiece pocket filter card for use by astronomers comprising:

a filter sheeting containing eight equal colored clear acetate filters;

a face card and a back card securely adhering the filter sheeting therebetween, said face and back cards, each having a dimension of 3 inches by 5 inches, which totally covers the filter sheeting, and having eight pre-cut ¾ inch holes regularly distributed thereon to respectively fit over the eight colored clear acetate filters; and a laminated transparent protective plastic sheeting totally covering the face and back cards, said plastic sheeting having eight pre-cut ¾ inch holes in respective alignments with the eight pre-cut ¾ inch holes of the face and back cards.

### 5,015,074
## POLYCHROME SCREEN

**Jean-Frederic Clerc, Saint-Egreve; Christine Ebel, Grenoble, and Jean Dijon, Pont de Claix, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**PCT No. PCT/FR88/00359, § 371 Date Jan. 8, 1990, § 102(e) Date Jan. 8, 1990, PCT Pub. No. WO89/00300, PCT Pub. Date Jan. 12, 1989**

**PCT Filed Jul. 5, 1988, Ser. No. 465,074**

**Claims priority, application France, Jul. 7, 1987, 87 09641**

**Int. Cl.$^5$ G02F** *1/13*

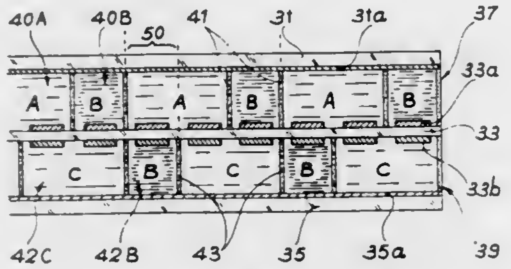
**U.S. Cl. 350—339 F** **12 Claims**

1. A polychrome screen comprising:

a first layer comprised of alternating regions of first and

VOL
1126
ISS
2
MY
14
1991
UMI

second dichroic display materials positioned between first and second insulating walls;
- a second layer comprised of alternating regions of the second dichroic display material and a third dichroic display material positioned between the second wall and a third insulating wall;
- wherein the first and second layers are superimposed such that each region of the first material of the first layer is juxtaposed to both a region of the second material of the second layer and to a part of a region of the third material of the second layer and wherein each region of the second material of the first layer is juxtaposed to the other part of a region of the third material of the second layer;
- wherein the first, second and third insulating walls are each provided with electrodes;



- wherein an image point of the screen is defined by three elementary image points respectively formed by superimposing first, second and third adjacent capacitors at the first layer, formed between the electrodes of the first and second insulating walls, with first, second and third adjacent capacitors of the second layer, formed between the electrodes of the second and third insulating layers;
- wherein a dielectric of the first and second capacitors of the first layer is comprised of the first material of the first layer and by the second material of the first layer for the third capacitor;
- wherein a dielectric of the first capacitor of the second layer is comprised of the second material of the second layer and by the third material of the second layer for the second and third capacitors.

---

### 5,015,075
### ELECTROCHROMIC ELEMENT

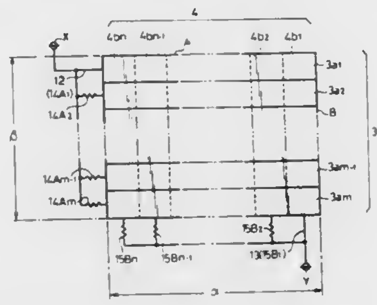
**Toshiyasu Ito, Kasugai; Takaaki Mori, Inazawa; Mamoru Kato, Nagoya, and Masanobu Senda, Aichi, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan**

**Filed Feb. 22, 1939, Ser. No. 313,478**

**Claims priority, application Japan, Apr. 7, 1988, 63-86384; Dec. 27, 1988, 63-333129**

**Int. Cl.⁵ G02F *1/17***

**U.S. Cl. 350—357** **5 Claims**



1. An electrochromic element comprising:
- a first substrate;
- a second substrate facing said first substrate;
- first electrode means provided on a surface of said first substrate which is in facing relation to said second substrate, said first electrode means including a plurality of first electrode pieces extending in a first direction, said first electrode pieces being electrically isolated from each other on said first substrate with first grooves;
- second electrode means provided on a surface of said second substrate which is in facing relation to said first substrate, and having substantially the same electric resistance as said first electrode means, said second electrode means including a plurality of second electrode pieces extending in a second direction intersecting said first direction, said second electrode pieces being electrically isolated from each other on said second substrate with second grooves, said first and second electrode pieces defining a plurality of pairs of facing surfaces at intersecting portions;
- color-forming means providing on at least one of said first and second electrode means;
- an electrolyte provided between said electrode means; and
- resistance means electrically connected to said first and second electrode means so as to substantially equalize values of current flowing between each said pair of facing surfaces.

---

### 5,015,076
### PROJECTION LEWS FOR A PROJECTOR

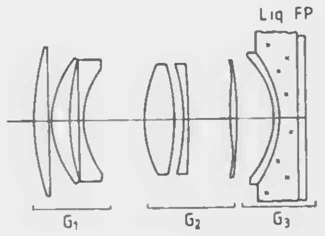
**Kiichirou Ueda, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan**

**Filed Apr. 20, 1989, Ser. No. 340,650**

**Claims priority, application Japan, Sep. 2, 1988, 63-218476; Dec. 21, 1988, 63-320706**

**Int. Cl.⁵ G02B *3/02, 9/64***

**U.S. Cl. 350—412** **9 Claims**



1. A projection lens for a projector comprising, in order from the screen side, a positive first lens unit including at least one positive lens and at least one negative lens, a positive second lens unit including at least one positive lens and at least one negative lens, and a negative third lens unit with a concave surface having a large curvature directed at the screen side, characterized in that said first lens unit comprises spherical lens elements, the at least one negative lens in the first lens unit having a concave surface having a larger curvature than said large curvature of said third lens unit, said larger curvature being directed at an adjacent convex surface farther from the screen, and the second lens unit and the third lens unit together having at least one or more aspherical surfaces.

---

### 5,015,077
### ZOOM LENS SYSTEM FOR USE IN A MICROFILM PROJECTION APPARATUS

**Toshihiko Ueda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 27, 1990, Ser. No. 485,553**

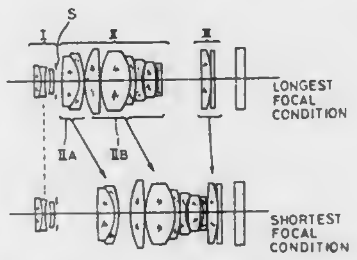
**Claims priority, application Japan, Feb. 28, 1989, 1-47491**

**Int. Cl.⁵ G02B *15/177, 15/20***

**U.S. Cl. 350—426** **6 Claims**

1. A zoom lens system comprising, in order from an enlargement side,
- a first lens group of a negative power which is fixed during a zooming operation and includes, in order from the enlargement side, a positive lens element and a negative lens element,

- a second lens group of a positive power which is movable during a zooming operation and includes, in order from the enlargement side, a first positive lens unit and a second positive lens unit, said first positive lens unit having a positive lens element and a negative meniscus lens element, said second positive lens unit having two positive lens elements and two negative lens elements, said first and second positive lens units being independently movable toward a reduction side during a zooming operation from a longest focal length condition to a shortest focal length condition, and
- a third lens group of a positive power which is movable during a zooming operation and includes, in order from the enlargement side, a positive lens element and a negative lens element.



---

### 5,015,078
### ASPHERICAL SINGLE LENS

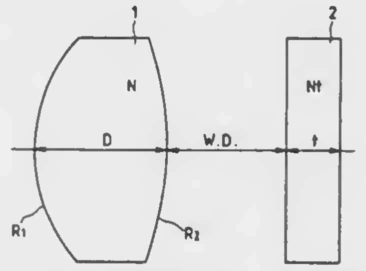
**Katsuya Oikawa, Mitaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 30, 1989, Ser. No. 443,311**

**Claims priority, application Japan, Dec. 1, 1988, 63-305543**

**Int. Cl.⁵ G02B *3/02***

**U.S. Cl. 350—432** **4 Claims**



1. An aspherical single lens whose first and second surfaces each are formed by an aspherical surface and in which, when the distance from an arbitrary point on said aspherical surface to the tangential plane of the vertex of said aspherical surface is x and the distance from said arbitrary point to the optic axis is H and the reference radius of curvature of the νth surface is $R_\nu$ and the cone constant of the νth surface is $K_\nu$ and the aspherical coefficient of the νth surface is $A_{\nu i}$ $(i=3, 4, \ldots)$, said aspherical surface is an aspherical surface represented by the following equation and which satisfies the following conditions (1), (2) and (3):

$$X = \frac{H^2/R_\nu}{1 + \sqrt{1 - (1 + K_\nu)(H/R_\nu)^2}} + A_{\nu 3}H^3$$

$$\ldots + A_{\nu 4}H^4 + \ldots$$

$$(\nu = 1, 2)$$

$$0.73 < \frac{(N-1)F^3}{N^2 R_1{}^3} < 0.85 \tag{1}$$

-continued

$$0.31 < \frac{(N-1)D}{NR_1} < 0.47 \tag{2}$$

$$-0.36 < \frac{R_1}{R_2} < -0.18 \tag{3}$$

where F is the focal length of said aspherical single lens, D is the on-axis thickness of said aspherical single lens, and N is the refractive index of said aspherical single lens for the wavelength used.

---

### 5,015,079
### COPYING LENS SYSTEM

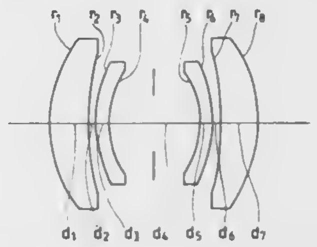
**Nobutaka Minefuji, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 28, 1989, Ser. No. 386,486**

**Claims priority, application Japan, Jul. 30, 1988, 63-191159; May 10, 1989, 1-116461**

**Int. Cl.⁵ G02B *9/36***

**U.S. Cl. 350—470** **12 Claims**



1. A copying lens system which, in order from the object side, comprises:
- a first lens element of positive meniscus having a convex surface directed toward an object;
- a second lens element of negative meniscus having a convex surface directed toward said object;
- a third lens element of negative meniscus having a convex surface directed toward an image; and
- a fourth lens element of positive meniscus having a convex surface directed toward said image,

wherein said copying lens system satisfies the following conditions:

$$-0.79 < f_1/f_2,\ f_4/f_3 < -0.67 \tag{7}$$

$$0.19 < r_1/f_M,\ -r_8/f_M < 0.28 \tag{8}$$

$$1.46 < r_1/r_4,\ r_8/r_5 < 1.67 \tag{9}$$

$$0.36 < d_4/\Sigma d < 0.45 \tag{10}$$

where
- $f_M$: a focal length of overall said copying lens system;
- $f_i$: a focal length of an i-th lens element.
- $r_i$: a radius of curvature of an i-th surface as counted from said object side; and
- $d_1$: a thickness of said i-th lens element as counted from said object side, or an axial distance between said i-th lens element and an (i+1)-th lens element.
- $\Sigma d$: an overall length of said copying lens system.

VOL
1126
ISS
2
MY
14
1991
UMI

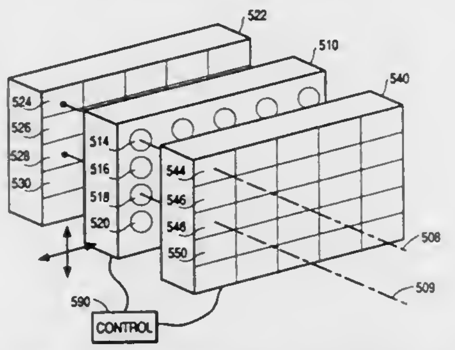
### 5,015,080
## CONTINUOUS WIDE ANGLE BEAM STEERER USING LENS TRANSLATION AND PHASE SHIFTER

**William J. Cassarly, King of Prussia, and Kevin M. Flood, Phoenixville, both of Pa., assignors to General Electric Company, Valley Forge, Pa.**

**Filed Mar. 26, 1990, Ser. No. 498,524**

**Int. Cl.$^5$ G02B** *26/08;* **G02F** *1/13*

U.S. Cl. 350—484 **19 Claims**



1. A beam steering arrangement for a plurality of sources of beams of electromagnetic radiation arrayed with preselected source-to-source spacing, comprising:

a first lens array, said first lens array including a first plurality of lenses, said lenses being arrayed with a lens-to-lens spacing which corresponds to said preselected source-to-source spacing,

an array of piston phase shifters, said array of piston phase shifters including a second plurality of piston phase shifters, which second plurality may equal said first plurality, said piston phase shifters being arrayed with an element-to-element spacing which corresponds to said preselected source-to-source spacing;

first mounting means coupled to one of said first lens array and said array of piston phase shifters, for mounting said one of said first lens array and said array of piston phase shifters for illumination by said sources, whereby said beams are phase modulated by said one of said first lens array and said array of phase shifters for generating first phase modulated beams;

second mounting means coupled to the other one of said first lens array and said array of piston phase shifters for mounting said other one of said first lens array and said array of piston phase shifters for illumination by said first phase modulated beams;

first beam steering means coupled to one of said first and second mounting means for generating relative motion between said first lens array and said sources; and

second beam steering means coupled to said piston phase shifters changing relative beam path lengths.

---

### 5,015,081
## BINOCULAR MICROSCOPE

**Nobuaki Kitajima, and Kazutoshi Takagi, both of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 251,592, Sep. 30, 1988, abandoned. This application Dec. 14, 1989, Ser. No. 449,052**

**Claims priority, application Japan, Sep. 30, 1987, 62-245973**

**Int. Cl.$^5$ G02B** *21/20*

U.S. Cl. 350—514 **9 Claims**

1. A binocular microscope comprising:

a stationary housing portion;

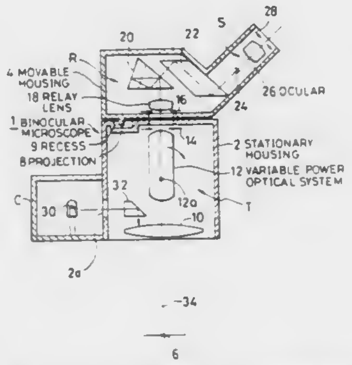
a movable housing portion mounted on said stationary housing portion for movement relative to said stationary housing portion;

objective optical means, disposed in said stationary housing portion, for receiving a bundle of light rays from an object and for emitting said bundle as parallel rays along an objective optical axis;

variable power optical means, disposed in said stationary housing portion, for receiving and magnifying said parallel rays emitted from said objective optical means;

relay optical means, disposed in said movable housing portion, for receiving and relaying the light rays from said variable power optical means;

ocular means, disposed on said movable housing portion, for receiving the light rays from said relay optical means; and



means for linearly moving said movable housing portion relative to said stationary housing portion in a direction substantially perpendicular to said optical axis of said objective optical means so as to change the angle at which the object is viewed through the ocular means.

---

### 5,015,082
## MICROSCOPE HAVING A BINOCULAR TUBE WITH RELATIVELY ROTATABLE TUBE ARMS

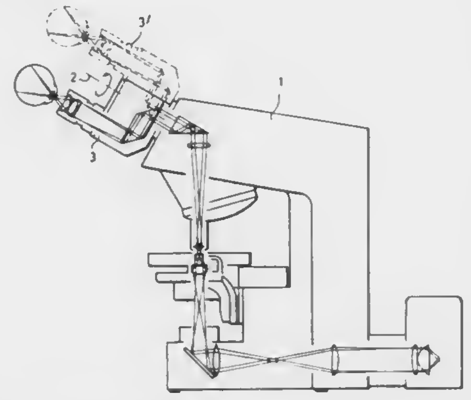
**Peter Dietrich, and Klaus Westphal, both of Oberkochen, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany**

**Filed Jan. 24, 1990, Ser. No. 469,361**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1989, 8903394**

**Int. Cl.$^5$ G02B** *23/04, 27/14*

U.S. Cl. 350—514 **9 Claims**



1. A microscope comprising:

a support;

an optical system arranged in said support for defining a beam path to an object;

a binocular tube defining an optical axis and having a first tube arm and a second tube arm;

mounting means for mounting said binocular tube on said support so as to interface with said optical system;

positioning means for permitting said binocular tube to be positionable into first and second viewing positions about said optical axis with said viewing positions being at respectively different elevations; and,

said positioning means including: first bearing means for rotatably journalling said first tube arm in said mounting means so as to permit said first tube arm to rotate through a complete revolution about said optical axis; and, second bearing means for rotatably journalling said second tube arm in said first tube arm so as to permit said second tube arm to rotate about said optical axis relative to said first tube arm.

---

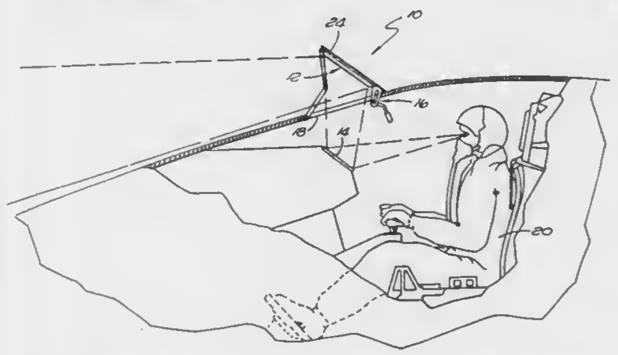
### 5,015,083
## AIRCRAFT VISION AUGMENTATION SYSTEM WITH ADJUSTABLE EXTERNAL MIRROR AND COCKPIT MIRROR

**Stephen G. Wurst, Orange, and Kaori E. Matsunaga, Hawthorne, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Continuation of Ser. No. 354,049, May 19, 1989, abandoned. This application May 14, 1990, Ser. No. 522,487**

**Int. Cl.$^5$ G02B** *23/08, 27/14*

U.S. Cl. 350—618 **5 Claims**



1. A vision augmentation system for a high performance aircraft, comprising:

(a) a transparency constructed in a portion of the fuselage of said aircraft at a desired location;

(b) an adjustable external mirror positionable at,

(i) a stowed position adjacent to said transparency and substantially flush with the outer skin of the fuselage so as to maintain the aerodynamic integrity of the aircraft during high speed flight, and

(ii) at least one deployed position for reflecting light received from a field of view exterior to the aircraft, during low speed travel;

(c) means for positioning said external mirror; and

(d) cockpit mirror means, located internal the aircraft, for receiving light reflected from the external mirror and through the transparency when the external mirror is deployed, said cockpit mirror means being so constructed and arranged to redirect the reflected light toward crewmember of the aircraft thus providing a real-time, three dimensional view from the vantage of an "apparent eye" position located aft of the external mirror, the vision augmentation system preserving depth perception cues.

---

### 5,015,084
## SPORTS TRAINING APPARATUS INCLUDING A MIRROR ASSEMBLY WITH ADJUSTABLE LINE SEGMENTS

**Ralph W. Kryder, 4481 S. Buffalo Rd. #27, Orchard Park, N.Y. 14240**

**Continuation-in-part of Ser. No. 96,541, Sep. 14, 1987, abandoned, which is a continuation of Ser. No. 857,733, Apr. 29, 1986, Pat. No. 4,693,570, which is a continuation of Ser. No. 532,841, Sep. 16, 1983, abandoned. This application Oct. 13, 1988, Ser. No. 257,395**

**Int. Cl.$^5$ G02B** *5/08, 7/18*

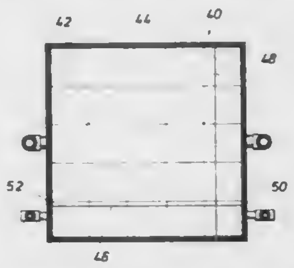
U.S. Cl. 350—632 **18 Claims**

1. A sports training apparatus comprising:

(a) a mirror assembly;

(b) a frame extending about said mirror assembly, said frame including channel means extending about said frame and integral therewith;

(c) wherein said mirror assembly includes adjustable line segment means extending across the surface of said mirror assembly, said adjustable line segment means being



stretched between slide connectors slidably mounted on said frame of said mirror assembly; and

(d) wherein said mirror assembly includes grid means formed thereon for aiding the athlete to develop proper skills for use in various sports.

---

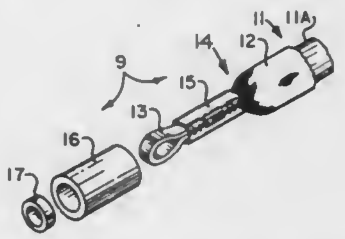
### 5,015,085
## FLOATABLE RETAINER FOR EYEGLASSES

**David G. May, 28 Windsor Dr., Little Rock, Ark. 72209**

**Filed Nov. 6, 1989, Ser. No. 432,619**

**Int. Cl.$^5$ G02C** *1/00, 3/00*

U.S. Cl. 351—43 **8 Claims**



1. A retainer for holding and floating eyeglasses, said retainer comprising:

an elongated, flexible cord having a pair of opposing ends, said cord comprising an inner, solid and flexible buoyant rod for floating said eyeglasses and an outer, tubular covering coaxially surrounding said rod for strengthening said cord;

a pair of resilient ovals for engaging said eyeglasses, one oval attached to each of said cord ends;

clamp means for securing said ovals to said cord ends by engaging both the ends of said rod and the ends of said tubular covering with an exposed end of said ovals emerging from said clamp means; and,

tube means for coaxially covering said clamp means and at least a portion of said exposed end of said ovals, said tube means defining a small orifice in said ovals for resiliently grasping the temples of said eyeglasses so that said cord holds said eyeglasses.

---

### 5,015,086
## ELECTRONIC SUNGLASSES

**Etsuo Okaue; Masaru Egawa; Yoshihiko Kasai, and Norio Horaguchi, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 346,497, May 2, 1989, abandoned. This application Apr. 16, 1990, Ser. No. 509,450**

**Claims priority, application Japan, Apr. 17, 1989, 1-44807[U]; Apr. 17, 1989, 1-44810[U]; May 31, 1989, 1-63374[U]**

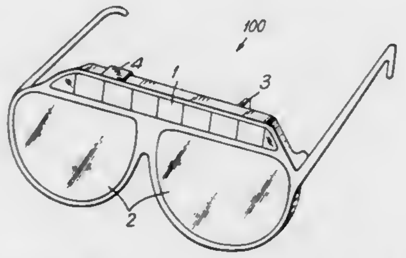
**Int. Cl.$^5$ G02C** *7/10*

U.S. Cl. 351—44 **6 Claims**

1. Electronic sunglasses of the transmittance-varying type

VOL
1126
ISS
2
MY
14
1991
UMI

including liquid crystal panels employing the electro-optical effect and a solar cell used as a power source, comprising voltage detecting means having such a hysteresis characteristic so as to output a signal for changing transmittance of the liquid crystal panels from a high mode to a low mode at at least a high predetermined voltage or illumination, and changing transmittance from a low mode to a high mode at at least a low voltage or illumination, first switch means operating at at least two switch positions, one said switch position having a first stage or illumination at less than 20,000 Lux and a second stage or illumination at 20,000 Lux or greater at which transmittance is changed from a high mode to a low mode and another switch position disabling said voltage detecting means, and second switch means operating to change transmittance from a high mode to a low mode independently of the set voltage value of the voltage detecting means according to the hysteresis effect.



---

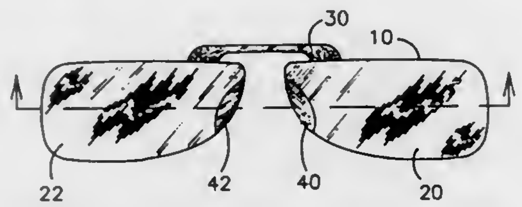
## 5,015,087
## PINCE-NEZ EYEGLASSES

**Charles Baratelli, Fort Lauderdale, Fla., assignor to DBS Optical, Inc., Ft. Lauderdale, Fla.**

**Filed Apr. 30, 1990, Ser. No. 516,515**

**Int. Cl.$^5$ G02C *1/00***

U.S. Cl. 351—65 12 Claims



1. One piece integral, frameless eyeglasses comprising:

(a) a first and second lens, disposed in a common plane, each of said lenses having at least one edge; and

(b) a flexible and resilient bridge integrally connecting said first and said second lens, said bridge separating said first and second lenses, when said bridge is unstressed, by a distance slightly less than the width of a user's nose where said eyeglasses are to be positioned, said bridge biasing said lenses toward each other when said lenses are stressed and separated from each other;

whereby said lenses are biased to mildly squeeze the nose of the user when first separated from each other and then released upon a user's nose, thus securing said eyeglasses in place without the necessity of any additional support or external appendage.

---

## 5,015,088
## ILLUMINATING APPARATUS FOR PROJECTION PURPOSES

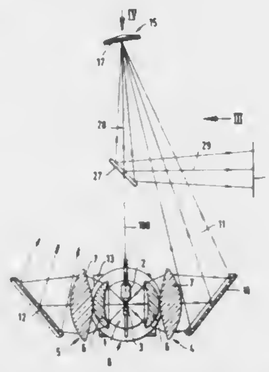
**Bruno Rhomberg, Hausen, and Beat Frick, Buchs, both of Switzerland, assignors to Gretag Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Aug. 30, 1990, Ser. No. 575,433**

**Claims priority, application Switzerland, Sep. 4, 1989, 3193/89**

**Int. Cl.$^5$ G03B *21/00, 21/20***

U.S. Cl. 352—198 20 Claims



1. Illuminating apparatus for projection purposes, in particular for a film projector or television image projector by the eidophor process, comprising:

a source of light which radiates in all directions;

a plurality of condensers located around said light source in a plane intersecting a center of radiation of said light source, said condensers being aligned with their optical axes on the light source;

deflecting mirrors associated with said condensers and tilted around an axis extending transversely to a path of light in said plane, and tilted relative to the plane defined by the optical axes of the condensers, and staggered relative to each other;

a secondary light source surface for receiving images of the light source from said deflecting mirrors, said secondary light source being located spaced apart from the plane through the source of light and further comprising a plurality of adjacent, imaging optical components formed as adjacent segments which are staggered relative to each other along their borders in correspondence with the staggering of the deflecting mirrors; and,

an optical device coordinated with said secondary light source surface and having an entrance pupil which receives images of the condensers from said staggered adjacent segments, the received images being superimposed on each other and being rotated relative to each other, and which reproduces said superimposed images on an image field.

---

## 5,015,089
## LEADER ASSEMBLY AND METHOD

**Mitchell C. Radov, 631 Montroyale Dr. East, Erie, Pa. 16504**

**Division of Ser. No. 247,627, Sep. 22, 1988, Pat. No. 4,894,674. This application Jan. 4, 1990, Ser. No. 460,746**

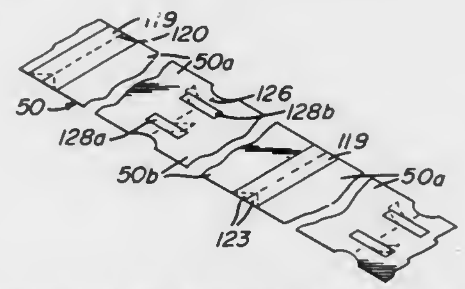
**Int. Cl.$^5$ G03C *1/76***

U.S. Cl. 352—235 11 Claims

1. A leader assembly for use with photosensitive strip film, comprising in combination:

a plurality of opaque elongated leader strips suitable for storing in a roll, each of said strips including perforations on a transverse line intermediate the ends to form first and second leaders; and

a plurality of tapes connecting said leader strips end-to-end to form a single continuous strip, each of said tapes including two laminae with one area of the confronting surfaces coated with a peelable adhesive;



whereby each of said tapes can be separated in two across the length of said assembly, peeled apart at the cut edges, and applied to opposite sides of a film end.

---

## 5,015,090
## CENTERING APPARATUS FOR A GEMSTONE

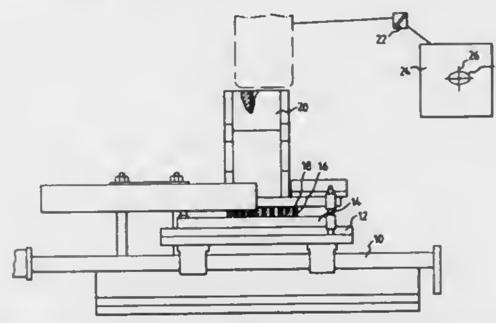
**Ilan Weisman, 52 Brener Street, Herzelia; Roni Shapira, Moshav Givat-Chen, Ranana; Roni Shafir, 9 Leon Blum Street, Ramat-Aviv, and Hanoh Shtark, 23 Lamerchav Street, Ramat Hasharon, all of Israel**

**Filed Jun. 16, 1989, Ser. No. 366,927**

**Claims priority, application Israel, Jun. 16, 1988, 86762**

**Int. Cl.$^5$ G01N *21/00***

U.S. Cl. 356—30 23 Claims



1. A method for sorting and centering unfinished gem stones comprising the steps of:

viewing the stone in a direction parallel to the axis of centering and providing an image of the circumference thereof;

superimposing the image of the circumference of the stone on a reference center image;

providing a reference circumference shape centered about the reference center;

adjusting the relative size of the reference shape until it can fit within the stone; and

moving the stone until it is centered about the reference center.

---

## 5,015,091
## DEVICE FOR DETECTING ALCOHOLIC CONTENT

**Hiroyoshi Suzuki; Kenji Ogawa, and Hiroko Maekawa, all of Himeji, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan**

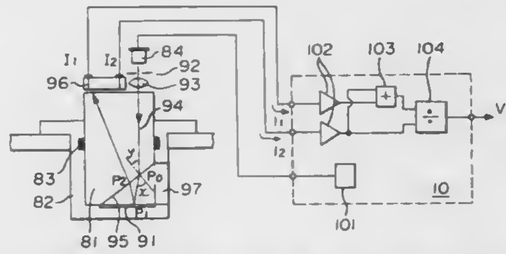
**Filed Mar. 22, 1989, Ser. No. 327,059**

**Claims priority, application Japan, Apr. 13, 1988, 63-92164; Apr. 14, 1988, 63-93938**

**Int. Cl.$^5$ G01N *21/41***

U.S. Cl. 356—135 4 Claims

1. A device for detecting alcoholic content in a fuel by finding its refractive index, said device having a surface for detecting the refractive index of the fuel and which constitutes a part of a fuel passageway, said device being disposed in a fuel supply pipe to an internal combustion engine and positioned proximate to said engine, characterized in that a light emitting element and a single dimensional light position sensing detector are provided at one end of a column-like transmission body, and a refractive interface and an oil-resistant reflecting surface are provided at the other end of said light transmission body so that a space between said refractive interface and said oil-resistant reflecting surface provides a part of the fuel passageway, wherein an incident light, which has entered into the refractive interface from the light emitting element and has been refracted there, is reflected at the oil-resistant reflecting surface, after which said reflected light is again caused to enter into the refractive interface, and then is collected on the single dimensional light position sensing detector, whereby a change in an angle of refraction of the light, due to the light being refracted twice is detected as a change in the position where the light is collected, on said single dimensional position sensing detector.



---

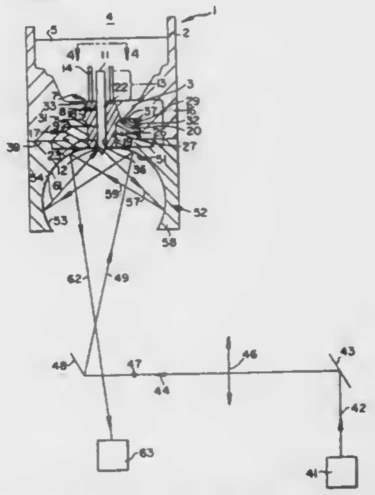
## 5,015,092
## SAMPLING PROBE FOR OPTICAL ANALYZATION OF A SAMPLE

**Donald W. Sting, New Canaan, Conn., assignor to Spectra-Tech, Inc., Stamford, Conn.**

**Filed May 5, 1989, Ser. No. 347,829**

**Int. Cl.$^5$ G01N *21/01***

U.S. Cl. 356—300 17 Claims



17. A sampling probe for optically analyzing a sample comprising

a reaction chamber containing the sample;

an MIR optical element having a cylindrical body including a flat end and curved end, the flat end and an adjacent active portion of the cylindrical body being positioned against the sample;

holder means to mount the MIR element to the reaction chamber, the holder means including

a holder plug having a bore at least partially therethrough to which at least a portion of the cylindrical body of the MIR optical element is secured and sealed and

a retainer member removably secured to a wall of the reaction chamber and supporting and sealing the holder plug in position;

a source of radiant energy and

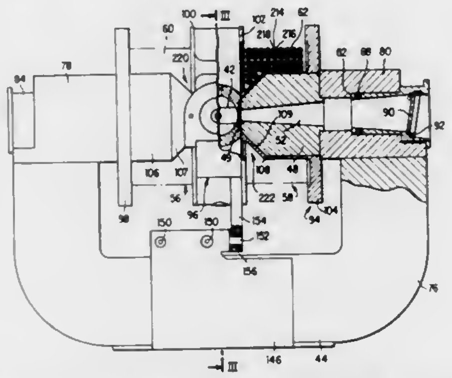
VOL
1126
ISS
2
MY
14
1991
UMI

optical means to direct radiant energy from the source to the curved end of the MIR element for multiple internal reflections along the MIR element to the flat end and then back along the MIR element through the curved end to a detector.

---

### 5,015,093
## ELECTROMAGNET FOR AN ATOMIC ABSORPTION SPECTROMETER

**Klaus P. Rogasch, Th.-Hofmannweg 3, D-7772 Uhldingen Muhlhofen 1, Fed. Rep. of Germany**
**Filed Nov. 7, 1989, Ser. No. 435,431**
**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809215**
**Int. Cl.$^5$ G01N** *21/31, 21/74*
U.S. Cl. 356—307 9 Claims



1. Solenoid for generating a magnetic field at the location of a sample in an atomic absorption spectrometer, wherein a shift of the absorption lines of the atoms of the element looked for in the sample relative to the emission lines of this element in a measuring light beam passed through an atomized sample is caused by the magnetic field due to the Zeeman effect, comprising

(a) a pair of pole pieces (46, 48) between which an air gap is formed, an atomizing device atomizing the sample within this air gap,
(b) a magnetic return path (76) connecting the pole pieces (46, 48),
(c) field coils (60, 62) for generating a magnetic flux through the pole pieces (46, 48), the air gap and the magnetic return path (76),

characterized in that

(d) the field coils (60, 62) are arranged on the pole pieces (46, 48) close to the air gap, and
(e) the windings of the field coils (60, 62) are formed by tubes through which a cooling liquid can be passed.

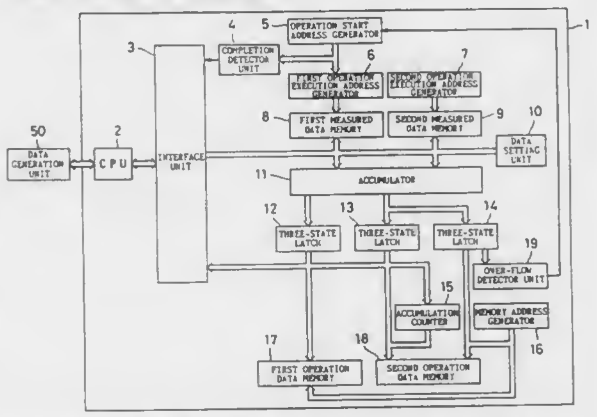
---

### 5,015,094
## PARTICLE SIZE MEASURING SYSTEM

**Koichi Oka, Otsu; Akira Kawaguchi, Kyoto; Kunio Kumagai, Koga, and Katsuhiro Morisawa, Hirakata, all of Japan, assignors to Otsuka Electronics Co., Ltd., Osaka, Japan**
**Filed Sep. 28, 1989, Ser. No. 413,647**
**Claims priority, application Japan, Oct. 3, 1988, 63-249336**
**Int. Cl.$^5$ G01N** *15/02*
U.S. Cl. 356—336 3 Claims

1. A particle size measuring system in which a laser light is irradiated to an object to be measured, time series data are generated based on the scattering light from the object to be measured, predetermined operations are executed based on the time series data thus generated, and the operation results are read and processed to obtain data representing the particle size of particles contained in the object to be measured, comprising:

time series data generating means for generating time series data representing the number of photon pulses per unit time;
first and second memories for storing said time series data;
reading means for successively reading, from said memories, time series data separated by a predetermined period of time from one another; and

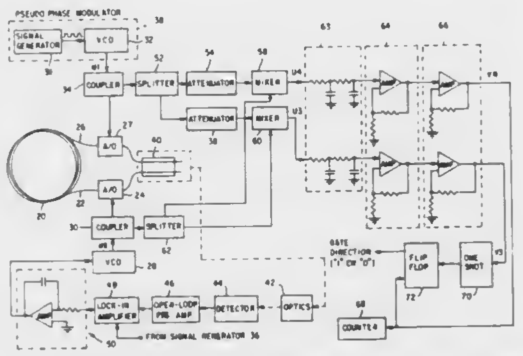


multiplication and accumulation operation means for multiplying the read time series data by one another, and for accumulating the multiplication results, the multiplication and accumulation being executed simultaneously with the reading operation by said reading means.

---

### 5,015,095
## CLOSED-LOOP FIBER-OPTIC ANGULAR RATE SENSOR INCLUDING A MIXER ARRANGEMENT FOR MEASURING ROTATIONAL DIRECTION AND RATE

**Walter P. Hollinger, Mahwah; Ahmed Aboyoussef, Lakewood, and Walter V. Werner, Caldwell, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**
**Filed Aug. 28, 1989, Ser. No. 400,175**
**Int. Cl.$^5$ G01B** *9/02*
U.S. Cl. 356—350 13 Claims



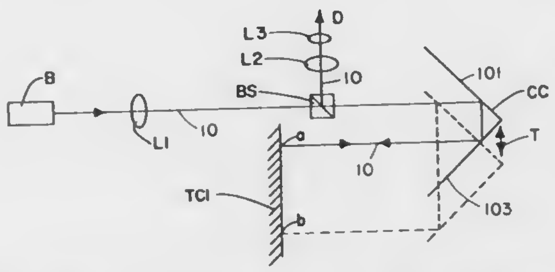
1. A closed-loop fiber-optic angular rate sensor having a multi-turn fiber-optic coil with two ends and with two counterpropagating light beams being transmitted through the coil so that the frequency difference between the two counterpropagating light beams is proportional to the rotational rate of the sensor, and having an arrangement for detecting said rotational rate, comprising:

first modulator means connected to one coil end and second modulator means connected to the other coil end;
first oscillator means providing a first signal at a first frequency, and said first modulator means connected to the first oscillator means and being driven by the first signal at the first frequency therefrom;
second oscillator means providing a second signal at a second frequency, and said second modulator means connected to the second oscillator means and being driven by the second signal at the second frequency therefrom;
first signal mixer means connected to the first and second oscillator means and responsive to the first and second signals at the first and second frequencies therefrom for providing a third signal at a frequency which includes the sum and the difference of the first and second frequencies;
first filter means connected to the first signal mixer means for filtering out the sum frequency included in the frequency of the third signal therefrom and providing a fourth signal at the difference frequency;
first signal shaping means connected to the first filter means for shaping the fourth signal therefrom at the difference frequency, and providing a first shaped signal at said difference frequency;
counter means connected to the signal shaping means for counting the shaped signal at the difference frequency, with the count provided thereby being indicative of the rotational rate;
second signal mixer means;
means connected to the second oscillator means for providing a fifth signal at the second frequency which is phase shifted in relation to the second signal from the second oscillator means;
the second signal mixer means connected to the first oscillator means and to the means for providing the fifth signal and responsive to the first signal and the fifth signal for providing a sixth signal at the frequency which includes the sum and difference of the first and second frequencies;
second filter means connected to the second signal mixer means for filtering out the sum frequency included in the frequency of the sixth signal from the second signal mixer means so that said sixth signal is at the difference frequency;
second signal shaping means connected to the second filter means for shaping the signal therefrom at the difference frequency and providing a second shaped signal at the difference frequency; and
means connected to the first signal shaping means and to the second signal shaping means, and responsive to the first and second shaped signals therefrom at the difference frequency for providing signal at first and second logic levels, with the signal at the first logic level being indicative of rotation of the sensor in one direction and the signal at the second logic level being indicative of rotation of the sensor in the opposite direction.

---

### 5,015,096
## METHOD AND APPARATUS FOR TESTING OPTICAL COMPONENTS

**Frank V. Kowalski, 209 Kimball Ave., Golden, Colo. 80401 , and Thomas E. Milner, 770 N. Dodge, Apartment 31, Tucson, Ariz. 85716**
**Continuation-in-part of Ser. No. 917,487, Oct. 10, 1986, abandoned. This application Oct. 24, 1988, Ser. No. 261,144**
**Int. Cl.$^5$ G01B** *11/30*
U.S. Cl. 356—371 17 Claims



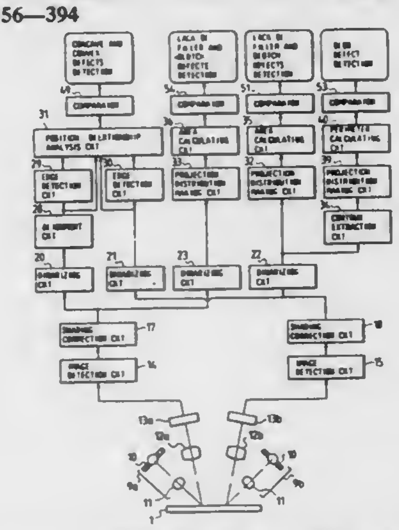
1. Apparatus for testing an optical test component, including the following disposed along an optical path:

a source of radiant energy for generating an incident beam and directing said incident beam along said optical path;
a trihedral retroreflector disposed in said optical path to displace said optical path and to redirect said incident beam therealong onto said test component, and to receive a reflected beam returning from said test component and to redirect said reflected beam back along said optical path;
detector means to receive said reflected beam for detecting any deviation between said reflected beam and said incident beam; and,
means for moving said trihedral retroreflector in X and Y directions in a plane perpendicular to said incident beam, to scan said redirected incident beam on the area of said test component.

---

### 5,015,097
## METHOD FOR INSPECTING FILLED STATE OF VIA-HOLES FILLED WITH FILLERS AND APPARATUS FOR CARRYING OUT THE METHOD

**Mineo Nomoto, Yokohama; Takanori Ninomiya, Hiratsuka; Hiroya Koshishiba; Toshimitsu Hamada, both of Yokohama, and Yasuo Nakagawa, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Oct. 4, 1989, Ser. No. 416,934**
**Int. Cl.$^5$ G01B** *11/00;* **G01N** *21/00;* **G06K** *9/00*
U.S. Cl. 356—394 18 Claims



1. A method for inspecting the filled state of a plurality of via-holes which pass through a circuit board from a surface thereof to the opposite surface and are filled with a substance whose electrical characteristics differ from the electrical characteristics of said circuit board, said method comprising the steps of: detecting an optical image of the surface of said circuit board having the plurality of via-holes filled with the substance; detecting a concave or convex state of the filler in each via-hole from each image of the fillers in said via-holes in the detected optical image of said surface; and deciding whether the filler is in the concave state or convex state on the basis of the detection results.

---

### 5,015,098
## DENSITOMETER WITH ERROR CORRECTION

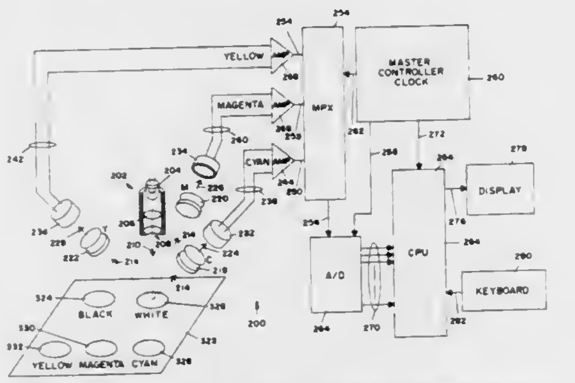
**Bernard J. Berg, Kentwood; David R. Bowden, Grand Rapids; Mark A. Cargill, Belding, and William R. Given, Kentwood, all of Mich., assignors to X-Rite, Incorporated, Grandville, Mich.**
**Continuation of Ser. No. 105,424, Oct. 5, 1987, abandoned. This application Jun. 7, 1990, Ser. No. 534,205**
**Int. Cl.$^5$ G01J** *3/52*
U.S. Cl. 356—402 20 Claims

1. A densitometer system adapted for measuring color characteristics of a substantially opaque object sample under test, the system comprising:

light source means for generating light rays and directing the same onto the object sample;
spectral filter means positioned at a predetermined angle relative to the direction of object illumination by the light source, and responsive to light rays reflected from the

VOL
1126
ISS
2
MY
14
1991
UMI

object sample so as to discriminate a predetermined color shade set of spectral responses of the reflected light rays;
detection means responsive to the light rays transmitted through the spectral filter means for generating on separate paths signals representative of the intensity of the transmitted light rays;
multiplexing means connected to the detection means for time multiplexing the signals on the separate paths;
processing means connected to the multiplexing means for processing the multiplexed signals;



input means connected to the processing means for providing user input to the densitometer; and
the processing means comprises means for generating solutions to correction factor functions relating a desired reflectance measurement to an actual reflectance measurement for each of the spectral filter color shades, wherein the correction factor functions are each a function of at least two of the actual reflectance measurements of the spectral filter color shades.

---

### 5,015,099
## DIFFERENTIAL ABSORPTION LASER RADAR GAS DETECTION APPARATUS HAVING TUNABLE WAVELENGTH SINGLE MODE SEMICONDUCTOR LASER SOURCE

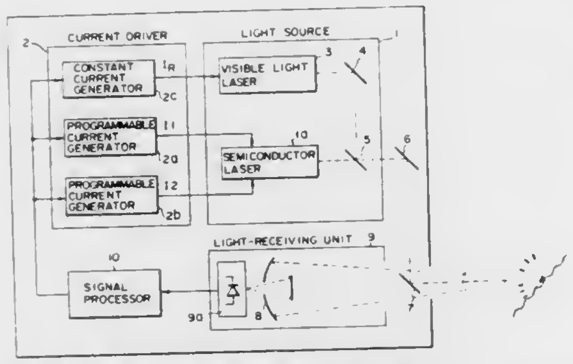
**Haruo Nagai, Isehara; Kiyoji Uehara, Tokyo, and Masafumi Aizawa, Yamato, all of Japan, assignors to Anritsu Corporation, Tokyo, Japan**

**Filed Mar. 12, 1990, Ser. No. 492,784**

**Claims priority, application Japan, Mar. 23, 1989, 1-71492; Dec. 29, 1989, 1-343580**

**Int. Cl.$^5$ G01N *21/00***

**U.S. Cl. 356—437** **11 Claims**



1. A gas detection apparatus, comprising:
light source means including a tunable wavelength single mode semiconductor laser, said tunable wavelength single mode semiconductor laser including means for outputting a single mode laser beam having a wavelength tuned in accordance with a drive current to a first optical path and a second optical path, and means for emitting, for an object to be detected, at least a first laser beam having a first wavelength which is absorbed by a gas to be detected or a second laser beam having a second wavelength which is not absorbed by the gas to be detected;
first control means for switching the drive current having a predetermined value corresponding to the first or the second wavelength at a predetermined period, and for supplying the drive current to said tunable wavelength single mode semiconductor laser, said first control means including means for controlling the drive current having the predetermined value corresponding to the first or the second wavelength so that the first and the second laser beams are alternately output from said tunable wavelength single mode semiconductor laser with substantially the same power while the first and the second wavelengths are maintained;
first light-receiving means for receiving first and second response light components generated when the first and the second laser beams emitted alternately from said tunable wavelength single mode semiconductor laser are incident on the object to be detected through the first optical path, and for outputting electrical signals corresponding to received light amounts of the first and the second response light components;
signal processing means for receiving the electrical signals from said first light-receiving means, and for processing a presence/absence condition of gas detection in accordance with a difference between the received light amounts of the first and the second response light components;
second light-receiving means for receiving the first and the second laser beams emitted from said tunable wavelength single mode semiconductor laser through the second optical path, and for outputting detection signals corresponding to the wavelengths and powers of the received first and second laser beams, said second light-receiving means including a wavelength divider for selecting said first laser beam, a first light-receiving element for receiving a beam output from the wavelength divider, and a second light-receiving element for receiving the first and the second laser beams non-selectively; and
second control means for feeding back a correction signal for correcting the drive currents having the predetermined values to said first control means in accordance with the detection signal from said second light-receiving means.

---

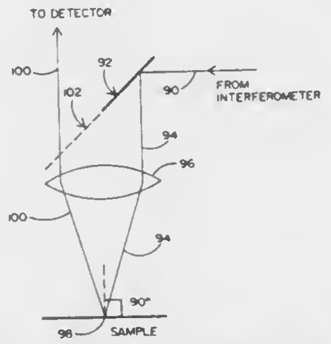
### 5,015,100
## APPARATUS AND METHOD FOR NORMAL INCIDENCE REFLECTANCE SPECTROSCOPY

**Walter M. Doyle, Laguna Beach, Calif., assignor to Axiom Analytical, Inc., Laguna Beach, Calif.**

**Filed Mar. 2, 1990, Ser. No. 487,633**

**Int. Cl.$^5$ G01N *21/55***

**U.S. Cl. 356—445** **15 Claims**



1. A spectroscopy system for analysis of a sample, using external reflectance spectroscopy, which comprises:
means for providing a pre-sample analytical radiation beam;
means for detecting a post-sample analytical radiation beam;
the analytical radiation beam comprising rays which have "p" state and "s" state polarization vectors;
means for positioning a sample which will provide a significant amount of specular reflection; and
a beamsplitter which (a) causes approximately half of the pre-sample radiation beam to reach the sample, (b) causes substantially the full specularly reflected radiation from the sample to reach the detecting means, and (c) ensures a substantial balance between the total "p" state polarization and the total "s" state polarization of the radiation reflected by the sample.

---

### 5,015,101
## APPARATUS AND PROCESS FOR MIXING AND FILLING

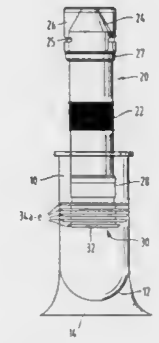
**Klaus Draenert, Gabriel-Max-Str. 3, D-8000 Munich 90, Fed. Rep. of Germany**

**Continuation of Ser. No. 414,595, Sep. 27, 1989, abandoned, which is a continuation of Ser. No. 133,064, Nov. 17, 1987, abandoned. This application Jun. 25, 1990, Ser. No. 542,634**

**Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3609672**

**Int. Cl.$^5$ B01F *5/12***

**U.S. Cl. 366—349** **19 Claims**



1. An apparatus for mixing a compound containing at least two components, comprising:
a first vessel closed at one end thereof;
a second vessel, the cross-section of which is smaller than that of the first vessel, the second vessel having an opening at one end thereof and being movable within the first vessel relative thereto; and
a sealing means at the outer circumference of the second vessel at its open end which seals off the space between the inner circumference of the first vessel and the outer circumference of the second vessel for the compound and its components so that the components are mixed and the compound is extruded into the second vessel when the two vessels are moved relative to each other, by pushing the second vessel with its open end into the first vessel.

---

### 5,015,102
## METHOD AND APPARATUS FOR MEASURING TEMPERATURE OF A LIVING BODY

**Keiji Yamaguchi, Shimizu, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan**

**PCT No. PCT/JP87/00816, § 371 Date Aug. 9, 1989, § 102(e) Date Aug. 9, 1989, PCT Pub. No. WO88/05161, PCT Pub. Date Jul. 14, 1988**

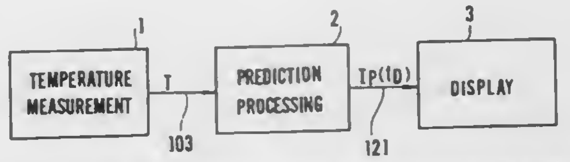
**PCT Filed Oct. 23, 1987, Ser. No. 378,186**

**Claims priority, application Japan, Dec. 24, 1986, 61-306357; Apr. 30, 1987, 62-104483**

**Int. Cl.$^5$ G06F *15/42;* G01K *3/00***

**U.S. Cl. 374—107** **18 Claims**

1. A method of measuring temperature of a living body, wherein sensed temperature at a future time is capable of being predicted based on a predictive functional formula having elapsed time from the start of temperature measurement as variable, said method comprising the steps of:
providing a predictive functional formula having temperature data as independent variables and elapsed time data as dependent variables and including a shape parameter for reflecting the shape of a sensed temperature curve and coefficient parameters for superimposing said predictive functional formula on said sensed temperature curve, the value of said shape parameter and coefficient parameters being unknown;
a temperature sensing step of sensing temperature and generating temperature data indicative of the temperature sensed;
a time measuring step of measuring elapsed time from start of temperature measurement and generating time data indicative of the measured elapsed time;
setting a value of a shape parameter on the basis of said temperature data and said elapsed time data obtained early.
setting said value of coefficient parameters by solving a simultaneous equation comprising a plurality of said predictive functional formula, said plurality of predictive functional formulas being solved by substituting for said formula variables said value of shape parameter, temperature data, and elapsed time data at a plurality of different points in time; and
calculating sensed temperature at a future time in accordance with the predictive functional formula specified by said value of shape parameter and coefficient parameters.



11. An apparatus for measuring the temperature of a living body, wherein sensed temperature at a future time is capable of being predicted, comprising:
memory means for storing a predictive functional formula having temperature data as independent variables and elapsed time data as dependent variable and including a shape parameter for reflecting the shape of a sensed temperature curve and coefficient parameters for superimposing said predictive functional formula on said sensed temperature curve, wherein said shape parameter and coefficient parameters are unknown;
temperature sensing means for sensing temperature and generating temperature data indicative of the temperature sensed;
time measuring means for measuring elapsed time from start of temperature measurement and generating time data indicative of the measured elapsed time;
shape parameter setting means for setting a value of shape parameter on the basis of said temperature data and elapsed time data;
coefficient parameter setting means for setting a value of coefficient parameters by solving a simultaneous equation comprising a plurality of said predictive functional formula, said plurality of predictive functional formulas being solved by substituting for said formula variables said value of shape parameter, and temperature data and elapsed time data at a plurality of different points in time; and
prediction processing means for calculating sensed temperature at a future time in accordance with the predictive functional formula specified by said value of shape parameter and coefficient parameters.

VOL
1126
ISS
2
MY
14
1991
UMI

5,015,103

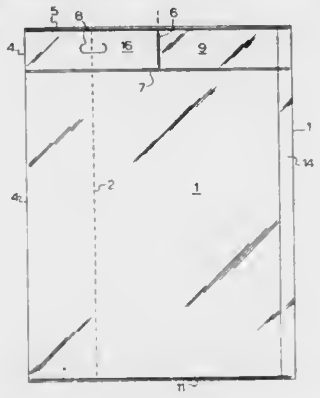
### SIDE LOADABLE BAG

**Joseph B. Mercer, Hickory, N.C., assignor to Plastic Packing, Inc., Hickory, N.C.**

**Filed Aug. 15, 1990, Ser. No. 567,767**

**Int. Cl.$^5$ B65D** *33/08*

U.S. Cl. 383—10 6 Claims



1. A bag for receiving and containing merchandise comprising a sheet of flaccid material folded along a fold line to provide two overlapping wall panels, said wall panels having spaced apart first and second pairs of edges, the edges of each pair joined together to form first and second spaced apart seams delimiting a bag cavity, and a third pair of edges disposed between said first and second seams unattached to one another and spaced apart from said fold line, said fold line being disposed inwardly between said overlapping wall panels forming a gusset with a part of said overlapping wall panels, and a handle portion, comprising a portion of said gusset and a portion of said overlapping wall panels not forming a part of said gusset, protruding beyond said bag cavity.

5,015,104

### SHAFT BEARING STRUCTURE

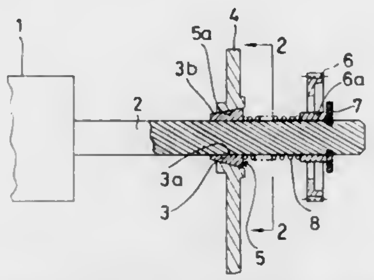
**Hiroyuki Sato, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan**

**Filed Oct. 4, 1989, Ser. No. 416,895**

**Claims priority, application Japan, Oct. 20, 1988, 63-136904[U]**

**Int. Cl.$^5$ F16H** *55/18;* **F16C** *27/00, 33/02*

U.S. Cl. 384—296 4 Claims



1. A shaft bearing structure comprising a rotatable shaft, a bushing disposed on said shaft, said bushing having an outer surface tapered in an axial direction so as to have a frusto-conical configuration, a support member having a support opening for receiving said bushing, said support opening having an inner surface tapered in an axial direction so as to have a frusto-conical configuration, a gear wheel mounted on said shaft to preclude relative rotation between said gear wheel and said shaft, a retainer means mounted on said shaft to preclude axial movement of said gear wheel on said shaft, and a biasing means disposed between said gear wheel and said bushing biasingly urging said bushing in an axial direction such that said tapered outer surface of said bushing is biased into mating contact with said tapered inner surface of said support opening, said biasing means applying a frictional load between said gear wheel and said retainer means so as to prevent backlash of said gear wheel, said support member having a slot leading to said support opening, said bushing having a protrusion extending outwardly of said tapered outer surface, said protrusion extending outwardly of said tapered outer surface, said protrusion being disposed in said slot to thereby prevent said bushing from rotating in said support opening.

5,015,105

### CROWN-SHAPED CAGE FOR A RADIAL BEARING

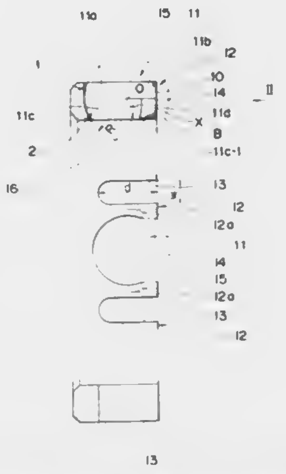
**Hiroshi Ueno, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan**

**Filed Mar. 21, 1990, Ser. No. 497,076**

**Claims priority, application Japan, Apr. 7, 1989, 1-41434[U]**

**Int. Cl.$^5$ F16C** *33/41, 33/44*

U.S. Cl. 384—531 7 Claims



1. A crown-shaped annular cage for a radial bearing, comprising:

partition walls spaced circumferentially at regular intervals around said cage and defining between adjacent partition walls a plurality of pockets for accomodating balls, said pockets being spaced from each other at regular intervals in the circumferential direction of said said cage, said pockets extending radially through said cage and having entrances opening axially of said annular cage on one side of said cage;

said partition walls on opposite sides of each pocket having engagement portions projecting into the pocket at the radially inner portion of the axially open entrance of the pocket, the engagement portions on both sides of each pocket being engagable with a ball in the pocket so as to prevent escape of the ball from the pocket in radial and axial directions; and

said partition walls having relief spaces therein at positions between said pockets for allowing deflection of the partition walls when balls are inserted in the pockets.

5,015,106

### MARKING APPARATUS WITH MULTIPLE LINE CAPABILITY

**John A. Robertson; David L. Cyphert, both of Chillicothe; Thomas E. Cyphert, Kingston, and Joseph F. Muscarella, Columbus, all of Ohio, assignors to Telesis Controls Corporation, Chillicothe, Ohio**

**Filed Sep. 25, 1989, Ser. No. 411,726**

**Int. Cl.$^5$ B41J** *2/22*

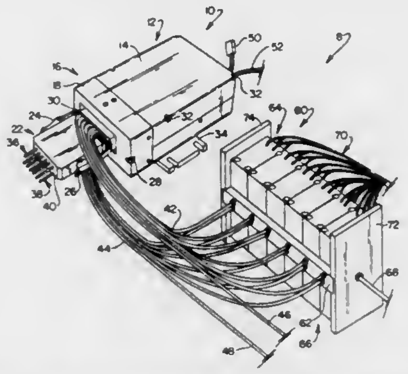
U.S. Cl. 400—121 31 Claims

1. Apparatus for marking solid material objects at a surface thereof in response to data inputs with a sequence of indentation defined characters, each within a pixel matrix of rows and columns comprising:

a housing;

an actuator assembly mounted within said housing having a cam follower driven input and a translational mechanism including an attachment portion drivable along vertical and transverse directions from said driven input to define a substantially singular plane locus of movement of said attachment portion representing a sequence of parallel, spaced, row-defining movements each row defining movement occurring between first and second row end terminal positions, said sequence of spaced row-defining movements occurring between first and second row sequence terminal positions;

a marker head assembly coupled with said attachment portion, having a confronting portion positionable in spaced adjacency with said surface and including at least one marker pin having an impacting tip drivably movable into said surface in response to control signals;



a cam assembly mounted adjacent said actuator assembly for rotational driving association with said cam follower driver input and drivably rotatable to effect said translational mechanism drive;

a motor having a drive output for drivably rotating said cam assembly;

timing means for deriving pixel position signals corresponding with said pixels of said matrix and terminal signals corresponding with said first and second row sequence terminal positions; and

control means responsive to said data inputs, said pixel position signals and said terminal signals for deriving said control signals.

5,015,107

### TYPE-WHEEL CASSETTE POSITIONER FOR PRINTER

**Yuichi Harada, Sakurahon, and Masaya Funamoto, Higashi, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

**Filed Mar. 3, 1989, Ser. No. 318,556**

**Claims priority, application Japan, Mar. 5, 1988, 63-29591[U]**

**Int. Cl.$^5$ B41J** *1/00*

U.S. Cl. 400—144.2 5 Claims

1. In a printer comprising:

a platen;

a type-wheel cassette rotatably accommodating a type-wheel with a plurality of types, said type-wheel cassette having a first side surface close to said platen and a second side surface more apart from said platen than said first side surface;

type selection means for rotatably driving said type-wheel to selectively position a type on said type-wheel at a printing position facing, on a printed line said platen in engagement with said type-wheel;

printing hammer means for effecting a printing operation by hammering said selected type of said type-wheel at said printing position against said platen; and

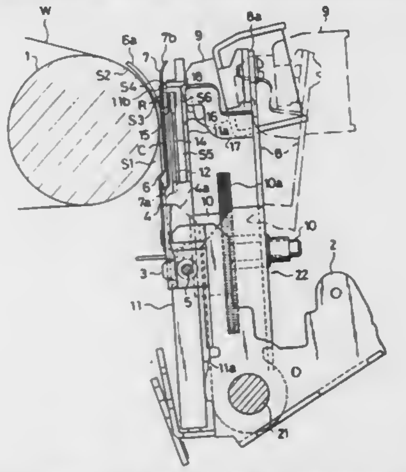
support frame means having a mounting position in which said type-wheel cassette is removably mounted, said support frame means being movable along said platen,

a type-wheel cassette positioner comprising:

a holder supported by said support frame means so as to be moved relatively to the support frame means between a type-wheel cassette holding position at which said type-wheel cassette is held in said mounting position, at which said type-wheel cassette is allowed to be removed from said mounting position;

first positioning means formed integrally with said holder, extending toward said type-wheel cassette mounted in said mounting position on said support frame means, said first positioning means being able to engage said second side surface adjacent to the selected type disposed at said printing position;

an intervening member secured to said support frame means and located between said type-wheel cassette mounted in said mounting position and said platen; and second positioning means formed integrally with said intervening member, extending toward said type-wheel cassette mounted in said mounted position on said support frame means, said second positioning means being able to engage said first side surface adjacent to the selected type disposed at said printing position so that said first and second positioning means face each other on the opposite sides of the type-wheel cassette, whereby positioning of the type-wheel cassette to said mounting position is ensured by co-operation of said first and second positioning means, wherein:



said first positioning means includes a pair of urging pieces spaced apart on the opposite sides of said printing position along said printing line; and

said second positioning means includes a pair of second urging pieces spaced apart on the opposite sides of said printing position along said printing line, said first and second urging pieces facing one another on the opposite sides of said type-wheel cassette.

5,015,108

### RIBBON PRINT TRACK REINKING WITH A ROLL SYSTEM

**Jeffrey H. Paterra, Charlotte, N.C., and Donald K. Rex, Highland Beach, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 360,182, Jun. 1, 1989, abandoned. This application Jun. 11, 1990, Ser. No. 535,638**

**Int. Cl.$^5$ B41J** *31/16, 31/14, 27/12*

U.S. Cl. 400—197 14 Claims

1. An improved ribbon cartridge assembly for use in computer printers, typewriters and the like comprising,

a housing,

an endless inked ribbon having a print track that extends a distance less than the width of the ribbon,

a printing mechanism,

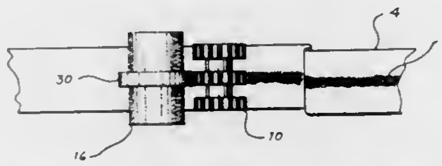
guide means for mounting and guiding said endless ribbon in

VOL
1126
ISS
2
MY
14
1991
UMI

said housing past said printing mechanism whereat ink on the ribbon is transferred to a print medium,

drive transfer roller means rotatably mounted on said housing about an axis of rotation drivingly engaging a major portion of the width of the surface of said ribbon including said print track, means for rotating said drive transfer roller means, pinch roller means rotatably mounted on said housing and having an axis of rotation generally parallel to the axis of rotation of said drive transfer roller, said pinch roller means being spaced from but in proximity to said drive transfer roller means,

means biasing said pinch roller means and said drive transfer roller means into engagement with said endless ribbon to advance said endless ribbon, and



inking means mounted on said housing, said inking means including a porous material defining an ink reservoir, said ink reservoir having a segment with a circumference greater than that of the remaining portion of the reservoir, said segment being aligned with said drive transfer roller such that only the print track is inked by the ink reservoir, said drive transfer roller being free of engagement of said inking means other than said segment thereof which engages said porous material, whereby, the drive transfer roller drivingly engages a major portion of the ribbon while applying ink only to the print track thereon.

---

### 5,015,109

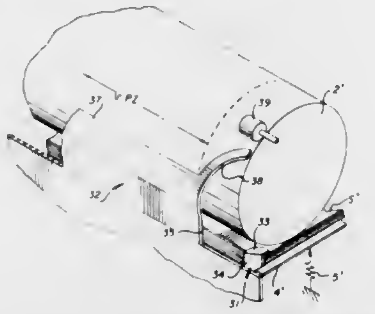
### SHEET FEED CONSTRUCTION FOR COMPACT PRINTERS

**John M. Brandon; Brian D. Bradley, both of Beavercreek, and Richard J. Ratermann, Centerville, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 24, 1989, Ser. No. 441,012**

**Int. Cl.$^5$ B41J** *13/10*

**U.S. Cl. 400—624** **4 Claims**



1. In a printer having a printing region, a sheet supply station, located below said printing region and constructed to support a sheet, and a rotatable feeder/platen located above said supply station for feeding a top sheet from a supported sheet stack and transporting it through said printing region, an improved sheet separator and guide construction comprising:

(a) a supply station egress region extending along across the path of sheet feed from said supply station and perpendicular to the direction for sheet feed;

(b) means for urging a supported sheet stack so that the top sheet contacts said feeder-platen and is moved into said egress region;

(c) a pair of sheet corner deflectors located respectively at opposite edges of said egress region, said deflectors being constructed to direct sheet corners feed three-against inwardly toward the sheet's center and downwardly; and

(d) a central deflector member located along a central portion of said egress region in spaced relation between said corner deflectors, said central deflector member being constructed to direct the center lead-edge of a sheet fed there-against upwardly toward the printer top at the same time said sheet corners are directed downwardly by said corner deflectors.

---

### 5,015,110

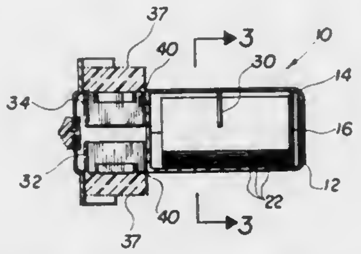
### APPLICATOR ASSEMBLY FOR A LIPSTICK OR LIKE SUBSTANCE

**Daniel D. DeLarocha, 5376 W. 14th La., Hialeah, Fla. 33012**

**Filed Nov. 7, 1989, Ser. No. 432,857**

**Int. Cl.$^5$ A45D** *40/00, 40/10, 40/18*

**U.S. Cl. 401—10** **13 Claims**



1. An application assembly for coating lipstick or a like substance on an applicator sheet for the transfer of the substance to the lips of the user, said assembly comprising:

a housing including an access opening formed in a wall thereof, said access opening dimensioned to pass an applicator sheet therethrough,

a substance supply movably mounted within said housing adjacent said access opening and including at least one supply container containing the substance therein and having an open, inner face exposing the contained substance and being selectively positionable into and out of substance transferring contact with a surface portion of the applicator sheet disposed within said housing through said access opening,

mounting means movably securing said substance supply within said housing in normally spaced relation to said access opening in engageable relation to an applicator sheet and including biasing means interconnecting said supply container to said housing and structured for normally biasing said substance supply out of said substance transferring contact with the surface portion of the applicator sheet, and

positioning means formed on said housing for positioning said substance supply into substance transferring contact with the applicator sheet and including an apertured construction formed in said housing being disposed and dimensioned to allow a finger of a user to pass therethrough into engaging relation with the supply container so as to facilitate movement of the substance supply into said substance transferring contact with the applicator sheet.

---

### 5,015,111

### ERASER DISPENSER AND WRITING INSTRUMENT EQUIPPED WITH ERASER DISPENSER

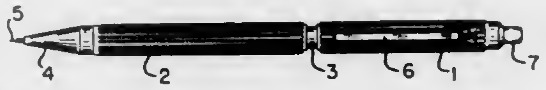
**Tor Petterson, Rancho Palos Verdes, Calif., assignor to Pentel of America, Ltd., Torrance, Calif.**

**Continuation of Ser. No. 167,549, Mar. 14, 1988, Pat. No. 4,904,101. This application Feb. 26, 1990, Ser. No. 485,229**

**Int. Cl.$^5$ B43K** *29/02*

**U.S. Cl. 401—52** **20 Claims**

1. A writing instrument comprising: a front tubular member having a writing tip at the front end thereof; advancing means axially displaceable in forward and rearward directions for incrementally advancing a writing medium lengthwise in the forward direction through the writing tip in response to forward axial displacement of the advancing means; an inner tubular member having a front portion disposed within and encircled by the front tubular member and having a rear portion; a rear tubular member disposed over and encircling the rear portion of the inner tubular member; means mounting the rear and inner tubular members for axial displacement together as a unit in forward and rearward directions relative to the front tubular member to effect forward axial displacement of the advancing means to thereby incrementally advance the writing medium; means mounting the rear tubular member for angular displacement in opposite directions relative to the front and inner tubular members; holding means disposed within the inner tubular member for releasably holding an elongate eraser; and means mounting the holding means to undergo axial displacement in forward and rearward directions within the inner tubular member in response to angular displacement of the rear tubular member in opposite directions to thereby axially retract and extend the eraser relative to the rear end of the rear tubular member.



---

### 5,015,112

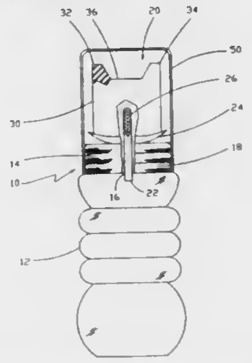
### COOKING OIL CONTAINER AND APPLICATOR

**Nancl N. Arnold, 4735 W. Lake Rd., Canandaigua, N.Y. 14424**

**Filed May 31, 1990, Ser. No. 531,136**

**Int. Cl.$^5$ B05C** *17/00*

**U.S. Cl. 401—202** **3 Claims**



1. An applicator device for applying a film of oil, said device including a container having a top wall, and an applicator assembly connected thereto:

said applicator assembly including a perforated vertical tube extending upwardly through the above said top wall of said container, a concave upward drain receptacle mounted on said tube in sealing engagement therewith and extending radially therefrom above said container, and a porous applicator tip over the outer end of said tube and on said drain receptacle, said tube being in fluid communication with said drain receptacle, said drain receptacle extending radially outward of said applicator tip;

whereby said applicator device is effective to provide oil to said applicator tip for application of a film of said oil on a desired surface, and to drain oil from said applicator tip back into said container.

---

### 5,015,113

### MULTIANGULAR PEN

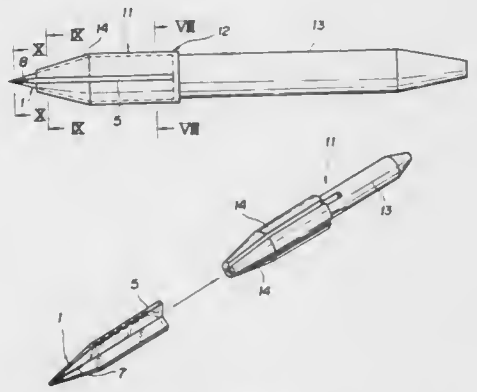
**Shizuo Yamanaka, 4-16-13-301, Shimo-renjaku, Mitaka-shi, Tokyo, Japan**

**Filed Dec. 6, 1988, Ser. No. 280,487**

**Claims priority, application Japan, Dec. 7, 1987, 62-307566; Aug. 4, 1988, 63-193412; Sep. 14, 1988, 63-120957**

**Int. Cl.$^5$ B43K** *5/02*

**U.S. Cl. 401—224** **1 Claim**



1. A multiangular pen comprising

a pen nib having a writing tip at one end and including

a trunk extending in a longitudinal direction of said pen nib from said tip and having a hollow columnar portion extending longitudinally therethrough,

a plurality of projections radially and outwardly projected from said trunk and having an angular interval disposed between said projections,

a plurality of slits each extending in a direction from said tip between said projections and opening radially from said hollow columnar portion,

a plurality of clearances each extending along a tip portion of said projections and also opening radially from said hollow columnar portion,

an ink chamber in said hollow columnar portion of said trunk at said tip of said pen nib surrounded by said slits and said clearances through which ink is passed from said ink chamber,

said slits and said projections being alternatively arranged with a same angular interval interposed between each said slit and said projection,

said tip of said pen nib being formed as a pyramid;

a penholder holding said pen nib at one end of said penholder;

an ink holding member in an other end of said penholder;

a pen core of liquid permeating fibrous material in said penholder which includes

a core body of liquid permeating material extending into said ink holding member to draw ink from said ink holding member,

holder pieces also of liquid permeating material having sections that fit against said trunk of said pen nib and extending on outer surfaces of said pen nib between said projections over portions of said slits away from said tip of said pen nib and supporting of said pen nib to pass ink from said holder pieces into said ink chamber in through said slits.

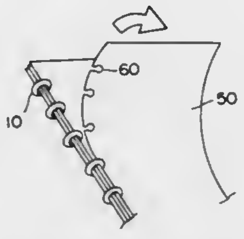
said holder pieces extending over and in contact with said core body to receive ink from said core body;

whereby ink from said ink holding member is passed through said core body to said holder pieces and into said slits in said portions of said slits overlapped by said holder pieces into said hollow columnar portion and into said ink chamber and then out of said slits and said clearances at said tip of said pen nib.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,114
### MODULAR LOOSE LEAF BINDER SYSTEM AND A BINDER RING USED THEREIN

**Paul D. Miller, 14 Fifth Ave., New York, N.Y. 10011**
**Filed Feb. 10, 1989, Ser. No. 308,797**
**Int. Cl.⁵ B42F** *3/00*
**U.S. Cl. 402—4** **4 Claims**

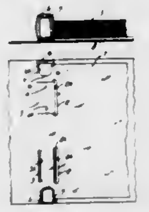


1. A modular loose leaf binder system, comprising:
a plurality of loose leaf paper sheets having opposing edges, each sheet having a plurality of aligned die-cut perforations proximate one edge thereof, and a predetermined distance from the perforation to said one edge;
at least two modular binder rings for binding said plurality of loose leaf paper sheets, each of said rings including a disk-shaped central portion having a first axial width, an aperture formed substantially in the center of said central portion, and an annular outer rim having an arcuately shaped outer surface configured as an outer segment of a circle, said annular outer rim having a second axial width greater than said first axial width, said outer rim intersecting with said central portion defining an elbow, with a radial distance extending from said aperture to said elbow being greater than the predetermined distance from the perforations to the edge of said paper sheets; and
a loose leaf cover having opposing edges and a plurality of die cut perforations proximate one said edge, said perforations extending a predetermined distance from said one edge less than the radial distance from the aperture to the elbow of said binder ring, said cover including a folding base portion opposite the perforated edge.

---

### 5,015,115
### INTERCHANGEABLE SHEET ALBUM FOR PHOTOGRAPHS AND CARDS

**Benito Mandolesl, Bertinoro, Italy, assignor to Linea BM di Mandolesi Benlto & C. S.n.c., Forli', Italy**
**Filed Aug. 24, 1989, Ser. No. 398,348**
**Claims priority, application Italy, Sep. 15, 1988, 12028 A/88**
**Int. Cl.⁵ B42F** *13/00*
**U.S. Cl. 402—56** **8 Claims**

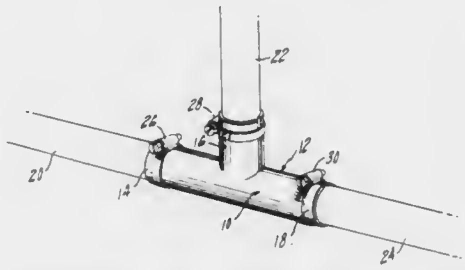


1. An interchangeable sheet album, comprising a cover and a plurality of sheets, said cover having an inner surface, each sheet of said plurality of sheets defining an outer edge, said each sheet being provided with at least one through slot, said at least one through slot defining an inner slot edge therein, said album further comprising at least one raised coupling insertion element and at least one raised guiding portion, said at least one raised coupling insertion element and said at least one raised guiding portion both being rigidly associated with said inner surface of said cover, said at least one raised coupling insertion element defining an insertion element inner surface, said at least one raised coupling insertion element being insertable inside said at least one through slot such that at least a portion of said inner slot edge of said at least one through slot is slideably engageable with at least a portion of said insertion element inner surface of said at least one raised coupling insertion element, said at least one raised guiding portion defining an engagement surface, said engagement surface at least temporarily engageing and guiding at least a portion of said outer edge of said each sheet, said at least one raised guiding portion and said at least one raised coupling insertion element being mutually arranged on said inner surface of said cover such that said plurality of sheets obtain a longitudinal and transverse superimposition when said plurality of sheets are parallel to said cover.

---

### 5,015,116
### STRUCTURAL JOINTS OF HIGH DIMENSIONAL STABILITY

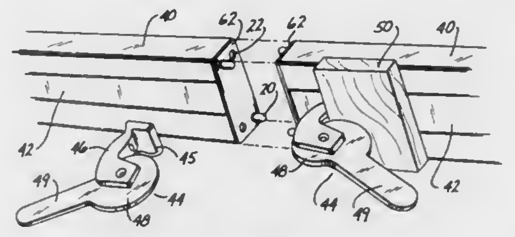
**Vincent C. Nardone; James R. Strife, both of South Windsor, and Karl M. Prewo, Vernon, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**
**Continuation-in-part of Ser. No. 234,647, Aug. 22, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 485,184**
**Int. Cl.⁵ F16B** *1/00;* **F16C** *9/00*
**U.S. Cl. 403—28** **11 Claims**



1. A dimensionally stable structural joint comprising:
(a) a connector having at least two tubular sleeves, each of said sleeves having a cylindrical cavity and inside and outside surfaces, said connector segmented parallel to the cylindrical cavity of the sleeves, said connector elements manufactured from a material with an axial coefficient of thermal expansion of approximately $-1.0$ to $1.0\times10^{-6}$ in $\text{in}^{-1°}$ $\text{F.}^{-1}$;
(b) at least two tubular structural members manufactured from a material having an axial coefficient thermal expansion of approximately $-1.0$ to $1.0\times10^{-6}$ in $\text{in}^{-1°}$ $\text{F.}^{-1}$ and a positive radial coefficient of thermal expansion of 8.0 to $14.0\times10^{-6}$ in $\text{in}^{-1°}$ $\text{F.}^{-1}$ which are inserted into said sleeves of said connector; and
(c) at least one annular clamping means per sleeve which has substantially the same coefficient of radial expansion as the tubular structural members, and is disposed around the outside surfaces of the sleeves to secure said tubular structural members within said sleeves,
whereby high dimensional stability results from the tightening of the clamping means which provide a constant state of stress, over a given temperature range, which is sufficient to secure said tubular members upon thermal contraction and insufficient to deform said tubular members upon thermal expansion and from the essentially equivalent radial expansion of said tubular structural members and said annular clamping means, and essentially zero axial expansion of said tubular structural members and said connector.

### 5,015,117
### CONSTRUCTION MATERIALS WITH END CONNECTORS

**Patrick S. Pawlicki, 27753 Hwy. 79, Santa Ysabel, Calif. 92070**
**Continuation-in-part of Ser. No. 11,905, Feb. 6, 1987, abandoned. This application Jun. 28, 1988, Ser. No. 212,603**
**Int. Cl.⁵ F16B** *7/04*
**U.S. Cl. 403—300** **17 Claims**

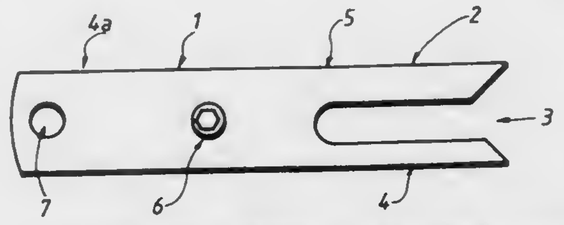


1. Construction means, comprising:
(a) an elongated concrete form member,
(b) a generally hollow polyethylene plastic extrusion of generally rectangular transverse cross-section forming said elongated concrete form member,
(c) said extrusion having a wall at one side shaped into a lipped dove-tailed keyway that tapers as it goes outwardly and that extends from end to end of said extrusion,
(d) a clamp having a base fitting in said keyway having an L-shaped arm forming together with said base a C-shaped and locking means on said arm opposite said base,
(e) said base having generally an elongated rectangular shape with the narrow dimension of the rectangular shape readily fitting into the dove-tailed keyway, with a dimension across the longer dimension of the rectangular shape making a press fit with the lips of the dove-tailed keyway, and having a still greater dimension across corner-to-corner of the rectangular shape so that the base is locked into the dove-tailed keyway by inserting the narrow dimension in said dove-tailed keyway, by next turning the base so that the dimension from corner-to-corner distorts the lips of said keyway, and by next turning the base so that the longer dimension across the rectangle make a press fit with the lips of the dove-tailed keyway, and
(f) a stake to support said concrete form member secured by said clamp and said stake being compressed against said wall of said extrusion by said locking means to help secure said clamp in place.

---

### 5,015,118
### MOUNTING MEANS

**Michael J. B. Sewell; Christopher K. B. Sewell; Margaret I. Sewell, and Charles P. B. Sewell, all of 82 Cliff View Dr., Green Bay, Auckland, New Zealand**
**Filed Mar. 14, 1989, Ser. No. 323,336**
**Claims priority, application Netherlands, Mar. 15, 1988, 223900**
**Int. Cl.⁵ B25G** *3/02*
**U.S. Cl. 403—362** **23 Claims**

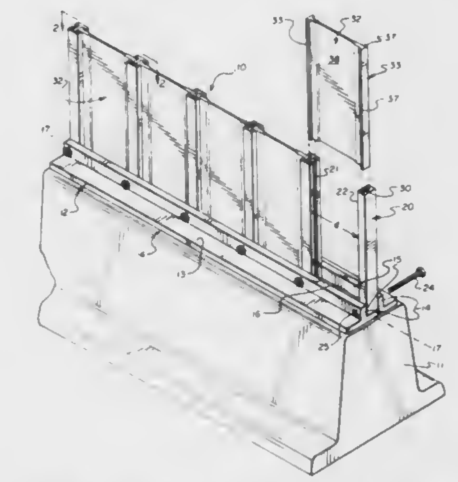


1. A mounting means engageable with a mounting channel, said mounting means including a contact portion, a mounting portion and engagement means actuable to in use engage said contact portion with said mounting channel, said mounting portion at least partially defining a mounting recess spaceable from inner portions of said channel to enable portion of a fixing means to be received in said channel when said mounting portion is in an engaged condition.

---

### 5,015,119
### VISION BLOCKING BARRIER

**Donald W. Schmanski, 1301 Hot Springs Rd., Carson City, Nev. 89706**
**Filed Sep. 11, 1989, Ser. No. 405,858**
**Int. Cl.⁵ E01F** *9/06*
**U.S. Cl. 404—12** **9 Claims**



1. A modular barrier for attachment to a top side of a barricade positioned along a roadside for substantially developing a total visual block for passing vehicular traffic, said barrier comprising:
an elongated base plate having opposing upper and lower surfaces of flat configuration and an elongate axis;
a plurality of support posts having top and bottom ends and opposing side surfaces;
attachment means comprising a pair of upward projecting elongate shoulders defining a horizontal mounting slot extending along the elongated axis of the base plate, said attachment means being rigidly coupled to the upper surface of the base plate and the bottom end of each post, the attachment means coupling the posts at equal separation distances along the upper surface of the base plate to form a linear array of vertical, parallel, equidistant posts, said posts having side faces being oriented along the elongate axis substantially along a common plane;
a plurality of opaque panel members, each having a width slightly greater than the separation distance between the side faces of the respective posts, each panel member having side edges of uniform cross-section and a top and bottom edge; and
a mounting track formed at the opposing side faces of each post and configured to slidably receive the side edges of the panel members in a tongue-in-groove relationship to form a wall wherein the panel members serve as removable components in which the side edges thereof can be inserted in the mounting tracks of adjacent posts and the bottom edge can be inserted into the horizontal slot of the attachment means to form a total visual block barrier.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,120

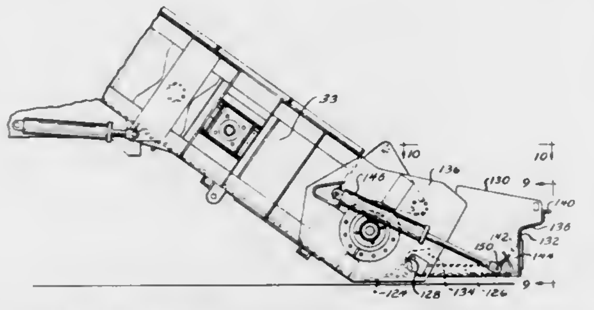
## METHODS AND APPARATUS FOR MAKING AN ASPHALT-AGGREGATE PAVEMENT

**James D. Brock, Chattanooga, Tenn.; Donald W. Smith, Aurora; James H. Basset, Sycamore, both of Ill., and John P. Renneck, Chattanooga, Tenn., assignors to Barber-Greene Company, DeKalb, Ill.**

**Continuation-in-part of Ser. No. 89,318, Aug. 25, 1987, Pat. No. 4,818,139. This application Feb. 10, 1989, Ser. No. 309,079**

**Int. Cl.$^5$ E01C** *19/10*

**U.S. Cl. 404—108** **30 Claims**



1. An apparatus capable of receiving material from a delivery truck, the apparatus comprising:

chassis means capable of receiving material;

inclined conveyor means mounted on the chassis means, the conveyor means having a discharge portion for discharging material into the chassis means and an inlet leading into the conveyor means; and

a trough extending from the inlet to receive material from the delivery truck;

wherein the trough is capable of having its volume decreased after receiving the material to move material in the truck dump hopper into the inlet.

---

### 5,015,121

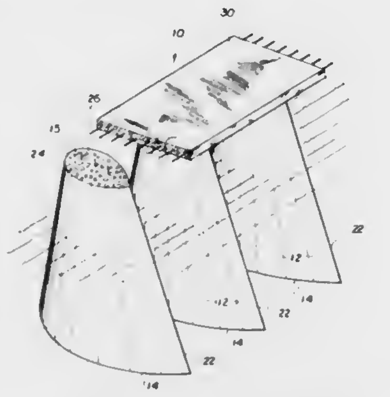
## OFFSHORE EROSION PROTECTION ASSEMBLY

**Hubert B. Perret-Gentil, 2 Jean Lafitte La., Key Largo, Fla. 33037**

**Filed Mar. 19, 1990, Ser. No. 495,634**

**Int. Cl.$^5$ E02B** *3/06*

**U.S. Cl. 405—31** **22 Claims**



1. An offshore erosion protection structure designed to reduce sand erosion from wave action and comprising:

a barrier assembly anchored to the floor of a body of water and extending upwardly therefrom to a height sufficient to extend above a normal water level,

said barrier assembly comprising a plurality of modules formed at least in part from a heavy, reinforced cementitious material and arranged in consecutive adjacent and at least partially spaced relation to one another,

said plurality of modules disposed offshore from a shoreline of the body of water and collectively disposed to conform in substantially parallel relation to and along a length of the shoreline,

said barrier assembly including a leading portion facing away from the shoreline and being angularly disposed at an inclined orientation substantially toward the shoreline,

each of said plurality of modules including a leading edge having a linear configuration and extending continuously along a length thereof, a plurality of leading edges on said plurality of modules disposed in spaced relation to one another, and

each of said plurality of modules further including a substantially rounded trailing portion extending along the length thereof and being oppositely disposed to a corresponding one of said leading edges, wherein said plurality of modules are collectively disposed and structured to force incoming waves to dissipate and pass therebetween along substantially an upper, exposed portion thereof.

---

### 5,015,122

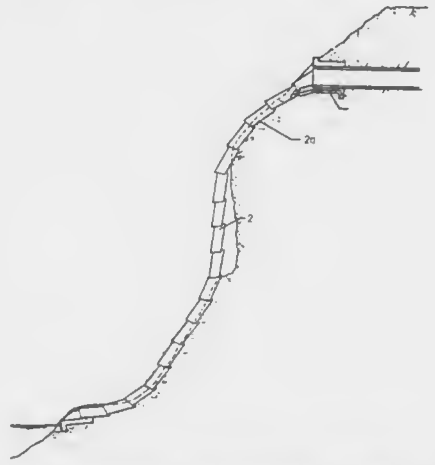
## SYSTEM PERMITTING CHANNELING OF DRAINAGE FLUID

**Denis Combes, 153, avenue Albert Thomas, 81000 Albi, France**

**Filed Jul. 10, 1989, Ser. No. 377,407**

**Int. Cl.$^5$ E02B** *3/00;* **B65G** *11/00*

**U.S. Cl. 405—36** **11 Claims**



5. System permitting the channeling of drainage fluid from a point located upstream to a point downstream, comprising:

a series of fitted conduit elements assembled together to articulate with one another, each conduit element of the assembled series being suspended from the preceding conduit element in the series where the first conduit element in the series is suspended from a point of anchorage located upstream; and

disconnectable hooking means for hingedly connecting adjacent conduit elements, wherein the disconnectable hooking means of each conduit element comprises preformed protuberances on the upper and lower side of said element and is intended to cooperate with respective upper and lower protuberances of two adjacent conduit elements in order to form a hook arrangement which serves as a hinge.

---

### 5,015,123

## METHOD AND APPARATUS FOR INSTALLATION OF DRAINAGE FIELD

**Randall J. Houck; Michael H. Houck, and Harold J. Houck, all of P.O. Box 867, Pisgah Forest, N.C. 28768**

**Filed Mar. 4, 1988, Ser. No. 164,255**

**Int. Cl.$^5$ E02B** *11/00*

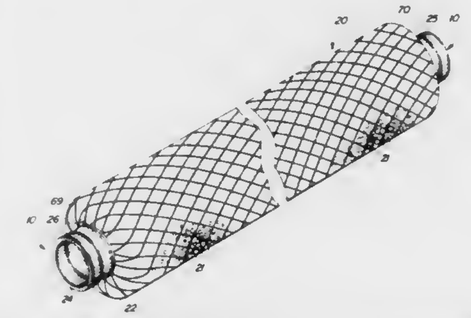
**U.S. Cl. 405—45** **22 Claims**

1. In a drainage field employed in a sewage treatment and disposal system for delivering fluid from a source of sewage effluent for absorption into the ground, a preassembled drainage line unit, comprising:

a horizontally extending perforated conduit connected to deliver fluid from said source;

a loose aggregation of discrete, crush resistant, lightweight elements surrounding said conduit;

a perforated sleeve member enveloping said aggregation and bounding the same relative to said conduit to define an aggregate-filled drainage cavity in fluid communication with the ground and with the perforations of said conduit;



said drainage cavity having predetermined minimum dimensions in directions outwardly of said conduit, and providing drainage characteristics similar to those of a cavity of the same dimensions constituted by an aggregation of rock or crushed stone; and

a male end cap mounted over one end of said conduit and a female end cap mounted over the other end of said conduit; said end caps being dimensioned and configured so that the male end cap of one such unit will mate in conduit interconnecting relationship with the female end cap of another such unit brought into end-to-end alignment therewith.

---

### 5,015,124

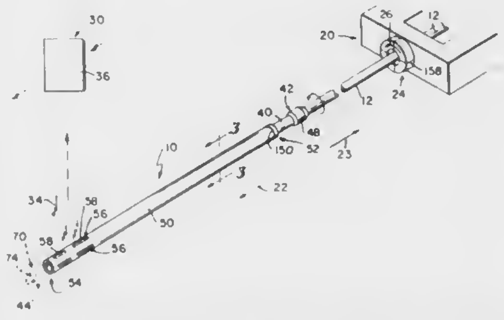
## APPARATUS FOR DIRECTING FORWARD MOVEMENT OF A ROD

**Robert G. Perry, 1259 Hatfield Dr., Evansville, Ind. 47715**

**Continuation-in-part of Ser. No. 415,642, Oct. 2, 1989, Pat. No. 4,936,708. This application May 10, 1990, Ser. No. 521,366**

**Int. Cl.$^5$ F16L** *1/02;* **E21B** *7/26, 11/02*

**U.S. Cl. 405—184** **25 Claims**



1. An apparatus for directing the forward movement of a rod as it is moved through a loose medium comprising a first member having a proximal end and a distal end, a second member sleeved onto the first member so that the first member is movable relative to the second member, means for coupling the proximal end of the first member to the rod so that movement of the rod moves the first member, means provided on one of the first and second members for directing movement of the rod, means providing a first drive shoulder on the first member, means providing a first drive face on the second member, means for yieldably biasing the first drive shoulder toward the second member to engage the first drive face on the second member in a first drive position wherein the directing means is disabled so that forward movement of the rod is not directed as it is moved through the loose medium, means providing a second drive shoulder on the first member, means providing a second drive face on the second member, and means for controlling the first drive shoulder to disengage the first drive face and to permit the second drive shoulder on the first member to engage the second drive face on the second member in a second drive position wherein the directing means is enabled to direct forward movement of the rod in a desired direction as it is moved through the loose medium.

---

### 5,015,125

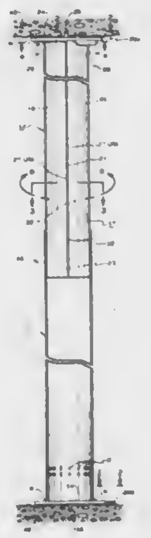
## YIELDABLE MINE POST

**Ben L. Seegmiller, 143 S. 400 East, Salt Lake City, Utah 84111**

**Filed Apr. 5, 1990, Ser. No. 503,654**

**Int. Cl.$^5$ E21D** *15/22*

**U.S. Cl. 405—288** **18 Claims**

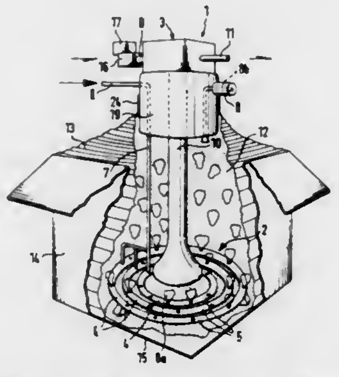


1. A mine post for vertical disposition between a mine roof and a mine floor and including, in combination, first and second post sections each having a respective, post length, said post lengths being mutually telescoping whereby one of said post lengths is innermost and the remaining of said post lengths is outermost, each of said post lengths having an outer end provided with a bearing member and also an inner end, each of said inner ends being mutually frictionally, telescopingly engaged, said innermost tubular post length being provided with a longitudinal wall slot, and wedge means inserted in said wall slot beyond said inner end of said outermost tubular post length for expanding the girth of said innermost tubular post length essentially within its elastic/plastic limit, at and proximate the area of wedge means insertion, for progressively increasing essentially elastic/plastic expansion of said outermost tubular post length and also increasing sliding friction resistance forces and essentially elastic/plastic coaction, between said tubular post lengths as said wedge means enters into and progresses within said outermost tubular post length, in response to post axial compression forces and yield incremental movements of said innermost tubular post length in and relative to said outermost tubular post length, whereby to allow for progressively increased loading and progressively reduced yield of said mine post in accordance with mine roof lowering, relative to the mine floor, and desired mine roof control.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,126
## METHOD OF AND APPARATUS FOR SUPPLYING PULVERULENT MATERIAL TO A PROCESSING DEVICE

**Erich Krämer, Röthenstrasse 21, 8628 Michelau, Fed. Rep. of Germany**
**Filed Apr. 6, 1989, Ser. No. 334,868**
**Claims priority, application Fed. Rep. of Germany, Apr. 14, 1988, 3812466; Aug. 9, 1988, 3827014**
**Int. Cl.$^5$ B65G** *53/42*
**U.S. Cl. 406—152 13 Claims**



1. Apparatus for supplying pulverulent material contained within a conventional transport container to a processing device, comprising:

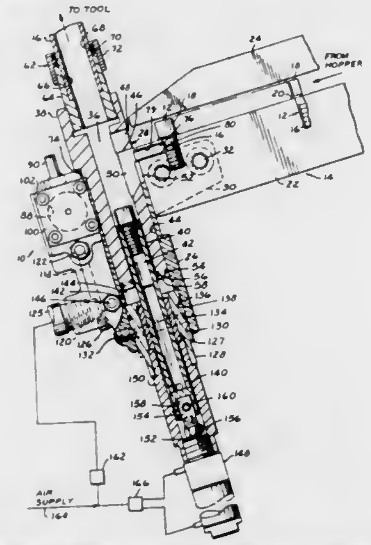
fluidizing means adapted for direct introduction into the transport container for fluidizing the pulverulent material within the transport container and including a plurality of radially spaced fluidizing elements; and

discharge means for conveying the fluidized pulverulent material from the transport container to the processing device.

---

### 5,015,127
## ARTICLE FEEDER

**Edward N. Hockman, Auburn Hills, Mich., assignor to Clyde Corporation, Rochester, Mich.**
**Filed Jan. 25, 1990, Ser. No. 470,157**
**Int. Cl.$^5$ B25B** *23/04;* **B65G** *51/28, 51/22*
**U.S. Cl. 406—192 10 Claims**

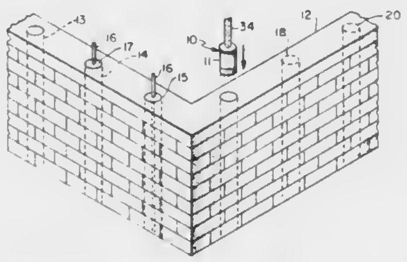


1. An apparatus for transferring articles from a source of supply in which a succession of articles with heads and depending shanks are in side-by-side relation and feeding one article at a time head first and generally longitudinally through a conduit, said apparatus comprising: a housing, an axially elongate passageway carried by said housing and having an article outlet constructed and arranged for communicating said passageway generally coaxially with the conduit, an inlet to said passageway spaced from said outlet and opening into the side of said passageway through which an article may enter into said passageway with its axis oriented generally parallel to the axis of said passageway and its shank depending from its head, a slide rod received in said passageway and having a pilot passage extending generally axially and opening through one end into said passageway and constructed and arranged to receive the shank of an article therein, said slide rod being movable to an extended position to close said inlet and dispose said one end of said slide rod downstream of said inlet and to a retracted position to open said inlet and dispose said one end upstream of said inlet, a first drive for moving said slide rod to its extended and retracted positions, valve means operatively associated with said slide rod for discharging compressed gas into said pilot passage upstream of an article received therein when said slide rod is in its extended position to propel such article head first through said passageway outlet and the conduit, and to turn off such discharge of compressed gas at least when said slide rod is in its retracted position, metering means carried by said housing and constructed and arranged to feed one article at a time from the source of supply through said inlet and passageway and onto said slide rod with the shank of such article received in said pilot passage thereof when said slide rod is in its retracted position, and a second drive carried by said housing and constructed and arranged to actuate said metering means.

---

### 5,015,128
## ROTARY DRILL APPARATUS

**Donald C. Ross, Jr., and Donald C. Ross, Sr., 3706 W. 224th St., Torrance, Calif. 90505**
**Filed Mar. 26, 1990, Ser. No. 498,405**
**Int. Cl.$^5$ B23B** *47/34*
**U.S. Cl. 408—59 3 Claims**



1. A rotary drill apparatus comprising:

a first circular cutting device rotatably driven to define a solid core intended to be removed to establish a hole or bore;

a second cutting device coaxially disposed with respect to said first cutting device in spaced-apart relationship;

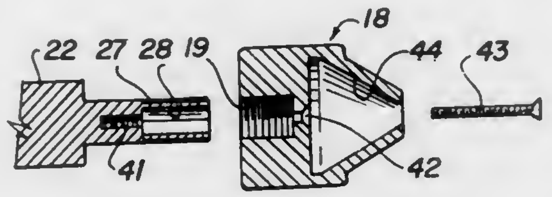
a cylindrical hollow body operably supporting said first and second cutting devices so as to operate simultaneously to cut said core and pulverize said core;

evacuation means including a coolant providing means operably disposed with said cutters and said body to forcibly carry and remove residue of said cut and pulverized core away from said hole or bore;

said evacuation system includes means associated with said second cutting device for conducting coolant from said providing means in mixing relationship with said core residue and further including means associated with said body for forcibly withdrawing said coolant mixed with said core residue externally of said body and said cutting devices.

### 5,015,129
## ADAPTER FOR BATTERY-POWERED SCREWDRIVER TO ATTACH DRILL CHUCK

**Stephen D. Albin, 797 Manor Way, Los Altos, Calif. 94022**
**Filed Aug. 23, 1990, Ser. No. 572,614**
**Int. Cl.$^5$ B23B** *31/10*
**U.S. Cl. 408—239 A 10 Claims**



1. An adapter for use with a battery powered screw driver of the type having an output shaft having a non-circular first socket shaped to receive the shank of a screwdriver blade therein and a drill chuck formed with an internally threaded second socket, said adapter comprising:

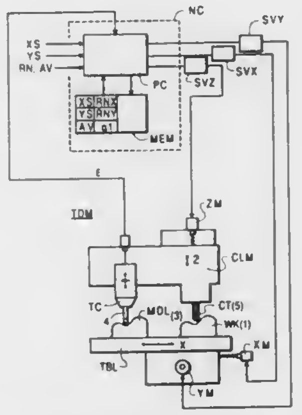
a body having a first end formed with a third socket complementary to said output shaft for linear slidable engagement therewith and a stem centrally located in said third socket, said stem being shaped complementary to said first socket, said third socket having attachment means to detachably secure said body to said output shaft,

said body having a second and opposite said first end having an externally threaded shank dimensioned to threadably engage said second socket.

---

### 5,015,130
## CONTOUR PROFILING MACHINE

**Hitoshi Matsuura, Hachioji, and Osamu Tsukamoto, Yamanashi, both of Japan, assignors to Fannc Ltd., Minamitsuru, Japan**
**PCT No. PCT/JP88/00608, § 371 Date Feb. 7, 1989, § 102(e) Date Feb. 7, 1989, PCT Pub. No. WO88/10173, PCT Pub. Date Dec. 29, 1988**
**PCT Filed Jun. 20, 1988, Ser. No. 309,555**
**Claims priority, application Japan, Jun. 19, 1987, 62-152573**
**Int. Cl.$^5$ B23Q** *35/04;* **G05B** *19/18*
**U.S. Cl. 409—80 5 Claims**



1. A contour profiling machine having a tracer head which is movable in three axes along a model shape, an amount of operation of a cutting tool is controlled in synchronization with displacement of the tracer head, said contour profiling machine comprising:

limit setting means for setting a limit as to one of the axes of the tracer head, and for setting limits parallel to and limits orthogonal to a direction of movement within a plane of movement determined with respect to the set limit of one of the axes of the tracer head;

polarity discrimination means, connected to said limit setting means, for discriminating polarities of the limits which are set relative to the direction of movement of the tracer head;

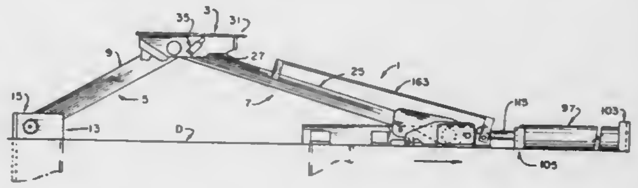
clamping means, connected to said limit setting means, for clamping contour profiling within a range defined by said set limits; and

clamp releasing means for releasing a clamped state when the tracer head has contacted a model while moving with contour profiling clamped.

---

### 5,015,131
## HITCH RETARDER

**Kenneth D. Schmidt, and Jan D. Hult, Both of St. Charles, Mo., assignors to ACE Industries, Incorporated, Earth City, Mo.**
**Filed Sep. 19, 1989, Ser. No. 409,315**
**Int. Cl.$^5$ B60P** *03/06*
**U.S. Cl. 410—63 21 Claims**



1. A retarder for a railcar hitch, said hitch being movable between an erected position and a retracted position, said retarder controlling movement of the hitch from its erected position to its retracted position, the retarder comprising:

a cylinder fixedly adapted to be mounted on a railcar;

a piston movable in the cylinder;

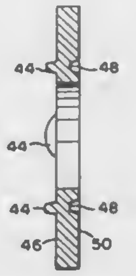
means for attaching the piston to said hitch so substantially only axial loads are placed on the piston during movement of the hitch from its erected to its retracted position; and,

means for controlling the compression of fluid in the cylinder by the piston to control the rate of movement of the hitch as the hitch moves from its erected position toward its retracted position.

---

### 5,015,132
## DIRECT TENSION INDICATOR WASHER

**F. Jonathan M. Turner, Philadelphia, and A. Craig Hood, Wayne, both of Pa., assignors to J & M Turner Inc., Southampton, Pa.**
**Filed May 15, 1990, Ser. No. 523,749**
**Int. Cl.$^5$ F16B** *31/02*
**U.S. Cl. 411—10 14 Claims**



1. A pre-load indicating washer comprising an annular body and a plurality of protuberances integral with said annular body struck and partially sheared from said annular body to project from a first face of said annular body and leave a corresponding plurality of indentations in a second face of said annular body opposite from said first face, each of said protuberances defined by:

VOL
1126
ISS
2
MY
14
1991
UMI

- (a) a pair of outer side walls extending away from said first face of said annular body, and
- (b) an outer surface extending between said pair of outer side walls and between two spaced regions of said first face of said annular body, and

each of said indentations defined by:

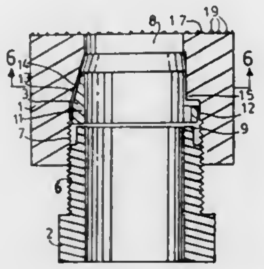
- (a) a pair of inner side walls extending through said annular body from said second face of said annular body and from which a pair of outer side walls of one of said protuberances has been sheared, and
- (b) an inner surface extending between said pair of inner side walls and between two spaced regions of said second face of said annular body

each of said outer side walls of said protuberances extending along a line not in alignment with the line along which the inner side wall of an indentation from which said outer side wall has been sheared extends and each of said indentations having a width at said second face of said annular body no less than the width of its associated protuberance at said first face of said annular body.

---

### 5,015,133
## UNIVERSAL NUT

**Frank R. Arena, 6842 - 149th Pl. N., Palm Beach County Estates, Palm Beach Gardens, Fla. 33418**
**Filed Apr. 16, 1990, Ser. No. 509,099**
**Int. Cl.$^5$ F16B** ***21/00***
**U.S. Cl. 411—267** **18 Claims**



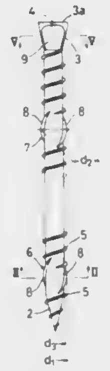
1. A universal, thread-forming nut assembly for engaging the threads of threaded shafts of different diameters and thread pitches, said nut assembly comprising:

- (a) a first member having a wrench-engaging outer surface, an axial bore of a diameter great enough to admit a threaded shaft, and two faces at right angles to the axis of said bore, an external face and an internal face, said internal face having an internally threaded cylindrical hole extending therefrom to a point intermediate said two faces, said hole being coaxial with, and of a diameter greater than said bore;
- (b) a second member having a wrench-engaging outer surface, an axial bore of a diameter great enough to admit said threaded shaft, two faces at right angles to the axis of said bore, an external face and an internal face, said internal face having a cylindrical portion extending therefrom and away from said external face, said cylindrical portion having an external thread corresponding to said internally threaded hole of said first member and arranged for cooperating therewith so that said cylindrical portion extends axially within said first member when said second member is rotated relative to said first member;
- (c) an insert including a plurality of jaw elements joined together by yieldable connecting means, said insert having an axial bore of a diameter great enough to admit said threaded shaft, said insert being held within said first member with an outer surface of said jaw elements engaging an inner surface of said first member, said inner surface having a cam shape for forcing said jaw elements centripetally when said insert is forced axially by contact with said cylindrical portion of said second member when said second member is screwed into said first member, said connecting means having sufficient rigidity to hold said jaw elements spaced apart before use and sufficiently yieldable to allow said jaw elements to move centripetally when forced axially; and
- (d) said jaw elements being soft enough to form threads upon being forced centripetally against said threaded shaft.

---

### 5,015,134
## TAPPING SCREW

**Isamu Gotoh, Osaka, Japan, assignor to Yamaki Sangyo Co., Ltd., Osaka, Japan**
**Filed Mar. 1, 1990, Ser. No. 486,654**
**Claims priority, application Japan, Sep. 12, 1989, 1-107117[U]**
**Int. Cl.$^5$ F16B** ***25/00***
**U.S. Cl. 411—386** **12 Claims**



1. A tapping screw comprising:

a shank having a front portion including a tapered portion at a front tip thereof and a rear portion;

a substantially pyramidically shaped head integrally connected with a rear end of said shank, said head having a cross sectional area which is substantially equal to a cross sectional area of said shank at a location where said head and said shank connect, said cross sectional area of said head gradually increasing toward a rear end of said head;

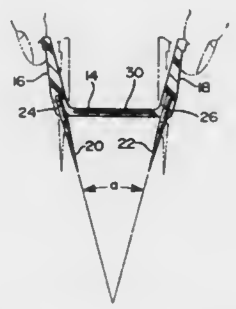
a first drill edge formed on an outer peripheral surface of said front portion of said shank; and

helical threads formed along said shank on an outer peripheral surface thereof with threads formed rearwardly of said first drill edge having a maximum diameter which is smaller than a maximum diameter of said first drill edge.

---

### 5,015,135
## FLEXIBLE FASTENER

**Antony W. Chamings, 18524 Cranbrook, Mt. Clemens, Mich. 48043**
**Filed Feb. 13, 1990, Ser. No. 479,156**
**Int. Cl.$^5$ F16B** ***15/00***
**U.S. Cl. 411—447** **7 Claims**



1. A flexible fastener, comprising:

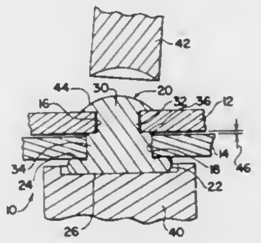
- (a) a body formed from a resilient flexible material, the body having a spacer section;
- (b) means for bending the body in response to finger pressure; and
- (c) a pair of spaced apart outwardly extending metal pins, the pins being partially housed within the body and disposed in a non-parallel converging configuration so as to define an angle therebetween;

wherein the body is deformable to align the pins in a substantially parallel configuration.

---

### 5,015,136
## RIVET JOINT AND METHOD OF MANUFACTURE

**Gregory J. Vetter, and James G. Seaser, both of Owatonna, Minn., assignors to Truth Incorporated, Owatonna, Minn.**
**Filed Jul. 6, 1990, Ser. No. 549,481**
**Int. Cl.$^5$ F16B** ***19/06***
**U.S. Cl. 411—504** **15 Claims**



1. A rivet for pivotally interconnecting first and second superposed links each having an opening therethrough, comprising;

a first head with a link engaging surface and an outer surface, said outer surface having a concave recess therein; and

a shank including first and second portions with a shoulder therebetween, said first portion being adjacent said head and receivable in the first link opening and said second portion being receivable in the second link opening;

wherein during assembly said second portion is deformed to form a second head to secure said links between said first and second heads and said first head is deformed to reduce the concavity of the recess therein.

---

### 5,015,137
## BOOKLET WITH CENTRAL DETACHABLE BUSINESS REPLY ENVELOPE AND OPTIONAL RESPONSE DEVICE PRODUCED FROM AN INTEGRAL WEB AND METHODS OF PRODUCTION

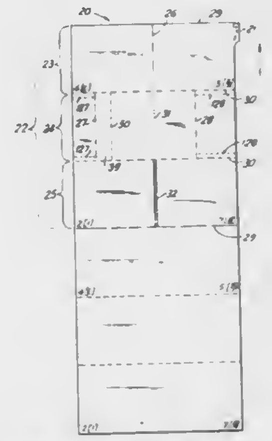
**John W. Stenner, Orange, Conn., assignor to Kurt H. Volk, Inc., Milford, Conn.**
**PCT No. PCT/US88/01118, § 371 Date Nov. 30, 1988, § 102(e) Date Nov. 30, 1988, PCT Pub. No. WO89/09136, PCT Pub. Date Oct. 5, 1989**
**PCT Filed Mar. 28, 1988, Ser. No. 309,202**
**Int. Cl.$^5$ B41L** ***43/12***
**U.S. Cl. 412—1** **26 Claims**

1. In the method of preparing a booklet having a plurality of pages from a pre-printed continuous web (**20, 220**) where the web (**20, 220**) comprises:

- (a) transverse separation lines (**29, 229**) which divide the web (**20, 220**) into booklet sections (**22, 222**);
- (b) a plurality of transverse dividing lines (**30, 230**) which divide each booklet section (**22, 222**) into a plurality of envelope and booklet sheets (**23, 24, 25; 223, 223′, 223″, 224** each having head and foot portions; and
- (c) a longitudinal fold line (**26, 226**) extending the length of the booklet section (**22, 222**) and forming the backbone of the booklet and dividing each sheet into booklet pages;

where the booklet sections (**22, 222**) are separated from the continuous web (**20, 220**) along the transverse separation lines (**29, 229**) and folded along the dividing lines (**30, 230**), the improvement comprising the steps of:

- (i) perforating one booklet sheet along at least one longitudinal line (**27, 28; 227, 228**) extending between the head and foot of the sheet to define an envelope sheet (**24, 224**) comprising response devices (**33, 35; 233, 235**) and an envelope flap (**39, 239**) adjacent a front envelope panel (***34b*, *234b***) joined along the longitudinal fold line (**26, 226**) to a rear envelope panel (***34a*, *234a***);
- (ii) applying adhesive to at least one of the front (***34b*, *234b***) or rear (***34a*, *234a***) envelope panels along lines adjacent the head and foot of the panels;
- (iii) applying a remoistenable adhesive along a line adjacent to the outer edge of the envelope flap (**39, 239**) and generally parallel to the longitudinal fold line (**26, 226**);
- (iv) folding the envelope and booklet sheets (**23, 24, 25; 223, 223′, 223″, 224**) along the transverse sheet dividing lines (**30, 230**) to a superposed configuration with the envelope sheet (**24, 224**) facing outwardly;
- (v) binding the superposed envelope and booklet sheets (**23, 24, 25; 223, 223′, 223″, 224**) together along the longitudinal fold line (**26, 226**);
- (vi) folding the bound superposed envelope and booklet sheets (**23, 24, 25; 223, 223′, 223″, 224**) along the longitudinal fold line (**26, 226**) to position the front (***34b*, *234b***) and rear (***34a*, *234a***) envelope panels in an overlying mated configuration to form an envelope; and
- (vii) separating the envelope and booklet sheets (**23, 24, 25; 223, 223′, 223″, 224**) from one another at the head and foot to form a booklet containing a separate pre-formed envelope.



---

### 5,015,138
## MACHINE FOR BOOKBINDING USING FLEXIBLE STRIPS

**Phillip M. Crudo, Sparks; Scott Foltz, Carson City, and Roger F. Lay, Reno, all of Nev., assignors to Velobind, Inc., Fremont, Calif.**
**Filed Jun. 15, 1990, Ser. No. 539,971**
**Int. Cl.$^5$ B42B** ***5/14***
**U.S. Cl. 412—43** **10 Claims**

1. A binding machine for sheets having first holes, a female strip having second holes and inward extending grooves communicating with the second holes formed on the outside surface of the female strip and a male strip having flexible studs passing through the first and second holes comprising

a frame having a platen to support the sheets formed with a depression to receive the female strip,

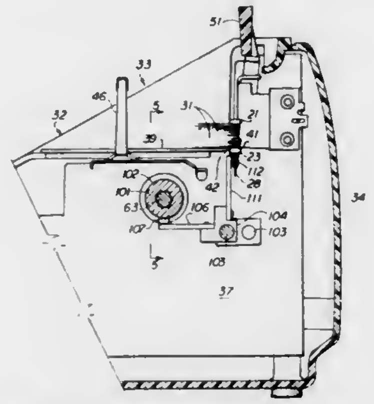
compression means on said frame to compress said strips toward each other with the sheets therebetween with excess lengths of the studs extending beyond the female strip, first actuating means for said compression means,

a cam, said cam having a groove, second actuating means for said cam,

at least one carriage mounted for reciprocating movement relative to said frame parallel to the strips having a cam

VOL 126
ISS 2
MY 14 1991
UMI

follower engaging said groove, said groove controlling movement of said carriage,



stud bending means on said carriage movable with said carriage to bend the excess lengths of the studs at right angles and into the grooves.

---

### 5,015,139
## AUTOMATED ARCHIVING AND RETRIEVAL SYSTEM FOR COMPUTER DATA STORAGE CASSETTES

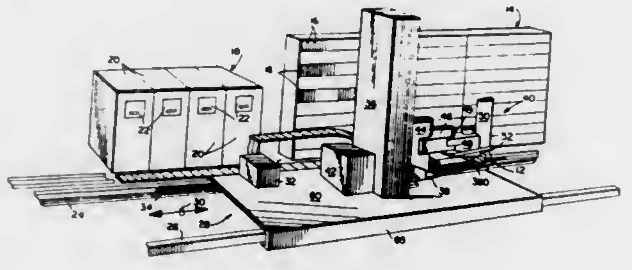
**Rolf Baur, Heubach-Lautern, Fed. Rep. of Germany, assignor to Grau GmbH & Co., Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 182,702, Apr. 18, 1988, and a continuation-in-part of Ser. No. 182,593, Apr. 18, 1988. This application Aug. 9, 1989, Ser. No. 391,284**

**Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801397**

Int. Cl.⁵ B65G *1/00*

U.S. Cl. 414—281 22 Claims



1. An automated archiving and retrieval system for computer data storage cassettes comprising:

a track on a ground surface which defines a path between one and another spaced locations on said ground surface;

a cassette library for archiving a number of data storage cassettes located at said one location;

at least one cassette drive unit located at said another location and having an input slot sized so as to accept therewithin a preselected one of said cassettes transported and inserted thereinto;

carriage means coupled to said track for moving along said defined path between said one and another locations, and hence between said cassette library and said at least one drive unit, said carriage means including,

(i) a carriage assembly;

(ii) motive means for moving said carriage platform along said track;

(iii) a robot platform mounted to said carriage platform and vertically movable above said track between raised and lowered positions; and

(iv) hoist means operatively connected to said robot platform for moving the same between said raised and lowered positions, and wherein said robot transport system further includes;

robot means mounted upon said robot platform for movement therewith between said raised and lowered positions, said robot means comprising a proximal arm member pivotal about a first vertical axis with respect to said hoist means, a distal arm member connected to said proximal arm member so that said proximal and distal arm members are capable of relative pivotal movements about a second vertical axis, and a support shaft disposed at a terminal end of said distal arm member, and pivotally movable relative to said distal arm member about a third vertical axis, and also movable vertically along said third vertical axis; and

gripping means fixed to said support shaft for gripping and releasing said preselected one of said cassettes to enable said preselected cassette to be transported between said cassette library and said at least one drive unit; wherein

movements of said carriage means along said established path and/or movements of said hoist means between said raised and lowered positions provide means for controlling an initial positioning of said gripping means relative to said preselected cassette to be gripped thereby, and wherein

movements of said proximal arm, said distal arm, and/or said support shaft provide means for controlling precise positioning of said gripping means relative to said preselected cassette, whereby said preselected cassette may be gripped by said gripping means and transported along said established path.

---

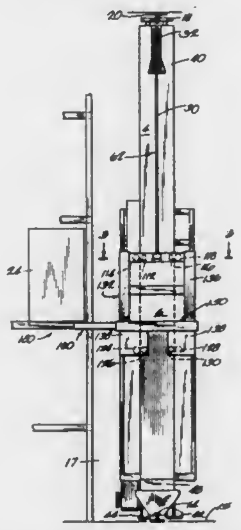
### 5,015,140
## SHUTTLE GUIDE FOR A STORAGE AND RETRIEVAL MACHINE

**David A. Kling, Richfield, Wis., assignor to Harnischfeger Engineers, Inc., Brookfield, Wis.**

**Filed Sep. 22, 1989, Ser. No. 411,293**

Int. Cl.⁵ B65G *1/00*

U.S. Cl. 414—282 5 Claims



1. In a storage and retrieval machine having a base travelable to designated locations, a mast mounted on the base, carriage means movable in vertical directions on the mast for carrying objects to and from positions adjacent overhead storage spaces, a shuttle mounted on the carriage and including object support plate means having a first plate and a second plate movable relative to each other in opposite directions transverse to the mast toward and away from storage spaces for depositing in and retrieving load objects from the storage spaces, the load objects and the shuttle each having a weight causing deflection of the support plate means downward when the latter is extended toward a storage space, a shuttle guide comprising:

a first guide member having a downward facing straight guide surface extending in said transverse directions and mounted on the first plate;

first guide roller means mounted on the second plate in engagement with the straight guide surface;

a second guide member having an upward facing inclined guide surface including an upward facing end portion mounted on one of the first and second plates, the inclination of the inclined guide surface being upward in one of said transverse directions;

second guide roller means mounted on the other of the first and second plates, the second guide roller means being engageable with the inclined guide surface for inclining upwardly that plate of the first and second plates that moves toward a storage space whereby downward deflection of the support plate means caused by the weight of the shuttle and a load object is counteracted; and

the second guide roller means includes a first guide roller having a height and a first position in engagement with the second guide member at the end portion and a second position at which the first guide roller disengages from and engages with the end portion of the second guide member during said transverse movement of the first and second plates, the height of the first guide roller being substantially the same at the first and second positions.

---

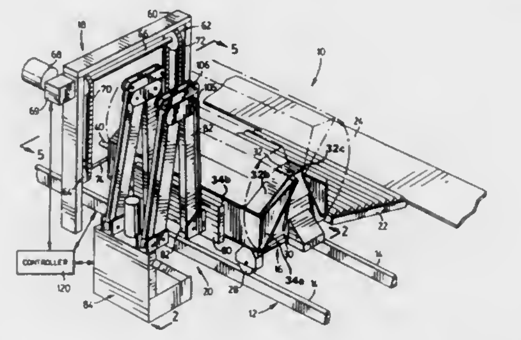
### 5,015,141
## FREIGHT TRANSPORTATION SYSTEM

**David N. Ferrence, Kingston, Canada, assignor to Utdc, Inc., Kingston, Canada**

**Divislon of Ser. No. 263,445, Oct. 27, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 516,965**

Int. Cl.⁵ B65G *67/28, 59/02*

U.S. Cl. 414—395 47 Claims



1. A freight transportation system comprising a loading station, an unloading station and a vehicle movable therebetween to transport freight, said vehicle including a support platform to carry said freight and retaining means on the platform, said retaining means being movable from a first position in which removal of freight is inhibited and a second position in which removal of freight is permitted, said unloading station including opening means movable relative to said vehicle when said vehicle is at said unloading station and operable on said retaining means to move it between said first and second positions, continued movement of said opening means releasing said retaining means to permit said retaining means to return to said first position independently of said opening means and freight discharge means operable to discharge freight from the platform to one side of said vehicle.

---

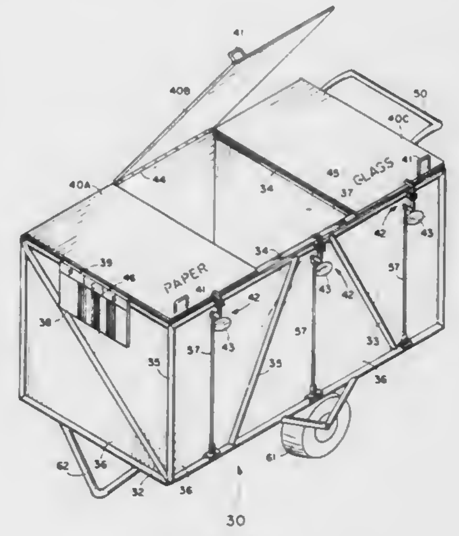
### 5,015,142
## SYSTEM FOR MECHANIZED PICKUP OF SEPARATED MATERIALS

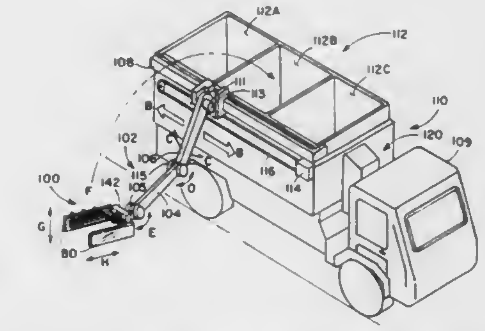
**William S. Carson, 3524 Twisted Oak Ct., Lake Wales, Fla. 33853**

**Filed Dec. 26, 1989, Ser. No. 457,299**

Int. Cl.⁵ B60P *1/30;* B65B *21/02*

U.S. Cl. 414—408 10 Claims





1. A system for collection, separation, and picking up of recyclable materials comprising:

(a) first container means for stationing at a point of use, and having a plurality of removable first bins, each of said first bins for receiving a different type of materials;

(b) second container means for stationing at a pickup point, and having a plurality of second bins corresponding to at least the number of said first bins, said second container means for selectively receiving materials being transferred from said first bins;

(c) a bin lid hingedly attached to each of said second bins, each lid including latch means for maintaining said lid in a closed condition;

(d) a pickup arm assembly having means for engaging said second container means preparatory to lifting of said second container means;

(e) a truck body for mounting to a truck, said body having a plurality of third bins corresponding to at least the number of said second bins;

(f) a track attached to said truck body for supporting said pickup arm assembly, including carriage means for moving said assembly along said body;

(g) said pickup arm assembly including articulated pickup arms attached between said container engaging means and said carriage means, first actuator means for moving said articulated arms vertically and laterally with respect to said truck body, second actuator means for moving said

VOL
1126
ISS
2
MY
14
1991
UMI

container engaging means, and third actuator means for selectively releasing said lid latch means; and

(h) control means for controlling said first, second, and third actuator means to engage said second container means, to lift and invert said second container means over said truck body, to selectively operate said carriage means to move the inverted second container means over each of said third bins, and to selectively release each of said closed lids over one of said third bins corresponding to the type of material in each of said closed second bins causing said material to drop from each selected second bin into a corresponding third bin.

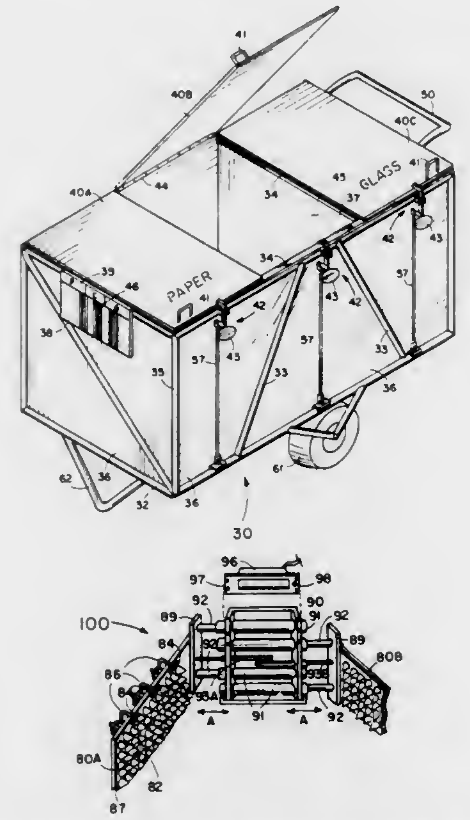
---

### 5,015,143

## CURBSIDE CONTAINER FOR RECYCLABLE MATERIAL

**William S. Carson, 3524 Twisted Oak Ct., Lake Wales, Fla. 33853**

**Filed Dec. 26, 1989, Ser. No. 456,563**
**Int. Cl.⁵ B65B *21/02;* B65F *1/00***
**U.S. Cl. 414—411 15 Claims**



1. Apparatus for receiving separated materials and selectively dumping such material comprising:

(a) a container divided into a plurality of bins, each bin for receiving one of said separated materials;

(b) a plurality of essentially planar lids, each lid for a respective bin, said lids being hingedly attached to said container for closing and covering each of said bins;

(c) a plurality of releasable securing means, each releasable securing means for a respective bin and lid, said releasable securing means including catch means for maintaining said lid in a normally closed position and release means for releasing said lid; and

(d) a pickup assembly for engaging said container preparatory to picking up and dumping said container, said pickup assembly includes a pair of opposing clamping arms with opposing surfaces to engage said container, wherein at least one arm of the pair of arms includes a plurality of catch actuators, and whereby each actuator selectively opens a respective releasable securing means.

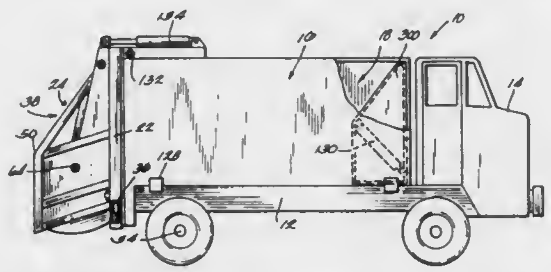
---

### 5,015,144

## APPARATUS FOR LOADING MATERIALS INTO A STORAGE COMPARTMENT AND ASSOCIATED FLUID PRESSURE DELIVERY SYSTEM

**Fred T. Smith, and Fred P. Smith, both of Palos Verdes Peninsula, Calif., assignors to The Heil Co., Brookfield, Wis.**

**Filed Mar. 13, 1989, Ser. No. 322,309**
**Int. Cl.⁵ B60P *1/00***
**U.S. Cl. 414—525.2 32 Claims**



1. A fluid pressure system comprising

first and second means each movable in response to fluid pressure to individually exert a force,

linkage means coupling said first means with said second means and being operative for moving said second means in response to movement of said first means, and vice versa.

conduit means for conveying fluid pressure to said first and second means at a pressure that varies according to the work load encountered by said first and second means, the system being free of other means for conveying fluid pressure to said first and second means, and

control means operative for directing the conveyance of fluid pressure in said conduit means including

first sensor means for sensing the variable fluid pressure in said conduct means, and

first valve means connected with said first sensor means and being operative, only when the sensed fluid pressure is less than a predetermined threshold value, for opening the conveyance of fluid pressure to said first means while closing the conveyance of fluid pressure to said second means so that, as said first and second means move together, only said first means exerts a force, said first valve means being further operative, only when the sensed fluid pressure equals or exceeds said threshold value, for opening the conveyance of fluid pressure to both said first and second means so that, as said first and second means move together, both said first and second means individually exert a force.

---

### 5,015,145

## AUTOMATED CARGO LOADING SYSTEM

**Mickey A. Angell, Winston-Salem; Thomas W. Cearley, Clemmons, both of N.C.; James C. Lewis, Albany, Ga.; Arthur R. St. Onge, York; John A. Szysb, Mt. Joy, both of Pa., and Kenneth W. White, Ithaca, N.Y., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Filed Oct. 6, 1989, Ser. No. 417,766**
**Int. Cl.⁵ B65G *67/04***
**U.S. Cl. 414—547 4 Claims**

1. A robot loader apparatus comprising:

a movable carriage;

a receiving station on said movable carriage configured to receive containers to be manipulated; and

a loader on said movable carriage, said loader comprising:

spaced vertical support members;

a beam defining a pivot axis between said support members, said beam being mounted for movement vertically along said support members; and

a robot arm mounted on said beam to pick up said containers from said receiving station and load said containers into a cargo compartment, said robot arm being mounted for pivoting movement about said pivot axis between said vertical support members and translational movement vertically with said beam between said support members, such that said robot arm can pick up said containers from a first location at said receiving station and rotate about said pivot axis to carry said containers through an arc to a second location.

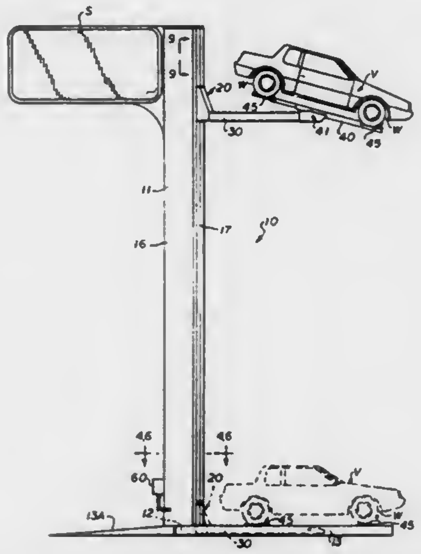
---

### 5,015,146

## VEHICLE DISPLAY LIFT

**Roger M. Barnes, and Stephen L. Comparato, both of Houston, Tex., assignors to Loadmaster Manufacturing, Inc., Houston, Tex.**

**Filed Oct. 13, 1989, Ser. No. 421,167**
**Int. Cl.⁵ B66F *7/28***
**U.S. Cl. 414—639 20 Claims**



1. A vehicle display lift for supporting and displaying a vehicle at a substantial height above the ground comprising;

an elongate vertical mast member supported at its bottom end on the ground,

carriage means movably mounted on said vertical mast member for vertical movement thereon between a lowermost position and an uppermost position,

hoist means on said mast member coupled to said carriage means for vertically moving said carriage means on said mast, motor means connected to said hoist means including control means operatively connected to a source of power for controlling the operation of said hoist means,

cantilever arm means secured at one end to said carriage means to move vertically therewith and extending horizontally outward therefrom, and

vehicle support means pivotally secured to the outer end of said cantilever arms means at a pivot point intermediate the center of gravity of said vehicle support means and said carriage means to tilt by gravity a predetermined distance relative thereto as said carriage means is moved vertically and adapted to receive a vehicle thereon when said carriage is in its lowermost position and said vehicle support means is in a substantially horizontal orientation and support the vehicle thereon at a predetermined angle relative to said cantilever arm to display the supported vehicle at a substantial distance above the ground when said carriage means is in its uppermost position.

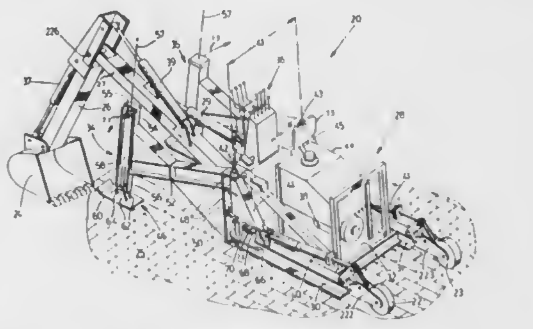
---

### 5,015,147

## EXCAVATING APPARATUS

**Peter J. Taylor, and Randall P. Taylor, both of R.R. 1, Smithville, Ontario, Canada L0R 2A0**

**Filed May 18, 1989, Ser. No. 353,583**
**Claims priority, application Canada, May 18, 1988, 567124**
**Int. Cl.⁵ B66C *23/78***
**U.S. Cl. 414—685 4 Claims**



1. An excavating apparatus comprising:

a body having a pair of side skids;

an excavating implement mounted on the body between the skids;

a pair of stabilizer legs mounted one to either side of the excavating implement on the body, the legs being mounted on respective vertical axes for movement horizontally about the axes;

a pair of pads;

means mounting the pads on the legs for reciprocal movement along respective inclined axes, the projections of which meet projections of the corresponding said vertical axes; and

actuator means coupled to the skids, legs and pads and operable selectively to elevate and move the apparatus.

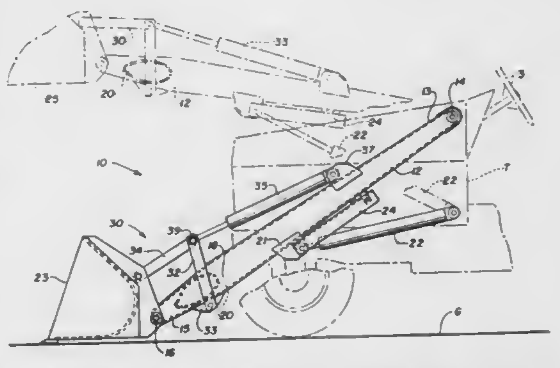
---

### 5,015,148

## LOADER MOUNTING FRAME

**Russell I. Johnson, Leonard; Daniel D. Radke, Troy, both of Mich., and Garry L. Ball, Lancaster, Pa., assignors to Ford New Holland, Inc., New Holland, Pa.**

**Continuation of Ser. No. 300,019, Jan. 23, 1989, abandoned. This application Aug. 21, 1990, Ser. No. 570,482**
**Int. Cl.⁵ E02F *3/38***
**U.S. Cl. 414—722 8 Claims**



1. In a mounting frame adapted to be pivotally connected to a tractor and for detachably supporting a working tool in an operative position forwardly of said tractor, said mounting frame having a pair of main support arms positioned, respectively, on opposing sides of said tractor, each said main support arm having a rearward end pivotally connectable to said tractor and a distal forward end pivotally connectable to said working tool for operable support thereof, wherein each said

VOL 126 ISS 2 MY 14 1991 UMI

main support arm is generally symmetrical about a straight line interconnecting said forward and rearward ends as seen from an elevational viewpoint transversely from said tractor, said mounting frame further having a torque tube extending transversely between said main support arms forwardly of said tractor, said tractor having a pair of hydraulic cylinders interconnecting, respectively, said main support arms at mounting points, located between said rearward end and said forward end, and said tractor to power a pivotal movement of said main support arms about said rearward ends, improved main support arms comprising:

each said main support arms including an intermediate portion located between said forward end and the corresponding said mounting point, said intermediate portion having the the greatest height of said main support arm and being positioned immediately rearwardly of said torque tube, the cross-sectional configuration of said main support arm decreasing in size from said intermediate portion to both said rearward end and said forward end.

---

### 5,015,149
### APPARATUS FOR MOVING INSERTERS FOR WORKPIECES

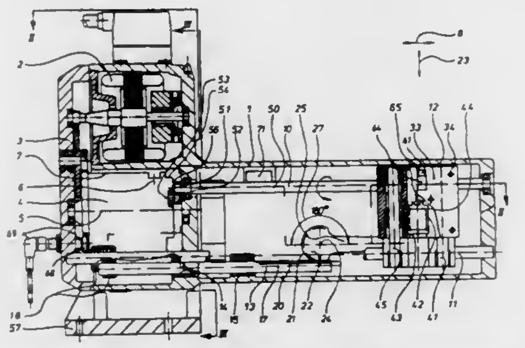
**Dieter Weiss, Danziger Str. 6, D-6967 Buchen, Fed. Rep. of Germany**

**Filed Aug. 11, 1989, Ser. No. 392,667**

**Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 8810248[U]**

**Int. Cl.⁵ B65G** *65/00*

U.S. Cl. 414—751 23 Claims



1. Apparatus for moving an object, such as the gripper of an inserter for workpieces, between two positions in a first direction and in a second direction substantially at right angles to the first direction, comprising first guide means extending in said first direction; a carriage reciprocable along said guide means; second guide means provided on said carriage and extending in said second direction; an object supporting device movable along said second guide means; means for reciprocating said carriage along said first guide means, including a rotor, first cam means including an endless cam on said rotor, and means for transmitting motion from said first cam means to said carriage including a toothed rack reciprocable in said first direction and having a follower tracking said endless cam, a gear mating with said rack and being rotatable about an axis which is normal to said first and second directions, and a lever rigid with said gear and coupled to said carriage to move said carriage along said first guide means in response to rotation of said gear by said rack; and means for moving said device back and forth along said second guide means, including second cam means provided on said rotor, and means for transmitting motion between said second cam means and said device.

---

### 5,015,150
### ARRANGEMENT FOR MOUNTING A PIVOTABLE PROPFAN BLADE

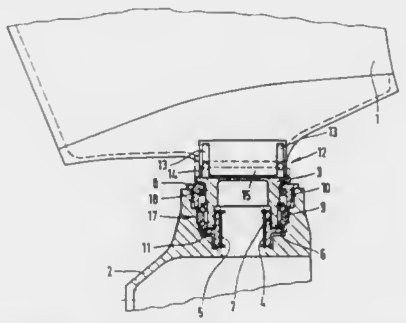
**Alois Rohra, Muchen, Fed. Rep. of Germany, assignor to MTU Munchen GmbH, Fed. Rep. of Germany**

**Filed May 31, 1989, Ser. No. 363,534**

**Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818466**

**Int. Cl.⁵ F01D** *5/30*

U.S. Cl. 416—220 R 19 Claims



1. An arrangement for mounting a shrouded pivotable propfan blade at a rotor of an engine, in which the propfan blade is fastened at a blade carrier and this blade carrier, by means of a roller bearing, is disposed in the rotor so that it can be adjustably pivoted around an axis which is radial with respect to the engine, wherein the propfan blade has a disk-shaped blade base which is releasably fastened by means of a divided clamping ring in a fitted disk-shaped upper part of the blade carrier, wherein the blade carrier is secured with respect to radial movements by means of a securing device which is accessible from the outside, and wherein the blade base and clamping ring are configured to accommodate exchange of a fan blade at the blade carrier in the axial direction of the rotor without substantial radial movements of the blade and without removal of the blade carrier from the rotor.

---

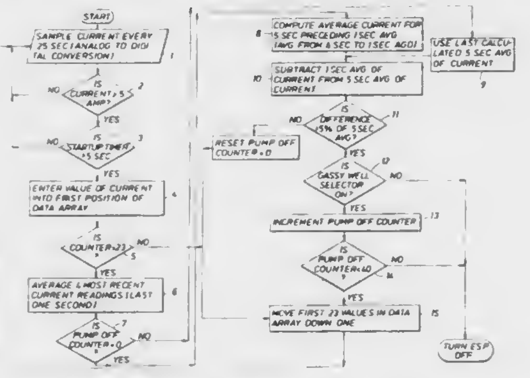
### 5,015,151
### MOTOR CONTROLLER FOR ELECTRICAL SUBMERSIBLE PUMPS

**Dale R. Snyder, Jr., Houston, and Joe H. Haws, Richmond, both of Tex., assignors to Shell Oil Company, Houston, Tex.**

**Continuation of Ser. No. 396,780, Aug. 21, 1989, abandoned, which is a cootinuation of Ser. No. 13,094, Feb. 10, 1987, abandoned. This application May 14, 1990, Ser. No. 523,296**

**Int. Cl.⁵ F04B** *49/00*

U.S. Cl. 417—18 36 Claims



START
SAMPLE CURRENT EVERY .25 SEC (ANALOG TO DIGITAL CONVERSION)
1
IS CURRENT > 5.5 AMP?
2
NO
YES
IS STARTUP TIMER > 5 SEC
3
NO
YES
ENTER VALUE OF CURRENT INTO FIRST POSITION OF DATA ARRAY
4
IS COUNTER = 23 ?
5
NO
YES
AVERAGE 4 MOST RECENT CURRENT READINGS (LAST ONE SECOND)
6
IS PUMP OFF COUNTER = 0 ?
7
NO
YES
COMPUTE AVERAGE CURRENT FOR 5 SEC PRECEDING 1 SEC AVG (AVG FROM 6 SEC TO 1 SEC AGO)
8
USE LAST CALCULATED 5 SEC AVG OF CURRENT
9
SUBTRACT 1 SEC AVG OF CURRENT FROM 5 SEC AVG OF CURRENT
10
IS DIFFERENCE ≥5% OF 5 SEC AVG?
11
NO
YES
RESET PUMP OFF COUNTER = 0
IS GASSY WELL SELECTOR ON?
12
NO
YES
INCREMENT PUMP OFF COUNTER
13
IS PUMP OFF COUNTER < 40 ?
14
NO
YES
MOVE FIRST 23 VALUES IN DATA ARRAY DOWN ONE
15
TURN ESP OFF

1. A method for measuring differential pump fluid power output comprising:

(a) measuring pump motor power consumption at timed intervals;

(b) determining a recent pump motor power consumption from the measurements;

(c) determining a previous pump motor power consumption from the measurements;

(d) deriving the difference between steps (b) and (c), the difference being indicative of differential pump fluid power output; and

(e) shutting the pump down when said differential exceeds a predetermined amount for a predetermined length of time.

---

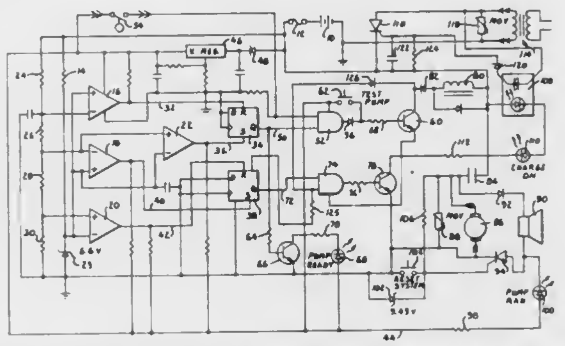
### 5,015,152
### BATTERY MONITORING AND CHARGING CIRCUIT FOR SUMP PUMPS

**James L. Greene, Kansas City, Mo., assignor to The Marley Company, Mission Woods, Kans.**

**Filed Nov. 20, 1989, Ser. No. 438,802**

**Int. Cl.⁵ F04B** *49/04*

U.S. Cl. 417—40 15 Claims



1. Control apparatus for a sump pump having a float switch which assumes first and second conditions, said apparatus comprising:

a rechargeable battery having a charging cycle and a discharge cycle;

means for monitoring the output voltage available from the battery;

means for establishing a low range of said output voltage between a preselected minimum level and a preselected intermediate level and a high range of said output voltage between said intermediate level and a preselected maximum level, aid intermediate level being between said minimum and maximum levels;

a battery charging circuit having a charging mode in which charging current is applied to the battery and an idle mode in which charging current to the battery is discontinued;

means for effecting the idle mode of the charging circuit when said output voltage reaches said maximum level;

means for deenergizing the pump whenever the float switch is in the first condition thereof;

means, effective when the battery is in the discharge cycle with said output voltage in said high range, for effecting the idle mode of the charging circuit and for energizing the pump from the battery when the float switch is in its second condition;

means, effective when the battery is in the discharge cycle with said output voltage in the low range, for energizing the pump from the battery when the float switch is in its second condition and for effecting the charging mode of the charging circuit whenever the pump is deenergized;

means for effecting the charging mode of the charging circuit whenever said output voltage drops to said minimum level;

means, effective when the battery is in the charging cycle with said output voltage in the low range, for maintaining the pump deenergized and for maintaining the charging circuit in the charging mode; and

means, effective when the battery is in the charging cycle with said output voltage in the high range, for energizing the pump from the battery when the float switch is in its second condition and for effecting the charging mode of the charging circuit whenever the pump is deenergized.

---

### 5,015,153
### COMPRESSOR CUTOFF CONTROL RESPONSIVE TO SHAFT POSITION

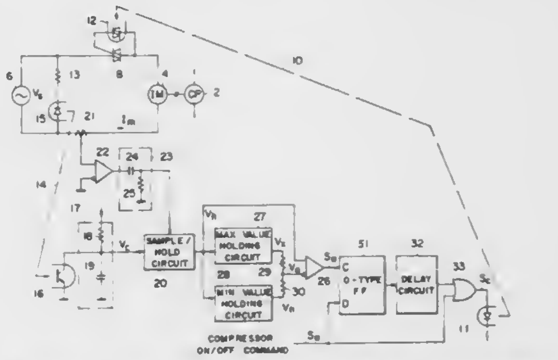
**Nichika Uesugi, Fuji; Shingo Ikawa, Fujinomiya, and Takayuki Kambe, Mishima, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 14, 1989, Ser. No. 379,650**

**Claims priority, application Japan, Jul. 26, 1988, 63-186368; Oct. 25, 1988, 63-268694**

**Int. Cl.⁵ F04B** *49/02*

U.S. Cl. 417—44 11 Claims



1. A method of detecting the shaft position of a compressor for an air conditioner, comprising the steps of:

detecting a phase difference during each cycle between a primary voltage and a primary current of an induction motor connected to a fixed frequency AC power source which drives a compressor for circulating refrigerant in a refrigerating cycle; and

detecting the shaft position of said compressor in accordance with a relationship between a change in said phase difference of said induction motor and pulsation of a load torque relative to the shaft position of said compressor.

---

### 5,015,154
### WOBBLE PLATE TYPE COMPRESSOR WITH VARIABLE DISPLACEMENT MECHANISM

**Teruo Higuchi; Kiyoshi Terauchi; Kazuhiko Takai; Sei Kikuchi, and Hideto Kobayashi, all of Gunma, Japan, assignors to Sanden Corporation, Gunma, Japan**

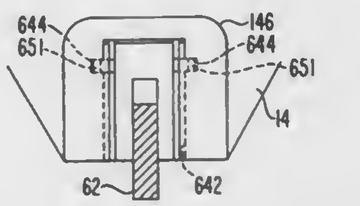
**Continuation-in-part of Ser. No. 157,782, Feb. 19, 1988, Pat. No. 4,875,834. This application Jul. 6, 1989, Ser. No. 375,895**

**Claims priority, application Japan, Feb. 19, 1987, 62-36443; Feb. 19, 1987, 62-36444**

**The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.**

**Int. Cl.⁵ F04B** *1/14*

U.S. Cl. 417—269 22 Claims



1. In a wobble plate type compressor, said compressor comprising a compressor housing having a cylinder block provided with a plurality of cylinders and a crank chamber adjacent said cylinder block, a piston slidably fitted within each of said cylinders, a drive shaft rotatably supported in said housing, an inclined plate disposed on said drive shaft at a variable inclination angle, said drive shaft and said inclined plate linked for joint rotational motion, a wobble plate disposed adjacent said

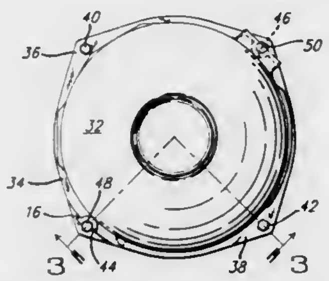
OL
1126
ISS
2
MY
14
1991
UMI

inclined plate, each of said plurality of pistons coupled at one end with said wobble plate, rotational motion of said drive shaft and said inclined plate converted into nutational motion of said wobble plate to reciprocate said pistons in said cylinders, and a rotation preventing mechanism to prevent rotational motion of said wobble plate, the improvement of said rotation preventing mechanism comprising;
a guide plate disposed within said crank chamber, said wobble plate reciprocating along said guide plate during nutational motion of said wobble plate;
said wobble plate including an extended portion, and a hole formed in said extended portion and including an annular groove formed along a peripheral surface of said hole; and
a cylindrical block disposed within said hole and including a vertical groove formed therein, said cylindrical block also including peripheral projections extending from opposite sides of an exterior surface thereof, said cylindrical block slidably disposed about said guide plate at said vertical groove and said projections disposed within said annular groove to retain said cylindrical block within said hole of said extended portion.

---

### 5,015,155
## MOTOR COVER ASSEMBLY AND METHOD

**James M. Brown, Sidney, Ohio, assignor to Copeland Corporation, Sidney, Ohio**
**Filed Mar. 26, 1990, Ser. No. 498,699**
**Int. Cl.$^5$ F04B** *39/14*
U.S. Cl. 417—360 8 Claims



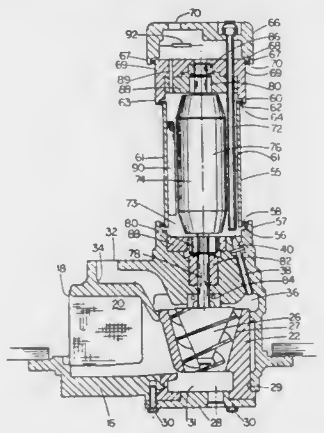
1. A refrigeration compressor comprising:
a compressor;
motor means operative to drive said compressor, said motor means including a stator defining a cylindrical bore and a rotor rotatably supported within said bore;
cover means overlying one end of said stator; and
first and second fastening means securing said stator to said compressor,
said second fastening means also securing said cover means to said one end of said stator, said first fastening means being spaced from said cover whereby said stator may be secured to said compressor by said first fastening means prior to assembly of said cover means.

---

### 5,015,156
## AIRCRAFT FUEL PUMP

**Daniel E. Scholz, 3343 Jaycox Rd., Avon, Ohio 44011**
**Filed Jun. 19, 1989, Ser. No. 368,491**
**Int. Cl.$^5$ F04B** *39/06*
U.S. Cl. 417—370 10 Claims

1. A pump capable of running dry for extended periods without damage, said pump adapted for pumping fluid from a reservoir and delivering fluid at an outlet, comprising:
a pump housing including:
  a. a fluid inlet in fluid connection with the reservoir;
  b. a fluid outlet;
  c. a first chamber in fluid connection with the inlet;
  d. a second chamber vertically above said first chamber and in fluid connection with the outlet;
  e. a passageway for passing fluid between the first chamber and the second chamber, said passageway having a first end adjacent said chamber and a second end adjacent said second chamber;
rotary electric drive means for driving a shaft, said drive means located in said second chamber and in heat transfer relation therewith, said outlet located vertically above said drive means;
an impeller mounted for rotational movement in said first chamber, said impeller in connection with said shaft, said impeller moving fluid from said inlet to said first end of said passageway upon rotation;
check valve means in said passageway for preventing flow from said second chamber to said first chamber while

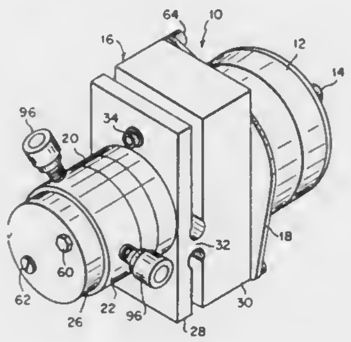


enabling fluid flow from said first chamber to said second chamber;
whereby when fluid is available at said inlet, said fluid is moved by action of said impeller through said first chamber, through said passageway and through said second chamber, to said outlet, said fluid passing through said second chamber cooling said drive means, and whereby when said fluid is no longer available at said inlet, said check valve means prevents flow downwardly out of said second chamber, said fluid held in said second chamber absorbing heat generated by said drive means to avoid damage to said pump.

---

### 5,015,157
## PUMP WITH MULTI-PORT DISCHARGE

**Dennis Pinkerton, 260 Sherbrook Rd., Lindenhurst, N.Y. 11757; Robert W. Jaekel, 1233 Yorkshire La., Barrington, Ill. 60010, and Guillermo P. Pardinas, 11091 SW. 61 Ter., Miami, Fla. 33173**
**Filed Jan. 10, 1990, Ser. No. 463,260**
**Int. Cl.$^5$ F04B** *7/06*
U.S. Cl. 417—500 17 Claims



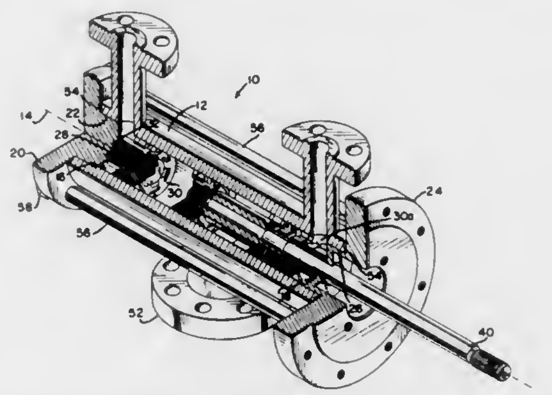
1. A valveless, positive displacement metering pump comprising:
a housing;

a cylindrical working chamber positioned within said housing;
a first passage in fluid communication with said working chamber and extending through said housing;
a second passage in fluid communication with said working chamber and extending through said housing;
a third passage in fluid communication with said working chamber and extending through said housing;
said first, second and third passages adjoining said working chamber at first, second and third radial positions, respectively, with respect to the longitudinal axis of said working chamber;
a piston positioned within said working chamber, said piston including a substantially cylindrical outer surface and a relieved portion defined by said outer surface;
means for reciprocating said piston back and forth within said working chamber and means for rotating said piston as it is reciprocated such that said relieved portion communicates sequentially with said second and third passage while said piston is moving in a first axial direction and communicates with said first passage while said piston is moving in a second axial direction opposite to said first axial direction.

---

### 5,015,158
## GAS COMPRESSOR

**Robert A. Bennitt, Painted Post, N.Y., assignor to Dresser-Rand Company, Corning, N.Y.**
**Filed Nov. 8, 1989, Ser. No. 433,257**
**Int. Cl.$^5$ F04B** *21/08*
U.S. Cl. 417—525 4 Claims

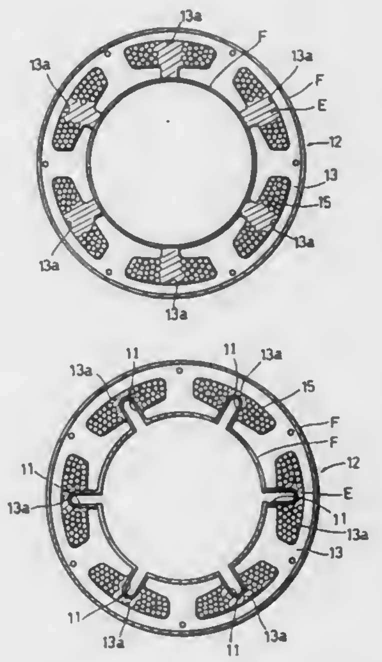


1. A gas compressor, comprising:
a single, straight cylinder having (a) a longitudinal axis, and (b) a single, circumferential wall; and
headers secured to opposite axial ends of said cylinder; wherein
one of said headers has a tapped hold formed in a surface thereof which opens into said cylinder;
the other of said headers has a tapped bore opening therethrough, centrally thereof; and
a first inlet valve threadedly engaged with said tapped hole and confined within said cylinder;
a second inlet valve threadedly engaged with said tapped bore and confined within said cylinder; wherein
said second inlet valve has a throughgoing bore formed therein which is coaxial with said tapped bore;
a piston rod in penetration of said bores, and having an end thereof projecting outwardly from said other header;
a pair of discharge valve coupled to said piston rod, and spaced apart along said rod, confined within said cylinder; and
gas inlet ports, radially formed in said cylinder adjacent opposite ends of said cylinder, opening in immediate proximity to said inlet valves; wherein
said piston rod has a shoulder formed thereabout intermediate the length thereof, and is externally threaded at the end thereof which is opposite said projecting end thereof; and further including
a tubular spacer, internally threaded at one end thereof, and externally threaded at opposite ends thereof; wherein
said spacer is set about said opposite end of said piston rod, having an end thereof abutting said shoulder, and said internally threaded end thereof is threadedly engaged with said opposite end of said piston rod;
said discharge valves are centrally bored and threaded;
said discharge valves are threadedly engaged with said externally threaded ends of said spacer; and
a gas outlet port formed in said cylinder intermediate said ends thereof.

---

### 5,015,159
## FUEL PUMP

**Koichi Mine; Hikaru Kikuta; Hitoshi Takeuchi, and Kingo Kamiya, all of Obu, Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu, Japan**
**Filed May 17, 1990, Ser. No. 524,426**
**Claims priority, application Japan, Jun. 1, 1989, 1-64157[U]; Apr. 9, 1990, 2-37734[U]**
**Int. Cl.$^5$ F04B** *35/04*
U.S. Cl. 417—366 2 Claims



1. A fuel pump comprising:
a housing;
a motor section provided in said housing, said motor section comprising an armature fixed to an inner wall of said housing and a magnet rotatably supported to said housing and opposed to said armature with a substantially annular space defined therebetween as a fuel passage, said armature comprising a core formed by stacking a plurality of plates and a coil wound around said core;
a pump section fixed to a lower end of said housing and connected to said motor section to be driven thereby;
a fuel inlet formed in said pump section for sucking a fuel by driving said motor section;
a fuel outlet formed at an upper end of said fuel pump for discharging the fuel fed from said fuel inlet through said fuel passage;
a first resin portion impregnated in said core and said coil for suppressing vibration of said armature; and
a second resin portion coated on a surface of at least said first

VOL
1126
ISS
2
MY
14
1991
UMI

resin portion, said second resin portion having a resistance against the fuel and no influence upon the fuel;

wherein said core is formed with a plurality of recesses for receiving said coil, and said first resin portion is entirely filled in said recesses, and said second resin portion is coated on inner and outer circumferential surfaces of said core and an exposed surface of said first resin portion.

---

### 5,015,160
### INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

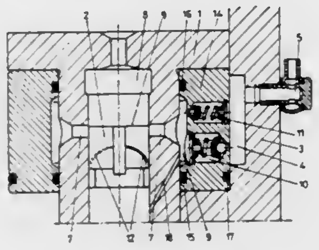
**Jaroslaw Hlousek, Golling; Gerhard Lehner, and Theodor Stipek, both of Hallein, all of Austria, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Apr. 5, 1989, Ser. No. 333,220**

**Claims priority, application Fed. Rep. of Germany, Jun. 18, 1988, 3820707**

**Int. Cl.⁵ F02M** *59/44*

**U.S. Cl. 417—499** **6 Claims**



1. An injection pump for internal combustion engines, having a housing, a pump piston bushing in said housing, a pump piston guided in said bushing, said pump piston having control edges for controlling the beginning and end of an injection event, the control edges cooperating with control bores provided in the wall of said pump piston bushing that permit fuel flow from and into a collecting chamber surrounding the pump piston bushing, into which collecting chamber fuel is delivered under pressure, and from which collecting chamber excess fuel, or fuel overflowing at the end of an injection event, is diverted, a suction valve (10) that opens toward the collecting chamber is connected to the collecting chamber for the delivery of fuel, while for the fuel diversion, said collecting chamber is embodied as a reservoir chamber (9) having pressure maintenance valve (11) which opens in a direction away from the reservoir chamber (9), said control bores (7) of the pump piston bushing (1) are connected to said reservoir chamber (9) and said reservoir chamber (9) is concentric with a suction chamber (4) which is connected to said reservoir chamber via said suction valve (10).

---

### 5,015,161
### MULTIPLE STAGE ORBITING RING ROTARY COMPRESSOR

**Jayendra J. Amin, Pontiac, and Guntis V. Strikis, Belleville, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Jun. 6, 1989, Ser. No. 362,636**

**Int. Cl.⁵ F04C** *2/344, 23/00*

**U.S. Cl. 418—6** **12 Claims**

1. A rotary compressor comprising:

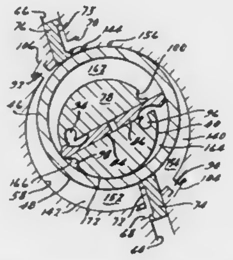
a housing fixed against rotation, defining an interior surface having a first axis;

a post substantially coaxial with the first axis, located within, and spaced radially from, the interior surface of the housing;

a ring mounted for planetary rotation about an axis radially displaced from the first axis, located within the housing between its interior surface and the post, having a first surface generally spaced from and locally contacting the interior surface of the housing at a first location of contact, and a second surface generally spaced from and locally contacting the post at a second location of contact;

outer vanes contacting the first surface of the ring at angularly spaced locations, dividing a first space bounded by the interior surface of the housing and the first surface of the ring into first and second chambers;

inner vanes contacting the second surface of the ring at angularly spaced locations, dividing a second space bounded by the post and the second surface of the ring into third and fourth chambers;



passage means for carrying fluid to and from the first and second spaces;

valve means for opening and closing communication between the passage means and the first and second spaces; and

a crankshaft mounted for rotation substantially about the first axis, having eccentric means driveably engaged with the ring and offset radially from the first axis for driving the ring in planetary rotation about the first axis.

---

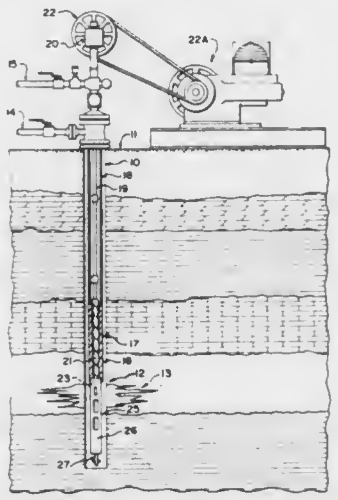
### 5,015,162
### ATTACHMENT FOR AN OIL WELL SCREW PUMP SYSTEM

**Terry D. Heppner, Box 54, Baldwinton, Saskatchewan, Canada S0M 0B0**

**Filed Nov. 28, 1989, Ser. No. 442,073**

**Int. Cl.⁵ F04C** *5/00, 15/00*

**U.S. Cl. 418—48** **9 Claims**



1. A rotary well pump system for pumping oil bearing fluid material from a producing formation to the ground surface, the system comprising a tubing extending from the ground surface to a position adjacent the producing formation, a screw pump located adjacent the producing formation and having a stator and a rotor, the stator being attached to the tubing and having an inlet opening facing in an axially downward direction for receiving the oil bearing material from the producing formation, a drive rod extending from a drive system at the ground surface to the rotor for driving the rotor in the stator to generate a pumping pressure in the fluid material entering said inlet opening for transmission by the pressure generated through the tubing to the surface, a sleeve member having a peripheral wall surrounding and extending axially from said inlet opening through which the oil bearing material passes to said inlet opening, a shaft extending axially of the sleeve, means connecting said shaft to said rotor for rotation therewith, an auger flight carried by said shaft and rotatable therewith inside said sleeve and at least one opening provided through the peripheral wall extending around a part only of the peripheral wall and at a position aligned with the auger flight such that rotation of said rod in a pumping direction causes the auger flight to feed said oil bearing material longitudinally of the sleeve towards said inlet opening.

---

### 5,015,163
### SCROLL TYPE COMPRESSOR WITH RADIALLY OUTER SUPPORT FOR FIXED END PLATE

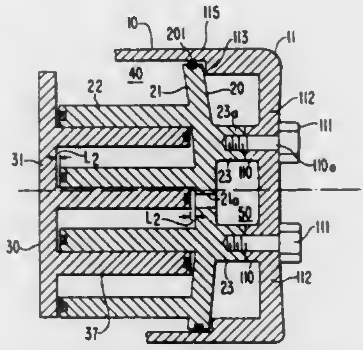
**Jiro Iizuka, Takasaki, Japan, assignor to Sanden Corporation, Japan**

**Filed Jul. 3, 1989, Ser. No. 374,777**

**Claims priority, application Japan, Jul. 8, 1988, 63-169098**

**Int. Cl.⁵ F04C** *18/04*

**U.S. Cl. 418—55.1** **16 Claims**



1. A scroll type fluid compressor comprising:

a compressor housing including a casing enclosed at one end, and a front end plate disposed on an opposite open end of said casing to enclose an interior chamber therein;

a fixed scroll fixedly disposed within said housing, said fixed scroll including a first circular end plate having an axial end surface from which a first spiral wrap extends;

an orbiting scroll disposed within said housing, said orbiting scroll including a second circular end plate from which a second spiral wrap extends, said first and second spiral wraps interfitting at an angular and radial offset to form a plurality of line contacts defining at least one pair of sealed-off fluid pockets, said first and second spiral wraps having a uniform height;

driving means operatively connected to said orbiting scroll for effecting the orbiting motion of said orbiting scroll to thereby change the volume of the fluid pockets; and

an axial gap maintained between the axial end surface of the spiral wrap of each scroll and the adjacent axial surface of the circular end plate of the other of said scroll, said axial gap being larger at a radially central region of said scroll.

---

### 5,015,164
### ROTARY COMPRESSOR HAVING LONG LENGTH BLADE

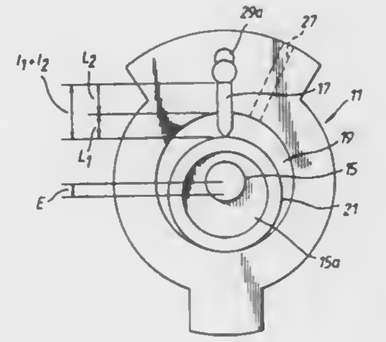
**Motohiro Kudou, Numazu, and Yutaka Sasahara, Fuji, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

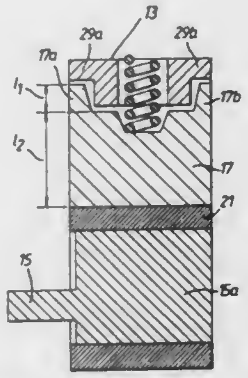
**Continuation of Ser. No. 212,673, Jun. 28, 1988, abandoned. This application Aug. 10, 1989, Ser. No. 391,710**

**Claims priority, application Japan, Jul. 28, 1987, 62-115485[U]**

**Int. Cl.⁵ F04C** *18/356*

**U.S. Cl. 418—63** **6 Claims**





1. A rotary compressor comprising:

a cylinder having an inner peripheral wall which defines a substantially cylindrical compressing chamber for temporarily storing a gaseous fluid;

means for defining a guide groove extending from the inner peripheral wall of the cylinder at a prescribed length in a radial direction, the guide groove having a bottom portion and communicating with the compressing chamber;

a reciprocally movable blade having opposite ends, disposed in the guide groove of the cylinder for partitioning the compressing chamber into a first compressing pressure cell and a second compressing pressure cell, the reciprocally movable blade being subject to a difference in compressing pressure between the first and second compressing pressure cells, the movable blade including at least one projection extending from one of the ends of the movable blade toward the bottom portion of the guide groove;

means for defining at least one depression at the bottom of the guide groove, the at least one depression permitting the at least one portion to reciprocally move thereinto; and

an eccentrically rotatable rotor associated with the movable blade for compressing the gaseous fluid in the compressing chamber to a prescribed level, the rotor having a substantially cylindrical peripheral surface engaged by the blade for partitioning the compressing chamber into the first compressing pressure cell and the second compressing pressure cell.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,165

### OPENING/CLOSING AND CENTERING DEVICE FOR TIRE VULCANIZER

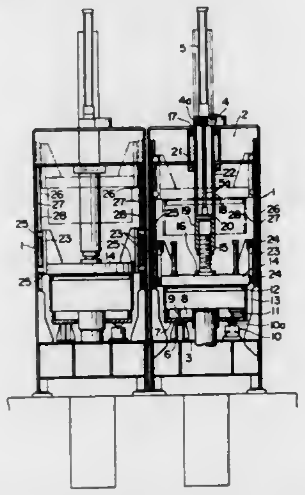
**Keiji Ozaki, Takarazuka, and Seisuke Fukumura, Miki, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan**

**Filed Sep. 22, 1989, Ser. No. 411,309**

**Claims priority, application Japan, Nov. 29, 1988, 63-303303**

**Int. Cl.⁵ B29C** *35/00*

**U.S. Cl. 425—28.1** **1 Claim**



1. In a tire vulcanizer including a frame comprised of a press base, a top frame and a pair of side frames; a lower mold fixed to said press base; an upper mold vertically movable to be opened and closed relative to said lower mold; a long-stroke cylinder mounted to said top frame for moving said upper mold; means for locking said upper mold into a closed position; a guide cylinder guided by said top frame at a central position concentric with a press axis; and a clamping cylinder connected to said lower mold;

an opening/closing and centering device comprising:

a mounting plate mounted on said top frame for supporting said long-stroke cylinder at a position concentric with said guide cylinder;

a piston rod of said long-stroke cylinder connected to said guide cylinder;

a threaded cylinder extending downwardly from a lower end of said guide cylinder;

a pressure plate mounted on said upper mold;

a fixture fixed to an upper surface of said pressure plate at a central position thereof;

an adjusting threaded shaft extending upwardly from said fixture and threadedly engaged with said threaded cylinder;

a plurality of first guide rollers rotatably supported by said pressure plate at peripheral symmetric positions thereof in opposed relationship to channel members on inside surfaces of said side frames for centering said pressure plate in a longitudinal direction thereof;

a plurality of second guide rollers rotatably supported by said pressure plate in perpendicular relationship to said first guide rollers for centering said pressure plate in a transverse direction thereof;

a first vertically extending guide surface formed on each of said channel members of said inside surfaces of said side frames and contacting said first guide rollers; and

at least one second vertically extending guide surface formed on outside surfaces of said channel members and contacting said second guide rollers,

wherein there are two of said second guide surfaces with said first guide surface being positioned between said second guide surfaces and extending transverse thereto.

---

### 5,015,166

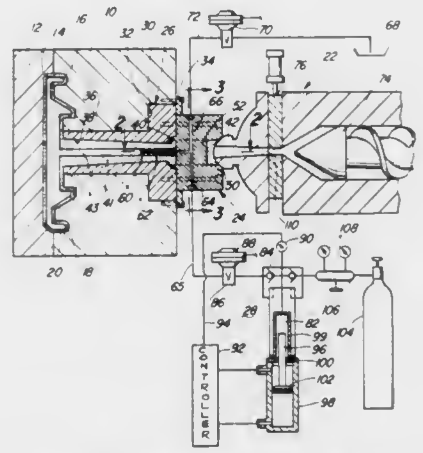
### INJECTION MOLDING APPARATUS FOR MAKING A HOLLOW OBJECT

**Indra R. Baxi, Troy, Mich., assignor to Eocore Molding Systems, Inc., East Detroit, Mich.**

**Filed Nov. 2, 1988, Ser. No. 266,476**

**Int. Cl.⁵ B29C** *49/78*

**U.S. Cl. 425—149** **8 Claims**



1. In a gas delivery apparatus for use in gas assisted injection molding of a plastic part, said part having an outer shell and a hollow core, and wherein molten plastic is injected into a mold and gas is introduced into said molten plastic at a preselected pressure higher than injection pressure of said molten plastic and wherein said preselected gas pressure is maintained in said core until said shell cools sufficiently to be self supporting, the improvement wherein said gas delivery apparatus comprises gas providing means for providing a first quantity of gas at said preselected pressure, said first quantity being greater than that required to make said part, a storage chamber having a volume sufficient to store said first quantity of gas at said preselected pressure, means for detecting deviations in gas pressure from said preselected pressure, and means for automatically decreasing said volume of said chamber in response to detected gas pressure variations after gas introduction is initiated to make up for gas depleted from said chamber and thereby maintain said preselected gas pressure substantially constant until plastic injection has ceased and said shell has become self-supporting, means for interrupting gas introduction into said plastic and means for venting said core to decompress said shell.

---

### 5,015,167

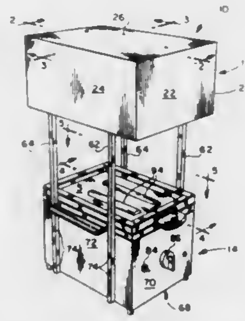
### VACUUM FORMING APPARATUS

**Robert V. Charles, Littleton, Colo., assignor to Ron Charles & Associates, Wilmette, Ill.**

**Filed Apr. 21, 1989, Ser. No. 341,865**

**Int. Cl.⁵ B29C** *51/10*

**U.S. Cl. 425—388** **7 Claims**



1. Apparatus for vacuum forming plastic sheets, comprising:

an upper member having opposing sides;

heater means in the upper member for softening said plastic sheets;

a base member spaced beneath said upper member and having opposing sides, each located beneath a respective opposing side of said upper member;

a vacuum table in said base member;

two pairs of spaced, generally coextensive guide rails extending between said upper member and said base member, the guide rails of each pair having ends fixedly secured to a side of said upper member and a side of said base member;

a carrier for holding a plastic sheet, having opposing sides and a handle outwardly protruding from each of said opposing sides, each handle positioned between a respective pair of guide rails, and each handle having two guide surfaces spaced apart from one another so as to be positioned immediately adjacent a guide rail so that said handles are confined by said guide rails as said carrier is translated between said upper member and said base member and so that said carrier is aligned generally parallel to said vacuum table when moved theretoward; and

means for releasably holding said carrier adjacent said upper member while the plastic sheet held therein is softened by said heater means.

---

### 5,015,168

### TOOL FOR MOULDING SELF-STIFFENED PANELS MADE FROM A COMPOSITE MATERIAL

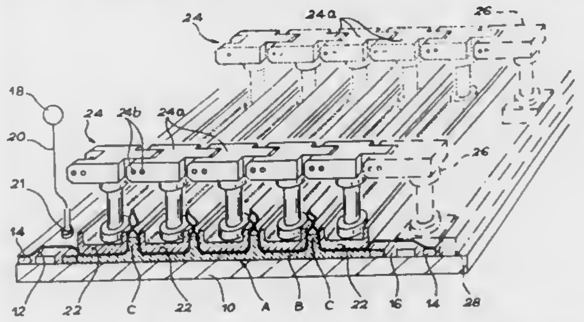
**Bernard Boime, Nanterre, and Bernard Taquoy, Sucy en Brie, both of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris Cedex, France**

**Filed Oct. 19, 1989, Ser. No. 424,066**

**Claims priority, application France, Nov. 8, 1988, 88 14561**

**Int. Cl.⁵ B29C** *35/02*

**U.S. Cl. 425—389** **6 Claims**



1. A tool for moulding self-stiffened panels of composite material with a thermosetting matrix, formed from a base plate provided with stiffeners, said tool comprising a block, a sealing bag having a peripheral edge tightly connected to the block, a tight volume being defined between the block and the bag, and solid calibration parts which are placed between the stiffeners of a panel to be moulded placed in said tight volume, and wherein the solid calibration parts are placed outside said tight volume.

---

### 5,015,169

### APPARATUS FOR DIE FORMING THERMOPLASTIC SHEET MATERIAL

**Louis P. Inzinna, Scotia, and Herman F. Nied, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jun. 8, 1989, Ser. No. 363,237**

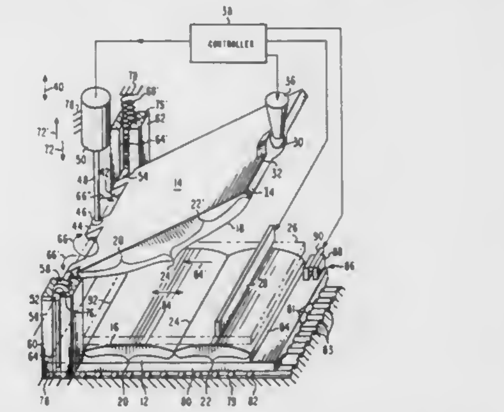
**Int. Cl.⁵ B29C** *51/22*

**U.S. Cl. 425—394** **10 Claims**

7. Apparatus for compressively deforming heat softened thermoplastic sheet material in a deforming cycle comprising:

a first die having a first contoured surface;

a second die having a second contoured surfaced shaped and dimensioned to mate with the first surface; and



means for forcing the first die toward the second die in a pivoting motion so that said dies progressively squeeze the sheet material therebetween in a direction generally from one edge of the material toward an opposing edge.

---

### 5,015,170

### INJECTION MOLDING COOLED SOCKET HOLDER FOR A HEATED NOZZLE

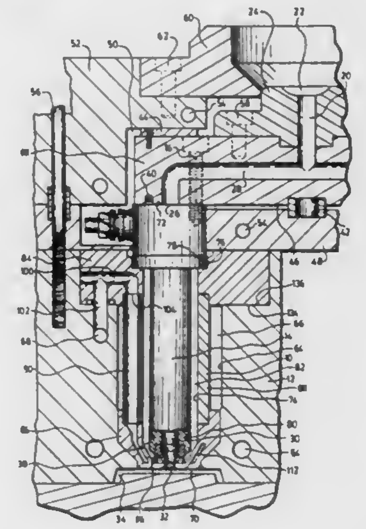
**Jobst U. Gellert, 7A Prince Street, Georgetown, Ontario, Canada L7G 2X1**

**Filed Sep. 4, 1990, Ser. No. 576,841**

**Claims priority, application Canada, Jul. 27, 1990, 2022120**

**Int. Cl.⁵ B29C** *45/74*

**U.S. Cl. 425—549** **8 Claims**



1. An injection molding integral cooled socket holder to be seated in a well in a cavity plate, the socket holder having a forward end, a rear end, and a central socket extending therethrough to receive an elongated heated nozzle to convey melt to a cavity, the socket holder comprising:

(a) a hollow rear collar portion having a central opening therethrough, a cooling fluid inlet passage and a cooling fluid outlet passage, the inlet passage having an inlet and an outlet, the outlet passage having an inlet and an outlet,

(b) a forward socket portion having an opening therethrough to receive a forward nose portion of the heated nozzle and to provide a gate leading to the cavity, the forward socket portion having a circular cooling fluid conduit with an inlet and an outlet to convey cooling fluid

VOL
1126
ISS
2
MY
14
1991
UMI

around the forward nose portion of the nozzle adjacent the gate, and

(c) a hollow central tube portion of a preselected length with a central cylindrical opening therethrough extending between the rear collar portion and the forward socket portion, the tube portion having a cylindrical outer surface, the outer surface having first and second outwardly open longitudinal grooves therein, a first small diameter tube of a preselected length being received in the first groove to provide a cooling fluid inlet duct and a second small diameter tube of a preselected length being received in the second groove to provide a cooling fluid outlet duct, the inlet duct connecting the outlet from the inlet passage in the rear collar portion to the inlet to the fluid conduit in the forward socket portion, and the outlet duct connecting the outlet from the fluid conduit in the forward socket portion to the inlet to the outlet passage in the rear collar.

---

### 5,015,171

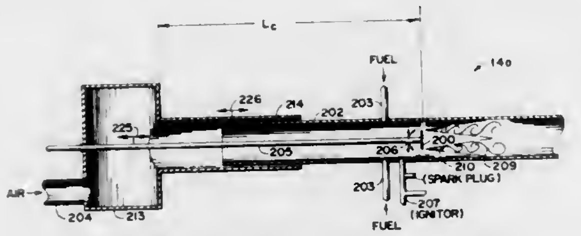
### TUNABLE PULSE COMBUSTOR

**Ben T. Zinn, Atlanta; Brady R. Daniel, Stone Mountain, and Andrew B. Rabhan, Atlanta, all of Ga., assignors to Sonotech, Inc., Atlanta, Ga.**

**Continuation of Ser. No. 227,900, Aug. 3, 1988, Pat. No. 4,909,731, which is a continuation-in-part of Ser. No. 75,065, Jul. 17, 1987, Pat. No. 4,770,626, which is a division of Ser. No. 836,997, Mar. 6, 1986, Pat. No. 4,699,588. This application Mar. 14, 1990, Ser. No. 493,490**

**Int. Cl.$^5$ F23C *11/04***

**U.S. Cl. 431—1** **42 Claims**



1. A frequency tunable pulse combustor, comprising:

a combustion chamber;

a combustion zone operatively associated with said combustion chamber wherein a combustion reaction of fuel and air occurs and heat is released to excite pulsations in said tunable pulse combustor;

air intake means for supplying air into said combustion zone for said combustion reaction;

fuel supply means for supplying fuel into said combustion zone for said combustion reaction;

exhaust means for exhausting combustion by-products; and

axially translatable adjusting means for selectively varying the frequency of pulsations in said tunable pulse combustor, thereby providing a selectively frequency tunable pulse combustor.

---

### 5,015,172

### METHOD AND APPARATUS FOR DETECTING SHORT CIRCUITED COMBUSTION AIR SWITCHES

**William R. Landis, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Jan. 27, 1989, Ser. No. 303,605**

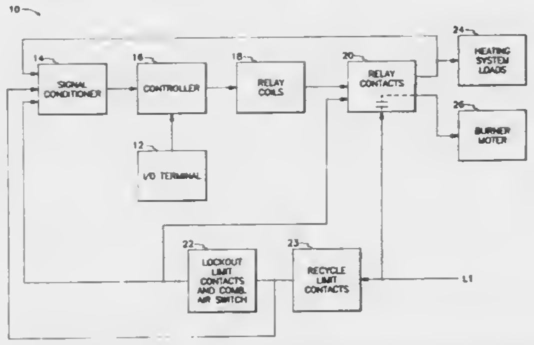
**Int. Cl.$^5$ F23N *5/22***

**U.S. Cl. 431—6** **24 Claims**

1. A method for detecting a faulty air switch in a heating system having an operation cycle comprising a plurality of operating periods where the air switch senses air flow in the heating system and causes air flow limit contact means to open when the air flow is outside a predetermined limit and where the air flow is outside the predetermined limit during a first operating period of the operation cycle, the method comprising the steps of:

providing a series circuit including the air flow limit contact means in series with other limit contact means, between a limit sense terminal and an energized input terminal where the other limit contact means should be closed during the first operating period of the operation cycle; and

sampling the limits sense terminal during the first operating period of the operation cycle to determine whether the limit sense terminal is energized.



---

### 5,015,173

### BURNER FOR THE COMBUSTION OF LIQUIDS IN THE GASEOUS STATE

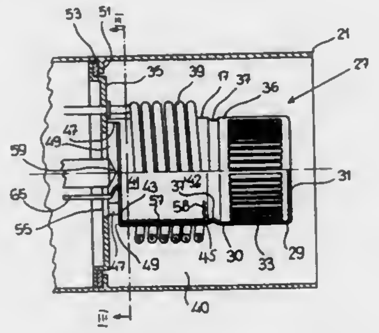
**Jörg Füllemann, Mastrils, and Heinrich Boner, Malans, both of Switzerland, assignors to VTH AG Verfahrenstechnik fur Heizung, Vaduz, Liechtenstein**

**Filed May 30, 1989, Ser. No. 358,673**

**Claims priority, application Switzerland, Jun. 9, 1988, 02201/88**

**Int. Cl.$^5$ F23J *5/02***

**U.S. Cl. 431—116** **28 Claims**



1. A burner comprising

a stationary gasifier (17) being formed as a hollow body, said gasifier including

means (19, 59) for supplying fuel to the interior of the hollow body;

an inlet (41) for air into the hollow body; and

an outlet (42) from the inside of the hollow body for a combustible gas/air mixture;

a stationary, hollow mixing head (29) coupled to the outlet (42) of the gasifier, said mixing head being formed with outlet openings (33) at outer walls thereof for intimately mixing said combustible gas/air mixture, and issuing said combustible gas/air mixture,

said mixing head (29) including a deflector section (31) positioned for deflection of said gas/air mixture through said openings (33), in substantially radial direction for formation of a flame, after ignition of said combustible gas/air mixture, which expands essentially radially from said mixing head (29); and

a flame tube (21) surrounding and spaced apart from the

gasifier (17) and the mixing head (29), and axially extending approximately to the end of the mixing head (29), so that a plane across the end of the flame tube and a plane across the end of the mixing head will be in approximate alignment to permit radial expansion of the flame shortly after the flame resulting from ejection of the gas/air mixture through said openings (33) touches the flame tube.

---

### 5,015,174

### BURNER HEAD FOR A FORCED-AIR GAS BURNER

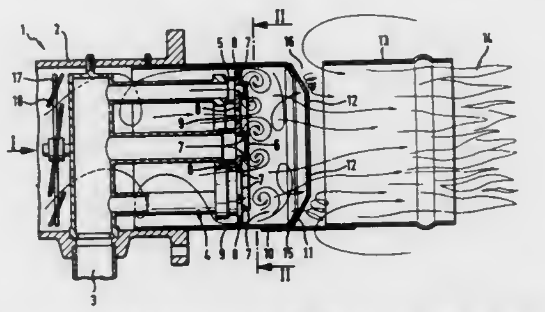
**Walter Dreizler, Brachetweg 16, 7000 Stuttgart 75, and Ulrich Dreizler, Verenaweg 3, 7208 Spaichingen, both of Fed. Rep. of Germany**

**Filed Jun. 21, 1989, Ser. No. 369,446**

**Claims priority, application Fed. Rep. of Germany, Jun. 21, 1988, 3820849**

**Int. Cl.$^5$ F23C *7/00***

**U.S. Cl. 431—116** **25 Claims**



1. A burner head for a forced-air gas burner that includes a burner tube, a combustible gas inlet, said burner tube receives a device (4), said device (4) includes a plurality of tubes that join said combustible gas inlet for distributing combustible gas and combustion air, said device for distributing gas and combustion air including combustible gas nozzles (7) and air flow openings (9, 19), a flame tube (13) adjoining the burner tube (1), at least one radial opening (16) between an end of said burner tube (10) and an adjacent end of said flame tube (13), which serves to provide exhaust gas recirculation, a ribbed ring (11) secured between the burner tube (10) and the flame tube (13) upstream of said radial opening (16) but downstream of said combustible gas nozzles (7) and air flow openings (9, 19), and said ribbed ring includes ribs (12) which protrude radially inward, crosswise to the longitudinal axis of the burner head.

---

### 5,015,175

### MELODIC CANDLE ASSEMBLY

**Che-Cheol Lee, No. 305, 119-dong, Chugong A.P.T., Gayemjong-dong, Changwon, Rep. of Korea**

**Filed Oct. 1, 1990, Ser. No. 590,942**

**Claims priority, application Rep. of Korea, Oct. 11, 1989, 89-15001**

**Int. Cl.$^5$ F23D *3/16***

**U.S. Cl. 431—253** **10 Claims**

1. A melodic candle assembly, comprising:

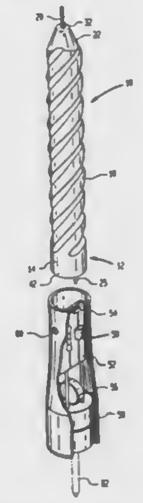
a generally cylindrical solid body made of a meltable and combustible material, said body having a top and a bottom end;

a combustible wick extending axially through said body and having a wick tip extending from said top end of said body for conveying melted material from said body to feed a flame maintained at said wick tip when said wick tip is ignited,

a long thin thermoresponsive member parallel and close to said wick, said member having a top end adjacent to said wick tip to be heated by said flame, said member having a lower end extending below said bottom end of said body, said member being responsive to heating of said top end thereof by said flame to produce a voltage at said lower end;

support means for holding said body in an axially upright position; and

an electronic circuit means enclosed by said support means, said lower end of said member being connected to said circuit means for applying said voltage thereto, said circuit means including audio frequency reproduction means for audibly reproducing prerecorded audible tones therefrom when said voltage is applied thereto whereby said audible tones are producéd when said flame heats said top end of said member, and said audible tones cease when said flame is extinguished.



---

### 5,015,176

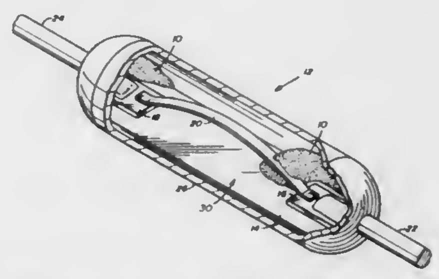
### METHOD OF MAKING A CERAMIC COATED MICROFUSE

**Leon Gurevich, St. Louis, Mo., assignor to Cooper Industries, Inc., Houston, Tex.**

**Division of Ser. No. 360,432, Jun. 2, 1989, Pat. No. 4,926,153. This application Feb. 26, 1990, Ser. No. 485,256**

**Int. Cl.$^5$ F27D *5/00;* H01H *85/38***

**U.S. Cl. 432—5** **2 Claims**



1. A method of curing a ceramic coated miniature fuse, comprising the steps of:

placing a fusing subassembly with a solidified and dried coating of ceramic thereon in an oven;

heating the subassemblies to drive off the water therein by elevating the temperature in the oven in a series of curing steps at different curing temperatures; and

changing the temperature from a lower to a higher temperature at a rate of not more than 30° per hour.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,177
### WAFER HANDLING APPARATUS

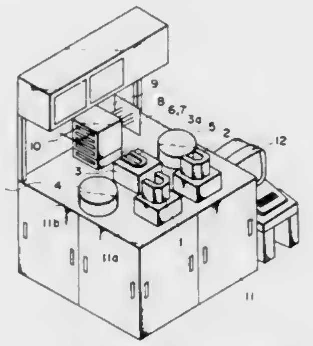
**Yoshiki Iwata, Yamato, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Contiouation of Ser. No. 68,246, Jun. 30, 1987, abandoned. This application Dec. 15, 1989, Ser. No. 453,188**

**Claims priority, application Japan, Jul. 4, 1986, 61-156243; Aug. 8, 1986, 61-185304; Aug. 29, 1986, 61-201815; Oct. 27, 1986, 61-253695**

**Int. Cl.⁵ F27B** *9/00*

**U.S. Cl. 432—121** **19 Claims**



1. A wafer handling apparatus comprising:

a common desk including a top surface having a front zone, a middle zone and a rear zone, the front zone being capable of receiving plural indexers functioning as a wafer sender and/or receiver;

at least one wafer processing unit disposed adjacent lateral sides of the middle zone;

a wafer baking oven disposed adjacent the rear zone, said oven including plural chambers provided with wafer supporting surfaces for accomodating and baking the wafers therein, wherein said chambers are disposed in the form of a multi-stage chamber in a direction perpendicular to the supporting surfaces; and

a wafer handling mechanism disposed adjacent a middle of the front zone, said wafer processing units and said oven.

---

### 5,015,178
### MELTING FURNACE

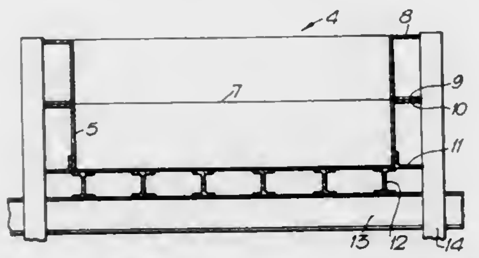
**Per H. Hystad, Kopervik, Norway, assignor to Karmoy Winch A/S, Kopervik, Norway**

**Filed Mar. 20, 1989, Ser. No. 325,535**

**Claims priority, application Norway, Mar. 25, 1988, 881337**

**Int. Cl.⁵ F27B** *14/08*

**U.S. Cl. 432—248** **2 Claims**



1. A melting furnace for containing a molten material comprising:

a shell for containing the molten material, said shell including a bottom wall and surrounding sidewalls made of common steel;

a lining of refractory material provided on said bottom wall and sidewalls for direct contact with the molten material;

an external supporting structure engaging said bottom wall and said sidewalls of said shell at a plurality of widely distributed locations for sufficiently supporting the shell as to substantially reduce sagging of said shell due to effects of prolonged exposure of said shell to high temperature from the molten material;

said supporting structure being constituted by a skeletal framework of interconnected elements made of a steel which is characterized by being weldable to said common steel, and by being able to withstand being exposed to elevated temperatures in the range of 180° C. to 450° C. for a period in the range of 3 to 4 years, due to being disposed in a heat exchange relationship with said shell, without substantial loss of stability, said skeletal framework comprising a network of trusses and comprising a plurality of outwardly projecting flanges having inner sides welded to outer sides of said shell.

---

### 5,015,179
### SPEECH MONITOR

**Joseph A. Resnick, R.D. 1, Box 415-A, Natrona Heights, Pa. 15065**

**Filed Jul. 29, 1986, Ser. No. 891,680**

**Int. Cl.⁵ G09B** *19/04*

**U.S. Cl. 434—185** **6 Claims**

1. A method of speech training comprising sensing speech of a student and providing a digital display of the sensed speech, the display being in the form of spaced, on-off indicators, wherein the digital display is provided in conjunction with a view of the student's face.

---

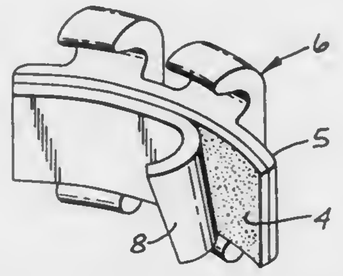
### 5,015,180
### DENTAL ARTICLE CONTAINING LIGHT-CURABLE PASTE

**Ronald M. Randklev, Grand Marais, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Mar. 1, 1989, Ser. No. 317,651**

**Int. Cl.⁵ A61C** *3/00*

**U.S. Cl. 433—9** **33 Claims**



21. A dental article comprising an orthodontic bracket having a base and a light-curable, non-toxic paste sandwiched between the base and a releasably adhering substrate.

---

### 5,015,181
### HEATER FOR DENTAL IMPRESSION COMPOUND

**Dale B. Parask, 3239 S. 58th St., Unit 307, Milwaukee, Wis. 53219**

**Filed Sep. 26, 1988, Ser. No. 248,637**

**Int. Cl.⁵ A61C** *19/00*

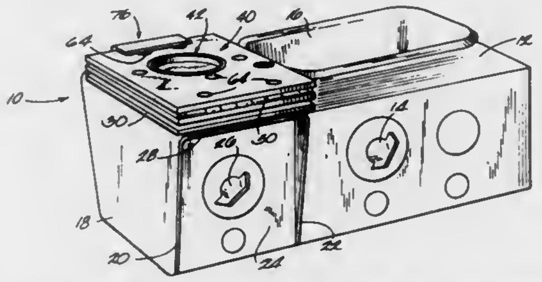
**U.S. Cl. 433—32** **18 Claims**

1. The combination of heating apparatus and a dental impression compound said combination comprising:

a container containing said compound and having a side wall connected to a heat conductive bottom said side wall having a projecting rib;

a heater having a heater plate; and

holder means for manipulating said container, said holder means cooperating with said side wall rib to hold said container and heat conductive bottom in heat transfer contact with said heater plate to heat said dental impression compound and means for pressing said holder means and container in contact with said heater plate.



---

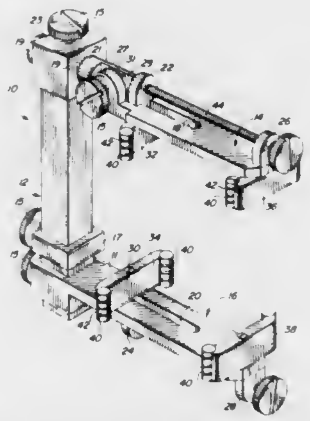
### 5,015,182
### DENTAL FIXATOR APPARATUS

**Norman E. Newberry, 1736 Chateau Ave., Anaheim, Calif. 92804**

**Filed Dec. 12, 1989, Ser. No. 448,901**

**Int. Cl.⁵ A61C** *11/00*

**U.S. Cl. 433—60** **6 Claims**



1. A dental fixator device comprising, in combination:

(a) a vertical staff;

(b) an upper horizontal arm adapted to support a dental model or cast;

(c) a horizontal shaft, the front end of which is releasably secured to the rear end of said upper horizontal arm and the rear end of which is releasably secured to said staff adjacent the upper end thereof, whereby said arm can be rotated around the longitudinal axis thereof and held in a desired position;

(d) a lower horizontal arm releasably secured to said staff below said upper arm and adapted to slide vertically on said staff and to support a dental model or cast; and

(e) two spaced pairs of clamps, one said pair being connected to one of said horizontal arms and the other of said paris being connected to the other of said horizontal arms, one clamp of each said pair being adjacent the rear of and slidable longitudinally of the associated horizontal arm, whereby a dental model or cast can be releasably held by the clamps of said pair without the use of bonding agent, each said clamp comprising a bracket, the opposite ends of which bear expanded gripping surfaces, each of said bracket being pivotally locked to the associated arm by a vertical screw for adjustable rotation in a horizontal plane, the brackets of said upper arm depending therefrom while the brackets of said lower arm project upwardly therefrom.

---

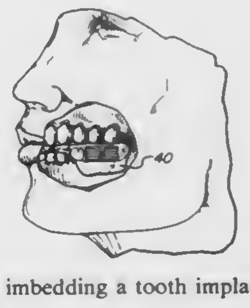
### 5,015,183
### LOCATING DEVICE AND METHOD OF PLACING A TOOTH IMPLANT

**Thomas J. Fenick, Garwood Rd., Trumbull, Conn. 06611**

**Filed Aug. 7, 1989, Ser. No. 390,080**

**Int. Cl.⁵ A61C** *3/02*

**U.S. Cl. 433—76** **12 Claims**



1. A method of imbedding a tooth implant comprising the steps of

forming a stint comprising a negative impression of a patient's teeth in the vicinity of the implant area,

locating a plurality of X-ray opaque strips in the negative impression of said stint in the vicinity of the implant area,

placing the stint so formed on the teeth of the patient, taking a series of oblique X-rays for a diagnostic evaluation of a patient's jaw structure in the vicinity of the implant area with said stint in the patient's mouth,

and plotting the optimal trajectory for an implant fixture by reference to the image points produced on said X-ray by said opaque strips.

---

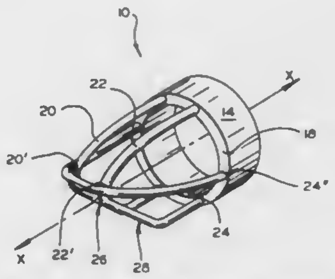
### 5,015,184
### EVACUATOR TUBE TIP GUARD

**Lanny Perry, RR, Utica, and William G. Thomas, Utica Rte., Hobson, both of Mont. 59452**

**Filed Feb. 12, 1990, Ser. No. 478,440**

**Int. Cl.⁵ A61C** *17/06, 17/14*

**U.S. Cl. 433—93** **2 Claims**



1. A guard for attachment to the open, free end of a dental saliva ejector tube, and/or a high volume evacuator tube, said guard comprising:

(a) a proximal, annular ring segment having a central, longitudinal axis for engagement with said open, free end; and

(b) at least two rigid guard loops of substantially like configuration and occupying a finite area, each of said guard loops having first and second ends which integrally extend from said annular ring segment along first and second lengths which slant inwardly toward said axis in a direction away from said ejector tube to form arcuate, distal portions at the intersection of said first and second lengths, said intersection of each said guard loop first and second lengths lying adjacent said central, longitudinal axis, said guard loops lying in substantially parallel, spaced planes to define openings therebetween communicating with said ejector tube open end, said openings having a total area greater than said finite area occupied by said guard loops and wherein said first length of each of said at least two guard loops slants gradually inwardly toward said central

VOL
1126
ISS
2
MY
14
1991
UMI

longitudinal axis and said second length of each of said at least two guard loops extends linearly and parallel to said central, longitudinal axis from said second end for substantially a first half of said second length, and wherein the second half of said second length, which extends between said first half and said arcuate, distal portion, is linear and forms an inner, obtuse angle with said first half, and an inner, acute angle with said central, longitudinal axis at said distal portion.

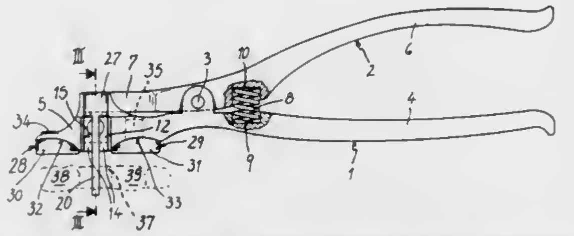
---

### 5,015,185
### DEVICE FOR EXTRACTING DENTAL PROSTHESES, CROWNS AND THE LIKE

**Davide Cané, Via XXV Aprile 10², 40055 Castenaso, and Giancarlo Venturi, Via Nazionale, 60, 40067 Rastignano, both of Italy.**

**Filed Sep. 21, 1989, Ser. No. 410,213**
**Int. Cl.⁵ A61C** *3/14*

**U.S. Cl. 433—159** **3 Claims**



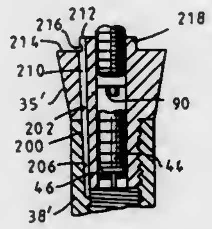
1. Device for extracting a dental prosthesis, comprising two mutually pivoted levers each having a handgrip and a jaw, a spring arranged between said handgrip and urging said handgrips to move apart, said levers being pivoted so that said jaws are moved apart when the handgrips are actuated mutually closer against the repulsion force of said spring, a seat provided in one of said jaws, a body articulated to the other one of said jaws and guided in said seat, two opposite rocker levers articulated in said body in a plane perpendicular to said jaws, said rocker levers comprising respective extension and opposite hook-like elements adapted to engage an edge of said prosthesis, when said device is placed in extracting position, a hole traversing said body and extending between said extensions, a spring accommodated in said hole and urging said hook-like elements to engage said edge, said jaw provided with said seat having abutments adapted to rest on the teeth adjacent to said prosthesis when said handgrips are moved towards each other, thus causing a resting reaction opposite to the extraction force exerted by said hook-like elements on said prosthesis.

---

### 5,015,186
### DENTAL IMPLANT ATTACHMENT SYSTEM

**Steven G. Detsch, 4115 The Hill Rd., Bonita, Calif. 92002**
**Continuation-in-part of Ser. No. 100,578, Sep. 24, 1987, Pat. No. 4,854,872. This application Jul. 26, 1989, Ser. No. 385,666**
**Int. Cl.⁵ A61C** *8/00, 3/00*

**U.S. Cl. 433—173** **6 Claims**



1. A prosthetic implant attachment system for mounting a prosthetic device to the jaw bone in the mouth comprising a base member, securing means associated with said base member for permitting said base member to be secured to the jaw bone in said mouth, said base member and said securing means having threaded portions for permitting said base member to be threadably connected to said securing means, and means for preventing rotational movement between said base member and said securing means, said means for preventing rotational movement between said base member and said securing means comprising a hole in the threaded portion of said base member, a hole in the threaded portion of said securing means and a pin member locatable in the holes in the threaded portion of said base member and the threaded portion of said securing means for engaging said base member and said securing means after said base member has been threadably connected to said securing means.

3. An implant analogue system for use in forming an artificial tooth for a dental implant comprising an impression head and a tapered pin member having a lower end portion and having an integral enlarged head portion sized and shaped to substantially correspond to said impression head and tapering generally from the integral enlarged head portion to the lower end portion with a substantially flat inclined surface located on a portion of the tapering portion of said pin member with the inclined surface sloping inward toward the lower end portion of said pin member.

6. An orthodontic prosthetic system for use with a dental implant secured in the jaw bone in the mouth comprising a cylindrical base member, means for securing said base member to said implant in the mouth, an orthodontic mounting member secured to said base member and an orthodontic bracket connected to said orthodontic mounting member, said orthodontic bracket having a plurality of projecting portions.

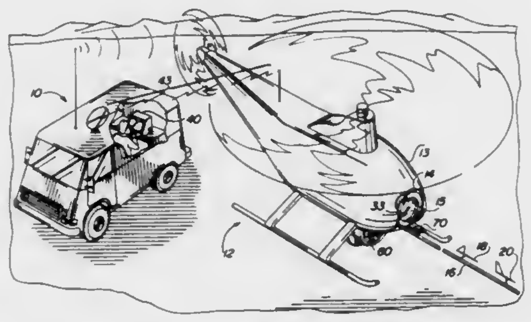
---

### 5,015,187
### HELICOPTER REMOTE CONTROL SYSTEM

**Douglas W. Lord, Orlando, Fla., assignor to Byron Hatfield and Ken Hudson, both of Orlando, Fla.**

**Filed Feb. 28, 1990, Ser. No. 486,170**
**Int. Cl.⁵ G09B** *9/00*

**U.S. Cl. 434—33** **12 Claims**



1. A system for providing an operator at a fixed location visual information for remote control of a helicopter comprising:

(a) a radio link from an airborne helicopter to said fixed location for transmitting video information;
(b) a television camera disposed in the nose of said helicopter for producing video signals representative of the terrain and objects within a field of view of said helicopter;
(c) means disposed within a field of view of said camera visually indicating relative wind direction with respect to said helicopter;
(d) means for measuring and displaying a visual indication of forward air speed of said helicopter, said display means disposed within the field of view of said camera;
(e) means for measuring pitch of said helicopter, said pitch measuring means including a pitch indicator disposed within the field of view of said camera; and
(f) television receiving and display means at said fixed location for receiving said video signals and displaying video representations of terrain and objects forward of said helicopter, relative wind direction with respect to said helicopter, and air speed and pitch of said helicopter.

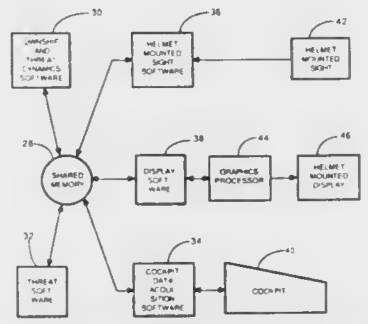
---

### 5,015,188
### THREE DIMENSIONAL TACTICAL ELEMENT SITUATION (3DTES) DISPLAY

**John C. Pellosie, Jr., Orlando, Fla.; Michael W. Haas, Beavercreek, and Kenneth Aldrich, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Continuation-in-part of Ser. No. 197,053, May 3, 1988, abandoned. This application Dec. 26, 1989, Ser. No. 456,227**
**Int. Cl.⁵ G09B** *9/00*

**U.S. Cl. 434—38** **18 Claims**



3. A flat image display apparatus for showing to an operator the position, in three dimensional space, of a primary object relative to one or more other objects, comprising:

(a) means for generating a generally top-down first view from above the primary object, showing the primary object generally at the center of the first view surrounded by the one or more other objects;
(b) means for generating a generally behind-forward perspective second view from behind the primary object, showing the primary object generally at the center of the second view surrounded by the one or more other objects;
(c) means for generating transition views intermediate between the first and second views;
(d) means responsive to operator input for changing between the first and second views, wherein the views are transformed from one to the other in substantially continuous transition steps; and,
(e) wherein each generating means includes means for automatically altering the views in response to rotation of the primary object to maintain a front-forward orientation of the primary object.

---

### 5,015,189
### TRAINING APPARATUS

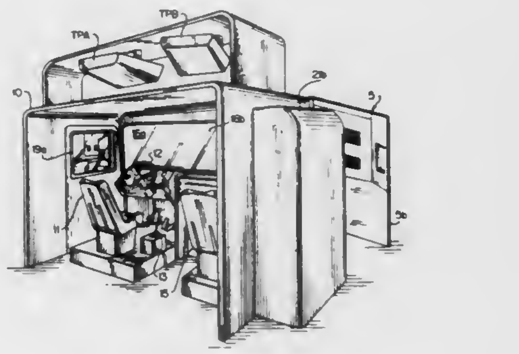
**Wenzinger, Jr., Vestal, N.Y., assignor to Doron Precision Systems, Inc., Binghamton, N.Y.**

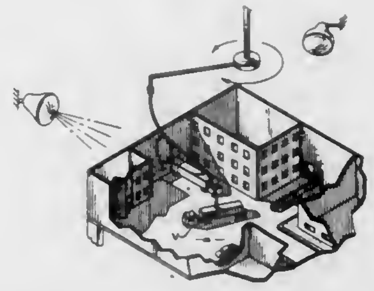
**Filed Oct. 20, 1989, Ser. No. 424,598**
**Int. Cl.⁵ G09B** *9/04*

**U.S. Cl. 434—63** **8 Claims**

1. Training apparatus, comprising, in combination:

a trainee station having a plurality of dummy controls simulating those of a land vehicle and operable to derive control signals;
a diorama;
a miniature vehicle supported atop said diorama, said miniature vehicle having a simulated tractor portion and a simulated trailer portion pivotally connected to said tractor portion for limited rotation about a substantially vertical axis, and miniature leftside and rightside rearview mirrors;
means responsive to said control signals for controlling movement of said miniature vehicle atop said diorama;
video camera means comprising a plurality of video cameras situated within said miniature vehicle and operative to derive video image signals depicting separate forward, leftside window and rightside window views of said diorama from within said miniature vehicle;
a screen spaced forwardly from said trainee station; means responsive to the video image signals depicting said forward view for providing a forward view display upon said screen; and direct-view video monitors responsive respectively to the video image signals depicting said leftside window and said rightside window views for providing leftside window and rightside window displays and said leftside and rightside rearview mirrors, respectively, at said trainee station.





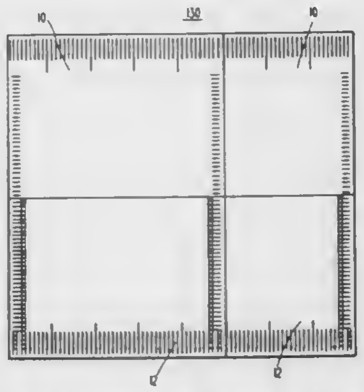
---

### 5,015,190
### ADJUSTABLE FURNITURE TEMPLATES METHOD

**Vinson G. Fowlkes, Jr., Middletown, N.J.**

**Filed Feb. 9, 1990, Ser. No. 477,740**
**Int. Cl.⁵ G09B** *29/00*

**U.S. Cl. 434—72** **10 Claims**



**1. A method for planning the design of a region and the positioning of an object in said region, comprising the steps of:**

**(a) disposing a first layout in said region to represent placement of said object within said region in a predetermined relationship with said region;**

VOL
1126
ISS
2
MY
14
1991
UMI

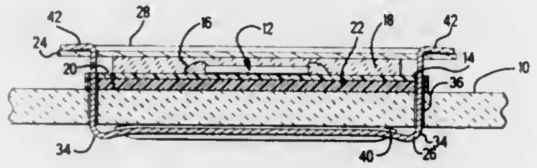
(b) disposing a second layout in an adjoining relationship with said first layout for forming a layout combination having a combined layout area;
(c) providing at least one of said first and second layouts with layout indicia wherein said layout indicia are associated with sequential numerical indicia selected to indicate a dimension of said combined layout area;
(d) adjusting said combined layout area in accordance with the dimensions of said object and in accordance with said layout indicia and said associated sequential numerical indicia;
(e) wherein at least one of said first and second layouts is provided with layout indicia and step (d) comprises disposing said second layout over said first layout in accordance with said layout indicia.

---

### 5,015,191
### FLAT 1C CHIP CONNECTOR

**Dimitry G. Grabbe, Middletown, and Joanne E. Shipe, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Mar. 5, 1990, Ser. No. 488,595**
**Int. Cl.$^5$ H01R** *9/09, 23/72*
**U.S. Cl. 439—71** **14 Claims**



1. An electrical connector (**22**) for electrically connecting contact pads arranged in an array on a planar surface of a first substrate (**10**) to respective contact pads arranged in a corresponding array on a planar surface of a second substrate (**14**), comprising:
a plurality of electrically conductive and generally planar contact members (**44**);
dielectric holding means (**54**) for holding said contact members (**44**) generally coplanar to each other and in a planar array corresponding to the arrays of said contact pads;
each of said contact members (**44**) having bent portions (**63**, **65**) with at least one bent portion (**63**) extending out of the plane of said each contact member and said planar array of contact members in a first direction and at least one bent portion (**65**) extending out of the plane of said each contact member and said planar array of contact members in a second direction; and
said dielectric holding means (**54**) being arranged (**56**) to expose the bent portions (**63**, **65**) of said contact members (**44**) for engagement with respective ones of said contact pads.

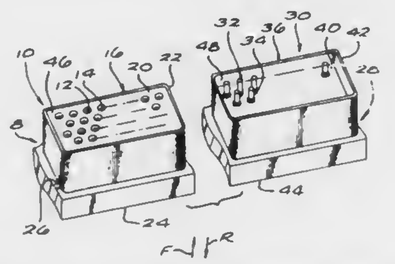
---

### 5,015,192
### CONTACT RETENTION AND SEALING SYSTEM

**David E. Welsh, Tustin, and Albert H. Wilson, Los Angeles, both of Calif., assignors to ITT Corporation, New York, N.Y.**

**Filed Nov. 13, 1989, Ser. No. 435,111**
**Int. Cl.$^5$ H01R** *9/09*
**U.S. Cl. 439—83** **15 Claims**

1. An electrical connector assembly comprising:
a circuit board having a plurality of holes and having a forward face;
a housing which includes an insulative elastomeric layer having a plurality of contact-receiving holes aligned with said holes in said circuit board and having a rear face substantially abutting the forward face of said circuit board;
a plurality of contacts lying in said holes of said elastomeric layer and board in fully installed positions therein, each contact including a forward mating portion, a rearward tail portion, and a middle portion between said forward and rearward portions, said middle portion having forward and rearward enlargements and a spacer of smaller diameter than said enlargements lying between them, said rearward enlargement having a rearwardly-facing shoulder abutting said circuit board forward face to withstand mating forces;
said holes in said elastomeric layer each being narrow enough that the forward enlargement of a corresponding contact can be pushed forwardly into the rear of the elastomeric layer to said final contact position only by forcing the contact forwardly with enough force to deform and displace elastomeric material at the walls of the hole, and each said forward enlargement having a forwardly-facing shoulder large enough to abut a location on said elastomeric layer to temporarily hold said contact in a partially installed position at which said rearwardly-facing shoulder on said rearward enlargement lies a predetermined distance rearward of the rear face of said elastomeric layer.



---

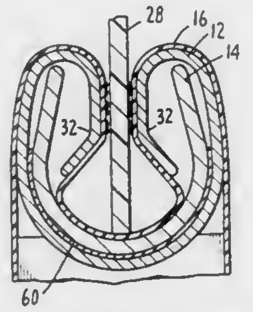
### 5,015,193
### HIGH DENSITY AND HIGH SIGNAL INTEGRITY CONNECTOR

**John F. Krumme, Del Mar; Michael Perry, Mountain View; Gary Yasumura, Santa Clara, and Gerald J. Selvin, Huntington Beach, all of Calif., assignors to Beta Phase, Inc., Menlo Park, Calif.**

**Continuation-in-part of Ser. No. 255,500, Oct. 11, 1988, Pat. No. 4,881,908, and a continuation-in-part of Ser. No. 388,832, Aug. 3, 1989, Pat. No. 4,911,643. This application Oct. 10, 1989, Ser. No. 418,532**

**The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.**

**Int. Cl.$^5$ H01R** *13/24*
U.S. Cl. 439—161 20 Claims



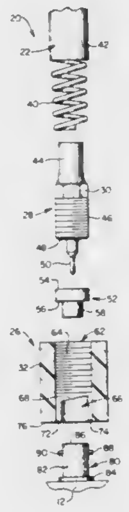
1. A high-performance connector comprising:
spring means, said spring means being an elongated hollow split tube having a longitudinal axis and an axially aligned split defining a generally C-shaped cross-section with end portions;
mechanical actuator means operatively connected to said spring means and being biased by said spring means, movement of said mechanical actuator means changing the dimension of said split; and
first and second sets of parallel spaced conductors, each set terminating at one end of each set thereof in a first and a second matrix of contact pads, respectively, the contact pads of each matrix being spaced from each other in that matrix in two dimensions, said first and second sets of conductors at least partially surrounding said spring means and said matrices being positioned within the split of said spring means adjacent the end portions of said spring means, pads of the first matrix being positioned on one side of the split and the pads of the second matrix being positioned generally opposite thereto on the other side of the split, movement of said spring means and said actuator means causing the plurality of pads on each matrix to move toward each other to contact and electrically connect with a substrate that may be inserted within said split.

---

### 5,015,194
### CONNECTOR FOR ANTENNAS AND COAXIAL CABLE

**James A. Seas, 3629 Whetstone River Rd. South, Marion, Ohio 43302**

**Division of Ser. No. 325,451, Mar. 17, 1989, Pat. No. 4,914,060. This application Oct. 18, 1989, Ser. No. 423,799**
**Int. Cl.$^5$ H01R** *4/54*
**U.S. Cl. 439—314** **8 Claims**



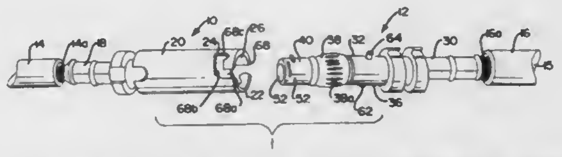
1. A connector for connecting a transmission device to a complementary connector fixed to the housing of another device having an end surface and engaging components for retaining said connector from outward movement, comprising:
a lead having a pin connector portion connectable with said transmission device for connection with said complementary connector;
a support clamp including a support portion for effecting connection with said transmission device, means for supporting said lead, a coupling portion and a compression shoulder;
a spacer having a compression surface configured for receiving said compression shoulder in force transmitting communication and including a contact shoulder disposed oppositely from said compression surface; and
sleeve means mountable over said complementary connector, removably engageable with said engaging components, and including an engaging region, connectable in force transfer relationship with said support clamp coupling portion for effecting a compression, non-yielding engagement between said support assembly contact shoulder and said complementary connector end surface.

---

### 5,015,195
### PLUG AND SOCKET ELECTRICAL CONNECTION ASSEMBLY

**Jose M. Piriz, Hillside, N.J., assignor to Thomas & Betts Corporation, Bridgewater, N.J.**

**Filed Mar. 13, 1990, Ser. No. 492,503**
**Int. Cl.$^5$ H01R** *4/54*
**U.S. Cl. 439—318** **16 Claims**



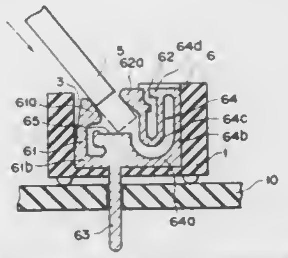
1. A plug and socket assembly for electrically interconnecting a pair of electrical cables, said assembly comprising:
an elongate socket connector having a termination extent adapted to be electrically connected to one cable of said pair and an opposed socket extent, said socket extent having an elongate open ended bore therein being defined by a bottom wall and a longitudinal bore side wall;
an elongate plug connector having a termination extent adapted to be electrically connected to the second cable of said pair and an opposed plug extent, said plug extent being defined by a front wall and a longitudinal plug side wall extending rearwardly therefrom, said plug extent being insertible into said socket bore to establish electrical connection between said bore side wall and said plug side wall and thereby establishing electrical connection between said pair of electrical cables; and
an axially deformed electrically insulative wiping element attached to the front wall of said plug extent, said wiping element being dimensioned for snugly fitting within said socket bore and slidably engaging said bore side wall upon said insertion of said plug extent thereinto.

---

### 5,015,196
### LOW INSERTION FORCE CONNECTOR AND ELECTRICAL CONTACT THEREFOR

**Masahiro Yamada, Yokohama, Japan, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 19, 1990, Ser. No. 467,521**
**Claims priority, application Japan, Jan. 18, 1989, 1-4128[U]**
**Int. Cl.$^5$ H01R** *13/62*
**U.S. Cl. 439—326** **7 Claims**



1. An electrical contact for a low insertion force connector comprising:
first contact means having a first contact portion for contacting one surface of a substrate,
second contact means having a second contact portion for contacting a second surface of the substrate,
a raised portion located between said first and second contact means, said raised portion providing a surface for supporting an edge of said substrate as it is inserted between the first and second contact means and rotated into a final position where said first contact portion electrically contacts a first contact area on said one surface and said

VOL
1126
ISS
2
MY
14
1991
UMI

second contact portion electrically contacts a second contact area on said second surface.

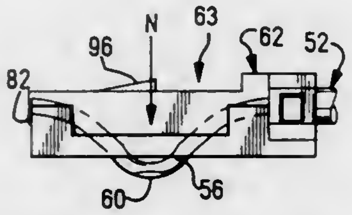
a pin portion located between said first and second contact means; and

a spring portion forming part of said second contact means and located between the second contact portion and the raised portion, said spring portion including a base portion connected to the raised portion and the pin portion, a vertical portion extending vertically from said base portion, and a U-shaped portion extending from the top of the vertical portion and terminating at its other end in said second contact portion.

---

### 5,015,197
### ELECTRICAL CONNECTOR AND CABLE UTILIZING SPRING GRADE WIRE

**John P. Redmond, Mechanicsburg, and Ray N. Shaak, Lebanon, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**
**Filed May 30, 1990, Ser. No. 530,666**
**Int. Cl.$^5$ H01R *13/62***
**U.S. Cl. 439—329** **17 Claims**



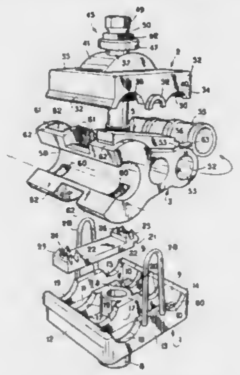
1. For use as an electrical connector, at least one length of wire including an insulating means with at least one portion of said wire extending free from said insulating means and a housing adapted to hold said free end and a length of said insulating means relative to a first contact point to be interconnected by said connector to said wire, the said elements of said connector being characterized in that the said wire is of a spring grade conductive material with said one portion inelastically deformed to provide a second contact point adapted to engage said first contact point and including a spring beam section, the insulating means including a thickness and characteristics to increase the bend radius of said wire as insulated to preclude fracturing stress and strain induced by bending loads, the said housing including portions receiving said one portion of said wire and positioning the said second contact point in bearing relationship with the said first contact point with the spring beam being deflected to provide a normal force engagement between said first and second contact points sufficient to assure a stable, low resistance interface.

---

### 5,015,198
### TERMINAL FOR CONNECTING AN INSULATED BRANCH CONDUCTOR TO AN INSULATED OVERHEAD LINE CONDUCTOR

**Michel Delin, Rieux, France, assignor to Niled S.A., Rieux, France**
**Continuation of Ser. No. 337,308, Apr. 13, 1989, abandoned. This application Dec. 14, 1989, Ser. No. 449,425**
**Claims priority, application France, Apr. 27, 1988, 88 05615**
**Int. Cl.$^5$ H01R *4/24***
**U.S. Cl. 439—411** **5 Claims**

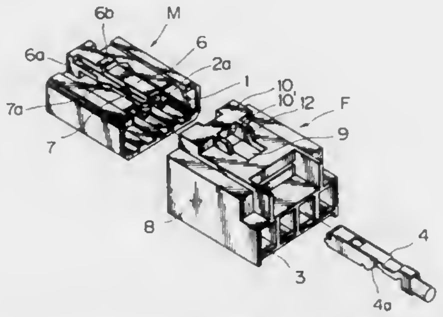
1. Terminal for connecting an insulated branch conductor to an insulated overhead line conductor comprising at least two pairs of contact bars, each of which contact bar has on a side adapted to face towards another contact bar near one end teeth adapted to pierce the insulation of the overhead line conductor and near the other end teeth adapted to pierce the insulation of the branch conductor; two insulative material half-shells, at least two parallel housings in each half-shell each adapted to receive a respective contact bar; a resilient gasket adapted to be placed between said half-shells, made in one piece and defining a laterally open first conduit adapted to pass over the overhead line conductor and a second conduit adapted to receive the branch conductor, said first and second conduits comprising respective slots for said teeth to pass through; coupling means for said half-shells adapted to enable relative sliding and pivoting of said half-shell; and a tapered hole in one of said half-shells, a screwthread in the other half-shell and a screw adapted to pass through said tapered hole and to be screwed into said screwthread to clamp said half-shells together.



---

### 5,015,199
### ELECTRIC CONNECTOR

**Seiji Hirano, Hiroshima; Masaharu Sakaguchi, Shizuoka; Satoru Kawanishi, Shizuoka, and Tomoyuki Ohmura, Shizuoka, all of Japan, assignors to Yazaki Corporation, Tokyo, Japan**
**Filed Oct. 24, 1989, Ser. No. 425,901**
**Claims priority, application Japan, Oct. 28, 1988, 63-139989[U]**
**Int. Cl.$^5$ H01R *13/627***
**U.S. Cl. 439—353** **13 Claims**

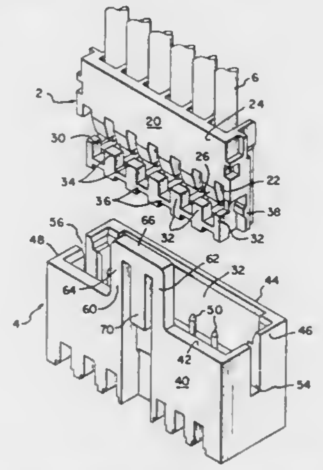


1. An electric connector, comprising a pair of female and male housings formed for fitting engagement with each other in one direction, the housings having terminals that electrically engage each other as the housing are mated, a locking arm means provided on an outer wall of said male housing by way of a base portion and extending in parallel to the fitting direction, said locking arm means being capable of resiliently deformed in a direction perpendicular to the fitting direction, a first engaging means formed on said locking arm means said female housing having a casing portion for receiving said male housing therein, said casing portion having an opening through which a disengaging action is accessible to said locking arm means, a first arresting means provided on said casing portion for engaging with said first engaging means in a fully fitted position of said female and male housings to lock said female and male housings to each other in the fully fitted position, a second engaging means formed at a location on said locking arm means forwardly of said first engaging means, and a second arresting means provided on said casing portion of said female housing for engaging with said second engaging means in a half-fitted position of said female and male housings to temporarily lock said female and male housings to each other in the half-fitted position.

---

### 5,015,200
### CONNECTOR WITH DOUBLE ACTING LATCH

**Lynn W. Abernethy, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.**
**Filed Feb. 20, 1990, Ser. No. 481,936**
**Int. Cl.$^5$ H01R *13/627***
**U.S. Cl. 439—357** **6 Claims**



1. An electrical connector assembly, comprising:

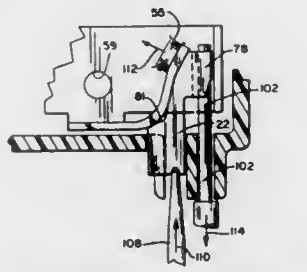
a receptacle comprising a housing and a plurality of terminals retained within said housing by contact latches, said latches having an inclined outer surface, said housing being provided with a trough extending laterally along an exterior surface adjacent free ends of said latches; and

a header comprising a housing having a cavity for receiving said receptacle and pins extending into said cavity for electrically engaging said terminals, said housing further having a latch comprising a cantilever beam extending into said cavity from a crosspiece mounted on a pair of arms which are thinner than said beam and which extend outwardly from a wall, said beam having a protrusion thereon protruding into said cavity below a free surface of said wall and received in said trough in said receptacle.

---

### 5,015,201
### WIRING DEVICE WITH IMPROVED PUSH-WIRE TERMINATION RELEASE

**Victor L. Brezee, and Edward B. Hubben, both of New York, N.Y., assignors to Pass & Seymour, Inc., Syracuse, N.Y.**
**Filed Feb. 20, 1990, Ser. No. 481,187**
**Int. Cl.$^5$ H01R *4/24***
**U.S. Cl. 439—441** **9 Claims**



1. In a wiring device having a housing wherein at least one electrical terminal is enclosed, said housing having a first through opening for insertion of an uninsulated end portion of an electrical conductor into said housing, the improvement comprising:

(a) flexible spring means within said housing having a portion biased toward engagement with an opposing surface of said terminal, said spring means being configured to permit axial movement of said conductor end portion in a first direction to a position between and in contact with each of said biased portion and said terminal surface as said conductor end portion is inserted through said first opening, whereby said conductor end portion is biased by said spring means into electrically conducting relation with said terminal surface, and to resist axial movement of said conductor end portion in a second direction, opposite to said first direction;

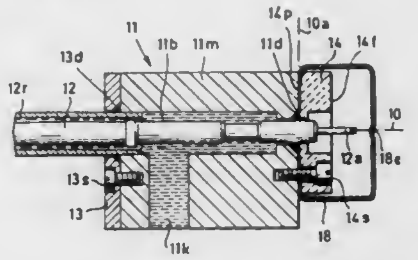
(b) said housing having a second through opening closely adjacent said first opening; and

(c) a member mounted in said second opening for freely reciprocating movement in a predetermined path between outer and inner positions, said member having a central stem portion extending the full length of said member and having a central axis substantially parallel to the axis of said second opening, and an engagement portion comprising an upper protrusion extending forwardly from said stem portion adjacent one end thereof, said upper protrusion including a forwardly disposed surface which slidingly contacts said terminal surface during said reciprocating movement, and said stem portion including a rearwardly disposed surface which contacts and moves said spring means in a direction away from said terminal surface during movement of said member from said outer to said inner position, thereby releasing said conductor from said position between said biased portion of said spring means and said terminal surface to permit movement of said conductor end portion in said second direction, out of said first opening.

---

### 5,015,202
### ELECTRIC PLUG CONNECTOR

**Martin Blumentritt, Königsbronn/Ochsenberg; Reiner Kohler, Aalen, and Peter Greve, Essingen, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany**
**Filed Apr. 6, 1990, Ser. No. 505,481**
**Claims priority, application Fed. Rep. of Germany, Apr. 14, 1989, 3912236**
**Int. Cl.$^5$ H01R *13/00, 4/60***
**U.S. Cl. 439—487** **8 Claims**



1. An electric plug connector for an apparatus having cooling means for removing heat generated in the apparatus, the plug connector comprising:

a first component connected to the apparatus and including a heat-conductive non-deformable first part operatively connected to the cooling means, said heat-conductive non-deformable first part having a first heat-contact surface formed thereon;

first electrical contact means for conducting electrical energy to said apparatus;

a second component movable and adapted so as to be connectable to said first component and including a heat-conductive non-deformable second part made of an electrically-insulating and good heat-conductive material and said heat-conductive second part having a second heat-contact surface formed thereon;

said first and second heat-contact surfaces being in snug uninterrupted surface-to-surface mechanical contact with

VOL
1126
ISS
2
MY
14
1991
UMI

each other when said first and second components are connected to each other so as to conjointly define a heat-transfer interface having a low heat resistance for facilitating the transfer of heat across said interface;

said first part being configured so as to cause said first part to define a low heat resistance path between said first heat-contact surface and said cooling means;

second electrical contact means mounted in said second component for electrically contact engaging said first electrical contact means when said components are connected to each other; and,

said second electrical contact means being connected to said heat-conductive second part so as to be in low heat resistance contact therewith and with said cooling means via a path conjointly defined by said second part, said heat-transfer interface and said first part so as to cool said second electrical contact means and said first electrical contact means when said first and second components are connected.

---

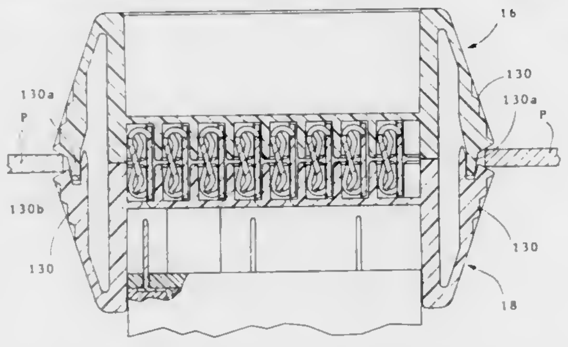
### 5,015,203
### POWER DISTRIBUTION UNIT HAVING IMPROVED JUNCTION BOX

**Randy M. Furrow, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Dec. 26, 1989, Ser. No. 456,920**

**Int. Cl.$^5$ H01R** ***13/73***

**U.S. Cl. 439—535** **5 Claims**



1. An electrical connector member for mounting in a panel cutout, the connector having at least two arms extending from a housing means, said arms being laterally aligned with each other and projecting towards each other, the arms having end surfaces spaced apart to locate the panel therebetween, when the connector is mounted in the panel, the connector being characterized in that:

the arms which face each other are operatively connected one to the other, one of said arms having a tongue while the other of said arms having a groove, where the tongue of the one said arm extends into the groove of the other said arm, such that deflection of one of the said arms causes the movement of the other said arm to install or remove the connector from the panel.

---

### 5,015,204
### MODULAR JACK

**Yukio Sakamoto; Toshlo Hori; Iwao Fukutani, and Takeshi Tanabe, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan**

**Filed Dec. 11, 1989, Ser. No. 448,300**

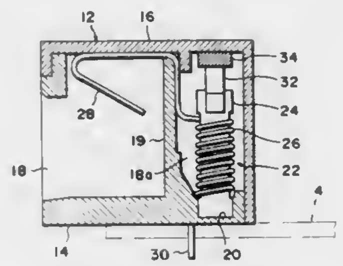
**Claims priority, application Japan, Dec. 12, 1988, 63-314806**

**Int. Cl.$^5$ H01R** ***13/66***

**U.S. Cl. 439—620** **3 Claims**

1. A modular jack for mounting on a circuit board, said modular jack comprising:

a common-mode choke coil in which two wires are separately wound around a ring-shaped core in opposite directions, each of said wires having an end terminating as a contactor to be put in contact with a plug and an end terminating as a lead which provides direct electrical connection of the common-mode choke coil with a printed wiring of said circuit board; and



a housing for housing said common mode choke coil, which housing is made of insulating material.

---

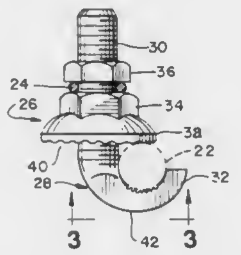
### 5,015,205
### CABLE CLAMP

**George J. Franks, Jr., 664 Thompson Cir., Inverness, Ill. 60067**

**Filed Nov. 7, 1989, Ser. No. 432,637**

**Int. Cl.$^5$ H01R** ***4/30***

**U.S. Cl. 439—803** **19 Claims**



1. A cable clamp for mechanically fastening together a telephone messenger wire and a telephone lasing wire comprising:

a hook member with a threaded shank portion and a jaw portion, said jaw portion forming a trough for engaging the messenger wire, the threads on the threaded shank portion extending substantially to the trough;

a messenger wire retaining nut threadable on said threaded shank portion to directly engage and secure the messenger wire within said trough; and

a lashing wire jam nut threadable on said threaded shank portion for retaining the lasing wire between said messenger wire retaining nut and said lasing wire jam nut when said lashing wire jam nut is tightened against said lashing wire.

---

### 5,015,206
### SOLDER TERMINAL

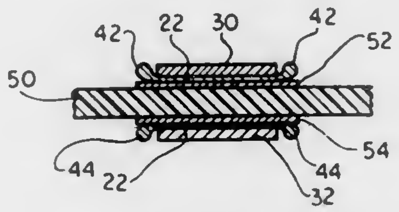
**Richard K. Dennis, Etters, Pa., assignor to Die Tech, Inc., York Haven, Pa.**

**Filed Apr. 5, 1990, Ser. No. 504,946**

**Int. Cl.$^5$ H01R** ***4/02, 9/09***

**U.S. Cl. 439—876** **17 Claims**

1. A solder terminal including a contact element and a first arm joined to the element, the arm having a flat base with opposed edges, and in integral solder mass comprising a thin flat solder layer integrally bonded to the base and a pair of solder reservoirs extending along the edges of the base and joined to the thin solder layer only.



---

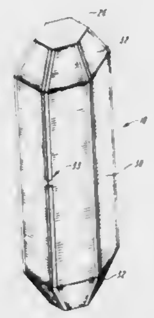
### 5,015,207
### MULTI-PATH FEED-THRU LEAD AND METHOD FOR FORMATION THEREOF

**Richard A. Koepke, New Bedford, Mass., assignor to Isotronics, Inc., New Bedford, Mass.**

**Filed Dec. 28, 1989, Ser. No. 458,092**

**Int. Cl.$^5$ H01R** ***4/58***

**U.S. Cl. 439—886** **17 Claims**



1. A multi-path feed-thru lead providing increased conductive pathway density, comprising:

an insulative substrate having a predetermined configuration, said insulative substrate including an extended intermediate portion and first and second end portions, said first and second end portions having configurations defining a first and second plurality of bonding pads, respectively;

a plurality of metalized conductive pathways formed on said intermediate portion and said plurality of bonding pads defined by said first and second end portions, respectively, of said insulative substrate;

adjacent ones of said metalized conductive pathways being defined and separated by exposed strips of said insulative substrate; and

conductive interconnect trace means formed in said exposed strips of said insulative substrate for electrically interconnecting at least one adjacent pair of said metalized conductive pathways.

---

### 5,015,208
### TORSO WRAP FOR BODY SURFING

**John W. Fox, and Rod Rigole, both of 17500 Red Hill, #200, Irvine, Calif. 92714**

**Filed Aug. 18, 1988, Ser. No. 234,337**

**Int. Cl.$^5$ A63C** ***15/02***

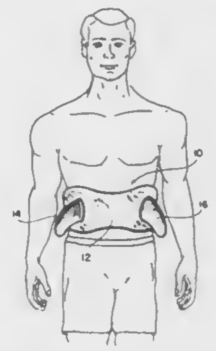
**U.S. Cl. 441—55** **6 Claims**

1. An adjustable torso wrap for body surfing to be worn around a person's torso to provide dorsal shaped fins across a front mid-section of the wearer's torso, the wrap comprising in combination:

(a) a belt element to circumscribe the torso of the person;

(b) at least one flexible support member disposed on said belt element to extend across the front mid-section of the wearer's torso;

(c) a pair of laterally spaced fin members of generally dorsal shape fixedly disposed on said flexible support member to project outwardly in a range of from about 30 degrees to about 60 degrees from a perpendicular axis relative to the longitudinal axis of said flexible support member; wherein when said adjustable torso wrap is worn to circumscribe the wearer's torso; said torso wrap provides the wearer with ability to control ride stability, direction and position on a wave face during body surfing.



---

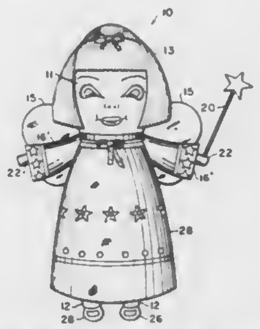
### 5,015,209
### TOOTH FAIRY DOLL

**Theresa Ortiz, 95 W. 195th St., Apt. 5F, Bronx, N.Y. 10468**

**Filed Aug. 27, 1990, Ser. No. 573,251**

**Int. Cl.$^5$ A63H** ***3/20***

**U.S. Cl. 446—73** **3 Claims**



1. A doll having arms with a body structured as a molar tooth having a pair of roots simulating legs, said doll including butterfly-like wings secured to the upper back portion of the doll and a wand in one hand, a receptacle disposed at the back of the doll generally where the wings are secured, said receptacle adapted to hold a tooth lost by a child, the doll being clothed with fairy-like apparel whereby to constitute the fantasy of a "tooth fairy doll."

---

### 5,015,210
### TOY WASH

**Erling T. Dideriksen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland**

**PCT No. PCT/DK88/00199, § 371 Date May 22, 1990, § 102(e) Date May 22, 1990, PCT Pub. No. WO89/05180, PCT Pub. Date Jun. 15, 1989**

**PCT Filed Dec. 1, 1988, Ser. No. 476,371**

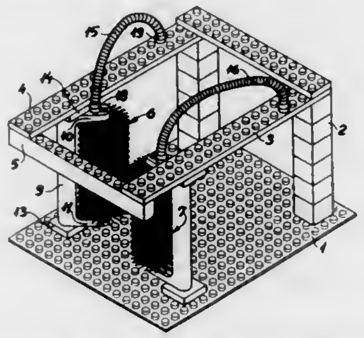
**Claims priority, application Denmark, Dec. 2, 1987, 6323/87**

**Int. Cl.$^5$ A63H** ***33/00***

**U.S. Cl. 446—128** **2 Claims**

1. A toy wash comprising a frame, at least one arm pivotally connected to said frame, a cylindrical wash brush disposed

VOL
1126
ISS
2
MY
14
1991
UMI

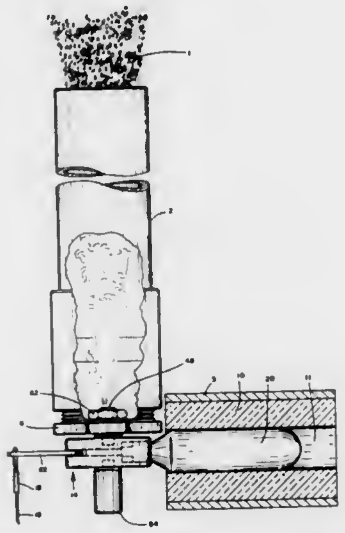


about a shaft and journalled to said arms, said arm protruding transversely to said shaft and an arch-shaped, elastic connector extending between said frame and said arm to spring bias said arm.

---

### 5,015,211
### CONFETTI CANNON

**Tyrone J. Reveen, 12B Sunset Way, #208, Henderson, Nev. 89014**
**Continuation-in-part of Ser. No. 940,866, Dec. 12, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 188,537**
**Int. Cl.$^5$ A63H** *33/30, 37/00*
**U.S. Cl. 446—475** **12 Claims**



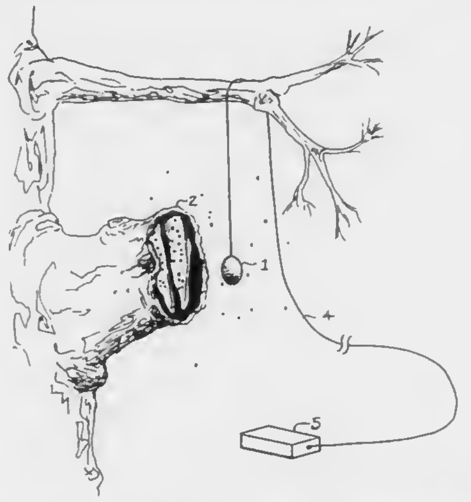
1. A confetti propulsion device for exploding a plug of particulate confetti packed into the device comprises
a barrel having a length of at least 3′ and a length/inside diameter ratio of from at least 20 to about 60,
propulsion means comprising a sealed $CO_2$ cartridge mounted at a lower end of the barrel,
valve means operatively connected to the propulsion means for releasing the contents of the $CO_2$ cartridge substantially instantaneously, and
trigger means for actuating the valve means.

---

### 5,015,212
### SYSTEM FOR ASSESSING BEE TEMPERAMENT

**Hayward G. Spangler, and Eric H. Erickson, both of Tucson, Ariz., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**
**Filed Apr. 25, 1990, Ser. No. 514,479**
**Int. Cl.$^5$ A01K** *57/00*
**U.S. Cl. 449—2** **14 Claims**

1. Apparatus for determining stinging behavior of a colony of bees in a bee habitat comprising
a. bee target means that may be placed adjacent said habitat, wherein said target means includes means to generate a single electrical signal in response to each attempt by a bee to sting said target means; and

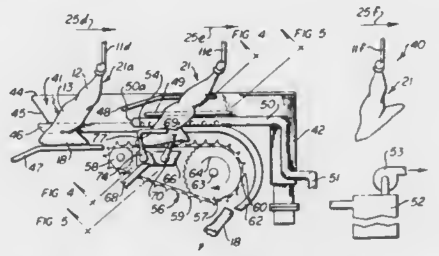


b. electrical signal receiving means operatively associated with said target means to individually convert each such signal into a form that expresses the total number of stings for a predetermined period.

---

### 5,015,213
### ON-LINE CUT-UP SYSTEM WITH JOINT OPENER

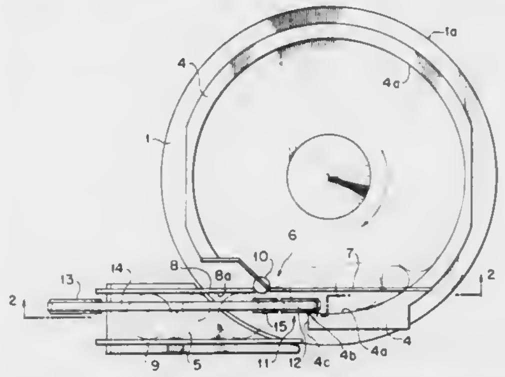
**Jacobus E. Hazenbroek, Burg de Zeeuwstraat 52, Numansdorp, Netherlands**
**Continuation-in-part of Ser. No. 472,719, Jan. 30, 1990. This application Aug. 24, 1990, Ser. No. 571,780**
**Int. Cl.$^5$ A22C** *21/00*
**U.S. Cl. 452—149** **17 Claims**



1. A method of subdividing poultry carcasses comprising:
moving a plurality of previously eviscerated birds suspended by their legs in spaced series on an overhead conveyor system along a processing path,
as each of the birds moves along the processing path:
splitting the breast of the bird,
removing the breast and upper back from the saddle of the bird,
cutting along the backbone of the upper back of the bird,
opening the joints between the thighs and the lower back of the saddle of the bird, and
cutting along the backbone of the lower back of the saddle of the bird.

### 5,015,214
### COIN FEED-IN APPARATUS FOR COIN HANDLING MACHINE

**Mikio Suzuki, Sakai, Japan, assignor to Laurel Bank Machines Co., Ltd., Tokyo, Japan**
**Filed Sep. 5, 1989, Ser. No. 402,640**
**Claims priority, application Japan, Sep. 6, 1988, 63-117122[U]; Aug. 21, 1989, 1-214703**
**Int. Cl.$^5$ G07D** *1/00*
**U.S. Cl. 453—56** **5 Claims**



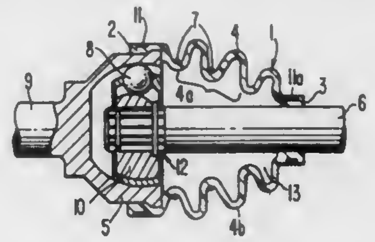
1. A coin feed-in apparatus for a coin handling machine comprising a rotatable disk for receiving coins, guide means having an opening for guiding the coins, which were received by the rotatable disk and moved toward the periphery of the rotatable disk by centrifugal force produced by the rotation of the rotatable disk, by the inner circumference thereof, a coin passage communicating with said opening and having a pair of first and second guide rail means for guiding coins and transporting belt means for transporting the coins, the coins being transported along the first guide rail means disposed on the side of the rotatable disk of the pair of guide rail means, discriminating means for discriminating the denomination, genuineness and the like of coins, counting means for counting the value of deposited coins, sorting means for sorting the coins in accordance with their denominations, the respective discriminating means, the counting means and the sorting means being arranged along said first guide rail means disposed on the side of the rotatable disk, and guide roller means rotatable and disposed upstream of said first guide rail means, said guide means being arranged so that said inner circumference thereof is positioned inside of the periphery of said rotatable disk and said first guide rail means being arranged so as to extend onto said rotatable disk and said transporting belt means being arranged so as to extend upstream of the end of the guide means disposed upstream of said opening with respect o the rotating direction of the rotatable disk and facing said opening.

---

### 5,015,215
### FLEXIBLE BOOT FOR UNIVERSAL JOINTS

**Susumu Uchida, Susono, Japan, assignor to Keeper Co., Ltd., Tokyo and NTN Corporation, Osaka, both of, Japan**
**Continuation of Ser. No. 410,008, Sep. 20, 1989, abandoned, which is a continuation of Ser. No. 236,790, Aug. 26, 1988, abandoned. This application Jun. 7, 1990, Ser. No. 536,953**
**Claims priority, application Japan, Aug. 31, 1987, 62-132726**
**Int. Cl.$^5$ F16D** *3/84*
**U.S. Cl. 464—175** **5 Claims**

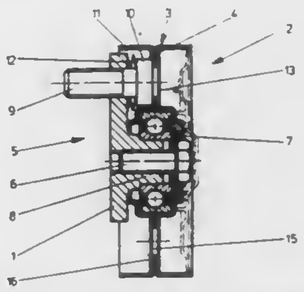
1. A flexible boot for universal joints including a joint body which has an inner ring fixed to one end of a first shaft and an outer ring provided on one end of a second shaft, wherein the boot comprises both ends fixed to said outer ring and to said first shaft, respectively, a bellows portion positioned between said both ends and having at least one alley, and at least one elastic holder ring closely contacted with an outer peripheral surface of said at least one valley, the rigidity to radial deformation of said elastic holder ring being smaller than the rigidity to radial deformation of said bellows portion, so as to prevent acute folding of said valley of the flexible boot.



---

### 5,015,216
### PREMOUNTED TENSIONING DEVICE

**Manfred Brandenstein, Eussenheim; Wolfgang Friedrick, Schweinfurt; Roland Haas, Hofheim, and Gerhard Herrmann, Schweinfurt, all of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany**
**Filed Jul. 14, 1989, Ser. No. 379,872**
**Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824184**
**Int. Cl.$^5$ F16H** *7/08*
**U.S. Cl. 474—101** **5 Claims**



1. A pre-mounted tensioning device comprising, for use with an idler wheel adapted to rotate on a bearing on a base, at least one fastening bolting means mounting said base to a mounting surface, said bolt located in an area between the surface of said idler wheel and said bearing, said surface of said wheel including a recess for allowing access to said bolting means, a spring element coupled between said base and said bolting means and acting on said base, said bolting means, before mounting, resting against said idler wheel surface by way of said spring element.

---

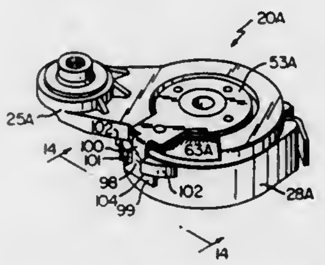
### 5,015,217
### BELT TENSIONER AND METHOD OF MAKING THE SAME

**Dewey D. Henderson, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio**
**Division of Ser. No. 461,149, Jan. 4, 1990, Pat. No. 4,985,010. This application Sep. 11, 1990, Ser. No. 580,693**
**Int. Cl.$^5$ F16H** *7/08*
**U.S. Cl. 474—135** **20 Claims**

1. In a tensioner for a power transmission belt that is adapted to be operated in an endless path, said tensioner comprising a support means for being fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, spring means operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt, said support means comprising a housing means containing said spring means therein, said support means comprising an arm plate means,

VOL
1126
ISS
2
MY
14
1991
UMI

said support means comprising a shaft means interconnecting said arm plate means to said housing means, said belt engaging means comprising an arm rotatably mounted on said shaft means and having a portion disposed intermediate said arm plate means and said housing means so as to be rotatable relative thereto, and a bushing means disposed between said portion of said arm and said arm plate means to facilitate movement therebetween, the improvement wherein said arm plate means has an extension extending around said portion of said arm and being operatively interconnected to said housing means to tend to prevent cocking of said arm on said shaft means when said belt engaging means is tensioning said belt, said housing means and said arm plate means respectively having adjusting means for adjusting the interconnection thereof so as to apply a certain frictional dampening force of said bushing means against said arm through adjustment of said adjusting means so as to tend to frictionally dampen the rotational movement of said arm relative to said arm plate means.



---

## 5,015,218
## TOOTHED PULLEY AND TRANSMISSION RELATED THERETO

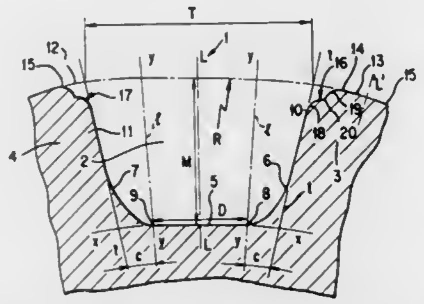
**Vincenzo Macchiarulo, Pescara, and Tommaso Di Giacomo, Guardiagrele, both of Italy, assignors to Pirelli Transmissioni Industriali S.p.A., Milan, Italy**

**Filed Nov. 27, 1989, Ser. No. 441,774**

**Claims priority, application Italy, Nov. 29, 1988, 22771 A/88**

**Int. Cl.⁵ F16G** ***1/28;*** **F16H** ***55/36***

**U.S. Cl. 474—152** **18 Claims**



1. A toothed pulley having a predetermined external circumference defined by a first predetermined circumferential line, said pulley comprising:

a plurality of grooves alternating with a plurality of teeth, each groove being disposed symmetrically with respect to a first central radial line L—L and defined by a base and two extended flanks extending from two initial ends and continuing as far as two final ends located on a second predetermined circumferential line, said second circumferential line having a smaller radius than said first circumferential line, each tooth being disposed symmetrically with respect to a second central radial line L'—L' and formed of a head delimitated by said first circumferential line over a segment contained between two terminal points, each flank having a final end connected by means of a connection to the terminal point of the head of the adjacent tooth, said connection comprising at least a first and a second convex curvilinear segment and a recess, said first and second curvilinear segments respectively being tangent to the final end of the flank and to the terminal point of the head respectively.

---

## 5,015,219
## ROLLER BELT ARRANGEMENT FOR CATERPILLAR TRACK-TYPE VEHICLES

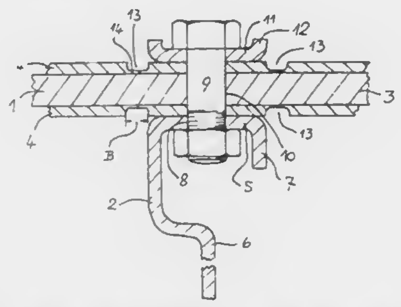
**Arnold Jäger, Gehrbergsweg 6A, D-3167 Burgdorf, Fed. Rep. of Germany**

**Filed Jan. 17, 1990, Ser. No. 466,044**

**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1989, 3901798**

**Int. Cl.⁵ F16G** ***1/00***

**U.S. Cl. 474—204** **10 Claims**



1. In a roller belt arrangement, for a caterpillar track-type vehicle, having two or more inextensible, rotating belts that extend parallel to one another and to which transversely extending gripper means are secured via securing means that pass through said belts, whereby on an inner side of said belts remote from said gripper means said securing means act upon said inner side of said belts via contact elements, with said belts each comprising an inextensible core that is disposed between two protective cover layers that are secured thereto, the improvement wherein: in the vicinity of lateral edges of at least one of said gripper means and said contact elements, said cover layers are provided with notches that extend along said lateral edges.

---

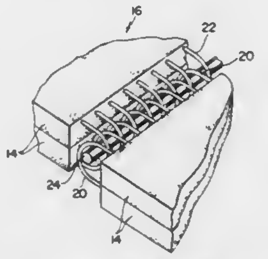
## 5,015,220
## SEAM FOR WORK FABRIC AND METHOD OF MANUFACTURE THEREOF

**Robert W. Legge, West Bridgewater, and William O. Hocking, Jr., Foxboro, both of Mass., assignors to Tamfelt, Inc., Canton, Mass.**

**Continuation-in-part of Ser. No. 227,884, Aug. 3, 1988, Pat. No. 4,911,683. This application Mar. 19, 1990, Ser. No. 503,469**

**Int. Cl.⁵ F16G** ***3/00;*** **B65G** ***15/30***

**U.S. Cl. 474—256** **6 Claims**



1. A work fabric including an endless body having opposed end portions that are defined by the collapsing of said fabric body upon itself, opposed interior surfaces of said fabric body thereby being disposed in abutting relation throughout said fabric body and said collapsed fabric body having oppositely disposed exterior surfaces, said fabric body including a plurality of parallel yarns that extend in a longitudinal direction and a plurality of cross yarns that extend in a transverse direction with respect to said longitudinal direction yarns, transverse openings being formed in one of said exterior surfaces in offset relation with respect to said opposed end portions of said fabric body by inserting therein additional enlarged specified cross yarns that are disposed in perpendicular relation with respect to said longitudinal direction yarns and then withdrawing said specified cross yarns from the inserted position thereof, said collapsed fabric body being folded such that the transverse openings as formed in said one exterior surface of said fabric body are disposed in adjacent relation, the offset relation of the openings as formed in said one exterior surface of said fabric body relative to the opposed end portions compensating for the difference in the longitudinal dimension of the oppositely disposed exterior surfaces of the fabric body as a result of the folding of the fabric body, and pin means extending through said transverse openings for interconnecting said opposed and adjacent end portions, thereby forming the woven fabric body in an endless double layer construction.

---

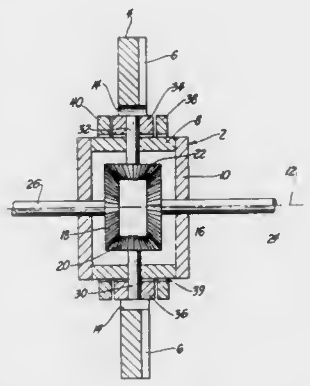
## 5,015,221
## DIFFERENTIAL STEERING MECHANISM

**Roger R. Smith, 7261 Lyons Rd., Imlay City, Mich. 48444**

**Filed Jun. 18, 1990, Ser. No. 539,943**

**Int. Cl.⁵ F16H** ***1/44.5***

**U.S. Cl. 475—19** **8 Claims**



1. A mechanism for delivering a higher speed rotational power output to one drive train member than to another drive train member, the mechanism comprising:

a cylindrical body having a first rotational axis;
a power input gear fixed to the cylindrical body;
output shafts extending along the first rotational axis from cylindrical body, the output shafts rotatable about the first rotational axis;
one output gear attached to one of the output shafts and another output gear attached to the other of the output shafts;
a pinion gear meshing with both the one output gear and the other output gear;
a pinion shaft fixed to the pinion gear;
a rotor outside the cylindrical body attached to the pinion shaft;
bearing rings positioned on the cylindrical body;
selectively actuatable means for forcing one of the bearing rings into engagement with the rotor.

---

## 5,015,222
## SPIRAL PAPER FOLDING MACHINE WITH AUTOMATIC CHANGE GEAR ADJUSTMENT

**Earnest B. Bunch, III, Glendale, Ariz., assignor to B. Bunch Company, Inc., Phoenix, Ariz.**

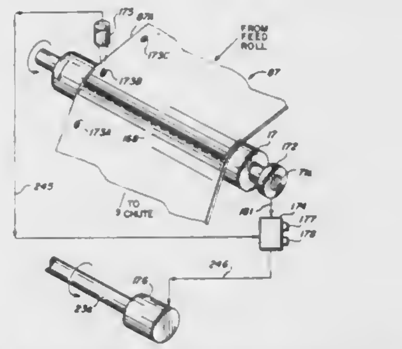
**Filed Jan. 10, 1989, Ser. No. 462,766**

**Int. Cl.⁵ B65H** ***45/105***

**U.S. Cl. 493—11** **7 Claims**

1. In combination with apparatus for producing continuous form stationery by folding a strip of paper along transverse lines of weakening formed therein while said strip of paper moves along a path of travel through said apparatus, said apparatus including

a frame,
oscillating guide means mounted on said frame for alternately distributing successive ones of said lines of weakening in said strip of paper in substantially opposite directions,
dispensing means for feeding said strip of said paper into said guide means at a predetermined velocity,
folding means carried on said frame and operatively associated with said oscillating guide means for urging said strip of paper distributed by said guide means into a folded condition,
gear train means for transmitting motive power to actuate said oscillating guide means and said folding means,
a drive shaft for transmitting motive power to said gear train means actuating said oscillating guide means and folding means,
means for transmitting motive power to said dispensing means,
power means to drive said means for transmitting motive power to said dispensing means,
said guide means, feeding means and folding means moving in synchronous relationship during the operation of said apparatus,



the improvement comprising means for rotating said drive shaft at a selected number of revolutions per minute in relation to said velocity at which said dispensing means feeds said strip of paper into said oscillating guide means and in relation to the fold length from one of said lines of weakening to another of said lines of weakening immediately succeeding said one of said folded lines of weakening, said drive shaft rotating means including

(a) sensor means for determining said velocity at which said dispensing means feeds said strip of paper into said oscillating guide means and for generating paper velocity signals representing the velocity in units of length per unit of time of said strip of paper directed into said oscillating guide means;
(b) motor means connected to said drive shaft and responsive to said paper velocity signals to
  (i) provide, independently of said means for transmitting motive power to said dispensing means, the motive power to rotate said drive shaft a selected number of revolutions each time said dispensing means dispenses a portion of said strip of paper having said fold length,
  (ii) maintain the synchronous relation between said feed roller and said papei distribution means, and
  (iii) cause said oscillating guide means to oscillate a selected number of times each time said guide means distributes a portion of said strip of paper having said fold length,
  said motor means including
  (iv) a first mode of operation to rotate said shaft at a first RPM with respect to said velocity of said strip of paper

VOL
1126
ISS
2
MY
14
1991
UMI

to fold said strip of paper along said lines of weakening into sections each having a first fold length,

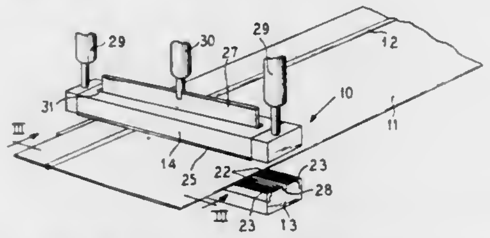
(v) a second mode of operation to rotate said shaft at a second RPM with respect to said velocity of said strip of paper to fold said strip of paper along said lines of weakening into sections each having a second fold length, said first RPM differing from said second RPM, said first fold length differing from said second fold length; and,

(c) control means to operate said motor means in either of said first and second modes of operation, said control means operating said motor in said first mode of operation by rotating with said motor means said shaft at said first RPM, said control means operating said motor in said second mode of operation by rotating with said motor means said shaft at said second RPM.

---

### 5,015,223
### HOTSEAL JAWS AND CUTOFF KNIFE ASSEMBLY FOR PROCESSING THERMOPLASTIC FILM BAG MAKING MATERIAL

**Hugo Boeckmann, Arlington Heights, Ill., assignor to Zip-Pak, Incorporated, Northbrook, Ill.**
**Filed Dec. 6, 1989, Ser. No. 446,804**
**Int. Cl.⁵ B31B** *23/16, 23/64*
U.S. Cl. 493—194 6 Claims



1. A hotseal jaw and cutoff knife assembly for cutting individual bags from a continuous length and simultaneously seaming the edges of adjacent bags of a thermoplastic film having a pressure reclosable rib and groove zipper extending across the top of the bags, comprising in combination:

complementary first and second opposed jaws extending laterally of continuous longitudinally extending multilayered bag material having a continuous longitudinally extending zipper thereon and said film bag material being fed between the jaws so that the jaws can be brought together at spaced intervals along the bag material to form side seams on adjacent bags and sever the bags intermediate said seams;

the first jaw having a planar pressure pad of a resilient material and having a central opening extending parallel to the jaw;

a cutter knife reciprocal in said opening to move toward the second jaw to cut the material held between the jaws;

the second jaw having a roughened rigid planar face parallel to the face of the first jaw to firmly lock slippery film material therebetween;

heater means for heating the second jaw in its entirety;

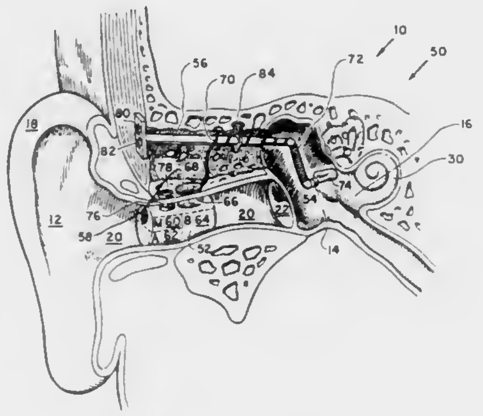
and a lateral extending slot in the second jaw aligned with the slot in the first jaw having a strip of heat resistant rubber therein providing an anvil against which the knife moves for cutting the material as the jaws clamp and seal the layers of material to form side seams for adjacent bags separated by said knife;

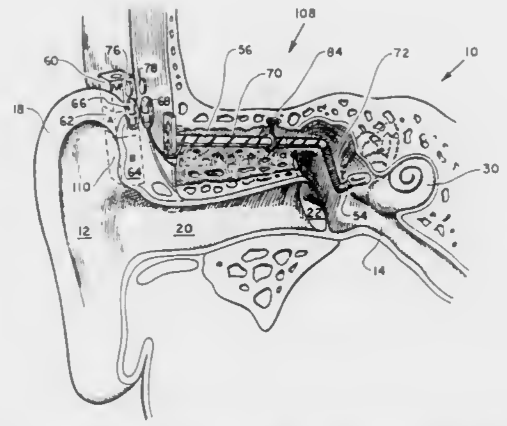
said face pad and said roughened face accommodating and holding the thickness of said zipper preventing leaking between the material layers sealed together at the zipper.

---

### 5,015,224
### PARTIALLY IMPLANTABLE HEARING AID DEVICE

**Anthony J. Maniglia, 14450 County Line Rd., Hunting Valley, Ohio 44022**
**Division of Ser. No. 258,788, Oct. 17, 1988, Pat. No. 4,957,478. This application Aug. 17, 1990, Ser. No. 568,841**
**Int. Cl.⁵ H04R** *25/00*
U.S. Cl. 600—25 20 Claims





1. A partially implantable hearing device, comprising:

a replaceable outer ear canal unit, having means for generating radio frequency waves responsive to acoustic energy received by the unit, and adapted to be located inside an outer ear canal of an ear;

means for holding said replaceable outer ear canal unit in a selected position in the outer ear canal;

an implanted means for generating a first magnetic field responsive to said radio frequency waves, wherein said means for generating the first magnetic field comprises an internal induction coil implanted under the skin in the outer ear canal wall for transcutaneously receiving said radio frequency waves from said radio frequency waves generating means, an electromagnetic driving coil connected to said internal induction coil for generating said first magnetic field responsive to said radio frequency waves, and means for positioning said electromagnetic driving coil adjacent to and at a distance from an implanted magnet securely attached to the location on the bone in the ossicular chain in the ear;

the implanted magnet having a second magnetic field located adjacent to said electromagnetic driving coil at a distance sufficient to permit the first and second magnetic field to interact with each other to cause the magnet to vibrate in a manner responsive to the acoustic energy received by the unit; and

means for securely attaching the implanted magnet to a location on a bone in the ossicular chain in the ear.

19. A partially implantable hearing device, comprising:

a replaceable hidden external unit, having means for generating radio frequency waves responsive to acoustic energy received by the unit, and adapted to be located externally and medially to an upper portion of a pinna of an ear;

means for holding said replaceable hidden external unit in a selected external position located medically near the upper portion of the pinna of the ear;

an implanted means for generating a first magnetic field responsive to said radio frequency waves, wherein said means for generating the first magnetic field comprises an internal induction coil implanted under a retroauricular skin behind the ear for transcutaneously receiving said radio frequency waves from said radio frequency waves generating means, an electromagnetic driving coil connected to said internal induction coil for generating said first magnetic field responsive to said radio frequency waves, and means for positioning said electromagnetic driving coil adjacent to and at a distance from an implanted magnet securely attached to the location on the bone in the ossicular chain in the ear;

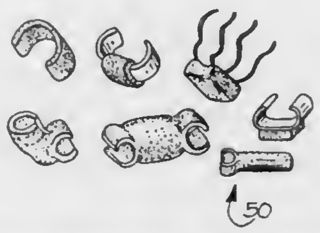
the implanted magnet, having a second magnetic field, located adjacent to said electromagnetic driving coil at a distance sufficient to permit the first and second magnetic field to interact with each other to cause the magnet to vibrate in a manner responsive to the acoustic energy received by the unit; and

means for securely attaching the implanted magnet to a location on a bone in the ossicular chain in the ear.

---

### 5,015,225
### IMPLANTABLE ELECTROMAGNETIC MIDDLE-EAR BONE-CONDUCTION HEARING AID DEVICE

**Jack V. D. Hough, Yukon; Kenneth J. Dormer, Edmond, both of Okla.; Kenneth E. Barton, Jr., and Robert Y. Chow, both of Jacksonville, Fla., assignors to Xomed, Inc., Jacksonville, Fla.**
**Continuation of Ser. No. 898,050, Aug. 18, 1986, Pat. No. 4,776,322, which is a continuation-in-part of Ser. No. 736,766, May 22, 1985, Pat. No. 4,606,329. This application Mar. 17, 1988, Ser. No. 169,312**
**The portion of the term of this patent subsequent to Oct. 11, 2005, has been disclaimed.**
**Int. Cl.⁵ H04R** *25/00*
U.S. Cl. 600—25 10 Claims



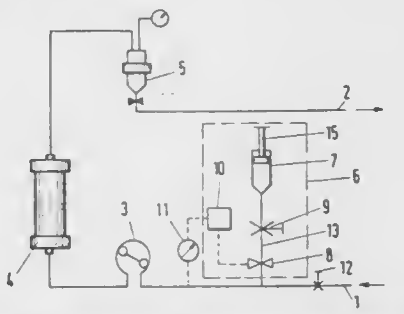
1. A prosthesis adapted for being implanted in the ossicular chain of the middle ear of a hearing impaired user comprising

a body member composed of biocompatible magnetic material, and having structural means, which is shaped to be adapted to at least partially surround one or more of the small bones of the ossicular chain, for mechanically securing the body member entirely in the middle ear of the user and in contact with or as a replacement for one or more of the small bones of the ossicular chain, such that said body member is adapted for receiving an electromagnetic signal converted from sound by a sound processing means which is positioned outside of the middle-ear of the user and so that no components pass through the boundary of the middle ear of the user, and with said magnetic material serving to vibrate the ossicular chain in response to such electromagnetic signal to stimulate the inner ear to create the perception of sound in the user.

---

### 5,015,226
### APPARATUS FOR INFUSION OF MEDICAMENTS

**Hans-Dietrich Polaschegg, Grünwiesenweg, Fed. Rep. of Germany, assignor to Fresenius AG, Fed. Rep. of Germany**
**Filed Oct. 30, 1989, Ser. No. 428,811**
**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1988, 3837298**
**Int. Cl.⁵ A61M** *37/00*
U.S. Cl. 604—4 6 Claims

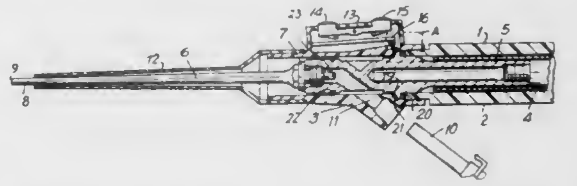


1. Apparatus for infusion of medicaments, in particular heparin, into the partial vacuum region of an extracorporeal blood circuit, in particular an extracorporeal blood circuit of a dialysis apparatus, comprising a supply container for the medicaments and a feed conduit from the supply container to the extracorporeal blood circuit, characterized by a shutoff member arranged in the feed conduit, a pressure measuring means for measuring the partial vacuum in the extracorporeal blood circuit and a control means which is connected to the pressure measuring means and the shutoff member and is constructed for periodic opening and closing of the shutoff member in dependence upon the measured partial vacuum and the desired medicament amount.

---

### 5,015,227
### APPARATUS FOR PROVIDING ENHANCED TISSUE FRAGMENTATION AND/OR HEMOSTASIS

**Alan Broadwin, Brooklyn, N.Y.; Joseph N. Logan, Trumbull, Conn., and Peter J. Kuhl, Queens, N.Y., assignors to Valleylab Inc., Boulder, Colo.**
**Continuation-in-part of Ser. No. 103,022, Sep. 30, 1987, Pat. No. 4,931,047. This application Apr. 3, 1990, Ser. No. 504,453**
**Int. Cl.⁵ A61B** *17/32, 17/39*
U.S. Cl. 604—22 4 Claims

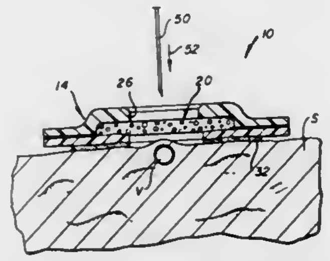


1. In a surgical apparatus for performing one or more surgical procedures at a surgical site on a patient comprising: a handpiece; a tool supported by said hand-piece; said tool having a vibrating tool tip; vibrating means including a metal connecting member for ultrasonically vibrating said tool tip; and RF current means selectively operable for providing an RF current to said tool tip for allowing performance of an electrosurgical procedure at the surgical site; said RF current means including switching means for switching the RF current provided to said tool tip to at least an RF cutting current during ultrasonic vibration, the improvement wherein said switching means comprises a switch module for selecting said RF current, an electrically conducting metal band connected to said switch module and an electrically conductive O-ring around said connecting member and in electrical contact with said metal band.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,228
## STERILIZING DRESSING DEVICE AND METHOD FOR SKIN PUNCTURE

**Richard L. Columbus, and Thomas R. Kissel, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Division of Ser. No. 361,473, Jun. 5, 1989, Pat. No. 4,988,341.**
**This application Oct. 4, 1990, Ser. No. 592,436**
**Int. Cl.$^5$ A61M** *31/00;* **A61F** *13/00, 13/02*
U.S. Cl. 604—51 **3 Claims**

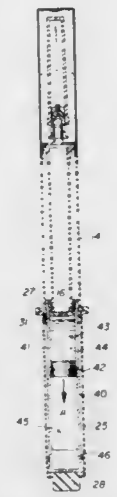


1. A method of injecting liquid into, or removing liquid from, a site on a live host body, said method comprising
  (a) positioning a transparent, puncturable, resealable gel medium containing a sterilizing agent preincorporated therein to cover said site, said medium having adhesive at least partially surrounding it and positioned to temporarily hold said medium on said host body;
  (b) contacting said body site with the medium and adhesive; and
  (c) inserting a needle into the host body by injecting the needle first through said medium so as to contact said sterilizing agent;
  whereby sterility of the needle is insured.

---

### 5,015,229
## DEVICE FOR DISPENSING LIQUIDS

**Gabriel Meyer, and Ernst Howald, both of Vesenaz, Switzerland, assignors to Medicorp Holding S.A., Luxembourg**
**PCT No. PCT/EP88/01027, § 371 Date Jul. 28, 1989, § 102(e) Date Jul. 28, 1989, PCT Pub. No. WO89/04679, PCT Pub. Date Jun. 1, 1989**
**PCT Filed Nov. 12, 1988, Ser. No. 392,538**
**Claims priority, application Switzerland, Nov. 16, 1987, 4448/87**
**Int. Cl.$^5$ A61M** *5/28*
U.S. Cl. 604—90 **12 Claims**

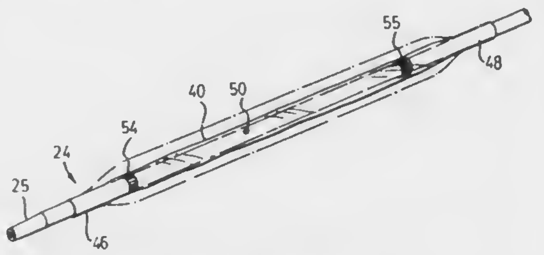


1. A device, for distributing a liquid medical product, comprising an elongated reservoir being open at one end and being closed at an opposite end thereof, the reservoir having substantially cylindrical side walls and a neck of reduced cross-section adjacent the open end, the reservoir being suitable for containing at least one liquid to be distributed by the device; distribution means, movable with respect to the reservoir, for distributing the liquid from the reservoir along an axial channel thereof to a dispensing element located remote from the reservoir, said distribution means comprising movable stopper means, at least partially engaging the neck of the reservoir, for sealing the open end of the reservoir when the device is in a storage position, and a radial channel communicating with the axial channel and located adjacent said stopper means remote from the closed end, said radial channel being closed by said stopper means when the device is in a storage position and communicating with the reservoir when the device is in an activated position to allow the flow of liquid from the reservoir to the dispensing element via the axial channel; a capsule, attached to the distribution means, engaging the open end of the reservoir; and a barrel, surmounting the reservoir, provided with inviolability means for keeping the barrel firmly attached to the capsule during storage; characterised in that said barrel is provided with a push button located to push against a portion of the closed end of the reservoir in such a way that the closed end of the reservoir moved toward said stopper means and the device passes from its storage position to its activated position, and said push button moves axially with respect to said barrel.

---

### 5,015,230
## ANGIOPLASTY CATHETER WITH SPIRAL BALLOON

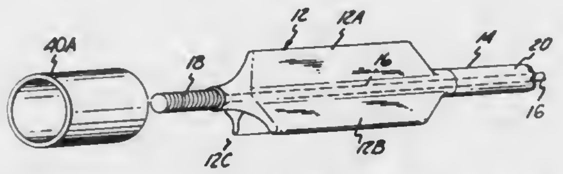
**Geoffrey S. Martin, and Anand Ram, both of Mississauga, Canada, assignors to Vas-Cath Incorporated, Mississauga, Canada**
**Filed Jan. 30, 1990, Ser. No. 472,007**
**Claims priority, application Canada, Jan. 30, 1989, 589510**
**Int. Cl.$^5$ A61M** *29/00*
U.S. Cl. 604—96 **8 Claims**



1. An angioplasty catheter comprising:
an elongate tubular main body having proximal and distal ends and including a fluid supply lumen extending longitudinally, and a side opening in the main body adjacent the distal end, the lumen terminating at the side opening;
a balloon of non-elastomeric material having ends spaced apart and attached at the ends of the balloon to the main body with one of the ends adjacent said distal end and the balloon containing the side opening, the balloon being twisted spirally between said ends of the balloon to store the balloon close to the main body in a collapsed condition; and
the main body being resiliently deformable within the balloon when the balloon is inflated to thereby store torsional energy in the main body for use in returning the balloon to the collapsed condition during deflation of the balloon.

### 5,015,231
## MULTIPART SPLIT SLEEVE BALLOON PROTECTOR FOR DILATATION CATHETER

**Peter T. Keith, Edina, and Charles L. Euteneuer, St. Michael, both of Minn., assignors to SciMed Life Systems, Inc., Maple Grove, Minn.**
**Filed Apr. 21, 1989, Ser. No. 341,931**
**Int. Cl.$^5$ A61M** *29/00*
U.S. Cl. 604—96 **65 Claims**

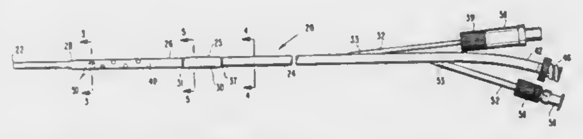


1. A balloon protector for a balloon catheter having a balloon positioned adjacent a distal end, the balloon protector comprising:
an inner sleeve having an interior for receiving the balloon; and
an outer sleeve having an interior for receiving the inner sleeve, the interior of the outer sleeve being sized smaller than an exterior of the inner sleeve, such that the outer sleeve applies a radially inward compressive force to the inner sleeve and the balloon when the outer sleeve is applied over the inner sleeve.

---

### 5,015,232
## DECOMPRESSION ENTEROCLYSIS BALLOON CATHETER

**Dean D. T. Maglinte, Zionsville, Ind., assignor to Cook Incorporated, Bloomington, Ind.**
**Filed Apr. 20, 1989, Ser. No. 340,922**
**Int. Cl.$^5$ A61M** *25/00*
U.S. Cl. 604—96 **13 Claims**



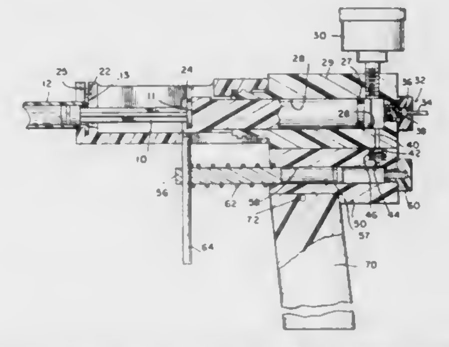
1. A catheter comprising:
an elongated flexible tube having a closed distal end;
a first passage running internally of said flexible tube, said first passage having lateral ports opening outwardly through said flexible tube; and,
a second passage disposed side by side said first passage internally of said flexible tube, said second passage having lateral ports opening inwardly of said flexible tube and which ports are longitudinally aligned with the outwardly opening ports of said first passage;
wherein the internally opening lateral ports of said second passage are aligned two at a time with the outwardly opening side ports of said first passage.

---

### 5,015,233
## PNEUMATIC INFLATION DEVICE

**Jeffrey D. McGough, Spencer, and Gail L. Brinson, Ellettsville, both of Ind., assignors to Freedom Machine, Inc., Ellettsville, Ind.**
**Filed Apr. 17, 1989, Ser. No. 338,741**
**Int. Cl.$^5$ A61M** *5/30*
U.S. Cl. 604—97 **8 Claims**

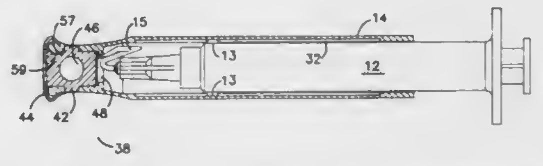
1. A driver for a syringe having a syringe barrel and a syringe plunger, said driver comprising
barrel holding means for holding said syringe barrel,
plunger holding means for holding said syringe plunger at least partially within said syringe barrel, the plunger holding means being movable with respect to the barrel holding means,
a pneumatic driver including a drive piston positioned at least partially in a drive piston chamber defined by a drive piston chamber body, with said drive piston being connected to said plunger holding means, and
pumping means for repeatedly pumping air into the drive piston chamber through a pneumatic passage containing a unidirectional valve that only permits airflow from said pumping means into the drive piston chamber, the pumping means including a manually driven element situated for reciprocating movement in a chamber connected to the pneumatic passage to transiently increase pneumatic pressure in the pneumatic passage and open the unidirectional valve.



---

### 5,015,234
## SYRINGE GUARD APPARATUS

**Robert G. Jullien, 2904 Graham Rd., Falls Church, Va. 22042**
**Filed Jun. 2, 1989, Ser. No. 360,585**
**Int. Cl.$^5$ A61M** *5/00*
U.S. Cl. 604—110 **8 Claims**



1. An assembly adapted for injecting or drawing fluid into or from a surface, said assembly comprising:
a barrel portion for containing fluid, said barrel being equipped with a needle on an end thereof, said needle being adapted to pass fluid contained in said barrel into or from said substrate;
tubular guard means telescopically related to and surrounding the end of said barrel equipped with said needle, said guard means having first and second ends and being adapted to telescope along said barrel between a first extended position, and a second retracted position; and,
end-piece means mounted on a first end of said guard means, said end-piece capable of being oriented in first and second positions, said first position allowing passage of said needle through said first end of said guard when said guard is moved to said retracted position, said second position of said end-piece means blocking passage of said needle through said first end of said guard means, and enabling positive destruction of said needle when said guard is moved to said retracted position, wherein
said end piece comprises a rotatable insert mounted for rotation about an axis within said first end of said guard, said axis being transverse with respect to the direction of said needle, said wheel member including an aperture therethrough transverse to said axis, said aperture being approximately aligned with said needle when said rotatable insert is oriented in said first position, and not aligned

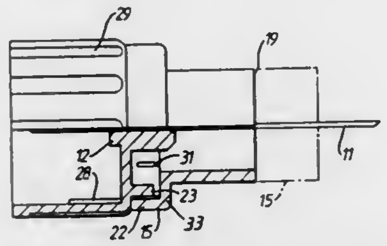
VOL
1126
ISS
2
MY
14
1991
UMI

with said needle when said rotatable insert is in said second position.

---

### 5,015,235
### SYRINGE NEEDLE COMBINATION

**David D. Crossman, Watlington, England, assignor to National Carpet Equipment, Inc., Maple Grove, Minn.**
**Continuation of Ser. No. 153,066, Feb. 8, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,438**
**Claims priority, application United Kingdom, Feb. 20, 1987, 870427**
**Int. Cl.$^5$ A61M** *5/00*
**U.S. Cl. 604—117** **5 Claims**

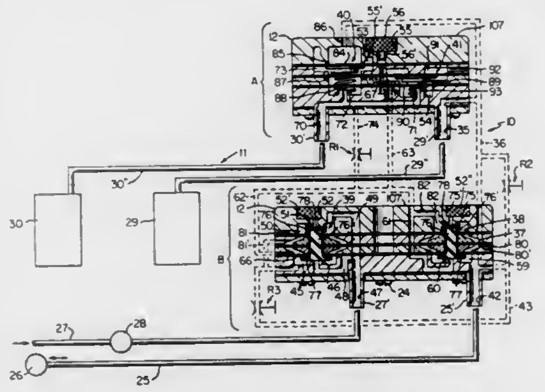


1. A method of injecting a substance into a patient, the method comprising:
(a) providing a needle combination including a needle for a syringe, a hub containing a boss carrying the needle, a depth adjuster and a cover which fits over the boss on the hub and defines an enclosure for the needle;
(b) removably fitting the depth adjuster on the hub, so as to set the degree of penetration of the needle in the patient;
(c) removing the cover;
(d) inserting the needle into the patient; and
(e) injecting the substance through the needle.

---

### 5,015,236
### INTERMITTENT PATIENT SUCTION SYSTEM, SELF-CONTAINED CONTROL DEVICE THEREFOR AND METHODS OF MAKING THE SAME

**Jay L. Lewis, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.**
**Continuation-in-part of Ser. No. 296,499, Jan. 1, 1989, abandoned. This application Nov. 13, 1989, Ser. No. 434,792**
**Int. Cl.$^5$ A61M** *1/00*
**U.S. Cl. 604—120** **9 Claims**

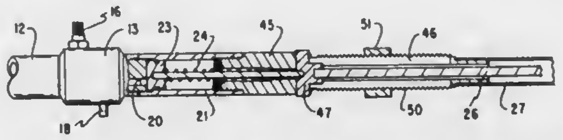


1. In an intermittent suction system having output means for alternately applying a vacuum and atmospheric pressure to a patient for removing fluids from said patient and wherein said system includes a vacuum source and first and second container means adapted to be interconnected to operating means of a self-contained control device and to said source and said mospheric pressure by said operating means of said control ice that is adapted to apply said vacuum through said output means to said patient in response to a vacuum condition of said first container means and to apply said atmospheric pressure through said output means to said patient in response to a vacuum condition in said second container means, said cooperating means of said control device having means for always interconnecting said vacuum through said output means to said patient when said vacuum condition in said first container means is a certain percentage of the vacuum condition of said source regardless of the vacuum value of said source so as to prevent any adverse interruption in said system during the use thereof for said patient should the vacuum level of said source fall to an undesirable level, said control device having a housing means that comprises a plurality of plates disposed in stacked relation so that two of said plates define outer plates and the remainder of said plates define inner plates, and two restrictor means for respectively controlling the "on" time and "off" time that said control device applies said vacuum and does not apply said vacuum through said output means to said patient, the improvement wherein said restrictor means are disposed in said housing means of said control device and are carried solely by one of said inner plates thereof.

---

### 5,015,237
### PNEUMATIC POWERED ANIMAL INJECTOR

**Henry Kleinwolterink, Jr., and Dixon G. Granstra, both of Sheldon, Iowa, assignors to Poke, Inc., Sheldon, Iowa**
**Filed Nov. 13, 1989, Ser. No. 435,252**
**Int. Cl.$^5$ A61M** *37/00*
**U.S. Cl. 604—143** **3 Claims**



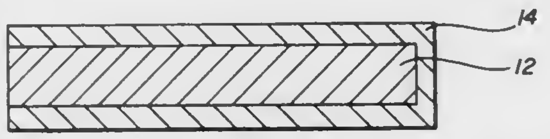
1. A device for vaccinating animals comprising wand means, a supply source of compressed gas attached to one end of said wand means, a pneumatic device having a cylinder and piston assembly attached to said wand means adjacent said supply source; said supply source being connected with said cylinder for transmissions of pneumatic pressure. valve means on said wand means between said supply source and said cylinder, hypodermic injection means attached to the end of said wand means opposite said supply source, said injection means including a piston rod on said piston, striker means on said piston rod, said wand means being formed to provide a slot over a portion of its length, said striker means being slidably journalled in said slot, whereby said pneumatic device operates said injection means, and abutment means adjustably mounted on said wand means adjacent said slot whereby adjustment of said abutment means controls the length of travel of said striker means and therefore of said piston.

---

### 5,015,238
### EXPANDABLE OBTURATOR AND CATHETER ASSEMBLY INCLUDING SAME

**Donald D. Solomon, Spring Valley; Mutlu Karakelle, Dayton, and Richard W. Beck, Centerville, all of Ohio, assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.**
**Continuation of Ser. No. 369,430, Jun. 21, 1989, abandoned. This application Sep. 20, 1989, Ser. No. 409,856**
**Int. Cl.$^5$ A61M** *5/00*
**U.S. Cl. 604—164** **24 Claims**

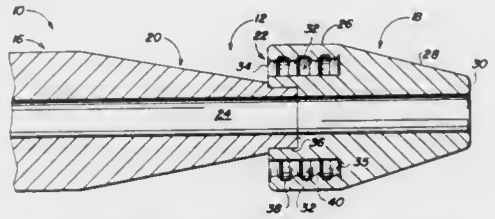
1. An obturator comprising a substantially nonhydrophilic polymeric rod coated with an adhering substantially hydrophilic polyurethane having a medicinal agent bulk distributed therein said polyurethane being capable of absorbing a liquid, releasing said medicinal agent and expanding to form a seal when the coated rod is inserted into a catheter.



---

### 5,015,239
### SHEATH INTRODUCER APPARATUS

**Kevin F. Browne, 1030 Lake Hollilngsworth Dr., Lakeland, Fla. 33803**
**Filed Mar. 22, 1989, Ser. No. 327,089**
**Int. Cl.$^5$ A61M** *5/178*
**U.S. Cl. 604—166** **11 Claims**



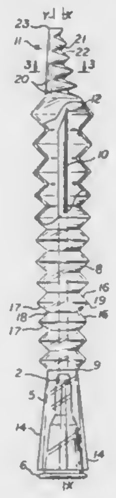
1. A sheath introducer, comprising in combination:
an intruder including a body portion, a neck portion and a head, said body portion and said head comprising a substantially cylindrical design of substantially same diameter, said neck portion being positioned between said body portion and said head and including a diameter less than that of said head, said neck portion comprises a forwardly converging frusto-conical configuration defining a vertical wall between said neck portion and said head;
an expandable and contractible sheath, said sheath being configured and dimensioned to be slid over said body portion of said introducer at least up to said vertical wall and at least a distal tip of said sheath being contracted to be said in position, whereby said head protects said distal tip of said sheath from damage from said sheath introducer introduces said sheath into subcutaneous tissue and whereby said sheath may then be expanded to allow removal of said introducer leaving said sheath in the subcutaneous tissue; and
comprising an annular blind slot formed circumferentially therein having an opened end extending through said wall allowing said tip of said sheath to be contracted and positioned therein for protection from damage by said head.

---

### 5,015,240
### HYPODERMIC NEEDLE SHIELD

**Zoltan Soproni, and Joseph A. Charmasson, both of San Diego, Calif., assignors to Ian Campbell Cree, Shelburne, Canada**
**Filed May 1, 1990, Ser. No. 517,326**
**Int. Cl.$^5$ A61M** *5/32*
**U.S. Cl. 604—192** **9 Claims**

1. In combination with an injecting needle having a rigid cannula extending from a coaxial hub for connecting to the outlet of a syringe or the like to a pointed distal tip, a retractable sheath which comprises:
a hollow base shaped and dimensioned to intimately engage over the hub;
a sleeve extending coaxially from the base around the length of the cannula, said sleeve being formed by a plurality of alternately inverted frusto-conical segments joined by resiliently pliable alternating inner and outer ring sections;
wherein said alternately inverted frusto-conical segments and ring sections are integrally molded from a common resilient material; and

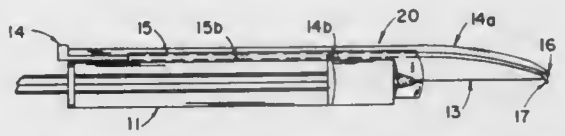


wherein said sleeve comprises an end portion having a substantially lesser cross-sectional diameter than the major part of the sleeve.

---

### 5,015,241
### SAFETY SYSTEM FOR HYPODERMIC SYRINGE AND NEEDLE

**Michael P. Feimer, 13627 Hascall, Omaha, Nebr. 68114**
**Continuation-in-part of Ser. No. 208,682, Jun. 20, 1988, Pat. No. 4,915,696. This application Feb. 26, 1990, Ser. No. 484,504**
**Int. Cl.$^5$ A61M** *5/32*
**U.S. Cl. 604—198** **2 Claims**



1. A system for securing a hypodermic syringe and needle after use, to prevent accidental pricking of patients or medical professionals, etc., and to prevent unintended leakage of fluid from the syringe portion of the hypodermic through a needle comprising in combination with a hypodermic syringe barrel, an assembly, which assembly comprises a needle, a guide, and means for attachment to the hypodermic syringe barrel; which guide provides an internal space into which a needle securing plunger can slide; which needle securing plunger, at the syringe end, thereof, has a head portion suitable for application of pressure by a user's thumb or finger, etc., followed by, as the length of the needle securing plunger is transversed, a tapering width dimension, which width dimension, becomes a smaller constant width as one follows the needle securing plunger toward the distal needle end thereof, which constant width is slightly smaller than the width of the space in the guide so that the needle securing plunger can slide into said guide; which guide and needle securing plunger further comprise teeth on the outer side of the needle securing plunger and on the inner side of the guide so that when the needle securing plunger is slid into the guide the teeth thereon move past the teeth in the guide, so that the needle securing plunger will not thereafter easily slide back out of the guide; which needle securing plunger further comprises, at the distal end thereof, a needle pocket on the bottom side thereof and a "v" shaped needle guide structure as viewed from the top or bottom of the needle guide structure; and which needle securing plunger is con-

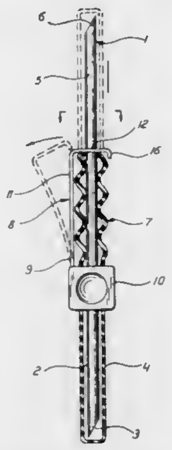
VOL
1126
ISS
2
MY
14
1991
UMI

structed so as to have a natural spring or tendency to curve toward the needle as the needle securing plunger is caused to move through the guide when pressure is applied to the head of the needle securing plunger, so that the needle pocket will naturally move to encompass the needle point as the needle securing plunger is caused to move as just described.

---

### 5,015,242
### MEDICAL NEEDLE UNIT

**Milton D. Heifetz, 704 N. Bedford Dr., Beverly Hills, Calif. 90210**
**Filed Jun. 12, 1989, Ser. No. 364,177**
**Int. Cl.$^5$ A61M** *5/32*
**U.S. Cl. 604—198** **14 Claims**



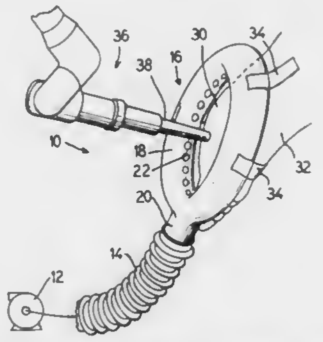
1. A medical needle unit, comprising:
a needle having a tip and insertable in and withdrawable from the body of a patient;
a protective element for preventing accidental puncture by said tip of said needle after the withdrawal of said needle from the body, said protective element being elastic and hood-shaped and also being formed so that before the withdrawal of said needle from the body said protective element surrounds said needle and is compressed to assume an accordion shape and to expose said tip of said needle, and after the withdrawal of said needle from the body said previously compressed protective element automatically expands and covers said tip of said needle;
means for retaining said protective element in its compressed position, said retaining means being arranged to cooperate with said protective element and actuatable so as to release the retention of said protective element after the withdrawal of said needle from the body, said retaining means including a retaining element which has one end remote from said tip of said needle and immovable relative to the latter, and another end closer to said tip of said needle and engaging said protective element in its compressed position to retain said protective element in said compressed position.

---

### 5,015,243
### MEANS FOR REMOVING SMOKE FROM A OPERATIVE SITE

**Michael Schifano, 2364 Mohawk, Glenview, Ill. 60025**
**Filed Jun. 30, 1989, Ser. No. 373,566**
**Int. Cl.$^5$ A61M** *1/00*
**U.S. Cl. 604—315** **19 Claims**

1. An apparatus for removing smoke from an operative site, comprising:
(a) pump means for producing a source of vacuum pressure;
(b) head means for distributing the vacuum pressure substantially around a perimeter of the operative site and including an open portion enscribed by said perimeter so as to be operative to permit a surgeon to perform a procedure within the perimeter; and

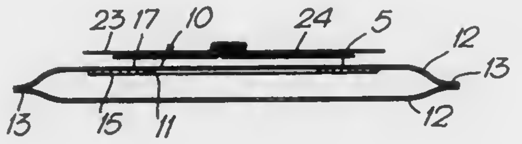


(c) means for coupling the head pressure means to the pump means allowing the head means to remove smoke from about the perimeter of the operative site.

---

### 5,015,244
### ADHESIVE RING ASSEMBLIES FOR COLLECTION BAGS

**David E. Cross, Rustington, England, assignor to Smiths Industries Public Limited Company, London, England**
**Filed Oct. 25, 1989, Ser. No. 426,608**
**Claims priority, application United Kingdom, Nov. 8, 1988, 8826151; Jan. 10, 1989, 8900494**
**Int. Cl.$^5$ A61F** *5/44*
**U.S. Cl. 604—344** **6 Claims**



1. An adhesive ring assembly for a collection bag comprising: a ring; means for securing said ring to said collection bag; an adhesive surface on said ring by which the collection bag is secured to a region around a body waste opening; and two release sheets, each release sheet having a central aperture and being folded substantially in half back on itself across its length to form a first part, an associated second part and a folded edge therebetween, the first parts being releasably adhered to respective different parts of the ring and the second parts being at least as long as the associated first parts so that they overlie the associated first parts and extend to opposite edges of the ring assembly, the said folded edges of the two release sheets lying adjacent one another so that each said sheet can be peeled away from the adhesive surface by pulling the second parts of the sheets from opposite edges of the ring assembly in directions substantially parallel to the ring while the ring assembly is held up to said region around the body waste opening to peel the release sheets away from the ring from the region where the sheets are folded.

### 5,015,245
### DISPOSABLE SANITARY ARTICLES

**Isao Noda, Fairfield, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**
**Filed Apr. 30, 1990, Ser. No. 516,601**
**Int. Cl.$^5$ A61F** *13/15. 13/20;* **D21H** *11/00;* **D21F** *13/00*
**U.S. Cl. 604—367** **11 Claims**

1. An absorbent structure comprising a topsheet, a backsheet, and an absorbent core interposed between said topsheet and backsheet, wherein said backsheet is a paper sheet, or the like, comprising multiple cellulosic fibers and a wet-strength agent which comprises a water-insoluble latex composition comprising the reaction product of a cationic polyamide/-polyamine/epichlorohydrin wet-strength resin and a reactant comprising an unsaturated polymerizable hydrocarbon moiety, said reaction product being co-polymerized with latex-forming polymerizable monomers or oligomers.

---

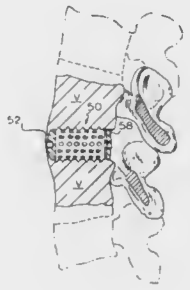
### 5,015,246

**Patent Not Issued For This Number**

---

### 5,015,247
### THREADED SPINAL IMPLANT

**Gary K. Michelson, 438 Sherman Canal, Venice, Calif. 90291**
**Filed Jun. 13, 1988, Ser. No. 205,935**
**Int. Cl.$^5$ A61F** *5/04, 2/44*
**U.S. Cl. 606—61** **9 Claims**

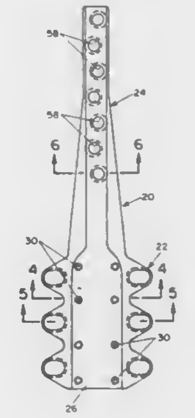


1. A fusion implant comprising a cylindrical member having an outside diameter larger than the space between two adjacent vertebrae to be fused and a series of threads on the exterior of the cylindrical member for engaging said vertebrae to maintain said implant in place, a plurality of openings in the cylindrical surface of said member, said outside diameter of said cylindrical member being substantially uniform over the entire length of the implant.

---

### 5,015,248
### BONE FRACTURE FIXATION DEVICE

**Albert H. Burstein, Stamford, Conn., and Jeffrey S. Bennett, Fort Lee, N.J., assignors to New York Society for the Relief of the Ruptured & Crippled, Maintaining the Hospital for Special Surgery, New York, N.Y.**
**Filed Jun. 11, 1990, Ser. No. 536,172**
**Int. Cl.$^5$ A61F** *5/00*
**U.S. Cl. 606—74** **7 Claims**

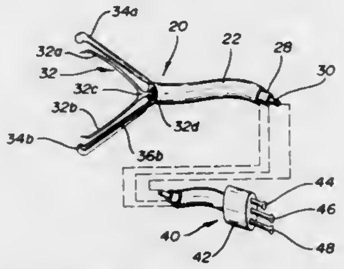


1. A bone fracture fixation device for use in stabilizing a fracture in a portion of a long bone that overlies or is proximate to a prosthetic joint component comprising an elongated fixation plate having a clamp portion including a center region and two side margins, the center region being adapted to be disposed adjacent a lengthwise segment of the bone overlying the implant proximate to the fracture, a multiplicity of spikes projecting from the clamp portion and adapted to penetrate partway into the bone and hold the fixation plate stationary relative to and spaced apart from the bone, at least two screw holes in each side margin of the clamp portion, each of the screw holes in one side margin being arranged transversely substantially opposite a screw hole in the other side margin with respect to the longitudinal axis of the fixation plate to thereby form opposite hole pairs, at least two clamps, each being generally C-shaped and being adapted to embrace partly the bone in a position on the opposite side thereof from the clamp portion of the fixation plate, at least two spikes projecting from each clamp and being adapted to penetrate partway into the bone and hold the clamp stationary relative to and spaced apart from the bone; a threaded hole in each end of each clamp located so as to be in alignment with a hole pair in the fixation plate, and threaded fasteners passing through the screw holes in the fixation plate and into the threaded holes in the clamps and joining the clamps to the fixation plate.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,249
### ENDOSCOPIC STAPLING DEVICE AND METHOD

**Naomi L. Nakao, 303 E. 57th St., New York, N.Y. 10022, and Peter J. Wilk, 185 W. End Ave., New York, N.Y. 10023**
**Filed Dec. 26, 1989, Ser. No. 456,960**
**Int. Cl.$^5$ A61B** *17/00*
**U.S. Cl. 606—142** **35 Claims**



1. A surgical instrument comprising:

an endoscope including an elongate flexible outer tubular member and a biopsy channel extending longitudinally through said tubular member;

an elongate flexible inner tubular member slidably disposed in said biopsy channel;

an elongated flexible rod member slidably disposed inside said inner tubular member;

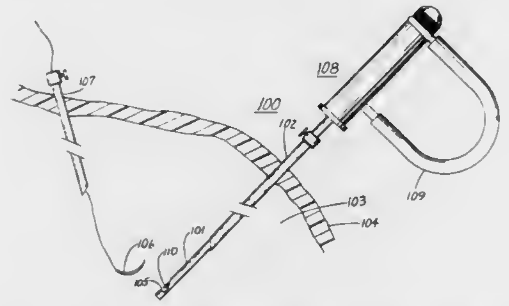
a staple disposed in a closed configuration at least partially inside said inner tubular member distally of a distal end of said rod member; and

means for opening said staple upon an ejection thereof from said inner tubular member by a distally directed motion of said rod member, said staple being provided with means for locking said staple in a closed configuration upon a closing of said staple by a distally directed motion of said inner tubular member subsequent to a distally directed motion of said rod member pushing said staple, in an opened configuration thereof, into or about body tissues to be clamped by said staple.

---

### 5,015,250
### MEDICAL INSTRUMENT FOR DRIVING A SUTURE NEEDLE

**Thomas L. Foster, Poland, Ind., assignor to Vance Products Incorporated, Spencer, Ind.**
**Filed Jan. 12, 1990, Ser. No. 464,347**
**Int. Cl.$^5$ A61B** *17/00*
**U.S. Cl. 606—147** **28 Claims**



1. A medical instrument for driving a suture needle through tissue, comprising:

an elongated member having a longitudinal passageway therein;

a channel capable of receiving said needle and positioned in said elongated member about a distal end thereof and transverse through said passageway;

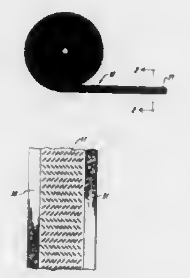
a wedge positioned within said passageway and operable across said channel to secure said needle between said elongated member and said wedge when said needle is positioned in said channel; and

a handle attached about a proximal end of said elongated member and having a longitudinal passageway extending to said longitudinal passageway of said elongated member.

---

### 5,015,251
### MEDICAL FASTENER STRAP

**Julian H. Cherubini, Newton, Mass., assignor to AliMed, Inc., Dedham, Mass.**
**Filed Nov. 30, 1984, Ser. No. 676,565**
**Int. Cl.$^5$ A61B** *17/12*
**U.S. Cl. 606—203** **5 Claims**



1. A medical fastener strap suitable for comfortable use in engaging the body and comprising,

a first elongated continuous stiff strip defining a first outer surface and an inner surface with elongated peripheral edges and having said outer surface carrying a plurality of resilient Velcro-type first engaging members,

a second continuous elongated strip having an inner surface and an outer surface with elongated peripheral side edges,

said outer surface of said second elongated continuous strip comprising a plurality of second engaging members designed and arranged to coact with said first engaging members to form a separable fastener,

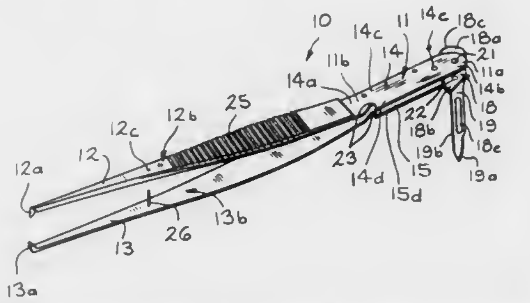
said second strip underlying said first strip and attached thereto having cushioning flaps with a width greater than the thickness of said first strip extending beyond said first strip edges to protect underlying body members therefrom in use,

whereby said strip can be wound around a body portion to overlap with said first outer surface engaging said second outer surface in separable engagement therewith.

---

### 5,015,252
### SURGICAL FORCEPS WITH SUTURE CUTTERS

**Mark W. Jones, 841 Audubon St., East Lansing, Mich. 48823**
**Filed Aug. 13, 1990, Ser. No. 565,687**
**Int. Cl.$^5$ A61B** *17/28, 17/32*
**U.S. Cl. 606—205** **14 Claims**



1. A device for closing and suturing an incision in the skin of a living body which comprises:

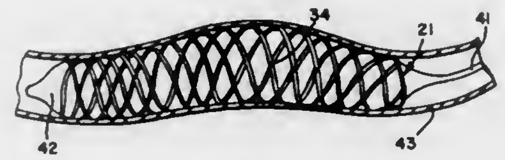
(a) forceps having a proximal handle and distal spaced apart moveable arms attached to the handle for pulling the sides of the incision together; and

(b) a knife blade which is mounted within the handle, wherein a notch is provided in the handle adjacent the blade such that a suture can be inserted into the notch and cut by the blade after the suture is inserted in the incision without injuring a user of the device.

---

### 5,015,253
### NON-WOVEN ENDOPROSTHESIS

**David C. MacGregor, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.**
**Filed Jun. 15, 1989, Ser. No. 366,676**
**Int. Cl.$^5$ A61F** *2/06*
**U.S. Cl. 623—1** **12 Claims**



1. A non-woven, generally tubular endoprosthesis for supporting living tissue, comprising:

(a) a wound, non-woven generally tubular stiff strand network;

(b) said stiff strand network includes a plurality of generally tubular layers of wire, one said layer overlying another said layer forming a generally tubular helically shaped member, said tubular member having an axial length and terminating at opposite ends;

(c) a contact interface between said generally tubular layers, said contact interface including a plurality of locations at which a strand portion of said one layer intersects and contacts a strand portion of said another layer, said contact interface being points for bonding;

(d) means for bonding said one layer to said other layer at said contact interface in order to form a non-woven, generally tubular endoprosthesis having attachment sites at said bonding points; and

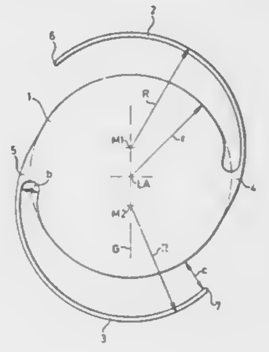
(e) said tubular layers of wire at the ends being cropped closely to said bonding points; and wherein the endoprosthesis has a diameter that is variable between a compressed percutaneous transluminally transportable diameter and an expanded, implanted diameter, said expanded diameter being for supporting an inside surface of a living tissue.

---

### 5,015,254
### INTRAOCULAR POSTERIOR CHAMBER LENS

**Jürgen-Hinrich Greite, Munich, Fed. Rep. of Germany, assignor to Adatomed Pharmazeutische und Medizintechnische Gesellschaft MBH, Munich, Fed. Rep. of Germany**
**Filed Oct. 5, 1989, Ser. No. 416,673**
**Claims priority, application Fed. Rep. of Germany, Aug. 18, 1989, 3927360**
**Int. Cl.$^5$ A61F** *2/16*
**U.S. Cl. 623—6** **8 Claims**

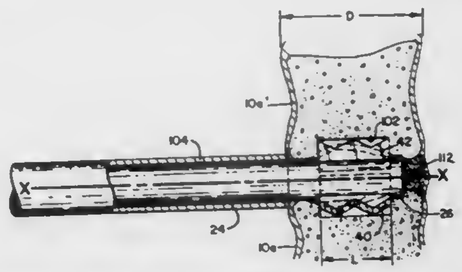
1. An intraocular posterior chamber lens for implantation in a human eye comprising a substantially circular biconvex optical lens body having a central axis and a haptic in the form of two elastic fixation loops for fixing the lens in the eye, each fixation loop being integral with the lens body and comprising a single limb extending substantially in a semi-circle from a junction point on the circumference of the lens body to a free end of the limb, the junction points of the respective limbs being positioned symmetrically on opposite sides of an imaginary straight line passing through said axis and the limbs extending from their respective junction points to their respective free ends in the same circumferential direction over the entire length of each limb, the limbs having respective centers located on said line at equal distances from and on opposite sides of said axis, each limb having an outer circumference extending from the respective junction point to the respective free end, the circumference configured for lying substantially in its entirety on a circle corresponding to the equator of the capsular sack of the eye when the lens is implanted.



---

### 5,015,255
### SPINAL STABILIZATION METHOD

**Stephen D. Kuslich, Maplewood, Minn., assignor to Spine-Tech, Inc., Minneapolis, Minn.**
**Filed May 10, 1989, Ser. No. 350,126**
**Int. Cl.$^5$ A61F** *2/44, 5/04*
**U.S. Cl. 623—17** **19 Claims**



1. A spinal stabilization method for a spine having contiguous vertebra with each of such vertebra including a body portion and with said body portions spaced apart by a layer of tissue, said method comprising the steps of:

forming an access opening into at least said layer of tissue with said access opening extending at least partially between said contiguous vertebra;

inserting an expandable cutting tool into said access opening with said cutting tool having a retracted size selected for said tool to pass into said opening, said cutting tool further having an expanded size selected for said tool to cut into an area greater than an area of said access opening;

removing at least a portion of said layer of tissue and said body portions with said expandable cutting tool to form an enlarged chamber disposed between said contiguous vertebra with said enlarge chamber having a cross-sectional area greater than a cross-sectional area of said access opening; and

at least partially filling said enlarged chamber with a graft medium.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,256
### METHOD AND MEANS FOR FIXING A JOINT PROSTHESIS

**Ingrid Bruce, and Lars Burce, both of Viken, Sweden, assignors to AB Idea, Sweden**

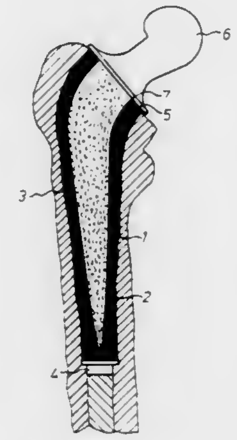
**PCT No. PCT/SE88/00157, § 371 Date Nov. 16, 1989, § 102(e) Date Nov. 16, 1989, PCT Pub. No. WO88/07355, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 30, 1988, Ser. No. 411,511**

**Claims priority, application Sweden, Mar. 30, 1987, 8701313**

**Int. Cl.⁵ A61F** *2/30, 2/32*

U.S. Cl. 623—18 **15 Claims**



1. A method for fixing a joint prosthesis in a bone cavity comprising the steps of:

reaming a cavity in a bone;

filling the cavity with grains of biocompatible material forming a grain bed;

inserting a stem portion of the prosthesis into the grain bed until the entire stem is substantially surrounded by the grains;

applying an external compaction force to the grain bed thereby securably locking the prosthesis in the cavity; and

applying a retaining device to the bed for retaining the grains within the cavity.

---

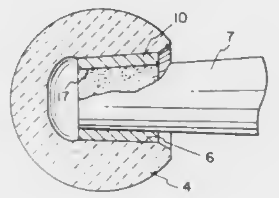
### 5,015,257
### PROSTHETIC INTERPOSITIONAL DEVICE/COUPLER

**Roy D. Crowninshield; Roy Y. Hori, both of Warsaw, Ind., and Thomas W. Fallin, Memphis, Tenn., assignors to Zimmer, Inc., Warsaw, Ind.**

**Filed Mar. 20, 1989, Ser. No. 325,799**

**Int. Cl.⁵ A61F** *2/34*

U.S. Cl. 623—22 **3 Claims**



1. In a prosthesis having a neck made of a first material and having a first taper and a head made of a second material and having a blind bore with a second taper, the improvement comprising a coupler for coupling said head to said stem comprising a body having a first end and a second end, said body generally tapering inwardly from said first end to said second end, wherein the first end is open for fitting over the neck of the prosthesis and said body having an outer surface having a uninterrupted single taper corresponding to said second taper and an inner surface having a uninterrupted single taper corresponding to said first taper, and wherein said first taper is different from said second taper such that the first taper is greater than the second taper relative to a longitudinal axis of said coupler.

---

### 5,015,258

**Patent Not Issued For This Number**

---

## CHEMICAL

### 5,015,259
### STAIN RESISTANT POLYMERIC COMPOSITION

**Thomas H. Moss, III; Ralph R. Sargent, and Michael S. Williams, all of Rome, Ga., assignors to Peach State Labs, Inc., Rome, Ga.**

**Division of Ser. No. 341,774, Apr. 20, 1989, Pat. No. 4,940,757.**

**This application May 10, 1990, Ser. No. 521,752**

**Int. Cl.⁵ D06M** *00/00;* **G08F** *223/00;* **C08G** *8/30, 63/48*

U.S. Cl. 8—115.6 **34 Claims**

1. A stain resistant carpet comprising:

(i) fibers containing polyamide linkages; and

(ii) a polymeric composition applied to the fibers that is prepared by polymerizing $H_2C{=}C(R)CO_2X$, where R is a hydrocarbon, halogenated hydrocarbon, or sulfonated hydrocarbon of from $C_1$ to $C_{15}$, phenol, naphthol, sulfonated phenol, sulfonated naphthol or a halogen, and X is H or a hydroxylated, ethoxylated, sulfonated, or halogenated hydrocarbon of $C_1$ to $C_{15}$, in the presence of a sulfonated aromatic formaldehyde condensation polymer.

---

### 5,015,260
### 2-ALKYL-4-METHOXY-5-AMINOPHENOL OR SALT THEREOF, OR 2-ALKYL-4-METHOXY-5-SUBSTITUTED AMINOPHENOL OR SALT THEREOF, AND DYEING COMPOSITION FOR KERATIN FIBERS COMPRISING THE SAME

**Tadashi Tamura; Akira Kiyomine; Yoshinori Nishizawa, all of Tochigi; Hidetoshi Tagami, Tokyo; Toru Yoshihara, Tokyo, and Jiro Kawase, Tokyo, all of Japan, assignors to Kao Corporation, Tokyo, Japan**

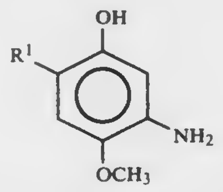
**Filed Jul. 27, 1990, Ser. No. 558,538**

**Claims priority, application Japan, Jul. 28, 1989, 1-195611; Jul. 28, 1989, 1-195612; Sep. 1, 1989, 1-227249**

**Int. Cl.⁵ A61K** *7/13*

U.S. Cl. 8—408 **10 Claims**

1. A 2-alkyl-4-methoxy-5-aminophenol represented by formula (I) below or a salt thereof:



(I)

wherein $R^1$ represents a substituted or unsubstituted lower alkyl group.

---

### 5,015,261
### PRE-TREATMENT OF CELLULOSIC FIBRES OR CELLULOSIC FIBRES IN BLENDS WITH SYNTHETIC FIBRES FOR SUBSEQUENT TRANSFER PRINTING

**Henry Donenfeld, Brighton, and Eduard Lemanis, East Keilor, both of Australia, assignors to BASF Australia, Ltd., Melbourne, Australia**

**Filed Jun. 16, 1987, Ser. No. 63,492**

**Claims priority, application Australia, Jun. 16, 1986, PH06423**

**Int. Cl.⁵ D06P** *3/82*

U.S. Cl. 8—532 **19 Claims**

1. A process for the pre-treatment of natural and regenerated cellulosic fibres and blends thereof with synthetic fibres for the purpose of subsequent transfer printing, comprising applying to said fibres a composition comprising a mixture of a water insoluble technical hexamethoxymethyl melamine having 50–70 weight percent hexamethoxymethyl melamine, the remainder being the self-condensation products of hexamethoxymethyl melamine having 2 to 6 molecular condensates of hexamethoxymethyl melamine and a $C_{4-8}$ glycol in water, and drying said fibres at a temperature below 180° C.

---

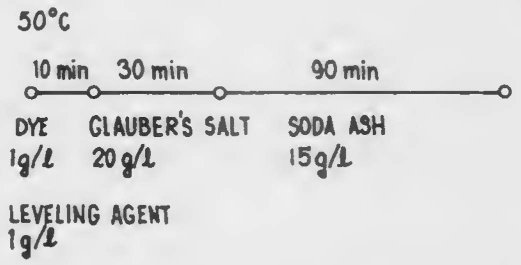
### 5,015,262
### DYE-LEVELING AGENT FOR REACTIVE DYEING: PHOSPHOLIPIDS OR PHOSPHOLIPID-TYPE COMPOUNDS

**Noriaki Ohba; Yujin Tabata, and Tateyuki Nagatomi, all of Tokyo, Japan, assignors to Nihon Surfactant Kogyo K.K., Tokyo, Japan**

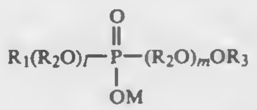
**Filed Dec. 26, 1988, Ser. No. 285,857**

**Int. Cl.⁵ D06P** *1/66;* **C09B** *62/00*

U.S. Cl. 8—543 **11 Claims**

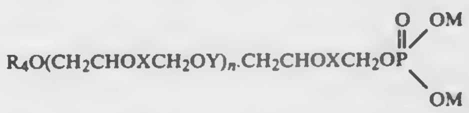


1. A method for dyeing a cloth which is capable of being dyed with a reactive dye, which comprises contacting said cloth with a dyeing solution comprising a reactive dye, an alkaline substance and a leveling agent, said leveling agent being selected from the group consisting of phospholipids obtained from animals or plants, compounds having the formula I and compounds having the formula II:



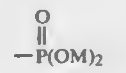
$$R_1(R_2O)_l-\overset{\overset{\displaystyle O}{\|}}{\underset{\underset{\displaystyle OM}{|}}{P}}-(R_2O)_mOR_3 \qquad (I)$$

wherein $R_1$ and $R_3$ each denotes alkyl, alkenyl, hydroxyalkyl, or M, with the proviso that both of $R_1$ and $R_3$ are not M simultaneously; $R_2$ denotes alkylene having 2 to 4 carbon atoms; l and m each denote O or an integer of at least 1; and M denotes alkali metal or hydrogen,



$$R_4O(CH_2CHOXCH_2OY)_n.CH_2CHOXCH_2O\overset{\overset{\displaystyle O}{\|}}{P}\begin{matrix}\diagup OM\\ \diagdown OM\end{matrix} \qquad (II)$$

wherein $R_4$ denotes alkyl, alkenyl, hydroxyalkyl, straight chain, hydroxy-substituted alkenyloxy or branched chain, hydroxy-substituted alkenyloxy; X and Y each denote hydrogen, alkoxy, alkyl, or



$$-\overset{\overset{\displaystyle O}{\|}}{P}(OM)_2$$

wherein M denotes alkali metal or hydrogen; and n denotes an integer of at least 1.

---

### 5,015,263
### COMPOSITION FOR COLORING SKIN AND METHOD

**Linda Albrecht, West Redding, and Leszek J. Wolfram, Stamford, both of Conn., assignors to Clairol Incorporated, New York, N.Y.**

**Continuation of Ser. No. 737,749, May 28, 1985, abandoned.**

**This application Aug. 12, 1988, Ser. No. 231,732**

**Int. Cl.⁵ C09B** *00/00*

U.S. Cl. 8—680 **4 Claims**

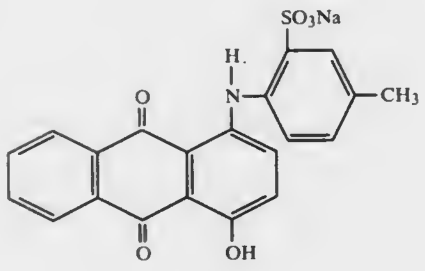
1. A process for coloring skin which comprises the step of contacting the skin with a solution consisting of

(a) an alcohol component which is capable of penetrating the

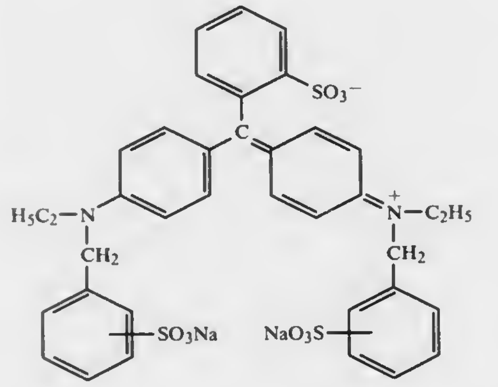
VOL
1126
ISS
2
MY
14
1991
UMI

skin to alter the hydrophobic or hydrophilic structures thereof;

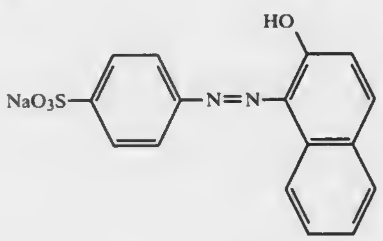
(b) a water soluble acid dye component wherein the dye is at least one selected from the group consisting of dyes having the formula:



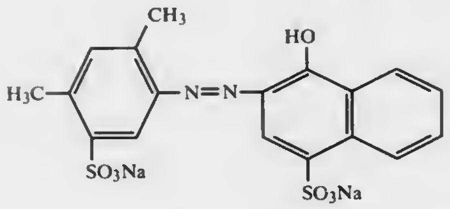
(i)



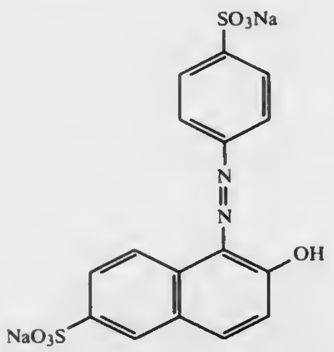
(ii)



(iii)

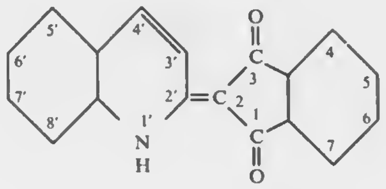


(iv)

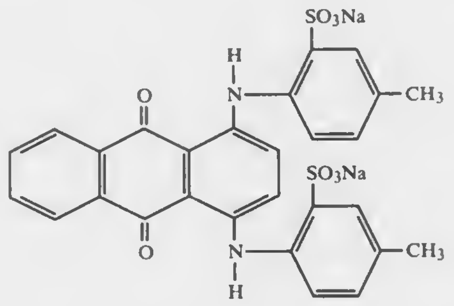


(v)

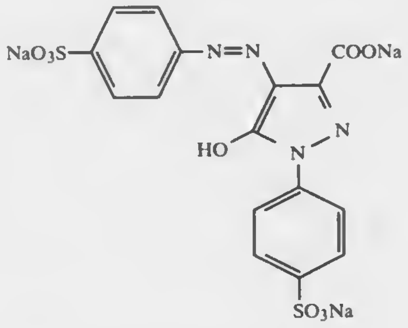
-continued



(vi)



(vii)



(viii)

(c) water

wherein the solution has an acid pH.

---

### 5,015,264

### NONPIGMENTARY TITANIUM DIOXIDE POWDERS

**Phillip M. Story, Yukon, and John R. Brand, Oklahoma City, both of Okla., assignors to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.**

**Filed Sep. 15, 1988, Ser. No. 244,676**

**Int. Cl.$^5$ C22B *1/14***

**U.S. Cl. 23—313 R** **11 Claims**

7. A process for preparing free flowing powders of nonpigmentary titanium dioxide granular aggregates consisting of:

forming a filter cake comprised of from about 25 to about 50 weight percent of free water and from about 50 to about 75 weight percent of flocculated pigmentary titanium dioxide particles by dewatering a flocculated slurry of pigmentary titanium dioxide particles, said pigmentary particles being prepared by oxidation of titanium tetrachloride in a vapor phase;

preparing solid preforms comprised of said free water and said flocculated pigmentary titanium dioxide particles, said preforms containing from about 25 to about 50 weight percent of said free water and from about 50 to about 75 weight percent of said flocculated pigmentary titanium dioxide particles based on the weight of said solid preforms said solid preforms being prepared from said filter cake by breaking or extruding said filter cake into said solid preforms;

drying said solid preforms at elevated temperatures to reduce the free water contained therein to levels of less than about 5.0 weight percent based on the weight of said solid preforms; and

subjecting said dried solid preforms to comminution to effect a reduction in size of said solid preforms to provide said free flowing powders of nonpigmentary titanium dioxide granular aggregates, said free flowing powders having bulk densities ranging from about 0.5 g/cc to about 3.5 g/cc and wherein at least about 75 weight percent of the nonpigmentary granular aggregates comprising said free flowing powders range in size from a minimum limiting particle size of about 150 microns to a maximum limiting particle size of about 1700 microns.

---

### 5,015,265

### PROCESS FOR MAKING CUBIC BORON NITRIDE FROM COATED HEXAGONAL BORON NITRIDE, AND ABRASIVE PARTICLES AND ARTICLES MADE THEREFROM

**Francis R. Corrigan, Westerville, and David E. Slutz, Worthington, both of Ohio, assignors to General Electric Company, Worthington, Ohio**

**Filed Jun. 14, 1989, Ser. No. 365,883**

**Int. Cl.$^5$ B24D *3/00***

**U.S. Cl. 51—293** **56 Claims**

1. A process for the preparation of polycrystalline cubic boron nitride from hexagonal boron nitride comprising:

(a) removing the oxide from the surface of the hexagonal boron nitride particles to form hexagonal boron nitride particles having a substantially oxide-free surface;

(b) coating the hexagonal boron nitride particles having an oxide-free surface with an agent capable of preventing re-oxidation of the surface of the hexagonal boron nitride particles to form coated hexagonal boron nitride particles in an oxide-free state;

(c) converting the coated hexagonal boron nitride particles in an oxide-free state to a polycrystalline cubic boron nitride mass by direct conversion of hexagonal boron nitride to cubic boron nitride.

---

### 5,015,266

### ABRASIVE SHEET AND METHOD FOR MANUFACTURING THE ABRASIVE SHEET

**Motokazu Yamamoto, 8-20-602, Mita 2-Chome, Minato-Ku, Tokyo, Japan**

**Filed Oct. 7, 1988, Ser. No. 255,113**

**Claims priority, application Japan, Dec. 28, 1987, 62-330404**

**Int. Cl.$^5$ B24D *3/00***

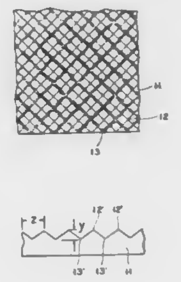
**U.S. Cl. 51—293** **4 Claims**

1. A method of making an abrasive sheet comprising the steps of:

embossing at least one side of a base sheet to form irregularities;

painting a slurry, made of a mixture of abrasive particles and resin adhesives, on the embossed side of said base sheet to form an abrasive layer having a substantially planar top surface; and

dry hardening said abrasive layer to form high and low abrasive parts corresponding to said irregularities on said side by first passing the slurry painted base sheet through a low temperature dryer to prevent surface drying and then passing the slurry painted base sheet through a high temperature dryer to evaporate organic solvent molecules in the resin adhesives.



---

### 5,015,267

### PROCESS FOR RAPPING OF ELECTROSTATIC PRECIPITATOR SURFACES

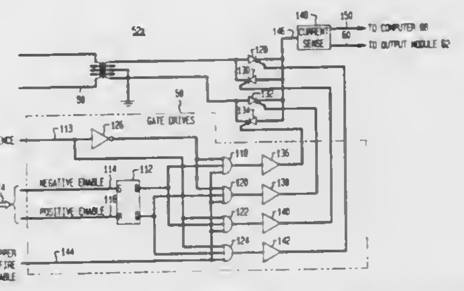
**Henry J. Del Gatto, New Egypt, and John E. Trainor, Willingboro, both of N.J., assignors to NWL Transformers, Bordentown, N.J.**

**Division of Ser. No. 207,778, Jun. 16, 1988, Pat. No. 4,928,456.**

**This application Mar. 21, 1990, Ser. No. 497,117**

**Int. Cl.$^5$ B03C *3/00***

**U.S. Cl. 55—12** **3 Claims**



1. In an electrostatic precipitator having an alternating source signal and a rapper for removing precipitate from a collecting surface, method for preventing magnetization of the rapper, comprising the steps of:

(a) first rectifying the alternating source signal to provide a plurality of pulses of a first polarity and applying the plurality of first polarity pulses to the rapper; and,

(b) second rectifying the alternating source signal to provide a plurality pulses of a second polarity and applying the plurality of second polarity pulses to the rapper whereby the magnetization of the rapper caused by applying the first polarity pulses is substantially canceled by the second polarity pulses.

---

### 5,015,268

### POLYMERIC MEMBRANE AND PROCESS FOR SEPARATING ALIPHATICALLY UNSATURATED HYDROCARBONS

**W. S. Winston Ho, Annandale, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Continuation of Ser. No. 256,666, Oct. 13, 1988, abandoned.**

**This application Sep. 19, 1989, Ser. No. 409,999**

**Int. Cl.$^5$ B01D *53/04, 71/38***

**U.S. Cl. 55—16** **13 Claims**

1. Process for separating at least one unsaturated hydrocarbon from a hydrocarbon feed stream containing said hydrocarbon by the steps of:

a. contacting the feed stream against a first side of a solid, homogeneous membrane consisting essentially of a hydro-

VOL
1126
ISS
2
MY
14
1991
UMI

philic polymer selected from the group consisting of polyvinylalcohol, polyvinylacetate, sulfonyl containing polymers, polyvinylpyrrolidone, polyethylene oxide, polyacrylamide, copolymers thereof, and blends thereof, and a metal or metal ion capable of reversibly complexing with the unsaturated hydrocarbon, said metal or metal ion is distributed homogeneously in said hydrophilic polymer; and

b. withdrawing at a second side of the membrane a permeate comprising the unsaturated hydrocarbon in higher concentration than in the feed stream; whereby said membrane provides high permeability and selectivity for unsaturated hydrocarbons and substantially increases the rate at which said permeate is withdrawn.

---

### 5,015,269
## GAS SEPARATION

**Michael E. Garrett, and John B. Gardner, both of Woking, United Kingdom, assignors to The BOC Group plc, Windlesham, England**

**Filed Dec. 21, 1989, Ser. No. 454,790**

**Claims priority, application United Kingdom, Dec. 23, 1988, 8830107**

**Int. Cl.$^5$ B01D** *53/22*

**U.S. Cl. 55—16** **15 Claims**

1. A method of separating a gas mixture in a vessel housing a multiplicity of semi-permeable membranes, including the steps of passing the mixture from an inlet to an outlet of the vessel along a flow path longitudinally in contact with the membranes, whereby one component of the gas mixture diffuses more rapidly through the membranes than another or the other component of the gas mixture, the gas mixture thus being enriched in said other component, and withdrawing permeate gas in a plurality of streams along separate passages, wherein said passages are defined by means which limit the extent of flow of permeate gas in each passage longitudinally off the said flow path to a fraction of the extent of the said flow path.

9. Apparatus for separating a gas mixture comprising a vessel housing a multiplicity of semi-permeable membranes and having an inlet for the gas mixture communicating with an outlet of the vessel along a flow path longitudinally in contact with the membranes whereby in operation one component of the gas mixture diffuses more rapidly through the membranes than another or the other component of the gas mixture, the gas mixture thus being enriched in the sad other component, wherein separate passages are defined in the vessel for withdrawal of permeate gas in a plurality of streams, said passages being defined by means which limit the extent of flow of permeate gas in each passage longitudinally of said flow path to only a fraction of the extent of said flow path.

---

### 5,015,270
## PHENYLINDANE-CONTAINING POLYIMIDE GAS SEPARATION MEMBRANES

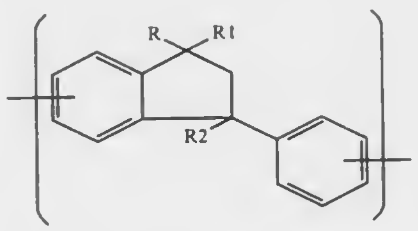
**Okan M. Ekiner, Wilmington, Del., and Richard A. Hayes, Parkersburg, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 10, 1989, Ser. No. 418,838**

**Int. Cl.$^5$ B01D** *53/22, 71/64*

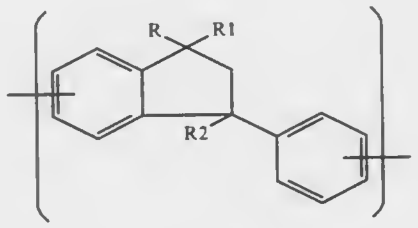
**U.S. Cl. 55—16** **14 Claims**

1. A process of separating a component from a mixture of gases having high sensitivity and gas permeation rates comprising bringing the mixture into contact with a feed side of a permselective composite or asymmetric membrane in a manner to cause a portion of the mixture to pass through the membrane to a permeate side, the resulting gas mixture on the permeate side being enriched in the component over that of the mixture on the feed side; the membrane being formed from a polyimide polymer having incorporated into the repeating polymer unit a phenylindane residue of the form;



wherein R, R1 and R2 are independently —H cr lower alkyl having from 1 to 6 carbon atoms.

10. An asymmetric membrane formed of a polyimide polymer having incorporated into the repeating polymer unit a phenylindane residue of the form:



wherein R, $R^1$ and $R^2$ are independently —H or lower alkyl having from 1 to 6 carbon atoms.

---

### 5,015,271
## SEPARATION OF GAS MIXTURES BY VACUUM SWING ADSORPTION (VSA) IN A TWO-ADSORBER SYSTEM

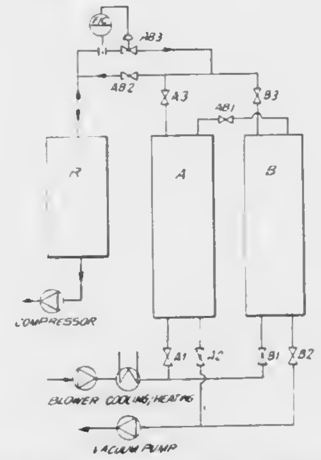
**Gerhard Reiss, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Aug. 23, 1989, Ser. No. 397,696**

**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 3829584**

Int. Cl.$^5$ B01D *53/04*

U.S. Cl. 55—25 7 Claims



1. Process for adsorptive separation of crude gas mixtures by vacuum swing adsorption in two containers filled with adsorbent said containers being adsorbers A and B which are provided with a bottom and top inlet and discharge end, the gas content which is adsorbed less strongly, if at all, (raffinate) being obtained under reduced pressure, said process comprising

(F1) operating the two adsorbers A and B alternately so that the crude gas fed into the adsorbers is not stopped at any time during the course of the process, a vacuum pump remaining continuously connected to the adsorbent packing,

(a) at time $t_1$ depressurizing adsorber A at the top end, the gas released in this way flowing into the top end of an evacuated adsorber B, adsorber A being connected at the bottom end to a vacuum pump and adsorber B being filled at the bottom end with crude gas,

(b) at time $t_2$ evacuating adsorber A and filling adsorber B at the top end with raffinate from a raffinate reservoir R, adsorber B being filled at the bottom end under reduced pressure with crude gas,

(c) at time $t_3$, evacuating adsorber A at the bottom end and filling adsorber B the bottom end with crude gas, or crude gas flows through adsorber B at the bottom end, starting at a pressure of 1 bar, and stripping off the gas content which is adsorbed less strongly as the product at the top end of adsorber B,

(d) proceeding further with the process by repeating the times $t_1$, $t_2$ and $t_3$ adsorbers A/B being changed over, or alternatively in a two-adsorber VSA process

(e) at time $t_1$ depressurizing adsorber A at the top end, the gas released in this way flows into the top end of the adsorber B, which is operated under reduced pressure, charging adsorber A at the bottom end with crude gas, adsorber B is connected at the bottom end to a vacuum pump, but the pressure in adsorber B rises here due to the entry of gas from adsorber A, and the pressure in adsorber A falls,

(f) at time $t_2$ the process proceeding analogously to (1b),

(g) at time $t_3$ the process proceeding analogously to (1c),

(h) the process proceeding further by repeating the times $t_1$, $t_2$ and $t_3$, adsorbers A/B being changed over.

---

### 5,015,272
## ADSORPTIVE SEPARATION PROCESS

**Hidetake Okada; Masato Kawai, both of Kawasaki; Shunji Enomoto, and Taisuke Suzuki, both of Tokyo, all of Japan, assignors to Japan Oxygen Co., Ltd., Japan**

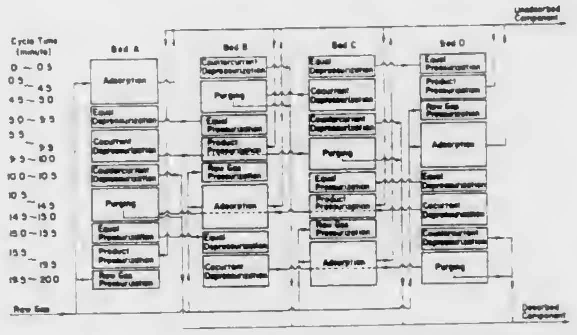
**PCT No. PCT/JP88/00929, § 371 Date May 16, 1989, § 102(e) Date May 16, 1989, PCT Pub. No. WO89/02309, PCT Pub. Date Mar. 23, 1989**

**PCT Filed Sep. 14, 1988, Ser. No. 362,436**

**Claims priority, application Japan, Sep. 16, 1987, 62-231646**

**Int. Cl.$^5$ B01D** *53/04*

**U.S. Cl. 55—26** **4 Claims**



1. An adsorptive separation process for separating hydrogen and/or helium as product by a pressure swing adsorption process, characterized in that four or more adsorbent beds have a raw gas inlet end and a product gas discharge end and have an interior filled with an adsorbent; and

that said process sequentially executes:

(a) an adsorption step for permitting raw gas to flow in the first adsorbent bed from said inlet end thereof under a constant highest pressure, causing said adsorbent to hold an easy adsorptive component, extracting an unadsorbed component as product gas from said product gas discharge end and completing flow of said raw gas when an adsorption front is at a middle of said first adsorbent bed;

(b) an equal depressurization step for discharging part of gas in said first adsorbent bed under said highest pressure from said product gas discharge end of said first adsorbent bed in a direction cocurrent to flow of said raw gas, and permitting said discharged gas to flow through said product gas discharge end of the second adsorbent bed which has been purified so as to eliminate an easy adsorptive component and is under a lowest pressure or low pressure set in advance by pressure equalization to cause said first and second adsorbent beds to have intermediate pressure;

(c) a cocurrent depressurization step for further discharging gas in said first adsorbent bed, which substantially consists of an unadsorbed component, from said product gas discharge end of said first adsorbent bed in a direction cocurrent to flow of said raw gas, further throttling pressure of said discharged gas to a lowest pressure for depressurization, permitting said cocurrent depressurized gas to flow through said product gas discharge end of the third adsorbent bed holding an easy adsorptive component and continuing said discharging until pressure of said first adsorbent bed becomes lower intermediate pressure lower than said intermediate pressure and when said easy adsorptive component of said third adsorbent bed is purged or is at least partially removed;

(d) a countercurrent depressurization step for discharging gas present in said first adsorbent bed under said low pressure formed by pressure equalization executed with respect to said third adsorbent bed already purged to be under said lowest pressure, from said raw gas inlet end in a direction countercurrent to flow of said raw gas to thereby countercurrently desorb said easy adsorptive component held by said adsorbent of said first adsorbent bed, and continuing said discharging until said first adsorbent bed has said lowest pressure;

(e) a purging step for throttling cocurrent depressurized gas from the fourth adsorbent bed to have said lowest pressure, introducing said gas to said product gas discharge end of said first adsorbent bed and permitting said gas to flow within said first adsorbent bed in a direction countercurrent to flow of said raw gas to thereby desorb at least part of said easy adsorptive component held by said adsorbent of said first adsorbent bed, and discharging said at least part of said easy adsorptive component in accompaniment with said cocurrent depressurized gas from said fourth adsorbent bed from said raw gas inlet end of said first adsorbent bed for purgation;

(f) an equal pressurization step for introducing gas present under said highest pressure in said second adsorbent bed which has undergone said adsorption step, to said product gas discharge end of said first adsorbent bed purged to be under said lowest pressure immediately or after pressure is increased to low pressure by pressure equalization executed with respect to said fourth adsorbent bed which have already undergone cocurrent depressurization to be under said lower intermediate pressure, and increasing pressure of said first adsorbent bed until said first and second adsorbent beds are equalized to have said intermediate pressure;

(g) a product pressurization step for introducing part of product gas under said highest pressure flowing from said third adsorbent bed or another adsorbent bed to said product gas discharge end of said first adsorbent bed during or upon completion of said equal pressurization step to thereby increase pressure of said first adsorbent bed to higher intermediate pressure greater than said intermediate pressure but lower than said highest pressure; and

(h) a raw gas pressurization step for introducing said raw gas to said raw gas inlet end of said first adsorbent bed whose pressure has been increased to said higher intermediate pressure, to thereby increase pressure of said first adsorbent bed to said highest pressure, while said third adsorbent bed or another adsorbent bed is executing said adsorption step;

VOL
1126
ISS
2
MY
14
1991
UMI

so that said raw gas is permitted to flow in said repressurized first adsorbent bed, and after returning to said adsorption step to extract hydrogen and/or helium as product gas from said discharge end, by pressure substantially equal to that of raw gas, and the variation of product gas flow rate is within a range of ±5%, said individual steps are thereafter continuously repeated, and a process of said individual steps is sequentially executed for said second adsorbent bed, third adsorbent bed and fourth adsorbent bed, and other adsorbent beds if there are more adsorbent beds.

---

**5,015,273**

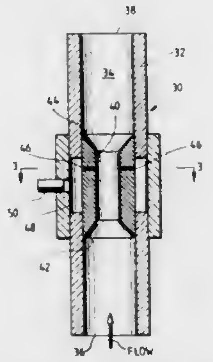
### FOAM BREAKER AND METHOD

**Billy E. Hamilton, Marrero; Brian K. Moore, Lafayette, both of La., and Donald E. Newton, Houston, Tex., assignors to Camco International Inc., Houston, Tex.**

**Filed Mar. 16, 1990, Ser. No. 494,704**

**Int. Cl.⁵ B01D** ***19/04***

**U.S. Cl. 55—53** **12 Claims**



1. In the method of treating an oil and/or gas well with a foam mixture of liquid and gas in which the foam is injected into the well bore and is then returned from the well bore, the improvement in a method of breaking up the mixture for storage comprising,

receiving the foam from the well bore,

compressing the foam mixture,

saturating the compressed foam mixture with a fluid by injecting a fluid into the compressed foam mixture, and

expanding the saturated foam mixture for separation into a liquid and gas, and separating the liquid and gas.

---

**5,015,274**

### HIGH EFFICIENCY INDUSTRIAL VACUUM CLEANER AND FILTER ELEMENT

**Timothy J. Perry, Danville, Calif., assignor to Mello Manufacturing, Inc., Richmond, Calif.**

**Continuation-in-part of Ser. No. 47,894, May 7, 1987, Pat. No. 4,838,907. This application May 26, 1989, Ser. No. 358,653**

**The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.**

**Int. Cl.⁵ B01D** ***46/00***

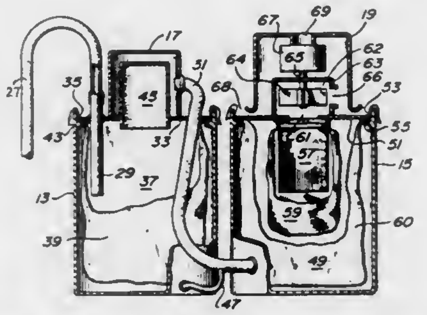
**U.S. Cl. 55—97** **18 Claims**

1. A method of filtering particulates from a gas stream comprising:

(a) passing said gas stream through a relatively transversely confined space into a substantially less confined space to cause entrained particulates to settle by gravity from said gas,

(b) passing said gas upwardly into an open-bottom-closed-top filter confirmation formed from smooth polymer fabric material comprised of a plurality of intersecting filter threads from 0.025 inches to 0.045 inches wide positioned with substantially a flat surface of the filter threads on the pressure side of the filter and any curved surface on the threads on the decreased pressure side of the filter, said threads defining filter openings having an oblong configuration from 0.002 inches to 0.006 inches in width and a length of between 0.009 and 0.021 inches which is not greater than will maintain the structural integrity of the filter openings and having an open-to-closed ratio of 5% to 11% and a total open area of 12 or more times the cross-sectional area of the relatively transversely confined space at a rate such that a portion of the particulates in the gas are drawn upwardly with the gas,

(c) continuing passing the gas through the filter medium and allowing particulates to build up on the filter medium on the sides and top of said filter medium until sufficient particulate material is present such that the weight of the outer layers of particulates at least is greater than the adhesion of the particulates together plus the force of the gas passing through the particulates,



(d) allowing outer portion f the particulate layers to slough off and fall away under the influence of gravity,

(e) catching any particulates that may pass through the filter during sloughing off of the particulate layers on the filter on at least on subsequent filter having a smaller filter opening size, and

(f) repeating steps (a) through (e).

---

**5,015,275**

### ISOTROPIC MICROPOROUS SYNDIOTACTIC POLYSTYRENE MEMBRANES AND PROCESSES FOR PREPARING THE SAME

**Henry N. Beck, Walnut Creek; Robert D. Mahoney, Danville; Hawk S. Wan, and Richard A. Lundgard, both of Antioch, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 14, 1989, Ser. No. 380,227**

**Int. Cl.⁵ B01D** ***53/22, 71/26***

**U.S. Cl. 55—158** **21 Claims**

1. A semi-permeable membrane comprising a thin isotropic syndiotactic polystyrene microporous membrane.

9. A process for preparing a semi-permeable isotropic syndiotactic polystyrene microporous membrane comprising the steps of;

A. forming a mixture comprising;
  (i) syndiotactic polystyrene, and
  (ii) at least one solvent for the syndiotactic polystyrene;

B. heating the mixture to a temperature under conditions such that a homogeneous fluid is formed which possesses sufficient viscosity to be formed into a membrane;

C. extruding or casting the homogeneous fluid into a membrane;

D. quenching or coagulating the membrane by passing the membrane through one or more zones under conditions such that the membrane solidifies; and

E. simultaneously or consecutively leaching the membrane by passing the membrane through one or more zones under conditions such that at least a substantial portion of the solvent for the syndiotactic polystyrene is removed from the membrane;

wherein the semi-permeable membrane so formed possesses isotropic microporous structure.

---

**5,015,276**

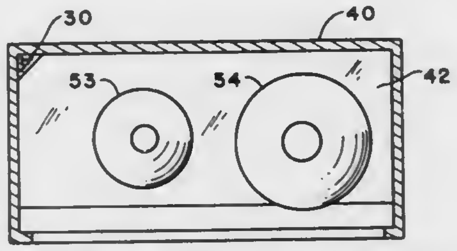
### CABINET AND VAPOR TRAP

**Donald D. Hedberg, and Michael H. Litin, both of Janesville, Wis., assignors to Lab Safety Supply, Inc., Janesville, Wis.**

**Filed Nov. 28, 1989, Ser. No. 442,913**

**Int. Cl.⁵ F26B** ***21/06;*** **B01D** ***50/00***

**U.S. Cl. 55—384** **9 Claims**



1. A vapor trap, for use in a rectangular box shaped steel cabinet storing upright cylindrical containers of volatile hazardous liquids, to trap vapors of said liquids escaping from said containers, said vapor trap comprising an outer shell having therewithin a vapor trapping material, said shell being of right-isosceles triangular box shape having a perforate rectangular hypotenuse front, two rectangular sides and two right-isosceles triangular ends, and said shell having on one of said sides fastening means to fasten said trap to a wall of said cabinet, whereby said trap may be nestled into a corner of said cabinet and fastened there in position out of the way of, avoiding contact with, and making maximum room for, said cylindrical containers.

---

**5,015,277**

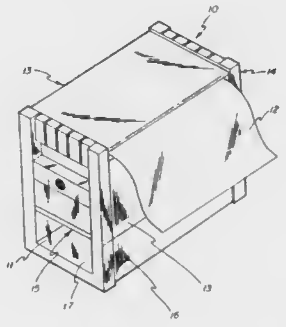
### INTEGRATED MEDIA CARTRIDGE AND FILTER

**Eric Walowit, Springboro, and Gregory J. Sexton, Dayton, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio**

**Filed Dec. 5, 1989, Ser. No. 446,367**

**Int. Cl.⁵ B01D** ***50/00***

**U.S. Cl. 55—385.1** **6 Claims**



3. In a cartridge having an enclosing housing and containing at least one spool for the storage of web material thereon, and in which process fumes are formed during the processing of said material in utilization apparatus into which the cartridge is inserted in use, and in which said apparatus includes fume collection ducting, the improvement comprising a fume processing filter in said cartridge housing, said filter having a capacity to filter the fumes caused by the processing of said material carried on said spool, means in said cartridge housing for accepting fumes from said ducting and directing said fumes to said filter.

---

**5,015,278**

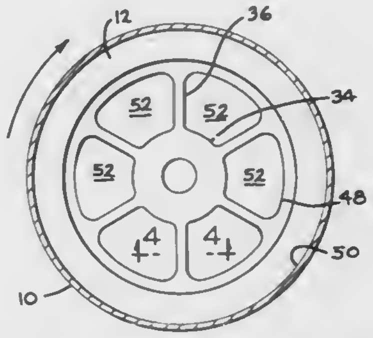
### OPEN BOTTOMED SPINNER FOR MINERAL FIBERS

**Yee Lee, Reynoldsburg, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Mar. 12, 1990, Ser. No. 491,892**

**Int. Cl.⁵ C03B** ***37/04***

**U.S. Cl. 65—6** **17 Claims**



13. A method of centrifuging molten mineral material into mineral fibers comprising rotating a spinner having a peripheral wall, the peripheral wall having a plurality of orifices for passing molten mineral material to form mineral fibers, the spinner having an annular spinner bottom wall having an inner and outer periphery, the inner periphery defining an open bore, the bottom wall being connected at its outer periphery to the peripheral wall and adapted to receive a stream of molten mineral material and direct the molten mineral material by centrifugal force to the peripheral wall, the spinner also having a central hub and spoke members connecting the hub and the bottom wall to enable rotational force to be transferred from the hub to the peripheral wall, the spoke members enabling a substantial flow of air downwardly through the bore, supplying molten mineral material to the spinner, and supplying a flow of air downwardly through the bore.

---

**5,015,279**

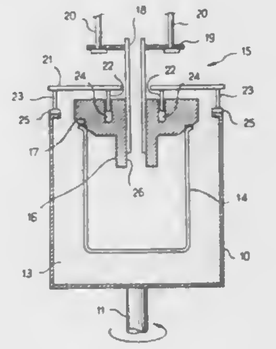
### APPARATUS FOR EXTRACTING SPIN CAST FUSED SILICA OBJECTS

**Paul Guibert, Bellegarde, and Francis A. P. Launay, Pithiviers-le-Vieil, both of France, assignors to Quartz & Silice, Courbevoie, France**

**Division of Ser. No. 309,585, Feb. 10, 1989. This application Jun. 25, 1990, Ser. No. 542,858**

**Int. Cl.⁵ C03B** ***19/00***

**U.S. Cl. 65—302** **14 Claims**



1. An apparatus for removing a fused silica glass object from a rotating pot containing pulverulent refractory material therein, comprising:

a rotating pot for containing a fused silica glass object;

a gripping member having means for gripping the upper rim of the object for removing said object from said rotating

VOL
1126
ISS
2
MY
14
1991
UMI

pot, said member capable of moving vertically while rotating and while gripping said object;

a rotational synchronization member operatively associated with the gripping member and located so as to provide frictional contact between said member and the edge of the pot containing said object while said pot and said object are rotating; and

means for moving said gripping member vertically downward and upward the upward movement removing said object from said pot

said rotational synchronization member being located with respect to said pot so as to impart to said gripping member the rotation of the pot when said rotational synchronization member is moved into frictional contact with the pot.

---

### 5,015,280
### MOLD FOR MOLDING OPTICAL ELEMENTS

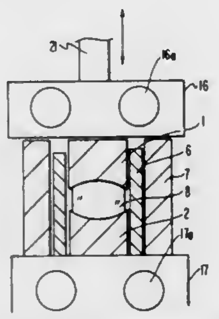
**Takayuki Kimoto, Neyagawa; Masaaki Sunohara, Nishinomiya; Takashi Inoue, Hirakata; Shoji Nakamura, Hirakata, and Daijirou Yonetani, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Aug. 22, 1989, Ser. No. 396,621**

**Claims priority, application Japan, Aug. 22, 1988, 63-207636; Oct. 19, 1988, 63-263229**

**Int. Cl.$^5$ C03B** *11/08*

U.S. Cl. 65—307 9 Claims



1. A mold adapted to be mounted between a pair of heater blocks and to have a pressure applied thereagainst by at least one of the heater blocks for molding a molding material into an optical element, comprising:

first and second elements, each of which includes an inner molding surface adapted to contact the molding material and an outer surface opposite said inner molding surface and adapted to contact a respective one of the pair of heater blocks, said inner molding surfaces of said first and second elements defining a cavity therebetween in which the molding material is adapted to be received and molded to form the optical elements;

a first ring member mounted about said first and second elements and having means, comprising an inner surface thereof, for guiding vertical movement of said first and second elements; and

a second ring member mounted about said first ring member and being formed of a material having a lower thermal conductivity than a material of said first ring member, said second ring member being vertically longer than said first ring member such that said second ring member defines a means for preventing said first and second elements to be moved together beyond a predetermined separation distance so as to predetermine a thickness of the optical element.

---

### 5,015,281
### METHOD FOR PREPARING FLUORIDE GLASSES

**Bruce T. Hall, Groton; Leonard J. Andrews, Wayland, and Robert C. Folweiler, Bedford, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Continuation of Ser. No. 177,204, Apr. 4, 1988, abandoned. This application Mar. 6, 1990, Ser. No. 492,424**

**Int. Cl.$^5$ C03B** *37/00*

U.S. Cl. 65—32.5 14 Claims

1. A method for preparing an optically clear fluoride glass comprising the following steps:

Step 1—melting in an atmosphere of inert gas a water free mixture consisting essentially of an in situ oxidant consisting of a nonvolatile metal fluoride, selected from the group consisting of $InF_3$ and mixtures of $InF_3$ and $SnF_4$, and high purity starting materials for a fluorozirconate optical glass, wherein the amount of said in situ oxidant in the mixture is sufficient to substantially prevent the reduction in oxidation state of zirconium in the water free mixture during the melting of the mixture, wherein the melting takes place without reactive atmosphere processing or the inclusion of $NH_4F{\cdot}HF$ in the mixture; and

Step 2—cooling the product of Step 1 to form an optically clear fluoride glass.

---

### 5,015,282
### FRESHNESS PRESERVING AGENT

**Nobumitsu Takahashi, Yokohama, and Kenichi Yoshie, Machida, both of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan**

**Filed Aug. 2, 1989, Ser. No. 388,517**

**Claims priority, application Japan, Aug. 10, 1988, 63-199167**

**Int. Cl.$^5$ A01N** *3/02;* **A23B** *7/153*

U.S. Cl. 71—65 10 Claims

1. A freshness preserving agent comprising carbon black having a specific surface area of at most 1,000 $m^2/g$ as measured by BET method and having a dibutyl phthalate oil absorption of from 100 to 300 ml per 100 g of the carbon black, and a palladium compound supported thereon.

---

### 5,015,283
### PLANT GROWTH REGULATING COMPOSITION AND METHOD FOR REGULATING GROWTH OF A PLANT

**Takeshige Miyazawa, Shizuoka, and Kazuhiko Kawano, Niiza, both of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan**

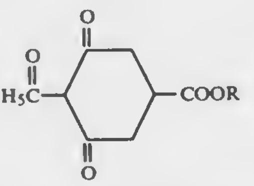
**Division of Ser. No. 353,550, May 18, 1989, Pat. No. 4,954,157. This application Apr. 10, 1990, Ser. No. 521,894**

**Claims priority, application Japan, May 19, 1988, 63-122268**

**Int. Cl.$^5$ A01N** *31/06, 33/04, 43/40*

U.S. Cl. 71—76 6 Claims

1. A plant growth regulating composition comprising a member selected from the group consisting of 3,5-dioxo-4-propionylcyclohexane carboxylic acid and its esters and salts, represented by the formula:



(I)

wherein R is a hydrogen atom, a lower alkyl group or a cation, and one compound selected from the group consisting of 1,1-dimethylpiperidinium chloride and 2-chloroethyltrimethylammonium chloride, as active ingredients in a ratio of 1:2.0-20 by weight, and an agricultural carrier or diluent.

### 5,015,284
### ALKYL- AND ALKENYLSULFONYLUREAS WHICH ARE SUBSTITUTED IN THE HETEROCYCLE, AND THEIR USE AS HERBICIDES OR PLANT GROWTH REGULATORS

**Lothar Willms, Hillschild; Klaus Bauer, Hanau; Hermann Bieringer, Eppstein/Taunus, and Helmut Bürstell, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

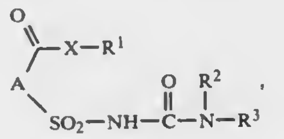
**Filed Apr. 6, 1989, Ser. No. 334,695**

**Claims priority, application Fed. Rep. of Germany, Apr. 8, 1988, 3811777**

**Int. Cl.$^5$ A01N** *43/54;* **C07D** *239/42, 239/34, 239/47, 401/12, 401/14, 403/12, 403/14*

U.S. Cl. 71—90 6 Claims

6. A method of controlling noxious plants which comprises applying an effective amount of a compound of formula I



(I)

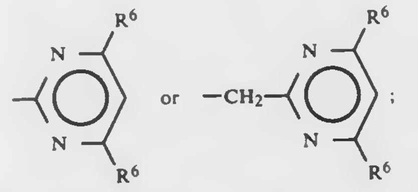
or a stereoisomer thereof, wherein:

A is a radical of formula $>C(R^4)_2$ or $>C{=}(R^5)_2$;

$R^1$ is H, $(C_1–C_8)$alkyl, $(C_2–C_8)$alkenyl, $(C_2–C_8)$alkynyl, it being possible for these aliphatic radicals to be monosubstituted or polysubstituted by halogen, or to be monosubstituted or disubstituted by $(C_1–C_6)$alkoxy, $(C_2–C_6)$alkenyloxy, $(C_2–C_6)$alkynyloxy, $(C_1–C_6)$alkylthio, $(C_1–C_6)$alkylsulfinyl, $(C_1–C_6)$alkylsulfonyl, $(C_1–C_6)$alkoxycarbonyl or by phenyl; or is $(C_3–C_8)$cycloalkyl which can be monosubstituted or polysubstituted by halogen, or monosubstituted or disubstituted by $(C_1–C_4)$alkoxy or $(C_1–C_4)$alkylthio; or is $(C_5–C_8)$cycloalkenyl, cyclopropylmethyl, epoxypropyl, furfuryl, tetrahydrofurfuryl, or phenoxy$(C_1–C_6)$alkyl or phenyl both of which can be substituted in the phenyl ring by halogen, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy or $NO_2$;

$R^2$ is H, $(C_1–C_8)$alkyl, $(C_2–C_8)$alkenyl, $(C_2–C_8)$alkynyl or $(C_1–C_4)$alkoxy;

$R^3$ is a radical of formula



the $R^4$ radicals independently of one another are H, $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, $(C_3–C_8)$cycloalkyl, it being possible for the abovementioned radicals which contain C to be monosubstituted or polysubstituted by halogen or monosubstituted or disubstituted by $(C_1–C_6)$alkoxy, $(C_2–C_6)$alkenyloxy, $(C_2–C_6)$alkynyloxy, $(C_1–C_6)$alkylthio, $(C_1–C_6)$alkylsulfinyl, $(C_1–C_6)$alkylsulfonyl or $(C_1–C_6)$alkoxycarbonyl, or by phenyl which can be monosubstituted or polysubstituted by halogen, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy, $(C_1–C_4)$alkylthio, $(C_1–C_4)$alkoxycarbonyl or $NO_2$, it being furthermore possible for one of the two radicals $R^4$ to be phenyl which can be monosubstituted or polysubstituted by halogen, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy, $NO_2$ or $CF_3$, or for the two radicals $R^4$ together to be an alkylene radical $—(CH_2)_m—$;

the $R^5$ radicals independently of one another are H, or $(C_1–C_6)$alkyl which can be monosubstituted or polysubstituted by halogen or monosubstituted or disubstituted by $(C_1–C_6)$alkoxy, $(C_1–C_6)$alkylthio, $(C_1–C_6)$alkylsulfinyl or $(C_1–C_6)$alkoxycarbonyl, or it being possible for one of the radicals $R^5$ to be phenyl which can be monosubstituted or polysubstituted by halogen, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy, $NO_2$, $CF_3$ or $(C_1–C_6)$alkoxycarbonyl, or for the two radicals $R^5$ together to be an alkylene radical $—(CH_2)_n—$;

the $R^6$ radicals independently of one another are H, halogen, or $(C_1–C_6)$alkyl, $(C_1–C_6)$alkoxy or $(C_1–C_6)$alkylthio which can be monosubstituted or polysubstituted by halogen or monosubstituted or disubstituted by $(C_1–C_4)$alkoxy or $(C_1–C_4)$alkylthio; or are a radical $N(R^{11})_2$, $(C_3–C_6)$cycloalkyl, $—OCHR^7COOR^{11}$, $(C_3–C_5)$alkenyl, $(C_2–C_4)$alkynyl, $(C_3–C_5)$alkenyloxy or $(C_3–C_5)$alkynyloxy;

$R^7$ is H or $(C_1–C_4)$alkyl;

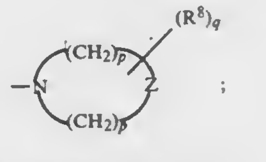
$R^8$ is $(C_1–C_4)$alkyl, $—CHF_2$ or $—CH_2CF_3$;

the $R^{11}$ radicals independently of one another are H, $(C_1–C_4)$alkyl, $(C_2–C_4)$alkenyl or $(C_3–C_4)$alkynyl;

X is O, S or $NR^{12}$;

Y is O or S;

$R^{12}$ is H, $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, $(C_1–C_6)$alkoxy, or a radical of formula



m is an integer from 2 to 6;

n is an integer from 3 to 6;

p is an integer from 1 to 3;

q is an integer from 0 to 3; and

Z is O, S, $CH_2$, NH or $N(C_1–C_4\text{-alkyl})$, or an agriculturally acceptable salt thereof to a noxious plant or to soil which is used in agriculture or industry.

---

### 5,015,285
### AROMATIC CARBOXYLIC ACID DERIVATIVES AND THE USE THEREOF FOR CONTROLLING UNDESIRABLE PLANT GROWTH

**Joachim Rheinheimer, Ludwigshafen; Peter Plath, Frankenthal; Karl Eicken, Wachenheim; Karl-Otto Westphalen, Speyer, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

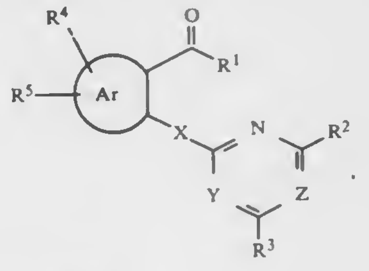
**Filed Sep. 19, 1989, Ser. No. 409,408**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832237**

**Int. Cl.$^5$ A01N** *43/54;* **C07D** *239/34, 239/38, 239/28*

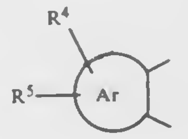
U.S. Cl. 71—92 8 Claims

1. An aromatic carboxylic acid derivative of the formula I



(I)

in which the radical



VOL
1126
ISS
2
MY
14
1991
UMI

is a substituted or unsubstituted quinoline, naphthalene or benzofuran radical,

$R^1$ is hydrogen, alkylidenaminoxy, unsubstituted or alkyl-substituted cycloalkylidenaminoxy, succinyliminoxy, unsubstituted or alkyl- or halogen-substituted alkenyloxy, alkynyloxy, unsubstituted or chloro- or methyl-substituted azolyl, alkylsulfonylamino, alkoxycarbonylalkyloxy, N-azolylalkyloxy, alkoxy which is unsubstituted or substituted by alkylthio, alkoxy, cyano, phenoxy, alkylcarbonyl or phenylcarbonyl, phenylalkoxy which is unsubstituted or substituted in the phenyl moiety by halogen, methoxy or methyl, hydroxyl or the radical $O^{\ominus}M^{\oplus}$, $M^{\oplus}$ being one equivalent of an alkali metal, alkaline earth metal or organic ammonium ion,

$R^2$ and $R^3$ are alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio,

X is oxygen or sulfur,

one of Y or Z is nitrogen and the other is the methine group, and

$R^4$ and $R^5$ are hydrogen, halogen, alkyl, haloalkyl, nitro, alkoxy, unsubstituted or alkyl- or halogensubstituted alkenyloxy, acylamino, alkylamino, dialkylamino or arylamino.

3. A herbicidal composition containing inert carriers and a herbicidally effective amount of an aromatic carboxylic acid derivative of the formula I as set forth in claim 1.

---

### 5,015,286

## 7-ETHOXY-5-FLUOROMETHYL-1,2,4-TRIAZOLO(1,5-A)-PYRIMIDINE-2-SULFONAMIDES

**Norman R. Pearson, Walnut Creek, Calif.; Chrislyn M. Carson, Midland, Mich., William A. Kleschick, Martinez, Calif.; assignors to The Dow Chemical Company, Midland, Mich.**

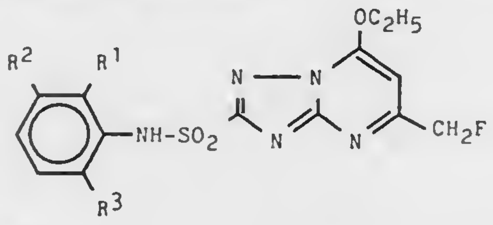
Division of Ser. No. 183,571, Apr. 19, 1988, Pat. No. 4,959,473. This application Mar. 6, 1990, Ser. No. 490,120

The portion of the term of this patent subsequent to Dec. 25, 2007, has been disclaimed.

Int. Cl.$^5$ A01N *43/90;* C07D *487/04*

U.S. Cl. 71—92 19 Claims

1. A compound of the formula:



wherein

$R^1$ represents H, F, Cl, Br, $CH_3$, $CF_3$, $NO_2$, $CO_2(C_1—C_4)$alkyl, or $CON(C_1—C_4)$alkyl$_2$;

$R^2$ represents H or $CH_3$; and

$R^3$ represents F, Cl, Br, $NO_2$, $CO_2(C_1—C_4)$alkyl, $CON(C_1—C_4)$alkyl$_2$, $OCH_3$, or $OC_2H_5$;

with the provisos that $R^1$ and $R^3$ are not simultaneously $NO_2$, $CO_2(C_1—C_4)$alkyl, or $CON(C_1—C_4)$alkyl$_2$ and $R^2$ is $CH_3$ when $R^1$ and $R^3$ both represent F, Cl, or Br;

and agriculturally acceptable salts thereof.

---

### 5,015,287

## STEEL MELTING AND SECONDARY-REFINING METHOD

**Katsuhiko Yamada, and Norio Egusa, both of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

Filed Jul. 25, 1989, Ser. No. 384,485

Claims priority, application Japan, Jul. 25, 1988, 63-186388

Int. Cl.$^5$ C21B *11/10*

U.S. Cl. 75—10.17 7 Claims

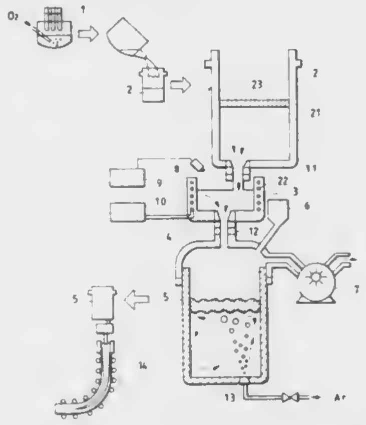
1. A method of melting and secondary-refining steel, said method comprising the steps of:

melting steel materials to produce molten steel and substantially simultaneously subjecting the molten steel to oxidation and decarburization, thereby progressing a dephosphorizing reaction;

tapping the molten steel into a primary ladle after a temperature of the molten steel has been raised incrementally to a value between a liquidus line temperature and 50° C. above the liquidus line temperature, thereby effectively dephosphorizing the steel;

teeming the molten steel into a refining furnace from the primary ladle;

controlling the temperature of the molten steel in the refining furnace utilizing a radiation sensor and an arithmetic unit to produce controlling signals along with an induction heater that heats the steel per the controlling signals, the temperature of the refining furnace being effectively regulated;



allowing the molten steel to flow into a secondary ladle at a lower portion of the secondary refining furnace while the temperture of the molten steel is raised by the induction heater; and

continuously bubbling argon gas into the secondary ladle, the secondary ladle having a vacuum within and slag existing within the secondary ladle, said bubbling step occurring concurrently with the flow of molten steel into the secondary ladle;

wherein said teeming, controlling, allowing and bubbling steps are continuously and simultaneously performed.

---

### 5,015,288

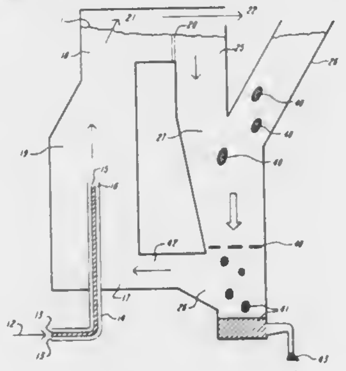
## GAS-FIRED ALUMINUM MELTER HAVING RECIRCULATING MOLTEN SALT BATH AND PROCESS

**Charles L. Kusik, Lincoln, and Edward Interess, Winchester, both of Mass., assignors to Gas Research Institute, Chicago, Ill.**

Filed Nov. 29, 1989, Ser. No. 443,716

Int. Cl.$^5$ C22B *21/06;* F27B *3/04*

U.S. Cl. 75—686 45 Claims



1. A process for melting aluminum in a recirculating molten salt bath, comprising the steps of:

heating a molten salt bath in a first container to a temperature at least sufficient for melting aluminum and causing the salt bath to flow upwards and out of said first container by combusting a gaseous fuel with a gaseous oxidant beneath the surface of the salt bath;

separating combustion products from said first container;

flowing the molten salt out of the top of said first container and thereafter downward into a second container;

introducing aluminum into the heated salt bath in said second container and allowing the aluminum to settle downward therein and melt;

separating molten aluminum from the downward-flowing molten salt; and

allowing the separated salt bath to recirculate from said second container to said first container for reheating.

---

### 5,015,289

## METHOD OF PREPARING A METAL BODY BY MEANS OF INJECTION MOLDING

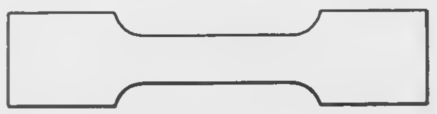
**Takuo Toda, and Masao Tsuda, both of Hiroshima, Japan, assignors to King Invest Co., Ltd., Hiroshima, Japan**

Filed Aug. 10, 1990, Ser. No. 565,976

Claims priority, application Japan, Feb. 2, 1990, 2-26319

Int. Cl.$^5$ B22F *1/00*

U.S. Cl. 75—229 14 Claims



1. In a method of preparing a metal body by means of injection molding wherein, a metal powder with short fibers and an organic binder, are mixed and kneaded, the kneaded mixture is injection molded to form a green body, the organic binder is removed from said green body to form a brown body, and the brown body is sintered, the improvement which comprises the short fibers have a melting point of about at least 350° C., are being added in an amount ranging from about 0.1 to 20 wt. % based on 100 wt. % of the metal powder, and such that at the time of sintering the shortened fibers, not less than 30 vol. % become fused with the metal powder and integrate with the metal.

---

### 5,015,290

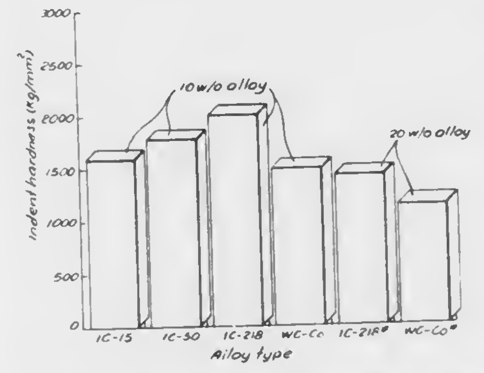
## DUCTILE $NI_3AL$ ALLOYS AS BONDING AGENTS FOR CERAMIC MATERIALS IN CUTTING TOOLS

**Terry N. Tiegs, Lenoir City, Tenn., and Robert R. McDonald, Traverse City, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

Division of Ser. No. 146,992, Jan. 22, 1988, Pat. No. 4,919,718. This application Oct. 12, 1989, Ser. No. 420,975

Int. Cl.$^5$ C22C *29/12*

U.S. Cl. 75—232 3 Claims



1. A cutting tool prepared from a composition comprising a refractory metal carbide and a ductile $Ni_3Al$ alloy.

---

### 5,015,291

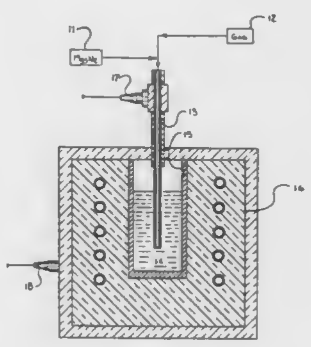
## PROCESS FOR DESULFURIZATION OF MOLTEN HOT METALS

**Edward J. Skach, Jr., Freeport, Tex., and Paul S. Frederick, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

Continuation-in-part of Ser. No. 366,814, Jun. 14, 1989. This application Dec. 8, 1989, Ser. No. 447,983

Int. Cl.$^5$ C21C *7/02*

U.S. Cl. 75—531 6 Claims



1. A process for desulfurizing molten metal comprising:

injecting a desulfurization reagent into the molten hot metal by a carrier gas via a lance immersed in said molten hot metal; said desulfurization reagent comprising powdered magnesium nitride.

---

### 5,015,292

## RECORDING FLUID FOR THE INK JET PROCESS

**Horst Bruder, Ludwigshafen; Rainer Dyllick-Brenzinger, Weinheim; Udo Mayer, Frankenthal, all of Fed. Rep. of Germany, and Steven J. Bares, Corvallis, Oreg., assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

Filed Jan. 23, 1989, Ser. No. 299,462

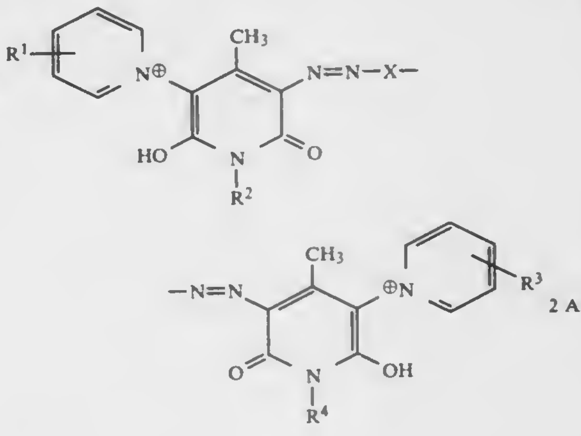
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801945

Int. Cl.$^5$ C02D *11/02*

U.S. Cl. 106—22 2 Claims

1. An ink jet process which comprises applying a recording fluid consisting essentially of 2-10% by weight of a dye, a water-miscible organic solvent, and 70 to 95% by weight of water, wherein the dye is represented by the formula I

(I)



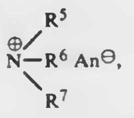
where

$An^-$ is an anion,

$R^1$ and $R^3$ are identical or different and each is independently of the other hydrogen, $C_1$–$C_4$-alkyl, carboxyl,

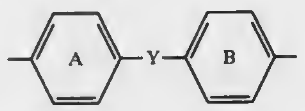
VOL 1126
ISS 2
MY 14 1991
UMI

$C_1$–$C_4$-akloxycarbonyl, carbamoyl or $C_1$–$C_4$-monoalkyl- or dialkyl-carbamoyl, $R^2$ and $R^4$ are identical or different and each is independently of the other hydrogen or $C_1$–$C_4$-alkyl which may be substituted by amino, $C_1$–$C_4$-monalkyl- or dialkyl-amino or by the radical

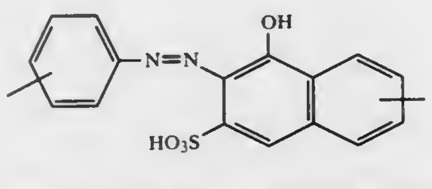


where $R^5$, $R^6$ and $R^7$ are identical or different and each is independently of the others $C_1$–$C_4$-alkyl and $An^-$ has the above-mentioned meaning, and X is a bridge member of the formula II or III

(II)



(III)



where Y is $C_1$–$C_6$-alkylene which may be interrupted by oxygen, imino or $C_1$–$C_4$-alkyamino, or is —N=N—, —CO—NH— or —$SO_2$—NH—, and the rings A and B are each independently unsubstituted or substituted by $C_1$–$C_4$-alkyl, hydroxyl, $C_1$–$C_4$-alkoxy, amino, $C_1$–$C_4$-monoalkyl, -dialkyl-amino, hydroxysulfonyl or A and B are each independently unsubstituted or substituted benzofused rings where said substituents are as defined above.

---

### 5,015,293

### METHOD OF FORMING A CROSSLINKED CHITOSAN POLYMER AND PRODUCT THEREOF

**Jean M. Mayer, Smithfield, R.I., and David L. Kaplan, Stow, Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 18, 1989, Ser. No. 408,975**

**Int. Cl.$^5$ C08L** *5/08;* **C08B** *37/08*

**U.S. Cl. 106—162** **18 Claims**

1. A method of forming a crosslinked chitosan polymer, comprising contacting chitosan with a basic solution of an epihalohydrin compound having a pH greater than 9, and heating the resulting mixture to a temperature between 35° C. and 45° C. and for a time sufficient to effect crosslinking of the chitosan.

---

### 5,015,294

### COMPOSITION SUITABLE FOR INJECTION MOLDING OF METAL ALLOY, OR METAL CARBIDE POWDERS

**David C. Ludwig, Towanda, Pa., assignor to GTE Products Corporation, Stamford, Conn.**

**Filed Apr. 4, 1990, Ser. No. 504,207**

**Int. Cl.$^5$ C08L** *91/06;* **B29C** *45/00;* **B29B** *11/08*

**U.S. Cl. 106—268** **5 Claims**

1. A composition suitable for injection molding of metallic material, said composition comprising about 2.8% to about 4.5% by weight of a binder and the balance a metallic material, said binder consisting essentially of about 6% to about 14% by weight of a fatty acid and the balance a hydrocarbon wax having a melting point of about 50° C. to about 100° C.

---

### 5,015,295

### FILLER FOR POLYESTER MOLDING COMPOUND AND METHOD

**Trevor G. Lamond, Quincy, Ill., assignor to J. M. Huber Corporation, Rumson, N.J.**

**Filed Jan. 31, 1989, Ser. No. 304,694**

**Int. Cl.$^5$ C09C** *1/02*

**U.S. Cl. 106—464** **11 Claims**

1. A process for making a Class I calcium carbonate filler suitable for use in a polyester molding compound comprising:
crushing a micritic Caribbean limestone having a $CaCo_3$ content of at least 95% by weight with no more than about 5% by weight impurities; and
dry grinding the crushed limestone to a median particle size in the range of 2 to 4 microns to produce a finely divided calcium carbonate filler having a Processing Stability Index less than about 150% and a Standard 30-Minute Viscosity or less than about 0.5 MMcps.

---

### 5,015,296

### CONTINUOUS EPIMERIZATION OF SUGARS, IN PARTICULAR D-ARABINOSE TO D-RIBOSE

**Walter Dobler, Heidelberg, and Joachim Paust, Neuhofen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

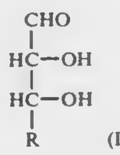
**Filed Apr. 22, 1988, Ser. No. 184,805**

**Claims priority, application Fed. Rep. of Germany, Apr. 30, 1987, 3714473**

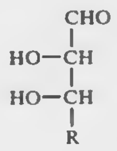
**Int. Cl.$^5$ C13K** *13/00*

**U.S. Cl. 127—42** **7 Claims**

1. A continuous process for epimerizing a pentose or hexose by heating a sugar in solution in a solvent in the presence of a basic anion exchanger charged with a molybdenum (VI) compound, which consists essentially of preparing a D- or L-sugar of the formula (Ia) or (Ib) having cis-disposed OH groups in the 2- and 3-positions of the sugar:

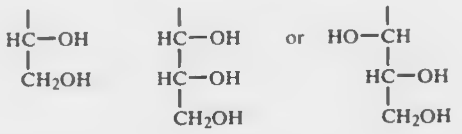


(Ia)

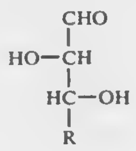


(Ib)

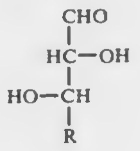
wherein R is one of the radicals of the formula:



by continuously passing a homogeneous solution of the corresponding sugar of the formula (IIa) or (IIb) having trans disposed OH groups in the 2- and 3-positions of the sugar:



(IIa)



(IIb)

in a mixture of water and methanol or water and ethanol through a reaction tube which contains the basic anion exchanger charged with the molybdenum (VI) compound, and further wherein said methanol and water are used in a ratio of about 95:5 to 30:70, respectively, and said ethanol and water are used in a ratio of about 85:15 to 30:70, wherein the conversion is equal or greater than about 35%.

---

### 5,015,297

### METHOD AND INSTALLATION FOR THE PRODUCTION OF ANHYDROUS CRYSTALLINE FRUCTOSE

**Haon Patrick, Le Gorgue, and Lemay Patrick, Lestrem, both of France, assignors to Roquette Freres, Lestrem, France**

**Continuation of Ser. No. 271,704, Nov. 16, 1988, abandoned, which is a continuation of Ser. No. 863,016, May 14, 1985, abandoned. This application Mar. 29, 1990, Ser. No. 501,377**

**Claims priority, application France, May 15, 1985, 85 07430**

**Int. Cl.$^5$ C13F** *1/02*

**U.S. Cl. 127—58** **21 Claims**

1. A method for the production of anhydrous crystalline fructose having a granulometric spectrum constant over time and characterized by a low proportion of fine and coarse crystals and by a high proportion of crystals of intermediate size, the said method comprising the steps of
selecting a crystallization zone having an upper and a lower end and establishing therein a temperature gradient decreasing globally downwards,
introducing continuously and under malaxation into the said crystallisation zone at a level close to its upper end a fructose syrup having a richness in fructose higher than 90% by weight and a concentration in dry matter higher than 70% by weight,
causing said syrup to travel undcr malaxation through said crystallization zone from the upper to the lower end in the presence of fructose crystals acting as crystallization seeds, said syrup and said crystals forming a mixture,
taking up from an intermediate level of the crystallization zone spaced from its ends by at least on sixth of the total length of said crystallization zone a fraction of the said mixture travelling through the said crystallization zone, said fraction representing from 40 to 110% by volume of the amount of fructose syrup introduced into the said crystallization zone,
recycling said fraction to a level close to the upper end of the crystallization zone,
subjecting the recycled fraction to a treatment adapted to fragment the crystals contained in this fraction in order to increase the number of seeds and to break aggregates of crystals,
collecting from a level close to the lower end of the crystallization zone a product highly enriched in anhydrous fructose crystals,
recovering said anhydrous crystals from said product.

---

### 5,015,298

### COMPOSITION AND METHOD FOR REMOVING IRON CONTAINING DEPOSITS FROM EQUIPMENT CONSTRUCTED OF DISSIMILAR METALS

**Stephen T. Arrington, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.**

**Continuation of Ser. No. 399,377, Aug. 22, 1989, abandoned, which is a continuation of Ser. No. 148,840, Jan. 27, 1988, abandoned. This application Jul. 24, 1990, Ser. No. 557,557**

**Int. Cl.$^5$ C23G** *1/06*

**U.S. Cl. 134—2** **7 Claims**

1. A method of cleaning and passivating at least one metal surface of equipment constructed of dissimilar metals, including at least one copper-containing metal and one ferrous-containing metal comprising:
contacting said surface with an aqueous cleaning composition that is free of ammonia and amines under conditions and for a period of time sufficient to remove iron containing deposits therefrom, without detrimentally effecting the dissimilar metals, said aqueous cleaning composition consisting of an alkali metal salt of citric acid formed by admixing citric acid with at least one base selected from the group consisting of alkali metal hydroxides, alkali metal carbonates and alkali metal phosphates, said base being admixed with said citric acid in an amount sufficient to make the pH of said composition in the range of from about 3.5 to about 4.5, and a corrosion inhibiting compound; and
after iron containing deposits are removed from said surface, adjusting the pH of said aqueous cleaning composition to a value in the range of from about 8 to about 10 and adding at least one oxidizing agent to said composition to passivate said metal surface.

---

### 5,015,299

### METHOD AND APPARATUS FOR THE REMOVAL OF DEPOSITS FROM THE INNER SURFACES OF HORIZONTAL CYLINDERS

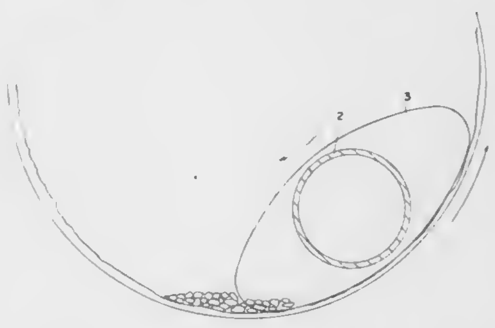
**Herbert Schweder, Magdeburg, German Democratic Rep., assignor to VEB Spezialbaukombinat Magdeburg, Magdeburg, Fed. Rep. of Germany**

**Filed Apr. 19, 1989, Ser. No. 340,239**

**Claims priority, application German Democratic Rep., May 19, 1988, 315913**

**Int. Cl.$^5$ B08B** *1/00, 9/08*

**U.S. Cl. 134—8** **14 Claims**



1. A process for the removal of a deposit from the inner surface of a rotating cylinder having a horizontal or inclined longitudinal axis, which comprises introducing a scraping body into the cylinder, said body being slidable forward and back in the axial direction in the cylinder either by the rotational movement of the cylinder or by means for axial propulsion of said slidable body within the cylinder, the surface of said body being in frictional engagement with the interior surface of the cylinder and for selectively scraping away said deposit, said body riding up to a point on the wall of the cylinder due to the frictional engagement, and then when the effect of the weight said body becomes greater than the frictional force of the engagement said body slides back in a generally radial direction toward the bottom of the cylinder while wearing away at least a part of said deposit within said cylinder by scraping action of the surface of said sliding body against the interior wall of the cylinder.

---

### 5,015,300

### METHOD AND APPARATUS FOR ADJUSTING A PRESELECTED SWEEPING SURFACE WIDTH OF A REVOLVING ROLL-TYPE BRUSH

**Konrad Leers, Wunstorf, Fed. Rep. of Germany, assignor to Schorling GmbH & Co. Waggonbau, Hanover, Fed. Rep. of Germany**

**Filed Dec. 11, 1989, Ser. No. 449,605**

**Claims priority, application Fed. Rep. of Germany, Dec. 7, 1988, 3841177; Dec. 7, 1988, 3841178**

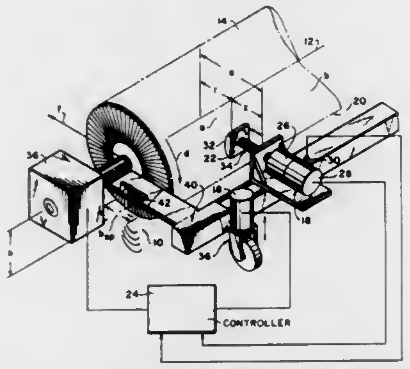
**Int. Cl.$^5$ B08B** *7/04*

**U.S. Cl. 134—18** **22 Claims**

1. A method of sweeping comprising adjusting a preselected sweeping surface width of a roll-type brush rotatable about an axis for the cleaning of surfaces such as roads, airport runways, wherein the spacing between the axis and the surface to be

VOL
1126
ISS
2
MY
14
1991
UMI

cleaned is altered by adjusting the sweeping surface, and wherein the roll diameter is detected by means of a sensor for the dimensioning of the nominal spacing of the roll diameter by bringing a scanning body into contact with the jacket surface of the revolving roll-type brush and by determining and adjusting the required spacing as deduced therefrom, said method comprising while sweeping a surface



advancing the scanning body first in the direction of the revolving roll-type brush at preset time intervals until contact with the jacket surface of the revolving brush is indicated by an altered signal of an acceleration recorder;

discontinuing the advance when such contact is indicated; and

measuring the distance of displacement of the scanning body to determine the diameter of the roll based on the displacement at a number of selectable measuring sites.

---

### 5,015,301

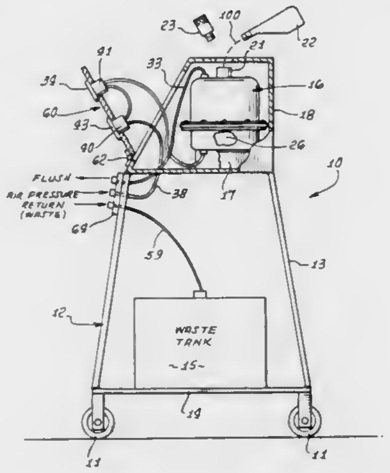
### VEHICLE POWER STEERING FLUSH APPARATUS AND METHOD

**James L. Baylor, Fontana; Tsu-Pow G. Tsao, Lakewood, and Michael J. Camacho, Covina, all of Calif., assignors to Wynn Oil Company, Fullerton, Calif.**

**Filed Mar. 1, 1990, Ser. No. 487,196**

**Int. Cl.$^5$ B08B** *3/00, 9/00*

**U.S. Cl. 134—22.1** **16 Claims**



1. In a system for flushing a vehicle power steering apparatus that contains first pressure fluid, the combination comprising:

(a) a container having a first zone for reception of a quantity of flushing liquid, and having a second fluid pressure zone, the container having an inlet for filling said flushing liquid into said first zone,

(b) a pusher carried by the container to extend between said zones,

(c) flushing liquid delivery means operatively connected with the container to receive pressurized flushing liquid displaced under pressure from said first zone in response to movement of the pusher in the container,

(d) a vehicle power steering apparatus enclosure connected with said delivery means to receive pressurized flushing liquid for flushing said apparatus,

(e) and the container having a second inlet connectible with a source of fluid pressure to be controllably delivered to said second zone for pressurally displacing said pusher toward the first zone, thereby to pressurize said flushing liquid and expel a quantity thereof to said delivery means.

---

### 5,015,302

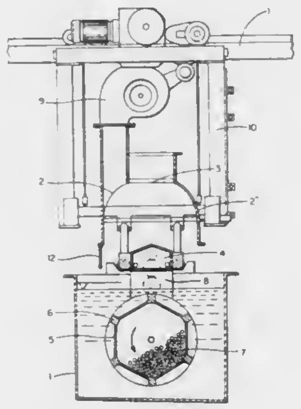
### SYSTEM AND METHOD FOR RECOVERING AND RECYCLING OF ADHERING SURFACE-TREATMENT SOLUTIONS FROM BARRELS AND THEIR LOADS

**Hans J. Henig, Albrecht-Achilles-Str. 48, Nürnberg, Fed. Rep. of Germany 8500**

**Filed Feb. 28, 1990, Ser. No. 486,376**

**Int. Cl.$^5$ B08B** *5/02, 7/04*

**U.S. Cl. 134—25.4** **20 Claims**



1. A system for removing adhering surface-treating aqueous solution from a barrel and its load of articles in bulk after electro-plating and/or chemical surface treatment and recovery of said solution, comprising:

a container for said solution;

a barrel aggregate for containing said load;

means for moving said barrel aggregate between a position inside said solution container and a position outside of and above said solution container;

a substantially half cylinder shell for partially embracing said barrel aggregate in said outside position so that said shell embraces substantially only that upper part of said barrel which is not filled with said load, said shell being stationary with respect to said barrel aggregate in any position thereof; and

means for supplying a stream of pressurized air flowing through said substantially half cylinder shell into said upper part of said barrel aggregate and in continuation through said load downwardly and out of said barrel aggregate for removing the adhered treating solution from said barrel aggregate and load and directly flowing the solution back to said container.

### 5,015,303

### LOW PROFILE ROLL CLEANING APPARATUS AND SELF ALIGNING BEARING USED THEREIN

**George C. Perneczky, 8918 Biloba, Orland Park, Ill. 60462**

**Division of Ser. No. 222,773, Jul. 22, 1988, Pat. No. 4,887,329. This application Aug. 30, 1989, Ser. No. 400,336**

**Int. Cl.$^5$ B08B** *1/04*

**U.S. Cl. 134—32** **12 Claims**

1. A method of automatically cleaning contaminants from a surface moving in rotational motion, with said surface having a width along the longitudinal axis of said rotational motion, comprising the steps of:

orienting at least one polishing block for polishing said moving surface with the longitudinal axis of said polishing block parallel to the longitudinal axis of said rotational motion;

swingingly engaging said polishing block with said moving surface about an axis of rotation; and

reciprocally scrubbing said moving surface with said polishing block being reciprocally moved along the width of said moving surface.

---

### 5,015,304

### RARE EARTH-IRON-BORON SINTERED MAGNETS

**Mohammad H. Ghandehari, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 48,321, May 11, 1987. This application Oct. 30, 1989, Ser. No. 428,855**

**Int. Cl.$^5$ H01F** *1/53*

**U.S. Cl. 148—302** **29 Claims**

1. A permanent magnet comprising a heavy lanthanide metal near the grain boundaries of light rare earth-iron-boron particles, said magnet prepared by a method comprising the steps of:

(a) mixing a particulate alloy containing at least one light rare earth metal, iron, boron, a ferromagnetic metal selected from the group consisting of nickel, cobalt, and mixtures thereof with at least one particulate metal additive containing a heavy lanthanide metal, said particulate alloy comprising a main magnetic phase having an empirical formula of about $Nd_2(FeCo)_{14}B$;

(b) aligning magnetic domains of the mixture in a magnetic field;

(c) compacting the aligned mixture to form a shape; and

(d) sintering the compacted shape for sufficient time to produce said permanent magnet having said heavy lanthanide metal near the grain boundaries of particles of said main magnetic phase.

---

### 5,015,305

### HIGH TEMPERATURE HYDROGENATION OF GAMMA TITANIUM ALUMINIDE

**Francis H. Froes, Moscow, Id., and Simon D. Shong, Taiwan, Taiwan, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Feb. 2, 1990, Ser. No. 474,196**

**Int. Cl.$^5$ C21D** *1/00;* **C22F** *1/18*

**U.S. Cl. 148—20.3** **12 Claims**

1. A method for refining the microstructure and enhancing the processability of titanium aluminum alloys containing about 45 to 55 atomic percent aluminum which comprises the steps of:

(a) rapidly solidifying a titanium aluminum alloy containing about 45 to 55 atomic percent aluminum in a hydrogen-containing atmosphere to provide a hydrogenated, rapidly solidified material having at least one dimension not greater than about 100 micrometers, and;

(b) diffusing hydrogen out of the hydrogenated solid material.

---

### 5,015,306

### METHOD FOR PREPARING RARE EARTH-IRON-BORON SINTERED MAGNETS

**Mohammad H. Ghandehari, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 48,321, May 11, 1987. This application Oct. 30, 1989, Ser. No. 428,857**

**Int. Cl.$^5$ H01F** *1/02*

**U.S. Cl. 148—103** **29 Claims**

1. A method for producing permanent magnets, comprising the steps of:

(a) mixing a particulate alloy containing at least one light rare earth metal, iron, boron, a ferromagnetic metal selected from the group consisting of nickel, cobalt, and mixtures thereof, with at least one particulate metal additive containing a heavy lanthanide metal, said particulate alloy comprising a main magnetic phase having an empirical formula of about $ND_2(Fe+Co)_{14}B$;

(b) aligning magnetic domains of the mixture in a magnetic field;

(c) compacting the aligned mixture to form a shape; and

(d) sintering the compacted shape for sufficient time to produce said permanent magnets having said heavy lanthanide metal near the grain boundaries of particles of said main magnetic phase.

---

### 5,015,307

### CORROSION RESISTANT RARE EARTH METAL MAGNET

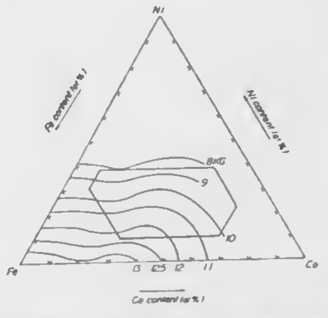
**Michio Shimotomai; Yasutaka Fnkuda, and Akira Fujita, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo Pref., Japan**

**Filed Sep. 30, 1988, Ser. No. 251,366**

**Claims priority, application Japan, Oct. 8, 1987, 62-252320; Dec. 23, 1987, 62-323804**

**Int. Cl.$^5$ H01F** *1/053*

**U.S. Cl. 148—302** **4 Claims**



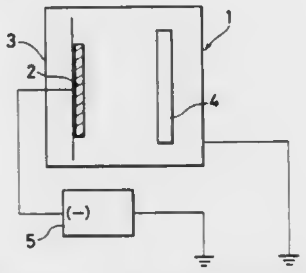
1. A corrosion-resistant rare earth metal-transition metal magnet alloy having a composition consisting of 10–25 at % of RE, wherein RE represents at least one metal selected from the group consisting of the rare earth elements inclusive of Y; 2–20 at % of B; and the remainder being transition metals of Fe, Co and Ni in such amounts that the amount of Fe is not less than 10 at % but less than 73 at %, that of Co is 7–50 at %, that of Ni is 9–30 at %, the total amount of Fe, Co and Ni is not less than 55 at % but less than 88 at %, and a ratio of (Co+Ni)at %/(Fe+Co+Ni)at % is more than about 40%; wherein said magnet alloy exhibits 0% rusty surface area fraction.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,308
### CORROSION-RESISTANT AND HEAT-RESISTANT AMORPHOUS ALUMINUM-BASED ALLOY THIN FILM AND PROCESS FOR PRODUCING THE SAME

**Hiroshi Yamagata, Tateyama, Japan, assignor to Tsuyoshi Masumoto and Yoshida Kogyo K.K., both of, Japan, a part interest**

**Filed Jul. 11, 1989, Ser. No. 378,169**
**Claims priority, application Japan, Jul. 22, 1988, 63-181625**
**Int. Cl.$^5$ C22C *21/00, 1/00***
**U.S. Cl. 148—403** **4 Claims**



1. A corrosion-resistant and heat-resistant aluminum-based alloy thin film having a composition represented by the general formula:

$Al_aNi_bX_cN_d$

wherein: X is a metal element selected from Y and Zr and a, b, c and d are atomic percentages falling within the following ranges:
$70 \leqq a \leqq 93$, $0.5 \leqq b \leqq 7.5$, $0.5 \leqq c \leqq 12$ and $1 \leqq d \leqq 18$,
said film being at least 50% by volume composed of an amorphous phase.

2. A process for producing a corrosion-resistant and heat-resistant aluminum-based alloy thin film, said film being at least 50% by volume of an amorphous phase, said process comprising depositing a material prepared so as to provide a composition represented by the general formula:

$Al_aNi_bX_cN_d$

wherein X is a metal selected from Y and Zr and a, b, c and d are atomic percentages falling within the following ranges:
$70 > a > 93$, $0.5 > b > 7.5$, $0.5 > c > 12$ and $1 > d > 18$,
onto a substrate by a thin film formation technique selected from a group of techniques consisting of ion plating, sputtering and vacuum depositing and thereby forming the thin film having said composition.

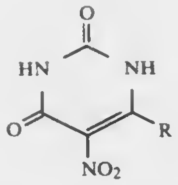
---

### 5,015,309
### GAS GENERANT COMPOSITIONS CONTAINING SALTS OF 5-NITROBARBITURIC ACID, SALTS OF NITROOROTIC ACID, OR 5-NITROURACIL

**Robert B. Wardle, Logan, and W. Wayne Edwards, Tremonton, both of Utah, assignors to Morton International, Inc., Chicago, Ill.**

**Filed May 4, 1989, Ser. No. 347,540**
**Int. Cl.$^5$ C06B *45/10***
**U.S. Cl. 149—19.1** **17 Claims**

1. A composition comprising:
A. from about 25% to about 75% by weight of a heterocyclic compound having the structure:



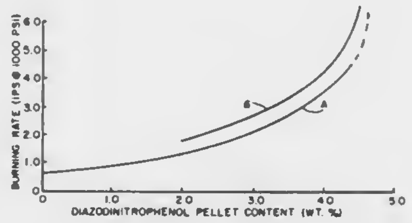
wherein R is selected from the group consisting of
hydrogen,
—$CO_2X$, and
—OX
and X is a cation selected from metals of Group I-A of the Periodic Table (except sodium), calcium, strontium, or barium;
B. from about 25% to about 75% by weight of an anhydrous oxidizing salt having a cation selected from metals of Group I-A of the Periodic Table (except sodium), calcium, strontium, or barium, said salt having an anion which is essentially free of carbon, hydrogen or halogens; and
C. from 0 to about 5% by weight of a binder.

---

### 5,015,310
### EMBEDDED EXPLOSIVES AS BURNING RATE ACCELERATORS FOR SOLID PROPELLANTS

**David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 4, 1990, Ser. No. 593,428**
**Int. Cl.$^5$ C06B *45/10***
**U.S. Cl. 149—19.9** **4 Claims**



1. A method of achieving an ultrahigh-burning rate for a composite solid propellant composition comprised of a hydroxyl-terminated polybutadiene binder system including an polyisocyanate curative as an additive of up to about 1 weight percent, an ammonium perchlorate oxidizer, and an aluminum metal fuel, said method comprising:
(i) providing said composite solid propellant composition in an uncured homogeneously mixed state which comprises a weight percent range from about 95 to about 99 of said ultrahigh burning rate composite solid propellant composition;
(ii) providing a solid explosive composition of diazodinitrophenol of predetermined shapes and dimensions of cubes or pellets, said dimension when of a cube shape being from about 1/16 inch to about 3/32 inch on each side, and said dimension when of a pellet shape being from about 1/16 inch to about 3/32 inch diameter;
(iii) adding a predetermined amount from about 1 weight percent to about 5 weight percent of said diazodinitrophenol to said weight percent ranges of said uncured homogeneously mixed composite solid propellant composition;
(iv) mixing said uncured uniformly mixed composite solid propellant composition with said added amount of said diazodinitrophenol to achieve a homogenous mixture; and,
(v) curing said uncured uniformly mixed composite solid propellant containing said diazodinitrophenol to yield an ultrahigh-burning rate composite solid propellant grain wherein said diazodinitrophenol functions as a burn rate accelerator.

---

### 5,015,311
### PRIMARY/DETONATOR COMPOSITIONS SUITABLE FOR USE IN COPPER CUPS

**Coodly P. Ramaswamy, Christiana, Pa., assignor to Breed Automotive Technology, Inc., Boonton Township, Morris County, N.J.**

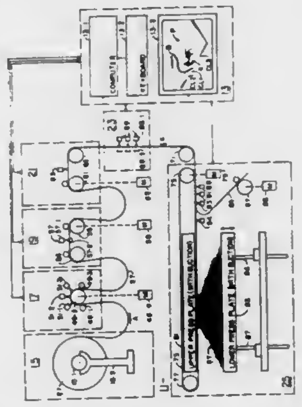
**Filed Oct. 3, 1990, Ser. No. 593,906**
**Int. Cl.$^5$ C06B *33/06***
**U.S. Cl. 149—42** **4 Claims**

1. A primer/detonator composition housed in a copper cup comprised of the following: antimony sulfide, potassium chlorate, zirconium and lead ferrocyanide.

---

### 5,015,312
### METHOD AND APPARATUS FOR CONSTRUCTING A THREE-DIMENSIONAL SURFACE OF PREDETERMINED SHAPE AND COLOR

**Norman F. Kinzie, 45 Brentwood Cir., Needham, Mass. 02192**
**Continuation of Ser. No. 102,577, Sep. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 36,023, Apr. 8, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 291,389**
**Int. Cl.$^5$ B44C *3/02***
**U.S. Cl. 156—63** **28 Claims**



1. A method of constructing a three-dimensional surface of predetermined shape and having a predetermined color pattern, the method comprising the steps of:
a. providing information corresponding to the shape and to the color pattern of said three-dimensional surface at a plurality of different cross-sections and information corresponding to the order of the cross-sections,
b. providing a length of sheet material, the sheet material having a top surface, a bottom surface and an edge, the sheet material being either ink absorbing or a material which will transmit color throuth an edge when colored on either the top surface or the bottom surface in the vicinty of the edge.
c. producing a series of color profiles on either the top surface or the bottom surface of said sheet material using said information and using either a liquid or dry coloring agent if the sheet material is one that will transmit color through an edge when colored on either the top surface or bottom surface in the vicinity of the edge or a liquid coloring agent capable of being absorbed if the sheet material is ink absorbing, each color profile corresponding to the shape and to the color pattern of said three-dimensional surface at a different cross-section, then
d. removing all of the sheet material outside of each color profile so produced so as to leave a series of unconnected individually shaped planar elements, each planar element having a shape in accordance with its color profile, and then
e. stacking the planar elements so produced adjacent one to another in the order of the cross-sections to which they correspond to form said three-dimensional surface.
f. whereby, the color perceived of the three-dimensional surface so produced will correspond to the color of the planar elements.

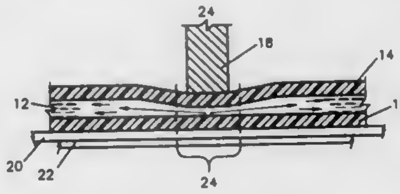
27. Apparatus for constructing a three-dimensional surface of predetermined shape and color from information corresponding to the shape and color of the three-dimensional surface at a plurality of different cross-sections, the apparatus comprising:
a. a form constructing station for forming the three-dimensional surface, and
b. a computer for controlling the operations of the form constructing station,
c. the form constructing station including:
  i. a supply reel for holding a quantity of sheet material, the sheet material having a top surface, a bottom surface and an edge and being either ink absorbing or a material that will transmit color through an edge when colored on either the top surface or the bottom surface in the vicinity of the edge, the bottom surface of the sheet material being coated with a pressure sensitive adhesive,
  ii. a take up reel for receiving sheet material from the supply reel,
  iii. a press plate equipped with suction disposed between said supply reel and said take up reel underneath said sheet material and movable up and down,
  iv. movable roller means for pressing the sheet material between the supply reel and the take up reel down over the press plate, and
  v. means for drawing a color profile on the sheet material while it is over the press plate, cutting the color profile to shape while it is over the press plate and removing waste material from the color profile so cut.

---

### 5,015,313
### PROCESS FOR HEAT SEALING PACKAGES

**Terrence M. Drew; Chris A Hanson, and Alden B. Hanson, all of Boulder, Colo., assignors to Alden Laboratories, Inc., Boulder, Colo.**

**Filed Nov. 9, 1989, Ser. No. 435,087**
**Int. Cl.$^5$ B32B *31/00, 31/20;* C09J *5/02***
**U.S. Cl. 156—87** **10 Claims**



1. A method for sealing a material within a package comprising:
(a) placing a polar liquid-containing material within a package comprising an upper sheet and a lower sheet of heat-sealable material,
(b) applying an alternating electromagnetic energy field to a portion of said heat-sealable package using a device having electrodes,
(c) vaporizing at least a portion of said polar liquid effective to clear the seal area of contaminating material by forcing said contaminating material out from between said sheets in a direction away from the seal area, without causing undesirable arcing between said electrodes, and
(d) continuing said application of said alternating electromagnetic energy field until said portion of said heat-sealable package is sealed.

VOL
1126
ISS
2
MY
14
1991
UMI

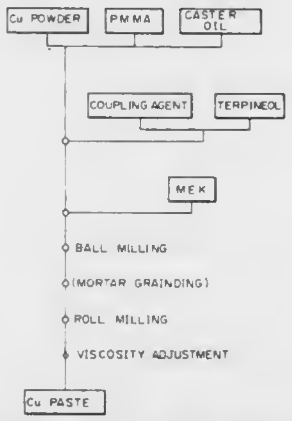
9. A sealing process comprising:
(a) vacuum molding a first piece of resinous material in order to achieve a desired shape,
(b) placing flowable, pressure-compensating material within said vacuum molded resinous material, said flowable, pressure-compensating material containing from 0.5 weight percent to about 5 weight percent water,
(c) placing a second piece of resinous material adjacent said first vacuum molded piece,
(d) removing air from between the two pieces of resinous material,
(e) applying radio frequency energy using a device having electrodes to overlapping edges of said two pieces of resinous materials until said water in said flowable, pressure-compensating material vaporizes in order to clear the seal area of flowable, pressure-compensating material by forcing said material out from between said two pieces of resinous material in a direction away from the seal area, without causing undesirable arcing between said electrodes, and
(f) continuing said radio frequency energy until portions of said two pieces of resinous material seal together.

---

### 5,015,314
## METHOD FOR PRODUCTION OF CERAMIC CIRCUIT BOARD

**Hitoshi Suzuki, Zama; Hiromitsu Yokoyama, Sagamihara; Mineharu Tsukada, Yamato; Hiromi Ogawa, Yokohama; Nobuo Kamehara, Isehara, and Koichi Niwa, Tama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

Continuation of Ser. No. 132,075, Dec. 11, 1987, abandoned.
This application Jan. 19, 1990, Ser. No. 469,739
Claims priority, application Japan, Dec. 17, 1986, 61-298889
Int. Cl.$^5$ C04B *41/82*
U.S. Cl. 156—89 3 Claims



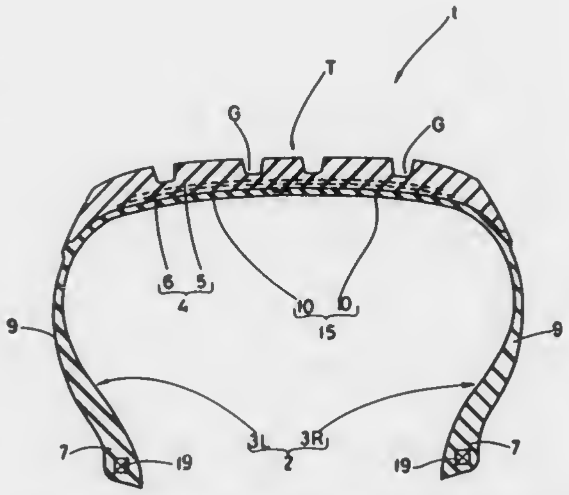
1. A method for producing a ceramic circuit board comprising the steps of (i) forming a conductor portion of the ceramic circuit board by printing a conductive paste composition on at least one ceramic base plate for the ceramic circuit board and then (ii) firing said ceramic circuit board together with said conductive paste composition printed thereon, said paste composition consisting essentially of (a) a copper powder, (b) a vehicle composed of an organic thermally depolymerizable binder, and (c) 0.5 to 3.5 parts by weight of isopropyl tridodecylbenze sulfonyl titanate and 0.5 to 3.5 parts by weight of isopropyl triisostearoyl titanate, both based on 100 parts by weight of the copper powder.

---

### 5,015,315
## METHOD OF MAKING A PNEUMATIC TIRE

**Eiji Nakasaki, Kakogawa, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**

Filed Feb. 24, 1989, Ser. No. 315,117
Claims priority, application Japan, Feb. 27, 1988, 63-44943
Int. Cl.$^5$ B29D *30/06*
U.S. Cl. 156—130.7 2 Claims



1. A method of manufacturing a pneumatic tire comprising a tire main body and a tread main body disposed therearound, said method comprising the steps of:
forming a pair of circular half body members from a pull resistant high polymer material, wherein each of said circular half body members comprises a bead portion, a sidewall portion extending radially outwardly from said bead portion, and a tread base portion extending axially inwardly from said sidewall portion, each of said tread base portions being provided at its axially innermost edge with a thin narrow joiner connecting member;
connecting said circular half body members to each other to form said tire main body by overlapping said respective joiner connecting members of each of said tread base portions of said respective circular half body members to provide a combined single tread base;
pressing said overlapped joiner members of said tread base portions together, each of said tread base portions being provided with a circumferentially extending rib on at least one of a radially inner side and outer side of said respective tread base portion for engaging with corresponding circumferentially extending grooves of a pressing tool to fit said ribs during the pressing step, whereby lateral movement of said tread base portions is prevented;
heating said overlapped joiner members of said tread base portions;
applying a tread main body to an outer periphery of said single tread base formed from said connected tread base portions of said half body members to form a raw cover tire, said tread main body including an uncured rubber tread and an uncured breaker;
placing said raw cover tire into a vulcanizing mold; and
vulcanizing said raw cover tire in said mold to unite said tread main body and said tire main body by the heat of vulcanization.

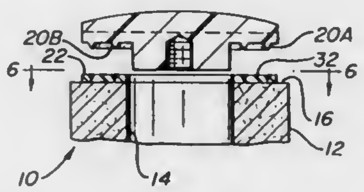
---

### 5,015,316
## FILTER ELEMENT

**Eugene A. Ostreicher, Farmington, Conn., and Joseph R. Infantino, Chappaqua, N.Y., assignors to Cuno, Incorporated, Meriden, Conn.**

Continuation of Ser. No. 153,874, Feb. 8, 1988, abandoned, which is a continuation of Ser. No. 38,078, Apr. 14, 1987, Pat. No. 4,725,323, which is a division of Ser. No. 736,873, May 22, 1985, abandoned. This application Sep. 13, 1989, Ser. No. 406,852

The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.
Int. Cl.$^5$ B65B *7/28;* B01D *27/08*
U.S. Cl. 156—69 6 Claims



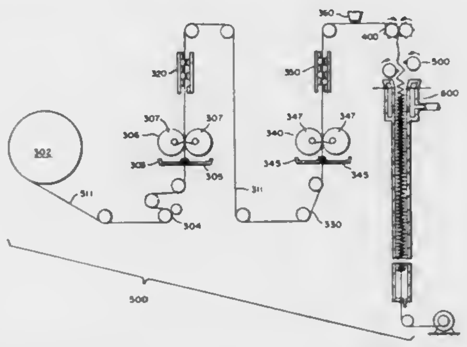
1. A method of manufacturing filter elements, comprising:
forming a filtering structure having at least one end adapted to coact with a filter housing;
forming a gasket means from a preformed resilient thermoplastic polymer closed cell foam sheet, said gasket means for sealing the end of the filtering structure and coacting with the housing for the filter;
heating the end of the filtering structure to a sufficiently high temperature adequate to form a melt surface on only one surface of the gasket sheet when the gasket is contacted to the heated end of the filtering structure; and subsequently,
contacting the heated end of the filtering structure to one surface of the gasket, whereby the melt surface is formed from and integral with the gasket sheet on said surface and adheres the gasket to the end of the filter structure, the gasket's other surface remaining sufficiently resilient to coact with the filter housing for sealing the end of the filter.

---

### 5,015,317
## METHOD AND APPARATUS FOR MAKING A MULTI-CELLULAR COLLAPSIBLE SHADE

**John A. Corey, Melrose, and John T. Schnebly, Rensselaer, both of N.Y., assignors to Comfortex Corporation, Cohoes, N.Y.**

Filed Dec. 22, 1988, Ser. No. 287,740
Int. Cl.$^5$ B32B *31/12*
U.S. Cl. 156—197 12 Claims



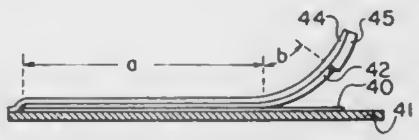
9. A method of forming a multi-cellular collapsible shade in the form of a single continuous length of pleated flexible web material comprising the steps of:
coating portions of both faces of a continuously fed web with an adhesive bonding substance in a predetermined pattern, said pattern comprising a plurality of narrow parallel strips extending transversely to the length of the web material;
detecting the precise longitudinal location of said stripes along the moving web;
transversely creasing the moving web at predetermined locations relative to said strips of said bonding pattern to establish a pleat pattern on the web, said creases extending parallel to said adhesive bonding stripes, said creases being created by creasing elements whose registry with the moving web is continuously adjustable as the web passes thereby;
dynamically adjusting the registry of said creasing elements with the moving web while the web is being pleated, as required to continuously maintain said predetermined locations in response to said detecting step;
folding the coated and creased web along said transverse creases and upon itself in alternating opposite directions; and
accumulating a stack of alternatingly directed pleats to form an array of tubular cells each extending transversely to the length of the web, with adjacent cells being joined together by said adhesive bonding strips.

---

### 5,015,318
## METHOD OF MAKING TAMPER- EVIDENT STRUCTURES

**Paul Smits; Aron M. Rosenfeld, both of Kingston, Canada, and Howard F. DeFerrari, Louisville, Ky., assignors to Alcan International Limited, Montreal, Canada**

Division of Ser. No. 83,720, Aug. 10, 1987, Pat. No. 4,837,061.
This application Jan. 11, 1989, Ser. No. 295,899
Int. Cl.$^5$ B32B *31/00, 31/20;* B65D *65/28*
U.S. Cl. 156—233 2 Claims



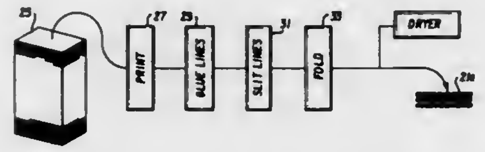
1. A method of forming a tamper evident structure, which comprises:
forming a laminate capable of generating a substantially non-dichroic color by a light interference and absorption phenomenon by providing a layer of a metal of medium light reflectivity, anodizing a surface of said metal to form a film of an oxide of said metal on said surface, depositing a translucent layer of a metal of medium light reflectivity on a surface of said film by a vapour deposition technique, and anodizing a surface of said translucent layer to form a film of an oxide of said metal forming said translucent layer, said anodization of said translucent metal layer being carried out in presence of fluorine ions, at least in limited areas of said surface of said translucent metal layer, to make said film of an oxide of the metal of said translucent layer detachable from said translucent layer at least in said limited areas; and
adhering a flexible strip of transparent or translucent material over said laminate in such a manner that the strength of attachment of the flexible strip to the laminate exceeds the adhesive strength between the film of an oxide of the metal of said translucent layer and the translucent metal layer, at least in said limited areas.

VOL 1126
ISS 2
MY 14 1991
UMI

### 5,015,319

### PROGRAMMABLE RACK AND SYSTEM FOR MAKING SAME

**Richard Wilen, 8 Roxbury Ct., Oakdale, N.Y. 11769**
**Filed Jul. 30, 1987, Ser. No. 79,597**
**The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.**
**Int. Cl.⁵ B32B** *31/00, 3/00;* **G09F** *19/00*
U.S. Cl. 156—227 **8 Claims**



1. A method for making a programmable organizer from a paper supply comprising the steps of:

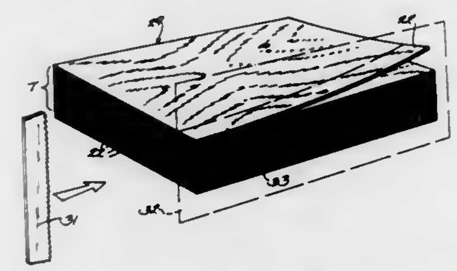
(a) feeding paper from said paper supply into a printer for printing data thereon;
(b) feeding said paper into a pattern gluer for laying down a pattern of glue stripes on the face of said paper;
(c) feeding said paper into a pattern slitter for cutting a pattern of slits in the surface of said paper, each slit of said pattern of slits being offset from the glue stripes; and
(d) folding said paper over itself for forming a two ply sheet of paper held together by said pattern of glue stripes, said pattern of glue stripes forming longitudinal pockets across said two ply sheet, the offset said slits forming openings in said longitudinal pockets.

---

### 5,015,320

### LAMINATE WOOD STRUCTURE

**Carl W. Abendroth, and Gary Stephenson, both of Crystal Falls, Mich., assignors to AGA, Inc., Amasa, Mich.**
**Division of Ser. No. 905,284, Sep. 8, 1986, Pat. No. 4,784,887. This application Aug. 5, 1988, Ser. No. 228,483**
**Int. Cl.⁵ B52B** *3/10*
U.S. Cl. 156—264 **18 Claims**



1. A method of forming a laminate wood structure in the form of a board having a desired length, width and thickness, and having a surface composed substantially entirely of edge-grain, said method comprising the steps of providing a plurality of substantially planar wooden plys each having a dimension along the direction of the wood grain of said ply at least as long as the desired length of said board, bonding said plys to one another in substantially parallel stacked relationship such that the direction of the wood grain of each ply is substantially the same and such that the total thickness of the resulting stack substantially equals or exceeds the desired width of said board. and further comprising the step of cutting said stack along the direction of the wood grain of said plys and perpendicularly to the plane of said plys so as to form an elongate board having a thickness of at least about 0.500 inches and a surface composed of the edge-grain of said individual plys exposed by said cutting.

---

### 5,015,321

### ADHESIVE AND ITS USE FOR PRODUCING ADHESIVE BONDS

**Bernhard Jansen, Cologne; Hanns P. Müller, Bergisch-Gladbach, and Rudolf Hombach, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**
**Continuation of Ser. No. 145,785, Jan. 15, 1988, abandoned. This application Jun. 29, 1989, Ser. No. 373,359**
**Claims priority, application Fed. Rep. of Germany, Jan. 23, 1987, 3701888**
**Int. Cl.⁵ C09J** *4/04;* **C08L** *51/08*
U.S. Cl. 156—331.7 **8 Claims**

1. A method for bonding a first substrate to a second substrate comprising applying a moisture curable adhesive to said first substrate and placing said second substrate together with said first substrate with said adhesive positioned therebetween said adhesive comprising the reaction product of

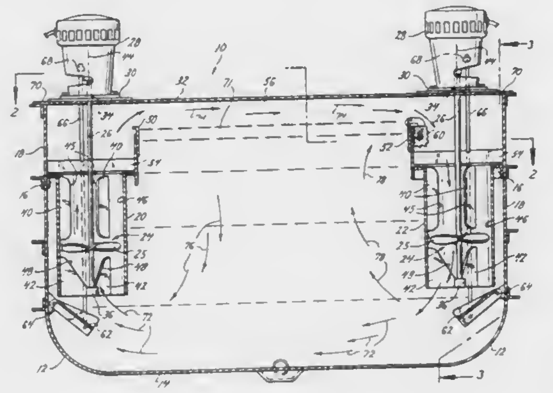
(i) at least one organic polyisocyanate,
(ii) at least one filled polyol, said filled polyol comprising
  (1) a polyether polyol,
  (2) the radical polymerization product of (a) acrylonitrile or (b) a mixture of styrene and acrylonitrile and
  (3) a product obtained by grafting at least some of said (2) on said (1), said radical polymerization product being present in an amount of 1-50% relative to the weight of said filled polyol, said reaction product being characterized in that it contains 2.5 to 25% by weight of free isocyanate groups.

---

### 5,015,322

### TANK ARRANGEMENT PARTICULARLY DESIGNED FOR CHEMICAL MILLING OPERATIONS

**Bruce M. Griffin, St. Charles; Robert G. Werkema, St. Louis, both of Mo., and Elbert D. Watt, Godfrey, Ill., assignors to McDonnell Douglas Corporation, Long Beach, Calif.**
**Filed Feb. 23, 1990, Ser. No. 483,788**
**Int. Cl.⁵ B44C** *1/22;* **C23F** *1/00;* **C03C** *15/00, 25/06*
U.S. Cl. 156—345 **14 Claims**



1. A tank arrangement particularly adapted for processing parts in chemical milling operations, which comprises

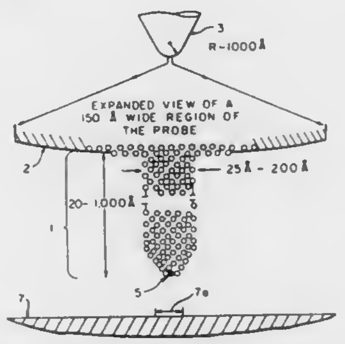
a tank adapted to contain a fluid for treatment of parts for chemical milling thereof,
a first draft tube mounted adjacent one end of said tank,
a second draft tube mounted adjacent the other end of said tank,
a first impeller enclosed within said first draft tube, and arranged to produce upward flow of fluid entering said first draft tube from said tank,
a second impeller enclosed within said second draft tube, and arranged to produce downward flow of fluid entering said second draft tube from said tank, and
means positioned within each of said draft tubes to prevent the formation of vortices above, within and below said draft tubes.

---

### 5,015,323

### MULTI-TIPPED FIELD-EMISSION TOOL FOR NANOSTRUCTURE FABRICATION

**Alan C. Gallagher, Louisville, Colo., assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.**
**Filed Oct. 10, 1989, Ser. No. 419,164**
**Int. Cl.⁵ C23F** *1/02*
U.S. Cl. 156—345 **7 Claims**



1. A device for the fabrication of molecular or crystalline nanostructures on a substrate surface comprising:

a field emitting probe having an end surface, and
at least one probe tip extension which extends from the end surface of said probe, said probe tip extension having a length of about 20–1,000 Å and a diameter or width of about 25–200 Å, said probe tip extension having an end distal from said probe end surface, said distal end comprising a single crystal plane and terminating in a single crystal unit plane cell, said unit plane cell having a central atom with a lower work function than the atoms surrounding said central atom
said end surface of said probe being substantially larger than said probe tip extension.

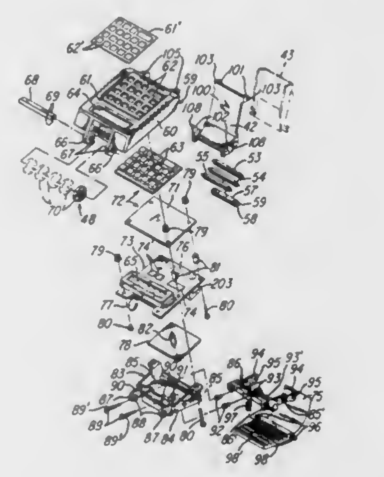
---

### 5,015,324

### HAND-HELD LABELER

**Brent E. Goodwin, Middletown; Donald L. Karn, Springboro; John D. Mistvurik, Tipp City; John R. Monteith, Dayton; Mark A. Seale, New Carlisle, and David R. Wisecup, Xenia, all of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio**
**Division of Ser. No. 209,759, Jun. 22, 1988, Pat. No. 4,956,045. This application Apr. 10, 1990, Ser. No. 506,973**
**Int. Cl.⁵ B65C** *11/02*
U.S. Cl. 156—384 **8 Claims**

1. A hand-held labeler for printing and applying labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, means on the housing for supporting a supply roll of a composite label web, a thermal print head, a platen cooperable with the print head for effecting printing on the labels, means for providing a path for the composite label web from the supply roll to between the print head and the platen, means for delaminiating printed labels from the carrier web, means for applying printed labels, means for advancing the carrier web to effect delamination of a printed label and to advance the printed label into label applying relationship with respect to the label applying means, wherein the platen includes a platen roll, a print head mounting member, means for mounting the print head mounting member for skewing movement with respect to the platen roll, means for pivotally mounting the print head to the mounting member, means for biasing the print head away from the mounting member into pressure contact with the platen roll, and means for limiting the movement of the print head with respect to the mounting member.

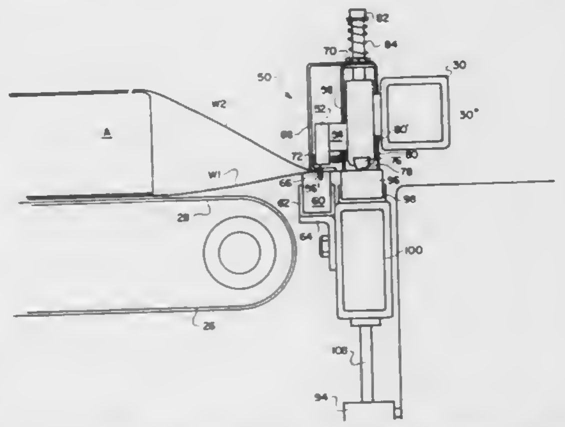


---

### 5,015,325

### PERFORATING MEANS FOR APPARATUS FOR HEAT-SEALING THERMOPLASTIC SHEETING

**Charles J. Bennett, Rte. 2, Box 154, and Billy J. Simpson, Sr., Rte. 1, Box 337, both of, Oakboro, N.C. 28129**
**Filed Nov. 20, 1989, Ser. No. 439,646**
**Int. Cl.⁵ B32B** *31/18*
U.S. Cl. 156—513 **16 Claims**

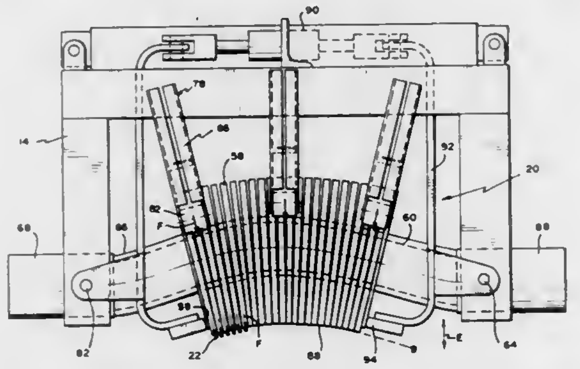


1. In a sealing apparatus for heat-sealing together facing webs of shrinkable thermoplastic sheeting to enclose an article between the webs, said sealing apparatus including a pair of sheet clamping jaws, one of said jaws having sheet heating means, said jaws being relatively movable into and out of adjacent clamping relation for gripping the facing webs of the sheeting between said jaws and heat sealing the webs by said heating means along a seal line sidewise adjacent the article, the improvement comprising means mounted to one of said jaws for forming at least one perforation in at least one of the webs of the sheeting at a predetermined spacing from the seal line when said jaws are moved into clamping relation to permit escape of air when the sheeting is shrunk, said spacing being selected to dispose the perforation at the side of the article when the sheeting is shrunk to minimize passage through the perforation of dirt and the like which may soil the article.

VOL
126
ISS
2
MY
14
1991
UMI

### 5,015,326
## COMPLIANT TAPE DISPENSING AND COMPACTING HEAD

**Ed Frank, Glenolden, Pa., assignor to The Boeing Company, Seattle, Wash.**
**Filed May 8, 1989, Ser. No. 348,952**
**Int. Cl.$^5$ B32B** *31/20, 31/04*
**U.S. Cl. 156—511** **15 Claims**



1. A compliant tape dispensing and compacting head, comprising:
- a plurality of tape supply means;
- an equal plurality of tape guide means; and
- an equal plurality of tape compacting means for compacting tape received from a respective one of said plurality of tape guide means, said plurality of tape compacting means including:
- displacement means for relative displacement of the tape compacting means with respect to each other; and
- a flexible shaft defining a longitudinal axis being capable of flex in a direction normal to said axis and a plurality of discs mounted adjacent to each other on said flexible shaft along its longitudinal axis, wherein said discs are biased by said displacement means in a direction normal to said longitudinal axis providing thereby a compaction force to said discs.

---

### 5,015,327
## METHOD FOR PRODUCING SEMICONDUCTIVE SINGLE CRYSTAL

**Tsunemasa Taguchi, Suita, and Hirokuni Nanba, Osaka, both of Japan, assignors to Production Engineering Association of Shin-Osaka and Sumitomo Electric Industries, Inc., both of Osaka, Japan**
**Filed Mar. 14, 1989, Ser. No. 323,029**
**Claims priority, application Japan, Mar. 14, 1988, 63-59786**
**The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.**
**Int. Cl.$^5$ C30G** *1/08, 1/10, 23/02, 29/48*
**U.S. Cl. 156—603** **6 Claims**

1. A method for growing a ZnSe thin film on a ZnSe single crystal substrate, comprising the steps of:

(a) placing a portion of a ZnSe polycrystal in a sealed reactor tube containing at least one gas selected form the group consisting of an inert gas, nitrogen and $H_2Se$ at a pressure of 0.1 Torr. to 100 Torr.,

(b) moving the reactor tube containing the ZnSe polycrystal through

(i) a low temperature first zone maintained at a temperature from room temperature to 100° C.,

(ii) a temperature-raising second zone having a temperature gradient from 50° C./cm to 200° C./cm,

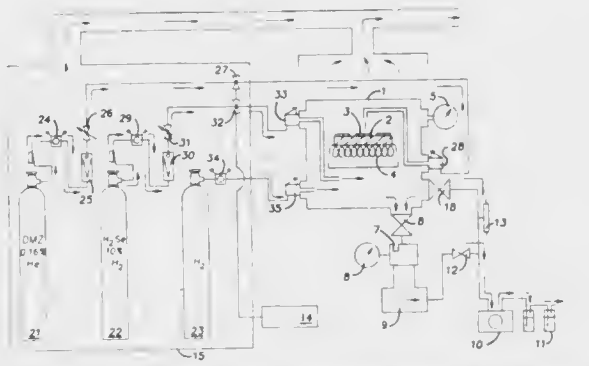
(iii) a high temperature third zone maintained at a temperature from 700° C. to 900° C.,

wherein the temperature of the temperature raising second zone does not exceed the temperature of the high temperature third zone,

(iv) a temperature-lowering fourth zone having a temperature gradient from -31 200° C./cm to −50° C./cm and

(v) a low temperature fifth zone at a temperature from room temperature to 100° C. in this order at a rate of 0.05 mm/day to 5 mm/day while maintaining the solid state of the ZnSe crystal wherein ZnSe polycrystal is converted to ZnSe single crystal,

(c) cutting the ZnSe single crystal to form a ZnSe single crystal substrate,



(d) heating the ZnSe single crystal substrate in a hydrogen atmosphere under a pressure from 0.1 Torr. to 10 Torr. at a temperature from 250° C. to 450° C. while introducing a gaseous organozinc compound and $H_2Se$ gas in such amounts that a molar ration of Se/Zn is from 10 to 100 to grow the ZnSe thin film on the surface of the ZnSe single crystal substrate.

---

### 5,015,328
## METHOD OF REDUCING SURFACE DAMAGE IN KTP OPTICAL WAVEGUIDES

**Brian J. Fitzpatrick, Ossining, and Phyllis M. Harnack, Hastings on Hudson, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.**
**Filed Sep. 14, 1989, Ser. No. 407,378**
**Int. Cl.$^5$ C30B** *19/12*
**U.S. Cl. 156—624** **8 Claims**

1. A method of producing an optical waveguide comprising:

(a) immersing a thin wafer of a material of the formula $K_{1-x}Rb_xTiOMO_4$ wherein $0 \leqq x < 1$ and M is P or As, having an optically smooth surface and cut from a single crystal of said material in a manner such that the Z axis of said wafer is perpendicular to said optically smooth surface, for 1–64 hours in molten potassium nitrate heated to 400° C.–500° C.,

(b) removing said wafer from said molten potassium nitrate,

(c) washing away potassium nitrate from said wafer, and

(d) subjecting said wafer for about 10 minutes to 4 hours to the action of at least one molten salt of a metal selected from the group consisting of Rb, Cs and Tl heated to 240° C.–335° C. to thereby cause said cation selected from the group consisting of Rb, Cs and Tl to replace K or Rb cations at said optically smooth surface and extending into said wafer to a depth of 0.6 μm–8 μm.

---

### 5,015,329
## PRE-SWELLING AND ETCHING OF PLASTICS FOR PLATING

**Gordhanbhai N. Patel, Somerset; Durgadas Bolikal, Highland Park, both of N.J., and Richard A. Bellemare, Watertown, Conn., assignors to JP Laboratories, Inc., Piscataway, N.J.**
**Continuation of Ser. No. 268,154, Nov. 7, 1988, Pat. No. 4,941,940. This application Mar. 6, 1990, Ser. No. 489,366**
**The portion of the term of this patent subsequent to Jul. 17, 2007, has been disclaimed.**
**Int. Cl.$^5$ B05D** *3/10*
**U.S. Cl. 156—628** **13 Claims**

1. A process of two step surface etching of polymeric materials made of polymers having at least one hydrolyzable functionality selected from the group consisting of polycarbonates, anhydrides, carboxyl esters, sulphonic esters, amides and urethanes, which comprises

the first step of exposing the surface to be etched to a liquid phase capable of microroughening said surface, comprising a good solvent for said polymer and a non-solvent for said polymer provided that where at least one member of the group of said good and said non solvents etchant is immiscible with the other, said liquid phase further comprises a sufficient amount of solubilizing agent miscible with said immiscible components to provide a single liquid phase and

a second step of hydrolyzing the said functionalities on said surface to the extent needed to provide a water wettable surface capable of being plated with electroless nickel or electroless copper to provide a plated layer having a strong level of adhesion to said surface by treating said surface with an etchant selected from the group consisting of

acidic etchants selected from the group consisting of aqueous mineral acids free of metallic components, benzene sulphonic acid and mixtures thereof and

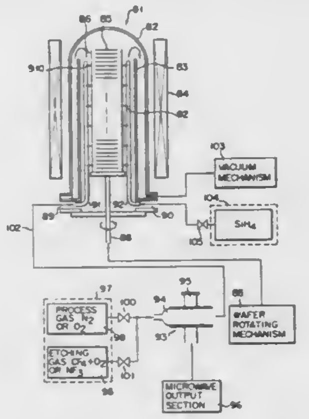
basic etchants selected from the group consisting of alkali metal hydroxides, quaternary ammonium hydroxides and mixtures thereof in the presence of an alkanolamine.

---

### 5,015,330
## FILM FORMING METHOD AND FILM FORMING DEVICE

**Katsuya Okumura; Takahiko Moriya; Shinji Miyazaki, all of Yokohama; Yoshio Kumagai, Kofu, and Susumu Tanaka, Hachioji, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan; Tokyo Electron Limited, Tokyo and Tokyo Electron Sagami Limited, Kanagawa, all of, Japan**
**Filed Feb. 28, 1990, Ser. No. 486,416**
**Claims priority, application Japan, Feb. 28, 1989, 1-46889; Jul. 10, 1989, 1-177368**
**Int. Cl.$^5$ B44C** *1/22;* **H01L** *21/306;* **C03C** *15/00;* **B05D** *3/06*
**U.S. Cl. 156—643** **6 Claims**

1. A film forming method comprising the steps of:
- placing a plurality of objects to be processed in a reaction container;
- supplying an etching gas in said reaction container;
- making said etching gas into a plasma;
- removing a natural oxidization originated film on said objects to be processed under a heating condition by said plasma;
- exhausting said etching gas after stopping supply of said etching gas so as to stop making of said plasma; and

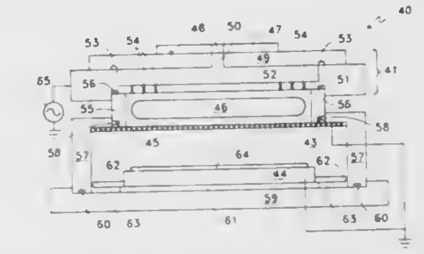


- supplying a film forming gas in said reaction container without rendering said reaction container open to air so as to form a film on said objects.

---

### 5,015,331
## METHOD OF PLASMA ETCHING WITH PARALLEL PLATE REACTOR HAVING A GRID

**Gary B. Powell, Petaluma, Calif., assignor to Matrix Integrated Systems, Richmond, Calif.**
**Continuation of Ser. No. 238,462, Aug. 30, 1988, abandoned. This application Aug. 10, 1990, Ser. No. 566,860**
**Int. Cl.$^5$ H01L** *21/306*
**U.S. Cl. 156—643** **34 Claims**



1. A method of etching a substrate comprising the steps of:
- placing the substrate on a surface in an apparatus comprising an upper electrode coupled to an R-F power source, a lower electrode and a grid having openings defined therein and disposed between said upper electrode and said lower electrode, said grid and upper electrode forming an upper chamber therebetween, said grid being clamped to have the same potential at all times as the lower electrode and forming with the lower electrode a lower chamber therebetween;
- passing a reactant gas into said upper chamber;
- subjecting said gas to an R-F field applied via said upper electrode to generate in said upper chamber a plasma including ions in said upper chamber;
- passing ions generated by said plasma through said grid toward said lower chamber; and
- etching said substrate on said surface, said surface being in said lower chamber, said substrate being etched by said ions.

OL
1126
ISS
2
MY
14
1991
UMI

### 5,015,332
## SPRAY DRYER

**Shoichi Iwaya; Hitoshi Masumura, both of Yuri; Hiroki Takahashi, Honjou; Masaaki Ohkawara; Katsumi Kobayashi, both of Yokohama, and Takashi Ito, Machida, all of Japan, assignors to TDK Corporation, Tokyo and Ohkawara Kakohki Co., Ltd., Kanagawa, both of, Japan**

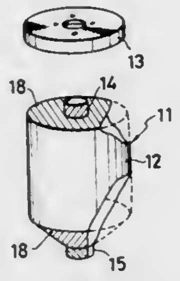
**PCT No. PCT/JP88/00670, § 371 Date Jan. 25, 1989, § 102(e) Date Jan. 25, 1989, PCT Pub. No. WO89/00070, PCT Pub. Date Jan. 12, 1989**

**PCT Filed Jul. 5, 1988, Ser. No. 306,451**

**Claims priority, application Japan, Jul. 6, 1987, 62-103749[U]; Jul. 6, 1987, 62-103752[U]; Jul. 6, 1987, 62-103753[U]**

**Int. Cl.$^5$ B01D** *1/18;* **F26B** *3/06*

**U.S. Cl. 159—4.2** **3 Claims**



2. A spray dryer for drying microdrops of a feed liquid in a spray drying chamber thereof, said spray drying chamber comprising:
- a vertically displaceable head section;
- a heat-resistant, porous resilient membrane attached at a top portion thereof to a bottom surface of said head section, said porous membrane being detachable from said head section at the top portion; and
- a rotary disc atomizer for spraying the microdrops into said spray drying chamber, said rotary disc atomizer having a thin adhesion-resistant layer disposed on a surface thereof which contacts the feed liquid;
- wherein the microdrops and hot air are sprayed into said spray drying chamber; thereby drying the microdrops to form a powder at the bottom of said porous membrane.

---

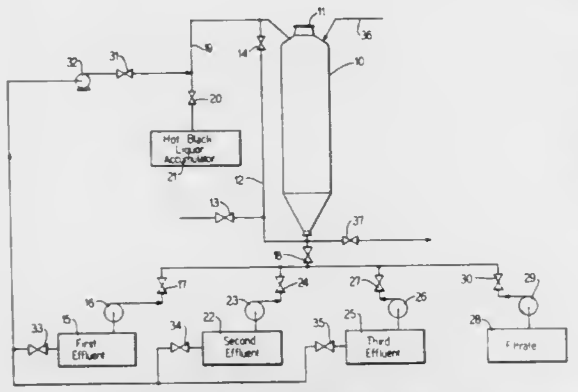
### 5,015,333
## MULTI-STAGE PULP WASHING WITHIN A BATCH DIGESTER

**Ralph S. Grant, Beaverton, Oreg., assignor to Beloit Corporation, Beloit, Wis.**

**Continuation-in-part of Ser. No. 515,493, Jul. 20, 1983, abandoned. This application Jun. 29, 1987, Ser. No. 68,721**

**Int. Cl.$^5$ D21C** *9/00, 9/04*

**U.S. Cl. 162—60** **8 Claims**



1. A method for cooking and washing pulp in a batch digester and for subjecting the pulp to multiple stages of pulp washing which comprises:
- filling a digester with wood chips and cooking liquor,
- cooking said wood chips in said digester with said cooking liquor in a substantially stationary column to produce pulp and a hot black liquor,
- when said cooking is completed and while maintaining said pulp in a substantially undisturbed and stationary column in said digester, displacing a first portion of said black liquor substantially less than the volume of said digester from said digester through an outlet at the upper end of said digester by introducing into the bottom of said digester a first wash effluent,
- displacing a second portion of the remaining black liquor substantially less than the volume of said digester from said digester through said outlet by introducing into the bottom of said digester a second wash effluent having a lower black liquor concentration than said first wash effluent, said second wash effluent displacing said first wash effluent in said digester and moving said first wash effluent toward said outlet at the upper end of said digester,
- minimizing mixing of said first and second effluents and said liquor and establishing minimal interface zones in the digester between said first effluent and said liquor and between said first and second effluents,
- directing the displaced hot black liquor portions to an accumulator,
- directing the first and second wash effluents from said digester to separate storage means, and
- emptying the pulp and remaining liquid from said digester after said black liquor portions have been displaced.

---

### 5,015,334
## COLLOIDAL COMPOSITION AND ITS USE IN THE PRODUCTION OF PAPER AND PAPERBOARD

**Arthur P. Derrick, Cronulla, Australia, assignor to Laporte Industries Limited, London, United Kingdom**

**Filed Sep. 22, 1989, Ser. No. 410,820**

**Claims priority, application United Kingdom, Dec. 10, 1988, 8828899**

**Int. Cl.$^5$ D21H** *21/10*

**U.S. Cl. 162—168.1** **15 Claims**

1. A paper or paperboard pulp or stock containing a composition, which comprises; a retention agent, which comprises;
- a water-dispersible colloidal siliceous material comprising a water-swellable clay having a cation exchange of at least 80 m. eq./100 gm and having particles in intimate association with molecules of a water-soluble organic polymer having an anionic charge density of at least 4 m. eq./gm said anionic polymer being present in an amount of from 0.5% to 25% based on the dry weight of the clay.

---

### 5,015,335
## CHLORINE DIOXIDE STATIC DISTRIBUTOR

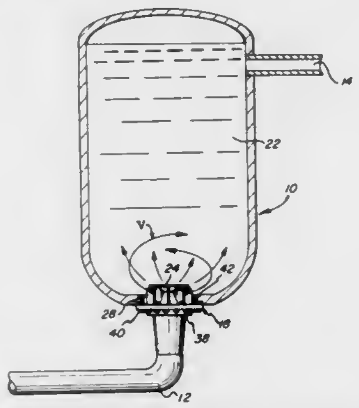
**Charles E. Green, Westchester, Ohio, assignor to Champion International Corporation, Stamford, Conn.**

**Filed Sep. 17, 1990, Ser. No. 586,529**

**Int. Cl.$^5$ D21C** *7/06, 9/14*

**U.S. Cl. 162—243** **3 Claims**

1. A static distributor for use in distributing a flow of pulp and chlorine dioxide into a wood pulp bleaching tower having walls comprising:
- a body having a central opening terminating in a concave upper surface in the bleach tower and structured and arranged for directing the flow entering through said opening towards the walls of said bleach tower;
- said body having:
- a base having an inlet port positioned in spaced, concentric relation to the central opening in said upper surface; and
- a series of spaced support plates between said base and upper surface spaced about the circumference of said upper surface and supporting said upper surface on said base structured and arranged for directing flow radially through spaced openings formed between said support plates to mix with said flow directed towards the walls of said bleach tower by said upper surface in said tower.



---

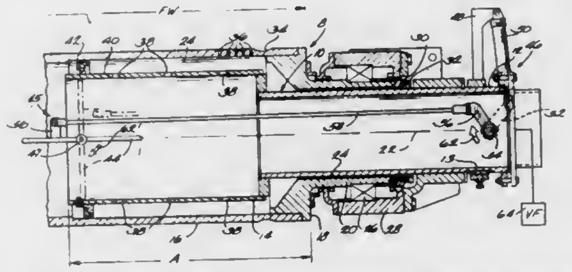
### 5,015,336
## FELT TURNING SUCTION ROLL

**Arnold J. Roerig, Beloit, and Dale A. Brown, Milton, both of Wis., assignors to Beloit Corporation, Beloit, Wis.**

**Filed Oct. 31, 1989, Ser. No. 429,536**

**Int. Cl.$^5$ D21F** *3/10, 7/00*

**U.S. Cl. 162—369** **6 Claims**



1. A felt turning roll for withdrawing air from the surroundings adjacent the periphery of the roll, comprising, in combination:
- a perforated, hollow roll shell;
- a journal mounted to each end of the roll shell and extending outwardly therefrom;
- bearing means disposed about each journal and rotatably supporting the roll shell on the journals;
- a stationary shaft extending inwardly into at least one end of the roll shell through and inwardly beyond the journal, each shaft extending for substantially less than the length of the roll shell, and at least one said shaft having a bore for establishing fluid communication from the end of the shaft outside the roll to within the interior of the shaft;
- opening means in the interior end of each bored shaft for establishing fluid communication between the bore and the interior of the roll shell;
- a seal between each bored shaft and the interior of the roll shell;
- whereby sub-atmospheric pressure can be established in the bored shaft and the roll shell to urge air inwardly through the perforations for discharge outside the roll.

---

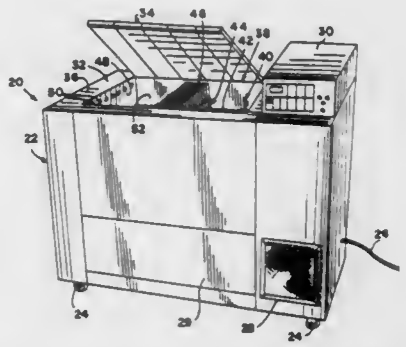
### 5,015,337
## VAPOR RECOVERY SYSTEM

**Douglas S. Fraser, P.O. Box 133, Bloomington, N.Y. 12411**

**Division of Ser. No. 185,986, Apr. 23, 1988, abandoned, which is a division of Ser. No. 900,530, Aug. 26, 1986, Pat. No. 4,745,354, which is a continuation-in-part of Ser. No. 736,421, May 20, 1985, abandoned. This application Sep. 5, 1989, Ser. No. 370,705**

**Int. Cl.$^5$ E01D** *5/00*

**U.S. Cl. 202—169** **12 Claims**



1. A vapor recovery system for separating a first vapor of a fluorocarbon from a second vapor, said system comprising:
- means for providing a source of said fluorocarbon including a chamber adapted for containing said first fluorocarbon vapor and said second vapor; and
- means in fluid communication with said chamber for condensing said first and second vapors into respective first and second liquids and to return said condensed first liquid to said chamber substantially free of any of said second vapor simultaneously condensed.

---

### 5,015,338
## METHOD OF MANUFACTURING A STAMPER FOR FORMATION OF OPTICAL INFORMATION CARRYING DISK

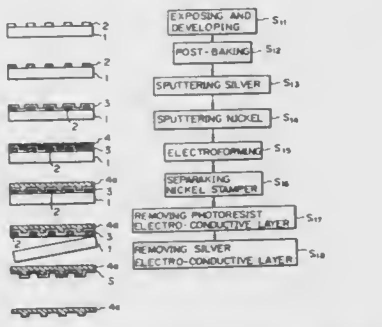
**Hirotoshi Tabuchi; Osamu Kumasaka; Katsura Ito, and Kenji Koushiro, all of Yamanashi, Japan, assignors to Pioneer Electronic Corp., Yamanashi, Japan**

**Filed May 2, 1989, Ser. No. 346,537**

**Claims priority, application Japan, Sep. 19, 1988, 63-234034**

**Int. Cl.$^5$ C25D** *1/10*

**U.S. Cl. 204—5** **5 Claims**



1. A method for manufacturing a stamper for the formation of an optical information carrying disk, which comprises the steps of:
- forming a first electro-conductive layer made of a first metal material on a surface of a master disk bearing minute pits corresponding to a data signal through physical vapor deposition;
- depositing a second electro-conductive layer made of a second metal material on said first electro-conductive layer through physical vapor deposition, said first and

VOL
1126
ISS
2
MY
14
1991
UMI

second metal materials being readily separable from each other;

electroforming said second metal material on said second electro-conductive layer so as to form an electroformed layer integral with said second electro-conductive layer, said second electro-conductive layer and said electroformed layer together forming a stamper layer;

separating said stamper layer and said first electro-conductive layer from said master disk; and

removing said first electro-conductive layer from said stamper layer thereby producing the stamper made of said second metal material.

---

### 5,015,339
### PROCESS FOR PREPARING NONCONDUCTIVE SUBSTRATES

**Phillip Pendleton, Cheshire, Conn., assignor to Olin Hunt Sub III Corp., Cheshire, Conn.**
**Filed Mar. 26, 1990, Ser. No. 499,229**
**Int. Cl.$^5$ C25D** *5/02, 5/54*
U.S. Cl. 204—15 18 Claims

1. The process for electroplating a metal layer to the surface of a nonconductive material which comprised the steps:

(a) contacting said substrate surface with an alkaline permanganate solution for an effective time and at an effective concentration and at an elevated temperature to prepare said substrate surface for a metal layer to be electroplated thereto;

(b) then contacting said substrate surface with an aqueous neutralizer/conditioner solution, said solution comprising water, at least one neutral or acidic reducing agent, and at least one polyelectrolyte polymer conditioner;

(c) then contacting said substrate surface with a liquid dispersion of carbon black comprised of:

(1) carbon black particles having an average particle size of less than about 3 microns in said dispersion;

(2) an effective dispersing amount of a surfactant which is compatible with said carbon black; and

(3) a liquid dispersing medium, wherein the amount of carbon black is sufficient to coat substantially all of the nonconducting substrate surface and is less than about 4% by weight of said liquid dispersion;

(d) separating substantially all of the liquid dispersing medium from said applied dispersion, thereby depositing said carbon black particles in a substantially continuous layer on said nonconductive substrate surface; and

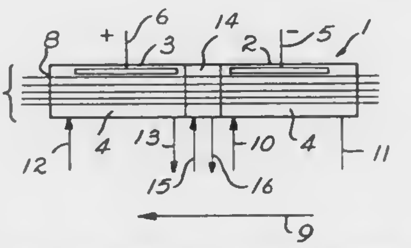
(e) electroplating a substantially continuous metal layer over the deposited carbon black layer on said nonconducting substrate surface.

---

### 5,015,340
### METHOD OF CONTINUOUS COATING OF ELECTRICALLY CONDUCTIVE SUBSTRATES

**Gabriel Colombier, Saint Egreve; Jacques Lefebvre, Voiron; Jean Galand, Villebon/S/Yvette, and Armand Golay, Moirans, all of France, assignors to Aluminium Pechiney, Paris, France**
**Filed Apr. 16, 1990, Ser. No. 509,190**
**Claims priority, application France, Apr. 25, 1989, 89 06137**
**Int. Cl.$^5$ C25D** *7/06*
U.S. Cl. 204—28 7 Claims

1. A method of continuously coating at least one electrically conductive substrate of aluminium or copper with a metal of a different type by high-speed electrolysis comprising the steps of passing said substrate through an activating bath in which is immersed at least one cathode, subsequently passing said substrate through a buffer bath, and then passing said substrate

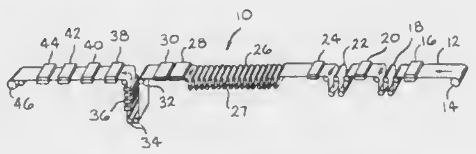


through a coating bath in which is immersed at least one anode, wherein said baths are of identical composition.

---

### 5,015,341
### INDUCTION GALVANNEALED ELECTROPLATED STEEL STRIP

**Franklin H. Guzzetta; Alan F. Gibson, both of Middletown, and David S. Mitch, Fairfield, all of Ohio, assignors to Armco Steel Company, L.P., Middletown, Ohio**
**Filed Aug. 5, 1988, Ser. No. 228,645**
**Int. Cl.$^5$ C25D** *5/50*
U.S. Cl. 204—28 13 Claims



1. A method of producing a galvannealed steel strip, comprising the steps of:

cleaning a steel strip,

electroplating at least one side of the steel strip with a zinc coating,

passing said coated strip through an induction coil operating at a frequency less than 10 kHz whereby said coated strip is heated to a temperature no greater than 510° C. to completely convert said zinc coating to a zinc/iron alloy coating by causing iron from the steel strip to diffuse through the entire thickness of said zinc coating,

cooling said alloyed strip to substantially stop said diffusion of iron into said zinc/iron alloy coating so that the thickness of any inner layer of zinc alloy gamma phases adjacent to the steel substrate is no greater than about 10% of the total thickness of said zinc/iron alloy coating and the remainder of said zinc/iron alloy coating having no greater than about 13 atomic % iron whereby said zinc/iron alloy coating is ductile and resistant to cracking.

---

### 5,015,342
### METHOD AND CELL FOR THE ELECTROLYTIC PRODUCTION OF A POLYVALENT METAL

**Marco V. Ginatta; Gianmichele Orsello, both of Turin, and Riccardo Berruti, Chieri, all of Italy, assignors to Ginatta Torno Titanium S.p.A., Turin, Italy**
**Filed Apr. 19, 1989, Ser. No. 340,356**
**Claims priority, application Italy, Apr. 19, 1988, 67364 A/88**
**Int. Cl.$^5$ C25C** *3/26, 3/08, 3/12*
U.S. Cl. 204—64 T 12 Claims

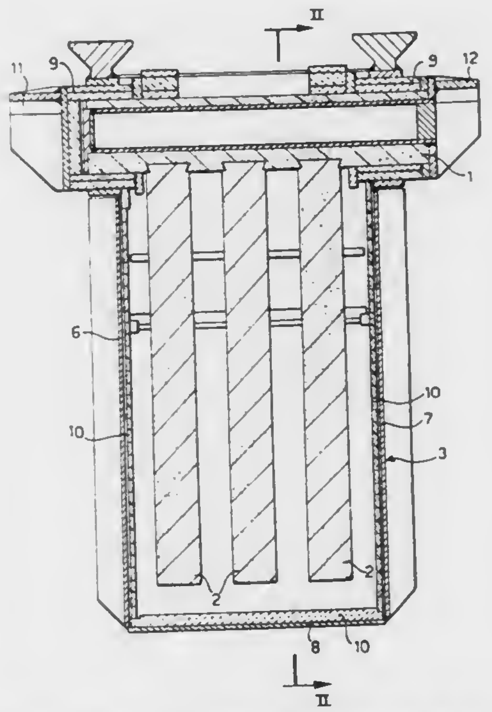
6. A method for the production of a polyvalent metal selected from the group consisting of titanium, zirconium and hafnium, by means of:

the cathodic dissolution of a halide of the metal in an electrolyte of alkali metal of alkaline earth metal halides in the fused state and

the electro-extraction of the metal carried out in a cell including at least one anode and one cathode and a conductive framework which acts as an intermediate electrode and surrounds the anode so as to define an anodic compartment and a cathodic compartment, the framework having walls which are permeable to the electrolyte and are adapted to support a deposit of the metal to be produced in the form of a panel, so as to allow ion transfer between the anodic and cathodic compartments but to limit the transfer of ions of the metal to be produced from the cathodic compartment to the anodic compartment, comprising the steps of:

(a) supplying the extraction cell with the electrolyte containing ions of the metal to be produced in solution,

(b) confining a bath of alkali metal halides or alkaline earth metal halides, which is substantially without ions of the metal to be produced, within the framework by means of electrolyte-tight sealing of the permeable walls of the framework by metal partitions which are capable of anodic dissolution,



(c) feeding an electric current between the anode and the framework so as to cause the cathodic deposition of the alkali metal or alkaline earth metal on the permeable walls of the framework for a sufficient period of time to cause an accumulation of this metal,

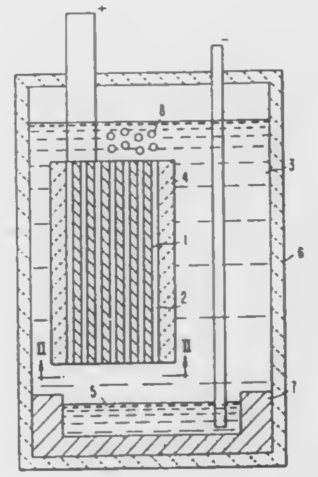
(d) feeding an electric current between the anode and the cathode so as to cause the deposition of the metal to be produced at the cathode and the simultaneous anodic dissolution of the partitions so as to cause the diffusion of ions of the metal to be produced from the cathodic compartment towards the anodic compartment with the formation of the deposit of the metal to be produced on the permeable walls of the framework as a result of the reduction of the metal ions by the alkali metal or the alkaline earth metal,

(e) maintaining the electric current feed between the anode and the cathode to achieve the deposition of the metal at the cathode and simultaneously

(f) regulating the current between the anode and the cathode and the framework so as to keep the characteristics of permeability of the deposit substantially constant.

### 5,015,343
### ELECTROLYTIC CELL AND PROCESS FOR METAL REDUCTION

**Alfred F. LaCamera, Trafford; Jan H. L. Van Linden, Allison Park; Thomas V. Pierce, Delmont, and James O. Parkhill, Tarentum, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**
**PCT No. PCT/US88/04565, § 371 Date Aug. 25, 1989, § 102(e) Date Aug. 25, 1989, PCT Pub. No. WO89/06289, PCT Pub. Date Jul. 13, 1989**
**Continuation-in-part of Ser. No. 138,391, Dec. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 197,889, May 24, 1988, abandoned. This PCT application Dec. 19, 1988, Ser. No. 438,500**
**Int. Cl.$^5$ C25C** *3/06;* **C25B** *1/02, 1/00*
U.S. Cl. 204—67 56 Claims



1. A metal reduction process of electrochemically producing electrode product from metal oxide during electrolysis in a molten salt composition, comprising providing an anode having an extended surface area for the selective evolution of gaseous electrode product, the metal oxide having a solubility <1 wt. % in the molten salt composition.

---

### 5,015,344
### ELECTRODES WITH DUAL POROSITY

**Antonio Nidola, and Gian N. Martelli, both of Milan, Italy, assignors to Oronzio deNora Impianti Elettrochimici S.p.A., Milan, Italy**
**Continuation-in-part of Ser. No. 78,517, Jul. 27, 1987, abandoned. This application Apr. 13, 1988, Ser. No. 181,406**
**Claims priority, application Italy, Jul. 28, 1986, 21278 A/86**
**Int. Cl.$^5$ C25B** *11/03, 11/06, 1/26*
U.S. Cl. 204—98 21 Claims

1. An electrode ion-exchange unitary assembly comprising a layer or coating of electrocatalytic and electroconductive particles bonded together on an ion-exchange membrane by sintering with an electrolyte-resistant, hydrophobic, fluorinated polymeric binder, said layer or coating having relatively small pores dispersed therethrough and a plurality of relatively larger channels larger than the small pores and of 10 to 150 microns and communicating therewith, extending from the exterior of the layer or coating into the interior of the layer or coating.

VOL
126
ISS
2
MY
14
1991
UMI

### 5,015,345

### METHOD FOR DETECTING DEFECTIVE ION EXCHANGE MEMBRANES IN MONOPOLAR AND BIPOLAR ELECTROLYZERS

**Carlo Traini, Milan, Italy; Corrado Mojana, Singapore, China, and Carlo Gusmini, Treviglio, Italy, assignors to DeNora Permelec S.p.A., Milan, Italy**
**PCT No. PCT/EP88/01170, § 371 Date Jul. 24, 1989, § 102(e) Date Jul. 24, 1989, PCT Pub. No. WO89/05873, PCT Pub. Date Jun. 29, 1989**
**PCT Filed Dec. 16, 1988, Ser. No. 391,559**
**Claims priority, application Italy, Dec. 18, 1987, 23077**
**Int. Cl.$^5$ C25B** *1/16, 15/00*
U.S. Cl. 204—98 **9 Claims**

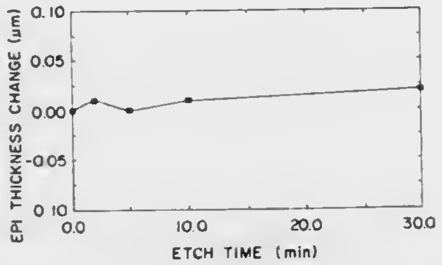
1. A method of locating a damaged diaphragm or ion exchange membrane in an elementary cell of an electrolyzer for the electrolysis of aqueous alkali metal halide solutions, said electrolyzer comprised of a series of elementary cells formed of an anode and a cathode separated by a diaphragm or ion exchange membrane, said method comprising detecting the value of either the elementary cell currents for the monopolar construction or the elementary cell voltages for the bipolar construction and comparing each of said values with the average value to determine abnormal deviation in any of said elementary cells characterized in that before detecting said values of elementary cell currents or voltages the total current fed to the electrolyzer operating under industrial production conditions is substantially reduced without interruption of the operation.

---

### 5,015,346

### ELECTROCHEMICAL METHOD FOR DEFECT DELINEATION IN SILICON-ON-INSULATOR WAFERS

**Terry R. Guilinger; Howland D. T. Jones; Michael J. Kelly; John W. Medernach; Joel O. Stevenson, and Sylvia S. Tsao, all of Albuquerque, N. Mex., assignors to United States Department of Energy, Washington, D.C.**
**Filed Apr. 10, 1990, Ser. No. 506,734**
**Int. Cl.$^5$ C25F** *3/00;* **B23H** *3/00*
U.S. Cl. 204—129.1 **5 Claims**



1. An electrochemical method for defect delineation in silicon-on-insulator wafers which comprises:

electrically contacting a front surface of said wafer so as to control the voltage of said front surface within a 0.1 to 12 volts range;

contacting said silicon wafer with an electrolyte solution;

electrochemically etching said silicon wafer;

removing said electrolyte from said silicon wafer; and

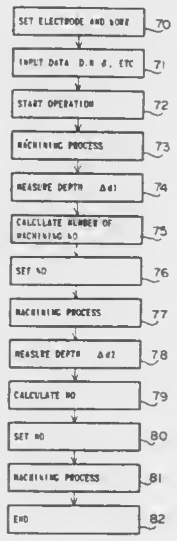
identifying defects and metal contamination in said silicon wafer.

---

### 5,015,347

### ELECTROLYTIC FINISHING METHOD

**Youhei Kuwabara, and Haruki Sugiyama, both of Fukuroi, Japan, assignors to Shizuoka Seiki Co., Ltd., Shizuoka, Japan**
**Filed Dec. 20, 1989, Ser. No. 453,878**
**Claims priority, application Japan, Dec. 26, 1988, 63-328555; Jan. 24, 1989, 1-14431; Jan. 28, 1989, 1-17869**
**Int. Cl.$^5$ B23H** *3/10, 3/00*
U.S. Cl. 204—129.2 **7 Claims**



1. A method for electrolytically finishing a workpiece including securing the work in a tank adapted to contain electrolyte, positioning an electrode to form a predetermined gap between the electrode and the surface of the work, supplying electrolyte to the tank so as to submerge the electrode and the work, applying pulses to the electrode, supplying clean electrolyte to the gap sufficient to remove debris therefrom, and discharging the electrolyte including residual products, the method comprising:

setting a predetermined machining depth;

setting a first theoretical number of machining passes necessary for obtaining the predetermined machining depth;

performing a first number of machining passes on the workpiece;

measuring a cut depth machined on the surface of the workpiece after performing said first actual number of machining passes;

determining a second theoretical number of machining passes required to achieve said machining depth, based on the measured cut depth; and

performing a second machining of the work based on the second theoretical number of machining passes sufficient to achieve said depth.

---

### 5,015,348

### HIGH MASS ISOTOPE SEPARATION ARRANGEMENT

**Jozef W. Eerkens, 1342 Lachman La., Pacific Palisades, Calif. 90272**
**Filed Jun. 14, 1972, Ser. No. 262,661**
**Int. Cl.$^5$ B01J** *19/08;* **B01D** *5/00*
U.S. Cl. 204—157.2 **19 Claims**

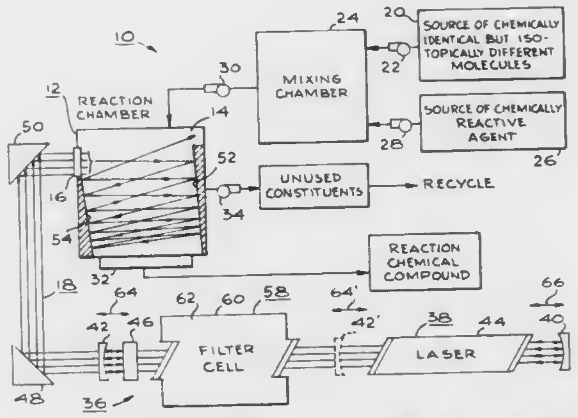
1. In a process for separating predetermined isotopic molecules from a mixture of chemically identical but isotopically different molecules to obtain a concentration of the predetermined isotope wherein the molecules comprising the mixture having a preselected lower rovibrational energy state and a higher rovibrational energy state with photon-inducible transitions between the lower rovibrational energy state and the higher rovibrational energy state and the photon frequency for the photon-inducible transitions between the lower and higher

rovibrational energy states of the predetermined isotopic molecules is different from the photon frequency for the photon-inducible transitions between the lower and higher rovibrational energy states of the other chemically identical but isotopically different molecules in the mixture, the improvement comprising the steps of:

supplying the mixture of chemically identical but isotopically different molecules into a reaction chamber at the lower rovibrational energy state, and in a first preselected physicochemical state; and

supplying a chemically reactive agent in the reaction chamber and the chemically reactive agent chemically combinable with the molecules at the higher rovibrational energy state to produce a chemical compound having atoms of the predetermined isotope in a second physicochemical state different from the first physicochemical state, and the chemically reactive agent unreactive with the molecules at the lower rovibrational energy state;

selectively photon inducing the transitions of the predetermined isotopic molecules from the lower rovibrational energy state to the higher rovibrational energy state to cause a chemical combination with the chemically reactive agent to provide a chemical compound having atoms of the predetermined isotope, and the step of selectively photon inducing the transitions of the predetermined isotopic molecules further comprises the steps of:



generating a beam of coherent photons having energy in the frequencies corresponding to the transitions of the molecules in the mixture from the lower rovibrational energy state to the higher rovibrational state;

filtering the beam of coherent photons to remove photons having energy at frequencies other than the frequencies corresponding to the transitions of the predetermined isotopic molecules from the lower rovibrational energy state to the higher rovibrational energy state; and

subjecting the contents of the reaction chamber to the filtered beam of coherent photons to induce the transitions of the predetermined isotopic molecules from the lower rovibrational energy state to the higher rovibrational energy state;

maintaining the contents of the reaction chamber at first predetermined temperature and at a first predetermined pressure; and

wherein the step of filtering the beam of coherent photons further comprises the steps of:

passing the beam of coherent photons through a filter cell containing a collection of the other chemically identical but isotopically different molecules contained in the mixture in the reaction chamber, and the collection of molecules in the filer cell substantially free of the predetermined isotopic molecules;

maintaining the collection of the molecules in the filter cell at a second predetermined temperature and a second predetermined pressure to provide molecules in the filter cell at the lower rovibrational energy state; and

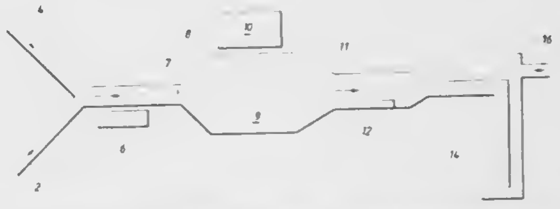
removing the chemical compound from the reaction chamber.

---

### 5,015,349

### LOW POWER DENSITY MICROWAVE DISCHARGE PLASMA EXCITATION ENERGY INDUCED CHEMICAL REACTIONS

**Steven L. Suib, Storrs, Conn., and Zongchao Zhang, Evanston, Ill., assignors to University of Connecticut, Storrs, Conn.**
**Continuation-in-part of Ser. No. 289,320, Dec. 23, 1988, abandoned. This application Dec. 21, 1989, Ser. No. 454,305**
**Int. Cl.$^5$ C10G** *15/00, 11/02*
U.S. Cl. 204—168 **15 Claims**



1. A method for cracking a hydrocarbon to create cracked reaction products, which comprises:

introducing a stream consisting of a hydrocarbon in fluid form into a reaction zone;

exposing said reaction zone to a microwave energy to continuously maintain a low power density microwave discharge plasma within said reaction zone and in the presence of said hydrocarbon;

determining concentrations of said cracked reaction products obtained downstream of said reaction zone;

adjusting said microwave energy introduced to said reaction zone until the concentrations of said cracked reaction products cannot be increased by further adjustment of said energy; and

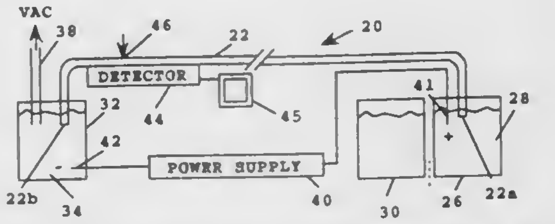
collecting at least one of said cracked reaction products at a point located downstream of said reaction zone.

---

### 5,015,350

### FLOW-RATE-CONTROLLED SURFACE-CHARGE COATING FOR CAPILLARY ELECTROPHORESIS

**John E. Wiktorowicz, San Jose, Calif., assignor to Applied Biosystems, Inc., Foster City, Calif.**
**Filed Nov. 6, 1989, Ser. No. 432,061**
**Int. Cl.$^5$ G01N** *27/26*
U.S. Cl. 204—180.1 **16 Claims**



1. A method of achieving selected electroosmotic flow characteristics in a capillary tube having charged surface groups, comprising

placing opposite ends of the tube in anodic and cathodic electrolyte reservoirs,

applying an electric field across the two reservoirs to produce electroosmotic flow from one tube end toward the other tube end,

drawing into and through the tube, a compound capable of

VOL
1126
ISS
2
MY
14
1991
UMI

stably altering the surface charge of the tube, as the compound is drawn through the tube,

monitoring the electroosmotic flow rate within the tube as the compound is drawn into and through the tube, and

continuing to draw said compound into and through the tube until a desired electroosmotic flow rate in the tube, as determined from said monitoring, is achieved.

---

### 5,015,351

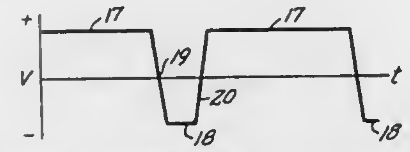
## METHOD FOR ELECTROCHEMICAL TREATMENT OF POROUS BUILDING MATERIALS, PARTICULARLY FOR DRYING AND RE-ALKALIZATION

**John B. Miller, Bergtunvn 9b, Oslo 10, Norway**

**Continuation-in-part of Ser. No. 333,300, Apr. 4, 1989, abandoned. This application Jun. 9, 1989, Ser. No. 364,580**

**Int. Cl.⁵ B01D** *13/02*

**U.S. Cl. 204—182.2** **18 Claims**



1. In a process for treating moist, porous building materials and the like, wherein positive electrode means are associated with the moist, porous material, negative electrode means are located remotely of and in electrical association with the positive electrode means through at least a portion of the porous material, and a voltage is applied to said electrodes to effect electrolytic action in the region between said electrodes, the improvement characterized by,

(a) impressing an electro-osmotically effective first voltage on said electrodes for a first portion of an operating cycle,

(b) thereafter impressing a second voltage of opposite polarity on said electrode means for a second portion of said operating cycle,

(c) effecting a time-controlled transition from said first voltage to said second voltage where the time rate of voltage change during said transition is such as to substantially avoid r.f.i radiations,

(d) said first and second voltages and said first and second portions of said operating cycle being so related that energy utilized in said first cycle portion is at least twice that utilized in said second cycle portion, and

(d) repeating said operating cycle continuously over a period of time to effect a predetermined treatment of said porous material.

---

### 5,015,352

## PREPARATION METHOD FOR AMORPHOUS SUPERLATTICE ALLOYS

**Koji Hashimoto, 2-25-2, Shogen, Izumi-ku, Sendai-shi, Miyagi; Hideaki Yoshioka, Sendai; Katsuhiko Asami, Sendai, and Asahi Kawashima, Sendai, all of Japan, assignors to Yoshida Kogyo K. K. and Koji Hashimoto, both of, Japan, a part interest**

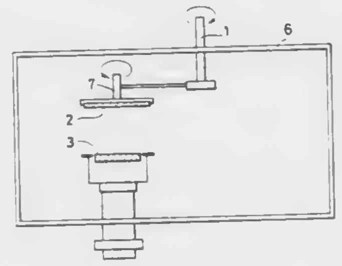
**Filed Oct. 13, 1989, Ser. No. 420,903**

**Claims priority, application Japan, Oct. 15, 1988, 63-260021**

**Int. Cl.⁵ C23C** *14/34*

**U.S. Cl. 204—192.15** **2 Claims**

1. A method of preparation by sputtering of an amorphous superlattice alloy consisting of lamellae based on periodic changes in the composition, said method comprising the steps of providing a target consisting of metal or alloy pieces placed on or embedded in an erosion region of another metal or alloy disk, continuously sputtering the erosion region onto substrates, and periodically changing the position of the substrate relative to the target by rotating the substrate in a plane extending parallel to a target face around a first axis extending normal to a center of the face of the target and orbiting the target around a second axis parallel to the first axis and spaced therefrom.



---

### 5,015,353

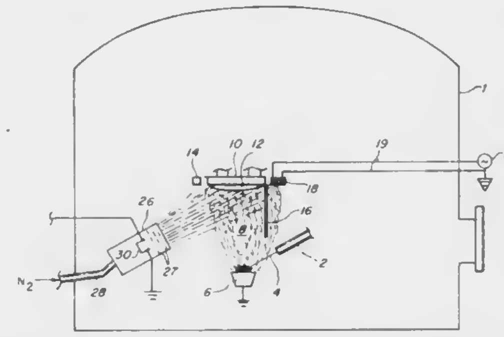
## METHOD FOR PRODUCING SUBSTOICHIOMETRIC SILICON NITRIDE OF PRESELECTED PROPORTIONS

**Graham K. Hubler, Alexandria; Edward P. Donovan, Annandale, both of Va., and Deborah Van Vechten, Baltimore, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 30, 1987, Ser. No. 102,937**

**Int. Cl.⁵ B05D** *3/06*

**U.S. Cl. 204—192.31** **13 Claims**



1. A method for producing substoichiometric silicon nitride $Si_{1-x}N_x$ of preselected stoichiometry x, said method employing an apparatus comprising: a means for depositing a film of silicon on a substrate; and a means for delivering nitrogen to said film; said method comprising:

a step for depositing said silicon film on said substrate;

a step for causing said means for delivering said nitrogen to deliver nitrogen to said substrate simultaneously with said depositing of said film, effective to cause mixing of said nitrogen and said silicon in said film, said mixing being effective to make said film a substoichiometric silicon nitride alloy $Si_{1-x}N_x$;

a step for controlling the amounts of said nitrogen delivered and said silicon deposited, effective to preselectively determine said stoichiometry x of said substoichiometric silicon nitride $Si_{1-x}N_x$; and

a step for altering by a preselected amount said relative amounts of said nitrogen delivered, and said silicon deposited, responsive to a silicon monitoring means and a nitrogen monitoring means, said step for altering being effective to alter said stoichiometry x by a preselected amount uniquely corresponding to said altering of said relative amounts of said nitrogen delivered and said silicon deposited.

### 5,015,354

## BIPOLAR-ELECTRODE ELECTROLYTIC CELL

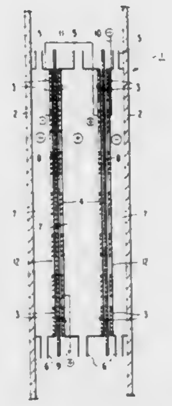
**Yoshinori Nishiki; Isao Sawamoto, both of Kanagawa; Shuji Nakamatsu, Kanagawa, and Takayuki Shimamune, Tokyo, all of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan**

**Filed May 10, 1989, Ser. No. 349,617**

**Claims priority, application Japan, May 11, 1988, 63-114389**

**Int. Cl.⁵ C25B** *9/00, 11/10*

**U.S. Cl. 204—254** **9 Claims**



1. A bipolar-electrode type series connected electrolytic cell for electrolysis of an electrolytic solution having a high electric resistance, including at least first and second diaphragms positioned to form a plurality of electrode compartments;

said compartments comprising a first outer compartment defined between a first side wall of the electrolytic cell and said first diaphragm positioned closest to said first side wall and in opposed relation thereto, a second outer compartment defined between a second side wall of the electrolytic cell and said second diaphragm positioned closest to said second side wall and in opposed relation thereto, and at least one inner electrode compartment defined between adjacent diaphragms;

said first and second outer compartments each containing a single electrode placed on said first and second diaphragms respectively, said at least one inner compartment containing two same-polar electrodes, each electrode of which is placed on an adjacent diaphragm defining said at least one inner compartment;

said electrodes being arranged such that different-polar electrodes are placed at opposing sides of each diaphragm, and such that the distance between same-polar electrodes within the same inner compartment is sufficiently large such that electrolysis therebetween does not substantially occur;

wherein two different-polar electrodes at the terminal ends of the series connected electrolytic cell are each electrically connected to a collector, and each of the remaining anode electrodes and cathode electrodes is electrically connected to a different-polar electrode present on an adjacent diaphragm.

---

### 5,015,355

## CORROSION MEASURING CELL

**Peter Schiessl, Aachen, Fed. Rep. of Germany, assignor to Strabag Bau-AG, Koeln-Deutz, Fed. Rep. of Germany**

**Filed Oct. 10, 1989, Ser. No. 418,555**

**Claims priority, application Fed. Rep. of Germany, Oct. 11, 1988, 3834628**

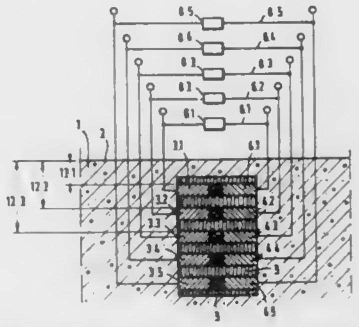
**Int. Cl.⁵ G01N** *17/02*

**U.S. Cl. 204—404** **28 Claims**

1. A corrosion measuring cell for structural or reinforcing steel embedded in a concrete part having an exterior surface, the cell comprising:

at least one cathode electrode embedded in the concrete part, said at least one cathode electrode being of corrosion-resistant metal;

a plurality of spaced anode electrodes of conventional steel embedded in the concrete part, said anode electrodes being spaced from said at least one cathode electrode and spaced from one another in such manner that the spaced anode electrodes are situated at varying depths from said concrete exterior surface;



at least one current measuring element, at said concrete exterior surface;

electrical connections extending from each of said at least one cathode electrode and each of said anode electrode of said current measuring element such that each of said anode electrodes is connectable through at least one of said at least one current measuring element to said cathode electrode, for detection/measurement of current due to corrosion at any one of said spaced anode electrodes.

---

### 5,015,356

## HYDROCARBON FUEL SYSTEMS

**William L. Talbert, 355 Folkstone Way, York, Pa. 17402**

**Continuation-in-part of Ser. No. 236,162, Aug. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 941,833, Dec. 15, 1986, abandoned, which is a continuation of Ser. No. 833,038, Feb. 26, 1986, abandoned, which is a continuation of Ser. No. 638,069, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 463,251, Feb. 2, 1983, abandoned, which is a continuation of Ser. No. 70,683, Aug. 29, 1979, abandoned. This application Aug. 15, 1990, Ser. No. 569,367**

**Int. Cl.⁵ C10L** *1/09*

**U.S. Cl. 208—16** **9 Claims**

1. A low Reid Vapor Pressure liquid gasoline for use in a standard carbureted internal combustion engine; said gasoline comprising a priming agent and a hydrocarbon mixture having an intermediate carbon range relative to $C_4$–$C_{12}$ fuel; said intermediate carbon range consisting essentially of $C_6$–$C_{10}$ hydrocarbons with $C_9$ and $C_{10}$ paraffinic hydrocarbons being present in the mixture; said gasoline having a boiling point range of 121° F.–345° F. at 1 atmosphere pressure; and said priming agent consisting of a hydrocarbon selected from the group consisting of $C_4$ and $C_5$ hydrocarbons and mixtures thereof and said priming agent being present in a minimum effective amount for raising the front end volatility of the gasoline to a minimum level for cold engine starting with said minimum effective amount being less than that required for $C_4$–$C_{12}$ gasoline.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,357
### WAX SWEATING

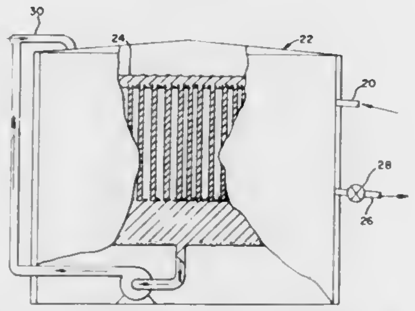
Roger M. Rueff, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 140,472, Jan. 4, 1988. This application Mar. 7, 1989, Ser. No. 320,520

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.$^5$ C10G *43/04*

U.S. Cl. 208—32 10 Claims



1. A wax sweating process, comprising the steps ot:

solidifying molten wax containing oil to crystallize said wax;

sweating said solidified wax to produce sweated wax containing less oil than said molten wax, said sweating including gradually and progressively heating said solidified wax is a sweating oven to at least its melting point; while

withdrawing liquid drippings comprising some of said wax and oil from said sweating oven;

determining the relationship of the melting point of the remaining solidified wax in said sweating oven as a function of the congealing point of said liquid drippings and the efficiency of said sweating oven;

monitoring the congealing point of said liquid drippings as said solidified wax in said sweating oven is being heated;

determining the melting point of the remaining solidified wax is said sweating oven based upon said monitored congealing point and said determined relationship of said melting point of the remaining solidified wax as a function of the congealing point of said liquid drippings and the efficiency of said sweating oven;

ceasing sweating of the remaining solidified wax in said sweating oven and withdrawal of said liquid drippings from said wax sweating oven when said melting point of the remaining solidified wax in said sweating oven reaches the desired wax product; thereafter

heating said oven to melt the remaining solidified wax without substantially deoiling and separating liquid drippings from said wax to liquify and produce the desired wax product; and

discharging said melted wax product from said sweating oven.

---

### 5,015,358
### ANTIFOULANTS COMPRISING TITANIUM FOR THERMAL CRACKING PROCESSES

Larry E. Reed, and Randall A. Porter, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 30, 1990, Ser. No. 575,246

Int. Cl.$^5$ C10G *9/16*

U.S. Cl. 208—48 AA 23 Claims

1. A method for reducing the formation of coke on metals which are contacted with a gaseous stream containing hydrocarbons in a thermal cracking process comprising the step of contacting said metals with an antifoulant selected from the group consisting of a combination of titanium and tin and a combination of titanium and antimony.

---

### 5,015,359
### HYDRODEWAXING METHOD WITH INTERSTATE RECOVERY OF OLEFIN

Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 125,435, Jun. 30, 1986, abandoned. This application Jan. 25, 1989, Ser. No. 301,700

Int. Cl.$^5$ C10G *65/10, 13/00*

U.S. Cl. 208—58 21 Claims

1. A process for dewaxing a hydrocarbon feed comprising:

(a) dewaxing the feed by contacting a hydrocarbon feed in the presence of hydrogen with a dewaxing catalyst;

(b) obtaining a dewaxed effluent;

(c) stripping the dewaxed effluent with a gaseous stripping medium to form a dewaxed fraction, a light olefinic gas fraction and an olefinic gasoline fraction;

(d) separation the dewaxed fraction from the olefinic gasoline fraction and the light olefinic gas friction, and

(e) hydrotreating the dewaxed fraction in the presence of hydrogen with a hydrotreating catalyst.

---

### 5,015,360
### PRODUCTION OF HYDROCARBON FRACTIONS BY HYDROCRACKING

Thomas F. Degnan, Moorestown; Garry W. Kirker, Washington Township, Gloucester County, both of N.J.; Richard F. Socha, Newtown, Pa.; Michael R. Stapleton, Freehold, and Ivy D. Johnson, Medford, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 879,787, Jun. 27, 1986, Pat. No. 4,859,648, which is a continuation-in-part of Ser. No. 687,414, Dec. 28, 1984, abandoned. This application Dec. 29, 1989, Ser. No. 459,216

Int. Cl.$^5$ C10G *47/12*

U.S. Cl. 208—110 14 Claims

1. A process comprising hydrocracking a hydrocarbon feedstock having an initial boiling point about 343° C. in the presence of a catalyst having cracking and hydrogenating activity, said catalyst comprising a layered silicate containing interspathic polymeric silica, in order to produce a hydrocarbon product having at least 35 percent by weight of hydrocarbons having a boiling point below 343° C., said catalyst further comprising at least one metal selected from the group consisting of Cr, Mo, W, Fe, Co, and Ni, wherein said hydrocracking occurs at conversions to product having a boiling point of less than 343° C. of greater than 70 percent volume of charge.

---

### 5,015,361
### CATALYTIC DEWAXING PROCESS EMPLOYING SURFACE ACIDITY DEACTIVATED ZEOLITE CATALYSTS

Robert J. Anthes, Hamilton Square, and Ross A. Kremer, Ringoes, both of N.J., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Jan. 23, 1989, Ser. No. 299,905

Int. Cl.$^5$ C10G *47/16*

U.S. Cl. 208—111 26 Claims

1. In a process for dewaxing a waxy component-containing hydrocarbon feedstock in which the feed is contacted with a zeolite hydrodewaxing catalyst under hydrodewaxing conditions to provide a dewaxed product, the improvement which comprises employing a zeolite hydrodewaxing catalyst, the zeolite surface of which has been at least partially deactivated for acid catalyzed reactions by chemisorption of a sterically-hindered amine surface-deactivating agent which possesses an average cross section diameter greater than that of the zeolite pores.

### 5,015,362
### CATALYTIC CONVERSION OF $NO_x$ OVER CARBONACEOUS PARTICLES

Arthur A. Chin, Cherry Hill, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 28, 1989, Ser. No. 458,053

Int. Cl.$^5$ C10G *11/18*

U.S. Cl. 208—121 14 Claims

1. A process for reducing the nitrogen oxides ($NO_x$) content of a flue gas stream containing $NO_x$ produced by a combustion process comprising:

(a) removing said flue gas stream from said combustion process,

(b) contacting, in a $NO_x$ reduction zone, said flue gas stream with a combustible carbonaceous substance and an amount of a NOx reduction catalyst comprising bismuth or oxides of bismuth effective for conversion of $NO_x$ to nitrogen in the presence of a combustible carbonaceous substance and reducing the content of $NO_x$ in said flue gas by catalytically reacting said $NO_x$ with said carbonaceous substance to produce a flue gas with a reduced content of $NO_x$.

---

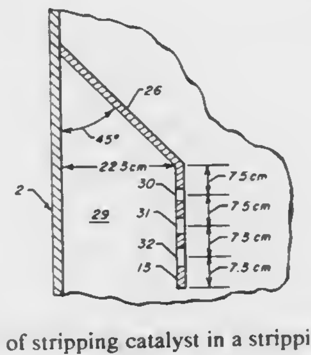
### 5,015,363
### FCC STRIPPING METHOD

Ismail B. Cetinkaya, Palatine, Ill., assignor to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 101,225, Sep. 25, 1987, which is a continuation-in-part of Ser. No. 867,972, May 29, 1986, abandoned. This application Dec. 14, 1989, Ser. No. 450,485

Int. Cl.$^5$ C01G *35/14;* B01J *8/20*

U.S. Cl. 208—150 5 Claims



1. A method of stripping catalyst in a stripping zone associated with a fluid catalytic cracking reactor wherein said stripping zone removes hydrocarbons from a continuously circulating stream of fluidized particulate catalyst by contact with a stripping gas, said method comprising:

(a) passing catalyst particles from a reaction zone into the upper end of a principally vertical stripping zone, passing said catalyst downwardly through a transverse flow area of said stripping zone, and withdrawing catalyst particles from a lower portion of said stripping zone;

(b) adding stripping gas to a lower portion of said stripping zone, passing said stripping gas upwardly through said stripping zone in countercurrent contact with said catalyst, and removing said stripping gas from an upper section of said stripping zone;

(c) deflecting catalyst flow through said stripping zone with at least one downwardly sloped grid that projects into said transverse flow area, said at least one grid having a vertically-oriented skirt depending from a lower portion thereof; and,

(d) collecting upwardly flowing stripping gas under said at least one grid and redistributing stripping gas laterally across the transverse flow area in a plurality of horizontal jets formed by holes in said at least one grid producing jets of at least two different lengths, wherein jets emanate from the skirts at different elevations and the length of the jets varies progressively down each skirt from the shortest jet at the top to the longest jet at the bottom.

---

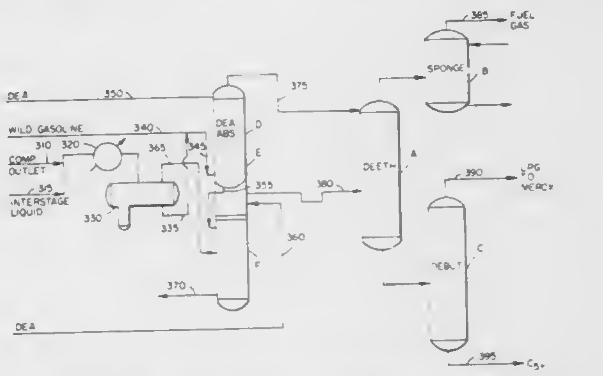
### 5,015,364
### METHOD AND MEANS FOR REFINERY GAS PLANT OPERATION

Mohsen N. Harandi, Lawrenceville, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Jun. 21, 1989, Ser. No. 369,169

Int. Cl.$^5$ C10G *29/20*

U.S. Cl. 208—236 13 Claims



1. A process for operating an unsaturated gas plant of a catalytic hydrocarbon conversion process, comprising;

contacting acidic hydrocarbon feedstreams to a gas plant separator zone with lean acid absorbing absorbent in an absorption zone comprising at least one liquid absorber bed and one vapor absorber bed upstream of said separator zone, said feedstreams comprising unstabilized liquid gasoline and liquid and vapor output streams from liquid-vapor separator for inter-stage liquids and compressor effluents from said conversion process main fractionator, whereby said feedstreams are deacidified.

---

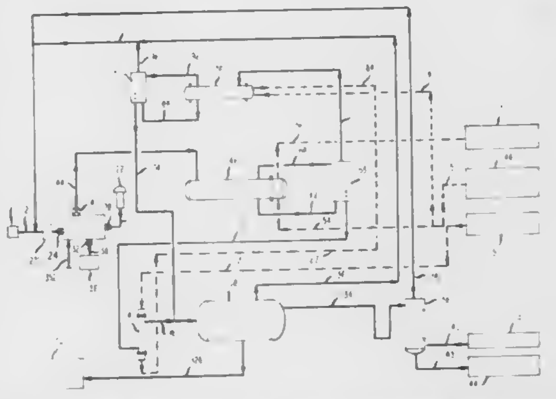
### 5,015,365
### PROCESS FOR REMOVING HALOGENATED HYDROCARBONS AND OTHER SOLVENTS FROM A SOLVENT LADEN AIR (SLA) STREAM

Tomas E. Vara; Jerry L. Mestemaker, and B. R. Thakker, all of Vero Beach, Fla., assignors to Vara International Inc., Vero Beach, Fla.

Filed Apr. 20, 1988, Ser. No. 183,821

Int. Cl.$^5$ B01D *53/04, 53/12*

U.S. Cl. 208—262.1 11 Claims



1. A process for removing solvents including halogenated hydrocarbons from an inlet solvent laden air (SLA) stream, comprising the steps of:

(a) passing the inlet SLA stream through at least two activated carbon absorption beds connected in series;

VOL
1126
ISS
2
MY
14
1991
UMI

(b) regenerating at least one additional activated carbon absorption bed, the regeneration comprising the steps of:

(i) passing a regenerating vapor through the adsorption bed, the regenerating vapor removing halogenated hydrocarbons and other solvents from the bed;

(ii) condensing the regenerating vapor to form a liquid fraction having at least one solvent-rich liquid fraction and at least one solvent-poor liquid fraction, said condensation step comprising a bulk vapor condensation step producing a liquid fraction and a vapor fraction, and a vent condensating step downstream to said bulk vapor condensation step, said vent condensation step being adapted to separate non-condensibles from said bulk vapor condensation step;

(iii) returning non-condensibles to the SLA inlet stream of step (a);

(iv) separating said liquid fraction from said bulk vapor condensation step and condensed liquid from said vent condensation step into a solvent-rich liquid fraction and a solvent-poor liquid fraction; and

(c) returning the bed of step (b) to the series of adsorption beds of step (a), and removing at least one of the adsorption beds from the series of step (a) and regenerating this bed by the process of step (b), said returned bed being connected in series downstream to other adsorption beds in said series, said removed bed being removed from a position in said series upstream to other adsorption beds in said series, whereby a cyclic adsorption and regeneration process can be provided which will effectively remove said halogenated hydrocarbons from said SLA.

---

### 5,015,366

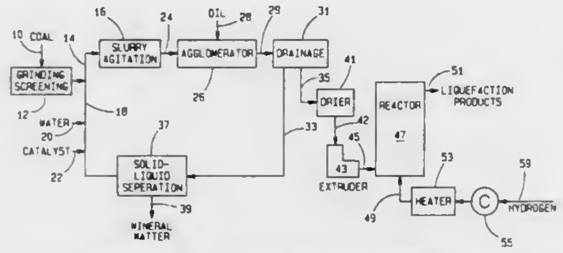
### PROCESS AND APPARATUS FOR COAL HYDROGENATION

**John A. Ruether, McMurray, Pa., and Theodore B. Simpson, McLean, Va., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Apr. 10, 1990, Ser. No. 506,739**

**Int. Cl.$^5$ C10G** *1/08*

**U.S. Cl. 208—408** **8 Claims**



1. In a method for processing carbonaceous material containing mineral matter and feeding the carbonaceous material into a hydrogenation reactor operating at an elevated pressure of about 70 to 250 atmospheres and at a temperature in excess of the plastic softening temperature of the carbonaceous material, the method including the steps of providing an aqueous slurry of the carbonaceous material and mineral matter as finely divided particulates with water and water soluble catalyst in sufficient proportions to effect dissolution and dispersion of the catalyst throughout the slurry, mixing a sufficient amount of oil into the slurry to form agglomerates of the finely divided carbonaceous material and oil while leaving the mineral matter essentially as unagglomerated solids; the improvement comprising

separating the agglomerates of carbonaceous material from the slurry containing the unagglomerated mineral matter at about atmospheric pressure;

separating the mineral matter from residual solution containing dissolved catalyst and recycling the residual solution and catalyst to provide aqueous slurry;

drying the carbonaceous agglomerates at about atmospheric pressure to remove essentially all of the moisture and to deposit solute catalyst onto the agglomerates;

extruding the agglomerates with deposited catalyst from about atmospheric the agglomerates to the elevated pressure and at a temperature below that at which the carbonaceous material without the added oil enters a plastic condition and feeding the extruded agglomerates into the hydrogenation reactor.

---

### 5,015,367

### ALKYLATED DIARYL OXIDE MONOSULFONATE COLLECTORS USEFUL IN THE FLOATATION OF MINERALS

**Richard R. Klimpel, Midland, and Donald E. Leonard, Shepherd, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Feb. 23, 1990, Ser. No. 484,038**

**Int. Cl.$^5$ B03D** *1/012, 1/02*

**U.S. Cl. 209—166** **18 Claims**

1. A process for the recovery of minerals by froth flotation comprising subjecting an aqueous slurry comprising particulate minerals selected from the group consisting of oxide ores, sulfide ores, noble metal ores, graphite inks and mixtures thereof to froth flotation in the presence of a collector comprising an alkylated diaryl oxide sulfonic acid or salt thereof and mixtures of such acids or salts wherein at least about 20 percent of the sulfonic acid or salts thereof are monosulfonated under conditions such that the minerals to be recovered are floated and the floated minerals are recovered.

---

### 5,015,368

### ORE FLOTATION PROCESS USING CARBAMATE COMPOUNDS

**Stephen A. Di Biase, Euclid, and James H. Bush, Mentor, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

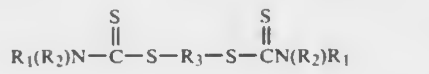
**Filed Jun. 15, 1990, Ser. No. 538,864**

**Int. Cl.$^5$ B03D** *1/012, 1/02*

**U.S. Cl. 209—166** **22 Claims**

1. A mineral recovery process comprising the steps of:

(A) forming a slurry comprising a crushed ore containing at least one mineral, water and a mineral collector which is at least one dithiocarbamate represented by the formula:



$$R_1(R_2)N-\overset{\overset{S}{\|}}{C}-S-R_3-S-\overset{\overset{S}{\|}}{C}N(R_2)R_1 \tag{I}$$

wherein each $R_1$ is independently hydrogen, a hydrocarbyl group having from 1 to about 18 carbon atoms, or $R_1$ taken together with $R_2$ and the nitrogen atom form a five, six or seven member heterocyclic group; each $R_2$ is independently a hydrocarbyl group having from 1 to about 18 carbon atoms, or $R_2$ taken together with $R_1$ and the nitrogen atom form a five, six or seven member heterocyclic group; and $R_3$ is a divalent hydrocarbon group; having from 1 to about 10 carbon atoms;

(B) subjecting the slurry from step (A) to froth flotation to produce a froth containing said mineral; and

(C) recovering said mineral from the froth.

### 5,015,369

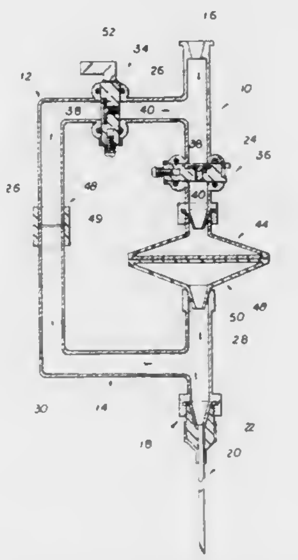
### ASSEMBLY FOR FILTERING AMNIOTIC FLUID

**Lori Romine, 11735 SW. 112th Ter., Miami, Fla. 33186; Ronald Sholders, 7640 SW. 168th St., Miami, Fla. 33157, and Richard Warren, c/o 11735 SW. 112 Ter., Miami, Fla. 33186**

**Filed Jan. 22, 1990, Ser. No. 468,207**

**Int. Cl.$^5$ B01D** *35/02*

**U.S. Cl. 210—136** **14 Claims**



1. A filtering assembly for removing amniocytes from amniotic fluid during pregnancy, said assembly comprising:

(a) a conduit structure including a first conduit section having one open end structured for connection to a syringe and having separate conduit segments both disposed in fluid communication with said open end,

(b) said conduit structure further including a second conduit section removably connected to said first conduit section and including two conduit segments connected to said first conduit section,

(c) said second conduit section including an open end structured for connection to a needle positioned and structured to allow fluid flow therethrough into and out of said conduit structure,

(d) filter means connected in fluid communication between said first and second conduit sections for filtering out amniocytes, for examination, from said amniotic fluid,

(e) said first and second conduit sections structured to define different paths of fluid flow between the syringe and the needle and into and out of said needle structure,

(f) valve means mounted on said conduit structure in flow regulating relation along said different paths of fluid flow between the syringe and the needle, and

(g) said filter means disposed in flow receiving relation along one of said different flow paths from the needle to syringe.

---

### 5,015,370

### APPARATUS AND METHOD FOR TREATING WELL WATER

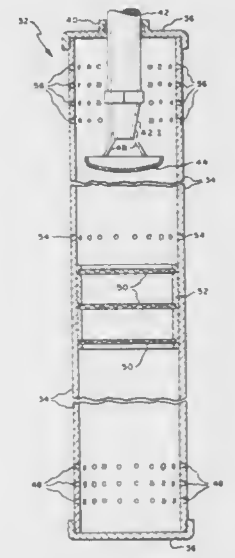
**Anthony Fricano, 3885 Luther Rd., Silver Springs, N.Y. 14550**

**Filed Jun. 8, 1989, Ser. No. 363,498**

**Int. Cl.$^5$ B01D** *21/30, 19/00*

**U.S. Cl. 210—138** **9 Claims**

4. In combination with a water supply system including a well of the type having a well casing which extends to a depth below the water table to establish a reservoir within the well casing, a water line running from the well into a building, and a pump for pumping water through the water line from the reservoir within the well to the building; wherein the improvement comprises an apparatus for treating the well water, the apparatus including an aerator and delivery means for delivering well water from the water line to the aerator, wherein the aerator includes a canister assembly, a jet nozzle disposed within an upper portion of the canister assembly, a plurality of apertures extending through the canister assembly below the jet nozzle and a surface within the canister assembly below the jet nozzle and above the plurality of apertures, the surface being in line with the jet nozzle so that water can impinge the surface during operation of the delivery means to breakup the water into small droplets, and the delivery means including mounting means for mounting the aerator within the well casing above the reservoir so that well water delivered to the aerator will subsequently flow back into the reservoir, the aerator causing gases such as hydrogen sulfide to be released from the water and also causing dissolved iron and manganese to oxidize and precipitate out of the water so that the quality of the water within the reservoir is substantially improved.



---

### 5,015,371

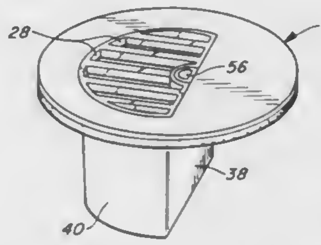
### SAFETY DEVICE FOR SEALING A DRAIN ASSEMBLY

**James E. Webb, Richmond, Calif., assignor to Nsertaseal Corporation, Richmond, Calif.**

**Filed Jan. 8, 1990, Ser. No. 461,686**

**Int. Cl.$^5$ E03F** *5/06*

**U.S. Cl. 210—164** **4 Claims**



1. A safety device for sealing a drain assembly leading from ground level to an underground line, said drain assembly including a grating support ledge and a peripheral wall extending a predetermined distance upwardly from said grating support ledge toward ground level, said safety device comprising;

a plate element defining an aperture, said plate element having an upper surface and a thickness less than said predetermined distance, said plate having an outer peripheral configuration generally corresponding to the configuration of said peripheral wall and positionable over said support ledge with the plate element upper surface disposed below said ground level;

a housing element affixed to said plate element and depend-

VOL
126
ISS
2
MY
14
1991
UMI

ing downwardly therefrom, said housing element including fluid-tight outer walls defining an interior closed to said underground line and communicating with the aperture defined by said plate element whereby a predetermined quantity of liquid passing downwardly through said aperture will completely fill said interior and weigh down said safety device, said housing element outer walls including a bottom wall, a generally planar first side wall extending upwardly from said bottom wall to said plate element and a generally curved second side wall connected to said first said wall at interconnected ends and extending upwardly from said bottom wall to said plate element, said bottom and side walls being integrally formed; and

a seal element disposed below said plate element and positionable between said support ledge and said plate element to provide a substantially fluid-tight seal therebetween when said liquid fills said interior.

---

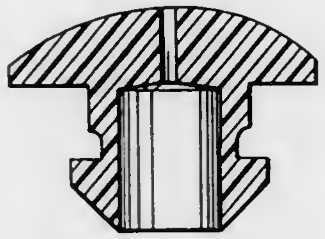
### 5,015,372
## TOXIN CONTAINING PERFORATED ANTIFOULING POLYMER NOZZLE GROMMET

**William B. Mercer, Annapolis, Md.; Nathan F. Cardarelli, and Richard L. Henry, both of Akron, Ohio, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 7, 1990, Ser. No. 476,234**

**Int. Cl.$^5$ B63B** *59/00*

**U.S. Cl. 210—170** **6 Claims**



6. In an underwater fluid distribution emission system having replaceable nozzle nozzles grommets positioned therein for emitting a fluid the improvement comprising nozzle grommets being formed from polymer toxicant formulation possessing physical properties of viscosity and tensile strength required to maintain their shape and remain in position against forces which tend to dislodge it including air pressure, water flow and gravity and retaining a capability of maintaining a controlled release of the toxicant.

---

### 5,015,373
## HIGH STABILITY POROUS ZIRCONIUM OXIDE SPHERULES

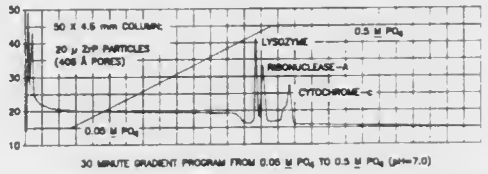
**Peter W. Carr, Minneapolis; Eric F. Funkenbusch, White Bear Lake; Martin P. Rigney, Roseville; Patrick L. Coleman, Minneapolis; Douglas A. Hanggi, St. Paul, and Wes A. Schafer, Minneapolis, all of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 151,819, Feb. 3, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 420,150**

**Int. Cl.$^5$ B01D** *15/08*

**U.S. Cl. 210—198.2** **8 Claims**

1. Porous $ZrO_2$ spherules coated with a hydrophobic cross-linked polymer coating wherein said coated spherules have a pore size from about 20–500 Å and a particle diameter range of about 0.5–500 microns, and are stable to about pH 14 in aqueous media.



---

### 5,015,374
## CLOSURE CAP FOR DIALYZERS

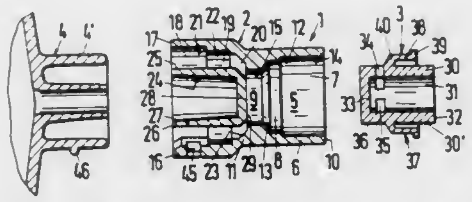
**Bernd Mathieu, Spiesen-Elversberg; Michael Rinck, St. Ingbert-Hassel; Jürgen Schnur, Oberthal; Dieter Selzer, Namborn, and Wolfram Weber, Spiesen-Elversberg, all of Fed. Rep. of Germany, assignors to Fresenius AG, Bad Homburg, Fed. Rep. of Germany**

**Filed Jul. 27, 1989, Ser. No. 386,284**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825573**

**Int. Cl.$^5$ B01D** *63/00, 65/02*

**U.S. Cl. 210—232** **37 Claims**



1. In a closure cap for dialyzers comprising first and second cap parts (2, 3), of which the first cap part (2) comprises means for attaching the first cap part to a dialyzer flange (4) while the second cap part (3) is movable between an open position in which the passage of a sterilization medium takes place and a closure position, the improvement wherein:

the first cap part (2) comprises a connection portion (16) having means (22, 60) for sealing the dialyzer flange (4) in the assembled state in a sterile manner and a first portion (6) which is adapted to be brought into flow connection with an in-line sterilization means.

---

### 5,015,375
## RECHARGEABLE FILTER ASSEMBLY

**Steven W. Fleck, Tampa, Fla., assignor to MCF Systems, Inc., Tampa, Fla.**

**Filed Aug. 16, 1989, Ser. No. 394,546**

**Int. Cl.$^5$ B01D** *27/08, 29/21*

**U.S. Cl. 210—232** **13 Claims**

1. A rechargeable filter assembly comprising:

a reusable perforated conduit having a first and a second open end;

a base plate affixed to said second end of said conduit, said base plate having a base aperture formed therethrough and said conduit being in fluid flow communication with said base aperture;

a reusable hollow perforated support cylinder having a first open end and a second open end, said support cylinder surrounding said conduit and spaced therefrom, said support cylinder and said conduit defining an inner cavity therebetween, and one of said ends of said support cylinder being removably attached to said base plate;

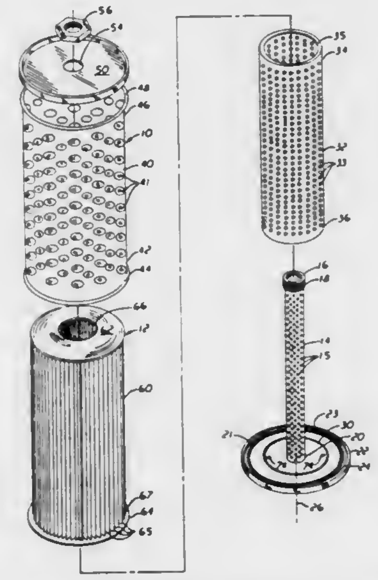
a reusable perforated cylindrical exterior shell having at least one open end, said exterior shell surrounding said support cylinder being removably connected to said base to define an outer cavity therebetween;

a lid having a lid aperture therethrough, said lid removably attached to said first end of said conduit and removably connected to said support cylinder;

a cylindrical filter unit having a first end and a second end, said filter unit having a first and second filter unit sealing means on said first and said second ends respectively, and said filter unit having an opening therethrough, said filter unit adapted to be removably inserted onto and around said support cylinder within said outer cavity, whereby said second sealing means of said filter unit is adjacent to said base plate and said first sealing means is adjacent to said lid of said filter assembly;

a lid attaching means for removably attaching said lid to said conduit;

a lid sealing means for removably sealing said lid to said filter unit wherein said perforated conduit further comprises a first section including said first end of said conduit, a second section including said second end of said conduit, and an annular shoulder interposed between said first and said second sections, said first section having a diameter less than said second sections, such that when said filter unit is inserted within said outer cavity said filter unit sealing means of said first end of said filter unit rests upon said shoulder, and when said lid is attached to said conduit by said lid attaching means, said filter unit sealing means of said first end of said filter unit is sealingly squeezed between said lid and said shoulder, whereby fluid is prevented from bypassing the filter medium;



a base plate sealing means for removably sealing said base plate to said second filter unit sealing means; and

filter medium inserted in said inner cavity.

---

### 5,015,376
## SEMI-RIGID ENHANCED AREA FILTER ELEMENT

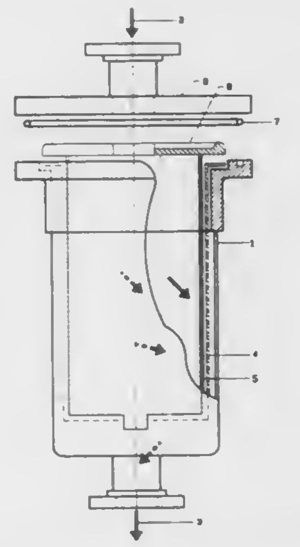
**Charles R. Picek, 10322 Malcolm Cir., Cockeysville, Md. 21030**

**Filed Jan. 22, 1990, Ser. No. 468,101**

**Int. Cl.$^5$ B01D** *29/17, 29/27*

**U.S. Cl. 210—317** **3 Claims**

1. A semi-rigid, enhanced area, and one piece disposable filter element that is to be closely fitted within a rigid nondisposable outer perforated retaining basket within a filter vessel comprised of an inlet cover and an outlet chamber which retains the basket on an internal ridge for separation of solids from liquids by providing inside to outside flow passage through multiple internal layers of padded filtering membranes alternately separated by layers of drainage media, said padded membranes to be provided with by-pass slits which function as self-regulating valves for progressive filtration through each succeeding layer up to a final integral layer of membrane containing no by-pass slits, and with all layers pleated vertically into a cylindrical shape and bonded together at the bottom with a solid resilient end cap and at the top with a flanged resilient open-ended end cap of which the flange does provide a sealing lip to isolate the inlet and outlet chambers of a filter housing by compression between the filter cover and the outlet chamber inner ridge.



---

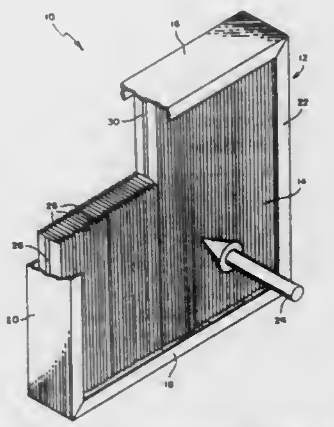
### 5,015,377
## PLANAR PLURAL TUBULAR FILTER ARRAY

**Robert K. Silvera, Round Lake, N.Y., assignor to Polyset Company, Round Lake, N.Y.**

**Filed Feb. 8, 1989, Ser. No. 307,776**

**Int. Cl.$^5$ B01D** *25/02, 27/08*

**U.S. Cl. 210—323.2** **3 Claims**



1. A high efficiency filter comprising a set of porous tubular members formed of a filter media, the members of said set being aligned in parallel to define a generally planar array of tubular members with the planar array aligned and disposed in a frame so as to present a generally planar face orthogonal to a fluid stream passing through said frame, said frame having cross members extending generally transversally of said tubular members and end members extending generally parallel to said tubular members, thereby confining a fluid stream passing through said array to passage normal to said planar face of said array and within and through said frame, each member of said set bonded and sealed at its respective end to the cross members of said frame to be thereby supported within said frame, inner members of said set being bonded and sealed along their lengths to adjacent members in said set, and outer members of said set being bonded and sealed along their lengths to the end

VOL
1126
ISS
2
MY
14
1991
UMI

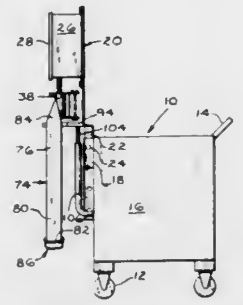
members of said frame to thereby present a tubular surface to any fluid stream passing through said frame, and further, said set of tubular members is formed from lengthwise-folded strips of said filter media by bonding each edge of a folded strip to the back of an adjacent strip.

---

### 5,015,378
### BELT OIL SKIMMER APPARATUS

**Philip C. Lewan; Robert G. Podlesak, and Kenneth L. Buchner, all of Jackson, Mich., assignors to Camshaft Machine Company, Jackson, Mich.**

**Filed Jan. 24, 1990, Ser. No. 469,352**
**Int. Cl.$^5$ B01D** *17/02;* **C02F** *1/40*
U.S. Cl. 210—386 17 Claims



1. Apparatus for removing oil from the horizontal surface of a body of liquid comprising, in combination, a frame adapted to be supported adjacent the body of liquid from which oil is to be removed, a primary elongated roller rotatably mounted on said frame for rotation about an axis inclined relative to the horizontal, said roller having an outer surface adapted to receive a substantially flat belt, a substantially flat endless belt having first and second sides, said belt first side engaging said roller, at least one pressure roller rotatably mounted on said frame having an axis of rotation adjacent said primary roller and engaging said belt second side and maintaining said belt first side in engagement with said primary roller, a motor mounted on said frame operatively connected to at least one of said rollers for rotating said rollers about their axes of rotation, and a collection receptacle mounted on said frame below said rollers receiving oil removed from said belt by said rollers, said belt depending below said primary roller and below said receptacle into the body of liquid from whose surface oil is to be removed.

---

### 5,015,379
### COILED FILTER STRIP WITH UPSTREAM AND DOWNSTREAM BUTT ENDS

**Mordeki Drori, P.O.B. 21538, Tel Aviv, Israel**

**Filed Jan. 17, 1989, Ser. No. 297,496**
**Int. Cl.$^5$ B01D** *27/07*
U.S. Cl. 210—411 12 Claims

1. A filter element comprising:

at least one coiled filter strip defining first and second butt ends, one of the butt ends being arranged to define an upstream surface during normal filtering operation, receiving fluid to be filtered, and the other of the butt ends being arranged to define a downstream surface during normal filtering operation, through which filtered fluid leaves the coiled strip;

each of the at least one coiled filter strips defining a first radially outwardly facing surface and a second radially inwardly facing surface thereof;

the first surface of generally any portion of generally any individual one of the at least one strips defining, in conjunction with the second surface of a radially outwardly disposed adjacent portion of an individual one of the at least one strips, a first filtering area; and

the second surface of the portion defining, in conjunction with the first surface of a radially inwardly disposed adjacent portion of an individual one of the at least one strips, a second filtering area disposed generally radially inwardly of the first filtering area;

each of the first and the second filtering areas communicating with the upstream and the downstream surfaces and defining a filtering barrier between the upstream surface and the downstream surface.

---

### 5,015,380
### MICROPOROUS SUPPORT LAYER WITH INTERFACIALLY POLYMERIZED COPOLYAMIDE MEMBRANE THEREON

**Sherman A. Sundet, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 341,037, Apr. 20, 1989. This application Aug. 31, 1989, Ser. No. 401,380**
**Int. Cl.$^5$ B01D** *71/56*
U.S. Cl. 210—490 10 Claims

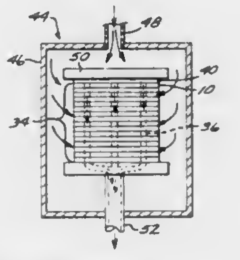
1. A multilayer reverse osmosis membrane comprising a microporous support layer and superposed thereon a copolyamide layer consisting essentially of units derived from m-phenylenediamine, and acyl units derived from cyclohexane-1,3,5-tricarbonyl chloride, and difunctional acyl chlorides of isophthaloyl chloride, terephthaloyl chloride, cyclohexane dicarbonyl chlorides, or mixtures thereof wherein the average functionality of the acyl chlorides is from about 2.20 to about 2.40.

---

### 5,015,381
### SOLID ELEMENT FLUID FILTER FOR REMOVING SMALL PARTICLES FROM FLUIDS

**M. Edmund Ellion, Arcadia; Philip A. Donatelli, Marina del Rey, and George Wolff, Huntington Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Mar. 9, 1987, Ser. No. 23,175**
**Int. Cl.$^5$ B01D** *29/44*
U.S. Cl. 210—490 17 Claims



1. A filter element, comprising:

a flat base having a thickness direction and a transverse direction; and

a layer of a solid material having a substantially constant thickness of less than about 10 micrometers deposited on said flat base, said layer having therein a pattern comprising a plurality of transversely extending continous channels.

---

### 5,015,382
### MICROPOROUS SUPPORT LAYER WITH INTERFACIALLY POLYMERIZED COPOLYAMIDE MEMBRANE THEREON

**Sherman A. Sundet, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 20, 1989, Ser. No. 341,037**
**Int. Cl.$^5$ B01D** *71/56*
U.S. Cl. 210—490 8 Claims

1. A multilayer reverse osmosis membrane comprising a microporous support layer and superposed thereon a copolyamide layer consisting essentially of units derived from m-phenylenediamine, and acyl units derived from mixtures of cyclohexane-1,3,5-tricarbonyl chloride, and alkylene diacyl

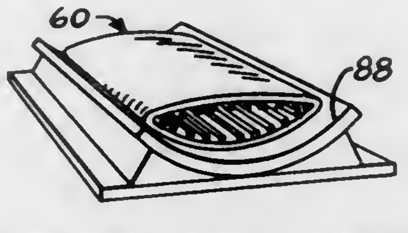
chlorides containing 4 to 12 carbon atoms, wherein the average functionality of the acyl chlorides is from about 2.35 to about 2.80.

---

### 5,015,383
### SLOTTED SCREEN SCALLOPS FOR HIGH LOADING PRESSURES AND METHOD OF MAKING SAME

**Thomas W. Evans, Houston, Tex.; Robert G. Norell, New Brighton, Minn.; Stephen A. Uban, Stillwater, Minn., and Richard C. Maxson, Maple Grove, Minn., assignors to Johnson Filtration Systems Inc., New Brighton, Minn.**

**Filed Jun. 15, 1989, Ser. No. 366,872**
**Int. Cl.$^5$ B01D** *29/00*
U.S. Cl. 210—497.1 8 Claims



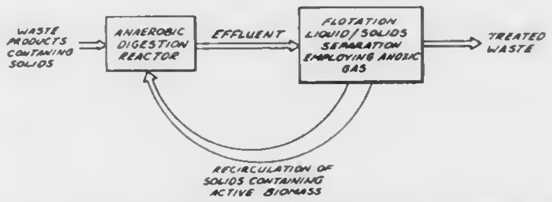
1. A generally tubular, elongated screen assembly comprising an elongated, slotted portion which is formed solely of a welded integral assembly of a length of wire helically wrapped and welded to each of a plurality of longitudinally extending support members at every intersection therewith, said wire being helically wrapped at a pitch which defines a generally uniform maximum spacing between adjacent wraps of wire along the entire length of said wire and the entire length of said slotted portion, said slotted portion having a cross-section normal to its axis which is at least twice as wide in one direction as it is in a direction normal to said one direction, and which includes a pair of elongated, opposed sides which face each other and are formed of two different, and relatively large radii, said pair of sides being joined at their ends by curved end portions which are of a much smaller radii than either of said opposed sides.

---

### 5,015,384
### ANAEROBIC DIGESTION PROCESS

**Dennis A. Burke, 2102 Lashi St., Olympia, Wash. 98503**

**Continuation of Ser. No. 198,332, May 25, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 445,918**
**Int. Cl.$^5$ C02P** *3/28*
U.S. Cl. 210—603 6 Claims


WASTE PRODUCTS CONTAINING SOLIDS
ANAEROBIC DIGESTION REACTOR
EFFLUENT
FLOTATION LIQUID/SOLIDS SEPARATION EMPLOYING ANOXIC GAS
TREATED WASTE
RECIRCULATION OF SOLIDS CONTAINING ACTIVE BIOMASS

1. In a method of treating waste products containing suspended solids by an anaerobic digestion process within an anaerobic reactor and withdrawing an anoxic gas and treated effluent from said reactor, the improvement consisting essentially of:

conducting a separate gas flotation step on effluent from said reactor in a manner such that active biomass is substantially separated from the digester effluent, wherein said gas flotation employs an anoxic gas and a chemical aid to promote separation of said active biomass withdrawing an effluent from said gas flotation step, and then

recirculating said separated active biomass to said anaerobic reactor to substantially increase the biomass within said anaerobic reactor, whereby the efficiency of the reactor is increased and the size of the reactor may be reduced.

---

### 5,015,385
### PROCESS FOR PROMOTION OF MICROBIAL CONSUMPTION OF WASTE WATER FATS

**Klaus Becker, Hamburg, Fed. Rep. of Germany, assignor to BTC Biotechnik International GmbH, Hamburg, Fed. Rep. of Germany**

**Division of Ser. No. 25,558, Mar. 13, 1987, abandoned. This application Nov. 13, 1989, Ser. No. 434,770**
**Claims priority, application Fed. Rep. of Germany, Mar. 13, 1986, 3608422**
**Int. Cl.$^5$ C02F** *3/00, 9/00;* **C11C** *1/00*
U.S. Cl. 210—610 5 Claims

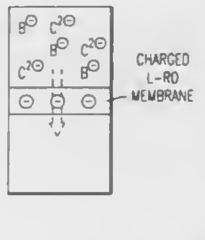
1. A process of purifying household or industrial establishment waste water pipes containing fatty waste water, which method comprises adding to the fatty waste water a growth factor which enhances the growth of bacteria contained in the waste water which break up or emulsify fat in an amount sufficient to effect the bacterial growth enhancement but insufficient to serve as a significant nutrient source for the bacteria.

---

### 5,015,386
### METHOD FOR SEPARATION OF ELECTROLYTES, AND METHOD FOR ION EXCHANGE OF ELECTROLYTES WITH COUNTER-IONS

**Toshiya Tanabe; Shigemitsu Abe; Masazumi Date, and Tetsuya Kawakita, all Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Filed Jul. 18, 1988, Ser. No. 220,597**
**Claims priority, application Japan, Jul. 20, 1987, 62-180852**
**Int. Cl.$^5$ E01D** *61/02*
U.S. Cl. 210—638 3 Claims



1. A method for separating electrolytes which have different charges of the same sign, which comprises causing an electrolyte to pass through a charged loose reverse-osmotic membrane having a charge density of 0.8 meq./g-dry membrane and a cutting molecular weight of 20,000, in an aqueous solution containing at least two electrolytes which have different charges of the same sign, wherein the anion or cation concentration in said solution is in the range of 5,000 to 200,000 ppm, and wherein the charged reverse-osmotic membrane is operated at a pressure of more than 10 kgf/cm$^2$.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,387

## METHOD FOR ACTIVATING CELLULOSIC MEMBRANE, ACTIVATED CELLULOSIC MEMBRANE, METHOD OF FIXING PHYSIOLOGICALLY ACTIVE SUBSTANCE ON THE ACTIVATED CELLULOSIC MEMBRANE AND PHYSIOLOGICALLY ACTIVE SUBSTANCE-FIXED MEMBRANE

**Ryoichi Nemori, and Yoshihisa Tsukada, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

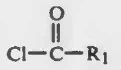
**Filed Oct. 18, 1989, Ser. No. 423,322**

**Claims priority, application Japan, Oct. 18, 1988, 63-262202; Nov. 8, 1988, 63-281850; Nov. 17, 1988, 63-290614**

**Int. Cl.⁵ B01D** *71/10*

**U.S. Cl. 210—638** **13 Claims**

1. A method for activating a membrane comprising cellulose as a main component, which method comprises reacting said membrane with a compound of formula (II):



$$Cl-\overset{\overset{\displaystyle O}{\|}}{C}-R_1 \qquad (II)$$

wherein $R_1$ represents a releasing group, so as to be able to form a stable bond between the resulting activated membrane and a physiologically active substance when said activated membrane is reacted with said physiologically active substance, while retaining the activity of the resulting bound physiologically active substance.

---

### 5,015,388

## INTEGRATED DEVICE FOR THE BIOSPECIFIC PURIFICATION OF A LIQUID CONTAINING CELLULAR ELEMENTS

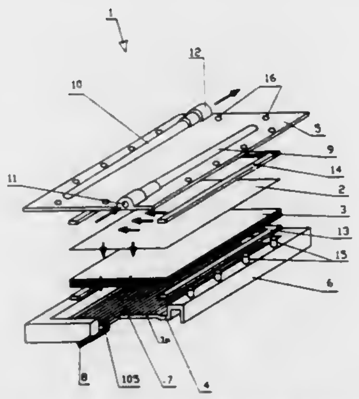
**Christian Pusineri, St Symphorien d'Ozon, and Michel Cronenberger, Mornant, both of France, assignors to Hospal Industrie, Cedex, France**

**Filed Mar. 24, 1989, Ser. No. 327,621**

**Claims priority, application France, Mar. 25, 1988, 88 04234**

**Int. Cl.⁵ B01D** *61/14, 61/18, 63/02, 63/08*

**U.S. Cl. 210—641** **16 Claims**



9. A method of biospecifically purifying a liquid containing a portion having cellular elements, the method comprising the steps of:

tangentially flowing the liquid over a membrane to separate the portion having cellular elements from the portion without cellular elements;

transversely flowing the portion of liquid without cellular elements through at least one microporous membrane sheet having purifying molecules grafted thereto to remove selected biospecific impurities; and

recombining the portion of liquid without cellular elements with the portion of the liquid having cellular elements.

---

### 5,015,389

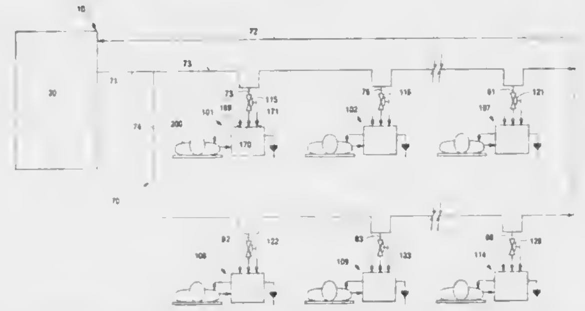
## CENTRALIZED BICARBONATE CONCENTRATE DISTRIBUTION SYSTEM AND RELATED METHODS FOR FACILITATING HEMODIALYSIS

**Luis C. Portillo, Jr., 1328 Blanco Rd., San Antonio, Tex. 78248**

**Filed Feb. 6, 1990, Ser. No. 475,645**

**Int. Cl.⁵ B01D** *61/24*

**U.S. Cl. 210—646** **2 Claims**



1. A method of distributing bicarbonate concentrate for use in a plurality of remote hemodialysis stations, comprising the steps of:

pumping bicarbonate concentrate from a tank through a distribution line which is directed to the remote proximities of a plurality of hemodialysis stations in a manner such that portions of flow of the bicarbonate concentrate are selectively divertable from the remote proximities in said distribution line to each of said hemodialysis stations;

maintaining the flow rate of the bicarbonate concentrate in said distribution line at approximately seven feet per second;

controlling the pressure within said distribution line to provide bicarbonate concentrate at less than or equal to fifteen p.s.i. for each of said hemodialysis stations;

recirculating a flow of bicarbonate concentrate remaining in said distribution line from each of said remote proximities back to said tank; and

re-introducing the remaining flow of bicarbonate concentrate into said tank in a manner which minimizes aeration of the bicarbonate concentrate.

---

### 5,015,390

## METHOD FOR CONTROLLING SCALE DEPOSITION IN AQUEOUS SYSTEMS USING QUATERNARY AMMONIUM/MALEIC ANHYDRIDE-TYPE POLYMERS

**Shih-Ruey T. Chen, Coraopolis, and Craig W. Vaughan, Freedom, both of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 214,979, Jul. 5, 1988, abandoned. This application Mar. 12, 1990, Ser. No. 491,889**

**Int. Cl.⁵ C02F** *5/10*

**U.S. Cl. 210—698** **5 Claims**

1. A method for controlling scale deposition, including deposition of calcium oxalate, barium sulfate, or zinc hydroxide scale, in an aqueous system, which method consists essentially of adding to said system an effective amount of a polymer comprising:

(a) maleic acid or anhydride; and (b) at least one quaternary dimethyldiallyl ammonium monomer; wherein the mole ratio of (a):(b) ranges from about 1:2 to about 3:1 and wherein said polymer has a molecular weight of from about 500 to about 10,000.

### 5,015,391

## SILICATE COAGULANT AID FOR TREATMENT OF OILY WASTEWATERS

**Michael F. Mohn, Levittown, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Dec. 12, 1989, Ser. No. 449,621**

**Int. Cl.⁵ C02F** *1/56*

**U.S. Cl. 210—708** **1 Claim**

1. A method for coagulating emulsified oil contaminants in effluent water discharged from metal processing operations having a turbidity greater than 200 (NTU) comprising adding to said water a sufficient amount for the purpose and in a concentration of from about 10 to about 300 parts per million of a cationic polymer condensation product of dimethylamine plus epichlorohydrin concurrent with sodium silicate having the formula: $Na_2.xSiO_2$, where $x=1.6$–$5$, wherein the weight ratio of said cationic polymer to said sodium silicate is between about 1 to 1 and 1 to 20, respectively, and wherein the emulsified oil is coagulated and the turbidity of said effluent water is reduced.

---

### 5,015,392

## THICKENER

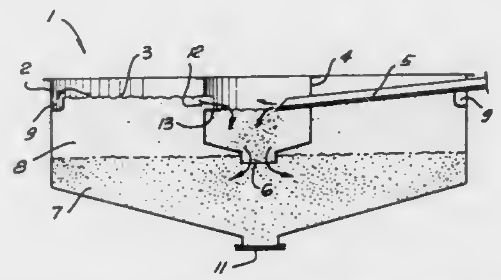
**David Taylor, New South Wales, Australia, assignor to Supaflo Pty. Limited, Australia**

**Filed Nov. 15, 1989, Ser. No. 436,720**

**Claims priority, application Australia, Nov. 17, 1988, PJ1518; Apr. 24, 1989, PJ3869**

**Int. Cl.⁵ B01D** *21/24*

**U.S. Cl. 210—712** **6 Claims**



1. A thickener for liquids or pulps comprising a tank in which flocculation takes place and dilute liquid is displaced toward the top of the tank, a feedwell having a bottom opening in fluid communication with the tank, a conduit for supplying a feed liquid to the feedwell, an aperture formed in the feedwell above the bottom opening and positioned for the flow of the dilute liquid directly from the tank into the feedwell for dilution of the feed liquid therein, and a weir plate mounted on the feedwell for movement between an open position for flow of dilute liquid from the tank into the feedwell and a closed position substantially closing the aperture.

---

### 5,015,393

## AUTOMATICALLY ADJUSTABLE WEIR AND ENVIRONMENTALLY PROTECTED SENSOR FOR A FLOATING SLUDGE REMOVAL SYSTEM

**Frederick E. Russell, and Brandon Russell, both of Elgin, Ill., assignors to Protectaire Systems Co., Elgin, Ill.**

**Continuation of Ser. No. 891,139, Jul. 28, 1986, Pat. No. 4,867,872. This application Jul. 24, 1989, Ser. No. 384,555**

**Int. Cl.⁵ B01D** *21/24*

**U.S. Cl. 210—744** **6 Claims**

4. A method of collecting overspray paint particles and for controlling the flow of liquid and floating sticky paint sludge being skimmed from the surface of the liquid in a tank having a weir with a skimming lip and an outlet connected to a suction pump, said method comprising the steps of:

wetting the paint overspray particles with a liquid and collecting the wetted paint particles and the liquid in a tank having a body of liquid with an upper surface level and having floating paint sludge on the upper surface of the body of liquid for removal from the tank,

skimming paint sludge and upper surface liquid from the body of liquid through the weir,

sensing the location of the upper surface level of the body of water without allowing the sticky paint sludge to adhere to the sensing means,

positioning a lip of a skimming weir just below the surface level of the liquid in the tank to regulate the amount of liquid flow over the lip and for skimming sludge with the surface flow of liquid into the weir,

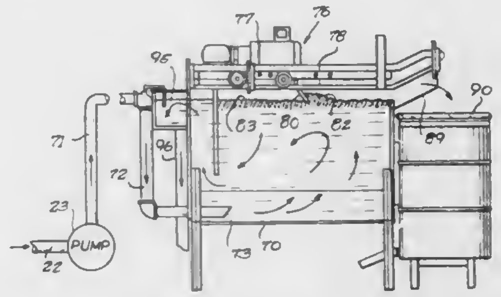
shifting the weir lip upwardly as the liquid level raises in the tank to maintain the lip just below the surface level to continue skimming of paint sludge and liquid flow as the liquid level raises,

shifting the weir lip downwardly as the liquid level lowers in the tank to maintain the weir lip just below the surface level of the body of liquid to continue skimming of paint sludge and liquid flow as the liquid level lowers,

sucking the liquid and paint sludge from through the weir at a substantially constant flow rate and maintaining the suction force of the pump by shifting the weir lip vertically to prevent the weir lip being above the upper surface level,

conveying the liquid and paint sludge from the weir to a means for removing the paint sludge from the liquid, and

returning the liquid after separation from the paint sludge for reuse for wetting paint particles.



---

### 5,015,394

## APPARATUS AND METHOD FOR THE TREATMENT OF WATER WITH OZONE

**Colburn McEllhenney, and Edwin A. Hess, both of Akron, Pa., assignors to Hess Machine Company, Ephrata, Pa.**

**Filed May 9, 1989, Ser. No. 349,529**

**Int. Cl.⁵ C02F** *1/78*

**U.S. Cl. 210—744** **4 Claims**

1. A method for the treatment of water with ozone comprising the steps of:

diffusing ozone under pressure into a moving stream of water confined within a pipe;

advancing the mixture of ozone and water through a tortuous path defined by the pipe;

discharging the fluid mixture of ozone and water through a number of directionally oriented orifices at the end of the pipe into a lower region of a treatment vessel in an outwardly and upwardly direction with reference to the vertical axis of the treatment vessel;

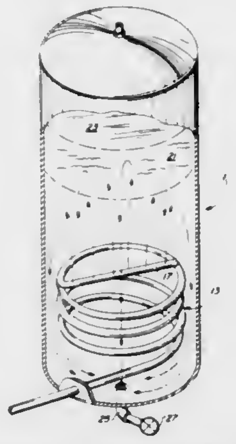
establishing a zone of turbulence within the treatment vessel by the discharge of the fluid mixture from the orifices;

withdrawing the fluid mixture from a region adjacent the bottom of the treatment vessel and below the level of the orifices;

whereby water treated with ozone is withdrawn from the

VOL
1126
ISS
2
MY
14
1991
UMI

treatment vessel in a direction generally opposite to that at which the fluid mixture is discharged into the treatment vessel to establish a generally countercurrent flow of fluid within the treatment vessel.



---

5,015,395

### METHOD FOR CONTROLLING ZEBRA MUSSELS USING DIALKYL DIALLYL AMMONIUM POLYMERS

**Ramon A. Muia, Coraopolis, and Rodney M. Donlan, Bridgeville, both of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.**

**Filed Apr. 18, 1990, Ser. No. 511,156**
**Int. Cl.$^5$ C02F** *1/50, 1/68*

**U.S. Cl. 210—755** **3 Claims**

1. A method for inhibiting the growth of zebra mussels in an aqueous system which contains zebra mussels or which is prone to the growth of zebra mussels and for inhibiting the ability of said zebra mussels to affix themselves via byssal threads to underwater surfaces comprising adding to said system an effective amount of a water soluble dialkyl diallyl quaternary ammonium polymer.

---

5,015,396

### REMOVAL OF CYANIDE FROM AQUEOUS STREAMS

**Robert P. D'Orazio, Houston, Tex., and John F. Rakszawski, Basking Ridge, N.J., assignors to The BOC Group, Inc., Murray Hill, N.J.**

**Filed Sep. 11, 1990, Ser. No. 580,734**
**Int. Cl.$^5$ C02F** *1/72, 1/58*

**U.S. Cl. 210—763** **20 Claims**

1. A method of reducing the concentration of cyanide in a cyanide-containing aqueous stream comprising contacting the aqueous stream in a reaction zone with an oxygen-containing gas stream and sufficient carbon dioxide to reduce the pH of the aqueous stream to value of at least 8 in the presence of a water-soluble reducible metal catalyst.

---

5,015,397

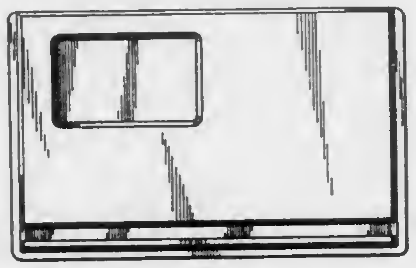
### CROSS FLOW FILTRATION APPARATUS AND PROCESS

**James J. Joseph, 203 Tilden Dr., P.O. Box 0232, East Syracuse, N.Y. 13057**

**Filed Jun. 8, 1987, Ser. No. 59,509**
**Int. Cl.$^5$ B01D** *37/04*

**U.S. Cl. 210—767** **11 Claims**

1. A cross flow filtration process for continuously separating a portion of a liquid from a contaminated substantially liquid influent to produce a concentrate, the process comprising the steps of introducing said influent at one end portion of a liquid permeable conduit having a wall comprised of a screen of substantially helically wound wire elements and which has a length at least three times its largest cross-section, continuously passing the influent along an interior portion of said screen, continuously collecting the liquid which permeates through the conduit, and passing said concentrate along said liquid permeable conduit and discharging said concentrate from an opposite end portion of said conduit.



---

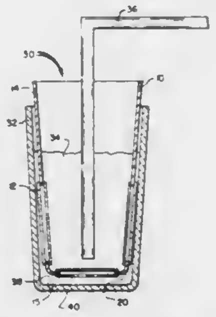
5,015,398

### METHOD AND APPARATUS FOR FILTRATION OF PHOTOGRAPHIC EMULSIONS

**Paul F. Cocuzzi, Holley, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 9, 1989, Ser. No. 349,460**
**Int. Cl.$^5$ B01D** *19/00, 29/23*

**U.S. Cl. 210—767** **16 Claims**



1. An apparatus for filtering comprising a liquid container and a filtering container, wherein said liquid container is provided with an open top, closed sides and closed bottom, said filtering container is provided outer members at the sides and bottom, said outer members at said sides and bottom are at least partially comprised of a filtering medium, said filtering container fits snugly into at least the bottom of said liquid container, and said apparatus further comprises a liquid withdrawal member extending into said filtering container.

---

5,015,399

### METHOD, SYSTEM, SHIP AND COLLECTING DEVICE FOR OIL SPILL RECOVERY

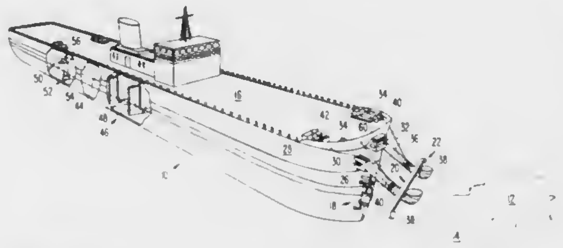
**J. David Eller, Deerfield Beach, Fla., assignor to M & W Pump Corporation, Deerfield Beach, Fla.**

**Filed Nov. 3, 1989, Ser. No. 431,395**
**Int. Cl.$^5$ E02B** *15/04*

**U.S. Cl. 210—776** **35 Claims**

13. A method of removing contaminant material from the surface of a body of water comprising the steps of:
providing a contaminant recovery vessel propellable along a body of water and having a reservoir;
positioning a rigid contaminant collecting device forwardly of the vessel for skimming through the surface contaminant as the vessel moves;
providing the collecting device with intake means having an intake opening that extend from the vessel to the surface and which have an intake opening formed at a distal end thereof with submersible pumping devices positioned therein adjacent the intake opening;

pivotally connecting a program end of said intake means to said vessel for maintaining skimming positioning of the intake means despite wave motion;
pumping the water/contaminant mixture to the reservoir by the submersible pumping devices;



separating the contaminant from the water; and,
discharging at least the separated water from the reservoir so as to provide for a generally continuous separating process.

---

5,015,400

### AMINO RESINS CROSSLINKED POLYMER GELS FOR PERMEABILITY PROFILE CONTROL

**Paul Shu, Princeton Junction, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.**

**Division of Ser. No. 917,324, Oct. 9, 1986, Pat. No. 4,834,180.**
**This application May 30, 1989, Ser. No. 358,745**
**The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.**
**Int. Cl.$^5$ F21B** *43/22*

**U.S. Cl. 252—8.554** **6 Claims**

1. A composition of matter for forming a gel comprising:
(a) water;
(b) 0.2 to 5.0 wt. percent of a cross-linkage polymer which is a member selected from the group consisting of polyvinyl alcohol, xanthan biopolymers, sodium aliginate biopolymers, poly(acrylamide-co-acrylamido-2-methyl propane sulfonate), and acrylamide modified polyvinyl alcohol; and
(c) 0.02 to 50.0 wt. percent of a partially methylated aminoplast resin which cross-links with said polymer thereby forming a gel in the absence of a salt which is acid generating upon the application of heat which gel is of a strength sufficient to close pores in one or more permeable zones of a formation where a formed gel results from a gelation reaction which proceeds under substantially all pH conditions.

---

5,015,401

### BEARINGS GREASE FOR ROCK BIT BEARINGS

**David K. Landry, Westminster, Colo., and Terry J. Koltermann, Pasadena, Tex., assignors to Hughes Tool Company, Houston, Tex.**

**Filed Oct. 16, 1990, Ser. No. 599,271**
**Int. Cl.$^5$ C10M** *125/18, 125/22*

**U.S. Cl. 252—18** **8 Claims**

1. A heavy duty lubricating grease comprising:
a multi-purpose heavy duty hydrocarbonaceous lubricant thickened by an alkaline soap to form a lubricating grease;
from about 1-20% by weight of the grease of powdered molybdenum disulfide; and
from about 1-20% by weight of the grease of powdered calcium fluoride, the weight percent ratio of powdered molybdenum disulfide to powdered calcium fluoride being in the range from about 1:6 to 6:1.

---

5,015,402

### BASIC METAL DIHYDROCARBYLPHOSPHORODITHIOATES

**Richard Yodice, and Alan C. Clark, both of Mentor, Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Continuation of Ser. No. 140,380, Jan. 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 928,422, Nov. 7, 1986.**
**This application Oct. 24, 1989, Ser. No. 426,512**
**Int. Cl.$^5$ C10M** *135/00, 137/00*

**U.S. Cl. 252—32.7 E** **41 Claims**

1. A method for preparing a basic metal dihydrocarbylphosphorodithioate wherein said method comprises reacting:
(A) at least one dihydrocarbyl phopsphorodithioic acid or the normal or acid metal salt thereof; with
(B) at least one metal oxide or hydroxide wherein the metal is zinc, copper, nickel, chromium, iron, cobalt, manganese, calcium, barium, antimony, lead, aluminum or tin; in the presence of
(C) at least one catalyst, said catalyst being at least one alkali or alkaline-earth metal hydroxide, oxide, carbonate, halide or mixture thereof;
wherein the metal of (C) is different from the metal of (A) or (B) and is not present in said basic metal dihydrocarbyl phosphorodithioate.

---

5,015,403

### PREPARATION OF LITHIUM-CALCIUM GREASE COMPOSITIONS

**Stephen E. Eisenstein, Houston, Tex., and Wayne J. Kuchler, Kenner, La., assignors to Shell Oil Company, Houston, Tex.**

**Filed Mar. 23, 1990, Ser. No. 498,116**
**Int. Cl.$^5$ C10M** *117/02*

**U.S. Cl. 252—40** **6 Claims**

1. A process for the preparation of a lubricating grease which comprises (a) dispersing in a major amount of a lubricating oil at about 180° F. to about 200° F. an effective amount of a saponifiable fatty material and lithium base to partially neutralize the fatty material, (b) then heating the resulting mixture from (a) to about 385° F. to about 410° F. at about ambient pressure to dissolve said fatty material, (c) homogenizing the resulting mixture from (b) at about 80 to about 200 psi while maintaining the temperature, (d) cooling the resulting mixture from (c) to a temperature below about 370° F., (e) adding calcium base to the resulting mixture from (d) to saponify the remaining unsaponified fatty material while maintaining the mixture at or reheating the mixture about 290° F. to about 360° F. and about ambient pressure, and (f) homogenizing the resulting mixture at about 100 to about 150 psi while maintaining the temperature to obtain a lithium-calcium mixed soap lubricating grease composition.

---

5,015,404

### OIL COMPOSITION CONTAINING HYDROGENATED OIL

**Junichi Kubo, Yokohama; Nobuo Yokoyama, Tokyo, and Hirotugu Kinoshita, Kawasaki, all of Japan, assignors to Nippon Oil Co., Ltd., Minato, Japan**

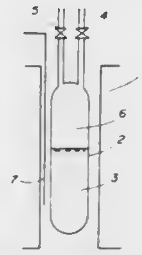
**Filed Apr. 5, 1989, Ser. No. 333,706**
**Claims priority, application Japan, Apr. 5, 1988, 63-082150; Apr. 5, 1988, 63-082151; Jun. 6, 1988, 63-138970; Jun. 6, 1988, 63-138971; Jul. 1, 1988, 63-165294; Jul. 1, 1988, 63-165295**
**Int. Cl.$^5$ C10M** *105/06, 111/02*

**U.S. Cl. 252—49.6** **23 Claims**

1. An oil composition comprising:
(i) 100 parts by weight of a base oil selected from the group consisting of mineral base oil, synthetic base oil and mixtures thereof, and
(ii) 0.1 to 20 parts by weight of a hydrogenated oil obtained by hydrogenating an oil selected from the group consisting of coal tar, oil produced by fractionating coal tar, a hydrocarbon obtained by thermally cracking petroleum and having a boiling point of not lower than 200° C., a

VOL
1126
ISS
2
MY
14
1991
UMI

hydrocarbon obtained by catalytically cracking petroleum and having a boiling point of not lower than 200° C., a hydrocarbon obtained by catalytically reforming petroleum and having a boiling point of not lower than 200° C.,



and mixtures thereof, whereby the hydrogenated oil has the hydrogen-donating properties of not lower than three times the hydrogen-donating properties of the base oil at temperatures of not lower than 350° C.

---

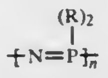
### 5,015,405
### (FLUORINATED PHENOXY)(3-PERFLUOROALKYLPHENOXY)-CYCLIC PHOSPHAZENES

**Kishore K. Kar, Midland, and Chester E. Pawloski, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 5, 1989, Ser. No. 417,363**
**Int. Cl.$^5$ C10M** *137/16*

**U.S. Cl. 252—49.9** **8 Claims**

1. A lubricant composition comprising a lubricant base stock and from at least about 0.1 weight percent to no greater than about 50 weight percent of at least 1 cyclic phosphazene corresponding to the formula:



$$\left[N{=}\overset{(R)_2}{\overset{|}{P}}\right]_n$$

wherein n is 3 through 7, R is individually in each occurrence fluorinated phenoxy or 3-perfluoroalkylphenoxy with the proviso that the ratio of fluorinated phenoxy to 3-perfluoroalkylphenoxy ranges from about 1:1 to about 1:5.

---

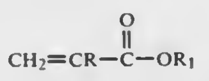
### 5,015,406
### MINERAL OIL OR SYNTHETIC OIL COMPOSITIONS CONTAINING TERPOLYMERS OF ALKYL ACRYLATES OR METHACRYLATES ETC.

**Hanh T. Le, Wilmington, Del., assignor to Conoco, Ponca City, Okla.**

**Division of Ser. No. 265,626, Oct. 31, 1988, Pat. No. 4,886,520. This application Aug. 14, 1989, Ser. No. 394,385**
**Int. Cl.$^5$ C10M** *149/10*

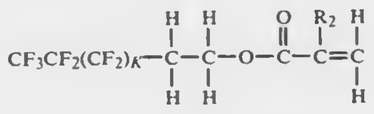
**U.S. Cl. 252—51.5 R** **25 Claims**

1. An oil composition which comprises a major amount of an oil selected from a mineral oil or synthetic oil and a minor amount of (1) an alkyl ester of unsaturated monocarboxylic acid, (2) an olefinically unsaturated homo or heterocyclic-nitrogen compound and (3) allyl acrylate or methacrylate or a perfluoroalkyl ethyl acrylate or methacrylate terpolymer having pour point depressant properties, said terpolymer comprising the reaction product of (a) a monomeric alkyl ester of carboxylic acid or a mixture of alkyl esters of carboxylic acid having the formula:



$$CH_2{=}CR{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}OR_1$$

wherein R is H or $CH_3$ and $R_1$ is alkyl having from about 1 to about 30 carbon atoms; (b) vinyl pyridine; and (c) allyl acrylate or methacrylate or a perfluoroalkyl ethyl acrylate or methacrylate or a mixture of perfluoroalkyl ethyl acrylates or methacrylates, said perfluoroalkyl ethyl acrylates or methacrylates having the formula:



$$CF_3CF_2(CF_2)_K{-}\underset{H}{\overset{H}{C}}{-}\underset{H}{\overset{H}{C}}{-}O{-}\overset{O}{\overset{\|}{C}}{-}\overset{R_2}{C}{=}\underset{H}{\overset{H}{C}}$$

wherein $R_2$ is H or $CH_3$, and K is an integer of from about 1 to about 20.

---

### 5,015,407

**Patent Not Issued For This Number**

---

### 5,015,408
### DENTURE CLEANING TABLET CONTAINING A BLEACH ACTIVATOR AND AN ORGANIC PHOSPHONIC ACID STABILIZER

**Mira Reuss, Mannheim, Fed. Rep. of Germany, assignor to Reckitt GmbH, Fed. Rep. of Germany**

**Filed Mar. 15, 1989, Ser. No. 323,865**
**Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3809359; Apr. 16, 1988, 3812693**
**Int. Cl.$^5$ C11D** *7/12, 7/18, 7/36, 17/00*

**U.S. Cl. 252—99** **18 Claims**

14. A composition for cleaning dentures in an aqueous solution comprising:
- at least one compound chosen from the group consisting of sodium hydrogen carbonate, sodium carbonate, and carbonates in an amount of approximately 10 to about 40 percent by weight;
- a least one compound chosen from the group consisting of citric acid, citrate, and citrates in an amount of approximately 5 to about 20 percent by weight;
- sodium perborate in an amount of approximately 15 to about 30 percent by weight;
- potassium monopersulphate in an amount approximately 20 to about 40 percent by weight;
- at least one perborate/peroxide activator in a content of approximately 0.5 to about 3.0 percent by weight of the total composition;
- at least one compound chosen from the group consisting of hydrolysis - stable organic phosphonic acid and salts thereof, being present in a content of approximately 0.5 to about 3.0 percent by weight of the total composition;
- a dye system including a keto-form coloured dye with chromophic groups and a redox-neutral dye; and
- the composition is free of any hydrophobic binders and does not include inorganic phosphates and organic sequestrants based on amino carboxylic acids.

---

### 5,015,409
### VISCOSITY-MODIFIERS FOR AQUEOUS-BASED FUNCTIONAL PRODUCTS CONTAINING MIXED METAL HYDROXIDES

**Arthur E. Read, Jr.; John L. Burba, III, both of Lake Jackson, Tex.; Peter A. Doty, and Clarence R. Crabb, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 60,133, Jun. 9, 1987, which is a continuation of Ser. No. 752,325, Jul. 5, 1985, abandoned. This application Mar. 11, 1988, Ser. No. 166,955**
**Int. Cl.$^5$ C11D** *1/12;* **C09K** *3/00;* **A61K** *7/32, 9/00*

**U.S. Cl. 252—108** **26 Claims**

1. A method for providing thickening or viscosity-modification of an aqueous-based functional product formulation, said method comprising

adding to the formulation an amount of a mixed metal hydroxide sufficient to thicken the formulation or to modify the viscosity of the formulation, said mixed metal hydroxide being at least one compound conforming substantially to the empirical formula

$$Li_mD_dT(OH)_{(m+2d+3+n.a)}A_a^n.xH_2O$$

- where m is an amount of Li of from zero to one,
- where D represents at least one divalent metal cation and d is an amount of from about zero to about 4,
- where T represents at least one trivalent metal cation,
- where A represents at least one monovalent or polyvalent anion or negative-valence radical,
- a is an amount of A ions of valence n, with n·a being an amount of from about zero to about −3,
- where (m+2d+3+n·a) is equal to or greater than 3.
- where (m+d) is greater than zero, and
- where $xH_2O$ represents excess waters of hydration, with x being zero or more, wherein the formulation is selected from the group consisting of a cleanser, a bleach, a soap, a detergent, a surfactant, shampoo, a toothpaste, a denture cleanser, a lotion, a face cream, an antiperspirant, a disinfectant, a fungicide, a mildewcide, an oxidizing agent, a reducing agent, a dishwasher detergent, or a stain remover.

---

### 5,015,410
### PAINT STRIPPER COMPOSITIONS CONTAINING N-METHYL-2-PYRROLIDONE, ALIPHATIC HYDROCARBONS, AND AROMATIC HYDROCARBONS

**Carl J. Sullivan, Exton, Pa., assignor to Arco Chemical Technology, Inc., Wilmington, Del.**

**Filed Feb. 20, 1990, Ser. No. 482,115**
**Int. Cl.$^5$ C09D** *9/00;* **C11D** *7/50*

**U.S. Cl. 252—166** **17 Claims**

1. A coating remover composition consisting essentially of a homogeneous blend of
- (a) from about 15 to 80 percent by weight of N-methyl-2-pyrrolidone;
- (b) from about 10 to 60 percent by weight of at least one aliphatic hydrocarbon containing from 6 to 30 carbon atoms and having a boiling point of at least 100° C.; and
- (c) from about 10 to 60 percent by weight of at least one miscibilizing solvent selected from the group consisting of aromatic hydrocarbons and ketones.

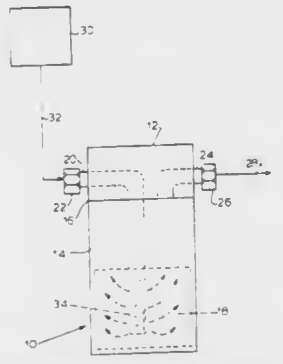
---

### 5,015,411
### PROCESS, COMPOSITION, AND APPARATUS FOR PURIFYING INERT GASES TO REMOVE LEWIS ACID AND OXIDANT IMPURITIES THEREFROM

**Glenn M. Tom, New Milford, and Duncan W. Brown, Wilton, both of Conn., assignors to Advanced Technology Materials, Inc., New Milford, Conn.**

**Division of Ser. No. 169,400, Mar. 17, 1988, Pat. No. 4,950,419, which is a continuation-in-part of Ser. No. 29,632, Mar. 24, 1987, Pat. No. 4,761,395. This application Mar. 16, 1990, Ser. No. 494,976**
**Int. Cl.$^5$ C10K** *1/00;* **B01J** *20/04;* **B01D** *53/04*

**U.S. Cl. 252—194** **12 Claims**



1. A process for purifying inert gases to remove Lewis acid and oxidant impurities therefrom, comprising contacting said inert gas mixture with a scavenger characterized by a water and oxygen removal capacity exceeding 5 liters of gaseous water and/or oxygen per liter of bed of the scavenger, said scavenger comprising:
- (a) an inert inorganic support having a surface area in the range of from about 30 to about 1000 square meters per gram, and thermally stable up to at least about 300° C.; and
- (b) an active scavenging species, present on said support at a concentration of from about 1 mole to about 5 moles per liter of support, and formed by deposition on the support of an organometallic precursor and pyrolysis thereof at a selected elevated temperature on said support, said organometallic precursor and said selected elevated temperature being selected from those of the group consisting of:
  - (i) said organometallic precursor being an organometal compound of the formula MR, wherein M is a metal from Group IA and R is alkyl, and said selected elevated temperature being in the range of from about 150° to about 210° C.; and
  - (ii) said organometallic precursor being an organometal compound of the formula $M(R)_2$, wherein M is a metal from Group IIA and R is alkyl, and said selected elevated temperature being in the range of from about 150° to about 210° C.; and
  - (iii) said organometallic precursor being an organometal compound of the formula $M(R)_3$, wherein M is a metal from Group IIIA and R is alkyl, and said selected elevated temperature being in the range of from about 150° to about 250° C.

---

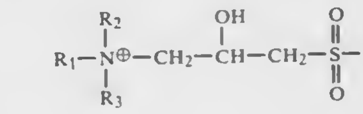
### 5,015,412
### ALKALINE TOLERANT SULFOBETAINE AMPHOTERIC SURFACTANTS

**William J. Zeman, Janesville, Wis., assignor to Sherex Chemical Company, Inc., Dublin, Ohio**

**Division of Ser. No. 140,972, Jan. 5, 1988, Pat. No. 4,913,841, and a continuation-in-part of Ser. No. 732,509, May 9, 1985, abandoned. This application Dec. 18, 1989, Ser. No. 452,572**
**Int. Cl.$^5$ C07C** *317/28;* **B01J** *13/00*

**U.S. Cl. 252—311** **5 Claims**

1. A method for making a storage stable aqueous basic solution having a calculated pH of 13 or greater of a sulfobetaine and the following general structure:



$$R_1{-}\underset{R_3}{\overset{R_2}{N^{\oplus}}}{-}CH_2{-}\overset{OH}{CH}{-}CH_2{-}\underset{O}{\overset{O}{\overset{\|}{\underset{\|}{S}}}}{-}O^{\ominus}$$

where
- $R_1$ is a $C_6$–$C_8$ alkyl group,
- $R_2$ and $R_3$ are $CH_3$, 2-hydroxy ethyl or 2-hydroxy propyl, which comprises:
- (a) forming an aqueous epichlorohydrin/bisulfite intermediate;
- (b) reacting said inatermediate and a $C_6$–$C_{12}$ alkyl, $R_2$, $R_3$ amine in an aqueous reaction mixture; and
- (c) adding sodium hydroxide to the thus-formed aqueous solution of said sulfobetaine in an amount of at least 50% by weight if not already present therein to achieve said calculated pH of greater than 13.

---

### 5,015,413
### ELECTRICALLY CONDUCTIVE POLYORGANOSILOXANE PRIMER COMPOSITION

**Hisayuki Nagaoka, Gunma, Japan, assignor to Toshiba Silicone Co., Ltd., Tokyo, Japan**

**Filed Feb. 28, 1990, Ser. No. 486,446**
**Claims priority, application Japan, Feb. 28, 1989, 1-48133**
**Int. Cl.$^5$ H01B** *1/06, 1/02;* **C08J** *3/08*

**U.S. Cl. 252—511** **7 Claims**

1. A primer composition comprising:

VOL
1126
ISS
2
MY
14
1991
UMI

(A) 100 parts by weight of a solvent-soluble polyorganosiloxane consisting essentially of $R^1SiO_{3/2}$ units and $R^1{}_2SiO$ units, wherein $R^1$ which may be the same or different, each represents an alkyl group having 1 to 8 carbon atoms, an alkenyl group having 2 to 3 carbon atoms or a phenyl group, and having at least two silicon-bonded hydroxyl groups per molecule, the molar ratio of said $R^1SiO_{3/2}$ units to said $R^1{}_2SiO$ units being from 100:4 to 100:20,

(B) 1 to 100 parts by weight of an organosiliane and/or a partial hydrolysis condensate thereof, said organsilane having more than two silicon-bonded hydrolyzable groups per molecule,

(C) 0 to 800 parts by weight of an electroconductive filler,

(D) 0.01 to 10 parts by weight of a curing catalyst, and

(E) an organic solvent.

---

### 5,015,414
## LOW-IRRITANT DETERGENT COMPOSITION CONTAINING ALKYL SACCHARIDE AND SULFOSUCCINATE SURFACTANTS

**Jun Kamegai, Ichikawa; Hiromi Takamura, and Hajime Hirota, both of Tokyo, all of Japan, assignors to Kao Corporation, Tokyo, Japan**

**Filed Sep. 1, 1989, Ser. No. 401,783**

**Claims priority, application Japan, Sep. 8, 1988, 63-225199**

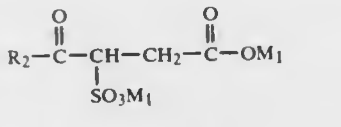
**Int. Cl.⁵ C11D** *1/83, 1/10, 1/12, 1/66*

**U.S. Cl. 252—545** **10 Claims**

1. A low-irritant detergent composition comprising an alkyl saccharide surfactant and a sulfosuccinate surfactant in weight proportion of 1:9 to 9:1, wherein said alkyl saccharide surfactant is a compound represented by the following formula (I):

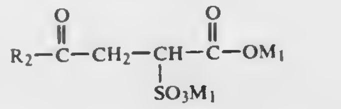
$$R_1-(OCH_2CH_2)l-(G)p \qquad (I)$$

wherein $R_1$ represents a $C_8$-$C_{18}$ linear or branched alkyl, alkenyl, or alkylphenyl group, G represents a $C_5$-$C_6$ reducing sugar, l denotes a number of 0 to 20, and p denotes a number of 1 to 10, and wherein said sulfosuccinate surfactant is a compound represented by the following formula (II) or (III):



(II)

$$R_2-\overset{O}{\overset{\|}{C}}-\underset{SO_3M_1}{\underset{|}{CH}}-CH_2-\overset{O}{\overset{\|}{C}}-OM_1 \qquad (II)$$



(III)

$$R_2-\overset{O}{\overset{\|}{C}}-CH_2-\underset{SO_3M_1}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}-OM_1 \qquad (III)$$

wherein $R_2$ represents $R_3-O-(CH_2CH_2O)_m-$ or $R_4CONH-(CH_2CH_2O)_m-$, wherein $R_3$ represents a $C_8$-$C_{22}$ linear or branched alkyl or alkenyl group, $R_4$ represents a $C_7$-$C_{21}$ linear or branched alkyl or alkenyl group, and m denotes a number of 0 to 20, and $M_1$ represents a hydrogen atom or a cation capable of forming a water-soluble salt and selected from the group consisting of an alkali metal, alkaline earth metal, ammonium and organic ammonium.

---

### 5,015,415
## N,N-DISUBSTITUTED PHTHALAMIC ACIDS AND THEIR AMMONIUM SALTS, AND THEIR USES THEREOF AS SURFACTANTS, EMULSIFIERS, AND CONDITIONING AGENTS IN SHAMPOOS

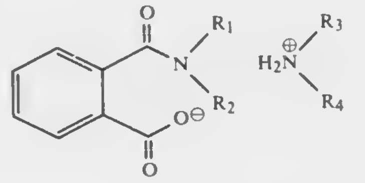
**Jean M. Goze, 757 NE. Holcomb Dr., Mundelein, Ill. 60060; Randal J. Bernhardt, 1905 E. Fairfield Rd., Lindenhurst, Ill. 60046; Branko Sajic, 5048 N. Ridgeway Ave., Chicago, Ill. 60625; Ned M. Rockwell, 301 Neuman Ct., Lake Bluff, Ill. 60044; Nina M. McConnell, 894 Burr Ave., Winnetka, Ill. 60093, and William R. Mohring, 4400 Lake Ave., Apt. 109A, Glenview, Ill. 60025**

**Filed Jun. 27, 1990, Ser. No. 542,780**

**Int. Cl.⁵ C11D** *1/62, 3/30;* **A61K** *7/075*

**U.S. Cl. 252—547** **27 Claims**

1. In a formulated shampoo comprising at least one surfactant and a second member selected from the group consisting of a silicone compound conditioning agent, an anti-dandruff agent and mixtures thereof, the improvement comprising an amount in the range of about 0.05% to about 20% of a salt of the formula:



wherein

$R_1$, $R_2$, $R_3$ and $R_4$ are the same or different and represent straight or branched chain alkyl groups having 10 to 40 carbon atoms, or aryl straight or branched chain alkyl groups having 10 to 40 carbon atoms.

---

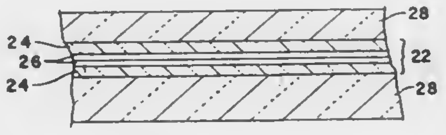
### 5,015,416
## PHOTOCHROMIC POLYMERIC MEMBRANE

**Jerome L. Reid, Wayland, Mass., assignor to Nelson Wasserman, West Newton, Mass.**

**Filed Jun. 20, 1988, Ser. No. 209,414**

**Int. Cl.⁵ G02B** *5/23;* **G03C** *1/005*

**U.S. Cl. 252—586** **14 Claims**



1. A process for making a photochromic material, said process comprising the steps of:

forming a first solution containing $Ag^+$ions;

forming a second solution including halides chosen from the group of $Br^-$, $Cl^-$ and $I^-$ions;

forming a suspension of silver halide particles sized in the range of approximately 50 Angstroms to 800 Angstroms, by mixing said first and second solutions;

adding to any of said solutions or suspension a polymeric material that will not irreversibly bind halogen, and in an amount less than 10 weight percent of said suspension;

forming a third solution containing ions chosen from the group consisting of $Cu^{++}$, $Cu^+$and combinations thereof, and also with (1) an ion selected from the group consisting of $R-S^-$, $S_2O_3^=$, $S^=$, or combination thereof, R being an organic radical, and/or (2) a mild reducing agent;

mixing said silver halide particles and said third solution so as to surface dope said silver halide particles and increase the photosensitivity and photochromic properties of said silver halide particles.

### 5,015,417
## NONLINEAR OPTICAL DEVICES FOR DERIVATIVES OF STILBENE AND DIPHENYLACETYLENE

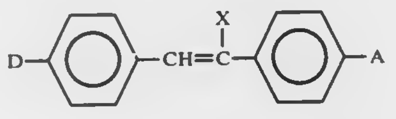
**Robert A. Clement, and Ying Wang, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 11, 1988, Ser. No. 155,025**

**Int. Cl.⁵ F21V** *9/04*

**U.S. Cl. 252—587** **5 Claims**

1. A nonlinear optical device capable of second harmonic generation comprising a nonlinear optical element, a source of coherent optical radiation, and means for direct said radiation into said element, said nonlinear optical element comprising a crystalline compound of the formula



wherein A is selected from Br, Cl, F or I;

wherein D is —OR, where R is selected from H, $C_1$-$C_{10}$ branched or unbranched alkyl or $C_1$-$C_{10}$ branched or unbranched hydroxyalkyl; and

wherein X is selected from H, CN, Br, I, Cl, F or $C_1$-$C_4$ branched or unbranched alkyl; said compound being crystallized in a noncentrosymmetric space group.

---

### 5,015,418
## ACYL MALATE DIESTERS

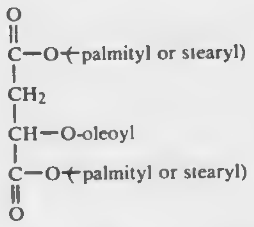
**Donald F. Hershberger, and Richard A. Plunkett, both of Elkhart, Ind., assignors to Haarmann & Reimer Corp., Springfield, N.J.**

**Filed Dec. 14, 1989, Ser. No. 450,680**

**Int. Cl.⁵ E11C** *3/02*

**U.S. Cl. 260—410.9 R** **2 Claims**

1. A composition of matter comprising a mixture of compounds corresponding to the formula:



$$\begin{array}{l} O \\ \| \\ C-O\text{-(palmityl or stearyl)} \\ | \\ CH_2 \\ | \\ CH-O\text{-oleoyl} \\ | \\ C-O\text{-(palmityl or stearyl)} \\ \| \\ O \end{array}$$

wherein the overall ratio of palmityl to stearyl is such that the composition has a melting range similar to that of cocoa butter.

---

### 5,015,419
## FATTY GLYCOLIC ACID DERIVATIVES AS YARN LUBRICANTS AND AS ANTIMICROBIAL AGENTS

**Jerry P. Moreau; August V. Bailey, both of New Orleans, and Anthony J. DeLucca, II, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Oct. 24, 1988, Ser. No. 261,531**

**Int. Cl.⁵ C07C** *69/66, 69/675, 69/73*

**U.S. Cl. 260—410.9 R** **12 Claims**

1. Glycolic acid esters of the formula:

$$ROCH_2COOR'$$

wherein R is a fatty acid acyl group of from 16 to 22 carbon atoms and may be straight chain or branched, saturated, monounsaturated or polyunsaturated, and R' is an alkyl or alkenyl group of from 4 to 22 carbon atoms.

---

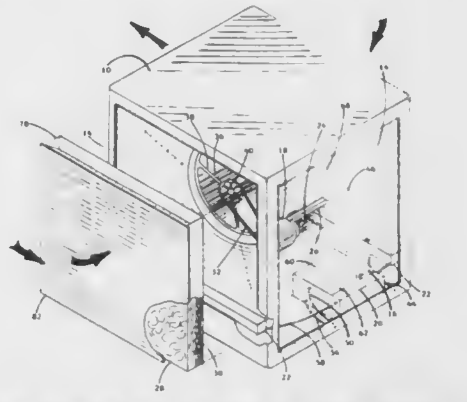
### 5,015,420
## EVAPORATIVE COOLING

**Tom F. Jones, 2400 Arrowhead, #265, Abilene, Tex. 79602**

**Filed Dec. 26, 1989, Ser. No. 457,110**

**Int. Cl.⁵ B01F** *3/04*

**U.S. Cl. 261—029** **3 Claims**



1. Means forming an evaporative cooler cabinet, means mounting cooler pads in opposite faces of said cabinet, means to supply water to such pads for evaporation, means mounting a blower having dual inlets and an outlet within said cabinet, and continuous funnel-shaped inductors extending between said cooler pads and said inlets, whereby excess moisture is excluded from other cooler components.

---

### 5,015,421
## DIFFUSION DEVICE

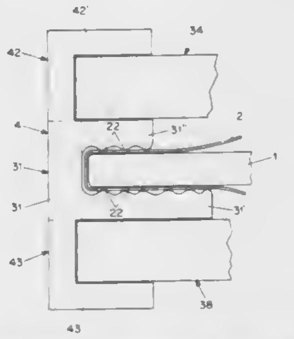
**Rudolf Messner, Adelsdorf, Fed. Rep. of Germany, assignor to Parkson Corporation, Fort Lauderdale, Fla.**

**Filed Jun. 15, 1989, Ser. No. 366,606**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1988, 8807929[U]**

**Int. Cl.⁵ B01F** *3/04*

**U.S. Cl. 261—122** **14 Claims**



1. A diffusion device comprising support means having a diffuser-supporting surface, flexible sheet-like diffuser means positioned on the support means adjacent to the supporting surface, and connecting means providing a removable, gas-tight connection between the periphery of the diffusor means and the periphery of the support means and arranged so that the diffusor means may be supported by the diffuser-supporting surface of the support means in the absence of gas pressure tending to separate the diffuser means from the support means, wherein the connecting means comprises continuous resilient clamping and sealing means engaging peripheral regions of the diffusor means and the support means to resiliently retain them in gas-tight sealing engagement along the periphery of the diffusor means and diffusor-retaining means for retaining the diffusor means adjacent to the diffusor-supporting surface at a location within the region defined by the periphery of the diffusor means and the support means to inhibit excessive

VOL
1126
ISS
2
MY
14
1991
UMI

separation of the diffusor means from the diffusor-supporting surface, wherein the diffusor-retaining means comprises at least one hold-down member disposed adjacent to the surface of the diffusor means within the periphery of the device, and U-shaped strip means embracing opposed edges of the support means and having L-shaped portions providing opposed grooves to receive the opposite ends of the hold-down member.

---

### 5,015,422
### $UO_2$ PELLET FABRICATION PROCESS

**Tadao Yato, Mito; Takeshi Onoue, Katsuta, and Hiroshi Tanaka, Omiya, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 13, 1989, Ser. No. 296,808**

**Claims priority, application Japan, May 25, 1988, 63-127935**

**Int. Cl.⁵ G21C** *21/00*

**U.S. Cl. 264—0.5** **6 Claims**

1. A process for fabricating $UO_2$ pellets of controlled grain size comprising:

(i) treating an aqueous solution of 50 to 500 $gl^{-1}$ of $UO_2F_2$, containing no HF, with $NH_3$ at a molar ratio of $NH_3/U$ of from 3 to 5, to obtain a slurry of a precipitate of ADU $(NH_4)_2U_2O_7$ and an aqueous solution which also contains U;

(ii) adding $NH_3$ to said solution to obtain an ADU $(NH_4)_2U_2O_7$ precipitate at a $NH_3/U$ molar ratio of from 6 to 12;

(iii) filtering and drying said $(NH_4)_2U_2O_7$ precipitate;

(iv) calcining and reducing said $(NH_4)_2U_2O_7$ under a hydrogen atmosphere forming $UO_2$ powder;

(v) compacting said $UO_2$ powder; and

(vi) sintering said compacted $UO_2$ powder in a $H_2$ atmosphere, forming pellets of $UO_2$ of a grain size of from 10 to 100 μm.

---

### 5,015,423
### METHOD OF MAKING UNIFORM POLYMER PARTICLES

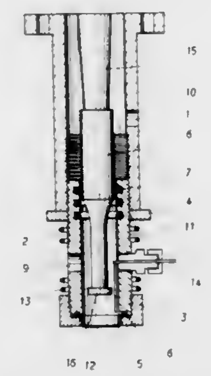
**Tamiyuki Eguchi, and Michito Tsunomori, both of Kobe, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 112,990, Oct. 27, 1987, abandoned. This application Nov. 1, 1989, Ser. No. 430,923**

**Claims priority, application Japan, Oct. 29, 1986, 61-257627; Oct. 31, 1986, 61-261517; Oct. 31, 1986, 61-261518; Nov. 12, 1986, 61-270595**

**Int. Cl.⁵ B29B** *9/10*

**U.S. Cl. 264—9** **9 Claims**



1. A process for preparing substantially uniform porous polymer particles which comprises: forming a solution of said polymer comprising said polymer and a solvent therefore; subjecting said polymer solution to cyclic turbulences having a substantially constant frequency of about 1,000 to 40,000 Hz sufficient to mechanically form substantially uniform liquid droplets of said solution which have substantially the same sign electric charge; jetting these droplets from an orifice into a gas atmosphere at a substantially constant flow rate; passing said droplets through said gas atmosphere; and impinging said droplets on a surface of a coagulating liquid, which is a nonsolvent for said polymer, is miscible with said solvent and has a surface tension sufficient to spontaneously substantially wet said liquid droplets; wherein the distance between said orifice and said surface of said coagulating liquid is such that said droplets are not substantially deformed by their collision with the surface of said coagulating liquid, and wherein said coagulating liquid acts to coagulate said polymer droplets.

---

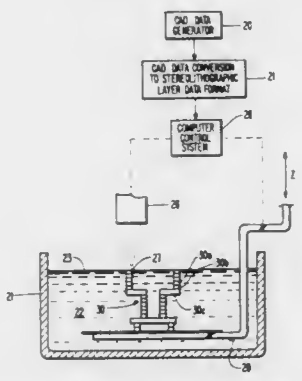
### 5,015,424
### METHODS AND APPARATUS FOR PRODUCTION OF THREE-DIMENSIONAL OBJECTS BY STEREOLITHOGRAPHY

**Dennis R. Smalley, Baldwin Park, Calif., assignor to 3D Systems, Inc., Valencia, Calif.**

**Filed Apr. 18, 1988, Ser. No. 183,015**

**Int. Cl.⁵ B29C** *35/08*

**U.S. Cl. 264—22** **50 Claims**



1. A method for producing a three-dimensional object from an object representation out of a medium capable of selective physical transformation upon exposure to synergistic stimulation, comprising the steps of:

successively forming horizontal layers of said medium on top of previously-formed layers of said object;

selectively exposing said layers of said medium to said synergistic stimulation in accordance with a building representation, having at least a portion which deviates from a corresponding portion of said object representation by inclusion of a deviation, to form said object substantially layer by layer;

whereupon a portion of said object comprising at least one substantially formed layer of said object is created which deviates according to said deviation from said corresponding portion of said object representation by inclusion of an unexposed area; and

wherein said area is situated near a boundary between a first portion of a first layer of said object which is not supported by a previously-formed layer, and a second portion of said first layer which is supported by a previously-formed layer, and whereupon said area is also situated above said first layer, to reduce distortion in said object.

29. An apparatus for producing a three-dimensional object out of a medium capable of selective physical transformation upon exposure to synergistic stimulation, comprising:

at least one computer programmed to form a building representation of the object which deviates from a corresponding object representation by inclusion of a deviation to reduce distortion in said object, the deviation specifying at least one unexposed area in a substantially formed layer of the object, the at least one unexposed area remaining unexposed during formation of the layer, the layer having a first portion and a second portion, and the at least on unexposed area also substantially isolating the first portion from the second portion; and

means coupled to said at least one computer for receiving said building representation, and for selectively exposing said medium to said synergistic stimulation in accordance with said building representation to form said object substantially layer by layer.

---

### 5,015,425
### MANUFACTURING APPARATUS

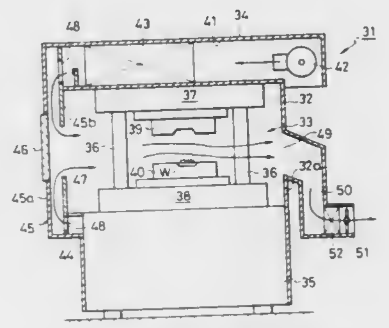
**Tsutomu Mimata, Akikawa; Toshihide Uematsu, Hinode, and Katsuhiro Tabata, Higashimurayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 93,715, Sep. 8, 1987, Pat. No. 4,890,780, which is a continuation of Ser. No. 800,708, Nov. 22, 1985, abandoned. This application Sep. 25, 1989, Ser. No. 411,895**

**Claims priority, application Japan, Nov. 22, 1984, 59-246025**

**Int. Cl.⁵ B29C** *33/72*

**U.S. Cl. 264—39** **6 Claims**



1. A method for fabricating an integrated circuit device comprising:

(a) opposing, with a predetermined space, the respective inner surfaces of upper and lower mold blocks accommodated inside a box-like housing for shielding the inside thereof from the outside dust;

(b) forming a substantially horizontal clean gas flow through the predetermined space between the upper and lower mold blocks by supplying a clean gas flow along the inner surfaces of the mold blocks from a first opening for supplying the clean gas flow disposed at a first side wall of the housing;

(c) maintaining the inner surfaces of the mold blocks clean by discharging the clean gas flow through a second opening for discharging gas disposed at a second side wall of the housing opposed to the first side wall;

(d) placing a semiconductor device chip to be sealed and at least one outer lead electrically connected therewith at the cavity of the lower mold block while maintaining the clean gas flow between the mold blocks; and

(e) closing the mold blocks so that the chip and a predetermined portion of the lead are included within the cavity formed by the upper and lower cavities, and encapsulating the chip and the predetermined portion of the lead by injecting a resin into the cavity.

---

### 5,015,426
### PRECISION SINGLE CAVITY AND MULTICAVITY PLASTIC INJECTION MOLDING VIA AN ADAPTIVE MOLD PROCESS

**Steven M. Maus, Osseo, and George J. Galic, Columbia Heights, both of Minn., assignors to Galic Maus Ventures, Columbia Heights, Minn.**

**Filed May 18, 1989, Ser. No. 353,911**

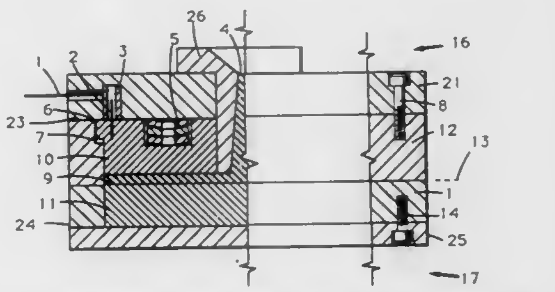
**Int. Cl.⁵ B29C** *45/56*

**U.S. Cl. 264—40.5** **17 Claims**

1. An injection molding method of producing plastic molded products having consistently high replication of at least one partforming surface of an adaptive mold cavity enclosed within a moldset wherein first and second opposing mold insert partforming surfaces are wetted by an injected plastic melt, the first mold insert surface located on a stationary half of the moldset and the second mold insert surface located on a movable half of the moldset,

the first and second mold insert surfaces forming the mold cavity having a first volume, the first and second mold insert surfaces being separated in a first position by a predetermined first distance which is slightly less than a sum of a desired final part thickness measured at room temperature plus a thermal shrinkage factor characteristic of the plastic, the first mold insert surface being separated a second distance away from a stationary-half clamp plate,

and the second mold insert surface being-separated a third distance from a movable-half clamp plate while the first and second mold insert surfaces are still in the first position, at least one of the second and third distances being measurably shortened in direct proportion to a melt volume of the injected plastic melt, wherein a resilient member is interposed between at least one of the first and second mold insert surfaces and its clamp plate, the resilient member having a length L2 when mounted in the moldset with inserts in the first position and having a length L4 when fully compressed, and a spring constant which determines its relationship of length to force is unchanged throughout the molding cycle for the resilient member,



the method comprising the steps of:

a. injecting a greater volume of plastic melt than the first volume into the mold cavity in the first position to partially compress the resilient member to a length L3 which is less than the length L2 but greater than the length L4, at which length L3 the melt packing force onto the second insert equals the opposing spring force of the resilient member;

b. holding within the mold cavity substantially all the injected volume and cooling the plastic melt to solidification, thereby reducing its volume and melt packing force, causing reduction in spring force and increase in length, until the moldset is opened for ejection.

---

### 5,015,427
### PROCESS FOR MAKING AN ORTHOTIC FOOTWEAR INSERT

**William Sosnow, Philadelphia, Pa., assignor to Happi, Inc., Gladwyne, Pa.**

**Continuation-in-part of Ser. No. 81,234, Aug. 4, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 312,226**

**Int. Cl.⁵ B29B** *7/62;* **B29C** *35/02;* **B29L** *31/48*

**U.S. Cl. 264—115** **11 Claims**

1. A process for making a resilient, shock-absorbing, shaped product, comprising the steps of:

(a) comminuting a self-adherent, clay-like, bulk elastomeric material into particles, wherein the particles retain their self-adherence after comminution and are capable of being formed into the shaped product,

(b) shaping said comminuted material into the shaped product,

VOL
1126
ISS
2
MY
14
1991
UMI

- (c) applying non-vulcanizing pressure to said shaped comminuted material, the pressure being sufficient to compress said material to a predetermined density, wherein the material is formed into the shaped product, and
- (d) heating said shaped product with sufficient heat to cure the material.

---

### 5,015,428
## PAN DRY SPINNING PROCESS OF INCREASED SPINNING CHIMNEY CAPACITY USING SUPERHEATED STEAM AS THE SPINNING GAS MEDIUM

**Ulrich Reinehr; Günter Türck; Rolf B. Hirsch, and Hermann-Josef Jungverdorben, all of Dormagen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Sep. 18, 1989, Ser. No. 408,861**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1988, 3832871**

**Int. Cl.$^5$ D01D** *5/04;* **D01F** *6/18*

**U.S. Cl. 264—129** **10 Claims**

1. In the production of PAN fibers by dry spinning a solution of the PAN in a solvent using steam as a spinning gas medium, the spinning being carried out to give an improved spinning chimney capacity of at least 20 kg PAN solid per spinning chimney per hour from a nozzle with a high number of holes, the steam being blown from the top downwards parallel or transversely to the direction of the fibers at a spinning defect quota of less than 10 per 100,000 filament and at a solvent content in the spun fibers of <20 wt. %, the improvement wherein

- (a) the nozzle has holes arranged annularly with a hole density of not more than 10.5 holes per cm$^2$ of annular spinneret area,
- (b) the hole separation of the annular nozzle is at least 2.8 mm,
- (c) the chimney wall temperature is at least 225° C.,
- (d) the specific energy consumption is at least 0.09 kWh per kg PAN solid per m$^2$ heating area,
- (e) the superheated steam has a temperature of at least 400° C. and the superheated steam is prepared in practically droplet-free form,
- (f) the amount of steam employed is at least 40 kg/h for blowing transverse to the direction of the fibers,
- (g) finishing of the threads takes place within the spinning chimney,
- (h) the minimum amount of moisture is more than 10 wt. %, based on the PAN solid, the threads being bundled and moistened,
- (i) the temperature of the fibers, measured at the chimney output, is below 135° C.

---

### 5,015,429
## METHOD FOR MOLDING A FOOT SHAPE

**Kazutoyo Suzuki, 43-6, Higashiogu 6-chome, Arakawa-ku, Tokyo, Japan**

**Division of Ser. No. 178,040, Apr. 5, 1988, Pat. No. 4,932,852. This application Nov. 13, 1989, Ser. No. 434,464**

**Claims priority, application Japan, Apr. 6, 1987, 62-84430**

**Int. Cl.$^5$ B29C** *51/20*

**U.S. Cl. 264—138** **5 Claims**

1. A method of molding a foot-shaped layer, comprising the steps of:

frictionally supporting a plurality of adjacent bar-like measuring elements in an upper position in an individually vertically movable condition within an opening of a predetermined area provided in a top plate;

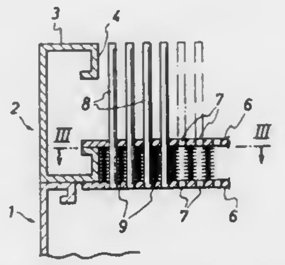
heating a thermoplastic film to a plasticized state;

covering upper end surfaces of the measuring elements facing the opening with the thermoplastic film;

stepping with a foot on the film and the measuring elements thereunder with the measuring elements in the upper position and the film in the plasticized state;

during said step of stepping, frictionally resisting downward vertical movement of the measuring elements, so that the measuring elements and portions of the film thereon move downward only by amounts corresponding to the shape of the foot to mold the film to the shape of the foot; and

cooling the molded film to obtain the foot-shaped layer.



---

### 5,015,430
## METHOD FOR MANUFACTURING MAGNETIC TAPE

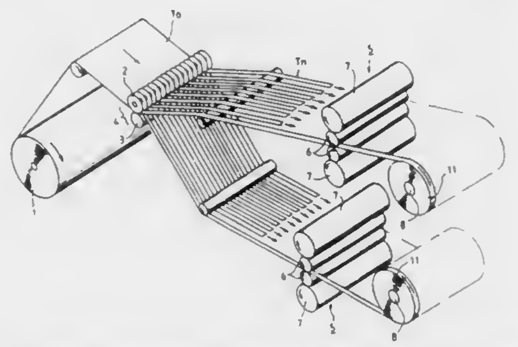
**Akihiro Suzuki, and Masaaki Sakaguchi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Sep. 29, 1989, Ser. No. 414,343**

**Claims priority, application Japan, Oct. 13, 1988, 63-255970**

**Int. Cl.$^5$ G11B** *5/72, 5/78;* **B29C** *53/10*

**U.S. Cl. 264—146** **8 Claims**



1. A method for manufacturing a magnetic tape, comprising the steps of:

providing a source tape having a magnetic recording layer formed thereon;

slivering said source tape to produce individual tapes of a final product width;

smoothing obverse and reverse surfaces of said individual tapes; and

winding said individual magnetic tapes after they have been smoothed.

---

### 5,015,431
## PROCESS FOR MAKING MODEL SKIN

**John C. Charkoudian, Newton, Mass., assignor to The Kendall Company, Lexington, Mass.**

**Division of Ser. No. 152,212, Feb. 4, 1988, Pat. No. 4,877,454. This application Aug. 29, 1989, Ser. No. 399,640**

**Int. Cl.$^5$ B29C** *39/02*

**U.S. Cl. 264—222** **5 Claims**

1. The method for preparing a model skin substrate adapted for in vitro screening of adhesives to human skin, said method comprising the steps of:

- (1) preparing a negative mold of human skin, said mold consisting a replica characterized as having the topography of the human skin from which it was prepared;
- (2) pouring into said mold a model skin formulation comprising water, water-soluble proteinaceous material which is crosslinkable to render it water-insoluble and water-swellable, di- or triglyceridic ester of a $C_{12}$ or greater fatty acid, and a crosslinking agent for said proteinaceous material, the ratio by weight of proteinaceous material to glyceridic ester being from about 2:1 to about 4:1;
- (3) allowing the model skin formulation to set and dry thereby crosslinking the water-soluble proteinaceous material to render it water-insoluble; and
- (4) thereafter removing said dried formulation from said mold to provide said model skin substrate, one surface of which conforms to the topography of said mold and in has human skin topography.

---

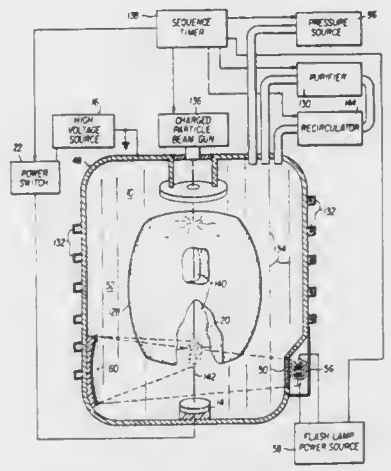
### 5,015,432
## METHOD AND APPARATUS FOR GENERATING AND UTILIZING A COMPOUND PLASMA CONFIGURATION

**Paul M. Koloc, Box 222, College Park, Md. 20740**

**Division of Ser. No. 701,808, Feb. 19, 1985, which is a continuation-in-part of Ser. No. 902,839, May 4, 1978, abandoned, which is a continuation of Ser. No. 706,454, Jul. 19, 1976, abandoned, which is a division of Ser. No. 409,060, Oct. 24, 1973, Pat. No. 4,023,065. This application Jul. 26, 1990, Ser. No. 557,796**

**Int. Cl.$^5$ G21B** *1/00*

**U.S. Cl. 376—148** **10 Claims**



1. A method of producing a compound plasma configuration in an enclosed region comprising the steps of:

providing a suitable fluid medium in said region,

selecting said fluid medium from the group consisting of vaporized or plasmatized solid or liquid state of matter formed of light fusionable nuclear material, a gas, an ionized gas, a plasma of light fusionable material, a mixture of states of matter of light fusionable nuclei,

producing a predetermined electrical environment in at least a portion of said region,

establishing a magnetic field oriented in a particular direction within said region,

producing a current stroke having an electromotive force in said fluid medium,

inducing said current stroke to follow a generally helical path, said helical path forming a closed loop, thereby resulting in the formation of a generally toroidal closed plasmoid.

---

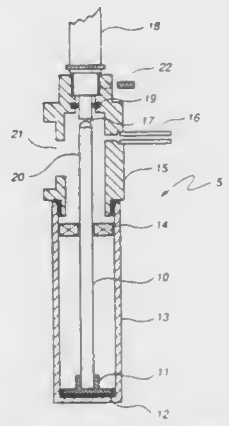
### 5,015,433
## NEUTRON ACTIVATED SWITCH

**David M. Barton, Espanola, N. Mex., assignor to The United States of America as represent by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 30, 1989, Ser. No. 428,681**

**Int. Cl.$^5$ G21C** *17/00*

**U.S. Cl. 376—245** **7 Claims**



7. A method of closing a contact in the presence of neutron radiation comprising the steps of:

placing an electrically conductive rod of fissionable material in a vacuum tight housing;

placing an adjustable contact through said housing positioned coaxial with but spaced apart an adjustable distance from said electrically conductive rod;

maintaining a vacuum inside said housing;

bombarding said electrically conductive rod with said neutron radiation; and

closing a circuit through said electrically conductive rod and said adjustable contact when said electrically conductive rod longitudinally expands against said adjustable contact.

---

### 5,015,434
## FIXED IN-CORE CALIBRATION DEVICES FOR BWR FLUX MONITORS

**Lealon C. Wimpee; Monty A. Ross; Timothy J. O'Neil, all of San Jose, and Edward M. Dean Chu, Los Altos, all of Calif., assignors to General Electric Company, San Jose, Calif.**

**Filed Jun. 13, 1989, Ser. No. 366,001**

**Int. Cl.$^5$ G21C** *17/00*

**U.S. Cl. 376—254** **3 Claims**

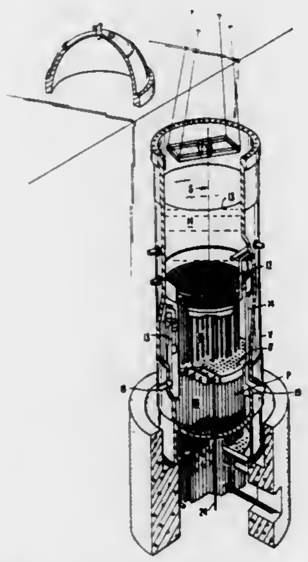
1. In a boiling water reactor having a reactor vessel, a core for containing a reaction within said reactor vessel, and a plurality of vertical in-core guide tubes extending from outside the reactor vessel into the core of said vessel at spaced apart locations, said vertical in-core guide tubes extending upwardly to the bottom of core to permit the insertion and removal of monitoring strings having local power range detectors for measuring the thermal neutron flux density interior of the core, the improvement comprising:

a string having a plurality of local power range detectors, each monitor including a cathode; fissionable material on said cathode; an anode insulating material; and wiring connecting each said anode and cathode from a position on said string interior of said core to a position through said in-core guide tube exterior of said reactor vessel, each said local power range detector being placed in spaced apart relation along an end of said string whereby when said string is inserted to the end of said vertical guide tubes in said core, said local power range monitors will be in spaced vertical relation along said conduits in said core for measuring the thermal neutron flux;

said string having a corresponding plurality of gamma ther-

VOL
1126
ISS
2
MY
14
1991
UMI

mometers, each said gamma thermometer provided along the length of said string at a position immediately adjacent a local power range monitor, each said gamma thermometer for monitoring the temperature of said gamma thermometers with respect to a reference to determine the gamma flux of said reactor adjacent said local power range monitor whereby during conditions of steady state power operation readings of said gamma thermometers can be used for the calibration of said local power range monitors.



---

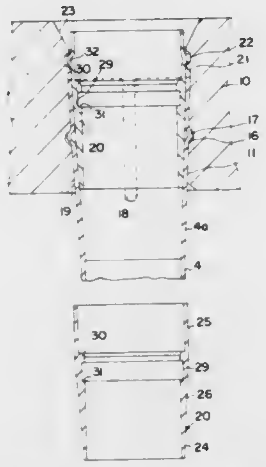
**5,015,435**

### DEVICE FOR DEMOUNTABLE FASTENING OF A GUIDE TUBE INTO AN END FITTING OF A FUEL ASSEMBLY OF A NUCLEAR REACTOR

**Petit Bernard, Saint Genis Laval, France, assignor to Framatome, Courbevoie and Cogema, Velizy Villacoublay, both of, France**

**Filed Sep. 19, 1989, Ser. No. 409,181**
**Claims priority, application France, Sep. 19, 1988, 88 12212**
**Int. Cl.$^5$ G21C *3/32***

U.S. Cl. 376—285 3 Claims



1. Device for demountable fastening of a guide tube into an end fitting of a fuel assembly of a nuclear reactor cooled by light water comprising a bundle of parallel fuel rods held in a framework (9) consisting of guide tubes (4), spacers (3) and end fittings (5, 6) fastened to ends of said guide tubes (4), at least one of said end fittings (5, 10) being fastened demountably to one of said ends of each of said guide tubes (4) by means of a radially distortable end part (4*a*) of said guide tube (4), said end part having a radially outwardly projecting interlocking part (17) engaged inside and over a part of the length of an opening (11) passing through a said end fitting (5, 10), said opening (11) comprising, in said part receiving a said guide tube (4), an annular bulge (16) intended to receive said interlocking part (17) of said guide tube, radial expansion of said end of said guide tube and retention of said interlocking part (17) in said annular bulge (16) of said opening (11) of said end fitting (5, 10) being provided by a locking sleeve (20) comprising a ring (24) for expanding said guide tube (4) and a shell (25) for fastening in said end fitting, projecting at said end of said guide tube in the locking position of said sleeve (20), inside a part of said opening (11) of said end fitting (5, 10) which does not receive said guide tubes (4), said part of said opening (11) of said end fitting (10) comprising at least one radial cavity (22) inside which a part (32) of the fastening shell (25) is distorted radially to ensure fastening of said locking sleeve (20), wherein:

(a) the outer surface of said locking sleeve (20) has, successively in an axial direction of said sleeve, a cylindrical upper part and a frusto-conical lower part, said sleeve being free of any radially outwardly protruding part;
(b) said fastening shell (25) constituting said cylindrical upper part of said sleeve is integral with said frusto-conical lower part constituting said ring (24) for expanding said tube and said fastening shell has a thickness substantially smaller than the thickness of the upper part of the frusto-conical ring for expanding said tube; and
(c) an interlocking annular groove (29) is machined in the upper part of an internal surface of said ring (24) for expanding said tube.

---

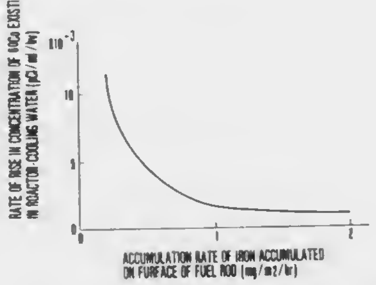
**5,015,436**

### WATER-COOLED DIRECT CYCLE NUCLEAR POWER PLANT

**Makoto Nagase, Hitachi; Yamoto Asakura, Katsuta; Motoaki Utamura, and Shunsuke Uchida, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 29, 1989, Ser. No. 330,316**
**Claims priority, application Japan, Mar. 30, 1988, 63-74375**
**Int. Cl.$^5$ G21C *9/00***

U.S. Cl. 376—306 18 Claims



1. A water-cooled direct cycle nuclear power plant comprising a nuclear reactor, a turbine, a condenser, a condensed-water purifying means and a feed water heater successively arranged as main constitution, further comprising:

means for measuring iron concentration in cooling water, and
means for injecting iron into cooling water for controlling iron amount at an optimum level during operation of the nuclear power plant, said iron-injecting means having a processing unit which calculates a necessary amount of iron concentration based on the data obtained by said iron concentration measuring means in order to supply iron amount into said cooling water for making an iron accumulation rate on fuel rod be not less than 0.5 mg/m$^2$/hr, but not more than 2.0 mg/m$^2$/hr, during operation of the nuclear power plant and a control unit for controlling the iron amount in the cooling water.

---

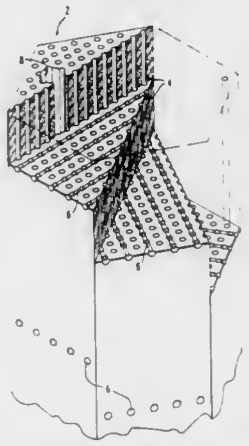
**5,015,437**

### GRAPHITE CORE BLOCKS FOR HIGH TEMPERATURE GAS-COOLED REACTOR

**Hans K. Fauske, Hinsdale, Ill., and George H. Clare, Aiken, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 17, 1989, Ser. No. 437,947**
**Int. Cl.$^5$ G21C *3/56***

U.S. Cl. 376—385 8 Claims



1. In a reactor core for a gas-cooled reactor, which core is composed of a plurality of prismatic bodies of graphite, each body containing nuclear fuel and having a top wall, a bottom wall and a plurality of vertically extending side walls, and each graphite body being provided with a plurality of first coolant flow channels extending vertically between the top wall and the bottom wall, the improvement wherein each said body is further provided with a plurality of second coolant flow channels extending transversely to said first channels and each interconnecting a plurality of said first channels to provide alternate flow paths for the coolant.

---

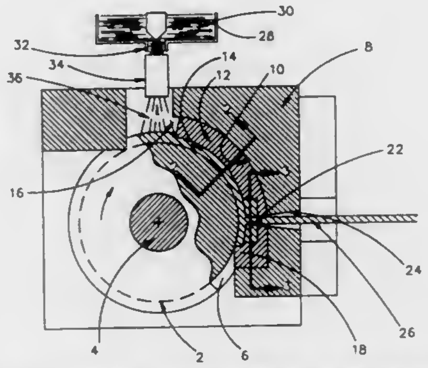
**5,015,438**

### EXTRUSION OF METALS

**Sankaranarayanan Ashok, Bethany; Harvey P. Cheskis, North Haven, and Derek E. Tyler, Cheshire, all of Conn., assignors to Olin Corporation, Cheshire, Conn.**

**Filed Jan. 2, 1990, Ser. No. 459,878**
**Int. Cl.$^5$ B22F *1/00***

U.S. Cl. 419—23 7 Claims



1. The process for extruding metal in an apparatus which includes a passageway formed between a first member and a second member, said passageway having an opening for the reception of a material to be extruded and a closed end remote from said opening, and die means adjacent said closed end, said process comprising:

a. continuously introducing a semisolid metal material into said opening of said passageway,
b. moving said first member relative to said second member in a direction toward said die means from said open end to said closed end so that said metal is drawn through the passageway, and
c. solidifying said semisolid material before it passes through said die means.

---

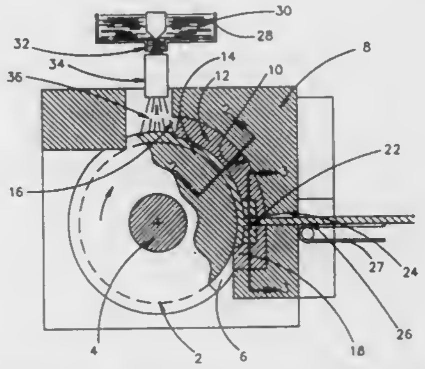
**5,015,439**

### EXTRUSION OF METALS

**Derek E. Tyler, Cheshire; Sankaranarayanan Ashok, Bethany, and Harvey P. Cheskis, North Haven, all of Conn., assignors to Olin Corporation, Cheshire, Conn.**

**Filed Jan. 2, 1990, Ser. No. 459,884**
**Int. Cl.$^5$ B22F *1/00***

U.S. Cl. 419—23 7 Claims



1. The process for extruding metal in an apparatus which includes a passageway formed between a first member and a second member, said passageway having an opening for the reception of a material to be extruded and a closed end remote from said opening, and die means adjacent said closed end, said process comprising:

a. continuously introducing a semisolid metal material into said opening of said passageway,
b. moving said first member relative to said second member in a direction toward said die means from said open end to said closed end so that said metal is drawn through the passageway, and
c. maintaining said material in its semisolid condition as it passes through said die means.

---

**5,015,440**

### REFRACTORY ALUMINIDES

**David M. Bowden, St. Louis, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.**

**Filed Sep. 1, 1989, Ser. No. 402,852**
**Int. Cl.$^5$ G22F *1/00***

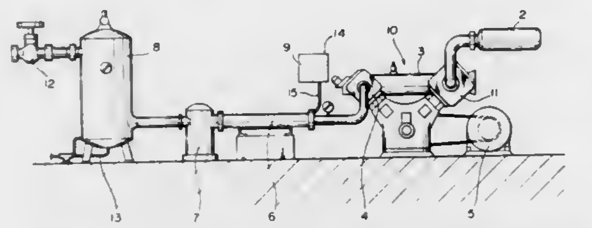
U.S. Cl. 419—31 10 Claims

1. A method of producing refractory aluminides comprising combining a powdered refractory metal and powdered aluminum in reactive proportions, confining the combined metal powders and heating the combined metal powders to remove entrained gases and moisture, exposing the combined metal powders to a vacuum and sealing the combined metal powders under the vacuum, applying pressure to the sealed confined metal powders and heating the confined metal powders to a temperature above the melting point of aluminum, the temperature being effective to initiate and sustain a reaction between the refractory metal and the aluminum substantially to completion, and recovering the refractory aluminide.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,441
## ANTI-CORROSION METHOD OF AIR COMPRESSION DEVICE AND ANTI-CORROSION AIR COMPRESSION DEVICE

**Eiichi Uratani, 3-1-9, Mukoujima, Sumida-ku, Tokyo, Japan**
**Filed Feb. 3, 1989, Ser. No. 307,111**
**Claims priority, application Japan, Feb. 4, 1988, 63-24121**
**Int. Cl.⁵ C23F** *11/04*
**U.S. Cl. 422—12** **3 Claims**



1. A method of preventing corrosion on the interior surface of an air compressing means, the air compressing means being designed for drawing atmospheric air thereinto and compressing the drawn air, the air compressing means having an interior surface made primarily of a metal with which the compressed air comes into contact, the air compressing means including a section in which occurs condensation of water vapor in the compressed air, the method comprising the steps of:

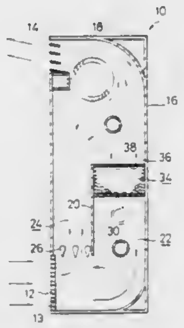
preparing a basic solution by electrolyzing a solution of water with a substance selected from the group of salt, chlorine and sulphur, whereby the solution becomes ionized and alkaline; and

supplying the prepared basic solution to the interior of said section so that the condensed water is neutralized or made weakly basic by the supplied basic solution.

---

### 5,015,442
## STERILIZING/DEODORIZING APPARATUS

**Yoichi Hirai, Aichi, Japan, assignor to Tokai Kogyo Co., Ltd., Aichi, Japan**
**Filed Feb. 24, 1989, Ser. No. 315,529**
**Claims priority, application Japan, Feb. 29, 1988, 63-44523**
**Int. Cl.⁵ A61L** *9/20*
**U.S. Cl. 422—121** **3 Claims**



1. A sterilizing/deodorizing apparatus for treating air, comprising:

a substantially hollow box-like body defining therein first and second air receiving chambers;

an air inlet formed in said body in communication with said first chamber to permit untreated air to be supplied thereto;

an air outlet provided in said body in communication with said second chamber to permit air to be discharged therefrom;

divider wall means mounted within said body for defining generally elongate first and second air passages which are isolated from one another and each of which has inlet and outlet ends providing communication with said first and second chambers, respectively;

means positioned within said body for creating air flow through said body from said inlet to said outlet;

flow adjusting means provided in said second passage for adjustably controlling the ratio of flows through said first and second passages by controlling the amount of flow through said second passage, said flow adjusting means being positioned adjacent the inlet end to said second passage;

an ozone generating means disposed within said first passage for generating ozone in the air passing from said first chamber through said first passage to said second chamber, said ozone generating means comprising an ultraviolet ray lamp which radiated ultraviolet rays of a wavelength of about 185 nm;

means movably supporting said lamp for movement between a first position wherein the lamp is disposed within said first passage at a substantial distance downstream from the inlet end thereof, and a second position wherein the lamp is disposed closely adjacent the inlet end to said first passage;

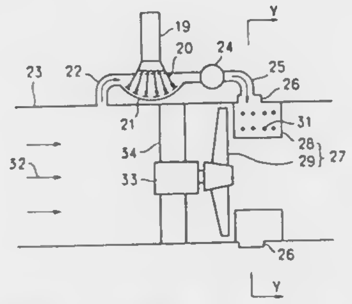
an ozone-decomposing catalyzer disposed within said first passage downstream of said ozone generating means; and

said second passage being free of air treating devices and being sized such that, when said second passage is fully open, most of the untreated air flowing through the inlet into said first chamber flows untreated through said second passage into said second chamber so as to bypass said first passage.

---

### 5,015,443
## METHOD OF AND APPARATUS FOR TREATING WASTE GAS BY IRRADIATION WITH ELECTRON BEAM

**Kanichi Ito, and Akihiko Maezawa, both of Yokohama, Japan, assignors to Ebara Corporation, Tokyo, Japan**
**PCT No. PCT/JP87/00259, § 371 Date Sep. 26, 1988, § 102(e) Date Sep. 26, 1988, PCT Pub. No. WO87/06494, PCT Pub. Date Nov. 5, 1987**
**PCT Filed Apr. 23, 1987, Ser. No. 265,453**
**Claims priority, application Japan, Apr. 24, 1986, 61-95666**
**The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.**
**Int. Cl.⁵ B01J** *19/08, 19/12;* **A21K** *27/02*
**U.S. Cl. 422—186** **2 Claims**



2. An apparatus for treating waste gas flowing in a waste gas main duct, comprising:

an electron beam irradiation chamber located exterior to said waste gas main duct for irradiation of any waste gas within said chamber with electron beams from an electron beam accelerator;

a feeding device having an inlet coupled to an outlet of said main duct and which introduces a part of waste gas to be treated into said electron beam irradiation chamber where said part of said waste gas is irradiated with electron beams thereby to form active species and which feeds the waste gas having said active species formed therein to an inlet of said main duct downstream of said outlet of said main duct;

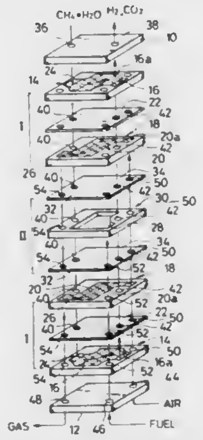
a dispersing device disposed in said main duct and coupled to said inlet of said main duct for uniformly dispersing in the main duct downstream of said outlet the waste gas having said active species fed from said feeding device; and

a capturing device for capturing noxious (gas) ingredients in the waste gas within the main duct which have been changed into the form of a mist or dust by the action of said active species.

---

### 5,015,444
## PLATE TYPE REFORMER

**Minoru Koga, Kawasaki, and Takenori Watanabe, Ichikawa, both of Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan**
**Filed Sep. 9, 1988, Ser. No. 243,334**
**Claims priority, application Japan, Sep. 25, 1987, 62-145404[U]**
**Int. Cl.⁵ B01J** *8/02*
**U.S. Cl. 422—195** **8 Claims**



1. A plate type reformer, comprising:

a plurality of main units, each main unit including a combustor filled with combustion catalyst and a reforming reactor filled with reforming catalyst with a heat conductive partition wall being sandwiched between the combustor and the reforming reactor;

an auxiliary unit including: a fuel plate which has a vacant fuel chamber; and two porous plates sandwiching the fuel plate, the porous plates serving as fuel distribution plates for uniformly supplying he fuel into each combustor of each main unit, whereby the reforming reactors of the main units are equally heated, the combustors of the main units facing each other so as to sandwich the auxiliary unit between the combustion of the main units;

an air passage for supplying air to said combustor;

an exhaust passage for discharging gas burned in said combustor;

a fuel gas passage for supplying fuel gas for reforming to the reforming reactor;

a gas discharge passage for discharging the gas which is reformed; and

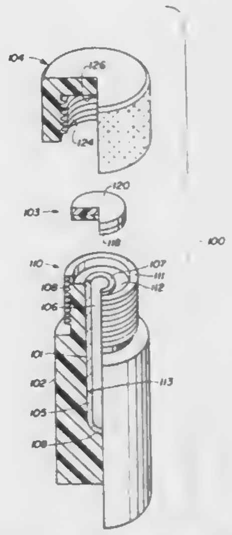
a fuel passage for supplying the fuel to said fuel chamber,

all the passages being formed within the main and auxiliary units.

---

### 5,015,445
## PROCESS AND APPARATUS FOR HYDROLYSIS OF PROTEINS AND PEPTIDES

**Muriel S. Doleman, and Patricia Webber, both of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**
**Filed Dec. 12, 1988, Ser. No. 283,531**
**Int. Cl.⁵ F28D** *21/00*
**U.S. Cl. 422—204** **4 Claims**



1. An apparatus for holding a sample of proteins dissolved in an aqueous acidic solution while the sample is being irradiated with microwaves to produce constituent amino acids from the proteins, the apparatus comprising:

a tube including a nonpyrolyzable glass body enclosing an inner space for holding proteins dissolved in a solution, the body having a substantially flat surface with an opening to the inner space;

a holder including a body having an outer threaded portion ending with a lip, an inner chamber defined by an inner wall substantially the shape of and for holding the tube, and a substantially flat surface connected to the lip, the substantially flat holder surface having a hole leading to the holder inner chamber, such that the tube can be inserted into the hole where the tube rests on the inner chamber wall and the substantially flat tube surface is substantially parallel to and slightly extended from the substantially flat holder surface;

a disk-shaped septum having a side for contacting the substantially flat surfaces of the tube and the holder such that when the side of the disk is contacting the substantially flat tube and holder surfaces, the disk extends slightly beyond the lip; and

a cap including an inner threaded portion connected to an inner wall, such that the inner threaded portion of the cap screws onto the outer threaded portion of the holder compressing the septum between the cap inner wall and the substantially flat tube and holder surfaces sealing the apparatus when holding a sample of proteins dissolved in a solution being irradiated with microwaves.

---

### 5,015,446
## CATALYST RETAINER FOR AN ELONGATED TUBE

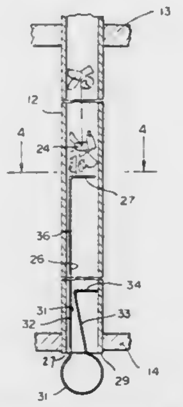
**Sheldon G. Trujillo, Vidor, Tex., assignor to Texaco Chemical Company, White Plains, N.Y.**
**Filed Nov. 30, 1989, Ser. No. 443,675**
**Int. Cl.⁵ B01J** *8/00*
**U.S. Cl. 422—312** **2 Claims**

1. In a reactor tube having an end face, and an inner wall defining a flow channel, in which a particulated bed is retained

VOL
1126
ISS
2
MY
14
1991
UMI

to contact a gaseous stream flowing through the tube, the improvement therein comprising:

- a retainer (**26**) removably positioned in said tube and comprising:
- an end wherein said end further comprises a retainer head (**27**) disposed transversly of said flow channel, said retainer head having a perforated barrier portion that allows said gaseous stream to pass therethrough, while deterring the passage of particulated material from said bed,
- an extended shank **36** having an upper end extending downwardly from said retainer head and also having a lower end,



- said lower end further extending downwardly and connected to a tension loop (**31**) whereby said tension loop (**31**) is in abutment with said tube end face, and further extending out of said tube end face,
- said tension loop (**31**) further connected to an arm (**33**) extending in an upwardly direction therefrom, whereby, said arm is spaced away from said extended shank (**36**) and is capable of being displaced toward said extended shank (**36**) to increase tension in said tension loop (**31**) and,
- said arm (**33**) having a second end having a tang (**34**) extending from said arm (**33**) and engaging the tube inner wall.

---

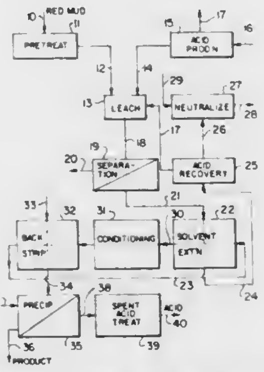
### 5,015,447
## RECOVERY OF RARE EARTH ELEMENTS FROM SULPHUROUS ACID SOLUTION BY SOLVENT EXTRACTION

**George D. Fulford; Gordon Lever, and Taichi Sato, all of Kingston, Canada, assignors to Alcan International Limited, Montreal, Canada**

**Filed Jul. 18, 1989, Ser. No. 381,577**

**Int. Cl.$^5$ C01F** *17/00*

**U.S. Cl. 423—21.5** **25 Claims**



1. A process for recovering rare earth elements comprising the steps of: (1) providing an aqueous sulphurous acid solution containing rare earth values, including elements having atomic numbers from 57 to 71 inclusive, scandium and yttrium, (2) contacting said sulphurous acid solution containing rare earth values with a substantially water-immiscible liquid organic extraction agent comprising an organo-phosphorus compound thereby to extract said rare earth elements into the organic phase, (3) separating the resulting rare earth elements containing organic extract from the residual acidic aqueous phase and (4) stripping the rare earth element from the organic extract.

---

### 5,015,448
## PARTICULATE MATERIAL SUITABLE FOR SELECTIVELY SEPARATING METAL CATIONS FROM AQUEOUS SOLUTIONS, PROCESS FOR ITS PRODUCTION, AND USE THEREOF

**Klaus-Dieter Vorlop, Braunschweig, and Michael Sell, Peine, both of Fed. Rep. of Germany, assignors to GUTEC Gesellschaft zur Entwicklung von Umweltschutztechnologie mbH, Hannover, Fed. Rep. of Germany**

**Filed Oct. 26, 1988, Ser. No. 262,836**

**Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736437**

**Int. Cl.$^5$ B01D** *15/00*

**U.S. Cl. 423—24** **26 Claims**

1. A particulate material suitable for selective separation of metal cations from aqueous solutions, wherein said material comprises a non-ionic, non-polymeric complexing agent, which is capable of complexing with the metal cations and which is dispersed in a continuous aqueous phase, and wherein said continuous aqueous phase is embedded in substantially localized, bound form in a hydrophilic gel, or said continuous aqueous phase is a freely movable component within a hydrophilic gel, or said continuous aqueous phase is encapsulated by a water-insoluble, ion-permeable shell.

---

### 5,015,449
## PROCESS FOR MAKING CONSTRUCTION GRADE CALCIUM SULFATE ALPHA-HEMIHYDRATE FROM MOIST FINELY DIVIDED GYPSUM OBTAINED FROM A POWER PLANT FLUE GAS DESULFURIZATION

**Thomas J. Koslowski, Aachen, Fed. Rep. of Germany, assignor to Promineral Gesellschaft zur Verwendung von Mineralstoffen mbH, Essen and Sicowa Verfahrenstechnik fur Baustoffe GmbH & Co. K.G., Aachen, both of, Fed. Rep. of Germany**

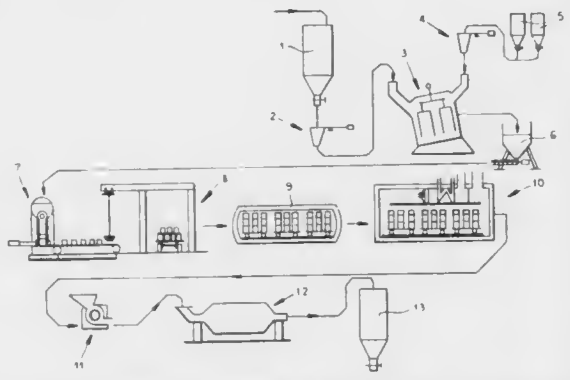
**Filed May 23, 1988, Ser. No. 197,604**

**Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717187**

**The portion of the term of this patent subsequent to May 14, 2008, has been disclaimed.**

**Int. Cl.$^5$ C04B** *11/02, 11/024*

**U.S. Cl. 423—172** **11 Claims**



1. In a process for making calcium sulfate hemihydrate suitable for a construction material from a moist finely divided gypsum obtained by flue gas desulfurization from a power plant fired by brown coal, the improvement wherein a molded body is formed by pressing said gypsum at a pressure from 0.1 to 14 N/mm$^2$, said gypsum having physically bound water in a range from about 3 to 20% by weight, said pressing being sufficient to achieve 15 to 60% pore volume and more than 5% of said pore volume containing air, said molded body being fed at ambient temperature to an autoclave and being heated in said autoclave with saturated steam, water being formed by condensation of said saturated steam and subsequently being drawn into said molded body as a condensate by capillary action of said pores, water held in said pores at least partially coming from said finely divided gypsum from which said molded body is formed, regulating crystal growth and crystal pattern of calcium sulfate hemihydrate growing from an aqueous solution phase by control of a process temperature in the range between 110° C. and 180° C. and by the pressure of the process atmosphere in said autoclave, said pressure being at or above that of saturated steam at said process temperature, after said growth at least partially forcing out said water present in said pore volume of said molded body by controlled release of said pressure in said autoclave, and said molded body being removed from said autoclave.

---

### 5,015,450
## PROCESS FOR MAKING CALCIUM SULFATE ALPHA-HEMIHYDRATE FROM CALCIUM SULFATE DIHYDRATE

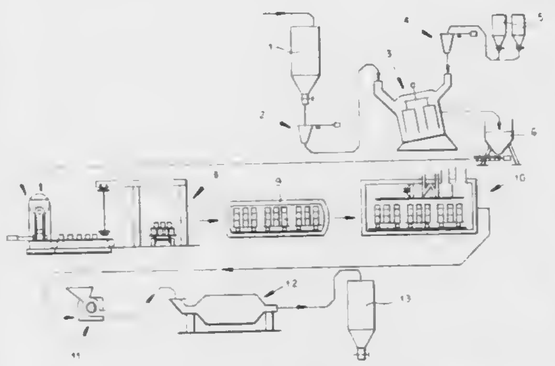
**Thomas J. Koslowski, Aachen, Fed. Rep. of Germany, assignor to Promineral Gesellschaft zur Verwendung Von Mineralstoffen mbH, Essen and Sicowa Verfahrenstechnik fur Baustoffe GmbH & Co. KG, Aachen, both of, Fed. Rep. of Germany**

**Filed May 23, 1988, Ser. No. 197,442**

**Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717187**

**Int. Cl.$^5$ C04B** *11/02, 11/024*

**U.S. Cl. 423—172** **12 Claims**



1. In a process for making calcium sulfate hemihydrate from a finely divided calcium sulfate dihydrate by recrystallization transformation of said calcium sulfate dihydrate in the presence of saturated steam, the improvement wherein a molded body is formed by pressing said calcium sulfate dihydrate, at a pressure from 0.1 to 14 N/mm$^2$, said dihydrate having physically bound water in a range from about 3 to 20% by weight, said pressing being sufficient to achieve a pore volume that is 15 to 60% of total volume and more than 5% by volume of said pore volume contains air, said molded body being fed at ambient temperature to an autoclave and being heated in said autoclave with saturated steam, water being formed by condensation of said saturated steam and subsequently being drawn into said molded body as a condensate by capillary action of open systems of said pores, water held in said pores at least partially coming from said finely divided calcium sulphate dihydrate from which said molded body is formed, regulating crystal growth and crystal pattern of said calcium sulfate hemihydrate which grows from an aqueous solution phase by a process temperature in a range between 110° C. and 180° C. and by the pressure of the process atmosphere in said autoclave said pressure being at or above that of saturated steam at said process temperature, after said growth at least partially forcing out said water present in said pore volume of said molded body by controlled release of said pressure in said autoclave, and said molded body being removed from said autoclave.

---

### 5,015,451
## PROCESS, FILTER AND DEVICE FOR MAKING AVAILABLE HIGH-QUALITY BREATHING AIR

**Heinz Hölter; Heinrich Igelbüscher, both of Gladbeck, and Heinrich Gresch, Dortmund-Wickede, all of Fed. Rep. of Germany, assignors to Heinz Holter, Gladbeck, Fed. Rep. of Germany**

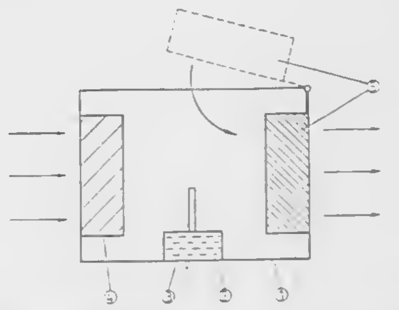
**PCT No. PCT/EP88/00469, § 371 Date Jan. 24, 1989, § 102(e) Date Jan. 24, 1989, PCT Pub. No. WO88/09205, PCT Pub. Date Dec. 1, 1988**

**PCT Filed May 26, 1988, Ser. No. 327,914**

**Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3718021; Jun. 6, 1987, 3719067; Jul. 21, 1987, 3724050; Jul. 25, 1987, 3724671; Aug. 12, 1987, 3726762; Aug. 26, 1987, 3728423; Sep. 15, 1987, 3730922**

**Int. Cl.$^5$ C01B** *21/00*

**U.S. Cl. 423—235** **12 Claims**



1. A filter for eliminating bacteria, viruses, fungi, spores, allergens, pollutants, and odors from an air stream, comprising a stack of discrete chemisorption filter layers including at least one alkaline layer and at least one acidic layer alternating with one another in said stack and traversed in succession by said air stream.

---

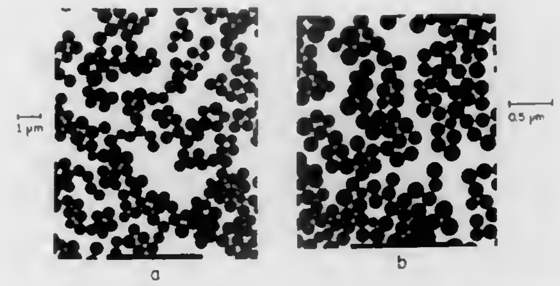
### 5,015,452
## PROCESS FOR SYNTHESIS OF UNIFORM COLLOIDAL PARTICLES OF RARE EARTH OXIDES

**Egon Matijevic, Potsdam, N.Y., assignor to Clarkson University, Potsdam, N.Y.**

**Continuation-in-part of Ser. No. 931,352, Nov. 17, 1986, abandoned. This application Jan. 16, 1987, Ser. No. 3,900**

**Int. Cl.$^5$ C01F** *17/00*

**U.S. Cl. 423—263** **9 Claims**



1. In a process for the preparation of colloidal particles from rare earth salts by homogeneous precipitation techniques involving the forced hydrolysis of a hydrated cation at elevated temperatures, the improvement comprising:

- (a) providing an aqueous solution, at an initial pH in the range of from about 4.5 to about 6, containing one or more hydrated rare earth cations;
- (b) heating the aqueous solution containing one or more hydrated rare earth cations to a temperature in the range

VOL
1126
ISS
2
MY
14
1991
UMI

of from about 70° to about 90° C., so as to effect deprotonation of the hydrated rare earth cations under conditions conducive to control over the kinetics of formation of a precursor of the colloidal particles, and thereby generate in single burst of nuclei preliminary to formation of colloidal particles;
(c) aging the solution, in step (b) the extent of such aging being based upon the growth of said nuclei to the desired particle size for the colloidal particles; and
(d) separating the colloidal particles from the solution in step (c) upon attainment of the particles of the desired particle size.

---

### 5,015,453
## CRYSTALLINE GROUP IVA METAL-CONTAINING MOLECULAR SIEVE COMPOSITIONS
**David M. Chapman, Ellicott City, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.**
**Filed Apr. 28, 1989, Ser. No. 345,133**
**Int. Cl.⁵ C01B** ***33/34***
**U.S. Cl. 423—306** **7 Claims**

2. A crystalline molecular sieve having a three-dimensional microporous framework structure and having a composition in terms of mole ratios of oxides in the synthesized and anhydrous state of:

$$A\,(M_2O):B(XO_2):C(SiO_2):D(P_2O_5) \qquad (I)$$

wherein
M is a alkali metal;
X is a Group IVA metal selected from the group consisting of titanium, zirconium, hafnium, and mixtures thereof;
A/B is a number from about 0.1 to about 2.0:
C/B is a number greater than 0 to about 3.0; and
D/B is a number from about 0 to about 3.0; and
having a powder x-ray diffraction pattern observed with Cu kα radiation and a scan of 4° to 68° 2θ of at least the d-spacings set forth in the following Table A which were measured relative to an internal standard:

TABLE A

| d(Å) |
|---|
| 7.8 ± 0.4 |
| 5.5 ± 0.2 |
| 4.5 ± 0.2 |
| 3.9 ± 0.2 |
| 3.2 ± 0.1 |
| 2.7 ± 0.1 |
| 2.6 ± 0.1 |
| 2.4 ± 0.1 |
| 2.33 ± 0.05 |
| 2.23 ± 0.05 |
| 1.94 ± 0.05 |
| 1.88 ± 0.05 |
| 1.83 ± 0.02 |
| 1.74 ± 0.02 |
| 1.65 ± 0.02 |
| 1.58 ± 0.02 |
| 1.54 ± 0.02 |
| 1.50 ± 0.02 |
| 1.41 ± 0.02 |

---

### 5,015,454
## PROCESS FOR PREPARATION OF AN ECR-5 CRYSTALLINE ZEOLITE COMPOSITION
**David E. W. Vaughan, Flemington, N.J., assignor to Exxon Research & Engineering Company, Florham Park, N.J.**
**Continuation of Ser. No. 249,535, Sep. 26, 1988, abandoned. This application May 2, 1990, Ser. No. 517,995**
**The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.**
**Int. Cl.⁵ C01B** ***33/34***
**U.S. Cl. 423—328** **4 Claims**

1. A process for preparing a crystalline zeolite having a composition, in terms of mole ratios of oxides, in the range:

$$1.0 \text{ to } 1.3\ (Li, Na)_2O\ Al_2O_3{:}2.0 \text{ to } 5.0\ SiO_2$$

and being isostructural with cancrinite, as shown by its characteristic x-ray diffraction pattern and having a sorption capacity greater than about 1% by weight hexane, comprising the steps of
(a) preparing a reaction mixture in an aqueous solution including a source of silica-alumina, said reaction mixture having a composition; in terms of mole ratios of oxides, within the following ranges:

$$xM_2O{:}Al_2O_3{:}ySiO_2{:}zH_2O$$

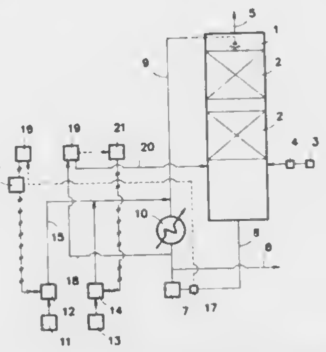
where
$x = 1.5$ to 2.8
$y = 2$ to 4
$z = 50$ to 140
$M = (Li + Na)$

$$\frac{Li}{Na} = 3 \text{ to } 9$$

(b) maintaining the reaction at a temperature between about 80° C. and 200° C. and times between 0.1 and 10 days.

---

### 5,015,455
## DISULFONATE PROCESS CONTROL
**Laszlo J. Balint, and Lamberto Crescentini, both of Chester, Va., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**
**Filed Dec. 23, 1988, Ser. No. 289,121**
**Int. Cl.⁵ C01B** ***21/093***
**U.S. Cl. 423—388** **4 Claims**

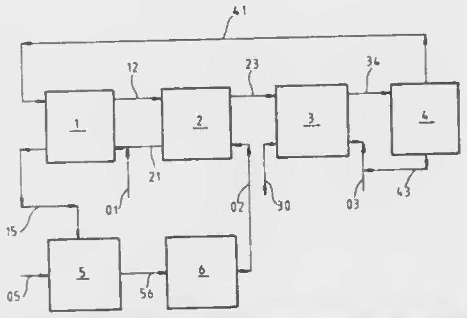


1. In a process for the production of hydroxylamine disulfonate diammonium salt (DS) comprising:
(a) recirculating a portion of a DS product solution stream to a packed reaction column;
(b) feeding an aqueous ammonium nitrite solution to said DS product solution stream portion;
(c) feeding $SO_2$ gas to said packed column to obtain sufficient contact of said $SO_2$ with the nitrite-containing DS product solution, thereby creating a reaction mixture to produce DS;

(d) feeding trim ammonia to the reaction mixture in an amount sufficient to satisfy stoichiometric requirements of ammonium ion in said reaction mixture; and
(e) withdrawing a DS product solution stream from said packed column, retaining a portion as product and recirculating the remaining portion to step (a) above;
the improvement comprising controlling said process by the steps comprising:
(f) measuring the pH of the DS product solution stream from step (e) above and comparing said pH with a pre-selected pH value;
(g) adjusting for deviation of pH of said DS product solution stream from said pre-selected pH value by adjusting the feed of nitrite solution in step (b) above;
(h) measuring the concentration of unreacted nitrite in the DS product solution stream from step (e) above and comparing said concentration with a pre-selected concentration value; and
(i) adjusting for deviation of said concentration from said pre-selected concentration value by adjusting the feed of trim ammonia in step (d) above.

---

### 5,015,456
## REMOVAL OF NITRATE AND/OR ORGANIC POLLUTANTS FROM EFFLUENTS
**Armand Verbueken, Gravenwezel; Domien Sluyts, Stabroek, and Roland Putseys, Heide-Kalmthout, all of Belgium, assignors to Bayer Antwerpen, Antwerp, Belgium**
**Filed Apr. 20, 1990, Ser. No. 513,346**
**Claims priority, application European Pat. Off., May 9, 1989, 89108278.6**
**Int. Cl.⁵ C01B** ***21/48;*** **B01D** ***15/04***
**U.S. Cl. 423—395** **13 Claims**

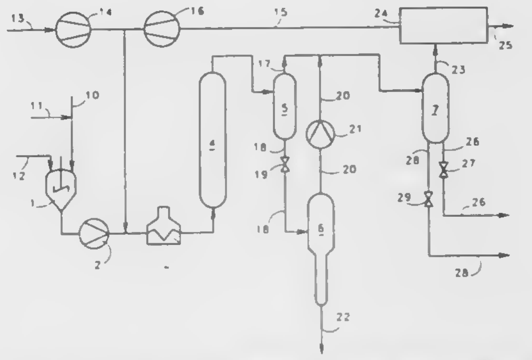


1. A continuous process for the removal of at least one of nitrate and organic contaminants from an aqueous effluent, which comprises subjecting said effluent to extractive liquid ion-exchange with a long-chain alkylamine dissolved in an organic solvent and present in the form of its sulfate salt obtained by addition of sulfuric acid to the amine, and reextracting the loaded organic phase with sodium hydroxide or ammonia, the treated effluent being recycled for reuse.

---

### 5,015,457
## PROCESS FOR THE HYDROGENATION OF ORGANOCHLORINE COMPOUNDS, NEUTRALIZATION OF THE HYDROCHLORIC ACID OBTAINED AND A NEUTRALIZATION AGENT FOR HYDROCHLORIC ACID OBTAINED FROM ORGANOCHLORINE COMPOUNDS
**Josef Langhoff, Dinslaken; Alfons Jankowski, and Klaus-Dieter Dohms, both of Essen, all of Fed. Rep. of Germany, assignors to Ruhrkohle AG, Essen, Fed. Rep. of Germany**
**Filed Aug. 15, 1989, Ser. No. 394,728**
**Int. Cl.⁵ C01B** ***7/01, 7/07***
**U.S. Cl. 423—481** **5 Claims**

1. Method for hydrogenation of an organochlorine compound and for at least partially neutralizing resultant hydrochloric acid, comprising the steps of:
obtaining at least one organochlorine compound;
hydrogenating said organochlorine compound to obtain at least hydrochloric acid; and
neutralizing at least some of said hydrochloric acid by exposing said hydrochloric acid to an agent at a temperature of between 300° C. to 500° C. and a pressure of about 50 to 300 bar thereby causing said hydrochloric acid to react with said acid;



said agent during said reaction consisting essentially of a member selected from the group consisting of: (a) a neutralization agent which is soluble in a fluid; and (b) a neutralization agent which is deposited on a carrier material; and
said neutralization agent consists essentially of a Na-salt of an organic acid.

---

### 5,015,458
## METHOD FOR PURIFYING SULFURIC ACID SOLUTIONS
**Clarence D. Vanderpool, and Timothy J. Hoffman, both of Towanda, Pa., assignors to GTE Products Corporation, Stamford, Conn.**
**Filed Apr. 4, 1990, Ser. No. 504,479**
**Int. Cl.⁵ C01B** ***17/90***
**U.S. Cl. 423—531** **2 Claims**

1. A method for removing iron from iron-contaminated sulfuric acid to render said sulfuric acid suitable for ion membrane processing, said method comprising:
(a) contacting said iron-contaminated sulfuric acid with an oxidizing agent to oxidize essentially all of said iron to the +3 oxidation state;
(b) contacting the resulting iron-contaminated sulfuric acid containing oxidized iron with a complexing agent selected from the group consisting of citric acid, oxalic acid, and tartaric acid, with the amount of said complexing agent being sufficient to complex essentially all of said oxidized iron; and
(c) contacting the resulting iron-contaminated sulfuric acid containing the complexed iron with activated carbon to remove essentially all of the iron and produce a purified sulfuric acid solution.

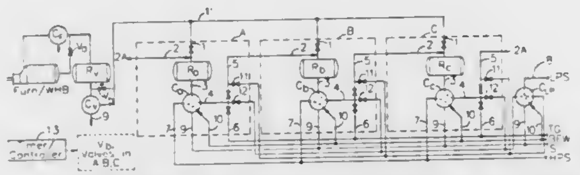
---

### 5,015,459
## HIGH PRESSURE-LOW PRESSURE STEAM SYSTEM FOR EXTENDED CLAUS SULFUR RECOVERY PLANT
**Paul T. Pendergraft, Houston, Tex., assignor to Amoco Corporation, Chicago, Ill.**
**Filed Nov. 30, 1989, Ser. No. 445,989**
**Int. Cl.⁵ G01B** ***17/04;*** **B01J** ***8/04;*** **B01D** ***50/00***
**U.S. Cl. 423—574 R** **4 Claims**

1. In an extended Claus process having at least first, second and third Claus catalytic reactors providing process gas respectively to first, second, and third sulfur condensers, the first, second, and third condensers being connected to a steam delivery system, the improvement comprising:
producing first pressure steam by directing process gas

VOL 1126 ISS 2 MY 14 1991 UMI

effective for producing steam at said first pressure from first, second and third catalytic reactors to first, second and third sulfur condensers respectively;
producing second pressure steam by directing process gas periodically from one of said first, second and third sulfur condensers to a fourth sulfur condenser;
providing cooled process gas from the fourth sulfur condenser to a final position Claus catalytic reactor operated under effective cold bed adsorption conditions.



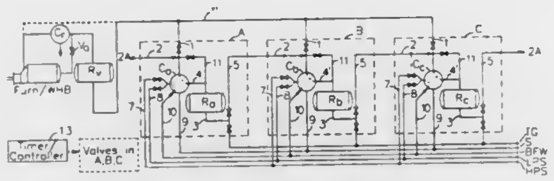
---

### 5,015,460
### CONDENSER-REACTOR SWITCHING UNITS FOR EXTENDED CLAUS PROCESS

**Paul T. Pendergraft, Houston, Tex., assignor to Amoco Corporation, Chicago, Ill.**

**Filed Nov. 30, 1989, Ser. No. 443,789**
**Int. Cl.$^5$ C01B** *17/04;* **B01J** *8/04, 12/02*

U.S. Cl. 423—574 R **10 Claims**



1. A sulfur recovery plant comprising:
at least three units connectable for sequentially receiving process gas and for removing sulfur therefrom, each unit having a Claus catalytic reactor alternately periodically operated under effective high temperature Claus conditions and periodically operated under effective cold bed adsorption conditions, each unit comprising:
a sulfur condenser having a gas inlet and a gas outlet;
the gas inlet being connectable by valve control in flow communication for receiving effluent process gas from one of a Claus catalytic reactor of another unit and a source of process gas from which sulfur is to be removed, optionally from a high temperature Claus reactor;
a valved bypass line connecting the gas inlet of the sulfur condenser with the gas outlet of the sulfur condenser;
the Claus catalytic reactor of each unit having an inlet connected in flow communication with the gas outlet of the sulfur condenser and having an effluent outlet;
outlet means for connecting the effluent outlet of the Claus catalytic reactor in flow communication with one of an inlet of at least one other unit and a tail gasline; and
means for switching each inlet sulfur condenser as a unit with a downstream reactor during operation of the plant.

---

### 5,015,461
### NOVEL HIGH SURFACE AREA OXIDE COMPOSITIONS WITH A PYROCHLORE STRUCTURE, METHODS FOR THEIR PREPARATION, AND CONVERSION PROCESSES UTILIZING SAME

**Allan J. Jacobson, Princeton; Richard B. Hall, Warren; Charles A. Mims, Summit, and Joseph T. Lewandowski, Whitehouse Station, all of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.**

**Filed Jun. 26, 1989, Ser. No. 343,752**
**Int. Cl.$^5$ C01G** *33/00, 35/00*

U.S. Cl. 423—593 **7 Claims**

1. An oxide compound with a pyrochlore structure and a surface area greater than about 20 m$^2$/g having the formula $A_2B_2O_7$ wherein A is a divalent metal catio and B is a metal cation selected from the group consisting of niobium, tantalum and mixtures thereof.

---

### 5,015,462
### STABLE STANNOUS CHLORIDE COMPOSITION FOR LABELING WITH RADIOACTIVE TECHNETIUM

**Makoto Azuma; Jun Takahashi, both of Hyogo; Hirohiko Yamauchi, Osaka, and Nobuo Ueda, Kawanishi, all of Japan, assignors to Nihon Medi-Physics Co. Ltd., Hyogo, Japan**

**Division of Ser. No. 135,527, Dec. 17, 1987, Pat. No. 4,880,616, which is a continuation of Ser. No. 791,474, Oct. 25, 1985, abandoned. This application Jun. 8, 1989, Ser. No. 362,975**
**Claims priority, application Japan, Oct. 26, 1984, 59-226395**
**Int. Cl.$^5$ A61K** *43/00;* **A61M** *36/14*

U.S. Cl. 424—1.1 **3 Claims**

1. A process for labelling red blood cells with 99m-technetium, which comprises the steps of
(a) dissolving a dry, solid, reductive composition in water to form a resultant solution; said dry, solid, reductive composition being prepared by forming an aqueous solution containing stannous chloride in a concentration of not less than 0.5 mol/liter by dissolving stannous chloride alone in an aqueous solvent, charging an amount of not more than 500 microliters of said aqueous solution into a container and lyophilizing the charged aqueous solution in said container,
(b) intravenously administering said resultant solution into a mammalian body, and
(c) subsequently intravenously administering 99m-technetium in a pertechnetate form into said body.

---

### 5,015,463
### METHOD TO DIAGNOSE THE PRESENCE OR ABSENCE OF TUMOR TISSUE

**Thomas J. Dougherty; William R. Potter, both of Grand Island, and Kenneth R. Weishaupt, Sloan, all of N.Y., assignors to Health Research, Inc., Buffalo, N.Y.**

**Continuation of Ser. No. 352,774, May 16, 1989, which is a continuation of Ser. No. 889,917, Jul. 24, 1986, Pat. No. 4,889,129, and a continuation of Ser. No. 889,829, Jul. 24, 1986, Pat. No. 4,866,168, which is a division of Ser. No. 609,991, May 14, 1984, Pat. No. 4,649,151, which is a continuation-in-part of Ser. No. 481,345, Apr. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 424,647, Sep. 27, 1982, abandoned, said Ser. No. 889,917, is a division of Ser. No. 609,991,. This application Apr. 26, 1990, Ser. No. 515,179**
**Int. Cl.$^5$ A61K** *49/00*

U.S. Cl. 424—7.1 **2 Claims**

1. A method to diagnose the presence or absence of tumor tissue at a location in a subject which method comprises
administering to said subject an effective amount of a composition consisting essentially of 10 kd aggregates of porphyrins which are fluorescent, photosensitizing and capable of localizing and being retained in tumor cells for a longer time than in normal tissues, and wherein the process for preparation of said composition comprises raising the pH of a hematoporphyrin derivative preparation in aqueous medium to 6.5–12 to obtain aggregates of 10 kd or greater and separating said aggregates from the remainder of the hematoporphyrin derivative preparation
in an amount effective to localize in a tumor at said suspected location;
waiting for sufficient time to permit the drug to clear normal tissue;
irradiating the suspected location with a wavelength absorbed by, and which elicits fluorescence from, said composition; and
measuring the fluorescence emitted.

### 5,015,464
### ANTIPLAQUE CHEWING GUM

**John R. Strobridge, Comstock Park, Mich., assignor to Amway Corporation, Ada, Mich.**

**Continuation of Ser. No. 30,175, Mar. 25, 1987, abandoned, and a continuation-in-part of Ser. No. 844,339, Mar. 26, 1986, abandoned. This application Jun. 13, 1989, Ser. No. 365,741**
**Int. Cl.$^5$ A61K** *7/16, 7/26, 9/68*

U.S. Cl. 424—48 **46 Claims**

1. An antiplaque chewing gum comprising:
a gum base having incorporated therein and antiplaque active system consisting essentially of 0.007 to 0.05% by weight of eucalyptol, from 0.3 to 2.10% by weight of menthol, from 0.12 to 0.8% by weight of methyl salicylate and from 0.01 to 0.1% by weight of thymol, said weight percents being based on total weight of said chewing gum.

---

### 5,015,465
### ORAL HYGIENE COMPOSITIONS

**Philip L. Straw, Woodham, England, assignor to Beecham Group P.L.C., England**

**Continuation of Ser. No. 842,490, Mar. 21, 1986, abandoned. This application Jun. 24, 1988, Ser. No. 210,834**
**Claims priority, application United Kingdom, Mar. 23, 1985, 8507625; Jun. 12, 1985, 8514860**
**Int. Cl.$^5$ A61K** *7/18*

U.S. Cl. 424—052 **8 Claims**

1. An aqueous hygiene composition comprising a silica base, from 1 to 10% by weight of the composition of a water soluble non-toxic strontium salt selected from the group consisting of strontium acetate, strontium chloride, strontium nitrate, strontium lactate and strontium bromide, a fluoride source providing from 250 ppm to 2000 ppm of fluoride in the composition, and a dentally acceptable carrier comprising water, provided that when the strontium salt is other than strontium acetate the silica base has a BET surface area of from 50 to 400 m$^2$/g.

---

### 5,015,466
### ANTICALCULUS COMPOSITIONS USING TARTRATE-SUCCINATES

**John J. Parran, Jr.; Margaret M. Coyle-Rees, both of Cincinnati; John T. Rotruck, and Richard J. Sunberg, both of Oxford, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jun. 26, 1990, Ser. No. 543,647**
**Int. Cl.$^5$ A61K** *7/18, 7/24*

U.S. Cl. 424—52 **31 Claims**

1. An oral care composition comprising an effective amount of an anticalculus agent which is a member selected from the group consisting of the acid or salt form of tartrate monosuccinate, tartrate disuccinate, and mixtures thereof, and a toxicologically acceptable oral carrier.

---

### 5,015,467
### COMBINED ANTICALCULUS AND ANTIPLAQUE COMPOSITIONS

**Herbert C. Smitherman, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jun. 26, 1990, Ser. No. 543,594**
**Int. Cl.$^5$ A61K** *7/18, 7/24, 9/68*

U.S. Cl. 424—52 **12 Claims**

1. An oral care composition, comprising:
a) an effective amount of an anticalculus agent which is a member selected from the group consisting of the acid or salt form of tartrate monosuccinate, tartrate disuccinate, and mixtures thereof;
b) an effective amount of a plaque-inhibiting polymer; and
c) a toxicologically acceptable oral carrier.

---

### 5,015,468
### MANUFACTURE OF TARTRATE DISUCCINATE/TARTRATE MONOSUCCINATE WITH ENHANCED TDS LEVELS

**Daniel S. Connor, Cincinnati, and Robert E. Stidham, Fairfield, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jun. 26, 1990, Ser. No. 543,646**
**Int. Cl.$^5$ A61K** *7/24*

U.S. Cl. 424—55 **10 Claims**

1. A process for preparing anticalculus mixtures comprising tartrate disuccinate and tartrate monosuccinate, said mixtures being characterized by an enriched ratio of said tartrate disuccinate to said tartrate monosuccinate, comprising reacting a maleate species with isomerically pure D- or L-tartrate, the maleate species being in excess over tartrate at a mole ratio of from about 1.8:1 to about 4:1, in the presence of an alkali metal hydroxide and an alkaline earth hydroxide in aqueous media.

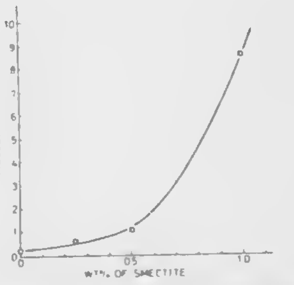
---

### 5,015,469
### WATER-IN-OIL EMULSION TYPE COSMETICS

**Toshio Yoneyama; Michihiro Yamaguchi; Shinji Tobe; Tomiyuki Nanba; Masaaki Ishiwatari; Hidekazu Toyoda; Shin Nakamura; Yoshimaru Kumano; Sadaki Takata, and Hiromi Ito, all of Yokohama, Japan, assignors to Shideido Company Ltd., Tokyo, Japan**

**Continuation of Ser. No. 197,869, May 24, 1988, abandoned. This application Jul. 23, 1990, Ser. No. 560,486**
**Claims priority, application Japan, Jan. 12, 1988, 63-4352**
**Int. Cl.$^5$ A61K** *7/42, 7/021;* **B01J** *13/00*

U.S. Cl. 424—59 **6 Claims**



1. A water-in-oil type emulsified cosmetic composition comprising:
(a) 0.2% to 5.5% by weight of a water-swellable clay mineral,
(b) 40 to 140 meg per 100 g of said clay mineral of a quaternary ammonium salt cationic surfactant,
(c) 0.05 to 2-fold relative to said clay mineral of at least one polyoxyalkylene modified organopolysiloxane,
(d) a balance of an aqueous phase, and
(e) 10 to 18% by weight of an oil phase containing at least one organic silicone resin comprising units of the formula:

$$RnSiO_{(4-n)/2}$$

wherein R is a hydrocarbon group having 1 to 6 carbon atoms or a phenyl group, and n represents a value of 1.0 to 1.8.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,015,470
## COSMETIC COMPOSITION

**Walter T. Gibson, 8 Braid Court, Wellingborough, Northants NN8 3PF, England**

**Filed Dec. 17, 1987, Ser. No. 134,422**

**Claims priority, application United Kingdom, Dec. 23, 1986, 8630721**

**Int. Cl.$^5$ A61K** *7/06*

**U.S. Cl. 424—70** **31 Claims**

1. A method for inducing, maintaining or increasing hair growth in a mammal which comprises: applying a hair growth inducing, maintaining or increasing amount of a composition to the skin or hair, said composition comprising:

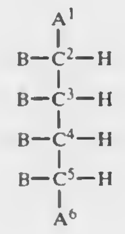
(i) a first chemical inhibitor selected from the group consisting of:

(a) a direct proteoglycanase inhibitor selected from the group consisting of:

1, 10-Phenanthroline
AcetylPhe-LeuSH
AcetylSer-LeuSH
AcetylTrp-LeuSH
AcetylPhe-Phe-LeuSH
$HSCH_2CH$(i-Butyl)$COPheNH_2$
$HSCH_2CH$(i-Butyl)COLeu-$PheNH_2$
AcetylTrp-IleSH
AcetylPhe-IleSH
HOOCCH(i-Butyl)Leu-Leu-$LeuOCH_3$
HOOCCH(i-Butyl)Leu-Leu-$AlaNH_2$
HOOCCH(i-Butyl)Leu-Leu-$PheNH_2$
HOOCCH(i-Butyl)Leu-Leu-Leu-$AlaNH_2$
$HONHCOCH_2CH$(n-Pentyl)COLeu-$PheNH_2$
$HONHCOCH_2CH$(n-Pentyl)COLeu-$AlaNH_2$
$HONHCOCH_2CH$(i-Butyl)COLeu-$PheNH_2$
$HONHCOCH_2CH$(n-Pentyl)COVal-$AlaNH_2$
and mixtures thereof;

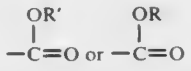
(b) an indirect proteoglycanase inhibitor which is cationic oligomer;

(c) a glycosaminoglycanase inhibitor which is an at least one exoglycosidase inhibitor selected from the group consisting of aldonolactones and esterified aldonolactones of the formula:



where

$A^1$ and $A^6$ are —H, —$CH_3$,



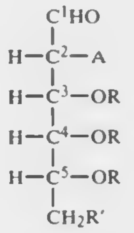
$$-\overset{OR'}{\overset{|}{C}}=O \text{ or } -\overset{OR}{\overset{|}{C}}=O$$

B is OR″ or a lactone linkage to position 1 or 6, or -$NHCOCH_3$ and where R is —H or $C_2$ to $C_8$ alkyl,

R′ is the remainder of the molecule joined through another C atom at positions 2 to 5 to form a lactone,

R″ is —H or $C_2$ to $C_4$ acyl of either configuration with respect to the backbone of this molecule;

(d) a glycosaminoglycanase inhibitor which is an exoglycosidase inhibitor selected from the group consisting of monosaccharides and esterified monosaccharaides of the formula:



where

A is —OR or —$NHCOCH_3$,

R is —H, —$SO_3M$, $C_2$ to $C_4$ acyl,

R′ is —H or —OR,

M is —H or a metal cation;

(e) a glycosaminoglycanase inhibitor which is an endoglycosidase inhibitor selected from the group consisting of:

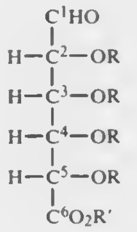
phosphorylated hesperidin
sodium aurothlomalate
substituted thiosemicarbazone indoles, and
mixtures thereof;

(f) a glycosaminoglycanase inhibitor which is a sulphatase or sulphamatase inhibitor selected from water soluble salts having an anion selected from the group consisting of:

inorganic sulphate
sulphite
pyrophosphate
fluoride
borate
chloride
gluconate, and
mixtures thereof;

(g) a glycosaminoglycanase inhibitor which is the sulphatase inhibitor D-Glucosamine-3-sulphate; and

(h) a glycosaminoglycan chain uptake inhibitor selected from the group consisting of hexuronic acids or esters thereof of the formula:



where

R is —H, —$SO_3M$, $C_2$ to $C_4$ acyl

R′ is —H or $C_2$ to $C_8$ alkyl; and

(ii) a cosmetically acceptable vehicle for the chemical inhibitor; provided that when the first chemical inhibitor is a weak inhibitor, such that a 1mM aqueous solution of the inhibitor reduces proteoglycanase activity, glycosaminoglycan activity or cellular uptake of glycosaminoglycan chains, by from 5 to 50%, in accordance with at least one of the assay tests as herein described, then there is also present in the composition at least one of, a second chemical inhibitor selected from the group consisting of proteoglycanase inhibitors, glycosaminoglycanase inhibitors, glycosaminoglycan chain cellular uptake inhibitors or mixtures thereof, an activity enhancer; the total amount of chemical inhibitor present in the composition being sufficient to increase hair growth in a rat, when said composition is applied topically thereto, by at least 10% more than that obtainable using an equal amount of a control composition from which the said inhibitors have been omitted.

---

## 5,015,471
## TOPICAL COMPOSITION

**David H. Birtwistle; Peter Carter, and David A. Rosser, all of Merseyside, England, assignors to Chesebrough-Pond's USA Co., Division of Conopco, Inc., New York, N.Y.**

**Filed Nov. 29, 1989, Ser. No. 442,958**

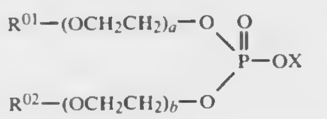
**Claims priority, application United Kingdom, Dec. 1, 1988, 8828013.6**

**Int. Cl.$^5$ A61K** *7/075, 7/50*

**U.S. Cl. 424—070** **21 Claims**

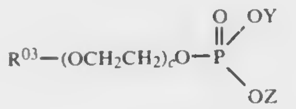
1. An aqueous composition suitable for topical application to the skin or hair, which comprises:

a. from 1 to 99.9% by weight of a dialkyl or dialkenyl phosphate salt (or mixtures thereof) having the structure (1):



(1)

b. from 0.01 to 20% by weight of a monoalkyl or monoalkenyl phosphate salt (or mixtures thereof) having the structure (2):



(2)

where

$R^{01}$, $R^{02}$ and $R^{03}$ are each chosen from branched or unbranched, alkyl or alkenyl groups having an average of from 7 to 9 carbon atoms;

X, Y and Z are each chosen from H, alkali metal, ammonium and substituted ammonium counterions; and

a, b and c are each chosen from 0 or a value 35 of from 1 to 4; the weight ratio of the monoalkyl or monoalkenyl phosphate salt to the dialkyl or dialkenyl phosphate salt being from 1:1000 to 1:5.

---

## 5,015,472
## COATING COMPOSITIONS AND METHODS FOR PREVENTING ADHESION OF ORGANISMS

**Osamu Isozaki, Yokohama; Naozumi Iwasawa, Hiratsuka; Toshiro Hirama, Fujisawa, and Hiroshi Iwai, Atsugi, all of Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan**

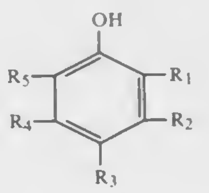
**Division of Ser. No. 317,501, Mar. 1, 1989, Pat. No. 4,973,477. This application May 23, 1990, Ser. No. 527,465**

**Claims priority, application Japan, Mar. 2, 1988, 63-50232; Mar. 8, 1988, 63-55396**

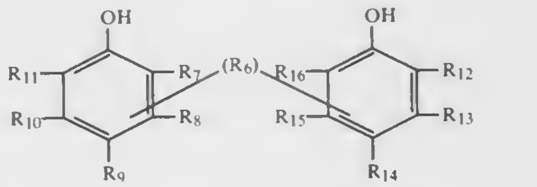
**Int. Cl.$^5$ A61K** *31/74;* **C08F** *22/10, 20/52, 122/10*

**U.S. Cl. 424—78** **4 Claims**

1. A method for preventing adhesion of organisms to a substrate or structure, characterized by coating the substrate or structure with a coating composition which comprises as its vehicle component a homopolymer or a copolymer, said homopolymer being prepared by homopolymerizing a phenol-modified unsaturated monomer, said phenol-modified unsaturated monomer being obtained by reacting (a) an unsaturated monomer containing an epoxy group and/or hydroxyl group with (b) an addition reaction product of a phenolic compound and a compound which is the anhydride of a dicarboxylic acid, and said copolymer being prepared by copolymerizing said phenol-modified unsaturated monomer with a radially polymerizable unsaturated monomer, said phenolic compound selected from the group consisting of:



wherein $R_1$–$R_5$ each represent hydrogen, halogen, hydroxyl, alkyl, alkoxy nitro, cyano, or an amino group, and



wherein $R_7$–$R_{16}$ each represent hydrogen, halogen, hydroxyl, alkyl, alkoxy, nitro, cyano, or an amino group, and $R_6$ represents an alkylene, —O—, —$CH_2O$—, —$CH_2OCH_2$—, or —$SO_2$—.

---

## 5,015,473
## 6-(SUBSTITUTED)METHYLENEPENICILLANIC AND 6-(SUBSTITUTED)HYDROXYMETHYLPENICILLANIC ACIDS AND DERIVATIVES THEREOF

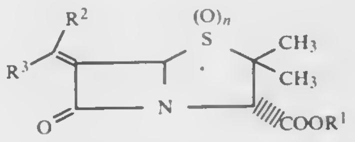
**Yuhpyng L. Chen, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 892,001, Jul. 30, 1986, Pat. No. 4,826,833, which is a continuation-in-part of Ser. No. 679,192, Dec. 11, 1984, abandoned, which is a continuation-in-part of Ser. No. 575,354, Jan. 30, 1984, abandoned. This application Jan. 13, 1989, Ser. No. 297,815**

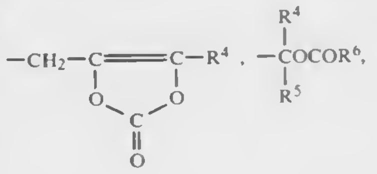
**Int. Cl.$^5$ C07D** *499/00;* **A61K** *31/425*

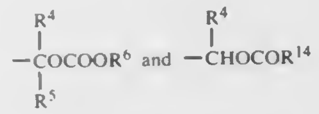
**U.S. Cl. 424—114** **25 Claims**

1. A compound of the formula



wherein n is zero, 1 or 2; $R^1$ is $R^a$ or $R^b$ where $R^a$ is the residue of a carboxy protecting group selected from tetrahydropyranyl, allyl, benzyl, 4-nitrobenzyl, benzhydryl, 2,2,2-trichloroethyl, t-butyl and phenacyl; and $R^b$ is hydrogen or the residue of an ester group readily hydrolyzable in vivo selected from 3-phthalidyl, 4-crotonolactonyl, gamma-butyrolacton-4-yl,

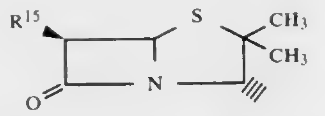




$$-\underset{R^5}{\overset{R^4}{\overset{|}{\underset{|}{C}}}}OCOOR^6 \text{ and } -\overset{R^4}{\overset{|}{C}}HOCOR^{14}$$

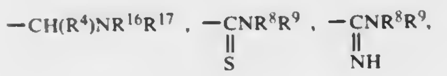
where $R^4$ and $R^5$ are each hydrogen or $CH_3$, $R^6$ is ($C_1$–$C_5$)-alkyl, and $R^{14}$ is

VOL
1126
.
ISS
2
MY
14
1991
UMI

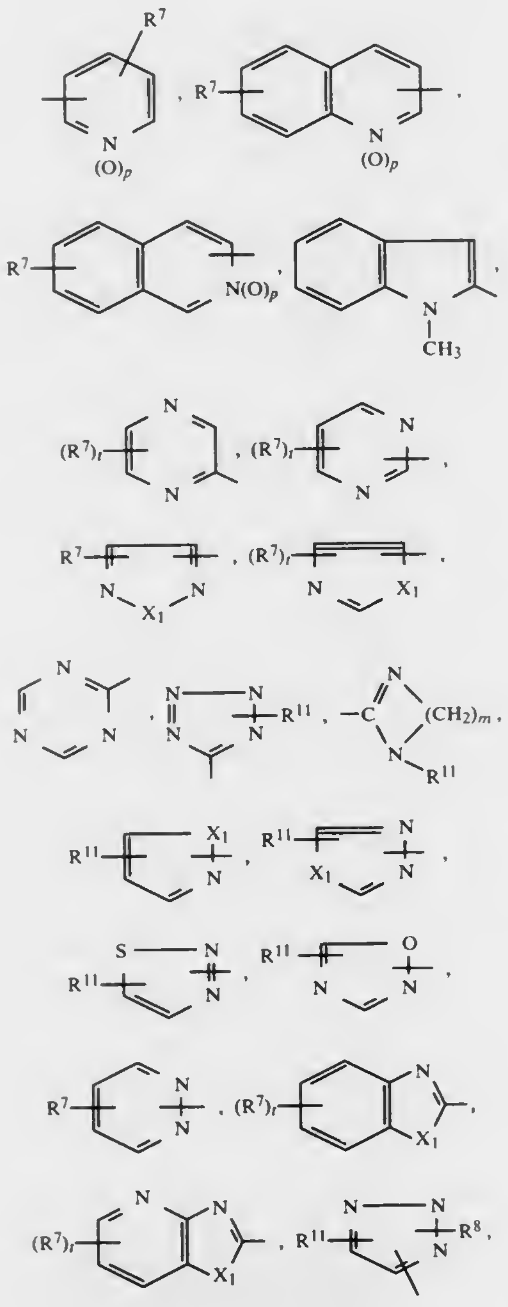


where $R^{15}$ is 2-phenylacetamido, 2-phenoxyacetamido, D-2-amino-2-phenylacetamido, D-2-amino-2-(4-hydroxyphenyl-)acetamido, 2-carboxy-2-phenylacetamido, 2-carboxy-2-(2-thienyl)acetamido, 2-carboxy-2-(3-thienyl)-acetamido, D-2-(4-ethyl-2,3-dioxopiperazinocarbonylamino)-2-phenylacetamido or 2,2-dimethyl-4-phenyl-5-imidazolidinone-1-yl;

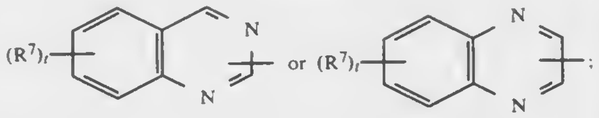
one of $R^2$ and $R^3$ is hydrogen and the other is Cl, $CH_2OH$, vinyl, $(C_1-C_4)$alkylthio, $(C_1-C_4)$alkylsulfonyl, furyl, thienyl, N-methylpyrrolyl, N-acetylpyrrolyl,



$$-\mathrm{CH(R^4)NR^{16}R^{17}},\quad -\underset{\underset{\mathrm{S}}{\|}}{\mathrm{C}}\mathrm{NR^8R^9},\quad -\underset{\underset{\mathrm{NH}}{\|}}{\mathrm{C}}\mathrm{NR^8R^9},$$



-continued



and m is 2 or 3, p is zero or 1, t is zero, 1 or 2, $X_1$ is S, O or $NR^{11}$, $R^7$ is hydrogen, $(C_1-C_4)$alkyl, $(C_1-C_4)$alkoxy, allyloxy, hydroxyl, carboxyl, $(C_2-C_5)$-alkoxycarbonyl, $(C_1-C_5)$alkylcarbonyl, phenyl, benzyl, naphthyl, pyridyl $NR^8R^9$, $CONR^8R^9$, $NHCOR^{10}$, $NO_2$, Cl, Br, $CF_3$ or $SR^8$; and $R^9$ are each hydrogen, $(C_1-C_4)$-alkyl, phenyl or benzyl; $R^{10}$ is $(C_1-C_4)$alkyl, $CF_3$ or phenyl; and $R^{11}$ is hydrogen, $(C_1-C_3)$ alkyl, $C_6H_5CH_2$ or $CH_3CO$; $R^{16}$ and $R^{17}$ are each H, $(C_1-C_4)$alkyl, $(C_2-C_4)$-hydroxyalkyl, or taken together with the nitrogen atom to which they are attached $R^{16}$ and $R^{17}$ form a pyrrolidino, piperidino, morpholino, thiomorpholino or 4-methylpiperazino group; or a pharmaceutically acceptable acid addition salt of said compound where $R^2$ or $R^3$ contains a basic nitrogen atom, or a pharmaceutically acceptable cationic salt of said compound wherein $R^1$ is hydrogen or $R^2$ or $R^3$ contains a carboxyl group.

---

### 5,015,474
### COMPOSITION FOR IMPARTING MOISTURE TO A SUBSTRATE

**Francis W. Parnell, Ross, Calif., assignor to Parnell Pharmaceuticals, Inc., San Rafael, Calif.**

**Continuation-in-part of Ser. No. 275,124, Nov. 22, 1988, Pat. No. 4,938,963. This application Mar. 26, 1990, Ser. No. 499,952**

**Int. Cl.$^5$ A61K** *35/78*

**U.S. Cl. 424—195.1** **34 Claims**

1. A method of imparting moisture to a substrate selected from the group consisting of skin and mucous membranes of an individual in need thereof, comprising the steps of:

contacting the substrate of said individual with erodictyon fluid in an amount sufficient to achieve an acceptable degree of moisture on the contacted tissue; and

allowing the erodictyon fluid to remain in contact with and coat the substrate for sufficient time and in sufficient amount so as to cause the substrate of the individual to have moisture imparted thereto.

---

### 5,015,475
### METHOD AND MEANS FOR PREVENTING OR DELAYING UNDESIRED PHOSPHINE LEVELS

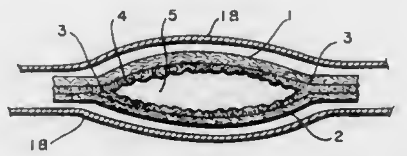
**Wolfgang Kapp, and Alfons Moog, both of Laudenbach, Fed. Rep. of Germany, assignors to Degesch GmbH, Laudenbach, Fed. Rep. of Germany**

**Filed May 12, 1989, Ser. No. 351,137**

**Claims priority, application United Kingdom, May 14, 1988, 8811476; May 14, 1988, 8811477**

**Int. Cl.$^5$ A61K** *9/14*

**U.S. Cl. 424—405** **27 Claims**



1. In a pest control product which comprises a composition which releases phosphine when contacted with atmospheric moisture which is substantially free from an ammonia-releasing component, the improvement wherein the product comprises an amount of a zeolite having pore widths from 0.3 to 1.5 nm and which is effective to delay the initial release of phosphine from the composition when the composition is first contacted with moisture during storage, transport or use.

---

### 5,015,476
### IMMUNIZATION IMPLANT AND METHOD

**Kent C. Cochrum, Corte Madera; Lynnor B. Stevenson, Los Altos Hills, and Scott R. King, San Francisco, all of Calif., assignors to Paravax, Inc., Palo Alto, Calif.**

**Filed Aug. 11, 1989, Ser. No. 392,795**

**Int. Cl.$^5$ A61K** *39/002, 39/02, 39/12;* **A61F** *2/00*

**U.S. Cl. 424—423** **32 Claims**

1. An implant capsule for immunizing an animal against parasite infection, comprising at least one antigen-producing parasite coated with a positively charged intermediate bonding material and encapsulated within one or more semipermeable polymeric envelope membranes, wherein said parasite is a mammalian parasite within the Phyla Protozoa, Platyhelminthes or Nemathelminthes.

---

### 5,015,477
### EDIBLE, BAKED COMPOSITIONS CONTAINING CHOLESTYRAMINE

**Thomas G. Wood, Morris Plaines, N.J., and Carol J. Xenides, Fargo, N. Dak., assignors to BASF K & F Corporation, Whippany, N.J.**

**Division of Ser. No. 206,197, Jun. 13, 1988, Pat. No. 4,931,280. This application Mar. 26, 1990, Ser. No. 499,160**

**The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.**

**Int. Cl.$^5$ A61K** *9/00*

**U.S. Cl. 424—439** **3 Claims**

1. An edible, baked composition in the form of a cookie suitable for medicinal use comprising:

a baked matrix comprised of water, an edible oil, mono, oligo or polysaccharides, flavoring, and cholestyramine which is present in an amount of about 5 to 20 percent by weight relative to the weight of said composition,

said composition being baked for a time period and at a temperature effective for providing a therapeutically effective dosage of undecomposed cholestyramine in said baked composition.

---

### 5,015,478
### PORPHYCENE ANTI-CANCER AGENTS AND TREATMENT METHODS

**Giulio Jori, Padova, Italy; Matthias Köcher, Overath; Emanuel Vogel, Cologne, both of Fed. Rep. of Germany, and Alexander D. Cross, Atherton, Calif., assignors to Cytopharm, Inc., Menlo Park, Calif.**

**Division of Ser. No. 232,411, Aug. 15, 1988, Pat. No. 4,913,907. This application Nov. 22, 1989, Ser. No. 432,701**

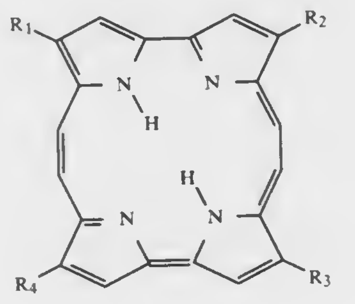
**Int. Cl.$^5$ A61K** *37/22*

**U.S. Cl. 424—450** **9 Claims**

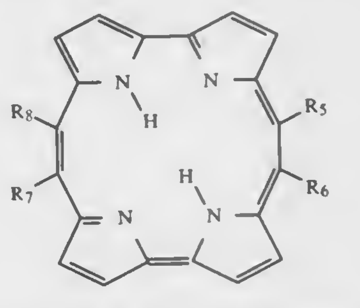
1. A method for treating cancer comprising

(a) administering a therapeutically effective amount of at least one porphycene compound of Formula I or Formula II to a patient; and

(b) exposing the body area of the patient having the cancer to a therapeutically sufficient amount of light having a wavelength of from 600 to 950 nm;


(I)

wherein $R_1$, $R_2$, $R_3$, and $R_4$ are hydrogen or a lower alkyl having from 1 to 6 carbons;


(II)

wherein $R_5$, $R_6$, $R_7$, and $R_8$ are hydrogen or a lower alkyl having from 1 to 6 carbons.

---

### 5,015,479
### SUSTAINED RELEASE CAPSULE OR TABLET FORMULATION COMPRISING A PHARMACEUTICALLY ACCEPTABLE DIHYDROPYRIDINE

**Seamus Mulligan, 4 Beech Lawn, Monksland, Ireland, and Randall T. Sparks, 2620 Pinebrook Dr., Gainesville, Ga.**

**Continuation of Ser. No. 9,510, Feb. 2, 1987, abandoned. This application Sep. 30, 1988, Ser. No. 253,357**

**Int. Cl.$^5$ A61K** *9/20, 37/20, 9/22*

**U.S. Cl. 424—457** **14 Claims**

1. A sustained release capsule or tablet formulation suitable for once daily administration comprising an adsorbate of a mixture of 1 part by weight of a pharmaceutically acceptable substantially amorphous dihydropyridine and from 0.1 to 10 parts by weight of a polyvinylpyrrolidone having an average molecular weight of at least 55,000 and having a viscosity which serves to sustain the release of active ingredients, the mixture being adsorbed on a cross-linked polyvinylpyrrolidone in a ratio of 1 part by weight of said mixture to 0.5 to 20 parts by weight of cross-linked polyvinylpyrrolidone, blended with a polymeric material which gels in the presence of water, wherein said polymeric material is selected from the group consisting of a pharmaceutically acceptable water-soluble polymer, a pharmaceutically acceptable water-insoluble polymer or mixtures of said polymers, the amount and ratio of said water-soluble polymer to said water-insoluble polymer being effective in combination with the viscosity of the polyvinylpyrrolidone to produce the desired sustained release effect.

---

### 5,015,480
### FILM COATING FORMULATIONS

**Ray F. Childers, Carmel; Peter L. Oren, Nobelsville, and Werner M. K. Seidler, Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Nov. 25, 1987, Ser. No. 125,087**

**Int. Cl.$^5$ A61K** *9/14*

**U.S. Cl. 424—486** **34 Claims**

1. An aqueous diffusion coating formulation for a pharmaceutical dosage form comprising an admixture of: (a) an aqueous dispersion of an insoluble polymer component of a copolymer of 2 parts of ethylacrylate and one part methylmethacrylate; and (b) as a hydrophilic component the polysaccharide pullulan; wherein (1) the insoluble polymer component is present in an amount of from 30 to 90 percent by weight of the total solids present in said coating formulation and the hydrophilic component is present in an amount of from 10 to 60 percent by weight of total solids present in said coating formulation and (2) the total amount of solids by weight representing the insoluble polymer component and the hydrophilic component of the coating formulation is from 65 to 100 percent of said coating formulation.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,481
### STABILIZED PHARMACEUTICAL ADMIXTURE COMPOSITION

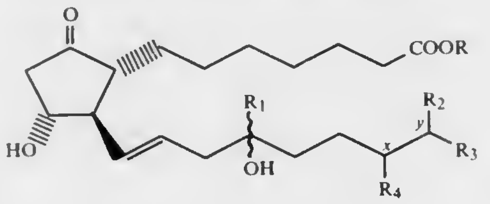
**Michel Franz; Michel Jans, both of Brussels, Belgium; Leo K. Mathur, Vernon Hills; Kamlesh B. Shah, Arlington Heights, and James E. Truelove, Libertyville, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

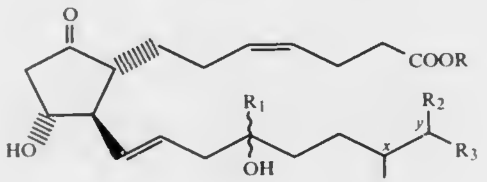
**Filed May 3, 1990, Ser. No. 518,354**
**Int. Cl.$^5$ A61K** *9/00, 45/08*

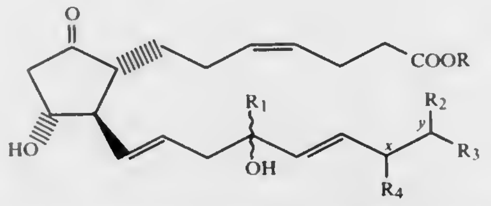
**U.S. Cl. 424—494** **8 Claims**

1. A stabilized and pharmaceutical composition comprising, in admixture, an NSAID selected from diclofenac, piroxicam and their salts;

a prostaglandin having the following structure;







wherein R represents hydrogen or lower alkyl having 1 to 6 carbon atoms, $R_1$ represents hydrogen, vinyl or lower alkyl having 1 to 4 carbon atoms and the wavy line represents R or S stereochemistry; $R_2$, $R_3$, and $R_4$ are hydrogen or lower alkyl having 1 to 4 carbon atoms or $R_2$ and $R_3$ together with carbon Y form a cycloalkenyl having 4 to 6 carbon atoms or $R_3$ and $R_4$ together with carbons X and Y form a cycloalkenyl having 4 to 6 carbon atoms and wherein the X-Y bond can be saturated or unsaturated; and

hydroxypropyl methylcellulose in an amount from about 10 mg to about 100 mg.

### 5,015,482

**Patent Not Issued For This Number**

### 5,015,483
### LIPOSOME COMPOSITION FOR THE STABILIZATION OF OXIDIZABLE SUBSTANCES

**Lynn C. Haynes; Harry Levine, both of Morris Plaines, and John W. Finley, Whippany, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.**

**Filed Feb. 9, 1989, Ser. No. 308,035**
**Int. Cl.$^5$ A23D** *7/00*

**U.S. Cl. 426—73** **24 Claims**

1. A shelf-stable, edible liposome composition comprising liposomes having an oxidizable lipophilic material dispersed in the lipid layer of said liposomes providing said lipophilic material with an improved resistance to autoxidation, and wherein said liposomes comprise at least one entrapped aqueous material and at least one polar lipid bilayer, said lipid bilayer including an effective amount of a liposome-forming polar lipid having dispersed therein at least one edible oxidizable lipophilic material.

### 5,015,484
### ROOT VEGETABLE COATED FOODSTUFF

**Peter Palmlin, and Marianne Rudberg, both of Helsingborg, Sweden, assignors to Nestec S.A., Vevey, Switzerland**

**Division of Ser. No. 321,364, Mar. 9, 1989, Pat. No. 4,919,953. This application Mar. 13, 1990, Ser. No. 492,941**

**Claims priority, application European Pat. Off., Mar. 19, 1988, 88104427.5**

**Int. Cl.$^5$ A23L** *1/214, 1/217, 1/314, 1/325*

**U.S. Cl. 426—92** **11 Claims**

1. A food product comprising a foodstuff coated with an edible heat-settable adhesive fluid which is coated with frozen pre-fried particles of fresh root vegetables which have a moisture content of from 20% to 50% by weight based on the total weight of the frozen pre-fried particles.

### 5,015,485
### DOG BISCUITS HAVING A COATING CONTAINING AN INORGANIC PYROPHOSPHATE

**Felice Scaglione, Hasbrouck Heights, and Lorna C. Staples, Teaneck, both of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.**

**Filed May 30, 1989, Ser. No. 358,173**
**Int. Cl.$^5$ A61K** *7/16, 7/20;* **A23L** *1/30*

**U.S. Cl. 426—94** **5 Claims**

1. Baked dog biscuit having an edible coating containing at least one alkali metal inorganic pyrophosphate, the coating containing about 0.1 to about 10 weight percent of said at least one alkali metal inorganic pyrophosphate, based upon the total weight of the baked dog biscuit, said at least one alkali metal inorganic pyrophosphate being water soluble, the baked dog biscuit being slightly acidic to neutral, the baked dog biscuit having a water activity of 0.70 or less, and the baked dog biscuit containing 5 to 13 weight percent or less, based upon the total weight of the baked dog biscuit, of water.

### 5,015,486
### DRY MIX FOR MICROWAVE MUFFINS WITH PSYLLIUM AND METHOD OF PREPARATION

**Dean E. Franssell, Minneapolis, and Philip E. Palkert, Eden Prairie, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.**

**Filed Sep. 11, 1989, Ser. No. 405,783**
**Int. Cl.$^5$ A21D** *6/00, 10/00*

**U.S. Cl. 426—243** **21 Claims**

1. A culinary dry mix useful in the preparation of muffin batter which upon microwave baking yields a baked good of improved volume and texture yet comprising high levels of soluble fiber, comprising:

A. about 20% to 50% by weight of the dry mix of flour;
B. about 25% to 45% by weight (dry basis) of the dry mix of sugars;
C. about 5% to 20% by weight of the dry mix of shortening, said shortening comprising
  1) about 90% to 99% fatty triglycerides, and
  2) about 1% to 10% of an emulsifier;
D. about 2% to 8% by weight of the dry mix of psyllium;
E. about 0.25% to 3.5% by weight of the dry mix of a member selected from the group consisting of guar gum, locust bean gum and mixtures thereof;
F. about 0.1% to 4% by weight of the dry mix of a leavening system.

### 5,015,487
### USE OF LANTHIONINES FOR CONTROL OF POST-PROCESSING CONTAMINATION IN PROCESSED MEAT

**Mark W. Collison, Granger; Terry F. Farver, Elkhart; Christine A. McDonald, Elkhart; Paula J. Herald, Elkhart, and Daniel J. Monticello, Elkhart, all of Ind., assignors to Haarmann & Reimer Corp., Springfield, N.J.**

**Filed Apr. 23, 1990, Ser. No. 513,252**
**Int. Cl.$^5$ A23B** *4/10, 4/20*

**U.S. Cl. 426—332** **10 Claims**

1. A method of controlling the contamination of processed meat products by undesirable microorganisms which method involves treating the surface of said meat product with a lanthionine bacteriocin after it has been heat treated.

### 5,015,488
### COOKIE PRODUCTION WITH EXTRUSION HEAT TREATMENT AND POST EXTRUSION MIXING AND BAKING

**Bernhard Van Lengerich, Ringwood, and Cathryn C. Warren, Ridgewood, both of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.**

**Filed Jun. 7, 1989, Ser. No. 362,472**
**Int. Cl.$^5$ A21D** *8/00*

**U.S. Cl. 426—549** **34 Claims**

1. A method for the production of cookies comprising:
(a) heating ingredients comprising flour, and shortening or fat in a cooker extruder to a temperature of at least about 150° F. to form a heat treated mass,
(b) reducing the temperature of said heat treated mass,
(c) admixing water with the heat treated mass to obtain a substantially homogeneous cookie dough-like mixture having a temperature of from about 100° F. to about 212° F.,
(d) forming the dough-like mixture into pieces, and
(e) leavening the pieces,

the water being admixed with said heat-treated mass at a pressure and at a heat treated mass temperature which are sufficiently low so as to avoid substantial separation of oil and to avoid extruder surging.

### 5,015,489
### PRODUCTION OF COOKIES WITH EXTRUSION AND POST EXTRUSION BAKING

**Bernhard Van Lengerich, Ringwood, and Cathryn C. Warren, Ridgewood, both of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.**

**Filed Jun. 7, 1989, Ser. No. 362,747**

**The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.**

**Int. Cl.$^5$ A21D** *2/00*

**U.S. Cl. 426—549** **82 Claims**

1. A method for producing cookies comprising:
(a) forming a substantially homogeneous dough-like mixture in a cooker extruder by heating ingredients comprising at least one flour and shortening or fat to a temperature of at least about 150° F. under conditions to prevent substantial starch gelatinization, the amount of shortening or fat being at least about 12% by weight, based upon the weight of the dough-like mixture,
(b) extruding the dough-like mixture,
(c) forming the extrudate into pieces, and
(d) leavening the pieces by subjecting them to post extrusion heating to obtain a crumb-like structure.

### 5,015,490
### PRODUCTION OF EXTRUDED BAKED PRODUCTS WITHOUT OIL SEPARATION

**Bernhard Van Lengerich, Ringwood, and Cathryn C. Warren, Ridgewood, both of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.**

**Filed Jun. 7, 1989, Ser. No. 362,690**
**Int. Cl.$^5$ A21D** *8/00*

**U.S. Cl. 426—549** **32 Claims**

1. A method for producing leavened products using a cooker extruder comprising:
(a) forming a heat treated mass in a cooker extruder by heating ingredients comprising at least one flour and shortening or fat to a temperature of at least about 150° F. to promote browning and flavor development,
(b) admixing water with the heat treated mass in said cooker extruder to form a dough-like mixture, the amount of shortening or fat being at least about 12% by weight, based upon the weight of the dough-like mixture, and
(c) leavening the dough-like mixture by subjecting it to post extrusion heating.

### 5,015,491
### PRODUCTION OF ISOMERISED HOP EXTRACT

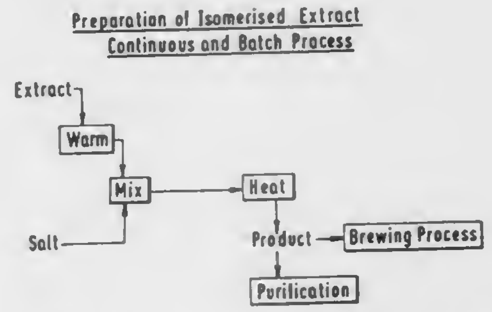
**Keith T. Westwood, Crawyley Down, and Allan Crescenzi, High Wycombe, both of England, assignors to The Brewing Research Foundation, Redhill, England**

**Filed Sep. 12, 1989, Ser. No. 405,935**

**Claims priority, application United Kingdom, Sep. 13, 1988, 8821420**

**Int. Cl.$^5$ C12C** *3/00*

**U.S. Cl. 426—600** **7 Claims**


Preparation of Isomerised Extract
Continuous and Batch Process
Extract
Warm
Mix
Heat
Salt
Product
Brewing Process
Purification

1. A method for the production of an isomerised hop preparation which comprises: in a solvent-free environment, mixing together a hop extract with a solid alkali or alkaline earth metal compound which is an alkali or alkaline earth metal salt, oxide or hydroxide and maintaining the resultant mixture at a temperature of at least 80° C. for a time sufficient to effect conversion of the α-acid in said hop extract into the iso-α-acid.

### 5,015,492
### METHOD AND APPARATUS FOR PULSED ENERGY INDUCED VAPOR DEPOSITION OF THIN FILMS

**Thirumalai Venkatesan, Bridgewater, and Xin D. Wu, Highland Park, both of N.J., assignors to Rutgers University, Piscataway and Bell Communications research, Inc., Livingston, both of, N.J.**

**Filed Apr. 3, 1989, Ser. No. 331,795**
**Int. Cl.$^5$ B05D** *3/06;* **C23C** *14/00*

**U.S. Cl. 427—8** **22 Claims**

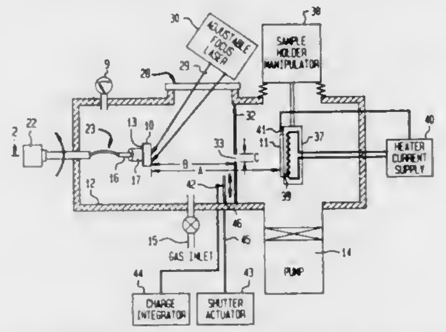
7. A vapor deposition method for coating a substrate with a complex material having a predetermined stoichiometric set of constituents, the method comprising the steps of
composing a pellet of said complex material,
irradiating at least a portion of said pellet with a pulsed beam of at least sufficient energy to vaporize said constituents congruently in a three-dimensional plume adjacent to said

VOL
1126
ISS
2
MY
14
1991
UMI

pellet, said plume including a central lobe in which the amount of evaporant material is at least in part a function of said density and in which the evaporant stoichiometric characteristic is approximately the same as in said pellet, and

intercepting on said substrate a portion of said evaporant plume in said central lobe, said intercepting step comprising the substep of blocking portions of said plume outside said lobe from deposition on said substrate.

13. Vapor deposition apparatus for directing an energy beam onto at least a portion of a body of a complex material to cause congruent evaporation of at least a portion of the material and



depositing the resulting evaporant as a film on a substrate, said material having a predetermined homogeneous stoichiometric set of constituents, said apparatus comprising:

means, including said beam, for irradiating at least a portion of said material with at least sufficient energy density congruently to vaporize said constituents in a three-dimensional plume adjacent to said pellet, said plume including a central lobe in which the amount of evaporant is at least in part a function of said density and in which the evaporant stoichiometric characteristic is approximately the same as in said pellet; and

means for intercepting substantially only a portion of said evaporant plume from said lobe on a substrate.

---

### 5,015,493

### PROCESS AND APPARATUS FOR COATING CONDUCTING PIECES USING A PULSED GLOW DISCHARGE

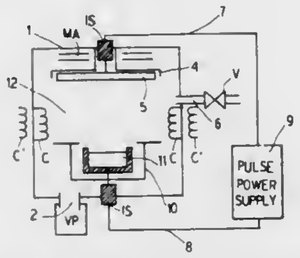
**Reinar Gruen, Wohlfahrtstr, 166, 4630 Bochuml, Fed. Rep. of Germany**

**Filed Jan. 11, 1988, Ser. No. 142,542**

**Claims priority, application Fed. Rep. of Germany, Jan. 11, 1987, 3700633**

**Int. Cl.$^5$ B05D** *5/12;* **C23C** *14/22, 14/28, 14/30*

U.S. Cl. 427—38 **9 Claims**



1. A PVD coating process for covering conductive pieces, comprising:

using an ionized vapor with reactive gases in a vacuum vessel;

establishing a pressure of less than 100 Pascal in said vacuum vessel;

connecting a conductive piece to a cathode connection of a pulsed DC energy supply;

establishing a glow discharge around the conductive pieces by using the pulsed DC energy supply connected directly between a source and the conductive pieces; and

applying DC pulses in a square wave form from said pulsed DC energy supply at a repetition frequency in a range of 0.1–100 kiloHertz and at a pulse to non-pulse ration in a range of 1:1–1:1000, each pulse of the pulsed DC energy supply having an amplitude of at least 100 volts and a duration of between 10 and 10,000 microseconds.

---

### 5,015,494

### MICROWAVE ENHANCED CVD METHOD FOR DEPOSITING DIAMOND

**Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan**

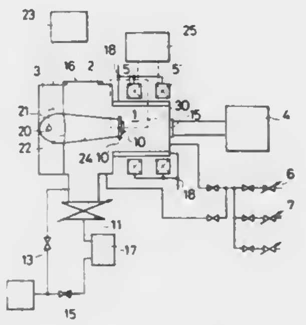
**Division of Ser. No. 159,610, Feb. 24, 1988, Pat. No. 4,869,923. This application Mar. 28, 1989, Ser. No. 329,877**

**Claims priority, application Japan, Feb. 24, 1987, 62-41748; Jul. 13, 1988, 62-175560**

**The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.**

**Int. Cl.$^5$ B05D** *3/06*

U.S. Cl. 427—39 **9 Claims**



1. A cyclotron resonance chemical vapor deposition method of forming a diamond or diamond-like carbon material on a substrate comprising:

inputting at least one reactive gas comprising carbon into a reaction chamber;

emitting a microwave into said reaction chamber at a predetermined frequency and in a predetermined direction;

establishing a magnetic field in said reaction chamber where the direction of the magnetic field is substantially parallel to the direction of the microwave and the strength of the magnetic field is such as to cause cyclotron resonance at a predetermined position in the reaction chamber;

exhausting the reaction chamber to establish in the chamber a pressure range of 0.1 to 300 Torr; and

holding the substrate approximately at said predetermined, cyclotron resonance position in the reaction chamber; and

depositing said diamond-like carbon material on a surface of the substrate.

---

### 5,015,495

### METHOD FOR WET PAINTING OR POWDER COATING

**Olli Nissinen, Saarijärvi, Finland, assignor to Valmet Oy, Finland**

**Continuation of Ser. No. 378,017, May 13, 1982. This application Jun. 11, 1984, Ser. No. 619,359**

**Claims priority, application Finland, May 22, 1981, 811583**

**Int. Cl.$^5$ B05D** *3/14*

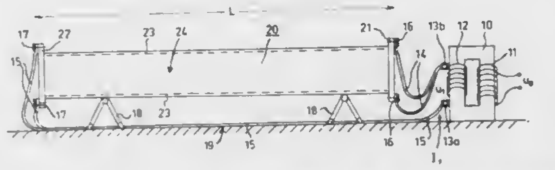
U.S. Cl. 427—49 **1 Claim**

1. A method for accelerating the drying of a wet paint coating applied to an object for accelerating the polymerization of a powder coating applied to the object, the object being constituted by a structural beam formed of electrically conductive material, comprising the steps of:

applying a wet paint or polymerizable powder coating to the object;

electrically coupling the coated object at opposite ends thereof into an electric circuit so that the object constitutes an electrical resistance in the circuit; and

passing an electric current through the circuit so that the coated object is heated by virtue of the electrical resistance presented thereby to an elevated temperature;



wherein the coated object coupled into the electric circuit has portions which present higher and lower electrical resistances and wherein different values of voltage are applied to the respective portions of the coated object so that the density of the current passing through the respective portions is substantially equal.

---

### 5,015,496

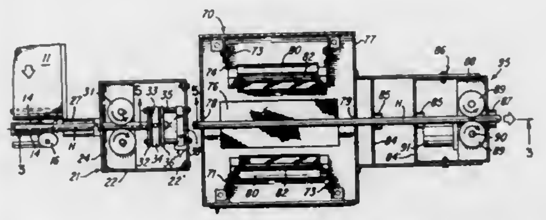
### PROCESS FOR APPLYING A PROTECTIVE COATING TO HANDLES

**Gary P. Maul, Worthington, Ohio, assignor to Vining Industries, Inc., Springfield, Ohio**

**Filed Jan. 3, 1989, Ser. No. 293,829**

**Int. Cl.$^5$ B05D** *3/06*

U.S. Cl. 427—54.1 **10 Claims**



1. A process for protectively coating longitudinally extending rod and bar-like objects, particularly objects such as wooden handles for brooms, brushes and mops, comprising the steps of depositing such objects, at a receiving station, on powered belt means, in a substantially immediately following, end spaced, series relation, applying power to said belt means and maintaining said relation of said objects thereto while moving them to, into, through and beyond a coating station, reinforcing the support and said movement of said objects in, through and beyond said coating station by applying drive means thereto immediately of their entry to said coating station, effecting the adherence of coating material to said objects during the passage thereof through said coating station, smoothly spreading said coating material on said objects as they issue from and are moved beyond said coating station, maintaining power on said drive means and producing a continuing advance of said objects to and through a drying chamber and into a following discharge station, within said discharge station applying a further drive means to said objects in a manner to accelerate the advancing movement thereof and produce thereby an increase in the end spaced relation of the object which is so accelerated from the following of said series related objects at that point in time at which the leading end of said following object is exiting from said coating chamber, thereby to insure the aforesaid smooth spreading of said coating material on said objects as they issue from and are moved beyond said coating station.

---

### 5,015,497

### CATHODE FOR ELECTRON TUBE AND MANUFACTURING METHOD THEREOF

**Kinjiro Sano; Toyokazu Kamata, both of Nagaokakyo; Keiji Fukuyama, Kamakura; Masato Saito, Kamakura, and Kelji Watanabe, Kamakura, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 864,566, May 16, 1986, Pat. No. 4,864,187. This application Jul. 10, 1989, Ser. No. 377,516**

**Claims priority, application Japan, May 25, 1985, 60-112601; May 25, 1985, 60-112602**

**Int. Cl.$^5$ B05D** *5/12*

U.S. Cl. 427—77 **6 Claims**

1. A method for manufacturing a cathode for an electron tube, comprising steps of:

subjecting a scandium oxide powder to a heat treatment at a temperature of 800°–1100° C. for more than 30 minutes in an oxiding atmosphere,

preparing a suspension which contains said heat-treated scandium oxide powder, an alkaline earth metal carbonate powder, a binder and an organic solvent

applying said suspension to a base comprising nickel as a major element and a reducing agent in order to form an electron-emissive layer on said base and then heating said base.

---

### 5,015,498

### METHOD FOR PREPARING A MAGNETIC RECORDING MEDIUM

**Masashi Aonuma; Akira Kasuga, and Haruo Masuda, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 235,715, Aug. 22, 1988, abandoned, which is a continuation of Ser. No. 77,052, Jul. 20, 1987, abandoned, which is a continuation of Ser. No. 690,070, Jan. 9, 1985, abandoned. This application Dec. 27, 1989, Ser. No. 462,321**

**Claims priority, application Japan, Jan. 11, 1984, 59-3160**

**Int. Cl.$^5$ B05D** *5/12*

U.S. Cl. 427—132 **15 Claims**

1. A method for preparing a magnetic recording medium comprising a non-magnetic support having coated thereon a magnetic layer of a magnetic coating composition containing ferromagnetic metal particles and a binder, comprising at least (1) a step of mixing and dispersing ferromagnetic metal particles, a binder, and a solvent in the absence of lubricating agents to prepare magnetic coating composition, (2) a step of adding and mixing a lubricating agent in an amount of from 0.2 to 20 parts by weight per 100 parts by weight of said ferromagnetic metal particles therewith and (3) a step of coating the resulting magnetic coating composition on a non-magnetic support, wherein said added lubricating agent is selected from the group consisting of a fatty acid and a salt of a fatty acid selected from the group consisting of a metal soap of an alkali metal or alkaline earth metal and wherein said ferromagnetic metal particles have a saturation magnetization of from 100 emu/g to 180 emu/g and a specific surface area of from 20 to 150 $m^2/g$.

---

### 5,015,499

### COMPOSITE GEM STONE AND PRODUCTION METHOD

**Santo Carbone, Apt. 302, 916 - 16 Ave. N.W., Calgary, Alberta, Canada**

**Filed Sep. 25, 1990, Ser. No. 587,743**

**Int. Cl.$^5$ B05D** *1/36*

U.S. Cl. 427—203 **4 Claims**

1. A process for making a composite gemstone utilizing gemstone material fragmented into minute thin flakes comprising the steps of:

(a) providing a prepared optically transparent support means

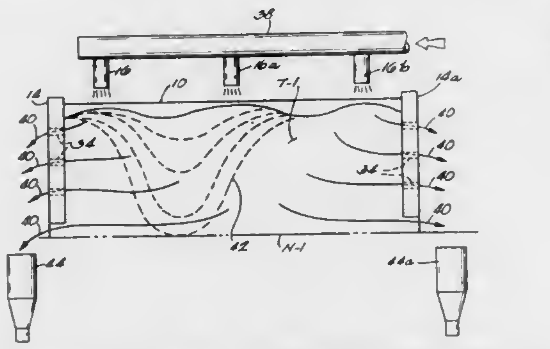
VOL
1126
ISS
2
MY
14
1991
UMI

having a front polished surface and a rear slightly roughed surfaces;
(b) applying to said rear surface a coating of clear, slow curing liquid epoxy resin;
(c) sprinkling said gemstone flakes onto said coating and allowing said flakes to settle to a point adjacent said rear surface with said coating;
(d) semi-curing said epoxy coating;
(e) applying to said semi-cured coating a layer of dark, translucent material and;
(f) heating said coating to harden same.

---

### 5,015,500
### ROLL COATER WITH PERFORATED DECKLES

**Gerald R. Garde, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.**
**Filed Nov. 16, 1989, Ser. No. 437,416**
**Int. Cl.$^5$ B05D** *1/28*
**U.S. Cl. 427—211** **8 Claims**



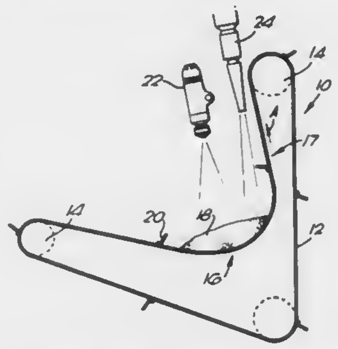
7. In a method for coating a traveling paper web with a roll coater, the coater having a plurality of rolls with at least two of the rolls in nipping engagement, and the web is directed to travel between two nipped rolls, at least one of the nipped rolls having a layer of coating on its surface, the steps comprising:
establishing a pool of liquid coating material in a trough formed between two of the nipped rolls;
positioning a pair of deckles in the trough between two nipped rolls, one deckle near either end of the trough, to maintain the pool in the trough between the deckles;
permitting the coating material to flow through one or both of the deckles in a controlled manner from one or more depths of the pool to thereby establish and maintain a lateral flow within the pool from one or both ends of the trough to stabilize the pool and control its turbulence;
whereby the coating material applied to the surface of a roll contacting the web to be coated is of a uniform quality.

---

### 5,015,501
### METHOD AND APPARATUS FOR COATING SMALL PARTS

**Henry C. Johnson, 18 Montford Close, Horsforth Leeds LS18 5SX, England**
**Filed Aug. 17, 1989, Ser. No. 395,277**
**Int. Cl.$^5$ B05D** *7/00*
**U.S. Cl. 427—212** **5 Claims**

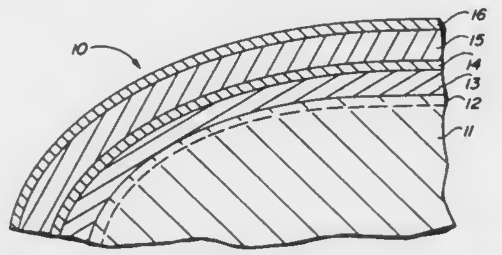
1. A method of coating small parts which comprises the sequential steps of placing the parts on a stationary surface capable of being moved, spraying the parts with coating composition while stationary on said surface, heating the parts to set the coating composition, moving the surface an amount sufficient to invert the parts, stopping the movement of the surface and repeating the sequence a multiplicity of times.



---

### 5,015,502
### CERAMIC THERMAL BARRIER COATING WITH ALUMINA INTERLAYER

**Thomas E. Strangman, Phoenix, and Patricia A. Solfest, Chandler, both of Ariz., assignors to Allied-Signal Inc., Phoenix, Ariz.**
**Division of Ser. No. 266,972, Nov. 3, 1988, Pat. No. 4,880,614. This application Nov. 8, 1989, Ser. No. 433,886**
**Int. Cl.$^5$ C23C** *16/00*
**U.S. Cl. 427—248.1** **6 Claims**



1. A method for producing a turbine component having an adherent ceramic thermal barrier coating on at least a portion of its surface, comprising the steps of:
(a) providing a superalloy substrate with a clean surface,
(b) applying a metallic bond coating onto at least a portion of said substrate surface,
(c) depositing a high purity alpha alumina layer substantially free of other metallic oxides and porosity on said bond coating by a chemical vapor deposition process; and
(d) applying a ceramic thermal barrier coating onto the alumina layer.

---

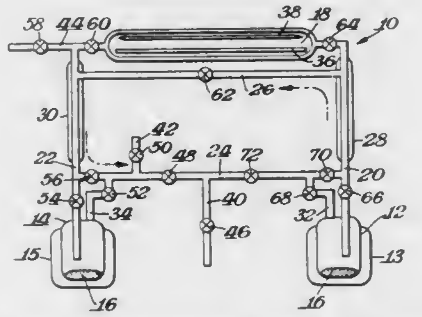
### 5,015,503
### APPARATUS FOR PRODUCING COMPOUND SEMICONDUCTOR THIN FILMS

**Robert D. Varrin, Jr., and Robert W. Birkmire, both of Newark, Del., assignors to The University of Delaware, Newark, Del.**
**Filed Feb. 7, 1990, Ser. No. 476,179**
**Int. Cl.$^5$ C23C** *16/00*
**U.S. Cl. 427—255.2** **32 Claims**

1. An apparatus for producing a compound semiconductor thin film material having a plurality of constituent elements wherein a substrate having thereon at least one constituent element of said semiconductor is heated in a reactive atmosphere which contains a gaseous species of a further constituent of said semiconductor to form the semiconductor thin film, said apparatus compromising:
a. means for supplying said gaseous species;
b. a vertically oriented hot leg riser selectively communicating with said supply means;

c. a reaction chamber located above said supply means and said hot leg riser;
d. heating means for said reaction chamber;
e. a vertically oriented cold leg downcomer selectively communicating with said reaction chamber;
f. a horizontally oriented cross-connect located above said supply means and below said reaction chamber and selectively communicating with said hot leg riser and cold leg downcomer; and
g. independently controlled heating and cooling means for said supply means, cross-connect and by-pass line, and means for controlling the flow communication through said apparatus;
wherein said supply means, riser, reaction chamber, downcomer and cross-connect function as a recirculating closed loop.

15. A process for producing a compound semiconductor thin film material having a plurality of constituent elements in a closed loop apparatus having as functional components means for supplying source material of at least one constituent element, a vertically oriented hot leg riser selectively communicating with said supply means, a reaction chamber located above said supply means and said hot leg riser, heating means for said reaction chamber, a vertically oriented cold leg downcomer selectively communicating with said reaction chamber, a horizontally oriented cross-connect located above said supply means and below said reaction chamber and selectively communicating with said hot leg riser and cold leg downcomer, and independently controlled heating and cooling means for said supply means, cross-connect and by-pass line, and means for controlling the flow communication through said apparatus, said process comprising the steps of:



a. preheating the apparatus;
b. operating the apparatus reactor in a closed loop fashion by establishing an initial thermosiphon flow of the source material through the hot leg riser and across the by-pass line and down the cold leg downcomer and across the cross-connect line;
c. diverting the flow through the reaction chamber after thermosiphon flow is established through the by-pass line; and
d. diverting the supply means to entrain the source material through the hot leg riser and into the reaction chamber for reaction with materials on the substrate.

---

### 5,015,504
### COATING METHOD FOR FORMING SMOOTH-ENDED BRISTLES ON A BRUSH

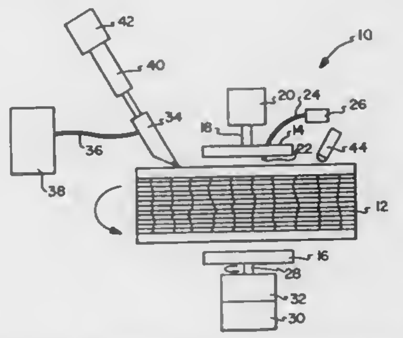
**John A. G. Gent, Liphook, and Jacob M. Blass, London, both of England, assignors to Cogent Limited, London, England**
**Filed Mar. 5, 1990, Ser. No. 487,829**
**Claims priority, application United Kingdom, Mar. 10, 1989, 8905478**
**Int. Cl.$^5$ B05D** *5/00, 1/18*
**U.S. Cl. 427—284** **10 Claims**

1. A process for treating bristles of a brush having a base and bristles, the bristles having two ends, one of said ends being anchored in said base, the other of said ends being a free end, comprising the steps of:
(i) contacting the free ends of the bristles with a composition of a polysiloxane prepolymer in solution in a solvent,
(ii) removing the bristles from the prepolymer composition to deposit prepolymer composition on the end of each bristle, and
(iii) curing each deposit of polysiloxane prepolymer by evaporation of the solvent, so as to form a body of cured polysiloxane polymer encapsulating the free end of each bristle,
wherein the prepolymer composition has a solids content such that after step (iii) the free end of each bristle is substantially individually encapsulated by a smooth, rounded cap of cured polysiloxane polymer.

---

### 5,015,505
### METHOD AND APPARATUS FOR STRIPING A TIRE SIDEWALL

**James F. Cetnar, Akron, Ohio, assignor to Bridgestone/Firestone, Inc., Akron, Ohio**
**Filed Sep. 25, 1989, Ser. No. 411,980**
**Int. Cl.$^5$ B05D** *5/00, 1/26;* **B05C** *3/20, 11/10*
**U.S. Cl. 427—286** **13 Claims**



1. Apparatus for applying a decorative strip to the sidewall of a tire, comprising:
first means for engaging the tire and sealing an inner cavity thereof;
second means in communication with the tire for inflating the tire by pressurizing said cavity to an inflation pressure at which the sidewall portion for receiving the decorative strip is flat and horizontal;
third means for rotating the tire about a central axis of the tire;
paint striping means in juxtaposition to the tire and maintaining a fixed portion relative to the rotating tire for depositing paint having a viscosity of 40-370 centipoise onto said tire sidewall portion as it rotates past said paint striping means; and
a source of paint in communication with said paint striping means and a means for pressurizing said source of paint to a pressure head of less than 7 psi.

9. A process for applying a decorative strip to the sidewall of a tire, comprising:
securing a tire to seal an inner cavity thereof, said tire being secured at opposite beads, said beads being maintained in fixed spaced-apart relation to maintain the sidewall flat in the area thereof to receive the decorative strip;
inflating said tire to a predetermined pressure at which said sidewall is flat in said area thereof to receive the decorative strip;
rotating said tire about a tire axis;
dispensing paint upon a sidewall of said tire during said rotation from a fixed position relative to said tire; and
wherein said step of dispensing paint comprises movement of a paint dispensing apparatus into contacting engagement with said area of said sidewall of said tire prior to dispensing paint, and removing said paint dispensing apparatus following said dispensing of paint, said apparatus contacting said area at an angle of 70°–85°.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,506

### SURFACE PREPARATION FOR ADHESIVE BONDING

**William M. Purcell, Springfield, Ohio, assignor to United States of America as Represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Sep. 7, 1990, Ser. No. 578,387**

**Int. Cl.$^5$ C23C** *22/00*

**U.S. Cl. 427—333** **8 Claims**

1. A method for preparing an aluminum surface for adhesive bonding which consists essentially of the sequential steps of:
   - (a) preparing an aqueous solution of an epoxy-functional silane;
   - (b) degreasing a selected area of the surface;
   - (c) wet abrading the selected area using the aqueous epoxy silane solution;
   - (d) removing any residue from the selected area;
   - (e) allowing the surface to air dry;
   - (f) wiping an alcoholic solution of an amino-functional silane onto the selected area; and
   - (g) allowing the surface to air dry.

---

### 5,015,507

### METHOD OF CONVERTING RUSTED SURFACE TO A DURABLE ONE

**Paul J. DesLauriers, Conroe, and William J. Heilman, Houston, both of Tex., assignors to Pennzoil Products Company, Houston, Tex.**

**Division of Ser. No. 884,175, Jul. 9, 1986, abandoned. This application Jan. 31, 1989, Ser. No. 304,439**

**Int. Cl.$^5$ B32B** *15/00*

**U.S. Cl. 427—385.5** **15 Claims**

1. A method for converting a rusted surface into a durable surface suitable for the application of further coatings, comprising

applying to said rusted surface a composition comprising
   - (a) a reducing agent which is compatible with the other reactants and will function to reduce trivalent iron to divalent iron;
   - (b) 20–50 wt. % of an organic monomer or 70–80 wt. % of an organic oligomer which is capable of polymerization in the presence of the reducing agent and ferric ions; and
   - (c) a stable free radical initiator which will function to polymerize the organic monomer wherein when said rust conversion composition is applied to a rusted surface in situ polymerization occurs which results in a durable coating.

---

### 5,015,508

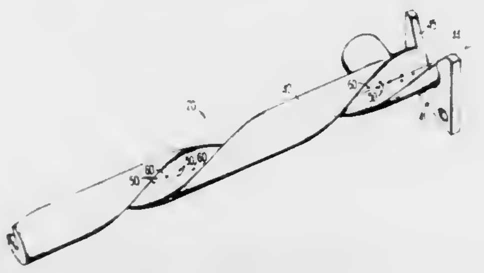
### METHODS OF AND A DEVICE FOR CAUSING A FLUID TO BE MOVED INTO ENGAGEMENT WITH A MOVING ELONGATED MATERIAL

**Jerry L. Glenn, Omaha, Nebr., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 25, 1989, Ser. No. 398,810**

**Int. Cl.$^5$ B05D** *1/02*

**U.S. Cl. 427—424** **30 Claims**



18. A method of causing a fluid to be moved into engagement with elongated material, said method comprising the steps of:
   - causing a plurality of orifices to be disposed in successive planes along a portion of an axis with each orifice being spaced from the axis, with each orifice in each successive plane being displaced rotationally from an orifice in a preceding plane and with each orifice opening to a surface which extends helically about the axis;
   - causing relative movement between said orifices and an elongated material along the axis; and
   - causing a supply of a fluid to be supplied to the orifices to cause the orifices to apply fluid to an outer surface of the elongated material.

---

### 5,015,509

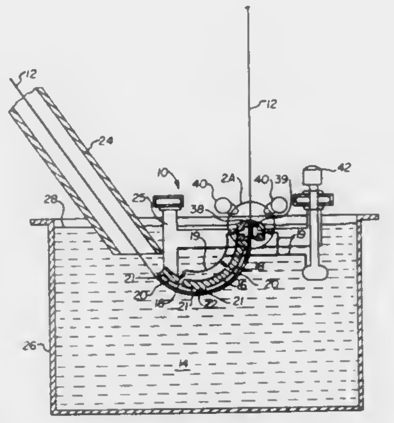
### HYDROSTATIC BEARING SUPPORT OF STRIP

**Giorgio A. Rey, Wexford, Pa., assignor to Italimpianti of America, Inc., Coraopolis, Pa.**

**Filed Mar. 27, 1990, Ser. No. 499,796**

**Int. Cl.$^5$ B05D** *1/18*

**U.S. Cl. 427—431** **13 Claims**



2. A method of supporting and treating a strip comprising:
   - providing at least one supporting chute surface, said chute surface having at least one hydrostatic chamber formed therein, said chamber defined by bounding outwardly projecting ridges formed on said chute surface;
   - providing a source of pressurized liquid;
   - supplying said pressurized liquid to said hydrostatic chamber;
   - conveying the strip across the chute surface whereby the pressurized liquid is flowably confined within the hydrostatic chamber to maintain the strip in a spaced relationship from the chute surface;
   - treating the strip with the pressurized liquid; and
   - recovering and recycling excess liquid flowing from said hydrostatic chamber.

5. The method of claim 2 wherein the liquid for supporting and treating the strip is a molten metal.

---

### 5,015,510

### BRACKET FOR MOUNTING FOLDABLE BRANCHES TO AN ARTIFICIAL TREE

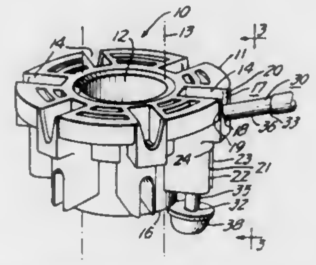
**Sherman Smith, Newburgh, N.Y., assignor to Hudson Valley Tree, Inc., Newburgh, N.Y.**

**Continuation of Ser. No. 378,371, Jul. 11, 1989, abandoned. This application Sep. 10, 1990, Ser. No. 581,170**

**Int. Cl.$^5$ A47G** *33/06*

**U.S. Cl. 428—18** **16 Claims**

1. A bracket for mounting foldable artificial tree branches to an artificial tree trunk comprising:
   - (a) at least one branch member having an elbow for pivotal engagement with said bracket upon movement of said member between a stowed and an operative position;
   - (b) means for guiding said branch member as said member pivots between the stowed and operative positions, said guiding means enabling said elbow to pivot upon movement of said member through said means;
   - (c) means for suspending of said branch member radially from said bracket in the operative position;



   - (d) means for restricting movement of said member about said bracket when in the stowed and operative positions; and
   - (e) means for limiting movement of said member through said guiding means when in the stowed and operative positions.

---

### 5,015,511

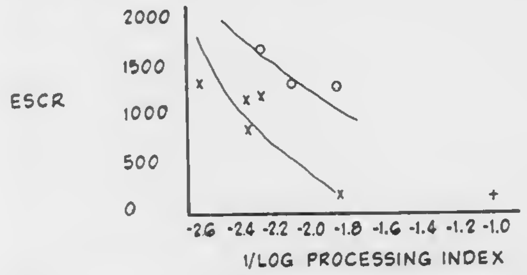
### LINEAR LOW DENSITY ETHYLENE INTERPOLYMERS FOR INJECTION MOLDING

**Duane S. Treybig, Lake Jackson; Wendy D. Harris, Angleton, and Christopher J. Thomas, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 12, 1988, Ser. No. 193,433**

**Int. Cl.$^5$ B29D** *22/00*

**U.S. Cl. 428—34.1** **21 Claims**



1. In a process wherein LLDPE articles having wall thicknesses in the range of about 0.15 to about 1.5 mm are made by injection-molding of molten LLDPE, the improvement wherein the LLDPE is selected from those which have
   - a sufficient amount of at least one copolymerized $C_5$–$C_{12}$ alpha-olefin to produce a density in the range of 0.91 to 0.945 gm/cc,
   - a melt flow rate in the range of about 60 to 200 gms./10 minutes,
   - an Mw/Mn ratio of from 6.7 to about 14.6, and
   - an $I_{10}/I_2$ ratio of from 7.2 to about 18.

---

### 5,015,512

### SOLDER-ENCLOSING HEAT-SHRINKABLE TUBE

**Yasuyo Matsumoto, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

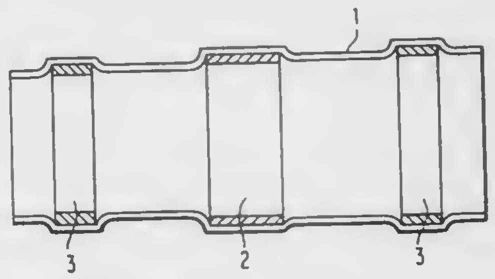
**Filed Oct. 26, 1989, Ser. No. 426,646**

**Claims priority, application Japan, Oct. 26, 1988, 63-268149**

**Int. Cl.$^5$ H01R** *4/02*

**U.S. Cl. 428—35.1** **6 Claims**

1. A solder-enclosing heat-shrinkable tube comprising:
   - a heat-shrinkable tube comprising a first fluororesin;
   - a ring-shaped fusible solder inserted in said tube; and
   - ring-shaped thermoplastic resin inserts placed in said tube on either side of said ring-shaped fusible solder;
   - wherein said ring-shaped thermoplastic resin inserts comprising a blend of
     - (A) a second fluororesin analogues to said first fluororesin, and



     - (B) an ethylene-vinyl acetate copolymer compatible with said second fluororesin.

---

### 5,015,513

### SEALABLE CONTAINERS

**Geoffrey Newbold, Wirral; Douglas Wraige, and John D. Wagner, both of Cheshire, all of England, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.**

**Filed May 22, 1987, Ser. No. 53,223**

**Claims priority, application United Kingdom, May 23, 1986, 8612706**

**Int. Cl.$^5$ C11D** *17/04*

**U.S. Cl. 428—35.5** **3 Claims**

1. A container formed from flexible materials adapted for delivering a treatment material into an environment comprising both water and mechanical agitation, the container having between two flexible walls thereof, at least one opening sealed mechanically strong in the dry state but which disintegrates in water of temperatures of 40° C. or below under the influence of mechanical agitation, the seal being formed from a mixture of:
   - (i) an adhesive component soluble in water at temperatures of 40° C. or below and
   - (ii) a heat-sealable component insoluble in water at temperatures of 40° C. or below.

wherein the heat-sealable component is selected from the group consisting of vinyl acetate homopolymers, vinyl acetate-/ethylene copolymers and polyacrylic acid esters.

---

### 5,015,514

### PULTRUDED OR FILAMENT WOUND SYNTHETIC RESIN FUSE TUBE

**William M. Rinehart, Centralia, Mo., assignor to A. B. Chance Company, Centralia, Mo.**

**PCT No. PCT/US88/02824, § 371 Date Jul. 7, 1989, § 102(e) Date Jul. 7, 1989, PCT Pub. No. WO89/01697, PCT Pub. Date Feb. 23, 1989**

**PCT Filed Aug. 17, 1988, Ser. No. 382,676**

**Int. Cl.$^5$ B32B** *1/08;* **H01H** *85/38*

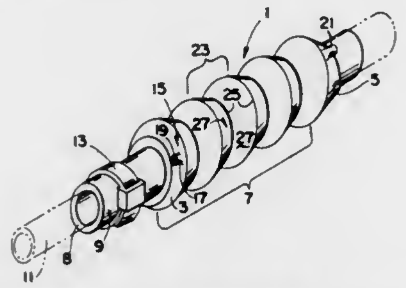
**U.S. Cl. 428—36.4** **11 Claims**

1. An arc-quenching fuse tube comprising an elongated tubular body having at least the inner wall thereof formed of an arc-quenching material, said material comprising an epoxy resin matrix including an epoxy resin cured in the presence of an anhydride curing agent, the matrix having an anhydride to epoxide equivalent of from about 1.2:1 to 1.4:1; from about 5% to 30% by volume of an organic fiber dispersed in said resin matrix, said organic fiber being characterized by the property of supporting the epoxy during formation of the tube therefrom the having the added function of forming arc-suppressing gaseous products during arcing within the tube; and an inorganic filler making up from about 40% to about 80% by weight of the and capable of generating molecular water under high temperature arcing conditions within the tube for reaction with carbon produced by decomposition of the epoxy resin and the organic fiber by such arcing to release gaseous products which serve to interrupt the arc.

VOL 1126
ISS 2
MY 14 1991
UMI

### 5,015,515
### VENTILATED EXPANDABLE BOOT

**Dale W. Paulin, 1146 State Route 60, Ashland, Ohio 44805**
**Continuation of Ser. No. 633,952, Jul. 24, 1984, abandoned. This application Sep. 26, 1985, Ser. No. 781,127**
**Int. Cl.$^5$ B32B** *3/26*
U.S. Cl. 428—36.8 10 Claims



1. An elastomeric boot for protecting an object from environmental influences, said boot comprising:
a flexible tubular enclosure having opposite ends and having an interior for containing an object with variable dimensions and for protecting said object from environmental influences external to said enclosure;
tubular attachment means connected with each of said ends for securing said enclosure to said object;
expansion means from and between said ends for varying the distance between said ends in response to changes in the dimensions of said object; and
vent means for allowing the influx of ambient air into said enclosure or efflux of interior art from said enclosure in response to an air pressure differential between the air inside and outside the enclosure,
said vent means having at least two openings through said enclosure positioned to enable air to circulate through the enclosure substantially the entire length thereof.

---

### 5,015,516
### DECORATIVE INLAID TYPES OF SHEET MATERIALS

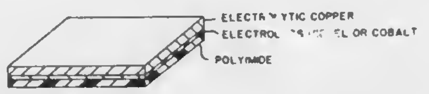
**Edward F. Lussi, Bethelem, and Thomas G. Smith, Easton, both of Pa., assignors to Tarkett Inc., Whitehall, Pa.**
**Continuation of Ser. No. 773,984, Sep. 9, 1985, abandoned. This application Apr. 3, 1989, Ser. No. 333,763**
**Int. Cl.$^5$ B23B** *5/22*
U.S. Cl. 428—143 29 Claims

1. A decorative, inlaid floor or wall covering which comprises:
(a) a substrate,
(b) a printed layer applied over said substrate in the form of a pattern, and
(c) an adhesive matrix layer, overlaying said printed layer, consisting essentially of an adhesive in which is embedded spherical or essentially spherical particles having an aspect ratio no greater than about 2:1
wherein said pattern is visible through said adhesive matrix layer.

---

### 5,015,517
### TEXTURED POLYIMIDE FILM

**Daniel P. Walsh, Peabody, Mass., assignor to Polyonics Corporation, Newburyport, Mass.**
**Division of Ser. No. 18,342, Feb. 24, 1987, Pat. No. 4,806,395. This application Oct. 22, 1987, Ser. No. 111,307**
**The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.**
**Int. Cl.$^5$ B32B** *3/26, 15/08, 27/00*
U.S. Cl. 428—156 2 Claims

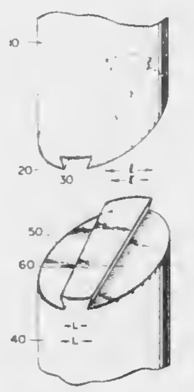


1. A polyimide film having a surface which is uniformly and substantially completely textured which consists essentially of a nodular appearance and having mechanical properties substantially the same as said film prior to being textured.

---

### 5,015,518
### GRAPHITE BODY

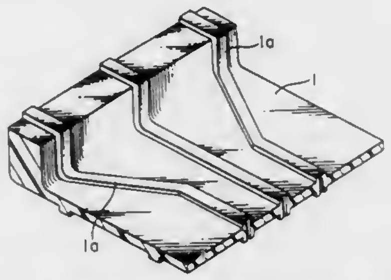
**Yoshito Sasaki, Tokyo, and Kunio Takaishi, Yamanashi, both of Japan, assignors to Toyo Carbon Co., Ltd., Tokyo, Japan**
**Continuation of Ser. No. 863,171, May 14, 1986, abandoned. This application May 30, 1989, Ser. No. 361,766**
**Claims priority, application Japan, May 14, 1985, 60-102463; May 14, 1985, 60-102464**
**Int. Cl.$^5$ B32B** *23/02;* **H05B** *7/14*
U.S. Cl. 428—192 9 Claims



1. A graphite arc furnace electrode comprising:
an elongated graphite body having substantial length and diameter;
connecting end surfaces formed on said graphite body for connecting said graphite body to another graphite body;
a T-shaped mound formed on one connecting end surface extending across the middle portion thereof; an inverted T-shaped groove formed on the other connecting end surface extending across the middle portion thereof; said mound and groove being gradually decreased in width longitudinally toward one end thereof, the width of said mound being in a range of $\frac{1}{5}$ to $\frac{3}{5}$ based on the length of lateral direction of said connecting end surface at the central point of height and length of said mound, said mound having a lateral inclination of 45 to 87 degrees with respect to said connecting end surface, the maximum width of an upper surface of said mound being $\frac{2}{3}$ or less based on the length of lateral direction of said connecting end surface and the minimum width of a base of said mound being $\frac{1}{4}$ or more based thereon.

### 5,015,519
### MOLDED ARTICLE WITH PARTIAL METAL PLATING AND A PROCESS FOR PRODUCING SUCH ARTICLE

**Tetsuo Yumoto, Tokorozawa, Japan, assignor to Sankyo Kasei Kabushiki Kaisha, Tokyo, Japan**
**Continuation-in-part of Ser. No. 180,923, Apr. 13, 1988, Pat. No. 4,908,259, Continuation-in-part of Ser. No. 109,353, Oct. 15, 1987, Pat. No. 4,812,275. This application Oct. 16, 1989, Ser. No. 422,174**
**Claims priority, application Japan, Nov. 18, 1986, 61-273035**
**The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.**
**Int. Cl.$^5$ B32B** *9/00*
U.S. Cl. 428—209 14 Claims



1. A partially metal-plated molded product comprising a plastic primary molded article having an outer surface, protrusions extending from said outer surface of said primary molded article, roughening means on said outer surface and on said protrusions of said primary molded article, a plastic secondary molded article disposed about said primary molded article, said secondary molded article having an external surface with through openings in which are disposed said protrusions of said primary molded article, said protrusions having exposed external faces, a catalyst disposed on the exposed external faces of said protrusions but not on the outer surface of said primary molded article, and plated metal on the catalyst disposed on said exposed external faces of said protrusions.

---

### 5,015,520
### DOUBLE-LAYER, THIN SHEET PLASTIC MATERIAL FOR PRODUCING DECORATIVE RIBBONS, PACKINGS AND THE LIKE

**Enzo Vaccari, Ferrara, Italy, assignor to Star Pennsylvania New Flower S.p.A., Ferrara, Italy**
**Filed Aug. 8, 1989, Ser. No. 390,124**
**Claims priority, application Italy, Feb. 8, 1989, 35564/89[U]**
**Int. Cl.$^5$ B32B** *5/32, 7/02, 7/04*
U.S. Cl. 428—215 6 Claims

1. A double layer, thin sheet plastic material for production of decorative tapes or ribbons, or packages, said material consisting of a first layer of foamed polypropylene attached to a second layer of a non-woven fabric which is adapted to give the material the aspect of a fabric, wherein said first layer has a thickness of 50 to 150μ and said second layer has a weight of 20 to 30 $g/m^2$.

6. A sheet plastic material according to claim 1, wherein said first layer has a thickness of about 100μ.

---

### 5,015,521
### POROUS FILM

**Toshio Fujii; Kazuhiro Kato; Tasuku Suzuki, all of Kurashiki, and Minoru Kashino, Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan**
**Continuation-in-part of Ser. No. 468,872, Jan. 23, 1990. This application Jan. 26, 1990, Ser. No. 470,893**
**Claims priority, application Japan, Jan. 27, 1989, 1-19317; Jan. 27, 1989, 1-19318; May 24, 1989, 1-131096**
**Int. Cl.$^5$ B32B** *3/24;* **C08J** *9/00*
U.S. Cl. 428—220 11 Claims

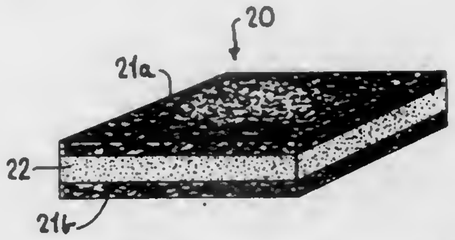
1. A porous film having a thickness of 90 μm or less, which is obtained from a composition comprising a linear polyethylene, 0 to 50 parts by weight of a branched low-density polyethylene based on 50 to 100 parts by weight of said linear polyethylene, a filler and a radical forming agent, and has a bending resistance of 50 mm or less in both the machine and transverse directions, a moisture permeability of 1500 $g/m^2.24$ hr or above, and a surface strength satisfying the following relation (I):

$$\text{Surface strength (kg)} \geqq 35 \times \text{film thickness (mm)} \qquad (I)$$

---

### 5,015,522
### MULTICOMPONENT FIBERS, FILMS AND FOAMS

**Francis P. McCullough, Jr., Lake Jackson; R. Vernoo Snelgrove, Damon, both of Tex., and David M. Hall, Auburn, Ala., assignors to The Dow Chemical Company, Midland, Mich.**
**Filed Sep. 5, 1990, Ser. No. 577,982**
**Int. Cl.$^5$ B32B** *3/26, 9/00*
U.S. Cl. 428—312.2 17 Claims



1. A multicomponent polymeric fiber, film or foam having at least one component comprising fire resistant carbonaceous material and another component comprising non-carbonaceous material.

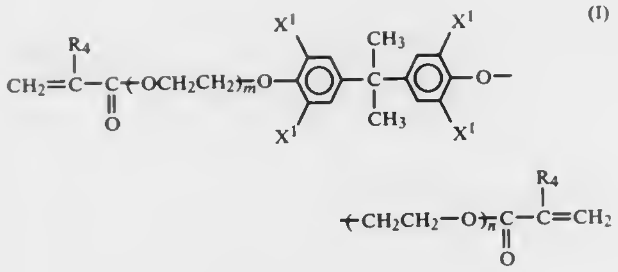
---

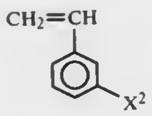
### 5,015,523
### COATED SYNTHETIC RESIN LENS

**Hiroshi Kawashima; Mikito Nakashima, and Takao Mogami, all of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**
**Continuation-in-part of Ser. No. 635,031, Jul. 27, 1984, abandoned. This application Feb. 10, 1987, Ser. No. 13,102**
**Claims priority, application Japan, Jul. 29, 1983, 58-138769**
**Int. Cl.$^5$ B32B** *27/06, 27/08, 27/30;* **B05D** *1/36*
U.S. Cl. 428—336 30 Claims

1. A coated synthetic resin lens comprising:
a synthetic resin lens body;
a primer coating formed of a copolymer of (1) at least 20% by weight of one of an acrylic and methacrylic monomer and (2) at least 10% by weight of an aromatic vinyl compound and having a thickness of between about 0.1 and 2 μ;
a cured coat including colloidal silica having a solids content between about 35 and 75% by weight, an organic silane compound containing epoxy groups and having a solids content between about 25 and 50% by weight, additives having a solids content between about 0 and 25% by weight and between about 60 and 80% by weight of a solvent in a coating solution; and
a dielectric anti-reflection layer formed on the cured coat,
wherein the synthetic resin lens body is selected from the group consisting of:
polydiethylene glycol bisallyl carbonate resin;
polycarbonate resin;
synthetic reins prepared from a copolymer formed by radical-polymerizing comonomers of formula I and II:

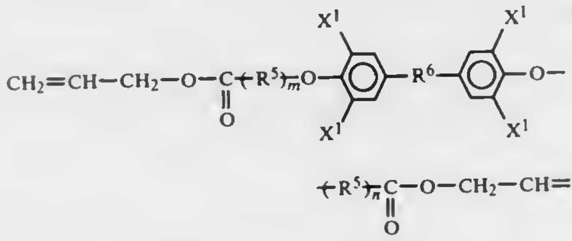
VOL
1126
ISS
2
MY
14
1991
UMI

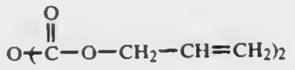

(I)


(II)

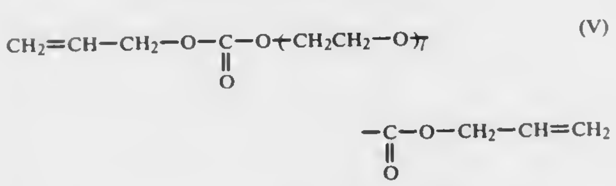
wherein $R_4$ is hydrogen or methyl, $X^1$ and $X^2$ are hydrogen or halogen other than fluorine, and m and n are both integers having a total between 0 and 8, inclusive;

a resin material formed by radical polymerizing comonomers of formulae III, IV and V as major constituents;


(III)

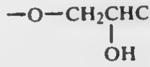

(IV)

$$O{+}\overset{\overset{O}{\|}}{C}-O-CH_2-CH=CH_2)_2$$


(V)

$$CH_2=CH-CH_2-O-\underset{\underset{O}{\|}}{C}-O{+}CH_2CH_2-O{+}_l-\underset{\underset{O}{\|}}{C}-O-CH_2-CH=CH_2$$

wherein $R^5$ is $-O-C_2H_4-$, $-O-C_3H_3-$ or



$$-O-CH_2\underset{\underset{OH}{|}}{C}HCH_2,$$

$R^6$ is $-O-$, $-S-$, $SO_2-$, $-CH_2-$ or $-C(CH_3)_2$, $X^1$ is hydrogen or a halogen other than fluorine, l is an integer between 1 and 10, inclusive and m and n are both integers having a total between about 0 and 8, inclusive;

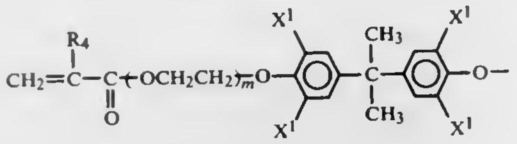
polymethyl methacrylate resin;

polystyrene resin; and

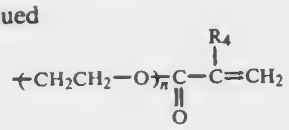
diallyl phthalate resin.

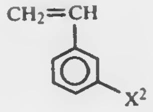
20. A method of preparing a synthetic resin lens comprising:

providing a synthetic resin lens body selected from the group consisting of polydiethylene glycol bisallyl carbonate resin, polycarbonate resin, synthetic resins prepared from a copolymer formed by radical-polymerizing comonomers of formulae I and II;

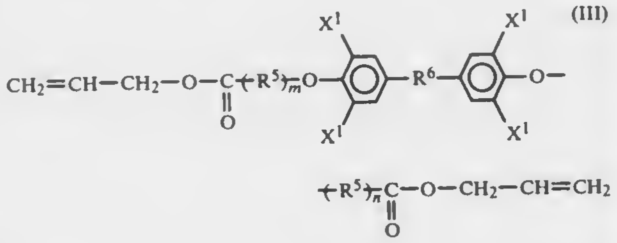

(I)

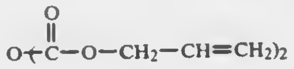
-continued



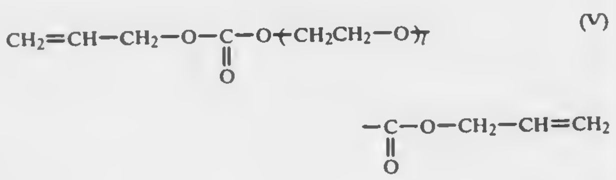

(II)

wherein $R_4$ is hydrogen or methyl, $X^1$ and $X^2$ are hydrogen or halogen other than fluorine, and m and n are both integers having a total between 0 and 8, inclusive; a resin material formed by radical polymerizing co-monomers of formulae III, IV and V as major constituents:


(III)

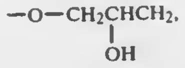

(IV)

$$O{+}\overset{\overset{O}{\|}}{C}-O-CH_2-CH=CH_2)_2$$


(V)

$$CH_2=CH-CH_2-O-\underset{\underset{O}{\|}}{C}-O{+}CH_2CH_2-O{+}_l-\underset{\underset{O}{\|}}{C}-O-CH_2-CH=CH_2$$

wherein $R^5$ is $-O-C_2H_4-$, $-O-C_3H_3-$ or



$$-O-CH_2\underset{\underset{OH}{|}}{C}HCH_2,$$

$R^6$ is $-O-$, $-S-$, $-SO_2-$, $-CH_2-$ or $-C(CH_3)_2-$, $X^1$ is hydrogen or a halogen other than fluorine, is an integer between 1 and 10, inclusive and m and n are both integers having a total between about 0 and 8, inclusive, polymethyl methacrylate resin, polystyrene resin, and diallyl phthalate resin;

depositing a primer coating on the synthetic resin lens body, said primer coating having a thickness of between about 0.1 and 2 μ and including a copolymer of (1) at least 20% by weight of one of an acrylic and methacrylic monomer and (2) at least 10% by weight of an aromatic vinyl compound;

depositing a cured coat on the primer coating including colloidal silica having a solids content between about 35 and 75% by weight, an organic silane compound containing epoxy groups and having a solids content between about 25 and 50% by weight, additives having a solids content between about 0 and 25% by weight and between about 60 and 80% by weight of a solvent in a coating solution; and

forming a dielectric anti-reflection layer on the cured coat.

---

## 5,015,524
## LENS SHEET

**Yukio Kobayashi; Shoichi Nagai; Masatoshi Takesue; Fumito Aosai, all of Nagoya, and Masao Inoue, Otake, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan**

**Filed Dec. 27, 1989, Ser. No. 457,242**

**Claims priority, application Japan, Dec. 27, 1988, 63-329802; Jun. 1, 1989, 1-137407**

**Int. Cl.$^5$ B32B** *27/36*

**U.S. Cl. 428—332** **17 Claims**

1. A lens sheet comprising a transparent substrate and a lens portion composed of a cured product of an ultraviolet-curable resin composition, which is formed on at least one surface of the transparent substrate, wherein the polymerization shrinkage, calculated based on the difference of the specific gravity at 25° C., of the ultraviolet-curable resin composition, caused at curing, is not larger than 20% and the modulus of elasticity at 25° C. after curing is 10 to 1,000 kg/cm$^2$.

---

## 5,015,525
## POLYOLEFIN FIBER HAVING IMPROVED INITIAL ELONGATION AND PROCESS FOR PREPARATION THEREOF

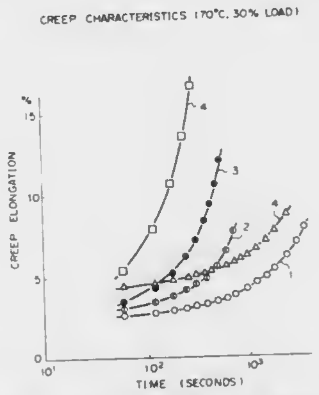
**Kazuo Yagi, Ohtake, and Hiroyuki Takeda, Ohno, both of Japan, assignors to Mitsui Petrochemical Industries Ltd., Tokyo, Japan**

**Filed Dec. 2, 1988, Ser. No. 279,084**

**Claims priority, application Japan, Dec. 3, 1987, 62-304484**

**Int. Cl.$^5$ D02G** *3/00*

**U.S. Cl. 428—364** **5 Claims**



1. A drawn, high strength polyolefin fiber comprising a drawn composition which is blend of (A) ultra-high-molecular-weight polyethylene having an intrinsic viscosity (η) of at least 5 dl/g with (B) ultra-high-molecular-weight ethylene/α-olefin copolymer having an intrinsic viscosity (η) of at least 5 dl/g and containing 0.5 to 10 α-olefin groups of at least 3 carbon atoms per 1000 carbon atoms on average, at an (A):(B) weight ratio of 10:90 to 90:10, said composition before drawing having an intrinsic viscosity (η) of at least 5 dl/g as a whole, and containing 0.2 to 5.0 α-olefin groups of at least 3 carbon atoms as side chains per 1000 carbon atoms on the average, and said drawn fiber having the following properties: (i) when measured under restraint conditions using a differential scanning calorimeter, has at least two close crystal melting peaks at temperatures higher by at least 15° C. than the inherent crystal melting temperature (Tm) of the polyethylene determined as the main peak at the time of the second temperature elevation, (ii) an initial elongation of less than 5% when measured 60 second from the time of initiation of application of a load, corresponding to 30% of the breaking load applied at room temperature to a test sample 1 cm long, at ambient temperature of 70° C., (iii) an average creep rate of at least $1\times10^{-4}$ sec$^{-1}$ when measured over the period of from 90 to 180 seconds after the time of initiating the application of said load, (iv) a strength retention ratio of at least 90% when measured after a heat history at 170° C. for 5 minutes, (v) an elastic modulus of at least 30 GPa at room temperature, and (vi) a tensile strength of at least 1.5 GPa.

---

## 5,015,526
## RADIATION-RESISTANT HIGH MOLECULAR COMPOSITION

**Masashige Kubo, Tokuyama; Yukihiro Tsutsumi, Kawasaki; Fumio Okisaki; Shunichi Fujimura, both of Shin-nanyo, and Teruo Fukuda, Shin-nanyo, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo and The Furukawa Electric Co., Ltd., Tokyo, both of, Japan**

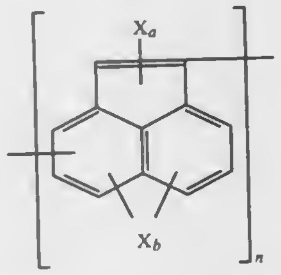
**Division of Ser. No. 98,883, Sep. 21, 1987, Pat. No. 4,900,766. This application Sep. 25, 1989, Ser. No. 412,087**

**Claims priority, application Japan, Sep. 22, 1986, 61-224356; Jun. 19, 1987, 62-152785**

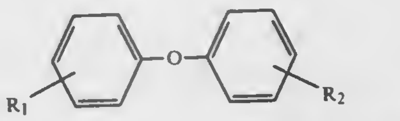
**Int. Cl.$^5$ D02G** *1/00;* **B32B** *5/22, 27/02*

**U.S. Cl. 428—378** **15 Claims**

1. An electric wire or cable having a covering of a radiation-resistant high molecular composition comprising a high molecular polymer, a halogenated acenaphthylene and/or condensates thereof represented by the following general formula (I):



wherein, X indicates a chlorine or bromine atom, a indicates 0 to 2, b indicates 1 to 6 and n indicates an integer not less than 1, and a diphenyl ether derivative represented by the following general formula (II):


[II]

wherein $R_1$ and $R_2$ independently indicate hydrogen, alkyl, alkoxy, phenyl phenoxy, diphenyloxy or terphenyloxy.

---

## 5,015,527
## INTERFACIAL EPOXY MICROCAPSULATION SYSTEM

**Hung-Ya Chao, Williamsville, N.Y., assignor to Moore Business Forms, Inc., Grand Island, N.Y.**

**Filed Jan. 13, 1989, Ser. No. 296,964**

**Int. Cl.$^5$ B01J** *13/16;* **B32B** *27/38*

**U.S. Cl. 428—402.21** **21 Claims**

1. An epoxy microcapsule comprising:

(a) an oil core material; and

(b) a microcapsule wall enclosing the oil core material, the

VOL
1126
ISS
2
MY
14
1991
UMI

microcapsule wall being an interfacial polymerization product of:
(i) an epoxy resin, and
(ii) a polyamino compound having primary and tertiary amino groups capable of crosslinking the epoxy resin.

---

### 5,015,528
### FLUIDIZED BED DIAMOND PARTICLE GROWTH

**John M. Pinneo, Woodside, Calif., assignor to Crystallume, Menlo Park, Calif.**

**Continuation-in-part of Ser. No. 32,415, Mar. 30, 1987, abandoned. This application Mar. 22, 1988, Ser. No. 171,720**
**Int. Cl.$^5$ C30B** *29/04*

U.S. Cl. 428—403 **4 Claims**

1. A composition comprising diamond-containing particles, said particles comprising a synthetic diamond core and an outer layer of a non-diamond material selected from the group consisting of silicon nitride, silicon, boron nitride, aluminum nitride, aluminum oxide, beryllium oxide and zirconium oxide.

---

### 5,015,529
### PHENOLIC MOLDING COMPOSITIONS

**Manoj K. Gupta, Southfield, Mich., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.**

**Continuation-in-part of Ser. No. 946,350, Dec. 24, 1986, abandoned. This application Sep. 14, 1988, Ser. No. 244,192**
**Int. Cl.$^5$ B32B** *27/38;* **C08K** *07/14*

U.S. Cl. 428—414 **4 Claims**

1. A sheet molding compound comprising a fiber reinforced treating mix sandwiched between polymeric films, said treating mix comprising, in percent by weight, based on the total composition, about 20 to about 60 percent resole phenolic resin; about 0.1 to about 15 percent of a curing agent selected from the group consisting of alkaline earth metal oxides and hydroxides, about 5 to about 60 percent filler that is chemically different than said curing agent; and an epoxy resin, wherein the epoxy resin is present in a proportion of about 5 to about 25 weight percent of epoxy resin based on the total weight of the resole phenolic resin and epoxy resin.

---

### 5,015,530
### HIGH EXPANSION, LITHIUM CORROSION RESISTANT SEALING GLASSES

**Richard K. Brow, and Randall D. Watkins, both of Albuquerque, N. Mex., assignors to The Unites States of America as represetned by the United States Department of Energy, Washington, D.C.**

**Filed Jan. 21, 1988, Ser. No. 146,560**
**Int. Cl.$^5$ B32B** *15/04*

U.S. Cl. 428—433 **9 Claims**

1. A glass-to-metal seal, suitable for use in ambient temperature lithium batteries, consisting essentially of:
(a) a metal selected from the group consisting of Alloy-52 and 446 SS, in contact with
(b) a glass consisting essentially of, in mole %:
RO about 40–60
$B_2O_3$ about 30–50
$Al_2O_3$ about 10–25
where RO may be BaO, SrO, or CaO, or any combination of the three.

---

### 5,015,531
### VINYL CHLORIDE-COATED STEEL SHEET

**Shuichi Moriizumi, Ibaraki; Kenichi Masuhara, Chiba; Hidetoshi Yamabe, Chiba; Takao Tomosue, Chiba; Kouji Mori, Chiba, and Hisaharu Kaneko, Ibaraki, all of Japan, assignors to Lonseal Corporation & Nissin Steel Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 83,372, Aug. 10, 1987, abandoned. This application Oct. 18, 1988, Ser. No. 259,190**
**Int. Cl.$^5$ B32F** *15/08*

U.S. Cl. 428—463 **11 Claims**

1. A vinyl chloride-coated sheet comprising a metal sheet comprising:
(a) a surface coated with an adhesive adapted to be cured by electron radiation without the need for heating; and
(b) a vinyl chloride film laminated to said coated surface, said vinyl chloride film comprising a mixture which comprises:
(i) a vinyl chloride resin;
(ii) from about 20 to about 40 parts by weight of a plasticizer comprising dioctyl sebacate;
(iii) from about 1.0 to about 6.0 parts by weight of a di-n-octyl tin mercaptide stabilizer; and
(iv) a low molecular weight polyethylene lubricant.

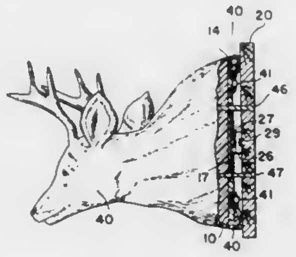
---

### 5,015,532
### TAXIDERMY TROPHY AND PROCESS

**Thomas E. Knight, P.O. Box 129, Ivor, Va. 23866**

**Filed May 21, 1990, Ser. No. 526,233**
**Int. Cl.$^5$ B44C** *5/02;* **G09F** *19/00*

U.S. Cl. 428—542.4 **10 Claims**



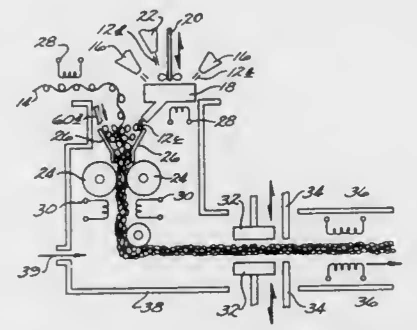
1. Means facilitating mounted alignment and flush fit of a taxidermy model to substantially the center of a decorative wall plaque comprising, in combination:
a manikin having the size and shape to receive an animal head skin and adapted to be mounted on a decorative wall plaque;
said manikin having a front and an aft end and formed of a molded plastics;
a recessed wooden insert fixedly provided in the aft end of said manikin such that peripheral portions of said manikin extend aft of said wooden insert;
an elongated, vertically disposed, groove extending substantially along the center of said wooden insert;
a decorative wall plaque;
a protuberance connected substantially at the center of said wall plaque and disposed in vertical relationship therewith;
said protuberance being slidably received within the elongated vertically disposed groove on said insert;
said protuberance and said groove serving to permit relative vertical movement while preventing relative horizontal and rotative movement between said manikin and said plaque; and
attachment means for tightly securing said manikin to said plaque.

### 5,015,533
### MEMBER OF A REFRACTORY METAL MATERIAL OF SELECTED SHAPE AND METHOD OF MAKING

**Richard G. Delagi, Sharon, Mass., and George Trenkler, East Providence, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation-in-part of Ser. No. 166,300, Mar. 10, 1988, Pat. No. 4,885,214. This application Sep. 22, 1988, Ser. No. 247,799 The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.**
**Int. Cl.$^5$ B22F** *7/02*

U.S. Cl. 428—549 **20 Claims**



1. A member of a selected shape substantially formed from a refractory intermetallic compound which comprises titanium aluminide wherein constituents of the refractory intermetallic compound are reacted with each other in situ within the selected shape.

---

### 5,015,534
### RAPIDLY SOLIDIFIED INTERMETALLIC-SECOND PHASE COMPOSITES

**Stephen L. Kampe, Laurel; John M. Brupbacher; Leontios Christodoulou, both of Baltimore, and Dennis C. Nagle, Ellicott City, all of Md., assignors to Martin Marietta Corporation, Bethesda, Md.**

**Division of Ser. No. 249,626, Sep. 26, 1988, Pat. No. 4,915,905, which is a continuation-in-part of Ser. No. 873,889, Jun. 13, 1986, Pat. No. 4,836,982, and Ser. No. 873,890, Jun. 13, 1986, Pat. No. 4,774,052, which is a continuation-in-part of Ser. No. 662,928, Oct. 19, 1984, abandoned. This application Aug. 30, 1989, Ser. No. 400,850**
**Int. Cl.$^5$ C22C** *14/00/21/00/32/00*

U.S. Cl. 428—570 **15 Claims**

1. A rapidly solidified composite powder comprising boride, carbide, nitride or silicide second phase particles dispersed within a titanium aluminide containing matrix.

15. A heat treated rapidly solidified composite material comprising $TiB_2$ second phase particles dispersed within a titanium aluminide containing matrix wherein the TiBw particles comprise a bimodal distribution characterized by substantially equiaxed $TiB_2$ particles in a size range between about 1 and about 5 microns and finer substantially equiaxed $TiB_2$ particles in a size range between about 0.1 and about 1 micron.

---

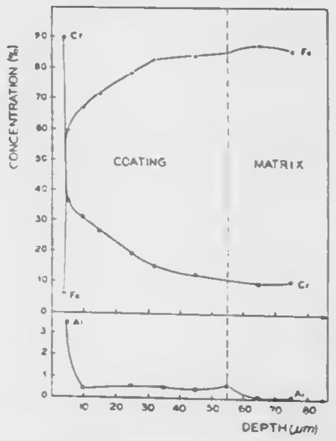
### 5,015,535
### ARTICLE FORMED FROM A LOW CARBON IRON ALLOY HAVING A CORROSION RESISTANT DIFFUSION COATING THEREON

**Edmundo M. Marquez, Caracas, Venezuela; Jean-Francois Nowak, Etienne, France, and Antonio Robles, Miranda, Venezuela, assignors to Intevep, S.A., Caracas, Venezuela**

**Division of Ser. No. 349,951, May 8, 1989, Pat. No. 4,929,473, which is a continuation of Ser. No. 79,693, Jul. 30, 1987, abandoned. This application May 9, 1990, Ser. No. 520,721**
**Int. Cl.$^5$ B32B** *15/18*

U.S. Cl. 428—610 **8 Claims**

1. An article of manufacture which is resistant to corrosive attack at high temperatures in environments having concentrations of vanadium, sulfur and sodium comprising an iron alloy containing less than about 0.25% carbon having a diffusion coating containing aluminum and chromium on at least one surface thereof, said diffusion coating having a thickness in a range of between about 50 microns to 200 microns wherein the concentration of chromium at a depth of about 20 microns is approximately 35% chromium and the concentration of chromium increases at depths of less than 20 microns wherein the concentration of chromium adjacent an external surface of said coating is up to about 90% and the maximum concentration of aluminum in said coating is about 4.5%.



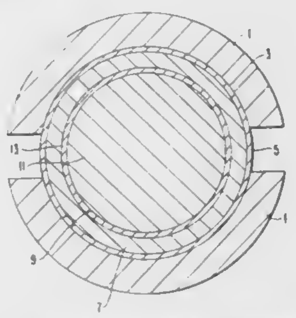
---

### 5,015,536
### METHOD OF MOUNTING PERMANENT MAGNETS WITHOUT ORGANIC ADHESIVES

**Richard C. Sweet, N. Tarrytown; Jose M. I. Azevedo, Mahopac, and Robert L. Bronnes, Irvington, all of N.Y., assignors to North American Philips Corporation, New York, N.Y.**

**Filed Jul. 14, 1989, Ser. No. 380,231**
**Int. Cl.$^5$ H01F** *10/30*

U.S. Cl. 428—611 **10 Claims**

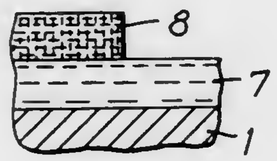


1. A magnet to metallic body seal consisting essentially of a first thin metal layer of a thickness of about 0.1 μm to about 0.5 μm and consisting of a metal selected from the group consisting of tantalum, niobium, zirconium, hafnium, titanium and vanadium and contacting a surface of a permanent magnet, said first thin metal layer being capable of forming a bond with said magnet, a second metallic layer consisting of a solderable metal selected from the group consisting of nickel, copper, alloys of nickel and copper, gold and silver and provided on the surface of said first thin metallic layer and a layer of a low melting point solder provided between, and contacting, said second metallic layer and said metallic body, at least the surface of said metallic body contacting said layer solder consisting essentially of a solderable metal selected from the group consisting of iron, solderable alloys of iron, copper, and solderable alloys of copper.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,537
## ORNAMENTAL MEMBER

**Akira Uchiyama, and Kiyohiro Imai, both of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**
**Filed Sep. 11, 1989, Ser. No. 405,243**
**Claims priority, application Japan, Sep. 12, 1988, 63-227812; Sep. 13, 1988, 63-229612; Jun. 9, 1989, 1-147721**
**Int. Cl.⁵ B32B** *15/04*
U.S. Cl. 428—623 21 Claims



1. An ornamental member, comprising:
a substrate;
a first hard film having a hardness of at least about 1000 HV deposited on said substrate; and
a second hard film having a hardness of at least about 1000 HV selectively deposited on said first hard film so that portions of the first hard film are exposed,
said first hard film and said second hard film having different color tones, at least one of said first hard film and said second hard film is a Ti containing ceramic and the other of said first hard film and said second hard film is selected from the group consisting of a Cr containing ceramic.

---

### 5,015,538
## PROCESS FOR PULSE ELECTROPLATING ELECTROACTIVE POLYMERS AND ARTICLES DERIVED THEREFROM

**Larry J. Krause, and Nena M. McCallum, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Sep. 22, 1989, Ser. No. 411,109**
**Int. Cl.⁵ C25D** *5/10, 5/56*
U.S. Cl. 428—626 18 Claims

1. A process for forming a composite comprising an electroactive polymer substrate comprising electroactive nuclei and a plurality of metal films, said composite having improved adhesion between the substrate and first metal film upon exposure to a temperature of 85° C. and a relative humidity of 85%, said process comprising the steps of:
(a) providing an electroactive polymer substrate bearing on at least one surface a conductive layer of a first metal;
(b) electroplating one or more metals selected from a first family of metals that are reduced at potentials more positive than the reduction potential of the electroactive polymer substrate;
(c) pulse electroplating one or more metals selected from a second family of metals that are reduced at potentials more negative than the reduction potential of the electroactive nuclei in a plating solution having charge compensating counter cations wherein the charge compensating counter cations are incapable of sustaining the necessary flux of electrons through the metallized surface to reduce the electroactive nuclei in the polymer substrate, said plating solution having a concentration of alkali metal ions of less than 4000 ppm and a concentration of arsenic ions of less than 10 ppm.

---

### 5,015,539
## BIMETALLIC STRIP FOR METAL SAWS

**Manfred Daxelmueller, Maidhofen/Ybbs; Dieter Doeberl, Boehlerwerk/Ybbs, and Gerhard Kraxner, Boehlerwerk, all of Austria, assignors to Bohler Ges. M.b.H., Kapfenberg, Austria**
**Filed Dec. 5, 1988, Ser. No. 280,114**
**Claims priority, application Austria, Dec. 4, 1987, 3196/87**
**Int. Cl.⁵ B32B** *15/00*
U.S. Cl. 428—685 8 Claims

1. A welded bimetallic strip or band, which can be used for manufacturing metal saw blades and metal saw bands, comprising a top layer of high speed tool steel and a support strip, wherein said top layer is metallurgically welded along at least one surface to at least one surface of said support strip, said support strip comprising a martensitically hardenable maraging steel containing a maximum carbon content of 0.05 wt.% and alloying elements of at least 10 wt.% in relative amounts as follows:
(i) Ni in an amount of 4–25 wt.%;
(ii) Co in an amount of 4–25 wt.%;
(iii) Mo in an amount of 2–10 wt.%;
(iv) a member of the group consisting of Ti, Al, Nb, Ta, and mixtures thereof in a total amount of 0.2–2 wt.%; and
(v) Fe and trace impurities from the melt (remainder).

---

### 5,015,540
## FIBER-CONTAINING COMPOSITE

**Marcus P. Borom, Schenectady; William B. Hillig, Ballston Lake; Raj N. Singh, Schenectady; William A. Morrison, Albany, and Leonard V. Interrante, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**
**Filed Jun. 1, 1987, Ser. No. 56,516**
**Int. Cl.⁵ B32B** *9/00*
U.S. Cl. 428—698 54 Claims

1. A process for producing a composite with a porosity of less than about 20% by volume comprised of boron nitride-coated fibrous material and a matrix phase, said fibrous material component of said coated fibrous material comprising at least about 5% by volume of the composite, said matrix phase containing silicon carbide formed in situ in an amount of at least about 5% by volume of the composite and elemental silicon in an amount of at least about 1% by volume of the composite, which comprises the following steps:
(a) depositing boron nitride on a fibrous material producing a coating thereon which leaves no significant portion of said fibrous material exposed, said fibrous material being selected from the group consisting of elemental carbon, a Si-C containing material containing at least about 50% by weight silicon and at least about 25% by weight carbon, and a combination thereof;
(b) depositing a silicon-wettable material on said boron nitride-coated fibrous material producing a coating thereon which leaves no significant portion of said boron nitride exposed, said silicon-wettable material adhering to boron nitride sufficiently to form said coating thereon and being wetted by silicon sufficiently to produce said composite;
(c) admixing an infiltration-promoting material containing elemental carbon with the resulting coated fibrous material producing a mixture wherein the fibrous material component of said coated fibrous material comprises at least about 5% by volume of said mixture;
(d) forming said mixture into a preform having an open porosity ranging from about 25% by volume to about 90% by volume of the preform;
(e) contacting said preform with silicon-associated infiltrating means whereby said silicon is infiltrated into said preform;
(f) heating the resulting structure in a partial vacuum to a temperature at which said silicon is molten and infiltrating said molten silicon into said preform to produce an infiltrated product having the composition of said composite,

said preform containing sufficient elemental carbon to react with said silicon to form said composite, said partial vacuum being at least sufficient to remove gas from said preform so as to allow said molten silicon to infiltrate said preform; and
(g) cooling said product to produce said composite.

---

### 5,015,541
## PROCESS FOR NEUTRALIZING SULFUR-CONTAINING CELLS

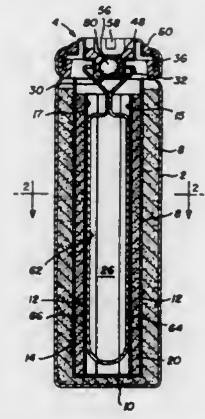
**William P. Evans, Rocky River, Ohio, assignor to Eveready Battery Company, Inc., St. Louis, Mo.**
**Filed Mar. 15, 1990, Ser. No. 493,607**
**Int. Cl.⁵ H01M** *10/42*
U.S. Cl. 429—49 20 Claims

1. A method for treating sulfur-containing cells to render them safe for disposal comprising the steps:
( a) submerging an open sulfur-containing cell in an alkaline hydrolysis solution containing an oxidant in which said solution is maintained at a pH above 8 and wherein the sulfur reacts with the alkaline hydrolysis solution to form at least one reaction product of the group consisting of sulfides and sulfites, and wherein the oxidant is present in a sufficient amount to convert the sulfides and sulfites to soluble sulfates; and
(b) adding an acid to neutralize the alkaline hydrolysis solution of step (a) to reduce the pH of the solution to a value within a neutral range to produce a safe disposal solution.

---

### 5,015,542
## ELECTROCHEMICAL CELL HAVING A SAFETY VENT CLOSURE

**Earl J. Chaney, Jr., Medina; Manuel R. Malay, Brunswick; Thomas J. O'Hara, Bay Village, and Alan D. Ayers, Westlake, all of Ohio, assignors to Eveready Battery Company, St. Louis, Mo.**
**Continuation of Ser. No. 421,440, Oct. 13, 1989, abandoned.**
**This application Apr. 23, 1990, Ser. No. 513,439**
**The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.**
**Int. Cl.⁵ H01M** *2/12*
U.S. Cl. 429—56 20 Claims

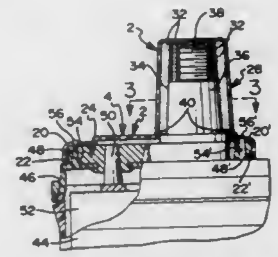


1. An electrochemical cell comprising active components of the cell assembled within a housing, said housing comprising a container having an open end closed by a cover and having at least one vent orifice defined by a wall in said housing; a bushing defining an axial opening and comprising an upper portion terminating with a thinner walled lower portion said bushing disposed within and against the wall defining the vent orifice in said housing; a seal member having an external circumference smaller than the internal circumference of the opening defined in the upper portion of the bushing and larger than the internal circumference of the opening defined in the lower portion of the bushing; said seal member force-fitted within the lower portion of the bushing to seal the cell; and wherein at least one of said bushing and said seal member is resiliently deformable such that said seal member will be at least partially expelled from the vent opening upon a predetermined internal gas pressure buildup within the cell to provide a vent for the cell.

---

### 5,015,543
## BATTERY TERMINAL CAP

**James H. English, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.**
**Filed Aug. 31, 1990, Ser. No. 575,756**
**Int. Cl.⁵ H01M** *2/34*
U.S. Cl. 429—65 8 Claims

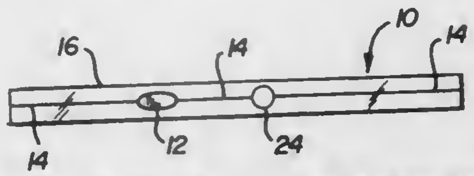


1. In an electric storage battery having a container, a cell element in said container, a post extending from said element through a wall of said container, a terminal outside said container having a root engaging said element post and a connector post extending from said root for engaging a battery terminal connector, and a shipping and display cap for shielding said terminal against damage and protecting said battery from accidental discharge, the improvement wherein said cap comprises:
a base permanently encasing said root while said battery is in service;
means operatively associated with said base for anchoring said base about said root; and
a tower separable from said base and encasing said connector post, said tower being joined to said base along a perforated parting line including a plurality of frangible links defining a plurality of perforations therebetween for facilitating ready separation and removal of said tower from said base to expose said connector post to receive said connector.

---

### 5,015,544
## BATTERY WITH STRENGTH INDICATOR

**James R. Burroughs, Encino, and Alan N. O'Kain, Corona del Mar, both of Calif., assignors to Strategic Energy Ltd., Newport Beach, Calif.**
**Filed Feb. 8, 1989, Ser. No. 308,210**
**Int. Cl.⁵ H01M** *10/48*
U.S. Cl. 429—93 11 Claims



1. A battery having a battery strength indicating means to indicate the strength of the battery comprising a battery having a first terminal and a second terminal; a battery indicator and switch means comprising a non-conductive base layer, a non-conductive top layer disposed over the base layer, a first chamber formed between the top layer and the base layer, and a second chamber spaced from the first chamber and formed between the top layer and the base layer; indicating means disposed in the first chamber; first conductive means electri-

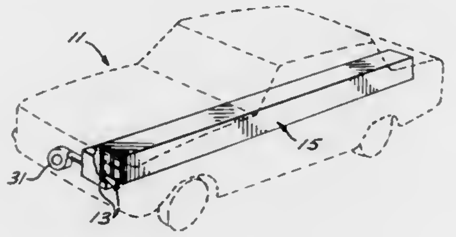
VOL 126
ISS 2
MY 14 1991
UMI

cally connected to one terminal of the battery and to one end of the indicating means; second conductive means connected to the opposite end of the indicating means and extending into the second chamber; third conductive means extending from within the second chamber and extending to contact the other terminal of the battery; and whereby the second conductive means and the third conductive means in the second chamber are spaced apart and said second chamber being deformable so that upon pressing of the second chamber the second conductive means will electrically contact the third conductive means thereby placing the indicating means in electrical contact across the terminals of the battery to indicate the strength of the battery.

### 5,015,545
## METHOD AND APPARATUS FOR COOLING AN ARRAY OF RECHARGEABLE BATTERIES

**Alec N. Brooks, Pasadena, Calif., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 3, 1990, Ser. No. 460,313**
**Int. Cl.$^5$ H01M *10/50***
**U.S. Cl. 429—99** **20 Claims**



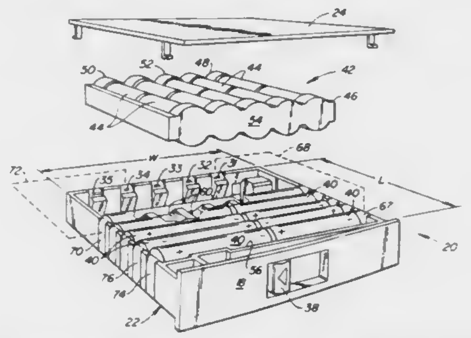
9. An electric vehicle comprising:
a plurality of rechargeable batteries;
an elongated tubular housing having a longitudinal axis extending from a forward end to a rearward end and sized to carry end-to-end a plurality of rechargeable batteries of predetermined size, wherein the housing is sized such that an air gap is defined between itself and the plurality of batteries, the air gap having a cross-sectional size that continuously decreases from the housing's forward end to its rearward end; and
air cooling means for transporting air through the air gap defined by the housing, from the forward end to the rearward end, the air being heated by the batteries as it is transported through the air gap, and thereby cooling the batteries, wherein the speed of the air continuously increases as it is transported along the air gap, due to the air gap's continuously decreasing cross-sectional size, to enhance the air's heat transfer coefficient in inverse relationship with the temperature differential between the air and the adjacent batteries, wherein the plurality of batteries are provided with a substantially uniform cooling effect and are maintained at a more uniform temperature.

### 5,015,546
## BATTERY COMPARTMENT

**Ken L. Dulaney, Redwood City, and John J. Daly, San Carlos, both of Calif., assignors to Grid Systems Corporation, Fremont, Calif.**

**Filed Jun. 12, 1989, Ser. No. 364,921**
**Int. Cl.$^5$ H01M *3/10***
**U.S. Cl. 429—99** **17 Claims**

1. In a portable, battery-powered electrical device, a battery compartment for accepting different types of battery cells, comprising,
a casing with a generally rectangular recess having a width dimension and a length dimension, the width dimension being suitable for receiving longitudinally an integral number of battery cells of a first type and the length dimension being suitable for receiving longitudinally an integral number of battery cells of a second type,
first electrical contact means disposed on a first inside wall of the casing for drawing power from the battery of cells of the second type when present, and second electrical contact means disposed on second and third inside walls of the casing for drawing power from the battery of cells of the first type when present, and

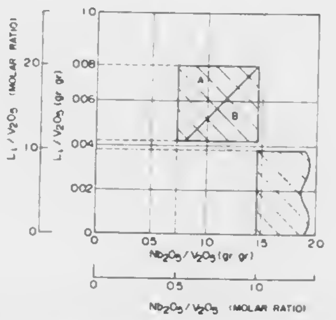


battery location means for holding the battery of cells of the first type in first preselected positions within the recess, and for holding the battery of cells of the second type in second preselected positions within the recess, the second cell positions being substantially perpendicular to the first cell positions.

### 5,015,547
## LITHIUM SECONDARY CELL

**Nobuharu Koshiba, Ikoma; Shuichi Nishino; Kenichi Takata, both of Hirakata, and Toshihiko Ikehata, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jul. 5, 1989, Ser. No. 375,468**
**Claims priority, application Japan, Jul. 8, 1988, 63-171272**
**Int. Cl.$^5$ H01M *4/48***
**U.S. Cl. 429—194** **3 Claims**

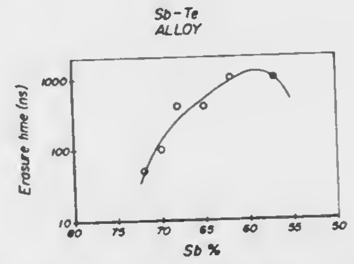


1. A lithium secondary cell having an electrolyte of an organic solvent in which a lithium salt is dissolved, and using a positive electrode of vanadium pentaoxide and a negative electrode of a compound of lithium with niobium pentaoxide in a charging state, wherein the amount of niobium pentaoxide is such that the molar ratio of the niobium pentaoxide to the vanadium pentaoxide is from not less than 0.5 to not more than 1, and the molar ratio of the total amount of lithium contained in the positive and negative electrodes to the vanadium pentaoxide is from not less than 1.1 to not more than 2.

### 5,015,548
## ERASABLE PHASE CHANGE OPTICAL RECORDING ELEMENTS AND METHODS

**Kee-Chuan Pan, Pittsford; Yuan-sheng Tyan, Webster, and Fridrich Vazan, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 286,003, Dec. 19, 1988, abandoned. This application Jun. 21, 1990, Ser. No. 541,660**
**Int. Cl.$^5$ G03C *1/00***
**U.S. Cl. 430—19** **1 Claim**



1. A method of recording and erasing information on an optical recording element, said element comprising a thin film optical recording layer of an alloy in a crystalline form, said alloy represented by the formula $Sb_xTe_{1-x}$, wherein x is between about 0.58 and 0.75, said method comprising the steps of:
(a) recording said information by focusing an information modulated laser beam on said cystalline alloy recording layer at a power and for a time sufficient to form a pattern of amorphous areas in said layer of alloy, said pattern corresponding to said information, and
(b) focusing a laser beam on said recorded layer for a time and at a power sufficient to crystallize at least a portion of the amorphous areas formed in step a), thereby erasing the information in said amorphous areas.

### 5,015,549
## COMPOSITION AND ELECTROPHOTOGRAPHIC USE OF MICROCAPSULAR PHOTOACTIVE TONER PARTICLES

**Paul V. Grosso, West Hartford; Michael J. Morgan, Northford; Feagin A. Wing, Jr., Farmington, all of Conn., and Roger W. Day, Louisville, Ky., assignors to Olin Corporation, Cheshire, Conn.**

**Continuation-in-part of Ser. No. 171,614, Mar. 23, 1988. This application Sep. 25, 1989, Ser. No. 411,938**
**Int. Cl.$^5$ G03G *9/12***
**U.S. Cl. 430—45** **22 Claims**

4. A developer-bearing, color-self-developing, electrostatically depositable, microcapsular toner particle comprising a shell and a core, said shell being fabricated of a polymer, and said core at least comprising as a color precursor a colorless, chromogenic material, and additionally containing a radiation-sensitive material, said chromogenic material being capable of becoming colored upon contact with a developer, said shell possessing a charge characteristic to render said toner particle electrostatically depositable, said shell additionally bearing a developer on the outer surface thereof, the shell of said toner particle being rupturable to release said chromogenic material.

### 5,015,550
## ELECTROPHOTOGRAPHIC COATED CARRIER PARTICLES AND METHODS THEREOF

**John A. Creatura, Ontario, and George R. Hsu, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 136,792, Dec. 22, 1987, Pat. No. 4,935,326. This application Mar. 12, 1990, Ser. No. 491,763**
**Int. Cl.$^5$ G03G *9/10***
**U.S. Cl. 430—108** **61 Claims**

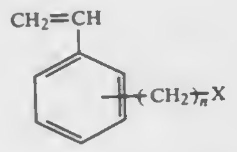
1. A process for the preparation of carrier particles with substantially stable conductivity parameters which comprises (1) mixing carrier cores with a polymer mixture comprising from about 10 to about 90 percent by weight of a first polymer, and from about 90 to about 10 percent by weight of a second polymer, wherein said first and second polymers are not in close proximity in the triboelectric series; (2) dry mixing the carrier core particles and the polymer mixture for a sufficient period of time enabling the polymer mixture to adhere to the carrier core particles; (3) heating the mixture of carrier core particles and polymer mixture to a temperature of between about 200° F. and about 550° F., whereby the polymer mixture melts and fuses to the carrier core particles; and (4) thereafter cooling the resulting coated carrier particles wherein the polymer mixture is selected from the group consisting of polyvinylidene fluoride and polyethylene; polymethylmethacrylate and copolyethylene vinyl acetate; copolyvinylidenefluoride tetrafluoroethylene and polyethylenes; copolyvinylidenefluoride tetrafluoroethylene and copolyethylene vinyl acetate; and polymethylmethacrylate and polyvinylidene fluoride.

### 5,015,551
## ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS CONTAINING POSITIVELY CHARGED RESIN PARTICLES

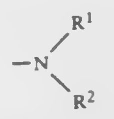
**Hiromichi Tachikawa; Hiroaki Yokoya; Nobuo Suzuki, and Syu Watarai, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd, Kanagawa, Japan**

**Continuation of Ser. No. 423,778, Sep. 27, 1982, abandoned. This application May 23, 1984, Ser. No. 613,020**
**Claims priority, application Japan, Sep. 29, 1981, 56-154115**
**Int. Cl.$^5$ G03G *9/12***
**U.S. Cl. 430—114** **10 Claims**

1. An electrophotographic liquid developer comprising a resin particle dispersion in a non-aqueous solvent having an electric resistance of higher than $10^9\Omega$ cm and a dielectric constant of less than 3, wherein said resin particle dispersion contains positively charged resin particles and said dispersion is prepared by polymerizing the monomer represented by the following general formula (I)


(I)

wherein n represents an integer of 1 to 6 and X represents



(wherein $R^1$ and $R^2$, which may be the same or different, each represents a hydrogen atom, a straight chain, branched, or cyclic alkyl group having 1 to 18 carbon atoms, a phenyl group, or a phenyl group substituted by an alkyl group having 1 to 12 carbon atoms), a morpholino group, or a piperazino group, in an organic solvent having dissolved therein a polymer substantially soluble in said organic solvent, and said organic solvent has an electric resistance of higher than $10^9\Omega$ cm and a dielectric constant of less than 3, wherein said resin particles are prepared by dissolving both said monomer represented by general formula (I) and said polymer in said organic solvent and carrying out the polymerization with a radical polymerization initiator, wherein said polymer acts as a dispersing agent and the ratio of said polymer to said monomer is 1 to 1/100 by weight, and
wherein the developer further contains a pigment or dye in an amount sufficient to effect color.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,552

### IMAGE FORMING METHOD AND TRANSFER RECORDING MEDIUM THEREFOR USING TWO ENERGIES

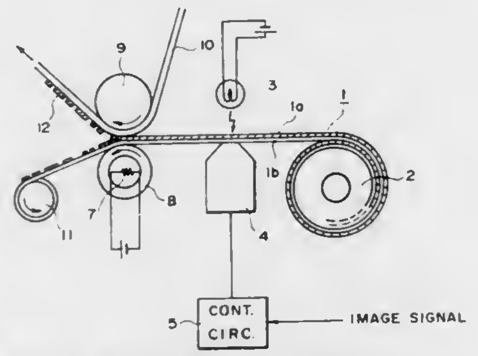
**Yasuyuki Tamura, Yokohama, and Shuzo Kaneko, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 869,689, Jun. 2, 1986, abandoned. This application Jun. 29, 1989, Ser. No. 373,637**

**Claims priority, application Japan, Jun. 3, 1985, 60-120080; Jun. 3, 1985, 60-120081; Jun. 17, 1985, 60-131411; Jun. 20, 1985, 60-134831; Jul. 9, 1985, 60-150597; Sep. 10, 1985, 60-199926; Nov. 11, 1985, 60-250884**

**Int. Cl.$^5$ G03C** *5/54;* **G03F** *7/26*

**U.S. Cl. 430—138** **31 Claims**



19. An image forming method, comprising:

(a) providing a transfer recording medium comprising a transfer recording layer formed thereon, said transfer recording layer being capable of causing an irreversible change in transfer characteristic thereof by polymerization, crosslinking or depolymerization when provided with heat and light energies, said transfer recording layer comprising a distributed layer of minute image forming elements each in the form of a capsule comprising a core material and a wall material encapsulating the core material, said core material being solid at room temperature and comprising a colorant and a functional component responsible for the irreversible change in transfer characteristic of the transfer layer,

(b) imparting heat energy to the transfer recording layer to heat the layer to an elevated temperature and imparting light energy to the transfer recording layer at the elevated temperature under such a condition that at least one of the heat and light energies correspond to a recording information signal, thereby to form a transferable portion in the transfer recording layer except for a part of the transfer recording layer imparted with both the heat and light energies; and

(c) thermally transferring the transferable portion of the transfer recording layer to a transfer-receiving medium, thereby to leave an image corresponding to the transferable portion on the transfer-receiving medium.

---

### 5,015,553

### METHOD OF PATTERNING RESIST

**Paul E. Grandmont, Franklin, and Harold Lake, Sharon, both of Mass., assignors to The Foxboro Company, Foxboro, Mass.**

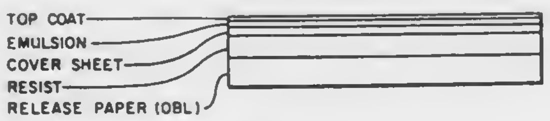
**Continuation of Ser. No. 6,624, Jan. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 742,742, Jun. 10, 1985, Pat. No. 4,666,818. This application Mar. 5, 1990, Ser. No. 489,789**

**Int. Cl.$^5$ G03C** *1/90, 1/68*

**U.S. Cl. 430—260** **4 Claims**

1. A photopatternable composite, comprising

a photopolymerizable layer between a release paper and a baseless emulsion layer having high gamma and high contrast at low energy exposure, the release paper being peelable from said photopolymerizable layer, said photopolymerizable and emulsion layers being separated by a cover sheet peelably releasable from said photopolymerizable layer.



---

### 5,015,554

### POSITIVE RADIATION-SENSITIVE MIXTURE

**Hans Ruckert, and Gabriele Lambert, both of Wiesbaden, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Continuation of Ser. No. 227,121, Aug. 2, 1988, abandoned. This application Aug. 6, 1990, Ser. No. 563,677**

**Claims priority, application Fed. Rep. of Germany, Aug. 4, 1987, 3725741**

**Int. Cl.$^5$ G03C** *7/037, 7/30*

**U.S. Cl. 430—270** **21 Claims**

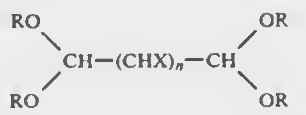
1. A radiation-sensitive mixture, comprising:

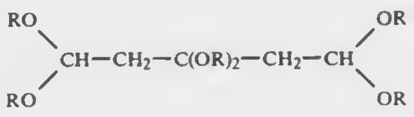
(a) a compound which produces a strong acid under the action of actinic radiation,

(b) an acetal, and

(c) a binder that is insoluble in water and soluble in organic solvents and aqueous-alkaline solutions,

wherein the acetal is a compound represented by either of formulae I and II


(I)


(II)

in which

R denotes a substituted or unsubstituted alkyl group,

X denotes a hydrogen or halogen atom or a hydroxyl, alkyl, alkoxy, alkoxycarbonyl, aryloxy or aryl group, and

n denotes zero or a number from 1 to 3.

---

### 5,015,555

### PHOTOPOLYMERIZABLE COMPOSITION CONTAINING HETEROCYCLIC TRIAZOLE

**Kenneth I. Lazaar, Sayre, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 867,437, May 28, 1986, abandoned. This application May 27, 1988, Ser. No. 198,648**

**Int. Cl.$^5$ G07C** *1/275*

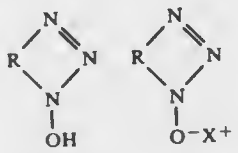
**U.S. Cl. 430—281** **11 Claims**

1. In a photopolymerizable composition comprising

(a) at least one nongaseous ethylenically unsaturated compound having a boiling point above 100° C. at normal atmospheric pressure and being capable of forming a high polymer by photoinitiated addition polymerization,

(b) an initiating system activated by actinic radiation, and

(c) a preformed macromolecular binder wherein the improvement comprises incorporation into said composition an additive of a heterocyclic triazole or its hydrate of the formula:



wherein R is an orthoarylene or orthoarylene substituted with alkyl, cyclic alkyl, aryl, aralkyl or alkaryl and $X^+$ is a cation.

---

### 5,015,556

### FLEXOGRAPHIC PRINTING PLATE PROCESS

**John A. Martens, Dellwood, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jul. 26, 1990, Ser. No. 557,980**

**Int. Cl.$^5$ G03F** *7/027, 7/34, 7/38*

**U.S. Cl. 430—306** **21 Claims**

1. A process for producing a flexographic printing plate comprising providing a relief imageable element comprising a flexible substrate having on at least one surface thereof a radiation hardenable composition in a thickness of at least 0.3 mm, imagewise irradiating said composition to harden the composition in irradiated areas, contacting said imagewise irradiated layer with an absorbent layer which can absorb unirradiated composition when it has been heated between 40° and 200° C., heating said composition layer so that it is at a temperature between 40° and 200° C. while in contact with said absorbent layer, said temperature being sufficiently high to enable said composition in unirradiated areas to flow into said absorbent layer, allowing at least 75% of said composition in unirradiated areas in contact with said absorbent layer to be absorbed by said absorbent layer, and removing said absorbent layer and said at least 75% of composition from unirradiated areas from said flexible substrate, said process further comprising the step of irradiating said hardenable composition layer with ionizing radiation through said substrate to harden at least some hardenable composition adjacent to said flexible substrate, but less than all of said hardenable composition.

---

### 5,015,557

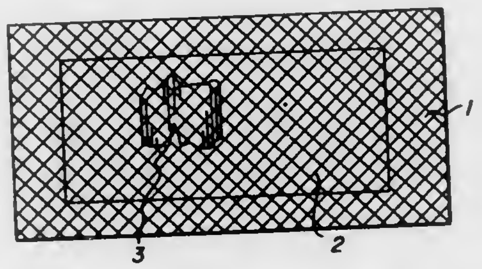
### SILK SCREEN PROCESS

**Ralph G. Mais, 1891 N.W. 36th St., Ft. Lauderdale, Fla. 33309**

**Filed Sep. 14, 1989, Ser. No. 407,053**

**Int. Cl.$^5$ G03F** *7/12*

**U.S. Cl. 430—308** **4 Claims**



1. Method for preparing a sealed printing screen, having an inside and outside surface, against pinholing, comprising the steps of:

(a) coating at least one side of the screen with photo emulsion;

(b) exposing the emulsion to an image to be printed;

(c) etching out the exposed emulsion;

(d) applying over the outside surface of the screen to include the image area a sheet of easy releasable pressure-sensitive vinyl;

(e) coating the inside of the screen with a sealing composition;

(f) peeling off said pressure-sensitive sheet of vinyl from the screen, which removes most of sealing composition from image area, and

(g) treating the image area with vinyl retarder.

(h) blowing out the image area with compress air.

---

### 5,015,558

### HIGH ENERGY BEAM-SENSITIVE COPOLYMER

**Hideo Ochi, and Tomoyuki Kitaori, both of Misato, Japan, assignors to Somar Corporation, Japan**

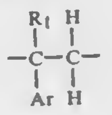
**Filed Aug. 9, 1989, Ser. No. 391,035**

**Claims priority, application Japan, Aug. 11, 1988, 63-200540**

**Int. Cl.$^5$ C03C** *5/00;* **C08F** *16/26, 8/18, 18/00*

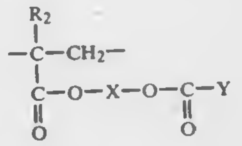
**U.S. Cl. 430—325** **3 Claims**

1. A copolymer sensitive to a high energy beam and containing a plurality of first and second monomer units having the following general formulas (I) and (II), respectively:


(I)

$$\begin{array}{ccccc} & R_1 & & H & \\ & | & & | & \\ - & C & - & C & - \\ & | & & | & \\ & Ar & & H & \end{array}$$

wherein $R_1$ stands for hydrogen or methyl and Ar stands for an aryl,

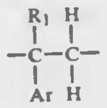

(II)

$$\begin{array}{cccccccccccc} & R_2 & & & & & & & & & & \\ & | & & & & & & & & & & \\ - & C & - & CH_2 & - & & & & & & & \\ & | & & & & & & & & & & \\ & C & - & O & - & X & - & O & - & C & - & Y \\ & \| & & & & & & & & \| & & \\ & O & & & & & & & & O & & \end{array}$$

wherein $R_2$ stands for hydrogen or methyl and X stands for $—CH_2—$, $—CH_2CH(OH)CH_2—$ or $—CH_2CH(CH_2OH)—$ and Y stands for o- or p-chlorophenyl, the molar ratio of the first monomer unit to the second monomer unit being 94:6 to 98:2.

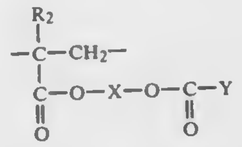
3. A process for the production of a fine resist pattern on a semiconductor substrate, comprising the steps of:

providing a solution of a copolymer sensitive to a high energy beam and containing a plurality of first and second monomer units having the following general formulas (I) and (II), respectively:


(I)

$$\begin{array}{ccccc} & R_1 & & H & \\ & | & & | & \\ - & C & - & C & - \\ & | & & | & \\ & Ar & & H & \end{array}$$

wherein $R_1$ stands for hydrogen or methyl and Ar stands for an aryl,


(II)

$$\begin{array}{cccccccccccc} & R_2 & & & & & & & & & & \\ & | & & & & & & & & & & \\ - & C & - & CH_2 & - & & & & & & & \\ & | & & & & & & & & & & \\ & C & - & O & - & X & - & O & - & C & - & Y \\ & \| & & & & & & & & \| & & \\ & O & & & & & & & & O & & \end{array}$$

wherein $R_2$ stands for hydrogen or methyl and X stands for $—CH_2CH_2—$, $—CH_2CH(OH)CH_2—$ or $—CH_2CH(CH_2OH)—$ and Y stands for o- or p-chlorophenyl, the molar ratio of the first monomer unit to the second monomer unit being 94:6 to 98:2;

applying said solution to a surface of the substrate and dry-

VOL
1126
ISS
2
MY
14
1991
UMI

ing same to form a layer with a thickness of 0.4–1 μm on the substrate;

exposing said layer to high energy radiations so that the exposed areas of said layer become insoluble in a developing liquid;

immersing said exposed layer in the developing liquid to remove the unexposed areas from the substrate, thereby to leave a fine resist pattern corresponding to said exposed areas.

---

### 5,015,559
## PROCESS FOR FORMING A FINE RESIST PATTERN

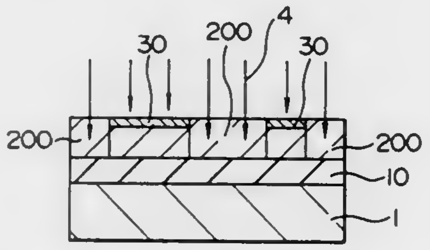
**Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jul. 14, 1989, Ser. No. 379,864**

**Claims priority, application Japan, Jul. 26, 1988, 63-185970**

**Int. Cl.⁵ G03F *7/32, 7/40***

**U.S. Cl. 430—326** **8 Claims**



1. A process for forming a fine resist pattern which comprises forming an organic thin film by coating a substrate with a resist comprising, as a base polymer, a polymer to which there is chemically bonded a functional group which is converted into amino group or sulfonic acid group responding to a first energy beam; forming a surface exposed patterned layer at the vicinity of the surface of the organic thin film by selectively exposing said surface to said first energy beam; selectively staining said surface exposed patterned layer with a substance which absorbs a second energy beam; exposing the entire surface of said organic thin film to said second energy beam and forming a resist pattern by developing the organic thin film exposed to said second energy beam.

---

### 5,015,560
## METHOD OF TREATING PHOTOGRAPHIC WASTE

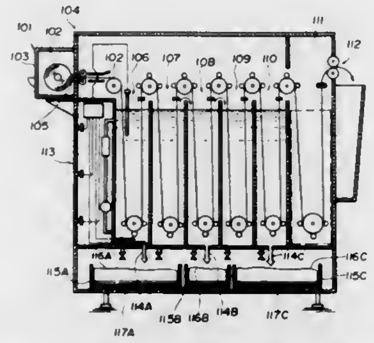
**Shigeharu Koboshi, Sagamihara; kazuhiro Kobayashi; Syozo Aoki, both of Tokyo, and Naoki Takabayashi, Tokyo, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 154,526, Feb. 5, 1988, abandoned, which is a continuation of Ser. No. 848,035, Apr. 4, 1986, abandoned. This application Jan. 10, 1989, Ser. No. 296,323**

**Claims priority, application Japan, Apr. 5, 1985, 60-73222**

**Int. Cl.⁵ G03C *11/24***

**U.S. Cl. 430—398** **18 Claims**



1. In a method of treating a waste solution resulting from the processing of a photographic material with a working solution, the improvement wherein at least part of said waste solution is absorbed by a resin which is capable of absorbing at least 30 times its own weight of a liquid.

---

### 5,015,561
## METHOD FOR FORMING A DIRECT POSITIVE IMAGE

**Kazunori Hayashi; Nobuaki Inoue, and Shingo Nishiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 6, 1989, Ser. No. 319,378**

**Claims priority, application Japan, Mar. 4, 1988, 63-51287; Apr. 4, 1988, 63-82543**

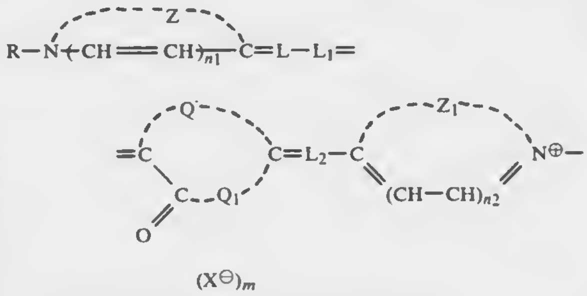
**Int. Cl.⁵ G03C *5/305***

**U.S. Cl. 430—487** **18 Claims**

1. A method for forming a direct positive image comprising:

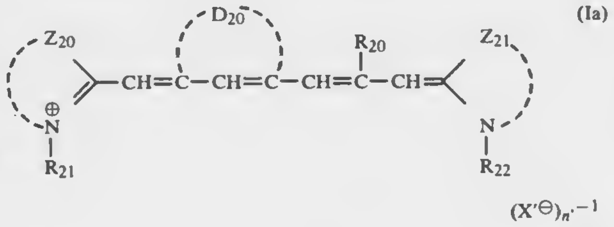
(a) imagewise exposing a direct positive silver halide photographic material comprising a support having thereon at least one light-sensitive silver halide emulsion layer containing non-prefogged internal latent image silver halide grains, at least one hydrophilic colloidal layer of the material containing a nucleating agent, and at least one sensitizing dye represented by formula (I), (Ia), (Ia'), or (Ib):

(I)

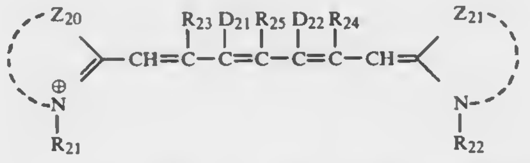


wherein Z and $Z_1$ each represents a non-metallic atomic group necessary for forming a 5-membered or 6-membered nitrogen-containing heterocyclic ring; R and $R_1$ each represents a substituted or unsubstituted alkyl group or an aryl group; Q and $Q_1$ represent a non-metallic atomic group necessary for forming together a 4-thiazolidinone group, a 5-thiazolidinone group or a 4-imidazolidinone group; L, $L_1$ and $L_2$ each represents a methine group or a substituted methine group; $n_1$ and $n_2$ each is 0 or 1; X represents an anion; and m is 0 or 1;

(Ia)

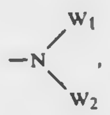


(Ia')



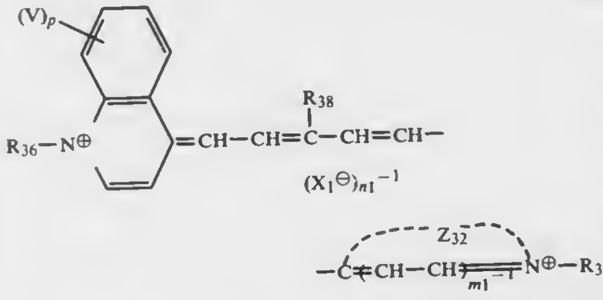
wherein $R_{21}$ and $R_{22}$ each represents a substituted or unsubstituted alkyl group; $R_{20}$ represents hydrogen, a methyl group, a methoxy group or an ethoxy group; $R_{23}$ and $R_{24}$ each represents hydrogen, a lower alkyl group, a phenyl group or a benzyl group; $R_{25}$ represents hydrogen,

a lower alkyl group, a lower alkoxy group, a phenyl group, a benzyl group or



wherein $W_1$ and $W_2$ each represents a substituted or unsubstituted alkyl group or a substituted or unsubstituted aryl group, and $W_1$ and $W_2$ may be linked to form a 5-membered or 6-membered nitrogen-containing heterocyclic ring; $D_{20}$ represents a substituted or unsubstituted group containing at least one ethylene bond; $D_{21}$ and $D_{22}$ each represents hydrogen, or a group containing an ethylene bond when $D_{21}$ and $D_{22}$ are linked to form a ring; $Z_{20}$ and $Z_{21}$ each represents a non-metallic atomic group necessary for forming a 5-membered or 6-membered nitrogen-containing heterocyclic ring; X' represents an acid anion; and n' is 1 or 2;

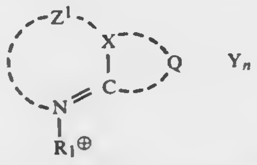
(Ib)



wherein $R_{36}$ and $R_{37}$ each has the same definition as $R_{21}$ and $R_{22}$; $R_{38}$ has the same definition as $R_{23}$; V represents hydrogen, a lower alkyl group, an alkoxy group, a halogen atom, or a substituted alkyl group; $Z_{32}$ has the same definition as $Z_{20}$ and $Z_{21}$; $X_1$ has the same definition as X; and $m_1$, $n_1$ and p is each 1 or 2; and

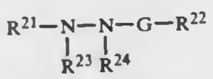
(b) developing said exposed material in the presence of a nucleation accelerator to form a positive image; wherein the nucleating agent is represented by formulae (N-I) or (N-II):

(N-I)



wherein $Z^1$ represents a non-metallic atomic group necessary for forming a 5-membered or 6-membered heterocyclic ring, alone or condensed with an aromatic ring or a heterocyclic ring; $R^1$ represents an aliphatic group; X represents =C— or =N—; Q represents a non-metallic atomic group necessary for forming a 4-membered to 12-membered non-aromatic hydrocarbon ring or 4-membered to 12-membered non-aromatic heterocyclic ring; provided that at least one of $R^1$, a substituent for $Z^1$ and a substituent for Q comprises an alkynyl group; Y represents a counter ion; and n is the number of Y groups necessary for charge balance;

(N-II)



$$R^{21}-\underset{R^{23}}{\underset{|}{N}}-\underset{R^{24}}{\underset{|}{N}}-G-R^{22}$$

wherein $R^{21}$ represents an aliphatic group, an aromatic group or a heterocyclic group; $R^{22}$ represents hydrogen, an alkyl group, an aralkyl group, an aryl group, an alkoxy group, an aryloxy group or an amino group; G represents a carbonyl group, a sulfonyl group, a sulfoxy group, a phosphoryl group, or an iminomethylene group; one of $R^{23}$ and $R^{24}$ represents hydrogen, and the other represents hydrogen or an alkylsulfonyl group, an arylsulfonyl group, or an acyl group; provided that G, $R^{23}$ and $R^{24}$ may be linked to form a hydrazone structure; and wherein the nucleation accelerator is represented by formula (II)

$$A\text{—}[\text{—}(Y)_{n_2}\text{—}B]_{m_2} \qquad \text{(II)}$$

wherein A represents an adsorption accelerating group for silver halide; Y represents a divalent linking group; B represents an organic group comprising at least one thioether group, amino group, ammonium group, ether group, or heterocyclic group; $n_2$ is 0 or 1; and $m_2$ is 1 or 2.

---

### 5,015,562
## LIGHT-SENSITIVE SILVER HALIDE ELEMENT CONTAINING MODANT, DYE AND SONIC POLYMER

**Ichizo Toya; Sumito Yamada, both of Kanagawa, and Koichi Suematsu, Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 321,823, Mar. 9, 1989, abandoned. This application Oct. 12, 1990, Ser. No. 596,620**

**Claims priority, application Japan, Mar. 9, 1988, 63-55585; Jun. 7, 1988, 63-139901**

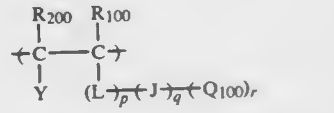
**Int. Cl.⁵ G03C *1/06***

**U.S. Cl. 430—518** **11 Claims**

1. A light-sensitive material comprising a support having thereon at least one light-sensitive silver halide emulsion layer, wherein at least one layer containing a mordant and a dye are provided on at least one side of said support; and at least one layer which is provided on the same side of said layer containing the mordant and dye contains a water-soluble ionic polymer as an agent for reducing color remaining,

wherein said water-soluble ionic polymer is present in an amount of from 0.01 to 1 g/m² and is a synthetic water-soluble polymer containing a repeating unit represented by formula (P):

(P)



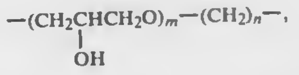
$$\text{—}(\underset{Y}{\underset{|}{\overset{R_{200}}{\overset{|}{C}}}}\text{——}\underset{(L)_p(J)_q(Q_{100})_r}{\underset{|}{\overset{R_{100}}{\overset{|}{C}}}})\text{—}$$

wherein

$R_{100}$ and $R_{200}$, which may be the same or different, each represents hydrogen, a substituted or unsubstituted alkyl group, a halogen atom, or $—CH_2COOM$, wherein M represents hydrogen or a cation;

L represents —CONH—, —NHCO—, —COO—, —OCO—, —CO—, $—SO_2—$, $—NHSO_2—$, $—SO_2NH—$, or —O—;

J represents a substituted or unsubstituted alkylene group, a substituted or unsubstituted arylene group, a substituted or unsubstituted aralkylene group, $—(CH_2CH_2O)_m—(CH_2)_n—$, or

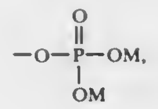


$$—(CH_2\underset{OH}{\underset{|}{C}}HCH_2O)_m—(CH_2)_n—,$$

wherein m is 0 or an integer of from 1 to 40, and n is 0 or an integer of from 1 to 4;

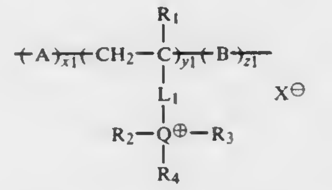
$Q_{100}$ represents —COOM, $—SO_3M$,

VOL
1126
ISS
2
MY
14
1991
UMI



$$-O-\overset{\overset{\displaystyle O}{\|}}{\underset{\underset{\displaystyle OM}{|}}{P}}-OM,$$

or —OM, wherein M represents hydrogen or a cation;
p and q each is 0 or 1;
r is an integer; and
Y represents hydrogen, a carboxyl group or a salt thereof; and
wherein said mordant is present in an amount of 5 to 500 $mg/m^2$ and is an anion exchange copolymer latex represented by formula (II):



(II)

$$-(A)_{x1}-(CH_2-\overset{\overset{\displaystyle R_1}{|}}{\underset{\underset{\displaystyle L_1-Q^{\oplus}(R_2)(R_3)(R_4)}{|}}{C}})_{y1}-(B)_{z1}- \quad X^{\ominus}$$

wherein
A represents an ethylenically unsaturated monomer unit;
$R_1$ represents hydrogen or a lower alkyl group having from 1 to about 6 carbon atoms;
$L_1$ represents a divalent group having from 1 to about 12 carbon atoms;
$R_2$, $R_3$, and $R_4$, which may be the same or different, each represents a substituted or unsubstituted alkyl group having from 1 to about 20 carbon atoms, a substituted or unsubstituted aralkyl group having from 7 to about 20 carbon atoms, or hydrogen, with the proviso that one of and only one of $R_2$, $R_3$, and $R_4$ is a hydrogen atom, and $R_2$, $R_3$, and $R_4$ may be linked to form a cyclic structure;
$Q^{\oplus}$ represents N or P;
$X^{\ominus}$ represents an anion except for iodide;
$x_1$ is a copolymerization ratio from 0 to 90 mol %;
$y_1$ is a copolymerization ratio from 10 to 99.9 mol %;
$z_1$ is a copolymerization ratio from 0.1 to 50 mol %; and
B represents a structural unit derived from a copolymerizable monomer containing at least two ethylenically unsaturated groups wherein said dye is contained in an amount of from 5 to 400 $mg/m^2$ and is selected from oxonol dyes, azo dyes, anthraquinone dyes, allylidene dyes, styryl dyes, triarylmethane dyes, merocyanine dyes and cyanine dyes.

---

### 5,015,563
## SILVER HALIDE LIGHT-SENSITIVE COLOR PHOTOGRAPHIC MATERIAL SUITABLE FOR RAPID PROCESSING COMPRISING A MERCAPTO OR AN AZAINDENE COMPOUND

**Yukio Ohya, and Yoshiyuki Nonaka, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan**

**Continuation of Ser. No. 348,080, May 3, 1989, abandoned, which is a continuation of Ser. No. 80,552, Jul. 31, 1987, abandoned. This application Jun. 7, 1990, Ser. No. 535,992**
**Claims priority, application Japan, Aug. 7, 1986, 61-185917**
**The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.**
**Int. Cl.$^5$ G03C** *1/34, 7/26, 7/32*
**U.S. Cl. 430—546** **14 Claims**

1. A light-sensitive silver halide photographic material comprising a reflective support having thereon at least one light-sensitive silver halide emulsion layer containing silver chloride or silver chlorobromide emulsion of which silver chloride content is not less than 90 mole %, said silver chloride or silver chlorobromide emulsion having been prepared by the addition of a heterocyclic mercapto compound or an azaindene compound during the period of formation of silver halide grains contained therein, a dye-forming coupler and a high-boiling organic solvent of which dielectric constant is not more than 6.

---

### 5,015,564
## STABILIZATIN OF PRECIPITATED DISPERSIONS OF HYDROPHOBIC COUPLERS, SURFACTANTS AND POLYMERS

**Chari Krishnan, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 288,922, Dec. 23, 1988, Pat. No. 4,957,857. This application Jun. 1, 1990, Ser. No. 531,657**
**Int. Cl.$^5$ G03C** *7/26, 7/32, 7/34*
**U.S. Cl. 430—546** **11 Claims**

1. A dispersion comprising water, and particles, said particles consisting essentially of a coupler having a ballast group comprising a straight chain hydrocarbon of up to 15 carbon atoms, a surfactant comprising a head group of sulfate or sulfonate and having no oxyethylene groups, and a nonionic water soluble polymer that is attracted to said surfactant with the proviso that said dispersion does not precipitate after three weeks' storage.

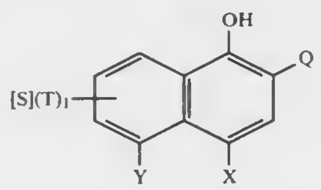
---

### 5,015,565
## COLOR PHOTOGRAPHIC RECORDING MATERIAL

**Erich Wolff, Solingen, Fed. Rep. of Germany, assignor to Agfa Gevaert Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany**

**Filed May 19, 1989, Ser. No. 354,503**
**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819051**
**Int. Cl.$^5$ G03C** *1/08, 7/32*
**U.S. Cl. 430—552** **3 Claims**

1. A photographic recording material comprising at least one photosensitive silver halide emulsion layer and, associated therewith, a cyan coupler corresponding to formula I



in which
Q is a 5-, 6-, or 7-membered heterocyclic radical containing at least one hetero atom selected from the group consisting of O, S, N and P;
T is a substituent which, when it is in the 6-position of the naphthol ring, can form a fused heterocyclic ring with Y;
l is 0, 1, 2 or 3;
X represents H or a group releasable during color coupling which is capable of forming a fused heterocyclic ring with Y;
Y represents $—Z—R^1$ or $—NH—R^2$;
Z represents —O—, $—S(O)_m—$ or $—SO_2—NH—$;
m is 0, 1 or 2;
$R^1$ represents H, $CF_3$, alkyl, aryl or a heterocyclic radical;
$R^2$ represents H or a monofunctional radical containing at least one carbon atom which is capable of forming a fused heterocyclic ring with X or with T (in the 6-position of the naphthol ring).

---

### 5,015,566
## TABULAR GRAIN PHOTOGRAPHIC ELEMENTS EXHIBITING REDUCED PRESSURE SENSITIVITY (II)

**Glen M. Dappen, and Wayne A. Bowman, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 241,665, Sep. 8, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 488,188**
**Int. Cl.$^5$ G03C** *1/04*
**U.S. Cl. 430—567** **13 Claims**

1. A photographic element comprised of a support and, coated on the support, at least one radiation-sensitive silver halide emulsion comprised of silver halide grains dispersed in a vehicle,
at least 50 percent of the total projected area of the silver halide grains being comprised of tabular grains satisfying the relationship:

$$ECD/t^2>25$$

where
ECD is the average equivalent circular diameter in μm of the tabular grains and
t is the average thickness in μm of the tabular grains, and
the vehicle being comprised of hydrophilic colloid forming a continuous phase and a latex,
characterized in that the vehicle contains in an amount sufficient to reduce pressure sensitivity a latex consisting essentially of a methacrylate polymer selected to have a glass transition temperature of less than 50° C.

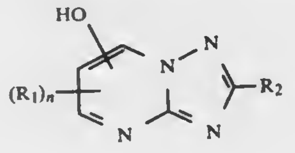
---

### 5,015,567
## METHOD FOR PRODUCING SILVER HALIDE PHOTOGRAPHIC EMULSION AND SILVER HALIDE PHOTOGRAPHIC MATERIAL

**Shuzo Suga, Shizuoka; Tadao Shishido; Hiroyuki Mifune, both of Kanagawa, and Yoshiro Kawashima, Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

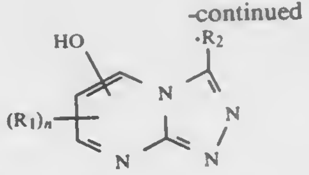
**Continuation of Ser. No. 21,045, Mar. 2, 1987, abandoned, which is a continuation of Ser. No. 658,711, Oct. 9, 1984, abandoned. This application Feb. 10, 1989, Ser. No. 308,964**
**Claims priority, application Japan, Oct. 7, 1983, 58-188226**
**Int. Cl.$^5$ G03C** *1/09, 1/34*
**U.S. Cl. 430—567** **19 Claims**

1. A method for producing a silver halide photographic material, comprising subjecting a silver halide photographic emulsion comprising silver iodochlorobromide or silver iodochlorobromide grains to sulfur sensitization or gold-sulfur sensitization in the presence of (1) at least one of an organic thioether compound and a tetra-substituted thiourea and (2) 1 mg to $1\times10^3$ mg per mol of silver halide of a nitrogen-containing heterocyclic compound selected from the compounds represented by formulae (V) and (VI), the amount in combination of said (1) at least one of an organic thioether compound and a tetra-substituted thiourea and (2) a nitrogen-containing heterocyclic compound being sufficient to improve pressure desensitization and safelight aptitude of said silver halide photographic material, and adding a stabilization effective amount of a nitrogen-containing heterocyclic compound selected from the compounds represented by formulae (V) and (VI) to said silver halide photographic emulsion after chemical ripening but prior to coating of said emulsion:



(V)

-continued



(VI)

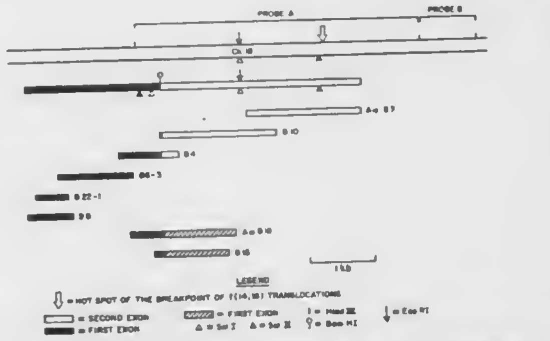
wherein $R_1$ and $R_2$, which may be the same or different, each represents a hydrogen atom; an alkyl group; an alkyl group substituted by an aromatic residue; an alkyl group substituted by an alkoxy group; an alkyl group substituted by a hydroxy group, a carbonyl group or an alkoxycarbonyl group; an aryl group; or an aryl group having a substituent group, and n represents 1 or 2.

---

### 5,015,568
## DIAGNOSTIC METHODS FOR DETECTING LYMPHOMAS IN HUMANS

**Yoshihide Tsujimoto, Landsdowne, and Carlo A. Croce, Philadelphia, both of Pa., assignors to The Wistar Institute, Philadelphia, Pa.**

**Filed Jul. 9, 1986, Ser. No. 883,687**
**Int. Cl.$^5$ C12Q** *1/68;* **G01N** *33/53*
**U.S. Cl. 435—5** **14 Claims**



1. A diagnostic method for detecting B-cell neoplasms in a human, comprising the steps of:
isolating B-cells from the human;
extracting proteins from said B-cells to form a test sample;
contacting said B-cells with an antibody which is immunoreactive with a bcl-2-alpha or bcl-2-beta or both under conditions where antibody-antigen complexes form and are stable to from antibody-antigen complexes;
quantitating the amount of antibody-antigen complexes formed with said B-cells;
comparing the amount of antibody-antigen complexes formed with said B-cells to the amount formed with a control sample, a ratio of B-cell complexes to control sample complexes of greater than about ten indicating B-cell neoplasm, said control sample selected from the group of cells consisting of: B-cells from a normal human, cells from an established normal B-cell or pre-B-cell line, and non-B-cells from said human.

---

### 5,015,569
## ACCELERATION OF NUCLEIC ACID HYBRIDIZATION

**Brian W. Pontius, Palo Alto, Calif., assignor to Board of Trustees of Leland Stanford University, Stanford, Calif.**

**Filed Dec. 1, 1989, Ser. No. 444,179**
**Int. Cl.$^5$ C12Q** *1/68;* **C07H** *21/00;* **C07K** *15/18*
**U.S. Cl. 435—6** **27 Claims**

1. A method for accelerating the rate of hybridization between two complementary nucleic acid sequences in an in vitro nucleic acid hybridization assay comprising:
(a) hybridizing two complementary nucleic acid sequences in a hybridization reaction mixture under conditions per-

VOL
1126
ISS
2
MY
14
1991
UMI

mitting nucleic acid hybridization where the reaction mixture comprises heterogeneous nuclear ribonucleoprotein having a carboxy terminus capable of hnRNP/hnRNP interaction, said ribonucleoprotein present in an amount sufficient to substantially accelerate the rate of hybridization above the hybridization rate in the absence of the ribonucleoprotein; and

(b) detecting the hybridization of the two complementary nucleic acid sequences with the proviso that neither of the nucleic acid sequences being detected is a polyribouridylic acid.

---

### 5,015,570

### MOLECULAR DIAGNOSIS OF ALZHEIMER DISEASE

**George A. Scangos, Woodbridge; Peter M. M. Rae, Hamden; Axel J. Unterbeck, West Haven, and Michael E. Kamarck, Bethany, all of Conn., assignors to Molecular Therapeutics, Inc., West Haven, Conn.**

**Filed May 13, 1988, Ser. No. 194,053**

**Int. Cl.$^5$ C12Q *1/68;* G01N *33/533***

**U.S. Cl. 435—6** **20 Claims**

```
... GAA GUG AAG AUG GAU GCA GAA UUC CGA CAU GAC UCA GGA UAU GAA
                Met Asp Ala Glu Phe Arg His Asp Ser Gly Tyr Glu
                     1

GUU CAU CAU CAA AAA UUG GUG UUC UUU GCA GAA GAU GUG GGU UCA AAC
Val His His Gln Lys Leu Val Phe Phe Ala Glu Asp Val Gly Ser Asn

                                     a       b       c
AAA GGU GCA AUC AUU GGA CUC AUG GUG GGC GGU GUU GUC AUA GCG ACA
Lys Gly Ala Ile Ile Gly Leu Met Val Gly Gly Val Val Ile Ala
                                     37          40

GUG AUC GUC AUC ACC UUG GUG AUG CUG AAG AAG AAA ...
 44
```

1. A method for diagnosing Alzheimer Disease or a predisposition to develop Alzheimer Disease in an individual, comprising the step of determining the presence of an alteration in the normal DNA base sequence

5 CAC TGT CGC TAT GAC AAC ACC GCC 3'.

or its normal complementary DNA or RNA sequences, in a sample of the DNA or RNA of such individual by hybridization with an aligonucleotide probe.

---

### 5,015,571

### POLYPEPTIDE-INDUCED MONOCLONAL RECEPTORS TO PROTEIN LIGANDS

**Henry L. Niman, Carlsbad, and Richard A. Lerner, La Jolla, both of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.**

**Continuation-in-part of Ser. No. 736,545, May 21, 1985, which is a continuation-in-part of Ser. No. 701,954, Feb. 15, 1985, and a continuation-in-part of Ser. No. 713,410, Feb. 15, 1985, abandoned, which is a continuation-in-part of Ser. No. 524,084, Aug. 17, 1983, abandoned. This application Apr. 16, 1987, Scr. No. 39,534**

**Int. Cl.$^5$ C12Q *1/00***

**U.S. Cl. 435—7.92** **9 Claims**

1. A method for ascertaining the presence of a female fetus in utero comprising the steps of:

(a) admixing a sample of boiled, reduced urine from a pregnant mother with receptor molecules that immunoreact with a polypeptide having a sequence that has a formula, written from left to right and in the direction from amino-terminus to carboxy-terminus, selected from the group consisting of:

(i) LMEQCWAYEPGQRPSF, and

(ii) YREQIKRVKDSDDVPMVLVGNKC, said urine sample being collected during a period about 16 through about 20 weeks into the pregnancy;

(b) maintaining said admixture for a time period sufficient for said receptor molecules to immunoreact with an oncoprotein present in said urine; and

(c) assaying for the presence of an immunoreactant of said receptor molecules with an oncoprotein ligand that has a relative molecular mass in a 5–17 percent polyacrylamide gel of about 40 kilodaltons for said receptor molecules that immunoreact with polypeptide (i) of step (a) and about 55 kilodaltons for said receptor molecules that immunoreact with polypeptide (ii) of step (a); the presence of an immunoreactant with either of said receptor molecules indicating the presence of a female fetus in utero.

---

### 5,015,572

### APPARATUS FOR DETERMINING A PROTEOLYTIC OR ESTEROLYTIC SUBSTANCE AND METHOD FOR DETERMINING A PROTEOLYTIC OR ESTEROLYTIC SUBSTANCE USING A LAYERED APPARATUS

**Jürgen Backhaus, Edingen; Dieter Mangold, Maxdorf, and Wolfgang-Reinhold Knappe, Bürstadt, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Apr. 19, 1989, Ser. No. 340,885**

**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813503**

**Int. Cl.$^5$ C12Q *1/44***

**U.S. Cl. 435—19** **13 Claims**

1. Apparatus useful in determining an esterolytically or proteolytically active ingredient of a body fluid, comprising a plurality of reagent containing layers, wherein said layers are positioned on a carrier in such a way as to permit liquid exchange therebetween, said plurality of reagents effecting a colorimetrically determinable signal in the presence of said esterolytically or proteolytically active ingredient, and wherein said plurality of reagent containing layers contain at least one diazonium salt comprising 2-methoxy-4(N-morpholino)-benzene-diazonium tetrachlorozincate, and at least one esterolytically or proteolytically cleavable ester comprising 3-(N-toluene-4'-sulphonyl-L-alanyloxy)-indole, wherein said diazonium salt and said ester are positioned in different layers.

---

### 5,015,573

### DNA VECTORS AND THEIR USE IN RECOMBINANT DNA TECHNOLOGY

**Geoffrey T. Yarranton, Winnersh; Gwynfor O. Humphreys, Wokingham; Martin K. Robinson; Celia A. Caulcott, both of Maidenhead, and Edwina M. Wright, Taplow, all of United Kingdom, assignors to Celltech Limited, Slough, United Kingdom**

**Continuation of Ser. No. 142,281, Dec. 30, 1987, abandoned, which is a continuation of Ser. No. 676,392, Nov. 20, 1984, abandoned. This application Dec. 5, 1988, Ser. No. 282,960**

**Claims priority, application United Kingdom, Mar. 25, 1983, 8308236**

**Int. Cl.$^5$ C12P *21/00, 19/34, 15/00, 1/20***

**U.S. Cl. 435—69.1** **18 Claims**

1. A DNA vector for use in procaryotic host cells comprising to replication systems that function in the same host cell; a first origin of replication resulting in a low copy number and stable inheritance of the vector, and a second, high copy number, origin of replication at which replication is directly controllable as the result of replacement or alteration by DNA manipulation of the natural vector sequence(s) which control replication at said second origin.

### 5,015,574

### DNA SEQUENCE INVOLVED IN GENE EXPRESSION AND PROTEIN SECRETION, EXPRESSION-SECRETION VECTOR INCLUDING THE DNA SEQUENCE AND THE METHOD OF PRODUCING PROTEINS BY USING THE EXPRESSION-SECRETION VECTOR

**Yoshio Furutani, Kanagawa; Akira Nakayama, Mobara; Masaru Honjo, Mobara; Hiroaki Shimada, Mobara; Kouichi Kawamura, Mobara; Izumi Mita, Mobara, and Akiko Akaoka, Mobara, all of Japan, assignors to Agency of Industrial Science and Technology and Extra-Ministerial Bureau of Ministry of International Trade and Industry, both of Tokyo, Japan**

**Filed Nov. 20, 1986, Ser. No. 932,587**

**Claims priority, application Japan, Nov. 25, 1985, 60-262663**

**Int. Cl.$^5$ C12N *15/00, 15/63, 15/75***

**U.S. Cl. 435—67.1** **33 Claims**

28. An recombinant DNA molecule comprising:

(a) a DNA sequence comprising a promoter region, a ribosome binding region and a 5'-region having a length within the range of 144 to 190 bases of a prepro-peptide coding region, said coding region having base pairs omitted from its 3'-end, all said regions being essentially those of the extracellular neutral protease gene of *Bacillus amyloliquefaciens;*

(b) a vector DNA derived from a plasmid or a phage capable of replicating in a host bacterium of the genus Bacillus; and

(c) a gene for a desired protein linked to the 3' end of said 5'-region through a linker so that the expression and secretion of the desired protein is directed by the DNA sequence (a), wherein the DNA sequence (a) has the following nucleotide sequence:

```
GATCTTAACA TTTTTCCCCT ATCATTTTTC
     CCGTCTTCAT TTGTCATTTT TTCCAGAAAA
     AATCGTCATT CGACTCATGT CTAATCCAAC
     ACGTCTCTCT CGGCTTATCC CCTGACACCG
     CCCGCCGACA GCCCGCATGG ACGAATCTAT
     CAATTCAGCC GCGGAGTCTA GTTTTATATT
     GCAGAATGCG AGATTGCTGG TTTATTATAA
     CAATATAAGT TTTCATTATT TTCAAAAAGG
     GGGATTTATT GTGGGTTTAG GTAAGAAATT
     GTCTAGTGCT GTAGCCGCTT CCTTTATGAG
     TTTAACCATC AGTCTGCCGG GTGTTCAGGC
     CGCTGAGAAT CCTCAGCTTA AAGAAAACCT
     GACGAATTTT GTACCGAAGC ATTCTTTGGT
                                      GCAA.
```

33. A method for producing a desired protein comprising:

(a) transforming a host bacterium of the genus Bacillus with a recombinant DNA molecule as claimed in any one of claims **28**, **29**, **30**, **31**, and **32**;

(b) culturing the resultant transformant in a culture medium to secrete the desired protein by expression of a gene for the protein encoded by the recombinant DNA molecule; and

(c) recovering the secreted protein from the culture medium.

---

### 5,015,575

### HYBRID DNA SYNTHESIS OF INSULIN

**Anthony J. Brake, Berkeley; Lawrence S. Cousens, San Francisco; Mickey S. Urdea, San Francisco, and Pablo D. T. Valenzuela, San Francisco, all of Calif., assignors to Chiron Corporation, Emeryville, Calif.**

**Continuation of Ser. No. 922,288, Oct. 23, 1986, Pat. No. 4,914,026, which is a continuation of Ser. No. 483,023, Apr. 7, 1983, abandoned. This application Feb. 13, 1990, Ser. No. 479,331**

**The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.**

**Int. Cl.$^5$ C12N *15/00, 2/00;* C12P *21/02, 21/00***

**U.S. Cl. 435—91** **6 Claims**

1. A DNA construct encoding a precursor of insulin capable of expression in yeast comprising a promoter sequence functional in yeast and a coding sequence under the control of said promoter sequence, said coding sequence encoding on expression a yeast alpha-factor leader sequence fused to a precursor of insulin.

---

### 5,015,576

### MACROPOROUS PARTICLES FOR CELL CULTIVATION OR CHROMATOGRAPHY

**Kjell Nilsson, Traktorgränden 4, S-222 51, Lund, and Klaus H. Mosbach, Lackalänga 31-38, S-244 02, Furulund, both of Sweden**

**Continuation-in-part of Ser. No. 919,325, Oct. 15, 1986, Pat. No. 4,935,365. This application Oct. 28, 1987, Ser. No. 114,421**

**Claims priority, application Sweden, Oct. 15, 1985, 85047645**

**The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.**

**Int. Cl.$^5$ C12P *21/08, 1/00;* C12N *11/02, 5/00***

**U.S. Cl. 435—70.21** **7 Claims**

1. A method for using macroporous particles in a bioreactor system for producing a biochemical product, said method comprising the steps of:

dissolving a water-soluble matrix material in an aqueous solvent to form an aqueous solution comprising said matrix material dissolved in said aqueous solvent;

mixing a sufficient amount of a water-insoluble liquid cavity generating compound with said aqueous solution of matrix material to form a dispersion of droplets of said liquid cavity generating compound in said aqueous solution;

adding additional liquid cavity generating compound to said dispersion in an amount sufficient to saturate said dispersion and form droplets of said dispersion dispersed in said liquid cavity generating compound;

solidifying said dispersed droplets to form beads of said matrix material having a large number of pores containing said liquid cavity generating compound dispersed therethrough;

separating said solidified beads from said liquid cavity generating compound;

removing said liquid cavity generating compound from the pores of said beads to form macroporous particles having a particle size of between about 10 to 500 micrometers and a large number of pores having diameters of between about 1–50 micrometers;

immobilizing an organism on said macroporous particles to produce an immobilized organism, said organism capable of producing said biochemical product;

charging said bioreactor system with said immobilized organism;

contacting said immobilized organism with a liquid reagent stream for culturing said immobilized organism; and

recovering said biochemical product from said bioreactor system.

7. A method for using macroporous particles as ion-exchangers in chromatography, said method comprising the steps of:

dissolving a water-soluble matrix material in an aqueous solvent to form an aqueous solution comprising said matrix material dissolved in said aqueous solvent;

VOL
1126
ISS
2
MY
14
1991
UMI

mixing a sufficient amount of water-insoluble liquid cavity generating compound with said aqueous solution of matrix material to form a dispersion of droplets of said liquid cavity generating compound in said aqueous solution;
adding additional liquid cavity generating compound to said dispersion in an amount sufficient to saturate said dispersion and form droplets of said dispersion dispersed in said liquid cavity generating compound;
solidifying said dispersed droplets to form beads of said matrix material having a large number of pores containing said liquid cavity generating compound dispersed therethrough;
separating said solidified beads from said liquid cavity generating compound; and
removing said liquid cavity generating compound from the pores of said beads to form said macroporous particles having a particle size of between about 10 to 500 micrometers and a large number of pores having diameters of between about 1-50 micrometers;
derivatizing said macroporous particles to form derivatized macroporous particles having ion-exchange groups;
preparing chromatography columns packed with said derivatized macroporous particles; and
using said chromatography columns for ion-exchange chromatography.

---

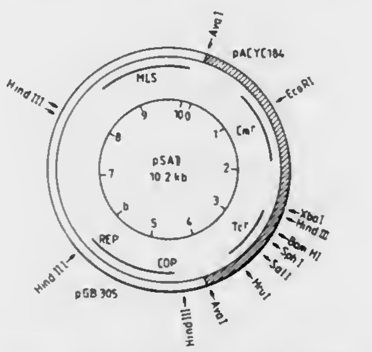
### 5,015,577
### DNA ENCODING HYALURONATE SYNTHASE

**Paul H. Weigel, Dickinson, and John Papaconstantinou, Galveston, both of Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.**

**Filed Aug. 29, 1989, Ser. No. 401,316**

**Int. Cl.$^5$ C12P** *19/04;* **C12N** *1/20, 9/10;* **C07H** *15/12*

**U.S. Cl. 435—101** **10 Claims**



1. A DNA segment isolated from a eukaryotic or prokaryotic source comprising a sequence encoding hyaluronate synthase.

---

### 5,015,578
### BMY-41950 ANTITUMOR ANTIBIOTIC

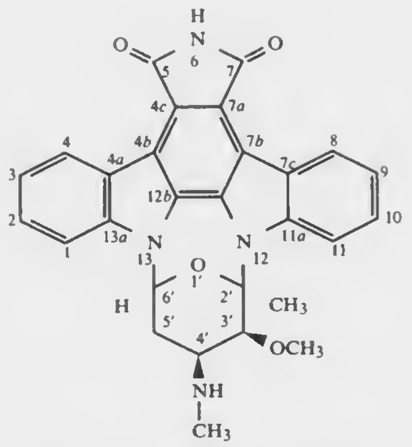
**Daniel Schroeder, Higganum; Kin S. Lam, Cheshire; Jacqueline Mattei, East Haven, and Grace A. Hesler, Branford, all of Conn., assignors to Bristol-Myers Squibb Company, New York, N.Y.**

**Continuation-in-part of Ser. No. 327,929, Mar. 23, 1989, abandoned. This application Feb. 20, 1990, Ser. No. 482,364**

**Int. Cl.$^5$ C12P** *17/00, 19/00;* **C12N** *1/20;* **C07H** *19/00*

**U.S. Cl. 435—119** **3 Claims**

1. A process for producing BMY-41950 having the formula



I

which comprises cultivating *Streptomyces staurosporeus* ATCC-55006 or a BMY-41950-producing mutant or variant thereof in an aqueous nutrient medium containing assimilable sources or carbon and nitrogen under submerged aerobic conditions until a substantial amount of BMY-41950 is produced by said organism in said culture medium and recovering the BMY-41950 from the culture medium.

---

### 5,015,579
### PRODUCTION OF (−)TRANS-2,3-EPOXYSUCCINIC ACID BY FERMENTATION

**Takamasa Yamaguchi, Suita, and Ikuo Nogami, Nagaokakyo, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Filed Feb. 10, 1987, Ser. No. 13,446**

**Claims priority, application Japan, Feb. 12, 1986, 61-29644; Jan. 17, 1987, 62-8611**

**Int. Cl.$^5$ C12P** *17/02;* **C12N** *1/14*

**U.S. Cl. 435—123** **2 Claims**

1. A method for producing (−)trans-2,3-epoxysuccinic acid which comprises
culturing filamentous fungi capable of producing (−)-trans-2,3-epoxysuccinic acid in a liquid medium wherein one of ammonia, sodium hydroxide or potassium hydroxide is added to maintain the culture medium in a pH range of 5.0 to 7.5 throughout the culturing period,
wherein said filamentous fungi are selected from the group consisting of *Aspergillus clavatus* (IFO 4362), *Aspergillus fumigatus* (IFO 7079), *Neosartorya fischeri* (IFO 8790), *Paecilomyces elegans* (IFO 6987), *Paecilomyces farinosus* (IFO 8581), *Talaromyces wortamannii* (IFO 7574), and *Byssochlamys nivea* (IFO 8815).

---

### 5,015,580
### PARTICLE-MEDIATED TRANSFORMATION OF SOYBEAN PLANTS AND LINES

**Paul Christou, Madison; Dennis McCabe, Middleton; William F. Swain, Madison, and Kenneth A. Barton, Middleton, all of Wis., assignors to Agracetus, Middleton, Wis.**

**Continuation-in-part of Ser. No. 79,658, Jul. 29, 1987, abandoned. This application May 12, 1988, Ser. No. 193,357**

**Int. Cl.$^5$ C12N** *15/00, 5/00;* **A01H** *1/00*

**U.S. Cl. 435—172.3** **24 Claims**

1. A method of making a genetically transformed soybean plant comprising the steps of:
preparing copies of a foreign gene including a coding region and flanking regulatory sequences effective to express the coding region in soybean cells;
joining copies of the foreign gene to biologically inert carrier particles;
placing an embryonic axis from a soybean seed on a target surface;

physically accelerating the particles carrying the foreign gene copies at the target surface in such a fashion that some particles lodge in the interior of at least some of the cells of the soybean embryonic acid;
inducing shoot formation directly from the embryonic axis by hormone treatment without intermediate proliferation of tissue in callus culture;
cultivating the shoot into a whole sexually mature soybean plant; and
verifying the existence of the foreign gene in the tissues of the regenerated plant.

---

### 5,015,581
### METHOD FOR PRODUCING THE HINC II RESTRICTION ENDONUCLEASE AND METHYLASE

**Jack S. Benner, II, Hamilton, and Phyllis A. Rees, Arlington, both of Mass., assignors to New England Biolabs, Inc., Beverly, Mass.**

**Filed Mar. 15, 1989, Ser. No. 324,402**

**Int. Cl.$^5$ C12N** *15/52, 9/22, 1/21*

**U.S. Cl. 435—172.3** **10 Claims**

1. Isolated DNA coding for the HincII restriction endonuclease, wherein the isolated DNA is obtainable from the vector p(pUC)HincIIRM-10-5.7.

---

### 5,015,582
### ISOLATED PHENYLALANINE DEHYDROGENASE GENE AND PROCESS FOR PRODUCTION OF PHENYLALANINE DEHYDROGENASE

**Yasuo Hibino; Yasuhisa Asano, both of Sagamihara, Japan; Noriko Okazaki, Rockville, Md., and Naganori Numao, Sagamihara, Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan**

**Continuation of Ser. No. 84,238, Aug. 11, 1987. This application May 10, 1990, Ser. No. 521,641**

**Claims priority, application Japan, Aug. 12, 1986, 61-187852; Nov. 27, 1986, 61-280654**

**Int. Cl.$^5$ C12N** *9/02, 1/02, 15/00;* **C07H** *15/12*

**U.S. Cl. 435—189** **8 Claims**

1. An isolated gene coding for phenylalanine dehydrogenase of *Sporosarcina urea* SCRC-R04 (FERM BP-1012).

---

### 5,015,583
### PROCESS FOR THE PURIFICATION OF PLASMINOGEN ACTIVATORS (PA)

**Eric P. Pâques, Marburg, Fed. Rep. of Germany, assignor to Behringwerke Aktiengesellschaft, Marburg/Lahn, Fed. Rep. of Germany**

**Continuation of Ser. No. 849,718, Apr. 9, 1986, abandoned. This application Dec. 12, 1988, Ser. No. 282,906**

**Claims priority, application Fed. Rep. of Germany, Apr. 11, 1985, 3512910**

**Int. Cl.$^5$ C12N** *9/48*

**U.S. Cl. 435—212** **19 Claims**

1. A process for the purification of a tissue plasminogen activator, which comprises bringing a solution containing tissue plasminogen activator or derivatives thereof into contact with a carrier-bound affinity material selected from the group consisting of polysulfates of a saccharide and sulfated sugars to create a loaded affinity column, removing the impurities from the loaded affinity column, and eluting the tissue plasminogen activator bound by the affinity material.

---

### 5,015,584
### EPIDERMAL GRAFT SYSTEM

**Miriam M. Brysk, Galveston, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.**

**Continuation-in-part of Ser. No. 108,338, Oct. 14, 1987, abandoned. This application Feb. 9, 1988, Ser. No. 153,957**

**Int. Cl.$^5$ C12N** *5/00;* **A61F** *2/10;* **A01N** *63/00*

**U.S. Cl. 435—240.23** **18 Claims**

7. A process for the preparation of a skin autograft composite, the process comprising:
obtaining human epidermal cells by a process involving treatment of a epidermal split-thickness human skin section with aqueous solution comprising a proteolytic enzyme to separate dermis and epidermis and separating epidermal cells from the section;
adding the epidermal cells to a collagen-coating immersed in a container containing a cell attachment eucaryotic cell medium comprising MCDB-153;
subculturing the epidermal cells in an undifferentiated state to facilitate cell growth; and
growing the subcultured epidermal cells in medium comprising MCDB-153 and on a collagen-coated synthetic surgical dressing to result in a skin autograft composite.

---

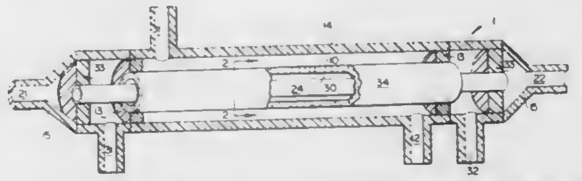
### 5,015,585
### METHOD AND APPARATUS FOR CULTURING AND DIFFUSIVELY OXYGENATING CELLS ON ISOTROPIC MEMBRANES

**James R. Robinson, 3326 Dyer Rd., Livermore, Calif. 94550**

**Filed Feb. 23, 1988, Ser. No. 159,015**

**Int. Cl.$^5$ C21N** *5/00;* **C12M** *3/04*

**U.S. Cl. 435—240.242** **3 Claims**



1. A method for culturing cells on isotropic polymer membranes, comprising the steps of:
immobilizing said cells in a cell growth chamber said chamber having at least two opposite sides thereof defined by a thickness of isotropic polymer membrane, and being bounded on all remaining sides by jacket means each thickness of said membrane having first and second surfaces, each of said first surfaces being directed inwardly with respect to said chamber and being separated by no more than 200 microns, and
wherein said chamber defined by said membranes and said jacket means is constructed of the same polymer material, and
passing nutrient fluid across said second surfaces of said membrane, and
diffusing said fluid through said membranes and into said growth chamber.

VOL
1126
ISS
2
MY
14
1991
UMI

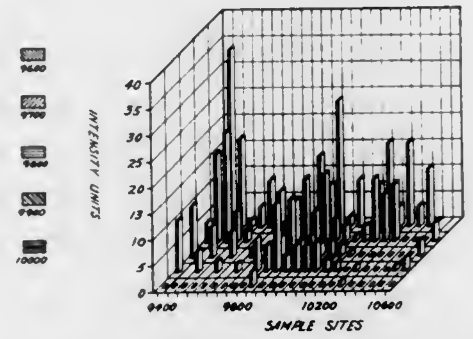
### 5,015,586

### METHOD AND APPARATUS USEFUL IN GEOCHEMICAL EXPLORATION FOR PETROLEUM OILS

**Shawn R. T. Severn, Victoria; Henry Rodriguez, Sidney; Renato R. A. Danesin, and Bryan E. Imber, both of Victoria, all of Canada, assignors to Banbury Gold Mines Ltd., Vancouver, Canada**

**Filed Nov. 13, 1989, Ser. No. 436,335**
**Int. Cl.⁵ G01N *33/24***

**U.S. Cl. 436—29** **1 Claim**



1. A geochemical method of exploring for petroleum oils, comprising:
   - contacting a soil sample from a geographical region with serum from a rabbit that has not been immunized with petroleum oils;
   - detecting binding of the rabbit serum to the sample; and
   - correlating the detected binding to the presence of petroleum oils in the geographical region from which the soil sample was obtained.

---

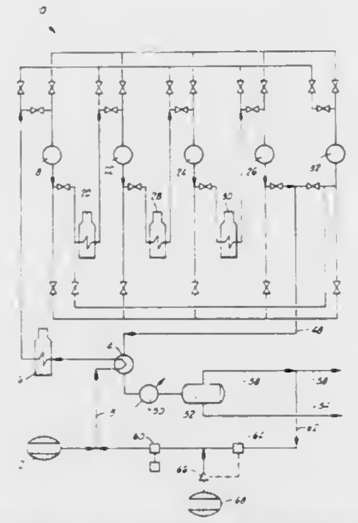
### 5,015,587

### REFORMER OPTIMIZATION FOR HEAD LIMITED RECYCLE SYSTEM

**Gary R. Patton, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Aug. 8, 1988, Ser. No. 230,009**
**Int. Cl.⁵ G01N *35/00***

**U.S. Cl. 436—55** **12 Claims**



7. In a catalytic reformer system having a catalytic reactor and centrifugal compressor for recycling a hydrogen stream from an outlet of said compressor to an inlet of said catalytic reactor, the improvement comprising injecting non-reactive gas into the hydrogen stream being recycled for controlling and maintaining a substantially constant molecular weight of the hydrogen and non-reactive gas mixture and thereby increasing a capacity of said compressor resulting in an increased amount of recycled hydrogen into said catalytic reactor.

---

### 5,015,588

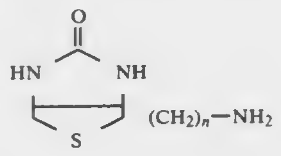
### METHOD FOR THE DETECTION OF FACTOR XIII IN PLASMA

**Kyung Lee; Manford K. Patterson, Jr., and Paul J. Birckbichler, all of Ardmore, Okla., assignors to The Samuel Roberts Noble Foundation, Inc.**

**Filed Oct. 29, 1987, Ser. No. 114,630**
**Int. Cl.⁵ G01N *33/573***

**U.S. Cl. 436—69** **9 Claims**

1. A method for quantitating blood coagulation Factor XIII in a plasma sample, comprising the steps of:
   - (a) desensitizing or removing intrinsic fibrinogen from the plasma sample to form a defibrinated plasma sample;
   - (b) incubating said defibrinated plasma sample with thrombin and $Ca^{2+}$ to activate Factor XIII to Factor XIIIa in said defibrinated plasma sample, thereby forming an activated plasma sample;
   - (c) incubating said activated plasma sample with a glutamine substrate and a primary amine derivative of biotin to form a biotinylated reaction product; and
   - (d) quantitating said biotinylated reaction product wherein said primary amine derivative of biotin is a compound of the general formula



wherein n=1, 2, 3, 4, 5, or 6.

---

### 5,015,589

### METHOD FOR DETECTING MATERNALLY TRANSFERRED DRUG METABOLITES IN NEWBORN INFANTS

**Enrique M. Ostrea, Jr., New Baltimore, Mich., assignor to Board of Governors of Wayne State University, Detroit, Mich.**

**Filed Oct. 28, 1988, Ser. No. 264,131**
**Int. Cl.⁵ G01N *33/00***

**U.S. Cl. 436—92** **8 Claims**

1. A method for assaying for maternally transferred morphine and cocaine metabolites in a newborn infant which consists essentially of:
   - (a) isolating meconium from the newborn infant which possibly contains the transferred metabolites from the mother;
   - (b) separating the metabolites from the meconium by mixing with acidic water and then treating the mixture to remove gross particulate matter and to provide an aqueous solution; and
   - (c) assaying the solution for the metabolites by an immunoassay using antibodies specific for morphine and cocaine.

---

### 5,015,590

### METHOD OF DETERMINING NITROGEN DIOXIDE CONCENTRATION IN A GAS SAMPLE WHICH CONTAINS OZONE

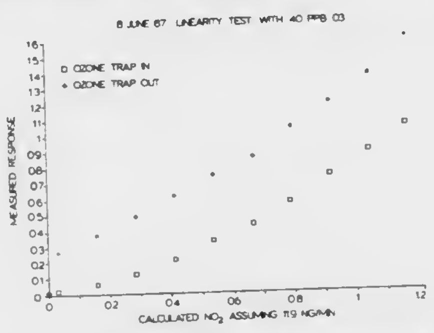
**John D. Kinrade, Egbert, Canada, assignor to Scintrex Limited, Concord, Canada**

**Filed Jun. 14, 1988, Ser. No. 207,114**
**Int. Cl.⁵ G01N *21/00***

**U.S. Cl. 436—117** **5 Claims**

1. In a method of determining the concentration of nitrogen dioxide in a gas sample containing nitrogen dioxide and ozone,

the improvement which comprises selectively removing said ozone from said gas sample prior to said determination by contacting said gas sample with a reducing agent having a redox potential below that of ozone and above or near that of nitrogen dioxide, said reducing agent being a multivalent metal compound selected from the group consisting of the lower valent form of antimony, arsenic, thallium, vanadium, manganese and copper oxides, sulfates, chlorides and nitrates.



---

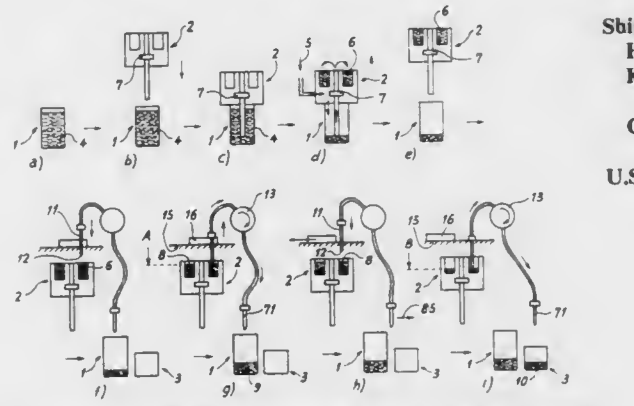
### 5,015,591

### METHOD AND APPARATUS FOR FILTERING AND METERING LIQUID SAMPLES

**Pierre-André Meyrat; Alain Oppliger, both of La Chaux-de-Fonds, and Denis Steiner, St-Imier, all of Switzerland, assignors to Nivarox-FAR S.A., Switzerland**

**Filed Oct. 12, 1988, Ser. No. 256,523**
**Claims priority, application Switzerland, Oct. 15, 1987, 04036/87**
**Int. Cl.⁵ B01L *3/02;* G01N *1/14***

**U.S. Cl. 436—178** **9 Claims**



1. Method of filtering and metering a liquid sample comprising the steps of
   - providing a first recipient in which is placed the sample to be filtered and metered, the volume of the sample comprising the desired quantity plus an excess,
   - providing a second recipient into which is decanted the sample contained in the first recipient, the volume decanted likewise comprising the desired quantity plus an excess,
   - interposing filtering means between the first and second recipients,
   - decanting into the first recipient a quantity of sample less than the excess quantity in the second recipient,
   - providing a third recipient into which is decanted from the second recipient the desired quantity of the liquid samples.

---

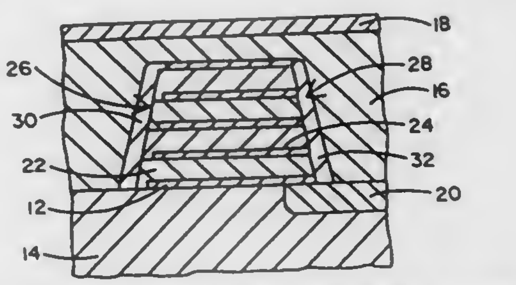
### 5,015,592

### METHOD OF FABRICATING A MULTI-LAYER METAL SILICIDE INFRARED DETECTOR

**Anton G. Moldovan, Irvine, Calif., assignor to Loral Aerospace Corp., New York, N.Y.**

**Division of Ser. No. 390,800, Aug. 8, 1989. This application Apr. 3, 1990, Ser. No. 504,195**
**Int. Cl.⁵ H01L *31/18***

**U.S. Cl. 437—4** **7 Claims**



1. A method of forming a multi-layered metal silicide infrared detector, comprising the steps of:
   - (a) providing a silicon substrate having a single contact pad formed of $N^+$ material therein;
   - (b) depositing a metal silicide layer on said substrate in such a position as to place a portion of said metal silicide layer in contact with said contact pad;
   - (c) depositing a stack including at least one set of alternating layers of silicon and the metal silicide over said metal silicide layer;
   - (d) interconnecting said metal silicide layers to each other and to said contact pad with a connecting layer fabricated of the same metal silicide as in said metal silicide layers; and
   - (e) interconnecting said silicon layers to each other and to said substrate with a connecting layer fabricated of silicon.

---

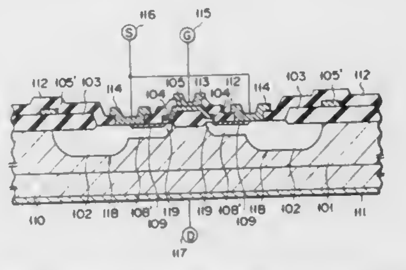
### 5,015,593

### METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE

**Shigeo Yawata; Kazuhisa Shibao, both of Hyogo, and Shun-ichi Hiraki, Nagareyama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 14, 1990, Ser. No. 522,787**
**Claims priority, application Japan, May 15, 1989, 1-121205**
**Int. Cl.⁵ H01L *21/265***

**U.S. Cl. 437—25** **7 Claims**



1. A method of manufacturing a semiconductor device comprising the steps of:
   - forming an insulation film on a semiconductor substrate;
   - depositing a polycrystalline semiconductor layer on said insulation film;
   - patterning said polycrystalline semiconductor layer to a desired configuration;
   - heat-treating for activation of the patterned polycrystalline semiconductor layer in an atmosphere containing oxygen at 900° to 1100° C.;
   - ion-implanting a desired impurity into said semiconductor substrate through said insulation film;

VOL
1126
ISS
2
MY
14
1991
UMI

heat-treating said semiconductor substrate in an inert gas atmosphere at 805° to 1050° C. to recrystallize the ion-implanted region of said semiconductor substrate; and
heat-treating said semiconductor substrate in an atmosphere at 900° to 1250° C. to diffuse the implanted impurity thereinto.

---

### 5,015,594

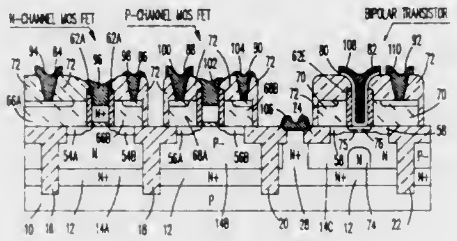
## PROCESS OF MAKING BICMOS DEVICES HAVING CLOSELY SPACED DEVICE REGIONS

**Shao-Fu S. Chu; San-Mei Ku, both of Poughkeepsie; Russell C. Lange, Wappingers Falls; Joseph F. Shephard, Hopewell Junction; Paul J. Tsang, Poughkeepsie, and Wen-Yuan Wang, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 24, 1988, Ser. No. 261,952**

**Int. Cl.$^5$ H01L *21/328, 21/335***

**U.S. Cl. 437—31** **14 Claims**



1. A method of forming at least one bipolar and two complementary metal oxide semiconductor transistors (BICMOS) comprising the steps of:
providing a body of semiconductor material including first, second, and third electrically isolated device regions, said first and second device regions adjacent each other and of opposite conductivity types;
forming first, second, and third studs over said first, second and third device regions, respectively, such that said first and second studs bisect said first and second device regions;
using said first and second studs as masks to form first and second doped regions adjoining opposite sides of said first and second studs in each of said first and second device regions, respectively, each of said first and second doped regions of opposite conductivity type to its associated device region;
forming first, second, and third insulating sidewalls on said first, second, and third studs, respectively;
forming a layer of conductive material generally conformally over said semiconductor body, said studs, and said sidewalls to a depth at least equal to the height of said sidewalls;
planarizing by chemically-mechanically polishing said layer of conductive material to a height generally equal to or less than the height of said sidewalls; and
patterning the planarized layer of conductive material, whereby to form spaced apart first and second contacts overlying said first and second doped regions in each of said first and second device regions, respectively, and an extrinsic base contact overlying said third device region;
removing said third stud while leaving the sidewall associated with said third stud to expose a portion of said third device region;
using said third sidewall as a mask to form, by out-diffusion from a solid dopant source, an intrinsic base region of opposite conductivity type to said third device region in the surface of said third device region; and
forming a vertical bipolar transistor in said third device region and first and second insulated gate transistors in said first and second device regions, respectively.

---

### 5,015,595

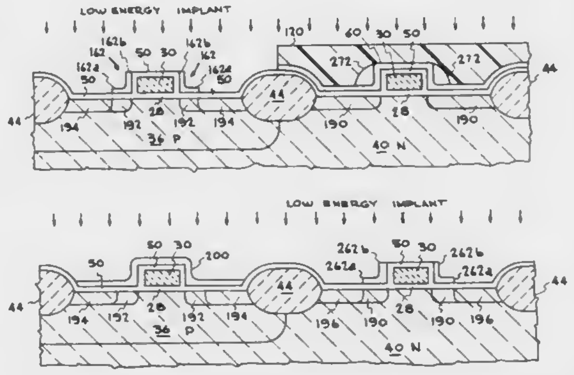
## METHOD OF MAKING A HIGH PERFORMANCE MOS DEVICE HAVING BOTH P- AND N- LDD REGIONS USING SINGLE PHOTORESIST MASK

**Donald L. Wollesen, Saratoga, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Sep. 9, 1988, Ser. No. 242,144**

**Int. Cl.$^5$ H01L *21/265***

**U.S. Cl. 437—31** **19 Claims**



1. An improved method for making an integrated circuit structure containing both PMOS and NMOS devices having lightly doped drain regions to avoid short channel and punchthrough problems characterized by the use of a single photoresist mask in the method which comprises:
(a) forming lightly doped source and drain (LDD) regions of a first conductivity type in a substrate adjacent to previously formed raised gate electrodes in a first implantation step;
(b) forming a shielding layer over said structure after said first implantation step;
(c) forming spacers of a different material than said shielding material over said shielding layer adjacent the sidewalls of said raised gate electrodes;
(d) forming said single photoresist mask over a portion of said structure containing one or more of said gate electrodes and LDD regions of a first conductivity type;
(e) selectively removing portions of said shielding layer not masked by said spacers or said photoresist mask;
(f) implanting portions of said substrate not covered by said photoresist mask or remaining portions of said shielding layer with a dopant of a second conductivity type to form source and drain regions for MOS devices of said second conductivity type;
(g) removing said spacers not covered by said photoresist mask, leaving el-shaped portions of said shielding layer comprising el-shaped shielding members having vertical portions adjacent the sides of said raised gate electrodes and horizontal portion extending over said substrate from said vertical portions a distance which approximates the width of said spacers to define LDD regions to be formed in said substrate;
(h) then forming lightly doped source and drain (LDD) regions of said second conductivity type adjacent gate electrodes not shielded by said photoresist mask by implanting said structure with a second conductivity type dopant at an energy level sufficient to penetrate said horizontal portions of said el-shaped shielding members;
(i) removing said el-shaped shielding members;
(j) growing a layer of oxide over the newly formed MOS devices of said second conductivity type to shield said second conductivity type MOS devices during subsequent formation of MOS devices of said first conductivity type;
(k) removing said single photoresist mask layer;
(l) selectively removing remaining portion of said shielding layer not under said remaining spacers leaving el-shaped portions of said shielding layer comprising el-shaped shielding members having vertical portions adjacent the sides of said raised gate electrodes and horizontal portion extending over said substrate from said vertical portions a distance approximately equal to the width of said spacers over said previously formed LDD regions of said first conductivity type in said substrate; and
(m) forming source and drain regions of said first conductivity type in the portion of said substrate not covered by said oxide layer adjacent said previously formed LDD regions of a first conductivity type, using said el-shaped shielding members as a mask;
whereby lightly doped source/drain (LDD) regions may be formed in an integrated circuit structure for both NMOS and PMOS devices using a single photoresist mask to provide lightly doped source/drain regions separating the channel regions of the substrate beneath said respective gate electrodes from said highly doped source/drain regions of said MOS devices.

---

### 5,015,596

## METHOD OF MAKING A GAAS JFET WITH SELF-ALIGNED P-TYPE GATE BY OUTDIFFUSION OF DOPONT FROM THE METALLIC GATE

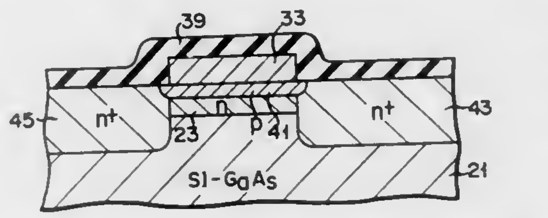
**Nobuyuki Toyoda; Naotaka Uchitomi, and Akimichi Hojo, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Division of Ser. No. 93,165, Sep. 3, 1987, abandoned, which is a continuation of Ser. No. 688,353, Jan. 2, 1985, abandoned. This application Feb. 8, 1990, Ser. No. 476,140**

**Claims priority, application Japan, Apr. 18, 1984, 59-77710**

**Int. Cl.$^5$ H01L *21/24***

**U.S. Cl. 437—41** **11 Claims**



1. A method of producing a GaAs JFET comprising the steps of:
forming an n type active layer in the surface region of a GaAs substrate;
forming a metal film with a high-melting point, containing a group II element, on said n type active layer;
patterning said high-melting point metal film to form a gate electrode;
ion-implanting an n type impurity at least in said n type active layer with a high concentration by using said gate electrode as an implantation-mask in a self-aligned fashion with respect to said gate electrode, an edge portion of said gate electrode corresponding to that of said implantation-mask; and
performing heat-treatment to diffuse said group II element, contained in said gate electrode, into said n type active layer for forming a p type gate and to activate the n type impurity implanted in the ion-implanting step to form a drain region and a source region.

---

### 5,015,597

## PROCESS FOR THE PRODUCTION OF AN INVERTED STRUCTURE, ACTIVE MATRIX DISPLAY SCREEN

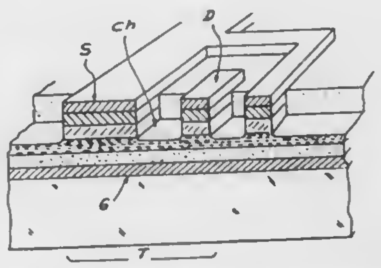
**Bruno Vinouze, Penvenan, and Yannick Chouan, Perros Guirec, both of France, assignors to French State represented by the Minister of Post, Telecommunications and Space (Centre National D'Etudes Des), Issy les Moulineaux, France**

**Filed Aug. 24, 1990, Ser. No. 573,340**

**Claims priority, application France, Aug. 29, 1989, 89 11331**

**Int. Cl.$^5$ H01L *21/312, 21/308;* G03C *5/00;* G02F *1/133***

**U.S. Cl. 437—41** **7 Claims**



1. Process for producing a wall for an active matrix display screen, characterized in that it comprises depositing in sequence on a transparent substrate (10) a stack of layers constituted by a first metallic layer (12), an insulating layer (14), a semiconducting layer (16), a highly doped semiconducting layer (18) and optionally a second conducting layer (20), a first photoetching takes place through a first masking level so as to only leave behind stack lines (L1,L2,L3, etc.), the stack lines are then is covered with negative photosensitive material (22) in order to obtain, between the stack lines, a layer having a thickness equal to that of said stack, the resultant structure is irradiated through the transparent substrate (10), the first metallic layer (12) of the stack rows serving as an opaque mask, the non-irradiated resin located above the stack rows is removed, said resin only being left between the stack rows (L1,L2, etc.), followed by planarization of the structure and annealing of the resin, a transparent conductive layer (30) is deposited on the structure and said layer undergoes photoetching to form a second masking level, defining columns and blocks provided with a finger parallel to the columns, the columns and block fingers overlapping the stack rows (L1,L2,L3 etc.) and the columns and blocks, as well as the fingers of the latter, are used as a mask for etching the second metallic layer (20) and the doped semiconducting layer (18), which leaves transistors (T) having as gate (G) the first metallic layer (12) deposited on the substrate, as the drain (D) the block finger, as source (S) the column and as channel (Ch) the semiconducting layer (16) beneath the etched zone between the column and the block finger.

---

### 5,015,598

## METHOD OF MANUFACTURING A DEVICE COMPRISING MIS TRANSISTORS HAVING A GATE ELECTRODE IN THE FORM OF AN INVERTED "T"

**Robertus D. J. Verhaar, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 25, 1990, Ser. No. 588,116**

**Claims priority, application France, Nov. 3, 1989, 89 14435**

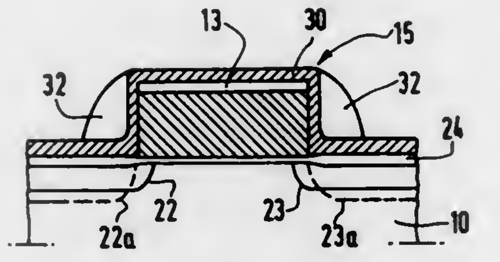
**Int. Cl.$^5$ H01L *21/265***

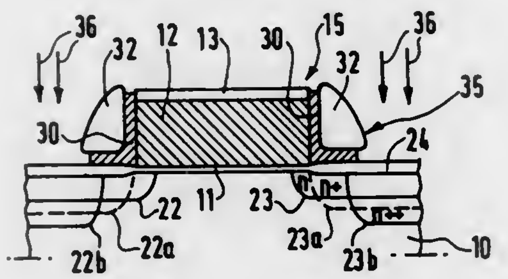
**U.S. Cl. 437—44** **10 Claims**

1. A method of manufacturing a semiconductor device comprising at least one transistor of the MIS type having a source region and a drain region each comprising a weakly doped part and a highly doped part slightly offset laterally with respect to the weakly doped part, and a gate electrode in the form of an inverted "T", which covers the weakly doped part and extends laterally towards the highly doped part, which method comprises the following steps, starting from a semiconductor body covered by an insulating gate layer:

VOL
1126
ISS
2
MY
14
1991
UMI

a deposition of a first polycrystalline layer rendered conducting by doping,
the formation of a first insulating layer for its later use as an etch stopper,
the deposition of a second polycrystalline conducting layer,
a combination of operations consisting first in limiting gate islands serving inter alia as a mask for the implantation of the weakly doped parts of the source and drain regions, and then in forming widened gate islands by means of one of the two polycrystalline conductive layers limited at the periphery of the preceding islands by insulating spacers formed from a second insulating layer, the part maintained of the second polycrystalline layer being in electrical continuity with the part maintained of the first polycrystalline layer, and
the ion implantation of the highly doped parts of the source and drain regions, using these widened source islands as an implantation mask, characterized in that, after the first insulating layer has been formed, there are successively effected:
limitation of the gate islands by successive etching treatments of the first insulating layer and of the first polycrystalline layer,
formation of provisional narrow spacers for the protection against oxidation of the edges of the gate islands by deposition of a layer of oxidation-preventing material followed by an anisotropic etching of the major part of this layer,
ion implantation of the weakly doped parts of the source and drain regions, using the gate islands provided with the provisional spacers as an implantation mask,
re-oxidation of the parts of the device not protected by the provisional spacers,
removal by selective etching of the provisional spacers,
deposition of the second polycrystalline layer,
formation of insulating spacers obtained by deposition of a second insulating layer followed by an anisotropic etching of the major pat of said second insulating layer,
formation of widened gate islands by selective etching of the major part of the second polycrystalline layer, using on the one hand the insulating spacers as a protection mask and the first insulating layer as an etch stopper,
ion implantation of the highly doped parts of the source and drain regions while using the widened gate islands as an implantation mask, and
operations for finishing the device with respect to the contact connections and to the electrical connections with the active regions and the gates of the transistors.





---

### 5,015,599

## METHOD OF MANUFACTURING A DEVICE COMPRISING MIS TRANSISTORS HAVING A PROJECTING GATE ON THE WEAKLY DOPED PARTS OF SOURCE AND DRAIN REGIONS

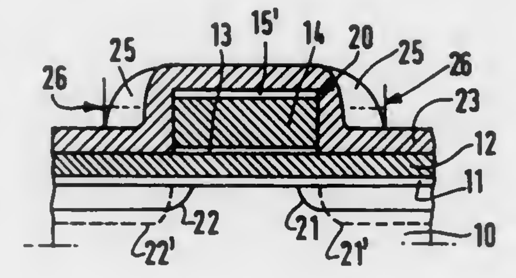
**Robertus D. J. Verhaar, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, Tarrytown, N.Y.**

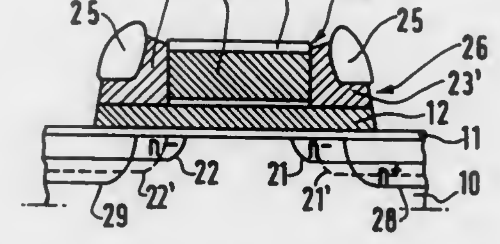
**Filed Sep. 25, 1990, Ser. No. 588,118**

**Claims priority, application France, Nov. 3, 1989, 89 14434**

**Int. Cl.$^5$ H01L *21/265***

U.S. Cl. 437—44 18 Claims





1. A method of manufacturing a semiconductor device comprising at least one transistor of the MIS type having a drain region and a source region each comprising a weakly doped part and a highly doped part slightly offset laterally with respect to the preceding part as well as a gate electrode covering the weakly doped part and extending laterally to the highly doped part, in which method there are successively effected on a semiconductor body covered by an insulating gate layer:
a deposition of a first polycrystalline layer conducting by doping,
the formation of a first insulating thin layer for later use as an etch stopper,
a deposition of a second polycrystalline conducting layer which is thicker than the first polycrystalline layer,
the formation of a second insulating layer which is thicker than the first insulating layer,
the definition of gate islands by local etching of the second insulating layer and of the second polycrystalline layer outside the islands,
the ion implantation of the weakly doped parts of the source and drain regions while using the gate islands as an implantation mask,
the formation of insulating spacers on the edges of the gate islands by a deposition of a third insulating layer followed by an anisotropic etching of the major part of this layer, the insulating spacers limiting at their periphery widened gate islands,
the removal by selective etching of the polycrystalline material exposed outside the widened gate islands,
the ion implantation of the highly doped parts of the source and drain regions while using the widened gate islands as an implantation mask, and then
the operations of finishing the device necessary for providing the contact connections and the interconnection with the active regions and with the gates of the transistors is characterized in that use is made of a first insulating layer

having a thickness exceeding that which permits obtaining an electrical conduction between the first and second polycrystalline layers; in that, after having carried out the ion implantation of the weakly doped parts of the source and drain regions, the parts of the first insulating layer situated outside the gate islands are removed by etching; and in that then a third polycrystalline layer is deposited on the assembly, which is rendered conducting by doping before the insulating spacers are formed.

---

### 5,015,600

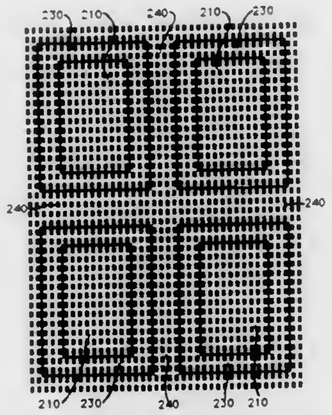
## METHOD FOR MAKING INTEGRATED CIRCUITS

**Frederick C. Livermore, Stittsville; John G. Hogeboom, Nepean, and Go S. Sunatori, Hull, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Jan. 25, 1990, Ser. No. 470,027**

**Int. Cl.$^5$ H01L *21/44***

U.S. Cl. 437—51 9 Claims



1. A method for making integrated circuits, comprising:
providing a semiconductor substrate carrying a plurality of unconnected drive devices at regularly spaced identical regions of the substrate and plurality of unconnected logic devices at substantially all regions of the substrate other than the regions carrying drive devices; and
forming at least one interconnection layer on the substrate to interconnect selected ones of the drive devices and the logic devices to define a plurality of integrated circuits, each integrated circuit being capable of performing a desired electronic function, the integrated circuits being separated by regions containing unconnected devices.

---

### 5,015,601

## METHOD OF MANUFACTURING A NONVOLATILE SEMICONDUCTOR DEVICE

**Kuniyoshi Yoshikawa, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

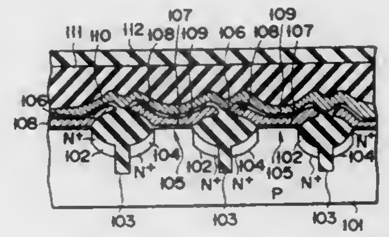
**Filed Jul. 18, 1990, Ser. No. 553,592**

**Claims priority, application Japan, Jul. 25, 1989, 1-191839**

**Int. Cl.$^5$ H01L *21/76***

U.S. Cl. 437—67 3 Claims

1. A method of manufacturing a nonvolatile semiconductor device, comprising the steps of:
forming embedded layers of a second conductivity type in a semiconductor substrate of a first conductivity type;
forming a channel region between the embedded layers by ion implantation, and then forming a first gate insulation film on the channel region;
forming an insulation film which is thicker than the first gate insulation film and located on the embedded layer;
forming a first gate electrode above the channel region such that the first gate electrode is kept in an electrically floating condition by the first gate insulation film, said first gate electrode being formed for each element;
forming a trench which extends through the insulation film and the embedded layer and reaches the interior of the semiconductor substrate, thereby dividing the embedded layer into a source region and a drain region;
filling the trench with an insulating material, thereby insulating and isolating one element from an adjacent one;



forming a second insulation film over the resultant semiconductor structure; and
forming a second gate electrode on the first gate electrode, the insulation film, and the trench, so as to electrically connect one element to the adjacent one.

---

### 5,015,602

## METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE HAVING A PLANARIZED CONSTRUCTION

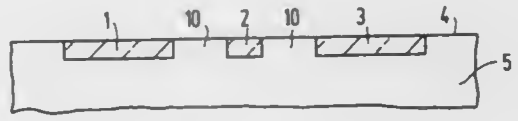
**Paulus A. Van Der Plas, and Reinier De Werdt, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

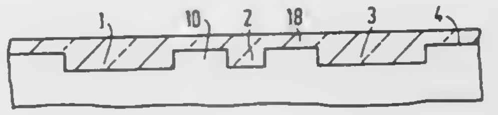
**Continuation of Ser. No. 219,518, Jul. 15, 1988, abandoned. This application May 10, 1990, Ser. No. 522,490**

**Claims priority, application Netherlands, Jul. 21, 1987, 8701717**

Int. Cl.$^5$ H01L *21/31, 21/76*

U.S. Cl. 437—67 18 Claims





1. A method of manufacturing a semiconductor device comprising the steps of
(a) forming at least one depression into a semiconductor substrate,
(b) covering said semiconductor substrate with at least one first layer, said at least one first layer completely filling said at least one depression, and said at least one first layer including a layer of a filling material,
(c) removing a portion of the thickness of said at least one first layer from said semiconductor substrate,
(d) covering said at least one first layer with a second layer having a planarized surface, and
(e) respectively etching said second layer and said at least one first layer at substantially the same etching rate to completely remove said second layer and to at least reduce a substantial thickness of said at least one first layer, and

VOL 1126
ISS 2
MY 14
1991
UMI

wherein step (e) is carried out until said at least one first layer is etched down to said semiconductor substrate.

---

### 5,015,603

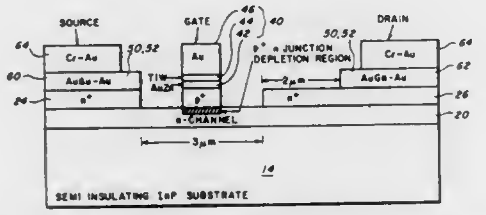
### TIW DIFFUSION BARRIER FOR AUZN OHMIC CONTACT TO P-TYPE INP

**John B. Boos, Springfield, Va.; Nicolas A. Papanicolaou, Silver Spring, Md., and Tung H. Weng, Rochester, Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Division of Ser. No. 208,444, Jun. 17, 1988, Pat. No. 4,816,881, which is a continuation of Ser. No. 749,238, Jun. 27, 1985, abandoned. This application Dec. 28, 1988, Ser. No. 291,479**

**Int. Cl.$^5$ H01L** *29/80*

**U.S. Cl. 437—184** **3 Claims**



1. A process for fabricating an Indium-Phosphide semiconductor device comprising the steps of:

- forming a prepared major surface on an Indium-Phosphide substrate of a semi-insulating material with an active region of n type semiconductivity within the substrate below the surface and with a surface region of p type semiconductivity within the substrate extending from the major surface and forming a p-n junction with the active region of n type semiconductivity; and
- fabricating a layered ohmic contact on at least a portion of the surface region of p type semiconductivity by the process comprising the steps of:
  - depositing a layer of Gold-Zinc alloy contiguous with the portion of the major surface by coevaporation of Gold and Zinc from separate sources;
  - depositing a layer of Titanium-Tungsten alloy contiguous with the layer of Gold-Zinc alloy;
  - depositing layer of metal contiguous with the layer to Titanium-Tungsten alloy; and
  - attaching the contact to at least a portion of the major surface.

---

### 5,015,604

### FABRICATION METHOD USING OXIDATION TO CONTROL SIZE OF FUSIBLE LINK

**Sheldon C. P. Lim, Sunnyvale; Julie W. Hellstrom, Santa Clara, and Ting P. Yen, Fremont, all of Calif., assignors to North American Philips Corp., Signetics Division, Sunnyvale, Calif.**

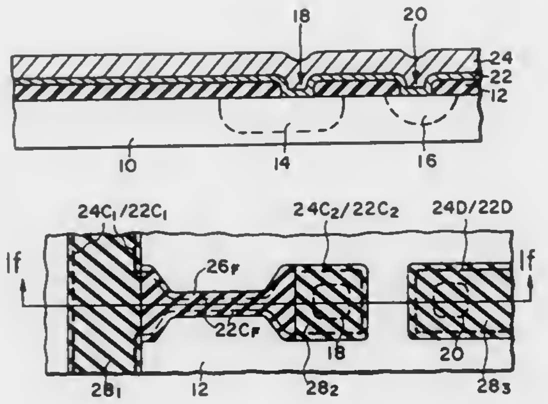
**Filed Aug. 18, 1989, Ser. No. 395,926**

**Int. Cl.$^5$ H01L** *21/44*

**U.S. Cl. 437—195** **12 Claims**

1. A method in which a fusible link is formed on a base structure comprising a main body and a first dielectric layer located along a surface of the body, the method entailing the step of providing the base structure with a patterned barrier metal layer and a patterned primary metal layer to create a further structure in which (a) the barrier metal layer lies on the first dielectric layer, (b) a main portion of the barrier metal layer comprises a pair of end sections and a fusible intermediate section extending between the end sections, and (c) part of the primary metal layer lies on at least one of the end sections but not on the intermediate section; characterized by performing the following steps while the further structure is in a deposition chamber without removing the further structure from the deposition chamber between the steps:

- growing barrier metal oxide along exposed material of the barrier metal layer by oxidizing the exposed material to a prescribed depth in order to thin the intermediate section; and



- depositing a second dielectric layer on the barrier metal oxide and over material of the primary metal layer.

---

### 5,015,605

### PROCESS FOR PREPARING HIGHLY POROUS GLASS-CERAMIC MOLDED PARTS

**Volker Frey; Bernd Pachaly, and Norbert Zeller, all of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany**

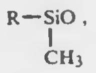
**Filed Jun. 13, 1988, Ser. No. 206,146**

**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1987, 3722597**

**Int. Cl.$^5$ F27B** *9/04, 9/10*

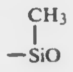
**U.S. Cl. 501—12** **5 Claims**

1. A process for preparing highly porous glass-ceramic molded parts having carbon atoms linked to silicon atoms, which comprises heating a molded part containing an organopolysiloxane which is solid at room temperature and consists of units of the formula



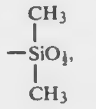
$$R-\underset{\displaystyle CH_3}{\underset{|}{SiO}},$$

where R is a radical selected from the group consisting of



$$\overset{\displaystyle CH_3}{\overset{|}{-SiO}}$$

and



$$\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{-SiO_{1/2}}}}},$$

which is linked via a single silicon-silicon bond and is obtained from a sol-gel process, in a nonoxidizing atmosphere or in vacuo at temperatures of from 700° to 1300° C. until a highly porous glass ceramic part is formed.

---

### 5,015,606

### LIGHTWEIGHT CERAMIC MATERIAL FOR BUILDING PURPOSES

**Rudiger Lang, Minden, and Bernd Meyer, Bremen, both of Fed. Rep. of Germany, assignors to Effem GmbH, Verden/Aller, Fed. Rep. of Germany**

**Continuation of Ser. No. 297,987, Jan. 17, 1989, abandoned, which is a division of Ser. No. 75,203, Jul. 17, 1987, Pat. No. 4,824,811, which is a continuation of Ser. No. 810,040, Dec. 17, 1985, abandoned. This application Feb. 1, 1990, Ser. No. 474,639**

**Claims priority, application Fed. Rep. of Germany, Apr. 19, 1984, 3414967**

**Int. Cl.$^5$ C04B** *38/00*

**U.S. Cl. 501—84** **11 Claims**

1. A lightweight ceramic material for use in building purposes, as a thermal and/or noise insulating material or as an aggregate for high temperature building materials, furnance building materials and/or refractory building materials, having a porosity of 50 to 300 volume parts of pores per 100 volume parts of solid material and a bulk density of 300 to 700 g/liter, prepared by the process which comprises forming a starting mixture containing 45 to 80 parts by weight of a clay selected from the group consisting of brick clay, Westerwald stoneware clay, fine stoneware clay, kaolin, montmorillonite, bentonite and marl, 0 to 50 parts by weight of an aggregate selected from the group consisting of calcite, quartz sand, dolomite, feldspar, chamotte, sepiolite, sawdust and coal, 15 to 30 parts by weight of water, 0.01 to 0.03 parts by weight of a deflocculant and 0.001 and 0.01 parts by weight of a surfactant; foaming the starting mixture under pressure at a pressure of 1 to 10 bar by compressed air at a temperature between ambient temperature and 95° C. to form a foam; molding and drying the foam to give a dried clay blank; and firing the dried clay blank at a product temperature between 600° and 1400° C.

---

### 5,015,607

### PREPARATION OF BORON/NITROGEN PRECERAMIC POLYMERS

**Pierre Ardaud, Sainte Foy les Lyon; Jean-Jacques LeBrun, Pierre Benite, and Gerard Mignani, Lyon, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France**

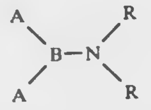
**Filed Apr. 3, 1989, Ser. No. 332,076**

**Claims priority, application France, Apr. 1, 1988, 88 04365**

**Int. Cl.$^5$ C04B** *35/46, 35/48*

**U.S. Cl. 501—96** **20 Claims**

1. A process for the preparation of a boron/nitrogen or boron/nitrogen/silicon cyclic preceramic polymer, comprising reacting (a) the product of the bulk thermolysis of a compound of Formula (1):



(1)

in which A is a halogen atom and R is a hydrogen atom, a hydrocarbon radical, or an organosilyl or hydrogenoorganosilyl radical, with (b) ammonia or an amino compound which comprises at least one —$NH_2$ group.

---

### 5,015,608

### HIGH HARDNESS SILICON NITRIDE SINTERED BODIES

**Tadaaki Matsuhisa, Kasugai, and Issei Hayakawa, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Nagoya City, Japan**

**Continuation of Ser. No. 132,260, Dec. 14, 1987, abandoned. This application Jul. 12, 1989, Ser. No. 379,704**

**Claims priority, application Japan, Dec. 27, 1986, 61-310209**

**Int. Cl.$^5$ C04B** *35/58*

**U.S. Cl. 501—97** **13 Claims**

13. A hot isostatic pressed high hardness silicon nitride sintered body for use as a bearing material consisting essentially of 10–50 wt% $\alpha$-$Si_3N_4$ with the remainder being $\beta$-$Si_3N_4$, said body being formed by a method comprising:

- mixing $Si_3N_4$ powder, predominantly consisting of 96% by weight $\alpha$-$Si_3N_4$, with 3–7 wt% $Y_2O_3$, 1–4 wt% MgO and 1–2 wt% $ZrO_2$ powders to form an initial mixture;
- pulverizing said initial mixture to form a resultant mixture;
- drying said resultant mixture to form a powder;
- shaping said powder to form a shaped powder compact;
- pressureless sintering said shaped powder compact to form a sintered body; and
- hot isostatic pressing said sintered body in an $N_2$ atmosphere at a pressure of 400 atm and a temperature of about 1530–1750° C. to form a hot pressed sintered body;
- wherein said hot isostatic pressed sintered body has a Knoop hardness of not less than 15.5 GPa, a bending strength of not less than 100 $kg/mm^2$ and a rolling fatigue life of not less than $1 \times 10^7$ cycles.

---

### 5,015,609

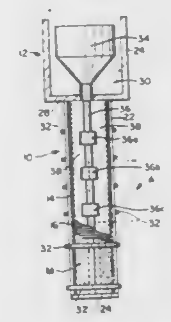
### CERAMIC COMPOSITE STRUCTURES HAVING INTRINSICALLY FITTED ENCASEMENT MEMBERS THEREON AND METHODS OF MAKING THE SAME

**Marc S. Newkirk, Newark, and H. Daniel Lesher, Wilmington, both of Del., assignors to Lanxide Technology Company, LP, Newark, Del.**

**Division of Ser. No. 212,071, Jun. 24, 1988, Pat. No. 4,822,759, Continuation of Ser. No. 908,073, Sep. 16, 1986, abandoned. This application Mar. 30, 1989, Ser. No. 331,280**

**Int. Cl.$^5$ C04B** *35/58*

**U.S. Cl. 501—127** **18 Claims**



1. A self-supporting ceramic composite structure comprising a filler, a polycrystalline ceramic matrix embedding said filler, said ceramic matrix comprising an interconnected oxidation reaction product of a precursor metal with an oxidant, and an encasement member comprising a sleave means superimposed onto said filler for maintaining said ceramic composite structure under compressive stress upon intimate engagement with said ceramic matrix developed in situ by intrinsic fit.

---

### 5,015,610

### POROUS CERAMIC COMPOSITE WITH DENSE SURFACE

**Ratnesh K. Dwivedi, Wilmington, Del., assignor to Lanxide Technology Company, LP, Newark, Del.**

**Division of Ser. No. 908,119, Sep. 16, 1986. This application Sep. 28, 1989, Ser. No. 414,183**

**Int. Cl.$^5$ C04B** *35/02*

**U.S. Cl. 501—127** **10 Claims**

1. A self-supporting ceramic composite article having a porous ceramic core bearing a dense ceramic surface layer formed by a method comprising the steps of:

(a) preparing a preform comprising a filler material and a parent metal distributed through said filler material and wherein the volume percent of parent metal is sufficient to form a volume of oxidation reaction product which exceeds the total spatial volume available within said preform;

VOL
1126
ISS
2
MY
14
1991
UMI

(b) melting said parent metal in the presence of an oxidant and reacting the resultant molten parent metal on contact therewith to form an oxidation reaction product;
(c) transporting said molten parent metal within said oxidation reaction product towards said oxidant to continue forming oxidation reaction product within said preform, thereby substantially filling said total spatial volume, and concurrently forming voids substantially throughout said preform which at least partially inversely replicate the geometry of said parent metal; and
(d) continuing said reaction for a time sufficient to transport molten parent metal through said oxidation reaction product towards said oxidant and to at least one surface of said preform to form a dense surface layer comprising an oxidation reaction product on said at least one surface, said dense surface layer being substantially free of voids.

---

### 5,015,611
### WATER REGENERATION OF DEACTIVATED CATALYST

**Danford E. Clark, Fountain Valley, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 457,554, Dec. 27, 1989, abandoned. This application Feb. 28, 1990, Ser. No. 486,533**

**Int. Cl.$^5$ B01J** *23/94, 38/48, 38/14;* **C10G** *45/08*

**U.S. Cl. 502—20** **40 Claims**

1. A method for regenerating a deactivated hydroprocessing catalyst by contacting the deactivated catalyst with an amount of water insufficent to saturate the deactivated catalyst but greater than about 0.5 weight percent of said deactivated catalyst and, subsequently, contacting the deactivated catalyst with free oxygen-containing gas at an elevated temperature in the range from about 300° F. to about 1050° F. for a time sufficient to remove a portion of sulfur deposits from said deactivated catalyst.

---

### 5,015,612
### OLEFIN POLYMERIZATION CATALYST SUBJECTED TO PRELIMINARY POLYMERIZATION TREATMENT

**Mamoru Kioka, Iwakuni; Masao Nakano, Yamaguchi; Kenji Doi, and Akinori Toyota, both of Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Filed Sep. 14, 1989, Ser. No. 407,437**

**Claims priority, application Japan, Sep. 14, 1988, 63-231213; Sep. 14, 1988, 63-231214**

**Int. Cl.$^5$ C08F** *4/654*

**U.S. Cl. 502—133** **9 Claims**

1. An olefin polymerization catalyst component subjected to preliminary polymerization treatment, which is formed by subjecting an olefin polymerization catalyst component (X), which is formed from
(A) a solid titanium catalyst component containing magnesium, titanium, halogen and an electron donor as essential ingredients; and which is formed by contacting magnesium compound, electron donor and titanium compound
(B) an organoaluminum compound catalyst component, and optionally,
(C) an electron donor, to successive preliminary polymerization treatment using each of a straight chain alpha-olefin having 2 to 5 carbon atoms and 3-methyl-1-butene, said component containing 0.1 to 300 g of a polymerization unit of the straight chain alpha-olefin having 2 to 5 carbon atoms and 0.1 to 100 g of a polymerization unit of 3-methyl-1butene, each per g of the solid part of the polymerization catalyst component (X).

---

### 5,015,613
### METAL DRIER COMPOSITIONS

**Christopher J. Hardiman, Belchertown, and Gary R. Bowers, Westfield, both of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 300,008, Jan. 23, 1989, Pat. No. 4,904,738, which is a division of Ser. No. 49,573, May 13, 1987, Pat. No. 4,839,100. This application Jan. 16, 1990, Ser. No. 464,850**

**Int. Cl.$^5$ C08F** *4/78*

**U.S. Cl. 502—170** **4 Claims**

1. A free radical polymerization catalyst comprising a metal drier and at least one molybdenum compound having a solubility in methyl ethyl ketone, ethanol or toluene of at least about 0.1 percent by weight wherein the molybdenum compound is selected from the group consisting of molybdenum dioxide dichloride, phosphomolybdic acid and molybdenum dioxide bis (2,4-pentanedione).

---

### 5,015,614
### NOVEL ALUMINA SUPPORT MATERIALS

**William C. Baird, Jr., Baton Rouge, La., and Ehsan I. Shoukry, Brights Grove, Canada, assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed Jul. 3, 1989, Ser. No. 375,225**

**Int. Cl.$^5$ B01J** *21/12, 23/03*

**U.S. Cl. 502—250** **18 Claims**

1. A modified alumina support material for reforming catalysts comprised of alumina and a modifier comprised of about 100 to 500 wppm Si and at least 10 wppm of one or more alkaline earth metals selected from Ca, Mg, Ba, and Sr, wherein the total amount of modifier does not exceed about 5,000 wppm.

---

### 5,015,615
### MOLDED ARTICLES BASED ON PYROGENICALLY PREPARED ALUMINUM OXIDE AND PROCESS FOR THEIR PRODUCTION

**Klaus Deller, Hainburg; Rainhard Klingel, Alzenau, and Helmfried Krause, Rodenbach, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Continuation of Ser. No. 308,124, Feb. 9, 1989, abandoned. This application Mar. 7, 1990, Ser. No. 492,397**

**Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803897**

**Int. Cl.$^5$ B01J** *21/04, 21/12, 32/00*

**U.S. Cl. 502—263** **6 Claims**

1. A molded article based on pyrogenically prepared aluminum oxide and having the following physical-chemical characteristic data:

| | |
|---|---|
| External diameter: | 2 to 15 mm |
| BET surface area: | 60 to 115 $m^2/g$ |
| Total Pore volume: | 0.30 to 0.80 ml/g |
| Crushing strength: | 100 to 300N |
| Pore size distribution: | no pores < 5 nm in diameter, at least 80% of the pores in the range 10 to 40 nm in diameter |
| Composition: | 94% to 99% by weight of $Al_2O_3$, remainder $SiO_2$. |

---

### 5,015,616
### COMPOSITION FOR CATALYTICALLY CLEANING EXHAUST GAS AND TO IMPROVE THE SENSITIVITY OF SENSORS

**Satoshi Sekido, Yawata; Hirokazu Tachibana, Kyoto, and Yasuharu Yamamura, Katano, all of Japan, assignors to Research Association of Electric Conductive Inorganic Compounds, Tokyo, Japan**

**Continuation of Ser. No. 300,229, Jan. 23, 1989, abandoned, which is a continuation of Ser. No. 74,711, Jul. 17, 1987, abandoned, which is a division of Ser. No. 826,495, Dec. 23, 1985, Pat. No. 4,692,429. This application Oct. 27, 1989, Ser. No. 428,029**

**Claims priority, application Japan, Apr. 25, 1984, 59-84353; May 30, 1984, 59-109812; Jul. 6, 1984, 59-140878**

**Int. Cl.$^5$ B01J** *21/06, 23/02, 23/10, 23/78, 23/84, 23/86*

**U.S. Cl. 502—303** **12 Claims**

1. A composition consisting essentially of a mixture of $Sr_{(1+x)/2}La_{(1-x)/2}Co_{1-x}Me_xO_{3-\delta}$ wherein $0<x\leqq 1$; $\delta$ represents loss of oxygen, and Me is at least one of Fe, Mn, Cr and V;

and $SrMéO_3$, wherein Mé is at least one of Ti, Zr and Hf.

---

### 5,015,617
### CATALYST FOR PURIFYING EXHAUST GAS AND METHOD FOR PRODUCTION THEREOF

**Tomohisa Ohata; Kazuo Tsuchitani, and Shinya Kitaguchi, all of Himeji, Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan**

**Filed Apr. 12, 1989, Ser. No. 336,700**

**Claims priority, application Japan, Apr. 14, 1988, 63-90310; Apr. 14, 1988, 63-90311**

**Int. Cl.$^5$ B01J** *21/06*

**U.S. Cl. 502—304** **25 Claims**

1. A catalyst for purifying exhaust gas produced by coating honeycomb carriers of monolithic structure with a catalyst composition comprising [10-50% by weight of ](1) cerium oxide particles dispersed on (a) zirconia or (b) zirconia and at least one member selected from the group consisting of yttria and calcia, said dispersed particles being obtained by impregnating zirconium oxide or hydroxide having a specific surface area of from 60–200 mg. with a solution of (i) a cerium salt or (ii) a cerium salt and at least one salt selected from the group consisting of yttrium salts and calcium salts, drying and then calcining the resultant impregnated particles, wherein said cerium oxide is contained in a range of 10 to 50% by weight based on said zirconia and the chart of the x-ray diffraction spectrum thereof does not show a peak for the crystalline form of cerium oxide, (2) refractory inorganic oxide particles, (3) 0.02 to 2% by weight of rhodium and (4) 0 to 10% by weight of at least one platinum-family metal selected from the group consisting of platinum and palladium, based on said catalyst composition.

---

### 5,015,618
### LASER ZONE MELTED BI—SR—CA—CU—O THICK FILMS

**Mark Levinson, Sudbury, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Oct. 19, 1989, Ser. No. 423,998**

**Int. Cl.$^5$ H01L** *39/24, 39/00*

**U.S. Cl. 505—001** **5 Claims**

1. A method for preparing a highly aligned thick film of superconducting bismuth strontium calcium copper oxide ceramic material comprising the steps of:
depositing on a suitable substrate a film about 5–200 μm thick of bismuth strontium calcium copper oxide wherein the ratios of Bi:(Sr, Ca):Cu are about 2:3:2 to 2:4:3; and
translating a laser beam over said deposited film in a direction relative to said deposited film and at a rate of about 0.2–15 cm/hr while said deposited film is held at a temperature of about 500°–950° C., wherein said beam is about 0.01–0.50 cm wide along said direction and provides about 0.2–10 W of optical power to said deposited film, and wherein said temperature and said beam translation rate, width, and optical power are selected to permit zone melting and resolidification of said deposited film to form said highly aligned thick film of superconducting bismuth strontium calcium copper oxide ceramic material.

---

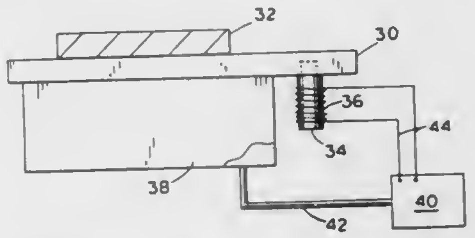
### 5,015,619
### SUPERCONDUCTING MIRROR FOR LASER GYROSCOPE

**Xingwu Wang, Alfred, N.Y., assignor to Alfred University, Alfred, N.Y.**

**Filed Nov. 13, 1989, Ser. No. 434,717**

**Int. Cl.$^5$ G02B** *5/08*

**U.S. Cl. 505—1** **16 Claims**



1. An apparatus for reflecting a light beam, wherein said apparatus is comprised of:
(a) a mirror assembly comprising a substrate and a superconductive mirror formed on such substrate, wherein:
  1. said substrate is optically transparent to said light beam and has a thickness of from about 0.5 to about 1.0 millimeter, and
  2. said superconductive mirror has a thickness of from about 0.5 to about 1.0 microns;
(b) means for cooling said superconductive mirror;
(c) means for measuring the temperature of said superconductive mirror;
(d) means for determining the reflectivity of said superconductive mirror; and
(e) means for varying the reflectivity of said superconductive mirror.

---

### 5,015,620
### HIGH-$T_c$ SUPERCONDUCTOR CONTACT UNIT HAVING LOW INTERFACE RESISTIVITY, AND METHOD OF MAKING

**John W. Ekin, Boulder, Colo.; Armand J. Panson, and Betty A. Blankenship, both of Pittsburgh, Pa., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C. and Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 117,259, Nov. 6, 1987. This application Nov. 22, 1988, Ser. No. 274,881**

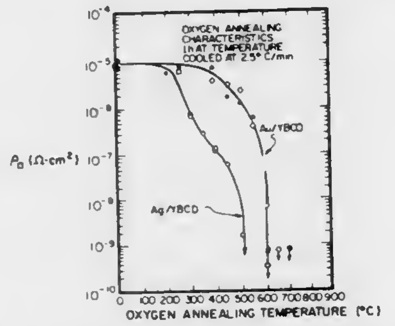
**Int. Cl.$^5$ B05D** *5/12;* **C23C** *14/34, 14/58*

**U.S. Cl. 505—1** **10 Claims**

1. A method for making a low surface resistivity contact to a high-$T_c$ oxide superconductive which comprises providing a high-$T_c$ oxide superconductor with at least one surface capable

VOL
1126
ISS
2
MY
14
1991
UMI

of having an inert metal deposited thereon, ensuring that said surface is in a substantially non-degraded state by subjecting said surface to abrading or etching in a manner such that said surface assumes a substantially non-degraded state or maintaining said surface in said substantially non-degraded state after



formation of said high-$T_c$ oxide superconductor, depositing said inert metal on said provided surface while said surface is in said substantially non-degraded state to thereby form a unit with said surface, and annealing said unit with oxygen for a period not exceeding about one hour at temperatures not exceeding about 700° C.

---

### 5,015,621

### SEDIMENTATION METHOD FOR FORMING BI-CONTAINING SUPERCONDUCTING FILMS

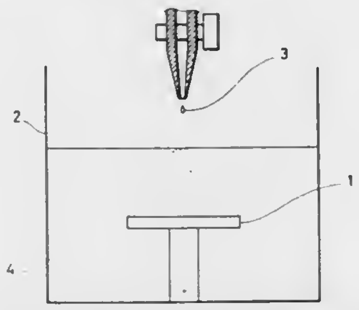
**Yasuhiko Takemura, Atsugi, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Filed May 24, 1989, Ser. No. 356,536**

**Claims priority, application Japan, Jun. 2, 1988, 63-137085**

**Int. Cl.⁵ B05D** *5/12*

U.S. Cl. 505—1 **10 Claims**



1. A method of forming a superconducting ceramic film comprising:
   preparing bismuth copper oxide superconducting ceramic material;
   grinding said ceramic material into a fine powder;
   dispersing said powder in an organic solvent liquid contained in a reservoir in which a surface to be coated is horizontally arranged;
   allowing said powder dispersed in said liquid to descend to said surface and form sediment in film form;
   separating said surface from said liquid; and
   firing said surface after it is separated from the liquid to form said superconducting ceramic film.

---

### 5,015,622

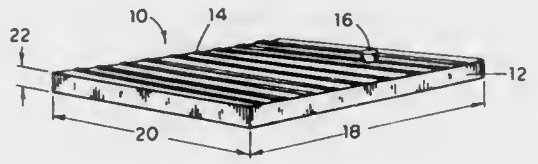
### MULTIDIRECTIONAL/ROTATIONAL SUPERCONDUCTOR MOTOR

**Raymond C. Ward; Xingwu Wang; William B. Carlson, all of Alfred, and Walter A. Schulze, Jr., Alfred Station, all of N.Y., assignors to Alfred University, Alfred, N.Y.**

**Filed Oct. 17, 1989, Ser. No. 422,542**

**Int. Cl.⁵ H92K** *41/00, 55/00*

U.S. Cl. 505—1 **20 Claims**



1. A contactless, multi-dimensional small stepper motor with a maximum dimension of less than about 10 centimeters for converting electrical energy to mechanical energy which causes movement of at least one transportable, magnetized article, wherein said motor comprises at least one superconductive primary suspending element, at least two primary conductive elements, at least one transportable magnetized element, means for supplying electrical energy to at least one of said primary conductive elements, means for cooling said superconductive primary suspending element, means for causing the movement of said article, and means for stopping the movement of said article, wherein:
   (a) said superconductive primary suspending element is comprised of at least 50 volume percent of superconductive material, wherein said superconductive material:
      1. has a first critical field value greater than about 10 Gauss, a second critical field value of at least one Tesla, and a critical temperature greater than 35 degrees Kelvin; and
      2. said superconductive material has a flux penetration ratio of from about 0.01 to about 0.1;
   (b) each of said primary conductive elements is separated from each adjacent primary conductive element by a distance of from about 0.01 to about 10 millimeters; and
   (c) the largest dimension of said transportable, magnetized article is no greater than 1 centimeter; and
   (d) said magnetized article has a magnetic moment between said first critical field value and said second critical field value.

---

### 5,015,623

### PLANAR JOSEPHSON DEVICE WITH A SILVER SALT INTERLAYER

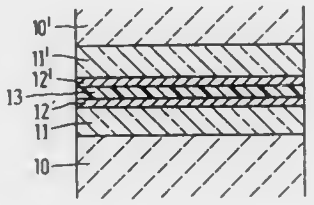
**Daphne Scholten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 6, 1990, Ser. No. 549,341**

**Claims priority, application Netherlands, Jul. 20, 1989, 8901874**

**Int. Cl.⁵ H01L** *39/22*

U.S. Cl. 505—1 **5 Claims**



1. A method of manufacturing a Josephson device comprising two layers of an oxidic superconducting material between which at least one non-superconducting layer is provided, characterized in that the at least one non-superconducting layer is manufactured from a silver salt selected from the group consisting of silver chloride, silver bromide, silver chlorate, silver phosphate and silver sulfate selected from the group consisting of silver chloride, silver bromide, silver chlorate, silver phosphate and silver sulfate which is connected to the superconducting layers through layers of silver.

---

### 5,015,624

### PROCESS FOR REDUCTION OF ORGANOHALOSILANES

**William J. Schulz, Jr., Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Apr. 30, 1990, Ser. No. 516,599**

**Int. Cl.⁵ C07F** *7/08*

U.S. Cl. 556—474 **20 Claims**

1. A process for preparation of reduced organosilanes of the formula

$$R_nSiH_aX_{4-n-a};$$

where R is independently selected from the group consisting of alkyl, cycloalkyl, alkenyl, aryl, aralkyl, halogenated alkyl, and halogenated aryl radicals; n=1, 2,or 3; a=1, 2, or 3; n+a=3 or 4; and X is a halogen; the process comprising:
   (A) forming a mixture comprising an organohalosilane of formula

$$R_nSiH_bX_{4-n-b};$$

   where R, n, and X are as previously described; b=0, 1, or 2; and n+b=1, 2, or 3;
and an alkylaluminum hydride of formula

$$R'_cAlH_{3-c};$$

where R' is an alkyl group of one to 10 carbon atoms and c=1 or 2; in a vessel;
   (B) effecting reaction of the organohalosilane with the alkylaluminum hydride; and
   (C) maintaining mixture temperature and vessel pressure sufficient to effect immediate vaporization of reduced organosilanes from the mixture.

---

### 5,015,625

### ALICYCLIC ESTERS AND THEIR USE AS PERFUMING INGREDIENTS

**Charles Fehr, Versoix, and José Galindo, Les Avanchets, both of Switzerland, assignors to Firmenich SA, Geneva, Switzerland**

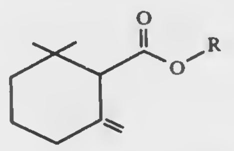
**Filed Jan. 3, 1990, Ser. No. 460,429**

**Claims priority, application Switzerland, Jan. 18, 1989, 150/89**

**Int. Cl.⁵ A01N** *7/46*

U.S. Cl. 512—24 **7 Claims**

1. A method to confer, enhance, improve or modify the odor properties of a perfuming composition or a perfumed article, which method comprises adding to said composition or article a fragrance effective amount of a compound of formula



(I)

wherein the symbol R represents a linear or branched, saturated or unsaturated alkyl radical containing from 1 to 3 carbon atoms so as to impart a floral, rosy, damascone type odor note to said composition or article.

---

### 5,015,626

### PORCINE SOMATOTROPIN TO IMPROVE MEAT QUALITY OF PIGS

**Lauren L. Christian, Ames, Iowa, and Lindy F. Miller, West Terre Haute, Ind., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Filed Aug. 2, 1989, Ser. No. 388,984**

**Int. Cl.⁵ A61K** *37/02;* **C07K** *7/10*

U.S. Cl. 514—12 **7 Claims**

1. A method of improving muscle quality of pigs normally susceptible to procine stress syndrome, said method comprising: administering daily to said pigs during their period of time for critical weight gain, in conjunction with their daily feed ration a small but muscle quality improving effective amount of procine somatotropin.

---

### 5,015,627

### STABILIZED SOMATOTROPIN FOR PARENTERAL ADMINISTRATION

**Thomas O. Lindsey, Coatesville, and Michael T. Clark, Downingtown, both of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.**

**Filed Jul. 20, 1990, Ser. No. 555,970**

**Int. Cl.⁵ A61K** *37/02;* **C07K** *7/10*

U.S. Cl. 514—12 **10 Claims**

1. A method for improving feed efficiency in animals which comprises parenterally administering to an animal organism in an amount sufficient to produce said efficiency a growth promoting agent being a complex of a porcine somatotropin and from about .05% to about 10% of a peptide aldehyde selected from the group consisting of leupeptin, elastinal, chymostatin and antipain.

---

### 5,015,628

### ANTICARIOGENIC PHOSPHOPEPTIDES

**Eric C. Reynolds, North Balwyn, Australia, assignor to The University of Melbourne and Victorian Dairy Industry Authority, both of Victoria, Australia**

**Filed Aug. 3, 1990, Ser. No. 563,798**

**Claims priority, application Australia, Jun. 12, 1986, PH6385**

**Int. Cl.⁵ C07K** *7/08;* **A61K** *39/12, 39/42;* **G01N** *33/53*

U.S. Cl. 514—12 **26 Claims**

1. A composition comprising a phosphopeptide selected from the group consisting of a phosphopeptide comprising the sequence A-B-C-D-E, where A, B, C, D and E are independently phosphoserine, phosphothreonine, phosphotyrosine, phosphohistidine, glutamate and aspartate, a phosphopeptide having the sequence A-B-C-D-E, where A, B and C are independently phosphoserine, phosphothreonine, phosphotyrosine and phosphohistidine and D and E are independently phosphoserine, phosphothreonine, glutamate and asparatate, a phosphopeptide having the sequence A-B-C-D-E where A, B and C are phosphoserine and D and E are glutamate, a phosphopeptide having the sequence Glu-Met-Glu-Ala-Glu-Pse-Ile-Pse-Pse-Pse-Glu-Glu-Ile-Val-Pro-Asn-Pse-Val-Glu-Glu-Lys, a phosphopeptide having the sequence Glu-Leu-Glu-Glu-Leu-Asn-Val-Pro-Gly-Glu-Ile-Val-Glu-Pse-Leu-Pse-Pse-Pse-Glu-Glu-Ser-Ile-Thr-Arg, a phosphopeptide having the sequence Asn-Thr-Met-Glu-His-Val-Pse-Pse-Pse-Glu-Glu-Ser-Ile-Ile-Pse-Gln, Glu-Thr-Tyr-Lys, a phosphopeptide having the sequence Asn-Ala-Asn-Glu-Glu-Glu-Tyr-Ser-Ile-Gly-Pse-Pse-Pse-Glu-Glu-Pse-Ala-Glu-Val-Ala-Thr-Glu-Glu-Val-Lys, a phosphopeptide having the sequence Glu-Gln-Leu-Pse-Pth-Pse-Glu-Glu-Asn-Ser-Lys and salts thereof.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,629
## TISSUE REPAIR

**Gere S. diZerega, Pasadena, Calif., assignor to University of Southern California, Los Angeles, Calif.**

**Continuation of Ser. No. 372,209, Jun. 26, 1989, abandoned, Continuation of Ser. No. 50,581, May 12, 1987, abandoned. This application Mar. 9, 1990, Ser. No. 494,914**

**Int. Cl.$^5$ A61K** *37/02;* **C07K** *7/14*

**U.S. Cl. 514—16** **5 Claims**

1. A method for accelerating re-epithelialization of wound tissue in a mammal, comprising applying to said wound tissue an amount of angiotensin II effective for said acceleration.

---

### 5,015,630
## 5-OXIME AVERMECTIN DERIVATIVES

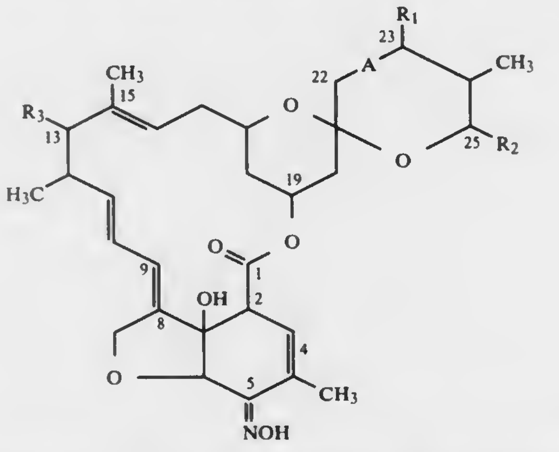
**Michael H. Fisher, Ringoes, and Helmut Mrozik, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Jan. 19, 1989, Ser. No. 298,710**

**Int. Cl.$^5$ A61K** *31/70;* **C07M** *17/04*

**U.S. Cl. 514—30** **13 Claims**

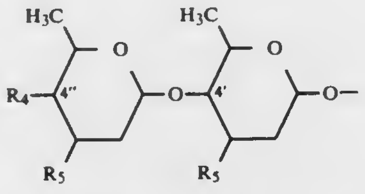
1. A compound having the formula:



wherein A at the 22,23 position represents a single bond and wherein $R_1$ is hydrogen or hydroxy or keto, or A represents a double bond and $R_1$ is absent;

$R_2$ is an alpha-branched $C_3$–$C_8$ alkyl;

$R_3$ is



wherein $R_4$ is attached to C-4″ by a single bond and is hydroxy, amino, N-methyl, N-ethyl, N-propyl, N-isopropyl or N-n-butyl amino; N,N-dimethyl, NN-diisopropyl or N,N-di-n-butyl amino; loweralkanoylamino, or N-loweralkylalkanoylamino; or $R_4$ is attached to C-4-41 or C-4′ by a double bond and is semicarbazono, N-loweralkylsemicarbazono, N,N-diloweralkylsemicarbazano, loweralkanoylhydrazono, benzoylhydrazono, or loweralkylbenzoylhydrazono, and each $R_5$ is independently hydroxy or methoxy.

9. The compound of claim 1 which is avermectin B1a/B1b 5-ketoxime.

---

### 5,015,631
## REPAIRING AGENT FOR CELLS AND TISSUES

**Sadanori Ogasawara, Tokorozawa; Kenji Abiko, Kaminoyama; Masayoshi Ito, Kunitachi, and Yoshiyasu Shitori, Tokyo, all of Japan, assignors to MECT Corporation, Japan**

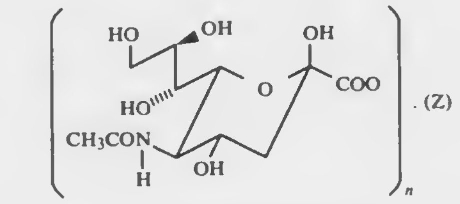
**Filed Jun. 24, 1988, Ser. No. 211,226**

**Claims priority, application Japan, Jun. 25, 1987, 62-158707**

**Int. Cl.$^5$ A61K** *31/00;* **A61F** *13/00*

**U.S. Cl. 514—53** **2 Claims**

1. A method of treating an animal suffering from nasal obstruction symptoms, which comprises applying to the nasal mucous membranes of the sufferer an effective amount of a compound of the formula:



wherein Z represents lithium, potassium, sodium, ammonium or an organic ammonium when n is 1, and Z represents calcium, barium or magnesium when n is 2.

---

### 5,015,632
## CHITOSAN PYRITHIONE AS AN ANTIMICROBIAL AGENT USEFUL IN PERSONAL CARE PRODUCTS

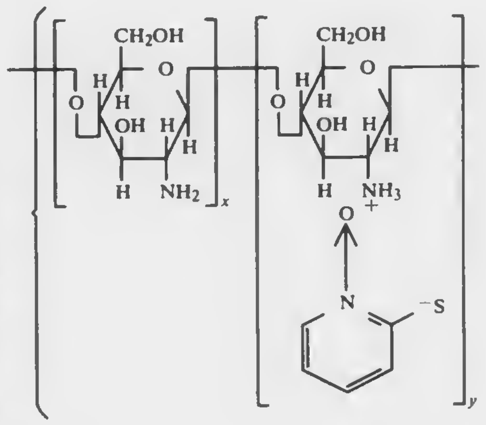
**John D. Nelson, Naugatuck, Conn., assignor to Olin Corporation, Cheshire, Conn.**

**Continuation-in-part of Ser. No. 461,720, Jan. 8, 1990, Pat. No. 4,957,908. This application Aug. 2, 1990, Ser. No. 562,507**

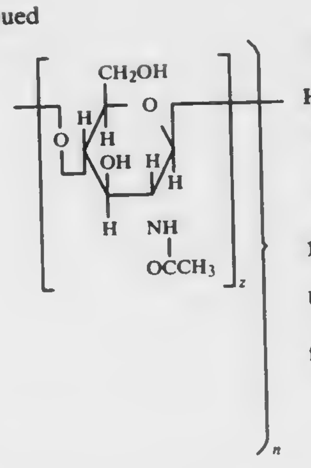
**Int. Cl.$^5$ A61K** *31/00;* **C08B** *37/00*

**U.S. Cl. 514—55** **4 Claims**

1. Chitosan pyrithione having the empirical structural formula:



-continued



wherein x, y and z are independently molar fractions having values between 0.01 and 0.98 with the proviso that $x+y+z=1$, and n has a value between about 700 and about 10,000.

---

### 5,015,633
## METHOD FOR INHIBITING LOSS OF COGNITIVE FUNCTIONS EMPLOYING AN ACE INHIBITOR

**Abraham Sudilovsky, Lawrenceville, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 160,989, Feb. 26, 1988, abandoned, which is a continuation-in-part of Ser. No. 118,121, Nov. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 43,127, Apr. 27, 1987, abandoned. This application Feb. 9, 1989, Ser. No. 308,293**

**Int. Cl.$^5$ A61K** *37/00*

**U.S. Cl. 514—91** **5 Claims**

1. A method of inhibiting loss of cognitive function in a mammalian specie over a prolonged period of time, which comprises administering to a mammalian specie in need of such treatment an effective amount of an angiotensin converting enzyme inhibitor which is (S)-1-[6-amino-2-[hydroxy(4 phenylbutyl)phosphinyl]oxy]-1-oxohexyl]-L-proline (SQ29,852), over a prolonged period of treatment to inhibit loss of cognitive function during such period of treatment.

---

### 5,015,634
## METHOD OF TREATING TISSUE DAMAGE WITH INOSITOL TRIPHOSPHATE

**Matti Siren, Montagnola/Lugano, Switzerland, assignor to Perstorp AB, Perstorp, Sweden**

**Continuation-in-part of Ser. No. 173,985, Mar. 28, 1988, and a continuation-in-part of Ser. No. 251,556, Sep. 30, 1988, and a continuation-in-part of Ser. No. 367,968, Jun. 19, 1989. This application Mar. 13, 1990, Ser. No. 492,740**

**Int. Cl.$^5$ A01N** *57/00, 37/08, 31/08, 57/00;* **C12N** *9/96*

**U.S. Cl. 514—103** **12 Claims**

1. A method of preventing or alleviating tissue damage comprising administering, to a mammal in need thereof, a tissue damage preventing or alleviating effective amount of a pharmaceutical composition which comprises at least one isomer of inositol triphosphate.

---

### 5,015,635
## PESTICIDAL S-(HALOGENOALKYL)-DITHIOPHOSPHORIC(PHOSPHONIC) ACID ESTERS

**Herbert Sommer, Remscheid; Jürgen Hartwig, and Hans-Detlef Matthaei, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

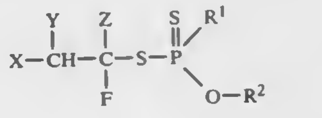
**Filed Jul. 26, 1989, Ser. No. 385,850**

**Claims priority, application Fed. Rep. of Germany, Aug. 4, 1988, 3826449**

**Int. Cl.$^5$ A01N** *57/12, 57/14;* **C07F** *9/32, 9/09*

**U.S. Cl. 514—144** **16 Claims**

1. An S-(halogenoalkyl)-dithiophosphoric acid ester of the formula



$$X-\underset{\displaystyle Y\ \ }{\overset{\displaystyle Y}{CH}}-\underset{\displaystyle F}{\overset{\displaystyle Z}{C}}-S-\overset{\displaystyle S}{\underset{}{P}}\begin{matrix}\diagup R^1\\ \diagdown O-R^2\end{matrix}$$

(I)

in which

$R^1$ represents $C_1$–$C_6$-alkoxy, $C_2$-$C_4$-alkenyloxy or $C_2$–$C_4$-alkynyloxy which is optionally substituted by a member selected from the group consisting of halogen and $C_1$–$C_4$-alkoxy,

$R^2$ represents $C_1$–$C_6$-alkyl which is optionally substituted by a member selected from the group consisting of halogen and $C_1$–$C_4$-alkoxy; or represents cycloalkyl which has 3 to 8 carbon atoms and is optionally substituted by a member selected from the group consisting of $C_1$–$C_4$-alkyl and halogen; or represents $C_2$–$C_4$-alkenyl or $C_2$–$C_4$ alkynyl which is optionally substituted by a member selected from the group consisting of halogen, methyl and ethyl, or represents aryl which has 6 to 10 carbon atoms and which is optionally substituted by a member selected from the group consisting of $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-halogenoalkyl having 1 to 9 halogen atoms and halogen,

X and Y are identical or different and independently of one another represent hydrogen, fluorine, chlorine, bromine or $C_1$–$C_{20}$-alkyl and

Z represents hydrogen, fluorine, chlorine or $C_1$–$C_4$-alkyl.

---

### 5,015,636
## THIAZETIDINE COMPOUNDS

**Masahiro Kise, Nakakyo; Masakuni Ozaki, Joyo; Kenji Kazuno, Shiga; Yoshifumi Tomii, Katano; Jun Segawa, Minami, and Shoji Yasufuki, Nishikyo, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan**

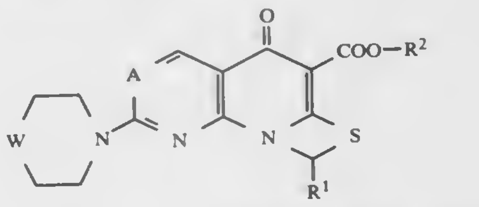
**Division of Ser. No. 247,959, Sep. 22, 1988, Pat. No. 4,882,328. This application Aug. 3, 1989, Ser. No. 388,854**

**Claims priority, application Japan, Sep. 22, 1987, 62-237729**

**Int. Cl.$^5$ C07D** *513/12;* **A61K** *31/505, 31/535*

**U.S. Cl. 514—210** **27 Claims**

1. A compound of the formula



(I)

or a pharmaceutically acceptable salt thereof wherein $R^1$ is hydrogen, lower alkyl or phenyl unsubstituted or substituted by one or two halo moieties, $R_2$ is hydrogen or lower alkyl, A is N, W is O or $NR_3$ wherein $R^3$ is hydrogen, lower alkyl, acyl, mono-, di- or tri-haloacyl, lower alkoxycarbonyl or (5-methyl-2-oxo-1,3-dioxolen-4-yl) methyl.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,637
### PYRIDO[3,4-B]PYRROLO[1,2-E][1,4,5]OXADIAZEPINES

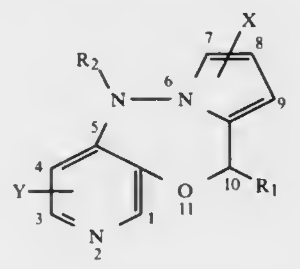
**Richard C. Effland, Bridgewater, and Larry Davis, Sergeantsville, both of N.J., assignors to Hoechst-Roussel Pharmaceutical Inc., Somerville, N.J.**

**Filed May 25, 1990, Ser. No. 529,082**

**Int. Cl.$^5$ C07D** *273/06;* **A61K** *31/55*

**U.S. Cl. 514—211** **9 Claims**

1. A compound of the formula,



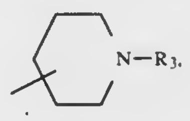
(1)

where

X is hydrogen, halogen or loweralkyl;

Y is hydrogen, halogen, loweralkyl, loweralkoxy or trifluoromethyl;

$R_1$ is hydrogen, loweralkyl, aryl, arylloweralkyl, diloweralkylaminoloweralkyl or



$R_3$ being hydrogen, loweralkyl or arylloweralkyl; and

$R_2$ is hydrogen, loweralkyl or arylloweralkyl;

or a pharmaceutically acceptable acid addition salt thereof.

9. A method of alleviating pain in a patient in need of relief from pain, which comprises administering to such a patient an effective amount of a compound as defined in claim 1.

---

### 5,015,638
### NAPHTHERIDINONE- AND PYRIDOOXAZINONE-PYRIDONE COMPOUNDS, CARDIOTONIC COMPOSITIONS INCLUDING SAME, AND THEIR USES

**Alfred P. Spada, Ambler; William L. Studt, Harleysville; Henry F. Campbell, North Wales; Donald E. Kuhla, Doylestown, and Thomas Tucker, North Wales, all of Pa., assignors to Rhone-Poulenc Rorer Pharmaceuticals Inc., Fort Washington, Pa.**

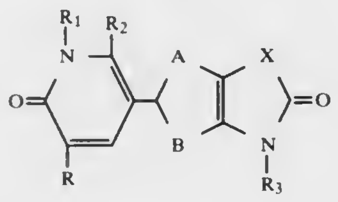
**Continuation-in-part of Ser. No. 47,394, May 8, 1987, Pat. No. 4,822,794. This application Nov. 3, 1989, Ser. No. 432,070**

**The portion of the term of this patent subsequent to Jan. 18, 2006, has been disclaimed.**

**Int. Cl.$^5$ A61K** *31/55;* **C07D** *487/04, 471/04, 498/04*

**U.S. Cl. 514—211** **23 Claims**

1. A compound of the formula



wherein:

A is —C= or —N=;

B is —C=C—; —C=N— or —N=C—;

provided that A or B represents a nitrogen-containing group;

X is $—(CR_4R_5)_a—(O)_b$-13 $(CR_6R_7)_c—$;

a and c are 0, 1 or 2;

b is 0 or 1;

provided that a+b+c=1, 2 or 3;

R is hydrogen, alkyl, alkoxyalkyl, hydroxyalkyl, nitro, halo, cyano, carbamoyl, alkyl carbamoyl, formyl aminoalkylene or amino;

$R_1$, $R_2$, $R_3$, $R_5$, $R_6$ and $R_7$ are hydrogen, alkyl, or aralkyl;

$R_4$ is hydrogen, alkyl, aryl, or aralkyl;

geminal $R_6$ and $R_7$ groups may together form a spiro substituent, $—(CH_2)_d—$, where d is 2 to 5;

or a pharmaceutically acceptable salt thereof.

22. A method for increasing cardiotonic contractility in a patient requiring such treatment which comprises administering to such patient an effective amount of a compound according to claim 1.

---

### 5,015,639
### SUBSTITUTED BENZAZEPINES, THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

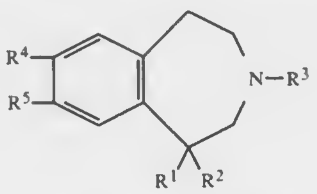
**Joel G. Berger, Cedar Grove; Wei K. Chang, Livingston, both of N.J., and Marjorie Peters, Saint Simons Island, Ga., assignors to Schering Corporation, Kenilworth, N.J.**

**Continuation-in-part of Ser. No. 32,135, Mar. 27, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 322,801**

**Int. Cl.$^5$ A61K** *31/55, 31/495;* **C07D** *403/02, 223/16*

**U.S. Cl. 514—213** **11 Claims**

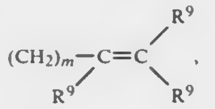
1. A compound having the structural formula I



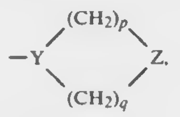
1

and the pharmaceutically acceptable salts thereof, wherein:

$R^1$ represents $—XR^6$, $—CHR^7R^8$, cycloalkyl, cycloalkenyl, —H. -13CN, $—(CO)OR^9$, $—O(CO)R^9$, $—O(CO)N(R^9)_2$, $—C{\equiv}CR^9$, $—(CO)N(R^9)_2$,



$$(CH_2)_m—C(R^9)=C(R^9)_2,$$



imidazolyl or pyrrolyl;

$R^2$ represents —H (provided that $R^1$ does not represent H), —OH (provided that $R^1$ does not represent —OH or —SH), or alkoxy;

in addition, $R^1$ and $R^2$ may together represent a carbonyl oxygen or a group =CH-aryl;

$R^3$ represents H, alkyl, allyl or cyclopropylmethyl;

$R^4$ represents H, halo, alkyl, haloalkyl or alkoxy;

$R^5$ represents $—OR^{10}$, $—N(R^9)_2$ or $—OC(R^7)_2OCOR^{13}$;

$R^6$ represents —H, aryl, naphthyl, aralkyl, alkyl, cycloalkyl, cycloalkenyl, haloalkyl, alkenyl, alkynyl, cycloalkylalkyl, cycloalkenylalkyl, alkoxyalkyl or $—(CH_2)_nR^{11}$;

$R^7$ represents —H or alkyl;

$R^8$ represents cycloalkyl, cycloalkenyl, cycloalkenylalkyl, aralkenyl, aralkynyl, alkynyl, haloalkyl, alkyxyalkyl or $—(CH_2)_nR^{12}$;

each $R^9$ independently represents H, alkyl aralkyl or aryl;

$R^{10}$ represents H, $—COR^9$ or $—CON(R^9)_2$;

$R^{11}$ represents $—(CO)OR^9$, $—COR^9$, $—(CO)N(R^9)_2$, —CN, $—O(CO)N(R^9)_2$, $—O(CO)R^9$, $—N(R^9)_2$, $—OR^9$ or $—SR^9$, provided that $R^{11}$ is not $—N(R^9)_2$,$—OR^9$ or $—SR^9$ when n is 1;

$R^{12}$ represents $—(CO)OR^9$, $—COR^9$, $—(CO)N(R^9)_2$, —CN, $—O(CO)N(R^9)_2$, $—O(CO)R^9$, $—N(R^9)_2$, $—OR^9$ or $—SR^9$;

$R^{13}$ represents alkyl, aralkyl or aryl;

X represents —O—, —S—, or $—N(R^9)—$;

m represents 0 or 1;

n represents an integer of from 1 to 4;

Y represents N or CH;

Z represents $CH_2$ (if Y does not represent CH) or $NR^9$;

p and q each independently represent integers of from 1 to 3 such that the sum of p plus q is from 1 to 5 and p and q do not both represent 1 when Y is N and Z is $NR^9$;

halo represents fluoro, chloro, bromo, or iodo;

alky represents straight or branched carbon chains having 1 to 6 carbon atoms;

cycloalkyl represents a saturated carbocyclic ring containing from 3 to 8 carbon atoms;

cycloalkenyl represents a carbocyclic ring containing a carbon-carbon double bond and having 5 to 8 atoms;

alkenyl represents straight or branched carbon chains having at least one carbon-carbon double bond and containing from 2 to 6 carbon atoms;

alkynyl represents straight of branched carbon chains having at least one carbon-carbon triple bond and containing from 2 to 6 carbon atoms;

aryl represents unsubstituted phenyl or substituted phenyl;

substituted phenyl represents phenyl mono- or di-substituted by alkyl, hydroxy, alkoxy, alkylthio, halo, trifluoromethyl or combinations thereof;

carbonyl oxygen represents a group =O;

haloalkyl represents an alkyl group as defined above containing from 1 to 5 halo groups, replacing some or all of the hydrogens thereon depending on the sites of possible halogenation; and

alkanediyl represents a divalent, straight or branched hydrocarbon chain having from 1 to 6 carbon atoms, the two available bonds being from the same or different carbon atoms thereof.

10. A method of treating depression in a mammal by administering to the mammal an antidepressive effective amount of a compound as claimed in claim 1.

11. A method of providing for analgesia in a mammal by administering to the mammal an analgesically effective amount of a compound as claimed in claim 1.

---

### 5,015,640
### 5,7-DIHYDRO-6H
### DIBENZ[C,E]AZEPINE-6-(THIO)CARBOXIMIDIC ACID ESTERS AND PESTICIDAL USE THEREOF

**René Zurflüh, Bülach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

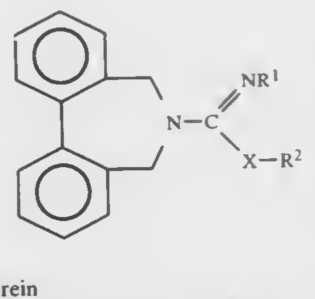
**Filed Nov. 7, 1989, Ser. No. 433,071**

**Claims priority, application Switzerland, Nov. 11, 1988, 4191/88; Aug. 24, 1989, 3067/89**

**Int. Cl.$^5$ C07D** *223/18;* **A01N** *47/42*

**U.S. Cl. 514—217** **27 Claims**

15. A method for the control of pests which comprises treating the locus to be protected or the pests themselves with an effective amount of one or more compounds of the formula



I

wherein

$R^1$ is hydrogen or $—Y—R^3$,

$R^2$ is $C_{1-6}$-alkyl, $C_{3-6}$-alkenyl or $C_{3-6}$-alkynyl substituted with $C_{3-6}$-cycloalkyl, aryl, aryloxy or heteroaryl, when $R^1$ is hydrogen, or, when $R^1$ is $—Y—R^3$, $R^2$ is unsubstituted $C_{1-6}$-alkyl, $C_{3-6}$-alkenyl or $C_{3-6}$-alkynyl or substituted with $C_{3-6}$-cycloalkyl, aryl, aryloxy or heteroaryl, or is unsubstituted $C_{2-6}$-alkyl or substituted with aryl or aryloxy and which is interrupted by one or two oxygen atoms, or

$R^2$ is aryl, heteroaryl, 2-tetrahydrofuranylmethyl, 2-tetrahydropyranylmethyl or one of the groups (a) to (c)

$—N=CR^4R^5$ (*a*)

$—Z—ON=CR^4R^5$ (*b*)

$—Z—NR^6R^7$ (*c*)

$R^3$ is hydrogen; unsubstituted or substituted $C_{1-6}$-alkyl, $C_{2-6}$-alkenyl, $C_{2-6}$-alkynyl, $C_{3-6}$-cycloalkyl, phenyl, naphthyl, p-biphenylyl, benzylphenyl, phenoxyphenyl, benzoylphenyl, 3,4-methylenedioxyphenyl or five- to six-membered heterocyclyl; a group $—OR^8$ (d); or a group $—NR^9R^{10}$ (e),

$R^4$ is $C_{1-6}$-alkyl,

$R^5$ is $C_{1-6}$-alkyl or phenyl, or

$R^4$ and $R^5$ taken together are tetra-, penta- or hexa-methylene,

$R^6$ is hydrogen or $C_{1-4}$-alkyl,

$R^7$ is $C_{1-4}$-alkyl, C2-5-alkanoyl or $C_{2-5}$-alkoxycarbonyl, or

$R^6$ and $R^7$ taken together with the nitrogen atom to which they are attached are a five- to seven-membered unsubstituted heterocyclic group or substituted with one or two $C_{1-4}$-alkyl groups and which, in addition to the nitrogen, can also have an additional 1 or 2 hetero atoms selected from the group consisting of oxygen, sulfur and nitrogen, and/or has a keto function in the ring,

$R^8$ is $C_{1-6}$-alkyl, $C_{2-6}$-haloalkyl, $C_{3-6}$-alkenyl, $C_{3-6}$-alkynyl, benzyl or unsubstituted or substituted phenyl,

$R^9$ is hydrogen or $C_{1-4}$-alkyl,

$R^{10}$ is $C_{1-6}$-alkyl or unsubstituted or substituted phenyl,

X is oxygen or sulfur, provided that when $R^2$ is group (a), X is oxygen,

Y is carbonyl, sulfinyl or sulfonyl, provided that $R^3$ is hydrogen or a group (d) or (e), Y is carbonyl, and

Z is $C_{1-4}$-alkylene, or an acid addition salt thereof, when $R^1$ is hydrogen.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,641
## ANTIGLAUCOMA AGENTS

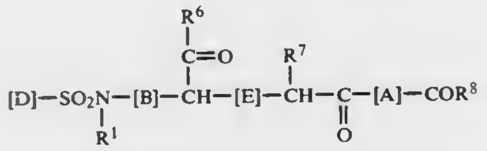
**David R. Andrews, 111 Roland Ave., South Orange, N.J. 07079; Federico C. A. Gaeta, 5 Shawnee Ave., Rockaway Township, Morris County, N.J. 07866, and Robert W. Watkins, Box 510B, R.R. #1, Great Meadows, N.J. 07838**

**Division of Ser. No. 892,003, Jul. 30, 1986, Pat. No. 4,885,293, which is a continuation-in-part of Ser. No. 784,000, Oct. 4, 1985, Pat. No. 4,826,816, and a continuation-in-part of Ser. No. 721,015, Apr. 8, 1985, Pat. No. 4,634,698, each is a continuation-in-part of Ser. No. 653,186, Apr. 24, 1984, Pat. No. 4,556,655. This application May 9, 1989, Ser. No. 349,369**

**Int. Cl.$^5$ A61K *31/54***

**U.S. Cl. 514—223.5** **9 Claims**

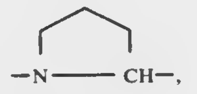
1. A method for reducing intraocular pressure which comprises topically administering from about 0.000001% (w/v) to about 1.0% of an ophthalmologically acceptable composition to the eye of a mammal in need of such treatment comprising a compound of the formula I:



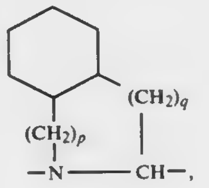
$$[D]-SO_2\underset{\underset{R^1}{|}}{N}-[B]-\overset{\overset{\overset{R^6}{|}}{C=O}}{\overset{|}{CH}}-[E]-\overset{\overset{R^7}{|}}{CH}-\underset{\underset{O}{\|}}{C}-[A]-COR^8$$

or a pharmaceutically acceptable salt thereof, wherein:

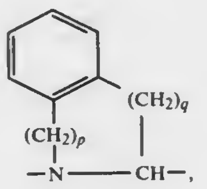
A is



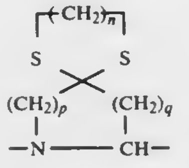
IIa



IIb

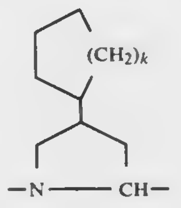


IIc



or

IId



IIe

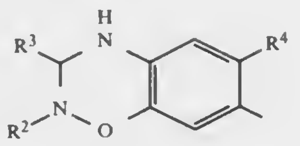
k is 1 or 2;

n is 0 or 1;

p and q are 0, 1 or 2, provided that in structures IIb and IIc the sum of p and q is 1 or 2, and that in formula IId, p is not 0;

B is —[J]—[L]—[M]—;

D is



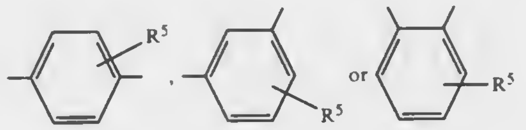
IIIa

E is —NH—, —O—, —S—, or —CH$_2$—;

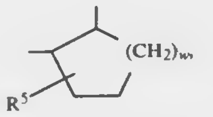
G is —SO$_2$—;

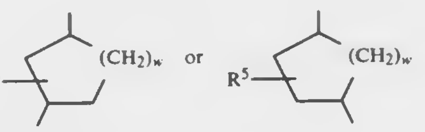
J is —(CH$_2$)$_s$— or —((CH$_2$)$_t$—W)—;

L is a chemical bond, cis- or trans-lower alkenylene, lower alkynylene, -Z-aryl-, -aryl-Z-, -Z-cycloalkyl-, or -cycloalkyl-Z-, a 5- or 6-membered heterocyclic radical comprising 3–5 carbon atoms and 1 or 2 heteroatoms selected from N, O and S, or a R$^5$-substituted heterocyclic radical, wherein aryl is



and cycloalkyl is

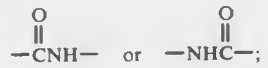




wherein w is 1, 2 or 3;

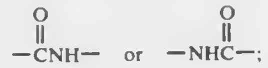
M is —(CH$_2$)$_u$— or —((CH$_2$)$_t$—X—(CH$_2$)$_v$)—;

W is



$$-\overset{\overset{O}{\|}}{C}NH- \quad \text{or} \quad -NH\overset{\overset{O}{\|}}{C}-;$$

X and Z are independently a chemical bond, —NR$^9$—, —O—, —S—,



$$-\overset{\overset{O}{\|}}{C}NH- \quad \text{or} \quad -NH\overset{\overset{O}{\|}}{C}-;$$

s, u and v are independently 0–5;

t is 1–5;

R$^1$, R$^2$ and R$^9$ are independently hydrogen, lower alkyl or lower acyl;

R$^3$ is hydrogen, lower alkyl, halo- and dihaloloweralkyl, trifluoroethylthiomethyl, phenylloweralkyl, (cycloalkyl)-lower alkyl, aminomethyl, loweralkylaminomethyl, phenyl(lower)alkylthiomethyl, (cycloalkyl)loweralkylaminomethyl, 2-, 3- or 4-pyridyllower alkyl, 2-, 4- or 5-, thiazolyloweralkyl, 2-, 4- or 5-1H-imidazolylloweralyl, 1-imidazolylloweralkyl, 1-morpholinoloweralkyl or hydroxyphenylloweralkyl;

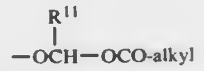
R$^4$ is chlorine or CF$_3$;

R$^5$ is hydrogen, halogen, lower alkyl, lower acyl, lower alkoxy, haloloweralkyl or phenylloweralkyl;

R$^7$ is hydrogen, lower alkyl or aminoloweralkyl;

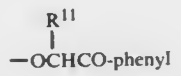
R$^6$ and R$^8$ are independently hydroxy, alkoxy having from 1 to 8 carbon atoms, benzyl, allyl, R$^{10}$—O$_r$—(CH$_2$)$_m$—O—, wherein O is oxygen or sulfur, r is 0 or 1 and

m is 2 to 4,



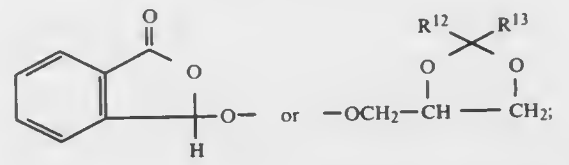
$$-O\overset{\overset{R^{11}}{|}}{CH}-OCO\text{-alkyl}$$

wherein the alkyl has from 3 to 8 carbon atoms,



$$-O\overset{\overset{R^{11}}{|}}{CH}CO\text{-phenyl}$$

wherein the phenyl may be substituted with group T defined below, 1-glyceryl,



R$^{10}$ is phenyl, substituted phenyl wherein the substituents are chosen from group T, 1-naphthyl or 2-naphthyl;

T is halogen, hydroxy, trifluoromethyl, lower alkoxy, lower alkyl, 2-furanyl, 3-furanyl, 2-thienyl, 3-thienyl, phenyl and substituted phenyl wherein the substituents are chosen from halogen, hydroxy, trifluoromethyl, lower alkoxy or lower alkyl;

R$^{11}$ is hydrogen or alkyl having from 1 to 8 carbon atoms;

R$^{12}$ is hydrogen, lower alkyl, unsubstituted or substituted phenyl and substituted or unsubstituted phenyl lower alkyl, wherein phenyl may be substituted by group T; and

R$^{13}$ is hydrogen or lower alkyl;

provided that if L is alkenylene or alkynylene, J is —(CH$_2$-)$_s$— wherein s is 1–5; provided that if L is -Z-aryl-or -Z-cycloalkyl-, J is —(CH$_2$)$_s$— wherein s is 2–5; provided that if L is alkenylene, alkynylene; -aryl-Z- or -cycloalkyl-Z-, M is —(CH$_2$)$_u$— wherein u is 1–5; provided that if s and u are each zero, L is aryl or cycloalkyl (i.e. Z is a bond); and provided that if s and v are each zero, L is aryl or cycloalkyl (i.e. Z is a bond)

in combination with from about 0.01 to about 1.0% of a beta adrenergic blocking agent.

---

### 5,015,642
## BENZOTHIAZINONE OXIDES, PROCESSES FOR THEIR PREPARATION, MEDICAMENTS CONTAINING THEM AND THE USE THEREOF, AND INTERMEDIATES FOR THEIR PREPARATION

**Ulrich Lerch, Hofheim am Taunus; Rainer Henning, Hattersheim am Main; Hansjörg Urbach, Kronberg/Taunus, and Joachim Kaiser, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

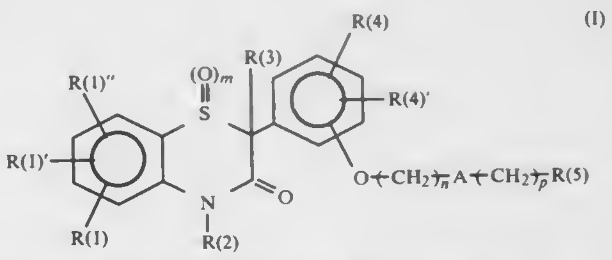
**Filed Aug. 10, 1988, Ser. No. 230,407**

**Claims priority, application Fed. Rep. of Germany, Aug. 12, 1987, 3726759**

**Int. Cl.$^5$ A61K *31/38;* C07D *279/16***

**U.S. Cl. 514—224.2** **5 Claims**

1. A benzothiazinone oxide of the formula I



(I)

and its salts with pharmaceutically acceptable acids, in which the following substituents and indices have the following meaning:

R(1), R(1)' and R(1)'' are identical or different and denote, independently of one another, hydrogen, (C$_1$–C$_4$)-alkyl, (C$_1$–C$_3$)-alkoxy, F, Cl, Br, CF$_3$, nitro, hydroxyl, acetamido or amino,

R(2) denotes hydrogen, (C$_1$–C$_{10}$)-alkyl, straight-chain or branches, (C$_3$–C$_{10}$)-alkenyl, straight-chain or branches, phenyl-(C$_1$–C$_4$)-alkly, the phenyl ring being unsubstituted or substituted by one, two or three substituents selected from the group consisting of (C$_1$–C$_4$)-alkyl, (C$_1$–C$_3$)-alkoxy, F, Cl, CF$_3$, (C$_1$–C$_2$)-alkylenedioxy and nitro,

R(3) denotes (C$_1$–C$_{15}$)-alkyl, straight-chain or branched, (C$_3$–C$_{15}$)-alkenyl, straight-chain or branched, (C$_4$–C$_8$)-cycloalkyl, (C$_4$–C$_8$)-cycloalkyl-(C$_1$–C$_4$)-alkyl, phenyl or phenyl-(C$_1$–C$_4$)-alkyl, the phenyl radical being unsubstituted or substituted by one, two or three substituents selected from the group consisting of (C$_1$–C$_4$)-alkyl, (C$_1$–C$_3$)-alkoxy, F, Cl, CF$_3$, (C$_1$–C$_2$)-alkylenedioxy and nitor,

R(4)' are identical or different and denote, independently of one another, hydrogen, (C$_1$–C$_4$)-alkyl, (C$_1$–C$_3$)-alkoxy, F, Cl, CF$_3$, nitro, hydroxyl, acetamido or amino,

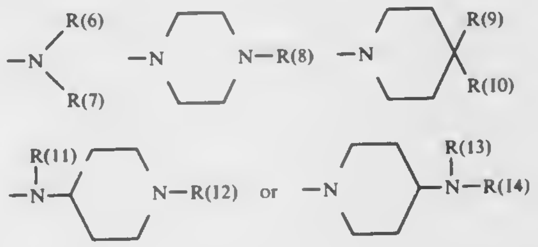
A denotes a CH(OH) group, a C=0 group, a CH=CH group, a C≡C group, a CH$_2$ group, oxygen or sulfur,

m denotes 1 or 2,

n denotes 1, 2 or 3,

p denotes zero, 1, 2, 3 or 4; but only 2, 3 or 4 where A is a heteroatom; and only 1, 2, 3 or 4 where A is a CH(OH), CH=CH or C≡C group,

R(5) denotes one of the following groups



in which

R(6) and R(7) are identical or different or denote, independently of one another, hydrogen, (C$_1$–C$_{10}$)-alkyl, (C$_4$–C$_8$)-cycloalkyl, (C$_4$–C$_8$)-cycloalkyl-(C$_1$–C$_4$)-alkyl, pyridyl-(C$_1$–C$_4$)-alkyl, phenyl-(C$_1$–C$_6$)-alkyl, benzhydryl or benzhydrl-(C$_1$–C$_4$)-alkyl, each of the phenyl radicals being unsubstituted or substituted by one, two or three radicals selected from the group consisting of (C$_1$–C$_4$)-alkyl, (C$_1$–C$_4$)-alkoxy, (C$_1$–C$_2$)-alkylenedioxy, F, Cl, Br, CF$_3$ and hydroxyl,

R(8) denotes hydrogen, (C$_1$–C$_{10}$)-alkyl, straight-chain or branched, (c$_1$–C$_8$)-alkanoyl, pyridyl, pyrimidinyl, phenyl, phenyl-(C$_1$–C$_4$)-alkyl, phenyl-(C$_3$–C$_5$)-alkenyl, benzhydryl or benzhydryl-(C$_1$–C$_4$)-alkyl, phenyl-(C$_1$–C$_4$)-alkanoyl or benzoyl, each of the phenyl radicals being unsubstituted or substituted by one, two or three radicals selected from the group consisting of

VOL
1126
ISS
2
MY
14.
1991
UMI

($C_1$–$C_4$)-alkyl, ($C_1$–$C_4$)-alkoxy, ($C_1$–$C_2$)-alkylenedioxy, F, Cl, Br, $CF_3$ and hydroxyl,
R(9) denotes hydrogen, ($C_1$–$C_{10}$)-alkyl, phenyl, phenyl-($C_1$–$C_4$)-alkyl, each of the phenyl radicals being unsubstituted or substituted by one, two or three radicals selectred from the group consisting of ($C_1$–$C_4$)-alkyl, ($C_1$–$C_4$)-alkoxy, ($C_1$–$C_2$Z)-alkylenidioxy, F, Cl, Br, $CF_3$ and hydroxyl,
R(10) denotes hydrogen, hydroxyl or ($C_1$–$C_4$)-alkoxy, and
R(11) and R(12) or R(13) and R(14) are identical or different and denote, independently of one another, hydrogen, ($C_1$–$C_{10}$))-alkyl, straight-chain or branched, ($C_1$–$C_6$)-alkanoyl, phenyl-($C_1$–$C_4$)-alkyl, benzhydrul, or benzhydryl-($C_1$–$C_4$)-alkyl, ·phenyl-($C_1$–$C_4$)-alkanoyl or benzoyl, each of the phenyl radicals being unsubstituted or substituted by one, two or three radicals selected from the group consisting of ($C_1$–$C_4$)-alkyl, ($C_1$–$C_4$)-alkoxy, ($C_1$–$C_2$)-alkylenedioxy, F, Cl, Br, $CF_3$ and hydroxyl.

4. A pharmaceutical composition for the treatment of diseases of the cardiovascular system which containsk a compound of the formula I as claimed in claim **1** together with a pharmaceutically acceptable vehicle.

---

### 5,015,643
### DISINFECTANT FOR THE TREATMENT OF WATER SYSTEMS

**Ronald L. Jones, Norcross, and Marion W. Wynn, Stone Mountain, both of Ga., assignors to Bio-Lab, Inc., Decatur, Ga.**
**Filed Nov. 6, 1989, Ser. No. 431,824**
**Int. Cl.$^5$ H01N *43/66;* A01N *59/08***
**U.S. Cl. 514—241** **3 Claims**

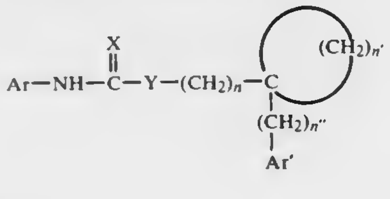
1. A solid disinfecting composition for disinfecting water systems comprising a mixture of trichloro-s-triazinetrione of from 80%–99% by weight and potassium bromide in an amount from 1%–20% by weight said composition providing a prolonged and controlled release of hypobromous acid when immersed in water.

---

### 5,015,644
### ANTIHYPERLIPIDEMIC AND ANTIATHEROSCLEROTIC UREA AND CARBAMATE COMPOUNDS

**Bruce D. Roth, Ann Arbor, and Bharat K. Trivedi, Canton, both of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**
**Continuation-in-part of Ser. No. 282,167, Dec. 9, 1988, abandoned, which is a continuation-in-part of Ser. No. 147,037, Feb. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 57,576, Jun. 2, 1987, abandoned. This application Jun. 1, 1989, Ser. No. 359,830**
**Int. Cl.$^5$ A61K *31/17;* C07C *275/28, 275/30, 275/32***
**U.S. Cl. 514—247** **31 Claims**

1. A compound having the formula



$$Ar-NH-\overset{\overset{X}{\|}}{C}-Y-(CH_2)_n-\underset{\underset{Ar'}{|}}{\underset{(CH_2)_{n''}}{\underset{|}{C}}}\bigcirc(CH_2)_{n'}$$

wherein Ar is
phenyl;
naphthyl;
phenyl substituted with
alkyl of from one to six carbon atoms,
alkoxy of from one to six carbon atoms,
phenoxy,
hydroxy,
fluorine,
chlorine,
bromine,
nitro,
trifluoromethyl,
—COOH,
—COO-alkyl (where alkyl is from one to four carbon atoms), or
—$NR_1R_2$ wherein
$R_1$ and $R_2$ are independently hydrogen, or alkyl of from one to six carbon atoms;
naphthyl substituted with
alkyl of from one to six carbon atoms,
alkoxy of from one to six carbon atoms,
hydroxy,
fluorine,
chlorine,
bromine,
nitro,
trifluoromethyl,
—COOH,
—COO-alkyl (where alkyl is from one to four carbon atoms), or
—$NR_1R_2$ wherein
$R_1$ and $R_2$ are independently hydrogen, or alkyl of from one to six carbon atoms;
X is oxygen or sulfur;
Y is —NH—;
n is zero or is an integer of from one to three;
n′ is an integer of from two to six; and
n″ is zero, one, or two;
Ar′ is
phenyl,
naphthyl, or a 5- or 6-membered monocyclic or fused bicyclic heterocycle containing at least one to four nitrogen, oxygen or sulfur atoms in at least one ring member;
phenyl, naphthyl or said heterocycle substituted with
alkyl of from one to six carbon atoms,
alkoxy of from one to six carbon atoms,
hydroxy,
benzyloxy,
fluorine,
chlorine,
bromine,
nitro,
trifluoromethyl,
—NH—$COCH_3$,
—$CONH_2$,
—COOH,
—$CH_2COOH$,
—$CH_2CONH_2$,
—$NR_1R_2$ wherein
$R_1$ and $R_2$ are independently hydrogen, alkyl of from one to six carbon atoms which terminal carbon may contain an $OR_3$ group where $R_3$ is hydrogen, alkyl of from one to six carbon atoms, alkanoyl having from 2 to 5 carbon atoms, benzoyl, or when joined together form a 5- or 6-membered ring optionally interrupted by an oxygen atom or —$NR_3$′; wherein $R_3$ is as defined above;
—$CH_2NR_1R_2$ where $R_1$ and $R_2$ are as defined above;
—$CH_2OR_3$ where $R_3$ is as defined above;
—COO-alkyl where alkyl is from one to six carbons which terminal carbon may contain an $OR_3$ group or $NR_1R_2$ where $R_1$, $R_2$, and $R_3$ are as defined above;
—$NHCH_2COO$-alkyl where alkyl is from one to four carbon atoms;
—$SO_2NR_1R_2$ where $R_1$ and $R_2$ are as defined above;
—$SO_2OR_3$ where $R_3$ is as defined above, or
—NH—$SO_2R_4$ where $R_4$ is alkyl of one to four carbon atoms or phenyl;
a N-oxide or
a pharmaceutically acceptable salt thereof.

**31**. A method of treating hypercholesterolemia and atherosclerosis comprising administering to a patient an ACAT-inhibitory effective amount of a compound as defined by claim **1** in combination with a pharmaceutically acceptable carrier.

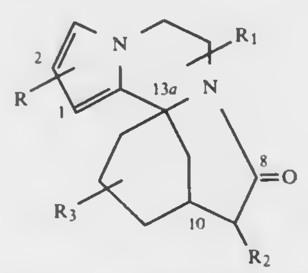
---

### 5,015,645
### TETRACYCLIC PYRROLE LACTAM DERIVATIVES

**Jan W. F. Wasley, Chatham, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Filed Oct. 19, 1989, Ser. No. 424,014**
**Int. Cl.$^5$ C07D *487/18, 487/10;* A61K *31/55, 31/495***
**U.S. Cl. 514—250** **7 Claims**

1. A compound of the formula

(II)



wherein R and $R_1$–$R_3$ independently represent hydrogen or lower alkyl.

5. A pharmaceutical composition suitable for enhancing retention performance in conditions of amnesia in mammals comprising an effective retention performance enhancing amount of a compound according to claim **1** in combination with one or more pharmaceutically acceptable carriers.

---

### 5,015,646
### PHARMACEUTICALLY USEFUL POLYMORPHIC MODIFICATION OF BUSPIRONE

**Jack C. Simms, deceased, late of Elberfeld, Ind. by Betty J. Simms, legal representative , assignor to Bristol-Myers Squibb Co., New York, N.Y.**
**Filed Aug. 28, 1987, Ser. No. 90,984**
**Int. Cl.$^5$ C07D *401/14;* A61K *31/505***
**U.S. Cl. 514—253** **3 Claims**

1. The lower melting polymorphic crystalline form of buspirone hydrochloride, characterized by a melting point of about 188° C., in pharmaceutically purified form.

---

### 5,015,647
### METHOD FOR TREATING VIRAL INFECTIONS

**Susan M. Daluge; Harry J. Leighton, both of Chapel Hill, and Sandra N. Lehrman, Durham, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.**
**Continuation of Ser. No. 42,423, Apr. 24, 1987, abandoned, Continuation-in-part of Ser. No. 856,582, Apr. 25, 1987. This application Jul. 19, 1989, Ser. No. 383,248**
**Int. Cl.$^5$ A61K *31/52***
**U.S. Cl. 514—263** **6 Claims**

1. A method for the treatment of a virus infection in a virus infected animal which comprises administering to said animal a therapeutically effective amount of the compound
(E)-4-(1-benzyl-1,2,3,6-tetrahydro-2,6-dioxo-3-butyl-9H-purin-8-yl) cinnamic acid or
(E)-4-(3-benzyl-1,2,3,6-tetrahydro-2,6-dioxo-1-butyl-9H purin-8-yl) cinnamic acid or a pharmaceutically acceptable salt thereof.

---

### 5,015,648
### USE OF A THROMBOXANE RECEPTOR ANTAGONIST IN PREGNANCY-INDUCED HYPERTENSION AND RELATED CONDITIONS

**Patrick P. A. Humphrey, Arcadia House, England, assignor to Glaxo Group Limited, London, England**
**Filed Jun. 20, 1989, Ser. No. 368,586**
**Claims priority, application United Kingdom, Jun. 21, 1988, 8814725.1**
**Int. Cl.$^5$ A61K *31/445***
**U.S. Cl. 514—317** **4 Claims**

1. A method of treatment of a pregnant female subject for combatting pregnancy-induced hypertension, preeclampsia, eclampsia or intrauterine growth retardation, either by therapy or prophylaxis, which method comprises administering to said subject an effective amount of an active ingredient, [1R-[1α(Z), 2β,3β,5α]]-(+)-7-[5-[[(1,1′-biphenyl)-4-yl]methoxy]-3-hydroxy-2-(1-piperidinyl)cyclopentyl]-4-heptenoic acid, or a physiologically acceptable salt, solvate or cyclodextrin complex thereof.

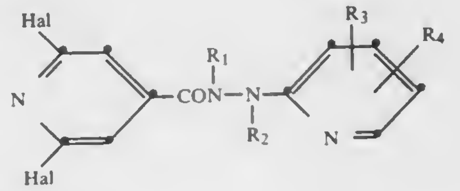
---

### 5,015,649
### PLANT-PROTECTIVE COMPOSITIONS

**Walter Kunz, Oberwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Continuation of Ser. No. 187,161, Apr. 28, 1988, abandoned. This application Sep. 1, 1989, Ser. No. 403,844**
**Claims priority, application Switzerland, Apr. 29, 1987, 1629/87**
**Int. Cl.$^5$ A61K *31/44***
**U.S. Cl. 514—332** **16 Claims**

1. A method of protecting plants from attack by phytopathogenic microorganisms which comprises applying, to said plants or to the locus thereof, an effective amount of a compound of formula I

(I)



wherein
Hal is halogen,
$R_1$ is hydrogen, methyl or —$COR_5$,
$R_2$ is hydrogen, $C_1$–$C_4$alkyl, or a radical selected from —$COR_5$ and —CO—Z—$R_6$,
$R_3$ is hydrogen, halogen, trifluoromethyl, trichloromethyl, —COOH, —$COOCH_3$, —OH or nitro,
$R_4$ is hydrogen, halogen, methoxy, trifluoromethyl or methyl,
$R_5$ is $C_1$–$C_6$alkyl, unsubstituted or substituted by one or more halogen atoms, $C_1$–$C_6$alkyl which is interrupted by oxygen or sulfur, $C_1$–$C_6$-alkyl which is substituted by one or more halogen atoms and interrupted by oxygen or sulfur; $C_2$–$C_4$alkenyl, unsubstituted or substituted by one or more halogen atoms; phenyl, benzyl, or phenyl or benzyl each substituted by halogen, methyl, trifluoromethyl or trichloromethyl, a 3- to 6-membered cycloalkyl radical or a cycloalkyl radical which is substituted by one or more halogen atoms or methyl groups,
$R_6$ is $C_1$–$C_5$alkyl, phenyl or, if Z is the —CO group, is O-alkyl containing 1 or 2 carbon atoms, and
Z is oxygen, sulfur or the —CO group.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,650
## CIRCULATION-ACTIVE BASIC 4-ARYL-DHP AMIDES

**Jürgen Stoltefuss, Haan; Eckhard Schwenner, Wuppertal; Rainer Gross, Wuppertal; Siegbert Hebisch, Wuppertal; Matthias Schramm, Cologne; Martin Bechem, Wuppertal; Claudia Hirth, Wuppertal, and Johannes-Peter Stasch, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

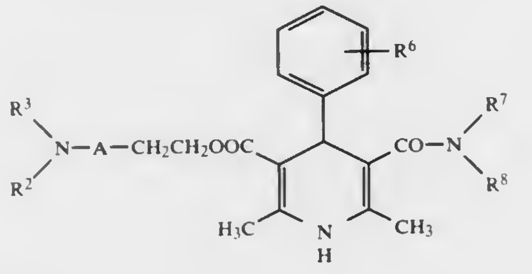
**Filed Sep. 27, 1989, Ser. No. 413,365**

**Claims priority, application Fed. Rep. of Germany, Oct. 5, 1988, 3833892**

**Int. Cl.$^5$ A61K** ***31/455;*** **C07D** ***211/86***

**U.S. Cl. 514—356** **10 Claims**

1. A dihydropyridine amide of the formula



in which

$R^2$ and $R^3$ carbon atoms, one of which is substituted by, and the other of which is optionally substituted by, halogen, alkoxy having up to 8 carbon atoms, trifluoromethyl or phenyl which is optionally substituted by methyl,

$R^6$ represents a group of the formula

$-O-(CH_2)_n-R^{10}$, $-S-(CH_2)_n-R^{10}$,
$-O-SO_2-(CH_2)_n-R^{10}$ or
$-O-CO-(CH_2)_n-R^{10}$

in which

$R^{10}$ denotes cyclohexyl or phenyl which is optionally substituted by methyl,

$R^7$ represents hydrogen or alkyl having up to 4 carbon atoms, and

$R^8$ represents hydrogen, cyclopropyl, cyclopentyl or represents straight-chain or branched alkyl with up to 5 carbon atoms which is optionally substituted by hydroxy,

or a physiologically acceptable salt thereof.

---

### 5,015,651
## TREATMENT OF HYPERTENSION WITH 1,2,4-ANGIOTENSIN II ANTAGONISTS

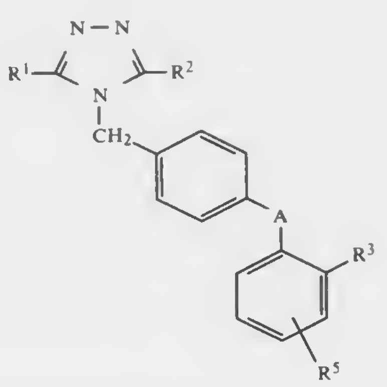
**David J. Carini, Wilmington; John J. V. Duncia, Newark, and Gregory J. Wells, Wilmington, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 141,669, Jan. 7, 1988, abandoned. This application Dec. 6, 1988, Ser. No. 279,193**

**Int. Cl.$^5$ A61K** ***31/41;*** **C07D** ***257/04***

**U.S. Cl. 514—381** **4 Claims**

1. A method of treating hypertension in a warm-blooded animal comprising administering to the animal, in an amount effective to lower the animal's blood pressure, an antihypertensive compound of the formula:



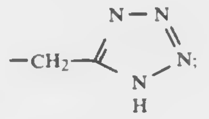
(I)

or a pharmaceutically suitable salt thereof, wherein

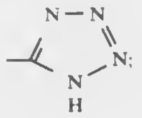
A is a carbon-carbon single bond, CO, O, NHCO, or $OCH_2$;

$R^1$ is alkyl of 2 to 6 carbon atoms, alkenyl or alkynyl of 3 to 6 carbon atoms, or $(CH_2)_nOR^4$ provided that when $R^1$ is $(CH_2)_nOR^4$ then $R^2$ is H, alkyl of 2 to 6 carbon atoms, or alkenyl or alkynyl of 3 to 6 carbon atoms;

$R^2$ is H, alkyl of 2 to 6 carbon atoms, alkenyl or alkynyl of 3 to 6 carbon atoms; $-(CH_2)_nOR^4$; $-(CH_2)_mCOR^6$; $-(CH_2)_nOCOR^4$; $-(CH_2)_nS(O)_tR^4$; $-CH=CH(CH_2)_mCR^4HOR^{12}$; $-CH=CH(CH_2)_mCOR^6$; $-(CH_2)_nNHCOOR^{11}$; $-(CH_2)_nNHSO_2R^{11}$; $-(CH_2)_nF$; or



$R^3$ is $CO_2H$, $-NHSO_2CF_3$; or



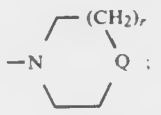
$R^4$ is H or alkyl of 1–4 carbon atoms;

$R^5$ is H, halogen, $NO_2$, methoxy, or alkyl of 1 to 4 carbon atoms;

$R^6$ is H, alkyl of 1 to 6 carbon atoms; cycloalkyl of 3 to 6 carbon atoms, $(CH_2)_mC_6H_5$, $OR^7$ or $NR^8R^9$;

$R^7$ is H, alkyl of 1 to 5 carbon atoms; cycloalkyl of 3 to 6 carbon atoms; phenyl or benzyl;

$R^8$ and $R^9$ are independently H, alkyl of 1 to 4 carbon atoms, phenyl, or benzyl; or benzyl; or $NR^8R^9$ taken together form a ring of the formula:



Q is $NR^{10}$, O or $CH_2$;

$R^{10}$ is H, alkyl of 1 to 4 carbon atoms or phenyl;

$R^{11}$ is alkyl of 1 to 6 carbon atoms or perfluoroalkyl of 1 to 6 carbon atoms or $(CH_2)_pC_6H_5$;

$R^{12}$ is H, alkyl of 1 to 4 carbon atoms, or acyl of 1 to 4 carbon atoms;

m is 0 to 6;
n is 1 to 6;
p is 0 to 3;
r is 0 to 1;
t is 0 to 2.

---

### 5,015,652
## 1-DIMETHYLCARBAMOYL-3-SUBSTITUTED-5-SUBSTITUTED-1H-1,2,4-TRIAZOLES

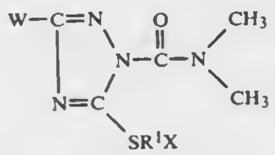
**Richard M. Jacobson, Chalfont, and Luong T. Nguyen, Lansdale, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Filed Apr. 4, 1988, Ser. No. 176,919**

**Int. Cl.$^5$ C07D** ***249/12;*** **A01N** ***43/653***

**U.S. Cl. 514—384** **25 Claims**

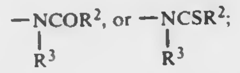
1. A compound of the formula



wherein

W is t-butyl, s-butyl, i-propyl, cyclopropyl, 1-methylthio-1 methylethyl or 1-methyl-cycloprop-1-yl;

X is



$\underset{R^3}{\underset{|}{-NCOR^2}}$, or $\underset{R^3}{\underset{|}{-NCSR^2}}$;

$R^1$ is unsubstituted or substituted $-(CH_2)_n-$ having one to four of the same or different substituents independently selected from halo, cyano, nitro, $-OR$, $-CO_2R$, $-OCOR$; $-COR$, $(C_2-C_6)$alkenyl, $(C_2-C_6)$alkynyl, $(C_1-C_6)$alkyl, $(C_1-C_6)$haloalkyl; or unsubstituted or substituted phenyl having one to three of the same or different substituents independently selected from halo, cyano, nitro, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthio, tetrafluoroethylthio, $-CO_2R$, $-COR$, $-OCOR$, $(C_1-C_4)$alkyl, $(C_1-C_4)$alkoxy, $(C_1-C_4)$haloalkyl or $(C_2-C_6)$alkenyl;

each $R^2$ is independently hydrogen; unsubstituted or substituted $(C_1-C_8)$alkyl having one to three of the same or different substituents independently selected from halo, cyano, amino, nitro, $-OR$, $-CO_2R$, $-COR$ or $-OCOR$; unsubstituted or substituted $(C_1-C_8)$alkoxy having one to three of the same or different substituents independently selected from halo, cyano, nitro, $-OR$, $-CO_2R$, $-COR$ or $-OCOR$; unsubstituted or substituted $(C_1-C_{12})$mono- or dialkylamino where the alkyl is substituted by one to three of the same or different substituents independently selected from halo, cyano, nitro, $-OR$, $-CO_2R$, $-COR$; unsubstituted or substituted $(C_6-C_{14})$arylamino where the aryl is substituted by one to three of the same or different substituents independently selected from halo, cyano, nitro, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthio, tetrafluoroethylthio, $-CO_2R$, $-COR$, $-OCOR$, $(C_1-C_4)$alkyl, $(C_1-C_4)$alkoxy, $(C_1-C_4)$-haloalkyl or $(C_2-C_6)$alkenyl; unsubstituted or substituted phenyl having one to three of the same or different substituents independently selected from halo, cyano, nitro, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthio, tetrafluoroethylthio, $-CO_2R$, $-COR$, $-OCOR$, $(C_1-C_4)$alkyl, $(C_1-C_4)$ alkoxy, $(C_1-C_4)$haloalkyl or $(C_2-C_6)$alkenyl;

$R^3$ is hydrogen; unsubstituted or substituted $(C_1-C_6)$-alkyl having from one to four of the same or different substituents independently selected from halo, cyano, nitro, $-OR$, $-CO_2R$, $-OCOR$, $-COR$, $(C_2-C_6)$alkenyl, $(C_2-C_6)$alkynyl, $(C_1-C_6)$-alkyl, $(C_1-C_6)$haloalkyl; or unsubstituted or substituted phenyl having one to three of the same or different substituents independently selected from halo, cyano, nitro, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthio, tetrafluoroethylthio, $-CO_2R$, $-COR$, $-OCOR$, $(C_1-C_4)$alkyl, $(C_1-C_4)$alkoxy, $(C_1-C_4)$haloalkyl or $(C_2-C_6)$alkenyl;

where each R is independently hydrogen; $(C_1-C_6)$alkyl; or phenyl optionally substituted with one to three of the same or different substituents independently selected from halo, cyano, nitro, hydroxy, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthio, tetrafluoroethylthio, $(C_1-C_4)$alkyl, $(C_1-C_4)$alkoxy, $(C_1-C_4)$haloalkyl, $(C_2-C_6)$alkenyl, carboxy, $(C_1-C_4)$alkoxycarbonyl;

n is 1 to 10, and agronomically acceptable salts thereof.

---

### 5,015,653
## [(5-OXO)-2-PYRROLIDINYL)METHYL]CYCLOHEXANEACETAMIDES, COMPOSITIONS AND USE

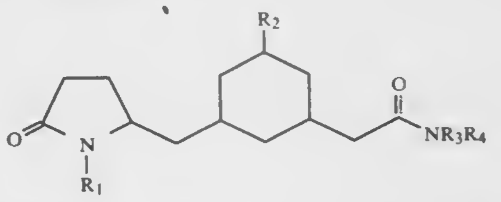
**Gary L. Olson, Westfield, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation-in-part of Ser. No. 377,643, Jul. 10, 1989, abandoned, which is a continuation-in-part of Ser. No. 297,726, Jan. 17, 1989, abandoned. This application Jun. 7, 1990, Ser. No. 534,399**

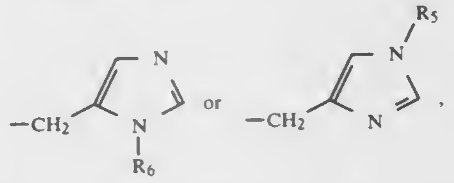
**Int. Cl.$^5$ A61K** ***31/40, 31/415;*** **C07D** ***207/12, 403/08***

**U.S. Cl. 514—397** **43 Claims**

1. A compound of the formula

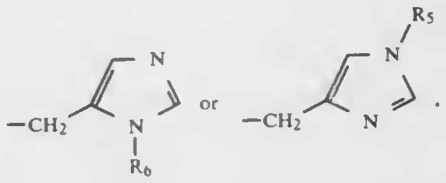


wherein $R_1$ is hydrogen, lower alkyl or aryl-lower alkyl; $R_2$ is hydrogen, lower alkyl, aryl, aryl-lower alkyl,



wherein $R_5$ and $R_6$ are hydrogen, lower alkyl or aryl-lower alkyl; $R_3$ and $R_4$, independently, are hydrogen, lower alkyl or aryl-lower alkyl;

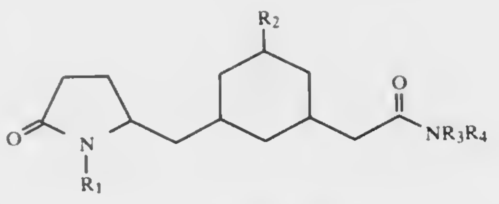
or an enantiomer, diastereomer, or racemate thereof, and, when $R_2$ is



a pharmaceutically acceptable acid addition salt thereof.

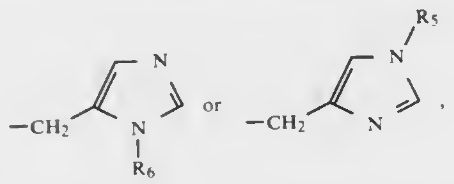
32. A method of treating memory deficits associated with Alzheimer's disease or age-associated memory impairment which comprises administering to a host requiring such treatment an effective amount of

VOL
1126
ISS
2
MY
14
1991
UMI



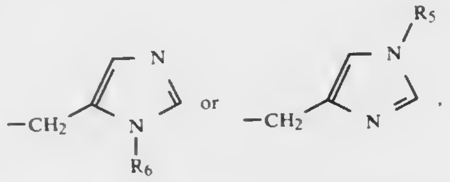
1

wherein $R_1$ is hydrogen, lower alkyl or aryl-lower alkyl; $R_2$ is hydrogen, lower alkyl, aryl, aryl-lower alkyl,



wherein $R_5$ and $R_6$ are hydrogen, lower alkyl or aryl-lower alkyl; $R_3$ and $R_4$, independently, are hydrogen, lower alkyl or aryl-lower alkyl;

or an enantiomer, diastereomer, or racemate thereof, and, when $R_2$ is



a pharmaceutically acceptable acid addition salt thereof.

---

### 5,015,654
## PHARMACEUTICAL COMPOSITIONS

**Saad Al-Damluji, London, United Kingdom, assignor to National Research Development Corporation, London, England**
**Filed Apr. 28, 1989, Ser. No. 348,589**
**Claims priority, application United Kingdom, Sep. 2, 1987, 8720600**
**Int. Cl.⁵ A01N *43/50***
**U.S. Cl. 514—402** **18 Claims**

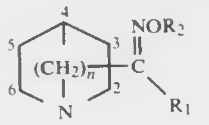
1. A pharmaceutical composition which comprises a mixture of a therapeutically effective amount of an alpha-2 adrenoceptor antagonist which is an imidazole derivative and therapeutically effective amount of a catecholamine precursor which is a member selected from the group consisting of tyrosine, phenylalanine, dihydroxyphenylalanine, dopamine and L-dihydroxyphenylserine.

---

### 5,015,655
## 1-AZABICYCLOALKANE DERIVATIVES, THEIR PREPARATION PROCESS AND THEIR USE AS MEDICAMENTS

**Giulio Galliani; Fernando Barzaghi, both of Monza; Carla Bonetti, Fontanella, and Emilio Toja, Milan, all of Italy, assignors to Roussel UCLAF, Paris, France**
**Filed Oct. 26, 1989, Ser. No. 426,778**
**Claims priority, application Italy, Oct. 28, 1988, 22452 A/88**
**Int. Cl.⁵ A61K *31/40;* C07D *209/02***
**U.S. Cl. 514—413** **20 Claims**

1. A compound of formula (I)



(I)

in which

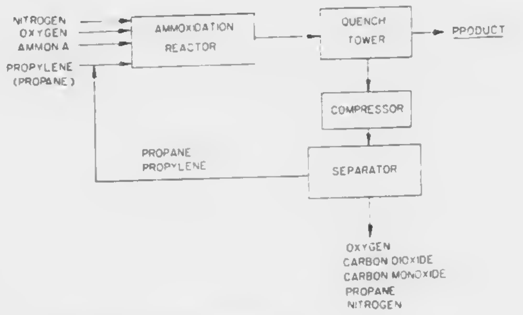
n represents the number 1,

$R_1$ and $R_2$, identical or different represent hydrogen or an unsubstituted or substituted member of the group consisting of a linear, branched or cyclic alkyl, alkenyl, and alkynyl which contain up to 6 carbon atoms, in which the member, if substituted, is substituted by at least one of hydroxy, alkoxy containing up to 6 carbon atoms, benzyl, phenthyl, a $COOalk_1$ radical in which $alk_1$ represents alkyl containing up to 6 carbon atoms, and a $—CON(alk_2)_2$ radical in which $alk_2$ represents alkyl containing up to 6 carbon atoms, the radical $—C(R_1)═NOR_2$ being in the 2, 3 or 4 position, in all their isomer forms, as well as its addition salts with pharmaceutically acceptable organic or mineral acids.

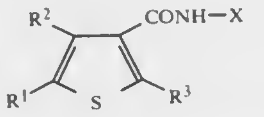
---

### 5,015,656
## ORGANIC COMPOUNDS AND THEIR USE AS PHARMACEUTICALS

**Maria I. F. Fernandez, Madrid, Spain; Terrence M. Hotten, Farnborough, and David E. Tupper, Reading, both of England, assignors to Lilly S.A., Madrid, Spain and Lilly Industries Limited, Basingstoke, England**
**Filed Sep. 26, 1989, Ser. No. 412,691**
**Claims priority, application United Kingdom, Sep. 30, 1988, 8823041**
**The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.**
**Int. Cl.⁵ A61K *31/38;* C07D *405/00, 409/00, 333/22***
**U.S. Cl. 514—422** **5 Claims**



1. A compound of the formula



(I)

in which $R^1$, $R^2$ and $R^3$ independently are hydrogen, hydroxy, halo, nitro, amino, $C_{2-5}$ acylamino, $C_{1-4}$ alkyl, —CHO, $—CH_2OH$, $—CH_2OC_{1-4}$ alkyl, —COOH, $—COC_{1-3}$ alkyl, $—CH(OH)C_{1-3}$ alkyl, $C_{1-4}$ alkoxy, $C_{2-4}$ alkenyloxy, $C_{1-4}$ alkylthio, $C_{1-4}$ alkylsulphinyl, $C_{1-4}$ alkylsulphonyl, N-substituted heterocyclyl, optionally substituted phenyl, optionally substituted phenylthio, optionally substituted phenylsulphinyl, optionally substituted phenylsulphonyl or optionally substituted phenylsulphonamido, or $R^1$ and $R^2$ together form a $C_{3-5}$ alkylene bridge; provided that at least one of $R^2$ and $R^3$ is $C_{1-4}$ alkoxy or $C_{2-4}$ alkenyloxy; and X is (i) $—(CH_2)_nN(R^4)_2$ where each $R^4$ independently is $C_{1-4}$ alkyl, $C_{2-4}$ alkenyl or optionally substituted $C_6H_5CH_2—$, and n is 1, 2 or 3, or (ii) a 5- to 8-membered alicyclic group containing one or two nitrogen atoms and directly attached to the amido nitrogen or attached by a $C_{1-3}$ alkylene chain; and salts and esters thereof.

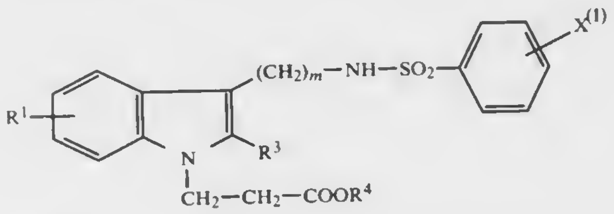
5. A method of treating an animal, including a human, suffering from or susceptible to a disorder of the central nervous system, which comprises administering an effective amount of a compound according to claim 1, or a pharmaceutically-acceptable salt or ester thereof.

---

### 5,015,657
## 2-HALOGEN-SUBSTITUTED N-INDOLYLETHYL-SULPHONAMIDES AND INHIBITING PLATELET AGGREGATION AND ANTOGONIZING THROMBOXANE A₂ THERE WITH

**Horst Boshagen, Haan; Elisabeth Perzborn, Wuppertal, and Volker-Bernd Fiedler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**
**Filed Nov. 15, 1989, Ser. No. 436,858**
**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1988, 3840338**
**Int. Cl.⁵ C07D *209/18;* A61K *31/405***
**U.S. Cl. 514—419** **13 Claims**

1. A 2-halogen-substituted N-indolylethyl-sulphonamide of the formula



in which

$R^1$ represents hydrogen, halogen or trifluoromethyl,

X is 0 to 5 halogen atoms, or is a member selected from the group consisting of cyano, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, alkyl, alkoxy, alkoxycarbonyl and alkylthio having in each case up to 8 carbon atoms, hydroxyl, carboxyl, phenyl, phenoxy, benzyloxy and benzylthio, or is a group of the formula $—NR^6R^7$,

wherein

$R^6$ and $R^7$ are identical or different and denote hydrogen, straight-chain or branched alkyl having up to 8 carbon atoms, aryl having 6 to 10 carbon atoms or acetyl,

$R^3$ represents halogen,

$R^4$ represents hydrogen or straight-chain or branched alkyl having up to 8 carbon atoms, or represents phenyl

and

m represents one of the numbers 2, 3, or 4, or a pharmaceutically acceptable salt thereof.

10. A method of inhibiting aggregation of platelets in a patient in need thereof which comprises administering to such patient an amount effective therefor of a compound or salt thereof according to claim 1.

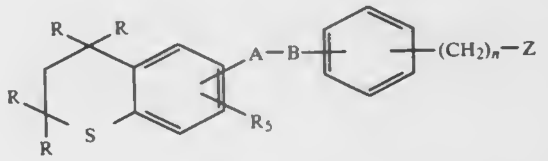
12. A method of antagonizing thromboxane $A_2$ in a patient in need thereof which comprises administering to such patient an amount effective therefor of a compound or salt thereof according to claim 1.

---

### 5,015,658
## THIOCHROMAN ESTERS OF PHENOLS AND TEREPHTHALLATES HAVING RETINOID-LIKE ACTIVITY

**Roshantha A. S. Chandraratna, El Toro, Calif., assignor to Allergan, Inc., Irvine, Calif.**
**Continuation-in-part of Ser. No. 212,855, Jun. 29, 1988, Pat. No. 4,895,868. This application Jun. 15, 1989, Ser. No. 366,831**
**The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.**
**Int. Cl.⁵ A61K *31/38;* C07D *335/06***
**U.S. Cl. 514—432** **16 Claims**

1. A Compound of the formula



in which:

the R groups are independently hydrogen or lower alkyl;

$R_5$ is lower alkyl, $R_5$ being attached to the thiochroman ring at the 6 or at the 7-position;

one of A and B is O or S and the other is —C(O)—, being attached to the thiochroman ring at the unoccupied 6 or 7-position;

n is 0–5; and

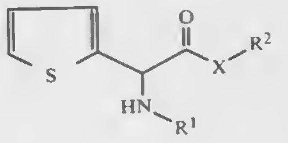
Z is H, or Z is —COD where D is —OH, or OM wherein M is a pharmaceutically acceptable cation, or D is $OR_1$ where $R_1$ is a lower alkyl group, or D is $—N(R_4)_2$ where $R_4$ is hydrogen or a lower alkyl group, or Z is —OE where E is hydrogen or a $C_{1-20}$ aliphatic, cycloaliphatic, or aliphatic-phenyl ether-forming group, or a $C_{1-10}$ aliphatic or cycloaliphatic carboxylic acid ester forming group, or a phenyl or lower alkyl phenyl carboxylic acid ester forming group, or Z is —CHO or an acetal derivative thereof formed with a lower alkyl or cycloalkyl alcohol, or an acetal derivative thereof formed with an alkyl diol having 2 to 6 carbon atoms, or Z is $—COR_3$ where $R_3$ is $—(CH_2)_mCH_3$ where m is 0–4 and the sum of n and m does not exceed 4, or a ketal derivative thereof formed with a lower alkyl or cycloalkyl alcohol, or a ketal derivative thereof formed with an alkyl diol having 2 to 6 carbon atoms.

---

### 5,015,659
## THIENYLACETIC ACID DERIVATIVES, PROCESS FOR THE PREPARATION THEREOF, THE USE THEREOF, AND PHARMACEUTICALS CONTAINING THESE AND THE PREPARATION THEREOF

**Karl Schönafinger, Alzenau; Rudi Beyerle, Frankfurt; Ursula Schindler, Mörfelden-Walldorf; Bernd Jablonka, Oberursel, all of Fed. Rep. of Germany, and Jeffery Troke, Newport Pagnell, England, assignors to Cassella Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**
**Filed Mar. 14, 1990, Ser. No. 495,439**
**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1989, 3908547**
**Int. Cl.⁵ A61K *31/38;* C07D *333/22***
**U.S. Cl. 514—438** **6 Claims**

1. Thienylacetic acid compounds of the general formula I



(I)

VOL
1126
ISS
2
MY
14
1991
UMI

in which

X denotes —O— or —NH—;

$R^1$ and $R^2$ independently denote hydrogen, the group $—CH_2—CO—R^3$ or the group $—CO—CH_2—NH_2$; and

$R^3$ denotes ($C_1$-$C_4$)-alkoxy, hydroxyl or amino, it not being possible for both $R^1$ and $R^2$ to represent hydrogen, as well as the pharmaceutically tolerated salts thereof.

---

### 5,015,660
## MICROBICIDAL/MICROBISTATIC COMPOSITION FOR INDUSTRIAL USE AND METHOD OF USING SAME

**Yasuhiro Hidaka, Osaka; Toshio Sato, Oita, and Masanobu Takahashi, Osaka, all of Japan, assignors to Yoshitami Pharmaceutical Industries, Ltd., Osaka, Japan**

**Filed Nov. 20, 1989, Ser. No. 438,381**

**Claims priority, application Japan, Nov. 21, 1988, 63-294378**

**Int. Cl.$^5$ A01N** *33/18, 43/26*

U.S. Cl. 514—441 **7 Claims**

1. A composition having microbicidal and microbistatic activity against microorganisms selected from the group consisting of Gram positive bacteria, Gram negative bacteria and yeasts, said composition comprising 4,5-dichloro-1,2-dithiol-3-one and bromonitrostyrene in a Synergistic weight ratio of 9:1 to 1:19.

---

### 5,015,661
## CHROMANES AND THEIR PHARMACEUTICAL COMPOSITIONS AND METHODS

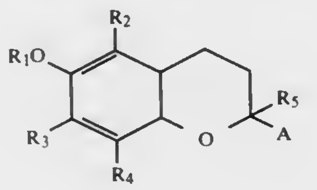
**Armin Walser, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation-in-part of Ser. No. 230,094, Aug. 9, 1988, abandoned. This application Jun. 16, 1989, Ser. No. 367,082**

**Int. Cl.$^5$ A61K** *31/355;* **C07D** *311/72*

U.S. Cl. 514—443 **30 Claims**

1. A racemic compound of the formula



I

wherein

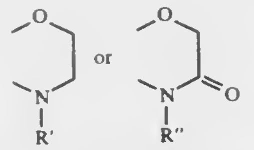
A is—C≡C—$R_6$

$R_1$ is hydrogen or lower alkanoyl,

$R_2$, $R_3$, and $r_4$ independently are hydrogen or lower alkyl,

$R_5$ is lower alkyl,

$R_6$ is a heteroaromatic radical selected from pyridinyl, imidazoyl, thienyl, 2-(pyridyl)thienyl, 2-(phenyl)thienyl, 2-chlorothienyl, furyl, pyrimidinyl, oxazolyl, quinolinyl, isoquinolinyl, indolyl, benzothienyl or benzofuranyl or an aromatic radical selected from phenyl, naphthyl or phenanthryl, which aromatic radical may optionally be substituted by one or more substituents selected from chlorine, fluorine, lower alkyl, lower alkoxy, phenyl lower alkoxy, lower alkanoyl, lower alkanoyloxy, hydroxy-lower alkyl, carboxy, lower alkoxycarbonyl, hydroxyimino lower alkyl, amino, amino lower alkyl, mono- or di-lower alkyl amino, mono- or di-lower alkylamino-lower alkyl, lower alkanoylamino, aminocarbonyl, lower alkylaminocarbonyl, lower dialkylaminocarbonyl, trifluoroacetylamino, trifluoromethyl, hydroxy, pyridyl, or on adjacent carbons can be



wherein R' is hydrogen, lower alkanoyl, trifluoroacetyl and R" hydrogen or lower alkyl,

or an enantiomer thereof or a salt thereof.

---

### 5,015,662
## ANTHELMINTIC BIOCONVERSION PRODUCTS

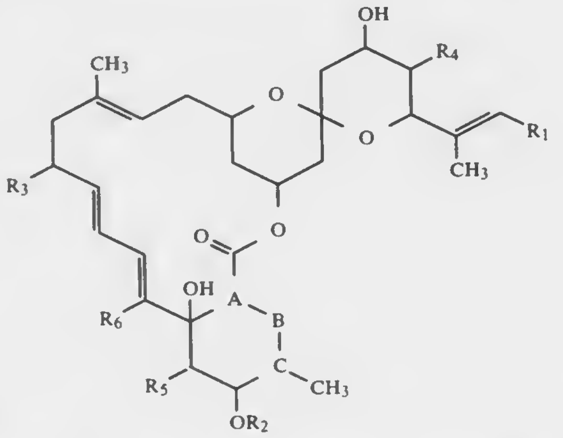
**Shieh-Shung T. Chen, Morganville, N.J., assignor to Merck & Co., Inc., Rahway, N.J.**

**Filed Oct. 18, 1988, Ser. No. 259,563**

**Int. Cl.$^5$ C07D** *493/222;* **A61K** *31/35*

U.S. Cl. 514—450 **5 Claims**

1. A compound having the formula:

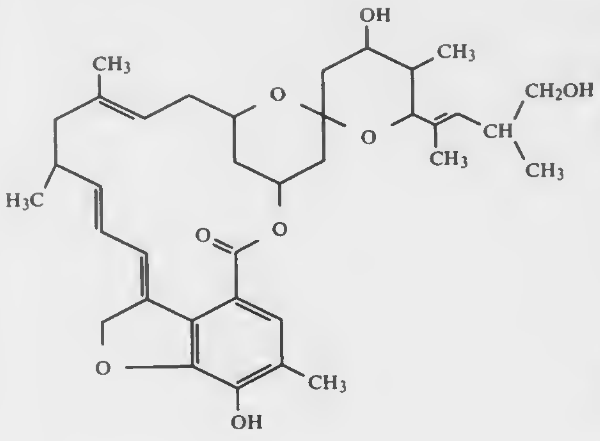


wherein $R_1$, $R_2$, $R_3$, $R_4$, $R_5$, $R_6$, A, B and C have the following meanings:

| $R_1$ | $R_2$ | $R_3$ | $R_4$ |
|---|---|---|---|
| $—CH(CH_3)CH_2OH$ | H | $CH_3$ | $CH_3$ |
| $—CH_2OH$ | H | $CH_3$ | $CH_3$ |
| $—CH_2OH$ | $CH_3$ | $CH_3$ | $CH_3$ |
| $—CH_2OH$ | $CH_3$ | $CH_3$ | $CH_3$ |
| $—CH(CH_3)CH_2OH$ | H | H | $CH_3$ |
| $—CH_2CH_2OH$ | H | $CH_3$ | $CH_3$ |
| $—CH(CH_3)CH_2OH$ | H | $CH_3$ | $CH_3$ |
| $—CH(CH_3)CH_2OH$ | H | $CH_3$ | $CH_2CH_3$ |
| $—CH(CH_3)CH_2OH$ | H | $CH_2CH_3$ | $CH_3$ |
| $—CH_2OH$ | $CH_3$ | $CH_3$ | $CH_3$ |
| $—CH(CH_3)CH_2OH$ | $CH_3$ | $CH_3$ | $CH_3$ |
| $—CH(CH_3)CH_2OH$ | $CH_3$ | $CH_3$ | $CH_3$ |

| $R_5$ | $R_6$ | $R_5 + R_6$ | A—B | B—C |
|---|---|---|---|---|
| | | $—O—CH_2—$ | CH—CH | CH═C |
| | | $—O—CH_2—$ | CH—CH | CH═C |
| | | $—O—CH_2—$ | CH—CH | CH═C |
| OH | $CH_2OH$ | | CH—CH | CH═C |
| | | $—O—CH_2—$ | CH—CH | CH═C |
| | | $—O—CH_2—$ | CH—CH | CH═C |
| | | $—O—CH_2—$ | C═CH | CH—CH |
| | | $—O—CH_2—$ | CH—CH | CH═C |
| | | $—O—CH_2—$ | CH—CH | CH═C |
| H | $CH_3$ | | CH—CH | CH═C |
| | | $—O—CH_2—$ | CH—CH | CH═C |
| H | $CH_3$ | | CH—CH | CH═C |

and the compound



---

### 5,015,663
## TREATMENT OF CONDITIONS REQUIRING ENHANCED OXYGEN AVAILABILITY OF MAMMALIAN TISSUES

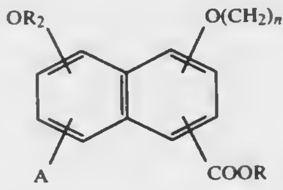
**John T. Suh, Maple Glen; Robert G. Pendleton, Hatfield; Charles E. Pendley, II, Abington; Kin T. Yu, Collegeville; Paul R. Menard, North Wales, and Alain B. Schreiber, Fort Washington, all of Pa., assignors to Rhone-Poulenc Rorer Pharmaceuticals Inc., Fort Washington, Pa.**

**Division of Ser. No. 333,520, May 11, 1989, Pat. No. 4,948,582, which is a division of Ser. No. 211,486, Jun. 23, 1988, Pat. No. 4,861,795. This application Mar. 5, 1990, Ser. No. 488,190**

**Int. Cl.$^5$ A61K** *31/21, 31/19, 31/40, 31/55*

U.S. Cl. 514—510 **8 Claims**

1. A method of maintaining oxygen-delivery capacity of transfusable blood cells comprising admixing said blood prior to transfusion with an effective amount of a compound of the formula



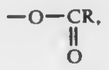
wherein

R is H, alkyl, aryl or aminoalkyl;

$R_1$ is $NR_3R_4$ where $R_3$ and $R_4$ form a cyclic amino group with N to which they are attached;

$R_2$ is H, acyl, aminoacyl, alkyl, substituted alkyl wherein the substituents are aryl, cycloalkyl, azacycloalkyl, CONHR, aryloxy or alkoxyalkyl;

A is H, halo, $CF_3$, OH,



$$—O—\underset{\displaystyle O}{\underset{\|}{C}}R,$$

aminoalkyl, aryl, acyl, alkoxy, alkyloxy, or alkoxyalkyloxy; and

n is 0–6; wherein said alkyl group in alkyl, aminoalkyl, substituted alkyl, alkoxyalkyl, and alkoxyalkyloxy contains up to 8 carbon atoms and said cycloalkyl group contains 3 to 10 carbon atoms or pharmaceutically acceptable salts thereof.

---

### 5,015,664
## ORALLY EFFECTIVE ION CHELATORS RELATED TO DEFEROXAMINE

**Donald E. Green, Sunnyvale, Calif., assignor to Oral D, Boston, Mass.**

**Continuation of Ser. No. 694,259, Jan. 24, 1985, abandoned, and a continuation-in-part of Ser. No. 574,482, Jan. 26, 1984, Pat. No. 4,671,901. This application Apr. 21, 1987, Ser. No. 41,679**

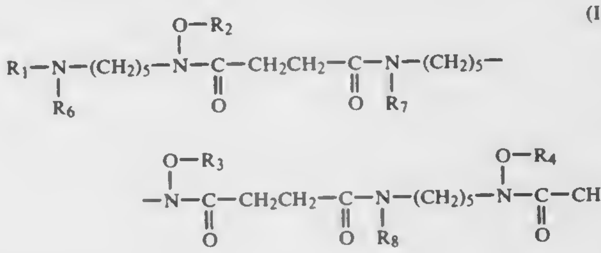
**The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.**

**Int. Cl.$^5$ A01N** *37/18;* **C07C** *233/00*

U.S. Cl. 514—616 **12 Claims**

1. Compounds of the formula:

(I)



$$R_1—\underset{\displaystyle R_6}{\underset{|}{N}}—(CH_2)_5—\overset{\displaystyle O—R_2}{\overset{|}{N}}—\underset{\displaystyle O}{\underset{\|}{C}}—CH_2CH_2—\underset{\displaystyle O}{\underset{\|}{C}}—\underset{\displaystyle R_7}{\underset{|}{N}}—(CH_2)_5—$$

$$—\overset{\displaystyle O—R_3}{\overset{|}{N}}—\underset{\displaystyle O}{\underset{\|}{C}}—CH_2CH_2—\underset{\displaystyle O}{\underset{\|}{C}}—\underset{\displaystyle R_8}{\underset{|}{N}}—(CH_2)_5—\overset{\displaystyle O—R_4}{\overset{|}{N}}—\underset{\displaystyle O}{\underset{\|}{C}}—CH_3$$

wherein

in a first compound $R_1$ is acetyl, $R_2$, $R_3$, $R_4$ and $R_6$ are each acetyl, and $R_7$ and $R_8$ are hydrogen;

in a second compound $R_1$ is acetyl, $R_2$, $R_3$, $R_4$ and $R_6$ are each acetyl, and $R_7$ is hydrogen;

in a third compound $R_1$ is acetyl, $R_2$, $R_3$, $R_4$, $R_6$, $R_7$ and $R_8$ are each acetyl;

in a fourth compound $R_1$ acetyl, $R_2$, $R_3$, $R_4$, and $R_8$ are each octanoyl, and $R_6$ and $R_7$ are each hydrogen;

in a fifth compound $R_1$ is acetyl, $R_2$,, $R_3$, $R_4$, $R_6$, $R_7$ and $R_8$ are each octanoyl;

in a sixth compound $R_1$ is hexanoyl, $R_2$, $R_3$, $R_4$ and $R_6$ are each pentanoyl and $R_7$ and $R_8$ are each hydrogen:

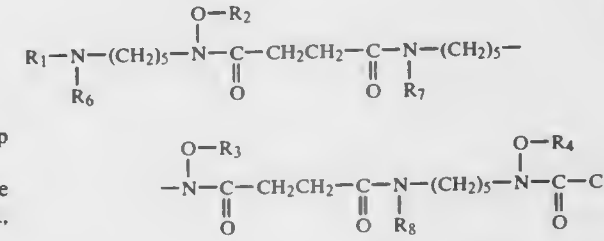
in a seventh compound $R_1$ is octanoyl, $R_2$, $R^3$, $R_4$ and $R_6$ are each octanoyl and $R_7$ and $R_8$ are each hydrogen:

in a eighth compound $R_1$ is octanoyl, $R_2$, $R_3$, $R_4$, $R_6$, and $R_8$ are each octanoyl and $R_7$ is hydrogen; or

in a ninth compound $R_1$ is octanoyl, $R_2$, $R_3$, $R_4$, $R_6$, $R_7$ and $R_8$ are each octanoyl.

3. A pharmaceutical composition for treating a trivalent metal ion overload condition in a human being which composition comprises a therapeutically effective amount of a compound of the formula:

(I)



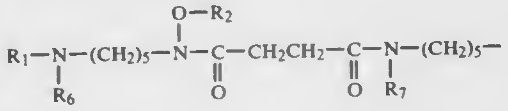
$$R_1—\underset{\displaystyle R_6}{\underset{|}{N}}—(CH_2)_5—\overset{\displaystyle O—R_2}{\overset{|}{N}}—\underset{\displaystyle O}{\underset{\|}{C}}—CH_2CH_2—\underset{\displaystyle O}{\underset{\|}{C}}—\underset{\displaystyle R_7}{\underset{|}{N}}—(CH_2)_5—$$

$$—\overset{\displaystyle O—R_3}{\overset{|}{N}}—\underset{\displaystyle O}{\underset{\|}{C}}—CH_2CH_2—\underset{\displaystyle O}{\underset{\|}{C}}—\underset{\displaystyle R_8}{\underset{|}{N}}—(CH_2)_5—\overset{\displaystyle O—R_4}{\overset{|}{N}}—\underset{\displaystyle O}{\underset{\|}{C}}—CH_3$$

wherein $R_1$ is acetyl, $R_2$, $R_3$, $R_4$ and $R_6$ are n-octanoyl, and $R_7$ and $R_8$ are each hydrogen.

12. A pharmaceutical composition for treating a trivalent metal ion over load condition in a human being which composition comprises a therapeutically effective amount of a compound of the formula:

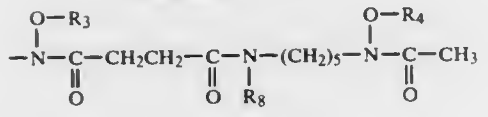
(I)



$$R_1—\underset{\displaystyle R_6}{\underset{|}{N}}—(CH_2)_5—\overset{\displaystyle O—R_2}{\overset{|}{N}}—\underset{\displaystyle O}{\underset{\|}{C}}—CH_2CH_2—\underset{\displaystyle O}{\underset{\|}{C}}—\underset{\displaystyle R_7}{\underset{|}{N}}—(CH_2)_5—$$

VOL
1126
ISS
2
MY
14
1991
UMI

-continued



$$-\underset{}{\overset{\overset{\displaystyle O-R_3}{|}}{N}}-\underset{\underset{\displaystyle O}{\|}}{C}-CH_2CH_2-\underset{\underset{\displaystyle O}{\|}}{C}-\underset{\underset{\displaystyle R_8}{|}}{N}-(CH_2)_5-\overset{\overset{\displaystyle O-R_4}{|}}{N}-\underset{\underset{\displaystyle O}{\|}}{C}-CH_3$$

wherein:

in a first compound, $R_1$ is acetyl, $R_2$, $R_3$, $R_4$ and $R_6$ are each acetyl, and $R_7$ and $R_8$ are hydrogen;

in a second compound, $R_1$ is acetyl, $R_2$, $R_3$, $R_4$, $R_6$ and $R_8$ are each acetyl, and $R_7$ is hydrogen;

in a third compound, $R_1$ is acetyl, $R_2$, $R_3$, $R_6$, $R_7$ and $R_8$ are each acetyl;

in a fourth compound, $R_1$ is acetyl, $R_2$, $R_3$, $R_4$, and $R_8$ are each octanoyl, and $R_6$ and $R_7$ are each hydrogen;

in a fifth compound, $R_1$ is acetyl, $R_2$, $R_3$, $R_4$, $R_6$ $R_7$ and $R_8$ are each octanoyl;

in a sixth compound, $R_1$ is hexanoyl; $R_2$, $R_3$, $R_4$ and $R_6$ are each pentanoyl and $R_7$ and $R_8$ are each hydrogen;

in a seventh compound, $R_1$ is octanoyl, $R_2$, $R_3$, $R_4$ and $R_6$ are each octanoyl and $R_7$ and $R_8$ are each hydrogen;

in an eighth compound, $R_1$ is octanoyl, $R_2$, $R_3$, $R_4$, $R_6$ and $R_8$ are each octanoyl and $R_7$ is hydrogen; or

in a ninth compound, $R_1$ is octanoyl, $R_2$, $R_3$, $R_4$, $R_6$, $R_7$ and $R_8$ are each octanoyl.

---

### 5,015,665

### N-ALKYL NEOTRIDECANAMIDE INSECT REPELLENT COMPOSITIONS

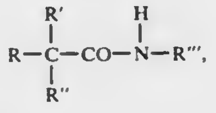
**Robert J. Steltenkamp, Somerset, N.J., assignor to Colgate-Palmolive Co., Piscataway, N.J.**

**Division of Ser. No. 71,305, Jul. 16, 1987, Pat. No. 4,804,683, which is a continuation-in-part of Ser. No. 894,985, Aug. 8, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 264,936**

**Int. Cl.$^5$ A01N** *37/18*

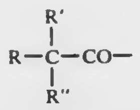
**U.S. Cl. 514—625** **13 Claims**

1. An insect repelling composition, useful for repelling insects from an area, location or item, which comprises an insect repellent proportion of a compound of the formula



$$R-\overset{\overset{\displaystyle R'}{|}}{\underset{\underset{\displaystyle R''}{|}}{C}}-CO-\overset{\overset{\displaystyle H}{|}}{N}-R''',$$

wherein R''' is methyl and



$$R-\overset{\overset{\displaystyle R'}{|}}{\underset{\underset{\displaystyle R''}{|}}{C}}-CO-$$

is neotridecanoyl, wherein the sum of the carbon atoms in R, R' and R'', all of which are alkyl groups, is eleven.

---

### 5,015,666

### TRIARYLCYCLOPROPANES AS ANTIESTROGENS AND ANTITUMOR AGENTS

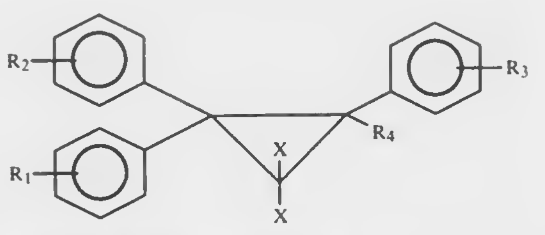
**Robert A. Magarian; Joseph T. Pento, both of Norman, Okla., and Billy W. Day, Newtonville, Mass., assignors to Board of Reagents of the University of Oklahoma, Norman, Okla.**

**Continuation-in-part of Ser. No. 98,945, Sep. 21, 1987, Pat. No. 4,879,315, which is a continuation-in-part of Ser. No. 363,429, Mar. 30, 1982, abandoned, which is a continuation-in-part of Ser. No. 166,255, Jul. 7, 1980, abandoned, which is a continuation-in-part of Ser. No. 128,040, Mar. 7, 1980, abandoned. This application Sep. 22, 1989, Ser. No. 410,938**

**Int. Cl.$^5$ A61K** *31/03*

**U.S. Cl. 514—754** **28 Claims**

1. A compound having the formula:



or any pharmaceutically acceptable salt thereof, in which:

$R_1$ is hydrogen, a hydroxyl group, an alkoxy group or a substituted or unsubstituted arylalkoxy group (with the proviso that $R_1$, $R_2$ and $R_3$ are not simultaneously arylalkoxy), and in which any substituent of the aryl group comprises an alkyl group;

$R_2$ is hydrogen, a hydroxyl group (with the proviso that $R_1$ and $R_3$ are not simultaneously alkoxy when $R_2$ is hydroxyl), an alkoxy group or a substituted alkoxy group in which the substituent of the alkoxy group comprises either a dialkylamino group, a heterocycle containing between about 5 and 6 members, at least one of which is nitrogen, or a substituted or unsubstituted aryl group, in which any substituent of the aryl group comprises an alkyl group;

$R_3$ is hydrogen, a hydroxyl group, an alkoxy group or a substituted alkoxy group and in which the substituent of the alkoxy group comprises either a dialkylamino group or a heterocycle containing between about 5 and 6 members, at least one of which is nitrogen, or a substituted or unsubstituted aryl group, in which any substituent of the aryl group comprises an alkyl group;

$R_4$ is hydrogen; and

X is a halogen or hydrogen.

---

### 5,015,667

### PRE-FOAMED BEADS OF POLYETHYLENE BASE RESIN

**Shohei Yoshimura, Tomioka; Hideki Kuwabara, Hadano, and Toru Yamaguchi, Utsunomiya, all of Japan, assignors to Japan Styrene Paper Corporation, Tokyo, Japan**

**Continuation of Ser. No. 166,818, Mar. 1, 1988, abandoned, which is a continuation of Ser. No. 842,121, Mar. 20, 1986, which is a continuation of Ser. No. 662,172, Oct. 18, 1984, abandoned. This application Nov. 2, 1988, Ser. No. 267,725**

**Claims priority, application Japan, Oct. 24, 1983, 58-198709**

**Int. Cl.$^5$ C08V** *9/22*

**U.S. Cl. 521—58** **18 Claims**

1. A method of forming prefoamed beads with a crosslinking degree of 10 to 45% gel content, comprising the steps of:

chemically crosslinking a starting bead-like polyethylene-base resin having a density greater than 0.940 g/cm$^3$ to a crosslinking degree of 10 to 45% gel content;

charging the crosslinked bead-like polyethylene-base resin, a foaming agent and a dispersion medium into a closed vessel;

agitating and heating the resulting admixture at a temperature of from (the melting point of the resin $-2°$ C.) to (the melting point of the resin $+30°$ C.); and

releasing the crosslinked bead-like polyethylene-base resin and dispersion medium into an atmosphere of a pressure lower than the internal pressure of the closed vessel thereby causing the crosslinked bead-like polyethylene-base resin to expand by an apparent expansion ratio in the range of from at least 15 to about 45.

---

### 5,015,668

### RUBBER COMPOSITION CONTAINING A DEODORIZING COMPONENT

**Tsunehisa Ueda, Zushi; Koji Miyazaki, Yokohama, and Tadao Natsuume, Yokosuka, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 242,424, Sep. 9, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 489,865**

**Claims priority, application Japan, Sep. 11, 1987, 62-228053**

**Int. Cl.$^5$ C08J** *3/20;* **C08C** *4/00;* **C08L** *7/00, 9/00*

**U.S. Cl. 523—102** **10 Claims**

1. A rubber composition comprising 100 parts by weight of rubber and 0.05 to 3.0 parts by weight of a compound having at least 1 mole % of an acid anhydride group in the molecule as a deodorizing active component characterized in that said compound having an acid anhydride group in the molecule is selected from the group consisting of (1) an alpha,beta-unsaturated dicarboxylic acid anhydride polymer selected from the group consisting of (a) a homopolymer of an alpha,-beta-unsaturated dicarboxylic acid anhydride and (b) a copolymer of an alpha,beta-unsaturated dicarboxylic acid anhydride and a copolymerizable monomer selected from the group consisting of an aromatic monoolefin, an alpha-olefin having at least 10 carbon atoms, unsaturated carboxylic acid esters, unsaturated nitriles, vinyl halides, vinyl ethers and unsaturated sulfonic acids; (2) a Diels-Alder reaction adduct of an alpha,-beta-unsaturated dicarboxylic acid anhydride and an olefin; and (3) an aromatic, aliphatic or alicyclic monocarboxylic or polycarboxylic acid anhydride.

---

### 5,015,669

### UNDERSEAL COMPOSITION, AND PROCESS FOR THE PRODUCTION THEREOF

**Gerd Aumann, Alpen-Veen; Matthias Giesen, Duisburg; Gerd Klatte, Rheinberg, and Hans-Jürgen Korte, Duesseldorf, all of Fed. Rep. of Germany, assignors to Deutsche Solvay-Werke GmbH, Solingen, Fed. Rep. of Germany**

**Filed Jan. 3, 1990, Ser. No. 460,392**

**Claims priority, application Fed. Rep. of Germany, Jan. 3, 1989, 3900054**

**Int. Cl.$^5$ C08K** *9/00, 3/26*

**U.S. Cl. 523—200** **31 Claims**

1. An underseal composition for motor vehicles, comprising finely divided vinyl chloride

(a) a finely divided vinyl chloride homopolymer, copolymer, terpolymer or graft polymer,

(b) a plasticizer,

(c) a stabilizer, and

(d) a filler comprising calcium carbonate particles, wherein at least a part of the surface of said filler is provided with a surface coating comprising a surface treatment agent which comprises an unsaturated monocarboxylic acid or fatty acid having from 4 to 14 carbon atoms with no additional polar substituents, or a salt thereof.

---

### 5,015,670

### POLYCARBONATE RESIN COMPOSITION

**Toshiaki Takada; Tadami Kinugawa; Katsuhiro Yamaguchi; Kou Tanabe, and Hiroyuki Nakano, all of Osaka, Japan, assignors to Mitsubishi Gas Chemical Company Ltd., Tokyo, Japan**

**Filed Oct. 18, 1990, Ser. No. 599,603**

**Claims priority, application Japan, Oct. 18, 1989, 1-269036**

**Int. Cl.$^5$ C08L** *69/00*

**U.S. Cl. 523—214** **5 Claims**

1. A glass-reinforced polycarbonate resin composition comprising an aromatic polycarbonate resin (a) and, blended therewith, 5 to 60% by weight based on the weight of the composition of a glass reinforcement (b) which has been treated with an acid.

---

### 5,015,671

### POWDER COATING COMPOSITION

**Kazuya Ono, Tokyo; Tetsuo Miyake, Saitama, and Katsuji Kitagawa, Kasukabe, all of Japan, assignors to Somar Corporation, Japan**

**Filed Dec. 29, 1989, Ser. No. 459,191**

**Claims priority, application Japan, Nov. 17, 1989, 1-299345**

**Int. Cl.$^5$ C08K** *3/36, 3/22*

**U.S. Cl. 523—402** **7 Claims**

1. A powder coating composition comprising an epoxy resin, a nitrogen-containing curing agent and an inorganic filler consisting essentially of aluminum hydroxide and silica, the weight ratio of the aluminum hydroxide to the silica being 1:4 to 4:1 and said filler being used in an amount of 40–300 parts by weight per 100 parts by weight of said epoxy resin.

---

### 5,015,672

### SYNTHETIC RESIN WITH BASIC NITROGEN GROUPS, PREPARATION AND USE THEREOF USING A URETHANE CARRYING KETIMINE

**Thomas Perner, Ludwigshafen; Rolf Osterloh, Erftstadt; Eberhard Schupp, Gruenstadt; Thomas Schwerzel, Ludwigshafen, and Klaas Ahlers, Muenster, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben Aktiengesellschaft, Muenster, Fed. Rep. of Germany**

**Division of Ser. No. 210,499, Jun. 23, 1988, Pat. No. 4,956,402. This application May 25, 1990, Ser. No. 528,377**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720956**

**Int. Cl.$^5$ C08G** *59/40;* **C09D** *5/44*

**U.S. Cl. 523—415** **20 Claims**

1. A synthetic resin which carries basic nitrogen groups and is water-dilutable by protonation with an acid, comprising a reaction product of

(A) an epoxy resin having an average molecular weight $M_n$ of from 300 to 6,000 and an average of from 1.5 to 3.0 epoxy groups per molecule, and

(B) a ketimine of a primary amine additionally containing one or more urethane groups, which reactionproduct,

following hydrolysis contains hydroxy groups, secondary amino groups and primary and/or tertiary amino groups which have been reacted so as to make the resulting resin self-crosslinking.

---

### 5,015,673

### SYNTHETIC RESIN WITH BASIC NITROGEN GROUPS, PREPARATION AND USE THEREOF USING A URETHANE CARRYING KETIMINE

**Thomas Perner, Ludwigshafen; Rolf Osterloh, Erftstadt; Eberhard Schupp, Gruenstadt; Thomas Schwerzel, Ludwigshafen, and Klaas Ahlers, Muenster, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben Aktiengesellschaft, Muenster, Fed. Rep. of Germany**

**Division of Ser. No. 210,499, Jun. 23, 1988, Pat. No. 4,956,402. This application May 25, 1990, Ser. No. 528,374**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720956**

**Int. Cl.$^5$ C08G** *59/40;* **C09D** *5/44*

**U.S. Cl. 523—415** **12 Claims**

1. A process for preparing a coating on an electroconductive substrate by cathodic electrocoating comprising electrocoating an electroconductive substrate in an electrocoating bath, said electrocoating bath being an aqueous dispersion comprising a synthetic resin which carries basic nitrogen groups, is water-dilutable by protonation with an acid, and comprises the reaction product of:

(A) an epoxy resin having an average molecular weight $M_n$ of from 300 to 6,000 and an average of from 1.5 to 3.0 epoxy groups per molecule; and

(B) a ketimine of a primary amine additionally containing one or more urethane groups

VOL
1126
ISS
2
MY
14
1991
UMI

and a crosslinking agent, said aqueous dispersion being obtained by protonating said synthetic resin with an acid.

---

### 5,015,674
## COMPOSITION OF VINYL POLYMER-GRAFTED, SILICONE POLYMER-MODIFIED EPOXY RESIN AND POLYMALEIMIDE

**Koichi Machida; Mikio Kitahara; Takayuki Kubo; Motoyuki Torikai, all of Yokohama, and Koutarou Asahina, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan**

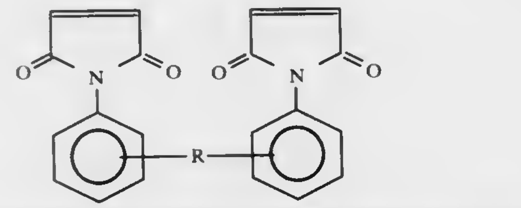
**Filed Jul. 31, 1989, Ser. No. 386,700**

**Claims priority, application Japan, Aug. 5, 1988, 63-194536; Aug. 9, 1988, 63-197096**

**Int. Cl.$^5$ C08L** *63/02, 63/04, 63/10*

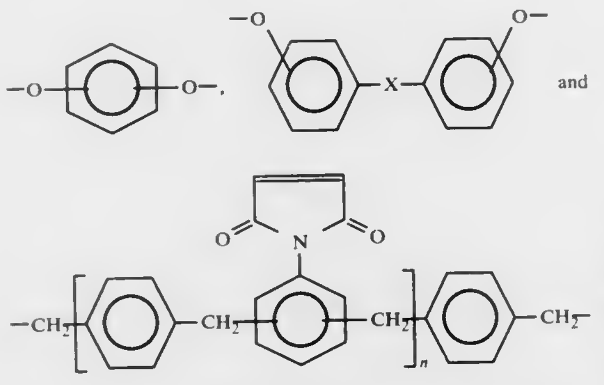
**U.S. Cl. 523—435** **18 Claims**

1. A resin composition for sealing semiconductors which comprises,
- (a) an epoxy resin wherein all or part of the epoxy resin is a modified epoxy resin composed of (1) a graft polymer of an epoxy resin and a vinyl polymer and (2) a silicone polymer in an oily state or as particles having an average particle size of not more than 1.0 micron,
- (b) a hardening agent,
- (c) an inorganic filler, and
- (d) a polymaleimide presented by the following general formula (I):



(I)

in formula (I), R represents a bivalent group selected from the group consisting of



wherein X represents a direct bond, a bivalent hydrocarbon group having 1 to 10 carbon atoms, a hexafluorinated isopropylidene group, a carbonyl group, a thio group, a sulfinyl group, a sulfonyl group or an oxide, and n represents an average number of the units enclosed in brackets ranging from 0 to 10.

---

### 5,015,675
## ENCAPSULATION METHOD, MICROELECTRONIC DEVICES MADE THEREFROM, AND HEAT CURABLE COMPOSITIONS BASED ON EPOXY RESINS, DIARYLIODONIUM HEXAFLUROANTIMONATE SALTS AND FREE RADICAL GENERATORS

**Erik W. Walles, Rensselaer; John H. Lupinski, Scotia, and James V. Crivello, Clifton Park, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jul. 31, 1989, Ser. No. 386,670**

**Int. Cl.$^5$ C08G** *59/68, 8/10;* **C08F** *4/00, 4/06*

**U.S. Cl. 523—443** **6 Claims**

1. A heat curable composition comprising by weight,
- (a) 100 parts of an epoxy resin having less than 100 parts per million of hydrolyzable chloride,
- (b) 10 to 1000 parts of fused silica filler,
- (c) a catalytic amount of a compatible monomeric, or polymeric diaryliodoniumhexafluoroantimonate salt, and
- (d) an effective amount of a free-radical generating aromatic compound as a cocatalyst for (c).

---

### 5,015,676
## PROCESS FOR ENHANCING THE ELECTROSTATIC CHARGEABILITY OF POWDER COATINGS OR POWDERS, AND THE USE THEREOF FOR SURFACE-COATING SOLID OBJECTS

**Hans-Tobias Macholdt, Darmstadt; Alexander Sieber, Frankfurt am Main; Claus Godau, Kiedrich, and Albrecht Manz, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengegellschaft, Fed. Rep. of Germany**

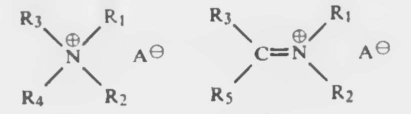
**Filed Nov. 3, 1988, Ser. No. 266,508**

**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737493**

**Int. Cl.$^5$ C08K** *5/3432, 5/3415, 5/29, 5/19*

**U.S. Cl. 523—453** **8 Claims**

1. A process for enhancing the electrostatic chargeability of triboelectrically sprayable powdery coating compositions consisting essentially of (1) a hydroxyl- or carboxyl-containing polyester resin or (2) an acrylic resin or (3) a combination of a hydroxyl- or carboxyl-containing polyester resin and an epoxy resin, or combinations thereof, intended for surface-coating solid objects, which comprises homogeneously incorporating, by dissolving or dispersing into a said powder coating composition, at least one salt-like, cationic compound of the formulae (1) and/or (2)



(1) (2)

in which $R_1$, $R_2$, $R_3$ and $R_4$, independently of one another, denote hydrogen atoms, straight-chain or branched alkyl groups having 1 to 30 carbon atoms, oxethyl groups of the formula $—(CH_2—CH_2—O)_n—R$ in which R is a hydrogen atom or a $(C_1–C_4)$alkyl or acyl group and n is a number from 1 to 10, mononuclear or polynuclear cycloaliphatic radicals having 5 to 12 carbon atoms, mononuclear or polynuclear aromatic radicals or araliphatic radicals, $R_5$ denotes a hydrogen, fulorine, chlorine or bromine atom or a $(C_1–C_6)$alkyl, $(C_1–C_6)$alkoxy or primary amino group, and where $R_1$ and $R_3$ maybe part of a ring system having 5 to 7 atoms and 0 to 3 double bonds, and $A\theta$ denotes the equivalent of an anioni, radical of an organic compound in an amount from about 0.01 to about 10 percent by weight.

---

### 5,015,677
## ADHESIVES DERIVED FROM BIOADHESIVE POLYPHENOLIC PROTEINS

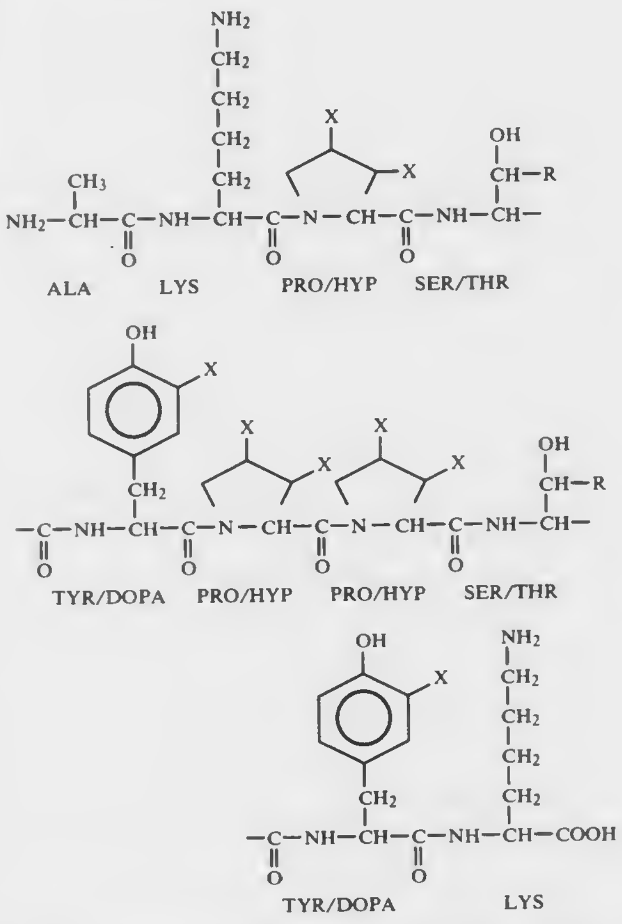
**Christine V. Benedict, Farmington, and Paul T. Picciano, Canton, both of Conn., assignors to Bio-Polymers, Inc., Plainville, Conn.**

**Continuation-in-part of Ser. No. 34,078, Apr. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 856,597, Apr. 25, 1986, abandoned. This application Jun. 27, 1988, Ser. No. 213,439**

**Int. Cl.$^5$ C08H** *1/00;* **C07K** *13/00;* **C12P** *21/06*

**U.S. Cl. 524—17** **34 Claims**

1. A water-imperious adhesive or coating formulation exhibiting an adhesive strength of at least about 100 gm/cm$^2$ when used on soft tissue comprising:
- (1) a bioadhesive polyphenolic protein component having from about 5 to about 99 weight percent of a proteinaceous substance comprising from about 50 to about 150 of the following repeating decapeptide unit:



in which each X is hydrogen or hydroxyl, and each R is hydrogen or methyl;
- (2) from about 1.0 to about 40 weight percent of a cross-linking agent which promotes cross-linking of the decapeptide;
- (3) one or more additives which promote the desired properties of the formulation, said additives comprising at least one surfactant and being present in an amount of from 0% to about 90% by weight, and
- (4) a filler compatible with the intended use of the formulation, said filler being present in an amount of from 0% to about 50% by weight,

wherein the bioadhesive polyphenolic protein component (1) is derived from the marine mussel.

---

### 5,015,678
## STABILIZERS DERIVED FROM N-HYDROXY HINDERED AMINES BY MICHAEL ADDITION REACTIONS

**Raymond Seltzer, New City; James P. Galbo, Hartsdale, and Ramanathan Ravichandran, Nanuet, all of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

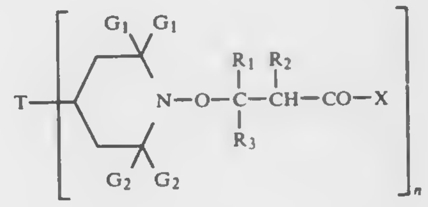
**Continuation-in-part of Ser. No. 326,354, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 480,177**

**Int. Cl.$^5$ C08K** *5/3435;* **C07D** *211/34, 211/40, 211/54*

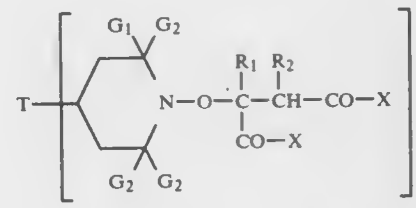
**U.S. Cl. 524—99** **37 Claims**

1. A compound having one of the formulas I to VIII

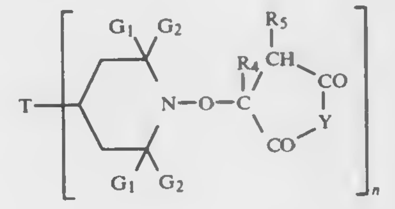
(I)



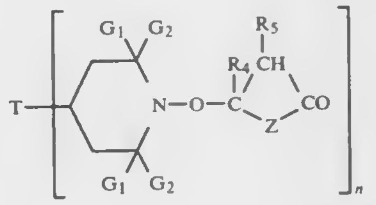
(II)



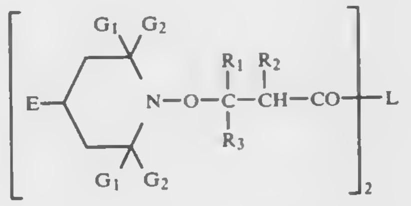
(III)



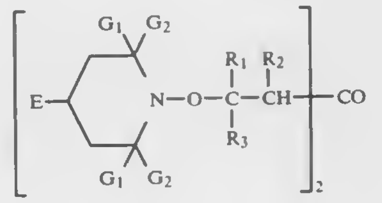
(IV)



(V)

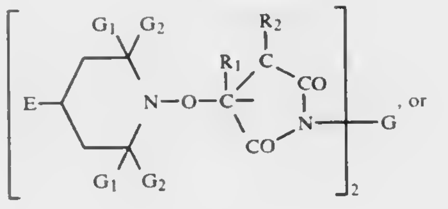


(VI)

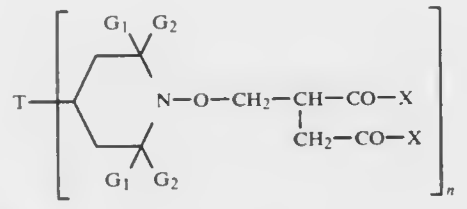


VOL 1126
ISS 2
MY 14 1991
UMI

-continued



(VII)



(VIII)

wherein

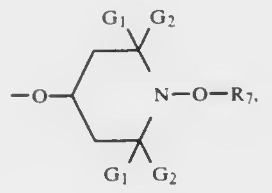
$G_1$ and $G_2$ are independently alkyl of 1 to 4 carbon atoms, or $G_1$ and $G_2$ together are pentamethylene,

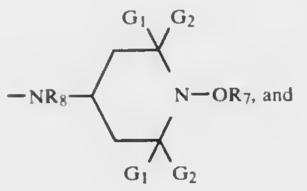
$R_1$ is hydrogen, methyl or phenyl,

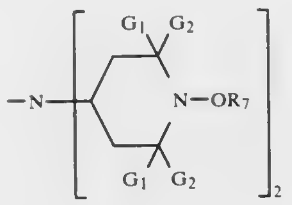
$R_2$ is hydrogen or methyl,

$R_3$ is hydrogen or alkyl of 1 to 4 carbon atoms,

X is alkoxy of 1 to 18 carbon atoms, $—NH_2$, $—NHR_6$, $—N(R_6)_2$ or a radical selected from the group consisting of







where

$R_6$ is alkyl of 1 to 8 carbon atoms, or phenyl,

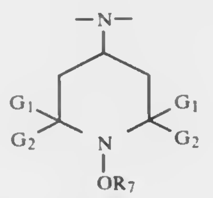
$R_7$ is alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, alkenyl of 2 to 18 carbon atoms, cycloalkenyl of 5 to 12 carbon atoms, aralkyl of 7 to 15 carbon atoms, a radical of a saturated or unsaturated bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms or aryl of 6 to 10 carbon atoms or said aryl substituted by alkyl,

$R_8$ is hydrogen or alkyl of 1 to 8 carbon atoms,

$R_4$ is hydrogen or methyl,

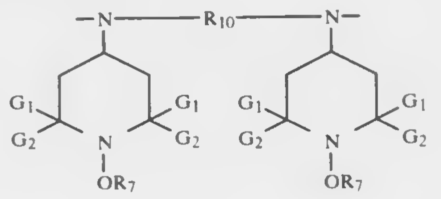
$R_5$ is hydrogen or methyl,

Y is —O—, —NH—, $—NR_9—$ or



where $R_9$ is alkyl of 1 to 18 carbon atoms,

Z is —NH—CO—NH— or $—CH_2C(CH_3)_2CH_2—$,



where

$R_{10}$ is alkylene of 2 to 18 carbon atoms or arylene of 10 carbon atoms,

G is alkylene of 1 to 12 carbon atoms or arylene of 6 to 10 carbon atoms,

T is an n-valent radical selected from the group consisting of a carboxyl radical of an aliphatic, cycloaliphatic or aromatic acid, hydroxy, alkoxy, cycloalkoxy, aralkoxy, an aminyl radical of an aliphatic or aromatic primary or secondary amine or of melamine or of an N-substituted melamine, an amidyl radical of an aliphatic or aromatic amide, carbamide or carbamate and an imidyl radical of a saturated imide, or

T is a 2n-valent alkoxy diradical forming a 1,3-dioxolane or 1,3-dioxane ring, or

T is a divalent radical of hydantoin or N-substituted hydantoin or a divalent carbon radical of 2,2-substituted 4-oxazolidone,

E has the same definitions as T, and

n is an integer from 1 to 4, with the proviso that in formula I when n is 1, T is benzyloxy and $R_1$, $R_2$ and $R_3$ are each hydrogen, X is not $—NH_2$; that in formula I, when n is 1, T is benzoyloxy and $R_1$, $R_2$ and $R_3$ are each hydrogen, X is not methoxy; that in formula I, when n is 1, T is benzoyloxy, X is methoxy and $R_3$ is hydrogen, $R_1$ or $R_2$ is not methyl when the other of $R_1$ and $R_2$ is hydrogen.

---

### 5,015,679

### POLYOLEFIN COMPOSITION

**Tooru Matumura, Kanagawa, Japan, assignor to Tonen Sekiyukagagaku K.K., Tokyo, Japan**

**Division of Ser. No. 143,984, Jan. 14, 1988, Pat. No. 4,857,230. This application Jun. 1, 1989, Ser. No. 359,532**

**Claims priority, application Japan, Jan. 23, 1987, 62-12484**

**Int. Cl.$^5$ C08K** *5/34, 5/3432, 5/3492*

**U.S. Cl. 524—99** **11 Claims**

1. Polyolefin material having improved resistance to heat and discoloration comprising a stabilizing amount of a stabilizing composition consisting of relatively high molecular weight hindered amine compound and an organic phosphorus compound having relatively low hygroscopicity, and a hydrotalcite.

---

### 5,015,680

### PRODUCTION OF A THERMOPLASTICALLY PROCESSABLE, AROMATIC POLYAMIDE USING A 4-PHENOXYPYRIDINE STABILIZER

**Jürgen Finke; Roland Feinauer, both of Marl, and Martin Bartmann, Recklinghausen, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Filed Jan. 31, 1990, Ser. No. 472,916**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905883**

**Int. Cl.$^5$ C08K** *5/343.2, 5/51, 5/52;* **C08G** *69/28*

**U.S. Cl. 524—99** **12 Claims**

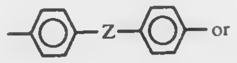
1. A process for producing a thermoplastically processable, aromatic polyamide by polycondensation of the following starting monomers:

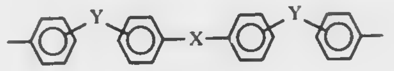
(A) HOOC—AR—COOH

(B) $H_2N—Ar'—NH_2$

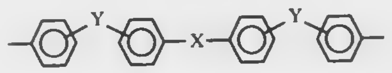
wherein

Ar is 1,3- or 1,4-phenylene, 1,4-, 1,5-, 2,6- or 2,7-naphthylene,





Ar' is: ;



X is $—SO_2—$ or —CO—;

Y is —O— or —S—;

Z is —O—; —S—; $—SO_2—$; —CO— or $—CR_2—$ or a single bond;

R is —H or $C_1—C_4—$alkyl;

in the melt in the presence of 0.05–4 mol %, based on the total mols of components (A) and (B), of an acid of the formula $H_3PO_n$ wherein n is 2 to 4 inclusive, or triphenyl phosphite, at a temperature of about 200°–400° C., and performing the polycondensation reaction in the presence of 0.05–4 mol %, based on the total mols of components (A) and (B), of 4-phenoxypyridine.

---

### 5,015,681

### FLAMEPROOF THERMOPLASTIC MOLDING MATERIALS BASED ON POLYAMIDES AND POLYESTER ELASTOMERS

**Peter Steiert; Walter Betz, both of Ludwigshafen; Christoph Plachetta, Limburgerhof, and Eckhard M. Koch, Fussgoenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Nov. 28, 1989, Ser. No. 442,549**

**Claims priority, application Fed. Rep. of Germany, Dec. 29, 1988, 3844228**

**Int. Cl.$^5$ C08K** *5/3492*

**U.S. Cl. 524—101** **5 Claims**

1. A flameproof thermoplastic molding material containing, as essential components,

(A) from 40 to 99.55% by weight of a thermoplastic polyamide,

(B) from 0.45 to 15% by weight of a thermoplastic polyester elastomer, and

(C) from 0.05 to 1.99% by weight of melamine cyanurate and in addition

(D) from 0 to 50% by weight of fibrous or particulate fillers or a mixture thereof.

---

### 5,015,682

### OLIGOMERIC N-HYDROCARBYLOXY HINDERED AMINE LIGHT STABILIZERS

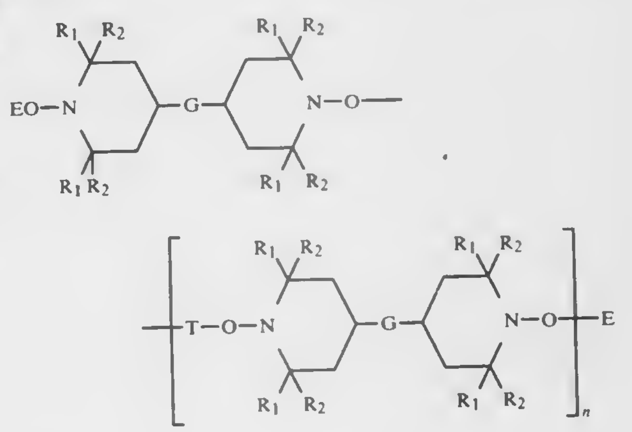
**James P. Galbo, Hartsdale, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 326,703, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 481,033**

**Int. Cl.$^5$ C08K** *5/3435*

**U.S. Cl. 524—102** **21 Claims**

1. An oligomeric N-hydrocarboxyloxy compound of the formula



where

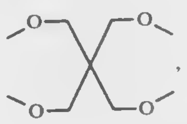
n is 1 to 5

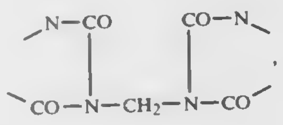
$R_1$ and $R_2$ are independently alkyl of 1 to 4 carbon atoms or $R_1$ and $R_2$ together are pentamethylene,

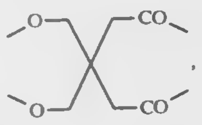
T is a diradical of an alkane or alkene of 1 to 18 carbon atoms, diradical of a cycloalkane or cycloalkene of 5 to 12 carbon atoms, or a diradical of a saturated or unsaturated bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms, with the proviso that the N-O groups are not necessarily attached to the same carbon atom in T,

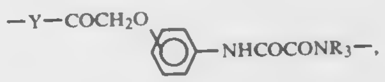
E is a monovalent radical of an alkane or alkene of 1 to 18 carbon atoms, a monovalent radical of a cycloalkane or cycloalkene of 5 to 12 carbon atoms or a monovalent radical of a saturated or unsaturated bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms,

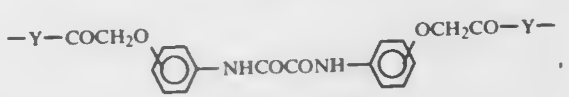
G is an organic linking moiety selected from the group consisting of —OCO—L—COO—, $—COO—L_1—OCO—$, $—NR_3—CO—L—CONR_3—$,

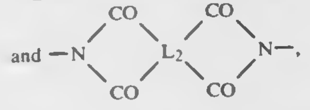












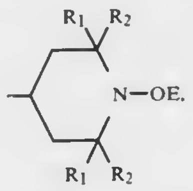
L is a direct bond or a divalent radical of an aliphatic,

VOL
1126
ISS
2
MY
14
1991
UMI

cycloaliphatic, unsaturated aliphatic or aromatic dicarboxylic acid without the two carboxy groups,

$L_1$ is a divalent radical of an aliphatic, cycloaliphatic or unsaturated aliphatic diol without the two hydroxy groups,

$R_3$ is hydrogen, alkyl of 1 to 8 carbon atoms or



Y is —O— or —$NR_3$—, and

$L_2$ is an aliphatic or aromatic tetravalent radical.

---

### 5,015,683
### BIS(1-HYDROCARBYLOXY-2,2,6,6-TETRAMETHYL-PIPERIDIN-4-YL)-AMINE DERIVATIVES AND STABILIZED COMPOSITIONS

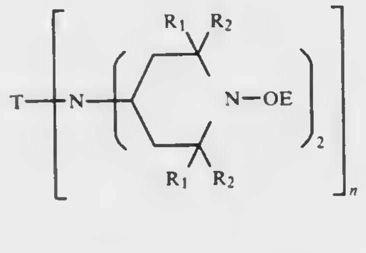
**James P. Galbo, Hartsdale, and Ramanathan Ravichandran, Nanuet, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 326,849, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 479,909**

**Int. Cl.$^5$ C08K *5/3435;* C07D *211/00***

**U.S. Cl. 524—103** **23 Claims**

1. A compound having the formula



wherein

N is 1 to 4,

$R_1$ and $R_2$ are independently alkyl of 1 to 4 carbon atoms or together $R_1$ and $R_2$ are pentamethylene,

E is alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, alkenyl of 2 to 18 carbon atoms, cycloalkenyl of 5 to 12 carbon atoms, aralkyl of 7 to 15 carbon atoms, a radical of a saturated or unsaturated bycyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms or aryl of 6 to 10 carbon atoms or said aryl substituted by alkyl, and

T is a radical of valence n, where, when n is 1, T is hydrogen, alkanoyl of 2 to 20 carbon atoms, cycloalkanoyl of 6 to 13 carbon atoms, aroyl of 7 to 11 carbon atoms, aralkanoyl of 8 to 16 carbon atoms, carbamoyl or alkoxycarbonyl of 2 to 20 carbon atoms.

when n is 2, T is —CO—, a divalent acyl radical of an aliphatic, cycloaliphatic, araliphatic or aromatic dicarboxylic acid, a divalent acyl radical of a dicarbamic acid or a divalent acyl radical of a mixed carboxylic-carbamic acid,

when n is 3, T is a trivalent acyl radical of an aliphatic, cycloaliphatic, araliphatic or aromatic tricarboxylic acid, and

when n is 4, T is a tetravalent acyl radical of an aliphatic, cycloaliphatic or aromatic tetracarboxylic acid.

---

### 5,015,684
### CRYSTALLINE RESIN COMPOSITIONS

**Tosbiaki Kobayashi, Nara, and Keiko Motomatsu, Oomagari, both of Japan, assignors to New Japan Chemical Co., Ltd., Kyoto, Japan**

**Filed Feb. 5, 1990, Ser. No. 474,945**

**Division of Ser. No. 403,395 Sept. 6, 1989, Pat. No. 5,015,684**

**Claims priority, application Japan, Sep. 16, 1988, 63-232896**

**Int. Cl.$^5$ C08K *5/15***

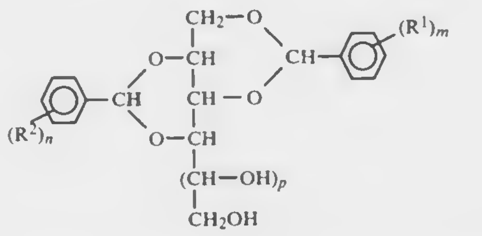
**U.S. Cl. 524—108** **6 Claims**

1. A crystalline resin composition comprising

(i) a crystalline resin, and

(ii) a nucleating agent composition which comprises

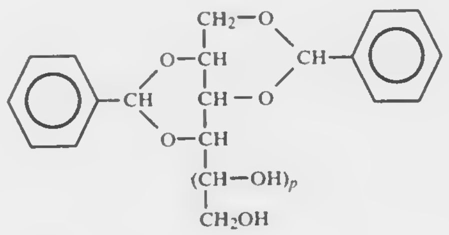
(a) at least one of the compounds represented by the formula



(I)

wherein $R^1$ is methyl, $R^2$ is hydrogen atom, and m is 2 or be 3; or $R^1$ is hydrogen atom, $R^2$ is methyl, and n is 2 or 3; and p is 0 or 1,

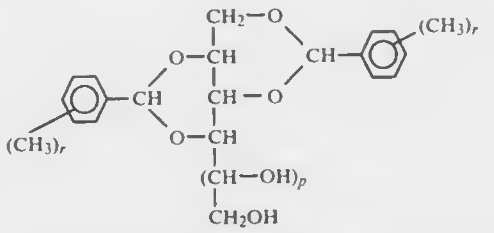
(b) at least one of the compounds represented by the formula



(II)

wherein p is 0 or 1, and

(c) at least one of the compounds of the formula



(III)

wherein r is the same and is an integer of 2 or 3, and p is 0 or 1, the proportions of the components (a), (b) and (c) to be combined being such that Z calculated according to the equation

$$Z=A/(A+B+C)$$

wherein A, B and C are each the amount by weight of the components (a), (b) and (c), respectively, is within the range of about 0.3 to about 0.8.

---

### 5,015,685
### PREPARATION OF TETRABROMOTETRALIN

**Leonard M. Shorr, Haifa, and Michael Peled, Beer-Sheva, both of Israel, assignors to Bromine Compounds Ltd., Israel, Israel**

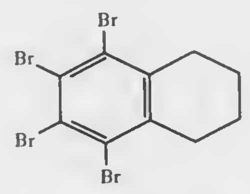
**Filed Feb. 20, 1990, Ser. No. 482,174**

**Claims priority, application Israel, Feb. 21, 1989, 89362**

**Int. Cl.$^5$ C08K *5/03;* C07C *17/22, 25/22***

**U.S. Cl. 524—412** **13 Claims**

1. The compound 5,6,7,8-tetrabromo-1,2,3,4-tetrahydronaphthalene of the formula:



6. A flame-retarded plastic composition comprising as an active ingredient 5,6,7,8-tetrabromo-1,2,3,4-tetrahydro-naphthalene, alone or together with other fire retardant or synergistic materials or both.

---

### 5,015,686
### COATINGS OF ARYLENE SULFIDE POLYMERS

**Lyle R. Kallenbach, and Michael C. Yu, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 18,361, Feb. 24, 1987, Pat. No. 4,835,051. This application Mar. 16, 1989, Ser. No. 324,495**

**Int. Cl.$^5$ C08K *3/22***

**U.S. Cl. 524—413** **8 Claims**

1. A coating formulation in the form of a powder consisting essentially of a metal oxide selected from the group consisting of Group 4b metal oxides and a mixture of a first poly(arylene sulfide) and a second poly(arylene sulfide) wherein said second poly(arylene sulfide) is poly(phenylene sulfide/sulfone), and wherein said first poly(arylene sulfide) has an extrusion rate of about 80 to about 400 grams/10 minutes.

---

### 5,015,687
### PIGMENTED LOW TEMPERATURE CURE EMULSION POLYMERS

**Kenneth G. Hahn, Jr., Hinckley, and Barbara L. Kunz, Bay Village, both of Ohio, assignors to The Glidden Company, Cleveland, Ohio**

**Division of Ser. No. 108,762, Oct. 15, 1987, Pat. No. 4,956,401. This application Nov. 7, 1989, Ser. No. 432,814**

**The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.**

**Int. Cl.$^5$ C08L *61/00***

**U.S. Cl. 524—512** **5 Claims**

1. A pigmented coating composition substantially free of cations containing a polymeric binder comprising by weight between 20% and 95% emulsion polymer and between 5% and 80% glycoluril derivative, said emulsion polymer containing reactive hydroxy, carboxyl, or acrylamide groups adapted to be coreactive with glycoluril, where said emulsion polymer is free of amine groups, and said composition produced by treating the emulsion polymer and glycoluril derivative with ion exchange resin to substantially remove the cations from the emulsion polymer and the glycoluril to reduce the pH of the polymeric binder to less than about 2.5; and

said polymeric binder combined with cation-free titanium dioxide pigment on a dry solids volume basis of the resulting pigmented coating composition containing between 5% and 30% titanium dioxide, where said titanium dioxide pigment surfaces are substantially free of cations prior to being combined with said polymeric binder.

---

### 5,015,688
### AQUEOUS HEAT-CUPABLE COATING SUBSTANCE IN A POLYESTER AND ACRYLIC BASE, PROCESS FOR ITS MANUFACTURE AND ITS USE

**Klaus Bederke, Sprockhövel; Volker Dücoffre, Wuppertal, and Knut Graef, Hattingen, all of Fed. Rep. of Germany, assignors to Herbertsgesellschaft GmbH, Wuppertal, Fed. Rep. of Germany**

**Filed Oct. 26, 1989, Ser. No. 427,460**

**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1989, 3910829**

**Int. Cl.$^5$ C08L *67/07***

**U.S. Cl. 524—600** **8 Claims**

1. Aqueous heat-curable coating substance in a base of polyester and acrylic resin mixed with amine resin and neutralizing agents, which may contain the usual paint additives, pigments, fillers and/or organic solvents, characterized by the fact that it contains as binding agents

(A) 20–25%/weight (in relation to the solid matter content in the binding agent) of an amine resin cross-linking agent and

(B) 80–55 %/weight (in relation to the solid matter content in the binding agent) of a polyester oligomer polyacrylate which is water soluble following neutralization with bases and whose numerical mean molecular weight (Mn) is 800 to 2000, manufactured by the radical polymerization of 80–50 %/weight minimum of

(a) a hydroxyfunctional (meth)acrylic acid ester and

(b) a monofunctional $\alpha\beta$-ethylenically unsaturated carbonic acid and

(c) if required, an $\alpha\beta$-ethylenically unsaturated monomer with no functional groups

in 20 to 50 %/weight of a hydroxyfunctional polyester oligomer, obtainable by the polycondensation of diols, polyols and dicarbonic acids and their derivatives, with a calculated molecular weight of 200 to 1000 a hydroxyl value of 280 to 600 and an acid value of 0 to 1.5, in which the monomers (a), (b) and (c) are used in such quantities that the resulting polyester oligomer polyacrylate has a hydroxyl value of 150 to 390 and an acid value of 16 to 40.

---

### 5,015,689
### UNSATURATED POLYESTER RESINS CONTAINING THERMOTROPIC POLYMERS, A PROCESS FOR THEIR PREPARATION AND THEIR USE FOR THE PRODUCTION OF MOULDED BODIES

**Helmut-Martin Meier, Ratingen; Harald Pielartzik, and Hermann Brinkmeyer, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Continuation of Ser. No. 142,453, Jan. 11, 1988, abandoned. This application Oct. 13, 1989, Ser. No. 423,516**

**Claims priority, application Fed. Rep. of Germany, Jan. 22, 1987, 3701740**

**Int. Cl.$^5$ C08G *63/00***

**U.S. Cl. 525—43** **7 Claims**

1. Mixtures pourable before curing of

I) from 10 to 90% by weight of unsaturated polyester resin and

II) from 90 to 10% by weight of thermotropic polymer in powder form, the percentages being based on the sum of I+II.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,690
### THERMOPLASTIC MODIFIER COMPOSITIONS WHICH IMPARTS IMPROVED APPEARANCE AND IMPACT PROPERTIES TO MOLDED THERMOPLASTICS

**William G. Williams, Baton Rouge, La., assignor to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.**
**Continuation-in-part of Ser. No. 37,416, Apr. 13, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 316,877**
**Int. Cl.$^5$ C08G** *81/02*
**U.S. Cl. 525—73** **13 Claims**

1. A modifier composition for blending with a thermoplastic resin to improve its low temperature impact strength without altering substantially the appearance and surface characteristics of the molded thermoplastic resin consisting essentially of the reaction product of (a) 25–90 parts by weight of an EPM or EPDM rubber grafted with (1) an epoxy functional alpha-beta ethylenically unsaturated hydrocarbon or (2) an alpha-beta unsaturated dicarboxylic acid or anhydride reacted with (b) 10–75 parts by weight of a reactive polystyrene having cyclic iminoether groups attached to the polystyrene polymer chain.

---

### 5,015,691
### ONE PART HEAT CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

**Larry N. Lewis, Scotia, and Tony C. Chang, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**
**Filed May 22, 1989, Ser. No. 354,557**
**Int. Cl.$^5$ C08F** *8/00*
**U.S. Cl. 525—100** **10 Claims**

1. A one part heat curable organopolysiloxane composition comprising by weight,

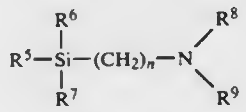
(A) 100 parts of an organopolysiloxane having at least two olefinically unsaturated organic radicals
(B) 1 to 20 parts of an organohydrogenpolysiloxane, and
(C) an effective amount of a platinum catalyst microencapsulated in an organic polymer selected from the class consisting of a phenolformaldehyde resin, a melamineformaldehyde resin, a polyacrylic acid-polycondensed methylated methylolamine product, a polyethylene, a polystyrene, a polyacrylate and a poly(styrene-acrylonitrile copolymer).

---

### 5,015,692
### PROCESS FOR PREPARING MODIFIED DIENE POLYMER RUBBERS

**Hiroyoshi Takao, Chiba; Akio Imai, Ichihara; Tomoaki Seki, Ichihara, and Mitsuji Tsuji, Ichihara, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan**
**Division of Ser. No. 415,380, Sep. 29, 1989, Pat. No. 4,957,976, which is a continuation of Ser. No. 126,338, Nov. 30, 1987, abandoned. This application Mar. 30, 1990, Ser. No. 501,700**
**Claims priority, application Japan, Dec. 1, 1986, 61-287091; Dec. 27, 1986, 61-315210; Dec. 27, 1986, 61-315211; Jan. 28, 1987, 62-19262; Jan. 28, 1987, 62-19263; Feb. 16, 1987, 62-32782**
**Int. Cl.$^5$ C08F** *8/32*
**U.S. Cl. 525—102** **6 Claims**

1. A process for preparing a modified diene polymer which comprises reacting an alkali metal-containing conjugated diene polymer with an aminosilane compound of the formula (2):



$$R^5-\underset{R^7}{\overset{R^6}{\mathrm{Si}}}-(CH_2)_n-N\begin{matrix}R^8\\ R^9\end{matrix} \qquad (2)$$

wherein each of $R^5$, $R^6$ and $R^7$ is an alkyl group or an alkoxy group, each of $R^8$ and $R^9$ is an alkyl group, and n is an integer, said alkali metal-containing conjugated diene polymer being a living polymer having an alkali metal end prepared by a polymerization of a conjugated diene monomer or a mixture of a conjugated diene monomer and an aromatic vinyl monomer in a hydrocarbon solvent in the presence of an alkali metal-based catalyst, or a polymer to which an alkali metal is introduced by an addition reaction of a diene polymer having conjugated diene units in the polymer chain and an alkali metal-based catalyst in a hydrocarbon solvent.

---

### 5,015,693
### EXTRUDABLE THERMOPLASTIC HYDROCARBON POLYMER COMPOSITION

**Denis Duchesne, and Bryce V. Johnon, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Division of Ser. No. 182,028, Apr. 15, 1988, Pat. No. 4,855,360. This application May 23, 1989, Ser. No. 356,062**
**Int. Cl.$^5$ C08L** *27/16, 27/14, 71/02*
**U.S. Cl. 525—187** **14 Claims**

1. A processing additive composition comprising fluorocarbon polymer, which if it is a homopolymer, is derived from vinylidene fluoride or vinyl fluoride, and poly(oxyalkylene) polymer such that the weight of said fluorocarbon polymer in said composition and the weight of said poly(oxyalkylene) polymer in said composition are in a ratio of 1/1 to 1/10.

---

### 5,015,694
### POLYOLEFINIC COMPOSITIONS WITH A HIGH IMPACT STRENGTH

**Federico Milani, Rovigo; Paola Massari, and Domenico Lori, both of Ferrara, all of Italy, assignors to Montedison S.p.A., Italy**
**Filed Sep. 24, 1990, Ser. No. 587,260**
**Claims priority, application Italy, Sep. 26, 1989, 21831 A/89**
**Int. Cl.$^5$ C08L** *23/16*
**U.S. Cl. 525—240** **4 Claims**

1. Polyolefinic compositions comprising

(a) from 35 to 45% by weight of a propylene-ethylene copolymer, containing from 4 to 10% by weight of copolymerized ethylene, and exhibiting a melt flow rate (M.F.R.) ranging from 10 to 20 (g/10 minutes, at 230° C. and 2.16 kg);
(b) from 35 to 45% by weight of a propylene-ethylene copolymer, containing from 4 to 10% by weight of ethylene, exhibiting a melt flow rate (M.F.R.) ranging from 35 to 45 (g/10 minutes, ar 230° C. and 2.16 kg);
(c) from 10 to 30% by weight of an elastomeric copolymer or terpolymer composed of units deriving from ethylene, propylene and, optionally, a conjugated or non-conjugated diene, containing from 40 to 55% by weight of propylene and from 0 to 5% by weight of a diene which is amorphous to X-rays, and furthermore characterized by:
values of the sum $\alpha 2+\alpha 4$ higher than 16%;
Mooney viscosity ML $(1+4)$ at 100° C. ranging from 30 to 38;
molecular weight distribution (M.W.D.) lower than 3;
values of product $R_1 \times R_2$ lower than 0.5;
intrinsic viscosity (in tetraline at 135° C.) ranging from 1.5 to 2 dl/g.

---

### 5,015,695
### FUNCTIONALIZED ELASTOMERIC POLYMER PRODUCTION

**Pui K. Wong, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**
**Continuation-in-part of Ser. No. 349,545, May 9, 1989, Pat. No. 4,978,719. This application Jul. 30, 1990, Ser. No. 559,784**
**Int. Cl.$^5$ C08F** *8/46, 8/30, 8/26, 8/14*
**U.S. Cl. 525—244** **11 Claims**

1. A process of producing a heat-curable elastomeric polymer which comprises contacting an elastomeric polymer having at least two pendant carboxylate group with an unsaturated organic halide of the formula

$$R'-\mathrm{Hal}$$

wherein Hal is halogen and R′ is propargyl, styrylmethyl or 4-(2-oxazolinyl)benzyl, in substantially neutral liquid phase solution in a polar reaction diluent.

---

### 5,015,696
### CHLORINATED EPDM WITH SUPERIOR STABILITY

**Stephen C. Davis, Box 416, 1987 Remo Drive, Bright's Grove, Ontario, Canada N0N 1C0 ; Janet B. Fulton, 155 Front Street, North, Apartment 1302, Sarnia, Ontario, Canada N7T 7V5 , and Peter P. M. Hoang, 139 Pasadena Green NE., Calgary, Alberta, Canada T1Y 6M9**
**Continuation-in-part of Ser. No. 430,010, Nov. 1, 1989, Pat. No. 4,959,420. This application Jul. 30, 1990, Ser. No. 559,096**
**Int. Cl.$^5$ C08F** *8/22*
**U.S. Cl. 525—331.7** **10 Claims**

1. A chlorinated ethylene-alpha olefin-nonconjugated diolefin terpolymer characterized by superior stability on storage or exposure to elevated temperatures having a chlorine content of from about 0.5 to 14 percent by weight based on the weight of said chlorinated terpolymer wherein the base ethylene-alpha olefin-nonconjugated diolefin terpolymer comprises:

(i) about 40 to 80 mol percent ethylene,
(ii) about 20 to 60 mol percent of a $C_3$ to $C_8$ alpha olefin, and
(iii) about 0.5 to 10 mol percent of a bridged ring nonconjugated diolefin characterized in that it is a 5-alkenyl-2-norbornene wherein the alkenyl group is a $C_5$ to $C_{12}$ hydrocarbon group with a trisubstituted olefinic bond that is not to said 2-norbornene ring.

---

### 5,015,697
### POLYBUTYLKETONES AND HYDROXYESTERS OF EPOXIDIZED POLYBUTENES

**Wayne T. Riddick, Oak Park, Ill., assignor to Amoco Corporation, Chicago, Ill.**
**Filed Jan. 31, 1989, Ser. No. 304,809**
**Int. Cl.$^5$ C08C** *19/00;* **C08F** *8/00, 8/14, 8/46*
**U.S. Cl. 525—386** **3 Claims**

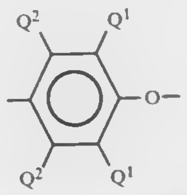
1. A process for preparing compositions comprising polybutyl ketones and hydroxyesters of epoxidized polybutenes wherein the epoxide group of said epoxidized polybutene is about 70% trisubstituted and about 20% tetra-substituted, wherein said epoxidized polybutene has been prepared from a polybutene having only one functional terminal double bond in an olefin structure about 70% trisubstituted and about 20% tetrasubstituted, wherein molecular weight of polybutene portion of said epoxidized polybutene is from about 200 to 20,000, which process comprises reacting an aliphatic or aromatic carboxylic acid of from 2 to 2,000 carbon atoms with said epoxidized polybutene in the presence of an acid catalyst with non-nucleophilic anions which does not react with said epoxide group, wherein molar ratio of said aliphatic or aromatic carboxylic acid to said epoxidized polybutene is at least about 1:1 at a temperature within the range of from about −20° C. to about 70° C., and said acid catalyst is present in an amount within the range of from about 0.2 to 15 mole % of said epoxidized polybutene.

---

### 5,015,698
### POLYPHENYLENE ETHER-POLYESTER COPOLYMERS, PRECURSORS THEREFOR, COMPOSITIONS CONTAINING SAID COPOLYMERS, AND METHODS FOR THEIR PREPARATION

**Paul D. Sybert, Cohoes; Choong Y. Han, Schenectady; Sterling B. Brown, Schenectady; Dennis J. McFay, Schenectady; William L. Gately, Burnt Hills, all of N.Y.; John A. Tyrell, Mt. Vernon, Ind., and Robert A. Florence, Pittsfield, Mass., assignors to General Electric Company, Schenectady, N.Y.**
**Continuation of Ser. No. 866,661, May 27, 1986, abandoned. This application Nov. 10, 1987, Ser. No. 122,480**
**Int. Cl.$^5$ C08L** *67/02, 71/04;* **C08G** *81/00*
**U.S. Cl. 525—391** **13 Claims**

1. A composition comprising copolymers having polyphenylene ether moieties comprising a plurality of structural units having the formula

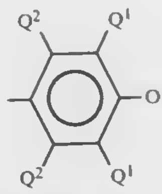


(II)

wherein in each of said units independently, each $Q^1$ is independently halogen, primary or secondary lower alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms; and each $Q^2$ is independently hydrogen, halogen,. primary, or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy or halohydrocarbonoxy as defined for $Q^1$; connected to poly(alkylene dicarboxylate) moieties containing at least 30 alkylene dicarboxylate units by polyvalent linking groups containing one or more carboxamide groups.

8. A resinous composition comprising a poly(alkylene dicarboxylate); an epoxy-functionalized polyphenylene ether prepared by reacting a polyphenylene ether with at least one of glycidyl methacrylate, glycidyl acrylate, glycidyl ethyl maleate, glycidyl ethyl fumarate and allyl glycidyl ether; and any reaction products thereof.

9. A composition according to claim 8 wherein the polyphenylene ether comprises a plurality of structural units having the formula



(II)

and in each of said units independently, each $Q^1$ is independently halogen, primary or secondary lower alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms; and each $Q^2$ is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy or halohydrocarbonoxy as defined for $Q^1$.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,699
## IRON-SCHIFF BASE MAGNETIC POLYMERS AND PROCESS THEREOF

**David B. Cotts, Osaka, Japan; Louisa M. Brodrecht, Menlo Park, Calif., and Robert C. Bening, Jr., Sunderland, Mass., assignors to Osaka Gas Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 79,665, Jun. 29, 1987, abandoned. This application Jul. 22, 1988, Ser. No. 221,794**

**Int. Cl.$^5$ C08F *283/00***

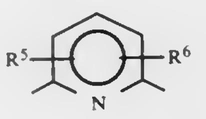
**U.S. Cl. 525—471** **21 Claims**

1. A process for the preparation o a magnetically active organometallic polymer having a molecular weight of between about 4,000 and 50,000 daltons, wherein the polymer comprises a multiplicity of Schiff's base tridentate chelating groups having the capacity to combine with the iron (II) or iron (III) ion of an inorganic salt, wherein the magnetically active organometallic polymer has the structure

$$—[—N{=}C(R^2)—R^1—C(R^3){=}N—R^4—]_n—$$

wherein

$R^1$ is a hetero-aromatic group containing a nitrogen atom of the structure.



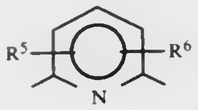
wherein

$R^5$ and $R^6$ are each independently selected from —H, $—CH_3$, $CH_3CH_2—$, —F, —Cl or —Br;

$R^2$ and $R^3$ are alkyl groups each independently selected from hydrogen or alkyl having from 1 to 12 carbon atoms;

$R^4$ is a direct carbon-carbon bond or is an alkylene group having from 1 to 12 carbon atoms; and n is the degree of polymerization necessary to achieve the molecular weight in daltons, which process comprises:

(a) combining at least one diamine selected from the group consisting of hydrazine and organic diamines having from 1 to 12 carbon atoms with at least one organic carbonyl compound selected from the group consisting of diketones or dialdehydes of the structure: $R^2—(C{=}O)—R^1—(C{=}O)—R^3$ wherein $R^1$ has the structure:



wherein $R^5$ and $R^6$ are defined hereinabove;

$R^2$ and $R^3$ are each independently selected from hydrogen or alkyl having from 1 to 12 carbon atoms in an anhydrous dipolar aprotic solvent for a time sufficient to produce the polymer at a temperature of between about 50° and 200° C.;

(b) recovering the polymer produced in step (a);

(c) combining the polymer of step (a) or step (b) with aqueous solution of an iron ion for a time sufficient to produce the organometallic polymer;

(d) recovering the organometallic polymer of step (c);

(e) heating the organometallic polymer up to about 200° C. for a time sufficient to observe a five to 100 times enhancement in magnetic susceptibility as compared to the unheated polymer, which magnetic susceptibiltiy is retained when the organometallic polymer is cooled to ambient temperature or below, and

(f) recovering the magnetically enhanced organometallic polymer of step (e).

---

### 5,015,700
## ANHYDRIDE-FUNCTIONAL ORGANO/(POLY)SILOXANES, A PROCESS FOR PREPARING THE SAME AND USES THEREOF

**Christian Herzig, Taching, and Josef Esterbauer, Hochburg, both of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany**

**Filed Aug. 6, 1990, Ser. No. 563,160**

**Claims priority, application Fed. Rep. of Germany, Aug. 18, 1989, 3927312**

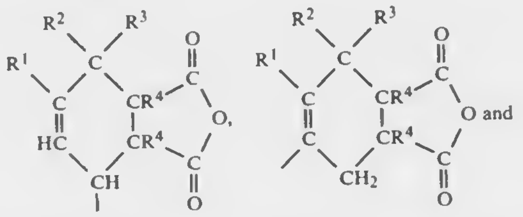
**Int. Cl.$^5$ C08F *283/00***

**U.S. Cl. 525—487** **16 Claims**

1. An anhydride-functional organo(poly)siloxane having average units of the general formula

$$A_aR_bSiO_{\frac{4-(a+b)}{2}}, \quad (I)$$

in which the R(s) are selected from the group consisting of a monovalent hydrocarbon radical and a monovalent halogenated hydrocarbon radical having from 1 to 18 carbon atom(s) per radical, A is a radical selected from the group consisting of the formulas



mixtures thereof, in which $R^1$ is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon radical and a monovalent halogenated hydrocarbon radical having from 1 to 12 carbon atom(s) per radical, $R^2$ is selected from the group consisting of a hydrogen atom, and a monovalent hydrocarbon radical having from 1 to 12 carbon atom(s) per radical, or the radicals $R^1$ and $R^2$ together represent a divalent hydrocarbon radical having from 3 to 5 carbon atoms per radical, $R^3$ is selected from the group consisting of a hydrogen atom and a monovalent hydrocarbon radical having from 1 to 4 carbon atom(s) per radical, with the proviso that $R^3$ is a hydrogen atom when the $R^1$ and $R^2$ radicals together represent a divalent hydrocarbon radical having from 3 to 5 carbon atoms per radical, $R^4$ is selected from the group consisting of a hydrogen atom, a halogen atom and a cyano radical, a is 0 or 1, with an average of from 0.003 to 1.0, b is 0, 1, 2 or 3, with an average of from 0.05 to 2.5, and the sum of a+b is an average which is not greater than 3, with the proviso that at least one radical A is present per molecule.

---

### 5,015,701
## COMPOSITION OF VINYL ESTER RESIN, HYDROXYALKYL (METH)ACRYLATE AND A STYRENE

**Linda A. Domeier, Somerville, N.J., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.**

**Continuation of Ser. No. 600,221, Apr. 17, 1984, abandoned, which is a continuation of Ser. No. 517,994, Aug. 1, 1983, abandoned, which is a continuation of Ser. No. 279,439, Jul. 1, 1981, abandoned. This application Jul. 26, 1985, Ser. No. 758,855**

**Int. Cl.$^5$ C08L *63/10***

**U.S. Cl. 525—531** **24 Claims**

1. A curable molding composition comprising a mixture of:

(a) from about 25 to about 60 weight percent of a vinyl ester produced from the addition of an unsaturated monocarboxylic acid to a polyepoxide, and having a molecular weight greater than 300;

(b) from about 5 to about 30 weight percent of 2-hydroxyethyl acrylate, 2-hydroxyethyl methacrylate, hydroxypropyl acrylate, or hydroxypropyl methacrylate; and

(c) from about 25 to about 65 weight percent of an ethylenically unsaturated monomer selected from styrene, its derivatives and homologues.

---

### 5,015,702
## TREATMENT OF POLY(ARYLENE SULFIDE/SULFONE) POLYMERS

**Lacey E. Scoggins, Bartlesville, Okla., and Joseph G. Ceurvorst, Lakewood, Colo., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Oct. 6, 1989, Ser. No. 417,932**

**Int. Cl.$^5$ C08F *6/00***

**U.S. Cl. 525—537** **14 Claims**

1. A method for treating a poly(arylene sulfide/sulfone) polymer in order to improve the thermal stability of said polymer which comprises:

(a) contacting said poly(arylene sulfide/sulfone) polymer with an aqueous solution of an acid selected from the group consisting of oxalic acid, maleic acid, trichloroacetic acid, hydrochloric acid, sulfuric acid, phosphoric acid, nitric acid, chromic acid, sulfurous acid and mixtures thereof; then

(b) contacting said poly(arylene sulfide/sulfone) polymer with an aqueous solution of a water soluble zinc compound; wherein said poly(arylene sulfide/sulfone) polymer is prepared by reacting under polymerization conditions a dihaloaromatic sulfone with an alkali metal sulfide and a polar organic compound and water and wherein the molar ratio of alkali metal sulfide to dihaloaromatic sulfone is in the range of about 1:0.75 to 1:0.99.

---

### 5,015,703
## REACTIVELY CAPPED POLYARYLENE SULFIDE AND METHOD AND INTERMEDIATES FOR THEIR PREPARATION

**Tohru Takekoshi, Scotia; Andrew J. Caruso; Jane M. Terry both of Schenectady, and Edwin J. Iwanowicz, Schenectady. all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 438,141, Nov. 17, 1989, abandoned, Division of Ser. No. 373,080, Jun. 29, 1989, abandoned. This application Nov. 19, 1990, Ser. No. 614,967**

**Int. Cl.$^5$ C08G *75/02***

**U.S. Cl. 525—537** **8 Claims**

1. A method for preparing a cured polyarylene sulfide which comprises

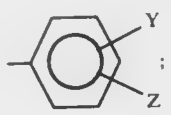
(1) effecting reaction in the melt, in the absence of solvents, between a polyarylene sulfide and a disulfide of the formula

$$A^1—S—S—A^2, \quad (I)$$

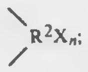
wherein:

each of $A^1$ and $A^2$ is independently

(II)



Y is X or $—R^1X_n$ and Z is hydrogen, X or $—R^1X_n$, or Y and Z together are



$R^2X_n$;

$R^1$ and $R^2$ are organic radicals;

X is a functional group capable of reaction with a functional group in another polymer molecule to form a block copolymer; and

n is 1 or 2, to form a reactively capped polyphenylene sulfide; and

(2) heating said reactively capped polyarylene sulfide with an oxygen-containing gas at a temperature above about 200° C. for a period of time to result in a substantial decrease in melt flow.

---

### 5,015,704
## REACTIVELY CAPPED POLYARYLENE SULFIDE AND METHOD AND INTERMEDIATES FOR THEIR PREPARATION

**Tohru Takekoshi, Scotia; Andrew J. Caruso; Jane M. Terry, both of Schenectady, and Edwin J. Iwanowicz, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 373,080, Jun. 29, 1989,. This application Nov. 19, 1990, Ser. No. 614,968**

**Int. Cl.$^5$ C08G *75/02***

**U.S. Cl. 525—537** **7 Claims**

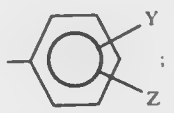
1. A method for preparing a reactively capped polyarylene sulfide which comprises effecting reaction in the melt, in the absence of solvents, between a polyarylene sulfide and a disulfide of the formula

(1) $A^1—S—S—A^2$.

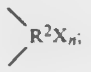
wherein:

each of $A^1$ and $A^2$ is endependently

(II)



Y is X or $—R^1X_n$ and Z is hydrogen, X or $—R^1X_n$, or Y and Z together are



$R^2X_n$;

$R^1$ and $R^2$ are organic radicals;

X is a functional group capable of reaction with a functional group in another polymer molecule to form a block copolymer; and

n is 1 or 2.

---

### 5,015,705
## POLYMERIZATION FEED COMPOSITION COMPRISING SLOW GEL/CURE SYSTEMS BASED ON DIALKYLZINC

**Andrew Bell, New Castle, Del., assignor to Hercules Incorporated, Wilmington, Del.**

**Division of Ser. No. 250,209, Sep. 28, 1988, Pat. No. 4,882,401. This application Nov. 13, 1989, Ser. No. 435,211**

**Int. Cl.$^5$ C08F *4/50***

**U.S. Cl. 526—142** **9 Claims**

1. A polymerization feed composition comprising: (a) a metathesis polymerizable cycloolefin; (b) a metathesis polymerization catalyst component comprising a catalyst selected from the group consisting of tungsten halides, molybdenum halides and oxyhalides of tungsten or molybdenum having two valences satisfied by oxygen instead of halogen; an oxygen donor; a phenolic compound; and a Lewis base or a chelating agent; and (c) a catalyst activator component comprising an activator compound selected from the group consisting of dialkylzinc, alkylzinc halide and aromatic zinc compounds, and a reaction rate moderator.

VOL
1126
ISS
2
MY
14
1991
UMI

**5,015,706**

### POLYMER-SUPPORTED 4-(N-BENZYL-N-METHYLAMINO)PYRIDINE CATALYST AND PROCESS FOR SAME

**Donald W. McQuigg, Mooresville, Ind.; Heather K. Webb, Champaign, Ill., and Edward E. Sowers, Mooresville, Ind., assignors to Reilly Industries, Inc.,, Indianapolis, Ind.**

**Filed Sep. 21, 1988, Ser. No. 247,152**

**Int. Cl.$^5$ C08T** *2/08*

**U.S. Cl. 526—200** **2 Claims**

1. A process for preparing a cross linked polymer supported 4-(N-benzyl-N-methylamino)pyridine material in high yield having effective physical and chemical properties as a catalyst, comprising the suspension copolymerization of an organic phase containing the corresponding vinyl-substituted pyridine monomer, a styrene monomer and a suitable cross-linking agent and free radical generating catalyst in the presence of an aqueous phase containing a cellulose ether derivative as the stabilizing agent.

---

**5,015,707**

### PREPARATION OF POLY-β-ALANINE FROM ACRYLAMIDE

**Fumihiko Yamamoto, Kawasaki, and Teruyuki Misumi, Yokohama, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 47,311, May 8, 1987, Pat. No. 4,855,365. This application May 17, 1989, Ser. No. 353,056**

**Claims priority, application Japan, May 9, 1986, 61-105889; May 9, 1986, 61-105890**

**Int. Cl.$^5$ C08G** *69/00*

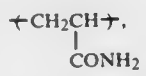
**U.S. Cl. 526—212** **7 Claims**

1. A process for producing a poly-β-alanine which comprises polymerizing acrylamide in the presence of 1/50,000 to 1/500 mole per mole of the acrylamide, of an alcoholate of an alkaline earth metal to obtain a poly-β-alanine,

said poly-β-alanine comprising:

(X) monomeric units represented by the formula —$CH_2CH_2CONH$—; and

(Y) monomeric units represented by the formula



$$-\!\!\left(CH_2\underset{\displaystyle CONH_2}{\underset{|}{C}H}\right)\!\!-,$$

the content of said units (Y) being in the range of 1.4 to 10 mmol per gram of the poly-β-alanine.

---

**5,015,708**

### PRECIPITATION POLYMERIZATION OF TERPOLYMERS OF A VINYL LACTAM, A POLYMERIZABLE CARBOXYLIC ACID AND A HYDROPHOBIC MONOMER IN AN ALIPHATIC HYDROCARBON SOLVENT

**Jenn S. Shih, Paramus; Terry E. Smith, Morristown, and Robert B. Login, Oakland, all of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.**

**Filed Jun. 26, 1989, Ser. No. 373,012**

**Int. Cl.$^5$ C08F** *26/08*

**U.S. Cl. 526—264** **15 Claims**

1. A precipitation polymerization process for making terpolymers of (i) a vinyl lactam, (ii) a polymerizable carboxylic acid selected from acrylic acid, methacrylic acid, itaconic acid and crotonic acid, and (iii) a hydrophobic monomer selected from an α-olefin, an alkyl vinyl ether, an N-alkyl or N,N-dialkyl acrylamide, an alkyl ester of a polymerizable carboxylic acid, a vinyl ester of a carboxylic acid, an N-alkyl diallylamine or a salt thereof, a polymerizable silicon alkyl monomer and a polymerizable fluoroalkyl acrylate or methacrylate, with at least 6 carbon atoms in the alkyl group therein, in a yield of at least 80% as a fine, white powder which comprises polymerizing 40–70% by wt. of (i) 15–40% by wt. of (ii), and 5–20% by wt. of (iii), in an aliphatic hydrocarbon solvent which is a $C_3$–$C_{10}$ saturated hydrocarbon, branched or unbranched, cyclic or acylic, in the presence of a free radical polymerization initiator, at about 50°–150° C., under an inert gas, with agitation, wherein the solvent is present in an amount sufficient to keep the terpolymer precipitate in a stirrable state, with up to about 40% solids, during the polymerization.

---

**5,015,709**

### RADIATION-CURABLE LIQUID RESIN FOR SECONDARY COATING OF LIGHTWAVE GUIDES

**Siegfried Birkle, A/Aisch; Hans-Dieter Feucht, Erlangen; Rainer Kamps, Coburg, and Eva Rissel, Forchheim, all of Fed. Rep. of Germany, assignors to Siemens Aktiengessellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Dec. 19, 1988, Ser. No. 286,461**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743992**

**Int. Cl.$^5$ C06F** *2/46*

**U.S. Cl. 526—279** **11 Claims**

1. A radiation-curable liquid resin useful as a secondary coating of lightwave guides, comprising a reaction product of (meth)-acrylic acid or (meth)-acrylic acid chloride or isocyanatoalkyl-(meth)-acrylate with an addition compound selected from the group consisting of: (a) a 1:2 addition compound of a diepoxide with a mean molecular weight ≦1000 and a short-chain α,ω-diol with a mean molecular weight ≦700, and (b) a 1:2 addition compound of a diepoxide with a mean molecular weight ≦400 and a monovalent aliphatic alcohol with a mean molecular weight ≦200, where the diepoxide as an aliphatic-aromatic or aromatic diglycidylether, an aliphatic or cycloaliphatic diepoxide or a silicon-organic diepoxide, and where the short-chain α,ω-diol is an α,ω-hydroxy-terminated polyoxyalkylene, an α,ω-hydroxy-terminated polyester, an α,ω-hydroxy-terminated polybutadiene, an α,ω-hydroxy-terminated organo-functional siloxane, or an α,ω-alkanediol with a mean molecular weight ≦200.

---

**5,015,710**

### PROCESS FOR PRODUCING A BLENDED METATHESIS/RADICAL POLYMER COMPOSITION

**Zenichiro Endo, and Shigeyoshi Hara, both of Iwakuni, Japan, assignors to Hercules Incorporated, Wilmington, Del.**

**Filed Sep. 27, 1990, Ser. No. 589,281**

**Int. Cl.$^5$ C08F** *36/00, 136/00, 236/00, 4/44*

**U.S. Cl. 526—283** **28 Claims**

1. A process for producing a molded polymer article by polymerizing and molding a monomer mixture comprised of a metathesis polymerizable monomer and a radically polymerizable vinyl monomer wherein metathesis and radical polymerization proceed simultaneously in the presence of a transition metal-based metathesis polymerization catalyst system characterized in that

(a) the monomer mixture under the conditions of the reaction generates a radical by a redox reaction with a reduced transition metal compound;

(b) at least a portion of the transition metal catalyst component is in a valence state at least one less than its maximum valence and;

(c) the vinyl monomer is free of a polar group containing active hydrogen and contains a second double bond conjugated with the vinyl group.

**5,015,711**

### THICKENING AGENT WHICH MODIFIES THE RHEOLOGICAL CHARACTERISTICS OF CHARGED AND/OR PIGMENTED, WHITE OR COLORED AQUEOUS COMPOSITIONS

**Benoit Simonet, Lozanne; Pierre Fabre, Collonges-Au-Mont-D'Or; Jacques Laluet, Lyons, and Jean-Bernard Egraz, Ecully, all of France, assignors to Coatex S.A., Caluire, France**

**Filed Jul. 6, 1989, Ser. No. 376,126**

**Claims priority, application France, Jul. 7, 1988, 88 09509**

**Int. Cl.$^5$ C08F** *26/02*

**U.S. Cl. 526—301** **16 Claims**

1. A copolymer which is water soluble in a neutral or an alkaline medium and which is composed of:

(a) at least one monomer having an ethylenic unsaturation site and at least one carboxylic function;

(b) at least one monomer having an ethylenic unsaturation site and no carboxylic function; and

(c) at least one surfactant monomer having at least one urethane function resulting from the reaction of an isocyanate with an ethylenic unsaturation site with a surfactant compound having a hydroxyl function which is reactive with regard to the —NCO group,

wherein said copolymer, when placed in an aqueous solution with 2% by weight of dry material and brought to a pH of 9 by the addition of ammonia, at a temperature of 20° C., has a Brookfield viscosity at 100 revolutions per minute of at most equal to 220 centipoises.

---

**5,015,712**

### METHOD FOR PREPARING IMIDE-CONTAINING POLYMERS

**Thomas H. Newman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 12, 1989, Ser. No. 420,499**

**Int. Cl.$^5$ C08F** *20/58*

**U.S. Cl. 526—304** **17 Claims**

1. A process for preparing imide-containing vinylaromatic polymers comprising polymerizing under free radical polymerization conditions in the substantial absence of a dehydration cyclization catalyst, a polymerizable monomer composition comprising at least one vinylaromatic monomer and at least one maleamic monocarboxylic acid monomer, to form a vinylaromatic monomer-maleamic monocarboxylic acid polymer which is in situ dehydrated and cyclized to form an imide-containing vinylaromatic polymer, and subsequently recovering said imide-containing vinylaromatic polymer.

---

**5,015,713**

### ALKALINE POLYMERIZATION OF CARBOXYLATED POLYMERS

**Peter R. J. Blanpain, Elst, and Hendrikus W. Leenders, Arnhem, both of Netherlands, assignors to Polysar Financial Services S.A., Fribourg, Switzerland and BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

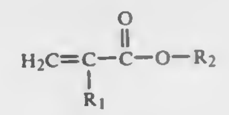
**Continuation of Ser. No. 183,048, Apr. 19, 1988, abandoned. This application Apr. 26, 1989, Ser. No. 342,675**

**Int. Cl.$^5$ C08F** *20/04*

**U.S. Cl. 526—318.4** **4 Claims**

1. In a process for the preparation of a latex by the emulsion polymerization of a monomer mixture selected from the group consisting of:

- (A) monomer mixture comprising:
  - (i) from 20 to 80 weight percent of a mixture comprising 100 to 75 weight percent of one or more $C_{8-12}$ vinyl aromatic monomers which are unsubstituted or substituted by a $C_{1-4}$ alkyl radical or a chlorine atom, and 0 to 25 weight percent of one or more $C_{2-8}$ alkenyl nitriles;
  - (ii) from 80 to 19.5 weight percent of one or more $C_{4-6}$ conjugated diolefins which are unsubstituted or substituted by a chlorine atom;
  - (iii) from 0.5 to 10 weight percent of one or more monomers of the formula:

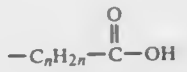


$$H_2C{=}\underset{\displaystyle R_1}{\underset{|}{C}}-\overset{\displaystyle O}{\overset{\|}{C}}-O-R_2$$

Formula I

wherein $R_1$ is hydrogen or a $C_{1-6}$ alkyl radical and $R_2$ a radical of the formula

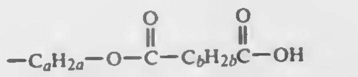
(a)



$$-C_nH_{2n}-\overset{\displaystyle O}{\overset{\|}{C}}-OH$$

wherein n is an integer from 1 to 6; or

(b)



$$-C_aH_{2a}-O-\overset{\displaystyle O}{\overset{\|}{C}}-C_bH_{2b}\overset{\displaystyle O}{\overset{\|}{C}}-OH$$

wherein a and b are integers from 1 to 4; and

  - (iv) optionally up to 20 weight percent of one or more monomers selected from the group consisting of:
    - (a) $C_{1-8}$ alkyl and hydroxy alkyl esters of $C_{3-6}$ ethylenically unsaturated carboxylic acids;
    - (b) $C_{3-6}$ ethylenically unsaturated aldehydes; and
    - (c) amides of $C_{3-6}$ ethylenically unsaturated carboxylic acids which amides are unsubstituted or substituted at the nitrogen atom by up to two radicals selected from the group consisting of $C_{1-4}$ hydroxyalkyl radicals;
- (B) monomer mixtures comprising:
  - (i) from 5 to 39.5 weight percent of a mixture comprising 100 to 75 weight percent of one or more $C_{2-8}$ alkenyl nitriles and 0 to 35 weight percent of one or more vinyl aromatic monomers which are unsubstituted or substituted by a $C_{1-4}$ alkyl radical or a chlorine atom;
  - (ii) from 94.5 to 60 weight percent of one or more $C_{4-6}$ conjugated diolefins which are unsubstituted or substituted by a chlorine atom;
  - (iii) from 0.5 to 10 weight percent of a monomer of Formula I as defined above; and
  - (iv) optionally up to 20 weight percent of one or more monomers selected from the group consisting of:
    - (a) $C_{1-8}$ alkyl and hydroxy alkyl esters of $C_{3-6}$ ethylenically unsaturated carboxylic acids;
    - (b) $C_{3-6}$ ethylenically unsaturated aldehydes; and
    - (c) amides of $C-_{3-6}$ ethylenically unsaturated carboxylic acids which amides are unsubstituted or substituted at the nitrogen atom by up to two radicals selected from the group consisting of $C_{1-4}$ alkyl and $C_{1-4}$ hydroxalkyl radicals; monomer mixtures comprising:
- (c) monomer mixtures comprising:
  - (i) from 99.5 to 70 weight percent of a monomer mixture comprising:
    - (a) from 100 to 80 weight percent of one or more halogenated $C_{2-6}$ aliphatic alkenyl monomers and
    - (b) up to 20 weight percent of one or more monomers selected from the group consisting of $C_{1-8}$ alkenyl and hydroxy alkyl esters of $C_{3-6}$ ethylenically unsaturated carboxylated acids;
  - (ii) from 0.5 to 29.5 weight of one or more monomers of Formula I as defined above; and
  - (iii) optionally up to 20 weight percent of one or more monomers selected from the group consisting of
    - (a) $C_{3-6}$ ethylenically unsaturated aldehydes; and
    - (b) amides of $C_{3-6}$ ethylenically unsaturated carboxylic acids which amides are unsubstituted or substituted at the nitrogen atom by up top two radicals selected

VOL
1126
ISS
2
MY
14
1991
UMI

from the group consisting of $C_{1-r}$ alkyl and $C_{1-4}$ hydroxyalkyl radicals;

the improvement characterized in that the polymerization takes place at a pH from 8.5 to 10.

---

**5,015,714**

## HEPTADIENE POLYMER AND PROCESS FOR PRODUCING THE SAME

**Yoshiharu Doi, Kanagawa; Satoshi Ueki, and Hiroyuki Furuhashi, both of Saitama, all of Japan, assignors to Tonen Corporation, Tokyo, Japan**

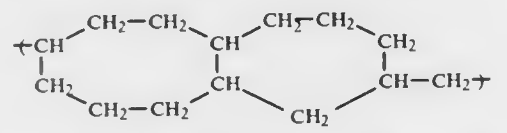
**Filed Mar. 14, 1990, Ser. No. 493,067**

**Claims priority, application Japan, Mar. 28, 1989, 1-73984**

**Int. Cl.$^5$ C08F** *136/20, 4/68*

**U.S. Cl. 526—336** **2 Claims**

1. A heptadiene polymer comprising the repeating units



and having a number-average molecular weight of 2,000–500,000.

---

**5,015,715**

## METHOD FOR BONDING AN ANALYTE-SENSITIVE DYE COMPOUND TO AN ADDITION-CURE SILICONE

**George A. Divers, San Diego, and Henry K. Hui, Laguna Niguel, both of Calif., assignors to Puritan-Bennett Corporation, Carlsbad, Calif.**

**Filed Aug. 16, 1989, Ser. No. 394,637**

**Int. Cl.$^5$ C08G** *77/06*

**U.S. Cl. 528—15** **17 Claims**

1. A method for bonding an analyte-sensitive indicator substance to addition-cure silicone to form a sensor element compressing the steps of:

functionalizing the analyte-sensitive indicator substance to obtain a linker arm with an isolated multiple bond;

hydrosilylating the functionalized indicator substance with a polymethylhydrosiloxane; and

cross-linking the resulting compound with vinyl-terminated polysiloxane.

---

**5,015,716**

## PARTICULATE MATERIAL COMPRISING A PLATINUM-CONTAINING HYDROSILYLATON CATALYST AND A DIORGANOPOLYSILANE

**Atsushi Togashi, Ichihara, and Toshio Saruyama, Narashino, both of Japan, assignors tu Toray Silicone Company, Limited, Tokyo, Japan**

**Filed Jun. 22, 1989, Ser. No. 370,418**

**Claims priority, application Japan, Jun. 29, 1988, 63-161355**

**Int. Cl.$^5$ C08G** *77/06*

**U.S. Cl. 528—15** **6 Claims**

1. A particulate composition comprising a platinum-containing hydrosilylation reaction catalyst dispersed in a polydiorganosilane having a softening point within the temperature range of from 50 to 200 degrees Centigrade, where the average particle size of said particulate does not exceed 100 micrometers and the surface layer of said particulate is substantially free of said catalyst.

---

**5,015,717**

## SULFUR-CONTAINING ORGANOPOLYSILOXANE WAXES AND A METHOD FOR PREPARING THE SAME

**Eugene R. Martin, Onsted, and Roy M. Griswold, Hudson, both of Mich., assignors to Wacker Silicones Corporation, Adrian, Mich.**

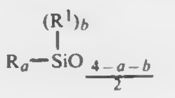
**Continuation of Ser. No. 197,223, Apr. 18, 1988, abandoned, which is a division of Ser. No. 945,124, Dec. 22, 1986, abandoned. This application Jun. 26, 1989, Ser. No. 371,132**

**Int. Cl.$^5$ C08G** *77/28*

**U.S. Cl. 528—30** **6 Claims**

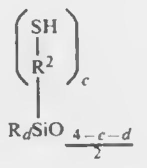
1. A solid sulfur containing organopolysiloxane wax having a melting point above 34° C. and containing

(1) siloxane units of the formula



$$R_a\overset{(R^1)_b}{\overset{|}{-SiO}}{}_{\frac{4-a-b}{2}}$$

(2) siloxane units of the formula

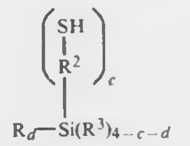


$$R_d\overset{\left(\overset{SH}{\overset{|}{R^2}}\right)_c}{\overset{|}{SiO}}{}_{\frac{4-c-d}{2}}$$

(3) siloxane units of the formula

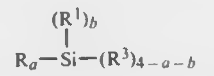
$$R_eSiO_{\frac{4-e}{2}},$$

which is obtained by reacting a mercaptofunctional silane of the formula



$$R_d-\overset{\left(\overset{SH}{\overset{|}{R^2}}\right)_c}{\overset{|}{Si}}(R^3)_{4-c-d}$$

with a mixture containing from 0.08 to 100 moles of an alkyl functional silane of the formula



$$R_a-\overset{(R^1)_b}{\overset{|}{Si}}-(R^3)_{4-a-b}$$

per mole of mercaptofunctional silane, from 1 to 32 moles of a cyclic trisiloxane of the formula

$$(R_2SiO)_3$$

per mole of mercaptofunctional silane and from 1 to 18 moles of an organodisiloxane of the formula

$$(R_3Si)_2O$$

per mole of mercaptofunctional silane in the presence of water and a catalyst having a pKa value less than 1, in which R is a monovalent hydrocarbon radical having from 1 to 10 carbon atoms, $R^1$ is an alkyl radical linked to silicon with an SiC-bond which has an average of at least 25 carbon atoms, $R^2$ is a multivalent radical selected from the group consisting of a hydrocarbon radical having from 2 to 10 carbon atoms which is free of aliphatic unsaturation, a hydrocarbon ether and a hydrocarbon thioether, $R^3$ is selected from the group consisting of a hydrocarbonoxy radical having from 1 to 10 carbon atoms and a halogen, a is an integer of from 0 to 2, b is an integer of 1 or 2, the sum of a+b is 1, 2 or 3, c is an integer of 1 or 2, d is an integer of from 0 to 2, and the sum of c +d is 1, 2 or 3, and e is 2 or 3.

---

**5,015,718**

## ADHESIVES AND METHOD FOR MAKING THE SAME

**George F. Dorsey, Farragut, Tenn., assignor to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.**

**Filed Jun. 30, 1989, Ser. No. 374,316**

**Int. Cl.$^5$ C08G** *18/38*

**U.S. Cl. 528—44** **17 Claims**

1. An improved and nonmutagenic adhesive, which comprises:

a thermosetting resin selected from polyurethane resins and epoxy resins; and

a curing agent intimately mixed with said thermosetting resin, said curing agent being a mixture of at least three aromatic diamines formed by the condensation of at least two 2,6-dialkylanilines with a formaldehyde in an acid solution, and stripping said aromatic diamines from said solution for use with said thermosetting resin, said curing agent being present about 5 to less than about 50 wt. % in said intimate mixture.

---

**5,015,719**

## AROMATIC DICYANATE/AROMATIC DIEPOXY COMPOSITIONS, CURED PRODUCTS AND METHODS

**Kostas I. Papathomas, Endicott; William J. Summa, Endwell, and David W. Wang, Vestal, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation-in-part of Ser. No. 154,861, Feb. 10, 1988, which is a division of Ser. No. 33,557, Apr. 3, 1987, Pat. No. 4,745,215. This application Jul. 14, 1989, Ser. No. 380,195**

**Int. Cl.$^5$ C08G** *22/14*

**U.S. Cl. 528—70** **31 Claims**

1. Resin composition which is heat-curable at temperatures between about 190° and 270° C., has a dielectric constant between about 2.8 and 3.1, a glass transition temperature between about 215° and 270° C., flame retardance and substantial heat stability evidenced by a degradation temperature between about 400° and 430° C., said composition containing a mixture of reactive monomers and/or prepolymers comprising a major amount by weight of a dicyanato diphenyl fluoroalkane and a minor amount by weight of an aromatic diepoxide having an epoxide equivalent weight between about 240 and 255.

---

**5,015,720**

## METHOD FOR PREPARING POLYCARBONATES CONTAINING ALIPHATIC ESTER GROUPS

**Eugene P. Boden, Scotia, and Peter D. Phelps, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jun. 8, 1990, Ser. No. 535,258**

**Int. Cl.$^5$ C08G** *63/64*

**U.S. Cl. 528—179** **20 Claims**

1. A method for preparing an aromatic polycarbonate containing aliphatic dicarboxylic ester groups which comprises the steps of:

(A) preparing an intermediate by the reaction in the absence of phosgene and in an alkaline medium of at least one dihydroxyaromatic compound and at least one anhydride of an aliphatic dicarboxylic acid having 4–6 carbon atoms; and

(B) effecting reaction between said intermediate and phosgene, in a mixture comprising an alkaline reagent, water, a substantially water-immiscible organic liquid and an interfacial polycarbonate formation catalyst and at a pH in the range of about 8–14.

---

**5,015,721**

## THERMOTROPIC LIQUID-CRYSTALLINE AROMATIC, POLYESTERS

**Giorgio Gabrielli, Milan; Mauro Maritano, Rovellasca; Giuseppe Motroni, Galliate, and L. Lawrence Chapoy, Lesa, all of Italy, assignors to Montedison S.p.A., Milan, Italy**

**Continuation of Ser. No. 277,126, Nov. 29, 1988, abandoned. This application Nov. 7, 1989, Ser. No. 433,411**

**Claims priority, application Italy, Dec. 2, 1987, 22854 A/87**

**Int. Cl.$^5$ C08G** *63/00, 63/02*

**U.S. Cl. 528—190** **10 Claims**

1. A thermotropic liquid-crystalline aromatic polyester which comprises:

(a) at least one unit derived from dicarboxy aromatic acids of the formula:

$$HOOC—Ar_1—O—Ar_2—COOH \tag{1}$$

wherein;

$Ar_1$ represents a divalent aromatic radical consisting of one ring, or of a plurality of condensed, partially condensed or non-condensed rings, containing from 6 to 18 carbon atoms, optionally substituted with halogens, or alkyl, aryl or aralkyl radicals containing a small number of carbon atoms; and

$Ar_2$ represents a divalent aromatic radical consisting of a plurality of condensed, partially condensed or non-condensed rings, containing from 12 to 18 carbon atoms, optionally substituted with halogens, or alkyl, aryl or aralkyl radicals containing a small number of carbon atoms;

(b) at least one unit derived from aromatic diols of the formula:

$$HO—Ar_3—OH \tag{2}$$

wherein:

$Ar_3$ represents a divalent aromatic radical consisting of one ring, or of a plurality of condensed, partially condensed or non-condensed rings, containing from 6 to 18 carbon atoms, optionally substituted with halogens or with alkyl, aryl, or aralkyl radicals containing a small number of carbon atoms, with cycloalkyl radicals containing from 5 to 12 carbon atoms, or with keto groups —COR or either groups —OR, wherein R represents an alkyl radical, or a cycloalkyl radical, an aryl radical consisting of one ring or of a plurality of condensed, partially condensed or non-condensed rings, containing from 1 to 18 carbon atoms, optionally substituted with halogens or with alkyl, aryl, or aralkyl radicals containing a small number of carbon atoms.

with or without at least one unit derived from other aromatic diacids hydroxy acids on both having the formula:

$$\text{(c) } HOOC—Ar_3—COOH \tag{3}$$

$$\text{(d) } HO—Ar_3—(CH{=}CH)_n—COOH \tag{4}$$

wherein n has a value of either 0 or 1.

---

**5,015,722**

## MELT-PROCESSABLE POLYESTER CAPABLE OF FORMING AN ANISOTROPIC MELT WHICH EXHIBITS A HIGHLY ATTRACTIVE BALANCE BETWEEN ITS MOLDING AND HEAT DEFLECTION TEMPERATURES

**Larry F. Charbonneau, Mendham; John A. Flint, Berkeley Heights; Gabor D. Kiss, Long Valley, and James P. Shepherd, Springfield, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Apr. 4, 1990, Ser. No. 504,310**

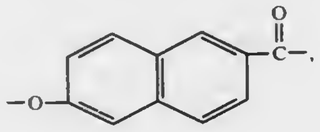
**Int. Cl.$^5$ C08G** *63/02, 63/18, 63/00*

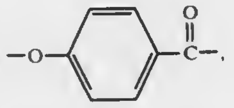
**U.S. Cl. 528—190** **21 Claims**

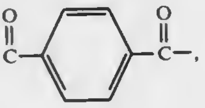
1. A melt-processable polyester capable of forming an anisotropic melt phase at a temperature below approximately 375°

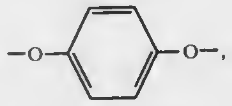
VOL
1126
ISS
2
MY
14
1991
UMI

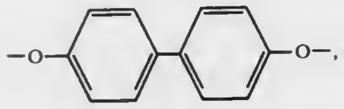
C. and which is capable of forming a molded article which exhibits a heat defection temperature of at least 250° C. consisting essentially of the recurring moieties I, II, III, IV, and V wherein:

I is

,

II is

,

III is

,

IV is

, and

V is

, and

wherein said polyester comprises approximately 1.4 to 10 mole percent of moiety I, approximately 50 to 70 mole percent of moiety II, approximately 10 to 24.3 mole percent of moiety III, approximately 1 to 12.15 mole percent of moiety IV, and approximately 5 to 23.3 mole percent of moiety V, with the proviso that the molar concentration of moiety III is substantially the same as the total molar concentration of moieties IV and V, and the molar concentration of moiety IV does not exceed that of moiety V.

---

### 5,015,723
## PROCESS FOR PRODUCING AROMATIC POLYESTERS

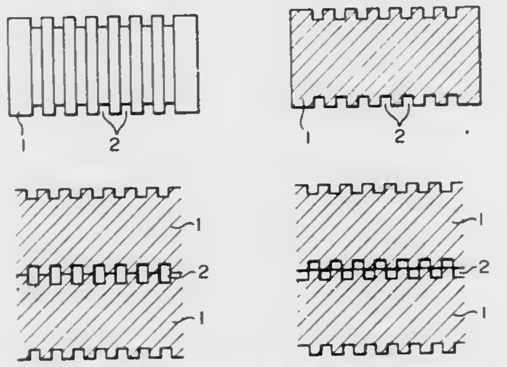
**Hiroaki Sugimoto; Yoshitaka Ohbe, both of Tsukuba; Kazuo Hayatsu, Ibaraki, and Atsukazu Iwata, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Aug. 28, 1989, Ser. No. 400,131**

**Claims priority, application Japan, Sep. 2, 1988, 63-220843; Sep. 2, 1988, 63-220846; Sep. 21, 1988, 63-238558**

**Int. Cl.$^5$ C08G** *63/02, 63/18, 63/00, 67/00*

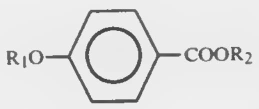
**U.S. Cl. 528—190** **6 Claims**



1. A process for producing an aromatic polyester which comprises

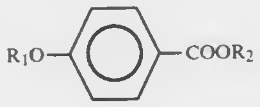
(1) charging the following components to a vessel,

(A) 30 to 80% by mole of component A consisting of at least one compound having the formula,

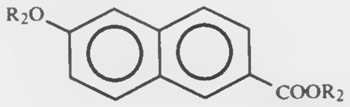


wherein $R_1$ is hydrogen, formyl, acetyl, propionyl or benzoyl, and $R_2$ is hydrogen, $C_1$-$C_6$ alkyl or $C_6$-$C_{18}$ aryl,

or a mixture of not less than 50% by mole of at least one compound having the formula,



wherein $R_1$ and $R_2$ have the same meanings as defined above, and less than 50% by mole of at least one compound having the formula,



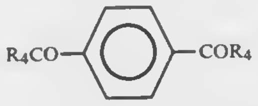
wherein $R_1$ and $R_2$ have the same meanings as defined above,

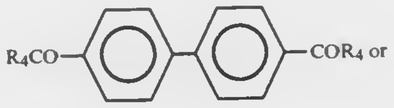
(B) 10 to 35% by mole of component B consisting of at least one compound having the formula,

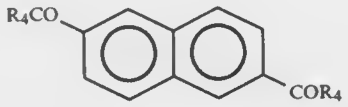
$R_3O—A_1—OR_3$

wherein $A_1$ is a divalent aromatic residue, and $R_3$ is hydrogen, acetyl, propionyl or benzoyl, and

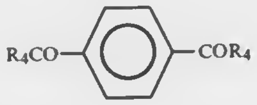
(C) 10 to 35% by mole of component C consisting of at least one compound having any one of the formulas,



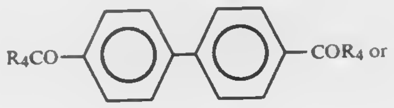

or

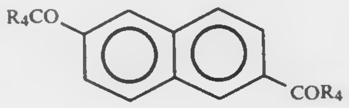


wherein $R_4$ is hydroxyl, $C_1$–$C_6$ alkyloxy, $C_6$–$C_{18}$ aryloxy or halogen, or a mixture of not less than 50% by mole of at least one compound having any one of the formulas,



-continued


or



wherein $R_4$ represents the same meaning as defined above, and less than 50% by mole of at least one compound having the formula,

$R_4CO—Ar—COR_4$

wherein Ar is a divalent aromatic residue, and $R_4$ has the same meaning as defined above,

(2) carrying out a polycondensation reaction in the vessel at a temperature of 270° to 380° C., and

(3) discharging the aromatic polyester in a molten state from the vessel when the flow temperature of the aromatic polyester reaches a temperature between 240° C. and a temperature not less than 20° C. below the reaction temperature.

---

### 5,015,724
## PROCESS OF PRODUCING POLYESTER, AND DEVELOPER COMPOSITION FOR ELECTROPHOTOGRAPHY

**Kuniyasu Kawabe, Wakayama, Japan, assignor to KAO Corporation, Tokyo, Japan**

**Filed Nov. 13, 1989, Ser. No. 434,728**

**Claims priority, application Japan, Nov. 18, 1988, 63-291951**

**Int. Cl.$^5$ C08G** *63/02*

**U.S. Cl. 528—272** **12 Claims**

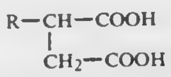
1. A co-condensation-polymerization process for preparing a modified polyester which comprises the steps of:

(1) reacting 10 to less than 25 mole percent of a dihydric alcohol having the following formula:

$HO—(CH_2)_n—OH$

in which n is an integer of 2 to 6, with

1 to 25 mole percent of a dicarboxylic acid or anhydride thereof having the following formula:



$$\begin{array}{l} R-CH-COOH \\ \quad\;\; | \\ \quad\;\; CH_2-COOH \end{array}$$

in which R is a saturated or unsaturated hydrocarbon group having 4 to 20 carbon atoms,

to produce a starting linear polyester having a number-average molecular weigh of 300 to 1,400,

wherein the mole percent of the dihydric alcohol is based on the total constituent monomer units of said starting linear polyester and the mole percent of the dicarboxylic acid or the anhydride thereof is based on the total monomer units of the modified polyester prepared, and

(2) reacting the produced starting linear polyester of step (1) with a tri- or higher-valent monomer selected from a tri- or higher-valent carboxylic acid, a derivative thereof, or a tri- or higher-valent alcohol,

to produce the modified polyester.

---

### 5,015,725
## AROMATIC SULFIDE/SULFONE POLYMER PRODUCTION

**Lacey E. Scoggins; Kenneth C. Hoover, both of Bartlesville, Okla., and Wei-Teh Wade Shang, Nagoya, Japan, assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 102,462, Sep. 29, 1987, abandoned. This application Aug. 31, 1989, Ser. No. 401,595**

**Int. Cl.$^5$ C08G** *69/08, 75/14*

**U.S. Cl. 528—310** **10 Claims**

1. A process for the production of aromatic sulfide/sulfone polymer which comprises the steps:

I. contacting
  (a) at least one lactam,
  (b) at least one alkali metal hydrosulfide,
  (c) water, and
  (d) at least one base selected from the group consisting of alkali metal hydroxides and mixtures of alkali metal hydroxides with alkali metal carbonates under reaction conditions of time and temperature sufficient to produce a mixture containing a complex which comprises said at least one alkali metal hydrosulfide and

II. contacting said mixture produced in step I with
  (e) at least one dihaloaromatic sulfone under polymerization conditions for a period of time sufficient to form an aromatic sulfide/sulfone polymer.

---

### 5,015,726
## POLYAMIDE FROM TOLUENEDIAMINE

**Edward N. Peters Lenox, both of Mass.; Geoffrey H. Riding, Castleton, N.Y.; and G. F. Willard, Dalton, Mass.; assignors to General Electric Company, Pittsfield, Mass.**

**Continuation of Ser. No. 301,194, Jan. 24, 1989, abandoned. This application May 25, 1990, Ser. No. 529,678**

**Int. Cl.$^5$ C08G** *69/32*

**U.S. Cl. 528—349** **18 Claims**

1. A polyamide which is the reaction product of:

(a) at least one diamine; and

(b) at least one dicarboxylic acid, said diamine and said dicarboxylic acid being in a mole ratio of from 48:52 to 52:48, said diamine comprising:
  (i) toluenediamine at a level of from 10 to 50 mole percent based on the total moles of diamine and dicarboxylic acid; and
  (ii) an aliphatic diamine at a level of from 0 to 40 mole percent based on the total moles of diamine and dicarboxylic acid, said dicarboxylic acid comprising:
  (i) isophthalic acid at a level of from 5 to 50 mole percent based on the total moles of diamine and dicarboxylic acid,
  (ii) terephthalic acid present at a level of from 0 to 27.5 mole percent based on the total moles of diamine and dicarboxylic acid,
  (iii) an aliphatic dicarboxylic acid at a level of from 0 to 45 mole percent based on the total moles of diamine and dicarboxylic acid, said aliphatic diamine and aliphatic dicarboxylic acid being at a combined level of from 5 to 45 mole percent based on the total moles of diamine and dicarboxylic acid.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,727
### DIMER FOR SYNTHESIS OF HIGH PERFORMANCE POLYMER MATRIX COMPOSITES

**Frank J. Riel, San Diego; Tuyet Vuong, Elsinore, and Edward A. Delaney, Spring Valley, all of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.**

**Continuation-in-part of Ser. No. 194,321, May 10, 1988. This application Apr. 26, 1990, Ser. No. 515,079**

**Int. Cl.$^5$ C08G** *8/02, 69/26*

**U.S. Cl. 528—353** **134 Claims**

TRIMER FORMATION AS A FUNCTION OF MOLE RATIOS, MDA/NA

| MOLE RATIO MD/NA | HPLC ANALYSIS, AREA PERCENT OF EACH COMPONENT | | | | | | |
|---|---|---|---|---|---|---|---|
| | MDA 5* | NA-MDA 15 | NI-MDA 20 | NA-MDA-NA 45 | NA-MDA-NI 55 | NI-MDA-NI 65 | TRIMER TOTAL |
| 4/1 | 44.8 | 5.4 | 33.5 | — | 0.1 | 2.5 | 2.6 |
| 3/1 | 51.1 | 4.8 | 36.5 | — | 0.8 | 3.7 | 4.5 |
| 2/1 | 34.9 | 2.9 | 49.1 | — | 0.5 | 8.9 | 9.4 |
| 1.05/1 | 19.5 | 1.9 | 42.5 | — | 8.9 | 15.2 | 24.1 |
| 0.95/1 | 15.4 | 3.1 | 48.5 | — | 6.1 | 23.1 | 29.2 |
| 0.86/1 | 1.9 | 15.8 | 5.2 | 40.7 | 19.2 | 11.6 | 71.5 |
| 0.50/1 | 2.4 | 24.6 | 2.7 | 51.4 | 12.8 | 2.5 | 66.7 |

* = ELUTION TIME, HPLC ANALYSIS

1. A process for the preparation of a polyimide prepolymer, comprising:

reacting a nadic compound selected from the group consisting of nadic acid, a monoester of nadic acid, and nadic anhydride with a primary aromatic diamine in an amount effective to suppress nadic-diamine-nadic trimer formation and to form a product consisting essentially of a nadic-diamine dimer, and

reacting said nadic-diamine dimer with the amic acid reaction product of a primary aromatic diamine and an aromatic compound selected from the group consisting of an aromatic dianhydride, a diester of an aromatic tetraacid, and an aromatic tetraacid, to form a polyimide prepolymer.

---

### 5,015,728
### PROCESS FOR THE PREPARATION OF INSULIN DERIVATIVES, THE B CHAIN OF WHICH IS LENGTHENED C-TERMINALLY

**Rainer Obermeier, Hattersheim am Main; Rolf Geiger, Frankfurt am Main, and Ulrich Grau, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

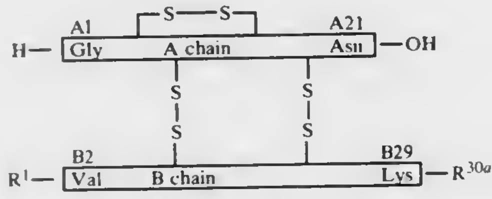
**Continuation-in-part of Ser. No. 650,639, Sep. 14, 1984, abandoned. This application Mar. 23, 1988, Ser. No. 172,236**

**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1983, 3333640**

**Int. Cl.$^5$ C07K** *7/40*

**U.S. Cl. 530—303** **9 Claims**

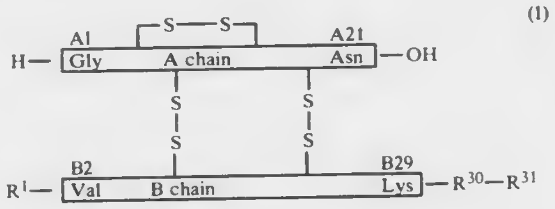
1. A process for the preparation of an insulin derivative of formula I comprising an aqueous solvent reacting, in ndopeptidase and an insulin of formula II



with a peptide of formula III

H—R30—R31 TM (III)

to produce the insulin derivative of formula I



(1)

wherein said insulin derivative I has an isoelectric point of above about 5.8, and

$R^1$ denotes H or H-Phe,

$R^{30}$ represents a radical of a neutral or basic naturally occurring L-amino acid,

$R^{31}$ represents a physiologically acceptable organic group of neutral or basic character, consisting of 1 to 3 α-amino acids in which the terminal carboxyl function is present in a free form, wherein at least one of $R^{30}$ and $R^{31}$ is of a basic character,

$R^{30a}$ denotes a radical of a genetically codable L-amino acid and

$R^{31a}$ represents OH or a protective group of a carboxyl function.

---

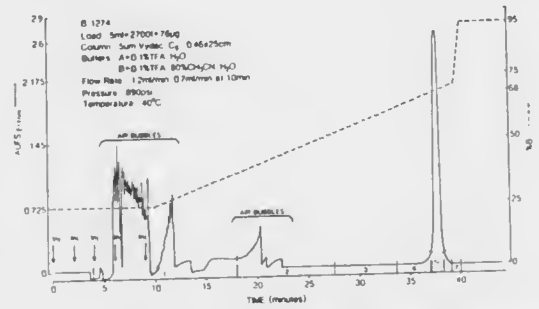
### 5,015,729
### OVINE INHIBIN

**Joachim Spiess, Encinitas; Jean E. F. Rivier, La Jolla, both of Calif.; C. Wayne Bardin, New York City, N.Y., and Wylie W. Vale, Jr., La Jolla, Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.**

**Continuation-in-part of Ser. No. 878,063, Jun. 24, 1986, abandoned, continuation-in-part of PCT US87/01470 filed Jun. 23, 1987. This application Jun 23, 1988, Ser. No. 210,683**

**Int. Cl.$^5$ C07K** *15/00*

**U.S. Cl. 530—350** **4 Claims**



1. A substantially pure ovine inhibin protein consisting essentially of greater than 90% by weight of total protein,

said inhibin protein consisting of a dimer of a first polypeptide chain having an apparent molecular weight of about 18,000 Daltons, as measured by gel electrophoresis, and a second polypeptide chain having a molecular weight of about 16,500 Daltons, as measured by gel electrophoresis, said first chain being linked to said second chain through disulfide bonding,

said dimer, when subjected to reverse phase HPLC elutes from a $C_8$ column of 5 micron particle size and 300 angstrom pore size, at between about 27 and about 28 minutes following the instigation of a straight line gradient flow of Buffers A and B which varies from 25% Buffer B to 90% Buffer B over a period of 45 minutes, at a flow rate of 0.7 ml per minute and a back pressure of about 890 psi, with Buffer A being 0.1% trifluoroacetic acid (TFA) and with Buffer B being 80% acetonitrile in 0.1% TFA:

said first chain having an amino-terminal sequence beginning with Ser-Thr-Pro-Pro-Leu-Pro-Trp-Pro-Trp-Ser-Pro-Ala-Ala-Leu-Arg-Leu-Leu-Gln-Arg-Pro-Pro-Glu-Glu-Pro-Ala-Ala-His-Ala-Asp-Cys-His-Arg -Ala and said second chain having the formula:

H-Gly-Leu-Glu-Cys-Asp-Gly-Lys-Val-Asn-Ile-Cys-Cys-Lys-Lys-Gln-Phe-Tyr-Val-Ser-Phe-Lys-Asp-Ile-Gly-Trp-Asn-Asp-Trp-Ile-Ile-Ala-Pro-Ser-Gly -Tyr-His-Ala-Asn-Tyr-Cys-Glu-Gly-Glu-Cys-Pro-Ser-His-Ile-Ala-Gly-Thr-Ser-Gly-Ser-Ser-Leu-Ser-Phe-His-Ser-Thr-Val-Ile-Asn-His-Tyr-Arg-Met-Arg -Gly-His-Ser-Pro-Phe-Ala-Asn-Leu-Lys-Ser-Cys-Cys-Val-Pro-Thr-Lys-Leu-Arg-Pro-Met-Ser-Met-Leu-Tyr-Tyr-Asp-Asp-Gly-Gln-Asn-Ile-Ile-Lys-Lys-Asp -Ile-Gln-Asn-Met-Ile-Val-Glu-Glu-Cys-Gly-Cys-Ser-OH, said protein specifically inhibiting basal secretion of follicle-stimulating hormone while not inhibiting basal secretion of luteinizing hormone.

---

### 5,015,730
### PREPARATION OF HOMOGENEOUS HUMAN FIBROBLAST INTERFERON

**Heinz-Jürgen Friesen, Moers, Fed. Rep. of Germany, and Sidney Pestka, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation of Ser. No. 691,989, Jan. 16, 1985, whicb is a continuation of Ser. No. 467,684, Feb. 18, 1983, abandoned, which is a continuation of Ser. No. 247,497, Mar. 25, 1981, Pat. No. 4,881,588**

**Int. Cl.$^5$ C07K** *15/26;* **A61K** *31/66*

**U.S. Cl. 530—351** **2 Claims**

1. Human fibroblast interferon having:

(a) a specific activity of about $4\times10^8$ units/mg as measured by a cytopathic effect inhibition assay;

(b) an apparent molecular weight of about 20,500 by sodium dodecylsulfate polyacrylamide gel electrophoresis;

(c) an amino acid composition (±15%) based on 24 hour hydrolysis in 6.0N HCl with 0.2% thioglycolic acid as follows:

| | |
|---|---|
| Asx | 15.1 |
| Thr* | 7.0 |
| Ser* | 7.5 |
| Glx | 22.2 |
| Pro | 3.0 |
| Gly | 6.9 |
| Ala | 7.4 |
| Cys | 3.0 |
| Val | 5.7 |
| Met | 4.5 |
| Ile | 9.4 |
| Leu** | 22.0 |
| Tyr | 8.8 |
| Phe | 8.0 |
| His | 4.5 |
| Lys | 11.0 |
| Arg | 11.9 |
| Trp | 3.0; |

wherein values indicated by* are uncorrected for losses during hydrolysis and the value is indicated by** is an arbitrary value;

(d) a partial amino acid sequence

$$\overset{1}{\text{H}_2\text{N—Met}}\text{—Ser—Tyr—Asn—}\overset{5}{\text{Leu}}\text{—Leu—Gly—Phe—}$$

$$\text{—Leu—}\overset{10}{\text{Gln}}\text{—Arg—Ser—Ser—Asn—}\overset{15}{\text{Phe}}$$

$$\text{. . . —Gln—}\overset{19}{\text{Lys}}\text{—. . . ;}$$

and

(e) a maximum of 3 residues of glucosamine and no residues of galactosamine or mannosamine per molecule of human fibroblast interferon;

which interferon is free of sodium dodecyl sulfate and is homogeneous as determined by obtaining a single band in sodium dodecylsulfate polyacrylamide gel electrophoresis, a constant specific activity, a single peak in HPLC with activity and protein levels superimposable and a single amino-terminal amino acid sequence.

---

### 5,015,731
### COPPER COMPLEX FORMAZAN COMPOUNDS CONTAINING A CYANAMIDO-S-TRIAZINYLAMINO RADICAL AND A FIBER-REACTIVE GROUP OF THE VINYLSULFONE SERIES, SUITABLE AS DYES

**Günther Schwaiger, Frankfurt am Main, and Hartmut Springer, Königstein/Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

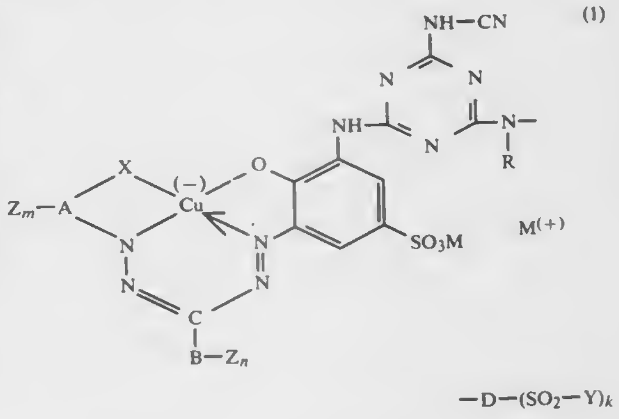
**Filed Feb. 2, 1990, Ser. No. 474,531**

**Claims priority, application Fed. Rep. of Germany, Feb. 6, 1989, 3903455**

**Int. Cl.$^5$ C09B** *50/00, 62/503;* **D06P** *1/384, 3/66*

**U.S. Cl. 534—618** **10 Claims**

1. A copper complex formazan compound conforming to the formula (1)



(1)

where

A is a benzene or naphthalene ring, which is unsubstituted or substituted by substituents selected from the group consisting of halogen, nitro, alkyl of 1 to 5 carbons, alkoxy of 1 to 4 carbons, alkylsulfonyl of 1 to 4 carbons, phenylsulfonyl, sulfamoyl and N-monoalkyl- and N,N-dialkylsulfamoyl each of 1 to 4 carbons in the alkyl;

B is a straight-chain or branched-chain alkylene of 1 to 8 carbons, or a straight-chain or branched-chain alkenylene of 2 to 8 carbons, which is unsubstituted or substituted by a phenyl which is unsubstituted or substituted by substituents selected from the group consisting of methyl, ethyl, methoxy, ethoxy, fluorine, bromine, chlorine and sulfamoyl, or is alkylene-phenylene having 1 to 4 carbons in the alkyl moiety or alkenylene-phenylene having 2 to 4 carbons in the alkenylene moiety, in each of which the phenylene is unsubstituted or substituted by substituents selected from the group consisting of methyl, ethyl, methoxy, ethoxy, fluorine, chlorine, bromine and sulfamoyl, or is phenylene or naphthylene, each being unsubstituted or substituted by substituents from the group consisting of hydroxy, nitro, halogen, alkyl of 1 to 5 carbons, alkoxy or 1 to 4 carbons and carbalkoxy having 1 to 4 carbons in the alkyl moiety, or is the bivalent radical of furan, thiophene, pyrrole, imidazole, indole, pyrazole, pyridine, pyrimidine, quinoline or benzimidazole, or

—B—Z is together hydrogen;

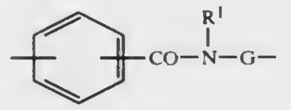
Z is sulfo or carboxy, attached as additional substituent on A and B to an aromatic of aliphatic carbon of A and B or to an aliphatic carbon of a substituent of A;

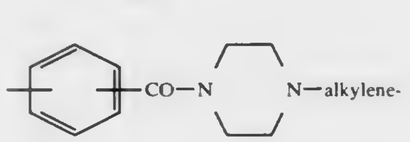
k is 1 or 2;

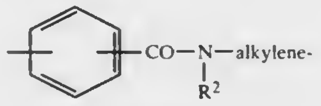
m is zero, 1 or 2 (if zero, Z being hydrogen);

VOL
1126
ISS
2
MY
14
1991
UMI

n is zero, 1 or 2 (if zero, Z being hydrogen);
the sum (m+n) is from 1 to 4;
if Z if present two or three times in the molecule, it may have different meanings within the stated meanings;
X is oxygen of carbonyloxy of the formula —CO—O—, the group X and the N-atom being bonded ortho to each other to the aromatic nucleus of A;
R is hydrogen or an unsubstituted or substituted alkyl of 1 to 4 carbons wherein the substituents are selected from the group consisting of hydroxy, carboxy, sulfato, phosphato, sulfo, cyano, alkoxy of 1 to 4 carbons, alkoxyalkoxy the alkyl and alkylene moieties of which being each of 1 to 4 carbons, and a group of the formula $—SO_x—Y$, where Y is as defined below;
D is an phenylene, unsubstituted or substituted by substituents selected from the group consisting of hydroxy, nitro, chlorine, bromine, fluorine, alkoxy of 1 to 4 carbons, alkyl of 1 to 4 carbons, sulfo, carboxy, β-sulfatoethylthio, alkylamino and dialkylamino each of 1 to 4 carbons in the alkyl moiety or moieties where either or both of the alkyl groups in said alkylamino and dialkylamino are unsubstituted or substituted by hydroxy, sulfo, carboxy, sulfato, phosphato, alkoxy or 1 to 4 carbons, alkoxyalkoxy having 1 to 4 carbons in the alkyl or alkylene radical, hydroxyalkoxy of 1 to 4 carbons in the alkylene radical, sulfatoalkoxy of 1 to 4 carbons in the alkylene radical and succinylamido of the formula $—NH—CO—CH_2—CH_2—COOM$, where M is defined below; an unsubstituted or a sulfo-substituted naphthylene, alkylene of 1 to 8 carbons, alkylene of 2 to 8 carbons interrupted by 1 or more hetero moieties selected from a group consisting of —NH—, $—N(R^1)—$, —O—, —S—, $—SO_2—$, —CO—, $—SO_2—NH—$, $—NH—SO_2—$, —CO—NH— and —NH—CO—, or substituted by 1 or 2 substituents from the group consisting of hydroxy, sulfo, carboxy, sulfato, phosphato, and alkanoyloxy of 2 to 5 carbons, or alkylene of 2 to 8 carbons substituted by 1 or more said hetero moieties and hydroxy, sulfo, carboxy, sulfato, phosphato, and alkanoyloxy of 2 to 5 carbon, or
D is a group of the general formula (2a), (2b), (2c), (2d), (2e), (2f), (2g) or (2h)


(2a)


(2b)

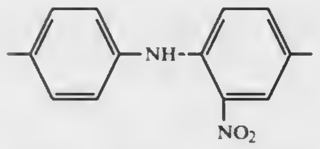

(2c)

-arylene-alkylene- (2d)

-alkylene-arylene- (2e)

-arylene-alkylene-arylene- (2f)

-alkylene-arylene-alkylene- (2g)


(2h)

$R^1$ is hydrogen or alkyl or 1 to 4 carbons,
$R^2$ is hydrogen or alkyl of 1 to 4 carbons, which is unsubstituted or substituted by a group of the general formula $—SO_2—Y$, where Y is as defined hereinafter, or by carboxy, sulfato, methoxy, ethoxy or chlorine, or is phenyl which is unsubstituted or substituted by 1 or 2 substituents from the group consisting of methyl, methoxy, ethoxy, sulfo, carboxy and chlorine,
G is phenyl which is unsubstituted or substituted by 1 or 2 substituents from the group consisting of chlorine, alkyl of 1 to 4 carbons, alkoxy or 1 to 4 carbons, hydroxy, sulfo and carboxy,
arylene is phenylene which is unsubstituted or substituted by 1 or 2 substituents from the group consisting of chlorine, bromine, nitro, alkoxy or 1 to 4 carbons, alkyl or 1 to 4 carbons, carboxy and sulfo, or is naphthylene which is unsubstituted or substituted by 1 or 2 sulfo groups,
alkylene is alkylene of 1 to 8 carbons, or is alkylene of 2 to 8 carbons, which is interrupted by 1 or more said hetero moieties or is substituted by 1 or 2 substituents from the group consisting of hydroxy, sulfo, carboxy, sulfato, phosphato and alkanoyloxy of 2 to 5 carbons, or is alkylene of 2 to 8 carbons substituted by 1 or more said hetero moieties and hydroxy, sulfo, carboxy, sulfato, phosphato, and alkanoxyloxy of 2 to 5 carbons, the alkylene and arylene moieties in the radicals of the general formulae (2d) to (2g) may in each case be separated from each other by one of the said hetero moieties;
Y is vinyl or an ethyl which is substituted in the β-position by a substituent which is eliminated under alkaline conditions; and
M is hydrogen, an alkali metal, or one equivalent of calcium.

---

## 5,015,732
## WATER SOLUBLE COPPER-COMPLEX PHENYLAZONAPHTHYL AND NAPHTHYLAZONAPHTHYL COMPOUNDS CONTAINING AS FIBRE-REACTIVE GROUPS A CHLORO-TRIAZINYL GROUP AND A GROUP OF THE VINYLSULFONE SERIES, SUITABLE AS DYESTUFFS

**Fritz Meininger, Frankfurt am Main, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

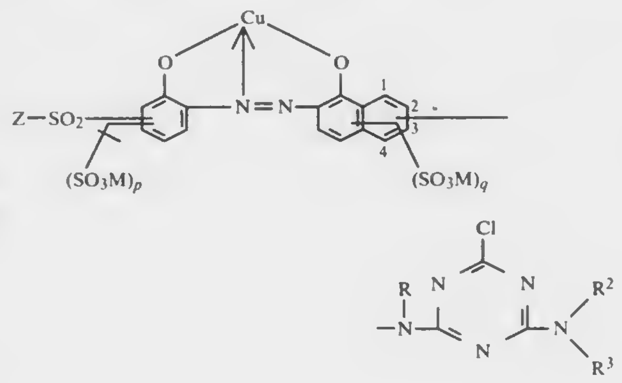
**Continuation of Ser. No. 73,841, Jul. 15, 1987, abandoned, which is a continuation of Ser. No. 570,433, Jan. 13, 1984, abandoned, which is a continuation of Ser. No. 395,645, Jul. 6, 1982, abandoned. This application Mar. 29, 1988, Ser. No. 180,708**

**Claims priority, application Fed. Rep. of Germany, Jul. 7, 1981, 3126909**

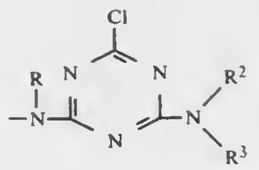
**Int. Cl.$^5$ C09B** *62/095, 62/515;* **D06P** *1/382, 1/384*

**U.S. Cl. 534—622** **8 Claims**

1. A copper-complex phenylazonaphthyl or naphthylazonaphthyl compound of the formula



in which:
the group of the formula



is bonded to the naphthalene moiety in the 1-position,
the radical of the benzene ring, drawn with a broken line, together with the benzene ring bonded to it, represents the corresponding naphthalene ring,
Z is vinyl, β-acetoxyethyl, β-thiosulfatoethyl, β-chloroethyl or β-sulfatoethyl,
R is hydrogen or alkyl of 1 to 4 C-atoms,
$R^2$ is hydrogen,
$R^3$ is phenyl substituted by sulfo or β-sulfato ethylsulfonyl,
p is zero or 1,
q is 2, and
M is hydrogen or an alkali metal.

---

## 5,015,733
## NUCLEOSIDES POSSESSING BLOCKED ALIPHATIC AMINO GROUPS

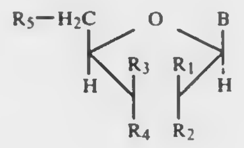
**Lloyd M. Smith, South Pasadena; Steven Fund, Palo Alto, and Robert J. Kaiser, Jr., Glendale, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.**

**Division of Ser. No. 878,045, Jun. 24, 1986, Pat. No. 4,849,513, which is a continuation-in-part of Ser. No. 709,579, Mar. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 565,010, Dec. 20, 1983, abandoned. This application Dec. 19, 1988, Ser. No. 287,387**

**Int. Cl.$^5$ C07H** *19/073, 19/16, 19/10, 19/20*

**U.S. Cl. 536—23** **8 Claims**

1. Protected amino nucleosides having the formula:



wherein B is selected from the group consisting of adenine, guanine, thymine, cytosine, uracil and inosine; R1, R2 and R5 are either H, OR, or NHR', with the proviso that one of R1, R2 and R5 is NHR' and only R5 can be OH, wherein R is a monovalent protecting organic group containing from 1 to about 25 carbon atoms, R' is a nitrogen protecting group; and R3 and R4 are either hydrogen or OH with the proviso that these two groups cannot be identical.

---

## 5,015,734
**Patent Not Issued For This Number**

---

## 5,015,735
**Patent Not Issued For This Number**

---

## 5,015,736
## PIPERAZINE INTERMEDIATES

**Juan Cabrê Castellvî, Barcelona; José Diago Meseguer, Granollers; Asunción Esteve Bianchini, Barcelona; Carlos E. Lenhardt Padrô, Alella, and Esteve Sans Pitarch, Barcelona, all of Spain, assignors to Gema, S.A., Barcelona, Spain**

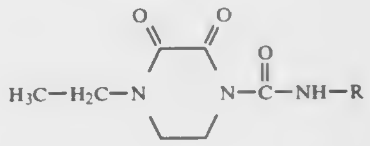
**Division nf Ser. No. 269,916, Nov. 10, 1988. This application Nov. 15, 1989, Ser. No. 437,414**

**Claims priority, application Spain, Nov. 16, 1987, 8703260**

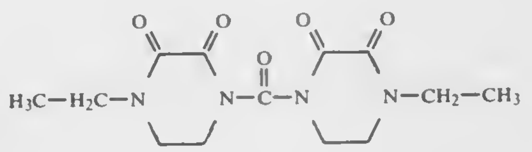
**Int. Cl.$^5$ C07D** *501/22;* **A61K** *31/545*

**U.S. Cl. 540—222** **5 Claims**

1. A process for the preparation of compounds of Formula (II)


(II)

where R is radical, substituted in alpha position, of phenylacetic acid, p-hydroxy phenylacetic acid, a 6-(phenyl-acetamido)-penicillanic acid or a 7-(phenylacetamido)-cephalosporanic acid, which comprises reacting N,N'-carbonyl-bis-(4-ethyl-2,3-dioxo)-piperazine of Formula (I)


(I)

with an amino acid selected from an alpha-aminophenylacetic acid, an alpha-amino-p-hydroxyphenylacetic acid, a 6-(alpha-amino-phenyl-acetamido)-penicillanic acid or a 7-(alpha-amino-phenyl-acetamido)-cephalosporanic acid.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,737
## THERAPEUTICALLY USEFUL BETA-LACTAMS

**Kyoung S. Kim, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

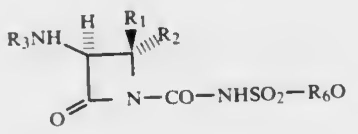
**PCT No. PCT/US88/02197, § 371 Date Jan. 25, 1990, § 102(e) Date Jan. 25, 1990, PCT Pub. No. WO89/00569, PCT Pub. Date Jan. 26, 1989**

**Continuation-in-part of Ser. No. 76,502, Jul. 22, 1987, abandoned. This PCT application Jul. 6, 1988, Ser. No. 460,840**

**Int. Cl.$^5$ A61K** *31/64;* **C07D** *401/14, 417/14*

**U.S. Cl. 540—363** 6 Claims

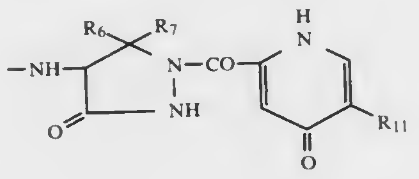
1. A compound of the formula



and pharmacologically acceptable salts thereof;
wherein $R_1$ and $R_2$ are the same or different and are

- a) hydrogen.
- b) $(C_1-C_{12})$ alkyl,
- c) $(C_2-C_8)$ alkenyl,
- d) $(C_2-C_8)$ alkynyl,
- e) $(C_3-C_{10})$ cycloalkyl,
- f) phenyl optionally substituted with from one to 3 substituents selected from the group consisting of halogen, hydroxy, amino, nitro, $(C_1-C_4)$alkyl, and $(C_1-C_4)$alkoxy,
- g) benzyl optionally substituted with from one to 3 substituents selected from the group consisting of halogen, hydroxy, amino, nitro $(C_1-C_4)$alkyl, and $(C_1-C_4)$alkoxy,
- h) $-CH_2-O-CO-CH_2-NHR_4$,
- i) $-CH_2-O-CO_2-R_5$,
- j) $-CH_2F$, or
- k) $-CHF_2$;

wherein $R_4$ is hydrogen, $-CHO$ or $-CO-O-C(CH_3)_3$;
wherein $R_5$ is $(C_1-C_8)$alkyl, $-(CH_2)_2NH-CO-O-C(CH_3)_3$, $-(CH_2)_2N(CH_3)-CO-O-C(CH_3)_3$, $-(CH_2)_2OC(O)NH_2$, $-(CH_2)_2Cl$, $-(CH_2)_2OCH_3$ or $-(CH_2)_2-NHCHO$;
wherein $R_3$ is an acyl group derived from a carboxylic acid;
wherein $R_{60}$ is a pyrazolidinone of the formula;



wherein $R_6$ is hydrogen or methyl;
wherein $R_7$ is hydrogen or methyl;
wherein $R_{11}$ is hydroxy or $-O-CH_2-(C_6H_5)$;
with the proviso that $R_6$ and $R_7$ cannot both be methyl.

---

### 5,015,738
## BENZO(B)PYRROLOBENZODIAZEPINES

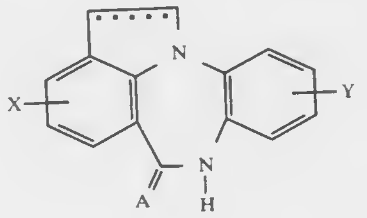
**Edward J. Glamkowski, Warren, and Barbara E. Kurys, Elmwood Park, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

**Division of Ser. No. 390,130, Aug. 7, 1989, Pat. No. 4,983,601. This application Sep. 21, 1990, Ser. No. 586,357**

**Int. Cl.$^5$ C07D** *487/06*

**U.S. Cl. 540—494** 7 Claims

1. A compound of the formula



wherein A is S, O, or $NNH_2$; X and Y are independently hydrogen, loweralkyl, or halogen; the dotted line represents an optional carbon-to-carbon bond, or an optical isomer thereof.

---

### 5,015,739
## PROCESSES FOR PREPARATION OF CYCLOPENTYL PURINE DERIVATIVES

**Anil K. Saksena, Upper Montclair; Viyyoor M. Girijavallabhan, Parsippany, and Ashit K. Ganguly, Upper Montclair, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.**

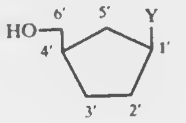
**Filed Apr. 22, 1988, Ser. No. 185,176**

**The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.**

**Int. Cl.$^5$ C07D** *473/34, 473/18, 473/30, 473/04*

**U.S. Cl. 544—277** 13 Claims

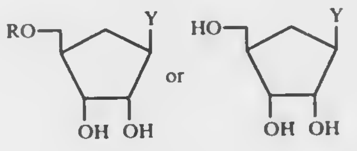
1. Method for preparing a 6′-hydroxycyclopentyl derivative of the formula:



(X)

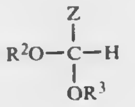
wherein Y is purine or modified purine which is adenin-9-yl, hypoxanthin-9-yl, guanin-9-yl, and xanthin-9-yl and bound via the nitrogen atom at the 9-position in the purine or the modified purine comprising:

(a) contacting at least one 2′, 3′-dihydroxy cyclopentyl derivative of the formula:



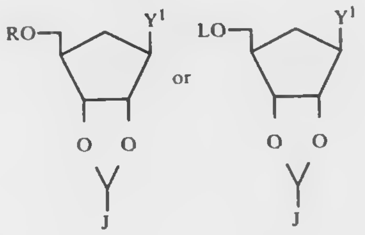
(I) (II)

wherein
Y is as defined hereinbefore,
R is alkyl of 1 to 6 carbon atoms, alkenylaklyl of 1 to 6 carbon atoms in the alkyl moiety, alkynlalkyl of 1 to 6 carbon atoms in the alkyl moiety, alkoxyalkyl of 1 to 6 carbon atoms in the alkyl moiety, dialkylaminoalkyl of 1 to 6 carbon atoms in each alkyl moiety, alkylthioalkyl of 1 to 6 carbon atoms in each alkyl moiety, benzyl, alkylbenzyl of 1 to 6 carbon atoms in the alkyl moiety, alkoxybenzyl of 1 to 6 carbon atoms in the alkoxy group, phenyl, alkoxyphenyl of 1 to 6 carbon atoms in the alkyl moiety, alkylphenyl of 1 to 6 carbon atoms in the alkyl moiety, cycloalkyl of 3 to 6 carbon atoms, cycloalkalkyl of 3 to 6 carbon atoms in the cycloalkyl moiety and 1 to 6 carbon atoms in the alkyl moiety, or $-COR^7$,
wherein
$R^7$ is alkyl of 1 to 6 carbon atoms, benzyl, alkylbenzyl of 1 to 6 carbon atoms in the alkyl moiety, alkylbenzyl of 1 to 6 carbon atoms in the alkoxy group, phenyl, alkylphenyl of 1 to 6 carbon atoms in the alkyl moiety, cycloalkyl of 3 to 6 carbon atoms or cycloalkalkyl of 3 to 6 carbon atoms in the cycloalkyl moiety and 1 to 6 carbon atoms in the alkyl moiety,
with a compound of the formula:



$$R^2O-\underset{OR^3}{\overset{Z}{C}}-H \qquad \text{(III)}$$

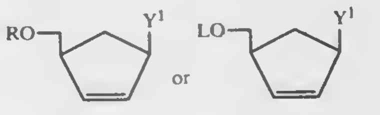
wherein
$R^2$ and $R^3$ independently are C-1 to C-3 alkyl;
Z is
$-OR^1$ wherein $R^1$ is the same value as for $R^2$ or $R^3$, or
$-NR^4R^5$ wherein $R^4$ and $R^5$ independently are hydrogen or the same values for R,
in the presence of an acid catalyst to yield at least one 2′, 3′-cyclic ortho ester of the formula:



(IV) (V)

wherein R is as defined hereinbefore,
J is $-OR^1$ or $-NR^4R^5$, and
L is hydrogen, $-CHOR^1OR^2$, $-CHOR^1OR^3$, $-CHOR^2OR^3$, $-CHOR^1NR^4R^5$, $-CHOR^2NR^4R^5$, $-CHOR^3NR^4R^5$ or $-CHO$, and
$Y^1$ is the same as Y with the proviso that any amino function present in Y can be free or can be converted to the Schiff base, $-N{=}CHZ$, $-NHCHOR^2NR^4R^5$, $-NCHOR^3NR^4R^5$, or $-NHCHOR^2OR^3$,
wherein Z, $R^1$, $R^2$, $R^3$, $R^4$ and $R^5$ are as defined hereinbefore;

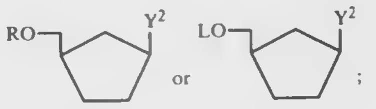
(b) contacting at least one 2′, 3′-cyclic ortho ester from step (a) with an anhydride under substantially anhydrous conditions to yield at least one 2′, 3′-dehydro derivative of the formula:



(VI) (VII)

(c) for those derivatives of $Y^1$ having the Schiff base $-N{=}CHZ$, hydrolyzing the Schiff base to reform the free amino function;

(d) contacting at least one 2′, 3′-dehydro derivative from step (b) or (c) with a hydrogenating agent to yield at least one cyclopentyl analogue of the formula:



(VIII) (IX)

wherein R and L are as defined hereinbefore; and
$Y^2$ is the same as Y with the proviso that the amino function is free or $-NHCHOR^2NR^4R^5$, $-NHCHOR^3NR^4R^5$, or $-NHCHOR^2OR^3$;

(e) hydrolyzing at least one cyclopentyl analogue from step (d) to the 6′-hydroxy cyclopentyl derivative of formula (X).

---

### 5,015,740
## ANTIPSYCHOTIC 3-PIPERAZINYLBENZAZOLE DERIVATIVES

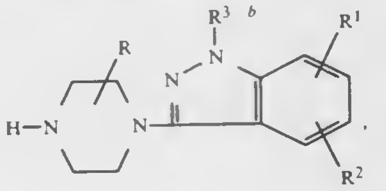
**Ludo E. J. Kennis, Turnhout; Jan Vandenberk, Beerse, and Josephus C. Mertens, Oud-Turnhout, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium**

**Division of Ser. No. 366,103, Jun. 14, 1989, Pat. No. 4,957,916, which is a continuation-in-part of Ser. No. 228,417, Aug. 5, 1988, abandoned. This application Jun. 11, 1990, Ser. No. 535,931**

**Int. Cl.$^5$ A61K** *31/495, 31/415;* **C07D** *231/56. 295/18*

**U.S. Cl. 544—366** 3 Claims

1. A chemical compound having the formula



(III-a)

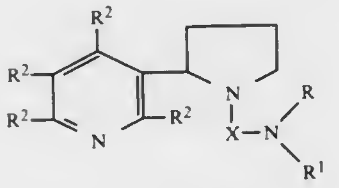
a pharmaceutically acceptable acid addition salt form thereof or a stereochemically isomeric form thereof, wherein:
R is hydrogen or $C_{1-6}$alkyl;
$R^1$ and $R^2$ each independently are hydrogen, halo, hydroxy, $C_{1-6}$alkyloxy or $C_{1-6}$alkyl;
$R^{3-b}$ is hydrogen, $C_{1-6}$alkyl or aryl$C_{1-6}$alkyl.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,015,741
## NICOTINE ANALOGS

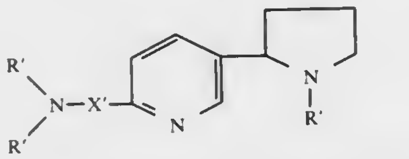
**Thomas S. Osdene, Richmond; Henry V. Secor, Midlothian, and Jeffrey I. Seeman, Richmond, all of Va., assignors to Philip Morris Incorporated, Richmond, Va.**
**Filed Oct. 3, 1989, Ser. No. 416,523**
**Int. Cl.$^5$ C07D** *401/04*
**U.S. Cl. 546—281** **19 Claims**

1. A nicotine analog corresponding to the formula:



where R, $R^1$ and $R^2$ are substituents selected from the group consisting of hydrogen and $C_1$-$C_4$ alkyl groups; and X is a divalent acyclic $C_2$-$C_{10}$ hydrocarbyl radical.

17. A nicotine analog corresponding to the formula:



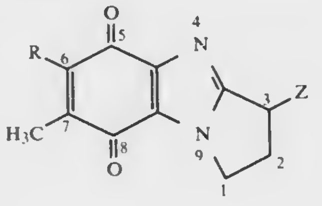
where R' is a $C_1$-$C_4$ alkyl group; and X' is a divalent acyclic $C_2$-$C_{10}$ hydrocarbyl radical.

---

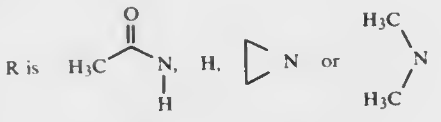
## 5,015,742
## SYNTHESIS AND ELUCIDATION OF AZAMITOSENE AND IMINOAZAMITOSENE

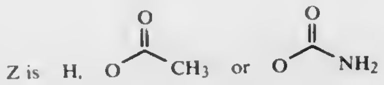
**Edward B. Skibo, Scottsdale, Ariz., assignor to Arizona Board of Regents, Tempe, Ariz.**
**Filed Feb. 28, 1990, Ser. No. 486,977**
**Int. Cl.$^5$ C07D** *235/30, 235/04, 487/00*
**U.S. Cl. 548—323** **24 Claims**

1. Azamitosenes having the structural formula:



wherein:



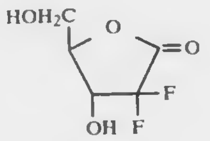


---

## 5,015,743
## DIFLUORO ANTIVIRALS AND INTERMEDIATE THEREFOR

**Larry W. Hertel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**
**Continuation of Ser. No. 288,383, Dec. 20, 1988, abandoned, which is a division of Ser. No. 58,219, Jun. 4, 1987, Pat. No. 4,808,614, which is a division of Ser. No. 677,146, Dec. 4, 1984, Pat. No. 4,692,434, which is a continuation-in-part of Ser. No. 473,883, Mar. 10, 1983, Pat. No. 4,526,988. This application Dec. 15, 1989, Ser. No. 449,156**
**The portion of the term of this patent subsequent to Jul. 2, 2002, has been disclaimed.**
**Int. Cl.$^5$ C07D** *307/32;* **A61K** *31/505;* **C07H** *19/16*
**U.S. Cl. 549—313** **1 Claim**

1. The lactone of the formula

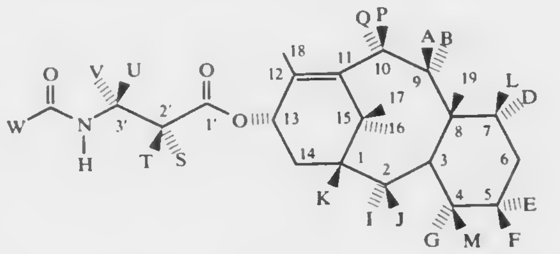


---

## 5,015,744
## METHOD FOR PREPARATION OF TAXOL USING AN OXAZINONE

**Robert A. Holton, Tallahassee, Fla., assignor to Florida State University, Tallahassee, Fla.**
**Filed Nov. 14, 1989, Ser. No. 436,235**
**Int. Cl.$^5$ C07D** *305/00, 303/00*
**U.S. Cl. 549—510** **19 Claims**

1. A process for the preparation of a taxol having the formula:



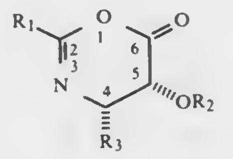
wherein

- A and B are independently hydrogen or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy or
- A and B together form an oxo;
- L and D are independently hydrogen or hydroxy or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy;
- E and F are independently hydrogen or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy or;
- E and F together from an oxo;
- G is hydrogen or hydroxy or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy or
- G and M together form an oxo or methylene or
- G and M together form an oxirane or
- M and F together form an oxetane;
- J is hydrogen, hydroxy, or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy or
- I is hydrogen, hydroxy, or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy; or
- I and J taken together form an oxo; and
- K is hydrogen, hydroxy or lower alkoxy, alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy; and
- P and Q are independently hydrogen or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy or
- P and Q together form an oxo; and
- S and T are independently hydrogen or lower alkanoyloxy, alkenoyloxy, alkynoyloxy, or aryloyloxy or

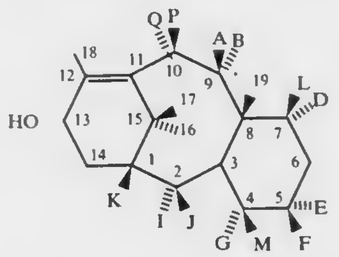
- S and T together form an oxo; and
- U and V are independently hydrogen or lower alkyl, alkenyl, alkynyl, aryl, or substituted aryl; and
- W is aryl, substituted aryl, lower alkyl, alkenyl, or alkynyl,

comprising:

contacting an oxazinone of the formula:



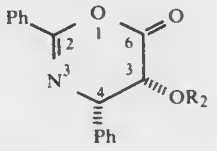
wherein $R_1$ is aryl, substituted aryl, alkyl, alkenyl, or alkynyl; $R_2$ is hydrogen, ethoxyethyl, 2,2,2-trichloroethoxymethyl or other hydroxyl protecting group; and $R_3$ is aryl, substituted aryl, alkyl, alkenyl, or alkynyl; with an alcohol of the formula:



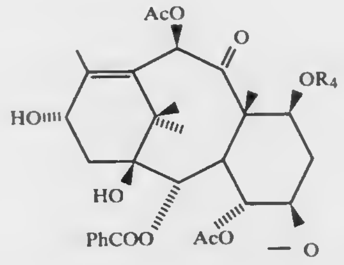
wherein said A, B, D, E, F, G, I, J, K, L, M, P and Q are as defined above, the contacting of said oxazinone and said alcohol being carried out in the presence of a sufficient amount of an activating agent to cause the oxazinone to react with the alcohol to form a β-amido ester which is suitable for use as an intermediate in the synthesis of taxol, and converting said intermediate to taxol.

2. The process of claim **1** wherein aryl is $C_{6-15}$ aryl, substituted aryl is $C_{6-15}$ substituted aryl, the substituents of which are selected from alkanoxy, hydroxy, halogen, alkyl, aryl, alkenyl, acyl, acyloxy, nitro, amino, and amido, alkyl is $C_{1-15}$ alkyl, alkenyl is $C_{2-15}$ alkenyl and alkynyl is $C_{2-15}$ alkynyl, alkanoyloxy is $C_{1-15}$ alkanoyloxy, alkenoyloxy is $C_{2-15}$ alkenoyloxy, alkynoyloxy is $C_{2-15}$ alkynoyloxy, and aryloyloxy is $C_{6-15}$ aryloyloxy.

15. A process for the preparation of taxol comprising reacting an oxazinone of the formula



wherein $R_2$ is a hydroxyl protecting group and Ph is phenyl, with an alcohol of the formula



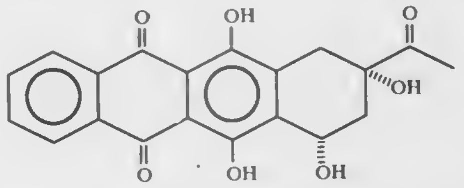
wherein $R_4$ is a hydroxyl protecting group, in the presence of a tertiary amine activating agent to form an intermediate, and converting the intermediate to taxol by hydrolyzing the $R_2$ and $R_4$ hydroxyl protecting groups.

---

## 5,015,745
## PROCESS FOR THE PREPARATION OF 4-DEMETHOXYDAUNOMYCINONE, THE AGLYCONE OF 4-DEMETHOXY-DAUNORUBICIN

**Silvia De Bernardinis, Milan; Walter Cabri, Limbiate; Tiziano Martinengo, Carpignano Sesia, and Franco Francalanci, Novara, all of Italy, assignors to Farmitalia Carlo Erba S.R.L., Milan, Italy**
**Filed Feb. 6, 1989, Ser. No. 306,559**
**Claims priority, application United Kingdom, Feb. 12, 1988, 8803301**
**Int. Cl.$^5$ C07C** *103/19, 103/75*
**U.S. Cl. 552—206** **11 Claims**

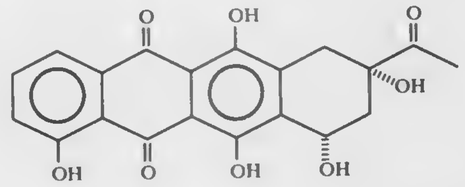
1. A process for the preparation of 4-demethoxydaunomycinone of formula (I):



I

which process comprises:

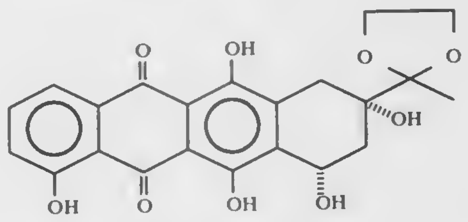
(a) protecting the 13-keto group of 4-demethyldaunomycinone of formula (2):



2

by treatment with ethylene glycol;

(b) reacting the resultant 4-demethyl-13-dioxolanyldaunomycinone of formula (3):



3

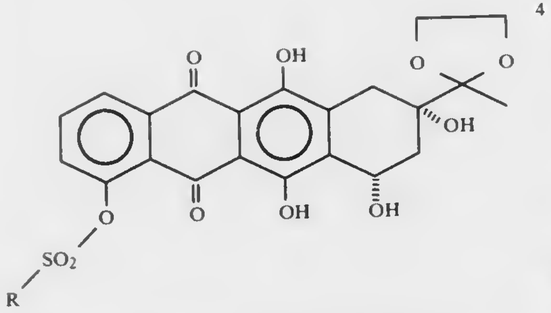
with a sulfonyl chloride of formula II:

$R—SO_2Cl$ (II)

wherein R represents an alkyl group of from 1 to 10 carbon atoms optionally substituted by one or more halogen atoms or an aryl group optionally substituted by halogen, alkyl, alkoxy or nitro, in the presence of N,N-diisopropylethylamine and a catalytic amount of 4-dimethylamino-pyridine.

(c) reacting the resultant sulfonated 4-demethyl-13-dioxolanyl-daunomycinone of formula (4):

VOL
1126
ISS
2
MY
14
1991
UMI



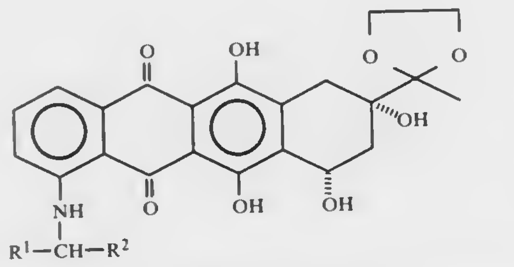
4

wherein R is as defined above, with an amine of formula III:

$R^1(R^2)CH—NH_2$ (III)

wherein $R^1$ and $R^2$ each independently represents a hydrogen atom or a phenyl group bearing one or more alkoxy groups;

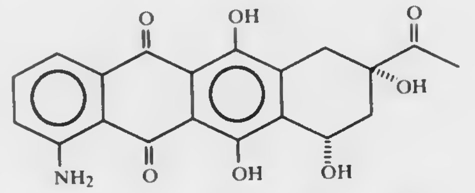
(d) removing the amino protecting group from the resultant 4-demethyl-4-(protected amino)-13-dioxolanyl-daunomycinone of formula (5):



5

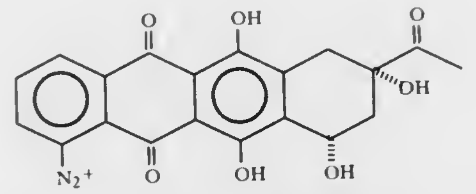
wherein $R^1$ and $R^2$ are as defined above;

(e) diazotising the 4-amino group of the resultant 4-demethoxy-4-amino-daunomycinone of formula (6):



6

and (f) reducing the resultant diazo-derivative of formula (7):



6

under mild conditions, thereby to obtain 4-demethoxydaunomycinone of formula I.

**5,015,746**

### 11β, 17α,21-TRIHYDROXY-1,4-PREGNADIENE-3,20-DIONE 21-[(E,E)-3,7,11-TRIMETHYL-2,6,10-DODECATRIENOATE]

**Yutaka Mizushima, Tokyo; Keiko Hoshi, Yokohama; Rie Igarashi, Kawasaki; Hirofusa Ajioka, Tokushima; Noriyuki Yamamoto; Masahito Komuro, both of Tokushima; Koichi Kanehira, Kurashiki; Masayuki Inoue, Kurashiki; Takashi Nishida, Kurashiki; Manzo Shiono, Okayama; Michio Terasawa, Nakatsu, and Kenzo Arizono, Nakatsu, all of Japan, assignors to Kuraray Co., Ltd., Okayama, Japan**

**Filed Jan. 23, 1989, Ser. No. 299,681**

**Claims priority, application Japan, Mar. 9, 1988, 63-57135; Mar. 31, 1988, 63-80542**

**Int. Cl.⁵ A61K** *31/56*

**U.S. Cl. 552—569** **1 Claim**

1. A method for the production of 11β,17α,21-trihydroxy-1,4-pregnadiene-3,20-dione 21-[(E,E)-3,7,11-trimethyl-2,6,10-dodecatrienoate], which comprises reacting prednisolone and (E,E)-3,7,11-trimethyl-2,6,10-dodecatrienoic acid in the presence of (disubstituted amino)pyridines and a condensing agent.

**5,015,747**

### ORGANOMETALLIC COMPOUNDS

**Martin Hostalek; Ludwig Pohl, both of Darmstadt; Dietrich Erdmann, Mühltal; Herbert Schumann; Uwe Hartmann, both of Berlin; Meino Heyen, and Holger Jürgensen, both of Aachen, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschränker Haftung, Darmstadt, Fed. Rep. of Germany**

**PCT No. PCT/EP88/00674, § 371 Date Apr. 7, 1989, § 102(e) Date Apr. 7, 1989, PCT Pub. No. WO89/01479, PCT Pub. Date Feb. 23, 1989**

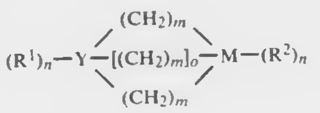
**PCT Filed Jul. 26, 1988, Ser. No. 348,624**

**Claims priority, application Fed. Rep. of Germany, Aug. 8, 1987, 3726485**

**Int. Cl.⁵ C07F** *5/00, 5/06;* **C23C** *16/18, 16/20*

**U.S. Cl. 556—1** **6 Claims**

1. An organometallic compound of the formula I



$$(R^1)_n-Y\begin{array}{c}\diagup (CH_2)_m \diagdown\\ -[(CH_2)_m]_o-\\ \diagdown (CH_2)_m \diagup\end{array}M-(R^2)_n$$

I

in which

$R^1$ and $R^2$ independently of one another are each H, a straight-chain or branched alkyl group having up to 7 C atoms, which can be partially or completely fluorinated, a cycloalkyl, alkenyl or cycloalkenyl group having each 3-8 C atoms or an unsubstituted or substituted phenyl group,

M is Al, In or Ga,

Y is N, P, As or Sb,

m is 2, 3 or 4,

n and o are each 0 or 1 and

n+o is 1.

**5,015,748**

### NOVEL FERROCENE DERIVATIVES, SURFACTANTS CONTAINING SAME AND A PROCESS FOR PRODUCING ORGANIC THIN FILMS

**Mitsuru Eida; Yoshio Hiroi, and Seiichiro Yokoyama, all of Sodegaura, Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan**

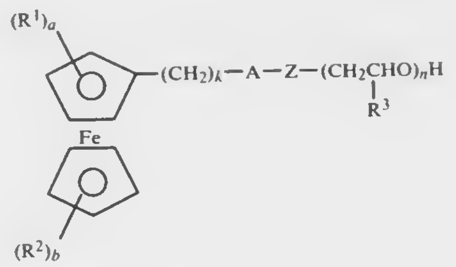
**Filed Sep. 8, 1989, Ser. No. 404,688**

**Claims priority, application Japan, Oct. 1, 1988, 63-248600; Feb. 28, 1989, 1-045370; Mar. 9, 1989, 1-054956**

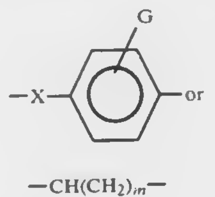
**Int. Cl.⁵ C07F** *17/02*

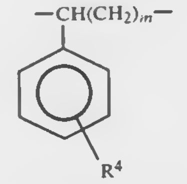
**U.S. Cl. 556—144** **24 Claims**

1. A ferrocene compound represented by the formula:

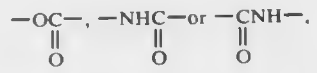


wherein A indicates





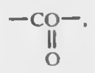
wherein X is —$CH_2$—, —O—,



$$-O\underset{\overset{\|}{O}}{C}-,\ -NH\underset{\overset{\|}{O}}{C}-\text{or}\ -\underset{\overset{\|}{O}}{C}NH-.$$

G is a hydrogen atom, a methyl group, or an ethyl group, $R^4$ is a hydrogen atom, a methyl group or an ethyl group, and m is a positive integer satisfying the expression $0 \leqq k+m \leqq 10$,

Z is —O— or



$$-\underset{\overset{\|}{O}}{C}O-.$$

and $R^1$ and $R^2$ are identical or different and each is H, $NH_2$, $N(CH_3)_2$,

$CH_3$, $CH_3O$, OH or a halogen atom, and $R^3$ is a hydrogen atom or a methyl group, k is a positive integer satisfying the expression $0 \leqq k+m \leqq 10$, and n is a real number of 2 to 70, a is an integer of 1 to 4, and b is an integer of 1 to 5.

**5,015,749**

### PREPARATION OF POLYHYDROCARBYL-ALUMINOXANES

**Gregory F. Schmidt; Dennis A. Hucul, and Richard E. Campbell, Jr., all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 91,566, Aug. 31, 1987, abandoned. This application Sep. 7, 1989, Ser. No. 405,118**

**Int. Cl.⁵ C07F** *5/06*

**U.S. Cl. 556—179** **10 Claims**

1. A process for the preparation of polyhydrocarbylaluminoxanes comprising contacting under reaction conditions that are conducive to the preparation of polyhydrocarbylaluminoxanes a polyhydrocarbylaluminoxane precursor and a porous organic or inorganic aqueous imbiber material having a pore size of from about 15 to about 10,000 Angstroms containing water imbibed or sorbed therein.

**5,015,750**

### PREPARATION OF TRIMETHYLALUMINUM

**Nam H. Tran, Houston; Dennis L. Deavenport, Seabrook, and Curtis W. Post, Friendswood, all of Tex., assignors to Texas Alkyls, Inc., Deer Park, Tex.**

**Filed Oct. 31, 1990, Ser. No. 606,669**

**Int. Cl.⁵ C07F** *5/06*

**U.S. Cl. 556—187** **8 Claims**

1. In a process for the production of trimethylaluminum from a methylaluminum chloride by sodium reduction, wherein the improvement comprises use of an effective amount of an alkali or alkaline earth metal fluoride to convert the methylaluminum chloride to trimethylaluminum.

**5,015,751**

### PROCESS FOR THE PRODUCTION OF ORGANOCHLOROSILANES

**Kurt Feldner, Leverkusen; Bruno Degen, Much; Gebhard Wagner, Odenthal, and Manfred Schulze, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Nov. 20, 1989, Ser. No. 439,726**

**Claims priority, application Fed. Rep. of Germany, Dec. 8, 1988, 3841417**

**The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.**

**Int. Cl.⁵ C07F** *7/16*

**U.S. Cl. 556—472** **4 Claims**

1. In the production of organochlorosilanes by reaction of silicon with an alkyl- and/or arylchloride in the presence of a copper catalyst and, optionally, promoter elements, the improvement wherein the silicon has been atomized with an inert gas has a particle size of less than about 1000 μm, by weight has an Al content of about 0.05 to 0.38%, a Ca content of about 0.02 to 0.2% and an Fe content of about 0.25 to 0.55%.

**5,015,752**

### THIURAM POLYSULFIDE

**Manfred Bergfeld, Erlenbach, Fed. Rep. of Germany, assignor to Akzo N.V., Netherlands**

**Filed May 9, 1985, Ser. No. 732,299**

**Claims priority, application European Pat. Off., Oct. 27, 1984, 84112964.6**

**Int. Cl.⁵ C07C** *333/00*

**U.S. Cl. 558—237** **9 Claims**

1. A process for the production of thiuram polysulfides substituted by at least one member of the group consisting of aliphatic, araliphatic, cycloaliphatic and aromatic hydrocarbon radicals, comprising reacting (a) a secondary amine substituted by at least one member selected from the group consisting of aliphatic, araliphatic, cycloaliphatic and aromatic hydrocarbon radicals, (b) carbon disulfide, and (c) sulfur, the reaction being carried out in a solvent at a temperature of from 0° to 150° C. in the presence of a tertiary amine, an oxidizing agent comprising oxygen or an oxygen-containing gas, and a metal-containing catalyst.

**5,015,753**

### PROCESS FOR PREPARING POLY(ALKYLENE CARBONATE) MONOAHLS AND POLYAHLS USEFUL AS SURFACTANTS

**Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

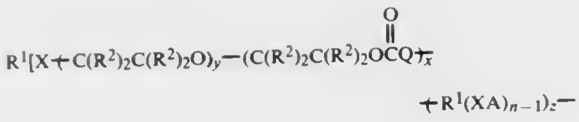
**Continuation-in-part of Ser. No. 223,462, Jul. 22, 1988, Pat. No. 4,895,970, which is a continuation-in-part of Ser. No. 885,118, Jul. 14, 1986, abandoned. This application Nov. 13, 1989, Ser. No. 435,846**

**Int. Cl.⁵ C07C** *69/96, 261/00, 69/00;* **C07G** *269/00*

**U.S. Cl. 558—260** **22 Claims**

1. A process for preparing a modified poly(alkylene carbonate) monoahl and/or polyahl comprising contacting a poly(alkylene carbonate) polyahl represented by the formula:

VOL
1126
ISS
2
MY
14
1991
UMI


(I)

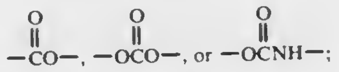
$$R^1[X\!+\!C(R^2)_2C(R^2)_2O)_y-(C(R^2)_2C(R^2)_2O\overset{O}{\overset{\|}{C}}Q)_x\!+\!R^1(XA)_{n-1})_z-H]_n$$

wherein

R^1 is separately in each occurrence an n-valent hydrocarbon radical or hydrocarbon radical which contains one or more heteroatoms of the group consisting of O, N and S;

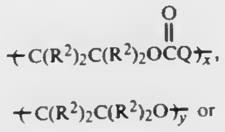
$R^2$ is separately in each occurrence hydrogen, halogen, nitro, cyano, $C_{1-20}$ hydrocarbyl substituted with hydrogen or one or more of the group consisting of halo, cyano, nitro, thioalkyl, tert-amino, alkoxy, $C_{6-20}$ aryloxy, $C_{7-24}$ aralkoxy, carbonyldioxy($C_{1-20}$) alkyl, carbonyldioxy($C_{6-24}$) aryl, carbonyldioxy($C_{7-24}$) aralkyl, $C_{1-24}$ alkoxycarbonyl, $C_{6-24}$ aryloxycarbonyl, $C_{7-24}$ aralkoxycarbonyl, $C_{1-20}$ alkylcarbonyl, $C_{6-24}$ arylcarbonyl, $C_{7-24}$ aralkylcarbonyl, $c_{1-20}$ alkylsulfinyl, $C_{6-24}$ arylsulfinyl, $C_{7-24}$ aralkylsulfinyl, $C_{1-24}$ alkylsulfonyl, $C_{6-24}$ arylsulfonyl and $C_{7-24}$ aralkylsulfonyl;

X is separately in each occurrence S, O, NH,



$$-\overset{O}{\overset{\|}{C}}O-,\ -O\overset{O}{\overset{\|}{C}}O-,\ \text{or}\ -O\overset{O}{\overset{\|}{C}}NH-;$$

A is separately in each occurrence



$$+C(R^2)_2C(R^2)_2O\overset{O}{\overset{\|}{C}}Q)_x,$$

$$+C(R^2)_2C(R^2)_2O)_y\ \text{or}$$

combinations thereof or a covalent bond;

Q is separately in each occurrence O, S or NH provided that all carbonate moieties are not terminal since terminal carbonate moieties are unstable and form OH moieties by elimination of $CO_2$;

n is separately in each occurrence an integer of from 1 to 25;

x is separately in each occurrence an integer of from 1 to 40;

y is separately in each occurrence an integer of from 1 to 120; and

z is separately in each occurrence an integer of from 0 to 5;

a monoahl represented by the formula $HY^1R^3$ or a diahl represented by the formula $HY^2R^4Y^2H$, wherein $Y^1$ and $Y^2$ are O, S, NH or $NH^5$, wherein $R^5$ is $C_{1-4}$ alkyl; $R^3$ is a $C_{1-20}$ alkyl or $C_{1-20}$ cycloalkyl, $C_{6-24}$ aryl, or $C_{7-24}$ aralkyl; and $R^4$ is $C_{2-20}$ alkylene, $C_{2-20}$ cycloalkylene, $C_{6-24}$ arylene or $C_{7-24}$ aralkylene, under conditions effective to form the modified poly(alkylene carbonate) monoahl and/or polyahl.

---

### 5,015,754

### QUATERNIZED CONDENSATION PRODUCTS OF TRIALKANOLAMINES

**Johannes P. Dix, Neuhofen; Rolf Fikentscher, and Ingrid Steenken-Richter, both of Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Aug. 21, 1989, Ser. No. 396,128**

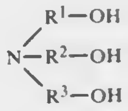
**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3829974**

**Int. Cl.⁵ C08G *65/32;* A61K *31/435;* D06M *13/46***

**U.S. Cl. 558—260** 6 Claims

1. A quaternized condensation product of:

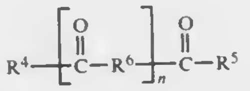
a high viscosity precondensate of one or more trialkanolamines of the formula I


1

where $R^1$, $R^2$ and $R^3$ are each 1,2-alkylene of from 2 to 4 carbon atoms, and

(B) from 1 to 30 mol % per mole of I of one of the following compounds II.

(a) a carboxylic acid or carboxylic acid derivative of the general formula IIa


IIa

$$R^4\!-\!\left[\overset{O}{\overset{\|}{C}}-R^6\right]_n\!-\!\overset{O}{\overset{\|}{C}}-R^5$$

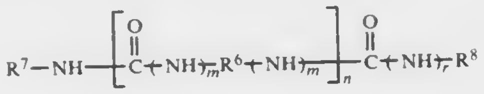
where

n is 0 or 1

$R^4$ and $R^5$ are each hydroxyl except if n is 0, or $C_1$–$C_8$-alkoxy which if n is 0 is open-chained or bonded together to form a five- or six-membered ring, or chlorine or bromine, and

$R^6$ is alkylene of from 1 to 50 carbon atoms which is either uninterrupted or interrupted by one or more nonadjacent oxygen atoms,

(b) a carboxamide of the formula IIb


IIb

$$R^7-NH\!-\!\left[\overset{O}{\overset{\|}{C}}\!+\!NH)_m R^6\!+\!NH)_m\right]_n\!-\!\overset{O}{\overset{\|}{C}}\!+\!NH)_r R^8$$

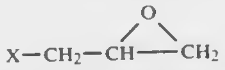
where

m, n, and r are each 0 or 1,

$R^7$ is hydrogen or $C_1$–$C_4$-alkyl and

$R^8$ is hydrogen , $C_1$–$C_{25}$-alkyl, $C_2$–$C_{25}$-alkenyl, or phenyl which is unsubstituted or substituted by $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, fluorine, chlorine or bromine,

(c) an epihalohydrin of the formula IIc


IIc

where X is chlorine or bromine,

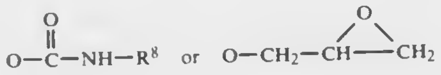
(d) a monofunctioal compound of the formula IId

$R^9$—Y IId

where

$R^9$ is $C_1$-$C_{25}$-alkyl, $C_2$–$C_{25}$-alkenyl, or phenyl which is unsubstituted or substituted by $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, fluorine, chlorine or bromine, and

Y is isocyanate or one of the groups



or

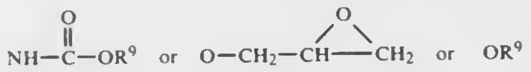
(e) a bifunctional compound of the formula IIe

$Z^1$—$R^{10}$—Z2 IIe

where

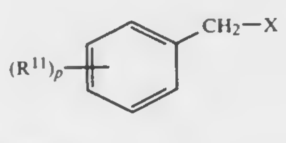
$R^{10}$ is alkylene of from 1 to 50 carbon atoms which is uninterrupted or interrupted by one or more nonadjacent oxygen atoms and which is unsubstituted or substituted by one or more mutually nonvicinal hydroxyl groups, and

$Z^1$ and $Z^2$ are each chlorine, bromine, isocyanate or one of the groups



or mixtures thereof, and

(c) from 25 to 100 mol % per mole of I of a benzyl halide of the formula III


III

where

p is from 0 to 2 and

$R^{11}$ is $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, fluorine, chlorine or bromine.

---

### 5,015,755

### 9-ANTHRYLALKYL COMPOUNDS

**Hans-Dieter Becker, Mölndal; Stefan Einarsson, Göteborg; Andrzej Grzegorczyk, Västra Frölunda; Björn Josefsson, Göteborg; Stig S. Lagerkvist, Göteborg; Per L. Möller, Göteborg; Domingo Sanchez, Floda, and Johan H. Sörensen, Göteborg, all of Sweden, assignors to Eka Nobel AB, Surte, Sweden**

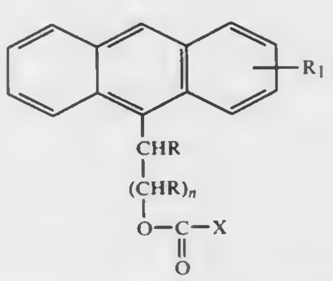
**Filed Aug. 10, 1989, Ser. No. 391,957**

**Claims priority, application Sweden, Aug. 18, 1988, 8802932**

**Int. Cl.⁵ C07C *69/96;* C07D *207/416, 255/02***

**U.S. Cl. 558—282** 10 Claims

1. New 9-anthrylalkyl compounds comprising the general formula



wherein R is hydrogen or an alkyl group, whereby, however, not more than one of the groups R is an alkyl group; $R_1$ is hydrogen, lower alkyl, halogen or nitro; n is an integer of from 1 to 7, whereby, however, the total number of carbon atoms in the group —CHR-(CHR)$_n$- does not exceed 8; and X is halogen, an azide group or a succinimidyl group.

---

### 5,015,756

### PROCESS FOR THE PRODUCTION OF NITRILES

**Ramakrishnan Ramachandran, Allendale; Yagya Shukla, Roselle Park, and Donald L. MacLean, Annandale, all of N.J., assignors to The BOC Group, Inc., New Providence, N.J.**

**Continuation-in-part of Ser. No. 216,037, Jul. 7, 1988, Pat. No. 4,868,330, which is a continuation-in-part of Ser. No. 178,117, Apr. 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 124,731, Nov. 24, 1987, abandoned. This application May 1, 1989, Ser. No. 345,916**

**The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.**

**Int. Cl.⁵ C07C *253/24, 253/26***

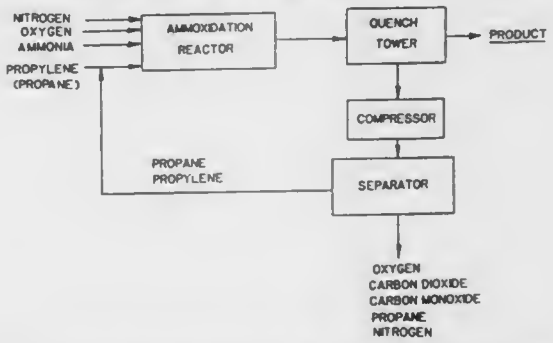
**U.S. Cl. 558—320** 21 Claims

1. A cyclic process for the production of alpha, beta olefinically unsaturated nitriles comprising:

(a) reacting a reactant from the group consisting of an alkane or alkene, an oxygen-containing gas, and ammonia in the vapor phase in the presence of an ammoxidation catalyst in a reactor vessel under conditions which produce an effluent containing the nitrile at low feed conversion and high product selectivity;

(b) quenching the effluent with a liquid to form a quenched liquid phase containing said nitrile and a gaseous phase containing gaseous products including unreacted reactant;

(c) recovering said nitrile from the liquid phase;



(d) introducing the gaseous phase as a pressurized feed into a selective separator to thereby remove a substantial portion of the unreacted reactant; and

(e) recycling said unreacted reactant under pressure to said reactor vessel, wherein the process is conducted in the presence of a gaseous flame suppressor, the process being controlled so that flame suppression will be maximized at the point in the process where the pressure is increased, the amount of flame suppressor being such that the gaseous phase formed in step (b) contains from about 30 to about 95 percent by volume thereof.

---

### 5,015,757

### SUBSTITUTED FLUOROCINNAMONNITRILES

**Detlef Wollweber, Wuppertal, and Wilhelm Brandes, Leichlingen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

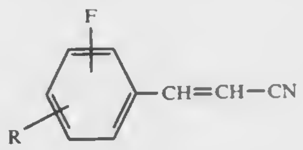
**Division of Ser. No. 266,966, Nov. 3, 1988, Pat. No. 4,960,789. This application May 21, 1990, Ser. No. 526,363**

**Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 3737984**

**Int. Cl.⁵ C07C *255/10***

**U.S. Cl. 558—401** 1 Claim

1. A substituted fluorocinnamonitrile of the formula



in which

R stands for halogen, alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy or halogenoalkylthio.

---

### 5,015,758

### PROCESS FOR THE PREPARATION OF 1-ADAMANTANE DERIVATIVES

**William R. Pilgrim, and Joel Lagiere, both of Valbonne, France, assignors to Centre International De Recherches Dermatologiques (CIRD), France**

**Filed Sep. 6, 1989, Ser. No. 403,280**

**Claims priority, application France, Sep. 7, 1988, 88 11706**

**Int. Cl.⁵ C07C *69/76***

**U.S. Cl. 560—56** 11 Claims

1. A process for the preparation of 1-adamantane derivatives characterized by the fact that a 1-acyloxyadamantane, in

VOL
1126
ISS
2
MY
14
1991
UMI

which the acyl group contains 1 to 4 carbon atoms, is reacted with a receptor compound in a linear aliphatic or cycloaliphatic type solvent in the presence of concentrated sulfuric acid and at ambient temperature.

---

## 5,015,759

## PROCESS FOR INCREASING THE DIRECT ESTERIFICATION REACTION RATE OF A DIACID WITH A GLYCOL

**David J. Lowe, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 8, 1989, Ser. No. 450,911**

**Int. Cl.$^5$ C07C *67/08***

**U.S. Cl. 560—91** **18 Claims**

1. A process for directly esterifying greater than 95 percent of the acid ends of a diacid comprising the steps of:

(a) mixing the diacid with 1,4-butanediol at a 1,4-butanediol:-diacid molar ratio of at least 2:1 to form a reaction mixture,

(b) heating the reaction mixture to about 180°C.,

(c) adding to the heated reaction from $0.13\times10^{-3}$ to $5.2\times10^{-3}$ moles of a catalyst compound per mole of the diacid, said catalyst compound being selected from the group consisting of organo-tin, organo-titanium, and organo-zirconium compounds, and

(d) reacting the reaction mixture, at atmospheric pressure, at an average reaction temperature ranging from 180° C. to 245° C. for a period of time no longer than sixty minutes from the time at which the catalyst compound was added to the reaction mixture to form a directly esterified diacid product.

---

## 5,015,760

## PROCESS FOR THE PREPARATION OF GLYOXYLIC ACID AND GLYOXYLIC ACID DERIVATIVES

**Alexander Sajtos, Linz, Austria, assignor to Chemie Linz Aktiengesellschaft, Linz, Austria**

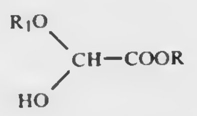
**Continuation of Ser. No. 508,054, Jun. 24, 1983, abandoned. This application Mar. 29, 1989, Ser. No. 331,026**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1982, 3224795**

**Int. Cl.$^5$ C07C *69/66***

**U.S. Cl. 560—186** **15 Claims**

1. In a process for the preparation of glyoxylic acid derivatives of the formula



$$\begin{matrix} R_1O & & \\ & \diagdown & \\ & & CH-COOR \\ & \diagup & \\ HO & & \end{matrix} \qquad (1)$$

in which R denotes an alkyl radical with 1 to 10 C atoms and $R_1$ denotes an alkyl radical with 1 to 4 C atoms, comprising (a) dissolving of a dialkyl maleate in which the alkyl radicals each have 1–10 C atoms in an aliphatic alcohol of the formula $R_1OH$, in which $R_1$ has the abovementioned meaning, and reaction of the maleate thus dissolved with the equivalent amount of ozone at −80° to +20° C., and (b) catalytic hydrogenation of the peroxide-containing solution thus obtained, under a pressure of 1 to 20 bar, at a temperature of 15° to 45° C., after which the hemi-acetal of alkyl glyoxylate of the formula 1 formed is isolated, the improvement wherein

(i) said peroxide-containing solution is continuously introduced into a vessel containing a suspension of a noble metal catalyst suitable for the catalytic hydrogenation, in the alcohol of the formula $R_1OH$, in which $R_1$ is as defined above, in the presence of hydrogen and said peroxide-containing solution being added at such rate that a peroxide content of not more than 0.1 mole/liter is established and maintained in the mixture to be hydrogenated throughout the entire course of the hydrogenation and

(ii) the pH of said hydrogenation is maintained at 2 to 7.

---

## 5,015,761

## TRICYCLO{6.2.1.0$^{1,6}$}UNDECANES USEFUL AS FRAGRANCE CHEMICALS

**Willem Lenselink, Voorthuizen, and Gerben Sipma, Hoevelaken, both of Netherlands, assignors to PFW(Nederland)B.V., Amersfoort, Netherlands**

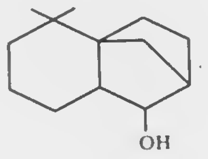
**Division of Ser. No. 193,996, Oct. 6, 1980, abandoned. This application Dec. 5, 1988, Ser. No. 282,821**

**Claims priority, application United Kingdom, Oct. 9, 1979, 7934984**

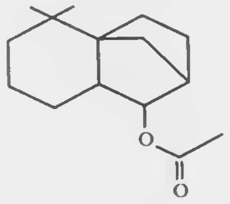
**Int. Cl.$^5$ C07C *67/02***

**U.S. Cl. 560—256** **4 Claims**

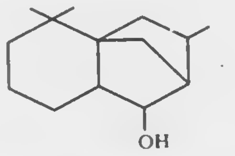
1. A compound having the structure:



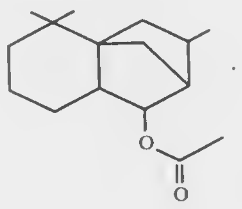
2. A compound having the structure:



3. A compound having the structure:



4. A compound having the structure:



---

## 5,015,762

## ARALKYLPHENYLUREAS AND HERBICIDES CONTAINING THESE

**Ulrich Schirmer, Heidelberg; Wolfgang Rohr, Wachenheim, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed May 28, 1981, Ser. No. 268,120**

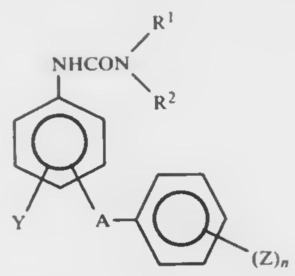
**Claims priority, application Fed. Rep. of Germany, Jun. 2, 1980, 3020969**

**The portion of the term of this patent subsequent to Dec. 27, 2000, has been disclaimed.**

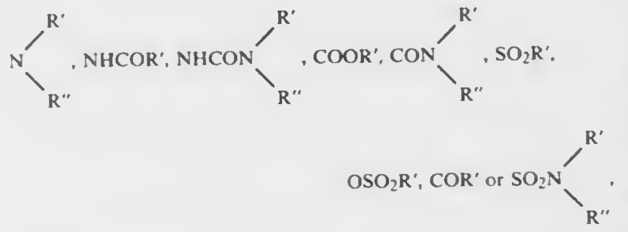
**Int. Cl.$^5$ C07C *259/00***

**U.S. Cl. 560—313** **7 Claims**

1. An aralkylphenylurea of the formula



where $R^1$ and $R^2$ are alkoxy or unsubstituted or halogen- or cyano-substituted alkyl, cycloalkyl, alkenyl or alkynyl, or $R^1$ and $R^2$ together are unsubstituted or alkyl-substituted alkylene which may or may not be interrupted by oxygen or sulfur, Y is hydrogen, alkyl, halogen, alkoxy or haloalkyl, A is unsubstituted or alkyl-substituted alkylene, Z is alkyl, haloalkyl, alkoxyalkyl, cycloalkyl, aralkyl, aryl, aryloxy, halogen, a $C_4H_4$ chain which is fused to the benzene ring to give a substituted or unsubstituted naphthyl ring, alkoxy, haloalkoxy, alkylthio, thiocyanato, cyano,



$$N\begin{matrix}\diagup R'\\ \diagdown R''\end{matrix},\ NHCOR',\ NHCON\begin{matrix}\diagup R'\\ \diagdown R''\end{matrix},\ COOR',\ CON\begin{matrix}\diagup R'\\ \diagdown R''\end{matrix},\ SO_2R',$$

$$OSO_2R',\ COR'\ \text{or}\ SO_2N\begin{matrix}\diagup R'\\ \diagdown R''\end{matrix},$$

R′ and R″ being hydrogen, alkyl, alkoxy, alkylthio, cycloalkyl or unsubstituted or alkyl-, halogen or alkoxy-substituted phenyl and n is 1, 2, 3 or 4, with the proviso that where 1) A is n-propylene or n-butylene, 2) $R^1$ is methyl, 3) Y is hydrogen or chlorine, 4) Z is alkyl of 1 to 4 carbon atoms, and 5) n is 1, $R^2$ cannot be methyl or methoxy.

---

## 5,015,763

## N-METHYL-α-DIALKYLAMIOACETOHYDROXAMIC ACID COMPOUND

**Mitsunori Ono, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

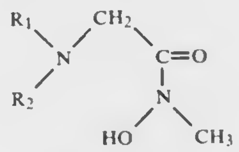
**Continuation of Ser. No. 207,429, Jun. 16, 1988, abandoned. This application Jul. 19, 1990, Ser. No. 554,113**

**Claims priority, application Japan, Jun. 17, 1987, 62-150970**

**Int. Cl.$^5$ C07C *229/00, 303/00***

**U.S. Cl. 562—106** **3 Claims**

1. An N-methyl-α-dialkylaminoacetohydroxamic acid represented by formula (I):



$$\begin{matrix} R_1 & & CH_2 & & \\ & N & & C{=}O & \\ R_2 & & & | & \\ & & & N & \\ & & HO & & CH_3 \end{matrix} \qquad (I)$$

wherein $R_1$ and $R_2$, which may be the same or different, are selected from the group consisting of a methyl group and an ethyl group and may be optionally substituted with a substituent selected from the group consisting of a hydroxyl group, a carboxy group, a sulfo group, and a quaternary ammonium group.

---

## 5,015,764

## PREPARATION OF OPTICALLY ACTIVE ALIPHATIC CARBOXYLIC ACIDS

**Thanikavelu Manimaran, and Fred J. Impastato, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.**

**Filed Jun. 18, 1990, Ser. No. 539,121**

**Int. Cl.$^5$ C07B *57/00***

**U.S. Cl. 562—401** **23 Claims**

20. A process for separating the diasteriomers from a racemic mixture of 2- (4-isobutylphenyl)propionic acid which comprises (i) forming a salt solution comprising said racemic mixture and an organic base; (ii) treating said salt solution at a temperature of about 25° C. to about 125° C. with a chiral organic base $C_1$ to $C_6$ linear or branched aliphatic amine or a $C_1$ to $C_6$ linear or branched aliphatic amine further substituted with $C_6$ to $C_{10}$ aryl group that is unsubstituted or substituted with $C_1$ to $C_6$ alkyl, $C_1$ to $C_6$ alkoxy or halo, or $C_1$ to $C_6$ linear or branched alkoxy; (iii) precipitating from the reaction solution formed in step (ii) the less soluble diasteriomeric salt and (iv) separating said precipitated salt.

21. The process of claim 20 wherein said separated salt is hydrolyzed and the free optically active 2-(4-isobutylphenyl)-propionic acid and the chiral amine are recovered.

---

## 5,015,765

## PROCESS FOR ISOLATING HYDROXAMIC ACIDS

**Gerald J. Murphy, Morrisville, Pa.; John W. Ager, Princeton, N.J., and Matthew I. Levinson, Chicago, Ill., assignors to FMC Corporation, Philadelphia, Pa.**

**Continuation of Ser. No. 172,996, Mar. 24, 1988, abandoned, which is a continuation of Ser. No. 873,567, Jun. 12, 1986, abandoned. This application Sep. 20, 1989, Ser. No. 411,194**

**Int. Cl.$^5$ C07C *83/10***

**U.S. Cl. 562—621** **6 Claims**

1. A process for isolating a solid hydroxamic acid product from an aqueous reaction mixture optionally containing residual hydroxylamine or a hydroxylamine acid addition salt, which comprises adding to the reaction mixture with agitation a product coalescing amount of a water insoluble organic liquid which is a nonsolvent for the product and passing hydrogen peroxide and/or sparging air through the reaction mixture during the agitation or thereafter, whereupon the product coalesces into buoyant, discrete particles and a clear aqueous phase is formed, and separating the aqueous phase from the particles; said organic liquid selected from hydrocarbons, halohydrocarbons and any mixture thereof, and said hydroxamic acid being 3-chloro-N-hydroxy-2,2-dimethylpropionamide.

---

## 5,015,766

## PREPARATION PROCESS OF ACRYLAMIDE

**Yoshihiko Kambara, Takaishi; Itsuo Oonaka, Toyonaka; Koichi Asao, and Kyoko Fukushima, both of Sakai, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan**

**Filed Dec. 15, 1988, Ser. No. 284,727**

**Claims priority, application Japan, Dec. 16, 1987, 62-316020; Dec. 26, 1987, 62-330916**

**Int. Cl.$^5$ C07C *231/06***

**U.S. Cl. 564—127** **6 Claims**

1. Process for the preparation of acrylamide which comprises reacting acrylonitrile with water in the presence of a Raney copper catalyst obtained by solidifying a molten raw material alloy comprising 15 to 75.0 weight percent of copper, 25 to 75 weight percent of Al as a major component and 0.1 to 10 weight percent of at least one metal selected from the group consisting of Sc, Ti, V, Nb, Cr, Mo, Mn, Fe, Co, Ni, Zn, Ga, Pd, Sn and Sb as a minor component at a cooling rate of $1\times10^2$ K/sec or more to produce a Raney copper alloy which is in a crystalline state, and followed by alkali leaching the Raney copper alloy.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,767

### N-(MERCAPTOALKYL)OMEGA-HYDROXYALKYLAMIDES AND THEIR USE AS A REDUCING AGENT IN A PROCESS FOR PERMANENTLY DEFORMING HAIR

**Jean Maignan, Tremblay les Conesse; Gérard Lang, Saint Gratien, and Gérard Malle, Villiers sur Morin, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France**

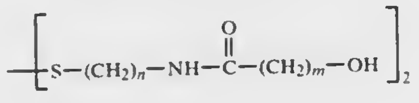
**Division of Ser. No. 388,050, Aug. 2, 1989, Pat. No. 4,956,175. This application May 25, 1990, Ser. No. 528,757**

**Claims priority, application Luxembourg, Aug. 4, 1988, 87310**

**Int. Cl.⁵ C07C** *235/06*

**U.S. Cl. 564—154** **2 Claims**

1. A compound having the formula



$$-\left[ S-(CH_2)_n-NH-\overset{O}{\overset{\|}{C}}-(CH_2)_m-OH \right]_2$$

wherein

n is 2 or 3, and

m is 2 to 5 inclusive.

2. The compound of claim I selected from the group consisting of

bis (N-4-ethylhydroxy butyramide) disulfide,
bis (N-5-ethylhydroxy valeramide) disulfide,
bis (N-6-ethylhydroxy caproamide) disulfide,
bis (N-3-ethylhydroxy propionamide) disulfide,
bis (N-4-propylhydroxy butyramide) disulfide, and
bis (N-6-propylhydroxy caproamide) disulfide.

---

### 5,015,768

### 2-((METH)ACRYLAMIDOMETHYL)-1,3-DIKETONES

**Bernhard Nick, Ludwigshafen; Kaspar Bott, Mannheim, and Guenther Schulz, Bad Durkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

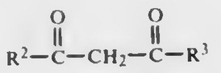
**Division of Ser. No. 360,989, Jun. 2, 1989. This application Aug. 13, 1990, Ser. No. 566,501**

**Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819455**

**Int. Cl.⁵ C07C** *231/12*

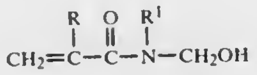
**U.S. Cl. 564—204** **5 Claims**

1. The process for preparing a 2-[(meth)acrylamidomethyl]-1,3-diketone, which comprises condensing a 1,3-diketone of the formula (II)



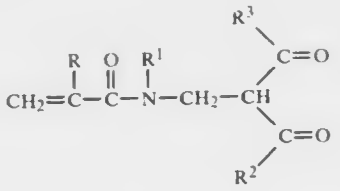
$$R^2-\overset{O}{\overset{\|}{C}}-CH_2-\overset{O}{\overset{\|}{C}}-R^3 \qquad (II)$$

where $R^2$ and $R^3$ are identical to or different from each other and each is alkyl of from 1 to 6 carbon atoms or unsubstituted aryl of from 6 to 20 carbon atoms or a phenyl radical substituted by one halogen radical or one phenyl radical or one or two alkyl radicals, with an N-methylol(meth)acrylamide of the formula (III)



$$CH_2=\overset{R}{\overset{|}{C}}-\overset{O}{\overset{\|}{C}}-\overset{R^1}{\overset{|}{N}}-CH_2OH \qquad (III)$$

where R is hydrogen or methyl and $R^1$ is hydrogen, methyl or ethyl, in a strong acid as the reaction medium to obtain a 2-[(meth)acrylamidomethyl]-1,3-diketone of the formula (I)



(I)

where R, $R^1$, $R^2$ and $R^3$ are each independently of the others defined as follows:

R is hydrogen or methyl,

$R^1$ is hydrogen, methyl or ethyl

$R^2$ and $R^3$ each is alkyl of from 1 to 6 carbon atoms or unsubstituted aryl of from 6 to 20 carbon atoms or a phenyl radical substituted by one halogen radical or one phenyl radical or one or two alkyl radicals, $R^2$ and $R^3$ being identical to or different from each other.

---

### 5,015,769

### 3-AMINO-4-NITROPHENOLS, THE PROCESS FOR PREPARATION THEREOF AND THEIR USE IN DYEING KERATINOUS FIBERS, AND NEW INTERMEDIATE 4,5-DINITROPHENOLS

**Alex Junino, Livry-Gargan; Gerard Lang, Saint-Gratien, and Alain Genet, Aulnay-sous-Bois, all of France, assignors to L'Oreal, Paris, France**

**Continuation of Ser. No. 140,797, Jan. 5, 1988, abandoned, which is a division of Ser. No. 850,695, Apr. 11, 1986, Pat. No. 4,740,622.**

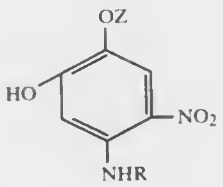
**This application Jun. 19, 1990, Ser. No. 540,263**

**Claims priority, application Luxembourg, Apr. 16, 1985, 85852**

**Int. Cl.⁵ C07C** *213/00*

**U.S. Cl. 564—399** **7 Claims**

1. A process for preparing a 3-amino-4-nitrophenol having the formula



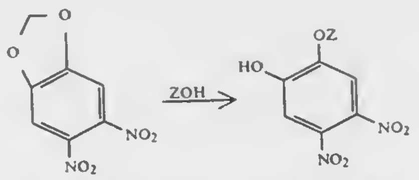
(I)

wherein

Z represents —$CH_2$—W wherein W represents hydrogen, alkyl having 1–6 carbon atoms, hydroxyalkyl wherein the alkyl moiety has 1–6 carbon atoms, polyhydroxyalkyl wherein the alkyl moiety has 2–6 carbon atoms, alkoxyalkyl wherein the alkoxy moiety has 1–3 carbon atoms and the alkyl moiety has 1–6 carbon atoms or hydroxyalkoxyalkyl wherein the alkoxy moiety has 1–3 carbon atoms and the alkyl moty has 1–6 carbon atoms and

R represents hydrogen, alkyl having 1–6 carbon atoms, hydroxyalkyl having 1–6 carbon atoms, polyhydroxyalkyl having 2–6 carbon atoms or alkoxyalkyl wherein the alkoxy moiety has 1–3 carbon atoms and the alkyl moiety has 1–6 carbon atoms, said process comprising

(i) in a first step, reacting an alcohol of the formula ZOH, wherein Z has the meaning given above, in the presence of a strong base, with 1,2-dinitro-4,5-methylenedioxybenzene at a temperature ranging from 20° to 200° C. under ambient pressure so as to produce a compound of formula II in accordance with the following reaction scheme:



wherein Z has the meaning given above, and

(ii) in a second stage, selectively substituting the $NO_2$ group in position para to the OZ group by a NHR group using ammonia or an amine of the formula $RNH_2$ wherein R has the meaning given above, at the refluxing temperature of the reaction medium.

---

### 5,015,770

### PROCESS FOR PREPARING (HYDROCARBYLTHIO) AROMATIC AMINES

**Gordon G. Knapp, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Continuation of Ser. No. 452,693, Dec. 18, 1989, abandoned, which is a continuation of Ser. No. 254,857, Oct. 7, 1988, abandoned. This application Jul. 16, 1990, Ser. No. 552,892**

**Int. Cl.⁵ C07C** *149/42*

**U.S. Cl. 564—440** **18 Claims**

1. In a process for reacting an unbridged aromatic amine with a hydrocarbyl disulfide in the presence of a Lewis acid catalyst to form a (hydrocarbylthio)aromatic amine, the improvement which comprises conducting the reaction in the presence of iodine, or iodine monobromide as the Lewis acid.

---

### 5,015,771

**Patent Not Issued For This Number**

---

### 5,015,772

### META-PHENYLENEDIAMINES, PROCESS FOR PREPARATION THEREOF, INTERMEDIATE COMPOUNDS AND USE OF THESE META-PHENYLENEDIAMINES AS COUPLERS FOR THE OXIDATION DYEING OF KERATINOUS FIBRES AND ESPECIALLY HUMAN HAIR

**Alex Junino, Livry-Gargan; Jean J. Vandenbossche, Aulnay-sous-Bois; Herve Borowiak, Tremblay-les-Gonesse, and Gerard Lang, Saint-Gratien, all of France, assignors to L'Oreal, Paris, France**

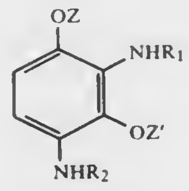
**Filed Jun. 19, 1990, Ser. No. 540,264**

**Claims priority, application Luxembourg, May 29, 1987, 86905**

**Int. Cl.⁵ C07C** *215/80*

**U.S. Cl. 564—443** **2 Claims**

1. A compound of formula (I)



(I)

in which:

$R_1$ and $R_2$ denote, independently of one another, a hydrogen atom, an alkyl radical having from 1 to 4 carbon atoms or a mono- or polyhydroxyalkyl radical having 2 or 3 carbon atoms; and

Z and Z' denotes, independently of one another, an alkyl radical having from 1 to 4 carbon atoms or a hydroxyalkyl radical having from 2 to 4 carbon atoms with the proviso that, when $R_1$ and $R_2$ simultaneously denote a hydrogen atom, Z and Z' do not simultaneously denote a methyl radical, and their addition salts with an acid.

---

### 5,015,773

### REDUCTIVE AMINATION OF HYDROXY-CONTAINING COMPOUNDS

**Ian D. Dobson, North Humberside, England, assignor to BP Chemicals Limited, London, Great Britain**

**Filed Aug. 4, 1989, Ser. No. 389,748**

**Claims priority, application United Kingdom, Aug. 18, 1988, 8819663**

**Int. Cl.⁵ C07C** *209/16, 209/18, 231/12*

**U.S. Cl. 564—474** **15 Claims**

1. A process for the production of a primary, secondary or tertiary amine by reacting in the presence of hydrogen at atmospheric pressure and elevated temperature a polyether alcohol as a first reactant which is substantially involatile at the elevated temperature and has at least one hydroxyl function, each of which is independently either a primary or secondary hydroxyl function, with a second reactant which is either ammonia or a primary or a secondary amine in the presence of a reductive amination catalyst wherein the reaction is effected in either a continuously or periodically open system to remove self-condensation by-products of the second reactant.

---

### 5,015,774

### PREPARATION PROCESS OF POLYOXYALKYLENE POLYAMINE HAVING TERMINAL SECONDARY AMINO GROUP

**Ariko Suekane; Fumio Yamazaki, both of Nagoya, and Takayoshi Masuda, Tokai, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan**

**Filed Nov. 14, 1989, Ser. No. 436,001**

**Claims priority, application Japan, Nov. 16, 1988, 63-287778; Dec. 22, 1988, 63-321927**

**Int. Cl.⁵ C07C** *213/02*

**U.S. Cl. 564—475** **17 Claims**

1. A process for the preparation of a polyoxyalkylene polyamine having a secondary amino group at the end of the polymer chain by reaction of a polyoxyalkylene polyol with a primary amine in the presence of a hydrogenation-dehydrogenation catalyst and 0.01 to 1 equivalent primary or secondary monohydric alcohol per equivalent of the primary amine.

2. The process of claim 1, wherein the hydrogenation-dehydrogenation catalyst is selected from the group consisting of (1) Ni, (2) Co, (3) Ni and Co, (4) Ni and Zn, (5) Co and Zn, (6) Ni, Co and Zn, (7) Cu and Cr.

---

### 5,015,775

### ALKYL ARYL SULFONES AND METHOD OF PREPARING THE SAME

**James L. Reilly, Towamencin, and Gordon R. Leader, Tredyffrin Township, Chester County, both of Pa., assignors to Atochem North America, Inc., Philadelphia, Pa.**

**Filed Mar. 31, 1988, Ser. No. 175,873**

**Int. Cl.⁵ C07C** *315/00*

**U.S. Cl. 568—28** **13 Claims**

1. A process of making an alkyl aryl sulfone of the formula:

$$R-SO_2-Ar-Y_n$$

wherein

R is alkyl having 1 to 18 carbon atoms, cycloalkyl having 3 to 10 carbon atoms, halogen-substituted cycloalkyl having 3 to 10 carbon atoms —XR'-substituted cycloalkyl having 3 to 10 carbon atoms where X is —O—, —S—, —SO—, —CO—, —$SO_2$—, —CONR'—, —$SO_2$NR'—, —NR'—or —$CO_2$— and R' is alkyl having 1 to 11 carbon atoms, or cycloalkyl having 3 to 11 carbon atoms;

Ar is an aromatic mono-, di-, tricyclic moiety or a fused aromatic system containing 6 to 20 aromatic carbon atoms, or a hetero-aromatic system containing 4 to 20 aromatic carbon atoms and 1 to 3 hetero atoms wherein

VOL
1126
ISS
2
MY
14
1991
UMI

said hetero atoms in the aromatic ring are selected from the group consisting of O, N, S and P;

Y is a substituent on the aryl group and is alkyl having 1 to 12 carbon atoms, cycloalkyl having 3 to 10 carbons, halogen, or —XR′, wherein X and R′ are as defined above; and

n is 1 to 10,

which comprises reacting an aryl compound of the formula Ar—$Y_n$ with alkyl sulfonic acid of the formula R—$SO_3H$ and a phosphorus reagent wherein Ar, Y, R and n are as defined above, but having at least one free hydrogen on the aryl group.

### 5,015,776

### PREPARATION OF 3-(ALKYLTHIO) ALDEHYDES

**Stanley R. Sandler, Springfield, Pa., assignor to Atochem North America, Inc., Philadelphia, Pa.**

**Continuation of Ser. No. 330,560, Mar. 30, 1989, abandoned, which is a continuation of Ser. No. 924,077, Oct. 28, 1986, abandoned. This application Feb. 20, 1990, Ser. No. 483,343**

**Int. Cl.$^5$ C07C** *319/00*

**U.S. Cl. 568—41** **6 Claims**

1. A process for the preparation of 3-(alkylthio) butanal which comprises reacting at a temperature within the range of about 25° to 100° C. a $C_1$-$C_6$ alkyl mercaptan with crotonaldehyde in the presence of a polyamine functionality and being in the free base form.

### 5,015,777

### PROCESS FOR THE PREPARATION OF AROMATIC BETA-DIKETONES

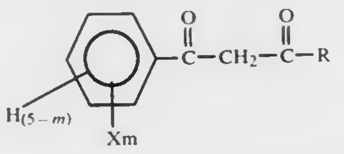
**Daniel R. Chisolm, Warwick, N.Y.; Richard A. Weiss, Parsippany, and Leonid Rozov, Fairlawn, both of N.J., assignors to Witco Corporation, New York, N.Y.**

**Filed Nov. 2, 1989, Ser. No. 430,563**

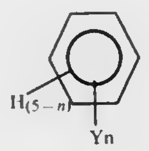
**Int. Cl.$^5$ C07C** *45/45*

**U.S. Cl. 568—314** **20 Claims**

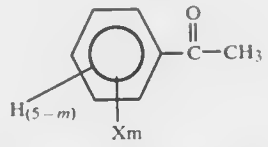
1. A process for the preparation of an aromatic beta-diketone having the structural formula:



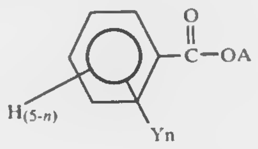
wherein X is selected from the group consisting of lower alkyl, lower alkoxy, lower alkylthio, chloro, bromo, nitro and methylenedioxy; and m is an integer from 0–3, provided that only one X is nitro or methylenedioxy; R is $(CH_2)pCH_3$ wherein p is an integer from about 11 to about 19; or



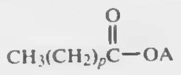
wherein Y is selected from the group consisting of lower alkyl, lower alkoxy, lower alkylthio, chloro, bromo and nitro and n is an integer from 0–3, provided that only one Y is nitro; which comprises mixing an acetophenone having the structural formula:



wherein X and m are as previously defined and a molar excess of an ester having the structural formula:



wherein Y and n are as previously described and A is lower alkyl or an alphatic ester having the structural formula:



$$CH_3(CH_2)_pC\overset{O}{\overset{\|}{}}—OA$$

wherein A and p are as previously defined in the presence of a sodium alkoxide in an aromatic hydrocarbon solvent at a temperature between about 120° C. and about 170° C.

### 5,015,778

### CATALYTIC METHOD TO PRODUCE HYDROXY SUBSTITUTED ARYLOPHENONES

**Anthony P. Haag, and E. W. Otterbacher, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 18, 1989, Ser. No. 452,452**

**Int. Cl.$^5$ C07C** *45/36*

**U.S. Cl. 568—319** **32 Claims**

1. A method of producing hydroxy substituted arylophenones that comprises contacting a diaryl compound having at least one diaryl moiety with an oxygen-containing gas in a liquid medium, each diaryl moiety comprising two aryl groups linked by an oxidizable carbon atom, at least one aryl group of the diaryl compound having at least one hydroxy group substituent, the liquid medium comprising a combination of liquid and solid components, the components being at least one base having a basicity greater than the diaryl compound and which is present in an amount sufficient to yield at least about one equivalent of base for each equivalent of hydroxy group functionality of the diaryl compound, at least one inert solvent capable of dissolving the diaryl compound, a catalytic amount of a metal atom catalyst capable of catalyzing conversion of the diaryl compound to a hydroxy substituted arylophenone and, optionally, activated carbon, the contact being conducted under conditions sufficient to produce a hydroxy substituted arylophenone.

### 5,015,779

### PROCESS FOR THE MANUFACTURE OF 4-(2-BUTENYLIDENE)-3,5,5-TRIMETHYL-2-CYCLOHEXEN-1-ONE

**Daniel Helmlinger, Gockhausen; Frank Kienzle, Flüh, and Erich Widmer, Müchenstein, all of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.**

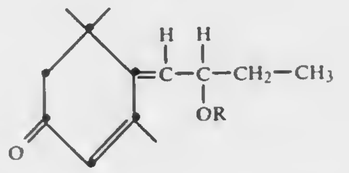
**Filed Aug. 28, 1989, Ser. No. 399,208**

**Claims priority, application Switzerland, Aug. 30, 1988, 3216/88; Jun. 22, 1989, 2324/89**

**Int. Cl.$^5$ C07C** *45/65*

**U.S. Cl. 568—346** **9 Claims**

1. A process for the manufacture of 4-(2-butenylidene)-3,5,5-trimethyl-2-cyclohexen-1-one which comprises pyrolyzing a compound of the formula



II

wherein

(a) R represents a lower-alkanoyl group containing an alkyl group having from one to six carbon atoms, benzoyl, or a substituted benzoyl containing as a substituent an alkyl group having from one to six carbon atoms and,

(b) the pyrolysis is carried out at a temperature of from about 400° C. to about 600° C.

### 5,015,780

### PROCESS FOR THE PREPARATION OF DIHALOBUTYRALDEHYDES

**Heinz Steiner, Münchenstein, and Hans Tobler, Allschwill, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

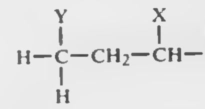
**Filed Jan. 16, 1990, Ser. No. 465,813**

**Claims priority, application Switzerland, Feb. 2, 1989, 364/89**

**Int. Cl.$^5$ C07C** *45/61, 47/14*

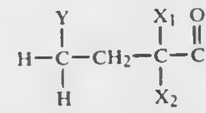
**U.S. Cl. 568—490** **10 Claims**

1. A process for the preparation of a dihalobutyraldehyde of formula I



$$H-\underset{H}{\overset{Y}{C}}-CH_2-\overset{X}{C}H-\overset{O}{\overset{\|}{C}}H \qquad (I)$$

wherein X and Y are each independently of the other Cl or Br, by catalytic dehalogenation of an α,α-dihalo compound with hydrogen in the presence of a noble metal catalyst or Raney nickel and of a hydrogen halide acceptor, in the temperature range from 0°–150° C. and under normal pressure or under a pressure of up to 15 MPa, which process comprises using as α,α-dihalo compound a α,α-dihalobutyraldehyde of formula II



$$H-\underset{H}{\overset{Y}{C}}-CH_2-\underset{X_2}{\overset{X_1}{C}}-\overset{O}{\overset{\|}{C}}H \qquad (II)$$

wherein Y has the above meaning and $X_1$ and $X_2$ are each independently of the other Cl or Br, and carrying out the reaction in an organic aprotic solvent.

### 5,015,781

### ANESTHETIC COMPOUND AND METHOD OF PREPARING

**Mark L. Robin, South Plainfield, and Donald F. Halpern, Fanwood, both of N.J., assignors to BOC, Inc., New Providence, N.J.**

**Continuation of Ser. No. 394,336, Aug. 15, 1989, abandoned, which is a continuation of Ser. No. 190,971, May 6, 1988, abandoned. This application May 18, 1990, Ser. No. 528,944**

**Int. Cl.$^5$ L07C** *41/22*

**U.S. Cl. 568—683** **4 Claims**

1. A method of producing the compound 2-(difluoromethoxy)-1,1,1,2-tetrafluoroethane comprising adding isoflurane to bromine trifluoride.

### 5,015,782

### ETHER PRODUCTION

**Mobsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Filed Mar. 19, 1990, Ser. No. 495,667**

**Int. Cl.$^5$ C07C** *41/06*

**U.S. Cl. 568—697** **28 Claims**

1. A multistage process for etherifying a mixed $C_4{}^+$ olefinic hydrocarbon feedstock containing isoalkene, comprising:

contacting the olefinic feedstock and aliphatic alcohol in a first reaction stage under partial etherification conditions with a regenerable inorganic metal oxide acid solid catalyst to convert a major amount of the isoalkene to $C_5{}^+$ tertiary-alkyl ether;

recovering a reactant effluent from the first stage containing ether product, unreacted alcohol and unreacted olefin including isoalkene;

charging the first stage effluent to a second stage catalytic distillation column containing solid acid resin etherification catalyst in a plurality of fixed bed catalysis-distillation zones to complete substantially full etherification of isoalkene;

recovering $C_5{}^+$ ether as a liquid from the catalytic distillation column;

regenerating the first stage catalyst to remove feedstock impurity and coke and to restore acid activity; and

continuing ether production with regenerated catalyst.

### 5,015,783

### PRODUCTION OF ETHERS BY THE REACTION OF ALCOHOLS AND OLEFINS

**Bipin V. Vora, Darien; Peter R. Pujado, Palatine, and Charles P. Luebke, Mount Prospect, all of Ill., assignors to UOP, Des Plaines, Ill.**

**Filed Dec. 4, 1989, Ser. No. 445,255**

**Int. Cl.$^5$ C07C** *41/06*

**U.S. Cl. 568—697** **11 Claims**

1. A process for producing ethers comprising:

(a) passing a feed stream comprising isoolefins and other hydrocarbons having four to five carbon atoms, at least one monohydroxy alcohol having from one to five carbon atoms and water to an etherification zone at etherification conditions and withdrawing an etherification zone effluent stream from said etherification zone comprising at least one ether, at least one alcohol, said other hydrocarbons, and water;

(b) passing said etherification zone effluent stream to a distillation column at distillation conditions and separating said etherification zone effluent stream into at least a bottoms product stream comprising said at least one ether and an overhead stream comprising said at least one alcohol, said other hydrocarbons and water;

(c) cooling said overhead stream to form a liquid hydrocarbon phase comprising said other hydrocarbons, and a liquid aqueous phase comprising said at least one alcohol and water;

(d) refluxing the distillation column with a portion of said hydrocarbon phase and recovering the remaining portion of said hydrocarbon phase as a distillate product stream;

(e) recycling a first portion of said aqueous phase to the etherification zone to comprise a portion of said feed stream; and

(f) combining the remaining portion of said aqueous phase with sai overhead stream prior to said cooling thereof.

VOL
1126
ISS
2
MY
14
1991
UMI

5,015,784

### ISOMERIZATION OF BISPHENOLS

**Udo Rudolph, and Claus Wulff, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

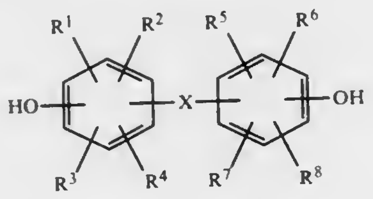
**Filed Aug. 3, 1989, Ser. No. 389,354**

**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3827643**

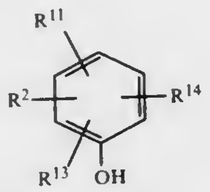
**Int. Cl.$^5$ C07C** *37/14, 39/16*

**U.S. Cl. 568—722** **3 Claims**

1. In the process for isomerization of bisphenols in the presence of phenols and catalyst, the improvement comprises contacting a bisphenol of the formula



with a phenol of the formula



and a catalyst selected from the group consisting of protonic acids, Lewis acids and acid ion exchange resins,

wherein

$R^1$ to $R^8$ are the same or different and each is, independent of the others, hydrogen or alkyl having 1–12 carbon atoms,

X is alkylidene having 1–12 carbon atoms or cycloalkylidene having 3–12 carbon atoms, with X in the ortho or para position to the —OH,

$R^{11}$ to $R^{14}$ are the same or different and each is, independent of the others, alkyl having 1–12 carbon atoms, halogen, aryl having 6–24 carbon atoms, alkoxy having 1–12 carbons atoms or cycloalkyl having 5–30 carbon atoms.

---

5,015,785

### PREPARATION OF MIXTURES OF ISOMERIC CRESOLS WITH A MOLAR RATIO OF PARA- TO META-CRESOL OF AT LEAST 0.6:1 TO 10:1

**Werner Steck; Helmut Lermer, both of Ludwigshafen; Matthias Schwarzmann, Limburgerhof, and Toni Dockner, Meckenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Aug. 8, 1990, Ser. No. 564,323**

**Claims priority, application Fed. Rep. of Germany, Aug. 9, 1989, 3926290**

**Int. Cl.$^5$ C07C** *37/48, 37/68, 39/06*

**U.S. Cl. 568—783** **10 Claims**

1. A process for the preparation of mixtures of isomeric cresols with a molar ratio of para- to metacresol of from 0.6:1 to 10:1 by isomerization of cresol mixtures or ortho- and/or meta-cresol on zeolite catalysts of the pentasil type in the gas phase at from 300 to 600° C. under from 0.01 to 50 bar, wherein the mean particle size of the zeolite catalyst is at least 3 μm, and the selectivity in the established test for the disproportionation of ethylbenzene to diethylbenzene isomers is at least 60% for para-diethylbenzene.

---

5,015,786

### PREPARATION OF CUMENE THROUGH ALKYLATION OF AN AROMATIC COMPOUND AND PREPARATION OF PHENOL THROUGH CUMENE

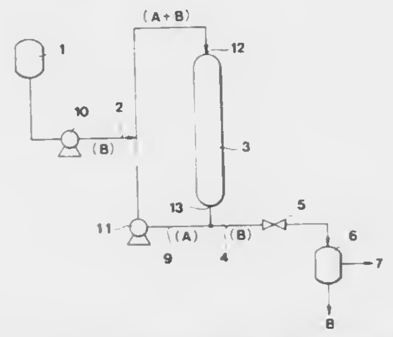
**Shintaro Araki, Ichihara; Fujihisa Matsunaga, Wakayama, and Hiroshi Fukuhara, Ichihara, all of Japan, assignors to Mitsui Petrochemical Industries Inc., Tokyo, Japan**

**Filed Nov. 27, 1989, Ser. No. 441,477**

**Claims priority, application Japan, Nov. 28, 1988, 63-300300; Nov. 30, 1988, 63-302617; Dec. 12, 1988, 63-328722**

**Int. Cl.$^5$ C07C** *37/07, 39/04*

**U.S. Cl. 568—798** **7 Claims**



1. A process for preparing phenol, comprising the steps of:

(a-1) alkylating benzene with isopropanol using a zeolyte catalyst at a temperature in the range of from 100° to 450° C. under liquid phase conditions at elevated pressure to synthesize cumene,

(b) oxidizing the cumene from step (a-1) with molecular oxygen at a temperature in the range of from 60° to 150° C. into cumene hydroperoxide,

(c) subjecting the cumene hydroperoxide to acid cleavage with an acidic compound selected from the group consisting of strong acids, heteropoly-acids and solid acids to synthesize phenol and acetone, and thereafter

(d) hydrogenating the acetone from step (c) with hydrogen gas at a temperature in the range of from 60° to 150° C. in a fixed bed under liquid phase conditions into isopropanol which is recycled to step (a-1).

---

5,015,787

### PROCESS FOR PRODUCTION CYCLOHEXANOL

**Jan F. Van Peppen, Chester, Va., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Apr. 10, 1989, Ser. No. 335,337**

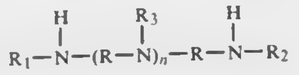
**Int. Cl.$^5$ C07C** *29/20, 35/08*

**U.S. Cl. 568—835** **12 Claims**

1. In a process for production of cyclohexanol comprising the selective catalytic hydrogenation of phenol to a product mixture comprising a major portion of cyclohexanol and a substantially smaller portion of cyclohexanone, then distillation of said product mixture to obtain cyclohexanol containing a minor amount of cyclohexanone meeting desired specification levels;

the improvement comprising adding to said product mixture an effective amount of a compound selected from the group consisting of

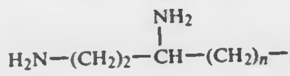
(a) a polyamine of the formula



$$R_1-\underset{\displaystyle\overset{|}{H}}{N}-(R-\underset{\displaystyle\overset{|}{R_3}}{N})_n-R-\underset{\displaystyle\overset{|}{H}}{N}-R_2$$

wherein n is an integer from 0 to 4; $R_1$, $R_2$ and $R_3$ are independently selected from the group consisting of hydrogen, alkyl, aryl, cycloalkyl, aralkyl and alkaryl; and R independently at each occurrence is selected from the group of radicals consisting of alkylene, arylene, alkylenearylene, dialkylene, cycloalkylene, dialkylene cycloalkylene, and nitrogen containing heterocyclic groups of 5 to 6 carbon atoms;

(b) a polyamine of the formula



$$H_2N-(CH_2)_2-\overset{\displaystyle NH_2}{\overset{|}{C}H}-(CH_2)_n-CH_3$$

wherein n is 16 or 18;

(c) a polyamine of the formula

$$H_2N-R'-NH_2$$

wherein R′ is an aliphatic hydrocarbon chain of 36 carbon atoms;

and (d) a polyethylenimine having a molecular weight of about 1,000 to 100,000;

and distilling the product mixture to obtain an improved yield of said cyclohexanol containing a minor amount of cyclohexanone.

---

5,015,788

### PROCESS FOR THE HYDROGENATION OF ACETYLENIC ALCOHOLS

**Herbert Toussaint, Frankenthal; Juergen Schossig, Fussgoenheim; Heinz Graefje; Wolfgang Reiss, both of Ludwigshafen; Roland Spahl, Lorsch; Matthias Irgang, Heidelberg; Walter Himmel; Gruenstadt, and Gerhard Koppenhoefer, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Apr. 2, 1990, Ser. No. 502,925**

**Claims priority, application Fed. Rep. of Germany, Apr. 27, 1989, 3913839**

**Int. Cl.$^5$ C07C** *29/17, 31/10, 31/20*

**U.S. Cl. 568—861** **9 Claims**

1. A process for the preparation of saturated alcohols by catalytic hydrogenation of acetylenic alcohols at a temperature of from 50° to 200° C. and under a pressure of from 30 to 320 bar, wherein a oatalyst is used which has a content of from 20 to 75% of nickel oxide, from 10 to 75% of zirconium oxide and from 5 to 50% of copper oxide, by weight of the oxidic, unreduced catalyst.

---

5,015,789

### METHOD OF PREPARING 1,3-PROPANEDIOL

**Dietrich Arntz, Oberursel, and Norbert Wiegand, Hanau, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed Aug. 3, 1990, Ser. No. 563,152**

**Claims priority, application Fed. Rep. of Germany, Aug. 8, 1989, 3926136**

**Int. Cl.$^5$ C07C** *29/14, 31/20, 47/19, 45/64*

**U.S. Cl. 568—862** **12 Claims**

1. A method of preparing 1,3-propanediol comprising hydrating acrolein in the presence of an acidic cation exchanger resin to form 3-hydroxypropionaldehyde, by reacting acrolein and water in a weight ratio of 1:2 to 1:20 at 30° to 120° C. and a pressure in a range from 1 to 20 bars in the presence of a cation exchanger resin having phosphonic acid groups, or salts thereof, separating said ion exchanger from the resulting reaction mixture and, to the extent it is present, unreacted acrolein to obtain 3-hydroxypropionaldehyde and subsequently catalytically hydrogenating the 3-hydroxypropionaldehyde in the liquid or gaseous phase using a hydrogenation catalyst therefor.

---

5,015,790

### 1,1,2-TRIFLUORO-6-IODO-1-HEXENE, 1,1,2-TRIFLUORO-1,5-HEXADIENE, AND PROCESSES THEREFORE

**Ming-Hong Hung, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 13, 1989, Ser. No. 450,257**

**Int. Cl.$^5$ C07C** *17/28, 17/74, 21/18*

**U.S. Cl. 570—126** **10 Claims**

1. A compound having the formula (I):

$$X-CF=CFCH_2CH_2CH_2CH_2I \qquad (I)$$

wherein X is F or $C_nF_{2n+1}$, and n is an integer from 1 to about 10.

3. A compound having the formula (II):

$$X-CF=CFCH_2CHCH=CH_2, \qquad (II)$$

wherein X is F or $C_nF_{2n+1}$, and n is an integer from 1 to about 10.

5. A process for the preparation of a compound of formula (I):

$$X-CF=CFCH2CH2CH2CH2I \qquad (I)$$

wherein X is F or $C_nF_{2n+1}$, and n is an integer from 1 to about 10, comprising contacting at least one mole of an iododifluoroolefin of formula X—CF=CFI, wherein X is defined as in formula (I), with at least two moles of ethylene under telomerization conditions.

8. A process for the preparation of a compound of formula (II):

$$X-CF=CFCH_2CHCH=CH_2, \qquad (II)$$

wherein X is F or $C_nF_{2n+1}$, and n is an integer from 1 to about 10, comprising:

(a) contacting an iododifluoroolefin of formula X—CF=CFI, wherein X is defined as in formula (II) above, with an excess of ethylene under telomerization conditions to yield a compound of formula (I):

$$X-CF=CFCH_2CH_2CH_2CH_2I \qquad (I)$$

wherein X is defined as in formula (II) above; and

(b) dehydrohalogenating said compound of formula (I) to yield a compound of formula (II).

---

5,015,791

### CATALYZED HYDROFLUORINATION OF ALKENES

**V. N. Mallikarjuna Rao, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 365,166, Jun. 15, 1989, abandoned, which is a continuation-in-part of Ser. No. 210,554, Jun. 23, 1988, abandoned. This application Aug. 22, 1990, Ser. No. 570,951**

**Int. Cl.$^5$ C07C** *17/00*

**U.S. Cl. 570—168** **13 Claims**

1. A process for the preparation of fluorinated alkanes which comprises contacting, at a temperature of about 0° C. to about 185° C., under substantially anhydrous conditions, one molar equivalent of an alkene selected from alkenes of the following formulas

$$R^1R^2C=CR^3R^4 \text{ and } R^5R^6C=CR^7R^8$$

wherein

$R^1$, $R^2$, $R^3$, $R^4$ and $R^5$, $R^6$, $R^7$, $R^8$ are each selected from the group represented by $C_xZ_{2x+1}$, wherein Z is H, F, Br or Cl and wherein x=0 to 10; and

at least one of the pairs $R^5$ and $R^6$, $R^7$ and $R^8$, $R^5$ and $R_7$, and $R^6$ and $R^8$ taken together is $-(CH_2)_n-$ wherein "n" is an integer from 2 to 7 with the proviso that when $R^5$ and $R^7$

VOL
1126
ISS
2
MY
14
1991
UMI

and/or $R^6$ and $R^8$ are trans, "n" must be 6 to 7, and when only two of the group $R^5R^6$, $R^7$, $R^8$ are combined to form a cyclic structure the remaining two groups may be $C_xZ_{2x+1}$, wherein Z is H, F, Br or Cl and x=0 to 10, with HF in the presence of at least one catalyst consisting essentially of tantalum pentachloride or tantalum pentabromide to produce reaction products; removing said reaction products from contact with said catalyst and isolating a fluorinated alkane having one or more fluorine atoms above the number present in said alkene.

---

### 5,015,792

## PREPARATION OF 4,4'-DIBROMOBIPHENYL

**Alain Nonn, Sainte Foy les Lyon, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France**

**Filed Apr. 24, 1989, Ser. No. 341,818**

**Claims priority, application France, Apr. 22, 1988, 88 05330**

**Int. Cl.⁵ C07C** *17/12, 25/18*

U.S. Cl. 570—208 9 Claims

1. A process for the preparation of 4,4'-dibromobiphenyl, comprising reacting biphenyl with bromine in a reaction medium which comprises at least one protic acid having a pKa no greater than 4.

---

### 5,015,793

## ELECTRICAL INSULATING OIL COMPOSITION

**Atsushi Sato, Tokyo; Shigenobu Kawakami, Ichikawa; Keiji Endo, Yokosuka, and Hideyuki Dohi, Yokohama, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan**

**Filed Sep. 4, 1987, Ser. No. 93,803**

**Claims priority, application Japan, Sep. 4, 1986, 61-208540**

**Int. Cl.⁵ H01G** *4/22;* **H01B** *3/22*

U.S. Cl. 585—6.3 6 Claims

1. An electrical insulating oil composition having good low temperature characteristics which composition comprises at least 4 members selected from the group consisting of the following 7 components:

(a) m-ethylbiphenyl,
(b) p-ethylbiphenyl,
(c) o-benzyltoluene,
(d) m-benzyltoluene,
(e) p-benzyltoluene,
(f) 1,1-diphenylethane, and
(g) 1,1-diphenylethylene

and is characterized in that the proportion of solid phase at a temperature of −40° C. of said electrical insulating oil system is not more than 45% by weight and the proportion of the total quantity of solid phase is calculated according to the following general equation of solid-liquid equilibrium:

$$X_i = \exp\left[\frac{\Delta H f}{R}\left(\frac{1}{Tf} - \frac{1}{T}\right)\right]$$

wherein $X_i$ is the equilibrium mole fraction of a component i of said 7 components in the liquid phase of said composition,

$\Delta Hf$ is the heat of fusion ($cal.mol^{-1}$) of said component i as a pure substance,
$Tf$ is the melting point (K) of said component i as a pure substance,
T is the temperature (K) of the system, and
R is the gas constant ($cal.mol^{-1}.\ K^{-1}$).

---

### 5,015,794

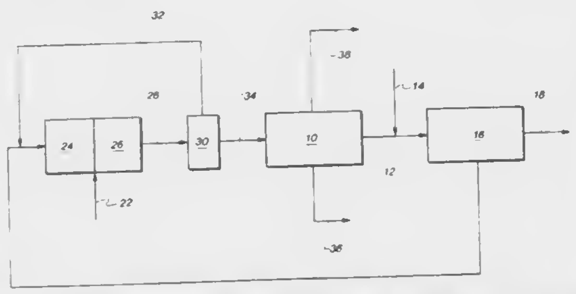
## REDUCING XYLENE LOSS IN THE CATALYTIC ISOMERIZATION OF A XYLENE-CONTAINING FEED

**Mark G. Reichmann, Oak Park, Ill., assignor to Amoco Corporation, Chicago, Ill.**

**Filed Sep. 21, 1989, Ser. No. 410,665**

**Int. Cl.⁵ C07C** *7/163, 5/22*

U.S. Cl. 585—258 6 Claims



1. In a continuous process for the isomerization over an isomerization catalyst in the presence of hydrogen of a xylene-containing feed in a reactor, said isomerization producing a product rich in p-xylene and containing a small amount of lower alkenes, the improvement in which a hydrogenation catalyst separate from said isomerization catalyst is present in said reactor to reduce xylene loss by removing said alkenes.

---

### 5,015,795

## NOVEL SYNTHETIC LUBE COMPOSITION AND PROCESS

**Bruce P. Pelrine, Trenton, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.**

**Continuation of Ser. No. 313,576, Feb. 21, 1989, abandoned. This application Aug. 3, 1990, Ser. No. 562,179**

**Int. Cl.⁵ C07C** *2/12, 2/62*

U.S. Cl. 585—330 5 Claims

1. A process for the conversion of alpha-olefins to high viscosity index lubricant range hydrocarbons in increased yield, comprising:

i. contacting $C_6$ to $C_{20}$ alpha-olefin feedstock, or mixtures, thereof, under oligomerization conditions with a reduced valence state Group VIB metal catalyst on porous support whereby an oligomerization product mixture is produced containing oligomers comprising olefinic lubricant range hydrocarbons and olefinic non-lubricant range hydrocarbon by-product;
ii. separating said lubricant and non-lubricant hydrocarbons and hydrogenating said lubricant range hydrocarbons;
iii. contacting said hydrogenated hydrocarbons and alkylating agent comprising said olefinic by-product in an alkylation zone under alkylating conditions with solid acidic catalyst whereby alkylated lubricant range hydrocarbons are produced.

---

### 5,015,796

## METHYL ALKYLATION OF TOLUENE USING BASIC ZEOLITE CATALYSTS

**Lynn H. Slaugh, Cypress, and Thomas F. Brownscombe, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Dec. 14, 1989, Ser. No. 450,799**

**Int. Cl.⁵ C07C** *1/207, 2/64*

U.S. Cl. 585—436 22 Claims

1. A process for the alkylation of methylbenzene to produce ethylbenzene and styrene which process comprises contacting said methylbenzene and methanol with a catalyst comprising a zeolite and an alkali(ne-earth) metal compound wherein said compound is selected from alkaline earth metal compound and a mixture of alkaline earth metal compound and alkali metal compound and wherein the sum of the amount of the alkali(ne-earth) metal in said compound and any metal cation exchanged in the zeolite is in excess of that required to provide a fully metal cation-exchanged zeolite.

---

### 5,015,797

## ALKYLATION OF POLYCYCLIC AROMATIC COMPOUNDS TO ALKYLATES ENRICHED IN THE LINEAR- AND NEAR LINEAR-SUBSTITUTED ISOMERS

**Guo-shuh J. Lee; Juan M. Garcés, and Joseph J. Maj, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 422,187, Oct. 16, 1989, which is a division of Ser. No. 323,530, Mar. 14, 1989, which is a continuation-in-part of Ser. No. 123,741, Nov. 23, 1987, Pat. No. 4,891,448. This application Dec. 28, 1989, Ser. No. 458,036**

**Int. Cl.⁵ C07C** *2/68*

U.S. Cl. 585—467 29 Claims

1. A process of alkylating a polycyclic aromatic compound to a mixture of substituted polycyclic aromatic compounds enriched in the linear- and near linear-alkylated isomers comprising contacting a polycyclic aromatic compound with an alkylating agent in the presence of a catalyst comprising an acidic mordenite zeolite having a silica/alumina molar ratio of between about 15:1 and about 300:1 and having a crystalline structure which is determined by X-ray diffraction to have a Symmetry Index in the range from about 1.0 to about 2.0, the contacting occurring at a temperature in the range from about 200° C. to about 350° C. and an alkene pressure in the range from about 10 psig to about 150 psig, such that a mixture of substituted polycyclic aromatic compounds enriched in the linear- and near linear-alkylated isomers is formed.

---

### 5,015,798

## CONVERSION OF METHANE

**Scott Han, Lawrenceville, N.J.; Robert E. Palermo, New Hope, Pa.; Judy A. Pearson, Point Pleasant, N.J., and Dennis E. Walsh, Richboro, Pa., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Filed Dec. 21, 1989, Ser. No. 454,532**

**Int. Cl.⁵ C07C** *2/00, 5/327*

U.S. Cl. 585—500 6 Claims

1. A process for synthesizing a mixture of organic compounds comprising higher hydrocarbons including $C_5+$ liquid hydrocarbons by the direct partial oxidation of methane, said process comprising the steps of:

(i) preparing a feed mixture comprising methane, oxygen gas, and a reaction modifier having at least two carbon atoms, said reaction modifier being selected from the group consisting of hydrocarbons, oxygenated hydrocarbons and mixtures thereof, said feed mixture containing about 3 to about 30 volume percent $O_2$ and an amount up to about 5 volume percent of said reaction modifier, said amount being effective to induce formation of said liquid hydrocarbons;
(ii) contacting said feed mixture with an intermediate pore size crystalline aluminosilicate zeolite catalyst having a silica to alumina ratio of at least about 12, said contacting being conducted under a combination of conversion conditions including a temperature of about 350° to about 500° C., a gas hourly space velocity on zeolite of about 100 to 100,000 $hr^{-1}$ and a pressure of about 150 to about 3000 psig;
(iii) recovering said mixture of organic compounds comprising liquid hydrocarbons;
(iv) discontinuing said reaction modifier from said feed mixture, thereby discontinuing the contact of said reaction modifier with said catalyst, while continuing the contact of said methane and oxygen gas with said catalyst; and
(v) continuing to recover said mixture of organic compounds comprising liquid hydrocarbons.

---

### 5,015,799

## OXIDATIVE COUPLING PROCESS FOR CONVERTING METHANE AND/OR NATURAL GAS TO MORE TRANSPORTABLE PRODUCTS

**Robert H. Walker, Chicago; Paul A. Willems, Geneva; George A. Huff, Naperville; Lewis E. Grimes, Oak Park; David F. Tatterson, Downers Grove, and Robert L. Mehlberg, Wheaton, all of Ill., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Jul. 6, 1989, Ser. No. 376,307**

**Int. Cl.⁵ C07C** *2/00*

U.S. Cl. 585—500 29 Claims

1. A method for converting methane to higher molecular weight hydrocarbons comprising the steps of: reacting a methane-containing feedstock with an oxygen-containing material in a reaction zone to produce an effluent stream comprising $C_2+$ hydrocarbons; maintaining said effluent stream at a temperature of at least 600° C.; contacting said effluent stream with a gaseous alkane quench material having a temperature of up to 1000° C. for under 2 seconds to produce a chemically quenched effluent stream having a reduced temperature.

VOL
1126
ISS
2
MY
14
1991
UMI

# ELECTRICAL

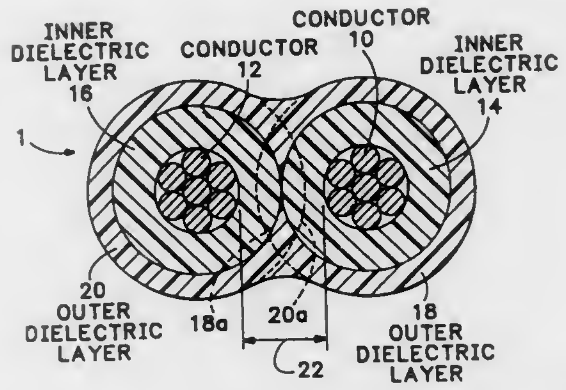
### 5,015,800
## MINIATURE CONTROLLED-IMPEDANCE TRANSMISSION LINE CABLE AND METHOD OF MANUFACTURE

**Gregory P. Vaupotic, Portland; Doris A. Beck, Beaverton, and Sokha Chy, Tualatin, all of Oreg., assignors to SuperComputer Systems Limited Partnership, Eau Claire, Wis.**

**Filed Dec. 20, 1989, Ser. No. 454,022**

**Int. Cl.$^5$ H01B** *11/00*

U.S. Cl. 174—34 **13 Claims**


INNER DIELECTRIC LAYER 16
CONDUCTOR 12
CONDUCTOR 10
INNER DIELECTRIC LAYER 14
1
20 OUTER DIELECTRIC LAYER
18a
20a
22
18 OUTER DIELECTRIC LAYER

1. A method for making a controlled-impedance transmission line comprising a pair of elongate electrical conductors extending generally in transversely separated, side-by-side relationship, said method comprising:

(a) forming a respective inner dielectric layer around each conductor of a pair of conductors separately;

(b) thereafter forming a respective outer dielectric layer around each of said inner dielectric layers separately, each outer dielectric layer of a respective conductor being of a different composition than that of the inner dielectric layer of the respective conductor;

(c) thereafter bonding the outer dielectric layer of one of said conductors to the outer dielectric layer of the other of said conductors in side-by-side relationship substantially without altering the inner dielectric layers of the conductors, thereby forming a controlled-impedance transmission line having a substantially uniform transverse spacing and dielectric constant between said conductors throughout the length of said transmission line.

8. A controlled-impedance transmission line comprising a pair of elongate electrical conductors extending generally in transversely separated, side-by-side relationship, each of said conductors being surrounded by a respective inner dielectric layer and a respective outer dielectric layer, each inner and outer dielectric layer being applied to a respective one of said conductors independently of the other one of said conductors, each outer dielectric layer of a respective conductor being of a different composition than that of the inner dielectric layer of the respective conductor, and the outer dielectric layer of one of said conductors being joined by a bond to the outer dielectric layer of the other of said conductors in side-by-side relationship substantially without alteration of the respective inner dielectric layers of the conductors from their condition as applied to the respective conductors, so as to form a controlled-impedance transmission line having a substantially uniform transverse spacing and dielectric constant between said conductors throughout the length of said transmission line.

---

### 5,015,801
## ELECTRICAL CIRCUIT MODULE

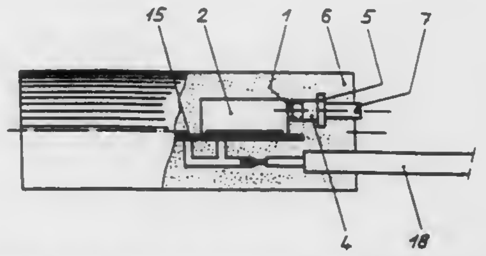
**Werner Schaller, Lampertheim, and Manfred Dürr, Blieskastel, both of Fed. Rep. of Germany, assignors to Schaller-Automation, Industrielie Automationstechnik KG, Blieskastel, Fed. Rep. of Germany**

**Filed May 11, 1989, Ser. No. 350,578**

**Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816112**

**Int. Cl.$^5$ H05K** *5/00;* **H01C** *10/10*

U.S. Cl. 174—52.2 **7 Claims**



1. An electrical circuit module in which structural elements of the circuit module are foamed or cast over with synthetic resin, comprising:

at least one component located in the interior of the synthetic resin and adjustable during operation of the circuit module, wherein said component has an actuating shaft; and

an extension shaft having a driver and being rotationally symmetrical, said extension shaft being coupled to said actuating shaft, wherein said extension shaft has a rotation-symmetrical bead and is embedded in the synthetic resin in a positive-fitting manner, said extension shaft having a surface which forms a separation layer toward the synthetic resin, and an adjustment end protruding to the outside of said synthetic resin.

---

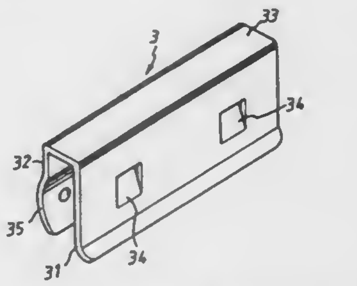
### 5,015,802
## COMPUTER CASING CONNECTOR

**Liu Chi, Taoyuan, Taiwan, assignor to Enlight Corporation, Taoyuan, Taiwan**

**Filed Aug. 27, 1990, Ser. No. 573,621**

**Int. Cl.$^5$ H05K** *9/00*

U.S. Cl. 174—35 GC **6 Claims**



1. A computer casing connector used to provide a tight spatial contact and an electrical connection between an upper piece and a lower piece of a computer casing, comprising an electrically conductive U-shaped body having a bottom, a first limb and a second limb, said first limb having a plurality of snap catches which are parts of said first limb being cut off along part of the edge thereof and bent inwards, said second limbs having a plurality of arcuate members which are parts of said second limbs being so cut off said second limb as to be deformable upon depressed, said lower piece having a plurality of holes, corresponding to said snap catches and complemental in shape and size to said snap catches, formed on edges thereof to engage with and trap therein said snap catches so as to securely fix said computer casing connector thereon.

VOL 1126 ISS 2 MY 14 1991 UMI

### 5,015,803
### THERMAL PERFORMANCE PACKAGE FOR INTEGRATED CIRCUIT CHIP

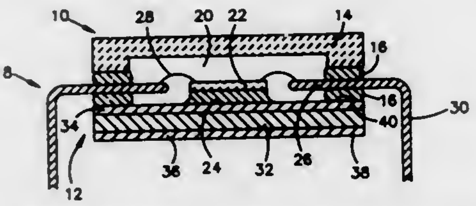
**Deepak Mahulikar, Meriden; Jacob Crane, Woodbridge, both of Conn., and Abid A. Khan, Godfrey, Ill., assignors to Olin Corporation, New Haven, Conn.**

**Filed May 31, 1989, Ser. No. 359,305**

**The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.**

**Int. Cl.⁵ H01L *23/02***

U.S. Cl. 174—52.4 **19 Claims**



1. A package adapted to house a microelectronic circuit, comprising:

- a. a composite base component, said composite base component comprising a first core layer and first and second cladding layers bonded to opposing sides of said first core layer;
- b. a lid component spaced from said composite base component and defining a cavity therebetween for housing said microelectronic circuit;
- c. a leadframe disposed between said composite base component and said lid component; and
- d. a sealing means to bond said leadframe to said first cladding layer of said composite base component and to said lid component.

---

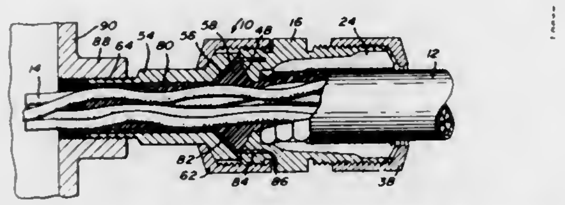
### 5,015,804
### ELECTRICAL CABLE CONNECTOR FOR SEALING AN ARMOURED ELECTRICAL CABLE

**William Nattel, Montreal, and Alain Michaud, St. Luc, both of Canada, assignors to Commander Electrical Materials, Inc.**

**Filed Mar. 26, 1990, Ser. No. 498,796**

**Int. Cl.⁵ H02G *15/06***

U.S. Cl. 174—65 SS **6 Claims**



1. An electrical cable connector for sealing an armoured electrical cable entering an explosion proof enclosure, comprising:

- a rigid substantially tubular body portion with external threads at each end, the body portion having a passage therethrough for insulated conductors of an armoured electrical cable, an internal curved shoulder at one end of the body portion, and an internal taper at the other end of the body portion;
- a substantially tubular seal made from firm resilient elastomeric material, to pass over the armoured electrical cable, the seal having a substantially cylindrical inner surface, a frusto-conical outer surface extending from a small end, having a curved lip at the small end where the outer surface and the inner surface join, the curved lip adapted to match the internal curved shoulder of the body portion;
- a first threaded cover means to engage the external threads at the end of the body portion with the internal curved shoulder to push against the tubular seal so that the curved lip is swivelled inwards and is adapted to contact the armoured electrical cable;
- a substantially tubular adaptor to fit over the insulated conductors of the armoured electrical cable, having an internal taper and an external shoulder at one end to adjoin the end of the body portion with the internal taper to form a sealant cavity between the two internal tapers;
- means for attachment to an aperture in the enclosure at the other end of the tubular adaptor, and
- a second threaded cover means to engage the external threads at the end of the body portion having the internal taper, to hold the tubular adaptor to the body portion.

---

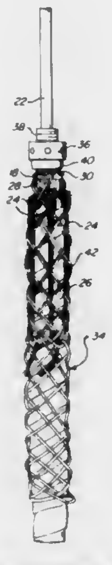
### 5,015,805
### KELLEMS GRIP CONSTRUCTION FOR CABLE CONNECTOR AND METHOD OF USING SAME

**Dennis M. Beckloff, Chesapeake, Va., and David L. Culberston, New London, Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 29, 1990, Ser. No. 501,916**

**Int. Cl.⁵ H02G *15/02***

U.S. Cl. 174—75 C **13 Claims**



1. In the method of assembling a grip connector onto a coaxial cable, the steps comprising:

- selecting a coaxial cable having a conductive core, a dielectric coating thereover, a metallic braid thereabout, synthetic resin reinforcing strands outwardly of said braid, and an outer sheath;
- removing a length of the outer sheath from an end portion of said cable to be provided with the connector, to expose said metallic braid and said reinforcing strands;
- forming said exposed strands into a multiplicity of bundles spaced about the periphery of said metallic braid and folding said bundles upon themselves to extend away from said end of said cable;
- placing a metallic washer over said exposed metallic braid and conductively bonding said metallic braid thereto;
- sliding over said cable end a grip connector having a connector element at its outer end and a cylindrical mesh compression sleeve formed by interlaced wires, said mesh sleeve extending over said washer and said bundles of strands;
- feeding said bundles of reinforcing strands outwardly through peripherally spaced openings in said mesh sleeve adjacent said connector element;
- looping each one of said bundles about a peripherally spaced intersection of the wires of said mesh sleeve and feeding each axially under said mesh sleeve towards the end thereof spaced from said connector element; and
- looping each one of said bundles about a peripherally spaced wire of said mesh sleeve adjacent said spaced end thereof, whereby said bundles of reinforcing strands are firmly interengaged with said mesh sleeve of said grip connector.

10. In a coaxial cable connection, the combination comprising:

- a coaxial cable having a conductive core, a dielectric coating thereover, a metallic braid thereabout, synthetic resin reinforcing strands outwardly of said braid, and an outer sheath, said cable having an end portion from which said outer sheath has been stripped;
- a conductive washer on said end portion of said braid spaced inwardly from the end of said cable, said braid being conductively coupled to said washer; and
- a grip connector having a connector element at said end of said cable engaged with said dielectric coating and a cylindrical mesh compression sleeve formed by interlaced wires, the portion of said reinforcing strands adjacent said cable being formed into a multiplicity of peripherally spaced bundles extending axially towards and then away from said washer and under said sleeve, said bundles being looped about intersections of the wire mesh adjacent said connector element and then extending axially away from said connector elements, said bundles also being looped about said wire mesh at points spaced from said washer.

---

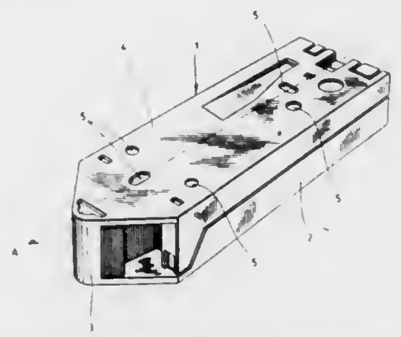
### 5,015,806
### ELECTRICAL SWITCHING DEVICE

**Guy Leclerc, Candiac; Serge Bernier, Saint-Bruno; Philippe Lalande, and Nevenka Prijic, both of Montréal, all of Canada, assignors to Honeywell Amplitrol, Inc., Candiac, Canada**

**Filed Mar. 19, 1990, Ser. No. 495,130**

**Int. Cl.⁵ H01H *3/02***

U.S. Cl. 200—52 R **8 Claims**



1. An electrical switching device particularly well adapted for use in a hold-up alarm system, comprising:

- a casing having a longitudinal axis and two lateral openings symmetrically positioned with respect to said axis;
- a push button switch centrally mounted inside said casing, said switch having an actuating push-button coaxial to said casing;
- means for connecting said push-button switch in series with a remote electrical circuit so that said circuit is switched on or off when the button of said switch is pressed;
- a flexible blade supported inside said casing, said flexible blade extending transversely inside said casing, said blade having a central portion adjacent to the push button of said switch and two opposite ends; and
- manually operable means for squeezing the blade in such a manner as to cause it to bend and press onto the push button to activate the switch, said squeezing means including a pair of actuating arms symmetrically mounted inside the casing, each of said arms extending across one of said lateral openings and having at least one portion that is movable inwards the casing to press against one of said ends of said blade whenever a pressure is exerted thereon through one of said lateral openings,
- wherein said push-button switch is actuated only when both of said arms are pushed in simultaneously.

7. An electrical switching device of claim 1, further comprising a reset switch mounted within said casing, and means for connecting said reset switch to said circuit.

---

### 5,015,807
### SHIFT LEVER APPARATUS FOR AUTOMOTIVE VEHICLES

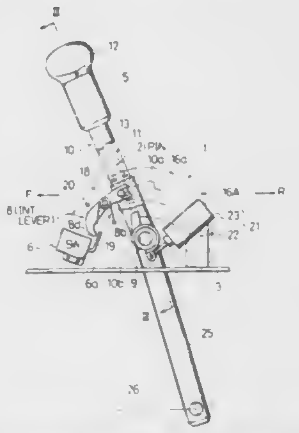
**Masaharu Ishizuki, Zama, and Hiroshi Sakon, Kosai, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Apr. 20, 1990, Ser. No. 512,758**

**Claims priority, application Japan, Apr. 25, 1989, 1-103514**

**Int. Cl.⁵ H01H *9/06***

U.S. Cl. 200—61.88 **4 Claims**



1. A shift level apparatus for an automotive vehicle, comprising:

- (a) a shift lever support frame formed with a pin locating cutout including at least a Park-position;
- (b) a shift lever pivotally supported by said shift lever support frame;
- (c) a position pin attached to said shift lever so as to be movable along an axial direction of said shift lever and engageable with the pin locating cutout;
- (d) a Park-position detecting switch fixedly supported on said shift lever support frame;
- (e) switch actuating power transmitting means pivotally supported between said position pin and said Park-position detecting switch and on said shift lever support frame, for actuating said Park-position detecting switch only when said shift lever and said position pin are shifted to the Park-position in the pin locating cutout of said shift lever support frame; and
- (f) an elastic member supported on said shift lever support frame, for elastically urging said switch actuating power transmitting means to such a position that said position pin is engageable with said switch actuating power transmitting means when shifted to the Park-position.

---

### 5,015,808
### NORMALLY OPEN PRESSURE SWITCH

**David A. Czarn, Cumberland, R.I.; Aziz Rahman; Alan M. Sadler, both of Attleboro, Mass., and Gary A. Baker, Scituate, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 22, 1989, Ser. No. 454,880**

**Int. Cl.⁵ H01H *35/40***

U.S. Cl. 200—83 P **7 Claims**

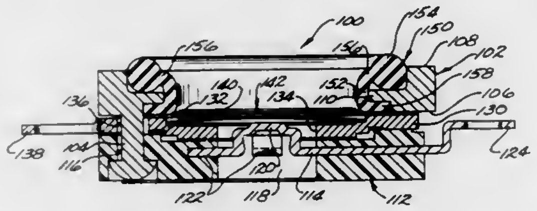
1. A pressure responsive switch comprising:

- (a) an upper body housing having a first hollow central region,
- (b) a lower body housing formed of electrically insulative

VOL
1126
ISS
2
MY
14
1991
UMI

material having a second hollow central region and a first electrically conductive member having a contact portion extending into the second hollow region, the conductive member extending externally of the lower body housing,

(c) a second electrically conductive member received between the upper and lower body housings, the second conductive member having an aperture extending therethrough aligned with the hollow region of the lower body housing, the contact portion extending into the aperture, and the second conductive member extending externally of the first and second body housings, an electrically conductive, pressure responsive snap acting member responsive to predetermined pressure thereagainst to switch from an upwardly extending condition to a downwardly extending condition supported on the second electrically conductive member over the aperture,



(d) a flexible sealing member having a neck portion, an outwardly extending lobe portion integrally connected to the neck portion, and an outwardly extending flange integrally connected to the neck, the upper body housing having a wall portion with upper and lower surfaces, the lower surface of the wall portion received on the flange of the sealing member biasing the flange against the second conductive member, and the upper surface of the wall portion forming a reaction surface for the lobe portion, the lobe portion extending above the upper body housing whereby mounting of the switch with the lobe portion biased against a switch seat will bias the lobe portion between the upper wall surface and the switch seat.

---

## 5,015,809

## VACUUM SWITCH ARRANGEMENT

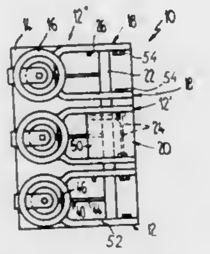
**Hans R. Wüthrich, Oberentfelden, Switzerland, assignor to Sprecher Energie AG, Oberentfelden, Switzerland**

**Filed Jun. 5, 1989, Ser. No. 361,257**

**Claims priority, application Switzerland, Jun. 14, 1988, 02283/88**

**Int. Cl.$^5$ H01H** *9/30*

**U.S. Cl. 200—144 R** **6 Claims**



1. A switch arrangement comprising:

at least one insulating support frame,

at least one vacuum switching tube arranged on said at least on insulating supporting frame, said at least one insulating support frame at least partly surrounds said at least one vacuum switching tube,

two parallel support parts laterally spaced apart from one another being and projecting from each of said at least one insulating support frame.

a spring force drive with an output member and with drive parts supported on said two parallel support parts of said at least one insulating support frame, and

at least one linkage connecting said output member of said spring force drive to a moving switching contact of each said at least one vacuum switching tube for driving said moving contact into engagement with a fixed switching contact.

---

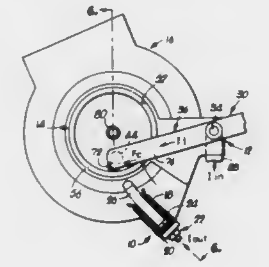
## 5,015,810

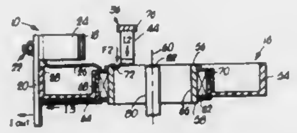
## ARC SPINNER INTERRUPTER

**David P. Eppinger, Centralia, and Hatim H. Taj, Columbia, both of Mo., assignors to A. B. Chance Company, Centralia, Mo. Continuation-in-part of Ser. No. 308,145, Feb. 8, 1989. This application Dec. 5, 1989, Ser. No. 446,476**

**Int. Cl.$^5$ H01H** *33/18*

**U.S. Cl. 200—147 R** **16 Claims**





1. Arc spinner interrupter apparatus comprising:

a first fixed electrical contact;

a ring electrode having first and second axial ends and defining a central longitudinal axis;

a field coil surrounding the ring electrode;

means for electrically coupling the ring electrode to the fixed electrical contact through the field coil so that a magnetic field is created within the ring electrode during current flow through the field coil;

a second electrical contact having an arm section which is selectively movable along a path in a plane perpendicular to the central longitudinal axis of the electrode into disposition engaging the fixed contact, the arm section being of generally L-shaped configuration presenting a first angled portion that extends in a direction parallel to the central longitudinal axis; and

a conductor extending from the second axial end of the ring electrode toward the first axial end substantially along the central longitudinal axis, the conductor having an inner axial end that is separated from the first angled portion of the arm section when the arm section is moved to a position colinear with the central longitudinal axis,

the fixed electrical contact being disposed radially outward of the ring electrode adjacent the first end of the ring electrode in a position such that the arm section of the movable contact moves toward the central longitudinal axis of the electrode when disconnected from the fixed electrical contact,

the conductor being constructed and configured to provide a generally uniform gradient in the electrostatic field surrounding the first angled portion of the arm section when the arm section is moved to a position intersecting the central longitudinal axis.

---

## 5,015,811

## SNAP-ACTION PUSHBUTTON SWITCH WITH CLICK SOUND

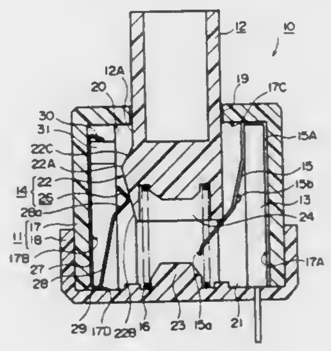
**Hiroyuki Moriyama, and Kenshi Nagata, both of Tottori, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

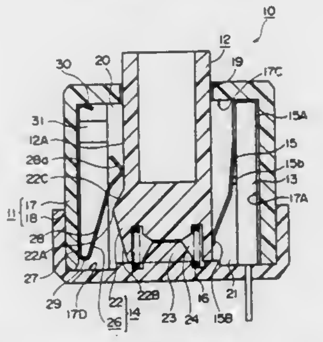
**Filed Jun. 13, 1989, Ser. No. 365,449**

**Claims priority, application Japan, Jun. 30, 1988, 63-162978**

**Int. Cl.$^5$ H01H** *9/00*

**U.S. Cl. 200—521** **5 Claims**





1. A pushbutton switch comprising:

a housing, said housing having an inner lateral wall, an inner top wall and an inner bottom wall;

a pushbutton disposed within said housing such that the pushbutton can reciprocate in a vertical direction, said pushbutton being biased in a release direction;

a switch mechanism disposed within said housing, said switch mechanism being actuated in response to the vertical movement of said pushbutton; and

click means disposed within said housing for producing a snap feeling and a click sound in response to the vertical movement of said pushbutton, said click means comprising:

an operating cam which is reciprocatably movable in a vertical direction along a predetermined path with said pushbutton, said

a plate spring which can move vertically within said housing, the vertical movement of the plate spring being limited by abutment against the inner top and bottom walls of said housing, said plate spring having an upright portion which contacts the inner lateral wall of the housing and a click spring portion extending into the predetermined path of reciprocating motion of said operating cam, wherein said pushbutton can move vertically over a range greater than can said plate spring;

wherein when said pushbutton is operated so that said operating cam trips over said click portion, a resilient force acting in a direction from said operating cam to either said inner top wall or inner bottom wall of said housing is imparted to the plate spring; and

wherein said housing comprises a first compartment which houses said plate spring and a second compartment which houses said switch mechanism.

---

## 5,015,812

## OVEN WITH AN EXHAUST OPENING FOR COLLECTING VAPORS TO CONTROL MATERIAL HEATING

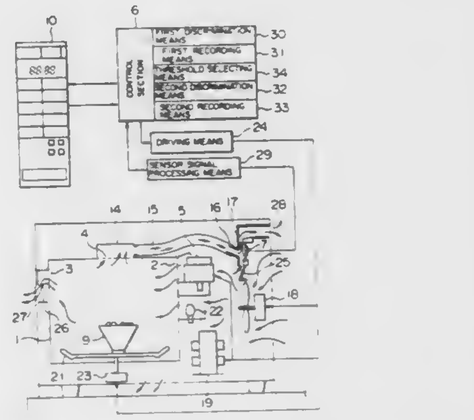
**Isao Kasai, Nabari; Kimiaki Yamaguchi, Nara; Shinichi Sakai, Yamatokoriyama; Susumu Murakami, Nara; Tatsuji Isono, Nabari, and Toyotsugu Hatagawa, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 17, 1990, Ser. No. 509,783**

**Claims priority, application Japan, Apr. 19, 1989, 1-099413**

**Int. Cl.$^5$ H05B** *6/68*

**U.S. Cl. 219—10.55 B** **12 Claims**



1. A heating apparatus for automatically heating a material, said apparatus comprising:

a heating chamber in which a material to be heated is disposed;

vapor sensing means for sensing vapor generated from the material to be heated and for producing data corresponding to the sensed vapor, said data controlling the automatic heating of the material;

an air supply opening through which air is supplied by an air supplying means into said heating chamber;

a first exhaust opening through which air is discharged to the outside of said heating chamber; and

a second exhaust opening through which vapor generated from the material is introduced to said vapor sensing means wherein said air supply opening, said first exhaust opening and said second exhaust opening are positioned selectively so that the vapor generated by the material to be heated which flows toward said second exhaust opening is not suppressed by an air stream flowing in said heating chamber from said air supply opening to said first exhaust opening.

---

## 5,015,813

## POWER FEEDING PORT ARRANGEMENT FOR A MICROWAVE HEATING APPARATUS

**Katsuyoshi Yamada, and Tsutomu Arai, both of Hanazono, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo and Mitsubishi Electric Home Appliance Co., Ltd., Saitama, both of, Japan**

**Filed Dec. 13, 1989, Ser. No. 450,250**

**Claims priority, application Japan, Dec. 14, 1988, 63-313675; May 17, 1989, 1-123174**

**Int. Cl.$^5$ H05B** *6/72*

**U.S. Cl. 219—10.55 F** **10 Claims**

1. A power feeding port arrangement for a microwave heating apparatus comprising:

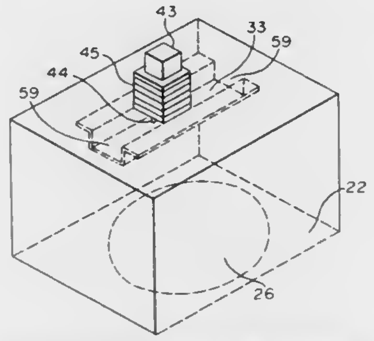
a microwave heating apparatus main body;

a heating chamber provided in the microwave heating apparatus main body and having at least two spaced openings in a wall thereof;

VOL
1126
ISS
2
MY
14
1991
UMI

a waveguide including a guide plate at an outside wall of the heating chamber positioned between the at least two openings of the heating chamber and a guide box having a substantially rectangular prism body and an open major side extending between longitudinal ends of the guide box, the guide box enclosing the two spaced openings of the heating chamber and at least a portion of the guide plate positioned therebetween with the open side facing the guide plate to provide a waveguide with at least a pair of power feeding ports; and

a microwave oscillating antenna for emitting radiowaves of a given wavelength, the microwave oscillating antenna protruding into the waveguide from a side of the guide box opposite the open side thereof;



wherein the microwave oscillating antenna is spaced from the longitudinal ends of the waveguide by a distance greater than about one quarter of the wavelength of the microwaves emitted thereby;

wherein the microwave oscillating antenna is positioned in the waveguide asymmetrically with respect to the longitudinal ends thereof;

wherein an interior space of the waveguide is substantially a rectangular prism in which only the microwave oscillating antenna is positioned; and

wherein one of the pair of power feeding ports have a larger area than an other of the pair of power feeding ports.

---

## 5,015,814
## CORE REMOVING DEVICE FOR WIRECUT ELECTRICAL DISCHARGE MACHINING APPARATUS

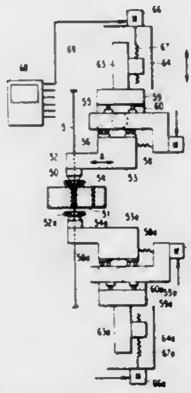
**Hiroaki Morishita, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 29, 1990, Ser. No. 546,178**

**Claims priority, application Japan, Dec. 15, 1989, 1-324950**

**Int. Cl.$^5$ B23H** *7/02, 11/00*

**U.S. Cl. 219—69.12** **13 Claims**



1. A core removing device for an electric discharge machining apparatus using a wire electrode comprising:

a pair of attracting means for supporting a core provided opposite one another across a workpiece;

driving means for moving said pair of attracting means relatively to each other and with respect to each of X, Y and Z axes.

---

## 5,015,815
## PROCESS AND DEVICE FOR REGULATION OF RESISTANCE OR ARC WELDING PROCESSES

**Ulrich Matuschek, Sperberweg 8, and Martin Zimmermann, Mauerstrasse 94, both of D-5100 Aachen, Fed. Rep. of Germany**

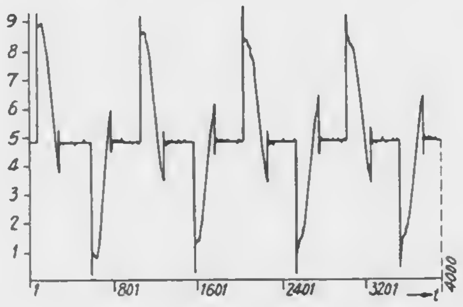
**PCT No. PCT/EP88/00280, § 371 Date Nov. 30, 1988, § 102(e) Date Nov. 30, 1988, PCT Pub. No. WO88/07430, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 31, 1988, Ser. No. 294,607**

**Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710727**

**Int. Cl.$^5$ B23K** *11/24*

**U.S. Cl. 219—110** **7 Claims**



1. A method of regulating a welding operation comprising the steps of measuring current strength of a welding current at welding electrodes and measuring voltage at welding electrodes; determining a resistance index of a workpiece to be welded during the welding operation from values of the measured current strength of the welding current and the voltage; storing the resistance index; evaluating the resistance index by comprising it with an empirically determined correcting or command variable; determining quantitatively and with a resolution of at least 10,000 measuring points/sec from the measured values, the correlation of a welding influencing parameter selected from the group consisting of power, energy, charge amount, electrode voltage, current strength and their combinations, with the resistance index of the workpiece, said step of determining quantitatively the effect of the welding influencing parameter including detecting quantitatively the welding influencing parameter as a correcting or command variable; and employing the welding influencing parameter for controlling a welding energy.

---

## 5,015,816
## RESISTANCE WELDING ELECTRODE AND PROCESS

**Arden W. Bush, Trafalger, and Everett E. Shirley, Lebanon, both of Ind., assignors to CMW, Inc., Indianapolis, Ind.**

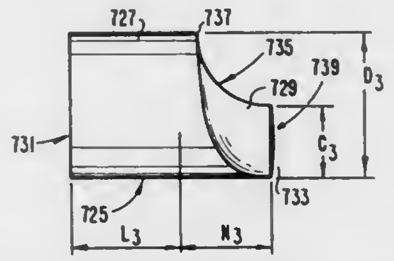
**Continuation-in-part of Ser. No. 260,196, Oct. 20, 1988, Pat. No. 4,954,687. This application Sep. 26, 1989, Ser. No. 410,823**

**Int. Cl.$^5$ B23K** *11/30*

**U.S. Cl. 219—119** **26 Claims**

1. A resistance welding electrode, comprising:

an electrically conductive metal body having a base portion, means for cooling said body, and an integral nose portion projecting from said base portion an axial nose length and terminating in a welding tip face, wherein said nose portion tapers inwardly between said base portion and said welding tip face with a concave profile taper for self-dressing during welding, wherein said nose portion is axially offset from said base portion, and wherein said welding tip face is non-flat and fabricated to define a shape having a convex welding tip curvature, wherein said welding tip face has a face diameter, said face diameter and said welding tip curvature defining a crown height near the center of said welding tip face, wherein said crown height is less than about 0.003 inches so said shape of said welding tip face allows radial expulsion of waste material and wherein said welding tip face is shaped to avoid initial conditioning of the electrode.



---

## 5,015,817
## METHOD FOR PRODUCING A HOLLOW SHAFT ENDOPROSTHESIS

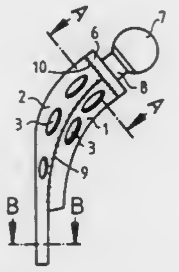
**Curt Kranz, Berlin, Fed. Rep. of Germany, assignor to Johnson & Johnson, New Brunswick, N.J.**

**Filed Dec. 21, 1989, Ser. No. 452,735**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3844155**

**Int. Cl.$^5$ B23K** *15/00*

**U.S. Cl. 219—121.14** **20 Claims**



1. Method for producing a hollow shaft endoprosthesis, in particular a hip joint prosthesis, comprising the following steps:

Producing two half-tubings, which may be connected together to form the shape of the shaft of the prosthesis, whereby said half-tubings touch in the region of two welding seams substantially running in a longitudinal direction, by one of moulding and forging, and

welding together both said half-tubings in the region of said welding seams.

---

## 5,015,818
## MAGNETIC COLLECTOR FOR FTM LASER WELD DEBRIS AND METHOD

**Allan D. Kautz, Naperville, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Dec. 30, 1988, Ser. No. 292,196**

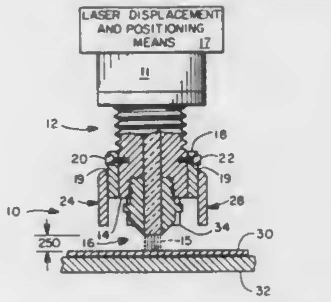
**Int. Cl.$^5$ B23K** *26/00*

**U.S. Cl. 219—121.63** **23 Claims**

1. Apparatus for securing a foil tension mask to a support structure for use in a color CRT and for collecting metallic debris produced during the securing of said foil tension mask, said apparatus comprising:

a laser beam source for directing a laser beam onto the foil tension mask and welding the foil tension mask to the support structure; and

magnetic means including a plurality of magnets disposed about said laser beam and adjacent to the foil tension mask where said laser beam is incident thereon for collecting the metallic debris produced during the securing of the foil tension mask to the support structure.



---

## 5,015,819
## DEVICE FOR PERFORATING ROD-SHAPED ITEMS

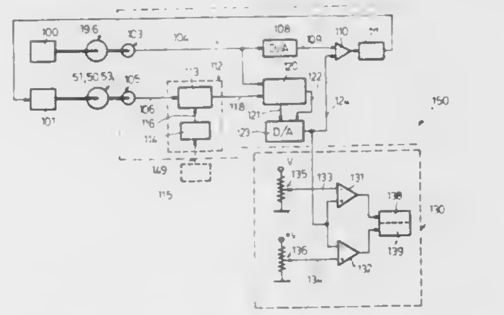
**Armando Neri, Bologna, and Mario Turra, Casalecchio Di Reno, both of Italy, assignors to G.D. Societa' Per Azioni, Italy**

**Filed Jun. 28, 1989, Ser. No. 373,326**

**Claims priority, application Italy, Jun. 29, 1988, 3526 A/88**

**Int. Cl.$^5$ B23K** *26/00*

**U.S. Cl. 219—121.7** **14 Claims**



1. A device for forming perforations in rod-shaped items (2), said device comprising a transfer roller (6) for transferring said items (2) from a loading position (7) to an unloading position (8) on the periphery of said roller (6), said items (2) being arranged parallel to the axis of said roller (6) and housed inside rotary bodies (31) on the same; and rotary means (53) coaxial with said roller (6) and designed to emit a coherent light (laser) beam (10) radially in relation to said roller (6) and on to a portion of said items (2); characterized by the fact that it comprises an electronic control circuit (150) for regulating the speed of said rotary means (53) in relation to that of said roller (6), and so regulate the number of perforations (15) formed in said portion of said items (2).

---

## 5,015,820
## METHOD OF MAKING SPRING WASHER WITH LASER BEAM

**Chueh-Horng Liou, Hsin Chu Shien, Taiwan, assignor to Industrial Technology Research Institute, Hsln Chu Hsien, Taiwan**

**Filed May 25, 1990, Ser. No. 528,851**

**Int. Cl.$^5$ B23K** *26/00*

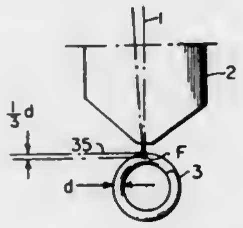
**U.S. Cl. 219—121.72** **1 Claim**

1. A method of making a spring washer comprising the steps of:

positioning a laser adjacent a spring coil, said spring coil serving as stock from which a plurality of individual spring washers are to be cut, said spring coil further including a central axis;

VOL
1126
ISS
2
MY
14
1991
UMI

directing a laser beam emitted from said laser perpendicular to and intersecting with said spring coil central axis;
focusing the laser beam into said spring coil at a depth of one-third of a diameter of said spring coil; and

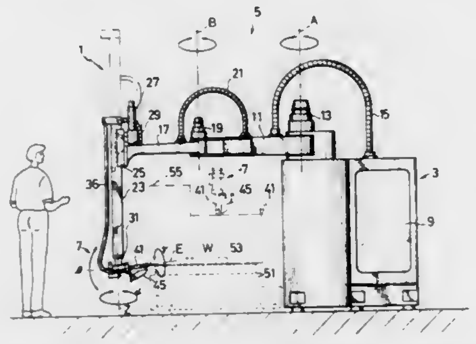


moving said laser relative to said spring coil central axis so as to cut said spring coil into a plurality of individual spring washers.

---

### 5,015,821
### COMPUTER CONTROLLED WELDING ROBOT

**Franco Sartorio, and Gianfranco Carbonato, both of Turin, Italy, assignors to Amada Company, Limited, Japan**
**Filed Feb. 14, 1989, Ser. No. 310,192**
**Claims priority, application Italy, Feb. 15, 1988, 67106 A/88; Feb. 15, 1988, 67107 A/88**
**Int. Cl.⁵ B23K** *9/127*
**U.S. Cl. 219—124.34** **15 Claims**

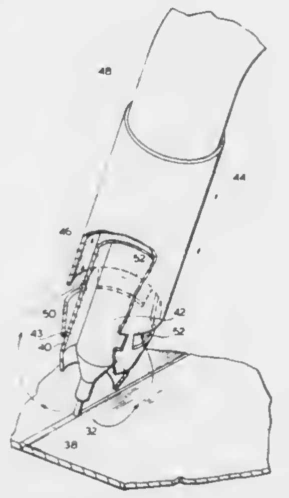


1. A welding robot for performing welding in a workpiece, comprising:
a base frame;
an arm means mounted on the base frame and provided with a tip section which is freely movable within a specified area in relation to the base frame;
a welding torch provided in a freely rotatable manner around at least one axis on the tip section of the arm means;
a detection means provided on the tip section of the arm means, for detecting the relative position of the welding torch with respect to the workpiece, the detection means being provided on the tip section so as to be rotatable about the axis of the welding torch; and
a control means capable of controlling the movement of the arm means with respect to the base frame and of controlling the rotation of the welding torch with respect to the tip section of the arm means and the rotation of the detection means about the welding torch, said control means including means for comparing the detected position of said welding torch with a desired position preprogrammable independent of prior robot movement.

---

### 5,015,822
### NOZZLE STRUCTURE IN WELDING GUN

**Robert N. Mann, Míssissauga, Canada, assignor to MIG VAC Inc., Mississauga, Canada**
**Filed Nov. 13, 1989, Ser. No. 434,275**
**Int. Cl.⁵ B23K** *9/00*
**U.S. Cl. 219—137.41** **4 Claims**



1. A welding gun head, comprising:
a welding wire conduit extending generally centrally within said welding gun head to define a fume-extracting passageway within said gun head; and
a sleeve surrounding said conduit adjacent the downstream end thereof and having a tubular portion mounted relative to a fixed tubular portion of said head, in overlapping relationship for selected axial movement of the said sleeve relative to the tubular portion of said head,
said sleeve having downstream portion thereof tapering to engagement with said conduit, and
a plurality of transversely-elongate narrow slots formed in said sleeve with an edge coincident with the location of commencement of said taper defining inlet openings to said fume-extracting passageway, each of said slots having a trapezoid outline with parallel longitudinal edges significantly greater in dimension that the lateral edges.

---

### 5,015,823
### HIGH MANGANESE CONTAINING WELD BEAD AND ELECTRODE FOR PRODUCING SAME

**Dennis D. Crockett, Mentor, and Robert P. Munz, Jefferson, both of Ohio, assignors to The Lincoln Electric Company, Cleveland, Ohio**
**Continuation of Ser. No. 159,458, Feb. 18, 1988, abandoned, which is a continuation of Ser. No. 940,867, Dec. 12, 1986, abandoned. This application Aug. 21, 1989, Ser. No. 396,833**
**Int. Cl.⁵ B23K** *35/22*
**U.S. Cl. 219—146.1** **13 Claims**

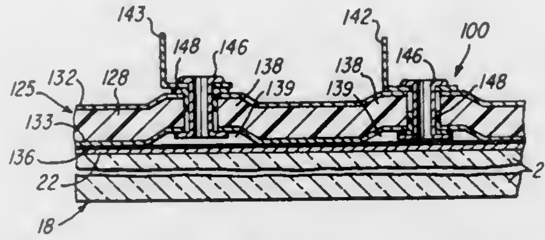
1. An electrode for depositing high manganese abrasion resistant weld beads comprised of a tube of carbon steel having a fill of the following ingredients as a percent of the total electrode weight:

| | Min. | Max. |
|---|---|---|
| $Na_2O$ | .17 | .41 |
| Mgo | .43 | .69 |
| $TiO_2$ | 2.8 | 4.7 |
| $CaF_2$ | 1.7 | 2.8 |
| C | .40 | .72 |
| Al | .3 | .7 |
| Si | .14 | .60 |
| Cr | 4.0 | 5.8 |
| Mn | 12.8 | 15.5 |
| Ni | .34 | .60 |
| Fe | 2.7 | 3.2 |
| Tube | Balance | Balance. |

---

### 5,015,824
### APPARATUS FOR HEATING A MIRROR OR THE LIKE

**Robert P. Monter, and Ronald L. Smith, both of Dayton, Ohio, assignors to Thermacon, Inc., Dayton, Ohio**
**Continuation of Ser. No. 307,051, Feb. 6, 1989, Pat. No. 4,942,286. This application Jul. 5, 1990, Ser. No. 548,618**
**Int. Cl.⁵ H05B** *3/84*
**U.S. Cl. 219—219** **15 Claims**



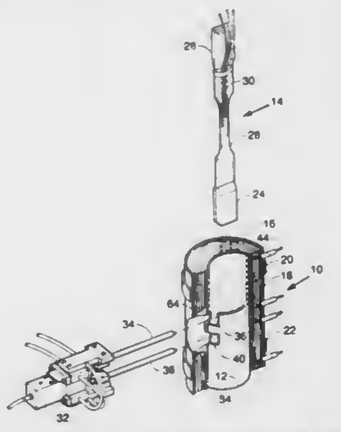
1. A heater assembly adapted to be attached to a mirror having a predetermined shape and size, comprising a layer of conductive polymer having opposite parallel flat surfaces providing said layer with a substantially uniform thickness, said polymer having a positive temperature coefficient of resistivity, a set of continuous metal foils bonded to said opposite surfaces of said layer and cooperating to form a laminated heater assembly having a uniform thickness with said layer of said polymer between said foils, said metal foils and said polymer layer having the same size and shape and generally the same as the size and shape of the mirror, means for attaching one of said metal foils forming one side of said heater assembly to the mirror, a portion of said laminated heater assembly including corresponding portions of said layer and said foils projecting laterally from the plane of said one metal foil and away from the mirror, means on the other side of said heater assembly for connecting said laterally projecting portions of both of said foils to a corresponding pair of electrical conductors, and said heater assembly being effective to heat substantially the entire mirror according to variations in temperature of different areas of the mirror.

---

### 5,015,825
### FURNACE FOR TENSILE/FATIGUE TESTING

**Pamela K. Brindley, Strongsville, Ohio, assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.**
**Filed Mar. 19, 1990, Ser. No. 382,885**
**Int. Cl.⁵ F27B** *5/14;* **F27D** *11/00;* **G01N** *3/08, 3/18*
**U.S. Cl. 219—390** **20 Claims**

17. In combination with an extensometer having a pair of spaced probes for contacting an edge of a centrally disposed substantially flat gage section of a test specimen having a tab at each end of said gage section, a furnace having a plurality of zones for heating said gage section during mechanical property testing of said specimen in tension and fatigue comprising
a non-cylindrical liner covering said gage section while leaving said tabs exposed, said liner having centrally disposed spaced apertures for receiving said extensometer probes and a non-circular cross-section defined by a major dimension and a minor dimension wherein portions of said liner adjacent to the ends of said major dimension are in close proximity to the edges of said flat gage section with said apertures being positioned at said major dimension and other portions of said liner adjacent to the end of said minor dimension being in close proximity to the surfaces of said flat gage section whereby heat loss at the ends of the liner adjacent to said tabs is minimized,
an insulating material surrounding said liner,
a cylindrical jacket surrounding said insulating material and said non cylindrical liner, said jacket and said liner having substantially the same length,

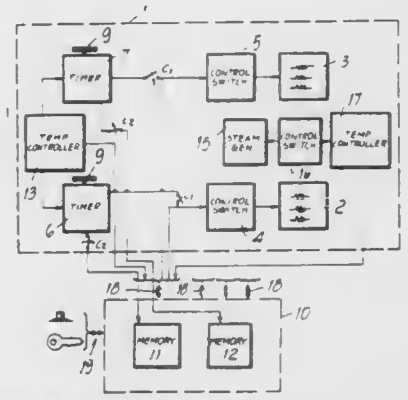


a tube extending from said jacket through said insulating material to the interior of said liner for conducting an inert gas to the interior of said liner adjacent to said flat gage section, and
a plurality of resistance heating wires encircling adjacent portions of said liner thereby forming said heating zones, each of said heating wires extending outward through openings in said jacket.

---

### 5,015,826
### POWER ADJUSTMENT DEVICE FOR ELECTRIC POWER SYSTEMS, IN PARTICULAR FOR ELECTRIC POWER SYSTEMS WITH ELECTRIC OVENS

**Pietro Curti, Lodivecchio, Italy, assignor to Curti S.n.c. di Curti Pietro & C., Lodivecchio, Italy**
**Filed May 17, 1989, Ser. No. 354,179**
**Claims priority, application Italy, May 27, 1988, 20791 A/88**
**Int. Cl.⁵ H05B** *1/02*
**U.S. Cl. 219—492** **21 Claims**



1. A power adjustment device for electric power systems, in particular for electric power systems with electric ovens, comprising means for detecting power requests of a plurality of users, available power storing means, means for checking if available power is sufficient to feed requesting users, and means for selectively enabling some of said users which are previously disabled and disabling some of said users which are previously enabled according to the available power, said

VOL 1126 ISS 2 MY 14 1991 UMI

enabling and disabling means comprising means for evaluating remaining turn on time of already enabled users and for selectively disabling at least one of said already enabled users having a shorter remaining turn on time when the available power is not sufficient to feed the requesting users, wherein said enabling and disabling means further comprise means for evaluating priority of the requesting users and means to selectively disable at least one of previously enabled users having lower priority than the requesting users when the available power is not sufficient to feed the requesting users having higher priority, and wherein said device further comprises a temperature controller associated with at least one user for detecting existing temperature and issuing a corresponding turn on request for the associated user, said request being fed to said means for detecting power requests and to said available power checking means.

---

**5,015,827**

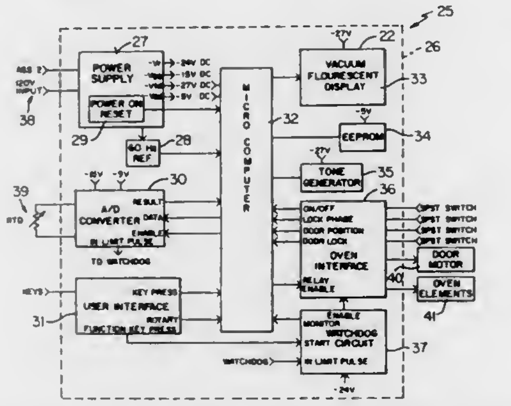
## CONTROL SYSTEM FOR A COOKING OVEN

**Brian J. Kadwell, Ringgold, Ga., and Daniel L. Fowler, Kentwood, Mich., assignors to Robert Shaw Controls Company, Richmond, Va.**

**Continuation of Ser. No. 248,395, Sep. 23, 1988, Pat. No. 4,922,081. This application Feb. 22, 1990, Ser. No. 483,570**

**Int. Cl.$^5$ H05B *1/02***

U.S. Cl. 219—497 4 Claims



1. In a control system for a cooking oven having a heating means and an oven door, said system comprising a high energy control circuit means having an output relay driver transistor for operating an oven door latching motor means of said system, manually operated means for initiating the operation of said high energy control circuit means, microcomputer means for operating said high energy control circuit means after said manually operated means has initiated the operation of said high energy control circuit means, and supervisory circuit means for detecting failure of said system and disabling said high energy control circuit means if said system is not operating in a normal mode thereof, the improvement wherein said supervisory circuit means has a supervisory transistor therein that is in series with said relay driver transistor and that must be switched on to enable said relay driver transistor, said supervisory circuit means having means therein for sustaining the on condition of said supervisory transistor, said system having operating means for initially switching on said supervisory transistor to initiate the operation of said high energy control circuit means, said operating means being adapted to continue the on condition of said relay driver transistor after the initial switching on thereof if said system is operating in a normal mode thereof, said microcomputer means having monitoring means for monitoring the state of said supervisory transistor.

---

**5,015,828**

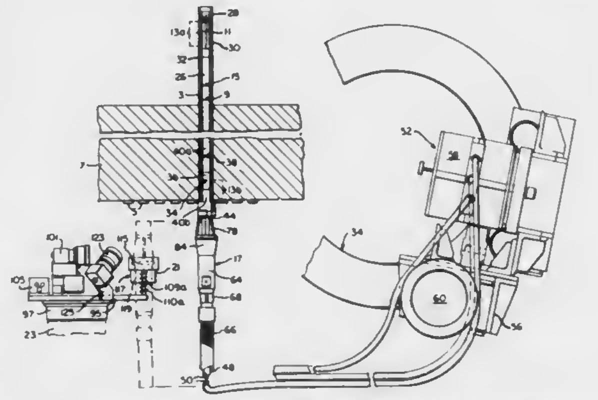
## SYSTEM AND METHOD FOR STRESS-RELIEF OF WELDS IN HEAT EXCHANGER TUBES

**William C. Ritz, Greensburg, and Robert D. Burack, Pleasant Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jul. 7, 1989, Ser. No. 376,438**

**Int. Cl.$^5$ H05B *3/00***

U.S. Cl. 219—523 30 Claims



11. A system for simultaneously heat treating a plurality of metallic tubes, each of which has an open end mounted in a tubesheet, comprising:

- a plurality of heater probes receivable within the open ends of said tubes, each of which includes means for detachably securing said probe within a tube;
- a plurality of probe guide assemblies, each of which includes a guide sleeve positionable over the open ends of said tubes against said tubesheet, and a guide conduit for guiding a heater probe through said guide sleeve and into a tube, and
- an end effector means connected to a robotic arm for delivering said guide assemblies over the open ends of different tubes, and having a coupler means for coupling to and uncoupling from a probe guide assembly.

---

**5,015,829**

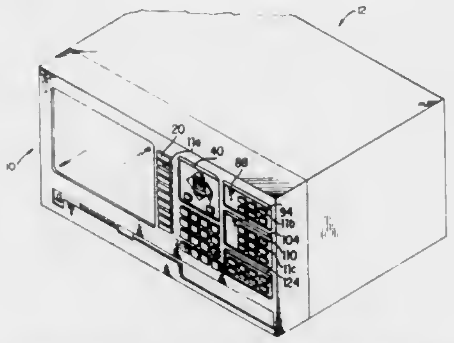
## KEY PAD AND FRONT PANEL ASSEMBLY FOR AN ELECTRONIC INSTRUMENT

**Randall N. Eilert, and Wilbur R. Ames, IV, both of Lake Stevens, Wash., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Apr. 28, 1989, Ser. No. 344,884**

**Int. Cl.$^5$ G06C *7/02;* H01H *13/00;* H05K *10/00***

U.S. Cl. 235—1 D 8 Claims



1. A panel assembly for an electronic instrument comprising:
- a panel having a group of holes formed therein; and
- a pad having a group of attached protuberances protruding from one side of the pad, the protuberances being positioned so that each hole has a protuberance extending through it whenever the panel and pad are assembled together, some of the group of protuberances being movable relative to the panel and pad assembly, at least one of the protuberances being substantially immovable relative to the panel and pad assembly.

---

**5,015,830**

## ELECTRONIC CARD READING DEVICE

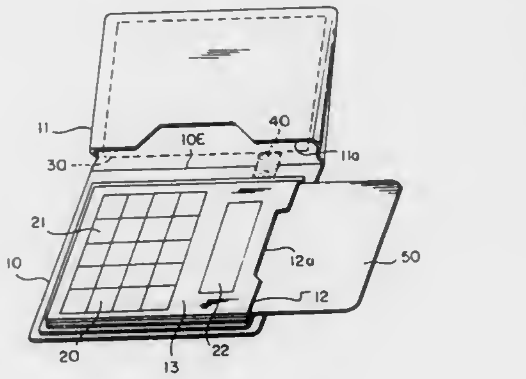
**Shigeaki Masuzawa, and Shigeki Komaki, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

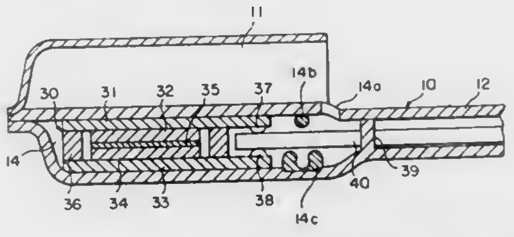
**Filed Jul. 3, 1989, Ser. No. 374,879**

**Claims priority, application Japan, Jul. 4, 1988, 63-88858[U]; Jul. 13, 1988, 63-92595[U]**

**Int. Cl.$^5$ G06F *15/02;* G06K *5/00***

U.S. Cl. 235—441 8 Claims





1. An electronic card reading device for reading the data stored in an electronic card by electrically bringing said electronic card into contact with the reading device and for displaying the data that is read on a display,

wherein said device comprises:
- a main unit in the form of a thin plate having card contacts which are electrically brought into contact with an electronic card, an integrated circuit, and a display portion for displaying the data which is read from the electronic card,
- a power source in the form of a thin plate which is electrically connected to said main unit to supply power thereto, said power source being constructed so as to be separate from said main unit, and a soft cover having a housing portion for said main unit and another housing portion for said power source, in which said main unit and said power source are separately housed, and having an electronic card pocket which is so disposed that an electronic card can be inserted therein and the electronic card thus inserted is brought into contact with said card contacts of said main unit which is housed in said main unit housing portion.

---

**5,015,831**

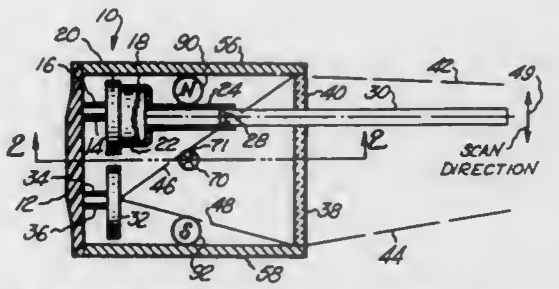
## SCAN MODULES FOR BAR CODE READERS AND THE LIKE IN WHICH SCAN ELEMENTS ARE FLEXURALLY SUPPORTED

**Jay M. Eastman, Pittsford, and John A. Boles, Fishers, both of N.Y., assignors to Photographic Sciences Corporation, Rochester, N.Y.**

**Filed Nov. 7, 1988, Ser. No. 267,873**

**Int. Cl.$^5$ G11B *7/135;* G06K *7/10***

U.S. Cl. 235—462 27 Claims



1. A miniature scan module which comprises a mounting structure, said structure being defined by at least first and second circuit boards with wiring thereon, flexure means having at least two elements of conductive material defining a pivot axis connecting said boards, an electrical current operated source providing a light beam, said source being mounted on and connected to the wiring on a first of said boards, means for driving said first board to execute oscillatory motion about said pivot axis and scan said beam, and said wiring on said first board and second board being connected to each other exclusively via said elements of said flexure means.

---

**5,015,832**

## METHOD OF AND APPARATUS FOR DECODING BAR CODE SYMBOLS

**Paul S. Filipski, and Paul E. Bacchi, both of Novato, Calif., assignors to Kensington Laboratories, Inc., Richmond, Calif.**

**Filed Feb. 27, 1989, Ser. No. 317,227**

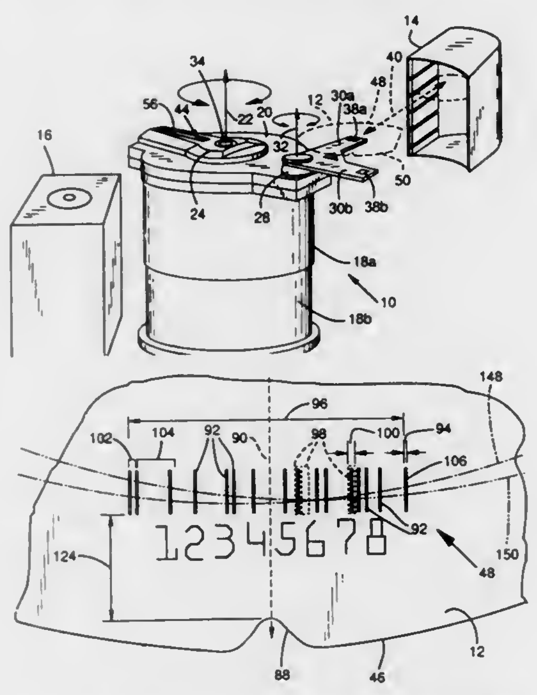
**Int. Cl.$^5$ G06K *7/10***

U.S. Cl. 235—462 14 Claims

1. A bar code scanner for decoding a bar code symbol including a sequence of alternating bars and spaces of widths that represent a message, the bars and spaces being characterized by differences in light reflectivities, comprising:
- light emitting means for emitting a light beam of preselected intensity for reflection by the bar code symbol;
- scanning means for scanning the light beam across the bar code symbol in an arcuate path defined by an angular displacement about a rotational axis, the reflected light beam being intensity modulated in response to the difference in the reflectivities of the bars and spaces;
- light detecting means receiving the reflected light beam for generating a reflectance signal corresponding to the intensity modulation of the reflected light beam and indicative of the relative positions of the bars and spaces along the arcuate path; and
- computing means responsive to the reflectance signal for

VOL
1126
ISS
2
MY
14
1991
UMI

deriving as integer multiples of a unit angular displacement the widths that represent the message, thereby determining the sequence of bars and spaces in the bar code symbol.



---

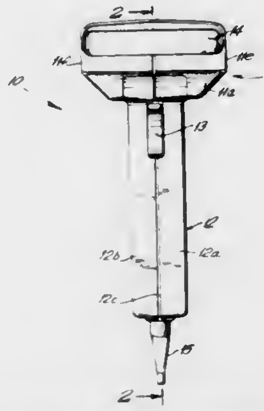
### 5,015,833
### SCAN BOARD MODULE FOR LASER SCANNERS

**Howard M. Shepard, Great River; Yuri Gofman, Brooklyn, and Edward Barkan, Setauket, all of N.Y., assignors to Symbol Technologies, Inc., Bohemia, N.Y.**

**Continuation of Ser. No. 429,198, Oct. 30, 1989, which is a continuation of Ser. No. 367,007, Jun. 16, 1989, abandoned, which is a continuation-in-part of Ser. No. 265,548, Nov. 1, 1988, Pat. No. 4,896,026. This application Feb. 23, 1990, Ser. No. 484,170**

**Int. Cl.$^5$ G06K** *7/10*

**U.S. Cl. 235—472** **31 Claims**



1. A scan module for use in light scanning systems for reading indicia having portions of different light reflectivity, comprising:

(a) a single printed circuit board having a centerline;
(b) light source means on the board, for emitting a light beam;
(c) optic means on the board, for optically forming and directing the light beam to a movable scanning mirror centrally mounted on the centerline to reflect the light beam to the indicia, thereby reflecting light from the indicia;
(d) sensor means on the board, said sensor means having a field of view and being operative for generating an electrical analog signal indicative of light of variable intensity reflected off the indicia;
(e) a movable collecting mirror centrally mounted on the centerline to the scanning mirror for joint movement therewith to direct the light reflected from the indicia to the sensor means;
(f) signal generating means on the board, for converting the analog signal to a digital signal indicative of the indicia;
(g) scanning means on the board, for jointly moving the scanning and collecting mirrors and for scanning at least one of said light beam and said field of view in a scan across the indicia; and
(h) conductor means on the board, for conducting the digital signal away from the board, wherein the conductor means is a flat ribbon cable.

---

### 5,015,834
### INFORMATION CARD SYSTEM COMMUNICABLE IN CONTACTLESS MANNER

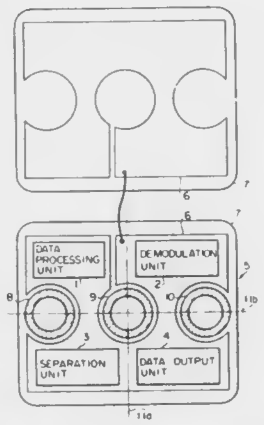
**Tadato Suzuki; Yoshikazu Yorimoto; Hidekazu Matsumura, and Seiji Hirano, all of Tokyo, Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan**

**Filed Apr. 7, 1989, Ser. No. 334,441**

**Claims priority, application Japan, Apr. 8, 1988, 63-86934; May 30, 1988, 63-134118; May 30, 1988, 63-134119**

**Int. Cl.$^5$ G06K** *7/08*

**U.S. Cl. 235—493** **24 Claims**



1. An information card system comprising:

a) an information card having
  a-1) at least first, second and third inductors respectively assigned to an input signal, a periodical signal and an output signal,
  a-2) a first data processing unit operative to execute program sequences for producing a plurality of output data signals after an initialization,
  a-3) a non-volatile memory unit associated with said first data processing unit and operative to memorize pieces of data information each represented by one of said output data signals,
  a-4) a first demodulation unit coupled between said first inductor and said first data processing unit and operative to extract a bit string indicative of a piece of input data information from said input signal,
  a-5) a separation unit coupled between said second inductor and said first data processing unit and operative to extract a pulse train from said periodical signal and to produce an electric power on the basis of said periodical signal, and
  a-6) an output unit coupled at an input node thereof to said separation unit and at an control node thereof to said first data processing unit and producing a data output signal in the presence of another output data signal fed from the first data processing unit, said output unit further producing an acknowledge signal in said initialization for transferring to said third inductor as said output signal; and

b) a terminal unit communicable with said information card having
  b-1) at least fourth, fifth and sixth inductors capable of respectively facing said first, second and third inductors or said third, second and first inductors in a contactless fashion,
  b-2) a second data processing unit,
  b-3) two series combination circuits coupled in parallel between said second data processing unit and said fourth and sixth inductors, each combination circuit operative to produce said input signal or said periodical signal depending upon a job assignment decided by said second data processing unit, and
  b-4) a combined unit coupled between said fifth inductor and said second data processing unit and operative to relay said output signal to said second data processor and to produce a detection signal indicative of whether or not said acknowledge signal is supplied thereto, wherein said second data processing unit allows one of said two series combination circuits to produce said input signal after receiving said detecting signal indicative of a presence of said acknowledge signal.

---

### 5,015,835
### OPTICAL INFORMATION READING AND WRITING DEVICE WITH DIFFRACTION MEANS

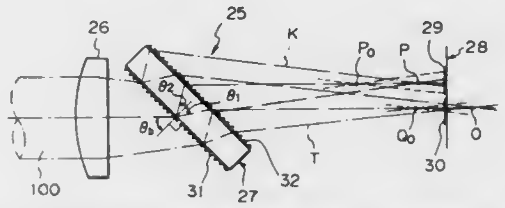
**Shigeru Ohuchida, Zama; Jonichi Kitabayashi, Kawasaki, and Toshiyuki Inokuchi, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,366**

**Claims priority, application Japan, Dec. 23, 1988, 63-325295; Mar. 30, 1989, 1-79126; Jul. 10, 1989, 1-177751**

**Int. Cl.$^5$ G01J** *1/20*

**U.S. Cl. 250—201.5** **11 Claims**



1. An optical information reading and writing device comprising:

a laser source which emits a laser beam for irradiating an optical information recording medium to record an information therein; and
an optical signal detection system which receives a reflection beam reflected from said optical information recording medium and controls position of said optical information recording medium, said optical signal detection system comprising:
a condenser lens which is disposed on an optical path of said reflection beam passing through said optical signal detection system and converges said reflection beam;
a dual grating element which has substantially linear diffraction gratings formed on both side surfaces thereof and divides said reflection beam converged by said condenser lens to two beams, one being a diffraction beam which is diffracted by said dual grating element and the other being a straight beam which passes substantially straight through said dual grating element without being diffracted thereby; and
two light receiving detector elements for detecting said diffraction beam and said straight beam, respectively, each of which light receiving detector elements is divided to three segments and disposed on a same plane as the other light receiving detector element.

---

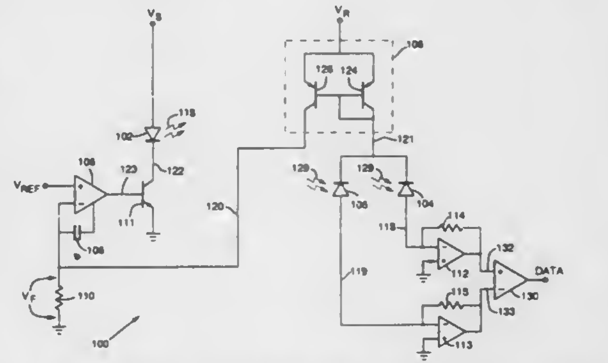
### 5,015,836
### SOURCE INTENSITY ADJUSTMENT APPARATUS FOR OPTICAL CHANNEL

**Joel C. Van Antwerp, Bullard, Tex., assignor to BEI Electronics, Inc., Carlsbad, Calif.**

**Filed Feb. 5, 1990, Ser. No. 475,330**

**Int. Cl.$^5$ G01J** *1/32*

**U.S. Cl. 250—205** **19 Claims**



1. An apparatus for use in an optical encoder of the type in which a code disk having indicia formed thereon is positioned for rotation through an optical path, said indicia imparting intensity variations in light traveling along said optical path, said apparatus comprising:

light source means for providing light of adjustable intensity;
light reception means, positioned with respect to said light source means to define said optical path, for receiving light from said light source means, for providing a reception intensity signal current which is proportional to said received light intensity variations, and for providing an intensity level signal current which is proportional to the total of said received light;
data signal generation means responsive to said reception intensity signal current for converting said reception intensity signal current into a data signal;
self-regulative feedback means responsive to said intensity level signal current for generating an intensity control feedback signal current which is proportional to said intensity level signal current, wherein said self-regulative feedback means has intrinsic operating parameters and said proportionality of said signal currents is substantially independent thereof; and
intensity adjustment means responsive to said intensity control feedback signal current for maintaining said intensity of said light source means at a predetermined level.

---

### 5,015,837
### CONTACT TYPE IMAGE SENSOR WITH ELECTRIC SHIELDING

**Masaki Hiroi, Sendai; Masumitsu Ino; Takehito Nagata, both of Yokohama, and Masumi Shimada, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo and Ricoh Research Institute of General Electronics Co., Ltd., Natori, both of, Japan**

**Filed Oct. 27, 1989, Ser. No. 427,702**

**Claims priority, application Japan, Nov. 2, 1988, 63-278090**

**Int. Cl.$^5$ H01J** *40/14*

**U.S. Cl. 250—208.1** **20 Claims**

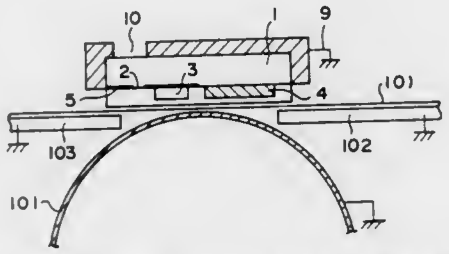
1. A contact type image sensor comprising:

a transparent base plate having a first surface and a second surface opposite to each other;
a light receiving layer formed on said first surface of the transparent base plate, said light receiving layer generat-

VOL
1126
ISS
2
MY
14
1991
UMI

ing an electric signal in response to light irradiated thereon;

a driving circuit layer formed on said first surface of the transparent base plate, said driving circuit layer including a thin-film transistor for driving said light receiving layer; and



a conducting thin film formed on said first surface and said second surface of the transparent base plate to thereby electrically shield said light receiving layer and said driving circuit layer.

---

### 5,015,838
## COLOR SENSOR HAVING LAMINATED SEMICONDUCTOR LAYERS

Hideo Yamagishi; Akihiko Hiroe; Hitoshi Nishio; Satoru Murakami; Keiko Miki, all of Kobe; Minori Yamaguchi, Akashi; Seishiro Mizukami, and Yoshihisa Tawada, both of Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

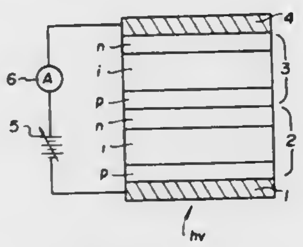
PCT No. PCT/JP88/00321, § 371 Date Jan. 27, 1989, § 102(e) Date Jan. 27, 1989, PCT Pub. No. WO88/07769, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 30, 1988, Ser. No. 294,625

Claims priority, application Japan, Mar. 31, 1987, 62-80548

Int. Cl.⁵ H01J *40/14*

U.S. Cl. 250—211 J 2 Claims



1. A semiconductor sensor, comprising:

a back electrode;

a semiconductor element laminated on said back electrode, said semiconductor element including a plurality of pn or pin junctions laminated directly together and having a light incident face for receiving light, said semiconductor element is constructed such that a quantity of photocarriers is increasingly produced in adjacent junctions from said light incident face for a whole wavelength band to be measured when a voltage is supplied; and

a transparent front electrode laminated on said semiconductor element, said transparent front electrode forming a light incident face of said color sensor, wherein a value of current is detected by changing said voltage supplied between said back and transparent front electrodes.

---

### 5,015,839
## AUTOMATIC GAIN MULTIPLICATION FACTOR CONTROL APPARATUS AND METHOD

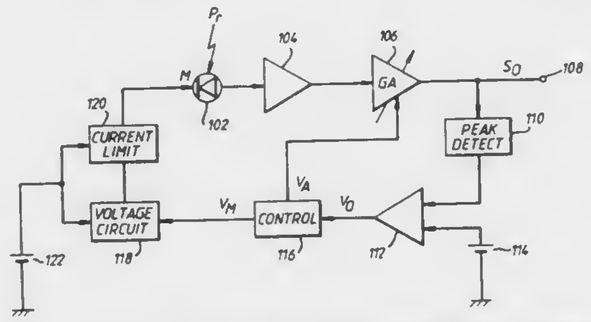
Sadao Tanikoshi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 29, 1989, Ser. No. 400,085

Claims priority, application Japan, Oct. 21, 1988, 63-265345

Int. Cl.⁵ H01J *40/14;* H03G *3/10*

U.S. Cl. 250—214 AG 30 Claims



1. An apparatus for automatically controlling gain, comprising:

receiving means for receiving optical signals, and for generating electrical signals corresponding to the received optical signals using an adjustable multiplication factor which depends on a bias signal;

variable gain control means for amplifying the electrical signals from the receiving means by an adjustable gain;

difference determining means for determining a difference between the electrical signals from the variable gain control means and a predetermined signal;

means for producing a first variable voltage having a value indicative of a maximum amount of adjustment of gain, and producing a second variable voltage indicative of a maximum adjustment of a bias amount; and

controlling means, responsive to the difference determining means, for controlling a gain of the variable gain control means by producing a gain control signal that has a first clipping characteristic which is based on said first variable voltage, and for producing the bias signal using a second clipping characteristic which is based on said second variable voltage whereby the multiplication factor is limited to a certain level based on said second clipping characteristic.

---

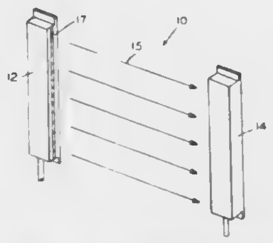
### 5,015,840
## SELF-CHECKING LIGHT CURTAIN SYSTEM AND METHOD OF OPERATION

David Blau, Cupertino, Calif., assignor to Scientific Technologies Incorporated, Hayward, Calif.

Filed Jan. 9, 1990, Ser. No. 463,240

Int. Cl.⁵ G01V *9/04*

U.S. Cl. 250—221 9 Claims



1. For use in a light curtain system having a light transmitter which sequentially strobes light beams across a zone to be protected and a light receiver having a plurality of phototransistors arrayed to receive the light beams, said phototransistors each having a base, a collector and an emitter, the improvement including control circuit means for selecting the sequence in which the phototransistors are enabled to produce output signals upon receiving light beams from the light transmitter, said control circuit means including shift register means for applying a voltage to the collector of a selected phototransistor sufficient to enable the phototransistor to generate an output signal responsive to incident light, said shift register means de-selecting said phototransistor by grounding the collector at the time that the light transmitter is not strobing light in the channel of the de-selected phototransistor, said circuit means including amplifier means for receiving and amplifying output signals from the phototransistors which are selected and which receive light from the transmitter.

---

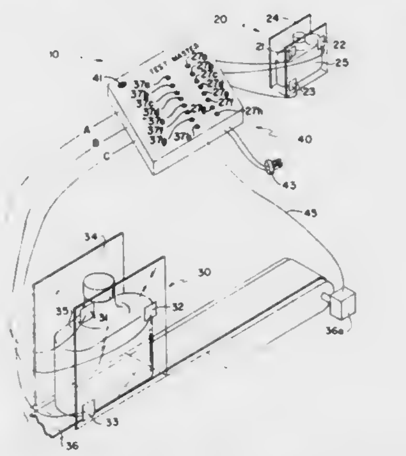
### 5,015,841
## OBJECT COMPARING DEVICE WITH DISCRETE SENSORS AND MASTER OBJECT

Kurt H. Hoppmann, and Horst A. Schober, both of Falls Church, Va., assignors to Hoppmann Corporation, Chantilly, Va.

Filed Sep. 7, 1989, Ser. No. 403,886

Int. Cl.⁵ G01N *9/04*

U.S. Cl. 250—223 R 10 Claims



1. A comparing device for comparing discrete, individual landmarks of a test object for completeness, quality and orientation as compared to discrete, individual landmarks of a master object comprising:

a plurality of discrete, individual master sensors arranged in a predetermined pattern corresponding to certain desired landmarks of a fixed master object for producing an output representative of the orientation of the fixed master object;

a plurality of discrete, individual test sensors arranged in the same pattern as said plurality of discrete, individual master sensors for sensing the compatible landmarks of a test object and for producing an output representative of the conditions of the test object; and

comparison means for comparing in parallel the output of said plurality of discrete, individual master sensors to the output of said plurality of discrete, individual test sensors for providing a signal to indicate a correctness of said test object corresponding to the desired landmarks of the fixed master object.

---

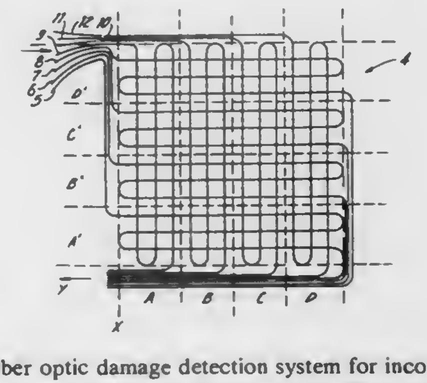
### 5,015,842
## HIGH DENSITY FIBER OPTIC DAMAGE DETECTION SYSTEM

Evan A. Fradenburgh, Fairfield, and Robert Zincone, Norwalk, both of Conn., assignors to United Technologies Corporation, East Hartford, Conn.

Filed Jnn. 1, 1989, Ser. No. 359,993

Int. Cl.⁵ H01J *5/16*

U.S. Cl. 250—227.15 24 Claims



1. A fiber optic damage detection system for incorporation in a composite structure comprising a first fiber optic strand placed on or embedded in the structure in a pattern of multiple loops which define an area wherein loss of light transmission through the fiber indicates damage to that area, the fiber disposed in a multiple path reversal pattern, the pattern having loops in both the forward and rearward directions to increase the number of adjacent fiber runs in an area, to provide a high fiber density with a fiber spacing as close as ⅛", to detect damage with a minimum number of fibers and, means for monitoring light transmission through the fiber.

---

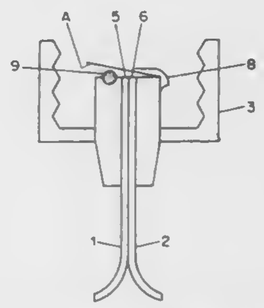
### 5,015,843
## FIBER OPTIC CHEMICAL SENSORS BASED ON POLYMER SWELLING

William R. Seitz, Durham, N.H., and Marian F. McCurley, Watertown, Mass., assignors to Polysense, Inc., Wellesley, Mass.

Filed Feb. 15, 1990, Ser. No. 480,548

Int. Cl.⁵ H01J *5/16*

U.S. Cl. 250—227.21 30 Claims



1. A detector for quantifying an analyte in a sample comprising:

(a) a housing

(b) light transmission means disposed within the housing such that light can be transmitted in both directions through the housing;

(c) means for coupling a first end of the light transmission means to a light source;

(d) means for coupling the first end of the light transmission means to a photodetector;

(e) a reflective member movable between first and second positions with respect to the light transmission means wherein the reflective member is disposed adjacent to a

VOL
1126
ISS
2
MY
14
1991
UMI

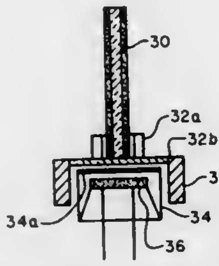
second end of the light transmission means such that light transmitted through the light transmission means from the first end to the second end is reflected by the reflective member and at least partially recollected by the light transmission means and wherein the amount of light recollected depends on the position of the reflective member relative to the light transmission means; and

(f) a polymeric detector element the volume of which varies in response to the amount of analyte in the sample, said detector element being mechanically connected to the reflective member and the light transmission means such that the position of the reflective member relative to light transmission means depends on the volume of the detector element.

---

### 5,015,844
## OPTICAL SURVEILLANCE SENSOR APPARATUS

**Eugene O. Cole, Albuquerque, N. Mex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**
**Filed Feb. 17, 1989, Ser. No. 312,533**
**Int. Cl.$^5$ G01B *11/26***
**U.S. Cl. 250—227.24** **18 Claims**



1. An optical sensor apparatus comprising in combination:

an optical fiber having a front surface and a back surface, said optical fiber having a predetermined length and a core diameter, said front and back surfaces being cleaved and polished, said optical fiber receiving light signal at said front surface, said optical fiber conducting said light signal to said back surface,

means for detecting light signals, said detecting means operatively aligned with said back surface of said optical fiber to directly receive said light signal therefrom, said detecting means having a center point and a larger diameter than said optical fiber, said optical fiber being aligned with the center point of said detecting means, said detecting means detecting said light signal and providing an output signal having a signal distribution in response thereto, and

means for signal processing, said signal processing means operatively connected to said detecting means to receive said output signal from said detecting means, said signal processing means processing said output signal to determine the signal distribution of said output signal.

---

### 5,015,845
## ELECTROSPRAY METHOD FOR MASS SPECTROMETRY

**Mark Allen, Sugarland, and Marvin L. Vestal, Houston, both of Tex., assignors to Vestec Corporation, Houston, Tex.**
**Filed Jun. 1, 1990, Ser. No. 531,872**
**Int. Cl.$^5$ H01J *49/26***
**U.S. Cl. 250—288** **20 Claims**

1. Apparatus for converting a liquid effluent including sample solute of interest and solvent into ionized molecules for analysis of the sample by a mass spectrometer, the apparatus comprising:

(a) an electrospray unit for receiving liquid effluent and for discharging charged droplets, the electrospray unit including

(i) an electrospray housing defining an atmospheric pressure electrospray chamber therein,

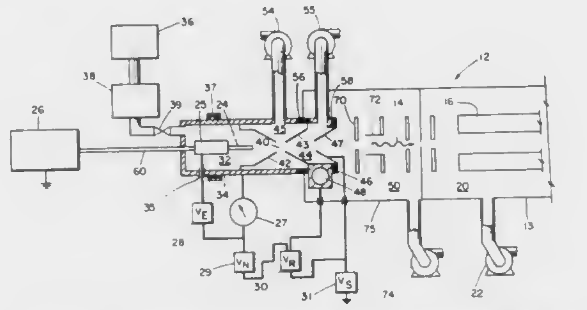
(ii) a capillary tube for passing liquid effluent therethrough, the capillary tube having an exit within the electrospray chamber for discharging sprayed droplets containing sample solute of interest and solvent,

(iii) a high voltage source for applying a high voltage to the capillary tube to produce charged sprayed droplets containing sample solute of interest and solvent, the charged sprayed droplets vaporizing within the electrospray housing to produce ions, and

(iv) a nozzle defining a portion of the electrospray housing and having a discharge port for outputting the ions and solvent vapor from the electrospray chamber, the discharge port being sized to maintain substantially atmospheric pressure within the electrospray chamber during spraying;

(v) a first electrical biasing unit for applying a biasing voltage to the nozzle; and

(b) an ion generating unit for receiving clusters of ions including condensed solvent from the electrospray unit and for discharging ionized molecules to the mass spectrometer, the ion generating unit including



(i) an ion generating housing defining an ion generating chamber therein,

(ii) an ion generating unit vacuum pump for maintaining pressure within the ion generating chamber in the range of from 0.1 Torr to 10 Torr,

(iii) a temperature sensor for monitoring the temperature within the ion generating chamber,

(iv) a heating unit responsive to the temperature sensor for heating the ion generating housing to a temperature of at least 120° C. to vaporize condensed solvent in the clusters of ions and produce desolvated ionized molecules of interest for analysis by the mass spectrometer,

(v) a sampling cone having passage therethrough for discharging ionized molecules from the ion generating chamber, and

(vi) a second electrical biasing unit for applying a biasing voltage to the sampling cone relative to the nozzle of the electrospray unit.

---

### 5,015,846
## LIGHT BEAM CONTROL APPARATUS AND LINEAR SCALE DEVICE SUITABLE FOR USE THEREIN

**Takashi Okuyama, and Masatoshi Iwama, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan**
**Filed Jul. 12, 1989, Ser. No. 379,027**
**Claims priority, application Japan, Jul. 15, 1988, 63-176646; Apr. 14, 1989, 1-94399**
**Int. Cl.$^5$ H01J *3/14***
**U.S. Cl. 250—235** **6 Claims**

1. A light beam control apparatus comprising:

light source means for producing first and second beams;

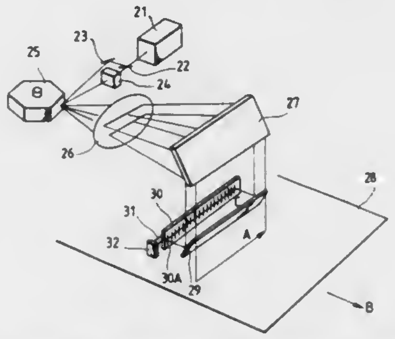
a first scan surface to which said first beam is applied;

a second scan surface to which said second beam is applied;

scanning means for causing said first and second beams to scan said first and second scan surfaces, respectively;

fluorescent optical fiber means disposed along a scanning direction of said second beam, for emitting fluorescent light in response to said second beam incident thereto and transmitting said fluorescent light; and

photodetecting means for detecting said fluorescent light;



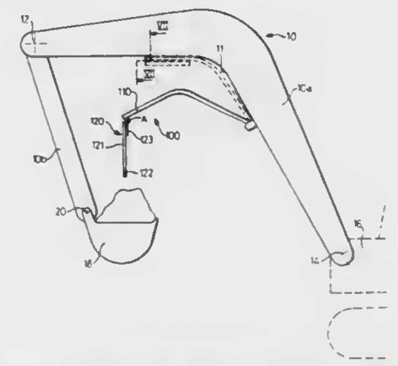
control means for determining a scanning position of said first beam on said first scan surface by using an output signal from said photodetecting means; and

modulating means for on/off-modulating said first beam, wherein said control means adjusts said scanning position of said first beam through controlling an on/off-modulation timing of said modulating means.

---

### 5,015,847
## DEVICE FOR MEASURING THE RADIOACTIVITY OF A LOAD OF ORE ON AN EXTRACTION MACHINE SUCH AS A MECHANICAL SHOVEL OR DIGGER

**Christian Rouillon, Meung Sur Loire, France, assignor to Compagnie Francaise De Mokta, Cedex, France**
**Filed Dec. 21, 1989, Ser. No. 454,436**
**Claims priority, application France, Dec. 30, 1988, 88 17481**
**Int. Cl.$^5$ E02F *9/26;* G01T *1/16***
**U.S. Cl. 250—253** **16 Claims**

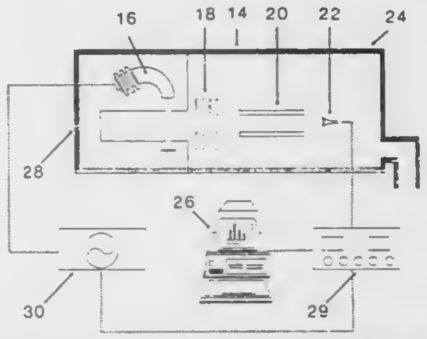


1. A device for measuring radioactivity for a machine for use in the extraction of radioactive ore and including at least one moving receptacle suitable for containing a load of ore, wherein the device comprises a rod having its top end hinged to the machine in such a manner as to leave the rod free to swing in at least one vertical plane, the bottom end of the rod having a radioactive radiation detector covering a determined solid angle, the device further including displacement means for bringing the rod and the receptacle in reproducible manner into a mutual disposition such that the load of ore contained in the receptacle occupies a substantial portion of the solid angle of the detector.

---

### 5,015,848
## MASS SPECTROSCOPIC APPARATUS AND METHOD

**David S. Bomse; Joel A. Silver, and Stanton: Alan C., all of Santa Fe, N. Mex., assignors to Southwest Sciences, Incorporated, Santa Fe, N. Mex.**
**Filed Oct. 13, 1989, Ser. No. 421,281**
**Int. Cl.$^5$ B01D *59/44***
**U.S. Cl. 250—281** **34 Claims**



1. A method for producing a two-dimensional mass spectrum of an analyte, the method comprising the steps of:

applying to an analyte a reproducible, progressively varying ionization energy;

mass filtering the ions generated;

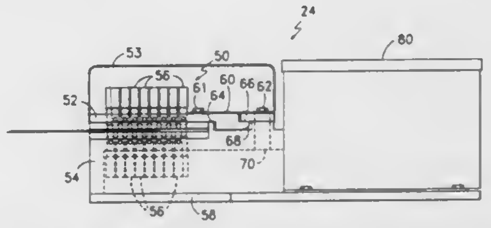
detecting and quantifying the mass filtered ions of the components generated as a function of time and producing output signals representative thereof;

processing the output signals to provide a two-dimensional mass spectrum representative of at least one component present within the analyte.

---

### 5,015,849
## INDEX MARKING SYSTEM

**Michael W. Gilpatrick, Chesnee, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.**
**Filed Dec. 14, 1989, Ser. No. 450,877**
**Int. Cl.$^5$ G01N *21/31***
**U.S. Cl. 250—302** **15 Claims**



1. A process for detecting reference locations on a moving textile substrate, comprising:

a. marking said substrate at a desired reference location with a marking material which exhibits selective absorption to light within a relatively narrow range of the non-visible spectrum and said substrate is substantially nonabsorptive of the non-visible light;

b. illuminating said substrate with light having a spectrum which includes said relatively narrow range of the non-visible spectrum;

c. sensing, within said narrow range of the non-visible spectrum, said illuminating light as said light is reflected from said substrate;

d. triggering a response whenever the intensity of said reflected light is reduced below a threshold level due to absorption of said light by said marking material.

VOL
1126
ISS
2
MY
14
1991
UMI

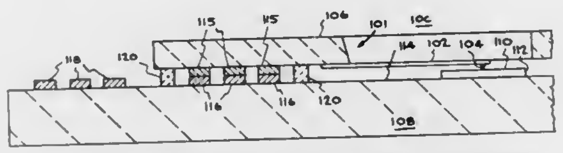
### 5,015,850
### MICROFABRICATED MICROSCOPE ASSEMBLY

**Mark J. Zdeblick, Los Altos Hills, and Thomas R. Albrecht, Stanford, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.**

**Filed Jun. 20, 1989, Ser. No. 368,664**

**Int. Cl.$^5$ G01N *23/00;* H01J *37/00***

**U.S. Cl. 250—306** **31 Claims**



1. A microfabricated microscope assembly, comprising:
- a piezoelectric bimorph cantilever arm having a first end fixed to said first substrate, said cantilever arm having a second free end with a tip fixed thereto;
- a second substrate;
- a scanned surface fixed to said second substrate and having various locations to be scanned by said tip, said tip and said scanned surface being configured to carry out a predetermined write or read mode of operation;
- spacer means fixed between said first and said second substrates for fixedly spacing said first and said second substrates a predetermined distance apart so that said tip is in close proximity to said recording surface, said spacer means including a plurality of spacer feet projecting between said first and said second substrates, the height of said spacer feet determining the spacing between said first and said second substrate, wherein said spacer feet have end surfaces at the ends thereof and wherein said microfabricated microscope assembly includes means for bonding the end surfaces of said spacer feet to one of said substrates;
- means for directly controlling the piezoelectric bimorph cantilever arm to scan said tip laterally over the scanned surface to access various locations on said scanned surface and to move the tip with respect to the scanned surface such that the tip is spaced at or in close proximity to said scanned surface.

---

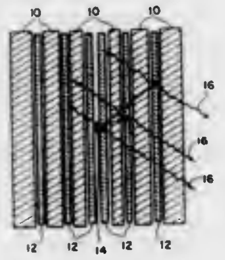
### 5,015,851
### SLOW POSITRON BEAM GENERATOR FOR LIFETIME STUDIES

**Jag J. Singh, Yorktown; Abe Eftekhari, Newport News, and Terry L. St. Clair, Poquoson, all of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed May 31, 1990, Ser. No. 531,372**

**Int. Cl.$^5$ H01J *37/00***

**U.S. Cl. 250—306** **21 Claims**



1. A slow positron beam generator for material studies comprising:
- a moderator;
- a conductive source;
- a material to be tested juxtaposed between said moderator and said conductive source; and
- a voltage source connected between said moderator and said conductive source.

---

### 5,015,852
### RADIATION IMAGE READ-OUT APPARATUS

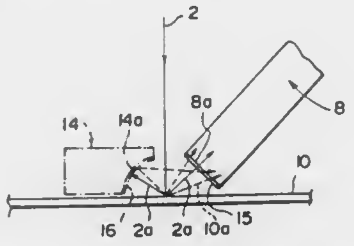
**Hiromi Ishikawa, and Sumihiro Nishihata, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Feb. 7, 1990, Ser. No. 476,229**

**Claims priority, application Japan, Feb. 20, 1989, 1-39515**

**Int. Cl.$^5$ G01N *23/04***

**U.S. Cl. 250—327.2** **14 Claims**



1. A radiation image read-out apparatus comprising:
- (i) a main scanning means which scans a stimulable phosphor sheet, on which a radiation image has been stored, with stimulating rays in a main scanning direction, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to the amount of energy stored thereon during its exposure to radiation,
- (ii) a sub-scanning means which moves the stimulable phosphor sheet with respect to the stimulating rays in a sub-scanning direction approximately normal to the main scanning direction,
- (iii) a light guide member which has a light input face extending along a main scanning line on the stimulable phosphor sheet and which guides the light emitted by the stimulable phosphor sheet and entering the light guide member at its light input face to a light output face of the light guide member, and
- (iv) a photodetector which is connected to the light output face of the light guide member,

wherein the improvement comprises the provision of a stimulating ray antireflection film, which is overlaid on said light input face of said light guide member and which comprises means for preventing said stimulating rays from being reflected by said light input face,

said stimulating ray antireflection film being designed so that the reflectivity of said stimulating rays from said stimulating ray antireflection film is lowest when said stimulating rays impinge thereupon at an angle of incidence which falls within the range of 30° to 50°.

---

### 5,015,853
### METHOD OF RECOGNIZING IRRADIATION FIELD, AND METHOD OF ADJUSTING IMAGE PROCESSING CONDITIONS

**Nobuyoshi Nakajima, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 125,084, Nov. 25, 1987, abandoned. This application Mar. 26, 1990, Ser. No. 498,678**

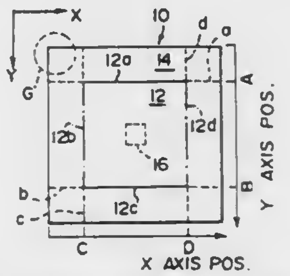
**Claims priority, application Japan, Nov. 25, 1986, 61-280117**

**The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.**

**Int. Cl.$^5$ H04N *5/32;* G01N *23/04***

**U.S. Cl. 250—327.2** **14 Claims**

1. A method of recognizing an irradiation field wherein a rectangular irradiation field is recognized in a case where a radiation image is recorded on a recording medium by limitation of the irradiation field in a rectangular form, the method of recognizing an irradiation field comprising the steps of:
- (i) detecting image signals at respective positions on said recording medium on the basis of the image information detected from said recording medium,
- (ii) setting an X axis and a Y axis along two adjacent sides of a contour of said rectangular irradiation field on said recording medium.
- (iii) adding up said image signal in said X axis direction and in said Y axis direction, detecting positions on said Y axis at which levels of the added-up signals in said X axis direction are equal to or greater than a predetermined threshold value Th, and detecting positions on said X axis at which the levels of the added-up signals in said Y axis direction are equal to or greater than the predetermined threshold value Th, and
- (iv) recognizing a region, which is surrounded by straight lines in said X axis direction at said positions on said Y axis and straight lines in said Y axis direction at said positions on said X axis on said recording medium, as the irradiation field,



wherein a characteristic value of the image signals inside of a predetermined region at the center of said recording medium is calculated, and a value obtained by multiplying said characteristic value by $1/\alpha$ wherein $\alpha$ denotes a value adjusted by consideration of the number of said image signals present in said X axis direction or in said Y axis direction, safety factors and the like is used as said threshold value Th.

---

### 5,015,854
### RADIATION IMAGE DISPLAYING APPARATUS

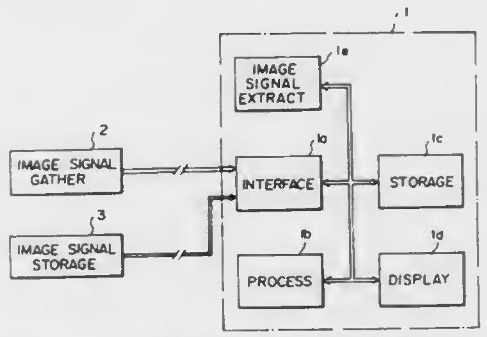
**Masao Shigyo; Shoji Kanada, and Eiji Oshida, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 8, 1989, Ser. No. 320,425**

**Claims priority, application Japan, Mar. 14, 1988, 63-59618**

**Int. Cl.$^5$ G01T *1/105***

**U.S. Cl. 250—327.2** **5 Claims**



1. A radiation image displaying apparatus comprising:
- (i) an interface section connected to an image signal gathering apparatus, which obtains an image signal by reading out a radiation image, and to an image signal storage device, which stores at least one image signal corresponding to a radiation image,
- (ii) an image processing section for carrying out image processing of an image signal,
- (iii) a storage section for storing at least one image signal corresponding to a radiation image to be displayed, and
- (iv) an image displaying section for reproducing an displaying a radiation image corresponding to an image signal stored in said storage section,

said interface section, said image processing section, said storage section and said image displaying section being connected to one another,

wherein the improvement comprises:
- (a) an image signal extracting section connected to said storage section, for processing image signals for said storage section in order to decrease the number of picture elements in the radiation images which are represented by said image signals, thereby generating a condensed image signal, which represents an outline of the corresponding radiation image, for each image signal stored in said storage section such that a plurality of said radiation image outlines can be simultaneously displayed by said image displaying section, and
- (b) said storage section including means for storing both said image signals, which are received from said image signal gathering apparatus or from said image signal storage device, and the condensed image signals, which are generated by said image signal extracting section from said image signal.

---

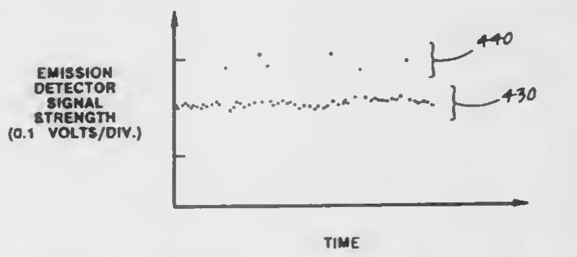
### 5,015,855
### RADIATION DOSIMETRY BY COUNTING DIFFERENTIALLY IONIZED SAMPLE AREAS FROM HEAVY CHARGED PARTICLE EVENTS

**Peter F. Braunlich, and Wolfgang Tetzlaff, all of Pullman, Wash., assignors to International Sensor Technology, Inc., Pullman, Wash.**

**Filed Apr. 10, 1989, Ser. No. 336,015**

**Int. Cl.$^5$ G01T *3/06***

**U.S. Cl. 250—337** **76 Claims**



1. A method for reading dose exposure information from a radiation dosimeter to obtain a measurement of the amount of heavy particle radiation to which the dosimeter has been exposed, comprising:
- beaming a stimulating beam onto a plurality of sample areas of the dosimeter to cause emission discharges from said sample areas; said emission discharges being variable amongst the sample areas with respect to at least one emission characteristic which is indicative of a sample area radiation dosage experienced by a particular sample area;
- measuring the emission discharges from a plurality of said sample areas to produce sample area emission information;
- comparing the sample area emission information from a plurality of sample areas;
- deducing an approximate indication of eventful sample areas which are those sample areas which exhibited an eventful emission discharge caused by incidence of at least one heavy particle upon the eventful sample area in an ionizing heavy particle event; and
- deriving from the indication of eventful sample areas, at least

VOL
1126
ISS
2
MY
14
1991
UMI

one measurement indicative of the approximate level of radiation exposure experienced by the dosimeter which was caused by heavy particle radiation.

---

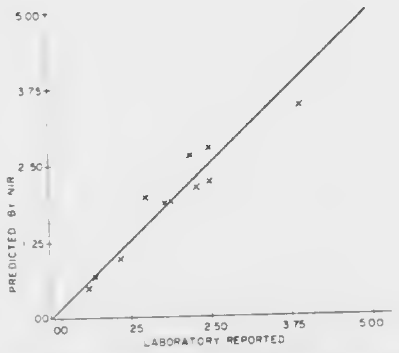
### 5,015,856
### AUTOMATED PROCESS FOR PERMEABILITY DETERMINATIONS OF BARRIER RESINS

**Harvey S. Gold, Newark, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 28, 1990, Ser. No. 500,571**

**Int. Cl.$^5$ G01N *21/35***

**U.S. Cl. 250—339** **18 Claims**



1. Process for the determination of the permeability to organic fluids of a barrier resin structure comprising at least one barrier resin and at least one structural resin, said process involving the following steps:

(a) establishing by independent means the permeability of each one of a statistically meaningful number of samples, divided into a Training set and a Validation set, of a particular barrier resin structure to a particular organic fluid, such permeability being designated base permeability;

(b) making multiple scans at different locations of each sample of the Training set with a near infrared spectrometer operatively connected to a computer programmed to perform statistical analysis of data, to obtain by coaddition the spectral response of each sample—which is its transmittance, reflectance, or absorbance—at each wavelength within the range of about 600-2500 nm;

(c) statistically generating for the totality of the samples of the Training set a data matrix correlating their spectral responses at each wavelength with their base permeabilities previously established according to paragraph (a) to formulate a mathematical expression in the form of a predictive equation for calculating sample permeability from the spectral responses;

(d) verifying the accuracy of the predictive equation obtained in step (c) by applying the equation to calculate the predicted permeabilities of the Training set;

(e) measuring under the same conditions the spectral responses of the Validation set and applying the predictive equation obtained from the Training set to predict the permeability of each sample of the Validation set;

(f) comparing the predicted permeability of each sample of the Validation set with its base permeability established according to paragraph (a);

(g) if the results indicate that the predictive equation derived in step (c) does not predict the permeabilities of the Validation set at least as well as it predicts the permeabilities of the Training set, modifying the predictive equation in a statistically acceptable manner until it predicts the permeabilities of the Validation set at least to that degree;

(h) if the predicted permeabilities of the samples of the Training set are not within a predetermined degree of error from their previously established base permeabilities, further modifying the predictive equation in a statistically acceptable manner until the resulting predictive equation predicts the permeability of the Training set within the predetermined degree of error; and

(i) measuring under the same conditions the spectral response of a barrier resin structure of unknown permeability and applying the above predictive equation to its spectral response, to predict the permeability of said structure.

---

### 5,015,857
### INFRARED DETECTOR

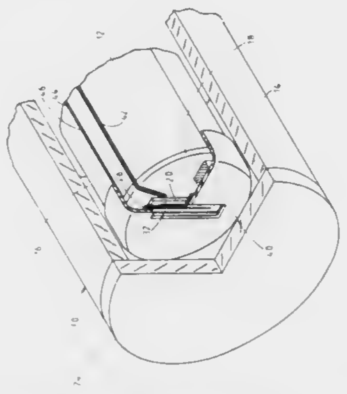
**Walter Bross, Konstantin Vanotti Strasse 3B, 7770 Überlingen; Hans Kordulla, Prielstrasse 43, 7776 Owingen, and Robert Rid, Drosselweg 9, 7778 Markdorf, all of Fed. Rep. of Germany**

**Filed Mar. 13, 1990, Ser. No. 492,627**

**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1989, 3908627**

**Int. Cl.$^5$ G01J *5/06***

**U.S. Cl. 250—349** **7 Claims**



1. An infrared detector comprising

an array of infrared sensitive detector elements arranged side-by-side on a substrate,

a passage plate arranged in front of said array of infrared sensitive detector elements and having straight passages therethrough,

each of said detector elements having an associated one of said passages aligned therewith,

the walls of said passages having reflecting and electrically conductive surfaces, which are connected to signal ground, said passages guiding infrared radiation entering at their front ends to the respective detector elements by reflection at said reflecting surfaces,

the apertures and lengths of said passages being selected to cause attenuation of radar radiation in said passages such that virtually no radar radiation becomes effective at said detector elements.

---

### 5,015,858
### THERMALLY ISOLATED FOCAL PLANE READOUT

**Frank L. Augustine, Encinitas, and Scott B. Evans, Carlsbad, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Mar. 27, 1990, Ser. No. 500,633**

**Int. Cl.$^5$ G01J *5/06***

**U.S. Cl. 250—352** **14 Claims**

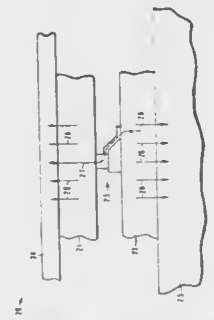
1. Detecting apparatus comprising:

a detector;

a first temperature-controlled heat sink coupled to the detector;

a detector readout;

a second temperature-controlled heat sink coupled to the detector readout;



an electrically conductive, thermally nonconductive interconnect arrangement interconnecting the detector and detector readout.

---

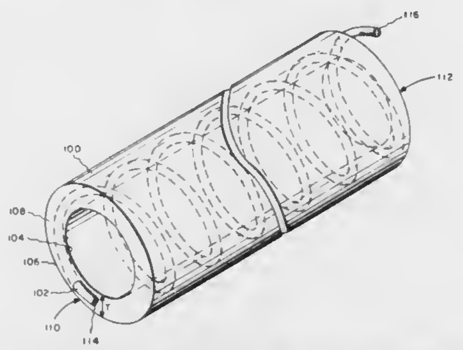
### 5,015,859
### METHOD AND APPARATUS FOR DETECTING WEAR

**Wayne H. Uejio, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 25, 1989, Ser. No. 412,034**

**Int. Cl.$^5$ G01M *11/08***

**U.S. Cl. 250—358.1** **17 Claims**



1. An apparatus for detecting wear along the surfaces of an elongated article, said apparatus comprising:

an optical fiber disposed at a predetermined depth and at a location within the article where wear is to be detected, said optical fiber being helically-shaped and including an input end and an output end, said input and output ends being disposed so as to be accessible by a system user;

means for emitting electromagnetic radiation, said emitting means disposed so as to be able to inject radiation into said input end of said optical fiber; and

means for detecting electromagnetic radiation, said detecting means disposed so as to be able to detect radiation emitted at said output end of said optical fiber.

---

### 5,015,860
### SCINTILLATOR MATERIALS CONTAINING LANTHANUM FLUORIDES

**William W. Moses, Berkeley, Calif., assignor to University of California, Berkeley, Calif.**

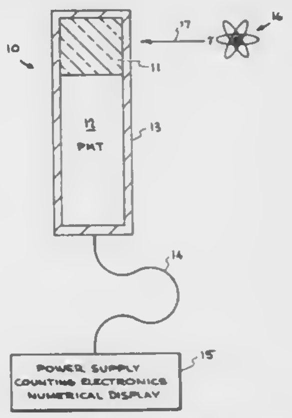
**Filed Apr. 3, 1990, Ser. No. 503,784**

**Int. Cl.$^5$ G01T *1/202;* C09K *11/85***

**U.S. Cl. 250—361 R** **14 Claims**

1. A radiation detection device comprising:

(a) a scintillator consisting essentially of a crystalline mixture of $LaF_3$ and $CeF_3$ wherein the amounts of $LaF_3$ is from about 25% to about 99.5% and the $CeF_3$ is from about 0.5% to about 75%; and



(b) means connected to the scintillator for converting scintillating light into an electrical pulse.

---

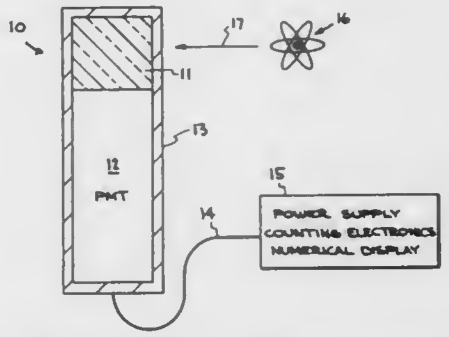
### 5,015,861
### LEAD CARBONATE SCINTILLATOR MATERIALS

**Stephen E. Derenzo, Pinole, and William W. Moses, Berkeley, both of Calif., assignors to Regents of the University of California, Oakland, Calif.**

**Filed Jul. 20, 1989, Ser. No. 383,158**

**Int. Cl.$^5$ G01T *1/202, 1/164***

**U.S. Cl. 250—361 R** **9 Claims**



1. A radioisotope camera comprising:

(a) a plurality of scintillator elements capable of converting gamma-radiation to optical radiation selected from the group of materials consisting essentially of lead carbonate and basic lead carbonate, each scintillator element being arranged in close proximity to each other and positioned to receive gamma radiation from a subject;

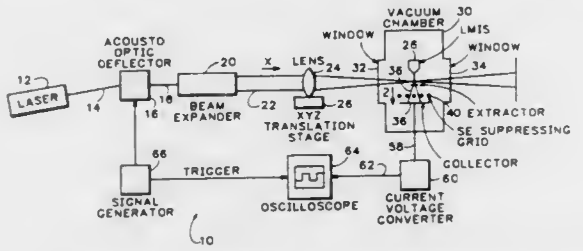
(b) a plurality of photodetectors positioned to receive optical radiation directly from the scintillator elements and convert the optical radiation into electrical pulses; and

(c) means connected to the photodetectors for responding to the electrical pulses generated by the photodetectors and reconstructing the spatial distribution of gamma radiation from the subject.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,862
### LASER MODULATION OF LMI SOURCES

**J. Fred Holmes, Portland; Jonathan H. Orloff, Lake Oswego, both of Oreg., and Karl J. Jousten, Berlin, Fed. Rep. of Germany, assignors to Oregon Graduate Institute of Science & Technology**
**Filed Jan. 22, 1990, Ser. No. 467,971**
**Int. Cl.$^5$ H01J** *27/00*
**U.S. Cl. 250—423 R** **12 Claims**

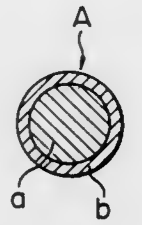


1. A method of modulating a liquid metal ion source comprising:
generating an ion beam with the liquid metal ion source;
generating a light beam with a light source;
focussing the light beam;
directing the focused light beam at the liquid metal ion source;
adjusting the location of the directed light beam relative to the liquid metal ion source; and
inducing a modulation in the ion beam by modulating the light beam.

---

### 5,015,863
### RADIATION SHIELD AND SHIELDING MATERIAL WITH EXCELLENT HEAT-TRANSFERRING PROPERTY

**Eiki Takeshima, Chiba; Kiyoshi Takatsu, Matsudo; Norio Asano, Tokyo, and Masahiro Hozumi, Matsudo, all of Japan, assignors to Sumitomo Heavy Industries, Ltd. and Nisshin Steel Co., Ltd., both of Tokyo, Japan**
**Filed Jan. 23, 1990, Ser. No. 469,857**
**Claims priority, application Japan, May 31, 1989, 1-136226**
**Int. Cl.$^5$ G21F** *1/12, 3/00*
**U.S. Cl. 250—515.1** **6 Claims**



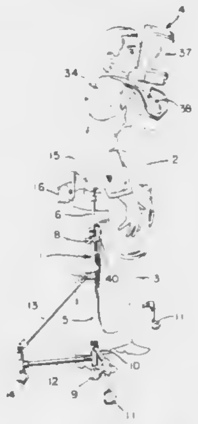
1. A radiation-shielding material comprising composite particles obtained by coating various kinds of minute particles of about 20μm to about 100 μm in diameter and having radiation-shielding property with the various kinds of metals of high thermal conductivity.

---

### 5,015,864
### MOBILE RADIATION SHIELD

**Massoud M. Maleki, 8620 N. Port Washington Rd., Milwaukee, Wis. 53217**
**Filed Sep. 21, 1989, Ser. No. 410,619**
**Int. Cl.$^5$ G21F** *3/00*
**U.S. Cl. 250—516.1** **22 Claims**

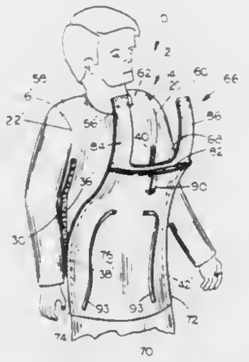
1. A manually propelled radiation shield comprising a frame, caster wheel means for supporting the frame for universal movement on the ground, a flexible sheet of material capable of preventing the transmission of radiation carried by the frame, said frame including a generally annular thrust means constructed and arranged to be engaged by the body of a user to propel the frame over the ground in accordance with walking movement of the user.



---

### 5,015,865
### X-RAY-PROTECTIVE SURGICAL GARMENT HAVING A REMOVABLE LEAD INSERT

**Annette S. Sayers, 1420 N. 131st Ave. Circle, Omaha, Nebr. 68154**
**Filed May 22, 1989, Ser. No. 354,104**
**Int. Cl.$^5$ G21F** *3/02*
**U.S. Cl. 250—516.1** **9 Claims**

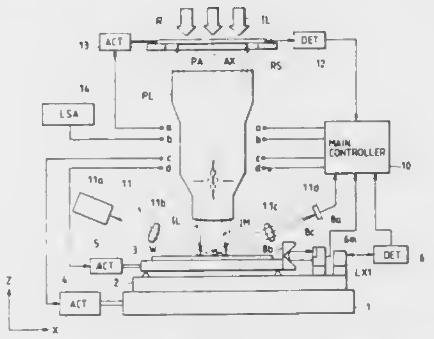


1. An X-ray-protective surgical garment comprising:
a garment having a forward portion and a rearward portion, with appropriate openings formed therein for the neck and arms,
a case means having an outer surface, an inner surface, a bottom edge, an open upper edge and spaced-apart side edges to form a cavity within said case means, removably secured to said forward portion,
a pair of first and second spaced-apart elongated shoulder straps extending upwardly from said upper edge of said case means;
said first strap having a first half of a cooperable fastener means mounted thereon and a said second half of said cooperable fastener secured to said rearward portion for cooperation with said first half, and
said second strap having a first half of a cooperable fastener means mounted thereon and said second half secured to said rearward portion for cooperation with said first half, and
said open upper edge being adapted to permit an X-ray-protective means to be removably inserted within said case means,
mounting means mounted on said forward portion for securing the case means to said forward portion, whereby said inner surface of said case will be positioned adjacent to and forward of said forward portion,
and X-ray-protective means removably positioned within said case means.

---

### 5,015,866
### STAGE APPARATUS IN EXPOSING APPARATUS

**Yutaka Hayashi, Yokohama, Japan, assignor to Nikon Corporation, Tokyo, Japan**
**Filed Dec. 1, 1989, Ser. No. 444,330**
**Claims priority, application Japan, Dec. 5, 1988, 63-307437**
**Int. Cl.$^5$ G01N** *21/86*
**U.S. Cl. 250—548** **15 Claims**



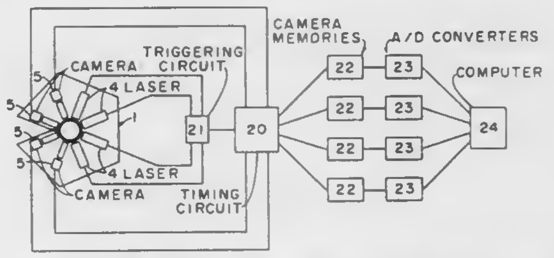
1. An exposing apparatus for copy transferring a pattern formed on a mask onto a substrate, comprising:
a moving stage which is two-dimensionally movable in a predetermined exposure reference plane surface;
inclination detecting means for detecting the inclination of the surface of the substrate in relation to said exposure reference plane surface;
stage position detecting means for detecting the two-dimensional positions of the moving stage;
a leveling stage which is mounted over the moving stage and supports the substrate and can incline the substrate in an arbitrary direction in relation to the exposure reference plane surface in cooperation with the inclination detecting means so that the surface of the substrate substantially coincides with the exposure reference plane surface;
deviation detecting means for detecting two-dimensional deviation amounts of the substrate in relation to the moving stage which are caused in association with the inclination of the leveling stage; and
control means for controlling the positions of the moving stage which are detected by the stage position detecting means in accordance with the deviation amounts which are detected by the deviation detecting means, thereby correcting the relative positional relation between the mask and the substrate.

---

### 5,015,867
### APPARATUS AND METHODS FOR MEASURING THE DIAMETER OF A MOVING ELONGATED MATERIAL

**Melvin W. Siegel, Pittsburgh, and Reed H. Grundy, Murrysville, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Aug. 30, 1989, Ser. No. 400,617**
**Int. Cl.$^5$ G01N** *21/86;* **G01B** *11/10*
**U.S. Cl. 250—560** **29 Claims**

1. A method for measuring the diameter variation of a substantially continuous length of opaque, moving, elongated material comprising the steps of:
(a) passing said elongated material substantially perpendicular to and within the path of at least one pulsed beam of electromagnetic radiation, each said at least one pulsed beam emitted by a separate semiconductor laser so as to generate two independent diffraction patterns simultaneously from the edges of said elongated material and an interference pattern due to the interaction of said diffraction patterns with one another;
(b) registering the intensity of said diffraction and interference patterns upon the surface of an array type charge coupled device positioned so as to interrupt the path of each said at least one pulsed beam, each said device possessing a plurality of discrete pixel elements thereon capable of producing an electrical charge proportional to the intensity of the diffraction and interference patterns;

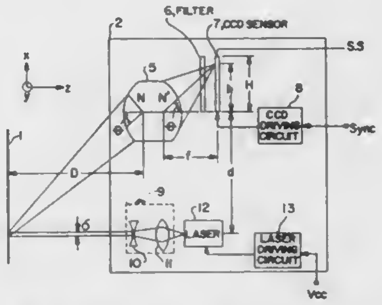


(c) converting the electrical charge within each pixel element into an analog electrical signal proportional to the intensity of the diffraction and interference patterns registered within each pixel element;
(d) converting said analog electrical signal into a digital representation;
(e) processing and storing said digital representation as a first vector array in a computer memory; and
(f) processing said vector array so as to calculate the diameter of said elongated material.

---

### 5,015,868
### REAL TIME DISTANCE SENSOR

**Hong C. Park, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea**
**Filed Nov. 29, 1988, Ser. No. 277,268**
**Claims priority, application Rep. of Korea, Nov. 30, 1987, 13680/1987[U]**
**Int. Cl.$^5$ G01N** *21/86*
**U.S. Cl. 250—561** **8 Claims**



1. A real time distance sensor, comprising:
laser means for producing a laser beam to be reflected off an object;
lens means for directing said laser beam onto said object;
CCD sensor means for detecting the reflected laser beam and for generating scanned signals according to a position of an image formed by the reflected laser beam;
pulse shaping means, operatively connected to said CCD sensor means, for producing digital pulse signals when said scanned signals are above a predetermined threshold level;
synchronous signals generating means for generating synchronous signals;
flip-flop means, operatively connected to said pulse shaping means and said synchronous signals generating means, for comparing said digital pulse signals with said synchronous signals and for generating a pulse signal representing the comparison;

VOL
1126
ISS
2
MY
14
1991
UMI

counter means for producing count data representing a measuring of a time interval between pulses in said synchronous signals;

latch means, responsive to said pulse signal, for latching said count data; and

calculating means, responsive to the latched count, for calculating a distance of said object from the real time distance sensor.

---

### 5,015,869
## DYNAMO FOR/ON BICYCLES

**Dieter Schürmann, Lessing Strasse 2, 4800 Bielefeld 1, and Bernd Gudereit, Hörster Strasse 30, 4800 Bielefeld 18, both of Fed. Rep. of Germany**

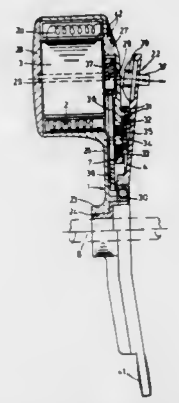
**PCT No. PCT/EP87/00339, § 371 Date Nov. 17, 1988, § 102(e) Date Nov. 17, 1988, PCT Pub. No. WO88/00549, PCT Pub. Date Jan. 28, 1988**

**PCT Filed Jun. 25, 1987, Ser. No. 196,194**

**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 3623605; European Pat. Off., Oct. 22, 1986, 253019**

**Int. Cl.$^5$ H02K** *7/18*

**U.S. Cl. 290—1 R** **15 Claims**



1. A dynamo for/on bicycles, with a housing which can be secured to the bicycle and which receives a stator and a rotor, the rotor being set in rotary motion by a drive member which is driven by a bicycle wheel, wherein a drive member (**4**) is mounted rotatably around a wheel axle (**6**) so as to be capable of kinematic connection with the wheel (**5**) and forms part of an engageable and disengageable dynamo gearing (**7**) which rotates the rotor (**3**) in dependence on wheel rotation, wherein on a bearing bracket (**11**) held torsionally securely in the housing (**1**) and mounted around the wheel axle (**6**) the gearing (**7**) comprises a driven gear (**13**), which is in engagement with the drive member (**4**) and can be moved out of engagement therewith by an actuating component (**17**), and a transmission gear (**15**) arranged coaxially thereto and coupled rotatably with the driven gear (**13**), which transmission gear (**15**) meshes with a gear wheel (**16**) arranged fixedly on or around the rotor (**3**), the driven gear (**13**) and the transmission gear (**15**) being mounted rotatably on a common shaft (**14**) and this shaft (**14**) being mounted between two legs (**11***a*, **11***c*) of different lengths of the bearing bracket (**11**) and the bearing bracket (**11**) being mounted with its longer leg (**11***a*) around the wheel axle (**6**) and being fixed in position by its U-web (**11***b*) between two strips (**12**) formed on the housing (**1**).

---

### 5,015,870
## VOLTAGE SUPPLY CIRCUIT

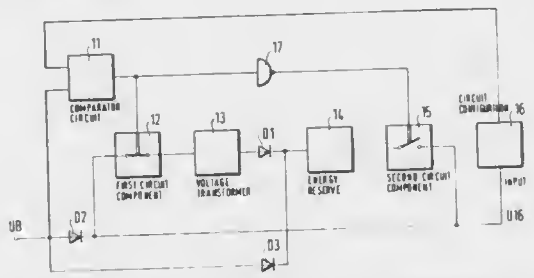
**Wolfgang Drobny, Besigheim; Bernhard Mattes, Sachsenheim; Werner Nitschke, Ditzingen; Peter Taufer, Renningen, and Hugo Weller, Oberriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Aug. 3, 1989, Ser. No. 389,349**

**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828990**

**Int. Cl.$^5$ H02J** *9/00*

**U.S. Cl. 307—66** **9 Claims**



1. A voltage supply circuit for an electrical device, the supply circuit having an energy reserve, a voltage transformer coupled to an input of the energy reserve, and a switching means, the switching means being actuated by a comparator circuit to connect the voltage transformer to a supply voltage in a first switching state, the energy reserve being chargeable by the voltage transformer in the first switching state, the switching means comprising a first switching means for connecting the voltage transformer to the supply voltage in the first switching state for the purpose of charging the energy reserve when the energy reserve is operating in open circuit in the first switching state and a second switching means for connecting an output of the energy reserve to the electrical device in a second switching state, said first and second switching means being actuated by said comparator circuit such that when the supply voltage drops below a threshold, the first and second switching means are switched to the second switching state wherein the voltage transformer is disconnected from the supply voltage and the energy reserve is connected to the electrical device.

---

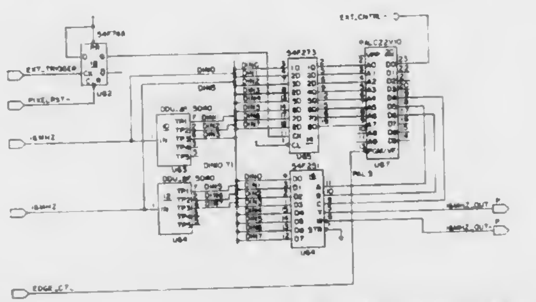
### 5,015,871
## MULTIPLE EXTERNAL ASYNCHRONOUS TRIGGERS CIRCUIT

**Joseph Sirabella, Massapequa, N.Y., assignor to Harris Corporation, Melbourne, Fla.**

**Filed Nov. 3, 1989, Ser. No. 431,305**

**Int. Cl.$^5$ H03K** *1/17*

**U.S. Cl. 307—269** **8 Claims**



1. A circuit for synchronizing the phase output of a clock relative to multiple asynchronous input signals, comprising:

a. a delay line means having an input clock signal as an input thereto and having spaced time delayed output taps to produce a plurality of phase displaced output clock signals;

b. a latch circuit having the plurality of phase displaced clock signals as inputs thereto, and being responsive to an asynchronous input signal to latch the states of the plurality of phase displaced clock signals at the receipt of the asynchronous input signal;

c. a programmable array logic circuit having the latch states from the latch circuit as inputs there to, and comparing the latch states to latch states in memory to determine the particular phase displaced clock signal which is selected to achieve synchronization with the asynchronous input signal and producing an output signal representative; and

d. a clock selector switch circuit, controlled by the output signal of said programmable array logic circuit to provide at the output thereof the particular phase displaced clock signal selected to achieve synchronization with the asynchronous input signal.

---

### 5,015,872
## METHOD AND CIRCUIT ARRANGEMENT FOR GENERATING A PHASE SHIFTED CLOCK PULSE SIGNAL

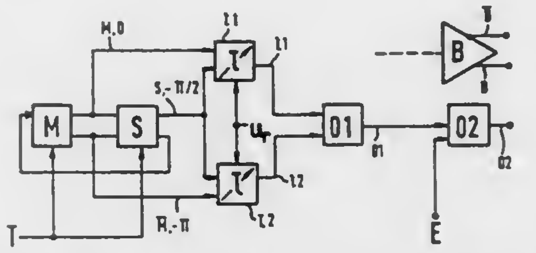
**Hans-Martin Rein, Witten, Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany**

**Filed Jul. 5, 1989, Ser. No. 375,686**

**Claims priority, application Fed. Rep. of Germany, Jul. 6, 1988, 3822857**

**Int. Cl.$^5$ H03K** *5/13, 5/00*

**U.S. Cl. 307—269** **15 Claims**



1. A method of generating a clock pulse signal which is shifted in phase by a phase value that can be set as desired between zero and $-2\pi$, using first and second continuous phase shifters which are settable between zero and $-\pi/2$ and $-3\pi/4$, respectively, comprising the steps of:

dividing the frequency of an original signal in half with a frequency divider;

generating phase shifts of the frequency-halved signal at 0, $-\pi/2$ and $-\pi$;

generating a first variably phase shifted signal by shifting the phase of the frequency-halved signal by between 0 and $-\pi/2$;

generating a second variable phase shifted signal by shifting the phase of the frequency-halved signal by between $-\pi/2$ and $-\pi$, said step of generating a first variably phase shifted signal including the steps of inputting to first and second input ports of a first controllable phase shifter respectively the unshifted frequency-halved signal and the frequency-halved signal phase shifted by $-\pi/2$ and adjustably controlling the phase of a first output signal of the first controllable phase shifter with a control signal thereby to generate any desired, predeterminably continuous phase values in a range from 0 to $-\pi/2$, said step of generating a second variably phase shifted signal including the steps of inputting to first and second input ports of a second controllable phase shifter respectively the frequency-halved signal phase shifted by $-\pi/2$ and the frequency-halved signal phase shifted by $-\pi$ and adjustably controlling the phase of a second output signal of the second controllable phase shifter with the same control signal as for the first phase shifter, thereby to generate any desired, predeterminable phase values in a range from $-\pi/2$ to $-\pi$; and

thereafter doubling the frequency of the first and second variably phase shifted signals to obtain phase shifted values between 0 and $-\pi$ with reference to the frequency of the original signal result.

---

### 5,015,873
## SEMICONDUCTOR DRIVER FOR PRODUCING SWITCHING AND OFFSET SIGNALS

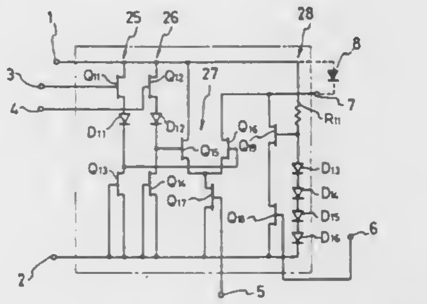
**Hiromitsu Hirayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Mar. 15, 1989, Ser. No. 324,219**

**Claims priority, application Japan, Mar. 18, 1988, 63-65347**

**Int. Cl.$^5$ H03K** *3/01, 3/42*

**U.S. Cl. 307—270** **7 Claims**



1. A semiconductor integrated circuit device for applying a switching current and an offset current in superposed relation to each other to an external load connectable between an output terminal and a first power supply terminal, the device comprising:

switching current supplying circuit means for supplying a switching current to said output terminal;

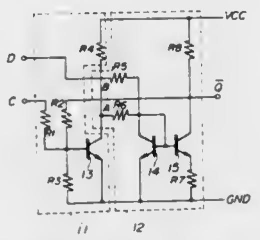
offset current supplying circuit means for supplying an offset current to said output terminal, said offset current supplying circuit means including a first field effect transistor having a drain electrode connected to said output terminal, and a second field effect transistor having substantially the same characteristics as said first field effect transistor and having a drain electrode connected to a source electrode of said first field effect transistor, a gate electrode connected to an offset current control terminal receptive of a control voltage effective to control the offset current, and a source electrode connected to a second power supply terminal; and

constant voltage generating circuit means for generating and applying a constant voltage to a gate electrode of the first field effect transistor, said constant voltage generating circuit means including a resistor connected between said first power supply terminal and the gate electrode of the first field effect transistor, and a plurality of diodes having substantially the same characteristics and being forwardly series-connected to each other such that an anode of a first stage diode in said plurality of the forwardly series-connected diodes is connected to the gate electrode of the first field effect transistor and a cathode of a last stage diode in said plurality of the forwardly series-connected diodes is connected to said second power supply terminal so that a voltage between said plurality of the series-connected diodes is set to a half of a power supply voltage applied between said first and second power supply terminals, each of said series-connected diodes having an internal resistance smaller than a specific resistance of said resistor.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,015,874
## STATUS HOLDING CIRCUIT AND LOGIC CIRCUIT USING THE SAME

**Motomu Takatsu, Hadano, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**
**Filed Dec. 27, 1989, Ser. No. 457,503**
**Claims priority, application Japan, Mar. 20, 1989, 1-68329**
**Int. Cl.⁵ H03K** *17/16, 19/094, 19/21*
**U.S. Cl. 307—272.1** **25 Claims**

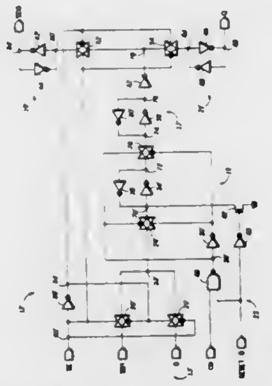


1. A status holding circuit, comprising:
a status holding transistor having a negative conductance range and having an emitter coupled to a negative power source, a collector and a base coupled to said collector;
first and second input terminals to which first and second input signals are applied;
a first resistor provided between said first input terminal and the collector of said transistor;
a second resistor provided between said second input terminal and the collector of said transistor; and
amplifier means, provided between a positive power source and the negative power source, for amplifying an output from the base of said status holding transistor to thereby generate an amplified output signal.

---

## 5,015,875
## TOGGLE-FREE SCAN FLIP-FLOP

**Grady L. Giles, and Jesse R. Wilson, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Dec. 1, 1989, Ser. No. 444,208**
**Int. Cl.⁵ H03K** *3/284, 19/007*
**U.S. Cl. 307—272.2** **28 Claims**

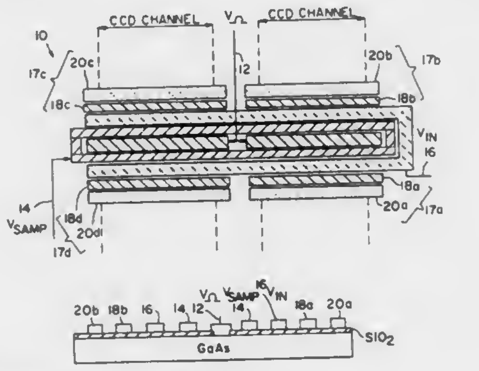


10. A toggle-free scan flip-flop, comprising:
a first inverter having an input for receiving a control signal, and an output connected to a first node;
a first switch for coupling a first input signal to an input node when said control signal is in a first logic state;
a second switch for coupling a second input signal to said input node when said control signal is in a second logic state;
a first latch having an input coupled to said input node, for receiving a data input signal, and an output;
a second latch having an input coupled to said output of said first latch and an output coupled to a second node, for providing a latch data output signal;
a third switch for coupling an input signal at said input node to the input of the first latch when said clock signal is in a first logic state;
a fourth switch for coupling said output of a first latch to said input of said second latch when said clock signal is in a second logic state;
a second inverter having an input for receiving said clock signal, and an output for providing a complementary clock signal to said third and said fourth switches;
a third inverter having an input coupled to the output of said second latch, and an output coupled to a fourth node;
a third latch having an input coupled to said fourth node, and an output for providing a first output signal;
a fourth latch having an input coupled to said fourth node, and an output for providing a second output signal;
a fifth switch for coupling the output of the third inverter to the input of said third latch when said control signal is in said first logic state; and
a sixth switch for coupling the output of the third inverter to the input of said fourth latch when said control signal is in said second logic state.

---

## 5,015,876
## HIGH SPEED CHARGE-COUPLED SAMPLER AND RATE REDUCTION CIRCUIT

**Knud L. Knudsen, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**
**Filed Jun. 30, 1989, Ser. No. 375,238**
**Int. Cl.⁵ H03K** *17/04, 17/56;* **G11C** *27/02*
**U.S. Cl. 307—352** **8 Claims**



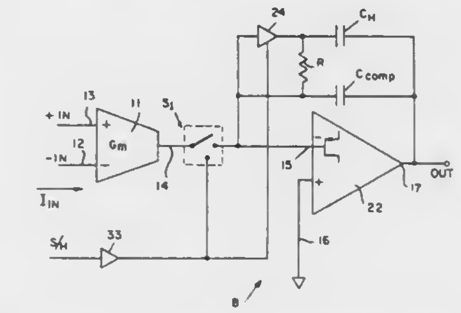
1. A sampler comprising:
a source for providing a supply of charges;
a sampling gate for regulating the amount of said supply of charge from said source; said sampling gate being adjacent to said source;
an input gate for modulating the amount of said supply of charge after said supply of charge emerges from said sampling gate; and
a plurality of sequential charge output gates, each of said sequential charge output gates being adjacent to said input gate, said plurality of sequential charge output gates being capable of conducting a packet of said supply of charge into one of said sequential charge output gates at a time, said plurality comprising at least four of said gates.

---

## 5,015,877
## LOW DISTORTION SAMPLE AND HOLD CIRCUIT

**Ken R. King, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.**
**Filed Apr. 13, 1990, Ser. No. 508,568**
**Int. Cl.⁵ G11C** *27/02*
**U.S. Cl. 307—353** **10 Claims**

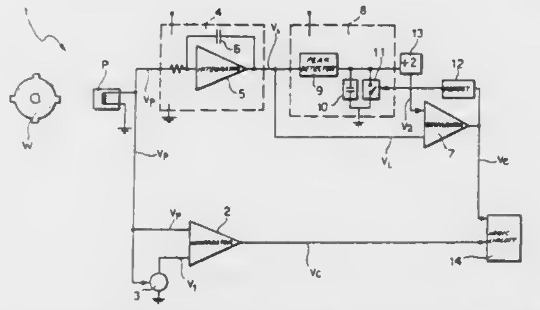
1. A sample and hold circuit having low distortion at a large full power bandwidth comprising
an input stage having input and an output for providing an output signal;
an output stage having an input which is switchably connected to the output of the input stage, and an output for generating an output signal;
a sampling switch switchably connecting the output of the input stage with the input of the output stage;
a compensation capacitor connected across the input and output of the output stage to be driven by current during sampling;
a series connected voltage buffer and a hold capacitor connected across the input and output of the output stage in parallel with the compensation capacitor;
said voltage buffer isolating the hold capacitor from the output of the input stage and charging the hold capacitor to a voltage value equalling an instantaneous voltage value of the compensation capacitor.



---

## 5,015,878
## CIRCUIT FOR PROCESSING THE SIGNAL GENERATED BY A VARIABLE-RELUCTANCE ELECTROMAGNETIC ROTATION SENSOR

**Diego Lasagna, Chieri, and Francesco P. Mandara, Turin, both of Italy, assignors to Marelli Autronica S.p.A., Milan, Italy**
**Filed Oct. 25, 1989, Ser. No. 426,378**
**Claims priority, application Italy, Oct. 25, 1988, 67957 A/88**
**Int. Cl.⁵ H03K** *5/153*
**U.S. Cl. 307—358** **2 Claims**

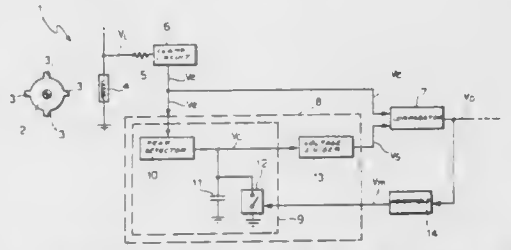


1. A circuit for processing a signal generated by a variable-reluctance electromagnetic rotation sensor comprising:
first threshold comparator means for comparing the signal provided by the sensor with a threshold signal and providing an output reference signal indicative of the zero-crossing of this signal;
an integrator circuit connected to the sensor,
second comparator means for providing an enabling signal when the signal provided by the integrator circuit exceeds a second threshold signal, and
a logic circuit having first and second inputs connected to outputs of the first and second comparator means respectively and arranged to transmit an output reference signal which is indicative of the zero-crossing of the signal of the sensor only when the second comparator means provides the enabling signal,
said second comparator means comprising:
a threshold-signal generator circuit, connected to an output of the integrator circuit, for generating a threshold signal whose amplitude is variable in a predetermined manner depending on the amplitude of the signal emitted by the integrator circuit, and
a comparator circuit having inputs thereto connected to the output of the integrator circuit and to an output of the threshold signal generator circuit, wherein said threshold-signal generator circuit comprises a peak-detector circuit having an input thereto connected to the output of said integrator circuit, storage means connected to the output of said peak-detector circuit, and reset circuit means for resetting said storage means, controlled by said second comparator means so as to reset said storage means each time the signal provided by said integrator circuit exceeds the threshold signal.

---

## 5,015,879
## CIRCUIT FOR PROCESSING THE SIGNAL GENERATED BY A VARIABLE-RELUCTANCE ELECTROMAGNETIC ROTATION SENSOR

**Diego Lasagna, Chieri, and Francesco Semeraro, Turin, both of Italy, assignors to Marelli Autronica S.p.A., Milan, Italy**
**Filed Oct. 25, 1989, Ser. No. 426,377**
**Claims priority, application Italy, Oct. 25, 1988, 67956 A/88**
**Int. Cl.⁵ H03K** *5/153*
**U.S. Cl. 307—358** **3 Claims**



1. A circuit for processing a signal generated by a variable-reluctance electromagnetic rotation sensor to provide a signal the sign of whose amplitude can change, in particular from positive to negative, passing through zero; the circuit comprising:
a threshold-signal generator circuit,
a threshold-comparator circuit with hysteresis which is connected to the sensor and to the threshold-signal generator circuit, and which outputs a signal which changes from a first level to a second level when the signal generated by the sensor exceeds a threshold signal, and which changes from the second level to the first level when the signal generated by the sensor passes through zero,
the threshold-signal generator circuit comprising
a peak-detector circuit which is connected to the sensor,
storage means connected to an output of the peak-detector circuit and to a threshold-signal input of the comparator, and
reset circuit means for resetting the storage means which are controlled by said signal output of the threshold-comparator circuit so as to zero the storage means almost instantaneously each time the signal provided by the sensor exceeds the threshold signal.

VOL
1126
ISS
2
MY
14
1991
UMI

**5,015,880**

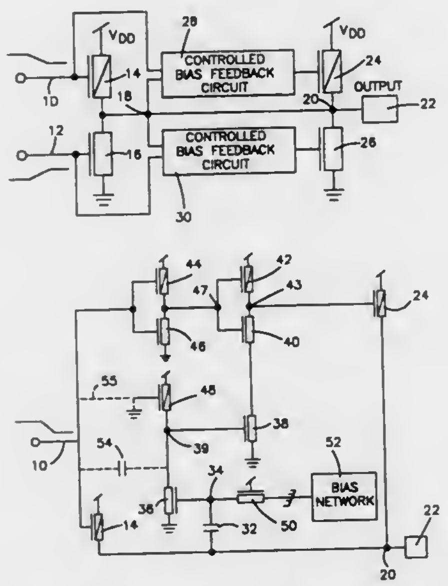
### CMOS DRIVER CIRCUIT

**Charles E. Drake, Underhill; Howard L. Kalter, Colchester, and Scott C. Lewis, Essex Junction, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 10, 1989, Ser. No. 419,341**

**Int. Cl.$^5$ H03K** *17/16, 19/20, 5/13*

**U.S. Cl. 307—443** **11 Claims**



1. In a CMOS integrated circuit for driving capacitance devices, wherein said circuit includes an input node and an output node and comprising a first transistor operatively connected to the input node to be turned "on" and "off", and being coupled between a power supply and the output node to supply an output thereto when turned "on"; the improvement which comprises;

a second transistor coupled between said power supply and the first output node to supply an output thereto when turned "on", first means operatively connected to both of said first and second transistors to turn said first transistor "on" prior to said second transistor, and controlled bias feedback means connected between said output node and said second transistor to turn said second transistor "on", if and only if the slew rate of the output signal of the first transistor is less than a given value.

**5,015,881**

### HIGH SPEED DECODING CIRCUIT WITH IMPROVED AND GATE

**Barbara A. Chappell; Terry I. Chappell, both of Amawalk, and Stanley E. Schuster, Granite Springs, all of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Mar. 2, 1990, Ser. No. 488,358**

**Int. Cl.$^5$ H03K** *19/017, 19/096, 19/094, 17/04*

**U.S. Cl. 307—449** **9 Claims**

1. An AND gate comprising:

first and second opposite type field effect transistors, each said transistor including first and second conduction path terminals and a control electrode;

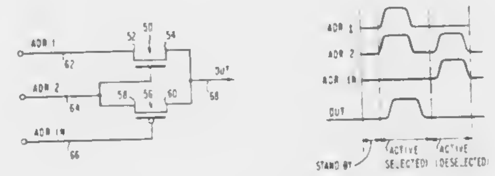
an output terminal connected in common to said second conduction path terminals of said first and second transistors;

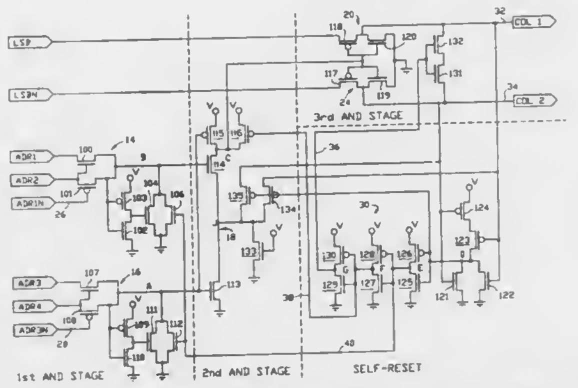
a first logic input connected to said first conduction path terminal of said first transistor;

a second logic input connected in common to said control electrode of said first transistor and to said first conduction path terminal of said second transistor;

a third input connected to said control electrode of said second transistor;

means for applying to said first, second and third inputs, a Standby conditioning potential which renders said transistors into a potentially conductive state; and





means for applying logic signals to said first and second inputs and a complement of the logic signal on said first input to said third input, whereby both said transistors may be rendered conductive by simultaneously applied logic signals of one type to said first and second logic inputs, to thereby cause said output terminal to reflect a logical AND.

**5,015,882**

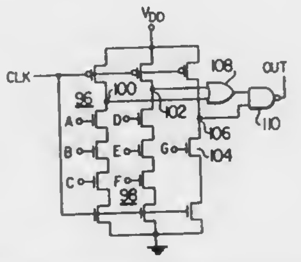
### COMPOUND DOMINO CMOS CIRCUIT

**Theodore W. Houston, Richardson; Patrick W. Bosshart, Dallas, and Ching-Heo Shaw, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 903,330, Sep. 3, 1986, abandoned. This application Jun. 25, 1990, Ser. No. 542,666**

**Int. Cl.$^5$ H03K** *19/017*

**U.S. Cl. 307—452** **8 Claims**



1. A compound domino logic circuit for performing a logical AND operation over a plurality of logic input signals, said circuit comprising:

at least three sections of logic devices arranged in parallel, each section including a node for providing a preliminary output signal, the logic devices in each of a first and a second section coupled in series to gate current flow in response to one or more of the plurality of input signals and generate a preliminary output signal at the section node, the third section including at least one logic device positioned to gate current flow in response to at least one additional input signal and generate a preliminary output signal a the third section node;

gate means for selectively coupling each preliminary node to a voltage source and for electrically isolating the sections from one another;

discharge means for selectively coupling each section to a second voltage level;

clock means for controlling said gate means in order to precharge each section with the voltage source and for controlling said discharge means in order to provide preliminary output signals at the nodes;

means for performing a logical OR operation over preliminary output signals provided by the first and second sections, said OR means providing a secondary logic output signal; and

means for performing a logical NAND operation over the secondary logic output signal and a preliminary output signal provided by the third precharged section.

**5,015,883**

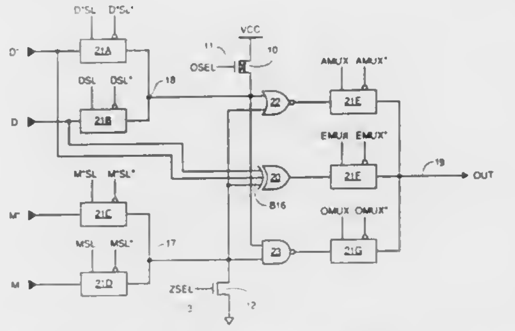
### COMPACT MULTIFUNCTION LOGIC CIRCUIT

**William K. Waller, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.**

**Filed Oct. 10, 1989, Ser. No. 420,139**

**Int. Cl.$^5$ G06F** *7/38;* **H03K** *17/56;* **G11C** *7/00*

**U.S. Cl. 307—465** **3 Claims**



1. A multifunction logic circuit having logic signals at high and low logic levels, comprising:

(a) an output node;

(b) first, second, and third passthrough gates, said passthrough gates capable of blocking or passing said logic signals to said final output node, said passthrough gates designed such that one and only one of said first, second, and third passthrough gates pass said logic signal to a final output node at any given time;

(c) a NOR gate, outputting to said final output node via said first passthrough gate, having a first and a second NOR input nodes;

(d) an XOR gate, outputting to said final output node via said passthrough gate, having a first, a second, and a third XOR input nodes;

(e) a NAND gate, outputting to said final output node via said third passthrough gate, having a first and a second NAND input nodes;

(f) fourth, fifth, sixth, and seventh passthrough gates, said passthrough gates capable of blocking or passing said logic signals to at least one of said NAND, NOR, and XOR input nodes, said passthrough gates designed such that only one of said fourth and fifth passthrough gates is capable of passing one of said logic signals at any given time and such that only one of said sixth and seventh passthrough gates is capable of passing one of said logic signals at any given time;

(g) a first input, an inverted first input, a second input, and a second inverted input, said first and said second XOR input nodes responsive to said first input and said inverted first input respectively;

(h) a first passthrough gate output node, responsive to said first input and said inverted first input through said fourth and fifth passthrough gates respectively, inputting to said first NOR input node and inputting to said first NAND input node;

(i) a second passthrough gate output node, responsive to said second input and said inverted second input through said sixth and seventh passthrough gates respectively, inputting to said second NOR input node, said second NAND input node, and said third XOR input node;

(j) a pullup device activated by a pullup control signal, to selectively pull said first NOR input node and said first NAND input node to a high level, such that said first input and inverted first input are blocked by said fourth and fifth passthrough gates when said pullup device is activated; and

(k) a pulldown device activated by a pulldown control signal, to selectively pull said second NAND input node and said second NOR input node, and said third XOR input node to said low logic level, such that said second input and said inverted second input are blocked by said sixth and seventh passthrough gates when said pulldown device is activated,

wherein, a combination of inputs is selected by said fourth, fifth, sixth, and seventh passthrough gates and said pullup and pulldown devices, and an output is selected by one of said first, second, and third passthrough gates, so that a predetermined logic function may be performed.

**5,015,884**

### MULTIPLE ARRAY HIGH PERFORMANCE PROGRAMMABLE LOGIC DEVICE FAMILY

**Om P. Agrawal, San Jose; George H. Landers, Mountain View; Nicholas A. Schmitz, Cupertino, all of Calif.; Jerry D. Moench, and Kerry A. Ilgenstein, both of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Continuation-in-part of Ser. No. 243,574, Sep. 12, 1988, Pat. No. 4,963,768, which is a continuation-in-part of Ser. No. 178,707, Apr. 7, 1988, Pat. No. 4,931,671, which is a continuation of Ser. No. 717,640, Mar. 29, 1985, Pat. No. 4,742,252. This application Mar. 7, 1990, Ser. No. 490,808**

**Int. Cl.$^5$ H03K** *19/177, 19/092*

**U.S. Cl. 307—465** **22 Claims**

1. An integrated circuit having a plurality of pins comprising:

a plurality of programmable logic blocks, each programmable logic block having a plurality of input lines and a plurality of output lines;

programmable switch interconnection means, operatively coupled to each of said programmable logic blocks, for receiving signals on said pluralities of output lines from said plurality of programmable logic blocks and for providing input signals to said pluralities of input lines of said plurality of programmable logic blocks, wherein each programmable logic block includes:

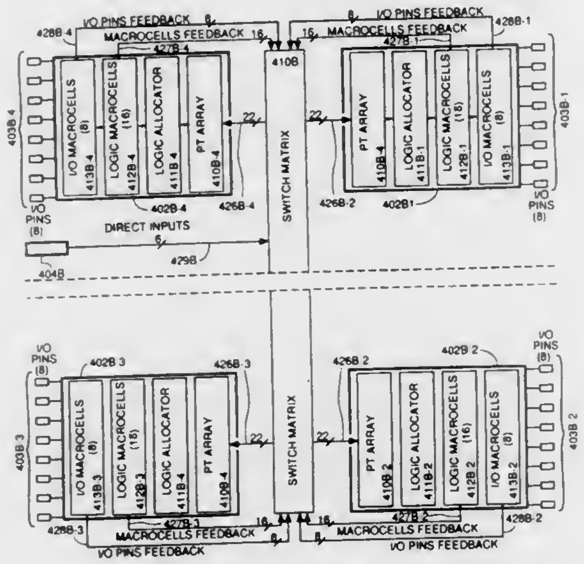
programmable array means, operatively coupled to programmable switch interconnection means, for receiving a plurality of input signals only from said plurality of programmable logic block input lines and for generating a plurality of output signals;

a plurality of programmable logic macrocell means, each programmable logic macrocell means, operatively coupled to said programmable switch interconnection means, having at least one input line and an output line;

logic allocator means, operatively coupled to said programmable array means and selectively operatively

VOL.
1126
ISS
2
MY
14
1991
UMI

coupled to and decoupled from each of said plurality of programmable logic macrocell means, for steering said plurality of output signals of said programmable array means to selected input lines of said plurality of programmable logic macrocell means and for decoupling said unselected input lines of said plurality of programmable logic macrocell means from said programmable array means; and



a plurality of programmable input/output (I/O) macrocell means, each I/O macrocell means, connected to one of said pins, and to the output line of one of said programmable logic macrocell means for selectively connecting and disconnecting said programmable logic macrocell means output line to said pin.

---

**5,015,885**

## RECONFIGURABLE PROGRAMMABLE INTERCONNECT ARCHITECTURE

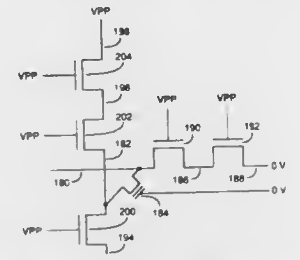
**Abbas El Gamal, Palo Alto, and Steve S. S. Chiang, Saratoga, both of Calif., assignors to Actel Corporation, Sunnyvale, Calif.**

**Continuation-in-part of Ser. No. 195,728, May 18, 1988, which is a continuation-in-part of Ser. No. 909,261, Sep. 19, 1986, Pat. No. 4,758,745. This application Feb. 10, 1989, Ser. No. 309,306**

**The portion of the term of this patent subsequent to Jul. 19, 2005, has been disclaimed.**

**Int. Cl.$^5$ H03K** *17/687*

**U.S. Cl. 307—465** **39 Claims**



1. In an integrated circuit, an electrically programmable interconnect architecture, comprising:

a plurality of modules placed in an array, the modules having connection nodes,

a plurality of sets of wiring channels, at least some of said sets of wiring channels having at least one wiring channel comprising at least two wiring segments and wherein at least one of said wiring segments is connected to at least one of said connection nodes,

a plurality of reconfigurable elements, each of said reconfigurable elements having two main terminals, said main terminals connected between selected ones of said wiring segments comprising one of said channels, each of said reconfigurable elements further including a control terminal,

configuring means, connected to said control terminals, for selectively rendering said reconfigurable elements conductive or non-conductive between said two main terminals,

series-pass transistors connecting selected adjacent ones of said segments, each of said series-pass transistors having a control element, and

selection circuitry connected to the control element of each of said series-pass transistors capable of selectively biasing each one of said series-pass transistors to cause it to conduct or not to conduct.

---

**5,015,886**

## PROGRAMMABLE SEQUENTIAL-CODE RECOGNITION CIRCUIT

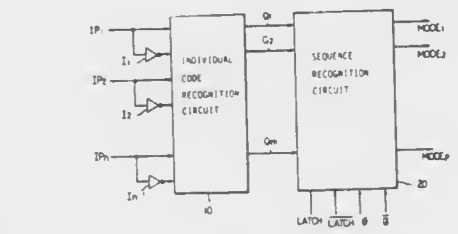
**Jung-Dal Choi; Hyung-Kyu Yim; Jae-Young Do, all of Seoul, and Jin-Ki Kim, Daegu, all of Rep. of Korea, assignors to SamSung Electronics Co., Ltd., Suwon, Rep. of Korea**

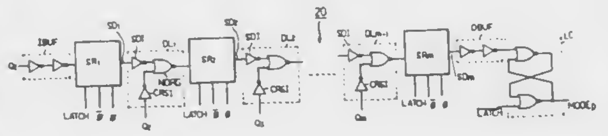
**Filed May 24, 1989, Ser. No. 356,172**

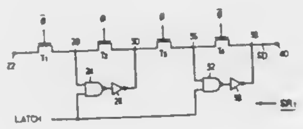
**Claims priority, application Rep. of Korea, Jul. 18, 1988, 1988-8954**

**Int. Cl.$^5$ H04Q** *7/00, 9/00;* **H04M** *11/02;* **H03K** *3/01*

**U.S. Cl. 307—465** **3 Claims**


IP1
IPk
IPn
INDIVIDUAL CODE RECOGNITION CIRCUIT
SEQUENCE RECOGNITION CIRCUIT
MODE1
MODE2
MODEp
LATCH
10
20





1. In a semiconductor device having a plurality of operating modes, a programmable sequential code recognition circuit comprising individual code recognition means, having a combination of a plurality of logic elements, for receiving a plurality of sequential input codes to thereafter provide an individual code according to recognition of said input codes, and sequence recognition means, coupled to the output of said individual code recognition means, for outputting a signal to enable or disable a particular operating mode upon the semiconductor device, in response to logic combination of said each individual code input, whereby a desired particular operating mode may be selected in the semiconductor device.

---

**5,015,887**

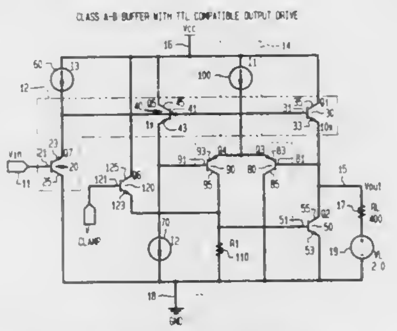
## A-B BUFFER CIRCUIT WITH TTL COMPATIBLE OUTPUT DRIVE

**Bruce J. Tesch, Melbourne; Jay D. Moser, Sr., Palm Bay, and Stephen P. Tam, Indialantic, all of Fla., assignors to Harris Corporation, Melbourne, Fla.**

**Filed Nov. 3, 1989, Ser. No. 431,517**

**Int. Cl.$^5$ H03K** *17/16;* **H03L** *3/26*

**U.S. Cl. 307—475** **22 Claims**



1. A signal coupling circuit comprising:

an input terminal to which an input signal is coupled;

an output terminal from which an output signal is derived;

a multistage emitter-follower transistor circuit coupled between said input and output terminals;

a current control transistor stage coupled to said output terminal for controlling the operation of said multistage emitter-follower transistor circuit;

a reference emitter-follower transistor stage coupled in parallel with one of the emitter-follower transistor stages of said multistage emitter-follower transistor circuit;

a differential amplifier stage having a first input coupled to said reference emitter-follower transistor stage and a second input coupled to said one of the emitter-follower transistor stages of said multistage emitter-follower transistor circuit, and a load impedance, to which said current control transistor stage is coupled; and

means for providing a prescribed bias current through said load impedance, so as to cause said current control transistor stage, and thereby said one of the emitter-follower transistor stages of said multistage emitter-follower transistor circuit, to be continuously conductive, irrespective of variations in said input signal.

---

**5,015,888**

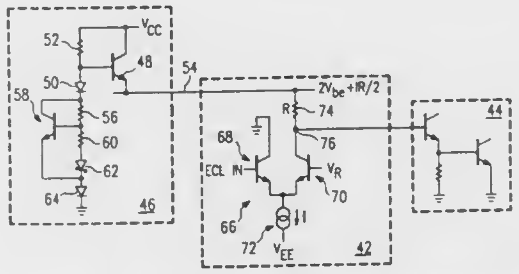
## CIRCUIT AND METHOD OF GENERATING LOGIC OUTPUT SIGNALS FROM AN ECL GATE TO DRIVE A NON-ECL GATE

**Kevin M. Ovens, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Oct. 19, 1989, Ser. No. 423,925**

**Int. Cl.$^5$ H03K** *19/01*

**U.S. Cl. 307—475** **26 Claims**



1. A circuit for generating logic output signals from an ECL gate for driving the input of a non-ECL gate comprising:

a node associated with the output of the ECL gate and the input to the non-ECL gate; and

voltage regulator circuitry for regulating the voltage on said node such that a voltage transition at said node responsive to a transition of the ECL gate encompasses the threshold voltage of the non-ECL gate to allow the ECL gate to drive the non-ECL gate directly.

---

**5,015,889**

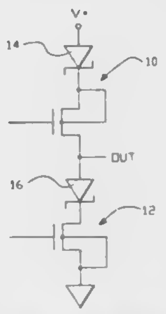
## SCHOTTKY ENHANCED CMOS OUTPUT CIRCUIT

**Robert L. Reay, 939 Addison Ave., Palo Alto, Calif. 94301**

**Filed Feb. 23, 1989, Ser. No. 314,378**

**Int. Cl.$^5$ H03K** *19/092, 19/00*

**U.S. Cl. 307—475** **5 Claims**



1. A CMOS output circuit comprising:

first and second voltage potentials;

a P-channel transistor having source, drain, and gate electrodes and an N-channel transistor having source, drain, and gate electrodes;

first input terminal means for applying a first input signal to said gate of said P-channel transistor;

second input terminal means for applying a second input signal to said gate electrode of said N-channel transistor;

a first Schottky diode connecting said source electrode of said P-channel transistor to said first voltage potential;

means connecting said source electrode of said N-channel transistor to said second voltage potential;

an output terminal connected to said drain electrode of said P-channel transistor; and

a second Schottky diode connecting said output terminal to said drain electrode of said N-channel transistor.

---

**5,015,890**

## SENSE AMPLIFIER HAVING PULL-UP CIRCUIT CONTROLLED BY FEEDBACK

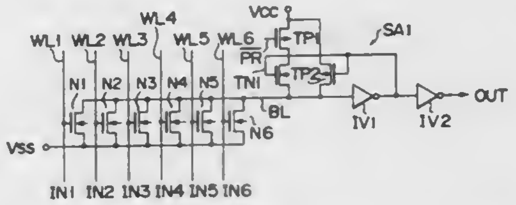
**Hiroaki Murakami, Tokyo, and Osamu Matsumoto, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Jan. 18, 1990, Ser. No. 466,925**

**Claims priority, application Japan, Jan. 27, 1989, 1-18306**

**Int. Cl.$^5$ H03K** *19/017*

**U.S. Cl. 307—530** **16 Claims**



1. A sense amplifier comprising:

first power source potential transfer means coupled between a power source potential supply terminal and an input terminal, said power source potential transfer means constantly or temporarily transferring the power source potential to said input terminal;

VOL
1126
ISS
2
MY
14
1991
UMI

inverting means for inverting the logic level of the potential at said input terminal;

a first transistor of a first conductivity type connected in series to said first power source potential transfer means between said power source potential supply terminal and said input terminal, said first transistor being switch-controlled by the output signal of said inverting means, said first transistor prohibiting said first power source potential transfer means from transferring the power source potential to said input terminal when said first transistor is off-state, and said first transistor allowing said first power source potential transfer means to transfer the power source potential to said input terminal when said first transistor is on-state; and

a second transistor of a second conductivity type connected between said power source potential supply terminal and said input terminal, said second transistor being switch-controlled by the output signal of said inverting means.

---

### 5,015,891

## OUTPUT FEEDBACK CONTROL CIRCUIT FOR INTEGRATED CIRCUIT DEVICE

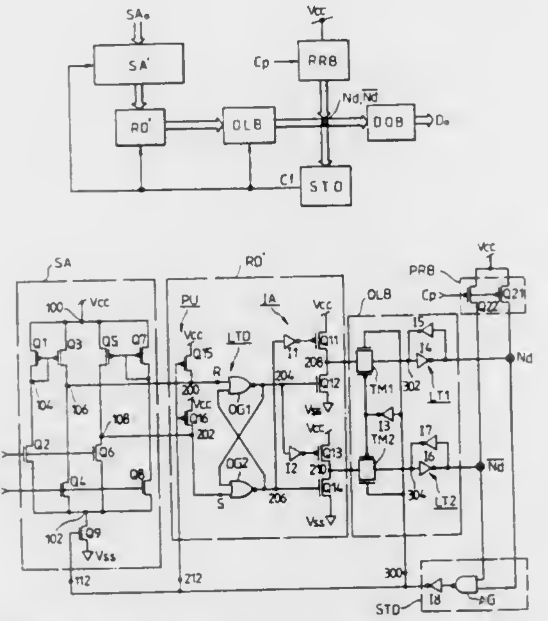
**Yun-ho Choi, Incbeon, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suweon, Rep. of Korea**

**Filed Sep. 15, 1989, Ser. No. 407,756**

**Claims priority, application Rep. of Korea, Dec. 30, 1988, 88-17888**

**Int. Cl.$^5$ H03K** *3/356, 3/013, 17/16;* **G11C** *7/00*

**U.S. Cl. 307—530** **23 Claims**



1. An output feedback control circuit for an integrated circuit device having an output stage for amplifying first weak signals read from a cell array forming a particular block, comprising:

a state transition detecting block for generating feedback control clock pulses after detecting any transition of output state in first and second output nodes;

a state transition detecting block for generating feedback control clock pulses after detecting any transition of output state in first and second output nodes;

an I/O line sense amplifier for amplifying the first weak signals read from said cell array, and having a first disable terminal for receiving feedback control clock pulses from said state transition detecting block;

a read driver for amplifying second and third signals received from said I/O line sense amplifier and having a second disable terminal for receiving the feedback control clock pulses from said state transition detecting block;

an output latch/transmission block for latching or transmitting fourth and fifth signals received from said read driver in accordance with voltage levels of the feedback control clock pulses received from said state transition detecting block; and

a precharge block for precharging said first and second output nodes of said output latch/transmission block in synchronization with a precharge clock pulse;

whereby, if said first and second output nodes cause a stage transition under a precharge state, the feedback control clock pulse from said state transition detecting block disables said I/O line sense amplifier and read driver, and latches current signals from said output latch/transmission block to block data flow, while, if the first and second output nodes are restored to the precharge state in synchronization with the precharge clock pulse at a new cycle, when said feedback control clock pulse is put in a reset stage, said I/O line sense amplifier, read driver and latch/transmission block should be activated to form a data input path for newly received data.

---

### 5,015,892

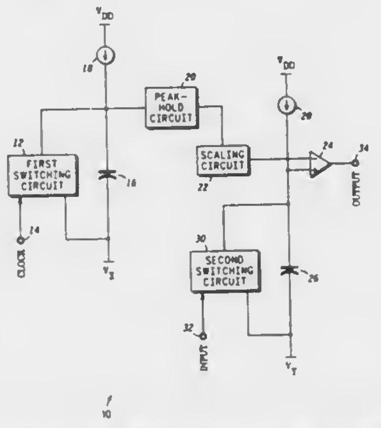
## ASYNCHRONOUS DELAY CIRCUIT

**Kaveh Parsi, Tempe, and David B. Harnishfeger, Chandler, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 16, 1990, Ser. No. 494,293**

**Int. Cl.$^5$ H03K** *5/13, 5/22, 5/159*

**U.S. Cl. 307—600** **7 Claims**



1. An asynchronous delay circuit for providing an output signal that is delayed by a predetermined time respective to an input signal applied thereto and having an input coupled to a clock, comprising:

a first capacitor;

first means responsive to the clock an coupled across said first capacitor for charging said first capacitor to a predetermined voltage when the clock is in a first logic state and discharging said first capacitor when the clock is in a second logic state;

peak-hold means having an input coupled to a first terminal of said first capacitor for providing an output signal at an output thereof representative of the peak voltage occurring at said input of said peak-hold means;

a second capacitor;

second means responsive to the input signal and coupled across said second capacitor for charging said second capacitor when the input signal is in a first logic state and discharging said second capacitor when the input signal is in a second logic state; and

a comparator having a first input coupled to said output of said peak-hold means, a second input coupled to a first terminal of said second capacitor, and an output at which the output signal is provided that is delayed by a predetermined time after the input signal is applied to said second means.

---

### 5,015,893

## MOTOR STRUCTURE WITH MAGNETIC INTERFERENCE SHIELD

**Shinichi Shiozawa, Nagano, Japan, assignor to Yugen Kaisha Chubuseimitsu, Nagano, Japan**

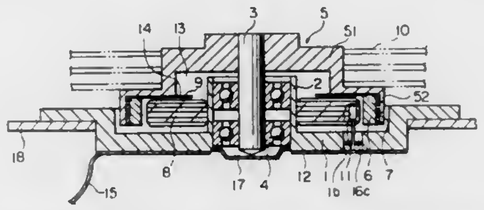
**Continuation-in-part of Ser. No. 369,990, Jun. 22, 1989, Pat. No. 4,943,748. This application Mar. 15, 1990, Ser. No. 494,068**

**Claims priority, application Japan, Jul. 16, 1988, 63-176245**

**The portion of the term of this patent subsequent to Jul. 24, 2007, has been disclaimed.**

**Int. Cl.$^5$ H02K** *11/00, 21/24;* **G11B** *5/12*

**U.S. Cl. 310—67 R** **18 Claims**



1. A motor structure for driving discs comprising a motor means having a frame wall and a hollow holding cylinder extending generally perpendicular from said frame wall, a rotor shaft coaxially disposed in said hollow holding cylinder, bearing means mounted on said hollow holding cylinder for rotatably supporting said rotor shaft, said holding cylinder having an outer part, coil means mounted on said outer part of said holding cylinder, a cup-shaped rotor means mounted on said rotor shaft, said cup-shaped rotor means having an end wall, a first cylindrical portion extending coaxially from said end wall, and a second cylindrical portion juxtaposed to said first cylindrical portion, said first cylindrical portion having a diameter which is less than the diameter of said second cylindrical portion, said coil means being generally axially aligned with and being disposed radially inwardly of said second cylindrical portion, magnet means mounted on said second cylindrical portion radially outwardly of said coil means, and shield means mounted on said rotor means and extending radially inwardly of said first cylindrical portion for shielding said discs from the magnetic field of said motor means.

---

### 5,015,894

## UNIT BEARING LEADLESS MOTOR

**William D. Crow, St. Louis, and Ronald D. Williams, St. Charles, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.**

**Filed Feb. 13, 1990, Ser. No. 479,285**

**Int. Cl.$^5$ H02K** *11/00*

**U.S. Cl. 310—71** **12 Claims**

1. A dynamoelectric machine having no external leads comprising:

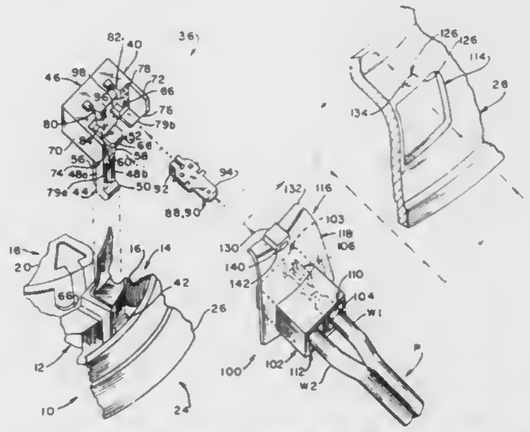
a stator assembly including at least one set of electrical windings terminable at each end;

a rotor assembly including a rotatable shaft;

a housing in which the stator and rotor assemblies are installed;

termination means internal of the housing in which the ends of the set of windings are terminated, the housing having an opening therein through which the termination means is accessible; and,

receptacle means to which external electrical wire are attachable, the receptacle means being matingly connectable with the termination means through the opening to connect the dynamoelectric machine with the external electrical wires, the housing including an end shield at at least one end of the housing, the opening being in the end shield, and the end shield having a curved outer surface adjacent the opening, and the receptacle means including an electrical receptacle having a curved surface corresponding to the curvature thereof.



---

### 5,015,895

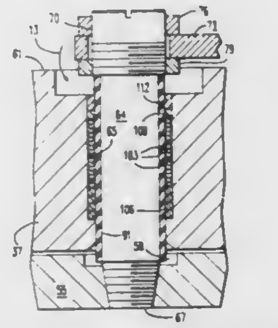
## INSULATED, GAS TIGHT ELECTRICAL LEAD CONDUCTOR

**Alan L. Obley, Altamonte Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 4, 1990, Ser. No. 460,791**

**Int. Cl.$^5$ H02K** *11/00;* **H01B** *17/26, 17/58*

**U.S. Cl. 310—71** **3 Claims**



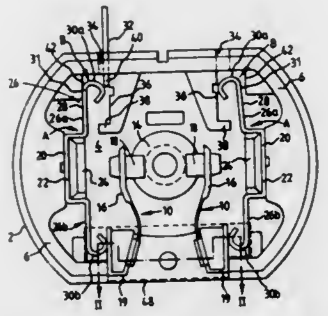
1. A dynamoelectric machine having a stator core, a rotor disposed within the stator core and spaced therefrom, the rotor including a shaft having a split axial lead disposed in an internal bore therein and a radial hole extending from the bore to the surface of the shaft, a radial lead conductor connected to said axial lead and projecting above the surface of the shaft, a plurality of field windings radially spaced about the rotor shaft, a conductive member for electrically connecting the radial lead conductor to said field windings, and means for insulating the radial lead conductor such that it is impermeable to gas flow between the radial lead conductor and said insulating means and electrically insulates said split axial lead from said field windings, wherein said insulating means is comprised of a generally rigid insulating tube formed of a glass cloth impregnated with an insulating resin, the insulating tube providing an interference fit with the radial lead conductor.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,896

### TERMINAL ARRANGEMENT FOR AN ELECTRIC MOTOR

**To-Fan Wong, Aberdeen, Hong Kong, assignor to Johnson Electric S.A., La Chaux de Fonds, Switzerland**
**Filed Dec. 27, 1989, Ser. No. 456,640**
**Claims priority, application United Kingdom, Dec. 30, 1988, 8830392**
**Int. Cl.⁵ H02K** *11/00*
**U.S. Cl. 310—71** **3 Claims**



1. A terminal arrangement for an electric motor comprising an end cap for the motor with a slot formed therein for receiving a male terminal, an electrical contact strip mounted in the end cap for contacting the male terminal, in which the contact strip has a central portion and a resilient first arm extending from the central portion into the slot, the first arm comprising a first limb pivotable about a first pivot point adjacent the central portion, and a second limb at an outer end of the first arm pivotable, about a second pivot point adjacent the outer end of the first arm, wherein the slot has a first wall against which the second limb rests and which forms a guide against which the terminal is guided by the second limb when the terminal is inserted into the slot, and the slot has a second wall against which the second limb is pressed when the male terminal is initially inserted in the slot, pivoting the first limb about the first pivot point, and in which the second limb is pivoted about the second pivot point as the male terminal is further inserted, the contact strip having a smaller resistance to displacement about the first pivot point than about the second pivot point so that the contact strip is displaced against a relatively smaller biassing force when the male terminal is initially inserted into the slot and then against a relatively greater biassing force when the male terminal is further inserted into the slot.

---

### 5,015,897

### GEARED ELECTRIC MOTOR

**Atsushi Inagaki; Koh Hiratsuka; Hiroaki Miura, and Yasujiro Saito, all of Yokohama, Japan, assignors to Jidosha Denki Kogyo K.K., Tokyo, Japan**
**Filed Jan. 9, 1990, Ser. No. 462,371**
**Claims priority, application Japan, Jan. 11, 1989, 1-2521[U]**
**Int. Cl.⁵ H02K** *5/14;* **H01R** *39/38*
**U.S. Cl. 310—83** **2 Claims**

1. A geared electric motor comprising:

a motor yoke and gear casing connected together;

an armature having an armature shaft housed in said motor yoke and supported for rotation in said motor yoke and gear casing;

a worm wheel rotatably mounted in said gear casing;

a worm provided on an end of said armature shaft in meshing engagement with said worm wheel for transmitting rotation of said armature to said worm wheel;

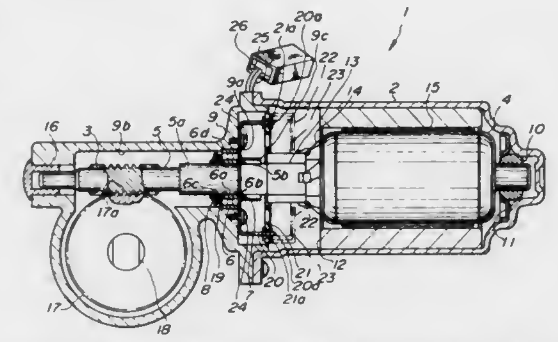
a radial ball bearing provided on said armature shaft and having an outer ring and an inner ring for rotatably supporting said armature shaft;

a brush holder base setting member fixed to said gear casing;

a brush holder base attached to the brush holder base setting member;

a brush holder fixed on said brush holder base; and

a brush housed in said brush holder for supplying an electric current to an armature coil on said armature through a commutator;



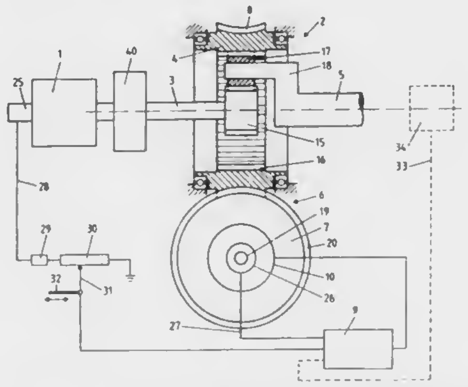
wherein said outer ring of the radial ball bearing is secured to said gear casing by said brush holder base setting member and said inner ring of the radial ball bearing is secured on the armature shaft using a stop ring and a push nut.

---

### 5,015,898

### CONTINUOUSLY VARIABLE DRIVE

**Heinz Frey, Hirtenhofstrasse 18, CH-6005 Luzern, Switzerland**
**PCT No. PCT/CH88/00149, § 371 Date May 8, 1989, § 102(e) Date May 8, 1989, PCT Pub. No. WO89/02550, PCT Pub. Date Mar. 23, 1989**
**PCT Filed Aug. 29, 1988, Ser. No. 365,159**
**Claims priority, application Switzerland, Sep. 9, 1987, 3479/87**
**Int. Cl.⁵ H02K** *24/00;* **F16H** *1/16*
**U.S. Cl. 310—83** **10 Claims**



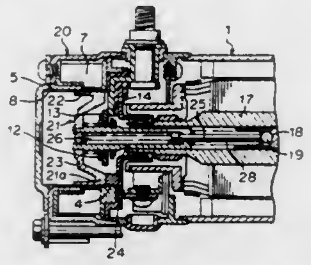
1. A continuously variable drive comprising a drive motor (1), a differential gear (2) with a first and a second input shaft (3, 4) and a power takeoff shaft (5), a worm gear (6) with a worm (7) and a worm wheel (8), as well as a rotationally controllable element (10) having an output shaft (19), where the drive motor (1) is connected to the first input shaft (3), the worm wheel (8) is connected to the second input shaft (4), and the worm (7) is connected to the output shaft (19) of the rotationally controllable element (10), wherein the diameter of the worm (7) is chosen to be at least half as great as the diameter of the worm wheel (8), and wherein the pitch angle of the worm gear threads (20) is chosen so that the worm gear (6) is just barely not self-locking when the worm (7) is running, first means (25) for measuring rotational speed of the drive motor (1) and generating a first output signal (28) and second means (26) for measuring rotational speed of the output shaft (19) of rotationally controllable element (10) and generating a second signal (27), and a controller (9) having a first input (31) and a second signal (27), the first input (31) coupled to the first shaft (3) and the second input (27) coupled to the output shaft (19) of rotationally controllable element (10) for controlling the speed of rotationally controllable element (10).

---

### 5,015,899

### ELECTROMAGNETIC SWITCH DEVICE WITH OPEN-ENDED PLUNGER

**Shuzou Isozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed May 14, 1990, Ser. No. 522,776**
**Claims priority, application Japan, May 15, 1989, 1-121911**
**Int. Cl.⁵ H02K** *7/118;* **F16H** *3/44;* **F02N** *11/00, 15/06*
**U.S. Cl. 310—83** **4 Claims**



1. An electromagnetic switch device which comprises:

an exciting coil wound around a cylindrical bobbin, a sleeve fitted to an inner circumference of the cylindrical bobbin.

a plunger disposed in the sleeve so as to be movable in an axial direction of the sleeve by a magnetic attraction force.

a cylindrial rod which is movable in association with the plunger, and

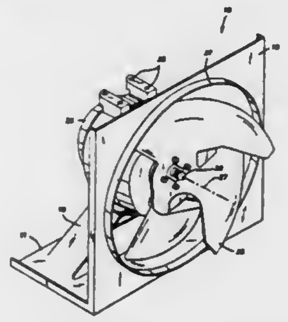
a movable contact attached to the cylindrial rod which comes into engagement with a fixed contact when the plunger is moved forwardly by the magnetic attraction force, wherein the plunger comprises a cylindrical body slidably fitted to the sleeve, and an intermediate plate portion which generally extends in a plane perpendicular to a central axial line of the cylindrical body, and wherein at least a part of the cylindrical body has a thin-walled portion which extends at least partially in a direction opposite an extension direction of the cylindrical rod from a junction to a radially outer portion of the intermediate plate portion.

---

### 5,015,900

### MOTOR SUPPORT AND METHOD OF MAKING

**Giles W. Morrill, 3 Matson Ct., Johnson City, Tenn. 37604**
**Filed Aug. 21, 1989, Ser. No. 396,374**
**Int. Cl.⁵ H02K** *5/00, 15/14;* **F16M** *1/00, 5/00*
**U.S. Cl. 310—91** **17 Claims**



1. An electric motor and support combination comprising:

a base formed of sheet metal and having a major portion lying in a base plane;

first and second arm means unitary with and bent from the plane of said base;

each of said two arm means having a distal end at the plane of the base and a proximal end adjacent said motor;

the proximal ends of said two arm means being securement ends;

means securing the securement ends of each of the two arm means to said electric motor at points near the periphery thereof so that said first and second arm means are disposed with a substantial radial component relative to said motor;

said motor having a shaft axis substantially parallel to said base; and

means to drive a load from said motor shaft, said sheet metal base establishing support of said electric motor and said load by said first and second arm means which are disposed with a substantial radial component relative to said motor to establish a relatively large rotational flexibility to said motor by flexure of said two arm means;

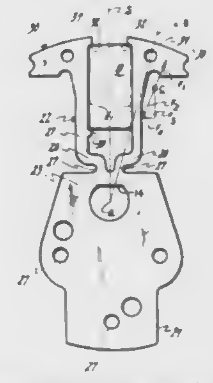
said base being substantially free of contact or connection with the motor other than through said two arm means whereby the support of said motor and load is substantially exclusively through said two arm means.

---

### 5,015,901

### ROTOR OF A MAGNETMOTIVE DEVICE

**Russell D. Phelon, Wilbraham, Mass., and Ronald G. Brunelle, Ellington, Conn., assignors to R. E. Phelon Company, Inc., East Longmeadow, Mass.**
**Filed Mar. 12, 1990, Ser. No. 491,970**
**Int. Cl.⁵ H09K** *21/22;* **H02K** *1/22, 21/12;* **F02P** *1/00*
**U.S. Cl. 310—153** **3 Claims**



1. A rotor for magnetomotive device for an internal combustion engine with a drive shaft and having a flux carrying core with pole shoes disposed on opposite sides of a permanent magnet, the improvement comprising an integral core member which includes a hub portion adapted to receive and be rotated by the shaft of said engine, a counterweight portion and a pair of radially extending, circumferentially spaced, resiliently flexible arm portions diametrically opposed by the counterweight portion of the core, each of the arm portions terminate at their outer ends in pole shoes configured to retain said magnet therebetween and being characterized by a configuration and distribution of mass so as to exert increasing clamping forces on opposite end portions of the permanent magnet with increased speeds of rotation of the rotor, the core and magnet assembly being disposed within a molded synthetic plastic material which forms the rotor body, said core being dynamically independent of the structural strength of the plastic rotor body.

---

### 5,015,902

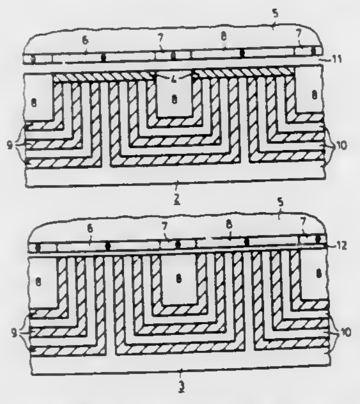
### MULTIPHASE SYNCHRONOUS PERMANENT MAGNET ELECTRIC MACHINE

**Wilhelm Leltgeb, Burgthann-Mimberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**
**PCT No. PCT/DE88/00322, § 371 Date Dec. 4, 1989, § 102(e) Date Dec. 4, 1989, PCT Pub. No. WO88/10022, PCT Pub. Date Dec. 15, 1988**
**PCT Filed Jun. 1, 1988, Ser. No. 445,686**
**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718983**
**Int. Cl.⁵ H02K** *21/14*
**U.S. Cl. 310—156** **5 Claims**

1. A multiphase, synchronous electrical machine excited by permanent magnets, having a stator winding and a rotor, the permanent magnets generating a basic excitation field and

VOL
1126
ISS
2
MY
14
1991
UMI

electrical current flowing through the stator winding generating an additional magnetic field in a radial direction, said additional magnetic field being added to or subtracted from the basic excitation field in the radial direction, said permanent magnets being disposed in the rotor, said rotor being free of windings, soft magnetic material with intervening spaces of nonmagnetic material forming groups of loops nested within each other in the rotor, the loops being exteriorly open towards an air gap disposed between the stator winding and rotor, said groups of nested loops each enclosing a pole gap disposed at a circumferential surface of the rotor substantially



centered in each nested loop group, the rotor being divided into at least two sections arranged axially, said first section being provided with said permanent magnets with said loops of soft magnetic material terminating at said permanent magnets, said second section having loops of soft magnetic material arranged such that said loops are open to the air gap between the stator winding and the rotor, said loops in said second section being nested within each other with nonmagnetic material being provided between said loops, said loops in said second section being provided to control the additional magnetic field generated by the stator winding.

---

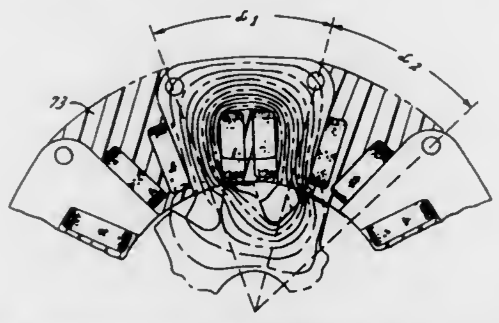
## 5,015,903
## ELECTRONICALLY COMMUTATED RELUCTANCE MOTOR

**Clyde J. Hancock, Loves Park, and James R. Hendershot, Rockford, both of Ill., assignors to Pacific Scientific Company, Newport Beach, Calif.**

**Continuation-in-part of Ser. No. 232,436, Aug. 15, 1988, Pat. No. 4,883,999. This application Mar. 28, 1989, Ser. No. 329,777**

**Int. Cl.⁵ H02K** *37/04, 19/06*

**U.S. Cl. 310—168** **19 Claims**



14. A motor powered by a polyphase source comprising, in combination, a stator having a plurality of adjacent pole pairs with each pole being a member of only one pair and windings on each of said pairs energized by a common phase of the polyphase source, a low reluctance path bridging between poles in each pair but not bridging poles of different pairs, a rotor having a plurality of equally spaced teeth for forming a low reluctance path between the faces of stator poles in a pair, the windings on stator poles in a pair being oppositely wound to create a not/south magnetic field between said stator poles in a pair, the stator poles in a pair being spaced by a first distance related to the spacing between rotor teeth, and adjacent stator pole pairs being separated from each other by a second distance so that energization of the stator pole pairs in a predetermined sequence causes movement of the rotor.

---

## 5,015,904
## STATOR FOR AN ELECTRICAL MACHINE

**Dittmar Kleemann, Friedland, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

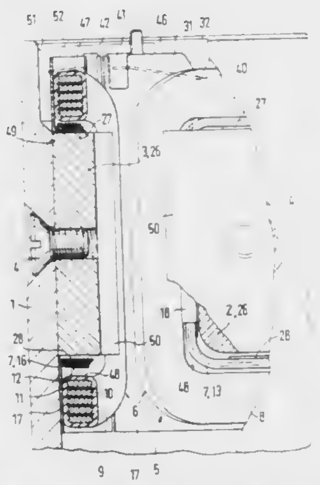
**Continuation of Ser. No. 276,322, filed as PCT DE87/00198 on May 6, 1987, published as WO87/07452 on Dec. 3, 1987, abandoned.**

**This application Apr. 27, 1990, Ser. No. 517,392**

**Claims priority, application Fed. Rep. of Germany, May 21, 1986, 3617017**

**Int. Cl.⁵ H02K** *3/00*

**U.S. Cl. 310—184** **4 Claims**



1. A multipole stator for an electric machine having a stator housing, a plurality of poles disconnectably attached to an inner side of the stator housing and a compound excitation winding, said excitation winding comprising a series of main winding elements each having a central opening, and a series of shunt winding elements arranged in said central openings; all shunt winding elements being wound from a continuous insulated wire onto assigned winding formers integrally connected with a band-shaped support of a flexible insulating material; each of said winding formers surrounding an opening in said band-shaped support; a longitudinal edge of said band-shaped support being formed with a plurality of wedge-shaped notches for anchoring said continuous insulated wire between respective shunt winding elements; two contact tabs attached to end portions of said longitudinal edge to provide connections to a negative and positive voltage respectively, ends of said continuous insulated wire being welded to said contact tabs; said band-shaped support being arched and arranged in said stator housing; and said poles passing through assigned openings in said band-shaped support.

---

## 5,015,905
## DC DYNAMOELECTRIC MACHINE WITH INTERPOLES HAVING MAGNETIC FLUX BYPASSING MEMBERS

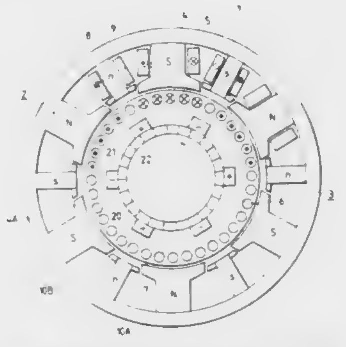
**Haruo Koharagi, Jyuou; Kazuo Tahara; Mitsuhiro Nitobe, both of Hitachi, and Nobutaka Suzuki, Tahagi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Setsubi Engineering Co., Ltd., Ibaraki, both of, Japan**

**Filed May 17, 1989, Ser. No. 353,473**

**Claims priority, application Japan, May 27, 1988, 63-128446; Jul. 13, 1988, 63-172741**

**Int. Cl.⁵ H02K** *1/10*

**U.S. Cl. 310—186** **9 Claims**



1. A DC dynamoelectric machine comprising:
a stator including an annular yoke;
a plurality of field poles each fastened to an inside of said annular yoke and having a field pole piece and a field winding surrounding said field pole piece;
a plurality of interpoles each disposed between said field poles, fastened to the inside of said annular yoke and having an interpole piece and an interpole winding surrounding said interpole piece;
an armature and an commutator rotatably disposed within said stator;
a brush assembly supported through said stator and slidably contacting said commutator; and
a plurality of magnetic flux bypassing members, each disposed between said field pole pieces and said interpole pieces at respective ends thereof near said armature, wherein each of said magnetic flux bypassing members include an element of magnetic material which permits eddy current flow therein during magnetic flux variation so as to suppress a sudden change of leakage magnetic flux flowing through said plurality of magnetic flux bypassing members in at least one of a direction from said field pole pieces to said interpole pieces and a direction from said interpole pieces to said field pole pieces.

---

## 5,015,906
## ELECTROSTATIC LEVITATION CONTROL SYSTEM FOR MICROMECHANICAL DEVICES

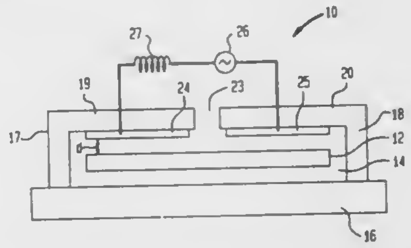
**Dong-Il D. Cho, Princeton Junction; Suresh Kumar, Princeton, and William N. Carr, Wayne, all of N.J., assignors to Princeton University, Princeton, N.J.**

**Filed Nov. 3, 1989, Ser. No. 431,385**

**Int. Cl.⁵ H02N** *1/00*

**U.S. Cl. 310—309** **22 Claims**

1. A levitation structure comprising:
a support made of an electrically non-conductive material;
first and second spaced electrical conductors mounted on said support;
a mass having a third electrical conductor mounted thereon freely positioned adjacent said first and second electrical conductors;
circuit means connected to said first and second electrical conductors for forming a resonant circuit including said first, second and third conductors and having a natural frequency; and



a voltage means for driving said circuit means with an oscillating voltage having a frequency greater than said natural frequency.

---

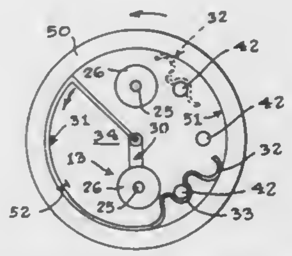
## 5,015,907
## MULTI-FILAMENT FLUORESCENT LAMP CONSTRUCTION

**Tibor Csincsa, 6479 Tisler Cres., Mississauga, Ontario, Canada L5N 3G6**

**Filed Nov. 13, 1989, Ser. No. 434,214**

**Int. Cl.⁵ H01J** *1/00, 61/067*

**U.S. Cl. 313—3** **2 Claims**



1. A multi-filament fluorescent lamp construction comprising:
a fluorescent tube having a cylindrical cap member formed on opposite ends;
an electrical contact unit associated with each of the cap members and including a pair of electrical contact rod members each being surrounded by an insulating sleeve member; wherein, the ends of the electrical contact rod members extend into said fluorescent tube;
a filament unit comprising a plurality of filament members disposed on opposite ends of said fluorescent tubes wherein each of said plurality of filament members is provided with a filament stud element;
a rotating contact unit disposed on opposite ends of the fluorescent lamp and comprising a contact rod engaging member and a sliding contact member adapted to sequentially engage the filament stud elements on said plurality of filament members disposed on the respective ends of the fluorescent lamp; wherein the sliding contact member comprises a contact spring element which is provided with a sinusoidally contoured spring detent portion which is dimensioned to sequentially and releasably engage said plurality of filament stud elements; and,
means for bringing said sliding contact member into said sequential engagement with said filament stud elements.

VOL
1126
ISS
2
MY
14
1991
UMI

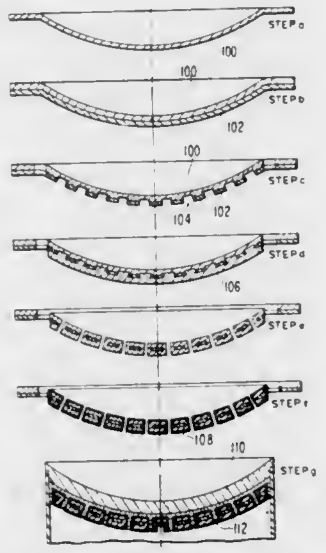
### 5,015,908
## FAST WARM-UP CATHODE FOR HIGH POWER VACUUM TUBES

**George V. Miram, Atherton, and Yosuke M. Mizuhara, Palo Alto, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Jan. 23, 1989, Ser. No. 299,296**

**Int. Cl.$^5$ H01J** *1/15*

**U.S. Cl. 313—37** **9 Claims**



1. A heater-cathode structure for use in a high power vacuum tube, comprising:
 a cathode;
 a heater sintered to said cathode, said heater being formed of anisotropic pyrolitic graphite coated with a layer of anisotropic pyrolitic boron nitride.

---

### 5,015,909
## GLASS COMPOSITION AND METHOD FOR MANUFACTURING A HIGH PERFORMANCE MICROCHANNEL PLATE

**William J. S. Zhong, Stamford, and John A. Williams, Monroe, both of Conn., assignors to Circon Corporation, Santa Barbara, Calif.**

**Filed Dec. 29, 1989, Ser. No. 458,849**

**Int. Cl.$^5$ C03C** *3/108*

**U.S. Cl. 313—105 R** **39 Claims**

1. A glass composition comprising the following components present in the glass in the following mole percent ranges:

| | |
|---|---|
| $SiO_2$ | 58–68 |
| PbO | 10–15 |
| $Bi_2O_3$ | 0.3–2.1 |
| $B_2O_3$ | 2.0–3.8 |
| $Al_2O_3$ | 0.9–1.2 |
| BaO | 5.5–16.2 |
| $Cs_2O$ | 0.0–1.9. |

---

### 5,015,910
## ELECTRON GUN FOR COLOR PICTURE TUBE

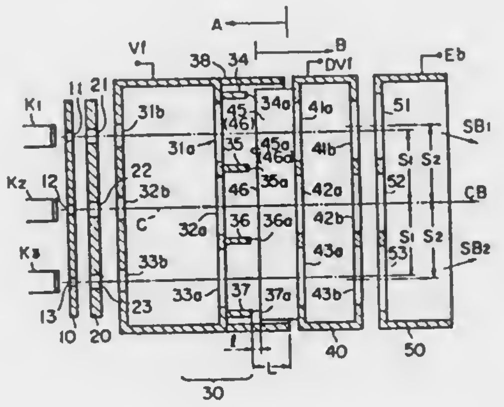
**Yoshiaki Takahashi, Chiba; Sakae Ishii, Mobara; Masayoshi Furuyama, Togane, and Shoji Shirai, Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Device Engineering Co., Ltd., Chiba, both of, Japan**

**Filed Sep. 12, 1989, Ser. No. 406,321**

**Claims priority, application Japan, Sep. 16, 1988, 63-230116**

**Int. Cl.$^5$ H01J** *29/50, 29/56, 29/58*

**U.S. Cl. 313—414** **12 Claims**



1. An electron gun for the color picture tube, comprising a cathode for emitting three electron beams aligned along a direction, and an accelerating electrode, focusing electrodes and an anode arranged in axial direction of the electron gun in that order:
 said focusing electrodes including a first focusing electrode arranged nearer to the accelerating electrode and a second focusing electrode arranged nearer to said anode, each having a plurality of electron beam passage apertures for passing the three electron beams emitted from said cathode;
 said first focusing electrode including a first flat electrode having a plurality of parallel flat plates secured thereto in the direction toward the second focusing electrode while sandwiching each of the electron beams along the direction of arrangement thereof after being passed through the electron passage apertures formed in the end thereof opposed to the second focusing electrode, said first focusing electrode further including a rim electrode surrounding said first flat electrode;
 said second focusing electrode including a second flat electrode having a couple of parallel flat plates erected toward the first focusing electrode and extending along the electron gu axis in opposed relationship with each other while sandwiching the electron beams along the direction perpendicular to the direction of arrangement of the electron beams after being passed through the electron beam passage apertures formed in the end of the second focusing electrode opposed to the first focusing electrode;
 said electron gun further comprising voltage application means for applying a predetermined focus voltage to said first focusing electrode and a voltage changing to a value higher than the focus voltage with the increase in the electron beam deflection to said second focusing electrode.

---

### 5,015,911
## MULTISTEP FOCUSING ELECTRON GUN FOR CATHODE RAY TUBE

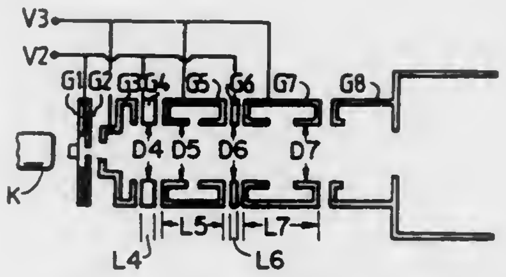
**Seog-lae Cho, Suwon, Rep. of Korea, assignor to Samsung Electron Devices Ltd., Seoul, Rep. of Korea**

**Filed May 9, 1989, Ser. No. 349,589**

**Claims priority, application Rep. of Korea, Nov. 17, 1988, 88-15132; Mar. 22, 1989, 89-3605**

**Int. Cl.$^5$ H01J** *29/54, 29/56*

**U.S. Cl. 313—414** **6 Claims**



1. A multi-step focusing type electron gun, comprising: a cathode; a control grid; a screen grid; and a plurality of electrodes including third, fourth, fifth, sixth, seventh and eighth electrodes each having beam passing holes for forming two unipotential auxiliary lenses and a bipotential major lens, the improvement being that said fourth, fifth, sixth and seventh electrodes are constituted according to the following formulas:

$$0.18 \leqq \frac{L4}{D4} \leqq 0.55$$

$$0.36 \leqq \frac{L5}{D5} \leqq 1.45$$

$$0.07 \leqq \frac{L6}{D6} \leqq 0.18$$

$$1.09 \leqq \frac{L7}{D7} \leqq 1.73$$

where D4, D5, D6 and D7 indicate, respectively, the diameters of the beam passing holes of the fourth, fifth, sixth and seventh electrodes, and L4, L5, L6 and L7 indicate the lengths thereof respectively.

---

### 5,015,912
## MATRIX-ADDRESSED FLAT PANEL DISPLAY

**Charles A. Spindt, Menlo Park, and Christopher E. Holland, Redwood City, both of Calif., assignors to SRI International, Menlo Park, Calif.**

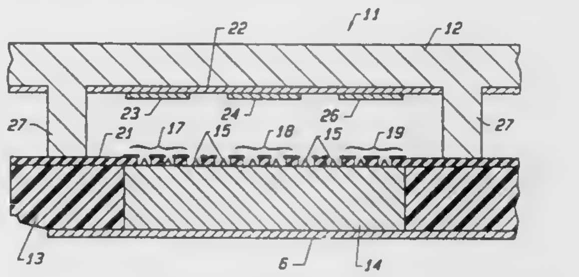
**Continuation of Ser. No. 891,853, Jul. 30, 1986, Pat. No. 4,857,799. This application Jul. 27, 1989, Ser. No. 386,297**

**The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.**

**Int. Cl.$^5$ H01J** *1/62*

**U.S. Cl. 313—495** **5 Claims**

1. A device for providing a plurality of individually controlled electron beams, comprising:
 (a) a backing structure of a semiconductive material of a first conductivity type;
 (b) means defining an electron beam receiving generally planar area spaced a selected distance from said backing structure;
 (c) a matrix array of individually addressable electron beam generating means positioned between said backing structure and said planar area;
 (d) electrical drive means for energizing selected ones of said electron beam generating means of said matrix array; and
 (e) electrical connections for each of said electron beam generating means extending through said backing structure and fabricated of a semiconductive material of a second conductivity type opposite the conductivity type of said first-mentioned semiconductive material.



---

### 5,015,913
## HIGH-PRESSURE DISCHARGE LAMP, ESPECIALLY SODIUM VAPOR LAMP

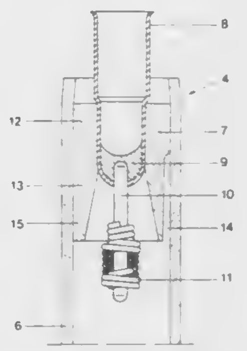
**Johannès Pfaue, Berlin, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft fur elektrische Glühlampen m.b.H., Munich, Fed. Rep. of Germany**

**Filed Aug. 17, 1989, Ser. No. 395,354**

**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 3829729**

**Int. Cl.$^5$ H01J** *17/18, 61/36*

**U.S. Cl. 313—625** **20 Claims**



1. High-pressure discharge lamp having
 a tubular discharge vessel (4, 6) of transparent ceramic material, defining a lamp axis;
 at least one essentially cylindrical end plug (7) of ceramic material fitted into the tubular discharge vessel and formed with a concentric opening therein;
 a current supply lead (8) tightly sealed through said opening in the at least one end plug;
 an electrode including an electrode support rod (10) and an electrode coil (11) secured to said current supply lead,
wherein
 the plug (7) concentrically surrounds the electrode and extends at least up to the end of the electrode coil which is closest to said plug,
 the outer circumference of the plug is formed with a circular recess in the surface thereof facing the interior of the discharge vessel and extending, in form of a groove, over a portion of the axial length (L) of said plug; and
 wherein a plurality of radially projecting, axially extending ribs (15) are provided, projecting across said groove to the inner wall of said discharge vessel (4, 6) and separating the groove in to a plurality of pockets (14) which, in plan view transverse to the axis of the lamp, are of essentially segmental part-circular ring shape.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,914

## COUPLERS FOR EXTRACTING RF POWER FROM A GYROTRON CAVITY DIRECTLY INTO FUNDAMENTAL MODE WAVEGUIDE

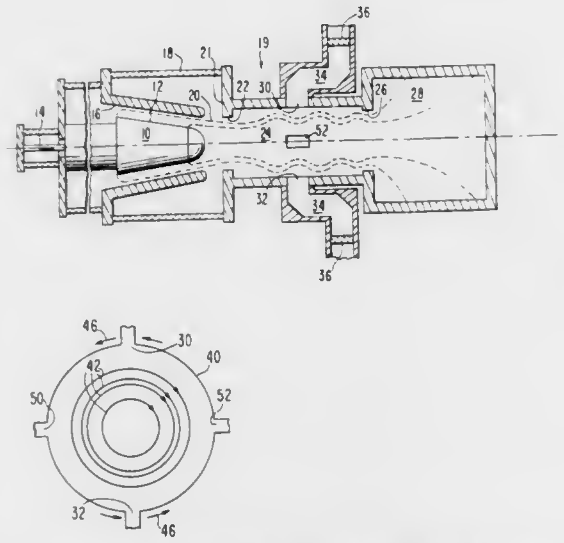
**Robert L. Ives, Cupertino; Howard R. Jory, Menlo Park, and Albert D. LaRue, Los Altos, all of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Dec. 9, 1988, Ser. No. 282,401**

**The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.**

**Int. Cl.$^5$ H01J** *25/00*

U.S. Cl. 315—4 **13 Claims**



1. A gyrotron comprising an interaction cavity for supporting a transverse electric field wave in a higher-order mode in a cavity resonator in energy-exchanging relation with an electron beam, means for extracting electromagnetic energy from said cavity into the fundamental modes of a plurality of waveguides, said means comprising at least a pair of coupling apertures in the cavity wall located at positions where the wall currents of said higher-order mode are equal in amplitude and phase, and the wall currents of an unwanted lower-order mode are equal in amplitude and phase, but reversed in direction between said apertures with respect to said wall currents of said higher-order mode.

---

### 5,015,915

## METHOD OF COMPENSATING FOR THE EARTH'S MAGNETIC FIELD IN A PICTURE TUBE

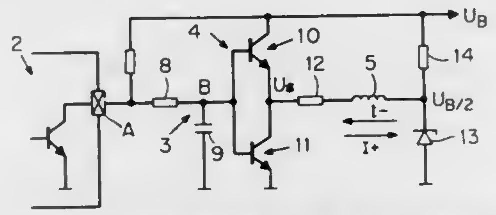
**Uwe Hartmann, and Udo Mai, both of Untergriesbach, Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany**

**Filed Sep. 1, 1989, Ser. No. 402,089**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1988, 3830931**

**Int. Cl.$^5$ H04N** *9/29*

U.S. Cl. 315—8 **8 Claims**



1. A method of compensating for the earth's magnetic field in a picture tube in remote-controlled video-display equipment, comprising: generating a voltage by a remote-control channel in said video-display equipment; providing a compensation coil in said picture tube; supplying said voltage to said compensation coil; and adjusting current through said compensation coil in finely-divided incremental steps, said current being continuously adjustable and further including the step of generating remote-control signals for said remote controlled video display equipment; and generating said voltage from said remote control signals by a digital to analog converter.

---

### 5,015,916

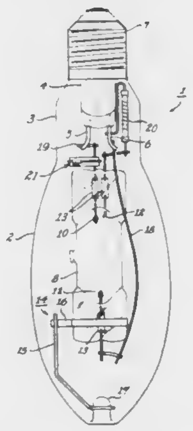
## ELECTRIC DISCHARGE LAMP AND THERMAL SWITCH STARTER MEANS THEREFOR

**Lawrence T. Mazza, Mayfield Heights, and Raymond A. Heindl, Euclid, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 18, 1989, Ser. No. 452,472**

**Int. Cl.$^5$ H05B** *41/06*

U.S. Cl. 315—47 **13 Claims**



1. An electric discharge lamp comprising:

(a) an outer light transmissive envelope,

(b) an inner arc tube having electrodes at opposite ends including at one end a main electrode and an auxiliary starting electrode connected to inleads hermetically sealed at a pinch seal region and a thermal switch within said outer envelope,

(c) the thermal switch comprising a thermally deformable bent metal strip having a first portion at one end physically joined to inlead means of one main electrode and a second bent portion at the opposite end, said first and second portions being joined by a middle portion, said second bent portion having a flexible conductor physically joined thereto, said flexible conductor running along substantially the entire second portion, further running along the middle portion, and then projecting forwardly of the first portion to engage inlead means of the auxiliary electrode for a short circuit between said main and auxiliary electrodes upon switch closure, and

(d) the conductor being moved responsive to thermal deformation by substantially the entire length of the bent metal strip.

### 5,015,917

## ADAPTOR FOR SMALL FLUORESCENT TUBES

**Juerg Nigg, Beckenhofstrasse 30, CH-8006 Zurich, Switzerland**

**Continuation-in-part of Ser. No. 815,085, Feb. 7, 1986, abandoned. This application Oct. 25, 1989, Ser. No. 427,146**

**Claims priority, application Switzerland, Apr. 9, 1984, 1772/84; Jun. 6, 1984, 2778/84; Jan. 25, 1985, 352/85; Feb. 7, 1985, 555/85; World Int. Prop. O., Apr. 4, 1985, PCT/CH85/00056**

**Int. Cl.$^5$ H05B** *41/00;* **H05K** *7/10;* **F21S** *5/00;* **F21V** *29/00*

U.S. Cl. 315—56 **22 Claims**

1. An adaptor for fluorescent tubes having contact pins, the adaptor having a fluorescent tube-compatible plug-in socket and an incandescent lamp-compatible screw cap, the adaptor comprising:

an external casing part **(1, 301)**;

said external casing part forming said incandescent lamp-compatible screw cap **(3, 203)**;

a printed circuit board **(307)** and an inner casing **(309)**;

said printed circuit board **(307)** secured to said inner casing **(309)** which is secured to said external casing part **(1,301)**;

said inner casing **(309)** forming said fluorescent tube-compatible plug-in socket **(347)**;

a plurality of contact members **(341)** secured to said printed circuit board **(307)**;

said contact members **(341)** being electrically connected by conductors **(337)** on said printed circuit board **(307)** for creating an electric connection of said inner casing **(309)** making said inner casing **(309)** compatible with fluorescent light fittings having differently arranged contact pins; and

said fluorescent tube-compatible plug-in socket **(347)** capable of receiving different shaped caps **(10, 12)** with said differently arranged contact pins of said light fittings.

---

### 5,015,918

## BICYCLE SINGLE-WIRE LIGHTING SYSTEM WITH STEADY-FLASHING-REFLECTOR REAR WARNING DEVICE

**John Copeland, 1230 Alameda De Las Pulgas Apt. 3, Belmont, Calif. 94002**

**Continuation of Ser. No. 223,297, Jul. 22, 1988, abandoned, which is a continuation of Ser. No. 825,380, Feb. 3, 1986, abandoned. This application Aug. 31, 1989, Ser. No. 402,123**

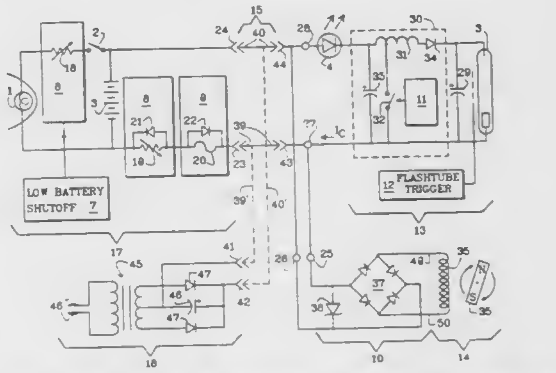
**Int. Cl.$^5$ H01K** *7/00;* **H05B** *41/14*

U.S. Cl. 315—76 **22 Claims**

1. A combination electric warning light and retro-reflector for small vehicle or pedestrian comprising

a retro-reflector including a transparent body having a multiplicity of corner reflectors molded on a substantially flat face thereof lying substantially in a plane adapted to be oriented approximately vertically and having an effective area of at least one square inch,

a directional beam emitting monochromatic light source juxtaposed with said retro-reflector in a manner which leaves said beam unobstructed by said retro-reflector, said source being oriented to cause said beam to have a direction generally normal to said plane.



a pulsed gas discharge light source arranged to emit light through the plane of said retro-reflector with a wide angle of dispersion, and

means located at least partially behind the outline of said retro-reflector for supplying power to said monochromatic light source and gas discharge light source.

---

### 5,015,919

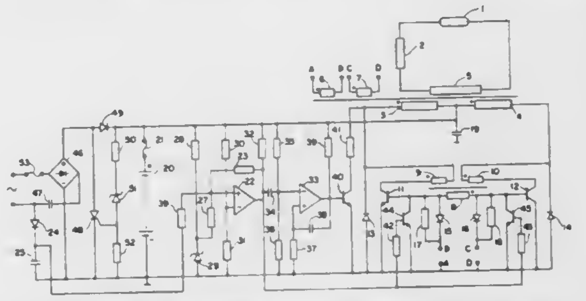
## EMERGENCY LIGHTING SYSTEM PROVIDED WITH A FLUORESCENT TUBE

**Oscar Vila-Masot, Puerto La Cruz, Venezuela, and Janis Melis, Budapest, Hungary, assignors to LED Corporation N.V., Netherlands Antilles**

**Filed Jul. 19, 1989, Ser. No. 382,177**

**Int. Cl.$^5$ H05B** *37/04, 41/14*

U.S. Cl. 315—86 **5 Claims**



1. An emergency lighting system connected to a source of conventional line current comprising:

a fluorescent tube;

an inductance connected in series with said fluorescent tube;

an oscillator circuit connected to said fluorescent tube providing a square wave signal, said oscillating including:

a push-pull transformer comprising first and second primary windings and a secondary winding connected to said inductance and said fluorescent tube;

a first transistor switch connected to said first primary winding;

a second transistor switch connected to said second primary winding; and

a saturated transformer connected to said second primary winding;

a storage battery having a positive and negative pole, said battery connected to said oscillator circuit;

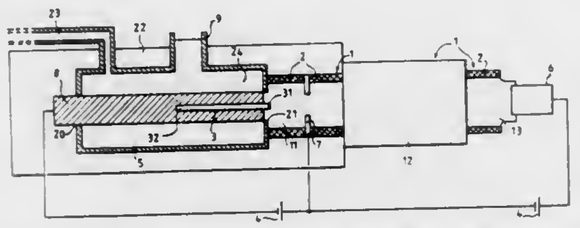
VOL
1126
ISS
2
MY
14
1991
UMI

a charging circuit connected between the source of conventional line current and said storage batter; and
sensing means connected to the line current source for initiating power to said oscillator circuit when the line current is discontinued.

---

### 5,015,920
## SUPERCONDUCTING DEVICE FOR INJECTION OF ELECTRONS INTO ELECTRON TUBES

Pierre Blanchard, Verrieres le Buisson, France, assignor to Thomson-CSF, Puteaux, France
Filed Jun. 27, 1989, Ser. No. 372,824
Claims priority, application France, Jul. 5, 1988, 88 09063
Int. Cl.$^5$ H01J *7/24*
U.S. Cl. 315—111.81 14 Claims



1. A device for the injection of electrons into an electron tube, comprising:

a bar of pre-determined length made of a superconductive material having a pre-determined energy of extraction, a first end of said bar entering an injection part of said tube;

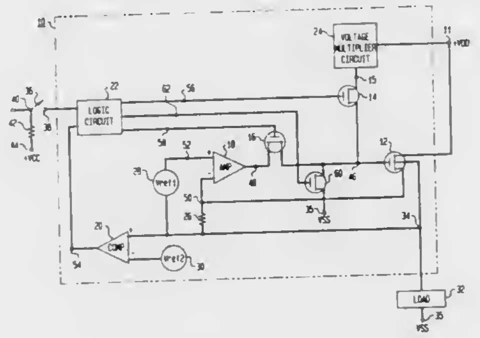
electrical supply means enabling the application of a main voltage between a first end of said bar, said bar acting as a cathode, and a main anode located in a receiving part of said tube, said voltage enabling electrons to be accelerated along said bar, so as to acquire a kinetic energy which is at least equal to the energy of extraction from the material forming the bar, and so as to be ejected outside said bar, through said bar's first end, and be injected into said injection part of said tube;

means to trigger the electron injection phenomenon.

---

### 5,015,921
## SOFT START SOLID STATE SWITCH

Peter J. Carlson, and Robert G. Hodgins, both of Raleigh, N.C., assignors to General Electric Company, Somerville, N.J.
Filed Mar. 17, 1988, Ser. No. 163,534
Int. Cl.$^5$ H05B *37/00;* G05F *1/00;* H01D *5/12*
U.S. Cl. 315—208 20 Claims



1. Circuitry connectable to a load whose impedance nonlinearly increases during turn-on, said circuitry comprising:

a device having a control terminal and first and second output terminals and being adapted such that current flow from one output terminal to the other output terminal through the device can be controlled by bias applied to the control terminal;

first biasing means selectively coupled to the control terminal of the device for selectively biasing on the device such that current flows through the device;

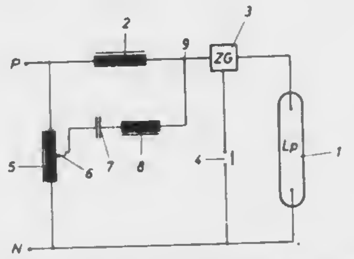
second biasing means selectively coupled to the control terminal of the device for selectively biasing the device to allow current flow there through which is greater than that permitted by the first biasing means; and

detecting and coupling/decoupling means coupled to the second output terminal of the device for effectively detecting the impedance of the load and for coupling the first biasing means or the second biasing means to bias on the device while decoupling the other such that when the impedance of the load is at or below a preselected level, the first biasing means controls current flow through the device, and when the impedance of the load is above the preselected level, the second biasing means controls current flow through the device.

---

### 5,015,922
## POWER SUPPLY CIRCUIT FOR A GAS DISCHARGE LAMP

Rudolf Mühling, Gebenstorf, Switzerland, assignor to Ultralight AG, Liechtenstein, Liechtenstein
PCT No. PCT/EP88/00652, § 371 Date Mar. 9, 1989, § 102(e) Date Mar. 9, 1989, PCT Pub. No. WO89/00804, PCT Pub. Date Jan. 26, 1989
PCT Filed Jul. 20, 1988, Ser. No. 332,280
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1987, 3723971
Int. Cl.$^5$ H05B *41/18*
U.S. Cl. 315—282 3 Claims



1. A power supply circuit for a gas discharge lamp operated at an AC power source containing a current-limiting reactor whose one end is connected to a connection of the gas discharge lamp, while its other (second) end and an other connection of the gas discharge lamp are adapted to be connected with the poles of the AC power source, and further comprising a regulating transformer connected in parallel to a series connection of the current limiting reactor and the gas discharge lamp having a tap connected to the connection point of current-limiting reactor and gas discharge lamp via a series connecting of a capacitor and an auxiliary reactor, the reactance of the capacitor being about 1.3 to 2.5 times the reactance of the auxiliary reactor.

---

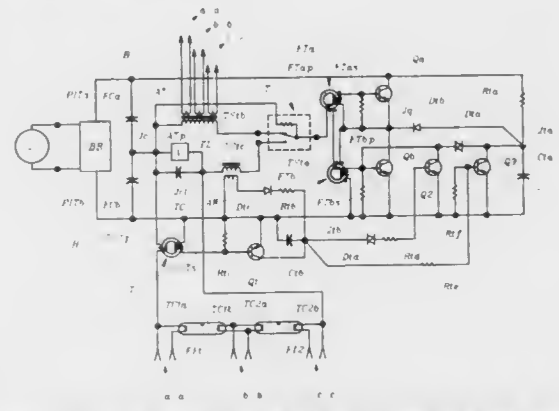
### 5,015,923
## EXTRA EFFICIENT ELECTRONIC BALLAST FOR FLUORESCENT LAMPS

Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010
Continuation of Ser. No. 907,229, Sep. 15, 1986, abandoned. This application Apr. 26, 1990, Ser. No. 513,053
Int. Cl.$^5$ H05B *41/36*
U.S. Cl. 315—307 20 Claims

1. An arrangement comprising:

power supply operative to provide an AC voltage across a pair of output terminals, the power supply having disable means and being operative, on receipt of a disable signal by said disable means, to cease to provide said AC voltage;

disable signal means having prevention means and being connected in circuit with the output terminals, the disable signal means being responsive to the AC voltage and operative, except if provided with a prevent signal at its prevention means, to provide said disable signal, thereby to cause the power supply to cease to provide said AC voltage; and

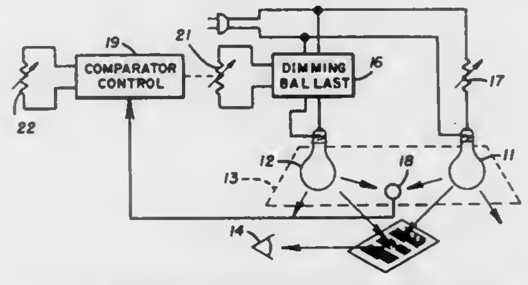


prevent signal means connected in circuit with the output terminals and responsive to current flowing therefrom, the prevent signal means being operative to provide said prevent signal as long as current flows from one of the output terminals.

---

### 5,015,924
## PUPILLARY EFFICIENT LIGHTING SYSTEM

Samuel M. Berman, San Francisco, and Don L. Jewett, Mill Valley, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.
Filed Apr. 14, 1989, Ser. No. 337,971
Int. Cl.$^5$ H05B *37/02, 41/16*
U.S. Cl. 315—324 9 Claims



1. A pupillary efficient lighting system comprising

at least two lighting subsystems each emitting visible light with different spectral power distributions which can be concurrently detected at a reception location,

means for varying the total scotopic illumination from said lighting system while maintaining the total photopic illumination from said lighting system at a desired level.

---

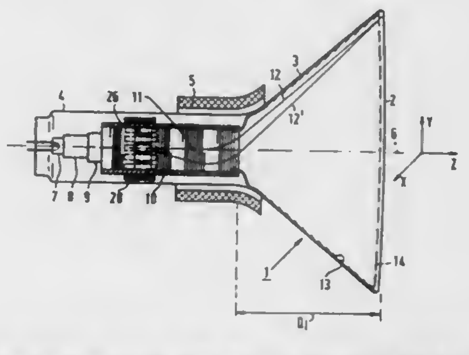
### 5,015,925
## PICTURE DISPLAY DEVICE

Tjerk G. Spanjer, and Gerardus A. H. M. Vrijssen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Jan. 8, 1990, Ser. No. 461,888
Claims priority, application Netherlands, Jan. 12, 1989, 8900069
Int. Cl.$^5$ G09G *1/04;* H01J *29/58, 29/50, 29/46*
U.S. Cl. 315—382 5 Claims

1. A picture display device comprising a cathode ray tube including a display screen and an electron gun for producing at least one electron beam directed toward the screen along an electron optical axis, said tube being adapted for the attachment of deflection means for deflecting the electron beam across the screen, characterized in that the electron gun comprises:

a. a beam shaping part including a cathode for emitting electrons and electrode means for forming the electrons into said beam;

b. a tubular structure of insulating material surrounding the electron optical axis, said tubular structure including an inner surface on which is disposed at different axial positions a correction element and a helical focusing element, each of said elements being formed in a layer of resistive material having a high electrical resistance, said elements producing an electrical correction lens field and an electrical focusing lens field, respectively, when respective voltages are applied to said elements;



c. a surface electrode disposed on an outer surface of the tubular structure and extending over at least a portion of the correction element, said surface electrode, said portion of the correction element and the insulating material of the tubular structure which is disposed between said surface electrode and said portion forming a capacitor;

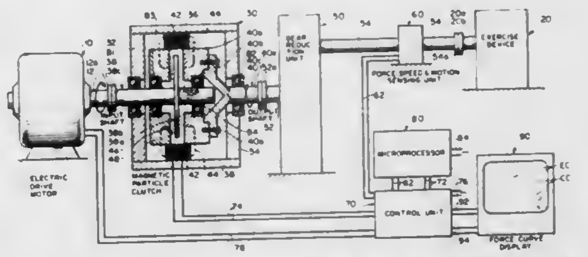
d. first voltage supplying means for applying a static voltage to the helical focusing element to effect focusing of the electron beam; and

e. second voltage supplying means for applying a dynamically variable correction voltage to the surface electrode, said voltage being coupled through said capacitor to the correction element to effect dynamic correction of the electron beam.

---

### 5,015,926
## ELECTRONICALLY CONTROLLED FORCE APPLICATION MECHANISM FOR EXERCISE MACHINES

John A. Casler, 1605 Manzanita La., Manhattan Beach, Calif. 90266
Filed Feb. 2, 1990, Ser. No. 474,546
Int. Cl.$^5$ A63B *21/5*
U.S. Cl. 318—9 9 Claims



1. A force development system for the application of controlled variable speeds and torque forces in exercise machines utilized to strengthen and develop body muscles of an exercising person, comprising:

a) a constant speed high torque force creation device including a primary rotary force output shaft;

VOL
1126
ISS
2
MY
14
1991
UMI

b) a dynamic clutch device including a rotary force input assembly interconnected to the primary rotary force output shaft of said torque force creation device for driving said clutch device, a rotary force output assembly including a secondary rotary force output shaft, and means for the controlled coupling of said rotary force output assembly to said force input assembly;

c) a speed reduction and torque amplifying device including force input means interconnected to the secondary rotary force output shaft of said clutch device, means for reducing the speed and amplifying the torque of the force input means of said speed reduction and torque amplifying device, and a tertiary rotary force output shaft of reduced speed with respect to the speed of said primary and secondary force output shafts, the tertiary output shaft of said speed reduction and torque amplifying device being mechanically interconnected with the force mechanism of an exercise machine for applying variable active and passive torque force to the exercising person using said machine;

d) electronic sensor means associated with the tertiary rotary force output shaft of said speed reduction and torque amplifying device for sensing the speed, motion and torque of said tertiary output shaft and the opposing torque force and motion of an exercising person as applied to said output shaft;

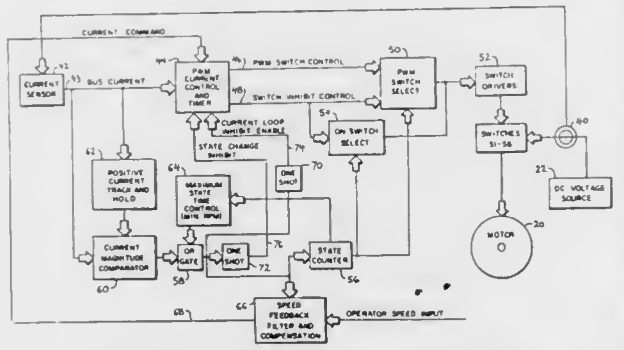
e) microprocessor means electrically interconnected to said electronic sensor means for receiving the speed, motion and torque force information sensed by said sensor means; and

f) control means electrically interconnected to said force creation device, to the controlled coupling means of said dynamic clutch device, and to said microprocessor means, said control means being directed by said microprocessor in relation to the speed, motion and torque force information sensed by said sensor means to operate and control said force generation device and to operate and control the controlled coupling means of said clutch device whereby controlled variable speeds and active and passive torque forces are applied to the force mechanism of the exercise machine in direct relation to the force applied to said mechanism by the exercising person during the active and positive force motion and passive and negative force motion of an exercise.

---

### 5,015,927
### ELECTRIC MOTOR WITH REGENERATION CURRENT COMMUTATION

**Jerome J. Reichard, Menomonee Falls, Wis., assignor to Thor Technology Corporation, Milwaukee, Wis.**
**Filed Aug. 4, 1989, Ser. No. 389,874**
**Int. Cl.$^5$ H02K *29/00***
**U.S. Cl. 318—139** **18 Claims**



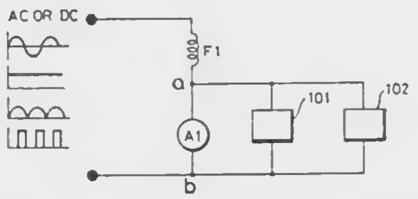
1. A method of controlling a three phase electric motor comprising energizing said phases in a cyclic sequence comprising a plurality of states, **1**, **2**, **3**, and so on, wherein during each state, two of the phases are energized and the third phase is unenergized, sensing regeneration current from the unenergized phase, and commutating to the next state in response to said regeneration current, and further comprising:

providing a plurality of switches;
energizing said phases in said cyclic sequence through said switches;
periodically turning off all of said switches simultaneously for a given blanking interval;
sensing said regeneration current during said blanking interval.

---

### 5,015,928
### UNIVERSAL SERIES MOTOR WITH SPEED LIMITING CIRCUIT TO PROTECT THE MOTOR FROM OVERSPEEDING DURING RELATIVELY-SMALL LOADS

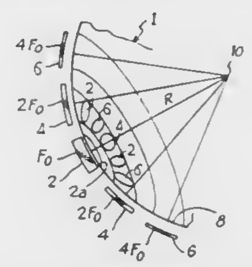
**Tai-Her Yang, Giant Lion Know-How Co., Ltd., 6F-5, No. 250, Sec. 4, Chung Hsiao E. Road, Taipei, Taiwan**
**Continuation-in-part of Ser. No. 201,849, Jun. 3, 1988, abandoned. This application May 23, 1990, Ser. No. 527,511**
**Int. Cl.$^5$ H02K *23/00***
**U.S. Cl. 318—250** **7 Claims**



1. A speed limiting circuit for protecting a universal series motor from overspeeding when the motor is lightly loaded, comprising a motor having an armature and a field winding, said armature having first and second ends and said field winding have first and second ends, said second end of said field winding being connected to said first end of said armature to form a series circuit, a source of power for said motor, said power source including first and second conductors, said first conductor being connected to said first end of said field winding, said second conductor being connected to said second end of said armature, a shunt element connected in parallel with said armature, said shunt element being connected from the junction between said second end of said field winding and said first end of said armature to said second end of said armature, said shunt element being normally non-conductive and being responsive to a control voltage input to become conductive whenever said control voltage input exceeds a pre-determined level, a voltage detection circuit connected in parallel with said armature and with said shunt element, said voltage detection circuit having first and second input terminals and an output terminal, said first input terminal of said voltage detection circuit being connected to the junction between said second end of said field winding and said first end of said armature, said voltage detection circuit producing a control voltage at said output terminal thereof proportional to the speed of said armature, and means for applying said control voltage to said shunt element to control the conduction of said shunt element, whereby said control voltage will rise to a value sufficient to render said shunt element conductive whenever the speed of said armature rises to a pre-determined value and current flow through said field winding is thereby increased, thereby tending to limit the speed of said armature to said pre-determined value.

### 5,015,929
### PIEZOELECTRIC DEVICE WITH REDUCED NEGATIVE WAVES, AND USE OF SAID DEVICE FOR EXTRACORPOREAL LITHOTRITY OR FOR DESTROYING PARTICULAR TISSUES

**Dominique Cathignol, Genas; Bernard Lacruche, Lyons, and Jean-Louis Mestas, Chassieu, all of France, assignors to Technomed International, S.A., Paris and Institut National de la Sante et de la Recherche Medical (Inserm), Lyons, both of, France**
**Continuation of Ser. No. 197,987, May 24, 1988, abandoned. This application Dec. 1, 1989, Ser. No. 449,503**
**Claims priority, application France, Sep. 7, 1987, 87 12385**
**Int. Cl.$^5$ H01L *41/08***
**U.S. Cl. 310—335** **18 Claims**



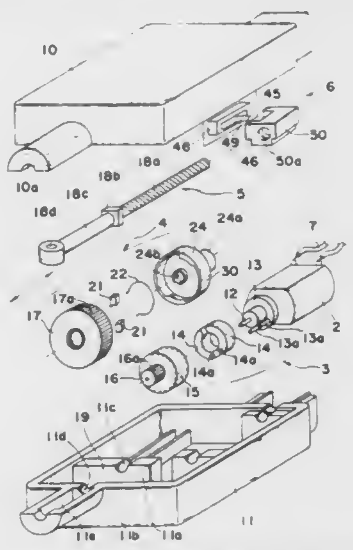
1. A device for generating ultrasonic waves focused on one focal point, having reduced negative waves, comprising a plurality of transducer elements of piezoelectric type arranged on a support means for focusing at one focal point, wherein said transducer elements are divided into at least first and second groups of transducer elements having first and second resonance frequencies, respectively, which resonance frequencies are different, and wherein the second group of transducer elements has a resonance frequency which is equal or substantially equal to a multiple or a submultiple of the resonance frequency of the transducer elements of the first group such that the principal positive ultrasonic waves produced by each group are added and the positive and negative secondary ultrasonic waves are at least partly cancelled out.

---

### 5,015,930
### POWER CONVERTING MECHANISM

**Tomoyuki Kikuta, and Chikara Kawaguchi, both of Kosai, Japan, assignors to Asmo Co., Ltd., Kosai, Japan**
**Division of Ser. No. 412,460, Sep. 26, 1989, abandoned, which is a division of Ser. No. 176,148, Mar. 31, 1989, Pat. No. 4,903,535. This application Apr. 6, 1990, Ser. No. 505,514**
**Int. Cl.$^5$ H01H *3/16***
**U.S. Cl. 318—466** **2 Claims**

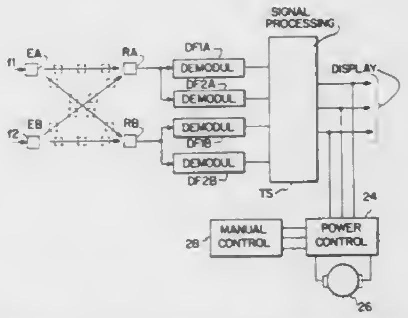
2. An electric door lock actuator comprising
a switch mechanism for actuating a door lock member,
a motor,
an output member driven by the motor and interlinked with the door lock member through a connecting rod, and
a pair of arms projecting on the output member and facing each other for engagement with a switch operation tab of the switch mechanism and provided with a recessed portion therebetween,
the recessed portion being provided with a width having a clearance larger than that of the switch operation tab, so that the output member is movable together with the switch operation tab, subsequent to movement through a clearance distance independent of the switch operation tab, to cut off electric power supply to the motor at the time of the switch operation tab being moved to a predetermined position, and
the switch mechanism having a charging stroke of a length shorter than that of the stroke of the door lock member interlinked with the output member, the stroke of the output member is longer than that of the door lock member.



---

### 5,015,931
### WINDSHIELD WIPER SYSTEM WITH RAIN DETECTOR

**Guy Muller, Bievres, France, assignor to Valeo Systemes D'Essuyage, Montigny-Le-Bretonneux, France**
**Filed Jun. 11, 1990, Ser. No. 535,651**
**Claims priority, application France, Jun. 12, 1989, 89 07715**
**Int. Cl.$^5$ B60S *1/08***
**U.S. Cl. 318—483** **6 Claims**



1. A windshield wiper system for a vehicle, comprising a windshield transparency detector which include a plurality of sources of frequency modulated light and a plurality of sensors for said light, said sources and sensors being arranged in a two dimensional array on a common zone of the windshield, each source radiating nondirectional light to propagate in said windshield to impinge upon each of said sensors, the system further comprising a demodulation circuit associated with each said light sensor for demodulating each of the frequencies of the light from said sources and for providing a signal corresponding to each demodulation.

---

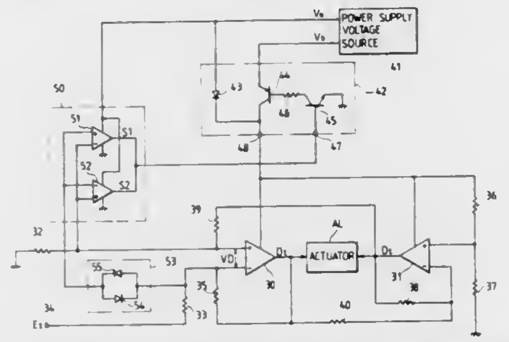
### 5,015,932
### ACTUATOR DRIVING CIRCUITS

**Shigeaki Wachi, Tokyo, Japan, assignor to Sony Corporation, Kitashinagawa, Japan**
**Filed May 30, 1990, Ser. No. 530,340**
**Claims priority, application Japan, Jun. 1, 1989, 1-137436**
**Int. Cl.$^5$ H02K *33/16*; G11B *7/00***
**U.S. Cl. 318—560** **9 Claims**

1. An actuator driving circuit for driving an actuator employed in a servocontrol system, the circuit comprising:

VOL
1126
ISS
2
MY
14
1991
UMI

an error signal input terminal to which an error signal obtained in the servocontrol system is supplied,
amplifying means for amplifying the error signal supplied through said error signal input terminal to produce a driving signal and for supplying said driving signal to the actuator,
power supply voltage source means for producing a first power supply voltage and a second power supply voltage higher than said first power supply voltage,
power supply voltage selecting means for selecting one of the first and second power supply voltages so as to supply said amplifying means with said one of the first and second power supply voltages selected, and



level detecting means for detecting a specific portion of the error signal having such a level as to cause said amplifying means to produce a portion of the driving signal having a level limited to be constant under a condition in which said first power supply voltage is supplied to said amplifying means and for producing a detection output by which said power supply voltage selecting means is controlled to select said second power supply voltage in place of said first power supply voltage when said specific portion of the error signal is detected, thereby enabling the circuit to compensate for shocks and vibrations caused by external force.

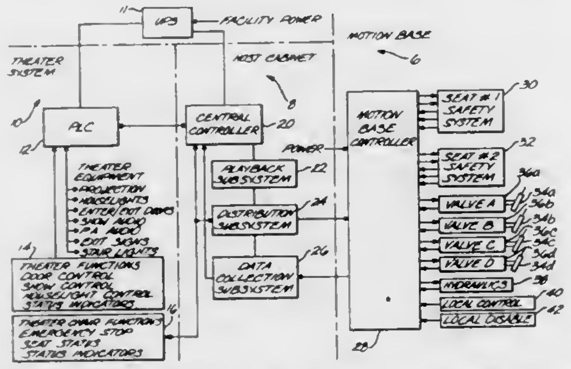
---

### 5,015,933
## SEAT BASE MOTION CONTROLLER
**William M. Watkins, Covina; David L. Toyne, Monrovia; Alan J. Arena, Chino, all of Calif.; Larry D. Lawver, Orlando, and Daniel S. Birket, Opopka, both of Fla., assignors to Ride-werks, Ltd., Burbank, Calif.**

**Filed Nov. 15, 1989, Ser. No. 437,344**

**Int. Cl.$^5$ A63G *31/16***

**U.S. Cl. 318—567** **14 Claims**



1. A motion seat base for use in combination with a visual presentation for increased realism in an entertainment experience comprising:
a frame for supporting at least one seat;
a plurality of actuating means which are independently positionable for imparting motion to the frame;
a means for providing actuation signals syncronized with the visual presentation;
a control means connected to the actuating means and responsive to the actuation signal providing means for controlling the position of each of the actuating means to impart motion;
a position sensing means connected to each actuating means for sensing the position of the actuating means and providing a feedback to the control means; and,
a safety system connected to the seat and the control means for deactivating the actuating means if an unsafe condition exists.

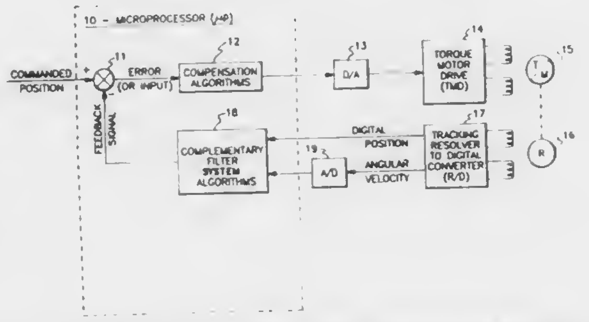
---

### 5,015,934
## APPARATUS AND METHOD FOR MINIMIZING LIMIT CYCLE USING COMPLEMENTARY FILTERING TECHNIQUES
**Steven R. Holley, Phoenix; David C. Cunningham, Carefree, both of Ariz., and Kevin D. Kral, Streamwood, Ill., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Sep. 25, 1989, Ser. No. 415,803**

**Int. Cl.$^5$ G05B *5/01***

**U.S. Cl. 318—611** **12 Claims**



1. An apparatus for controlling the positioning of a device in response to a commanded input signal, said apparatus comprising:
(a) means for moving the device in response to an error signal;
(b) sensor means for determining the actual position of the device, said sensor means outputting a quantized primary signal and a derivative signal corresponding to the actual position and velocity of the device, respectively; and
(c) complementary filter system means, for filtering the primary signal and the derivative signal to generate a derived position signal, the derived position signal being combined with the commanded input signal to generate the error signal, whereby the filtering results in effectively increasing the resolution of the sensor means thereby reducing the limit cycle caused by quantization of the sensor means.

---

### 5,015,935
## SERVO-CONTROL APPARATUS
**Yasusuke Iwashita, Yamanashi, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan**

**PCT No. PCT/JP89/00969, § 371 Date May 21, 1990, § 102(e) Date May 21, 1990, PCT Pub. No. WO90/03603, PCT Pub. Date Apr. 5, 1990**

**PCT Filed Sep. 25, 1989, Ser. No. 490,564**

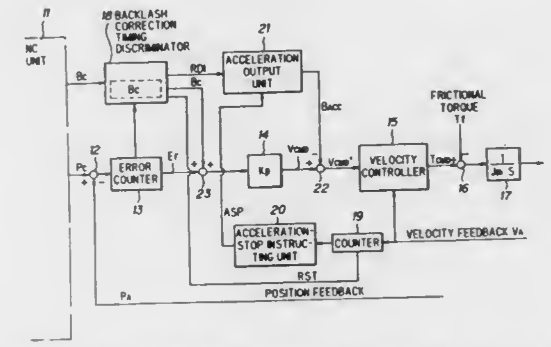
**Claims priority, application Japan, Sep. 30, 1988, 63-243990**

**Int. Cl.$^5$ G05B *11/01***

**U.S. Cl. 318—630** **4 Claims**

1. A servo-control apparatus for generating a velocity command by applying backlash correction data to position error data when direction of rotation of a servomotor is reversed,

and performing a backlash correction by adding an amount of backlash acceleration to said velocity command, comprising:
means for detecting reversal of the direction of rotation of the servomotor;
means for detecting that an accumulated value of velocity feedback has become equal to a predetermined value after backlash acceleration is started; and



means for outputting the amount of backlash acceleration when direction of rotation of a servomotor is reversed, and terminating output of the amount of backlash acceleration when the accumulated value of velocity feedback becomes equal to the predetermined value.

---

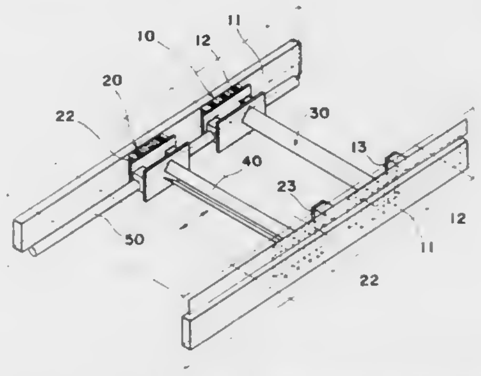
### 5,015,936
## LINEAR DRIVING DEVICE FOR USE OF A COPYING APPARATUS
**Atsushi Inoue, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 29, 1989, Ser. No. 442,697**

**Claims priority, application Japan, Nov. 30, 1988, 63-304359**

**Int. Cl.$^5$ G05B *11/00*; G03G *15/28***

**U.S. Cl. 318—687** **3 Claims**



1. A linear driving arrangement for use in a copying apparatus comprising:
first and second linear driving sections for displacing a drum projection optical mechanism and an original document scanning optical mechanism from respective initial positions alternately in an original document scanning direction;
a driving control section for imparting a speed pattern for said drum projection optical mechanism and said original document scanning optical mechanism in a ratio of 1 to 1, and further for controlling said first and second linear driving sections according to the speed pattern; and
an initial position adjusting section for independently controlling the respective first and second linear driving sections according to external instructions, separately from the control performed by the said driving control section.

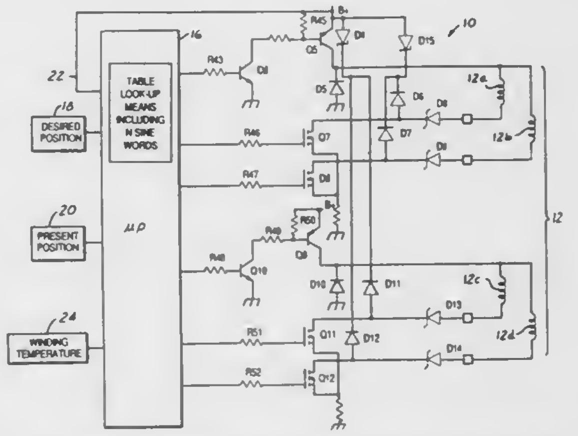
---

### 5,015,937
## PARAMETRIC CURRENT CONTROL FOR MICROSTEPPING UNIPOLAR MOTOR
**Danny O. Wright, Newport News, and Kregg S. Wiggins, Hayes, both of Va., assignors to Siemens-Bendix Antomotive Electronics L.P., Auburn Hills, Mich.**

**Filed Oct. 26, 1989, Ser. No. 427,270**

**Int. Cl.$^5$ H02P *8/00***

**U.S. Cl. 318—696** **8 Claims**



1. A unipolar stepping motor control system comprising in combination:
a unipolar stepping motor comprising a two phase winding, each phase winding having two oppositely wound coils, said motor having a shaft that rotates a driven member;
present position sensor means effective to generate a signal indicating the present position of said driven member;
desired position generator means effective to generate a signal indicating the desired position of said driven member;
means, including a microprocessor, responsive to said signals for generating an error signal indicative of the difference between the present position and the desired position of said driven member to cause said stepping motor to drive said driven member to said desired position;
means for generating discrete sine and cosine values of a control current over a range of 360 degrees;
for each of said coils, a corresponding controlled conduction device for controlling the flow of current in the corresponding coil, the controlled conduction devices being under the control of said microprocessor;
said microprocessor serving to cause a first one of said controlled conduction devices to be conductive for only positive sine values of said control current, a second one of said controlled conduction devices to be conductive for only negative sine values of said control current, a third one of said controlled conduction devices to be conductive only for positive cosine values of said control current, and a fourth one of said controlled conduction devices to be conductive only for negative cosine values of said control current;
said system further including current regulating means for regulating the control current in each of said coils, said current regulating means comprising voltage sensing means, supplied to said microprocessor, for sensing the voltage of a D.C. supply that supplies the control current to said coils via said controlled conduction devices, and temperature sensing means, supplied to said microprocessor, for sensing motor temperature proximate said phase windings, and said microprocessor serving to operate said controlled conduction devices such that current to said coils is regulated in a manner causing motor operation to be substantially insensitive to fluctuations in motor temperature and in D.C. supply voltage.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,015,938
## SYNCHRONIZABLE DRIVE SYSTEM

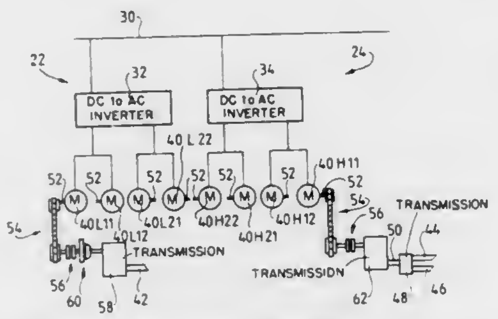
**Reinhard Oehler, Berg am Irchel; Urs Meyer, Niederglatt, and Andre Lattion, Seuzach, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland**

**Filed Jun. 30, 1989, Ser. No. 373,461**

**Claims priority, application Switzerland, Jul. 6, 1988, 02571/88**

**Int. Cl.$^5$ D01H** *15/02;* **H02P** *1/46*

**U.S. Cl. 318—696** **10 Claims**



1. A ring spinning machine comprising
a plurality of rotatable spindles;
a drafting arrangement for feeding fiber to said spindles, said arrangement including a plurality of driven rollers and at least two drive motors for each respective roller, each said motor being controlled in dependence on a supply frequency delivered thereto;
a plurality of power transmissions, each transmission being disposed for coupling a respective motor with a respective roller driven thereby and including a clutch, a first gear transmission between a respective motor and said clutch, and a second gear transmission between said clutch and said roller; and
a control for supplying an individual supply frequency to each said motor, said control being operatively connected to said clutch of each power transmission to couple said motors simultaneously with said rollers in response to said motors reaching a speed to run in synchronism with the supply frequency delivered thereto.

---

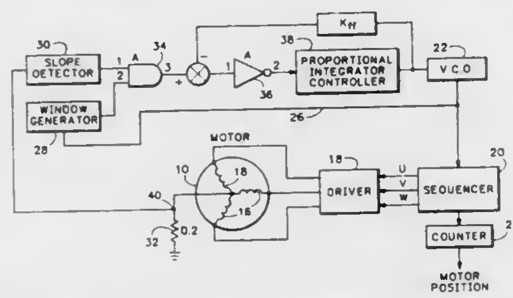
### 5,015,939
## CONTROL CIRCUIT FOR SWITCHED RELUCTANCE MOTOR

**Karl Konecny, Portland, Oreg., assignor to Synektron Corporation, Portland, Oreg.**

**Filed Aug. 10, 1990, Ser. No. 565,943**

**Int. Cl.$^5$ H02P** *5/40*

**U.S. Cl. 318—701** **14 Claims**



1. A motor control circuit for a switched reluctance electric motor, said motor having a plurality of stator poles wound with coils, said coils being coupled to a driver circuit for energizing said coils in sequence, comprising:
(a) current sensing means coupled to said coils for detecting a signal proportional to current in said coils;
(b) slope detection means for detecting the rate of change of said signal with respect to time over predetermined time intervals during which the change in inductance with respect to rotor position is substantially at a maximum; and
(c) variable oscillator means responsive to an integrated output of said slope detection means for generating a timing signal for said driver circuit.

---

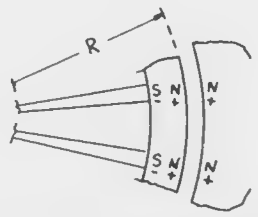
### 5,015,940
## PRESSURE CONSTRAINT OF A ROTATING ARTICLE SUCH AS A FLYWHEEL

**Lambros Lois, 6104 Dunleer Ct., Bethesda, Md. 20817**

**Continuation of Ser. No. 841,031, Mar. 17, 1986, abandoned, which is a continuation of Ser. No. 503,648, Jun. 16, 1983, abandoned, which is a continuation-in-part of Ser. No. 325,884, Nov. 30, 1981, abandoned. This application Dec. 21, 1987, Ser. No. 135,487**

**Int. Cl.$^5$ F16C** *15/00;* **H02J** *15/00*

**U.S. Cl. 322—4** **13 Claims**



2. A method of increasing the maximum rate of rotation and correspondingly the maximum kinetic energy per unit mass which can be tolerated before breakup by a rotating flywheel of a sufficiently large structure to be practical for storing and subsequently retrieving energy, which is rotating on a shaft and has a perimeter portion extended from said shaft, comprising applying to said perimeter of the rotating flywheel an inward radial pressure additional to any such pressure derived from the rotational motion itself, said additional pressure being sufficiently continuous whereby the maximum rate of revolution of said flywheel and, correspondingly, said maximum kinetic energy per unit mass are substantially increased.

---

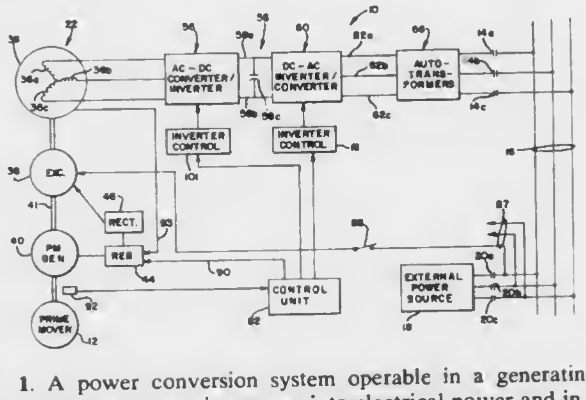
### 5,015,941
## POWER CONVERSION SYSTEM WITH BI-DIRECTIONAL POWER CONVERTER HAVING PRIME MOVER START CAPABILITY

**P. John Dhyanchand, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Oct. 30, 1989, Ser. No. 428,969**

**Int. Cl.$^5$ F02N** *11/04;* **H02P** *9/04*

**U.S. Cl. 322—10** **5 Claims**



1. A power conversion system operable in a generating mode to convert motive power into electrical power and in a starting mode to convert electrical power into motive power utilizing an external power source and a generator having armature windings, comprising:
first and second bidirectional means, each of said bidirectional means being operable as either an AC to DC converter or a DC to AC inverter;
a DC link coupling said first and second bidirectional means;
transformer means connected to said second means;
said first bidirectional means further being adapted to be connected to said armature windings, and said transformer means further being adapted to be connected to the external power source; and
control means connected to said first and second bidirectional means for causing said first bidirectional means to operate as a converter and said second bidirectional means to operate as an inverter when operating in said generating mode, and for causing said first bidirectional means to operate as an inverter and said second bidirectional means to operate as a converter when operating in said starting mode.

---

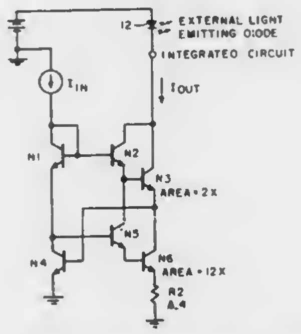
### 5,015,942
## POSITIVE TEMPERATURE COEFFICIENT CURRENT SOURCE WITH LOW POWER DISSIPATION

**Frank J. Kolanko, Greenville, R.I., assignor to Cherry Semiconductor Corporation, East Greenwich, R.I.**

**Filed Jun. 7, 1990, Ser. No. 534,770**

**Int. Cl.$^5$ G05F** *3/16;* **G09G** *3/14, 3/32*

**U.S. Cl. 323—315** **7 Claims**



1. A positive temperature coefficient current source comprising:
a first transistor having a collector for receiving a reference current, a base connected to the collector and an emitter;
a second transistor having a base connected to the base of said first transistor, a collector and an emitter;
a third transistor having a base connected to the emitter of said second transistor, a collector connected to the collector of said second transistor and an emitter;
a fourth transistor having a collector connected to the emitter of said first transistor, a base connected to the emitter of said third transistor and an emitter connected to ground;
a fifth transistor having a base connected to the emitter of said first transistor, a collector and an emitter;
a sixth transistor having a base connected to the emitter of said fifth transistor, a collector connected to the emitter of said third transistor and an emitter; and
a resistor connected between the emitter of said sixth transistor and ground.

---

### 5,015,943
## HIGH POWER, HIGH SENSITIVITY MICROWAVE CALORIMETER

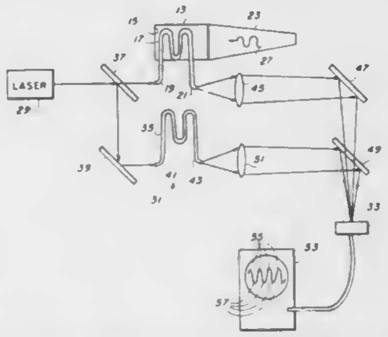
**Frederick M. Mako, Fairfax Station, and John A. Pasour, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 22, 1989, Ser. No. 354,559**

**Int. Cl.$^5$ G01R** *23/04*

**U.S. Cl. 324—95** **10 Claims**

1. A microwave calorimeter for substantially measuring the total microwave energy in an applied microwave pulse, said microwave calorimeter comprising:
a housing having a highly reflective interior surface;
means for transmitting microwave energy into said housing;
a microwave absorbing device disposed in said housing for absorbing microwave energy transmitted into said housing and for producing a thermal response proportional to the amount of microwave energy being absorbed, said microwave absorbing device including a first fiber optic bundle of a preselected unheated length responsive to the absorption of said microwave energy for producing a thermal response of an increase in length of said fiber optic bundle, said length increase being proportional to the amount of said microwave energy absorbed by said fiber optic bundle; and
means responsive to said thermal response for determining the amount of microwave energy being absorbed by said device.



---

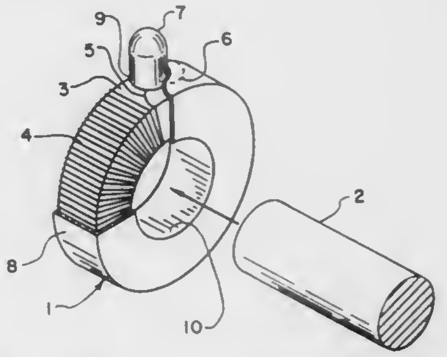
### 5,015,944
## CURRENT INDICATING DEVICE

**James E. Bubash, 252 Sunset Dr., St. Louis, Mo. 63011**

**Continuation of Ser. No. 940,730, Dec. 10, 1986, abandoned, which is a continuation-in-part of Ser. No. 643,839, Aug. 23, 1984, abandoned, which is a continuation of Ser. No. 283,489, Jul. 15, 1981, abandoned. This application May 8, 1989, Ser. No. 349,986**

**Int. Cl.$^5$ G01R** *1/20, 19/15*

**U.S. Cl. 324—127** **5 Claims**



1. A self-contained current indicating device permanently mounted on an electrical conductor for signalling the flow of current through said conductor by giving an apparently constant visual signal when current above a predetermined minimum is flowing through said conductor, comprising a toroidal core with an opening through its center; an electrically conductive wire wound on and around the said toroidal core with a reach of each full turn of said wire passing through said central opening and leaving a conductor-receiving central opening therein, said coil having two ends, and elongated illuminating means electrically connected to said two ends of said coil wire, said illuminating means being carried by and

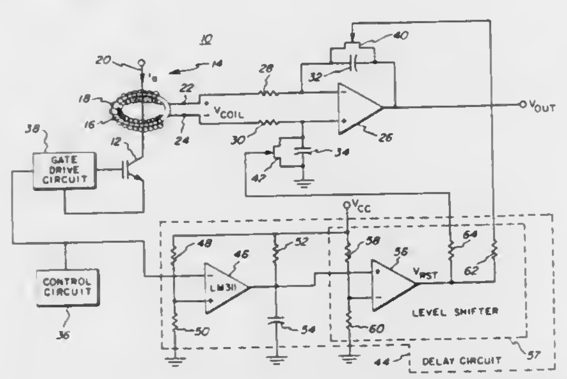
VOL
1126
ISS
2
MY
14
1991
UMI

mounted on said wound core, an encapsulating housing surrounding said coil and a part of said illuminating means, the rest of said illuminating means projecting radially outwardly from said encapsulating housing to be continuously visible to a viewer, said conductor-receiving central opening being of a size to admit said conductor, said illuminating means being energized above a predetermined level of current passing through said conductor to provide an apparently constant visual signal, said illuminating means and coil constituting a single, unitary, mechanical package without external electrical connection.

---

### 5,015,945
## CURRENT SENSOR FOR MEASURING CURRENT IN A SEMICONDUCTOR SWITCH

**Arthur V. Radun, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.**
**Filed Jun. 25, 1990, Ser. No. 542,617**
**Int. Cl.$^5$ G01R** *27/02, 31/02*
**U.S. Cl. 324—127** **5 Claims**



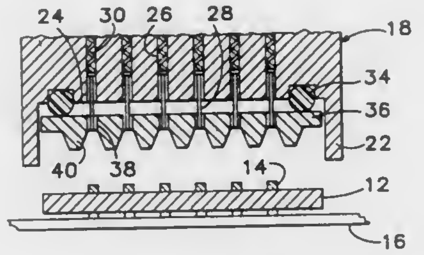
2. A current sensor for sensing a current flowing in a unidirectional semiconductor switching device, comprising:
- a current sensing coil wound around a nonmagnetic, substantially toroidal core situated so that a conductor coupled in series with said switching device passes through the center of said core, said coil having two terminals across which is produced a voltage proportional to the derivative of said current;
- an integrator having an inverting input and a noninverting input respectively coupled to the two terminals of said coil, said integrator providing a voltage proportional to said current at the output thereof; and
- control circuit means coupled to said switching device via drive circuit means and further coupled to said integrator for generating a reset signal for resetting the output voltage of said integrator to zero whenever said switching device is turned off.

---

### 5,015,946
## HIGH DENSITY PROBE

**Bozidar Janko, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**
**Filed Feb. 26, 1990, Ser. No. 484,334**
**Int. Cl.$^5$ G01R** *1/02, 1/04*
**U.S. Cl. 324—158 F** **3 Claims**

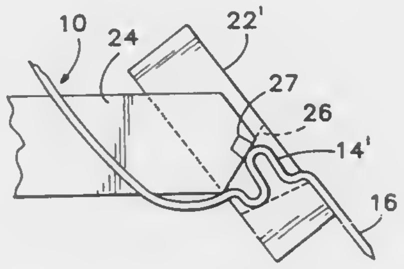
1. A probe for an integrated circuit package having high density leads comprising:
- a probe housing having a skirt that extends down over the integrated circuit package with alignment surfaces that align the probe housing with the integrated circuit package, the probe housing including elastically mounted probe pins aligned to make contact with the high density leads; and
- an alignment plate elastically mounted within the probc housing internal of the skirt and having a plurality of serrations on either side of pin holes, the serrations meshing with the high density leads and the probe pins extending through the pin holes to contact the leads when the probe is pressed down on the integrated circuit package.



---

### 5,015,947
## LOW CAPACITANCE PROBE TIP

**Warren L. Chism, Vancouver, Wash., assignor to Tektronix, Inc., Beaverton, Oreg.**
**Filed Mar. 19, 1990, Ser. No. 495,176**
**Int. Cl.$^5$ G01R** *31/22;* **H01R** *39/00*
**U.S. Cl. 324—158 P** **5 Claims**



5. A low capacitance probe comprising:
- a hybrid electrical circuit board;
- a probe tip body having a tapered hole therethrough with the probe tip body fixedly mounted to the hybrid electrical circuit board so that an electrical contact of the hybrid electrical circuit board is exposed at the tapered hole; and
- a low capacitance probe tip formed from a small diameter wire and inserted into the tapered hole, the low capacitance probe tip having a straight section contiguous with a tapered S-shaped section and a pointed front end with the longitudinal axis of the pointed front end normal to the longitudinal axis of the tapered S-shaped section, the straight section being inserted through the tapered hole in the probe body with S-shaped section engaging the interior walls of the tapered hole in an interference fit to hold the probe tip fixedly in place as the S-shaped section is pulled into the tapered hole by force applied to the straight section, the probe tip making electrical contact with the electrical contact when so inserted.

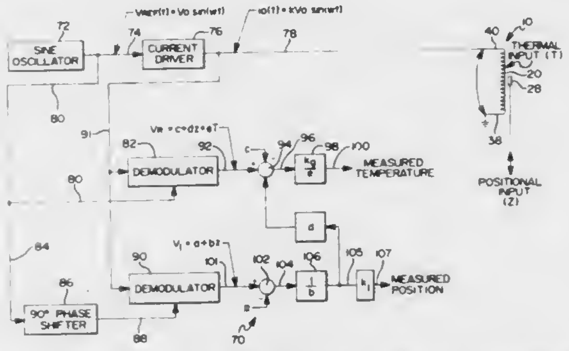
---

### 5,015,948
## TRANSDUCER FOR PROVIDING A POSITION SIGNAL AND TRANSDUCER TEMPERATURE

**Sydney K. Tew, New Baltimore, Mich., assignor to Cadillac Gage Textron Inc., Warren, Mich.**
**Filed Apr. 24, 1989, Ser. No. 341,835**
**The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.**
**Int. Cl.$^5$ G01B** *7/14;* **G01N** *27/72;* **G01R** *33/00*
**U.S. Cl. 324—207.23** **8 Claims**

1. A transducer for providing a measured transducer temperature signal and a measured position signal by use of:
- a mechanical device having a position input means;
- a drive rod coupled to said position input means operative to be moved linearly in response to said position input means; and

- a transducer having a winding on a bore liner and a finite length core of high permeability material located within said bore liner and adapted to be connected to said drive rod for linear movement within said bore liner characterized by:
- a single coil wound on said bore liner having only two leads, said single coil being made from a material which produces an output voltage across the only two leads which is highly temperature dependent;
- a finite length core of high permeability material located within said bore liner connected to said drive rod to be moved linearly within said bore liner;
- said core being positioned by said drive rod at an initial position wholly within said bore liner to be electromagnetically coupled with first segments of said single coil to produce an initial signal corresponding to an initial position of said drive rod;
- said single coil having a non-linear winding pattern between said only two leads, said core progressively electromagnetically coupling to said single coil as said core moves linearly within said bore liner so that movement of said core will produce a linear inductance variation across said leads which corresponds to the linear movement of said core within said bore liner;
- means defining a constant alternating current source for exciting said single coil;
- first circuit means for producing a first signal of the operating temperature of the transducer by processing the real component of the voltage across said single coil produced by inductive coupling of the reciprocating core and said single coil in accordance with the position that the core assumes within the single coil during operation of the transducer; and
- second circuit means for producing a second signal of the position of the core within said single coil including means for extracting the imaginary component of the voltage across the single coil produced by inductive coupling of the reciprocating core with said single coil in accordance with the position of the core within the single coil.

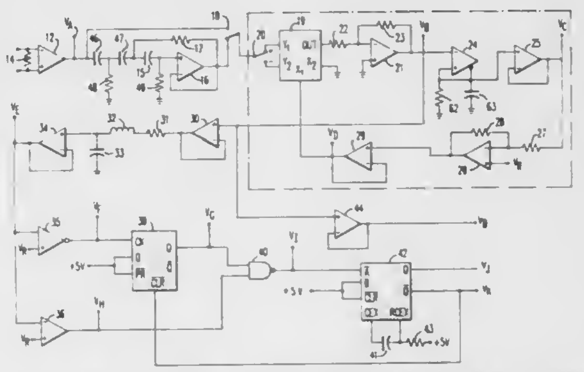


---

### 5,015,949
## STEAM TURBINE BLADE ARRIVAL TIME PROCESSOR WITH AUTOMATIC GAIN CONTROL

**Karl C. Koch, Pittsburgh; Robert M. Oates, Murrysville Boro; Carlo F. Peteronio, Ross Township, Allegheny County, and Charles W. Einolf, Jr., Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Dec. 22, 1988, Ser. No. 288,592**
**Int. Cl.$^5$ G01H** *11/02;* **G01B** *7/14;* **H03K** *5/153;* **H03L** *5/00*
**U.S. Cl. 324—207.25** **11 Claims**

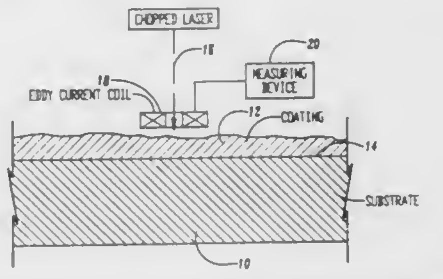
1. An apparatus for precisely detecting the passing of an individual blade of a rotating machine past a stationary sensor, comprising;
- stationary magnetic sensor means for producing an input signal of substantially constant magnitude each time the blade passes said sensor means;
- automatic gain control means responsive to said input signal for regulating the amplitude of said input signal to a predefined nominal value;
- zero-crossing detection means for producing an output signal in response to said regulated input signal each time said regulated input signal crosses a reference axis;
- means for producing a gating signal coinciding with an expected arrival time of the blade at said sensor means wherein said means for producing said gating signal includes a first comparator for receiving said regulated input signal at a first input terminal thereof and for receiving a first reference signal at a second input terminal thereof, said gating signal being available at an output terminal thereof;
- gate means responsive to said gating signal for conducting said output signal which occurs during the expected arrival time of the blade at said sensor means;
- flip-flop means for propagating said gating signal to said gate means until such a time as said flip-flop means is cleared; and
- means responsive to said conducted output signal for producing a pulse coinciding with the time at which the blade passes said sensor means.



---

### 5,015,950
## METHOD AND APPARATUS FOR DETERMINING THERMAL RESISTANCE AND STRUCTURAL INTEGRITY OF COATINGS ON CONDUCTING MATERIALS BY MONITORING ELECTRICAL CONDUCTANCE OF THE UNDERLYING MATERIAL UPON LOCALIZED HEATING OF THE OVERLYING COATING

**James H. Rose, and John C. Moulder, both of Ames, Iowa, assignors to Iowa Sate University Research Foundation, Inc., Ames, Iowa**
**Filed Jul. 21, 1989, Ser. No. 383,799**
**Int. Cl.$^5$ G01N** *27/72;* **G01R** *33/00, 31/00*
**U.S. Cl. 324—224** **19 Claims**



1. A method for nondestructively analyzing coatings on electrically conducting materials comprising: imposing a controlled known heat load to a localized area of

the barrier coating; measuring the electrical conductivity of the material at or near

VOL 1126
ISS 2
MY 14 1991
UMI

the localized area; and deriving characteristics of the barrier coating at or near the
localized area from the measurement of electrical conductivity.

---

5,015,951

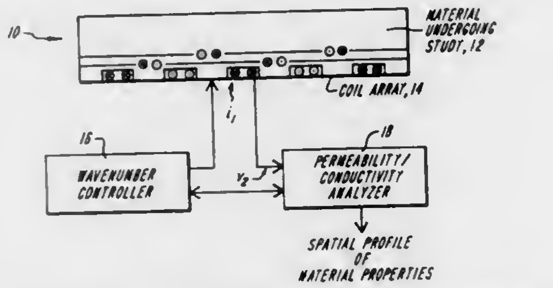
### APPARATUS AND METHODS FOR MEASURING PERMEABILITY AND CONDUCTIVITY IN MATERIALS USING MULTIPLE WAVENUMBER MAGNETIC INTERROGATIONS

**James R. Melcher, Lexington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 104,179, Oct. 2, 1987, Pat. No. 4,814,690. This application Mar. 20, 1989, Ser. No. 325,695**

**Int. Cl.$^5$ G01N** *27/72;* **G01R** *33/12*

**U.S. Cl. 324—232** **20 Claims**


10
MATERIAL UNDERGOING STUDY, 12
COIL ARRAY, 14
16
18
WAVENUMBER CONTROLLER
PERMEABILITY/CONDUCTIVITY ANALYZER
SPATIAL PROFILE OF MATERIAL PROPERTIES

1. An apparatus for measuring a property of a material, the apparatus comprising:

an array of electromagnetic elements capable of imposing a magnetic field in a material and sensing a resulting electromagnetic response;

a wavenumber controller connected to said array for applying a current to subsets of said electromagnetic elements and thereby defining fundamental wavenumbers associated with said imposed magnetic field in the material; and

an analyzer connected to said wavenumber controller, including means for comparing the resulting responses sensed by said electromagnetic array at different wavenumbers to predictions in order to derive a spatial profile of complex permeability or conductivity in the material.

---

5,015,952

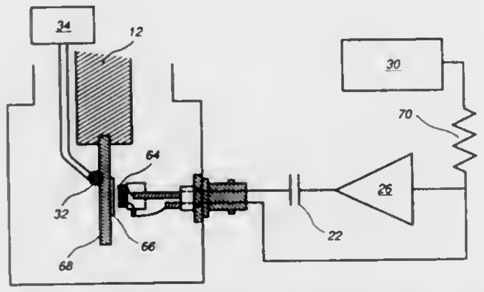
### APPARATUS FOR CHARACTERIZING CONDUCTIVITY OF MATERIALS BY MEASURING THE EFFECT OF INDUCED SHIELDING CURRENTS THEREIN

**James D. Doss, Los Alamos, N. Mex., assignor to University of California, Alameda, Calif.**

**Continuation-in-part of Ser. No. 181,451, Apr. 13, 1988. This application Mar. 14, 1989, Ser. No. 324,264**

**Int. Cl.$^5$ G01N** *27/72;* **G01R** *33/12, 33/035;* **G01C** *21/08*

U.S. Cl. 324—236 6 Claims



1. An apparatus for characterization of electrical conductivity of films, said apparatus comprising in combination support means for holding the film under investigation, electronic oscillator means having a series-resonant LC circuit, the inductive member thereof comprising inductive means disposed generally in the vicinity of the material under investigation and having the effective inductance thereof modified by magnetic fields generated by shielding currents induced in the film under investigation by the action of said inductive means, and counting means for measuring the frequency of oscillation of said electronic oscillator means.

---

5,015,953

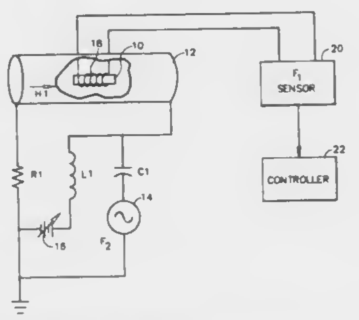
### MAGNETOMETER FOR DETECTING DC MAGNETIC FIELD VARIATIONS

**Lucian G. Ferguson, Largo, and Lincoln H. Charlot, Jr., St. Petersburg, both of Fla., assignors to Security Tag Systems, Inc., St. Petersburg, Fla.**

**Filed Jul. 31, 1986, Ser. No. 891,379**

**Int. Cl.$^5$ G01R** *33/02*

U.S. Cl. 324—244 24 Claims



1. A magnetometer, comprising

a device that resonates at a characteristic resonant frequency by converting energy stored therein as a result of being excited by electromagnetic radiation at twice the resonant frequency when biased by a DC magnetic field within a predetermined field intensity range in which the amplitude of said resonance varies with variations of the DC magnetic bias field intensity;

means for biasing the device with a DC magnetic field that is within said predetermined field intensity range;

means for exciting the device to resonate at said characteristic resonant frequency at an amplitude level that remains constant when the DC magnetic bias field intensity does not vary and is within said predetermined field intensity range; and

means for sensing the amplitude of resonance of the device at the characteristic resonant frequency;

whereby a variation in the amplitude of the resonance sensed by the sensing means indicates a variation in the intensity of the DC magnetic bias field.

---

5,015,954

### MAGNETIC RESONANCE ANALYSIS IN REAL TIME, INDUSTRIAL USAGE MODE

**Ronald L. Dechene, Boxford, Mass.; Thomas B. Smith, Atkinson, N.H., and Scott A. Marino, Haverhill, Mass., assignors to Auburn International, Inc., Danvers, Mass.**

**Filed Jun. 30, 1989, Ser. No. 374,493**

**Int. Cl.$^5$ G01R** *33/20*

U.S. Cl. 324—307 11 Claims

1. Nuclear magnetic resonance system for industrial process monitoring comprising:

(a) means for accessing successive samples from an industrial process, placing them in a sample measuring region and discarding successive such samples from said sample measuring region,

(b) means for applying a base magnetic field to the sample measuring region to effect precession of sample nuclei therein and for applying a resonant excitationpulse to the sample measuring region to modify the precession

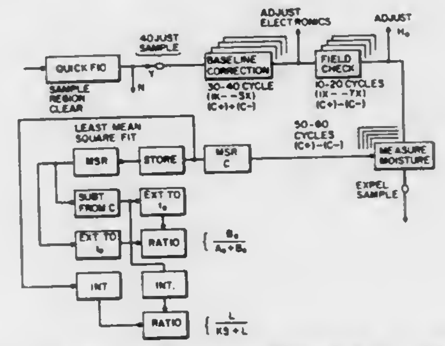
means defining receive antenna coil means and signal

translating means interacting with a sample in said region and relaxation detected at the coil means as free induction decay signal which is measurable as a free induction decay curve via said signal translating means,

(c) means for digitizing the free induction decay curve and automatically analyzing the digitized curve to zero-axis intercepts of and components of the decay curve, summing and extracting a ratio of the intercept of one of said components to the sum of the intercepts of said components,

and wherein:

said means (a)-(c) are constructed and arranged;



(1) to stabilize base field application, excitation and signal translation conditions in response to variations of one or more parameters of actual condition of a sample in the sample measuring region;

(2) to effect such extraction of ratio and related stabilization on a repeating, high speed basis for successive samples from the industrial process; and

(3) translating at least a thousand data points in each decay curve and effecting reduction as to at least a hundred points thereof whereby sample component proportions are reliably and repeatedly measurable from sample to sample in rapid succession for on-line real time monitoring.

---

5,015,955

### MAGNETIC RESONANCE METHODS

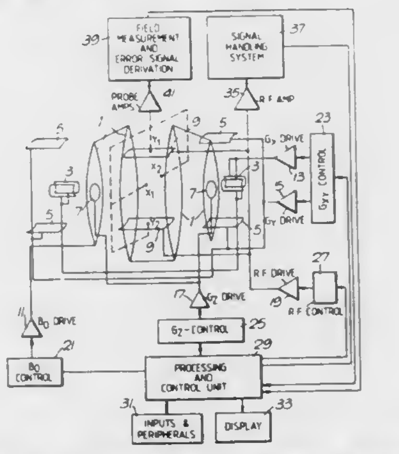
**Ian R. Young, Nr. Marlborough, England, assignor to Picker International, Ltd., Wembley, England**

**Filed Dec. 26, 1989, Ser. No. 456,460**

**Claims priority, application United Kingdom, Dec. 23, 1988, 8830095; Mar. 31, 1989, 8907364**

**Int. Cl.$^5$ G01R** *33/20*

**U.S. Cl. 324—309** **7 Claims**



**1. A magnetic resonance method wherein a gradient magnetic field is applied to a body by application of a gradient pulse pattern to the body characterised in that the effect of eddy currents produced by the gradient magnetic field is reduced by selection of the rates of change of magnetic flux** produced during the edges of the or each pulse of said pulse pattern in relation to the times elapsing between said edges and the time constants of the eddy currents.

---

5,015,956

### MAGNETIC RESONANCE TOMOGRAPHY METHOD FOR DETERMINING THE NUCLEAR MAGNETIZATION IN A NUMBER OF PARALLEL SLICES

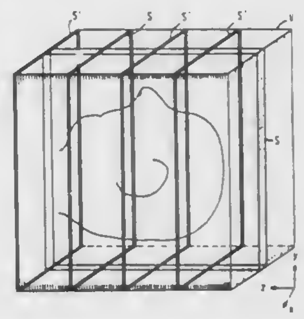
**Jens D. Jensen, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Nov. 14, 1989, Ser. No. 436,520**

**Claims priority, application Fed. Rep. of Germany, Nov. 17, 1988, 3838792**

**Int. Cl.$^5$ G01R** *33/20*

**U.S. Cl. 324—309** **4 Claims**



1. A magnetic resonance tomography method, characterized in that for the determination of the nuclear magnetization distribution in a slice (S) first a plurality of mutually parallel slices (S') extending perpendicularly to the slice (S) are excited by cycles of sequences, each sequence including the formation of at least one slice-selective RF pulse and subsequently the switching on and off of a magnetic gradient field (Gx) extending perpendicularly to said slice (S) and also includes the reception of a spin resonance signal, the time integral over the magnetic gradient field (Gx) being varied from one cycle to another, the nuclear magnetization distribution in the mutually parallel slices (S') being determined from the spin resonance signals, the nuclear magnetization distribution in the slice (S) being determined from the distributions thus determined.

---

5,015,957

### AMPEROMETRIC METHOD FOR MEASURING ACIDITY

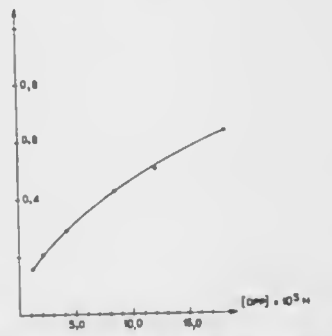
**Jacques Bessiere, Gondizeville, and Michel Perdicakis, Nancy, both of France, assignors to Electricite de France (Service National), Paris, France**

**Filed Jul. 5, 1989, Ser. No. 375,578**

**Claims priority, application France, Jul. 6, 1988, 88 09161**

**Int. Cl.$^5$ G01N** *27/02*

U.S. Cl. 324—438 **20 Claims**



1. An amperometric method for the direct measurement of acidity in a medium which contains at least one ester of an acid

VOL 1126
ISS 2
MY 14
1991
UMI

containing oxygen, and whose dielectric constant is lower than 30, comprising the steps of:

(a) fixing a given voltage between a measuring ultramicroelectrode and a counterelectrode, which together with said medium form an electrochemical cell, the ratio between the surface area of the counterelectrode and the ultramicroelectrode being at least equal to 10;
(b) measuring the current between said ultramicroelectrode and said counterelectrode; and
(c) correlating the current measured in step (b) to the acidity of the medium by use of a curve which represents the relationship between the currents passing through the electrodes during the addition of increasing quantities of diphenylphosphoric acid via a microbarette to an initial volume of 10 ml of said medium.

---

### 5,015,958

## ELONGATE SENSORS COMPRISING CONDUCTIVE POLYMERS, AND METHODS AND APPARATUS USING SUCH SENSORS

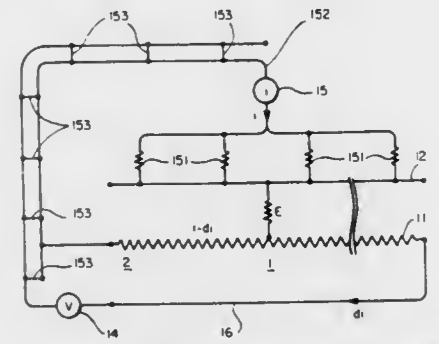
**Michael Masia, Redwood City; James P. Reed, San Francisco; Robert S. Wasley, San Carlos; Paul D. Hauptly, Fremont; Larry R. Reeder, San Jose; Peter L. Brooks, Los Altos; Thomas W. Tolles, San Francisco; Louis M. Frank, Sunnyvale; Mauro Booomi, Palo Alto; Denis Wales, Fremont; Ray F. Stewart, Redwood City; John Lahlouh, Belmont, and Laurence Welsh, Palo Alto, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 306,237, Feb. 2, 1989, abandoned, which is a continuation of Ser. No. 832,562, Feb. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 599,047, Apr. 11, 1984, abandoned, Ser. No. 556,740, Nov. 30, 1983, abandoned, Ser. No. 556,829, Dec. 1, 1983, abandoned, Ser. No. 618,109, Jun. 7, 1984, abandoned, Ser. No. 618,108, Jun. 7, 1984, abandoned, Ser. No. 603,484, Apr. 24, 1984, abandoned, Ser. No. 744,170, Jun. 12, 1985, abandoned, and Ser. No. 787,278, Oct. 15, 1985, abandoned, said Ser. No. 599,047, is a continuation-in-part of Ser. No. 509,897, Jun. 30, 1983, abandoned, said Ser. No. 556,829, is a continuation-in-part of Ser. No. 556,740, , said Ser. No. 618,108, is a continuation-in-part of Ser. No. 603,485, Apr. 24, 1984, abandoned, said Ser. No. 787,278, is a continuation-in-part of Ser. No. 744,170,. This application Jun. 27, 1989, Ser. No. 372,179**

**The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.**

**Int. Cl.$^5$ G01R *31/08;* H01B *7/32***

U.S. Cl. 324—522 28 Claims



18. A method for detecting and locating the presence of an electrolyte, which method comprises
(A) providing a system
  (a) which comprises
    a power source;
    a voltage-measuring device; and
    an elongate sensor for detecting and locating the presence of an electrolyte, the sensor comprising
      (1) a first elongate electrical connection means which has a near end and a far end;
      (2) a second elongate electrical connection means
        (i) which has a near end adjacent the near end of the first connection means and a far end adjacent the far end of the first connection means,
        (ii) whose impedance, from the near end to each point thereon, is characteristic of its length from the near end to that point, and
        (iii) which is electrically insulated from the first connection means between its near end and its far end in the absence of the electrolyte and which, in the presence of the electrolyte, becomes electrically connected to the first connection means, the connection being effective at a first point whose location is defined by the location of the point or points at which the electrolyte is present; and
      (3) a third elongate electrical connection means which has a near end adjacent the near ends of the first and second connection means and a far end adjacent the far ends of the first and second connection means and which is electrically insulated from said first and second electrical connection means between its near end and its far end in the absence of the electrolyte and in the presence of the electrolyte;
    the first, second and third connection means being physically secured together; at least one of the first and second connection means comprising an elongate metal core which is electrically surrounded by a jacket of a composition which comprises a polymeric component and, dispersed in the polymeric component, a sufficient amount of a particulate conductive filler to render the composition conductive at ambient temperature; and at least one of said first, second and third connection means having a wrapped configuration; and
  (b) in which system, when an electrolyte is present,
    electrical connection is made between the first connection means and the second connection means through said conductive polymer composition;
    the connection to the second connection means being effective at a first point whose location is defined by the location of the point or points at which the electrolyte is present;
    the making of the connection enabling the formation of a test circuit which comprises (i) that part of the second connection means which lies between the first point and a second point at the near end of the second connection means, (ii) the connection, and (iii) the power source, the power source causing an electrical current of known size to be transmitted between the first and second points on the second connection means; and
    the current and the second connection means being such that, by measuring the voltage drop between the first and second points, the spatial relationship between the first and second points can be determined;
(B) monitoring the system continuously or on a schedule to determine when a said connection has been made, said test circuit being in existence while said monitoring is taking place if a said connection has been made; and
(C) when it is determined that a said connection has been made, using the voltage-measuring device to determine the voltage drop between the first and second points; and
(D) obtaining the location of the point or points at which the electrolyte is present from the measurement made in step (C).

---

### 5,015,959

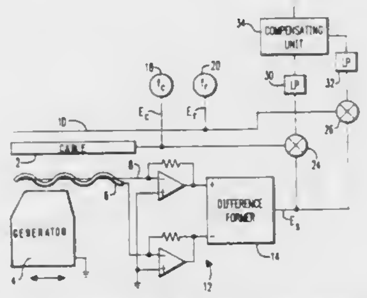
## SENSE WIRE SIGNAL ENHANCEMENTS FOR INSULATION DEFECT DETECTION

**Gregory D. Matthews, Edgewood, and Juris A. Asars, Murrysville Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 5, 1990, Ser. No. 461,577**

**Int. Cl.$^5$ G01N *27/20;* G01R *31/08;* H04B *3/46***

U.S. Cl. 324—557 11 Claims



1. A device for monitoring an electrical cable composed of a conductor surrounded by insulation, to locate insulation defects, while a signal is impressed on the conductor, in the presence of noise fields, comprising:
  an ion generator for creating an ionized atmosphere to envelop the cable;
  sense wire means arranged to be disposed in the vicinity of the cable and within the ionized atmosphere so that the signal impressed on the cable conductor is coupled into said sense wire means when the ionized atmosphere envelops an insulation defect; and
  means for monitoring the signal coupled into said sense wire means from the cable conductor,
  wherein said sense wire means comprise a first wire presenting a low resistance to the ionized atmosphere, a second wire presenting a high resistance to the ionized atmosphere, and means connected for producing a sense wire signal which is a function of the difference between the signal coupled into said first wire and the signal coupled into said second wire.

---

### 5,015,960

## METHOD OF GENERATING A VOLTAGE WITH A TRIANGULAR WAVE FORM

**Uwe Hartmann, Untergriesbach, and Fritz Ohnemus, Villingen-Schwenningen, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany**

**Filed Apr. 28, 1989, Ser. No. 345,039**

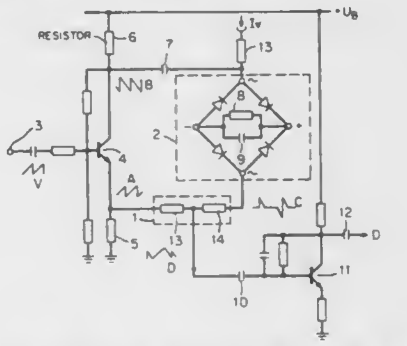
**Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814561**

**The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.**

**Int. Cl.$^5$ H03K *5/08, 4/10, 5/00, 12/00***

U.S. Cl. 328—36 9 Claims

1. A method for generating a voltage with a triangular waveform independent of frequency comprising the steps: producing two oppositely-phased voltages with sawtooth waveforms of different amplitudes and with one of said oppositely-phased voltages having a horizontal waveform during predetermined intervals of a period; and adding said two oppositely-phased voltages together in an adding circuit, time instants at which said triangular waveform pass through zero coinciding with time instants at which said sawtooth waveforms pass through zero.



---

### 5,015,961

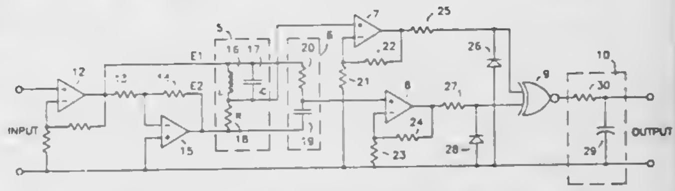
## FREQUENCY SHIFT DEMODULATOR

**Robert E. Springer; George F. Hafer, and Everett A. Gilbert, all of Montrose, Colo., assignors to Da-Tel Research Company, Incorporated, Montrose, Colo.**

**Filed Aug. 3, 1990, Ser. No. 562,236**

**Int. Cl.$^5$ H03D *3/26***

U.S. Cl. 329—300 2 Claims



1. A demodulator circuit for frequency shift modulated carrier signals comprising and connected in order:
  a. a means to obtain two carrier signal terminals 180 degrees out of phase;
  b. an all pass network consisting of a resistor and a resonant inductance and capacitor connected across the two carrier signal terminals;
  c. an all pass network consisting of a resistor and capacitor also connected across the two carrier signal terminals;
  d. two limiting amplifiers processing the signal outputs of the above mentioned networks;
  e. logic circuit measuring the phase angle difference between the outputs of the two mentioned all pass networks;
  f. a low pass filter designed to remove the FS carrier frequencies from the logic circuit output and leave the digital message signal.

---

### 5,015,962

## PHASE DEMODULATOR AND ITS APPLICATION TO AN MLS TYPE LANDING SYSTEM

**Daniel Brault, Montigny Les Cormeilles, and Alain Grousseau, Conflans Ste Honorine, both of France, assignors to Thomson-CSF, Puteaux, France**

**PCT No. PCT/FR88/00428, § 371 Date Apr. 11, 1989, § 102(e) Date Apr. 11, 1989, PCT Pub. No. WO89/02188, PCT Pub. Date Mar. 9, 1989**

**PCT Filed Aug. 30, 1988, Ser. No. 353,630**

**Claims priority, application France, Sep. 4, 1987, 87 12330**

**Int. Cl.$^5$ H03D *3/06;* H04L *27/22***

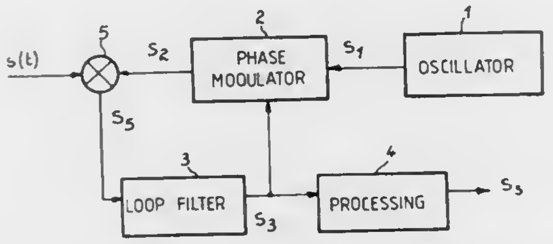
U.S. Cl. 329—346 5 Claims

1. A phase demodulator comprising
modulating means for modulating the phase of a first signal $S_1$ of frequency $w_1$ to produce a second signal $S_2$, said frequency $w_1$ being close to the frequency $w_0$ of an input signal s(t) to be demodulated,

VOL
1126
ISS
2
MY
14
1991
UMI

mixing means for mixing said input signal s(t) and said second signal $S_2$ to form a mixing means output signal,

loop filter means for receiving said mixing means output signal and for forming a loop filter means output signal for controlling said modulating means, and



processing means for receiving said loop filter means output signal and for forming an output signal of said phase demodulator.

---

### 5,015,963
### SYNCHRONOUS DEMODULATOR

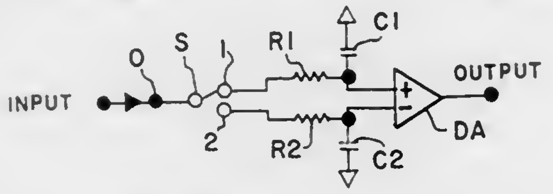
**John F. Sutton, Greenbelt, Md., assignor to The United States of America as represented by the Administrator of the National**

**Aeronautics and Space Administration, Washington, D.C.**

**Filed Sep. 29, 1989, Ser. No. 414,815**

**Int. Cl.$^5$ H03D *1/04***

**U.S. Cl. 329—361** **24 Claims**



1. A synchronous demodulator comprising:

a differential amplifier with inverting and noninverting inputs and an output;

a pair of network means, each of said network means including a low pass filter for providing signal averaging and voltage storage, connected to said amplifier, each one of said pair of network means being connected to a respective one of said inputs; and,

means to apply an essentially periodic incoming signal alternately between each of said pair of network means,

whereby a signal is developed at said differential amplifier output, said output signal having a relatively high signal-to-ripple characteristic and from which output signal any dc offset present in the incoming signal has been essentially suppressed.

---

### 5,015,964
### OPTICAL AMPLIFIERS

**Michael J. O'Mahony, Colchester, England, assignor to British Telecommunications Public Limited Company, London, England**

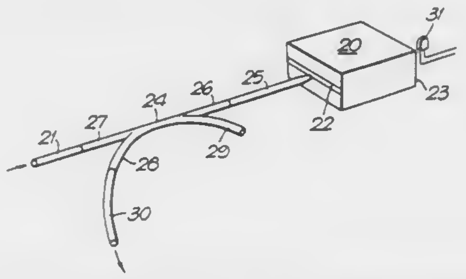
**Continuation of Ser. No. 361,803, May 31, 1989, abandoned, which is a continuation of Ser. No. 138,378, filed as PCT GB87/00298 on May 8, 1987, published as WO87/07091 on Nov. 19, 1987, abandoned. This application Mar. 16, 1990, Ser. No. 494,835**

**Claims priority, application United Kingdom, May 6, 1986, 8611241**

**Int. Cl.$^5$ H01S *3/19, 3/23***

**U.S. Cl. 330—4.3** **20 Claims**

1. An optical amplifier comprising a medium capable of providing optical amplification by laser action, the amplifier being provided with a single optical cavity within which said medium is confined, the optical cavity comprising first and second opposed signal reflection means having respectively,



low and high reflectivities $R_1$ and $R_2$, wherein the product $R_1R_2$ is less than $5 \times 10^{-4}$ and $R_2$ is in the range 0.3 to 1.0.

---

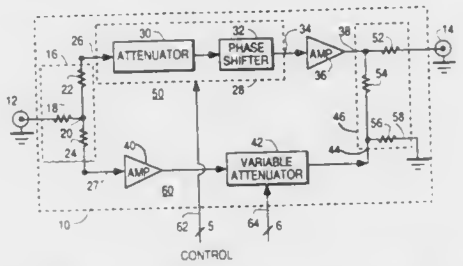
### 5,015,965
### PREDISTORTION EQUALIZER WITH RESISTIVE COMBINERS AND DIVIDERS

**Allen Katz, Trenton, and Robert R. Urban, Englishtown, both of N.J., assignors to General Electric Company, East Windsor, N.J.**

**Filed Nov. 22, 1989, Ser. No. 440,580**

**Int. Cl.$^5$ H03F *1/26***

**U.S. Cl. 330—149** **14 Claims**



13. A method for producing predistorted signals, comprising the steps, over a frequency of interest, of:

resistively dividing into first and second portions the signals to be predistorted;

passing said first portion of said signals through a first channel having reference phase shift and also having reference magnitude, to produce first channel output signals;

passing said second portion of said signals through a second channel having phase shift equal to said reference phase plus a further phase shift having a value in the range of 90° to 270° and also having magnitude which is nonlinearly related to the magnitude of said second portion of said signals to be predistorted, to produce second channel output signals; and

resistively combining said first and second channel output signals for generating said predistorted signals.

---

### 5,015,966
### FOLDED CASCODE AMPLIFIER

**Harry J. McIntyre, Los Angeles, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed May 1, 1990, Ser. No. 517,019**

**Int. Cl.$^5$ H03F *3/45***

**U.S. Cl. 330—253** **2 Claims**

1. An amplifying circuit comprising:

a. first and second supply terminals for receiving relatively positive and relatively negative operating potentials, respectively;

b. input terminals for receiving input signals thereat; and a signal output terminal;

c. first folded cascode differential amplifier means, including first common source circuitry for converting a differential input voltage to a first differential current and operable

with a common-mode range to said first supply terminal,

first cascode device for receiving on an input one side of said first differential current for conversion to a voltage on a first output node,

second cascode device for receiving on an input the other side of said first differential current for conversion to a voltage on a second output node;

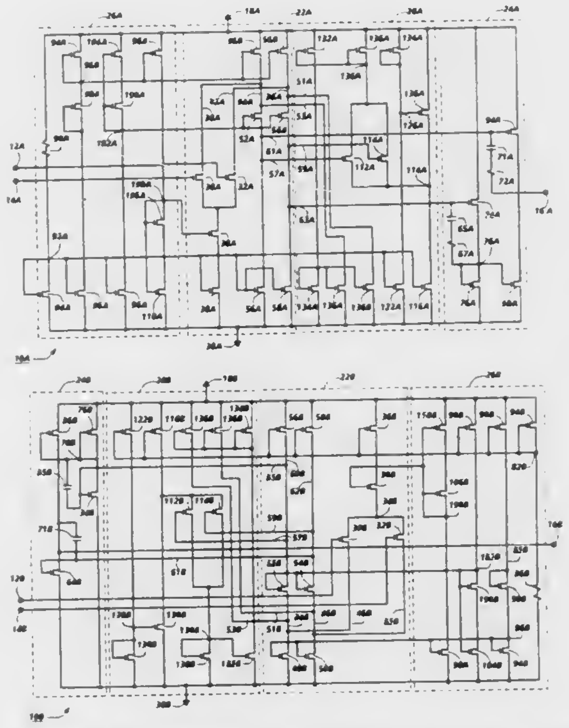
d. second folded cascode differential amplifier means, including:

second common source circuitry for converting a differential input voltage to a second differential current and operable with a common-mode range to said second supply terminal,

third cascode device for receiving on an input one side of said second differential current for conversion to a voltage on a third output node,

fourth cascode device for receiving on an input the other side of said second differential current for conversion to a voltage on a fourth output node;

e. first output amplifier means including:



first and second input connections connected to respective first and second output nodes,

first inverter means having an input serving as said second input connection and an output for inverting the signal received at said second input connection,

first and second field-effect transistors of P-channel and N-channel type, respectively, each in common-source amplifier configuration having respective sources connected to said respective first and second supply terminals, having respective drains connected to said signal output terminal, having the gate of said first field effect transistor serving as said first input connection and having the gate of said second field-effect transistor connected to said first inverter means output;

f. first common mode feedback means connected to said first and second output nodes and to said inputs of said first and second cascode devices for comparing the voltages on said first and second output nodes with a first reference voltage and maintaining said first and second output nodes at said first reference voltage in a negative feedback loop by drawing current from said inputs of said first and second cascode devices, wherein said first reference voltage is set substantially at the difference between the voltage of said first supply terminal and the gate-source threshold voltage of said first field-effect transistor;

g. second output amplifier means including:

third and fourth input connections connected to respective third and forth output nodes,

second inverter means having an input serving as said fourth input connection and an output for inverting the signal received at said fourth input connection,

third and fourth field-effect of P-channel and N-channel type, respectively, each in common-source amplifier configuration having respective sources to said respective first and second supply terminals having respective drains connected to said signal output terminal, having the gate of said third field-effect transistor serving as said third input connection and having the gate of said fourth field-effect transistor connected to said second inverter means output;

h. second common mode feedback means connected to said third and fourth output nodes and to said inputs of said third and fourth cascode devices for comparing the voltages on said third and fourth output nodes with a second reference voltage and maintaining said third and fourth output nodes at said second reference voltage in a negative feedback loop by supplying current to said inputs of said third and fourth cascode devices, wherein said second reference voltage is set substantially at the sum of the voltage of said second supply terminal and the gate-source threshold voltage of said fourth field-effect transistor.

---

### 5,015,967
### INTEGRATABLE AMPLIFIER CIRCUIT

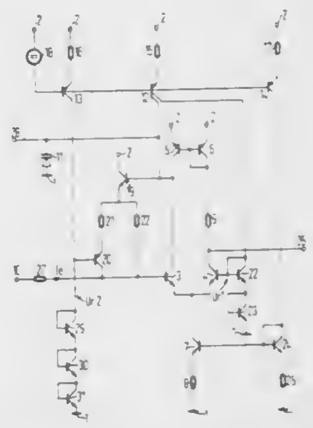
**Helmut Bichler, Graefelfing, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Apr. 9, 1990, Ser. No. 507,259**

**Claims priority, application European Pat. Off., Apr. 14, 1989, 89106663**

**Int. Cl.$^5$ H03F *3/45***

**U.S. Cl. 330—257** **8 Claims**



8. Integratable amplifier circuit, comprising:

a differential amplifier stage having a non-inverting input, an inverting input, a non-inverting output, and an inverting output,

a capacitor connected between the non-inverting output and a potential,

a current source connected between the inverting output and another potential,

a first transistor having a collector connected to the other potential, a base connected to the non-inverting output, and an emitter,

a second transistor having a collector connected to the inverting input, a base, and an emitter, and

VOL
1126
ISS
2
MY
14
1991
UMI

a resistor connected between the emitters of said first and second transistors.

---

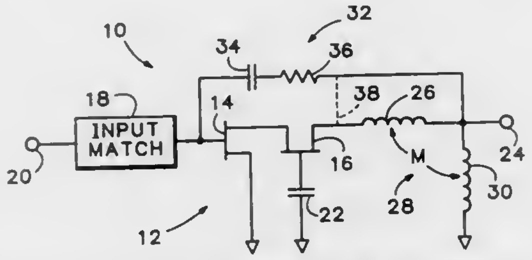
### 5,015,968
### FEEDBACK CASCODE AMPLIFIER

**Allen F. Podell, Palo Alto; Fazal Ali, Santa Clara, and Robert H. Benton, Mountain View, all of Calif., assignors to Pacific Monolithics, Sunnyvale, Calif.**

**Filed Jul. 27, 1990, Ser. No. 558,611**

**Int. Cl.⁵ H03F** *3/16*

**U.S. Cl. 330—277** **9 Claims**



1. A microwave-frequency feedback cascode amplifier comprising:

cascode amplifier means comprising a first field-effect transistor means (FET) having a gate for receiving a signal to be amplified, a source coupled to a reference voltage, and a drain; and a second FET having a source coupled to the drain of the first FET, a gate coupled to the reference voltage, and a drain;

first inductance means having a first terminal coupled to the drain of the second FET, a second terminal for outputting an amplified input signal;

second inductance means having a first terminal coupled to the second terminal of the first inductance means, and a second terminal coupled to the reference voltage; and

feedback means coupling the drain of the second FET to the gate of the first FET means.

---

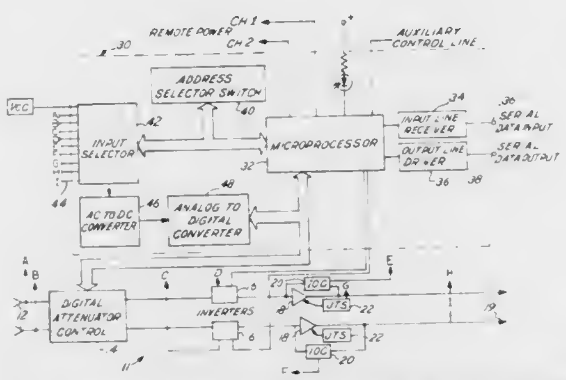
### 5,015,969
### AMPLIFIER CONTROL SYSTEM

**Clay Barclay, and Larry Shallenburger, both of Elkhart, Ind., assignors to Crown International, Inc., Elkhart, Ind.**

**Filed Dec. 11, 1989, Ser. No. 448,523**

**Int. Cl.⁵ H03G** *3/30*

**U.S. Cl. 330—284** **6 Claims**



1. A control for an amplifier having analog input and output signals, said control comprising: means carried by said amplifier for monitoring said amplifier analog signals, said means for monitoring including means for converting said analog signals into digital information, computer means operatively associated with said monitoring means for analyzing said digital information, said computer means further including output means for sending instructions from said computer means to said means for monitoring, said means for monitoring including an amplifier control means responsive to said instructions for adjusting said analog singals, wherein said computer means is remote from said amplifier and includes display means for displaying said digital information and input means for accepting said instructions, and an interface means having a plurality of control zones connected between a plurality of said amplifiers and said remote computer means, said interface means for transferring said instructions from said computer means to said amplifier, said means for monitioring including an address member constituting means for identifying said amplifier from other amplifiers connected to one of said zones, said instructions including monitoring means address/information.

---

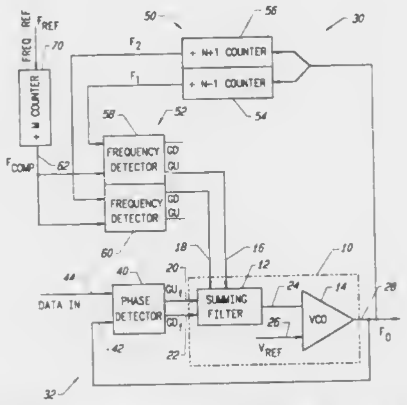
### 5,015,970
### CLOCK RECOVERY PHASE LOCK LOOP HAVING DIGITALLY RANGE LIMITED OPERATING WINDOW

**Bertrand J. Williams, Campbell, and Ronald L. Treadway, Saratoga, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Feb. 15, 1990, Ser. No. 481,449**

**Int. Cl.⁵ H03L** *7/087, 7/089*

**U.S. Cl. 331—11** **25 Claims**



1. Clock generating apparatus, for use with a frequency comparison input signal and generating a clock output signal, comprising:

coarse adjustment feedback means for generating a first error signal if the frequency of said clock output signal divided by a predetermined value N−A is less than the frequency of said frequency comparison input signal, and for generating a second error signal if the frequency of said clock output signal divided by a predetermined value N+B is greater than said frequency of said frequency comparison input signal, N>1, 0>A>N and 0<B<N; and

clock signal generating means for increasing the frequency of said clock output signal in response to said first error signal and for decreasing the frequency of said clock output signal in response to said second error signal.

---

### 5,015,971
### FREQUENCY AGILE MICROWAVE SIGNAL GENERATOR

**Stephen D. Taylor, Agoura, and Paul I. Tanaka, Lawndale, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 22, 1989, Ser. No. 455,675**

**Int. Cl.⁵ H03L** *7/12, 7/20*

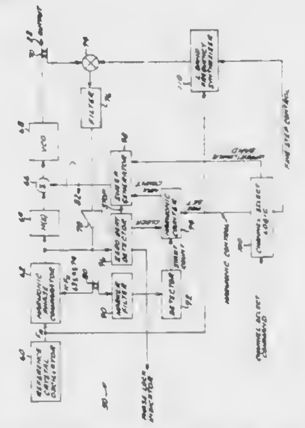
**U.S. Cl. 331—16** **11 Claims**

1. A frequency synthesized, microwave signal generator, comprising:

a reference oscillator for generating a reference signal at a reference frequency;

a programmable harmonic phase lock loop (PLL) responsive to said reference signal, said loop being closed around a harmonic phase comparator, a voltage controlled oscillator (VCO), the generator output signal being taken at the output of the VCO, and an offset signal mixer for mixing the VCO signal with a fine frequency control offset signal, the output of the offset mixer comprising a microwave signal fed back to the harmonic phase comparison for comparison with the reference signal, wherein the PLL may be programmably locked to a harmonic of the reference signal;

a frequency synthesizer for generating said fine frequency control signal;



means for programming the harmonic PLL to a selected one of a plurality N of harmonics of the reference frequency for providing coarse step frequency control of the generator output signal; and

means for controlling said frequency synthesizer to generate a fine frequency control signal at a desired frequency so as to achieve fine frequency control of the output signal;

whereby coarse step and fine frequency control are achieved by the generator in a single phase lock loop.

---

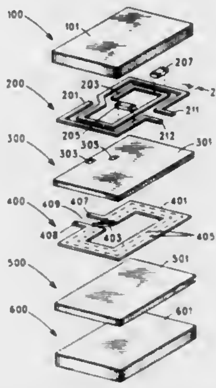
### 5,015,972
### BROADBAND RF TRANSFORMER

**Lawrence F. Cygan, Schaumburg, Ill.; Helge O. Granberg, Phoenix, Ariz.; Richard S. Bickham, Algonquin, and Carl Missele, Elgin, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 17, 1989, Ser. No. 395,240**

**Int. Cl.⁵ H03H** *7/38*

**U.S. Cl. 333—32** **4 Claims**



1. A boardband RF transformer having a primary metalization layer (**200**) forming multiple primary turns and primary terminals (**211, 212**), said primary metalization layer having an overlaying and adjacent first thermally-conductive ferrite layer (**100**) having a thickness, a secondary metalization layer (**400**) forming a single secondary turn (**401**) and secondary terminals (**407, 408**), a dielectric layer (**300**) having a thickness separating said primary layer and said secondary layer, said multiple primary turns generally overlaying said single secondary turn, said primary turns forming a path on said secondary turn when projected thereon, said secondary metalization layer having an underlaying and adjacent substrate layer (**500**) having a thickness and made of a thermally-conductive material, said substrate layer having an underlaying and adjacent second thermally-conductive ferrite layer (**600**) having a thickness.

---

### 5,015,973
### DUPLEXER WITH AN ISOLATING CIRCUIT ON A DIELECTRIC PLATE

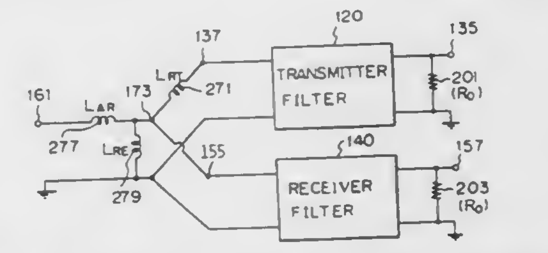
**Izumi Kawakami; Tomokazu Komazaki; Katsuhiko Gunji; Norio Onishi; Yoshimitsu Sakurai; Hiroyuki Horii, and Akira Mashimo, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Aug. 26, 1988, Ser. No. 237,673**

**Claims priority, application Japan, Aug. 31, 1987, 62-215047; Aug. 31, 1987, 62-215048; Aug. 31, 1987, 62-215049**

**Int. Cl.⁵ H03H** *7/46*

**U.S. Cl. 333—132** **15 Claims**



10. A duplexer for transmitting a signal to and simultaneously receiving a signal from a common antenna, the duplexer comprising:

a transmitter filter for transmitting a transmitter frequency signal in a trasmitter frequency range, the transmitter filter having a transmitter filter input terminal and a transmitter filter output terminal;

a receiver filter for receiving a receiver frequency signal in a receiver frequency range, the receiver filter having a receiver filter input terminal and a receiver filter output terminal;

a dielectric plate having a specific inductive capacity, the dielectric plate having an outer surface;

an antenna terminal;

a first conductive line coupling the transmitter filter output terminal to a connecting point;

a second conductive line coupling the receiver filter input terminal to the connecting point;

a third conductive line coupling the connecting point to the antenna terminal;

a fourth conductive line; and

a conductive layer covering the outer surface of the dielectric plate except a portion thereof, the fourth conductive line being formed on the portion of the surface of the dielectric plate and having a first inductance value, the fourth conductive line connecting the connecting point to the conductive layer.

VOL 1126
ISS 2
MY 14 1991
UMI

### 5,015,974
## ISOLATING CIRCUIT AND DIELECTRIC FILTER FOR USE THEREIN

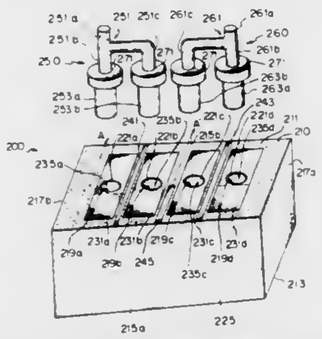
**Tomokazu Komazaki; Katsubitko Gunji; Norio Onishi, and Akira Mashimo, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Jun. 15, 1989, Ser. No. 366,516**

**Claims priority, application Japan, Jun. 20, 1988, 63-150136; Sep. 2, 1988, 63-218475**

**Int. Cl.⁵ H01P** *1/213, 1/202*

U.S. Cl. 333—134 **13 Claims**



1. An isolating circuit for isolating a first frequency signal in a first frequency range and a second frequency signal in a second frequency range, the isolating circuit comprising:

an antenna terminal;

a first filter for isolating said first frequency signal, said first filter having a first input terminal, a first output terminal, a first conductive part with first and second portions, and means for forming first, second, and third resonators, wherein said first resonator is coupled to said first input terminal, wherein said third resonator is coupled to said first output terminal, and wherein said first portion of said first conductive part is coupled to said second resonator through a capacitance and said second portion of said first conductive part is coupled to one of said first and third resonators through a capacitance; and

a second filter for isolating said second frequency signal, said second filter having a second input terminal, a second output terminal, second conductive part with third and further portions, and means for forming fourth, fifth, and sixth resonators, wherein said fourth resonator is coupled to said second input terminal, wherein said sixth resonator is coupled to said second output terminal, and wherein said third portion is coupled to said fifth resonator through a capacitance and said fourth portion is coupled to one of said fourth and sixth resonators through a capacitance.

---

### 5,015,975
## NOISE FILTER

**Akira Okubo, Nagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan**

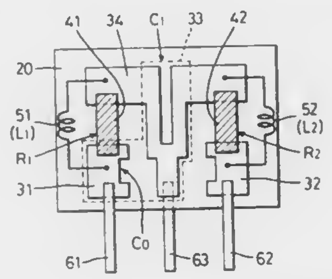
**Filed Aug. 21, 1989, Ser. No. 396,213**

**Claims priority, application Japan, Aug. 19, 1988, 63-206942**

**Int. Cl.⁵ H03H** *7/00*

U.S. Cl. 333—181 **2 Claims**

1. A noise filter comprising a T-type line electrode and input and output terminal electrodes provided on a front surface of a dielectric substrate, an L-shaped rear electrode provided on a rear surface of the dielectric substrate so as to be opposite to a central portion of the T-type line electrode and to the input terminal electrode to respectively form one capacitor element between the central portion of the T-type line electrode and the rear electrode and another capacitor element between the input terminal electrode and the rear electrode, a pair of resistors provided in such a way as to respectively straddle both terminal electrodes and the T-type line electrode and a pair of inductance elements formed by respectively connecting a chip coil in parallel with each of said resistors.



---

### 5,015,976
## MICROWAVE FILTER

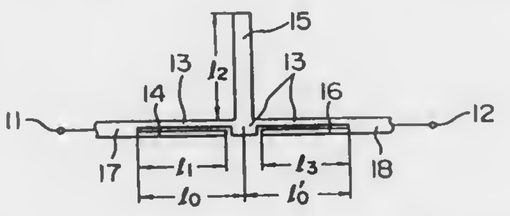
**Hiroshi Saka, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 7, 1989, Ser. No. 432,846**

**Claims priority, application Japan, Nov. 11, 1988, 63-286142; Nov. 11, 1988, 63-286143**

**Int. Cl.⁵ H01P** *1/203*

U.S. Cl. 333—204 **10 Claims**



1. A microwave filter comprising:

a main line having an input terminal and an output terminal; and

first, second and third open-ended lines, each connected to said main line with an equal or nearly equal interval $l_0$, $l_0'(l_0 \simeq l_0')$ respectively and having a length of $l_1$, $l_2$ and $l_3$, respectively;

wherein said first and third lines are constituted with open-ended parallel-coupled lines arranged in parallel to the main line, said second line is constituted with an open-ended stub arranged in shunt with said main line, the lengths $l_1$, $l_2$ and $l_3$ of said first, second and third lines are selected to be equal to the ¼ wavelength of a stop-band frequency such that the poles of attenuation thereof are positioned within a stop band, the lengths $l_0$, $l_0'$, $l_1$, $l_2$ and $l_3$ are selected to satisfy a condition of $l_1 < l_2 < l_0 \simeq l_0' < 2l_1$ and $l_3 < l_2 < l_0 \simeq l_0' < 2l_3$ or to satisfy a condition $l_1 = l_3 < l_2 < l_0 \simeq l_0' < 2l_1$, and the characteristic impedance of at least the first and third lines is selected to be higher than that of the input and output lines connected to the input and output terminals, and the interval $l_0$, $l_0'$, between the first, second and third open-ended lines is selected to be longer than 5/16 wavelength of a pass-band frequency but shorter than 7/16 wavelength of said pass-band frequency.

---

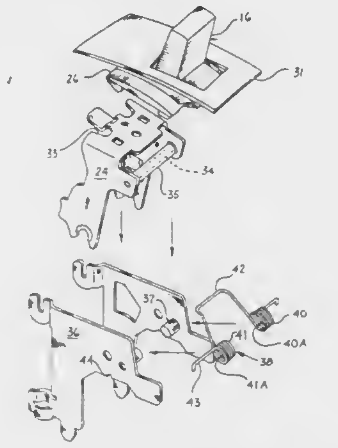
### 5,015,977
## CIRCUIT BREAKER POSITIVE TRIP INDICATION SPRING

**Geoffrey H. McKay, West Hartford; Andrew M. Candelora, East Haven, and Michael C. Guerrette, Plymouth, all of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed Aug. 2, 1990, Ser. No. 561,752**

**Int. Cl.⁵ H01H** *73/12*

U.S. Cl. 335—17 **9 Claims**



1. A compact industrial-rated circuit breaker comprising:

a molded plastic cover and case;

a pair of contacts within said case arranged for automatic separation upon occurrence of an overcurrent condition through a protected circuit;

an operating mechanism within said case connected with said contacts for causing said contact separation, said operating mechanism being supported between a pair of side frames;

a pair of operating springs within said operating mechanism for providing opening force to said contacts;

an operating handle attached to said operating mechanism for manually opening and closing said contacts;

a handle yoke attached to said operating mechanism and said operating handle;

a visual access slot formed in said cover for providing indication of the condition of said contacts; and

a trip indication spring associated with said operating handle providing additive force to the operating springs to move said handle yoke and said operating handle under said access slot when said operating handle is driven to a tripped position; and

a trip indication spring associated with said operating handle.

---

### 5,015,978
## ELECTROMAGNETIC RELAY

**Kiyotaka Yokoo; Hideki Hitachi, and Matsujiro Ikeda, all of Tokyo, Japan, assignors to NEC Corporation, Japan**

**Filed May 25, 1988, Ser. No. 198,476**

**Claims priority, application Japan, May 29, 1987, 62-137265; Jun. 2, 1987, 62-139150; Sep. 14, 1987, 62-231626; Oct. 22, 1987, 62-267800; Oct. 30, 1987, 62-167024[U]; Oct. 30, 1987, 62-276401**

**Int. Cl.⁵ H01H** *51/22*

U.S. Cl. 335—78 **5 Claims**

1. An electromagnetic relay comprising:

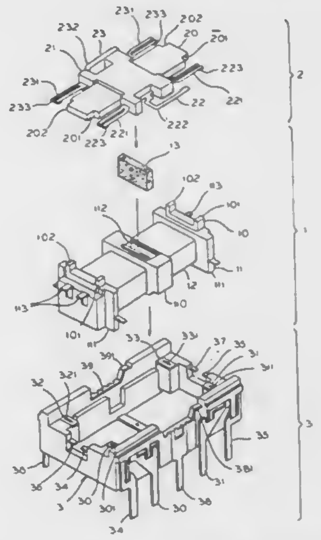
a coil assembly having a permanent magnet arranged in a manner to cause one of its magnetic poles to make contact with the center of a U-shaped core on which said coil is wound;

an armature assembly including an armature having opposite ends mounted to oppose opposite ends of said core, hinge springs for supporting said armature for undertaking a seesaw movement wherein either end of the armature comes into contact with or separates from the opposite ends of said core respectively, and movable contact springs cooperating with the seesaw movement of said armature, and the armature, the hinge spring and the movable spring being integrally fixed with an insulating molded member; and

an insulating base having a box-like shape with an opening on the top thereof and including stationary contact terminals having stationary contacts positioned to oppose movable contacts of said movable contact springs and including common terminals to be connected to one end of said hinge springs, when said coil assembly is placed within said opening and when said armature assembly is arranged in a manner so that the other magnetic pole of said magnet acts as a supporting fulcrum for the seesaw movement of said armature;

each of the opposite ends of said U-shaped core having two projections provided on both sides of surfaces on the ends of said core;

each of the opposite ends of said armature having two notches formed in shapes corresponding to said projections to form an air gap between side surfaces of said armature ends and each of said projections whereby a path of the magnetic flux is formed by said air gap when each of said armature ends separates from the core end.



---

### 5,015,979
## ELECTROMAGNETIC RELAY

**Yoichi Nakanishi, Kyoto; Junichi Kanetani, Takatsuki, and Muneo Nakata, Iida, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Dec. 11, 1989, Ser. No. 448,272**

**Claims priority, application Japan, Dec. 15, 1988, 63-163667[U]; Dec. 22, 1988, 63-165992[U]; Dec. 26, 1988, 63-168945[U]; May 16, 1989, 1-56169[U]; May 16, 1989, 1-56170[U]; May 30, 1989, 1-62726[U]**

**Int. Cl.⁵ H01H** *51/22*

U.S. Cl. 335—83 **10 Claims**

1. An electromagnetic relay, comprising:

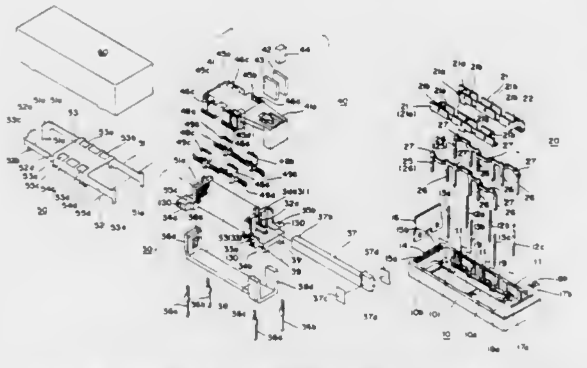
a pair of leaf springs coupled by a coupling member;

a movable block, said movable block including a stand mounted between said pair of opposing leaf springs and contacting said pair of opposing leaf springs contact portions, said movable block being movable in a direction perpendicular to the length of the leaf springs in accordance with the energization and deenergization of the electromagnet;

at least one groove formed in said stand, said at least one

VOL
1126
ISS
2
MY
14
1991
UMI

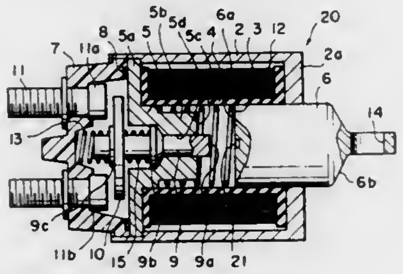
groove conducting bonding agent to said contact portions; and



at least one through hole formed in said coupling member to allow introduction of bonding agent into said at least one groove.

## 5,015,980
## SOLENOID SWITCH APPARATUS

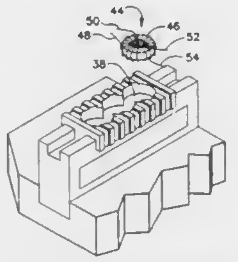
**Takeshi Sugiyama, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Mar. 30, 1990, Ser. No. 501,575**
**Claims priority, application Japan, Mar. 31, 1989, 1-81875**
**Int. Cl.$^5$ H01H** *63/02*
**U.S. Cl. 335—126** **6 Claims**



1. A solenoid switch, comprising:
an excitation coil (**3**);
a stationary iron core (**5**) disposed within said excitation coil;
a movable iron core (**6;16**) slidably disposed within said excitation coil in an opposing relationship with respect to said stationary iron core;
a compression spring (**12**) disposed between said stationary and movable iron cores;
an actuator rod (**9**; **19**) slidably extending through said stationary iron core;
spring means (**13**) for biasing said actuator rod to have a planar inner end thereof projecting from said stationary iron core toward a planar inner end of said movable iron core;
a contact assembly having a movable contact (**10**) mounted on said actuator rod and stationary contact means (**11***a*, **11***b*), said contact assembly operating in accordance with the movement of said actuator rod; and
magnetic reluctance modification means (**21**; **22**) defined in the inner end of the actuator rod or the movable iron core for reducing an amount of magnetic flux passing between said movable iron core and said stationary iron core via said actuating rod upon engagement between the inner ends of the actuator rod and the movable iron core, and for attendantly enhancing the amount of magnetic flux passing directly between the movable iron core and the stationary iron core.

## 5,015,981
## ELECTRONIC MICROMINIATURE PACKAGING AND METHOD

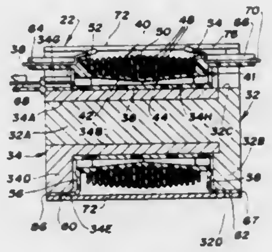
**James D. Lint, and Aurelio J. Gutierrez, both of San Diego, Calif., assignors to Pulse Engineering, Inc., San Diego, Calif.**
**Filed Aug. 21, 1990, Ser. No. 570,894**
**Int. Cl.$^5$ H01F** *17/02;* **H05K** *7/02*
**U.S. Cl. 336—65** **20 Claims**



1. An electronic device having a plurality of leads comprising:
a three dimensional electronic element holder of a non-conducting material having at least one cavity therein and a plurality of lead slots extending from said cavity to a base of said holder;
an electronic element mounted in said cavity and having a plurality of leads extending therefrom;
a plurality of said leads extending within said slots from said element to said base; and
a plurality of lead terminals mounted on said holder and each having one end extending into one of said slots conductively connected with a lead and a free end extending outward therefrom.

## 5,015,982
## IGNITION COIL

**Albert A. Skinner; Ronnalee House, both of Anderson; Roger W. Kellams, Carmel, and Jose A. Cruz, Chesterfield, all of Ind., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Aug. 10, 1989, Ser. No. 391,816**
**Int. Cl.$^5$ H01F** *17/06, 27/26*
**U.S. Cl. 336—69** **24 Claims**

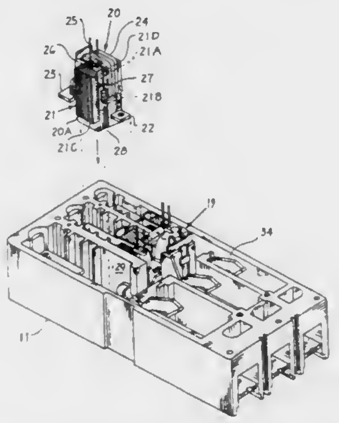


1. An ignition coil comprising, first and second axially spaced magnetic parts each formed of iron particles in a binder of electrical insulating material that serves to bind the particles together and to provide gaps between at least some of the particles, a core means formed of magnetic material magnetically connecting said parts, a primary winding disposed about said core means, a secondary winding disposed about said primary winding, and at least one axially extending member formed of magnetic material located outside of said secondary winding for magnetically connecting said parts, said axially extending member being positioned to provide radially extending air gaps respectively between inner surfaces of said axially extending member and outer surfaces of said first and second parts.

---

## 5,015,983
## COMPACT CIRCUIT INTERRUPTER HAVING MULTIPLE AMPERE RATINGS

**Donna C. DeRosier; Richard A. Dziura, both of Plainville; Joseph M. Palmieri, Southington; Eric D. Juntwait, Plainville; Linda Y. Jacobs, Barkhamsted, and Graham A. Scott, Avon, all of Conn., assignors to General Electric Company, New York, N.Y.**
**Filed Jun. 18, 1990, Ser. No. 539,399**
**Int. Cl.$^5$ H01H** *71/08*
**U.S. Cl. 336—180** **12 Claims**

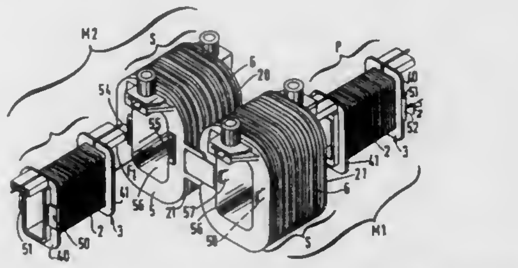


1. A compact circuit breaker having variable ampere ratings comprising:
a molded plastic circuit breaker cover and a molded plastic circuit breaker case;
an operating mechanism within said case arranged for separating a pair of contacts upon occurrence of an overcurrent condition through said contacts for a predetermined period of time;
an electronic trip unit circuit arranged within said circuit interrupter cover for controlling operation of said operating mechanism and;
a current transformer within said case connected with said trip unit circuit for providing operating power to said trip unit circuit and for providing a current signal to said trip unit circuit representative of current flow through a protected circuit;
said current transformer comprising a rectangular core of predetermined size and a secondary winding consisting of a predetermined number of turns arranged about said core, said current transformer further comprising a multiple turn primary winding arranged about said core, whereby a preselected ampere rating to said trip unit circuit is selected by a number of primary turns selected for said primary winding.

## 5,015,984
## IGNITION COIL, IN PARTICULAR FOR AN INTERNAL COMBUSTION ENGINE OF AN AUTOMOTIVE VEHICLE, AND MEANS FOR RETAINING THE PRIMARY ASSEMBLY WITHIN THE SECONDARY ASSEMBLY OF SUCH A COIL

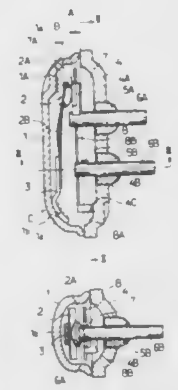
**Dominique Vialaneix, Issoire, France, assignor to Valeo Electronique, Voisins-le-Bretonneux, France**
**Filed Apr. 18, 1990, Ser. No. 510,821**
**Claims priority, application France, Apr. 28, 1989, 89 05641**
**Int. Cl.$^5$ H01F** *27/30*
**U.S. Cl. 336—197** **2 Claims**

1. An ignition coil assembly comprising:
at least one magnetic circuit including a primary and a secondary assembly,
said primary assembly including a tubular former defining a first tubular cavity, an end plate positioned at each end thereof, a winding extending around said primary former between said end plates, and a central magnetic core mounted within the first tubular cavity and positioned between said end plates,
said secondary assembly including a tubular former defining a second tubular cavity, an end plate at each end thereof, a secondary winding extending around said secondary former, aligning step means integrally formed on the inside of said secondary former and projecting into said second tubular cavity for engaging and aligning said primary assembly within said secondary assembly, said aligning step means including a plurality of wedge-shaped steps oppositely positioned on the inside of said secondary former, each of said wedge-shaped steps including a head portion adjacent one of said secondary end plates, said secondary cavity receiving said primary assembly with one of said primary end plates nesting within said wedge-shaped steps to position said primary assembly within said secondary assembly and in spaced relation thereto, and to prevent further translational movement of said primary assembly within said secondary assembly.



## 5,015,985
## THERMALLY RESPONSIVE SWITCH

**Susumu Ubukata, and Yasukazu Mizutani, both of Nagoya, Japan, assignors to Susumu Ubukata, Nagoya, Japan**
**Filed Feb. 28, 1990, Ser. No. 486,204**
**Claims priority, application Japan, Mar. 1, 1989, 1-49625**
**Int. Cl.$^5$ H01H** *37/12, 37/54*
**U.S. Cl. 337—368** **2 Claims**



1. A thermally responsive switch comprising:
(a) an elliptic dome-shaped receptacle formed of a metallic material and having an opening at one side thereof along its longitudinal direction, the receptacle having a peripheral wall including both ends in the longitudinal direction, each end having a spherical surface, and a section between the ends, the section having an arcuate transverse section;
(b) a support formed of an electrically conductive material and having two ends, said support being conductively secured at one end to an inner surface of one of the two spherical ends of said receptacle;
(c) a thermally responsive element disposed in said receptacle and having two ends, said thermally responsive element being secured at one end to the other end of said support, the other end of said thermally responsive ele-

VOL
1126
ISS
2
MY
14
1991
UMI

ment being positioned opposite an inner surface of the other spherical end of said receptacle with a predetermined space interposed therebetween, said thermally responsive element having a shallow dish-shaped portion for effecting a snap action and a movable contact carried on said other end thereof;

(d) a metallic lid member secured to said receptacle so as to hermetically close the opening of said receptacle, said lid member having a wall thickness greater than that of said receptacle, and also having a through-hole;

(e) a terminal pin formed of an electrically conductive material and inserted through the through-hole of said lid member to thereby be hermetically held in position with an electrically insulative material in the through-hole, said terminal pin having a fixed contact secured to a portion thereof positioned in said receptacle so that the movable contact is engaged with and disengaged from the fixed contact;

(f) an inwardly deformed portion provided so as to correspond to the spherical end portion of said receptacle to the inner wall of which said support is secured or the vicinity thereof, said inwardly deformed portion being inwardly deformed when subjected to an external force so that the contact pressure between the movable and fixed contacts is adjusted; and

(g) a projection inwardly projected at the other spherical end of the receptacle so as to adjust the predetermined space between said other end of said thermally responsive element and the inner surface of said other spherical end of the receptacle, thereby limiting a moving range of said other end of said thermally responsive element.

---

### 5,015,986
### ORGANIC POSITIVE TEMPERATURE COEFFICIENT THERMISTOR

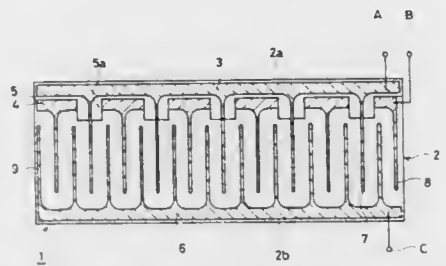
**Katsuyuki Uchida, and Haruo Takahata, both of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Apr. 6, 1990, Ser. No. 505,566**

**Claims priority, application Japan, Apr. 6, 1989, 1-88629**

**Int. Cl.$^5$ H01C *7/10***

**U.S. Cl. 338—22 R** **8 Claims**



1. An organic positive temperature coefficient thermistor, comprising:

a sheet made of a material exhibiting a positive temperature characteristic of resistance made of conductive particles dispersed in an organic polymer material;

first and second conductive power supplying portions arranged opposed to each other and separated by a predetermined distance on said sheet; and

first and second pluralities of branch-shaped electrodes respectively connected to said first and second power supplying portions and each said plurality of branch-shaped electrodes extending in the direction of the respective opposed power supplying portion, the plurality of branch-shaped electrodes connected to one of the power supplying portions being interdigitated with the plurality of branch-shaped electrodes connected to the other power supplying portion;

wherein at least a selected one of said first and second power supplying portions comprises a plurality of power supplying electrodes which are insulated from each other, and each electrode of said plurality of branch-shaped electrodes connected to the selected power supplying portion is connected to a respective one of the plurality of power supplying electrodes, and said branch-shaped electrodes are spaced along their respective power supplying electrodes with a predetermined ratio between the respective number of branch-shaped electrodes connected to each of the power supplying electrodes.

---

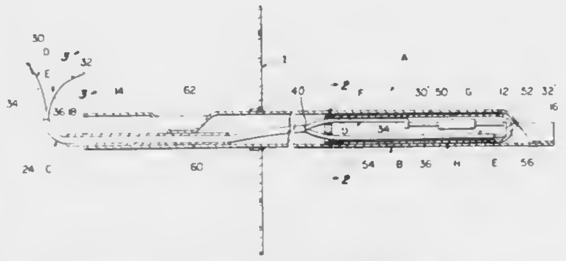
### 5,015,987
### TEMPERATURE SENSING APPARATUS

**Ronald A. Nixon; Marc A. Peoples, both of Mansfield, and Emil R. Plasko, Lexington, all of Ohio, assignors to Therm-O-Disc, Incorporated, Mansfield, Ohio**

**Filed Jul. 21, 1989, Ser. No. 383,209**

**Int. Cl.$^5$ H01C *7/10***

**U.S. Cl. 338—22 R** **10 Claims**



1. A temperature sensing device comprising:

an elongated metal tube having opposite end portions;

a thermistor positioned within said tube adjacent one of said end portions;

a pair of wires extending into said tube at the other of said end portions thereof and being connected with said thermistor;

a ceramic tube interposed between said metal tube and said thermistor; and

said ceramic tube having a closed end adjacent said one end portion of said metal tube.

---

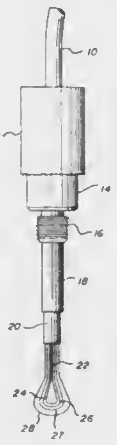
### 5,015,988
### TEMPERATURE PROBE

**Taylor C. Fletcher, 1534 Sunny Crest Dr., Fullerton, Calif. 92635**

**Filed Sep. 14, 1989, Ser. No. 407,329**

**Int. Cl.$^5$ H01C *3/04***

**U.S. Cl. 338—28** **9 Claims**



1. A temperature probe for measuring temperatures of aqueous solutions comprising: a casing; a pair of insulated low thermal conductivity lead wires extending into said casing and protruding outwardly therefrom; a thermistor type temperature sensor mounted on the distal ends of said lead wires and electrically connected thereto; a thin electrically insulating coating encasing said thermistor to provide electrical insulation from the aqueous solution whose temperature is being measured by the probe; a protective epoxy coating extending over said electrically insulating coating to protect said insulating coating from rupture; and a second epoxy coating extending over said thermistor and over said insulated lead wires to assure minimal electrical conductance between the sensor and the aqueous solution.

---

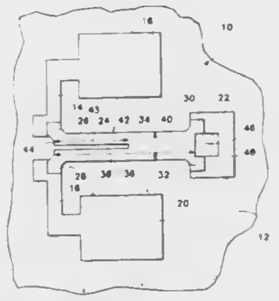
### 5,015,989
### FILM RESISTOR WITH ENHANCED TRIMMING CHARACTERISTICS

**Paul D. Wohlfarth, Vernonia, and Gregg L. Buchanan, Forest Grove, both of Oreg., assignors to Pacific Hybrid Microelectronics, Inc. and N.W. Silicon Specialists, Inc., both of Portland, Oreg.**

**Filed Jul. 28, 1989, Ser. No. 387,085**

**Int. Cl.$^5$ H01C *10/00***

**U.S. Cl. 338—195** **20 Claims**



1. A film resistor, comprising:

(a) a film of electrically resistive material having a predetermined shape;

(b) a pair of circuit conductor terminals connected to said film of resistive material at apart-spaced locations thereon; and

(c) a shunt conductor of material having a lower resistivity than said resistive material, said shunt conductor being spaced apart from both of said circuit conductor terminals and not connected electrically with either of said circuit conductor terminals except through said film resistive material, and being interconnected with said film of resistive material at a shunt conductor terminal location on said film of resistive material spaced apart from said circuit conductor terminals, so as to be in position to carry a portion of an electric current flowing through said resistor between said conductor terminals.

---

### 5,015,990
### BRAKE REPLACEMENT WARNING SYSTEM AND DEVICE USEFUL THEREIN

**Dwayne Reede, 22 Jefferson St., Norwalk, Conn. 06851**

**Filed Mar. 1, 1990, Ser. No. 486,857**

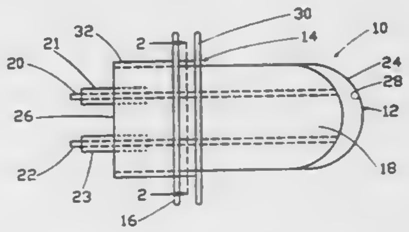
**Int. Cl.$^5$ B60T *17/22***

**U.S. Cl. 340—454** **12 Claims**

1. A component wear warning system comprising a detector comprising:

(a) two electric leads;

(b) a body portion having two ends and at least one side, partially containing and physically and electrically insulating said two electric leads, one from another, such that said two electric leads enter one end of said body portion and said two electric leads are separate, exposed and coterminous with the other end of said body portion; and



(c) a non-electrically-conducting coating, covering said other end of said body portion and the exposed electric leads.

---

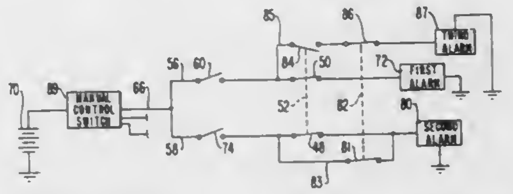
### 5,015,991
### ALARM SYSTEM FOR VEHICLE AUTOMATIC TRANSMISSION

**William A. Barr, P.O. Box 13, Gibson Island, Md. 21056**

**Filed Mar. 27, 1990, Ser. No. 499,646**

**Int. Cl.$^5$ B60Q *11/00***

**U.S. Cl. 340—456** **12 Claims**



1. An alarm system for an automotive vehicle provided with an automatic transmission including a gear selector lever having a park position and a parking pawl engageable with a parking gear provided with radially extending circumferentially spaced teeth for parking said vehicle in response to movement of said gear selector lever to said park position;

(a) first and second control switches positioned to close when the gear selector lever is set to any position other than the park position;

(b) a third control switch in series with one of said first and second control switches and positioned to close when a door of the automotive vehicle is opened;

(c) a first alarm device in series with said third control switch and said one of said first and second control switches for producing a first alarm signal when both of said switches are closed;

(d) a fourth control switch in series with the other of said first and second control switches and positioned to close whenever a driver leaves his seat in the automotive vehicle; and

(e) a second alarm device in series with said fourth control switch and the other of said first and second control switches for producing a second alarm signal distinctly different from said first alarm signal when both of said fourth control switch and said other of said first and second control switches are closed.

---

### 5,015,992
### COBALT-NIOBIUM AMORPHOUS FERROMAGNETIC ALLOYS

**John O. Strom-Olsen, Montreal, and Piotr Z. Rudkowski, Pierrefonds, both of Canada, assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Jun. 29, 1989, Ser. No. 372,991**

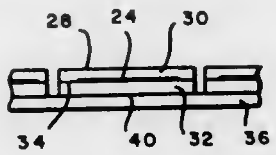
**Int. Cl.$^5$ G08B *13/24***

**U.S. Cl. 340—551** **25 Claims**

2. A marker for use in an electronic article surveillance

VOL
1126
ISS
2
MY
14
1991
UMI

system, the marker comprising: a marker element for producing a detectable response and including an amorphous ferro-



magnetic element made from a molten alloy containing 2.5 to 15% niobium, and a carrier for the marker element.

---

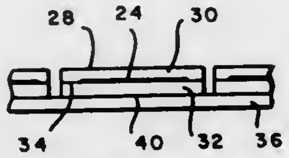
### 5,015,993
### FERROMAGNETIC ALLOYS WITH HIGH NICKEL CONTENT AND HIGH PERMEABILITY

**John O. Strom-Olsen, Montreal, and Piotr Z. Rudkowski, Pierrfond, both of Canada, assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Jun. 29, 1989, Ser. No. 372,993**

**Int. Cl.$^5$ G08B** *13/24*

**U.S. Cl. 340—551** **36 Claims**



1. A marker for use in an electronic article surveillance system, the marker comprising: a ferromagnetic amorphous ferromagnetic element containing 35 to 55% nickel, up to 35% of at least one of iron and cobalt and a combination thereof and made by rapid solidification from a molten ferromagnetic alloy, and a carrier for said ferromagnetic amorphous element.

---

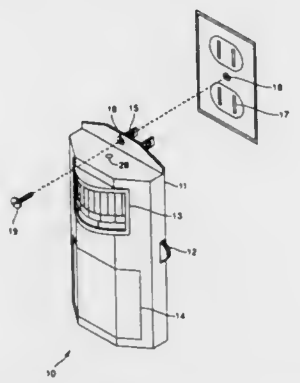
### 5,015,994
### SECURITY LIGHT CONTROLLED BY MOTION DETECTOR

**Kenneth Hoberman; Kim Kirwan, both of Omaha, Nebr., and Gary Gordon, Shenandoah, Iowa, assignors to GRH Electronics, Omaha, Nebr.**

**Filed Dec. 28, 1989, Ser. No. 458,131**

**Int. Cl.$^5$ G08B** *13/18*

**U.S. Cl. 340—567** **11 Claims**



1. A security light comprising:
a source of illumination;
pronged plug means for insertion into a standard electrical wall outlet without the need for permanent electrical connection to power mains or permanent physical attachment to a structural support;
means for detecting motion in an area near said security light; and
means for applying power to said source of illumination in response to the detection of said motion.

---

### 5,015,995
### FLUID LEVEL MONITOR

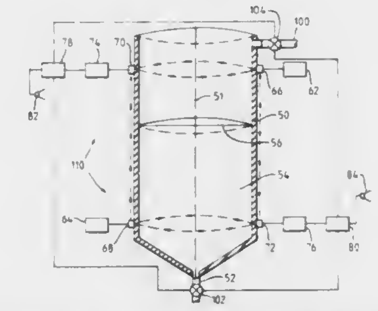
**Trevor J. Holroyd, Derby, England, assignor to Stresswave Technology Limited, Derby, England**

**Filed Oct. 24, 1989, Ser. No. 425,970**

**Claims priority, application United Kingdom, Dec. 3, 1988, 8828282**

**Int. Cl.$^5$ G08B** *21/00*

**U.S. Cl. 340—621** **18 Claims**



1. A fluid level monitor for monitoring the level of fluid in a vessel comprising first acoustic emission transducer means acoustically coupled to the wall of the vessel substantially in a first plane perpendicular to the longitudinal direction of the vessel, second acoustic emission transducer means acoustically coupled to the wall of the vessel substantially in a second plane perpendicular to the longitudinal direction of the vessel, the first and second planes being longitudinally spaced, the first transducer means being arranged to transmit stress waves into the wall of the vessel, the stress waves propagate around the perphery of the wall and are damped by any fluid contacting the wall in the first plane, the first transducer means being arranged to detect stress waves propagating in the wall and to convert them into a first electrical signal, the first electrical signal corresponds to the stress wave activity detected by the first transducer means, first means for determining the presence/absence of fluid at at least a portion of the first plane from the amplitude of the first electrical signal corresponding to the stress wave activity detected, the second transducer means being arranged to transmit stress waves into the wall of the vessel which propagate around the periphery of the wall and are damped by any fluid contacting the wall in the second plane, the second transducer means being arranged to detect stress waves propagating in the wall and to convert them into a second electrical signal, the second electrical signal corresponds to the stress wave activity detected by the second transducer means, second means for determining the presence/absence of fluid at at least a portion of the second plane from the amplitude of the second electrical signal corresponding to the stress wave activity detected, the first transducer means and second transducer means being positioned substantially in at least one plane parallel to the longitudinal direction of the vessel such that stress waves transmitted into the wall of the vessel by at least one of the first transducer means or second transducer means and propagating generally longitudinally along the vessel are detected by the second transducer means or first transducer means to produce a third electrical signal, means for determining the alteration of the fluid level between the first plane and the second plane from the amplitude of the third electrical signal.

---

### 5,015,996
### SWITCH DEVICE WITH A TROUBLE DETECTING AND INDICATING FUNCTION

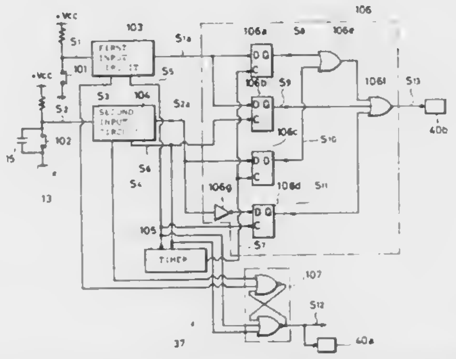
**Keisuke Konishi; Kenji Shinohara, both of Osaka; Norio Iwakiri, Kyoto, and Tomofumi Kurashige, Tottori, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Division of Ser. No. 228,063, Aug. 4, 1988, Pat. No. 4,992,777. This application Aug. 29, 1990, Ser. No. 574,083**

**Claims priority, application Japan, Aug. 10, 1987, 62-200678; Aug. 10, 1987, 62-200679; Aug. 11, 1987, 62-201529; Aug. 11, 1987, 62-201530; Aug. 20, 1987, 62-207707**

**Int. Cl.$^5$ G08B** *21/00*

**U.S. Cl. 340—644** **4 Claims**



1. A switch device having a trouble detecting and indicating function comprising:
a casing;
first switch means provided within said casing and externally operated between open and closed positions;
second switch means provided within said casing and externally operated jointly with said first switch means between open and closed positions;
first circuit means for providing an output signal responsive to the operation of said first switch means;
second circuit means for providing an output signal responsive to the operation of said second switch means;
means positioned within said casing for detecting moisture therein and providing an output signal upon detecting moisture; and
means for providing a warning signal in response to the output signal from said moisture detecting means;
wherein said means for detecting moisture comprises switch means electrically connected in parallel with said second switch means and adapted to be short circuited by the moisture trapped within said casing.

---

### 5,015,997
### METHOD AND APPARATUS FOR MEASURING COMBINE GRAIN LOSS

**Gilbert J. I. Strubbe, Zedelgem, Belgium, assignor to Ford New Holland, Inc., New Holland, Pa.**

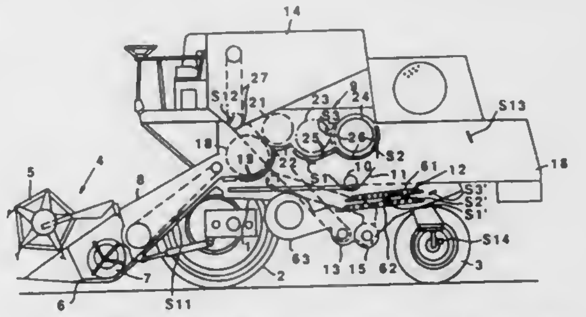
**Division of Ser. No. 335,658, Apr. 10, 1989, Pat. No. 4,951,031. This application May 16, 1990, Ser. No. 524,104**

**Claims priority, application European Pat. Off., Apr. 26, 1988, 882008022**

**Int. Cl.$^5$ G08B** *21/00*

**U.S. Cl. 340—684** **15 Claims**

1. In an apparatus including detector means associated with a grain handling mechanism in a crop harvesting machine for measuring grain loss from said machine, said grain handling mechanism including threshing means for threshing grain from crop material, separating means for removing threshed graim from said crop material, and cleaning means in flow communication with said separating means to receive separated grain therefrom and clean trash material from said separated grain therefrom and clean trash material from said separated grain to create cleaned grain, said grain moving through said grain handling mechanism along a crop flow path terminating at the discharge of said grain from said grain handling mechanism, said crop material defining operating condition parameters affecting the efficiency of said grain handling mechanism to harvest said crop material, the improvement comprising:
at least two detector means associated with said grain handling mechanism, each of said detector means being provided at spaced apart locations along the length of the flow path of the crop material through said grain handling mechanism and being operable to measure grain separation in said grain handling mechanism at each said location



within the machine and to produce electrical output signals representative thereof; and
processor means programmed with a plurality of grain loss algorithms against which the output signals are applied to derive therefrom a substantially absolute indication of grain loss at a given instant, said processor means being operable to select one of said algorithms for utilization in response to said operating condition parameters, each said algorithm calculating the absolute indication of grain loss using a ratio of selected said output signals.

---

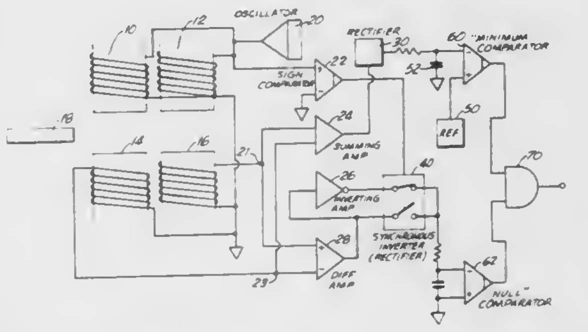
### 5,015,998
### NULL SEEKING POSITION SENSOR

**George H. Ellis, Blacksburg, and James C. Kirby, Radford, both of Va., assignors to Kollmorgen Corporation, Simsbury, Conn.**

**Filed Aug. 9, 1989, Ser. No. 391,430**

**Int. Cl.$^5$ G08B** *21/00*

**U.S. Cl. 340—686** **6 Claims**



1. A position sensor comprising:
A pair of primary sense windings;
A pair of secondary sense windings, said pair of primary sense windings separated by an air-gap from said pair of secondary sense windings;
At least one screen member of material capable of interrupting a magnetic drive field and adapted to be positioned in said air gap in correlation with the position of a moving member being sensed;
Oscillator drive means applying current in parallel to said pair of primary sense windings, said current in said pair of primary sense windings electrically inducing corresponding current in said pair of secondary sense windings; and
Circuit means for detecting the presence of said screen

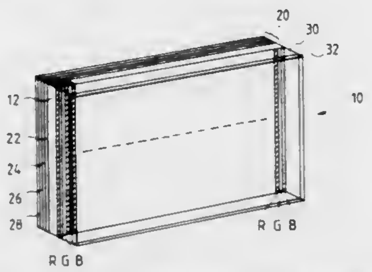
VOL
1126
ISS
2
MY
14
1991
UMI

member within said air gap, said circuit means providing an indication when said screen member is located at a certain position within said air gap.

---

### 5,015,999
## DISPLAY UNIT

**Kunio Imai, and Hitoshi Nakada, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**
**Filed Jan. 4, 1989, Ser. No. 293,280**
**Claims priority, application Japan, Jul. 27, 1988, 63-187391**
**Int. Cl.$^5$ G09G *3/22***
**U.S. Cl. 340—702** **6 Claims**

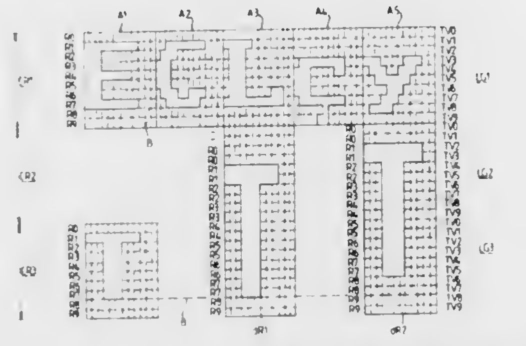


1. A display unit for displaying two-dimensional images comprising:
a fluorescent layer for emitting light when exposed to ultraviolet rays, said fluorescent layer including three different types of fluorescent material arranged in narrow strips in consecutive and repeating sequences that emit red, green and blue light, respectively, said fluorescent layer further having a thickness on the order of from approximately 1000 to 5000 angstroms; and
an electric-field ultraviolet light emitting device having a positive electrode layer, a positive hole injection layer, a light emission layer, and a negative electrode layer, respectively, in a stacked face-to-face configuration, provided integrally behind said fluorescent layer for selective irradiation of said fluorescent layer.

---

### 5,016,000
## CRT CHARACTER DISPLAY APPARATUS EMPLOYING DOUBLE HEIGHT ALGORITHM

**Richard E. F. Bugg, Coulsdon, England, assignor to U.S. Philips Corporation, New York, N.Y.**
**Continuation of Ser. No. 21,558, Feb. 27, 1987, abandoned, which is a continuation of Ser. No. 642,288, Aug. 20, 1984, abandoned. This application Jun. 28, 1990, Ser. No. 547,524**
**Claims priority, application United Kingdom, Sep. 1, 1983, 8323399**
**Int. Cl.$^5$ G09G *1/16***
**U.S. Cl. 340—731** **7 Claims**

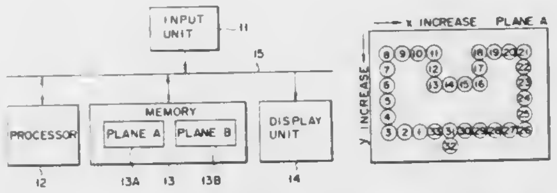


1. A data display apparatus for displaying data represented by digital codes and with the displayed data composed of discrete characters the shapes of which are defined by selected dots of a dot matrix which constitutes a character format for the characters comprising: a raster scan display device which provides a raster display using horizontal display lines in a recurrent scan cycle, acquisition means for acquiring digital codes representing data selected for display, memory means for storing the digital codes, a character memory in which character information that identifies the patterns of discrete dots which define the character shapes are stored as corresponding patterns of data bits in respective character memory cell matrices, addressing means for selectively addressing and reading out in each scan cycle of the display device the character information in accordance with the stored digital codes, and means responsive to the information read out to produce character generating signals for driving the display device, the addressing means being operable to perform addressing sequences for displaying a first row of characters having a first common base line irrespective of whether the characters of the row are a mixture of single height upper and lower case characters and of substantially double height upper case characters, in which addressing sequences, for displaying a single height character all of the bit rows of a relevant cell matrix are read-out once only to cause the display of the character dot rows in a single group of adjacent display lines to display the character in a single character display area on or about said first common base line a given number of display lines from the bottom of the row, whereas for displaying an upper case character of substantially double height a number of bit rows at the bottom of the relevant cell matrix are read-out only once to cause the display, below said first common base line, of the associated character dot rows in a same number of adjacent display lines of a first group, and the remaining number of the bit rows of the cell matrix are read-out twice to cause the display, on or above said first common base line, of the associated character dot rows in adjacent pairs of the remaining display lines of the first group and further adjacent pairs of display lines of a second immediately preceding group thereby to display a character as an effective double height character in two adjacent character display areas one above the other, the addressing means being further operable to perform addressing sequences for displaying a second row of characters having a second common base line irrespective of whether the characters of the row are a mixture of upper and lower case characters of substantially double height in which further addressing sequences all of a further number of bit rows above but not adjacent to the bottom of a relevant cell matrix are read out twice to cause the display of associated character dot rows in adjacent pairs of display lines of a third group on or above said second base line and further adjacent pairs of display lines of a fourth immediately preceding group thereby to display a character as an effective double height character in two adjacent character display areas one above the other, characterized in that in displaying said second row of characters a number of bit rows at the bottom of the relevant cell matrix, which number corresponds to that for said first row of characters, are read out once only to cause the display, below said second common base line, of the associated character dot rows in a same number of adjacent display lines of said third group, the number of adjacent display lines below said first common base line in said first group corresponding to the number of adjacent display lines below said second common base line in said third group, the addressing means being additionally operable to perform addressing sequences for displaying a third row of characters having a third common baseling irrespective of whether the characters of the row are a mixture of single and substantially double height characters including substantially double height lower case characters which in the case of single height characters is in the same manner as for said first row of characters while in the case of substantially double height characters is in the same manner as for said second row of characters with the number of adjacent display lines below said third common base line corresponding to that for said first and second common baselines, wherein all display rows each have a common baseline whose position is common to all rows such that any row may display any mixture of charactes each being located on or about said common base line while character portions of and accents for substantially double height characters appearing below said commonly positioned baseline are of the same size as corresponding character portions of and accents for single height characters.

---

### 5,016,001
## PATTERN DATA GENERATING SYSTEM

**Tsutomu Minagawa, Fujisawa; Masahide Ohhashi, Yokohama, and Naoyuki Kai, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Jan. 27, 1989, Ser. No. 302,709**
**Claims priority, application Japan, Jan. 30, 1988, 63-20314**
**Int. Cl.$^5$ G09G *1/14***
**U.S. Cl. 340—747** **11 Claims**

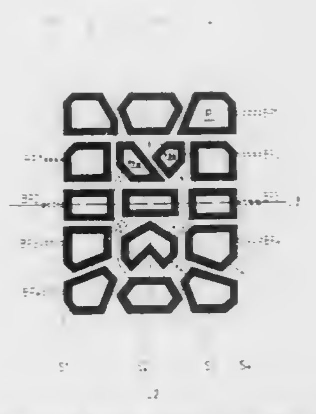


1. A pattern data generating system wherein an area on a two-dimensional bit map plane enclosed by a closed curve defined by a given start point and points subsequent to the start point, is filled or painted, a position of each of the points being determined by individual x- and y-coordinates defined on said two-dimensional bit map plane, the system comprising:
first and second bit map memories;
first control means for generating the subsequent points based on the coordinates of the start point and on changes dx and dy, where dx and dy are the differences of the x- and y-coordinates of pairs of adjacent points, which pairs are contained in the group consisting of the start point and the subsequent points, and writing the start point and the generated subsequent points in said first bit map memory;
second control means for selecting points from a group comprising the start point and the subsequent points, and writing the selected points in said second bit map memory, said selected points being located on memory scan lines defined in said second bit map memory;
third control means for, if w points **b0**, **b1**, . . . , **b**$(w-2)$, and **b**$(w-1)$ are present on one of the scan lines in said second bit map memory, performing exclusive ORed operation on data of j points **b0**, **b1**, . . . , **b**$(j-1)$ selected from the w points, and writing the exclusive ORed data of the j points in said second bit map memory, where each of said w and j is a positive integer (w less than or equal to 1; j less than or equal to 1); and
fourth control means for performing a predetermined arithmetic operation on data of each point in said first bit map memory with the exclusive ORed data of the point in said second bit map memory, corresponding to the point in said first bit map memory, to obtain a filled or painted area of said closed curve.

---

### 5,016,002
## MATRIX DISPLAY

**Lauri Levanto, Salo, Finland, assignor to Nokia-Mobira OY, Salo, Finland**
**Filed Apr. 5, 1989, Ser. No. 333,986**
**Claims priority, application Finland, Apr. 15, 1988, 881787**
**Int. Cl.$^5$ G09F *9/00***
**U.S. Cl. 340—756** **10 Claims**

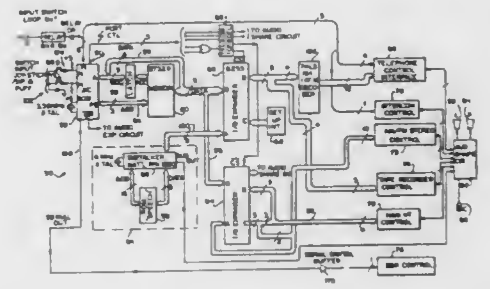


1. A matrix display for the display of alphanumeric characters, the elements (Pi) of the matrix forming a $5\times3$ matrix with outer columns on either side of a center column, characterized in that one element in the middle column of the matrix and within the confines of a perimeter defined by the elements in the outer columns is divided into two parts (P5*a*, (P5*b*) so that the matrix comprises a total of 16 pixels (Pi).

---

### 5,016,003
## ENVIRONMENTAL CONTROL SYSTEM FOR THE HANDICAPPED

**Richard F. Rice, Jr., Huntsville; David M. Kelly, Madison, and Daryl L. Smith, Moulton, all of Ala., assignors to Rice-Kelly Research and Engineering, Inc., Huntsville, Ala.**
**Filed Oct. 27, 1988, Ser. No. 263,439**
**Int. Cl.$^5$ H04M *1/00;* G05D *29/00***
**U.S. Cl. 340—825.19** **13 Claims**



1. A method for providing a handicapped user with control over his environment comprising the steps of
(a) presenting, one at a time in a predetermined sequence, a first set of options to said user;
(b) selecting one of said options within said first set in response to user manipulation of a control having first and second active positions in synchronism with the time said one option is presented to said user;
(c) presenting one at a time, in sequence, a further set of options different from said first set of options to said user in response to said selecting step (b);
(d) subsequent to said step (b), repeating said presenting step (a) in response to further user manipulation of said same control to said first active position;
(e) selecting one of said options within said further options set in response to further user manipulation of said same

VOL
1126
ISS
2
MY
14
1991
UMI

control to said second active position in synchronism with the time said one of said further options is presented to said user; and

(f) controlling the operation of an appliance in response to said selecting step (e).

---

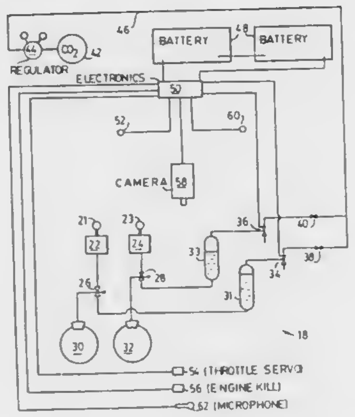
### 5,016,004
## GAS OPERATED VEHICULAR CONTROL SYSTEM
**John W. Funk, and David H. Saint, both of Medicine Hat, Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Canada**

**Filed Dec. 23, 1988, Ser. No. 289,044**

**Claims priority, application Canada, Dec. 24, 1987, 555425**

**Int. Cl.⁵ H04B** *1/00*

**U.S. Cl. 340—825.69** **31 Claims**



1. A system for controlling, from a remote station, the operation of a vehicle having a body, a suspension system, an hydraulic brake-operated skid steering system, and a drive motor, comprising:

on the vehicle
  a video transmission system,
  an electronic command reception system including electronic control means for accepting electronic command signals and operating said steering system in response to said signals,
    a source of compress gas,
    a source of electrical energy connected to said electronic control means, and
    a pair of three-way solenoid-operated first valves on said vehicle, each valve being connected to said source of compressed gas, to said electronic control means and hydraulically to brakes of the vehicle on an appropriate side thereof; and
at the remote station
  a video monitoring system, and
  an electronic transmission system for sending said electronic command signals to said electronic command reception system on said vehicle;
whereby an operator at said station can monitor the progress of said vehicle via said video systems and control the movements of said vehicle via said electronic systems.

---

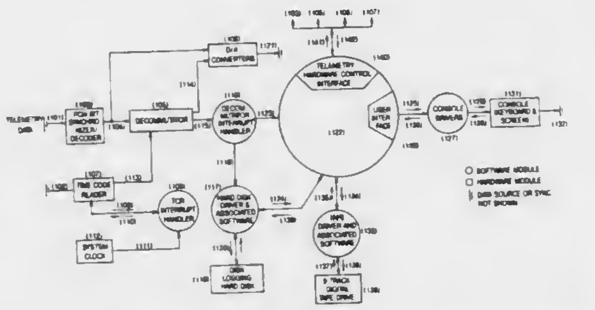
### 5,016,005
## TELEMETRY APPARATUS AND METHOD
**Harold L. Shaw; Randall B. Smith; Larry E. Cunningham; Barry E. Rishel; John P. Gioannini, all of Las Cruces, and Warren B. Harkey, Mesilla Park, all of N. Mex., assignors to Terametrix Systems International, Inc., Las Cruces, N. Mex.**

**Filed Oct. 13, 1987, Ser. No. 107,766**

**Int. Cl.⁵ G08C** *19/00*

**U.S. Cl. 340—870.19** **59 Claims**

**MICROFICHE APPENDIX INCLUDED**
**(10 Microfiche, 56 Pages)**


TELEMETRY DATA
DECOMMUTATOR
D/A CONVERTERS
TELEMETRY HARDWARE CONTROL INTERFACE
USER INTERFACE
CONSOLE KEYBOARD & SCREEN
TIME CODE READER
SYSTEM CLOCK
HARD DISK DRIVER & ASSOCIATED SOFTWARE
DISK LOGGING HARD DISK
9 TRACK DIGITAL TAPE DRIVE
SOFTWARE MODULE
HARDWARE MODULE
DATA SOURCE OR SYNC NOT SHOWN

1. For use with a microprocessor based CPU, an apparatus for processing a real-time telemetry data stream having any of a selected number of PCM codes with corresponding time-tag data comprising:
  means for logging data in any of the selected number of PCM codes from the real-time telemetry data stream;
  means for scaling and displaying data from the real-time telemetry data stream;
  means for providing an analog output representative of data from the real-time telemetry data stream; and
  means for simultaneously utilizing said data logging means, said data scaling and displaying means and said analog output providing means;
wherein all said means are software-programmable.

---

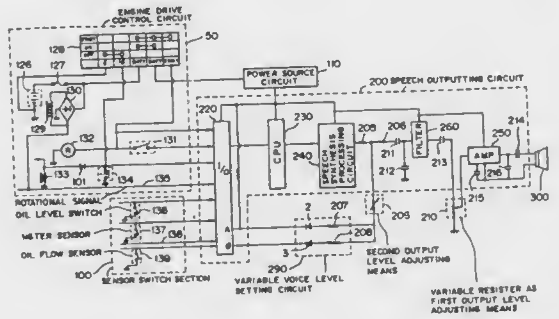
### 5,016,006
## AUDIO ALARM OUTPUTTING DEVICE FOR OUTBOARD ENGINE
**Kazuhiro Umehara, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan**

**Filed Jul. 21, 1988, Ser. No. 222,182**

**Claims priority, application Japan, Jul. 31, 1987, 62-193235**

**Int. Cl.⁵ G08B** *23/00*

**U.S. Cl. 340—984** **9 Claims**


ENGINE DRIVE CONTROL CIRCUIT
50
110
POWER SOURCE CIRCUIT
200 SPEECH OUTPUTTING CIRCUIT
CPU
SPEECH SYNTHESIS PROCESSING CIRCUIT
FILTER
AMP
ROTATIONAL SIGNAL
OIL LEVEL SWITCH
WATER SENSOR
OIL FLOW SENSOR
100
SENSOR SWITCH SECTION
VARIABLE VOICE LEVEL SETTING CIRCUIT
SECOND OUTPUT LEVEL ADJUSTING MEANS
VARIABLE RESISTER AS FIRST OUTPUT LEVEL ADJUSTING MEANS
300

1. An audio alarm apparatus for an engine, comprising: sensor means for detecting an abnormality in the operation of the engine, speech outputting circuit means responsive to detection of said abnormality by said sensor means for outputting an audible synthesized vocal statement at a volume which can be varied, and voice level setting means cooperable with said speech outputting circuit means and responsive to the speed of the engine for controlling the volume of said audible synthesized spoken statement in response solely to variations in the speed of the engine; wherein said voice level setting means sets the volume for a vocal statement to a respective discrete level in each of a plurality of respective engine speed ranges, wherein as the speed of the engine increases from one of said speed ranges to the next higher speed range said level setting means increases the volume for the vocal statement in a step-like manner from one of said discrete levels to another of said discrete levels which is higher, wherein said speech outputting circuit means includes a speaker and includes a speech signal synthesizing circuit which has a signal output coupled to said speaker and which has a control output, and wherein said level setting means is operatively coupled to said signal output and is responsive to variations of a voltage at said control output for varying characteristics of a signal at said signal output.

---

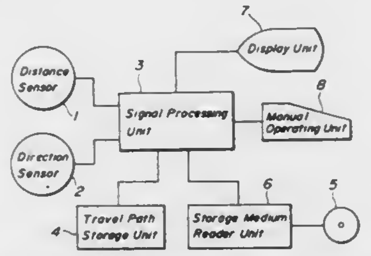
### 5,016,007
## APPARATUS FOR DISPLAYING TRAVEL PATH
**Akira Iiboshi, Saitama, and Yukinobu Nakamura, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 849,101, Apr. 7, 1986, abandoned. This application Nov. 29, 1988, Ser. No. 277,417**

**Claims priority, application Japan, Apr. 19, 1985, 60-84928; Apr. 19, 1985, 60-84929**

**Int. Cl.⁵ G08G** *1/123*

**U.S. Cl. 340—995** **14 Claims**



1. An apparatus for displaying a travel path of a moving body in which locations of the moving body for every unit of travel distance on X-Y coordinates imposed on a road map are successively decided by computer processing, on the basis of outputs of a distance sensor for detecting a travel distance of the moving body and a direction sensor for detecting a direction of said travel, by means of a signal processing device and current locations of the moving body are renewably displayed on a display screen on which line segments of roads on the road map have been previously displayed, on the basis of data of the locations as decided above, comprising:
  means for effecting polygonal approximation of the travel path of the moving body by line segments of said travel path, said travel path being obtained by storing the data of the locations of the moving body as decided by the above-mentioned computer processing according to a process previously programmed in said signal processing device;
  selecting means for selecting proposed line segments of a road approximating the line segments of said travel path from the above-mentioned line segments of the roads on the road map in which data concerning the locations on the X-Y coordinates of the respective line segments of said travel path which have been previously approximated by polygonal approximation are stored in a memory, said selecting means including a comparing means for comparing characteristic amounts concerning positional relation between (1) the line segment of the travel path decided by the computer processing and (2) the line segment of the road to determine if the amounts fall within an allowable range;
  means for effecting matching of a first pattern of the proposed line segments of the road on the road map as selected and a second pattern of the line segments of said travel path including comparing said first and second patterns and selecting a first pattern that is similar to the second pattern; and
  means for making the travel path coincide with said selected first pattern of the proposed line segments of the road on the road map to which the matching of the pattern has been effected.

---

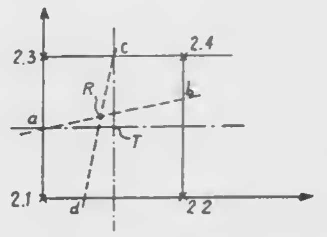
### 5,016,008
## DEVICE FOR DETECTING THE POSITION OF A CONTROL MEMBER ON A TOUCH-SENSITIVE PAD
**Daniel Gruaz, Montigny le Bretonneux, and Claude Marchal, Garancieres, both of France, assignors to Sextant Avionique, Meudon La Foret, France**

**Filed May 23, 1988, Ser. No. 197,431**

**Claims priority, application France, May 25, 1987, 87 07323**

**Int. Cl.⁵ H03K** *17/96;* **G01B** *21/00*

**U.S. Cl. 341—33** **4 Claims**



1. A device for detecting the position of a control member on a touch-sensitive pad comprising a series of detection areas, an analog circuit for attributing a detection coefficient to each area, which coefficient is a function of the amplitude of a signal emitted by said analog circuit, said amplitude being itself a function of the degree to which the detection area is overlapped by the control member, means for selecting detection areas having a high degree of overlap amongst all of the detection areas, means for attributing an origin to one of the areas having a high degree of overlap and means for determining a median point of said detection areas having a high degree of overlap as weighted by their detection coefficient.

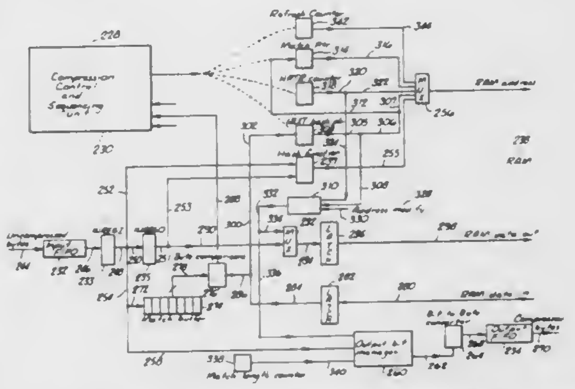
---

### 5,016,009
## DATA COMPRESSION APPARATUS AND METHOD
**Douglas L. Whiting, South Pasadena; Glen A. George, and Glen E. Ivey, both of Pasadena, all of Calif., assignors to Stac, Inc., Pasadena, Calif.**

**Filed Jan. 13, 1989, Ser. No. 297,152**

**Int. Cl.⁵ H03M** *7/40;* **H03L** *7/00*

**U.S. Cl. 341—67** **73 Claims**



1. A method for converting an input data character stream into a variable length encoded data stream in a data compression system, said data compression system comprising a history array means, said history array means having a plurality of

VOL
1126
ISS
2
MY
14
1991
UMI

entries, said entries of said history array means for storing said input data stream, a history array pointer, said history array pointer indicating a latest entry in said history array means, a hash table means having a plurality of entries, each entry of said hash table means for storing a pointer indicating one of said entries of said history array means, and an offset array means, said offset array means having a plurality of entries, each entry of said offset array means providing a link, if any, from one of said entries in said history array means to one or more other entries of said history array means, said method comprising the steps of:

performing a search in said history array means for a longest matching data string which matches said input data stream, said step of performing said search including the steps of:

performing a hashing function on said input data stream, said hashing function providing a pointer indicating one of said entries of said hash table means,

obtaining said pointer stored at said hash table entry pointed to by said hashing function,

calculating a difference between said history array pointer and said pointer obtained from said hash table means,

storing said difference into said offset array means entry pointed to by said history array pointer, and

storing said history array pointer into said hash table entry pointed to by said hashing function,

operative when said matching data string is found within said history array means, encoding said matching data string found in said history array means by assigning a tag indicating that said matching data string was found and a string substitution code including a variable length indicator of the length of said matching data string and a pointer indicating the location within said history array means of said matching data string,

operative when said matching data string is not found within said history array means, encoding a first character of said input data stream by assigning a "raw" data tag indicating that no matching data string was found in said history array means and said first character of said input data stream,

whereby said input data stream is converted into a variable length encoded data stream.

---

### 5,016,010

## SYSTEM FOR CONTROLLING A NUMBER OF BITS REQUIRED TO REPRESENT CODED OUTPUT DATA

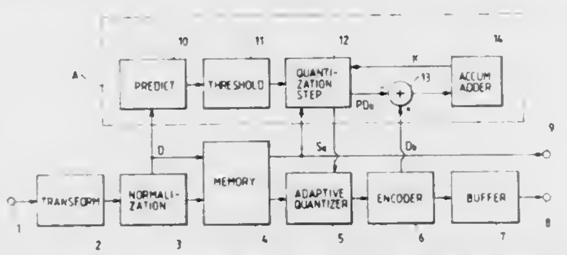
**Kenji Sugiyama, Noda, Japan, assignor to Victor Company of Japan, Ltd., Japan**

**Filed Jan. 22, 1990, Ser. No. 467,396**

**Claims priority, application Japan, Jan. 24, 1989, 1-14273**

**Int. Cl.$^5$ H03M *7/40***

**U.S. Cl. 341—67** **2 Claims**



1. A system for controlling a number of bits required to represent coded output data, comprising:

means for encoding input data into codes and outputting said codes;

means for predicting the number of bits in output codes which are outputted from the encoding means during respective first predetermined periods;

means for adding the predicted numbers of bits in the output codes to derive a sum thereof which is generated during a second predetermined period longer than said first periods;

means for controlling an actual number of bits in the output codes from the encoding means in accordance with the derived sum;

means for sequentially generating differences between the predicted number of bits of the output codes and the actual numbers of bits of the output codes which are generated during respective first periods;

means for accumulating said differences into an accumulated value; and

means for controlling the actual numbers of bits of the output codes from the encoding means in accordance with the accumulated value;

whereby the actual number of bits in the codes which are outputted from the encoding means during each second period can be held equal to or smaller than a predetermined amount.

---

### 5,016,011

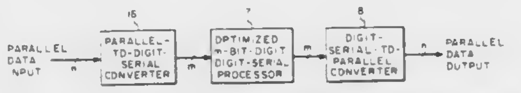
## INCREASED PERFORMANCE OF DIGITAL INTEGRATED CIRCUITS BY PROCESSING WITH MULTIPLE-BIT-WIDTH DIGITS

**Richard I. Hartley, Schenectady, N.Y.; Peter F. Corbett, Princeton, N.J., and Fathy F. Yassa, Clifton Park, N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 347,860, May 4, 1989, abandoned, which is a continuation-in-part of Ser. No. 204,792, Jun. 10, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 482,121**

**Int. Cl.$^5$ H03M *9/00***

**U.S. Cl. 341—95** **36 Claims**


16
7
8
PARALLEL DATA INPUT
n
PARALLEL-TO-DIGIT-SERIAL CONVERTER
m
OPTIMIZED m-BIT-DIGIT DIGIT-SERIAL PROCESSOR
m
DIGIT-SERIAL-TO-PARALLEL CONVERTER
n
PARALLEL DATA OUTPUT

21. A system for processing digital data, said system comprising:

a first plural-phase parallel-to-digit-serial converter for separating a first succession of n-bit-wide parallel words into a plurality p in number of m-bit-wide digit-serial signals respectively identified by consecutive ordinal numbers first through $p^{th}$, m being a positive plural integer, n being a positive plural integer that is a multiple of m, and p being a positive plural integer;

a plurality p in number of means for processing digit-serial signals respectively identified by consecutive ordinal numbers first through $p^{th}$, each of which means for processing has as a first input signal thereto that m-bit-wide digit-serial signal identified by the same ordinal number that means for processing is, and which means for processing generate respective m-bit-wide digit-serial responses responsive to their input signals; and

a plural-phase digit-serial-to-parallel converter for combining the digit-serial responses of said first through $p^{th}$ means for processing digit-serial signals to generate a combined n-bit-wide parallel-word response.

---

### 5,016,012

## TECHNIQUE FOR COMPENSATING SWITCHED CAPACITOR CIRCUITS HAVING GAIN-SETTING RESISTORS

**Jeffrey W. Scott, Temple, and Thayamkulangara R. Viswanathan, Wyomissing, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Oct. 4, 1989, Ser. No. 416,888**

**Int. Cl.$^5$ H03M *1/06***

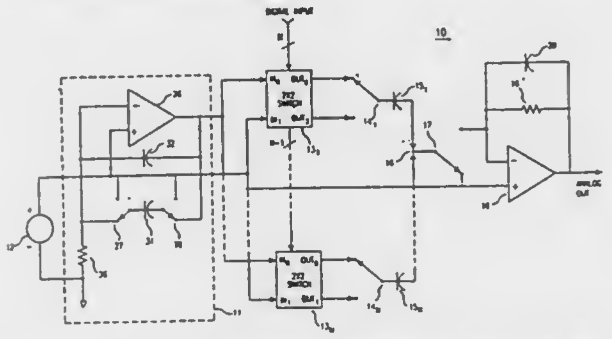
**U.S. Cl. 341—118** **9 Claims**

8. A method of compensating for variations in circuit characteristics of switched capacitor circuit formed in an integrated circuit, the circuit having:

at least one signal carrying operational amplifier having a first resistor in the feedback path thereof and an input;

a first voltage reference; and,

at least one signal capacitor, one end thereof selectively coupling between a second voltage reference and the input of the signal carrying operational amplifier, the other end thereof selectively coupling between the second voltage reference and the first voltage reference; characterized by the step of:



varying the voltage of the first voltage reference in response to the second voltage reference, a second resistor, and the equivalent resistance of a compensation capacitor to compensate for variations in the capacitance of the signal capacitor;

wherein the voltage of the second voltage reference is substantially constant.

---

### 5,016,013

**Patent Not Issued For This Number**

---

### 5,016,014

## HIGH ACCURACY ANALOG-TO-DIGITAL CONVERTER WITH RAIL-TO-RAIL REFERENCE AND INPUT VOLTAGE RANGES

**Ricky F. Bitting, Fort Collins, Colo., assignor to NCR Corporation, Dayton, Ohio**

**Filed Jun. 14, 1990, Ser. No. 538,354**

**Int. Cl.$^5$ H03M *1/46, 1/68***

**U.S. Cl. 341—162** **14 Claims**

1. An analog-to-digital converter for converting an unknown analog voltage to a binary signal, said unknown analog voltage being within a voltage range defined by a first and second reference voltage, said analog-to-digital converted comprising:

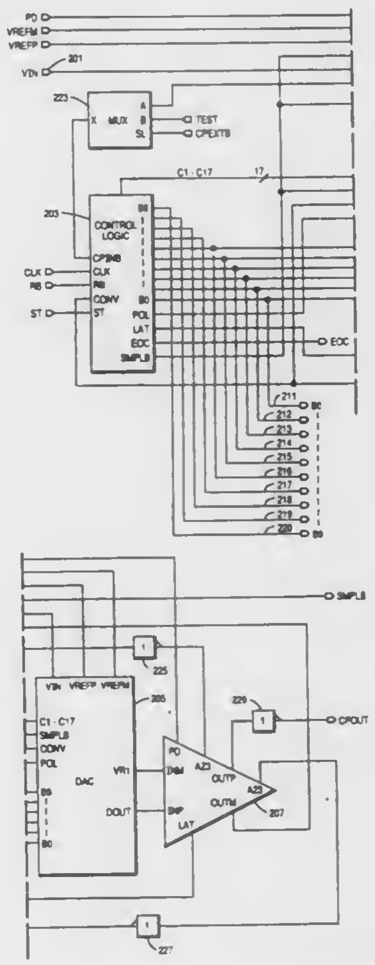
means for generating a known analog voltage;

means for generating a third reference voltage equal to one-half the sum of said first and second reference voltages;

means connected to receive said unknown analog voltage and said third reference voltage for subtracting said unknown analog voltage from said third reference voltage and generating an output corresponding thereto;

means connected to receive said known analog voltage and the output of said subtracting means for summing said known analog voltage with the output of said subtracting means and generating an output corresponding thereto; and

means connected to receive the output of said summing means and said third reference voltage for comparing the output of said summing means with said third reference voltage.



---

### 5,016,015

## AIRCRAFT CONSTRUCTION

**Philip F. Novak; Robert D. Shannon, both of Wichita, Kans.; Robert L. Pinckney, Cheyney, Pa., and James R. Humphreys, Jr., Wichita, Kans., assignors to The Boeing Company, Seattle, Wash.**

**Division of Ser. No. 295,644, Jul. 17, 1963, Pat. No. 4,924,228. This application Oct. 13, 1989, Ser. No. 421,490**

**Int. Cl.$^5$ H01Q *17/00***

**U.S. Cl. 342—2** **1 Claim**

1. An airfoil edge structure for minimizing reflection of microwave energy back to its source comprising,

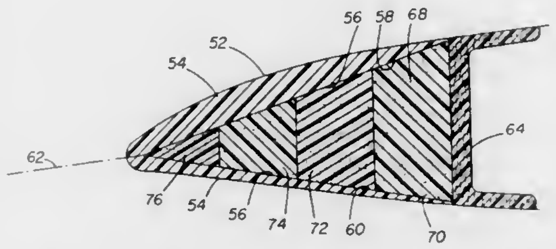
a layer of unfilled structural foam plastic defining outer and inner portions, and outer portion being generally oriented in the forward direction and defining the aerodynamic surface shape of the airfoil edge, said inner portion defining first and second interior planar surfaces, said first and second interior planar surfaces intersecting along a line laterally coextensive with and spaced aft from the forwardmost part of said outer portion and defining a sharp Vee having its vertex at said line of intersection and diverging in the aft direction,

a filter covering said first and second interior planar surfaces for reflecting microwave energy having a frequency of above about two thousand megacycles.

a thin plastic skin having non-metallic fiber reinforcement

VOL
1126
ISS
2
MY
14
1991
UMI

covering said aerodynamic surface shape of said outer portion of said layer of unfilled structural foam plastic,
a spar formed of plastic reinforced by non-metallic fibers and supporting said layer of unfilled structural foam plastic, and
a plurality of layers of foam plastic disposed between said first and second interior planar surfaces and said spar, said layers of foam plastic being filled with microwave absorbing material so that said plurality of layers have a resistivity of between one hundred and ten thousand microohms per centimeter, and said layers being graded according to the dielectric constants thereof outwardly from said spar in such a manner that the higher the dielectric constant of each of said layers the nearer said layer is to said spar.

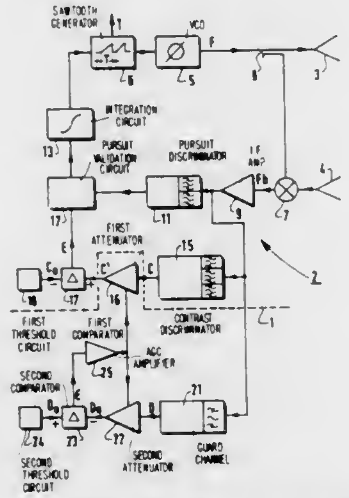


---

## 5,016,016

## VOLUME-SCATTERED ECHO DISCRIMINATION DEVICE FOR FM/CW RANGE MEASURING RADAR AND USE IN A RADIO ALTIMETER

**Raymond Strauch, Viroflay, France, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Apr. 13, 1990, Ser. No. 509,260**
**Claims priority, application France, Apr. 21, 1989, 89 05336**
**Int. Cl.$^5$ G01S *13/34***
**U.S. Cl. 342—87** **5 Claims**



1. A linearly frequency modulated continuous wave radar for measuring the range to a first object, said radar comprising:
- a. transmitting means for transmitting to the first object a wave having a frequency which periodically varies linearly;
- b. receiving means for receiving an echo of the transmitted wave from the first object;
- c. beat signal means coupled to the transmitting means and to the receiving means for producing from the transmitted wave and the echo wave a beat signal having a frequency fb;
- d. first discrimination means coupled to the beat signal means for producing a signal representing the comparability of the frequency fb with a reference frequency $f_o$;
- e. second discrimination means coupled to the beat signal means for producing a signal representing the comparability of an electrical characteristic of the beat signal with an electrical characteristic representative of the first object; and
- f. validation means coupled to the transmitting means and to the first and second discrimination means for controlling the frequency of the transmitted wave to maintain fb at $f_o$;

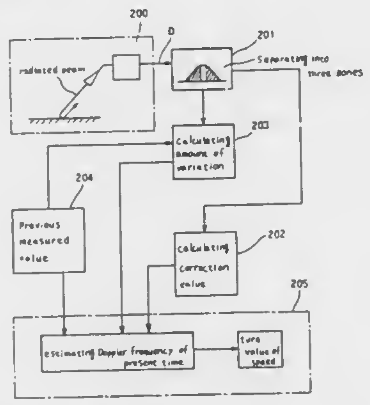
characterized in that said second discrimination means comprises:
- (1) contrast discrimination means for detecting in the beat signal a first frequency spectrum representative of an echo from the first object and for producing a first signal representative of the energy of said detected spectrum;
- (2) volume scattered echo discrimination means for detecting in the beat signal an upper portion of a second frequency spectrum representative of an echo from a second object, said second spectrum resembling the first spectrum in the frequency range detected by the contrast discrimination means but being a substantially different in said upper portion, said volume scattered echo discrimination means including magnitude adjusting means coupled to the contrast discrimination means for attenuating the magnitude of the first signal upon detection of said upper portion of the second frequency spectrum.

---

## 5,016,017

## DOPPLER RADAR SPEED DETECTING METHOD AND APPARATUS THEREFOR

**Masao Kodera, Okazaki; Kunihiko Sasaki; Seishio Mikami, both of Aichi, and Jyunshi Utsu, Nishio, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**
**Filed Dec. 8, 1989, Ser. No. 447,905**
**Claims priority, application Japan, Dec. 27, 1988, 63-331138**
**Int. Cl.$^5$ G01S *13/60***
**U.S. Cl. 342—106** **22 Claims**


200
D
201
Separating into three zones
radiated beam
203
calculating amount of variation
204
Previous measured value
202
calculating correction value
205
estimating Doppler frequency of present time
ture value of speed

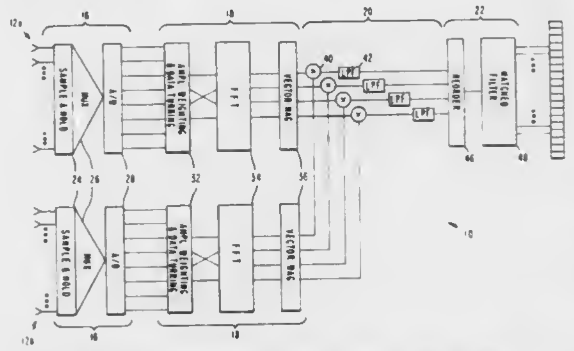
1. A Doppler radar speed detecting method for detecting a speed of a moving object based on the Doppler effect, comprising the steps of:
- obtaining a plurality of measured data including information of a Doppler frequency indicative of a speed of said moving object from a reflected wave which is transmitted from said moving object and is reflected;
- sorting said measured data obtained within a sampling time into a first group which are within a first frequency region which is higher than a previously obtained Doppler frequency value, and a second group which are within a second frequency region which is lower than said previously obtained Doppler frequency value;
- counting numbers of said measured data that are in said first and second groups respectively;
- calculating a correction value indicative of an amount that said moving object is accelerating or decelerating based on said number of said measured data in said first and second groups;
- calculating a present Doppler frequency value based on said previously obtained Doppler frequency value and said correction value; and
- calculating a speed of said moving object based on said present Doppler frequency value.

---

## 5,016,018

## APERTURE SYNTHESIZED RADIOMETER USING DIGITAL BEAMFORMING TECHNIQUES

**Donald C. D. Chang, Thousand Oaks, and Edwin A. Kelley, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**
**Filed Mar. 22, 1989, Ser. No. 326,935**
**Int. Cl.$^5$ G01S *7/00***
**U.S. Cl. 342—351** **27 Claims**



1. An aperture synthesized radiometer comprising:
- two substantially parallel linear antenna arrays adapted to receive radiation emitted or reflected from a scene and adapted to generate two sets of substantially parallel fanbeams;
- analog to digital conversion means coupled to the two antenna arrays for converting received radiation into corresponding digitized radiation signals; and
- digital beamforming means substantially colocated with the antenna arrays and the analog to digital conversion means for processing and synthesizing the digitized radiation signals to provide an image corresponding to the scene, said digital beamforming means comprising means for digitally forming a plurality of cross track fanbeams and means for cross-correlating the plurality of digitally formed cross track fanbeams to produce an image of the scene.

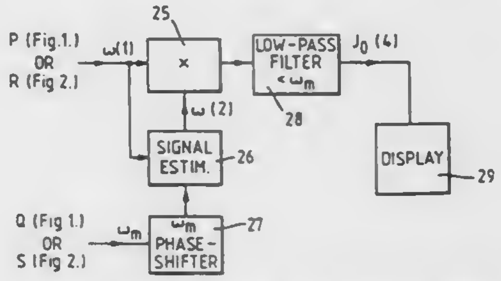
---

## 5,016,019

## METHOD AND APPARATUS FOR PROCESSING SYNTHETIC APERTURE AERIAL SIGNALS

**Henry W. Hawkes, Wynchcombe, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, United Kingdom**
**PCT No. PCT/GB88/00407, § 371 Date Jan. 4, 1990, § 102(e) Date Jan. 4, 1990, PCT Pub. No. WO88/09938, PCT Pub. Date Dec. 15, 1988**
**PCT Filed May 24, 1988, Ser. No. 457,704**
**Claims priority, application United Kiogdom, Jun. 5, 1987, 8713212; Aug. 21, 1987, 8719853**
**Int. Cl.$^5$ G01S *1/44***
**U.S. Cl. 342—400** **40 Claims**

1. A method of processing signals received from one of a synthetic-aperture aerial from an external radiator and a synthetic-aperture aerial at an external position, which is phase-modulated at the scanning frequency of said aerial, comprising:
- generating a signal of the same carrier frequency as the received signal and phase-modulated at the scanning frequency;
- multiplying the generated signal by the received signal to derive an output which includes a selectable Bessel Function representing a directional polar diagram;



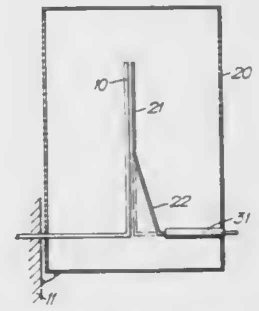
- and controlling one of the phase and amplitude, based upon the aerial configuration, of the scanning frequency, as applied to produce said phase-modulation of the generated signal, in order to maximise or minimise, as appropriate, a selected Bessel Function and thereby control the bearing direction of said polar diagram relative to the aerial.

---

## 5,016,020

## TRANSCEIVER TESTING APPARATUS

**Iain F. Simpson, Fife, United Kingdom, assignor to The Marconi Company Limited, England**
**Filed Apr. 19, 1989, Ser. No. 340,436**
**Claims priority, application United Kingdom, Apr. 25, 1988, 8809688**
**Int. Cl.$^5$ G01R *27/00***
**U.S. Cl. 343—703** **7 Claims**



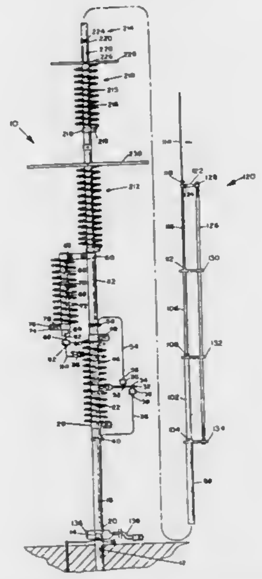
1. Apparatus for testing a radio transceiver installation having an installation antenna that normally resonates at a resonant frequency, the apparatus comprising:
- (a) a grounded hood mounted on the installation and surrounding the installation antenna in a test mode, said hood being dimensioned to be non-resonant at the resonant frequency of the installation antenna, thereby lowering the resonant frequency of the installation antenna when the hood alone surrounds the installation antenna;
- (b) a hood antenna that normally resonates at a higher resonant frequency greater than said resonant frequency of the installation antenna, said hood antenna being mounted within the hood and being coupled to the installation antenna in the test mode to form an over-coupled band-pass filter having lower and higher frequency poles; and
- (c) means to adjust the higher frequency pole of the filter to be substantially coincident with said resonant frequency of the installation antenna in the test mode by varying said higher resonant frequency of the hood antenna.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,016,021
## 12 AND 17 METER ADAPTER ASSEMBLIES

**Donald R. Newcomb, Lockhart, Tex., assignor to Butternut Electronics Company, Lockhart, Tex.**

**Filed Jan. 16, 1990, Ser. No. 465,446**
**Int. Cl.$^5$ H01Q** *9/14, 9/18*
**U.S. Cl. 343—722** **2 Claims**



1. In combination, a vertical antenna and at least one adapter assembly comprising:

a. vertical antenna resonating on six predetermined segments of the high frequency spectrum comprising first inductor-capacitor means vertically supported and comprising an eighty/seventy-five meter section including an eighty/-seventy-five meter inductor and capacitor connected in parallel across the top of said section, said inductor adjusting the center frequency of operation, second inductor-capacitor means vertically connected to said first inductor-capacitor means and comprising a forty-meter section including a forty-meter inductor and capacitor connected in parallel across the top of said section, said inductor adjusting the center frequency of operation, and said inductors and capacitors connecting at a common point on an insulator between said sections, vertical radiating means connected to said second inductor-capacitor means by an insulator post, said vertical radiating means comprising first, second, third, fourth, fifth and sixth vertical radiating sectional elements secured to each of the other respective elements, third inductor-capacitor means vertically supported and comprising a thirty-meter inductor and capacitor connected in series between said forty-meter inductor and said vertical radiating element, stub means connected to a top portion of said vertical radiating means, spaced a fraction of a wavelength therefrom and extending parallel downwardly therefrom, said stub means substantially one-quarter wavelength of fifteen meters, an impedance matching coil connected across said first inductor-capacitor means and ground, a coaxial cable transmission line impedance matching section connected across said impedance matching coil, and said vertical antenna having a height in the range of twenty-five to twenty-six feet whereby a coaxial cable transmission line connected to said first inductor-capacitor means and ground, and the entire vertical radiating length of said vertical antenna is active on five of said six high-frequency spectrum segments and said stub means decouples said vertical radiating means above said stub means thereby yielding a quarter wave vertical radiating means on the frequency corresponding to the length of said stub means; and,

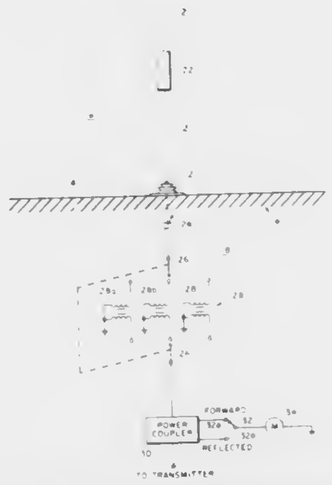
b. antenna adapter for adding onto said vertical antenna for operation on a predetermined frequency comprising an air wound coil of a plurality of turns for surrounding an element of said antenna, a clamp at one end for clamping onto said antenna including a nut and bolt assembly, an insulator at another end of the air wound coil secured thereto with a nut and bolt assembly, a clamp at the other end of the insulator for securing to said antenna, and at least one metal capacitor strip extending at a substantially right angle to said air wound coil secured to the junction of said insulator and said end of said air wound coil with a nut and bolt assembly.

---

### 5,016,022
## MONOPOLE INDUCTIVELY LOADED ANTENNA TUNING SYSTEM

**Joseph F. Kershaw, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 14, 1981, Ser. No. 301,909**
**Int. Cl.$^5$ H01Q** *9/00*
**U.S. Cl. 343—750** **9 Claims**



3. A monopole inductively loaded antenna system comprising:

an inductively loaded monopole antenna element;

a ground plane, there being an area above said ground plane and an area below said ground plane;

a base insulator for supporting said monopole antenna element affixed to said ground plane, said antenna element being coupled to said base insulator in said area above said ground plane;

a loading inductance connected in said antenna element; and

means connected to said antenna element and positioned in said area below said ground a plane for varying the resonant frequency of said inductively loaded monopole, antenna said varying means comprising a variable tuning capacitor.

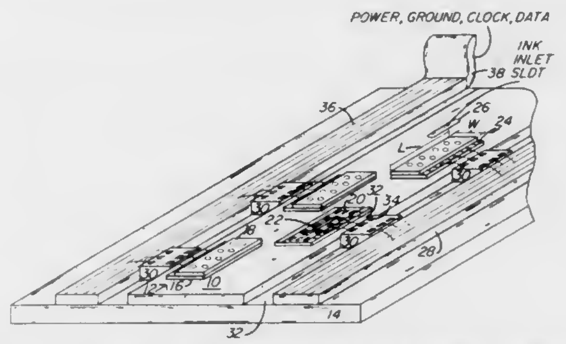
---

### 5,016,023
## LARGE EXPANDABLE ARRAY THERMAL INK JET PEN AND METHOD OF MANUFACTURING SAME

**C. S. Chan; Conrad L. Wright, and Gary E. Hanson, all of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 6, 1989, Ser. No. 417,936**
**Int. Cl.$^5$ B41J** *2/05*
**U.S. Cl. 346—1.1** **17 Claims**

5. A hybrid expandable ink jet printhead array comprising a common insulating substrate having a plurality of ink feed ports therein and a plurality of discrete ink jet printheads therein aligned on said substrate and being fluidically connected, respectively, to said ink feed ports for receiving ink therefrom during an ink jet printing operation, each printhead including a supporting thin film substrate and an overlying orifice plate, and ink propulsion transducers on said thin film substrate for propelling ink through an opening or openings in said orifice plate, said printheads being individually mounted on said common insulating substrate, and each of said printheads being laterally offset with respect to each adjacent printhead by at least a distance equal to or greater than a width dimension of each printhead.

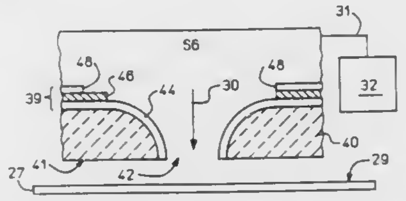


---

### 5,016,024
## INTEGRAL INK JET PRINT HEAD

**Si-Ty Lam, San Jose, and William J. Lloyd, Belmont, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jan. 9, 1990, Ser. No. 462,670**
**Int. Cl.$^5$ B41J** *2/05, 2/16*
**U.S. Cl. 346—1.1** **37 Claims**



1. A method of forming an integral ink jet print head, the method comprising the steps of:

(a) forming an orifice plate defining through itself at least one orifice;

(b) forming an insulative layer over at least a portion of the plate and over a surface area thereof defining said orifice;

(c) forming a resistive layer over a portion of the insulative layer;

(d) forming an electric current conductive layer over a portion of the resistive layer and coextensive therewith over a portion of said orifice plate, whereby all of said insulative, resistive and conductive layers terminate at an ink ejection surface of said orifice plate;

(e) forming a pattern in said conductive layer which defines one or more dimensions of a heater resistor area within said resistive layer; and

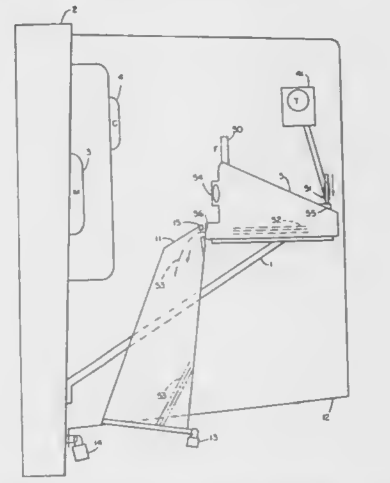
(f) forming at least one ink distribution channel adjacent said heater resistor area whereby one or more of said insulative, resistive or conductive layers may be left in place on the surface of said orifice plate or etch-removed therefrom.

---

### 5,016,025
## AUTOMATIC SECURED DOCUMENT METER READING APPARATUS

**John R. Wyss, 4020 148th Ave., NW., Suite F, Redmond, Wash. 98052**

**Filed May 25, 1990, Ser. No. 533,104**
**Int. Cl.$^5$ G01D** *9/42;* **G03B** *29/00, 17/50*
**U.S. Cl. 346—14 MR** **5 Claims**



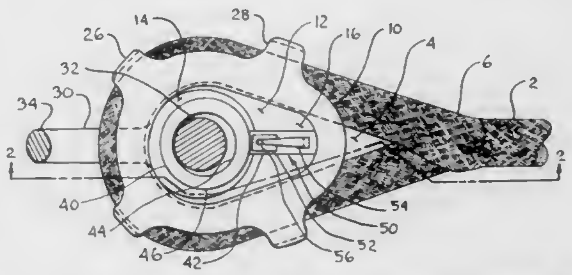
1. Meter reading and documenting apparatus comprising a rigid framework which is the mounting adaptor which connects to the meter base, a meter base, a meter to be read, an instant-picture camera with built-in picture ejection means, activation means of the camera, a timer in communication with activation means of the camera, a security compartment, and instant-picture photographic film which is to be exposed at whatever interval readings are desired, such that said timer triggers, at said given interval, said activation means and upon said triggering unexposed instant-picture film is exposed to the face of the meter such that a successful photographic representation of the meter reading is made within the camera upon the film and thenceforth production of a photographic document is automatically completed by the built-in actions of the instant-picture camera, which also automatically ejects the recently exposed document into the security compartment where the photographic documentation of the reading is then safely stored until its eventual disposition by one authorized to access the secured compartment.

---

### 5,016,026
## LOAD RECORDING ROPE THIMBLE

**John F. Flory, 4 Tower La., Morristown, N.J. 07960**

**Filed Apr. 28, 1989, Ser. No. 344,997**
**Int. Cl.$^5$ G01D** *9/00;* **G01G** *19/14*
**U.S. Cl. 346—33 R** **20 Claims**



5. An improved thimble adapted to be disposed within an eye at the end of a flexible tension member, said thimble comprising:

an annular body member, an outer peripheral wall on said body member for engaging said eye of said tension mem-

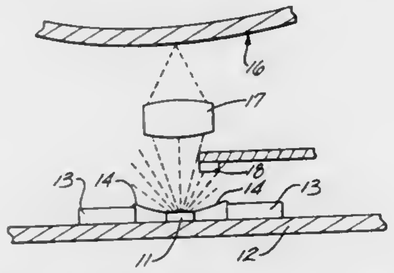
VOL
1126
ISS
2
MY
14
1991
UMI

ber, an inner peripheral wall on said body member defining an aperture for receiving a load transferring element,
a slot in said body member spaced from that portion of said outer peripheral wall which engages said eye, and
means operably attached to said body member for recording differential motion between opposite sides of said body member.

---

### 5,016,027
### LIGHT OUTPUT POWER MONITOR FOR AN LED PRINTHEAD

**John J. Uebbing, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**
**Filed Dec. 4, 1989, Ser. No. 445,404**
**Int. Cl.⁵ H04N** *1/21*
**U.S. Cl. 346—107 R** **20 Claims**



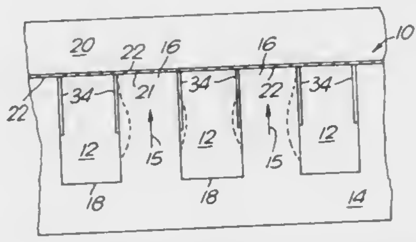
1. A light output power monitor for an LED printhead which has an array of individually time modulated LEDs for exposing a photoreactive surface through a lens array, comprising:
- detector means for detecting light output power of each LED in the LED array;
- calibration means for storing calibration ratios corresponding to the loss of light output power through the lens array for each LED;
- means for selectively supplying current to each LED;
- exposure control means for individually regulating the activation and deactivation times of each current supply means in response to modified exposure data; and
- correction means coupled to the exposure control means for acquiring raw exposure data, light output values from the detection means and calibration ratios from the calibration memory means and individually defining modified exposure data for each LED controlled by the exposure control means based on the detected light output values, the raw exposure data and the stored calibration ratios.

---

### 5,016,028
### HIGH DENSITY MULTI-CHANNEL ARRAY, ELECTRICALLY PULSED DROPLET DEPOSITION APPARATUS

**Stephen Temple, Cambridge, England, assignor to AM International, Inc., Chicago, Ill.**
**Filed Oct. 13, 1989, Ser. No. 421,426**
**Claims priority, application United Kingdom, Oct. 13, 1988, 8824014**
**Int. Cl.⁵ B41J** *2/045*
**U.S. Cl. 346—140 R** **15 Claims**

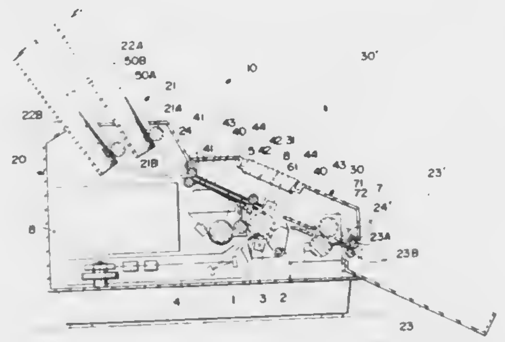
1. A high density multi-channel array electrically pulsed droplet deposition apparatus, comprising a sheet of piezoelectric material poled in a direction normal to said sheet and formed with a plurality of parallel channels mutually spaced in an array direction normal to the length of said channels, each channel being defined by facing side walls and a bottom surface extending between the respective side walls, each of at least some of said side walls including electrodes on opposite sides thereof to form shear mode actuators for effecting droplet expulsion from the channels associated with the actuators, each electrode extending substantially along the length of the corresponding side wall and over an area so spaced from the bottom surface of the channel in which the electrode is disposed as to leave the portion of said sheet adjacent said bottom surface substantially free from piezo-electric distortion when an electric field is applied across the electrodes of the associated wall.



---

### 5,016,029
### PRINTER

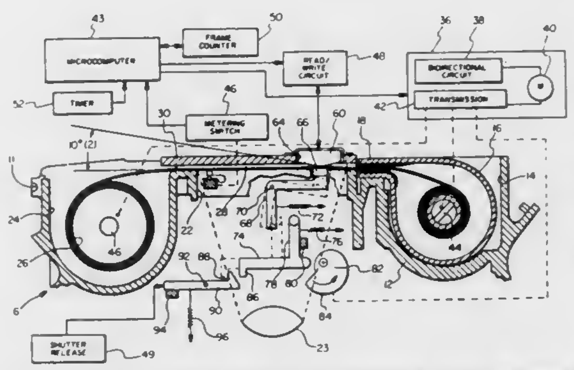
**Seiichi Mori, Fujisawa; Masatoshi Takano, Tokyo, and Kazuhiro Ichinokawa, Kawagoe, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Oct. 13, 1989, Ser. No. 421,060**
**Claims priority, application Japan, Oct. 17, 1988, 63-135252[U]**
**Int. Cl.⁵ G01D** *15/14;* **G03G** *21/00*
**U.S. Cl. 346—160** **10 Claims**



1. A printer wherein an image is printed on a cutsheet type recording medium, which comprises:
- feed means for feeding said recording medium one by one along a predetermined feed path;
- image forming means disposed under said feed path for forming an image onto the undersurface of said recording medium fed by said feed means; and
- discharge means for discharging and stacking said recording medium with the image carrying surface down;
- wherein said feed means is arranged at the upper portion of one side of said printer while said discharge means is arranged at the lower portion of the other side of said printer;
- wherein said feed path linearly extends from said feed means to said discharge means with an inclination at a predetermined angle;
- wherein said printer comprises a body and a clamshell rockably mounted on said body; and
- wherein the upper surface of said body and the lower surface of said clamshell define said feed path therebetween.

### 5,016,030
### APPARATUS FOR MAGNETICALLY READING AND RECORDING ON FILM

**Patricia A. Dwyer, Rochester, and Jeffrey R. Stoneham, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Continuation-in-part of Ser. No. 417,347, Oct. 5, 1989, abandoned. This application Jul. 3, 1990, Ser. No. 549,257**
**Int. Cl.⁵ B03B** *7/00*
**U.S. Cl. 354—21** **12 Claims**

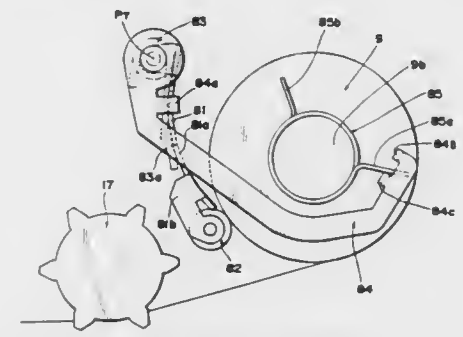


1. In a photographic apparatus including a body having an exposure opening, a magnetic read/write head, and means for transporting a photographic film over the exposure opening to expose frames of a film, the film having a magnetic surface for magnetically reading and recording information on the film, said camera apparatus comprising:
- means for supporting the magnetic read/write head in the apparatus; and
- means for causing the head to assume one angular position relative to the film during movement of the film during movement of the film in one direction and a second angular position relative to the film in an opposite direction.

---

### 5,016,031
### FILM WINDING/REWINDING APPARATUS

**Takahisa Shimada, and Junichi Tanii, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Apr. 3, 1989, Ser. No. 332,495**
**Claims priority, application Japan, Apr. 4, 1988, 63-83924; Apr. 4, 1988, 63-83925; Apr. 4, 1988, 63-83926; Apr. 5, 1988, 63-86174; Apr. 5, 1988, 63-86175**
**Int. Cl.⁵ G03B** *1/18*
**U.S. Cl. 354—173.1** **2 Claims**

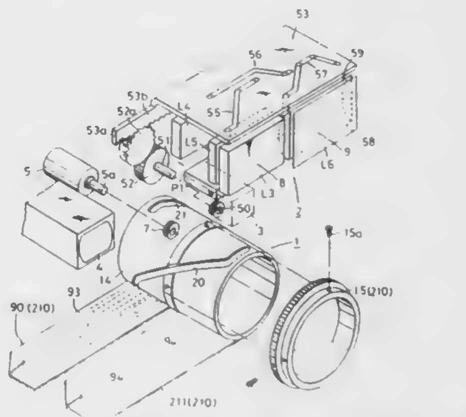


1. A film rewinding apparatus comprising:
- a motor;
- a spool connected to said motor and winding a film;
- a film rewinding mechanism removably connected to a patrone and connected to said motor and adapted for rewinding the film into said patrone;
- a clutch member coupled with a connecting portion of said spool and for sliding relative to said spool after rotating by a predetermined angle together with said spool both in normal and reverse directions; and
- a film pressing member to be pressed against a peripheral face of said spool by an urging member during a film winding operation and moved to be distant from a peripheral face of said spool against the force of the urging member when said clutch member rotates by more than a predetermined angle during a film rewinding operation.

---

### 5,016,032
### LENS SHUTTER CAMERA INCLUDING ZOOM LENS

**Keisuke Haraguchi; Shinsuke Kohmoto, and Shigeru Kondoh, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Division of Ser. No. 144,030, Jan. 7, 1988, Pat. No. 4,944,030. This application Feb. 14, 1990, Ser. No. 480,215**
**Claims priority, application Japan, May 12, 1986, 61-108278; May 12, 1986, 61-108279; May 28, 1986, 61-80861; Jun. 2, 1986, 61-83932; Jun. 2, 1986, 61-127496; Jun. 21, 1986, 61-145470; Jun. 26, 1986, 61-150995; Aug. 15, 1986, 61-125045; Aug. 22, 1986, 61-196911; Aug. 29, 1986, 61-132658; Aug. 29, 1986, 61-132659; Aug. 29, 1986, 61-132660; Aug. 29, 1986, 61-132661; May 28, 1987, 62-80862**
**Int. Cl.⁵ G03B** *5/00, 17/02*
**U.S. Cl. 354—195.1** **20 Claims**



1. A light blocking mechanism used in a lens shutter camera including a rotatable cam ring with at least one camming groove therein, said mechanism comprising at least one light intercepting member positioned about the periphery of said cam ring, said member thereby comprising means for covering each said camming groove and for preventing light from entering the interior of said cam ring.

---

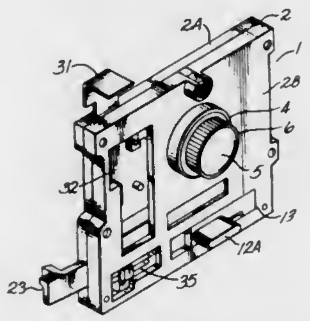
### 5,016,033
### SHUTTER MECHANISM FOR A CAMERA

**Yet Chan, Kowloon, Hong Kong, assignor to Achiever Industries Ltd., Kowloon, Hong Kong**
**Filed Oct. 3, 1989, Ser. No. 416,495**
**Claims priority, application United Kingdom, Oct. 4, 1988, 8823260; Apr. 14, 1989, 8908512**
**Int. Cl.⁵ G03B** *9/06*
**U.S. Cl. 354—251** **12 Claims**

1. A shutter mechanism for a camera, which mechanism comprises a shutter housing having an aperture; a shutter plate mounted for movement between a first position in which it closes the aperture and a second position in which it opens the aperture and spring-biassed into the closed position; shutter-plate operating means arranged for sliding and pivotal movement with respect to the housing and spring-biassed out of a cocked position, said operating means and said shutter plate each being provided with interengageable cam surfaces, such that upon sliding movement of the operating means into a cocked position the cam surface of the operating means will co-operate with the cam surface of the shutter plate to cause a

VOL
1126
ISS
2
MY
14
1991
UMI

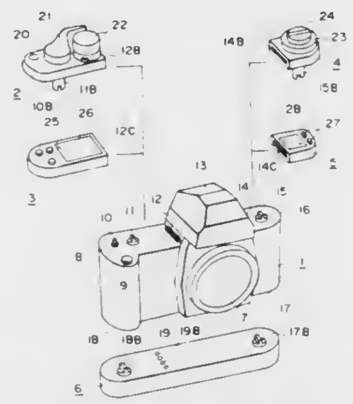
pivoting movement of the operating means to allow the operating means to pass beyond the cam surface of the shutter plate, and such that upon release of the operating means from its cocked position, interengagement of the respective cam surfaces will cause the shutter plate momentarily to open the aperture; and trigger means being provided to retain said operating means in its cocked position and to release it from its cocked position.



---

### 5,016,034
### CAMERA SYSTEM

**Tetsuro Goto, Funabashi, Japan, assignor to Nikon Corporation, Tokyo, Japan**
**Filed Sep. 10, 1990, Ser. No. 580,179**
**Claims priority, application Japan, Sep. 13, 1989, 1-235520**
**Int. Cl.$^5$ G03B** *17/02*
**U.S. Cl. 354—288** **13 Claims**

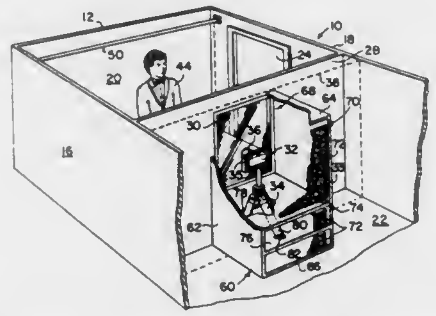


1. A camera system, comprising:
a mechanical operation unit having an operation member capable of being continuously shifted by an outside operation and first unit-side connecting means for outputting information relative to picture factors corresponding to the position of said operation member;
a switch operation unit having a setting member for allowing an outside switching operation and second unit-side connecting means for outputting information relative to picture factors corresponding to the operation of said setting member; and
a camera body to which either said mechanical operation unit or said switch operation unit is selectively attachable, said camera body having electrical connecting means for transmitting information connectable to both of said unit-side connecting means of said mechanical operation unit and said switch operation unit and exposure control means to which the information relative to picture factors is input from said mechanical operation unit or said switch operation unit being attached.

---

### 5,016,035
### ENCLOSED SELF-PORTRAIT PHOTOGRAPHIC STUDIO WITH CAMERA LOCATED BEHIND ONE-WAY MIRROR

**Robert E. Myles, Jr., 55 Bartlett St., Malden, Mass. 02148**
**Filed Aug. 28, 1989, Ser. No. 397,915**
**Int. Cl.$^5$ G03B** *15/06*
**U.S. Cl. 354—290** **8 Claims**



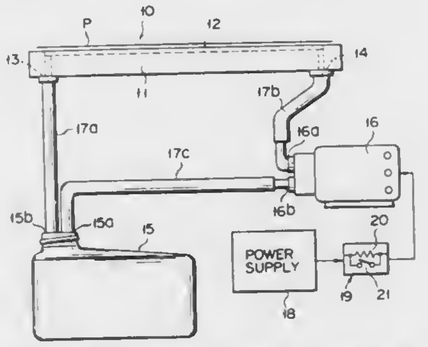
1. An automatic photographic studio for producing negatives and portrait quality prints, comprising:
a studio area;
a camera room;
an opaque partition disposed between said studio area and said camera room, said partition including a one-way mirror receiving orifice;
a one-way mirror having opposite reflecting and viewing surfaces mounted in said one-way mirror receiving orifice, said reflecting surface facing said studio area and said viewing surface facing said camera room;
a camera having a lens disposed in said camera room, said lens directed towards said viewing surface;
camera rotating means connected to said camera for rotating said camera through 90 degrees about the longitudinal axis of said camera lens;
flash lighting means mounted on said partition in said studio area nd connected to said camera, and;
activating means disposed in said studio area and connected to said camera to simultaneously activate said camera to make an exposure of a portion of said studio area through said one-way mirror and to cause said flash lighting means to illuminate said studio area during said exposure.

---

### 5,016,036
### DEVICE FOR DEVELOPING RECORDING MEDIA WITH LIQUID DEVELOPER

**Masaji Nishikawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**
**Filed Jun. 15, 1990, Ser. No. 538,929**
**Claims priority, application Japan, Jun. 21, 1989, 1-158799; Jun. 21, 1989, 1-158800; May 8, 1990, 2-118211**
**Int. Cl.$^5$ G03D** *5/06, 5/00*
**U.S. Cl. 354—318** **8 Claims**

1. A developing device of the liquid developer type comprising:
a developing head including a rod-like body, at least one liquid developer flowing passage which is formed within the rod-like body for allowing a liquid developer to flow therethrough and which has a slit-shaped opening formed in the top of a rod-like body so as to cause the liquid developer to act on a latent image formed on a recording medium, and an inlet and an outlet provided in the lower portion of the rod-like body to communicate with both ends of the liquid developer flowing passage so as to allow the liquid developer to be introduced into the passage through the inlet and discharged out of the passage through the outlet;
a tank for storing the liquid developer, which has an inlet and an outlet connected to the inlet of the passage;
a suction pump provided with a suction inlet connected to the outlet of the passage and a discharge outlet connected to the inlet of the tank; and
a means for adjusting and controlling the pumping capacity of the suction pump, responsive to a control command which represents a predetermined sequence and/or a state of the liquid developer circulated;
the passage, the tank and the suction pipe forming a liquid developer circulating line;

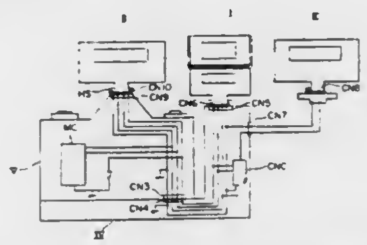


wherein when the suction pump is operated with a controlled pumping capacity while permitting the slit-shaped opening of the passage in the developing head to be covered by the recording medium, a predetermined negative pressure is created in the liquid developer circulating line, the liquid developer in the tank is introduced into the liquid developer circulating line by the action of the negative pressure to develop the latent image on the recording medium and then returned into the tank after this image development is finished.

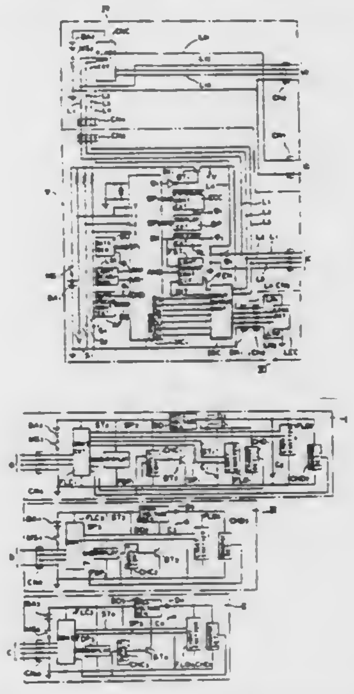
---

### 5,016,037
### FLASH PHOTOGRAPHING SYSTEM

**Nobuyuki Taniguchi, Tondabayashi; Hiroshi Hosomizu, Nara; Kenji Tsuji, Kashiwara; Takanobu Omaki, Sennan, and Masaaki Nakai, Nara, all of Japan, assignors to Minolta Camera Co., Ltd., Osaka, Japan**
**Division of Ser. No. 16,004, Feb. 18, 1987, which is a division of Ser. No. 819,015, Jan. 15, 1986, abandoned, which is a division of Ser. No. 614,031, May 25, 1984, Pat. No. 4,573,786. This application Nov. 1, 1988, Ser. No. 265,813**
**Int. Cl.$^5$ G03B** *15/05*
**U.S. Cl. 354—413** **4 Claims**



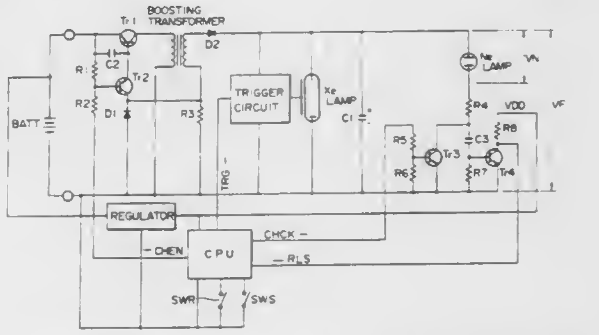
1. A state confirming device for detecting charge completion states of a plural number of flash light devices, each having a capacitor for storing a flash light energy, charge state detecting means for detecting a charge state of the capacitor to deliver a charge completion signal when the charge state is at a level higher than a certain determined value, and mount signal forming means for delivering a mount signal when the flash light is mounted, comprising:
(a) a detecting circuit for detecting the charge completion signal and the mount signal from each of the flash light devices to produce a signal indicating the charge completion states when all of the charge completion signals from the flash light devices delivering the mount signal have been detected.



---

### 5,016,038
### STROBE CONTROL APPARATUS

**Takeo Kobayashi, Tokyo; Takao Nishida, Urawa; Yasushi Tabata, Ichikawa; Norio Numako, Nogi, and Katsutoshi Nagai, Kawaguchi, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Mar. 15, 1990, Ser. No. 494,237**
**Int. Cl.$^5$ G03B** *7/16, 15/03, 00/00*
**U.S. Cl. 354—418** **16 Claims**



1. An apparatus for controlling a strobe which is used with a camera, said apparatus-comprising;
a charging means for charging the strobe:
voltage detecting means for detecting the charged voltage of the strobe:
charging time measuring means for measuring the time elapsed after charging starts;
charging time-limit selecting means for selecting one of a plurality of charging times according to the operating conditions of the camera;
charging voltage limit selecting means for selecting one of a plurality of charge limit voltages according to the operating conditions of the camera;

VOL
1126
ISS
2
MY
14
1991
UMI

charging means for stopping charging when the charged voltage does not reach the selected charge limit voltage after the selected charging time has elapsed;

charging prohibiting means for prohibiting charging if a predetermined charge prohibit time has not elapsed after charging is completed;

heat discriminating means for discriminating the heat condition of the strobe; and

prohibiting time changing means for changing said predetermined prohibit time according to the heat condition of the strobe as discriminated by said heat discriminating means.

---

### 5,016,039
### CAMERA SYSTEM

**Toshio Sosa, Narashino; Isao Uchida, Tokyo; Toru Fukuhara, Isehara; Tadao Takagi, Yokohama; Hiroyuki Iwasaki; Toshihiro Sato, both of Tokyo; Masaru Muramatsu, Yokohama; Kazuto Ohtsuka, Tokyo; Tadao Kai, Kawasaki; Shigeyuki Uchiyama, Tokyo, and Yoichi Koizumi, Kawasaki, all of Japan, assignors to Nikon Corporation, Tokyo, Japan**

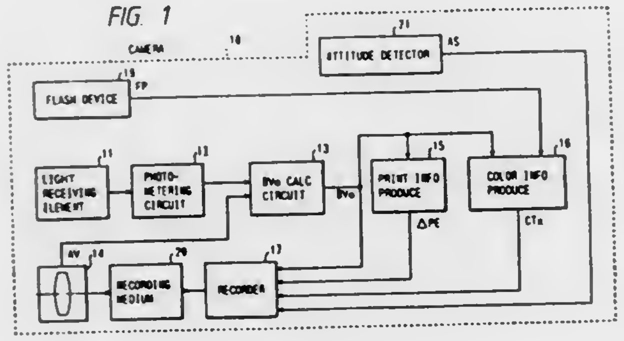
**Continuation of Ser. No. 345,573, May 1, 1989, abandoned. This application Aug. 13, 1990, Ser. No. 567,692**

**Claims priority, application Japan, May 7, 1988, 63-109886; May 7, 1988, 63-109887; May 7, 1988, 63-109888; May 20, 1988, 63-123701; May 24, 1988, 63-126799; May 26, 1988, 63-129030; May 31, 1988, 63-134105; Jul. 20, 1988, 63-180653; Aug. 23, 1988, 63-208847**

**Int. Cl.⁵ G03B** *7/08*

**U.S. Cl. 354—430** **40 Claims**

FIG. 1



1. A camera system comprising:

means for recording an image of a photographing field in a recording medium;

photometering means for forming brightness information concerning the brightness level of the photographing field;

means for discriminating states of said photographing field on the basis of said brightness level; and

means for forming, in accordance with said states of said photographing field, color information concerning the color of the light from a light source for illuminating said photographing field.

---

### 5,016,040
### METHOD AND APPARATUS FOR FORMING A RECORDING ON A RECORDING MEDIUM

**Eugene J. Dwyer, III, New York, N.Y., assignor to Silhouette Technology, Inc., Morristown, N.J.**

**Continuation-in-part of Ser. No. 54,294, May 26, 1987, Pat. No. 4,829,339, and a continuation-in-part of Ser. No. 347,247, May 4, 1989, Pat. No. 4,924,254. This application May 8, 1989, Ser. No. 348,551**

**Int. Cl.⁵ G03B** *27/72, 27/80*

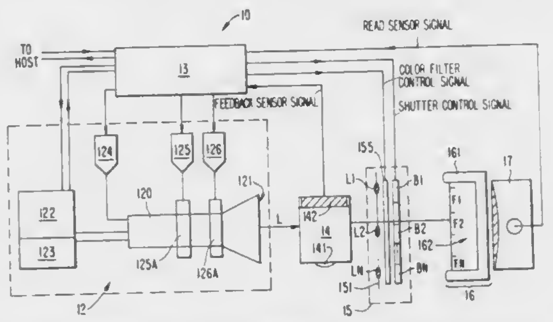
**U.S. Cl. 355—20** **43 Claims**

1. A method for forming a recording on a recording medium for reducing recording error occurring between adjacent sections of a recording medium on which information is recorded in pels with each section being comprised of a matrix of individually addressable pels comprising:

providing a recording medium;

dividing information to be recorded into a plurality of sections with at least one section being comprised of a matrix of addressable pels having a non-overlap region and at least one overlap region which is common to another section with each overlap region of a section forming a boundary with another section; and

recording a plurality of individual sections of a recording on the recording medium joined in the overlap regions by recording pels to form the recording while varying a characteristic of pels in at least one of the recorded sections in the overlap region to reduce the effect of recording errors on the recording and recording pels in the non-overlap region of the at least one section without varying the characteristic of the pels.



---

### 5,016,041
### IMAGE RECORDING APPARATUS HAVING SHEET NIP RELEASING MECHANISM AND SHUTTER MECHANISM

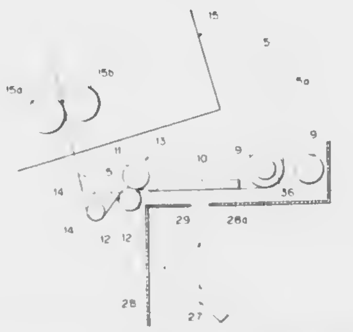
**Katsuyoshi Sonobe, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan**

**Filed Sep. 12, 1990, Ser. No. 581,057**

**Claims priority, application Japan, Oct. 31, 1989, 1-285308; Oct. 31, 1989, 1-285313**

**Int. Cl.⁵ G03B** *27/32, 27/52*

**U.S. Cl. 355—27** **8 Claims**



1. An image recording apparatus for forming a latent image on a rolled photosensitive sheet, the latent image corresponding to an image of an original, and for forming a visible image on a developer sheet, the visible image corresponding to the latent image, the apparatus comprising;

a cartridge shaft on which the rolled photosensitive sheet is provided;

an exposure portion on which the photosensitive sheet is positioned to form the latent image thereon, to thus provide an exposed zone, an unexposed zone being subsequent to the exposed zone;

a pressure developing unit positioned downstream of the exposure portion for superposing the exposed zone with the developer sheet and for pressing these sheet together for forming the visible image on the developer sheet;

a separation means positioned downstream of the pressure developing unit for separating the photosensitive sheet from the developer sheet;

a takeup means positioned downstream of the separation means for taking up the light exposed photosensitive sheet thereover, the photosensitive sheet being fed in one direction from the cartridge shaft to the takeup means;

feeding means positioned between the exposure portion and the pressure developing unit for nippingly feeding the photosensitive sheet toward the pressure developing unit at a constant speed in the one direction;

a sheet nip releasing mechanism connected to the feeding means for releasing the sheet nipping force of the feeding means when the unexposed zone of the photosensitive sheet is moved from the downstream portion of the exposure portion to the upstream portion thereof after the photosensitive sheet is separated from the developer sheet; and

a reversal feed driving means for moving the photosensitive sheet in a second direction opposite the one direction.

---

### 5,016,042
### APPARATUS FOR RECORDING COLOR IMAGE USING MASK MEMBERS

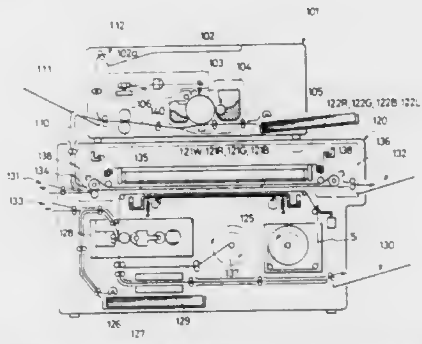
**Takemi Yamamoto, and Ichiro Sasaki, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Jan. 27, 1989, Ser. No. 302,608**

**Claims priority, application Japan, Jan. 29, 1988, 63-20987**

**Int. Cl.⁵ G03B** *27/52*

**U.S. Cl. 355—27** **4 Claims**



1. An image recording apparatus for recording an image of an original on a photosensitive recording medium using at least two intermediate sheets, said image of said original containing a first image and a second image, said first image being located in a first region of said original and said second image being located in a second region of said original, said apparatus comprising:

means for printing a first light shielding image and a second light shielding image simultaneously on at least one of said intermediate sheets, said first light shielding image being printed to have an outline profile corresponding to and larger than that of said first image and said second light shielding image being printed to at least partially cover said second image;

a light source unit for irradiating light through said intermediate sheets onto said photosensitive recording medium to form a latent image corresponding to said image of said original; and

a developing unit for developing said latent image and providing a visible image.

---

### 5,016,043
### EXPOSURE CONTROL PROCESS AND PHOTOGRAPHIC COLOR COPYING APPARATUS

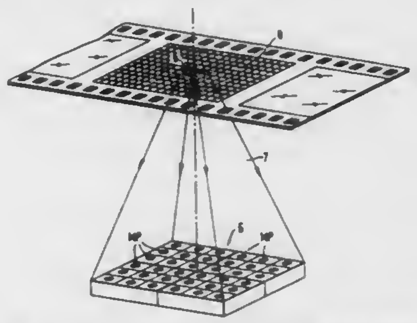
**Walter Kraft, Zürich, Switzerland, and Werner R. von Stein, Hamburg, Fed. Rep. of Germany, assignors to Gretag Systems, Bothell, Wash.**

**Filed Sep. 22, 1989, Ser. No. 411,120**

**Claims priority, application Switzerland, Sep. 23, 1988, 3541/88**

**Int. Cl.⁵ G03B** *27/80*

**U.S. Cl. 355—38** **20 Claims**



1. Process for the control of exposure in a photographic color copying apparatus comprising the steps of:

scanning a copy original in a plurality of scanning regions photoelectrically;

determining a measured triplet value for each scanning region from scan values obtained, corresponding to three color transparencies or color densities of the scanning region of the copy original

determining for each scanning region at least one detail contrast parameter representing a measure of the detail contrast within the scanning region;

and determining the necessary quantities of copying light from said triplet values and from taking said detail contrast parameters.

---

### 5,016,044
### PHOTOGRAPHIC PRINTER EMPLOYING A ROOF-SHAPED REFLECTOR

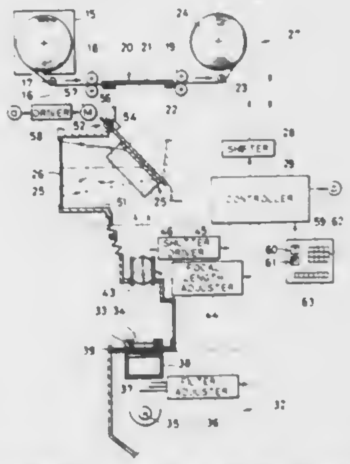
**Kanji Tokuda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Feb. 6, 1990, Ser. No. 475,531**

**Claims priority, application Japan, Feb. 6, 1989, 1-27287; Feb. 6, 1989, 1-27289**

**Int. Cl.⁵ G03B** *27/52, 27/70, 27/44*

**U.S. Cl. 355—43** **13 Claims**



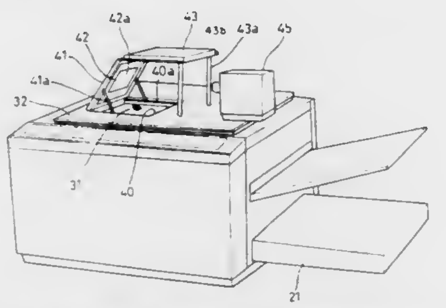
1. A photographic printer having an L-shaped printing optical path extending from a photographic film to a photosen-

VOL
1126
ISS
2
MY
14
1991
UMI

sitive material wherein an original image recorded in the photographic film is projected onto the photosensitive material via a printing lens, said photographic printer comprising:
at least one printing station for printing said original image onto said photosensitive material; and
roof type reflection means for reversing the right and left sides of an image, said roof type reflection means being disposed substantially at a 45 degree angle relative to the optical axis of said printing lens and causing an incident light thereto to reflect toward said photosensitive material, wherein said roof type reflection means comprises a prism which is a triangle pole having a right angled isosceles triangle section and having its opposing end surfaces cut off.

---

### 5,016,045
## IMAGE READING APPARATUS
**Yoshio Watanabe, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Oct. 30, 1989, Ser. No. 428,921**
**Claims priority, application Japan, Oct. 31, 1988, 63-275196**
**Int. Cl.$^5$ G03B** *27/52*
**U.S. Cl. 355—43** **7 Claims**

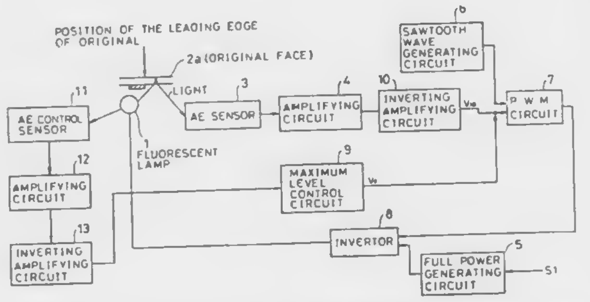


1. An image reading apparatus, comprising:
an original table provided with an image focusing plane for focusing thereon an image projected from a transparent original;
an original table cover means for shielding the original table, said original table cover means having an image projection window and a lid member having one end being engaged with said original table cover and being adapted to cover or expose the image projection window, said lid member having a reflector on the inner surface thereof for reflecting the projected image toward the image focusing plane on the original table.

---

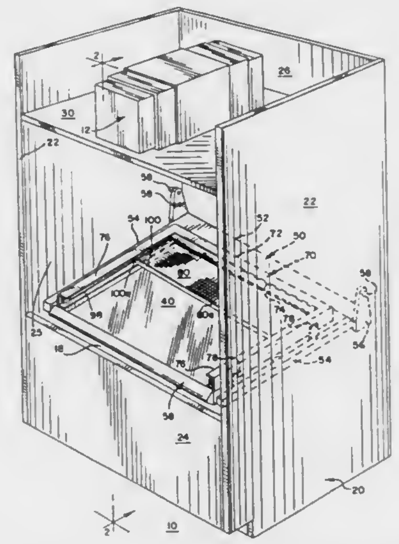
### 5,016,046
## AUTOMATIC EXPOSURE DEVICE FOR COPYING MACHINE
**Haruo Nishiyama, Kyoto, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**
**Filed Nov. 22, 1989, Ser. No. 440,304**
**Claims priority, application Japan, Nov. 25, 1988, 63-298942**
**Int. Cl.$^5$ G03B** *27/72*
**U.S. Cl. 355—68** **15 Claims**

1. An automatic exposure device for a copying machine, comprising:
a lamp for exposing an original;
a power source for supplying variable amounts of electric power to said lamp;
a first sensor for sensing the quantity of light of said lamp;
a second sensor for sensing the quantity of light of said lamp;
control means for increasing the amount of electric power supplied to said lamp by said power source proportionally to the decrease in the quantity of the light determined by said first sensor; and
maximum electric power setting means for setting the maximum amount of electric power that can be supplied to said lamp by said power source, the maximum amount of electric power being dependent upon the quantity of light sensed by said second sensor.


POSITION OF THE LEADING EDGE OF ORIGINAL
2a (ORIGINAL FACE)
LIGHT
11
AE CONTROL SENSOR
1
FLUORESCENT LAMP
3
AE SENSOR
4
AMPLIFYING CIRCUIT
10
INVERTING AMPLIFYING CIRCUIT
6
SAWTOOTH WAVE GENERATING CIRCUIT
7
P W M CIRCUIT
12
AMPLIFYING CIRCUIT
9
MAXIMUM LEVEL CONTROL CIRCUIT
13
INVERTING AMPLIFYING CIRCUIT
8
INVERTOR
5
FULL POWER GENERATING CIRCUIT
S1

---

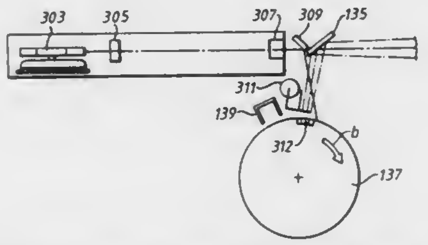
### 5,016,047
## LIGHT-MODIFYING APPARATUS FOR EXPOSURE DEVICES
**G. B. Kirby Meacham, Shaker Heights, Ohio, assignor to nuArc Company, Inc., Niles, Ill.**
**Filed Jul. 5, 1990, Ser. No. 548,087**
**Int. Cl.$^5$ G03B** *27/72*
**U.S. Cl. 355—71** **22 Claims**



1. Apparatus for changing the character of light energy flowing from a light source toward a generally planar sheet of light sensitive copy, comprising:
a roll enclosure housing mounted adjacent one edge and outside of said copy sheet;
a roll of thin, flexible, light-modifying sheet material rotatably mounted in said housing for rolling and unrolling on a roller between a first, light-intercepting unrolled position extending out of said housing generally parallel of said planar copy sheet spaced in an area between said light source and said copy sheet and a second, rolled-up position contained in said housing outside of said area;
guide means extending outwardly of said housing along opposite edges of said copy sheet normal to said one edge including means for guiding a leading edge of said roll of sheet material toward an edge of said copy sheet opposite said one edge thereof; and
motor means in said roller for rolling and unrolling said sheet material to move the same between said first and second positions.

---

### 5,016,048
## IMAGE FORMING APPARATUS FOR FORMING AN ORIGINAL IMAGE AND AN ADDITIONAL IMAGE
**Junji Watanabe, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Dec. 22, 1989, Ser. No. 454,947**
**Claims priority, application Japan, Dec. 23, 1988, 63-325586; Dec. 23, 1988, 63-325587; Jan. 10, 1989, 1-2114; Jan. 10, 1989, 1-2115**
**Int. Cl.$^5$ G03G** *21/00*
**U.S. Cl. 355—202** **23 Claims**

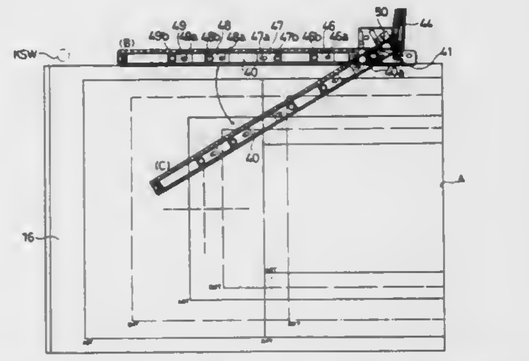


1. An image forming apparatus for forming a first image and a second image on a photosensitive material, said image forming apparatus comprising:
first light means for emitting light in accordance with the first image which follows a first path so as to be incident on said photosensitive material;
second light means for emitting light in accordance with the second image which follows a second path so as to be incident on said photosensitive material;
shutter means for selectively blocking the light emitted by said first light means;
control means for controlling the second light means so that the second light means emits light in accordance with the second image onto a shadow portion of said photosensitive material, said shadow portion formed when said shutter means blocks the light emitted by the first light means;
first motor means for selectively moving the shutter means in a first direction in response to position data; and
second motor means for selectively moving said shutter means in a second direction perpendicular to the first direction in response to the position data, said second motor means moving said shutter means between a first position outside the first path of light from said first light means and a second position within the first path of light for blocking the light emitted by the first light means.

---

### 5,016,049
## DOCUMENT DETECTING DEVICE FOR AN IMAGE FORMING APPARATUS
**Takashi Onishi; Hiroyuki Hanamoto; Hirohisa Miyamoto, and Keiji Yoshida, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Jun. 2, 1989, Ser. No. 360,480**
**Claims priority, application Japan, Jun. 3, 1988, 63-137687; Jun. 3, 1988, 63-137688; Jun. 3, 1988, 63-137689; Dec. 21, 1988, 63-323994; Dec. 21, 1988, 63-323995**
**Int. Cl.$^5$ G03G** *15/04;* **G03B** *27/62*
**U.S. Cl. 355—203** **21 Claims**

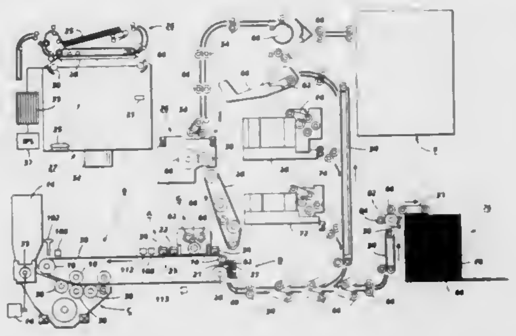
1. A document detecting device for an image forming apparatus comprising:
a glass document table on which a document is to be placed,
projecting means for optically scanning the document on said document table from below and for projecting a light corresponding to an image of the document onto a device for electrically retaining the image,
a plurality of sensors for detecting document condition,
sensor supporting means, for supporting said sensors, which is pivotal between a predetermined position below said glass document table and its original position outside the area right below said glass document table, and
pivoting means for pivoting said sensor supporting means, and



computing means for driving said pivoting means to pivot said sensor supporting means to the predetermined position and for detecting the size of the document dependent upon outputs from said sensors.

---

### 5,016,050
## XEROGRAPHIC SETUP AND OPERATING SYSTEM FOR ELECTROSTATOGRAPHIC REPRODUCTION MACHINES
**Daniel C. Roehrs, Webster; Angelo T. Caruso, Rochester; Robert E. Grace; Robert M. Mara, both of Fairport; John G. Elliot, Penfield; Patricia J. Saraceno, Rochester, and James M. Pacer, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**
**Filed Apr. 27, 1989, Ser. No. 344,774**
**Int. Cl.$^5$ G03G** *15/02*
**U.S. Cl. 355—208** **6 Claims**



1. In an electrostatographic machine having a first corotron for charging the photoreceptor to a uniform charge level and a second corotron downstream of said first corotron, each of said first and second corotrons having a coronode and a shield, said second corotron normally employing a preset fixed shield biasing voltage whereby said second corotron functions to level the charge applied to said photoreceptor by said first corotron, a process for determining the optimum preset shield biasing voltage for said second corotron while taking into account the dark decay tendency of the photoreceptor, said machine having plural operating modes with different preset fixed corotron shield biasing voltages for said second corotron tailored to said operating modes, comprising the steps of:
(a) on initialization of said machine;
(1) measuring photoreceptor dark decay with said second corotron shield biasing voltage set at a predetermined high voltage to obtain a first dark decay voltage,
(2) measuring photoreceptor dark decay with said second corotron shield biasing voltage set at a predetermined low voltage to obtain a second dark decay voltage, and

VOL
1126
ISS
2
MY
14
1991
UMI

(3) using said first and second dark decay voltages, determining a dark decay charge intercept value; and

(b) during machine operation;

(1) using said dark decay charge intercept value to predict the degree of dark decay for a given shield biasing voltage on said second corotron; and

(2) setting said preset shield biasing voltages for said second corotron for each of said machine operating modes whereby to provide an optimum photoreceptor charge level for each of said modes with minimal change in copy quality from mode to mode.

---

### 5,016,051
## ELECTROPHOTOGRAPHIC COPYING MACHINE WITH DEVICE FOR SHIFTING AN IMAGE

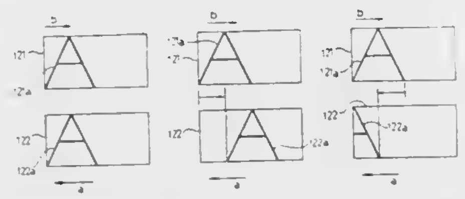
**Takeshi Morikawa; Kaoru Hashimoto, and Hiroyuki Ideyama, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 141,717, Jan. 11, 1988, abandoned. This application Nov. 8, 1989, Ser. No. 432,392**

**Claims priority, application Japan, Jan. 10, 1987, 62-3687; Jan. 10, 1987, 62-3688; Jan. 28, 1987, 62-18871**

**Int. Cl.⁵ G03G *21/00***

**U.S. Cl. 355—218** **19 Claims**



1. An electrophotographic copying machine comprising:

a photosensitive member,

optical means for projecting light on the photosensitive member to form a latent image of a document, the optical means having scanning means reciprocatingly movable a variable distance for exposing the document to light by scanning,

image forming means for developing the latent image formed on the photosensitive member and transferring the developed image onto a copy sheet,

means for giving a variable magnification,

means for feeding the copy sheet to the image forming means,

input means for entering the position on the copy sheet where the image is to be formed, and

control means for controlling the operation timing of the feeding means according to the input from the input means and controlling the distance of movement of the scanning means according to the input of the input means, the magnification and the size of the copy sheet.

---

### 5,016,052
## READER/PRINTER DEVICE WITH POWER SAVER FUNCTION AND PRINT NUMBER RESET

**Takeshi Sambayashi, Tokyo; Hideshi Ousbiden, Kawasaki; Hiroaki Takaoka, and Kazushige Morihara, both of Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 312,309, Feb. 17, 1989, abandoned, which is a continuation of Ser. No. 905,563, Sep. 10, 1986, abandoned. This application Nov. 7, 1989, Ser. No. 433,427**

**Claims priority, application Japan, Sep. 10, 1985, 60-202310; Sep. 20, 1985, 60-209503; Oct. 31, 1985, 60-245064**

**Int. Cl.⁵ G03G *15/00***

**U.S. Cl. 355—228** **8 Claims**

1. A record reader/printer, comprising:

a light source device for irradiating a record with a projection light to obtain image information recorded in the record;

projecting means for using said projection light to project an image of said image information recorded in the record to display the image;

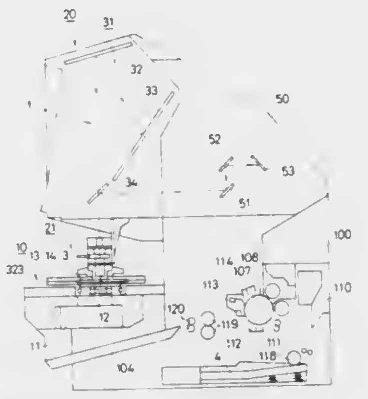
means, responsive to said projecting means, for forming a latent image on an image bearing member according to the image information;

means for developing the latent image on the image bearing member;

means for transferring the developed image on the image bearing member to a recording medium;

heating means for heating the developed image on the recording medium to a predetermined fixing temperature to form a fixed image on the recording medium;

print number setting means for setting and storing a set number of prints to be printed; and



operating means for

(a) selecting one of a power saving mode and a non-power saving mode,

(b) when the power saving mode is selected, maintaining said predetermined number of prints and controlling said light source device to be non-operative and controlling said heating means to be at a temperature lower than the predetermined fixing temperature, and

(c) when the non-power saving mode is selected: (1) controlling the light source to be operative, (2) controlling the heating means to be at the predetermined fixed temperature, (3) determining if a predetermined time is elapsed without forming an image on the recording medium, and (4) resetting the set number of the prints to a predetermined number when said predetermined time is elapsed.

---

### 5,016,053
## STIRRER ROLLER OF DEVELOPING DEVICE IN ELECTROPHOTOGRAPHIC COPYING MACHINE

**Yoshiaki Ibuchi, and Yoshikazu Nishikawa, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 368,069, Jun. 15, 1989, abandoned, which is a continuation of Ser. No. 256,185, Oct. 6, 1988, abandoned, which is a continuation of Ser. No. 134,563, Dec. 18, 1987, abandoned, which is a continuation of Ser. No. 934,005, Nov. 24, 1986, abandoned. This application Mar. 5, 1990, Ser. No. 489,796**

**Claims priority, application Japan, Nov. 29, 1985, 60-185268[U]**

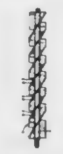
**Int. Cl.⁵ G03G *15/06***

**U.S. Cl. 355—245** **6 Claims**

1. A stirrer roller of a developing device for electrophotography, comprising

an axis, and

a plurality of elliptical plates obliquely attached to said axis such that said plates are mutually parallel and that the projections of said elliptical plates in the direction of said axis are circles, each of said plates having notches which are symmetrically positioned with respect to the center thereof such that the trajectories of said notches do not overlap as said roller is rotated around said axis.



---

### 5,016,054
## APPARATUS FOR IMPROVING A MULTI-COLOR ELECTROPHOTOGRAPHIC IMAGE

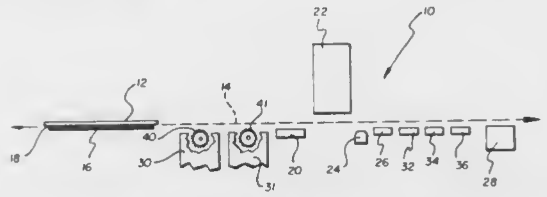
**Lawrence C. Steele, Webster, and Kenneth E. Rook, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 26, 1989, Ser. No. 358,916**

**The portion of the term of this patent subsequent to Mar. 5, 2008, has been disclaimed.**

**Int. Cl.⁵ G03G *15/10, 15/01***

**U.S. Cl. 355—256** **14 Claims**



1. In an apparatus for producing a multi-stage electrophotographic image comprising means for providing an electrophotographic medium on a carrier therefor, means for translating the carrier and medium together over a predetermined path, means for charging the medium, means for exposing the medium to a first light-borne image, means for toning the image bearing charged region of the medium to produce a first color visible image, and means for returning the carrier to the starting position to repeat the foregoing steps of charging said medium, exposing it to a second light-borne image and toning said medium to produce a second visible image, the improvement comprising means for buffing the surface of the first toned image with a relatively course, stiff and rough fibrous brush member after said first toning step and prior to said second charging step to smooth the toned image and prevent unwanted toner particles from adhering to the first toned image.

---

### 5,016,055
## METHOD AND APPARATUS FOR USING VIBRATORY ENERGY WITH APPLICATION OF TRANSFER FIELD FOR ENHANCED TRANSFER IN ELECTROPHOTOGRAPHIC IMAGING

**Kenneth W. Pietrowski, Penfield, and Charles A. Radulski, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

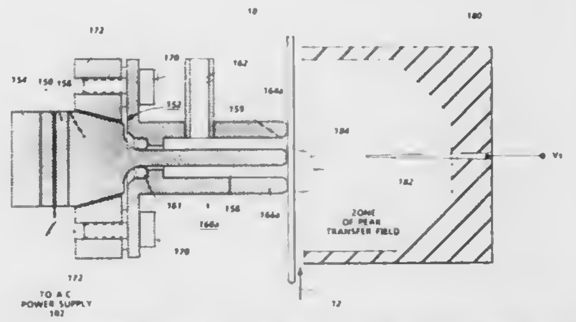
**Filed Jul. 2, 1990, Ser. No. 548,351**

**Int. Cl.⁵ G03G *15/14***

**U.S. Cl. 355—273** **28 Claims**

1. In an imaging device having a non-rigid member with a first charge retentive surface, moving in a process direction along an endless path, means for producing a toner image on the charge retentive surface, corona transfer device, having at least a first coronode driven with a relatively high voltage to a corona producing condition for providing non-contacting electrostatic transfer of the developed toner image within a transfer field to a second surface in contact with said charge retentive surface, said coronode supported within said corotron arranged generally, parallel to said charge retentive surface and transverse to the direction of movement thereof, and means for enhancing transfer of said developed image to said second surface across areas of less than optimal contact said transfer enhancing means including:

vibratory energy producing means, mechanically coupled in line contact with a second surface of said non-rigid member, applying vibratory energy enabling toner release from the charge retentive surface, at a position prior to and near, or opposite, the region where the transfer field is approaching its peak value.



---

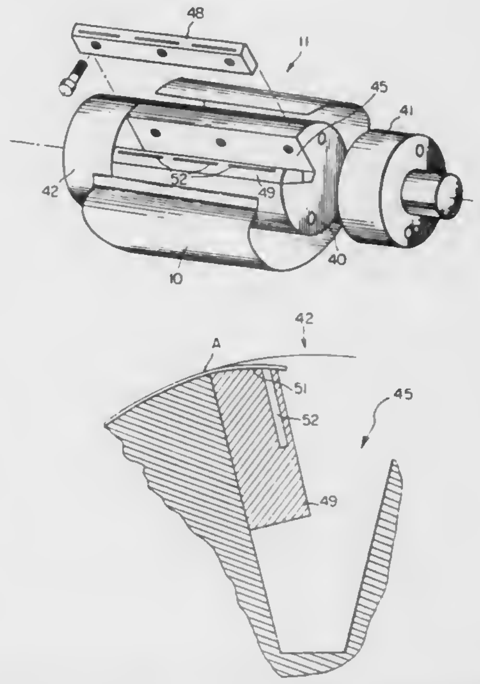
### 5,016,056
## MULTICOLOR IMAGE FORMING APPARATUS AND TRANSFER ROLLER

**Kevin M. Johnson, Rochester, and Robert E. Zeman, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 7, 1990, Ser. No. 519,999**

**Int. Cl.⁵ G03G *15/00***

**U.S. Cl. 355—279** **12 Claims**



1. Multicolor image forming apparatus comprising a photoconductive drum rotatable to bring a photoconductive periphery of said drum past a series of electrophotographic stations, which stations include charging, exposing and toning stations to create a series of different color toner images, and a transfer station for transferring said images in registration to a receiving sheet to create a multicolor toner image, said transfer station including:

VOL
1126
ISS
2
MY
14
1991
UMI

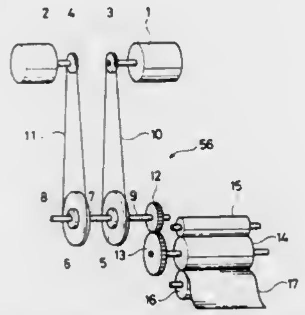
a rotatable transfer roller forming a pressure nip with said drum and having an axis of rotation, a peripheral surface, and a trough in said peripheral surface running generally parallel to said axis,
means for securing a receiving sheet to said periphery, said means including means located in said trough for securing an end of a receiving sheet, and
means defining a ramp surface in said trough for supporting said secured end through a gradual decline away from an extension of the periphery of said roller as the end enters the trough.

---

### 5,016,057
## METHOD FOR CONTROLLING ROTATION OF A FIXING ROLLER

**Yoshihiro Nakajima; Kunihiro Onishi, both of Osaka, and Akihiro Takada, Neyagawa, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Sep. 6, 1990, Ser. No. 578,702**
**Int. Cl.$^5$ G03G** *15/20*
**U.S. Cl. 355—282** **3 Claims**



1. A method for controlling rotation of a fixing roller, the fixing roller being rotated by a first motor and a second motor, the first motor being driven at a high speed, the second motor being driven at a low speed, the torques of the first motor and the second motor being transmitted to a rotary shaft of the fixing roller through respective one-way clutches, the method comprising the steps of;
starting the driving of the second motor immediately before the driving of the first motor is stopped; and
keeping the driving of the second motor at least until the driving of the first motor is started.

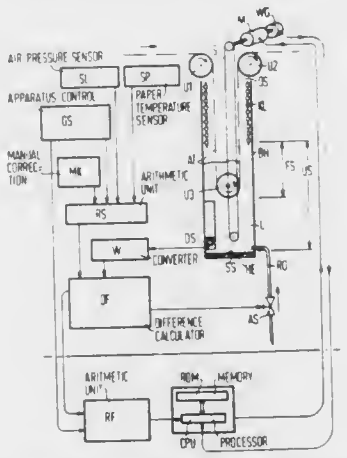
---

### 5,016,058
## METHOD AND ARRANGEMENT FOR FIXING TONER IMAGES APPLIED TO A WEB-SHAPED RECORDING MEDIUM WITH HIGH QUALITY CONSISTENCY

**Eduard Mair, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**PCT No. PCT/DE87/00468, § 371 Date Apr. 14, 1989, § 102(e) Date Apr. 14, 1989, PCT Pub. No. WO88/03281, PCT Pub. Date May 5, 1988**
**PCT Filed Oct. 19, 1987, Ser. No. 343,300**
**Claims priority, application Fed. Rep. of Germany, Oct. 24, 1986, 3636324**
**Int. Cl.$^5$ G03G** *15/20*
**U.S. Cl. 355—292** **8 Claims**

1. An arrangement for fixing toner images applied to a web-shaped recording medium with a solvent vapor, comprising:
a container containing a solvent vapor in a fixing region;
a guide means for guiding a recording medium into said fixing region in said container, said guide means being arranged displaceable in position within the container;
an electromotive means for varying the position of said guide means in said container to effect a modification of a passage distance of the recording medium through the fixing region of the container;
at least one sensor for sensing an operating condition of the arrangement for fixing; and



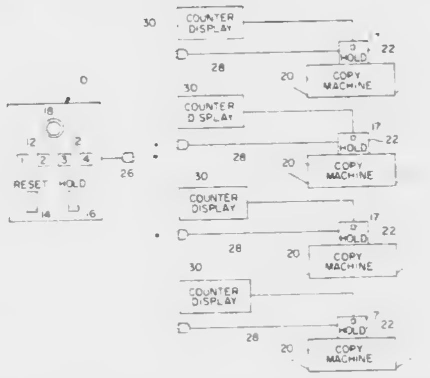
a control circuit for controlling said electromotive means to modify the passage distance of the recording medium through the fixing region to compensate for variations in the operating conditions sensed by said sensors.

---

### 5,016,059
## PHOTOCOPY MACHINE REMOTELY CONTROLLED COPY COUNTING SYSTEM

**Wilfred Smeiman, 2120 Howell Ave., #403, Anaheim, Calif. 92806**

**Continuation of Ser. No. 317,272, Feb. 28, 1989, abandoned, which is a continuation of Ser. No. 937,072, Dec. 7, 1986, abandoned. This application Feb. 27, 1990, Ser. No. 488,427**
**Int. Cl.$^5$ G03G** *15/00*
**U.S. Cl. 355—308** **20 Claims**



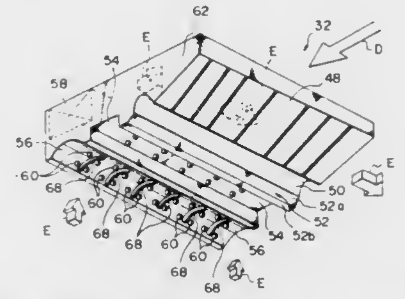
1. A copy counting system for counting and visibly displaying the number of copies to a customer and a cashier comprising:
transmitter means for remotely transmitting control signals to one or more copy machines; receiver means connected to each of said one or more copy machines for responding to signals from said transmitter means;
connecting means connecting said remote transmitting means to said receiver means through exciting electrical wiring;
interface means for interfacing said receiver means with an electric signal in each of said one or more copy machines produced when a photocopy is made; said interface means generating an output pulse for each photocopy made on each of said one or more copy machines;
digital display means connected to each of said interface means for receiving said output pulses; said digital display means providing a digital display of the number of copies made by each of said one or more copy machines;
said digital display means being mounted to be clearly visible to both a customer and cashier;
said remote transmitting means including means for resetting each individual digital display means at each of said one or more copy machines to zero;
whereby said cashier may reset said digital display means of one of said one or more copy machines after accounting for the number of copies made.

---

### 5,016,060
## PAPER TRANSPORTING DEVICE FOR AN IMAGE RECORDER HAVING GUIDE RIBS ON A TRANSPORT SURFACE

**Yukiyoshi Arai, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Sep. 25, 1989, Ser. No. 411,834**
**Claims priority, application Japan, Sep. 27, 1988, 63-125170[U]**
**Int. Cl.$^5$ G03G** *21/00*
**U.S. Cl. 355—312** **7 Claims**



1. A paper transporting device for an image recorder for transporting, after a visible image formed on a surface of an image carrier by an electrophotographic procedure has been transferred to a paper sheet by an image transferring device, said paper sheet separated from said image carrier to a fixing device by orienting one surface of said paper sheet carrying said visible image downward and by sucking the other surface of said paper sheet by sucking means, said device comprising:
a body located above the image carrier and the image transferring device;
a guide member provided on an underside of said body and having a transport surface for transporting the paper sheet;
a number of holes formed through said transport surface of said guide member for sucking the paper sheet by suction of said sucking means; and
a plurality of guide rib members protruding from said transport surface for guiding the paper sheet, said number of holes being positioned at opposite sides and in close proximity to said plurality of guide ribs;
wherein said plurality of guide ribs prevent an increase of suction through said holes and thereby prevent an increase in frictional resistance between the transport surface having said holes and said paper sheet.

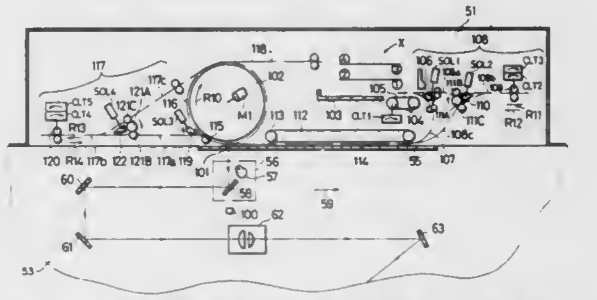
---

### 5,016,061
## RECIRCULATING AUTOMATIC DOCUMENT FEEDER

**Osamu Tashiro, Osaka, and Masafumi Okumura, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kashia, Osaka, Japan**

**Filed Apr. 21, 1989, Ser. No. 341,219**
**Claims priority, application Japan, Apr. 21, 1988, 63-98793; Jun. 10, 1988, 63-143947**
**Int. Cl.$^5$ G03G** *21/00*
**U.S. Cl. 355—320** **9 Claims**

1. A recirculating automatic document feeder for feeding original documents to a scanning exposure region of an optical reading apparatus for scanning exposure comprising:
a document hopper for receiving a stack of the original documents;
a loop-shaped feeder conveying route for continuously conveying the documents from the bottom of said document hopper to the top of said document hopper by way of the scanning exposure region;



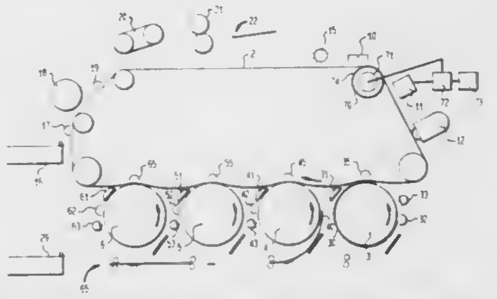
first switchback means situated along part of said feeder conveying route from said document hopper to the scanning exposure region for selectively inverting the documents;
second switchback means situated along part of said feeder conveying route from the scanning exposure region to said document hopper for inverting the documents inverted by said first switchback means.

---

### 5,016,062
## MULTICOLOR IMAGE FORMING APPARATUS HAVING IMPROVED REGISTRATION

**Alan E. Rapkin, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 2, 1990, Ser. No. 459,851**
**Int. Cl.$^5$ G03G** *15/01, 15/16*
**U.S. Cl. 355—327** **17 Claims**



1. Apparatus for forming multicolor toner images comprising:
an endless web, driveable through an endless path and having a first row of perforations along one edge of said web and a second row of perforations along the other edge of said web,
a plurality of imaging members spaced along said endless path, each of said members including a drum shaped member having first and second sprockets engageable with said first and second rows of perforations, respectively,
means for forming an electrostatic image on each of said imaging members and for toning said electrostatic images with toners of different color to create a different color toner image on each imaging member,
means for transferring said toner images in registration to either said endless web or a receiving sheet carried by said web to create a multicolor toner image, and
means for maintaining at least one tooth of each of the first and second sprockets of each imaging member against a

VOL
1126
ISS
2
MY
14
1991
UMI

given edge of complementary perforations in said first and second rows of perforations to control orientation of said web and imaging member during said transfer.

---

5,016,063

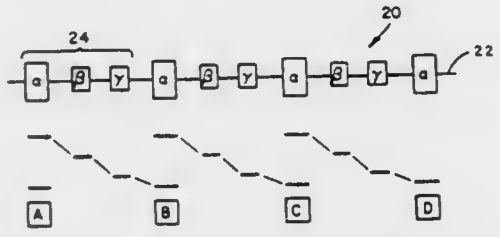
### MOLECULAR IMPLEMENTATION OF MOLECULAR SHIFT REGISTER MEMORIES

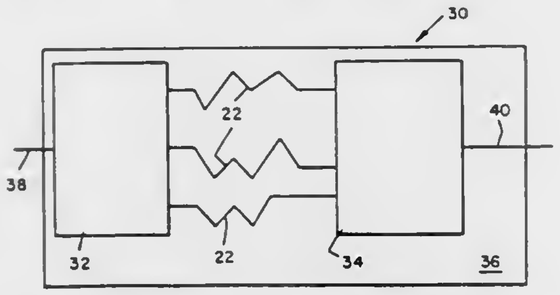
**David N. Beratan, South Pasadena, Calif., and Jose N. Onuchic, Sao Carlos, Brazil, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Aug. 14, 1989, Ser. No. 393,176**

**Int. Cl.$^5$ H01L** *29/28*

U.S. Cl. 357—8 22 Claims





1. A composition for use in molecular shift registers comprising a polymer made up of at least three monomeric repeat units, each monomeric repeat unit comprising at least three different monomers, a first donor monomer, at least one intermediate monomer, and a final acceptor monomer, with one monomer having an energy level having a ground state and an upper state and all of the remaining monomers each having an energy level having a ground state only, said one monomer comprising a monomer selected from the group of donor, intermediate, and acceptor monomers, each said unit capable of transferring a charged species selected from the group of electrons and holes from one unit to a neighboring unit upon a single pulse of light, and each said unit having molecular orbitals that are selected from the group of predominantly filled with electrons or empty.

---

5,016,064

### QUANTOM WELL STRUCTURE HAVING ENHANCED CONDUCTIVITY

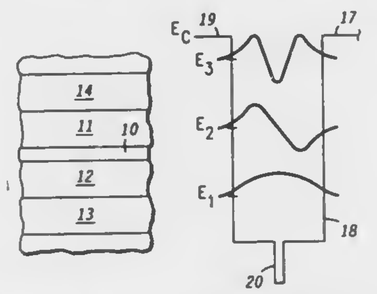
**Herbert Goronkin, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Sep. 25, 1989, Ser. No. 411,780**

**Int. Cl.$^5$ H01L** *29/161, 29/205, 29/00, 27/12*

U.S. Cl. 357—16 16 Claims

1. An enhanced conductivity III-V compund semiconductor comprising: a barrier layer; a first layer of material positioned on the barrier layer and having optical phonons at a predetermined energy level; a monoatomic layer positioned over the first layer and having optical phonons at an energy level lower than the energy level of the phonons of the first layer; and a second layer of material positioned on the monoatomic layer and having optical phonons at substantially the same energy level as the first layer of material.



---

5,016,065

### COMPOUND SEMICONDUCTOR SUBSTRATE WITH INGAP LAYER

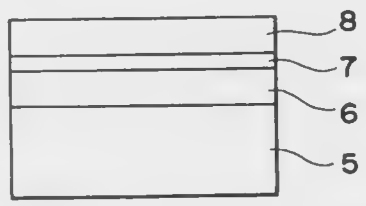
**Akinori Seki, Kitakatsuragi; Fumihiro Knoushi, Hirakata; Jun Kudo, and Masayoshi Koba, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 2, 1989, Ser. No. 430,268**

**Claims priority, application Japan, Nov. 4, 1988, 63-280041**

**Int. Cl.$^5$ H01L** *29/161*

U.S. Cl. 357—16 6 Claims



1. A compound semiconductor substrate comprising:
(a) a Si substrate;
(b) a first semiconductor layer of InP formed on the substrate,
(c) a second semiconductor layer of $In_xGa_{1-x}P$ $(0<x<1)$ having such a lattice constant as to produce a stress in a direction opposite to the stress which occurs during the time of forming said first semiconductor layer due to a difference of thermal expansion coefficient between said substrate and said first semiconductor layer, formed on said first semiconductor layer, and
(d) a third semiconductor layer of InP formed on said second semiconductor layer.

---

5,016,066

### VERTICAL POWER MOSFET HAVING HIGH WITHSTAND VOLTAGE AND HIGH SWITCHING SPEED

**Mitsuasa Takahashi, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Mar. 31, 1989, Ser. No. 331,449**

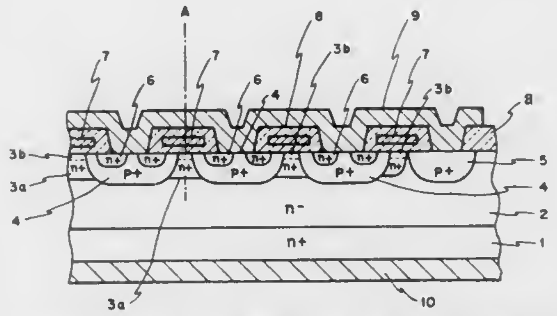
**Claims priority, application Japan, Apr. 1, 1988, 63-81490**

**Int. Cl.$^5$ H01L** *29/10, 29/78, 29/34*

U.S. Cl. 357—23.4 13 Claims

10. A vertical MOSFET comprising:
a drain region;
a plurality of base regions formed on a first surface of said drain region;
a plurality of source regions formed in said plurality of base regions, respectively;
a gate electrode formed above said fist surface between said source regions with an insulator film interposed between said gate electrode and said first surface;

a first semiconductor region having an impurity concentration which is higher than an impurity concentration of said drain region and being the same conductivity type as that of said drain region;
a second semiconductor region formed in said first surface of said drain region between said base regions, said second semiconductor region having an impurity concentration which is lower than an impurity concentration of said first semiconductor region and being the same conductivity type as that of said drain region, said first semiconductor region and said drain region, and side walls of said first semiconductor region being in contact with said base regions;
a source electrode connected electrically and commonly to said plurality of source regions; and
a drain electrode connected electrically to a second surface of said drain region opposite to said first surface.



---

5,016,067

### VERTICAL MOS TRANSISTOR

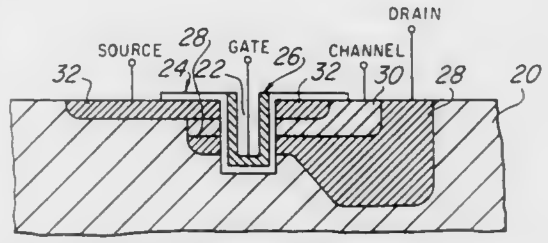
**Kiyoshi Mori, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 180,424, Apr. 11, 1988, abandoned, which is a continuation of Ser. No. 921,728, Oct. 21, 1986, abandoned. This application Dec. 8, 1989, Ser. No. 449,124**

**The portion of the term of this patent subsequent to May 14, 2008, has been disclaimed.**

**Int. Cl.$^5$ H01L** *29/78*

U.S. Cl. 357—23.4 6 Claims



5. An insulated gate transistor, comprising:
a semiconductor layer of a second conductivity type containing a trench at a first surface, said trench having sidewalls substantially perpendicular to said first surface;
a first source/drain region within said layer, said first source/drain region doped a first conductivity type, and said first source/drain region located with a first portion of said sidewalls forming a part of the boundary of said first source/drain region;
said trench extending through said first source/drain region into said semiconductor layer;
a channel region within said layer, said channel region doped a second conductivity type opposite said first type, and said channel region located with a second portion of said sidewalls forming a part of the boundary of said channel region, said second portion abutting said first portion, and said channel region extending to said first surface away from said trench;
a second source/drain region within said layer, said second source/drain region doped said first type, and said second source/drain region located with a third portion of said sidewalls forming a part of the boundary of said second source/drain region, said third portion abutting said second portion, and said second source/drain region extending to said first surface;
a gate insulator on said sidewalls at said second portion; and
a gate on said gate insulator.

---

5,016,068

### VERTICAL FLOATING-GATE TRANSISTOR

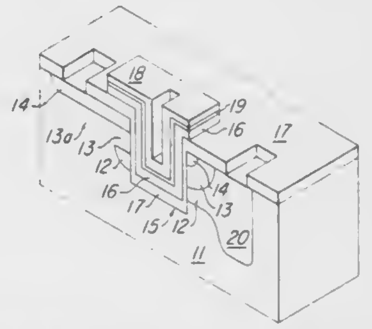
**Kiyoshi Mori, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 181,789, Apr. 15, 1988, abandoned. This application Dec. 8, 1989, Ser. No. 449,135**

**The portion of the term of this patent subsequent to May 14, 2008, has been disclaimed.**

**Int. Cl.$^5$ H01L** *27/115, 29/788*

U.S. Cl. 357—23.5 9 Claims

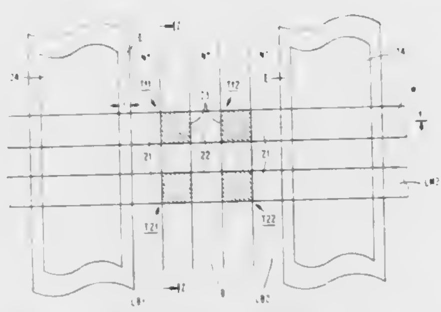


8. A floating-gate transistor, comprising:
a semiconductor layer of a second conductivity type containing a trench at a first surface, said trench having sidewalls substantially perpendicular to said first surface;
a first sourcedrain region within said layer, said first source-drain region doped a first conductivity type, said first source-drain region located with a first portion of said sidewalls forming a part of the boundary of said first source-drain region, and said first source-drain region extending to said surface away from said trench;
said trench extending through said first source-drain region into said semiconductor layer;
a channel region within said layer, said channel region doped a second conductivity type opposite said first type, and said channel region located with a second portion of said sidewalls forming a part of the boundary of said channel region, said second portion abutting said first portion, and said channel region extending to said first surface away from said trench;
a second source-drain region within said layer, said second source-drain region doped said first type, and said second source-drain region located with a third portion of said sidewalls forming a part of the boundary of said second source-drain region, said third portion abutting said second portion, and said second source-drain region extending to said first surface;
a first gate insulator on said sidewalls at said second portion;
a first gate on said first gate insulator;
a second insulator on said first gate and separated from said first gate insulator by said first gate; and
a second gate on said second gate insulator, said second gate separated from said first gate by said second gate insulator.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,016,069
### LARGE-SCALE EPROM MEMORY

**Albert Bergemont, La Tronche, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France**
**Filed Aug. 11, 1989, Ser. No. 392,501**
**Claims priority, application France, Aug. 11, 1988, 88 10962**
**Int. Cl.$^5$ H01L** *29/68*
**U.S. Cl. 357—23.5** **16 Claims**



1. A memory having multiple memory points comprising: multiple floating gate MOS transistors arranged on a substrate to correlate with the respective memory points. each of the transistors including a control gate, a floating gate, a source, and a drain region of a first conductivity type,

plural word lines extending in a first direction, each of the word lines interconnecting the transistor control gates of a first group of transistors,

plural bit lines extending in a second direction, the first and second directions differing from each other by 90°, each of the bit lines interconnecting the transistor drains of a second group of transistors,

the drain region of each transistor in the second group extending in the second direction to form one of the bit lines,

said word lines addressing a selected transistor row and said bit lines transmitting a signal indicative of a logic state of the transistors;

plural constant-potential lines extending in the second direction, each of the constant potential lines interconnecting the sources of one group of transistors, each of the constant-potential lines including a diffusion of the first conductivity type and being positioned between a pair of adjacent bit lines, all of the contact-potential lines being at the same potential,

a plurality of dielectric isolation areas extending in the second direction, each of the isolation areas being positioned on the side of each bit line opposite to one of the constant-potential lines, and

plural conductive areas extending in the second direction, each of said conductive areas covering one of said isolation areas.

---

### 5,016,070
### STACKED CMOS SRAM WITH VERTICAL TRANSISTORS AND CROSS-COUPLED CAPACITORS

**Ravishankar Sundaresan, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**
**Continuation of Ser. No. 373,746, Jun. 30, 1989, abandoned. This application Jul. 5, 1990, Ser. No. 548,446**
**Int. Cl.$^5$ H01L** *29/68, 29/10, 27/01*
**U.S. Cl. 357—23.6** **11 Claims**

1. An integrated device comprising:

a semiconductive substrate having a first trench formed therein and having a first conductivity type;

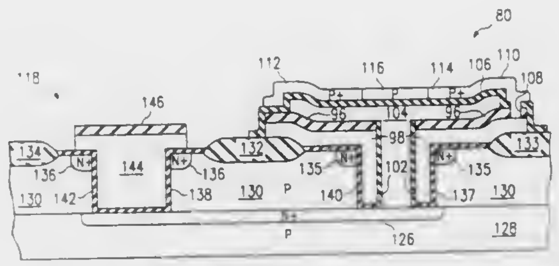
first and second doped regions formed in said substrate each adjacent to said trench and separated by a first channel region;

a first insulating layer formed on the walls of said first trench;

a first gate formed on the walls of said trench over said insulating layer, said gate controlling current in said first channel region;

a second insulating layer formed on the walls of said trench and over said first gate;

a second gate formed on the walls of said trench and over said second insulating layer, said second gate and said first gate being capacitively coupled and said second gate being conductively connected to said second doped region;



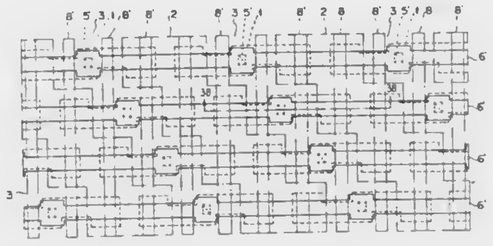
a third insulating layer formed on said second gate; and

a semiconductive layer formed on said third insulating layer, a third and fourth doped region formed in said semiconductive layer, said third and fourth doped regions being separated by a second channel region and said second gate controlling current in said second channel region.

---

### 5,016,071
### DYNAMIC MEMORY DEVICE

**Jumpei Kumagai, Yokohama, and Syuso Fujii, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Sep. 7, 1989, Ser. No. 403,870**
**Claims priority, application Japan, Nov. 18, 1988, 63-291958**
**Int. Cl.$^5$ H01L** *29/68, 27/10, 29/06, 23/48*
**U.S. Cl. 357—23.6** **12 Claims**



1. A dynamic memory device comprising:

a memory cell array having a plurality of dynamic memory cells each formed of one transistor and one capacitor, adjacent memory cells of said memory array in a direction of the channel width of said transistor being displaced in a channel length direction of said transistor by $\frac{1}{2}^{n}$ (n is a natural number not less than 2) pitch;

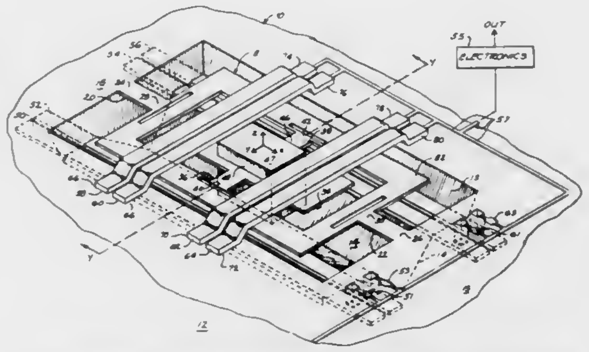
a plurality of gate electrodes formed in a stripe configuration to extend in parallel with each other in the channel width direction and cross said memory cell array, for applying potential to the gate electrode of each of said transistors; and

a plurality of bit lines formed in a stripe configuration to extend in parallel with each other in the channel length direction and cross said memory cell array.

---

### 5,016,072
### SEMICONDUCTOR CHIP GYROSCOPIC TRANSDUCER

**Paul Greiff, Wayland, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.**
**Continuation-in-part of Ser. No. 143,515, Jan. 13, 1988, abandoned. This application Mar. 14, 1990, Ser. No. 493,327**
**Int. Cl.$^5$ H01L** *29/00;* **G01P** *9/00, 15/00*
**U.S. Cl. 357—26** **34 Claims**



1. A micromechanical gyroscopic transducer comprising:

a mass of semiconductor material having a void on a top surface extending downward, said mass of silicon comprising a silicon frame;

a transducer element suspended above said void, said transducer element comprising:

first and second flexible linkages integral with said frame material for coupling said transducer element to said frame at opposite ends, first ends of said first flexible linkages being connected to said silicon frame;

a first gimbal plate integral with said frame material connected to said second ends of said first and second flexible linkages, said first gimbal plate being capable of oscillatory motion about an axis through said first and second flexible linkages;

a second gimbal pate, interior to said first gimbal plate;

third and fourth flexible linkages integral with said frame material coupling said second gimbal plate to said first gimbal plate on opposite ends, said third and fourth flexible linkages having first ends and second ends, said first ends of said third and fourth flexible linkages being connected o said first gimbal plate and said second ends of said third and fourth flexible linkages being connected to said second gimbal plate, said second gimbal plate being capable of oscillatory motion about an axis through said third and fourth flexible linkages;

a substantially balanced mass, central to said second gimbal plate, said substantially balanced mass having a top side and a bottom side defining an axis therebetween;

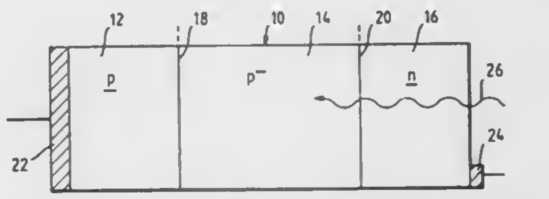
first and second sets of electrodes configured within said mass in a bottom region of said void and integral with said frame material, said first set of integral electrodes facing said first gimbal plate and said second set of integral electrodes facing said second gimbal plate; and

a plurality of bridge electrodes configured above said transducer element, each of said plurality of bridge electrodes being supported from said frame at an electrode landing and extending over at least one of said first and second gimbal plates.

---

### 5,016,073
### PHOTODETECTOR SEMICONDUCTOR WHICH DOES NOT REQUIRE EXTENSIVE COOLING

**Charles T. Elliott, Malvern, and Timothy Ashley, Malvern Link, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**
**Continuation of Ser. No. 323,096, Mar. 7, 1989, abandoned, which is a continuation of Ser. No. 127,718, Dec. 2, 1987, abandoned, which is a continuation of Ser. No. 42,016, Apr. 24, 1987, abandoned, which is a continuation of Ser. No. 749,936, Jun. 17, 1985, abandoned. This application Oct. 22, 1990, Ser. No. 600,126**
**Claims priority, application United Kingdom, Jul. 6, 1984, 8417303**
**Int. Cl.$^5$ H01L** *27/14*
**U.S. Cl. 357—30** **7 Claims**



1. A photodetector device having a given operating temperature and including:

(1) a semiconducting first device region having a sufficiently low doping to produce predominantly intrinsic properties at the operating temperature when unbiased;

(2) a semiconducting second device region of opposite majority carrier type to that of the first region, the second device region having sufficiently high doping to produce extrinsic properties at the operating temperature and forming with the first region a pn junction arranged to extract minority carriers from the first region when reverse biased;

(3) a semiconductor third device region having an interface with the first region distant not more than one minority carrier diffusion length from the pn junction, the first region having no biase electrode between the interface and pn junction, the third region having sufficiently high doping to produce extrinsic properties at the operating temperature and to depress the first region minority carrier concentration when appropriately biased, and wherein the interface consists of any one of:

(i) a homostructure pn junction,

(ii) a heterostructure pn junction,

(iii) an excluding contact between first and third region materials of like composition and majority carrier type, and

(iv) an excluding contact between first and third region materials of different composition and like majority carrier type, the third region material having a wider bandgap than said first region; and

(4) bias contacts arranged on the second and third regions.

---

### 5,016,074
### EPITAXIAL INTERMETALLIC CONTACT FOR COMPOUND SEMICONDUCTORS

**Timothy D. Sands, Cranbury, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.**
**Division of Ser. No. 267,073, Nov. 4, 1988, which is a continuation-in-part of Ser. No. 110,332, Oct. 20, 1987, abandoned. This application Jun. 14, 1990, Ser. No. 537,685**
**Int. Cl.$^5$ H01L** *29/72, 29/161, 27/12*
**U.S. Cl. 357—34** **1 Claim**

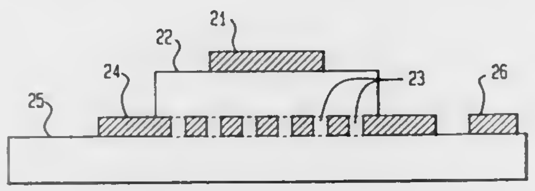
1. Epitaxial permeable-base transistor comprising:

(a) a single-crystal III–V semiconductor layer that serves as the collector of the transistor;

VOL
1126
ISS
2
MY
14
1991
UMI

(b) a single-crystal III–V semiconductor layer that serves as the emitter of the transistor;

(c) an epitaxial layer of a transition metal aluminide that serves as the base of the transistor, said aluminide being of the cesium chloride structure and comprising aluminum and a transition metal in a 1:1 atomic ratio, said epitaxial layer being in the form of a patterned grid sandwiched between said III–V semiconductor collector and said III–V semiconductor emitter such that the current flow between emitter and collector passes through semiconductor materials in the perforation of the base or between base grid bars, said current being modulated by the electric field created by a voltage applied to the base,



(d) ohmic contact to the collector,

(c) ohmic contact to the base, and

(d) ohmic contact to the emitter.

---

### 5,016,075
## SEMICONDUCTOR MEMORY DEVICE

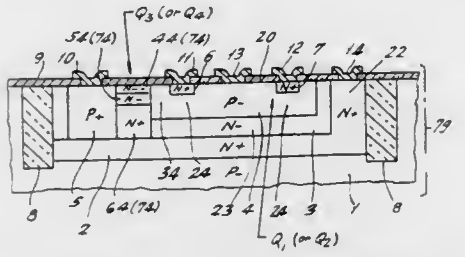
**Yukio Minato, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Oct. 16, 1989, Ser. No. 421,816**

**Claims priority, application Japan, Oct. 14, 1988, 63-258481**

**Int. Cl.$^5$ H01L** *29/72, 27/14, 31/00, 31/14*

**U.S. Cl. 357—35** **15 Claims**



1. A semiconductor memory device comprising; a semiconductor substrate having a major surface and a plurality of memory cells formed on said substrate, each of said memory cells including a lateral bipolar transistor as a load element, each of said transistors having a collector region of a first conductivity type formed in said substrate and extending from said major surface, an emitter region of said first conductivity type formed in said substrate and extending from said major surface and a base region of a second conductivity type, opposite to said first conductivity type, formed in said substrate and extending from said major surface and being located between said collector and emitter regions, said base region having an impurity concentration of said second conductivity type which is increased from said major surface in the depth direction of said base region, each of said transistors having a current amplification factor characteristic which abruptly decreases as the collector current through said transistor increases when said memory cell of which forms a part is switched between a memory holding operation and a memory writing operation.

---

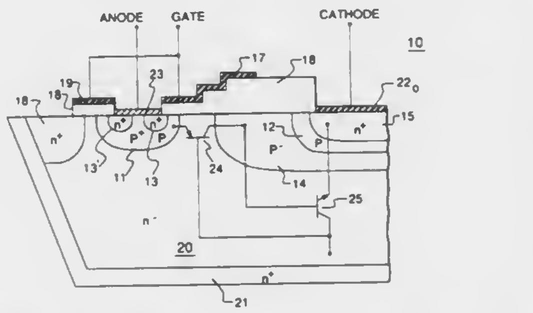
### 5,016,076
## LATERAL MOS CONTROLLED THYRISTOR

**Mohamed N. Darwish, Glenmoore, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Feb. 28, 1990, Ser. No. 486,459**

**Int. Cl.$^5$ H01L** *29/74, 29/78*

**U.S. Cl. 357—38** **8 Claims**



1. A lateral MOS controlled thyristor, having first and second output terminals and a gate, disposed in the major surface of a high-resistivity semiconductor epitaxial layer (**20**) of a first conductivity type, is characterized by:

first (**11**) and second (**12**) spaced-apart regions of a second conductivity type in the epitaxial layer and adjacent to a major surface thereof;

a third region (**13**) of the first conductivity type within the first region and adjacent to the major surface;

a fourth region (**14**) of the second conductivity type in contact with the second region, disposed in the epitaxial layer and adjacent to the major surface;

a rectifying contact ($22_o$, **15** or $22_R$) with the second region; and,

a conductive layer (**17**) overlaying and insulated from selected portions of the epitaxial layer and the first and fourth regions;

wherein the first and third regions are connected together to form the first output terminal, the rectifying contact forms the second output terminal, and the conductive layer forms the gate.

---

### 5,016,077
## INSULATED GATE TYPE SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME

**Masaki Sato, Kawasaki, and Shigeru Atsumi, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Aug. 22, 1986, Ser. No. 899,025**

**Claims priority, application Japan, Aug. 26, 1985, 60-187008; Jun. 5, 1986, 61-130661**

**Int. Cl.$^5$ H01L** *27/020, 29/780;* **H03K** *17/687*

**U.S. Cl. 357—41** **6 Claims**

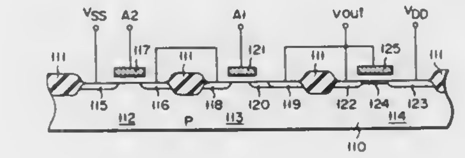
1. A logic circuit for an insulated gate type semiconductor device, comprising:

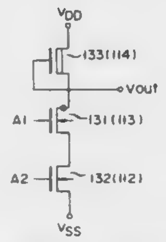
input terminal means for receiving an input signal;

output terminal means for supplying an output signal having a logic value determined by said input signal;

a first N channel transistor directly connected to said output terminal means and having source, drain and channel regions, said drain region including a high-impurity concentration region and a low-impurity concentration region located contiguous to said channel region, and said source region including a high-impurity concentration region contiguous to said channel region;

a second N channel transistor connected between said first N channel transistor and a low potential, and having source, drain and channel regions, said drain and source regions each including high-impurity concentration regions located contiguous to said channel region; and





a load transistor connected between said output terminal means and a high potential.

---

### 5,016,078
## CMOS INTEGRATED CIRCUIT STRUCTURE PROTECTED AGAINST ELECTROSTATIC DISCHARGES

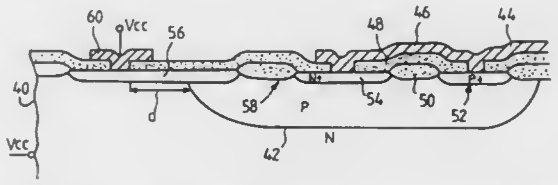
**Francois Tailliet, Epinay sur Seine, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France**

**Filed Jul. 11, 1990, Ser. No. 551,555**

**Claims priority, application France, Jul. 13, 1989, 89 09548**

**Int. Cl.$^5$ H01L** *27/02*

**U.S. Cl. 357—42** **7 Claims**



1. An integrated circuit in CMOS technology with N substrate and P well, including a structure for the protection of a contact pad against electrostatic discharges, said protection structure comprising an NPN type lateral transistor formed in a P well, with an N+ type collector region and an N+ type emitter region superficially diffused in said P well and a base region also formed in said P well, the collector of the transistor being connected to a metallization, the emitter being connected to a pad to be protected, and a metallic ohmic contact being provided between the pad to be protected and the P-type well to take it to the potential of the pad, wherein the N+ type region forming the collector includes one part located within the P-type well and one part extending outside the well, the metallization coming into contact with the collector region in this external part.

---

### 5,016,079
## INTEGRATED INJECTION LOGIC GATE WITH HEAVILY DOPED DIFFUSION

**Mark R. Plagens, Richardson, Tex., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Nov. 30, 1989, Ser. No. 444,066**

**Int. Cl.$^5$ H01L** *27/02, 29/72*

**U.S. Cl. 357—43** **2 Claims**

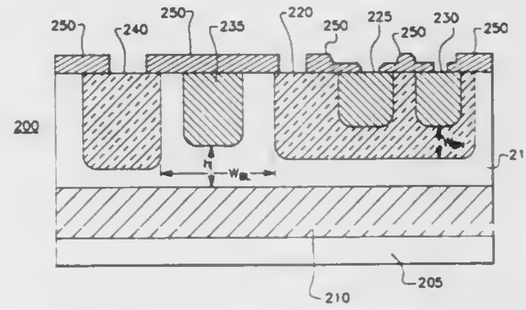
1. A semiconductor device, comprising:

a substrate having a first conductivity type and a major surface;

a first layer having a second conductivity type and a first doping concentration formed on said major surface and having an upper planar surface;

a second layer having said second conductivity type and a second doping concentration lower than said first doping concentration said second layer being formed on said first layer's upper planar surface;

spaced first and second regions formed within said second layer, said first and second regions being of opposite conductivity type from said second layer, said second region having spaced third and fourth regions formed therein of opposite conductivity type from said secon region; and



a distinct fifth region formed in said second layer between said first and second regions, said fifth region being of the same conductivity type as said second layer but having said first doping concentration.

---

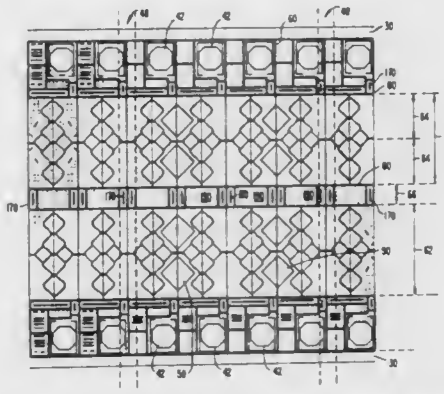
### 5,016,080
## PROGRAMMABLE DIE SIZE CONTINUOUS ARRAY

**Piccolo G. Giannella, Saratoga, Calif., assignor to Exar Corporation, San Jose, Calif.**

**Continuation-in-part of Ser. No. 225,094, Oct. 7, 1988, abandoned. This application Nov. 29, 1988, Ser. No. 277,169**

**Int. Cl.$^5$ H01L** *37/10, 27/15*

**U.S. Cl. 357—45** **18 Claims**



1. A semiconductor wafer for semi-custom integrated circuits comprising:

an array of components arranged so that no areas are reserved without components for scribe lines in at least one of any two orthogonal directions;

a plurality of cell areas containing interior components, said cell areas having a perimeter isolation region for electrically isolating said interior components from other components and said cell areas having a size sufficient to support a bonding pad;

each of said cell areas containing components for at least one bipolar transistor;

said cells being arranged in columns, each column having a width greater than a width required for a scribe line; and

each of said cells including a nitride layer formed between an n-epitaxial layer and an oxide layer to prevent contamination at a scribe line cut.

VOL
1126
ISS
2
MY
14
1991
UMI

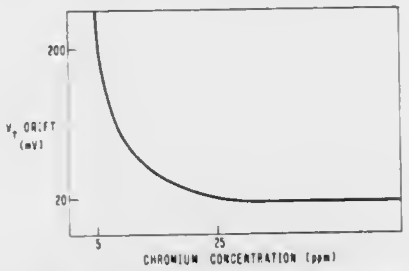
### 5,016,081
### MOBILE ION GETTERER FOR METAL CONDUCTORS

**George N. Brown, Spring Township, Berks County; Luke J. Howard, and William F. Rimmler, both of Exeter Township, Berks County, all of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Mar. 22, 1989, Ser. No. 327,216**

**Int. Cl.$^5$ H01L** *23/48, 23/36, 21/44, 29/12*

**U.S. Cl. 357—67** **5 Claims**



1. A semiconductor device having at least one metal conductor characterized by the metal conductor having therein a mobile ion getterer for reducing the out-diffusion of mobile ion contaminants from the conductor,

wherein the concentration of the mobile ion getterer is less than 2 percent by weight; and,

wherein the mobile ion getterer is, singly or in combination, selected from the group consisting of chromium, molybdenum, and tungsten.

---

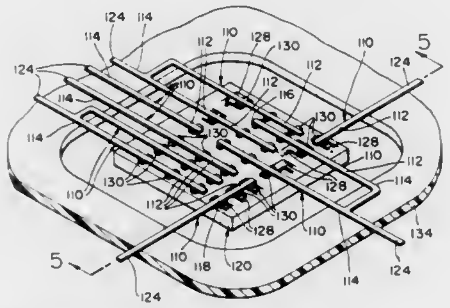
### 5,016,082
### INTEGRATED CIRCUIT INTERCONNECT DESIGN

**Norman J. Roth, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.**

**Continuation of Ser. No. 245,094, Sep. 16, 1988, abandoned. This application Jun. 18, 1990, Ser. No. 539,277**

**Int. Cl.$^5$ H01L** *23/495, 23/535*

**U.S. Cl. 357—70** **2 Claims**



1. The combination comprising:

a monolithic integrated circuit chip; and

an interconnection lead suitable for electrically interconnecting a plurality of bonding sites on said monolithic integrated circuit chip, the interconnection lead comprising:

an electrically conductive copper strip having a first end and a second end, said strip being physically connected at said first end to an electrically conductive tape comprising a plurality of these said conductive strips so that said tape is suitable for use with tape automated bonding techniques; and

between three to five bonding regions on said strip, each of said bonding regions having a bonding bump disposed thereon, said bonding regions being provided between said first electrical connection between said strip and said integrated circuit through said bonding bump;

such that said interconnection lead is electrically connected at said bonding regions to a corresponding number of regions on said integrated circuit.

---

### 5,016,083
### SUBMOUNT FOR SEMICONDUCTOR LASER DEVICE

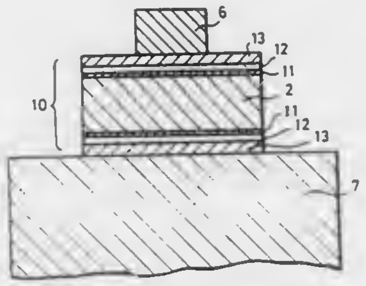
**Mitsuo Ishii, Itami, and Hidenori Nishihara, Fukuoka, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jun. 27, 1990, Ser. No. 544,375**

**Claims priority, application Japan, Jan. 12, 1990, 2-5176**

**Int. Cl.$^5$ H01L** *23/48, 39/02;* **H01S** *3/04*

**U.S. Cl. 357—71** **6 Claims**



1. A semiconductor laser device submount for securing a semiconductor laser chip to a metal block comprising:

a submount body doped with Sb; and

a metallization structure disposed on each of two opposing surfaces of said Sb-doped submount body, said metallization structure comprising a first Au layer, an AuSb layer, and a second Au layer sequentially disposed in the named order on each of the surfaces.

---

### 5,016,084
### SEMICONDUCTOR DEVICE

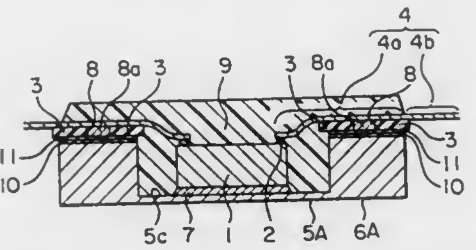
**Shin Nakao, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 310,874, Feb. 16, 1989, abandoned. This application Apr. 2, 1990, Ser. No. 503,100**

**Claims priority, application Japan, Dec. 8, 1988, 63-308806**

**Int. Cl.$^5$ H05K** *7/20;* **H01L** *23/30*

**U.S. Cl. 357—72** **15 Claims**



1. A semiconductor device comprising:

an electrically conductive cap including a bottom wall and a contiguous edge portion transverse to said bottom wall, said bottom wall and edge portion defining a recess bounded by said edge portion and said bottom wall;

a semiconductor element disposed in the recess;

an insulating film disposed on said edge portion adjacent the recess and generally parallel to said bottom wall;

a lead disposed on said insulating film and connected to said semiconductor element; and

an encapsulating resin disposed in said recess encapsulating said semiconductor element, said insulating film, and said lead, wherein said edge portion and bottom wall have thicknesses generally parallel to and transverse to said bottom wall, respectively, and said edge portion has a thickness greater than the thickness of said bottom wall whereby warpage of said bottom wall when said encapsulating resin is cured is prevented.

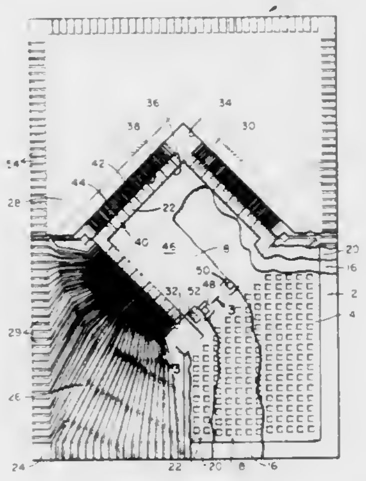
### 5,016,085
### HERMETIC PACKAGE FOR INTEGRATED CIRCUIT CHIPS

**Douglas A. Hubbard, Canoga Park, and Louis E. Gates, Jr., Westlake Village, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Mar. 4, 1988, Ser. No. 164,282**

**Int. Cl.$^5$ H01L** *23/02, 23/16*

**U.S. Cl. 357—74** **12 Claims**



1. A package for integrated circuit chips, comprising:

a dielectric base layer serving as the bottom of said package, a metallic film conductive ground plane secured to the top of said dielectric base layer for connection to ground potential;

a dielectric voltage layer directly on the top of said ground plane, walls defining at least one component opening through said dielectric voltage layer to define a component cavity and to provide physical access to said ground plane, a metallic film conductive voltage plane on the top of said dielectric voltage layer, said voltage plane being for connection to a voltage potential with respect to said ground plane, isolated ground pads on said voltage plane, said isolated ground pads being electrically connected to said ground plane through said dielectric voltage layer so that said voltage plane and said isolated ground pads are both on said voltage layer;

a dielectric signal layer, said dielectric signal layer having walls defining an opening therethrough in alignment with said component opening through said voltage layer to further define said component cavity and to expose said ground plane, said signal layer having walls defining a chip opening therethrough adjacent said component opening to define a chip cavity, said chip opening exposing a portion of said voltage plane to define the bottom of said chip cavity and exposing at least a portion of said ground pads in said voltage plane, a plurality of metallic traces on said signal layer forming a signal plane, said metallic traces terminating in chip connection pads adjacent said chip opening and terminating in pads adjacent the outer periphery of said signal layer; and

a top dielectric layer positioned on the top of said signal plane so that said package contains no more than five dielectric layers carrying conductive planes thereon, said top dielectric layer having a chip opening therein larger than said chip opening in said signal dielectric layer to form an interior shelf on said dielectric signal layer to expose said chip connection pads on said interior shelf, said dielectric top layer having package connection pads around the exterior edge of said dielectric top layer, said connection pads on said dielectric top layer around the exterior thereof being connected to said pads on said dielectric signal layer, said chip opening being arranged so that a chip of maximum size may be housed within said package.

---

### 5,016,086
### IC CARD

**Michiya Inoue, and Yutaka Mizuno, both of Hachioji, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**

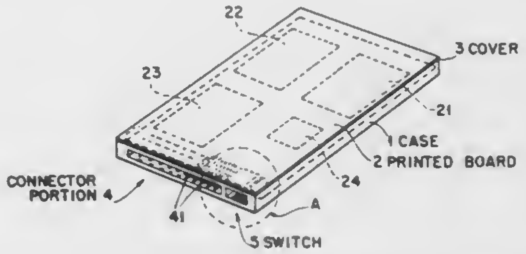
**PCT No. PCT/JP88/00776, § 371 Date Feb. 14, 1989, § 102(e) Date Feb. 14, 1989, PCT Pub. No. WO89/00924, PCT Pub. Date Feb. 9, 1989**

**PCT Filed Aug. 4, 1988, Ser. No. 314,052**

**Claims priority, application Japan, Aug. 5, 1987, 62-195754**

**Int. Cl.$^5$ H01L** *23/02*

**U.S. Cl. 357—74** **2 Claims**



1. An IC card having a connector portion and a changeover switch that are led out from a circuit pattern incorporating a semiconductor integrated circuit, the IC card comprising:

connector means formed integral with said connector portion and changeover switch;

lead means for connecting connector pins of said connector means and contact terminals of said changeover switch with said circuit pattern;

a case for accommodating said circuit pattern, which includes said semiconductor integrated circuit,

said case having a cover, a back and four sides with three of said sides being comprised of solid wall portions and one of said sides having openings therein to accommodate said connector pins and said switch whereby said connector pins and said switch are both mounted in said one side; and

an electrically insulating packing material provided inside said case around said lead means adjacent said openings in said one side to hermetically seal said case.

---

### 5,016,087
### INTEGRATED CIRCUIT PACKAGE

**Werner O. Haug, Boeblingen; Erich Klink, Schoenaich; Karl E. Kröll, Altdorf; Thomas Ludwig, Sindelfingen; Helmut Schettler, Dettenhausen; Rainer Stahl, Schönaich, and Otto M. Wagner, Altdorf, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 15, 1990, Ser. No. 480,422**

**Claims priority, application European Pat. Off., Apr. 20, 1989, 89107094.8**

**Int. Cl.$^5$ H01L** *23/12, 23/14*

**U.S. Cl. 357—75** **30 Claims**

1. An integrated circuit package, comprising,

a passive semiconductor interconnection carrier,

said interconnection carrier being of a first conductivity type,

at least one well of an opposite second conductivity type being provided in the surface of said interconnection carrier,

a power supply distribution wiring comprising first and second conductive lines,

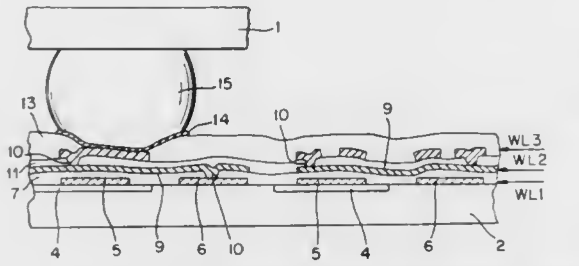
said first conductive line being deposited in an ohmic contact relationship on at least a portion of said well,

said second conductive line being deposited in an ohmic

VOL 1126
ISS 2
MY 14
1991
UMI

contact relationship on the surface of said interconnection carrier, and

said first and said second conductive lines being connected to first and second terminals of said power supply, so that a junction capacitance is formed between said well and said interconnection carrier thereby forming a decoupling capacitor.



---

5,016,088

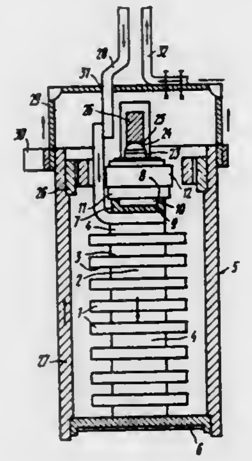
### UNIT OF SEMICONDUCTOR ELEMENTS

**Igor V. Ermilov, Reutov; Jury I. Matusov, and Evgeny V. Mescheryakov, both of Moscow, all of U.S.S.R., assignors to Institut Imeni V. I. Lenina, Moscow, U.S.S.R.**

**Filed Nov. 2, 1989, Ser. No. 430,872**

**Int. Cl.⁵ H01L** *23/32*

**U.S. Cl. 357—76** **1 Claim**



1. A unit of series-connected semiconductor elements, comprising:

a cylindrical metal case having a bottom and side walls;

a clamping mechanism;

a first clamping element of said clamping mechanism, whose functions are discharged by said bottom of said case made of a current-conducting material;

a second clamping element of said clamping mechanism, made of an insulation material, electrically insulated from said case and mechanically coupled with said side walls of said case;

a chain of said semiconductor elements arranged coaxially with said case, said semiconductor elements of said chain being made in the form of a pellet, and having end surfaces which adjoin each other;

a first extreme semiconductor element of said chain, contacting said bottom of said case which functions as said first clamping element of said clamping mechanism;

a second extreme semiconductor element of said chain, contacting said second clamping element of said clamping mechanism;

a first current-carrying busbar electrically associated with the upper part of said side wall of said case;

a second current-carrying busbar electrically associated with the output of said second extreme semiconductor element of said chain, so that when an electric current is applied to said unit, said current will flow in a first direction through said semiconductor elements, and will flow in a second direction through said case, and said second direction is opposite to said first direction.

---

5,016,089

### SUBSTRATE FOR HYBRID IC, HYBRID IC USING THE SUBSTRATE AND ITS APPLICATIONS

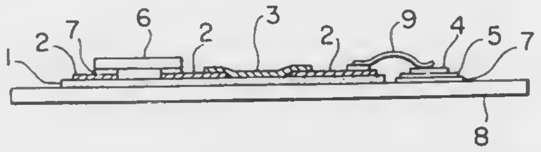
**Mitsuru Fujii, Hadano; Tadamichi Asai, Ibaraki; Toshio Ogawa, Katsuta; Osamu Ito; Akira Ikegami, both of Hitachi; Mitsuru Hasegawa; Takao Kobayashi, both of Hitachi, and Teizo Tamura, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 4, 1989, Ser. No. 293,443**

**Claims priority, application Japan, Jan. 11, 1988, 63-2591**

**Int. Cl.⁵ H01L** *39/02, 27/02, 23/48, 29/40*

**U.S. Cl. 357—80** **18 Claims**



1. A resistor-carrying substrate for hybrid IC, which comprises a ceramic base, a thick film resistor containing glass, formed on the ceramic base, a thick film conductor containing glass, formed at the terminals of the thick film resistor, and an electrically conductive means, provided between the conductor and the resistor, for preventing diffusion of the glass of the thick film resistor into the thick film conductor.

---

5,016,090

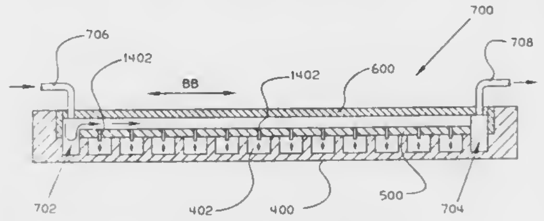
### CROSS-HATCH FLOW DISTRIBUTION AND APPLICATIONS THEREOF

**George T. Galyon, Fishkill; George M. Jordhamo; Kevin P. Moran, both of Wappingers Falls, and Michael L. Zumbrunnen, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 21, 1990, Ser. No. 496,838**

**Int. Cl.⁵ H02B** *1/00;* **G06F** *1/00;* **H01L** *23/46*

**U.S. Cl. 357—82** **16 Claims**



1. A heat removal apparatus, comprising:

a first plate having a plurality of inlet channels formed therein and a plurality of outlet channels formed therein and disposed so as to be interleaved with said inlet channels;

a second plate having a plurality of cooling channels formed therein, said second plate being disposed in communication with said first plate such that said cooling channels are not parallel with said inlet channels and said outlet channels;

a third plate, having a plurality of nozzles formed therein, said third plate being disposed between said first and second plates such that said nozzles align with said inlet channels;

an inlet manifold chamber connected to supply a coolant to said inlet channels; and

an outlet manifold chamber connected to receive said coolant from said outlet channels;

wherein said inlet channels are of a depth that decreases with distance from said inlet manifold chamber.

---

5,016,091

### AUTOMATIC OPTICAL FILTER DISPLACING CIRCUIT

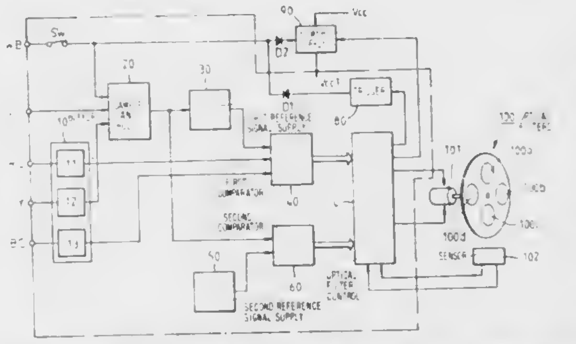
**Hae-yong Choi, Kyunggi, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea**

**Filed Jul. 31, 1989, Ser. No. 387,524**

**Claims priority, application Rep. of Korea, Dec. 12, 1988, 1988/20476**

**Int. Cl.⁵ H04N** *9/73*

**U.S. Cl. 358—29** **22 Claims**



1. An automatic optical filter displacing circuit, comprising:

means for buffering incoming R and B gain control signals and luminance signals;

means for sampling and holding said luminance signals supplied by said buffering means, to produce average values of said luminance signals and carry out a sampling of said average values in response to an incoming automatic white balance set signal and a vertical driving signal;

first means for generating a first reference signal by generating color temperature translating reference signals based on said average values of luminance signals sampled by said sampling and holding means;

first means for making a judgment about the displacement of an optical filter after making a comparison between said color temperature translating reference signal and said buffered R and B gain control signals;

second means for generating light amount adjusting reference signals;

second means for making a judgment on the displacement of the optical filter after comparing said light amount adjusting reference signal with said sampled average value of luminance signals;

means for controlling positional displacement of the optical filters based on judgments of said first and second means for making a judgment;

trigger means for generating said white balance set signal, said trigger means being automatically activated after positional displacement of the optical filter; and

means for supplying power to said first and second generating means, trigger means and positional displacement means for a predetermined period of time in response to said white balance set signal supplied by said trigger means.

---

5,016,092

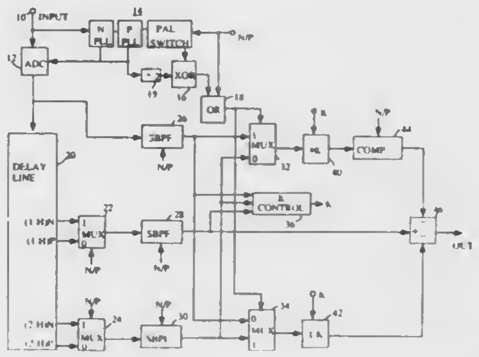
### CONTROL CIRCUITRY FOR AN ADAPTIVE MULTISTANDARD VIDEO COMB FILTER

**Stuart S. Perlman, Princeton, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Division of Ser. No. 437,952, Nov. 17, 1989. This application Oct. 3, 1990, Ser. No. 592,397**

**Int. Cl.⁵ H04N** *9/78*

**U.S. Cl. 358—31** **11 Claims**



1. In a multimode comb filter apparatus for comb filtering video signals corresponding to NTSC and PAL standards in first and second modes, said video signals including a chrominance component, and said apparatus including sampling means for providing video signal samples the occurrence of which are phase aligned to a chrominance subcarrier axis in the NTSC mode and phase aligned a predetermined number of degrees relative to the chrominance subcarrier axis in the PAL mode, said apparatus further including delay means for providing video samples from at least first, second and third horizontal lines and means responsive to a control signal for generating alternative comb filtered signals representing said second horizontal line in both modes, apparatus for generating said control signal comprising:

means for generating respective sums of samples from said first and second horizontal lines and from said second and third horizontal lines, and for generating respective differences of samples from said first and second horizontal lines and from said second and third horizontal lines;

means responsive to said respective sums of samples for generating said control signal in said first mode, and responsive to ones of said respective sums and ones of said respective differences for generating said control signal in said second mode.

---

5,016,093

### VIDEO CAMERA SYSTEM WITH WHITE BALANCE ADJUSTMENT

**Masanobu Yoshida, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Mar. 22, 1989, Ser. No. 327,097**

**Claims priority, application Japan, Mar. 31, 1988, 63-079559**

**Int. Cl.⁵ H04N** *9/73, 5/243*

**U.S. Cl. 358—41** **7 Claims**

1. A video camera system comprising:

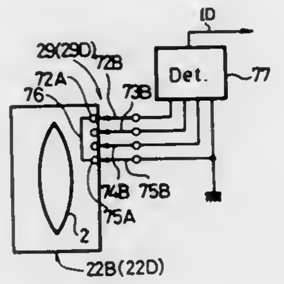
a camera body including image pickup means operative to provide a signal corresponding to a light image projected onto said pickup means, signal processing means responsive to said signal from said image pickup means for providing a color video signal, and white balance adjusting means connected to said signal processing means for correcting the white balance of said color video signal;

exchangeable lens devices interchangeably mountable on said camera body and each including imaging lens means for projecting said light image onto said image pickup means;

socket means provided on each exchangeable lens device

VOL
1126
ISS
2
MY
14
1991
UMI

having respective electrical interconnections uniquely identifying said lens device;
conductive terminals provided on said camera body for engaging said socket means when a lent device is mounted on said camera body and thereby produce a lens identifying signal determined by the electrical interconnections of said socket means;
memory means provided in said camera body for storing

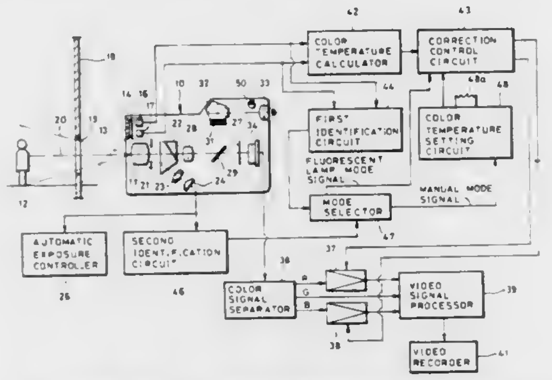


white balance correction data characteristic of each of said exchangeable lens devices;
means responsive to said lens identifying signal for reading from said memory means the white balance correction data characteristic of the lens device then mounted on said camera body; and
means responsive to said white balance correction data read from said memory means for correcting operation of said white balance adjusting means.

---

### 5,016,094
### WHITE BALANCE CORRECTION APPARATUS

**Kiyotaka Kaneko, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
**Filed Jan. 31, 1989, Ser. No. 304,197**
**Claims priority, application Japan, Feb. 3, 1988, 63-13258[U]**
**Int. Cl.⁵ H04N** *9/64, 9/73*
**U.S. Cl. 358—41** **4 Claims**

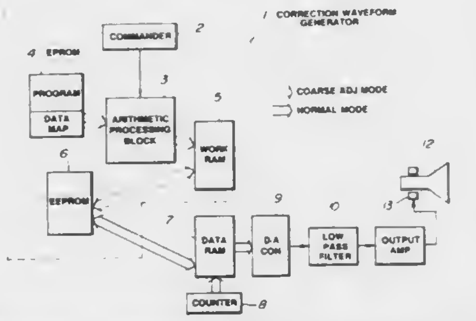

42
43
COLOR TEMPERATURE CALCULATOR
CORRECTION CONTROL CIRCUIT
18
10 32 50 33
14 16
17
44
48a 48
20 19 13
22 28
27 34
31
FIRST IDENTIFICATION CIRCUIT
COLOR TEMPERATURE SETTING CIRCUIT
29
11 21 23 24
FLUORESCENT LAMP MODE SIGNAL
12
MANUAL MODE SIGNAL
MODE SELECTOR
47
AUTOMATIC EXPOSURE CONTROLLER
SECOND IDENTIFICATION CIRCUIT
37
36
26
46
COLOR SIGNAL SEPARATOR
R
G
B
VIDEO SIGNAL PROCESSOR
39
38
VIDEO RECORDER
41

1. A white balance correction apparatus used for electronic cameras having a taking lens system and imaging means, comprising:
first photometry means for measuring a first light from an environment including a scene to be photographed and generating a first photometry signal;
second photometry means for measuring a second light from the scene through the taking lens system and generating a second photometry signal;
first identification means for identifying a light source of the first light based on the first photometry signal and generating a first identification signal representing a result of the first identification;
second identification means for identifying a light source of the second light and generating a second identification signal representing a result of the second identification;
a mode selector for selecting one of white balance correction modes based on a combination of the first and second identification signals; and
correction control means for adjusting the gain of primary color signals output from the imaging means according to the selected white balance correction mode,
the first and second identification means respectively identify whether the light sources are fluorescent lamps based on detection of ripple in the first and second photometry signals.

---

### 5,016,095
### DIGITAL CONVERGENCE FOR TELEVISION RECEIVER

**Kazuo Kii, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**
**Filed Oct. 12, 1989, Ser. No. 420,470**
**Claims priority, application Japan, Oct. 14, 1988, 63-P259000**
**Int. Cl.⁵ H04N** *9/16, 9/18*
**U.S. Cl. 358—64** **13 Claims**



1. Apparatus for generating correction waveform data for an image display, comprising:
a memory storing previously calculated basic correction waveform data for each of a plurality of representative adjustment points of one quadrant of the image display, the number of said representative adjustment points being substantially less than the total number of adjustment points in one quadrant of the image display;
means for reading out said representative adjustment points from said memory from four different starting points depending upon the quadrant of the image display being corrected; and
calculation processing means including a work random access memory for adding or subtracting only to or from the basic correction waveform data at all of said adjustment points including the representative adjustment points on the basis of adjustment instructions pertaining to the respective representative adjustment points of each quadrant of the image display, thereby generating correction waveform data for use in forming said image display.

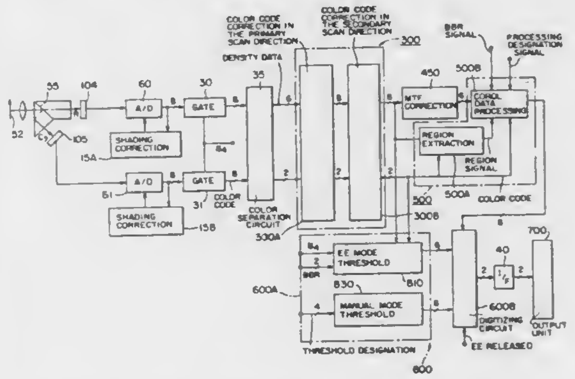
---

### 5,016,096
### APPARATUS FOR COLOR PROCESSING SPECIFICALLY INSIDE OR OUTSIDE A DETECTED REGION

**Masahiko Matsunawa, and Hiroshi Katoh, both of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan**
**Filed Sep. 20, 1988, Ser. No. 247,087**
**Claims priority, application Japan, Sep. 21, 1987, 62-236789**
**Int. Cl.⁵ H04N** *1/46*
**U.S. Cl. 358—75** **6 Claims**

1. An image processing apparatus for identifying a region marked with a predetermined color on a document, comprising
(a) reading means for separating an image light beam emanating from said document into a plurality of color component light beams, and photoelectrically converting said color component light beams into a plurality of color component signals;

(b) A/D converting means for converting each of said color component signals into corresponding digital quantities and for processing them to provide digital outputs;
(c) signal forming means for outputting per pixel either a recording signal representing one of specific colors for recording or a region signal from a ROM means comprised therein corresponding to said digital outputs, and
(d) processing means for processing each said region signal from said signal forming means for identifying said region;

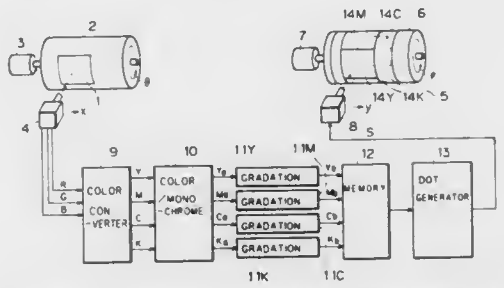


(e) said ROM means comprising a first portion having region data stored therein which corresponds to each said region signal, and a second portion having recording data corresponding to each said recording signal stored therein, wherein said first portion is addressed by said digital outputs corresponding to the predetermined color, and said second portion is addressed by said digital outputs corresponding to other colors than said predetermined color, whereby said other colors are classified into said specific colors for recording.

---

### 5,016,097
### METHOD OF OBTAINING MONOCHROMATIC IMAGE FROM COLOR ORIGINAL THROUGH COLOR IMAGE RECORDER

**Masanori Shimano, Tokyo, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan**
**Filed Dec. 9, 1988, Ser. No. 282,117**
**Claims priority, application Japan, Dec. 9, 1987, 62-309673; Aug. 26, 1988, 63-213331**
**Int. Cl.⁵ G03F** *3/08*
**U.S. Cl. 358—79** **21 Claims**

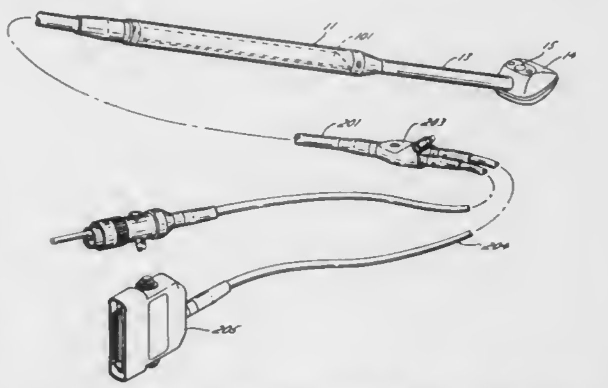


1. A method of obtaining a monochromatic image from a multicolor original image through overprinting of a plurality of color inks, said method comprising the steps of:
(a) obtaining a single color component signal which is indicative of one color component of a multicolor original image,
(b) simultaneously applying a plurality of predetermined correction rules to said single color component signal to obtain a set of corrected color component signals,
(c) producing a plurality of printing blocks as a function of said corrected color component signals, and
(d) using said printing blocks to overprint a plurality of color inks on a common plane to obtain a monochromatic image substantially reproducing said original image in a monochromatic color on said common plane.

---

### 5,016,098
### ELECTRONIC VIDEO DENTAL CAMERA

**David H. Cooper, Saratoga, and Charles S. Bush, Los Gatos, both of Calif., assignors to Fuji Optical Systems, Incorporated, Los Gatos, Calif.**
**Continuation-in-part of Ser. No. 22,171, Mar. 5, 1987, Pat. No. 4,727,416. This application Jan. 28, 1988, Ser. No. 149,521**
**Int. Cl.⁵ A61B** *1/04, 1/06*
**U.S. Cl. 358—98** **24 Claims**



1. A dental camera for use in displaying an image from inside the mouth onto a monitor comprising an electronic video endoscope comprising:
a handle;
a camera head at the distal end of said handle including a means for receiving an image, said camera head being formed such that said means for receiving an image is placed at an angle from the axis of said handle, so as to enable viewing of substantially all areas of a patient's teeth inside the mouth, including the distal, labial, buccal, and lingual aspects of the teeth; and
electronic circuitry contained within said handle.

---

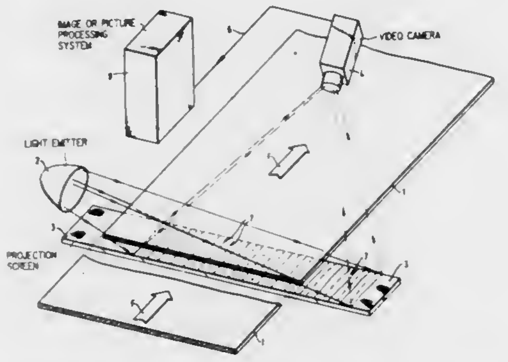
### 5,016,099
### PROCESS FOR DETERMINING THE OPTICAL QUALITY OF FLAT GLASS OR FLAT GLASS PRODUCTS

**Wolfgang Bongardt, Aachen; Helmut Gowert, Stolberg; Hans-Josef Winkeler, Aachen, and Josef Schneiders, Stolberg, all of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Courbevoie, France**
**Filed May 10, 1989, Ser. No. 349,692**
**Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816392**
**Int. Cl.⁵ H04N** *7/18*
**U.S. Cl. 358—106** **21 Claims**

1. A process for determining the optical quality of flat glass, particularly float glass, or products made from flat glass, in which the glass plate is illuminated under an oblique angle of incidence and a silhouette of the illuminated glass plate is produced on a projection screen which, corresponding to the strip-like areas extending in the direction of the glass plate with the character of convex or concave cylindrical lenses comprises light and dark strips associated therewith, characterized by the following features:
(a) the silhouette is determined with a video camera in a narrow measuring field running substantially at right angles to the light and dark strips;
(b) corresponding digitized signals are produced in the video camera or in a series connected digitization stage for the luminance (picture halftone) of each image or picture point;

VOL
1126
ISS
2
MY
14
1991
UMI

(c) the difference signal is in each case formed between the digitized signals corresponding to the measured luminance profile and the signals corresponding to the luminance profile of a plane-parallel, defect-free glass plate (basic luminance profile);



(d) the quotient is in each case formed from said different signals and the corresponding signals for the basic luminance; and

(e) by multiplying said quotients with a correction factor the absolute values of the refractive powers or values proportional thereto are determined and numerically and/or graphically evaluated.

---

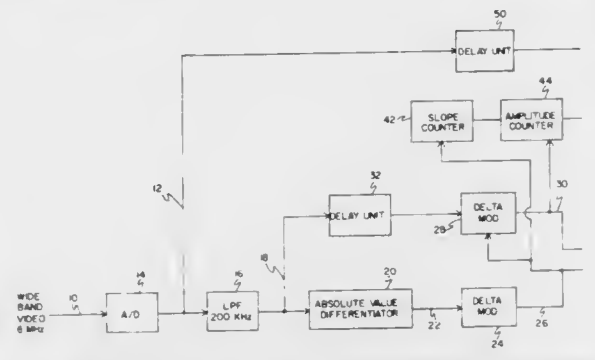
### 5,016,100
### TRANSMISSION OF A VIDEO SIGNAL USING ADAPTIVE DELTA MODULATION

**Richard W. Citta, Oak Park, and Dennis M. Mutzabaugh, Mt. Prospect, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Continuation-in-part of Ser. No. 176,839, Apr. 4, 1988, abandoned. This application Dec. 20, 1989, Ser. No. 453,525**

**Int. Cl.$^5$ H04N** *7/12*

**U.S. Cl. 358—133** **23 Claims**



1. A method of processing and transmitting a video signal comprising:

separating the video signal into a low frequency component and a high frequency component;

encoding the low frequency component using a predetermined data compression method for developing a digital bit stream representing the low frequency component; and

transmitting both the high frequency component signal and the digital bit stream, the digital bit stream being transmitted during the vertical blanking interval of the high frequency component.

---

### 5,016,101
### VIDEO SIGNAL TO PHOTOGRAPHIC FILM CONVERSION

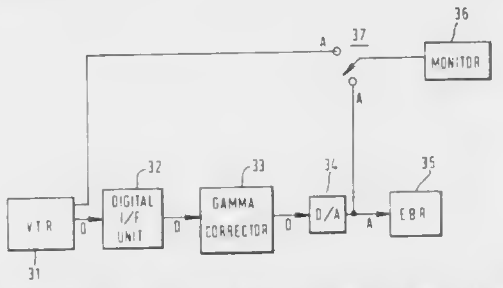
**John W. Richards, Chilbolton; Clive H. Gillard; Richard J. A. Avis, both of Chineham; Raphael Samad, Tadley, and Carl W. Walters, Reading, all of United Kingdom, assignors to Sony Corporation, Tokyo, Japan**

**Filed Apr. 20, 1990, Ser. No. 512,279**

**Claims priority, application United Kingdom, Apr. 27, 1989, 8909656**

**Int. Cl.$^5$ H04N** *5/87, 7/01*

**U.S. Cl. 358—140** **10 Claims**



1. A method of converting an input video signal to a photographic film image, the method comprising the steps of:

deriving from said input video signal a motion compensated digital video signal having a format corresponding to 24 progressive scan frames per second;

recording said motion compensated digital video signal on a recording medium with the use of a video signal recorder;

reproducing said motion compensated digital video signal from said recording medium to provide a reproduced digital video signal;

digital-to-analog converting said reproduced digital video signal to form an analog video signal having a format corresponding to 24 progressive scan frames per second; and

supplying said analog video signal to a photographic recorder to record the content of said analog video signal on photographic film.

---

### 5,016,102
### MOTION DEPENDENT VIDEO SIGNAL PROCESSING

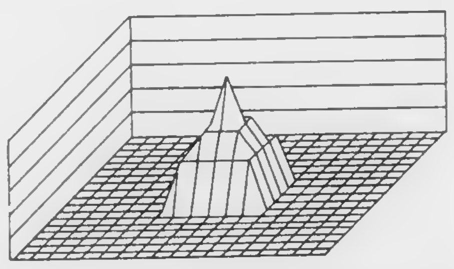
**Richard J. A. Avis, Basingstoke, United Kingdom, assignor to Sony Corporation, Tokyo, Japan**

**Filed Apr. 20, 1990, Ser. No. 512,262**

**Claims priority, application United Kingdom, Apr. 27, 1989, 8909649.9**

**Int. Cl.$^5$ H04N** *7/01*

**U.S. Cl. 358—140** **8 Claims**



1. A motion compensated video standards converter for converting a video signal conforming to a first video standard to a converted video signal conforming with a second video standard, said video signal being provided as a sequence of intervals selected from fields and frames, each of said intervals being arranged in a plurality of blocks each representing a portion of an image represented by said video signal, comprising:

comparing means for comparing each of a plurality of blocks in a first interval of said video signal with a search area comprising a plurality of blocks in an adjacent interval of said video signal by generating a respective correlation surface for each of said plurality of blocks in said first interval, said respective correlation surface representing the respective differences between the image portion represented by said each of said plurality of blocks in said first interval and the respective image portions represented by each of said plurality of blocks in said search area;

motion vector deriving means for deriving motion vectors representing motion of the image portion represented by said each of said plurality of blocks in said first interval based upon a detection of a clear minimum value of said respective correlation surface, by determining whether the respective differences represented thereby increase monotonically in a region thereof surrounding a minimum of said respective differences thereof; and

interpolator means for producing said converted video signal, said interpolator means being controlled at least in dependence on said motion vectors derived by said motion vector deriving means.

---

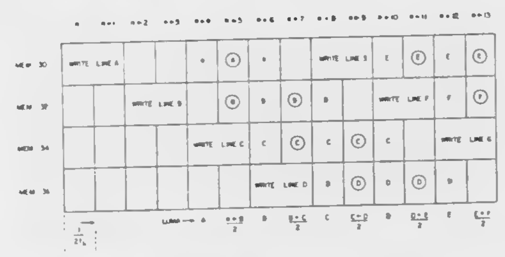
### 5,016,103
### SPATIAL SCAN CONVERTER WITH VERTICAL DETAIL ENHANCEMENT

**Khosro M. Rabii, Arlington Heights, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Aug. 17, 1989, Ser. No. 395,006**

**Int. Cl.$^5$ H04N** *5/14*

**U.S. Cl. 358—166** **8 Claims**



1. A method of operating an interlaced video scanning system comprising the steps of:

writing successive lines of real video information into memory at a line frequency rate 1 H;

reading stored video information from said memory at a line frequency rate 2 H;

developing interpolated lines of video information based upon real video information from immediately adjacent lines;

processing successive ones of said lines of real video information with a vertical detail component developed according to the relationship $K[2m-(u+l)]$, where m, u and l are successive video upper, middle and lower lines and K is a constant, to enhance vertical detail; and

making the enhanced real video lines and the interpolated video lines available for display at a line frequency rate 2 H.

---

### 5,016,104
### RECEIVER-COMPATIBLE NOISE REDUCTION SYSTEMS

**Jae S. Lim, Winchester, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Jun. 22, 1989, Ser. No. 370,171**

**Int. Cl.$^5$ H04N** *5/213, 1/419*

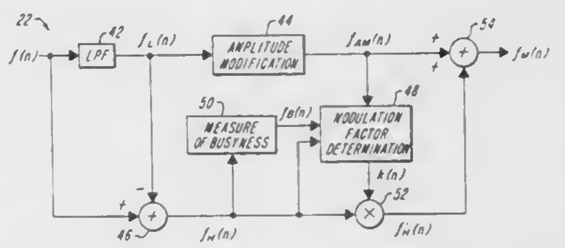
**U.S. Cl. 358—167** **12 Claims**

1. An apparatus for combatting degradation of data signals, the apparatus comprising:

decomposition means for decomposing a data signal into a low frequency signal and at least one high frequency signal;

variance measurement means for measuring the local variance of data values in said high frequency signal;

scaling means for modifying the high frequency signal by application of a series of scaling factors over selected regions in response to the local variance of data values in said regions to produce a modified high frequency signal;



summing means for summing said low frequency signal and said modified high frequency signal to yield a modulated facsimile of the data signal, and

means for transmitting or storing said modulated facsimile and data representative of said scaling factors to permit reconstruction of the data signal and concomitant reduction in signal degradation by application of a series of inverse scaling factors.

---

### 5,016,105
### SPECIAL EFFECTS MIXER FOR VIDEO SIGNALS WITH AUTOMATIC AMPLITUDE CONTROL OF SIGNALS RELATING TO LOWER PRIORITY PLANES

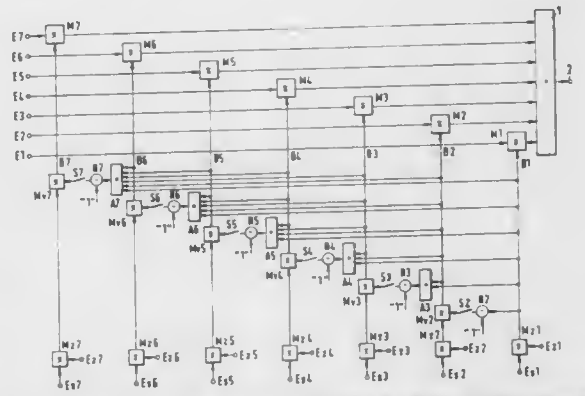
**Klaus-Dieter Muller, Weiterstadt; Ernst Rau, Zwingenberg, and Christian Sacber, Darmstadt-Eberstadt, all of Fed. Rep. of Germany, assignors to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany**

**Filed Dec. 19, 1989, Ser. No. 453,393**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1988, 3842978**

**Int. Cl.$^5$ H04N** *5/265, 5/262*

**U.S. Cl. 358—182** **12 Claims**



1. A mixer for video signals having a plurality of video signal inputs (E1, E2,...) and a plurality of first multipliers (M1, M2,...) respectively having first inputs connected respectively to said video signal inputs, second inputs connected respectively to outputs of mixing control signal sources (Es1, Es2,...) and outputs connected to respective inputs of a common addition circuit (1), and further comprising:

a plurality of second multipliers (Mv2, Mv3,...) respectively interposed between all but a first one (M1) of said first multipliers and all but a first one (ES1) of said mixing control signal sources for premultiplying the respective outputs thereof and respectively having outputs connected respectively to said second inputs of said first

VOL
1126
ISS
2
MY
14
1991
UMI

multipliers, first inputs connected respectively to said mixing control signal sources other than said first one thereof, and second inputs, said first one (M1) of said first multipliers being connected to and identifying a first one (E1) of said video signal inputs as the video signal input which is of highest priority;

a plurality of complement-forming subtraction circuits (N2, N3...) respectively having first inputs connected to a signal source of constant value ("1"), outputs connected respectively to said second inputs of said respective second multipliers (Mv2, Mv3,...), and second inputs; a first one of said subtraction circuits (N2) having its second input connected to said second input of said first one (M1) of said first multipliers and its output connected to a first one (Mv2) of said second multipliers, and thereby defining a second one (E2) of said video signal inputs as the video signal input of second priority, and

a plurality of second addition circuits (A3, A4...) respectively having outputs connected to the respective second inputs of all but said first one (N2) of said subtraction circuits, a first one of said second addition circuits (A3) having a first input connected to said second input of said first one of said first multipliers (M1) and a second input connected to a second input of a second one (M2) of said first multipliers and an output connected through a second one (N3) of said substractors to a second one (MV3) of said second multipliers and thereby identifying a third one (E3) of said video signal inputs as the video signal input of third priority,

at least one other (A4, A5...) of said second addition circuits having an output connected through one of said subtraction circuits (N4, N5...) to one of said second multipliers (Mv4, Mv5...) and inputs connected respectively to second inputs of first multipliers (M1, M2, M3...) which are connected to video signal inputs of higher priority, and thereby defining the priority of at least one (E4, E5...) of said video signal inputs.

---

### 5,016,106
### IMAGE SIGNAL PROCESSING CIRCUIT FOR PRODUCING MULTIPLE PICTURES ON A COMMON DISPLAY SCREEN

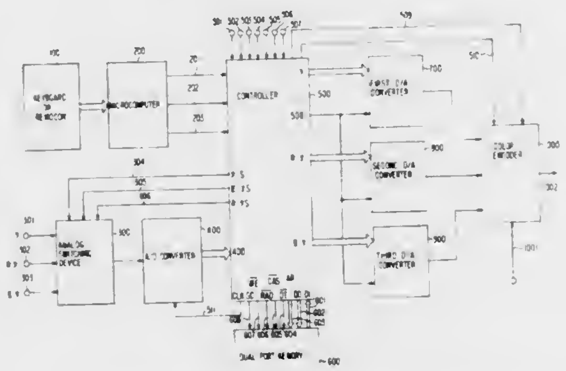
**Kim Yong-Je, Kyoungsangnam-do, Rep. of Korea; Hoon-Sun Choi, and Dae-Yoon Sim, both of Seoul, all of Rep. of Korea, assignors to SamSung Electronics Co., Ltd., Maetan-Dong, Rep. of Korea**

**Filed May 31, 1989, Ser. No. 359,129**

**Claims priority, application Rep. of Korea, Jul. 8, 1988, 1988-8465**

**Int. Cl.$^5$ H04N** *5/262, 5/268, 9/74*

**U.S. Cl. 358—183** **44 Claims**



1. A picture signal processing circuit for producing multiple pictures simultaneously on a display screen of an appliance provided with a synchronizing signal separator and oscillator, said circuit comprising:

a keyboard or remocon capable of providing an instruction word for a multiple mode established by a user;

a microcomputer for checking the instruction word input through said keyboard or remocon, producing first clock signals and first data for processing multiple pictures, and recognizing whether said first data is effective on the basis of second data received through a strobe line;

a controller coupled to receive vertical and horizontal synchronizing signals for a main picture and sub-pictures for a video signal and to receive a first and a second reference frequency, to thereby control the displaying of the multiple pictures on the display screen in dependence upon the first data from said microcomputer;

analog switching device means, for providing output data by selecting and inputting luminance signals Y and color difference signals B—Y and R—Y in a sequence of R—Y, Y, Y, B—Y, Y, Y in response to switching signals for selecting said luminance signal and color difference signals from the controller;

analog/digital converter means for converting output data of the analog switching device means into digital data on a basis of a second clock signal from the controller;

a dual-port memory provided with two access ports of input/output terminals bidirectionally accessible independently from each other of said ports, to conduct $\overline{DT}$, $\overline{CAS}$, $\overline{RAS}$, $\overline{WE}$ and SC signals between corresponding ports of the controller in response to the vertical and horizontal synchronizing signals for the main picture and sub-pictures, to receive address signals, to store and read the digital data via the access ports in accordance with a designation of windows for multiple pictures, and output corresponding video data via a serial port in response to a first control signal from a random port of said controller;

first, second and third digital-to-analog converting means for dividing the video data from said dual-port memory into the luminance signals and the color difference access signals in accordance with digital-to-analog conversion sampling signals produced by said controller, thereby converting the digital data into analog signals; and

color encoder means for encoding analog signals produced by said first, second and third digital-to-analog converting means with a main picture video signal, on a basis of sub-picture position determining signals and pedestal clamping signals of a composite synchronizing signal from said controller, to thereafter enable a multiple picture video display.

---

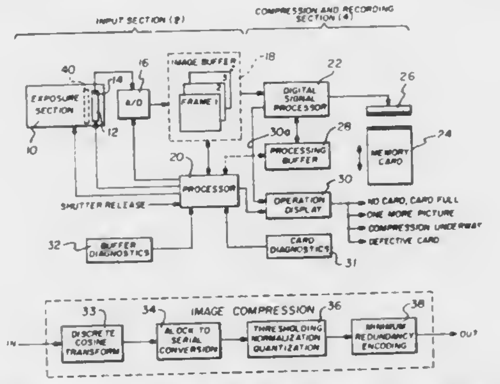
### 5,016,107
### ELECTRONIC STILL CAMERA UTILIZING IMAGE COMPRESSION AND DIGITAL STORAGE

**Steven J. Sasson, Hilton, and Robert G. Hills, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 9, 1989, Ser. No. 349,566**

**Int. Cl.$^5$ H04N** *5/225, 5/30*

**U.S. Cl. 358—209** **18 Claims**



1. Electronic still imaging apparatus employing digital pro-

cessing of image signals corresponding to a still image and storage of the processed image signals in a removable digital memory, said imaging apparatus including an area image sensor having a two-dimensional array of photosites corresponding to picture elements of the image and means for exposing said sensor to image light so that analog image information if generated in respective photosites, said imaging apparatus comprising:

means for converting the analog image information into digital image signals corresponding to the picture elements;

an image buffer with storage capacity for storing digital image signals corresponding to a plurality of still images;

control processor means responsive to user instructions for initiating operation of said exposing means, for clocking the image information from said sensor, and for controlling said converting means to deliver said digital signals to said image buffer, said control processor means loading digital image signals corresponding to said plurality of still images into said image buffer at an input rate commensurate with normal operation of the camera;

digital processing means for operating on blocks of stored digital image signals at a processing throughput rate different than said input rate, said digital processing means including means for transforming blocks of digital image signals into corresponding sets of transform coefficient signals and for encoding the transform coefficient signals into a compressed stream of processed digital image signals;

means responsive to said digital processing means for downloading the processed image signals to said removable digital memory; and

diagnostic means for monitoring the utilization of said image buffer whereby information is generated as to the current condition of the image buffer.

---

### 5,016,108
### SOLID-STATE IMAGING DEVICE HAVING SERIES-CONNECTED PAIRS OF SWITCHING MOS TRANSISTORS FOR TRANSFERRING SIGNAL ELECTRIC CHARGES THERETHROUGH

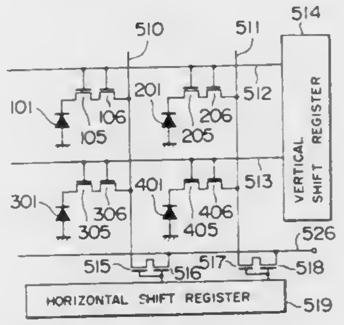
**Hajime Akimoto, Hachioji, and Shinya Ohba, Kanagawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 1, 1988, Ser. No. 214,514**

**Claims priority, application Japan, Jul. 2, 1987, 62-163916**

**Int. Cl.$^5$ H04N** *3/12, 3/14, 5/335*

**U.S. Cl. 358—212** **49 Claims**



1. A solid-state imaging device comprising:

a plurality of photoelectric conversion elements, arranged in matrix form within a semiconductor substrate of a first conductivity type, for storing signal electric charges in accordance with incident light;

first signal lines, arranged in parallel, for transmitting therethrough the signal electric charges stored in respective ones of said photoelectric conversion elements correspondingly coupled therewith and which are arrayed in a predetermined direction;

first switch means for respectively effecting a transfer of a signal electric charge stored in each photoelectric conversion element to a corresponding first signal line coupled therewith, said first switch means including a plurality of transfer means for coupling said plurality of photoelectric conversion elements to said first signal lines, each one of said plurality of transfer means is comprised of a first MOS transistor formed in said semiconductor substrate wherein one of a source and drain thereof is correspondingly associated with a respective one of said photoelectric conversion elements and a second MOS transistor provided above said semiconductor substrate on an insulating film wherein one of a source and drain thereof is electrically connected to the other of the source and drain of said first MOS transistor and the other of the source and drain thereof is coupled to a corresponding one of said first signal lines;

a second signal line for transferring said signal electric charges, provided from said first signal lines, to an output terminal of said device;

second switch means for transferring said signal electric charge on each first signal line to said second signal line; and

scanning means for scanning said first and second switch means in a predetermined sequence.

---

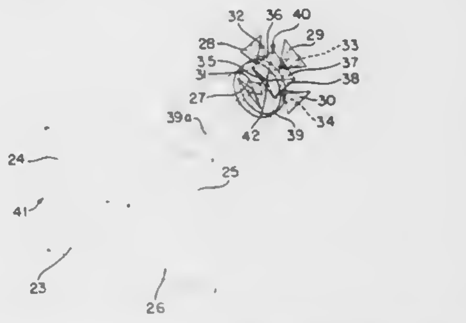
### 5,016,109
### APPARATUS AND METHOD FOR SEGMENTING A FIELD OF VIEW INTO CONTIGUOUS, NON-OVERLAPPING, VERTICAL AND HORIZONTAL SUB-FIELDS

**William J. Gaylord, Stone Mountain, Ga., assignor to Bell South Corporation, Atlanta, Ga.**

**Filed Jul. 2, 1990, Ser. No. 547,825**

**Int. Cl.$^5$ H04N** *5/225*

**U.S. Cl. 358—225** **33 Claims**



1. An apparatus for segmenting a field of view into contiguous, non-overlapping horizontal and vertical sub-fields, the apparatus comprising:

a pyramid shaped element having reflective side facets, the pyramid shaped element being oriented and configured such that the side facets develop the sub-fields.

---

### 5,016,110
### AUTOMATIC FOCUSING CONTROL OF A VIDEO CAMERA FOR INDUSTRIAL AND MILITARY PURPOSES

**Albin Vuichard, Mollis; Bruno Bühler, Stadel, and Tell Cavin, Uster, all of Switzerland, assignors to Oerlikon-Contraves AG, Zurich, Switzerland**

**Filed Jul. 17, 1989, Ser. No. 380,970**

**Claims priority, application Switzerland, Jul. 28, 1988, 02859/88**

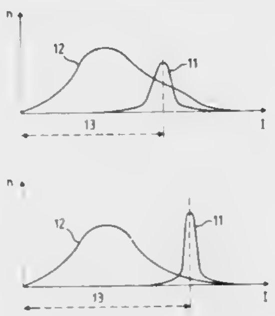
**Int. Cl.$^5$ H04N** *5/232*

**U.S. Cl. 358—227** **24 Claims**

1. An apparatus for automatically and passively focusing a video camera with respect to a predeterminate object comprising;

VOL 1126
ISS 2
MY 14
1991
UMI

a video camera for producing an image of an area containing the predeterminate object;
an image control unit connected to said video camera;
said image control unit receiving data representative of a predetermined image frame of said image produced by said video camera and which predetermined image frame mainly contains an image of said predeterminate object;
said image control unit determining the mean brightness of said predetermined image frame;



a focus control unit interconnected between said image control unit and said video camera; and
said focus control unit controlling a focusing operation at said video camera with respect to said predeterminate object in response to control signals received from said image control unit as a function of said mean brightness of said predetermined image frame.

---

## 5,016,111

## TELEVISION SIGNAL RECORDING/REPRODUCING APPARATUS OF COLOR-UNDER RECORDING TYPE

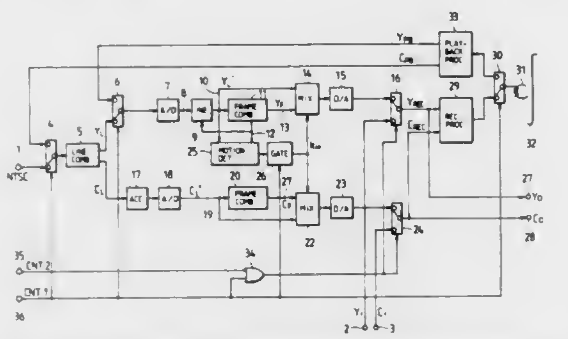
**Toshiyuki Sakamoto, Fujisawa; Noboru Kojima, Kawasaki, and Isao Nakagawa, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 15, 1988, Ser. No. 271,310**

**Claims priority, application Japan, Nov. 27, 1987, 62-297450**

**Int. Cl.$^5$ H04N** *9/82*

U.S. Cl. 358—328 **7 Claims**



1. A television signal recording/reproducing apparatus comprising:
a line comb filter fed with an analog composite video signal via an input terminal and separating said composite video signal into a luminance signal and a color signal by interline calculation;
first and second analog-to-digital converters for converting into digital signals the luminance signal and the color signal separated by said line comb filter;
a noise reduction circuit fed with the output signal of said first analog-to-digital converter and removing a noise component from said output signal;
a first frame comb filter fed with the output signal of said noise reduction circuit and removing a residual color signal component in said output signal by calculating interframe signals;
a first mixer for mixing the input signal and the output signal of said first frame comb filter with each other;
a first digital-to-analog converter for converting the output digital signal of said first mixer into an analog signal;
a second frame comb filter fed with the output signal of said second analog-to-digital converter and removing a residual luminance signal component in the output signal by calculating interframe signals;
a second mixer for mixing the input signal and the output signal of said second frame comb filter with each other;
a second digital-to-analog converter for converting the output digital signal of said second mixer into an analog signal;
control means for controlling signal mixing ratios in said first and second mixers;
a recording processing circuit for carrying out predetermined recording processes for the output signals of said first and second digital-to-analog converters;
recording/playback means for magnetically recording the output signal of said recording processing circuit on a recording medium, and reproducing the signal recorded on said recording medium; and
a playback processing circuit for carrying out predetermined playback processes for the signal reproduced by said recording/playback means.

---

## 5,016,112

## COMBINED VIDEO RECORDER AND CAMERA WITH SUPERIMPOSITION OF VIDEO AND DATA

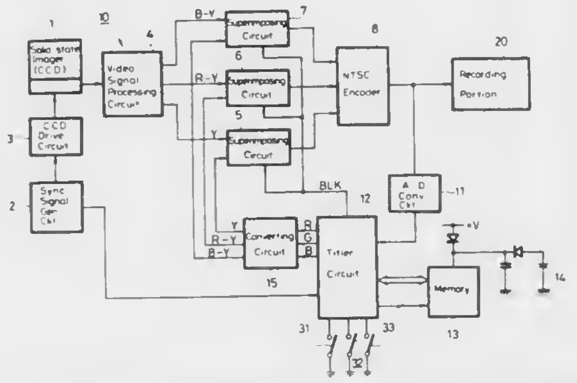
**Takatsugu Nakajima, Tokyo; Katsumi Endo, and Toru Miura, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Aug. 21, 1989, Ser. No. 396,527**

**Claims priority, application Japan, Aug. 23, 1988, 63-209092**

**Int. Cl.$^5$ H04N** *5/76*

U.S. Cl. 358—335 **5 Claims**



1. A video recording apparatus of the type having a built-in type camera which includes an image pickup portion for picking an object and a recording portion for recording a video signal derived from the image pickup portion in accordance with a predetermined format, wherein the improved apparatus comprises:
(a) means for converting the video signal from the image pickup portion to digital image data;
(b) memory means for storing the digital image data;
(c) means for producing an image signal from the image data read out from the memory means, said image signal having a plurality of modes;
(d) means for superimposing the image signal formed of the image data upon the video signal from the image pickup portion;
(e) control means for controlling the writing and reading of the image data in the memory means;
(f) first operation switch means for triggering the control means to store the image data in the memory means;

(g) second operation switch means for triggering the control means to superimpose the image signal upon the video signal; and
(h) third operation switch means for triggering the control means to designate a color for the image signal, wherein when the second operation switch means has not been engaged, the third operation switch means is operated as a mode selection switch for selecting one of the modes of the image signal.

---

## 5,016,113

## APPARATUS FOR REPRODUCING AND PROCESSING PICTURE INFORMATION INCLUDING GRAPHIC CODES FROM A RECORDING MEDIUM

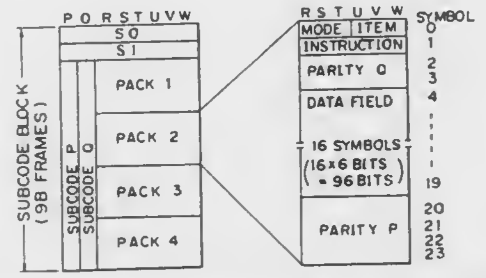
**Masayasu Yamashita; Masami Suzuki; Junichi Yoshio, and Osamu Watanabe, all of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Sep. 22, 1988, Ser. No. 247,564**

**Claims priority, application Japan, Apr. 4, 1988, 63-82621; Apr. 4, 1988, 63-82623**

**Int. Cl.$^5$ H04N** *5/76*

U.S. Cl. 358—335 **5 Claims**



1. An apparatus for reproducing and processing picture information for forming a picture signal corresponding to a graphic code obtained from a recording medium on which, in addition to a video format signal and a coded information signal, graphic codes including picture information are recorded, said graphic codes being inserted as a subcode of said coded information signal, and for mixing said picture signal in said video format signal obtained from said recording medium, said apparatus comprising:
a first input means for receiving said subcode obtained from said coded information signal recovered from said recording medium;
a second input means for receiving said video format signal recovered from said recording medium;
a demodulation means for demodulating said graphic codes from said subcode supplied from said first input means;
a picture signal generating means for generating said picture signal from said graphic codes demodulated at said demodulation means;
a mixing means for mixing said picture signal generated at said picture signal generating means with said video format signal supplied through said second input means;
an operation means for generating a display mode changing command by a manual operation; and
a display mode changing means connected to said operation means and at least one of said picture signal generating means and said mixing means, for changing a mode of display of said picture signal within a picture formed by said video format signal in response to said display mode changing command.

---

## 5,016,114

## DIGITAL COPIER APPARATUS WITH EXTERNAL LASER CARD STORAGE MEDIUM AND IMAGE COMPRESSION VARIABLE WITH AVAILABLE MEMORY

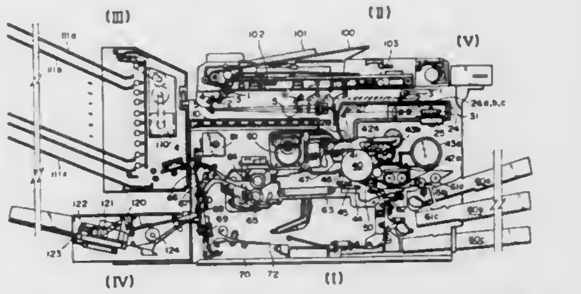
**Seiji Sakata, Yokohama; Tamotsu Harada, Tokyo; Norifumi Ito; Masayuki Hayashi, both of Kawasaki; Tsuyoshi Yoshimura, Tokyo, and Nobuynki Koinuma, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Dec. 8, 1987, Ser. No. 131,004**

**Claims priority, application Japan, Dec. 9, 1986, 61-293872**

**Int. Cl.$^5$ H04N** *1/40*

U.S. Cl. 358—404 **18 Claims**



1. A digital copier using an external storing medium for storing a document image of an original document, comprising:
inputting means for converting into an electric signal image data which are read by scanning said document image;
recording means for recording image data, which have been converted into said electric signal by said inputting means, by storing said image data in said storing medium, said recording means being constructed to compress said image data; and
outputting means for printing out said electric signal to reproduce an image,
wherein said recording means is further constructed to compare an amount of said image data and a residual of memory capacity of said storing medium and, if said amount of image data is greater than said residual, stores said image data in said storing medium after reducing said image data in magnification and, if said amount of image data is smaller than said residual, stores said image data without reducing said image data.

---

## 5,016,115

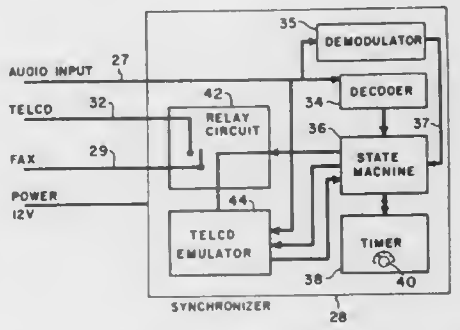
## POINT TO MULTI POINT FAX TRANSMISSION METHOD AND SYSTEM

**Jeffrey E. Calkins, Tulsa, Okla., assignor to United Video, Inc., Tulsa, Okla.**

**Filed Sep. 11, 1989, Ser. No. 405,333**

**Int. Cl.$^5$ H04N** *1/32*

U.S. Cl. 358—442 **3 Claims**



1. A system for the simultaneous transmission of information

VOL
1126
ISS
2
MY
14
1991
UMI

to a plurality of standard facsimile receivers, in which each facsimile receiver has a nascent state and a minimum time characteristic for responding to a call in which called station identification, digital identification signals and other responsive signals are characteristically transmitted by the receiving facsimile receivers, comprising:

means to transmit by selected carrier a unitary signal from a unitary location to a plurality of facsimile receivers;

means with said transmit means to provide spaced ring signals to which said receivers are responsive, such means providing a selected number of ring signals equal to at least the maximum number required by each of the facsimile receivers;

means with said transmit means to provide a digital command signal and training check command signal to the plurality of facsimile receivers, such signals being delayed following said ring signals a selected time commensurate with the maximum time required by said plurality of facsimile receivers;

means with said transmit means of transmitting a facsimile message simultaneously to said plurality of facsimile receivers, such means being delayed a preselected length of time following said digital command and training check command signals required for each of said facsimile receivers to reach the ready state to receive the facsimile message;

means, upon the termination of said facsimile message, of transmitting an end of procedure message by said transmitter means which is received simultaneously be each of said facsimile receivers to thereby cause the facsimile receivers to terminate the procedure and return to their nascent states.

---

### 5,016,116
## COPYING APPARATUS

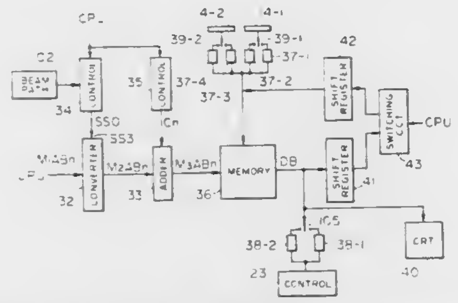
**Katsuyoshi Maeshima, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 770,658, Aug. 29, 1985, abandoned, which is a division of Ser. No. 175,449, Aug. 5, 1980, Pat. No. 4,562,485. This application Aug. 19, 1987, Ser. No. 86,813**

**Claims priority, application Japan, Aug. 10, 1979, 54-102479; Aug. 10, 1979, 54-102480**

**Int. Cl.$^5$ H04M** *1/40*

U.S. Cl. 358—448 **35 Claims**



1. A copying apparatus, comprising:

scanning means for scanning an original image and for producing signals corresponding to the image;

memory means for storing the signals corresponding to the original image scanned by said scanning means;

copy mode input means for determining an image conversion mode to be used for forming a copy image on a copy material in a relationship faithful to or different from the original image;

first control means for controlling access to said memory means in response to the determination from said mode input means for effecting image conversion;

second control mans for controlling said first control means, in response to the image conversion mode for producing the image in a determined position on the copy material; and

image forming means for forming the image at the determined position on the copy material in accordance with the data, wherein said second control means controls said first control means in such a manner that a copy image is formed on the copy material when the image conversion is effected.

---

### 5,016,117
## OPTICAL READER HAVING APPARATUS FOR DISCRIMINATION BETWEEN DITHER-MATRIX AND NON-DITHER-MATRIX READING AREAS, AND/OR MEANS FOR DETERMINING LIGHT EMITTER DRIVE POWER VALUES BY USING REFERENCE REFLECTOR SURFACE

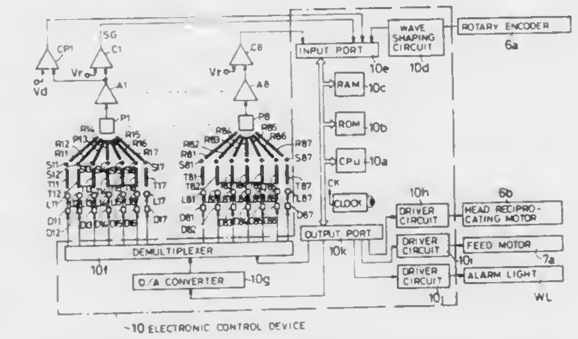
**Takayuki Matsumoto; Shuji Otsuka, both of Nagoya; Tetsuo Harano, Inazawa; Kouzi Takeyama; Suzuyo Murai, both of Nagoya; Kouichi Mino; Koji Matsumura, both of Kashiwa; Chikamasa Hattori, Ichinomiya, and Kazuhiro Kuwabara, Tokoname, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Dec. 16, 1988, Ser. No. 285,854**

**Claims priority, application Japan, Dec. 29, 1987, 62-332489; Apr. 1, 1988, 63-81688; Apr. 1, 1988, 63-81689**

**Int. Cl.$^5$ H04N** *1/40*

U.S. Cl. 358—456 **16 Claims**



1. An apparatus for effecting discrimination between a dither-matrix reading area and a non-dither-matrix reading area on a subject copy which is optically read, comprising:

irradiating means for irradiating local segments of an image-bearing surface of said subject copy with light beams having different intensities;

reading means for receiving the light beams reflected from said local segments of the subject copy, and obtaining image data representative of a presence or an absence of an achromatic tone in each of said local segments based on an amount of the light beam reflected by each said local segment;

reading control means for operating said irradiating means and said reading means to irradiate the local segments in a predetermined discrimination zone of said image-bearing surface, first with the light beam having a first intensity of said different intensities, and then with the light beam having a second intensity of said different intensities which is different from said first intensity, to obtain first image data and second image data, respectively;

comparing means for comparing said first and second image data of said each local segment in said predetermined discrimination zone, with each other, and determining whether said first and second image data agree with each other, or not, for said each local segment; and

discriminating means for determining that said discrimination zone is said dither-matrix reading area, if a degree of disagreement of said first and second image data of said discrimination zone exceeds a predetermined reference value, said discriminating means determining that said discrimination zone is said non-dither-matrix reading area, if said degree of disagreement does not exceed said reference value.

---

### 5,016,118
## IMAGE DETERMINING METHOD AND APPARATUS

**Toshihiko Nannichi, Fuchu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 19, 1989, Ser. No. 409,212**

**Claims priority, application Japan, Sep. 22, 1988, 63-237846**

**Int. Cl.$^5$ H04M** *1/40*

U.S. Cl. 358—462 **14 Claims**

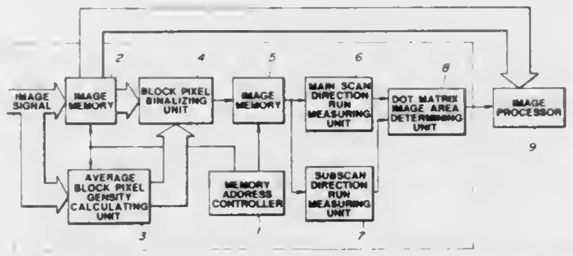


IMAGE SIGNAL
IMAGE MEMORY
2
BLOCK PIXEL BINALIZING UNIT
4
IMAGE MEMORY
5
MAIN SCAN DIRECTION RUN MEASURING UNIT
6
DOT MATRIX IMAGE AREA DETERMINING UNIT
8
IMAGE PROCESSOR
9
AVERAGE BLOCK PIXEL GENSITY CALCULATING UNIT
3
MEMORY ADDRESS CONTROLLER
1
SUBSCAN DIRECTION RUN MEASURING UNIT
7

1. An image determining method of determining a dot matrix image or a character/line picture on the basis of a halftone image signal obtained by scanning an original image including a dot matrix image or a character/line picture, comprising the steps of:

extracting a pixel block corresponding to a two-dimensional region of a predetermined area from the halftone image signal;

calculating the average pixel density of the extracted pixel block;

binarizing the respective pixels of the pixel block using the calculated average pixel density as a density threshold; and

determining whether the pixel block is a dot matrix image or a character/line picture on the basis of a logical form using as a reference the length of the binarized runs and the frequency of occurrence of the runs.

---

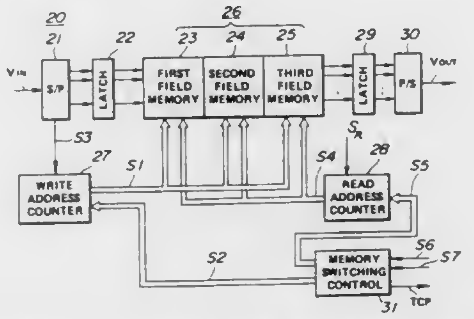
### 5,016,119
## VIDEO SIGNAL REPRODUCING APPARATUS WITH TWO MODES OF KEEPING TRACK OF ADDRESS

**Tetsuo Ogawa; Takao Abe, and Toshiya Asai, all of Kanagawa, Japan, assignors to Sony Corporation, Kitashinagawa, Japan**

**Continuation of Ser. No. 13,234, Feb. 10, 1987, abandoned. This application Aug. 8, 1989, Ser. No. 391,401**

**Int. Cl.$^5$ H04N** *5/783*

U.S. Cl. 360—10.3 **9 Claims**



1. Apparatus for use with a video tape having a longitudinal track in which an address signal is recorded and successive slant tracks in which a video signal and an information signal are respectively recorded at predetermined locations, said apparatus comprising:

means for reproducing said video signal, said information signal, and said address signal;

means responsive to the reproduced information signal for generating a control pulse signal;

address indication means responsive alternatively to said address signal recorded on said longitudinal track and said control pulse signal for providing an address indication; and

control means responsive to the speed of movement of said tape for selectively coupling one of said address signal and said control pulse signal to said address indication means;

wherein said address indication means includes a counter responsive to said address signal for accumulating a count corresponding to a value loaded by said address signal and responsive to said control pulse signal for updating said count, thereby accumulating a count corresponding to said address indication.

---

### 5,016,120
## APPARATUS FOR RECORDING AND REPRODUCING A DIGITIZED AUDIO SIGNAL ON A MAGNETIC TAPE WHICH HAS A SLANT TRACK FORMAT INCLUDING MEANS FOR DETECTING A CONTROL SIGNAL TO IDENTIFY A DIGITIZED AUDIO SIGNAL ON THE SLANT TRACK

**Hiroshi Okada, and Takao Takahashi, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan**

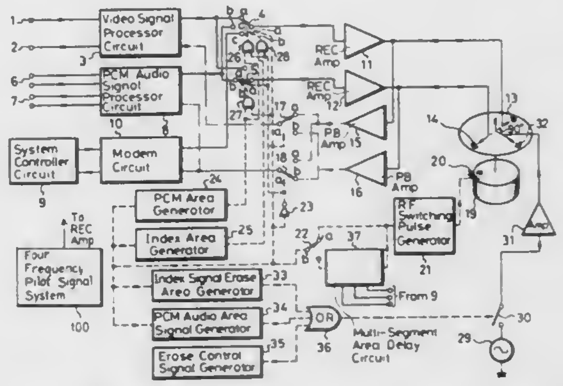
**Continuation of Ser. No. 168,580, Mar. 7, 1988, abandoned, which is a continuation of Ser. No. 838,626, Mar. 11, 1986, abandoned. This application Aug. 1, 1989, Ser. No. 388,314**

**Claims priority, application Japan, Mar. 28, 1985, 60-064554**

**The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.**

**Int. Cl.$^5$ G11B** *5/02*

U.S. Cl. 360—27 **5 Claims**


Video Signal Processor Circuit
PCM Audio Signal Processor Circuit
REC Amp
REC Amp
PB Amp
PB Amp
System Controller Circuit
Modem Circuit
PCM Area Generator
Index Area Generator
To REC Amp
Four Frequency Pilot Signal System
100
Index Signal Erase Area Generator
PCM Audio Area Signal Generator
Erase Control Signal Generator
OR
Multi-Segment Area Delay Circuit
RF Switching Pulse Generator
From 9
11
13
14
16
20
21
29
30
31
32
33
34
35
36
37

1. An apparatus for recording and reproducing at least a digitized audio signal on a magnetic tape having a slant track format, comprising:

a cylindrical surface having a rotary head associated therewith, and a slant track format magnetic tape wrapped around the cylindrical surface so as to be in position for scanning by the rotary head;

said rotary head having a transducer means for recording on and reproducing from slant tracks on the magnetic tape;

pilot signal tracking means connected to said rotary head transducer means for producing a four frequency signal which is recorded by the rotary head;

audio signal processing means connected to said transducer means for recording and reproducing at least one digitized audio signal on a part of a plurality of slant tracks;

index signal means also connected to said transducer means for supplying an index signal to said transducer means to be recorded anywhere within a rear back area and guard area associated with and directly following the part of each of a predetermined number of said plurality of slant tracks identifying a beginning of a desired program of the digitized audio signal;

VOL 1126
ISS 2
MY 14 1991
UMI

said index signal means producing said index signal such that it has a predetermined frequency chosen for searching said beginning of said desired program and so as not to interfere with the four frequency pilot signal; and

means connected to said audio signal processing means for detecting said index signal so as to identify said beginning of the desired program of said digitized audio signal on the slant track during reproducing.

---

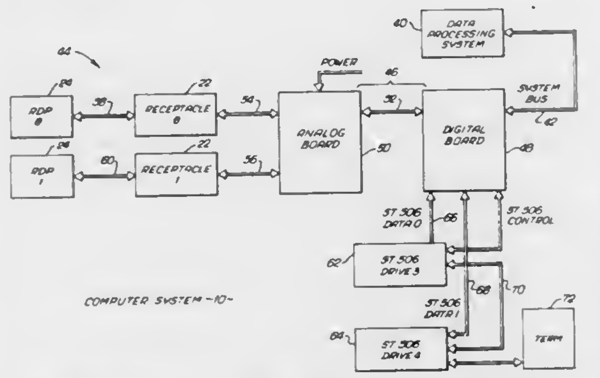
### 5,016,121
### DISK DRIVE CONTROLLER SYSTEM

**Charles I. Peddle, Scotts Valley; Robert G. Taylor, Jr., Santa Cruz; John R. Masters, Aptos; Glenn M. Stark, Santa Cruz; Kenneth M. Stein, San Jose; James M. Donohue, Los Alamitos; Michael T. Dugan, Thousand Oaks; William G. Swinton, Santa Cruz; Bruce A. Fairman, Woodside, and Warren L. Dalziel, Monte Sereno, all of Calif., assignors to Tandon Corporation, Moorpark, Calif.**

**Filed Feb. 25, 1988, Ser. No. 162,948**

**Int. Cl.$^5$ G11B** *5/09*

U.S. Cl. 360—39 9 Claims



1. A hard disk drive system compromising:

a disk drive having a rotatable storage media and at least one data transducer that is movable radially relative to a center of rotation of rotatable storage media to write data to and retrieve data from the storage media, the data being stored on the media in a plurality of sectors which are sequentially disposed circumferentially about the storage media;

a disk drive controller coupled to communicate information over a central processing unit system bus and to control information transfers with the disk drive in response to information received form the system bus, the controller including a RAM sector store which is large enough to store all of the data that may be stored in a plurality of sectors on the media, a positioning subsystem that controls the positioning of the data transducer relative to the storage media in response to information received over the system bus and a data transfer subsystem controlling data transfers between the sector store and the storage media and between the sector store and the system bus in response to information received from the system bus and wherein the sector store transfers data sufficiently fast that data for a plurality of sectors can be continually sequentially exchanged with a plurality of physically sequential sectors on the media without physical sector interleave; and

a second disk drive having a rotatable storage media and at least one data transducer that is movable radially relative to a center of rotation of the rotatable storage media to write date to and retrieve data from the storage media, the data being stored on the media in a plurality of sectors which are sequentially disposed circumferentially about the storage media, the disk drive controller being coupled to control information transfers with the second disk drive in response to information received from the system bus including separate sets of control registers for the first mentioned and second disk drives and being capable of commanding overlapping seeks to selected cylinders by the first mentioned and second disk drives.

---

### 5,016,122
### COIL SWITCHING DEVICE

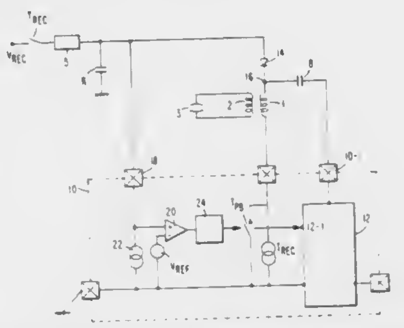
**Thierry Meunier, Obereschach, Fed. Rep. of Germany, and Jean L. Jaffard, Saint Egreve, France, assignors to SGS-Thomson Microelectronics S.A., Gentilly, France**

**Filed Mar. 15, 1989, Ser. No. 323,905**

**Claims priority, application France, Mar. 18, 1988, 88 03899**

**Int. Cl.$^5$ G11B** *15/087*

U.S. Cl. 360—62 17 Claims



17. A method of selectively operating a magnetic playback-/recording device in a playback mode for detecting magnetically recorded information on a magnetic medium and in a record mode for magnetically recording information onto said magnetic medium, said playback/recording device including a magnetic playback/recording head having a first winding for detecting magnetically recorded information on said magnetic medium and for magnetically recording information onto said magnetic medium, and a second coil magnetically coupled to said first coil and including first and second terminals for supplying a playback signal from, and a recording signal to, said first coil, comprising the steps of:

selectively supplying a power supply potential to operate said magnetic recording device in said recording mode;

decreasing said power supply potential by a second potential to supply a record bias signal;

supplying said record bias signal to said playback/recording head;

detecting a level of said selectively supplied power supply potential and, in response, supplying a record control signal; and

modulating said record bias signal with information to be recorded by said playback/recording head in response to said record control signal.

---

### 5,016,123
### APPARATUS FOR MAGNETICALLY DETERMINING THE STATUS OF A CARTRIDGE IN A MAGNETIC RECORDER

**Herbert Karsh, Laguna Beach, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 5, 1989, Ser. No. 417,403**

**Int. Cl.$^5$ G11B** *15/04, 19/02*

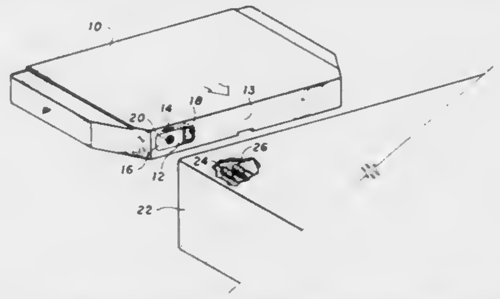
U.S. Cl. 360—69 7 Claims

1. Apparatus for determining a selected functional status of a magnetic tape cartridge positioned in a magnetic recorder and/or reproducer system, said apparatus comprising:

a. a moveable tab on said cartridge,

b. a magnet attached to said tab, wherein said tab moves said magnet to a plurality of specific positions relative to said cartridge,

c. a plurality of magnetic field sensors located in said recorder and/or reproducer system proximate said magnet when said cartridge is positioned within said apparatus, wherein a sensor of said plurality of sensors is responsive to said magnet when said magnet is positioned adjacent to said sensor, whereby the response of said sensor is related to said selected functional status due to the position of said magnet on said movable tab.



---

### 5,016,124
### RECORDING APPARATUS WITH CONTROL OF ENERGY TO THE DRIVE AT START UP

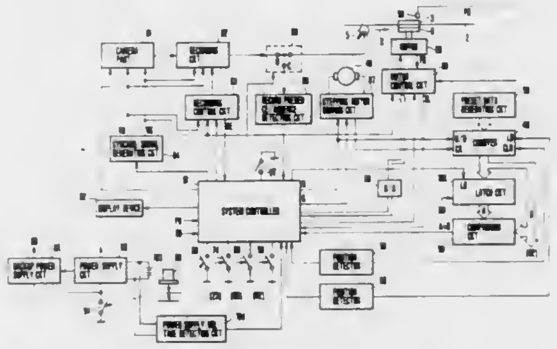
**Nobuo Fukushima; Shinji Sakai; Osamu Takeda; Yasutomo Suzuki, and Masahiro Takei, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 12, 1987, Ser. No. 2,175**

**Claims priority, application Japan, Jan. 14, 1986, 61-005977; Jan. 31, 1986, 61-020503; Jan. 31, 1986, 61-020504; Jan. 31, 1986, 61-020505; Jan. 31, 1986, 61-020506**

**Int. Cl.$^5$ G11B** *19/20*

U.S. Cl. 360—69 29 Claims



26. A drive control apparatus, comprising:

(a) drive means for changing a relative position between a first object and a second object; and

(d) supply means for supplying electrical energy to said drive means in accordance with a control signal, said supply means having a first start mode in which said control signal is fixed and a second start mode in which said control signal is variable, said supply means being arranged to control drive speed of said drive means to a substantially same speed in said first start mode as well as in said second start mode.

---

### 5,016,125
### TAPE LOADING MECHANISM FOR A MAGNETIC RECORDING/REPRODUCING APPARATUS

**Hidekazu Takeda, Katsuta; Kenji Ogiro; Nobuyuki Kaku, both of Yokohama, and Kyulchirou Nagai, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 14, 1989, Ser. No. 322,971**

**Claims priority, application Japan, Mar. 17, 1988, 63-61972; Apr. 15, 1988, 63-91808**

**Int. Cl.$^5$ G11B** *15/665*

U.S. Cl. 360—85 13 Claims

1. A magnetic recording/reproducing apparatus of a helical scanning type including a magnetic head assembly for recording on and reproducing signals from a magnetic tape, said apparatus comprising:

a) a plurality of magnetic heads constituting said magnetic head assembly;

b) a rotary drum having said magnetic head assembly mounted on a peripheral edge portion thereof, said rotary drum adapted to be rotated by rotary driving means to slide on the surface of said magnetic tape so that said magnetic head assembly scans said magnetic tape in the helical scanning manner and has a plane of rotation;

c) a stationary drum disposed coaxially with and adjacent said rotary drum, said stationary drum guiding and maintaining said magnetic tape in a predetermined posture, which magnetic tape is wound around a periphery of said stationary drum;

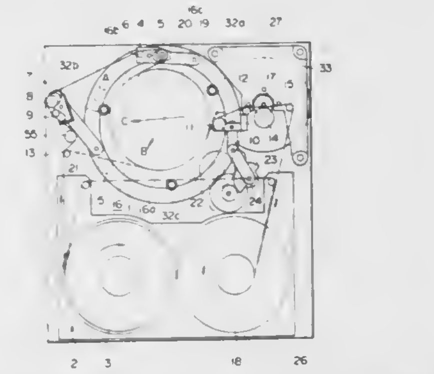
d) a cassette incorporating therein tape winding means around which said magnetic tape is wound to be accommodated in said cassette, said cassette being disposed so that a central reference plane thereof extends perpendicular to the surface of said magnetic tape accommodated in said cassette and through a center of said magnetic tape in the widthwise direction thereof, and a level of the central reference plane is lower than a level of a center of the plane of rotation of said magnetic head assembly;

e) tape loading means disposed on outer peripheries of said rotary drum and said stationary drum and adapted to draw said magnetic tape out of said cassette, and obliquely winding up said magnetic tape around said outer peripheries of said rotary drum and said stationary drum through a predetermined winding angle or releasing said magnetic tape therefrom, said tape loading means including

i) a first entrance-side tape height regulation guide disposed in the vicinity of the outer peripheries of said rotary drum and said stationary drum on an entrance side where said magnetic tape is supplied to said rotary drum and said stationary drum while said magnetic tape is wound around the outer peripheries of said rotary drum and said stationary drum, said first entrance-side tape height regulation guide having a tape winding center thereof disposed at a level with respect to said central reference plane which is higher than a level of said center of the plane of rotation of said magnetic head assembly with respect to said central reference plane, and

ii) a first exit-side tape height regulation guide disposed in the vicinity of the outer peripheries of said rotary drum and said stationary drum on an exit side where said magnetic tape is taken up from said rotary drum and said stationary drum while said magnetic tape is wound around the outer peripheries of said rotary drum and stationary drum, said first exit-side tape height regulation guide having a tape winding center thereof disposed at a level with respect to said central reference plane which is higher than said central reference plane and which is lower than the level of said center of the plane of rotation of said magnetic head assembly;

f) a capstan adapted to make said magnetic heads travel



/OL
126
SS
2
MY
14
1991
UMI

when rotated, a driving capstan motor being directly and coaxially connected to a lower portion of said capstan to rotate the same;

g) tape tension regulation means contacting the recording surface of said magnetic tape and stably applying a predetermined tension to said magnetic tape while said magnetic tape travels; and

h) a main chassis serving as a base on which said stationary drum, said cassette, said tape loading means, said capstan, said capstan motor and said tape tension regulation means are supported.

---

## 5,016,126

## DEVICE FOR CONTROLLING AN ACCESS OPERATION OF AN INFORMATION RECORDING AND REPRODUCING DEVICE

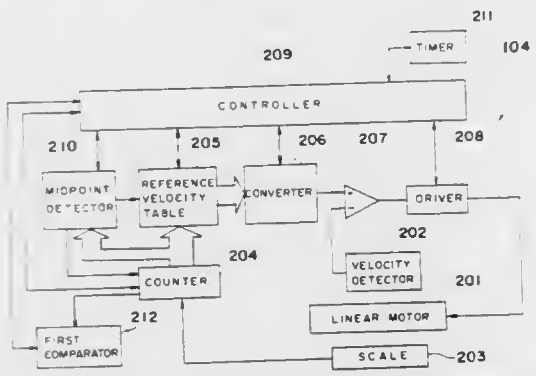
**Nobuyuki Horie; Yoshiki Nishioka, both of Tenri; Toshihiro Yamanaka, Ikoma, and Yoshio Yuki, Nabari, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Aug. 30, 1989, Ser. No. 400,790**

**Claims priority, application Japan, Sep. 2, 1988, 63-220712**

**Int. Cl.$^5$ G11B** *5/55, 21/08*

**U.S. Cl. 360—78.07** **4 Claims**



1. A device for controlling an access operation of an information recording and reproducing device to a target position for rough access in a disk-shaped recording medium prior to a precision access to a final target position, the recording medium having concentric tracks or a spiral track divided into multiple sectors, comprising:

a recording/reproducing means for recording to and reading from said recording medium;

an actuating means for actuating the recording/reproducing means;

a travel signal generator for generating a travel signal according to a travel distance of the recording/reproducing means;

a counting means for counting an output from the travel signal generator;

a comparing means for calculating a difference between a value indicating an access distance which must be traveled for rough access and a value counted by the counting means and then comparing the difference with a predetermined value which has a tolerable range;

a time measuring means for measuring a specified time after the rough access begins, which corresponds to the access distance; and

a discriminating means for discriminating whether or not an actual rough access has been normally finished as desired when the time measuring means finishes measuring the specified time, the discriminating means deciding that the actual rough access has been normally finished if the comparison carried out by the comparing means results in that the difference between the access distance and the counted value falls within the range of the predetermined value.

---

## 5,016,127

## MECHANISM FOR TRANSPORTING AND RECEIVING LARGE AND SMALL TAPE CASSETTES

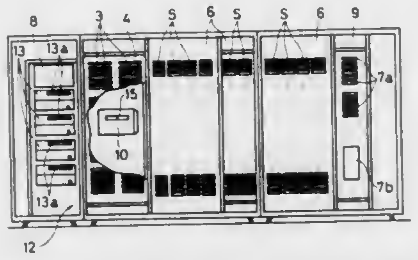
**Yasuo Inoue; Haruo Takeda; Keiji Sato; Noriyuki Yamazaki, and Osamu Iida, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Mar. 20, 1989, Ser. No. 326,097**

**Claims priority, application Japan, Mar. 23, 1988, 63-69088; Mar. 31, 1988, 63-79911; Apr. 6, 1988, 63-84591**

**Int. Cl.$^5$ G11B** *15/68*

**U.S. Cl. 360—94** **9 Claims**



1. An automatic cassette changer for selectively loading cassettes of various sizes into a recording and/or playback unit, said cassette changer comprising:

cassette-housing racks having first cassette rack guides for guiding to a storage position a first cassette of a first size that has at least two, parallel, opposite sides and second cassette rack guides for guiding to a storage position a second cassette of a second size that has at least two, parallel, opposite sides, said second size being different than said fist size;

a cassette transfer unit having means for selectively drawing said first cassette of the first size or said second cassette of the second size from said cassette-housing racks or said recording and/or playback unit and having first cassette transfer unit guides for guiding said two sides of said first cassette of the first size, and having second cassette transfer unit guides for guiding said two sides of said second cassettes of the second size, so as to transfer said first cassette of the first size or said second cassette of the second size drawn from said cassette-housing racks to said recording and/or playback unit, and vice versa; and

a control unit for controlling motions of said cassette transfer unit to transfer first cassettes of the first size and second cassettes of the second size between said cassette housing racks and the recording/playback unit in accordance with information supplied under a predetermined operating program.

---

## 5,016,128

## SUPERCONDUCTING INFORMATION STORAGE DEVICE

**Mark S. DiIorio, San Diego; Stephen E. Robinson, San Diego; Duane B. Crum, San Diego; Douglas N. Paulson, Del Mar; D. Scott Buchanan, San Diego, and James R. Marsden, San Diego, all of Calif., assignors to Biomagnetic Technologies, Inc., San Diego, Calif.**

**Filed Apr. 27, 1988, Ser. No. 187,017**

**Int. Cl.$^5$ G11B** *5/012*

**U.S. Cl. 360—97.01** **12 Claims**

1. An information storage device, comprising:

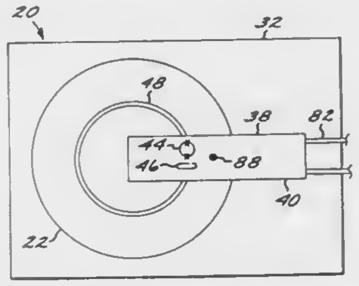
a medium support mounted so as to be rotatable about an axis of rotation;

a magnetic recording medium deposited upon a surface of said medium support;

a read/write head head positioned adjacent the surface of said medium support upon which said magnetic recording medium is deposited;

means for writing a magnetic pattern into said recording medium, said means for writing being mounted on said read/write head; and

means for reading the magnetic pattern in said recording medium, said means for reading being mounted on said read/write head and including a superconducting quantum interference device.



---

## 5,016,129

## FLYING-TYPE COMPOSITE MAGNETIC HEAD WITH APPROPRIATE BONDING GLASSES AND METHOD OF PRODUCING SAME

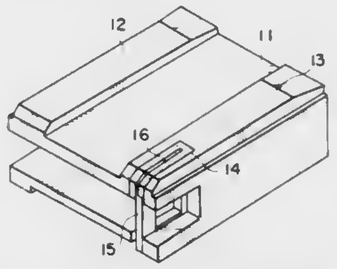
**Ryo Goto; Tadafumi Tomitani, both of Mouka; Fumio Nitanda, Fukaya; Masanobu Yamazaki; Manabu Toyoda, both of Mouka, and Makoto Ushijima, Tokyo, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan**

**Filed Mar. 29, 1989, Ser. No. 330,216**

**Claims priority, application Japan, Mar. 29, 1988, 63-75259; Apr. 7, 1988, 63-85718**

**Int. Cl.$^5$ G11B** *5/60*

**U.S. Cl. 360—103** **5 Claims**



1. A flying-type composite magnetic head comprising:

(a) a magnetic core constituted by a pair of core pieces bonded together by a first glass portion, at least one of opposing surfaces of said core pieces being formed with a thin magnetic metal layer having a thickness of 1.5 to 5.0 $\mu$m; and,

(b) a non-magnetic slider having a slit in which said magnetic core is fixed by a second glass portion, wherein said first glass portion has a softening point of 560°–580° C. and a yielding temperature of 500°-530° C., and said second glass portion has a softening point of 410°–450° C.

---

## 5,016,130

## RETAINING DEVICE FOR A MAGNETIC HEAD

**Yasuhiro Hashiguchi, Katsuta; Noboru Katohno, Mito, and Yoshihiro Shibata, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 23, 1987, Ser. No. 111,629**

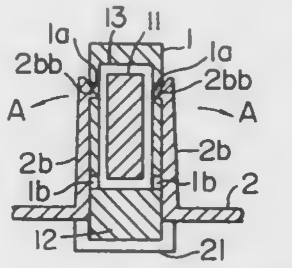
**Claims priority, application Japan, Oct. 24, 1986, 61-162205[U]**

**Int. Cl.$^5$ G11B** *5/48*

**U.S. Cl. 360—104** **4 Claims**

1. A retaining device for a magnetic head in a magnetic recording/reproducing apparatus for recording signals onto magnetic tape and reproducing the signals thus recorded, wherein said magnetic head includes a magnetic core, a core retaining member for retaining said core, and an armor portion integrally molded with said core retaining member, and said magnetic head records signals onto said magnetic tape, and reproduces signals from said magnetic tape or erases signals recorded on said magnetic tape, said retaining device comprising:

a groove disposed on a side face of said magnetic head where the magnetic head does not contact said magnetic tape, said groove being formed when said core retaining member and said armor portion are integrally molded;



an elastic piece for mounting said magnetic head to a mounting member made of resin, said elastic piece being disposed and integrally molded on said mounting member;

wherein said elastic piece includes a nail integral with said elastic piece; and

wherein said nail is positioned on said elastic piece such that said nail releasably engages said groove to fix said magnetic head to said mounting member.

---

## 5,016,131

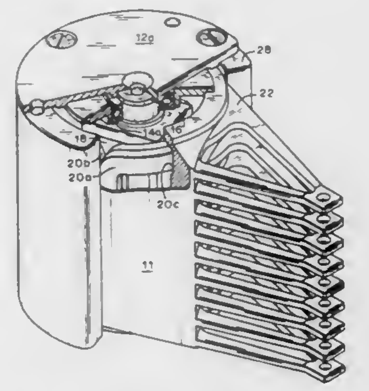
## INTEGRAL BALANCED-MOMENT HEAD POSITIONER

**Charles M. Riggle; Peter R. Svendsen, both of Colorado Springs, and John D. Read, Monument, all of Colo., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed Apr. 26, 1989, Ser. No. 343,907**

**Int. Cl.$^5$ G11B** *5/55*

**U.S. Cl. 360—106** **6 Claims**



1. A rotational positioner for positioning read/write heads across a plurality of magnetic disks, said positioner comprised of:

A. a rotor assembly mounted for rotation about a central axis said rotor assembly including
  i. a rotor;
  ii. a plurality of arms carried on said rotor within a predetermined axial location of said axis for supporting the read/write heads;
  iii. a coil mounted on said rotor with a pair of legs extending parallel to the axis each of which is positioned diametrically opposite the other with respect to the axis, said coil legs being at the same axial location as said arms; and
  iv. a counterweight disposed on said rotor opposite said arms such that the center of gravity of said rotor assembly is on the axis, said counterweight dynamically balancing said rotor; and

VOL 1126
ISS 2
MY 14 1991
UMI

B. means for passing a magnetic flux radially through said coil legs such that a torque developed in response to current through said coil and a reactive counter-torque developed in response to the rotating rotor assembly are at the same axial location and there is no net force on the axis.

---

### 5,016,132
## MAGNETIC RECORDING AND REPRODUCING TAPE GUIDE UNIT

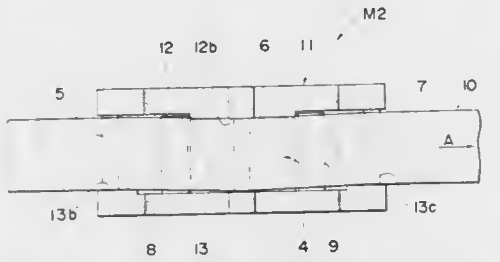
**Tobru Okuda; Hideo Okada, both of Nara; Takashi Koyama, Tenri; Osamu Okada, Ikoma, and Mamoru Nakatsuka, Kashiwara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 7, 1989, Ser. No. 376,645**

**Claims priority, application Japan, Jul. 8, 1988, 63-171305**

**Int. Cl.$^5$ G11B** *15/60*

**U.S. Cl. 360—130.21** **7 Claims**



1. A head unit for a magnetic recording and reproducing comprising:

a tape guide unit including a pair of spaced tape guide substrates wherein each said tape guide substrate includes at least one tape guide face, a spacer provided between said tape guide substrates so as to position said tape guide substrates a predetermined distance apart and approximately parallel to each other, and guide poles for guiding a surface of a magnetic tape, said guide poles extending through front portions of said tape guide substrates in a direction generally perpendicular to surfaces of said tape guide substrates; and

a plurality of magnetic heads fixed in preadjusted postures with respect to said tape guide unit;

wherein said tape guide substrates are of a non-symmetrical configuration, and a tape guide width between a tape guide face of the upper tape guide substrate and tape guide faces of the lower tape guide substrate is set to be slightly smaller than a width of a magnetic tape by a predetermined degree.

---

### 5,016,133
## APPARATUS FOR FLICKER PROTECTION WHEN A SERVO-MOTOR STARTS

**Minetoshi Noguchi, Tama, and Shigemi Yamano, Chofu, both of Japan, assignors to Juki Corporation, Tokyo, Japan**

**Continuation of Ser. No. 149,697, Jan. 29, 1988, abandoned. This application Apr. 18, 1990, Ser. No. 512,062**

**Claims priority, application Japan, Jan. 30, 1987, 62-21110**

**Int. Cl.$^5$ H02H** *3/24*

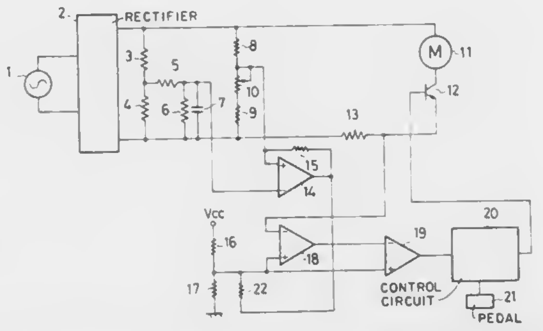
**U.S. Cl. 361—92** **3 Claims**

1. In a sewing machine having a servo motor connected to an electric source for driving a main shaft of the sewing machine and a pedal switch for varying an electric current to drive or stop the servo motor in response to the amount of depression thereof, an electric circuit for reducing flicker due to voltage drop of said electric source when the servo motor starts, comprising:

means for generating a signal representing a drop in voltage of said electric source,

an electric-current-setting circuit for generating a signal representing a predetermined maximum current value for the servo motor,

a control circuit for supplying an electric current in response to the amount of depression of said pedal switch such that when the depression amount is maximum, said predetermined maximum current is supplied to said servo motor, and



an attenuating circuit responsive of said signal representing said drop in voltage for changing said signal representing said predetermined maximum current into a signal representing the reduced maximum current to said control circuit.

---

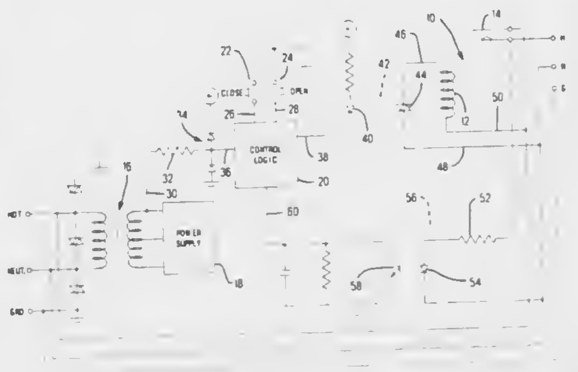
### 5,016,134
## DRIVER CIRCUIT FOR SINGLE COIL MAGNETIC LATCHING RELAY

**Paul S. Chang, Harrisburg, and Lee W. Steely, Mohnton, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Aug. 8, 1990, Ser. No. 564,227**

**Int. Cl.$^5$ H01H** *47/32, 47/24*

**U.S. Cl. 361—153** **10 Claims**



1. An arrangement for controlling a single coil magnetic latching relay having an output switch that is closed and remains closed when the relay is energized by a pulse across its coil of a first polarity and is opened and remains open when the relay is deenergized by a pulse across its coil of a second polarity, comprising:

close input means for receiving a close signal indicating that said output switch is to be closed;

open input means for receiving an open signal indicating that said output switch is to be opened;

means for receiving AC power;

close means coupled to said close input means and responsive to a close signal received thereat for applying a half cycle pulse of said AC power having said first polarity to the coil of said relay; and

open means coupled to said open input means and responsive to an open signal received thereat for applying a pulse which is a portion of a half cycle of said AC power having said second polarity to the coil of said relay, said portion being chosen so that the effective current at said second polarity is insufficient to reenergize said relay.

---

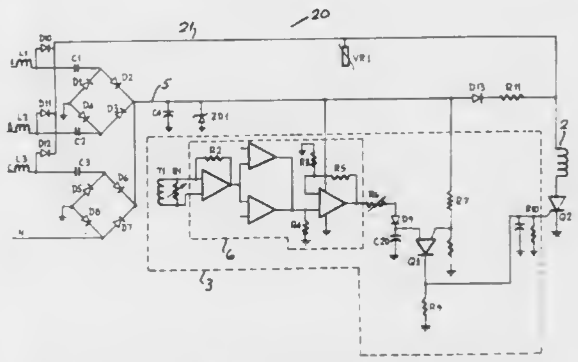
### 5,016,135
## POWER SUPPLY INCORPORATING CIRCUIT BREAKER AND FAULT DETECTION CIRCUIT

**Henry J. Zylstra, Alburnett, Iowa, assignor to Square D Company, Palatine, Ill.**

**Continuation of Ser. No. 340,323, Apr. 19, 1989, abandoned. This application Jul. 16, 1990, Ser. No. 552,374**

**Int. Cl.$^5$ H02H** *7/08, 7/125*

**U.S. Cl. 361—156** **5 Claims**



1. A low current power supply incorporating a circuit breaker and fault detection circuit means for supplying tripping energy for said circuit breaker, said power supply being subject to dielectric testing with a high DC voltage, comprising:

line and neutral power leads;

rectifier means coupled to said line and neutral power leads for supplying power to said fault detection circuit means; and

a capacitor, on the order of 0.1 microfarads, individually coupled between each of said line power leads and said rectifier means for protecting said power supply from said high DC voltage.

---

### 5,016,136
## CHARGE BUILD-UP AND DECAY MONITOR

**C. James Corris, Shenandoah, Ga., assignor to Semtronics Corporation, Peachtree City, Ga.**

**Filed Feb. 17, 1989, Ser. No. 312,609**

**Int. Cl.$^5$ H01T** *23/00*

**U.S. Cl. 361—230** **16 Claims**

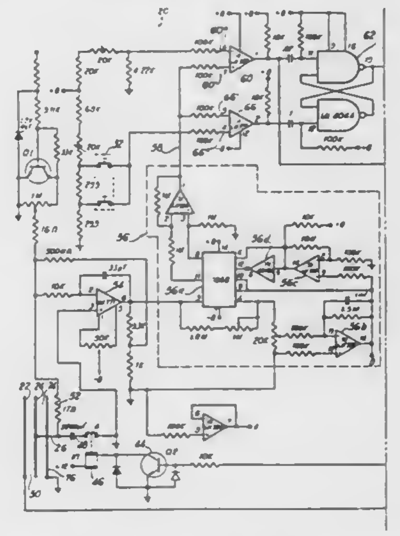
1. A charge monitor comprising:

a. a first plate for receiving a charge;

b. a second plate separated from the first plate by a constant predetermined distance;

c. a capacitor connected to the second plate; and

d. means connected to the second plate in parallel to the capacitor for indicating the charge on the first plate by sensing the charge induced on the second plate when the capacitor is connected to electrical ground.



---

### 5,016,137
## MULTI-LAYER CERAMIC CAPACITOR

**Yoichiro Yokotani, Suita; Hiroshi Kagata, Katano; Junichi Kato, Osaka, and Kouichi Kugimiya, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 30, 1989, Ser. No. 443,167**

**Claims priority, application Japan, Dec. 5, 1988, 63-307386; Jan. 23, 1989, 1-13810**

**Int. Cl.$^5$ H01G** *4/10*

**U.S. Cl. 361—321** **6 Claims**

1. A multi-layer ceramic capacitor comprising,

(a) internal electrode layers having many pores or trenches, in which the diameters of the pores and the gaps of the trenches are z μm.

(b) ceramic dielectric layers, whose thickness is x μm, extending between the internal electrode layers, wherein z/x is defined by the formula, $z/x \leqq 1.0$.

---

### 5,016,138
## THREE DIMENSIONAL INTEGRATED CIRCUIT PACKAGE

**John K. Woodman, 601 Mystic La., Foster City, Calif. 94404**

**Continuation-in-part of Ser. No. 113,635, Oct. 27, 1987, Pat. No. 4,868,712. This application Sep. 18, 1989, Ser. No. 408,750**

**Int. Cl.$^5$ H05K** *7/20*

**U.S. Cl. 361—381** **5 Claims**

1. A three-dimensional high density integrated circuit package comprising

a. at least two integrated circuit layers, each of said layers having a first face and a second face and a plurality of edges, wherein at least a portion of the respective faces of said layers are juxtaposed in a face-to-face contacting relationship forming an integral, hermetically sealed stack of said layers, and further wherein each of said layers is an integral unit including:

(1) a substrate member, including a plurality of operative connectors,

(2) at least one integrated circuit chip member mounted on each said substrate, said chip being operatively coupled to said connectors, and

(3) a spacer member having a central aperture surrounding each said chip on each said substrate,

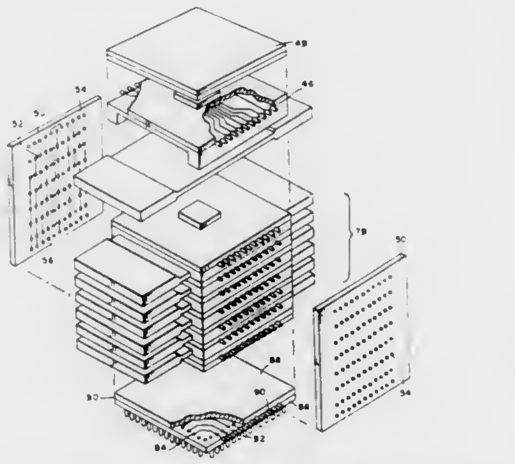
said layers each including one or more vertical grooves

VOL
1126
ISS
2
MY
14
1991
UMI

formed therethrough so as to be in alignment with one another,

b. conductive pin means for operatively interconnecting internally within said package through said aligned grooves any one or more of said connectors on any one of said layers with any one or more of said connectors on any other said layer, whereby at least one of said connectors communicates with one or more external circuits,

said package further comprising heatsink members interspersed at predetermined intervals between said layers to provide lateral heat dissipation for each of said layers.



---

### 5,016,139

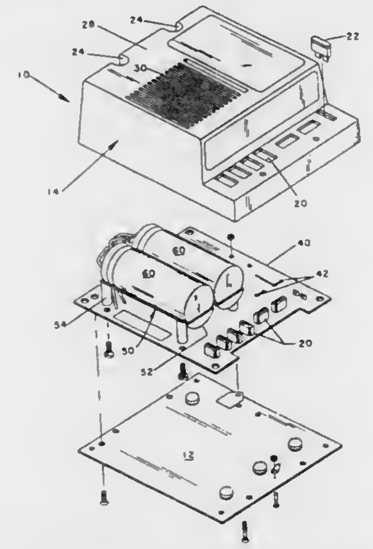
### ELECTRONIC POWER SUPPLY WITH ENHANCED HEAT TRANSFER CHARACTERISTICS

**James L. Stopa, Old Saybrook, and Stephen C. Bibbiani, Westbrook, both of Conn., assignors to Whelen Technologies, Inc., Chester, Conn.**

**Filed Sep. 6, 1989, Ser. No. 403,599**

**Int. Cl.$^5$ H05K** *7/20*

**U.S. Cl. 361—386** **19 Claims**



1. A power supply with enhanced heat transfer characteristics comprising:

base means;

circuit means comprising a circuit board and including at least one capacitor having an exterior surface which is generally of cylindrical shape;

capacitor cradle means supporting said at least one capacitor, said cradle means comprising a bed having a concave-shaped surface generally complementary in shape to a portion of the exterior surface of said at least one capacitor, said cradle means being mounted on said circuit means;

cover means mounted to said base means and cooperating with said base means to enclose said circuit means and said cradle means, said cover means comprising a top portion having an interiorly projecting capacitor receiver, said receiver having a surface contour which is in part generally complementary in shape to said capacitor exterior surface, said receiver being in surface-to-surface contact with said at least one capacitor whereby said at least one capacitor is clamped in a fixed position between said capacitor cradle means and said receiver and is in intimate heat transfer relationship with said receiver.

---

### 5,016,140

### SWITCH ARRANGED FOR BEING MOUNTED ON A CIRCUIT BOARD

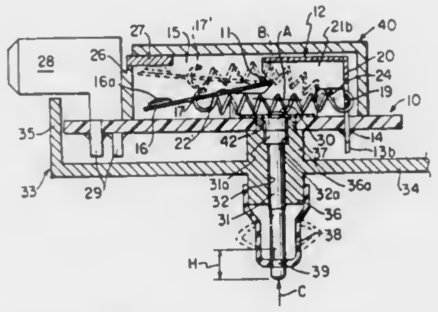
**Fritz Prestel, Hausen a. Tann, and Martin Lohner, Balingen-Ostdorf, both of Fed. Rep. of Germany, assignors to BSG-Schalttechnik GMBH & Co. KG, Balingen, Fed. Rep. of Germany**

**Filed Aug. 8, 1989, Ser. No. 391,417**

**Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829301**

**Int. Cl.$^5$ H05K** *7/02*

**U.S. Cl. 361—400** **11 Claims**



1. A switch arranged to be mounted on a circuit board comprising a movable wiper and at least one counter-contact arranged in the area of movement of said wiper, said wiper movable between a first above dead-center position and a second switching position to contact said counter-contact, a biassing spring engaging said wiper and generating a biassing force, an actuating element adapted to be operational by external switching means, and a main support on which said wiper is supported, said main support being placed directly on said circuit board and fixed thereon, characterized in that

(a) said biassing spring is mounted on said main support and on said wiper, said biassing spring, supporting said wiper and operable to bias said wiper into said first above dead-center position,

(b) said actuating element comprising a rod passing through said circuit board in a direction parallel to the direction of movement of said wiper; and

(c) wherein said rod is positioned to bear vertically upon a central area of said biassing spring to displace said central area of said spring to move said wiper from said first position to said second switching position.

---

### 5,016,141

### PRINTED CIRCUIT BOARD EDGE-LOCKING DEVICE

**James D. Lorig, and John A. Shearer, both of Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed May 9, 1990, Ser. No. 521,306**

**Int. Cl.$^5$ H05K** *7/14*

**U.S. Cl. 361—415** **7 Claims**

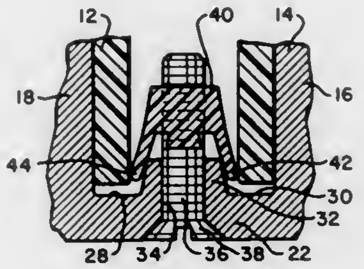
1. A locking device combined with a pair of spaced apart

printed circuit boards located within a support chassis having a pair of outer side walls held apart by upper and lower cross-walls, said circuit boards being edge supported on at least one of the cross-walls, comprising:

center wall means integral with the cross-wall supporting the circuit boards extending upwardly between facing circuit board edge portions, said center wall means opposite side surfaces sloping toward each other and at least two openings extending through the center wall means and adjacent cross-wall; and

clamping means including,

an elongated body having two openings aligned with the center wall means openings,



first and second clamping strips respectively integral with opposite sides of the body and flared away from said body, and

machine screws threaded from the outside of the support chassis through the center wall means openings into the body openings;

said screws on being threadedly advanced into the body openings, pull the clamping strips onto the center wall means sloping sides deforming the strips outwardly to clamp the board edge portions against the support chassis side walls.

---

### 5,016,142

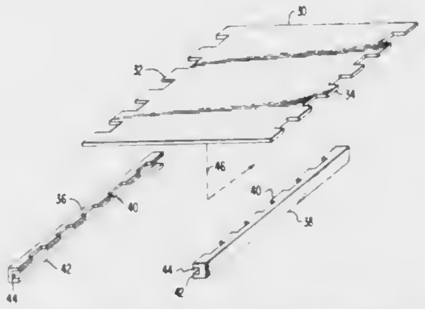
### PRINTED CIRCUIT BOARD GUIDE APPARATUS FOR A LIMITED ACCESS AREA

**Robert C. White, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Jul. 27, 1990, Ser. No. 558,489**

**Int. Cl.$^5$ H05K** *7/14*

**U.S. Cl. 361—415** **17 Claims**



1. A printed circuit board guide apparatus for guiding a printed circuit board to a mounted position, comprising:

a plurality of first tabs extending from a first edge of said printed circuit board;

a plurality of second tabs extending from a second edge of said printed circuit board, said second edge being directly opposite to said first edge;

first and second guide units disposed in a spaced apart parallel relationship to each other and each guide unit including a plurality of guide tabs extending from a top surface of said each guide unit and a ledge extending from a bottom surface of said each guide unit parallel to said guide tabs, said guide tabs and said ledge of said each guide unit forming a channel which extends from a first end of said each guide unit to a second end of said each guide unit; and

said plurality of first and said plurality of second tabs of said printed circuit board and said guide tabs of said first and second guide units being arranged for permitting said printed circuit board to be dropped into said first and second guide units and pushed along said channels riding on said ledges to said mounted position.

---

### 5,016,143

### ILLUMINATING SYSTEM

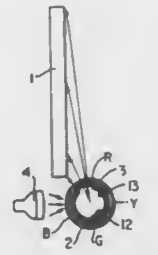
**Wallace R. Aikens, Plano, assignor to Gulton Industries, Inc., Plano, Tex.**

**Continuation-in-part of Ser. No. 255,062, Oct. 7, 1988. This application Aug. 18, 1989, Ser. No. 395,889**

**The portion of the term of this patent subsequent to Feb. 26, 2008, has been disclaimed.**

**Int. Cl.$^5$ F21V** *5/00*

**U.S. Cl. 362—32** **29 Claims**



1. An elongated lighting arrangement comprising:

an elongated tube having an interior and having the property of propagating light axially therewithin,

said tube having a light-transmissible wall portion extending along the length of the tube and extending only partially around the circumference of said tube,

said tube also having an internally reflective surface for propagating light within and along the axis of the tube by reflection by said surface when light is supplied to said interior,

a longitudinally extending diffusing medium arranged in said tube interior and only partially around the inner periphery of said tube and substantially diametrically opposite said light-transmissible wall portion to diffuse light striking said diffusing medium both directly and by reflection from said reflective wall surface,

said light-transmissible wall portion, said diffusing medium and said reflective surface extending longitudinally of said tube and in the aggregate over substantially the entire inner periphery of the cross-section of said tube,

whereby light supplied to said tube is propagated along said tube and light in said tube impinging on said diffusing medium causes light from the diffusing medium to pass outwardly through said light-transmissible portion.

---

### 5,016,144

### ILLUMINATING WHEEL COVERS

**Darryl DiMaggio, 10904 Scarsdale Blvd., Suite 140, Houston, Tex. 77089**

**Filed Mar. 28, 1990, Ser. No. 500,727**

**Int. Cl.$^5$ B60Q** *1/00*

**U.S. Cl. 362—35** **6 Claims**

1. A vehicle wheel cover comprising:

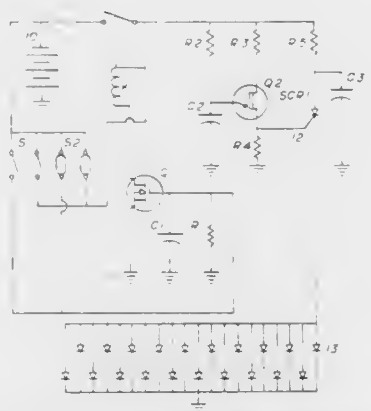
a plurality of light emitting diodes;

a power source;

means for creating an electrical connection between said power source and said light emitting diodes so as to illuminate said light emitting diodes responsive to slow or moderate rotational speeds of said vehicle cover, said means for creating an electrical connection being adapted to

VOL
1126
ISS
2
MY
14
1991
UMI

transfer and continue current flow from said power source to said light emitting diode as said vehicle cover increases in rotational speeds; and



operatively connected to said light emitting diodes, said signal means being electronically activated so as to cause said light emitting diodes to pulsate, said signal means being selectively deactivatable.

---

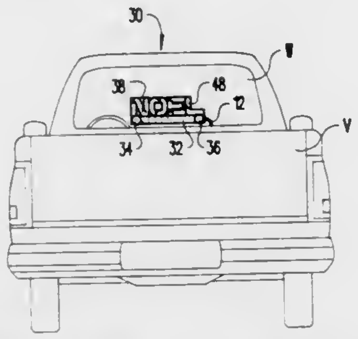
### 5,016,145
### ILLUMINATED DISPLAY VEHICLE ORNAMENT

**Kent A. Singleton, 7570 Hunters Woods Dr., Dunwoody, Ga. 30350**

**Filed Oct. 12, 1989, Ser. No. 420,303**

**Int. Cl.$^5$ B60Q** *1/26*

**U.S. Cl. 362—80.1** **1 Claim**



1. An illuminated display vehicle ornament, comprising:

an elongated power cord;

a cigarette lighter adaptor plug at one end of said cord for engagement with a vehicle lighter socket;

an elongated hollow rectangular base formed from an opaque material;

a mounting socket in said base electrically connected to an end of said power cord opposite said adaptor plug;

an elongated bulb in said mounting socket;

suction cup means for securing said base to an interior vehicle window surface;

releasable fastening means for securing a selected one of a plurality of different display signs to said base;

said display sign including a plurality of letters formed by a hollow housing having a forwardly directed opaque wall and a rearwardly directed translucent wall;

said fastening means including an elongated rectangular slot extending along a top surface of said base and a cooperating frictionally engaging elongated rectangular projection extending along a bottom surface of said housing;

said projection formed from a translucent material to transmit light from said bulb in said base to said housing and through said rearwardly directed translucent wall;

a pair of inwardly extending ledges on said base, formed at opposite ends of said slot; and

cooperating recesses formed at opposite ends of said bottom surface of said housing for engagement with said ledges.

---

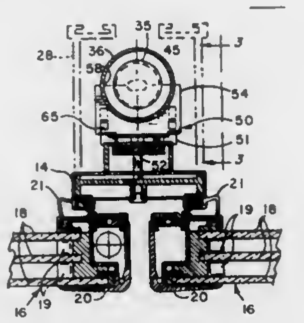
### 5,016,146
### REFRIGERATOR LIGHT ASSEMBLY WITH BULB INSULATING AND PROTECTIVE SLEEVE

**Melvin Kaspar, La Grange Park, Ill., assignor to Ardco, Inc., Chicago, Ill.**

**Filed Oct. 10, 1989, Ser. No. 418,590**

**Int. Cl.$^5$ F21V** *33/00*

U.S. Cl. 362—92 **20 Claims**



1. A refrigerator cabinet light fixture assembly comprising

a base member for mounting within the refrigerator cabinet, said base member including an elongated vertical section and socket supports carried in transversely extending relation to said vertical section at vertically spaced apart locations,

said socket supports each having a respective electrical socket,

an elongated lamp bulb supported between said sockets in parallel spaced relation to the base member vertical section,

an elongated plastic tubular sleeve extending substantially the length of said bulb in parallel relation to said base member vertical section,

means supporting said tubular sleeve in concentric relation about said bulb for defining an air insulating space therebetween, and;

stabilizing means interposed between said base member vertical section and said tubular sleeve at a location intermediate the ends of said tubular sleeve and base member vertical section for preventing substantial relative movement between said sleeve and bulb along the entire length of the sleeve and for enabling said sleeve to protect said bulb from the damaging impact of forces striking the exterior or said sleeve.

---

### 5,016,147
### FLIGHT DESK WITH INDICATORS

**Scott W. Voorhees, 1515 Davis Ford Rd., Suite 6, Woodbridge, Va. 22192**

**Filed Dec. 16, 1988, Ser. No. 285,017**

**Int. Cl.$^5$ F21V** *33/00*

U.S. Cl. 362—99 **18 Claims**

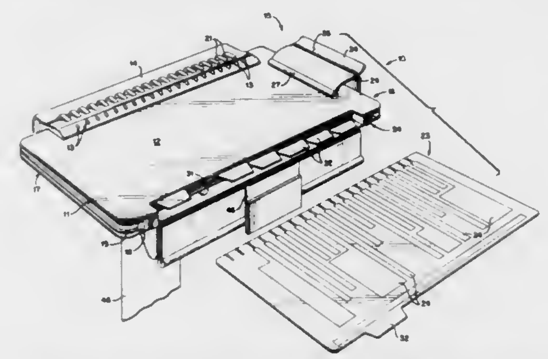
1. A board assembly comprising:

a main body having a substantially flat top surface;

a plurality of visual indicator means comprising light emitting diodes;

at least one indicator card having indicia thereon;

means for mounting said visual indicator means in operative association with said main body top surface so that when an indicator card is placed thereon areas of the indicator card line up with said visual indicator means; and



holding means for holding an indicator card on said top surface in alignment with said visual indicator means.

---

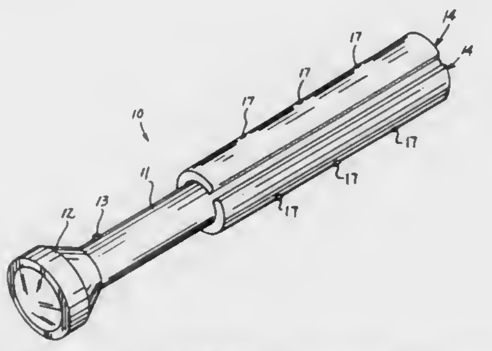
### 5,016,148
### FLASHLIGHT BATON APPARATUS

**Blane D. Kohm, 832 Edgemont, Perryville, Mo. 63775**

**Filed Feb. 28, 1990, Ser. No. 486,613**

**Int. Cl.$^5$ A45B** *3/02*

U.S. Cl. 362—102 **6 Claims**



1. A flashlight baton apparatus comprising, in combination,

a flashlight including a longitudinally aligned cylindrical flashlight body, including an enlarged illuminated head member axially aligned with the body, and

a switch positioned adjacent the head member on the body for selective illumination of the head member, and

a resilient shell means for securement to the flashlight body, the shell means defined by an axial length less than that of a predetermined axial length defined by the flashlight body, and

the shell means including a convex interior surface complementary to an exterior surface defined by the body, and

fastening means for securement of the shell means to the body, and

wherein the shell means is defined as a generally resilient shell member defined by cylindrical concave interior surface and a spaced cylindrical convex exterior surface, and the resilient shell further including a series of cylindrical bores directed through the shell, the cylindrical bores arranged parallel to one another and parallel to an axis defined by the cylindrical shell, and the cylindrical bores defined by a predetermined cylindrical configuration.

---

### 5,016,149
### ILLUMINATING METHOD AND ILLUMINATING APPARATUS FOR CARRYING OUT THE SAME, AND PROJECTION EXPOSURE METHOD AND PROJECTION EXPOSURE APPARATUS FOR CARRYING OUT THE SAME

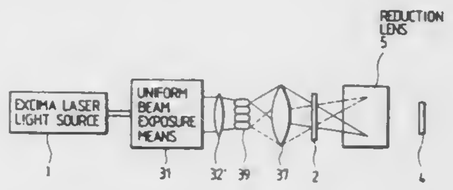
**Minoru Tanaka, Yokohama; Yoshitada Oshida, Fujisawa; Yasuhiro Yoshitake, and Tetsuzo Tanimoto, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 20, 1989, Ser. No. 439,436**

**Claims priority, application Japan, Nov. 24, 1988, 63-294520**

**Int. Cl.$^5$ F21K** *7/00*

U.S. Cl. 362—259 **23 Claims**



1. An illuminating method of illuminating a predetermined area on an object in an uniform illuminance distribution, comprising:

converting the intensity distribution of a light beam emitted by a highly directional light source into a substantially linear intensity distribution;

splitting the light beam into a plurality of component beams;

superposing the component beams in a predetermined area on the object so that the component teams will not interfere with each other.

---

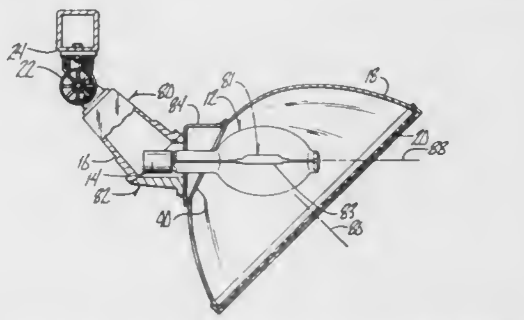
### 5,016,150
### MEANS AND METHOD FOR INCREASING OUTPUT, EFFICIENCY, AND FLEXIBILITY OF USE OF AN ARC LAMP

**Myron K. Gordin, and Jim L. Drost, both of Oskaloosa, Iowa, assignors to Musco Corporation, Oskaloosa, Iowa**

**Filed Oct. 19, 1989, Ser. No. 424,161**

**Int. Cl.$^5$ F21V** *7/12*

U.S. Cl. 362—263 **15 Claims**



1. A lighting fixture having socket means to which is mountable an arc lamp having a longitudinal axis which is coaxial with longitudinal axis of an arc tube in the arc lamp, the arc tube having an equator generally midway along the arc tube and generally perpendicular to the longitudinal axis of the arc tube comprising:

mounting means for mounting the socket means to a support;

reflector means mountable to the socket means; and

the reflector means having an open face and having an aiming axis extending generally from the middle of the reflector along a central axis which is not coaxial with the axes of the arc tube and arc lamp, the reflector means oriented, however, to surround a substantial majority of the equator of the arc tube to capture and reflectively control, a substantial majority of the light emanating from the arc tube the longitudinal axis of the arc tube diverging

VOL
1126
ISS
2
MY
14
1991
UMI

from the aiming axis of the reflector means but always extending in one direction out of the open face of the reflector means, wherein the longitudinal axis of the arc tube being oriented in a substantially horizontal position during operation of the arc lamp although the axis of the reflector is tilted between 10 and 60 degrees below horizontal so that the reflector maintains capture and control of the light source for a controlled, concentrated beam, but maintains the arc tube substantially horizontally to reduce or eliminate loss of light output from the arc tube caused by tilt factor and to control and reshape the beam configuration.

---

**5,016,151**

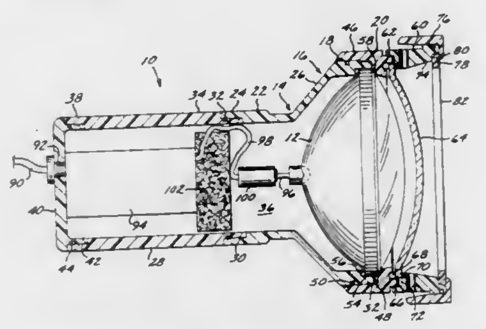
### HIGH-INTENSITY UNDERWATER LIGHT SOURCE

**Richard Mula, Oakland, Calif., assignor to Hydroimage, Los Angeles, Calif.**

**Filed May 17, 1989, Ser. No. 354,981**

**Int. Cl.$^5$ F21V** *31/00*

**U.S. Cl. 362—267** **13 Claims**



1. An underwater light source, comprising:
- a sealed beam lamp;
- a lamp shell sealed against leakage of water and made of machined aluminum, the shell having a front end and being sufficiently large to receive the lamp therein with the lamp positioned to direct its beam out of the front end of the lamp shell;
- a retainer that holds the lamp in place within the lamp shell;
- a heat resistant glass cover on the front end of the lamp shell;
- an ignitor connected to the lamp;
- an ignitor shell sealed against leakage of water, the ignitor shell being sufficiently large to receive the ignitor therein; and
- means for insulating the ignitor from the heat produced by the lamp during operation.

---

**5,016,152**

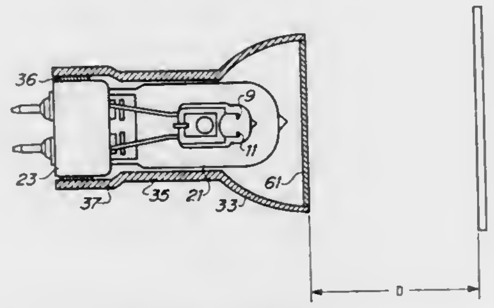
### FOCUSED LIGHT SOURCE AND METHOD

**George K. Awai, Ikuwai, Hi., and Song S. Lee, San Jose, Calif., assignors to Fiberstars, Inc., Fremont, Calif.**

**Filed Sep. 21, 1989, Ser. No. 410,860**

**Int. Cl.$^5$ F21V** *9/00*

**U.S. Cl. 362—293** **9 Claims**



1. Lighting apparatus comprising:
- a lamp including a filamentary source therein of radiation within a determined waveband, said source being oriented along an axis that is substantially normal to a reference axis that is aligned with a selected direction of illumination;
- reflector means disposed about the lamp for concentrating radiation therefrom near a point substantially along the reference axis and remote from the source, said reflector means including substantially an ellipsoid of revolution substantially about the reference axis with said point and another point near said source as the foci of the ellipsoid and being truncated substantially in a plane normal to the reference axis at a location therealong approximately equidistant between the location of said source and said point; and
- a face plate of radiation transmissive material disposed at the truncation of the reflector means for transmitting therethrough the radiation originating from said source.

---

**5,016,153**

### ARTICULATED ARM LAMP

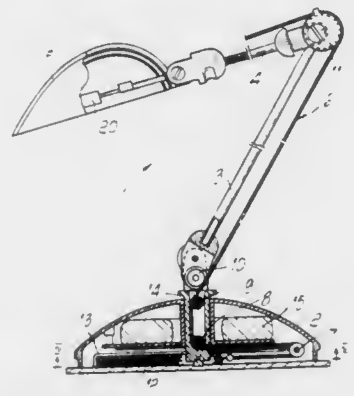
**Ernesto Gismondi, Milan, Italy, and John T. Bissell, Los Angeles, Calif., assignors to Artemide S.p.A., Milan, Italy**

**Filed May 17, 1989, Ser. No. 353,109**

**Claims priority, application Italy, May 20, 1988, 20679 A/88**

**Int. Cl.$^5$ F21V** *21/18;* **F21S** *1/12*

**U.S. Cl. 362—402** **17 Claims**



1. An articulated arm lamp comprising:
- at least one base;
- articulated arm means;
- at least one portion defined by said articulated arm means and being connected to said base;
- at least another portion defined by said articulated arm means;
- at least one light source connected to said other portion of said articulated arm means;
- positioning means including a flexible support element connected to said base, said articulated arm means and said light source for positioning said articulated arms means and said light source with respect to said base and constituting an electrical conductor means adapted for electrically connecting said light source to a source of electrical energy.

---

**5,016,154**

### CONNECTION STRUCTURE FOR THE SUPPORTING ROD OF A FLOOR LAMP

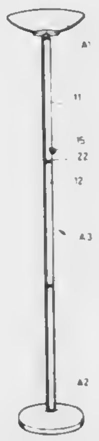
**Chuing-Hui Leeyeh, P.O. Box 96-405, Taipei 10098, Taiwan**

**Filed Sep. 4, 1990, Ser. No. 576,998**

**Int. Cl.$^5$ F21S** *1/12*

**U.S. Cl. 362—414** **3 Claims**

1. An improved connection structure for a supporting rod of a floor lamp comprising a lamp base, a bulb socket and a plurality of supporting rods; and a rotary switch being mounted on one of said supporting rods; said supporting rods mainly including:
- a top part being connected together with a stub connector;
- said stub connector having one end connected with said top part and an opposite end thereof being provided with recess points and a L-shaped groove;
- a joint member including an 'upper cylinder and a lower cylinder; and said upper cylinder having a plurality of symmetrical L-shaped grooves and a slanting-curved surface; and said lower cylinder having a bottom with a round hole, in which a wire retainer is mounted, and power wires pass through;
- said wire retainer retaining a wire knot therein;
- a lower part having a recess point to be engaged with said L-shaped groove on said stub connector; and
- wherein said joint member is connected by rotation with said stub connector in a lower end of said top part.



---

**5,016,155**

### HEADLAMP FOR AN AUTOMOTIVE VEHICLE HAVING IMPROVED MEANS FOR RUNNING ADJUSTMENT

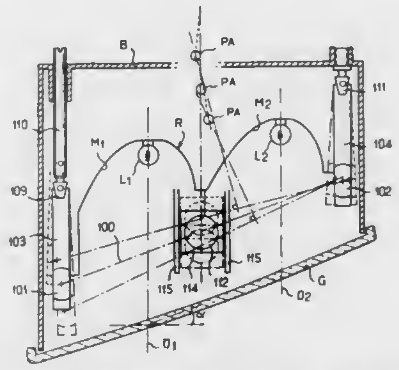
**Gérard Chevance, Torcy, France, assignor to Valeo Vision, Bobigny Cedex, France**

**Filed Aug. 28, 1990, Ser. No. 573,778**

**Claims priority, application France, Sep. 7, 1989, 89 11712**

**Int. Cl.$^5$ B60Q** *1/02*

**U.S. Cl. 362—418** **7 Claims**



1. A headlamp for an automotive vehicle comprising a housing including means defining opposed side walls, a reflector mounted in the housing between said side walls, at least one lamp mounted in the housing and defining with the reflector an optical axis, and a closure glass mounted on the front of the housing and being substantially inclined with respect to a plane perpendicular to the said optical axis, the headlamp further comprising pivot means mounting the reflector in the housing and defining at least a horizontal axis, and adjusting means for adjusting the orientation of the reflector by pivoting movement of the latter at least about the said horizontal axis, said adjusting means including first and second knuckles fixed with respect to the reflector and positioned adjacent said opposed side walls of said housing, and means defining respective sockets connected with the housing, the said knuckles being received respectively in the said sockets and together defining the said horizontal axis, the said pivot means being disposed in the housing so as to define the said horizontal axis closely adjacent to the closure glass, substantially parallel to the latter, and inclined with respect to a plane perpendicular to the optical axis; and means defining slides formed in said side walls, with the said means comprising sockets for said first and second knuckles in the form of bars retained in said slides.

---

**5,016,156**

### HIGH VOLTAGE STABILIZING CIRCUIT

**Atsuhisa Ogawa, c/o Fujisawakojo, Ikegami Tsushinki Co., Ltd., 400 Kozuka, Fujisawa-shi, Kanagawa, Japan**

**PCT No. PCT/JP83/00419, § 371 Date Aug. 6, 1984, § 102(e) Date Aug. 6, 1984, PCT Pub. No. WO84/02441, PCT Pub. Date Jun. 21, 1984**

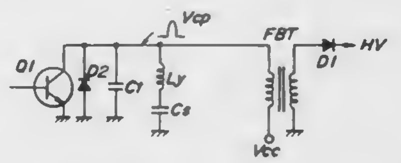
**PCT Filed Nov. 24, 1983, Ser. No. 654,019**

**Claims priority, application Japan, Dec. 8, 1982, 57-213937**

**The portion of the term of this patent subsequent to Jun. 1, 2004, has been disclaimed.**

**Int. Cl.$^5$ H02M** *3/335*

**U.S. Cl. 363—21** **14 Claims**



1. A high voltage stabilizing circuit, comprising:
- high voltage generating means: for boosting a pulse voltage produced from a horizontal deflection circuit during a flyback period of a horizontal deflection pulse to obtain a high voltage;
- operations period control means for performing switching operations, only during said flyback period, to controls aid flyback period, the flyback period control means including a variable resistor for changing the resistance according to variations of the high voltage, thereby controlling said high voltage; and
- switching control means for controlling a period of said switching operation.

---

**5,016,157**

### VSCF SYSTEM WITH DC LINK HARMONICS CONTROL

**Gregory I. Rozman, and Vijay K. Maddali, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Oct. 30, 1989, Ser. No. 428,759**

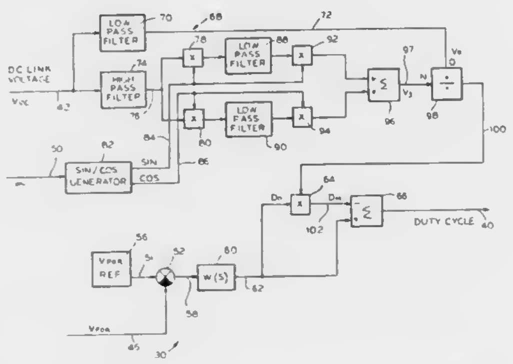
**Int. Cl.$^5$ H02M** *1/12*

**U.S. Cl. 363—39** **18 Claims**

1. In a control system for an inverter powered by a DC source, the inverter being controlled to provide a select duty cycle to control inverter output voltage, the improvement comprising:
- means for developing a duty cycle command representing a duty cycle necessary to maintain inverter output voltage at a desired level;
- means for sensing harmonic content from said DC source; and
- means coupled with said developing means and said sensing

VOL
1126
ISS
2
MY
14
1991
UMI

means for modulating said duty cycle command responsive to the harmonic content from the DC source to provide an inverter output voltage having reduced harmonic content.



---

## 5,016,158
## PARALLEL MULTI-INVERTER SYSTEM AND MOTOR DRIVE SYSTEM USING THE SAME

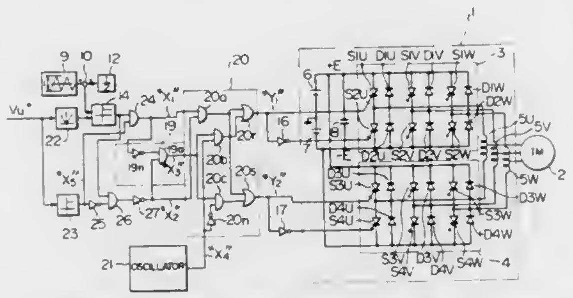
**Takayuki Matsui, Hitachi; Toshiaki Okuyama, Ibaraki; Kazuaki Tobari, Mito; Yuzuru Kubota, Hitachi, and Junichi Takahashi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 27, 1990, Ser. No. 544,392**

**Claims priority, application Japan, Jun. 30, 1989, 1-166657**

**Int. Cl.$^5$ H02M** *7/521*

**U.S. Cl. 363—71** **3 Claims**



1. A parallel multi-inverter system including a plurality of inverters connected to each other through parallel reactors to convert a DC voltage of a DC power source into an AC voltage according to phase output voltage command signal, said system further comprising:

an absolute-value circuit for inverting a negative part of said output voltage command signal into positive;

a comparison circuit for comparing an output of said absolute-value circuit with a carrier signal;

a polarity discrimination circuit for discriminating a polarity of the output voltage command signal;

a first AND circuit for performing a logical AND operation of an output of said polarity discrimination circuit and an output of said comparison circuit;

a polarity inversion circuit for inverting the output of the polarity discrimination circuit; and

a second AND circuit for performing a logical AND of an output of said polarity inversion circuit and the output of the comparison circuit,

wherein an output voltage of said multi-inverter system is controlled according to an output signal of said second AND circuit.

---

## 5,016,159
## STELLATE STORE AND BROADCAST NETWORK WITH COLLISION AVOIDANCE

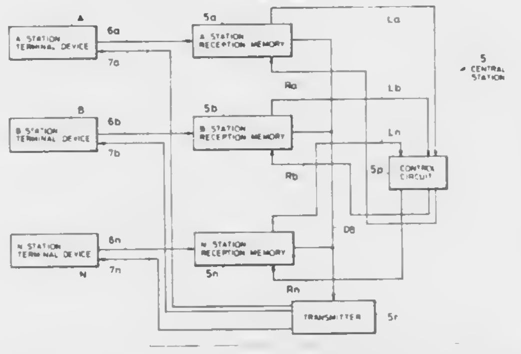
**Naotaka Maruyama, Tokyo, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Filed Feb. 18, 1987, Ser. No. 16,121**

**Claims priority, application Japan, Feb. 21, 1986, 61-35029; Feb. 21, 1986, 61-35030; Sep. 12, 1986, 61-213753; Sep. 25, 1986, 61-226570**

**Int. Cl.$^5$ G06F** *13/00*

**U.S. Cl. 364—200** **12 Claims**


A
A STATION TERMINAL DEVICE
6a
7a
5a
A STATION RECEPTION MEMORY
La
5
CENTRAL STATION
Ra
Lb
B
B STATION TERMINAL DEVICE
6b
7b
5b
B STATION RECEPTION MEMORY
Ln
5p
CONTROL CIRCUIT
Rb
DB
N STATION TERMINAL DEVICE
N
6n
7n
N STATION RECEPTION MEMORY
5n
Rn
TRANSMITTER
5r

1. A stellate store and broadcast network with collision avoidance comprising a plurality of terminal devices, a central station for collectively receiving data packets transmitted from said terminal devices and selectively broadcasting said data packets to said terminal devices, and a plurality of bidirectional communication channels interconnecting said terminal devices and a plurality of terminal interfaces in said central station, which station comprises a plurality of reception memories interconnected to said terminal interfaces of said central station with each reception memory having a capacity for storing therein at least one data packet transmitted thereto from a said terminal device over a said bidirectional communication channel through a said terminal interface, a control circuit for monitoring whether data packets are stored in said reception memories and for providing read signals sequentially to selected ones of those of said reception memories containing stored data packets to cause them to provide at outputs thereof data packets representing those data packets stored therein, and a broadcasting means interconnected to said terminal interfaces and to said reception memory outputs for broadcasting data packets provided by said reception memories to all the terminal devices over the bidirectional communication channels.

---

## 5,016,160
## COMPUTER SYSTEM HAVING EFFICIENT DATA TRANSFER OPERATIONS

**Shawn M. Lambeth; Lee P. Prissel, and William D. Tarara, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 15, 1988, Ser. No. 284,958**

**Int. Cl.$^5$ G06F** *13/00*

**U.S. Cl. 364—200** **10 Claims**

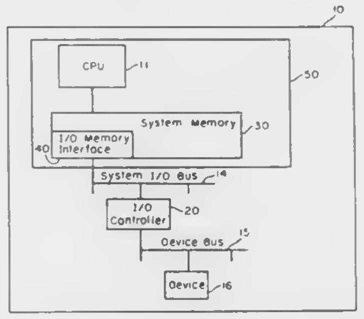
1. A computer system having efficient data transfer operations, comprising:

a system memory having system addresses;

a central processing unit connected to said system memory;

means for receiving a plurality of indirect data address word commands from said central processing unit;

means for combining said plurality of indirect data address word commands to form a lesser number of combined indirect data address word commands if the system addresses specified in said indirect data address word commands are contiguous; and



means for transmitting data between said system memory specified by said combined indirect address word commands and another component of said computer system.

---

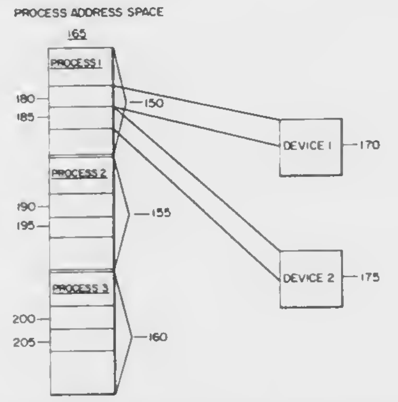
## 5,016,161
## METHOD AND APPARATUS FOR THE FLOW CONTROL OF DEVICES

**James Van Loo, Los Altos; Susan Carrie; Jerald Evans, both of Mountain View, and Jeffrey Spirn, Palo Alto, all of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.**

**Division of Ser. No. 336,717, Apr. 12, 1989. This application Sep. 28, 1989, Ser. No. 413,834**

**Int. Cl.$^5$ G06F** *9/40*

**U.S. Cl. 364—200** **6 Claims**



1. A multi-tasking system in which multiple processes are executed by a central processing unit(CPU) of the system on a time-shared basis using context switching, the context of the CPU being the state of the CPU with respect to a particular process, the switching of the CPU from one process to another process referred to as process switching, said system further comprising at least one device which executes commands issued by the CPU and is connected to the system through a memory management unit (MMU), said device being mapped into the process address space of each process which may access the device, said process address space comprising pages which are grouped into segments, each of said pages having a corresponding valid bit that invokes a page fault if the bit is not set and an attempt is made to access the address space, each of said segments having a page fault handler associated with it which is invoked when a page fault occurs in the segment, said system further comprising a means for controlling said device comprising:

means for mapping the device in each process address space such that each device is mapped into a separate segment whereby processes access the device through the address the device is mapped to in its process address space;

a device queue which receives the commands issued by the CPU and forms a queue of the commands to be executed on the device;

means for assembling the commands in the device queue;

an assembly buffer connected to the device queue which stores a partial assembled command as the command output from the device queue is assembled;

a command buffer connected to the assembly buffer and the device, said command buffer receiving a complete assembled command output from the assembly buffer and outputting the command to the device;

means for determining when the device queue has reached a first predetermined capacity indicative that the device queue is approximately full and any additional commands input to the device queue will be lost;

means for determining when the device queue is below a second predetermined capacity indicative that the device queue is approximately empty and can accept additional commands;

when the device has reached a first predetermined capacity, means for resetting the corresponding valid bits of the process address space with respect to a process attempting to access the device by the CPU issuing commands, such that attempts to access the device will cause a page fault;

when the device is below a second predetermined capacity, means for setting the corresponding valid bits of the process address space with respect to the process attempting to access the device and waking the process if the process is asleep;

means for initializing the page fault handler to put the process to sleep thereby suspending the process and preventing the CPU from inputting commands to the device queue, which would be lost because the queue is full, until such time when the device queue is below the second capacity and can accept additional commands.

---

## 5,016,162
## CONTENTION REVOLUTION IN A DIGITAL COMPUTER SYSTEM

**David I. Epstein, Framingham; Mark D. Hummel, Bellingham; Jeffrey F. Hatalsky, Wakefield; Rona J. Newmark, Northboro; Rosemarie Alicandro, Millbury; Peter C. Bixby, Northboro; Donald D. Burn, Westboro; Eric H. Enberg, Westboro; Paul K. Marino; Paul W. Woodbury, both of Hopkinton; Michael A. Pogue, Framingham; Morgan J. Dempsey, Framingham; Shreyaunsh R. Shah, Milford, and Leo C. Waible, III, Northboro, all of Mass., assignors to Data General Corp., Westboro, Mass.**

**Filed Mar. 30, 1988, Ser. No. 175,458**

**Int. Cl.$^5$ G06F** *13/374*

**U.S. Cl. 364—200** **5 Claims**

1. In a digital logic system, a method of resolving contention among contenders for a resource, the contenders being members of a group of n potential contenders, the method comprising the steps of:

(a) denominating the potential contenders zero through $n-1$;

(b) providing each potential contender with n digital signal lines, where:
  the digital signal lines are denominated zero through $n-1$;
  each potential contender signifies entering contention by bringing its zero-denominated digital signal line to the TRUE condition; and
  any certain potential contender senses that another potential contender is contending when one of the certain potential contender's digital signal lines other than its zero-denominated one goes to a TRUE condition, each other potential contender being associated with a different one of the certain potential contender's digital signal lines,

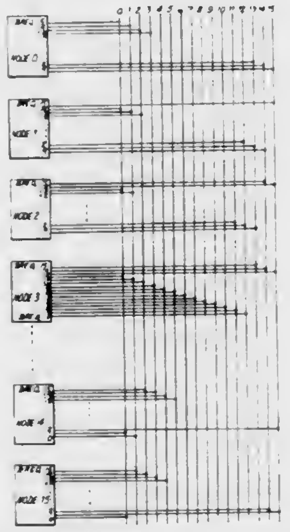
(c) providing n conductors denominated zero through $n-1$;

(d) connecting each of the n digital signal lines of each of the n potential contenders to one of the n conductors according to the algorithm

VOL
1126
ISS
2
MY
14
1991
UMI

$k=(n-i+j)\text{MODULO}n$

where:
i is a number in the range zero to n−1 denoting a potential contender;
j is a number in the range zero to n−1 denoting a digital signal line on a potential contender; and
k is a number in the range zero to n−1 denoting a conductor to which the digital signal line identified jointly by i and j is to be connected;
(e) providing each potential contender with



means for determining $i_{last}$, the denomination of the potential contender which most recently had control of the resource, and
means for determiniging its priority index p, according to

$p=(n+i-i_{last}-1)\text{MODULO}n$

where
i is the potential contender's denomination among the n potential contenders, and
(f) allowing the contender with the lowest value of p to take control of the resource.

---

### 5,016,163
### PARALLEL PROCESSING SYSTEM INCLUDING CONTROL COMPUTER FOR DIVIDING AN ALGORITHM INTO SUBALGORITHMS AND FOR DETERMINING NETWORK INTERCONNECTIONS

**Christopher R. Jesshope; Patrick S. Pope, both of Dept. of Electronics and Computer Science, The University of Southampton; Anthony J. G. Hey, Dept. of Physics, The University of Southampton; Denis A. Nicole, Dept. of Electronics and Computer Science, The University of Southampton, and Edward K. Lloyd, Dept. of Mathematics, The University of Southampton, all of Highfield, Southampton SO9 5NH, Great Britain**

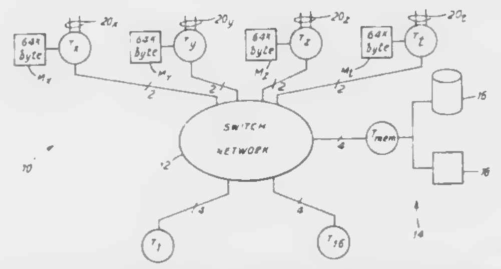
**Filed Jun. 30, 1987, Ser. No. 140,668**

**Claims priority, application United Kingdom, Aug. 30, 1985, 8521672**

**Int. Cl.$^5$ G06F** *9/06, 9/46, 15/16*

**U.S. Cl. 364—200** **2 Claims**

1. A data processing device for performing parallel data processing on an algorithm by a plurality of computers performing the data processing in parallel, comprising:
a. a plurality of fully programmable data processing computers for performing the data processing in parallel each fully programmable data processing computer having a plurality of input and output ports;
b. a switch network for effecting connections between the plurality of data processing computers; and
c. a control computer means including;
means for receiving instructions defining an algorithm to be executed, said algorithm comprising at least a number of subalgorithms which may be executed concurrently,
means for translating the algorithm into said subalgorithms for execution in parallel by said plurality of data processing computers,
means for programming the data processing computers to execute the subalgorithms, and
means for controlling the switch network to provide direct connections between the data processing computers which must communicate for the execution of their respective subalgorithms, and
wherein said switch network comprises at least one switch circuit having a first and a second plurality of connections for respective computer ports, and the switch network configuration being controlled by the control computer means to connect the first plurality of connections in any permutation to the second plurality of connections, and
wherein at least some of the computers each have first and second data ports, all of the first ports being connected to respective connections of said first plurality of connections, and all of the second ports being connected to respective connections of said second plurality of connections, and
wherein at least some of the data processing computers form a group, each data processing computer having a plurality of pairs of data ports and wherein corresponding pairs of data ports from each data processing computer of the group are connected to respective common switch circuits, with the ports of each pair being connected, respectively, to one of a first plurality of connections to one of said circuits and to one of a second plurality of connections of said one of said circuits.



---

### 5,016,164
### COMPUTER SYSTEM HAVING DELAYED SAVE ON PROCEDURE CALLS

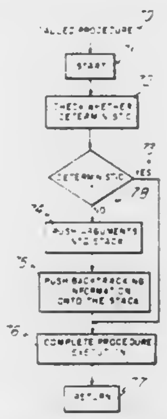
**Aditya Srivastava, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 205,043, May 31, 1988, abandoned, which is a continuation of Ser. No. 854,219, Apr. 21, 1986, abandoned. This application Feb. 24, 1989, Ser. No. 317,061**

**Int. Cl.$^5$ G06F** *15/00*

**U.S. Cl. 364—200** **9 Claims**

1. A method for making non-deterministic procedure calls in a computer system having a stack, comprising the steps of:
(a) saving on said stack of said computer system a first portion of then existing information necessary to return operation of said computer system from the procedure calls;
(b) entering the procedure;
(c) after step (b), determining whether a second portion of information necessary to do backtracking must also be saved on the stack of said computer system, said second portion of information existing in said computer system at the time of entering the procedure; and


START
DETERMINISTIC
YES
NO
79
PUSH BACKTRACKING INFORMATION ONTO THE STACK
COMPLETE PROCEDURE EXECUTION
RETURN

(d) saving on the stack of said computer system or discarding said second portion of information necessary to do backtracking in accordance with the determination of step (c).

---

### 5,016,165
### DIRECT MEMORY ACCESS CONTROLLED SYSTEM

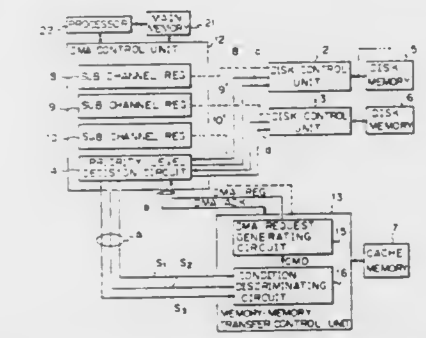
**Akinao Tanikawa, Yokohama; Toshiharu Ohshima, Kawasaki, and Toshihiro Sakai, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Jan. 12, 1988, Ser. No. 142,949**

**Claims priority, application Japan, Jan. 12, 1987, 62-004664**

**Int. Cl.$^5$ G06F** *13/00*

**U.S. Cl. 364—200** **14 Claims**



13. A direct memory access control system, comprising:
a main memory;
an auxiliary memory;
a submemory;
an auxiliary memory control unit connected to said auxiliary memory, controlling data storage in said auxiliary memory and having an auxiliary transfer capacity when active;
a direct memory access control unit, connected to said main memory and said auxiliary memory control unit, performing data transfers between said main memory and said auxiliary memory control unit and between said main memory and said submemory, having a transfer capacity and a marginal transfer capacity equal to the transfer capacity less the auxiliary transfer capacity when said auxiliary memory control unit is active; and
a memory to memory transfer control unit, connected between said submemory and said direct memory access control unit, and including means for varying data transfer speed of said memory to memory transfer control unit of data transfers between said submemory and said main memory through said direct memory access control unit responsive to the marginal transfer capacity to adjust data transfer through said direct memory access control unit to equal the transfer capacity.

---

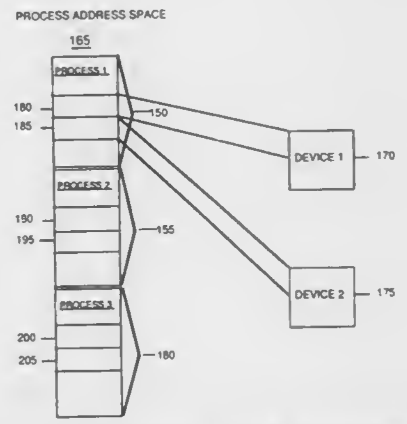
### 5,016,166
### METHOD AND APPARATUS FOR THE SYNCHRONIZATION OF DEVICES

**James Van Loo, Los Altos; Susan Carrie, and Jerald Evans, both of Mountain View, all of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.**

**Division of Ser. No. 336,717, Apr. 12, 1989. This application Sep. 28, 1989, Ser. No. 413,990**

**Int. Cl.$^5$ G06F** *9/46*

**U.S. Cl. 364—200** **6 Claims**



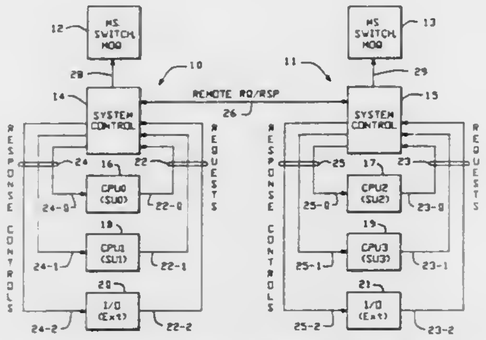
1. A multi-tasking system in which multiple processes are executed by a central processing unit (CPU) of the system on a time-shared basis using context switching, the context of the CPU being the state of the CPU with respect to a particular process, the switching of the CPU from one process to another process referred to as process switching, said system further comprising at least one device which is connected to the system through a memory management unit (MMU), said device being mapped into the process address space of each process which may access the device, said process address space comprising pages which are grouped into segments, each of said pages having a corresponding valid bit that invokes a page fault if the bit is not set and an attempt is made to access the address space, each of said segments having a page fault handler associated with it which is invoked when a page fault occurs in the segment, said system further comprising a means for synchronizing process access to said device wherein a first process has a high priority associated with it such that it requires exclusive access to the device, said system comprising:
means for mapping the device in each process address space such that each device is mapped into a separate segment whereby processes access the device through the address the device is mapped to in its process address space;
means for a first process to notify the page fault handler that it requires exclusive access to the device;
means for the first process to notify the page fault handler that it completed access to the device; means for initializing the page fault handler,
when the first process notifies the page fault handler that it requires exclusive access to the device, means for resetting the valid bits of the process address space corresponding to other processes the device is mapped to;
when a process attempts to access the device and the valid bits in the process address space the device is mapped to are reset thereby causing a page fault, putting the process to sleep thereby suspending the process,
when the first process notifies the page fault handler that it completed access to the device, setting the valid bits of the process address space corresponding to the other processes the device is mapped to and waking suspended processes;
whereby access to the device is synchronized among processes.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,016,167
## RESOURCE CONTENTION DEADLOCK DETECTION AND PREVENTION

**Kham X. Nguyen, Milpitas; Theodore S. Robinson, Cupertino; Michael D. Taylor, and Kevin L. Daberkow, both of San Jose, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.**

**Filed Dec. 21, 1987, Ser. No. 135,845**
**Int. Cl.⁵ G06F** *13/14, 15/16*
U.S. Cl. 364—200 **4 Claims**



1. A data processing system including more than two processing units generating requests for system data, the system data subject of a request being identified by a system address and wherein the processing units generate valid signal upon successful access to requested data, the system comprising:

main storage means for storing the system data, including a plurality of data locations being grouped in a plurality of modules, the module in which a given data location is grouped being identified by a field within the system address of the given data location;

means, coupled to each of the processing units and to receive a predicted busy signal that indicates which modules of the main storage means are predicted to be busy by the time that a request generated in the processing units reaches the main storage means, for enabling the processing units to generate requests for system data in data locations in response to the predicted busy signal; and

control means, coupled to the main storage means and the processing units, for supplying requests for system data to the plurality of modules in the main storage means, including

means, coupled to the processing units and receiving as inhibit signal, and responsive to the inhibit signal and predetermined processing unit priority, for selecting a request from a processing unit having priority and that is not inhibited by the inhibit signal,

means, coupled to the means for selecting and responsive to a selected request, for accepting the selected request when the module identified in the system address of the request is not busy due to other accesses to data locations within the module, else rejecting the request,

counting means, connected to the processing units, for counting requests generated by the respective processing units to generate respective processing unit counts,

means, connected to the counting means and to receive the valid signals from the processing units, for resetting the processing unit count for a given processing unit when a valid signal is generated by the given processing unit,

means, connected to the counting means, for generating a processing unit overflow signal when a processing unit count reaches a threshold number,

means, connected to receive the processing unit overflow signals, for generating the inhibit signal in response to a given processing unit overflow signal indicating processing units to be inhibited from selection by the means for selecting until the given processing unit generates a valid signal, and

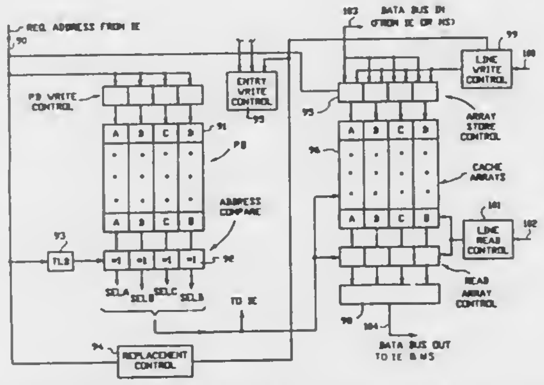
means, coupled to each of the processing units and the means for accepting, and responsive to accepted requests, for generating the predicted busy signal.

---

### 5,016,168
## METHOD FOR STORING INTO NON-EXCLUSIVE CACHE LINES IN MULTIPROCESSOR SYSTEMS

**Lishing Liu, Pleasantville, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 23, 1988, Ser. No. 289,659**
**Int. Cl.⁵ G06F** *9/312, 15/16, 12/08, 9/46*
U.S. Cl. 364—200 **1 Claim**



1. A method for storing into a non-exclusive cache line in a multiprocessor system having a plurality of processors, a local cache for each of said processors, and a main storage, said method comprising the steps performed by a computer of:

when execution of a current instruction by one of said processors requires storage into a cache line which is currently held in the cache of said one processor as a non-exclusive cache line, storing into said non-exclusive line while waiting for the status of said non-exclusive line to be changed to exclusive;

provisionally processing subsequent instructions by said one processor while waiting for the status of said non-exclusive line to be changed to exclusive;

simultaneously with said step of storing into said non-exclusive line, requesting that the status for said non-exclusive line be changed to exclusive at said local cache; and

redoing any of said provisionally processed instructions which used data fetched from a cache line which becomes invalid before the status of said non-exclusive line is changed to exclusive or which depends upon any said redone instruction.

---

### 5,016,169
## DATA PROCESSOR CAPABLE OF CORRECTLY RE-EXECUTING INSTRUCTIONS

**Kei Koya, and Yoshikuni Sato, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Mar. 28, 1988, Ser. No. 173,784**
**Claims priority, application Japan, Mar. 27, 1987, 62-74910**
**Int. Cl.⁵ G06F** *9/30*
U.S. Cl. 364—200 **5 Claims**

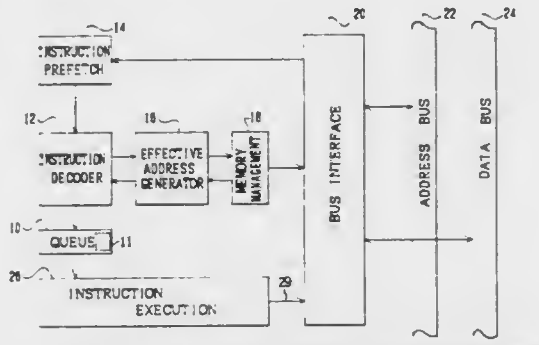
1. A data processor which includes a bus interface coupled to an external bus for transferring information to and from said external bus, an instruction decoding section coupled to said bus interface to receive an instruction through said bus interface from said external bus so as to decode a received instruction; and an instruction execution unit coupled to receive decoded information from said instruction decoding section to execute received decoded information, comprising the improvement in which said instruction decoding section includes:

an instruction decoder for receiving said instruction through said bus interface to output a decoded instruction to said instruction execution unit and to generate tag information, said tag information including information indicative of an input/output access instruction when said received instruction instructs input/output access, said instruction decoder also generating auxiliary information indicative of said input/output access instruction and outputting said auxiliary information indicative of said input/output access instruction together with said decoded information to said instruction execution unit;

an effective address generator receiving said tag information to calculate an effective address; and

a memory management unit receiving said effective address to generate a real address and output said real address to said bus interface,

so that when said tag information indicates that said decoded information is said input/output access instruction, said memory management unit outputs to said bus interface a signal indicating that an instruction being decoded is an input/output instruction, so that said bus interface stops data transfer between said external bus and said bus interface and retains said real address received from said memory management unit until a predetermined condition is satisfied, and after said predetermined condition is satisfied, said instruction execution unit responds to said auxiliary information indicative of said input/output access instruction and said decoded information so as to restart said bus interfce so that said bus interface starts a bus cycle for input/output access on the basis of said retained real address received from said memory management unit.

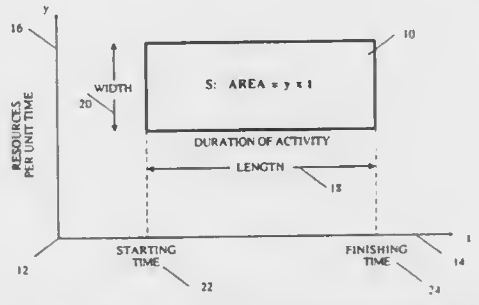


---

### 5,016,170
## TASK MANAGEMENT

**Spiro N. Pollalis, 44 Concord Ave., Apt. 106, Cambridge, Mass. 02138, and Yasuo Ueda, 6-4-27 Hayashiji Ikunoku, Osaka 544, Japan**

**Filed Sep. 22, 1988, Ser. No. 247,778**
**Int. Cl.⁵ G06F** *15/21*
U.S. Cl. 364—401 **36 Claims**



1. A method to aid graphically the management of a set of tasks, comprising the steps of

representing a quantity associated with each task by a geometric object of at least two dimensions whose geometric area or volume is indicative of said quantity,

displaying each said geometric object on a display device, and

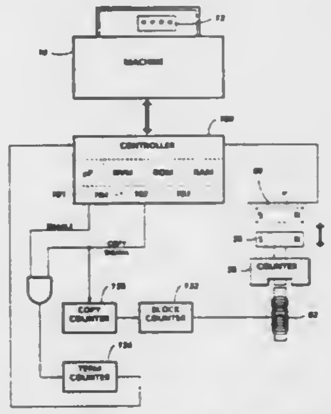
graphically indicating information about dependencies in the performance of said tasks on said display.

---

### 5,016,171
## COPY CARTRIDGE WARRANTY AND BILLING SYSTEM

**Douglas P. Connolly, Webster; Barry G. Rickett, Pittsford; Robert J. Yax, Springwater, and Roger M. Swanson, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 20, 1989, Ser. No. 341,003**
**Int. Cl.⁵ G06F** *7/00;* **G03G** *15/00*
U.S. Cl. 364—406 **15 Claims**



1. A customer billing system for an electrostatographic copying or printing machine, said machine having a movable photoreceptor, charging means for uniformly charging the photoreceptor, means for exposing the photoreceptor following charging to create electrostatic latent images on the photoreceptor, developing means for developing the electrostatic latent images on the photoreceptor, transfer means for transferring the developed images from the photoreceptor to a support material, fixing means to fix the transferred images on the support material and an operating system for controlling operation of said machine, comprising, in combination:

(a) at least one of said photoreceptor and developing means comprising a replaceable cartridge having a limited operational life allowing said machine on installation of said cartridge to produce a preset number of copies;
(b) said cartridge including a copy counter;
(c) counter operating means on said machine for indexing said cartridge copy counter as copies are produced by said machine; and
(d) counter disabling means to disable said cartridge copy counter when said cartridge copy counter reaches a predetermined count representative of said preset number of copies.

8. A customer billing system for an electrostatographic copying or printing machine, said machine having an operating system for controlling operation of said machine, comprising, in combination:

(a) a replaceable cartridge for use in operating said machine, said cartridge having a limited operational life allowing said machine on installation of said cartridge to produce a predetermined number of copies;
(b) said cartridge including a copy counter;
(c) counter operating means on said machine for indexing said cartridge copy counter as copies are produced by said machine; and
(d) counter disabling means to disable said cartridge copy counter and render said cartidge dead when said cartridge copy counter reaches a preset copy count;
(e) said operating system including grace means to allow said machine to produce a predetermined number of grace copies using a dead cartridge pending installation of a fresh cartridge.

12. A billing and warranty method for a copier/printing

VOL
1126
ISS
2
MY
14
1991
UMI

machine using a replaceable subassembly guaranteed to provide a preset number of copies, comprising the steps of:

(a) tolling a count of copies made on at least one counter in said machine and on a counter in said cartridge;

(b) when the copy count on said cartridge counter reaches a predetermined copy count, preventing further counting by said cartridge counter;

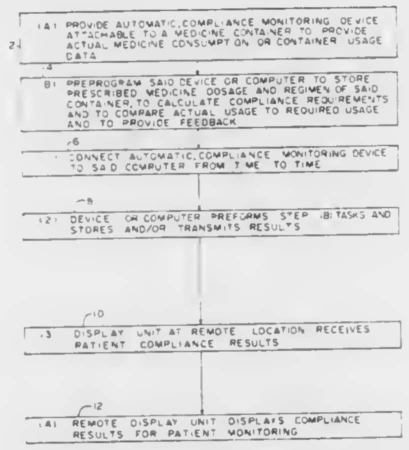
(c) continuing tolling a count of subsequent copies on said machine counter; and

(d) when the copy count on said machine counter reaches a predetermined copy count reflecting said guaranteed number of copies, shutting down said machine until a new cartridge is installed.

---

### 5,016,172
## PATIENT COMPLIANCE AND STATUS MONITORING SYSTEM

**Albert L. Dessertine, Flemington, N.J., assignor to Ramp Com-Ramp Comsystems, Inc., Flemington, N.J.**
**Continuation-in-part of Ser. No. 365,933, Jun. 14, 1989. This application Dec. 26, 1989, Ser. No. 457,175**
**Int. Cl.$^5$ G06F** *15/42*
U.S. Cl. 364—413.02 **20 Claims**


(A) PROVIDE AUTOMATIC,COMPLIANCE MONITORING DEVICE ATTACHABLE TO A MEDICINE CONTAINER TO PROVIDE ACTUAL MEDICINE CONSUMPTION OR CONTAINER USAGE DATA
2
4
(B) PREPROGRAM SAID DEVICE OR COMPUTER TO STORE PRESCRIBED MEDICINE DOSAGE AND REGIMEN OF SAID CONTAINER, TO CALCULATE COMPLIANCE REQUIREMENTS AND TO COMPARE ACTUAL USAGE TO REQUIRED USAGE AND TO PROVIDE FEEDBACK
6
CONNECT AUTOMATIC,COMPLIANCE MONITORING DEVICE TO SAID COMPUTER FROM TIME TO TIME
8
(2) DEVICE OR COMPUTER PREFORMS STEP (B) TASKS AND STORES AND/OR TRANSMITS RESULTS
10
(3) DISPLAY UNIT AT REMOTE LOCATION RECEIVES PATIENT COMPLIANCE RESULTS
12
(4) REMOTE DISPLAY UNIT DISPLAYS COMPLIANCE RESULTS FOR PATIENT MONITORING

1. A method of monitoring a patient's medicine compliance, which comprises:

(a) providing an automatic, compliance monitoring device, which device automatically tracks at least one type of data related to actual medicine consumption or container usage, said device being connectable to a medicine container;

(b) from time to time, connecting said device to a computer to input the actual medicine consumption or container usage data;

(c) having either said device or said computer programmed to store the prescribed medicine dosage and regimen of said container;

(d) having either said device or said computer programmed to calculate compliance requirements for each dosage administration for the prescription period of the medicine and for comparing the actual medicine consumption or container usage with the compliance requirements;

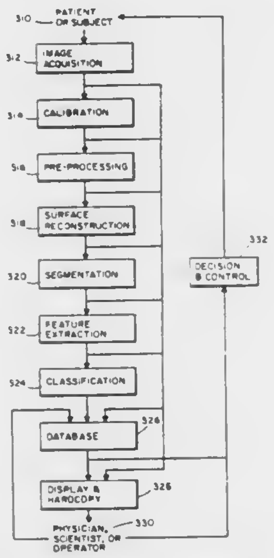
(e) connecting said computer to a display unit at a remote location away from the automatic compliance monitoring device; and,

(f) visually displaying the compliance results on said display unit to permit compliance monitoring.

---

### 5,016,173
## APPARATUS AND METHOD FOR MONITORING VISUALLY ACCESSIBLE SURFACES OF THE BODY

**Robert O. Kenet; Barney J. Kenet, both of Lakeland, Fla., and Guillermo J. Tearney, Cambridge, Mass., assignors to Vanguard Imaging Ltd., Cambridge, Mass.**
**Filed Apr. 13, 1989, Ser. No. 337,304**
**Int. Cl.$^5$ G06F** *15/92*
U.S. Cl. 364—413.13 **15 Claims**



1. An apparatus for monitoring visually accessible surfaces of the body comprising:

means for acquiring digital images;

means for pre-processing said digital image to calibrate and correct for aberrations in the digital image;

means for determining or estimating a three-dimensional representation of the surface of which the image is taken;

means for estimating the boundaries of lesions on said surface from said image;

means for extracting two- and three-dimensional quantitative features of the lesions on said surface from said image;

means for visual display and hardcopy presentation of two-dimensional and reconstructed three-dimensional representations of the lesions on said surface;

means for storing said digital images in a database; and

means for extracting information from the database for comparison of images at different points in time or space.

---

### 5,016,174
## DEVICE AND METHOD OF FAIL-SAFE CONTROL FOR ELECTRONICALLY CONTROLLED AUTOMATIC TRANSMISSION

**Yasunobu Ito, and Kenji Suzuki, both of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan**
**Filed Dec. 7, 1988, Ser. No. 280,937**
**Claims priority, application Japan, Dec. 28, 1987, 62-329508**
**Int. Cl.$^5$ B60K** *41/08;* **G05D** *17/02*
U.S. Cl. 364—424.1 **6 Claims**

6. A fail-safe control method for an electronically controlled automatic transmission for use in an automobile, said transmission having a mechanical section including a plurality of friction devices engagable responsive to hydraulic pressure, said method comprising:

sensing the number of revolutions input to the transmission;

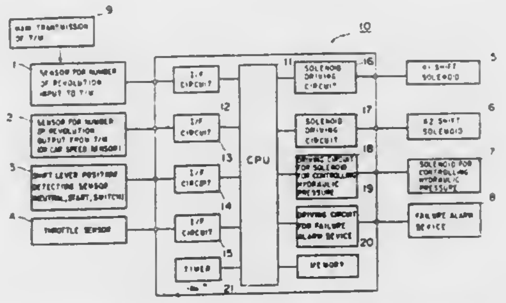
sensing the number of revolutions output from the transmission or the automobile speed;

calculating the actual gear ratio of the transmission by dividing the number of revolutions input to the transmission by the number of revolutions output from the transmission;

measuring shift time elapsed between initiation of a shift and completion of the shift;

detecting abnormal slippage in the mechanical section of the transmission by determining that the measured shift time is outside of a predetermined range for shift time;

generating an abnormality signal responsive to detection of abnormal slippage;


9
MAIN TRANSMISSION OF T/M
10
1
SENSOR FOR NUMBER OF REVOLUTION INPUT TO T/M
2
SENSOR FOR NUMBER OF REVOLUTION OUTPUT FROM T/M (OR CAR SPEED SENSOR)
3
SHIFT LEVER POSITION DETECTING SENSOR (NEUTRAL,START,SWITCH)
4
THROTTLE SENSOR
I/F CIRCUIT
11
12
13
14
15
CPU
TIMER
21
SOLENOID DRIVING CIRCUIT
16
17
18
19
20
DRIVING CIRCUIT FOR SOLENOID FOR CONTROLLING HYDRAULIC PRESSURE
DRIVING CIRCUIT FOR FAILURE ALARM DEVICE
MEMORY
5
6
7
8
#1 SHIFT SOLENOID
#2 SHIFT SOLENOID
SOLENOID FOR CONTROLLING HYDRAULIC PRESSURE
FAILURE ALARM DEVICE

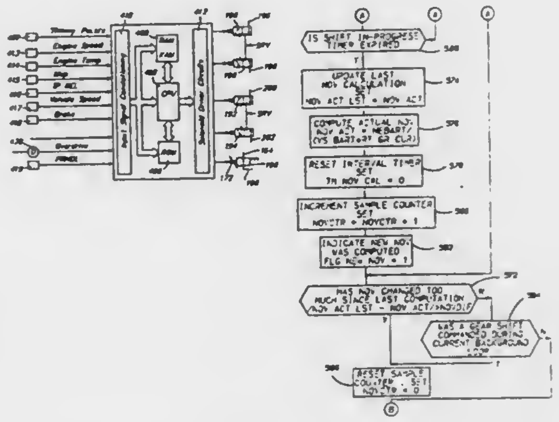
controlling the hydraulic pressure to said mechanical section by operation of a solenoid valve responsive to an electric command signal; and

turning off said solenoid valve, thereby raising the hydraulic pressure to a maximum level, in response to said abnormality signal.

---

### 5,016,175
## LEARNED N/V RATIO ELECTRONIC CONTROL FOR AUTOMATIC TRANSMISSION REFERENCE SPEED IN A DRIVELINE HAVING UNKNOWN AXLE RATIO

**Paul A. Baltusis, Northville; Thomas L. Greene, Plymouth, and Bruce J. Palansky, Livonia, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**
**Filed Dec. 27, 1988, Ser. No. 289,889**
**Int. Cl.$^5$ B60K** *41/22;* **F16H** *45/02;* **G06F** *15/20*
U.S. Cl. 364—424.1 **7 Claims**


CPU
IS SHIFT IN-PROGRESS TIMER EXPIRED
UPDATE LAST NOV CALCULATION SET NOV ACT LST = NOV ACT
COMPUTE ACTUAL N/V: NOV ACT = NEBART/(VS BART*RT GR CUR)
RESET INTERVAL TIMER SET TM NOV CAL = 0
INCREMENT SAMPLE COUNTER SET NOVCTR = NOVCTR + 1
INDICATE NEW NOV WAS COMPUTED FLG NEW NOV = 1
HAS NOV CHANGED TOO MUCH SINCE LAST COMPUTATION
WAS A GEAR SHIFT COMMANDED DURING CURRENT BACKGROUND LOOP
RESET SAMPLE COUNTER: SET NOVCTR = 0

7. A method for controlling an automatic transmission having a speed reduction of unknown magnitude located in a driveline between a transmission component and the drive wheels of the vehicle, said transmission including a device for hydrodynamically connecting a power source and the input to a gearset, a multiple speed ratio gear mechanism, hydraulically actuated friction elements, comprising the steps of:

locking the connecting device;

providing a data base that includes a reference speed of a driveline component and a variable corresponding to reference speed representing current operating conditions, and NVBASE a base ratio of transmission output shaft speed to vehicle speed;

repetitively determining said variable representing current operating conditions, RT GR CUR the current gear ratio in which the transmission is operating, NEBART the current power source speed, and VSBART the current vehicle speed;

computing NOV ACT, equal to NEBART/(VSBART*RT GR CUR);

computing and storing in memory RT NOVS KAM, the ratio of NOV ACT/NVBASE;

correcting the reference speed, using the ratio of current NOV ratio to base NOV ratio; and

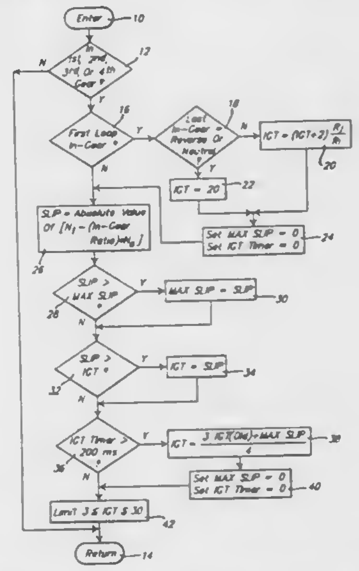
producing a signal representing a commanded change in operational state of the transmission after the speed of said driveline component reaches the corrected reference speed; and

producing a change in speed ratio of the gear mechanism by selectively engaging and disengaging the friction elements in response to the signal representing a commanded change in operational state of the transmission.

---

### 5,016,176
## METHOD OF IN-GEAR TOLERANCE CONTROL

**Gerald L. Holbrook, Rochester Hills, and Maurice B. Leising, Clawson, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**
**Filed May 12, 1989, Ser. No. 351,693**
**Int. Cl.$^5$ B60K** *41/18;* **G05D** *17/02*
U.S. Cl. 364—424.1 **9 Claims**



9. In a vehicle having a transmission including an input member, an output member, a gear assembly for changing the ratio of torque between the input member and output member, a plurality of input sensors for providing signals indicative of measurement data for predetermined conditions, and a controller having memory for processing an storing the signals and predetermined values and providing output signals, a method of determining and controlling the in-gear tolerance (IGT) of the transmission, said method comprising the steps of:

sensing the speed of the input member and output member by the input sensors;

calculating by the controller the speed of the input member and output member based on the sensed speeds;

determining whether the transmission is operating in one of a plurality of in-gear conditions;

exiting if the transmission is not operating in one of a plurality of in-gear conditions;

if the transmission is operating in one of a plurality of in-gear conditions, initializing the value of IGT, a maximum value

VOL
1126
ISS
2
MY
14
1991
UMI

of slip and an IGT timer by the controller on the first pass of the method;

calculating by the controller the current slip by the calculated speed of the input member minus the product of the current in-gear ratio multiplied by the calculated speed of the output member;

determining whether the value of calculated slip is greater than a maximum value of slip;

if the value of calculated slip is greater than the maximum value of slip, setting the maximum value of slip equal to the calculated slip;

determining whether the value of IGT timer is greater than a predetermined value;

limiting the value of IGT between first and second predetermined values if the value of the IGT timer is not greater than the predetermined value;

calculating by the controller the value of IGT based on previous IGT values if the value of the IGT timer is greater than the predetermined value; and

controlling the transmission using the calculated value of IGT.

---

### 5,016,177

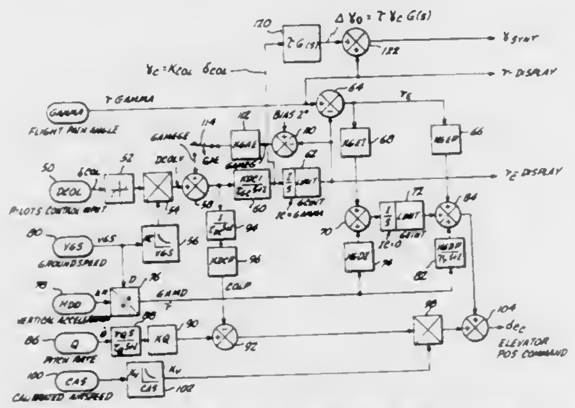
## AIRCRAFT FLIGHT PATH ANGLE DISPLAY SYSTEM

**Antonius A. Lambregts, Issaquah, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed May 31, 1983, Ser. No. 499,290**

**Int. Cl.⁵ G06F *15/50***

**U.S. Cl. 364—424.06** **8 Claims**



1. A method of producing a flight path angle display for an aircraft, the method comprising the steps of:

(a) providing an aircraft flight control steering system having a predetermined time response lag $\tau$ to a command input, said time response lag being substantially independent of flight conditions;

(b) providing a signal $\gamma$ representative of the aircraft's actual flight path angle;

(c) producing a signal $\Delta\gamma_D$ having a predetermined relationship to said response lag $\tau$ and to a flight path angle command;

(d) producing a synthesized signal $\gamma_{SYNT}$, where:

$$\gamma_{SYNT} = \gamma + \Delta\gamma_D;$$

and,

(e) displaying said $\gamma_{SYNT}$ signal.

---

### 5,016,178

## BRAKE PRESSURE CONTROL APPARATUS

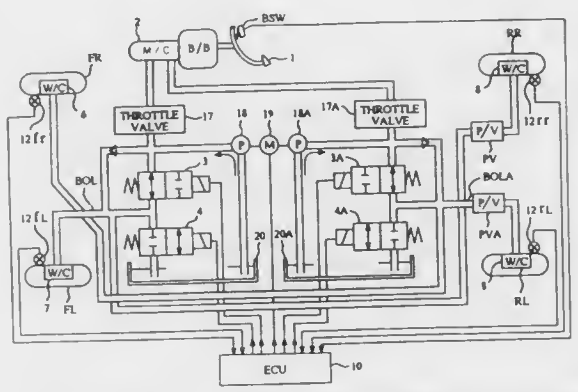
**Kazutaka Kuwana, Toyota; Tsuyoshi Yoshida, Obu, and Shinsuke Sakane, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Continuation of Ser. No. 230,228, Aug. 9, 1988, abandoned. This application Mar. 29, 1990, Ser. No. 501,951**

**Claims priority, application Japan, Aug. 20, 1987, 62-206655**

**Int. Cl.⁵ B60T *8/64***

**U.S. Cl. 364—426.02** **4 Claims**



1. Apparatus for controlling braking pressure of a vehicle wheel brake, comprising:

normally-open first valve means disposed between a fluid pressure source and the wheel brake for controlling the passage of brake fluid between the fluid pressure source and the wheel brake;

normally-closed second valve means disposed between the first valve means and the wheel brake for maintaining the brake fluid at a low pressure;

detection means for detecting a wheel speed of a brake equipped wheel;

means for arithmetically computing a reference speed and wheel acceleration in accordance with the detected wheel speed;

first valve control means responsive to a "reducing" control mode for closing the first valve means and opening the second valve means for reducing the brake pressure of the wheel;

second valve control means responsive to an "intensifying" control mode for opening the first valve means and closing the second valve means for increasing the brake pressure of the wheel;

third valve control means responsive to a "hold" control mode for closing both said first and second valve means for maintaining the brake pressure of the wheel;

memory means for storing constants for specifying functions indicating boundaries of at least the "reducing", "intensifying" and "hold" domains in a two dimensional plane, including (a) the wheel acceleration, (b) an operational parameter determined by the wheel rotational speed and the reference speed, as variables;

means for deciding one of the control modes by obtaining a calculated value by utilizing the constants and either one of (a) the wheel acceleration arithmetically computed by the arithmetic means, or (b) the operational parameter corresponding to the wheel rotational speed detected by the detection means and the reference speed arithmetically computed by the arithmetic means; and comparing the obtained calculated value with the other of (a) said wheel acceleration, and (b) said operational parameter not utilized in obtaining said calculated value in order to judge whether the calculated value is located in "reducing", "intensifying", or "hold" domain; and

means responsive to the control mode decision for selecting one of the "reducing", "intensifying", and "hold" control modes.

---

### 5,016,179

## DRIVE SLIP REGULATOR FOR MOTOR VEHICLES

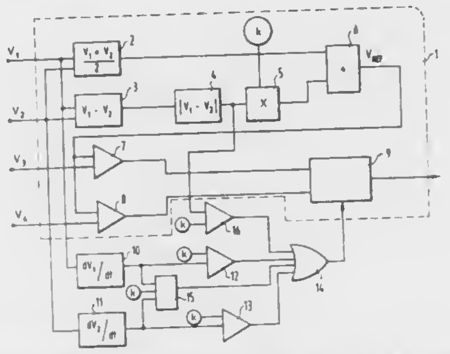
**Alfred Utzt, Fürstenfeldbruck, Fed. Rep. of Germany, assignor to Knorr-Bremse AG, Munich, Fed. Rep. of Germany**

**Filed Jul. 13, 1989, Ser. No. 379,384**

**Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823686**

**Int. Cl.⁵ B60T *8/58***

**U.S. Cl. 364—426.02** **5 Claims**



1. Drive slip regulator for vehicles having a motor and rotational speed sensors for two driven wheels and two non-driven wheels of said vehicles, comprising

(a) the speed sensors of said two non-driven wheels connected to a first computation unit, which forms an arithmetic means value of output signals of said speed sensors of said two non-driven wheels;

(b) a subtractor forming a differential value of input signals of said speed sensors of said non-driven wheels;

(c) a second computation unit forming an absolute value of an input signal thereof connected to an output of said subtractor;

(d) a first multiplier multiplying said absolute value from said second computation unit by a first constant value;

(e) an output of said first multiplier and an output of said first computation unit being connected with two inputs of an adder, which forms a reference value signal;

(f) an output of said adder connected with an input of each of a first and a second comparator;

(g) a further input of each of said first and second comparators respectively connected with said speed sensors of said driven wheels;

(h) outputs of said first and second comparators each connected with an input of a controller;

(i) said speed sensors of said non-driven wheels each being connected to an input of a corresponding differentiator;

(j) output of each said differentiator respectively being connected with the corresponding first input of the third and fourth comparators, second input of said third and fourth comparators each being connected to a second constant value;

(k) said absolute value of said second computation unit being connected to a fifth comparator having a further input connected to a third constant value;

(l) said outputs of said differentiators being respectively connected to the first and second inputs of a second subtractor, the third input of said second subtractor being connected to a fourth constant value;

(m) the outputs of said third, fourth and fifth comparators and an output of said second subtractor being connected with inputs of an OR-gate;

(n) an output of said OR-gate being connected to a control input of said controller;

(o) said controller being in inoperative condition when said output of said OR-gate carries a signal; and

(p) an output signal of said controller diminishing driven force of said motor causing braking of said driven wheels.

---

### 5,016,180

## TAMPER PROOF METHOD AND APPARATUS FOR ADJUSTING A CONTROL PARAMETER OF A CONTROLLED APPARATUS

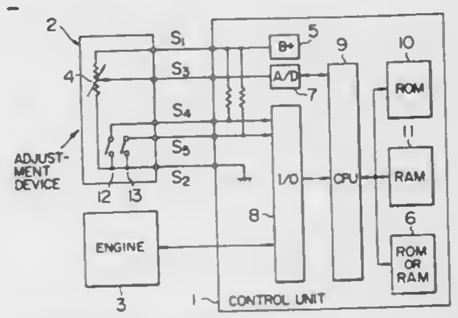
**Masaaki Fujisawa, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 103,292, Oct. 1, 1987, abandoned. This application Aug. 4, 1989, Ser. No. 391,704**

**Claims priority, application Japan, Oct. 1, 1986, 61-231183**

**Int. Cl.⁵ G06F *15/20;* F02P *17/00;* F02D *28/00***

**U.S. Cl. 364—431.04** **11 Claims**



5. An adjustment apparatus for an engine control system, comprising:

first memory means for storing a control program and fixed control values;

second memory means, of a type in which data can be rewritten and stored in a non-volatile manner, for storing compensation values;

third memory means for temporarily storing compensation values;

control means connected to said first, second and third memory means for generating a control output signal to perform a predetermined engine control processing according to (i) the control program and a fixed control value stored in said first memory means and (ii) a compensation value stored in said second memory means, including:

(a) mode decision means for producing a mode signal indicating an adjustment mode for correcting a compensation value;

(b) compensation amount determining means for producing a compensation amount signal representing an amount of compensation for a control value;

(c) memory command means for generating a command signal to indicate that a predetermined engine condition is reached; and

(d) processing means connected to said mode decision means and said compensation amount determining means for storing in aid third memory means a compensation value based on a a compensation amount signal received from said compensation amount determining means when said mode signal indicating an adjustment mode is received from said mode decision means and for transferring a compensation value from said third memory means to said second memory means when said command signal is received from said memory command means while said mode signal indicates an adjustment mode.

---

### 5,016,181

## METHOD AND SYSTEM FOR AN ENGINE IGNITION TIMING CONTROL

**Yuji Hayashida, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 28, 1989, Ser. No. 372,656**

**Claims priority, application Japan, Jul. 5, 1988, 63-168171**

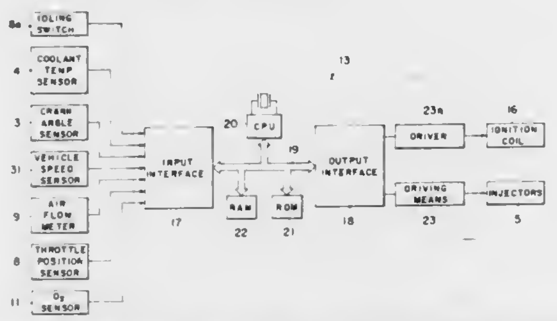
**Int. Cl.⁵ F02P *5/04***

**U.S. Cl. 364—431.09** **7 Claims**

1. An ignition timing control system of an engine having a

VOL
1126
ISS
2
MY
14
1991
UMI

throttle valve, an idling switch producing a switch signal when the throttle valve is fully closed, a crank angle sensor provided to detect an engine speed, a vehicle speed sensor provided to detect a vehicle speed of a vehicle, a coolant temperature sensor provided to detect an engine temperature, engine load detecting means for detecting an engine load, calculating means responsive to the engine speed and the engine load for calculating an optimum ignition timing, driving means for generating an ignition signal to spark an ignition plug at the optimum ignition timing, and fuel supplying means for supplying a fuel to the engine in dependency on variable operation conditions of the engine, comprising:



- determining means responsive to the switch signal, the vehicle speed and the engine temperature for determining a fuel-cut state;
- setting means for setting a delay time in response to the engine speed and for producing a fuel-cut signal when said delay time is lapsed after said determining means determines the fuel-cut state;
- correcting means for correcting the optimum ignition timing with a predetermined correction value corresponding to the magnitude of the engine speed during said delay time so as to provide a corrected ignition timing to the driving means; and
- fuel-cut means responsive to said fuel-cut signal for cutting off the supply of the fuel to the engine.

---

### 5,016,182
## REGISTER CONTROL MEANS FOR WEB PROCESSING APPARATUS

**Paul W. Bergland; James D. Parker, both of Brookfield, and Thomas H. Timple, Pewaukee, all of Wis., assignors to Stevens Graphics Corporation, New Berlin, Wis.**

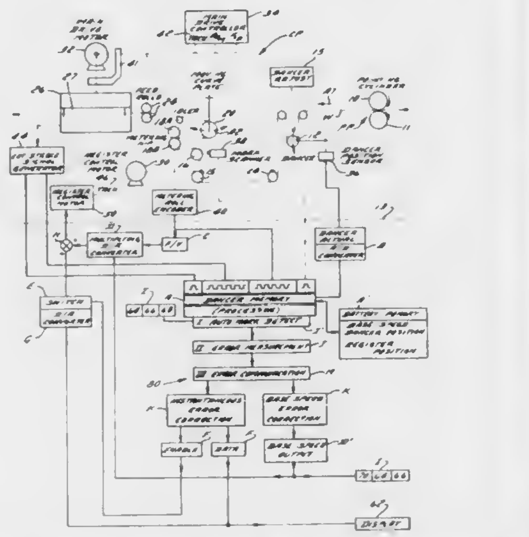
**Filed Dec. 29, 1988, Ser. No. 291,819**

**Int. Cl.$^5$ G06F *15/46;* B65H *23/18***

**U.S. Cl. 364—469** **6 Claims**

1. Register control means for web processing apparatus to match the surface speed of a metering roll which supplies a pre-printed web to a cutting zone in a cutter mechanism to the surface speed of an impression cylinder which applies impressions and associated register marks to said web and to effect registration between said impressions and said cutting zone, said apparatus comprising a register control motor for said metering roll and a movable dancer engageable with said web at a location between said impression cylinder and said metering roll, said register control means comprising:

- base speed selector means for operating said register control motor to establish and maintain a base speed for said web;
- error correction means for ascertaining a register error, if any, and for adjusting said base speed to establish a corrected base speed to eliminate said register error;
- dancer position locater means for ascertaining and remembering a null position assumed by said dancer when said web is operating at said corrected base speed; and



- for subsequently recalling said null position to enable an initial operation of said register control motor at a speed wherein said dancer assumes said recalled null position.

---

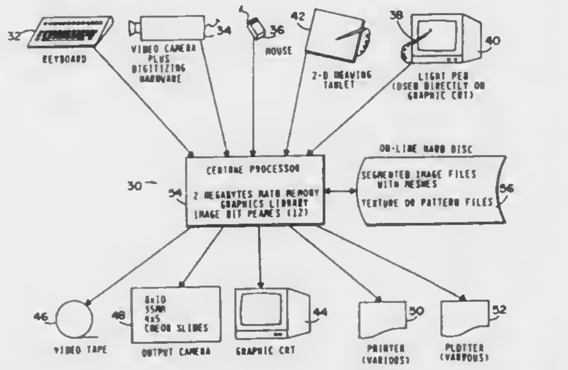
### 5,016,183
## TEXTILE DESIGN SYSTEM AND METHOD

**Emory Shyong, Grand Rapids, Mich., assignor to Computer Design, Inc., Grand Rapids, Mich.**

**Filed Sep. 13, 1988, Ser. No. 243,690**

**Int. Cl.$^5$ G06F *15/46***

**U.S. Cl. 364—470** **35 Claims**



22. A computer-assisted design system apparatus for generating an image of a textile article comprising:

- input means for receiving a user selection of fiber arrangement in a lateral cross section of a yarn;
- yarn image generating means for generating a longitudinal image of yarn in response to said input means;
- weave matrix data storage means for storing parameters sufficient to specify a weave pattern; and
- woven fabric image generating means for applying a set of weave pattern parameters to said yarn image generating means to generate an image of a fabric woven according to a weave pattern utilizing a yarn image generated from a user selection to said input means.

---

### 5,016,184
## METHOD AND DEVICE FOR DIRECTING AND CONTROLLING THE OPERATION OF AN INJECTION MOLDING MACHINE

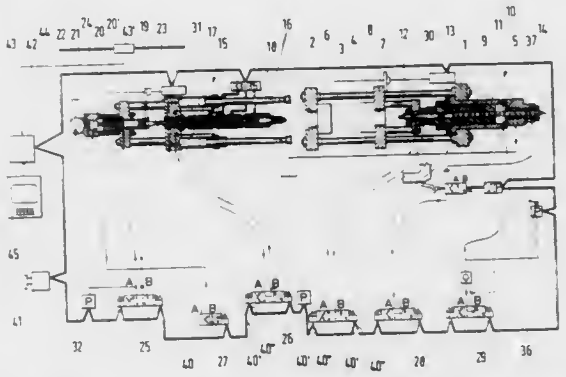
**Lothar Gutjahr, Malterdingen, Fed. Rep. of Germany, assignor to Klockner Ferromatik Desma GmbH, Malterdingen, Fed. Rep. of Germany**

**Filed Jan. 11, 1989, Ser. No. 295,779**

**Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802254**

**Int. Cl.$^5$ G06F *15/46;* B29C *45/76***

**U.S. Cl. 364—476** **8 Claims**



1. A method for directing and controlling the operation of an injection molding machine by means of at least one device governed by a timing program said machine having a number of sensors which provide actual values during machine operation and a number of actuators forming and executing control commands received from the sensors, comprising the steps of:

- serially connecting the sensors and actuators in a predetermined relationship via a closed loop control cable for carrying data and timing information such that all information is available in successive words, jointly releasing information from the actuators and/or sensors on to the cable and, in dependence on the status of the program timing, jointly executing the control commands of the actuators.

---

### 5,016,185
## ELECTROMAGNETIC PYRAMIDAL CONE ABSORBER WITH IMPROVED LOW FREQUENCY DESIGN

**Edward F. Kuester, and Christopher L. Holloway, both of Boulder, Colo., assignors to University of Colorado Foundation, Inc., Boulder, Colo.**

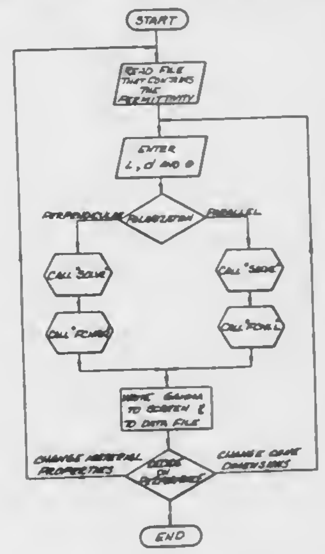
**Filed Mar. 24, 1989, Ser. No. 328,409**

**Int. Cl.$^5$ G06F *15/60;* E04B *1/82***

**U.S. Cl. 364—481** **3 Claims**

1. A process for constructing a pyramidal cone absorbing structure of a type employed in an anechoic chamber comprising the steps of:

- selecting a complex permittivity, at a selected plurality of frequencies, of a material comprising the pyramidal cone absorbing structure;
- computing, for a predetermined parallel and perpendicular polarization of an incident electromagnetic wave, a solution of a first order differential Riccati equation that expresses a derivative of a reflection coefficient as a function of effective properties of the material comprising the pyramidal cone absorbing structure, to obtain the magnitude of the reflection coefficient at each of said plurality of frequencies; and
- constructing a pyramidal cone absorbing structure having a desired computed magnitude of the reflection coefficient and having a length (L) of a tapered section forming a portion of the pyramidal cone absorbing structure, a thickness (d) of a backing layer forming a portion of the pyramidal cone absorbing structure, and an angle theta at which the incident electromagnetic wave impinges upon the pyramidal cone absorbing structure.


START
READ FILE THAT CONTAINS THE PERMITTIVITY
ENTER L, d AND θ
PERPENDICULAR
POLARIZATION
PARALLEL
WRITE GAMMA TO SCREEN & TO DATA FILE
CHANGE MATERIAL PROPERTIES
CHANGE CONE DIMENSIONS
END

---

### 5,016,186
## METHOD OF DETECTING NOISE DISAPPEARANCE AND DETECTING DEVICE THEREFOR

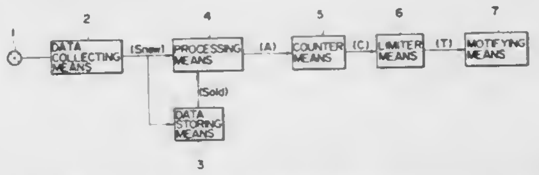
**Ichiro Toyoda; Toshihiko Niinomi, both of Hiroshima; Shigeru Kaseda, and Koichi Takahashi, both of Aichi, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Idemitsu Kosan Company Limited, Tokyo, Japan**

**Filed Feb. 7, 1989, Ser. No. 307,872**

**Claims priority, application Japan, Feb. 9, 1988, 63-26505; Apr. 7, 1988, 63-46224[U]**

**Int. Cl.$^5$ G06F *15/20, 15/46***

**U.S. Cl. 364—507** **8 Claims**



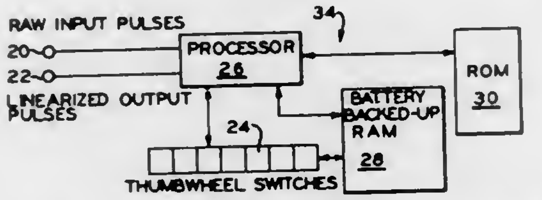
1. A method of detecting a substantial reduction of a noise component, comprising the steps of:

- storing in data storing means output signals issued from data collecting means for successively collecting signals from a detector;
- processing by a processing means an absolute defference between the output signal currently issuing from said data collecting means and one of the output signals stored in said data storing means;
- incrementing a count number of a counter means when said absolute difference from said processing means is smaller than a preset difference, and clearing said count number when said absolute difference is larger than said preset difference; and
- issuing a predetermined alarm when the count number is greater than a preset threshold value to indicate the substantial reduction of a noise component even if the signals from the detector fluctuate.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,016,187
### LINEARIZED TURBINE FLOW METER FOR FUEL DISPENSERS

**Maurice J. Forkert, and Mark E. Sullivan, both of Fort Wayne, Ind., assignors to Tokheim Corporation, Fort Wayne, Ind.**
**Filed Jan. 17, 1989, Ser. No. 298,040**
**Int. Cl.$^5$ G01F** ***1/12;*** **G06F** ***15/20***
U.S. Cl. 364—510 **15 Claims**



1. In a fuel dispensing apparatus having a flow meter and a liquid flow line, an apparatus for adjusting the measured flow rate of said flow meter to correct for the non-linear output signals of said flow meter, said apparatus comprising:
a flow meter having a rotor, said flow meter adapted to measure the flow rate of a liquid flow line as a function of the rotational velocity of said rotor;
an output means, coupled to said flow meter, for generating signals at a rate which is proportional to the rotational velocity of said rotor, and providing an output frequency;
memory means for storing a plurality of calibration values, each one of said calibration values being associated with a frequency which is an endpoint of a prefined interval, such that each of said intervals has a lower and a higher endpoint value;
processor means, coupled to said output means and said memory means, for linearizing said output frequency by using a predetermined correction factor to produce an estimated frequency, said processor periodically recalculating said correction factor by selecting an appropriate interval containing said estimated frequency, then determining the relative displacement of said estimated frequency within said interval, the relative displacement being defined as the difference of the upper endpoint and the estimated frequency which is divided by the length of the interval, then calculating a new correction factor (K) using the equation:

$$K=KB-[X^{*}(KB-KA)]$$

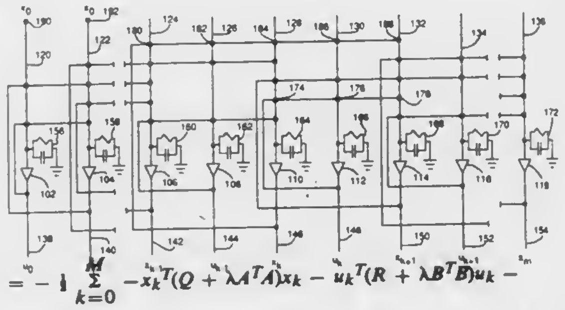
with KA being the calibration factor associated with the lower endpoint value of said interval, X being said relative displacement, and KB being the calibration factor associated with said higher endpoint value.

---

### 5,016,188
### DISCRETE-TIME OPTIMAL CONTROL BY NEURAL NETWORK

**Ming-Shong Lan, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**
**Filed Oct. 2, 1989, Ser. No. 416,163**
**Int. Cl.$^5$ G06F** ***15/46***
U.S. Cl. 364—513 **7 Claims**

5. A method of determining according to a quadratic cost function optimal control inputs for a linear discrete-time process at M sampling times, the process being characterized by p state variables and r control variables, comprising
providing a neural network having N=(p+r) M neurons;
assigning a distinct neuron to represent the value of each state variable at each sampling time;
assigning a distinct neuron to represent the value of each control variable at each sampling time;
providing an input for each neuron;
providing an output for each neuron;
connecting the neurons representing the initial values of each state variable and each control variable to an external input having a value determined by a modified quadratic cost function J' defined as:



$$J' = -\frac{1}{2}\sum_{k=0}^{M} -x_k{}^T(Q+\lambda A^TA)x_k - u_k{}^T(R+\lambda B^TB)u_k -$$

$$x_{k+1}^T(\lambda I)x_{k+1} + x_{k+1}^T(\lambda A)x_k + x_k{}^T(\lambda A^T)x_{k+1} + x_{k+1}(\lambda B)u_k +$$

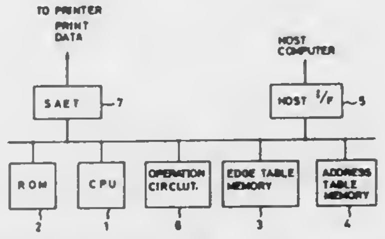
$$u_k{}^T(\lambda B^T)x_{k+1} - x_k{}^T(\lambda A^TB)u_k - u_k{}^T(\lambda B^TA)x_k$$

where A is a p×p state transition matrix, B is a p×r control distribution matrix, $x_k$ is a p×1 state vector, $u_k$ is an r×1 control vector at the sampling time instant k, Q and R are symmetric weighting matrices, M is the number of time steps, λ is a finite constraint strength, and I is the identity matrix;
connecting the output of each neuron to the input of each other neuron in the network, the strength of each such connection being determined by the modified cost function; and
running the neural network for a sufficient time to minimize the cost function, thereby producing optimum values for each control variable at each sampling time.

---

### 5,016,189
### AREA FILLING DEVICE

**Masahiro Yamada, Tokyo, Japan, assignor to Ricoh Company, Ltd., Japan**
**Filed Jun. 30, 1989, Ser. No. 374,297**
**Claims priority, application Japan, Jul. 6, 1988, 63-166966**
**Int. Cl.$^5$ G06F** ***15/62***
U.S. Cl. 364—518 **11 Claims**

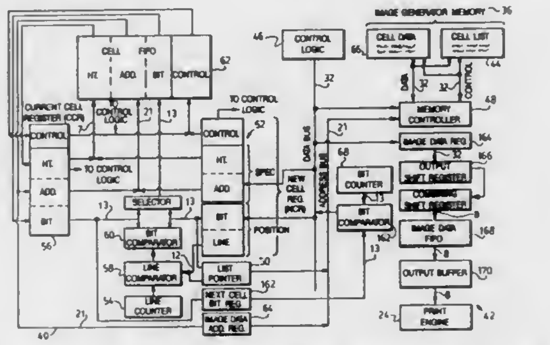


1. An area filling device comprising:
receiving means for receiving X-Y coordinate data related to endpoints of edges consisting of a closed loop figure from an external device;
edge table storing means for storing an edge table having data related to said edges;
address table means for storing edge table address data for every Y coordinate value;
operation means, connected to said receiving means, said edge table storing means and address table means, for calculating said data related to said edges from said endpoints supplied from said receiving means and for writing calculated data into a storage area of said edge table storing means indicated by said edge table address data defined in said address table means;
active-edge table forming means, coupled to said edge table storing means and said address table means, for forming first, second and third active-edge tables for every Y coordinate value from said data related to the edges stored in said edge table storing means, said first active-edge table indicating bit value data having a predetermined bit at an X coordinate position where there is an edge which is not a horizontal edge, said second active-edge table indicating bit value data having a predetermined bit at X coordinate positions where there are endpoints of a horizontal edge, said third active-edge table indicating bit value data having a predetermined bit at an X coordinate position where there is an endpoint of an edge;
logic means, coupled to said active-edge table forming means, for inverting said bit data included in said first active-edge table each time said predetermined bit defined in said first active-edge table appears and for inverting said bit data included in said second active-edge table each time said predetermined bit defined in said second active-edge table appears; and
OR gate means, coupled to said active-edge table forming means and said logic means, for receiving said bit data related to said first and second active-edge tables and supplied from said logic means and said bit data related to said third active-edge table and supplied from said active-edge table forming means and for calculating an OR operation on said received bit data,
the results of the OR operation obtained for every Y coordinate value forming print data.

---

### 5,016,190
### DEVELOPMENT OF RASTER SCAN IMAGES FROM INDEPENDENT CELLS OF IMAGED DATA

**Christopher W. Thomson, Islington, Canada, assignor to Delphax Systems, Randolph, Mass.**
**Filed May 5, 1988, Ser. No. 190,427**
**Int. Cl.$^5$ G06F** ***15/62***
U.S. Cl. 364—518 **1 Claim**

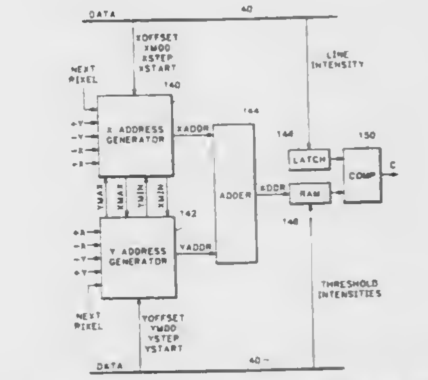


1. Apparatus for organizing digital data received from a source such as a host computer into raster scan order, the apparatus comprising:
- (a) a cell data memory for storing all data representing attributes of a cell namely,
  - (i) a number of a starting raster scan in which the cell first occurs,
  - (ii) a bit location of a first bit in the starting raster scan,
  - (iii) a number of the raster scan lines in the cell, and
  - (iv) an address of data representing a portion of the cell in the starting raster scan and commencing at said bit location;
- (b) a cell list memory for storing data representing each of said number of raster scan lines for said cell, the data representing the starting raster scan being located at said address;
- (c) a new cell register for receiving and storing said cell data prior to the raster scan reaching said starting raster scan;
- (d) a current cell register for receiving and temporarily storing said attributes (a)(ii), (a)(iii) and (a)(iv) of said cell;
- (e) data comparison means for comparing attributes (a)(ii), (a)(iii) and (a)(iv) of said cell in the new cell register with the corresponding attributes of a previous cell stored in the current cell register, the comparison means including adjustment means for decrementing attributes (a)(iii) and (a)(iv) to the data for the next raster scan line of said cell;
- (f) a FIFO for selectively receiving data representing attributes (a)(ii), (a)(iii) and (a)(iv) from either said new cell register or said current cell register;
- (g) a line counter actuated after each raster scan to increment to the next raster scan;
- (h) line comparison means for comparing the line number from the line counter with attribute (a)(i) to determine whether said data comparison means should be actuated, the line comparison means operating when the raster scan line number matches attribute (a)(i) to determine which of attribute (a)(ii) of the cell in the new cell register and the previous cell in the current cell register takes priority in the raster scan and causing the attributes (a)(ii), (a)(iii) and (a)(iv) of the cell data so selected to pass to the FIFO so that data is received in the FIFO in the order in which the data representing a series of cells is to be added to the raster scan; and
- (i) image assembler means for receiving attributes (a)(ii) and (a)(iv) in sequence as attribute (a)(iv) is decremented by the data comparison means, retrieving corresponding data from the cell list memory and assembling the corresponding data into the raster scan.

---

### 5,016,191
### HALF TONING PIXEL PROCESSOR

**Pierre A. Radochonski, Lake Oswego, Oreg., assignor to Tektronix, Inc., Portland, Oreg.**
**Filed Sep. 2, 1988, Ser. No. 239,736**
**Int. Cl.$^5$ G06F** ***15/62***
U.S. Cl. 364—518 **18 Claims**



1. For a pixel processing system including a bit map memory storing pixel data bits, each pixel data bit corresponding to a separate pixel of a half tone cell array forming a graphic design and controlling appearance in said graphic design of said pixel data bit's corresponding pixel, a half tone pixel processor comprising:
means for storing object description data indicating intensity and positioning relative to said half tone cell array of a graphic object to be included in said graphic design;
addressable memory means for storing at various addresses pixel intensity threshold data corresponding to each pixel of a half tone cell and for reading out said pixel intensity threshold data when addressed;
addressing means for determining from said stored object description data an address within said addressable memory means of pixel intensity threshold data corresponding to a particular pixel of said half tone cell array spanned by said graphic object when said graphic object is included in said graphic design, said addressing means addressing said addressable memory means with the determined address such that said addressable memory means reads out pixel

VOL
126
ISS
2
MY
14
1991
UMI

intensity threshold data corresponding to the particular pixel;

a comparator for comparing the intensity indicated by said object description data to the pixel intensity threshold data read out of said addressable memory means and producing an output bit indicating a result of the comparison; and

means for setting a state of a bit stored in said bit map memory corresponding to said particular pixel in response to a state of said output bit.

---

### 5,016,192

### VIDEOTEX TERMINAL WITH A MEMORY FOR STORING PLURAL PICTURE FRAMES

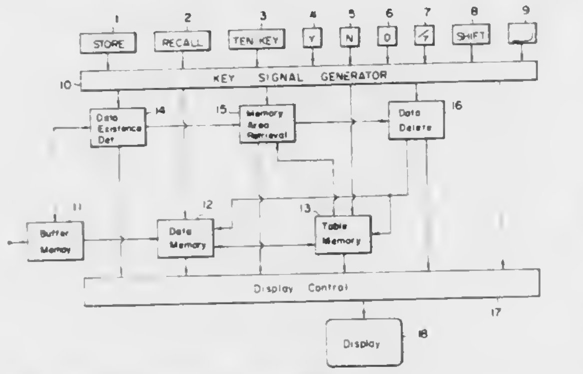
**Takanobu Ishido; Sachiyo Tan, and Masami Furukori, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Sep. 8, 1986, Ser. No. 904,886**

**Claims priority, application Japan, Sep. 10, 1985, 60-200078; Sep. 25, 1985, 60-211725**

**Int. Cl.$^5$ G06F *12/04***

**U.S. Cl. 364—518** **8 Claims**



1. A videotex terminal comprising,

means for receiving picture data from a videotex data source,

keyboard means,

data memory means, connected to the picture data receiving means, for storing units of picture data fed from said videotex data source,

table memory means for storing a starting address and data size of each unit of picture data in said data memory means in connection with a corresponding unit number of each unit,

display means for displaying a picture corresponding to picture data supplied to the display means, and

memory control means, connected to the keyboard means, for locating the address of a memory area in said data memory means where new picture data can be stored and a unit number unused in said table memory means writing said new picture data in said memory area of said data memory means with said unused unit number, and changing the contents of said table memory means so that it corresponds to the contents of said data memory means.

---

### 5,016,193

### PIXEL AND LINE ENHANCEMENT METHOD AND APPARATUS

**Robert F. Stone, New Smyrna; Jeffrey D. Potter, Port Orange, and William S. Beamon, III, Ormond Beach, all of Fla., assignors to General Electric Company, Syracuse, N.Y.**

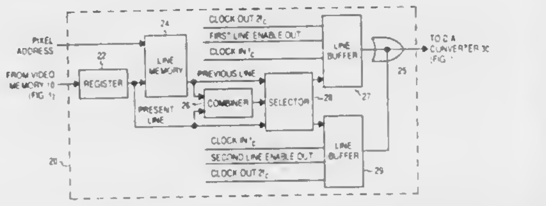
**Filed Apr. 7, 1988, Ser. No. 178,934**

**Int. Cl.$^5$ G06F *15/68***

**U.S. Cl. 364—518** **23 Claims**

1. In a computer image generation system, apparatus for determining composed pixel modulation data having pixel modulation values for a first predetermined number of lines for a display from pixel modulation information having pixel modulation values for a second predetermined number of lines for a second display, wherein the second predetermined number of lines is less than the first predetermined number of lines, the apparatus comprising:

combiner means for predeterminedly combining individual pixel modulation values of the pixel modulation information for generating derived pixel modulation data having derived pixel modulation values; and



selector means coupled to the combiner means for receiving the derived pixel modulation data and further coupled for receiving the pixel modulation information, the selector means for predeterminedly selecting pixel modulation values from the derived pixel modulation data and from the pixel modulation information for supplying the composed pixel modulation data such that each line of the composed pixel modulation data includes at least one pixel modulation value selected from the derived pixel modulation data and from the pixel modulation information.

---

### 5,016,194

### IMAGE FORMING APPARATUS

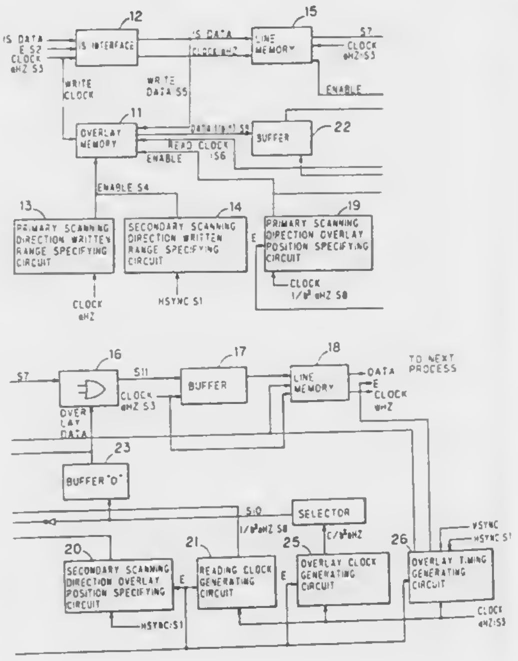
**Tsukasa Matsushita, and Hidechika Kumamoto, both of Osaka, Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 6, 1989, Ser. No. 431,931**

**Claims priority, application Japan, Nov. 11, 1988, 63-286253**

**Int. Cl.$^5$ G06F *15/00***

**U.S. Cl. 364—519** **7 Claims**


IS DATA
IS INTERFACE
LINE MEMORY
WRITE CLOCK
WRITE DATA S5
OVERLAY MEMORY
BUFFER
READ CLOCK
ENABLE
PRIMARY SCANNING DIRECTION WRITTEN RANGE SPECIFYING CIRCUIT
SECONDARY SCANNING DIRECTION WRITTEN RANGE SPECIFYING CIRCUIT
PRIMARY SCANNING DIRECTION OVERLAY POSITION SPECIFYING CIRCUIT
HSYNC S1
CLOCK
OVERLAY DATA
BUFFER "D"
SELECTOR
DATA
TO NEXT PROCESS
SECONDARY SCANNING DIRECTION OVERLAY POSITION SPECIFYING CIRCUIT
READING CLOCK GENERATING CIRCUIT
OVERLAY CLOCK GENERATING CIRCUIT
OVERLAY TIMING GENERATING CIRCUIT
HSYNC:S1
11
12
13
14
15
16
17
18
19
20
21
22
23
25
26

1. An apparatus for image forming, comprising:

a photoconductor on which an electrostatic image is formed;

first image data inputting means for inputting first image data;

storing means for storing second image data;

second image data inputting means for inputting second image data stored in said storage means;

image data synthesizing means for synthesizing into composite image data said first image data inputted with said first image data inputting means and said second image data inputted with said second image data inputting means;

control means for controlling a cycle and timing of inputting said second image data to said image data synthesizing means in relation to a cycle and timing of inputting said first image data to said image data synthesizing means, such that the formed image size and arrangement can be varied in accordance with the timing of input and cycle of input of said first and second image data; and

exposing means for exposing said photoconductor depending on the composite image data provided by said data synthesizing means.

---

### 5,016,195

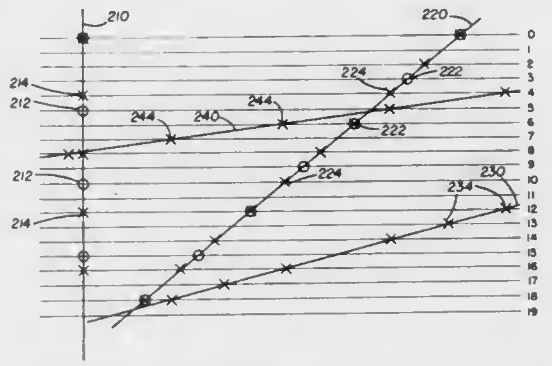
### HIGH QUALITY PLOTTING TECHNIQUE FOR RASTER PRINTING DEVICES

**Rick A. Warp, Menlo Park, Calif., assignor to Da Vinci Graphics, Inc., Palo Alto, Calif.**

**Filed Mar. 3, 1989, Ser. No. 319,659**

**Int. Cl.$^5$ G06F *3/12;* G06K *15/10***

**U.S. Cl. 364—519** **50 Claims**



1. A method for converting a plurality of operating vectors for printing on an output device having a plurality of print lines, comprising the steps of:

designating for print dots of said operating victors, which dots occur on any of the print lines nk, where n is a predetermined number of lines in a group and k is any integer; and

designating for print dots of only those of said operating vectors having a slope smaller than a predetermined first angle to the print lines, which dots occur on any of the print lines $nk+m_1$, where n is said predetermined number of lines in a group, $m_1$ is a first predetermined integer between 0 and n exclusive, and k is any integer, wherein said first angle is less than or equal to 45°.

---

### 5,016,196

### RAIN SAMPLING DEVICE

**Danny A. Nelson; Stanley D. Tomich, both of Richland; Donald W. Glover, Prosser; Errol V. Allen, Benton City; Jeremy M. Hales, Kennewick, and Marshall T. Dana, Richland, all of Wash., assignors to Battelle Memorial Institute, Richland, Wash.**

**Continuation of Ser. No. 198,192, May 24, 1988, abandoned. This application Feb. 2, 1990, Ser. No. 476,124**

**Int. Cl.$^5$ G06F *15/20, 15/54;* G01W *1/14;* G08B *21/00***

**U.S. Cl. 364—550** **10 Claims**

1. A rain sampling device, comprising:

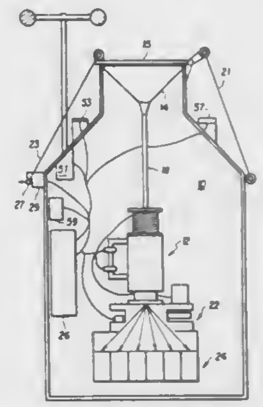
(a) a collection chamber for temporarily holding a sample of wet precipitation until said sample is of sufficient size;

(b) means for diverting wet precipitation into said collection chamber;

(c) electrical control means for generating control signals for regulating operations of the sampling device;

(d) valve means including a magnetically actuated plunger for releasing said sample of precipitation from said chamber while blocking further quantities of precipitation from entering said chamber in response to a control signal from said control means;

(e) a plurality of vessels for permanently retaining samples of wet precipitation; and



(f) means for distributing various samples of wet precipitation released from said chamber into different ones of said retaining vessels;

wherein said electrical control means includes a microcomputer means for implementing sampling time schedules for operating said valve means as desired by an operator of the sampling device.

---

### 5,016,197

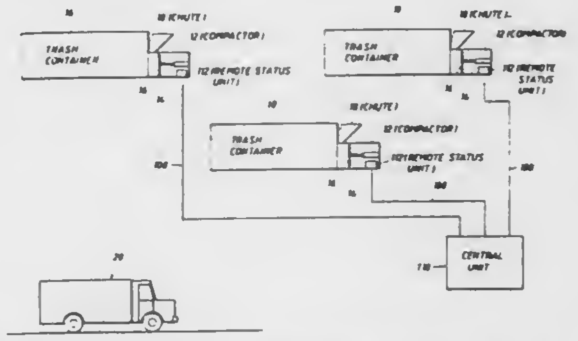
### AUTOMATED TRASH MANAGEMENT SYSTEM

**Rodney H. Neumann, and Charles B. Allison, both of Houston, Tex., assignors to MGM Services, Inc., Houston, Tex.**

**Continuation of Ser. No. 257,422, Oct. 13, 1988, abandoned, which is a continuation-in-part of Ser. No. 228,384, Aug. 4, 1988, abandoned, which is a continuation of Ser. No. 876,066, Jun. 17, 1986, Pat. No. 4,773,027. This application Jun. 1, 1990, Ser. No. 532,359**

**Int. Cl.$^5$ G06F *15/46;* B30B *15/26***

**U.S. Cl. 364—550** **10 Claims**



1. A monitoring system for measuring the fullness of any one of a plurality of trash containers, each trash container in operative association with a packing system having a compression member for engaging and compacting the trash in said trash container, the monitoring system comprising.

a plurality of remote status units, each status unit in association with a trash container, each status unit including means for continuously recording signals representative of hydraulic pressure during compaction strokes of said packing system,

communications linkage means for transferring said stored signals on command from a central unit means from each of said remote status units to said central unit means, said central unit means for issuing commands to and for peri-

VOL
1126
ISS
2
MY
14
1991
UMI

odically receiving stored signals representative of hydraulic pressure from each of said remote status units, whereby said stored signals are useful in determining the fullness of each of said trash containers.

---

### 5,016,198
### MEASURING SYSTEM THAT ALLOCATES A MEASURED VALUE TO A MEASURABLE VARIABLE AND MEASURMENT TRANSDUCER THEREOF

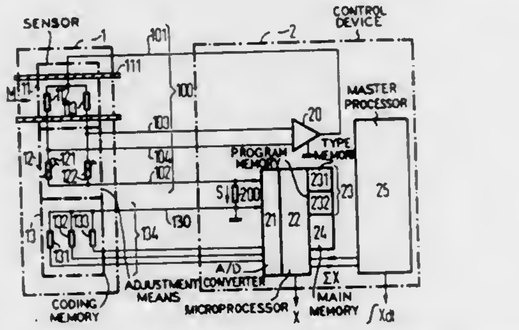
**Hans Schreiber, Lappersdorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 363,380, Jun. 6, 1989, abandoned, which is a continuation of Ser. No. 30,077, Mar. 25, 1987, abandoned. This application Mar. 19, 1990, Ser. No. 496,123**

**Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614118**

**Int. Cl.$^5$ G06F** *15/00*

**U.S. Cl. 364—550** **18 Claims**



10. A measuring system for determining a value X of a measured parameter M, comprising:

sensor means for supplying an electrical measured signal S having a value which is dependent on a value of the measured parameter M;

control means having an input connected to receive said measured signal S from said sensor means, said control device means having a type characteristic memory containing a given type characteristic curve, each point on it defining corresponding values of parameter M and measured signal S;

said sensor means connected to the control device means including a coding memory means containing data for defining an individual characteristic curve of the connected sensor means;

said control means including means for computing a series of points defining said individual characteristic curve of the sensor means form the data in the coding memory means and said type characteristic curve in the type characteristic memory, each point defining an output value X for a correlated measured signal S, and including individual memory means for storing and reading said points of the individual characteristic curve; and

said control means employing the individual memory means to read out a correlated output value X for each measured signal S at the input of the control means.

---

### 5,016,199
### CO-ORDINATE MEASURING

**David R. McMurtry, Wotton-under-Edge; John P. Robertson, Horfield, and Alan D. Darlington, Dursley, all of United Kingdom, assignors to Renisbaw plc, Wotton-under-Edge, United Kingdom**

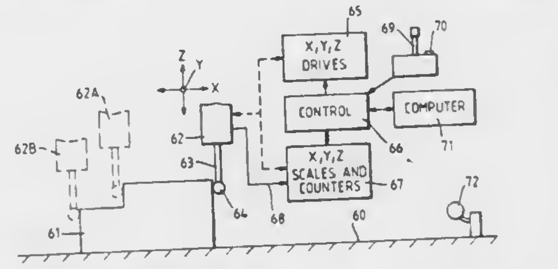
**Continuation of Ser. No. 76,688, Jul. 22, 1987, Pat. No. 4,901,256. This application Jan. 12, 1990, Ser. No. 464,596**

**Claims priority, application United Kingdom, Jul. 25, 1986, 8618152**

**The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.**

**Int. Cl.$^5$ G01B** *21/20*

**U.S. Cl. 364—560** **21 Claims**



1. A method of inspecting an article using coordinate positioning apparatus comprising a fixed part, a movable part, coordinate measuring means for providing outputs indicative of the relative positions of the fixed and movable parts, and probe means mounted on one of said fixed and movable parts for sensing points on a said article mounted on the other of said fixed and movable parts, the method comprising:

moving the probe means relative to the article, towards points on the article;

determining the direction of movement of the probe means relative to each of said points;

determining coordinates of each of said points in response to the probe means and outputs of the coordinate measuring means; and

on the basis of said directions, making a decision concerning the geometrical shape of at least a portion of said article.

---

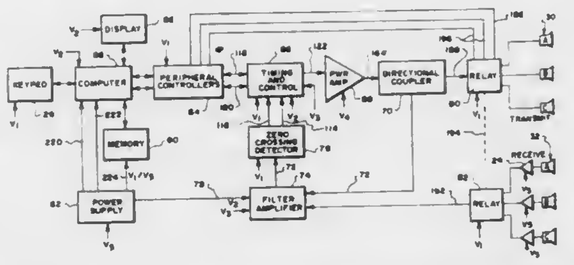
### 5,016,200
### WEIGHT DETERMINING APPARATUS UTILIZING ACOUSTIC WAVE ELAPSED TIME MEASUREMENT AND COMPUTER

**Frank Passarelli, 323 S. Church La., Los Angeles, Calif. 90049**

**Filed Oct. 30, 1989, Ser. No. 428,832**

**Int. Cl.$^5$ G01G** *11/00, 19/08*

**U.S. Cl. 364—567** **14 Claims**



1. A method of determining the weight of a structure comprising the steps of:

mounting a transmitting acoustical transducer and a receiving acoustical transducer in a spaced apart manner on a load bearing member of said structure;

emitting an acoustic wave from said transmitting acoustical transducer within said load bearing member;

picking up said acoustic wave by said receiving acoustic transducer;

determining the elapsed time of transmission of said acoustic

wave from said transmitting acoustical transducer to said receiving acoustical transducer;

comparing said elapsed time to a graphical representation where said graphical representation has been previously calculated in view of known weights of said structure and ascertained elapsed times with there being a different point on said graph for each particular lapsed time and weight; and

arriving at and displaying a weight for said structure.

7. In combination with a truck, said truck being for the purpose of carrying a load, said load being increasable, said truck having at least one load carrying axle, a weight determining apparatus mounted in conjunction with said truck, said weight determining apparatus comprising:

acoustic wave transmitting means mounted on said axle, said acoustic wave transmitting means for emitting an acoustic wave into said axle;

acoustic wave receiving means mounted on said axle, said acoustic wave receiving means being spaced from said acoustic wave transmitting means, said acoustic wave receiving means for picking up said acoustic wave; and

computer means mounted within said truck, said computer means to measure the elapsed time between the transmitting and receiving of said acoustic wave and compare such to known elapsed times versus weight values to thereby ascertain the current weight of said truck upon said axle.

---

### 5,016,201
### SYSTEM FOR CALIBRATING, MONITORING AND REPORTING THE STATUS OF A PH SENSOR

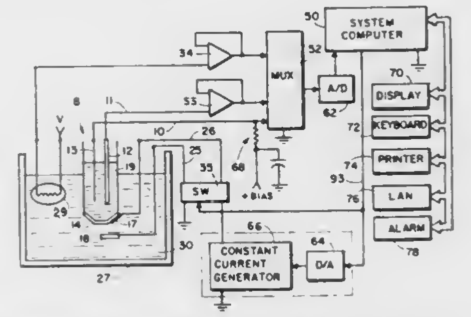
**Avron I. Bryan, 26 Country Club Rd., Cocoa Beach, Fla. 32931, and Michael R. Cushman, 521 Brandonwood Rd., Kingsport, Tenn. 37660**

**Filed Feb. 6, 1989, Ser. No. 306,064**

**The portion of the term of this patent subsequent to Oct. 2, 2007, has been disclaimed.**

**Int. Cl.$^5$ G06F** *15/46;* **G01N** *27/26*

**U.S. Cl. 364—571.04** **12 Claims**



1. A system for measuring pH of a process solution, and having on-line, real-time calibration, test and monitoring of the condition of a pH sensor of the system during operation, comprising:

a) a pH sensor having a sensor electrode, a reference electrode, an electrolyte, and a pH-sensitive glass membrane, said sensor, including said glass membrane, immersed in said process solution,

b) a first electrode attached to an external surface of said glass membrane immersed in said process solution;

c) a second electrode immersed in said process solution and spaced apart from said first electrode;

d) a source of direct current having its output connected to said first and second electrodes;

e) control means for periodically controlling said direct current source to cause current flow between said first electrode and said second electrode for producing electrolysis in said process solution to thereby slightly change the amount of hydrogen ions incident on said sensor, said change in hydrogen ions producing a change in pH at said membrane relative to the pH due to the process, wherein said pH sensor produces periodic test signal pulses, each having a rise time, a maximum magnitude, and a decay time, said pulses superimposed on a process solution pH signal from said pH sensor;

f) calibration means for determining and storing normal values of a rise time, a maximum amplitude, and a decay time of said change in pH for a properly operating pH sensor; and

g) means for comparing, during operation of said system, said rise times, said magnitudes, and said decay times of said changes in pH to said stored normal values, and detecting deviations from said calibration values indicative of a change in characteristics of said pH sensor.

---

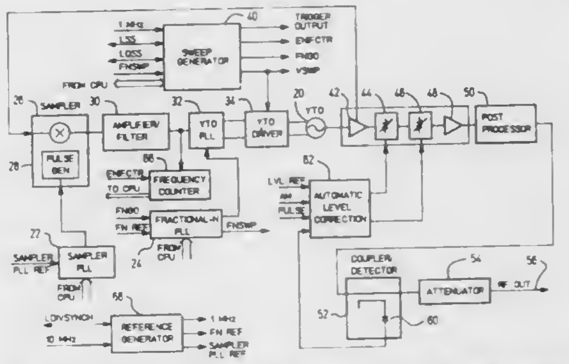
### 5,016,202
### INTERPOLATED SWEPT PARAMETER SYSTEM FOR SYNTHESIZED SWEEPER

**Michael J. Seibel, Windsor; Douglas E. Fullmer, Santa Rosa; James E. Bossaller, Rohnert Park, and Glen M. Baker, Santa Rosa, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Sep. 29, 1989, Ser. No. 414,556**

**Int. Cl.$^5$ G01R** *35/00*

**U.S. Cl. 364—571.07** **17 Claims**



10. Apparatus for correcting a frequency-dependent parameter in a swept frequency signal source having selectable start and stop frequencies, comprising:

means for storing a first table of parameter correction values corresponding to a set of first frequencies within the sweep range of said signal source;

means for defining a second set of frequencies between a selected start frequency and a selected stop frequency of a sweep;

means for calculating a parameter correction value for each of said second frequencies from said first table of parameter correction values, said correction values for each of said second frequencies constituting a second table of parameter correction values; and

means for correcting said parameter as said signal source is swept between said start and stop frequencies using said second table of correction values.

---

### 5,016,203
### METHOD OF OPTICAL DENSITY CORRECTION

**Tomoaki Komatsu, and Sigeo Saton, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Division of Ser. No. 191,121, May 6, 1988, Pat. No. 4,937,764. This application May 26, 1989, Ser. No. 357,682**

**Claims priority, application Japan, May 6, 1987, 62-67654; May 6, 1987, 62-67655; May 6, 1987, 62-110296**

**Int. Cl.$^5$ G01N** *9/00*

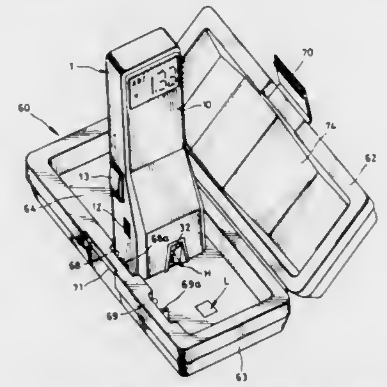
**U.S. Cl. 364—571.02** **2 Claims**

1. A method of correcting measured optical density in which a reflection density of a subject is calculated by measuring

VOL
1126
ISS
2
MY
14
1991
UMI

reflected light from the subject illuminated by a lamp, comprising the steps of

positioning the lamp to illuminate high and low density standard optical density members;
measuring the optical density of said high and low standard optical density members using light from said lamp reflected by said density members to obtain measured values of standard high and low optical densities;
obtaining data for zero point correction based on the differences between said measured value and preset standard values of densities of said high and low standard optical density members;



storing said zero point correction data in a memory;
positioning said zero point correction data in a memory;
positioning the lamp to illuminate a said subject;
measuring the optical density of said subject using light from said lamp reflected by said subject; and
correcting the thus-measured value of optical density of said subject by using said zero point correction data read out from said memory, to produce a corrected measured value R, according to the equation

$$R=R_D-\alpha\cdot R_D-K$$

wherein $\alpha$ is a coefficient equal to

$$\frac{(R_2-R_H)-(R_1-R_L)}{(R_2-R_1)}$$

$R_L$ is said preset value of low standard density,
$R_H$ is said preset value of high standard density,
$R_1$ is said measured value of low standard density,
$R_2$ is said measured value of high standard density,
K is a constant, and
$R_D$ is said measured value prior to correction; and
displaying the measured optical density thus corrected.

---

## 5,016,204

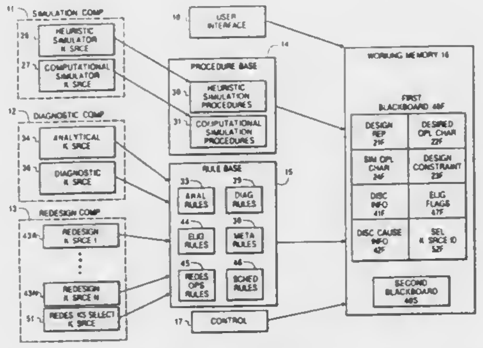
## EXPERT SYSTEM FOR PERFORMING DIAGNOSTIC AND REDESIGN OPERATIONS INCORPORATING MULTIPLE LEVELS OF SIMULATION DETAIL

**Evangelos Simoudis, Marlboro; Richard P. Evans, Bolton, and Donald G. Vonada, Stow, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed Feb. 28, 1989, Ser. No. 316,775**
**Int. Cl.⁵ G06F *15/18***
**U.S. Cl. 364—578** **16 Claims**

1. An expert system for performing a redesign operation in connection with an original design comprising:

A. a memory including a plurality of blackboards each for storing a design representation and desired operational characteristics of said design;
B. a simulation component comprising a plurality of simulators each for generating simulated operational characteristics in connection with a design representation on one of said blackboards;
C. a diagnostic component for identifying operational discrepancies between the simulated operational characteristics and the desired operational characteristics and for identifying the causes of the operational discrepancies; and



D. a redesign component for generating a redesign of said design representation on said blackboards in response to the identified discrepancies and discrepancy causes.

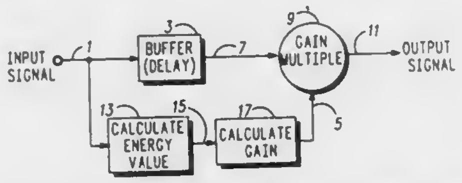
---

## 5,016,205

## DIGITAL SIGNAL PROCESSOR BASED AGC

**Peggy P. Shumway, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Apr. 27, 1989, Ser. No. 344,321**
**Int. Cl.⁵ H03G *3/20***
**U.S. Cl. 364—715.01** **29 Claims**



1. In a signal processor having a desired output signal level, a buffer, an input signal, a signal gain that may be adjusted, and an output signal, a method for adjusting said signal gain based on said input signal comprising the steps of:

(a) providing said input signal;
(b) delaying said input signal by a predetermined time interval in said buffer; (c) determining a desired signal gain value responsive to said input signal;
(d) adjusting said signal gain responsive to said desired signal gain value;
(e) providing said output signal responsive to the product of said input signal and said signal gain.

---

## 5,016,206

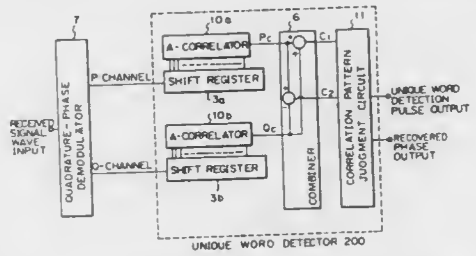
## UNIQUE WORD DETECTION SYSTEM

**Hideyuki Shinonaga, Saitama, Japan, assignor to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan**

**Filed Aug. 29, 1989, Ser. No. 400,294**
**Claims priority, application Japan, Sep. 7, 1988, 63-222275**
**Int. Cl.⁵ G06F *15/336***
**U.S. Cl. 364—715.11** **10 Claims**

1. A unique word detection system comprising:

a demodulator receiving a received signal;
a plurality of correlation means for providing a plurality of correlation values between a plurality of output data, which are demodulated by said demodulator, and one or more than one predetermined patterns;
a linear operation circuit performing a linear operation on said plurality of correlation values to provide a correlation pattern; and
determining means for determining a unique word by comparing said correlation pattern with predetermined correlation patterns to recognize presence of a unique word in said received signal when said correlation pattern coincides with one of said predetermined correlation patterns.



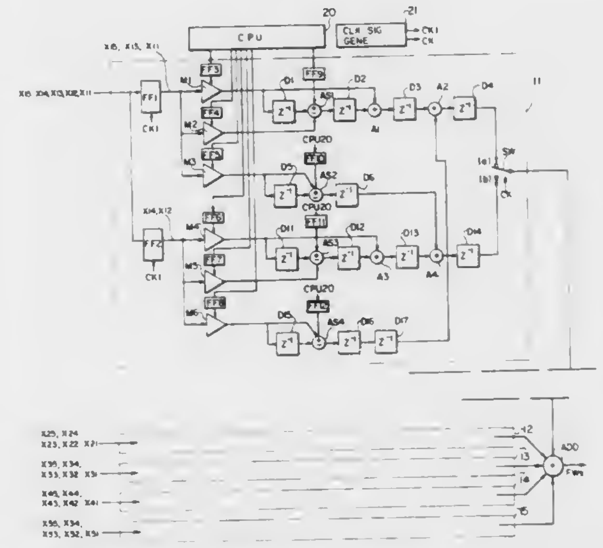
---

## 5,016,207

## HIGH-SPEED DIGITAL FILTER PROCESSOR INCLUDING PARALLEL PATHS FOR PROCESSING DATA, SUITABLE FOR USE IN SPATIAL FILTER IMAGE PROCESSING

**Tatsuya Fujii, Nishinomiya; Yutaka Sato, Settsu, and Masafumi Tanaka, Osaka, all of Japan, assignors to Ricoh Company, Ltd., Japan**

**Continuation-in-part of Ser. No. 336,460, Apr. 10, 1989, abandoned. This application Apr. 3, 1990, Ser. No. 503,424**
**Claims priority, application Japan, Apr. 20, 1988, 63-98852**
**Int. Cl.⁵ G06F *15/31***
**U.S. Cl. 364—724.01** **34 Claims**



1. A digital filter processor comprising:

input means for distributing an input digital data train including a plurality of digital data to a plurality of systems, each of said systems being provided with a corresponding one of the distributed data trains at the same time;
each of said systems including operation means for multiplying each digital data included in said corresponding one of the distributed data trains by a corresponding multiplication factor at the same time to thereby generate multiplied data and for generating a sum signal indicative of a sum total of said multiplied data related to said corresponding one of the distributed data trains, each of said systems outputting said sum signal at the same time;
selection means for selecting one of the sum signals supplied from said operation means provided for said plurality of systems and for outputting an output digital signal; and
clock signal generating means for generating a first clock signal CK and a second clock signal CK1, said input digital data train being supplied to said input means in synchronism with said second clock signal CK1, said selection means being controlled by said second clock signal CK1, and said operation means operating in synchronism with said first clock CK.

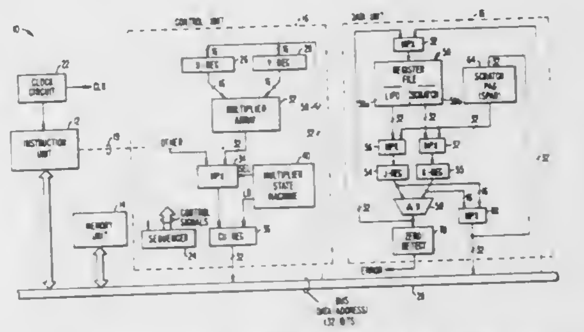
---

## 5,016,208

## DEFERRED COMPARISON MULTIPLIER CHECKER

**Robert W. Horst, Champaign, Ill., and Robert L. Jardine, Cupertino, Calif., assignors to Tandem Computers Incorporated, Cupertino, Calif.**

**Filed Jul. 11, 1989, Ser. No. 377,982**
**Int. Cl.⁵ G06F *11/14***
**U.S. Cl. 364—740** **8 Claims**



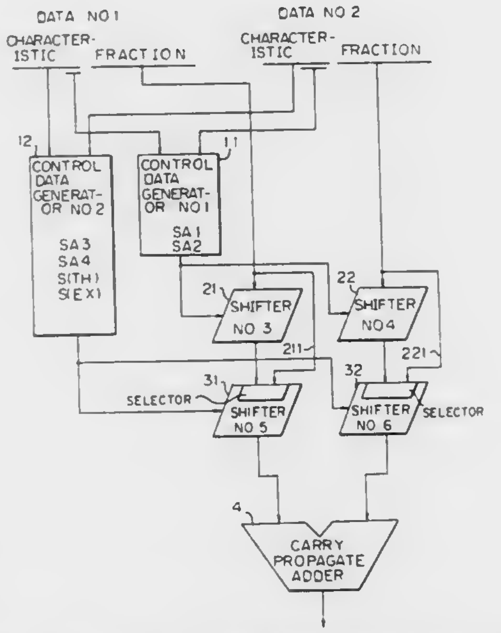
1. In a data processing system including a processor unit of the type having an instruction unit operable to execute a plurality of instructions, and an autonomous arithmetic unit operable to receive multi-bit operands to perform arithmetic operations substantially in parallel with operation of the instruction unit and produce therefrom a result, a method of checking the result comprising the steps of:

providing at least first and second operands to the arithmetic unit;
the arithmetic unit performing a first arithmetic operation on the first and second operands to obtain therefrom a first arithmetic result;
temporarily retaining the first arithmetic result and, at the same time, making the first arithmetic result available to the processor unit;
providing again the first and second operands in swapped order so that the first operand takes the place of the second operand as a third operand, and the second operand takes the place of the first operand as a fourth operand;
the arithmetic unit performing a second arithmetic operation on the third and fourth operands to obtain therefrom a second arithmetic result;
holding the second arithmetic result until a next immediately successive arithmetic operation is requested while permitting use of the first arithmetic result by the instruction unit;
when the next immediately successive arithmetic operation is requested, comparing the first and second arithmetic results it one another for equality when the other arithmetic operation is requested; and
issuing an error signal in the even the comparing step does not result in equality.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,016,209
## FLOATING-POINT ADDITION/SUBTRACTION SYSTEM WITH DIGIT POSITION ALIGNMENT BETWEEN FRACTIONS OF MULTIPLE SETS OF DATA

**Masayuki Ikeda, and Kohichi Ueda, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**
**Continuation of Ser. No. 678,938, Dec. 6, 1984, abandoned. This application May 31, 1988, Ser. No. 206,930**
**Claims priority, application Japan, Dec. 9, 1983, 58-233114; Dec. 29, 1983, 58-248422**
**Int. Cl.⁵ G06F** *7/50*
**U.S. Cl. 364—748** **7 Claims**



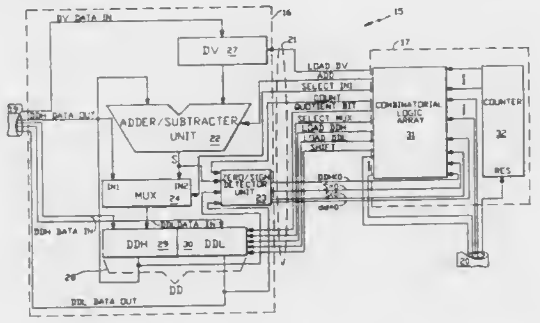
1. A system of floating-point addition/subtraction for two sets of data in which a comparison calculation between characteristics of said two sets of data is carried out to generate a shifting control information for realizing digit position alignment between fractions of said two sets of data and a shifting operation is carried out on the basis of said generated shifting control information, said system comprising:

- a first shifting control data generating means for generating a first shifting control data based on a comparison between only low significant bits of the characteristics of said two sets of data;
- a second shifting control data generating means for generating a second shifting control data based on a comparison between the entire bits of the characteristics of said two sets of data;
- a first shifting means for realizing a first digit position alignment between the fractions of said two sets of data based on the first shifting control data generated by said first shifting control data generating means, the comparison in said second shifting control data generating means for generating said second shifting control data being carried out in parallel with the first digit position alignment operation in said first shifting means based on said first shifting control data, so that the speed of the total operation of the shifting control data generations and the shifting in the system is increased;
- a second shifting means for realizing a second digit position alignment between the fractions of said two sets of data based on the second shifting control data generated by said second shifting control data generating means; and
- a calculating means for carrying out addition based on the outputs from said second shifting means.

---

### 5,016,210
## BINARY DIVISION OF SIGNED OPERANDS

**Brian J. Sprague, and Gregory A. Portanova, both of Enfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.**
**Filed Nov. 15, 1989, Ser. No. 437,000**
**Int. Cl.⁵ G06F** *7/52*
**U.S. Cl. 364—766** **4 Claims**



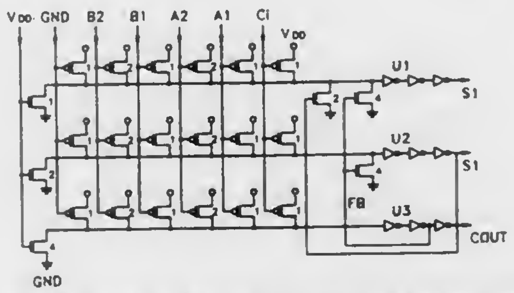
1. A divider unit, for iteratively applying restoring division to signed, fixed point, binary operands, comprising:

- a first storage means for storing a divisior signal;
- a second storage means, for storing a dividend signal, responsive to a SHIFT signal and a QUOTIENTBIT signal, wherein asserting said SHIFT signal causes contents of said second storage means to shift left one bit and causes the least significant bit of said second storage means to equal said QUOTIENTBIT signal;
- a third storage means, responsive to said SHIFT signal and to the most significant bit of said second storage means, wherein asserting said SHIFT signal causes contents of said third storage means to shift left one bit and causes the least significant bit of said third storage means to equal the most significant bit of said second storage means;
- input means, for providing said divisor signal to said first storage means, for providing said dividend signal to said second storage means, and for providing a signal having all bits equal to the most significant bit of said dividend signal to said third storage means;
- addition/subtraction means, having a divisor signal input coupled to said first storage means, a partial dividend signal input coupled to said third storage means, and a control input for receiving an ADD signal, for providing a partial remainder signal output, wherein said partial remainder signal equals the sum of said divisor signal and said partial dividend in response to said ADD signal being asserted and said partial remainder signal equals said partial dividend signal minus said divisor signal in response to said ADD signal not being asserted;
- multiplexing means, responsive to said partial dividend signal, said partial remainder signal, and a SELECTINI1 signal, for providing a mux output signal to said third storage means, wherein said mux output signal equals said partial dividend signal in response to said SELECTIN1 signal being asserted and wherein said mux output signal equals said partial remainder signal in response to said SELECTIN1 signal not being asserted;
- zero/sign detector means, responsive to a COUNT signal, said partial remainder signal, and said second and third storage means, for providing a DDH$<$0 signal in response to said third storage means being less than zero, for providing an S$=$0 signal in response to said partial remainder signal equalling zero, for providing an S$<$0 signal in response to said partial remainder signal being less than zero, and for providing a dd$+$0 signal in response to a number of most significant bits of said second storage means indicating a signal value of zero, said number being indicated by said COUNT signal; and
- controlling means, responsive to said DDH$<$0, S$+$0, S$<$0, and dd$+$0 signals, for asserting said ADD signal in response to said divisor signal and said dividend signal having opposite signs, for asserting said SELECTIN1 signal in response to said divisor and said dividend signals being positive and said S$<$0 signal being asserted, for asserting said SELECTIN1 signal in response to said dividend signal being positive, said divisor signal being negative and said S$<$0 signal being asserted, for asserting said SELECTIN1 signal in response to said dividend signal being negative, said divisor signal being positive, said S$<$0 signal not being asserted and either said S$+$0 signal not being asserted or said dd$+$0 signal not being asserted, for asserting said SELECTIN1 signal in response to said dividend and divisor signals being negative, said S$<$0 signal not being asserted, and either said S$+$0 signal not being asserted or said dd$+$0 signal not being asserted, for providing said COUNT signal equal to the number of division iterations, for asserting said QUOTIENTBIT signal in response to said divisor and said dividend signals being positive and said S$<$0 signal not being asserted, for asserting said QUOTIENTBIT signal in response to said dividend signal being positive, said divisor signal being negative and said S$<$0 signal being asserted, for asserting said QUOTIENTBIT signal in response to said dividend signal being negative, said divisor signal being positive, said S$<$0 signal not being asserted and either said S$+$0 signal not being asserted or said dd$+$0 signals not being asserted, for asserting said QUOTIENTBIT signal in response to said dividend and divisor signals being negative, and either said S$<$0 being asserted or said S$+$0 and dd$+$0 signals being asserted, and for asserting said SHIFT signal once per division iteration.

---

### 5,016,211
## NEURAL NETWORK IMPLEMENTATION OF A BINARY ADDER

**Ho-sun Jeong, Taegu, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Kyunggi-do, Rep. of Korea**
**Filed Feb. 1, 1990, Ser. No. 473,654**
**Claims priority, application Rep. of Korea, Feb. 2, 1989, 89-1369**
**Int. Cl.⁵ G06F** *7/50*
**U.S. Cl. 364—786** **12 Claims**



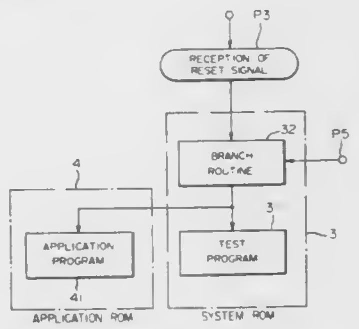
1. A binary adder for adding-processing in a parallel manner two N bit binary digits, an augend and an addend, and a carry in and outputting an N bit output sum and a carry out comprising:

- (N$+$1) output buffer amplifiers corresponding to the N bit output sum and the carry out resulting from said adding-processing;
- augend input-synapse group means for coupling a first power source voltage to an input line of said each output buffer amplifier, according to a value of the augend, with a connecting weight value corresponding to each binary bit value of the N bit binary augend input;
- addend input-synapse group means for coupling the first power source voltage to the input line of said each output buffer amplifier, according to the value of the addend, with a connecting weight value corresponding to each binary bit value of the binary addend input;
- carry input-synapse group means for coupling the first power source voltage to the input line of said each output buffer amplifier, according to a value of the carry in, the with a connecting weight value of a reference weighting value according to the carry input;
- first bias-synapse group means for coupling a second power source voltage to the input line of said each output buffer amplifier with the connecting weight value of a binary value of said output sum and carry bit;
- second bias-synapse group means for coupling said first power source voltage to the input line of said each output buffer amplifier teach with a connecting weight value of a reference weighting value;
- an output feedback-synapse group means for coupling said second power source voltage to the input line of each lower bit output buffer amplifier, according to the value of each upper bit output buffer amplifier, with a connecting weight value corresponding to the binary output value each upper bit output buffer amplifier; and
- means for inverting outputs of said output buffer amplifiers.

---

### 5,016,212
## IC CARD HAVING SYSTEM ROM SELECTION INHIBIT

**Atsuo Yamaguchi; Shigeru Furuta; Takesi Inoue; Kenichi Takahira; Shuzo Fujioka, and Toshiyuki Matsubara, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Dec. 1, 1988, Ser. No. 278,451**
**Claims priority, application Japan, Jun. 30, 1988, 63-160742**
**Int. Cl.⁵ G06F** *12/06, 11/28*
**U.S. Cl. 364—900** **3 Claims**



1. An IC card comprising:

- a CPU;
- an input/output (I/O) terminal;
- a first memory for storing a test program and a branch routine, the branch routine being executed following a system reset and monitoring said I/O terminal for instructions received from outside said IC card, wherein if an instruction for executing the test program is received at said I/O terminal, the branch routine proceeds to the test program;
- a second memory including a plurality of contiguous memory addresses for storing an application program, the application program including a first instruction, the plurality of addresses including a starting address at which the first instruction of the application program is stored, said second memory further storing the starting address of the application program at a predetermined address, wherein the branch routine includes instructions for directing said CPU to read the contents of the predetermined address and to jump to the application program at the starting address indicated by the contents of the predetermined address if no instruction for executing the test program is received at said I/O terminal;
- a bus connecting said CPU, said first and second memories, and said I/O terminal;
- detection means for detecting that said CPU has read the starting address of the application program from the pre-

VOL
1126
ISS
2
MY
14
1991
UMI

determined address, thereby detecting that said CPU has begun executing the application program stored in said second memory; and

disconnection means for disconnecting said first memory from said bus when said detection means detects that said CPU has read the starting address of the application program from the predetermined address.

---

### 5,016,213

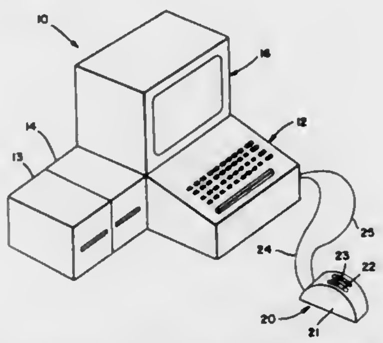
### METHOD AND APPARATUS FOR CONTROLLING AN ELECTRICAL DEVICE USING ELECTRODERMAL RESPONSE

**Robert B. Dilts, 3543 La Madrona Dr., Scotts Valley, Calif. 95066, and Trone L. Miller, 1960 California St., #17, Mountain View, Calif. 94040**

**Filed Aug. 20, 1984, Ser. No. 642,318**

**Int. Cl.$^5$ G06F** *1/00, 15/28*

U.S. Cl. 364—900 6 Claims



2. Apparatus utilizing electrodermal response or other autonomic nervous system functions of a biologic individual as a conscious control means, comprising in combination:

a) an electrical device programmed to respond in a desired humanly perceptible fashion to changes in the sense and amplitude of an electrical control signal only in a given range at the input thereto, said given range being a range within which the electrical device is capable of response;

b) means for sensing a value characteristic of the state of said electrodermal response or other autonomic nervous system function;

c) means for converting said sensed value into an electrical signal which changes in sense and amplitude with changes in said sensed value;

d) means for continuously adjusting said electrical signal toward a given electrical value which represents a zero rate of change of the sensed value, with a range of velocities of adjustment approaching the average range of velocities of adjustment which can be achieved by the central nervous system of said biologic individual in said value characteristic of the state of said electrodermal response or other autonomic nervous system function;

e) means for deriving a representation of said adjustment of the electrical signal and converting it to an electrical output signal having a value corresponding to a zero rate of change of the sensed value at about the middle of said given range and which varies directly in sense and amplitude with changes in said representation, with a difference between the minimum and maximum values thereof that is a substantial portion of said given range; and

f) means coupling said electrical output signal to said input of said electrical device to provide said electrical control signal thereto;

g) whereby the biologic individual consciously makes inputs to the central nervous system in order to affect the autonomic nervous system to induce changes to said value characteristic in a positive or negative direction and thereby inducing a response in the electrical device in a positive or negative direction.

---

### 5,016,214

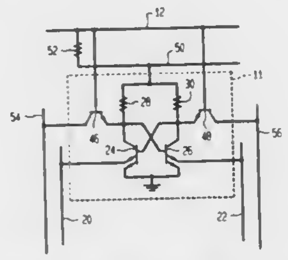
### MEMORY CELL WITH SEPARATE READ AND WRITE PATHS AND CLAMPING TRANSISTORS

**Samir M. Laymoun, Sunnyvale, Calif., assignor to Fairchild Semiconductor Corporation, Culpertino, Calif.**

**Filed Jan. 14, 1987, Ser. No. 3,114**

**Int. Cl.$^5$ G11C** *11/411*

U.S. Cl. 365—154 9 Claims



1. A random access memory circuit of the type having a plurality of memory cells and a main word line for providing a variable voltage which selectively enables data to be written into and read from the cells, each memory cell comprising:

a pair of cross-coupled bipolar transistors wherein the base of a first transistor of said pair is connected to the collector of the second transistor of said pair and the collector of said first transistor is connected to the base of said second transistor;

a pair of load resistors respectively connecting the collectors of said pair of cross-coupled transistors to a bias voltage;

a pair of clamping transistors responsive to the voltage on said word line for respective controlling voltage levels at the collectors of said pair of cross-coupled transistors, said clamping transistors respectively connecting the collectors of said pair of cross-coupled transistors to a first pair of bit lines which conduct currents that are sensed to determine the value of data stored in the cell; and

means for connecting emitters of said pair of cross coupled transistors to a second pair of bit lines.

---

### 5,016,215

### HIGH SPEED EPROM WITH REVERSE POLARITY VOLTAGES APPLIED TO SOURCE AND DRAIN REGIONS DURING READING AND WRITING

**Howard L. Tigelaar, Allen Texas assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 102,993, Sep. 30, 1987, abandoned. This application Mar. 12, 1990, Ser. No. 494,784**

**Int. Cl.$^5$ G11C** *16/04, 16/06*

U.S. Cl. 365—185 9 Claims

1. A memory device comprising:

a first means for providing a reference voltage,

a write voltage which is more positive than said reference voltage, and

a read voltage which is more positive than said reference voltage;

a plurality of memory cells each of said memory cells comprising:

a first doped region formed in a substrate;

a second doped region formed in said substrate and separated from said first doped region, said first and second doped regions defining a channel region therebetween, said channel region comprising a first subchannel region adjacent to said first doped region and a second subchannel region adjacent to said second doped region;

a first dielectric layer formed on the surface of said channel region;

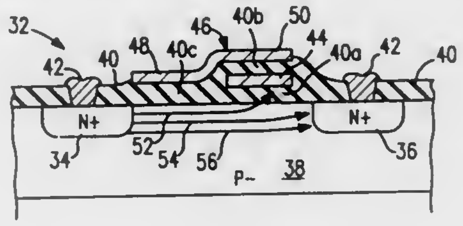
a floating gate formed on said first dielectric layer above said second subchannel region;

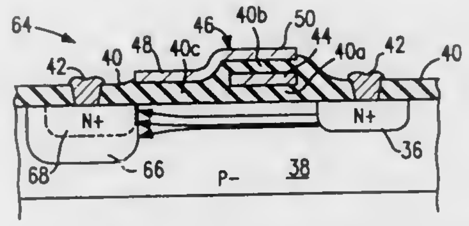
a second dielectric layer formed on the top and side surfaces of said floating gate; and

a control gate formed on said first dielectric layer above said first subchannel region and formed on said second dielectric layer, said floating gate interposed between said control gate and said second subchannel region;

said first means selectively applying one of said reference voltage and said read voltage to the first doped region of a selected memory cell wherein said read voltage is applied to said first doped region of said selected memory cell during reading of data from said selected memory cell and said reference voltage is applied to said first doped region of said selected memory cell during writing of data to said selected memory cell; and

said first means providing one of said write voltage and said reference voltage to the second doped region of said selected memory cell wherein said write voltage is applied to said second doped region of said selected memory cell during writing of data to said selected memory cell and said reference voltage is applied to said second doped region of said selected memory cell during reading of data from said selected memory cell.





---

### 5,016,216

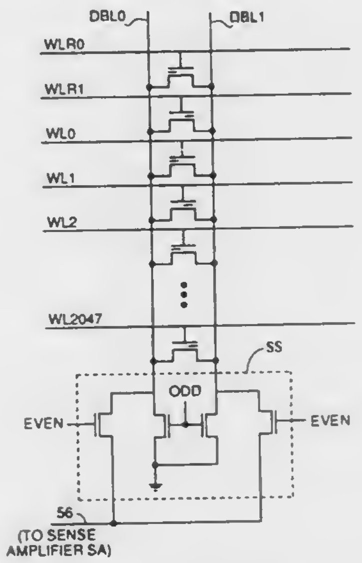
### DECODER FOR A FLOATING GATE MEMORY

**Syed Ali, Cupertino, Calif., assignor to WaferScale Integration, Inc., Fremont, Calif.**

**Filed Oct. 17, 1988, Ser. No. 258,926**

**Int. Cl.$^5$ G11C** *7/00, 16/04, 8/00*

U.S. Cl. 365—185 20 Claims



1. Structure comprising an array of asymmetrical floating gate transistors including a plurality of bit lines and a plurality of word lines, said structure further comprising:

a sense amplifier;

means for receiving an address;

first decoder means for decoding a first group of address bits within said address and selecting one of said word lines in response thereto;

second decoder means for receiving a second group of address bits of said address and for selecting in response thereto a pair of bit lines, said second decoder means receiving at least one address bit from said first group of address bits and generating a signal indicative of whether an even or odd-numbered word line is addressed by said first group of address bits, said signal being used to select a first one of said bit lines within said pair of bit lines and couple said first bit line to a reference voltage, said signal also being used to select a second one of said bit lines within said pair of bit lines and couple said second bit line to said sense amplifier;

wherein each bit line within said plurality of bit lines serves as a drain for a first group of transistors coupled to said bit line and as a source for a second group of transistors coupled to said bit line; and

wherein said array is constructed such that the floating gate for each transistor within a first set of said transistors is located at a first position within said transistor, each transistor in said first set of transistors being associated with one of said even-numbered word lines, and the floating gate for each transistor within a second set of said transistors is located at a second position within said transistor, each transistor in said second set of said transistors being associated with one of said odd-numbered word lines.

---

### 5,016,217

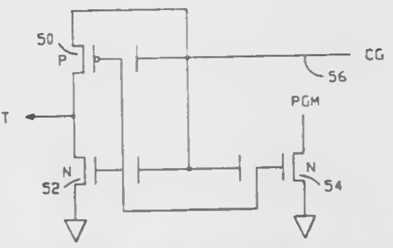
### LOGIC CELL ARRAY USING CMOS EPROM CELLS HAVING REDUCED CHIP SURFACE AREA

**Dhaval J. Brahmbhatt, San Jose, Calif., assignor to ICT International CMOS Technology, Inc., San Jose, Calif.**

**Continuation of Ser. No. 194,785, May 17, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 488,405**

**Int. Cl.$^5$ G11C** *11/34*

U.S. Cl. 365—185 2 Claims



1. A logic cell array comprising a plurality of configurable logic blocks arranged in rows and columns, each logic block including an ultraviolet light erasable EPROM memory cell, each EPROM memory cell having a serially connected CMOS transistor pair including a p-channel transistor having a source connected to a first terminal and an n-channel transistor having a source connected to a circuit ground potential, an output connected to a common terminal of said CMOS transistor pair, said CMOS transistor pair having a common floating gate and a common control gate, and means for selectively charging said common floating gate including an electrically programmable n-channel field effect transistor having a drain connected to a programming voltage terminal and a source connected to circuit ground potential, a floating gate connected to said common floating gate and a control gate connected to said common control gate, whereby said common floating gate receives electrons when positive voltages are applied to said programming voltage terminal and to said common control

VOL
1126
ISS
2
MY
14
1991
UMI

gate, said first terminal connected to said common control gate, each cell storing a "1" when said common control gate is at a positive voltage potential and said common floating gate has electrons stored hereon, each cell storing a "0" when said common control gate is at a positive voltage potential and said common floating gate has no electrons stored thereon, and each cell having a floating output when no positive voltage potential is applied to said common control gate.

---

### 5,016,218

## NONVOLATILE MEMORY WITH DATA WRITE CIRCUITRY TO REDUCE WRITE ERRORS

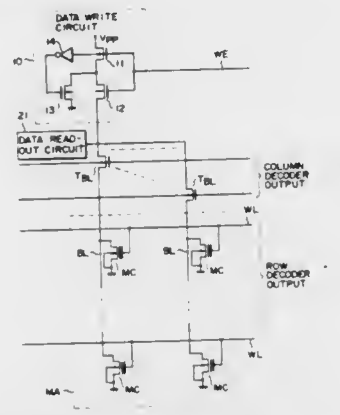
**Akihiro Yamazaki, and Katsuya Kiyohara, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 21, 1988, Ser. No. 273,535**

**Claims priority, application Japan, Nov. 24, 1987, 62-295695**

**Int. Cl.$^5$ G11C** *7/00*

**U.S. Cl. 365—189.09** **4 Claims**



1. A nonvolatile memory comprising:

bit lines connected to drains of corresponding memory cell transistors;

a data write circuit, connected to each of the bit lines and to a write voltage terminal, including:

a plurality of MOS transistors connected in series between said bit lines and said write voltage terminal, each of said plurality of MOS transistors having a gate;

a single MOS transistor, connected to a junction between two of said plurality of serially connected MOS transistors and to a ground terminal, for supplying a current from said junction to said ground terminal;

a write-enable signal line, connected to each of said gates of said plurality of serially connected MOS transistors, for applying write-enable signals to said gates; and

wherein said single MOS transistor connected to said ground terminal is turned off when said plurality of serially connected MOS transistors are in an ON state, and turned on when said plurality of serially connected MOS transistors are in an OFF state, in accordance with a write-enable signal on said write-enable signal line.

---

### 5,016,219

## COMPUTER MEMORY WRITE PROTECTION CIRCUIT

**James B. Nolan, Phoenix, and Jeffrey M. Michelsen, Mesa, both of Ariz., assignors to VLSI Technology, Inc., San Jose, Calif.**

**Filed Feb. 12, 1990, Ser. No. 478,609**

**Int. Cl.$^5$ G11C** *7/00*

**U.S. Cl. 365—195** **17 Claims**

1. A write protection circuit for preventing implementation of a memory write cycle for a memory when a power interruption occurs, said circuit including in combination:

data supply means for supplying data signals to be stored in a memory;

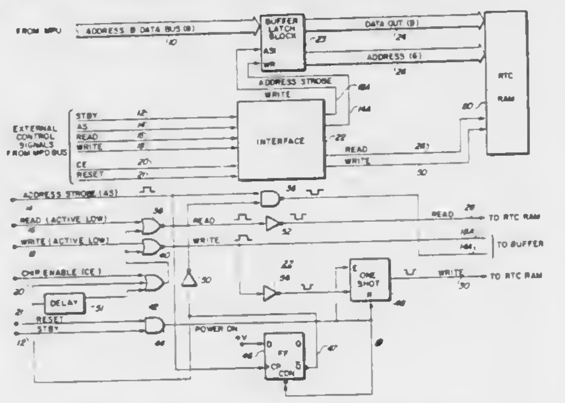
power monitor means for producing a power loss signal in response to power interruption;

first buffer means coupled with said data supply means for temporarily storing data signals therein and for providing such stored data signals on the output thereof to the memory for storage therein;

delay circuit means with an input and an output;

a source of write pulses coupled with said first buffer means for causing the storage of data signals present from said data supply means therein at the time of occurrence of said write pulses, and further coupled with the input of said delay circuit means, the output of said delay circuit means supplying delayed write pulses to the memory for effecting storage therein of the data signals on the output of said first buffer means of the time of occurrence of said delayed write pulses; and

means coupled with said power monitor means and said delay circuit means for preventing said delay circuit means from supplying delayed write pulses to the memory in response to a power loss signal from said power monitor means.



---

### 5,016,220

## SEMICONDUCTOR MEMORY DEVICE WITH LOGIC LEVEL RESPONSIVE TESTING CIRCUIT AND METHOD THEREFOR

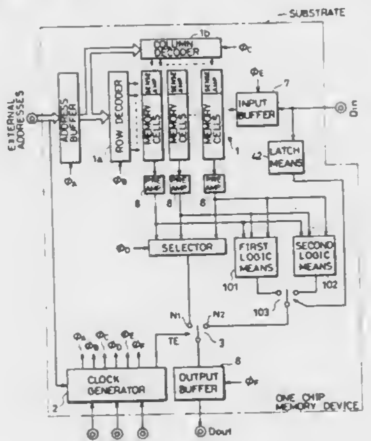
**Tadato Yamagata, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 27, 1989, Ser. No. 441,005**

**Claims priority, application Japan, Nov. 28, 1988, 63-301437**

**Int. Cl.$^5$ G11C** *7/00, 29/00*

**U.S. Cl. 365—201** **8 Claims**



1. A testing circuit for a semiconductor memory device including an array of memory cells divided into a plurality of blocks, means for selecting a desired memory cell in each of said blocks, and means for loading and reading in parallel at least a test pattern of bits, all of a like selected logic level, comprising

logic means for performing a a logical operation on data read in parallel from said selected cell in each said block of said memory and outputting the result of said logical operation, and

logical operation switching means for switching the logical operation between a first logical operation and a second logical operation responsive to said like selected logic level.

---

### 5,016,221

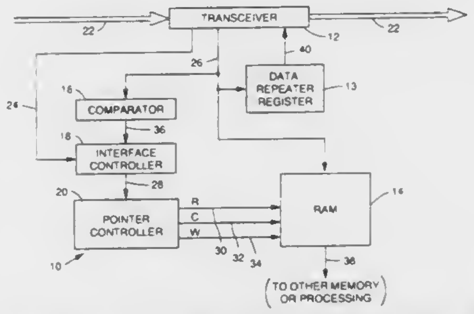
## FIRST-IN, FIRST-OUT (FIFO) MEMORY WITH VARIABLE COMMIT POINT

**James R. Hamstra, Shorewood, Minn., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Dec. 1, 1989, Ser. No. 444,741**

**Int. Cl.$^5$ G11C** *7/00*

**U.S. Cl. 365—221** **20 Claims**



1. An improvement in a FIFO memory that provides first-in, first-out digital data storage and retrieval, sequentially inputting and storing digital data and sequentially retrieving and outputting said stored digital data, said FIFO memory comprising addressable memory means having memory locations for addressably inputting, storing, retrieving and outputting said digital data, said FIFO memory further comprising W-pointer means for addressing one of said memory locations into which said digital data is to be stored, and R-pointer means for addressing one of said memory locations from which said stored digital data is to be retrieved, wherein said improvement comprises:

C-pointer means for selectably addressing one of said memory locations which serves as a boundary between first and second subsets of said stored digital data within said FIFO memory; and

commitment decision means for specifying said memory location to be addressed by said C-pointer means.

---

### 5,016,222

## CIRCUIT RESPONSIVE TO A VOLTAGE CHANGE FOR DETECTING ERRONEOUS WRITING INTO A MEMORY

**Kiyokazu Hashimoto, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Feb. 27, 1990, Ser. No. 485,629**

**Claims priority, application Japan, Feb. 27, 1989, 1-45826**

**Int. Cl.$^5$ G11C** *7/00, 11/00;* **G05F** *3/16*

**U.S. Cl. 365—226** **3 Claims**

1. A circuit for detecting a power supply voltage in a memory system, comprising:

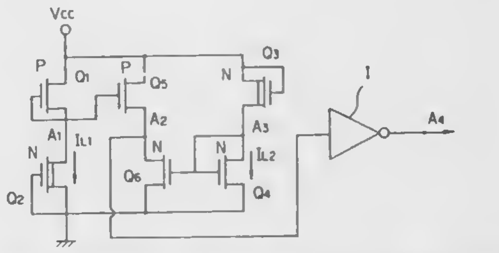
a first P-channel field-effect transistor having a source connected to a power supply, and a commonly connected gate and drain;

an N-channel depletion mode field-effect transistor having a drain connected to said drain of said first P-channel field-effect transistor, and a gate and a source commonly connected to a ground;

a turned on field-effect transistor having a gate and a source connected to said power supply;

a first N-channel enhancement mode field-effect transistor having a drain and a gate commonly connected to a drain of said turned on field effect transistor and a source connected to the ground;

a second P-channel field-effect transistor having a source connected to said power supply, a gate connected to a common node between said first P-channel field-effect transistor and said N-channel depletion mode field-effect transistor, and a drain connected to a voltage detecting node;



a second N-channel enhancement mode field-effect transistor having a drain connected through said voltage detecting node to said drain of said second P-channel field-effect transistor, a gate connected to a common node between said turned on field-effect transistor and said first N-channel enhancement mode transistor, and a source connected to the ground; and

an inverter connected between said power supply and the ground, and having an input terminal connected to said voltage detecting node and an output terminal for providing a voltage detected result.

---

### 5,016,223

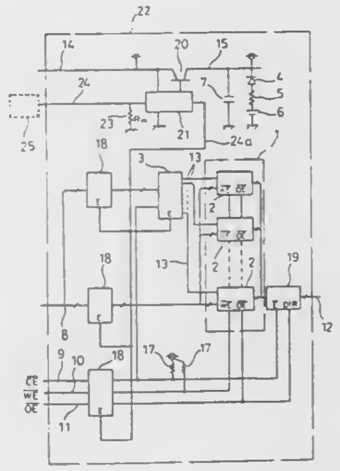
## MEMORY CARD CIRCUIT

**Masatoshi Kimura, and Kohichi Hayamizu, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 17, 1990, Ser. No. 509,780**

**Int. Cl.$^5$ G11C** *5/14*

**U.S. Cl. 365—229** **6 Claims**



1. A memory card circuit for a portable memory card selectably insertable in and extractable from a terminal unit thereby respectively connecting and disconnecting the circuit from the terminal unit for reading information from and writing information into the memory card circuit comprising:

a memory for storing data;

an internal power supply for applying a voltage to the memory to retain stored data when the circuit is not connected to the terminal unit;

a power input terminal for supplying power to said circuit

OL
126
ISS
2
MY
14
1991
UMI

from a terminal unit when the circuit is connected to a terminal unit;

a data input terminal for supplying data to the memory;

a data output terminal for receiving data from the memory;

a unidirectional non-inverting buffer connected between said data input terminal and said memory and including a first non-inverting buffer amplifier, connected between said data input terminal and said memory, a first analog switch connected between said data input terminal and said non-inverting buffer amplifier and a second analog switch connected between said non-inverting buffer amplifier and ground;

a bidirectional three-state buffer connected between said memory and said data output terminal including second and third oppositely directed, parallel connected buffer amplifiers connected between said memory and said data output terminal, a third analog switch connected between said data output terminal and said second and third buffer amplifiers and fourth and fifth analog switches connected respectively between said memory and ground and said data output terminal and ground;

a power switch connected in series between said power input terminal and said internal power supply; and

a supply voltage detecting circuit receiving a card insertion and extraction signal indicative of the connection with and disconnection from a terminal unit of the circuit and the voltage of said internal power supply for generating an output signal for opening and closing the power switch and for actuating said unidirectional non-inverting buffer and said bidirectional three-state buffer.

---

## 5,016,224

## SEMICONDUCTOR MEMORY DEVICE

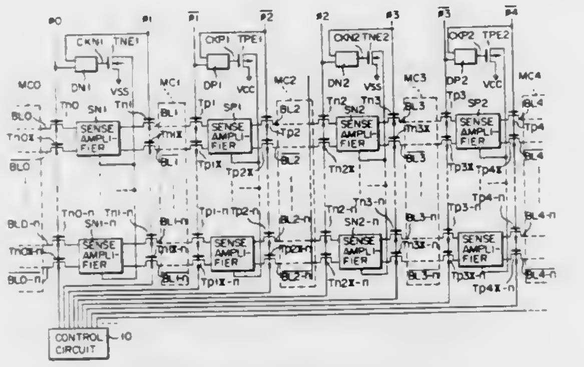
**Hiroto Tanaka, Oobu, and Syuso Fujii, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 8, 1989, Ser. No. 404,421**

**Claims priority, application Japan, Sep. 12, 1988, 63-228059**

**Int. Cl.$^5$ G11C** *7/06*

**U.S. Cl. 365—230.03** **14 Claims**



1. A semiconductor memory device comprising:

first blocks of memory cells;

second blocks of memory cells connected to said first blocks of memory cells;

third blocks of memory cells connected to said second blocks of memory cells;

first sense amplifiers formed of N-channel transistors, connected between said first blocks of memory cells and said second blocks of memory cells;

second sense amplifiers formed of P-channel transistors, connected between said second blocks of memory cells and said third blocks of memory cells;

first switching means for separating electrically a selected one of said first blocks of memory cells in response to a first signal applied thereto, said first switching means connected between said first blocks and said first sense amplifiers;

second switching means for separating electrically a selected one of said second blocks of memory cells in response to a second signal applied thereto, said second switching means connected between said first sense amplifiers and said second blocks of memory cells;

third switching means for separating electrically a selected one of said second blocks of memory cells in response to a third signal applied thereto, said third switching means connected between said second blocks of memory cells and said second sense amplifiers; and

fourth switching means for separating electrically a selected one of said third blocks of memory cells in response to a fourth signal applied thereto, said fourth switching means connected between said second sense amplifiers and said third blocks of memory cells.

---

## 5,016,225

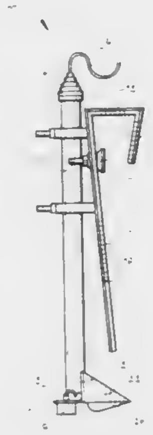
## TRANSDUCER MOUNTING BRACKET

**Merril Blomberg, 6746 190th La., N.W., Anoka, Minn. 55303**

**Filed Nov. 13, 1989, Ser. No. 434,354**

**Int. Cl.$^5$ H04R** *15/00*

**U.S. Cl. 367—173** **1 Claim**



1. A transducer mounting bracket, comprising:

an elongated base formed from sheet metal lined with a resilient material for frictional engagement with a boat transom;

a downwardly opening channel formed at an upper end of said base for frictional engagement with a boat transom, said channel tapering in width from a widest portion adjacent said upper end;

an elongated conduit extending along a front face of said base;

a pair of spaced mounting blocks secured in vertical spaced aligned locations on said front face of said base;

a lower one of said mounting blocks projecting laterally from said base an extent sufficient to dispose said conduit in a vertical orientation;

aligned circular apertures formed through said mounting blocks and receiving said conduit;

a thumb screw extending through each of said mounting blocks for clamping engagement with said conduit, securing said conduit on said base for vertical adjustment with respect to said base;

an L-shaped bracket having a vertical leg portion secured to said conduit and a horizontal leg portion secured to a sonar transducer for securing the sonar transducer at a bottom end of said conduit;

at least one suction cup tipped clamping screw extending transversely through said base for engagement with a boat transom

a signal lead from said transducer extending through said conduit and sealed at a top portion of said conduit by a flexible boot; and

a generally V-shaped weed deflector on said vertical leg

portion of said L-shaped bracket, said weed deflector having a central apex line formed by intersecting triangular side faces, said apex line lying in a plane containing a central longitudinal axis of said conduit, a pointed tip portion of said weed deflector directed toward said transom.

---

## 5,016,226

## APPARATUS FOR GENERATING A DATA STREAM

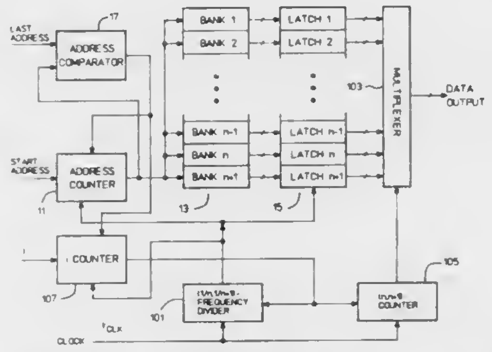
**Kiyokasu Hiwada, Akishimashi, and Nobuyuki Kasuga, Hachiojishi, both of Japan, assignors to Hewlett-Packard, Palo Alto, Calif.**

**Filed Nov. 9, 1988, Ser. No. 269,386**

**Claims priority, application Japan, Nov. 16, 1986, 62-290263**

**Int. Cl.$^5$ G11C** *7/00, 8/00, 11/402*

**U.S. Cl. 365—233** **10 Claims**



1. An apparatus for generating a data stream comprising:

clock means for providing a clock signal;

address generating means coupled to said clock means for generating a sequence of addresses, said address generating means comprising address counter means, stepping in response to a frequency divided clock signal, for generation said sequence of addresses, and means for setting said address counter means to a start address;

memory means responsive to said addresses, from which a plurality of words of data associated with each of said addresses are read in response to each of said addresses, said memory means comprises n+1 memory bank means, each memory bank means having an output from which data is read; and

output means for sequentially outputting said plurality of words of data that is read from said memory means before the data associated with the next said address is read from said memory, said output means comprising a plurality of n+1 latches each of said latches connected to an associated one of said memory bank means for latching said plurality of words read from said memory means, and selection means coupled to said plurality of latch means for sequentially selecting each of said plurality of latch means in response to a selection signal and for sequentially outputting a word from the latch means selected based on said selection signal;

control means coupled to said clock means, said control means performing control in synchronism with said clock signal such that said output means outputs only a portion of said plurality of words of data, said control means comprising frequency dividing means for dividing said clock signal by said switchable factor to produce a frequency divided clock signal, first counter means for generating said selection signal in response to said clock signal, said first counter means counting by a switchable modulus number, and second counter means stepping in response to said frequency divided clock signal, to produce a switching control output;

said first counter means responsive to said switching control output for switching its modulus number between n and n+1 when said switching control output reaches a predetermined number; and

said frequency dividing means responsive to said switching control output for switching its factor of frequency division between n and n+1 when said switching control output reaches said predetermined number.

---

## 5,016,227

## TOP MOUNTED BUOY SIGNALING DEVICE

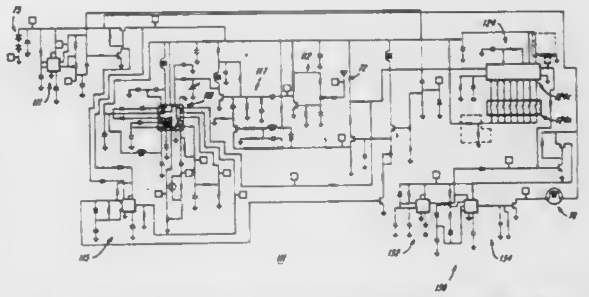
**John H. Turner, Jr., Cambridge, Mass., assignor to Whistler Corporation, Westford, Mass.**

**Continuation-in-part of Ser. No. 228,723, Aug. 4, 1988. This application Aug. 25, 1989, Ser. No. 398,768**

**The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.**

**Int. Cl.$^5$ H04B** *1/59*

**U.S. Cl. 367—3** **8 Claims**



1. A top mounted buoy signaling device for marine navigation, comprising:

remote transmitter assembly means for generating a coded address signal to selectively activate said top mounted buoy signaling device, said remote transmitter assembly means including encoder subcircuit means having a preset coded address for generating a digitized coded address for modulating a carrier signal to provide said coded address signal;

means for disposing said top mounted buoy signaling device in a marine environment; and

receiver assembly means top mounted in environmentally sealed combination with said signaling device disposing means in spaced apart relation from water in the marine environment for receiving said coded address signal, said receiver assembly means including

- detector means for detecting said coded address signal to provide the digitized coded address embodied in said coded address signal,
- decoder means coupled to said detector means and having stored therein a coded address corresponding to said preset coded address of said transmitter assembly means and operative in response to a match between said stored coded address and said preset coded address for generating a valid transmission signal; and
- lamp driver means coupled to said decoder means and operative in response to said valid transmission signal for providing a light output in a predetermined radiation pattern for a predetermined period of time for marine navigation.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,016,228
## SONAR TRANSDUCERS

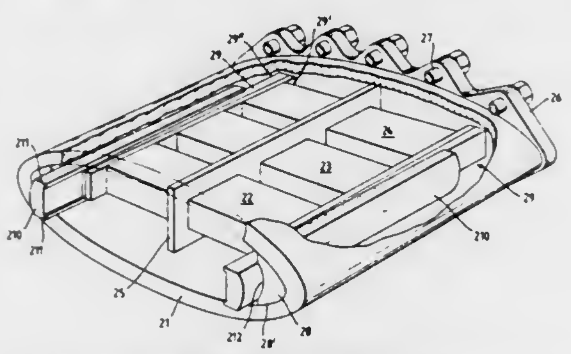
**Douglas B. Arnold, Portland; George Bromfield, Martinstown, and John C. Gardner, Bowden, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, Great Britain**

**Filed Nov. 21, 1988, Ser. No. 276,196**

**Claims priority, application United Kingdom, Mar. 19, 1986, 8606744; Mar. 19, 1986, 8606745; Mar. 19, 1986, 8606746; Mar. 19, 1986, 8606747**

**Int. Cl.⁵ H04R** *17/00*

U.S. Cl. 367—163 **25 Claims**



1. A flextensional transducer comprising:
a hollow cylindrical flexural shell, elliptical in cross section and open at both ends;
at least one linear stack of piezo-electric elements fitted along the major axis of the elliptical shell between the opposed internal walls of the shell;
two metal inserts located on at each end of the major axis between the shell wall and the corresponding end of the transducer stack and shaped in cross section to maintain the elliptical shape of the shell; and
wedge-shaped portions interposed between each insert and the corresponding stack end.

---

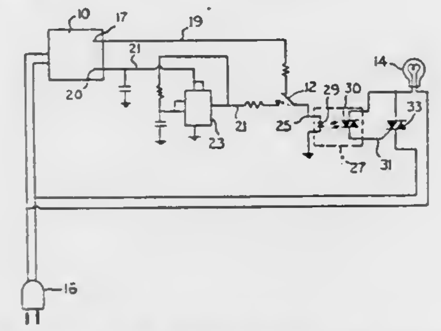
## 5,016,229
## ELECTRONICALLY OPERATED CLOCK FOR HEARING IMPAIRED PERSONS

**Harry C. Gibbens, Jr., 11327 Louise Ave., Lynwood, Calif. 90262-3113**

**Filed Jun. 25, 1990, Ser. No. 544,186**

**Int. Cl.⁵ G04B** *47/00;* **G04C** *21/16*

U.S. Cl. 368—10 **2 Claims**



1. In an electronically-operated alarm clock having a first D.C. output lamp accessory line, and a second D.C. alarm signal output line: the improvement comprising an electronic flasher means in said alarm signal output line; an A.C.-D.C. interaction line; a manual switch means operable to selectively connect said A.C.-D.C. interaction line to said alarm signal line or to said lamp accessory line; and A.C. circuit that includes a lamp, a two direction silicon controlled rectifier means in series with the lamp, and means for triggering said two direction silicon controlled rectifier means; and an electronic switch means for transferring an electric signal from the A.C.-D.C. interaction line to the A.C. circuit whereby said lamp can be energized by a signal through either output line.

---

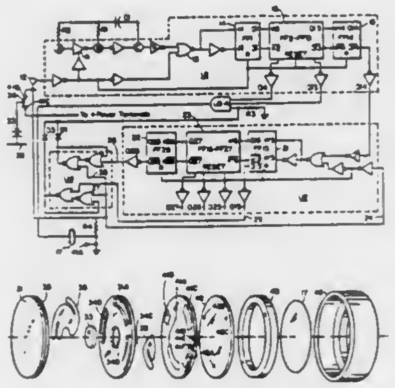
## 5,016,230
## TIMING

**Monte G. Selfers, and Gary K. Gillum, Sr., both of 5163 Ashley Dr., Nashville, Tenn. 37211**

**Filed Jul. 6, 1989, Ser. No. 376,835**

**Int. Cl.⁵ G04B** *47/00;* **G04C** *57/00*

U.S. Cl. 368—10 **14 Claims**



1. A medication timer assembly for attachment to a medication container comprising,
an electronic timing circuit having a reset input and output,
an end-of-time interval indicator connector to the output of said electronic timing circuit,
attaching means for attaching the medication timer assembly to a medication container,
a battery,
and a powering mechanism for selectively connecting the battery to the electronic timing circuit characterized by a reset position in which the battery delivers electric power to the electronic timing circuit and is coupled to the reset input to provide a reset signal that resets the electronic timing circuit to an initial condition, and a run position in which the battery delivers electric power to the electronic timing circuit so that said electronic timing circuit provides an output signal to the end-of-time interval indicator signifying the end of a predetermined timed interval and wherein said powering mechanism comprises relatively movable elements defining at least two rotational detent positions corresponding to said reset and run positions.

---

## 5,016,231
## APPARATUS FOR ELECTRONICALLY CORRECTING AN ELECTRONIC TIMEPIECE

**Takashi Kawaguchi; Hiroshi Yabe; Akihiko Maruyama, and Hiroyuki Kubo, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Filed Apr. 19, 1989, Ser. No. 340,620**

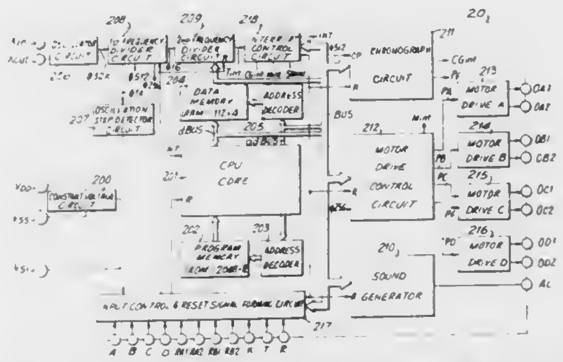
**Claims priority, application Japan, Apr. 19, 1988, 63-96225; Jul. 1, 1988, 63-165261**

**Int. Cl.⁵ G04B** *19/04, 27/08*

U.S. Cl. 368—80 **5 Claims**

1. A method for setting an indicator on an electronically correcting electronic timepiece having an indicator for indicating the time, a step motor for driving the indicator, correction signal forming circuit for producing a drive pulse for driving the step motor to correct said indicator, control means for producing a control interrupt and for controlling said correction signal forming circuit to change the speed of the indicator in steps during correction of the indicator, including the steps:
switching the timepiece to an indicator setting mode;
inputting a reference clock value to the control means;

controlling the correction signal forming circuit in response to the reference clock value;
inputting a forward drive command to the correction signal forming circuit;
inputting a data value to the control means;



driving the indicator at a continuous speed for a period corresponding to the input data value;
producing a control interrupt; and
increasing the reference clock value if the reference clock value is less than a predetermined value.

---

## 5,016,232
## MAGNETO-OPTIC INFORMATION-CARRYING MEDIUM INCLUDING THREE MAGNETIC LAYERS

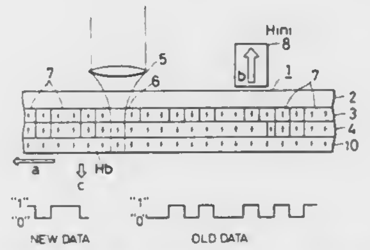
**Michihiro Tadokoro; Kazuo Okada, and Hitoshi Imai, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 155,728, Feb. 16, 1988, abandoned. This application Mar. 8, 1990, Ser. No. 490,324**

**Claims priority, application Japan, Apr. 3, 1987, 62-83391**

**Int. Cl.⁵ G11B** *7/24, 13/04, 11/12*

U.S. Cl. 369—13 **8 Claims**



1. A magneto-optic information carrying medium comprising:
a recording magneto-optic layer having a first Curie temperature Tc1 and a first coercive force Hc1;
an auxiliary magneto-optic layer having a second Curie temperature Tc2 and a second coercive force Hc2;
a bias magnetic layer having a third Curie temperature Tc3 and a third coercive force Hc3;
said recording magneto-optic layer, said auxiliary magneto-optic layer, and said bias magnetic layer being stacked on each other;
said bias magnetic layer being premagnetized to generate a magnetic field weaker than is necessary to reverse the direction of magnetization of said recording magneto-optic layer and said auxiliary magneto-optic layer at a temperature below their respective Curie temperatures, and sufficiently strong enough to magnetize said recording magneto-optic layer and said auxiliary magneto-optic layer when said recording magneto-optic layer and said auxiliary magneto-optic layer have reached their respective Curie temperature to destroy the magnetic alignments therein;
said auxiliary magneto-optic layer having a weaker coercive force than said recording magneto-optic layer and said bias magnetic layer so that when an external initializing magnetic field Hini satisfying:
$Hc2 < Hini < Hc1, Hini < Hc3$
is applied to said medium in a predetermined direction, said auxiliary magneto-optic layer is magnetized in said predetermined direction of said external initializing magnetic field while said recording magneto-optic layer and said bias magnetic layer remain unchanged;
said recording magneto-optic layer having a lower Curie temperature than said auxiliary magneto-optic layer and said bias magnetic layer so that when the layers are heated to a first temperature T1 satisfying:
$Tc1 < T1 < Tc2, T1 < Tc3$
said recording magneto-optic layer reaches its respective Curie temperature to destroy the magnetic alignment therein, while said auxiliary magneto-optic layer and said bias magnetic layer do not reach their respective Curie temperatures to maintain the magnetic alignment therein;
said auxiliary magneto-optic layer having a lower Curie temperature than said bias magnetic layer so that when the layers are heated to a second temperature T0 satisfying:
$Tc2 < T0 < Tc3$
said auxiliary magneto-optic layer reaches its Curie temperature to destroy the magnetic alignment therein, while said bias magnetic layer does not reach its respective Curie temperature to maintain the magnetic alignment therein;
whereby when the layers are heated to said first temperature, said recording magneto-optic layer is magnetized by the magnetic field in said auxiliary magneto-optic layer upon said auxiliary magneto-optic layer being allowed to cool provided that the magnetic field in said auxiliary magneto-optic layer is stronger than the magnetic field in said bias magnetic layer, and when the layers are heated to said second temperature said recording magneto-optic layer and said auxiliary magneto-optic layer are magnetized in the direction of the field in said bias magnetic layer;
a substrate permitting transmission of a laser beam for writing and reading information, said laser beam being used for said heating of said layers; and
wherein said recording magneto-optic layer is stacked on said substrate and adjacent therewith, said auxiliary magneto-optic layer is stacked on said recording magneto-optic layer and adjacent therewith, and bias magnetic layer is stacked on said auxiliary magneto-optic layer and adjacent therewith.

---

## 5,016,233
## OPTICAL SCANNING ARRANGEMENT FOR MAINTAINING CONSTANT THE LIGHT OUTPUT OF A LASER BEAM OR THE LASER CURRENT

**Yasuaki Morimoto, Villingen-Schwenningen; Heinz J. Schröder, VS-Marbach, and Friedhelm Zucker, Villingen-Schwenningen, all of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany**

**Filed Sep. 28, 1988, Ser. No. 250,726**

**Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732903**

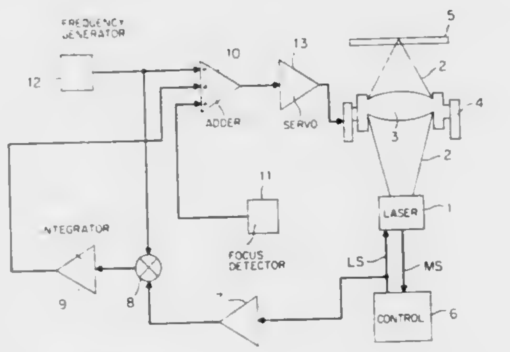
**Int. Cl.⁵ G11B** *7/00*

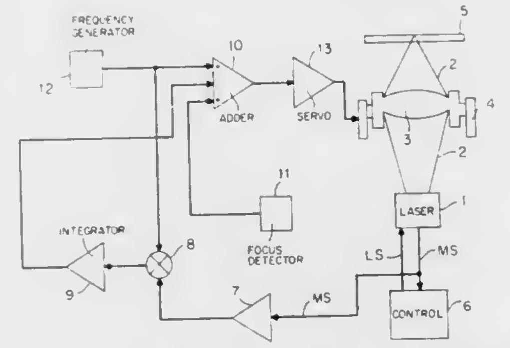
U.S. Cl. 369—44.13 **4 Claims**

1. An optical scanning arrangement comprising: a source with a monitor diode for generating a laser beam with a light output; an optical recording medium; a focusing circuit for focusing said laser beam on said optical recording medium; a source of a periodic signal with an output; a summation amplifier having a first input terminal connected to the output of said source of periodic signal; a multiplier having a first input connected to the output of said source of periodic signal; and multiplier having an output connected to a second input of said summation amplifier; said focusing circuit having positioning means; said summation amplifier having an output connected

VOL
1126
ISS
2
MY
14
1991
UMI

to said positioning means; said focusing circuit having an actual value of focus error supplied to a third input of said summation amplifier; a control source connected to said laser beam generating source for providing a laser controlling signal to a second input of said multiplier and to said laser beam generating





source to maintain the light output of said laser beam at a constant level, said light output of said laser beam tending to vary due to said periodic signal, variations of the light output being substantially eliminated by said control source to maintain said light output of said laser beam at said constant level, so that said laser beam is focused by said controlling signal.

---

### 5,016,234

### TWO-LASER COLLIMATED BEAM OPTICAL HEAD WITH MONITOR

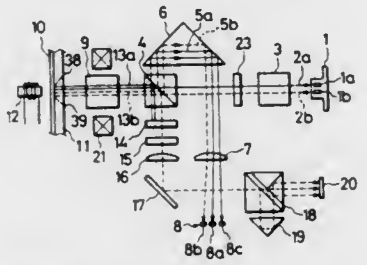
**Shigeru Nakamura, Tachikawa; Sadatsugi Machida, Shimabara; Takeshi Nakao, Sagamihara, and Masahiro Ojima, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 22, 1988, Ser. No. 209,982**

**Claims priority, application Japan, Jun. 22, 1987, 62-153478**

**Int. Cl.⁵ G11B** *7/00*

**U.S. Cl. 369—44.14** **13 Claims**



1. A two-laser beam optical head apparatus, comprising:

a first laser source and a second laser for radiating respective laser beams;

a single collimate lens means for collimating the two laser beams radiated from said laser sources to produce collimated parallel beams, said first and second laser sources being fixed on a single material fixed to said single collimate lens means;

beam splitter means, located between said laser sources and an information medium, for splitting off a first and a second monitor beam from the collimated beams prior to irradiation of the information medium by the collimated beams and for splitting off a first and a second reflected beam from the collimated beams after the collimated beams have irradiated the information medium and have been reflected from the information medium, the reflected beams having a direction of travel from the beam splitter means which is opposite the direction of travel of the monitor beams from the beam splitter means;

optical splitting means for transmitting the second reflected beam through the optical splitting means and for reflecting the first reflected beam so that the first reflected beam has the same direction of travel as the first and second monitor beams;

a first optical detector having a first and a second optical detecting device for detecting radiating light power of said first and second laser sources and having a third optical detecting device for receiving the first reflected beam; and

a second optical detector for receiving the second reflected beam.

---

### 5,016,235

### ARRANGEMENT FOR READING AN OPTICALLY READABLE LIGHT REFLECTIVE CARRIER

**Claude Tinet, Paris, France, assignor to Thomson-CSF, Paris, France**

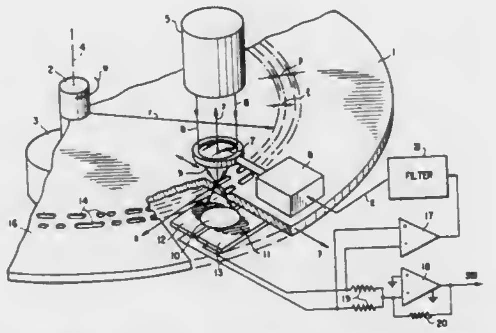
**Continuation of Ser. No. 213,097, Jun. 29, 1988, Pat. No. 4,856,108, which is a division of Ser. No. 96,317, Sep. 9, 1987, Pat. No. 4,868,808, which is a continuation of Ser. No. 925,491, Oct. 29, 1986, abandoned, which is a continuation of Ser. No. 667,100, Nov. 1, 1984, abandoned, which is a division of Ser. No. 545,110, Oct. 25, 1983, Pat. No. 4,491,940, which is a continuation of Ser. No. 108,499, Dec. 31, 1979, abandoned, which is a continuation of Ser. No. 793,270, May 3, 1977, abandoned, which is a continuation of Ser. No. 390,715, Aug. 23, 1973, abandoned. This application May 12, 1989, Ser. No. 350,773**

**Claims priority, application France, Aug. 25, 1972, 72 30346**

**The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.**

**Int. Cl.⁵ G11B** *7/09, 7/24, 7/13*

**U.S. Cl. 369—44.41** **7 Claims**



1. An arrangement for reading an optically readable light reflective carrier on which data is stored in the form of diffractive data elements which are deviations from a reference surface but not holes through the carrier, said data elements each having a width of at most 2 microns, a plurality of adjacent tracks located on said carrier, at least one of said data elements being positioned on each of said adjacent tracks, comprising:

illumination means for projecting a concentrated light spot onto said carrier and said data elements, said light spot substantially occupying the width of, any one of said data elements being read in order to obtain diffraction of light along the entire length of each of said data elements;

an optical arrangement for collecting light reflected from said carrier in such a manner that the light energy received when the projected light spot impinges on the reference surface is greater than the light energy received when the projected light spot impinges on a data element, the optical arrangement being configured and positioned such that a part of the light diffracted by said data elements is not collected by said optical arrangement; and

detection means receiving the collected light for providing a data readout signal.

---

### 5,016,236

### DISC LOADING APPARATUS FOR A VERTICAL TYPE COMPACT DISC PLAYER

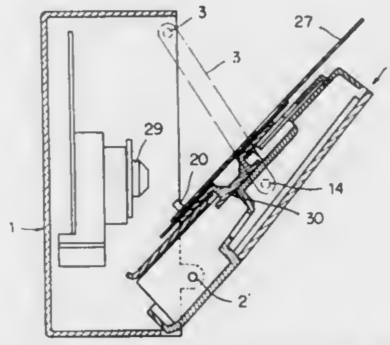
**Eung J. Cho, Kyungki, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea**

**Filed Sep. 27, 1989, Ser. No. 413,219**

**Claims priority, application Rep. of Korea, Sep. 30, 1988, 12899/1988**

**Int. Cl.⁵ G11B** *33/02, 5/016*

**U.S. Cl. 369—75.2** **3 Claims**



1. A disc loading apparatus for a compact disc player, which comprises:

a door housing mounted to a main body of said disc loading apparatus by hinges, said door housing including a L-shaped sensor pin guide channel disposed in the one side thereof,

right and left side supporting levers pivotally fixed to lower sides of an interior of said door housing by first pivot pins at lower end portions thereof, respectively, said right and left side supporting levers having an X-shaped cross portion crossed with each other at a middle portion thereof and provided with a pair of supporting pins fixed to an upper end portion thereof, respectively, for passing through a pair of arc channels disposed in the interior of said door housing so as to support a small-sized disc or a large-sized disc and turning along a predetermined angle between a lower position and an upper position of the right and left side supporting levers so as to mate with a center of a turn table of the disc loading apparatus, and

means for driving for turning said right and left side supporting levers to lower or upper positions of the right and left side supporting lever, said driving means including:

a bracket vertically, movably mounted to upper and lower guide pins supported on the interior of said door housing at upper and lower vertical guide channels thereof, said bracket provided with a tension coil spring connected to said upper guide pin for maintaining the bracket to be located at an upper position of the door housing,

an elastic bar fixed to a lower end portion of said bracket at one end thereof and inserted into an elongated hole of the middle portion of said right and left side supporting levers at a bent portion of the other end thereof;

a slider having a sensor pin guide slot disposed in an upper portion thereof,

a turning link pivotally fixed to the upper side portion of said main body at an upper portion thereof by a second pivot pin, and pivotally fixed to said slider at a lower portion thereof by a third pivot pin, and

a sensor lever pivotally fixed to an upper end portion of an upper surface of said bracket by a fourth pivot pin at one end thereof, said sensor lever provided with a sensor pin at the other end thereof wherein the sensor pin moves along

said L-shaped sensor pin guide channel, whereby the sensor pin detects the insertion of the large-sized disc or the small-sized disc and the large-sized disc and or the small-sized disc are separatively, automatically inserted into the disc loading apparatus and upon opening a door of the door housing, the large-sized disc is automatically lifted from the disc loading apparatus.

---

### 5,016,237

### PRISMS OPTICS STABLE WITH RESPECT TO WAVELENGTH AND TEMPERATURE VARIATIONS AND OPTICAL INFORMATION PROCESSING APPARATUS

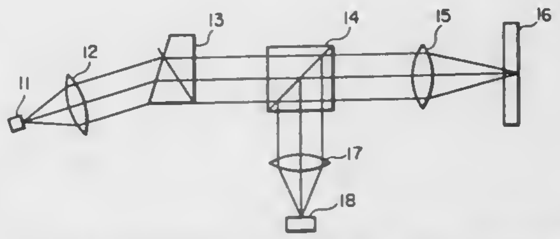
**Shigeru Nakamura, Hachioji; Sadao Takahashi, Nagaoka; Masateru Watanabe, Kanagawa, and Akira Arimoto, Musashimurayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 839,510, Mar. 14, 1986, abandoned. This application Jul. 19, 1989, Ser. No. 382,025**

**Claims priority, application Japan, Mar. 22, 1985, 60-55830**

**Int. Cl.⁵ G11B** *7/08, 7/135*

**U.S. Cl. 369—112** **9 Claims**



9. Optical information processing apparatus comprising at least a light source for writing, an optical system transforming a light beam into a parallel light beam, a prism for changing the shape of the parallel light beam and an optical system for converging said parallel light beam, wherein said prism for changing the shape of the parallel light beam is a composite prism consisting of at least two types of prisms including a first prism and a second prism made of material having different variations in the refractive index due to wavelength variations and to temperature variations, said composite prism satisfying the conditions represented by:

$$\frac{\Delta n_2}{n_2} \tan \alpha_1 = \frac{\Delta n_1}{n_1} (\tan \theta_2 + \tan \alpha_1) \text{ and}$$

$$\frac{\Delta n_2}{\Delta n_1} = \frac{\Delta n_{T2}}{\Delta n_{T1}}.$$

where $\Delta n_1$ and $\Delta n_2$ are variations in the refractive index due to wavelength variations $\Delta n_{T1}$ and [$\alpha n_{T2}$] $\Delta n_{T2}$ are variations in the refractive index due to temperature variations; $n_1$ and $n_2$ are refractive indexes for a particular wavelength; $\Theta_2$ is a refractive angle at the light incidence surface of the first prism; and $\alpha_1$ is the angle of incidence at the boundary surface between the first and second prism.

VOL
1126
ISS
2
MY
14
1991
UMI

## 5,016,238

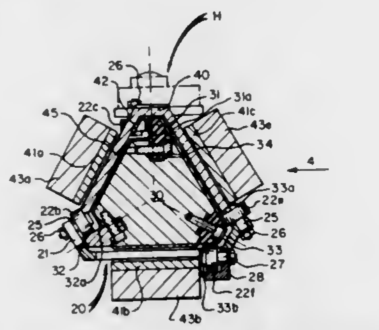
## LINEAR ACTUATOR FOR RADIAL ACCESS IN DISK RECORDER/PLAYER

**Boris A. Shtipelman, Rochester, and Paul Heppner, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 3, 1989, Ser. No. 305,689**

**Int. Cl.⁵ G11B** *21/10*

U.S. Cl. 369—215 6 Claims



1. A linear actuator for controlling the movement of a payload along a linear trajectory, said actuator comprising:

a single elongated ferromagnetic member extending in a direction parallel to said trajectory, said member having a substantially triangular cross-section defined by three planar sides whose respective planes intersect, said ferromagnetic member detachably supporting a plurality of spaced, parallel ways which are contacted by said bearing means as said carriage slides along said ferromagnetic member, said ways defining four planar surfaces which are adapted to contact said bearing means, two of said surfaces being perpendicular to each other, and the remaining two of said surfaces being perpendicular to each other and angularly disposed with respect to the other two of said surfaces; p1 a carriage for supporting a payload;

an actuator coil surrounding said ferromagnetic member, said coil being rigidly coupled to said carriage;

bearing means for slidably mounting said carriage for movement along said elongated member, said ferromagnetic member functioning to guide said carriage along a path parallel to said trajectory, said bearing means comprising a plurality of roller bearings rotatably mounted on said carriage and positioned to engage said member so that said carriage can move only in a direction parallel to said trajectory;

magnetic filed-producing means spaced about said ferromagnetic member for producing a permanent magnetic field perpendicular to said three planar sides, in the vicinity of said coil; and

means for controlling current flow through said coil to control the position of said coil along said member and, hence, the position of the payload along a linear trajectory.

---

## 5,016,239

## RECORDING METHOD AND APPARATUS

**Paul R. Goldberg, Palo Alto; Bryan K. Clark, Sunnyvale; Joel D. Finegan, Campbell, and Robert Guerra, Santa Clara, all of Calif., assignors to Tandy Corporation, Ft. Worth, Tex.**

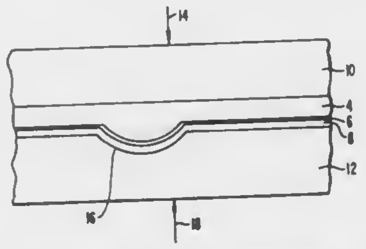
**Division of Ser. No. 294,723, Jan. 10, 1989, and a continuation-in-part of Ser. No. 153,288, Feb. 5, 1988, abandoned. This application Oct. 2, 1989, Ser. No. 416,079**

**Int. Cl.⁵ G11B** *5/84;* **G01D** *9/00*

U.S. Cl. 369—284 12 Claims

1. A method of recording and erasing data on a recording medium comprising the steps of:

directing a record beam at an expansion layer of a recording medium through a first surface, said recording medium further comprising a first, expansion layer and a second, retention layer adjacent said first expansion layer, and means for reflecting at least an erase beam at an interface of said first, expansion layer and said second, retention layer, said record beam heating a portion of said expansion layer so as to cause expansion thereof; and thereafter



directing an erase beam at said medium through a second surface opposing said first surface, to reflect off said reflecting means through said second, retention layer in response to an erase signal, said erase beam heating at least a portion of said retention layer in order to cause erasure of data.

---

## 5,016,240

## OPTICAL RECORDING MEDIUM

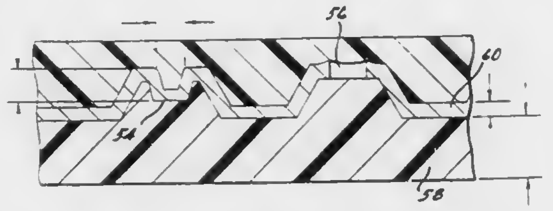
**Andrew J. Strandjord and Donald J. Perettie, Ronald L. Yates, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 140,172, Dec. 31, 1987, Pat. No. 4,998,239, which is a continuation-in-part of Ser. No. 14,882, Feb. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 105,426, Oct. 7, 1987, abandoned. This application Mar. 29, 1990, Ser. No. 501,058**

**The portion of the term of this patent subsequent to Mar. 5, 2008, has been disclaimed.**

**Int. Cl.⁵ G11B** *7/24*

U.S. Cl. 369—288 7 Claims



1. A medium for storage of information that can be optically read comprising a substrate layer and a highly reflective, soft metal alloy film adhered to at least one surface of the substrate layer, said soft metal alloy comprising, as percent by weight of the alloy, Sn (25-90), Bi (8-60) and Cu (1-25).

---

## 5,016,241

## SMALL DISK ADAPTER WITH STORAGE CASE

**Noel M. Lee, Daly City; Rodney A. Herman, and Thomas J. Crothers, both of Alameda, all of Calif., assignors to Monster Cable Products, Inc., San Francisco, Calif.**

**Filed Jul. 10, 1989, Ser. No. 377,535**

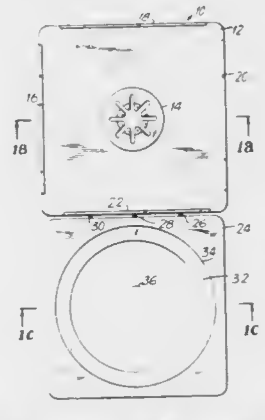
**Int. Cl.⁵ G11B** *7/26*

U.S. Cl. 369—289 13 Claims

1. An adapter including a storage case for use with compact disk recording media for use of a small disk of a first diameter on a mechanism only capable of handling recording media of a diameter larger than said first diameter comprising:

a first portion for securing said disk, said first portion storing said disk prior to use,

a second portion constituting said storage case detachably connected to said first portion and having a support surface and a mounting segment on said support surface, said mounting segment being circular and of sufficient diameter to accommodate said disk in operative position on said



mechanism, said support surface being substantially rectangular and having a length and width larger than said first diameter.

---

## 5,016,242

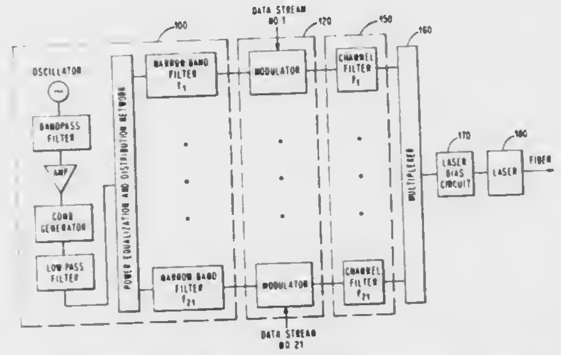
## MICROWAVE SUBCARRIER GENERATION FOR FIBER OPTIC SYSTEMS

**Douglas D. Tang, Chelmsford, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Nov. 1, 1988, Ser. No. 265,628**

**Int. Cl.⁵ H04J** *14/02*

U.S. Cl. 370—3 32 Claims



1. A method of optically transmitting a plurality of information signals, comprising the steps of:

generating a plurality of harmonics from a single oscillator of prespecified fundamental microwave frequency to provide an input harmonic spectrum;

providing a set of replicate harmonic spectrums each having a frequency spectrum identical to that of said input harmonic spectrum;

filtering each of said replicate spectrums to selectively extract therefrom a respective harmonic for use as a microwave subcarrier signal;

modulating each of said subcarrier signals with a respective one of said information signals:

summing said modulated subcarrier signals to form a composite optical signal; and

optically transmitting said composite optical signal.

---

## 5,016,243

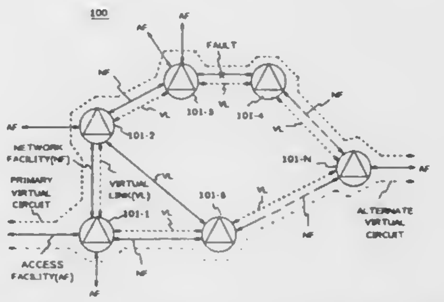
## AUTOMATIC FAULT RECOVERY IN A PACKET NETWORK

**Franklin D. Fite, Jr., Aberdeen, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Nov. 6, 1989, Ser. No. 431,796**

**Int. Cl.⁵ H04J** *3/14*

U.S. Cl. 370—16 **26 Claims**



1. Apparatus in a packet node for recovering from faults in transmission paths including at least one virtual circuit in a network including a plurality of packet nodes, the apparatus comprising:

means for detecting faults in any transmission paths associated with the node, each of said transmission paths including at least one network facility transporting at least one virtual circuit;

first means for determining if any virtual circuit affected by a detected fault is terminated in the node;

first means for generating a fault indication message for each network facility transporting a virtual circuit that is affected by the detected fault and including an identity of each virtual circuit affected by the detected fault being transported on said network facility that is not terminated in the node;

first means for transmitting said generated fault indication messages, each generated fault indication message being transmitted on at least one of the affected virtual circuits being transported by a corresponding network facility away from the fault to some other node in the network; and

means for switching any affected virtual circuits determined to be terminated in the node to associated alternate virtual circuits for transmission toward a destination node.

---

## 5,016,244

## METHOD FOR CONTROLLING FAILOVER BETWEEN REDUNDANT NETWORK INTERFACE MODULES

**W. Russell Massey, Jr., Levittown; Renee Drobish, Dresher, and Paul F. McLaughlin, Hatfield, all of Pa., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Sep. 8, 1989, Ser. No. 404,748**

**Int. Cl.⁵ H04J** *3/14*

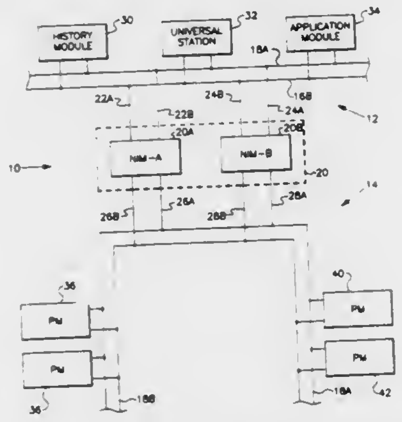
U.S. Cl. 370—16 **12 Claims**

1. A method by which redundant network interface modules (NIMs) interconnecting communication buses of a first and second local area network communicate with one another over the communication buses of the first and second local are network whereby each of the redundant NIMs includes a first NIM and a second NIM, the first NIM being designated as the primary and second NIM being designated as the secondary, the secondary NIM taking over the function of the primary NIM on the occurrence of failover conditions; comprising the steps of:

the first and second NIMs communicating with each other at predetermined time intervals over the communication buses of both networks, each communication between the NIMs over the communication bus of the first network including the status of the second network as perceive by the NIM transmitting the message and each communica-

VOL
1126
ISS
2
MY
14
1991
UMI

tion between the NIMs over the communication bus of the second network including the status of the first network as perceived by the NIM transmitting the message;



the primary NIM failing over to the secondary NIM when the primary NIM determines that it is unable to communicate with the first network and the secondary NIM determines that it is able to communicate with the first network.

---

### 5,016,245

### MODULAR EXPANDABLE DIGITAL SINGLE-STAGE SWITCHING NETWORK IN ATM (ASYNCHRONOUS TRANSFER MODE) TECHNOLOGY FOR A FAST PACKET-SWITCHED TRANSMISSION OF INFORMATION

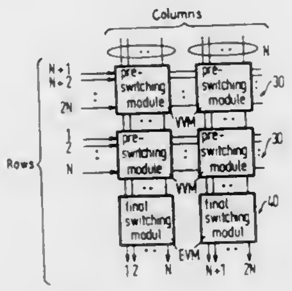
**Manfred Lobjinski; Michael Horn, and Christian Hinterberger, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Nov. 29, 1989, Ser. No. 442,720**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3843724**

**Int. Cl.$^5$ H04Q** ***11/04***

**U.S. Cl. 370—60** **15 Claims**



7. Modular expandable digital single-stage switching network in ATM (Asynchronous Transfer Mode) technology for a fast packet-switched transmission of information, having J×N network inputs and J×N network outputs, comprising:

J×J array of pre-switching modules, each having N primary inputs, N expansion inputs and N pre-switching outputs;

J×J array of final switching modules, each having N final inputs and N final outputs;

the J×N network inputs forming J subdivisions of N inputs, each N network inputs in each subdivision J being connected respectively to the N primary inputs of each of the J pre-switching modules in each column k where $1\leqq k\leqq J$ for each row j where $1\leqq j\leqq J$;

the N pre-switching outputs of the pre-switching modules in row j and column k being connected respectively to the N expression inputs of the pre-switching modules in row j+1 and column k, where $1\leqq j\leqq J-1$ and $1\leqq k\leqq J$;

the N pre-switching outputs of the pre-switching module in row J and column k being connected to the N final inputs of the final switching module in column k, where $1\leqq k\leqq J$; and

the N final outputs of the J final modules forming the J×N network outputs, each of the switching modules having in each case on the primary input side a header information filter for the purpose of route selection, each of said pre-switching modules containing a single FIFO store, operatively connected to the filter, which can read in 2N packets simultaneously and read out N packets simultaneously, to avoid packet overtaking, a chronological sequence of packets arriving on one of the N primary inputs of the pre-switching module being replaced on the N pre-switching outputs of the pre-switching module, the header information filter processing only a part of a header of the information for switching the packets to the respective switching module column, and the header information filter of each of the final switching module processing another part of the header of the information for the final switching to a network output; the chronological sequence of packets being replaced in such a way that the packet read into the store first is output via the pre-switching output having a highest priority, that is the pre-switching output which is processed in the next respective row of the switching network by the store of the respective switching module as the first of all N expansion inputs, the second packet via the pre-switching output with the second-highest priority, and so forth, as a result of which the chronological sequence of the packets is recovered.

---

### 5,016,246

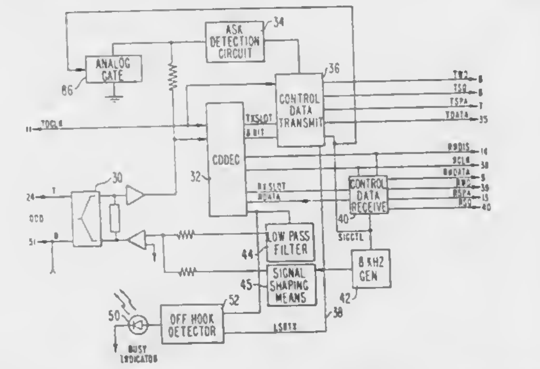
### DIGITAL TELEPHONE SYSTEM CIRCUITS

**James J. Wisniewski, Sterling, Va., assignor to Hubbell Incorporated, Orange, Conn.**

**Filed Dec. 29, 1989, Ser. No. 459,286**

**Int. Cl.$^5$ H04J** ***1/14***

**U.S. Cl. 370—76** **6 Claims**



1. In a telephone system of the type including means at a first location for generating multicycle ASK control or supervisory signals at a frequency significantly above voice band and voice signals for transmission to a destination connected to said first location by voice quality telephone lines, means at the first location end of the telephone lines for digitally encoding the voice signals in a plurality of digital words and means for recognizing the presence of the ASK signals for setting the least significant bit of each said digital word to one preselected state when an ASK signal is present and to a second state when no ASK signal is present, and means at the destination end of the telephone lines for reconstructing the voice signals and for regenerating the ASK signal in response to the LSB states, and wherein said means for reconstructing includes filter circuit means responsive to the presence of the ASK signal to produce an output signal, the improvement comprising

shaping circuit means for receiving the ASK signal before said signal is applied to said filter circuit means and for shaping the envelope of the signal so that the leading and trailing ends thereof increase and decrease to and from a full amplitude level in an interval greater than one cycle of said ASK signal and

circuit means for coupling said shaped signal to said filter circuit means to thereby reduce the number and amplitude of harmonics produced by said filter circuit means.

---

### 5,016,247

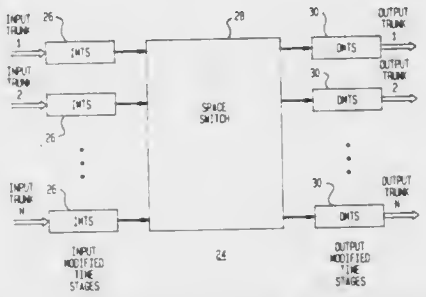
### MULTIHOP TIME ASSIGNED SPEECH INTERPOLATION (TASI) SYSTEM FOR TELECOMMUNICATION NETWORKS

**Israel Cidon, New York, N.Y., and Inder S. Gopal, Fort Lee, N.J., assignors to IBM Corporation, Armonk, N.Y.**

**Filed Aug. 7, 1989, Ser. No. 390,122**

**Int. Cl.$^5$ H04J** ***3/17***

**U.S. Cl. 370—81.00** **14 Claims**



1. In a telecommunication network for implementing multihop Time Assigned Speech Interpolation (TASI) having at least an input trunk and an output trunk for carrying transmissions in the form of frames, each frame having a plurality of physical slots associated respectively with logical channel numbers of respective calls being transmitted, and a circuit switch of the Time-Space-Time variety interposed between the input trunk and output trunk and wherein the space switch portion of said circuit switch has at least an input port and an output port and includes a plurality of switch slots, the improvements in said circuit switch comprising:

an input modified time state (IMTS) having an input terminal and an output terminal, means coupling the input and the output terminals of said IMTS respectively to said input trunk and to said input port of the space switch, said IMTS including means for collecting samples of inactive/active calls in said frame of said input trunk and for mapping the physical slots associated with the call samples to predetermined ones of the switch slots in said space switch,

an output modified time stage (OMTS) having an input terminal and an output terminal, means coupling the input and the output terminals of said OMTS respectively to said output port of said space switch and to said output trunk,

said IMTS providing a signal via said space switch to said OMTS indicative of a change in status of selected ones of said predetermined space switch slots, said OMTS including means responsive to the signals from said IMTS for indicating a change in the assignment of a physical slot in a frame of said output trunk for each call sample of the selected space switch slots indicated as having a change in status.

---

### 5,016,248

### BUFFER MEMORY DEVICE FOR PACKET DATA AND METHOD OF CONTROLLING THE DEVICE

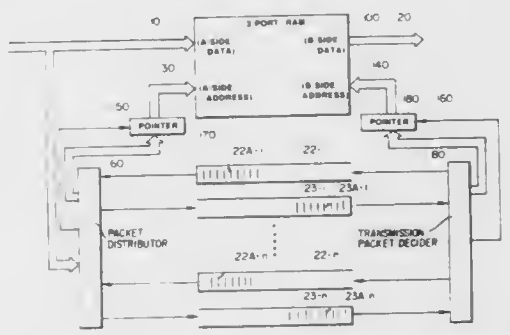
**Norimasa Kudoh, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 25, 1989, Ser. No. 426,424**

**Claims priority, application Japan, Oct. 27, 1988, 63-271601**

**Int. Cl.$^5$ H04J** ***3/24***

**U.S. Cl. 370—94.1** **13 Claims**



1. A system for storing and reading data in a packet form, comprising:

a plurality of packet queue means for storing input packet data therein;

a plurality of first pointer queue means, each associated with a corresponding one of said packet queue means, for storing therein pointers indicative of addresses of writable areas in each of said packet queue means, respectively;

a plurality of second pointer queue means, each associated with a corresponding one of said packet queue means, for storing therein pointers indicative of addresses of readable areas in each of said packet queue means, respectively;

address control means for selecting an address of any one of said packet queue means to write packet data on the basis of the pointers stored in said first pointer queue means and for selecting an address of one of said packet queue means to read packet data on the basis of the pointers stored in said second pointer queue means; and

pointer control means, operable in response to a reading operation of a packet data from one of said packet queue means, for deleting a pointer, indicative of the address of that packet queue means where said packet data had been stored, from the one of the second pointer queue means where said pointer had been stored and for writing said pointer into one of said first pointer queue means.

---

### 5,016,249

### DUAL COMPUTER CROSS-CHECKING SYSTEM

**David C. Hurst, Knowle, and Malcolm Brearley, Solihull, both of England, assignors to Lucas Industries public limited company, Birmingham, England**

**Filed Dec. 19, 1988, Ser. No. 286,154**

**Claims priority, application United Kingdom, Dec. 22, 1987, 8729901**

**Int. Cl.$^5$ G06F** ***11/00***

**U.S. Cl. 371—16.1** **14 Claims**

1. A dual computer cross-checking system comprising:

a control computer;

control data supply means for supplying control data to said control computer;

means in said computer for processing said control data and producing control output signals;

a monitoring computer for checking the operation of the control computer;

means for interchanging check data between the control computer and the monitoring computer on a cyclic basis;

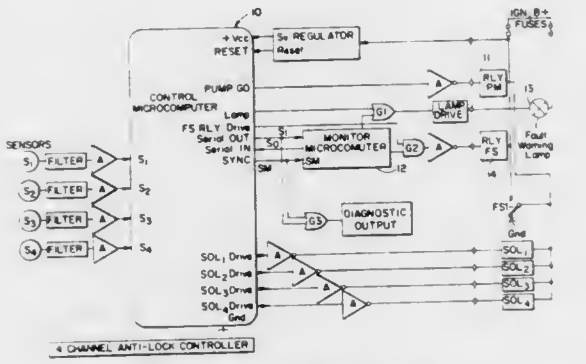
means in each computer for carrying out a predetermined calculation on the check data it receives from the other

VOL
1126
ISS
2
MY
14
1991
UMI

computer whereby to modify that check data in a predetermined manner;

means in each computer for checking that the modified check data received from the other computer bears a predetermined relationship to the check data it transmitted to the other computer in the previous cycle; and

shut-down means controlled by both computers for shutting down the control system in the event that at least one of said checking operations reveals a discrepancy.



---

### 5,016,250

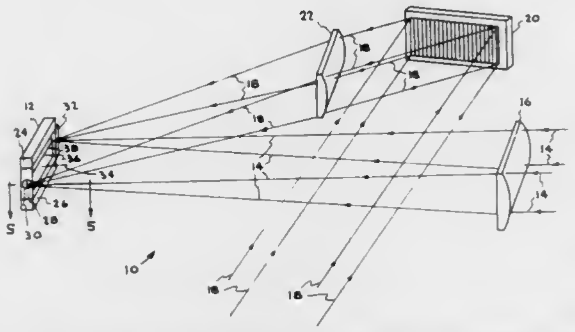
### X-RAY LASERS AND METHODS UTILIZING TWO COMPONENT DRIVING ILLUMINATION PROVIDED BY OPTICAL LASER MEANS OF RELATIVELY LOW ENERGY AND SMALL PHYSICAL SIZE

**Mordecai D. Rosen, Berkeley, and Dennis L. Matthews, El Granada, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 18, 1989, Ser. No. 423,165**

**Int. Cl.$^5$ H01S *3/30***

**U.S. Cl. 372—5** **15 Claims**



1. An X-ray laser in which X-ray radiation is amplified along a path disposed within an X-ray gain medium, the X-ray laser comprising:

a target comprised of a material from which the X-ray gain medium is to be produced;

means for illuminating a narrow and linear portion of the target with a first quantity of optical laser radiation, that has scarcely enough energy to explode the portion and produce therefrom a narrow and linear cool plasma of uniform composition; and

means for uniformly sweeping a second quantity of optical laser radiation across the length, from end to end, of the narrow and linear cool plasma of uniform composition, at approximately the speed of light, to consecutively illuminate continuously succeeding portions of the cool plasma with optical laser radiation having scarcely enough energy to heat, ionize, and invert each succeeding portion of the cool plasma, and thereby convert it into a continuously succeeding portion of the X-ray gain medium.

---

### 5,016,251

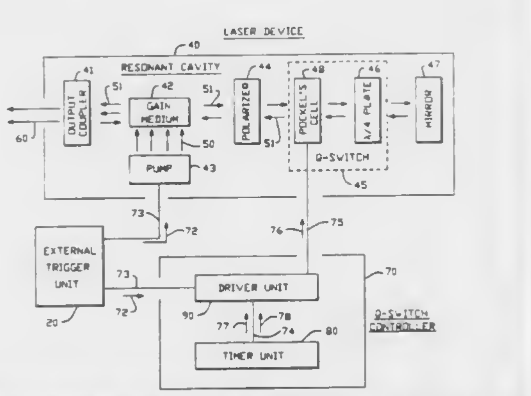
### Q-SWITCH DRIVER

**John D'Arcy, Belmont, Calif., assignor to Spectra Physics, LPD, Mountain View, Calif.**

**Filed Mar. 28, 1990, Ser. No. 500,674**

**Int. Cl.$^5$ H01S *3/11***

**U.S. Cl. 372—10** **17 Claims**



1. An apparatus operating a laser device, having a long-pulse mode, to control long pulses of laser light emitted from said laser device, said laser device including a pump, a gain medium, and a Q-switch disclosed in a resonant cavity, said pump supplying constant pulses of pump energy to said gaim medium during a first period of time said apparatus comprising: a controller means for adjustably controlling a timing window which demarcates operation of said Q-switch;said controller means including:

means for indicating an amount of a desired pump energy coupled into said long pulses;

means for determining,responsive to said amount of coupled pump energy,said timing window,which begins substantially at the beginning of said first period of time;and

means for holding said Q-switch open during said timing window.

---

### 5,016,252

### SEMICONDUCTOR LASER DEVICE

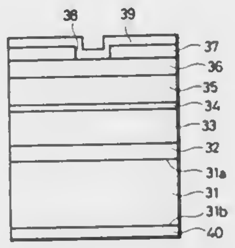
**Hiroki Hamada; Shoji Honda; Masayuki Shono, and Takao Yamaguchi, all of Osaka, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Sep. 26, 1989, Ser. No. 412,786**

**Claims priority, application Japan, Sep. 29, 1988, 63-245148; Mar. 20, 1989, 1-68784; Mar. 31, 1989, 1-83107**

**Int. Cl.$^5$ H01S *3/19***

**U.S. Cl. 372—45** **10 Claims**



1. In a semiconductor laser device comprising:

a GaAs substrate of a first conductivity type,

a buffer layer of the first conductivity type containing Ga, In and P, formed on one main surface of said GaAs substrate inclined by 5° or more from a {100} plane of said substrate in a <011> direction,

a clad layer of the first conductivity type containing Al, Ga, In and P, formed on said buffer layer,

an active layer containing Ga, In and P, formed on said clad layer of the first conductivity type, and

a clad layer of a second conductivity type containing Al, Ga, In and P, formed on said active layer.

---

### 5,016,253

### SEMICONDUCTOR LASER DEVICE

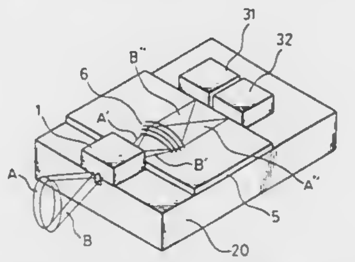
**Masayuki Kubota, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Apr. 3, 1990, Ser. No. 503,799**

**Claims priority, application Japan, Apr. 12, 1989, 1-93580**

**Int. Cl.$^5$ H01S *3/19***

**U.S. Cl. 372—50** **10 Claims**



1. A semiconductor laser device comprising:

a semiconductor laser element including opposed front and rear facets for emitting a plurality of laser beams from each of said front and rear facets;

a light guide layer for guiding the plurality of laser beams emitted from said rear facet and for converging the laser beams by wave front conversion during guiding; and

a plurality of photodetectors which each detect a respective wave front converged laser beam from said light guide layer for monitoring the laser beams emitted from said front facet.

---

### 5,016,254

### LASER-ACTIVE MEDIUM AND PROCESS FOR PRODUCING SAME

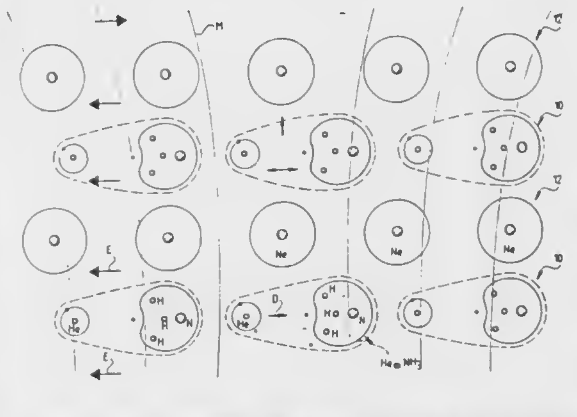
**Georg Saenger, Voorschoten, and Gerrit Hietkamp, Otterlo, both of Netherlands, assignors to Deutscbe Forschungsanstalt fuer Luft- und Raumfahrt e.V., Fed. Rep. of Germany**

**Filed May 15, 1990, Ser. No. 523,798**

**Claims priority, application Fed. Rep. of Germany, May 17, 1989, 3916094**

**Int. Cl.$^5$ H01S *3/223***

**U.S. Cl. 372—55** **26 Claims**



1. Laser-active medium, characterized in that it comprises a complex ($He_mNH_3$) of metastable helium and ammonia as well as a radiation-active component (Ne), in that said complex ($He_mNH_3$) and said radiation-active component (Ne) are both in the condensed, solid phase, and in that said complex ($He_mNH_3$) is present in said laser-active medium (52) in condensed form with its dipole moment (D) aligned substantially in one direction.

---

### 5,016,255

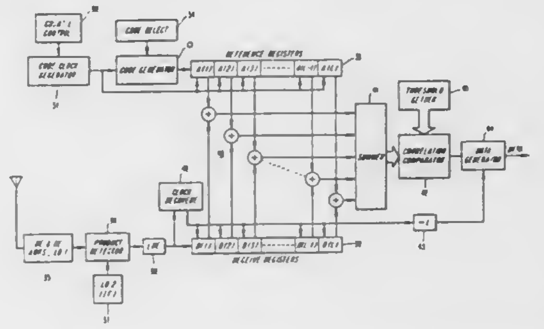
### ASYMMETRIC SPREAD SPECTRUM CORRELATOR

**Robert C. Dixon, Palmer Lake, and Jeffrey S. Vanderpool, Colorado Springs, both of Colo., assignors to Omnipoint Data Company, Incorporated, Boston, Mass.**

**Filed Aug. 7, 1989, Ser. No. 389,914**

**Int. Cl.$^5$ H04K *1/00***

**U.S. Cl. 375—1** **16 Claims**



1. An apparatus for decoding a received spread spectrum signal having a data signal modulated with a PN code, comprising:

threshold setting means for analyzing the pattern and application of the data signal, noise environment, and amount of error correction, and determining a threshold level;

reference-sequence-storage means for storing a reference pseudo-noise signal;

receive-sequence-storage means for storing the received spread spectrum signal;

chip-comparison means coupled to said reference-sequence-storage means and said receive-sequence-storage means, and responsive to the received spread spectrum signal for comparing each chip of the received spread spectrum signal with each respective chip of the reference pseudo-noise signal to generate a plurality of chip-comparison signals;

summer means coupled to said chip-comparison means and responsive to the plurality of chip-comparison signals for adding the plurality of chip-comparison signals to generate a correlation signal; and

correlation-comparison means coupled to said summer means and responsive to the correlation signal being greater than the threshold level for generating a first data symbol, and for generating a second data symbol in response to the correlation signal not being greater than the threshold level.

---

### 5,016,256

### SPREAD SPECTRUM INTERCEPT APPARATUS AND METHOD

**Clarence H. Stewart, 7805 Kareo Forest Dr., McLean, Va. 22102**

**Filed Oct. 17, 1989, Ser. No. 422,838**

**Int. Cl.$^5$ H04K *1/00***

**U.S. Cl. 375—1** **9 Claims**

1. An apparatus for detecting an intercept signal having spread spectrum modulation, comprising:

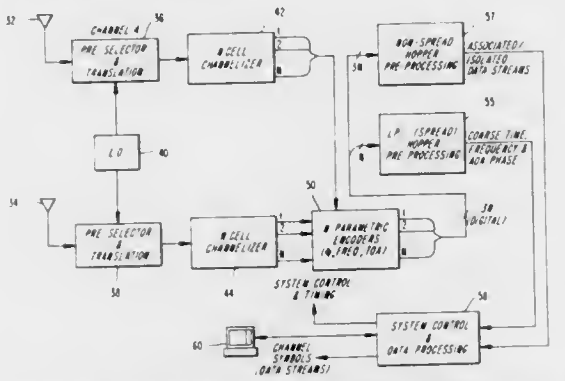
a first antenna for outputting the intercept signal;

first means for channelizing the spectrum of the intercept signal into a first plurality of spectrum segments, with each spectrum segment having a corresponding segment signal, respectively;

a parametric encoder for measuring a corresponding plural-

VOL
126
ISS
2
MY
14
1991
UMI

ity of frequencies of each of the first plurality of segment signals, respectively; and


32
CHANNEL A
36
PRE SELECTOR & TRANSLATION
42
N CELL CHANNELIZER
NON-SPREAD HOPPER PRE PROCESSING
57
ASSOCIATED/ISOLATED DATA STREAMS
55
LP (SPREAD) HOPPER PRE PROCESSING
COARSE TIME, FREQUENCY & AOA PHASE
LO
40
34
PRE SELECTOR & TRANSLATION
38
N CELL CHANNELIZER
44
50
N PARAMETRIC ENCODERS (Φ, FREQ, TOA)
(DIGITAL)
SYSTEM CONTROL & TIMING
58
SYSTEM CONTROL & DATA PROCESSING
60
CHANNEL SYMBOLS (DATA STREAMS)

means for generating from the plurality of frequencies a frequency estimate of the intercept signal.

---

### 5,016,257
### RECEIVER FOR BANDSPREAD SIGNALS, PARTICULARLY GPS RECEIVER

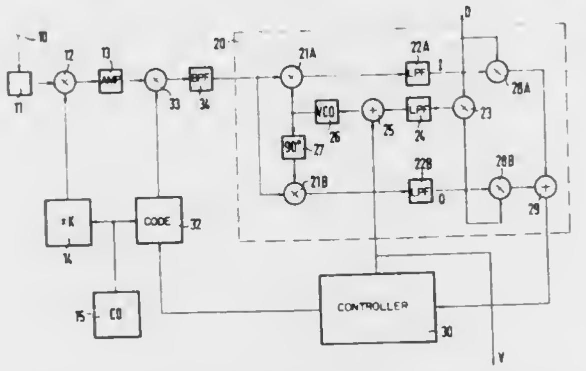
**Michael Wolf, Schwäbisch Gmünd, and Wolfgang Beier, Weil der Stadt, both of Fed. Rep. of Germany, assignors to Standard Elektrik Lorenz AG, Stuttgart, Fed. Rep. of Germany**

**Filed Mar. 13, 1989, Ser. No. 323,570**

**Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808328**

**Int. Cl.$^5$ H04K** *1/00*

**U.S. Cl. 375—1** **7 Claims**



1. A receiver for a spread spectrum signal generated using a predetermined code at a remote transmitter, said receiver comprising:

reference means for generating a receiver reference frequency independent of a transmitter reference frequency used by the remote transmitter,

a first phase-locked loop wherein said predetermined code and said receiver reference frequency are used to recover a code frequency and a code phase with which the received spread spectrum signal is converted into a narrowband signal having a narrower bandwidth than the received spread spectrum signal and comprising a carrier signal modulated with a data signal, said first phase-locked loop further comprising:

frequency correction means responsive to the recovered code frequency for generating a frequency correction signal representative of deviations in the recovered code frequency relative to the receiver reference frequency; and

a second phase-locked loop wherein the carrier signal is simulated in frequency and phase in response to a control signal, said second phase-locked loop further comprising: phase correction means for generating a phase correction signal representative of deviations in the phase of the simulated carrier signal, and

summer means for combining said frequency correction signal with said phase correction signal to thereby form said control signal.

---

### 5,016,258
### DIGITAL MODULATOR AND DEMODULATOR

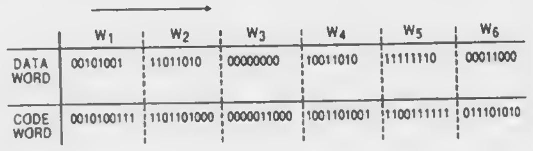
**Shinichi Tanaka, Kyoto; Hiromichi Ishibashi, Toyonaka; Mitsubara Akira, Takatsuki, and Tsuyoshi Okada, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 9, 1989, Ser. No. 363,987**

**Claims priority, application Japan, Jun. 10, 1988, 63-144261; Jul. 8, 1988, 63-171280**

**Int. Cl.$^5$ H04L** *15/00;* **H03M** *7/20*

**U.S. Cl. 375—25** **11 Claims**



| | $W_1$ | $W_2$ | $W_3$ | $W_4$ | $W_5$ | $W_6$ |
|---|---|---|---|---|---|---|
| DATA WORD | 00101001 | 11011010 | 00000000 | 10011010 | 11111110 | 00011000 |
| CODE WORD | 0010100111 | 1101101000 | 0000011000 | 1001101001 | 1100111111 | 011101010 |

9. A demodulator for reproducing data words each being composed of M bits from a channel signal formed of a serial train of code words each being composed of N bits, where $N > M$, and containing a specific number of '1' bits, said code words being classified into at least two groups such that the number of '1' bits contained in each code word in each of said groups is the same and such that the number of '1' bits contained in each code word in the number of '1' bits contained in each code word in another of said groups, comprising:

a plurality of voltage comparating means having different thresholds from one another for waveform shaping the channel signal with the respective thresholds;

a plurality of counting means which are respectively coupled to the plurality of voltage comparating means and each of which is for separating an output of a corresponding one of the plurality of voltage comparating means into N-bit words and counting the number of '1' bits contained in each N-bit word;

maximum likelihood detecting means for identifying as a code word one having a maximum likelihood from N-bit words in each of which the number counted by the counting means corresponds to one of the predetermined numbers; and

decoding means for decoding the code word identified by the maximum likelihood detecting means to recover a data word.

---

### 5,016,259
### LOW JITTER DDFS FSK MODULATOR

**David L. Hershberger, Nevada City, Calif., assignor to The Grass Valley Group, Inc., Nevada City, Calif.**

**Filed Mar. 3, 1989, Ser. No. 319,040**

**Int. Cl.$^5$ H04L** *27/12*

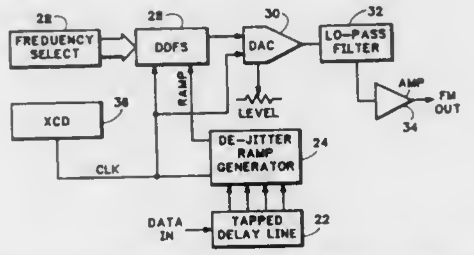
**U.S. Cl. 375—62** **8 Claims**

5. An improved direct digital frequency synthesized frequency shift keyed modulator of the type having a sine lookup table to output a digital sinusoid and a ramp generator to provide a modulating input that changes the constant value input when there are transitions in data input, the improvement comprising:

means for polyphase sampling the data input to produce n samples for each sample clock pulse;

means for generating a correction signal as a function of the data transitions as represented by the n samples;

means for offsetting the modulating input by the correction signal so that the change to the constant value input is closer in time to the data transitions; and



means for integrating said constant value input and feeding the result into the sine lookup table using a Euler integrator.

---

### 5,016,260
### MODULATOR AND TRANSMITTER

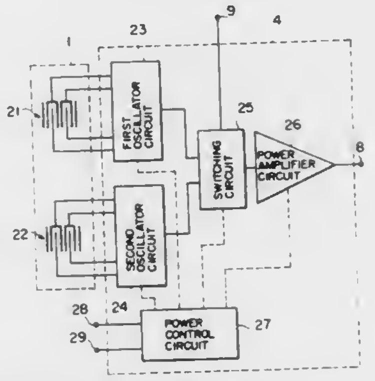
**Youichi Masuda, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Jun. 30, 1989, Ser. No. 374,248**

**Claims priority, application Japan, Jul. 29, 1988, 63-190377; Mar. 13, 1989, 1-60162**

**Int. Cl.$^5$ H03C** *7/00*

**U.S. Cl. 375—66** **8 Claims**



5. A transmitter comprising:

a plurality of surface acoustic wave devices;

a plurality of oscillator circuits, each having a differential circuit arranged in a one-to-one correspondence with said plurality of surface acoustic wave devices, each of said differential circuits generating different frequency signals in correspondence with corresponding surface acoustic wave devices;

a switching circuit for selecting a predetermined frequency signal from the plurality of different frequency signals on the basis of a value of a digital signal to be modulated, and for outputting the selected frequency signal as a modulation signal; and

a power amplifier circuit for amplifying an output signal from said switching circuit.

---

### 5,016,261
### METHOD AND APPARATUS FOR ACHIEVING IMPROVED ANTI-JAM PERFORMANCE VIA CONVERSION GAIN

**Frank Amoroso, and Jacob L. Bricker, both of Santa Ana, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Apr. 17, 1989, Ser. No. 339,552**

**Int. Cl.$^5$ H04B** *1/10*

**U.S. Cl. 375—76** **20 Claims**

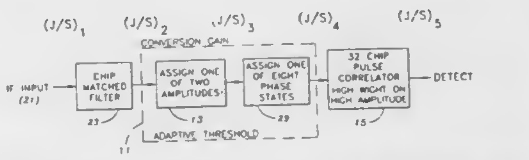
1. A method of improving antijam performance of a processing circuit via conversion gain in the reception of a received phase modulated signal accompanied by jamming interference, the method comprising:

receiving a plurality of input signal segments each of said segments including a phase modulated information signal portion and an interference portion;

separating said input signal segments into a predetermined number of signal chips;

sorting the signal chips, in accordance with signal chip amplitude;

setting a first amplitude threshold to segregate the signal chips based on the relative amplitude of the signal chips;



repeating said steps of separating, sorting and setting a first amplitude threshold for each input signal segment to repeatedly identify a predetermined number of said signal chips having greater relative amplitude; and

applying a first weighting gain factor to signal chips that exceed said first amplitude threshold and a second weighting gain factor to remaining signal chips, said first weighting gain factor being greater than said second weighting gain factor.

---

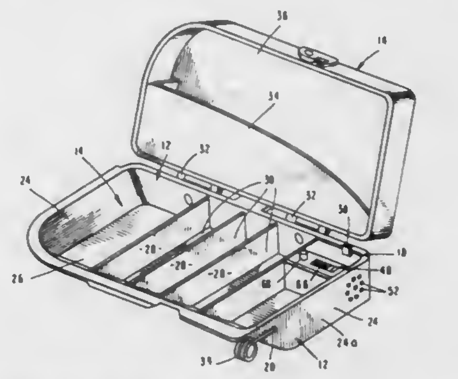
### 5,016,262
### CASH CADDY

**Michelle Cushing, 9833 Daines Dr., Temple City, Calif. 91780**

**Filed Oct. 16, 1989, Ser. No. 422,100**

**Int. Cl.$^5$ G08B** *13/08;* **G07D** *13/00;* **G06M** *1/22*

**U.S. Cl. 377—15** **3 Claims**



1. A change making apparatus comprising:

(a) a body portion having interconnected front, back, side and bottom walls;

(b) a plurality of transversely spaced partitions extending between said front and back walls, and defining a plurality of coin receiving channels;

(c) a top closure member hingably connected to said body portion, said top closure member being movable from a first closed position in engagement with said front side walls to a second open position spaced apart from said front and side walls;

(d) signal means carried by said body portion for emitting a signal upon movement of said top closure member toward said second open position; and

(e)) counter means carried by said body portion for counting and recording each instance of movement of said top closure means from said first position to said second position.

VOL
1126
ISS
2
MY
14
1991
UMI

### 5,016,263
## SAMPLE-HOLD CIRCUIT WITH OUTPUTS TAKEN BETWEEN CATES OF DYNAMIC SHIFT REGISTER TO AVOID SKEW FROM UNEQUAL INTERSTAGE CONNECTION LENGTHS

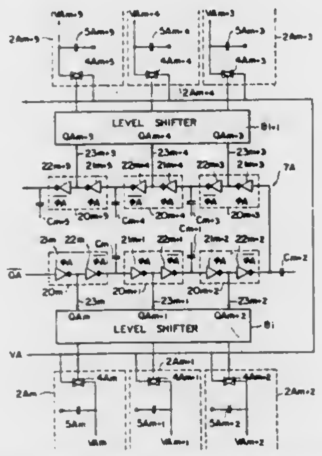
**Nobutaka Kitagawa, Kawasaki; Akihiro Sueda, and Yasunori Kuwasima, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 6, 1989, Ser. No. 375,944**

**Claims priority, application Japan, Jul. 7, 1988, 63-169645**

**Int. Cl.$^5$ H03K** *21/40, 21/12, 23/44;* **G11C** *11/407*

U.S. Cl. 377—68 **8 Claims**



1. A sample-hold circuit comprising a large number of sample-hold elements, and a multi-stage shift register in which interstage connections at some stages are of different lengths from other stage interconnections, said shift register employed for controlling sampling timings of said sample-hold elements, including a large number of stages corresponding to said respective sample-hold elements, each stage of said multi-stage shift register including an input gate for taking a signal shifted from the preceding stage there into, and an output gate for shifting the signal taken in by said input gate to the succeeding stage, respective sampling timings of said sample-hold elements corresponding to respective stages being determined by signals taken between said input and output gates through said input gates at said respective stages thereby obtaining substantially equal output overlap among the stages despite said unequal interconnection lengths of said some stages.

---

### 5,016,264
## TRANSFER METHOD AND ARRANGEMENT FOR A FILM CASSETTE UNIT IN A PANORAMIC X-RAY APPARATUS

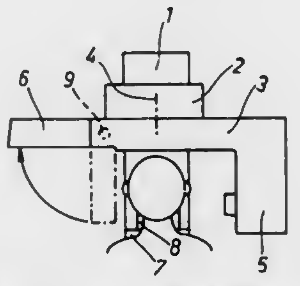
**Klaus Hyttinen, Kerava, Finland, assignor to Instrumentarium Corp., Finland**

**Filed Dec. 6, 1989, Ser. No. 447,016**

**Claims priority, application Finland, Mar. 21, 1989, 891320**

**Int. Cl.$^5$ A61B** *6/14*

U.S. Cl. 378—38 **7 Claims**



1. In an panoramic X-ray apparatus, a support column, frame means mounted for vertical movement on said support column, elongated bracket means mounted for rotation on said frame means about a vertical axis, an X-ray tube disposed on one end of said bracket means and having a horizontal aperture axis, a film cassette unit connected to the opposite end of said bracket means, support means disposed on said bracket means between said X-ray tube and said film cassette for supporting the head of a patient between said X-ray tube and said film cassette unit, and mounting means for mounting said film cassette unit for movement relative to said bracket means from an operative position where said film cassette unit is in alignment with said axis to an inoperative position where said film cassette unit is located above and out of alignment with said axis.

---

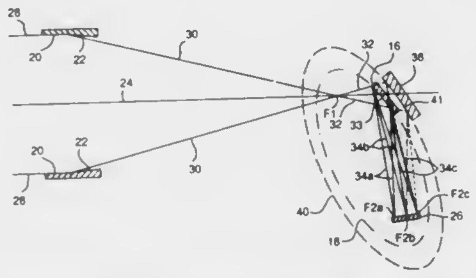
### 5,016,265
## VARIABLE MAGNIFICATION VARIABLE DISPERSION GLANCING INCIDENCE IMAGING X-RAY SPECTROSCOPIC TELESCOPE

**Richard B. Hoover, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Continuation-in-part of Ser. No. 705,979, Aug. 15, 1985. This application Jun. 28, 1990, Ser. No. 545,089**

**Int. Cl.$^5$ G21K** *7/00*

U.S. Cl. 378—43 **34 Claims**



1. A multispectral x-ray spectroscopic telescope for producing multiple high spatial resolution spectral images of solar and stellar x-ray and extreme ultraviolet radiation sources comprising: a telescope housing, a primary optical system having a glancing incidence primary mirror carried at a receiving end of said telescope housing for reflecting a beam of incident radiation, said primary optical system having an optical axis and a primary focus disposed within said housing, a plurality of mirrors each having a respective concave surface corresponding to a surface of revolution and having diffraction gratings ruled on the respective concave surface disposed within said housing behind said primary focus at an inclination to said optical axis, said diffraction grating mirrors being arranged in said optical system so that a first focal point of said diffraction grating mirrors is coincident with the primary focus of said optical system, an x-ray detector disposed within said housing and carried at a second focus of each diffraction grating mirror off of said optical axis, a multilayer coating on each concave surface of said diffraction grating mirrors to enhance the reflectivity of a desired wavelength of radiation, and positioning means for selectively positioning one of said diffraction grating mirrors behind said primary focus so that the reflected beam of incident radiation impinges upon said one diffraction grating mirror to thereby reflect and disperse by diffraction x-rays of a desired wavelength upon said detector.

### 5,016,266
## PROCESS AND APPARATUS FOR MONITORING MONOCRYSTALLINE STRUCTURES WITH IMAGES OF KIKUCHI PSEUDO-LINES

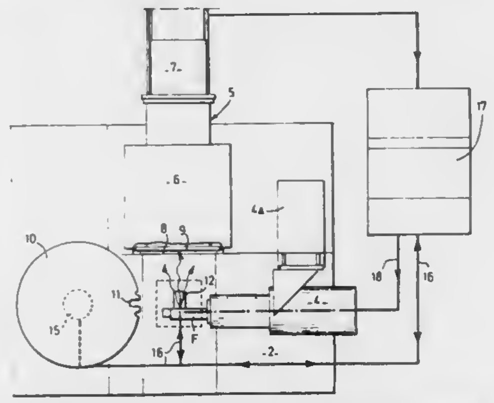
**Michel Meurtin, Mazeres-Lezons, France, assignor to Turbomeca, Bordes, France**

**Filed Feb. 21, 1990, Ser. No. 482,791**

**Claims priority, application France, Feb. 24, 1989, 89 02409**

**Int. Cl.$^5$ G01N** *23/00, 23/207, 23/04;* **G21K** *1/06*

U.S. Cl. 378—73 **15 Claims**



6. Apparatus for carrying out a process for controlling the crystallographic quality of objects having a monocrystalline structure, said apparatus comprising a detecting means for producing an enlarged picture of a diagram composed of Kikuchi pseudo-lines obtained by bombarding said monocrystalline structure with a beam of photons in a natural ambient atmosphere, said apparatus further comprising a stand, an X-ray generator having a microfocus, an assembly comprising in series an intensity amplifier, a video camera device, and an object support interposed between the microfocus and the intensify amplifier.

---

### 5,016,267
## INSTRUMENTATION FOR CONDITIONING X-RAY OR NEUTRON BEAMS

**Stephen W. Wilkins, Victoria, Australia, assignor to Commonwealth Scientific and Industrial Research, Australia**

**PCT No. PCT/AU87/00262, § 371 Date Mar. 20, 1989, § 102(e) Date Mar. 20, 1989, PCT Pub. No. WO88/01428, PCT Pub. Date Feb. 25, 1988**

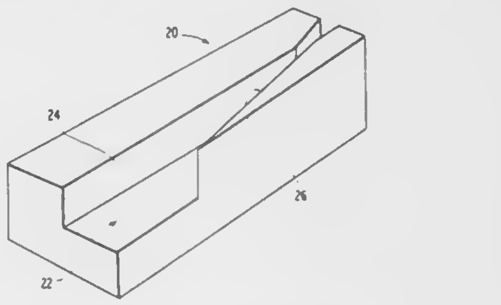
**PCT Filed Aug. 14, 1987, Ser. No. 332,846**

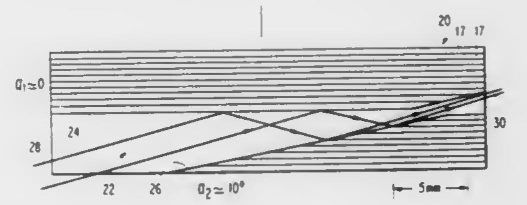
**Claims priority, application Australia, Aug. 15, 1986, PH7494/86; Mar. 4, 1987, PI0670/87**

**Int. Cl.$^5$ G21K** *1/06;* **G01T** *3/00*

U.S. Cl. 378—84 **26 Claims**

1. An x-ray or neutron instrument incorporating a source of x-rays or neutrons, x-ray or neutron lens means disposed in a path for x-rays or neutrons emitted by said source, the lens means comprising an array of multiple channels being elongate open-ended but laterally closed ducts arranged across the path to receive and pass segments of an x-ray or neutron beam occupying said path, which channels have side walls reflective to x-rays or neutrons of said beam incident at a grazing angle less than the critical grazing angle for total external reflection of the x-rays or neutrons, whereby to cause substantial focusing or collimation and/or concentration of the thus reflected x-rays or neutrons, each of said channels having a diameter to length ratio between one and two times said critical grazing angle whereby to achieve optimum efficiency with one reflection of the respective said beam segment in each channel.





---

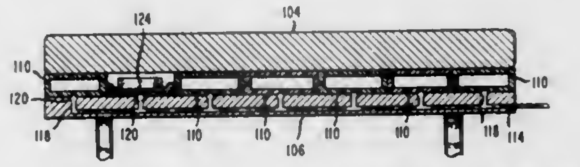
### 5,016,268
## PATIENT SUPPORT

**D. Barry Lotman, 13175 Sand Grouse Ct., Palm Beach Gardens, Fla. 33480**

**Continuation-in-part of Ser. No. 144,469, Jan. 15, 1988. This application Oct. 6, 1989, Ser. No. 418,145**

**Int. Cl.$^5$ H05G** *1/02;* **A61B** *6/04, 6/14;* **A61G** *7/08*

U.S. Cl. 378—177 **25 Claims**



1. An assembly for the recordation of an image of a patient cast by x-rays emanating from an x-ray source, said assembly comprising:

an x-ray cassette for recording said x-ray image;

a generally flat patient support surface; and,

a plurality of lifting means disposed about the support surface and adapted to support the patient, said lifting means comprising elongated inflatable runners, and further comprising connection means for placing said elongated inflatable runners in fluid connection with fluid supply means, said connection means further comprising means for selective deflation of said elongated inflatable runners, whereby said elongated inflatable runners, when inflated, support the patient, and whereby selective deflation of the elongated inflatable runners permits the insertion of said x-ray cassette beneath a corresponding portion of the patient for recordation of said x-ray image.

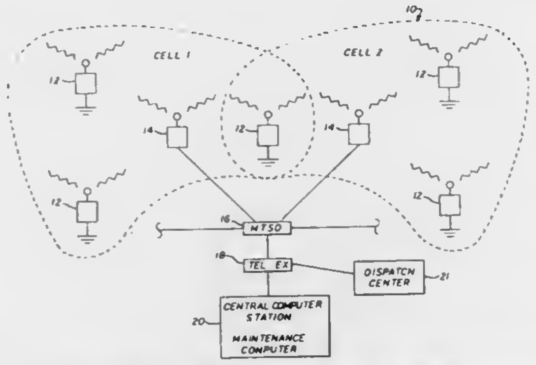
VOL
1126
ISS
2
MY
14
1991
UMI

### 5,016,269
## METHOD AND APPARATUS FOR UTILIZING A CELLULAR TELEPHONE IN A PROGRAMMABLE, INTELLIGENT EMERGENCY FREEWAY CALLBOX

**Stephen W. Rogers, Irvine, Calif., assignor to GTE Mobilnet, Incorporated, Houston, Tex.**

**Filed Nov. 4, 1988, Ser. No. 267,539**
**Int. Cl.⁵ H04Q** *7/02*

U.S. Cl. 379—59 **2 Claims**



1. In an emergency call box system using cellular telephone technology, the combination comprising:
- a plurality of fixed location call box means, each of which comprises:
  - cellular transceiver means for transmitting and receiving data signals and/or voice signals,
  - programmable means for controlling the operation of the cellular transceiver means according to a program having a plurality of parameters which govern the timing and sequence of steps performed by the call box means;
- remotely located communication processor means including:
  - means for storing a plurality of call box personalities as preselected sets of values for the parameters of said program, each set of values corresponding to a different characteristic manner of call box operation;
  - means for assigning each of said sets of values to a plurality of the call box means to create a group of call box means for operation according to each personality;
  - means for generating audio-frequency data signals for transmission to the call box means of one of said groups to cause each of said call box means to operate according to the personality of the group; and,
- a cellular system mobile telephone switching means for passing said data signals and said voice signals between the cellular transceiver means and the remotely located communication processor means.

---

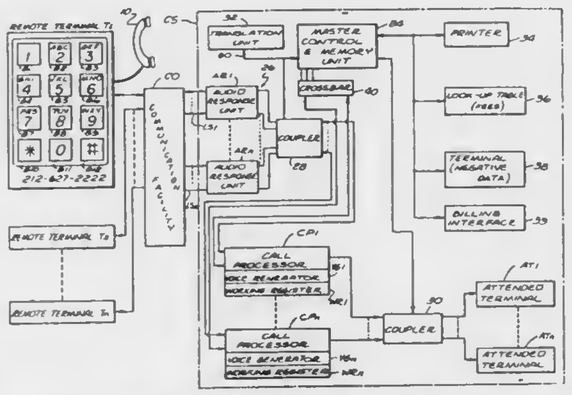
### 5,016,270
## EXPANDED TELEPHONE DATA ORGANIZATION SYSTEM

**Ronald A. Katz, Los Angeles, Calif., assignor to First Data Resources Inc., Omaha, Nebr.**

**Filed Apr. 3, 1989, Ser. No. 332,068**
**Int. Cl.⁵ H04M** *11/00*

U.S. Cl. 379—92 **9 Claims**

1. A data system, as for use by callers, as to register and supply data regarding specific subjects through telephonic facilities from telephone instruments including digital input means for providing digital response signals, said data system comprising:
- control and memory means for storing data related to said specific subjects as for registration and including addressing means for alternatively addressing said memory means with signals representing telephone keypad compatible designation codes and telephone keypad incompatible designation codes to access said data related to said specific subjects;
- attended terminal means coupled to said control and memory means as to receive data related to said specific subjects and further to provide telephone keypad incompatible designation codes to said addressing means to address said control and memory means for access;
- cue means for cueing select connected ones of said telephone instruments to prompt actuation of said telephone instrument digital input means to provide responsive telephone keypad compatible designation code signals;
- means for applying said responsive telephone keypad compatible designation code signals to said addressing means in a form to access data related to an identified subject; and
- processor means including working register means to store data from a caller at a telephone instrument, said data being pertinent to said identified subject in said control and memory means.



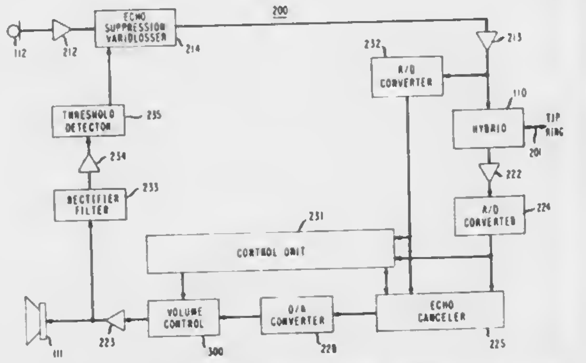
---

### 5,016,271
## ECHO CANCELER-SUPPRESSOR SPEAKERPHONE

**William A. Ford, Farmingdale, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 30, 1989, Ser. No. 358,030**
**Int. Cl.⁵ H04M** *9/08*

U.S. Cl. 379—410 **13 Claims**



1. An apparatus for processing speech signals for a communication line, the apparatus including a transmit signal path for transmitting speech signals to the communication line and a receive signal path for receiving speech signals from the communication line, the apparatus comprising:
- loss insertion means in the transmit signal path for attenuating the speech signals for transmission over the communication line;
- echo canceling means in the receive signal path for canceling transmit speech signals appearing in the receive signal path;

- receive speech level adjusting means for controlling the level of the speech signals in the receive signal path;
- means for measuring an estimate of both the level of speech signals received from the communication line and the level of transmit speech signals appearing in the receive signal path; and
- loss adjusting means operably responsive to the measuring means for proportionally adjusting the level of attenuation inserted by the loss insertion means into the transmit path in response to the estimate of the level of the speech signals received from the communication line, and the receive speech level adjusting means being operably responsive to both the echo canceling means and the measuring means for inserting attenuation into the receive signal path in response to uncanceled transmit speech signals appearing in the receive signal path.

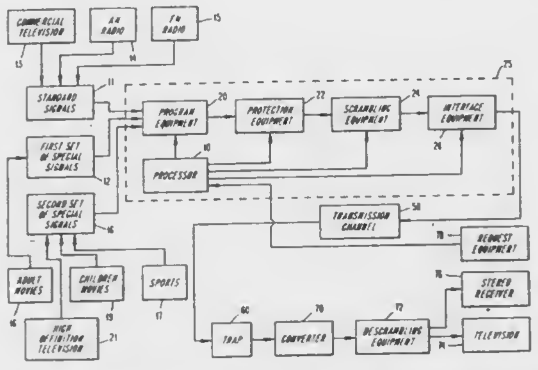
---

### 5,016,272
## HOME VIDEO SYSTEM

**James R. Stubbs, 771 Erford Rd., Camp Hill, Pa. 17011, and Thomas R. Terry, 4 Mondale Circle, Hummelstown, Pa. 17036**

**Filed Jun. 16, 1989, Ser. No. 367,086**
**Int. Cl.⁵ H04N** *7/167*

U.S. Cl. 380—5 **40 Claims**



1. A home video system for use by a headend transmitting simultaneously a plurality of standard signals including audio and video signals, and a first set and a second set of special signals including audio and video signals, to allocate a predetermined combination of services selected from a plurality of more than two different services, each including at least video and audio services, to selected blocks of a plurality of users, comprising:
- a cable serving as a transmission channel having a large capacity for the plurality of standard signals and the first and second set of special signals;
- a headend system including,
  - program means for originating the plurality of standard signals and the first and second set of special signals;
  - interface means coupled between said program means and said cable for interfacing the plurality of standard signals and the first and second set of special signals from said program means with said cable;
  - protection means coupled between said program means and said interface means for distorting the synchronization pulse signal of the first set and second set of the special signals for preventing recording of the first set and second set of the special signals while allowing direct use of the received signals by each subscriber;
  - scrambling means coupled between said program means and said interface means for scrambling the second set of the special signals;
  - processor means coupled to said program means for tracking pay-per-view subscribed usage;
- a trap coupled to said cable and responsive to a first code transmitted from said headend system for filtering signals from among a first block of the first and second sets of the special signals;
- a converter coupled to said trap and responsive to a second code transmitted from said headend system for filtering signals from among a second block of the first and second sets of special signals;
- means coupled to said converter for descrambling signals from among the second set of special signals;
- means coupled to said descrambling means and said converter for receiving the standard signals and signals from among the first and second block of the first and second sets of special signals passing through said trap and said converter; and
- means located at said receiving means and coupled to said headend system for requesting the reception of a particular special signal.

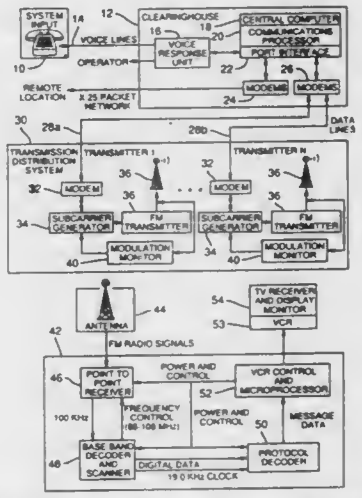
---

### 5,016,273
## DUAL COMMUNICATION MODE VIDEO TAPE RECORDER

**Don G. Hoff, Tiburon, Calif., assignor to AT&E Corporation, San Francisco, Calif.**

**Filed Jan. 9, 1989, Ser. No. 295,172**
**Int. Cl.⁵ H04N** *7/167*

U.S. Cl. 380—10 **13 Claims**



1. A system for visually displaying paging messages comprising:
- (a) a television monitor;
- (b) a VCR operatively connected to said television monitor;
- (c) means operatively connected to said VCR for generating alphanumeric characters for display on said television monitor; and
- (d) means operatively connected to said character generating means for receiving RF signals on a predetermined frequency having information representative of a paging message embedded therein, said RF signals being initiated telephonically by a user at a remote location.

---

### 5,016,274
## ON-LINE/OFF-LINE DIGITAL SIGNING

**Silvio Micali, 224 Upland Rd., Cambridge, Mass. 02140; Oded Goldreich, 19 Ben Gurion, Tel Aviv, and Shimon Even, 13 Vitkin Street, Haifa, both of Israel**

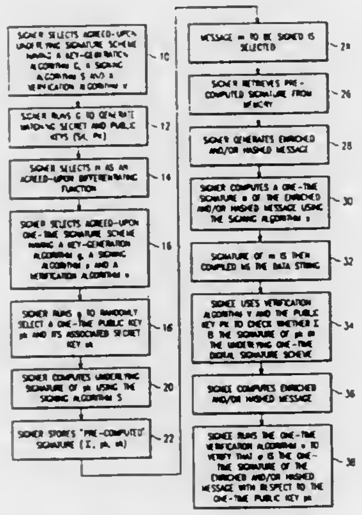
**Filed Nov. 8, 1988, Ser. No. 268,803**
**Int. Cl.⁵ H04L** *9/30*

U.S. Cl. 380—23 **33 Claims**

1. A method for enabling a single signer to generate a digital signature of a message using first and second digital signature schemes, each of the digital signature schemes having a key generation algorithm for generating a pair of matching public

VOL 1126
ISS 2
MY 14 1991
UMI

and secret keys, a signing algorithm which uses the pair of matching public and secret keys to produce a signature with respect to the public key, and a verification algorithm for determining whether the signature produced by the signing algorithm is valid with respect to the public key, comprising the steps of:


SIGNER SELECTS AGREED-UPON UNDERLYING SIGNATURE SCHEME HAVING A KEY-GENERATION ALGORITHM G, A SIGNING ALGORITHM S AND A VERIFICATION ALGORITHM V
10
SIGNER RUNS G TO GENERATE MATCHING SECRET AND PUBLIC KEYS (SK, PK)
12
SIGNER SELECTS H AS AN AGREED-UPON DIFFERENTIATING FUNCTION
14
SIGNER SELECTS AGREED-UPON ONE-TIME SIGNATURE SCHEME HAVING A KEY-GENERATION ALGORITHM g, A SIGNING ALGORITHM s AND A VERIFICATION ALGORITHM v
16
SIGNER RUNS g TO RANDOMLY SELECT A ONE-TIME PUBLIC KEY pk AND ITS ASSOCIATED SECRET KEY sk
18
SIGNER COMPUTES UNDERLYING SIGNATURE OF pk USING THE SIGNING ALGORITHM S
20
SIGNER STORES "PRE-COMPUTED" SIGNATURE (Σ, pk, sk)
22
MESSAGE m TO BE SIGNED IS SELECTED
24
SIGNER RETRIEVES PRE-COMPUTED SIGNATURE FROM MEMORY
26
SIGNER GENERATES ENRICHED AND/OR HASHED MESSAGE
28
SIGNER COMPUTES A ONE-TIME SIGNATURE σ OF THE ENRICHED AND/OR HASHED MESSAGE USING THE SIGNING ALGORITHM s
30
SIGNATURE OF m IS THEN COMPILED AS THE DATA STRING
32
SIGNEE USES VERIFICATION ALGORITHM V AND THE PUBLIC KEY PK TO CHECK WHETHER Σ IS THE SIGNATURE OF pk IN THE UNDERLYING ONE-TIME DIGITAL SIGNATURE SCHEME
34
SIGNEE COMPUTES ENRICHED AND/OR HASHED MESSAGE
36
SIGNEE RUNS THE ONE-TIME VERIFICATION ALGORITHM v TO VERIFY THAT σ IS THE ONE-TIME SIGNATURE OF THE ENRICHED AND/OR HASHED MESSAGE WITH RESPECT TO THE ONE-TIME PUBLIC KEY pk
38

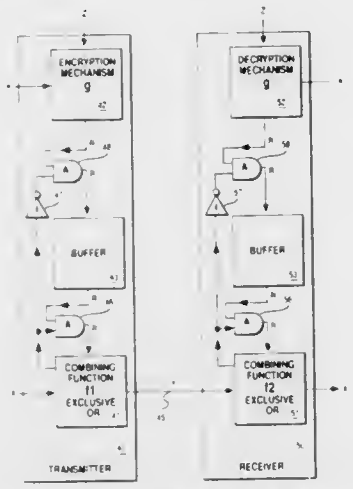
(a) computing a signature $\Sigma$ of the public key pk of the first digital signature scheme using the signing algorithm S of the second digital signature scheme; and

(b) computing a signature $\sigma$ of the message using the signing algorithm s of the first digital signature scheme to generate a digital signature of the message, the digital signature comprising a data string $(\Sigma,\sigma)$.

---

### 5,016,275
### BUFFERED ENCRYPTION/DECRYPTION

**Todd A. Smith, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.**
**Filed Oct. 28, 1988, Ser. No. 264,225**
**Int. Cl.$^5$ H04L** *9/18*
**U.S. Cl. 380—43** **12 Claims**



1. A method for enciphering data in a data processing system, comprising: pregenerating, in advance of receipt of data to be enciphered, a cryptographic bit stream;

loading said cryptographic bit stream into a buffer upon said pregenerating said cryptographic bit stream;

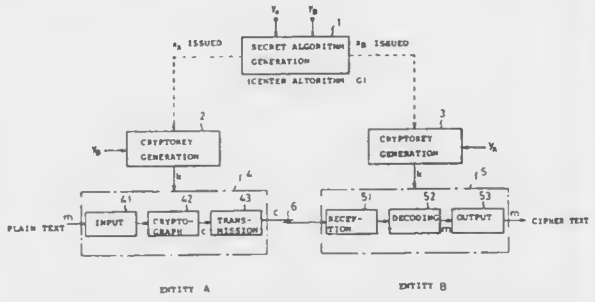
removing a number of bits of said cryptographic bit stream from said buffer; and

combining, after said buffering and asynchronously with respect to said pregenerating, said number of bits of said cryptographic bit stream with a number of bits of said data to be enciphered according to a mathematical function, said combining including controlling said buffer during said loading, to prevent said removing said bits of said cryptographic bit stream during said loading.

---

### 5,016,276
### COMMON CRYPTOKEY GENERATION SYSTEM AND COMMUNICATION SYSTEM USING COMMON CRYPTOKEYS

**Tutomu Matumoto, and Hideki Imai, both of Yokohama, Japan, assignors to Kabushiki Kaisya Advance, Tokyo, Japan**
**Continuation of Ser. No. 390,478, Aug. 7, 1989, abandoned, which is a continuation of Ser. No. 174,161, Mar. 28, 1988, abandoned. This application May 7, 1990, Ser. No. 518,317**
**Claims priority, application Japan, Jul. 31, 1986, 61-178652; Oct. 24, 1986, 61-251896**
**Int. Cl.$^5$ H04L** *9/02*
**U.S. Cl. 380—45** **25 Claims**



1. A common cryptokey generation system for generating a common cryptokey to be used in securely communicating text from a first entity to a second entity, the first and second entities being remote from one another and having respective unique first and second entity indentifiers, the system comprising:

algorithm generation means for transforming the entity identifiers into a center algorithm, and for using the center algorithm to generate first and second algorithms uniquely corresponding to the respective first and second entities; and

first and second cryptokey generation means associated with the respective first and second entities and remote from each other for generating the common cryptokey, each of the first and second cryptokey generation means having storage means for storing the respective first and second algorithms and processing means operatively coupled to the storage means for processing the respective first and second algorithms in combination with the respective second and first entity identifiers to generate the common cryptokey.

---

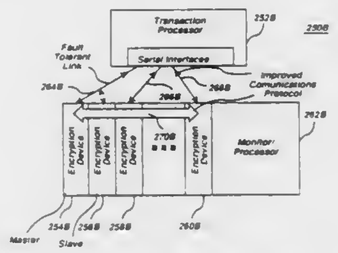
### 5,016,277
### ENCRYPTION KEY ENTRY METHOD IN A MICROCOMPUTER-BASED ENCRYPTION SYSTEM

**Scott B. Hamilton, Kirkland, Wash., assignor to The Exchange System Limited Partnership, Bellevue, Wash.**
**Filed Dec. 9, 1988, Ser. No. 283,444**
**Int. Cl.$^5$ H04L** *9/02;* **H04K** *1/00*
**U.S. Cl. 380—49** **7 Claims**

1. A method of configuring a data encryption devices in a data encryption system, said method comprising the steps of:

coupling a plurality of data encryption devices with a data bus;

configuring individual data encryption devices in predefined groups;

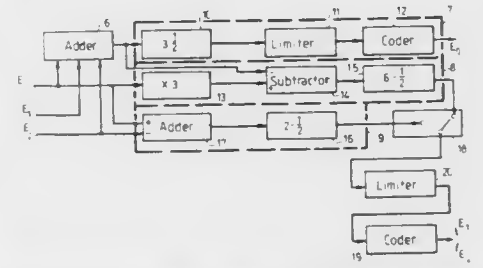


and loading encryption key data into each of said data encryption devices in one of said predefined groups through said data bus.

---

### 5,016,278
### METHOD AND DEVICE FOR CODING THE ENERGY OF A VOCAL SIGNAL IN VOCODERS WITH VERY LOW THROUGHPUT RATES

**Denis Rochette, Paris, and Pierre A. Laurent, Bessancourt, both of France, assignors to Thomson-CSF, Puteaux, France**
**Filed May 1, 1989, Ser. No. 345,231**
**Claims priority, application France, May 4, 1988, 88 06002**
**Int. Cl.$^5$ G10L** *5/00*
**U.S. Cl. 381—36** **8 Claims**



1. A method for coding energy of vocal signals in linear prediction vocoders with very low throughput rates, including analyzing the vocal signals in consecutive windows, quantifying, on a determined number m of levels, the vocal signal in each of the windows and measuring, in each of the windows, a r-m-s value of the quantified levels of the vocal signal, comprising the steps of:

constructing, in a vector space in n dimensions, said vector space having a first base comprised of unit vectors ($e_1$ to $e_n$) of energies measured on n consecutive windows, a resultant energy vector corresponding to a sum of n energy vectors measured respectively in said n windows of analysis of the vocal signal;

achieving, in said vector space, a change of base, said changed base having, as a first main axis, an oriented axis having, as components, the unit vectors of the first base;

projecting, in the changed base, the resultant energy vector;

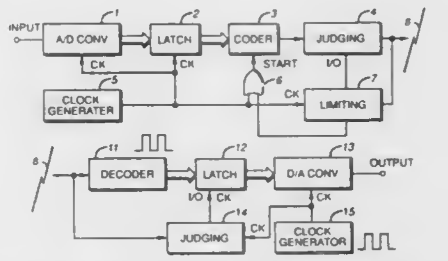
coding, on q bits such that $2q=m$, a component of the resultant vector projected on the first main axis of the changed base; and

coding, on a reduced number of bits smaller than q, components of the resultant vector projected on n-1 other main axes of the vector space defined in the changed base.

---

### 5,016,279
### SPEECH ANALYZING AND SYNTHESIZING APPARATUS USING REDUCED NUMBER OF CODES

**Shuichi Kawama, Kyoto, and Yoshiji Fujimoto, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**
**Continuation of Ser. No. 249,000, Sep. 26, 1988, abandoned. This application Aug. 16, 1989, Ser. No. 395,204**
**Claims priority, application Japan, Sep. 26, 1987, 62-241571**
**Int. Cl.$^5$ G10L** *7/02*
**U.S. Cl. 381—36** **2 Claims**



1. A speech analyzing and synthesizing apparatus comprising a coding section and a decoding section, said coding section including

a sampling means for successively sampling a speech signal to sequentially output sampled signals,

a quantizer having a quantization range associated therewith for receiving said sampled signals to output quantized value signals corresponding to said sampled signals, and

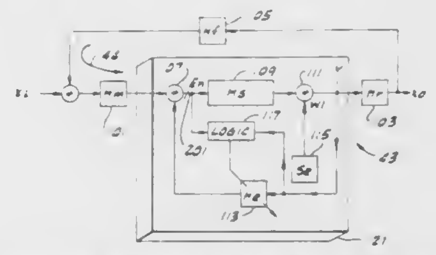
a coding means for receiving said quantized value signals and outputting per sampling a number of codes representing a difference between two or said sampled signals, said number being one or greater and determined according to said difference, said coding means outputting more than one code per sampling if said difference exceeds said quantization range,

said decoding section including a decoding means for decoding said codes and thereby outputting values each representing said difference, said coding section further including a limiting means for analyzing said codes and limiting said number to be equal to or less than a maximum number, said maximum number being determined by said values and by specified ones of said codes outputted earlier.

---

### 5,016,280
### ELECTRONIC FILTERS, HEARING AIDS AND METHODS

**A. Maynard Engebretson, Ladue; Michael P. O'Connell, Maplewood, and Baohua Zheng, University City, all of Mo., assignors to Central Institute for the Deaf, St. Louis, Mo.**
**Filed Mar. 23, 1988, Ser. No. 172,266**
**Int. Cl.$^5$ H04R** *25/00;* **H03B** *29/00*
**U.S. Cl. 381—68** **78 Claims**



1. An electronic filter for a hearing aid having microphone means for generating an electrical output from sounds external to a user of the hearing aid and electrically driven receiver means for emitting sound into the ear of the user of the hearing aid, some of the sound emitted by the receiver returning to the

VOL
126
ISS
2
MY
14
1991
UMI

microphone means to add a feedback contribution to its electrical output, the electronic filter comprising:

first means for electronic processing of the electrical output of the microphone means to produce a filtered signal and for combining the filtered signal with a second distinct signal for the receiver of the hearing aid; and

adaptive filter means, interconnected with said first means, for electronic processing of the filtered signal and second distinct signal while said first means is producing the filtered signal to produce an adaptive output to said first means to continuously simultaneously offset the feedback contribution in the electrical output of the microphone means in the hearing aid.

69. A method of operating a hearing aid having microphone means for generating an electrical output from sounds external to a user of the hearing aid and electrically driven receiver means for emitting sound into the ear of the user of the hearing aid, some of the sound emitted by the receiver returning to the microphone means to add a feedback contribution to its electrical output, the method comprising the steps of:

processing the electrical output of the microphone means to produce a filtered signal;

combining the filtered signal with a second distinct signal for the receiver of the hearing aid;

adaptively filtering during the processing step the filtered signal and second distinct signal to produce an adaptive output;

feeding back the adaptive output to continuously simultaneously offset the feedback contribution in the electrical output of the microphone means for the processing step.

---

### 5,016,281

### IMAGE ANALYSIS COUNTING SYSTEM

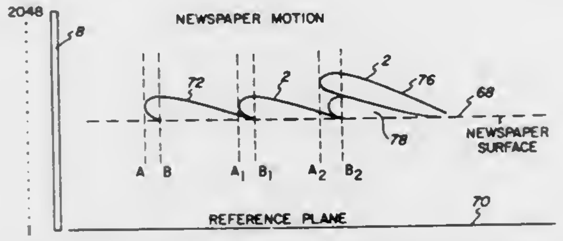
**Susan G. Eppler, Garland, and Robert M. Moorehead, Richardson, both of Tex., assignors to Comar, Inc., Tex.**

**Continuation-in-part of Ser. No. 348,710, Jun. 7, 1989, Pat. No. 4,962,538, which is a continuation-in-part of Ser. No. 309,243, Feb. 13, 1989. This application Jan. 23, 1990, Ser. No. 468,695**

**The portion of the term of this patent subsequent to Oct. 9, 2007, has been disclaimed.**

**Int. Cl.$^5$ G06K** *9/00*

U.S. Cl. 382—1 **2 Claims**



1. A system for obtaining a count of overlapped newspapers delivered to a newspaper stacker comprising:

first means for optically focusing the side image of the newspapers on a linear detector array including;

a light source;

a lens system oriented in a plane generally parallel to the surface of the newspapers and parallel to said linear detector array;

a first mirror for receiving reflected light from the edges of the newspapers; and

a second mirror generally disposed at an angle of 45° from said first mirror for transmitting an image of the edges of the newspapers from said first mirror to said lens system;

second means for shifting analog outputs at a clock defined rate from said detector array to differential amplifier means for removing the DC offset therefrom;

third means receiving the output from said differential amplifier means and for converting said differential amplifier means output to a digital output signal as defined by a selected light level,

a shift register for receiving said third means output signal,

a microprocessing means for developing an image top profile value of the newspaper flow image as it appears in said linear detector array based upon the output of said shift register;

means for comparing the difference between successive newspaper image top profile values to obtain a derivative of successive image top profile values;

means for initiating a newspaper count output when the rate of change of successive image top profile values change from positive to negative; and

means to develop a newspaper thickness definite value, said newspaper count output comprises a single count increment when said newspaper thickness definitive value exceeds a calibrated thickness value and said newspaper count output comprises a double count increment when said measured newspaper thickness exceeds a second calibrated thickness value.

---

### 5,016,282

### EYE TRACKING IMAGE PICKUP APPARATUS FOR SEPARATING NOISE FROM FEATURE PORTIONS

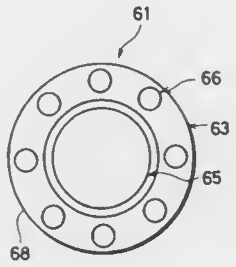
**Akira Tomono; Muneo Iida, and Kazunori Ohmura, all of Kyoto, Japan, assignors to ATR Communication Systems Research Laboratories, Kyoto, Japan**

**Filed Jul. 12, 1989, Ser. No. 378,626**

**Claims priority, application Japan, Jul. 14, 1988, 63-175899; Aug. 3, 1988, 63-193898; Aug. 3, 1988, 63-193899; Nov. 16, 1988, 63-289761**

**Int. Cl.$^5$ G06K** *9/00*

U.S. Cl. 382—2 **11 Claims**



1. An image pickup apparatus extracting features of an image of an object, comprising:

illuminating means (61, 62) for illuminating said object with polarized light;

an optical system (65, 607, 608, 609) for forming an image of reflected light out of the polarized light emitted by said illuminating means for illuminating said object;

a polarizing element (615, 616) provided on an image forming optical axis of the optical system for blocking a regularly reflected component of said reflected light and for passing a diffused reflected component; and

image detecting means (612, 613, 614) provided on said image forming point for detecting the diffused reflected component extracted by said polarizing element, wherein

said optical system comprises optical separating means (608, 609) for separating the reflected light from said object into first and second optical paths to form images, respectively;

said polarizing element comprises an element (616) provided on an optical axis of the first optical path of said optical separating means;

said image detecting means comprises

first means (613) provided on the optical axis of the first optical path of said optical separating means for detecting the diffused reflected component extracted by said polarizing element, and

second means (64) provided on an optical axis of the second optical path of said optical separating means for detecting the regularly reflected component and the diffused reflected component out of said reflected light;

said image pickup apparatus further comprising:

image processing means (617) responsive to outputs from said first and second means for forming a differential image.

---

### 5,016,283

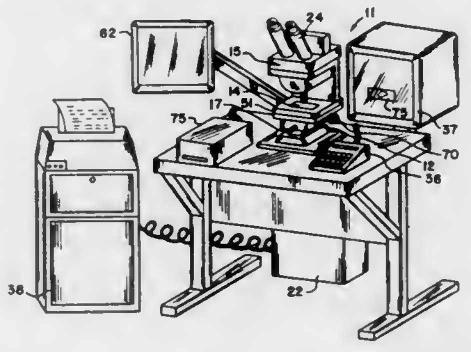
### METHODS AND APPARATUS FOR IMMUNOPLOIDY ANALYSIS

**James W. Bacus, Hinsdale, and Robert J. Marder, River Forest, both of Ill., assignors to Cell Analysis Systems, Inc., Lombard, Ill.**

**Continuation-in-part of Ser. No. 927,285, Nov. 4, 1986, which is a continuation-in-part of Ser. No. 794,937, Nov. 4, 1984, Pat. No. 4,741,043. This application Nov. 17, 1987, Ser. No. 121,674**

**Int. Cl.$^5$ G06K** *9/00*

U.S. Cl. 382—6 **6 Claims**



1. An interactive method of analyzing a population of cells for a predetermined material with a digital image processing means, said method comprising the steps of:

optically marking cells in the population for a first particular visual morphological feature, which includes binding a chromogen to a specific protein in the cytoplasm of the cells, to allow visualization of morphological characteristics of the cells;

optically enhancing the predetermined material on cells in the cell population, which includs staining nuclear DNA in the cells which causes the cytoplasm to be destroyed;

providing a magnified image of a plurality of cells in a field of view from the population to a user-observer, through the use of said digital image processing means, and allowing viewing of the optically-marked morphological feature of the cells and of the optically-enhanced material for the cells in the field of view, by digitizing and separating the image into two separate images where, in the first image, the DNA stained areas are visible and, in the second image, the optically-marked cytoplasm areas are visible, and by combing the two image areas and marking those cells which contain optically-marked cytoplasm areas;

gating the cells in the field of view of the combined image into one of several subpopulation classifications based upon the optically-marked cell cytoplasm image and the stained nuclear DNA image as viewed by the user-observer;

measuring with the digital image processing means the optical density of the nuclear DNA material on cells of the gated subpopulation, and

generating with the digital image processing means a quantitation based on the measurments of the nuclear DNA material of the cells.

# DESIGN PATENTS

## GRANTED MAY 14, 1991

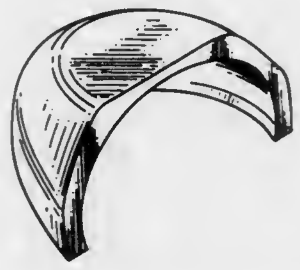
### ERRATA

| For<br>CLASS | See<br>PATENT NO. |
|---|---|
| D14-130 | 316,833 |
| D19-051 | 316,880 |

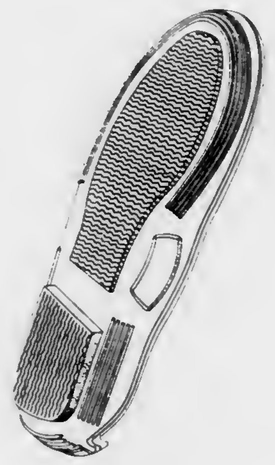
# DESIGNS

MAY 14, 1991

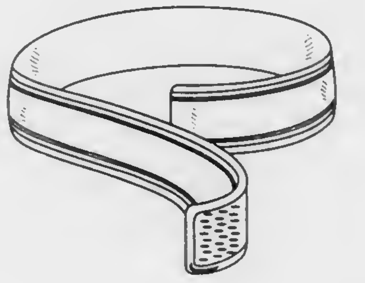
316,772
**SAFETY SHOE TOE CAP**
Douglas R. Rose, 13850 Forest Grove Rd., Brookfield, Wis. 53005
Filed Jul. 25, 1988, Ser. No. 223,753
Term of patent 14 years
U.S. Cl. D2—314



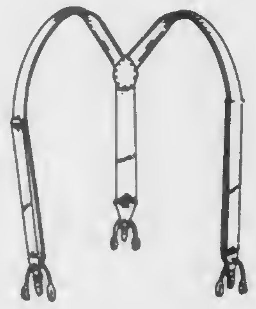
316,773
**SHOE SOLE**
Diego D. Valle, Comunanza, Italy, assignor to Tomaificio, Italy
Filed Jun. 16, 1987, Ser. No. 63,272
Claims priority, application Italy, Dec. 16, 1986, 36327/86
Term of patent 14 years
U.S. Cl. D2—320



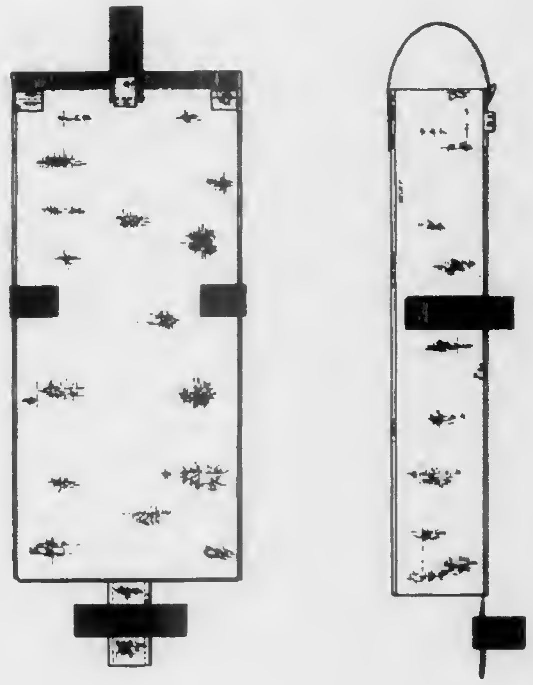
316,774
**HEADBAND**
Kevin Falk, 5021 84th Ave. S.E., Mercer Island, Wash. 98040
Filed Aug. 5, 1988, Ser. No. 229,025
Term of patent 14 years
U.S. Cl. D2—514



316,775
**SUSPENDERS**
Paul Schott, 104 Chestnut Hill Rd., Trumbull, Conn. 06611, assignor to Paul Schott, New York, N.Y.
Filed Aug. 31, 1987, Ser. No. 91,044
Term of patent 14 years
U.S. Cl. D2—626



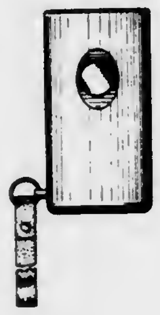
316,776
**CRUTCH BAG**
Lance O. Yarus, 341 Cumberland St., P.O. Box 629, Lebanon, Pa. 17042
Filed Feb. 8, 1989, Ser. No. 308,379
Term of patent 14 years
U.S. Cl. D3—11



VOL
126
SS
2
MY
14
1991
UMI

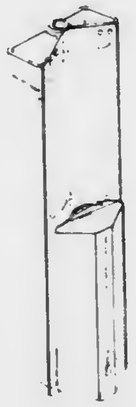
### 316,777
### UMBRELLA HANDLE

Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed May 8, 1990, Ser. No. 521,164
Term of patent 14 years
U.S. Cl. D3—12



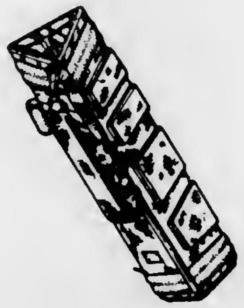
### 316,778
### GOLF BAG

Enrico Fumia, Turin, Italy, assignor to Pininfarina Extra S.r.l., Turin, Italy
Filed Dec. 15, 1987, Ser. No. 133,457
Claims priority, application Italy, Jun. 15, 1987, 53424/87[U]
Term of patent 14 years
U.S. Cl. D3—37



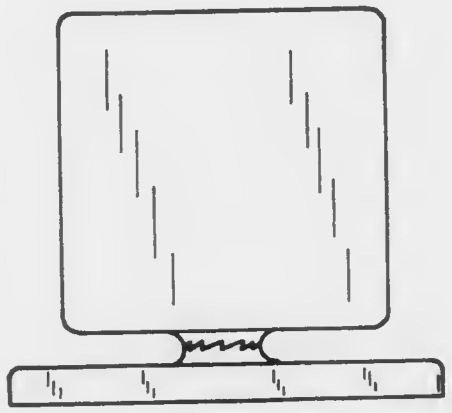
### 316,779
### GOLF BAG

Douglas A. Henrickson, Ada, and Danny S. Henrickson, Grand Rapids, Terry L. Mitchell, Jenison, all of Mich., assignors to Douglas Sports, Inc., Belmont Mich.
Filed Oct. 24, 1989, Ser. No. 426,691
Term of patent 14 years
U.S. Cl. D3—37



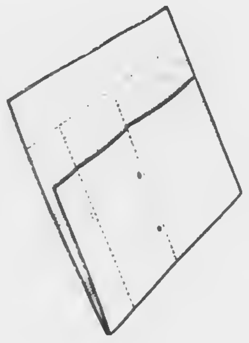
### 316,780
### TREE STAND BOW HOLDER

Robert W. Chilcutt, 22 Henderson Dr., and Michael W. Mooney, P.O. Box 1242, Byrd Rd., both of Paris, Tenn. 38242
Filed Mar. 23, 1988, Ser. No. 176,376
Term of patent 14 years
U.S. Cl. D3—38



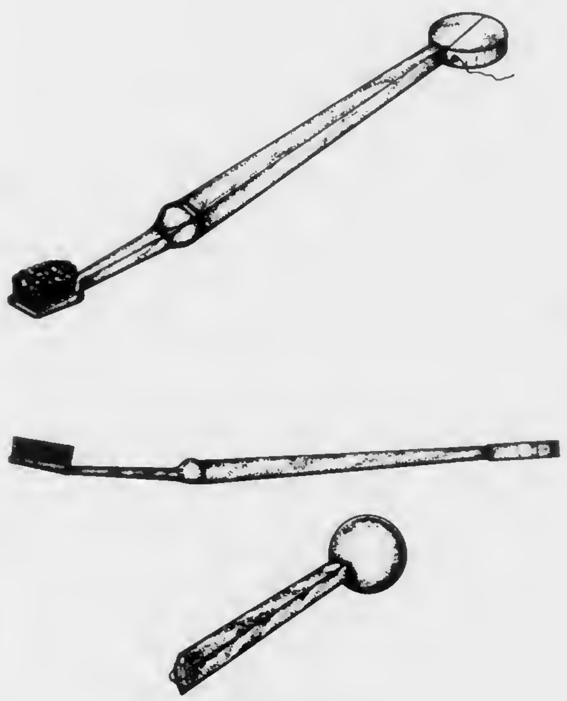
### 316,781
### PHOTO SERVICE WALLET

Vesa Hiltunen, Haagan Pappilantie 2 C 19, SF-00320 Helsinki, Finland
Filed Nov. 24, 1987, Ser. No. 124,766
Claims priority, application Finland, Jun. 2, 1987, 450/87
Term of patent 14 years
U.S. Cl. D3—56



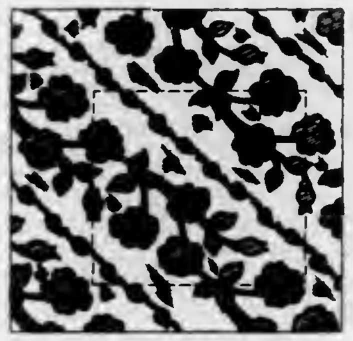
### 316,782
### COMBINED TOOTHBRUSH AND REFILLABLE-TYPE DENTAL FLOSS HOLDER

Maynard O. Torbenson, R.R. 2, Box 129, Enderlin, N. Dak. 58027
Filed Jul. 19, 1988, Ser. No. 221,447
Term of patent 14 years
U.S. Cl. D4—108



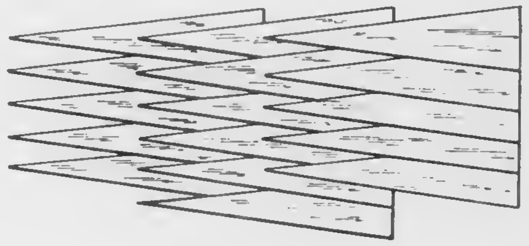
### 316,783
### TEXTILE FABRIC

Rudolf Cerny, Steinfurt, Fed. Rep. of Germany, assignor to Arnold Kock GmbH u. Co. KG, Steinfurt, Fed. Rep. of Germany
Filed Aug. 23, 1988, Ser. No. 235,332
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 8MRBD.5B1.660
Term of patent 14 years
U.S. Cl. D5—37



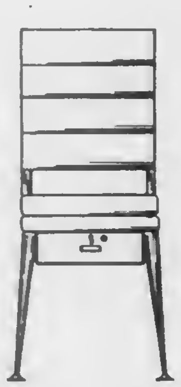
### 316,784
### FABRIC FEATHER

Laura J. Mauer, 1015 Snowberry Rd., Roseburg, Oreg. 97470
Filed Mar. 28, 1988, Ser. No. 63,295
Term of patent 14 years
U.S. Cl. D5—99



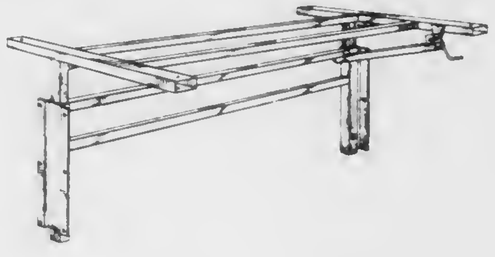
### 316,785
### COMBINED CHAIR AND SAFE UNIT

Roy T. Beane, Rte. #8, Box 102, Milton, Fla. 32570
Filed Apr. 29, 1988, Ser. No. 188,385
Term of patent 14 years
U.S. Cl. D6—336



### 316,786
### DESK FRAME

John E. Grout, New South Wales, Australia, assignor to Ergonomic Equipment Pty. Ltd., Marrickville, Australia
Filed Mar. 27, 1987, Ser. No. 32,077
Claims priority, application Australia, Oct. 8, 1986, 7011/86
The portion of the term of this patent subsequent to Jan. 22, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—491

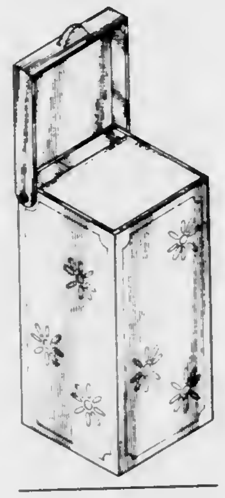


VOL
126
SS
2
MY
14
1991
UMI

### 316,787
### TISSUE DISPENSER

Marguerite C. Kelly, 110 Central Ave., Dalton, Mass. 01226
Filed Aug. 31, 1989, Ser. No. 401,660
Term of patent 14 years

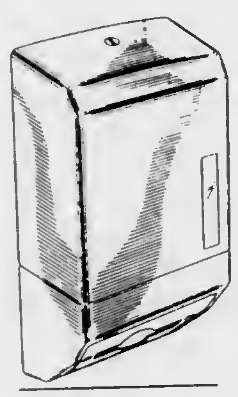
U.S. Cl. D6—515



### 316,788
### DISPENSER FOR FOLDED SHEET PRODUCTS

Roy Fischer, Scottsdale, and Paul F. Fair, Phoenix, both of Ariz., assignors to Kimberly-Clark Corporation, Neenah, Wis.
Filed Apr. 6, 1989, Ser. No. 334,513
Term of patent 14 years

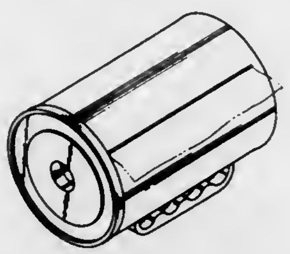
U.S. Cl. D6—522



### 316,789
### PAPER TOWEL HOLDER

Delvin D. McLaughlin, 14414-13th St., Milan, Ill. 61264
Filed Jun. 5, 1989, Ser. No. 361,107
Term of patent 14 years

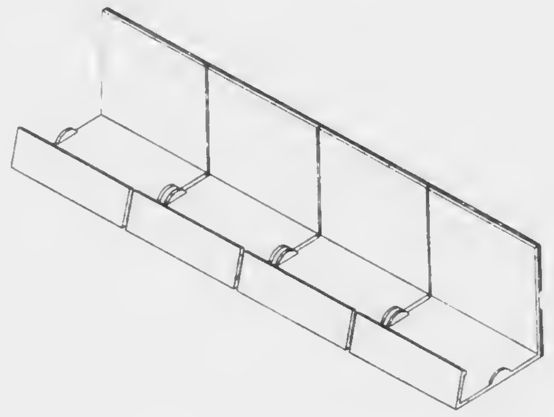
U.S. Cl. D6—522



### 316,790
### RACK FOR SPICE CANS

E. Stanley Robbins, Killen, Ala., and Rodney W. Robbins, Nashville, Tenn., assignors to Robbins Industries, Inc., Florence, Ala.
Filed Jan. 31, 1989, Ser. No. 304,107
Term of patent 14 years

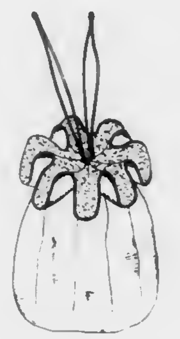
U.S. Cl. D6—574



### 316,791
### COMBINED BLANKET AND BAG

Patrick J. Carney, Springfield, and Samuel L. Ferrante, Media, both of Pa., assignors to Solar Bear, Inc., Wilmington, Del.
Filed Jun. 8, 1987, Ser. No. 59,394
Term of patent 14 years

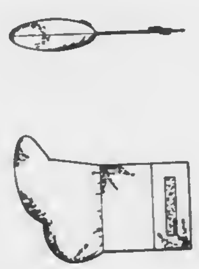
U.S. Cl. D6—595



### 316,792
### INFANT HEAD SUPPORT FOR ATTACHMENT TO A CHILD'S CAR SEAT

Deborah K. Schmitz, R.R. #3, Box 230, Kokomo, Ind. 46901
Filed Dec. 7, 1987, Ser. No. 129,682
Term of patent 14 years

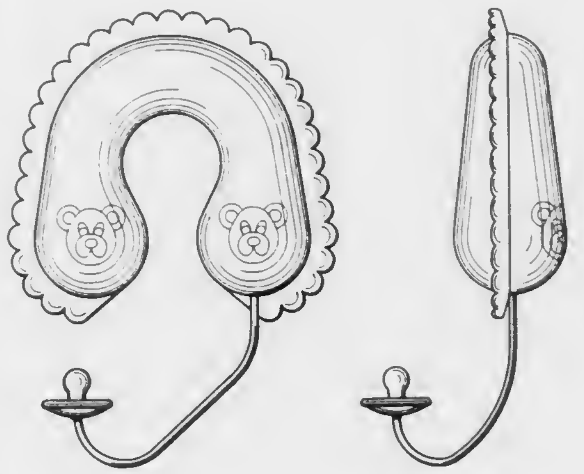
U.S. Cl. D6—601



### 316,793
### COMBINATION INFANT CAR SEAT NECK SUPPORT AND PACIFIER

Jill M. Manjarrez, 133 W. Olive, San Ysidro, Calif. 92073
Filed Jun. 1, 1989, Ser. No. 359,942
Term of patent 14 years

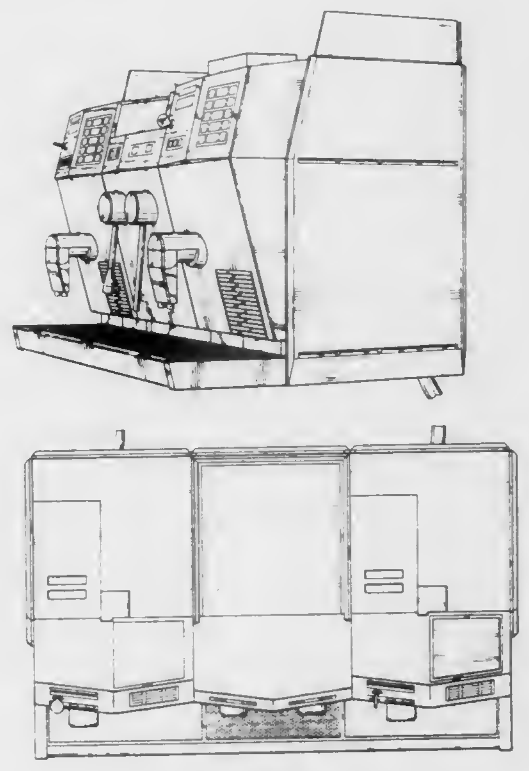
U.S. Cl. D6—601



### 316,794
### COFFEE MACHINE

Johann Volgger, and Ruth Volgger, both of Seon, Switzerland, assignors to Cafina AG, Switzerland
Filed Nov. 16, 1988, Ser. No. 272,203
Term of patent 14 years

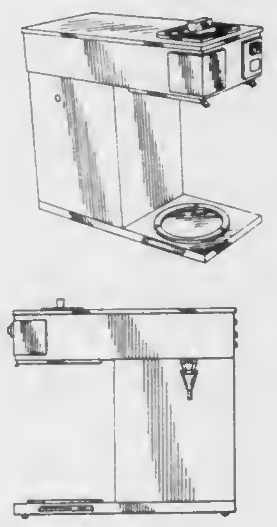
U.S. Cl. D7—308



### 316,795
### BEVERAGE BREWER

Alan W. Brewer, Divernon, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.
Filed Dec. 19, 1988, Ser. No. 285,947
Term of patent 14 years

U.S. Cl. D7—308



OL
126
SS
2
MY
14
1991
UMI

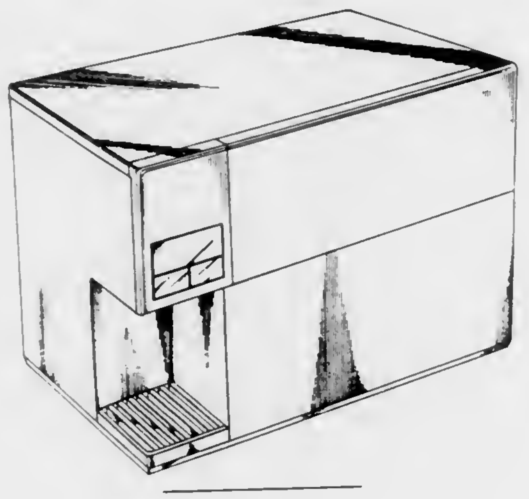
### 316,796
### BEVERAGE DISPENSER

Jonathan Kirschner, 2209 Winding Cr. La., Marietta, Ga. 30064, and Hans-Jurgen Engels, 865 Lake Forest Cir., Roswell, Ga. 30076

Division of Ser. No. 13,850, Feb. 12, 1987, Pat. No. Des. 311,846, which is a continuation-in-part of Ser. No. 859,876, May 2, 1986, abandoned. This application Feb. 20, 1990, Ser. No. 482,453

Term of patent 14 years

U.S. Cl. D7—311



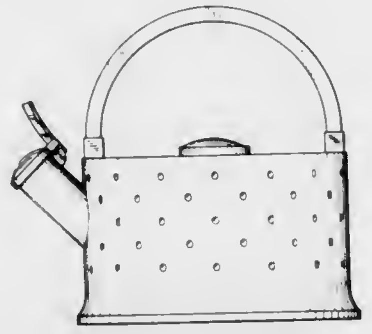
### 316,797
### TEA KETTLE

Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.

Filed Oct. 9, 1990, Ser. No. 594,841

Term of patent 14 years

U.S. Cl. D7—322



### 316,798
### COFFEE BEAM ROASTING MACHINE

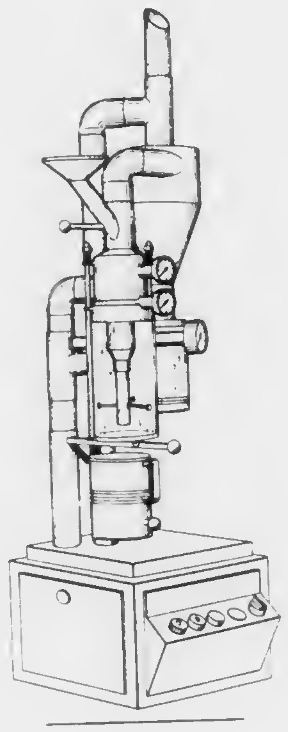
Harald Munk, Stockelsdorf, Fed. Rep. of Germany, assignor to Novopack Machinenbau GmbH, Wahlstedt, Fed. Rep. of Germany

Filed Nov. 3, 1987, Ser. No. 116,564

Claims priority, application Fed. Rep. of Germany, May 4, 1987, MR124

Term of patent 14 years

U.S. Cl. D7—338



### 316,799
### ACCESSORY FOR A KITCHEN APPLIANCE FOR PUREEING AND JUICING

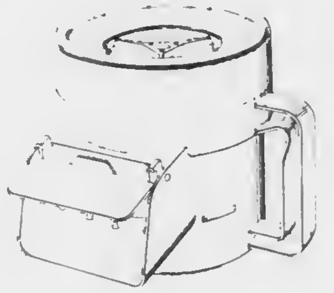
Jean-Louis Barrault, Boulogne-Billancourt, France, assignor to Moulinex (Societe Anonyme), Bagnolet, France

Filed Apr. 14, 1988, Ser. No. 181,089

Claims priority, application France, Oct. 15, 1987, 876031

Term of patent 14 years

U.S. Cl. D7—412



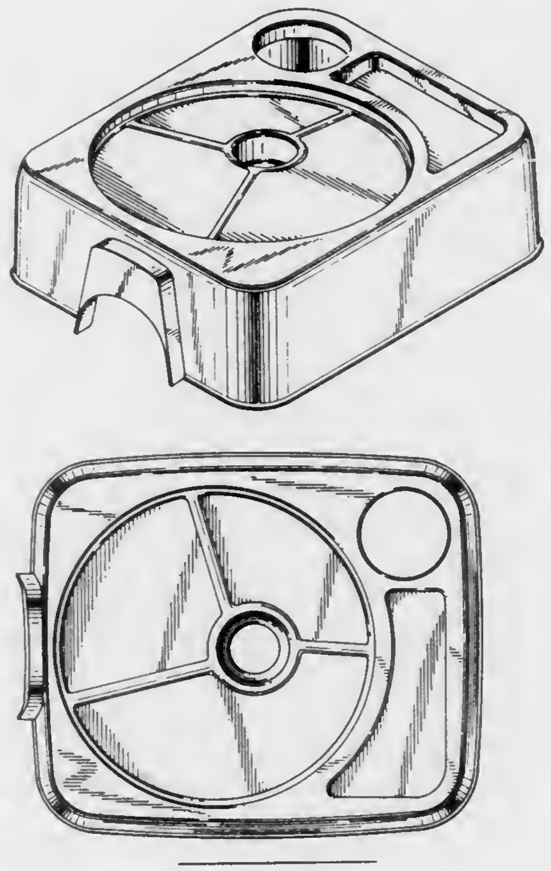
### 316,800
### SERVING TRAY

Leroy I. Wertheim, 1152 Eagle View Dr., Kodak, Tenn. 37764

Filed Oct. 20, 1988, Ser. No. 260,482

Term of patent 14 years

U.S. Cl. D7—549



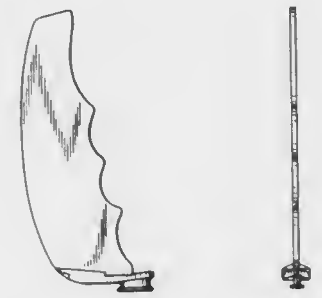
### 316,801
### FRUIT PEELER

Peter S. C. Cheng, 5 Ross Street, Toronto, Ontario, Canada M5T 1Z8

Filed Oct. 24, 1988, Ser. No. 261,186

Term of patent 14 years

U.S. Cl. D7—693



### 316,802
### SCISSORS

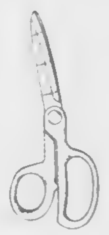
Masami Yamagishi, Matsudo, Japan, assignor to Kai Cutlery Center Co., Ltd., Seki, Japan

Filed Sep. 1, 1988, Ser. No. 239,415

Claims priority, application Japan, Apr. 12, 1988, 63-14854

Term of patent 14 years

U.S. Cl. D8—57



### 316,803
### TILER'S TOOL

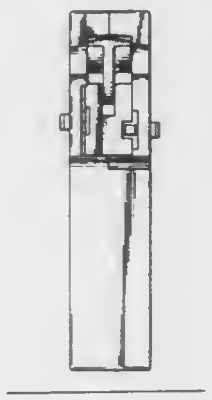
Anthony I. Newman, Cheshire, England, assignor to Swordfish Systems Limited, Cheshire, England

Filed Sep. 1, 1988, Ser. No. 239,416

Claims priority, application United Kingdom, Mar. 5, 1988, 1048998

Term of patent 14 years

U.S. Cl. D8—105



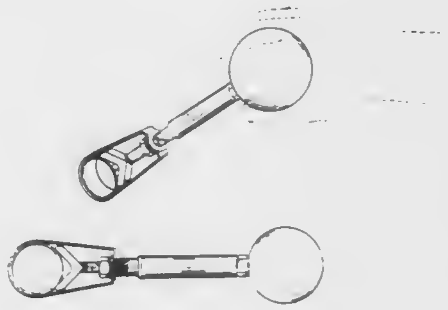
### 316,804
### AUXILIARY HANDLE

James Foulke, 1606 Waetham, Ann Arbor, Mich. 48103, and Yair Lifshitz, 739 Skynob, Ann Arbor, Mich. 48105

Filed Jun. 6, 1988, Ser. No. 202,432

Term of patent 14 years

U.S. Cl. D8—307



VOL
126
ISS
2
MY
14
1991
UMI

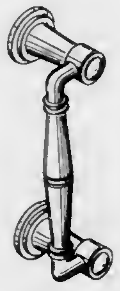
## 316,805
## SLIDING PATIO DOOR HANDLE

Gary F. Paulson, Waseca, and Thomas A. Cloutier, Faribault, both of Minn., assignors to Truth Incorporated, Owatonna, Minn.

Filed Jan. 27, 1989, Ser. No. 302,727

Term of patent 14 years

U.S. Cl. D8—319



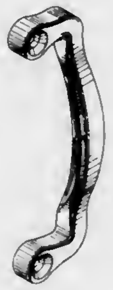
## 316,806
## SLIDING PATIO DOOR HANDLE

Gary F. Paulson, Waseca, and Thomas A. Cloutier, Faribault, both of Minn., assignors to Truth Incorporated, Owatonna, Minn.

Filed Jan. 27, 1989, Ser. No. 302,738

Term of patent 14 years

U.S. Cl. D8—319



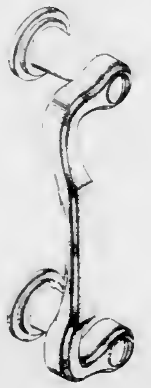
## 316,807
## SLIDING PATIO DOOR HANDLE

Gary F. Paulson, Waseca, and Thomas A. Cloutbier, Faribault, both of Minn., assignors to Truth Incorporated, Owatonna, Minn.

Filed Jan. 27, 1989, Ser. No. 302,739

Term of patent 14 years

U.S. Cl. D8—319



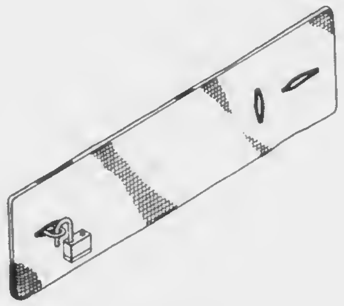
## 316,808
## AUTOMOBILE STEERING COLUMN LOCK

Wiley Partridge, Jr., Rte. 5, Box 568, Cleveland, Tex. 77327

Filed Oct. 18, 1988, Ser. No. 259,578

Term of patent 14 years

U.S. Cl. D8—333



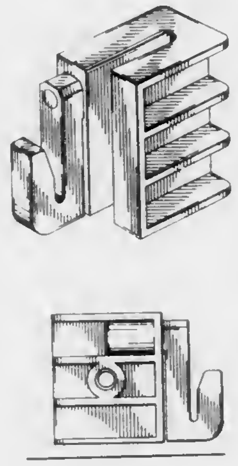
## 316,809
## BUCKET HOLDER

Ronald L. Carson, 4819 E. Piccadilly Rd., Phoenix, Ariz. 85018

Filed Jan. 12, 1990, Ser. No. 463,967

Term of patent 14 years

U.S. Cl. D8—373



## 316,810
## CLIP FOR BUTT JOINING SIDING

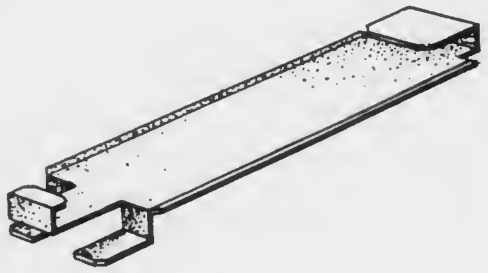
Ronald R. Blackford, Papatoetoe, New Zealand, assignor to James Hardie & Coy Pty. Limited, New South Wales, Australia

Filed Feb. 5, 1987, Ser. No. 11,131

Claims priority, application Australia, Aug. 14, 1986, 6272/86

Term of patent 14 years

U.S. Cl. D8—382



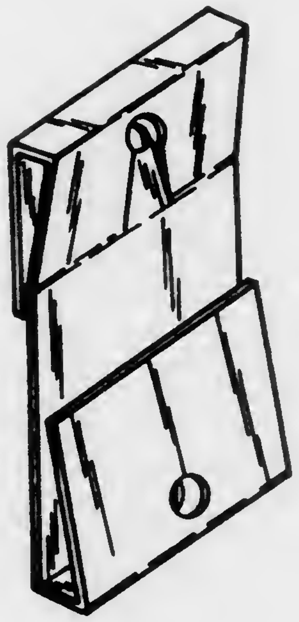
## 316,811
## FASTENER FOR CEILING OR WALL CONSTRUCTION, PICTURE FRAME HANGING OR THE LIKE

Harold J. Paul, 2015 Magnolia Ave., Pensacola, Fla. 32503

Filed Jun. 20, 1988, Ser. No. 208,643

Term of pateut 14 years

U.S. Cl. D8—382



## 316,812
## CONTAINER FOR CONFECTIONERY PRODUCTS

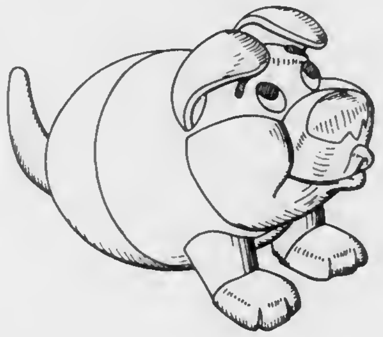
Pietro Ferrero, Rhode St. Genese, Belgium, assignor to Ferrero Ardennes S.A., Arlon, Belgium

Filed Sep. 23, 1988, Ser. No. 249,073

Claims priority, application Italy, Mar. 24, 1988, 53009/88[U]

Term of patent 14 years

U.S. Cl. D9—318



## 316,813
## BOTTLE

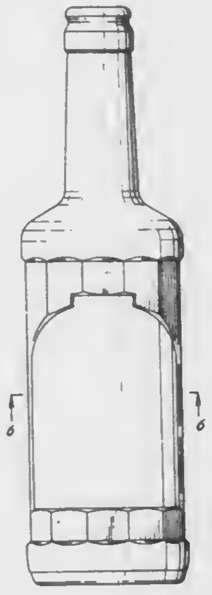
Michael R. Cannon, Dorset, England, assignor to Cornish Brewery Company Limited, Cornwall, England

Filed May 31, 1989, Ser. No. 359,424

Claims priority, application United Kingdom, Mar. 10, 1989, 1057760

Term of patent 14 years

U.S. Cl. D9—370



## 316,814
## SPORRAN FLASK

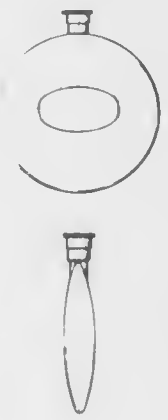
Thomas Duffy, Glasgow, Scotland, and Patrick A. Grant, 2 The Crescent, Busby, Glasgow, Scotland, assignors to Patrick A. B. Grant, Inverness-shire, Scotland

Filed Apr. 8, 1987, Ser. No. 35,719

Claims priority, application United Kingdom, Oct. 11, 1986, 1037335

Term of patent 14 years

U.S. Cl. D9—371



VOL 1126 ISS 2 MY 14 1991 UMI

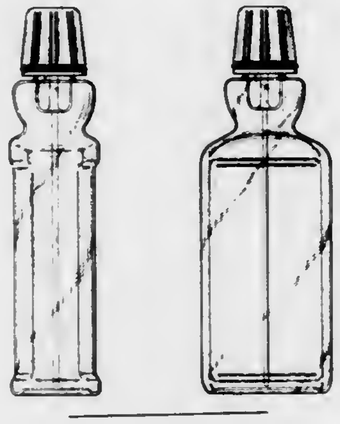
### 316,815
### COMBINED BOTTLE AND CAP

Gerald J. Kalin, Califon, N.J., and John R. Kent, Yardley, Pa., assignors to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.

Filed Mar. 10, 1989, Ser. No. 322,816

Term of patent 14 years

U.S. Cl. D9—404



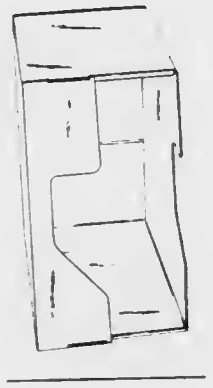
### 316,816
### PACKAGE

Sture H. Wiholm, Johanneshov, Sweden, assignor to Bind-O-Matic AB, Stockholm, Sweden

Filed May 7, 1987, Ser. No. 46,626

Term of patent 14 years

U.S. Cl. D9—432



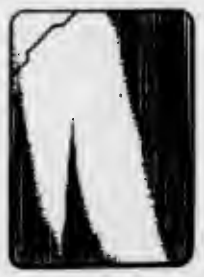
### 316,817
### LID FOR OVENABLE CARTON

Hampton E. Forbes, and Warren C. Foraker, both of Newark, Del., assignors to Westvaco Corporation, New York, N.Y.

Filed Jun. 11, 1987, Ser. No. 60,511

Term of patent 14 years

U.S. Cl. D9—438



### 316,818
### ALARM CLOCK

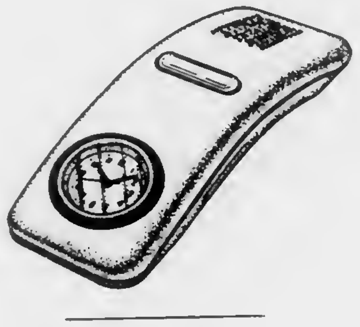
Mitsuo Wada, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Jan. 29, 1987, Ser. No. 8,425

Claims priority, application Japan, Sep. 18, 1986, 61-36867

Term of patent 14 years

U.S. Cl. D10—1



### 316,819
### CLOCK

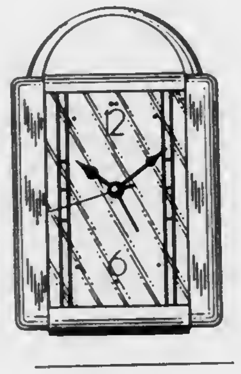
Seiji Odaka, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Feb. 12, 1988, Ser. No. 155,832

Claims priority, application Japan, Sep. 3, 1987, 62-36034

Term of patent 14 years

U.S. Cl. D10—19



### 316,820
### CLOCK

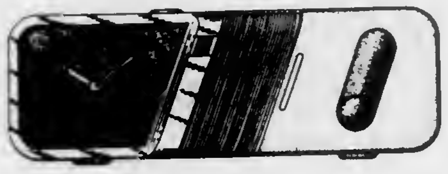
Mitsuo Wada, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Mar. 4, 1988, Ser. No. 164,006

Claims priority, application Japan, Oct. 26, 1987, 62-43676

Term of patent 14 years

U.S. Cl. D10—24



### 316,821
### CLOCK

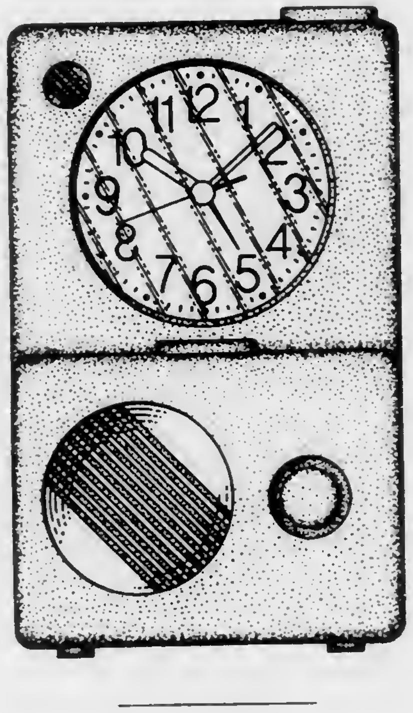
Mitsuo Wada, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Mar. 4, 1988, Ser. No. 164,007

Claims priority, application Japan, Oct. 26, 1987, 62-43675

Term of patent 14 years

U.S. Cl. D10—24



### 316,822
### CLOCK

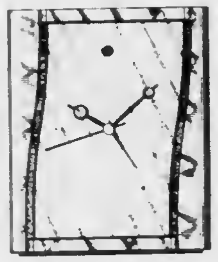
Seiji Odaka, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Mar. 4, 1988, Ser. No. 164,005

Claims priority, application Japan, Sep. 9, 1987, 62-36798

Term of patent 14 years

U.S. Cl. D10—26



### 316,823
### MOISTURE METER

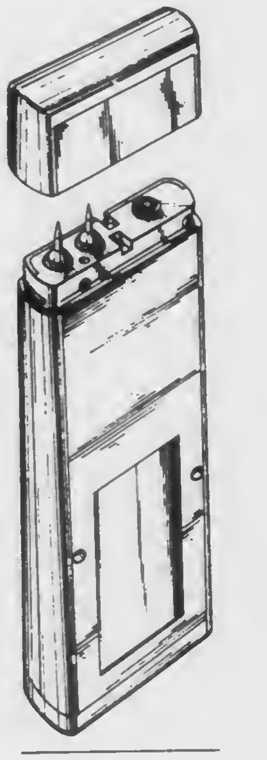
Fali M. Dadachanji, Marlow, United Kingdom, assignor to Protimeter plc, Marlow, England

Filed Apr. 27, 1989, Ser. No. 344,232

Claims priority, application United Kingdom, Nov. 16, 1988, 1055019

Term of patent 14 years

U.S. Cl. D10—56



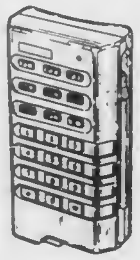
### 316,824
### TELEPHONE LINE TESTER

Leslie I. Sohay, Ventura, and Charles E. Grafton, South Pasadena, both of Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Oct. 19, 1987, Ser. No. 110,768

Term of patent 14 years

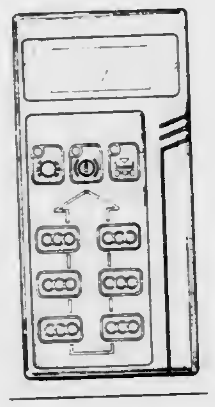
U.S. Cl. D10—78



VOL 1126 ISS 2 MY 14 1991 UMI

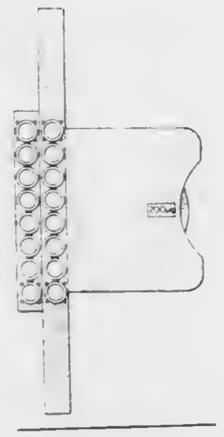
316,825
### PORTABLE AUTOMOTIVE MONITORING INSTRUMENT

Otto Becker, Trossingen, Fed. Rep. of Germany, assignor to Mannesmann Kienzle GmbH
Filed May 5, 1989, Ser. No. 348,474
Claims priority, application World Int. Prop. O., Nov. 8, 1988, DM/012142
Term of patent 14 years
U.S. Cl. D10—78



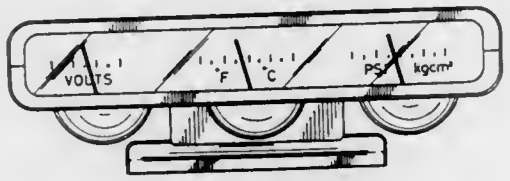
316,826
### ANALYTIC COLORMETRIC INSTRUMENT

Robert G. Neuman, Philadelphia, Pa., assignor to Exocell, Inc., Philadelphia, Pa.
Filed Sep. 16, 1988, Ser. No. 245,259
Term of patent 14 years
U.S. Cl. D10—81



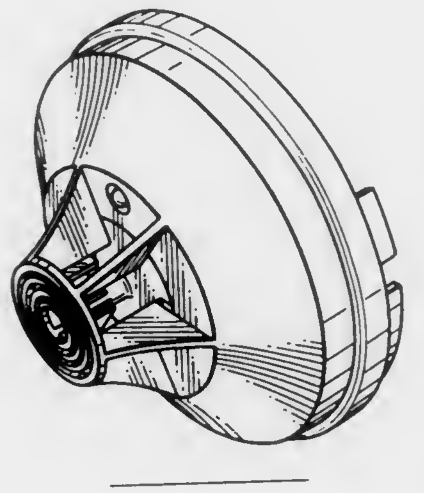
316,827
### VEHICLE GAUGE

Shinichi Asano, Tokyo, Japan, assignor to Car Mate Mfg. Co., Ltd., Tokyo, Japan
Filed Jul. 22, 1988, Ser. No. 224,534
Claims priority, application Japan, Feb. 16, 1988, 63-6198
Term of patent 14 years
U.S. Cl. D10—102



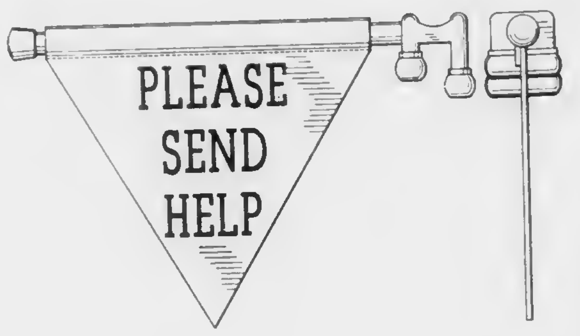
316,828
### FIRE DETECTOR

Hideto Amemiya, and Takashi Suzuki, both of Tokyo, Japan, assignors to Nittan Company, Limited, Tokyo, Japan
Filed Jun. 6, 1988, Ser. No. 203,028
Term of patent 14 years
U.S. Cl. D10—106



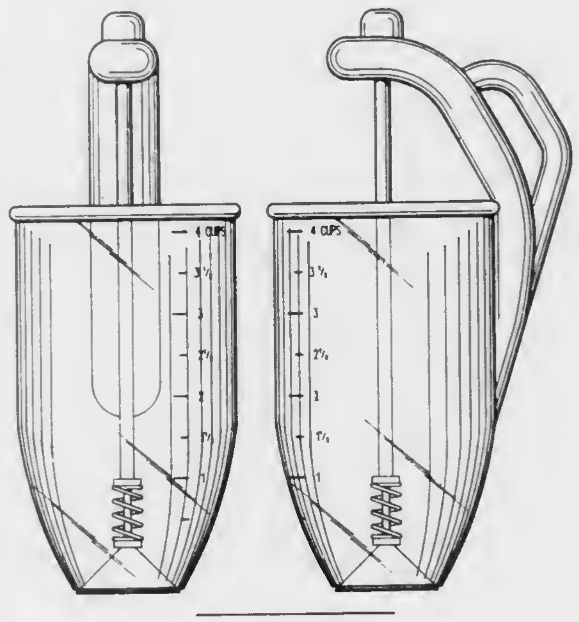
316,829
### COMBINED AUTOMOBILE SIGNAL FLAG AND HOLDER

Larry S. Davis, 1104 Mt. Erin Dr., Richmond, Va. 23231
Filed Mar. 27, 1989, Ser. No. 328,597
Term of patent 14 years
U.S. Cl. D10—109



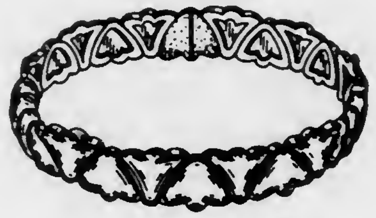
316,830
### PANCAKE BATTER DISPENSER

Thomas M. Demakas, 530 S. Broad, Griffith, Ind. 46319, and Miguel M. Martinez, 2902 178th St., Hammond, Ind. 46324
Filed Jul. 21, 1988, Ser. No. 222,231
Term of patent 14 years
U.S. Cl. D10—46.2



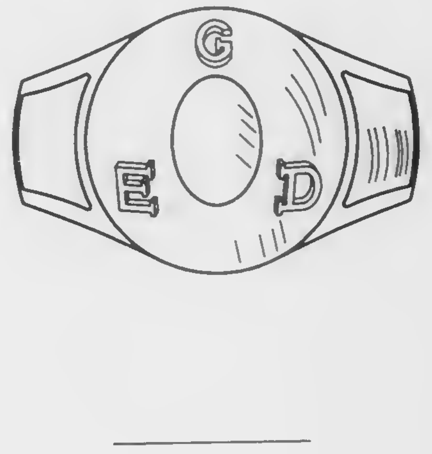
316,831
### BRACELET

Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Division of Ser. No. 44,113, Apr. 30, 1987, Pat. No. D. 310,182.
This application Apr. 26, 1990, Ser. No. 514,524
Claims priority, application Italy, Oct. 31, 1986, 36212/86[U]
Term of patent 14 years
U.S. Cl. D11—6



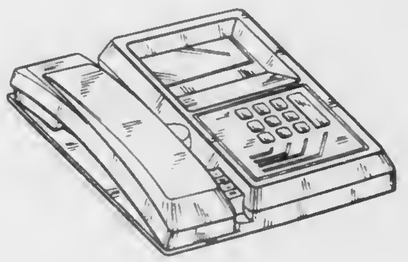
316,832
### FINGER RING

Charlie H. Johnson, Sr., Rte. #1 Box 224, Dryden, Va. 24243
Filed Apr. 27, 1988, Ser. No. 187,077
Term of patent 14 years
U.S. Cl. D11—35



316,833
### VIDEOPHONE

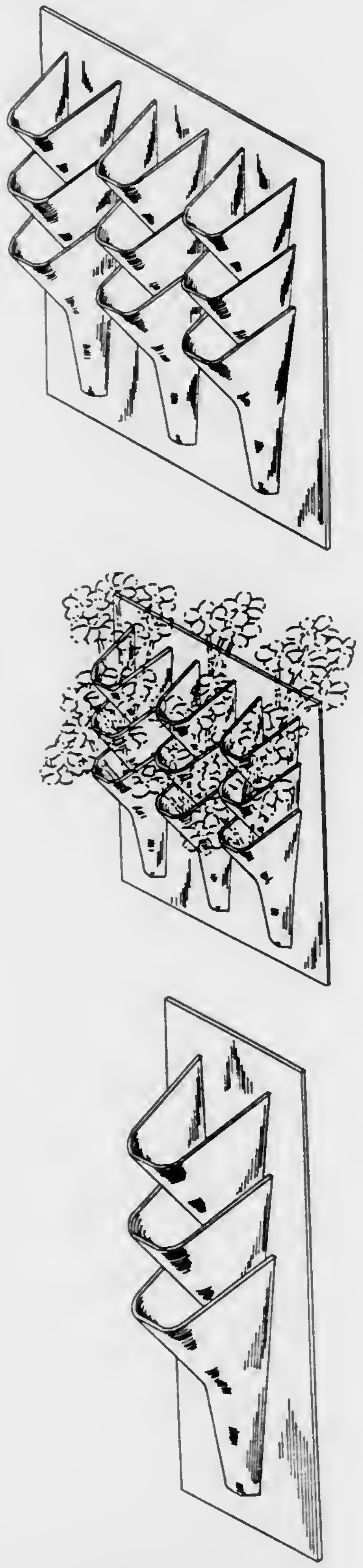
Orlando Miozzo, via A Ferrero, 9, 35133 Padova, Italy
Filed Jan. 9, 1990, Ser. No. 463,669
Claims priority, application Int'l Pat. Institute, Aug. 7, 1989, DM/014303
Term of patent 14 years
U.S. Cl. D14—130



VOL
126
ISS
2
MY
14
1991
UMI

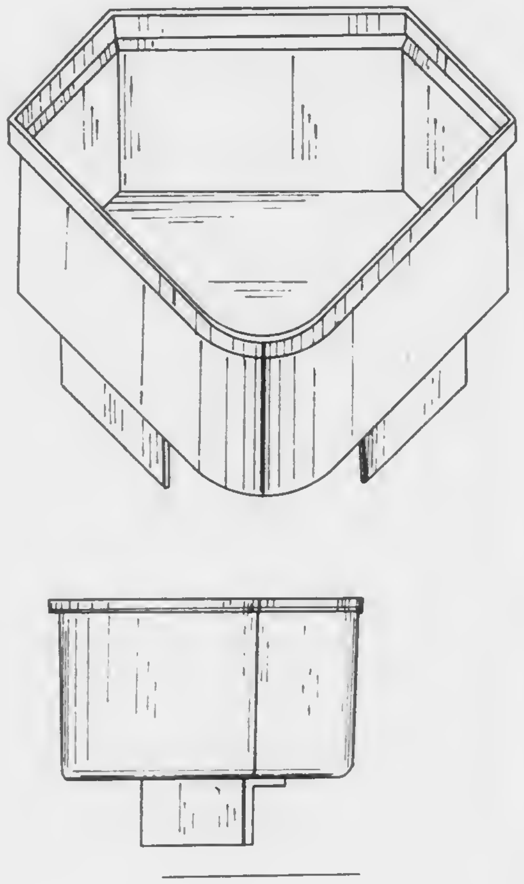
### 316,834
### FLOWER DISPLAY SUPPORT OR SIMILAR ARTICLE

Walter M. Mendenhall, Medeira Beach, Fla., assignor to Modern Display Plastics, Inc., Sebring, Ohio
Filed Apr. 13, 1988, Ser. No. 175,691
Term of patent 14 years
U.S. Cl. D11—143



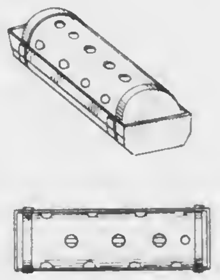
### 316,835
### PARTITION PLANTER

Alyce Ginsberg, 91 Post La., Bernardsville, N.J. 07924
Filed Jul. 6, 1988, Ser. No. 215,915
Term of patent 14 years
U.S. Cl. D11—143



### 316,836
### PLANTER

Theodore H. Kistner, 1757 Lorenzen Dr., San Jose, Calif. 95124
Filed Mar. 28, 1989, Ser. No. 329,699
Term of patent 14 years
U.S. Cl. D11—156



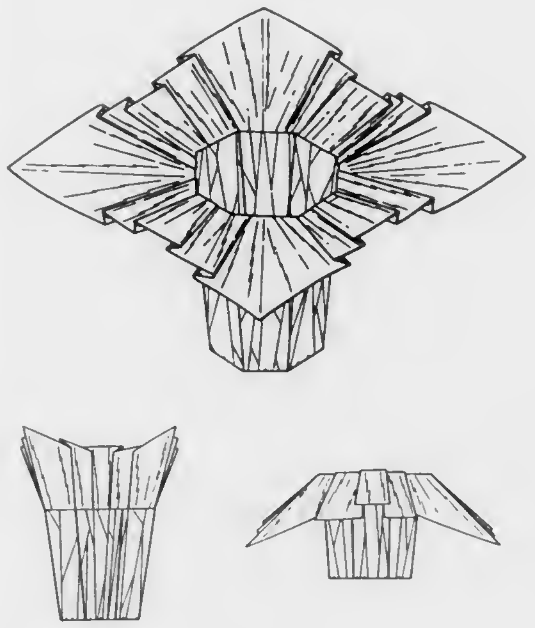
### 316,837
### FLOWER POT COVER

Donald E. Weder; Erwin H. Weder, both of Highland, Ill.; Wanda M. Weder, Highland, Calif.; Franklin J. Craig, Valley Park, Mo.; Wilma M. Donnelly, Highland, Ill.; Phyllis J. Bolk, Highland, Ill.; John W. Bergstrand, Highland, Ill., and Robert C. Abrams, Edwardsville, Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 613,053, May 22, 1984, Pat. No. Des. 293,224. This application Oct. 13, 1987, Ser. No. 108,308

The portion of the term of this patent subsequent to Apr. 2, 2005, has been disclaimed.

Term of patent 14 years
U.S. Cl. D11—164

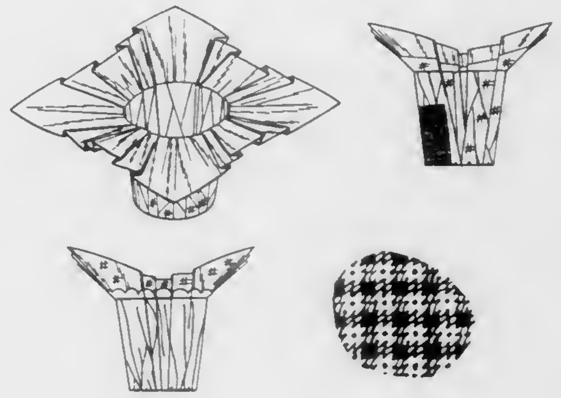


### 316,838
### FLOWER POT COVER

Donald E. Weder; Erwin H. Weder, both of Highland, Ill.; Wanda M. Weder, Highland, Calif.; Franklin J. Craig, Valley Park, Mo.; Wilma M. Donnelly, Highland, Ill.; Phyllis J. Bolk, Highland, Ill.; John W. Bergstrand, Highland, Ill., and Robert C. Abrams, Edwardsville, Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 613,053, May 22, 1984, Pat. No. Des. 293,224. This application Oct. 13, 1987, Ser. No. 108,316

Term of patent 14 years
U.S. Cl. D11—164

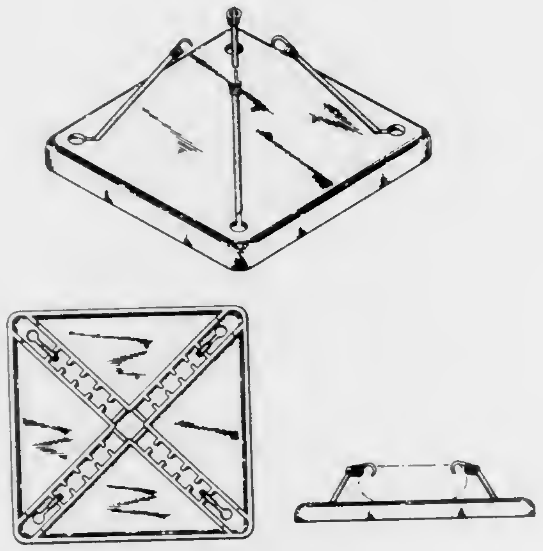


### 316,839
### CARRIER FOR FLOWER HOLDER

Stanley J. Nowicki, 7701 Cotswald Way, Citrus Heights, Calif. 95610

Filed Jun. 24, 1988, Ser. No. 211,325
Term of patent 14 years

U.S. Cl. D11—164

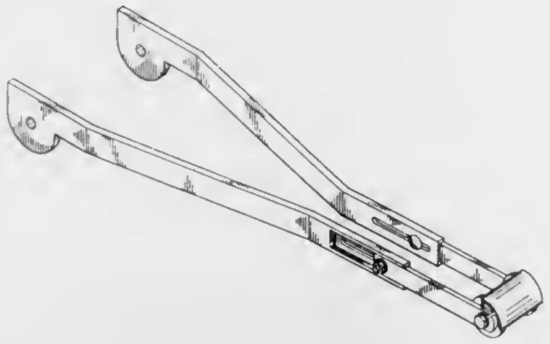


### 316,840
### BICYCLE WATER GUARD

Gilmar Barros, 302 Union Ave. Apt. #6, New Rochelle, N.Y. 10801

Filed May 16, 1989, Ser. No. 352,842
Term of patent 14 years

U.S. Cl. D12—126

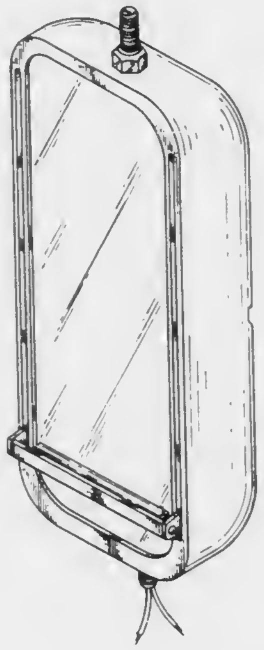


### 316,841
### SELF CLEANING REAR VIEW MIRROR FOR TRUCK OR THE LIKE

Lee Neff, R.D. 1 Box 81, Julian, Pa. 16844

Filed Nov. 28, 1989, Ser. No. 442,175
Term of patent 14 years

U.S. Cl. D12—187

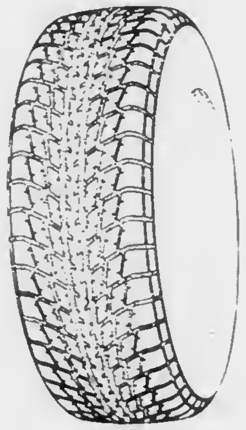


### 316,842
### DESIGN FOR A TIRE

Maurice I. Graas, Luxembourg City, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 17, 1988, Ser. No. 259,007
Term of patent 14 years

U.S. Cl. D12—147

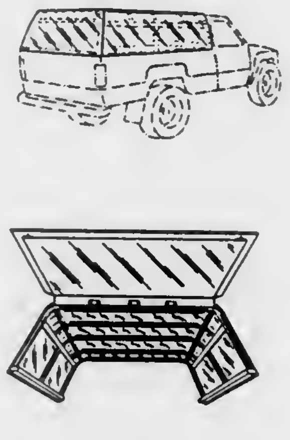


### 316,843
### CAP FOR THE BED OF A PICKUP TRUCK

Jeff A. Oldham, 134 1st. St., Seal Beach, Calif. 90740

Filed Mar. 24, 1988, Ser. No. 172,347
Term of patent 14 years

U.S. Cl. D12—156

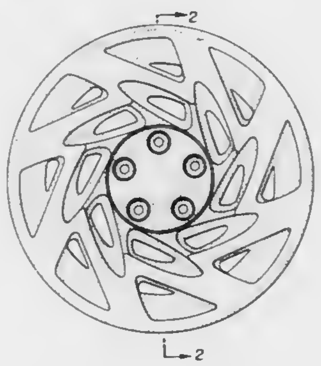


### 316,844
### WHEEL COVER

Thomas B. Peloquin, Clawson, and John K. Wasenko, West Bloomfield, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 23, 1989, Ser. No. 299,851
Term of patent 14 years

U.S. Cl. D12—209

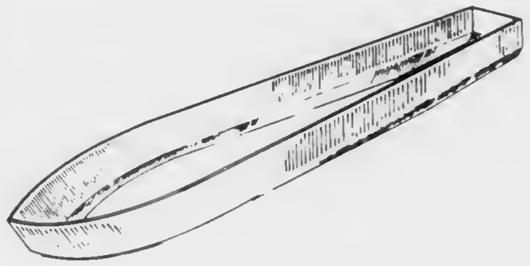


### 316,845
### BOAT

Douglas G. Slanker, 191 Indian Grove, Ontario, Canada M6P 2H4, and Edward Gillis, 45 Glenlake Avenue, Toronto, Ontario, Canada M6P 1E2

Filed Jun. 6, 1988, Ser. No. 203,030
Term of patent 14 years

U.S. Cl. D12—302

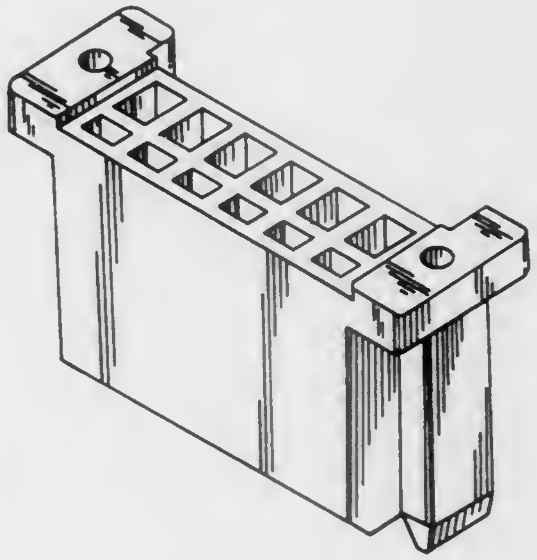


### 316,846
### ELECTRICAL CONNECTOR HOUSING

Yasuharu Moriai, and Osamu Ito, both of Suzuka, Japan, assignors to Sumitomo Wiring Systems, Ltd., Suzuka, Japan

Filed Nov. 7, 1988, Ser. No. 268,388
Claims priority, application Japan, May 6, 1988, 63-17956
Term of patent 14 years

U.S. Cl. D13—147

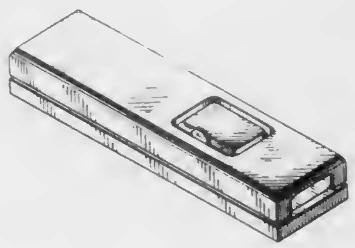


### 316,847
### TRANSMITTER FOR WIRELESS SWITCH AND DIMMER

Michael J. Rowen, Center Valley, and Joel S. Spira, Coopersburg, both of Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.

Filed Jul. 29, 1988, Ser. No. 226,155
The portion of the term of this patent subsequent to Sep. 26, 2003, has been disclaimed.
Term of patent 14 years

U.S. Cl. D13—168



VOL
1126
ISS
2
MY
14
1991
UMI

316,848

### MOUNTING SUBSTRATE FOR SEMICONDUCTORS

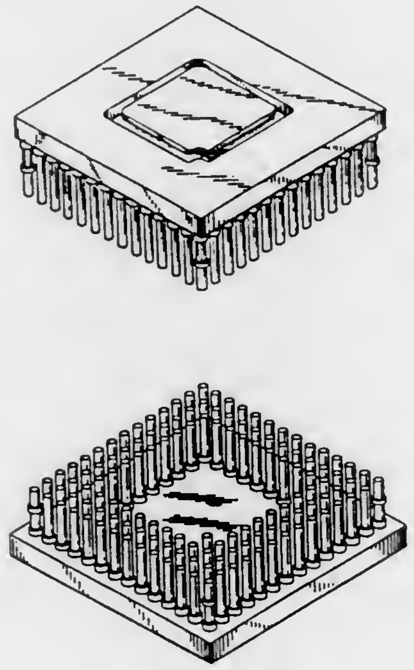
Terutomi Hasegawa, 2-40 Nakagawa-Cho, Ogaki-City, Gifu Pref., and Nobumichi Goto, 291, Kami-Shirokane, Seki City Gifu Pref., both of Japan

Filed Jan. 4, 1988, Ser. No. 140,434

Claims priority, application Japan, Jul. 4, 1987, 62-27276; Jul. 4, 1987, 62-27280

Term of patent 14 years

U.S. Cl. D13—82



316,849

### COMPUTER ENCLOSURE

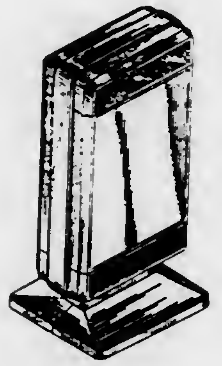
John Houghton, Billingstad, Norway, assignor to Norwegian Bioinstruments A/S, Sandoes, Norway

Filed May 7, 1987, Ser. No. 46,867

Claims priority, application Norway, Dec. 2, 1986, 67871

Term of patent 14 years

U.S. Cl. D14—102



316,850

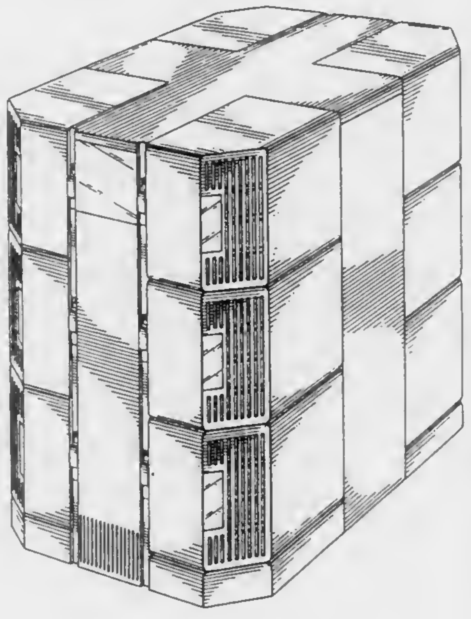
### ARRAYED DISK DRIVE SYSTEM

David W. Gordon; Jeff Samson, and Warren Conner, all of Boulder, Colo., assignors to Array Technology Corporation, Boulder, Colo.

Filed Nov. 14, 1988, Ser. No. 270,304

Term of patent 14 years

U.S. Cl. D14—102



316,851

### PORTABLE COMPUTER OR SIMILAR ARTICLE

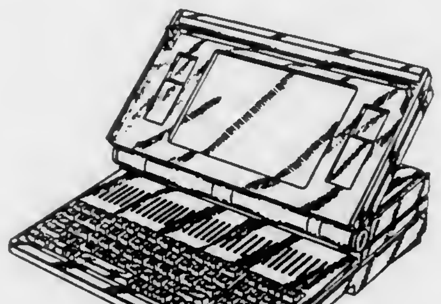
Hartmut H. Esslinger, Los Gatos; Eric I. Gruenberg, Soquel, and James R. Stewart, San Jose, all of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Filed Jan. 23, 1980, Ser. No. 299,719

The portion of the term of this patent subsequent to Apr. 16, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—106



316,852

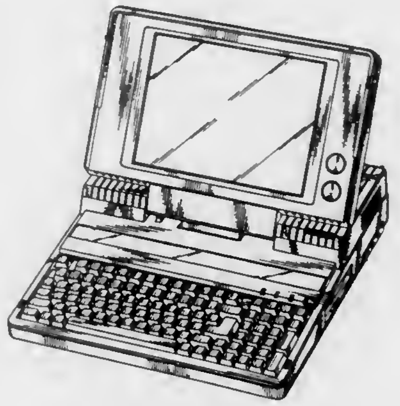
### PORTABLE LAPTOP COMPUTER

Akishige Sai, Hyogo, and Benito Mishiro, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 13, 1989, Ser. No. 365,985

Term of patent 14 years

U.S. Cl. D14—106



316,853

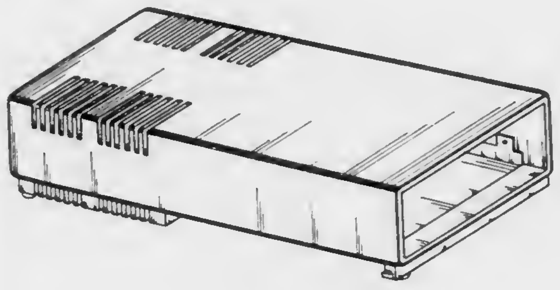
### COMPUTER PERIPHERAL ENCLOSURE

David V. Dickey, San Luis Obispo, Calif., assignor to Product R&D Corporation, San Luis Obispo, Calif.

Filed Jan. 13, 1989, Ser. No. 297,536

Term of patent 14 years

U.S. Cl. D14—107



316,854

### WIRELESS DATA TRANSMITTER/RECEIVER WITH A BAR CODE READER

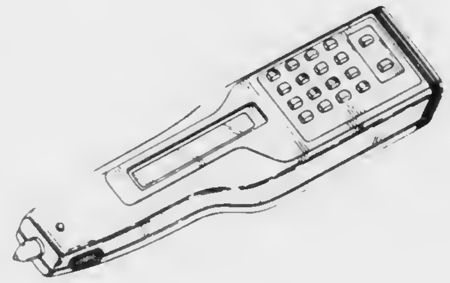
Toshiharu Okuyama, and Toshio Mikiya, both of Tokyo, Japan, assignors to Nitto Kohki, Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 331,539

Claims priority, application Japan, Oct. 6, 1988, 63-39319

Term of patent 14 years

U.S. Cl. D14—116



316,855

### TELEVISION SET

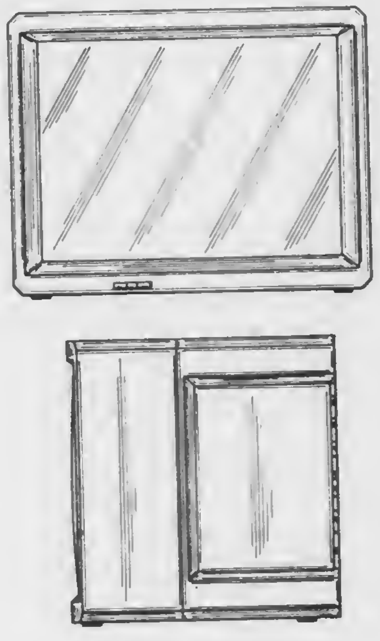
Taisuke Saeki, and Hiroshi Kajimoto, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed May 10, 1989, Ser. No. 350,110

Claims priority, application Japan, Nov. 22, 1988, 63-45561

Term of patent 14 years

U.S. Cl. D14—126



316,856

### COMBINED TELEVISION RECEIVER AND VIDEO TAPE RECORDER

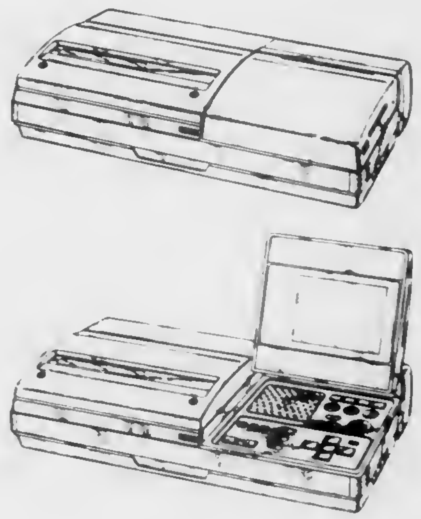
Atsuhiko Urushihara; Yutaka Yonezawa, both of Kokubunji, and Akira Takahashi, Saitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 4, 1989, Ser. No. 389,565

Claims priority, application Japan, Feb. 20, 1989, 1-5956

Term of patent 14 years

U.S. Cl. D14—129



VOL
1126
ISS
2
MY
14
1991
UMI

### 316,857
### COMBINED CORDLESS HANDSET

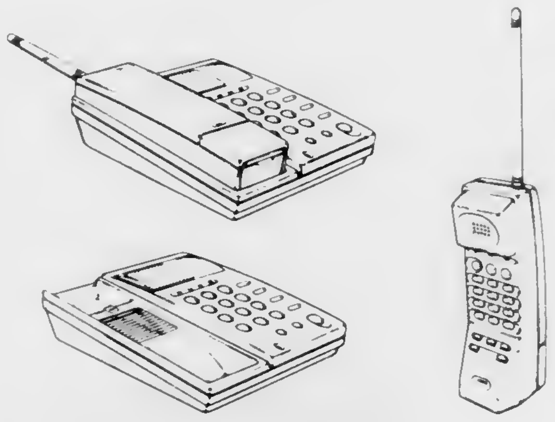
Hee S. Park, Seoul, Rep. of Korea, assignor to Gold Star Telecommunications Co., Ltd., Seoul, Rep. of Korea

Filed Jan. 2, 1990, Ser. No. 459,675

Claims priority, application Rep. of Korea, May 24, 1989, 6880/1989; May 24, 1989, 6881/1989

Term of patent 14 years

U.S. Cl. D14—138



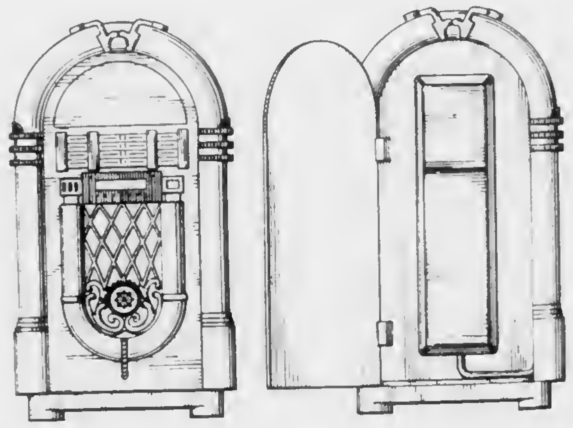
### 316,858
### HOUSING FOR A TELEPHONE SET

Kash Gobindram, Ronkonkoma, N.Y., assignor to Kash 'N Gold, Ltd., Ronkonkoma, N.Y.

Filed Jan. 26, 1990, Ser. No. 471,136

Term of patent 14 years

U.S. Cl. D14—143



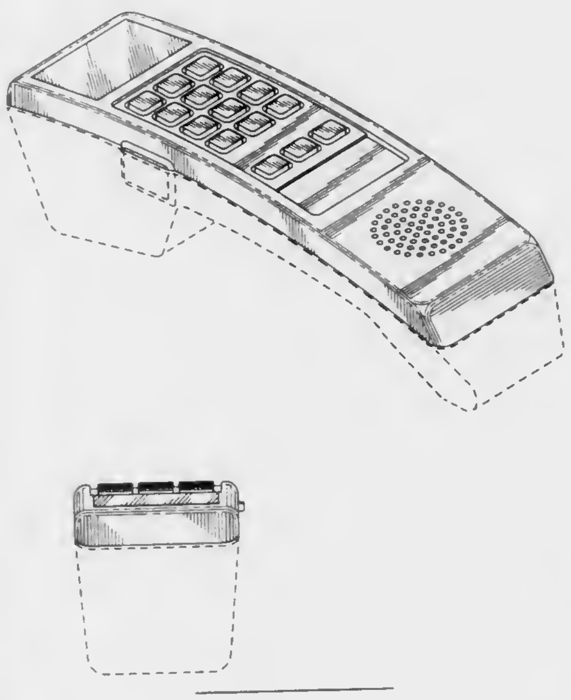
### 316,859
### DIAL TOP-HOUSING FOR TELEPHONE HANDSET OR SIMILAR ARTICLE

Allen Wong, Streamwood, and Russell Ansai, Chicago, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 11, 1989, Ser. No. 448,455

Term of patent 14 years

U.S. Cl. D14—148



### 316,860
### TAPE RECORDER

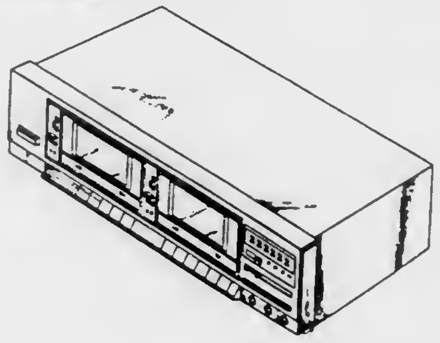
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Minoru Sube, Hachioji; Yuji Sato, Chofu, and Yukio Iikura, Asaka, all of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Oct. 14, 1988, Ser. No. 258,251

Claims priority, application Japan, Apr. 21, 1988, 63-16246

Term of patent 14 years

U.S. Cl. D14—164



### 316,861
### HEADPHONE

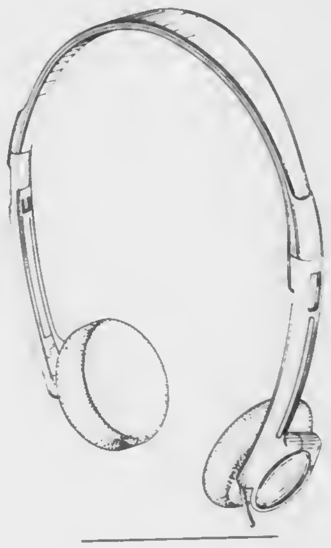
Shingo Yoda, and Kazue Kato, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 7, 1988, Ser. No. 280,995

Claims priority, application Japan, Jun. 14, 1988, 63-23502

Term of patent 14 years

U.S. Cl. D14—205



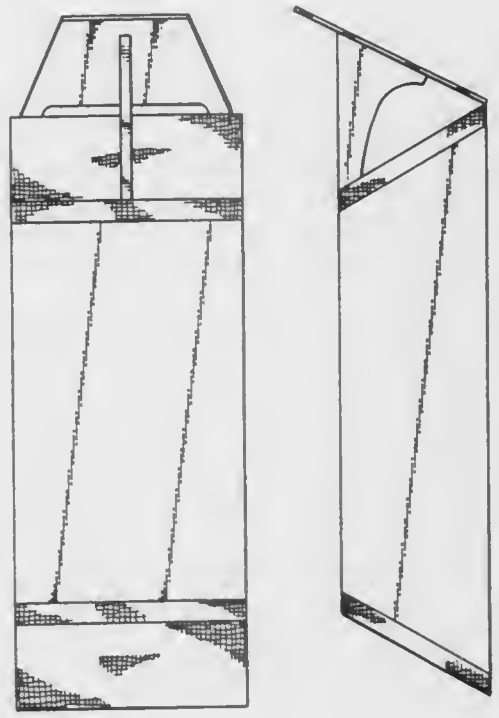
### 316,862
### COMBINED LOUDSPEAKER CABINET AND SOUND REFLECTOR

Andrew E. Flanders, 570 N. 10th Ave., Cornelius, Oreg. 97113

Division of Ser. No. 66,796, Jun. 25, 1987. This application Apr. 9, 1990, Ser. No. 506,658

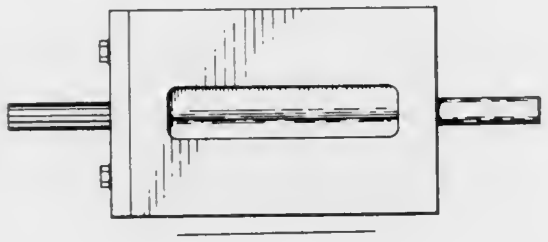
Term of patent 14 years

U.S. Cl. D14—214

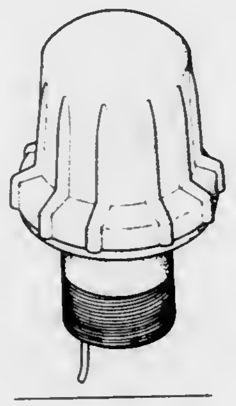


VOL
1126
ISS
2
MY
14
1991
UMI

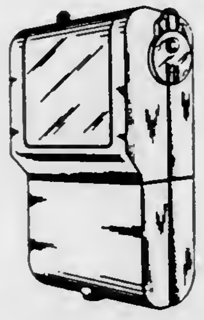
316,863
### ROTARY VANE COMBUSTION ENGINE
Christopher C. Coles, Box 455, Medical Lake, Wash. 99022
Filed Nov. 21, 1988, Ser. No. 274,044
Term of patent 14 years
U.S. Cl. D15—1



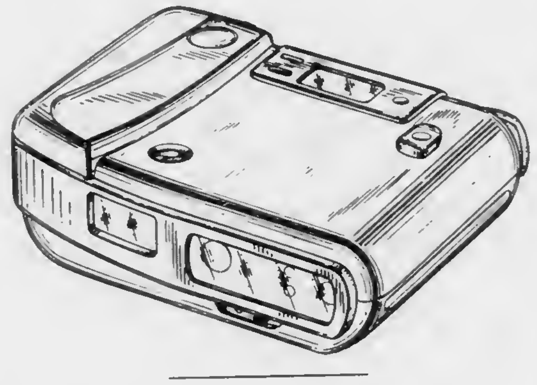
316,864
### BREATHER ASSEMBLY FOR COMBUSTION ENGINE
Thomas L. Davis, Tulsa, and Roy A. Harper, Jr., Broken Arrow, both of Okla., assignors to Arrow Specialty Company, Tulsa, Okla.
Filed Nov. 16, 1988, Ser. No. 272,264
Term of patent 14 years
U.S. Cl. D15—5



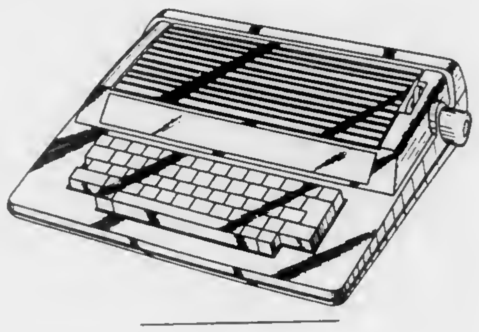
316,865
### AIR PUMP
Eric J. Armstrong, Pennsburg, and Thomas L. Latone, Quakertown, both of Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Jul. 28, 1988, Ser. No. 228,804
Term of patent 14 years
U.S. Cl. D15—7



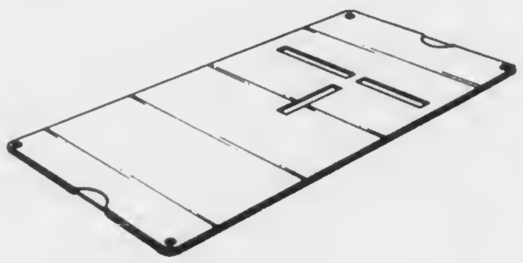
316,866
### MAGNETIC STILL CAMERA
Keisuke Tejima, Tokyo, and Mitsuhiro Nakamura, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Oct. 27, 1989, Ser. No. 427,359
Claims priority, application Japan, May 30, 1989, 1-19753
Term of patent 14 years
U.S. Cl. D16—202



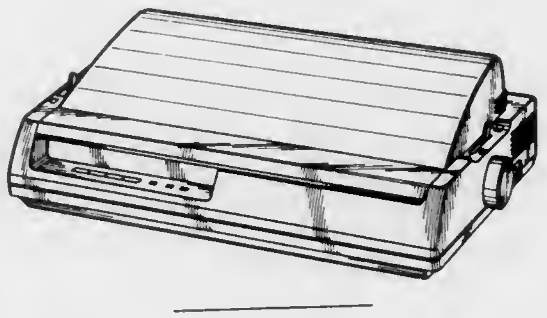
316,867
### TYPEWRITER
Hiroshi Sakaguchi, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Jun. 5, 1989, Ser. No. 361,566
Claims priority, application Japan, Dec. 6, 1988, 63-47645
Term of patent 14 years
U.S. Cl. D18—1



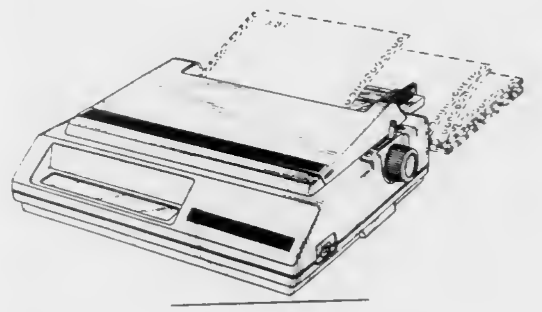
316,868
### SLIDE CALCULATOR
Craig E. Johnson, West Chicago, Ill., assignor to Schwan's Sales Enterprises, Inc., Marshall, Minn.
Filed Mar. 31, 1989, Ser. No. 332,225
Term of patent 14 years
U.S. Cl. D18—9



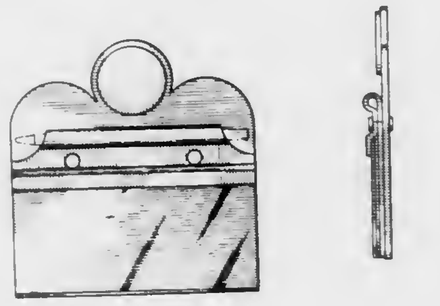
316,869
### PRINTER
Kouki Sugawara, and Sampei Seki, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Nov. 22, 1988, Ser. No. 275,565
Claims priority, application Japan, Nov. 10, 1988, 63-44102
Term of patent 14 years
U.S. Cl. D18—13



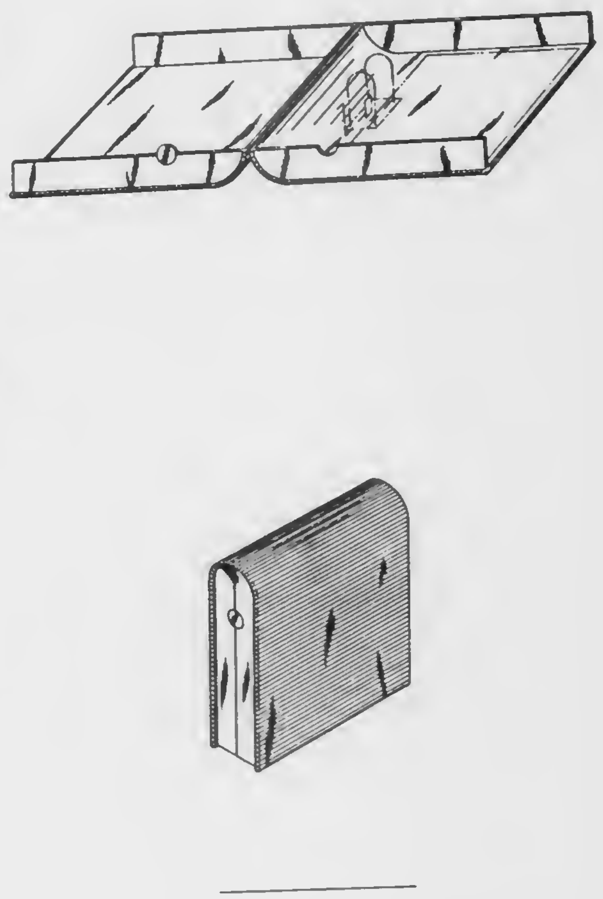
316,870
### PRINTER
Kouki Sugawara, and Kazuo Yoshida, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Inc., Tokyo, Japan
Filed Nov. 22, 1988, Ser. No. 275,566
Claims priority, application Japan, Nov. 10, 1988, 63-44103
Term of patent 14 years
U.S. Cl. D18—13



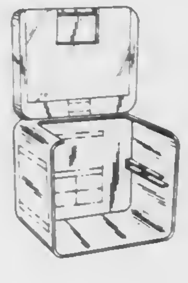
316,871
### COMBINDED NOTE PAD AND HOLDER THEREFOR
Richard Woods, 4333 San Gabriel River Pkwy., Pico Rivera, Calif. 90660
Filed Nov. 2, 1989, Ser. No. 430,656
Term of patent 14 years
U.S. Cl. D19—2



316,872
### RING BINDER
Heinz Witschi, Ortschwaben, Switzerland, assignor to Innotech AG, Schellenberg, Liechtenstein
Filed Jan. 18, 1989, Ser. No. 298,094
Claims priority, application Switzerland, Jul. 20, 1988, 116902
Term of patent 14 years
U.S. Cl. D19—27



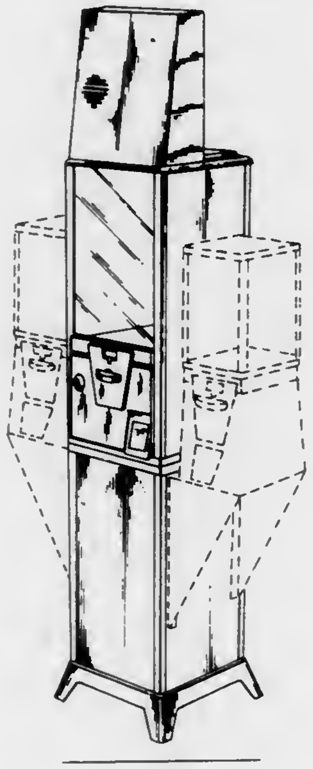
316,873
### NEWSPAPER VENDING BIN OR SIMILAR ARTICLE
Milton J. Merl, New City, N.Y., assignor to Gannett Co., Ltd., Arlington, Va.
Filed Aug. 14, 1987, Ser. No. 85,414
Term of patent 14 years
U.S. Cl. D20—6



VOL
126
SS
2
MY
14
991
UMI

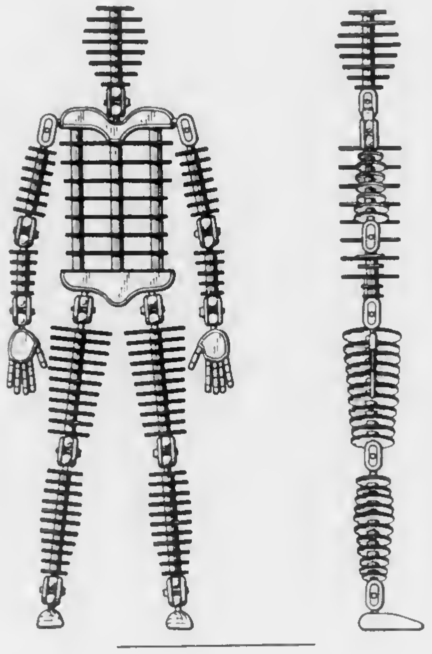
### 316,874
### DISPENSER FOR BUBBLE GUM OR OTHER ENCAPSULATED ARTICLES

Simon Grill, 24242 Hatteras St., Woodland Hills, Calif. 91367
Filed Jul. 14, 1989, Ser. No. 379,897
Term of patent 14 years
U.S. Cl. D20—7



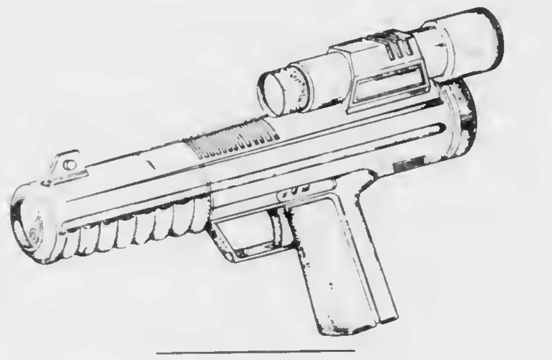
### 316,876
### MANNEQUIN

Robert J. Heseltine, 216a (First Floor) Bradford Road, Shipley, West Yorkshire, England BD18 3AN
Filed Mar. 28, 1989, Ser. No. 329,645
Claims priority, application United Kingdom, Sep. 30, 1988, 1053932
Term of patent 14 years
U.S. Cl. D20—31



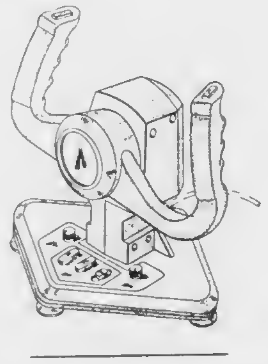
### 316,878
### VIDEO GAME GUN

Takehiko Ishiwata, Kanagawa, Japan, assignor to Nexoft Corporation, Torrance, Calif.
Filed Jul. 17, 1989, Ser. No. 381,015
Claims priority, application Japan, May 23, 1989, 1-18743
Term of patent 14 years
U.S. Cl. D21—13



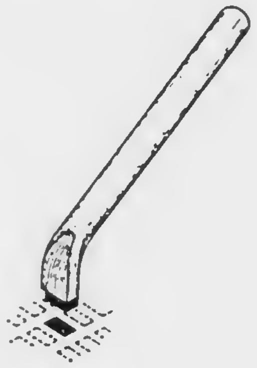
### 316,879
### JOYSTICK FOR ELECTRONIC GAMES

Donald P. Shulman, and Betty A. Shulman, both of 440 Brentwood Dr., Piscataway, N.J. 08854
Filed Jan. 9, 1989, Ser. No. 294,801
Term of patent 14 years
U.S. Cl. D21—48



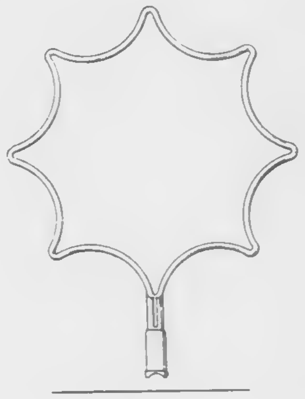
### 316,880
### LOTTERY CARD MARKER

Thomas J. Conlan, 35 Miller Rd., Latham, N.Y. 12110
Filed May 6, 1988, Ser. No. 190,948
Term of patent 14 years
U.S. Cl. D19—51



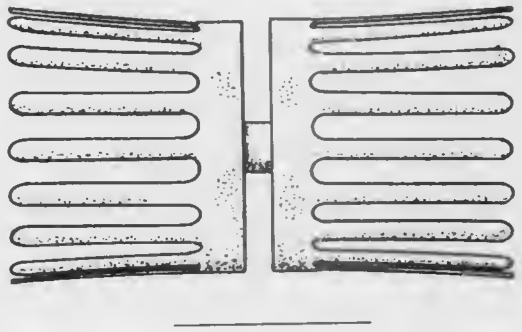
### 316,881
### BUBBLE WAND

Richard L. Neuroth; Margerate A. B. Neuroth, both of R.R. Box 178-A, Epworth, Iowa 52045; Richard A. Robertson, and Elizabeth A. Robertson, both of 3065 Hales Mill Rd., Dubuque, Iowa 52001
Filed Jun. 13, 1989, Ser. No. 365,505
Term of patent 14 years
U.S. Cl. D21—61



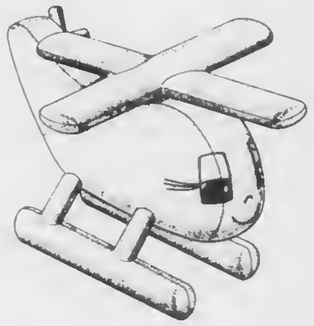
### 316,882
### RETURN TOP

William M. Hanlon, III, Castro Valley, Calif., assignor to DaMert Company, San Leandro, Calif.
Filed Aug. 10, 1989, Ser. No. 391,859
Term of patent 14 years
U.S. Cl. D21—99



### 316,883
### STUFFED TOY HELICOPTER

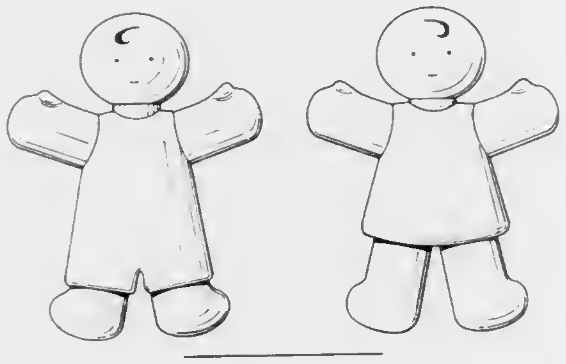
Antoinette T. Doles, 8008 N. 38th Ave., Phoenix, Ariz. 85051
Filed May 5, 1988, Ser. No. 190,521
Term of patent 14 years
U.S. Cl. D21—155



VOL 1126 ISS 2 MY 14 1991 UMI

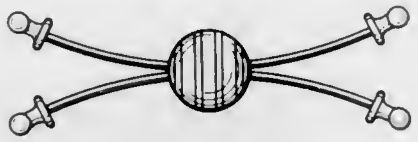
### 316,884
### DOLL

**Patrick Rylands, London, United Kingdom, assignor to Simon Gompes and Herman Schpektor, Amsterdam, Netherlands**
Filed May 9, 1988, Ser. No. 190,944
Claims priority, application United Kingdom, Nov. 10, 1987, 1046220
Term of patent 14 years
U.S. Cl. D21—171



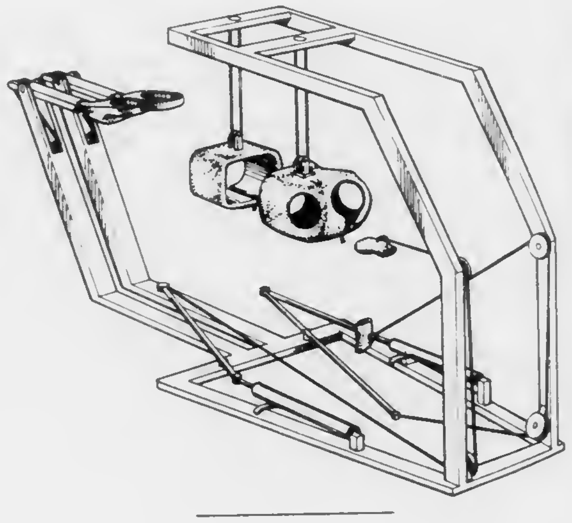
### 316,885
### TETHERED EXERCISER

**Deomangal Heerah, and Deodat Heerah, both of 518 39 St., Brooklyn, N.Y. 11232**
Filed Oct. 19, 1987, Ser. No. 110,529
Term of patent 14 years
U.S. Cl. D21—191



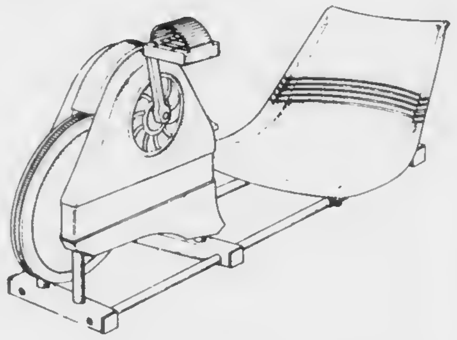
### 316,886
### SWIMMER EXERCISE MACHINE

Joseph A. Sally, 1425 Cherokee St., Los Angeles, Calif. 90046
Filed Jul. 28, 1988, Ser. No. 225,487
Term of patent 14 years
U.S. Cl. D21—191



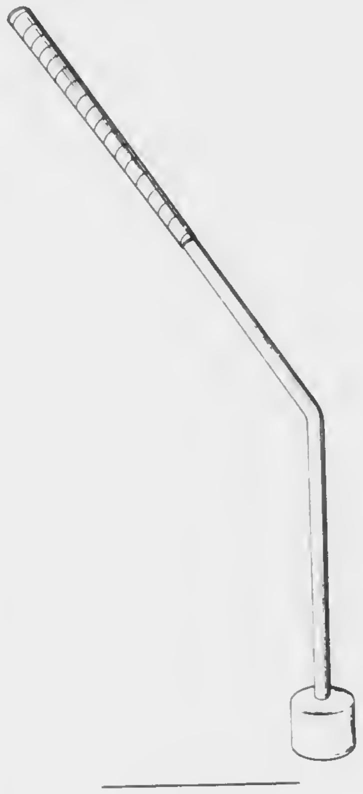
### 316,887
### CYCLE EXERCISER

Yuan H. Lo, No. 8-1, Tou Chien St., Kan Kou Tsun, Lu Chu Hsiang, Tao-Yuan Hsien, Taiwan
Filed Dec. 9, 1988, Ser. No. 281,690
Term of patent 14 years
U.S. Cl. D21—194



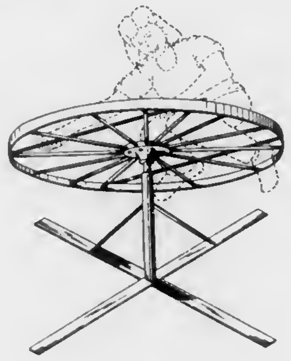
### 316,888
### GOLF TRAINER CLUB

**Anthony Foresi, 9717 Manor, Allen Park, Mich. 48101**
Filed Mar. 21, 1988, Ser. No. 171,911
Term of patent 14 years
U.S. Cl. D21—234



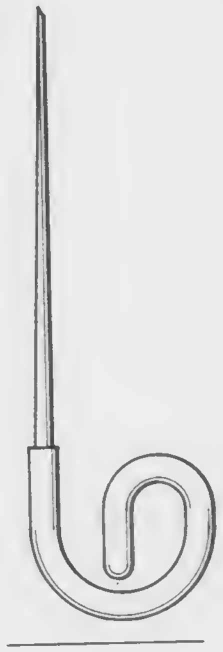
### 316,889
### ROUNDABOUT AMUSEMENT RIDE

Evan K. Smith, Box 27, Guide Rock, Nebr. 68942, assignor to Larry K. Smith, Omaha, Nebr.
Filed Dec. 8, 1988, Ser. No. 282,341
Term of patent 14 years
U.S. Cl. D21—249



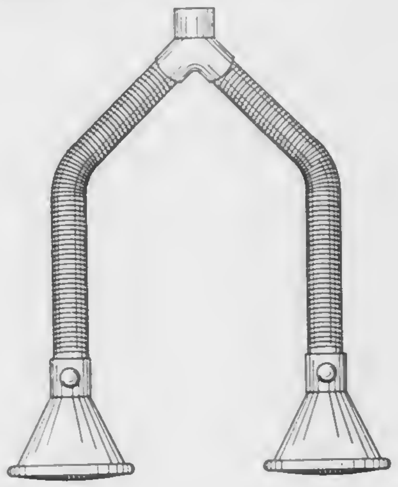
### 316,890
### FISHING WORM THREADER

**Oscar T. Robinson, and Ann Robinson, both of 348 22nd St., Costa Mesa, Calif. 92627**
Filed Jul. 7, 1988, Ser. No. 216,247
Term of patent 14 years
U.S. Cl. D22—149



### 316,891
### TWO-HEADED SHOWER

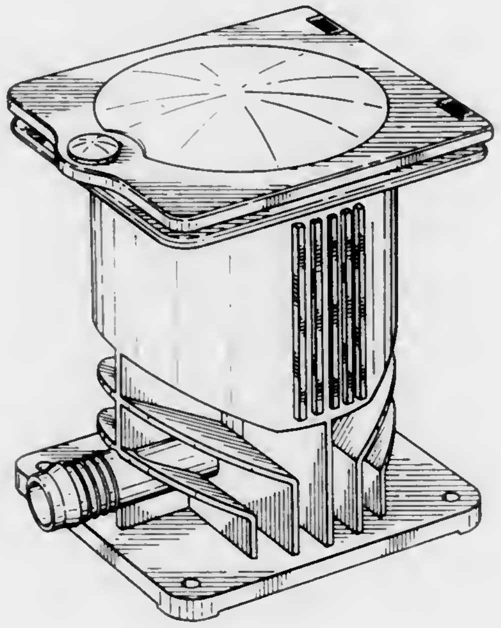
Gilbert Y. Lee, 94-262 Kahuahele St., Waipahu, Hong Kong 96797
Filed Jun. 1, 1987, Ser. No. 56,745
Term of patent 14 years
U.S. Cl. D23—213



VOL
126
ISS
2
MY
14
1991
UMI

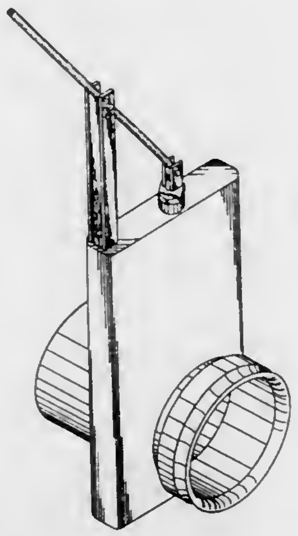
### 316,892
### SPRINKLER

Franco Clivio, Zürich, Switzerland, assignor to Gardena Kress & Kastner GmbH, Fed. Rep. of Germany
Filed Aug. 23, 1989, Ser. No. 397,570
Term of patent 14 years
U.S. Cl. D23—214



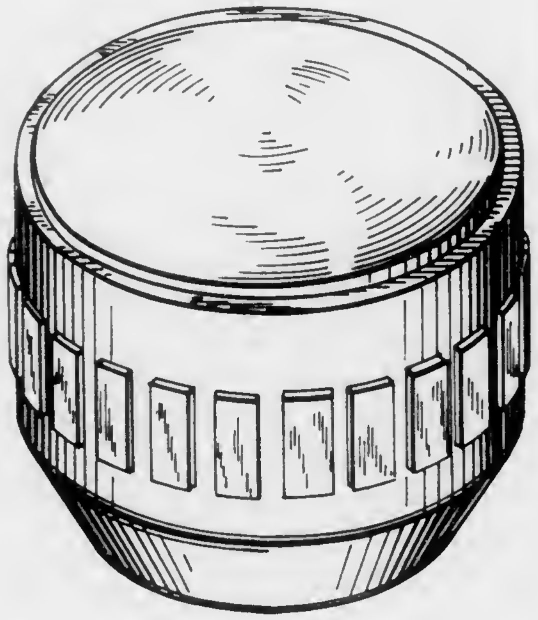
### 316,893
### GATE VALVE FOR IRRIGATION PIPE

James J. Glodowski, 3050 S. Lincoln, Jerome, Id. 83338
Filed Oct. 26, 1987, Ser. No. 112,774
Term of patent 14 years
U.S. Cl. D23—244



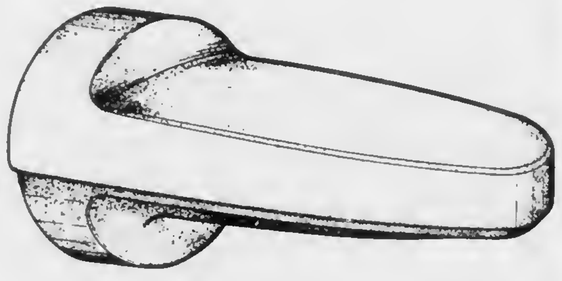
### 316,894
### FAUCET HANDLE OR THE LIKE

Michel M. Jolibois, Reims, France, assignor to Jacob Delafon, Paris, France
Filed Dec. 2, 1988, Ser. No. 280,624
Claims priority, application France, Sep. 5, 1988, 885476
Term of patent 14 years
U.S. Cl. D23—250



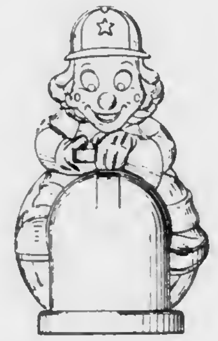
### 316,895
### TUB SPOUT

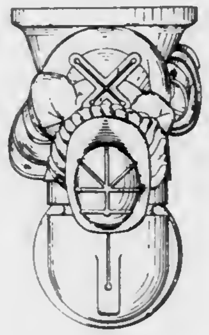
Loran R. Hill, Indianapolis, and Anthony G. Spangler, Sheridan, both of Ind., assignors to Masco Corporation of Indiana, Taylor, Mich.
Filed Aug. 10, 1988, Ser. No. 230,538
Term of patent 14 years
U.S. Cl. D23—255



### 316,896
### PROTECTOR FOR A WATER SPOUT

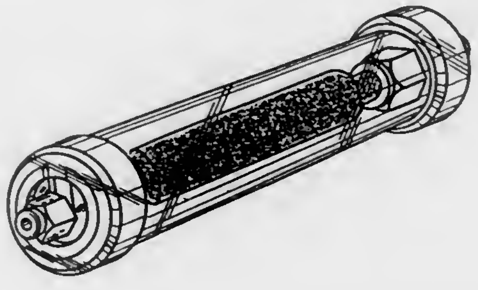
Stanley Fukuoka, Chicago, Ill., assignor to JED Products, Inc., Teaneck, N.J.
Filed Jul. 21, 1988, Ser. No. 222,240
Term of patent 14 years
U.S. Cl. D23—256





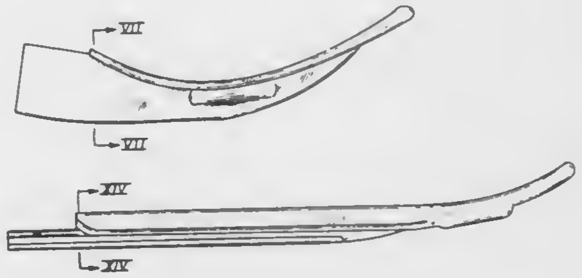
### 316,897
### COMBINED GAS TREATMENT TUBE AND ENCLOSING GUARD TUBE

Barry L. Burger, Bellefonte, and John F. McDevitt, State College, both of Pa., assignors to Supelco, Inc., Bellefronte, Pa.
Filed Apr. 14, 1987, Ser. No. 38,805
Term of patent 14 years
U.S. Cl. D24—8



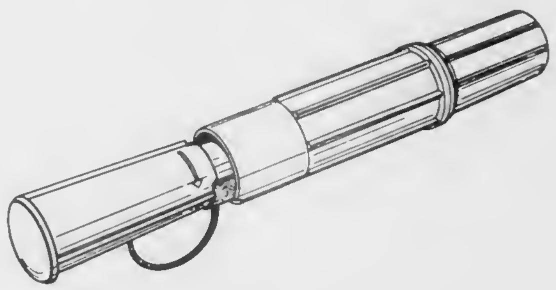
### 316,898
### LARYNGOSCOPE BLADE COVER

Chang S. Park, 65 Methodist Rd., Greenville, Pa. 16125
Filed Jan. 21, 1988, Ser. No. 146,357
Term of patent 14 years
U.S. Cl. D24—17



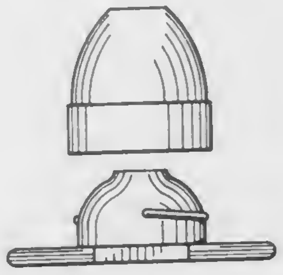
### 316,899
### TWO-CHAMBER INJECTOR

Ake B. Andersson, Onsala, and Kjell I. Wellenstam, Gothenburg, both of Sweden, assignors to Astra Meditec AB, Molndal, Sweden
Filed Feb. 18, 1988, Ser. No. 158,988
Claims priority, application Sweden, Sep. 1, 1987, 871923
Term of patent 14 years
U.S. Cl. D24—24



### 316,900
### NON-DRIP BABY BOTTLE CAP

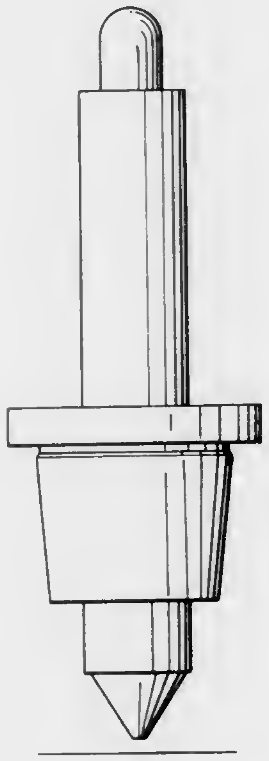
Lesa L. White, and Johnny R. White, both of 706 S. Sutton, Mabank, Tex. 75147
Filed Sep. 2, 1988, Ser. No. 240,045
Term of patent 14 years
U.S. Cl. D24—47



VOL 1126 ISS 2 MY 14 1991 UMI

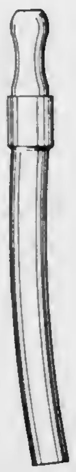
### 316,901
### DROPPER TIP OR SIMILAR ARTICLE

James W. Walsh, 3832 Beech Ave., Baltimore, Md. 21211
Filed Sep. 23, 1987, Ser. No. 100,008
Term of patent 14 years
U.S. Cl. D24—51



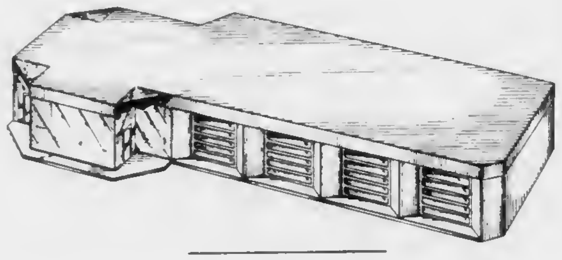
### 316,902
### METER HOSE INHALER RESERVOIR

H. Curt Hoelfing, 18475 Phyllis Rd., Cottonwood, Calif. 96022
Filed Sep. 2, 1988, Ser. No. 239,846
Term of patent 14 years
U.S. Cl. D24—62



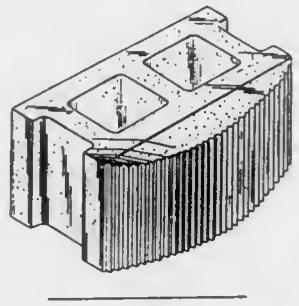
### 316,903
### BUILDING FOR AN AUTOMOTIVE SERVICE STATION OR THE LIKE

Raymond Poelvoorde, New York, N.Y., assignor to Sun Refining and Marketing Company, Philadelphia, Pa.
Filed Dec. 16, 1988, Ser. No. 285,888
The portion of the term of this patent subsequent to May 21, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—34



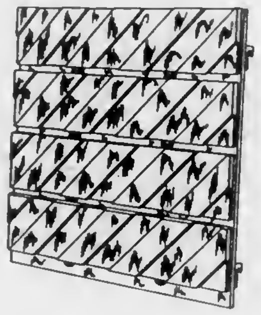
### 316,904
### CONVEX BLOCK

Paul J. Forsberg, 7600 France Ave. South, Edina, Minn. 55435
Continuation-in-part of Ser. No. 863,399, May 14, 1986, Pat. No. Des. 301,064. This application Nov. 21, 1988, Ser. No. 273,874
The portion of the term of this patent subsequent to May 9, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—114



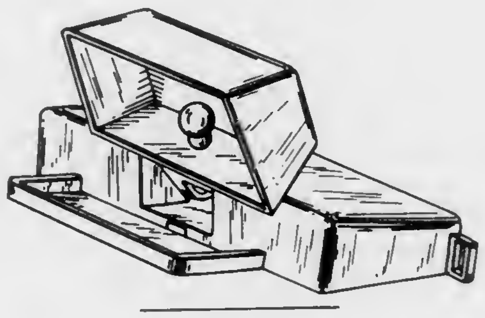
### 316,905
### DECORATIVE PANEL

Jorgen Michaelsen, Struer, Denmark, assignor to Bang & Olufsen, Struer, Denmark
Filed Jan. 5, 1988, Ser. No. 140,801
Claims priority, application Denmark, Jul. 6, 1987, MA 740 1987
Term of patent 14 years
U.S. Cl. D25—138



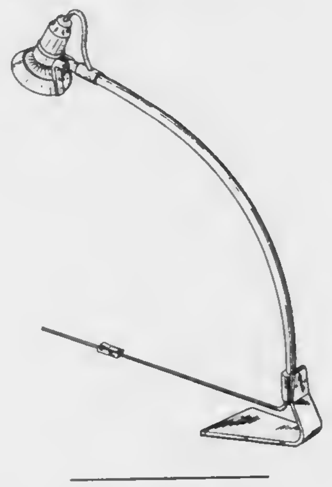
### 316,906
### PORTABLE LIGHT

Arthur S. Friedman, Box 625, 2144 Seneca West, Merrick, N.Y. 11566
Filed Jul. 19, 1989, Ser. No. 381,939
Term of patent 14 years
U.S. Cl. D26—44



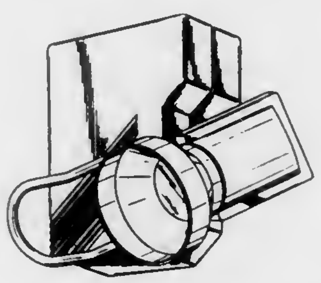
### 316,907
### ADJUSTABLE LAMP

Mario Barbaglia, and Marco Colombo, both of Milan, Italy, assignors to Paf SRL, Italy
Filed Mar. 13, 1989, Ser. No. 322,236
Term of patent 14 years
U.S. Cl. D26—62



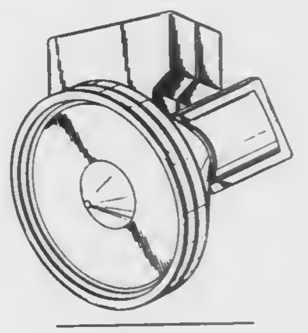
### 316,908
### ADJUSTABLE SPOTLIGHT

Paul Atkinson, Leicester, and Robert Stuart, East Dean, Nr. Eastbourne, both of England, assignors to GTE Rotaflex Limited, London, England
Filed Dec. 23, 1988, Ser. No. 288,803
Claims priority, application United Kingdom, Jul. 1, 1988, 1051991
Term of patent 14 years
U.S. Cl. D26—63



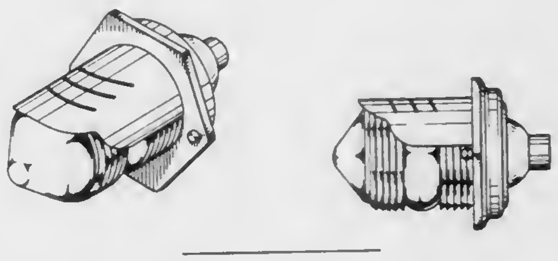
### 316,909
### ADJUSTABLE SPOTLIGHT

Atkinson Paul, Leicester, and Robert Stuart, East Dean, Nr. Eastbourne both of England, assignors to GTE Rotaflex Limited, London, England
Filed Dec. 23, 1988, Ser. No. 288,816
Claims priority, application United Kingdom, Jul. 1, 1988, 1051991
Term of patent 14 years
U.S. Cl. D26—63



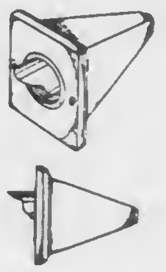
### 316,910
### EXTERIOR LIGHTING FIXTURE

Kevork P. Hazerjian, West Roxbury, Mass., and Amos Levitt, South Orange, N.J., assignors to Sturdy Lantern Mfg. Co., Inc., North Attleboro, Mass.
Filed Aug. 31, 1989, Ser. No. 400,970
Term of patent 14 years
U.S. Cl. D26—67



### 316,911
### EXTERIOR LIGHTING FIXTURE

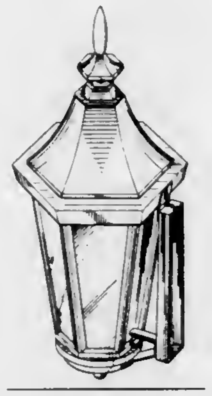
Kevork P. Hazerjian, West Roxbury, Mass., and Amos Levitt, South Orange, N.J., assignors to Sturdy Lantern Mfg. Co., Inc., North Attleboro, Mass.
Filed Aug. 31, 1989, Ser. No. 400,971
Term of patent 14 years
U.S. Cl. D26—67



VOL
1126
ISS
2
MY
14
1991
UMI

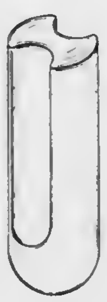
### 316,912
### WALL LANTERN

Young J. Choi, Jugong Apt. 403-701, Dunchon-dong, Kangdoog-Ku, Seoul, Rep. of Korea
Filed Apr. 6, 1989, Ser. No. 334,851
Claims priority, application Rep. of Korea, Dec. 29, 1988, 17915
Term of patent 14 years
U.S. Cl. D26—87



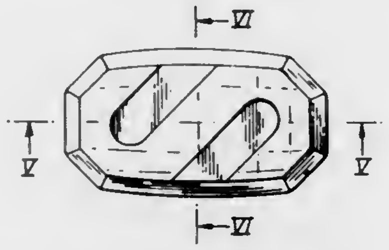
### 316,913
### SUPPOSITORY

Solomon Motola, Marlton; Martha C. Aveson, Voorhees; Richard Kenny, Manahawkin, and Robert J. Wilkinson, Hammonton, all of N.J., assignors to American Home Products Corporation, New York, N.Y.
Filed Jul. 16, 1990, Ser. No. 553,503
Term of patent 14 years
U.S. Cl. D28—2



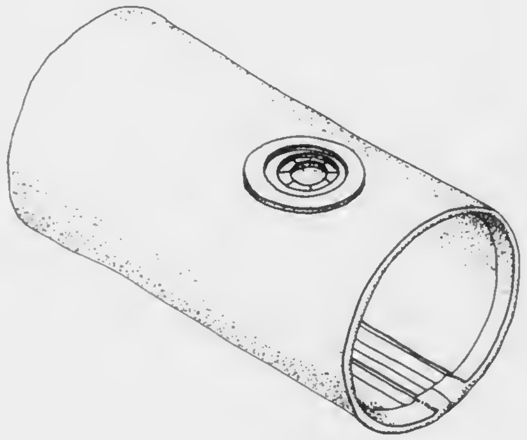
### 316,914
### TABLET

Roger Withington, Surrey, England, assignor to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio
Filed Jan. 26, 1990, Ser. No. 471,243
Claims priority, application United Kingdom, Aug. 1, 1989, 2000016
Term of patent 14 years
U.S. Cl. D28—2



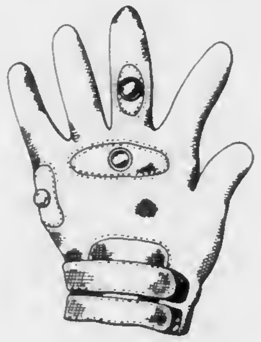
### 316,915
### PROTECTOR FOR WELDER'S GLOVES

Donald D. Dryzal, Box 8, Strongstown, Pa. 15957
Filed Jan. 12, 1987, Ser. No. 2,568
The portion of the term of this patent subsequent to Jan. 10, 2008, has been disclaimed.
Term of patent 14 years
U.S. Cl. D29—20



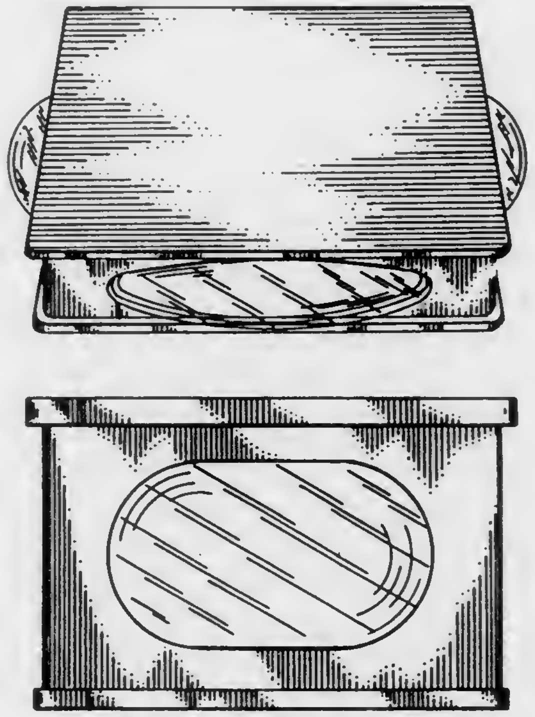
### 316,916
### BILLIARD GLOVE

Jewell James, 4305½ Lumni Shore Rd., Ferndale, Wash. 98248
Filed Sep. 11, 1987, Ser. No. 95,247
Term of patent 14 years
U.S. Cl. D29—22



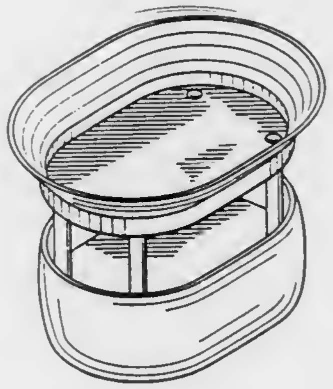
### 316,917
### AQUARIUM

Jeffrey A. Oldham, 2425 LaCosta Ave., #C, Carlsbad, Calif. 92008
Filed May 22, 1989, Ser. No. 354,691
Term of patent 14 years
U.S. Cl. D30—101



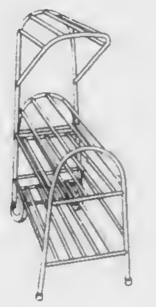
### 316,918
### PET FOOD DISH

Alvin C. Harris, 3503 Debeney, Houston, Tex. 77039
Filed Oct. 31, 1988, Ser. No. 264,500
Term of patent 14 years
U.S. Cl. D30—130



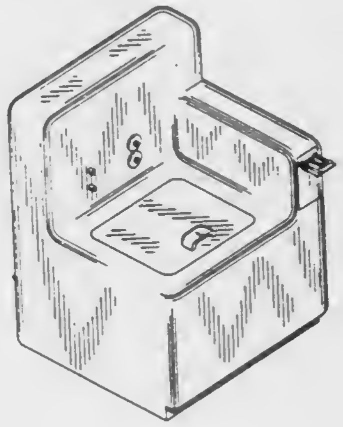
### 316,919
### STAND FOR SADDLES

Mark O. Reep, 8881 Bold Ruler La., Riverside, Calif. 92509
Filed Jan. 11, 1988, Ser. No. 142,412
Term of patent 14 years
U.S. Cl. D30—143



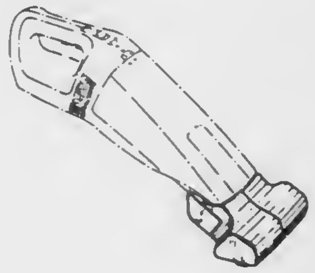
### 316,920
### WASHINE MACHINE WITH DETERGENT DISPENSER

Jess Murphy, 314 Northride Circle-Box 2067, Guymon, Okla. 73942
Filed Nov. 8, 1988, Ser. No. 268,995
Term of patent 14 years
U.S. Cl. D32—6



### 316,921
### VACUUM CLEANER BRUSH

Burton E. Gerke, Jr., Newtown; Richard B. Kosten, and Bryan P. De Blois, both of West Haven, all of Conn., assignors to Black & Decker, Inc., Newark, Del.
Filed Jan. 9, 1989, Ser. No. 294,549
Term of patent 14 years
U.S. Cl. D32—33



VOL
1126
ISS
2
MY
14
1991
UMI

# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 14TH DAY OF MAY, 1991

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Corporation: *See—*
Isaksson, Juhani, 5,014,632, Cl. 110-347.000.
A. B. Chance Company: *See—*
Eppinger, David P.; and Taj, Hatim H., 5,015,810, Cl. 200-147.00R.
Rinehart, William M., 5,015,514, Cl. 428-36.400.
Aalborg Boilers A/S: *See—*
Hyldgaard, Niels J., 5,014,652, Cl. 122-4.00D.
Aardvark Corporation, Inc.: *See—*
Sweeney, Gerald T., 5,015,014, Cl. 285-81.000.
AB Idea: *See—*
Bruce, Ingrid; and Burce, Lars, 5,015,256, Cl. 623-18.000.
Abdrakhmanov, Gabdrashit S.: *See—*
Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M., 5,014,779, Cl. 166-55.700.
Abe, Kenichi: *See—*
Takamatsu, Hisashi; Naganuma, Norihisa; and Abe, Kenichi, 5,015,055, Cl. 350-96.150.
Abe, Masahiko: *See—*
Fujii, Takaaki; Abe, Masahiko; and Kobayashi, Akio, 5,014,672, Cl. 123-492.000.
Abe, Shigemitsu: *See—*
Tanabe, Toshiya; Abe, Shigemitsu; Date, Masazumi; and Kawakita, Tetsuya, 5,015,386, Cl. 210-638.000.
Abe, Takao: *See—*
Ogawa, Tetsuo; Abe, Takao; and Asai, Toshiya, 5,016,119, Cl. 360-10.300.
Abendroth, Carl W.; and Stephenson, Gary, to AGA, Inc. Laminate wood structure. 5,015,320, Cl. 156-264.000.
Abernathy, Paul L.: *See—*
Hacker, George G.; Turner, James K.; Abernathy, Paul L.; Payne, Bobby G.; Killian, Roy C.; and Laws, David G., 5,014,526, Cl. 68-178.000.
Abernethy, Lynn W., to AMP Incorporated. Connector with double acting latch. 5,015,200, Cl. 439-357.000.
Abiko, Kenji: *See—*
Ogasawara, Sadanori; Abiko, Kenji; Ito, Masayoshi; and Shitori, Yoshiyasu, 5,015,631, Cl. 514-53.000.
Aboyoussef, Ahmed: *See—*
Hollinger, Walter P.; Aboyoussef, Ahmed; and Werner, Walter V., 5,015,095, Cl. 356-350.000.
Acculase, Inc.: *See—*
Levatter, Jeffrey I., 5,015,067, Cl. 350-96.290.
ACE Industries, Incorporated: *See—*
Schmidt, Kenneth D.; and Holt, Jan D., 5,015,131, Cl. 410-63.000.
Achiever Industries Ltd.: *See—*
Chan, Yet, 5,016,033, Cl. 354-251.000.
Actel Corporation: *See—*
El Gamal, Abbas; and Chiang, Steve S. S., 5,015,885, Cl. 307-465.000.
Acuson Corporation: *See—*
Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, 5,014,710, Cl. 128-660.050.
Acustar, Inc.: *See—*
Lawless, Daniel F., 5,014,557, Cl. 73-756.000.
Adatomed Pharmazeutische und Medizintechnische Gesellschaft mbH: *See—*
Greite, Jurgen-Hinrich, 5,015,254, Cl. 623-6.000.
Adelberg, Marvin. Clamp for regulating fluid flow through plastic tubing. 5,014,962, Cl. 251-6.000.
Adestia Corporation: *See—*
Petrohilos, Dimitri, 5,014,952, Cl. 248-250.000.
Advanced Micro Devices, Inc.: *See—*
Agrawal, Om P.; Landers, George H.; Schmitz, Nicholas A.; Moench, Jerry D.; and Ilgenstein, Kerry A., 5,015,884, Cl. 307-465.000.
Williams, Bertrand J.; and Treadway, Ronald L., 5,015,970, Cl. 331-11.000.
Wollesen, Donald L., 5,015,595, Cl. 437-31.000.
Advanced Technology Materials, Inc.: *See—*
Tom, Glenn M.; and Brown, Duncan W., 5,015,411, Cl. 252-194.000.
Aerospatiale Societe Nationale Industrielle: *See—*
Dalbera, Jacques M., 5,014,935, Cl. 244-137.100.
AGA, Inc.: *See—*
Abendroth, Carl W.; and Stephenson, Gary, 5,015.320, Cl. 156-264.000.
Agee, Donald P.: *See—*
Dupuy, Ronald E.; and Agee, Donald P., 5,014,464, Cl. 49-440.000.
Agency of Industrial Science and Technology: *See—*
Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
Ager, John W.: *See—*
Murphy, Gerald J.; Ager, John W.; and Levinson, Matthew I., 5,015,765, Cl. 562-621.000.
Agfa Gevaert Aktiengesellschaft: *See—*
Wolff, Erich, 5,015,565, Cl. 430-552.000.
Agracetus: *See—*
Christou, Paul; McCabe, Dennis; Swain, William F.; and Barton, Kenneth A., 5,015,580, Cl. 435-172.300.
Agrawal, Om P.; Landers, George H.; Schmitz, Nicholas A.; Moench, Jerry D.; and Ilgenstein, Kerry A., to Advanced Micro Devices, Inc. Multiple array high performance programmable logic device family. 5,015,884, Cl. 307-465.000.
Ahlers, Klaas: *See—*
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,672, Cl. 523-415.000.
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,673, Cl. 523-415.000.
Ahresty Corporation: *See—*
Aoyama, Shunzo; Yoshida, Kunio; Doi, Hachiro; and Sakamoto, Katsumi, 5,014,765, Cl. 164-72.000.
Aigo, Seiichiro. Bubbler device for washing semiconductor materials. 5,014,727, Cl. 134-102.000.
Aikens, Wallace R., to Gulton Industries, Inc. Illuminating system. 5,016,143, Cl. 362-32.000.
Airaksinen, Pentti, to Cimcorp Oy. Paint toner dispensing machine. 5,014,883, Cl. 222-318.000.
Aisan Kogyo Kabushiki Kaisha: *See—*
Mine, Koichi; Kikuta, Hikaru; Takeuchi, Hitoshi; and Kamiya, Kingo, 5,015,159, Cl. 417-366.000.
Aisin AW Co., Ltd.: *See—*
Kawamoto, Mutsumi; Inagaki, Hidemitsu; and Tanaka, Satoru, 5,014,800, Cl. 180-65.500.
Aisin AW Kabushiki Kaisha: *See—*
Ito, Yasunobu; and Suzuki, Kenji, 5,016,174, Cl. 364-424.100.
Suzuki, Akira; and Tanaka, Katsuya, 5,014,747, Cl. 137-625.650.
Aisin Seiki K.K.: *See—*
Kuwana, Kazutaka; Yoshida, Tsuyoshi; Tozu, Kenji; and Sakane, Shinsuke, 5,015,041, Cl. 303-95.000.
Aisin Seiki Kabushiki Kaisha: *See—*
Hara, Soichi; and Kageyama, Hiroshi, 5,014,658, Cl. 123-193.00P.
Horiuchi, Ichiro; and Kawai, Shunichi, 5,014,567, Cl. 74-359.000.
Kuwana, Kazutaka; Yoshida, Tsuyoshi; and Sakane, Shinsuke, 5,016,178, Cl. 364-426.020.
Nishii, Michiharu, 5,015,045, Cl. 303-114.000.
Ochi, Moriya; and Sahashi, Masahiro, 5,014,635, Cl. 112-311.000.
Suzuki, Hiroshi, 5,014,838, Cl. 192-89.00B.
Aizawa, Masafumi: *See—*
Nagai, Haruo; Uehara, Kiyoji; and Aizawa, Masafumi, 5,015,099, Cl. 356-437.000.
Ajinomoto Co., Inc.: *See—*
Tanabe, Toshiya; Abe, Shigemitsu; Date, Masazumi; and Kawakita, Tetsuya, 5,015,386, Cl. 210-638.000.
Ajioka, Hirofusa: *See—*
Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.
Akaoka, Akiko: *See—*
Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
Akatake Engineering Co., Ltd.: *See—*
Hayashi, Tsunemi, 5,014,889, Cl. 222-644.000.
Akebono Brake Industry Co., Ltd.: *See—*
Iwata, Yukio, 5,014,602, Cl. 92-117.00A.
Akimoto, Hajime; and Ohba, Shinya, to Hitachi, Ltd. Solid-state imaging device having series-connected pairs of switching MOS transistors for transferring signal electric charges therethrough. 5,016,108, Cl. 358-212.000.
Akira, Mitsubara: *See—*
Tanaka, Shinichi; Ishibashi, Hiromichi; Akira, Mitsubara; and Okada, Tsuyoshi, 5,016,258, Cl. 375-25.000.
Aktiebolaget Electrolux: *See—*
Faijersson, Sven I., 5,014,665, Cl. 123-329.000.
Akzo N.V.: *See—*
Bergfeld, Manfred, 5,015,752, Cl. 558-237.000.
Al-Damluji, Saad, to National Research Development Corporation. Pharmaceutical compositions. 5,015,654, Cl. 514-402.000.

VOL 1126 ISS 2 MY 14 1991 UMI

- Albin, Stephen D. Adapter for battery-powered screwdriver to attach drill chuck. 5,015,129, Cl. 408-239.00A.
- Albrecht, Linda; and Wolfram, Leszek J., to Clairol Incorporated. Composition for coloring skin and method. 5,015,263, Cl. 8-680.000.
- Albrecht, Thomas R.: *See—*
  - Zdeblick, Mark J.; and Albrecht, Thomas R., 5,015,850, Cl. 250-306.000.
- Albrecht, Wilhelm: *See—*
  - Wawra, Helmut; Albrecht, Wilhelm; Wagner, Bernd; Franke, Andreas; and Gellner, Harald, 5,014,831, Cl. 192-4.00A.
- Alcan International Limited: *See—*
  - Fulford, George D.; Lever, Gordon; and Sato, Taichi, 5,015,447, Cl. 423-21.500.
  - Smits, Paul; Rosenfeld, Aron M.; and DeFerrari, Howard F., 5,015,318, Cl. 156-233.000.
- Alden Laboratories, Inc.: *See—*
  - Drew, Terrence M.; Hanson, Chris A; and Hanson, Alden B., 5,015,313, Cl. 156-87.000.
- Aldrich, Kenneth: *See—*
  - Pellosie, John C., Jr.; Haas, Michael W.; and Aldrich, Kenneth, 5,015,188, Cl. 434-38.000.
- Alexander, Michael E. Insulation retaining apparatus. 5,014,482, Cl. 52-506.000.
- Alexandrov, Maxim L.: *See—*
  - Larin, Marxen P.; Alexandrov, Maxim L.; and Nikolaev, Valery I., 5,014,517, Cl. 62-55.500.
- Alfred Teves GmbH: *See—*
  - Kircher, Dieter; Volz, Peter; and Wupper, Hans, 5,015,044, Cl. 303-114.000.
  - Rueffer, Manfred; Toepperwien, Bernd; and Dusil, Vladimir, 5,014,597, Cl. 91-369.200.
- Alfred Treves GmbH: *See—*
  - Reinartz, Hans-Dieter; Steffes, Helmut; and Hayn, Holger V., 5,014,514, Cl. 60-533.000.
- Alfred University: *See—*
  - Wang, Xingwu, 5,015,619, Cl. 505-1.000.
  - Ward, Raymond C.; Wang, Xingwu; Carlson, William B.; and Schulze, Walter A., Jr., 5,015,622, Cl. 505-1.000.
- Ali, Fazal: *See—*
  - Podell, Allen F.; Ali, Fazal; and Benton, Robert H., 5,015,968, Cl. 330-277.000.
- Ali, Syed, to WaferScale Integration, Inc. Decoder for a floating gate memory. 5,016,216, Cl. 365-185.000.
- Alicandro, Rosemarie: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- AliMed, Inc.: *See—*
  - Cherubini, Julian H., 5,015,251, Cl. 606-203.000.
- All Tech Industries: *See—*
  - Patti, Anthony G.; DeHart, Larry L., Sr.; and DeHart, Larry L., Jr., 5,014,460, Cl. 43-113.000.
- Allen, Errol V.: *See—*
  - Nelson, Danny A.; Tomich, Stanley D.; Glover, Donald W.; Allen, Errol V.; Hales, Jeremy M.; and Dana, Marshall T., 5,016,196, Cl. 364-550.000.
- Allen, Mark; and Vestal, Marvin L., to Vestec Corporation. Electrospray method for mass spectrometry. 5,015,845, Cl. 250-288.000.
- Allergan, Inc.: *See—*
  - Chandraratna, Roshantha A. S., 5,015,658, Cl. 514-432.000.
- Alley, Lewis E.: *See—*
  - Dennis, Wendell E.; Sheeley, Steven M.; Brown, Stephen M.; Washam, Kevin A.; Alley, Lewis E.; and Cain, Marvin D., 5,014,882, Cl. 222-309.000.
- Allied-Signal Inc.: *See—*
  - Balint, Laszlo J.; and Crescentini, Lamberto, 5,015,455, Cl. 423-388.000.
  - Hollinger, Walter P.; Aboyoussef, Ahmed; and Werner, Walter V., 5,015,095, Cl. 356-350.000.
  - Navarette, Carlos A.; and Mashita, Eric M., 5,014,603, Cl. 92-165.00R.
  - Strangman, Thomas E.; and Solfest, Patricia A., 5,015,502, Cl. 427-248.100.
  - Thomson, Mark W.; and Matulich, Dan S., 5,014,518, Cl. 62-88.000.
  - Van Peppen, Jan F., 5,015,787, Cl. 568-835.000.
  - Wang, Yiren S.; Rhee, Seong K.; and Jokisch, Robert E., 5,014,827, Cl. 188-72.400.
- Allison, Charles B.: *See—*
  - Neumann, Rodney H.; and Allison, Charles B., 5,016,197, Cl. 364-550.000.
- Alt, Eckhard, to Intermedics, Inc. Rate responsive cardiac pacemaker. 5,014,700, Cl. 128-419.0PG.
- Alt, Eckhard, to Intermedics, Inc. Rate responsive cardiac pacemaker. 5,014,702, Cl. 128-419.0PG.
- Alt, Eckhard, to Intermedics, Inc. Rate responsive cardiac pacemaker. 5,014,703, Cl. 128-419.0PG.
- Alt, Eckhard, to Intermedics, Inc. Rate responsive cardiac pacemaker. 5,014,704, Cl. 128-419.0PG.
- Aluminium Pechiney: *See—*
  - Colombier, Gabriel; Lefebvre, Jacques; Galand, Jean; and Golay, Armand, 5,015,340, Cl. 204-28.000.
  - Garat, Michel, 5,014,764, Cl. 164-34.000.
- Aluminum Company of America: *See—*
  - LaCamera, Alfred; Van Linden, Jan H. L.; Pierce, Thomas V.; and Parkhill, James O., 5,015,343, Cl. 204-67.000.
- AM International, Inc.: *See—*
  - Temple, Stephen, 5,016,028, Cl. 346-140.00R.
- Amada Company, Limited: *See—*
  - Sartorio, Franco; and Carbonato, Gianfranco, 5,015,821, Cl. 219-124.340.
- Amdahl Corporation: *See—*
  - Nguyen, Kham X.; Robinson, Theodore S.; Taylor, Michael D.; and Daberkow, Kevin L., 5,016,167, Cl. 364-200.000.
- Ames, Wilbur R., IV: *See—*
  - Eilert, Randall N.; and Ames, Wilbur R., IV, 5,015,829, Cl. 235-1.00D.
- Amin, Jayendra J.; and Strikis, Guntis V., to Ford Motor Company. Multiple stage orbiting ring rotary compressor. 5,015,161, Cl. 418-6.000.
- Ammann, Hans H., to AT&T Bell Laboratories. Method and apparatus for facilitating loading of a panel processing machine and positioning of artwork on a work surface thereon. 5,014,413, Cl. 29-559.000.
- Amoco Corporation: *See—*
  - Pendergraft, Paul T., 5,015,459, Cl. 423-574.00R.
  - Pendergraft, Paul T., 5,015,460, Cl. 423-574.00R.
  - Puri, Rajen; and Stein, Michael H., 5,014,785, Cl. 166-263.000.
  - Puri, Rajen; Yee, Dan; Buxton, Thomas S.; and Majahan, Om, 5,014,788, Cl. 166-308.000.
  - Reichmann, Mark G., 5,015,794, Cl. 585-258.000.
  - Riddick, Wayne T., 5,015,697, Cl. 525-386.000.
  - Rueff, Roger M., 5,015,357, Cl. 208-32.000.
  - Walker, Robert H.; Willems, Paul A.; Huff, George A.; Grimes, Lewis E.; Tatterson, David F.; and Mehlberg, Robert L., 5,015,799, Cl. 585-500.000.
- Amoroso, Frank; and Bricker, Jacob L., to Hughes Aircraft Company. Method and apparatus for achieving improved anti-jam performance via conversion gain. 5,016,261, Cl. 375-76.000.
- AMP Incorporated: *See—*
  - Abernethy, Lynn W., 5,015,200, Cl. 439-357.000.
  - Chang, Paul S.; and Steely, Lee W., 5,016,134, Cl. 361-153.000.
  - Furrow, Randy M., 5,015,203, Cl. 439-535.000.
  - Grabbe, Dimitry G.; and Shipe, Joanne E., 5,015,191, Cl. 439-71.000.
  - Marpoe, Jr. Gary R.; and Pentz, Edward L., 5,014,535, Cl. 72-326.000.
  - Redmond, John P.; and Shaak, Ray N., 5,015,197, Cl. 439-329.000.
  - Reynolds, Charles E., 5,014,416, Cl. 29-701.000.
- Ampferer, Herbert, to Dr. Ing. h.c.F. Porsche AG. Camshaft drive of a multi-cylinder V-engine. 5,014,655, Cl. 123-90.310.
- Amsted Industries Incorporated: *See—*
  - Schultz, Thomas R., 5,014,626, Cl. 105-4.100.
- Amway Corporation: *See—*
  - Strobridge, John R., 5,015,464, Cl. 424-48.000.
- Anagnostopoulos, Panagiotis A., to Ergon S.A. Wire processing machine. 5,014,533, Cl. 72-131.000.
- Anchor Industries, Inc.: *See—*
  - Daus, John H., 5,014,369, Cl. 4-503.000.
- Anderson, Carl P.; and Mayer, Edward E., to Ricoh Company, Ltd.; and Ricoh Corporation. Recirculating automatic document feeder. 5,014,972, Cl. 271-3.100.
- Anderson Industries, Inc.: *See—*
  - Anderson, Robert K., Jr.; and Tibbett, Ernest E., II, 5,014,475, Cl. 52-19.000.
- Anderson, Neal R.: *See—*
  - Fox, Thomas M.; and Anderson, Neal R., 5,014,621, Cl. 102-213.000.
- Anderson, Nestor A.; and Walsh, Michael E., to Champion International Corporation. Easy opening gable top carton and blank therefor. 5,014,854, Cl. 206-611.000.
- Anderson, Robert K., Jr.; and Tibbett, Ernest E., II, to Anderson Industries, Inc. Step module for use in constructing stairways. 5,014,475, Cl. 52-19.000.
- Anderson, Sterling J., to United States of America, Interior. Hydraulically actuated mechanical rock excavator. 5,015,039, Cl. 299-22.000.
- Andrews, David R.; Gaeta, Federico C. A.; and Watkins, Robert W. Antiglaucoma agents. 5,015,641, Cl. 514-223.500.
- Andrews, Leonard J.: *See—*
  - Hall, Bruce T.; Andrews, Leonard J.; and Folweiler, Robert C., 5,015,281, Cl. 65-32.500.
- Andris, Raimund. Metering and spray pump for liquid and low-viscosity substances. 5,014,881, Cl. 222-207.000.
- Angell, Mickey A.; Cearley, Thomas W.; Lewis, James C.; St. Onge, Arthur R.; Szysh, John A.; and White, Kenneth W., to R. J. Reynolds Tobacco Company. Automated cargo loading system. 5,015,145, Cl. 414-547.000.
- Ankrom, Dennis M.: *See—*
  - Muck, Dennis N.; Ankrom, Dennis M.; and Brown, George B., 5,014,976, Cl. 271-220.000.
- Anritsu Corporation: *See—*
  - Nagai, Haruo; Uehara, Kiyoji; and Aizawa, Masafumi, 5,015,099, Cl. 356-437.000.
- ANT Nachrichtentechnik GmbH: *See—*
  - Rein, Hans-Martin, 5,015,872, Cl. 307-269.000.
- Anthes, Robert J.; and Kremer, Ross A., to Mobil Oil Corp. Catalytic dewaxing process employing surface acidity deactivated zeolite catalysts. 5,015,361, Cl. 208-111.000.
- Antonious, Anthony J. Iron type golf club head. 5,014,993, Cl. 273-169.000.

- Anttonen, Raine, to Ronde Engineering. Conveyor belt cleaner. 5,014,844, Cl. 198-499.000.
- Aoki, Syozo: *See—*
  - Koboshi, Shigeharu; Kobayashi, Kazuhiro; Aoki, Syozo; and Takabayashi, Naoki, 5,015,560, Cl. 430-398.000.
- Aonuma, Masashi; Kasuga, Akira; and Masuda, Haruo, to Fuji Photo Film Co., Ltd. Method for preparing a magnetic recording medium. 5,015,498, Cl. 427-132.000.
- Aosai, Fumito: *See—*
  - Kobayashi, Yukio; Nagai, Shoichi; Takesue, Masatoshi; Aosai, Fumito; and Inoue, Masao, 5,015,524, Cl. 428-332.000.
- Aoshima, Shigeru: *See—*
  - Kamiunten, Shoji; Aoshima, Shigeru; Tsumura, Takashi; Ochiai, Kouichi; and Inaba, Takashi, 5.014,552, Cl. 73-204.210.
- Aoyama, Shunzo; Yoshida, Kunio; Doi, Hachiro; and Sakamoto, Katsumi, to Ahresty Corporation. Heat retaining method for molten metal supplied into injection sleeve, method of applying heat insulating powder onto an inner surface of the injection sleeve, and device therefor. 5,014,765, Cl. 164-72.000.
- Applied Biosystems, Inc.: *See—*
  - Wiktorowicz, John E., 5,015,350, Cl. 204-180.100.
- Arai, Tsutomu: *See—*
  - Yamada, Katsuyoshi; and Arai, Tsutomu, 5,015,813, Cl. 219-10.55F.
- Arai, Yukiyoshi, to Ricoh Company, Ltd. Paper transporting device for an image recorder having guide ribs on a transport surface. 5,016,060, Cl. 355-312.000.
- Araki, Shintaro; Matsunaga, Fujihisa; and Fukuhara, Hiroshi, to Mitsui Petrochemical Industries Inc. Preparation of cumene through alkylation of an aromatic compound and preparation of phenol through cumene. 5,015,786, Cl. 568-798.000.
- Arber, Amihadar: *See—*
  - Graupe, Daniel; and Arber, Amihadar, 5,014,705, Cl. 128-419.00R.
- Arcas, Noe; and Parente, Charles A., to Grumman Aerospace Corporation. Acoustic liner. 5,014,815, Cl. 181-213.000.
- Arco Chemical Technology, Inc.: *See—*
  - Sullivan, Carl J., 5,015,410, Cl. 252-166.000.
- Ardaud, Pierre; LeBrun, Jean-Jacques; and Mignani, Gerard, to Rhone-Poulenc Chimie. Preparation of boron/nitrogen preceramic polymers. 5,015,607, Cl. 501-96.000.
- Ardco, Inc.: *See—*
  - Kaspar, Melvin, 5,016,146, Cl. 362-92.000.
- Ardes, Ron: *See—*
  - Guarriellò, Theodore J.; Guarriello, Henry J., Jr.; and Guarriello, Joseph A., 5,014,480, Cl. 52-309.120.
- Arena, Alan J.: *See—*
  - Watkins, William M.; Toyne, David L.; Arena, Alan J.; Lawver, Larry D.; and Birket, Daniel S., 5,015,933, Cl. 318-567.000.
- Arena, Frank R. Universal nut. 5,015,133, Cl. 411-267.000.
- Ariga, Masao, to Kabushiki Kaisha Taihei Seisakusho. Method of circulating a heat transfer medium through a caterpillar and a plate treating apparatus using the caterpillar. 5,014,772, Cl. 165-86.000.
- Arimoto, Akira: *See—*
  - Nakamura, Shigeru; Takahashi, Sadao; Watanabe, Masateru; and Arimoto, Akira, 5,016,237, Cl. 369-112.000.
- Arizona Board of Regents: *See—*
  - Skibo, Edward B., 5,015,742, Cl. 548-323.000.
- Arizono, Kenzo: *See—*
  - Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.
- Armco Steel Company, L.P.: *See—*
  - Guzzetta, Franklin H.; Gibson, Alan F.; and Mitch, David S., 5,015,341, Cl. 204-28.000.
- Armstrong, Ernest T. Refuse separator. 5,014,858, Cl. 209-641.000.
- Arnold, Douglas B.; Bromfield, George; and Gardner, John C., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Sonar transducers. 5,016,228, Cl. 367-163.000.
- Arnold, Felix. Tent. 5,014,728, Cl. 135-104.000.
- Arnold, Nanci N. Cooking oil container and applicator. 5,015,112, Cl. 401-202.000.
- Arnoldt, Peter J., to Ductmate Industries, Inc. Duct connector. 5,015,018, Cl. 285-367.000.
- Arntz, Dietrich; and Wiegand, Norbert, to Degussa Aktiengesellschaft. Method of preparing 1,3-propanediol. 5,015,789, Cl. 568-862.000.
- ARO Corporation, The: *See—*
  - Ohman, Lachlan; and Meyer, Gary L., 5,014,950, Cl. 248-231.500.
- Arrington, Stephen T., to Halliburton Company. Composition and method for removing iron containing deposits from equipment constructed of dissimilar metals. 5,015,298, Cl. 134-2.000.
- Arrow Paper Products Company: *See—*
  - Galonska, David A., 5,014,579, Cl. 82-47.000.
- Artemide S.p.A.: *See—*
  - Gismondi, Ernesto; and Bissell, John T., 5,016,153, Cl. 362-402.000.
- Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
  - Yamamoto, Fumihiko; and Misumi, Teruyuki, 5,015,707, Cl. 526-212.000.
- Asahi Kogaku Kogyo K.K.: *See—*
  - Okuyama, Takashi; and Iwama, Masatoshi, 5,015,846, Cl. 250-235.000.
- Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
  - Haraguchi, Keisuke; Kohmoto, Shinsuke; and Kondoh, Shigeru, 5,016,032, Cl. 354-195.100.
  - Kobayashi, Takeo; Nishida, Takao; Tabata, Yasushi; Numako, Norio; and Nagai, Katsutoshi, 5,016,038, Cl. 354-418.000.
  - Minefuji, Nobutaka, 5,015,079, Cl. 350-470.000.
  - Mori, Seiichi; Takano, Masatoshi; and Ichinokawa, Kazuhiro, 5,016,029, Cl. 346-160.000.
  - Takahashi, Nagashige, 5,014,685, Cl. 128-4.000.
- Asahina, Koutarou: *See—*
  - Machida, Koichi; Kitahara, Mikio; Kubo, Takayuki; Torikai, Motoyuki; and Asahina, Koutarou, 5,015,674, Cl. 523-435.000.
- Asai, Tadamichi: *See—*
  - Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.
- Asai, Toshiya: *See—*
  - Ogawa, Tetsuo; Abe, Takao; and Asai, Toshiya, 5,016,119, Cl. 360-10.300.
- Asakura, Yamoto: *See—*
  - Nagase, Makoto; Asakura, Yamoto; Utamura, Motoaki; and Uchida, Shunsuke, 5,015,436, Cl. 376-306.000.
- Asami, Katsuhiko: *See—*
  - Hashimoto, Koji; Yoshioka, Hideaki; Asami, Katsuhiko; and Kawashima, Asahi, 5,015,352, Cl. 204-192.150.
- Asano, Norio: *See—*
  - Takeshima, Eiki; Takatsu, Kiyoshi; Asano, Norio; and Hozumi, Masahiro, 5,015,863, Cl. 250-515.100.
- Asano, Yasuhisa: *See—*
  - Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 5,015,582, Cl. 435-189.000.
- Asao, Koichi: *See—*
  - Kambara, Yoshihiko; Oonaka, Itsuo; Asao, Koichi; and Fukushima, Kyoko, 5,015,766, Cl. 564-127.000.
- Asaro, Stanley B.; and Asaro, Toni J. Article support apparatus. 5,014,948, Cl. 248-215.000.
- Asaro, Toni J.: *See—*
  - Asaro, Stanley B.; and Asaro, Toni J., 5,014,948, Cl. 248-215.000.
- Asars, Juris A.: *See—*
  - Matthews, Gregory D.; and Asars, Juris A., 5,015,959, Cl. 324-557.000.
- Ashley, Timothy: *See—*
  - Elliott, Charles T.; and Ashley, Timothy, 5,016,073, Cl. 357-30.000.
- Ashok, Sankaranarayanan; Cheskis, Harvey P.; and Tyler, Derek E., to Olin Corporation. Extrusion of metals. 5,015,438, Cl. 419-23.000.
- Ashok, Sankaranarayanan: *See—*
  - Tyler, Derek E.; Ashok, Sankaranarayanan; and Cheskis, Harvey P., 5,015,439, Cl. 419-23.000.
- Asmo Co., Ltd.: *See—*
  - Kikuta, Tomoyuki; and Kawaguchi, Chikara, 5,015,930, Cl. 318-466.000.
- AT&E Corporation: *See—*
  - Hoff, Don G., 5,016,273, Cl. 380-10.000.
- AT&T Bell Laboratories: *See—*
  - Ammann, Hans H., 5,014,413, Cl. 29-559.000.
  - Brown, George N.; Howard, Luke J.; and Rimmler, William F., 5,016,081, Cl. 357-67.000.
  - Darwish, Mohamed N., 5,016,076, Cl. 357-38.000.
  - Fite, Franklin D., Jr., 5,016,243, Cl. 370-16.000.
  - Ford, William A., 5,016,271, Cl. 379-410.000.
  - Glenn, Jerry L., 5,015,508, Cl. 427-424.000.
  - Panuska, Andrew J.; and Patel, Parbhubhai D., 5,015,063, Cl. 350-96.230.
  - Petisce, James R., 5,015,068, Cl. 350-96.300.
  - Scott, Jeffrey W.; and Viswanathan, Thayamkulangara R., 5,016,012, Cl. 341-118.000.
- Atlas Copco AB: *See—*
  - Hansson, Gunnar C., 5,014,794, Cl. 173-12.000.
- Atochem North America, Inc.: *See—*
  - Reilly, James L.; and Leader, Gordon R., 5,015,775, Cl. 568-28.000.
  - Sandler, Stanley R., 5,015,776, Cl. 568-41.000.
- ATR Communication Systems Research Laboratories: *See—*
  - Tomono, Akira; Iida, Muneo; and Ohmura, Kazunori, 5,016,282, Cl. 382-2.000.
- Atsugi Motor Parts Company, Limited: *See—*
  - Harima, Toshio; Sato, Kenichi; and Matsuya, Tatsuyuki, 5,014,836, Cl. 192-58.00B.
- Atsugi Unisia Corporation: *See—*
  - Hirao, Sumio; Matsunaga, Masaji; and Yamada, Yoshihiro, 5,014,604, Cl. 92-212.000.
- Atsumi, Shigeru: *See—*
  - Sato, Masaki; and Atsumi, Shigeru, 5,016,077, Cl. 357-41.000.
- Attic Technology, Inc.: *See—*
  - Palmer, Edward G., 5,014,770, Cl. 165-48.200.
- Auburn International, Inc.: *See—*
  - Dechene, Ronald L.; Smith, Thomas B.; and Marino, Scott A., 5,015,954, Cl. 324-307.000.
- Aucagne, Jean: *See—*
  - Bompard, Bruno; and Aucagne, Jean, 5,014,755, Cl. 139-420.00A.
- Augers Unlimited, Inc.: *See—*
  - Gibson, Paul N., 5,014,795, Cl. 175-45.000.
- Augustine, Frank L.; and Evans, Scott B., to Hughes Aircraft Company. Thermally isolated focal plane readout. 5,015,858, Cl. 250-352.000.
- Aukland (USA), Inc.: *See—*
  - Gray, Norman, 5,014,361, Cl. 2-167.000.
- Aumann, Gerd; Giesen, Matthias; Klatte, Gerd; and Korte, Hans-Jurgen, to Deutsche Solvay-Werke GmbH Underseal composition, and process for the production thereof. 5,015,669, Cl. 523-200.000.
- Automobiles Citroen: *See—*
  - Trapy, Jean, 5,014,662, Cl. 123-250.000.

VOL
1126
ISS
2
MY
14
1991
UMI

Automobiles Peugeot: *See—*
Trapy, Jean, 5,014,662, Cl. 123-250.000.
Autotrol Corporation: *See—*
Roos, William N., 5,014,877, Cl. 221-265.000.
Auyer, Richard A.; Buccellato, Robert J.; Gidynski, Andrew J.; Ingersoll, Richard M.; and Sridharan, Needangalam S., to General Dynamics Land Systems, Inc. Perforated plate armor. 5,014,593, Cl. 89-36.020.
Avia Group International, Inc.: *See—*
Richard, Daniel; Kolman, Kenneth; Case, Charles; Becker, Ronald; and Gross, Alex, 5,014,449, Cl. 36-114.000.
Avis, Richard J. A., to Sony Corporation. Motion dependent video signal processing. 5,016,102, Cl. 358-140.000.
Avis, Richard J. A.: *See—*
Richards, John W.; Gillard, Clive H.; Avis, Richard J. A.; Samad, Raphael; and Walters, Carl W., 5,016,101, Cl. 358-140.000.
Awai, George K.; and Lee, Song S., to Fiberstars, Inc. Focused light source and method. 5,016,152, Cl. 362-293.000.
Axiom Analytical, Inc.: *See—*
Doyle, Walter M., 5,015,100, Cl. 356-445.000.
Ayers, Alan D.: *See—*
Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 5,015,542, Cl. 429-56.000.
Azevedo, Jose M. I.: *See—*
Sweet, Richard C.; Azevedo, Jose M. I.; and Bronnes, Robert L., 5,015,536, Cl. 428-611.000.
Azuma, Makoto; Takahashi, Jun; Yamauchi, Hirohiko; and Ueda, Nobuo, to Nihon Medi-Physics Co. Ltd. Stable stannous chloride composition for labeling with radioactive technetium. 5,015,462, Cl. 424-1.100.
B. Bunch Company, Inc.: *See—*
Bunch, Earnest B., III, 5,015,222, Cl. 493-11.000.
Bacchi, Paul E.: *See—*
Filipski, Paul S.; and Bacchi, Paul E., 5,015,832, Cl. 235-462.000.
Backhaus, Jurgen; Mangold, Dieter; and Knappe, Wolfgang-Reinhold, to Boehringer Mannheim GmbH. Apparatus for determining a proteolytic or esterolytic substance and method for determining a proteolytic or esterolytic substance using a layered apparatus. 5,015,572, Cl. 435-19.000.
Bacus, James W.; and Marder, Robert J., to Cell Analysis Systems, Inc. Methods and apparatus for immunoploidy analysis. 5,016,283, Cl. 382-6.000.
Baechle, Georg: *See—*
Koch, Peter; Waas, Peter; Neumeyer, Franz; and Baechle, Georg, 5,014,910, Cl. 237-2.00A.
Bailey, August V.: *See—*
Moreau, Jerry P.; Bailey, August V.; and DeLucca, Anthony J., II, 5,015,419, Cl. 260-410.90R.
Baird, William C., Jr.; and Shoukry, Ehsan I., to Exxon Research and Engineering Company. Novel alumina support materials. 5,015,614, Cl. 502-250.000.
Baker, Gary A.: *See—*
Czarn, David A.; Rahman, Aziz; Sadler, Alan M.; and Baker, Gary A., 5,015,808, Cl. 200-83.00P.
Baker, Glen M.: *See—*
Seibel, Michael J.; Fullmer, Douglas E.; Bossaller, James E.; and Baker, Glen M., 5,016,202, Cl. 364-571.070.
Baldassarre, Ferdinand, to Moteurs Leroy-Somer. Electromagnetic brake with clamping jaws. 5,014,828, Cl. 188-173.000.
Balint, Laszlo J.; and Crescentini, Lamberto, to Allied-Signal Inc. Disulfonate process control. 5,015,455, Cl. 423-388.000.
Ball, Garry L.: *See—*
Johnson, Russell I.; Radke, Daniel D.; and Ball, Garry L., 5,015,148, Cl. 414-722.000.
Ballard, James G.: *See—*
LeGrand, Pierre N.; Ballard, James G.; Liegel, Reinald D.; and Wisner, Craig A., 5,014,442, Cl. 33-608.000.
Ballstadt, George. Extruded molding for glass block structures. 5,014,471, Cl. 52-98.000.
Baltusis, Paul A.; Greene, Thomas L.; and Palansky, Bruce J., to Ford Motor Company. Learned N/V ratio electronic control for automatic transmission reference speed in a driveline having unknown axle ratio. 5,016,175, Cl. 364-424.100.
Ban, Tadahiko, to Kabushiki Kaisha Baarei. Ornamental snap fasteners. 5,014,400, Cl. 24-108.000.
Banbury Gold Mines Ltd.: *See—*
Severn, Shawn R. T.; Rodriguez, Henry; Danesin, Renato R. A.; and Imber, Bryan E., 5,015,586, Cl. 436-29.000.
Bandzul, John H. Truck mounted snow plow support cap. 5,014,451, Cl. 37-231.000.
Baratelli, Charles, to DBS Optical, Inc. Pince-Nez eyeglasses. 5,015,087, Cl. 351-65.000.
Barber-Greene Company: *See—*
Brock, James D.; Smith, Donald W.; Basset, James H.; and Renneck, John P., 5,015,120, Cl. 404-108.000.
Barbier, Marcel M., to Marcel M. Barbier, Inc. Combination door and door frame. 5,014,463, Cl. 49-401.000.
Barbot, Joel: *See—*
Warnan, Francois; and Barbot, Joel, 5,014,953, Cl. 248-284.000.
Barcel, James E.; and Soukup, Thomas M., to Siemens-Pacesetter, Inc. Lead to electrode joint assembly and method of manufacture thereof. 5,014,720, Cl. 128-786.000.
Barclay, Clay; and Shallenburger, Larry, to Crown International, Inc. Amplifier control system. 5,015,969, Cl. 330-284.000.
Bardin, C. Wayne: *See—*
Spiess, Joachim; Rivier, Jean E. F.; Bardin, C. Wayne; and Vale, Wylie W., Jr., 5,015,729, Cl. 530-350.000.
Bares, Steven J.: *See—*
Bruder, Horst; Dyllick-Brenzinger, Rainer; Mayer, Udo; and Bares, Steven J., 5,015,292, Cl. 106-22.000.
Barkan, Edward: *See—*
Shepard, Howard M.; Gofman, Yuri; and Barkan, Edward, 5,015,833, Cl. 235-472.000.
Barnes, Roger M.; and Comparato, Stephen L., to Loadmaster Manufacturing, Inc. Vehicle display lift. 5,015,146, Cl. 414-639.000.
Barr, William A. Alarm system for vehicle automatic transmission. 5,015,991, Cl. 340-456.000.
Bartmann, Martin: *See—*
Finke, Jurgen; Feinauer, Roland; and Bartmann, Martin, 5,015,680, Cl. 524-99.000.
Barton, David M., to United States of America, Energy. Neutron activated switch. 5,015,433, Cl. 376-245.000.
Barton, Kenneth A.: *See—*
Christou, Paul; McCabe, Dennis; Swain, William F.; and Barton, Kenneth A., 5,015,580, Cl. 435-172.300.
Barton, Kenneth E., Jr.: *See—*
Hough, Jack V. D.; Dormer, Kenneth J.; Barton, Kenneth E., Jr.; and Chow, Robert Y., 5,015,225, Cl. 600-25.000.
Barton, Lowell R.; and Humphrey, Henry L., to Texas Instruments Incorporated. Deep access bond head. 5,014,900, Cl. 228-4.500.
Bary, Daniel: *See—*
Lessi, Jacques; Perreau, Philippe; Bary, Daniel; and Grard, Guy, 5,014,440, Cl. 33-557.000.
Barzaghi, Fernando: *See—*
Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, 5,015,655, Cl. 514-413.000.
BASF Aktiengesellschaft: *See—*
Blanpain, Peter R. J.; and Leenders, Hendrikus W., 5,015,713, Cl. 526-318.400.
Bruder, Horst; Dyllick-Brenzinger, Rainer; Mayer, Udo; and Bares, Steven J., 5,015,292, Cl. 106-22.000.
Dix, Johannes P.; Fikentscher, Rolf; and Steenken-Richter, Ingrid, 5,015,754, Cl. 558-260.000.
Dobler, Walter; and Paust, Joachim, 5,015,296, Cl. 127-42.000.
Nick, Bernhard; Bott, Kaspar; and Schulz, Guenther, 5,015,768, Cl. 564-204.000.
Rheinheimer, Joachim; Plath, Peter; Eicken, Karl; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,015,285, Cl. 71-92.000.
Schirmer, Ulrich; Rohr, Wolfgang; and Wuerzer, Bruno, 5,015,762, Cl. 560-313.000.
Steck, Werner; Lermer, Helmut; Schwarzmann, Matthias; and Dockner, Toni, 5,015,785, Cl. 568-783.000.
Steiert, Peter; Betz, Walter; Plachetta, Christoph; and Koch, Eckhard M., 5,015,681, Cl. 524-101.000.
Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl. 568-861.000.
BASF Australia, Ltd.: *See—*
Donenfeld, Henry; and Lemanis, Eduard, 5,015,261, Cl. 8-532.000.
BASF K & F Corporation: *See—*
Wood, Thomas G.; and Xenides, Carol J., 5,015,477, Cl. 424-439.000.
BASF Lacke & Farben Aktiengesellschaft: *See—*
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,672, Cl. 523-415.000.
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,673, Cl. 523-415.000.
Basset, James H.: *See—*
Brock, James D.; Smith, Donald W.; Basset, James H.; and Renneck, John P., 5,015,120, Cl. 404-108.000.
Battelle Memorial Institute: *See—*
Nelson, Danny A.; Tomich, Stanley D.; Glover, Donald W.; Allen, Errol V.; Hales, Jeremy M.; and Dana, Marshall T., 5,016,196, Cl. 364-550.000.
Ridgway, Richard W.; Seiler, Milton R.; and Wood, Van E., 5,015,052, Cl. 350-96.130.
Bauer, Hans A. Intra-uterine pessary. 5,014,722, Cl. 128-830.000.
Bauer, Klaus: *See—*
Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,015,284, Cl. 71-90.000.
Baur, Rolf, to Grau GmbH & Co. Automated archiving and retrieval system for computer data storage cassettes. 5,015,139, Cl. 414-281.000.
Baxi, Indra R., to Encore Molding Systems, Inc. Injection molding apparatus for making a hollow object. 5,015,166, Cl. 425-149.000.
Baxter International Inc.: *See—*
Winchell, David A.; and Mitchell, Richard J., 5,014,750, Cl. 138-43.000.
Baxter, James E.; and Poole, Robert D., to Royal Ordnance plc. Discarding sabots. 5,014,624, Cl. 102-503.000.
Bayer Aktiengesellschaft: *See—*
Boshagen, Horst; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, 5,015,657, Cl. 514-419.000.
Feldner, Kurt; Degen, Bruno; Wagner, Gebhard; and Schulze, Manfred, 5,015,751, Cl. 556-472.000.
Jansen, Bernhard; Muller, Hanns P.; and Hombach, Rudolf, 5,015,321, Cl. 156-331.700.
Meier, Helmut-Martin; Pielartzik, Harald; and Brinkmeyer, Hermann, 5,015,689, Cl. 525-43.000.

Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,015,428, Cl. 264-129.000.
Reiss, Gerhard, 5,015,271, Cl. 55-25.000.
Rudolph, Udo; and Wulff, Claus, 5,015,784, Cl. 568-722.000.
Sommer, Herbert; Hartwig, Jurgen; and Matthaei, Hans-Detlef, 5,015,635, Cl. 514-144.000.
Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.
Wollweber, Detlef; and Brandes, Wilhelm, 5,015,757, Cl. 558-401.000.
Bayer Antwerpen: *See—*
Verbueken, Armand; Sluyts, Domien; and Putseys, Roland, 5,015,456, Cl. 423-395.000.
Baylor, James L.; Tsao, Tsu-Pow G.; and Camacho, Michael J., to Wynn Oil Company. Vehicle power steering flush apparatus and method. 5,015,301, Cl. 134-22.100.
Beal, Sydney: *See—*
Hodges, Michael J.; and Beal, Sydney, 5,014,634, Cl. 112-262.200.
Beamon, William S., III: *See—*
Stone, Robert F.; Potter, Jeffrey D.; and Beamon, William S., III, 5,016,193, Cl. 364-518.000.
Bechem, Martin: *See—*
Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.
Beck, Doris A.: *See—*
Vaupotic, Gregory P.; Beck, Doris A.; and Chy, Sokha, 5,015,800, Cl. 174-34.000.
Beck, Henry N.; Mahoney, Robert D.; Wan, Hawk S.; and Lundgard, Richard A., to Dow Chemical Company, The. Isotropic microporous syndiotactic polystyrene membranes and processes for preparing the same. 5,015,275, Cl. 55-158.000.
Beck, Richard W.: *See—*
Solomon, Donald D.; Karakelle, Mutlu; and Beck, Richard W., 5,015,238, Cl. 604-164.000.
Becker, Bernd: *See—*
Stoeckl, Klaus; and Becker, Bernd, 5,015,035, Cl. 297-345.000.
Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., to Eka Nobel AB. 9-anthrylalkyl compounds. 5,015,755, Cl. 558-282.000.
Becker, Klaus, to BTC Biotechnik International GmbH. Process for promotion of microbial consumption of waste water fats. 5,015,385, Cl. 210-610.000.
Becker, Raymond P., to Conductive Containers, Inc. Electro-static protective container for electrical components. 5,014,849, Cl. 206-328.000.
Becker, Ronald: *See—*
Richard, Daniel; Kolman, Kenneth; Case, Charles; Becker, Ronald; and Gross, Alex, 5,014,449, Cl. 36-114.000.
Beckloff, Dennis M.; and Culberston, David L., to United States of America, Navy. Kellems grip construction for cable connector and method of using same. 5,015,805, Cl. 174-75.00C.
Becton, Dickinson and Company: *See—*
Solomon, Donald D.; Karakelle, Mutlu; and Beck, Richard W., 5,015,238, Cl. 604-164.000.
Bederke, Klaus; Ducoffre, Volker; and Graef, Knut, to Herbertsgesellschaft GmbH. Aqueous heat-curable coating substance in a polyester and acrylic base, process for its manufacture and its use. 5,015,688, Cl. 524-600.000.
Beduz, Carlo; and Scurlock, Ralph G., to BOC Group plc, The. Liquefied gas boilers. 5,014,773, Cl. 165-115.000.
Beebe, James C.; and Cargould, Barry D., to Illinois Tool Works Inc. Damped high speed tire testing machine. 5,014,551, Cl. 73-146.000.
Beecham Group P.L.C.: *See—*
Straw, Philip L., 5,015,465, Cl. 424-052.000.
Beeler, Alfred: *See—*
Gloor, Rene ; Muller, Michael; and Beeler, Alfred, 5,014,394, Cl. 19-98.000.
Beer, Klaus; Richards, Gary W.; Oare, Thomas R.; Brown, Thomas A.; and Wells, Thomas H., to Goodyear Tire & Rubber Company, The. Angled overlay belt for tires. 5,014,762, Cl. 152-532.000.
Behr Industrial Equipment Inc.: *See—*
Cann, Roger S.; and Ostin, Richard M., 5,014,645, Cl. 118-663.000.
Behrendt, Ullrich: *See—*
Zingher, Oded; Wuhrl, Arno; Behrendt, Ullrich; Schafer, Ralf; and Ziesing, Gunter, 5,014,618, Cl. 101-365.000.
Behringwerke Aktiengesellschaft: *See—*
Paques, Eric P., 5,015,583, Cl. 435-212.000.
BEI Electronics, Inc.: *See—*
Van Antwerp, Joel C., 5,015,836, Cl. 250-205.000.
Beier, Wolfgang: *See—*
Wolf, Michael; and Beier, Wolfgang, 5,016,257, Cl. 375-1.000.
Bel South Corporation: *See—*
Gaylord, William J., 5,016,109, Cl. 358-225.000.
Bell, Andrew, to Hercules Incorporated. Polymerization feed composition comprising slow gel/cure systems based on dialkylzinc. 5,015,705, Cl. 526-142.000.
Bell Communications Research, Inc.: *See—*
Sands, Timothy D., 5,016,074, Cl. 357-34.000.
Venkatesan, Thirumalai; and Wu, Xin D., 5,015,492, Cl. 427-8.000.
Bellcomb Technologies Incorporated: *See—*
Leslie, Robert H.; Neumann, Glynn F.; and Pehrson, Gene A., 5,014,476, Cl. 52-220.000.
Bellemare, Richard A.: *See—*
Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., 5,015,329, Cl. 156-628.000.
Beloit Corporation: *See—*
Garde, Gerald R., 5,015,500, Cl. 427-211.000.
Grant, Ralph S., 5,015,333, Cl. 162-60.000.
Roerig, Arnold J.; and Brown, Dale A., 5,015,336, Cl. 162-369.000.
Bemis Company, Inc.: *See—*
West, George A., 5,014,493, Cl. 53-410.000.
Benak, Arnold M.; and Villamater, Jaime V. Kidney cooling jacket. 5,014,695, Cl. 128-400.000.
Bene, Armand, to Madinox S.A. Machine for dyeing fabric in a rope. 5,014,525, Cl. 68-20.000.
Benedict, Christine V.; and Picciano, Paul T., to Bio-Polymers, Inc. Adhesives derived from bioadhesive polyphenolic proteins. 5,015,677, Cl. 524-17.000.
Bening, Robert C., Jr.: *See—*
Cotts, David B.; Brodrecht, Louisa M.; and Bening, Robert C., Jr., 5,015,699, Cl. 525-471.000.
Benner, Jack S., II; and Rees, Phyllis A., to New England Biolabs, Inc. Method for producing the HincII restriction endonuclease and methylase. 5,015,581, Cl. 435-172.300.
Bennett, Charles J.; and Simpson, Billy J., Sr. Perforating means for apparatus for heat-sealing thermoplastic sheeting. 5,015,325, Cl. 156-513.000.
Bennett, Jeffrey S.: *See—*
Burstein, Albert H.; and Bennett, Jeffrey S., 5,015,248, Cl. 606-74.000.
Bennetts, Steven A.: *See—*
Kelly, David L.; and Bennetts, Steven A., 5,014,473, Cl. 52-125.500.
Bennitt, Robert A., to Dresser-Rand Company. Gas compressor. 5,015,158, Cl. 417-525.000.
Benson, David E.; and Post, Michael T., to Brod & McClung - Pace Co. Clean room air system. 5,014,608, Cl. 98-33.100.
Benton, Robert H.: *See—*
Podell, Allen F.; Ali, Fazal; and Benton, Robert H., 5,015,968, Cl. 330-277.000.
Beratan, David N.; and Onuchic, Jose N., to United States of America, National Aeronautics and Space Administration. Molecular implementation of molecular shift register memories. 5,016,063, Cl. 357-8.000.
Berg, Bernard J.; Bowden, David R.; Cargill, Mark A.; and Given, William R., to X-Rite, Incorporated. Densitometer with error correction. 5,015,098, Cl. 356-402.000.
Bergemont, Albert, to SGS-Thomson Microelectronics S.A. Large-scale EPROM memory. 5,016,069, Cl. 357-23.500.
Berger, Joel G.; Chang, Wei K.; and Peters, Marjorie, to Schering Corporation. Substituted benzazepines, their preparation and pharmaceutical compositions containing them. 5,015,639, Cl. 514-213.000.
Bergfeld, Manfred, to Akzo N.V. Thiuram polysulfide. 5,015,752, Cl. 558-237.000.
Berghefer, Ray A. Plow mounting apparatus. 5,014,452, Cl. 37-235.000.
Bergland, Paul W.; Parker, James D.; and Timple, Thomas H., to Stevens Graphics Corporation. Register control means for web processing apparatus. 5,016,182, Cl. 364-469.000.
Berman, Allan. Quartz integrated trough/sump recirculating filtered high-purity chemical bath. 5,014,737, Cl. 137-334.000.
Berman, Samuel M.; and Jewett, Don L., to United States of America, Energy. Pupillary efficient lighting system. 5,015,924, Cl. 315-324.000.
Bernard, Petit, to Framatome; and Cogema. Device for demountable fastening of a guide tube into an end fitting of a fuel assembly of a nuclear reactor. 5,015,435, Cl. 376-285.000.
Bernhardt, Randal J.: *See—*
Goze, Jean M.; Bernhardt, Randal J.; Sajic, Branko; Rockwell, Ned M.; McConnell, Nina M.; and Mohring, William R., 5,015,415, Cl. 252-547.000.
Bernier, Serge: *See—*
Lecierc, Guy; Bernier, Serge; Lalande, Philippe; and Prijic, Nevenka, 5,015,806, Cl. 200-52.00R.
Berruti, Riccardo: *See—*
Ginatta, Marco V.; Orsello, Gianmichele; and Berruti, Riccardo, 5,015,342, Cl. 204-64.00T.
Berry, John T.: *See—*
El-Kaddah, Nagy H.; Piwonka, Thomas S.; and Berry, John T., 5,014,769, Cl. 164-493.000.
Bersonnet, George B.; and Schumway, Dante L., to Proform Fitness Products, Inc. Exercise cycle with locking mechanism. 5,014,980, Cl. 272-73.000.
Bessiere, Jacques; and Perdicakis, Michel, to Electricite de France (Service National). Amperometric method for measuring acidity. 5,015,957, Cl. 324-438.000.
Beta Phase, Inc.: *See—*
Krumme, John F.; Perry, Michael; Yasumura, Gary; and Selvin, Gerald J., 5,015,193, Cl. 439-161.000.
Bethlehem Steel Corporation: *See—*
Russo, Thomas J., 5,014,393, Cl. 164-416.000.
Better Sleep Manufacturing Co.: *See—*
Emery, William W., 5,014,860, Cl. 211-106.000.
Betz Laboratories, Inc.: *See—*
Mohn, Michael F., 5,015,391, Cl. 210-708.000.
Betz, Walter: *See—*
Steiert, Peter; Betz, Walter; Plachetta, Christoph; and Koch, Eckhard M., 5,015,681, Cl. 524-101.000

VOL 1126
ISS 2
MY 14 1991
UMI

- Beyerle, Rudi: *See—*
  - Schonafinger, Karl; Beyerle, Rudi; Schindler, Ursula; Jablonka, Bernd; and Troke, Jeffery, 5,015,659, Cl. 514-438.000.
- Bibbiani, Stephen C.: *See—*
  - Stopa, James L.; and Bibbiani, Stephen C., 5,016,139, Cl. 361-386.000.
- Bichler, Helmut, to Siemens Aktiengesellschaft. Integratable amplifier circuit. 5,015,967, Cl. 330-257.000.
- Bickham, Richard S.: *See—*
  - Cygan, Lawrence F.; Granberg, Helge O.; Bickham, Richard S.; and Missele, Carl, 5,015,972, Cl. 333-32.000.
- Bielefelder Kuchenmaschinen- und Transportgerate-Fabrik von Braucke GmbH: *See—*
  - von Braucke, Manfred; and von Braucke, Hans, 5,014,461, Cl. 47-40.500.
- Bieringer, Hermann: *See—*
  - Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,015,284, Cl. 71-90.000.
- Big Ideas Toy and Game Development, Inc.: *See—*
  - Kaser, Christopher K.; and Cummings, Gerald W., 5,014,990, Cl. 273-128.00R.
- Billingsley, Michael A.: *See—*
  - Miller, Larry D.; and Billingsley, Michael A., 5,014,945, Cl. 248-188.400.
- Bio-Lab, Inc.: *See—*
  - Jones, Ronald L.; and Wynn, Marion W., 5,015,643, Cl. 514-241.000.
- Bio-Polymers, Inc.: *See—*
  - Benedict, Christine V.; and Picciano, Paul T., 5,015,677, Cl. 524-17.000.
- Biologic Systems Corp.: *See—*
  - Bjelkhagen, Hans; and Friedman, Marc D., 5,014,709, Cl. 128-654.000.
- Biomagnetic Technologies, Inc.: *See—*
  - Dilorio, Mark S.; Robinson, Stephen E.; Crum, Duane B.; Paulson, Douglas N.; Buchanan, D. Scott; and Marsden, James R., 5,016,128, Cl. 360-97.010.
- Birckbichler, Paul J.: *See—*
  - Lee, Kyung; Patterson, Manford K., Jr.; and Birckbichler, Paul J., 5,015,588, Cl. 436-69.000.
- Bird Products Corporation: *See—*
  - DeVries, Douglas F., 5,014,694, Cl. 128-205.240.
- Birket, Daniel S.: *See—*
  - Watkins, William M.; Toyne, David L.; Arena, Alan J.; Lawver, Larry D.; and Birket, Daniel S., 5,015,933, Cl. 318-567.000.
- Birkle, Siegfried; Feucht, Hans-Dieter; Kamps, Rainer; and Rissel, Eva, to Siemens Aktiengesellschaft. Radiation-curable liquid resin for secondary coating lightwave guides. 5,015,709, Cl. 526-279.000.
- Birkmire, Robert W.: *See—*
  - Varrin, Robert D., Jr.; and Birkmire, Robert W., 5,015,503, Cl. 427-255.200.
- Birtwistle, David H.; Carter, Peter; and Rosser, David A., to Chesebrough-Pond's USA Co., division of Conopco, Inc. Topical composition. 5,015,471, Cl. 424-070.000.
- Bissell, John T.: *See—*
  - Gismondi, Ernesto; and Bissell, John T., 5,016,153, Cl. 362-402.000.
- Bissell, Martin, to Lucas Industries Public Limited Company. Fluid control device and braking system. 5,015,046, Cl. 303-118.000.
- Bitting, Ricky F., to NCR Corporation. High accuracy analog-to-digital converter with rail-to-rail reference and input voltage ranges. 5,016,014, Cl. 341-162.000.
- Bixby, Peter C.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Bjelkhagen, Hans; and Friedman, Marc D., to Biologic Systems Corp. Method and apparatus for high resolution holographic imaging of biological tissue. 5,014,709, Cl. 128-654.000.
- Black Clawson Company, The: *See—*
  - Nowisch, Heinz K.; and Tetro, Richard S., 5,014,924, Cl. 242-56.00R.
- Blanchard, Pierre, to Thomson-CSF. Superconducting device for injection of electrons into electron tubes. 5,015,920, Cl. 315-111.810.
- Blankenship, Betty A.: *See—*
  - Ekin, John W.; Panson, Armand J.; and Blankenship, Betty A., 5,015,620, Cl. 505-1.000.
- Blanpain, Peter R. J.; and Leenders, Hendrikus W., to Polysar Financial Services S.A.; and BASF Aktiengesellschaft. Alkaline polymerization of carboxylated polymers. 5,015,713, Cl. 526-318.400.
- Blass, Jacob M.: *See—*
  - Gent, John A. G.; and Blass, Jacob M., 5,015,504, Cl. 427-284.000.
- Blau, David, to Scientific Technologies Incorporated. Self-checking light curtain system and method of operation. 5,015,840, Cl. 250-221.000.
- Bleimhofer, Walter: *See—*
  - Hubner, Thorger; and Bleimhofer, Walter, 5,014,363, Cl. 2-243.00A.
- Bloemer, Guenter, to Stollenwerk Fabrik fur Sanitatsaustungen Hans Stollenwerk & Cie GmbH & Co. Carriage for a stretcher. 5,015,024, Cl. 296-20.000.
- Blomberg, Merril. Transducer mounting bracket. 5,016,225, Cl. 367-173.000.
- Bloom, Leonard: *See—*
  - Cohen, Todd J., 5,014,698, Cl. 128-419.00D.
- Blue Magic Products, Inc.: *See—*
  - Grisel, Joseph P., 5,014,399, Cl. 24-72.500.
- Blumentritt, Martin; Kohler, Reiner; and Greve, Peter, to Carl-Zeiss-Stiftung. Electric plug connector. 5,015,202, Cl. 439-487.000.
- Board of Governors of Wayne State University: *See—*
  - Ostrea, Enrique M., Jr., 5,015,589, Cl. 436-92.000.
- Board of Reagents of the University of Oklahoma: *See—*
  - Magarian, Robert A.; Pento, Joseph T.; and Day, Billy W., 5,015,666, Cl. 514-754.000.
- Board of Regents, The University of Texas System: *See—*
  - Brysk, Miriam M., 5,015,584, Cl. 435-240.230.
  - Weigel, Paul H.; and Papaconstantinou, John, 5,015,577, Cl. 435-101.000.
- BOC Group, Inc., The: *See—*
  - D'Orazio, Robert P.; and Rakszawski, John F., 5,015,396, Cl. 210-763.000.
  - Ramachandran, Ramakrishnan; Shukla, Yagya; and MacLean, Donald L., 5,015,756, Cl. 558-320.000.
- BOC Group plc, The: *See—*
  - Beduz, Carlo; and Scurlock, Ralph G., 5,014,773, Cl. 165-115.000.
  - Garrett, Michael E.; and Gardner, John B., 5,015,269, Cl. 55-16.000.
- BOC, Inc.: *See—*
  - Robin, Mark L.; and Halpern, Donald F., 5,015,781, Cl. 568-683.000.
- Boden, Eugene P.; and Phelps, Peter D., to General Electric Company. Method for preparing polycarbonates containing aliphatic ester groups. 5,015,720, Cl. 528-179.000.
- Boeckmann, Hugo, to Zip-Pak, Incorporated. Stretch stress relief for bag thermo-cross-seals in vertical form, fill and seal machines. 5,014,499, Cl. 53-451.000.
- Boeckmann, Hugo, to Zip-Pak, Incorporated. Hotseal jaws and cutoff knife assembly for processing thermoplastic film bag making material. 5,015,223, Cl. 493-194.000.
- Boehringer Mannheim GmbH: *See—*
  - Backhaus, Jurgen; Mangold, Dieter; and Knappe, Wolfgang-Reinhold, 5,015,572, Cl. 435-19.000.
- Boeing Company, The: *See—*
  - Frank, Ed, 5,015,326, Cl. 156-511.000.
  - Harm, Dorson J.; and Zabinsky, Joseph M., 5,014,933, Cl. 244-53.00B.
  - Lambregts, Antonius A., 5,016,177, Cl. 364-424.060.
  - McClaflin, James K., 5,014,934, Cl. 244-132.000.
  - Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,016,015, Cl. 342-2.000.
- Bogomolov, Rodion M.: *See—*
  - Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M., 5,014,779, Cl. 166-55.700.
- Bohler Ges. m.b.H.: *See—*
  - Daxelmueller, Manfred; Doeberl, Dieter; and Kraxner, Gerhard, 5,015,539, Cl. 428-685.000.
- Boime, Bernard; and Taquoy, Bernard, to Societe Nationale Industrielle et Aerospatiale. Tool for moulding self-stiffened panels made from a composite material. 5,015,168, Cl. 425-389.000.
- Bolejack, Kevin J.; Forgnone, Frederick; and McCoy, Christopher. Method and apparatus for bagging product units. 5,014,495, Cl. 53-433.000.
- Boles, John A.: *See—*
  - Eastman, Jay M.; and Boles, John A., 5,015,831, Cl. 235-462.000.
- Bolikal, Durgadas: *See—*
  - Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., 5,015,329, Cl. 156-628.000.
- Boltze, Carsten: *See—*
  - Holzbach, Wolfgang; Boltze, Carsten; Kramer, Karl-Heinz; and Meier, Heinrich, 5,014,759, Cl. 152-427.000.
- Bombeke, Martin; and Dambre, Paul. Steel wire for reinforcing elastomer articles with improved adhesion promoting layer. 5,014,760, Cl. 152-451.000.
- Bompard, Bruno; and Aucagne, Jean, to Brochier S.A. Textile structure with binding weave for multiple layers of non-interlaced fit filaments. 5,014,755, Cl. 139-420.00A.
- Bomse, David S.; Silver, Joel A.; and Stanton: Alan C., to Southwest Sciences, Incorporated. Mass spectroscopic apparatus and method. 5,015,848, Cl. 250-281.000.
- Boner, Heinrich: *See—*
  - Fullemann, Jorg; and Boner, Heinrich, 5,015,173, Cl. 431-116.000.
- Bonetti, Carla: *See—*
  - Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, 5,015,655, Cl. 514-413.000.
- Bongardt, Wolfgang; Gowert, Helmut; Winkeler, Hans-Josef; and Schneiders, Josef, to Saint-Gobain Vitrage. Process for determining the optical quality of flat glass or flat glass products. 5,016,099, Cl. 358-106.000.
- Bonk, Daniel. Valance spacer assembly. 5,014,951, Cl. 248-231.800.
- Bonnett, Roy E., to Ford Motor Company. Hinge for a folding window. 5,015,028, Cl. 296-107.000.
- Bonomi, Mauro: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Bonstein, James L., to Deutsch Fastener Corporation. Method of forming a locking nut and locked threaded connection. 5,014,411, Cl. 29-525.100.

- Boos, John B.; Papanicolaou, Nicolas A.; and Weng, Tung H., to United States of America, Navy. TiW diffusion barrier for AuZn ohmic contact to P-Type InP. 5,015,603, Cl. 437-184.000.
- Booth, Bruce L.; and Marchegiano, Joseph E., to Du Pont de Nemours, E. I., and Company. Optical fiber connector assemblies and methods of making the assemblies. 5,015,059, Cl. 350-96.170.
- Booth, Carolyn R.: *See—*
  - Coonrad, Ralph W.; and Booth, Carolyn R., 5,014,375, Cl. 5-431.000.
- Borom, Marcus P.; Hillig, William B.; Singh, Raj N.; Morrison, William A.; and Interrante, Leonard V., to General Electric Company. Fiber-containing composite. 5,015,540, Cl. 428-698.000.
- Boron, Joseph: *See—*
  - Falk, Richard A.; Janicsek, Larry; Boron, Joseph; and Colzani, James, 5,014,561, Cl. 73-864.530.
- Borowiak, Herve: *See—*
  - Junino, Alex; Vandenbossche, Jean J.; Borowiak, Herve; and Lang, Gerard, 5,015,772, Cl. 564-443.000.
- Borthwick, James T., Jr.: *See—*
  - Davis, Bill E.; Myers, Eugene W.; Goodhart, Richard B.; Paris, William M.; and Borthwick, James T., Jr., 5,014,496, Cl. 53-433.000.
- Bos, Philip J.: *See—*
  - Rumbaugh, Scott H.; Jones, Michael D.; Scheu, Friedrich; and Bos, Philip J., 5,015,057, Cl. 350-96.150.
- Boshagen, Horst; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, to Bayer Aktiengesellschaft. 2-halogen-substituted N-indolylethyl-sulphonamides and inhibiting platelet aggregation and antagonizing thromboxane $A_2$ therewith. 5,015,657, Cl. 514-419.000.
- Bossaller, James E.: *See—*
  - Seibel, Michael J.; Fullmer, Douglas E.; Bossaller, James E.; and Baker, Glen M., 5,016,202, Cl. 364-571.070.
- Bosshart, Patrick W.: *See—*
  - Houston, Theodore W.; Bosshart, Patrick W.; and Shaw, Ching-Heo, 5,015,882, Cl. 307-452.000.
- Bott, Kaspar: *See—*
  - Nick, Bernhard; Bott, Kaspar; and Schulz, Guenther, 5,015,768, Cl. 564-204.000.
- Boughten, Larry R.; Evoniuk, Christopher J.; Scott, James M.; and Staff, Karen E. Tube expanding device. 5,014,407, Cl. 29-235.000.
- Bowden, David M., to McDonnell Douglas Corporation. Refractory aluminides. 5,015,440, Cl. 419-31.000.
- Bowden, David R.: *See—*
  - Berg, Bernard J.; Bowden, David R.; Cargill, Mark A.; and Given, William R., 5,015,098, Cl. 356-402.000.
- Bowers, Gary R.: *See—*
  - Hardiman, Christopher J.; and Bowers, Gary R., 5,015,613, Cl. 502-170.000.
- Bowman, Wayne A.: *See—*
  - Dappen, Glen M.; and Bowman, Wayne A., 5,015,566, Cl. 430-567.000.
- Boyer, Wesley D., to Ford Motor Company. Ignition system with repetitive sparks. 5,014,676, Cl. 123-637.000.
- BP Chemicals Limited: *See—*
  - Dobson, Ian D., 5,015,773, Cl. 564-474.000.
- BPH Patent Holding AG: *See—*
  - Kallenbach, Dieter H. F., 5,014,382, Cl. 15-1.700.
- Bradd, Sidney H.; and Tucker, Richard R., to Hoover Company, The. Cleaner cord wrap. 5,014,385, Cl. 15-323.000.
- Bradley, Brian D.: *See—*
  - Brandon, John M.; Bradley, Brian D.; and Ratermann, Richard J., 5,015,109, Cl. 400-624.000.
- Brahmbhatt, Dhaval J., to ICT International CMOS Technology, Inc. Logic cell array using CMOS EPROM cells having reduced chip surface area. 5,016,217, Cl. 365-185.000.
- Brake, Anthony J.; Cousens, Lawrence S.; Urdea, Mickey S.; and Valenzuela, Pablo D. T., to Chiron Corporation. Hybrid DNA synthesis of insulin. 5,015,575, Cl. 435-91.000.
- Brand, John R.: *See—*
  - Story, Phillip M.; and Brand, John R., 5,015,264, Cl. 23-313.00R.
- Brandenstein, Manfred; Friedrick, Wolfgang; Haas, Roland; and Herrmann, Gerhard, to SKF GmbH. Premounted tensioning device. 5,015,216, Cl. 474-101.000.
- Brandes, Wilhelm: *See—*
  - Wollweber, Detlef; and Brandes, Wilhelm, 5,015,757, Cl. 558-401.000.
- Brandon, John M.; Bradley, Brian D.; and Ratermann, Richard J., to Eastman Kodak Company. Sheet feed construction for compact printers. 5,015,109, Cl. 400-624.000.
- Brault, Daniel; and Grousseau, Alain, to Thomson-CSF. Phase demodulator and its application to an MLS type landing system. 5,015,962, Cl. 329-346.000.
- Braunlich, Peter F.; and Tetzlaff, Wolfgang, to International Sensor Technology, Inc. Radiation dosimetry by counting differentially ionized sample areas from heavy charged particle events. 5,015,855, Cl. 250-337.000.
- Brearley, Malcolm: *See—*
  - Hurst, David C.; and Brearley, Malcolm, 5,016,249, Cl. 371-16.100.
- Breed Automotive Technology, Inc.: *See—*
  - Ramaswamy, Coodly P., 5,015,311, Cl. 149-42.000.
- Brennwalder, Daniel: *See—*
  - Wernli, Joerg; Brennwalder, Daniel; Erni, Markus; Fritschi, Isidor; and Wanzenried, Andreas, 5,014,505, Cl. 57-275.000.
- Brewing Research Foundation, The: *See—*
  - Westwood, Keith T.; and Crescenzi, Allan, 5,015,491, Cl. 426-600.000.
- Breyer, Karl-Hermann, to Carl-Zeiss-Stiftung. Probing device for a coordinate measuring apparatus. 5,014,444, Cl. 33-702.000.
- Brezee, Victor L.; and Hubben, Edward B., to Pass & Seymour, Inc. Wiring device with improved push-wire termination release. 5,015,201, Cl. 439-441.000.
- Brezette, Michael W.; Shaffer, Robert A.; Burns, Fredrick B.; and Moon, Howard R., to EZ Paintr Corporation. Pad attachment for paint roller assemblies. 5,014,384, Cl. 15-230.110.
- Bricker, Jacob L.: *See—*
  - Amoroso, Frank; and Bricker, Jacob L., 5,016,261, Cl. 375-76.000.
- Bridgestone Corporation: *See—*
  - Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,014,799, Cl. 177-211.000.
- Bridgestone/Firestone, Inc.: *See—*
  - Cetnar, James F., 5,015,505, Cl. 427-286.000.
- Briggs & Stratton Corporation: *See—*
  - Santi, John D., 5,014,605, Cl. 92-223.000.
  - Uuskallio, Arvo F., 5,014,897, Cl. 227-119.000.
- Brighton, Carl T.: *See—*
  - Pollack, Solomon R.; Brighton, Carl T.; Pienkowski, David; and Griffith, Neil J., 5,014,699, Cl. 128-419.00F.
- Brindley, Pamela K., to United States of America, National Aeronautics and Space Administration. Furnace for tensile/fatigue testing. 5,015,825, Cl. 219-390.000.
- Brinkmeyer, Hermann: *See—*
  - Meier, Helmut-Martin; Pielartzik, Harald; and Brinkmeyer, Hermann, 5,015,689, Cl. 525-43.000.
- Brinson, Gail L.: *See—*
  - McGough, Jeffrey D.; and Brinson, Gail L., 5,015,233, Cl. 604-97.000.
- Bristol-Myers Squibb Company: *See—*
  - Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., 5,015,578, Cl. 435-119.000.
  - Simms, Jack C., deceased, 5,015,646, Cl. 514-253.000.
- British Aerospace Public Limited Company: *See—*
  - Haines, Derrick J., 5,014,555, Cl. 73-518.000.
- British Petroleum Company plc, The: *See—*
  - Papavergos, Panayiotis G., 5,014,790, Cl. 169-44.000.
- British Telecommunications Public Limited Company: *See—*
  - O'Mahony, Michael J., 5,015,964, Cl. 330-4.300.
- Broadwin, Alan; Logan, Joseph N.; and Kuhl, Peter J., to Valleylab Inc. Apparatus for providing enhanced tissue fragmentation and/or hemostasis. 5,015,227, Cl. 604-22.000.
- Brochier S.A.: *See—*
  - Bompard, Bruno; and Aucagne, Jean, 5,014,755, Cl. 139-420.00A.
- Brock, James D.; Smith, Donald W.; Basset, James H.; and Renneck, John P., to Barber-Greene Company. Methods and apparatus for making an asphalt-aggregate pavement. 5,015,120, Cl. 404-108.000.
- Brockhoff, Joseph. Batting apparatus. 5,014,984, Cl. 273-26.00B.
- Brod & McClung - Pace Co.: *See—*
  - Benson, David E.; and Post, Michael T., 5,014,608, Cl. 98-33.100.
- Brodrecht, Louisa M.: *See—*
  - Cotts, David B.; Brodrecht, Louisa M.; and Bening, Robert C., Jr., 5,015,699, Cl. 525-471.000.
- Broeren, Johannes H.: *See—*
  - Heeman, Avraham; and Broeren, Johannes H., 5,014,681, Cl. 128-64.000.
- Broering, Louis C.; and Miller, Paul R., to Cummins Engine Company, Inc. Diesel engine white smoke control system. 5,014,509, Cl. 60-274.000.
- Bromfield, George: *See—*
  - Arnold, Douglas B.; Bromfield, George; and Gardner, John C., 5,016,228, Cl. 367-163.000.
- Bromine Compounds Ltd.: *See—*
  - Shorr, Leonard M.; and Peled, Michael, 5,015,685, Cl. 524-412.000.
- Bronnes, Robert L.: *See—*
  - Sweet, Richard C.; Azevedo, Jose M. I.; and Bronnes, Robert L., 5,015,536, Cl. 428-611.000.
- Brooks, Alec N., to General Motors Corporation. Method and apparatus for cooling an array of rechargeable batteries. 5,015,545, Cl. 429-99.000.
- Brooks, David A., to Oakleigh, Ltd. Device for displacing a submerged article. 5,014,912, Cl. 239-11.000.
- Brooks, Peter L.: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Bross, Walter; Kordulla, Hans; and Rid, Robert. Infrared detector. 5,015,857, Cl. 250-349.000.
- Brother Kogyo Kabushiki Kaisha: *See—*
  - Harada, Yuichi; and Funamoto, Masaya, 5,015,107, Cl. 400-144.200.
  - Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.
  - Murata, Kunihiko; Morii, Satoshi; Iwasaki, Toshiaki; and Mitsui, Hiroyuki, 5,014,633, Cl. 112-121.120.
  - Sonobe, Katsuyoshi, 5,016,041, Cl. 355-27.000.
  - Yamamoto, Takemi; and Sasaki, Ichiro, 5,016,042, Cl. 355-27.000.
- Brow, Richard K.; and Watkins, Randall D., to United States of America, Energy. High expansion, lithium corrosion resistant sealing glasses. 5,015,530, Cl. 428-433.000.
- Brown, Dale A.: *See—*
  - Roerig, Arnold J.; and Brown, Dale A., 5,015,336, Cl. 162-369.000.

VOL
1126
ISS
2
MY
14
1991
UMI

Brown, Duncan W.: *See—*
Tom, Glenn M.; and Brown, Duncan W., 5,015,411, Cl. 252-194.000.
Brown, George B.: *See—*
Muck, Dennis N.; Ankrom, Dennis M.; and Brown, George B., 5,014,976, Cl. 271-220.000.
Brown, George N.; Howard, Luke J.; and Rimmler, William F., to AT&T Bell Laboratories. Mobile ion getterer for metal conductors. 5,016,081, Cl. 357-67.000.
Brown, James M., to Copeland Corporation. Motor cover assembly and method. 5,015,155, Cl. 417-360.000.
Brown, Stephen M.: *See—*
Dennis, Wendell E.; Sheeley, Steven M.; Brown, Stephen M.; Washam, Kevin A.; Alley, Lewis E.; and Cain, Marvin D., 5,014,882, Cl. 222-309.000.
Brown, Sterling B.: *See—*
Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., 5,015,698, Cl. 525-391.000.
Brown, Thomas A.: *See—*
Beer, Klaus; Richards, Gary W.; Oare, Thomas R.; Brown, Thomas A.; and Wells, Thomas H., 5,014,762, Cl. 152-532.000.
Brown, Tobias; and Siegal, Burton L., to Sellstrom Manufacturing Company. Face shield. 5,014,353, Cl. 2-11.000.
Browne, Kevin F. Sheath introducer apparatus. 5,015,239, Cl. 604-166.000.
Brownscombe, Thomas F.: *See—*
Slaugh, Lynn H.; and Brownscombe, Thomas F., 5,015,796, Cl. 585-436.000.
Bruce, Ingrid; and Burce, Lars, to AB Idea. Method and means for fixing a joint prosthesis. 5,015,256, Cl. 623-18.000.
Bruckner-Maschinenbau Co. KG: *See—*
Cunningham, Wallace, 5,014,402, Cl. 26-91.000.
Bruder, Horst; Dyllick-Brenzinger, Rainer; Mayer, Udo; and Bares, Steven J., to BASF Aktiengesellschaft. Recording fluid for the ink jet process. 5,015,292, Cl. 106-22.000.
Brudny, Alex: *See—*
Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, 5,014,627, Cl. 108-50.000.
Brunelle, Ronald G.: *See—*
Phelon, Russell D.; and Brunelle, Ronald G., 5,015,901, Cl. 310-153.000.
Brunnert, Eberhard, to Julius Blum Gesellschaft m.b.H. Closing device for drawers. 5,015,048, Cl. 312-319.000.
Bruns, Siegfried: *See—*
Kamp, Heinz; Gerhards, Peter; and Bruns, Siegfried, 5,014,922, Cl. 242-18.00R.
Brupbacher, John M.: *See—*
Kampe, Stephen L.; Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., 5,015,534, Cl. 428-570.000.
Brussel, Richard, to Krupp Maschinentechnik Gesellschaft mit beschrankter Haftung. Apparatus for determining the distance between a pair of surfaces in communication with upper and lower mold halves in a press. 5,014,546, Cl. 73-37.500.
Bryan, Avron I.; and Cushman, Michael R. System for calibrating, monitoring and reporting the status of a pH sensor. 5,016,201, Cl. 364-571.040.
Bryan, Raymond G.; and Hlousek, Louis, to Linear Instruments. Off axis rotation of diffraction grating. 5,015,069, Cl. 350-162.170.
Bryan, William T. Closure for a container. 5,014,888, Cl. 222-541.000.
Brysk, Miriam M., to Board of Regents, The University of Texas System. Epidermal graft system. 5,015,584, Cl. 435-240.230.
BSG-Schalttechnik GmbH & Co. KG: *See—*
Prestel, Fritz; and Lohner, Martin, 5,016,140, Cl. 361-400.000.
BTC Biotechnik International GmbH: *See—*
Becker, Klaus, 5,015,385, Cl. 210-610.000.
BTS Broadcast Television Systems GmbH: *See—*
Muller, Klaus-Dieter; Rau, Ernst; and Sacher, Christian, 5,016,105, Cl. 358-182.000.
Bubash, James E. Current indicating device. 5,015,944, Cl. 324-127.000.
Buccellato, Robert J.: *See—*
Auyer, Richard A.; Buccellato, Robert J.; Gidynski, Andrew J.; Ingersoll, Richard M.; and Sridharan, Needangalam S., 5,014,593, Cl. 89-36.020.
Buchanan, D. Scott: *See—*
DiIorio, Mark S.; Robinson, Stephen E.; Crum, Duane B.; Paulson, Douglas N.; Buchanan, D. Scott; and Marsden, James R., 5,016,128, Cl. 360-97.010.
Buchanan, Gregg L.: *See—*
Wohlfarth, Paul D.; and Buchanan, Gregg L., 5,015,989, Cl. 338-195.000.
Buchanan, Max F.: *See—*
Sullivan, Robert W.; Holder, Tommie J.; and Buchanan, Max F., 5,014,653, Cl. 123-43.00A.
Bucher-Guyer AG Maschinenfabrik: *See—*
Gresch, Walter, 5,014,612, Cl. 99-276.000.
Buchner, Kenneth L.: *See—*
Lewan, Philip C.; Podlesak, Robert G.; and Buchner, Kenneth L., 5,015,378, Cl. 210-386.000.
Buese, George J., to Johnson & Johnson Orthopaedics, Inc. Method of making a stretchable orthopaedic fiberglass casting tape. 5,014,403, Cl. 28-170.000.
Bugg, Richard E. F., to U.S. Philips Corporation. CRT character display apparatus employing double height algorithm. 5,016,000, Cl. 340-731.000.
Buhler, Bruno: *See—*
Vuichard, Albin; Buhler, Bruno; and Cavin, Tell, 5,016,110, Cl. 358-227.000.
Bunch, Earnest B., III, to B. Bunch Company, Inc. Spiral paper folding machine with automatic change gear adjustment. 5,015,222, Cl. 493-11.000.
Burack, Robert D.: *See—*
Ritz, William C.; and Burack, Robert D., 5,015,828, Cl. 219-523.000.
Burba, John L., III: *See—*
Read, Arthur E., Jr.; Burba, John L., III; Doty, Peter A.; and Crabb, Clarence R., 5,015,409, Cl. 252-108.000.
Burce, Lars: *See—*
Bruce, Ingrid; and Burce, Lars, 5,015,256, Cl. 623-18.000.
Burch, Donald J.: *See—*
Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, 5,014,710, Cl. 128-660.050.
Burger, Wilfried: *See—*
Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.
Burke Company, The: *See—*
Kelly, David L.; and Bennetts, Steven A., 5,014,473, Cl. 52-125.500.
Burke, Dennis A. Anaerobic digestion process. 5,015,384, Cl. 210-603.000.
Burkitt, Garrett J., III: *See—*
Thrasher, Lawrence E.; Olson, Gordon E.; Burkitt, Garrett J., III; Schmidt, Timothy E.; Haddad, Elias M.; and Conti-Johnston, Susan, 5,014,372, Cl. 4-542.000.
Burn, Donald D.: *See—*
Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
Burns, Fredrick B.: *See—*
Brezette, Michael W.; Shaffer, Robert A.; Burns, Fredrick B.; and Moon, Howard R., 5,014,384, Cl. 15-230.110.
Burpee, Tom: *See—*
Wittig, Gary P.; and Burpee, Tom, 5,014,868, Cl. 220-85.00H.
Burroughs, James R.; and O'Kain, Alan N., to Strategic Energy Ltd. Battery with strength indicator. 5,015,544, Cl. 429-93.000.
Burroughs Wellcome Co.: *See—*
Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., 5,015,647, Cl. 514-263.000.
Burrows, Bradford J.: *See—*
Kindig, Alan L.; Lindberg, Kenneth M.; and Burrows, Bradford J., 5,015,034, Cl. 297-227.000.
Burstein, Albert H.; and Bennett, Jeffrey S., to New York Society for the Relief of the Ruptured & Crippled, Maintaining the Hospital for Special Surgery. Bone fracture fixation device. 5,015,248, Cl. 606-74.000.
Burstell, Helmut: *See—*
Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,015,284, Cl. 71-90.000.
Busch, William K.: *See—*
Donaldson, Daniel J.; and Busch, William K., 5,014,757, Cl. 141-114.000.
Bush, Arden W.; and Shirley, Everett E., to CMW, Inc. Resistance welding electrode and process. 5,015,816, Cl. 219-119.000.
Bush, Charles S.: *See—*
Cooper, David H.; and Bush, Charles S., 5,016,098, Cl. 358-98.000.
Bush, James H.: *See—*
Di Biase, Stephen A.; and Bush, James H., 5,015,368, Cl. 209-166.000.
Bustos, Rafael T., to Leggett & Platt, Incorporated. Assembly for cantilevered display header. 5,014,862, Cl. 211-193.000.
Butternut Electronics Company: *See—*
Newcomb, Donald R., 5,016,021, Cl. 343-722.000.
Butzin, Donald F.; Tunnell, George W.; King, Harold B., Jr.; and Schoenig, Frederick C., Jr., to General Electric Company. Quality assurance apparatus for dimensionally inspecting elongated components. 5,014,439, Cl. 33-533.000.
Buxton, Thomas S.: *See—*
Puri, Rajen; Yee, Dan; Buxton, Thomas S.; and Majahan, Om, 5,014,788, Cl. 166-308.000.
Byrne, James C. Disposable shaver. 5,014,427, Cl. 30-41.000.
C.J.S. Sciences Limited: *See—*
Jones, David, 5,014,738, Cl. 137-340.000.
C. Nicolai GmbH & Co. KG: *See—*
Philipp, Alexander, 5,014,706, Cl. 128-581.000.
Cabre Castellvi, Juan; Diago Meseguer, Jose ; Esteve Bianchini, Asuncion; Lenhardt Padro, Carlos E.; and Sans Pitarch, Esteve, to Gema, S.A. Piperazine intermediates. 5,015,736, Cl. 540-222.000.
Cabri, Walter: *See—*
De Bernardinis, Silvia; Cabri, Walter; Martinengo, Tiziano; and Francalanci, Franco, 5,015,745, Cl. 552-206.000.
Cadillac Gage Textron Inc.: *See—*
Tew, Sydney K., 5,015,948, Cl. 324-207.230.
Cain, Marvin D.: *See—*
Dennis, Wendell E.; Sheeley, Steven M.; Brown, Stephen M.; Washam, Kevin A.; Alley, Lewis E.; and Cain, Marvin D., 5,014,882, Cl. 222-309.000.

Calgon Corporation: *See—*
Chen, Shih-Ruey T.; and Vaughan, Craig W., 5,015,390, Cl. 210-698.000.
Muia, Ramon A.; and Donlan, Rodney M., 5,015,395, Cl. 210-755.000.
California Institute of Technology: *See—*
Smith, Lloyd M.; Fund, Steven; and Kaiser, Robert J., Jr., 5,015,733, Cl. 536-23.000.
Calkins, Jeffrey E., to United Video, Inc. Point to multi point fax transmission method and system. 5,016,115, Cl. 358-442.000.
Calvest Associates: *See—*
Culkin, Joseph B., 5,014,564, Cl. 74-61.000.
Camacho, Michael J.: *See—*
Baylor, James L.; Tsao, Tsu-Pow G.; and Camacho, Michael J., 5,015,301, Cl. 134-22.100.
Camco International Inc.: *See—*
Hamilton, Billy E.; Moore, Brian K.; and Newton, Donald E., 5,015,273, Cl. 55-53.000.
Cameron, Gordon M. Distributor for packed tower. 5,014,740, Cl. 137-561.00A.
Campbell, Henry F.: *See—*
Spada, Alfred P.; Studt, William L.; Campbell, Henry F.; Kuhla, Donald E.; and Tucker, Thomas, 5,015,638, Cl. 514-211.000.
Campbell, Michael L.: *See—*
Linton, Leon; and Campbell, Michael L., 5,014,843, Cl. 198-377.000.
Campbell, Richard E., Jr.: *See—*
Schmidt, Gregory F.; Hucul, Dennis A.; and Campbell, Richard E., Jr., 5,015,749, Cl. 556-179.000.
Camshaft Machine Company: *See—*
Lewan, Philip C.; Podlesak, Robert G.; and Buchner, Kenneth L., 5,015,378, Cl. 210-386.000.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Funk, John W.; and Saint, David H., 5,016,004, Cl. 340-825.690.
Candelora, Andrew M.: *See—*
McKay, Geoffrey H.; Candelora, Andrew M.; and Guerrette, Michael C., 5,015,977, Cl. 335-17.000.
Cane , Davide; and Venturi, Giancarlo. Device for extracting dental prostheses, crowns and the like. 5,015,185, Cl. 433-159.000.
Cann, Roger S.; and Ostin, Richard M., to Behr Industrial Equipment Inc. Electrostatic spray coating system. 5,014,645, Cl. 118-663.000.
Canon Kabushiki Kaisha: *See—*
Fukushima, Nobuo; Sakai, Shinji; Takeda, Osamu; Suzuki, Yasutomo; and Takei, Masahiro, 5,016,124, Cl. 360-69.000.
Iwata, Yoshiki, 5,015,177, Cl. 432-121.000.
Maeshima, Katsuyoshi, 5,016,116, Cl. 358-448.000.
Oikawa, Katsuya, 5,015,078, Cl. 350-432.000.
Tamura, Yasuyuki; and Kaneko, Shuzo, 5,015,552, Cl. 430-138.000.
Capps, Alan W. Golf queuing station. 5,014,985, Cl. 273-32.00R.
Car-Graph, Inc.: *See—*
Makhobey, Mark, 5,014,999, Cl. 277-3.000.
Car-O-Liner Company: *See—*
Eltvik, Bjorn, 5,014,538, Cl. 72-422.000.
Carbonato, Gianfranco: *See—*
Sartorio, Franco; and Carbonato, Gianfranco, 5,015,821, Cl. 219-124.340.
Carbone, Santo. Composite gem stone and production method. 5,015,499, Cl. 427-203.000.
Cardarelli, Nathan F.: *See—*
Mercer, William B.; Cardarelli, Nathan F.; and Henry, Richard L., 5,015,372, Cl. 210-170.000.
Carenco, Alain: *See—*
Castera, Jean-Paul; Meunier, Paul-Louis; Carenco, Alain; Dupont, Jean-Marie; and Friez, Pierre, 5,015,051, Cl. 350-96.120.
Cargill, Mark A.: *See—*
Berg, Bernard J.; Bowden, David R.; Cargill, Mark A.; and Given, William R., 5,015,098, Cl. 356-402.000.
Cargould, Barry D.: *See—*
Beebe, James C.; and Cargould, Barry D., 5,014,551, Cl. 73-146.000.
Carini, David J.; Duncia, John J. V.; and Wells, Gregory J., to Du Pont de Nemours, E. I., and Company. Treatment of hypertension with 1,2,4-angiotensin II antagonists. 5,015,651, Cl. 514-381.000.
Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co.: *See—*
Luhmer, Udo; and Schapp, Udo, 5,014,467, Cl. 51-287.000.
Carl-Zeiss-Stiftung: *See—*
Blumentritt, Martin; Kohler, Reiner; and Greve, Peter, 5,015,202, Cl. 439-487.000.
Breyer, Karl-Hermann, 5,014,444, Cl. 33-702.000.
Dietrich, Peter; and Westphal, Klaus, 5,015,082, Cl. 350-514.000.
Schwarz, Jurgen; and Lohmann, Wolfgang, 5,014,707, Cl. 128-633.000.
Carlson, Mark A.: *See—*
Smith, John A.; and Carlson, Mark A., 5,014,997, Cl. 273-360.000.
Carlson, Peter J.; and Hodgins, Robert G., to General Electric Company. Soft start solid state switch. 5,015,921, Cl. 315-208.000.
Carlson, William B.: *See—*
Ward, Raymond C.; Wang, Xingwu; Carlson, William B.; and Schulze, Walter A., Jr., 5,015,622, Cl. 505-1.000.
Carr, Peter W.; Funkenbusch, Eric F.; Rigney, Martin P.; Coleman, Patrick L.; Hanggi, Douglas A.; and Schafer, Wes A., to University of Minnesota, Regents of the. High stability porous zirconium oxide spherules. 5,015,373, Cl. 210-198.200.
Carr, William N.: *See—*
Cho, Dong-Il D.; Kumar, Suresh; and Carr, William N., 5,015,906, Cl. 310-309.000.
Carrie, Susan: *See—*
Van Loo, James; Carrie, Susan; Evans, Jerald; and Spirn, Jeffrey, 5,016,161, Cl. 364-200.000.
Van Loo, James; Carrie, Susan; and Evans, Jerald, 5,016,166, Cl. 364-200.000.
Carroll, Kenneth J.: *See—*
Pless, Benjamin D.; and Carroll, Kenneth J., 5,014,701, Cl. 128-419.0PG.
Carson, Chrislyn M.: *See—*
Pearson, Norman R.; Kleschick, William A.; and Carson, Chrislyn M., 5,015,286, Cl. 71-92.000.
Carson, William S. System for mechanized pickup of separated materials. 5,015,142, Cl. 414-408.000.
Carson, William S. Curbside container for recyclable material. 5,015,143, Cl. 414-411.000.
Carter, Peter: *See—*
Birtwistle, David H.; Carter, Peter; and Rosser, David A., 5,015,471, Cl. 424-070.000.
Caruso, Andrew J.: *See—*
Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,703, Cl. 525-537.000.
Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,704, Cl. 525-537.000.
Caruso, Angelo T.: *See—*
Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G.; Saraceno, Patricia J.; and Pacer, James M., 5,016,050, Cl. 355-208.000.
Case, Charles: *See—*
Richard, Daniel; Kolman, Kenneth; Case, Charles; Becker, Ronald; and Gross, Alex, 5,014,449, Cl. 36-114.000.
Casey, Morton P., Jr.: *See—*
Komanduri, Ranga; von Turkovich, Branimer F.; and Casey, Morton P., Jr., 5,014,581, Cl. 82-173.000.
Casio Computer Co., Ltd.: *See—*
Obata, Katsuhiko, 5,014,589, Cl. 84-735.000.
Omata, Fumio; Sakai, Katutosi; and Nomura, Yoshio, 5,014,588, Cl. 84-726.000.
Sakashita, Shigeo, 5,014,586, Cl. 84-637.000.
Casler, John A. Electronically controlled force application mechanism for exercise machines. 5,015,926. Cl. 318-9.000.
Cassarino, Aurelio V.: *See—*
Orner, Robert E.; Cassarino, Aurelio V.; and Sepso, Roger P., 5,014,520, Cl. 62-187.000.
Cassarly, William J.; and Flood, Kevin M., to General Electric Company. Continuous wide angle beam steerer using lens translation and phase shifter. 5,015,080, Cl. 350-484.000.
Cassella Aktiengesellschaft: *See—*
Schonafinger, Karl; Beyerle, Rudi; Schindler, Ursula; Jablonka, Bernd; and Troke, Jeffery, 5,015,659, Cl. 514-438.000.
Cassidy, Benjamin J., to International Paper Company. Tapered carton and blank for forming it. 5,014,905, Cl. 229-113.000.
Castera, Jean-Paul; Meunier, Paul-Louis; Carenco, Alain; Dupont, Jean-Marie; and Friez, Pierre, to Thomson-CSF; and L'Etat Francais. Integrated single-mode isolator waveguide and application to a semiconductor laser. 5,015,051, Cl. 350-96.120.
Castolin S.A.: *See—*
Simm, Wolfgang; Steine, Hans-Theo; and Streb, Karl P., 5,014,915, Cl. 239-79.000.
Caterpillar Inc.: *See—*
Smith, David P., 5,014,734, Cl. 137-117.000.
Caterpillar Industrial Inc.: *See—*
Valencic, Terence E.; and Wible, John E., 5,014,811, Cl. 180-286.000.
Cates, Marion: *See—*
Sides, Gary D.; and Cates, Marion, 5,014,541, Cl. 73-23.410.
Cathignol, Dominique; Lacruche, Bernard; and Mestas, Jean-Louis, to Technomed International, S.A.; and Institut National de la Sante et de la Recherche Medical (INSERM). Piezoelectric device with reduced negative waves, and use of said device for extracorporeal lithotrity or for destroying particular tissues. 5,015,929, Cl. 310-335.000.
Caulcott, Celia A.: *See—*
Yarranton, Geoffrey T.; Humphreys, Gwynfor O.; Robinson, Martin K.; Caulcott, Celia A.; and Wright, Edwina M., 5,015,573, Cl. 435-69.100.
Cavin, Tell: *See—*
Vuichard, Albin; Buhler, Bruno; and Cavin, Tell, 5,016,110, Cl. 358-227.000.
CCL Custom Manufacturing, Inc.: *See—*
Wittig, Gary P.; and Burpee, Tom, 5,014,868, Cl. 220-85.00H.
Cearley, Thomas W.: *See—*
Angell, Mickey A.; Cearley, Thomas W.; Lewis, James C.; St. Onge, Arthur R.; Szysh, John A.; and White, Kenneth W., 5,015,145, Cl. 414-547.000.
Cebal: *See—*
Fiorini, Roland; and Prayer, Gerard, 5,014,492, Cl. 53-405.000.
CED's, Inc.: *See—*
Csaszar, Gabor, 5,014,739, Cl. 137-512.150.
Cell Analysis Systems, Inc.: *See—*
Bacus, James W.; and Marder, Robert J., 5,016,283, Cl. 382-6.000.
Celltech Limited: *See—*
Yarranton, Geoffrey T.; Humphreys, Gwynfor O.; Robinson, Martin K.; Caulcott, Celia A.; and Wright, Edwina M., 5,015,573, Cl. 435-69.100.

VOL
1126
ISS
2
MY
14
1991
UMI

- Central Institute for the Deaf: *See—*
  - Engebretson, A. Maynard; O'Connell, Michael P.; and Zheng, Baohua, 5,016,280, Cl. 381-68.000.
- Centre International de Recherches Dermatologiques (CIRD): *See—*
  - Pilgrim, William R.; and Lagiere, Joel, 5,015,758, Cl. 560-56.000.
- Centre National d'Etudes des Telecommunications et d'Etudes Spatiales: *See—*
  - Vinouze, Bruno; and Chouan, Yannick, 5,015,597, Cl. 437-41.000.
- Cetinkaya, Ismail B., to UOP. FCC stripping method. 5,015,363, Cl. 208-150.000.
- Cetnar, James F., to Bridgestone/Firestone, Inc. Method and apparatus for striping a tire sidewall. 5,015,505, Cl. 427-286.000.
- Ceurvorst, Joseph G.: *See—*
  - Scoggins, Lacey E.; and Ceurvorst, Joseph G., 5,015,702, Cl. 525-537.000.
- Chadwick, Curt H.: *See—*
  - Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, 5,014,627, Cl. 108-50.000.
- Chaffee, Paul H., to United States of America, Energy. Apparatus and method for increasing the bandwidth of a laser beam. 5,015,054, Cl. 350-96.150.
- Chaffin, Joel S.: *See—*
  - Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, 5,014,710, Cl. 128-660.050.
- Chamings, Antony W. Flexible fastener. 5,015,135, Cl. 411-447.000.
- Champagne, Raymond P., to Neles-Jamesbury Corporation. Fluid pressure actuator. 5,014,598, Cl. 92-13.005.
- Champion International Corporation: *See—*
  - Anderson, Nestor A.; and Walsh, Michael E., 5,014,854, Cl. 206-611.000.
  - Green, Charles E., 5,015,335, Cl. 162-243.000.
- Chan, C. S.; Wright, Conrad L.; and Hanson, Gary E., to Hewlett-Packard Company. Large expandable array thermal ink jet pen and method of manufacturing same. 5,016,023, Cl. 346-1.100.
- Chan, Yet, to Achiever Industries Ltd. Shutter mechanism for a camera. 5,016,033, Cl. 354-251.000.
- Chandraratna, Roshantha A. S., to Allergan, Inc. Thiochroman esters of phenols and terephthallates having retinoid-like activity. 5,015,658, Cl. 514-432.000.
- Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., to Eveready Battery Company. Electrochemical cell having a safety vent closure. 5,015,542, Cl. 429-56.000.
- Chang, Byung J., to Kaiser Optical Systems. Method of forming holographic optical elements free of secondary fringes. 5,015,049, Cl. 350-3.810.
- Chang, Donald C. D.; and Kelley, Edwin A., to Hughes Aircraft Company. Aperture synthesized radiometer using digital beamforming techniques. 5,016,018, Cl. 342-351.000.
- Chang, Jyh-Chin. Chair for reinforcement rod. 5,014,485, Cl. 52-678.000.
- Chang, Paul S.; and Steely, Lee W., to AMP Incorporated. Driver circuit for single coil magnetic latching relay. 5,016,134, Cl. 361-153.000.
- Chang, Tony C.: *See—*
  - Lewis, Larry N.; and Chang, Tony C., 5,015,691, Cl. 525-100.000.
- Chang, Wei K.: *See—*
  - Berger, Joel G.; Chang, Wei K.; and Peters, Marjorie, 5,015,639, Cl. 514-213.000.
- Chao, Hung-Ya, to Moore Business Forms, Inc. Interfacial epoxy microcapsulation system. 5,015,527, Cl. 428-402.210.
- Chapelain, Jean-Claude; Masson, Patrice P.; Dupoty, Gerard C.; Crenn, Gerard; and Cloux, Jean-Noel, to Otis Elevator Company. Method for installing an elevator inside a building, and assembly jigs used therefor. 5,014,822, Cl. 187-1.00R.
- Chapman, David M., to W. R. Grace & Co.-Conn. Crystalline group IVA metal-containing molecular sieve compositions. 5,015,453, Cl. 423-306.000.
- Chapolini, Robert J. Device for measuring the impedance to flow of a natural or prosthetic vessel in a living body. 5,014,715, Cl. 128-672.000.
- Chapoy, L. Lawrence: *See—*
  - Gabrielli, Giorgio; Maritano, Mauro; Motroni, Giuseppe; and Chapoy, L. Lawrence, 5,015,721, Cl. 528-190.000.
- Chappell, Barbara A.; Chappell, Terry I.; and Schuster, Stanley E., to International Business Machines Corp. High speed decoding circuit with improved AND gate. 5,015,881, Cl. 307-449.000.
- Chappell, Terry I.: *See—*
  - Chappell, Barbara A.; Chappell, Terry I.; and Schuster, Stanley E., 5,015,881, Cl. 307-449.000.
- Charbonneau, Larry F.; Flint, John A.; Kiss, Gabor D.; and Shepherd, James P., to Hoechst Celanese Corporation. Melt-processable polyester capable of forming an anisotropic melt which exhibits a highly attractive balance between its molding and heat deflection temperatures. 5,015,722, Cl. 528-190.000.
- Charkoudian, John C., to Kendall Company, The. Process for making model skin. 5,015,431, Cl. 264-222.000.
- Charles, Robert V., to Ron Charles & Associates. Vacuum forming apparatus. 5,015,167, Cl. 425-388.000.
- Charles Stark Draper Laboratory, Inc., The: *See—*
  - Greiff, Paul, 5,016,072, Cl. 357-26.000.
- Charlot, Lincoln H., Jr.: *See—*
  - Ferguson, Lucian G.; and Charlot, Lincoln H., Jr., 5,015,953, Cl. 324-244.000
- Charmasson, Joseph A.: *See—*
  - Soproni, Zoltan; and Charmasson, Joseph A., 5,015,240, Cl. 604-192.000.
- Chemie Linz Aktiengesellschaft: *See—*
  - Sajtos, Alexander, 5,015,760, Cl. 560-186.000.
- Chen, Shieh-Shung T., to Merck & Co., Inc. Anthelmintic bioconversion products. 5,015,662, Cl. 514-450.000.
- Chen, Shih-Ruey T.; and Vaughan, Craig W., to Calgon Corporation. Method for controlling scale deposition in aqueous systems using quaternary ammonium/maleic anhydride-type polymers. 5,015,390, Cl. 210-698.000.
- Chen, Ting-Kuo: *See—*
  - Yeh, Chia-Luan; and Chen, Ting-Kuo, 5,014,479, Cl. 52-308.000.
- Chen, Yuhpyng L., to Pfizer Inc. 6-(substituted)methylenepenicillanic and 6-(substituted)hydroxymethylpenicillanic acids and derivatives thereof. 5,015,473, Cl. 424-114.000.
- Cherry Semiconductor Corporation: *See—*
  - Kolanko, Frank J., 5,015,942, Cl. 323-315.000.
- Cherubini, Julian H., to AliMed, Inc. Medical fastener strap. 5,015,251, Cl. 606-203.000.
- Chesebrough-Pond's USA Co., division of Conopco, Inc.: *See—*
  - Birtwistle, David H.; Carter, Peter; and Rosser, David A., 5,015,471, Cl. 424-070.000.
- Cheskis, Harvey P.: *See—*
  - Ashok, Sankaranarayanan; Cheskis, Harvey P.; and Tyler, Derek E., 5,015,438, Cl. 419-23.000.
  - Tyler, Derek E.; Ashok, Sankaranarayanan; and Cheskis, Harvey P., 5,015,439, Cl. 419-23.000.
- Chevance, Gerard, to Valeo Vision. Headlamp for an automotive vehicle having improved means for running adjustment. 5,016,155, Cl. 362-418.000.
- Chevron Research Company: *See—*
  - Duerksen, John H., 5,014,787, Cl. 166-303.000.
- Chi, Liu, to Enlight Corporation. Computer casing connector. 5,015,802, Cl. 174-35.0GC.
- Chiang, Steve S. S.: *See—*
  - El Gamal, Abbas; and Chiang, Steve S. S., 5,015,885, Cl. 307-465.000.
- Chiba, Hironobu: *See—*
  - Takato, Koji; and Chiba, Hironobu, 5,014,817, Cl. 181-254.000.
- Childers, Ray F.; Oren, Peter L.; and Seidler, Werner M. K., to Eli Lilly and Company. Film coating formulations. 5,015,480, Cl. 424-486.000.
- Childs, Paul; Hurley, James R.; and Orcheski, Conrad J., to Tecogen, Inc. Gas fired combination convection-steam oven. 5,014,679, Cl. 126-21.00A.
- Chin, Arthur A., to Mobil Oil Corporation. Catalytic conversion of $NO_x$ over carbonaceous particles. 5,015,362, Cl. 208-121.000.
- Chiron Corporation: *See—*
  - Brake, Anthony J.; Cousens, Lawrence S.; Urdea, Mickey S.; and Valenzuela, Pablo D. T., 5,015,575, Cl. 435-91.000.
- Chism, Warren L., to Tektronix, Inc. Low capacitance probe tip. 5,015,947, Cl. 324-158.00P.
- Chisolm, Daniel R.; Weiss, Richard A.; and Rozov, Leonid, to Witco Corporation. Process for the preparation of aromatic beta-diketones. 5,015,777, Cl. 568-314.000.
- Cho, Dong-Il D.; Kumar, Suresh; and Carr, William N., to Princeton University. Electrostatic levitation control system for micromechanical devices. 5,015,906, Cl. 310-309.000.
- Cho, Eung J., to Goldstar Co., Ltd. Disc loading apparatus for a vertical type compact disc player. 5,016,236, Cl. 369-75.200.
- Cho, Seog-lae, to Samsung Electron Devices Ltd. Multistep focusing electron gun for cathode ray tube. 5,015,911, Cl. 313-414.000.
- Choi, Hae-yong, to SamSung Electronics Co., Ltd. Automatic optical filter displacing circuit. 5,016,091, Cl. 358-29.000.
- Choi, Hoon-Sun: *See—*
  - Yong-Je, Kim; Choi, Hoon-Sun; and Sim, Dae-Yoon, 5,016,106, Cl. 358-183.000.
- Choi, Jung-Dal; Yim, Hyung-Kyu; Do, Jae-Young; and Kim, Jin-Ki, to SamSung Electronics Co., Ltd. Programmable sequential-code recognition circuit. 5,015,886, Cl. 307-465.000.
- Choi, Yun-ho, to SamSung Electronics Co., Ltd. Output feedback control circuit for integrated circuit device. 5,015,891, Cl. 307-530.000.
- Chouan, Yannick: *See—*
  - Vinouze, Bruno; and Chouan, Yannick, 5,015,597, Cl. 437-41.000.
- Chow, Robert Y.: *See—*
  - Hough, Jack V. D.; Dormer, Kenneth J.; Barton, Kenneth E., Jr.; and Chow, Robert Y., 5,015,225, Cl. 600-25.000.
- Christian, Lauren L.; and Miller, Lindy F., to Iowa State University Research Foundation, Inc. Porcine somatotropin to improve meat quality of pigs. 5,015,626, Cl. 514-12.000.
- Christodoulou, Leontios: *See—*
  - Kampe, Stephen L.; Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., 5,015,534, Cl. 428-570.000.
- Christou, Paul; McCabe, Dennis; Swain, William F.; and Barton, Kenneth A., to Agracetus. Particle-mediated transformation of soybean plants and lines. 5,015,580, Cl. 435-172.300.
- Chrysler Corporation: *See—*
  - Holbrook, Gerald L.; and Leising, Maurice B., 5,016,176, Cl. 364-424.100.
  - Morley, Darrel L.; Pierce, Wayne A.; and Willyard, James A., 5,014,893, Cl. 224-321.000.
- Chu, Shao-Fu S.; Ku, San-Mei; Lange, Russell C.; Shephard, Joseph F.; Tsang, Paul J.; and Wang, Wen-Yuan, to International Business Machines Corporation. Process of making BiCMOS devices having closely spaced device regions. 5,015,594, Cl. 437-31.000.

- Chujyo, Kenichi: *See—*
  - Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.
- Church, Fred E.: *See—*
  - Young, Alfred; and Church, Fred E., 5,014,876, Cl. 221-233.000.
- Chy, Sokha: *See—*
  - Vaupotic, Gregory P.; Beck, Doris A.; and Chy, Sokha, 5,015,800, Cl. 174-34.000.
- Ciba-Geigy Corporation: *See—*
  - Galbo, James P., 5,015,682, Cl. 524-102.000.
  - Galbo, James P.; and Ravichandran, Ramanathan, 5,015,683, Cl. 524-103.000.
  - Kunz, Walter, 5,015,649, Cl. 514-332.000.
  - Seltzer, Raymond, Galbo, James P.; and Ravichandran, Ramanathan, 5,015,678, Cl. 524-99.000.
  - Steiner, Heinz; and Tobler, Hans, 5,015,780, Cl. 568-490.000.
  - Wasley, Jan W. F., 5,015,645, Cl. 514-250.000.
  - Zurfluh, Rene , 5,015,640, Cl. 514-217.000.
- Cidon, Israel; and Gopal, Inder S., to International Business Machines Corporation. Multihop time assigned speech interpolation (TASI) system for telecommunication networks. 5,016,247, Cl. 370-81.000.
- Cimcorp Oy: *See—*
  - Airaksinen, Pentti, 5,014,883, Cl. 222-318.000.
- Cipra, Jan E.: *See—*
  - Malmgren, Robert C.; Soltanpour, Parviz N.; and Cipra, Jan E., 5,014,462, Cl. 47-1.010.
- Circon Corporation: *See—*
  - Zhong, William J. S.; and Williams, John A., 5,015,909, Cl. 313-105.00R.
- Citta, Richard W.; and Mutzabaugh, Dennis M., to Zenith Electronics Corporation. Transmission of a video signal using adaptive delta modulation. 5,016,100, Cl. 358-133.000.
- Clairol Incorporated: *See—*
  - Albrecht, Linda; and Wolfram, Leszek J., 5,015,263, Cl. 8-680.000.
- Clare, George H.: *See—*
  - Fauske, Hans K.; and Clare, George H., 5,015,437, Cl. 376-385.000.
- Clark, Alan C.: *See—*
  - Yodice, Richard; and Clark, Alan C., 5,015,402, Cl. 252-32.70E.
- Clark, Bryan K.: *See—*
  - Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,016,239, Cl. 369-284.000.
- Clark, Danford E., to Union Oil Company of California. Water regeneration of deactivated catalyst. 5,015,611, Cl. 502-20.000.
- Clark, Michael T.: *See—*
  - Lindsey, Thomas O.; and Clark, Michael T., 5,015,627, Cl. 514-12.000.
- Clarke, Neville; and Winter, Thomas H. Method for startup of production in an oil well. 5,014,789, Cl. 166-372.000.
- Clarkson University: *See—*
  - Matijevic, Egon, 5,015,452, Cl. 423-263.000.
- Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, to Krupp Kautex Maschinenbau GmbH. Barrel of thermoplastic material. 5,014,873, Cl. 220-601.000.
- Clement, Robert A.; and Wang, Ying, to Du Pont de Nemours, E. I., and Company. Nonlinear optical devices for derivatives of stilbene and diphenylacetylene. 5,015,417, Cl. 252-587.000.
- Clerc, Jean-Frederic; Ebel, Christine; and Dijon, Jean, to Commissariat a l'Energie Atomique. Polychrome screen. 5,015,074, Cl. 350-339.00F.
- Clifton, William L., III: *See—*
  - Homeier, Ronald F.; Lortz, Allan R.; Clifton, William L., III; and Williams, Jeffrey L., 5,015,010, Cl. 280-808.000.
- Clintex Corporation: *See—*
  - Cueman, Glenn F.; Richbourg, Henry L., Jr.; and Ramsey, Barnwell S., 5,014,691, Cl. 128-80.00H.
- Cloux, Jean-Noel: *See—*
  - Chapelain, Jean-Claude; Masson, Patrice P.; Dupoty, Gerard C.; Crenn, Gerard; and Cloux, Jean-Noel, 5,014,822, Cl. 187-1.00R.
- Clyde Corporation: *See—*
  - Hockman, Edward N., 5,015,127, Cl. 406-192.000.
- CMS Research Corporation: *See—*
  - Sides, Gary D.; and Cates, Marion, 5,014,541, Cl. 73-23.410.
- CMW, Inc.: *See—*
  - Bush, Arden W.; and Shirley, Everett E., 5,015,816, Cl. 219-119.000.
- Coatex S.A.: *See—*
  - Simonet, Benoit; Fabre, Pierre; Laluet, Jacques; and Egraz, Jean-Bernard, 5,015,711, Cl. 526-301.000.
- Cochrum, Kent C.; Stevenson, Lynnor B.; and King, Scott R., to Paravax, Inc. Immunization implant and method. 5,015,476, Cl. 424-423.000.
- Cocuzzi, Paul F., to Eastman Kodak Company. Method and apparatus for filtration of photographic emulsions. 5,015,398, Cl. 210-767.000.
- Cogema: *See—*
  - Bernard, Petit, 5,015,435, Cl. 376-285.000.
- Cogent Limited: *See—*
  - Gent, John A. G.; and Blass, Jacob M., 5,015,504, Cl. 427-284.000.
- Cohen, Todd J., to Bloom, Leonard, a part interest. Method of and system for monitoring and treating a malfunctioning heart. 5,014,698, Cl. 128-419.00D.
- Cole, Eugene O., to United States of America, Air Force. Optical surveillance sensor apparatus. 5,015,844, Cl. 250-227.240.
- Cole, Richard D. Over the eyepiece pocket filter card. 5,015,073, Cl. 350-317.000.
- Coleman, Ernest A.: *See—*
  - Ravipati, Sitaramaiah; Zador, Eugene; Kaczmarek, Wesley R.; Coleman, Ernest A.; and Rostoker, David, 5,014,468, Cl. 51-295.000.
- Coleman, Patrick L.: *See—*
  - Carr, Peter W.; Funkenbusch, Eric F.; Rigney, Martin P.; Coleman, Patrick L.; Hanggi, Douglas A.; and Schafer, Wes A., 5,015,373, Cl. 210-198.200.
- Colgate-Palmolive Co.: *See—*
  - Steltenkamp, Robert J., 5,015,665, Cl. 514-625.000.
- Collison, Mark W.; Farver, Terry F.; McDonald, Christine A.; Herald, Paula J.; and Monticello, Daniel J., to Haarmann & Reimer Corp. Use of lanthionines for control of post-processing contamination in processed meat. 5,015,487, Cl. 426-332.000.
- Colombier, Gabriel; Lefebvre, Jacques; Galand, Jean; and Golay, Armand, to Aluminium Pechiney. Method of continuous coating of electrically conductive substrates. 5,015,340, Cl. 204-28.000.
- Columbus, Richard L.; and Kissel, Thomas R., to Eastman Kodak Company. Sterilizing dressing device and method for skin puncture. 5,015,228, Cl. 604-51.000.
- Colzani, James: *See—*
  - Falk, Richard A.; Janicsek, Larry; Boron, Joseph; and Colzani, James, 5,014,561, Cl. 73-864.530.
- Comar, Inc.: *See—*
  - Eppler, Susan G.; and Moorehead, Robert M., 5,016,281, Cl. 382-1.000.
- Combes, Denis. System permitting channeling of drainage fluid. 5,015,122, Cl. 405-36.000.
- Comfortex Corporation: *See—*
  - Corey, John A.; and Schnebly, John T., 5,015,317, Cl. 156-197.000.
- Commander Electrical Materials, Inc.: *See—*
  - Nattel, William; and Michaud, Alain, 5,015,804, Cl. 174-65.0SS.
- Commissariat a l'Energie Atomique: *See—*
  - Clerc, Jean-Frederic; Ebel, Christine; and Dijon, Jean, 5,015,074, Cl. 350-339.00F.
- Commonwealth of Australia, The: *See—*
  - Thorncraft, David A.; Lyons, Peter R. A.; Rashleigh, Scott C.; Maine, Johnathan A.; and Love, John D., 5,015,058, Cl. 350-96.150.
- Commonwealth Scientific and Industrial Research: *See—*
  - Wilkins, Stephen W., 5,016,267, Cl. 378-84.000.
- Compagnie Francaise de Mokta: *See—*
  - Rouillon, Christian, 5,015,847, Cl. 250-253.000.
- Comparato, Stephen L.: *See—*
  - Barnes, Roger M.; and Comparato, Stephen L., 5,015,146, Cl. 414-639.000.
- Computer Design, Inc.: *See—*
  - Shyong, Emory, 5,016,183, Cl. 364-470.000.
- Concept Inc.: *See—*
  - Ogilvie, Rick A.; and Winkler, Rance A., 5,014,389, Cl. 15-353.000.
- Conductive Containers, Inc.: *See—*
  - Becker, Raymond P., 5,014,849, Cl. 206-328.000.
- Connolly, Douglas P.; Rickett, Barry G.; Yax, Robert J.; and Swanson, Roger M., to Xerox Corporation. Copy cartridge warranty and billing system. 5,016,171, Cl. 364-406.000.
- Connor, Daniel S.; and Stidham, Robert E., to Procter & Gamble Company, The. Manufacture of tartrate disuccinate/tartrate monosuccinate with enhanced TDS levels. 5,015,468, Cl. 424-55.000.
- Conoco: *See—*
  - Le, Hanh T., 5,015,406, Cl. 252-51.50R.
- Constantin, Daniel; Fert, Jean-Jacques; and Mettivier, Francine, to L'Oreal; and Etablissements Albert Aucouturier. Cartoning machine, for automatically placing an article, in particular a bottle, into a box. 5,014,501, Cl. 53-173.000.
- Conti-Johnston, Susan: *See—*
  - Thrasher, Lawrence E.; Olson, Gordon E.; Burkitt, Garrett J., III; Schmidt, Timothy E.; Haddad, Elias M.; and Conti-Johnston, Susan, 5,014,372, Cl. 4-542.000.
- Continental Aktiengesellschaft: *See—*
  - Holzbach, Wolfgang; Boltze, Carsten; Kramer, Karl-Heinz; and Meier, Heinrich, 5,014,759, Cl. 152-427.000.
- Cook Incorporated: *See—*
  - Maglinte, Dean D. T., 5,015,232, Cl. 604-96.000.
- Coonrad, Ralph W.; and Booth, Carolyn R., to Span-America Medical Systems, Inc. Surgical pad. 5,014,375, Cl. 5-431.000.
- Cooper, David H.; and Bush, Charles S., to Fuji Optical Systems, Incorporated. Electronic video dental camera. 5,016,098, Cl. 358-98.000.
- Cooper Industries, Inc.: *See—*
  - Gurevich, Leon, 5,015,176, Cl. 432-5.000.
- Copeland, Anthony S. Camera belt clip. 5,014,892, Cl. 224-271.000.
- Copeland Corporation: *See—*
  - Brown, James M., 5,015,155, Cl. 417-360.000.
- Copeland, John. Bicycle single-wire lighting system with steady-flashing-reflector rear warning device. 5,015,918, Cl. 315-76.000.
- Copolymer Rubber & Chemical Corporation: *See—*
  - Williams, William G., 5,015,690, Cl. 525-73.000.
- Corbett, Peter F.: *See—*
  - Hartley, Richard I.; Corbett, Peter F.; and Yassa, Fathy F., 5,016,011, Cl. 341-95.000.
- Cordis Corporation: *See—*
  - MacGregor, David C., 5,015,253, Cl. 623-1.000.
- Corey, John A.; and Schnebly, John T., to Comfortex Corporation. Method and apparatus for making a multi-cellular collapsible shade. 5,015,317, Cl. 156-197.000.

VOL 1126 ISS 2 MY 14 1991 UMI

- Corrigan, Francis R.; and Slutz, David E., to General Electric Company. Process for making cubic boron nitride from coated hexagonal boron nitride, and abrasive particles and articles made therefrom. 5,015,265, Cl. 51-293.000.
- Corris, C. James, to Semtronics Corporation. Charge build-up and decay monitor. 5,016,136, Cl. 361-230.000.
- Corsi, Armando, to JOBS S.p.A. Automatic machine tool head designed to increase the number of machine operating axes. 5,014,542, Cl. 173-39.000.
- Costar, Donald G. Offset denture brush. 5,014,383, Cl. 15-160.000.
- Cotts, David B.; Brodrecht, Louisa M.; and Bening, Robert C., Jr., to Osaka Gas Co., Ltd. Iron-Schiff base magnetic polymers and process thereof. 5,015,699, Cl. 525-471.000.
- Cousens, Lawrence S.: *See—*
  - Brake, Anthony J.; Cousens, Lawrence S.; Urdea, Mickey S.; and Valenzuela, Pablo D. T., 5,015,575, Cl. 435-91.000.
- Covert, Charles H.; Turner, Kenneth W.; Sherwood, Carl H.; Gifford, William E.; and Wagner, Richard W., to General Motors Corporation. Vacuum actuated tank vapor vent valve. 5,014,742, Cl. 137-588.000.
- Cox, Karmen D., to Emerson Electric Co. Control circuit using a sulphonated fluorocarbon humidity sensor. 5,014,908, Cl. 236-44.00E.
- Coyle-Rees, Margaret M.: *See—*
  - Parran, John J., Jr.; Coyle-Rees, Margaret M.; Rotruck, John T.; and Sunberg, Richard J., 5,015,466, Cl. 424-52.000.
- Crabb, Clarence R.: *See—*
  - Read, Arthur E., Jr.; Burba, John L., III; Doty, Peter A.; and Crabb, Clarence R., 5,015,409, Cl. 252-108.000.
- Crane, Jacob: *See—*
  - Mahulikar, Deepak; Crane, Jacob; and Khan, Abid A., 5,015,803, Cl. 174-52.400.
- Cray Computer Corporation: *See—*
  - Cray, Seymour R.; and Krajewski, Nicholas J., 5,014,419, Cl. 29-830.000.
- Cray Research, Inc.: *See—*
  - Morton, David M., 5,014,904, Cl. 228-176.000.
- Cray, Seymour R.; and Krajewski, Nicholas J., to Cray Computer Corporation. Twisted wire jumper electrical interconnector and method of making. 5,014,419, Cl. 29-830.000.
- Creative Crusade Limited: *See—*
  - Woodward, Keith, 5,014,995, Cl. 273-261.000.
- Creatura, John A.; and Hsu, George R., to Xerox Corporation. Electrophotographic coated carrier particles and methods thereof. 5,015,550, Cl. 430-108.000.
- Cree, Ian Campbell: *See—*
  - Soproni, Zoltan; and Charmasson, Joseph A., 5,015,240, Cl. 604-192.000.
- Crenn, Gerard: *See—*
  - Chapelain, Jean-Claude; Masson, Patrice P.; Dupoty, Gerard C.; Crenn, Gerard; and Cloux, Jean-Noel, 5,014,822, Cl. 187-1.00R.
- Crescentini, Lamberto: *See—*
  - Balint, Laszlo J.; and Crescentini, Lamberto, 5,015,455, Cl. 423-388.000.
- Crescenzi, Allan: *See—*
  - Westwood, Keith T.; and Crescenzi, Allan, 5,015,491, Cl. 426-600.000.
- Cressman, Paul J., to Eastman Kodak Company. Multichannel waveguide print head with symmetric output. 5,015,066, Cl. 350-96.270.
- Crivello, James V.: *See—*
  - Walles, Erik W.; Lupinski, John H.; and Crivello, James V., 5,015,675, Cl. 523-443.000.
- Croce, Carlo A.: *See—*
  - Tsujimoto, Yoshihide; and Croce, Carlo A., 5,015,568, Cl. 435-5.000.
- Crockett, Dennis D.; and Munz, Robert P., to Lincoln Electric Company, The. High manganese containing weld bead and electrode for producing same. 5,015,823, Cl. 219-146.100.
- Crockett, Eric T. Food delivery box. 5,014,853, Cl. 206-602.000.
- Cronenberger, Michel: *See—*
  - Pusineri, Christian; and Cronenberger, Michel, 5,015,388, Cl. 210-641.000.
- Cross, Alexander D.: *See—*
  - Jori, Giulio; Kocher, Matthias; Vogel, Emanuel; and Cross, Alexander D., 5,015,478, Cl. 424-450.000.
- Cross, David E., to Smiths Industries Public Limited Company. Adhesive ring assemblies for collection bags. 5,015,244, Cl. 604-344.000.
- Crossman, David D., to National Carpet Equipment, Inc. Syringe needle combination. 5,015,235, Cl. 604-117.000.
- Crothers, Thomas J.: *See—*
  - Lee, Noel M.; Herman, Rodney A.; and Crothers, Thomas J., 5,016,241, Cl. 369-289.000.
- Crow, William D.; and Williams, Ronald D., to Emerson Electric Co. Unit bearing leadless motor. 5,015,894, Cl. 310-71.000.
- Crown International, Inc.: *See—*
  - Barclay, Clay; and Shallenburger, Larry, 5,015,969, Cl. 330-284.000.
- Crowninshield, Roy D.; Hori, Roy Y.; and Fallin, Thomas W., to Zimmer, Inc. Prosthetic interpositional device/coupler. 5,015,257, Cl. 623-22.000.
- Crudo, Phillip M.; Foltz, Scott; and Lay, Roger F., to Velobind, Inc. Machine for bookbinding using flexible strips. 5,015,138, Cl. 412-43.000.
- Crum, Duane B.: *See—*
  - DiIorio, Mark S.; Robinson, Stephen E.; Crum, Duane B.; Paulson, Douglas N.; Buchanan, D. Scott; and Marsden, James R., 5,016,128, Cl. 360-97.010.
- Cruz, Jose A.: *See—*
  - Skinner, Albert A.; House, Ronnalee; Kellams, Roger W.; and Cruz, Jose A., 5,015,982, Cl. 336-69.000.
- Crystallume: *See—*
  - Pinneo, John M., 5,015,528, Cl. 428-403.000.
- Csaszar, Gabor, to CED's, Inc. Check valve assembly. 5,014,739, Cl. 137-512.150.
- Csincsa, Tibor. Multi-filament fluorescent lamp construction. 5,015,907, Cl. 313-3.000.
- Cueman, Glenn F.; Richbourg, Henry L., Jr.; and Ramsey, Barnwell S., to Clintex Corporation. Ankle brace with densified batting. 5,014,691, Cl. 128-80.00H.
- Culberston, David L.: *See—*
  - Beckloff, Dennis M.; and Culberston, David L., 5,015,805, Cl. 174-75.00C.
- Culkin, Joseph B., to Calvest Associates. Eccentric drive mechanism. 5,014,564, Cl. 74-61.000.
- Cummings, Donald R., to D.U.T. Pty. Ltd. Method and apparatus for improving utilization of fuel values of as-mined coal in pulverized fuel-fired boilers. 5,014,651, Cl. 122-4.00D.
- Cummings, Ernie W., to Drain-All, Inc. Automatic drain valve. 5,014,735, Cl. 137-195.000.
- Cummings, Gerald W.: *See—*
  - Kaser, Christopher K.; and Cummings, Gerald W., 5,014,990, Cl. 273-128.00R.
- Cummins Engine Company, Inc.: *See—*
  - Broering, Louis C.; and Miller, Paul R., 5,014,509, Cl. 60-274.000.
  - Morley, Lloyd F., II; and Harrod, Russell L., 5,014,549, Cl. 73-118.100.
- Cump, Charles. Reel assembly and method for loading a reel. 5,014,925, Cl. 242-86.000.
- Cunningham, David C.: *See—*
  - Holley, Steven R.; Cunningham, David C.; and Kral, Kevin D., 5,015,934, Cl. 318-611.000.
- Cunningham, Larry E.: *See—*
  - Shaw, Harold L.; Smith, Randall B.; Cunningham, Larry E.; Rishel, Barry E.; Gioannini, John P.; and Harkey, Warren B., 5,016,005, Cl. 340-870.190.
- Cunningham, Wallace, to G. Bruckner GmbH; and Bruckner-Maschinenbau Co. KG. Tenter apparatus. 5,014,402, Cl. 26-91.000.
- Cuno, Incorporated: *See—*
  - Ostreicher, Eugene A.; and Infantino, Joseph R., 5,015,316, Cl. 156-69.000.
- Curti, Pietro, to Curti S.n.c. di Curti Pietro & C. Power adjustment device for electric power systems, in particular for electric power systems with electric ovens. 5,015,826, Cl. 219-492.000.
- Curti S.n.c. di Curti Pietro & C.: *See—*
  - Curti, Pietro, 5,015,826, Cl. 219-492.000.
- Cushing, Michelle. Cash caddy. 5,016,262, Cl. 377-15.000.
- Cushman, Michael R.: *See—*
  - Bryan, Avron I.; and Cushman, Michael R., 5,016,201, Cl. 364-571.040.
- Cyb, Frederick F. Heat-retaining exhaust components and method of preparing same. 5,014,903, Cl. 228-176.000.
- Cygan, Lawrence F.; Granberg, Helge O.; Bickham, Richard S.; and Missele, Carl, to Motorola, Inc. Broadband RF transformer. 5,015,972, Cl. 333-32.000.
- Cyphert, David L.: *See—*
  - Robertson, John A.; Cyphert, David L.; Cyphert, Thomas E.; and Muscarella, Joseph F., 5,015,106, Cl. 400-121.000.
- Cyphert, Thomas E.: *See—*
  - Robertson, John A.; Cyphert, David L.; Cyphert, Thomas E.; and Muscarella, Joseph F., 5,015,106, Cl. 400-121.000.
- Cytopharm, Inc.: *See—*
  - Jori, Giulio; Kocher, Matthias; Vogel, Emanuel; and Cross, Alexander D., 5,015,478, Cl. 424-450.000.
- Czarn, David A.; Rahman, Aziz; Sadler, Alan M.; and Baker, Gary A., to Texas Instruments Incorporated. Normally open pressure switch. 5,015,808, Cl. 200-83.00P.
- D.U.T. Pty. Ltd.: *See—*
  - Cummings, Donald R., 5,014,651, Cl. 122-4.00D.
- Da-Tel Research Company, Incorporated: *See—*
  - Springer, Robert E.; Hafer, George F.; and Gilbert, Everett A., 5,015,961, Cl. 329-300.000.
- Da Vinci Graphics, Inc.: *See—*
  - Warp, Rick A., 5,016,195, Cl. 364-519.000.
- Daberkow, Kevin L.: *See—*
  - Nguyen, Kham X.; Robinson, Theodore S.; Taylor, Michael D.; and Daberkow, Kevin L., 5,016,167, Cl. 364-200.000.
- Daimler-Benz AG: *See—*
  - Resch, Reinhard, 5,015,043, Cl. 303-100.000.
  - Wawra, Helmut; Albrecht, Wilhelm; Wagner, Bernd; Franke, Andreas; and Gellner, Harald, 5,014,831, Cl. 192-4.00A.
- Dainippon Screen Mfg. Co., Ltd.: *See—*
  - Shimano, Masanori, 5,016,097, Cl. 358-79.000.
- Dalbera, Jacques M., to Aerospatiale Societe Nationale Industrielle. Autonomous load embarking and disembarking apparatus integrated in an aircraft. 5,014,935, Cl. 244-137.100.
- Dalbiez, Andre : *See—*
  - Graton, Michel; and Dalbiez, Andre , 5,014,842, Cl. 192-106.200.
- Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., to Burroughs Wellcome Co. Method for treating viral infections. 5,015,647, Cl. 514-263.000.
- Daly, John J.: *See—*
  - Dulaney, Ken L.; and Daly, John J., 5,015,546, Cl. 429-99.000.

- Dalziel, Warren L.: *See—*
  - Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.
- Dambre, Paul: *See—*
  - Bombeke, Martin; and Dambre, Paul, 5,014,760, Cl. 152-451.000.
- Damman, Cornelis C., to Holland Mechanics, B.V. Method for manufacturing a spoke wheel. 5,014,425, Cl. 29-894.333.
- Dana Corporation: *See—*
  - Schlenker, Theodore R., 5,014,568, Cl. 74-424.80R.
- Dana, Marshall T.: *See—*
  - Nelson, Danny A.; Tomich, Stanley D.; Glover, Donald W.; Allen, Errol V.; Hales, Jeremy M.; and Dana, Marshall T., 5,016,196, Cl. 364-550.000.
- Danesin, Renato R. A.: *See—*
  - Severn, Shawn R. T.; Rodriguez, Henry; Danesin, Renato R. A.; and Imber, Bryan E., 5,015,586, Cl. 436-29.000.
- Daniel, Brady R.: *See—*
  - Zinn, Ben T.; Daniel, Brady R.; and Rabhan, Andrew B., 5,015,171, Cl. 431-1.000.
- Danser, Harold W., III: *See—*
  - Jebe, Arnim B.; Flagg, Frank D.; Danser, Harold W., III; Kobernus, William; and Schick, George, 5,014,431, Cl. 30-124.000.
- Dapezi, Karl, to GEZE Sport International GmbH. Bicycle pedal with a releasable binding. 5,014,571, Cl. 74-594.600.
- Dappen, Glen M.; and Bowman, Wayne A., to Eastman Kodak Company. Tabular grain photographic elements exhibiting reduced pressure sensitivity (II). 5,015,566, Cl. 430-567.000.
- D'Arcy, John, to Spectra Physics, LPD. Q-switch driver. 5,016,251, Cl. 372-10.000.
- Darlington, Alan D.: *See—*
  - McMurtry, David R.; Robertson, John P.; and Darlington, Alan D., 5,016,199, Cl. 364-560.000.
- Darwish, Mohamed N., to AT&T Bell Laboratories. Lateral MOS controlled thyristor. 5,016,076, Cl. 357-38.000.
- Daspit, Ronald A. Venting packer. 5,014,782, Cl. 166-120.000.
- Data General Corp.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Date, Masazumi: *See—*
  - Tanabe, Toshiya; Abe, Shigemitsu; Date, Masazumi; and Kawakita, Tetsuya, 5,015,386, Cl. 210-638.000.
- Date, Yozo; and Tsumura, Toshihiro, to Suehiro Seiko Kabushiki Kaisha. Chain saw guide bar. 5,014,435, Cl. 30-387.000.
- Daubenbuchel, Werner: *See—*
  - Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, 5,014,873, Cl. 220-601.000.
- Daus, John H., to Anchor Industries, Inc. Pool cover tie-down. 5,014,369, Cl. 4-503.000.
- Davis, Bill E.; Myers, Eugene W.; Goodhart, Richard B.; Paris, William M.; and Borthwick, James T., Jr., to Stewart Systems, Inc. Method of and apparatus for continuous bakery product wrapping. 5,014,496, Cl. 53-433.000.
- Davis, Larry: *See—*
  - Effland, Richard C.; and Davis, Larry, 5,015,637, Cl. 514-211.000.
- Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M. Chlorinated EPDM with superior stability. 5,015,696, Cl. 525-331.700.
- Daxelmueller, Manfred; Doeberl, Dieter; and Kraxner, Gerhard, to Bohler Ges. m.b.H. Bimetallic strip for metal saws. 5,015,539, Cl. 428-685.000.
- Day, Billy W.: *See—*
  - Magarian, Robert A.; Pento, Joseph T.; and Day, Billy W., 5,015,666, Cl. 514-754.000.
- Day, Roger W.: *See—*
  - Grosso, Paul V.; Morgan, Michael J.; Wing, Feagin A., Jr.; and Day, Roger W., 5,015,549, Cl. 430-45.000.
- Day, Yeu S. Detachable water scooter assembly. 5,014,639, Cl. 114-352.000.
- Dayco Products, Inc.: *See—*
  - Henderson, Dewey D., 5,015,217, Cl. 474-135.000.
- Daystar, Inc.: *See—*
  - Goodman, Clarence R.; and Presley, Jerry R., 5,015,002, Cl. 277-212.0FB.
- DBS Optical, Inc.: *See—*
  - Baratelli, Charles, 5,015,087, Cl. 351-65.000.
- Dean Chu, Edward M.: *See—*
  - Wimpee, Lealon C.; Ross, Monty A.; O'Neil, Timothy J.; and Dean Chu, Edward M., 5,015,434, Cl. 376-254.000.
- Dear, Terrence A.; Ingard, Karl U.; and Schuchardt, Mark E., to Du Pont de Nemours, E. I., and Company. Silencer for gas induction and exhaust systems. 5,014,816, Cl. 181-229.000.
- Deavenport, Dennis L.: *See—*
  - Tran, Nam H.; Deavenport, Dennis L.; and Post, Curtis W., 5,015,750, Cl. 556-187.000.
- DeBecker, Luc G.: *See—*
  - Tillotson, Neil E.; and DeBecker, Luc G., 5,014,362, Cl. 2-168.000.
- De Bernardinis, Silvia; Cabri, Walter; Martinengo, Tiziano; and Francalanci, Franco, to Farmitalia Carlo Erba S.r.l. Process for the preparation of 4-demethoxydaunomycinone, the aglycone of 4-demethoxydaunorubicin. 5,015,745, Cl. 552-206.000.
- Dechene, Ronald L.; Smith, Thomas B.; and Marino, Scott A., to Auburn International, Inc. Magnetic resonance analysis in real time, industrial usage mode. 5,015,954, Cl. 324-307.000.
- Decorator Discount DBA Decor Resource: *See—*
  - Fergie, B. Christine, 5,015,036, Cl. 297-397.000.
- DeFerrari, Howard F.: *See—*
  - Smits, Paul; Rosenfeld, Aron M.; and DeFerrari, Howard F., 5,015,318, Cl. 156-233.000.
- De Gastines, Gerard, to Facam S.A. Device for attaching a flexible covering element such as a piece of a carpeting or a mat to its support. 5,014,390, Cl. 16-4.000.
- Degen, Bruno: *See—*
  - Feldner, Kurt; Degen, Bruno; Wagner, Gebhard; and Schulze, Manfred, 5,015,751, Cl. 556-472.000.
- Degesch GmbH: *See—*
  - Kapp, Wolfgang; and Moog, Alfons, 5,015,475, Cl. 424-405.000.
- Degnan, Thomas F.; Kirker, Garry W.; Socha, Richard F.; Stapleton, Michael R.; and Johnson, Ivy D., to Mobil Oil Corporation. Production of hydrocarbon fractions by hydrocracking. 5,015,360, Cl. 208-110.000.
- Degussa Aktiengesellschaft: *See—*
  - Arntz, Dietrich; and Wiegand, Norbert, 5,015,789, Cl. 568-862.000.
  - Deller, Klaus; Klingel, Rainhard; and Krause, Helmfried, 5,015,615, Cl. 502-263.000.
- DeHart, Larry L., Jr.: *See—*
  - Patti, Anthony G.; DeHart, Larry L., Sr.; and DeHart, Larry L., Jr., 5,014,460, Cl. 43-113.000.
- DeHart, Larry L., Sr.: *See—*
  - Patti, Anthony G.; DeHart, Larry L., Sr.; and DeHart, Larry L., Jr., 5,014,460, Cl. 43-113.000.
- Delagi, Richard G.; and Trenkler, George, to Texas Instruments Incorporated. Member of a refractory metal material of selected shape and method of making. 5,015,533, Cl. 428-549.000.
- Delaney, Edward A.: *See—*
  - Riel, Frank J.; Vuong, Tuyet; and Delaney, Edward A., 5,015,727, Cl. 528-353.000.
- DeLarocha, Daniel D. Applicator assembly for a lipstick or like substance. 5,015,110, Cl. 401-10.000.
- Delco Electronics Corporation: *See—*
  - Owen, Marvin L.; and Jacobs, Frederick D., 5,014,642, Cl. 116-28.100.
  - Roth, Norman J., 5,016,082, Cl. 357-70.000.
- Del Gatto, Henry J.; and Trainor, John E., to NWL Transformers. Process for rapping of electrostatic precipitator surfaces. 5,015,267, Cl. 55-12.000.
- Delin, Michel, to Niled S.A. Terminal for connecting an insulated branch conductor to an insulated overhead line conductor. 5,015,198, Cl. 439-411.000.
- Deller, Klaus; Klingel, Rainhard; and Krause, Helmfried, to Degussa Aktiengesellschaft. Molded articles based on pyrogenically prepared aluminum oxide and process for their production. 5,015,615, Cl. 502-263.000.
- Delphax Systems: *See—*
  - Thomson, Christopher W., 5,016,190, Cl. 364-518.000.
- Delsey, S.A.: *See—*
  - Seynhaeve, Andre, 5,014,830, Cl. 190-36.000.
- DeLucca, Anthony J., II: *See—*
  - Moreau, Jerry P.; Bailey, August V.; and DeLucca, Anthony J., II, 5,015,419, Cl. 260-410.90R.
- Dempsey, Morgan J.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Demuth, Robert: *See—*
  - Staheli, Paul; Demuth, Robert; and Fritzsche, Peter, 5,014,395, Cl. 19-105.000.
- Dennis, Richard K., to Die Tech, Inc. Solder terminal. 5,015,206, Cl. 439-876.000.
- Dennis, Wendell E.; Sheeley, Steven M.; Brown, Stephen M.; Washam, Kevin A.; Alley, Lewis E.; and Cain, Marvin D., to Marlen Research Corporation. Pivot-action portioning apparatus and method. 5,014,882, Cl. 222-309.000.
- DeNora Permelec S.p.A.: *See—*
  - Traini, Carlo; Mojana, Corrado; and Gusmini, Carlo, 5,015,345, Cl. 204-98.000.
- Derenzo, Stephen E.; and Moses, William W., to University of California, Regents of the. Lead carbonate scintillator materials. 5,015,861, Cl. 250-361.00R.
- DeRosier, Donna C.; Dziura, Richard A.; Palmieri, Joseph M.; Juntwait, Eric D.; Jacobs, Linda Y.; and Scott, Graham A., to General Electric Company. Compact circuit interrupter having multiple ampere ratings. 5,015,983, Cl. 336-180.000.
- Derrick, Arthur P., to Laporte Industries limited. Colloidal composition and its use in the production of paper and paperboard. 5,015,334, Cl. 162-168.100.
- Desaderata, The Poet. Three-dimensional book or display. 5,014,455, Cl. 40-539.000.
- Design Tool, Inc.: *See—*
  - Young, Alfred; and Church, Fred E., 5,014,876, Cl. 221-233.000.
- DesLauriers, Paul J.; and Heilman, William J., to Pennzoil Products Company. Method of converting rusted surface to a durable one. 5,015,507, Cl. 427-385.500.
- Dessertine, Albert L., to Ramp Comsystems, Inc. Patient compliance and status monitoring system. 5,016,172, Cl. 364-413.020.

VOL 1126 ISS 2 MY 14 1991 UMI

Detexomat Machinery Limited: *See—*
Hodges, Michael J.; and Beal, Sydney, 5,014,634, Cl. 112-262.200.

Detig, Robert H.; Sidey, Michael; and Wang, Li-Shin, to Photon Imaging Corp. Electronic printer or scanner using a fiber optic bundle. 5,015,064, Cl. 350-96.240.

Detloff, Clement A., to General Motors Corporation. Drive linkage for automobile sunroof. 5,015,030, Cl. 296-223.000.

Detsch, Steven G. Dental implant attachment system. 5,015,186, Cl. 433-173.000.

Deutsch Fastener Corporation: *See—*
Bonstein, James L., 5,014,411, Cl. 29-525.100.

Deutsche Forschungsanstalt fuer Luft- und Raumfahrt e.V.: *See—*
Saenger, Georg; and Hietkamp, Gerrit, 5,016,254, Cl. 372-55.000.

Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH: *See—*
Lehmann, Wolfgang, 5,014,368, Cl. 4-314.000.

Deutsche Solvay-Werke GmbH: *See—*
Aumann, Gerd; Giesen, Matthias; Klatte, Gerd; and Korte, Hans-Jurgen, 5,015,669, Cl. 523-200.000.

Deutsche Thomson-Brandt GmbH: *See—*
Hartmann, Uwe; and Mai, Udo, 5,015,915, Cl. 315-8.000.
Hartmann, Uwe; and Ohnemus, Fritz, 5,015,960, Cl. 328-36.000.
Morimoto, Yasuaki; Schroder, Heinz J.; and Zucker, Friedhelm, 5,016,233, Cl. 369-44.130.

DeVries, Douglas F., to Bird Products Corporation. Ambient pressure air/oxygen blender. 5,014,694, Cl. 128-205.240.

De Werdt, Reinier: *See—*
Van Der Plas, Paulus A.; and De Werdt, Reinier, 5,015,602, Cl. 437-67.000.

Dhyanchand, P. John, to Sundstrand Corporation. Power conversion system with bi-directional power converter having prime mover start capability. 5,015,941, Cl. 322-10.000.

Diago Meseguer, Jose : *See—*
Cabre Castellvi, Juan; Diago Meseguer, Jose ; Esteve Bianchini, Asuncion; Lenhardt Padro, Carlos E.; and Sans Pitarch, Esteve, 5,015,736, Cl. 540-222.000.

Dial Corporation, The: *See—*
Loesel, John L., Jr.; and Gilson, Channing W., 5,014,880, Cl. 222-181.000.

Di Biase, Stephen A.; and Bush, James H., to Lubrizol Corporation, The. Ore flotation process using carbamate compounds. 5,015,368, Cl. 209-166.000.

Dideriksen, Erling T., to Interlego A.G. Toy wash. 5,015,210, Cl. 446-128.000.

Die Tech, Inc.: *See—*
Dennis, Richard K., 5,015,206, Cl. 439-876.000.

Dietrich, Peter; and Westphal, Klaus, to Carl-Zeiss-Stiftung. Microscope having a binocular tube with relatively rotatable tube arms. 5,015,082, Cl. 350-514.000.

Di Giacomo, Tommaso: *See—*
Macchiarulo, Vincenzo; and Di Giacomo, Tommaso, 5,015,218, Cl. 474-152.000.

Digital Equipment Corporation: *See—*
Riggle, Charles M.; Svendsen, Peter R.; and Read, John D., 5,016,131, Cl. 360-106.000.
Simoudis, Evangelos; Evans, Richard P.; and Vonada, Donald G., 5,016,204, Cl. 364-578.000.

Dilorio, Mark S.; Robinson, Stephen E.; Crum, Duane B.; Paulson, Douglas N.; Buchanan, D. Scott; and Marsden, James R., to Biomagnetic Technologies, Inc. Superconducting information storage device. 5,016,128, Cl. 360-97.010.

Dijon, Jean: *See—*
Clerc, Jean-Frederic; Ebel, Christine; and Dijon, Jean, 5,015,074, Cl. 350-339.00F.

Dilts, Robert B.; and Miller, Trone L. Method and apparatus for controlling an electrical device using electrodermal response. 5,016,213, Cl. 364-900.000.

DiMaggio, Darryl. Illuminating wheel covers. 5,016,144, Cl. 362-35.000.

Discipio, William R., Sr. Enhanced visibility helmet. 5,014,366, Cl. 2-424.000.

Divers, George A.; and Hui, Henry K., to Puritan-Bennett Corporation. Method for bonding an analyte-sensitive dye compound to an addition-cure silicone. 5,015,715, Cl. 528-15.000.

Dix, Johannes P.; Fikentscher, Rolf; and Steenken-Richter, Ingrid, to BASF Aktiengesellschaft. Quaternized condensation products of trialkanolamines. 5,015,754, Cl. 558-260.000.

Dixon, Linda H., to E. R. Carpenter Company Inc. Pillow. 5,014,377, Cl. 5-434.000.

Dixon, Robert C.; and Vanderpool, Jeffrey S., to Omnipoint Data Company, Incorporated. Asymmetric spread spectrum correlator. 5,016,255, Cl. 375-1.000.

diZerega, Gere S., to University of Southern California. Tissue repair. 5,015,629, Cl. 514-16.000.

Do, Jae-Young: *See—*
Choi, Jung-Dal; Yim, Hyung-Kyu; Do, Jae-Young; and Kim, Jin-Ki, 5,015,886, Cl. 307-465.000.

Dobine, Dwayne. Bath pillow. 5,014,373, Cl. 4-575.000.

Dobler, Walter; and Paust, Joachim, to BASF Aktiengesellschaft. Continuous epimerization of sugars, in particular D-arabinose to D-ribose. 5,015,296, Cl. 127-42.000.

Dobson, Ian D., to BP Chemicals Limited. Reductive amination of hydroxy-containing compounds. 5,015,773, Cl. 564-474.000.

Dockner, Toni: *See—*
Steck, Werner; Lermer, Helmut; Schwarzmann, Matthias; and Dockner, Toni, 5,015,785, Cl. 568-783.000.

Dr. Ing. h.c.F. Porsche AG: *See—*
Ampferer, Herbert, 5,014,655, Cl. 123-90.310.

Doeberl, Dieter: *See—*
Daxelmueller, Manfred; Doeberl, Dieter; and Kraxner, Gerhard, 5,015,539, Cl. 428-685.000.

Dohi, Hideyuki: *See—*
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,015,793, Cl. 585-6.300.

Dohms, Klaus-Dieter: *See—*
Langhoff, Josef; Jankowski, Alfons; and Dohms, Klaus-Dieter, 5,015,457, Cl. 423-481.000.

Doi, Hachiro: *See—*
Aoyama, Shunzo; Yoshida, Kunio; Doi, Hachiro; and Sakamoto, Katsumi, 5,014,765, Cl. 164-72.000.

Doi, Kenji: *See—*
Kioka, Mamoru; Nakano, Masao; Doi, Kenji; and Toyota, Akinori, 5,015,612, Cl. 502-133.000.

Doi, Yoshiharu; Ueki, Satoshi; and Furuhashi, Hiroyuki, to Tonen Corporation. Heptadiene polymer and process for producing the same. 5,015,714, Cl. 526-336.000.

Dolan, Donald T.; Durst, Robert T., Jr.; Hubbard, David W.; and Silverberg, Morton, to Pitney Bowes Inc. Modular mailing machine. 5,014,797, Cl. 177-4.000.

Doleman, Muriel S.; and Webber, Patricia, to Du Pont de Nemours, E. I., and Company. Process and apparatus for hydrolysis of proteins and peptides. 5,015,445, Cl. 422-204.000.

Domeier, Linda A., to Union Carbide Chemicals and Plastics Company Inc. Composition of vinyl ester resin, hydroxyalkyl (meth)acrylate and a styrene. 5,015,701, Cl. 525-531.000.

Donaldson, Daniel J.; and Busch, William K. Balloon inflating device. 5,014,757, Cl. 141-114.000.

Donatelli, Philip A.: *See—*
Ellion, M. Edmund; Donatelli, Philip A.; and Wolff, George, 5,015,381, Cl. 210-490.000.

Donenfeld, Henry; and Lemanis, Eduard, to BASF Australia, Ltd. Pre-treatment of cellulosic fibres or cellulosic fibres in blends with synthetic fibres for subsequent transfer printing. 5.015,261, Cl. 8-532.000.

Donlan, Rodney M.: *See—*
Muia, Ramon A.; and Donlan, Rodney M., 5,015,395, Cl. 210-755.000.

Donohue, James M.: *See—*
Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.

Donovan, Edward P.: *See—*
Hubler, Graham K.; Donovan, Edward P.; and Van Vechten, Deborah, 5,015,353, Cl. 204-192.310.

Doran, Arthur J.: *See—*
Doran, Cheryl C.; and Doran, Arthur J., 5,014,376, Cl. 5-431.000.

Doran, Cheryl C.; and Doran, Arthur J. Apparatus for holding and supporting an infant. 5,014,376, Cl. 5-431.000.

D'Orazio, Robert P.; and Rakszawski, John F., to BOC Group, Inc., The. Removal of cyanide from aqueous streams. 5,015,396, Cl. 210-763.000.

Dormer, Kenneth J.: *See—*
Hough, Jack V. D.; Dormer, Kenneth J.; Barton, Kenneth E., Jr.; and Chow, Robert Y., 5,015,225, Cl. 600-25.000.

Doron Precision Systems, Inc.: *See—*
Wenzinger, Jr., 5,015,189, Cl. 434-63.000.

Dorsey, George F., to Martin Marietta Energy Systems, Inc. Adhesives and method for making the same. 5,015,718, Cl. 528-44.000.

Doss, James D., to University of California. Apparatus for characterizing conductivity of materials by measuring the effect of induced shielding currents therein. 5,015,952, Cl. 324-236.000.

Doty, Peter A.: *See—*
Read, Arthur E., Jr.; Burba, John L., III; Doty, Peter A.; and Crabb, Clarence R., 5,015,409, Cl. 252-108.000.

Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., to Health Research, Inc. Method to diagnose the presence or absence of tumor tissue. 5,015,463, Cl. 424-7.100.

Dow Chemical Company, The: *See—*
Beck, Henry N.; Mahoney, Robert D.; Wan, Hawk S.; and Lundgard, Richard A., 5,015,275, Cl. 55-158.000.
Haag, Anthony P.; and Otterbacher, E. W., 5,015,778, Cl. 568-319.000.
Harris, Robert F., 5,015,753, Cl. 558-260.000.
Kar, Kishore K.; and Pawloski, Chester E., 5,015,405, Cl. 252-49.900.
Klimpel, Richard R.; and Leonard, Donald E., 5,015,367, Cl. 209-166.000.
Lee, Guo-shuh J.; Garces, Juan M.; and Maj, Joseph J., 5,015,797, Cl. 585-467.000.
McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Hall, David M., 5,015,522, Cl. 428-312.200.
Newman, Thomas H., 5,015,712, Cl. 526-304.000.
Pearson, Norman R.; Kleschick, William A.; and Carson, Chrislyn M., 5,015,286, Cl. 71-92.000.
Read, Arthur E., Jr.; Burba, John L., III; Doty, Peter A.; and Crabb, Clarence R., 5,015,409, Cl. 252-108.000.
Schmidt, Gregory F.; Hucul, Dennis A.; and Campbell, Richard E., Jr., 5,015,749, Cl. 556-179.000.
Skach, Edward J., Jr.; and Frederick, Paul S., 5,015,291, Cl. 75-531.000.
Smith, David A.; and Geiger, Herb, 5,014,978, Cl. 271-308.000.

Strandjord, Andrew J.; Yates, Ronald L.; and Perettie, Donald J., 5,016,240, Cl. 369-288.000.
Tiegs, Terry N.; and McDonald, Robert R., 5,015,290, Cl. 75-232.000.
Treybig, Duane S.; Harris, Wendy D.; and Thomas, Christopher J., 5,015,511, Cl. 428-34.100.

Dow Corning Corporation: *See—*
Schulz, William J., Jr., 5,015,624, Cl. 556-474.000.

DowBrands Inc.: *See—*
Sowle, Cynthia W.; and Tobey, Stephen W., 5,014,650, Cl. 119-171.000.

Doyle, Walter M., to Axiom Analytical, Inc. Apparatus and method for normal incidence reflectance spectroscopy. 5,015,100, Cl. 356-445.000.

Draenert, Klaus. Apparatus and process for mixing and filling. 5,015,101, Cl. 366-349.000.

Drain-All, Inc.: *See—*
Cummings, Ernie W., 5,014,735, Cl. 137-195.000.

Drake, Charles E.; Kalter, Howard L.; and Lewis, Scott C., to International Business Machines Corporation. CMOS driver circuit. 5,015,880, Cl. 307-443.000.

Dreizler, Ulrich: *See—*
Dreizler, Walter; and Dreizler, Ulrich, 5,015,174, Cl. 431-116.000.

Dreizler, Walter; and Dreizler, Ulrich. Burner head for a forced-air gas burner. 5,015,174, Cl. 431-116.000.

Dresser-Rand Company: *See—*
Bennitt, Robert A., 5,015,158, Cl. 417-525.000.

Drew, Terrence M.; Hanson, Chris A; and Hanson, Alden B., to Alden Laboratories, Inc. Process for heat sealing packages. 5,015,313, Cl. 156-87.000.

Driftmyer, Richard T., to United States of America, Navy. Window cooling for high speed flight. 5,014,932, Cl. 244-117.00A.

Drobish, Renee: *See—*
Massey, W. Russell, Jr.; Drobish, Renee; and McLaughlin, Paul F., 5,016,244, Cl. 370-16.000.

Drobny, Wolfgang; Mattes, Bernhard; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, to Robert Bosch GmbH. Voltage supply circuit. 5,015,870, Cl. 307-66.000.

Drobny, Wolfgang: *See—*
Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.

Droguet, Roland, to Societe Anonyme dite: Droguet International. Container-display unit for articles hanging from rods. 5,014,847, Cl. 206-279.000.

Drori, Mordeki. Coiled filter strip with upstream and downstream butt ends. 5,015,379, Cl. 210-411.000.

Drost, Jim L.: *See—*
Gordin, Myron K.; and Drost, Jim L., 5,016,150, Cl. 362-263.000.

Duchamp, Robert: *See—*
Pollard, Jean; Duchamp, Robert; and Truchot, Patrick, 5,015,065, Cl. 350-96.240.

Duchesne, Denis; and Johnon, Bryce V., to Minnesota Mining and Manufacturing Company. Extrudable thermoplastic hydrocarbon polymer composition. 5,015,693, Cl. 525-187.000.

Ducoffre, Volker: *See—*
Bederke, Klaus; Ducoffre, Volker; and Graef, Knut, 5,015,688, Cl. 524-600.000.

Ducolon, Fredric D., Jr. Redirected recoil mechanism. 5,014,595, Cl. 89-44.010.

Ductmate Industries, Inc.: *See—*
Arnoldt, Peter J., 5,015,018, Cl. 285-367.000.

Duerksen, John H., to Chevron Research Company. Single well injection and production system. 5,014,787, Cl. 166-303.000.

Dugan, Michael T.: *See—*
Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.

Dulaney, Ken L.; and Daly, John J., to Grid Systems Corporation. Battery compartment. 5,015,546, Cl. 429-99.000.

Dumont, Allen D., to Walker, Mary A. Anti-abrasion protective device. 5,014,354, Cl. 2-23.000.

Duncia, John J. V.: *See—*
Carini, David J.; Duncia, John J. V.; and Wells, Gregory J., 5,015,651, Cl. 514-381.000.

Dunegan Engineering Consultants, Inc.: *See—*
Dunegan, Harold L., 5,014,556, Cl. 73-587.000.

Dunegan, Harold L., to Dunegan Engineering Consultants, Inc. Acoustic emission simulator. 5,014,556, Cl. 73-587.000.

Du Pont de Nemours, E. I., and Company: *See—*
Booth, Bruce L.; and Marchegiano, Joseph E., 5,015,059, Cl. 350-96.170.
Carini, David J.; Duncia, John J. V.; and Wells, Gregory J., 5,015,651, Cl. 514-381.000.
Clement, Robert A.; and Wang, Ying, 5,015,417, Cl. 252-587.000.
Dear, Terrence A.; Ingard, Karl U.; and Schuchardt, Mark E., 5,014,816, Cl. 181-229.000.
Doleman, Muriel S.; and Webber, Patricia, 5,015,445, Cl. 422-204.000.
Ekiner, Okan M.; and Hayes, Richard A., 5,015,270, Cl. 55-16.000.
Gold, Harvey S., 5,015,856, Cl. 250-339.000.
Hung, Ming-Hong, 5,015,790, Cl. 570-126.000.
Lazaar, Kenneth I., 5,015,555, Cl. 430-281.000.
Lowe, David J., 5,015,759, Cl. 560-91.000.
Rao, Sundar M., 5,014,545, Cl. 73-55.000.
Rao, V. N. Mallikarjuna, 5,015,791, Cl. 570-168.000.
Sundet, Sherman A., 5,015,380, Cl. 210-490.000.
Sundet, Sherman A., 5,015,382, Cl. 210-490.000.
Wiseman, Timothy R., Sr., 5,014,357, Cl. 2-81.000.
Yamada, Masahiro, 5,015,196, Cl. 439-326.000.

Dupont, Jean-Marie: *See—*
Castera, Jean-Paul; Meunier, Paul-Louis; Carenco, Alain; Dupont, Jean-Marie; and Friez, Pierre, 5,015,051, Cl. 350-96.120.

Dupoty, Gerard C.: *See—*
Chapelain, Jean-Claude; Masson, Patrice P.; Dupoty, Gerard C.; Crenn, Gerard; and Cloux, Jean-Noel, 5,014,822, Cl. 187-1.00R.

Dupro AG: *See—*
Worwag, Peter, 5,014,386, Cl. 15-339.000.

Dupuy, Ronald E.; and Agee, Donald P., to GenCorp Inc. Window pane sealing strip having a flexible reinforced glass-run channel. 5,014,464, Cl. 49-440.000.

Durkin, Edward T.: *See—*
Meunchen, Paul K.; and Durkin, Edward T., 5,014,689, Cl. 128-77.000.

Durr, Manfred: *See—*
Schaller, Werner; and Durr, Manfred, 5,015,801, Cl. 174-52.200.

Durst, Robert T., Jr.: *See—*
Dolan, Donald T.; Durst, Robert T., Jr.; Hubbard, David W.; and Silverberg, Morton, 5,014,797, Cl. 177-4.000.

Dusil, Vladimir: *See—*
Rueffer, Manfred; Toepperwien, Bernd; and Dusil, Vladimir, 5,014,597, Cl. 91-369.200.

Duster, Horst: *See—*
Nobis, Dieter; Hollmann, Friedrich; and Duster, Horst, 5,014,412, Cl. 29-527.700.

Dwivedi, Ratnesh K., to Lanxide Technology Company, LP. Porous ceramic composite with dense surface. 5,015,610, Cl. 501-127.000.

Dwyer, Eugene J., III, to Silhouette Technology, Inc. Method and apparatus for forming a recording on a recording medium. 5,016,040, Cl. 355-20.000.

Dwyer, Patricia A.; and Stoneham, Jeffrey R., to Eastman Kodak Company. Apparatus for magnetically reading and recording on film. 5,016,030, Cl. 354-21.000.

Dyllick-Brenzinger, Rainer: *See—*
Bruder, Horst; Dyllick-Brenzinger, Rainer; Mayer, Udo; and Bares, Steven J., 5,015,292, Cl. 106-22.000.

Dynamit Nobel Aktiengesellschaft: *See—*
Leupacher, Wolfgang, 5,014,620, Cl. 102-201.000.

Dynic Corporation: *See—*
Saito, Masayuki; Fujimoto, Takenobu; and Hagiwara, Takuya, 5,014,417, Cl. 29-783.000.

Dziura, Richard A.: *See—*
DeRosier, Donna C.; Dziura, Richard A.; Palmieri, Joseph M.; Juntwait, Eric D.; Jacobs, Linda Y.; and Scott, Graham A., 5,015,983, Cl. 336-180.000.

E. R. Carpenter Company Inc.: *See—*
Dixon, Linda H., 5,014,377, Cl. 5-434.000.

E. R. Squibb & Sons, Inc.: *See—*
Sudilovsky, Abraham, 5,015,633, Cl. 514-91.000.

Eastman, Jay M.; and Boles, John A., to Photographic Sciences Corporation. Scan modules for bar code readers and the like in which scan elements are flexurally supported. 5,015,831, Cl. 235-462.000.

Eastman Kodak Company: *See—*
Brandon, John M.; Bradley, Brian D.; and Ratermann, Richard J., 5,015,109, Cl. 400-624.000.
Cocuzzi, Paul F., 5,015,398, Cl. 210-767.000.
Columbus, Richard L.; and Kissel, Thomas R., 5,015,228, Cl. 604-51.000.
Cressman, Paul J., 5,015,066, Cl. 350-96.270.
Dappen, Glen M.; and Bowman, Wayne A., 5,015,566, Cl. 430-567.000.
Dwyer, Patricia A.; and Stoneham, Jeffrey R., 5,016,030, Cl. 354-21.000.
Johnson, Kevin M.; and Zeman, Robert E., 5,016,056, Cl. 355-279.000.
Karsh, Herbert, 5,016,123, Cl. 360-69.000.
Krishnan, Chari, 5,015,564, Cl. 430-546.000.
Pan, Kee-Chuan; Tyan, Yuan-sheng; and Vazan, Fridrich, 5,015,548, Cl. 430-19.000.
Rapkin, Alan E., 5,016,062, Cl. 355-327.000.
Robertson, Jeffrey C., 5,014,923, Cl. 242-55.000.
Sasson, Steven J.; and Hills, Robert G., 5,016,107, Cl. 358-209.000.
Shtipelman, Boris A.; and Heppner, Paul, 5,016,238, Cl. 369-215.000.
Steele, Lawrence C.; and Rook, Kenneth E., 5,016,054, Cl. 355-256.000.

Ebara Corporation: *See—*
Ito, Kanichi; and Maezawa, Akihiko, 5,015,443, Cl. 422-186.000.

Ebel, Christine: *See—*
Clerc, Jean-Frederic; Ebel, Christine; and Dijon, Jean, 5,015,074, Cl. 350-339.00F.

Eddy, Jack E. Rolling platform assembly. 5,014,381, Cl. 14-17.000.

Edmonds, Brian J.: *See—*
Waters, William J.; Leissler, George W.; and Edmonds, Brian J., 5,014,768, Cl. 164-418.000.

Edwards, W. Wayne: *See—*
Wardle, Robert B.; and Edwards, W. Wayne, 5,015,309, Cl. 149-19.100.

Eerkens, Jozef W. High mass isotope separation arrangement. 5,015,348, Cl. 204-157.200.

VOL
1126
ISS
2
MY
14
1991
UMI

Effem GmbH: *See—*
Lang, Rudiger; and Meyer, Bernd, 5,015,606, Cl. 501-84.000.
Effland, Richard C.; and Davis, Larry, to Hoechst-Roussel Pharmaceutical Inc. Pyrido[3,4-b]pyrrolo[1,2-e][1,4,5]oxadiazepines. 5,015,637, Cl. 514-211.000.
Eftekhari, Abe: *See—*
Singh, Jag J.; Eftekhari, Abe; and St. Clair, Terry L., 5,015,851, Cl. 250-306.000.
Egawa, Masaru: *See—*
Okaue, Etsuo; Egawa, Masaru; Kasai, Yoshihiko; and Horaguchi, Norio, 5,015,086, Cl. 351-44.000.
Egloffstein, Nicole: *See—*
Wild, Johann K.; and Egloffstein, Nicole, 5,014,848, Cl. 206-315.900.
Egraz, Jean-Bernard: *See—*
Simonet, Benoit; Fabre, Pierre; Laluet, Jacques; and Egraz, Jean-Bernard, 5,015,711, Cl. 526-301.000.
Eguchi, Tamiyuki; and Tsunomori, Michito, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Method of making uniform polymer particles. 5,015,423, Cl. 264-9.000.
Egusa, Norio: *See—*
Yamada, Katsuhiko; and Egusa, Norio, 5,015,287, Cl. 75-10.170.
Ehrensperger AG: *See—*
Kopp, Volker, 5,014,887, Cl. 222-402.100.
Eich, Dieter K. Crimp press. 5,014,539, Cl. 72-452.000.
Eicken, Karl: *See—*
Rheinheimer, Joachim; Plath, Peter; Eicken, Karl; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,015,285, Cl. 71-92.000.
Eida, Mitsuru; Hiroi, Yoshio; and Yokoyama, Seiichiro, to Idemitsu Kosan Co., Ltd. Novel ferrocene derivatives, surfactants containing same and a process for producing organic thin films. 5,015,748, Cl. 556-144.000.
Eilert, Randall N.; and Ames, Wilbur R., IV, to Hewlett-Packard Company. Key pad and front panel assembly for an electronic instrument. 5,015,829, Cl. 235-1.00D.
Einarsson, Stefan: *See—*
Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.
Einolf, Charles W., Jr.: *See—*
Koch, Karl C., Oates, Robert M.; Peteronio, Carlo F.; and Einolf, Charles W., Jr., 5,015,949, Cl. 324-207.250.
Eiselen, Otto: *See—*
Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, 5,014,873, Cl. 220-601.000.
Eisenstein, Stephen E.; and Kuchler, Wayne J., to Shell Oil Company. Preparation of lithium-calcium grease compositions. 5,015,403, Cl. 252-40.000.
Eka Nobel AB: *See—*
Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.
Ekin, John W.; Panson, Armand J.; and Blankenship, Betty A., to United States of America, Commerce; and Westinghouse Electric Corporation. High-$T_c$ superconductor contact unit having low interface resistivity, and method of making. 5,015,620, Cl. 505-1.000.
Ekiner, Okan M.; and Hayes, Richard A., to Du Pont de Nemours, E. I., and Company. Phenylindane-containing polyimide gas separation membranes. 5,015,270, Cl. 55-16.000.
Electricite de France (Service National): *See—*
Bessiere, Jacques; and Perdicakis, Michel, 5,015,957, Cl. 324-438.000.
El Gamal, Abbas; and Chiang, Steve S. S., to Actel Corporation. Reconfigurable programmable interconnect architecture. 5,015,885, Cl. 307-465.000.
Eli Lilly and Company: *See—*
Childers, Ray F.; Oren, Peter L.; and Seidler, Werner M. K., 5,015,480, Cl. 424-486.000.
Hertel, Larry W., 5,015,743, Cl. 549-313.000.
El-Kaddah, Nagy H.; Piwonka, Thomas S.; and Berry, John T., to Inductotherm Corp. Induction melting of metals without a crucible. 5,014,769, Cl. 164-493.000.
Eller, J. David, to M & W Pump Corporation. Method, system, ship and collecting device for oil spill recovery. 5,015,399, Cl. 210-776.000.
Ellion, M. Edmund; Donatelli, Philip A.; and Wolff, George, to Hughes Aircraft Company. Solid element fluid filter for removing small particles from fluids. 5,015,381, Cl. 210-490.000.
Elliot, John G.: *See—*
Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G; Saraceno, Patricia J.; and Pacer, James M., 5,016,050, Cl. 355-208.000.
Elliott, Charles T.; and Ashley, Timothy, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Photodetector semiconductor which does not require extensive cooling. 5,016,073, Cl. 357-30.000.
Ellis, George H.; and Kirby, James C., to Kollmorgen Corporation. Null seeking position sensor. 5,015,998, Cl. 340-686.000.
Eltvik, Bjorn, to Car-O-Liner Company. Vehicle chassis clamp. 5,014,538, Cl. 72-422.000.
Emerson Electric Co.: *See—*
Cox, Karmen D., 5,014,908, Cl. 236-44.00E.
Crow, William D.; and Williams, Ronald D., 5,015,894, Cl. 310-71.000.

Emert, Anton: *See—*
Hornschemeyer, Heinz; and Emert, Anton, 5,015,005, Cl 280-630.000.
Emery, William W., to Better Sleep Manufacturing Co. Shower caddy. 5,014,860, Cl. 211-106.000.
Emhart Industries, Inc.: *See—*
Smart, Charles F., 5,014,894, Cl. 227-6.000.
Emilsider Meccanica S.p.A.: *See—*
Melara, Francescantonio, 5,014,392, Cl. 16-46.000.
Emitec Gesellschaft fur Emissionstechnologie mbH: *See—*
Swars, Helmut, 5,014,572, Cl. 74-595.000.
Enberg, Eric H.: *See—*
Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
Encore Molding Systems, Inc.: *See—*
Baxi, Indra R., 5,015,166, Cl. 425-149.000.
Enderlin, Robert, to Passap Knitting Machines, Inc. Process and installation for heat treatment of textile threads. 5,014,380, Cl. 8-149.300.
Endo, Katsumi: *See—*
Nakajima, Takatsugu; Endo, Katsumi; and Miura, Toru, 5,016,112, Cl. 358-335.000.
Endo, Keiji: *See—*
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,015,793, Cl. 585-6.300.
Endo, Zenichiro; and Hara, Shigeyoshi, to Hercules Incorporated. Process for producing a blended metathesis/radical polymer composition. 5,015,710, Cl. 526-283.000.
Engebretson, A. Maynard; O'Connell, Michael P.; and Zheng, Baohua, to Central Institute for the Deaf. Electronic filters, hearing aids and methods. 5,016,280, Cl. 381-68.000.
English, James H., to General Motors Corporation. Battery terminal cap. 5,015,543, Cl. 429-65.000.
Enlight Corporation: *See—*
Chi, Liu, 5,015,802, Cl. 174-35.0GC.
Enomoto, Masayuki: *See—*
Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.
Enomoto, Shunji: *See—*
Okada, Hidetake; Kawai, Masato; Enomoto, Shunji; and Suzuki, Taisuke, 5,015,272, Cl. 55-26.000.
Eppinger, David P.; and Taj, Hatim H., to A. B. Chance Company. Arc spinner interrupter. 5,015,810, Cl. 200-147.00R.
Eppler, Susan G.; and Moorehead, Robert M., to Comar, Inc. Image analysis counting system. 5,016,281, Cl. 382-1.000.
Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, to Data General Corp. Contention revolution in a digital computer system. 5,016,162, Cl. 364-200.000.
Erdmann, Dietrich: *See—*
Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, 5,015,747, Cl. 556-1.000.
Ergon S.A.; *See—*
Anagnostopoulos, Panagiotis A., 5,014,533, Cl. 72-131.000.
Erickson, Eric H.: *See—*
Spangler, Hayward G.; and Erickson, Eric H., 5,015,212, Cl. 449-2.000.
Ermilov, Igor V.; Matusov, Jury I.; and Mescheryakov, Evgeny V., to Institut Imeni V. I. Lenina. Unit of semiconductor elements. 5,016,088, Cl. 357-76.000.
Erni, Markus: *See—*
Wernli, Joerg; Brennwalder, Daniel; Erni, Markus; Fritschi, Isidor; and Wanzenried, Andreas, 5,014,505, Cl. 57-275.000.
Erno Raumfahrttechnik GmbH: *See—*
Nauck, Joachim, 5,014,936, Cl. 244-158.00R.
Esterbauer, Josef: *See—*
Herzig, Christian; and Esterbauer, Josef, 5,015,700, Cl. 525-487.000.
Esteve Bianchini, Asuncion: *See—*
Cabre Castellvi, Juan; Diago Meseguer, Jose ; Esteve Bianchini, Asuncion; Lenhardt Padro, Carlos E.; and Sans Pitarch, Esteve, 5,015,736, Cl. 540-222.000.
Etablissements Albert Aucouturier: *See—*
Constantin, Daniel; Fert, Jean-Jacques; and Mettivier, Francine, 5,014,501, Cl. 53-173.000.
Ethyl Corporation: *See—*
Knapp, Gordon G., 5,015,770, Cl. 564-440.000.
Manimaran, Thanikavelu; and Impastato, Fred J., 5,015,764, Cl. 562-401.000.
Euteneuer, Charles L.: *See—*
Keith, Peter T.; and Euteneuer, Charles L., 5,015,231, Cl. 604-96.000.
Evangelos, Grigoropoulos; and Evangelos, Valianatos. Method for installation of building tiles without adhesive materials and standardized tiles for implementing the same. 5,014,488, Cl. 52-746.000.
Evangelos. Valianatos: *See—*
Evangelos, Grigoropoulos; and Evangelos, Valianatos, 5,014,488, Cl. 52-746.000.
Evans, Jerald: *See—*
Van Loo, James; Carrie, Susan; Evans, Jerald, and Spirn, Jeffrey, 5,016,161, Cl. 364-200.000.

Van Loo, James; Carrie, Susan; and Evans, Jerald, 5,016,166, Cl. 364-200.000.
Evans, John W. Engine prelubricator and pressurized lubricant reservoir. 5,014,820, Cl. 184-6.300.
Evans, Richard P.: *See—*
Simoudis, Evangelos; Evans, Richard P.; and Vonada, Donald G., 5,016,204, Cl. 364-578.000.
Evans, Scott B.: *See—*
Augustine, Frank L.; and Evans, Scott B., 5,015,858, Cl. 250-352.000.
Evans, Thomas W.; Norell, Robert G.; Uban, Stephen A.; and Maxson, Richard C., to Johnson Filtration Systems Inc. Slotted screen scallops for high loading pressures and method of making same. 5,015,383, Cl. 210-497.100.
Evans, William P., to Eveready Battery Company, Inc. Process for neutralizing sulfur-containing cells. 5,015,541, Cl. 429-49.000.
Even, Shimon: *See—*
Micali, Silvio; Goldreich, Oded; and Even, Shimon, 5,016,274, Cl. 380-23.000.
Eveready Battery Company: *See—*
Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 5,015,542, Cl. 429-56.000.
Eveready Battery Company, Inc.: *See—*
Evans, William P., 5,015,541, Cl. 429-49.000.
Evoniuk, Christopher J.: *See—*
Boughten, Larry R.; Evoniuk, Christopher J.; Scott, James M.; and Staff, Karen E., 5,014,407, Cl. 29-235.000.
Exar Corporation: *See—*
Giannella, Piccolo G., 5,016,080, Cl. 357-45.000.
Exchange System Limited Partnership, The: *See—*
Hamilton, Scott B., 5,016,277, Cl. 380-49.000.
Extra-Ministerial Bureau of Ministry of International Trade and Industry: *See—*
Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
Exxon Research and Engineering Company: *See—*
Baird, William C., Jr.; and Shoukry, Ehsan I., 5,015,614, Cl. 502-250.000.
Ho, W. S. Winston, 5,015,268, Cl. 55-16.000.
Jacobson, Allan J.; Hall, Richard B.; Mims, Charles A.; and Lewandowski, Joseph T., 5,015,461, Cl. 423-593.000.
Vaughan, David E. W., 5,015,454, Cl. 423-328.000.
EZ Paintr Corporation: *See—*
Brezette, Michael W.; Shaffer, Robert A.; Burns, Fredrick B.; and Moon, Howard R., 5,014,384, Cl. 15-230.110.
Fabre, Pierre: *See—*
Simonet, Benoit; Fabre, Pierre; Laluet, Jacques; and Egraz, Jean-Bernard, 5,015,711, Cl. 526-301.000.
Facam S.A.: *See—*
De Gastines, Gerard, 5,014,390, Cl. 16-4.000.
Faijersson, Sven I., to Aktiebolaget Electrolux. R.P.M. - limiting circuit of an i.c. engine. 5,014,665, Cl. 123-329.000.
Fairchild Semiconductor Corporation: *See—*
Laymoun, Samir M., 5,016,214, Cl. 365-154.000.
Fairman, Bruce A.: *See—*
Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.
Falk, Richard A.; Janicsek, Larry; Boron, Joseph; and Colzani, James, to Midwest Instrument Co., Inc. Method and apparatus for obtaining accurate sample. 5,014,561, Cl. 73-864.530.
Fallin, Thomas W.: *See—*
Crowninshield, Roy D.; Hori, Roy Y.; and Fallin, Thomas W., 5,015,257, Cl. 623-22.000.
Familian Northwest: *See—*
Fye, Edward H., 5,014,730, Cl. 137-454.200.
Fanuc Ltd.: *See—*
Inoue, Michiya; and Mizuno, Yutaka, 5,016,086, Cl. 357-74.000.
Iwashita, Yasusuke, 5,015,935, Cl. 318-630.000.
Matsuura, Hitoshi; and Tsukamoto, Osamu, 5,015,130, Cl. 409-80.000.
Fapec: *See—*
Heimendinger, Bernard, 5,014,902, Cl. 228-170.000.
Fargo, Richard N., to Otis Elevator Company. Hydraulic elevator control valve. 5,014,824, Cl. 187-17.000.
Farmitalia Carlo Erba S.r.l.: *See—*
De Bernardinis, Silvia; Cabri, Walter; Martinengo, Tiziano; and Francalanci, Franco, 5,015,745, Cl. 552-206.000.
Farver, Terry F.: *See—*
Collison, Mark W.; Farver, Terry F.; McDonald, Christine A.; Herald, Paula J.; and Monticello, Daniel J., 5,015,487, Cl. 426-332.000.
Fash, D. Grant, III: *See—*
Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, 5,014,710, Cl. 128-660.050.
Fast, Duane, to Tri W-G, Inc. Patient treatment table. 5,014,688, Cl. 128-70.000.
Fauske, Hans K.; and Clare, George H., to Westinghouse Electric Corp. Graphite core blocks for high temperature gas-cooled reactor. 5,015,437, Cl. 376-385.000.
Federal-Mogul Corporation: *See—*
Kocsis, Judith; Stojkov, Joseph A.; and Towler, Michael E., 5,014,599, Cl. 92-84.000.

Fehr, Charles; and Galindo, Jose , to Firmenich SA. Alicyclic esters and their use as perfuming ingredients. 5,015,625, Cl. 512-24.000.
Feimer, Michael P. Safety system for hypodermic syringe and needle. 5,015,241, Cl. 604-198.000.
Feinauer, Roland: *See—*
Finke, Jurgen; Feinauer, Roland; and Bartmann, Martin, 5,015,680, Cl. 524-99.000.
Feldner, Kurt; Degen, Bruno; Wagner, Gebhard; and Schulze, Manfred, to Bayer Aktiengesellschaft. Process for the production of organochlorosilanes. 5,015,751, Cl. 556-472.000.
Felling, Gerald J. Chaise lounge with adjustable canopy. 5,015,032, Cl. 297-184.000.
Fenick, Thomas J. Locating device and method of placing a tooth implant. 5,015,183, Cl. 433-76.000.
Ferdinand Lusch GmbH & Co. KG.: *See—*
Horenkamp, Franz, 5,015,031, Cl. 257-84.000.
Fergie, B. Christine, to Decorator Discount DBA Decor Resource. Apparatus for use as headrest. 5,015,036, Cl. 297-397.000.
Ferguson, Lucian G.; and Charlot, Lincoln H., Jr., to Security Tag Systems, Inc. Magnetometer for detecting DC magnetic field variations. 5,015,953, Cl. 324-244.000.
Ferguson, William H. Snow plow stand. 5,014,961, Cl. 248-670.000.
Fernandez, Maria I. F.; Hotten, Terrence M.; and Tupper, David E., to Lilly S.A.; and Lilly Industries Limited. Organic compounds and their use as pharmaceuticals. 5,015,656, Cl. 514-422.000.
Ferrante, Pat. Jig assembly. 5,014,540, Cl. 72-481.000.
Ferrence, David N., to Utdc, Inc. Freight transportation system. 5,015,141, Cl. 414-395.000.
Fert, Jean-Jacques: *See—*
Constantin, Daniel; Fert, Jean-Jacques; and Mettivier, Francine, 5,014,501, Cl. 53-173.000.
Fetters, David M., to Hart & Cooley, Inc. Clip securing arrangement for ventilation systems. 5,015,015, Cl. 285-114.000.
Feucht, Hans-Dieter: *See—*
Birkle, Siegfried; Feucht, Hans-Dieter; Kamps, Rainer; and Rissel, Eva, 5,015,709, Cl. 526-279.000.
Fiberstars, Inc.: *See—*
Awai, George K.; and Lee, Song S., 5,016,152, Cl. 362-293.000.
Fiedler, Volker-Bernd: *See—*
Boshagen, Horst; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, 5,015,657, Cl. 514-419.000.
Fikentscher, Rolf: *See—*
Dix, Johannes P.; Fikentscher, Rolf; and Steenken-Richter, Ingrid, 5,015,754, Cl. 558-260.000.
Filipski, Paul S.; and Bacchi, Paul E., to Kensington Laboratories, Inc. Method of and apparatus for decoding bar code symbols. 5,015,832, Cl. 235-462.000.
Finegan, Joel D.: *See—*
Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,016,239, Cl. 369-284.000.
Finke, Jurgen; Feinauer, Roland; and Bartmann, Martin, to Huels Aktiengesellschaft. Production of a thermoplastically processable, aromatic polyamide using a 4-phenoxypyridine stabilizer. 5,015,680, Cl. 524-99.000.
Finley, John W.: *See—*
Haynes, Lynn C.; Levine, Harry; and Finley, John W., 5,015,483, Cl. 426-73.000.
Finzel, Lothar, to Siemens Aktiengesellschaft. Splice union for the mechanical joining of two light waveguides. 5,015,062, Cl. 350-96.210.
Fiorini, Roland; and Prayer, Gerard, to Cebal. Process and apparatus for closing a flexible tube after filling. 5,014,492, Cl. 53-405.000.
Firmenich SA: *See—*
Fehr, Charles; and Galindo, Jose , 5,015,625, Cl. 512-24.000.
First Data Resources Inc.: *See—*
Katz, Ronald A., 5,016,270, Cl. 379-92.000.
Fisher, Michael H.; and Mrozik, Helmut, to Merck & Co., Inc. 5-oxime avermectin derivatives. 5,015,630, Cl. 514-30.000.
Fite, Franklin D., Jr., to AT&T Bell Laboratories. Automatic fault recovery in a packet network. 5,016,243, Cl. 370-16.000.
Fitzpatrick, Brian J.; and Harnack, Phyllis M., to North American Philips Corporation. Method of reducing surface damage in KTP optical waveguides. 5,015,328, Cl. 156-624.000.
Flagg, Frank D.: *See—*
Jebe, Arnim B.; Flagg, Frank D.; Danser, Harold W., III; Kobernus, William; and Schick, George, 5,014,431, Cl. 30-124.000.
Fleck, Steven W., to MCF Systems, Inc. Rechargeable filter assembly. 5,015,375, Cl. 210-232.000.
Flentge, Melvin L. Pipe tongs. 5,014,578, Cl. 81-367.000.
Fletcher, Taylor C. Temperature probe. 5,015,988, Cl. 338-28.000.
Fletcher-Terry Company, The: *See—*
Kozyrski, Vincent T.; and Millett, Claude R., 5,014,436, Cl. 33-27.030.
Kozyrski, Vincent T.; and Peters, Alan R., 5,014,584, Cl. 83-464.000.
Flint, John A.: *See—*
Charbonneau, Larry F.; Flint, John A.; Kiss, Gabor D.; and Shepherd, James P., 5,015,722, Cl. 528-190.000.
Flood, Kevin M.: *See—*
Cassarly, William J.; and Flood, Kevin M., 5,015,080, Cl. 350-484.000.
Florence, Robert A.: *See—*
Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., 5,015,698, Cl. 525-391.000.

VOL 126
SS 2
MY 14 1991
UMI

Florida State University: *See—*
- Holton, Robert A., 5,015,744, Cl. 549-510.000.

Flory, John F. Load recording rope thimble. 5,016,026, Cl. 346-33.00R.

Flow Systems, Inc.: *See—*
- Raghavan, Chidambaram, 5,014,423, Cl. 29-890.144

FMC Corporation: *See—*
- Murphy, Gerald J.; Ager, John W.; and Levinson, Matthew I., 5,015,765, Cl. 562-621.000.

Focke & Co.: *See—*
- Focke, Heinz; and Liedtke, Kurt, 5,014,814, Cl. 181-200.000

Focke & Co. (GmbH & Co.): *See—*
- Focke, Heinz; and Wach, Jurgen, 5,014,490, Cl. 53-73.000

Focke, Heinz; and Wach, Jurgen, to Focke & Co. (GmbH & Co.). Apparatus for the feeding of packaging blanks to a folding unit 5,014,490, Cl. 53-73.000.

Focke, Heinz; and Liedtke, Kurt, to Focke & Co. Sound-damping machine parts. 5,014,814, Cl. 181-200.000

Fogertey, Frank R., Jr Steering wheel cover. 5,014,570, Cl. 74-558.500

Foley, Kevin G.: *See—*
- Kurtz, Robert L.; Foley, Kevin G.; and Hindle, Kurt J., 5,014,456, Cl. 42-50.000.

Folsom, James C., to Moore Business Forms, Inc. Web knicker 5,014,971, Cl. 270-039.000.

Foltz, Scott: *See—*
- Crudo, Phillip M.; Foltz, Scott; and Lay, Roger F., 5,015,138, Cl 412-43.000.

Folweiler, Robert C.: *See—*
- Hall, Bruce T.; Andrews, Leonard J.; and Folweiler, Robert C., 5,015,281, Cl. 65-32.500.

Ford, Brian R.: *See—*
- Moore, Kenneth P.; Ford, Brian R.; and Williams, Stephen B., 5,014,977, Cl. 271-221.000.

Ford Motor Company: *See—*
- Amin, Jayendra J.; and Strikis, Guntis V., 5,015,161, Cl. 418-6.000.
- Baltusis, Paul A.; Greene, Thomas L.; and Palansky, Bruce J., 5,016,175, Cl. 364-424.100.
- Bonnett, Roy E., 5,015,028, Cl. 296-107.000.
- Boyer, Wesley D., 5,014,676, Cl 123-637.000.
- Wade, Wallace R.; and Rao, Vemulapalli D N., 5,014,511, Cl. 60-303.000.

Ford New Holland, Inc.: *See—*
- Johnson, Russell I; Radke, Daniel D; and Ball, Garry L., 5,015,148, Cl. 414-722.000.
- Merritt, John H., III; and Margerum, Edwin O., 5,014,613, Cl. 100-5.000.
- Strubbe, Gilbert J. I., 5,015,997, Cl. 340-684.000.

Ford, William A., to AT&T Bell Laboratories Echo canceler-suppressor speakerphone 5,016,271, Cl. 379-410.000.

Forgnone, Frederick: *See—*
- Bolejack, Kevin J.; Forgnone, Frederick; and McCoy, Christopher, 5,014,495, Cl. 53-433.000.

Forkert, Maurice J.; and Sullivan, Mark E., to Tokheim Corporation. Linearized turbine flow meter for fuel dispensers. 5,016,187, Cl. 364-510.000.

Foster, Thomas L., to Vance Products Incorporated. Medical instrument for driving a suture needle. 5,015,250, Cl. 606-147.000.

Foster Wheeler Energy Corporation: *See—*
- Moran, Edward, 5,014,901, Cl 228-119.000.

Fowler, Daniel L.: *See—*
- Kadwell, Brian J.; and Fowler, Daniel L., 5,015,827, Cl. 219-497.000

Fowlkes, Vinson G., Jr Adjustable furniture templates method. 5,015,190, Cl. 434-72.000.

Fox, John W.; and Rigole, Rod Torso wrap for body surfing. 5,015,208, Cl. 441-55.000.

Fox, Thomas M., and Anderson, Neal R., to Motorola, Inc. Optical target detector. 5,014,621, Cl. 102-213.000.

Foxboro Company, The: *See—*
- Grandmont, Paul E.; and Lake, Harold, 5,015,553, Cl. 430-260.000.

Fradenburgh, Evan A.; and Zincone, Robert, to United Technologies Corporation. High density fiber optic damage detection system. 5,015,842, Cl. 250-227.150.

Framatome: *See—*
- Bernard, Petit, 5,015,435, Cl. 376-285.000.

Francalanci, Franco: *See—*
- De Bernardinis, Silvia; Cabri, Walter; Martinengo, Tiziano; and Francalanci, Franco, 5,015,745, Cl. 552-206.000.

Frank, Ed, to Boeing Company, The. Compliant tape dispensing and compacting head. 5,015,326, Cl. 156-511.000.

Frank, Gregory R., to Howmet Corporation. Method of making ceramic cores. 5,014,763, Cl. 164-15.000.

Frank, Louis M: *See—*
- Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.

Franke, Andreas: *See—*
- Wawra, Helmut; Albrecht, Wilhelm; Wagner, Bernd; Franke, Andreas; and Gellner, Harald, 5,014,831, Cl. 192-4.00A.

Franklin, Charles C.; and Gisske, Edward T. Leak detector. 5,014,543, Cl. 73-40.50R.

Franks, George J., Jr. Cable clamp. 5,015,205, Cl. 439-803.000.

Franssell, Dean E.; and Palkert, Philip E., to General Mills, Inc. Dry mix for microwave muffins with psyllium and method of preparation. 5,015,486, Cl. 426-243.000

Franz, Michel; Jans, Michel; Mathur, Leo K.; Shah, Kamlesh B.; and Truelove, James E., to G. D. Searle & Co. Stabilized pharmaceutical admixture composition. 5,015,481, Cl. 424-494.000.

Fraser, Douglas S. Vapor recovery system. 5,015,337, Cl. 202-169.000.

Frederick, Paul S.: *See—*
- Skach, Edward J., Jr.; and Frederick, Paul S., 5,015,291, Cl. 75-531.000

Freedom Machine, Inc.: *See—*
- McGough, Jeffrey D.; and Brinson, Gail L., 5,015,233, Cl. 604-97.000.

Fresenius AG: *See—*
- Mathieu, Bernd; Rinck, Michael; Schnur, Jurgen; Selzer, Dieter; and Weber, Wolfram, 5,015,374, Cl. 210-232.000.
- Polaschegg, Hans-Dietrich, 5,015,226, Cl. 604-4.000.

Frey, Heinz. Continuously variable drive. 5,015,898, Cl. 310-83.000.

Frey, Manfred: *See—*
- Heep, Dieter; Vogel, Paul; Frey, Manfred; and Schmalz, Joachim, 5,014,885, Cl. 222-368.000.

Frey, Volker; Pachaly, Bernd; and Zeller, Norbert, to Wacker-Chemie GmbH. Process for preparing highly porous glass-ceramic molded parts. 5,015,605, Cl. 501-12.000.

Fricano, Anthony. Apparatus and method for treating well water. 5,015,370, Cl. 210-138.000.

Frick, Beat: *See—*
- Rhomberg, Bruno; and Frick, Beat, 5,015,088, Cl. 352-198.000.

Friedman, Marc D.: *See—*
- Bjelkhagen, Hans; and Friedman, Marc D., 5,014,709, Cl. 128-654.000.

Friedrich Grohe Armaturenfabrik GmbH & Co.: *See—*
- Humpert, Jurgen; and Pawelzik, Manfred, 5,014,749, Cl. 137-801.000.
- Korfgen, Harald; Hirsch, Heinz; Grendel, Vinzenz; Wagner, Friedrich; and Grau, Walter, 5,014,736, Cl 137-315.000.

Friedrick, Wolfgang: *See—*
- Brandenstein, Manfred; Friedrick, Wolfgang; Haas, Roland; and Herrmann, Gerhard, 5,015,216, Cl. 474-101.000.

Friesen, Heinz-Jurgen; and Pestka, Sidney, to Hoffmann-La Roche Inc. Preparation of homogeneous human fibroblast interferon. 5,015,730, Cl. 530-351.000.

Friez, Pierre: *See—*
- Castera, Jean-Paul; Meunier, Paul-Louis; Carenco, Alain; Dupont, Jean-Marie; and Friez, Pierre, 5,015,051, Cl. 350-96.120.

Fritschi, Isidor: *See—*
- Wernli, Joerg; Brennwalder, Daniel; Erni, Markus; Fritschi, Isidor; and Wanzenried, Andreas, 5,014,505, Cl. 57-275.000.

Fritzsche, Peter: *See—*
- Staheli, Paul; Demuth, Robert; and Fritzsche, Peter, 5,014,395, Cl. 19-105.000.

Froes, Francis H.; and Shong, Simon D., to United States of America, Air Force. High temperature hydrogenation of gamma titanium aluminide. 5,015,305, Cl. 148-20.300.

Fuel Systems Textron Inc.: *See—*
- Halvorsen, Robert M., 5,014,918, Cl. 239-410.000.

Fuji Jukogyo Kabushiki Kaisha: *See—*
- Hayashida, Yuji, 5,016,181, Cl. 364-431.090.
- Hirose, Kenji, 5,014,801, Cl. 180-140.000.
- Kashiwase, Hajime, 5,014,566, Cl. 74-331.000.

Fuji Kucho Kogyo Kabushiki Kaisha: *See—*
- Takasugi, Tamotsu, 5,014,424, Cl. 29-890.149.

Fuji Optical Systems, Incorporated: *See—*
- Cooper, David H.; and Bush, Charles S., 5,016,098, Cl. 358-98.000.

Fuji Photo Film Co., Ltd.: *See—*
- Aonuma, Masashi; Kasuga, Akira; and Masuda, Haruo, 5,015,498, Cl. 427-132.000.
- Hayashi, Kazunori; Inoue, Nobuaki; and Nishiyama, Shingo, 5,015,561, Cl. 430-487.000.
- Ishikawa, Hiromi; and Nishihata, Sumihiro, 5,015,852, Cl. 250-327.200.
- Kaneko, Kiyotaka, 5,016,094, Cl. 358-41.000.
- Komatsu, Tomoaki; and Satou, Sigeo, 5,016,203, Cl. 364-571.020.
- Nakajima, Nobuyoshi, 5,015,853, Cl. 250-327.200.
- Nemori, Ryoichi; and Tsukada, Yoshihisa, 5,015,387, Cl. 210-638.000.
- Ono, Mitsunori, 5,015,763, Cl. 562-106.000.
- Shigyo, Masao; Kanada, Shoji; and Oshida, Eiji, 5,015,854, Cl. 250-327.200.
- Suga, Shuzo; Shishido, Tadao; Mifune, Hiroyuki; and Kawashima, Yoshiro, 5,015,567, Cl. 430-567.000.
- Suzuki, Akihiro; and Sakaguchi, Masaaki, 5,015,430, Cl. 264-146.000.
- Tachikawa, Hiromichi; Yokoya, Hiroaki; Suzuki, Nobuo; and Watarai, Syu, 5,015,551, Cl. 430-114.000.
- Tokuda, Kanji, 5,016,044, Cl. 355-43.000.
- Toya, Ichizo; Yamada, Sumito; and Suematsu, Koichi, 5,015,562, Cl. 430-518.000.

Fuji Xerox Co., Ltd.: *See—*
- Maruyama, Naotaka, 5,016,159, Cl. 364-200.000.

Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, to Hitachi, Ltd. Substrate for hybrid IC, hybrid IC using the substrate and its applications. 5,016,089, Cl. 357-80.000.

Fujii, Syuso: *See—*
- Kumagai, Jumpei; and Fujii, Syuso, 5,016,071, Cl. 357-23.600.
- Tanaka, Hiroto; and Fujii, Syuso, 5,016,224, Cl 365-230.030.

Fujii, Takaaki; Abe, Masahiko; and Kobayashi, Akio, to Honda Giken Kogyo Kabushiki Kaisha. Fuel supply controller for an internal combustion engine. 5,014,672, Cl. 123-492.000.

Fujii, Tatsuya; Sato, Yutaka; and Tanaka, Masafumi, to Ricoh Company, Ltd. High-speed digital filter processor including parallel paths for processing data, suitable for use in spatial filter image processing. 5,016,207, Cl. 364-724.010.

Fujii, Toshio; Kato, Kazuhiro; Suzuki, Tasuku; and Kashino, Minoru, to Mitsubishi Kasei Corporation. Porous film. 5,015,521, Cl. 428-220.000.

Fujikawa, Makoto: *See—*
- Tsukada, Shinichi; Shinomiya, Tsutomu; Yoshino, Eiichi; Yoshioka, Shigeki; and Fujikawa, Makoto, 5,014,491, Cl. 53-366.000.

Fujimoto, Hiroaki; and Okazaki, Masaki, to Sanshin Kogyo Kabushiki Kaisha. Fuel feed device for internal combustion engine. 5,014,673, Cl. 123-512.000.

Fujimoto, Takenobu: *See—*
- Saito, Masayuki; Fujimoto, Takenobu; and Hagiwara, Takuya, 5,014,417, Cl. 29-783.000.

Fujimoto, Yoshiji: *See—*
- Kawama, Shuichi; and Fujimoto, Yoshiji, 5,016,279, Cl. 381-36.000.

Fujimura, Shunichi: *See—*
- Kubo, Masashige; Tsutsumi, Yukihiro; Okisaki, Fumio; Fujimura, Shunichi; and Fukuda, Teruo, 5,015,526, Cl. 428-378.000.

Fujioka, Shuzo: *See—*
- Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Takahira, Kenichi; Fujioka, Shuzo; and Matsubara, Toshiyuki, 5,016,212, Cl. 364-900.000.

Fujisawa, Masaaki, to Hitachi, Ltd. Tamper proof method and apparatus for adjusting a control parameter of a controlled apparatus. 5,016,180, Cl. 364-431.040.

Fujita, Akira: *See—*
- Shimotomai, Michio; Fukuda, Yasutaka; and Fujita, Akira, 5,015,307, Cl. 148-302.000.

Fujitsu Limited: *See—*
- Ikeda, Masayuki; and Ueda, Kohichi, 5,016,209, Cl. 364-748.000.
- Suzuki, Hitoshi; Yokoyama, Hiromitsu; Tsukada, Mineharu; Ogawa, Hiromi; Kamehara, Nobuo; and Niwa, Koichi, 5,015,314, Cl. 156-89.000.
- Takamatsu, Hisashi; Naganuma, Norihisa; and Abe, Kenichi, 5,015,055, Cl. 350-96.150.
- Takatsu, Motomu, 5,015,874, Cl. 307-272.100
- Tanikawa, Akinao; Ohshima, Toshiharu; and Sakai, Toshihiro, 5,016,165, Cl. 364-200.000.

Fujiwara, Takuji; Waseda, Koji; and Matsumoto, Akio, to Mazda Motor Corporation. Control systems for automatic transmissions. 5,014,575, Cl. 74-866.000.

Fujiyama, Mamoru: *See—*
- Takenakajima, Takefumi; Nishimura, Kazuo; Fujiyama, Mamoru; and Fukushima, Toshihiro, 5,014,752, Cl. 138-149.000.

Fukubayashi, Makoto: *See—*
- Noji, Ikutaro; Kaiju, Masaki; Sakamoto, Hideyuki; and Fukubayashi, Makoto, 5,014,522, Cl. 82-227.000.

Fukuda, Teruo: *See—*
- Kubo, Masashige; Tsutsumi, Yukihiro; Okisaki, Fumio; Fujimura, Shunichi; and Fukuda, Teruo, 5,015,526, Cl. 428-378.000.

Fukuda, Yasutaka: *See—*
- Shimotomai, Michio; Fukuda, Yasutaka; and Fujita, Akira, 5,015,307, Cl. 148-302.000.

Fukuhara, Hiroshi: *See—*
- Araki, Shintaro; Matsunaga, Fujihisa; and Fukuhara, Hiroshi, 5,015,786, Cl. 568-798.000.

Fukuhara, Toru: *See—*
- Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.

Fukumura, Seisuke: *See—*
- Ozaki, Keiji; and Fukumura, Seisuke, 5,015,165, Cl. 425-28.100.

Fukushima, Kyoko: *See—*
- Kambara, Yoshihiko; Oonaka, Itsuo; Asao, Koichi; and Fukushima, Kyoko, 5,015,766, Cl. 564-127.000.

Fukushima, Nobuo; Sakai, Shinji; Takeda, Osamu; Suzuki, Yasutomo; and Takei, Masahiro, to Canon Kabushiki Kaisha. Recording apparatus with control of energy to the drive at start up. 5,016,124, Cl. 360-69.000.

Fukushima, Toshihiro: *See—*
- Takenakajima, Takefumi; Nishimura, Kazuo; Fujiyama, Mamoru; and Fukushima, Toshihiro, 5,014,752, Cl. 138-149.000.

Fukutani, Iwao: *See—*
- Sakamoto, Yukio; Hori, Toshio; Fukutani, Iwao; and Tanabe, Takeshi, 5,015,204, Cl. 439-620.000.

Fukuyama, Keiji: *See—*
- Sano, Kinjiro; Kamata, Toyokazu; Fukuyama, Keiji; Saito, Masato; and Watanabe, Keiji, 5,015,497, Cl. 427-77.000.

Fulford, George D.; Lever, Gordon; and Sato, Taichi, to Alcan International Limited. Recovery of rare earth elements from sulphurous acid solution by solvent extraction. 5,015,447, Cl. 423-21.500.

Fullemann, Jorg; and Boner, Heinrich, to VTH AG Verfahrenstechnik fur Heizung. Burner for the combustion of liquids in the gaseous state. 5,015,173, Cl. 431-116.000.

Fullmer, Douglas E.: *See—*
- Seibel, Michael J.; Fullmer, Douglas E.; Bossaller, James E.; and Baker, Glen M., 5,016,202, Cl. 364-571.070.

Fulton, Janet B.: *See—*
- Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., 5,015,696, Cl. 525-331.700.

Funahashi, Makoto: *See—*
- Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,014,577, Cl. 74-869.000.

Funamoto, Masaya: *See—*
- Harada, Yuichi; and Funamoto, Masaya, 5,015,107, Cl. 400-144.200.

Fund, Steven: *See—*
- Smith, Lloyd M.; Fund, Steven; and Kaiser, Robert J., Jr., 5,015,733, Cl. 536-23.000.

Funk, John W.; and Saint, David H., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Gas operated vehicular control system. 5,016,004, Cl. 340-825.690.

Funkenbusch, Eric F.: *See—*
- Carr, Peter W.; Funkenbusch, Eric F.; Rigney, Martin P.; Coleman, Patrick L.; Hanggi, Douglas A.; and Schafer, Wes A., 5,015,373, Cl. 210-198.200.

Furrow, Randy M., to AMP Incorporated. Power distribution unit having improved junction box. 5,015,203, Cl. 439-535.000.

Furuhashi, Hiroyuki: *See—*
- Doi, Yoshiharu; Ueki, Satoshi; and Furuhashi, Hiroyuki, 5,015,714, Cl. 526-336.000.

Furukawa Electric Co., Ltd., The: *See—*
- Kubo, Masashige; Tsutsumi, Yukihiro; Okisaki, Fumio; Fujimura, Shunichi; and Fukuda, Teruo, 5,015,526, Cl. 428-378.000.

Furukori, Masami: *See—*
- Ishido, Takanobu; Tan, Sachiyo; and Furukori, Masami, 5,016,192, Cl. 364-518.000.

Furuta, Shigeru: *See—*
- Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Takahira, Kenichi; Fujioka, Shuzo; and Matsubara, Toshiyuki, 5,016,212, Cl. 364-900.000.

Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, to Agency of Industrial Science and Technology; and Extra-Ministerial Bureau of Ministry of International Trade and Industry. DNA sequence involved in gene expression and protein secretion, expression-secretion vector including the DNA sequence and the method of producing proteins by using the expression-secretion vector. 5,015,574, Cl. 435-67.100.

Furuyama, Masayoshi: *See—*
- Takahashi, Yoshiaki; Ishii, Sakae; Furuyama, Masayoshi; and Shirai, Shoji, 5,015,910, Cl. 313-414.000.

Fussell, Don L. Water-proof geophone housing. 5,014,813, Cl. 181-122.000.

Fye, Edward H., to Familian Northwest. Knife gate valve. 5,014,730, Cl. 137-454.200.

Fyfe, Edward R.; and Kelly, James M. System and apparatus for limiting the effect of vibrations between a structure and its foundation. 5,014,474, Cl. 52-167.000.

G. Bruckner GmbH: *See—*
- Cunningham, Wallace, 5,014,402, Cl. 26-91.000.

G. D. Searle & Co.: *See—*
- Franz, Michel; Jans, Michel; Mathur, Leo K.; Shah, Kamlesh B.; and Truelove, James E., 5,015,481, Cl. 424-494.000.

G.D. Societa' Per Azioni: *See—*
- Neri, Armando; and Turra, Mario, 5,015,819, Cl. 219-121.700.

Gabrielli, Giorgio; Maritano, Mauro; Motroni, Giuseppe; and Chapoy, L. Lawrence, to Montedison S.p.A. Thermotropic liquid-crystalline aromatic, polyesters. 5,015,721, Cl. 528-190.000.

Gaeta, Federico C. A.: *See—*
- Andrews, David R.; Gaeta, Federico C. A.; and Watkins, Robert W., 5,015,641, Cl. 514-223.500.

GAF Chemicals Corporation: *See—*
- Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., 5,015,708, Cl. 526-264.000.

Gagnon, Kenneth M., Sr., to Quack Sporting Clays, Inc. Protective device for target throwing apparatus. 5,014,677, Cl. 124-6.000.

Galand, Jean: *See—*
- Colombier, Gabriel; Lefebvre, Jacques; Galand, Jean; and Golay, Armand, 5,015,340, Cl. 204-28.000.

Galbo, James P., to Ciba-Geigy Corporation. Oligomeric N-hydrocarbyloxy hindered amine light stabilizers. 5,015,682, Cl. 524-102.000.

Galbo, James P.; and Ravichandran, Ramanathan, to Ciba-Geigy Corporation. Bis(1-hydrocarbyloxy-2,2,6,6-tetramethylpiperidin-4-yl)-amine derivatives and stabilized compositions. 5,015,683, Cl. 524-103.000.

Galbo, James P.: *See—*
- Seltzer, Raymond; Galbo, James P.; and Ravichandran, Ramanathan, 5,015,678, Cl. 524-99.000.

Galic, George J.: *See—*
- Maus, Steven M.; and Galic, George J., 5,015,426, Cl. 264-40.500.

Galic Maus Ventures: *See—*
- Maus, Steven M.; and Galic, George J., 5,015,426, Cl. 264-40.500.

Galindo, Jose : *See—*
- Fehr, Charles; and Galindo, Jose , 5,015,625, Cl. 512-24.000.

Gallagher, Alan C., to United States of America, Commerce. Multi-tipped field-emission tool for nanostructure fabrication. 5,015,323, Cl. 156-345.000.

Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, to Roussel UCLAF. 1-azabicycloalkane derivatives, their preparation process and their use as medicaments. 5,015,655, Cl. 514-413.000.

Galonska, David A., to Arrow Paper Products Company. Tube cutting apparatus and methods. 5,014,579, Cl. 82-47.000.

VOL 1126 ISS 2 MY 14 1991 UMI

- Galyon, George T.; Jordhamo, George M.; Moran, Kevin P.; and Zumbrunnen, Michael L., to International Business Machines Corporation. Cross-hatch flow distribution and applications thereof. 5,016,090, Cl. 357-82.000.
- Gamblin, Tom D. Commode seat lifting apparatus. 5,014,367, Cl. 4-251.000.
- Gandy, Carroll E.; and Watford, Roland S., Jr., to Sonoco Products Company. Yarn carrier and method and apparatus for manufacturing the same. 5,014,928, Cl. 242-118.320.
- Ganguly, Ashit K.: *See—*
  - Saksena, Anil K.; Girijavallabhan, Viyyoor M.; and Ganguly, Ashit K., 5,015,739, Cl. 544-277.000.
- Garat, Michel, to Aluminium Pechiney. Lost-foam casting of aluminum under pressure. 5,014,764, Cl. 164-34.000.
- Garces, Juan M.: *See—*
  - Lee, Guo-shuh J.; Garces, Juan M.; and Maj, Joseph J., 5,015,797, Cl. 585-467.000.
- Garde, Gerald R., to Beloit Corporation. Roll coater with perforated deckles. 5,015,500, Cl. 427-211.000.
- Gardner, John B.: *See—*
  - Garrett, Michael E.; and Gardner, John B., 5,015,269, Cl. 55-16.000.
- Gardner, John C.: *See—*
  - Arnold, Douglas B.; Bromfield, George; and Gardner, John C., 5,016,228, Cl. 367-163.000.
- Garrett, Michael E.; and Gardner, John B., to BOC Group plc, The. Gas separation. 5,015,269, Cl. 55-16.000.
- Gas Research Institute: *See—*
  - Kusik, Charles L.; and Interess, Edward, 5,015,288, Cl. 75-686.000.
- Gaston County Dyeing Machine Co.: *See—*
  - Hacker, George G.; Turner, James K.; Abernathy, Paul L.; Payne, Bobby G.; Killian, Roy C.; and Laws, David G., 5,014,526, Cl. 68-178.000.
- Gately, William L.: *See—*
  - Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., 5,015,698, Cl. 525-391.000.
- Gates, Louis E., Jr.: *See—*
  - Hubbard, Douglas A.; and Gates, Louis E., Jr., 5,016,085, Cl. 357-74.000.
- Gaylord, William J., to Bel South Corporation. Apparatus and method for segmenting a field of view into contiguous, non-overlapping, vertical and horizontal sub-fields. 5,016,109, Cl. 358-225.000.
- Geary, George B. Threaded tubular coupling. 5,015,017, Cl. 285-333.000.
- Gee, Gregory P.; Martin, Edward J.; and Prawdzik, David P., to General Motors Corporation. Method of processing mass air sensor signals. 5,014,550, Cl. 73-118.200.
- Geiger, Herb: *See—*
  - Smith, David A.; and Geiger, Herb, 5,014,978, Cl. 271-308.000.
- Geiger, Rolf: *See—*
  - Obermeier, Rainer; Geiger, Rolf; and Grau, Ulrich, 5,015,728, Cl. 530-303.000.
- Gellert, Jobst U. Injection molding cooled socket holder for a heated nozzle. 5,015,170, Cl. 425-549.000.
- Gellner, Harald: *See—*
  - Wawra, Helmut; Albrecht, Wilhelm; Wagner, Bernd; Franke, Andreas; and Gellner, Harald, 5,014,831, Cl. 192-4.00A.
- Gema, S.A.: *See—*
  - Cabre Castellvi, Juan; Diago Meseguer, Jose ; Esteve Bianchini, Asuncion; Lenhardt Padro, Carlos E.; and Sans Pitarch, Esteve, 5,015,736, Cl. 540-222.000.
- GenCorp Inc.: *See—*
  - Dupuy, Ronald E.; and Agee, Donald P., 5,014,464, Cl. 49-440.000.
- General Dynamics Land Systems, Inc.: *See—*
  - Auyer, Richard A.; Buccellato, Robert J.; Gidynski, Andrew J.; Ingersoll, Richard M.; and Sridharan, Needangalam S., 5,014,593, Cl. 89-36.020.
- General Electric Company: *See—*
  - Boden, Eugene P.; and Phelps, Peter D., 5,015,720, Cl. 528-179.000.
  - Borom, Marcus P.; Hillig, William B.; Singh, Raj N.; Morrison, William A.; and Interrante, Leonard V., 5,015,540, Cl. 428-698.000.
  - Butzin, Donald F.; Tunnell, George W.; King, Harold B., Jr.; and Schoenig, Frederick C., Jr., 5,014,439, Cl. 33-533.000.
  - Carlson, Peter J.; and Hodgins, Robert G., 5,015,921, Cl. 315-208.000.
  - Cassarly, William J.; and Flood, Kevin M., 5,015,080, Cl. 350-484.000.
  - Corrigan, Francis R.; and Slutz, David E., 5,015,265, Cl. 51-293.000.
  - DeRosier, Donna C.; Dziura, Richard A.; Palmieri, Joseph M.; Juntwait, Eric D.; Jacobs, Linda Y.; and Scott, Graham A., 5,015,983, Cl. 336-180.000.
  - Giles, Harold F., Jr.; Peters, Edward N.; Riding, Geoffrey H.; Thimons, Thomas V.; and Willard, G. F., 5,015,726, Cl. 528-349.000.
  - Hartley, Richard I.; Corbett, Peter F.; and Yassa, Fathy F., 5,016,011, Cl. 341-95.000.
  - Inzinna, Louis P.; and Nied, Herman F., 5,015,169, Cl. 425-394.000.
  - Katz, Allen; and Urban, Robert R., 5,015,965, Cl. 330-149.000.
  - Lewis, Larry N.; and Chang, Tony C., 5,015,691, Cl. 525-100.000.
  - Mazza, Lawrence T.; and Heindl, Raymond A., 5,015,916, Cl. 315-47.000.
  - McKay, Geoffrey H.; Candelora, Andrew M.; and Guerrette, Michael C., 5,015,977, Cl. 335-17.000.
  - O'Donnell, Matthew, 5,014,712, Cl. 128-661.010.
  - Radun, Arthur V., 5,015,945, Cl. 324-127.000.
  - Stone, Robert F.; Potter, Jeffrey D.; and Beamon, William S., III, 5,016,193, Cl. 364-518.000.
  - Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., 5,015,698, Cl. 525-391.000.
  - Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,703, Cl. 525-537.000.
  - Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,704, Cl. 525-537.000.
  - Uejio, Wayne H., 5,015,859, Cl. 250-358.100.
  - Walles, Erik W.; Lupinski, John H.; and Crivello, James V., 5,015,675, Cl. 523-443.000.
  - Wimpee, Lealon C.; Ross, Monty A.; O'Neil, Timothy J.; and Dean Chu, Edward M., 5,015,434, Cl. 376-254.000.
- General Mills, Inc.: *See—*
  - Franssell, Dean E.; and Palkert, Philip E., 5,015,486, Cl. 426-243.000.
- General Motors Corporation: *See—*
  - Brooks, Alec N., 5,015,545, Cl. 429-99.000.
  - Covert, Charles H.; Turner, Kenneth W.; Sherwood, Carl H.; Gifford, William E.; and Wagner, Richard W., 5,014,742, Cl. 137-588.000.
  - Detloff, Clement A., 5,015,030, Cl. 296-223.000.
  - English, James H., 5,015,543, Cl. 429-65.000.
  - Gee, Gregory P.; Martin, Edward J.; and Prawdzik, David P., 5,014,550, Cl. 73-118.200.
  - Hunter, Joseph H.; and Runde, Jeffrey K., 5,014,573, Cl. 74-866.000.
  - Johnston, Albert D., 5,014,833, Cl. 192-45.000.
  - Knoll, Jeffrey G.; and Kunkel, Dennis T., 5,014,802, Cl. 180-140.000.
  - Lederer, John F., 5,014,771, Cl. 165-76.000.
  - Leptich, Joseph M.; Penney, Keith A.; and Lowe, Steve F., 5,014,656, Cl. 123-169.0EL.
  - Lin, William C., 5,015,040, Cl. 303-93.000.
  - Martell, David R., 5,014,445, Cl. 33-731.000.
  - Nine, Harmon D., 5,014,537, Cl. 72-350.000.
  - Siak, June-sang; and Klingenmaier, Otto J., 5,014,774, Cl. 165-133.000.
  - Skinner, Albert A.; House, Ronnalee; Kellams, Roger W.; and Cruz, Jose A., 5,015,982, Cl. 336-69.000.
- Genet, Alain: *See—*
  - Junino, Alex; Lang, Gerard; and Genet, Alain, 5,015,769, Cl. 564-399.000.
- Gent, John A. G.; and Blass, Jacob M., to Cogent Limited. Coating method for forming smooth-ended bristles on a brush. 5,015,504, Cl. 427-284.000.
- George, Glen A.: *See—*
  - Whiting, Douglas L.; George, Glen A.; and Ivey, Glen E., 5,016,009, Cl. 341-67.000.
- George, Robert D., to Sherwood Medical Company. Method of sterilizing medical articles. 5,014,494, Cl. 53-425.000.
- Gerhards, Peter: *See—*
  - Kamp, Heinz; Gerhards, Peter; and Bruns, Siegfried, 5,014,922, Cl. 242-18.00R.
- Germanton, Damon; and Lehr, Menahem, to Measurement Specialties, Inc. Variable speed DC motor controller apparatus particularly adapted for control of portable-power tools. 5,014,793, Cl. 173-12.000.
- Gero, Gabriel. Multiple purpose dispensing package and blank. 5,014,906, Cl. 229-123.000.
- GEZE Sport International GmbH: *See—*
  - Dapezi, Karl, 5,014,571, Cl. 74-594.600.
- Ghandehari, Mohammad H., to Union Oil Company of California. Rare earth-iron-boron sintered magnets. 5,015,304, Cl. 148-302.000.
- Ghandehari, Mohammad H., to Union Oil Company of California. Method for preparing rare earth-iron-boron sintered magnets. 5,015,306, Cl. 148-103.000.
- Giannella, Piccolo G., to Exar Corporation. Programmable die size continuous array. 5,016,080, Cl. 357-45.000.
- Giannini, Gabriel M. Optical connector. 5,015,061, Cl. 350-96.200.
- Gibbens, Harry C., Jr. Electronically operated clock for hearing impaired persons. 5,016,229, Cl. 368-10.000.
- Gibbens, Richard T., III. Radial arm saw alignment device. 5,014,443, Cl. 33-640.000.
- Giblin, Elizabeth; and Giblin, Jay P. Chair assembly having non-slip seat. 5,015,037, Cl. 297-452.000.
- Giblin, Jay P.: *See—*
  - Giblin, Elizabeth; and Giblin, Jay P., 5,015,037, Cl. 297-452.000.
- Gibson, Alan F.: *See—*
  - Guzzetta, Franklin H.; Gibson, Alan F.; and Mitch, David S., 5,015,341, Cl. 204-28.000.
- Gibson, Paul N., to Augers Unlimited, Inc. Percent grade boring and monitoring apparatus. 5,014,795, Cl. 175-45.000.
- Gibson, Walter T. Cosmetic composition. 5,015,470, Cl. 424-70.000.
- Gidynski, Andrew J.: *See—*
  - Auyer, Richard A.; Buccellato, Robert J.; Gidynski, Andrew J.; Ingersoll, Richard M.; and Sridharan, Needangalam S., 5,014,593, Cl. 89-36.020.
- Gierloff, Christian S. Garden glove tool. 5,014,792, Cl. 172-371.000.
- Giesen, Matthias: *See—*
  - Aumann, Gerd; Giesen, Matthias; Klatte, Gerd; and Korte, Hans-Jurgen, 5,015,669, Cl. 523-200.000.

- Gifford, William E.: *See—*
  - Covert, Charles H.; Turner, Kenneth W.; Sherwood, Carl H.; Gifford, William E.; and Wagner, Richard W., 5,014,742, Cl. 137-588.000.
- Gilbert, Everett A.: *See—*
  - Springer, Robert E.; Hafer, George F.; and Gilbert, Everett A., 5,015,961, Cl. 329-300.000.
- Giles, Grady L.; and Wilson, Jesse R., to Motorola, Inc. Toggle-free scan flip-flop. 5,015,875, Cl. 307-272.200.
- Giles, Harold F., Jr.; Peters, Edward N.; Riding, Geoffrey H.; Thimons, Thomas V.; and Willard, G. F., to General Electric Company. Polyamide from toluenediamine. 5,015,726, Cl. 528-349.000.
- Gillard, Clive H.: *See—*
  - Richards, John W.; Gillard, Clive H.; Avis, Richard J. A.; Samad, Raphael; and Walters, Carl W., 5,016,101, Cl. 358-140.000.
- Gillespie, Joseph D. Clutch adjustment and lockup system. 5,014,841, Cl. 192-105.00C.
- Gillum, Gary K., Sr.: *See—*
  - Seifers, Monte G.; and Gillum, Gary K., Sr., 5,016,230, Cl. 368-10.000.
- Gilpatrick, Michael W., to Milliken Research Corporation. Index marking system. 5,015,849, Cl. 250-302.000.
- Gilson, Channing W.: *See—*
  - Loesel, John L., Jr.; and Gilson, Channing W., 5,014,880, Cl. 222-181.000.
- Ginatta, Marco V.; Orsello, Gianmichele; and Berruti, Riccardo, to Ginatta Torno Titanium S.p.A. Method and cell for the electrolytic production of a polyvalent metal. 5,015,342, Cl. 204-64.00T.
- Ginatta Torno Titanium S.p.A.: *See—*
  - Ginatta, Marco V.; Orsello, Gianmichele; and Berruti, Riccardo, 5,015,342, Cl. 204-64.00T.
- Gioannini, John P.: *See—*
  - Shaw, Harold L.; Smith, Randall B.; Cunningham, Larry E.; Rishel, Barry E.; Gioannini, John P.; and Harkey, Warren B., 5,016,005, Cl. 340-870.190.
- Girijavallabhan, Viyyoor M.: *See—*
  - Saksena, Anil K.; Girijavallabhan, Viyyoor M.; and Ganguly, Ashit K., 5,015,739, Cl. 544-277.000.
- Gismondi, Ernesto; and Bissell, John T., to Artemide S.p.A. Articulated arm lamp. 5,016,153, Cl. 362-402.000.
- Gisske, Edward T.: *See—*
  - Franklin, Charles C.; and Gisske, Edward T., 5,014,543, Cl. 73-40.50R.
- Givaudan Corporation: *See—*
  - Helmlinger, Daniel; Kienzle, Frank; and Widmer, Erich, 5,015,779, Cl. 568-346.000.
- Given, William R.: *See—*
  - Berg, Bernard J.; Bowden, David R.; Cargill, Mark A.; and Given, William R., 5,015,098, Cl. 356-402.000.
- Glamkowski, Edward J.; and Kurys, Barbara E., to Hoechst-Roussel Pharmaceuticals Inc. Benzo(b)pyrrolobenzodiazepines. 5,015,738, Cl. 540-494.000.
- Glaxo Group Limited: *See—*
  - Humphrey, Patrick P. A., 5,015,648, Cl. 514-317.000.
- Glenn, Jerry L., to AT&T Bell Laboratories. Methods of and a device for causing a fluid to be moved into engagement with a moving elongated material. 5,015,518, Cl. 427-424.000.
- Glennon, Michael J.: *See—*
  - Zweig, John E.; Kehn, John P.; and Glennon, Michael J., 5,014,592, Cl. 89-24.000.
- Glidden Company, The: *See—*
  - Hahn, Kenneth G., Jr.; and Kunz, Barbara L., 5,015,687, Cl. 524-512.000.
- Gloor, Rene ; Muller, Michael; and Beeler, Alfred, to Siegfried Peyer AG. Method and apparatus for making representative samples of textile fibers. 5,014,394, Cl. 19-98.000.
- Glover, Donald W.: *See—*
  - Nelson, Danny A.; Tomich, Stanley D.; Glover, Donald W.; Allen, Errol V.; Hales, Jeremy M.; and Dana, Marshall T., 5,016,196, Cl. 364-550.000.
- Glynn, Kenneth P., to Tenax-Glynn Corporation. Patient compliance medicine cap. 5,014,798, Cl. 177-25.190.
- Godau, Claus: *See—*
  - Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, 5,015,676, Cl. 523-453.000.
- Gofman, Yuri: *See—*
  - Shepard, Howard M.; Gofman, Yuri; and Barkan, Edward, 5,015,833, Cl. 235-472.000.
- Golay, Armand: *See—*
  - Colombier, Gabriel; Lefebvre, Jacques; Galand, Jean; and Golay, Armand, 5,015,340, Cl. 204-28.000.
- Gold, Harvey S., to Du Pont de Nemours, E. I., and Company. Automated process for permeability determinations of barrier resins. 5,015,856, Cl. 250-339.000.
- Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, to Tandy Corporation. Recording method and apparatus. 5,016,239, Cl. 369-284.000.
- Goldman, Stephen A.; Horney, James C.; and Retzsch, Herbert L., to Procter & Gamble Company, The. Absorbent structures with gelling agent and absorbent articles containing such structures. 5,015,246, Cl. 604-368.000.
- Goldreich, Oded: *See—*
  - Micali, Silvio; Goldreich, Oded; and Even, Shimon, 5,016,274, Cl. 380-23.000.
- Goldring Display Group, Inc.: *See—*
  - Niven, Mark A., 5,014,949, Cl. 248-220.400.
- Goldstar Co., Ltd.: *See—*
  - Cho, Eung J., 5,016,236, Cl. 369-75.200.
  - Park, Hong C., 5,015,868, Cl. 250-561.000.
- Goodhart, Richard B.: *See—*
  - Davis, Bill E.; Myers, Eugene W.; Goodhart, Richard B.; Paris, William M.; and Borthwick, James T., Jr., 5,014,496, Cl. 53-433.000.
- Goodman, Clarence R.; and Presley, Jerry R., to Daystar, Inc. Protective bellows. 5,015,002, Cl. 277-212.0FB.
- Goodwin, Brent E.; Karn, Donald L.; Mistvurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., to Monarch Marking Systems, Inc. Hand-held labeler. 5,015,324, Cl. 156-384.000.
- Goodyear Tire & Rubber Company, The: *See—*
  - Beer, Klaus; Richards, Gary W.; Oare, Thomas R.; Brown, Thomas A.; and Wells, Thomas H., 5,014,762, Cl. 152-532.000.
- Gopal, Inder S.: *See—*
  - Cidon, Israel; and Gopal, Inder S., 5,016,247, Cl. 370-81.000.
- Gordin, Myron K.; and Drost, Jim L., to Musco Corporation. Means and method for increasing output, efficiency, and flexibility of use of an arc lamp. 5,016,150, Cl. 362-263.000.
- Gordon, Gary: *See—*
  - Hoberman, Kenneth; Kirwan, Kim; and Gordon, Gary, 5,015,994, Cl. 340-567.000.
- Goronkin, Herbert, to Motorola, Inc. Quantom well structure having enhanced conductivity. 5,016,064, Cl. 357-16.000.
- Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Yamazaki, Masanobu; Toyoda, Manabu; and Ushijima, Makoto, to Hitachi Metals, Ltd. Flying-type composite magnetic head with appropriate bonding glasses and method of producing same. 5,016,129, Cl. 360-103.000.
- Goto, Tetsuro, to Nikon Corporation. Camera system. 5,016,034, Cl. 354-288.000.
- Gotoh, Isamu, to Yamaki Sangyo Co., Ltd. Tapping screw. 5,015,134, Cl. 411-386.000.
- Gotou, Tetsuo; Shimada, Hiroo; and Nakamura, Katsunori, to Honda Giken Kogyo Kabushiki Kaisha. Oil pan structure for internal combustion engine. 5,014,819, Cl. 184-6.200.
- Gowert, Helmut: *See—*
  - Bongardt, Wolfgang; Gowert, Helmut; Winkeler, Hans-Josef; and Schneiders, Josef, 5,016,099, Cl. 358-106.000.
- Goze, Jean M.; Bernhardt, Randal J.; Sajic, Branko; Rockwell, Ned M.; McConnell, Nina M.; and Mohring, William R. N,N-disubstituted phthalamic acids and their ammonium salts, and their uses thereof as surfactants, emulsifiers, and conditioning agents in shampoos. 5,015,415, Cl. 252-547.000.
- Grabbe, Dimitry G.; and Shipe, Joanne E., to AMP Incorporated. Flat IC chip connector. 5,015,191, Cl. 439-71.000.
- Grace, Robert E.: *See—*
  - Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G.; Saraceno, Patricia J.; and Pacer, James M., 5,016,050, Cl. 355-208.000.
- Graef, Knut: *See—*
  - Bederke, Klaus; Ducoffre, Volker; and Graef, Knut, 5,015,688, Cl. 524-600.000.
- Graefje, Heinz: *See—*
  - Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl. 568-861.000.
- Granberg, Helge O.: *See—*
  - Cygan, Lawrence F.; Granberg, Helge O.; Bickham, Richard S.; and Missele, Carl, 5,015,972, Cl. 333-32.000.
- Grandmont, Paul E.; and Lake, Harold, to Foxboro Company, The. Method of patterning resist. 5,015,553, Cl. 430-260.000.
- Granstra, Dixon G.: *See—*
  - Kleinwolterink, Henry, Jr.; and Granstra, Dixon G., 5,015,237, Cl. 604-143.000.
- Grant, Ralph S., to Beloit Corporation. Multi-stage pulp washing within a batch digester. 5,015,333, Cl. 162-60.000.
- Grard, Guy: *See—*
  - Lessi, Jacques; Perreau, Philippe; Bary, Daniel; and Grard, Guy, 5,014,440, Cl. 33-557.000.
- Grass Valley Group, Inc., The: *See—*
  - Hershberger, David L., 5,016,259, Cl. 375-62.000.
- Graton, Michel; and Dalbiez, Andre , to Valeo. Torsion damping device for an automotive friction clutch disc. 5,014,842, Cl. 192-106.200.
- Gratsch, Jack M. Steam press drawing ambient air in heat exchange with steam through a workpiece and having two pressing positions and having movable split head and back portions. 5,014,453, Cl. 38-36.000.
- Grau GmbH & Co.: *See—*
  - Baur, Rolf, 5,015,139, Cl. 414-281.000.
- Grau, Ulrich: *See—*
  - Obermeier, Rainer; Geiger, Rolf; and Grau, Ulrich, 5,015,728, Cl. 530-303.000.
- Grau, Walter: *See—*
  - Korfgen, Harald; Hirsch, Heinz; Grendel, Vinzenz; Wagner, Friedrich; and Grau, Walter, 5,014,736, Cl. 137-315.000.
- Graupe, Daniel; and Arber, Amihadar, to Sigmedics, Inc. of Delaware. Microprocessor-controlled multiplexed functional electrical stimulator for surface stimulation in paralyzed patients. 5,014,705, Cl. 128-419.00R.
- Gravel, Jean-Pierre. Layout ruler. 5,014,438, Cl. 33-494.000.
- Gray, Norman, to Aukland (USA), Inc. Polyurethane elastic glove having improved puncture and tear resistance. 5,014,361, Cl. 2-167.000.

VOL 126 SS 2 MY 14 1991 UMI

Green, Charles E., to Champion International Corporation. Chlorine dioxide static distributor. 5,015,335, Cl. 162-243.000.

Green, Donald E., to Oral D. Orally effective ion chelators related to deferoxamine. 5,015,664, Cl. 514-616.000.

Greene, James L., to Marley Company, The. Battery monitoring and charging circuit for sump pumps. 5,015,152, Cl. 417-40.000.

Greene, Thomas L.: *See—*

Baltusis, Paul A.; Greene, Thomas L.; and Palansky, Bruce J., 5,016,175, Cl. 364-424.100.

Gregory, Charles E., Jr.: *See—*

Lewis, Hogan G.; and Gregory, Charles E., Jr., 5,014,457, Cl. 42-70.110.

Greiff, Paul, to Charles Stark Draper Laboratory, Inc., The. Semiconductor chip gyroscopic transducer. 5,016,072, Cl. 357-26.000.

Greite, Jurgen-Hinrich, to Adatomed Pharmazeutische und Medizintechnische Gesellschaft mbH. Intraocular posterior chamber lens 5,015,254, Cl. 623-6.000.

Grendel, Vinzenz: *See—*

Korfgen, Harald; Hirsch, Heinz; Grendel, Vinzenz; Wagner, Friedrich; and Grau, Walter, 5,014,736, Cl. 137-315.000.

Gresch, Heinrich: *See—*

Holter, Heinz; Igelbuscher, Heinrich; and Gresch, Heinrich, 5,015,451, Cl. 423-235.000.

Gresch, Walter, to Bucher-Guyer AG Maschinenfabrik. Process for the production of dealcoholized beverages, as well as a unit and device for performing the process. 5,014,612, Cl. 99-276.000

Gretag Aktiengesellschaft: *See—*

Rhomberg, Bruno; and Frick, Beat, 5,015,088, Cl. 352-198.000.

Gretag Systems: *See—*

Kraft, Walter; and von Stein, Werner R., 5,016,043, Cl. 355-38.000.

Greve, Peter: *See—*

Blumentritt, Martin; Kohler, Reiner; and Greve, Peter, 5,015,202, Cl. 439-487.000.

GRH Electronics: *See—*

Hoberman, Kenneth; Kirwan, Kim; and Gordon, Gary, 5,015,994, Cl. 340-567.000.

Grid Systems Corporation: *See—*

Dulaney, Ken L.; and Daly, John J., 5,015,546, Cl. 429-99.000.

Griesbach, Ray H.; and Hustad, Gerald O., to Oscar Mayer Foods Corporation. Reclosable package 5,014,856, Cl. 206-632.000.

Griffin, Bruce M.; Werkema, Robert G.; and Watt, Elbert D., to McDonnell Douglas Corporation. Tank arrangement particularly designed for chemical milling operations. 5,015,322, Cl. 156-345.000.

Griffith, John M.: *See—*

Swarden, M. C.; Jansen, W.; and Griffith, John M., 5,014,421, Cl. 29-889.700.

Griffith, Neil J.: *See—*

Pollack, Solomon R.; Brighton, Carl T.; Pienkowski, David; and Griffith, Neil J., 5,014,699, Cl. 128-419.00F.

Grimes, Lewis E.: *See—*

Walker, Robert H.; Willems, Paul A.; Huff, George A.; Grimes, Lewis E.; Tatterson, David F.; and Mehlberg, Robert L., 5,015,799, Cl. 585-500.000.

Grisel, Joseph P., to Blue Magic Products, Inc. Sheet fastening assembly and fastener therefor. 5,014,399, Cl. 24-72.500.

Griswold, Roy M.: *See—*

Martin, Eugene R.; and Griswold, Roy M., 5,015,717, Cl. 528-30.000.

Gross, Alex: *See—*

Richard, Daniel, Kolman, Kenneth; Case, Charles; Becker, Ronald, and Gross, Alex, 5,014,449, Cl. 36-114.000.

Gross, Rainer: *See—*

Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.

Grosso, Paul V.; Morgan, Michael J., Wing, Feagin A., Jr.; and Day, Roger W., to Olin Corporation Composition and electrophotographic use of microcapsular photoactive toner particles 5,015,549, Cl. 430-45.000.

Grousseau, Alain: *See—*

Brault, Daniel; and Grousseau, Alain, 5,015,962, Cl. 329-346.000.

Gruaz, Daniel; and Marchal, Claude, to Sextant Avionique Device for detecting the position of a control member on a touch-sensitive pad. 5,016,008, Cl. 341-33.000.

Gruber, Bruno. Holding, retaining and adhering means. 5,014,946, Cl. 248-206.500.

Gruen, Reinar. Process and apparatus for coating conducting pieces using a pulsed glow discharge. 5,015,493, Cl. 427-38.000.

Grumman Aerospace Corporation: *See—*

Arcas, Noe; and Parente, Charles A., 5,014,815, Cl. 181-213.000

Grundy, Reed H.: *See—*

Siegel, Melvin W.; and Grundy, Reed H., 5,015,867, Cl. 250-560.000.

Grzegorczyk, Andrzej: *See—*

Becker, Hans-Dieter, Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S., Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.

GTE Laboratories Incorporated: *See—*

Hall, Bruce T.; Andrews, Leonard J.; and Folweiler, Robert C., 5,015,281, Cl. 65-32.500.

Levinson, Mark, 5,015,618, Cl. 505-001.000.

Tang, Douglas D., 5,016,242, Cl. 370-3.000.

GTE Mobilnet, Incorporated: *See—*

Rogers, Stephen W., 5,016,269, Cl. 379-59.000.

GTE Products Corporation: *See—*

Ludwig, David C., 5,015,294, Cl. 106-268.000

Vanderpool, Clarence D.; and Hoffman, Timothy J., 5,015,458, Cl. 423-531.000.

Wright, John O., 5,014,418, Cl. 29-827.000

Guarriello, Henry J., Jr.: *See—*

Guarriello, Theodore J.; Guarriello, Henry J., Jr.; and Guarriello, Joseph A., 5,014,480, Cl. 52-309.120

Guarriello, Joseph A.: *See—*

Guarriello, Theodore J.; Guarriello, Henry J., Jr.; and Guarriello, Joseph A., 5,014,480, Cl. 52-309.120.

Guarriello, Theodore J.; Guarriello, Henry J., Jr.; and Guarriello, Joseph A., to Ardes, Ron, a part interest. Plastic forms for poured concrete. 5,014,480, Cl. 52-309.120.

Gudereit, Bernd: *See—*

Schurmann, Dieter; and Gudereit, Bernd, 5,015,869, Cl. 290-1.00R

Guerra, Robert: *See—*

Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,016,239, Cl. 369-284.000.

Guerrette, Michael C.: *See—*

McKay, Geoffrey H.; Candelora, Andrew M.; and Guerrette, Michael C., 5,015,977, Cl. 335-17.000.

Guibert, Paul; and Launay, Francis A. P., to Quartz & Silice. Apparatus for extracting spin cast fused silica objects. 5,015,279, Cl. 65-302.000.

Guilinger, Terry R.; Jones, Howland D. T.; Kelly, Michael J.; Medernach, John W.; Stevenson, Joel O.; and Tsao, Sylvia S., to United States of America, Energy. Electrochemical method for defect delineation in silicon-on-insulator wafers 5,015,346, Cl. 204-129.100.

Gulton Industries, Inc.: *See—*

Aikens, Wallace R., 5,016,143, Cl. 362-32.000.

Gunji, Katsuhiko: *See—*

Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, 5,015,973, Cl. 333-132.000.

Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; and Mashimo, Akira, 5,015,974, Cl. 333-134.000.

Gupta, Manoj K., to Occidental Chemical Corporation. Phenolic molding compositions. 5,015,529, Cl. 428-414.000.

Gurevich, Leon, to Cooper Industries, Inc. Method of making a ceramic coated microfuse. 5,015,176, Cl. 432-5.000.

Gusmini, Carlo: *See—*

Traini, Carlo; Mojana, Corrado; and Gusmini, Carlo, 5,015,345, Cl. 204-98.000.

Gustafsson, Per. Down hole drills using spent driving fluid for flushing purposes. 5,014,796, Cl. 175-296.000.

GUTEC Gesellschaft zur Entwicklung von Umweltschutztechnologie mbH: *See—*

Vorlop, Klaus-Dieter; and Sell, Michael, 5,015,448, Cl. 423-24.000.

Gutierrez, Aurelio J.: *See—*

Lint, James D.; and Gutierrez, Aurelio J., 5,015,981, Cl. 336-65.000.

Gutjahr, Lothar, to Klockner Ferromatik Desma GmbH. Method and device for directing and controlling the operation of an injection molding machine. 5,016,184, Cl. 364-476.000.

Guzzetta, Franklin H.; Gibson, Alan F.; and Mitch, David S., to Armco Steel Company, L.P. Induction galvannealed electroplated steel strip. 5,015,341, Cl. 204-28.000.

H. Krantz GmbH & Co.: *See—*

Weck, Franz, 5,014,609, Cl. 98-40.140.

Haag, Anthony P.; and Otterbacher, E. W., to Dow Chemical Company, The. Catalytic method to produce hydroxy substituted arylophenones. 5,015,778, Cl. 568-319.000.

Haarmann & Reimer Corp.: *See—*

Collison, Mark W.; Farver, Terry F.; McDonald, Christine A.; Herald, Paula J.; and Monticello, Daniel J., 5,015,487, Cl. 426-332.000.

Hershberger, Donald F.; and Plunkett, Richard A., 5,015,418, Cl. 260-410.90R.

Haas, Michael W.: *See—*

Pellosie, John C., Jr., Haas, Michael W.; and Aldrich, Kenneth, 5,015,188, Cl. 434-38.000

Haas, Roland. *See—*

Brandenstein, Manfred; Friedrick, Wolfgang; Haas, Roland; and Herrmann, Gerhard, 5,015,216, Cl. 474-101.000.

Hacker, George G.; Turner, James K.; Abernathy, Paul L.; Payne, Bobby G.; Killian, Roy C.; and Laws, David G., to Gaston County Dyeing Machine Co. Textile wet processing machine having fabric circulation chamber with adjustable inner wall. 5,014,526, Cl. 68-178.000.

Hacker, Martin E.: *See—*

Trapani, Richard D.; Hacker, Martin E.; Turner, Melvyn E.; Taylor, Ronald; and Rotolico, Anthony J., 5,014,916, Cl. 239-85.000.

Haddad, Elias M.: *See—*

Thrasher, Lawrence E.; Olson, Gordon E.; Burkitt, Garrett J., III; Schmidt, Timothy E.; Haddad, Elias M.; and Conti-Johnston, Susan, 5,014,372, Cl. 4-542.000.

Hafele KG: *See—*

Nock, Hans, 5,015,047, Cl. 312-335.000.

Hafer, George F.: *See—*

Springer, Robert E.; Hafer, George F.; and Gilbert, Everett A., 5,015,961, Cl. 329-300.000.

Hafner, Josef: *See—*

Richter, Peter; Hafner, Josef, and Schonenberger, Rolf, 5,014,864, Cl. 213-104.000.

Hagen, Kenneth G., to Thermo Electron Web Systems, Inc. Positive pressure web floater dryer with parallel flow. 5,014,447, Cl. 34-156.000

Hagiwara, Takuya: *See—*

Saito, Masayuki; Fujimoto, Takenobu; and Hagiwara, Takuya, 5,014,417, Cl. 29-783.000.

Hahn, Kenneth G., Jr.; and Kunz, Barbara L., to Glidden Company, The. Pigmented low temperature cure emulsion polymers. 5,015,687, Cl. 524-512.000.

Haines, Derrick J., to British Aerospace Public Limited Company. Roll rate sensor. 5,014,555, Cl. 73-518.000.

Hales, Jeremy M.: *See—*

Nelson, Danny A.; Tomich, Stanley D.; Glover, Donald W.; Allen, Errol V.; Hales, Jeremy M.; and Dana, Marshall T., 5,016,196, Cl. 364-550.000.

Hall, Bruce T.; Andrews, Leonard J.; and Folweiler, Robert C., to GTE Laboratories Incorporated. Method for preparing fluoride glasses. 5,015,281, Cl. 65-32.500.

Hall, David M.: *See—*

McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Hall, David M., 5,015,522, Cl. 428-312.200.

Hall, Gaddis G. Automatic cable gripping device. 5,015,023, Cl. 294-102.100.

Hall, Richard B.: *See—*

Jacobson, Allan J.; Hall, Richard B.; Mims, Charles A.; and Lewandowski, Joseph T., 5,015,461, Cl. 423-593.000.

Halliburton Company: *See—*

Arrington, Stephen T., 5,015,298, Cl. 134-2.000.

Halmose, John M.: *See—*

Sepso, Roger P.; and Halmose, John M., 5,014,729, Cl. 137-513.300.

Halpern, Donald F.: *See—*

Robin, Mark L.; and Halpern, Donald F., 5,015,781, Cl. 568-683.000.

Halvorsen, Robert M., to Fuel Systems Textron Inc. Airblast fuel injector. 5,014,918, Cl. 239-410.000.

Hama, Kazuaki: *See—*

Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,014,799, Cl. 177-211.000.

Hamada, Hiroki; Honda, Shoji; Shono, Masayuki; and Yamaguchi, Takao, to Sanyo Electric Co., Ltd. Semiconductor laser device. 5,016,252, Cl. 372-45.000.

Hamada, Tetsuro: *See—*

Ohyama, Yasuharu; Izawa, Masaki; Watanabe, Katsuji; and Hamada, Tetsuro, 5,015,009, Cl. 280-772.000.

Hamada, Tomohiro, to Mitsubishi Denki Kabushiki Kaisha. Throttle control apparatus. 5,014,806, Cl. 180-197.000.

Hamada, Toshimitsu: *See—*

Nomoto, Mineo; Ninomiya, Takanori; Koshishiba, Hiroya; Hamada, Toshimitsu; and Nakagawa, Yasuo, 5,015,097, Cl. 356-394.000.

Hamano, Eiji: *See—*

Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.

Hamilton, Billy E.; Moore, Brian K.; and Newton, Donald E., to Camco International Inc. Foam breaker and method. 5,015,273, Cl. 55-53.000.

Hamilton, Scott B., to Exchange System Limited Partnership, The. Encryption key entry method in a microcomputer-based encryption system. 5,016,277, Cl. 380-49.000.

Hammond, David W. Sanitary can seal organization. 5,014,869, Cl. 220-90.200.

Hamricke, Kevin K., to Meredith/Burda Company. Signature delivery and stacking apparatus. 5,014,975, Cl. 271-202.000.

Hamstra, James R., to National Semiconductor Corporation. First-in, first-out (FIFO) memory with variable commit point. 5,016,221, Cl. 365-221.000.

Han, Choong Y.: *See—*

Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., 5,015,698, Cl. 525-391.000.

Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., to Mobil Oil Corporation. Conversion of methane. 5,015,798, Cl. 585-500.000.

Hanamoto, Hiroyuki: *See—*

Onishi, Takashi; Hanamoto, Hiroyuki; Miyamoto, Hirohisa; and Yoshida, Keiji, 5,016,049, Cl. 355-203.000.

Hancock, Clyde J.; and Hendershot, James R., to Pacific Scientific Company. Electronically commutated reluctance motor. 5,015,903, Cl. 310-168.000.

Hanggi, Douglas A.: *See—*

Carr, Peter W.; Funkenbusch, Eric F.; Rigney, Martin P.; Coleman, Patrick L.; Hanggi, Douglas A.; and Schafer, Wes A., 5,015,373, Cl. 210-198.200.

Hanson, Alden B.: *See—*

Drew, Terrence M.; Hanson, Chris A; and Hanson, Alden B., 5,015,313, Cl. 156-87.000.

Hanson, Chris A: *See—*

Drew, Terrence M.; Hanson, Chris A; and Hanson, Alden B., 5,015,313, Cl. 156-87.000.

Hanson, Gary E.: *See—*

Chan, C. S.; Wright, Conrad L.; and Hanson, Gary E., 5,016,023, Cl. 346-1.100.

Hanson, James M., to Miller, Wally. Vest and backpack combination. 5,014,359, Cl. 2-94.000.

Hansson, Gunnar C., to Atlas Copco AB. Power driven tool and drive system therefor. 5,014,794, Cl. 173-12.000.

Happi, Inc.: *See—*

Sosnow, William, 5,015,427, Cl. 264-115.000.

Hara, Shigeyoshi: *See—*

Endo, Zenichiro; and Hara, Shigeyoshi, 5,015,710, Cl. 526-283.000.

Hara, Soichi; and Kageyama, Hiroshi, to Aisin Seiki Kabushiki Kaisha. Piston assembly having a fusible core to form a cooling channel and a method for the manufacture thereof. 5,014,658, Cl. 123-193.00P.

Harada, Tamotsu: *See—*

Sakata, Seiji; Harada, Tamotsu; Ito, Norifumi; Hayashi, Masayuki; Yoshimura, Tsuyoshi; and Koinuma, Nobuyuki, 5,016,114, Cl. 358-404.000.

Harada, Yuichi; and Funamoto, Masaya, to Brother Kogyo Kabushiki Kaisha. Type-wheel cassette positioner for printer. 5,015,107, Cl. 400-144.200.

Haraguchi, Keisuke; Kohmoto, Shinsuke; and Kondoh, Shigeru, to Asahi Kogaku Kogyo Kabushiki Kaisha. Lens shutter camera including zoom lens. 5,016,032, Cl. 354-195.100.

Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corporation. Hydrodewaxing method with interstate recovery of olefin. 5,015,359, Cl. 208-58.000.

Harandi, Mohsen N., to Mobil Oil Corporation. Method and means for refinery gas plant operation. 5,015,364, Cl. 208-236.000.

Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corporation. Ether production. 5,015,782, Cl. 568-697.000.

Harano, Tetsuo: *See—*

Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.

Hardiman, Christopher J.; and Bowers, Gary R., to Monsanto Company. Metal drier compositions. 5,015,613, Cl. 502-170.000.

Hare, Nicholas S., Sr. Electro-rheological shock absorber. 5,014,829, Cl. 188-267.000.

Harima, Toshio; Sato, Kenichi; and Matsuya, Tatsuyuki, to Atsugi Motor Parts Company, Limited. Fan drive clutch for internal combustion engine. 5,014,836, Cl. 192-58.00B.

Harkey, Warren B.: *See—*

Shaw, Harold L.; Smith, Randall B.; Cunningham, Larry E.; Rishel, Barry E.; Gioannini, John P.; and Harkey, Warren B., 5,016,005, Cl. 340-870.190.

Harm, Dorson J.; and Zabinsky, Joseph M., to Boeing Company, The. Translating lip aircraft cowling structure adapted for noise reduction. 5,014,933, Cl. 244-53.00B.

Harnack, Phyllis M.: *See—*

Fitzpatrick, Brian J.; and Harnack, Phyllis M., 5,015,328, Cl. 156-624.000.

Harney, William J., to Magna International Inc. Powered six-way seat adjustor and mechanisms therefor. 5,014,958, Cl. 248-394.000.

Harnischfeger Engineers, Inc.: *See—*

Kling, David A., 5,015,140, Cl. 414-282.000.

Harnishfeger, David B.: *See—*

Parsi, Kaveh; and Harnishfeger, David B., 5,015,892, Cl. 307-600.000.

Harris Corporation: *See—*

King, Ken R., 5,015,877, Cl. 307-353.000.

Sirabella, Joseph, 5,015,871, Cl. 307-269.000.

Tesch, Bruce J.; Moser, Jay D., Sr.; and Tam, Stephen P., 5,015,887, Cl. 307-475.000.

Harris, Robert F., to Dow Chemical Company, The. Process for preparing poly(alkylene carbonate) monoahls and polyahls useful as surfactants. 5,015,753, Cl. 558-260.000.

Harris, Wendy D.: *See—*

Treybig, Duane S.; Harris, Wendy D.; and Thomas, Christopher J., 5,015,511, Cl. 428-34.100.

Harrod, Russell L.: *See—*

Morley, Lloyd F., II; and Harrod, Russell L., 5,014,549, Cl. 73-118.100.

Hart & Cooley, Inc.: *See—*

Fetters, David M., 5,015,015, Cl. 285-114.000.

Hartley, Richard I.; Corbett, Peter F.; and Yassa, Fathy F., to General Electric Company. Increased performance of digital integrated circuits by processing with multiple-bit-width digits. 5,016,011, Cl. 341-95.000.

Hartmann, Uwe; and Mai, Udo, to Deutsche Thomson-Brandt GmbH. Method of compensating for the earth's magnetic field in a picture tube. 5,015,915, Cl. 315-8.000.

Hartmann, Uwe; and Ohnemus, Fritz, to Deutsche Thomson-Brandt GmbH. Method of generating a voltage with a triangular wave form. 5,015,960, Cl. 328-36.000.

Hartmann, Uwe: *See—*

Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, 5,015,747, Cl. 556-1.000.

Hartwig, Jurgen: *See—*

Sommer, Herbert; Hartwig, Jurgen; and Matthaei, Hans-Detlef, 5,015,635, Cl. 514-144.000.

Harvey, George R.: *See—*

Maybrey, John G.; and Harvey, George R., 5,014,534, Cl. 72-250.000.

Harvey, Harold H., Jr.: *See—*

Lynde, Gerald D.; Winterrowd, Kenneth W.; and Harvey, Harold H., Jr., 5,014,778, Cl. 166-55.600.

Hasegawa, Mitsuru: *See—*

Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.

VOL 1126
ISS 2
MY 14 1991
UMI

- Hashiguchi, Toshihiko: *See—*
  - Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka, Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.
- Hashiguchi, Yasuhiro; Katohno, Noboru; and Shibata, Yoshihiro, to Hitachi, Ltd. Retaining device for a magnetic head. 5,016,130, Cl. 360-104.000.
- Hashimoto, Kaoru: *See—*
  - Morikawa, Takeshi; Hashimoto, Kaoru; and Ideyama, Hiroyuki, 5,016,051, Cl. 355-218.000.
- Hashimoto, Kiyokazu, to NEC Corporation Circuit responsive to a voltage change for detecting erroneous writing into a memory. 5,016,222, Cl. 365-226.000
- Hashimoto, Koji; Yoshioka, Hideaki; Asami, Katsuhiko; and Kawashima, Asahi, to Yoshida Kogyo K.K.; and Hashimoto, Koji, a part interest. Preparation method for amorphous superlattice alloys. 5,015,352, Cl. 204-192.150.
- Hatagawa, Toyotsugu: *See—*
  - Kasai, Isao; Yamaguchi, Kimiaki; Sakai, Shinichi; Murakami, Susumu; Isono, Tatsuji; and Hatagawa, Toyotsugu, 5,015,812, Cl. 219-10.55B.
- Hatalsky, Jeffrey F.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Hatfield, Byron: *See—*
  - Lord, Douglas W., 5,015,187, Cl. 434-33.000.
- Hatta, Toshiyuki: *See—*
  - Kato, Chiaki; Nishi, Masaya; and Hatta, Toshiyuki, 5,014,406, Cl. 29-130.000.
- Hattori, Chikamasa: *See—*
  - Matsumoto, Takayuki, Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo, Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.
- Haubold-Kihlberg GmbH. *See—*
  - Heidrich, Theodor, 5,014,898, Cl. 227-130.000.
- Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., to International Business Machines Corporation. Integrated circuit package. 5,016,087, Cl. 357-75.000.
- Hauptly, Paul D.: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Hawkes, Henry W., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Method and apparatus for processing synthetic aperture aerial signals. 5,016,019, Cl. 342-400.000.
- Haws, Joe H.: *See—*
  - Snyder, Dale R., Jr.; and Haws, Joe H., 5,015,151, Cl. 417-18.000.
- Hayakawa, Issei: *See—*
  - Matsuhisa, Tadaaki; and Hayakawa, Issei, 5,015,608, Cl. 501-97.000.
- Hayamizu, Kohichi: *See—*
  - Kimura, Masatoshi; and Hayamizu, Kohichi, 5,016,223, Cl. 365-229.000.
- Hayashi, Kazunori; Inoue, Nobuaki; and Nishiyama, Shingo, to Fuji Photo Film Co., Ltd. Method for forming a direct positive image. 5,015,561, Cl 430-487.000.
- Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, to Olympus Optical Co. Radioactive ray detecting therapeutic apparatus. 5,014,708, Cl. 128-653.00R.
- Hayashi, Masayuki: *See—*
  - Sakata, Seiji; Harada, Tamotsu; Ito, Norifumi; Hayashi, Masayuki; Yoshimura, Tsuyoshi; and Koinuma, Nobuyuki, 5,016,114, Cl 358-404.000.
- Hayashi, Tsunemi, to Akatake Engineering Co., Ltd.; and Shin-Etsu Chemical Co., Ltd. Powder feeding apparatus. 5,014,889, Cl. 222-644.000.
- Hayashi, Yutaka, to Nikon Corporation. Stage apparatus in exposing apparatus. 5,015,866, Cl. 250-548.000.
- Hayashida, Yuji, to Fuji Jukogyo Kabushiki Kaisha. Method and system for an engine ignition timing control. 5,016,181, Cl. 364-431.090.
- Hayatsu, Kazuo: *See—*
  - Sugimoto, Hiroaki; Ohbe, Yoshitaka; Hayatsu, Kazuo; and Iwata, Atsukazu, 5,015,723, Cl. 528-190.000.
- Hayes, Richard A.: *See—*
  - Ekiner, Okan M.; and Hayes, Richard A., 5,015,270, Cl. 55-16.000.
- Hayn, Holger V.: *See—*
  - Reinartz, Hans-Dieter; Steffes, Helmut; and Hayn, Holger V., 5,014,514, Cl. 60-533.000
- Haynes, Lynn C.; Levine, Harry; and Finley, John W., to Nabisco Brands, Inc. Liposome composition for the stabilization of oxidizable substances. 5,015,483, Cl. 426-73.000.
- Hays, Philip G., to Scott Fetzer Company, The. Brush roll mounting. 5,014,387, Cl 15-339.000.
- Hazenbroek, Jacobus E. On-line cut-up system with joint opener 5,015,213, Cl. 452-149.000.
- Health Research, Inc.: *See—*
  - Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., 5,015,463, Cl. 424-7.100.
- Hebisch, Siegbert: *See—*
  - Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.
- Hedberg, Donald D.; and Litin, Michael H., to Lab Safety Supply, Inc. Cabinet and vapor trap. 5,015,276, Cl. 55-384.000.
- Heel, Jurgen D., to Salon Care Services, Inc. Portable salon unit. 5,014,371, Cl. 4-516.000.
- Heeman, Avraham; and Broeren, Johannes H., to Mego Afek Industrial Measuring Instruments. Method and apparatus for applying intermittent compression to a body part. 5,014,681, Cl. 128-64.000.
- Heep, Dieter; Vogel, Paul, Frey, Manfred; and Schmalz, Joachim, to Waeschle Maschinenfabrik GmbH. Apparatus for feeding bulk material. 5,014,885, Cl. 222-368.000.
- Heidelberger Druckmaschinen AG: *See—*
  - Jeschke, Willi, 5,014,619, Cl. 101-415.100.
- Heidrich, Theodor, to Haubold-Kihlberg GmbH. Pneumatically operated fastener driving implement. 5,014,898, Cl. 227-130.000.
- Heifetz, Milton D. Medical needle unit. 5,015,242, Cl. 604-198.000.
- Heikkila, Unto A.: *See—*
  - Ilves, Juhani E.; and Heikkila, Unto A., 5,014,638, Cl. 114-230.000.
- Heil Co., The: *See—*
  - Smith, Fred T.; and Smith, Fred P., 5,015,144, Cl. 414-525 200.
- Heilman, William J.: *See—*
  - DesLauriers, Paul J.; and Heilman, William J., 5,015,507, Cl. 427-385.500.
- Heimendinger, Bernard, to Fapec. Method of manufacturing a support panel forming a display unit and panel obtained by this method. 5,014,902, Cl. 228-170.000.
- Hein-Werner Corporation: *See—*
  - LeGrand, Pierre N.; Ballard, James G.; Liegel, Reinald D.; and Wisner, Craig A., 5,014,442, Cl. 33-608.000.
- Heindl, Raymond A.: *See—*
  - Mazza, Lawrence T.; and Heindl, Raymond A., 5,015,916, Cl 315-47.000.
- Hellstrom, Julie W.: *See—*
  - Lim, Sheldon C. P.; Hellstrom, Julie W.; and Yen, Ting P., 5,015,604, Cl. 437-195.000.
- Helmlinger, Daniel; Kienzle, Frank; and Widmer, Erich, to Givaudan Corporation. Process for the manufacture of 4-(2-hutenylidene)-3,5,5-trimethyl-2-cyclohexen-1-one. 5,015,779, Cl. 568-346.000.
- Hendershot, James R.: *See—*
  - Hancock, Clyde J.; and Hendershot, James R., 5,015,903, Cl. 310-168.000.
- Henderson, Dewey D., to Dayco Products, Inc. Belt tensioner and method of making the same. 5,015,217, Cl. 474-135.000.
- Hendrickson, Travis L.: *See—*
  - Wyson, Daniel; and Hendrickson, Travis L., 5,015,021, Cl. 292-230.000.
- Henig, Hans J. System and method for recovering and recycling of adhering surface-treatment solutions from barrels and their loads. 5,015,302, Cl. 134-25.400.
- Henne, Michael: *See—*
  - Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.
- Henning, Rainer: *See—*
  - Lerch, Ulrich; Henning, Rainer; Urbach, Hansjorg; and Kaiser, Joachim, 5,015,642, Cl. 514-224.200.
- Henriquez, Kenneth R. Vehicular storage device. 5,015,025, Cl. 296-37.600.
- Henry, Richard L.: *See—*
  - Mercer, William B.; Cardarelli, Nathan F.; and Henry, Richard L., 5,015,372, Cl. 210-170.000.
- Hepburn, George R.; and Paley, Dror. Adjustable splint. 5,014,690, Cl 128-80.00H.
- Heppner, Paul: *See—*
  - Shtipelman, Boris A., and Heppner, Paul, 5,016,238, Cl. 369-215.000.
- Heppner, Terry D. Attachment for an oil well screw pump system. 5,015,162, Cl. 418-48.000.
- Herald, Paula J.: *See—*
  - Collison, Mark W.; Farver, Terry F.; McDonald, Christine A.; Herald, Paula J.; and Monticello, Daniel J., 5,015,487, Cl. 426-332.000.
- Herbertsgesellschaft GmbH: *See—*
  - Bederke, Klaus; Ducoffre, Volker; and Graef, Knut, 5,015,688, Cl. 524-600.000.
- Hercules Incorporated: *See—*
  - Bell, Andrew, 5,015,705, Cl. 526-142.000.
  - Endo, Zenichiro; and Hara, Shigeyoshi, 5,015,710, Cl. 526-283.000.
- Herman, Rodney A.: *See—*
  - Lee, Noel M.; Herman, Rodney A.; and Crothers, Thomas J., 5,016,241, Cl. 369-289.000.
- Herrington, Fox J.; and O'Sullivan, James P., Sr., to Mobil Oil Corp. Pad of bags. 5,014,852, Cl. 206-554.000.
- Herrmann, Gerhard: *See—*
  - Brandenstein, Manfred; Friedrick, Wolfgang; Haas, Roland; and Herrmann, Gerhard, 5,015,216, Cl. 474-101.000.
- Hershberger, David L., to Grass Valley Group, Inc., The. Low jitter DDFS FSK modulator. 5,016,259, Cl. 375-62.000.

- Hershberger, Donald F.; and Plunkett, Richard A., to Haarmann & Reimer Corp. Acyl malate diesters. 5,015,418, Cl. 260-410.90R.
- Hertel, Larry W., to Eli Lilly and Company. Difluoro antivirals and intermediate therefor. 5,015,743, Cl. 549-313.000.
- Herzig, Christian; and Esterbauer, Josef, to Wacker-Chemie GmbH. Anhydride-functional organo/(poly)siloxanes, a process for preparing the same and uses thereof. 5,015,700, Cl. 525-487.000.
- Hesler, Grace A.: *See—*
  - Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., 5,015,578, Cl. 435-119.000.
- Hess, Edwin A.: *See—*
  - McEllhenney, Colburn; and Hess, Edwin A., 5,015,394, Cl. 210-744.000.
- Hess, Joachim. Heat emitting unit in form of a heater or cooler. 5,014,776, Cl. 165-185.000.
- Hess Machine Company: *See—*
  - McEllhenney, Colburn; and Hess, Edwin A., 5,015,394, Cl. 210-744.000.
- Hewlett-Packard: *See—*
  - Hiwada, Kiyokasu; and Kasuga, Nobuyuki, 5,016,226, Cl. 365-233.000.
- Hewlett-Packard Company: *See—*
  - Chan, C. S.; Wright, Conrad L.; and Hanson, Gary E., 5,016,023, Cl. 346-1.100.
  - Eilert, Randall N.; and Ames, Wilbur R., IV, 5,015,829, Cl. 235-1.00D.
  - Knudsen, Knud L., 5,015,876, Cl. 307-352.000.
  - Lam, Si-Ty; and Lloyd, William J., 5,016,024, Cl. 346-1.100.
  - Seibel, Michael J.; Fullmer, Douglas E.; Bossaller, James E.; and Baker, Glen M., 5,016,202, Cl. 364-571.070.
  - Uebbing, John J., 5,016,027, Cl. 346-107.00R.
- Hey, Anthony J. G.: *See—*
  - Jesshope, Christopher R.; Pope, Patrick S.; Hey, Anthony J. G.; Nicole, Denis A.; and Lloyd, Edward K., 5,016,163, Cl. 364-200.000.
- Heyen, Meino: *See—*
  - Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, 5,015,747, Cl. 556-1.000.
- Heymann, Frank J., to Westinghouse Electric Corp. Hole pattern for valve muffler. 5,014,746, Cl. 137-625.300.
- Hibino, Hiroki: *See—*
  - Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.
- Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, to Sagami Chemical Research Center. Isolated phenylalanine dehydrogenase gene and process for production of phenylalanine dehydrogenase. 5,015,582, Cl. 435-189.000.
- Hidaka, Yasuhiro; Sato, Toshio; and Takahashi, Masanobu, to Yoshitami Pharmaceutical Industries, Ltd. Microbicidal/microbistatic composition for industrial use and method of using same. 5,015,660, Cl. 514-441.000.
- Hietkamp, Gerrit: *See—*
  - Saenger, Georg; and Hietkamp, Gerrit, 5,016,254, Cl. 372-55.000.
- Higgins, George D.; and Nelson, Thomas A., Jr., to McCain Manufacturing Corporation. Signature machine. 5,014,979, Cl. 271-104.000.
- Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, to Sanden Corporation. Wobble plate type compressor with variable displacement mechanism. 5,015,154, Cl. 417-269.000.
- Hill, Robert. Lockable tube roller. 5,014,879, Cl. 222-99.000.
- Hillig, William B.: *See—*
  - Borom, Marcus P.; Hillig, William B.; Singh, Raj N.; Morrison, William A.; and Interrante, Leonard V., 5,015,540, Cl. 428-698.000.
- Hills, Robert G.: *See—*
  - Sasson, Steven J.; and Hills, Robert G., 5,016,107, Cl. 358-209.000.
- Hillstrom, Warren W.: *See—*
  - Walker, Evan H.; and Hillstrom, Warren W., 5,014,623, Cl. 102-477.000.
- Himmel, Walter: *See—*
  - Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl. 568-861.000.
- Hindle, Kurt J.: *See—*
  - Kurtz, Robert L.; Foley, Kevin G.; and Hindle, Kurt J., 5,014,456, Cl. 42-50.000.
- Hinterberger, Christian: *See—*
  - Lobjinski, Manfred; Horn, Michael; and Hinterberger, Christian, 5,016,245, Cl. 370-60.000.
- Hippach, Charles K., to Pro-Tool, Inc. Fuel injector puller. 5,014,409, Cl. 29-267.000.
- Hirai, Yoichi, to Tokai Kogyo Co., Ltd. Sterilizing/deodorizing apparatus. 5,015,442, Cl. 422-121.000.
- Hiraki, Shun-ichi: *See—*
  - Yawata, Shigeo; Shibao, Kazuhisa; and Hiraki, Shun-ichi, 5,015,593, Cl. 437-25.000.
- Hirama, Toshiro: *See—*
  - Isozaki, Osamu; Iwasawa, Naozumi; Hirama, Toshiro; and Iwai, Hiroshi, 5,015,472, Cl. 424-78.000.
- Hirano, Seiji; Sakaguchi, Masaharu; Kawanishi, Satoru; and Ohmura, Tomoyuki, to Yazaki Corporation. Electric connector. 5,015,199, Cl. 439-353.000.
- Hirano, Seiji: *See—*
  - Suzuki, Tadato; Yorimoto, Yoshikazu; Matsumura, Hidekazu; and Hirano, Seiji, 5,015,834, Cl. 235-493.000.
- Hirao, Sumio; Matsunaga, Masaji; and Yamada, Yoshihiro, to Nissan Motor Company, Limited; and Atsugi Unisia Corporation. Piston for internal combustion engine. 5,014,604, Cl. 92-212.000.
- Hiratsuka, Koh: *See—*
  - Inagaki, Atsushi; Hiratsuka, Koh; Miura, Hiroaki; and Saito, Yasujiro, 5,015,897, Cl. 310-83.000.
- Hirayama, Hiromitsu, to NEC Corporation. Semiconductor driver for producing switching and offset signals. 5,015,873, Cl. 307-270.000.
- Hiroe, Akihiko: *See—*
  - Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.
- Hiroi, Masaki; Ino, Masumitsu; Nagata, Takehito; and Shimada, Masumi, to Ricoh Company, Ltd.; and Ricoh Research Institute of General Electronics Co., Ltd. Contact type image sensor with electric shielding. 5,015,837, Cl. 250-208.100.
- Hiroi, Yoshio: *See—*
  - Eida, Mitsuru; Hiroi, Yoshio; and Yokoyama, Seiichiro, 5,015,748, Cl. 556-144.000.
- Hirose, Kenji, to Fuji Jukogyo Kabushiki Kaisha. Method and device for rear-wheel steering of automotive vehicle. 5,014,801, Cl. 180-140.000.
- Hirota, Hajime: *See—*
  - Kamegai, Jun; Takamura, Hiromi; and Hirota, Hajime, 5,015,414, Cl. 252-545.000.
- Hirsch, Heinz: *See—*
  - Korfgen, Harald; Hirsch, Heinz; Grendel, Vinzenz; Wagner, Friedrich; and Grau, Walter, 5,014,736, Cl. 137-315.000.
- Hirsch, Rolf B.: *See—*
  - Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,015,428, Cl. 264-129.000.
- Hirschberg, Jakub, to Siemens Aktiengesellschaft. Bipolar electrode lead for medical applications. 5,014,721, Cl. 128-786.000.
- Hirth, Claudia: *See—*
  - Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.
- Hitachi Device Engineering Co., Ltd.: *See—*
  - Takahashi, Yoshiaki; Ishii, Sakae; Furuyama, Masayoshi; and Shirai, Shoji, 5,015,910, Cl. 313-414.000.
- Hitachi, Hideki: *See—*
  - Yokoo, Kiyotaka; Hitachi, Hideki; and Ikeda, Matsujiro, 5,015,978, Cl. 335-78.000.
- Hitachi, Ltd.: *See—*
  - Akimoto, Hajime; and Ohba, Shinya, 5,016,108, Cl. 358-212.000.
  - Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.
  - Fujisawa, Masaaki, 5,016,180, Cl. 364-431.040.
  - Hashiguchi, Yasuhiro; Katohno, Noboru; and Shibata, Yoshihiro, 5,016,130, Cl. 360-104.000.
  - Koharagi, Haruo; Tahara, Kazuo; Nitobe, Mitsuhiro; and Suzuki, Nobutaka, 5,015,905, Cl. 310-186.000.
  - Matsui, Takayuki; Okuyama, Toshiaki; Tobari, Kazuaki; Kubota, Yuzuru; and Takahashi, Junichi, 5,016,158, Cl. 363-71.000.
  - Mimata, Tsutomu; Uematsu, Toshihide; and Tabata, Katsuhiro, 5,015,425, Cl. 264-39.000.
  - Nagase, Makoto; Asakura, Yamoto; Utamura, Motoaki; and Uchida, Shunsuke, 5,015,436, Cl. 376-306.000.
  - Nakamura, Shigeru; Machida, Sadatsugi; Nakao, Takeshi; and Ojima, Masahiro, 5,016,234, Cl. 369-44.140.
  - Nakamura, Shigeru; Takahashi, Sadao; Watanabe, Masateru; and Arimoto, Akira, 5,016,237, Cl. 369-112.000.
  - Nogami, Tadahiko; Nakamura, Ichiro; Maeno, Ichiro; and Kinose, Ryohei, 5,014,748, Cl. 137-625.650.
  - Nomoto, Mineo; Ninomiya, Takanori; Koshishiba, Hiroya; Hamada, Toshimitsu; and Nakagawa, Yasuo, 5,015,097, Cl. 356-394.000.
  - Sakamoto, Toshiyuki; Kojima, Noboru; and Nakagawa, Isao, 5,016,111, Cl. 358-328.000.
  - Takahashi, Yoshiaki; Ishii, Sakae; Furuyama, Masayoshi; and Shirai, Shoji, 5,015,910, Cl. 313-414.000.
  - Takeda, Hidekazu; Ogiro, Kenji; Kaku, Nobuyuki; and Nagai, Kyuichirou, 5,016,125, Cl. 360-85.000.
  - Tanaka, Minoru; Oshida, Yoshitada; Yoshitake, Yasuhiro; and Tanimoto, Tetsuzo, 5,016,149, Cl. 362-259.000.
- Hitachi Metals, Ltd.: *See—*
  - Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Yamazaki, Masanobu; Toyoda, Manabu; and Ushijima, Makoto, 5,016,129, Cl. 360-103.000.
  - Yano, Mitsuru; and Yasuda, Hisashi, 5,014,558, Cl. 73-804.000.
- Hitachi Setsubi Engineering Co., Ltd.: *See—*
  - Koharagi, Haruo; Tahara, Kazuo; Nitobe, Mitsuhiro; and Suzuki, Nobutaka, 5,015,905, Cl. 310-186.000.
- Hitt, David H.: *See—*
  - Hutchison, Richard M.; and Hitt, David H., 5,014,560, Cl 73-862.330.
- Hiwada, Kiyokasu; and Kasuga, Nobuyuki, to Hewlett-Packard. Apparatus for generating a data stream. 5,016,226, Cl. 365-233.000.
- Hlousek, Jaroslaw; Lehner, Gerhard; and Stipek, Theodor, to Robert Bosch GmbH. Injection pump for internal combustion engines. 5,015,160, Cl. 417-499.000.

VOL 1126 ISS 2 MY 14 1991 UMI

- Hlousek, Louis: *See—*
  - Bryan, Raymond G.; and Hlousek, Louis, 5,015,069, Cl. 350-162.170.
- Ho, W. S. Winston, to Exxon Research and Engineering Co. Polymeric membrane and process for separating aliphatically unsaturated hydrocarbons. 5,015,268, Cl. 55-16.000.
- Hoang, Peter P. M.: *See—*
  - Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., 5,015,696, Cl. 525-331.700.
- Hoberman, Kenneth; Kirwan, Kim; and Gordon, Gary, to GRH Electronics. Security light controlled by motion detector. 5,015,994, Cl. 340-567.000.
- Hocking, William O., Jr.: *See—*
  - Legge, Robert W.; and Hocking, William O., Jr., 5,015,220, Cl. 474-256.000.
- Hockman, Edward N., to Clyde Corporation. Article feeder. 5,015,127, Cl. 406-192.000.
- Hodges, Michael J.; and Beal, Sydney, to Detexomat Machinery Limited. Hosiery toe closing method and apparatus. 5,014,634, Cl. 112-262.200.
- Hodgins, Robert G.: *See—*
  - Carlson, Peter J.; and Hodgins, Robert G., 5,015,921, Cl. 315-208.000.
- Hoechst Aktiengesellschaft: *See—*
  - Lerch, Ulrich; Henning, Rainer; Urbach, Hansjorg; and Kaiser, Joachim, 5,015,642, Cl. 514-224.200.
  - Meininger, Fritz, 5,015,732, Cl. 534-622.000.
  - Obermeier, Rainer; Geiger, Rolf; and Grau, Ulrich, 5,015,728, Cl. 530-303.000.
  - Ruckert, Hans; and Lambert, Gabriele, 5,015,554, Cl. 430-270.000.
  - Schwaiger, Gunther; and Springer, Hartmut, 5,015,731, Cl. 534-618.000.
  - Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,015,284, Cl. 71-90.000.
- Hoechst Celanese Corporation: *See—*
  - Charbonneau, Larry F.; Flint, John A.; Kiss, Gabor D.; and Shepherd, James P., 5,015,722, Cl. 528-190.000.
- Hoechst-Roussel Pharmaceutical Inc.: *See—*
  - Effland, Richard C.; and Davis, Larry, 5,015,637, Cl. 514-211.000.
- Hoechst-Roussel Pharmaceuticals Inc.: *See—*
  - Glamkowski, Edward J.; and Kurys, Barbara E., 5,015,738, Cl. 540-494.000.
- Hoeks, Antonius J. L. M.: *See—*
  - Lammers, Jan F.; Hoeks, Antonius J. L. M.; and Kennedy Van Dam, Frank D. S., 5,014,968, Cl. 269-322.000.
- Hoff, Don G., to AT&E Corporation. Dual communication mode video tape recorder. 5,016,273, Cl. 380-10.000.
- Hoffman, Timothy J.: *See—*
  - Vanderpool, Clarence D.; and Hoffman, Timothy J., 5,015,458, Cl. 423-531.000.
- Hoffmann-La Roche Inc.: *See—*
  - Friesen, Heinz-Jurgen; and Pestka, Sidney, 5,015,730, Cl. 530-351.000.
  - Olson, Gary L., 5,015,653, Cl. 514-397.000.
  - Walser, Armin, 5,015,661, Cl. 514-443.000.
- Hofmann, Jurgen: *See—*
  - Kraus, Willibald; and Hofmann, Jurgen, 5,014,939, Cl. 248-70.000.
- Hogeboom, John G.: *See—*
  - Livermore, Frederick C.; Hogeboom, John G.; and Sunatori, Go S., 5,015,600, Cl. 437-51.000.
- Hojo, Akimichi: *See—*
  - Toyoda, Nobuyuki; Uchitomi, Naotaka; and Hojo, Akimichi, 5,015,596, Cl. 437-41.000.
- Hokkai Can Co., Ltd.: *See—*
  - Tsukada, Shinichi; Shinomiya, Tsutomu; Yoshino, Eiichi; Yoshioka, Shigeki; and Fujikawa, Makoto, 5,014,491, Cl. 53-366.000.
- Holbrook, Gerald L.; and Leising, Maurice B., to Chrysler Corporation. Method of in-gear tolerance control. 5,016,176, Cl. 364-424.100.
- Holder, Tommie J.: *See—*
  - Sullivan, Robert W.; Holder, Tommie J.; and Buchanan, Max F., 5,014,653, Cl. 123-43.00A.
- Holland, Christopher E.: *See—*
  - Spindt, Charles A.; and Holland, Christopher E., 5,015,912, Cl. 313-495.000.
- Holland Mechanics, B.V.: *See—*
  - Damman, Cornelis C., 5,014,425, Cl. 29-894.333.
- Hollander, Milton B.; and Rivera, Louis, to Omega Engineering, Inc. Collapsible and conformable container. 5,014,907, Cl. 229-117.010.
- Holley, Steven R.; Cunningham, David C.; and Kral, Kevin D., to Honeywell Inc. Apparatus and method for minimizing limit cycle using complementary filtering techniques. 5,015,934, Cl. 318-611.000.
- Hollinger, Walter P.; Aboyoussef, Ahmed; and Werner, Walter V., to Allied-Signal Inc. Closed-loop fiber-optic angular rate sensor including a mixer arrangement for measuring rotational direction and rate. 5,015,095, Cl. 356-350.000.
- Hollmann, Friedrich: *See—*
  - Nobis, Dieter; Hollmann, Friedrich; and Duster, Horst, 5,014,412, Cl. 29-527.700.
- Holloway, Christopher L.: *See—*
  - Kuester, Edward F.; and Holloway, Christopher L., 5,016,185, Cl. 364-481.000.
- Holmes, J. Fred; Orloff, Jonathan H.; and Jousten, Karl J., to Oregon Graduate Institute of Science & Technology. Laser modulation of LMI sources. 5,015,862, Cl. 250-423.00R.
- Holroyd, Trevor J., to Stresswave Technology Limited. Apparatus for determining the surface roughness of a material. 5,014,547, Cl. 73-105.000.
- Holroyd, Trevor J., to Stresswave Technology Limited. Fluid level monitor. 5,015,995, Cl. 340-621.000.
- Holt, Jan D.: *See—*
  - Schmidt, Kenneth D.; and Holt, Jan D., 5,015,131, Cl. 410-63.000.
- Holter, Heinz; Igelbuscher, Heinrich; and Gresch, Heinrich, to Holter, Heinz. Process, filter and device for making available high-quality breathing air. 5,015,451, Cl. 423-235.000.
- Holton, Robert A., to Florida State University. Method for preparation of taxol using an oxazinone. 5,015,744, Cl. 549-510.000.
- Holzbach, Wolfgang; Boltze, Carsten; Kramer, Karl-Heinz; and Meier, Heinrich, to Continental Aktiengesellschaft. Vehicle wheel having valve means to prevent misuse. 5,014,759, Cl. 152-427.000.
- Hombach, Rudolf: *See—*
  - Jansen, Bernhard; Muller, Hanns P.; and Hombach, Rudolf, 5,015,321, Cl. 156-331.700.
- Homeier, Ronald F.; Lortz, Allan R.; Clifton, William L., III; and Williams, Jeffrey L., to Indiana Mills & Manufacturing, Inc. Seat integrated seat belt system. 5,015,010, Cl. 280-808.000.
- Honda Giken Kogyo Kabushiki Kaisha: *See—*
  - Fujii, Takaaki; Abe, Masahiko; and Kobayashi, Akio, 5,014,672, Cl. 123-492.000.
  - Gotou, Tetsuo; Shimada, Hiroo; and Nakamura, Katsunori, 5,014,819, Cl. 184-6.200.
  - Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.
  - Iihoshi, Akira; and Nakamura, Yukinobu, 5,016,007, Cl. 340-995.000.
  - Kazama, Akio, 5,014,812, Cl. 180-292.000.
  - Ohyama, Yasuharu; Izawa, Masaki; Watanabe, Katsuji; and Hamada, Tetsuro, 5,015,009, Cl. 280-772.000.
  - Ohzono, Kouhei; Takeuchi, Kazuhiro; Honda, Shoichi; and Koyabu, Takeshi, 5,014,839, Cl. 192-0.092.
  - Sasajima, Koji; Maki, Kazuya; and Yamaguchi, Kouji, 5,014,574, Cl. 74-866.000.
  - Uchida, Hiroyuki, 5,014,805, Cl. 180-184.000.
  - Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.
- Honda, Shoichi: *See—*
  - Ohzono, Kouhei; Takeuchi, Kazuhiro; Honda, Shoichi; and Koyabu, Takeshi, 5,014,839, Cl. 192-0.092.
- Honda, Shoji: *See—*
  - Hamada, Hiroki; Honda, Shoji; Shono, Masayuki; and Yamaguchi, Takao, 5,016,252, Cl. 372-45.000.
- Honeywell Amplitrol, Inc.: *See—*
  - Leclerc, Guy; Bernier, Serge; Lalande, Philippe; and Prijic, Nevenka, 5,015,806, Cl. 200-52.00R.
- Honeywell Inc.: *See—*
  - Holley, Steven R.; Cunningham, David C.; and Kral, Kevin D., 5,015,934, Cl. 318-611.000.
  - Landis, William R., 5,015,172, Cl. 431-6.000.
  - Massey, W. Russell, Jr.; Drobish, Renee; and McLaughlin, Paul F., 5,016,244, Cl. 370-16.000.
  - Plagens, Mark R., 5,016,079, Cl. 357-43.000.
- Honjo, Masaru: *See—*
  - Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
- Hood, A. Craig: *See—*
  - Turner, F. Jonathan M.; and Hood, A. Craig, 5,015,132, Cl. 411-10.000.
- Hoover Company, The: *See—*
  - Bradd, Sidney H.; and Tucker, Richard R., 5,014,385, Cl. 15-323.000.
- Hoover, Kenneth C.: *See—*
  - Scoggins, Lacey E.; Hoover, Kenneth C.; and Shang, Wei-Teh Wade, 5,015,725, Cl. 528-310.000.
- Hoover, Richard B., to United States of America, National Aeronautics and Space Administration. Variable magnification variable dispersion glancing incidence imaging x-ray spectroscopic telescope. 5,016,265, Cl. 378-43.000.
- Hoppmann Corporation: *See—*
  - Hoppmann, Kurt H.; and Schober, Horst A., 5,015,841, Cl. 250-223.00R.
- Hoppmann, Kurt H.; and Schober, Horst A., to Hoppmann Corporation. Object comparing device with discrete sensors and master object. 5,015,841, Cl. 250-223.00R.
- Horaguchi, Norio: *See—*
  - Okaue, Etsuo; Egawa, Masaru; Kasai, Yoshihiko; and Horaguchi, Norio, 5,015,086, Cl. 351-44.000.
- Horenkamp, Franz, to Ferdinand Lusch GmbH & Co. KG. Reclining chair. 5,015,031, Cl. 257-84.000.
- Hori, Roy Y.: *See—*
  - Crowninshield, Roy D.; Hori, Roy Y.; and Fallin, Thomas W., 5,015,257, Cl. 623-22.000.
- Hori, Tomoshige; and Itoh, Kensuke, to Snow Brand Milk Products Co., Ltd. Method for measuring the state of a fluid 5,014,553, Cl. 73-295.000.
- Hori, Toshio: *See—*
  - Sakamoto, Yukio; Hori, Toshio; Fukutani, Iwao; and Tanabe, Takeshi, 5,015,204, Cl. 439-620.000.

- Horie, Nobuyuki; Nishioka, Yoshiki; Yamanaka, Toshihiro; and Yuki, Yoshio, to Sharp Kabushiki Kaisha. Device for controlling an access operation of an information recording and reproducing device. 5,016,126, Cl. 360-78.070.
- Horii, Hiroyuki: *See—*
  - Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, 5,015,973, Cl. 333-132.000.
- Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 5,014,807, Cl. 180-219.000.
- Horiuchi, Ichiro; and Kawai, Shunichi, to Aisin Seiki Kabushiki Kaisha. Gear type transmission. 5,014,567, Cl. 74-359.000.
- Horn, Michael: *See—*
  - Lobjinski, Manfred; Horn, Michael; and Hinterberger, Christian, 5,016,245, Cl. 370-60.000.
- Horney, James C.: *See—*
  - Goldman, Stephen A.; Horney, James C.; and Retzsch, Herbert L., 5,015,246, Cl. 604-368.000.
- Hornschemeyer, Heinz; and Emert, Anton, to Marker Deutschland GmbH. Front-piece for a safety ski-binding. 5,015,005, Cl. 280-630.000.
- Horst, Robert W.; and Jardine, Robert L., to Tandem Computers Incorporated. Deferred comparison multiplier checker. 5,016,208, Cl. 364-740.000.
- Hoshi, Keiko: *See—*
  - Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.
- Hoshizaki Denki Kabushiki Kaisha: *See—*
  - Sakai, Tadashi; Minari, Katsunobu; and Ohta, Hideji, 5,014,521, Cl. 62-212.000.
- Hosomizu, Hiroshi: *See—*
  - Taniguchi, Nobuyuki; Hosomizu, Hiroshi; Tsuji, Kenji; Omaki, Takanobu; and Nakai, Masaaki, 5,016,037, Cl. 354-413.000.
- Hospal Industrie: *See—*
  - Pusineri, Christian; and Cronenberger, Michel, 5,015,388, Cl. 210-641.000.
- Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, to Merck Patent Gesellschaft mit beschranker Haftung. Organometallic compounds. 5,015,747, Cl. 556-1.000.
- Hotten, Terrence M.: *See—*
  - Fernandez, Maria I. F.; Hotten, Terrence M.; and Tupper, David E., 5,015,656, Cl. 514-422.000.
- Houck, Harold J.: *See—*
  - Houck, Randall J.; Houck, Michael H.; and Houck, Harold J., 5,015,123, Cl. 405-45.000.
- Houck, Michael H.: *See—*
  - Houck, Randall J.; Houck, Michael H.; and Houck, Harold J., 5,015,123, Cl. 405-45.000.
- Houck, Randall J.; Houck, Michael H.; and Houck, Harold J. Method and apparatus for installation of drainage field. 5,015,123, Cl. 405-45.000.
- Hough, Jack V. D.; Dormer, Kenneth J., Barton, Kenneth E., Jr.; and Chow, Robert Y., to Xomed, Inc. Implantable electromagnetic middle-ear bone-conduction hearing aid device. 5,015,225, Cl. 600-25.000.
- House, Ronnalee: *See—*
  - Skinner, Albert A.; House, Ronnalee; Kellams, Roger W.; and Cruz, Jose A., 5,015,982, Cl. 336-69.000.
- Houston, Theodore W.; Bosshart, Patrick W.; and Shaw, Ching-Heo, to Texas Instruments Incorporated. Compound domino CMOS circuit. 5,015,882, Cl. 307-452.000.
- Howald, Ernst: *See—*
  - Meyer, Gabriel; and Howald, Ernst, 5,015,229, Cl. 604-90.000.
- Howard, Luke J.: *See—*
  - Brown, George N.; Howard, Luke J.; and Rimmler, William F., 5,016,081, Cl. 357-67.000.
- Howard, Thomas A.; and McGee, Donovan E., to XPC, Incorporated. Fusing together metal particles using a high-frequency electromagnetic field. 5,014,420, Cl. 29-846.000.
- Howell, Jesse A., to Sperry Marine Inc. Glare reduction shield. 5,015,072, Cl. 350-276.00R.
- Howmet Corporation: *See—*
  - Frank, Gregory R., 5,014,763, Cl. 164-15.000.
- Hoyt, Earl; and Patel, Manharbhai K., to Reckitt & Colman Inc. Air-freshening device. 5,014,913, Cl. 239-45.000.
- Hozumi, Masahiro: *See—*
  - Takeshima, Eiki; Takatsu, Kiyoshi; Asano, Norio; and Hozumi, Masahiro, 5,015,863, Cl. 250-515.100.
- Hsu, George R.: *See—*
  - Creatura, John A.; and Hsu, George R., 5,015,550, Cl. 430-108.000.
- Huang, Tien-Tsai. Tire pressure indicator. 5,014,643, Cl. 116-34.00R.
- Hubbard, David W.: *See—*
  - Dolan, Donald T.; Durst, Robert T., Jr.; Hubbard, David W.; and Silverberg, Morton, 5,014,797, Cl. 177-4.000.
- Hubbard, Douglas A.; and Gates, Louis E., Jr., to Hughes Aircraft Company. Hermetic package for integrated circuit chips. 5,016,085, Cl. 357-74.000.
- Hubbell Incorporated: *See—*
  - Wisniewski, James J., 5,016,246, Cl. 370-76.000.
- Hubben, Edward B.: *See—*
  - Brezee, Victor L.; and Hubben, Edward B., 5,015,201, Cl. 439-441.000.
- Hubler, Graham K.; Donovan, Edward P.; and Van Vechten, Deborah, to United States of America, Navy. Method for producing substoichiometric silicon nitride of preselected proportions. 5,015,353, Cl. 204-192.310.
- Hubner, Thorger; and Bleimhofer, Walter, to W. L. Gore & Associates, Inc. Wearing apparel with ventilation material. 5,014,363, Cl. 2-243.00A.
- Hucul, Dennis A.: *See—*
  - Schmidt, Gregory F.; Hucul, Dennis A.; and Campbell, Richard E., Jr., 5,015,749, Cl. 556-179.000.
- Hudson, Ken: *See—*
  - Lord, Douglas W., 5,015,187, Cl. 434-33.000.
- Hudson Valley Tree, Inc.: *See—*
  - Smith, Sherman, 5,015,510, Cl. 428-18.000.
- Huels Aktiengesellschaft: *See—*
  - Finke, Jurgen; Feinauer, Roland; and Bartmann, Martin, 5,015,680, Cl. 524-99.000.
- Huff, George A.: *See—*
  - Walker, Robert H.; Willems, Paul A.; Huff, George A.; Grimes, Lewis E.; Tatterson, David F.; and Mehlberg, Robert L., 5,015,799, Cl. 585-500.000.
- Huff, Phyllis M. Utilities storage box. 5,014,850, Cl. 206-371.000.
- Hughes Aircraft Company: *See—*
  - Amoroso, Frank; and Bricker, Jacob L., 5,016,261, Cl. 375-76.000.
  - Augustine, Frank L.; and Evans, Scott B., 5,015,858, Cl. 250-352.000.
  - Chang, Donald C. D.; and Kelley, Edwin A., 5,016,018, Cl. 342-351.000.
  - Ellion, M. Edmund; Donatelli, Philip A.; and Wolff, George, 5,015,381, Cl. 210-490.000.
  - Hubbard, Douglas A.; and Gates, Louis E., Jr., 5,016,085, Cl. 357-74.000.
  - LeCompte, George W., 5,014,930, Cl. 244-3.120.
  - Lorig, James D.; and Shearer, John A., 5,016,141, Cl. 361-415.000.
  - Taylor, Stephen D.; and Tanaka, Paul I., 5,015,971, Cl. 331-16.000.
- Hughes Tool Company: *See—*
  - Landry, David K.; and Koltermann, Terry J., 5,015,401, Cl. 252-18.000.
- Hui, Henry K.: *See—*
  - Divers, George A.; and Hui, Henry K., 5,015,715, Cl. 528-15.000.
- Hull, Harold L.; and Montgomery, Robert D. Combination tool. 5,014,379, Cl. 7-127.000.
- Hummel, Mark D.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Humpert, Jurgen; and Pawelzik, Manfred, to Friedrich Grohe Armaturenfabrik GmbH & Co. Mixing valve with decorative faucet. 5,014,749, Cl. 137-801.000.
- Humphrey, Henry L.: *See—*
  - Barton, Lowell R.; and Humphrey, Henry L., 5,014,900, Cl. 228-4.500.
- Humphrey, Patrick P. A., to Glaxo Group Limited. Use of a thromboxane receptor antagonist in pregnancy-induced hypertension and related conditions. 5,015,648, Cl. 514-317.000.
- Humphreys, Gwynfor O.: *See—*
  - Yarranton, Geoffrey T.; Humphreys, Gwynfor O.; Robinson, Martin K.; Caulcott, Celia A.; and Wright, Edwina M., 5,015,573, Cl. 435-69.100.
- Humphreys, James R., Jr.: *See—*
  - Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,016,015, Cl. 342-2.000.
- Humphries, Donald, Sr. Auto anti-theft device. 5,014,530, Cl. 70-277.000.
- Hung, Ming-Hong, to Du Pont de Nemours, E. I., and Company. 1,1,2-trifluoro-6-iodo-1-hexene, 1,1,2-trifluoro-1,5-hexadiene, and processes therefore. 5,015,790, Cl. 570-126.000.
- Hunter, Joseph H.; and Runde, Jeffrey K., to General Motors Corporation. Double transition upshift control in an automatic transmission. 5,014,573, Cl. 74-866.000.
- Hurley, James R.: *See—*
  - Childs, Paul; Hurley, James R.; and Orcheski, Conrad J., 5,014,679, Cl. 126-21.00A.
- Hurst, David C.; and Brearley, Malcolm, to Lucas Industries public limited company. Dual computer cross-checking system. 5,016,249, Cl. 371-16.100.
- Hustad, Gerald O.: *See—*
  - Griesbach, Ray H.; and Hustad, Gerald O., 5,014,856, Cl. 206-632.000.
- Hutchison, Richard M.; and Hitt, David H., to Sundstrand Corporation. Torque measuring apparatus. 5,014,560, Cl. 73-862.330.
- Hydroimage: *See—*
  - Mula, Richard, 5,016,151, Cl. 362-267.000.
- Hyldgaard, Niels J., to Aalborg Boilers A/S. Fluid bed cooler, a fluid bed combustion reactor and a method for the operation of a such reactor. 5,014,652, Cl. 122-4.00D.
- Hystad, Per H., to Karmoy Winch A/S. Melting furnace. 5,015,178, Cl. 432-248.000.
- Hyttinen, Klaus, to Instrumentarium Corp. Transfer method and arrangement for a film cassette unit in a panoramic X-ray apparatus. 5,016,264, Cl. 378-38.000.

VOL
1126
ISS
2
MY
14
1991
UMI

I.M. Electronics Co., Ltd.: *See—*

Kondo, Hiroatsu, 5,014,857, Cl. 209-534.000.

Ibuchi, Yoshiaki; and Nishikawa, Yoshikazu, to Sharp Kabushiki Kaisha. Stirrer roller of developing device in electrophotographic copying machine. 5,016,053, Cl. 355-245.000.

Ichinokawa, Kazuhiro: *See—*

Mori, Seiichi; Takano, Masatoshi; and Ichinokawa, Kazuhiro, 5,016,029, Cl. 346-160.000.

Ichinose, Kiyohiro: *See—*

Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.

Ichinose, Toshihiko: *See—*

Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.

ICT International CMOS Technology, Inc.: *See—*

Brahmbhatt, Dhaval J., 5,016,217, Cl. 365-185.000.

Ide, Yusaku; Nakamura, Koji; and Kato, Shigeki, to Toyo Ink Manufacturing Co., Ltd. Process for the preparation of copper phthalocyanine pigment. 5,015,735, Cl. 540-123.000.

Idemitsu Kosan Co., Ltd.: *See—*

Eida, Mitsuru; Hiroi, Yoshio; and Yokoyama, Seiichiro, 5,015,748, Cl. 556-144.000.

Toyoda, Ichiro; Niinomi, Toshihiko; Kaseda, Shigeru; and Takahashi, Koichi, 5,016,186, Cl. 364-507.000.

Ideyama, Hiroyuki: *See—*

Morikawa, Takeshi; Hashimoto, Kaoru; and Ideyama, Hiroyuki, 5,016,051, Cl. 355-218.000.

Igarashi, Rie: *See—*

Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.

Igari, Kozaburo: *See—*

Suzuki, Akimitsu; Igari, Kozaburo; and Yabe, Hiroshi, 5,014,834, Cl. 192-48.300.

Igelbuscher, Heinrich: *See—*

Holter, Heinz; Igelbuscher, Heinrich; and Gresch, Heinrich, 5,015,451, Cl. 423-235.000.

Iida, Muneo: *See—*

Tomono, Akira; Iida, Muneo; and Ohmura, Kazunori, 5,016,282, Cl. 382-2.000.

Iida, Osamu: *See—*

Inoue, Yasuo; Takeda, Haruo; Sato, Keiji; Yamazaki, Noriyuki; and Iida, Osamu, 5,016,127, Cl. 360-94.000.

Iihoshi, Akira; and Nakamura, Yukinobu, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for displaying travel path. 5,016,007, Cl. 340-995.000.

Iizuka, Jiro, to Sanden Corporation. Scroll type compressor with radially outer support for fixed end plate. 5,015,163, Cl. 418-55.100.

Ikawa, Shingo: *See—*

Uesugi, Nichika; Ikawa, Shingo; and Kambe, Takayuki, 5,015,153, Cl. 417-44.000.

Ikeda Bussan Co., Ltd.: *See—*

Mouri, Takayuki, 5,015,026, Cl. 296-65.100.

Ikeda, Masayuki; and Ueda, Kohichi, to Fujitsu Limited. Floating-point addition/subtraction system with digit position alignment between fractions of multiple sets of data. 5,016,209, Cl. 364-748.000.

Ikeda, Matsujiro: *See—*

Yokoo, Kiyotaka; Hitachi, Hideki; and Ikeda, Matsujiro, 5,015,978, Cl. 335-78.000.

Ikeda, Shiro; Yamada, Syoichi; Kawachi, Satoshi; and Ishizaka, Masakatsu, to JGC Corporation. Cyclone furnace. 5,014,631, Cl. 110-264.000.

Ikegami, Akira: *See—*

Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.

Ikehata, Toshihiko: *See—*

Koshiba, Nobuharu; Nishino, Shuichi; Takata, Kenichi; and Ikehata, Toshihiko, 5,015,547, Cl. 429-194.000.

Ilgenstein, Kerry A.: *See—*

Agrawal, Om P.; Landers, George H.; Schmitz, Nicholas A.; Moench, Jerry D.; and Ilgenstein, Kerry A., 5,015,884, Cl. 307-465.000.

Illinois Tool Works: *See—*

McMahon, Michael J., 5,014,498, Cl. 53-451.000.

Illinois Tool Works Inc.: *See—*

Beebe, James C.; and Cargould, Barry D., 5,014,551, Cl. 73-146.000.

Illy, Ernesto; and Suggi Liverani, Furio, to Illycaffe S.p.A. Coffee machine. 5,014,611, Cl. 99-280.000.

Illycaffe S.p.A.: *See—*

Illy, Ernesto; and Suggi Liverani, Furio, 5,014,611, Cl. 99-280.000.

Ilves, Juhani E.; and Heikkila, Unto A. Mooring construction for a boat. 5,014,638, Cl. 114-230.000.

Imai, Akio: *See—*

Takao, Hiroyoshi; Imai, Akio; Seki, Tomoaki; and Tsuji, Mitsuji, 5,015,692, Cl. 525-102.000.

Imai, Hideki: *See—*

Matumoto, Tutomu; and Imai, Hideki, 5,016,276, Cl. 380-45.000.

Imai, Hitoshi: *See—*

Tadokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, 5,016,232, Cl. 369-13.000.

Imai, Kiyohiro: *See—*

Uchiyama, Akira, and Imai, Kiyohiro, 5,015,537, Cl. 428-623.000.

Imai, Kunio; and Nakada, Hitoshi, to Pioneer Electronic Corporation. Display unit. 5,015,999, Cl. 340-702.000.

Imber, Bryan E.: *See—*

Severn, Shawn R. T.; Rodriguez, Henry; Danesin, Renato R. A.; and Imber, Bryan E., 5,015,586, Cl. 436-29.000.

Impastato, Fred J.: *See—*

Manimaran, Thanikavelu; and Impastato, Fred J., 5,015,764, Cl. 562-401.000.

Inaba, Makoto: *See—*

Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.

Inaba, Takashi: *See—*

Kamiunten, Shoji; Aoshima, Shigeru; Tsumura, Takashi; Ochiai, Kouichi; and Inaba, Takashi, 5,014,552, Cl. 73-204.210.

Inada, Yoriko: *See—*

Uchiyama, Hiromitsu; Kawamoto, Masayuki; and Inada, Yoriko, 5,015,007, Cl. 280-707.000.

Inagaki, Atsushi; Hiratsuka, Koh; Miura, Hiroaki; and Saito, Yasujiro, to Jidosha Denki Kogyo K.K. Geared electric motor. 5,015,897, Cl. 310-83.000.

Inagaki, Hidemitsu: *See—*

Kawamoto, Mutsumi; Inagaki, Hidemitsu; and Tanaka, Satoru, 5,014,800, Cl. 180-65.500.

Inax Corporation: *See—*

Yasuo, Takashi, 5,014,909, Cl. 236-44.00R.

Indiana Mills & Manufacturing, Inc.: *See—*

Homeier, Ronald F.; Lortz, Allan R.; Clifton, William L., III; and Williams, Jeffrey L., 5,015,010, Cl. 280-808.000.

Inductotherm Corp.: *See—*

El-Kaddah, Nagy H.; Piwonka, Thomas S.; and Berry, John T., 5,014,769, Cl. 164-493.000.

Industrial Technology Research Institute: *See—*

Liou, Chueh-Horng, 5,015,820, Cl. 219-121.720.

Infantino, Joseph R.: *See—*

Ostreicher, Eugene A.; and Infantino, Joseph R., 5,015,316, Cl. 156-69.000.

Ingard, Karl U.: *See—*

Dear, Terrence A.; Ingard, Karl U.; and Schuchardt, Mark E., 5,014,816, Cl. 181-229.000.

Ingersoll-Rand Company: *See—*

Swarden, M. C.; Jansen, W.; and Griffith, John M., 5,014,421, Cl. 29-889.700.

Ingersoll, Richard M.: *See—*

Auyer, Richard A.; Buccellato, Robert J.; Gidynski, Andrew J.; Ingersoll, Richard M.; and Sridharan, Needangalam S., 5,014,593, Cl. 89-36.020.

Ino, Masumitsu: *See—*

Hiroi, Masaki; Ino, Masumitsu; Nagata, Takehito; and Shimada, Masumi, 5,015,837, Cl. 250-208.100.

Inokuchi, Toshiyuki: *See—*

Ohuchida, Shigeru; Kitabayashi, Junichi; and Inokuchi, Toshiyuki, 5,015,835, Cl. 250-201.500.

Inoue, Atsushi, to Sharp Kabushiki Kaisha. Linear driving device for use of a copying apparatus. 5,015,936, Cl. 318-687.000.

Inoue, Masao: *See—*

Kobayashi, Yukio; Nagai, Shoichi; Takesue, Masatoshi; Aosai, Fumito; and Inoue, Masao, 5,015,524, Cl. 428-332.000.

Inoue, Masayuki: *See—*

Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.

Inoue, Michiya; and Mizuno, Yutaka, to Fanuc Ltd. IC card. 5,016,086, Cl. 357-74.000.

Inoue, Nobuaki: *See—*

Hayashi, Kazunori; Inoue, Nobuaki; and Nishiyama, Shingo, 5,015,561, Cl. 430-487.000.

Inoue, Takashi: *See—*

Kimoto, Takayuki; Sunohara, Masaaki; Inoue, Takashi; Nakamura, Shoji; and Yonetani, Daijirou, 5,015,280, Cl. 65-307.000.

Inoue, Takesi: *See—*

Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Takahira, Kenichi; Fujioka, Shuzo; and Matsubara, Toshiyuki, 5,016,212, Cl. 364-900.000.

Inoue, Yasuo; Takeda, Haruo; Sato, Keiji; Yamazaki, Noriyuki; and Iida, Osamu, to Sony Corporation. Mechanism for transporting and receiving large and small tape cassettes. 5,016,127, Cl. 360-94.000.

Institut Francais du Petrole: *See—*

Lessi, Jacques; Perreau, Philippe; Bary, Daniel; and Grard, Guy, 5,014,440, Cl. 33-557.000.

Trapy, Jean, 5,014,662, Cl. 123-250.000.

Institut Imeni V. I. Lenina: *See—*

Ermilov, Igor V.; Matusov, Jury I.; and Mescheryakov, Evgeny V., 5,016,088, Cl. 357-76.000.

Institut National de la Sante et de la Recherche Medical (INSERM): *See—*

Cathignol, Dominique; Lacruche, Bernard; and Mestas, Jean-Louis, 5,015,929, Cl. 310-335.000.

Instrumentarium Corp.: *See—*

Hyttinen, Klaus, 5,016,264, Cl. 378-38.000.

Insulated Panel Systems, Inc.: *See—*

Spring, Richard C., 5,014,478, Cl. 52-281.000.

Interess, Edward: *See—*

Kusik, Charles L.; and Interess, Edward, 5,015,288, Cl. 75-686.000.

Interlego A.G.: *See—*

Dideriksen, Erling T., 5,015,210, Cl. 446-128.000.

Intermedics, Inc.: *See—*

Alt, Eckhard, 5,014,700, Cl. 128-419.0PG.

Alt, Eckhard, 5,014,702, Cl. 128-419.0PG.

Alt, Eckhard, 5,014,703, Cl. 128-419.0PG.

Alt, Eckhard, 5,014,704, Cl. 128-419.0PG.

International Business Machines Corp.: *See—*

Chappell, Barbara A.; Chappell, Terry I.; and Schuster, Stanley E., 5,015,881, Cl. 307-449.000.

Chu, Shao-Fu S.; Ku, San-Mei; Lange, Russell C.; Shephard, Joseph F.; Tsang, Paul J.; and Wang, Wen-Yuan, 5,015,594, Cl. 437-31.000.

Cidon, Israel; and Gopal, Inder S., 5,016,247, Cl. 370-81.000.

Drake, Charles E.; Kalter, Howard L.; and Lewis, Scott C., 5,015,880, Cl. 307-443.000.

Galyon, George T.; Jordhamo, George M.; Moran, Kevin P.; and Zumbrunnen, Michael L., 5,016,090, Cl. 357-82.000.

Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., 5,016,087, Cl. 357-75.000.

Lambeth, Shawn M.; Prissel, Lee P.; and Tarara, William D., 5,016,160, Cl. 364-200.000.

Liu, Lishing, 5,016,168, Cl. 364-200.000.

Papathomas, Kostas I.; Summa, William J.; and Wang, David W., 5,015,719, Cl. 528-70.000.

Paterra, Jeffrey H.; and Rex, Donald K., 5,015,108, Cl. 400-197.000.

Smith, Todd A., 5,016,275, Cl. 380-43.000.

International Paper Company: *See—*

Cassidy, Benjamin J., 5,014,905, Cl. 229-113.000.

International Sensor Technology, Inc.: *See—*

Braunlich, Peter F.; and Tetzlaff, Wolfgang, 5,015,855, Cl. 250-337.000.

International Soil Systems, Inc.: *See—*

Malmgren, Robert C.; Soltanpour, Parviz N.; and Cipra, Jan E., 5,014,462, Cl. 47-1.010.

International Sonic Technologies: *See—*

Schafer, Mark E., 5,014,686, Cl. 128-24.0EL.

Interrante, Leonard V.: *See—*

Borom, Marcus P.; Hillig, William B.; Singh, Raj N.; Morrison, William A.; and Interrante, Leonard V., 5,015,540, Cl. 428-698.000.

Intevep, S.A.: *See—*

Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, 5,015,535, Cl. 428-610.000.

Inzinna, Louis P.; and Nied, Herman F., to General Electric Company. Apparatus for die forming thermoplastic sheet material. 5,015,169, Cl. 425-394.000.

Iowa Mold Tooling Company, Inc.: *See—*

Vlaanderen, James, 5,014,863, Cl. 212-182.000.

Iowa State University Research Foundation, Inc.: *See—*

Christian, Lauren L.; and Miller, Lindy F., 5,015,626, Cl 514-12.000.

Rose, James H.; and Moulder, John C., 5,015,950, Cl. 324-224.000.

Irgang, Matthias: *See—*

Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl 568-861.000.

Isaksson, Juhani, to A. Ahlstrom Corporation. Distributor plate in a fluidized bed reactor. 5,014,632, Cl. 110-347.000.

Isayama, Kazuo: *See—*

Ohshima, Hirofumi; Sato, Masanori; and Isayama, Kazuo, 5,014,659, Cl. 123-195.00H.

Ishibashi, Fumikazu, to Nissan Motor Company, Ltd. of No. 2. Intake manifold for internal combustion engine. 5,014,654, Cl. 123-52.0MC.

Ishibashi, Hiromichi: *See—*

Tanaka, Shinichi; Ishibashi, Hiromichi; Akira, Mitsubara; and Okada, Tsuyoshi, 5,016,258, Cl. 375-25.000.

Ishido, Takanobu; Tan, Sachiyo; and Furukori, Masami, to Sony Corporation. Videotex terminal with a memory for storing plural picture frames. 5,016,192, Cl. 364-518.000.

Ishihara, Koichiro: *See—*

Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.

Ishii, Mitsuo; and Nishihara, Hidenori, to Mitsubishi Denki Kabushiki Kaisha. Submount for semiconductor laser device. 5,016,083, Cl. 357-71.000.

Ishii, Sakae: *See—*

Takahashi, Yoshiaki; Ishii, Sakae; Furuyama, Masayoshi; and Shirai, Shoji, 5,015,910, Cl. 313-414.000.

Ishikawa, Hiromi; and Nishihata, Sumihiro, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 5,015,852, Cl. 250-327.200.

Ishikawa, Masayoshi; and Takemura, Masami, to Yoshida Kogyo K.K. Adjusting device for use in work-well attachment mounted on stile. 5,014,465, Cl. 49-482.000.

Ishikawajima-Harima Heavy Industries Co., Ltd.: *See—*

Koga, Minoru; and Watanabe, Takenori, 5,015,444, Cl. 422-195.000.

Ishiwatari, Masaaki: *See—*

Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.

Ishizaka, Masakatsu: *See—*

Ikeda, Shiro; Yamada, Syoichi; Kawachi, Satoshi; and Ishizaka, Masakatsu, 5,014,631, Cl. 110-264.000.

Ishizuki, Masaharu; and Sakon, Hiroshi, to Nissan Motor Co., Ltd. Shift lever apparatus for automotive vehicles. 5,015,807, Cl. 200-61.880.

Isono, Tatsuji: *See—*

Kasai, Isao; Yamaguchi, Kimiaki; Sakai, Shinichi; Murakami, Susumu; Isono, Tatsuji; and Hatagawa, Toyotsugu, 5,015,812, Cl. 219-10.55B.

Isotronics, Inc.: *See—*

Koepke, Richard A., 5,015,207, Cl. 439-886.000.

Isozaki, Osamu; Iwasawa, Naozumi; Hirama, Toshiro; and Iwai, Hiroshi, to Kansai Paint Co., Ltd. Coating compositions and methods for preventing adhesion of organisms. 5,015,472, Cl. 424-78.000.

Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Engine starter motor. 5,014,563, Cl 74-7.00R.

Isozumi, Shuzou, to Mitsubishi Denki Kabushiki Kaisha. Electromagnetic switch device with open-ended plunger. 5,015,899, Cl. 310-83.000.

Isuzu Motors Limited: *See—*

Matsuoka, Hiroshi, 5,014,664, Cl. 123-271.000.

Itabashi, Akihisa, to Ricoh Company, Ltd. $F\theta$ lens system in optical scanner. 5,015,050, Cl. 350-6.800.

Italimpianti of America, Inc.: *See—*

Rey, Giorgio A., 5,015,509, Cl. 427-431.000.

Ito, Hiromi: *See—*

Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.

Ito, Kanichi; and Maezawa, Akihiko, to Ebara Corporation. Method of and apparatus for treating waste gas by irradiation with electron beam. 5,015,443, Cl. 422-186.000.

Ito, Katsura: *See—*

Tabuchi, Hirotoshi; Kumasaka, Osamu; Ito, Katsura; and Koushiro, Kenji, 5,015,338, Cl. 204-5.000.

Ito, Kazuyoshi, to Yoshida Kogyo K.K. Button applicator with safety apparatus. 5,014,895, Cl. 227-8.000.

Ito, Masayoshi: *See—*

Ogasawara, Sadanori; Abiko, Kenji; Ito, Masayoshi; and Shitori, Yoshiyasu, 5,015,631, Cl. 514-53.000.

Ito, Norifumi: *See—*

Sakata, Seiji; Harada, Tamotsu; Ito, Norifumi; Hayashi, Masayuki; Yoshimura, Tsuyoshi; and Koinuma, Nobuyuki, 5,016,114, Cl. 358-404.000.

Ito, Osamu: *See—*

Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.

Ito, Takashi: *See—*

Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi, and Ito, Takashi, 5,015,332, Cl. 159-4.200.

Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Senda, Masanobu, to Toyoda Gosei Co., Ltd. Electrochromic element. 5,015,075, Cl. 350-357.000.

Ito, Yasunobu; and Suzuki, Kenji, to Aisin AW Kabushiki Kaisha. Device and method of fail-safe control for electronically controlled automatic transmission. 5,016,174, Cl. 364-424.100.

Ito, Yufuko; Koseki, Hideo; Kawamura, Toshio; and Tsukikawa, Yasuhiko, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for writing oxide film. 5,014,646, Cl. 118-725.000.

Itoh, Hiroshi: *See—*

Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,014,577, Cl. 74-869.000.

Itoh, Kensuke: *See—*

Hori, Tomoshige; and Itoh, Kensuke, 5,014,553, Cl. 73-295.000.

ITT Corporation: *See—*

Welsh, David E.; and Wilson, Albert H., 5,015,192, Cl. 439-83.000.

Ives, Robert L.; Jory, Howard R.; and LaRue, Albert D., to Varian Associates, Inc. Couplers for extracting RF power from a gyrotron cavity directly into fundamental mode waveguide. 5,015,914, Cl. 315-4.000.

Ivey, Glen E.: *See—*

Whiting, Douglas L.; George, Glen A.; and Ivey, Glen E., 5,016,009, Cl. 341-67.000.

Iwai, Hiroshi: *See—*

Isozaki, Osamu; Iwasawa, Naozumi; Hirama, Toshiro; and Iwai, Hiroshi, 5,015,472, Cl. 424-78.000.

Iwakiri, Norio: *See—*

Konishi, Keisuke; Shinohara, Kenji; Iwakiri, Norio; and Kurashige, Tomofumi, 5,015,996, Cl. 340-644.000.

Iwama, Masatoshi: *See—*

Okuyama, Takashi; and Iwama, Masatoshi, 5,015,846, Cl. 250-235.000.

Iwanowicz, Edwin J.: *See—*

Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,703, Cl. 525-537.000.

Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,704, Cl. 525-537.000.

Iwasaki, Hiroyuki: *See—*

Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.

VOL 1126
ISS 2
MY 14 1991
UMI

Iwasaki, Toshiaki: *See—*
Murata, Kunihiko; Morii, Satoshi; Iwasaki, Toshiaki; and Mitsui, Hiroyuki, 5,014,633, Cl. 112-121.120.

Iwasawa, Naozumi: *See—*
Isozaki, Osamu; Iwasawa, Naozumi; Hirama, Toshiro; and Iwai, Hiroshi, 5,015,472, Cl. 424-78.000.

Iwashita, Yasusuke, to Fanuc Ltd. Servo-control apparatus. 5,015,935, Cl. 318-630.000.

Iwata, Atsukazu: *See—*
Sugimoto, Hiroaki; Ohbe, Yoshitaka; Hayatsu, Kazuo; and Iwata, Atsukazu, 5,015,723, Cl. 528-190.000.

Iwata, Yoshiki, to Canon Kabushiki Kaisha. Wafer handling apparatus. 5,015,177, Cl. 432-121.000.

Iwata, Yukio, to Akebono Brake Industry Co., Ltd. Hydraulic cylinder unit capable of being set in three positions. 5,014,602, Cl. 92-117.00A.

Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi; and Ito, Takashi, to TDK Corporation; and Ohkawara Kakohki Co., Ltd. Spray dryer. 5,015,332, Cl. 159-4.200.

Izawa, Masaki: *See—*
Ohyama, Yasuharu; Izawa, Masaki; Watanabe, Katsuji; and Hamada, Tetsuro, 5,015,009, Cl. 280-772.000.

J. I. Case Company: *See—*
Richman, Kevin S.; and Orsborn, Jesse H., 5,014,502, Cl. 56-41.000.
Schupback, Jesse L., 5,015,008, Cl. 280-764.100.

J. M. Huber Corporation: *See—*
Lamond, Trevor G., 5,015,295, Cl. 106-464.000.

J & M Turner Inc.: *See—*
Turner, F. Jonathan M.; and Hood, A. Craig, 5,015,132, Cl. 411-10.000.

Jablonka, Bernd: *See—*
Schonafinger, Karl; Beyerle, Rudi; Schindler, Ursula; Jablonka, Bernd; and Troke, Jeffery, 5,015,659, Cl. 514-438.000.

Jacobs, Frederick D.: *See—*
Owen, Marvin L.; and Jacobs, Frederick D., 5,014,642, Cl. 116-28.100.

Jacobs, Linda Y.: *See—*
DeRosier, Donna C.; Dziura, Richard A.; Palmieri, Joseph M.; Juntwait, Eric D.; Jacobs, Linda Y.; and Scott, Graham A., 5,015,983, Cl. 336-180.000.

Jacobson, Allan J.; Hall, Richard B.; Mims, Charles A.; and Lewandowski, Joseph T., to Exxon Research & Engineering Company. Novel high surface area oxide compositions with a pyrochlore structure, methods for their preparation, and conversion processes utilizing same. 5,015,461, Cl. 423-593.000.

Jacobson, Richard M.; and Nguyen, Luong T., to Rohm and Haas Company. 1-dimethylcarbamoyl-3-substituted-5-substituted-1H-1,2,4-triazoles. 5,015,652, Cl. 514-384.000.

Jaekel, Robert W.: *See—*
Pinkerton, Dennis; Jaekel, Robert W.; and Pardinas, Guillermo P., 5,015,157, Cl. 417-500.000.

Jaffard, Jean L.: *See—*
Meunier, Thierry; and Jaffard, Jean L., 5,016,122, Cl. 360-62.000.

Jager, Arnold. Roller belt arrangement for caterpillar track-type vehicles. 5,015,219, Cl. 474-204.000.

Janicsek, Larry: *See—*
Falk, Richard A.; Janicsek, Larry; Boron, Joseph; and Colzani, James, 5,014,561, Cl. 73-864.530.

Janko, Bozidar, to Tektronix, Inc. High density probe. 5,015,946, Cl. 324-158.00F.

Jankowski, Alfons: *See—*
Langhoff, Josef; Jankowski, Alfons; and Dohms, Klaus-Dieter, 5,015,457, Cl. 423-481.000.

Jans, Michel: *See—*
Franz, Michel; Jans, Michel; Mathur, Leo K.; Shah, Kamlesh B.; and Truelove, James E., 5,015,481, Cl. 424-494.000.

Jansen, Bernhard; Muller, Hanns P.; and Hombach, Rudolf, to Bayer Aktiengesellschaft. Adhesive and its use for producing adhesive bonds. 5,015,321, Cl. 156-331.700.

Jansen, W.: *See—*
Swarden, M. C.; Jansen, W.; and Griffith, John M., 5,014,421, Cl. 29-889.700.

Janssen Pharmaceutica N.V.: *See—*
Kennis, Ludo E. J.; Vandenberk, Jan; and Mertens, Josephus C., 5,015,740, Cl. 544-366.000.

Janz, Ronald J. Flexible cup dispensing apparatus. 5,014,878, Cl. 221-279.000.

Japan Electronic Control Systems, Co., Ltd.: *See—*
Tomisawa, Naoki, 5,014,548, Cl. 73-118.100.

Japan Oxygen Co., Ltd.: *See—*
Okada, Hidetake; Kawai, Masato; Enomoto, Shunji; and Suzuki, Taisuke, 5,015,272, Cl. 55-26.000.

Japan Styrene Paper Corporation: *See—*
Yoshimura, Shohei; Kuwabara, Hideki; and Yamaguchi, Toru, 5,015,667, Cl. 521-58.000.

Jardine, Robert L.: *See—*
Horst, Robert W.; and Jardine, Robert L., 5,016,208, Cl. 364-740.000.

Jay, Richard D., to Mather Seal Company. Low friction seal assembly. 5,015,001, Cl. 277-37.000.

Jebe, Arnim B.; Flagg, Frank D.; Danser, Harold W., III; Kobernus, William; and Schick, George, to Jebe, Arnim B. Tool for handling disposable food containing bags. 5,014,431, Cl. 30-124.000.

Jeenicke, Edmund: *See—*
Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.

Jensen, Jens D., to U.S. Philips Corp. Magnetic resonance tomography method for determining the nuclear magnetization in a number of parallel slices. 5,015,956, Cl. 324-309.000.

Jeong, Ho-sun, to Samsung Electronics Co., Ltd. Neural network implementation of a binary adder. 5,016,211, Cl. 364-786.000.

Jeschke, Willi, to Heidelberger Druckmaschinen AG. Device for tensioning flexible printing plates on a plate cylinder of a rotary printing machine. 5,014,619, Cl. 101-415.100.

Jesshope, Christopher R.; Pope, Patrick S.; Hey, Anthony J. G.; Nicole, Denis A.; and Lloyd, Edward K. Parallel processing system including control computer for dividing an algorithm into subalgorithms and for determining network interconnections. 5,016,163, Cl. 364-200.000.

Jewett, Don L.: *See—*
Berman, Samuel M.; and Jewett, Don L., 5,015,924, Cl. 315-324.000.

JGC Corporation: *See—*
Ikeda, Shiro; Yamada, Syoichi; Kawachi, Satoshi; and Ishizaka, Masakatsu, 5,014,631, Cl. 110-264.000.

Jidosha Denki Kogyo K.K.: *See—*
Inagaki, Atsushi; Hiratsuka, Koh; Miura, Hiroaki; and Saito, Yasujiro, 5,015,897, Cl. 310-83.000.

JOBS S.p.A.: *See—*
Corsi, Armando, 5,014,542, Cl. 173-39.000.

Johnon, Bryce V.: *See—*
Duchesne, Denis; and Johnon, Bryce V., 5,015,693, Cl. 525-187.000.

Johnson Electric S.A.: *See—*
Wong, To-Fan, 5,015,896, Cl. 310-71.000.

Johnson Filtration Systems Inc.: *See—*
Evans, Thomas W.; Norell, Robert G.; Uban, Stephen A.; and Maxson, Richard C., 5,015,383, Cl. 210-497.100.

Johnson, Henry C. Method and apparatus for coating small parts. 5,015,501, Cl. 427-212.000.

Johnson, Ivy D.: *See—*
Degnan, Thomas F.; Kirker, Garry W.; Socha, Richard F.; Stapleton, Michael R.; and Johnson, Ivy D., 5,015,360, Cl. 208-110.000.

Johnson & Johnson: *See—*
Kranz, Curt, 5,015,817, Cl. 219-121.140.

Johnson & Johnson Orthopaedics, Inc.: *See—*
Buese, George J., 5,014,403, Cl. 28-170.000.

Johnson, Keith O.: *See—*
Roper, Alan; and Johnson, Keith O., 5,014,713, Cl. 128-664.000.

Johnson, Kevin M.; and Zeman, Robert E., to Eastman Kodak Company. Multicolor image forming apparatus and transfer roller. 5,016,056, Cl. 355-279.000.

Johnson, Leonard M., to Massachusetts Institute of Technology. Reduction of modulator non-linearities with independent bias angle control. 5,015,053, Cl. 350-96.140.

Johnson, Michael K. Window wind guard for motor vehicles. 5,014,607, Cl. 98-2.130.

Johnson, Ron M., to P.O.S. Components. Interlocking card organizer. 5,014,859, Cl. 211-55.000.

Johnson, Russell I.; Radke, Daniel D.; and Ball, Garry L., to Ford New Holland, Inc. Loader mounting frame. 5,015,148, Cl. 414-722.000.

Johnson, William M. Hazard warning device for vehicles. 5,014,641, Cl. 116-28.00R.

Johnston, Albert D., to General Motors Corporation. Roller clutch with improved installation. 5,014,833, Cl. 192-45.000.

Jokisch, Robert E.: *See—*
Wang, Yiren S.; Rhee, Seong K.; and Jokisch, Robert E., 5,014,827, Cl. 188-72.400.

Jones, David, to C.J.S. Sciences Limited. Valve. 5,014,738, Cl. 137-340.000.

Jones, Donald A.; and Jones, Robert M., to Numerical Concepts, Inc. In-line, continuous paper batching system. 5,014,974, Cl. 271-189.000.

Jones, Howland D. T.: *See—*
Guilinger, Terry R.; Jones, Howland D. T.; Kelly, Michael J.; Medernach, John W.; Stevenson, Joel O.; and Tsao, Sylvia S., 5,015,346, Cl. 204-129.100.

Jones, Mark W. Surgical forceps with suture cutters. 5,015,252, Cl. 606-205.000.

Jones, Michael D.: *See—*
Rumbaugh, Scott H.; Jones, Michael D.; Scheu, Friedrich; and Bos, Philip J., 5,015,057, Cl. 350-96.150.

Jones, Robert M.: *See—*
Jones, Donald A.; and Jones, Robert M., 5,014,974, Cl. 271-189.000.

Jones, Ronald L.; and Wynn, Marion W., to Bio-Lab, Inc. Disinfectant for the treatment of water systems. 5,015,643, Cl. 514-241.000.

Jones, Tom F. Evaporative cooling. 5,015,420, Cl. 261-029.000.

Jordhamo, George M.: *See—*
Galyon, George T.; Jordhamo, George M.; Moran, Kevin P.; and Zumbrunnen, Michael L., 5,016,090, Cl. 357-82.000.

Jori, Giulio; Kocher, Matthias; Vogel, Emanuel; and Cross, Alexander D., to Cytopharm, Inc. Porphycene anti-cancer agents and treatment methods. 5,015,478, Cl. 424-450.000.

Jory, Howard R.: *See—*
Ives, Robert L.; Jory, Howard R.; and LaRue, Albert D., 5,015,914. Cl. 315-4.000.

Josefsson, Bjorn: *See—*
Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.

Joseph, James J. Cross flow filtration apparatus and process. 5,015,397, Cl. 210-767.000.

Jousten, Karl J.: *See—*
Holmes, J. Fred; Orloff, Jonathan H.; and Jousten, Karl J., 5,015,862, Cl. 250-423.00R.

JP Laboratories, Inc.: *See—*
Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., 5,015,329, Cl. 156-628.000.

Juki Corporation: *See—*
Noguchi, Minetoshi; and Yamano, Shigemi, 5,016,133, Cl. 361-92.000.

Julius Blum Gesellschaft m.b.H.: *See—*
Brunnert, Eberhard, 5,015,048, Cl. 312-319.000.

Jullian, Michel. Blasting system and components therefor. 5,014,622, Cl. 102-312.000.

Jullien, Robert G. Syringe guard apparatus. 5,015,234, Cl. 604-110.000.

Jungverdorben, Hermann-Josef: *See—*
Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,015,428, Cl. 264-129.000.

Junino, Alex; Lang, Gerard; and Genet, Alain, to L'Oreal. 3-amino-4-nitrophenols, the process for preparation thereof and their use in dyeing keratinous fibers, and new intermediate 4,5-dinitrophenols. 5,015,769, Cl. 564-399.000.

Junino, Alex; Vandenbossche, Jean J.; Borowiak, Herve; and Lang, Gerard, to L'Oreal. Meta-phenylenediamines, process for preparation thereof, intermediate compounds and use of these meta-phenylenediamines as couplers for the oxidation dyeing of keratinous fibres and especially human hair. 5,015,772, Cl. 564-443.000.

Juntwait, Eric D.: *See—*
DeRosier, Donna C.; Dziura, Richard A.; Palmieri, Joseph M.; Juntwait, Eric D.; Jacobs, Linda Y.; and Scott, Graham A., 5,015,983, Cl. 336-180.000.

Jurgensen, Holger: *See—*
Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, 5,015,747, Cl. 556-1.000.

K. B. Lighting Inc.: *See—*
Weber, Walter K., 5,014,964, Cl. 251-352.000.

Kaari, Kauko. Impulse torque converter. 5,014,837, Cl. 192-61.000.

Kabelschlepp Gesellschaft mit beschrankter Haftung: *See—*
Moritz, Werner, 5,014,506, Cl. 59-78.100.

Kabushiki Kaisha Advance: *See—*
Matumoto, Tutomu; and Imai, Hideki, 5,016,276, Cl. 380-45.000.

Kabushiki Kaisha Baarei: *See—*
Ban, Tadahiko, 5,014,400, Cl. 24-108.000.

Kabushiki Kaisha Daikin Seisakusho: *See—*
Tojima, Hiromi, 5,014,840, Cl. 192-98.000.

Kabushiki Kaisha Duct Sangyo: *See—*
Takasugi, Tamotsu, 5,014,424, Cl. 29-890.149.

Kabushiki Kaisha Kobe Seiko Sho: *See—*
Ozaki, Keiji; and Fukumura, Seisuke, 5,015,165, Cl. 425-28.100.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Nishita, Kunio, 5,014,821, Cl. 184-55.200.

Kabushiki Kaisha Okada Seisakusho: *See—*
Takasugi, Tamotsu, 5,014,424, Cl. 29-890.149.

Kabushiki Kaisha Taihei Seisakusho: *See—*
Ariga, Masao, 5,014,772, Cl. 165-86.000.

Kabushiki Kaisha Tokai-Rika-Denki Seisakusho: *See—*
Kitazawa, Yasuho, 5,014,401, Cl. 24-633.000.

Kabushiki Kaisha Toshiba: *See—*
Kitagawa, Nobutaka; Sueda, Akihiro; and Kuwasima, Yasunori, 5,016,263, Cl. 377-68.000.
Kudoh, Norimasa, 5,016,248, Cl. 370-94 100.
Kudou, Motohiro; and Sasahara, Yutaka, 5,015,164, Cl. 418-63.000.
Kumagai, Jumpei; and Fujii, Syuso, 5,016,071, Cl. 357-23.600.
Masuda, Youichi, 5,016,260, Cl. 375-66.000.
Minagawa, Tsutomu; Ohhashi, Masahide; and Kai, Naoyuki, 5,016,001, Cl. 340-747.000.
Murakami, Hiroaki and Matsumoto, Osamu, 5,015,890, Cl. 307-530.000.
Nannichi, Toshihiko, 5,016,118, Cl. 358-462.000.
Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, 5,015,330, Cl. 156-643.000.
Sambayashi, Takeshi; Oushiden, Hideshi; Takaoka, Hiroaki; and Morihara, Kazushige, 5,016,052, Cl. 355-228.000.
Sato, Masaki; and Atsumi, Shigeru, 5,016,077, Cl. 357-41.000.
Tanaka, Hiroto; and Fujii, Syuso, 5,016,224, Cl. 365-230.030.
Tanikoshi, Sadao, 5,015,839, Cl. 250-214.0AG.
Toyoda, Nobuyuki; Uchitomi, Naotaka; and Hojo, Akimichi, 5,015,596, Cl. 437-41.000.
Uesugi, Nichika; Ikawa, Shingo; and Kambe, Takayuki, 5,015,153, Cl. 417-44.000.
Watanabe, Junji, 5,016,048, Cl. 355-202.000.
Watanabe, Yoshio, 5,016,045, Cl. 355-43.000.
Yamazaki, Akihiro; and Kiyohara, Katsuya, 5,016,218, Cl. 365-189.090.
Yawata, Shigeo; Shibao, Kazuhisa; and Hiraki, Shun-ichi, 5,015,593, Cl. 437-25.000.
Yoshikawa, Kuniyoshi, 5,015,601, Cl 437-67.000.

Kabushikikaisha Hara Shokki Seisakusho: *See—*
Katori, Mutsuhiko; and Yamada, Kazuo, 5,014,397, Cl. 19-231.000.

Kaczmarek, Wesley R.: *See—*
Ravipati, Sitaramaiah; Zador, Eugene; Kaczmarek, Wesley R.; Coleman, Ernest A.; and Rostoker, David, 5,014,468, Cl. 51-295.000.

Kadomaru, Kazuo: *See—*
Noma, Hiroyuki; Kouno, Tadao; and Kadomaru, Kazuo, 5,014,761, Cl. 152-527.000.

Kadwell, Brian J.; and Fowler, Daniel L., to Robertshaw Controls Company. Control system for a cooking oven. 5,015,827, Cl. 219-497.000.

Kagata, Hiroshi: *See—*
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; and Kugimiya, Kouichi, 5,016,137, Cl. 361-321.000.

Kageyama, Hiroshi: *See—*
Hara, Soichi; and Kageyama, Hiroshi, 5,014,658, Cl. 123-193.00P.

Kai, Naoyuki: *See—*
Minagawa, Tsutomu; Ohhashi, Masahide; and Kai, Naoyuki, 5,016,001, Cl. 340-747.000.

Kai, Tadao: *See—*
Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.

Kaiju, Masaki: *See—*
Noji, Ikutaro; Kato, Masaki; Kaiju, Masaki; and Kinami, Ikuo, 5,014,519, Cl. 62-176.300.
Noji, Ikutaro; Kaiju, Masaki; Sakamoto, Hideyuki; and Fukubayashi, Makoto, 5,014,522, Cl. 82-227.000.

Kaiser, Heinrich, to Stahlwerke Peine-Salzgitter AG. Process and apparatus to clean a molten metal or slag conveyor trough. 5,014,965, Cl. 266-44.000.

Kaiser, Joachim: *See—*
Lerch, Ulrich; Henning, Rainer; Urbach, Hansjorg; and Kaiser, Joachim, 5,015,642, Cl. 514-224.200.

Kaiser Optical Systems: *See—*
Chang, Byung J., 5,015,049, Cl. 350-3.810.

Kaiser, Robert J., Jr.: *See—*
Smith, Lloyd M.; Fund, Steven; and Kaiser, Robert J., Jr., 5,015,733, Cl. 536-23.000.

Kaku, Nobuyuki: *See—*
Takeda, Hidekazu; Ogiro, Kenji; Kaku, Nobuyuki; and Nagai, Kyuichirou, 5,016,125, Cl. 360-85.000.

Kakuta, Yoshiaki. Acceleration device of exhaust gas stream for an internal combustion engine. 5,014,512, Cl. 60-319.000.

Kallenbach, Dieter H F., to BPH Patent Holding AG. Swimming pool cleaner. 5,014,382, Cl. 15-1.700.

Kallenbach, Lyle R.; and Yu, Michael C., to Phillips Petroleum Company. Coatings of arylene sulfide polymers. 5,015,686, Cl. 524-413.000.

Kalter, Howard L.: *See—*
Drake, Charles E.; Kalter, Howard L.; and Lewis, Scott C., 5,015,880, Cl. 307-443.000.

Kamarck, Michael E.: *See—*
Scangos, George A.; Rae, Peter M. M.; Unterbeck, Axel J.; and Kamarck, Michael E., 5,015,570, Cl. 435-6.000.

Kamata, Toyokazu: *See—*
Sano, Kinjiro; Kamata, Toyokazu; Fukuyama, Keiji; Saito, Masato; and Watanabe, Keiji, 5,015,497, Cl. 427-77.000.

Kambara, Yoshihiko; Oonaka, Itsuo; Asao, Koichi; and Fukushima, Kyoko, to Mitsui Toatsu Chemicals, Incorporated. Preparation process of acrylamide. 5,015,766, Cl. 564-127.000.

Kambe, Takayuki: *See—*
Uesugi, Nichika; Ikawa, Shingo; and Kambe, Takayuki, 5,015,153, Cl. 417-44.000.

Kamegai, Jun; Takamura, Hiromi; and Hirota, Hajime, to Kao Corporation. Low-irritant detergent composition containing alkyl saccharide and sulfosuccinate surfactants. 5,015,414, Cl. 252-545.000.

Kamehara, Nobuo: *See—*
Suzuki, Hitoshi; Yokoyama, Hiromitsu; Tsukada, Mineharu; Ogawa, Hiromi; Kamehara, Nobuo; and Niwa, Koichi, 5,015,314, Cl. 156-89.000.

Kamiunten, Shoji; Aoshima, Shigeru; Tsumura, Takashi; Ochiai, Kouichi; and Inaba, Takashi, to Yamatake-Honeywell Co., Ltd. Flow meter. 5,014,552, Cl. 73-204.210.

Kamiya, Kingo: *See—*
Mine, Koichi; Kikuta, Hikaru; Takeuchi, Hitoshi; and Kamiya, Kingo, 5,015,159, Cl. 417-366.000.

Kamp, Heinz; Gerhards, Peter; and Bruns, Siegfried, to W. Schlafhorst & Co. Control means for apparatus for cross-winding packages. 5,014,922, Cl. 242-18.00R.

Kampe, Stephen L.; Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., to Martin Marietta Corporation. Rapidly solidified intermetallic-second phase composites. 5,015,534, Cl. 428-570.000.

Kamps, Rainer: *See—*
Birkle, Siegfried; Feucht, Hans-Dieter; Kamps, Rainer; and Rissel, Eva, 5,015,709, Cl. 526-279.000.

Kanada, Shoji: *See—*
Shigyo, Masao; Kanada, Shoji; and Oshida, Eiji, 5,015,854, Cl. 250-327.200.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
Eguchi, Tamiyuki; and Tsunomori, Michito, 5,015,423, Cl. 264-9.000.
Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.

Kanehira, Koichi: *See—*
Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito, Kanehira, Koichi;

VOL
1126
ISS
2
MY
14
1991
UMI

Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.
Kaneko, Hisaharu: *See—*
Moriizumi, Shuichi; Masuhara, Kenichi; Yamabe, Hidetoshi; Tomosue, Takao; Mori, Kouji; and Kaneko, Hisaharu, 5,015,531, Cl. 428-463.000.
Kaneko, Kiyotaka, to Fuji Photo Film Co., Ltd. White balance correction apparatus. 5,016,094, Cl. 358-41.000.
Kaneko, Shuzo: *See—*
Tamura, Yasuyuki; and Kaneko, Shuzo, 5,015,552, Cl. 430-138.000.
Kanetani, Junichi: *See—*
Nakanishi, Yoichi; Kanetani, Junichi; and Nakata, Muneo, 5,015,979, Cl. 335-83.000.
Kansai Paint Co., Ltd.: *See—*
Isozaki, Osamu; Iwasawa, Naozumi; Hirama, Toshiro; and Iwai, Hiroshi, 5,015,472, Cl. 424-78.000.
Kao Corporation: *See—*
Kamegai, Jun; Takamura, Hiromi; and Hirota, Hajime, 5,015,414, Cl. 252-545.000.
Kawabe, Kuniyasu, 5,015,724, Cl. 528-272.000.
Tamura, Tadashi; Kiyomine, Akira; Nishizawa, Yoshinori; Tagami, Hidetoshi; Yoshihara, Toru; and Kawase, Jiro, 5,015,260, Cl. 8-408.000.
Kaplan, David L.: *See—*
Mayer, Jean M.; and Kaplan, David L., 5,015,293, Cl. 106-162.000.
Kapp, Wolfgang; and Moog, Alfons. to Degesch GmbH. Method and means for preventing or delaying undesired phosphine levels. 5,015,475, Cl. 424-405.000.
Kar, Kishore K.; and Pawloski, Chester E., to Dow Chemical Company, The. (Fluorinated phenoxy)(3-perfluoroalkylphenoxy)-cyclic phosphazenes. 5,015,405, Cl. 252-49.900.
Karakelle, Mutlu: *See—*
Solomon, Donald D.; Karakelle, Mutlu; and Beck, Richard W., 5,015,238, Cl. 604-164.000.
Karmoy Winch A/S: *See—*
Hystad, Per H., 5,015,178, Cl. 432-248.000.
Karn, Donald L.: *See—*
Goodwin, Brent E.; Karn, Donald L.; Mistvurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,015,324, Cl. 156-384.000.
Karsh, Herbert, to Eastman Kodak Company. Apparatus for magnetically determining the status of a cartridge in a magnetic recorder. 5,016,123, Cl. 360-69.000.
Kasai, Isao; Yamaguchi, Kimiaki; Sakai, Shinichi; Murakami, Susumu; Isono, Tatsuji; and Hatagawa, Toyotsugu, to Matsushita Electric Industrial Co., Ltd. Oven with an exhaust opening for collecting vapors to control material heating. 5,015,812, Cl. 219-10.55B.
Kasai, Yoshihiko: *See—*
Okaue, Etsuo; Egawa, Masaru; Kasai, Yoshihiko; and Horaguchi, Norio, 5,015,086, Cl. 351-44.000.
Kaseda, Shigeru: *See—*
Toyoda, Ichiro; Niinomi, Toshihiko; Kaseda, Shigeru; and Takahashi, Koichi, 5,016,186, Cl. 364-507.000.
Kaser, Christopher K.; and Cummings, Gerald W., to Big Ideas Toy and Game Development, Inc. Kicking toy. 5,014,990, Cl. 273-128.00R.
Kashino, Minoru: *See—*
Fujii, Toshio; Kato, Kazuhiro; Suzuki, Tasuku; and Kashino, Minoru, 5,015,521, Cl. 428-220.000.
Kashiwase, Hajime, to Fuji Jukogyo Kabushiki Kaisha. Automatic transmission for a motor vehicle. 5,014,566, Cl. 74-331.000.
Kaspar, Melvin, to Ardco, Inc. Refrigerator light assembly with bulb insulating and protective sleeve. 5,016,146, Cl. 362-92.000.
Kasuga, Akira: *See—*
Aonuma, Masashi; Kasuga, Akira; and Masuda, Haruo, 5,015,498, Cl. 427-132.000.
Kasuga, Nobuyuki: *See—*
Hiwada, Kiyokasu; and Kasuga, Nobuyuki, 5,016,226, Cl. 365-233.000.
Kato, Chiaki; Nishi, Masaya; and Hatta, Toshiyuki, to Sumitomo Electric Industries, Ltd. Elastic fixing roller and method of producing the same. 5,014,406, Cl. 29-130.000.
Kato, Junichi: *See—*
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; and Kugimiya, Kouichi, 5,016,137, Cl. 361-321.000.
Kato, Kazuhiro: *See—*
Fujii, Toshio; Kato, Kazuhiro; Suzuki, Tasuku; and Kashino, Minoru, 5,015,521, Cl. 428-220.000.
Kato, Kiyohiko: *See—*
Tsunakawa, Isao; Rikihisa, Nobuyoshi; and Kato, Kiyohiko, 5,014,657, Cl. 123-185.00B.
Kato, Mamoru: *See—*
Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Senda, Masanobu, 5,015,075, Cl. 350-357.000.
Kato, Masaki: *See—*
Noji, Ikutaro; Kato, Masaki; Kaiju, Masaki; and Kinami, Ikuo, 5,014,519, Cl. 62-176.300.
Kato, Osami; Tsukamoto, Tsutomu; and Saitoh, Takanori, to Minolta Camera Co., Ltd. Film strip feeding apparatus. 5,014,929, Cl. 242-195.000.
Kato, Shigeki: *See—*
Ide, Yusaku; Nakamura, Koji; and Kato, Shigeki, 5,015,735, Cl. 540-123.000.
Katoh, Hiroshi: *See—*
Matsunawa, Masahiko; and Katoh, Hiroshi, 5,016,096, Cl. 358-75.000.
Katohno, Noboru: *See—*
Hashiguchi, Yasuhiro; Katohno, Noboru; and Shibata, Yoshihiro, 5,016,130, Cl. 360-104.000.
Katori, Mutsuhiko; and Yamada, Kazuo, to Kabushikikaisha Hara Shokki Seisakusho. Detaching roller driving mechanism for a comber employing two driving systems. 5,014,397, Cl. 19-231.000.
Katz, Allen; and Urban, Robert R., to General Electric Company. Predistortion equalizer with resistive combiners and dividers. 5,015,965, Cl. 330-149.000.
Katz, Ronald A., to First Data Resources Inc. Expanded telephone data organization system. 5,016,270, Cl. 379-92.000.
Kaufman, Jack W. Articles for protection of living tissues. 5,014,723, Cl. 128-853.000.
Kautz, Allan D., to Zenith Electronics Corporation. Magnetic collector for FTM laser weld debris and method. 5,015,818, Cl. 219-121.630.
Kawabe, Kuniyasu, to KAO Corporation. Process of producing polyester, and developer composition for electrophotography. 5,015,724, Cl. 528-272.000.
Kawachi, Satoshi: *See—*
Ikeda, Shiro; Yamada, Syoichi; Kawachi, Satoshi; and Ishizaka, Masakatsu, 5,014,631, Cl. 110-264.000.
Kawaguchi, Akira: *See—*
Oka, Koichi; Kawaguchi, Akira; Kumagai, Kunio; and Morisawa, Katsuhiro, 5,015,094, Cl 356-336.000.
Kawaguchi, Chikara: *See—*
Kikuta, Tomoyuki; and Kawaguchi, Chikara, 5,015,930, Cl. 318-466.000.
Kawaguchi, Harold H.: *See—*
Patscot, Linda S.; and Kawaguchi, Harold H., 5,014,725, Cl. 132-324.000.
Kawaguchi, Takashi; Yabe, Hiroshi; Maruyama, Akihiko; and Kubo, Hiroyuki, to Seiko Epson Corporation. Apparatus for electronically correcting an electronic timepiece. 5,016,231, Cl. 368-80.000.
Kawai, Masato: *See—*
Okada, Hidetake; Kawai, Masato; Enomoto, Shunji; and Suzuki, Taisuke, 5,015,272, Cl. 55-26.000.
Kawai, Osamu: *See—*
Ogawa, Eiji; and Kawai, Osamu, 5,014,927, Cl. 242-107.40R.
Kawai, Shunichi: *See—*
Horiuchi, Ichiro; and Kawai, Shunichi, 5,014,567, Cl. 74-359.000.
Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, to Oki Electric Industry Co., Ltd. Duplexer with an isolating circuit on a dielectric plate. 5,015,973, Cl. 333-132.000.
Kawakami, Shigenobu: *See—*
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,015,793, Cl. 585-6.300.
Kawakita, Tetsuya: *See—*
Tanabe, Toshiya; Abe, Shigemitsu; Date, Masazumi; and Kawakita, Tetsuya, 5,015,386, Cl. 210-638.000.
Kawama, Shuichi; and Fujimoto, Yoshiji, to Sharp Kabushiki Kaisha. Speech analyzing and synthesizing apparatus using reduced number of codes. 5,016,279, Cl. 381-36.000.
Kawamoto, Masayuki: *See—*
Uchiyama, Hiromitsu; Kawamoto, Masayuki; and Inada, Yoriko, 5,015,007, Cl. 280-707.000.
Kawamoto, Mutsumi; Inagaki, Hidemitsu; and Tanaka, Satoru, to Aisin AW Co., Ltd. Motor driving device provided with decelerator and electric vehicle. 5,014,800, Cl. 180-65.500.
Kawamura, Kouichi: *See—*
Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
Kawamura, Toshio: *See—*
Ito, Yufuko; Koseki, Hideo; Kawamura, Toshio; and Tsukikawa, Yasuhiko, 5,014,646, Cl. 118-725.000.
Kawanishi, Satoru: *See—*
Hirano, Seiji; Sakaguchi, Masaharu; Kawanishi, Satoru; and Ohmura, Tomoyuki, 5,015,199, Cl. 439-353.000.
Kawano, Kazuhiko: *See—*
Miyazawa, Takeshige; and Kawano, Kazuhiko, 5,015,283, Cl. 71-76.000.
Kawasaki Steel Corporation: *See—*
Shimotomai, Michio; Fukuda, Yasutaka; and Fujita, Akira, 5,015,307, Cl. 148-302.000.
Kawase, Jiro: *See—*
Tamura, Tadashi; Kiyomine, Akira; Nishizawa, Yoshinori; Tagami, Hidetoshi; Yoshihara, Toru; and Kawase, Jiro, 5,015,260, Cl. 8-408.000.
Kawashima, Asahi: *See—*
Hashimoto, Koji; Yoshioka, Hideaki; Asami, Katsuhiko; and Kawashima, Asahi, 5,015,352, Cl. 204-192.150.
Kawashima, Hiroshi; Nakashima, Mikito; and Mogami, Takao, to Seiko Epson Corporation. Coated synthetic resin lens. 5,015,523, Cl. 428-336.000.
Kawashima, Yoshiro: *See—*
Suga, Shuzo; Shishido, Tadao; Mifune, Hiroyuki; and Kawashima, Yoshiro, 5,015,567, Cl. 430-567.000.
Kayali, Nabil A., to NK Innovations, Inc. Adjustable drink holder. 5,014,956, Cl. 248-311.200.
Kazama, Akio, to Honda Giken Kogyo Kabushiki Kaisha. Drive system for vehicle. 5,014,812, Cl. 180-292.000.
Kazuno, Kenji: *See—*
Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 5,015,636, Cl. 514-210.000.

KDI American Products, Inc.: *See—*
Thrasher, Lawrence E.; Olson, Gordon E.; Burkitt, Garrett J., III; Schmidt, Timothy E.; Haddad, Elias M.; and Conti-Johnston, Susan, 5,014,372, Cl. 4-542.000.
Keeper Co., Ltd.: *See—*
Uchida, Susumu, 5,015,215, Cl. 464-175.000.
Kehn, John P.: *See—*
Zweig, John E.; Kehn, John P.; and Glennon, Michael J., 5,014,592, Cl. 89-24.000.
Keith, Peter T.; and Euteneuer, Charles L., to SciMed Life Systems, Inc. Multipart split sleeve balloon protector for dilatation catheter. 5,015,231, Cl. 604-96.000.
Kellams, Roger W.: *See—*
Skinner, Albert A.; House, Ronnalee; Kellams, Roger W.; and Cruz, Jose A., 5,015,982, Cl. 336-69.000.
Kelley, Dixon L., to Teleflex Incorporated. Motion transmitting remote control assembly and method for making same. 5,014,569, Cl. 74-502.400.
Kelley, Edwin A.: *See—*
Chang, Donald C. D.; and Kelley, Edwin A., 5,016,018, Cl. 342-351.000.
Kelly, David L.; and Bennetts, Steven A., to Burke Company, The. Apparatus and method for lifting tilt-up wall constructions. 5,014,473, Cl. 52-125.500.
Kelly, David M.: *See—*
Rice, Richard F., Jr.; Kelly, David M.; and Smith, Daryl L., 5,016,003, Cl. 340-825.190.
Kelly, James M.: *See—*
Fyfe, Edward R.; and Kelly, James M., 5,014,474, Cl. 52-167.000.
Kelly, Michael J.: *See—*
Guilinger, Terry R.; Jones, Howland D. T.; Kelly, Michael J.; Medernach, John W.; Stevenson, Joel O.; and Tsao, Sylvia S., 5,015,346, Cl. 204-129.100.
Kemmerling, Karl-Heinz, to Mannesmann Aktiengesellschaft. Method for automatically reducing the drawing speed of a tubular material drawing machine. 5,014,531, Cl. 72-9.000.
Kendall Company, The: *See—*
Charkoudian, John C., 5,015,431, Cl. 264-222.000.
Meunchen, Paul K.; and Durkin, Edward T., 5,014,689, Cl. 128-77.000.
Kenet, Barney J.: *See—*
Kenet, Robert O.; Kenet, Barney J.; and Tearney, Guillermo J., 5,016,173, Cl. 364-413.130.
Kenet, Robert O.; Kenet, Barney J.; and Tearney, Guillermo J., to Vanguard Imaging Ltd. Apparatus and method for monitoring visually accessible surfaces of the body. 5,016,173, Cl. 364-413.130.
Kennametal Inc.: *See—*
Ramunas, Valdas S., 5,015,003, Cl. 279-123.000.
Kennedy Van Dam, Frank D. S.: *See—*
Lammers, Jan F.; Hoeks, Antonius J. L. M.; and Kennedy Van Dam, Frank D. S., 5,014,968, Cl. 269-322.000.
Kennis, Ludo E. J.; Vandenberk, Jan; and Mertens, Josephus C., to Janssen Pharmaceutica N.V. Antipsychotic 3-piperazinylbenzazole derivatives. 5,015,740, Cl. 544-366.000.
Kensington Laboratories, Inc.: *See—*
Filipski, Paul S.; and Bacchi, Paul E., 5,015,832, Cl. 235-462.000.
Kerr-McGee Chemical Corporation: *See—*
Story, Phillip M.; and Brand, John R., 5,015,264, Cl. 23-313.00R.
Kershaw, Joseph F., to United States of America, Navy. Monopole inductively loaded antenna tuning system. 5,016,022, Cl. 343-750.000.
Khan, Abid A.: *See—*
Mahulikar, Deepak; Crane, Jacob; and Khan, Abid A., 5,015,803, Cl. 174-52.400.
Kiefer, Erich: *See—*
Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, 5,014,873, Cl. 220-601.000.
Kienzle, Frank: *See—*
Helmlinger, Daniel; Kienzle, Frank; and Widmer, Erich, 5,015,779, Cl. 568-346.000.
Kii, Kazuo, to Sony Corporation. Digital convergence for television receiver. 5,016,095, Cl. 358-64.000.
Kikuchi, Eiji: *See—*
Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.
Kikuchi, Sei: *See—*
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 5,015,154, Cl. 417-269.000.
Kikuta, Hikaru: *See—*
Mine, Koichi; Kikuta, Hikaru; Takeuchi, Hitoshi; and Kamiya, Kingo, 5,015,159, Cl. 417-366.000.
Kikuta, Tomoyuki; and Kawaguchi, Chikara, to Asmo Co., Ltd. Power converting mechanism. 5,015,930, Cl. 318-466.000.
Killian, Roy C.: *See—*
Hacker, George G.; Turner, James K.; Abernathy, Paul L.; Payne, Bobby G.; Killian, Roy C.; and Laws, David G., 5,014,526, Cl. 68-178.000.
Kim, Jin-Ki: *See—*
Choi, Jung-Dal; Yim, Hyung-Kyu; Do, Jae-Young; and Kim, Jin-Ki, 5,015,886, Cl. 307-465.000.
Kim, Kyoung S., to Upjohn Company, The. Therapeutically useful beta-lactams. 5,015,737, Cl. 540-363.000.
Kimoto, Takayuki; Sunohara, Masaaki; Inoue, Takashi; Nakamura, Shoji; and Yonetani, Daijirou, to Matsushita Electric Industrial Co., Ltd. Mold for molding optical elements. 5,015,280, Cl. 65-307.000.
Kimura, Masatoshi; and Hayamizu, Kohichi, to Mitsubishi Denki Kabushiki Kaisha. Memory card circuit. 5,016,223, Cl. 365-229.000.
Kimura, Shigeru: *See—*
Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.
Kimura, Takeo, to Tachi-S Co., Ltd. Fore-and-aft suspension device for automotive seat. 5,014,960, Cl. 248-602.000.
Kinami, Ikuo: *See—*
Noji, Ikutaro; Kato, Masaki; Kaiju, Masaki; and Kinami, Ikuo, 5,014,519, Cl. 62-176.300.
Kindig, Alan L.; Lindberg, Kenneth M.; and Burrows, Bradford J., to Prince Corporation. Upholstery system. 5,015,034, Cl. 297-227.000.
King, Harold B., Jr.: *See—*
Butzin, Donald F.; Tunnell, George W.; King, Harold B., Jr.; and Schoenig, Frederick C., Jr., 5,014,439, Cl. 33-533.000.
King Invest Co., Ltd.: *See—*
Toda, Takuo; and Tsuda, Masao, 5,015,289, Cl. 75-229.000.
King, J. D., to King, J. D. Fishing aid. 5,014,891, Cl. 224-200.000.
King, John R., to S&K Enterprises, Inc. Rack beams and method of making same. 5,014,487, Cl. 52-731.000.
King, Ken R., to Harris Corporation. Low distortion sample and hold circuit. 5,015,877, Cl. 307-353.000.
King, Scott R.: *See—*
Cochrum, Kent C.; Stevenson, Lynnor B.; and King, Scott R., 5,015,476, Cl. 424-423.000.
Kinose, Ryohei: *See—*
Nogami, Tadahiko; Nakamura, Ichiro; Maeno, Ichiro; and Kinose, Ryohei, 5,014,748, Cl. 137-625.650.
Kinoshita, Hirotugu: *See—*
Kubo, Junichi; Yokoyama, Nobuo; and Kinoshita, Hirotugu, 5,015,404, Cl. 252-49.600.
Kinrade, John D., to Scintrex Limited. Method of determining nitrogen dioxide concentration in a gas sample which contains ozone. 5,015,590, Cl. 436-117.000.
Kinshofer, Alfred, to Kinshofer Greiftechnik GmbH. Container with a handling device. 5,014,870, Cl. 220-263.000.
Kinshofer Greiftechnik GmbH: *See—*
Kinshofer, Alfred, 5,014,870, Cl. 220-263.000.
Kinugawa, Tadami: *See—*
Takada, Toshiaki; Kinugawa, Tadami; Yamaguchi, Katsuhiro; Tanabe, Kou; and Nakano, Hiroyuki, 5,015,670, Cl. 523-214.000.
Kinzie, Norman F. Method and apparatus for constructing a three-dimensional surface of predetermined shape and color. 5,015,312, Cl. 156-63.000.
Kioka, Mamoru; Nakano, Masao; Doi, Kenji; and Toyota, Akinori, to Mitsui Petrochemical Industries, Ltd. Olefin polymerization catalyst subjected to preliminary polymerization treatment. 5,015,612, Cl. 502-133.000.
Kioritz Corporation: *See—*
Nagashima, Akira; and Koga, Hiroaki, 5,014,835, Cl. 192-48.500.
Kirby, James C.: *See—*
Ellis, George H.; and Kirby, James C., 5,015,998, Cl. 340-686.000.
Kircher, Dieter; Volz, Peter; and Wupper, Hans, to Alfred Teves GmbH. Braking pressure regulating device. 5,015,044, Cl. 303-114.000.
Kirker, Garry W.: *See—*
Degnan, Thomas F.; Kirker, Garry W.; Socha, Richard F.; Stapleton, Michael R.; and Johnson, Ivy D., 5,015,360, Cl. 208-110.000.
Kirwan, Kim: *See—*
Hoberman, Kenneth; Kirwan, Kim; and Gordon, Gary, 5,015,994, Cl. 340-567.000.
Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, to Nippon Shinyaku Co., Ltd. Thiazetidine compounds. 5,015,636, Cl. 514-210.000.
Kiss, Gabor D.: *See—*
Charbonneau, Larry F.; Flint, John A.; Kiss, Gabor D.; and Shepherd, James P., 5,015,722, Cl. 528-190.000.
Kissel, Thomas R.: *See—*
Columbus, Richard L.; and Kissel, Thomas R., 5,015,228, Cl. 604-51.000.
Kitabayashi, Junichi: *See—*
Ohuchida, Shigeru; Kitabayashi, Junichi; and Inokuchi, Toshiyuki, 5,015,835, Cl. 250-201.500.
Kitagawa, Katsuji: *See—*
Ono, Kazuya; Miyake, Tetsuo; and Kitagawa, Katsuji, 5,015,671, Cl. 523-402.000.
Kitagawa, Nobutaka; Sueda, Akihiro; and Kuwasima, Yasunori, to Kabushiki Kaisha Toshiba. Sample-hold circuit with outputs taken between gates of dynamic shift register to avoid skew from unequal interstage connection lengths. 5,016,263, Cl. 377-68.000.
Kitaguchi, Shinya: *See—*
Ohata, Tomohisa; Tsuchitani, Kazuo; and Kitaguchi, Shinya, 5,015,617, Cl. 502-304.000.
Kitahara, Mikio: *See—*
Machida, Koichi; Kitahara, Mikio; Kubo, Takayuki; Torikai, Motoyuki; and Asahina, Koutarou, 5,015,674, Cl. 523-435.000.
Kitajima, Nobuaki; and Takagi, Kazutoshi, to Tokyo Kogaku Kikai Kabushiki Kaisha. Binocular microscope. 5,015,081, Cl. 350-514.000.
Kitaori, Tomoyuki: *See—*
Ochi, Hideo; and Kitaori, Tomoyuki, 5,015,558, Cl. 430-325.000.
Kitazawa, Yasuho, to Kabushiki Kaisha Tokai-Rika-Denki Seisakusho. Seat belt system. 5,014,401, Cl. 24-633.000.

VOL
1126
ISS
2
MY
14
1991
UMI

Kitsos, Christos G.: *See—*

Kitsos, George G.; and Kitsos, Christos G., 5,014,874, Cl. 220-908.000.

Kitsos, George G.; and Kitsos, Christos G., to Kitsos, George G. Refuse container. 5,014,874, Cl. 220-908.000.

Kiyohara, Katsuya: *See—*

Yamazaki, Akihiro; and Kiyohara, Katsuya, 5,016,218, Cl. 365-189.090.

Kiyomine, Akira: *See—*

Tamura, Tadashi; Kiyomine, Akira; Nishizawa, Yoshinori; Tagami, Hidetoshi; Yoshihara, Toru; and Kawase, Jiro, 5,015,260, Cl. 8-408.000.

KLA Instruments Corporation: *See—*

Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, 5,014,627, Cl. 108-50.000.

Klatte, Gerd: *See—*

Aumann, Gerd; Giesen, Matthias; Klatte, Gerd; and Korte, Hans-Jurgen, 5,015,669, Cl. 523-200.000.

Kleemann, Dittmar, to Robert Bosch GmbH. Stator for an electrical machine. 5,015,904, Cl. 310-184.000.

Kleinwolterink, Henry, Jr.; and Granstra, Dixon G., to Poke, Inc. Pneumatic powered animal injector. 5,015,237, Cl. 604-143.000.

Klenk, Martin; Linder, Ernst; and Moser, Winfried, to Robert Bosch GmbH. Method and system for adjusting the lambda value. 5,014,668. Cl. 123-399.000.

Kleschick, William A.: *See—*

Pearson, Norman R.; Kleschick, William A.; and Carson, Chrislyn M., 5,015,286, Cl. 71-92.000.

Klimpel, Richard R.; and Leonard, Donald E., to Dow Chemical Company, The. Alkylated diaryl oxide monosulfonate collectors useful in the floatation of minerals. 5,015,367, Cl. 209-166.000.

Kling, David A., to Harnischfeger Engineers, Inc. Shuttle guide for a storage and retrieval machine. 5,015,140, Cl. 414-282.000.

Klingel, Rainhard: *See—*

Deller, Klaus; Klingel, Rainhard; and Krause, Helmfried. 5,015,615, Cl. 502-263.000.

Klingenmaier, Otto J.: *See—*

Siak, June-sang; and Klingenmaier, Otto J., 5,014,774, Cl. 165-133.000.

Klink, Erich: *See—*

Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., 5,016,087, Cl. 357-75.000.

Klockner Ferromatik Desma GmbH: *See—*

Gutjahr, Lothar, 5,016,184, Cl. 364-476.000.

Klusener, Peter: *See—*

Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, 5,014,873, Cl. 220-601.000.

Knapp, Alfons, to Masco Corporation. Small hand-held shower head for domestic sinks connected to a faucet. 5,014,919, Cl. 239-579.000.

Knapp, Gordon G., to Ethyl Corporation. Process for preparing (hydrocarbylthio) aromatic amines. 5,015,770, Cl. 564-440.000.

Knappe, Wolfgang-Reinhold: *See—*

Backhaus, Jurgen; Mangold, Dieter; and Knappe, Wolfgang-Reinhold, 5,015,572, Cl. 435-19.000.

Knight, Thomas E. Taxidermy trophy and process. 5,015,532, Cl. 428-542.400.

Knipex-Werk C. Gustav Putsch: *See—*

Putsch, Ralf; and Putsch, Karl, 5,014,432, Cl. 30-191.000.

Knoll, Jeffrey G.; and Kunkel, Dennis T., to General Motors Corporation. Rear steer controller. 5,014,802, Cl. 180-140.000.

Knorr-Bremse AG: *See—*

Utzt, Alfred, 5,016,179, Cl. 364-426.020.

Knoushi, Fumihiro: *See—*

Seki, Akinori; Knoushi, Fumihiro; Kudo, Jun; and Koba, Masayoshi, 5,016,065, Cl. 357-16.000.

Knudsen, Knud L., to Hewlett-Packard Company. High speed charge-coupled sampler and rate reduction circuit. 5,015,876, Cl. 307-352.000.

Koba, Masayoshi: *See—*

Seki, Akinori; Knoushi, Fumihiro; Kudo, Jun; and Koba, Masayoshi, 5,016,065, Cl. 357-16.000.

Kobayashi, Akio: *See—*

Fujii, Takaaki; Abe, Masahiko; and Kobayashi, Akio, 5,014,672, Cl. 123-492.000.

Kobayashi, Hideto: *See—*

Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 5,015,154, Cl. 417-269.000.

Kobayashi, Katsumi: *See—*

Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi; and Ito, Takashi, 5,015,332, Cl. 159-4.200.

Kobayashi, Kazuhiro: *See—*

Koboshi, Shigeharu; Kobayashi, Kazuhiro; Aoki, Syozo; and Takabayashi, Naoki, 5,015,560, Cl. 430-398.000.

Kobayashi, Takao: *See—*

Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.

Kobayashi, Takeo; Nishida, Takao; Tabata, Yasushi; Numako, Norio; and Nagai, Katsutoshi, to Asahi Kogaku Kogyo Kabushiki Kaisha Strobe control apparatus. 5,016,038, Cl. 354-418.000.

Kobayashi, Toshiaki; and Motomatsu, Keiko, to New Japan Chemical Co., Ltd. Crystalline resin compositions. 5,015,684, Cl. 524-108.000.

Kobayashi, Yoshikazu, to Nitto Kohku Co., Ltd. Pressure checker. 5,014,786, Cl. 116-272.000.

Kobayashi, Yukio; Nagai, Shoichi; Takesue, Masatoshi; Aosai, Fumito; and Inoue, Masao, to Mitsubishi Rayon Company, Ltd. Lens sheet. 5,015,524, Cl. 428-332.000.

Kobernus, William: *See—*

Jebe, Arnim B.; Flagg, Frank D.; Danser, Harold W., III; Kobernus, William; and Schick, George, 5,014,431, Cl. 30-124.000.

Koboshi, Shigeharu; Kobayashi, Kazuhiro; Aoki, Syozo; and Takabayashi, Naoki, to Konishiroku Photo Industry Co., Ltd. Method of treating photographic waste. 5,015,560, Cl. 430-398.000.

Koch, Eckhard M.: *See—*

Steiert, Peter; Betz, Walter; Plachetta, Christoph; and Koch, Eckhard M., 5,015,681, Cl. 524-101.000.

Koch, Karl C.; Oates, Robert M.; Peteronio, Carlo F.; and Einolf, Charles W., Jr., to Westinghouse Electric Corp. Steam turbine blade arrival time processor with automatic gain control. 5,015,949, Cl. 324-207.250.

Koch, Peter; Waas, Peter; Neumeyer, Franz; and Baechle, Georg, to Webasto AG Fahrzeugtechnik. Process for operating a motor vehicle heating system and motor vehicle heating system. 5,014,910, Cl. 237-2.00A.

Kocher, Matthias: *See—*

Jori, Giulio; Kocher, Matthias; Vogel, Emanuel; and Cross, Alexander D., 5,015,478, Cl. 424-450.000.

Kocsis, Judith; Stojkov, Joseph A.; and Towler, Michael E., to Federal-Mogul Corporation. Two piece hydraulic piston assembly with swaged piston-sleeve joint. 5,014,599, Cl. 92-84.000.

Kodera, Masao; Sasaki, Kunihiko; Mikami, Seishin; and Utsu, Jyunshi, to Nippon Soken, Inc. Doppler radar speed detecting method and apparatus therefor. 5,016,017, Cl. 342-106.000.

Koepke, Richard A., to Isotronics, Inc. Multi-path feed-thru lead and method for formation thereof. 5,015,207, Cl. 439-886.000.

Koga, Hiroaki: *See—*

Nagashima, Akira; and Koga, Hiroaki, 5,014,835, Cl. 192-48.500.

Koga, Minoru; and Watanabe, Takenori, to Ishikawajima-Harima Heavy Industries Co., Ltd. Plate type reformer. 5,015,444, Cl. 422-195.000.

Koharagi, Haruo; Tahara, Kazuo; Nitobe, Mitsuhiro; and Suzuki, Nobutaka, to Hitachi, Ltd.; and Hitachi Setsubi Engineering Co., Ltd. DC dynamoelectric machine with interpoles having magnetic flux bypassing members. 5,015,905, Cl. 310-186.000.

Kohl, Vance L., to Manitowoc Company, Inc., The. Ice machine. 5,014,523, Cl. 62-347.000.

Kohler, Reiner: *See—*

Blumentritt, Martin; Kohler, Reiner; and Greve, Peter, 5,015,202, Cl. 439-487.000.

Kohm, Blane D. Flashlight baton apparatus. 5,016,148, Cl. 362-102.000.

Kohmoto, Shinsuke: *See—*

Haraguchi, Keisuke; Kohmoto, Shinsuke; and Kondoh, Shigeru, 5,016,032, Cl. 354-195.100.

Koinuma, Nobuyuki: *See—*

Sakata, Seiji; Harada, Tamotsu; Ito, Norifumi; Hayashi, Masayuki; Yoshimura, Tsuyoshi; and Koinuma, Nobuyuki, 5,016,114, Cl. 358-404.000.

Koiwa, Mitsuru, to Mitsubishi Denki Kabushiki Kaisha. Ignition apparatus for an internal combustion engine. 5,014,675, Cl. 123-609.000.

Koizumi, Yoichi: *See—*

Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.

Kojima, Noboru: *See—*

Sakamoto, Toshiyuki; Kojima, Noboru; and Nakagawa, Isao, 5,016,111, Cl. 358-328.000.

Kokusai Denshin Denwa Co., Ltd.: *See—*

Shinonaga, Hideyuki, 5,016,206, Cl. 364-715.110.

Kolanko, Frank J., to Cherry Semiconductor Corporation. Positive temperature coefficient current source with low power dissipation. 5,015,942, Cl. 323-315.000.

Kollmorgen Corporation: *See—*

Ellis, George H.; and Kirby, James C., 5,015,998, Cl. 340-686.000.

Kolman, Kenneth: *See—*

Richard, Daniel; Kolman, Kenneth; Case, Charles; Becker, Ronald; and Gross, Alex, 5,014,449, Cl. 36-114.000.

Koloc, Paul M. Method and apparatus for generating and utilizing a compound plasma configuration. 5,015,432, Cl. 376-148.000.

Koltermann, Terry J.: *See—*

Landry, David K.; and Koltermann, Terry J., 5,015,401, Cl. 252-18.000.

Komaki, Shigeki: *See—*

Masuzawa, Shigeaki; and Komaki, Shigeki, 5,015,830, Cl. 235-441.000.

Komanduri, Ranga; von Turkovich, Branimer F.; and Casey, Morton P., Jr., to United States of America, Air Force. Apparatus for machining. 5,014,581, Cl. 82-173.000.

Komatsu, Tomoaki; and Satou, Sigeo, to Fuji Photo Film Co., Ltd. Method of optical density correction. 5,016,203, Cl. 364-571.020.

Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; and Mashimo, Akira, to Oki Electric Industry Co., Ltd. Isolating circuit and dielectric filter for use therein. 5,015,974, Cl. 333-134.000.

Komazaki, Tomokazu: *See—*

Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, 5,015,973, Cl. 333-132.000.

Komori-Chambon SA: *See—*

Teik, Goh B., 5,014,582, Cl. 83-24.000.

Komuro, Masahito: *See—*

Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.

Kondo, Hiroatsu, to I.M. Electronics Co., Ltd. Discriminating apparatus for printed matter. 5,014,857, Cl. 209-534.000.

Kondoh, Shigeru: *See—*

Haraguchi, Keisuke; Kohmoto, Shinsuke; and Kondoh, Shigeru, 5,016,032, Cl. 354-195.100.

Kone Elevator GmbH: *See—*

Pelto-Huikko, Raimo, 5,014,823, Cl. 187-17.000.

Konecny, Karl, to Synektron Corporation. Control circuit for switched reluctance motor. 5,015,939, Cl. 318-701.000.

Konica Corporation: *See—*

Matsunawa, Masahiko; and Katoh, Hiroshi, 5,016,096, Cl. 358-75.000.

Ohya, Yukio; and Nonaka, Yoshiyuki, 5,015,563, Cl. 430-546.000.

Ueda, Kiichirou, 5,015,076, Cl. 350-412.000.

Konishi, Keisuke; Shinohara, Kenji; Iwakiri, Norio; and Kurashige, Tomofumi, to Omron Tateisi Electronics Co. Switch device with a trouble detecting and indicating function. 5,015,996, Cl. 340-644.000.

Konishiroku Photo Industry Co., Ltd.: *See—*

Koboshi, Shigeharu; Kobayashi, Kazuhiro; Aoki, Syozo; and Takabayashi, Naoki, 5,015,560, Cl. 430-398.000.

Konitzer, Frank. Cow anti-kick apparatus, and method of use. 5,014,648, Cl. 119-105.000.

Kono, Hiromi: *See—*

Satoh, Yuji; Kono, Hiromi; Soda, Hiroyuki; and Otsuka, Masuhiro, 5,014,832, Cl. 192-30.00W.

Kopp, Volker, to Ehrensperger AG. Valve for a container for dispensing a pressurized fluid. 5,014,887, Cl. 222-402.100.

Koppenhoefer, Gerhard: *See—*

Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl. 568-861.000.

Kordulla, Hans: *See—*

Bross, Walter; Kordulla, Hans; and Rid, Robert, 5,015,857, Cl. 250-349.000.

Korfgen, Harald; Hirsch, Heinz; Grendel, Vinzenz; Wagner, Friedrich; and Grau, Walter, to Friedrich Grohe Armaturenfabrik GmbH & Co. Shut-off and control valve. 5,014,736, Cl. 137-315.000.

Korte, Hans-Jurgen: *See—*

Aumann, Gerd; Giesen, Matthias; Klatte, Gerd; and Korte, Hans-Jurgen, 5,015,669, Cl. 523-200.000.

Koseki, Hideo: *See—*

Ito, Yufuko; Koseki, Hideo; Kawamura, Toshio; and Tsukikawa, Yasuhiko, 5,014,646, Cl. 118-725.000.

Koshiba, Nobuharu; Nishino, Shuichi; Takata, Kenichi; and Ikehata, Toshihiko, to Matsushita Electric Industrial Co., Ltd. Lithium secondary cell. 5,015,547, Cl. 429-194.000.

Koshishiba, Hiroya: *See—*

Nomoto, Mineo; Ninomiya, Takanori; Koshishiba, Hiroya; Hamada, Toshimitsu; and Nakagawa, Yasuo, 5,015,097, Cl. 356-394.000.

Koslowski, Thomas J., to Promineral Gesellschaft zur Verwendung von Mineralstoffen mbH; and Sicowa Verfahrenstechnik fur Baustoffe GmbH & Co. K.G. Process for making construction grade calcium sulfate alpha-hemihydrate from moist finely divided gypsum obtained from a power plant flue gas desulfurization. 5,015,449, Cl. 423-172.000.

Koslowski, Thomas J., to Promineral Gesellschaft zur Verwendung Von Mineralstoffen mbH; and Sicowa Verfahrenstechnik far Baustoffe GmbH & Co. KG. Process for making calcium sulfate alpha-hemihydrate from calcium sulfate dihydrate. 5,015,450, Cl. 423-172.000.

Kouno, Tadao: *See—*

Noma, Hiroyuki; Kouno, Tadao; and Kadomaru, Kazuo, 5,014,761, Cl. 152-527.000.

Koushiro, Kenji: *See—*

Tabuchi, Hirotoshi; Kumasaka, Osamu; Ito, Katsura; and Koushiro, Kenji, 5,015,338, Cl. 204-5.000.

Kowalski, Frank V.; and Milner, Thomas E. Method and apparatus for testing optical components. 5,015,096, Cl. 356-371.000.

Koya, Kei; and Sato, Yoshikuni, to NEC Corporation. Data processor capable of correctly re-executing instructions. 5,016,169, Cl. 364-200.000.

Koyabu, Takeshi: *See—*

Ohzono, Kouhei; Takeuchi, Kazuhiro; Honda, Shoichi; and Koyabu, Takeshi, 5,014,839, Cl. 192-0.092.

Koyama, Takashi: *See—*

Okuda, Tohru; Okada, Hideo; Koyama, Takashi; Okada, Osamu; and Nakatsuka, Mamoru, 5,016,132, Cl. 360-130.210.

Koyo Seiko Co., Ltd.: *See—*

Ueno, Hiroshi, 5,015,105, Cl. 384-531.000.

Kozyrski, Vincent T.; and Millett, Claude R., to Fletcher-Terry Company, The. Circle cutting system. 5,014,436, Cl. 33-27.030.

Kozyrski, Vincent T.; and Peters, Alan R., to Fletcher-Terry Company, The. Machine and method for cutting oval shapes. 5,014,584, Cl. 83-464.000.

Kraft, Walter; and von Stein, Werner R., to Gretag Systems. Exposure control process and photographic color copying apparatus. 5,016,043, Cl. 355-38.000.

Krajewski, Nicholas J.: *See—*

Cray, Seymour R.; and Krajewski, Nicholas J., 5,014,419, Cl. 29-830.000.

Kral, Kevin D.: *See—*

Holley, Steven R.; Cunningham, David C.; and Kral, Kevin D., 5,015,934, Cl. 318-611.000.

Kramer, Erich. Method of and apparatus for supplying pulverulent material to a processing device. 5,015,126, Cl. 406-152.000.

Kramer, Jerry D. Vehicle with integral cover. 5,015,029, Cl. 296-180.100.

Kramer, Karl-Heinz: *See—*

Holzbach, Wolfgang; Boltze, Carsten; Kramer, Karl-Heinz; and Meier, Heinrich, 5,014,759, Cl. 152-427.000.

Kranz, Curt, to Johnson & Johnson. Method for producing a hollow shaft endoprosthesis. 5,015,817, Cl. 219-121.140.

Kraus, Willibald; and Hofmann, Jurgen, to TRW United Carr GmbH & Co. Holding element of plastic. 5,014,939, Cl. 248-70.000.

Krause, Helmfried: *See—*

Deller, Klaus; Klingel, Rainhard; and Krause, Helmfried, 5,015,615, Cl. 502-263.000.

Krause, Larry J.; and McCallum, Nena M., to Minnesota Mining and Manufacturing Company. Process for pulse electroplating electroactive polymers and articles derived therefrom. 5,015,538, Cl. 428-626.000.

Krauter, Allan I., to Welch Allyn, Inc. Hydraulic muscle pump. 5,014,515, Cl. 60-581.000.

Krauter, Allan I.; and Vivenzio, Robert L., to Welch Allyn, Inc. Bistep terminator for hydraulic or pneumatic muscle. 5,014,600, Cl 92-92.000.

Kraxner, Gerhard: *See—*

Daxelmueller, Manfred; Doeberl, Dieter; and Kraxner, Gerhard, 5,015,539, Cl. 428-685.000.

Kremer, Ross A.: *See—*

Anthes, Robert J.; and Kremer, Ross A., 5,015,361, Cl. 208-111.000.

Krishnan, Chari, to Eastman Kodak Company. Stabilizatin of precipitated dispersions of hydrophobic couplers, surfactants and polymers. 5,015,564, Cl. 430-546.000.

Kroll, Karl E.: *See—*

Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., 5,016,087, Cl. 357-75.000.

Krumme, John F.; Perry, Michael; Yasumura, Gary; and Selvin, Gerald J., to Beta Phase, Inc. High density and high signal integrity connector. 5,015,193, Cl. 439-161.000.

Krupp Kautex Maschinenbau GmbH: *See—*

Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, 5,014,873, Cl. 220-601.000.

Krupp Maschinentechnik Gesellschaft mit beschrankter Haftung. *See—*

Brussel, Richard, 5,014,546, Cl. 73-37.500.

Kryder, Ralph W. Sports training apparatus including a mirror assembly with adjustable line segments. 5,015,084, Cl. 350-632.000.

Ku, San-Mei: *See—*

Chu, Shao-Fu S.; Ku, San-Mei; Lange, Russell C.; Shephard, Joseph F.; Tsang, Paul J.; and Wang, Wen-Yuan, 5,015,594, Cl. 437-31.000.

Kubo, Hiroyuki: *See—*

Kawaguchi, Takashi; Yabe, Hiroshi; Maruyama, Akihiko; and Kubo, Hiroyuki, 5,016,231, Cl. 368-80.000.

Kubo, Junichi; Yokoyama, Nobuo; and Kinoshita, Hirotugu, to Nippon Oil Co., Ltd. Oil composition containing hydrogenated oil. 5,015,404. Cl. 252-49.600.

Kubo, Masashige; Tsutsumi, Yukihiro; Okisaki, Fumio; Fujimura, Shunichi; and Fukuda, Teruo, to Toyo Soda Manufacturing Co., Ltd.; and Furukawa Electric Co., Ltd., The. Radiation-resistant high molecular composition. 5,015,526, Cl. 428-378.000.

Kubo, Mikio: *See—*

Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.

Kubo, Takayuki: *See—*

Machida, Koichi; Kitahara, Mikio; Kubo, Takayuki; Torikai, Motoyuki; and Asahina, Koutarou, 5,015,674, Cl. 523-435.000.

Kubota, Masayuki, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,016,253, Cl. 372-50.000.

Kubota, Yuzuru: *See—*

Matsui, Takayuki; Okuyama, Toshiaki; Tobari, Kazuaki; Kubota, Yuzuru; and Takahashi, Junichi, 5,016,158, Cl. 363-71.000.

Kuchler, Wayne J.: *See—*

Eisenstein, Stephen E.; and Kuchler, Wayne J., 5,015,403, Cl. 252-40.000.

Kudo, Jun: *See—*

Seki, Akinori; Knoushi, Fumihiro; Kudo, Jun; and Koba, Masayoshi, 5,016,065, Cl. 357-16.000.

Kudoh, Norimasa, to Kabushiki Kaisha Toshiba. Buffer memory device for packet data and method of controlling the device. 5,016,248, Cl. 370-94.100.

Kudou, Motohiro; and Sasahara, Yutaka, to Kabushiki Kaisha Toshiba. Rotary compressor having long length blade. 5,015,164, Cl. 418-63.000.

Kuester, Edward F.; and Holloway, Christopher L., to University of Colorado Foundation, Inc. Electromagnetic pyramidal cone absorber with improved low frequency design. 5,016,185, Cl 364-481.000.

VOL
1126
ISS
2
MY
14
1991
UMI

Kugimiya, Kouichi: *See—*
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; and Kugimiya, Kouichi, 5,016,137, Cl. 361-321.000.

Kuhl, Peter J.: *See—*
Broadwin, Alan; Logan, Joseph N.; and Kuhl, Peter J., 5,015,227, Cl. 604-22.000.

Kuhla, Donald E.: *See—*
Spada, Alfred P.; Studt, William L.; Campbell, Henry F.; Kuhla, Donald E.; and Tucker, Thomas, 5,015,638, Cl. 514-211.000.

Kuhn S.A.: *See—*
Weber, Andre, 5,014,766, Cl. 164-154.000.

Kuhn, Willi: *See—*
Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.

Kumagai, Jumpei; and Fujii, Syuso, to Kabushiki Kaisha Toshiba. Dynamic memory device. 5,016,071, Cl. 357-23.600.

Kumagai, Kunio: *See—*
Oka, Koichi; Kawaguchi, Akira; Kumagai, Kunio; and Morisawa, Katsuhiro, 5,015,094, Cl. 356-336.000.

Kumagai, Yoshio: *See—*
Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, 5,015,330, Cl. 156-643.000.

Kumamoto, Hidechika: *See—*
Matsushita, Tsukasa; and Kumamoto, Hidechika, 5,016,194, Cl. 364-519.000.

Kumano, Yoshimaru: *See—*
Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.

Kumar, Suresh: *See—*
Cho, Dong-Il D.; Kumar, Suresh; and Carr, William N., 5,015,906, Cl. 310-309.000.

Kumasaka, Osamu: *See—*
Tabuchi, Hirotoshi; Kumasaka, Osamu; Ito, Katsura; and Koushiro, Kenji, 5,015,338, Cl. 204-5.000.

Kumiai Chemical Industry Co., Ltd.: *See—*
Miyazawa, Takeshige; and Kawano, Kazuhiko, 5,015,283, Cl. 71-76.000.

Kunkel, Dennis T.: *See—*
Knoll, Jeffrey G.; and Kunkel, Dennis T., 5,014,802, Cl. 180-140.000.

Kunz, Barbara L.: *See—*
Hahn, Kenneth G., Jr.; and Kunz, Barbara L., 5,015,687, Cl. 524-512.000.

Kunz, Walter, to Ciba-Geigy Corporation. Plant-protective compositions. 5,015,649, Cl. 514-332.000.

Kupfer, Adelbert: *See—*
Richter, Helmut; and Kupfer, Adelbert, 5,015,071, Cl. 350-171.000.

Kuraray Co., Ltd.: *See—*
Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.

Kurashige, Tomofumi: *See—*
Konishi, Keisuke; Shinohara, Kenji; Iwakiri, Norio; and Kurashige, Tomofumi, 5,015,996, Cl. 340-644.000.

Kure, William L. Lawn aerator. 5,014,791, Cl. 172-21.000.

Kuroda, Masuo: *See—*
Wakabayashi, Masashi; and Kuroda, Masuo, 5,014,751, Cl. 138-127.000.

Kurosawa, Yoshi: *See—*
Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi; and Matsumura, Masami, 5,015,056, Cl. 350-96.150.

Kurt H. Volk, Inc.: *See—*
Stenner, John W., 5,015,137, Cl. 412-1.000.

Kurtz, Robert L.; Foley, Kevin G.; and Hindle, Kurt J., to Smith & Wesson Corp. Cartridge magazine for semi-automatic firearms. 5,014,456, Cl. 42-50.000.

Kurys, Barbara E.: *See—*
Glamkowski, Edward J.; and Kurys, Barbara E., 5,015,738, Cl. 540-494.000.

Kusik, Charles L.; and Interess, Edward, to Gas Research Institute. Gas-fired aluminum melter having recirculating molten salt bath and process. 5,015,288, Cl. 75-686.000.

Kuslich, Stephen D., to Spine-Tech, Inc. Spinal stabilization method. 5,015,255, Cl. 623-17.000.

Kuwabara, Hideki: *See—*
Yoshimura, Shohei; Kuwabara, Hideki; and Yamaguchi, Toru, 5,015,667, Cl. 521-58.000.

Kuwabara, Kazuhiro: *See—*
Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.

Kuwabara, Youhei; and Sugiyama, Haruki, to Shizuoka Seiki Co., Ltd. Electrolytic finishing method. 5,015,347, Cl. 204-129.200.

Kuwana, Kazutaka; Yoshida, Tsuyoshi; Tozu, Kenji; and Sakane, Shinsuke, to Aisin Seiki K.K. Anti-skid control system for an automotive vehicle. 5,015,041, Cl. 303-95.000.

Kuwana, Kazutaka; Yoshida, Tsuyoshi; and Sakane, Shinsuke, to Aisin Seiki Kabushiki Kaisha. Brake pressure control apparatus. 5,016,178, Cl. 364-426.020.

Kuwasima, Yasunori: *See—*
Kitagawa, Nobutaka; Sueda, Akihiro; and Kuwasima, Yasunori, 5,016,263, Cl. 377-68.000.

Kyushu Hitachi Maxell, Ltd.: *See—*
Yamashita, Yasuo, 5,014,428, Cl. 30-43.600.

Lab Safety Supply, Inc.: *See—*
Hedberg, Donald D.; and Litin, Michael H., 5,015,276, Cl. 55-384.000.

Labinal S.A.: *See—*
Nadin, Leonard, 5,015,013, Cl. 285-64.000.

Laboratorium fur experimentelle Chirurgie: *See—*
Tepic, Slobodan, 5,014,433, Cl. 30-248.000.

LaCamera, Alfred; Van Linden, Jan H. L.; Pierce, Thomas V.; and Parkhill, James O., to Aluminum Company of America. Electrolytic cell and process for metal reduction. 5,015,343, Cl. 204-67.000.

Lacruche, Bernard: *See—*
Cathignol, Dominique; Lacruche, Bernard; and Mestas, Jean-Louis, 5,015,929, Cl. 310-335.000.

Ladner, John C., Sr.; and Ladner, June C. Automotive thermal breaker apparatus. 5,014,661, Cl. 123-198.00D.

Ladner, June C.: *See—*
Ladner, John C., Sr.; and Ladner, June C., 5,014,661, Cl. 123-198.00D.

Lagerkvist, Stig S.: *See—*
Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.

Lagiere, Joel: *See—*
Pilgrim, William R.; and Lagiere, Joel, 5,015,758, Cl. 560-56.000.

Lahlouh, John: *See—*
Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.

Laimbock, Franz. Exhaust system, particularly for two-stroke cycle internal combustion engines. 5,014,510, Cl. 60-299.000.

Lake, Harold: *See—*
Grandmont, Paul E.; and Lake, Harold, 5,015,553, Cl. 430-260.000.

Lalande, Philippe: *See—*
Leclerc, Guy; Bernier, Serge; Lalande, Philippe; and Prijic, Nevenka, 5,015,806, Cl. 200-52.00R.

Laluet, Jacques: *See—*
Simonet, Benoit; Fabre, Pierre; Laluet, Jacques; and Egraz, Jean-Bernard, 5,015,711, Cl. 526-301.000.

Lam, Kin S.: *See—*
Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., 5,015,578, Cl. 435-119.000.

Lam, Si-Ty; and Lloyd, William J., to Hewlett-Packard Company. Integral ink jet print head. 5,016,024, Cl. 346-1.100.

Lambert, Gabriele: *See—*
Ruckert, Hans; and Lambert, Gabriele, 5,015,554, Cl. 430-270.000.

Lambeth, Shawn M.; Prissel, Lee P.; and Tarara, William D., to International Business Machines Corporation. Computer system having efficient data transfer operations. 5,016,160, Cl. 364-200.000.

Lambregts, Antonius A., to Boeing Company, The. Aircraft flight path angle display system. 5,016,177, Cl. 364-424.060.

Lammers, Jan F.; Hoeks, Antonius J. L. M.; and Kennedy Van Dam, Frank D. S., to U.S. Philips Corporation. Patient positioning and transport system. 5,014,968, Cl. 269-322.000.

Lamond, Trevor G., to J. M. Huber Corporation. Filler for polyester molding compound and method. 5,015,295, Cl. 106-464.000.

Lan, Ming-Shong, to Rockwell International Corporation. Discrete-time optimal control by neural network. 5,016,188, Cl. 364-513.000.

Lande, Helene S.: *See—*
Traller, Thomas H.; and Lande, Helene S., 5,014,527, Cl. 70-94.000.

Landers, George H.: *See—*
Agrawal, Om P.; Landers, George H.; Schmitz, Nicholas A.; Moench, Jerry D.; and Ilgenstein, Kerry A., 5,015,884, Cl. 307-465.000.

Landis, William R., to Honeywell Inc. Method and apparatus for detecting short circuited combustion air switches. 5,015,172, Cl. 431-6.000.

Landry, David K.; and Koltermann, Terry J., to Hughes Tool Company. Bearings grease for rock bit bearings. 5,015,401, Cl. 252-18.000.

Lane, George R.; and McDuff, Frank M. Mobile home strap extender. 5,014,470, Cl. 52-23.000.

Lang, Gerard: *See—*
Junino, Alex; Lang, Gerard; and Genet, Alain, 5,015,769, Cl. 564-399.000.
Junino, Alex; Vandenbossche, Jean J.; Borowiak, Herve; and Lang, Gerard, 5,015,772, Cl. 564-443.000.
Maignan, Jean; Lang, Gerard; and Malle, Gerard, 5,015,767, Cl. 564-154.000.

Lang, Rudiger; and Meyer, Bernd, to Effem GmbH. Lightweight ceramic material for building purposes. 5,015,606, Cl. 501-84.000.

Langdon, Donald R.: *See—*
Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, 5,014,710, Cl. 128-660.050.

Lange, Russell C.: *See—*
Chu, Shao-Fu S.; Ku, San-Mei; Lange, Russell C.; Shephard, Joseph F.; Tsang, Paul J.; and Wang, Wen-Yuan, 5,015,594, Cl. 437-31.000.

Langhoff, Josef; Jankowski, Alfons; and Dohms, Klaus-Dieter, to Ruhrkohle AG. Process for the hydrogenation of organochlorine compounds, neutralization of the hydrochloric acid obtained and a neutralization agent for hydrochloric acid obtained from organochlorine compounds. 5,015,457, Cl. 423-481.000.

Lanxide Technology Company, LP: *See—*
Dwivedi, Ratnesh K., 5,015,610, Cl. 501-127.000.
Newkirk, Marc S.; and Lesher, H. Daniel, 5,015,609, Cl. 501-127.000.

Laporte Industries limited: *See—*
Derrick, Arthur P., 5,015,334, Cl. 162-168.100.

Larin, Marxen P.; Alexandrov, Maxim L.; and Nikolaev, Valery I. Cryogenic sorption pump. 5,014,517, Cl. 62-55.500.

Larsen, Hugh G.: *See—*
Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, 5,014,710, Cl. 128-660.050.

LaRue, Albert D.: *See—*
Ives, Robert L.; Jory, Howard R.; and LaRue, Albert D., 5,015,914, Cl. 315-4.000.

Lasagna, Diego; and Mandara, Francesco P., to Marelli Autronica S.p.A. Circuit for processing the signal generated by a variable-reluctance electromagnetic rotation sensor. 5,015,878, Cl. 307-358.000.

Lasagna, Diego; and Semeraro, Francesco, to Marelli Autronica S.p.A. Circuit for processing the signal generated by a variable-reluctance electromagnetic rotation sensor. 5,015,879, Cl. 307-358.000.

Lattion, Andre: *See—*
Oehler, Reinhard; Meyer, Urs; and Lattion, Andre, 5,015,938, Cl. 318-696.000.

Launay, Francis A. P.: *See—*
Guibert, Paul; and Launay, Francis A. P., 5,015,279, Cl. 65-302.000.

Laurel Bank Machines Co., Ltd.: *See—*
Suzuki, Mikio, 5,015,214, Cl. 453-56.000.

Laurent, Pierre A.: *See—*
Rochette, Denis; and Laurent, Pierre A., 5,016,278, Cl. 381-36.000.

Lauridsen, Kenneth W., to United Conveyor Corporation. Shaft seal. 5,014,998, Cl. 277-30.000.

Lawless, Daniel F., to Acustar, Inc. Composite base for a pressure transducer. 5,014,557, Cl. 73-756.000.

Laws, David G.: *See—*
Hacker, George G.; Turner, James K.; Abernathy, Paul L.; Payne, Bobby G.; Killian, Roy C.; and Laws, David G., 5,014,526, Cl. 68-178.000.

Lawver, Larry D.: *See—*
Watkins, William M.; Toyne, David L.; Arena, Alan J.; Lawver, Larry D.; and Birket, Daniel S., 5,015,933, Cl. 318-567.000.

Lay, Roger F.: *See—*
Crudo, Phillip M.; Foltz, Scott; and Lay, Roger F., 5,015,138, Cl. 412-43.000.

Laymoun, Samir M., to Fairchild Semiconductor Corporation. Memory cell with separate read and write paths and clamping transistors. 5,016,214, Cl. 365-154.000.

Lazaar, Kenneth I., to Du Pont de Nemours, E. I., and Company. Photopolymerizable composition containing heterocyclic triazole. 5,015,555, Cl. 430-281.000.

Le, Hanh T., to Conoco. Mineral oil or synthetic oil compositions containing terpolymers of alkyl acrylates or methacrylates etc. 5,015,406, Cl. 252-51.50R.

Leader, Gordon R.: *See—*
Reilly, James L.; and Leader, Gordon R., 5,015,775, Cl. 568-28.000.

LeBrun, Jean-Jacques: *See—*
Ardaud, Pierre; LeBrun, Jean-Jacques; and Mignani, Gerard, 5,015,607, Cl. 501-96.000.

Leclerc, Guy; Bernier, Serge; Lalande, Philippe; and Prijic, Nevenka, to Honeywell Amplitrol, Inc. Electrical switching device. 5,015,806, Cl. 200-52.00R.

LeCompte, George W., to Hughes Aircraft Company. Missile filament dispensing arrangement. 5,014,930, Cl. 244-3.120.

LED Corporation N.V.: *See—*
Vila-Masot, Oscar; and Melis, Janis, 5,015,919, Cl. 315-86.000.

Lederer, John F., to General Motors Corporation. Heat exchanger core reinforcement. 5,014,771, Cl. 165-76.000.

Lee, Che-Cheol. Melodic candle assembly. 5,015,175, Cl. 431-253.000.

Lee, Guo-shuh J.; Garces, Juan M.; and Maj, Joseph J., to Dow Chemical Company, The. Alkylation of polycyclic aromatic compounds to alkylates enriched in the linear- and near linear-substituted isomers. 5,015,797, Cl. 585-467.000.

Lee, John C.: *See—*
Payson, Steven J.; and Lee, John C., 5,014,682, Cl. 126-501.000.

Lee, Kyung; Patterson, Manford K., Jr.; and Birckbichler, Paul J., to Samuel Roberts Noble Foundation, Inc., The. Method for the detection of factor XIII in plasma. 5,015,588, Cl. 436-69.000.

Lee, Noel M.; Herman, Rodney A.; and Crothers, Thomas J., to Monster Cable Products, Inc. Small disk adapter with storage case. 5,016,241, Cl. 369-289.000.

Lee, Song S.: *See—*
Awai, George K.; and Lee, Song S., 5,016,152, Cl. 362-293.000.

Lee, Walter: *See—*
Mirando, Salvatore V.; and Lee, Walter, 5,014,988, Cl. 273-125.00A.
Mirando, Salvatore V.; and Lee, Walter, 5,014,991, Cl. 273-138.00A.

Lee, Yee, to Owens-Corning Fiberglas Corporation. Open bottomed spinner for mineral fibers. 5,015,278, Cl. 65-6.000.

Leenders, Hendrikus W.: *See—*
Blanpain, Peter R. J.; and Leenders, Hendrikus W., 5,015,713, Cl. 526-318.400.

Leers, Konrad, to Schorling GmbH & Co. Waggonbau. Method and apparatus for adjusting a preselected sweeping surface width of a revolving roll-type brush. 5,015,300, Cl. 134-18.000.

Leeyeh, Chuing-Hui. Connection structure for the supporting rod of a floor lamp. 5,016,154, Cl. 362-414.000.

Lefebvre, Jacques: *See—*
Colombier, Gabriel; Lefebvre, Jacques; Galand, Jean; and Golay, Armand, 5,015,340, Cl. 204-28.000.

Legge, Robert W.; and Hocking, William O., Jr., to Tamfelt, Inc. Seam for work fabric and method of manufacture thereof. 5,015,220, Cl. 474-256.000.

Leggett & Platt, Incorporated: *See—*
Bustos, Rafael T., 5,014,862, Cl. 211-193.000.

LeGrand, Pierre N.; Ballard, James G.; Liegel, Reinald D.; and Wisner, Craig A., to Hein-Werner Corporation. Universal measuring system. 5,014,442, Cl. 33-608.000.

Lehmann, Wolfgang, to Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH. Method for monitoring the discharge of liquids and apparatus therefor. 5,014,368, Cl. 4-314.000.

Lehner, Gerhard: *See—*
Hlousek, Jaroslaw; Lehner, Gerhard; and Stipek, Theodor, 5,015,160, Cl. 417-499.000.

Lehr, Menahem: *See—*
Germanton, Damon; and Lehr, Menahem, 5,014,793, Cl. 173-12.000.

Lehrman, Sandra N.: *See—*
Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., 5,015,647, Cl. 514-263.000.

Leighton, Harry J.: *See—*
Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., 5,015,647, Cl. 514-263.000.

Leising, Maurice B.: *See—*
Holbrook, Gerald L.; and Leising, Maurice B., 5,016,176, Cl. 364-424.100.

Leissler, George W.: *See—*
Waters, William J.; Leissler, George W.; and Edmonds, Brian J., 5,014,768, Cl. 164-418.000.

Leitgeb, Wilhelm, to Siemens Aktiengesellschaft. Multiphase synchronous permanent magnet electric machine. 5,015,902, Cl. 310-156.000.

Leland Stanford Junior University, The Board of Trustees of the: *See—*
Zdeblick, Mark J.; and Albrecht, Thomas R., 5,015,850, Cl. 250-306.000.

Leland Stanford University, Board of Trustees of: *See—*
Pontius, Brian W., 5,015,569, Cl. 435-6.000.

Lemanis, Eduard: *See—*
Donenfeld, Henry; and Lemanis, Eduard, 5,015,261, Cl. 8-532.000.

Lenhardt Padro, Carlos E.: *See—*
Cabre Castellvi, Juan; Diago Meseguer, Jose ; Esteve Bianchini, Asuncion; Lenhardt Padro, Carlos E.; and Sans Pitarch, Esteve, 5,015,736, Cl. 540-222.000.

Lenselink, Willem; and Sipma, Gerben, to PFW(Nederland)B.V. Tricyclo{6.2.1.0$^{1,6}$}undecanes useful as fragrance chemicals. 5,015,761, Cl. 560-256.000.

Leonard, Donald E.: *See—*
Klimpel, Richard R.; and Leonard, Donald E., 5,015,367, Cl. 209-166.000.

Leptich, Joseph M.; Penney, Keith A.; and Lowe, Steve F., to General Motors Corporation. Internal combustion engine having a permanent ground electrode and replaceable center electrode element. 5,014,656, Cl. 123-169.0EL.

Lerch, Ulrich; Henning, Rainer; Urbach, Hansjorg; and Kaiser, Joachim, to Hoechst Aktiengesellschaft. Benzothiazinone oxides, processes for their preparation, medicaments containing them and the use thereof, and intermediates for their preparation. 5,015,642, Cl. 514-224.200.

Lermer, Helmut: *See—*
Steck, Werner; Lermer, Helmut; Schwarzmann, Matthias; and Dockner, Toni, 5,015,785, Cl. 568-783.000.

Lerner, Richard A.: *See—*
Niman, Henry L.; and Lerner, Richard A., 5,015,571, Cl. 435-7.920.

Lesher, H. Daniel: *See—*
Newkirk, Marc S.; and Lesher, H. Daniel, 5,015,609, Cl. 501-127.000.

Leslie, Robert H.; Neumann, Glynn F.; and Pehrson, Gene A., to Bellcomb Technologies Incorporated. Multicomponent panel system and method as assembly. 5,014,476, Cl. 52-220.000.

Lessi, Jacques; Perreau, Philippe; Bary, Daniel; and Grard, Guy, to Institut Francais du Petrole. Device and method for measuring the deformations of a sample. 5,014,440, Cl. 33-557.000.

Lesyk, Eugene. Self-storing and inking stamp. 5,014,617, Cl. 101-333.000.

L'Etat Francais: *See—*
Castera, Jean-Paul; Meunier, Paul-Louis; Carenco, Alain; Dupont, Jean-Marie; and Friez, Pierre, 5,015,051, Cl. 350-96.120.

Leupacher, Wolfgang, to Dynamit Nobel Aktiengesellschaft. Detonator/igniter element with bleachable absorber. 5,014,620, Cl. 102-201.000.

Levanto, Lauri, to Nokia-Mobira Oy. Matrix display. 5,016,002, Cl. 340-756.000.

Levatter, Jeffrey I., to Acculase, Inc. Optical fiber power output measuring means. 5,015,067, Cl. 350-96.290.

Lever Brothers Company, division of Conopco, Inc.: *See—*
Newbold, Geoffrey; Wraige, Douglas; and Wagner, John D., 5,015,513, Cl. 428-35.500.

VOL 1126 ISS 2 MY 14 1991 UMI

- Lever, Gordon: *See—*
  - Fulford, George D.; Lever, Gordon; and Sato, Taichi, 5,015,447, Cl. 423-21.500.
- Levine, Harry: *See—*
  - Haynes, Lynn C.; Levine, Harry; and Finley, John W., 5,015,483, Cl. 426-73.000.
- Levinson, Mark, to GTE Laboratories Incorporated. Laser zone melted Bi—Sr—Ca—Cu—O thick films. 5,015,618, Cl. 505-001.000.
- Levinson, Matthew I.: *See—*
  - Murphy, Gerald J.; Ager, John W.; and Levinson, Matthew I., 5,015,765, Cl. 562-621.000.
- Lew, Hyok S. Rotameter with read-out device. 5,014,559, Cl. 73-861.560.
- Lewan, Philip C.; Podlesak, Robert G.; and Buchner, Kenneth L., to Camshaft Machine Company. Belt oil skimmer apparatus. 5,015,378, Cl. 210-386.000.
- Lewandowski, Joseph T.: *See—*
  - Jacobson, Allan J.; Hall, Richard B.; Mims, Charles A.; and Lewandowski, Joseph T., 5,015,461, Cl. 423-593.000.
- Lewis, Hogan G.; and Gregory, Charles E., Jr. Safe weapons system for a firearm. 5,014,457, Cl. 42-70.110.
- Lewis, James C.: *See—*
  - Angell, Mickey A.; Cearley, Thomas W.; Lewis, James C.; St. Onge, Arthur R.; Szysh, John A.; and White, Kenneth W., 5,015,145, Cl. 414-547.000.
- Lewis, Jay L., to Robertshaw Controls Company. Intermittent patient suction system, self-contained control device therefor and methods of making the same. 5,015,236, Cl. 604-120.000.
- Lewis, Larry N.; and Chang, Tony C., to General Electric Company. One part heat curable organopolysiloxane compositions. 5,015,691, Cl. 525-100.000.
- Lewis, Scott C.: *See—*
  - Drake, Charles E.; Kalter, Howard L.; and Lewis, Scott C., 5,015,880, Cl. 307-443.000.
- Liedtke, Kurt: *See—*
  - Focke, Heinz; and Liedtke, Kurt, 5,014,814, Cl. 181-200.000.
- Liegel, Reinald D.: *See—*
  - LeGrand, Pierre N.; Ballard, James G.; Liegel, Reinald D.; and Wisner, Craig A., 5,014,442, Cl. 33-608.000.
- Lifka, Hans, to Messerschmitt-Boelkow-Blohm GmbH. Combination propulsion system for a flying craft. 5,014,508, Cl. 60-224.000.
- Lilly Industries Limited: *See—*
  - Fernandez, Maria I. F.; Hotten, Terrence M.; and Tupper, David E., 5,015,656, Cl. 514-422.000.
- Lilly S.A.: *See—*
  - Fernandez, Maria I. F.; Hotten, Terrence M.; and Tupper, David E., 5,015,656, Cl. 514-422.000.
- Lim, Jae S., to Massachusetts Institute of Technology. Receiver-compatible noise reduction systems. 5,016,104, Cl. 358-167.000.
- Lim, Sheldon C. P.; Hellstrom, Julie W.; and Yen, Ting P., to North American Philips Corp., Signetics Division. Fabrication method using oxidation to control size of fusible link. 5,015,604. Cl. 437-195.000.
- Lin, Jiing-Kang; and Niemiro, Thaddeus A., to Rockwell International Corporation. Water stop module. 5,014,615, Cl. 101-147.000.
- Lin, William C., to General Motors Corporation. Electronic control dynamic brake proportioning. 5,015,040, Cl. 303-93.000.
- Lincoln Electric Company, The: *See—*
  - Crockett, Dennis D.; and Munz, Robert P., 5,015,823, Cl. 219-146.100.
- Lindberg, Kenneth M.: *See—*
  - Kindig, Alan L.; Lindberg, Kenneth M.; and Burrows, Bradford J., 5,015,034, Cl. 297-227.000.
- Linder, Ernst: *See—*
  - Klenk, Martin; Linder, Ernst; and Moser, Winfried, 5,014,668, Cl. 123-399.000.
- Lindsey, Thomas O.; and Clark, Michael T., to SmithKline Beecham Corporation. Stabilized somatotropin for parenteral administration. 5,015,627, Cl. 514-12.000.
- Lindvall, Sture S. Apparatus for conveying article carriers along a succession of processing stations. 5,014,726, Cl. 134-76.000.
- Linea BM di Mandolesi Benito & C. S.n.c.: *See—*
  - Mandolesi, Benito, 5,015,115, Cl. 402-56.000.
- Linear Instruments: *See—*
  - Bryan, Raymond G.; and Hlousek, Louis, 5,015,069, Cl. 350-162.170.
- Lint, James D.; and Gutierrez, Aurelio J., to Pulse Engineering, Inc. Electronic microminiature packaging and method. 5,015,981, Cl. 336-65.000.
- Linton, Leon; and Campbell, Michael L., to Southern Systems, Inc. Cam operated fixture for a conveyor. 5,014,843, Cl. 198-377.000.
- Liou, Chueh-Horng, to Industrial Technology Research Institute. Method of making spring washer with laser beam. 5,015,820, Cl. 219-121.720.
- Litin, Michael H.: *See—*
  - Hedberg, Donald D.; and Litin, Michael H., 5,015,276, Cl. 55-384.000.
- Liu, Lishing, to International Business Machines Corporation. Method for storing into non-exclusive cache lines in multiprocessor systems. 5,016,168, Cl. 364-200.000.
- Livermore, Frederick C.; Hogeboom, John G.; and Sunatori, Go S., to Northern Telecom Limited. Method for making integrated circuits. 5,015,600, Cl. 437-51.000.
- Lloyd, Edward K.: *See—*
  - Jesshope, Christopher R.; Pope, Patrick S.; Hey, Anthony J. G.; Nicole, Denis A.; and Lloyd, Edward K., 5,016,163, Cl. 364-200.000.
- Lloyd, William J.: *See—*
  - Lam, Si-Ty; and Lloyd, William J., 5,016,024, Cl. 346-1.100.
- Loadmaster Manufacturing, Inc.: *See—*
  - Barnes, Roger M.; and Comparato, Stephen L., 5,015,146, Cl. 414-639.000.
- Lobjinski, Manfred; Horn, Michael; and Hinterberger, Christian, to Siemens Aktiengesellschaft. Modular expandable digital single-stage switching network in ATM (Asynchronous Transfer Mode) technology for a fast packet-switched transmission of information. 5,016,245, Cl. 370-60.000.
- Loesel, John L., Jr.; and Gilson, Channing W., to Dial Corporation, The. Liquid dispensing assembly. 5,014,880, Cl. 222-181.000.
- Loffler, Johannes: *See—*
  - Zapke, Klaus; and Loffler, Johannes, 5,014,744, Cl. 137-614.210.
- Logan, Joseph N.: *See—*
  - Broadwin, Alan; Logan, Joseph N.; and Kuhl, Peter J., 5,015,227, Cl. 604-22.000.
- Login, Robert B.: *See—*
  - Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., 5,015,708, Cl. 526-264.000.
- Lohmann, Wolfgang: *See—*
  - Schwarz, Jurgen; and Lohmann, Wolfgang, 5,014,707, Cl. 128-633.000.
- Lohner, Martin: *See—*
  - Prestel, Fritz; and Lohner, Martin, 5,016,140, Cl. 361-400.000.
- Lohrmann, Gunter. Punch-biopsy apparatus with cannula-aiming device. 5,014,717, Cl. 128-754.000.
- Lois, Lambros. Pressure constraint of a rotating article such as a flywheel. 5,015,940, Cl. 322-4.000.
- Lonseal Corporation & Nissin Steel Co., Ltd.: *See—*
  - Moriizumi, Shuichi; Masuhara, Kenichi; Yamabe, Hidetoshi; Tomosue, Takao; Mori, Kouji; and Kaneko, Hisaharu, 5,015,531, Cl. 428-463.000.
- Looker, Steve. Cremator. 5,014,630, Cl. 110-194.000.
- Loral Aerospace Corp.: *See—*
  - Moldovan, Anton G., 5,015,592, Cl. 437-4.000.
- Lord, Douglas W., to Hatfield, Byron; and Hudson, Ken. Helicopter remote control system. 5,015,187, Cl. 434-33.000.
- L'Oreal: *See—*
  - Constantin, Daniel; Fert, Jean-Jacques; and Mettivier, Francine, 5,014,501, Cl. 53-173.000.
  - Junino, Alex; Lang, Gerard; and Genet, Alain, 5,015,769, Cl. 564-399.000.
  - Junino, Alex; Vandenbossche, Jean J.; Borowiak, Herve; and Lang, Gerard, 5,015,772, Cl. 564-443.000.
- Lori, Domenico: *See—*
  - Milani, Federico; Massari, Paola; and Lori, Domenico, 5,015,694, Cl. 525-240.000.
- Lorig, James D.; and Shearer, John A., to Hughes Aircraft Company. Printed circuit board edge-locking device. 5,016,141, Cl. 361-415.000.
- Lortz, Allan R.: *See—*
  - Homeier, Ronald F.; Lortz, Allan R.; Clifton, William L., III; and Williams, Jeffrey L., 5,015,010, Cl. 280-808.000.
- Lotman, D. Barry. Patient support. 5,016,268, Cl. 378-177.000.
- Love, John D.: *See—*
  - Thorncraft, David A.; Lyons, Peter R. A.; Rashleigh, Scott C.; Maine, Johnathan A.; and Love, John D., 5,015,058, Cl. 350-96.150.
- Lowe, David J., to Du Pont de Nemours, E. I., and Company. Process for increasing the direct esterification reaction rate of a diacid with a glycol. 5,015,759, Cl. 560-91.000.
- Lowe, Steve F.: *See—*
  - Leptich, Joseph M.; Penney, Keith A.; and Lowe, Steve F., 5,014,656, Cl. 123-169.0EL.
- Lubrizol Corporation, The: *See—*
  - Di Biase, Stephen A.; and Bush, James H., 5,015,368, Cl. 209-166.000.
  - Yodice, Richard; and Clark, Alan C., 5,015,402, Cl. 252-32.70E.
- Lucas Industries Public Limited Company: *See—*
  - Bissell, Martin, 5,015,046, Cl. 303-118.000.
  - Hurst, David C.; and Brearley, Malcolm, 5,016,249, Cl. 371-16.100.
- Ludwig, David C., to GTE Products Corporation. Composition suitable for injection molding of metal alloy, or metal carbide powders. 5,015,294, Cl. 106-268.000.
- Ludwig, Thomas: *See—*
  - Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., 5,016,087, Cl. 357-75.000.
- Luebke, Charles P.: *See—*
  - Vora, Bipin V.; Pujado, Peter R.; and Luebke, Charles P., 5,015,783, Cl. 568-697.000.
- Luhmer, Udo; and Schapp, Udo, to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co. Method and machine for the discontinuous generating grinding with indexing. 5,014,467, Cl. 51-287.000.
- Lundgard, Richard A.: *See—*
  - Beck, Henry N.; Mahoney, Robert D.; Wan, Hawk S.; and Lundgard, Richard A., 5,015,275, Cl. 55-158.000.
- Lupinski, John H.: *See—*
  - Walles, Erik W.; Lupinski, John H.; and Crivello, James V., 5,015,675, Cl. 523-443.000.
- Lussi, Edward F.; and Smith, Thomas G., to Tarkett Inc. Decorative inlaid types of sheet materials. 5,015,516, Cl. 428-143.000.

- Lynde, Gerald D.; Winterrowd, Kenneth W.; and Harvey, Harold H., Jr., to Tri-State Oil TOols, Inc. Milling tool for cutting well casing. 5,014,778, Cl. 166-55.600.
- Lyons, Peter R. A.: *See—*
  - Thorncraft, David A.; Lyons, Peter R. A.; Rashleigh, Scott C.; Maine, Johnathan A.; and Love, John D., 5,015,058, Cl. 350-96.150.
- M & W Pump Corporation: *See—*
  - Eller, J. David, 5,015,399, Cl. 210-776.000.
- Macchiarulo, Vincenzo; and Di Giacomo, Tommaso, to Pirelli Transmissioni Industriali S.p.A. Toothed pulley and transmission related thereto. 5,015,218, Cl. 474-152.000.
- MacDonald, Michael W. Building facade. 5,014,477, Cl. 52-235.000.
- MacGregor, David C., to Cordis Corporation. Non-woven endoprosthesis. 5,015,253, Cl. 623-1.000.
- Machida, Koichi; Kitahara, Mikio; Kubo, Takayuki; Torikai, Motoyuki; and Asahina, Koutarou, to Mitsui Toatsu Chemicals, Inc. Composition of vinyl polymer-grafted, silicone polymer-modified epoxy resin and polymaleimide. 5,015,674, Cl. 523-435.000.
- Machida, Sadatsugi: *See—*
  - Nakamura, Shigeru; Machida, Sadatsugi; Nakao, Takeshi; and Ojima, Masahiro, 5,016,234, Cl. 369-44.140.
- Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht. Process for enhancing the electrostatic chargeability of powder coatings or powders, and the use thereof for surface-coating solid objects. 5,015,676, Cl. 523-453.000.
- MacLean, Donald L.: *See—*
  - Ramachandran, Ramakrishnan; Shukla, Yagya; and MacLean, Donald L., 5,015,756, Cl. 558-320.000.
- Maddali, Vijay K.: *See—*
  - Rozman, Gregory I.; and Maddali, Vijay K., 5,016,157, Cl. 363-39.000.
- Madinox S.A.: *See—*
  - Bene, Armand, 5,014,525, Cl. 68-20.000.
- Maeda, Osamu: *See—*
  - Taue, Jun; and Maeda, Osamu, 5,014,671, Cl. 123-447.000.
- Maekawa, Hiroko: *See—*
  - Suzuki, Hiroyoshi; Ogawa, Kenji; and Maekawa, Hiroko, 5,015,091, Cl. 356-135.000.
- Maeno, Ichiro: *See—*
  - Nogami, Tadahiko; Nakamura, Ichiro; Maeno, Ichiro; and Kinose, Ryohei, 5,014,748, Cl. 137-625.650.
- Maeshima, Katsuyoshi, to Canon Kabushiki Kaisha. Copying apparatus. 5,016,116, Cl. 358-448.000.
- Maezawa, Akihiko: *See—*
  - Ito, Kanichi; and Maezawa, Akihiko, 5,015,443, Cl. 422-186.000.
- Magarian, Robert A.; Pento, Joseph T.; and Day, Billy W., to Board of Reagents of the University of Oklahoma. Triarylcyclopropanes as antiestrogens and antitumor agents. 5,015,666, Cl. 514-754.000.
- Maglinte, Dean D. T., to Cook Incorporated. Decompression enteroclysis balloon catheter. 5,015,232, Cl. 604-96.000.
- Magna International Inc.: *See—*
  - Harney, William J., 5,014,958, Cl. 248-394.000.
- Mahoney, Robert D.: *See—*
  - Beck, Henry N.; Mahoney, Robert D.; Wan, Hawk S.; and Lundgard, Richard A., 5,015,275, Cl. 55-158.000.
- Mahulikar, Deepak; Crane, Jacob; and Khan, Abid A., to Olin Corporation. Thermal performance package for integrated circuit chip. 5,015,803, Cl. 174-52.400.
- Mai, Udo: *See—*
  - Hartmann, Uwe; and Mai, Udo, 5,015,915, Cl. 315-8.000.
- Maignan, Jean; Lang, Gerard; and Malle, Gerard, to Societe Anonyme dite: L'Oreal. N-(mercaptoalkyl)Ω-hydroxyalkylamides and their use as a reducing agent in a process for permanently deforming hair. 5,015,767, Cl. 564-154.000.
- Maine, Johnathan A.: *See—*
  - Thorncraft, David A.; Lyons, Peter R. A.; Rashleigh, Scott C.; Maine, Johnathan A.; and Love, John D., 5,015,058, Cl. 350-96.150.
- Mair, Eduard, to Siemens Aktiengesellschaft. Method and arrangement for fixing toner images applied to a web-shaped recording medium with high quality consistency. 5,016,058, Cl. 355-292.000.
- Mais, Ralph G. Silk screen process. 5,015,557, Cl. 430-308.000.
- Maj, Joseph J.: *See—*
  - Lee, Guo-shuh J.; Garces, Juan M.; and Maj, Joseph J., 5,015,797, Cl. 585-467.000.
- Majahan, Om: *See—*
  - Puri, Rajen; Yee, Dan; Buxton, Thomas S.; and Majahan, Om, 5,014,788, Cl. 166-308.000.
- Makhobey, Mark, to Car-Graph, Inc. Pressure enhanced self aligning seal. 5,014,999, Cl. 277-3.000.
- Maki, Kazuya: *See—*
  - Sasajima, Koji; Maki, Kazuya; and Yamaguchi, Kouji, 5,014,574, Cl. 74-866.000.
- Makishima, Reichi, to Nitto Kohki Co., Ltd. Double-pipe pipe coupling. 5,014,743, Cl. 137-614.030.
- Mako, Frederick M.; and Pasour, John A., to United States of America, Navy. High power, high sensitivity microwave calorimeter. 5,015,943, Cl. 324-95.000.
- Malay, Manuel R.: *See—*
  - Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 5,015,542, Cl. 429-56.000.
- Maleki, Massoud M. Mobile radiation shield. 5,015,864, Cl. 250-516.100.
- Malik, James J.; and Theodore, George J. Wire holder for plastic bag for trash. 5,014,944, Cl. 248-99.000.
- Malle, Gerard: *See—*
  - Maignan, Jean; Lang, Gerard; and Malle, Gerard, 5,015,767, Cl. 564-154.000.
- Malmgren, Robert C.; Soltanpour, Parviz N.; and Cipra, Jan E., to International Soil Systems, Inc. Soil amendment with rubber particles. 5,014,462, Cl. 47-1.010.
- MAN Roland Druckmaschinen AG: *See—*
  - Zingher, Oded; Wuhrl, Arno; Behrendt, Ullrich; Schafer, Ralf; and Ziesing, Gunter, 5,014,618, Cl. 101-365.000.
- Manabe, Takahiro: *See—*
  - Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.
- Mandara, Francesco P.: *See—*
  - Lasagna, Diego; and Mandara, Francesco P., 5,015,878, Cl. 307-358.000.
- Mandolesi, Benito, to Linea BM di Mandolesi Benito & C. S.n.c. Interchangeable sheet album for photographs and cards. 5,015,115, Cl. 402-56.000.
- Mangold, Dieter: *See—*
  - Backhaus, Jurgen; Mangold, Dieter; and Knappe, Wolfgang-Reinhold, 5,015,572, Cl. 435-19.000.
- Maniglia, Anthony J. Partially implantable hearing aid device. 5,015,224, Cl. 600-25.000.
- Manimaran, Thanikavelu; and Impastato, Fred J., to Ethyl Corporation. Preparation of optically active aliphatic carboxylic acids. 5,015,764, Cl. 562-401.000.
- Manitowoc Company, Inc., The: *See—*
  - Kohl, Vance L., 5,014,523, Cl. 62-347.000.
- Mann, Robert N., to MIG VAC Inc. Nozzle structure in welding gun. 5,015,822, Cl. 219-137.410.
- Mannesmann Aktiengesellschaft: *See—*
  - Kemmerling, Karl-Heinz, 5,014,531, Cl. 72-9.000.
- Manz, Albrecht: *See—*
  - Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, 5,015,676, Cl. 523-453.000.
- Mara, Robert M.: *See—*
  - Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G.; Saraceno, Patricia J.; and Pacer, James M., 5,016,050, Cl. 355-208.000.
- Marathon Oil Company: *See—*
  - McClure, D. Craig, 5,014,783, Cl. 166-252.000.
- Marcel M. Barbier, Inc.: *See—*
  - Barbier, Marcel M., 5,014,463, Cl. 49-401.000.
- Marchal, Claude: *See—*
  - Gruaz, Daniel; and Marchal, Claude, 5,016,008, Cl. 341-33.000.
- Marchegiano, Joseph E.: *See—*
  - Booth, Bruce L.; and Marchegiano, Joseph E., 5,015,059, Cl. 350-96.170.
- Marconi Company Limited, The: *See—*
  - Simpson, Iain F., 5,016,020, Cl. 343-703.000.
- Marder, Robert J.: *See—*
  - Bacus, James W.; and Marder, Robert J., 5,016,283, Cl. 382-6.000.
- Marelli Autronica S.p.A.: *See—*
  - Lasagna, Diego; and Mandara, Francesco P., 5,015,878, Cl. 307-358.000.
  - Lasagna, Diego; and Semeraro, Francesco, 5,015,879, Cl. 307-358.000.
- Margerum, Edwin O.: *See—*
  - Merritt, John H., III; and Margerum, Edwin O., 5,014,613, Cl. 100-5.000.
- Marino, Paul K.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Marino, Scott A.: *See—*
  - Dechene, Ronald L.; Smith, Thomas B.; and Marino, Scott A., 5,015,954, Cl. 324-307.000.
- Maritano, Mauro: *See—*
  - Gabrielli, Giorgio; Maritano, Mauro; Motroni, Giuseppe; and Chapoy, L. Lawrence, 5,015,721, Cl. 528-190.000.
- Marker Deutschland GmbH: *See—*
  - Hornschemeyer, Heinz; and Emert, Anton, 5,015,005, Cl. 280-630.000.
- Markert, Eberhard, to Michael Horauf Maschinenfabrik GmbH & Co. KG. Apparatus for gripping and decollating a bottom blank of a stack of blanks in a book covering machine. 5,014,973, Cl. 271-100.000.
- Marlboro Marketing, Inc.: *See—*
  - Merl, Milton, 5,014,954, Cl. 248-285.000.
- Marlen Research Corporation: *See—*
  - Dennis, Wendell E.; Sheeley, Steven M.; Brown, Stephen M.; Washam, Kevin A.; Alley, Lewis E.; and Cain, Marvin D., 5,014,882, Cl. 222-309.000.
- Marley Company, The: *See—*
  - Greene, James L., 5,015,152, Cl. 417-40.000.
- Marpoe, Jr. Gary R.; and Pentz, Edward L., to AMP Incorporated. Apparatus for forming embossments on electrical contact terminals. 5,014,535, Cl. 72-326.000.
- Marquardt, Wayne: *See—*
  - Reitmeier, Jerry; Marquardt, Wayne; Smith, Mark; and Nethers, David, 5,014,896, Cl. 227-39.000.
- Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, to Intevep, S.A. Article formed from a low carbon iron alloy having

VOL
1126
ISS
2
MY
14
1991
UMI

a corrosion resistant diffusion coating thereon. 5,015,535, Cl. 428-610.000.
Marsden, James R.: *See—*
Dilorio, Mark S.; Robinson, Stephen E.; Crum, Duane B.; Paulson, Douglas N.; Buchanan, D. Scott; and Marsden, James R., 5,016,128, Cl. 360-97.010.
Martell, David R., to General Motors Corporation. Transmission fluid fill regulator and seal assembly. 5,014,445, Cl. 33-731.000.
Martelli, Gian N.: *See—*
Nidola, Antonio; and Martelli, Gian N., 5,015,344, Cl. 204-98.000.
Martens, John A., to Minnesota Mining and Manufacturing Company. Flexographic printing plate process. 5,015,556, Cl. 430-306.000.
Martin, Edward J.: *See—*
Gee, Gregory P.; Martin, Edward J.; and Prawdzik, David P., 5,014,550, Cl. 73-118.200.
Martin, Eugene R.; and Griswold, Roy M., to Wacker Silicones Corporation. Sulfur-containing organopolysiloxane waxes and a method for preparing the same. 5,015,717, Cl. 528-30.000.
Martin, Geoffrey S.; and Ram, Anand, to Vas-Cath Incorporated. Angioplasty catheter with spiral balloon. 5,015,230, Cl. 604-96.000.
Martin Marietta Corporation: *See—*
Kampe, Stephen L.; Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., 5,015,534, Cl. 428-570.000.
Martin Marietta Energy Systems, Inc.: *See—*
Dorsey, George F., 5,015,718, Cl. 528-44.000.
Martinengo, Tiziano: *See—*
De Bernardinis, Silvia; Cabri, Walter; Martinengo, Tiziano; and Francalanci, Franco, 5,015,745, Cl. 552-206.000.
Maruyama, Akihiko: *See—*
Kawaguchi, Takashi; Yabe, Hiroshi; Maruyama, Akihiko; and Kubo, Hiroyuki, 5,016,231, Cl. 368-80.000.
Maruyama, Naotaka, to Fuji Xerox Co., Ltd. Stellate store and broadcast network with collision avoidance. 5,016,159, Cl. 364-200.000.
Mas, Georges L. J. M.: *See—*
Tamagno, Didier Y. F.; Mas, Georges L. J. M.; and Navelier, Alain F. E. A., 5,015,060, Cl. 350-96.200.
Masco Corporation: *See—*
Knapp, Alfons, 5,014,919, Cl. 239-579.000.
Mashimo, Akira: *See—*
Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, 5,015,973, Cl. 333-132.000.
Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; and Mashimo, Akira, 5,015,974, Cl. 333-134.000.
Mashita, Eric M.: *See—*
Navarette, Carlos A.; and Mashita, Eric M., 5,014,603, Cl. 92-165.00R.
Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, to Raychem Corporation. Elongate sensors comprising conductive polymers, and methods and apparatus using such sensors. 5,015,958, Cl. 324-522.000.
Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, to Acuson Corporation. Steered linear color döppler imaging. 5,014,710, Cl. 128-660.050.
Massachusetts Institute of Technology: *See—*
Johnson, Leonard M., 5,015,053, Cl. 350-96.140.
Lim, Jae S., 5,016,104, Cl. 358-167.000.
Melcher, James R., 5,015,951, Cl. 324-232.000.
Massari, Paola: *See—*
Milani, Federico; Massari, Paola; and Lori, Domenico, 5,015,694, Cl. 525-240.000.
Massey, W. Russell, Jr.; Drobish, Renee; and McLaughlin, Paul F., to Honeywell Inc. Method for controlling failover between redundant network interface modules. 5,016,244, Cl. 370-16.000.
Masson, Patrice P.: *See—*
Chapelain, Jean-Claude; Masson, Patrice P.; Dupoty, Gerard C.; Crenn, Gerard; and Cloux, Jean-Noel, 5,014,822, Cl. 187-1.00R.
Masters, John R.: *See—*
Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.
Masuda, Haruo: *See—*
Aonuma, Masashi; Kasuga, Akira; and Masuda, Haruo, 5,015,498, Cl. 427-132.000.
Masuda, Takayoshi: *See—*
Suekane, Ariko; Yamazaki, Fumio; and Masuda, Takayoshi, 5,015,774, Cl. 564-475.000.
Masuda, Youichi, to Kabushiki Kaisha Toshiba. Modulator and transmitter. 5,016,260, Cl. 375-66.000.
Masuhara, Kenichi: *See—*
Moriizumi, Shuichi; Masuhara, Kenichi; Yamabe, Hidetoshi; Tomosue, Takao; Mori, Kouji; and Kaneko, Hisaharu, 5,015,531, Cl. 428-463.000.
Masumoto, Tsuyoshi: *See—*
Yamagata, Hiroshi, 5,015,308, Cl. 148-403.000.
Masumura, Hitoshi: *See—*
Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi; and Ito, Takashi, 5,015,332, Cl. 159-4.200.
Masuzawa, Shigeaki; and Komaki, Shigeki, to Sharp Kabushiki Kaisha. Electronic card reading device. 5,015,830, Cl. 235-441.000.
Mather Seal Company: *See—*
Jay, Richard D., 5,015,001, Cl. 277-37.000.
Mathieu, Bernd; Rinck, Michael; Schnur, Jurgen; Selzer, Dieter; and Weber, Wolfram, to Fresenius AG. Closure cap for dialyzers. 5,015,374, Cl. 210-232.000.
Mathur, Leo K.: *See—*
Franz, Michel; Jans, Michel; Mathur, Leo K.; Shah, Kamlesh B.; and Truelove, James E., 5,015,481, Cl. 424-494.000.
Matijevic, Egon, to Clarkson University. Process for synthesis of uniform colloidal particles of rare earth oxides. 5,015,452, Cl. 423-263.000.
Matrix Integrated Systems: *See—*
Powell, Gary B., 5,015,331, Cl. 156-643.000.
Matsubara, Toshiyuki: *See—*
Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Takahira, Kenichi; Fujioka, Shuzo; and Matsubara, Toshiyuki, 5,016,212, Cl. 364-900.000.
Matsuda, Toshiro, to Nissan Motor Co., Ltd. Driving torque distribution control system for 4WD vehicle. 5,014,809, Cl. 180-248.000.
Matsuda, Yusaku, to Sanwa Diamond Industrial Co., Ltd. Cutter. 5,014,678, Cl. 125-15.000.
Matsuhisa, Tadaaki; and Hayakawa, Issei, to NGK Insulators, Ltd. High hardness silicon nitride sintered bodies. 5,015,608, Cl. 501-97.000.
Matsui, Takayuki; Okuyama, Toshiaki; Tobari, Kazuaki; Kubota, Yuzuru; and Takahashi, Junichi, to Hitachi, Ltd. Parallel multi-inverter system and motor drive system using the same. 5,016,158, Cl. 363-71.000.
Matsumoto, Akio: *See—*
Fujiwara, Takuji; Waseda, Koji; and Matsumoto, Akio, 5,014,575, Cl. 74-866.000.
Matsumoto, Osamu: *See—*
Murakami, Hiroaki; and Matsumoto, Osamu, 5,015,890, Cl. 307-530.000.
Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, to Brother Kogyo Kabushiki Kaisha. Optical reader having apparatus for discrimination between dither-matrix and non-dither-matrix reading areas, and/or means for determining light emitter drive power values by using reference reflector surface. 5,016,117, Cl. 358-456.000.
Matsumoto, Yasuyo, to Sumitomo Electric Industries, Ltd. Solder-enclosing heat-shrinkable tube. 5,015,512, Cl. 428-35.100.
Matsumura, Hidekazu: *See—*
Suzuki, Tadato; Yorimoto, Yoshikazu; Matsumura, Hidekazu; and Hirano, Seiji, 5,015,834, Cl. 235-493.000.
Matsumura, Koji: *See—*
Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.
Matsumura, Masami: *See—*
Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi; and Matsumura, Masami, 5,015,056, Cl. 350-96.150.
Matsunaga, Fujihisa: *See—*
Araki, Shintaro; Matsunaga, Fujihisa; and Fukuhara, Hiroshi, 5,015,786, Cl. 568-798.000.
Matsunaga, Kaori E.: *See—*
Wurst, Stephen G.; and Matsunaga, Kaori E., 5,015,083, Cl. 350-618.000.
Matsunaga, Masaji: *See—*
Hirao, Sumio; Matsunaga, Masaji; and Yamada, Yoshihiro, 5,014,604, Cl. 92-212.000.
Matsunawa, Masahiko; and Katoh, Hiroshi, to Konica Corporation. Apparatus for color processing specifically inside or outside a detected region. 5,016,096, Cl. 358-75.000.
Matsuoka, Hiroshi, to Isuzu Motors Limited. Heat-insulating structure of swirl chamber. 5,014,664, Cl. 123-271.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Ito, Yufuko; Koseki, Hideo; Kawamura, Toshio; and Tsukikawa, Yasuhiko, 5,014,646, Cl. 118-725.000.
Kasai, Isao; Yamaguchi, Kimiaki; Sakai, Shinichi; Murakami, Susumu; Isono, Tatsuji; and Hatagawa, Toyotsugu, 5,015,812, Cl. 219-10.55B.
Kimoto, Takayuki; Sunohara, Masaaki; Inoue, Takashi; Nakamura, Shoji; and Yonetani, Daijirou, 5,015,280, Cl. 65-307.000.
Koshiba, Nobuharu; Nishino, Shuichi; Takata, Kenichi; and Ikehata, Toshihiko, 5,015,547, Cl. 429-194.000.
Ogawa, Kazufumi, 5,015,559, Cl. 430-326.000.
Saka, Hiroshi, 5,015,976, Cl. 333-204.000.
Tanaka, Shinichi; Ishibashi, Hiromichi; Akira, Mitsubara; and Okada, Tsuyoshi, 5,016,258, Cl. 375-25.000.
Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; and Kugimiya, Kouichi, 5,016,137, Cl. 361-321.000.
Matsushita, Tsukasa; and Kumamoto, Hidechika, to Mita Industrial Co., Ltd. Image forming apparatus. 5,016,194, Cl. 364-519.000.
Matsuura, Hitoshi; and Tsukamoto, Osamu, to Fanuc Ltd. Contour profiling machine. 5,015,130, Cl. 409-80.000.
Matsuya, Tatsuyuki: *See—*
Harima, Toshio; Sato, Kenichi; and Matsuya, Tatsuyuki, 5,014,836, Cl. 192-58.00B.

Matsuzaki, Masanobu: *See—*
Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.
Matsuzawa, Soichiro, Takeya, Fuminori; and Terada, Nobuhiro, to NGK Insulators, Ltd. Method for producing a magnetic head core. 5,014,414, Cl. 29-603.000.
Mattei, Jacqueline: *See—*
Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., 5,015,578, Cl. 435-119.000.
Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, to Robert Bosch GmbH. Method for controlling the release of passenger restraint systems. 5,014,810, Cl. 180-268.000.
Mattes, Bernhard: *See—*
Drobny, Wolfgang; Mattes, Bernhard; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,015,870, Cl. 307-66.000.
Matthaei, Hans-Detlef: *See—*
Sommer, Herbert; Hartwig, Jurgen; and Matthaei, Hans-Detlef, 5,015,635, Cl. 514-144.000.
Matthews, Dennis L.: *See—*
Rosen, Mordecai D.; and Matthews, Dennis L., 5,016,250, Cl. 372-5.000.
Matthews, Gregory D.; and Asars, Juris A., to Westinghouse Electric Corp. Sense wire signal enhancements for insulation defect detection. 5,015,959, Cl. 324-557.000.
Matulich, Dan S.: *See—*
Thomson, Mark W.; and Matulich, Dan S., 5,014,518, Cl. 62-88.000.
Matumori, Shigeru. Shooting coat for absorbing shock of shooting. 5,014,358, Cl. 2-94.000.
Matumoto, Tutomu; and Imai, Hideki, to Kabushiki Kaisha Advance. Common cryptokey generation system and communication system using common cryptokeys. 5,016,276, Cl. 380-45.000.
Matumura, Tooru, to Tonen Sekiyukagagaku K.K. Polyolefin composition. 5,015,679, Cl. 524-99.000.
Matuschek, Ulrich; and Zimmermann, Martin. Process and device for regulation of resistance or arc welding processes. 5,015,815, Cl. 219-110.000.
Matusov, Jury I.: *See—*
Ermilov, Igor V.; Matusov, Jury I.; and Mescheryakov, Evgeny V., 5,016,088, Cl. 357-76.000.
Maul, Gary P., to Vining Industries, Inc. Process for applying a protective coating to handles. 5,015,496, Cl. 427-54.100.
Maurin, Bruno; and Piera, Henri, to SEB S.A. Smoothing iron having screen printed enamel strips wider at the front and narrower at the rear of the pressing sole surface. 5,014,454, Cl. 38-93.000.
Maus, Otfried, to Schenck Auto-Services-Gerate GmbH. Balancing machine support and method. 5,014,426, Cl. 29-897.300.
Maus, Steven M.; and Galic, George J., to Galic Maus Ventures. Precision single cavity and multicavity plastic injection molding via an adaptive mold process. 5,015,426, Cl. 264-40.500.
Maxpro Helmets, Inc.: *See—*
Schulz, Arthur M., 5,014,365, Cl. 2-412.000.
Maxson, Richard C.: *See—*
Evans, Thomas W.; Norell, Robert G.; Uban, Stephen A.; and Maxson, Richard C., 5,015,383, Cl. 210-497.100.
May, David G. Floatable retainer for eyeglasses. 5,015,085, Cl. 351-43.000.
Maybrey, John G.; and Harvey, George R., to Stelco Inc. Frame-mounted entry guide system. 5,014,534, Cl. 72-250.000.
Mayer, Edward E.: *See—*
Anderson, Carl P.; and Mayer, Edward E., 5,014,972, Cl. 271-3.100.
Mayer, Jean M.; and Kaplan, David L., to United States of America, Army. Method of forming a crosslinked chitosan polymer and product thereof. 5,015,293, Cl. 106-162.000.
Mayer, Udo: *See—*
Bruder, Horst; Dyllick-Brenzinger, Rainer; Mayer, Udo; and Bares, Steven J., 5,015,292, Cl. 106-22.000.
Mayle, Robert L. One-piece self-covering termination bar. 5,014,486, Cl. 52-717.100.
Mazda Motor Corporation: *See—*
Fujiwara, Takuji; Waseda, Koji; and Matsumoto, Akio, 5,014,575, Cl. 74-866.000.
Ohshima, Hirofumi; Sato, Masanori; and Isayama, Kazuo, 5,014,659, Cl. 123-195.00H.
Takato, Koji; and Chiba, Hironobu, 5,014,817, Cl. 181-254.000.
Takeda, Toshio, 5,014,674, Cl. 123-520.000.
Takehara, Shin; and Morita, Toshiki, 5,015,006, Cl. 280-707.000.
Mazza, Lawrence T.; and Heindl, Raymond A., to General Electric Company. Electric discharge lamp and thermal switch starter means therefor. 5,015,916, Cl. 315-47.000.
McCabe, Dennis: *See—*
Christou, Paul; McCabe, Dennis; Swain, William F.; and Barton, Kenneth A., 5,015,580, Cl. 435-172.300.
McCain Manufacturing Corporation: *See—*
Higgins, George D.; and Nelson, Thomas A., Jr., 5,014,979, Cl. 271-104.000.
McCallister, John. Golf putter with swing directing cues. 5,014,992, Cl. 273-164.000.
McCallum, Nena M.: *See—*
Krause, Larry J.; and McCallum, Nena M., 5,015,538, Cl. 428-626.000.
McCarthy, Michael D., to Metko, Inc. Conveyor with rigidly locked sections. 5,014,845, Cl. 198-735.200.
McClaflin, James K., to Boeing Company, The. Removable seal for discontinuities in aircraft skin. 5,014,934, Cl. 244-132.000.
McClure, D. Craig, to Marathon Oil Company. Sequentially flooding an oil-bearing formation with a surfactant and hot aqueous fluid. 5,014,783, Cl. 166-252.000.
McConnell, Nina M.: *See—*
Goze, Jean M.; Bernhardt, Randal J.; Sajic, Branko; Rockwell, Ned M.; McConnell, Nina M.; and Mohring, William R., 5,015,415, Cl. 252-547.000.
McCoy, Christopher: *See—*
Bolejack, Kevin J.; Forgnone, Frederick; and McCoy, Christopher, 5,014,495, Cl. 53-433.000.
McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Hall, David M., to Dow Chemical Company, The. Multicomponent fibers, films and foams. 5,015,522, Cl. 428-312.200.
McCurley, Marian F.: *See—*
Seitz, William R.; and McCurley, Marian F., 5,015,843, Cl. 250-227.210.
McDonald, Christine A.: *See—*
Collison, Mark W.; Farver, Terry F.; McDonald, Christine A.; Herald, Paula J.; and Monticello, Daniel J., 5,015,487, Cl. 426-332.000.
McDonald, Robert R.: *See—*
Tiegs, Terry N.; and McDonald, Robert R., 5,015,290, Cl. 75-232.000.
McDonnell Douglas Corporation: *See—*
Bowden, David M., 5,015,440, Cl. 419-31.000.
Griffin, Bruce M.; Werkema, Robert G.; and Watt, Elbert D., 5,015,322, Cl. 156-345.000.
McDuff, Frank M.: *See—*
Lane, George R.; and McDuff, Frank M., 5,014,470, Cl. 52-23.000.
McEllhenney, Colburn; and Hess, Edwin A., to Hess Machine Company. Apparatus and method for the treatment of water with ozone. 5,015,394, Cl. 210-744.000.
MCF Systems, Inc.: *See—*
Fleck, Steven W., 5,015,375, Cl. 210-232.000.
McFay, Dennis J.: *See—*
Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., 5,015,698, Cl. 525-391.000.
McGee, Donovan E.: *See—*
Howard, Thomas A.; and McGee, Donovan E., 5,014,420, Cl. 29-846.000.
McGough, Jeffrey D.; and Brinson, Gail L., to Freedom Machine, Inc. Pneumatic inflation device. 5,015,233, Cl. 604-97.000.
McGrath, James J. Snowshoe. 5,014,450, Cl. 36-124.000.
McGuire, Michael D. Chain lock for sliding door. 5,015,022, Cl. 292-278.000.
McGuire- Nicholas Company, Inc.: *See—*
Seber, Brett P., 5,014,636, Cl. 112-419.000.
McIntyre, Harry J., to Xerox Corporation. Folded cascode amplifier. 5,015,966, Cl. 330-253.000.
McKay, Geoffrey H.; Candelora, Andrew M.; and Guerrette, Michael C., to General Electric Company. Circuit breaker positive trip indication spring. 5,015,977, Cl. 335-17.000.
McLaughlin, Carol F.; Taylor, Ronald R.; Williams, William D.; and Steusloff, Patrick M., to Pyxis Corporation. Medication dispenser station. 5,014,875, Cl. 221-2.000.
McLaughlin, Paul F.: *See—*
Massey, W. Russell, Jr.; Drobish, Renee; and McLaughlin, Paul F., 5,016,244, Cl. 370-16.000.
McLeod, Paul C. Knee loading and testing apparatus and method. 5,014,719, Cl. 128-774.000.
McMahon, Michael J., to Zip-Pak, Incorporated. Method and apparatus for smoothing of bag making material in form, fill and seal machines. 5,014,497, Cl. 53-451.000.
McMahon, Michael J., to Illinois Tool Works. Web control means and method for bag making machine. 5,014,498, Cl. 53-451.000.
McMurtry, David R.; Robertson, John P.; and Darlington, Alan D., to Renishaw plc. Co-ordinate measuring. 5,016,199, Cl. 364-560.000.
McNamara, William J. Mechanism for detaching blade segments from a segmented knife blade. 5,014,429, Cl. 30-162.000.
McQuigg, Donald W.; Webb, Heather K.; and Sowers, Edward E., to Reilly Industries, Inc.,. Polymer-supported 4-(N-benzyl-N-methylamino)pyridine catalyst and process for same. 5,015,706, Cl. 526-200.000.
Meacham, G. B. Kirby, to nuArc Company, Inc. Light-modifying apparatus for exposure devices. 5,016,047, Cl. 355-71.000.
Mead Corporation, The: *See—*
Walowit, Eric; and Sexton, Gregory J., 5,015,277, Cl. 55-385.100.
York, Brian K., 5,015,011, Cl. 281-18.000.
Measurement Specialties, Inc.: *See—*
Germanton, Damon; and Lehr, Menahem, 5,014,793, Cl. 173-12.000.
Mecaplastic: *See—*
Robache, Patrick, 5,014,500, Cl. 53-559.000.
MECT Corporation: *See—*
Ogasawara, Sadanori; Abiko, Kenji; Ito, Masayoshi; and Shitori, Yoshiyasu, 5,015,631, Cl. 514-53.000.
Medernach, John W.: *See—*
Guilinger, Terry R.; Jones, Howland D. T.; Kelly, Michael J.; Medernach, John W.; Stevenson, Joel O.; and Tsao, Sylvia S., 5,015,346, Cl. 204-129.100.
Medicorp Holding S.A.: *See—*
Meyer, Gabriel; and Howald, Ernst, 5,015,229, Cl. 604-90.000.

VOL
1126
ISS
2
MY
14
1991
UMI

- Medtronic, Inc.: *See—*
  - Mehra, Rahul, 5,014,696, Cl. 128-419.00D.
- Meeker, John G. Wall shield and chimney support. 5,014,684, Cl. 126-531.000.
- Mego Afek Industrial Measuring Instruments: *See—*
  - Heeman, Avraham; and Broeren, Johannes H., 5,014,681, Cl. 128-64.000.
- Mehlberg, Robert L.: *See—*
  - Walker, Robert H.; Willems, Paul A.; Huff, George A.; Grimes, Lewis E.; Tatterson, David F.; and Mehlberg, Robert L., 5,015,799, Cl. 585-500.000.
- Mehra, Rahul, to Medtronic, Inc. Endocardial defibrillation electrode system. 5,014,696, Cl. 128-419.00D.
- Meier, Heinrich: *See—*
  - Holzbach, Wolfgang; Boltze, Carsten; Kramer, Karl-Heinz; and Meier, Heinrich, 5,014,759, Cl. 152-427.000.
- Meier, Helmut-Martin; Pielartzik, Harald; and Brinkmeyer, Hermann, to Bayer Aktiengesellschaft. Unsaturated polyester resins containing thermotropic polymers, a process for their preparation and their use for the production of moulded bodies. 5,015,689, Cl. 525-43.000.
- Meininger, Fritz, to Hoechst Aktiengesellschaft. Water soluble copper-complex phenylazonaphthyl and naphthylazonaphthyl compounds containing as fibre-reactive groups a chloro-triazinyl group and a group of the vinylsulfone series, suitable as dyestuffs. 5,015,732, Cl. 534-622.000.
- Melara, Francescantonio, to Emilsider Meccanica S.p.A. Self-orientatable twin wheel of the kind comprising a pair of coaxial wheels. 5,014,392, Cl. 16-46.000.
- Melcher, James R., to Massachusetts Institute of Technology. Apparatus and methods for measuring permeability and conductivity in materials using multiple wavenumber magnetic interrogations. 5,015,951, Cl. 324-232.000.
- Melchior, Jean F. Two-stroke internal combustion engine and cylinder head for the latter. 5,014,663, Cl. 123-257.000.
- Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M. Device for expanding pipes. 5,014,779, Cl. 166-55.700.
- Melis, Janis: *See—*
  - Vila-Masot, Oscar; and Melis, Janis, 5,015,919, Cl. 315-86.000.
- Mello Manufacturing, Inc.: *See—*
  - Perry, Timothy J., 5,015,274, Cl. 55-97.000.
- Menard, Paul R.: *See—*
  - Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 5,015,663, Cl. 514-510.000.
- Mercer, Joseph B., to Plastic Packing, Inc. Side loadable bag. 5,015,103, Cl. 383-10.000.
- Mercer, William B.; Cardarelli, Nathan F.; and Henry, Richard L., to United States of America, Navy. Toxin containing perforated anti-fouling polymer nozzle grommet. 5,015,372, Cl. 210-170.000.
- Merck & Co., Inc.: *See—*
  - Chen, Shieh-Shung T., 5,015,662, Cl. 514-450.000.
  - Fisher, Michael H.; and Mrozik, Helmut, 5,015,630, Cl. 514-30.000.
- Merck Patent Gesellschaft mit beschranker Haftung: *See—*
  - Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, 5,015,747, Cl. 556-1.000.
- Meredith/Burda Company: *See—*
  - Hamricke, Kevin K., 5,014,975, Cl. 271-202.000.
- Merl, Milton, to Marlboro Marketing, Inc. Adjustable display arm assembly. 5,014,954, Cl. 248-285.000.
- Merritt, John H., III; and Margerum, Edwin O., to Ford New Holland, Inc. Twine wrapper trip mechanism. 5,014,613, Cl. 100-5.000.
- Mertens, Josephus C.: *See—*
  - Kennis, Ludo E. J.; Vandenberk, Jan; and Mertens, Josephus C., 5,015,740, Cl. 544-366.000.
- Mescheryakov, Evgeny V.: *See—*
  - Ermilov, Igor V.; Matusov, Jury I.; and Mescheryakov, Evgeny V., 5,016,088, Cl. 357-76.000.
- Messerschmitt-Boelkow-Blohm GmbH: *See—*
  - Lifka, Hans, 5,014,508, Cl. 60-224.000.
- Messerschmitt-Bolkow-Blohm GmbH: *See—*
  - Moggert, Wolf-Dieter, 5,014,590, Cl. 89-1.570.
- Messner, Rudolf, to Parkson Corporation. Diffusion device. 5,015,421, Cl. 261-122.000.
- Mestas, Jean-Louis: *See—*
  - Cathignol, Dominique; Lacruche, Bernard; and Mestas, Jean-Louis, 5,015,929, Cl. 310-335.000.
- Mestemaker, Jerry L.: *See—*
  - Vara, Tomas E.; Mestemaker, Jerry L.; and Thakker, B. R., 5,015,365, Cl. 208-262.100.
- Metallgesellschaft Aktiengesellschaft: *See—*
  - Zapke, Klaus; and Loffler, Johannes, 5,014,744, Cl. 137-614.210.
- Metko, Inc.: *See—*
  - McCarthy, Michael D., 5,014,845, Cl. 198-735.200.
- Mettivier, Francine: *See—*
  - Constantin, Daniel; Fert, Jean-Jacques; and Mettivier, Francine, 5,014,501, Cl. 53-173.000.
- Meunchen, Paul K.; and Durkin, Edward T., to Kendall Company, The. Hand brace. 5,014,689, Cl. 128-77.000.
- Meunier, Paul-Louis: *See—*
  - Castera, Jean-Paul; Meunier, Paul-Louis; Carenco, Alain; Dupont, Jean-Marie; and Friez, Pierre, 5,015,051, Cl. 350-96.120.
- Meunier, Thierry; and Jaffard, Jean L., to SGS-Thomson Microelectronics S.A. Coil switching device. 5,016,122, Cl. 360-62.000.
- Meurtin, Michel, to Turbomeca. Process and apparatus for monitoring monocrystalline structures with images of Kikuchi pseudo-lines. 5,016,266, Cl. 378-73.000.
- Meyer, Bernd: *See—*
  - Lang, Rudiger; and Meyer, Bernd, 5,015,606, Cl. 501-84.000.
- Meyer, Gabriel; and Howald, Ernst, to Medicorp Holding S.A. Device for dispensing liquids. 5,015,229, Cl. 604-90.000.
- Meyer, Gary L.: *See—*
  - Ohman, Lachlan; and Meyer, Gary L., 5,014,950, Cl. 248-231.500.
- Meyer, Hal G., to Precision Governors, Inc. Electro-hydraulic control system for governors. 5,014,667, Cl. 123-360.000.
- Meyer, Urs: *See—*
  - Oehler, Reinhard; Meyer, Urs; and Lattion, Andre, 5,015,938, Cl. 318-696.000.
- Meyrat, Pierre-Andre ; Oppliger, Alain; and Steiner, Denis, to Nivarox-FAR S.A. Method and apparatus for filtering and metering liquid samples. 5,015,591, Cl. 436-178.000.
- MGM Services, Inc.: *See—*
  - Neumann, Rodney H.; and Allison, Charles B., 5,016,197, Cl. 364-550.000.
- Micali, Silvio; Goldreich, Oded; and Even, Shimon. On-line/off-line digital signing. 5,016,274, Cl. 380-23.000.
- Michael Horauf Maschinenfabrik GmbH & Co. KG: *See—*
  - Markert, Eberhard, 5,014,973, Cl. 271-100.000.
- Michaud, Alain: *See—*
  - Nattel, William; and Michaud, Alain, 5,015,804, Cl. 174-65.0SS.
- Michelsen, Jeffrey M.: *See—*
  - Nolan, James B.; and Michelsen, Jeffrey M., 5,016,219, Cl. 365-195.000.
- Michelson, Gary K. Threaded spinal implant. 5,015,247, Cl. 606-61.000.
- Micron Technology, Inc.: *See—*
  - Waller, William K., 5,015,883, Cl. 307-465.000.
- Midwest Instrument Co., Inc.: *See—*
  - Falk, Richard A.; Janicsek, Larry; Boron, Joseph; and Colzani, James, 5,014,561, Cl. 73-864.530.
- Mifune, Hiroyuki: *See—*
  - Suga, Shuzo; Shishido, Tadao; Mifune, Hiroyuki; and Kawashima, Yoshiro, 5,015,567, Cl. 430-567.000.
- MIG VAC Inc.: *See—*
  - Mann, Robert N., 5,015,822, Cl. 219-137.410.
- Mignani, Gerard: *See—*
  - Ardaud, Pierre; LeBrun, Jean-Jacques; and Mignani, Gerard, 5,015,607, Cl. 501-96.000.
- Mikami, Seishin: *See—*
  - Kodera, Masao; Sasaki, Kunihiko; Mikami, Seishin; and Utsu, Jyunshi, 5,016,017, Cl. 342-106.000.
- Mikhail, Ameer G., to United States of America, Army. Kinetic energy projectile with impact-ejected fins. 5,014,931, Cl. 244-3.250.
- Mikhailin, Jury G.: *See—*
  - Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M., 5,014,779, Cl. 166-55.700.
- Miki, Keiko: *See—*
  - Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.
- Milani, Federico; Massari, Paola; and Lori, Domenico, to Montedison S.p.A. Polyolefinic compositions with a high impact strength. 5,015,694, Cl. 525-240.000.
- Millay, Jack M.; and Walloch, Richard A., to SpaceLabs, Inc. Method and apparatus for distinguishing between accurate and inaccurate blood pressure measurements in the presence of artifact. 5,014,714, Cl. 128-672.000.
- Miller, John B. Method for electrochemical treatment of porous building materials, particularly for drying and re-alkalization. 5,015,351, Cl. 204-182.200.
- Miller, Larry C. Pediatric immobilization device. 5,014,724, Cl. 128-870.000.
- Miller, Larry D.; and Billingsley, Michael A. Wedgie. 5,014,945, Cl. 248-188.400.
- Miller, Lindy F.: *See—*
  - Christian, Lauren L.; and Miller, Lindy F., 5,015,626, Cl. 514-12.000.
- Miller, Paul D. Modular loose leaf binder system and a binder ring used therein. 5,015,114, Cl. 402-4.000.
- Miller, Paul R.: *See—*
  - Broering, Louis C.; and Miller, Paul R., 5,014,509, Cl. 60-274.000.
- Miller, Trone L.: *See—*
  - Dilts, Robert B.; and Miller, Trone L., 5,016,213, Cl. 364-900.000.
- Miller, Wally: *See—*
  - Hanson, James M., 5,014,359, Cl. 2-94.000.
- Millett, Claude R.: *See—*
  - Kozyrski, Vincent T.; and Millett, Claude R., 5,014,436, Cl. 33-27.030.
- Milliken Research Corporation: *See—*
  - Gilpatrick, Michael W., 5,015,849, Cl. 250-302.000.
- Milner, Thomas E.: *See—*
  - Kowalski, Frank V.; and Milner, Thomas E., 5,015,096, Cl. 356-371.000.
- Milwaukee Valve Company, Inc.: *See—*
  - Roberts, John L., 5,014,528, Cl. 70-177.000.
- Mimata, Tsutomu; Uematsu, Toshihide; and Tabata, Katsuhiro, to Hitachi, Ltd. Manufacturing apparatus. 5,015,425, Cl. 264-39.000.

- Mims, Charles A.: *See—*
  - Jacobson, Allan J.; Hall, Richard B.; Mims, Charles A.; and Lewandowski, Joseph T., 5,015,461, Cl. 423-593.000.
- Minagawa, Tsutomu; Ohhashi, Masahide; and Kai, Naoyuki, to Kabushiki Kaisha Toshiba. Pattern data generating system. 5,016,001, Cl. 340-747.000.
- Minari, Katsunobu: *See—*
  - Sakai, Tadashi; Minari, Katsunobu; and Ohta, Hideji, 5,014,521, Cl. 62-212.000.
- Minato, Yukio, to NEC Corporation. Semiconductor memory device. 5,016,075, Cl. 357-35.000.
- Mine, Koichi; Kikuta, Hikaru; Takeuchi, Hitoshi; and Kamiya, Kingo, to Aisan Kogyo Kabushiki Kaisha. Fuel pump. 5,015,159, Cl. 417-366.000.
- Minefuji, Nobutaka, to Asahi Kogaku Kogyo Kabushiki Kaisha. Copying lens system. 5,015,079, Cl. 350-470.000.
- Mingazov, Salikhzyan M.: *See—*
  - Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M., 5,014,779, Cl. 166-55.700.
- Minnesota Mining and Manufacturing Company: *See—*
  - Duchesne, Denis; and Johnon, Bryce V., 5,015,693, Cl. 525-187.000.
  - Krause, Larry J.; and McCallum, Nena M., 5,015,538, Cl. 428-626.000.
  - Martens, John A., 5,015,556, Cl. 430-306.000.
  - Randklev, Ronald M., 5,015,180, Cl. 433-9.000.
- Mino, Kouichi: *See—*
  - Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.
- Minolta Camera Co., Ltd.: *See—*
  - Kato, Osami; Tsukamoto, Tsutomu; and Saitoh, Takanori, 5,014,929, Cl. 242-195.000.
  - Taniguchi, Nobuyuki; Hosomizu, Hiroshi; Tsuji, Kenji; Omaki, Takanobu; and Nakai, Masaaki, 5,016,037, Cl. 354-413.000.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Morikawa, Takeshi; Hashimoto, Kaoru; and Ideyama, Hiroyuki, 5,016,051, Cl. 355-218.000.
  - Onishi, Takashi; Hanamoto, Hiroyuki; Miyamoto, Hirohisa; and Yoshida, Keiji, 5,016,049, Cl. 355-203.000.
  - Shimada, Takahisa; and Tanii, Junichi, 5,016,031, Cl. 354-173.100.
  - Ueda, Toshihiko, 5,015,077, Cl. 350-426.000.
- Miram, George V.; and Mizuhara, Yosuke M., to Varian Associates, Inc. Fast warm-up cathode for high power vacuum tubes. 5,015,908, Cl. 313-37.000.
- Mirando, Salvatore V.; and Lee, Walter, to SMS Manufacturing Corporation. Poker roll game. 5,014,988, Cl. 273-125.00A.
- Mirando, Salvatore V.; and Lee, Walter, to SMS Manufacturing Co., Ltd. Amusement game. 5,014,991, Cl. 273-138.00A.
- Misawa, Junichi: *See—*
  - Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,014,799, Cl. 177-211.000.
- Misawa Shokai Co., Ltd.: *See—*
  - Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,014,799, Cl. 177-211.000.
- Missele, Carl: *See—*
  - Cygan, Lawrence F.; Granberg, Helge O.; Bickham, Richard S.; and Missele, Carl, 5,015,972, Cl. 333-32.000.
- Mistvurik, John D.: *See—*
  - Goodwin, Brent E.; Karn, Donald L.; Mistvurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,015,324, Cl. 156-384.000.
- Misumi, Teruyuki: *See—*
  - Yamamoto, Fumihiko; and Misumi, Teruyuki, 5,015,707, Cl. 526-212.000.
- Mita Industrial Co., Ltd.: *See—*
  - Matsushita, Tsukasa; and Kumamoto, Hidechika, 5,016,194, Cl. 364-519.000.
  - Nakajima, Yoshihiro; Onishi, Kunihiro; and Takada, Akihiro, 5,016,057, Cl. 355-282.000.
- Mita, Izumi: *See—*
  - Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
- Mitch, David S.: *See—*
  - Guzzetta, Franklin H.; Gibson, Alan F.; and Mitch, David S., 5,015,341, Cl. 204-28.000.
- Mitchell, James L., to Ridewell Corporation. Elevating, reversible self-steering suspension system. 5,015,004, Cl. 280-81.600.
- Mitchell, Richard J.: *See—*
  - Winchell, David A.; and Mitchell, Richard J., 5,014,750, Cl. 138-43.000.
- Mitchen, Joel R., to Safety Diagnostics, Inc. Blood collection and testing method. 5,014,718, Cl. 128-771.000.
- Mitsubishi Denki K.K.: *See—*
  - Suzuki, Hiroyoshi; Ogawa, Kenji; and Maekawa, Hiroko, 5,015,091, Cl. 356-135.000.
- Mitsubishi Denki Kabushiki Kaisha: *See—*
  - Hamada, Tomohiro, 5,014,806, Cl. 180-197.000.
  - Ishii, Mitsuo; and Nishihara, Hidenori, 5,016,083, Cl. 357-71.000.
  - Isozumi, Shuzoo, 5,014,563, Cl. 74-7.00R.
  - Isozumi, Shuzou, 5,015,899, Cl. 310-83.000.
  - Kimura, Masatoshi; and Hayamizu, Kohichi, 5,016,223, Cl. 365-229.000.
  - Koiwa, Mitsuru, 5,014,675, Cl. 123-609.000.
  - Kubota, Masayuki, 5,016,253, Cl. 372-50.000.
  - Morishita, Hiroaki, 5,015,814, Cl. 219-69.120.
  - Nakao, Shin, 5,016,084, Cl. 357-72.000.
  - Sano, Kinjiro; Kamata, Toyokazu; Fukuyama, Keiji; Saito, Masato; and Watanabe, Keiji, 5,015,497, Cl. 427-77.000.
  - Sugiyama, Takeshi; and Morishita, Akira, 5,014,562, Cl. 74-6.000.
  - Sugiyama, Takeshi, 5,015,980, Cl. 335-126.000.
  - Suzuki, Shigehiko, 5,014,825, Cl. 187-104.000.
  - Tadokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, 5,016,232, Cl. 369-13.000.
  - Tanizawa, Kazuo; and Nakagawa, Jun, 5,014,484, Cl. 52-646.000.
  - Yamada, Katsuyoshi; and Arai, Tsutomu, 5,015,813, Cl. 219-10.55F.
  - Yamagata, Tadato, 5,016,220, Cl. 365-201.000.
  - Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Takahira, Kenichi; Fujioka, Shuzo; and Matsubara, Toshiyuki, 5,016,212, Cl. 364-900.000.
  - Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi; and Matsumura, Masami, 5,015,056, Cl. 350-96.150.
- Mitsubishi Electric Home Appliance Co., Ltd.: *See—*
  - Yamada, Katsuyoshi; and Arai, Tsutomu, 5,015,813, Cl. 219-10.55F.
- Mitsubishi Gas Chemical Company Ltd.: *See—*
  - Takada, Toshiaki; Kinugawa, Tadami; Yamaguchi, Katsuhiro; Tanabe, Kou; and Nakano, Hiroyuki, 5,015,670, Cl. 523-214.000.
- Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Yamana, Shinji; Nakamura, Mikio; and Tsuzuki, Akihiro, 5,014,405, Cl. 29-33.00R.
- Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
  - Toyoda, Ichiro; Niinomi, Toshihiko; Kaseda, Shigeru; and Takahashi, Koichi, 5,016,186, Cl. 364-507.000.
- Mitsubishi Kasei Corporation: *See—*
  - Fujii, Toshio; Kato, Kazuhiro; Suzuki, Tasuku; and Kashino, Minoru, 5,015,521, Cl. 428-220.000.
  - Takahashi, Nobumitsu; and Yoshie, Kenichi, 5,015,282, Cl. 71-65.000.
- Mitsubishi Kinzoku Kabushiki Kaisha: *See—*
  - Yato, Tadao; Onoue, Takeshi; and Tanaka, Hiroshi, 5,015,422, Cl. 264-0.500.
- Mitsubishi Rayon Company, Ltd.: *See—*
  - Kobayashi, Yukio; Nagai, Shoichi; Takesue, Masatoshi; Aosai, Fumito; and Inoue, Masao, 5,015,524, Cl. 428-332.000.
- Mitsui, Hiroyuki: *See—*
  - Murata, Kunihiko; Morii, Satoshi; Iwasaki, Toshiaki; and Mitsui, Hiroyuki, 5,014,633, Cl. 112-121.120.
- Mitsui Kinzoku Kogyo Kabushiki Kaisha: *See—*
  - Mizuki, Tetsuro, 5,015,020, Cl. 292-216.000.
- Mitsui Petrochemical Industries Inc.: *See—*
  - Araki, Shintaro; Matsunaga, Fujihisa; and Fukuhara, Hiroshi, 5,015,786, Cl. 568-798.000.
- Mitsui Petrochemical Industries, Ltd.: *See—*
  - Kioka, Mamoru; Nakano, Masao; Doi, Kenji; and Toyota, Akinori, 5,015,612, Cl. 502-133.000.
  - Yagi, Kazuo; and Takeda, Hiroyuki, 5,015,525, Cl. 428-364.000.
- Mitsui Toatsu Chemicals, Incorporated: *See—*
  - Kambara, Yoshihiko; Oonaka, Itsuo; Asao, Koichi; and Fukushima, Kyoko, 5,015,766, Cl. 564-127.000.
  - Machida, Koichi; Kitahara, Mikio; Kubo, Takayuki; Torikai, Motoyuki; and Asahina, Koutarou, 5,015,674, Cl. 523-435.000.
  - Suekane, Ariko; Yamazaki, Fumio; and Masuda, Takayoshi, 5,015,774, Cl. 564-475.000.
- Mitsumoto, Hisashi, to Nissan Motor Company, Limited. Spark ignition timing control system for internal combustion engine adapted to mixture fuel of more than one individual fuels with fail-safe feature in case of failure of operation of sensor monitoring concentration of one of individual fuel in mixture fu. 5,014,670, Cl. 123-425.000.
- Miura, Hiroaki: *See—*
  - Inagaki, Atsushi; Hiratsuka, Koh; Miura, Hiroaki; and Saito, Yasujiro, 5,015,897, Cl. 310-83.000.
- Miura, Toru: *See—*
  - Nakajima, Takatsugu; Endo, Katsumi; and Miura, Toru, 5,016,112, Cl. 358-335.000.
- Miyake, Tetsuo: *See—*
  - Ono, Kazuya; Miyake, Tetsuo; and Kitagawa, Katsuji, 5,015,671, Cl. 523-402.000.
- Miyamoto, Hirohisa: *See—*
  - Onishi, Takashi; Hanamoto, Hiroyuki; Miyamoto, Hirohisa; and Yoshida, Keiji, 5,016,049, Cl. 355-203.000.
- Miyazaki, Koji: *See—*
  - Ueda, Tsunehisa; Miyazaki, Koji; and Natsuume, Tadao, 5,015,668, Cl. 523-102.000.
- Miyazaki, Shinji: *See—*
  - Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, 5,015,330, Cl. 156-643.000.
- Miyazawa, Takeshige; and Kawano, Kazuhiko, to Kumiai Chemical Industry Co., Ltd. Plant growth regulating composition and method for regulating growth of a plant. 5,015,283, Cl. 71-76.000.
- Mizuguchi, Koichi: *See—*
  - Murai, Masasumi; Mizuguchi, Koichi; and Nishiyama, Jun, 5,014,625, Cl. 104-292.000.
- Mizuhara, Yosuke M.: *See—*
  - Miram, George V.; and Mizuhara, Yosuke M., 5,015,908, Cl. 313-37.000.

VOL
1126
ISS
2
MY
14
1991
UMI

- Mizukami, Seishiro: *See—*
  - Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.
- Mizuki, Tetsuro, to Mitsui Kinzoku Kogyo Kabushiki Kaisha. Vehicular door locking device. 5,015,020, Cl. 292-216.000.
- Mizuno, Yutaka: *See—*
  - Inoue, Michiya; and Mizuno, Yutaka, 5,016,086, Cl. 357-74.000.
- Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, to Kuraray Co., Ltd. 11β, 17α,21-trihydroxy-1,4-pregnadiene-3,20-dione 21-[(E,E)-3,7,11-trimethyl-2,6,10-dodecatrienoate]. 5,015,746, Cl. 552-569.000.
- Mizutani, Yasukazu: *See—*
  - Ubukata, Susumu; and Mizutani, Yasukazu, 5,015,985, Cl. 337-368.000.
- Mobil Oil Corp.: *See—*
  - Anthes, Robert J.; and Kremer, Ross A., 5,015,361, Cl. 208-111.000.
  - Chin, Arthur A., 5,015,362, Cl. 208-121.000.
  - Degnan, Thomas F.; Kirker, Garry W.; Socha, Richard F.; Stapleton, Michael R.; and Johnson, Ivy D., 5,015,360, Cl. 208-110.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., 5,015,798, Cl. 585-500.000.
  - Harandi, Mohsen N.; and Owen, Hartley, 5,015,359, Cl. 208-58.000.
  - Harandi, Mohsen N., 5,015,364, Cl. 208-236.000.
  - Harandi, Mohsen N.; and Owen, Hartley, 5,015,782, Cl. 568-697.000.
  - Herrington, Fox J.; and O'Sullivan, James P., Sr., 5,014,852, Cl. 206-554.000.
  - Pelrine, Bruce P., 5,015,795, Cl. 585-330.000.
  - Shu, Paul, 5,015,400, Cl. 252-8.554.
- Moe, Michael K. Panel configurable for selective insulation or heat transmission. 5,014,481, Cl. 52-406.000.
- Moench, Jerry D.: *See—*
  - Agrawal, Om P.; Landers, George H.; Schmitz, Nicholas A.; Moench, Jerry D.; and Ilgenstein, Kerry A., 5,015,884, Cl. 307-465.000.
- Mogami, Takao: *See—*
  - Kawashima, Hiroshi; Nakashima, Mikito; and Mogami, Takao, 5,015,523, Cl. 428-336.000.
- Moggert, Wolf-Dieter, to Messerschmitt-Bolkow-Blohm GmbH. Device for ejecting submunition. 5,014,590, Cl. 89-1.570.
- Mohn, Michael F., to Betz Laboratories, Inc. Silicate coagulant aid for treatment of oily wastewaters. 5,015,391, Cl. 210-708.000.
- Mohr, Larry L.: *See—*
  - Montgomery, James R.; and Mohr, Larry L., 5,015,070, Cl. 350-163.000.
- Mohring, William R.: *See—*
  - Goze, Jean M.; Bernhardt, Randal J.; Sajic, Branko; Rockwell, Ned M.; McConnell, Nina M.; and Mohring, William R., 5,015,415, Cl. 252-547.000.
- Mojana, Corrado: *See—*
  - Traini, Carlo; Mojana, Corrado; and Gusmini, Carlo, 5,015,345, Cl. 204-98.000.
- Moldovan, Anton G., to Loral Aerospace Corp. Method of fabricating a multi-layer metal silicide infrared detector. 5,015,592, Cl. 437-4.000.
- Molecular Therapeutics, Inc.: *See—*
  - Scangos, George A.; Rae, Peter M. M.; Unterbeck, Axel J.; and Kamarck, Michael E., 5,015,570, Cl. 435-6.000.
- Moller, Per L.: *See—*
  - Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.
- Monarch Marking Systems, Inc.: *See—*
  - Goodwin, Brent E.; Karn, Donald L.; Mistvurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,015,324, Cl. 156-384.000.
- Monsanto Company: *See—*
  - Hardiman, Christopher J.; and Bowers, Gary R., 5,015,613, Cl. 502-170.000.
- Monster Cable Products, Inc.: *See—*
  - Lee, Noel M.; Herman, Rodney A.; and Crothers, Thomas J., 5,016,241, Cl. 369-289.000.
- Montedison S.p.A.: *See—*
  - Gabrielli, Giorgio; Maritano, Mauro; Motroni, Giuseppe; and Chapoy, L. Lawrence, 5,015,721, Cl. 528-190.000.
  - Milani, Federico; Massari, Paola; and Lori, Domenico, 5,015,694, Cl. 525-240.000.
- Monteith, John R.: *See—*
  - Goodwin, Brent E.; Karn, Donald L.; Mistvurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,015,324, Cl. 156-384.000.
- Monter, Robert P.; and Smith, Ronald L., to Thermacon, Inc. Apparatus for heating a mirror or the like. 5,015,824, Cl. 219-219.000.
- Montgomery, James R.; and Mohr, Larry L., to Mouse Systems Corporation. Reference grid for optical scanner. 5,015,070, Cl. 350-163.000.
- Montgomery, Robert D.: *See—*
  - Hull, Harold L.; and Montgomery, Robert D., 5,014,379, Cl. 7-127.000.
- Monticello, Daniel J.: *See—*
  - Collison, Mark W.; Farver, Terry F.; McDonald, Christine A.; Herald, Paula J.; and Monticello, Daniel J., 5,015,487, Cl. 426-332.000.
- Moog, Alfons: *See—*
  - Kapp, Wolfgang; and Moog, Alfons, 5,015,475, Cl. 424-405.000.
- Moog Controls, Inc.: *See—*
  - Perini, Richard J., 5,015,000, Cl. 277-16.000.
- Moon, Howard R.: *See—*
  - Brezette, Michael W.; Shaffer, Robert A.; Burns, Fredrick B.; and Moon, Howard R., 5,014,384, Cl. 15-230.110.
- Moore, Brian K.: *See—*
  - Hamilton, Billy E.; Moore, Brian K.; and Newton, Donald E., 5,015,273, Cl. 55-53.000.
- Moore Business Forms, Inc.: *See—*
  - Chao, Hung-Ya, 5,015,527, Cl. 428-402.210.
  - Folsom, James C., 5,014,971, Cl. 270-039.000.
- Moore, Charles F. Insulation seal for inspection holes. 5,014,866, Cl. 215-364.000.
- Moore, Kenneth P.; Ford, Brian R.; and Williams, Stephen B., to Xerox Corporation. Sheet stopping and lateral registration system. 5,014,977, Cl. 271-221.000.
- Moorehead, Robert M.: *See—*
  - Eppler, Susan G.; and Moorehead, Robert M., 5,016,281, Cl. 382-1.000.
- Moran, Edward, to Foster Wheeler Energy Corporation. Rotatable welding fixture and method for metal cladding tubular membrane panels. 5,014,901, Cl. 228-119.000.
- Moran, Kevin P.: *See—*
  - Galyon, George T.; Jordhamo, George M.; Moran, Kevin P.; and Zumbrunnen, Michael L., 5,016,090, Cl. 357-82.000.
- Moreau, Jerry P.; Bailey, August V.; and DeLucca, Anthony J., II, to United States of America, Agriculture. Fatty glycolic acid derivatives as yarn lubricants and as antimicrobial agents. 5,015,419, Cl. 260-410.90R.
- Morgan, Michael J.: *See—*
  - Grosso, Paul V.; Morgan, Michael J.; Wing, Feagin A., Jr.; and Day, Roger W., 5,015,549, Cl. 430-45.000.
- Mori, Kiyoshi, to Texas Instruments Incorporated. Vertical MOS transistor. 5,016,067, Cl. 357-23.400.
- Mori, Kiyoshi, to Texas Instruments Incorporated. Vertical floating-gate transistor. 5,016,068, Cl. 357-23.500.
- Mori, Kouji: *See—*
  - Moriizumi, Shuichi; Masuhara, Kenichi; Yamabe, Hidetoshi; Tomosue, Takao; Mori, Kouji; and Kaneko, Hisaharu. 5,015,531, Cl. 428-463.000.
- Mori, Seiichi; Takano, Masatoshi; and Ichinokawa, Kazuhiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Printer. 5,016,029, Cl. 346-160.000.
- Mori, Takaaki: *See—*
  - Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Senda, Masanobu, 5,015,075, Cl. 350-357.000.
- Morihara, Kazushige: *See—*
  - Sambayashi, Takeshi; Oushiden, Hideshi; Takaoka, Hiroaki; and Morihara, Kazushige, 5,016,052, Cl. 355-228.000.
- Morii, Satoshi: *See—*
  - Murata, Kunihiko; Morii, Satoshi; Iwasaki, Toshiaki; and Mitsui, Hiroyuki, 5,014,633, Cl. 112-121.120.
- Moriizumi, Shuichi; Masuhara, Kenichi; Yamabe, Hidetoshi; Tomosue, Takao; Mori, Kouji; and Kaneko, Hisaharu, to Lonseal Corporation & Nissin Steel Co., Ltd. Vinyl chloride-coated steel sheet. 5,015,531, Cl. 428-463.000.
- Morikawa, Takeshi; Hashimoto, Kaoru; and Ideyama, Hiroyuki, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying machine with device for shifting an image. 5,016,051, Cl. 355-218.000.
- Morimoto, Yasuaki; Schroder, Heinz J.; and Zucker, Friedhelm, to Deutsche Thomson-Brandt GmbH. Optical scanning arrangement for maintaining constant the light output of a laser beam or the laser current. 5,016,233, Cl. 369-44.130.
- Morin Freres: *See—*
  - Morin, Marcel; and Morin, Jacques, 5,014,503, Cl. 56-63.000.
- Morin, Jacques: *See—*
  - Morin, Marcel; and Morin, Jacques, 5,014,503, Cl. 56-63.000.
- Morin, Marcel; and Morin, Jacques, to Morin Freres. Corn sterilizing machine. 5,014,503, Cl. 56-63.000.
- Morisawa, Katsuhiro: *See—*
  - Oka, Koichi; Kawaguchi, Akira; Kumagai, Kunio; and Morisawa, Katsuhiro, 5,015,094, Cl. 356-336.000.
- Morishita, Akira: *See—*
  - Sugiyama, Takeshi; and Morishita, Akira, 5,014,562, Cl. 74-6.000.
- Morishita, Hiroaki, to Mitsubishi Denki Kabushiki Kaisha. Core removing device for wirecut electrical discharge machining apparatus. 5,015,814, Cl. 219-69.120.
- Morita, Toshiki: *See—*
  - Takehara, Shin; and Morita, Toshiki, 5,015,006, Cl. 280-707.000.
- Moritz, Werner, to Kabelschlepp Gesellschaft mit beschrankter Haftung. Guide chain for guiding energy lines. 5,014,506, Cl. 59-78.100.
- Moriya, Takahiko: *See—*
  - Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, 5,015,330, Cl. 156-643.000.
- Moriyama, Hiroyuki; and Nagata, Kenshi, to Omron Tateisi Electronics Co. Snap-action pushbutton switch with click sound. 5,015,811, Cl. 200-521.000.
- Morley, Darrel L.; Pierce, Wayne A.; and Willyard, James A., to Chrysler Corporation. Luggage rack for a vehicle. 5,014,893, Cl. 224-321.000.
- Morley, Lloyd F., II; and Harrod, Russell L., to Cummins Engine Company, Inc. Test apparatus for air intake manifold heater system. 5,014,549, Cl. 73-118.100.
- Morrill, Giles W. Motor support and method of making. 5,015,900, Cl. 310-91.000.

- Morrison, William A.: *See—*
  - Borom, Marcus P.; Hillig, William B.; Singh, Raj N.; Morrison, William A.; and Interrante, Leonard V., 5,015,540, Cl. 428-698.000.
- Morton, David M., to Cray Research, Inc. Board-mounted thermal path connector and cold plate. 5,014,904, Cl. 228-176.000.
- Morton International, Inc.: *See—*
  - Wardle, Robert B.; and Edwards, W. Wayne, 5,015,309, Cl. 149-19.100.
- Mosbach, Klaus H.: *See—*
  - Nilsson, Kjell; and Mosbach, Klaus H., 5,015,576, Cl. 435-70.210.
- Moser, Jay D., Sr.: *See—*
  - Tesch, Bruce J.; Moser, Jay D., Sr.; and Tam, Stephen P., 5,015,887, Cl. 307-475.000.
- Moser, Winfried: *See—*
  - Klenk, Martin; Linder, Ernst; and Moser, Winfried, 5,014,668, Cl. 123-399.000.
- Moses, William W., to University of California. Scintillator materials containing lanthanum fluorides. 5,015,860, Cl. 250-361.00R.
- Moses, William W.: *See—*
  - Derenzo, Stephen E.; and Moses, William W., 5,015,861, Cl. 250-361.00R.
- Moss, Thomas H., III; Sargent, Ralph R.; and Williams, Michael S., to Peach State Labs, Inc. Stain resistant polymeric composition. 5,015,259, Cl. 8-115.600.
- Moteurs Leroy-Somer: *See—*
  - Baldassarre, Ferdinand, 5,014,828, Cl. 188-173.000.
- Motomatsu, Keiko: *See—*
  - Kobayashi, Toshiaki; and Motomatsu, Keiko, 5,015,684, Cl. 524-108.000.
- Motorola, Inc.: *See—*
  - Cygan, Lawrence F.; Granberg, Helge O.; Bickham, Richard S.; and Missele, Carl, 5,015,972, Cl. 333-32.000.
  - Fox, Thomas M.; and Anderson, Neal R., 5,014,621, Cl. 102-213.000.
  - Giles, Grady L.; and Wilson, Jesse R., 5,015,875, Cl. 307-272.200.
  - Goronkin, Herbert, 5,016,064, Cl. 357-16.000.
  - Parsi, Kaveh; and Harnishfeger, David B., 5,015,892, Cl. 307-600.000.
  - Shumway, Peggy P., 5,016,205, Cl. 364-715.010.
- Motroni, Giuseppe: *See—*
  - Gabrielli, Giorgio; Maritano, Mauro; Motroni, Giuseppe; and Chapoy, L. Lawrence, 5,015,721, Cl. 528-190.000.
- Moulder, John C.: *See—*
  - Rose, James H.; and Moulder, John C., 5,015,950, Cl. 324-224.000.
- Mouri, Takayuki, to Ikeda Bussan Co., Ltd. Automobile seat hinge. 5,015,026, Cl. 296-65.100.
- Mouse Systems Corporation: *See—*
  - Montgomery, James R.; and Mohr, Larry L., 5,015,070, Cl. 350-163.000.
- Mrotz, Walter C., III, to Shaw-Walker Company, The. Ergonomic seat and back structure for a chair. 5,015,038, Cl. 297-457.000.
- Mrozik, Helmut: *See—*
  - Fisher, Michael H.; and Mrozik, Helmut, 5,015,630, Cl. 514-30.000.
- MTU Munchen GmbH: *See—*
  - Rohra, Alois, 5,015,150, Cl. 416-220.00R.
- Muck, Dennis N.; Ankrom, Dennis M.; and Brown, George B., to Xerox Corporation. Exit roller shield for duplex printing. 5,014,976, Cl. 271-220.000.
- Muhlhausen, Peter; and Nausester, Adolf, to Wegman & Co. GmbH. Unbalance-compensating device for a weapons system especially a heavy weapon. 5,014,594, Cl. 89-37.080.
- Muhling, Rudolf, to Ultralight AG. Power supply circuit for a gas discharge lamp. 5,015,922, Cl. 315-282.000.
- Muia, Ramon A.; and Donlan, Rodney M., to Calgon Corporation. Method for controlling zebra mussels using dialkyl diallyl ammonium polymers. 5,015,395, Cl. 210-755.000.
- Mukhametshin, Almaz A.: *See—*
  - Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M., 5,014,779, Cl. 166-55.700.
- Mula, Richard, to Hydroimage. High-intensity underwater light source. 5,016,151, Cl. 362-267.000.
- Muller, Guy, to Valeo Systemes D'Essuyage. Windshield wiper system with rain detector. 5,015,931, Cl. 318-483.000.
- Muller, Hanns P.: *See—*
  - Jansen, Bernhard; Muller, Hanns P.; and Hombach, Rudolf, 5,015,321, Cl. 156-331.700.
- Muller, Klaus-Dieter; Rau, Ernst; and Sacher, Christian, to BTS Broadcast Television Systems GmbH. Special effects mixer for video signals with automatic amplitude control of signals relating to lower priority planes. 5,016,105, Cl. 358-182.000.
- Muller, Michael: *See—*
  - Gloor, Rene ; Muller, Michael; and Beeler, Alfred, 5,014,394, Cl. 19-98.000.
- Mulligan, Seamus; and Sparks, Randall T. Sustained release capsule or tablet formulation comprising a pharmaceutically acceptable dihydropyridine. 5,015,479, Cl. 424-457.000.
- Multi-Comp, Inc.: *See—*
  - Wick, John J., 5,014,851, Cl. 206-539.000.
- Munz, Robert P.: *See—*
  - Crockett, Dennis D.; and Munz, Robert P., 5,015,823, Cl. 219-146.100.
- Murai, Masasumi; Mizuguchi, Koichi; and Nishiyama, Jun, to Tsubakimoto Chain Company. Linear motor driven trolley conveyor. 5,014,625, Cl. 104-292.000.
- Murai, Suzuyo: *See—*
  - Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.
- Murakami, Hiroaki; and Matsumoto, Osamu, to Kabushiki Kaisha Toshiba. Sense amplifier having pull-up circuit controlled by feedback. 5,015,890, Cl. 307-530.000.
- Murakami, Satoru: *See—*
  - Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.
- Murakami, Susumu: *See—*
  - Kasai, Isao; Yamaguchi, Kimiaki; Sakai, Shinichi; Murakami, Susumu; Isono, Tatsuji; and Hatagawa, Toyotsugu, 5,015,812, Cl. 219-10.55B.
- Muramatsu, Masaru: *See—*
  - Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.
- Murata, Kunihiko; Morii, Satoshi; Iwasaki, Toshiaki; and Mitsui, Hiroyuki, to Brother Kogyo Kabushiki Kaisha. Workpiece fabric holding device for use in sewing machine. 5,014,633, Cl. 112-121.120.
- Murata Manufacturing Co., Ltd.: *See—*
  - Okubo, Akira, 5,015,975, Cl. 333-181.000.
  - Sakamoto, Yukio; Hori, Toshio; Fukutani, Iwao; and Tanabe, Takeshi, 5,015,204, Cl. 439-620.000.
  - Uchida, Katsuyuki; and Takahata, Haruo, 5,015,986, Cl. 338-22.00R.
- Murphy, Gerald J.; Ager, John W.; and Levinson, Matthew I., to FMC Corporation. Process for isolating hydroxamic acids. 5,015,765, Cl. 562-621.000.
- Muscarella, Joseph F.: *See—*
  - Robertson, John A.; Cyphert, David L.; Cyphert, Thomas E.; and Muscarella, Joseph F., 5,015,106, Cl. 400-121.000.
- Musco Corporation: *See—*
  - Gordin, Myron K.; and Drost, Jim L., 5,016,150, Cl. 362-263.000.
- Mutter, Heinz, to Sulzer Brothers Limited. Closable vessel. 5,014,871, Cl. 220-315.000.
- Mutzabaugh, Dennis M.: *See—*
  - Citta, Richard W.; and Mutzabaugh, Dennis M., 5,016,100, Cl. 358-133.000.
- Myers, Eugene W.: *See—*
  - Davis, Bill E.; Myers, Eugene W.; Goodhart, Richard B.; Paris, William M.; and Borthwick, James T., Jr., 5,014,496, Cl. 53-433.000.
- Myles, Robert E., Jr. Enclosed self-portrait photographic studio with camera located behind one-way mirror. 5,016,035, Cl. 354-290.000.
- N.W. Silicon Specialists, Inc.: *See—*
  - Wohlfarth, Paul D.; and Buchanan, Gregg L., 5,015,989, Cl. 338-195.000.
- Nabisco Brands, Inc.: *See—*
  - Haynes, Lynn C.; Levine, Harry; and Finley, John W., 5,015,483, Cl. 426-73.000.
  - Scaglione, Felice; and Staples, Lorna C., 5,015,485, Cl. 426-94.000.
  - Van Lengerich, Bernhard; and Warren, Cathryn C., 5,015,488, Cl. 426-549.000.
  - Van Lengerich, Bernhard; and Warren, Cathryn C., 5,015,489, Cl. 426-549.000.
  - Van Lengerich, Bernhard; and Warren, Cathryn C., 5,015,490, Cl. 426-549.000.
- Nadin, Leonard, to Labinal S.A. Connector fitting for connecting corrugated conduit sections. 5,015,013, Cl. 285-64.000.
- Nagai, Haruo; Uehara, Kiyoji; and Aizawa, Masafumi, to Anritsu Corporation. Differential absorption laser radar gas detection apparatus having tunable wavelength single mode semiconductor laser source. 5,015,099, Cl. 356-437.000.
- Nagai, Katsutoshi: *See—*
  - Kobayashi, Takeo; Nishida, Takao; Tabata, Yasushi; Numako, Norio; and Nagai, Katsutoshi, 5,016,038, Cl. 354-418.000.
- Nagai, Kyuichirou: *See—*
  - Takeda, Hidekazu; Ogiro, Kenji; Kaku, Nobuyuki; and Nagai, Kyuichirou, 5,016,125, Cl. 360-85.000.
- Nagai, Shoichi: *See—*
  - Kobayashi, Yukio; Nagai, Shoichi; Takesue, Masatoshi; Aosai, Fumito; and Inoue, Masao, 5,015,524, Cl. 428-332.000.
- Naganuma, Norihisa: *See—*
  - Takamatsu, Hisashi; Naganuma, Norihisa; and Abe, Kenichi, 5,015,055, Cl. 350-96.150.
- Nagaoka, Hisayuki, to Toshiba Silicone Co., Ltd. Electrically conductive polyorganosiloxane primer composition. 5,015,413, Cl. 252-511.000.
- Nagasaki, Tatsuo, to Olympus Optical Co., Ltd. Ultrasonic diagnosis apparatus. 5,014,711, Cl. 128-660.070.
- Nagase, Makoto; Asakura, Yamoto; Utamura, Motoaki; and Uchida, Shunsuke, to Hitachi, Ltd. Water-cooled direct cycle nuclear power plant. 5,015,436, Cl. 376-306.000.
- Nagashima, Akira; and Koga, Hiroaki, to Kioritz Corporation. Power work-machine. 5,014,835, Cl. 192-48.500.
- Nagata, Kenshi: *See—*
  - Moriyama, Hiroyuki; and Nagata, Kenshi, 5,015,811, Cl. 200-521.000.

VOL
1126
ISS
2
MY
14
1991
UMI

Nagata, Takehito: *See—*
  Hiroi, Masaki; Ino, Masumitsu; Nagata, Takehito; and Shimada, Masumi, 5,015,837, Cl. 250-208.100.
Nagatomi, Tateyuki: *See—*
  Ohba, Noriaki; Tabata, Yujin; and Nagatomi, Tateyuki, 5,015,262, Cl. 8-543.000.
Nagle, Dennis C.: *See—*
  Kampe, Stephen L.; Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., 5,015,534, Cl. 428-570.000.
Nakada, Hitoshi: *See—*
  Imai, Kunio; and Nakada, Hitoshi, 5,015,999, Cl. 340-702.000.
Nakagawa, Isao: *See—*
  Sakamoto, Toshiyuki; Kojima, Noboru; and Nakagawa, Isao, 5,016,111, Cl. 358-328.000.
Nakagawa, Jun: *See—*
  Tanizawa, Kazuo; and Nakagawa, Jun, 5,014,484, Cl. 52-646.000.
Nakagawa, Yasuo: *See—*
  Nomoto, Mineo; Ninomiya, Takanori; Koshishiba, Hiroya; Hamada, Toshimitsu; and Nakagawa, Yasuo, 5,015,097, Cl. 356-394.000.
Nakai, Keiichiro; and Nakanishi, Yoshinori, to Otis Elevator Company. Apparatus for maintaining an air gap in a toroidal type linear motor. 5,014,826, Cl. 187-112.000.
Nakai, Masaaki: *See—*
  Taniguchi, Nobuyuki; Hosomizu, Hiroshi; Tsuji, Kenji; Omaki, Takanobu; and Nakai, Masaaki, 5,016,037, Cl. 354-413.000.
Nakajima, Nobuyoshi, to Fuji Photo Film Co., Ltd. Method of recognizing irradiation field, and method of adjusting image processing conditions. 5,015,853, Cl. 250-327.200.
Nakajima, Takatsugu; Endo, Katsumi; and Miura, Toru, to Sony Corporation. Combined video recorder and camera with superimposition of video and data. 5,016,112, Cl. 358-335.000.
Nakajima, Yoshihiro; Onishi, Kunihiro; and Takada, Akihiro, to Mita Industrial Co., Ltd. Method for controlling rotation of a fixing roller. 5,016,057, Cl. 355-282.000.
Nakamatsu, Shuji: *See—*
  Nishiki, Yoshinori; Sawamoto, Isao; Nakamatsu, Shuji; and Shimamune, Takayuki, 5,015,354, Cl. 204-254.000.
Nakamura, Ichiro: *See—*
  Nogami, Tadahiko; Nakamura, Ichiro; Maeno, Ichiro; and Kinose, Ryohei, 5,014,748, Cl. 137-625.650.
Nakamura, Katsunori: *See—*
  Gotou, Tetsuo; Shimada, Hiroo; and Nakamura, Katsunori, 5,014,819, Cl. 184-6.200.
Nakamura, Koji: *See—*
  Ide, Yusaku; Nakamura, Koji; and Kato, Shigeki, 5,015,735, Cl. 540-123.000.
Nakamura, Mikio: *See—*
  Yamana, Shinji; Nakamura, Mikio; and Tsuzuki, Akihiro, 5,014,405, Cl. 29-33.00R.
Nakamura, Shigeru; Machida, Sadatsugi; Nakao, Takeshi; and Ojima, Masahiro, to Hitachi, Ltd. Two-laser collimated beam optical head with monitor. 5,016,234, Cl. 369-44.140.
Nakamura, Shigeru; Takahashi, Sadao; Watanabe, Masateru; and Arimoto, Akira, to Hitachi, Ltd. Prism optics stable with respect to wavelength and temperature variations and optical information processing apparatus. 5,016,237, Cl. 369-112.000.
Nakamura, Shin: *See—*
  Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.
Nakamura, Shoji: *See—*
  Kimoto, Takayuki; Sunohara, Masaaki; Inoue, Takashi; Nakamura, Shoji; and Yonetani, Daijirou, 5,015,280, Cl. 65-307.000.
Nakamura, Yukinobu: *See—*
  Iihoshi, Akira; and Nakamura, Yukinobu, 5,016,007, Cl. 340-995.000.
Nakanishi, Yoichi; Kanetani, Junichi; and Nakata, Muneo, to Omron Tateisi Electronics Co. Electromagnetic relay. 5,015,979, Cl. 335-83.000.
Nakanishi, Yoshinori: *See—*
  Nakai, Keiichiro; and Nakanishi, Yoshinori, 5,014,826, Cl. 187-112.000.
Nakano, Hiroyuki: *See—*
  Takada, Toshiaki; Kinugawa, Tadami; Yamaguchi, Katsuhiro; Tanabe, Kou; and Nakano, Hiroyuki, 5,015,670, Cl. 523-214.000.
Nakano, Masao: *See—*
  Kioka, Mamoru; Nakano, Masao; Doi, Kenji; and Toyota, Akinori, 5,015,612, Cl. 502-133.000.
Nakano, Yasuhiko: *See—*
  Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.
Nakao, Makoto: *See—*
  Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,014,799, Cl. 177-211.000.
Nakao, Naomi L.; and Wilk, Peter J. Endoscopic stapling device and method. 5,015,249, Cl. 606-142.000.
Nakao, Shin, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device. 5,016,084, Cl. 357-72.000.
Nakao, Takeshi: *See—*
  Nakamura, Shigeru; Machida, Sadatsugi; Nakao, Takeshi; and Ojima, Masahiro, 5,016,234, Cl. 369-44.140.

Nakasaki, Eiji, to Sumitomo Rubber Industries, Ltd. Method of making a pneumatic tire. 5,015,315, Cl. 156-130.700.
Nakashima, Mikito: *See—*
  Kawashima, Hiroshi; Nakashima, Mikito; and Mogami, Takao, 5,015,523, Cl. 428-336.000.
Nakata, Muneo: *See—*
  Nakanishi, Yoichi; Kanetani, Junichi; and Nakata, Muneo, 5,015,979, Cl. 335-83.000.
Nakatsuka, Mamoru: *See—*
  Okuda, Tohru; Okada, Hideo; Koyama, Takashi; Okada, Osamu; and Nakatsuka, Mamoru, 5,016,132, Cl. 360-130.210.
Nakayama, Akira: *See—*
  Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
Nakayama, Shunichi; and Takayanagi, Yasushi, to Sanden Corporation. Valve apparatus for preventing leakage of a beverage. 5,014,963, Cl. 251-245.000.
Nakazawa, Shinsuke: *See—*
  Takasaki, Tadaoki; and Nakazawa, Shinsuke, 5,014,669, Cl. 123-414.000.
Nanba, Hirokuni: *See—*
  Taguchi, Tsunemasa; and Nanba, Hirokuni, 5,015,327, Cl. 156-603.000.
Nanba, Tomiyuki: *See—*
  Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.
Nannichi, Toshihiko, to Kabushiki Kaisha Toshiba. Image determining method and apparatus. 5,016,118, Cl. 358-462.000.
Nardone, Vincent C.; Strife, James R.; and Prewo, Karl M., to United Technologies Corporation. Structural joints of high dimensional stability. 5,015,116, Cl. 403-28.000.
National Carpet Equipment, Inc.: *See—*
  Crossman, David D., 5,015,235, Cl. 604-117.000.
National Coupling Company, Inc.: *See—*
  Smith, Robert E., III, 5,015,016, Cl. 285-108.000.
National Research Development Corporation: *See—*
  Al-Damluji, Saad, 5,015,654, Cl. 514-402.000.
National Semiconductor Corporation: *See—*
  Hamstra, James R., 5,016,221, Cl. 365-221.000.
Natsuume, Tadao: *See—*
  Ueda, Tsunehisa; Miyazaki, Koji; and Natsuume, Tadao, 5,015,668, Cl. 523-102.000.
Nattel, William; and Michaud, Alain, to Commander Electrical Materials, Inc. Electrical cable connector for sealing an armoured electrical cable. 5,015,804, Cl. 174-65.0SS.
Nauck, Joachim, to Erno Raumfahrttechnik GmbH. Satellite system having variable configuration. 5,014,936, Cl. 244-158.00R.
Nausester, Adolf: *See—*
  Muhlhausen, Peter; and Nausester, Adolf, 5,014,594, Cl. 89-37.080.
Navarette, Carlos A.; and Mashita, Eric M., to Allied-Signal Inc. Hydraulic actuator having frangible or deformable components. 5,014,603, Cl. 92-165.00R.
Navelier, Alain F. E. A.: *See—*
  Tamagno, Didier Y. F.; Mas, Georges L. J. M.; and Navelier, Alain F. E. A., 5,015,060, Cl. 350-96.200.
NCR Corporation: *See—*
  Bitting, Ricky F., 5,016,014, Cl. 341-162.000.
NEC Corporation: *See—*
  Hashimoto, Kiyokazu, 5,016,222, Cl. 365-226.000.
  Hirayama, Hiromitsu, 5,015,873, Cl. 307-270.000.
  Koya, Kei; and Sato, Yoshikuni, 5,016,169, Cl. 364-200.000.
  Minato, Yukio, 5,016,075, Cl. 357-35.000.
  Sano, Toshifumi, 5,014,777, Cl. 165-185.000.
  Takahashi, Mitsuasa, 5,016,066, Cl. 357-23.400.
  Yokoo, Kiyotaka; Hitachi, Hideki; and Ikeda, Matsujiro, 5,015,978, Cl. 335-78.000.
Neles-Jamesbury Corporation: *See—*
  Champagne, Raymond P., 5,014,598, Cl. 92-13.005.
Nelson, Danny A.; Tomich, Stanley D.; Glover, Donald W.; Allen, Errol V.; Hales, Jeremy M.; and Dana, Marshall T., to Battelle Memorial Institute. Rain sampling device. 5,016,196, Cl. 364-550.000.
Nelson, Dean O.; and Nelson, Richard W. Trash bag holder. 5,014,943, Cl. 248-99.000.
Nelson, John D., to Olin Corporation. Chitosan pyrithione as an antimicrobial agent useful in personal care products. 5,015,632, Cl. 514-55.000.
Nelson, Richard W.: *See—*
  Nelson, Dean O.; and Nelson, Richard W., 5,014,943, Cl. 248-99.000.
Nelson, Thomas A., Jr.: *See—*
  Higgins, George D.; and Nelson, Thomas A., Jr., 5,014,979, Cl. 271-104.000.
Nemori, Ryoichi; and Tsukada, Yoshihisa, to Fuji Photo Film Co., Ltd. Method for activating cellulosic membrane, activated cellulosic membrane, method of fixing physiologically active substance on the activated cellulosic membrane and physiologically active substance-fixed membrane. 5,015,387, Cl. 210-638.000.
Neri, Armando; and Turra, Mario, to G.D. Societa' Per Azioni. Device for perforating rod-shaped items. 5,015,819, Cl. 219-121.700.
Nestec S.A.: *See—*
  Palmlin, Peter; and Rudberg, Marianne, 5,015,484, Cl. 426-92.000.

Nethers, David: *See—*
  Reitmeier, Jerry; Marquardt, Wayne; Smith, Mark; and Nethers, David, 5,014,896, Cl. 227-39.000.
Neumann, Glynn F.: *See—*
  Leslie, Robert H.; Neumann, Glynn F.; and Pehrson, Gene A., 5,014,476, Cl. 52-220.000.
Neumann, Rodney H.; and Allison, Charles B., to MGM Services, Inc. Automated trash management system. 5,016,197, Cl. 364-550.000.
Neumeyer, Franz: *See—*
  Koch, Peter; Waas, Peter; Neumeyer, Franz; and Baechle, Georg, 5,014,910, Cl. 237-2.00A.
New England Biolabs, Inc.: *See—*
  Benner, Jack S., II; and Rees, Phyllis A., 5,015,581, Cl. 435-172.300.
New Japan Chemical Co., Ltd.: *See—*
  Kobayashi, Toshiaki; and Motomatsu, Keiko, 5,015,684, Cl. 524-108.000.
New York Society for the Relief of the Ruptured & Crippled, Maintaining the Hospital for Special Surgery: *See—*
  Burstein, Albert H.; and Bennett, Jeffrey S., 5,015,248, Cl. 606-74.000.
Newberry, Norman E. Dental fixator apparatus. 5,015,182, Cl. 433-60.000.
Newbold, Geoffrey; Wraige, Douglas; and Wagner, John D., to Lever Brothers Company, division of Conopco, Inc. Sealable containers. 5,015,513, Cl. 428-35.500.
Newcomb, Donald R., to Butternut Electronics Company. 12 and 17 meter adapter assemblies. 5,016,021, Cl. 343-722.000.
Newkirk, Marc S.; and Lesher, H. Daniel, to Lanxide Technology Company, LP. Ceramic composite structures having intrinsically fitted encasement members thereon and methods of making the same. 5,015,609, Cl. 501-127.000.
Newman, Thomas H., to Dow Chemical Company, The. Method for preparing imide-containing polymers. 5,015,712, Cl. 526-304.000.
Newmark, Rona J.: *See—*
  Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
Newton, Donald E.: *See—*
  Hamilton, Billy E.; Moore, Brian K.; and Newton, Donald E., 5,015,273, Cl. 55-53.000.
NGK Insulators, Ltd.: *See—*
  Matsuhisa, Tadaaki; and Hayakawa, Issei, 5,015,608, Cl. 501-97.000.
  Matsuzawa, Soichiro; Takeya, Fuminori; and Terada, Nobuhiro, 5,014,414, Cl. 29-603.000.
Nguyen, Kham X.; Robinson, Theodore S.; Taylor, Michael D.; and Daberkow, Kevin L., to Amdahl Corporation. Resource contention deadlock detection and prevention. 5,016,167, Cl. 364-200.000.
Nguyen, Luong T.: *See—*
  Jacobson, Richard M.; and Nguyen, Luong T., 5,015,652, Cl. 514-384.000.
Nichol, William H., Jr. Hosiery display hanger assembly. 5,014,957, Cl. 248-340.000.
Nick, Bernhard; Bott, Kaspar; and Schulz, Guenther, to BASF Aktiengesellschaft. 2-(meth)acrylamidomethyl)-1,3-diketones. 5,015,768, Cl. 564-204.000.
Nicole, Denis A.: *See—*
  Jesshope, Christopher R.; Pope, Patrick S.; Hey, Anthony J. G.; Nicole, Denis A.; and Lloyd, Edward K., 5,016,163, Cl. 364-200.000.
Nidola, Antonio; and Martelli, Gian N., to Oronzio deNora Impianti Elettrochimici S.p.A. Novel electrodes with dual porosity. 5,015,344, Cl. 204-98.000.
Nied, Herman F.: *See—*
  Inzinna, Louis P.; and Nied, Herman F., 5,015,169, Cl. 425-394.000.
Nieminen, Jorma, to Oy Scanwoven Ab. Non-woven article made of a heat-resisting material, method for manufacturing the article and apparatus for implementing the method. 5,014,396, Cl. 19-205.000.
Niemiro, Thaddeus A.: *See—*
  Lin, Jiing-Kang; and Niemiro, Thaddeus A., 5,014,615, Cl. 101-147.000.
Nigg, Juerg. Adaptor for small fluorescent tubes. 5,015,917, Cl. 315-56.000.
Nihon Medi-Physics Co. Ltd.: *See—*
  Azuma, Makoto; Takahashi, Jun; Yamauchi, Hirohiko; and Ueda, Nobuo, 5,015,462, Cl. 424-1.100.
Nihon Surfactant Kogyo K.K.: *See—*
  Ohba, Noriaki; Tabata, Yujin; and Nagatomi, Tateyuki, 5,015,262, Cl. 8-543.000.
Niinomi, Toshihiko: *See—*
  Toyoda, Ichiro; Niinomi, Toshihiko; Kaseda, Shigeru; and Takahashi, Koichi, 5,016,186, Cl. 364-507.000.
Nikolaev, Valery I.: *See—*
  Larin, Marxen P.; Alexandrov, Maxim L.; and Nikolaev, Valery I., 5,014,517, Cl. 62-55.500.
Nikon Corporation: *See—*
  Goto, Tetsuro, 5,016,034, Cl. 354-288.000.
  Hayashi, Yutaka, 5,015,866, Cl. 250-548.000.
  Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.
Niled S.A.: *See—*
  Delin, Michel, 5,015,198, Cl. 439-411.000.

Nilssen, Ole K. Extra efficient electronic ballast for fluorescent lamps. 5,015,923, Cl. 315-307.000.
Nilsson, Kjell; and Mosbach, Klaus H. Macroporous particles for cell cultivation or chromatography. 5,015,576, Cl. 435-70.210.
Niman, Henry L.; and Lerner, Richard A., to Scripps Clinic and Research Foundation. Polypeptide-induced monoclonal receptors to protein ligands. 5,015,571, Cl. 435-7.920.
Nine, Harmon D., to General Motors Corporation. Convertible lock-bead-drawbead. 5,014,537, Cl. 72-350.000.
Ninomiya, Takanori: *See—*
  Nomoto, Mineo; Ninomiya, Takanori; Koshishiba, Hiroya; Hamada, Toshimitsu; and Nakagawa, Yasuo, 5,015,097, Cl. 356-394.000.
Nintendo Company Limited: *See—*
  Okada, Satoru; and Nishizawa, Kenji, 5,014,982, Cl. 273-435.000.
Nippon Oil Co., Ltd.: *See—*
  Kubo, Junichi; Yokoyama, Nobuo; and Kinoshita, Hirotugu, 5,015,404, Cl. 252-49.600.
Nippon Petrochemicals Company, Limited: *See—*
  Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,015,793, Cl. 585-6.300.
Nippon Seiko Kabushiki Kaisha: *See—*
  Ogawa, Eiji; and Kawai, Osamu, 5,014,927, Cl. 242-107.40R.
Nippon Shinyaku Co., Ltd.: *See—*
  Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 5,015,636, Cl. 514-210.000.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See—*
  Ohata, Tomohisa; Tsuchitani, Kazuo; and Kitaguchi, Shinya, 5,015,617, Cl. 502-304.000.
Nippon Soken, Inc.: *See—*
  Kodera, Masao; Sasaki, Kunihiko; Mikami, Seishin; and Utsu, Jyunshi, 5,016,017, Cl. 342-106.000.
Nippon Zeon Co., Ltd.: *See—*
  Ueda, Tsunehisa; Miyazaki, Koji; and Natsuume, Tadao, 5,015,668, Cl. 523-102.000.
Nishi, Masaya: *See—*
  Kato, Chiaki; Nishi, Masaya; and Hatta, Toshiyuki, 5,014,406, Cl. 29-130.000.
Nishida, Takao: *See—*
  Kobayashi, Takeo; Nishida, Takao; Tabata, Yasushi; Numako, Norio; and Nagai, Katsutoshi, 5,016,038, Cl. 354-418.000.
Nishida, Takashi: *See—*
  Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.
Nishihara, Hidenori: *See—*
  Ishii, Mitsuo; and Nishihara, Hidenori, 5,016,083, Cl. 357-71.000.
Nishihata, Sumihiro: *See—*
  Ishikawa, Hiromi; and Nishihata, Sumihiro, 5,015,852, Cl. 250-327.200.
Nishii, Michiharu, to Aisin Seiki Kabushiki Kaisha. Hydraulic braking system. 5,015,045, Cl. 303-114.000.
Nishikawa, Masaji, to Olympus Optical Co., Ltd. Device for developing recording media with liquid developer. 5,016,036, Cl. 354-318.000.
Nishikawa, Yoshikazu: *See—*
  Ibuchi, Yoshiaki; and Nishikawa, Yoshikazu, 5,016,053, Cl. 355-245.000.
Nishiki, Yoshinori; Sawamoto, Isao; Nakamatsu, Shuji; and Shimamune, Takayuki, to Permelec Electrode Ltd. Bipolar-electrode electrolytic cell. 5,015,354, Cl. 204-254.000.
Nishimura, Kazuo: *See—*
  Takenakajima, Takefumi; Nishimura, Kazuo; Fujiyama, Mamoru; and Fukushima, Toshihiro, 5,014,752, Cl. 138-149.000.
Nishino, Shuichi: *See—*
  Koshiba, Nobuharu; Nishino, Shuichi; Takata, Kenichi; and Ikehata, Toshihiko, 5,015,547, Cl. 429-194.000.
Nishio, Hitoshi: *See—*
  Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.
Nishioka, Yoshiki: *See—*
  Horie, Nobuyuki; Nishioka, Yoshiki; Yamanaka, Toshihiro; and Yuki, Yoshio, 5,016,126, Cl. 360-78.070.
Nishita, Kunio, to Kabushiki Kaisha Komatsu Seisakusho. Lubricating system for air feed pipe lines laid in a factory. 5,014,821, Cl. 184-55.200.
Nishiyama, Haruo, to Sharp Kabushiki Kaisha. Automatic exposure device for copying machine. 5,016,046, Cl. 355-68.000.
Nishiyama, Jun: *See—*
  Murai, Masasumi; Mizuguchi, Koichi; and Nishiyama, Jun, 5,014,625, Cl. 104-292.000.
Nishiyama, Shingo: *See—*
  Hayashi, Kazunori; Inoue, Nobuaki; and Nishiyama, Shingo, 5,015,561, Cl. 430-487.000.
Nishizawa, Kenji: *See—*
  Okada, Satoru; and Nishizawa, Kenji, 5,014,982, Cl. 273-435.000.
Nishizawa, Yoshinori: *See—*
  Tamura, Tadashi; Kiyomine, Akira; Nishizawa, Yoshinori; Tagami, Hidetoshi; Yoshihara, Toru; and Kawase, Jiro, 5,015,260, Cl. 8-408.000.
Nissan Motor Company, Limited: *See—*
  Hirao, Sumio; Matsunaga, Masaji; and Yamada, Yoshihiro, 5,014,604, Cl. 92-212.000.

VOL 1126 ISS 2 MY 14 1991 UMI

  - Ishizuki, Masaharu; and Sakon, Hiroshi, 5,015,807, Cl. 200-61.880.
  - Matsuda, Toshiro, 5,014,809, Cl. 180-248.000.
  - Mitsumoto, Hisashi, 5,014,670, Cl. 123-425.000.
  - Noji, Ikutaro; Kato, Masaki; Kaiju, Masaki; and Kinami, Ikuo, 5,014,519, Cl. 62-176.300.
  - Noji, Ikutaro; Kaiju, Masaki; Sakamoto, Hideyuki; and Fukubayashi, Makoto, 5,014,522, Cl. 82-227.000.
  - Taguchi, Hiromi, 5,014,741, Cl. 137-565.000.
  - Takasaki, Tadaoki; and Nakazawa, Shinsuke, 5,014,669, Cl. 123-414.000.
  - Yamaguchi, Hiroshi, 5,014,576, Cl. 74-866.000.
- Nissan Motor Company, Ltd. of No. 2: *See—*
  - Ishibashi, Fumikazu, 5,014,654, Cl. 123-52.0MC.
- Nisshin Steel Co., Ltd.: *See—*
  - Takeshima, Eiki; Takatsu, Kiyoshi; Asano, Norio; and Hozumi, Masahiro, 5,015,863, Cl. 250-515.100.
- Nissinen, Olli, to Valmet Oy. Method for wet painting or powder coating. 5,015,495, Cl. 427-49.000.
- Nitanda, Fumio: *See—*
  - Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Yamazaki, Masanobu; Toyoda, Manabu; and Ushijima, Makoto, 5,016,129, Cl. 360-103.000.
- Nitobe, Mitsuhiro: *See—*
  - Koharagi, Haruo; Tahara, Kazuo; Nitobe, Mitsuhiro; and Suzuki, Nobutaka, 5,015,905, Cl. 310-186.000.
- Nitschke, Werner: *See—*
  - Drobny, Wolfgang; Mattes, Bernhard; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,015,870, Cl. 307-66.000.
  - Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.
- Nitto Kohki Co., Ltd.: *See—*
  - Makishima, Reichi, 5,014,743, Cl. 137-614.030.
- Nitto Kohku Co., Ltd.: *See—*
  - Kobayashi, Yoshikazu, 5,014,786, Cl. 116-272.000.
- Nitzberg, Leonard R. Fluid-joint breakaway swivel coupling. 5,014,732, Cl. 137-68.100.
- Nivarox-FAR S.A.: *See—*
  - Meyrat, Pierre-Andre ; Oppliger, Alain; and Steiner, Denis, 5,015,591, Cl. 436-178.000.
- Niven, Mark A., to Goldring Display Group, Inc. Product dispenser. 5,014,949, Cl. 248-220.400.
- Niwa, Koichi: *See—*
  - Suzuki, Hitoshi; Yokoyama, Hiromitsu; Tsukada, Mineharu; Ogawa, Hiromi; Kamehara, Nobuo; and Niwa, Koichi, 5,015,314, Cl. 156-89.000.
- Nixon, Ronald A.; Peoples, Marc A.; and Plasko, Emil R., to Therm-O-Disc, Incorporated. Temperature sensing apparatus. 5,015,987, Cl. 338-22.00R.
- NK Innovations, Inc.: *See—*
  - Kayali, Nabil A., 5,014,956, Cl. 248-311.200.
- Nobis, Dieter; Hollmann, Friedrich; and Duster, Horst, to SMS Schloemann-Siemag Aktiengesellschaft. Strip casting installation with rotary hearth furnace and method for producing hot-rolled steel strip therefrom. 5,014,412, Cl. 29-527.700.
- Nock, Hans, to Hafele KG. Drawer support assembly. 5,015,047, Cl. 312-335.000.
- Noda, Isao, to Procter & Gamble Company, The. Disposable sanitary articles. 5,015,245, Cl. 604-367.000.
- Nogami, Ikuo: *See—*
  - Yamaguchi, Takamasa; and Nogami, Ikuo, 5,015,579, Cl. 435-123.000.
- Nogami, Tadahiko; Nakamura, Ichiro; Maeno, Ichiro; and Kinose, Ryohei, to Hitachi, Ltd. Rotary valve. 5,014,748, Cl. 137-625.650.
- Noguchi, Minetoshi; and Yamano, Shigemi, to Juki Corporation. Apparatus for flicker protection when a servo-motor starts. 5,016,133, Cl. 361-92.000.
- Noji, Ikutaro; Kato, Masaki; Kaiju, Masaki; and Kinami, Ikuo, to Nissan Motor Co., Ltd. Automotive air tempering apparatus. 5,014,519, Cl. 62-176.300.
- Noji, Ikutaro; Kaiju, Masaki; Sakamoto, Hideyuki; and Fukubayashi, Makoto, to Nissan Motor Co., Ltd. Automotive air tempering apparatus. 5,014,522, Cl. 82-227.000.
- Nokia-Mobira Oy: *See—*
  - Levanto, Lauri, 5,016,002, Cl. 340-756.000.
- Nolan, James B.; and Michelsen, Jeffrey M., to VLSI Technology, Inc. Computer memory write protection circuit. 5,016,219, Cl. 365-195.000.
- Noma, Hiroyuki; Kouno, Tadao; and Kadomaru, Kazuo, to Sumitomo Rubber Industries, Ltd. Radial tire for motorcycle with improved metallic belt cord. 5,014,761, Cl. 152-527.000.
- Nomoto, Mineo; Ninomiya, Takanori; Koshishiba, Hiroya; Hamada, Toshimitsu; and Nakagawa, Yasuo, to Hitachi, Ltd. Method for inspecting filled state of via-holes filled with fillers and apparatus for carrying out the method. 5,015,097, Cl. 356-394.000.
- Nomura, Yoshio: *See—*
  - Omata, Fumio; Sakai, Katutosi; and Nomura, Yoshio, 5,014,588, Cl. 84-726.000.
- Nonaka, Yoshiyuki: *See—*
  - Ohya, Yukio; and Nonaka, Yoshiyuki, 5,015,563, Cl. 430-546.000.
- Nonn, Alain, to Rhone-Poulenc Chimie. Preparation of 4,4'-dibromobiphenyl. 5,015,792, Cl. 570-208.000.
- Norell, Robert G.: *See—*
  - Evans, Thomas W.; Norell, Robert G.; Uban, Stephen A.; and Maxson, Richard C., 5,015,383, Cl. 210-497.100.
- North American Philips Corporation: *See—*
  - Fitzpatrick, Brian J.; and Harnack, Phyllis M., 5,015,328, Cl. 156-624.000.
  - Sweet, Richard C.; Azevedo, Jose M. I.; and Bronnes, Robert L., 5,015,536, Cl. 428-611.000.
- North American Philips Corp., Signetics Division: *See—*
  - Lim, Sheldon C. P.; Hellstrom, Julie W.; and Yen, Ting P., 5,015,604, Cl. 437-195.000.
- Northern Telecom Limited: *See—*
  - Livermore, Frederick C.; Hogeboom, John G.; and Sunatori, Go S., 5,015,600, Cl. 437-51.000.
  - Soubliere, Marc P., 5,014,959, Cl. 248-551.000.
- Norton Company: *See—*
  - Ravipati, Sitaramaiah; Zador, Eugene; Kaczmarek, Wesley R.; Coleman, Ernest A.; and Rostoker, David, 5,014,468, Cl. 51-295.000.
- Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., to Boeing Company, The. Aircraft construction. 5,016,015, Cl. 342-2.000.
- Nowak, Jean-Francois: *See—*
  - Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, 5,015,535, Cl. 428-610.000.
- Nowisch, Heinz K.; and Tetro, Richard S., to Black Clawson Company, The. Apparatus and method for roll changing on a continuous winder. 5,014,924, Cl. 242-56.00R.
- Nozu, Mikio: *See—*
  - Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.
- Nsertaseal Corporation: *See—*
  - Webb, James E., 5,015,371, Cl. 210-164.000.
- NSK-Warner Kabushiki Kaisha: *See—*
  - Suzuki, Akimitsu; Igari, Kozaburo; and Yabe, Hiroshi, 5,014,834, Cl. 192-48.300.
- NTN Corporation: *See—*
  - Uchida, Susumu, 5,015,215, Cl. 464-175.000.
- nuArc Company, Inc.: *See—*
  - Meacham, G. B. Kirby, 5,016,047, Cl. 355-71.000.
- Numako, Norio: *See—*
  - Kobayashi, Takeo; Nishida, Takao; Tabata, Yasushi; Numako, Norio; and Nagai, Katsutoshi, 5,016,038, Cl. 354-418.000.
- Numao, Naganori: *See—*
  - Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 5,015,582, Cl. 435-189.000.
- Numerical Concepts, Inc.: *See—*
  - Jones, Donald A.; and Jones, Robert M., 5,014,974, Cl. 271-189.000.
- NWL Transformers: *See—*
  - Del Gatto, Henry J.; and Trainor, John E., 5,015,267, Cl. 55-12.000.
- Oakleigh, Ltd.: *See—*
  - Brooks, David A., 5,014,912, Cl. 239-11.000.
- Oare, Thomas R.: *See—*
  - Beer, Klaus; Richards, Gary W.; Oare, Thomas R.; Brown, Thomas A.; and Wells, Thomas H., 5,014,762, Cl. 152-532.000.
- Oates, Robert M.: *See—*
  - Koch, Karl C.; Oates, Robert M.; Peteronio, Carlo F.; and Einolf, Charles W., Jr., 5,015,949, Cl. 324-207.250.
- Obata, Katsuhiko, to Casio Computer Co., Ltd. Control apparatus for electronic musical instrument for generating musical tone having tone pitch corresponding to input waveform signal. 5,014,589, Cl. 84-735.000.
- Obermeier, Rainer; Geiger, Rolf; and Grau, Ulrich, to Hoechst Aktiengesellschaft. Process for the preparation of insulin derivatives, the B chain of which is lengthened c-terminally. 5,015,728, Cl. 530-303.000.
- Obley, Alan L., to Westinghouse Electric Corp. Insulated, gas tight electrical lead conductor. 5,015,895, Cl. 310-71.000.
- Occidental Chemical Corporation: *See—*
  - Gupta, Manoj K., 5,015,529, Cl. 428-414.000.
- Ochi, Hideo; and Kitaori, Tomoyuki, to Somar Corporation. High energy beam-sensitive copolymer. 5,015,558, Cl. 430-325.000.
- Ochi, Moriya; and Sahashi, Masahiro, to Aisin Seiki Kabushiki Kaisha. Device for controlling feeding quantity of a sewing machine. 5,014,635, Cl. 112-311.000.
- Ochiai, Kouichi: *See—*
  - Kamiunten, Shoji; Aoshima, Shigeru; Tsumura, Takashi; Ochiai, Kouichi; and Inaba, Takashi, 5,014,552, Cl. 73-204.210.
- O'Connell, Michael P.: *See—*
  - Engebretson, A. Maynard; O'Connell, Michael P.; and Zheng, Baohua, 5,016,280, Cl. 381-68.000.
- O'Donnell, Matthew, to General Electric Company. Coded excitation for transmission dynamic focusing of vibratory energy beam. 5,014,712, Cl. 128-661.010.
- Oechsle, Walter. Lawn comber attachment. 5,014,504, Cl. 56-372.000.
- Oehler, Reinhard; Meyer, Urs; and Lattion, Andre, to Rieter Machine Works, Ltd. Synchronizable drive system. 5,015,938, Cl. 318-696.000.
- Oerlikon-Contraves AG: *See—*
  - Vuichard, Albin; Buhler, Bruno; and Cavin, Tell, 5,016,110, Cl. 358-227.000.
- Ogasawara, Sadanori; Abiko, Kenji; Ito, Masayoshi; and Shitori, Yoshiyasu, to MECT Corporation. Repairing agent for cells and tissues. 5,015,631, Cl. 514-53.000.
- Ogawa, Atsuhisa. High voltage stabilizing circuit. 5,016,156, Cl. 363-21.000.
- Ogawa, Eiji; and Kawai, Osamu, to Nippon Seiko Kabushiki Kaisha. Webbing retractor. 5,014,927, Cl. 242-107.40R.

- Ogawa, Hiromi: *See—*
  - Suzuki, Hitoshi; Yokoyama, Hiromitsu; Tsukada, Mineharu; Ogawa, Hiromi; Kamehara, Nobuo; and Niwa, Koichi, 5,015,314, Cl. 156-89.000.
- Ogawa, Hiroshi, to Omron Tateisi Electronics Co. Sphygmomanometer air connector. 5,014,716, Cl. 128-685.000.
- Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Process for forming a fine resist pattern. 5,015,559, Cl. 430-326.000.
- Ogawa, Kenji: *See—*
  - Suzuki, Hiroyoshi; Ogawa, Kenji; and Maekawa, Hiroko, 5,015,091, Cl. 356-135.000.
- Ogawa, Tetsuo; Abe, Takao; and Asai, Toshiya, to Sony Corporation. Video signal reproducing apparatus with two modes of keeping track of address. 5,016,119, Cl. 360-10.300.
- Ogawa, Toshio: *See—*
  - Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.
- Ogilvie, Rick A.; and Winkler, Rance A., to Concept Inc. Foot manipulated suction head and method for employing same. 5,014,389, Cl. 15-353.000.
- Ogiro, Kenji: *See—*
  - Takeda, Hidekazu; Ogiro, Kenji; Kaku, Nobuyuki; and Nagai, Kyuichirou, 5,016,125, Cl. 360-85.000.
- O'Hara, Thomas J.: *See—*
  - Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 5,015,542, Cl. 429-56.000.
- Ohata, Tomohisa; Tsuchitani, Kazuo; and Kitaguchi, Shinya, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Catalyst for purifying exhaust gas and method for production thereof. 5,015,617, Cl. 502-304.000.
- Ohba, Noriaki; Tabata, Yujin; and Nagatomi, Tateyuki, to Nihon Surfactant Kogyo K.K. Dye-leveling agent for reactive dyeing: phospholipids or phospholipid-type compounds. 5,015,262, Cl. 8-543.000.
- Ohba, Shinya: *See—*
  - Akimoto, Hajime; and Ohba, Shinya, 5,016,108, Cl. 358-212.000.
- Ohbe, Yoshitaka: *See—*
  - Sugimoto, Hiroaki; Ohbe, Yoshitaka; Hayatsu, Kazuo; and Iwata, Atsukazu, 5,015,723, Cl. 528-190.000.
- Ohhashi, Masahide: *See—*
  - Minagawa, Tsutomu; Ohhashi, Masahide; and Kai, Naoyuki, 5,016,001, Cl. 340-747.000.
- Ohkawara Kakohki Co., Ltd.: *See—*
  - Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi; and Ito, Takashi, 5,015,332, Cl. 159-4.200.
- Ohkawara, Masaaki: *See—*
  - Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi; and Ito, Takashi, 5,015,332, Cl. 159-4.200.
- Ohman, Lachlan; and Meyer, Gary L., to ARO Corporation, The. Mounting clamp for securing apparatus to outside of tie rod cylinder. 5,014,950, Cl. 248-231.500.
- Ohmura, Kazunori: *See—*
  - Tomono, Akira; Iida, Muneo; and Ohmura, Kazunori, 5,016,282, Cl. 382-2.000.
- Ohmura, Tomoyuki: *See—*
  - Hirano, Seiji; Sakaguchi, Masaharu; Kawanishi, Satoru; and Ohmura, Tomoyuki, 5,015,199, Cl. 439-353.000.
- Ohnemus, Fritz: *See—*
  - Hartmann, Uwe; and Ohnemus, Fritz, 5,015,960, Cl. 328-36.000.
- Ohshima, Hirofumi; Sato, Masanori; and Isayama, Kazuo, to Mazda Motor Corporation. Reinforced structure of a cylinder block of an internal combustion engine. 5,014,659, Cl. 123-195.00H.
- Ohshima, Toshiharu: *See—*
  - Tanikawa, Akinao; Ohshima, Toshiharu; and Sakai, Toshihiro, 5,016,165, Cl. 364-200.000.
- Ohshima, Yutaka: *See—*
  - Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.
- Ohta, Hideji: *See—*
  - Sakai, Tadashi; Minari, Katsunobu; and Ohta, Hideji, 5,014,521, Cl. 62-212.000.
- Ohtsuka, Kazuto: *See—*
  - Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.
- Ohuchida, Shigeru; Kitabayashi, Junichi; and Inokuchi, Toshiyuki, to Ricoh Company, Ltd. Optical information reading and writing device with diffraction means. 5,015,835, Cl. 250-201.500.
- Ohya, Yukio; and Nonaka, Yoshiyuki, to Konica Corporation. Silver halide light-sensitive color photographic material suitable for rapid processing comprising a mercapto or an azaindene compound. 5,015,563, Cl. 430-546.000.
- Ohyama, Yasuharu; Izawa, Masaki; Watanabe, Katsuji; and Hamada, Tetsuro, to Honda Giken Kogyo Kabushiki Kaisha. Active suspension system and method for controlling same. 5,015,009, Cl. 280-772.000.
- Ohzono, Kouhei; Takeuchi, Kazuhiro; Honda, Shoichi; and Koyabu, Takeshi, to Honda Giken Kogyo Kabushiki Kaisha. Drive train of a wheeled vehicle and method for controlling the same. 5,014,839, Cl. 192-0.092.
- Oikawa, Katsuya, to Canon Kabushiki Kaisha. Aspherical single lens. 5,015,078, Cl. 350-432.000.
- Ojima, Masahiro: *See—*
  - Nakamura, Shigeru; Machida, Sadatsugi; Nakao, Takeshi; and Ojima, Masahiro, 5,016,234, Cl. 369-44.140.
- Oka, Koichi; Kawaguchi, Akira; Kumagai, Kunio; and Morisawa, Katsuhiro, to Otsuka Electronics Co., Ltd. Particle size measuring system. 5,015,094, Cl. 356-336.000.
- Okada, Hideo: *See—*
  - Okuda, Tohru; Okada, Hideo; Koyama, Takashi; Okada, Osamu; and Nakatsuka, Mamoru, 5,016,132, Cl. 360-130.210.
- Okada, Hidetake; Kawai, Masato; Enomoto, Shunji; and Suzuki, Taisuke, to Japan Oxygen Co., Ltd. Adsorptive separation process. 5,015,272, Cl. 55-26.000.
- Okada, Hiroshi; and Takahashi, Takao, to Sony Corporation. Apparatus for recording and reproducing a digitized audio signal on a magnetic tape which has a slant track format including means for detecting a control signal to identify a digitized audio signal on the slant track. 5,016,120, Cl. 360-27.000.
- Okada, Kazuhiro, to Wacoh Corporation. Manufacturing method of a detector using resistance elements. 5,014,415, Cl. 29-621.100.
- Okada, Kazuo: *See—*
  - Tadokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, 5,016,232, Cl. 369-13.000.
- Okada, Osamu: *See—*
  - Okuda, Tohru; Okada, Hideo; Koyama, Takashi; Okada, Osamu; and Nakatsuka, Mamoru, 5,016,132, Cl. 360-130.210.
- Okada, Satoru; and Nishizawa, Kenji, to Nintendo Company Limited. Memory cartridge and game apparatus using the same. 5,014,982, Cl. 273-435.000.
- Okada, Tsuyoshi: *See—*
  - Tanaka, Shinichi; Ishibashi, Hiromichi; Akira, Mitsubara; and Okada, Tsuyoshi, 5,016,258, Cl. 375-25.000.
- O'Kain, Alan N.: *See—*
  - Burroughs, James R.; and O'Kain, Alan N., 5,015,544, Cl. 429-93.000.
- Okano, Shigetarou: *See—*
  - Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.
- Okaue, Etsuo; Egawa, Masaru; Kasai, Yoshihiko; and Horaguchi, Norio, to Seiko Epson Corporation. Electronic sunglasses. 5,015,086, Cl. 351-44.000.
- Okazaki, Masaki: *See—*
  - Fujimoto, Hiroaki; and Okazaki, Masaki, 5,014,673, Cl. 123-512.000.
- Okazaki, Noriko: *See—*
  - Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 5,015,582, Cl. 435-189.000.
- Oki Electric Industry Co., Ltd.: *See—*
  - Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, 5,015,973, Cl. 333-132.000.
  - Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; and Mashimo, Akira, 5,015,974, Cl. 333-134.000.
- Okisaki, Fumio: *See—*
  - Kubo, Masashige; Tsutsumi, Yukihiro; Okisaki, Fumio; Fujimura, Shunichi; and Fukuda, Teruo, 5,015,526, Cl. 428-378.000.
- Okubo, Akira, to Murata Manufacturing Co., Ltd. Noise filter. 5,015,975, Cl. 333-181.000.
- Okuda, Tohru; Okada, Hideo; Koyama, Takashi; Okada, Osamu; and Nakatsuka, Mamoru, to Sharp Kabushiki Kaisha. Magnetic recording and reproducing tape guide unit. 5,016,132, Cl. 360-130.210.
- Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, to Kabushiki Kaisha Toshiba; Tokyo Electron Limited; and Tokyo Electron Sagami Limited. Film forming method and film forming device. 5,015,330, Cl. 156-643.000.
- Okumura, Masafumi: *See—*
  - Tashiro, Osamu; and Okumura, Masafumi, 5,016,061, Cl. 355-320.000.
- Okuyama, Takashi; and Iwama, Masatoshi, to Asahi Kogaku Kogyo K.K. Light beam control apparatus and linear scale device suitable for use therein. 5,015,846, Cl. 250-235.000.
- Okuyama, Toshiaki: *See—*
  - Matsui, Takayuki; Okuyama, Toshiaki; Tobari, Kazuaki; Kubota, Yuzuru; and Takahashi, Junichi, 5,016,158, Cl. 363-71.000.
- Olin Corporation: *See—*
  - Ashok, Sankaranarayanan; Cheskis, Harvey P.; and Tyler, Derek E., 5,015,438, Cl. 419-23.000.
  - Grosso, Paul V.; Morgan, Michael J.; Wing, Feagin A., Jr.; and Day, Roger W., 5,015,549, Cl. 430-45.000.
  - Mahulikar, Deepak; Crane, Jacob; and Khan, Abid A., 5,015,803, Cl. 174-52.400.
  - Nelson, John D., 5,015,632, Cl. 514-55.000.
  - Tyler, Derek E.; Ashok, Sankaranarayanan; and Cheskis, Harvey P., 5,015,439, Cl. 419-23.000.
- Olin Hunt Sub III Corp.: *See—*
  - Pendleton, Phillip, 5,015,339, Cl. 204-15.000.
- Olson, Gary L., to Hoffmann-La Roche Inc. [(5-oxo)-2-pyrrolidinyl)-methyl]cyclohexaneacetamides, compositions and use. 5,015,653, Cl. 514-397.000.
- Olson, Gordon E.: *See—*
  - Thrasher, Lawrence E.; Olson, Gordon E.; Burkitt, Garrett J., III; Schmidt, Timothy E.; Haddad, Elias M.; and Conti-Johnston, Susan, 5,014,372, Cl. 4-542.000.

VOL
126
SS
2
MY
14
1991
UMI

- Olympus Optical Co.: *See—*
  - Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.
- Olympus Optical Co., Ltd.: *See—*
  - Nagasaki, Tatsuo, 5,014,711, Cl. 128-660.070.
  - Nishikawa, Masaji, 5,016,036, Cl. 354-318.000.
- O'Mahony, Michael J., to British Telecommunications Public Limited Company. Optical amplifiers. 5,015,964, Cl. 330-4.300.
- Omaki, Takanobu: *See—*
  - Taniguchi, Nobuyuki; Hosomizu, Hiroshi; Tsuji, Kenji; Omaki, Takanobu; and Nakai, Masaaki, 5,016,037, Cl. 354-413.000.
- Omata, Fumio; Sakai, Katutosi; and Nomura, Yoshio, to Casio Computer Co., Ltd. Electronic stringed musical instrument with a string vibration detecting apparatus. 5,014,588, Cl. 84-726.000.
- Omega Engineering, Inc.: *See—*
  - Hollander, Milton B.; and Rivera, Louis, 5,014,907, Cl. 229-117.010.
- Omnipoint Data Company, Incorporated: *See—*
  - Dixon, Robert C.; and Vanderpool, Jeffrey S., 5,016,255, Cl. 375-1.000.
- Omron Tateisi Electronics Co.: *See—*
  - Konishi, Keisuke; Shinohara, Kenji; Iwakiri, Norio; and Kurashige, Tomofumi, 5,015,996, Cl. 340-644.000.
  - Moriyama, Hiroyuki; and Nagata, Kenshi, 5,015,811, Cl. 200-521.000.
  - Nakanishi, Yoichi; Kanetani, Junichi; and Nakata, Muneo, 5,015,979, Cl. 335-83.000.
  - Ogawa, Hiroshi, 5,014,716, Cl. 128-685.000.
- O'Neil, Timothy J.: *See—*
  - Wimpee, Lealon C.; Ross, Monty A.; O'Neil, Timothy J.; and Dean Chu, Edward M., 5,015,434, Cl. 376-254.000.
- Onishi, Kunihiro: *See—*
  - Nakajima, Yoshihiro; Onishi, Kunihiro; and Takada, Akihiro, 5,016,057, Cl. 355-282.000.
- Onishi, Norio: *See—*
  - Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, 5,015,973, Cl. 333-132.000.
  - Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; and Mashimo, Akira, 5,015,974, Cl. 333-134.000.
- Onishi, Takashi; Hanamoto, Hiroyuki; Miyamoto, Hirohisa; and Yoshida, Keiji, to Minolta Camera Kabushiki Kaisha. Document detecting device for an image forming apparatus. 5,016,049, Cl. 355-203.000.
- Ono, Kazuya; Miyake, Tetsuo; and Kitagawa, Katsuji, to Somar Corporation. Powder coating composition. 5,015,671, Cl. 523-402.000.
- Ono, Mitsunori, to Fuji Photo Film Co., Ltd. N-methyl-α-dialkylamioacetohydroxamic acid compound. 5,015,763, Cl. 562-106.000.
- Onoue, Takeshi: *See—*
  - Yato, Tadao; Onoue, Takeshi; and Tanaka, Hiroshi, 5,015,422, Cl. 264-0.500.
- Onuchic, Jose N.: *See—*
  - Beratan, David N.; and Onuchic, Jose N., 5,016,063, Cl. 357-8.000.
- Ooki, Kenji: *See—*
  - Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.
- Oonaka, Itsuo: *See—*
  - Kambara, Yoshihiko; Oonaka, Itsuo; Asao, Koichi; and Fukushima, Kyoko, 5,015,766, Cl. 564-127.000.
- Oppliger, Alain: *See—*
  - Meyrat, Pierre-Andre ; Oppliger, Alain; and Steiner, Denis, 5,015,591, Cl. 436-178.000.
- Optec D.D. Melco Laboratory Co., Ltd.: *See—*
  - Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi; and Matsumura, Masami, 5,015,056, Cl. 350-96.150.
- Optec Dai-Ichi Denko Co., Ltd.: *See—*
  - Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi; and Matsumura, Masami, 5,015,056, Cl. 350-96.150.
- Oral D: *See—*
  - Green, Donald E., 5,015,664, Cl. 514-616.000.
- Orcheski, Conrad J.: *See—*
  - Childs, Paul; Hurley, James R.; and Orcheski, Conrad J., 5,014,679, Cl. 126-21.00A.
- Oregon Graduate Institute of Science & Technology: *See—*
  - Holmes, J. Fred; Orloff, Jonathan H.; and Jousten, Karl J., 5,015,862, Cl. 250-423.00R.
- Oren, Peter L.: *See—*
  - Childers, Ray F.; Oren, Peter L.; and Seidler, Werner M. K., 5,015,480, Cl. 424-486.000.
- Orloff, Jonathan H.: *See—*
  - Holmes, J. Fred; Orloff, Jonathan H.; and Jousten, Karl J., 5,015,862, Cl. 250-423.00R.
- Orner, Robert E.; Cassarino, Aurelio V.; and Sepso, Roger P., to Robertshaw Controls Company. Control device having a coiled compression shape memory spring, refrigerator system utilizing the control device and methods of making the same. 5,014,520, Cl. 62-187.000.
- Oronzio deNora Impianti Elettrochimici S.p.A.: *See—*
  - Nidola, Antonio; and Martelli, Gian N., 5,015,344, Cl. 204-98.000.
- Orr, Donna R. Garment crotch structure and method. 5,014,364, Cl. 2-408.000.
- Orsborn, Jesse H.: *See—*
  - Richman, Kevin S.; and Orsborn, Jesse H., 5,014,502, Cl. 56-41.000.
- Orsello, Gianmichele: *See—*
  - Ginatta, Marco V.; Orsello, Gianmichele; and Berruti, Riccardo, 5,015,342, Cl. 204-64.00T.
- Ortiz, Theresa. Tooth fairy doll. 5,015,209, Cl. 446-73.000.
- Osada, Yasuhito: *See—*
  - Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.
- Osaka Gas Co., Ltd.: *See—*
  - Cotts, David B.; Brodrecht, Louisa M.; and Bening, Robert C., Jr., 5,015,699, Cl. 525-471.000.
- Oscar Mayer Foods Corporation: *See—*
  - Griesbach, Ray H.; and Hustad, Gerald O., 5,014,856, Cl. 206-632.000.
- Osdene, Thomas S.; Secor, Henry V.; and Seeman, Jeffrey I., to Philip Morris Incorporated. Novel nicotine analogs. 5,015,741, Cl. 546-281.000.
- Oshida, Eiji: *See—*
  - Shigyo, Masao; Kanada, Shoji; and Oshida, Eiji, 5,015,854, Cl. 250-327.200.
- Oshida, Yoshitada: *See—*
  - Tanaka, Minoru; Oshida, Yoshitada; Yoshitake, Yasuhiro; and Tanimoto, Tetsuzo, 5,016,149, Cl. 362-259.000.
- Osipov, Vladimir W., to Walker Magnetics Group, Inc. Body member positioner. 5,014,970, Cl. 269-328.000.
- Osterloh, Rolf: *See—*
  - Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,672, Cl. 523-415.000.
  - Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,673, Cl. 523-415.000.
- Ostin, Richard M.: *See—*
  - Cann, Roger S.; and Ostin, Richard M., 5,014,645, Cl. 118-663.000.
- Ostrea, Enrique M., Jr., to Board of Governors of Wayne State University. Method for detecting maternally transferred drug metabolites in newborn infants. 5,015,589, Cl. 436-92.000.
- Ostreicher, Eugene A.; and Infantino, Joseph R., to Cuno, Incorporated. Filter element. 5,015,316, Cl. 156-69.000.
- O'Sullivan, James P., Sr.: *See—*
  - Herrington, Fox J.; and O'Sullivan, James P., Sr., 5,014,852, Cl. 206-554.000.
- Otis Elevator Company: *See—*
  - Chapelain, Jean-Claude; Masson, Patrice P.; Dupoty, Gerard C.; Crenn, Gerard; and Cloux, Jean-Noel, 5,014,822, Cl. 187-1.00R.
  - Fargo, Richard N., 5,014,824, Cl. 187-17.000.
  - Nakai, Keiichiro; and Nakanishi, Yoshinori, 5,014,826, Cl. 187-112.000.
- Otsuka Electronics Co., Ltd.: *See—*
  - Oka, Koichi; Kawaguchi, Akira; Kumagai, Kunio; and Morisawa, Katsuhiro, 5,015,094, Cl. 356-336 000.
- Otsuka, Masuhiro: *See—*
  - Satoh, Yuji; Kono, Hiromi; Soda, Hiroyuki; and Otsuka, Masuhiro, 5,014,832, Cl. 192-30.00W.
- Otsuka, Shuji: *See—*
  - Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.
- Otterbacher, E. W.: *See—*
  - Haag, Anthony P.; and Otterbacher, E. W., 5,015,778, Cl. 568-319.000.
- Oushiden, Hideshi: *See—*
  - Sambayashi, Takeshi; Oushiden, Hideshi; Takaoka, Hiroaki; and Morihara, Kazushige, 5,016,052, Cl. 355-228.000.
- Ovens, Kevin M., to Texas Instruments Incorporated. Circuit and method of generating logic output signals from an ECL gate to drive a non-ECL gate. 5,015,888, Cl. 307-475.000.
- Owen, H. Drew, Sr. Step assembly. 5,014,640, Cl. 114-362.000.
- Owen, Hartley: *See—*
  - Harandi, Mohsen N.; and Owen, Hartley, 5,015,359, Cl. 208-58.000.
  - Harandi, Mohsen N.; and Owen, Hartley, 5,015,782, Cl. 568-697.000.
- Owen, Marvin L.; and Jacobs, Frederick D., to Delco Electronics Corporation. Adjustment mechanism for a transmission position indicator. 5,014,642, Cl. 116-28.100.
- Owens-Corning Fiberglas Corporation: *See—*
  - Lee, Yee, 5,015,278, Cl. 65-6.000.
- Oy Scanwoven Ab: *See—*
  - Nieminen, Jorma, 5,014,396, Cl. 19-205.000.
- Ozaki, Keiji; and Fukumura, Seisuke, to Kabushiki Kaisha Kobe Seiko Sho. Opening/closing and centering device for tire vulcanizer. 5,015,165, Cl. 425-28.100.
- Ozaki, Masakuni: *See—*
  - Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 5,015,636, Cl. 514-210.000.
- P.O.S. Components: *See—*
  - Johnson, Ron M., 5,014,859, Cl 211-55.000.
- Pacer, James M.: *See—*
  - Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G.; Saraceno, Patricia J.; and Pacer, James M., 5,016,050, Cl. 355-208.000.
- Pachaly, Bernd: *See—*
  - Frey, Volker; Pachaly, Bernd; and Zeller, Norbert, 5,015,605, Cl. 501-12.000.

- Pacific Hybrid Microelectronics, Inc.: *See—*
  - Wohlfarth, Paul D.; and Buchanan, Gregg L., 5,015,989, Cl. 338-195.000.
- Pacific Monolithics: *See—*
  - Podell, Allen F.; Ali, Fazal; and Benton, Robert H., 5,015,965, Cl. 330-277.000.
- Pacific Scientific Company: *See—*
  - Hancock, Clyde J.; and Hendershot, James R., 5,015,903, Cl. 310-168.000.
- Pacmac, Inc.: *See—*
  - Terminella, Frank; Terminella, Emanuele; Stroud, William; and Terminella, Joseph E., 5,014,489, Cl. 53-51.000.
- Palansky, Bruce J.: *See—*
  - Baltusis, Paul A.; Greene, Thomas L.; and Palansky, Bruce J., 5,016,175, Cl. 364-424.100.
- Palermo, Robert E.: *See—*
  - Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., 5,015,798, Cl. 585-500.000.
- Paley, Dror: *See—*
  - Hepburn, George R.; and Paley, Dror, 5,014,690, Cl. 128-80.00H.
- Palkert, Philip E.: *See—*
  - Franssell, Dean E.; and Palkert, Philip E., 5,015,486, Cl. 426-243.000.
- Palmer, Edward G., to Attic Technology, Inc. Attic solar energy vehicle. 5,014,770, Cl. 165-48.200.
- Palmieri, Joseph M.: *See—*
  - DeRosier, Donna C.; Dziura, Richard A.; Palmieri, Joseph M.; Juntwait, Eric D.; Jacobs, Linda Y.; and Scott, Graham A., 5,015,983, Cl. 336-180.000.
- Palmlin, Peter; and Rudberg, Marianne, to Nestec S.A. Root vegetable coated foodstuff. 5,015,484, Cl. 426-92.000.
- Pan, Kee-Chuan; Tyan, Yuan-sheng; and Vazan, Fridrich, to Eastman Kodak Company. Erasable phase change optical recording elements and methods. 5,015,548, Cl. 430-19.000.
- Panson, Armand J.: *See—*
  - Ekin, John W.; Panson, Armand J.; and Blankenship, Betty A., 5,015,620, Cl. 505-1.000.
- Panuska, Andrew J.; and Patel, Parbhubhai D., to AT&T Bell Laboratories. Optical fiber cable core. 5,015,063, Cl. 350-96.230.
- Papaconstantinou, John: *See—*
  - Weigel, Paul H.; and Papaconstantinou, John, 5,015,577, Cl. 435-101.000.
- Papanicolaou, Nicolas A.: *See—*
  - Boos, John B.; Papanicolaou, Nicolas A.; and Weng, Tung H., 5,015,603, Cl. 437-184.000.
- Papathomas, Kostas I.; Summa, William J.; and Wang, David W., to International Business Machines Corporation. Aromatic dicyanate/aromatic diepoxy compositions, cured products and methods. 5,015,719, Cl. 528-70.000.
- Papavergos, Panayiotis G., to British Petroleum Company plc, The. Method and apparatus for fire control. 5,014,790, Cl. 169-44.000.
- Paques, Eric P., to Behringwerke Aktiengesellschaft. Process for the purification of plasminogen activators (PA). 5,015,583, Cl. 435-212.000.
- Parask, Dale B. Heater for dental impression compound. 5,015,181, Cl. 433-32.000.
- Paravax, Inc.: *See—*
  - Cochrum, Kent C.; Stevenson, Lynnor B.; and King, Scott R., 5,015,476, Cl. 424-423.000.
- Pardinas, Guillermo P.: *See—*
  - Pinkerton, Dennis; Jaekel, Robert W.; and Pardinas, Guillermo P., 5,015,157, Cl. 417-500.000.
- Parente, Charles A.: *See—*
  - Arcas, Noe; and Parente, Charles A., 5,014,815, Cl. 181-213.000.
- Paris, William M.: *See—*
  - Davis, Bill E.; Myers, Eugene W.; Goodhart, Richard B.; Paris, William M.; and Borthwick, James T., Jr., 5,014,496, Cl. 53-433.000.
- Park, Hong C., to Goldstar Co., Ltd. Real time distance sensor. 5,015,868, Cl. 250-561.000.
- Parker, James D.: *See—*
  - Bergland, Paul W.; Parker, James D.; and Timple, Thomas H., 5,016,182, Cl. 364-469.000.
- Parkhill, James O.: *See—*
  - LaCamera, Alfred; Van Linden, Jan H. L.; Pierce, Thomas V.; and Parkhill, James O., 5,015,343, Cl. 204-67.000.
- Parkson Corporation: *See—*
  - Messner, Rudolf, 5,015,421, Cl. 261-122.000.
- Parnell, Francis W., to Parnell Pharmaceuticals, Inc. Composition for imparting moisture to a substrate. 5,015,474, Cl. 424-195.100.
- Parnell Pharmaceuticals, Inc.: *See—*
  - Parnell, Francis W., 5,015,474, Cl. 424-195.100.
- Parran, John J., Jr.; Coyle-Rees, Margaret M.; Rotruck, John T.; and Sunberg, Richard J., to Procter & Gamble Company, The. Anticalculus compositions using tartrate-succinates. 5,015,466, Cl. 424-52.000.
- Parsi, Kaveh; and Harnishfeger, David B., to Motorola, Inc. Asynchronous delay circuit. 5,015,892, Cl. 307-600.000.
- Pasour, John A.: *See—*
  - Mako, Frederick M.; and Pasour, John A., 5,015,943, Cl. 324-95.000.
- Pass & Seymour, Inc.: *See—*
  - Brezee, Victor L.; and Hubben, Edward B., 5,015,201, Cl. 439-441.000.
- Passap Knitting Machines, Inc.: *See—*
  - Enderlin, Robert, 5,014,380, Cl. 8-149.300.
- Passarelli, Frank. Weight determining apparatus utilizing acoustic wave elapsed time measurement and computer. 5,016,200, Cl. 364-567.000.
- Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., to JP Laboratories, Inc. Pre-swelling and etching of plastics for plating. 5,015,329, Cl. 156-628.000.
- Patel, Manharbhai K.: *See—*
  - Hoyt, Earl; and Patel, Manharbhai K., 5,014,913, Cl. 239-45.000.
- Patel, Parbhubhai D.: *See—*
  - Panuska, Andrew J.; and Patel, Parbhubhai D., 5,015,063, Cl. 350-96.230.
- Patent Treuhand Gesellschaft fur elektrische Gluhlampen m.b.H.: *See—*
  - Pfaue, Johannes, 5,015,913, Cl. 313-625.000.
- Paterra, Jeffrey H.; and Rex, Donald K., to International Business Machines Corporation. Ribbon print track reinking with a roll system. 5,015,108, Cl. 400-197.000.
- Patrick, Haon; and Patrick, Lemay, to Roquette Freres. Method and installation for the production of anhydrous crystalline fructose. 5,015,297, Cl. 127-58.000.
- Patrick, Lemay: *See—*
  - Patrick, Haon; and Patrick, Lemay, 5,015,297, Cl. 127-58.000.
- Patscot, Linda S.; and Kawaguchi, Harold H., to Patscot, Linda S. Dental floss applicator. 5,014,725, Cl. 132-324.000.
- Patterson, Manford K., Jr.: *See—*
  - Lee, Kyung; Patterson, Manford K., Jr.; and Birckbichler, Paul J., 5,015,588, Cl. 436-69.000.
- Patti, Anthony G.; DeHart, Larry L., Sr.; and DeHart, Larry L., Jr., to All Tech Industries. Combination lantern and flying insect eradicator. 5,014,460, Cl. 43-113.000.
- Patton, Gary R., to Phillips Petroleum Company. Reformer optimization for head limited recycle system. 5,015,587, Cl. 436-55.000.
- Paulin, Dale W. Ventilated expandable boot. 5,015,515, Cl. 428-36.800.
- Paulson, Douglas N.: *See—*
  - Dilorio, Mark S.; Robinson, Stephen E.; Crum, Duane B.; Paulson, Douglas N.; Buchanan, D. Scott; and Marsden, James R., 5,016,128, Cl. 360-97.010.
- Paust, Joachim: *See—*
  - Dobler, Walter; and Paust, Joachim, 5,015,296, Cl. 127-42.000.
- Pawelzik, Manfred: *See—*
  - Humpert, Jurgen; and Pawelzik, Manfred, 5,014,749, Cl. 137-801.000.
- Pawlicki, Patrick S. Construction materials with end connectors. 5,015,117, Cl. 403-300.000.
- Pawloski, Chester E.: *See—*
  - Kar, Kishore K.; and Pawloski, Chester E., 5,015,405, Cl. 252-49.900.
- Payne, Bobby G.: *See—*
  - Hacker, George G.; Turner, James K.; Abernathy, Paul L.; Payne, Bobby G.; Killian, Roy C.; and Laws, David G., 5,014,526, Cl. 68-178.000.
- Payson, Steven J.; and Lee, John C. Pellet stove mantel with integral hopper. 5,014,682, Cl. 126-501.000.
- Peach State Labs, Inc.: *See—*
  - Moss, Thomas H., III; Sargent, Ralph R.; and Williams, Michael S., 5,015,259, Cl. 8-115.600.
- Pearson, Judy A.: *See—*
  - Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., 5,015,798, Cl. 585-500.000.
- Pearson, Norman R.; Kleschick, William A.; and Carson, Chrislyn M., to Dow Chemical Company, The. 7-ethoxy-5-fluoromethyl-1,2,4-triazolo[1,5-a]-pyrimidine-2-sulfonamides. 5,015,286, Cl. 71-92.000.
- Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., to Tandon Corporation. Disk drive controller system. 5,016,121, Cl. 360-39.000.
- Pehrson, Gene A.: *See—*
  - Leslie, Robert H.; Neumann, Glynn F.; and Pehrson, Gene A., 5,014,476, Cl. 52-220.000.
- Peled, Michael: *See—*
  - Shorr, Leonard M.; and Peled, Michael, 5,015,685, Cl. 524-412.000.
- Pellosie, John C., Jr.; Haas, Michael W.; and Aldrich, Kenneth, to United States of America, Air Force. Three dimensional tactical element situation (3DTES) display. 5,015,188, Cl. 434-38.000.
- Pelrine, Bruce P., to Mobil Oil Corporation. Novel synthetic lube composition and process. 5,015,795, Cl. 585-330.000.
- Pelto-Huikko, Raimo, to Kone Elevator GmbH. Apparatus for improving the performance of a motor-controlled hydraulic elevator. 5,014,823, Cl. 187-17.000.
- Pendergraft, Paul T., to Amoco Corporation. High pressure-low pressure steam system for extended Claus sulfur recovery plant. 5,015,459, Cl. 423-574.00R.
- Pendergraft, Paul T., to Amoco Corporation. Condenser-reactor switching units for extended Claus process. 5,015,460, Cl. 423-574.00R.
- Pendleton, Phillip, to Olin Hunt Sub III Corp. Process for preparing nonconductive substrates. 5,015,339, Cl. 204-15.000.
- Pendleton, Robert G.: *See—*
  - Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 5,015,663, Cl. 514-510.000.
- Pendley, Charles E., II: *See—*
  - Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 5,015,663, Cl. 514-510.000.

VOL
1126
ISS
2
MY
14
1991
UMI

- Penney, Keith A.: *See—*
  - Leptich, Joseph M.; Penney, Keith A.; and Lowe, Steve F., 5,014,656, Cl. 123-169.0EL.
- Pennzoil Products Company: *See—*
  - DesLauriers, Paul J.; and Heilman, William J., 5,015,507, Cl. 427-385.500.
- Pentel of America, Ltd.: *See—*
  - Petterson, Tor, 5,015,111, Cl. 401-52.000.
- Pento, Joseph T.: *See—*
  - Magarian, Robert A.; Pento, Joseph T.; and Day, Billy W., 5,015,666, Cl. 514-754.000.
- Pentz, Edward L.: *See—*
  - Marpoe, Jr. Gary R.; and Pentz, Edward L., 5,014,535, Cl. 72-326.000.
- Peoples, Marc A.: *See—*
  - Nixon, Ronald A.; Peoples, Marc A.; and Plasko, Emil R., 5,015,987, Cl. 338-22.00R.
- Perdicakis, Michel: *See—*
  - Bessiere, Jacques; and Perdicakis, Michel, 5,015,957, Cl. 324-438.000.
- Perettie, Donald J.: *See—*
  - Strandjord, Andrew J.; Yates, Ronald L.; and Perettie, Donald J., 5,016,240, Cl. 369-288.000.
- Perini, Richard J., to Moog Controls, Inc. Floating seal arrangement. 5,015,000, Cl. 277-16.000.
- Perkin-Elmer Corporation, The: *See—*
  - Trapani, Richard D.; Hacker, Martin E.; Turner, Melvyn E.; Taylor, Ronald; and Rotolico, Anthony J., 5,014,916, Cl. 239-85.000.
- Perlman, Stuart S., to RCA Licensing Corporation. Control circuitry for an adaptive multistandard video comb filter. 5,016,092, Cl. 358-31.000.
- Permelec Electrode Ltd.: *See—*
  - Nishiki, Yoshinori; Sawamoto, Isao; Nakamatsu, Shuji; and Shimamune, Takayuki, 5,015,354, Cl. 204-254.000.
- Perneczky, George C. Low profile roll cleaning apparatus and self aligning bearing used therein. 5,015,303, Cl. 134-32.000.
- Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, to BASF Lacke & Farben Aktiengesellschaft. Synthetic resin with basic nitrogen groups, preparation and use thereof using a urethane carrying ketimine. 5,015,672. Cl. 523-415.000.
- Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, to BASF Lacke & Farben Aktiengesellschaft. Synthetic resin with basic nitrogen groups, preparation and use thereof using a urethane carrying ketimine. 5,015,673, Cl. 523-415.000.
- Perreau, Philippe: *See—*
  - Lessi, Jacques; Perreau, Philippe; Bary, Daniel; and Grard, Guy, 5,014,440, Cl. 33-557.000.
- Perret-Gentil, Hubert B. Offshore erosion protection assembly. 5,015,121, Cl. 405-31.000.
- Perrone, Michael A. Post-surgical slipper. 5,014,448, Cl. 36-110.000.
- Perry, Lanny; and Thomas, William G. Evacuator tube tip guard. 5,015,184, Cl. 433-93.000.
- Perry, Michael: *See—*
  - Krumme, John F.; Perry, Michael; Yasumura, Gary; and Selvin, Gerald J., 5,015,193, Cl. 439-161.000.
- Perry, Robert G. Apparatus for directing forward movement of a rod. 5,015,124, Cl. 405-184.000.
- Perry, Timothy J., to Mello Manufacturing, Inc. High efficiency industrial vacuum cleaner and filter element. 5,015,274, Cl. 55-97.000.
- Perry, Wayne. Bicycle rack for use in pickup trucks. 5,014,890, Cl. 224-42.46R.
- Perstorp AB: *See—*
  - Siren, Matti, 5,015,634, Cl. 514-103.000.
- Perzborn, Elisabeth: *See—*
  - Boshagen, Horst; Perzborn, Elisabeth; and Fiedler, Volker-Bernd. 5,015,657, Cl. 514-419.000.
- Pestka, Sidney: *See—*
  - Friesen, Heinz-Jurgen; and Pestka, Sidney, 5,015,730, Cl. 530-351.000.
- Peteronio, Carlo F.: *See—*
  - Koch, Karl C.; Oates, Robert M.; Peteronio, Carlo F.; and Einolf, Charles W., Jr., 5,015,949, Cl. 324-207.250.
- Peters, Alan R.: *See—*
  - Kozyrski, Vincent T.; and Peters, Alan R., 5,014,584, Cl. 83-464.000.
- Peters, Dennis W. Golf trainer. 5,014,994, Cl. 273-187.00R.
- Peters, Edward N.: *See—*
  - Giles, Harold F., Jr.; Peters, Edward N.; Riding, Geoffrey H.; Thimons, Thomas V.; and Willard, G. F., 5,015,726, Cl. 528-349.000.
- Peters, Marjorie: *See—*
  - Berger, Joel G.; Chang, Wei K.; and Peters, Marjorie, 5,015,639, Cl. 514-213.000.
- Peters, Terry D. Railway switch stand and method of modifying the same. 5,014,937, Cl. 246-406.000.
- Petisce, James R., to AT&T Bell Laboratories. Coated optical fiber and methods of making. 5,015,068, Cl. 350-96.300.
- Petrohilos, Dimitri, to Adestia Corporation. Shelf support clip. 5,014,952, Cl. 248-250.000.
- Petterson, Tor, to Pentel of America, Ltd. Eraser dispenser and writing instrument equipped with eraser dispenser. 5,015,111, Cl. 401-52.000.
- Pfaue, Johannes, to Patent Treuhand Gesellschaft fur elektrische Gluhlampen m.b.H. High-pressure discharge lamp, especially sodium vapor lamp. 5,015,913, Cl. 313-625.000.
- Pfizer Inc.: *See—*
  - Chen, Yuhpyng L., 5,015,473, Cl. 424-114.000.
- PFW(Nederland)B.V.: *See—*
  - Lenselink, Willem; and Sipma, Gerben, 5,015,761, Cl. 560-256.000.
- Phelon, Russell D.; and Brunelle, Ronald G., to R. E. Phelon Company, Inc. Rotor of a magnetmotive device. 5,015,901, Cl. 310-153.000.
- Phelps, Peter D.: *See—*
  - Boden, Eugene P.; and Phelps, Peter D., 5,015,720, Cl. 528-179.000.
- Philip Morris Incorporated: *See—*
  - Osdene, Thomas S.; Secor, Henry V.; and Seeman, Jeffrey I., 5,015,741, Cl. 546-281.000.
- Philipp, Alexander, to C. Nicolai GmbH & Co. KG. Orthotic insole with regions of different hardness. 5,014,706, Cl. 128-581.000.
- Phillips Petroleum Company: *See—*
  - Kallenbach, Lyle R.; and Yu, Michael C., 5,015,686, Cl. 524-413.000.
  - Patton, Gary R., 5,015,587, Cl. 436-55.000.
  - Reed, Larry E.; and Porter, Randall A., 5,015,358, Cl. 208-48.0AA.
  - Scoggins, Lacey E.; and Ceurvorst, Joseph G., 5,015,702, Cl. 525-537.000.
  - Scoggins, Lacey E.; Hoover, Kenneth C.; and Shang, Wei-Teh Wade, 5,015,725, Cl. 528-310.000.
- Photographic Sciences Corporation: *See—*
  - Eastman, Jay M.; and Boles, John A., 5,015,831, Cl. 235-462.000.
- Photon Imaging Corp.: *See—*
  - Detig, Robert H.; Sidey, Michael; and Wang, Li-Shin, 5,015,064, Cl. 350-96.240.
- Picanol N.V.: *See—*
  - Vandeweghe, Michel; and Vanheule, Willy, 5,014,754, Cl. 139-1.00R.
- Picciano, Paul T.: *See—*
  - Benedict, Christine V.; and Picciano, Paul T., 5,015,677, Cl. 524-17.000.
- Picek, Charles R. Semi-rigid enhanced area filter element. 5,015,376, Cl. 210-317.000.
- Picker International, Ltd.: *See—*
  - Young, Ian R., 5,015,955, Cl. 324-309.000.
- Pielartzik, Harald: *See—*
  - Meier, Helmut-Martin; Pielartzik, Harald; and Brinkmeyer, Hermann, 5,015,689, Cl. 525-43.000.
- Pienkowski, David: *See—*
  - Pollack, Solomon R.; Brighton, Carl T.; Pienkowski, David; and Griffith, Neil J., 5,014,699, Cl. 128-419.00F.
- Piera, Henri: *See—*
  - Maurin, Bruno; and Piera, Henri, 5,014,454, Cl. 38-93.000.
- Pierce, Thomas V.: *See—*
  - LaCamera, Alfred; Van Linden, Jan H. L.; Pierce, Thomas V.; and Parkhill, James O., 5,015,343, Cl. 204-67.000.
- Pierce, Wayne A.: *See—*
  - Morley, Darrel L.; Pierce, Wayne A.; and Willyard, James A., 5,014,893, Cl. 224-321.000.
- Pietrowski, Kenneth W.; and Radulski, Charles A., to Xerox Corporation. Method and apparatus for using vibratory energy with application of transfer field for enhanced transfer in electrophotographic imaging. 5,016,055, Cl. 355-273.000.
- Pilgrim, William R.; and Lagiere, Joel, to Centre International de Recherches Dermatologiques (CIRD). Process for the preparation of 1-adamantane derivatives. 5,015,758, Cl. 560-56.000.
- Pinckney, Robert L.: *See—*
  - Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,016,015, Cl. 342-2.000.
- Pinkerton, Dennis; Jaekel, Robert W.; and Pardinas, Guillermo P. Pump with multi-port discharge. 5,015,157, Cl. 417-500.000.
- Pinneo, John M., to Crystallume. Fluidized bed diamond particle growth. 5,015,528, Cl. 428-403.000.
- Pioneer Electronic Corporation: *See—*
  - Imai, Kunio; and Nakada, Hitoshi, 5,015,999, Cl. 340-702.000.
  - Tabuchi, Hirotoshi; Kumasaka, Osamu; Ito, Katsura; and Koushiro, Kenji, 5,015,338, Cl. 204-5.000.
  - Yamashita, Masayasu; Suzuki, Masami; Yoshio, Junichi; and Watanabe, Osamu, 5,016,113, Cl. 358-335.000.
- Pirelli Transmissioni Industriali S.p.A.: *See—*
  - Macchiarulo, Vincenzo; and Di Giacomo, Tommaso, 5,015,218, Cl. 474-152.000.
- Piriz, Jose M., to Thomas & Betts Corporation. Plug and socket electrical connection assembly. 5,015,195, Cl. 439-318.000.
- Pitney Bowes Inc.: *See—*
  - Dolan, Donald T.; Durst, Robert T., Jr.; Hubbard, David W.; and Silverberg, Morton, 5,014,797, Cl. 177-4.000.
  - Strom-Olsen, John O.; and Rudkowski, Piotr Z., 5,015,992, Cl. 340-551.000.
  - Strom-Olsen, John O.; and Rudkowski, Piotr Z., 5,015,993, Cl. 340-551.000.
- Piwonka, Thomas S.: *See—*
  - El-Kaddah, Nagy H.; Piwonka, Thomas S.; and Berry, John T., 5,014,769, Cl. 164-493.000.
- Plachetta, Christoph: *See—*
  - Steiert, Peter; Betz, Walter; Plachetta, Christoph; and Koch, Eckhard M., 5,015,681, Cl. 524-101.000.
- Plagens, Mark R., to Honeywell Inc. Integrated injection logic gate with heavily doped diffusion. 5,016,079, Cl. 357-43.000.
- Plasko, Emil R.: *See—*
  - Nixon, Ronald A.; Peoples, Marc A.; and Plasko, Emil R., 5,015,987, Cl. 338-22.00R.
- Plastic Packing, Inc.: *See—*
  - Mercer, Joseph B., 5,015,103, Cl. 383-10.000.

- Plath, Peter: *See—*
  - Rheinheimer, Joachim; Plath, Peter; Eicken, Karl; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,015,285, Cl. 71-92.000.
- Pless, Benjamin; Sweeney, Michael; and Winkle, Roger, to Ventritex. Programmable defibrillator. 5,014,697, Cl. 128-419.00D.
- Pless, Benjamin D.; and Carroll, Kenneth J., to Ventritex, Inc. Implantable cardiac defibrillator employing a digital waveform analyzer system. 5,014,701, Cl. 128-419.0PG.
- Pletsch, Hubert: *See—*
  - Wolf, Franz J.; and Pletsch, Hubert, 5,014,967, Cl. 267-153.000.
- Plunkett, Richard A.: *See—*
  - Hershberger, Donald F.; and Plunkett, Richard A., 5,015,418, Cl. 260-410.90R.
- PMC Patents Management & Consulting (Luxembourg) Holding S.A.: *See—*
  - Wild, Johann K.; and Egloffstein, Nicole, 5,014,848, Cl. 206-315.900.
- Podell, Allen F.; Ali, Fazal; and Benton, Robert H., to Pacific Monolithics. Feedback cascode amplifier. 5,015,968, Cl. 330-277.000.
- Podlesak, Robert G.: *See—*
  - Lewan, Philip C.; Podlesak, Robert G.; and Buchner, Kenneth L., 5,015,378, Cl. 210-386.000.
- Pogue, Michael A.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Pohl, Ludwig: *See—*
  - Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, 5,015,747, Cl. 556-1.000.
- Poke, Inc.: *See—*
  - Kleinwolterink, Henry, Jr.; and Granstra, Dixon G., 5,015,237, Cl. 604-143.000.
- Polaschegg, Hans-Dietrich, to Fresenius AG. Apparatus for infustion of medicaments. 5,015,226, Cl. 604-4.000.
- Pollack, Solomon R.; Brighton, Carl T.; Pienkowski, David; and Griffith, Neil J., to University of Pennsylvania, Trustees of the. Electromagnetic method and apparatus for healing living tissue. 5,014,699, Cl. 128-419.00F.
- Pollalis, Spiro N.; and Ueda, Yasuo. Task management. 5,016,170, Cl. 364-401.000.
- Pollard, Jean; Duchamp, Robert; and Truchot, Patrick, to Societe d'Etudes et de Recherches de l'Ecole Nationale Superieure d'Arts et Metiers. Optical anamorphoser and method of manufacture. 5,015,065, Cl. 350-96.240.
- Polyonics Corporation: *See—*
  - Walsh, Daniel P., 5,015,517, Cl. 428-156.000.
- Polysar Financial Services S.A.: *See—*
  - Blanpain, Peter R. J.; and Leenders, Hendrikus W., 5,015,713, Cl. 526-318.400.
- Polysense, Inc.: *See—*
  - Seitz, William R.; and McCurley, Marian F., 5,015,843, Cl. 250-227.210.
- Polyset Company: *See—*
  - Silvera, Robert K., 5,015,377, Cl. 210-323.200.
- Pontius, Brian W., to Leland Stanford University, Board of Trustees of. Acceleration of nucleic acid hybridization. 5,015,569, Cl. 435-6.000.
- Poole, Robert D.: *See—*
  - Baxter, James E.; and Poole, Robert D., 5,014,624, Cl. 102-503.000.
- Pope, Patrick S.: *See—*
  - Jesshope, Christopher R.; Pope, Patrick S.; Hey, Anthony J. G.; Nicole, Denis A.; and Lloyd, Edward K., 5,016,163, Cl. 364-200.000.
- Portanova, Gregory A.: *See—*
  - Sprague, Brian J.; and Portanova, Gregory A., 5,016,210, Cl. 364-766.000.
- Porter, Frank K., Jr., to Raytheon Company. Multiple encoder fuze. 5,014,591, Cl. 89-6.000.
- Porter, Randall A.: *See—*
  - Reed, Larry E.; and Porter, Randall A., 5,015,358, Cl. 208-48.0AA.
- Porter, Ronald J., to Sierra Machinery, Inc. Centering stand for cylinder holder. 5,014,580, Cl. 82-164.000.
- Portillo, Luis C., Jr. Centralized bicarbonate concentrate distribution system and related methods for facilitating hemodialysis. 5,015,389, Cl. 210-646.000.
- Post, Curtis W.: *See—*
  - Tran, Nam H.; Deavenport, Dennis L.; and Post, Curtis W., 5,015,750, Cl. 556-187.000.
- Post, Michael T.: *See—*
  - Benson, David E.; and Post, Michael T., 5,014,608, Cl. 98-33.100.
- Potter, Jeffrey D.: *See—*
  - Stone, Robert F.; Potter, Jeffrey D.; and Beamon, William S., III, 5,016,193, Cl. 364-518.000.
- Potter, William R.: *See—*
  - Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., 5,015,463, Cl. 424-7.100.
- Potzas, Peter. Device for relieving the strain on cables. 5,014,938, Cl. 248-56.000.
- Powell, Gary B., to Matrix Integrated Systems. Method of plasma etching with parallel plate reactor having a grid. 5,015,331, Cl. 156-643.000.
- PPG Industries, Inc.: *See—*
  - Siegel, Melvin W.; and Grundy, Reed H., 5,015,867, Cl. 250-560.000.
- Pratt, Jerry D. Angle measuring apparatus. 5,014,441, Cl. 33-561.100.
- Prawdzik, David P.: *See—*
  - Gee, Gregory P.; Martin, Edward J.; and Prawdzik, David P., 5,014,550, Cl. 73-118.200.
- Prayer, Gerard: *See—*
  - Fiorini, Roland; and Prayer, Gerard, 5,014,492, Cl. 53-405.000.
- Precision Governors, Inc.: *See—*
  - Meyer, Hal G., 5,014,667, Cl. 123-360.000.
- Preformed Line Products Company: *See—*
  - Sherman, Thomas E., 5,014,941, Cl. 248-74.400.
- Prelich, John G. Exercising devices using magnetic resistance. 5,014,981, Cl. 272-122.000.
- Presley, Jerry R.: *See—*
  - Goodman, Clarence R.; and Presley, Jerry R., 5,015,002, Cl. 277-212.0FB.
- Prestel, Fritz; and Lohner, Martin, to BSG-Schalttechnik GmbH & Co. KG. Switch arranged for being mounted on a circuit board. 5,016,140, Cl. 361-400.000.
- Presty, Dominic F.; and Tompkins, Thomas M., to United States Surgical Corporation. Surgical stapling apparatus. 5,014,899, Cl. 227-180.000.
- Prewo, Karl M.: *See—*
  - Nardone, Vincent C.; Strife, James R.; and Prewo, Karl M., 5,015,116, Cl. 403-28.000.
- Prijic, Nevenka: *See—*
  - Leclerc, Guy; Bernier, Serge; Lalande, Philippe; and Prijic, Nevenka, 5,015,806, Cl. 200-52.00R.
- Prince Corporation: *See—*
  - Kindig, Alan L.; Lindberg, Kenneth M.; and Burrows, Bradford J., 5,015,034, Cl. 297-227.000.
- Princeton University: *See—*
  - Cho, Dong-Il D.; Kumar, Suresh; and Carr, William N., 5,015,906, Cl. 310-309.000.
- Prindle, William: *See—*
  - Skerker, Robert; and Prindle, William, 5,014,434, Cl. 30-345.000.
  - Skerker, Robert B.; and Prindle, William, 5,014,921, Cl. 241-169.200.
- Prissel, Lee P.: *See—*
  - Lambeth, Shawn M.; Prissel, Lee P.; and Tarara, William D., 5,016,160, Cl. 364-200.000.
- Pro-Tool, Inc.: *See—*
  - Hippach, Charles K., 5,014,409, Cl. 29-267.000.
- Procter & Gamble Company, The: *See—*
  - Connor, Daniel S.; and Stidham, Robert E., 5,015,468, Cl. 424-55.000.
  - Goldman, Stephen A.; Horney, James C.; and Retzsch, Herbert L., 5,015,246, Cl. 604-368.000.
  - Noda, Isao, 5,015,245, Cl. 604-367.000.
  - Parran, John J., Jr.; Coyle-Rees, Margaret M.; Rotruck, John T.; and Sunberg, Richard J., 5,015,466, Cl. 424-52.000.
  - Smitherman, Herbert C., 5,015,467, Cl. 424-52.000.
- Production Engineering Association of Shin-Osaka: *See—*
  - Taguchi, Tsunemasa; and Nanba, Hirokuni, 5,015,327, Cl. 156-603.000.
- Proform Fitness Products, Inc.: *See—*
  - Bersonnet, George B.; and Schumway, Dante L., 5,014,980, Cl. 272-73.000.
- Promineral Gesellschaft zur Verwendung von Mineralstoffen mbH: *See—*
  - Koslowski, Thomas J., 5,015,449, Cl. 423-172.000.
  - Koslowski, Thomas J., 5,015,450, Cl. 423-172.000.
- Protectaire Systems Co.: *See—*
  - Russell, Frederick E.; and Russell, Brandon, 5,015,393, Cl. 210-744.000.
- Pujado, Peter R.: *See—*
  - Vora, Bipin V.; Pujado, Peter R.; and Luebke, Charles P., 5,015,783, Cl. 568-697.000.
- Pulse Engineering, Inc.: *See—*
  - Lint, James D.; and Gutierrez, Aurelio J., 5,015,981, Cl. 336-65.000.
- Purcell, William M., to United States of America, Air Force. Surface preparation for adhesive bonding. 5,015,506, Cl. 427-333.000.
- Puri, Rajen; and Stein, Michael H., to Amoco Corporation. Methane production from carbonaceous subterranean formations. 5,014,785, Cl. 166-263.000.
- Puri, Rajen; Yee, Dan; Buxton, Thomas S.; and Majahan, Om, to Amoco Corporation. Method of increasing the permeability of a coal seam. 5.014,788, Cl. 166-308.000.
- Puritan-Bennett Corporation: *See—*
  - Divers, George A.; and Hui, Henry K., 5,015,715, Cl. 528-15.000.
- Pusineri, Christian; and Cronenberger, Michel, to Hospal Industrie. Integrated device for the biospecific purification of a liquid containing cellular elements. 5,015,388, Cl. 210-641.000.
- Putsch, Karl: *See—*
  - Putsch, Ralf; and Putsch, Karl, 5,014,432, Cl. 30-191.000.
- Putsch, Ralf; and Putsch, Karl, to Knipex-Werk C. Gustav Putsch. Center-cutters. 5,014,432, Cl. 30-191.000.
- Putseys, Roland: *See—*
  - Verbueken, Armand; Sluyts, Domien; and Putseys, Roland, 5,015,456, Cl. 423-395.000.
- Pyle, Stoddard H.: *See—*
  - Webb, William J.; and Pyle, Stoddard H., 5,014,583, Cl. 83-76.900.
- Pyxis Corporation: *See—*
  - McLaughlin, Carol F.; Taylor, Ronald R.; Williams, William D.; and Steusloff, Patrick M., 5,014,875, Cl. 221-2.000.
- Quack Sporting Clays, Inc.: *See—*
  - Gagnon, Kenneth M., Sr., 5,014,677, Cl. 124-6.000.

VOL 126
ISS 2
MY 14 1991
UMI

- Quaker Oats Company, The: *See—*
  - Taylor, William R., 5,014,587, Cl. 84-659.000.
- Quartz & Silice: *See—*
  - Guibert, Paul; and Launay, Francis A. P., 5,015,279, Cl. 65-302.000.
- R. E. Phelon Company, Inc.: *See—*
  - Phelon, Russell D.; and Brunelle, Ronald G., 5,015,901, Cl. 310-153.000.
- R. E. Timm & Associates, Inc.: *See—*
  - Timm, Ronald E., 5,014,629, Cl. 109-34.000.
- R. J. Reynolds Tobacco Company: *See—*
  - Angell, Mickey A.; Cearley, Thomas W.; Lewis, James C.; St. Onge, Arthur R.; Szysh, John A.; and White, Kenneth W., 5,015,145, Cl. 414-547.000.
- R.R. Donnelley & Sons Company: *See—*
  - Tapper, Lee C., 5,014,616, Cl. 101-153.000.
- Rabhan, Andrew B.: *See—*
  - Zinn, Ben T.; Daniel, Brady R.; and Rabhan, Andrew B., 5,015,171, Cl. 431-1.000.
- Rabii, Khosro M., to Zenith Electronics Corporation. Spatial scan converted with vertical detail enhancement. 5,016,103, Cl. 358-166.000.
- Radermacher, Roger. Machine for wrapping divider panels or the like. 5,014,408, Cl. 29-243.580.
- Radke, Daniel D.: *See—*
  - Johnson, Russell I.; Radke, Daniel D.; and Ball, Garry L., 5,015,148, Cl. 414-722.000.
- Radochonski, Pierre A., to Tektronix, Inc. Half toning pixel processor. 5,016,191, Cl. 364-518.000.
- Radov, Mitchell C. Leader assembly and method. 5,015,089, Cl. 352-235.000.
- Radulski, Charles A.: *See—*
  - Pietrowski, Kenneth W.; and Radulski, Charles A., 5,016,055, Cl. 355-273.000.
- Radun, Arthur V., to General Electric Company. Current sensor for measuring current in a semiconductor switch. 5,015,945, Cl. 324-127.000.
- Rae, Peter M. M.: *See—*
  - Scangos, George A.; Rae, Peter M. M.; Unterbeck, Axel J.; and Kamarck, Michael E., 5,015,570, Cl. 435-6.000.
- Raffel, Mark J., to Raffel Product Development Co. Mounting for vibrating motor. 5,014,687, Cl. 128-33.000.
- Raffel Product Development Co.: *See—*
  - Raffel, Mark J., 5,014,687, Cl. 128-33.000.
- Raghavan, Chidambaram, to Flow Systems, Inc. Method for forming a sealed coupling using a high pressure hose fitting with an O-ring type seal. 5,014,423, Cl. 29-890.144.
- Rahman, Aziz: *See—*
  - Czarn, David A.; Rahman, Aziz; Sadler, Alan M.; and Baker, Gary A., 5,015,808, Cl. 200-83.00P.
- Rakszawski, John F.: *See—*
  - D'Orazio, Robert P.; and Rakszawski, John F., 5,015,396, Cl. 210-763.000.
- Ram, Anand: *See—*
  - Martin, Geoffrey S.; and Ram, Anand, 5,015,230, Cl. 604-96.000.
- Ramachandran, Ramakrishnan; Shukla, Yagya; and MacLean, Donald L., to BOC Group, Inc., The. Process for the production of nitriles. 5,015,756, Cl. 558-320.000.
- Ramaswamy, Coodly P., to Breed Automotive Technology, Inc. Primary/detonator compositions suitable for use in copper cups. 5,015,311, Cl. 149-42.000.
- Ramp Comsystems, Inc.: *See—*
  - Dessertine, Albert L., 5,016,172, Cl. 364-413.020.
- Ramsey, Barnwell S.: *See—*
  - Cueman, Glenn F.; Richbourg, Henry L., Jr.; and Ramsey, Barnwell S., 5,014,691, Cl. 128-80.00H.
- Ramunas, Valdas S., to Kennametal Inc. Top jaw assembly with replaceable work holding pads. 5,015,003, Cl. 279-123.000.
- Randklev, Ronald M., to Minnesota Mining and Manufacturing Company. Dental article containing light-curable paste. 5,015,180, Cl. 433-9.000.
- Rao, Sundar M., to Du Pont de Nemours, E. I., and Company. Apparatus for determining flow behavior index. 5,014,545, Cl. 73-55.000.
- Rao, V. N. Mallikarjuna, to Du Pont de Nemours, E. I., and Company. Catalyzed hydrofluorination of alkenes. 5,015,791, Cl. 570-168.000.
- Rao, Vemulapalli D. N.: *See—*
  - Wade, Wallace R.; and Rao, Vemulapalli D. N., 5,014,511, Cl. 60-303.000.
- Rapkin, Alan E., to Eastman Kodak Company. Multicolor image forming apparatus having improved registration. 5,016,062, Cl. 355-327.000.
- Rashleigh, Scott C.: *See—*
  - Thorncraft, David A.; Lyons, Peter R. A.; Rashleigh, Scott C.; Maine, Johnathan A.; and Love, John D., 5,015,058, Cl. 350-96.150.
- Ratermann, Richard J.: *See—*
  - Brandon, John M.; Bradley, Brian D.; and Ratermann, Richard J., 5,015,109, Cl. 400-624.000.
- Rau, Ernst: *See—*
  - Muller, Klaus-Dieter; Rau, Ernst; and Sacher, Christian, 5,016,105, Cl. 358-182.000.
- Ravichandran, Ramanathan: *See—*
  - Galbo, James P.; and Ravichandran, Ramanathan, 5,015,683, Cl. 524-103.000.
  - Seltzer, Raymond; Galbo, James P.; and Ravichandran, Ramanathan, 5,015,678, Cl. 524-99.000.
- Ravipati, Sitaramaiah; Zador, Eugene; Kaczmarek, Wesley R.; Coleman, Ernest A.; and Rostoker, David, to Norton Company. Patterned coated abrasive for fine surface finishing. 5,014,468, Cl. 51-295.000.
- Raychem Corporation: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Raytheon Company: *See—*
  - Porter, Frank K., Jr., 5,014,591, Cl. 89-6.000.
- Razdolsky, Robert, to Reliance Comm/Tec Corporation. Locking mechanism for equipment cabinet. 5,015,019, Cl. 292-200.000.
- RCA Licensing Corporation: *See—*
  - Perlman, Stuart S., 5,016,092, Cl. 358-31.000.
- Read, Arthur E., Jr.; Burba, John L., III; Doty, Peter A.; and Crabb, Clarence R., to Dow Chemical Company, The. Viscosity-modifiers for aqueous-based functional products containing mixed metal hydroxides. 5,015,409, Cl. 252-108.000.
- Read, John D.: *See—*
  - Riggle, Charles M.; Svendsen, Peter R.; and Read, John D., 5,016,131, Cl. 360-106.000.
- Reay, Robert L. Schottky enhanced CMOS output circuit. 5,015,889, Cl. 307-475.000.
- Reckitt & Colman Inc.: *See—*
  - Hoyt, Earl; and Patel, Manharbhai K., 5,014,913, Cl. 239-45.000.
- Reckitt GmbH: *See—*
  - Reuss, Mira, 5,015,408, Cl. 252-99.000.
- Redmond, John P.; and Shaak, Ray N., to AMP Incorporated. Electrical connector and cable utilizing spring grade wire. 5,015,197, Cl. 439-329.000.
- Reed, James P.: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Reed, Larry E.; and Porter, Randall A., to Phillips Petroleum Company. Antifoulants comprising titanium for thermal cracking processes. 5,015,358, Cl. 208-48.0AA.
- Reed Packaging Limited: *See—*
  - Sams, Bernard, 5,014,886, Cl. 222-399.000.
- Reede, Dwayne. Brake replacement warning system and device useful therein. 5,015,990, Cl. 340-454.000.
- Reeder, Larry R.: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Rees, Phyllis A.: *See—*
  - Benner, Jack S., II; and Rees, Phyllis A., 5,015,581, Cl. 435-172.300.
- Reesman, Russell B. Apparatus for heating an article. 5,014,446, Cl. 34-151.000.
- Reichard, Jerome J., to Thor Technology Corporation. Electric motor with regeneration current commutation. 5,015,927, Cl. 318-139.000.
- Reichmann, Mark G., to Amoco Corporation. Reducing xylene loss in the catalytic isomerization of a xylene-containing feed. 5,015,794, Cl. 585-258.000.
- Reid, Jerome L., to Wasserman, Nelson. Photochromic polymeric membrane. 5,015,416, Cl. 252-586.000.
- Reilly Industries, Inc.,: *See—*
  - McQuigg, Donald W.; Webb, Heather K.; and Sowers, Edward E., 5,015,706, Cl. 526-200.000.
- Reilly, James L.; and Leader, Gordon R., to Atochem North America, Inc. Alkyl aryl sulfones and method of preparing the same. 5,015,775, Cl. 568-28.000.
- Rein, Hans-Martin, to ANT Nachrichtentechnik GmbH. Method and circuit arrangement for generating a phase shifted clock pulse signal. 5,015,872, Cl. 307-269.000.
- Reinartz, Hans-Dieter; Steffes, Helmut; and Hayn, Holger V., to Alfred Treves GmbH. Method for assembling a piston-and-cylinder unit with a force transmission element. 5,014,514, Cl. 60-533.000.
- Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, to Bayer Aktiengesellschaft. Pan dry spinning process of increased spinning chimney capacity using superheated steam as the spinning gas medium. 5,015,428, Cl. 264-129.000.
- Reischle, Klaus: *See—*
  - Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.
- Reiss, Gerhard, to Bayer Aktiengesellschaft. Separation of gas mixtures by vacuum swing adsorption (VSA) in a two-adsorber system. 5,015,271, Cl. 55-25.000.
- Reiss, Wolfgang: *See—*
  - Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl. 568-861.000.
- Reit Distributing Corp.: *See—*
  - Reitmeier, Jerry; Marquardt, Wayne; Smith, Mark; and Nethers David, 5,014,896, Cl. 227-39.000.
- Reitmeier, Jerry; Marquardt, Wayne; Smith, Mark; and Nethers, David, to Reit Distributing Corp. Staple gun for attaching labels. 5,014,896, Cl. 227-39.000.
- Reliance Comm/Tec Corporation: *See—*
  - Razdolsky, Robert, 5,015,019, Cl. 292-200.000.

- Renishaw plc: *See—*
  - McMurtry, David R.; Robertson, John P.; and Darlington, Alan D., 5,016,199, Cl. 364-560.000.
- Renneck, John P.: *See—*
  - Brock, James D.; Smith, Donald W.; Basset, James H.; and Renneck, John P., 5,015,120, Cl. 404-108.000.
- Resch, Reinhard, to Daimler-Benz AG. Drive-slip control device (ASR) on a road vehicle also equipped with an anti-lock system (ABS). 5,015,043, Cl. 303-100.000.
- Research Association of Electric Conductive Inorganic Compounds: *See—*
  - Sekido, Satoshi; Tachibana, Hirokazu; and Yamamura, Yasuharu, 5,015,616, Cl. 502-303.000.
- Resnick, Joseph A. Speech monitor. 5,015,179, Cl. 434-185.000.
- Retzsch, Herbert L.: *See—*
  - Goldman, Stephen A.; Horney, James C.; and Retzsch, Herbert L., 5,015,246, Cl. 604-368.000.
- Reuss, Mira, to Reckitt GmbH. Denture cleaning tablet containing a bleach activator and an organic phosphonic acid stabilizer. 5,015,408, Cl. 252-99.000.
- Reveen, Tyrone J. Confetti cannon. 5,015,211, Cl. 446-475.000.
- Rex, Donald K.: *See—*
  - Paterra, Jeffrey H.; and Rex, Donald K., 5,015,108, Cl. 400-197.000.
- Rey, Giorgio A., to Italimpianti of America, Inc. Hydrostatic bearing support of strip. 5,015,509, Cl. 427-431.000.
- Reynolds, Charles E., to AMP Incorporated. Single line, automatic key programming and connector transfer system. 5,014,416, Cl. 29-701.000.
- Reynolds, Eric C., to University of Melbourne, The; and Victorian Dairy Industry Authority. Anticariogenic phosphopeptides. 5,015,628, Cl. 514-12.000.
- Reynolds, Richard W.: *See—*
  - Rice, John N.; and Reynolds, Richard W., 5,014,507, Cl. 60-204.000.
- Rhee, Seong K.: *See—*
  - Wang, Yiren S.; Rhee, Seong K.; and Jokisch, Robert E., 5,014,827, Cl. 188-72.400.
- Rheinheimer, Joachim; Plath, Peter; Eicken, Karl; Westphalen, Karl-Otto; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Aromatic carboxylic acid derivatives and the use thereof for controlling undesirable plant growth. 5,015,285, Cl. 71-92.000.
- Rhoades, Janice I. Self-manipulatable assembly for moving a leg in a cast. 5,014,692, Cl. 128-83.000.
- Rhomberg, Bruno; and Frick, Beat, to Gretag Aktiengesellschaft. Illuminating apparatus for projection purposes. 5,015,088, Cl. 352-198.000.
- Rhone-Poulenc Chimie: *See—*
  - Ardaud, Pierre; LeBrun, Jean-Jacques; and Mignani, Gerard, 5,015,607, Cl. 501-96.000.
  - Nonn, Alain, 5,015,792, Cl. 570-208.000.
- Rhone-Poulenc Rorer Pharmaceuticals Inc.: *See—*
  - Spada, Alfred P.; Studt, William L.; Campbell, Henry F.; Kuhla, Donald E.; and Tucker, Thomas, 5,015,638, Cl. 514-211.000.
  - Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 5,015,663, Cl. 514-510.000.
- Rice, John N.; and Reynolds, Richard W., to Sundstrand Corporation. Direct drive gaseous hydrogen turbo actuator. 5,014,507, Cl. 60-204.000.
- Rice-Kelly Research and Engineering, Inc.: *See—*
  - Rice, Richard F., Jr.; Kelly, David M.; and Smith, Daryl L., 5,016,003, Cl. 340-825.190.
- Rice, Richard F., Jr.; Kelly, David M.; and Smith, Daryl L., to Rice-Kelly Research and Engineering, Inc. Environmental control system for the handicapped. 5,016,003, Cl. 340-825.190.
- Richard, Daniel; Kolman, Kenneth; Case, Charles; Becker, Ronald; and Gross, Alex, to Avia Group International, Inc. Shoe sole construction. 5,014,449, Cl. 36-114.000.
- Richards, Gary W.: *See—*
  - Beer, Klaus; Richards, Gary W.; Oare, Thomas R.; Brown, Thomas A.; and Wells, Thomas H., 5,014,762, Cl. 152-532.000.
- Richards, John W.; Gillard, Clive H.; Avis, Richard J. A.; Samad, Raphael; and Walters, Carl W., to Sony Corporation. Video signal to photographic film conversion. 5,016,101, Cl. 358-140.000.
- Richbourg, Henry L., Jr.: *See—*
  - Cueman, Glenn F.; Richbourg, Henry L., Jr.; and Ramsey, Barnwell S., 5,014,691, Cl. 128-80.00H.
- Richman, Kevin S.; and Orsborn, Jesse H., to J. I. Case Company. Doffer assembly for a harvesting unit of a cotton harvester. 5,014,502, Cl. 56-41.000.
- Richter, Helmut; and Kupfer, Adelbert, to Siemens Aktiengesellschaft. Light distributor for an X-ray diagnostics installation. 5,015,071, Cl. 350-171.000.
- Richter, Peter; Hafner, Josef; and Schonenberger, Rolf, to Veit Transpo GmbH. Conveyor system. 5,014,864, Cl. 213-104.000.
- Rickett, Barry G.: *See—*
  - Connolly, Douglas P.; Rickett, Barry G.; Yax, Robert J.; and Swanson, Roger M., 5,016,171, Cl. 364-406.000.
- Ricoh Company, Ltd.: *See—*
  - Anderson, Carl P.; and Mayer, Edward E., 5,014,972, Cl. 271-3.100.
  - Arai, Yukiyoshi, 5,016,060, Cl. 355-312.000.
  - Fujii, Tatsuya; Sato, Yutaka; and Tanaka, Masafumi, 5,016,207, Cl. 364-724.010.
  - Hiroi, Masaki; Ino, Masumitsu; Nagata, Takehito; and Shimada, Masumi, 5,015,837, Cl. 250-208.100.
  - Itabashi, Akihisa, 5,015,050, Cl. 350-6.800.
  - Ohuchida, Shigeru; Kitabayashi, Junichi; and Inokuchi, Toshiyuki, 5,015,835, Cl. 250-201.500.
  - Sakata, Seiji; Harada, Tamotsu; Ito, Norifumi; Hayashi, Masayuki; Yoshimura, Tsuyoshi; and Koinuma, Nobuyuki, 5,016,114, Cl. 358-404.000.
  - Yamada, Masahiro, 5,016,189, Cl. 364-518.000.
- Ricoh Corporation: *See—*
  - Anderson, Carl P.; and Mayer, Edward E., 5,014,972, Cl. 271-3.100.
- Ricoh Research Institute of General Electronics Co., Ltd.: *See—*
  - Hiroi, Masaki; Ino, Masumitsu; Nagata, Takehito; and Shimada, Masumi, 5,015,837, Cl. 250-208.100.
- Rid, Robert: *See—*
  - Bross, Walter; Kordulla, Hans; and Rid, Robert, 5,015,857, Cl. 250-349.000.
- Riddick, Wayne T., to Amoco Corporation. Polybutylketones and hydroxyesters of epoxidized polybutenes. 5,015,697, Cl. 525-386.000.
- Ridewell Corporation: *See—*
  - Mitchell, James L., 5,015,004, Cl. 280-81.600.
- Ridewerks, Ltd.: *See—*
  - Watkins, William M.; Toyne, David L.; Arena, Alan J.; Lawver, Larry D.; and Birket, Daniel S., 5,015,933, Cl. 318-567.000.
- Ridgway, Richard W.; Seiler, Milton R.; and Wood, Van E., to Battelle Memorial Institute. Optical modulation at millimeter-wave frequencies. 5,015,052, Cl. 350-96.130.
- Riding, Geoffrey H.: *See—*
  - Giles, Harold F., Jr.; Peters, Edward N.; Riding, Geoffrey H.; Thimons, Thomas V.; and Willard, G. F., 5,015,726, Cl. 528-349.000.
- Riel, Frank J.; Vuong, Tuyet; and Delaney, Edward A., to Rohr Industries, Inc. Dimer for synthesis of high performance polymer matrix composites. 5,015,727, Cl. 528-353.000.
- Rieter Machine Works, Ltd.: *See—*
  - Oehler, Reinhard; Meyer, Urs; and Lattion, Andre, 5,015,938, Cl. 318-696.000.
  - Staheli, Paul; Demuth, Robert; and Fritzsche, Peter, 5,014,395, Cl. 19-105.000.
  - Wernli, Joerg; Brennwalder, Daniel; Erni, Markus; Fritschi, Isidor; and Wanzenried, Andreas, 5,014,505, Cl. 57-275.000.
- Rifaat, Mahassen S. Sun visor. 5,015,027, Cl. 296-97.600.
- Riggle, Charles M.; Svendsen, Peter R.; and Read, John D., to Digital Equipment Corporation. Integral balanced-moment head positioner. 5,016,131, Cl. 360-106.000.
- Rigney, Martin P.: *See—*
  - Carr, Peter W.; Funkenbusch, Eric F.; Rigney, Martin P.; Coleman, Patrick L.; Hanggi, Douglas A.; and Schafer, Wes A., 5,015,373, Cl. 210-198.200.
- Rigole, Rod: *See—*
  - Fox, John W.; and Rigole, Rod, 5,015,208, Cl. 441-55.000.
- Rikihisa, Nobuyoshi: *See—*
  - Tsunakawa, Isao; Rikihisa, Nobuyoshi; and Kato, Kiyohiko, 5,014,657, Cl. 123-185.00B.
- Rimmler, William F.: *See—*
  - Brown, George N.; Howard, Luke J.; and Rimmler, William F., 5,016,081, Cl. 357-67.000.
- Rinck, Michael: *See—*
  - Mathieu, Bernd; Rinck, Michael; Schnur, Jurgen; Selzer, Dieter; and Weber, Wolfram, 5,015,374, Cl. 210-232.000.
- Rinehart, William M., to A. B. Chance Company. Pultruded or filament wound synthetic resin fuse tube. 5,015,514, Cl. 428-36.400.
- Rishel, Barry E.: *See—*
  - Shaw, Harold L.; Smith, Randall B.; Cunningham, Larry E.; Rishel, Barry E.; Gioannini, John P.; and Harkey, Warren B., 5,016,005, Cl. 340-870.190.
- Rissel, Eva: *See—*
  - Birkle, Siegfried; Feucht, Hans-Dieter; Kamps, Rainer; and Rissel, Eva, 5,015,709, Cl. 526-279.000.
- Ritz, William C.; and Burack, Robert D., to Westinghouse Electric Corp. System and method for stress-relief of welds in heat exchanger tubes. 5,015,828, Cl. 219-523.000.
- Rivera, Louis: *See—*
  - Hollander, Milton B.; and Rivera, Louis, 5,014,907, Cl. 229-117.010.
- Rivier, Jean E. F.: *See—*
  - Spiess, Joachim; Rivier, Jean E. F.; Bardin, C. Wayne; and Vale, Wylie W., Jr., 5,015,729, Cl. 530-350.000.
- Robache, Patrick, to Mecaplastic. Device and installation for forming and closing trays. 5,014,500, Cl. 53-559.000.
- Robbins, Edward S., III. Sleeved containers with thin film lining. 5,014,872, Cl. 220-403.000.
- Robert Bosch GmbH: *See—*
  - Drobny, Wolfgang; Mattes, Bernhard; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,015,870, Cl. 307-66.000.
  - Hlousek, Jaroslaw; Lehner, Gerhard; and Stipek, Theodor, 5,015,160, Cl. 417-499.000.
  - Kleemann, Dittmar, 5,015,904, Cl. 310-184.000.
  - Klenk, Martin; Linder, Ernst; and Moser, Winfried, 5,014,668, Cl. 123-399.000.
  - Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.
- Roberts, John L., to Milwaukee Valve Company, Inc. Tamper-proof locking mechanism for quarter turn valves. 5,014,528, Cl. 70-177.000.
- Roberts, Kent S. Latch mechanism. 5,014,628, Cl. 108-133.000.
- Robertshaw Controls Company: *See—*
  - Kadwell, Brian J.; and Fowler, Daniel L., 5,015,827, Cl. 219-497.000.

Lewis, Jay L., 5,015,236, Cl. 604-120.000.
Orner, Robert E.; Cassarino, Aurelio V.; and Sepso, Roger P., 5,014,520, Cl. 62-187.000.
Sepso, Roger P.; and Halmose, John M., 5,014,729, Cl. 137-513.300.

Robertson, Jeffrey C., to Eastman Kodak Company. Web-spool for a cartridge. 5,014,923, Cl. 242-55.000.

Robertson, John A.; Cyphert, David L.; Cyphert, Thomas E.; and Muscarella, Joseph F., to Telesis Controls Corporation. Marking apparatus with multiple line capability. 5,015,106, Cl. 400-121.000.

Robertson, John P.: *See—*
McMurtry, David R.; Robertson, John P.; and Darlington, Alan D., 5,016,199, Cl. 364-560.000.

Robin, Mark L.; and Halpern, Donald F., to BOC, Inc. Anesthetic compound and method preparing. 5,015,781, Cl. 568-683.000.

Robinson, James R. Method and apparatus for culturing and diffusively oxygenating cells on isotropic membranes. 5,015,585, Cl. 435-240.242.

Robinson Knife Manufacturing Co., Inc.: *See—*
Skerker, Robert; and Prindle, William, 5,014,434, Cl. 30-345.000.
Skerker, Robert B.; and Prindle, William, 5,014,921, Cl. 241-169.200.

Robinson, Martin K.: *See—*
Yarranton, Geoffrey T.; Humphreys, Gwynfor O.; Robinson, Martin K.; Caulcott, Celia A.; and Wright, Edwina M., 5,015,573, Cl. 435-69.100.

Robinson, Stephen E.: *See—*
DiIorio, Mark S.; Robinson, Stephen E.; Crum, Duane B.; Paulson, Douglas N.; Buchanan, D. Scott; and Marsden, James R., 5,016,128, Cl. 360-97.010.

Robinson, Theodore S.: *See—*
Nguyen, Kham X.; Robinson, Theodore S.; Taylor, Michael D.; and Daberkow, Kevin L., 5,016,167, Cl. 364-200.000.

Robles, Antonio: *See—*
Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, 5,015,535, Cl. 428-610.000.

Roccaforte, Harry I., to Waldorf Corporation. Flip top sealed carton with tear filament. 5,014,855, Cl. 206-616.000.

Rochette, Denis; and Laurent, Pierre A., to Thomson-CSF. Method and device for coding the energy of a vocal signal in vocoders with very low throughput rates. 5,016,278, Cl. 381-36.000.

Rockwell International Corporation: *See—*
Lan, Ming-Shong, 5,016,188, Cl. 364-513.000.
Lin, Jiing-Kang; and Niemiro, Thaddeus A., 5,014,615, Cl. 101-147.000.
Wurst, Stephen G.; and Matsunaga, Kaori E., 5,015,083, Cl. 350-618.000.

Rockwell, Ned M.: *See—*
Goze, Jean M.; Bernhardt, Randal J.; Sajic, Branko; Rockwell, Ned M.; McConnell, Nina M.; and Mohring, William R., 5,015,415, Cl. 252-547.000.

Rodriguez, Henry: *See—*
Severn, Shawn R. T.; Rodriguez, Henry; Danesin, Renato R. A.; and Imber, Bryan E., 5,015,586, Cl. 436-29.000.

Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G.; Saraceno, Patricia J.; and Pacer, James M., to Xerox Corporation. Xerographic setup and operating system for electrostatographic reproduction machines. 5,016,050, Cl. 355-208.000.

Roerig, Arnold J.; and Brown, Dale A., to Beloit Corporation. Felt turning suction roll. 5,015,336, Cl. 162-369.000.

Rogasch, Klaus P. Electromagnet for an atomic absorption spectrometer. 5,015,093, Cl. 356-307.000.

Rogers, Stephen W., to GTE Mobilnet, Incorporated. Method and apparatus for utilizing a cellular telephone in a programmable, intelligent emergency freeway callbox. 5,016,269, Cl. 379-59.000.

Rohm and Haas Company: *See—*
Jacobson, Richard M.; and Nguyen, Luong T., 5,015,652, Cl. 514-384.000.

Rohr Industries, Inc.: *See—*
Riel, Frank J.; Vuong, Tuyet; and Delaney, Edward A., 5,015,727, Cl. 528-353.000.

Rohr, Wolfgang: *See—*
Schirmer, Ulrich; Rohr, Wolfgang; and Wuerzer, Bruno, 5,015,762, Cl. 560-313.000.

Rohra, Alois, to MTU Munchen GmbH. Arrangement for mounting a pivotable propfan blade. 5,015,150, Cl. 416-220.00R.

Romine, Lori; Sholders, Ronald; and Warren, Richard. Assembly for filtering amniotic fluid. 5,015,369, Cl. 210-136.000.

Ron Charles & Associates: *See—*
Charles, Robert V., 5,015,167, Cl. 425-388.000.

Ronde Engineering: *See—*
Anttonen, Raine, 5,014,844, Cl. 198-499.000.

Rook, Kenneth E.: *See—*
Steele, Lawrence C.; and Rook, Kenneth E., 5,016,054, Cl. 355-256.000.

Roos, William N., to Autotrol Corporation. Pellet dispenser. 5,014,877, Cl. 221-265.000.

Roper, Alan; and Johnson, Keith O., to Tarris Enterprises, Inc. Method and apparatus for measuring thickness of fat using infrared light. 5,014,713, Cl. 128-664.000.

Roquette Freres: *See—*
Patrick, Haon; and Patrick, Lemay, 5,015,297, Cl. 127-58.000.

Rose, James H.; and Moulder, John C., to Iowa State University Research Foundation, Inc. Method and apparatus for determining thermal resistance and structural integrity of coatings on conducting materials by monitoring electrical conductance of the underlying material upon localized heating of the overlying coating. 5,015,950, Cl. 324-224.000.

Rosen, Mordecai D.; and Matthews, Dennis L., to United States of America, Energy. X-ray lasers and methods utilizing two component driving illumination provided by optical laser means of relatively low energy and small physical size. 5,016,250, Cl. 372-5.000.

Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, to KLA Instruments Corporation. Stable instrument bench with replicated precision surface. 5,014,627, Cl. 108-50.000.

Rosenfeld, Aron M.: *See—*
Smits, Paul; Rosenfeld, Aron M.; and DeFerrari, Howard F., 5,015,318, Cl. 156-233.000.

Ross, Donald C., Jr.; and Ross, Donald C., Sr. Rotary drill apparatus. 5,015,128, Cl. 408-59.000.

Ross, Donald C., Sr.: *See—*
Ross, Donald C., Jr.; and Ross, Donald C., Sr., 5,015,128, Cl. 408-59.000.

Ross, Monty A.: *See—*
Wimpee, Lealon C.; Ross, Monty A.; O'Neil, Timothy J.; and Dean Chu, Edward M., 5,015,434, Cl. 376-254.000.

Rosser, David A.: *See—*
Birtwistle, David H.; Carter, Peter; and Rosser, David A., 5,015,471, Cl. 424-070.000.

Rossignol, Leopold; and van Wassenhove, Denis, to Textilver SA. Radiant heat resistant flexible tube. 5,014,753, Cl. 138-149.000.

Rostoker, David: *See—*
Ravipati, Sitaramaiah; Zador, Eugene; Kaczmarek, Wesley R.; Coleman, Ernest A.; and Rostoker, David, 5,014,468, Cl. 51-295.000.

Roth, Bruce D.; and Trivedi, Bharat K., to Warner-Lambert Company. Antihyperlipidemic and antiatherosclerotic urea and carbamate compounds. 5,015,644, Cl. 514-247.000.

Roth, Norman J., to Delco Electronics Corporation. Integrated circuit interconnect design. 5,016,082, Cl. 357-70.000.

Rotolico, Anthony J.: *See—*
Trapani, Richard D.; Hacker, Martin E.; Turner, Melvyn E.; Taylor, Ronald; and Rotolico, Anthony J., 5,014,916, Cl. 239-85.000.

Rotruck, John T.: *See—*
Parran, John J., Jr.; Coyle-Rees, Margaret M.; Rotruck, John T.; and Sunberg, Richard J., 5,015,466, Cl. 424-52.000.

Rouillon, Christian, to Compagnie Francaise de Mokta. Device for measuring the radioactivity of a load of ore on an extraction machine such as a mechanical shovel or digger. 5,015,847, Cl. 250-253.000.

Roussel UCLAF: *See—*
Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, 5,015,655, Cl. 514-413.000.

Royal Ordnance plc: *See—*
Baxter, James E.; and Poole, Robert D., 5,014,624, Cl. 102-503.000.

Rozman, Gregory I.; and Maddali, Vijay K., to Sundstrand Corporation. VSCF system with DC link harmonics control. 5,016,157, Cl. 363-39.000.

Rozov, Leonid: *See—*
Chisolm, Daniel R.; Weiss, Richard A.; and Rozov, Leonid, 5,015,777, Cl. 568-314.000.

Ruckert, Hans; and Lambert, Gabriele, to Hoechst Aktiengesellschaft. Positive radiation-sensitive mixture. 5,015,554, Cl. 430-270.000.

Rudberg, Marianne: *See—*
Palmlin, Peter; and Rudberg, Marianne, 5,015,484, Cl. 426-92.000.

Rudkowski, Piotr Z.: *See—*
Strom-Olsen, John O.; and Rudkowski, Piotr Z., 5,015,992, Cl. 340-551.000.
Strom-Olsen, John O.; and Rudkowski, Piotr Z., 5,015,993, Cl. 340-551.000.

Rudolph, Udo; and Wulff, Claus, to Bayer Aktiengesellschaft. Isomerization of bisphenols. 5,015,784, Cl. 568-722.000.

Ruedisueli, Anton: *See—*
Vogel, Rudolf; and Ruedisueli, Anton, 5,014,756, Cl. 139-97.000.

Rueff, Roger M., to Amoco Corporation. Wax sweating. 5,015,357, Cl. 208-32.000.

Rueffer, Manfred; Toepperwien, Bernd; and Dusil, Vladimir, to Alfred Teves GmbH. Vacuum brake power booster with metal cup supporting reaction disk. 5,014,597, Cl. 91-369.200.

Ruether, John A.; and Simpson, Theodore B., to United States of America, Energy. Process and apparatus for coal hydrogenation. 5,015,366, Cl. 208-408.000.

Ruhrkohle AG: *See—*
Langhoff, Josef; Jankowski, Alfons; and Dohms, Klaus-Dieter, 5,015,457, Cl. 423-481.000.

Rumbaugh, Scott H.; Jones, Michael D.; Scheu, Friedrich; and Bos, Philip J., to Tektronix, Inc. Liquid crystal fiber optic attenuator and process for making same. 5,015,057, Cl. 350-96.150.

Rumpf, Robert J.; Willey, Ronald A.; and Storck, Kevin, to TRW Vehicle Safety Systems Inc. Web sensitive and vehicle sensitive retractor. 5,014,926, Cl. 242-107.40A.

Runde, Jeffrey K.: *See—*
Hunter, Joseph H.; and Runde, Jeffrey K., 5,014,573, Cl. 74-866.000.

Russell, Brandon: *See—*
Russell, Frederick E.; and Russell, Brandon, 5,015,393, Cl. 210-744.000.

Russell, Frederick E.; and Russell, Brandon, to Protectaire Systems Co. Automatically adjustable weir and environmentally protected sensor for a floating sludge removal system. 5,015,393, Cl. 210-744.000.

Russo, Thomas J., to Bethlehem Steel Corporation. Vibrating mold assembly. 5,014,393, Cl. 164-416.000.

Rutgers University: *See—*
Venkatesan, Thirumalai; and Wu, Xin D., 5,015,492, Cl. 427-8.000.

S&K Enterprises, Inc.: *See—*
King, John R., 5,014,487, Cl. 52-731.000.

Sacher, Christian: *See—*
Muller, Klaus-Dieter; Rau, Ernst; and Sacher, Christian, 5,016,105, Cl. 358-182.000.

Sadler, Alan M.: *See—*
Czarn, David A.; Rahman, Aziz; Sadler, Alan M.; and Baker, Gary A., 5,015,808, Cl. 200-83.00P.

Saenger, Georg; and Hietkamp, Gerrit, to Deutsche Forschungsanstalt fuer Luft- und Raumfahrt e.V. Laser-active medium and process for producing same. 5,016,254, Cl. 372-55.000.

Safety Diagnostics, Inc.: *See—*
Mitchen, Joel R., 5,014,718, Cl. 128-771.000.

Safonov, Jury A.: *See—*
Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M., 5,014,779, Cl. 166-55.700.

Sagami Chemical Research Center: *See—*
Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 5,015,582, Cl. 435-189.000.

Sahashi, Masahiro: *See—*
Ochi, Moriya; and Sahashi, Masahiro, 5,014,635, Cl. 112-311.000.

St. Clair, Terry L.: *See—*
Singh, Jag J.; Eftekhari, Abe; and St. Clair, Terry L., 5,015,851, Cl. 250-306.000.

Saint, David H.: *See—*
Funk, John W.; and Saint, David H., 5,016,004, Cl. 340-825.690.

Saint-Gobain Vitrage: *See—*
Bongardt, Wolfgang; Gowert, Helmut; Winkeler, Hans-Josef; and Schneiders, Josef, 5,016,099, Cl. 358-106.000.

St. Luke's Episcopal Hospital: *See—*
Wright, William B., II; and Sauberli, Dean D., 5,014,693, Cl. 128-204.180.

St. Martin, Louis G. Remote control modification for manually controlled hydraulic systems. 5,014,596, Cl. 91-6.000.

St. Onge, Arthur R.: *See—*
Angell, Mickey A.; Cearley, Thomas W.; Lewis, James C.; St. Onge, Arthur R.; Szysh, John A.; and White, Kenneth W., 5,015,145, Cl. 414-547.000.

Saito, Masato: *See—*
Sano, Kinjiro; Kamata, Toyokazu; Fukuyama, Keiji; Saito, Masato; and Watanabe, Keiji, 5,015,497, Cl. 427-77.000.

Saito, Masayuki; Fujimoto, Takenobu; and Hagiwara, Takuya, to Dynic Corporation. Apparatus for assembling ink ribbon feeder roller assemblies of ink ribbon cassettes. 5,014,417, Cl. 29-783.000.

Saito, Yasujiro: *See—*
Inagaki, Atsushi; Hiratsuka, Koh; Miura, Hiroaki; and Saito, Yasujiro, 5,015,897, Cl. 310-83.000.

Saitoh, Takanori: *See—*
Kato, Osami; Tsukamoto, Tsutomu; and Saitoh, Takanori, 5,014,929, Cl. 242-195.000.

Sajic, Branko: *See—*
Goze, Jean M.; Bernhardt, Randal J.; Sajic, Branko; Rockwell, Ned M.; McConnell, Nina M.; and Mohring, William R., 5,015,415, Cl. 252-547.000.

Sajtos, Alexander, to Chemie Linz Aktiengesellschaft. Process for the preparation of glyoxylic acid and glyoxylic acid derivatives. 5,015,760, Cl. 560-186.000.

Saka, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Microwave filter. 5,015,976, Cl. 333-204.000.

Sakaguchi, Masaaki: *See—*
Suzuki, Akihiro; and Sakaguchi, Masaaki, 5,015,430, Cl. 264-146.000.

Sakaguchi, Masaharu: *See—*
Hirano, Seiji; Sakaguchi, Masaharu; Kawanishi, Satoru; and Ohmura, Tomoyuki, 5,015,199, Cl. 439-353.000.

Sakai, Katutosi: *See—*
Omata, Fumio; Sakai, Katutosi; and Nomura, Yoshio, 5,014,588, Cl. 84-726.000.

Sakai, Shinichi: *See—*
Kasai, Isao; Yamaguchi, Kimiaki; Sakai, Shinichi; Murakami, Susumu; Isono, Tatsuji; and Hatagawa, Toyotsugu, 5,015,812, Cl. 219-10.55B.

Sakai, Shinji: *See—*
Fukushima, Nobuo; Sakai, Shinji; Takeda, Osamu; Suzuki, Yasutomo; and Takei, Masahiro, 5,016,124, Cl. 360-69.000.

Sakai, Tadashi; Minari, Katsunobu; and Ohta, Hideji, to Hoshizaki Denki Kabushiki Kaisha. Refrigeration system in ice making machine. 5,014,521, Cl. 62-212.000.

Sakai, Toshihiro: *See—*
Tanikawa, Akinao; Ohshima, Toshiharu; and Sakai, Toshihiro, 5,016,165, Cl. 364-200.000.

Sakamoto, Hideyuki: *See—*
Noji, Ikutaro; Kaiju, Masaki; Sakamoto, Hideyuki; and Fukubayashi, Makoto, 5,014,522, Cl. 82-227.000.

Sakamoto, Katsumi: *See—*
Aoyama, Shunzo; Yoshida, Kunio; Doi, Hachiro; and Sakamoto, Katsumi, 5,014,765, Cl. 164-72.000.

Sakamoto, Toshiyuki; Kojima, Noboru; and Nakagawa, Isao, to Hitachi, Ltd. Television signal recording/reproducing apparatus of color-under recording type. 5,016,111, Cl. 358-328.000.

Sakamoto, Yukio; Hori, Toshio; Fukutani, Iwao; and Tanabe, Takeshi, to Murata Manufacturing Co., Ltd. Modular jack. 5,015,204, Cl. 439-620.000.

Sakane, Shinsuke: *See—*
Kuwana, Kazutaka; Yoshida, Tsuyoshi; Tozu, Kenji; and Sakane, Shinsuke, 5,015,041, Cl. 303-95.000.
Kuwana, Kazutaka; Yoshida, Tsuyoshi; and Sakane, Shinsuke, 5,016,178, Cl. 364-426.020.

Sakashita, Shigeo, to Casio Computer Co., Ltd. Chord setting apparatus and electronic wind instrument using the same. 5,014,586, Cl. 84-637.000.

Sakata, Seiji; Harada, Tamotsu; Ito, Norifumi; Hayashi, Masayuki; Yoshimura, Tsuyoshi; and Koinuma, Nobuyuki, to Ricoh Company, Ltd. Digital copier apparatus with external laser card storage medium and image compression variable with available memory. 5,016,114, Cl. 358-404.000.

Sakon, Hiroshi: *See—*
Ishizuki, Masaharu; and Sakon, Hiroshi, 5,015,807, Cl. 200-61.880.

Saksena, Anil K.; Girijavallabhan, Viyyoor M.; and Ganguly, Ashit K., to Schering Corporation. Processes for preparation of cyclopentyl purine derivatives. 5,015,739, Cl. 544-277.000.

Sakurai, Yoshimitsu: *See—*
Kawakami, Izumi; Komazaki, Tomokazu; Gunji, Katsuhiko; Onishi, Norio; Sakurai, Yoshimitsu; Horii, Hiroyuki; and Mashimo, Akira, 5,015,973, Cl. 333-132.000.

Salk Institute for Biological Studies, The: *See—*
Spiess, Joachim; Rivier, Jean E. F.; Bardin, C. Wayne; and Vale, Wylie W., Jr., 5,015,729, Cl. 530-350.000.

Salomatin, Valentin V.: *See—*
Meling, Konstantin V.; Safonov, Jury A.; Abdrakhmanov, Gabdrashit S.; Mikhailin, Jury G.; Bogomolov, Rodion M.; Salomatin, Valentin V.; Mukhametshin, Almaz A.; and Mingazov, Salikhzyan M., 5,014,779, Cl. 166-55.700.

Salon Care Services, Inc.: *See—*
Heel, Jurgen D., 5,014,371, Cl. 4-516.000.

Samad, Raphael: *See—*
Richards, John W.; Gillard, Clive H.; Avis, Richard J. A.; Samad, Raphael; and Walters, Carl W., 5,016,101, Cl. 358-140.000.

Sambayashi, Takeshi; Oushiden, Hideshi; Takaoka, Hiroaki; and Morihara, Kazushige, to Kabushiki Kaisha Toshiba. Reader/printer device with power saver function and print number reset. 5,016,052, Cl. 355-228.000.

Sams, Bernard, to Reed Packaging Limited. Dispensing valve. 5,014,886, Cl. 222-399.000.

Samsung Electron Devices Ltd.: *See—*
Cho, Seog-lae, 5,015,911, Cl. 313-414.000.

SamSung Electronics Co., Ltd.: *See—*
Choi, Hae-yong, 5,016,091, Cl. 358-29.000.
Choi, Jung-Dal; Yim, Hyung-Kyu; Do, Jae-Young; and Kim, Jin-Ki, 5,015,886, Cl. 307-465.000.
Choi, Yun-ho, 5,015,891, Cl. 307-530.000.
Jeong, Ho-sun, 5,016,211, Cl. 364-786.000.
Yong-Je, Kim; Choi, Hoon-Sun; and Sim, Dae-Yoon, 5,016,106, Cl. 358-183.000.

Samuel Roberts Noble Foundation, Inc., The: *See—*
Lee, Kyung; Patterson, Manford K., Jr.; and Birckbichler, Paul J., 5,015,588, Cl. 436-69.000.

Sanchez, Domingo: *See—*
Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.

Sanden Corporation: *See—*
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 5,015,154, Cl. 417-269.000.
Iizuka, Jiro, 5,015,163, Cl. 418-55.100.
Nakayama, Shunichi; and Takayanagi, Yasushi, 5,014,963, Cl. 251-245.000.

Sanders Associates, Inc.: *See—*
Smith, John A.; and Carlson, Mark A., 5,014,997, Cl. 273-360.000.

Sandler, Stanley R., to Atochem North America, Inc. Preparation of 3-(alkylthio) aldehydes. 5,015,776, Cl. 568-41.000.

Sands, Timothy D., to Bell Communications Research, Inc. Epitaxial intermetallic contact for compound semiconductors. 5,016,074, Cl. 357-34.000.

Sankyo Kasei Kabushiki Kaisha: *See—*
Yumoto, Tetsuo, 5,015,519, Cl. 428-209.000.

Sano, Kinjiro; Kamata, Toyokazu; Fukuyama, Keiji; Saito, Masato; and Watanabe, Keiji, to Mitsubishi Denki Kabushiki Kaisha. Cathode for electron tube and manufacturing method thereof. 5,015,497, Cl. 427-77.000.

Sano, Toshifumi, to NEC Corporation. Cooling structure. 5,014,777, Cl. 165-185.000.

Sans Pitarch, Esteve: *See—*
Cabre Castellvi, Juan; Diago Meseguer, Jose ; Esteve Bianchini, Asuncion; Lenhardt Padro, Carlos E.; and Sans Pitarch, Esteve, 5,015,736, Cl. 540-222.000.

Sanshin Kogyo Kabushiki Kaisha: *See—*
Fujimoto, Hiroaki; and Okazaki, Masaki, 5,014,673, Cl. 123-512.000.

Santi, John D., to Briggs & Stratton Corporation. Magnesium piston coated with a fuel ingition products adhesive. 5,014,605, Cl. 92-223.000.

Sanwa Diamond Industrial Co., Ltd.: *See—*
Matsuda, Yusaku, 5,014,678, Cl. 125-15.000.

VOL 1126 ISS 2 MY 14 1991 UMI

Sanyo Electric Co., Ltd.: *See*—

Hamada, Hiroki; Honda, Shoji; Shono, Masayuki; and Yamaguchi, Takao, 5,016,252, Cl. 372-45.000.

Saraceno, Patricia J.: *See*—

Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G.; Saraceno, Patricia J.; and Pacer, James M., 5,016,050, Cl. 355-208.000.

Sargent, Ralph R.: *See*—

Moss, Thomas H., III; Sargent, Ralph R.; and Williams, Michael S., 5,015,259, Cl. 8-115.600.

Sartorio, Franco; and Carbonato, Gianfranco, to Amada Company, Limited. Computer controlled welding robot. 5,015,821, Cl. 219-124.340.

Saruyama, Toshio: *See*—

Togashi, Atsushi; and Saruyama, Toshio, 5,015,716, Cl. 528-15.000.

Sasa, Hiroyuki: *See*—

Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.

Sasahara, Yutaka: *See*—

Kudou, Motohiro; and Sasahara, Yutaka, 5,015,164, Cl. 418-63.000.

Sasajima, Koji; Maki, Kazuya; and Yamaguchi, Kouji, to Honda Giken Kogyo Kabushiki Kaisha. Speed control apparatus for a continuously variable speed. 5,014,574, Cl. 74-866.000.

Sasaki, Ichiro: *See*—

Yamamoto, Takemi; and Sasaki, Ichiro, 5,016,042, Cl. 355-27.000.

Sasaki, Kunihiko: *See*—

Kodera, Masao; Sasaki, Kunihiko; Mikami, Seishin; and Utsu, Jyunshi, 5,016,017, Cl. 342-106.000.

Sasaki, Yoshito; and Takaishi, Kunio, to Toyo Carbon Co., Ltd. Graphite body. 5,015,518, Cl. 428-192.000.

Sasson, Steven J.; and Hills, Robert G., to Eastman Kodak Company. Electronic still camera utilizing image compression and digital storage. 5,016,107, Cl. 358-209.000.

Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, to Bridgestone Corporation; and Misawa Shokai Co., Ltd. Measuring apparatus. 5,014,799, Cl. 177-211.000.

Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, to Nippon Petrochemicals Company, Limited. Electrical insulating oil composition. 5,015,793, Cl. 585-6.300.

Sato, Hiroyuki, to Seikosha Co., Ltd. Shaft bearing structure. 5,015,104, Cl. 384-296.000.

Sato, Hisashi, to Tsuchiya, Michiko, a part interest. Pneumatic mat with safety apparatus. 5,014,378, Cl. 5-453.000.

Sato, Keiji: *See*—

Inoue, Yasuo; Takeda, Haruo; Sato, Keiji; Yamazaki, Noriyuki; and Iida, Osamu, 5,016,127, Cl. 360-94.000.

Sato, Kenichi: *See*—

Harima, Toshio; Sato, Kenichi; and Matsuya, Tatsuyuki, 5,014,836, Cl. 192-58.00B.

Sato, Masaki; and Atsumi, Shigeru, to Kabushiki Kaisha Toshiba. Insulated gate type semiconductor device and method of manufacturing the same. 5,016,077, Cl. 357-41.000.

Sato, Masanori: *See*—

Ohshima, Hirofumi; Sato, Masanori; and Isayama, Kazuo, 5,014,659, Cl. 123-195.00H.

Sato, Seiichi: *See*—

Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi; and Matsumura, Masami, 5,015,056, Cl. 350-96.150.

Sato, Taichi: *See*—

Fulford, George D.; Lever, Gordon; and Sato, Taichi, 5,015,447, Cl. 423-21.500.

Sato, Toshihiro: *See*—

Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.

Sato, Toshio: *See*—

Hidaka, Yasuhiro; Sato, Toshio; and Takahashi, Masanobu, 5,015,660, Cl. 514-441.000.

Sato, Yoshikuni: *See*—

Koya, Kei; and Sato, Yoshikuni, 5,016,169, Cl. 364-200.000.

Sato, Yutaka: *See*—

Fujii, Tatsuya; Sato, Yutaka; and Tanaka, Masafumi, 5,016,207, Cl. 364-724.010.

Satoh, Yuji; Kono, Hiromi; Soda, Hiroyuki; and Otsuka, Masuhiro, to Zexel Corporation. Clutch control system. 5,014,832, Cl. 192-30.00W.

Satou, Sigeo: *See*—

Komatsu, Tomoaki; and Satou, Sigeo, 5,016,203, Cl. 364-571.020.

Sauber, Richard C. Stem ware. 5,014,865, Cl. 215-99.500.

Sauberli, Dean D.: *See*—

Wright, William B., II; and Sauberli, Dean D., 5,014,693, Cl. 128-204.180.

Saunders, Raymond. Portable outdoor multi game apparatus. 5,014,983, Cl. 273-1.50R.

Saunders, William T., to Weirton Steel Corporation. Method and apparatus for drawing sheet metal can stock. 5,014,536, Cl. 72-349.000.

Savard, Frank J.; and Savard, Patrick A. Two wheeled vehicle having an adjustable custer and custer angle. 5,014,808, Cl. 180-219.000.

Savard, Patrick A.: *See*—

Savard, Frank J.; and Savard, Patrick A., 5,014,808, Cl. 180-219.000.

Sawamoto, Isao: *See*—

Nishiki, Yoshinori; Sawamoto, Isao; Nakamatsu, Shuji; and Shimamune, Takayuki, 5,015,354, Cl. 204-254.000.

Sayers, Annette S. X-ray-protective surgical garment having a removable lead insert. 5,015,865, Cl. 250-516.100.

Sayles, David C., to United States of America, Army. Embedded explosives as burning rate accelerators for solid propellants. 5,015,310, Cl. 149-19.900.

Scaglione, Felice; and Staples, Lorna C., to Nabisco Brands, Inc. Dog biscuits having a coating containing an inorganic pyrophosphate. 5,015,485, Cl. 426-94.000.

Scangos, George A.; Rae, Peter M. M.; Unterbeck, Axel J.; and Kamarck, Michael E., to Molecular Therapeutics, Inc. Molecular diagnosis of Alzheimer Disease. 5,015,570, Cl. 435-6.000.

Schaefer, Willi, to Siemens Aktiengesellschaft. Patient supporting table having a support plate provided with a cut-out and having a base member carrying the support plate. 5,014,969, Cl. 269-322.000.

Schafer, Mark E., to International Sonic Technologies. Phantom kidney stone system. 5,014,686, Cl. 128-24.0EL.

Schafer, Ralf: *See*—

Zingher, Oded; Wuhrl, Arno; Behrendt, Ullrich; Schafer, Ralf; and Ziesing, Gunter, 5,014,618, Cl. 101-365.000.

Schafer, Wes A.: *See*—

Carr, Peter W.; Funkenbusch, Eric F.; Rigney, Martin P.; Coleman, Patrick L.; Hanggi, Douglas A.; and Schafer, Wes A., 5,015,373, Cl. 210-198.200.

Schaller-Automation, Industrielle Automationstechnik KG: *See*—

Schaller, Werner; and Durr, Manfred, 5,015,801, Cl. 174-52.200.

Schaller, Werner; and Durr, Manfred, to Schaller-Automation, Industrielle Automationstechnik KG. Electrical circuit module. 5,015,801, Cl. 174-52.200.

Schapp, Udo: *See*—

Luhmer, Udo; and Schapp, Udo, 5,014,467, Cl. 51-287.000.

Schenck Auto-Services-Gerate GmbH: *See*—

Maus, Otfried, 5,014,426, Cl. 29-897.300.

Schering Corporation: *See*—

Berger, Joel G.; Chang, Wei K.; and Peters, Marjorie, 5,015,639, Cl. 514-213.000.

Saksena, Anil K.; Girijavallabhan, Viyyoor M.; and Ganguly, Ashit K., 5,015,739, Cl. 544-277.000.

Schettler, Helmut: *See*—

Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., 5,016,087, Cl. 357-75.000.

Scheu, Friedrich: *See*—

Rumbaugh, Scott H.; Jones, Michael D.; Scheu, Friedrich; and Bos, Philip J., 5,015,057, Cl. 350-96.150.

Schiazza, Alfred; and Sepke, Arnold L., to White Consolidated Industries, Inc. Battery powered vacuum cleaner. 5,014,388, Cl. 15-339.000.

Schick, George: *See*—

Jebe, Arnim B.; Flagg, Frank D.; Danser, Harold W., III; Kobernus, William; and Schick, George, 5,014,431, Cl. 30-124.000.

Schiessl, Peter, to Strabag Bau-AG. Corrosion measuring cell. 5,015,355, Cl. 204-404.000.

Schifano, Michael. Means for removing smoke from an operative site. 5,015,243, Cl. 604-315.000.

Schindler, Ursula: *See*—

Schonafinger, Karl; Beyerle, Rudi; Schindler, Ursula; Jablonka, Bernd; and Troke, Jeffery, 5,015,659, Cl. 514-438.000.

Schirmer, Ulrich; Rohr, Wolfgang; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Aralkylphenylureas and herbicides containing these. 5,015,762, Cl. 560-313.000.

Schlenker, Theodore R., to Dana Corporation. Deflector for ball screw and nut assembly. 5,014,568, Cl. 74-424.80R.

Schmalz, Joachim: *See*—

Heep, Dieter; Vogel, Paul; Frey, Manfred; and Schmalz, Joachim, 5,014,885, Cl. 222-368.000.

Schmanski, Donald W. Vision blocking barrier. 5,015,119, Cl. 404-12.000.

Schmidt, Gregory F.; Hucul, Dennis A.; and Campbell, Richard E., Jr., to Dow Chemical Company, The. Preparation of polyhydrocarbylaluminoxanes. 5,015,749, Cl. 556-179.000.

Schmidt, Kenneth D.; and Holt, Jan D., to ACE Industries, Incorporated. Hitch retarder. 5,015,131, Cl. 410-63.000.

Schmidt, Timothy E.: *See*—

Thrasher, Lawrence E.; Olson, Gordon E.; Burkitt, Garrett J., III; Schmidt, Timothy E.; Haddad, Elias M.; and Conti-Johnston, Susan, 5,014,372, Cl. 4-542.000.

Schmitz, Nicholas A.: *See*—

Agrawal, Om P.; Landers, George H.; Schmitz, Nicholas A.; Moench, Jerry D.; and Ilgenstein, Kerry A., 5,015,884, Cl. 307-465.000.

Schnebly, John T.: *See*—

Corey, John A.; and Schnebly, John T., 5,015,317, Cl. 156-197.000.

Schneiders, Josef: *See*—

Bongardt, Wolfgang; Gowert, Helmut; Winkeler, Hans-Josef; and Schneiders, Josef, 5,016,099, Cl. 358-106.000.

Schnur, Jurgen: *See*—

Mathieu, Bernd; Rinck, Michael; Schnur, Jurgen; Selzer, Dieter; and Weber, Wolfram, 5,015,374, Cl. 210-232.000.

Schober, Horst A.: *See*—

Hoppmann, Kurt H.; and Schober, Horst A., 5,015,841, Cl. 250-223.00R.

Schoenig, Frederick C., Jr.: *See*—

Butzin, Donald F.; Tunnell, George W.; King, Harold B., Jr.; and Schoenig, Frederick C., Jr., 5,014,439, Cl. 33-533.000.

Scholten, Daphne, to U.S. Philips Corporation. Planar Josephson device with a silver salt interlayer. 5,015,623, Cl. 505-1.000.

Scholz, Daniel E. Aircraft fuel pump. 5,015,156, Cl. 417-370.000.

Schonafinger, Karl; Beyerle, Rudi; Schindler, Ursula; Jablonka, Bernd; and Troke, Jeffery, to Cassella Aktiengesellschaft. Thienylacetic acid derivatives, process for the preparation thereof, the use thereof, and pharmaceuticals containing these and the preparation thereof. 5,015,659, Cl. 514-438.000.

Schonenberger, Rolf: *See*—

Richter, Peter; Hafner, Josef; and Schonenberger, Rolf, 5,014,864, Cl. 213-104.000.

Schorling GmbH & Co. Waggonbau: *See*—

Leers, Konrad, 5,015,300, Cl. 134-18.000.

Schossig, Juergen: *See*—

Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl. 568-861.000.

Schramm, Matthias: *See*—

Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.

Schreiber, Alain B.: *See*—

Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 5,015,663, Cl. 514-510.000.

Schreiber, Hans, to Siemens Aktiengesellschaft. Measuring system that allocates a measured value to a measurable variable and measurment transducer thereof. 5,016,198, Cl. 364-550.000.

Schroder, Heinz J.: *See*—

Morimoto, Yasuaki; Schroder, Heinz J.; and Zucker, Friedhelm, 5,016,233, Cl. 369-44.130.

Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., to Bristol-Myers Squibb Company. BMY-41950 antitumor antibiotic. 5,015,578, Cl. 435-119.000.

Schuchardt, Mark E.: *See*—

Dear, Terrence A.; Ingard, Karl U.; and Schuchardt, Mark E., 5,014,816, Cl. 181-229.000.

Schulte, Arnolf. Lockable caster wheel. 5,014,391, Cl. 16-35.00R.

Schultz, Thomas R., to Amsted Industries Incorporated. Female connecting member with disassembly feature for articulated connection. 5,014,626, Cl. 105-4.100.

Schulz, Arthur M., to Maxpro Helmets, Inc. Gas-fitted protective helmet. 5,014,365, Cl. 2-412.000.

Schulz, Guenther: *See*—

Nick, Bernhard; Bott, Kaspar; and Schulz, Guenther, 5,015,768, Cl. 564-204.000.

Schulz, Kenneth. Children's vanity step-stool. 5,014,818, Cl. 182-90.000.

Schulz, William J., Jr., to Dow Corning Corporation. Process for reduction of organohalosilanes. 5,015,624, Cl. 556-474.000.

Schulze, Manfred: *See*—

Feldner, Kurt; Degen, Bruno; Wagner, Gebhard; and Schulze, Manfred, 5,015,751, Cl. 556-472.000.

Schulze, Walter A., Jr.: *See*—

Ward, Raymond C.; Wang, Xingwu; Carlson, William B.; and Schulze, Walter A., Jr., 5,015,622, Cl. 505-1.000.

Schumann, Herbert: *See*—

Hostalek, Martin; Pohl, Ludwig; Erdmann, Dietrich; Schumann, Herbert; Hartmann, Uwe; Heyen, Meino; and Jurgensen, Holger, 5,015,747, Cl. 556-1.000.

Schumway, Dante L.: *See*—

Bersonnet, George B.; and Schumway, Dante L., 5,014,980, Cl. 272-73.000.

Schupback, Jesse L., to J. I. Case Company. Stabilizer pad assembly for an earth moving apparatus. 5,015,008, Cl. 280-764.100.

Schupp, Eberhard: *See*—

Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,672, Cl. 523-415.000.

Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,673, Cl. 523-415.000.

Schurmann, Dieter; and Gudereit, Bernd. Dynamo for/on bicycles. 5,015,869, Cl. 290-1.00R.

Schuster, Stanley E.: *See*—

Chappell, Barbara A.; Chappell, Terry I.; and Schuster, Stanley E., 5,015,881, Cl. 307-449.000.

Schwaiger, Gunther; and Springer, Hartmut, to Hoechst Aktiengesellschaft. Copper complex formazan compounds containing a cyanamido-S-triazinylamino radical and a fiber-reactive group of the vinylsulfone series, suitable as dyes. 5,015,731, Cl. 534-618.000.

Schwarz, Jurgen; and Lohmann, Wolfgang, to Carl-Zeiss-Stiftung. Apparatus for measuring and evaluating the inherent fluorescent spectra of organic tissue surfaces. 5,014,707, Cl. 128-633.000.

Schwarzmann, Matthias: *See*—

Steck, Werner; Lermer, Helmut; Schwarzmann, Matthias; and Dockner, Toni, 5,015,785, Cl. 568-783.000.

Schweder, Herbert, to VEB Spezialbaukombinat Magdeburg. Method and apparatus for the removal of deposits from the inner surfaces of horizontal cylinders. 5,015,299, Cl. 134-8.000.

Schwelling, Hermann. Paper shredder. 5,014,920, Cl. 241-101.200.

Schwenner, Eckhard: *See*—

Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.

Schwerzel, Thomas: *See*—

Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,672, Cl. 523-415.000.

Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 5,015,673, Cl. 523-415.000.

Scientific Technologies Incorporated: *See*—

Blau, David, 5,015,840, Cl. 250-221.000.

SciMed Life Systems, Inc.: *See*—

Keith, Peter T.; and Euteneuer, Charles L., 5,015,231, Cl. 604-96.000.

Scintrex Limited: *See*—

Kinrade, John D., 5,015,590, Cl. 436-117.000.

Scoggins, Lacey E.; and Ceurvorst, Joseph G., to Phillips Petroleum Company. Treatment of poly(arylene sulfide/sulfone) polymers. 5,015,702, Cl. 525-537.000.

Scoggins, Lacey E.; Hoover, Kenneth C.; and Shang, Wei-Teh Wade, to Phillips Petroleum Company. Aromatic sulfide/sulfone polymer production. 5,015,725, Cl. 528-310.000.

Scott Fetzer Company, The: *See*—

Hays, Philip G., 5,014,387, Cl. 15-339.000.

Scott, Graham A.: *See*—

DeRosier, Donna C.; Dziura, Richard A.; Palmieri, Joseph M.; Juntwait, Eric D.; Jacobs, Linda Y.; and Scott, Graham A., 5,015,983, Cl. 336-180.000.

Scott, James M.: *See*—

Boughten, Larry R.; Evoniuk, Christopher J.; Scott, James M.; and Staff, Karen E., 5,014,407, Cl. 29-235.000.

Scott, Jeffrey W.; and Viswanathan, Thayamkulangara R., to AT&T Bell Laboratories. Technique for compensating switched capacitor circuits having gain-setting resistors. 5,016,012, Cl. 341-118.000.

Scripps Clinic and Research Foundation: *See*—

Niman, Henry L.; and Lerner, Richard A., 5,015,571, Cl. 435-7.920.

Scurlock, Ralph G.: *See*—

Beduz, Carlo; and Scurlock, Ralph G., 5,014,773, Cl. 165-115.000.

Seale, Mark A.: *See*—

Goodwin, Brent E.; Karn, Donald L.; Mistvurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,015,324, Cl. 156-384.000.

Seas, James A. Connector for antennas and coaxial cable. 5,015,194, Cl. 439-314.000.

Seaser, James G.: *See*—

Vetter, Gregory J.; and Seaser, James G., 5,015,136, Cl. 411-504.000.

SEB S.A.: *See*—

Maurin, Bruno; and Piera, Henri, 5,014,454, Cl. 38-93.000.

Seber, Brett P., to McGuire- Nicholas Company, Inc. Composite padded fabric material and edge binding system. 5,014,636, Cl. 112-419.000.

Secor, Henry V.: *See*—

Osdene, Thomas S.; Secor, Henry V.; and Seeman, Jeffrey I., 5,015,741, Cl. 546-281.000.

Security Tag Systems, Inc.: *See*—

Ferguson, Lucian G.; and Charlot, Lincoln H., Jr., 5,015,953, Cl. 324-244.000.

Seegmiller, Ben L. Yieldable mine post. 5,015,125, Cl. 405-288.000.

Seeman, Jeffrey I.: *See*—

Osdene, Thomas S.; Secor, Henry V.; and Seeman, Jeffrey I., 5,015,741, Cl. 546-281.000.

Segawa, Jun: *See*—

Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 5,015,636, Cl. 514-210.000.

Seibel, Michael J.; Fullmer, Douglas E.; Bossaller, James E.; and Baker, Glen M., to Hewlett-Packard Company. Interpolated swept parameter system for synthesized sweeper. 5,016,202, Cl. 364-571.070.

Seidler, Werner M. K.: *See*—

Childers, Ray F.; Oren, Peter L.; and Seidler, Werner M. K., 5,015,480, Cl. 424-486.000.

Seifers, Monte G.; and Gillum, Gary K., Sr. Timing. 5,016,230, Cl. 368-10.000.

Seiko Epson Corporation: *See*—

Kawaguchi, Takashi; Yabe, Hiroshi; Maruyama, Akihiko; and Kubo, Hiroyuki, 5,016,231, Cl. 368-80.000.

Kawashima, Hiroshi; Nakashima, Mikito; and Mogami, Takao, 5,015,523, Cl. 428-336.000.

Okaue, Etsuo; Egawa, Masaru; Kasai, Yoshihiko; and Horaguchi, Norio, 5,015,086, Cl. 351-44.000.

Uchiyama, Akira; and Imai, Kiyohiro, 5,015,537, Cl. 428-623.000.

Seikosha Co., Ltd.: *See*—

Sato, Hiroyuki, 5,015,104, Cl. 384-296.000.

Seiler, Milton R.: *See*—

Ridgway, Richard W.; Seiler, Milton R.; and Wood, Van E., 5,015,052, Cl. 350-96.130.

Seitz, William R.; and McCurley, Marian F., to Polysense, Inc. Fiber optic chemical sensors based on polymer swelling. 5,015,843, Cl. 250-227.210.

Seki, Akinori; Knoushi, Fumihiro; Kudo, Jun; and Koba, Masayoshi, to Sharp Kabushiki Kaisha. Compound semiconductor substrate with InGaP layer. 5,016,065, Cl. 357-16.000.

Seki, Tomoaki: *See*—

Takao, Hiroyoshi; Imai, Akio; Seki, Tomoaki; and Tsuji, Mitsuji, 5,015,692, Cl. 525-102.000.

Sekido, Satoshi; Tachibana, Hirokazu; and Yamamura, Yasuharu, to Research Association of Electric Conductive Inorganic Compounds. Composition for catalytically cleaning exhaust gas and to improve the sensitivity of sensors. 5,015,616, Cl. 502-303.000.

VOL 1126
ISS 2
MY 14 1991
UMI

- Sell, Michael: *See—*
  - Vorlop, Klaus-Dieter; and Sell, Michael, 5,015,448, Cl. 423-24.000.
- Sellstrom Manufacturing Company: *See—*
  - Brown, Tobias; and Siegal, Burton L., 5,014,353, Cl. 2-11.000.
- Seltzer, Raymond; Galbo, James P.; and Ravichandran, Ramanathan, to Ciba-Geigy Corporation. Stabilizers derived from N-hydroxy hindered amines by Michael addition reactions. 5,015,678, Cl. 524-99.000.
- Selvin, Gerald J.: *See—*
  - Krumme, John F.; Perry, Michael; Yasumura, Gary; and Selvin, Gerald J., 5,015,193, Cl. 439-161.000.
- Selzer, Dieter: *See—*
  - Mathieu, Bernd; Rinck, Michael; Schnur, Jurgen; Selzer, Dieter; and Weber, Wolfram, 5,015,374, Cl. 210-232.000.
- Semeraro, Francesco: *See—*
  - Lasagna, Diego; and Semeraro, Francesco, 5,015,879, Cl. 307-358.000.
- Semiconductor Energy Laboratory Co., Ltd.: *See—*
  - Takemura, Yasuhiko, 5,015,621, Cl. 505-1.000.
  - Yamazaki, Shunpei, 5,015,494, Cl. 427-39.000.
- Semtronics Corporation: *See—*
  - Corris, C. James, 5,016,136, Cl. 361-230.000.
- Senda, Hiroshi: *See—*
  - Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.
- Senda, Masanobu: *See—*
  - Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Senda, Masanobu, 5,015,075, Cl. 350-357.000.
- Sepke, Arnold L.: *See—*
  - Schiazza, Alfred; and Sepke, Arnold L., 5,014,388, Cl. 15-339.000.
- Sepso, Roger P.; and Halmose, John M., to Robertshaw Controls Company. Expansion device for a refrigeration system, piston therefor and methods of making the same. 5,014,729, Cl. 137-513.300.
- Sepso, Roger P.: *See—*
  - Orner, Robert E.; Cassarino, Aurelio V.; and Sepso, Roger P., 5,014,520, Cl. 62-187.000.
- Severn, Shawn R. T.; Rodriguez, Henry; Danesin, Renato R. A.; and Imber, Bryan E., to Banbury Gold Mines Ltd. Method and apparatus useful in geochemical exploration for petroleum oils. 5,015,586, Cl. 436-29.000.
- Sewell, Charles P. B.: *See—*
  - Sewell, Michael J. B.; Sewell, Christopher K. B.; Sewell, Margaret I.; and Sewell, Charles P. B., 5,015,118, Cl. 403-362.000.
- Sewell, Christopher K. B.: *See—*
  - Sewell, Michael J. B.; Sewell, Christopher K. B.; Sewell, Margaret I.; and Sewell, Charles P. B., 5,015,118, Cl. 403-362.000.
- Sewell, Margaret I.: *See—*
  - Sewell, Michael J. B.; Sewell, Christopher K. B.; Sewell, Margaret I.; and Sewell, Charles P. B., 5,015,118, Cl. 403-362.000.
- Sewell, Michael J. B.; Sewell, Christopher K. B.; Sewell, Margaret I.; and Sewell, Charles P. B. Mounting means. 5,015,118, Cl. 403-362.000.
- Sextant Avionique: *See—*
  - Gruaz, Daniel; and Marchal, Claude, 5,016,008, Cl. 341-33.000.
- Sexton, Gregory J.: *See—*
  - Walowit, Eric; and Sexton, Gregory J., 5,015,277, Cl. 55-385.100.
- Seynhaeve, Andre, to Delsey, S.A. Fastening devices for straps in an article of luggage. 5,014,830, Cl. 190-36.000.
- SGS-Thomson Microelectronics S.A.: *See—*
  - Bergemont, Albert, 5,016,069, Cl. 357-23.500.
  - Meunier, Thierry; and Jaffard, Jean L., 5,016,122, Cl. 360-62.000.
  - Tailliet, Francois, 5,016,078, Cl. 357-42.000.
- Shaak, Ray N.: *See—*
  - Redmond, John P.; and Shaak, Ray N., 5,015,197, Cl. 439-329.000.
- Shaffer, Robert A.: *See—*
  - Brezette, Michael W.; Shaffer, Robert A.; Burns, Fredrick B.; and Moon, Howard R., 5,014,384, Cl. 15-230.110.
- Shafir, Roni: *See—*
  - Weisman, Ilan; Shapira, Roni; Shafir, Roni; and Shtark, Hanoh, 5,015,090, Cl. 356-30.000.
- Shah, Kamlesh B.: *See—*
  - Franz, Michel; Jans, Michel; Mathur, Leo K.; Shah, Kamlesh B.; and Truelove, James E., 5,015,481, Cl. 424-494.000.
- Shah, Shreyaunsh R.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Shallenburger, Larry: *See—*
  - Barclay, Clay; and Shallenburger, Larry, 5,015,969, Cl. 330-284.000.
- Shang, Wei-Teh Wade: *See—*
  - Scoggins, Lacey E.; Hoover, Kenneth C.; and Shang, Wei-Teh Wade, 5,015,725, Cl. 528-310.000.
- Shannon, Robert D.: *See—*
  - Novak, Philip F.; Shannon, Robert D.; Pinckney, Robert L.; and Humphreys, James R., Jr., 5,016,015, Cl. 342-2.000.
- Shapira, Roni: *See—*
  - Weisman, Ilan; Shapira, Roni; Shafir, Roni; and Shtark, Hanoh, 5,015,090, Cl. 356-30.000.
- Sharp Kabushiki Kaisha: *See—*
  - Horie, Nobuyuki; Nishioka, Yoshiki; Yamanaka, Toshihiro; and Yuki, Yoshio, 5,016,126, Cl. 360-78.070.
  - Ibuchi, Yoshiaki; and Nishikawa, Yoshikazu, 5,016,053, Cl. 355-245.000.
  - Inoue, Atsushi, 5,015,936, Cl. 318-687.000.
  - Kawama, Shuichi; and Fujimoto, Yoshiji, 5,016,279, Cl. 381-36.000.
  - Masuzawa, Shigeaki; and Komaki, Shigeki, 5,015,830, Cl. 235-441.000.
  - Nishiyama, Haruo, 5,016,046, Cl. 355-68.000.
  - Okuda, Tohru; Okada, Hideo; Koyama, Takashi; Okada, Osamu; and Nakatsuka, Mamoru, 5,016,132, Cl. 360-130.210.
  - Seki, Akinori; Knoushi, Fumihiro; Kudo, Jun; and Koba, Masayoshi, 5,016,065, Cl. 357-16.000.
  - Tashiro, Osamu; and Okumura, Masafumi, 5,016,061, Cl. 355-320.000.
- Shaw, Ching-Heo: *See—*
  - Houston, Theodore W.; Bosshart, Patrick W.; and Shaw, Ching-Heo, 5,015,882, Cl. 307-452.000.
- Shaw, Harold L.; Smith, Randall B.; Cunningham, Larry E.; Rishel, Barry E.; Gioannini, John P.; and Harkey, Warren B., to Terametrix Systems International, Inc. Telemetry apparatus and method. 5,016,005, Cl. 340-870.190.
- Shaw-Walker Company, The: *See—*
  - Mrotz, Walter C., III, 5,015,038, Cl. 297-457.000.
- Shearer, John A.: *See—*
  - Lorig, James D.; and Shearer, John A., 5,016,141, Cl. 361-415.000.
- Sheeley, Steven M.: *See—*
  - Dennis, Wendell E.; Sheeley, Steven M.; Brown, Stephen M.; Washam, Kevin A.; Alley, Lewis E.; and Cain, Marvin D., 5,014,882, Cl. 222-309.000.
- Shell Oil Company: *See—*
  - Eisenstein, Stephen E.; and Kuchler, Wayne J., 5,015,403, Cl. 252-40.000.
  - Slaugh, Lynn H.; and Brownscombe, Thomas F., 5,015,796, Cl. 585-436.000.
  - Snyder, Dale R., Jr.; and Haws, Joe H., 5,015,151, Cl. 417-18.000.
  - Wong, Pui K., 5,015,695, Cl. 525-244.000.
- Shen, Chin-Wen, deceased (by Shen, Tze-Chien, executor), to Texaco Inc. Steamflooding in multi layered reservoirs. 5,014,784, Cl. 166-263.000.
- Shen, Tze-Chien, executor: *See—*
  - Shen, Chin-Wen, deceased, 5,014,784, Cl. 166-263.000.
- Shepard, Howard M.; Gofman, Yuri; and Barkan, Edward, to Symbol Technologies, Inc. Scan board module for laser scanners. 5,015,833, Cl. 235-472.000.
- Shephard, Joseph F.: *See—*
  - Chu, Shao-Fu S.; Ku, San-Mei; Lange, Russell C.; Shephard, Joseph F.; Tsang, Paul J.; and Wang, Wen-Yuan, 5,015,594, Cl. 437-31.000.
- Shepherd, James P.: *See—*
  - Charbonneau, Larry F.; Flint, John A.; Kiss, Gabor D.; and Shepherd, James P., 5,015,722, Cl. 528-190.000.
- Sherex Chemical Company, Inc.: *See—*
  - Zeman, William J., 5,015,412, Cl. 252-311.000.
- Sherikar, Sanjay V., to Tiernay Turbines. Turbocharger with downstream pressure-gain combustor. 5,014,516, Cl. 60-605.100.
- Sherman, Clarence A., to ZSI, Inc. Clamp assembly. 5,014,940, Cl. 248-74.100.
- Sherman, Thomas E., to Preformed Line Products Company. Cable support assembly. 5,014,941, Cl. 248-74.400.
- Sherwood, Carl H.: *See—*
  - Covert, Charles H.; Turner, Kenneth W.; Sherwood, Carl H.; Gifford, William E.; and Wagner, Richard W., 5,014,742, Cl. 137-588.000.
- Sherwood Medical Company: *See—*
  - George, Robert D., 5,014,494, Cl. 53-425.000.
- Shibao, Kazuhisa: *See—*
  - Yawata, Shigeo; Shibao, Kazuhisa; and Hiraki, Shun-ichi, 5,015,593, Cl. 437-25.000.
- Shibata, Yoshihiro: *See—*
  - Hashiguchi, Yasuhiro; Katohno, Noboru; and Shibata, Yoshihiro, 5,016,130, Cl. 360-104.000.
- Shideido Company Ltd.: *See—*
  - Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.
- Shiga, Daizo: *See—*
  - Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.
- Shigyo, Masao; Kanada, Shoji; and Oshida, Eiji, to Fuji Photo Film Co., Ltd. Radiation image displaying apparatus. 5,015,854, Cl. 250-327.200.
- Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., to GAF Chemicals Corporation. Precipitation polymerization of terpolymers of a vinyl lactam, a polymerizable carboxylic acid and a hydrophobic monomer in an aliphatic hydrocarbon solvent. 5,015,708, Cl. 526-264.000.
- Shimada, Hiroaki: *See—*
  - Furutani, Yoshio; Nakayama, Akira; Honjo, Masaru; Shimada, Hiroaki; Kawamura, Kouichi; Mita, Izumi; and Akaoka, Akiko, 5,015,574, Cl. 435-67.100.
- Shimada, Hiroo: *See—*
  - Gotou, Tetsuo; Shimada, Hiroo; and Nakamura, Katsunori, 5,014,819, Cl. 184-6.200.

- Shimada, Masumi: *See—*
  - Hiroi, Masaki; Ino, Masumitsu; Nagata, Takehito; and Shimada, Masumi, 5,015,837, Cl. 250-208.100.
- Shimada, Takahisa; and Tanii, Junichi, to Minolta Camera Kabushiki Kaisha. Film winding/rewinding apparatus. 5,016,031, Cl. 354-173.100.
- Shimamune, Takayuki: *See—*
  - Nishiki, Yoshinori; Sawamoto, Isao; Nakamatsu, Shuji; and Shimamune, Takayuki, 5,015,354, Cl. 204-254.000.
- Shimano, Masanori, to Dainippon Screen Mfg. Co., Ltd. Method of obtaining monochromatic image from color original through color image recorder. 5,016,097, Cl. 358-79.000.
- Shimotomai, Michio; Fukuda, Yasutaka; and Fujita, Akira, to Kawasaki Steel Corporation. Corrosion resistant rare earth metal magnet. 5,015,307, Cl. 148-302.000.
- Shin-Etsu Chemical Co., Ltd.: *See—*
  - Hayashi, Tsunemi, 5,014,889, Cl. 222-644.000.
- Shinohara, Kenji: *See—*
  - Konishi, Keisuke; Shinohara, Kenji; Iwakiri, Norio; and Kurashige, Tomofumi, 5,015,996, Cl. 340-644.000.
- Shinomiya, Tsutomu: *See—*
  - Tsukada, Shinichi; Shinomiya, Tsutomu; Yoshino, Eiichi; Yoshioka, Shigeki; and Fujikawa, Makoto, 5,014,491, Cl. 53-366.000.
- Shinonaga, Hideyuki, to Kokusai Denshin Denwa Co., Ltd. Unique word detection system. 5,016,206, Cl. 364-715.110.
- Shiono, Manzo: *See—*
  - Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.
- Shiozawa, Shinichi, to Yugen Kaisha Chubuseimitsu. Motor structure with magnetic interference shield. 5,015,893, Cl. 310-67.00R.
- Shipe, Joanne E.: *See—*
  - Grabbe, Dimitry G.; and Shipe, Joanne E., 5,015,191, Cl. 439-71.000.
- Shirai, Shoji: *See—*
  - Takahashi, Yoshiaki; Ishii, Sakae; Furuyama, Masayoshi; and Shirai, Shoji, 5,015,910, Cl. 313-414.000.
- Shirley, Everett E.: *See—*
  - Bush, Arden W.; and Shirley, Everett E., 5,015,816, Cl. 219-119.000.
- Shishido, Tadao: *See—*
  - Suga, Shuzo; Shishido, Tadao; Mifune, Hiroyuki; and Kawashima, Yoshiro, 5,015,567, Cl. 430-567.000.
- Shitori, Yoshiyasu: *See—*
  - Ogasawara, Sadanori; Abiko, Kenji; Ito, Masayoshi; and Shitori, Yoshiyasu, 5,015,631, Cl. 514-53.000.
- Shizuoka Seiki Co., Ltd.: *See—*
  - Kuwabara, Youhei; and Sugiyama, Haruki, 5,015,347, Cl. 204-129.200.
- Shoher, Itzhak; and Whiteman, Aharon E. Dental swager. 5,014,532, Cl. 72-60.000.
- Sholders, Ronald: *See—*
  - Romine, Lori; Sholders, Ronald; and Warren, Richard, 5,015,369, Cl. 210-136.000.
- Shong, Simon D.: *See—*
  - Froes, Francis H.; and Shong, Simon D., 5,015,305, Cl. 148-20.300.
- Shono, Masayuki: *See—*
  - Hamada, Hiroki; Honda, Shoji; Shono, Masayuki; and Yamaguchi, Takao, 5,016,252, Cl. 372-45.000.
- Shorr, Leonard M.; and Peled, Michael, to Bromine Compounds Ltd. Preparation of tetrabromotetralin. 5,015,685, Cl. 524-412.000.
- Shoukry, Ehsan I.: *See—*
  - Baird, William C., Jr.; and Shoukry, Ehsan I., 5,015,614, Cl. 502-250.000.
- Showakiki Industry Co., Ltd.: *See—*
  - Tsunakawa, Isao; Rikihisa, Nobuyoshi; and Kato, Kiyohiko, 5,014,657, Cl. 123-185.00B.
- Shtark, Hanoh: *See—*
  - Weisman, Ilan; Shapira, Roni; Shafir, Roni; and Shtark, Hanoh, 5,015,090, Cl. 356-30.000.
- Shtipelman, Boris A.; and Heppner, Paul, to Eastman Kodak Company. Linear actuator for radial access in disk recorder/player. 5,016,238, Cl. 369-215.000.
- Shu, Paul, to Mobil Oil Corporation. Amino resins crosslinked polymer gels for permeability profile control. 5,015,400, Cl. 252-8.554.
- Shukla, Yagya: *See—*
  - Ramachandran, Ramakrishnan; Shukla, Yagya; and MacLean, Donald L., 5,015,756, Cl. 558-320.000.
- Shumway, Peggy P., to Motorola, Inc. Digital signal processor based AGC. 5,016,205, Cl. 364-715.010.
- Shyong, Emory, to Computer Design, Inc. Textile design system and method. 5,016,183, Cl. 364-470.000.
- Siak, June-sang; and Klingenmaier, Otto J., to General Motors Corporation. Biocidal coated air conditioning evaporator. 5,014,774, Cl. 165-133.000.
- Sicowa Verfahrenstechnik fur Baustoffe GmbH & Co. KG: *See—*
  - Koslowski, Thomas J., 5,015,450, Cl. 423-172.000.
- Sicowa Verfahrenstechnik fur Baustoffe GmbH & Co. K.G.: *See—*
  - Koslowski, Thomas J., 5,015,449, Cl. 423-172.000.
- Sides, Gary D.; and Cates, Marion, to CMS Research Corporation. Continuous air monitoring apparatus and method. 5,014,541, Cl. 73-23.410.
- Sidey, Michael: *See—*
  - Detig, Robert H.; Sidey, Michael; and Wang, Li-Shin, 5,015,064, Cl. 350-96.240.
- Sieber, Alexander: *See—*
  - Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, 5,015,676, Cl. 523-453.000.
- Siegal, Burton L.: *See—*
  - Brown, Tobias; and Siegal, Burton L., 5,014,353, Cl. 2-11.000.
- Siegel, Melvin W.; and Grundy, Reed H., to PPG Industries, Inc. Apparatus and methods for measuring the diameter of a moving elongated material. 5,015,867, Cl. 250-560.000.
- Siegfried Peyer AG: *See—*
  - Gloor, Rene ; Muller, Michael; and Beeler, Alfred, 5,014,394, Cl. 19-98.000.
- Siemens Aktiengesellschaft: *See—*
  - Bichler, Helmut, 5,015,967, Cl. 330-257.000.
  - Birkle, Siegfried; Feucht, Hans-Dieter; Kamps, Rainer; and Rissel, Eva, 5,015,709, Cl. 526-279.000.
  - Finzel, Lothar, 5,015,062, Cl. 350-96.210.
  - Hirschberg, Jakub, 5,014,721, Cl. 128-786.000.
  - Leitgeb, Wilhelm, 5,015,902, Cl. 310-156.000.
  - Lobjinski, Manfred; Horn, Michael; and Hinterberger, Christian, 5,016,245, Cl. 370-60.000.
  - Mair, Eduard, 5,016,058, Cl. 355-292.000.
  - Richter, Helmut; and Kupfer, Adelbert, 5,015,071, Cl. 350-171.000.
  - Schaefer, Willi, 5,014,969, Cl. 269-322.000.
  - Schreiber, Hans, 5,016,198, Cl. 364-550.000.
  - Stoeckl, Klaus; and Becker, Bernd, 5,015,035, Cl. 297-345.000.
- Siemens-Bendix Automotive Electronics L.P.: *See—*
  - Wright, Danny O.; and Wiggins, Kregg S., 5,015,937, Cl. 318-696.000.
- Siemens-Pacesetter, Inc.: *See—*
  - Barcel, James E.; and Soukup, Thomas M., 5,014,720, Cl. 128-786.000.
- Siemer, Darryl D., to United States of America, Energy. Self-powered automatic secondary air controllers for woodstoves and small furnaces. 5,014,680, Cl. 126-77.000.
- Sierra Machinery, Inc.: *See—*
  - Porter, Ronald J., 5,014,580, Cl. 82-164.000.
- Sigmedics, Inc. of Delaware: *See—*
  - Graupe, Daniel; and Arber, Amihadar, 5,014,705, Cl. 128-419.00R.
- Silhouette Technology, Inc.: *See—*
  - Dwyer, Eugene J., III, 5,016,040, Cl. 355-20.000.
- Silver, Joel A.: *See—*
  - Bomse, David S.; Silver, Jòel A.; and Stanton: Alan C., 5,015,848, Cl. 250-281.000.
- Silvera, Robert K., to Polyset Company. Planar plural tubular filter array. 5,015,377, Cl. 210-323.200.
- Silverberg, Morton: *See—*
  - Dolan, Donald T.; Durst, Robert T., Jr.; Hubbard, David W.; and Silverberg, Morton, 5,014,797, Cl. 177-4.000.
- Sim, Dae-Yoon: *See—*
  - Yong-Je, Kim; Choi, Hoon-Sun; and Sim, Dae-Yoon, 5,016,106, Cl. 358-183.000.
- Simm, Wolfgang; Steine, Hans-Theo; and Streb, Karl P., to Castolin S.A. Apparatus for the flame spraying of powder materials by means of an autogenous flame. 5,014,915, Cl. 239-79.000.
- Simms, Betty J., legal representative: *See—*
  - Simms, Jack C., deceased, 5,015,646, Cl. 514-253.000.
- Simms, Jack C., deceased (by Simms, Betty J., legal representative), to Bristol-Myers Squibb Co. Pharmaceutically useful polymorphic modification of buspirone. 5,015,646, Cl. 514-253.000.
- Simonet, Benoit; Fabre, Pierre; Laluet, Jacques; and Egraz, Jean-Bernard, to Coatex S.A. Thickening agent which modifies the rheological characteristics of charged and/or pigmented, white or colored aqueous compositions. 5,015,711, Cl. 526-301.000.
- Simoudis, Evangelos; Evans, Richard P.; and Vonada, Donald G., to Digital Equipment Corporation. Expert system for performing diagnostic and redesign operations incorporating multiple levels of simulation detail. 5,016,204, Cl. 364-578.000.
- Simpson, Billy J., Sr.: *See—*
  - Bennett, Charles J.; and Simpson, Billy J., Sr., 5,015,325, Cl. 156-513.000.
- Simpson, Iain F., to Marconi Company Limited, The. Transceiver testing apparatus. 5,016,020, Cl. 343-703.000.
- Simpson, Theodore B.: *See—*
  - Ruether, John A.; and Simpson, Theodore B., 5,015,366, Cl. 208-408.000.
- Singh, Jag J.; Eftekhari, Abe; and St. Clair, Terry L., to United States of America, National Aeronautics and Space Administration. Slow positron beam generator for lifetime studies. 5,015,851, Cl 250-306.000.
- Singh, Raj N : *See—*
  - Borom, Marcus P.; Hillig, William B.; Singh, Raj N.; Morrison, William A.; and Interrante, Leonard V., 5,015,540, Cl. 428-698.000.
- Singleton, Kent A. Illuminated display vehicle ornament. 5,016,145, Cl. 362-80.100.
- Sipma, Gerben: *See—*
  - Lenselink, Willem; and Sipma, Gerben, 5,015,761, Cl. 560-256.000.
- Sirabella, Joseph, to Harris Corporation. Multiple external asynchronous triggers circuit. 5,015,871, Cl. 307-269.000.
- Siren, Matti, to Perstorp AB. Method of treating tissue damage with inositol triphosphate. 5,015,634, Cl. 514-103.000.
- Sirocky, Paul J.; and Steinetz, Bruce M., to United States of America, National Aeronautics and Space Administration. High-temperature, flexible, thermal barrier seal. 5,014,917, Cl. 239-265.110.

VOL 1126 ISS 2 MY 14 1991 UMI

- Skach, Edward J., Jr.; and Frederick, Paul S., to Dow Chemical Company, The. Process for desulfurization of molten hot metals. 5,015,291, Cl. 75-531.000.
- Skerker, Robert; and Prindle, William, to Robinson Knife Manufacturing Co., Inc. Kitchen tool. 5,014,434, Cl. 30-345.000.
- Skerker, Robert B.; and Prindle, William, to Robinson Knife Manufacturing Co., Inc. Potato masher. 5,014,921, Cl. 241-169.200.
- SKF GmbH: *See—*
  - Brandenstein, Manfred; Friedrick, Wolfgang; Haas, Roland; and Herrmann, Gerhard, 5,015,216, Cl. 474-101.000.
- Skibo, Edward B., to Arizona Board of Regents. Synthesis and elucidation of azamitosene and iminoazamitosene. 5,015,742, Cl. 548-323.000.
- Skinner, Albert A.; House, Ronnalee; Kellams, Roger W.; and Cruz, Jose A., to General Motors Corporation. Ignition coil. 5,015,982 Cl. 336-69.000.
- Skipper, Uvon. Long distance section mill for pipe in a borehole. 5,014,780, Cl. 166-55.000.
- Slaugh, Lynn H.; and Brownscombe, Thomas F., to Shell Oil Company. Methyl alkylation of toluene using basic zeolite catalysts. 5,015,796, Cl. 585-436.000.
- Slutz, David E.: *See—*
  - Corrigan, Francis R.; and Slutz, David E., 5,015,265, Cl. 51-293.000.
- Sluyts, Domien: *See—*
  - Verbueken, Armand; Sluyts, Domien; and Putseys, Roland, 5,015,456, Cl. 423-395.000.
- Smalley, Dennis R., to 3D Systems, Inc. Methods and apparatus for production of three-dimensional objects by stereolithography. 5,015,424, Cl. 264-22.000.
- Smart, Charles F., to Emhart Industries, Inc. Automatic riveting machine. 5,014,894, Cl. 227-6.000.
- Smeiman, Wilfred. Photocopy machine remotely controlled copy counting system. 5,016,059, Cl. 355-308.000.
- Smilovici, Adrian. Flat bed knitting machine having plural carriages. 5,014,524, Cl. 66-64.000.
- Smith, Daryl L.: *See—*
  - Rice, Richard F., Jr.; Kelly, David M.; and Smith, Daryl L., 5,016,003, Cl. 340-825.190.
- Smith, David A.; and Geiger, Herb, to Dow Chemical Company, The. Method and apparatus for the sequential handling of flexible products. 5,014,978, Cl. 271-308.000.
- Smith, David P., to Caterpillar Inc. Quick drop valve. 5,014,734, Cl. 137-117.000.
- Smith, Donald W.: *See—*
  - Brock, James D.; Smith, Donald W.; Basset, James H.; and Renneck, John P., 5,015,120, Cl. 404-108.000.
- Smith, Eileen M.; and Smith, Henry I. Removing perspiration. 5,014,360, Cl. 2-115.000.
- Smith, Fred P.: *See—*
  - Smith, Fred T.; and Smith, Fred P., 5,015,144, Cl. 414-525.200.
- Smith, Fred T.; and Smith, Fred P., to Heil Co., The. Apparatus for loading materials into a storage compartment and associated fluid pressure delivery system. 5,015,144, Cl. 414-525.200.
- Smith, Henry I.: *See—*
  - Smith, Eileen M.; and Smith, Henry I., 5,014,360, Cl. 2-115.000.
- Smith, John A.; and Carlson, Mark A., to Sanders Associates, Inc. Brake-control system for accelerating freely falling objects to a moving craft's speed. 5,014,997, Cl. 273-360.000.
- Smith, Kenneth M. Air entangled yarn. 5,014,404, Cl. 28-271.000.
- Smith, Lloyd M.; Fund, Steven; and Kaiser, Robert J., Jr., to California Institute of Technology. Nucleosides possessing blocked aliphatic amino groups. 5,015,733, Cl. 536-23.000.
- Smith, Mark: *See—*
  - Reitmeier, Jerry; Marquardt, Wayne; Smith, Mark; and Nethers, David, 5,014,896, Cl. 227-39.000.
- Smith, Michael L. Tubing collar position sensing apparatus, and associated methods, for use with a snubbing unit. 5,014,781, Cl. 166-66.500.
- Smith, Randall B.: *See—*
  - Shaw, Harold L.; Smith, Randall B.; Cunningham, Larry E.; Rishel, Barry E.; Gioannini, John P.; and Harkey, Warren B., 5,016,005, Cl. 340-870.190.
- Smith, Robert E., III, to National Coupling Company, Inc. Internal pressure loaded V-seal connector. 5,015,016, Cl. 285-108.000.
- Smith, Roger R. Differential steering mechanism. 5,015,221, Cl. 475-19.000.
- Smith, Ronald L.: *See—*
  - Monter, Robert P.; and Smith, Ronald L., 5,015,824, Cl. 219-219.000.
- Smith, Sherman, to Hudson Valley Tree, Inc. Bracket for mounting foldable branches to an artificial tree. 5,015,510, Cl. 428-18.000.
- Smith, Terry E.: *See—*
  - Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., 5,015,708, Cl. 526-264.000.
- Smith, Thomas B.: *See—*
  - Dechene, Ronald L.; Smith, Thomas B.; and Marino, Scott A., 5,015,954, Cl. 324-307.000.
- Smith, Thomas G.: *See—*
  - Lussi, Edward F.; and Smith, Thomas G., 5,015,516, Cl. 428-143.000.
- Smith, Todd A., to International Business Machines Corporation. Buffered encryption/decryption. 5,016,275, Cl. 380-43.000.
- Smith & Wesson Corp.: *See—*
  - Kurtz, Robert L.; Foley, Kevin G.; and Hindle, Kurt J., 5,014,456, Cl. 42-50.000.
- Smitherman, Herbert C., to Procter & Gamble Company, The. Combined anticalculus and antiplaque compositions. 5,015,467, Cl. 424-52.000.
- SmithKline Beecham Corporation: *See—*
  - Lindsey, Thomas O.; and Clark, Michael T., 5,015,627, Cl. 514-12.000.
- Smiths Industries Public Limited Company: *See—*
  - Cross, David E., 5,015,244, Cl. 604-344.000.
- Smits, Paul; Rosenfeld, Aron M.; and DeFerrari, Howard F., to Alcan International Limited. Method of making tamper-evident structures. 5,015.318, Cl. 156-233.000.
- SMS Manufacturing Co., Ltd.: *See—*
  - Mirando, Salvatore V.; and Lee, Walter, 5,014,991, Cl. 273-138.00A.
- SMS Manufacturing Corporation: *See—*
  - Mirando, Salvatore V.; and Lee, Walter, 5,014,988, Cl. 273-125.00A.
- SMS Schloemann-Siemag Aktiengesellschaft: *See—*
  - Nobis, Dieter; Hollmann, Friedrich; and Duster, Horst, 5,014,412, Cl. 29-527.700.
- Snelgrove R. Vernon: *See—*
  - McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Hall, David M., 5,015,522, Cl. 428-312.200.
- Snow Brand Milk Products Co., Ltd.: *See—*
  - Hori, Tomoshige; and Itoh. Kensuke, 5,014,553, Cl. 73-295.000.
- Snyder, Dale R., Jr.; and Haws, Joe H., to Shell Oil Company. Motor controller for electrical submersible pumps. 5,015,151, Cl. 417-18.000.
- Socha, Richard F.: *See—*
  - Degnan, Thomas F.; Kirker, Garry W.; Socha, Richard F.; Stapleton, Michael R.; and Johnson, Ivy D., 5,015,360, Cl. 208-110.000.
- Societe Anonyme dite: Droguet International: *See—*
  - Droguet, Roland, 5,014,847, Cl. 206-279.000.
- Societe Anonyme dite: L'Oreal: *See—*
  - Maignan, Jean; Lang, Gerard; and Malle, Gerard, 5,015,767, Cl. 564-154.000.
- Societe d'Etudes et de Recherches de l'Ecole Nationale Superieure d'Arts et Metiers: *See—*
  - Pollard, Jean; Duchamp, Robert; and Truchot, Patrick, 5,015,065, Cl. 350-96.240.
- Societe ECA: *See—*
  - Tamagno, Didier Y. F.; Mas, Georges L. J. M.; and Navelier, Alain F. E. A., 5,015,060, Cl. 350-96.200.
- Societe Nationale Industrielle et Aerospatiale: *See—*
  - Boime, Bernard; and Taquoy, Bernard, 5,015,168, Cl. 425-389.000.
- Soda, Hiroyuki: *See—*
  - Satoh, Yuji; Kono, Hiromi; Soda, Hiroyuki; and Otsuka, Masuhiro, 5,014,832, Cl. 192-30.00W.
- Solfest, Patricia A.: *See—*
  - Strangman, Thomas E.; and Solfest, Patricia A., 5,015,502, Cl. 427-248.100.
- Solomon, Donald D.; Karakelle, Mutlu; and Beck, Richard W., to Becton, Dickinson and Company. Expandable obturator and catheter assembly including same. 5,015,238, Cl. 604-164.000.
- Soltanpour, Parviz N.: *See—*
  - Malmgren, Robert C.; Soltanpour, Parviz.N.; and Cipra, Jan E., 5,014,462, Cl. 47-1.010.
- Somar Corporation: *See—*
  - Ochi, Hideo; and Kitaori, Tomoyuki, 5,015,558, Cl. 430-325.000.
  - Ono, Kazuya; Miyake, Tetsuo; and Kitagawa, Katsuji, 5,015,671, Cl. 523-402.000.
- Sommer, Herbert; Hartwig, Jurgen; and Matthaei, Hans-Detlef, to Bayer Aktiengesellschaft. Pesticidal S-(halogenoalkyl)-dithiophosphoric(phosphonic) acid esters. 5,015,635, Cl. 514-144.000.
- Sonobe, Katsuyoshi, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus having sheet nip releasing mechanism and shutter mechanism. 5,016,041, Cl. 355-27.000.
- Sonoco Products Company: *See—*
  - Gandy, Carroll E.; and Watford, Roland S., Jr., 5,014,928, Cl. 242-118.320.
- Sonotech, Inc.: *See—*
  - Zinn, Ben T.; Daniel, Brady R.; and Rabhan, Andrew B., 5,015,171, Cl. 431-1.000.
- Sony Corporation: *See—*
  - Avis, Richard J. A., 5,016,102, Cl. 358-140.000.
  - Inoue, Yasuo; Takeda, Haruo; Sato, Keiji; Yamazaki, Noriyuki; and Iida, Osamu, 5,016,127, Cl. 360-94.000.
  - Ishido, Takanobu; Tan, Sachiyo; and Furukori, Masami, 5,016,192, Cl. 364-518.000.
  - Kii, Kazuo, 5,016,095, Cl. 358-64.000.
  - Nakajima, Takatsugu; Endo, Katsumi; and Miura, Toru, 5,016,112, Cl. 358-335.000.
  - Ogawa, Tetsuo; Abe, Takao; and Asai, Toshiya, 5,016,119, Cl. 360-10.300.
  - Okada, Hiroshi; and Takahashi, Takao, 5,016,120, Cl. 360-27.000.
  - Richards, John W.; Gillard, Clive H.; Avis, Richard J. A.; Samad, Raphael; and Walters, Carl W., 5,016,101, Cl. 358-140.000.
  - Wachi, Shigeaki, 5,015,932, Cl. 318-560.000.
  - Yoshida, Masanobu, 5,016,093, Cl. 358-41.000.
- Soong, Tsai C. Frame for sports racket. 5,014,987, Cl. 273-73.00C.
- Soproni, Zoltan; and Charmasson, Joseph A., to Cree, Ian Campbell. Hypodermic needle shield. 5,015,240, Cl. 604-192.000.
- Sorensen, Johan H.: *See—*
  - Becker, Hans-Dieter; Einarsson, Stefan; Grzegorczyk, Andrzej; Josefsson, Bjorn; Lagerkvist, Stig S.; Moller, Per L.; Sanchez, Domingo; and Sorensen, Johan H., 5,015,755, Cl. 558-282.000.

- Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, to Nikon Corporation. Camera system. 5,016,039, Cl. 354-430.000.
- Sosnow, William, to Happi, Inc. Process for making an orthotic footwear insert. 5,015,427, Cl. 264-115.000.
- Soubliere, Marc P., to Northern Telecom Limited. Closures. 5,014,959, Cl. 248-551.000.
- Soukup, Thomas M.: *See—*
  - Barcel, James E.; and Soukup, Thomas M., 5,014,720, Cl. 128-786.000.
- Southern, Don L. Apparatus for repairing holes in wood. 5,014,483, Cl. 52-514.000.
- Southern Systems, Inc.: *See—*
  - Linton, Leon; and Campbell, Michael L., 5,014,843, Cl. 198-377.000.
- Southwest Sciences, Incorporated: *See—*
  - Bomse, David S.; Silver, Joel A.; and Stanton: Alan C., 5,015,848, Cl. 250-281.000.
- Sowers, Edward E.: *See—*
  - McQuigg, Donald W.; Webb, Heather K.; and Sowers, Edward E., 5,015,706, Cl. 526-200.000.
- Sowle, Cynthia W.; and Tobey, Stephen W., to DowBrands Inc. Animal litter. 5,014,650, Cl. 119-171.000.
- SpaceLabs, Inc.: *See—*
  - Millay, Jack M.; and Walloch, Richard A., 5,014,714, Cl. 128-672.000.
- Spada, Alfred P.; Studt, William L.; Campbell, Henry F.; Kuhla, Donald E.; and Tucker, Thomas, to Rhone-Poulenc Rorer Pharmaceuticals Inc. Naphtheridinone- and pyridooxazinone-pyridone compounds, cardiotonic compositions including same, and their uses. 5,015,638, Cl. 514-211.000.
- Spahl, Roland: *See—*
  - Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, 5,015,788, Cl. 568-861.000.
- Span-America Medical Systems, Inc.: *See—*
  - Coonrad, Ralph W.; and Booth, Carolyn R., 5,014,375, Cl. 5-431.000.
- Spangler, Hayward G.; and Erickson, Eric H., to United States of America, Agriculture. System for assessing bee temperament. 5,015,212, Cl. 449-2.000.
- Spanjer, Tjerk G.; and Vrijssen, Gerardus A. H. M., to U.S. Philips Corporation. Picture display device. 5,015,925, Cl. 315-382.000.
- Sparks, Randall T.: *See—*
  - Mulligan, Seamus; and Sparks, Randall T., 5,015,479, Cl. 424-457.000.
- Spectra Physics, LPD: *See—*
  - D'Arcy, John, 5,016,251, Cl. 372-10.000.
- Spectra-Tech, Inc.: *See—*
  - Sting, Donald W., 5,015,092, Cl. 356-300.000.
- Sperry Marine Inc.: *See—*
  - Howell, Jesse A., 5,015,072, Cl. 350-276.00R.
- Spiess, Joachim; Rivier, Jean E. F.; Bardin, C. Wayne; and Vale, Wylie W., Jr., to Salk Institute for Biological Studies, The. Ovine inhibin. 5,015,729, Cl. 530-350.000.
- Spindt, Charles A.; and Holland, Christopher E., to SRI International. Matrix-addressed flat panel display. 5,015,912, Cl. 313-495.000.
- Spine-Tech, Inc.: *See—*
  - Kuslich, Stephen D., 5,015,255, Cl. 623-17.000.
- Spirn, Jeffrey: *See—*
  - Van Loo, James; Carrie, Susan; Evans, Jerald; and Spirn, Jeffrey, 5,016,161, Cl. 364-200.000.
- Sprague, Brian J.; and Portanova, Gregory A., to United Technologies Corporation. Binary division of signed operands. 5,016,210, Cl. 364-766.000.
- Sprecher Energie AG: *See—*
  - Wuthrich, Hans R., 5,015,809, Cl. 200-144.00R.
- Spring, Richard C., to Insulated Panel Systems, Inc. Panels and panel interlocking means. 5,014,478, Cl. 52-281.000.
- Springer, Hartmut: *See—*
  - Schwaiger, Gunther; and Springer, Hartmut, 5,015,731, Cl. 534-618.000.
- Springer, Robert E.; Hafer, George F.; and Gilbert, Everett A., to Da-Tel Research Company, Incorporated. Frequency shift demodulator. 5,015,961, Cl. 329-300.000.
- Square D Company: *See—*
  - Zylstra, Henry J., 5,016,135, Cl. 361-156.000.
- SRI International: *See—*
  - Spindt, Charles A.; and Holland, Christopher E., 5,015,912, Cl. 313-495.000.
- Sridharan, Needangalam S.: *See—*
  - Auyer, Richard A.; Buccellato, Robert J.; Gidynski, Andrew J.; Ingersoll, Richard M.; and Sridharan, Needangalam S., 5,014,593, Cl. 89-36.020.
- Srivastava, Aditya, to Texas Instruments Incorporated. Computer system having delayed save on procedure calls. 5,016,164, Cl. 364-200.000.
- Stac, Inc.: *See—*
  - Whiting, Douglas L.; George, Glen A.; and Ivey, Glen E., 5,016,009, Cl. 341-67.000.
- Stadtler, Marc-Michael. Modular system for setting up furniture, racks, frameworks and the like. 5,014,861, Cl. 211-182.000.
- Staff, Karen E.: *See—*
  - Boughten, Larry R.; Evoniuk, Christopher J.; Scott, James M.; and Staff, Karen E., 5,014,407, Cl. 29-235.000.
- Staheli, Paul; Demuth, Robert; and Fritzsche, Peter, to Rieter Machine Works Ltd. Apparatus for automatically compensating density or thickness variations of fiber material at textile machines, such as cards, draw frames and the like. 5,014,395, Cl. 19-105.000.
- Stahl, Rainer: *See—*
  - Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., 5,016,087, Cl. 357-75.000.
- Stahlecker, Fritz; and Stahlecker, Hans, to Stahlecker, Fritz; and Stahlecker, Hans. High-draft drafting unit. 5,014,398, Cl. 19-244.000.
- Stahlecker, Hans: *See—*
  - Stahlecker, Fritz; and Stahlecker, Hans, 5,014,398. Cl. 19-244.000.
- Stahlwerke Peine-Salzgitter AG: *See—*
  - Kaiser, Heinrich, 5,014,965, Cl. 266-44.000.
- Standard Elektrik Lorenz AG: *See—*
  - Wolf, Michael; and Beier, Wolfgang, 5,016,257, Cl. 375-1.000.
- Stanton: Alan C.: *See—*
  - Bomse, David S.; Silver, Joel A.; and Stanton: Alan C., 5,015,848, Cl. 250-281.000.
- Staples, Lorna C.: *See—*
  - Scaglione, Felice; and Staples, Lorna C., 5,015,485, Cl. 426-94.000.
- Stapleton, Michael R.: *See—*
  - Degnan, Thomas F.; Kirker, Garry W.; Socha, Richard F.; Stapleton, Michael R.; and Johnson, Ivy D., 5,015,360, Cl. 208-110.000.
- Star Pennsylvania New Flower S.p.A.: *See—*
  - Vaccari, Enzo, 5,015,520, Cl. 428-215.000.
- Stark, Glenn M.: *See—*
  - Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.
- Stark, Robert, Sr. Swimming pool bulkhead. 5,014,370, Cl. 4-505.000.
- Stasch, Johannes-Peter: *See—*
  - Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, 5,015,650, Cl. 514-356.000.
- Steck, Werner; Lermer, Helmut; Schwarzmann, Matthias; and Dockner, Toni, to BASF Aktiengesellschaft. Preparation of mixtures of isomeric cresols with a molar ratio of para- to meta-cresol of at least 0.6:1 to 10:1. 5,015,785, Cl. 568-783.000.
- Steele, Lawrence C.; and Rook, Kenneth E., to Eastman Kodak Company. Apparatus for improving a multi-color electrophotographic image. 5,016,054, Cl. 355-256.000.
- Steely, Lee W.: *See—*
  - Chang, Paul S.; and Steely, Lee W., 5,016,134, Cl. 361-153.000.
- Steenken-Richter, Ingrid: *See—*
  - Dix, Johannes P.; Fikentscher, Rolf; and Steenken-Richter, Ingrid, 5,015,754, Cl. 558-260.000.
- Steffes, Helmut: *See—*
  - Reinartz, Hans-Dieter; Steffes, Helmut; and Hayn, Holger V., 5,014,514, Cl. 60-533.000.
- Steiert, Peter; Betz, Walter; Plachetta, Christoph; and Koch, Eckhard M., to BASF Aktiengesellschaft. Flameproof thermoplastic molding materials based on polyamides and polyester elastomers. 5,015,681, Cl. 524-101.000.
- Stein, Kenneth M.: *See—*
  - Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.
- Stein, Michael H.: *See—*
  - Puri, Rajen; and Stein, Michael H., 5,014,785, Cl. 166-263.000.
- Steine, Hans-Theo: *See—*
  - Simm, Wolfgang; Steine, Hans-Theo; and Streb, Karl P., 5,014,915, Cl. 239-79.000.
- Steiner, Denis: *See—*
  - Meyrat, Pierre-Andre ; Oppliger, Alain; and Steiner, Denis, 5,015,591, Cl. 436-178.000.
- Steiner, Heinz; and Tobler, Hans, to Ciba-Geigy Corporation. Process for the preparation of dihalobutyraldehydes. 5,015,780, Cl. 568-490.000.
- Steiner, James R.: *See—*
  - Steiner, Norman F.; and Steiner, James R., 5,014,606, Cl. 98-2.090.
- Steiner, Norman F.; and Steiner, James R. Windshield defroster system for the Bell Helicopter Textron, Inc., model 206 helicopter and military derivatives. 5,014,606, Cl. 98-2.090.
- Steinetz, Bruce M.: *See—*
  - Sirocky, Paul J.; and Steinetz, Bruce M., 5,014,917, Cl. 239-265.110.
- Stelco Inc.: *See—*
  - Maybrey, John G.; and Harvey, George R., 5,014,534, Cl. 72-250.000.
- Steltenkamp, Robert J., to Colgate-Palmolive Co. N-alkyl neotridecanamide insect repellent compositions. 5,015,665, Cl. 514-625.000.
- Stenner, John W., to Kurt H. Volk, Inc. Booklet with central detachable business reply envelope and optional response device produced from an integral web and methods of production. 5,015,137, Cl. 412-1.000.
- Stephenson, Gary: *See—*
  - Abendroth, Carl W.; and Stephenson, Gary, 5,015,320, Cl. 156-264.000.
- Stephenson, Peter, to Stephenson, Peter; and Swanepoel, Jacobus. Variable ratio transmission. 5,014,565, Cl. 74-190.000.
- Steusloff, Patrick M.: *See—*
  - McLaughlin, Carol F.; Taylor, Ronald R.; Williams, William D.; and Steusloff, Patrick M., 5,014,875, Cl. 221-2.000.

VOL 1126 ISS 2 MY 14 1991 UMI

Stevens Graphics Corporation: *See—*

Bergland, Paul W.; Parker, James D.; and Timple, Thomas H., 5,016,182, Cl. 364-469.000.

Stevenson, Joel O.: *See—*

Guilinger, Terry R.; Jones, Howland D. T.; Kelly, Michael J.; Medernach, John W.; Stevenson, Joel O.; and Tsao, Sylvia S., 5,015,346, Cl. 204-129.100.

Stevenson, Lynnor B.: *See—*

Cochrum, Kent C.; Stevenson, Lynnor B.; and King, Scott R., 5,015,476, Cl. 424-423.000.

Stevenson, William H., IV. Roller reefing system for sails and the like. 5,014,637, Cl. 114-103.000.

Stewart, Clarence H. Spread spectrum intercept apparatus and method. 5,016,256, Cl. 375-1.000.

Stewart, Ray F.: *See—*

Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.

Stewart Systems, Inc.: *See—*

Davis, Bill E.; Myers, Eugene W.; Goodhart, Richard B.; Paris, William M.; and Borthwick, James T., Jr., 5,014,496, Cl. 53-433.000.

Stidham, Robert E.: *See—*

Connor, Daniel S.; and Stidham, Robert E., 5,015,468, Cl. 424-55.000.

Sting, Donald W., to Spectra-Tech, Inc. Sampling probe for optical analyzation of a sample. 5,015,092, Cl. 356-300.000.

Stinson, Charles W. Protective cover for vehicle windows. 5,014,758, Cl. 150-168.000.

Stipek, Theodor: *See—*

Hlousek, Jaroslaw; Lehner, Gerhard; and Stipek, Theodor, 5,015,160, Cl. 417-499.000.

Stoeckl, Klaus; and Becker, Bernd, to Siemens Aktiengesellschaft. Dental patient chair. 5,015,035, Cl. 297-345.000.

Stojkov, Joseph A.: *See—*

Kocsis, Judith; Stojkov, Joseph A.; and Towler, Michael E., 5,014,599, Cl. 92-84.000.

Stollenwerk Fabrik fur Sanitatsaustungen Hans Stollenwerk & Cie GmbH & Co.: *See—*

Bloemer, Guenter, 5,015,024, Cl. 296-20.000.

Stoltefuss, Jurgen; Schwenner, Eckhard; Gross, Rainer; Hebisch, Siegbert; Schramm, Matthias; Bechem, Martin; Hirth, Claudia; and Stasch, Johannes-Peter, to Bayer Aktiengesellschaft. Circulation-active basic 4-aryl-DHP amides. 5,015,650, Cl. 514-356.000.

Stone, Robert F.; Potter, Jeffrey D.; and Beamon, William S., III, to General Electric Company. Pixel and line enhancement method and apparatus. 5,016,193, Cl. 364-518.000.

Stoneham, Jeffrey R.: *See—*

Dwyer, Patricia A.; and Stoneham, Jeffrey R., 5,016,030, Cl. 354-21.000.

Stopa, James L.; and Bibbiani, Stephen C., to Whelen Technologies, Inc. Electronic power supply with enhanced heat transfer characteristics. 5,016,139, Cl. 361-386.000.

Storck, Kevin: *See—*

Rumpf, Robert J.; Willey, Ronald A.; and Storck, Kevin, 5,014,926, Cl. 242-107.40A.

Story, Phillip M.; and Brand, John R., to Kerr-McGee Chemical Corporation. Nonpigmentary titanium dioxide powders. 5,015,264, Cl. 23-313.00R.

Strabag Bau-AG: *See—*

Schiessl, Peter, 5,015,355, Cl. 204-404.000.

Strandjord, Andrew J.; Yates, Ronald L.; and Perettie, Donald J., to Dow Chemical Company, The. Optical recording medium. 5,016,240, Cl. 369-288.000.

Strangman, Thomas E.; and Solfest, Patricia A., to Allied-Signal Inc. Ceramic thermal barrier coating with alumina interlayer. 5,015,502, Cl. 427-248.100.

Strategic Energy Ltd.: *See—*

Burroughs, James R.; and O'Kain, Alan N., 5,015,544, Cl. 429-93.000.

Strauch, Raymond, to U.S. Philips Corporation. Volume-scattered echo discrimination device for FM/CW range measuring radar and use in a radio altimeter. 5,016,016, Cl. 342-87.000.

Straw, Philip L., to Beecham Group P.L.C. Oral hygiene compositions. 5,015,465, Cl. 424-052.000.

Streb, Karl P.: *See—*

Simm, Wolfgang; Steine, Hans-Theo; and Streb, Karl P., 5,014,915, Cl. 239-79.000.

Stresswave Technology Limited: *See—*

Holroyd, Trevor J., 5,014,547, Cl. 73-105.000.

Holroyd, Trevor J., 5,015,995, Cl. 340-621.000.

Strife, James R.: *See—*

Nardone, Vincent C.; Strife, James R.; and Prewo, Karl M., 5,015,116, Cl. 403-28.000.

Strikis, Guntis V.: *See—*

Amin, Jayendra J.; and Strikis, Guntis V., 5,015,161, Cl. 418-6.000.

Strobridge, John R., to Amway Corporation. Antiplaque chewing gum. 5,015,464, Cl. 424-48.000.

Strom-Olsen, John O.; and Rudkowski, Piotr Z., to Pitney Bowes Inc. Cobalt-niobium amorphous ferromagnetic alloys. 5,015,992, Cl. 340-551.000.

Strom-Olsen, John O.; and Rudkowski, Piotr Z., to Pitney Bowes Inc. Ferromagnetic alloys with high nickel content and high permeability. 5,015,993, Cl. 340-551.000.

Stroud, William: *See—*

Terminella, Frank; Terminella, Emanuele; Stroud, William; and Terminella, Joseph E., 5,014,489, Cl. 53-51.000.

Strubbe, Gilbert J. I., to Ford New Holland, Inc. Method and apparatus for measuring combine grain loss. 5,015,997, Cl. 340-684.000.

Stubbs, James R.; and Terry, Thomas R. Home video system. 5,016,272, Cl. 380-5.000.

Studt, William L.: *See—*

Spada, Alfred P.; Studt, William L.; Campbell, Henry F.; Kuhla, Donald E.; and Tucker, Thomas, 5,015,638, Cl. 514-211.000.

Sublet, Warner G. Adjustable-depth bait slider. 5,014,459, Cl. 43-44.850.

Sudilovsky, Abraham, to E. R. Squibb & Sons, Inc. Method for inhibiting loss of cognitive functions employing an ace inhibitor. 5,015,633, Cl. 514-91.000.

Sueda, Akihiro: *See—*

Kitagawa, Nobutaka; Sueda, Akihiro; and Kuwasima, Yasunori, 5,016,263, Cl. 377-68.000.

Suehiro Seiko Kabushiki Kaisha: *See—*

Date, Yozo; and Tsumura, Toshihiro, 5,014,435, Cl. 30-387.000.

Suekane, Ariko; Yamazaki, Fumio; and Masuda, Takayoshi, to Mitsui Toatsu Chemicals, Inc. Preparation process of polyoxyalkylene polyamine having terminal secondary amino group. 5,015,774, Cl. 564-475.000.

Suematsu, Koichi: *See—*

Toya, Ichizo; Yamada, Sumito; and Suematsu, Koichi, 5,015,562, Cl. 430-518.000.

Suga, Shuzo; Shishido, Tadao; Mifune, Hiroyuki; and Kawashima, Yoshiro, to Fuji Photo Film Co., Ltd. Method for producing silver halide photographic emulsion and silver halide photographic material. 5,015,567, Cl. 430-567.000.

Suggi Liverani, Furio: *See—*

Illy, Ernesto; and Suggi Liverani, Furio, 5,014,611, Cl. 99-280.000.

Sugimoto, Hiroaki; Ohbe, Yoshitaka; Hayatsu, Kazuo; and Iwata, Atsukazu, to Sumitomo Chemical Company, Limited. Process for producing aromatic polyesters. 5,015,723, Cl. 528-190.000.

Sugiyama, Haruki: *See—*

Kuwabara, Youhei; and Sugiyama, Haruki, 5,015,347, Cl. 204-129.200.

Sugiyama, Kenji, to Victor Company of Japan, Ltd. System for controlling a number of bits required to represent coded output data. 5,016,010, Cl. 341-67.000.

Sugiyama, Takeshi; and Morishita, Akira, to Mitsubishi Denki Kabushiki Kaisha. Engine starter with a shortened over-running clutch. 5,014,562, Cl. 74-6.000.

Sugiyama, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Solenoid switch apparatus. 5,015,980, Cl. 335-126.000.

Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., to Rhone-Poulenc Rorer Pharmaceuticals Inc. Treatment of conditions requiring enhanced oxygen availability of mammalian tissues. 5,015,663, Cl. 514-510.000.

Suib, Steven L.; and Zhang, Zongchao, to University of Connecticut. Low power density microwave discharge plasma excitation energy induced chemical reactions. 5,015,349, Cl. 204-168.000.

Sullivan, Carl J., to Arco Chemical Technology, Inc. Paint stripper compositions containing N-methyl-2-pyrrolidone, aliphatic hydrocarbons, and aromatic hydrocarbons. 5,015,410, Cl. 252-166.000.

Sullivan Engine Works, Inc.: *See—*

Sullivan, Robert W.; Holder, Tommie J.; and Buchanan, Max F., 5,014,653, Cl. 123-43.00A.

Sullivan, Mark E.: *See—*

Forkert, Maurice J.; and Sullivan, Mark E., 5,016,187, Cl. 364-510.000.

Sullivan, Robert W.; Holder, Tommie J.; and Buchanan, Max F., to Sullivan Engine Works, Inc. Rotary vee engine. 5,014,653, Cl. 123-43.00A.

Sulzer Brothers Limited: *See—*

Mutter, Heinz, 5,014,871, Cl. 220-315.000.

Vogel, Rudolf; and Ruedisueli, Anton, 5,014,756, Cl. 139-97.000.

Sumitomo Chemical Company, Limited: *See—*

Sugimoto, Hiroaki; Ohbe, Yoshitaka; Hayatsu, Kazuo; and Iwata, Atsukazu, 5,015,723, Cl. 528-190.000.

Takao, Hiroyoshi; Imai, Akio; Seki, Tomoaki; and Tsuji, Mitsuji, 5,015,692, Cl. 525-102.000.

Sumitomo Electric Industries, Inc.: *See—*

Taguchi, Tsunemasa; and Nanba, Hirokuni, 5,015,327, Cl. 156-603.000.

Sumitomo Electric Industries, Ltd.: *See—*

Kato, Chiaki; Nishi, Masaya; and Hatta, Toshiyuki, 5,014,406, Cl. 29-130.000.

Matsumoto, Yasuyo, 5,015,512, Cl. 428-35.100.

Yamada, Katsuhiko; and Egusa, Norio, 5,015,287, Cl. 75-10.170.

Yoshino, Masato, 5,015,042, Cl. 303-96.000.

Sumitomo Heavy Industries, Ltd.: *See—*

Takeshima, Eiki; Takatsu, Kiyoshi; Asano, Norio; and Hozumi, Masahiro, 5,015,863, Cl. 250-515.100.

Sumitomo Rubber Industries, Ltd.: *See—*

Nakasaki, Eiji, 5,015,315, Cl. 156-130.700.

Noma, Hiroyuki; Kouno, Tadao; and Kadomaru, Kazuo, 5,014,761, Cl. 152-527.000.

Summa, William J.: *See—*

Papathomas, Kostas I.; Summa, William J.; and Wang, David W., 5,015,719, Cl. 528-70.000.

Sun, Fu-Cheng. Structure of an ink cup. 5,014,437, Cl. 33-414.000.

Sun Microsystems, Inc.: *See—*

Van Loo, James; Carrie, Susan; Evans, Jerald; and Spirn, Jeffrey, 5,016,161, Cl. 364-200.000.

Van Loo, James; Carrie, Susan; and Evans, Jerald, 5,016,166, Cl. 364-200.000.

Sunatori, Go S.: *See—*

Livermore, Frederick C.; Hogeboom, John G.; and Sunatori, Go S., 5,015,600, Cl. 437-51.000.

Sunberg, Richard J.: *See—*

Parran, John J., Jr.; Coyle-Rees, Margaret M.; Rotruck, John T.; and Sunberg, Richard J., 5,015,466, Cl. 424-52.000.

Sundaresan, Ravishankar, to Texas Instruments Incorporated. Stacked CMOS sRAM with vertical transistors and cross-coupled capacitors. 5,016,070, Cl. 357-23.600.

Sundet, Sherman A., to Du Pont de Nemours, E. I., and Company. Microporous support layer with interfacially polymerized copolyamide membrane thereon. 5,015,380, Cl. 210-490.000.

Sundet, Sherman A., to Du Pont de Nemours, E. I., and Company. Microporous support layer with interfacially polymerized copolyamide membrane thereon. 5,015,382, Cl. 210-490.000.

Sundholm, Goran. Working cylinder. 5,014,601, Cl. 92-109.000.

Sundstrand Corporation: *See—*

Dhyanchand, P. John, 5,015,941, Cl. 322-10.000.

Hutchison, Richard M.; and Hitt, David H., 5,014,560, Cl. 73-862.330.

Rice, John N.; and Reynolds, Richard W., 5,014,507, Cl. 60-204.000.

Rozman, Gregory I.; and Maddali, Vijay K., 5,016,157, Cl. 363-39.000.

Sundstrom, Vernon L., 5,014,513, Cl. 60-456.000.

White, Robert C., 5,016,142, Cl. 361-415.000.

Sundstrom, Vernon L., to Sundstrand Corporation. Self-sealing transfer tube for port plate. 5,014,513, Cl. 60-456.000.

Sunohara, Masaaki: *See—*

Kimoto, Takayuki; Sunohara, Masaaki; Inoue, Takashi; Nakamura, Shoji; and Yonetani, Daijirou, 5,015,280, Cl. 65-307.000.

Supaflo Pty. Limited: *See—*

Taylor, David, 5,015,392, Cl. 210-712.000.

SuperComputer Systems Limited Partnership: *See—*

Vaupotic, Gregory P.; Beck, Doris A.; and Chy, Sokha, 5,015,800, Cl. 174-34.000.

Susumu Ubukata: *See—*

Ubukata, Susumu; and Mizutani, Yasukazu, 5,015,985, Cl. 337-368.000.

Sutton, John F., to United States of America, National Aeronautics and Space Administration. Synchronous demodulator. 5,015,963, Cl. 329-361.000.

Suzuki, Akihiro; and Sakaguchi, Masaaki, to Fuji Photo Film Co., Ltd. Method for manufacturing magnetic tape. 5,015,430, Cl. 264-146.000.

Suzuki, Akimitsu; Igari, Kozaburo; and Yabe, Hiroshi, to NSK-Warner Kabushiki Kaisha. Speed responsive one-way centrifugal clutch. 5,014,834, Cl. 192-48.300.

Suzuki, Akira; and Tanaka, Katsuya, to Aisin AW Kabushiki Kaisha. Pressure control valve. 5,014,747, Cl. 137-625.650.

Suzuki, Fujiyuki, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Constant-speed traveling equipment. 5,014,804, Cl. 180-178.000.

Suzuki, Hiroshi, to Aisin Seiki Kabushiki Kaisha. Diaphragm spring arrangement for a clutch. 5,014,838, Cl. 192-89.00B.

Suzuki, Hiroyoshi; Ogawa, Kenji; and Maekawa, Hiroko, to Mitsubishi Denki K.K. Device for detecting alcoholic content. 5,015,091, Cl. 356-135.000.

Suzuki, Hiroyuki: *See—*

Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,014,799, Cl. 177-211.000.

Suzuki, Hitoshi; Yokoyama, Hiromitsu; Tsukada, Mineharu; Ogawa, Hiromi; Kamehara, Nobuo; and Niwa, Koichi, to Fujitsu Limited. Method for production of ceramic circuit board. 5,015,314, Cl. 156-89.000.

Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*

Suzuki, Fujiyuki, 5,014,804, Cl. 180-178.000.

Umehara, Kazuhiro, 5,016,006, Cl. 340-984.000.

Suzuki, Kazutoyo. Method for molding a foot shape. 5,015,429, Cl. 264-138.000.

Suzuki, Kenji: *See—*

Ito, Yasunobu; and Suzuki, Kenji, 5,016,174, Cl. 364-424.100.

Suzuki, Masami: *See—*

Yamashita, Masayasu; Suzuki, Masami; Yoshio, Junichi; and Watanabe, Osamu, 5,016,113, Cl. 358-335.000.

Suzuki, Mikio, to Laurel Bank Machines Co., Ltd. Coin feed-in apparatus for coin handling machine. 5,015,214, Cl. 453-56.000.

Suzuki, Nobuo: *See—*

Tachikawa, Hiromichi; Yokoya, Hiroaki; Suzuki, Nobuo; and Watarai, Syu, 5,015,551, Cl. 430-114.000.

Suzuki, Nobutaka: *See—*

Koharagi, Haruo; Tahara, Kazuo; Nitobe, Mitsuhiro; and Suzuki, Nobutaka, 5,015,905, Cl. 310-186.000.

Suzuki, Shigehiko, to Mitsubishi Denki Kabushiki Kaisha. Rescue operating apparatus for elevator. 5,014,825, Cl. 187-104.000.

Suzuki, Tadato; Yorimoto, Yoshikazu; Matsumura, Hidekazu; and Hirano, Seiji, to Toppan Printing Co., Ltd. Information card system communicable in contactless manner. 5,015,834, Cl. 235-493.000.

Suzuki, Taisuke: *See—*

Okada, Hidetake; Kawai, Masato; Enomoto, Shunji; and Suzuki, Taisuke, 5,015,272, Cl. 55-26.000.

Suzuki, Tasuku: *See—*

Fujii, Toshio; Kato, Kazuhiro; Suzuki, Tasuku; and Kashino, Minoru, 5,015,521, Cl. 428-220.000.

Suzuki, Yasutomo: *See—*

Fukushima, Nobuo; Sakai, Shinji; Takeda, Osamu; Suzuki, Yasutomo; and Takei, Masahiro, 5,016,124, Cl. 360-69.000.

Svendsen, Peter R.: *See—*

Riggle, Charles M.; Svendsen, Peter R.; and Read, John D., 5,016,131, Cl. 360-106.000.

Svensson, Sten. Tombstone. 5,014,472, Cl. 52-103.000.

Swain, William F.: *See—*

Christou, Paul; McCabe, Dennis; Swain, William F.; and Barton, Kenneth A., 5,015,580, Cl. 435-172.300.

Swanepoel, Jacobus: *See—*

Stephenson, Peter, 5,014,565, Cl. 74-190.000.

Swanson, Roger M.: *See—*

Connolly, Douglas P.; Rickett, Barry G.; Yax, Robert J.; and Swanson, Roger M., 5,016,171, Cl. 364-406.000.

Swarden, M. C.; Jansen, W.; and Griffith, John M., to Ingersoll-Rand Company. Contoured blade edge cutting method. 5,014,421, Cl. 29-889.700.

Swars, Helmut, to Emitec Gesellschaft fur Emissionstechnologie mbH. Assembled crankshaft. 5,014,572, Cl. 74-595.000.

Sweeney, Gerald T., to Aardvark Corporation, Inc. Plastic pipe section. 5,015,014, Cl. 285-81.000.

Sweeney, Michael: *See—*

Pless, Benjamin; Sweeney, Michael; and Winkle, Roger, 5,014,697, Cl. 128-419.00D.

Sweet, Richard C.; Azevedo, Jose M. I.; and Bronnes, Robert L., to North American Philips Corporation. Method of mounting permanent magnets without organic adhesives. 5,015,536, Cl. 428-611.000.

Swinton, William G.: *See—*

Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.

Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., to General Electric Company. Polyphenylene ether-polyester copolymers, precursors therefor, compositions containing said copolymers, and methods for their preparation. 5,015,698, Cl. 525-391.000.

Symbol Technologies, Inc.: *See—*

Shepard, Howard M.; Gofman, Yuri; and Barkan, Edward, 5,015,833, Cl. 235-472.000.

Synektron Corporation: *See—*

Konecny, Karl, 5,015,939, Cl. 318-701.000.

Syoji, Masaaki: *See—*

Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.

Szysh, John A.: *See—*

Angell, Mickey A.; Cearley, Thomas W.; Lewis, James C.; St. Onge, Arthur R.; Szysh, John A.; and White, Kenneth W., 5,015,145, Cl. 414-547.000.

Tabata, Katsuhiro: *See—*

Mimata, Tsutomu; Uematsu, Toshihide; and Tabata, Katsuhiro, 5,015,425, Cl. 264-39.000.

Tabata, Yasushi: *See—*

Kobayashi, Takeo; Nishida, Takao; Tabata, Yasushi; Numako, Norio; and Nagai, Katsutoshi, 5,016,038, Cl. 354-418.000.

Tabata, Yujin: *See—*

Ohba, Noriaki; Tabata, Yujin; and Nagatomi, Tateyuki, 5,015,262, Cl. 8-543.000.

Tabuchi, Hirotoshi; Kumasaka, Osamu; Ito, Katsura; and Koushiro, Kenji, to Pioneer Electronic Corp. Method of manufacturing a stamper for formation of optical information carrying disk. 5,015,338, Cl. 204-5.000.

Tachi-S Co., Ltd.: *See—*

Kimura, Takeo, 5,014,960, Cl. 248-602.000.

Tachibana, Hirokazu: *See—*

Sekido, Satoshi; Tachibana, Hirokazu; and Yamamura, Yasuharu, 5,015,616, Cl. 502-303.000.

Tachikawa, Hiromichi; Yokoya, Hiroaki; Suzuki, Nobuo; and Watarai, Syu, to Fuji Photo Film Co., Ltd. Electrophotographic liquid developers containing positively charged resin particles. 5,015,551, Cl. 430-114.000.

Tadokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. Magneto-optic information-carrying medium including three magnetic layers. 5,016,232, Cl. 369-13.000.

Taft, Monte. Cat litter box with integral, collapsible enclosure. 5,014,649, Cl. 119-168.000.

Tagami, Hidetoshi: *See—*

Tamura, Tadashi; Kiyomine, Akira; Nishizawa, Yoshinori; Tagami, Hidetoshi; Yoshihara, Toru; and Kawase, Jiro, 5,015,260, Cl 8-408.000.

Tagawa, Motoyuki: *See—*

Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.

Taguchi, Hiromi, to Nissan Motor Company, Limited. Oil passage structure in transmission casing of an automatic transmission for automotive vehicles. 5,014,741, Cl. 137-565.000.

Taguchi, Tsunemasa; and Nanba, Hirokuni, to Production Engineering Association of Shin-Osaka; and Sumitomo Electric Industries, Inc. Method for producing semiconductive single crystal. 5,015,327, Cl. 156-603.000.

VOL 1126 ISS 2 MY 14 1991 UMI

Tahara, Kazuo: *See—*

Koharagi, Haruo; Tahara, Kazuo; Nitobe, Mitsuhiro; and Suzuki, Nobutaka, 5,015,905, Cl. 310-186.000.

Tailliet, Francois, to SGS-Thomson Microelectronics S.A. CMOS integrated circuit structure protected against electrostatic discharges. 5,016,078, Cl. 357-42.000.

Taj, Hatim H.: *See—*

Eppinger, David P.; and Taj, Hatim H., 5,015,810, Cl. 200-147.00R.

Takabayashi, Naoki: *See—*

Koboshi, Shigeharu; Kobayashi, Kazuhiro; Aoki, Syozo; and Takabayashi, Naoki, 5,015,560, Cl. 430-398.000.

Takada, Akihiro: *See—*

Nakajima, Yoshihiro; Onishi, Kunihiro; and Takada, Akihiro, 5,016,057, Cl. 355-282.000.

Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, to Toyota Jidosha Kabushiki Kaisha. Hydraulic control device for automatic transmission for vehicle having two parallel input clutches. 5,014,577, Cl. 74-869.000.

Takada, Toshiaki; Kinugawa, Tadami; Yamaguchi, Katsuhiro; Tanabe, Kou; and Nakano, Hiroyuki, to Mitsubishi Gas Chemical Company Ltd. Polycarbonate resin composition. 5,015,670, Cl. 523-214.000.

Takagi, Kazutoshi: *See—*

Kitajima, Nobuaki; and Takagi, Kazutoshi, 5,015,081, Cl. 350-514.000.

Takagi, Tadao: *See—*

Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.

Takahashi, Hiroki: *See—*

Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi; and Ito, Takashi, 5,015,332, Cl. 159-4.200.

Takahashi, Jun: *See—*

Azuma, Makoto; Takahashi, Jun; Yamauchi, Hirohiko; and Ueda, Nobuo, 5,015,462, Cl. 424-1.100.

Takahashi, Junichi: *See—*

Matsui, Takayuki; Okuyama, Toshiaki; Tobari, Kazuaki; Kubota, Yuzuru; and Takahashi, Junichi, 5,016,158, Cl. 363-71.000.

Takahashi, Koichi: *See—*

Toyoda, Ichiro; Niinomi, Toshihiko; Kaseda, Shigeru; and Takahashi, Koichi, 5,016,186, Cl. 364-507.000.

Takahashi, Masanobu: *See—*

Hidaka, Yasuhiro; Sato, Toshio; and Takahashi, Masanobu, 5,015,660, Cl. 514-441.000.

Takahashi, Mitsuasa, to NEC Corporation. Vertical power MOSFET having high withstand voltage and high switching speed. 5,016,066, Cl. 357-23.400.

Takahashi, Nagashige, to Asahi Kogaku Kogyo Kabushiki Kaisha. Brake for bending control device of endoscope. 5,014,685, Cl. 128-4.000.

Takahashi, Nobumitsu; and Yoshie, Kenichi, to Mitsubishi Kasei Corporation. Freshness preserving agent. 5,015,282, Cl. 71-65.000.

Takahashi, Sadao: *See—*

Nakamura, Shigeru; Takahashi, Sadao; Watanabe, Masateru; and Arimoto, Akira, 5,016,237, Cl. 369-112.000.

Takahashi, Takao: *See—*

Okada, Hiroshi; and Takahashi, Takao, 5,016,120, Cl. 360-27.000.

Takahashi, Tokuyuki: *See—*

Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,014,577, Cl. 74-869.000.

Takahashi, Yoshiaki; Ishii, Sakae; Furuyama, Masayoshi; and Shirai, Shoji, to Hitachi, Ltd.; and Hitachi Device Engineering Co., Ltd. Electron gun for color picture tube. 5,015,910, Cl. 313-414.000.

Takahata, Haruo: *See—*

Uchida, Katsuyuki; and Takahata, Haruo, 5,015,986, Cl. 338-22.00R.

Takahira, Kenichi: *See—*

Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Takahira, Kenichi; Fujioka, Shuzo; and Matsubara, Toshiyuki, 5,016,212, Cl. 364-900.000.

Takai, Kazuhiko: *See—*

Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 5,015,154, Cl. 417-269.000.

Takaishi, Kunio: *See—*

Sasaki, Yoshito; and Takaishi, Kunio, 5,015,518, Cl. 428-192.000.

Takamatsu, Hisashi; Naganuma, Norihisa; and Abe, Kenichi, to Fujitsu Limited. Polarization coupler. 5,015,055, Cl. 350-96.150.

Takamura, Hiromi: *See—*

Kamegai, Jun; Takamura, Hiromi; and Hirota, Hajime, 5,015,414, Cl. 252-545.000.

Takano, Masatoshi: *See—*

Mori, Seiichi; Takano, Masatoshi; and Ichinokawa, Kazuhiro, 5,016,029, Cl. 346-160.000.

Takao, Hiroyoshi; Imai, Akio; Seki, Tomoaki; and Tsuji, Mitsuji, to Sumitomo Chemical Company Limited. Process for preparing modified diene polymer rubbers. 5,015,692, Cl. 525-102.000.

Takaoka, Hiroaki: *See—*

Sambayashi, Takeshi; Oushiden, Hideshi; Takaoka, Hiroaki; and Morihara, Kazushige, 5,016,052, Cl. 355-228.000.

Takasaki, Tadaoki; and Nakazawa, Shinsuke, to Nissan Motor Company, Limited. System and method for controlling ignition timing for internal combustion engine having cylinder banks. 5,014,669, Cl. 123-414.000.

Takasugi, Tamotsu, to Kabushiki Kaisha Okada Seisakusho; Kabushiki Kaisha Duct Sangyo; and Fuji Kucho Kogyo Kabushiki Kaisha. Method of making a curved pipe. 5,014,424, Cl. 29-890.149.

Takata, Kenichi: *See—*

Koshiba, Nobuharu; Nishino, Shuichi; Takata, Kenichi; and Ikehata, Toshihiko, 5,015,547, Cl. 429-194.000.

Takata, Sadaki: *See—*

Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.

Takato, Koji; and Chiba, Hironobu, to Mazda Motor Corporation. Engine exhaust apparatus and method. 5,014,817, Cl. 181-254.000.

Takatsu, Kiyoshi: *See—*

Takeshima, Eiki; Takatsu, Kiyoshi; Asano, Norio; and Hozumi, Masahiro, 5,015,863, Cl. 250-515.100.

Takatsu, Motomu, to Fujitsu Limited. Status holding circuit and logic circuit using the same. 5,015,874, Cl. 307-272.100.

Takayama, Shuichi: *See—*

Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.

Takayanagi, Yasushi: *See—*

Nakayama, Shunichi; and Takayanagi, Yasushi, 5,014,963, Cl. 251-245.000.

Takeda Chemical Industries, Ltd.: *See—*

Yamaguchi, Takamasa; and Nogami, Ikuo, 5,015,579, Cl. 435-123.000.

Takeda, Haruo: *See—*

Inoue, Yasuo; Takeda, Haruo; Sato, Keiji; Yamazaki, Noriyuki; and Iida, Osamu, 5,016,127, Cl. 360-94.000.

Takeda, Hidekazu; Ogiro, Kenji; Kaku, Nobuyuki; and Nagai, Kyuichirou, to Hitachi, Ltd. Tape loading mechanism for a magnetic recording/reproducing apparatus. 5,016,125, Cl. 360-85.000.

Takeda, Hiroyuki: *See—*

Yagi, Kazuo; and Takeda, Hiroyuki, 5,015,525, Cl. 428-364.000.

Takeda, Osamu: *See—*

Fukushima, Nobuo; Sakai, Shinji; Takeda, Osamu; Suzuki, Yasutomo; and Takei, Masahiro, 5,016,124, Cl. 360-69.000.

Takeda, Toshio, to Mazda Motor Corporation. Fuel vapor control for automotive vehicle engine. 5,014,674, Cl. 123-520.000.

Takehara, Shin; and Morita, Toshiki, to Mazda Motor Corporation. Suspension apparatus of a vehicle. 5,015,006, Cl. 280-707.000.

Takei, Masahiro: *See—*

Fukushima, Nobuo; Sakai, Shinji; Takeda, Osamu; Suzuki, Yasutomo; and Takei, Masahiro, 5,016,124, Cl. 360-69.000.

Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., to General Electric Company. Reactively capped polyarylene sulfide and method and intermediates for their preparation. 5,015,703, Cl. 525-537.000.

Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., to General Electric Company. Reactively capped polyarylene sulfide and method and intermediates for their preparation. 5,015,704, Cl. 525-537.000.

Takemura, Masami: *See—*

Ishikawa, Masayoshi; and Takemura, Masami, 5,014,465, Cl. 49-482.000.

Takemura, Yasuhiko, to Semiconductor Energy Laboratory Co., Ltd. Sedimentation method for forming Bi-containing superconducting films. 5,015,621, Cl. 505-1.000.

Takenaka, Hiroshi: *See—*

Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.

Takenakajima, Takefumi; Nishimura, Kazuo; Fujiyama, Mamoru; and Fukushima, Toshihiro, to Zojirushi Vacuum Bottle Co., Ltd. Nonfreezing pipe. 5,014,752, Cl. 138-149.000.

Takeshima, Eiki; Takatsu, Kiyoshi; Asano, Norio; and Hozumi, Masahiro, to Sumitomo Heavy Industries, Ltd.; and Nisshin Steel Co., Ltd. Radiation shield and shielding material with excellent heat-transferring property. 5,015,863, Cl. 250-515.100.

Takesue, Masatoshi: *See—*

Kobayashi, Yukio; Nagai, Shoichi; Takesue, Masatoshi; Aosai, Fumito; and Inoue, Masao, 5,015,524, Cl. 428-332.000.

Takeuchi, Hitoshi: *See—*

Mine, Koichi; Kikuta, Hikaru; Takeuchi, Hitoshi; and Kamiya, Kingo, 5,015,159, Cl. 417-366.000.

Takeuchi, Kazuhiro: *See—*

Ohzono, Kouhei; Takeuchi, Kazuhiro; Honda, Shoichi; and Koyabu, Takeshi, 5,014,839, Cl. 192-0.092.

Takeya, Fuminori: *See—*

Matsuzawa, Soichiro; Takeya, Fuminori; and Terada, Nobuhiro, 5,014,414, Cl. 29-603.000.

Takeyama, Kouzi: *See—*

Matsumoto, Takayuki; Otsuka, Shuji; Harano, Tetsuo; Takeyama, Kouzi; Murai, Suzuyo; Mino, Kouichi; Matsumura, Koji; Hattori, Chikamasa; and Kuwabara, Kazuhiro, 5,016,117, Cl. 358-456.000.

Talbert, William L. Hydrocarbon fuel systems. 5,015,356, Cl. 208-16.000.

Tam, Stephen P.: *See—*

Tesch, Bruce J.; Moser, Jay D., Sr.; and Tam, Stephen P., 5,015,887, Cl. 307-475.000.

Tamagno, Didier Y. F.; Mas, Georges L. J. M.; and Navelier, Alain F. E. A., to Societe ECA. Connector for optical fibre cables. 5,015,060, Cl. 350-96.200.

Tamfelt, Inc.: *See—*

Legge, Robert W.; and Hocking, William O., Jr., 5,015,220, Cl. 474-256.000.

Tamura, Tadashi; Kiyomine, Akira; Nishizawa, Yoshinori; Tagami, Hidetoshi; Yoshihara, Toru; and Kawase, Jiro, to Kao Corporation. 2-alkyl-4-methoxy-5-aminophenol or salt thereof, or 2-alkyl-4-methoxy-5-substituted aminophenol or salt thereof, and dyeing composition for keratin fibers comprising the same. 5,015,260, Cl. 8-408.000.

Tamura, Teizo: *See—*

Fujii, Mituru; Asai, Tadamichi; Ogawa, Toshio; Ito, Osamu; Ikegami, Akira; Hasegawa, Mitsuru; Kobayashi, Takao; and Tamura, Teizo, 5,016,089, Cl. 357-80.000.

Tamura, Yasuyuki; and Kaneko, Shuzo, to Canon Kabushiki Kaisha. Image forming method and transfer recording medium therefor using two energies. 5,015,552, Cl. 430-138.000.

Tan, Sachiyo: *See—*

Ishido, Takanobu; Tan, Sachiyo; and Furukori, Masami, 5,016,192, Cl. 364-518.000.

Tanabe, Kou: *See—*

Takada, Toshiaki; Kinugawa, Tadami; Yamaguchi, Katsuhiro; Tanabe, Kou; and Nakano, Hiroyuki, 5,015,670, Cl. 523-214.000.

Tanabe, Takeshi: *See—*

Sakamoto, Yukio; Hori, Toshio; Fukutani, Iwao; and Tanabe, Takeshi, 5,015,204, Cl. 439-620.000.

Tanabe, Toshiya; Abe, Shigemitsu; Date, Masazumi; and Kawakita, Tetsuya, to Ajinomoto Co., Inc. Method for separation of electrolytes, and method for ion exchange of electrolytes with counter-ions. 5,015,386, Cl. 210-638.000.

Tanaka, Hiroshi: *See—*

Yato, Tadao; Onoue, Takeshi; and Tanaka, Hiroshi, 5,015,422, Cl. 264-0.500.

Tanaka, Hiroto; and Fujii, Syuso, to Kabushiki Kaisha Toshiba. Semiconductor memory device. 5,016,224, Cl. 365-230.030.

Tanaka, Katsuya: *See—*

Suzuki, Akira; and Tanaka, Katsuya, 5,014,747, Cl. 137-625.650.

Tanaka, Masafumi: *See—*

Fujii, Tatsuya; Sato, Yutaka; and Tanaka, Masafumi, 5,016,207, Cl. 364-724.010.

Tanaka, Minoru; Oshida, Yoshitada; Yoshitake, Yasuhiro; and Tanimoto, Tetsuzo, to Hitachi, Ltd. Illuminating method and illuminating apparatus for carrying out the same, and projection exposure method and projection exposure apparatus for carrying out the same. 5,016,149, Cl. 362-259.000.

Tanaka, Paul I.: *See—*

Taylor, Stephen D.; and Tanaka, Paul I., 5,015,971, Cl. 331-16.000.

Tanaka, Satoru: *See—*

Kawamoto, Mutsumi; Inagaki, Hidemitsu; and Tanaka, Satoru, 5,014,800, Cl. 180-65.500.

Tanaka, Shinichi; Ishibashi, Hiromichi; Akira, Mitsubara; and Okada, Tsuyoshi, to Matsushita Electric Industrial Co., Ltd. Digital modulator and demodulator. 5,016,258, Cl. 375-25.000.

Tanaka, Susumu: *See—*

Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, 5,015,330, Cl. 156-643.000.

Tandem Computers Incorporated: *See—*

Horst, Robert W.; and Jardine, Robert L., 5,016,208, Cl. 364-740.000.

Tandon Corporation: *See—*

Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.

Tandy Corporation: *See—*

Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,016,239, Cl. 369-284.000.

Tang, Douglas D., to GTE Laboratories Incorporated. Microwave subcarrier generation for fiber optic systems. 5,016,242, Cl. 370-3.000.

Taniguchi, Nobuyuki; Hosomizu, Hiroshi; Tsuji, Kenji; Omaki, Takanobu; and Nakai, Masaaki, to Minolta Camera Co., Ltd. Flash photographing system. 5,016,037, Cl. 354-413.000.

Tanii, Junichi: *See—*

Shimada, Takahisa; and Tanii, Junichi, 5,016,031, Cl. 354-173.100.

Tanikawa, Akinao; Ohshima, Toshiharu; and Sakai, Toshihiro, to Fujitsu Limited. Direct memory access controlled system. 5,016,165, Cl. 364-200.000.

Tanikoshi, Sadao, to Kabushiki Kaisha Toshiba. Automatic gain multiplication factor control apparatus and method. 5,015,839, Cl. 250-214.0AG.

Tanimoto, Tetsuzo: *See—*

Tanaka, Minoru; Oshida, Yoshitada; Yoshitake, Yasuhiro; and Tanimoto, Tetsuzo, 5,016,149, Cl. 362-259.000.

Tanizawa, Kazuo; and Nakagawa, Jun, to Mitsubishi Denki Kabushiki Kaisha. Module for expandable truss structure and expandable truss structure employing said module. 5,014,484, Cl. 52-646.000.

Tapper, Lee C., to R.R. Donnelley & Sons Company. Scavenger for a gravure printing press. 5,014,616, Cl. 101-153.000.

Taquoy, Bernard: *See—*

Boime, Bernard; and Taquoy, Bernard, 5,015,168, Cl. 425-389.000.

Tarara, William D.: *See—*

Lambeth, Shawn M.; Prissel, Lee P.; and Tarara, William D., 5,016,160, Cl. 364-200.000.

Tarkett Inc.: *See—*

Lussi, Edward F.; and Smith, Thomas G., 5,015,516, Cl. 428-143.000.

Tarris Enterprises, Inc.: *See—*

Roper, Alan; and Johnson, Keith O., 5,014,713, Cl. 128-664.000.

Tashiro, Osamu; and Okumura, Masafumi, to Sharp Kabushiki Kaisha. Recirculating automatic document feeder. 5,016,061, Cl. 355-320.000.

Tates: *See—*

Van Melle, Jean, 5,014,867, Cl. 220-1.500.

Tatterson, David F.: *See—*

Walker, Robert H.; Willems, Paul A.; Huff, George A.; Grimes, Lewis E.; Tatterson, David F.; and Mehlberg, Robert L., 5,015,799, Cl. 585-500.000.

Taue, Jun; and Maeda, Osamu, to Yamaha Hatsudoki Kabushiki Kaisha. High pressure fuel injection unit for engines. 5,014,671, Cl. 123-447.000.

Taufer, Peter: *See—*

Drobny, Wolfgang; Mattes, Bernhard; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,015,870, Cl. 307-66.000.

Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000.

Tawada, Yoshihisa: *See—*

Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.

Taylor, David, to Supaflo Pty. Limited. Thickener. 5,015,392, Cl. 210-712.000.

Taylor, Michael D.: *See—*

Nguyen, Kham X.; Robinson, Theodore S.; Taylor, Michael D.; and Daberkow, Kevin L., 5,016,167, Cl. 364-200.000.

Taylor, Peter J.; and Taylor, Randall P. Excavating apparatus. 5,015,147, Cl. 414-685.000.

Taylor, Randall P.: *See—*

Taylor, Peter J.; and Taylor, Randall P., 5,015,147, Cl. 414-685.000.

Taylor, Robert G., Jr.: *See—*

Peddle, Charles I.; Taylor, Robert G., Jr.; Masters, John R.; Stark, Glenn M.; Stein, Kenneth M.; Donohue, James M.; Dugan, Michael T.; Swinton, William G.; Fairman, Bruce A.; and Dalziel, Warren L., 5,016,121, Cl. 360-39.000.

Taylor, Ronald: *See—*

Trapani, Richard D.; Hacker, Martin E.; Turner, Melvyn E.; Taylor, Ronald; and Rotolico, Anthony J., 5,014,916, Cl. 239-85.000.

Taylor, Ronald R.: *See—*

McLaughlin, Carol F.; Taylor, Ronald R.; Williams, William D.; and Steusloff, Patrick M., 5,014,875, Cl. 221-2.000.

Taylor, Stephen D.; and Tanaka, Paul I., to Hughes Aircraft Company. Frequency agile microwave signal generator. 5,015,971, Cl. 331-16.000.

Taylor, William R., to Quaker Oats Company, The. Electronic piano tone circuit. 5,014,587, Cl. 84-659.000.

TDK Corporation: *See—*

Iwaya, Shoichi; Masumura, Hitoshi; Takahashi, Hiroki; Ohkawara, Masaaki; Kobayashi, Katsumi; and Ito, Takashi, 5,015,332, Cl. 159-4.200.

Tearney, Guillermo J.: *See—*

Kenet, Robert O.; Kenet, Barney J.; and Tearney, Guillermo J., 5,016,173, Cl. 364-413.130.

Technical Innovations, Inc.: *See—*

Vollenweider, Edward E., II, 5,014,355, Cl. 2-79.000.

Technomed International, S.A.: *See—*

Cathignol, Dominique; Lacruche, Bernard; and Mestas, Jean-Louis, 5,015,929, Cl. 310-335.000.

Tecogen, Inc.: *See—*

Childs, Paul; Hurley, James R.; and Orcheski, Conrad J., 5,014,679, Cl. 126-21.00A.

Teichmann, Peter: *See—*

Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, 5,014,873, Cl. 220-601.000.

Teik, Goh B., to Komori-Chambon SA. Carton blank deceleration unit. 5,014,582, Cl. 83-24.000.

Tektronix, Inc.: *See—*

Chism, Warren L., 5,015,947, Cl. 324-158.00P.

Janko, Bozidar, 5,015,946, Cl. 324-158.00F.

Radochonski, Pierre A., 5,016,191, Cl. 364-518.000.

Rumbaugh, Scott H.; Jones, Michael D.; Scheu, Friedrich; and Bos, Philip J., 5,015,057, Cl. 350-96.150.

Teleflex Incorporated: *See—*

Kelley, Dixon L., 5,014,569, Cl. 74-502.400.

Telesis Controls Corporation: *See—*

Robertson, John A.; Cyphert, David L.; Cyphert, Thomas E.; and Muscarella, Joseph F., 5,015,106, Cl. 400-121.000.

Temple, Stephen, to AM International, Inc. High density multi-channel array, electrically pulsed droplet deposition apparatus. 5,016,028, Cl. 346-140.00R.

Tenax-Glynn Corporation: *See—*

Glynn, Kenneth P., 5,014,798, Cl. 177-25.190.

Tepic, Slobodan, to Laboratorium fur experimentelle Chirurgie. Scissors for household and medical uses. 5,014,433, Cl. 30-248.000.

Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, to Matsushita Electric Industrial Co., Ltd. Angular rate sensor. 5,014,554, Cl. 73-505.000.

VOL 1126 ISS 2 MY 14 1991 UMI

- Terada, Nobuhiro: *See—*
  - Matsuzawa, Soichiro; Takeya, Fuminori; and Terada, Nobuhiro, 5,014,414, Cl. 29-603.000.
- Terametrix Systems International, Inc.: *See—*
  - Shaw, Harold L.; Smith, Randall B.; Cunningham, Larry E.; Rishel, Barry E.; Gioannini, John P.; and Harkey, Warren B., 5,016,005, Cl. 340-870.190.
- Terasawa, Michio: *See—*
  - Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.
- Terauchi, Kiyoshi: *See—*
  - Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 5,015,154, Cl. 417-269.000.
- Terminella, Emanuele: *See—*
  - Terminella, Frank; Terminella, Emanuele; Stroud, William; and Terminella, Joseph E., 5,014,489, Cl. 53-51.000.
- Terminella, Frank; Terminella, Emanuele; Stroud, William; and Terminella, Joseph E., to Pacmac, Inc. Film sheet feed for food tray film wrapping machine. 5,014,489, Cl. 53-51.000.
- Terminella, Joseph E.: *See—*
  - Terminella, Frank; Terminella, Emanuele; Stroud, William; and Terminella, Joseph E., 5,014,489, Cl. 53-51.000.
- Terry, Jane M.: *See—*
  - Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,703, Cl. 525-537.000.
  - Takekoshi, Tohru; Caruso, Andrew J.; Terry, Jane M.; and Iwanowicz, Edwin J., 5,015,704, Cl. 525-537.000.
- Terry, Thomas R.: *See—*
  - Stubbs, James R.; and Terry, Thomas R., 5,016,272, Cl. 380-5.000.
- Terumo Kabushiki Kaisha: *See—*
  - Yamaguchi, Keiji, 5,015,102, Cl. 374-107.000.
- Tesch, Bruce J.; Moser, Jay D., Sr.; and Tam, Stephen P., to Harris Corporation. A-B buffer circuit with TTL compatible output drive. 5,015,887, Cl. 307-475.000.
- Tetro, Richard S.: *See—*
  - Nowisch, Heinz K.; and Tetro, Richard S., 5,014,924, Cl. 242-56.00R.
- Tetzlaff, Wolfgang: *See—*
  - Braunlich, Peter F.; and Tetzlaff, Wolfgang, 5,015,855, Cl. 250-337.000.
- Tew, Sydney K., to Cadillac Gage Textron Inc. Transducer for providing a position signal and transducer temperature. 5,015,948, Cl. 324-207.230.
- Texaco Chemical Company: *See—*
  - Trujillo, Sheldon G., 5,015,446, Cl. 422-312.000.
- Texaco Inc.: *See—*
  - Shen, Chin-Wen, deceased, 5,014,784, Cl. 166-263.000.
- Texas Alkyls, Inc.: *See—*
  - Tran, Nam H.; Deavenport, Dennis L.; and Post, Curtis W., 5,015,750, Cl. 556-187.000.
- Texas Instruments Incorporated: *See—*
  - Barton, Lowell R.; and Humphrey, Henry L., 5,014,900, Cl. 228-4.500.
  - Czarn, David A.; Rahman, Aziz; Sadler, Alan M.; and Baker, Gary A., 5,015,808, Cl. 200-83.00P.
  - Delagi, Richard G.; and Trenkler, George, 5,015,533, Cl. 428-549.000.
  - Houston, Theodore W.; Bosshart, Patrick W.; and Shaw, Ching-Heo, 5,015,882, Cl. 307-452.000.
  - Mori, Kiyoshi, 5,016,067, Cl. 357-23.400.
  - Mori, Kiyoshi, 5,016,068, Cl. 357-23.500.
  - Ovens, Kevin M., 5,015,888, Cl. 307-475.000.
  - Srivastava, Aditya, 5,016,164, Cl. 364-200.000.
  - Sundaresan, Ravishankar, 5,016,070. Cl. 357-23.600.
  - Tigelaar, Howard L., 5,016,215, Cl. 365-185.000.
- Textilver SA: *See—*
  - Rossignol, Leopold; and van Wassenhove, Denis, 5,014,753, Cl. 138-149.000.
- Thakker, B. R.: *See—*
  - Vara, Tomas E.; Mestemaker, Jerry L.; and Thakker, B. R., 5,015,365, Cl. 208-262.100.
- Theodore, George J.: *See—*
  - Malik, James J.; and Theodore, George J., 5,014,944, Cl. 248-99.000.
- Therm-O-Disc, Incorporated: *See—*
  - Nixon, Ronald A.; Peoples, Marc A.; and Plasko, Emil R., 5,015,987, Cl. 338-22.00R.
- Thermacon, Inc.: *See—*
  - Monter, Robert P.; and Smith, Ronald L., 5,015,824, Cl. 219-219.000.
- Thermo Electron Web Systems, Inc.: *See—*
  - Hagen, Kenneth G., 5,014,447, Cl. 34-156.000.
- Thieme, Gaylord G. Cap printing device and method. 5,014,614, Cl. 101-35.000.
- Thimons, Thomas V.: *See—*
  - Giles, Harold F., Jr.; Peters, Edward N.; Riding, Geoffrey H.; Thimons, Thomas V.; and Willard, G. F., 5,015,726, Cl. 528-349.000.
- Thomas & Betts Corporation: *See—*
  - Piriz, Jose M., 5,015,195, Cl. 439-318.000.
- Thomas, Christopher J.: *See—*
  - Treybig, Duane S.; Harris, Wendy D.; and Thomas, Christopher J., 5,015,511, Cl. 428-34.100.
- Thomas, William G.: *See—*
  - Perry, Lanny; and Thomas, William G., 5,015,184, Cl. 433-93.000.
- Thompson, Victor R. Surfboard holder. 5,014,955, Cl. 248-309.100.
- Thomson, Christopher W., to Delphax Systems. Development of raster scan images from independent cells of imaged data. 5,016,190, Cl. 364-518.000.
- Thomson-CSF: *See—*
  - Blanchard, Pierre, 5,015,920, Cl. 315-111.810.
  - Brault, Daniel; and Grousseau, Alain, 5,015,962, Cl. 329-346.000.
  - Castera, Jean-Paul; Meunier, Paul-Louis; Carenco, Alain; Dupont, Jean-Marie; and Friez, Pierre, 5,015,051, Cl. 350-96.120.
  - Rochette, Denis; and Laurent, Pierre A., 5,016,278, Cl. 381-36.000.
  - Tinet, Claude, 5,016,235, Cl. 369-44.410.
  - Warnan, Francois; and Barbot, Joel, 5,014,953, Cl. 248-284.000.
- Thomson, Mark W.; and Matulich, Dan S., to Allied-Signal Inc. ECS with advanced air cycle machine. 5,014,518, Cl. 62-88.000.
- Thor Technology Corporation: *See—*
  - Reichard, Jerome J., 5,015,927, Cl. 318-139.000.
- Thorncraft, David A.; Lyons, Peter R. A.; Rashleigh, Scott C.; Maine, Johnathan A.; and Love, John D., to Commonwealth of Australia, The. Asymmetric fibre optic couplers and their fabrication. 5,015,058, Cl. 350-96.150.
- Thrasher, Lawrence E.; Olson, Gordon E.; Burkitt, Garrett J., III; Schmidt, Timothy E.; Haddad, Elias M.; and Conti-Johnston, Susan, to KDI American Products, Inc. Self-rotating spa jet assembly. 5,014,372, Cl. 4-542.000.
- Tibbett, Ernest E., II: *See—*
  - Anderson, Robert K., Jr.; and Tibbett, Ernest E., II, 5,014,475, Cl. 52-19.000.
- Tiegs, Terry N.; and McDonald, Robert R., to Dow Chemical Company, The. Ductile $Ni_3Al$ alloys as bonding agents for ceramic materials in cutting tools. 5,015,290, Cl. 75-232.000.
- Tiernay Turbines: *See—*
  - Sherikar, Sanjay V., 5,014,516, Cl. 60-605.100.
- Tigelaar, Howard L., to Texas Instruments Incorporated. High speed EPROM with reverse polarity voltages applied to source and drain regions during reading and writing. 5,016,215, Cl. 365-185.000.
- Tillotson Corporation: *See—*
  - Tillotson, Neil E.; and DeBecker, Luc G., 5,014,362, Cl. 2-168.000.
- Tillotson, Neil E.; and DeBecker, Luc G., to Tillotson Corporation. Elastomeric covering material and hand glove made therewith. 5,014,362, Cl. 2-168.000.
- Timm, Ronald E., to R. E. Timm & Associates, Inc. Pressure vessel for dispensing materials and method for filling same. 5,014,629, Cl. 109-34.000.
- Timple, Thomas H.: *See—*
  - Bergland, Paul W.; Parker, James D.; and Timple, Thomas H., 5,016,182, Cl. 364-469.000.
- Tinet, Claude, to Thomson-CSF. Arrangement for reading an optically readable light reflective carrier. 5,016,235, Cl. 369-44.410.
- Tobari, Kazuaki: *See—*
  - Matsui, Takayuki; Okuyama, Toshiaki; Tobari, Kazuaki; Kubota, Yuzuru; and Takahashi, Junichi, 5,016,158, Cl. 363-71.000.
- Tobe, Shinji: *See—*
  - Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.
- Tobey, Stephen W.: *See—*
  - Sowle, Cynthia W.; and Tobey, Stephen W., 5,014,650, Cl. 119-171.000.
- Tobler, Hans: *See—*
  - Steiner, Heinz; and Tobler, Hans, 5,015,780, Cl. 568-490.000.
- Toda, Takuo; and Tsuda, Masao, to King Invest Co., Ltd. Method of preparing a metal body by means of injection molding. 5,015,289, Cl. 75-229.000.
- Toepperwien, Bernd: *See—*
  - Rueffer, Manfred; Toepperwien, Bernd; and Dusil, Vladimir, 5,014,597, Cl. 91-369.200.
- Togashi, Atsushi; and Saruyama, Toshio, to Toray Silicone Company, Limited. Particulate material comprising a platinum-containing hydrosilylaton catalyst and a diorganopolysilane. 5,015,716, Cl. 528-15.000.
- Toja, Emilio: *See—*
  - Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, 5,015,655, Cl. 514-413.000.
- Tojima, Hiromi, to Kabushiki Kaisha Daikin Seisakusho. Release bearing mechanism of a clutch. 5,014,840, Cl. 192-98.000.
- Tokai Kogyo Co., Ltd.: *See—*
  - Hirai, Yoichi, 5,015,442, Cl. 422-121.000.
- Tokheim Corporation: *See—*
  - Forkert, Maurice J.; and Sullivan, Mark E., 5,016,187, Cl. 364-510.000.
- Tokuda, Kanji, to Fuji Photo Film Co., Ltd. Photographic printer employing a roof-shaped reflector. 5,016,044, Cl. 355-43.000.
- Tokyo Electron Limited: *See—*
  - Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, 5,015,330, Cl. 156-643.000.
- Tokyo Electron Sagami Limited: *See—*
  - Okumura, Katsuya; Moriya, Takahiko; Miyazaki, Shinji; Kumagai, Yoshio; and Tanaka, Susumu, 5,015,330, Cl. 156-643.000.
- Tokyo Kogaku Kikai Kabushiki Kaisha: *See—*
  - Kitajima, Nobuaki; and Takagi, Kazutoshi, 5,015,081, Cl. 350-514.000.

- Tolles, Thomas W.: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Tom, Glenn M.; and Brown, Duncan W., to Advanced Technology Materials, Inc. Process, composition, and apparatus for purifying inert gases to remove Lewis acid and oxidant impurities therefrom. 5,015,411, Cl. 252-194.000.
- Tomasi-Dubois, Mary J. Dropseat jumpsuit. 5,014,356, Cl. 2-79.000.
- Tomich, Stanley D.: *See—*
  - Nelson, Danny A.; Tomich, Stanley D.; Glover, Donald W.; Allen, Errol V.; Hales, Jeremy M.; and Dana, Marshall T., 5,016,196, Cl. 364-550.000.
- Tomii, Yoshifumi: *See—*
  - Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 5,015,636, Cl. 514-210.000.
- Tomisawa, Naoki, to Japan Electronic Control Systems, Co., Ltd. Method and apparatus for detecting deterioration of sucked air flow quantity-detecting device of engine. 5,014,548, Cl. 73-118.100.
- Tomitani, Tadafumi: *See—*
  - Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Yamazaki, Masanobu; Toyoda, Manabu; and Ushijima, Makoto, 5,016,129, Cl. 360-103.000.
- Tomono, Akira; Iida, Muneo; and Ohmura, Kazunori, to ATR Communication Systems Research Laboratories. Eye tracking image pickup apparatus for separating noise from feature portions. 5,016,282, Cl. 382-2.000.
- Tomosue, Takao: *See—*
  - Moriizumi, Shuichi; Masuhara, Kenichi; Yamabe, Hidetoshi; Tomosue, Takao; Mori, Kouji; and Kaneko, Hisaharu, 5,015,531, Cl. 428-463.000.
- Tompkins, Thomas M.: *See—*
  - Presty, Dominic F.; and Tompkins, Thomas M., 5,014,899, Cl. 227-180.000.
- Tonen Corporation: *See—*
  - Doi, Yoshiharu; Ueki, Satoshi; and Furuhashi, Hiroyuki, 5,015,714, Cl. 526-336.000.
- Tonen Sekiyukagagaku K.K.: *See—*
  - Matumura, Tooru, 5,015,679, Cl. 524-99.000.
- Toppan Printing Co., Ltd.: *See—*
  - Suzuki, Tadato; Yorimoto, Yoshikazu; Matsumura, Hidekazu; and Hirano, Seiji, 5,015,834, Cl. 235-493.000.
- Toray Silicone Company, Limited: *See—*
  - Togashi, Atsushi; and Saruyama, Toshio, 5,015,716, Cl. 528-15.000.
- Torikai, Motoyuki: *See—*
  - Machida, Koichi; Kitahara, Mikio; Kubo, Takayuki; Torikai, Motoyuki; and Asahina, Koutarou, 5,015,674, Cl. 523-435.000.
- Toshiba Silicone Co., Ltd.: *See—*
  - Nagaoka, Hisayuki, 5,015,413, Cl. 252-511.000.
- Toussaint, Herbert; Schossig, Juergen; Graefje, Heinz; Reiss, Wolfgang; Spahl, Roland; Irgang, Matthias; Himmel, Walter; and Koppenhoefer, Gerhard, to BASF Aktiengesellschaft. Process for the hydrogenation of acetylenic alcohols. 5,015,788, Cl. 568-861.000.
- Towler, Michael E.: *See—*
  - Kocsis, Judith; Stojkov, Joseph A.; and Towler, Michael E., 5,014,599, Cl. 92-84.000.
- Toya, Ichizo; Yamada, Sumito; and Suematsu, Koichi, to Fuji Photo Film Co., Ltd. Light-sensitive silver halide element containing modant, dye and sonic polymer. 5,015,562, Cl. 430-518.000.
- Toyne, David L.: *See—*
  - Watkins, William M.; Toyne, David L.; Arena, Alan J.; Lawver, Larry D.; and Birket, Daniel S., 5,015,933, Cl. 318-567.000.
- Toyo Carbon Co., Ltd.: *See—*
  - Sasaki, Yoshito; and Takaishi, Kunio, 5,015,518, Cl. 428-192.000.
- Toyo Ink Manufacturing Co., Ltd.: *See—*
  - Ide, Yusaku; Nakamura, Koji; and Kato, Shigeki, 5,015,735, Cl. 540-123.000.
- Toyo Radiator Co., Ltd.: *See—*
  - Watanabe, Hiroshi, 5,014,775, Cl. 165-167.000.
- Toyo Soda Manufacturing Co., Ltd.: *See—*
  - Kubo, Masashige; Tsutsumi, Yukihiro; Okisaki, Fumio; Fujimura, Shunichi; and Fukuda, Teruo, 5,015,526, Cl. 428-378.000.
- Toyoda Gosei Co., Ltd.: *See—*
  - Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Senda, Masanobu, 5,015,075, Cl. 350-357.000.
- Toyoda, Hidekazu: *See—*
  - Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.
- Toyoda, Ichiro; Niinomi, Toshihiko; Kaseda, Shigeru; and Takahashi, Koichi, to Mitsubishi Jukogyo Kabushiki Kaisha; and Idemitsu Kosan Company Limited. Method of detecting noise disappearance and detecting device therefor. 5,016,186, Cl. 364-507.000.
- Toyoda, Manabu: *See—*
  - Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Yamazaki, Masanobu; Toyoda, Manabu; and Ushijima, Makoto, 5,016,129, Cl. 360-103.000.
- Toyoda, Nobuyuki; Uchitomi, Naotaka; and Hojo, Akimichi, to Kabushiki Kaisha Toshiba. Method of making a GaAs JFET with self-aligned p-type gate by outdiffusion of dopont from the metallic gate. 5,015,596, Cl. 437-41.000.
- Toyota, Akinori: *See—*
  - Kioka, Mamoru; Nakano, Masao; Doi, Kenji; and Toyota, Akinori, 5,015,612, Cl. 502-133.000.
- Toyota Jidosha Kabushik Kaisha: *See—*
  - Uchiyama, Hiromitsu; Kawamoto, Masayuki; and Inada, Yoriko, 5,015,007, Cl. 280-707.000.
- Toyota Jidosha Kabushiki Kaisha: *See—*
  - Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 5,014,577, Cl. 74-869.000.
- Tozu, Kenji: *See—*
  - Kuwana, Kazutaka; Yoshida, Tsuyoshi; Tozu, Kenji; and Sakane, Shinsuke, 5,015,041, Cl. 303-95.000.
- Traini, Carlo; Mojana, Corrado; and Gusmini, Carlo, to DeNora Permelec S.p.A. Method for detecting defective ion exchange membranes in monopolar and bipolar electrolyzers. 5,015,345, Cl. 204-98.000.
- Trainor, John E.: *See—*
  - Del Gatto, Henry J.; and Trainor, John E., 5,015,267, Cl. 55-12.000.
- Traller, Thomas H.; and Lande, Helene S. Kickproofer. 5,014,527, Cl. 70-94.000.
- Tran, Nam H.; Deavenport, Dennis L.; and Post, Curtis W., to Texas Alkyls, Inc. Preparation of trimethylaluminum. 5,015,750, Cl. 556-187.000.
- Trapani, Richard D.; Hacker, Martin E.; Turner, Melvyn E.; Taylor, Ronald; and Rotolico, Anthony J., to Perkin-Elmer Corporation, The. Angular gas cap for thermal spray gun. 5,014,916, Cl. 239-85.000.
- Trapy, Jean, to Institut Francais du Petrole; Automobiles Peugeot; and Automobiles Citroen. Device for controlling the jet of carburetted mixture delivered by a pneumatic injection system. 5,014,662, Cl. 123-250.000.
- Treadway, Ronald L.: *See—*
  - Williams, Bertrand J.; and Treadway, Ronald L., 5,015,970, Cl. 331-11.000.
- Trenkler, George: *See—*
  - Delagi, Richard G.; and Trenkler, George, 5,015,533, Cl. 428-549.000.
- Treybig, Duane S.; Harris, Wendy D.; and Thomas, Christopher J., to Dow Chemical Company, The. Linear low density ethylene interpolymers for injection molding. 5,015,511, Cl. 428-34.100.
- Tri-State Oil TOols, Inc.: *See—*
  - Lynde, Gerald D.; Winterrowd, Kenneth W.; and Harvey, Harold H., Jr., 5,014,778, Cl. 166-55.600.
- Tri W-G, Inc.: *See—*
  - Fast, Duane, 5,014,688, Cl. 128-70.000.
- Trivedi, Bharat K.: *See—*
  - Roth, Bruce D.; and Trivedi, Bharat K., 5,015,644, Cl. 514-247.000.
- Troke, Jeffery: *See—*
  - Schonafinger, Karl; Beyerle, Rudi; Schindler, Ursula; Jablonka, Bernd; and Troke, Jeffery, 5,015,659, Cl. 514-438.000.
- Truchot, Patrick: *See—*
  - Pollard, Jean; Duchamp, Robert; and Truchot, Patrick, 5,015,065, Cl. 350-96.240.
- Truelove, James E.: *See—*
  - Franz, Michel; Jans, Michel; Mathur, Leo K.; Shah, Kamlesh B.; and Truelove, James E., 5,015,481, Cl. 424-494.000.
- Trujillo, Sheldon G., to Texaco Chemical Company. Catalyst retainer for an elongated tube. 5,015,446, Cl. 422-312.000.
- Truth Incorporated: *See—*
  - Vetter, Gregory J.; and Seaser, James G., 5,015,136, Cl. 411-504.000.
- TRW United Carr GmbH & Co.: *See—*
  - Kraus, Willibald; and Hofmann, Jurgen, 5,014,939, Cl. 248-70.000.
- TRW Vehicle Safety Systems Inc.: *See—*
  - Rumpf, Robert J.; Willey, Ronald A.; and Storck, Kevin, 5,014,926, Cl. 242-107.40A.
- Tsang, Paul J.: *See—*
  - Chu, Shao-Fu S.; Ku, San-Mei; Lange, Russell C.; Shephard, Joseph F.; Tsang, Paul J.; and Wang, Wen-Yuan, 5,015,594, Cl. 437-31.000.
- Tsao, Sylvia S.: *See—*
  - Guilinger, Terry R.; Jones, Howland D. T.; Kelly, Michael J.; Medernach, John W.; Stevenson, Joel O.; and Tsao, Sylvia S., 5,015,346, Cl. 204-129.100.
- Tsao, Tsu-Pow G.: *See—*
  - Baylor, James L.; Tsao, Tsu-Pow G.; and Camacho, Michael J., 5,015,301, Cl. 134-22.100.
- Tsubakimoto Chain Company: *See—*
  - Murai, Masasumi; Mizuguchi, Koichi; and Nishiyama, Jun, 5,014,625, Cl. 104-292.000.
- Tsuchitani, Kazuo: *See—*
  - Ohata, Tomohisa; Tsuchitani, Kazuo; and Kitaguchi, Shinya, 5,015,617, Cl. 502-304.000.
- Tsuchiya, Michiko: *See—*
  - Sato, Hisashi, 5,014,378, Cl. 5-453.000.
- Tsuda, Masao: *See—*
  - Toda, Takuo; and Tsuda, Masao, 5,015,289, Cl. 75-229.000.
- Tsuji, Kenji: *See—*
  - Taniguchi, Nobuyuki; Hosomizu, Hiroshi; Tsuji, Kenji; Omaki, Takanobu; and Nakai, Masaaki, 5,016,037, Cl 354-413.000.
- Tsuji, Mitsuji: *See—*
  - Takao, Hiroyoshi; Imai, Akio; Seki, Tomoaki; and Tsuji, Mitsuji, 5,015,692, Cl. 525-102.000.
- Tsujimoto, Yoshihide; and Croce, Carlo A., to Wistar Institute, The. Diagnostic methods for detecting lymphomas in humans. 5,015,568, Cl. 435-5.000.

VOL
1126
ISS
2
MY
14
1991
UMI

- Tsukada, Mineharu: *See—*
  - Suzuki, Hitoshi; Yokoyama, Hiromitsu; Tsukada, Mineharu; Ogawa, Hiromi; Kamehara, Nobuo; and Niwa, Koichi, 5,015,314, Cl. 156-89.000.
- Tsukada, Shinichi; Shinomiya, Tsutomu; Yoshino, Eiichi; Yoshioka, Shigeki; and Fujikawa, Makoto, to Hokkai Can Co., Ltd. Apparatus for seaming can end. 5,014,491, Cl. 53-366.000.
- Tsukada, Yoshihisa: *See—*
  - Nemori, Ryoichi; and Tsukada, Yoshihisa, 5,015,387, Cl. 210-638.000.
- Tsukamoto, Osamu: *See—*
  - Matsuura, Hitoshi; and Tsukamoto, Osamu, 5,015,130, Cl. 409-80.000.
- Tsukamoto, Tsutomu: *See—*
  - Kato, Osami; Tsukamoto, Tsutomu; and Saitoh, Takanori, 5,014,929, Cl. 242-195.000.
- Tsukaya, Takashi: *See—*
  - Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.
- Tsukikawa, Yasuhiko: *See—*
  - Ito, Yufuko; Koseki, Hideo; Kawamura, Toshio; and Tsukikawa, Yasuhiko, 5,014,646, Cl. 118-725.000.
- Tsumura, Takashi: *See—*
  - Kamiunten, Shoji; Aoshima, Shigeru; Tsumura, Takashi; Ochiai, Kouichi; and Inaba, Takashi, 5,014,552, Cl. 73-204.210.
- Tsumura, Toshihiro: *See—*
  - Date, Yozo; and Tsumura, Toshihiro, 5,014,435, Cl. 30-387.000.
- Tsunakawa, Isao; Rikihisa, Nobuyoshi; and Kato, Kiyohiko, to Showakiki Industry Co., Ltd. Recoil starter 5,014,657, Cl. 123-185.00B.
- Tsunomori, Michito: *See—*
  - Eguchi, Tamiyuki; and Tsunomori, Michito, 5,015,423, Cl. 264-9.000.
- Tsutsumi, Yukihiro: *See—*
  - Kubo, Masashige; Tsutsumi, Yukihiro; Okisaki, Fumio; Fujimura, Shunichi; and Fukuda, Teruo, 5,015,526, Cl. 428-378.000.
- Tsuzuki, Akihiro: *See—*
  - Yamana, Shinji; Nakamura, Mikio; and Tsuzuki, Akihiro, 5,014,405, Cl. 29-33.00R.
- Tucker, Richard R.: *See—*
  - Bradd, Sidney H.; and Tucker, Richard R., 5,014,385, Cl. 15-323.000.
- Tucker, Thomas: *See—*
  - Spada, Alfred P.; Studt, William L.; Campbell, Henry F.; Kuhla, Donald E.; and Tucker, Thomas, 5,015,638, Cl. 514-211.000.
- Tungett, Ronald L. Means for hygienically positioning an outlet of an appliance indirect drain conduit. 5,014,942, Cl. 248-79.000.
- Tunnell, George W.: *See—*
  - Butzin, Donald F.; Tunnell, George W.; King, Harold B., Jr.; and Schoenig, Frederick C., Jr., 5,014,439, Cl. 33-533.000.
- Tupper, David E.: *See—*
  - Fernandez, Maria I. F.; Hotten, Terrence M.; and Tupper, David E., 5,015,656, Cl. 514-422.000.
- Turbomeca. *See—*
  - Meurtin, Michel, 5,016,266, Cl. 378-73.000.
- Turck, Gunter: *See—*
  - Reinehr, Ulrich; Turck, Gunter; Hirsch, Rolf B.; and Jungverdorben, Hermann-Josef, 5,015,428, Cl. 264-129.000.
- Turner, F. Jonathan M.; and Hood, A. Craig, to J & M Turner Inc. Direct tension indicator washer. 5,015,132, Cl. 411-10.000.
- Turner, James K.: *See—*
  - Hacker, George G.; Turner, James K.; Abernathy, Paul L.; Payne, Bobby G.; Killian, Roy C.; and Laws, David G., 5,014,526, Cl 68-178.000.
- Turner, John H., Jr., to Whistler Corporation. Top mounted buoy signaling device. 5,016,227, Cl. 367-3.000.
- Turner, Kenneth W.: *See—*
  - Covert, Charles H.; Turner, Kenneth W.; Sherwood, Carl H.; Gifford, William E., and Wagner, Richard W., 5,014,742, Cl. 137-588.000
- Turner, Melvyn E.: *See—*
  - Trapani, Richard D.; Hacker, Martin E.; Turner, Melvyn E.; Taylor, Ronald; and Rotolico, Anthony J., 5,014,916, Cl. 239-85.000.
- Turra, Mario: *See—*
  - Neri, Armando, and Turra, Mario, 5,015,819, Cl. 219-121.700
- Twito, Israel. Air outlets in air conditioning units. 5,014,610, Cl 98-110.000.
- Tyan, Yuan-sheng *See—*
  - Pan, Kee-Chuan, Tyan, Yuan-sheng; and Vazan, Fridrich, 5,015,548, Cl. 430-19.000.
- Tyler, Derek E., Ashok, Sankaranarayanan; and Cheskis, Harvey P., to Olin Corporation. Extrusion of metals. 5,015,439, Cl. 419-23.000.
- Tyler, Derek E.: *See—*
  - Ashok, Sankaranarayanan; Cheskis, Harvey P., and Tyler, Derek E., 5,015,438, Cl 419-23.000.
- Tyrell, John A.: *See—*
  - Sybert, Paul D.; Han, Choong Y.; Brown, Sterling B.; McFay, Dennis J.; Gately, William L.; Tyrell, John A.; and Florence, Robert A., 5,015,698, Cl 525-391.000.
- Uban, Stephen A.: *See—*
  - Evans, Thomas W., Norell, Robert G.; Uban, Stephen A., and Maxson, Richard C., 5,015,383, Cl 210-497.100
- Ube Industries, Ltd., *See—*
  - Ueno, Toyoaki, 5,014,767, Cl. 164-312.000.
- Ubukata, Susumu; and Mizutani, Yasukazu, to Susumu Ubukata. Thermally responsive switch. 5,015,985, Cl. 337-368.000.
- Uchida, Hiroyuki, to Honda Giken Kogyo Kabushiki Kaisha. Snow vehicle. 5,014,805, Cl. 180-184.000.
- Uchida, Isao: *See—*
  - Sosa, Toshio; Uchida, Isao; Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.
- Uchida, Katsuyuki; and Takahata, Haruo, to Murata Manufacturing Co., Ltd. Organic positive temperature coefficient thermistor. 5,015,986, Cl. 338-22.00R.
- Uchida, Shunsuke: *See—*
  - Nagase, Makoto; Asakura, Yamoto; Utamura, Motoaki; and Uchida, Shunsuke, 5,015,436, Cl. 376-306.000.
- Uchida, Susumu, to Keeper Co., Ltd.; and NTN Corporation. Flexible boot for universal joints. 5,015,215, Cl. 464-175.000.
- Uchitomi, Naotaka: *See—*
  - Toyoda, Nobuyuki; Uchitomi, Naotaka; and Hojo, Akimichi, 5,015,596, Cl. 437-41.000.
- Uchiyama, Akira; and Imai, Kiyohiro, to Seiko Epson Corporation. Ornamental member. 5,015,537, Cl. 428-623.000.
- Uchiyama, Hiromitsu; Kawamoto, Masayuki; and Inada, Yoriko, to Toyota Jidosha Kabushik Kaisha. Damping force control system for shock absorber variable with amplitude of vehicle height difference exceeding limit value. 5,015,007, Cl. 280-707.000.
- Uchiyama, Shigeyuki: *See—*
  - Sosa, Toshio; Uchida, Isao, Fukuhara, Toru; Takagi, Tadao; Iwasaki, Hiroyuki; Sato, Toshihiro; Muramatsu, Masaru; Ohtsuka, Kazuto; Kai, Tadao; Uchiyama, Shigeyuki; and Koizumi, Yoichi, 5,016,039, Cl. 354-430.000.
- Uebbing, John J., to Hewlett-Packard Company. Light output power monitor for a LED printhead. 5,016,027, Cl. 346-107.00R.
- Ueda, Atsushi: *See—*
  - Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi, and Matsumura, Masami, 5,015,056, Cl. 350-96.150.
- Ueda, Kazumitsu: *See—*
  - Terada, Jiro; Ueda, Kazumitsu; Takenaka, Hiroshi; Nozu, Mikio; Senda, Hiroshi; Osada, Yasuhito; Ichinose, Toshihiko; and Manabe, Takahiro, 5,014,554, Cl. 73-505.000.
- Ueda, Kiichirou, to Konica Corporation. Projection lens for a projector. 5,015,076, Cl. 350-412.000.
- Ueda, Kohichi: *See—*
  - Ikeda, Masayuki; and Ueda, Kohichi, 5,016,209, Cl. 364-748.000.
- Ueda, Nobuo: *See—*
  - Azuma, Makoto; Takahashi, Jun; Yamauchi, Hirohiko; and Ueda, Nobuo, 5,015,462, Cl. 424-1.100.
- Ueda, Toshihiko, to Minolta Camera Kabushiki Kaisha. Zoom lens system for use in a microfilm projection apparatus. 5,015,077, Cl. 350-426.000.
- Ueda, Tsunehisa; Miyazaki, Koji; and Natsuume, Tadao, to Nippon Zeon Co., Ltd. Rubber composition containing a deodorizing component. 5,015,668, Cl. 523-102.000.
- Ueda, Yasuo: *See—*
  - Pollalis, Spiro N.; and Ueda, Yasuo, 5,016,170, Cl. 364-401.000.
- Uehara, Kiyoji: *See—*
  - Nagai, Haruo; Uehara, Kiyoji; and Aizawa, Masafumi, 5,015,099, Cl. 356-437.000.
- Uejio, Wayne H., to General Electric Company. Method and apparatus for detecting wear. 5,015,859, Cl. 250-358.100.
- Ueki, Satoshi: *See—*
  - Doi, Yoshiharu; Ueki, Satoshi; and Furuhashi, Hiroyuki, 5,015,714, Cl. 526-336.000.
- Uematsu, Toshihide: *See—*
  - Mimata, Tsutomu; Uematsu, Toshihide; and Tabata, Katsuhiro, 5,015,425, Cl. 264-39.000.
- Ueno, Hiroshi, to Koyo Seiko Co., Ltd. Crown-shaped cage for a radial bearing. 5,015,105, Cl. 384-531.000.
- Ueno, Toyoaki, to Ube Industries, Ltd. Multi-drive injection apparatus 5,014,767, Cl. 164-312.000.
- Uesugi, Nichika; Ikawa, Shingo; and Kambe, Takayuki, to Kabushiki Kaisha Toshiba. Compressor cutoff control responsive to shaft position. 5,015,153, Cl. 417-44.000.
- Ultralight AG: *See—*
  - Muhling, Rudolf, 5,015,922, Cl. 315-282.000.
- Umehara, Kazuhiro, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Audio alarm outputting device for outboard engine. 5,016,006, Cl. 340-984.000.
- Union Carbide Chemicals and Plastics Company Inc.: *See—*
  - Domeier, Linda A., 5,015,701, Cl. 525-531 000.
- Union Oil Company of California: *See—*
  - Clark, Danford E., 5,015,611, Cl. 502-20.000.
  - Ghandehari, Mohammad H., 5,015,304, Cl. 148-302.000.
  - Ghandehari, Mohammad H., 5,015,306, Cl. 148-103.000.
- United Conveyor Corporation: *See—*
  - Lauridsen, Kenneth W., 5,014,998, Cl. 277-30.000.
- United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
  - Arnold, Douglas B.; Bromfield, George; and Gardner, John C., 5,016,228, Cl 367-163.000.
  - Elliott, Charles T.; and Ashley, Timothy, 5,016,073, Cl. 357-30.000.
  - Hawkes, Henry W., 5,016,019, Cl. 342-400.000.
- United States of America
  - Agriculture: *See—*
    - Moreau, Jerry P.; Bailey, August V.; and DeLucca, Anthony J., II, 5,015,419, Cl. 260-410.90R.
    - Spangler, Hayward G.; and Erickson, Eric H., 5,015,212, Cl. 449-2.000.
  - Air Force: *See—*
    - Cole, Eugene O., 5,015,844, Cl. 250-227.240.
    - Froes, Francis H.; and Shong, Simon D., 5,015,305, Cl. 148-20.300.
    - Komanduri, Ranga; von Turkovich, Branimer F.; and Casey, Morton P., Jr., 5,014,581, Cl. 82-173.000.
    - Pellosie, John C., Jr.; Haas, Michael W.; and Aldrich, Kenneth, 5,015,188, Cl. 434-38.000.
    - Purcell, William M., 5,015,506, Cl. 427-333.000.
  - Army: *See—*
    - Mayer, Jean M.; and Kaplan, David L., 5,015,293, Cl. 106-162.000.
    - Mikhail, Ameer G., 5,014,931, Cl. 244-3.250.
    - Sayles, David C., 5,015,310, Cl. 149-19.900.
    - Walker, Evan H.; and Hillstrom, Warren W., 5,014,623, Cl. 102-477.000.
    - Zweig, John E.; Kehn, John P.; and Glennon, Michael J., 5,014,592, Cl. 89-24.000.
  - Commerce: *See—*
    - Ekin, John W.; Panson, Armand J.; and Blankenship, Betty A., 5,015,620, Cl. 505-1.000.
    - Gallagher, Alan C., 5,015,323, Cl. 156-345.000.
  - Energy: *See—*
    - Barton, David M., 5,015,433, Cl. 376-245.000.
    - Berman, Samuel M.; and Jewett, Don L., 5,015,924, Cl. 315-324.000.
    - Brow, Richard K.; and Watkins, Randall D., 5,015,530, Cl. 428-433.000.
    - Chaffee, Paul H., 5,015,054, Cl. 350-96.150.
    - Guilinger, Terry R.; Jones, Howland D T.; Kelly, Michael J.; Medernach, John W.; Stevenson, Joel O.; and Tsao, Sylvia S., 5,015,346, Cl. 204-129.100.
    - Rosen, Mordecai D.; and Matthews, Dennis L., 5,016,250, Cl. 372-5.000.
    - Ruether, John A.; and Simpson, Theodore B., 5,015,366, Cl. 208-408.000.
    - Siemer, Darryl D., 5,014,680, Cl. 126-77.000.
  - Interior: *See—*
    - Anderson, Sterling J., 5,015,039, Cl. 299-22.000.
  - National Aeronautics and Space Administration: *See—*
    - Beratan, David N.; and Onuchic, Jose N., 5,016,063, Cl. 357-8.000.
    - Brindley, Pamela K., 5,015,825, Cl. 219-390.000.
    - Hoover, Richard B., 5,016,265, Cl. 378-43.000.
    - Singh, Jag J.; Eftekhari, Abe; and St. Clair, Terry L., 5,015,851, Cl. 250-306.000.
    - Sirocky, Paul J.; and Steinetz, Bruce M., 5,014,917, Cl. 239-265.110.
    - Sutton, John F., 5,015,963, Cl. 329-361.000.
  - Navy: *See—*
    - Beckloff, Dennis M.; and Culberston, David L., 5,015,805, Cl. 174-75.00C.
    - Boos, John B.; Papanicolaou, Nicolas A.; and Weng, Tung H., 5,015,603, Cl. 437-184.000.
    - Driftmyer, Richard T., 5,014,932, Cl. 244-117.00A.
    - Hubler, Graham K.; Donovan, Edward P.; and Van Vechten, Deborah, 5,015,353, Cl. 204-192.310.
    - Kershaw, Joseph F., 5,016,022, Cl. 343-750.000.
    - Mako, Frederick M.; and Pasour, John A., 5,015,943, Cl. 324-95.000.
    - Mercer, William B.; Cardarelli, Nathan F.; and Henry, Richard L., 5,015,372, Cl. 210-170.000.
- U.S. Philips Corporation: *See—*
  - Bugg, Richard E. F., 5,016,000, Cl. 340-731.000.
  - Jensen, Jens D., 5,015,956, Cl. 324-309.000.
  - Lammers, Jan F.; Hoeks, Antonius J. L. M.; and Kennedy Van Dam, Frank D. S., 5,014,968, Cl. 269-322.000.
  - Scholten, Daphne, 5,015,623, Cl. 505-1.000.
  - Spanjer, Tjerk G.; and Vrijssen, Gerardus A. H. M., 5,015,925, Cl. 315-382.000.
  - Strauch, Raymond, 5,016,016, Cl. 342-87.000.
  - Van Der Plas, Paulus A.; and De Werdt, Reinier, 5,015,602, Cl. 437-67.000.
  - Verhaar, Robertus D. J., 5,015,598, Cl. 437-44.000.
  - Verhaar, Robertus D. J., 5,015,599, Cl. 437-44.000.
- United States Surgical Corporation: *See—*
  - Presty, Dominic F.; and Tompkins, Thomas M., 5,014,899, Cl. 227-180.000.
- United Technologies Corporation: *See—*
  - Fradenburgh, Evan A.; and Zincone, Robert, 5,015,842, Cl. 250-227.150.
  - Nardone, Vincent C.; Strife, James R.; and Prewo, Karl M., 5,015,116, Cl. 403-28.000.
  - Sprague, Brian J.; and Portanova, Gregory A., 5,016,210, Cl. 364-766.000.
- United Video, Inc.: *See—*
  - Calkins, Jeffrey E., 5,016,115, Cl. 358-442.000.
- University of California, Regents of the: *See—*
  - Derenzo, Stephen E.; and Moses, William W., 5,015,861, Cl. 250-361.00R.
  - Doss, James D., 5,015,952, Cl. 324-236.000.
  - Moses, William W., 5,015,860, Cl. 250-361.00R.
- University of Colorado Foundation, Inc.: *See—*
  - Kuester, Edward F.; and Holloway, Christopher L., 5,016,185, Cl. 364-481.000.
- University of Connecticut: *See—*
  - Suib, Steven L.; and Zhang, Zongchao, 5,015,349, Cl. 204-168.000.
- University of Delaware, The: *See—*
  - Varrin, Robert D., Jr.; and Birkmire, Robert W., 5,015,503, Cl. 427-255.200.
- University of Melbourne, The: *See—*
  - Reynolds, Eric C., 5,015,628, Cl. 514-12.000.
- University of Minnesota, Regents of the: *See—*
  - Carr, Peter W.; Funkenbusch, Eric F.; Rigney, Martin P.; Coleman, Patrick L.; Hanggi, Douglas A.; and Schafer, Wes A., 5,015,373, Cl. 210-198.200.
- University of Pennsylvania, Trustees of the: *See—*
  - Pollack, Solomon R.; Brighton, Carl T.; Pienkowski, David; and Griffith, Neil J., 5,014,699, Cl. 128-419.00F.
- University of Southern California: *See—*
  - diZerega, Gere S., 5,015,629, Cl. 514-16.000.
- Unterbeck, Axel J.: *See—*
  - Scangos, George A.; Rae, Peter M. M.; Unterbeck, Axel J.; and Kamarck, Michael E., 5,015,570, Cl. 435-6.000.
- UOP: *See—*
  - Cetinkaya, Ismail B., 5,015,363, Cl. 208-150.000.
  - Vora, Bipin V.; Pujado, Peter R.; and Luebke, Charles P., 5,015,783, Cl. 568-697.000.
- Upjohn Company, The: *See—*
  - Kim, Kyoung S., 5,015,737, Cl. 540-363.000.
- Urakami, Fukashi. Device capable of suction-adhering to a wall surface and moving therealong. 5,014,803, Cl. 180-164.000.
- Uratani, Eiichi. Anti-corrosion method of air compression device and anti-corrosion air compression device. 5,015,441, Cl. 422-12.000.
- Urbach, Hansjorg: *See—*
  - Lerch, Ulrich; Henning, Rainer; Urbach, Hansjorg; and Kaiser, Joachim, 5,015,642, Cl. 514-224.200.
- Urban, Robert R.: *See—*
  - Katz, Allen; and Urban, Robert R., 5,015,965, Cl. 330-149.000.
- Urdea, Mickey S.: *See—*
  - Brake, Anthony J.; Cousens, Lawrence S.; Urdea, Mickey S.; and Valenzuela, Pablo D. T., 5,015,575, Cl. 435-91.000.
- Urrestarazu Borda, Rafael. Mechanical lottery. 5,014,989, Cl. 273-145.00C.
- Ushijima, Makoto: *See—*
  - Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Yamazaki, Masanobu; Toyoda, Manabu; and Ushijima, Makoto, 5,016,129, Cl. 360-103.000.
- Utamura, Motoaki: *See—*
  - Nagase, Makoto; Asakura, Yamoto; Utamura, Motoaki; and Uchida, Shunsuke, 5,015,436, Cl. 376-306.000.
- Utdc, Inc.: *See—*
  - Ferrence, David N., 5,015,141, Cl. 414-395.000.
- Utsu, Jyunshi: *See—*
  - Kodera, Masao; Sasaki, Kunihiko; Mikami, Seishin; and Utsu, Jyunshi, 5,016,017, Cl. 342-106.000.
- Utzt, Alfred, to Knorr-Bremse AG. Drive slip regulator for motor vehicles. 5,016,179, Cl. 364-426.020.
- Uuskallio, Arvo F., to Briggs & Stratton Corporation. Staple gun driver guide assembly. 5,014,897, Cl. 227-119.000.
- Vaccari, Enzo, to Star Pennsylvania New Flower S.p.A. Double-layer, thin sheet plastic material for producing decorative ribbons, packings and the like. 5,015,520, Cl. 428-215.000.
- Vale, Wylie W., Jr.: *See—*
  - Spiess, Joachim; Rivier, Jean E. F.; Bardin, C. Wayne; and Vale, Wylie W., Jr., 5,015,729, Cl. 530-350.000.
- Valencic, Terence E.; and Wible, John E., to Caterpillar Industrial Inc. Battery retaining system. 5,014,811, Cl. 180-286.000.
- Valenzuela, Pablo D. T.: *See—*
  - Brake, Anthony J.; Cousens, Lawrence S.; Urdea, Mickey S.; and Valenzuela, Pablo D. T., 5,015,575, Cl. 435-91.000.
- Valeo: *See—*
  - Graton, Michel; and Dalbiez, Andre , 5,014,842, Cl. 192-106.200.
  - Vincent, Philippe, 5,014,911, Cl. 237-12.30B.
- Valeo Electronique: *See—*
  - Vialaneix, Dominique, 5,015,984, Cl. 336-197.000.
- Valeo Systemes D'Essuyage: *See—*
  - Muller, Guy, 5,015,931, Cl. 318-483.000.
- Valeo Vision: *See—*
  - Chevance, Gerard, 5,016,155, Cl. 362-418.000.
- Valleylab Inc.: *See—*
  - Broadwin, Alan; Logan, Joseph N.; and Kuhl, Peter J., 5,015,227, Cl. 604-22.000.
- Valmet Oy: *See—*
  - Nissinen, Olli, 5,015,495, Cl. 427-49.000.
- Van Antwerp, Joel C., to BEI Electronics, Inc. Source intensity adjustment apparatus for optical channel. 5,015,836, Cl. 250-205.000.
- Vance Products Incorporated: *See—*
  - Foster, Thomas L., 5,015,250, Cl. 606-147.000.
- Vandenberk, Jan: *See—*
  - Kennis, Ludo E. J.; Vandenberk, Jan; and Mertens, Josephus C., 5,015,740, Cl. 544-366.000.
- Vandenbossche, Jean J.: *See—*
  - Junino, Alex; Vandenbossche, Jean J.; Borowiak, Herve; and Lang, Gerard, 5,015,772, Cl. 564-443.000.
- Van Der Plas, Paulus A.; and De Werdt, Reinier, to U.S. Philips Corporation. Method of manufacturing a semiconductor device having a planarized construction. 5,015,602, Cl. 437-67.000.

VOL
1126
ISS
2
MY
14
1991
UMI

Vanderpool, Clarence D.; and Hoffman, Timothy J., to GTE Products Corporation. Method for purifying sulfuric acid solutions. 5,015,458, Cl. 423-531.000.
Vanderpool, Jeffrey S.: *See—*
Dixon, Robert C.; and Vanderpool, Jeffrey S., 5,016,255, Cl. 375-1.000.
Vandeweghe, Michel; and Vanheule, Willy, to Picanol N.V. Attachment for guard plates in weaving machines. 5,014,754, Cl. 139-1.00R.
Vanguard Imaging Ltd.: *See—*
Kenet, Robert O.; Kenet, Barney J.; and Tearney, Guillermo J., 5,016,173, Cl. 364-413.130.
Vanheule, Willy: *See—*
Vandeweghe, Michel; and Vanheule, Willy, 5,014,754, Cl. 139-1.00R.
Van Lengerich, Bernhard; and Warren, Cathryn C., to Nabisco Brands, Inc. Cookie production with extrusion heat treatment and post extrusion mixing and baking. 5,015,488, Cl. 426-549.000.
Van Lengerich, Bernhard; and Warren, Cathryn C., to Nabisco Brands, Inc. Production of cookies with extrusion and post extrusion baking. 5,015,489, Cl. 426-549.000.
Van Lengerich, Bernhard; and Warren, Cathryn C., to Nabisco Brands, Inc. Production of extruded baked products without oil separation. 5,015,490, Cl. 426-549.000.
Van Linden, Jan H. L.: *See—*
LaCamera, Alfred; Van Linden, Jan H. L.; Pierce, Thomas V.; and Parkhill, James O., 5,015,343, Cl. 204-67.000.
Van Loo, James; Carrie, Susan; Evans, Jerald; and Spirn, Jeffrey, to Sun Microsystems, Inc. Method and apparatus for the flow control of devices. 5,016,161, Cl. 364-200.000.
Van Loo, James; Carrie, Susan; and Evans, Jerald, to Sun Microsystems, Inc. Method and apparatus for the synchronization of devices. 5,016,166, Cl. 364-200.000.
Van Melle, Jean, to Tates. Container. 5,014,867, Cl. 220-1.500.
Van Peppen, Jan F., to Allied-Signal Inc. Process for production cyclohexanol. 5,015,787, Cl. 568-835.000.
Van Vechten, Deborah: *See—*
Hubler, Graham K.; Donovan, Edward P.; and Van Vechten, Deborah, 5,015,353, Cl. 204-192.310.
van Wassenhove, Denis: *See—*
Rossignol, Leopold; and van Wassenhove, Denis, 5,014,753, Cl. 138-149.000.
Vara International Inc.: *See—*
Vara, Tomas E.; Mestemaker, Jerry L.; and Thakker, B. R., 5,015,365, Cl. 208-262.100.
Vara, Tomas E.; Mestemaker, Jerry L.; and Thakker, B. R., to Vara International Inc. Process for removing halogenated hydrocarbons and other solvents from a solvent laden air (SLA) stream. 5,015,365, Cl. 208-262.100.
Varian Associates, Inc.: *See—*
Ives, Robert L.; Jory, Howard R.; and LaRue, Albert D., 5,015,914, Cl. 315-4.000.
Miram, George V.; and Mizuhara, Yosuke M., 5,015,908, Cl. 313-37.000.
Varrin, Robert D., Jr.; and Birkmire, Robert W., to University of Delaware, The. Apparatus for producing compound semiconductor thin films. 5,015,503, Cl. 427-255.200.
Vas-Cath Incorporated: *See—*
Martin, Geoffrey S.; and Ram, Anand, 5,015,230, Cl. 604-96.000.
Vaughan, Craig W.: *See—*
Chen, Shih-Rucy T.; and Vaughan, Craig W., 5,015,390, Cl. 210-698.000.
Vaughan, David E. W., to Exxon Research & Engineering Company. Process for preparation of an ECR-5 crystalline zeolite composition. 5,015,454, Cl. 423-328.000.
Vaupotic, Gregory P.; Beck, Doris A.; and Chy, Sokha, to SuperComputer Systems Limited Partnership. Miniature controlled-impedance transmission line cable and method of manufacture. 5,015,800, Cl. 174-34.000.
Vazan, Fridrich: *See—*
Pan, Kee-Chuan; Tyan, Yuan-sheng; and Vazan, Fridrich, 5,015,548, Cl. 430-19.000.
VDO Adolf Schindling AG: *See—*
Westenberger, Helmut, 5,014,666, Cl. 123-339.000.
VEB Spezialbaukombinat Magdeburg: *See—*
Schweder, Herbert, 5,015,299, Cl. 134-8.000.
Veit Transpo GmbH: *See—*
Richter, Peter; Hafner, Josef; and Schonenberger, Rolf, 5,014,864, Cl. 213-104.000.
Velobind, Inc.: *See—*
Crudo, Phillip M.; Foltz, Scott; and Lay, Roger F., 5,015,138, Cl. 412-43.000.
Venkatesan, Thirumalai; and Wu, Xin D., to Rutgers University; and Bell Communications Research, Inc. Method and apparatus for pulsed energy induced vapor deposition of thin films. 5,015,492, Cl. 427-8.000.
Ventritex: *See—*
Pless, Benjamin; Sweeney, Michael; and Winkle, Roger, 5,014,697, Cl. 128-419.00D.
Ventritex, Inc.: *See—*
Pless, Benjamin D.; and Carroll, Kenneth J., 5,014,701, Cl. 128-419.0PG.
Venturi, Giancarlo: *See—*
Cane , Davide; and Venturi, Giancarlo, 5,015,185, Cl. 433-159.000.
Verbueken, Armand; Sluyts, Domien; and Putseys, Roland, to Bayer Antwerpen. Removal of nitrate and/or organic pollutants from effluents. 5,015,456, Cl. 423-395.000.
Verhaar, Robertus D. J., to U.S. Philips Corporation. Method of manufacturing a device comprising MIS transistors having a gate electrode in the form of an inverted "T". 5,015,598, Cl. 437-44.000.
Verhaar, Robertus D. J., to U.S. Philips Corporation. Method of manufacturing a device comprising MIS transistors having a projecting gate on the weakly doped parts of source and drain regions. 5,015,599, Cl. 437-44.000.
Vestal, Marvin L.: *See—*
Allen, Mark; and Vestal, Marvin L., 5,015,845, Cl. 250-288.000.
Vestec Corporation: *See—*
Allen, Mark; and Vestal, Marvin L., 5,015,845, Cl. 250-288.000.
Vetter, Gregory J.; and Seaser, James G., to Truth Incorporated. Rivet joint and method of manufacture. 5,015,136, Cl. 411-504.000.
Vialaneix, Dominique, to Valeo Electronique. Ignition coil, in particular for an internal combustion engine of an automotive vehicle, and means for retaining the primary assembly within the secondary assembly of such a coil. 5,015,984, Cl. 336-197.000.
Victor Company of Japan, Ltd.: *See—*
Sugiyama, Kenji, 5,016,010, Cl. 341-67.000.
Victorian Dairy Industry Authority: *See—*
Reynolds, Eric C., 5,015,628, Cl. 514-12.000.
Vila-Masot, Oscar; and Melis, Janis, to LED Corporation N.V. Emergency lighting system provided with a fluorescent tube. 5,015,919, Cl. 315-86.000.
Villamater, Jaime V.: *See—*
Benak, Arnold M.; and Villamater, Jaime V., 5,014,695, Cl. 128-400.000.
Vincent, Philippe, to Valeo. Heating and/or air conditioning apparatus for an automotive vehicle. 5,014,911, Cl. 237-12.30B.
Vining Industries, Inc.: *See—*
Maul, Gary P., 5,015,496, Cl. 427-54.100.
Vinouze, Bruno; and Chouan, Yannick, to Centre National d'Etudes des Telecommunications et d'Etudes Spatiales. Process for the production of an inverted structure, active matrix display screen. 5,015,597, Cl. 437-41.000.
Viswanathan, Thayamkulangara R.: *See—*
Scott, Jeffrey W.; and Viswanathan, Thayamkulangara R., 5,016,012, Cl. 341-118.000.
Vivenzio, Robert L.: *See—*
Krauter, Allan I.; and Vivenzio, Robert L., 5,014,600, Cl. 92-92.000.
Vlaanderen, James, to Iowa Mold Tooling Company, Inc. Vehicle mounted crane. 5,014,863, Cl. 212-182.000.
VLSI Technology, Inc.: *See—*
Nolan, James B.; and Michelsen, Jeffrey M., 5,016,219, Cl. 365-195.000.
Vogel, Emanuel: *See—*
Jori, Giulio; Kocher, Matthias; Vogel, Emanuel; and Cross, Alexander D., 5,015,478, Cl. 424-450.000.
Vogel, Paul: *See—*
Heep, Dieter; Vogel, Paul; Frey, Manfred; and Schmalz, Joachim, 5,014,885, Cl. 222-368.000.
Vogel, Rudolf; and Ruedisueli, Anton, to Sulzer Brothers Limited. Pile warp tension control in a loom. 5,014,756, Cl. 139-97.000.
Vollenweider, Edward E., II, to Technical Innovations, Inc. Disposable environmental control suit. 5,014,355, Cl. 2-79.000.
Volz, Peter: *See—*
Kircher, Dieter; Volz, Peter; and Wupper, Hans, 5,015,044, Cl. 303-114.000.
Vonada, Donald G.: *See—*
Simoudis, Evangelos; Evans, Richard P.; and Vonada, Donald G., 5,016,204, Cl. 364-578.000.
von Braucke, Hans: *See—*
von Braucke, Manfred; and von Braucke, Hans, 5,014,461, Cl. 47-40.500.
von Braucke, Manfred; and von Braucke, Hans, to Bielefelder Kuchenmaschinen- und Transportgerate-Fabrik von Braucke GmbH. Stand, in particular for Christmas trees. 5,014,461, Cl. 47-40.500.
von Braunhut, Harold. Word card game. 5,014,996, Cl. 273-299.000.
von Stein, Werner R.: *See—*
Kraft, Walter; and von Stein, Werner R., 5,016,043, Cl. 355-38.000.
von Turkovich, Branimer F.: *See—*
Komanduri, Ranga; von Turkovich, Branimer F.; and Casey, Morton P., Jr., 5,014,581, Cl. 82-173.000.
Voorhees, Scott W. Flight desk with indicators. 5,016,147, Cl. 362-99.000.
Vora, Bipin V.; Pujado, Peter R.; and Luebke, Charles P., to UOP. Production of ethers by the reaction of alcohols and olefins. 5,015,783, Cl. 568-697.000.
Vorlop, Klaus-Dieter; and Sell, Michael, to GUTEC Gesellschaft zur Entwicklung von Umweltschutztechnologie mbH. Particulate material suitable for selectively separating metal cations from aqueous solutions, process for its production, and use thereof. 5,015,448, Cl. 423-24.000.
Vrijssen, Gerardus A. H. M.: *See—*
Spanjer, Tjerk G.; and Vrijssen, Gerardus A. H. M., 5,015,925, Cl. 315-382.000.
VTH AG Verfahrenstechnik fur Heizung: *See—*
Fullemann, Jorg; and Boner, Heinrich, 5,015,173, Cl. 431-116.000.
Vuichard, Albin; Buhler, Bruno; and Cavin, Tell, to Oerlikon-Contraves AG. Automatic focusing control of a video camera for industrial and military purposes. 5,016,110, Cl. 358-227.000.
Vuong, Tuyet: *See—*
Riel, Frank J.; Vuong, Tuyet; and Delaney, Edward A., 5,015,727, Cl. 528-353.000.

W. L. Gore & Associates, Inc.: *See—*
Hubner, Thorger; and Bleimhofer, Walter, 5,014,363, Cl. 2-243.00A.
W. R. Grace & Co.-Conn.: *See—*
Chapman, David M., 5,015,453, Cl. 423-306.000.
W. Schlafhorst & Co.: *See—*
Kamp, Heinz; Gerhards, Peter; and Bruns, Siegfried, 5,014,922, Cl. 242-18.00R.
Waas, Peter: *See—*
Koch, Peter; Waas, Peter; Neumeyer, Franz; and Baechle, Georg, 5,014,910, Cl. 237-2.00A.
Wach, Jurgen: *See—*
Focke, Heinz; and Wach, Jurgen, 5,014,490, Cl. 53-73.000.
Wachi, Shigeaki, to Sony Corporation. Actuator driving circuits. 5,015,932, Cl. 318-560.000.
Wacker-Chemie GmbH: *See—*
Frey, Volker; Pachaly, Bernd; and Zeller, Norbert, 5,015,605, Cl. 501-12.000.
Herzig, Christian; and Esterbauer, Josef, 5,015,700, Cl. 525-487.000.
Wacker Silicones Corporation: *See—*
Martin, Eugene R.; and Griswold, Roy M., 5,015,717, Cl. 528-30.000.
Wacoh Corporation: *See—*
Okada, Kazuhiro, 5,014,415, Cl. 29-621.100.
Wade, Wallace R.; and Rao, Vemulapalli D. N., to Ford Motor Company. Filtration system for diesel engine exhaust-II. 5,014,511, Cl. 60-303.000.
Waeschle Maschinenfabrik GmbH: *See—*
Heep, Dieter; Vogel, Paul; Frey, Manfred; and Schmalz, Joachim, 5,014,885, Cl. 222-368.000.
WaferScale Integration, Inc.: *See—*
Ali, Syed, 5,016,216, Cl. 365-185.000.
Wagner, Bernd: *See—*
Wawra, Helmut; Albrecht, Wilhelm; Wagner, Bernd; Franke, Andreas; and Gellner, Harald, 5,014,831, Cl. 192-4.00A.
Wagner, Friedrich: *See—*
Korfgen, Harald; Hirsch, Heinz; Grendel, Vinzenz; Wagner, Friedrich; and Grau, Walter, 5,014,736, Cl. 137-315.000.
Wagner, Gebhard: *See—*
Feldner, Kurt; Degen, Bruno; Wagner, Gebhard; and Schulze, Manfred, 5,015,751, Cl. 556-472.000.
Wagner, John D.: *See—*
Newbold, Geoffrey; Wraige, Douglas; and Wagner, John D., 5,015,513, Cl. 428-35.500.
Wagner, Larry C. Fishing pole holder. 5,014,458, Cl. 43-21.200.
Wagner, Otto M.: *See—*
Haug, Werner O.; Klink, Erich; Kroll, Karl E.; Ludwig, Thomas; Schettler, Helmut; Stahl, Rainer; and Wagner, Otto M., 5,016,087, Cl. 357-75.000.
Wagner, Richard W.: *See—*
Covert, Charles H.; Turner, Kenneth W.; Sherwood, Carl H.; Gifford, William E.; and Wagner, Richard W., 5,014,742, Cl. 137-588.000.
Waible, Leo C., III: *See—*
Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
Wakabayashi, Masashi; and Kuroda, Masuo, to Yokohama Rubber Co., Ltd. Composite hose construction. 5,014,751, Cl. 138-127.000.
Waldorf Corporation: *See—*
Roccaforte, Harry I., 5,014,855, Cl. 206-616.000.
Wales, Denis: *See—*
Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
Walker, Evan H.; and Hillstrom, Warren W., to United States of America, Army. Binary munition system. 5,014,623, Cl. 102-477.000.
Walker Magnetics Group, Inc.: *See—*
Osipov, Vladimir W., 5,014,970, Cl. 269-328.000.
Walker, Mary A.: *See—*
Dumont, Allen D., 5,014,354, Cl. 2-23.000.
Walker, Randy J.: *See—*
Walker, Scott A.; and Walker, Randy J., 5,014,846, Cl. 206-5.000.
Walker, Robert H.; Willems, Paul A.; Huff, George A.; Grimes, Lewis E.; Tatterson, David F.; and Mehlberg, Robert L., to Amoco Corporation. Oxidative coupling process for converting methane and/or natural gas to more transportable products. 5,015,799, Cl. 585-500.000.
Walker, Scott A.; and Walker, Randy J. Protective cover for eyeglasses. 5,014,846, Cl. 206-5.000.
Wallenås, Anders. Dose control apparatus for agricultural tube sprayers for spreading pesticides on fields and plants. 5,014,914, Cl. 239-62.000.
Waller, William K., to Micron Technology, Inc. Compact multifunction logic circuit. 5,015,883, Cl. 307-465.000.
Walles, Erik W.; Lupinski, John H.; and Crivello, James V., to General Electric Company. Encapsulation method, microelectronic devices made therefrom, and heat curable compositions based on epoxy resins, diaryliodonium hexafluroantimonate salts and free radical generators. 5,015,675, Cl. 523-443.000.
Wallis, Bernard J. Method and apparatus for forming core assemblies. 5,014,422, Cl. 29-890.044.
Walloch, Richard A.: *See—*
Millay, Jack M.; and Walloch, Richard A., 5,014,714, Cl. 128-672.000.
Walowit, Eric; and Sexton, Gregory J., to Mead Corporation, The. Integrated media cartridge and filter. 5,015,277, Cl. 55-385.100.
Walser, Armin, to Hoffmann-La Roche Inc. Chromanes and their pharmaceutical compositions and methods. 5,015,661, Cl. 514-443.000.
Walsh, Daniel P., to Polyonics Corporation. Textured polyimide film. 5,015,517, Cl. 428-156.000.
Walsh, Dennis E.: *See—*
Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., 5,015,798, Cl. 585-500.000.
Walsh, Michael E.: *See—*
Anderson, Nestor A.; and Walsh, Michael E., 5,014,854, Cl. 206-611.000.
Walters, Carl W.: *See—*
Richards, John W.; Gillard, Clive H.; Avis, Richard J. A.; Samad, Raphael; and Walters, Carl W., 5,016,101, Cl. 358-140.000.
Wan, Hawk S.: *See—*
Beck, Henry N.; Mahoney, Robert D.; Wan, Hawk S.; and Lundgard, Richard A., 5,015,275, Cl. 55-158.000.
Wang, David W.: *See—*
Papathomas, Kostas I.; Summa, William J.; and Wang, David W., 5,015,719, Cl. 528-70.000.
Wang, Frank. Visor mounting apparatus for radar detectors. 5,014,947, Cl. 248-214.000.
Wang, John. Adjustable telescopic apparatus. 5,014,966, Cl. 267-64.260.
Wang, Li-Shin: *See—*
Detig, Robert H.; Sidey, Michael; and Wang, Li-Shin, 5,015,064, Cl. 350-96.240.
Wang, Wen-Yuan: *See—*
Chu, Shao-Fu S.; Ku, San-Mei; Lange, Russell C.; Shephard, Joseph F.; Tsang, Paul J.; and Wang, Wen-Yuan, 5,015,594, Cl. 437-31.000.
Wang, Xingwu, to Alfred University. Superconducting mirror for laser gyroscope. 5,015,619, Cl. 505-1.000.
Wang, Xingwu: *See—*
Ward, Raymond C.; Wang, Xingwu; Carlson, William B.; and Schulze, Walter A., Jr., 5,015,622, Cl. 505-1.000.
Wang, Ying: *See—*
Clement, Robert A.; and Wang, Ying, 5,015,417, Cl. 252-587.000.
Wang, Yiren S.; Rhee, Seong K.; and Jokisch, Robert E., to Allied-Signal Inc. Actuation piston for disc brake with vibration attenuator. 5,014,827, Cl. 188-72.400.
Wanzenried, Andreas: *See—*
Wernli, Joerg; Brennwalder, Daniel; Erni, Markus; Fritschi, Isidor; and Wanzenried, Andreas, 5,014,505, Cl. 57-275.000.
Ward, Raymond C.; Wang, Xingwu; Carlson, William B.; and Schulze, Walter A., Jr., to Alfred University. Multidirectional/rotational superconductor motor. 5,015,622, Cl. 505-1.000.
Wardle, Robert B.; and Edwards, W. Wayne, to Morton International, Inc. Gas generant compositions containing salts of 5-nitrobarbituric acid, salts of nitroorotic acid, or 5-nitrouracil. 5,015,309, Cl. 149-19.100.
Warnan, Francois; and Barbot, Joel, to Thomson-CSF. Hinged-arm type of mechanism and sonar antenna fitted out with a mechanism such as this. 5,014,953, Cl. 248-284.000.
Warner-Lambert Company: *See—*
Roth, Bruce D.; and Trivedi, Bharat K., 5,015,644, Cl. 514-247.000.
Warp, Rick A., to Da Vinci Graphics, Inc. High quality plotting technique for raster printing devices. 5,016,195, Cl. 364-519.000.
Warren, Cathryn C.: *See—*
Van Lengerich, Bernhard; and Warren, Cathryn C., 5,015,488, Cl. 426-549.000.
Van Lengerich, Bernhard; and Warren, Cathryn C., 5,015,489, Cl. 426-549.000.
Van Lengerich, Bernhard; and Warren, Cathryn C., 5,015,490, Cl. 426-549.000.
Warren, Richard: *See—*
Romine, Lori; Sholders, Ronald; and Warren, Richard, 5,015,369, Cl. 210-136.000.
Waseda, Koji: *See—*
Fujiwara, Takuji; Waseda, Koji; and Matsumoto, Akio, 5,014,575, Cl. 74-866.000.
Washam, Kevin A.: *See—*
Dennis, Wendell E.; Sheeley, Steven M.; Brown, Stephen M.; Washam, Kevin A.; Alley, Lewis E.; and Cain, Marvin D., 5,014,882, Cl. 222-309.000.
Wasley, Jan W. F., to Ciba-Geigy Corporation. Tetracyclic pyrrole lactam derivatives. 5,015,645, Cl. 514-250.000.
Wasley, Robert S.: *See—*
Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
Wasserman, Nelson: *See—*
Reid, Jerome L., 5,015,416, Cl. 252-586.000.
Watanabe, Hiroshi, to Toyo Radiator Co., Ltd. Oil cooler and manufacturing method thereof. 5,014,775, Cl. 165-167.000.
Watanabe, Junji, to Kabushiki Kaisha Toshiba. Image forming apparatus for forming an original image and an additional image. 5,016,048, Cl. 355-202.000.
Watanabe, Katsuji: *See—*
Ohyama, Yasuharu; Izawa, Masaki; Watanabe, Katsuji; and Hamada, Tetsuro, 5,015,009, Cl. 280-772.000.

VOL 1126
ISS 2
MY 14 1991
UMI

- Watanabe, Keiji: *See—*
  - Sano, Kinjiro; Kamata, Toyokazu; Fukuyama, Keiji; Saito, Masato; and Watanabe, Keiji, 5,015,497, Cl. 427-77.000.
- Watanabe, Masateru: *See—*
  - Nakamura, Shigeru; Takahashi, Sadao; Watanabe, Masateru; and Arimoto, Akira, 5,016,237, Cl. 369-112.000.
- Watanabe, Osamu: *See—*
  - Yamashita, Masayasu; Suzuki, Masami; Yoshio, Junichi; and Watanabe, Osamu, 5,016,113, Cl. 358-335.000.
- Watanabe, Takenori: *See—*
  - Koga, Minoru; and Watanabe, Takenori, 5,015,444, Cl. 422-195.000.
- Watanabe, Yoshio, to Kabushiki Kaisha Toshiba. Image reading apparatus. 5,016,045, Cl. 355-43.000.
- Watarai, Syu: *See—*
  - Tachikawa, Hiromichi; Yokoya, Hiroaki; Suzuki, Nobuo; and Watarai, Syu, 5,015,551, Cl. 430-114.000.
- Waters & Associates: *See—*
  - Waters, William J.; Leissler, George W.; and Edmonds, Brian J., 5,014,768, Cl. 164-418.000.
- Waters, William J.; Leissler, George W.; and Edmonds, Brian J., to Waters & Associates. Chill plate having high heat conductivity and wear resistance. 5,014,768, Cl. 164-418.000.
- Watford, Roland S., Jr.: *See—*
  - Gandy, Carroll E.; and Watford, Roland S., Jr., 5,014,928, Cl. 242-118.320.
- Watkins, Randall D.: *See—*
  - Brow, Richard K.; and Watkins, Randall D., 5,015,530, Cl. 428-433.000.
- Watkins, Robert W.: *See—*
  - Andrews, David R.; Gaeta, Federico C. A.; and Watkins, Robert W., 5,015,641, Cl. 514-223.500.
- Watkins, William M.; Toyne, David L.; Arena, Alan J.; Lawver, Larry D.; and Birket, Daniel S., to Ridewerks, Ltd. Seat base motion controller. 5,015,933, Cl. 318-567.000.
- Watt, Elbert D.: *See—*
  - Griffin, Bruce M.; Werkema, Robert G.; and Watt, Elbert D., 5,015,322, Cl. 156-345.000.
- Watt, Paul G. Articulate downspout. 5,014,745, Cl. 137-615.000.
- Watts, W. David. Shot removal system. 5,014,469, Cl. 51-425.000.
- Wawra, Helmut; Albrecht, Wilhelm; Wagner, Bernd; Franke, Andreas; and Gellner, Harald, to Daimler-Benz AG. Device for locking an actuating lever of a shifting device. 5,014,831, Cl. 192-4.00A.
- Webasto AG Fahrzeugtechnik: *See—*
  - Koch, Peter; Waas, Peter; Neumeyer, Franz; and Baechle, Georg, 5,014,910, Cl. 237-2.00A.
- Webb, Heather K.: *See—*
  - McQuigg, Donald W.; Webb, Heather K.; and Sowers, Edward E., 5,015,706, Cl. 526-200.000.
- Webb, James E., to Nsertaseal Corporation. Safety device for sealing a drain assembly. 5,015,371, Cl. 210-164.000.
- Webb, William J.; and Pyle, Stoddard H. Push feed system for a saw. 5,014,583, Cl. 83-76.900.
- Webber, Patricia: *See—*
  - Doleman, Muriel S.; and Webber, Patricia, 5,015,445, Cl. 422-204.000.
- Weber, Andre, to Kuhn S.A. Foundry core shooter. 5,014,766, Cl. 164-154.000.
- Weber, Walter K., to K. B Lighting Inc. Vent nozzle. 5,014,964, Cl 251-352.000.
- Weber, Wolfram: *See—*
  - Mathieu, Bernd; Rinck, Michael; Schnur, Jurgen; Selzer, Dieter; and Weber, Wolfram, 5,015,374, Cl. 210-232.000.
- Weck, Franz, to H. Krantz GmbH & Co. Inductive air passage. 5,014,609, Cl. 98-40.140.
- Wegman & Co. GmbH. *See—*
  - Muhlhausen, Peter; and Nausester, Adolf, 5,014,594, Cl. 89-37.080.
- Wehrens, Dirk: *See—*
  - Clemens, Werner; Daubenbuchel, Werner; Eiselen, Otto; Kiefer, Erich; Klusener, Peter; Teichmann, Peter; and Wehrens, Dirk, 5,014,873, Cl. 220-601.000.
- Weigel, Paul H.; and Papaconstantinou, John, to Board of Regents, The University of Texas System. DNA encoding hyaluronate synthase. 5,015,577, Cl. 435-101.000.
- Weirton Steel Corporation: *See—*
  - Saunders, William T., 5,014,536, Cl. 72-349.000.
- Weishaupt, Kenneth R.: *See—*
  - Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., 5,015,463, Cl. 424-7.100.
- Weisman, Ilan; Shapira, Roni; Shafir, Roni; and Shtark, Hanoh. Centering apparatus for a gemstone. 5,015,090, Cl. 356-30.000.
- Weiss, Dieter. Apparatus for moving inserters for workpieces. 5,015,149, Cl. 414-751.000.
- Weiss, Richard A.: *See—*
  - Chisolm, Daniel R.; Weiss, Richard A.; and Rozov, Leonid, 5,015,777, Cl. 568-314.000.
- Welch Allyn, Inc.: *See—*
  - Krauter, Allan I., 5,014,515, Cl. 60-581.000.
  - Krauter, Allan I.; and Vivenzio, Robert L., 5,014,600, Cl. 92-92.000.
- Weller, Hugo: *See—*
  - Drobny, Wolfgang; Mattes, Bernhard; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,015,870, Cl. 307-66.000.
  - Mattes, Bernhard; Nitschke, Werner; Kuhn, Willi; Drobny, Wolfgang; Weller, Hugo; Taufer, Peter; Jeenicke, Edmund; Reischle, Klaus; Henne, Michael; and Burger, Wilfried, 5,014,810, Cl. 180-268.000
- Wells, Gregory J.: *See—*
  - Carini, David J.; Duncia, John J. V.; and Wells, Gregory J., 5,015,651, Cl. 514-381.000.
- Wells, Thomas H.: *See—*
  - Beer, Klaus; Richards, Gary W.; Oare, Thomas R.; Brown, Thomas A.; and Wells, Thomas H., 5,014,762, Cl. 152-532.000.
- Welsh, David E.; and Wilson, Albert H., to ITT Corporation. Contact retention and sealing system. 5,015,192, Cl. 439-83.000.
- Welsh, Laurence: *See—*
  - Masia, Michael; Reed, James P.; Wasley, Robert S.; Hauptly, Paul D.; Reeder, Larry R.; Brooks, Peter L.; Tolles, Thomas W.; Frank, Louis M.; Bonomi, Mauro; Wales, Denis; Stewart, Ray F.; Lahlouh, John; and Welsh, Laurence, 5,015,958, Cl. 324-522.000.
- Weng, Tung H.: *See—*
  - Boos, John B.; Papanicolaou, Nicolas A.; and Weng, Tung H., 5,015,603, Cl. 437-184.000.
- Wenzinger, Jr., to Doron Precision Systems, Inc. Training apparatus. 5,015,189, Cl. 434-63.000.
- Werkema, Robert G.: *See—*
  - Griffin, Bruce M.; Werkema, Robert G.; and Watt, Elbert D., 5,015,322, Cl. 156-345.000.
- Werner, Walter V.: *See—*
  - Hollinger, Walter P.; Aboyoussef, Ahmed; and Werner, Walter V., 5,015,095, Cl. 356-350.000.
- Wernli, Joerg; Brennwalder, Daniel; Erni, Markus; Fritschi, Isidor; and Wanzenried, Andreas, to Rieter Machine Works, Ltd. Apparatus for changing bobbin tubes and tube gripper therefor. 5,014,505, Cl. 57-275.000.
- Wesley, Sam, Sr. End blown flute with standard keying. 5,014,585, Cl. 84-384.000.
- West, Christopher N., to Westland Helicopters Limited. Method and apparatus for detecting cracks in helicopter rotor blades. 5,014,544, Cl. 73-40.700.
- West, George A., to Bemis Company, Inc. Form-fill-seal packaging. 5,014,493, Cl. 53-410.000.
- Westenberger, Helmut, to VDO Adolf Schindling AG. Load adjustment device. 5,014,666, Cl. 123-339.000.
- Westerbeke Corporation: *See—*
  - Westerbeke, John H., Jr., 5,014,660, Cl. 123-198.00E.
- Westerbeke, John H., Jr., to Westerbeke Corporation. Cooling system for an enclosed heat source. 5,014,660, Cl. 123-198.00E.
- Westerberg, Anders. Method for preventing freezing in pipes, and a piping system for carrying out the method. 5,014,731, Cl. 137-59.000
- Westinghouse Electric Corporation: *See—*
  - Ekin, John W.; Panson, Armand J.; and Blankenship, Betty A., 5,015,620, Cl. 505-1.000.
  - Fauske, Hans K.; and Clare, George H., 5,015,437, Cl 376-385.000.
  - Heymann, Frank J., 5,014,746, Cl. 137-625.300.
  - Koch, Karl C.; Oates, Robert M.; Peteronio, Carlo F.; and Einolf, Charles W., Jr., 5,015,949, Cl. 324-207.250.
  - Matthews, Gregory D.; and Asars, Juris A., 5,015,959, Cl. 324-557.000.
  - Obley, Alan L., 5,015,895, Cl. 310-71.000.
  - Ritz, William C.; and Burack, Robert D., 5,015,828, Cl. 219-523.000.
- Westland Helicopters Limited: *See—*
  - West, Christopher N., 5,014,544, Cl. 73-40.700.
- Westpnal, Klaus: *See—*
  - Dietrich, Peter; and Westphal, Klaus, 5,015,082, Cl. 350-514.000.
- Westphalen, Karl-Otto: *See—*
  - Rheinheimer, Joachim; Plath, Peter; Eicken, Karl; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,015,285, Cl. 71-92.000.
- Westwood, Keith T.; and Crescenzi, Allan, to Brewing Research Foundation, The. Production of isomerized hop extract. 5,015,491, Cl. 426-600.000.
- Whelen Technologies, Inc.: *See—*
  - Stopa, James L.; and Bibbiani, Stephen C., 5,016,139, Cl. 361-386.000.
- Whistler Corporation: *See—*
  - Turner, John H., Jr., 5,016,227, Cl. 367-3.000.
- White Consolidated Industries, Inc.: *See—*
  - Schiazza, Alfred; and Sepke, Arnold L., 5,014,388, Cl. 15-339.000.
- White, Kenneth W.: *See—*
  - Angell, Mickey A.; Cearley, Thomas W.; Lewis, James C.; St. Onge, Arthur R.; Szysh, John A.; and White, Kenneth W., 5,015,145, Cl. 414-547.000.
- White, Robert C., to Sundstrand Corporation. Printed circuit board guide apparatus for a limited access area. 5,016,142, Cl. 361-415.000.
- Whiteman, Aharon E.: *See—*
  - Shoher, Itzhak; and Whiteman, Aharon E., 5,014,532, Cl. 72-60.000.
- Whiting, Douglas L.; George, Glen A.; and Ivey, Glen E., to Stac, Inc. Data compression apparatus and method. 5,016,009, Cl. 341-67.000.
- Wible, John E.: *See—*
  - Valencic, Terence E.; and Wible, John E., 5,014,811, Cl. 180-286.000.
- Wick, John J., to Multi-Comp, Inc. Package assembly for dispensing pharmaceutical medications and method of manufacturing the same. 5,014,851, Cl. 206-539.000.
- Widmer, Erich: *See—*
  - Helmlinger, Daniel; Kienzle, Frank; and Widmer, Erich, 5,015,779, Cl. 568-346.000.
- Wiegand, Norbert: *See—*
  - Arntz, Dietrich; and Wiegand, Norbert, 5,015,789, Cl. 568-862.000.
- Wiggins, Kregg S.: *See—*
  - Wright, Danny O.; and Wiggins, Kregg S., 5,015,937, Cl. 318-696.000.

- Wiktorowicz, John E., to Applied Biosystems, Inc. Flow-rate-controlled surface-charge coating for capillary electrophoresis. 5,015,350, Cl. 204-180.100.
- Wild, Johann K.; and Egloffstein, Nicole, to PMC Patents Management & Consulting (Luxembourg) Holding S.A. Device for storing tennis balls. 5,014,848, Cl. 206-315.900.
- Wilen, Richard. Programmable rack and system for making same. 5,015,319, Cl. 156-227.000.
- Wilk, Peter J.: *See—*
  - Nakao, Naomi L.; and Wilk, Peter J., 5,015,249, Cl. 606-142.000.
- Wilkening, Donald W. High efficiency fireplace and method of operation. 5,014,683, Cl. 126-515.000.
- Wilkins, Stephen W., to Commonwealth Scientific and Industrial Research. Instrumentation for conditioning X-ray or neutron beams. 5,016,267, Cl. 378-84.000.
- Willard, G. F.: *See—*
  - Giles, Harold F., Jr.; Peters, Edward N.; Riding, Geoffrey H.; Thimons, Thomas V.; and Willard, G. F., 5,015,726, Cl. 528-349.000.
- Willems, Paul A.: *See—*
  - Walker, Robert H.; Willems, Paul A.; Huff, George A.; Grimes, Lewis E.; Tatterson, David F.; and Mehlberg, Robert L., 5,015,799, Cl. 585-500.000.
- Willey, Ronald A.: *See—*
  - Rumpf, Robert J.; Willey, Ronald A.; and Storck, Kevin, 5,014,926, Cl. 242-107.40A.
- Williams, Bertrand J.; and Treadway, Ronald L., to Advanced Micro Devices, Inc. Clock recovery phase lock loop having digitally range limited operating window. 5,015,970, Cl. 331-11.000.
- Williams, Gary R. Restraint stretcher. 5,014,374, Cl. 5-82.00R.
- Williams, Jeffrey L.: *See—*
  - Homeier, Ronald F.; Lortz, Allan R.; Clifton, William L., III; and Williams, Jeffrey L., 5,015,010, Cl. 280-808.000.
- Williams, John A.: *See—*
  - Zhong, William J. S.; and Williams, John A., 5,015,909, Cl. 313-105.00R.
- Williams, Michael S.: *See—*
  - Moss, Thomas H., III; Sargent, Ralph R.; and Williams, Michael S., 5,015,259, Cl. 8-115.600.
- Williams, Ronald D.: *See—*
  - Crow, William D.; and Williams, Ronald D., 5,015,894, Cl. 310-71.000.
- Williams, Stephen B.: *See—*
  - Moore, Kenneth P.; Ford, Brian R.; and Williams, Stephen B., 5,014,977, Cl. 271-221.000.
- Williams, William D.: *See—*
  - McLaughlin, Carol F.; Taylor, Ronald R.; Williams, William D.; and Steusloff, Patrick M., 5,014,875, Cl. 221-2.000.
- Williams, William G., to Copolymer Rubber & Chemical Corporation. Thermoplastic modifier compositions which imparts improved appearance and impact properties to molded thermoplastics. 5,015,690, Cl. 525-73.000.
- Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, to Hoechst Aktiengesellschaft. Alkyl- and alkenylsulfonylureas which are substituted in the heterocycle, and their use as herbicides or plant growth regulators. 5,015,284, Cl. 71-90.000.
- Willyard, James A.: *See—*
  - Morley, Darrel L.; Pierce, Wayne A.; and Willyard, James A., 5,014,893, Cl. 224-321.000.
- Wilson, Albert H.: *See—*
  - Welsh, David E.; and Wilson, Albert H., 5,015,192, Cl. 439-83.000.
- Wilson, Earl L. Automatic switching valve. 5,014,733, Cl. 137-113.000.
- Wilson, Jesse R.: *See—*
  - Giles, Grady L.; and Wilson, Jesse R., 5,015,875, Cl. 307-272.200.
- Wimpee, Lealon C.; Ross, Monty A.; O'Neil, Timothy J.; and Dean Chu, Edward M., to General Electric Company. Fixed in-core calibration devices for BWR flux monitors. 5,015,434, Cl. 376-254.000.
- Winchell, David A.; and Mitchell, Richard J., to Baxter International Inc. Systems having fixed and variable flow rate control mechanisms. 5,014,750, Cl. 138-43.000.
- Wing, Feagin A., Jr.: *See—*
  - Grosso, Paul V.; Morgan, Michael J.; Wing, Feagin A., Jr.; and Day, Roger W., 5,015,549, Cl. 430-45.000.
- Winkeler, Hans-Josef: *See—*
  - Bongardt, Wolfgang; Gowert, Helmut; Winkeler, Hans-Josef; and Schneiders, Josef, 5,016,099, Cl. 358-106.000.
- Winkle, Roger: *See—*
  - Pless, Benjamin; Sweeney, Michael; and Winkle, Roger, 5,014,697, Cl. 128-419.00D.
- Winkler, Rance A.: *See—*
  - Ogilvie, Rick A.; and Winkler, Rance A., 5,014,389, Cl. 15-353.000.
- Winner, Kurt. Window assembly. 5,014,466, Cl. 49-504.000.
- Winter, Thomas H.: *See—*
  - Clarke, Neville; and Winter, Thomas H., 5,014,789, Cl. 166-372.000.
- Winterrowd, Kenneth W.: *See—*
  - Lynde, Gerald D.; Winterrowd, Kenneth W.; and Harvey, Harold H., Jr., 5,014,778, Cl. 166-55.600.
- Winters, Deana. Underseat receptacle for purses and other possessions. 5,015,033, Cl. 297-192.000.
- Wisecup, David R.: *See—*
  - Goodwin, Brent E.; Karn, Donald L.; Mistvurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 5,015,324, Cl. 156-384.000.
- Wiseman, Timothy R., Sr., to Du Pont de Nemours, E. I., and Company. Coverall for protection against steam jets. 5,014,357, Cl. 2-81.000.
- Wisner, Craig A.: *See—*
  - LeGrand, Pierre N.; Ballard, James G.; Liegel, Reinald D.; and Wisner, Craig A., 5,014,442, Cl. 33-608.000.
- Wisniewski, James J., to Hubbell Incorporated. Digital telephone system circuits. 5,016,246, Cl. 370-76.000.
- Wistar Institute, The: *See—*
  - Tsujimoto, Yoshihide; and Croce, Carlo A., 5,015,568, Cl. 435-5.000.
- Witco Corporation: *See—*
  - Chisolm, Daniel R.; Weiss, Richard A.; and Rozov, Leonid, 5,015,777, Cl. 568-314.000.
- Wittig, Gary P.; and Burpee, Tom, to CCL Custom Manufacturing, Inc. Holding device for containers. 5,014,868, Cl. 220-85.00H.
- WOCO Franz-Josef Wolf & Co.: *See—*
  - Wolf, Franz J.; and Pletsch, Hubert, 5,014,967, Cl. 267-153.000.
- Wohlfarth, Paul D.; and Buchanan, Gregg L., to Pacific Hybrid Microelectronics, Inc.; and N.W. Silicon Specialists, Inc. Film resistor with enhanced trimming characteristics. 5,015,989, Cl. 338-195.000.
- Wolf, Franz J.; and Pletsch, Hubert, to WOCO Franz-Josef Wolf & Co. Spring element. 5,014,967, Cl. 267-153.000.
- Wolf, Michael; and Beier, Wolfgang, to Standard Elektrik Lorenz AG. Receiver for bandspread signals, particularly GPS receiver. 5,016,257, Cl. 375-1.000.
- Wolff, Erich, to Agfa Gevaert Aktiengesellschaft. Color photographic recording material. 5,015,565, Cl. 430-552.000.
- Wolff, George: *See—*
  - Filion, M. Edmund; Donatelli, Philip A.; and Wolff, George, 5,015,381, Cl. 210-490.000.
- Wolfram, Leszek J.: *See—*
  - Albrecht, Linda; and Wolfram, Leszek J., 5,015,263, Cl. 8-680.000.
- Wollesen, Donald L., to Advanced Micro Devices, Inc. Method of making a high performance MOS device having both P- and N-LDD regions using single photoresist mask. 5,015,595, Cl. 437-31.000.
- Wollweber, Detlef; and Brandes, Wilhelm, to Bayer Aktiengesellschaft. Substituted fluorocinnamonnitriles. 5,015,757, Cl. 558-401.000.
- Woltman, Robert B. Fish culture system. 5,014,647, Cl. 119-3.000.
- Wong, Pui K., to Shell Oil Company. Functionalized elastomeric polymer production. 5,015,695, Cl. 525-244.000.
- Wong, To-Fan, to Johnson Electric S.A. Terminal arrangement for an electric motor. 5,015,896, Cl. 310-71.000.
- Wood, Thomas G.; and Xenides, Carol J., to BASF K & F Corporation. Edible, baked compositions containing cholestyramine. 5,015,477, Cl. 424-439.000.
- Wood, Van E.: *See—*
  - Ridgway, Richard W.; Seiler, Milton R.; and Wood, Van E., 5,015,052, Cl. 350-96.130.
- Woodbury, Paul W.: *See—*
  - Epstein, David I.; Hummel, Mark D.; Hatalsky, Jeffrey F.; Newmark, Rona J.; Alicandro, Rosemarie; Bixby, Peter C.; Burn, Donald D.; Enberg, Eric H.; Marino, Paul K.; Woodbury, Paul W.; Pogue, Michael A.; Dempsey, Morgan J.; Shah, Shreyaunsh R.; and Waible, Leo C., III, 5,016,162, Cl. 364-200.000.
- Woodman, John K. Three dimensional integrated circuit package. 5,016,138, Cl. 361-381.000.
- Woodward, Keith, to Creative Crusade Limited. Board game apparatus. 5,014,995, Cl. 273-261.000.
- Wortham, Charles D. Plywood saw. 5,014,430, Cl. 30-166.300.
- Worwag, Peter, to Dupro AG. Suction nozzle, with a brush, for a vacuum cleaner. 5,014,386, Cl. 15-339.000.
- Wraige, Douglas: *See—*
  - Newbold, Geoffrey; Wraige, Douglas; and Wagner, John D., 5,015,513, Cl. 428-35.500.
- Wright, Conrad L.: *See—*
  - Chan, C. S.; Wright, Conrad L.; and Hanson, Gary E., 5,016,023, Cl. 346-1.100.
- Wright, Danny O.; and Wiggins, Kregg S., to Siemens-Bendix Automotive Electronics L.P. Parametric current control for microstepping unipolar motor. 5,015,937, Cl. 318-696.000.
- Wright, Edwina M.: *See—*
  - Yarranton, Geoffrey T.; Humphreys, Gwynfor O.; Robinson, Martin K.; Caulcott, Celia A.; and Wright, Edwina M., 5,015,573, Cl. 435-69.100.
- Wright, John N.: *See—*
  - Maslak, Samuel H.; Burch, Donald J.; Wright, John N.; Larsen, Hugh G.; Langdon, Donald R.; Chaffin, Joel S.; and Fash, D. Grant, III, 5,014,710, Cl. 128-660.050.
- Wright, John O., to GTE Products Corporation. Method of forming a two piece chip carrier. 5,014,418, Cl. 29-827.000.
- Wright, William B., II; and Sauberli, Dean D., to St. Luke's Episcopal Hospital. Ceiling-mounted gas delivering unit for use in a catheter laboratory. 5,014,693, Cl. 128-204.180.
- Wu, Wen-Yin. Extensible car lock. 5,014,529, Cl. 70-209.000.
- Wu, Xin D.: *See—*
  - Venkatesan, Thirumalai; and Wu, Xin D., 5,015,492, Cl. 427-8.000.
- Wuerzer, Bruno: *See—*
  - Rheinheimer, Joachim; Plath, Peter; Eicken, Karl; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,015,285, Cl. 71-92.000.
  - Schirmer, Ulrich; Rohr, Wolfgang; and Wuerzer, Bruno, 5,015,762, Cl. 560-313.000.
- Wuhrl, Arno: *See—*
  - Zingher, Oded; Wuhrl, Arno; Behrendt, Ullrich; Schafer, Ralf; and Ziesing, Gunter, 5,014,618, Cl. 101-365.000.
- Wulff, Claus: *See—*
  - Rudolph, Udo; and Wulff, Claus, 5,015,784, Cl. 568-722.000.
- Wunsch, Erich. Spray container 5,014,884, Cl. 222-333.000.

VOL 1126
ISS 2
MY 14 1991
UMI

Wupper, Hans: *See—*

Kircher, Dieter; Volz, Peter; and Wupper, Hans, 5,015,044, Cl. 303-114.000.

Wurst, Stephen G.; and Matsunaga, Kaori E., to Rockwell International Corporation. Aircraft vision augmentation system with adjustable external mirror and cockpit mirror. 5,015,083, Cl. 350-618.000.

Wuthrich, Hans R., to Sprecher Energie AG. Vacuum switch arrangement. 5,015,809, Cl. 200-144.00R.

Wynn, Marion W.: *See—*

Jones, Ronald L.; and Wynn, Marion W., 5,015,643, Cl. 514-241.000.

Wynn Oil Company: *See—*

Baylor, James L.; Tsao, Tsu-Pow G.; and Camacho, Michael J., 5,015,301, Cl. 134-22.100.

Wyson, Daniel; and Hendrickson, Travis L. Trash dumpster lock with gravity operated release. 5,015,021, Cl. 292-230.000.

Wyss, John R. Automatic secured document meter reading apparatus. 5,016,025, Cl. 346-14.0MR.

X-Rite, Incorporated: *See—*

Berg, Bernard J.; Bowden, David R.; Cargill, Mark A.; and Given, William R., 5,015,098, Cl. 356-402.000.

Xenides, Carol J.: *See—*

Wood, Thomas G.; and Xenides, Carol J., 5,015,477, Cl. 424-439.000.

Xerox Corporation: *See—*

Connolly, Douglas P.; Rickett, Barry G.; Yax, Robert J.; and Swanson, Roger M., 5,016,171, Cl. 364-406.000.

Creatura, John A.; and Hsu, George R., 5,015,550, Cl. 430-108.000.

McIntyre, Harry J., 5,015,966, Cl. 330-253.000.

Moore, Kenneth P.; Ford, Brian R.; and Williams, Stephen B., 5,014,977, Cl. 271-221.000.

Muck, Dennis N.; Ankrom, Dennis M.; and Brown, George B., 5,014,976, Cl. 271-220.000.

Pietrowski, Kenneth W.; and Radulski, Charles A., 5,016,055, Cl. 355-273.000.

Roehrs, Daniel C.; Caruso, Angelo T.; Grace, Robert E.; Mara, Robert M.; Elliot, John G.; Saraceno, Patricia J.; and Pacer, James M., 5,016,050, Cl. 355-208.000.

Xomed, Inc.: *See—*

Hough, Jack V. D.; Dormer, Kenneth J.; Barton, Kenneth E., Jr.; and Chow, Robert Y., 5,015,225, Cl. 600-25.000.

XPC, Incorporated: *See—*

Howard, Thomas A.; and McGee, Donovan E., 5,014,420, Cl. 29-846.000.

Yabe, Hiroshi: *See—*

Kawaguchi, Takashi; Yabe, Hiroshi; Maruyama, Akihiko; and Kubo, Hiroyuki, 5,016,231, Cl. 368-80.000.

Suzuki, Akimitsu; Igari, Kozaburo; and Yabe, Hiroshi, 5,014,834, Cl. 192-48.300.

Yagi, Kazuo; and Takeda, Hiroyuki, to Mitsui Petrochemical Industries Ltd. Polyolefin fiber having improved initial elongation and process for preparation thereof. 5,015,525, Cl. 428-364.000.

Yamabe, Hidetoshi: *See—*

Moriizumi, Shuichi; Masuhara, Kenichi; Yamabe, Hidetoshi; Tomosue, Takao; Mori, Kouji; and Kaneko, Hisaharu, 5,015,531, Cl. 428-463.000.

Yamada, Katsuhiko; and Egusa, Norio, to Sumitomo Electric Industries, Ltd. Steel melting and secondary-refining method. 5,015,287, Cl. 75-10.170.

Yamada, Katsuyoshi; and Arai, Tsutomu, to Mitsubishi Denki Kabushiki Kaisha; and Mitsubishi Electric Home Appliance Co., Ltd. Power feeding port arrangement for a microwave heating apparatus. 5,015,813, Cl. 219-10.55F.

Yamada, Kazuo: *See—*

Katori, Mutsuhiko; and Yamada, Kazuo, 5,014,397, Cl. 19-231.000.

Yamada, Masahiro, to Du Pont de Nemours, E. I., and Company. Low insertion force connector and electrical contact therefor. 5,015,196, Cl. 439-326.000.

Yamada, Masahiro, to Ricoh Company, Ltd. Area filling device. 5,016,189, Cl. 364-518.000.

Yamada, Sumito: *See—*

Toya, Ichizo; Yamada, Sumito; and Suematsu, Koichi, 5,015,562, Cl. 430-518.000.

Yamada, Syoichi: *See—*

Ikeda, Shiro; Yamada, Syoichi; Kawachi, Satoshi; and Ishizaka, Masakatsu, 5,014,631, Cl. 110-264.000.

Yamada, Yoshihiro: *See—*

Hirao, Sumio; Matsunaga, Masaji; and Yamada, Yoshihiro, 5,014,604, Cl. 92-212.000.

Yamagata, Hiroshi, to Masumoto, Tsuyoshi; and Yoshida Kogyo K.K., a part interest. Corrosion-resistant and heat-resistant amorphous aluminum-based alloy thin film and process for producing the same. 5,015,308, Cl. 148-403.000.

Yamagata, Tadato, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device with logic level responsive testing circuit and method therefor. 5,016,220, Cl. 365-201.000.

Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Color sensor having laminated semiconductor layers. 5,015,838, Cl. 250-211.00J.

Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Takahira, Kenichi; Fujioka, Shuzo; and Matsubara, Toshiyuki, to Mitsubishi Denki Kabushiki Kaisha. IC card having system ROM selection inhibit 5,016,212, Cl. 364-900.000.

Yamaguchi, Hiroshi, to Nissan Motor Co., Ltd. Line pressure control during downshift. 5,014,576, Cl. 74-866.000.

Yamaguchi, Katsuhiro: *See—*

Takada, Toshiaki; Kinugawa, Tadami; Yamaguchi, Katsuhiro; Tanabe, Kou; and Nakano, Hiroyuki, 5,015,670, Cl. 523-214.000.

Yamaguchi, Kazuo; Kurosawa, Yoshi; Sato, Seiichi; Ueda, Atsushi; and Matsumura, Masami, to Optec D.D. Melco Laboratory Co., Ltd.; Optec Dai-Ichi Denko Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Photointerruptor for use in light-transmission type rotary encoder. 5,015,056, Cl. 350-96.150.

Yamaguchi, Keiji, to Terumo Kabushiki Kaisha. Method and apparatus for measuring temperature of a living body. 5,015,102, Cl. 374-107.000.

Yamaguchi, Kimiaki: *See—*

Kasai, Isao; Yamaguchi, Kimiaki; Sakai, Shinichi; Murakami, Susumu; Isono, Tatsuji; and Hatagawa, Toyotsugu, 5,015,812, Cl. 219-10.55B.

Yamaguchi, Kouji: *See—*

Sasajima, Koji; Maki, Kazuya; and Yamaguchi, Kouji, 5,014,574, Cl. 74-866.000.

Yamaguchi, Michihiro: *See—*

Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, 5,015,469, Cl. 424-59.000.

Yamaguchi, Minori: *See—*

Yamagishi, Hideo; Hiroe, Akihiko; Nishio, Hitoshi; Murakami, Satoru; Miki, Keiko; Yamaguchi, Minori; Mizukami, Seishiro; and Tawada, Yoshihisa, 5,015,838, Cl. 250-211.00J.

Yamaguchi, Takamasa; and Nogami, Ikuo, to Takeda Chemical Industries, Ltd. Production of (−)trans-2,3-epoxysuccinic acid by fermentation. 5,015,579, Cl. 435-123.000.

Yamaguchi, Takao: *See—*

Hamada, Hiroki; Honda, Shoji; Shono, Masayuki; and Yamaguchi, Takao, 5,016,252, Cl. 372-45.000.

Yamaguchi, Toru: *See—*

Yoshimura, Shohei; Kuwabara, Hideki; and Yamaguchi, Toru, 5,015,667, Cl. 521-58.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See—*

Taue, Jun; and Maeda, Osamu, 5,014,671, Cl. 123-447.000.

Yamaki Sangyo Co., Ltd.: *See—*

Gotoh, Isamu, 5,015,134, Cl. 411-386.000.

Yamamoto, Fumihiko; and Misumi, Teruyuki, to Asahi Kasei Kogyo Kabushiki Kaisha. Preparation of poly-β-alanine from acrylamide. 5,015,707, Cl. 526-212.000.

Yamamoto, Motokazu. Abrasive sheet and method for manufacturing the abrasive sheet. 5,015,266, Cl. 51-293.000.

Yamamoto, Noriyuki: *See—*

Mizushima, Yutaka; Hoshi, Keiko; Igarashi, Rie; Ajioka, Hirofusa; Yamamoto, Noriyuki; Komuro, Masahito; Kanehira, Koichi; Inoue, Masayuki; Nishida, Takashi; Shiono, Manzo; Terasawa, Michio; and Arizono, Kenzo, 5,015,746, Cl. 552-569.000.

Yamamoto, Takemi; and Sasaki, Ichiro, to Brother Kogyo Kabushiki Kaisha. Apparatus for recording color image using mask members. 5,016,042, Cl. 355-27.000.

Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for coating automotive body. 5,014,644, Cl. 118-314.000.

Yamamoto, Toshiteru: *See—*

Horiike, Satoru; Nakano, Yasuhiko; Okano, Shigetarou; Kimura, Shigeru; Matsuzaki, Masanobu; Yamamoto, Toshiteru; Ooki, Kenji; Hamano, Eiji; and Kubo, Mikio, 5,014,807, Cl. 180-219.000.

Yamamura, Yasuharu: *See—*

Sekido, Satoshi; Tachibana, Hirokazu; and Yamamura, Yasuharu, 5,015,616, Cl. 502-303.000.

Yamana, Shinji; Nakamura, Mikio; and Tsuzuki, Akihiro, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Jig pallet for an automatic assembly device. 5,014,405, Cl. 29-33.00R.

Yamanaka, Shizuo. Multiangular pen. 5,015,113, Cl. 401-224.000.

Yamanaka, Toshihiro: *See—*

Horie, Nobuyuki; Nishioka, Yoshiki; Yamanaka, Toshihiro; and Yuki, Yoshio, 5,016,126, Cl. 360-78.070.

Yamano, Shigemi: *See—*

Noguchi, Minetoshi; and Yamano, Shigemi, 5,016,133, Cl. 361-92.000.

Yamashita, Masayasu; Suzuki, Masami; Yoshio, Junichi; and Watanabe, Osamu, to Pioneer Electronic Corporation. Apparatus for reproducing and processing picture information including graphic codes from a recording medium. 5,016,113, Cl. 358-335.000.

Yamashita, Yasuo, to Kyushu Hitachi Maxell, Ltd. Rotary type electric razor. 5,014,428, Cl. 30-43.600.

Yamatake-Honeywell Co., Ltd.: *See—*

Kamiunten, Shoji; Aoshima, Shigeru; Tsumura, Takashi; Ochiai, Kouichi; and Inaba, Takashi, 5,014,552, Cl. 73-204.210.

Yamauchi, Hirohiko: *See—*

Azuma, Makoto; Takahashi, Jun; Yamauchi, Hirohiko; and Ueda, Nobuo, 5,015,462, Cl. 424-1.100.

Yamazaki, Akihiro; and Kiyohara, Katsuya, to Kabushiki Kaisha Toshiba. Nonvolatile memory with data write circuitry to reduce write errors. 5,016,218, Cl. 365-189.090.

Yamazaki, Fumio: *See—*

Suekane, Ariko; Yamazaki, Fumio; and Masuda, Takayoshi, 5,015,774, Cl. 564-475.000.

Yamazaki, Kyuya: *See—*

Yamamoto, Toru; Shiga, Daizo; Chujyo, Kenichi; Kikuchi, Eiji; Enomoto, Masayuki; Syoji, Masaaki; Ichinose, Kiyohiro; and Yamazaki, Kyuya, 5,014,644, Cl. 118-314.000.

Yamazaki, Masanobu: *See—*

Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Yamazaki, Masanobu; Toyoda, Manabu; and Ushijima, Makoto, 5,016,129, Cl. 360-103.000.

Yamazaki, Noriyuki: *See—*

Inoue, Yasuo; Takeda, Haruo; Sato, Keiji; Yamazaki, Noriyuki; and Iida, Osamu, 5,016,127, Cl. 360-94.000.

Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Microwave enhanced CVD method for depositing diamond. 5,015,494, Cl. 427-39.000.

Yanagawa, Yutaka: *See—*

Hayashi, Masaaki; Ishihara, Koichiro; Ohshima, Yutaka; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Inaba, Makoto; Hashiguchi, Toshihiko; Hibino, Hiroki; and Sasa, Hiroyuki, 5,014,708, Cl. 128-653.00R.

Yang, Tai-Her. Universal series motor with speed limiting circuit to protect the motor from overspeeding during relatively-small loads. 5,015,928, Cl. 318-250.000.

Yano, Mitsuru; and Yasuda, Hisashi, to Hitachi Metals, Ltd. Polyurethane foam model and method of measuring stress distribution by using such model. 5,014,558, Cl. 73-804.000.

Yarranton, Geoffrey T.; Humphreys, Gwynfor O.; Robinson, Martin K.; Caulcott, Celia A.; and Wright, Edwina M., to Celltech Limited. DNA vectors and their use in recombinant DNA technology. 5,015,573, Cl. 435-69.100.

Yassa, Fathy F.: *See—*

Hartley, Richard I.; Corbett, Peter F.; and Yassa, Fathy F., 5,016,011, Cl. 341-95.000.

Yasuda, Hisashi: *See—*

Yano, Mitsuru; and Yasuda, Hisashi, 5,014,558, Cl. 73-804.000.

Yasufuki, Shoji: *See—*

Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 5,015,636, Cl. 514-210.000.

Yasumura, Gary: *See—*

Krumme, John F.; Perry, Michael; Yasumura, Gary; and Selvin, Gerald J., 5,015,193, Cl. 439-161.000.

Yasuo, Takashi, to Inax Corporation. Television receiver. 5,014,909, Cl. 236-44.00R.

Yates, Ronald L.: *See—*

Strandjord, Andrew J.; Yates, Ronald L.; and Perettie, Donald J., 5,016,240, Cl. 369-288.000.

Yato, Tadao; Onoue, Takeshi; and Tanaka, Hiroshi, to Mitsubishi Kinzoku Kabushiki Kaisha. $UO_2$ pellet fabrication process. 5,015,422, Cl. 264-0.500.

Yawata, Shigeo; Shibao, Kazuhisa; and Hiraki, Shun-ichi, to Kabushiki Kaisha Toshiba. Method of manufacturing semiconductor device. 5,015,593, Cl. 437-25.000.

Yax, Robert J.: *See—*

Connolly, Douglas P.; Rickett, Barry G.; Yax, Robert J.; and Swanson, Roger M., 5,016,171, Cl. 364-406.000.

Yazaki Corporation: *See—*

Hirano, Seiji; Sakaguchi, Masaharu; Kawanishi, Satoru; and Ohmura, Tomoyuki, 5,015,199, Cl. 439-353.000.

Yee, Dan: *See—*

Puri, Rajen; Yee, Dan; Buxton, Thomas S.; and Majahan, Om, 5,014,788, Cl. 166-308.000.

Yeh, Chia-Luan; and Chen, Ting-Kuo. Flexible assembling partition means. 5,014,479, Cl. 52-308.000.

Yen, Ting P.: *See—*

Lim, Sheldon C. P.; Hellstrom, Julie W.; and Yen, Ting P., 5,015,604, Cl. 437-195.000.

Yim, Hyung-Kyu: *See—*

Choi, Jung-Dal; Yim, Hyung-Kyu; Do, Jae-Young; and Kim, Jin-Ki, 5,015,886, Cl. 307-465.000.

Yodice, Richard; and Clark, Alan C., to Lubrizol Corporation, The. Basic metal dihydrocarbylphosphorodithioates. 5,015,402, Cl. 252-32.70E.

Yokohama Rubber Co., Ltd.: *See—*

Wakabayashi, Masashi; and Kuroda, Masuo, 5,014,751, Cl. 138-127.000.

Yokoo, Kiyotaka; Hitachi, Hideki; and Ikeda, Matsujiro, to NEC Corporation. Electromagnetic relay. 5,015,978, Cl. 335-78.000.

Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; and Kugimiya, Kouichi, to Matsushita Electric Industrial Co., Ltd. Multi-layer ceramic capacitor. 5,016,137, Cl. 361-321.000.

Yokoya, Hiroaki: *See—*

Tachikawa, Hiromichi; Yokoya, Hiroaki; Suzuki, Nobuo; and Watarai, Syu, 5,015,551, Cl. 430-114.000.

Yokoyama, Hiromitsu: *See—*

Suzuki, Hitoshi; Yokoyama, Hiromitsu; Tsukada, Mineharu; Ogawa, Hiromi; Kamehara, Nobuo; and Niwa, Koichi, 5,015,314, Cl. 156-89.000.

Yokoyama, Nobuo: *See—*

Kubo, Junichi; Yokoyama, Nobuo; and Kinoshita, Hirotugu, 5,015,404, Cl. 252-49.600.

Yokoyama, Seiichiro: *See—*

Eida, Mitsuru; Hiroi, Yoshio; and Yokoyama, Seiichiro, 5,015.748, Cl. 556-144.000.

Yonetani, Daijirou: *See—*

Kimoto, Takayuki; Sunohara, Masaaki; Inoue, Takashi; Nakamura, Shoji; and Yonetani, Daijirou, 5,015,280, Cl. 65-307.000.

Yoneyama, Toshio; Yamaguchi, Michihiro; Tobe, Shinji; Nanba, Tomiyuki; Ishiwatari, Masaaki; Toyoda, Hidekazu; Nakamura, Shin; Kumano, Yoshimaru; Takata, Sadaki; and Ito, Hiromi, to Shideido Company Ltd. Water-in-oil emulsion type cosmetics. 5,015,469, Cl. 424-59.000.

Yong-Je, Kim; Choi, Hoon-Sun; and Sim, Dae-Yoon, to SamSung Electronics Co., Ltd. Image signal processing circuit for producing multiple pictures on a common display screen. 5,016,106, Cl. 358-183.000.

Yorimoto, Yoshikazu: *See—*

Suzuki, Tadato; Yorimoto, Yoshikazu; Matsumura, Hidekazu; and Hirano, Seiji, 5,015,834, Cl. 235-493.000.

York, Brian K., to Mead Corporation, The. Binder with observation window. 5,015,011, Cl. 281-18.000.

Yoshida, Keiji: *See—*

Onishi, Takashi; Hanamoto, Hiroyuki; Miyamoto, Hirohisa; and Yoshida, Keiji, 5,016,049, Cl. 355-203.000.

Yoshida Kogyo K.K.: *See—*

Hashimoto, Koji; Yoshioka, Hideaki; Asami, Katsuhiko; and Kawashima, Asahi, 5,015,352, Cl. 204-192.150.

Ishikawa, Masayoshi; and Takemura, Masami, 5,014,465, Cl. 49-482.000.

Ito, Kazuyoshi, 5,014,895, Cl. 227-8.000.

Yamagata, Hiroshi, 5,015,308, Cl. 148-403.000.

Yoshida, Kunio: *See—*

Aoyama, Shunzo; Yoshida, Kunio; Doi, Hachiro; and Sakamoto, Katsumi, 5,014,765, Cl. 164-72.000.

Yoshida, Masanobu, to Sony Corporation. Video camera system with white balance adjustment. 5,016,093, Cl. 358-41.000.

Yoshida, Tsuyoshi: *See—*

Kuwana, Kazutaka; Yoshida, Tsuyoshi; Tozu, Kenji; and Sakane, Shinsuke, 5,015,041, Cl. 303-95.000.

Kuwana, Kazutaka; Yoshida, Tsuyoshi; and Sakane, Shinsuke, 5,016,178, Cl. 364-426.020.

Yoshie, Kenichi: *See—*

Takahashi, Nobumitsu; and Yoshie, Kenichi, 5,015,282, Cl. 71-65.000.

Yoshihara, Toru: *See—*

Tamura, Tadashi; Kiyomine, Akira; Nishizawa, Yoshinori; Tagami, Hidetoshi; Yoshihara, Toru; and Kawase, Jiro, 5,015,260, Cl. 8-408.000.

Yoshikawa, Kuniyoshi, to Kabushiki Kaisha Toshiba. Method of manufacturing a nonvolatile semiconductor device. 5,015,601, Cl. 437-67.000.

Yoshimura, Shohei; Kuwabara, Hideki; and Yamaguchi, Toru, to Japan Styrene Paper Corporation. Pre-foamed beads of polyethylene base resin. 5,015,667, Cl. 521-58.000.

Yoshimura, Tsuyoshi: *See—*

Sakata, Seiji; Harada, Tamotsu; Ito, Norifumi; Hayashi, Masayuki; Yoshimura, Tsuyoshi; and Koinuma, Nobuyuki, 5,016,114, Cl. 358-404.000.

Yoshino, Eiichi: *See—*

Tsukada, Shinichi; Shinomiya, Tsutomu; Yoshino, Eiichi; Yoshioka, Shigeki; and Fujikawa, Makoto, 5,014,491, Cl. 53-366.000.

Yoshino, Masato, to Sumitomo Electric Industries, Ltd. Antilock control device. 5,015,042, Cl. 303-96.000.

Yoshio, Junichi: *See—*

Yamashita, Masayasu; Suzuki, Masami; Yoshio, Junichi; and Watanabe, Osamu, 5,016,113, Cl. 358-335.000.

Yoshioka, Hideaki: *See—*

Hashimoto, Koji; Yoshioka, Hideaki; Asami, Katsuhiko; and Kawashima, Asahi, 5,015,352, Cl. 204-192.150.

Yoshioka, Shigeki: *See—*

Tsukada, Shinichi; Shinomiya, Tsutomu; Yoshino, Eiichi; Yoshioka, Shigeki; and Fujikawa, Makoto, 5,014,491, Cl. 53-366.000.

Yoshitake, Yasuhiro: *See—*

Tanaka, Minoru; Oshida, Yoshitada; Yoshitake, Yasuhiro; and Tanimoto, Tetsuzo, 5,016,149, Cl. 362-259.000.

Yoshitami Pharmaceutical Industries, Ltd.: *See—*

Hidaka, Yasuhiro; Sato, Toshio; and Takahashi, Masanobu, 5,015,660, Cl. 514-441.000.

Young, Alfred; and Church, Fred E., to Design Tool, Inc. Fastener feed assembly. 5,014,876, Cl. 221-233.000.

Young, Ian R., to Picker International, Ltd. Magnetic resonance methods. 5,015,955, Cl. 324-309.000.

Yu, Kin T.: *See—*

Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 5,015,663, Cl. 514-510.000.

Yu, Michael C.: *See—*

Kallenbach, Lyle R.; and Yu, Michael C., 5,015,686, Cl. 524-413.000.

Yugen Kaisha Chubuseimitsu: *See—*

Shiozawa, Shinichi, 5,015,893, Cl. 310-67.00R.

Yuki, Yoshio: *See—*

Horie, Nobuyuki; Nishioka, Yoshiki; Yamanaka, Toshihiro; and Yuki, Yoshio, 5,016,126, Cl. 360-78.070.

Yumoto, Tetsuo, to Sankyo Kasei Kabushiki Kaisha. Molded article with partial metal plating and a process for producing such article. 5,015,519, Cl. 428-209.000.

Zabinsky, Joseph M.: *See—*

Harm, Dorson J.; and Zabinsky, Joseph M., 5,014,933, Cl 244-53.00B.

VOL
1126
ISS
2
MY
14
1991
UMI

Zador, Eugene: *See—*

Ravipati, Sitaramaiah; Zador, Eugene; Kaczmarek, Wesley R.; Coleman, Ernest A.; and Rostoker, David, 5,014,468, Cl. 51-295.000.

Zapke, Klaus; and Loffler, Johannes, to Metallgesellschaft Aktiengesellschaft. Shut-off device. 5,014,744, Cl. 137-614.210.

Zdeblick, Mark J.; and Albrecht, Thomas R., to Leland Stanford Junior University, The Board of Trustees of the. Microfabricated microscope assembly. 5,015,850, Cl. 250-306.000.

Zeller, Norbert: *See—*

Frey, Volker; Pachaly, Bernd; and Zeller, Norbert, 5,015,605, Cl. 501-12.000.

Zeman, Robert E.: *See—*

Johnson, Kevin M.; and Zeman, Robert E., 5,016,056, Cl. 355-279.000.

Zeman, William J., to Sherex Chemical Company, Inc. Alkaline tolerant sulfobetaine amphoteric surfactants. 5,015,412, Cl. 252-311.000.

Zenith Electronics Corporation: *See—*

Citta, Richard W.; and Mutzabaugh, Dennis M., 5,016,100, Cl. 358-133.000.

Kautz, Allan D., 5,015,818, Cl. 219-121.630.

Rabii, Khosro M., 5,016,103, Cl. 358-166.000.

Zexel Corporation: *See—*

Satoh, Yuji; Kono, Hiromi; Soda, Hiroyuki; and Otsuka, Masuhiro, 5,014,832, Cl. 192-30.00W.

Zhang, Zongchao: *See—*

Suib, Steven L.; and Zhang, Zongchao, 5,015,349, Cl. 204-168.000.

Zheng, Baohua: *See—*

Engebretson, A. Maynard; O'Connell, Michael P.; and Zheng, Baohua, 5,016,280, Cl. 381-68.000.

Zhong, William J. S.; and Williams, John A., to Circon Corporation. Glass composition and method for manufacturing a high performance microchannel plate. 5,015,909, Cl. 313-105.00R.

Ziesing, Gunter: *See—*

Zingher, Oded; Wuhrl, Arno; Behrendt, Ullrich; Schafer, Ralf; and Ziesing, Gunter, 5,014,618, Cl. 101-365.000.

Zimmer, Inc.: *See—*

Crowninshield, Roy D.; Hori, Roy Y.; and Fallin, Thomas W., 5,015,257, Cl. 623-22.000.

Zimmermann, Martin: *See—*

Matuschek, Ulrich; and Zimmermann, Martin, 5,015,815, Cl. 219-110.000.

Zincone, Robert: *See—*

Fradenburgh, Evan A.; and Zincone, Robert, 5,015,842, Cl. 250-227.150.

Zingher, Oded; Wuhrl, Arno; Behrendt, Ullrich; Schafer, Ralf; and Ziesing, Gunter, to MAN Roland Druckmaschinen AG. Sensor based inking control for a printing press. 5,014,618, Cl. 101-365.000.

Zinn, Ben T.; Daniel, Brady R.; and Rabhan, Andrew B., to Sonotech, Inc. Tunable pulse combustor. 5,015,171, Cl. 431-1.000.

Zip-Pak, Incorporated: *See—*

Boeckmann, Hugo, 5,014,499, Cl. 53-451.000.

Boeckmann, Hugo, 5,015,223, Cl. 493-194.000.

McMahon, Michael J., 5,014,497, Cl. 53-451.000.

Zojirushi Vacuum Bottle Co., Ltd.: *See—*

Takenakajima, Takefumi; Nishimura, Kazuo; Fujiyama, Mamoru; and Fukushima, Toshihiro, 5,014,752, Cl. 138-149.000.

ZSI, Inc.: *See—*

Sherman, Clarence A., 5,014,940, Cl. 248-74.100.

Zucker, Friedhelm: *See—*

Morimoto, Yasuaki; Schroder, Heinz J.; and Zucker, Friedhelm, 5,016,233, Cl. 369-44.130.

Zumbrunnen, Michael L.: *See—*

Galyon, George T.; Jordhamo, George M.; Moran, Kevin P.; and Zumbrunnen, Michael L., 5,016,090, Cl. 357-82.000.

Zurfluh, Rene , to Ciba-Geigy Corporation. 5,7-dihydro-6H dibenz[-c,e]azepine-6-(thio)carboximidic acid esters and pesticidal use thereof. 5,015,640, Cl. 514-217.000.

Zweig, John E.; Kehn, John P.; and Glennon, Michael J., to United States of America, Army. Multi-lug breech mechanism. 5,014,592, Cl. 89-24.000.

Zylstra, Henry J., to Square D Company. Power supply incorporating circuit breaker and fault detection circuit. 5,016,135, Cl. 361-156.000.

3D Systems, Inc.: *See—*

Smalley, Dennis R., 5,015,424, Cl. 264-22.000.

# LIST OF REISSUE PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 14TH DAY OF MAY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Farrall, George A.: *See—*

Harnden, John D., Jr.; Kornrumpf, William P.; and Farrall, George A., Re. 33,587, Cl. 29-25.350.

General Electric Company: *See—*

Harnden, John D., Jr.; Kornrumpf, William P.; and Farrall, George A., Re. 33,587, Cl. 29-25.350.

Graff, Paul, to NFA Corp. Elastic with embedded pull cord. Re. 33,586, Cl. 2-221.000.

Harnden, John D., Jr.; Kornrumpf, William P.; and Farrall, George A., to General Electric Company. Method for (prepolarizing and centering) operating a piezoceramic power switching device. Re. 33,587, Cl. 29-25.350.

Kornrumpf, William P.: *See—*

Harnden, John D., Jr.; Kornrumpf, William P.; and Farrall, George A., Re. 33,587, Cl. 29-25.350.

Lednicer, David A.; and Owen, Stephen J., to United Technologies Corporation. Helicopter blade airfoil. Re. 33,589, Cl. 416-223.00R.

NFA Corp.: *See—*

Graff, Paul, Re. 33,586, Cl. 2-221.000.

Owen, Stephen J.: *See—*

Lednicer, David A.; and Owen, Stephen J., Re. 33,589, Cl. 416-223.00R.

Steinhilber, Helmut. Desk with an additional lectern. Re. 33,588, Cl. 312-196.000.

United Technologies Corporation: *See—*

Lednicer, David A.; and Owen, Stephen J., Re. 33,589, Cl. 416-223.00R.

---

# LIST OF REEXAMINATION PATENTEES

TO WHOM

## CERTIFICATES WERE ISSUED

Daar, Yair; and Yahav, Shimon, to Improver Corporation. Apparatus for hair removal. B1 4,524,772, 5-14-91, Cl. 606-133.000.

Fine, Harvey A., to Weldotron Corporation. Integrated stretch-wrap packaging system. B1 4,458,470, 5-14-91, Cl. 53-502.000.

Improver Corporation: *See—*

Daar, Yair; and Yahav, Shimon, B1 4,524,772, Cl. 606-133.000.

Linear Technology Corporation: *See—*

Nelson, Carl T., B1 4,755,741, Cl. 323-289.000.

Nelson, Carl T., to Linear Technology Corporation. Adaptive transistor drive circuit. B1 4,755,741, 5-14-91, Cl. 323-289.000.

Weldotron Corporation: *See—*

Fine, Harvey A., B1 4,458,470, Cl. 53-502.000.

Yahav, Shimon: *See—*

Daar, Yair; and Yahav, Shimon, B1 4,524,772, Cl. 606-133.000.

---

# LIST OF DESIGN PATENTEES

Abrams, Robert C.: *See—*

Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.

Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.

Amemiya, Hideto; and Suzuki, Takashi, to Nittan Company, Limited. Fire detector. 316,828, 5-14-91, Cl. D10-106.000.

American Home Products Corporation: *See—*

Motola, Solomon; Aveson, Martha C.; Kenny, Richard; and Wilkinson, Robert J., 316,913, Cl. D28-2.000.

Ancona, Bruce: *See—*

Ancona, Jane; and Ancona, Bruce, 316,797, Cl. D7-322.000.

Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Tea kettle. 316,797, 5-14-91, Cl. D7-322.000.

Andersson, Ake B.; and Wellenstam, Kjell I., to Astra Meditec AB. Two-chamber injector. 316,899, 5-14-91, Cl. D24-24.000.

Ansai, Russell: *See—*

Wong, Allen; and Ansai, Russell, 316,859, Cl. D14-148.000.

Apple Computer, Inc.: *See—*

Esslinger, Hartmut H.; Gruenberg, Eric I.; and Stewart, James R., 316,851, Cl. D14-106.000.

Armstrong, Eric J.; and Latone, Thomas L., to Du Pont de Nemours, E. I., and Company. Air pump. 316,865, 5-14-91, Cl. D15-7.000.

Arnold Kock GmbH u. Co. KG: *See—*

Cerny, Rudolf, 316,783, Cl. D5-37.000.

Array Technology Corporation: *See—*

Gordon, David W.; Samson, Jeff; and Conner, Warren, 316,850, Cl. D14-102.000.

Arrow Specialty Company: *See—*

Davis, Thomas L.; and Harper, Roy A., Jr., 316,864, Cl. D15-5.000.

Asano, Shinichi, to Car Mate Mfg. Co., Ltd. Vehicle gauge. 316,827, 5-14-91, Cl. D10-102.000.

Astra Meditec AB: *See—*

Andersson, Ake B.; and Wellenstam, Kjell I., 316,899, Cl. D24-24.000.

Atkinson, Paul; and Stuart, Robert, to GTE Rotaflex Limited. Adjustable spotlight. 316,908, 5-14-91, Cl. D26-63.000.

Atkinson Paul; and Stuart, Robert, to GTE Rotaflex Limited. Adjustable spotlight. 316,909, 5-14-91, Cl. D26-63.000.

Aveson, Martha C.: *See—*

Motola, Solomon; Aveson, Martha C.; Kenny, Richard; and Wilkinson, Robert J., 316,913, Cl. D28-2.000.

Bang & Olufsen: *See—*

Michaelsen, Jorgen, 316,905, Cl. D25-138.000.

Barbaglia, Mario; and Colombo, Marco, to Paf S.r.l. Adjustable lamp. 316,907, 5-14-91, Cl. D26-62.000

Barrault, Jean-Louis, to Moulinex (Societe Anonyme). Accessory for a kitchen appliance for pureeing and juicing. 316,799, 5-14-91, Cl. D7-412.000.

Barros, Gilmar. Bicycle water guard. 316,840, 5-14-91, Cl. D12-126.000.

Barry, Robert V.: *See—*

Momot, David; Barry, Robert V.; and Townsend, Ensley E., 316,875, Cl. D20-20.000.

Beane, Roy T. Combined chair and safe unit. 316,785, 5-14-91, Cl. D6-336.000.

Becker, Otto, to Mannesmann Kienzle GmbH. Portable automotive monitoring instrument. 316,825, 5-14-91, Cl. D10-78.000.

Bergstrand, John W.: *See—*

Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.

Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.

Bind-O-Matic AB: *See—*

Wiholm, Sture H., 316,816, Cl. D9-432.000.

VOL
1126
ISS
2
MY
14
1991
UMI

- Black & Decker, Inc.: *See—*
  - Gerke, Burton E., Jr.; Kosten, Richard B.; and De Blois, Bryan P., 316,921, Cl. D32-33.000.
- Blackford, Ronald R., to James Hardie & Coy Pty. Limited. Clip for butt joining siding. 316,810, 5-14-91, Cl. D8-382.000.
- Bolk, Phyllis J.: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.
- Brewer, Alan W., to Bunn-O-Matic Corporation. Beverage brewer. 316,795, 5-14-91, Cl. D7-308.000.
- Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Bracelet. 316,831, 5-14-91, Cl. D11-6.000.
- Bunn-O-Matic Corporation: *See—*
  - Brewer, Alan W., 316,795, Cl. D7-308.000.
- Burger, Barry L.; and McDevitt, John F., to Supelco, Inc. Combined gas treatment tube and enclosing guard tube. 316,897, 5-14-91, Cl. D24-8.000.
- Cafina AG: *See—*
  - Volgger, Johann; and Volgger, Ruth, 316,794, Cl. D7-308.000.
- Cain, Ann S., to 'totes', incorporated. Umbrella handle. 316,777, 5-14-91, Cl. D3-12.000.
- Cannon, Michael R., to Cornish Brewery Company Limited. Bottle. 316,813, 5-14-91, Cl. D9-370.000.
- Car Mate Mfg. Co., Ltd.: *See—*
  - Asano, Shinichi, 316,827, Cl. D10-102.000.
- Carney, Patrick J.; and Ferrante, Samuel L., to Solar Bear, Inc. Combined blanket and bag. 316,791, 5-14-91, Cl. D6-595.000.
- Carson, Ronald L. Bucket holder. 316,809, 5-14-91, Cl. D8-373.000.
- Cerny, Rudolf, to Arnold Kock GmbH u. Co. KG. Textile fabric. 316,783, 5-14-91, Cl. D5-37.000.
- Cheng, Peter S. C. Fruit peeler. 316,801, 5-14-91, Cl. D7-693.000.
- Chilcutt, Robert W.; and Mooney, Michael W. Tree stand bow holder. 316,780, 5-14-91, Cl. D3-38.000.
- Choi, Young J. Wall lantern. 316,912, 5-14-91, Cl. D26-87.000.
- Clivio, Franco, to Gardena Kress & Kastner GmbH. Sprinkler. 316,892, 5-14-91, Cl. D23-214.000.
- Clouthier, Thomas A.: *See—*
  - Paulson, Gary F.; and Clouthier, Thomas A., 316,807, Cl. D8-319.000.
- Cloutier, Thomas A.: *See—*
  - Paulson, Gary F.; and Cloutier, Thomas A., 316,805, Cl. D8-319.000.
  - Paulson, Gary F.; and Cloutier, Thomas A., 316,806, Cl. D8-319.000.
- Coles, Christopher C. Rotary vane combustion engine. 316,863, 5-14-91, Cl. D15-1.000.
- Colombo, Marco: *See—*
  - Barbaglia, Mario; and Colombo, Marco, 316,907, Cl. D26-62.000.
- Conlan, Thomas J. Lottery card marker. 316,880, 5-14-91, Cl. D19-51.000.
- Conner, Warren: *See—*
  - Gordon, David W.; Samson, Jeff; and Connér, Warren, 316,850, Cl. D14-102.000.
- Cornish Brewery Company Limited: *See—*
  - Cannon, Michael R., 316,813, Cl. D9-370.000.
- Craig, Franklin J.: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.
- Dadachanji, Fali M., to Protimeter plc. Moisture meter. 316,823, 5-14-91, Cl. D10-56.000.
- DaMert Company: *See—*
  - Hanlon, William M., III, 316,882, Cl. D21-99.000.
- Davis, Larry S. Combined automobile signal flag and holder. 316,829, 5-14-91, Cl. D10-109.000.
- Davis, Thomas L.; and Harper, Roy A., Jr., to Arrow Specialty Company. Breather assembly for combustion engine. 316,864, 5-14-91, Cl. D15-5.000.
- De Blois, Bryan P.: *See—*
  - Gerke, Burton E., Jr.; Kosten, Richard B.; and De Blois, Bryan P., 316,921, Cl. D32-33.000.
- Delafon, Jacob: *See—*
  - Jolibois, Michel M., 316,894, Cl. D23-250.000.
- Demakas, Thomas M.; and Martinez, Miguel M. Pancake batter dispenser. 316,830, 5-14-91, Cl. D10-46.200.
- Dickey, David V., to Product R&D Corporation. Computer peripheral enclosure. 316,853, 5-14-91, Cl. D14-107.000.
- Doles, Antoinette T. Stuffed toy helicopter. 316,883, 5-14-91, Cl. D21-155.000.
- Donnelly, Wilma M.: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.
- Douglas Sports, Inc.: *See—*
  - Henrickson, Douglas A.; and Henrickson, Danny S., 316,779, Cl. D3-37.000.
- Dryzal, Donald D. Protector for welder's gloves. 316,915, 5-14-91, Cl. D29-20.000.
- Duffy, Thomas; and Grant, Patrick A., to Grant, Patrick A. B. Sporran flask. 316,814, 5-14-91, Cl. D9-371.000.
- Du Pont de Nemours, E. I., and Company: *See—*
  - Armstrong, Eric J.; and Latone, Thomas L., 316,865, Cl. D15-7.000.
- Eastman Kodak Company: *See—*
  - Momot, David; Barry, Robert V.; and Townsend, Ensley E., 316,875, Cl. D20-20.000.
- Engels, Hans-Jurgen: *See—*
  - Kirschner, Jonathan; and Engels, Hans-Jurgen, 316,796, Cl. D7-311.000.
- Ergonomic Equipment Pty. Ltd.: *See—*
  - Grout, John E., 316,786, Cl. D6-491.000.
- Esslinger, Hartmut H.; Gruenberg, Eric I.; and Stewart, James R., to Apple Computer, Inc. Portable computer or similar article. 316,851, 5-14-91, Cl. D14-106.000.
- Exocell, Inc.: *See—*
  - Neuman, Robert G., 316,826, Cl. D10-81.000.
- Fair, Paul F.: *See—*
  - Fischer, Roy; and Fair, Paul F., 316,788, Cl. D6-522.000.
- Falk, Kevin. Headband. 316,774, 5-14-91, Cl. D2-514.000.
- Ferrante, Samuel L.: *See—*
  - Carney, Patrick J.; and Ferrante, Samuel L., 316,791, Cl. D6-595.000.
- Ferrero Ardennes S.A.: *See—*
  - Ferrero, Pietro, 316,812, Cl. D9-318.000.
- Ferrero, Pietro, to Ferrero Ardennes S.A. Container for confectionery products. 316,812, 5-14-91, Cl. D9-318.000.
- Fischer, Roy; and Fair, Paul F., to Kimberly-Clark Corporation. Dispenser for folded sheet products. 316,788, 5-14-91, Cl. D6-522.000.
- Flanders, Andrew E. Combined loudspeaker cabinet and sound reflector. 316,862, 5-14-91, Cl. D14-214.000.
- Foraker, Warren C.: *See—*
  - Forbes, Hampton E.; and Foraker, Warren C., 316,817, Cl. D9-438.000.
- Forbes, Hampton E.; and Foraker, Warren C., to Westvaco Corporation. Lid for ovenable carton. 316,817, 5-14-91, Cl. D9-438.000.
- Foresi, Anthony. Golf trainer club. 316,888, 5-14-91, Cl. D21-234.000.
- Forsberg, Paul J. Convex block. 316,904, 5-14-91, Cl. D25-114.000.
- Foulke, James; and Lifshitz, Yair. Auxiliary handle. 316,804, 5-14-91, Cl. D8-307.000.
- Freidman, Arthur S. Portable light. 316,906, 5-14-91, Cl. D26-44.000.
- Fukuoka, Stanley, to JED Products, Inc. Protector for a water spout. 316,896, 5-14-91, Cl. D23-256.000.
- Fumia, Enrico, to Pininfarina Extra S.r.l. Golf bag. 316,778, 5-14-91, Cl. D3-37.000.
- Gannett Co., Ltd.: *See—*
  - Merl, Milton J., 316,873, Cl. D20-6.000.
- Gardena Kress & Kastner GmbH: *See—*
  - Clivio, Franco, 316,892, Cl. D23-214.000.
- General Motors Corporation: *See—*
  - Peloquin, Thomas B.; and Wasenko, John K., 316,844, Cl. D12-209.000.
- Gerke, Burton E., Jr.; Kosten, Richard B.; and De Blois, Bryan P., to Black & Decker, Inc. Vacuum cleaner brush. 316,921, 5-14-91, Cl. D32-33.000.
- Gillis, Edward: *See—*
  - Slanker, Douglas G.; and Gillis, Edward, 316,845, Cl. D12-302.000.
- Ginsberg, Alyce. Partition planter. 316,835, 5-14-91, Cl. D11-143.000.
- Glodowski, James J. Gate valve for irrigation pipe. 316,893, 5-14-91, Cl. D23-244.000.
- Gobindram, Kash, to Kash 'N Gold, Ltd. Housing for a telephone set. 316,858, 5-14-91, Cl. D14-143.000.
- Gold Star Telecommunications Co., Ltd.: *See—*
  - Park, Hee S., 316,857, Cl. D14-138.000.
- Goodyear Tire & Rubber Company, The: *See—*
  - Graas, Maurice I., 316,842, Cl. D12-147.000.
- Gordon, David W.; Samson, Jeff; and Conner, Warren, to Array Technology Corporation. Arrayed disk drive system. 316,850, 5-14-91, Cl. D14-102.000.
- Goto, Nobumichi: *See—*
  - Hasegawa, Terutomi; and Goto, Nobumichi, 316,848, Cl. D13-82.000.
- Graas, Maurice I., to Goodyear Tire & Rubber Company, The. Design for a tire. 316,842, 5-14-91, Cl. D12-147.000.
- Grafton, Charles E.: *See—*
  - Sohay, Leslie I.; and Grafton, Charles E., 316,824, Cl. D10-78.000.
- Grant, Patrick A.: *See—*
  - Duffy, Thomas; and Grant, Patrick A., 316,814, Cl. D9-371.000.
- Grant, Patrick A. B.: *See—*
  - Duffy, Thomas; and Grant, Patrick A., 316,814, Cl. D9-371.000.
- Grill, Simon. Dispenser for bubble gum or other encapsulated articles. 316,874, 5-14-91, Cl. D20-7.000.
- Grout, John E., to Ergonomic Equipment Pty. Ltd. Desk frame. 316,786, 5-14-91, Cl. D6-491.000.
- Gruenberg, Eric I.: *See—*
  - Esslinger, Hartmut H.; Gruenberg, Eric I.; and Stewart, James R., 316,851, Cl. D14-106.000.
- GTE Rotaflex Limited: *See—*
  - Atkinson, Paul; and Stuart, Robert, 316,908, Cl. D26-63.000.
  - Atkinson Paul; and Stuart, Robert, 316,909, Cl. D26-63.000.
- Hanlon, William M., III, to DaMert Company. Return top. 316,882, 5-14-91, Cl. D21-99.000.

- Harper, Roy A., Jr.: *See—*
  - Davis, Thomas L.; and Harper, Roy A., Jr., 316,864, Cl. D15-5.000.
- Harris, Alvin C. Pet food dish. 316,918, 5-14-91, Cl. D30-130.000.
- Harris Corporation: *See—*
  - Sohay, Leslie I.; and Grafton, Charles E., 316,824, Cl. D10-78.000.
- Hasegawa, Shigeru: *See—*
  - Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Sato, Yuji; and Iikura, Yukio, 316,860, Cl. D14-164.000.
- Hasegawa, Terutomi; and Goto, Nobumichi. Mounting substrate for semiconductors. 316,848, 5-14-91, Cl. D13-82.000.
- Hazerjian, Kevork P.; and Levitt, Amos, to Sturdy Lantern Mfg. Co., Inc. Exterior lighting fixture. 316,910, 5-14-91, Cl. D26-67.000.
- Hazerjian, Kevork P.; and Levitt, Amos, to Sturdy Lantern Mfg. Co., Inc. Exterior lighting fixture. 316,911, 5-14-91, Cl. D26-67.000.
- Heerah, Deodat: *See—*
  - Heerah, Deomangal; and Heerah, Deodat, 316,885, Cl. D21-191.000.
- Heerah, Deomangal; and Heerah, Deodat. Tethered exerciser. 316,885, 5-14-91, Cl. D21-191.000.
- Henrickson, Danny S.: *See—*
  - Henrickson, Douglas A.; and Henrickson, Danny S., 316,779, Cl. D3-37.000.
- Henrickson, Douglas A.; and Henrickson, Danny S., to Douglas Sports, Inc. Golf bag. 316,779, 5-14-91, Cl. D3-37.000.
- Heseltine, Robert J. Mannequin. 316,876, 5-14-91, Cl. D20-31.000.
- Highland Supply Corporation: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.
- Hill, Loran R.; and Spangler, Anthony G., to Masco Corporation of Indiana. Tub spout. 316,895, 5-14-91, Cl. D23-255.000.
- Hiltunen, Vesa. Photo service wallet. 316,781, 5-14-91, Cl. D3-56.000.
- Hitachi, Ltd.: *See—*
  - Urushihara, Atsuhiko; Yonezawa, Yutaka; and Takahashi, Akira, 316,856, Cl. D14-129.000.
- Hoelfing, H. Curt. Meter hose inhaler reservoir. 316,902, 5-14-91, Cl. D24-62.000.
- Houghton, John, to Norwegian Bioinstruments A/S. Computer enclosure. 316,849, 5-14-91, Cl. D14-102.000.
- Iikura, Yukio: *See—*
  - Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Sato, Yuji; and Iikura, Yukio, 316,860, Cl. D14-164.000.
- Innotech AG: *See—*
  - Witschi, Heinz, 316,872, Cl. D19-27.000.
- Ishiwata, Takehiko, to Nexopt Corporation. Video game gun. 316,878, 5-14-91, Cl. D21-13.000.
- Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Sato, Yuji; and Iikura, Yukio, to Teac Corporation. Tape recorder. 316,860, 5-14-91, Cl. D14-164.000.
- Ito, Osamu: *See—*
  - Moriai, Yasuharu; and Ito, Osamu, 316,846, Cl. D13-147.000.
- James Hardie & Coy Pty. Limited: *See—*
  - Blackford, Ronald R., 316,810, Cl. D8-382.000.
- James, Jewell. Billiard glove. 316,916, 5-14-91, Cl. D29-22.000.
- JED Products, Inc.: *See—*
  - Fukuoka, Stanley, 316,896, Cl. D23-256.000.
- Johnson, Charlie H., Sr. Finger ring. 316,832, 5-14-91, Cl. D11-35.000.
- Johnson, Craig E., to Schwan's Sales Enterprises, Inc. Slide calculator. 316,868, 5-14-91, Cl. D18-9.000.
- Johnson & Johnson Consumer Products, Inc.: *See—*
  - Kalin, Gerald J.; and Kent, John R., 316,815, Cl. D9-404.000.
- Jolibois, Michel M., to Delafon, Jacob. Faucet handle or the like. 316,894, 5-14-91, Cl. D23-250.000.
- Kai Cutlery Center Co., Ltd.: *See—*
  - Yamagishi, Masami, 316,802, Cl. D8-57.000.
- Kajimoto, Hiroshi: *See—*
  - Saeki, Taisuke; and Kajimoto, Hiroshi, 316,855, Cl. D14-126.000.
- Kalin, Gerald J.; and Kent, John R., to Johnson & Johnson Consumer Products, Inc. Combined bottle and cap. 316,815, 5-14-91, Cl. D9-404.000.
- Kash 'N Gold, Ltd.: *See—*
  - Gobindram, Kash, 316,858, Cl. D14-143.000.
- Kato, Kazue: *See—*
  - Yoda, Shingo; and Kato, Kazue, 316,861, Cl. D14-205.000.
- Kelly, Marguerite C. Tissue dispenser. 316,787, 5-14-91, Cl. D6-515.000.
- Kenny, Richard: *See—*
  - Motola, Solomon; Aveson, Martha C.; Kenny, Richard; and Wilkinson, Robert J., 316,913, Cl. D28-2.000.
- Kent, John R.: *See—*
  - Kalin, Gerald J.; and Kent, John R., 316,815, Cl. D9-404.000.
- Kimberly-Clark Corporation: *See—*
  - Fischer, Roy; and Fair, Paul F., 316,788, Cl. D6-522.000.
- Kirschner, Jonathan; and Engels, Hans-Jurgen. Beverage dispenser. 316,796, 5-14-91, Cl. D7-311.000.
- Kistner, Theodore H. Planter. 316,836, 5-14-91, Cl. D11-156.000.
- Kosten, Richard B.: *See—*
  - Gerke, Burton E., Jr.; Kosten, Richard B.; and De Blois, Bryan P., 316,921, Cl. D32-33.000.
- Latone, Thomas L.: *See—*
  - Armstrong, Eric J.; and Latone, Thomas L., 316,865, Cl. D15-7.000.
- Lee, Gilbert Y. Two-headed shower. 316,891, 5-14-91, Cl. D23-213.000.
- Levitt, Amos: *See—*
  - Hazerjian, Kevork P.; and Levitt, Amos, 316,910, Cl. D26-67.000.
  - Hazerjian, Kevork P.; and Levitt, Amos, 316,911, Cl. D26-67.000.
- Lifshitz, Yair: *See—*
  - Foulke, James; and Lifshitz, Yair, 316,804, Cl. D8-307.000.
- Lo, Yuan H. Cycle exerciser. 316,887, 5-14-91, Cl. D21-194.000.
- Lutron Electronics Co., Inc.: *See—*
  - Rowen, Michael J.; and Spira, Joel S., 316,847, Cl. D13-168.000.
- M. Kamenstein, Inc.: *See—*
  - Ancona, Jane; and Ancona, Bruce, 316,797, Cl. D7-322.000.
- Manjarrez, Jill M. Combination infant car seat neck support and pacifier. 316,793, 5-14-91, Cl. D6-601.000.
- Mannesmann Kienzle GmbH: *See—*
  - Becker, Otto, 316,825, Cl. D10-78.000.
- Martinez, Miguel M.: *See—*
  - Demakas, Thomas M.; and Martinez, Miguel M., 316,830, Cl. D10-46.200.
- Masco Corporation of Indiana: *See—*
  - Hill, Loran R.; and Spangler, Anthony G., 316,895, Cl. D23-255.000.
- Matsushita Electric Industrial Co., Ltd.: *See—*
  - Sai, Akishige; and Mishiro, Benito, 316,852, Cl. D14-106.000.
- Mauer, Laura J. Fabric feather. 316,784, 5-14-91, Cl. D5-99.000.
- McDevitt, John F.: *See—*
  - Burger, Barry L.; and McDevitt, John F., 316,897, Cl. D24-8.000.
- McLaughlin, Delvin D. Paper towel holder. 316,789, 5-14-91, Cl. D6-522.000.
- Mendenhall, Walter M., to Modern Display Plastics, Inc. Flower display support or similar article. 316,834, 5-14-91, Cl. D11-143.000.
- Merl, Milton J., to Gannett Co., Ltd. Newspaper vending bin or similar article. 316,873, 5-14-91, Cl. D20-6.000.
- Merrell Dow Pharmaceuticals Inc.: *See—*
  - Withington, Roger, 316,914, Cl. D28-2.000.
- Michaelsen, Jorgen, to Bang & Olufsen. Decorative panel. 316,905, 5-14-91, Cl. D25-138.000.
- Mikiya, Toshio: *See—*
  - Okuyama, Toshiharu; and Mikiya, Toshio, 316,854, Cl. D14-116.000.
- Miozzo, Orlando. Videophone. 316,833, 5-14-91, Cl. D14-130.000.
- Mishiro, Benito: *See—*
  - Sai, Akishige; and Mishiro, Benito, 316,852, Cl. D14-106.000.
- Mitchell, David S., to Scafftag Limited. Card holder. 316,877, 5-14-91, Cl. D20-43.000.
- Modern Display Plastics, Inc.: *See—*
  - Mendenhall, Walter M., 316,834, Cl. D11-143.000.
- Momot, David; Barry, Robert V.; and Townsend, Ensley E., to Eastman Kodak Company. Electro-optical display for cameras or the like. 316,875, 5-14-91, Cl. D20-20.000.
- Mooney, Michael W.: *See—*
  - Chilcutt, Robert W.; and Mooney, Michael W., 316,780, Cl. D3-38.000.
- Moriai, Yasuharu; and Ito, Osamu, to Sumitomo Wiring Systems, Ltd. Electrical connector housing. 316,846, 5-14-91, Cl. D13-147.000.
- Motola, Solomon; Aveson, Martha C.; Kenny, Richard; and Wilkinson, Robert J., to American Home Products Corporation. Suppository. 316,913, 5-14-91, Cl. D28-2.000.
- Motorola, Inc.: *See—*
  - Wong, Allen; and Ansai, Russell, 316,859, Cl. D14-148.000.
- Moulinex (Societe Anonyme): *See—*
  - Barrault, Jean-Louis, 316,799, Cl. D7-412.000.
- Munk, Harald, to Novopack Machinenbau GmbH. Coffee beam roasting machine. 316,798, 5-14-91, Cl. D7-338.000.
- Murphy, Jess. Washine machine with detergent dispenser. 316,920, 5-14-91, Cl. D32-6.000.
- Nakamura, Mitsuhiro: *See—*
  - Tejima, Keisuke; and Nakamura, Mitsuhiro, 316,866, Cl. D16-202.000.
- Neff, Lee. Self cleaning rear view mirror for truck or the like. 316,841, 5-14-91, Cl. D12-187.000.
- Neuman, Robert G., to Exocell, Inc. Analytic colormetric instrument. 316,826, 5-14-91, Cl. D10-81.000.
- Neuroth, Margerate A. B.: *See—*
  - Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 316,881, Cl. D21-61.000.
- Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A. Bubble wand. 316,881, 5-14-91, Cl D21-61.000.
- Newman, Anthony I., to Swordfish Systems Limited. Tiler's tool. 316,803, 5-14-91, Cl. D8-105.000.
- Nexopt Corporation: *See—*
  - Ishiwata, Takehiko, 316,878, Cl. D21-13.000.
- Nittan Company, Limited: *See—*
  - Amemiya, Hideto; and Suzuki, Takashi, 316,828, Cl. D10-106.000.
- Nitto Kohki, Co., Ltd.: *See—*
  - Okuyama, Toshiharu; and Mikiya, Toshio, 316,854, Cl. D14-116.000.
- Norwegian Bioinstruments A/S: *See—*
  - Houghton, John, 316,849, Cl. D14-102.000.
- Novopack Machinenbau GmbH: *See—*
  - Munk, Harald, 316,798, Cl. D7-338.000.
- Nowicki, Stanley J. Carrier for flower holder. 316,839, 5-14-91, Cl. D11-164.000.
- Odaka, Seiji, to Seikosha Co., Ltd. Clock. 316,819, 5-14-91, Cl. D10-19.000.
- Odaka, Seiji, to Seikosha Co., Ltd. Clock. 316,822, 5-14-91, Cl. D10-26.000.

VOL
1126
ISS
2
MY
14
1991
UMI

Oki Electric Industry Co., Inc.: *See—*
  Sugawara, Kouki; and Yoshida, Kazuo, 316,870, Cl. D18-13.000.
Oki Electric Industry Co., Ltd.: *See—*
  Sugawara, Kouki; and Seki, Sampei, 316,869, Cl. D18-13.000.
Okuyama, Toshiharu; and Mikiya, Toshio, to Nitto Kohki, Co., Ltd. Wireless data transmitter/receiver with a bar code reader. 316,854, 5-14-91, Cl. D14-116.000.
Oldham, Jeff A. Cap for the bed of a pickup truck. 316,843, 5-14-91, Cl. D12-156.000.
Oldham, Jeffrey A. Aquarium. 316,917, 5-14-91, Cl. D30-101.000.
Paf S.r.l.: *See—*
  Barbaglia, Mario; and Colombo, Marco, 316,907, Cl. D26-62.000.
Park, Chang S. Laryngoscope blade cover. 316,898, 5-14-91, Cl. D24-17.000.
Park, Hee S., to Gold Star Telecommunications Co., Ltd. Combined cordless handset. 316,857, 5-14-91, Cl. D14-138.000.
Partecipazioni Bulgari S.p.A.: *See—*
  Bulgari, Paolo, 316,831, Cl. D11-6.000.
Partridge, Wiley, Jr. Automobile steering column lock. 316,808, 5-14-91, Cl. D8-333.000.
Paul, Harold J. Fastener for ceiling or wall construction, picture frame hanging or the like. 316,811, 5-14-91, Cl. D8-382.000.
Paulson, Gary F.; and Cloutier, Thomas A., to Truth Incorporated. Sliding patio door handle. 316,805, 5-14-91, Cl. D8-319.000.
Paulson, Gary F.; and Cloutier, Thomas A., to Truth Incorporated. Sliding patio door handle. 316,806, 5-14-91, Cl. D8-319.000.
Paulson, Gary F.; and Clouthier, Thomas A., to Truth Incorporated. Sliding patio door handle. 316,807, 5-14-91, Cl. D8-319.000.
Peloquin, Thomas B.; and Wasenko, John K., to General Motors Corporation. Wheel cover. 316,844, 5-14-91, Cl. D12-209.000.
Pininfarina Extra S.r.l.: *See—*
  Fumia, Enrico, 316,778, Cl. D3-37.000.
Poelvoorde, Raymond, to Sun Refining and Marketing Company. Building for an automotive service station or the like. 316,903, 5-14-91, Cl. D25-34.000.
Product R&D Corporation: *See—*
  Dickey, David V., 316,853, Cl. D14-107.000.
Protimeter plc: *See—*
  Dadachanji, Fali M., 316,823, Cl. D10-56.000.
Reep, Mark O. Stand for saddles. 316,919, 5-14-91, Cl. D30-143.000.
Robbins, E. Stanley; and Robbins, Rodney W., to Robbins Industries, Inc. Rack for spice cans. 316,790, 5-14-91, Cl. D6-574.000.
Robbins Industries, Inc.: *See—*
  Robbins, E. Stanley; and Robbins, Rodney W., 316,790, Cl. D6-574.000.
Robbins, Rodney W.: *See—*
  Robbins, E. Stanley; and Robbins, Rodney W., 316,790, Cl. D6-574.000.
Robertson, Elizabeth A.: *See—*
  Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 316,881, Cl. D21-61.000.
Robertson, Richard A.: *See—*
  Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 316,881, Cl. D21-61.000.
Robinson, Ann: *See—*
  Robinson, Oscar T.; and Robinson, Ann, 316,890, Cl. D22-149.000.
Robinson, Oscar T.; and Robinson, Ann. Fishing worm threader. 316,890, 5-14-91, Cl. D22-149.000.
Rose, Douglas R. Safety shoe toe cap. 316,772, 5-14-91, Cl. D2-314.000.
Rowen, Michael J.; and Spira, Joel S., to Lutron Electronics Co., Inc. Transmitter for wireless switch and dimmer. 316,847, 5-14-91, Cl. D13-168.000.
Rylands, Patrick, to Simon Gompes and Herman Schpektor. Doll. 316,884, 5-14-91, Cl. D21-171.000.
Saeki, Taisuke; and Kajimoto, Hiroshi, to Sharp Corporation. Television set. 316,855, 5-14-91, Cl. D14-126.000.
Sai, Akishige; and Mishiro, Benito, to Matsushita Electric Industrial Co., Ltd. Portable laptop computer. 316,852, 5-14-91, Cl. D14-106.000.
Sakaguchi, Hiroshi, to Sharp Corporation. Typewriter. 316,867, 5-14-91, Cl. D18-1.000.
Sally, Joseph A. Swimmer exercise machine. 316,886, 5-14-91, Cl. D21-191.000.
Samson, Jeff: *See—*
  Gordon, David W.; Samson, Jeff; and Conner, Warren, 316,850, Cl. D14-102.000.
Sato, Yuji: *See—*
  Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Sato, Yuji; and Iikura, Yukio, 316,860, Cl. D14-164.000.
Scafftag Limited: *See—*
  Mitchell, David S., 316,877, Cl. D20-43.000.
Schmitz, Deborah K. Infant head support for attachment to a child's car seat. 316,792, 5-14-91, Cl. D6-601.000.
Schott, Paul, to Schott, Paul. Suspenders. 316,775, 5-14-91, Cl. D2-626.000.
Schwan's Sales Enterprises, Inc.: *See—*
  Johnson, Craig E., 316,868, Cl. D18-9.000.
Seikosha Co., Ltd.: *See—*
  Odaka, Seiji, 316,819, Cl. D10-19.000.
  Odaka, Seiji, 316,822, Cl. D10-26.000.
  Wada, Mitsuo, 316,818, Cl. D10-1.000.
  Wada, Mitsuo, 316,820, Cl. D10-24.000.
  Wada, Mitsuo, 316,821, Cl. D10-24.000.
Seki, Sampei: *See—*
  Sugawara, Kouki; and Seki, Sampei, 316,869, Cl. D18-13.000.
Sharp Corporation: *See—*
  Saeki, Taisuke; and Kajimoto, Hiroshi, 316,855, Cl. D14-126.000.
  Sakaguchi, Hiroshi, 316,867, Cl. D18-1.000.
Shulman, Betty A.: *See—*
  Shulman, Donald P.; and Shulman, Betty A., 316,879, Cl. D21-48.000.
Shulman, Donald P.; and Shulman, Betty A. Joystick for electronic games. 316,879, 5-14-91, Cl. D21-48.000.
Simon Gompes and Herman Schpektor: *See—*
  Rylands, Patrick, 316,884, Cl. D21-171.000.
Slanker, Douglas G.; and Gillis, Edward. Boat. 316,845, 5-14-91, Cl. D12-302.000.
Smith, Evan K., to Smith, Larry K. Roundabout amusement ride. 316,889, 5-14-91, Cl. D21-249.000.
Smith, Larry K.: *See—*
  Smith, Evan K., 316,889, Cl. D21-249.000.
Sohay, Leslie I.; and Grafton, Charles E., to Harris Corporation. Telephone line tester. 316,824, 5-14-91, Cl. D10-78.000.
Solar Bear, Inc.: *See—*
  Carney, Patrick J.; and Ferrante, Samuel L., 316,791, Cl. D6-595.000.
Sony Corporation: *See—*
  Tejima, Keisuke; and Nakamura, Mitsuhiro, 316,866, Cl. D16-202.000.
  Yoda, Shingo; and Kato, Kazue, 316,861, Cl. D14-205.000.
Spangler, Anthony G.: *See—*
  Hill, Loran R.; and Spangler, Anthony G., 316,895, Cl. D23-255.000.
Spira, Joel S.: *See—*
  Rowen, Michael J.; and Spira, Joel S., 316,847, Cl. D13-168.000.
Stewart, James R.: *See—*
  Esslinger, Hartmut H.; Gruenberg, Eric I.; and Stewart, James R., 316,851, Cl. D14-106.000.
Stuart, Robert: *See—*
  Atkinson, Paul; and Stuart, Robert, 316,908, Cl. D26-63.000.
  Atkinson Paul; and Stuart, Robert, 316,909, Cl. D26-63.000.
Sturdy Lantern Mfg. Co., Inc.: *See—*
  Hazerjian, Kevork P.; and Levitt, Amos, 316,910, Cl. D26-67.000.
  Hazerjian, Kevork P.; and Levitt, Amos, 316,911, Cl. D26-67.000.
Sube, Minoru: *See—*
  Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Sato, Yuji; and Iikura, Yukio, 316,860, Cl. D14-164.000.
Sugawara, Kouki; and Seki, Sampei, to Oki Electric Industry Co., Ltd. Printer. 316,869, 5-14-91, Cl. D18-13.000.
Sugawara, Kouki; and Yoshida, Kazuo, to Oki Electric Industry Co., Inc. Printer. 316,870, 5-14-91, Cl. D18-13.000.
Sumitomo Wiring Systems, Ltd.: *See—*
  Moriai, Yasuharu; and Ito, Osamu, 316,846, Cl. D13-147.000.
Sun Refining and Marketing Company: *See—*
  Poelvoorde, Raymond, 316,903, Cl. D25-34.000.
Supelco, Inc.: *See—*
  Burger, Barry L.; and McDevitt, John F., 316,897, Cl. D24-8.000.
Suzuki, Takashi: *See—*
  Amemiya, Hideto; and Suzuki, Takashi, 316,828, Cl. D10-106.000.
Swordfish Systems Limited: *See—*
  Newman, Anthony I., 316,803, Cl. D8-105.000.
Takahashi, Akira: *See—*
  Urushihara, Atsuhiko; Yonezawa, Yutaka; and Takahashi, Akira, 316,856, Cl. D14-129.000.
Teac Corporation: *See—*
  Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Sato, Yuji; and Iikura, Yukio, 316,860, Cl. D14-164.000.
Tejima, Keisuke; and Nakamura, Mitsuhiro, to Sony Corporation. Magnetic still camera. 316,866, 5-14-91, Cl. D16-202.000.
Tomaificio: *See—*
  Valle, Diego D., 316,773, Cl. D2-320.000.
Torbenson, Maynard O. Combined toothbrush and refillable-type dental floss holder. 316,782, 5-14-91, Cl. D4-108.000.
'totes', incorporated: *See—*
  Cain, Ann S., 316,777, Cl. D3-12.000.
Townsend, Ensley E.: *See—*
  Momot, David; Barry, Robert V.; and Townsend, Ensley E., 316,875, Cl. D20-20.000.
Truth Incorporated: *See—*
  Paulson, Gary F.; and Cloutier, Thomas A., 316,805, Cl. D8-319.000.
  Paulson, Gary F.; and Cloutier, Thomas A., 316,806, Cl. D8-319.000.
  Paulson, Gary F.; and Clouthier, Thomas A., 316,807, Cl. D8-319.000.
Urushihara, Atsuhiko; Yonezawa, Yutaka; and Takahashi, Akira, to Hitachi, Ltd. Combined television receiver and video tape recorder. 316,856, 5-14-91, Cl. D14-129.000.
Valle, Diego D., to Tomaificio. Shoe sole. 316,773, 5-14-91, Cl. D2-320.000.
Volgger, Johann; and Volgger, Ruth, to Cafina AG. Coffee machine. 316,794, 5-14-91, Cl. D7-308.000.
Volgger, Ruth: *See—*
  Volgger, Johann; and Volgger, Ruth, 316,794, Cl. D7-308.000.
Wada, Mitsuo, to Seikosha Co., Ltd. Alarm clock. 316,818, 5-14-91, Cl. D10-1.000.
Wada, Mitsuo, to Seikosha Co., Ltd. Clock. 316,820, 5-14-91, Cl. D10-24.000.
Wada, Mitsuo, to Seikosha Co., Ltd. Clock. 316,821, 5-14-91, Cl. D10-24.000.

Walsh, James W. Dropper tip or similar article. 316,901, 5-14-91, Cl. D24-51.000.
Wasenko, John K.: *See—*
  Peloquin, Thomas B.; and Wasenko, John K., 316,844, Cl. D12-209.000.
Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., to Highland Supply Corporation. Flower pot cover. 316,837, 5-14-91, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., to Highland Supply Corporation. Flower pot cover. 316,838, 5-14-91, Cl. D11-164.000.
Weder, Erwin H.: *See—*
  Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.
  Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.
Weder, Wanda M.: *See—*
  Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,837, Cl. D11-164.000.
  Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 316,838, Cl. D11-164.000.
Wellenstam, Kjell I.: *See—*
  Andersson, Ake B.; and Wellenstam, Kjell I., 316,899, Cl. D24-24.000.
Wertheim, Leroy I. Serving tray. 316,800, 5-14-91, Cl. D7-549.000.
Westvaco Corporation: *See—*
  Forbes, Hampton E.; and Foraker, Warren C., 316,817, Cl. D9-438.000.
White, Johnny R.: *See—*
  White, Lesa L.; and White, Johnny R., 316,900, Cl. D24-47.000.
White, Lesa L.; and White, Johnny R. Non-drip baby bottle cap. 316,900, 5-14-91, Cl. D24-47.000.
Wiholm, Sture H., to Bind-O-Matic AB. Package. 316,816, 5-14-91, Cl. D9-432.000.
Wilkinson, Robert J.: *See—*
  Motola, Solomon; Aveson, Martha C.; Kenny, Richard; and Wilkinson, Robert J., 316,913, Cl. D28-2.000.
Withington, Roger, to Merrell Dow Pharmaceuticals Inc. Tablet. 316,914, 5-14-91, Cl. D28-2.000.
Witschi, Heinz, to Innotech AG. Ring binder. 316,872, 5-14-91, Cl. D19-27.000.
Wong, Allen; and Ansai, Russell, to Motorola, Inc. Dial top-housing for telephone handset or similar article. 316,859, 5-14-91, Cl. D14-148.000.
Woods, Richard. Combined note pad and holder therefor. 316,871, 5-14-91, Cl. D19-2.000.
Yamagishi, Masami, to Kai Cutlery Center Co., Ltd. Scissors. 316,802, 5-14-91, Cl. D8-57.000.
Yarus, Lance O. Crutch bag. 316,776, 5-14-91, Cl. D3-11.000.
Yoda, Shingo; and Kato, Kazue, to Sony Corporation. Headphone. 316,861, 5-14-91, Cl. D14-205.000.
Yonezawa, Yutaka: *See—*
  Urushihara, Atsuhiko; Yonezawa, Yutaka; and Takahashi, Akira, 316,856, Cl. D14-129.000.
Yoshida, Kazuo: *See—*
  Sugawara, Kouki; and Yoshida, Kazuo, 316,870, Cl. D18-13.000.

# LIST OF PLANT PATENTEES

Amorao, Amado Q.: *See—*
  Johnson, Harold A., Jr.; Sjulin, Thomas M.; Amorao, Amado Q.; and Espejo, Joseph I., Jr., 7,522, Cl. 49.000.
Bell, Margaret A.: *See—*
  Francis, Henry; Bell, Margaret A.; and Jeffrey, David, 7,521, Cl. 30.000.
DeVor Nurseries, Inc.: *See—*
  Marciel, Stanley G., 7,520, Cl. 19.000.
Driscoll Strawberry Associates, Inc.: *See—*
  Johnson, Harold A., Jr.; Sjulin, Thomas M.; Amorao, Amado Q.; and Espejo, Joseph I., Jr., 7,522, Cl. 49.000.
Espejo, Joseph I., Jr.: *See—*
  Johnson, Harold A., Jr.; Sjulin, Thomas M.; Amorao, Amado Q.; and Espejo, Joseph I., Jr., 7,522, Cl. 49.000.
Fleming, Margaret M., to Plant Company, The. Kalanchoe plant named Little Flame. 7,524, 5-14-91, Cl. 68.000.
Francis, Henry; Bell, Margaret A.; and Jeffrey, David. Macadamia named "Hidden Valley A16" . 7,521, 5-14-91, Cl. 30.000.
Hilverda B.V.: *See—*
  Hilverda, Jan J., 7,525, Cl. 70.000.
Hilverda, Jan J., to Hilverda B.V. Carnation named Hildance. 7,525, 5-14-91, Cl. 70.000.
Jeffrey, David: *See—*
  Francis, Henry; Bell, Margaret A.; and Jeffrey, David, 7,521, Cl. 30.000.
Johnson, Harold A., Jr.; Sjulin, Thomas M.; Amorao, Amado Q.; and Espejo, Joseph I., Jr., to Driscoll Strawberry Associates, Inc. Strawberry plant named 'E26'. 7,522, 5-14-91, Cl. 49.000.
Marciel, Stanley G., to DeVor Nurseries, Inc. Rose plant named Devnovia. 7,520, 5-14-91, Cl. 19.000.
Plant Company, The: *See—*
  Fleming, Margaret M., 7,524, Cl. 68.000.
Sjulin, Thomas M.: *See—*
  Johnson, Harold A., Jr.; Sjulin, Thomas M.; Amorao, Amado Q.; and Espejo, Joseph I., Jr., 7,522, Cl. 49.000.
Wilcox, Harry D., Jr. Forsythia plant named 'Fiesta'. 7,523, 5-14-91, Cl. 54.000.

VOL
1126
ISS
2
MY
14
1991
UMI

# CLASSIFICATION OF PATENTS

## ISSUED MAY 14, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

| | |
|---|---|
| **CLASS 2** | |
| 11 | 5,014,353 |
| 23 | 5,014,354 |
| 79 | 5,014,355 |
| | 5,014,356 |
| 81 | 5,014,357 |
| 94 | 5,014,358 |
| | 5,014,359 |
| 115 | 5,014,360 |
| 167 | 5,014,361 |
| 168 | 5,014,362 |
| 221 | Re.33,586 |
| 243 A | 5,014,363 |
| 408 | 5,014,364 |
| 412 | 5,014,365 |
| 424 | 5,014,366 |
| **CLASS 4** | |
| 251 | 5,014,367 |
| 314 | 5,014,368 |
| 503 | 5,014,369 |
| 505 | 5,014,370 |
| 516 | 5,014,371 |
| 542 | 5,014,372 |
| 575 | 5,014,373 |
| **CLASS 5** | |
| 82 R | 5,014,374 |
| 431 | 5,014,375 |
| | 5,014,376 |
| 434 | 5,014,377 |
| 453 | 5,014,378 |
| **CLASS 7** | |
| 127 | 5,014,379 |
| **CLASS 8** | |
| 115.6 | 5,015,259 |
| 149.3 | 5,014,380 |
| 408 | 5,015,260 |
| 532 | 5,015,261 |
| 543 | 5,015,262 |
| 680 | 5,015,263 |
| **CLASS 14** | |
| 17 | 5,014,381 |
| **CLASS 15** | |
| 1.7 | 5,014,382 |
| 160 | 5,014,383 |
| 230.11 | 5,014,384 |
| 323 | 5,014,385 |
| 339 | 5,014,386 |
| | 5,014,387 |
| | 5,014,388 |
| 353 | 5,014,389 |
| **CLASS 16** | |
| 4 | 5,014,390 |
| 35 R | 5,014,391 |
| 46 | 5,014,392 |
| **CLASS 19** | |
| 98 | 5,014,394 |
| 105 | 5,014,395 |
| 205 | 5,014,396 |
| 231 | 5,014,397 |
| 244 | 5,014,398 |
| **CLASS 23** | |
| 313 R | 5,015,264 |
| **CLASS 24** | |
| 72.5 | 5,014,399 |
| 108 | 5,014,400 |
| 633 | 5,014,401 |
| **CLASS 26** | |
| 91 | 5,014,402 |
| **CLASS 28** | |
| 170 | 5,014,403 |
| 271 | 5,014,404 |
| **CLASS 29** | |
| 25.35 | Re.33,587 |
| 33 R | 5,014,405 |
| 130 | 5,014,406 |
| 235 | 5,014,407 |
| 243.58 | 5,014,408 |
| 267 | 5,014,409 |
| 525.1 | 5,014,411 |
| 527.7 | 5,014,412 |
| 559 | 5,014,413 |
| 603 | 5,014,414 |
| 621.1 | 5,014,415 |
| 701 | 5,014,416 |
| 783 | 5,014,417 |
| 827 | 5,014,418 |
| 830 | 5,014,419 |
| 846 | 5,014,420 |
| 889.7 | 5,014,421 |
| 890.044 | 5,014,422 |
| 890.144 | 5,014,423 |
| 890.149 | 5,014,424 |
| 894.333 | 5,014,425 |
| 897.3 | 5,014,426 |
| **CLASS 30** | |
| 41 | 5,014,427 |
| 43.6 | 5,014,428 |
| 124 | 5,014,431 |
| 162 | 5,014,429 |
| 166.3 | 5,014,430 |
| 191 | 5,014,432 |
| 248 | 5,014,433 |
| 345 | 5,014,434 |
| 387 | 5,014,435 |
| **CLASS 33** | |
| 27.03 | 5,014,436 |
| 414 | 5,014,437 |
| 494 | 5,014,438 |
| 533 | 5,014,439 |
| 557 | 5,014,440 |
| 561.1 | 5,014,441 |
| 608 | 5,014,442 |
| 640 | 5,014,443 |
| 702 | 5,014,444 |
| 731 | 5,014,445 |
| **CLASS 34** | |
| 151 | 5,014,446 |
| 156 | 5,014,447 |
| **CLASS 36** | |
| 110 | 5,014,448 |
| 114 | 5,014,449 |
| 124 | 5,014,450 |
| **CLASS 37** | |
| 231 | 5,014,451 |
| 235 | 5,014,452 |
| **CLASS 38** | |
| 36 | 5,014,453 |
| 93 | 5,014,454 |
| **CLASS 40** | |
| 539 | 5,014,455 |
| **CLASS 42** | |
| 50 | 5,014,456 |
| 70 11 | 5,014,457 |
| **CLASS 43** | |
| 21.2 | 5,014,458 |
| 44.85 | 5,014,459 |
| 113 | 5,014,460 |
| **CLASS 47** | |
| 1.01 | 5,014,462 |
| 40.5 | 5,014,461 |
| **CLASS 49** | |
| 401 | 5,014,463 |
| 440 | 5,014,464 |
| 482 | 5,014,465 |
| 504 | 5,014,466 |
| **CLASS 51** | |
| 287 | 5,014,467 |
| 293 | 5,015,265 |
| | 5,015,266 |
| 295 | 5,014,468 |
| 425 | 5,014,469 |
| **CLASS 52** | |
| 19 | 5,014,475 |
| 23 | 5,014,470 |
| 98 | 5,014,471 |
| 103 | 5,014,472 |
| 125.5 | 5,014,473 |
| 167 | 5,014,474 |
| 220 | 5,014,476 |
| 235 | 5,014,477 |
| 281 | 5,014,478 |
| 308 | 5,014,479 |
| 309.12 | 5,014,480 |
| 406 | 5,014,481 |
| 506 | 5,014,482 |
| 514 | 5,014,483 |
| 646 | 5,014,484 |
| 678 | 5,014,485 |
| 717.1 | 5,014,486 |
| 731 | 5,014,487 |
| 746 | 5,014,488 |
| **CLASS 53** | |
| 51 | 5,014,489 |
| 73 | 5,014,490 |
| 173 | 5,014,501 |
| 366 | 5,014,491 |
| 405 | 5,014,492 |
| 410 | 5,014,493 |
| 425 | 5,014,494 |
| 433 | 5,014,495 |
| | 5,014,496 |
| 451 | 5,014,497 |
| | 5,014,498 |
| | 5,014,499 |
| 502 | B1 4,458,470 |
| 559 | 5,014,500 |
| **CLASS 55** | |
| 12 | 5,015,267 |
| 16 | 5,015,268 |
| | 5,015,269 |
| | 5,015,270 |
| 25 | 5,015,271 |
| 26 | 5,015,272 |
| 53 | 5,015,273 |
| 97 | 5,015,274 |
| 158 | 5,015,275 |
| 384 | 5,015,276 |
| 385.1 | 5,015,277 |
| **CLASS 56** | |
| 41 | 5,014,502 |
| 63 | 5,014,503 |
| 372 | 5,014,504 |
| **CLASS 57** | |
| 275 | 5,014,505 |
| **CLASS 59** | |
| 78.1 | 5,014,506 |
| **CLASS 60** | |
| 204 | 5,014,507 |
| 224 | 5,014,508 |
| 274 | 5,014,509 |
| 299 | 5,014,510 |
| 303 | 5,014,511 |
| 319 | 5,014,512 |
| 456 | 5,014,513 |
| 533 | 5,014,514 |
| 581 | 5,014,515 |
| 605.1 | 5,014,516 |
| **CLASS 62** | |
| 55.5 | 5,014,517 |
| 88 | 5,014,518 |
| 176.3 | 5,014,519 |
| 187 | 5,014,520 |
| 212 | 5,014,521 |
| 347 | 5,014,523 |
| **CLASS 65** | |
| 6 | 5,015,278 |
| 32.5 | 5,015,281 |
| 302 | 5,015,279 |
| 307 | 5,015,280 |
| **CLASS 66** | |
| 64 | 5,014,524 |
| **CLASS 68** | |
| 20 | 5,014,525 |
| 178 | 5,014,526 |
| **CLASS 70** | |
| 94 | 5,014,527 |
| 177 | 5,014,528 |
| 209 | 5,014,529 |
| 277 | 5,014,530 |
| **CLASS 71** | |
| 65 | 5,015,282 |
| 76 | 5,015,283 |
| 90 | 5,015,284 |
| 92 | 5,015,285 |
| | 5,015,286 |
| **CLASS 72** | |
| 9 | 5,014,531 |
| 60 | 5,014,532 |
| 131 | 5,014,533 |
| 250 | 5,014,534 |
| 326 | 5,014,535 |
| 349 | 5,014,536 |
| 350 | 5,014,537 |
| 422 | 5,014,538 |
| 452 | 5,014,539 |
| 481 | 5,014,540 |
| **CLASS 73** | |
| 23.41 | 5,014,541 |
| 37.5 | 5,014,546 |
| 40.5 R | 5,014,543 |
| 40.7 | 5,014,544 |
| 55 | 5,014,545 |
| 105 | 5,014,547 |
| 118.1 | 5,014,548 |
| | 5,014,549 |
| 118.2 | 5,014,550 |
| 146 | 5,014,551 |
| 204.21 | 5,014,552 |
| 295 | 5,014,553 |
| 505 | 5,014,554 |
| 518 | 5,014,555 |
| 587 | 5,014,556 |
| 756 | 5,014,557 |
| 804 | 5,014,558 |
| 861.56 | 5,014,559 |
| 862.33 | 5,014,560 |
| 864.53 | 5,014,561 |
| **CLASS 74** | |
| 6 | 5,014,562 |
| 7 R | 5,014,563 |
| 61 | 5,014,564 |
| 190 | 5,014,565 |
| 331 | 5,014,566 |
| 359 | 5,014,567 |
| 424.8 R | 5,014,568 |
| 502.4 | 5,014,569 |
| 558.5 | 5,014,570 |
| 594.6 | 5,014,571 |
| 595 | 5,014,572 |
| 866 | 5,014,573 |
| | 5,014,574 |
| | 5,014,575 |
| | 5,014,576 |
| 869 | 5,014,577 |
| **CLASS 75** | |
| 10.17 | 5,015,287 |
| 229 | 5,015,289 |
| 232 | 5,015,290 |
| 531 | 5,015,291 |
| 686 | 5,015,288 |
| **CLASS 81** | |
| 367 | 5,014,578 |
| **CLASS 82** | |
| 47 | 5,014,579 |
| 164 | 5,014,580 |
| 173 | 5,014,581 |
| 227 | 5,014,522 |
| **CLASS 83** | |
| 24 | 5,014,582 |
| 76.9 | 5,014,583 |
| 464 | 5,014,584 |
| **CLASS 84** | |
| 384 | 5,014,585 |
| 637 | 5,014,586 |
| 659 | 5,014,587 |
| 726 | 5,014,588 |
| 735 | 5,014,589 |
| **CLASS 89** | |
| 1.57 | 5,014,590 |
| 6 | 5,014,591 |
| 24 | 5,014,592 |
| 36.02 | 5,014,593 |
| 37.08 | 5,014,594 |
| 44.01 | 5,014,595 |
| **CLASS 91** | |
| 6 | 5,014,596 |
| 369.2 | 5,014,597 |
| **CLASS 92** | |
| 13.005 | 5,014,598 |
| 84 | 5,014,599 |
| 92 | 5,014,600 |
| 109 | 5,014,601 |
| 117 A | 5,014,602 |
| 165 R | 5,014,603 |
| 212 | 5,014,604 |
| 223 | 5,014,605 |
| **CLASS 98** | |
| 2.09 | 5,014,606 |
| 2.13 | 5,014,607 |
| 33.1 | 5,014,608 |
| 40.14 | 5,014,609 |
| 110 | 5,014,610 |
| **CLASS 99** | |
| 276 | 5,014,612 |
| 280 | 5,014,611 |
| **CLASS 100** | |
| 5 | 5,014,613 |
| **CLASS 101** | |
| 35 | 5,014,614 |
| 147 | 5,014,615 |
| 153 | 5,014,616 |
| 333 | 5,014,617 |
| 365 | 5,014,618 |
| 415.1 | 5,014,619 |
| **CLASS 102** | |
| 201 | 5,014,620 |
| 213 | 5,014,621 |
| 312 | 5,014,622 |
| 477 | 5,014,623 |
| 503 | 5,014,624 |
| **CLASS 104** | |
| 292 | 5,014,625 |
| **CLASS 105** | |
| 4.1 | 5,014,626 |
| **CLASS 106** | |
| 22 | 5,015,292 |
| 162 | 5,015,293 |
| 268 | 5,015,294 |
| 464 | 5,015,295 |
| **CLASS 108** | |
| 50 | 5,014,627 |
| 133 | 5,014,628 |
| **CLASS 109** | |
| 34 | 5,014,629 |
| **CLASS 110** | |
| 194 | 5,014,630 |
| 264 | 5,014,631 |
| 347 | 5,014,632 |
| **CLASS 112** | |
| 121.12 | 5,014,633 |
| 262.2 | 5,014,634 |
| 311 | 5,014,635 |
| 419 | 5,014,636 |
| **CLASS 114** | |
| 103 | 5,014,637 |
| 230 | 5,014,638 |
| 352 | 5,014,639 |
| 362 | 5,014,640 |
| **CLASS 116** | |
| 28 R | 5,014,641 |
| 28.1 | 5,014,642 |
| 34 R | 5,014,643 |
| 272 | 5,014,786 |
| **CLASS 118** | |
| 314 | 5,014,644 |
| 663 | 5,014,645 |
| 725 | 5,014,646 |
| **CLASS 119** | |
| 3 | 5,014,647 |
| 105 | 5,014,648 |
| 168 | 5,014,649 |
| 171 | 5,014,650 |
| **CLASS 122** | |
| 4 D | 5,014,651 |
| | 5,014,652 |
| **CLASS 123** | |
| 43 A | 5,014,653 |
| 52 MC | 5,014,654 |
| 90.31 | 5,014,655 |
| 169 EL | 5,014,656 |
| 185 B | 5,014,657 |
| 193 P | 5,014,658 |
| 195 H | 5,014,659 |
| 198 D | 5,014,661 |
| 198 E | 5,014,660 |
| 250 | 5,014,662 |
| 257 | 5,014,663 |
| 271 | 5,014,664 |
| 329 | 5,014,665 |
| 339 | 5,014,666 |
| 360 | 5,014,667 |
| 399 | 5,014,668 |
| 414 | 5,014,669 |
| 425 | 5,014,670 |
| 447 | 5,014,671 |
| 492 | 5,014,672 |
| 512 | 5,014,673 |
| 520 | 5,014,674 |
| 609 | 5,014,675 |
| 637 | 5,014,676 |
| **CLASS 124** | |
| 6 | 5,014,677 |
| **CLASS 125** | |
| 15 | 5,014,678 |
| **CLASS 126** | |
| 21 A | 5,014,679 |
| 77 | 5,014,680 |
| 501 | 5,014,682 |
| 515 | 5,014,683 |
| 531 | 5,014,684 |
| **CLASS 127** | |
| 42 | 5,015,296 |
| 58 | 5,015,297 |
| **CLASS 128** | |
| 4 | 5,014,685 |
| 24 EL | 5,014,686 |
| 33 | 5,014,687 |
| 64 | 5,014,681 |
| 70 | 5,014,688 |
| 77 | 5,014,689 |
| 80 H | 5,014,690 |
| | 5,014,691 |
| 83 | 5,014,692 |
| 204.18 | 5,014,693 |
| 205.24 | 5,014,694 |
| 400 | 5,014,695 |
| 419 D | 5,014,696 |
| | 5,014,697 |
| | 5,014,698 |
| 419 F | 5,014,699 |
| 419 PG | 5,014,700 |
| | 5,014,701 |
| | 5,014,702 |
| | 5,014,703 |
| | 5,014,704 |
| 419 R | 5,014,705 |
| 581 | 5,014,706 |
| 633 | 5,014,707 |
| 653 R | 5,014,708 |
| 654 | 5,014,709 |
| 660.05 | 5,014,710 |
| 660.07 | 5,014,711 |
| 661.01 | 5,014,712 |
| 664 | 5,014,713 |
| 672 | 5,014,714 |
| | 5,014,715 |
| 685 | 5,014,716 |
| 754 | 5,014,717 |
| 771 | 5,014,718 |
| 774 | 5,014,719 |
| 786 | 5,014,720 |
| | 5,014,721 |
| 830 | 5,014,722 |
| 853 | 5,014,723 |
| 870 | 5,014,724 |
| **CLASS 132** | |
| 324 | 5,014,725 |
| **CLASS 134** | |
| 2 | 5,015,298 |
| 8 | 5,015,299 |
| 18 | 5,015,300 |
| 22.1 | 5,015,301 |
| 25.4 | 5,015,302 |

VOL 1126 ISS 2 MY 14 1991 UMI

| | |
|---|---|
| 32 | 5,015,303 |
| 76 | 5,014,726 |
| 102 | 5,014,727 |
| **CLASS 135** | |
| 104 | 5,014,728 |
| **CLASS 137** | |
| 59 | 5,014,731 |
| 68.1 | 5,014,732 |
| 113 | 5,014,733 |
| 117 | 5,014,734 |
| 195 | 5,014,735 |
| 315 | 5,014,736 |
| 334 | 5,014,737 |
| 340 | 5,014,738 |
| 454.2 | 5,014,730 |
| 512.15 | 5,014,739 |
| 513.3 | 5,014,729 |
| 561 A | 5,014,740 |
| 565 | 5,014,741 |
| 588 | 5,014,742 |
| 614.03 | 5,014,743 |
| 614.21 | 5,014,744 |
| 615 | 5,014,745 |
| 625.3 | 5,014,746 |
| 625.65 | 5,014,747 |
| | 5,014,748 |
| 801 | 5,014,749 |
| **CLASS 138** | |
| 43 | 5,014,750 |
| 127 | 5,014,751 |
| 149 | 5,014,752 |
| | 5,014,753 |
| **CLASS 139** | |
| 1 R | 5,014,754 |
| 97 | 5,014,756 |
| 420 A | 5,014,755 |
| **CLASS 141** | |
| 114 | 5,014,757 |
| **CLASS 148** | |
| 20.3 | 5,015,305 |
| 103 | 5,015,306 |
| 302 | 5,015,304 |
| | 5,015,307 |
| 403 | 5,015,308 |
| **CLASS 149** | |
| 19.1 | 5,015,309 |
| 19.9 | 5,015,310 |
| 42 | 5,015,311 |
| **CLASS 150** | |
| 168 | 5,014,758 |
| **CLASS 152** | |
| 427 | 5,014,759 |
| 451 | 5,014,760 |
| 527 | 5,014,761 |
| 532 | 5,014,762 |
| **CLASS 156** | |
| 63 | 5,015,312 |
| 69 | 5,015,316 |
| 87 | 5,015,313 |
| 89 | 5,015,314 |
| 130.7 | 5,015,315 |
| 197 | 5,015,317 |
| 227 | 5,015,319 |
| 233 | 5,015,318 |
| 264 | 5,015,320 |
| 331.7 | 5,015,321 |
| 345 | 5,015,322 |
| | 5,015,323 |
| 384 | 5,015,324 |
| 511 | 5,015,326 |
| 513 | 5,015,325 |
| 603 | 5,015,327 |
| 624 | 5,015,328 |
| 628 | 5,015,329 |
| 643 | 5,015,330 |
| | 5,015,331 |
| **CLASS 159** | |
| 4.2 | 5,015,332 |
| **CLASS 162** | |
| 60 | 5,015,333 |
| 168.1 | 5,015,334 |
| 243 | 5,015,335 |
| 369 | 5,015,336 |
| **CLASS 164** | |
| 15 | 5,014,763 |
| 34 | 5,014,764 |
| 72 | 5,014,765 |
| 154 | 5,014,766 |
| 312 | 5,014,767 |
| 416 | 5,014,393 |
| 418 | 5,014,768 |
| 493 | 5,014,769 |
| **CLASS 165** | |
| 48.2 | 5,014,770 |
| 76 | 5,014,771 |
| 86 | 5,014,772 |
| 115 | 5,014,773 |
| 133 | 5,014,774 |
| 167 | 5,014,775 |
| 185 | 5,014,776 |
| | 5,014,777 |
| **CLASS 166** | |
| 55.6 | 5,014,778 |
| 55.7 | 5,014,779 |
| 55.8 | 5,014,780 |
| 66.5 | 5,014,781 |
| 120 | 5,014,782 |
| 252 | 5,014,783 |
| 263 | 5,014,784 |
| | 5,014,785 |
| 303 | 5,014,787 |
| 308 | 5,014,788 |
| 372 | 5,014,789 |
| **CLASS 169** | |
| 44 | 5,014,790 |
| **CLASS 172** | |
| 21 | 5,014,791 |
| 371 | 5,014,792 |
| **CLASS 173** | |
| 12 | 5,014,793 |
| | 5,014,794 |
| 39 | 5,014,542 |
| **CLASS 174** | |
| 34 | 5,015,800 |
| 35 GC | 5,015,802 |
| 52.2 | 5,015,801 |
| 52.4 | 5,015,803 |
| 65 SS | 5,015,804 |
| 75 C | 5,015,805 |
| **CLASS 175** | |
| 45 | 5,014,795 |
| 296 | 5,014,796 |
| **CLASS 177** | |
| 4 | 5,014,797 |
| 25.19 | 5,014,798 |
| 211 | 5,014,799 |
| **CLASS 180** | |
| 65.5 | 5,014,800 |
| 140 | 5,014,801 |
| | 5,014,802 |
| 164 | 5,014,803 |
| 178 | 5,014,804 |
| 184 | 5,014,805 |
| 197 | 5,014,806 |
| 219 | 5,014,807 |
| | 5,014,808 |
| 248 | 5,014,809 |
| 268 | 5,014,810 |
| 286 | 5,014,811 |
| 292 | 5,014,812 |
| **CLASS 181** | |
| 122 | 5,014,813 |
| 200 | 5,014,814 |
| 213 | 5,014,815 |
| 229 | 5,014,816 |
| 254 | 5,014,817 |
| **CLASS 182** | |
| 90 | 5,014,818 |
| **CLASS 184** | |
| 6.2 | 5,014,819 |
| 6.3 | 5,014,820 |
| 55.2 | 5,014,821 |
| **CLASS 187** | |
| 1 R | 5,014,822 |
| 17 | 5,014,823 |
| | 5,014,824 |
| 104 | 5,014,825 |
| 112 | 5,014,826 |
| **CLASS 188** | |
| 72.4 | 5,014,827 |
| 173 | 5,014,828 |
| 267 | 5,014,829 |
| **CLASS 190** | |
| 36 | 5,014,830 |
| **CLASS 192** | |
| 0.092 | 5,014,839 |
| 4 A | 5,014,831 |
| 30 W | 5,014,832 |
| 45 | 5,014,833 |
| 48.3 | 5,014,834 |
| 48.5 | 5,014,835 |
| 58 B | 5,014,836 |
| 61 | 5,014,837 |
| 89 B | 5,014,838 |
| 98 | 5,014,840 |
| 105 C | 5,014,841 |
| 106.2 | 5,014,842 |
| **CLASS 198** | |
| 377 | 5,014,843 |
| 499 | 5,014,844 |
| 735.2 | 5,014,845 |
| **CLASS 200** | |
| 52 R | 5,015,806 |
| 61.88 | 5,015,807 |
| 83 P | 5,015,808 |
| 144 R | 5,015,809 |
| 147 R | 5,015,810 |
| 521 | 5,015,811 |
| **CLASS 202** | |
| 169 | 5,015,337 |
| **CLASS 204** | |
| 5 | 5,015,338 |
| 15 | 5,015,339 |
| 28 | 5,015,340 |
| | 5,015,341 |
| 64 T | 5,015,342 |
| 67 | 5,015,343 |
| 98 | 5,015,344 |
| | 5,015,345 |
| 129.1 | 5,015,346 |
| 129.2 | 5,015,347 |
| 157.2 | 5,015,348 |
| 168 | 5,015,349 |
| 180.1 | 5,015,350 |
| 182.2 | 5,015,351 |
| 192.15 | 5,015,352 |
| 192.31 | 5,015,353 |
| 254 | 5,015,354 |
| 404 | 5,015,355 |
| **CLASS 206** | |
| 5 | 5,014,846 |
| 279 | 5,014,847 |
| 315.9 | 5,014,848 |
| 328 | 5,014,849 |
| 371 | 5,014,850 |
| 539 | 5,014,851 |
| 554 | 5,014,852 |
| 602 | 5,014,853 |
| 611 | 5,014,854 |
| 616 | 5,014,855 |
| 632 | 5,014,856 |
| **CLASS 208** | |
| 16 | 5,015,356 |
| 32 | 5,015,357 |
| 48 AA | 5,015,358 |
| 58 | 5,015,359 |
| 110 | 5,015,360 |
| 111 | 5,015,361 |
| 121 | 5,015,362 |
| 150 | 5,015,363 |
| 236 | 5,015,364 |
| 262.1 | 5,015,365 |
| 408 | 5,015,366 |
| **CLASS 209** | |
| 166 | 5,015,367 |
| | 5,015,368 |
| 534 | 5,014,857 |
| 641 | 5,014,858 |
| **CLASS 210** | |
| 136 | 5,015,369 |
| 138 | 5,015,370 |
| 164 | 5,015,371 |
| 170 | 5,015,372 |
| 198.2 | 5,015,373 |
| 232 | 5,015,374 |
| | 5,015,375 |
| 317 | 5,015,376 |
| 323.2 | 5,015,377 |
| 386 | 5,015,378 |
| 411 | 5,015,379 |
| 490 | 5,015,380 |
| | 5,015,381 |
| | 5,015,382 |
| 497.1 | 5,015,383 |
| 603 | 5,015,384 |
| 610 | 5,015,385 |
| 638 | 5,015,386 |
| | 5,015,387 |
| 641 | 5,015,388 |
| 646 | 5,015,389 |
| 698 | 5,015,390 |
| 708 | 5,015,391 |
| 712 | 5,015,392 |
| 744 | 5,015,393 |
| | 5,015,394 |
| 755 | 5,015,395 |
| 763 | 5,015,396 |
| 767 | 5,015,397 |
| | 5,015,398 |
| 776 | 5,015,399 |
| **CLASS 211** | |
| 55 | 5,014,859 |
| 106 | 5,014,860 |
| 182 | 5,014,861 |
| 193 | 5,014,862 |
| **CLASS 212** | |
| 182 | 5,014,863 |
| **CLASS 213** | |
| 104 | 5,014,864 |
| **CLASS 215** | |
| 99.5 | 5,014,865 |
| 364 | 5,014,866 |
| **CLASS 219** | |
| 10.55 B | 5,015,812 |
| 10.55 F | 5,015,813 |
| 69.12 | 5,015,814 |
| 110 | 5,015,815 |
| 119 | 5,015,816 |
| 121.14 | 5,015,817 |
| 121.63 | 5,015,818 |
| 121.7 | 5,015,819 |
| 121.72 | 5,015,820 |
| 124.34 | 5,015,821 |
| 137.41 | 5,015,822 |
| 146.1 | 5,015,823 |
| 219 | 5,015,824 |
| 390 | 5,015,825 |
| 492 | 5,015,826 |
| 497 | 5,015,827 |
| 523 | 5,015,828 |
| **CLASS 220** | |
| 1.5 | 5,014,867 |
| 85 H | 5,014,868 |
| 90.2 | 5,014,869 |
| 263 | 5,014,870 |
| 315 | 5,014,871 |
| 403 | 5,014,872 |
| 601 | 5,014,873 |
| 908 | 5,014,874 |
| **CLASS 221** | |
| 2 | 5,014,875 |
| 233 | 5,014,876 |
| 265 | 5,014,877 |
| 279 | 5,014,878 |
| **CLASS 222** | |
| 99 | 5,014,879 |
| 181 | 5,014,880 |
| 207 | 5,014,881 |
| 309 | 5,014,882 |
| 318 | 5,014,883 |
| 333 | 5,014,884 |
| 368 | 5,014,885 |
| 399 | 5,014,886 |
| 402.1 | 5,014,887 |
| 541 | 5,014,888 |
| 644 | 5,014,889 |
| **CLASS 224** | |
| 42.46 R | 5,014,890 |
| 200 | 5,014,891 |
| 271 | 5,014,892 |
| 321 | 5,014,893 |
| **CLASS 227** | |
| 6 | 5,014,894 |
| 8 | 5,014,895 |
| 39 | 5,014,896 |
| 119 | 5,014,897 |
| 130 | 5,014,898 |
| 180 | 5,014,899 |
| **CLASS 228** | |
| 4.5 | 5,014,900 |
| 119 | 5,014,901 |
| 170 | 5,014,902 |
| 176 | 5,014,903 |
| | 5,014,904 |
| **CLASS 229** | |
| 113 | 5,014,905 |
| 117.01 | 5,014,907 |
| 123 | 5,014,906 |
| **CLASS 235** | |
| 1 D | 5,015,829 |
| 441 | 5,015,830 |
| 462 | 5,015,831 |
| | 5,015,832 |
| 472 | 5,015,833 |
| 493 | 5,015,834 |
| **CLASS 236** | |
| 44 E | 5,014,908 |
| 44 R | 5,014,909 |
| **CLASS 237** | |
| 2 A | 5,014,910 |
| 12.3 B | 5,014,911 |
| **CLASS 239** | |
| 11 | 5,014,912 |
| 45 | 5,014,913 |
| 62 | 5,014,914 |
| 79 | 5,014,915 |
| 85 | 5,014,916 |
| 265.11 | 5,014,917 |
| 410 | 5,014,918 |
| 579 | 5,014,919 |
| **CLASS 241** | |
| 101.2 | 5,014,920 |
| 169.2 | 5,014,921 |
| **CLASS 242** | |
| 18 R | 5,014,922 |
| 55 | 5,014,923 |
| 56 R | 5,014,924 |
| 86 | 5,014,925 |
| 107.4 A | 5,014,926 |
| 107.40 R | 5,014,927 |
| 118.32 | 5,014,928 |
| 195 | 5,014,929 |
| **CLASS 244** | |
| 3.12 | 5,014,930 |
| 3.25 | 5,014,931 |
| 53 B | 5,014,933 |
| 117 A | 5,014,932 |
| 132 | 5,014,934 |
| 137.1 | 5,014,935 |
| 158 R | 5,014,936 |
| **CLASS 246** | |
| 406 | 5,014,937 |
| **CLASS 248** | |
| 56 | 5,014,938 |
| 70 | 5,014,939 |
| 74.1 | 5,014,940 |
| 74.4 | 5,014,941 |
| 79 | 5,014,942 |
| 99 | 5,014,943 |
| | 5,014,944 |
| 188.4 | 5,014,945 |
| 206.5 | 5,014,946 |
| 214 | 5,014,947 |
| 215 | 5,014,948 |
| 220.4 | 5,014,949 |
| 231.5 | 5,014,950 |
| 231.8 | 5,014,951 |
| 250 | 5,014,952 |
| 284 | 5,014,953 |
| 285 | 5,014,954 |
| 309.1 | 5,014,955 |
| 311.2 | 5,014,956 |
| 340 | 5,014,957 |
| 394 | 5,014,958 |
| 551 | 5,014,959 |
| 602 | 5,014,960 |
| 670 | 5,014,961 |
| **CLASS 250** | |
| 201.5 | 5,015,835 |
| 205 | 5,015,836 |
| 208.1 | 5,015,837 |
| 211 J | 5,015,838 |
| 214 AG | 5,015,839 |
| 221 | 5,015,840 |
| 223 R | 5,015,841 |
| 227.15 | 5,015,842 |
| 227.21 | 5,015,843 |
| 227.24 | 5,015,844 |
| 235 | 5,015,846 |
| 253 | 5,015,847 |
| 281 | 5,015,848 |
| 288 | 5,015,845 |
| 302 | 5,015,849 |
| 306 | 5,015,850 |
| | 5,015,851 |
| 327.2 | 5,015,852 |
| | 5,015,853 |
| | 5,015,854 |
| 337 | 5,015,855 |
| 339 | 5,015,856 |
| 349 | 5,015,857 |
| 352 | 5,015,858 |
| 358.1 | 5,015,859 |
| 361 R | 5,015,860 |
| | 5,015,861 |
| 423 R | 5,015,862 |
| 515.1 | 5,015,863 |
| 516.1 | 5,015,864 |
| | 5,015,865 |
| 548 | 5,015,866 |
| 560 | 5,015,867 |
| 561 | 5,015,868 |
| **CLASS 251** | |
| 6 | 5,014,962 |
| 245 | 5,014,963 |
| 352 | 5,014,964 |
| **CLASS 252** | |
| 8.554 | 5,015,400 |
| 18 | 5,015,401 |
| 32.7 E | 5,015,402 |
| 40 | 5,015,403 |
| 49.6 | 5,015,404 |
| 49.9 | 5,015,405 |
| 51.5 R | 5,015,406 |
| 99 | 5,015,408 |
| 108 | 5,015,409 |
| 166 | 5,015,410 |
| 194 | 5,015,411 |
| 311 | 5,015,412 |
| 511 | 5,015,413 |
| 545 | 5,015,414 |
| 547 | 5,015,415 |
| 586 | 5,015,416 |
| 587 | 5,015,417 |
| **CLASS 257** | |
| 84 | 5,015,031 |
| **CLASS 260** | |
| 410.9 R | 5,015,418 |
| | 5,015,419 |
| **CLASS 261** | |
| 029 | 5,015,420 |
| 122 | 5,015,421 |
| **CLASS 264** | |
| 0.5 | 5,015,422 |
| 9 | 5,015,423 |
| 22 | 5,015,424 |
| 39 | 5,015,425 |
| 40.5 | 5,015,426 |
| 115 | 5,015,427 |
| 129 | 5,015,428 |
| 138 | 5,015,429 |
| 146 | 5,015,430 |
| 222 | 5,015,431 |
| **CLASS 266** | |
| 44 | 5,014,965 |
| **CLASS 267** | |
| 64.26 | 5,014,966 |
| 153 | 5,014,967 |
| **CLASS 269** | |
| 322 | 5,014,968 |
| | 5,014,969 |
| 328 | 5,014,970 |
| **CLASS 270** | |
| 039 | 5,014,971 |
| **CLASS 271** | |
| 3.1 | 5,014,972 |
| 100 | 5,014,973 |
| 104 | 5,014,979 |
| 189 | 5,014,974 |
| 202 | 5,014,975 |
| 220 | 5,014,976 |
| 221 | 5,014,977 |
| 308 | 5,014,978 |
| **CLASS 272** | |
| 73 | 5,014,980 |
| 122 | 5,014,981 |
| **CLASS 273** | |
| 1.5 R | 5,014,983 |
| 26 B | 5,014,984 |
| 32 R | 5,014,985 |
| 73 C | 5,014,987 |
| 125 A | 5,014,988 |
| 128 R | 5,014,990 |
| 138 A | 5,014,991 |
| 145 C | 5,014,989 |
| 164 | 5,014,992 |
| 169 | 5,014,993 |
| 187 R | 5,014,994 |
| 261 | 5,014,995 |
| 299 | 5,014,996 |
| 360 | 5,014,997 |
| 435 | 5,014,982 |
| **CLASS 277** | |
| 3 | 5,014,999 |
| 16 | 5,015,000 |
| 30 | 5,014,998 |
| 37 | 5,015,001 |
| 212 FB | 5,015,002 |
| **CLASS 279** | |
| 123 | 5,015,003 |
| **CLASS 280** | |
| 81.6 | 5,015,004 |
| 630 | 5,015,005 |
| 707 | 5,015,006 |
| | 5,015,007 |
| 764.1 | 5,015,008 |
| 772 | 5,015,009 |
| 808 | 5,015,010 |
| **CLASS 281** | |
| 18 | 5,015,011 |
| **CLASS 285** | |
| 64 | 5,015,013 |
| 81 | 5,015,014 |
| 108 | 5,015,016 |
| 114 | 5,015,015 |
| 333 | 5,015,017 |
| 367 | 5,015,018 |
| **CLASS 290** | |
| 1 R | 5,015,869 |

| | |
|---|---|
| **CLASS 292** | |
| 200 | 5,015,019 |
| 216 | 5,015,020 |
| 230 | 5,015,021 |
| 278 | 5,015,022 |
| **CLASS 294** | |
| 102.1 | 5,015,023 |
| **CLASS 296** | |
| 20 | 5,015,024 |
| 37.6 | 5,015,025 |
| 65.1 | 5,015,026 |
| 97.6 | 5,015,027 |
| 107 | 5,015,028 |
| 180.1 | 5,015,029 |
| 223 | 5,015,030 |
| **CLASS 297** | |
| 184 | 5,015,032 |
| 192 | 5,015,033 |
| 227 | 5,015,034 |
| 345 | 5,015,035 |
| 397 | 5,015,036 |
| 452 | 5,015,037 |
| 457 | 5,015,038 |
| **CLASS 299** | |
| 22 | 5,015,039 |
| **CLASS 303** | |
| 93 | 5,015,040 |
| 95 | 5,015,041 |
| 96 | 5,015,042 |
| 100 | 5,015,043 |
| 114 | 5,015,044 |
| | 5,015,045 |
| 118 | 5,015,046 |
| **CLASS 307** | |
| 66 | 5,015,870 |
| 269 | 5,015,871 |
| | 5,015,872 |
| 270 | 5,015,873 |
| 272.1 | 5,015,874 |
| 272.2 | 5,015,875 |
| 352 | 5,015,876 |
| 353 | 5,015,877 |
| 358 | 5,015,878 |
| | 5,015,879 |
| 443 | 5,015,880 |
| 449 | 5,015,881 |
| 452 | 5,015,882 |
| 465 | 5,015,883 |
| | 5,015,884 |
| | 5,015,885 |
| | 5,015,886 |
| 475 | 5,015,887 |
| | 5,015,888 |
| | 5,015,889 |
| 530 | 5,015,890 |
| | 5,015,891 |
| 600 | 5,015,892 |
| **CLASS 310** | |
| 67 R | 5,015,893 |
| 71 | 5,015,894 |
| | 5,015,895 |
| | 5,015,896 |
| 83 | 5,015,897 |
| | 5,015,898 |
| | 5,015,899 |
| 91 | 5,015,900 |
| 153 | 5,015,901 |
| 156 | 5,015,902 |
| 168 | 5,015,903 |
| 184 | 5,015,904 |
| 186 | 5,015,905 |
| 309 | 5,015,906 |
| 335 | 5,015,929 |
| **CLASS 312** | |
| 196 | Re.33,588 |
| 319 | 5,015,048 |
| 335 | 5,015,047 |
| **CLASS 313** | |
| 3 | 5,015,907 |
| 37 | 5,015,908 |
| 105 R | 5,015,909 |
| 414 | 5,015,910 |
| | 5,015,911 |
| 495 | 5,015,912 |
| 625 | 5,015,913 |
| **CLASS 315** | |
| 4 | 5,015,914 |
| 8 | 5,015,915 |
| 47 | 5,015,916 |
| 56 | 5,015,917 |
| 76 | 5,015,918 |
| 86 | 5,015,919 |
| 111.81 | 5,015,920 |
| 208 | 5,015,921 |
| 282 | 5,015,922 |
| 307 | 5,015,923 |
| 324 | 5,015,924 |
| 382 | 5,015,925 |
| **CLASS 318** | |
| 9 | 5,015,926 |
| 139 | 5,015,927 |
| 250 | 5,015,928 |
| 466 | 5,015,930 |
| 483 | 5,015,931 |
| 560 | 5,015,932 |
| 567 | 5,015,933 |
| 611 | 5,015,934 |
| 630 | 5,015,935 |
| 687 | 5,015,936 |
| 696 | 5,015,937 |
| | 5,015,938 |
| 701 | 5,015,939 |
| **CLASS 322** | |
| 4 | 5,015,940 |
| 10 | 5,015,941 |
| **CLASS 323** | |
| 289 | B1 4,755,741 |
| 315 | 5,015,942 |
| **CLASS 324** | |
| 95 | 5,015,943 |
| 127 | 5,015,944 |
| | 5,015,945 |
| 158 F | 5,015,946 |
| 158 P | 5,015,947 |
| 207.23 | 5,015,948 |
| 207.25 | 5,015,949 |
| 224 | 5,015,950 |
| 232 | 5,015,951 |
| 236 | 5,015,952 |
| 244 | 5,015,953 |
| 307 | 5,015,954 |
| 309 | 5,015,955 |
| | 5,015,956 |
| 438 | 5,015,957 |
| 522 | 5,015,958 |
| 557 | 5,015,959 |
| **CLASS 328** | |
| 36 | 5,015,960 |
| **CLASS 329** | |
| 300 | 5,015,961 |
| 346 | 5,015,962 |
| 361 | 5,015,963 |
| **CLASS 330** | |
| 4.3 | 5,015,964 |
| 149 | 5,015,965 |
| 253 | 5,015,966 |
| 257 | 5,015,967 |
| 277 | 5,015,968 |
| 284 | 5,015,969 |
| **CLASS 331** | |
| 11 | 5,015,970 |
| 16 | 5,015,971 |
| **CLASS 333** | |
| 32 | 5,015,972 |
| 132 | 5,015,973 |
| 134 | 5,015,974 |
| 181 | 5,015,975 |
| 204 | 5,015,976 |
| **CLASS 335** | |
| 17 | 5,015,977 |
| 78 | 5,015,978 |
| 83 | 5,015,979 |
| 126 | 5,015,980 |
| **CLASS 336** | |
| 65 | 5,015,981 |
| 69 | 5,015,982 |
| 180 | 5,015,983 |
| 197 | 5,015,984 |
| **CLASS 337** | |
| 368 | 5,015,985 |
| **CLASS 338** | |
| 22 R | 5,015,986 |
| | 5,015,987 |
| 28 | 5,015,988 |
| 195 | 5,015,989 |
| **CLASS 340** | |
| 454 | 5,015,990 |
| 456 | 5,015,991 |
| 551 | 5,015,992 |
| | 5,015,993 |
| 567 | 5,015,994 |
| 621 | 5,015,995 |
| 644 | 5,015,996 |
| 684 | 5,015,997 |
| 686 | 5,015,998 |
| 702 | 5,015,999 |
| 731 | 5,016,000 |
| 747 | 5,016,001 |
| 756 | 5,016,002 |
| 825.19 | 5,016,003 |
| 825.69 | 5,016,004 |
| 870.19 | 5,016,005 |
| 984 | 5,016,006 |
| 995 | 5,016,007 |
| **CLASS 341** | |
| 33 | 5,016,008 |
| 67 | 5,016,009 |
| | 5,016,010 |
| 95 | 5,016,011 |
| 118 | 5,016,012 |
| 162 | 5,016,014 |
| **CLASS 342** | |
| 2 | 5,016,015 |
| 87 | 5,016,016 |
| 106 | 5,016,017 |
| 351 | 5,016,018 |
| 400 | 5,016,019 |
| **CLASS 343** | |
| 703 | 5,016,020 |
| 722 | 5,016,021 |
| 750 | 5,016,022 |
| **CLASS 346** | |
| 1.1 | 5,016,023 |
| | 5,016,024 |
| 14 MR | 5,016,025 |
| 33 R | 5,016,026 |
| 107 R | 5,016,027 |
| 140 R | 5,016,028 |
| 160 | 5,016,029 |
| **CLASS 350** | |
| 3.81 | 5,015,049 |
| 6.8 | 5,015,050 |
| 96.12 | 5,015,051 |
| 96.13 | 5,015,052 |
| 96.14 | 5,015,053 |
| 96.15 | 5,015,054 |
| | 5,015,055 |
| | 5,015,056 |
| | 5,015,057 |
| | 5,015,058 |
| 96.17 | 5,015,059 |
| 96.20 | 5,015,060 |
| | 5,015,061 |
| 96.21 | 5,015,062 |
| 96.23 | 5,015,063 |
| 96.24 | 5,015,064 |
| | 5,015,065 |
| 96.27 | 5,015,066 |
| 96.29 | 5,015,067 |
| 96.30 | 5,015,068 |
| 162.17 | 5,015,069 |
| 163 | 5,015,070 |
| 171 | 5,015,071 |
| 276 R | 5,015,072 |
| 317 | 5,015,073 |
| 339 F | 5,015,074 |
| 357 | 5,015,075 |
| 412 | 5,015,076 |
| 426 | 5,015,077 |
| 432 | 5,015,078 |
| 470 | 5,015,079 |
| 484 | 5,015,080 |
| 514 | 5,015,081 |
| | 5,015,082 |
| 618 | 5,015,083 |
| 632 | 5,015,084 |
| **CLASS 351** | |
| 43 | 5,015,085 |
| 44 | 5,015,086 |
| 65 | 5,015,087 |
| **CLASS 352** | |
| 198 | 5,015,088 |
| 235 | 5,015,089 |
| **CLASS 354** | |
| 21 | 5,016,030 |
| 173.1 | 5,016,031 |
| 195.1 | 5,016,032 |
| 251 | 5,016,033 |
| 288 | 5,016,034 |
| 290 | 5,016,035 |
| 318 | 5,016,036 |
| 413 | 5,016,037 |
| 418 | 5,016,038 |
| 430 | 5,016,039 |
| **CLASS 355** | |
| 20 | 5,016,040 |
| 27 | 5,016,041 |
| | 5,016,042 |
| 38 | 5,016,043 |
| 43 | 5,016,044 |
| | 5,016,045 |
| 68 | 5,016,046 |
| 71 | 5,016,047 |
| 202 | 5,016,048 |
| 203 | 5,016,049 |
| 208 | 5,016,050 |
| 218 | 5,016,051 |
| 228 | 5,016,052 |
| 245 | 5,016,053 |
| 256 | 5,016,054 |
| 273 | 5,016,055 |
| 279 | 5,016,056 |
| 282 | 5,016,057 |
| 292 | 5,016,058 |
| 308 | 5,016,059 |
| 312 | 5,016,060 |
| 320 | 5,016,061 |
| 327 | 5,016,062 |
| **CLASS 356** | |
| 30 | 5,015,090 |
| 135 | 5,015,091 |
| 300 | 5,015,092 |
| 307 | 5,015,093 |
| 336 | 5,015,094 |
| 350 | 5,015,095 |
| 371 | 5,015,096 |
| 394 | 5,015,097 |
| 402 | 5,015,098 |
| 437 | 5,015,099 |
| 445 | 5,015,100 |
| **CLASS 357** | |
| 8 | 5,016,063 |
| 16 | 5,016,064 |
| | 5,016,065 |
| 23.4 | 5,016,066 |
| | 5,016,067 |
| 23.5 | 5,016,068 |
| | 5,016,069 |
| 23.6 | 5,016,070 |
| | 5,016,071 |
| 26 | 5,016,072 |
| 30 | 5,016,073 |
| 34 | 5,016,074 |
| 35 | 5,016,075 |
| 38 | 5,016,076 |
| 41 | 5,016,077 |
| 42 | 5,016,078 |
| 43 | 5,016,079 |
| 45 | 5,016,080 |
| 67 | 5,016,081 |
| 70 | 5,016,082 |
| 71 | 5,016,083 |
| 72 | 5,016,084 |
| 74 | 5,016,085 |
| | 5,016,086 |
| 75 | 5,016,087 |
| 76 | 5,016,088 |
| 80 | 5,016,089 |
| 82 | 5,016,090 |
| **CLASS 358** | |
| 29 | 5,016,091 |
| 31 | 5,016,092 |
| 41 | 5,016,093 |
| | 5,016,094 |
| 64 | 5,016,095 |
| 75 | 5,016,096 |
| 79 | 5,016,097 |
| 98 | 5,016,098 |
| 106 | 5,016,099 |
| 133 | 5,016,100 |
| 140 | 5,016,101 |
| | 5,016,102 |
| 166 | 5,016,103 |
| 167 | 5,016,104 |
| 182 | 5,016,105 |
| 183 | 5,016,106 |
| 209 | 5,016,107 |
| 212 | 5,016,108 |
| 225 | 5,016,109 |
| 227 | 5,016,110 |
| 328 | 5,016,111 |
| 335 | 5,016,112 |
| | 5,016,113 |
| 404 | 5,016,114 |
| 442 | 5,016,115 |
| 448 | 5,016,116 |
| 456 | 5,016,117 |
| 462 | 5,016,118 |
| **CLASS 360** | |
| 10.3 | 5,016,119 |
| 27 | 5,016,120 |
| 39 | 5,016,121 |
| 62 | 5,016,122 |
| 69 | 5,016,123 |
| | 5,016,124 |
| 78.07 | 5,016,126 |
| 85 | 5,016,125 |
| 94 | 5,016,127 |
| 97.01 | 5,016,128 |
| 103 | 5,016,129 |
| 104 | 5,016,130 |
| 106 | 5,016,131 |
| 130.21 | 5,016,132 |
| **CLASS 361** | |
| 92 | 5,016,133 |
| 153 | 5,016,134 |
| 156 | 5,016,135 |
| 230 | 5,016,136 |
| 321 | 5,016,137 |
| 381 | 5,016,138 |
| 386 | 5,016,139 |
| 400 | 5,016,140 |
| 415 | 5,016,141 |
| | 5,016,142 |
| **CLASS 362** | |
| 32 | 5,016,143 |
| 35 | 5,016,144 |
| 80.1 | 5,016,145 |
| 92 | 5,016,146 |
| 99 | 5,016,147 |
| 102 | 5,016,148 |
| 259 | 5,016,149 |
| 263 | 5,016,150 |
| 267 | 5,016,151 |
| 293 | 5,016,152 |
| 402 | 5,016,153 |
| 414 | 5,016,154 |
| 418 | 5,016,155 |
| **CLASS 363** | |
| 21 | 5,016,156 |
| 39 | 5,016,157 |
| 71 | 5,016,158 |
| **CLASS 364** | |
| 200 | 5,016,159 |
| | 5,016,160 |
| | 5,016,161 |
| | 5,016,162 |
| | 5,016,163 |
| | 5,016,164 |
| | 5,016,165 |
| | 5,016,166 |
| | 5,016,167 |
| | 5,016,168 |
| | 5,016,169 |
| 401 | 5,016,170 |
| 406 | 5,016,171 |
| 413.02 | 5,016,172 |
| 413.13 | 5,016,173 |
| 424.06 | 5,016,177 |
| 424.1 | 5,016,174 |
| | 5,016,175 |
| | 5,016,176 |
| 426.02 | 5,016,178 |
| | 5,016,179 |
| 431.04 | 5,016,180 |
| 431.09 | 5,016,181 |
| 469 | 5,016,182 |
| 470 | 5,016,183 |
| 476 | 5,016,184 |
| 481 | 5,016,185 |
| 507 | 5,016,186 |
| 510 | 5,016,187 |
| 513 | 5,016,188 |
| 518 | 5,016,189 |
| | 5,016,190 |
| | 5,016,191 |
| | 5,016,192 |
| | 5,016,193 |
| 519 | 5,016,194 |
| | 5,016,195 |
| 550 | 5,016,196 |
| | 5,016,197 |
| | 5,016,198 |
| 560 | 5,016,199 |
| 567 | 5,016,200 |
| 571.02 | 5,016,203 |
| 571.04 | 5,016,201 |
| 571.07 | 5,016,202 |
| 578 | 5,016,204 |
| 715.01 | 5,016,205 |
| 715.11 | 5,016,206 |
| 724.01 | 5,016,207 |
| 740 | 5,016,208 |
| 748 | 5,016,209 |
| 766 | 5,016,210 |
| 786 | 5,016,211 |
| 900 | 5,016,212 |
| | 5,016,213 |
| **CLASS 365** | |
| 154 | 5,016,214 |
| 185 | 5,016,215 |
| | 5,016,216 |
| | 5,016,217 |
| 189.09 | 5,016,218 |
| 195 | 5,016,219 |
| 201 | 5,016,220 |
| 221 | 5,016,221 |
| 226 | 5,016,222 |
| 229 | 5,016,223 |
| 230.03 | 5,016,224 |
| 233 | 5,016,226 |
| **CLASS 366** | |
| 349 | 5,015,101 |
| **CLASS 367** | |
| 3 | 5,016,227 |
| 163 | 5,016,228 |
| 173 | 5,016,225 |
| **CLASS 368** | |
| 10 | 5,016,229 |
| | 5,016,230 |
| 80 | 5,016,231 |
| **CLASS 369** | |
| 13 | 5,016,232 |
| 44.13 | 5,016,233 |
| 44.14 | 5,016,234 |
| 44.41 | 5,016,235 |
| 75.2 | 5,016,236 |
| 112 | 5,016,237 |
| 215 | 5,016,238 |
| 284 | 5,016,239 |
| 288 | 5,016,240 |
| 289 | 5,016,241 |
| **CLASS 370** | |
| 3 | 5,016,242 |
| 16 | 5,016,243 |
| | 5,016,244 |
| 60 | 5,016,245 |
| 76 | 5,016,246 |
| 81.00 | 5,016,247 |
| 94.1 | 5,016,248 |
| **CLASS 371** | |
| 16.1 | 5,016,249 |
| **CLASS 372** | |
| 5 | 5,016,250 |
| 10 | 5,016,251 |
| 45 | 5,016,252 |
| 50 | 5,016,253 |
| 55 | 5,016,254 |
| **CLASS 374** | |
| 107 | 5,015,102 |
| **CLASS 375** | |
| 1 | 5,016,255 |
| | 5,016,256 |
| | 5,016,257 |
| 25 | 5,016,258 |
| 62 | 5,016,259 |
| 66 | 5,016,260 |
| 76 | 5,016,261 |
| **CLASS 376** | |
| 148 | 5,015,432 |
| 245 | 5,015,433 |
| 254 | 5,015,434 |
| 285 | 5,015,435 |
| 306 | 5,015,436 |
| 385 | 5,015,437 |
| **CLASS 377** | |
| 15 | 5,016,262 |
| 68 | 5,016,263 |
| **CLASS 378** | |
| 38 | 5,016,264 |
| 43 | 5,016,265 |
| 73 | 5,016,266 |
| 84 | 5,016,267 |
| 177 | 5,016,268 |
| **CLASS 379** | |
| 59 | 5,016,269 |
| 92 | 5,016,270 |
| 410 | 5,016,271 |
| **CLASS 380** | |
| 5 | 5,016,272 |
| 10 | 5,016,273 |
| 23 | 5,016,274 |
| 43 | 5,016,275 |
| 45 | 5,016,276 |
| 49 | 5,016,277 |
| **CLASS 381** | |
| 36 | 5,016,278 |
| | 5,016,279 |
| 68 | 5,016,280 |
| **CLASS 382** | |
| 1 | 5,016,281 |
| 2 | 5,016,282 |
| 6 | 5,016,283 |
| **CLASS 383** | |
| 10 | 5,015,103 |
| **CLASS 384** | |
| 296 | 5,015,104 |
| 531 | 5,015,105 |
| **CLASS 400** | |
| 121 | 5,015,106 |
| 144.2 | 5,015,107 |
| 197 | 5,015,108 |
| 624 | 5,015,109 |
| **CLASS 401** | |
| 10 | 5,015,110 |
| 52 | 5,015,111 |
| 202 | 5,015,112 |
| 224 | 5,015,113 |
| **CLASS 402** | |
| 4 | 5,015,114 |
| 56 | 5,015,115 |

VOL
1126
ISS
2
MY
14
1991
UMI

# CLASSIFICATION OF PATENTS

### CLASS 403

| | |
|---|---|
| 28 | 5,015,116 |
| 300 | 5,015,117 |
| 362 | 5,015,118 |

### CLASS 404

| | |
|---|---|
| 12 | 5,015,119 |
| 108 | 5,015,120 |

### CLASS 405

| | |
|---|---|
| 31 | 5,015,121 |
| 36 | 5,015,122 |
| 45 | 5,015,123 |
| 184 | 5,015,124 |
| 288 | 5,015,125 |

### CLASS 406

| | |
|---|---|
| 152 | 5,015,126 |
| 192 | 5,015,127 |

### CLASS 408

| | |
|---|---|
| 59 | 5,015,128 |
| 239 A | 5,015,129 |

### CLASS 409

| | |
|---|---|
| 80 | 5,015,130 |

### CLASS 410

| | |
|---|---|
| 63 | 5,015,131 |

### CLASS 411

| | |
|---|---|
| 10 | 5,015,132 |
| 267 | 5,015,133 |
| 386 | 5,015,134 |
| 447 | 5,015,135 |
| 504 | 5,015,136 |

### CLASS 412

| | |
|---|---|
| 1 | 5,015,137 |
| 43 | 5,015,138 |

### CLASS 414

| | |
|---|---|
| 281 | 5,015,139 |
| 282 | 5,015,140 |
| 395 | 5,015,141 |
| 408 | 5,015,142 |
| 411 | 5,015,143 |
| 525 2 | 5,015,144 |
| 547 | 5,015,145 |
| 639 | 5,015,146 |
| 685 | 5,015,147 |
| 722 | 5,015,148 |
| 751 | 5,015,149 |

### CLASS 416

| | |
|---|---|
| 220 R | 5,015,150 |
| 223 R | Re 33,589 |

### CLASS 417

| | |
|---|---|
| 18 | 5,015,151 |
| 40 | 5,015,152 |
| 44 | 5,015,153 |
| 269 | 5,015,154 |
| 360 | 5,015,155 |
| 366 | 5,015,159 |
| 370 | 5,015,156 |
| 439 | 5,015,160 |
| 500 | 5,015,157 |
| 525 | 5,015,158 |

### CLASS 418

| | |
|---|---|
| 6 | 5,015,161 |
| 48 | 5,015,162 |
| 55 1 | 5,015,163 |
| 63 | 5,015,164 |

### CLASS 419

| | |
|---|---|
| 23 | 5,015,438 |
| | 5,015,439 |
| 31 | 5,015,440 |

### CLASS 422

| | |
|---|---|
| 12 | 5,015,441 |
| 121 | 5,015,442 |
| 186 | 5,015,443 |
| 195 | 5,015,444 |
| 204 | 5,015,445 |
| 312 | 5,015,446 |

### CLASS 423

| | |
|---|---|
| 21 5 | 5,015,447 |
| 24 | 5,015,448 |
| 172 | 5,015,449 |
| | 5,015,450 |
| 235 | 5,015,451 |
| 263 | 5,015,452 |
| 306 | 5,015,453 |
| 328 | 5,015,454 |
| 388 | 5,015,455 |
| 395 | 5,015,456 |
| 481 | 5,015,457 |
| 531 | 5,015,458 |
| 574 R | 5,015,459 |
| | 5,015,460 |
| 593 | 5,015,461 |

### CLASS 424

| | |
|---|---|
| 1 1 | 5,015,462 |
| 7 1 | 5,015,463 |
| 48 | 5,015,464 |
| 52 | 5,015,466 |
| | 5,015,467 |
| 55 | 5,015,468 |
| 59 | 5,015,469 |
| 70 | 5,015,470 |
| 78 | 5,015,472 |
| 052 | 5,015,465 |
| 070 | 5,015,471 |
| 114 | 5,015,473 |
| 195 1 | 5,015,474 |
| 405 | 5,015,475 |
| 423 | 5,015,476 |
| 439 | 5,015,477 |
| 450 | 5,015,478 |
| 457 | 5,015,479 |
| 486 | 5,015,480 |
| 494 | 5,015,481 |

### CLASS 425

| | |
|---|---|
| 28 1 | 5,015,165 |
| 149 | 5,015,166 |
| 388 | 5,015,167 |
| 389 | 5,015,168 |
| 394 | 5,015,169 |
| 549 | 5,015,170 |

### CLASS 426

| | |
|---|---|
| 73 | 5,015,483 |
| 92 | 5,015,484 |
| 94 | 5,015,485 |
| 243 | 5,015,486 |
| 332 | 5,015,487 |
| 549 | 5,015,488 |
| | 5,015,489 |
| | 5,015,490 |
| 600 | 5,015,491 |

### CLASS 427

| | |
|---|---|
| 8 | 5,015,492 |
| 38 | 5,015,493 |
| 39 | 5,015,494 |
| 49 | 5,015,495 |
| 54 1 | 5,015,496 |
| 77 | 5,015,497 |
| 132 | 5,015,498 |
| 203 | 5,015,499 |
| 211 | 5,015,500 |
| 212 | 5,015,501 |
| 248.1 | 5,015,502 |
| 255.2 | 5,015,503 |
| 284 | 5,015,504 |
| 286 | 5,015,505 |
| 333 | 5,015,506 |
| 385 5 | 5,015,507 |
| 424 | 5,015,508 |
| 431 | 5,015,509 |

### CLASS 428

| | |
|---|---|
| 18 | 5,015,510 |
| 34 1 | 5,015,511 |
| 35 1 | 5,015,512 |
| 35.5 | 5,015,513 |
| 36 4 | 5,015,514 |
| 36.8 | 5,015,515 |
| 143 | 5,015,516 |
| 156 | 5,015,517 |
| 192 | 5,015,518 |
| 209 | 5,015,519 |
| 215 | 5,015,520 |
| 220 | 5,015,521 |
| 312.2 | 5,015,522 |
| 332 | 5,015,524 |
| 336 | 5,015,523 |
| 364 | 5,015,525 |
| 378 | 5,015,526 |
| 402.21 | 5,015,527 |
| 403 | 5,015,528 |
| 414 | 5,015,529 |
| 433 | 5,015,530 |
| 463 | 5,015,531 |
| 542 4 | 5,015,532 |
| 549 | 5,015,533 |
| 570 | 5,015,534 |
| 610 | 5,015,535 |
| 611 | 5,015,536 |
| 623 | 5,015,537 |
| 626 | 5,015,538 |
| 685 | 5,015,539 |
| 698 | 5,015,540 |

### CLASS 429

| | |
|---|---|
| 49 | 5,015,541 |
| 56 | 5,015,542 |
| 65 | 5,015,543 |
| 93 | 5,015,544 |
| 99 | 5,015,545 |
| | 5,015,546 |
| 194 | 5,015,547 |

### CLASS 430

| | |
|---|---|
| 19 | 5,015,548 |
| 45 | 5,015,549 |
| 108 | 5,015,550 |
| 114 | 5,015,551 |
| 138 | 5,015,552 |
| 260 | 5,015,553 |
| 270 | 5,015,554 |
| 281 | 5,015,555 |
| 306 | 5,015,556 |
| 308 | 5,015,557 |
| 325 | 5,015,558 |
| 326 | 5,015,559 |
| 398 | 5,015,560 |
| 487 | 5,015,561 |
| 518 | 5,015,562 |
| 546 | 5,015,563 |
| | 5,015,564 |
| 552 | 5,015,565 |
| 567 | 5,015,566 |
| | 5,015,567 |

### CLASS 431

| | |
|---|---|
| 1 | 5,015,171 |
| 6 | 5,015,172 |
| 116 | 5,015,173 |
| | 5,015,174 |
| 253 | 5,015,175 |

### CLASS 432

| | |
|---|---|
| 5 | 5,015,176 |
| 121 | 5,015,177 |
| 248 | 5,015,178 |

### CLASS 433

| | |
|---|---|
| 9 | 5,015,180 |
| 32 | 5,015,181 |
| 60 | 5,015,182 |
| 76 | 5,015,183 |
| 93 | 5,015,184 |
| 159 | 5,015,185 |
| 173 | 5,015,186 |

### CLASS 434

| | |
|---|---|
| 33 | 5,015,187 |
| 38 | 5,015,188 |
| 63 | 5,015,189 |
| 72 | 5,015,190 |
| 185 | 5,015,179 |

### CLASS 435

| | |
|---|---|
| 5 | 5,015,568 |
| 6 | 5,015,569 |
| | 5,015,570 |
| 7.92 | 5,015,571 |
| 19 | 5,015,572 |
| 67.1 | 5,015,574 |
| 69 1 | 5,015,573 |
| 70.21 | 5,015,576 |
| 91 | 5,015,575 |
| 101 | 5,015,577 |
| 119 | 5,015,578 |
| 123 | 5,015,579 |
| 172 3 | 5,015,580 |
| | 5,015,581 |
| 189 | 5,015,582 |
| 212 | 5,015,583 |
| 240 23 | 5,015,584 |
| 240 242 | 5,015,585 |

### CLASS 436

| | |
|---|---|
| 29 | 5,015,586 |
| 55 | 5,015,587 |
| 69 | 5,015,588 |
| 92 | 5,015,589 |
| 117 | 5,015,590 |
| 178 | 5,015,591 |

### CLASS 437

| | |
|---|---|
| 4 | 5,015,592 |
| 25 | 5,015,593 |
| 31 | 5,015,594 |
| | 5,015,595 |
| 41 | 5,015,596 |
| | 5,015,597 |
| 44 | 5,015,598 |
| | 5,015,599 |
| 51 | 5,015,600 |
| 67 | 5,015,601 |
| | 5,015,602 |
| 184 | 5,015,603 |
| 195 | 5,015,604 |

### CLASS 439

| | |
|---|---|
| 71 | 5,015,191 |
| 83 | 5,015,192 |
| 161 | 5,015,193 |
| 314 | 5,015,194 |
| 318 | 5,015,195 |
| 326 | 5,015,196 |
| 329 | 5,015,197 |
| 353 | 5,015,199 |
| 357 | 5,015,200 |
| 411 | 5,015,198 |
| 441 | 5,015,201 |
| 487 | 5,015,202 |
| 535 | 5,015,203 |
| 620 | 5,015,204 |
| 803 | 5,015,205 |
| 876 | 5,015,206 |
| 886 | 5,015,207 |

### CLASS 441

| | |
|---|---|
| 55 | 5,015,208 |

### CLASS 446

| | |
|---|---|
| 73 | 5,015,209 |
| 128 | 5,015,210 |
| 475 | 5,015,211 |

### CLASS 449

| | |
|---|---|
| 2 | 5,015,212 |

### CLASS 452

| | |
|---|---|
| 149 | 5,015,213 |

### CLASS 453

| | |
|---|---|
| 56 | 5,015,214 |

### CLASS 464

| | |
|---|---|
| 175 | 5,015,215 |

### CLASS 474

| | |
|---|---|
| 101 | 5,015,216 |
| 135 | 5,015,217 |
| 152 | 5,015,218 |
| 204 | 5,015,219 |
| 256 | 5,015,220 |

### CLASS 475

| | |
|---|---|
| 19 | 5,015,221 |

### CLASS 493

| | |
|---|---|
| 11 | 5,015,222 |
| 194 | 5,015,223 |

### CLASS 501

| | |
|---|---|
| 12 | 5,015,605 |
| 84 | 5,015,606 |
| 96 | 5,015,607 |
| 97 | 5,015,608 |
| 127 | 5,015,609 |
| | 5,015,610 |

### CLASS 502

| | |
|---|---|
| 20 | 5,015,611 |
| 133 | 5,015,612 |
| 170 | 5,015,613 |
| 250 | 5,015,614 |
| 263 | 5,015,615 |
| 303 | 5,015,616 |
| 304 | 5,015,617 |

### CLASS 505

| | |
|---|---|
| 1 | 5,015,619 |
| | 5,015,620 |
| | 5,015,621 |
| | 5,015,622 |
| | 5,015,623 |
| 001 | 5,015,618 |

### CLASS 512

| | |
|---|---|
| 24 | 5,015,625 |

### CLASS 514

| | |
|---|---|
| 12 | 5,015,626 |
| | 5,015,627 |
| | 5,015,628 |
| 16 | 5,015,629 |
| 30 | 5,015,630 |
| 53 | 5,015,631 |
| 55 | 5,015,632 |
| 91 | 5,015,633 |
| 103 | 5,015,634 |
| 144 | 5,015,635 |
| 210 | 5,015,636 |
| 211 | 5,015,637 |
| | 5,015,638 |
| 213 | 5,015,639 |
| 217 | 5,015,640 |
| 223.5 | 5,015,641 |
| 224 2 | 5,015,642 |
| 241 | 5,015,643 |
| 247 | 5,015,644 |
| 250 | 5,015,645 |
| 253 | 5,015,646 |
| 263 | 5,015,647 |
| 317 | 5,015,648 |
| 332 | 5,015,649 |
| 356 | 5,015,650 |
| 381 | 5,015,651 |
| 384 | 5,015,652 |
| 397 | 5,015,653 |
| 402 | 5,015,654 |
| 413 | 5,015,655 |
| 419 | 5,015,657 |
| 422 | 5,015,656 |
| 432 | 5,015,658 |
| 438 | 5,015,659 |
| 441 | 5,015,660 |
| 443 | 5,015,661 |
| 450 | 5,015,662 |
| 510 | 5,015,663 |
| 616 | 5,015,664 |
| 625 | 5,015,665 |
| 754 | 5,015,666 |

### CLASS 521

| | |
|---|---|
| 58 | 5,015,667 |

### CLASS 523

| | |
|---|---|
| 102 | 5,015,668 |
| 200 | 5,015,669 |
| 214 | 5,015,670 |
| 402 | 5,015,671 |
| 415 | 5,015,672 |
| | 5,015,673 |
| 435 | 5,015,674 |
| 443 | 5,015,675 |
| 453 | 5,015,676 |

### CLASS 524

| | |
|---|---|
| 17 | 5,015,677 |
| 99 | 5,015,678 |
| | 5,015,679 |
| | 5,015,680 |
| 101 | 5,015,681 |
| 102 | 5,015,682 |
| 103 | 5,015,683 |
| 108 | 5,015,684 |
| 412 | 5,015,685 |
| 413 | 5,015,686 |
| 512 | 5,015,687 |
| 600 | 5,015,688 |

### CLASS 525

| | |
|---|---|
| 43 | 5,015,689 |
| 73 | 5,015,690 |
| 100 | 5,015,691 |
| 102 | 5,015,692 |
| 187 | 5,015,693 |
| 240 | 5,015,694 |
| 244 | 5,015,695 |
| 331.7 | 5,015,696 |
| 386 | 5,015,697 |
| 391 | 5,015,698 |
| 471 | 5,015,699 |
| 487 | 5,015,700 |
| 531 | 5,015,701 |
| 537 | 5,015,702 |
| | 5,015,703 |
| | 5,015,704 |

### CLASS 526

| | |
|---|---|
| 142 | 5,015,705 |
| 200 | 5,015,706 |
| 212 | 5,015,707 |
| 264 | 5,015,708 |
| 279 | 5,015,709 |
| 283 | 5,015,710 |
| 301 | 5,015,711 |
| 304 | 5,015,712 |
| 318 4 | 5,015,713 |
| 336 | 5,015,714 |

### CLASS 528

| | |
|---|---|
| 15 | 5,015,715 |
| | 5,015,716 |
| 30 | 5,015,717 |
| 44 | 5,015,718 |
| 70 | 5,015,719 |
| 179 | 5,015,720 |
| 190 | 5,015,721 |
| | 5,015,722 |
| | 5,015,723 |
| 272 | 5,015,724 |
| 310 | 5,015,725 |
| 349 | 5,015,726 |
| 353 | 5,015,727 |

### CLASS 530

| | |
|---|---|
| 303 | 5,015,728 |
| 350 | 5,015,729 |
| 351 | 5,015,730 |

### CLASS 534

| | |
|---|---|
| 618 | 5,015,731 |
| 622 | 5,015,732 |

### CLASS 536

| | |
|---|---|
| 23 | 5,015,733 |

### CLASS 540

| | |
|---|---|
| 123 | 5,015,735 |
| 222 | 5,015,736 |
| 363 | 5,015,737 |
| 494 | 5,015,738 |

### CLASS 544

| | |
|---|---|
| 277 | 5,015,739 |
| 366 | 5,015,740 |

### CLASS 546

| | |
|---|---|
| 281 | 5,015,741 |

### CLASS 548

| | |
|---|---|
| 323 | 5,015,742 |

### CLASS 549

| | |
|---|---|
| 313 | 5,015,743 |
| 510 | 5,015,744 |

### CLASS 552

| | |
|---|---|
| 206 | 5,015,745 |
| 569 | 5,015,746 |

### CLASS 556

| | |
|---|---|
| 1 | 5,015,747 |
| 144 | 5,015,748 |
| 179 | 5,015,749 |
| 187 | 5,015,750 |
| 472 | 5,015,751 |
| 474 | 5,015,624 |

### CLASS 558

| | |
|---|---|
| 237 | 5,015,752 |
| 260 | 5,015,753 |
| | 5,015,754 |
| 282 | 5,015,755 |
| 320 | 5,015,756 |
| 401 | 5,015,757 |

### CLASS 560

| | |
|---|---|
| 56 | 5,015,758 |
| 91 | 5,015,759 |
| 186 | 5,015,760 |
| 256 | 5,015,761 |
| 313 | 5,015,762 |

### CLASS 562

| | |
|---|---|
| 106 | 5,015,763 |
| 401 | 5,015,764 |
| 621 | 5,015,765 |

### CLASS 564

| | |
|---|---|
| 127 | 5,015,766 |
| 154 | 5,015,767 |
| 204 | 5,015,768 |
| 399 | 5,015,769 |
| 440 | 5,015,770 |
| 443 | 5,015,772 |
| 474 | 5,015,773 |
| 475 | 5,015,774 |

### CLASS 568

| | |
|---|---|
| 28 | 5,015,775 |
| 41 | 5,015,776 |
| 314 | 5,015,777 |
| 319 | 5,015,778 |
| 346 | 5,015,779 |
| 490 | 5,015,780 |
| 683 | 5,015,781 |
| 697 | 5,015,782 |
| | 5,015,783 |
| 722 | 5,015,784 |
| 783 | 5,015,785 |
| 798 | 5,015,786 |
| 835 | 5,015,787 |
| 861 | 5,015,788 |
| 862 | 5,015,789 |

### CLASS 570

| | |
|---|---|
| 126 | 5,015,790 |
| 168 | 5,015,791 |
| 208 | 5,015,792 |

### CLASS 585

| | |
|---|---|
| 6.3 | 5,015,793 |
| 258 | 5,015,794 |
| 330 | 5,015,795 |
| 436 | 5,015,796 |
| 467 | 5,015,797 |
| 500 | 5,015,798 |
| | 5,015,799 |

### CLASS 600

| | |
|---|---|
| 25 | 5,015,224 |
| | 5,015,225 |

### CLASS 604

| | |
|---|---|
| 4 | 5,015,226 |
| 22 | 5,015,227 |
| 51 | 5,015,228 |
| 90 | 5,015,229 |
| 96 | 5,015,230 |
| | 5,015,231 |
| | 5,015,232 |
| 97 | 5,015,233 |
| 110 | 5,015,234 |
| 117 | 5,015,235 |
| 120 | 5,015,236 |
| 143 | 5,015,237 |
| 164 | 5,015,238 |
| 166 | 5,015,239 |
| 192 | 5,015,240 |
| 198 | 5,015,241 |
| | 5,015,242 |
| 315 | 5,015,243 |
| 344 | 5,015,244 |
| 367 | 5,015,245 |
| 368 | 5,015,246 |

### CLASS 606

| | |
|---|---|
| 61 | 5,015,247 |
| 74 | 5,015,248 |
| 133 | B1 4,524,772 |
| 142 | 5,015,249 |
| 147 | 5,015,250 |
| 203 | 5,015,251 |
| 205 | 5,015,252 |

### CLASS 623

| | |
|---|---|
| 1 | 5,015,253 |
| 6 | 5,015,254 |
| 17 | 5,015,255 |
| 18 | 5,015,256 |
| 22 | 5,015,257 |

# CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D2— | 314 | 316,772 | | 322 | 316,797 | | 26 | 316,822 | | 168 | 316,847 | | 27 | 316,872 | D24— | 8 | 316,897 |
| | 320 | 316,773 | | 338 | 316,798 | | 46.2 | 316,830 | D14— | 102 | 316,849 | | 51 | 316,880 | | 17 | 316,898 |
| | 514 | 316,774 | | 412 | 316,799 | | 56 | 316,823 | | | 316,850 | D20— | 6 | 316,873 | | 24 | 316,899 |
| | 626 | 316,775 | | 549 | 316,800 | | 78 | 316,824 | | 106 | 316,851 | | 7 | 316,874 | | 47 | 316,900 |
| D3— | 11 | 316,776 | | 693 | 316,801 | | | 316,825 | | | 316,852 | | 20 | 316,875 | | 51 | 316,901 |
| | 12 | 316,777 | D8— | 57 | 316,802 | | 81 | 316,826 | | 107 | 316,853 | | 31 | 316,876 | | 62 | 316,902 |
| | 37 | 316,778 | | 105 | 316,803 | | 102 | 316,827 | | 116 | 316,854 | | 43 | 316,877 | D25— | 34 | 316,903 |
| | | 316,779 | | 307 | 316,804 | | 106 | 316,828 | | 126 | 316,855 | D21— | 13 | 316,878 | | 114 | 316,904 |
| | 38 | 316,780 | | 319 | 316,805 | | 109 | 316,829 | | 129 | 316,856 | | 48 | 316,879 | | 138 | 316,905 |
| | 56 | 316,781 | | | 316,806 | D11— | 6 | 316,831 | | 130 | 316,833 | | 61 | 316,881 | D26— | 44 | 316,906 |
| D4— | 108 | 316,782 | | | 316,807 | | 35 | 316,832 | | 138 | 316,857 | | 99 | 316,882 | | 62 | 316,907 |
| D5— | 37 | 316,783 | | 333 | 316,808 | | 143 | 316,834 | | 143 | 316,858 | | 155 | 316,883 | | 63 | 316,908 |
| | 99 | 316,784 | | 373 | 316,809 | | | 316,835 | | 148 | 316,859 | | 171 | 316,884 | | | 316,909 |
| D6— | 336 | 316,785 | | 382 | 316,810 | | 156 | 316,836 | | 164 | 316,860 | | 191 | 316,885 | | 67 | 316,910 |
| | 491 | 316,786 | | | 316,811 | | 164 | 316,837 | | 205 | 316,861 | | | 316,886 | | | 316,911 |
| | 515 | 316,787 | D9— | 318 | 316,812 | | | 316,838 | | 214 | 316,862 | | 194 | 316,887 | | 87 | 316,912 |
| | 522 | 316,788 | | 370 | 316,813 | | | 316,839 | D15— | 1 | 316,863 | | 234 | 316,888 | D28 — | 2 | 316,913 |
| | | 316,789 | | 371 | 316,814 | D12— | 126 | 316,840 | | 5 | 316,864 | | 249 | 316,889 | | | 316,914 |
| | 574 | 316,790 | | 404 | 316,815 | | 147 | 316,842 | | 7 | 316,865 | D22— | 149 | 316,890 | D29— | 20 | 316,915 |
| | 595 | 316,791 | | 432 | 316,816 | | 156 | 316,843 | D16— | 202 | 316,866 | D23— | 213 | 316,891 | | 22 | 316,916 |
| | 601 | 316,792 | | 438 | 316,817 | | 187 | 316,841 | D18— | 1 | 316,867 | | 214 | 316,892 | D30— | 101 | 316,917 |
| | | 316,793 | D10— | 1 | 316,818 | | 209 | 316,844 | | 9 | 316,868 | | 244 | 316,893 | | 130 | 316,918 |
| D7— | 308 | 316,794 | | 19 | 316,819 | | 302 | 316,845 | | 13 | 316,869 | | 250 | 316,894 | | 143 | 316,919 |
| | | 316,795 | | 24 | 316,820 | D13— | 82 | 316,848 | | | 316,870 | | 255 | 316,895 | D32— | 6 | 316,920 |
| | 311 | 316,796 | | | 316,821 | | 147 | 316,846 | D19— | 2 | 316,871 | | 256 | 316,896 | | 33 | 316,921 |

# CLASSIFICATION OF PLANTS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 19 | 7,520 | | 30 | 7,521 | | 49 | 7,522 | | 54 | 7,523 | | 68 | 7,524 | | 70 | 7,525 |

VOL
1126
ISS
2
MY
14
1991
UMI

# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

| | |
|---|---|
| Alabama | 1 |
| Alaska | 2 |
| American Samoa | 3 |
| Arizona | 4 |
| Arkansas | 5 |
| California | 6 |
| Canal Zone | 7 |
| Colorado | 8 |
| Connecticut | 9 |
| Delaware | 10 |
| District of Columbia | 11 |
| Florida | 12 |
| Georgia | 13 |
| Guam | 14 |
| Hawaii | 15 |
| Idaho | 16 |
| Illinois | 17 |
| Indiana | 18 |
| Iowa | 19 |
| Kansas | 20 |
| Kentucky | 21 |
| Louisiana | 22 |
| Maine | 23 |
| Maryland | 24 |
| Massachusetts | 25 |
| Michigan | 26 |
| Minnesota | 27 |
| Mississippi | 28 |
| Missouri | 29 |
| Montana | 30 |
| Nebraska | 31 |
| Nevada | 32 |
| New Hampshire | 33 |
| New Jersey | 34 |
| New Mexico | 35 |
| New York | 36 |
| North Carolina | 37 |
| North Dakota | 38 |
| Ohio | 39 |
| Oklahoma | 40 |
| Oregon | 41 |
| Pennsylvania | 42 |
| Puerto Rico | 43 |
| Rhode Island | 44 |
| South Carolina | 45 |
| South Dakota | 46 |
| Tennessee | 47 |
| Texas | 48 |
| Utah | 49 |
| Vermont | 50 |
| Virginia | 51 |
| Virgin Islands | 52 |
| Washington | 53 |
| West Virginia | 54 |
| Wisconsin | 55 |
| Wyoming | 56 |
| U.S. Air Force | 57 |
| U.S. Army | 58 |
| U.S. Navy | 59 |

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01 : 5,014,541
5,014,557
5,014,769
5,014,829
5,014,859
5,014,872
5,015,023
5,015,310
5,016,003
5,016,265
02 : 5,014,359
04 : 5,014,516
5,014,621
5,014,791
5 014,930
5,014,999
5,015,002
5,015,212
5,015,222
5,015,502
5,015,742
5,015,892
5,015,934
5,016,064
5,016,141
5,016,219
05 : 5,014,489
5,014,719
5,015,085
06 . Re.33,586
5,014,356
5,014,372
5,014,374
5,014,411
5,014,460
5,014,471
5,014,473
5,014,474
5,014,481
5,014,495
5,014,518
5,014,556
5,014,564
5,014,585
5,014,603
5,014,607
5,014,627
5,014,636
5,014,647
5,014,649
5,014,694
5,014,697
5,014,698
5,014,701
5,014,710
5,014,720
5,014,724
5,014,737
5,014,787
5,014,805
5,014,846
5,014,875
5,014,879
5,014,880
5,014,890
5,014,892
5,014,943
5,014,948
5,014,962
5,014,972
5,014,983
5,014,992
5,015,032
5,015,033
5,015,036
5,015,054
5,015,061
5,015,067
5,015,070
5,015,073
5,015,083
5,015,100
5,015,111
5,015,117
5,015,128
5,015,129
5,015,144
5,015,182
5,015,186
5,015,192
5,015,193
5,015,208
5,015,240
5,015,242
5,015,247
5,015,274
5,015,275
5,015,286
5,015,301
5,015,304
5,015,306
5,015,331
5,015,348
5,015,350
5,015,371
5,015,381
5,015,424
5,015,434
5,015,474
5,015,476
5,015,528
5,015,544
5,015,545
5,015,546
5,015,569
5,015,571
5,015,575
5,015,585
5,015,592
5,015,595
5,015,604
5,015,611
5,015,629
5,015,658
5,015,664
5,015,715
5,015,727
5,015,729
5,015,733
5,015,832
5,015,840
5,015,850
5,015,858
5,015,860
5,015,861
5,015,876
5,015,884
5,015,885
5,015,889
5,015,908
5,015,912
5,015,914
5,015,918
5,015,924
5,015,926
5,015,933
5,015,958
5,015,966
5,015,968
5,015,970
5,015,971
5,015,981
5,015,988
5,016,009
5,016,018
5,016,022
5,016,024
5,016,027
5,016,059
5,016,063
5,016,080
5,016,085
5,016,098
5,016,121
5,016,123
5,016,128
5,016,138
5,016,142
5,016,151
5,016,161
5,016,166
5,016,167
5,016,188
5,016,195
5,016,200
5,016,202
5,016,213
5,016,214
5,016,216
5,016,217
5,016,229
5,016,239
5,016,241
5,016,250
5,016,251
5,016,259
5,016,261
5,016,262
5,016,269
5,016,270
5,016,273
4,755,741
08 : 5,014,462
5,014,475
5,014,559
5,014,606
5,014,783
5,014,891
5,015,096
5,015,167
5,015,313
5,015,323
5,015,401
5,015,620
5,015,961
5,016,014
5,016,131
5,016,185
5,016,255
09 5,014,431
5,014,436
5,014,456
5,014,520
5,014,584
5,014,725
5,014,729
5,014,797
5,014,820
5,014,824
5,014,894
5,014,899
5,014,907
5,015,037
5,015,092
5,015,116
5,015,137
5,015,183
5,015,248
5,015,263
5,015,316
5,015,339
5,015,349
5,015,411
5,015,438
5,015,439
5,015,473
5,015,549
5,015,570
5,015,578
5,015,632
5,015,677
5,015,803
5,015,842
5,015,909
5,015,977
5,015,983
5,015,990
5,016,139
5,016,210
10 5,014,545
5,015,270
5,015,380
5,015,382
5,015,406
5,015,417
5,015,445
5,015,503
5,015,609
5,015,610
5,015,651
5,015,705
5,015,759
5,015,790
5,015,791
5,015,856
12 : 5,014 478
5,014,561
5,014,630
5,014,638
5,014,692
5,014,746
5,014,874
5,014,942
5,015,025
5,015,087
5,015,110
5,015,121
5,015,133
5,015,142
5,015,143
5,015,187
5,015,188
5,015,239
5,015,253
5,015,365
5,015,369
5,015,375
5,015,399
5,015,557
5,015,744
5,015,877
5,015,887
5,015,8[illegible]5
5,015,953
5,016,173
5,016,193
5,016,201
5,016,268
13 5,014,469
5,014,483
5,014,862
5,015,029
5,015,063
5,015,068
5,015,171
5,015,259
5,015,643
5,015,827
5,016,109
5,016,136
5,016,145
15 5,014,377
5,016,152
16 5,014,680
5,015,305
5,015,883
5,016,023
17 5,014,353

VOL
1126
ISS
2
MY
14
1991
UMI

5,014,365
5,014,376
5,014,384
5,014,388
5,014,497
5,014,498
5,014,499
5,014,502
5,014,507
5,014,513
5,014,560
5,014,615
5,014,626
5,014,629
5,014,667
5,014,705
5,014,709
5,014,718
5,014,734
5,014,739
5,014,750
5,014,757
5,014,802
5,014,849
5,014,855
5,014,868
5,014,925
5,014,951
5,014,979
5,014,994
5,014,998
5,015,019
5,015,205
5,015,223
5,015,243
5,015,295
5,015,303
5,015,357
5,015,363
5,015,393
5,015,415
5,015,437
5,015,697
5,015,783
5,015,794
5,015,799
5,015,818
5,015,903
5,015,923
5,015,941
5,015,972
5,016,100
5,016,103
5,016,146
5,016,157
5,016,205
5,016,208
5,016,283
18 : 5,014,369
5,014,464
5,014,509
5,014,549
5,014,573
5,014,616
5,014,850
5,014,896
5,014,974
5,015,010
5,015,124
5,015,232
5,015,233
5,015,250
5,015,257
5,015,418
5,015,480
5,015,487
5,015,543
5,015,646
5,015,706
5,015,743
5,015,816
5,015,969
5,015,982
5,016,082
5,016,187
19 : 5,014,863
5,014,975
5,015,008
5,015,237
5,015,626
5,015,950
5,016,135
5,016,150
20 : 5,014,882
5,016,015
21 : 5,014,540
5,014,957
22 : 5,014,430
5,014,443
5,014,758
5,014,778
5,014,782
5,014,984
5,015,273
5,015,419
5,015,614

5,015,690
5,015,764
5,015,770
23 : 5,014,447
5,014,971
24 : 5,014,393
5,014,623
5,014,637
5,014,690
5,014,715
5,014,816
5,014,931
5,014,932
5,014,945
5,014,993
5,014,996
5,015,372
5,015,376
5,015,432
5,015,453
5,015,534
5,015,940
5,015,963
5,015,991
25 : 5,014,360
5,014,421
5,014,451
5,014,591
5,014,660
5,014,679
5,014,792
5,014,961
5,014,970
5,014,997
5,015,053
5,015,207
5,015,220
5,015,251
5,015,281
5,015,288
5,015,312
5,015,416
5,015,431
5,015,517
5,015,533
5,015,553
5,015,581
5,015,613
5,015,618
5,015,726
5,015,901
5,015,951
5,015,954
5,016,035
5,016,072
5,016,104
5,016,162
5,016,170
5,016,204
5,016,227
5,016,242
5,016,274
26 : 5,014,354
5,014,355
5,014,373
5,014,422
5,014,445
5,014,452
5,014,487
5,014,511
5,014,537
5,014,550
5,014,568
5,014,569
5,014,579
5,014,593
5,014,599
5,014,642
5,014,645
5,014,650
5,014,656
5,014,676
5,014,745
5,014,763
5,014,774
5,014,827
5,014,893
5,014,903
5,014,918
5,014,926
5,014,940
5,014,964
5,014,978
5,015,001
5,015,015
5,015,028
5,015,030
5,015,034
5,015,038
5,015,040
5,015,049
5,015,098
5,015,127
5,015,135
5,015,148
5,015,161

5,015,166
5,015,221
5,015,252
5,015,320
5,015,367
5,015,378
5,015,405
5,015,464
5,015,529
5,015,589
5,015,624
5,015,644
5,015,712
5,015,717
5,015,737
5,015,749
5,015,753
5,015,778
5,015,797
5,015,948
5,016,175
5,016,176
5,016,183
5,016,240
27 : 5,014,407
5,014,420
5,014,476
5,014,493
5,014,683
5,014,696
5,014,770
5,015,039
5,015,136
5,015,172
5,015,180
5,015,231
5,015,255
5,015,373
5,015,426
5,015,486
5,015,538
5,015,556
5,015,693
5,016,160
5,016,221
5,016,225
28 : 5,014,661
29 : 5,014,458
5,014,494
5,014,570
5,014,908
5,015,004
5,015,131
5,015,152
5,015,176
5,015,217
5,015,322
5,015,440
5,015,514
5,015,810
5,015,894
5,015,944
5,016,148
5,016,280
30 : 5,015,184
31 : 5,014,937
5,015,241
5,015,508
5,015,865
5,015,994
32 : 5,014,379
5,014,383
5,014,580
5,015,069
5,015,119
5,015,138
5,015,211
33 : 5,014,362
5,014,366
5,014,381
5,015,843
34 : 5,014,403
5,014,413
5,014,427
5,014,429
5,014,466
5,014,793
5,014,798
5,014,854
5,014,860
5,014,905
5,014,913
5,014,988
5,014,991
5,015,027
5,015,064
5,015,095
5,015,190
5,015,195
5,015,267
5,015,268
5,015,329
5,015,359
5,015,360
5,015,361
5,015,362

5,015,364
5,015,400
5,015,454
5,015,461
5,015,477
5,015,483
5,015,485
5,015,488
5,015,489
5,015,490
5,015,492
5,015,630
5,015,633
5,015,637
5,015,639
5,015,641
5,015,645
5,015,653
5,015,661
5,015,662
5,015,665
5,015,701
5,015,708
5,015,722
5,015,738
5,015,739
5,015,756
5,015,781
5,015,782
5,015,795
5,015,798
5,015,906
5,015,965
5,016,026
5,016,074
5,016,092
5,016,172
5,016,243
5,016,271
4,458,470
35 : 5,015,346
5,015,433
5,015,530
5,015,844
5,015,848
5,015,952
5,016,005
36 : Re.33,587
5,014,434
5,014,450
5,014,468
5,014,477
5,014,515
5,014,524
5,014,587
5,014,592
5,014,600
5,014,684
5,014,712
5,014,723
5,014,742
5,014,771
5,014,815
5,014,818
5,014,852
5,014,906
5,014,916
5,014,921
5,014,923
5,014,924
5,014,947
5,014,949
5,014,954
5,014,976
5,014,977
5,014,987
5,014,990
5,015,000
5,015,022
5,015,066
5,015,084
5,015,112
5,015,114
5,015,157
5,015,158
5,015,169
5,015,189
5,015,201
5,015,209
5,015,227
5,015,228
5,015,249
5,015,317
5,015,319
5,015,328
5,015,337
5,015,370
5,015,377
5,015,397
5,015,398
5,015,452
5,015,463
5,015,510
5,015,527
5,015,536
5,015,540

5,015,548
5,015,550
5,015,564
5,015,566
5,015,594
5,015,619
5,015,622
5,015,675
5,015,678
5,015,682
5,015,683
5,015,691
5,015,698
5,015,703
5,015,704
5,015,719
5,015,720
5,015,777
5,015,831
5,015,833
5,015,859
5,015,871
5,015,881
5,015,945
5,016,011
5,016,030
5,016,040
5,016,050
5,016,054
5,016,055
5,016,056
5,016,062
5,016,090
5,016,107
5,016,168
5,016,171
5,016,238
5,016,247
37 5,014,361
5,014,375
5,014,404
5,014,439
5,014,457
5,014,526
5,014,535
5,014,691
5,014,876
5,014,955
5,014,985
5,015,103
5,015,108
5,015,123
5,015,145
5,015,200
5,015,203
5,015,325
5,015,647
5,015,921
38 : 5,014,688
39 : 5,014,385
5,014,387
5,014,453
5,014,486
5,014,551
5,014,689
5,014,762
5,014,768
5,014,811
5,014,833
5,014,853
5,014,865
5,014,888
5,014,917
5,014,941
5,014,944
5,014,950
5,015,003
5,015,011
5,015,052
5,015,106
5,015,109
5,015,155
5,015,156
5,015,194
5,015,224
5,015,238
5,015,245
5,015,246
5,015,265
5,015,277
5,015,278
5,015,324
5,015,335
5,015,341
5,015,368
5,015,402
5,015,466
5,015,467
5,015,468
5,015,496
5,015,505
5,015,506
5,015,515
5,015,541
5,015,542
5,015,687

5,015,823
5,015,824
5,015,825
5,015,916
5,015,987
5,016,047
40 : 5,014,399
5,014,482
5,014,640
5,014,653
5,014,785
5,014,788
5,015,225
5,015,264
5,015,298
5,015,358
5,015,588
5,015,666
5,015,686
5,015,702
5,015,725
5,016,115
41 : 5,014,449
5,014,459
5,014,608
5,014,641
5,014,713
5,014,714
5,014,730
5,014,733
5,015,057
5,015,333
5,015,800
5,015,862
5,015,939
5,015,946
5,015,989
5,016,191
42 5,014,416
5,014,418
5,014,480
5,014,530
5,014,613
5,014,686
5,014,699
5,014,981
5,015,018
5,015,059
5,015,080
5,015,089
5,015,132
5,015,179
5,015,191
5,015,197
5,015,206
5,015,294
5,015,311
5,015,326
5,015,343
5,015,356
5,015,366
5,015,390
5,015,391
5,015,394
5,015,395
5,015,410
5,015,427
5,015,458
5,015,509
5,015,516
5,015,555
5,015,568
5,015,627
5,015,638
5,015,652
5,015,663
5,015,765
5,015,775
5,015,776
5,015,828
5,015,867
5,015,949
5,015,959
5,016,012
5,016,076
5,016,081
5,016,134
5,016,244
5,016,272
44 : 5,014,598
5,014,677
5,015,293
5,015,808
5,015,942
45 : 5,014,795
5,014,928
5,015,849
47 : 5,014,448
5,014,732
5,014,735
5,014,843
5,015,120
5,015,236
5,015,290
5,015,718
5,015,900

5,016,230
48 : 5,014,364
5,014,367
5,014,441
5,014,470
5,014,496
5,014,527
5,014,578
5,014,693
5,014,780
5,014,781
5,014,784
5,014,813
5,014,841
5,014,866
5,014,900
5,014,956
5,015,016
5,015,017
5,015,146
5,015,151
5,015,291

5,015,383
5,015,389
5,015,396
5,015,403
5,015,409
5,015,420
5,015,446
5,015,459
5,015,460
5,015,507
5,015,511
5,015,522
5,015,577
5,015,584
5,015,587
5,015,695
5,015,750
5,015,796
5,015,836
5,015,845
5,015,875
5,015,882

5,015,888
5,016,021
5,016,067
5,016,068
5,016,070
5,016,079
5,016,143
5,016,144
5,016,164
5,016,197
5,016,215
5,016,275
5,016,281
49 5,014,628
5,014,869
5,014,980
5,015,021
5,015,125
5,015,309
50 : 5,014,851
5,015,880
51 : 5,014,357

5,014,371
5,014,463
5,014,581
5,015,072
5,015,234
5,015,353
5,015,455
5,015,532
5,015,603
5,015,741
5,015,787
5,015,805
5,015,841
5,015,851
5,015,937
5,015,943
5,015,998
5,016,147
5,016,246
5,016,256
53 : Re.33,589
5,014,370

5,014,408
5,014,409
5,014,423
5,014,595
5,014,596
5,014,614
5,014,682
5,014,933
5,014,934
5,015,014
5,015,384
5,015,829
5,015,855
5,015,947
5,016,025
5,016,177
5,016,196
5,016,277
54 5,014,536
55 5,014,419
5,014,446
5,014,455

5,014,523
5,014,528
5,014,543
5,014,605
5,014,648
5,014,687
5,014,845
5,014,856
5,014,877
5,014,878
5,014,897
5,014,904
5,015,140
5,015,181
5,015,276
5,015,336
5,015,412
5,015,500
5,015,580
5,015,864
5,015,927
5,016,182

## DESIGN PATENTS

01 : 316,790
04 : 316,788
316,809
316,883
06 : 316,793
316,824
316,836
316,839
316,843
316,851
316,853
316,871
316,874
316,882
316,886
316,890

316,902
316,917
316,919
08 : 316,850
09 : 316,775
316,921
10 : 316,817
12 : 316,785
316,800
316,811
316,834
13 : 316,796
16 : 316,893
17 : 316,789
316,795

316,837
316,838
316,859
316,868
316,896
18 : 316,792
316,830
316,895
19 : 316,881
24 : 316,901
25 : 316,787
316,910
316,911
26 : 316,779
316,804

316,844
316,888
27 : 316,805
316,806
316,807
316,904
31 : 316,889
34 : 316,815
316,835
316,879
316,913
36 : 316,797
316,840
316,858
316,873

316,875
316,880
316,885
316,903
316,906
38 316,782
39 316,777
40 : 316,864
316,920
41 : 316,784
316,862
42 : 316,776
316,791
316,826
316,841

316,847
316,865
316,897
316,898
316,915
47 : 316,780
48 : 316,808
316,900
316,918
51 : 316,829
316,832
53 : 316,774
316,863
316,916
55 : 316,772

## PLANT PATENTS

06 : 7,520
7,522
7,524
09 : 7,523

U.S. GOVERNMENT PRINTING OFFICE : O—1991

VOL
1126

ISS
2

MY
14

1991

UMI

## CHANGE OF ADDRESS FORM

NAME—FIRST, LAST
COMPANY NAME OR ADDITIONAL ADDRESS LINE
STREET ADDRESS
CITY STATE ZIP CODE
PLEASE PRINT OR TYPE (or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

## SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM
ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST
COMPANY NAME OR ADDITIONAL ADDRESS LINE
STREET ADDRESS
CITY STATE ZIP CODE
PLEASE PRINT OR TYPE (or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ........

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

VOL
1126

ISS
2

MY
14

1991

UMI

VOL
1126

ISS
2

MY
14

1991

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE

OL

126

SS

3

MY

21

991

UMI

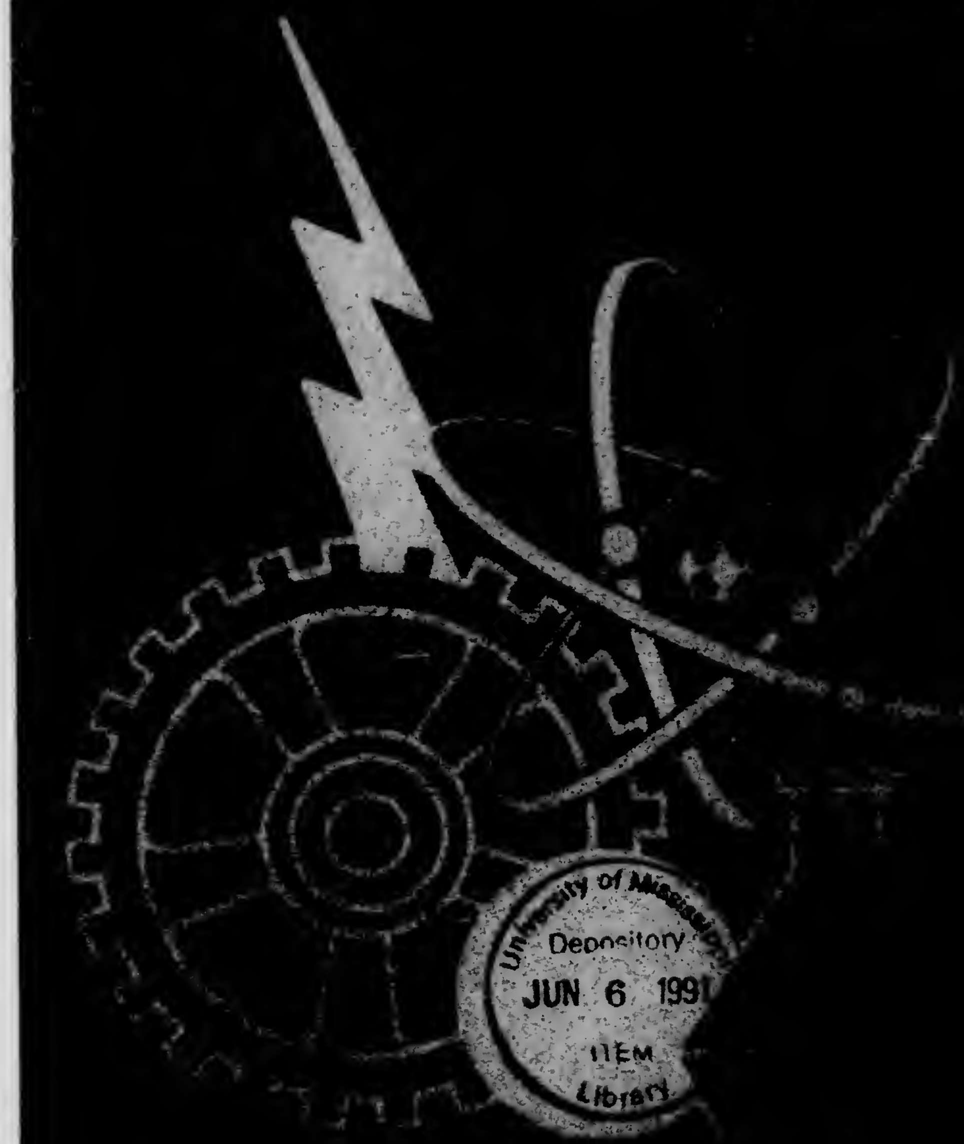
C 21.5:1126/3
Official Gazette, Patents, ...

Vol. 1126 Number 3

# OFFICIAL GAZETTE
## of the
## UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS
May 21, 1991



University of Mississippi
Depository
JUN 6 1991
ITEM
Library

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

VOL
1126
ISS
3
MY
21
1991
UMI

# OFFICIAL GAZETTE of the
# UNITED STATES PATENT AND TRADEMARK OFFICE

May 21, 1991 Volume 1126 Number 3

## CONTENTS

Page
Patent and Trademark Office Notices
  Patent Cooperation Treaty (PCT) Information .......... 1126 OG 28
  Notice of Maintenance Fees Payable .......... 1126 OG 28
  Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees .......... 1126 OG 29
  Notification of Acceptance of Delayed Payment of Maintenance Fee .......... 1126 OG 31
  Reissue Applications Filed .......... 1126 OG 31
  Requests for Reexaminations Filed .......... 1126 OG 32
  Errata .......... 1126 OG 32
  Service by Publication .......... 1126 OG 32
  Patent Certificates of Correction .......... 1126 OG 33
  Special Boxes for Mail .......... 1126 OG 34
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries .......... 1126 OG 35
Patent Examining Corps .......... 1126 OG 37
**Availability of Patentin Computer Program Training Friday, May 31, 1991 and Monday, July 1,1991** .......... 1126 OG 39
**Amendment to Interrogatory Practices** .......... 1126 OG 40
**Advisory Commission on Patent Law Reform Request for Comments** .......... 1126 OG 43
**Revision of Patent and Trademark Fees** .......... 1126 OG 56
**Reexaminations** .......... 1329
Reissue Patents Granted ( 33,590 ) .......... 1333
Plant Patents Granted ( 7,526 ) .......... 1335
Patents Granted
  General and Mechanical ( 5,016,284 ) .......... 1337
  Chemical ( 5,017,194 ) .......... 1653
  Electrical ( 5,017,736 ) .......... 1805
Design Patents Granted ( 316,922 ) .......... 1973
Index of Patentees .......... PI 1
Indices of Reissue, Reexamination, Design and Plant Patents .......... PI 79
Classification of
  Patents (Including Reissues and Reexaminations) .......... PI 85
  Designs, and Plants Applications .......... PI 89
Geographical Index of Residence of Inventors
  Patents (Including Reissues and Reexaminations) .......... PI 91
  Designs and Plant Applications .......... PI 93
Change of Address Form and Subscription Order Form .......... PI 95

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.
THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

University of Mississippi
Depository
JUN 6 1991
ITEM
Library

VOL
1126
ISS
3
MY
21
1991
UMI

# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German marks and the exchange rate of the U.S. dollar in relation to the German mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees ( in U.S. dollars) is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed | 550.00 |
| —Corresponding prior U.S. national application filed | 380.00 |
| —Supplemental search fee, per additional invention | 150.00 |
| European Patent Office as ISA | 1492.00 |
| Preliminary examination fee | |
| USPTO as International Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as ISA | 400.00 |
| —Additional examination fee, per additional invention | 130.00 |
| —ISA not the USPTO | 600.00 |
| —Additional examination fee, per additional invention | 200.00 |
| International fees | |
| Basic fee | 559.00 |
| Basic Supplemental fee (for each page over 30) | 11.00 |
| Designation fee per country or region for the first 10 national or regional offices | 135.00 |
| Designation fee for 11th and subsequent designations | No Charge |
| Handling fee | 171.00 |

U.S. National Stage fees

| | Small Entity | Regular |
|---|---|---|
| USPTO was IPEA | 165.00 | 330.00 |
| USPTO was ISA but not IPEA | 185.00 | 370.00 |
| USPTO was neither ISA nor IPEA | 250.00 | 500.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 18.00 | 36.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 60.00 | 120.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) | 60.00 | 120.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) | 30.00 | 30.00 |

April 11, 1991

HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner*
*of Patents and Trademarks.*

---

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on May 17, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,744,106 through 4,745,633
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 15, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,447,911 through 4,449,250
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant..........$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..........$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))..........$415.00
By other than a small entity..........$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))..........$835.00
By other than a small enttity..........$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982..........$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))..........$60.00
By other than a small entity..........$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable..........$550.00"

---

## Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MARCH 10, 1991*
*DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,375,709 | 06/218,198 | 3/08/83 |
| 4,375,720 | 06/280,583 | 3/08/83 |
| 4,375,729 | 06/288,053 | 3/08/83 |
| 4,375,730 | 06/308,012 | 3/08/83 |
| 4,375,732 | 06/283,937 | 3/08/83 |
| 4,375,734 | 06/293,643 | 3/08/83 |
| 4,375,757 | 06/284,459 | 3/08/83 |
| 4,375,758 | 06/301,500 | 3/08/83 |
| 4,375,759 | 06/216,570 | 3/08/83 |
| 4,375,803 | 06/256,531 | 3/08/83 |
| 4,375,811 | 06/237,743 | 3/08/83 |
| 4,375,821 | 06/225,439 | 3/08/83 |
| 4,375,830 | 06/239,443 | 3/08/83 |
| 4,375,840 | 06/305,027 | 3/08/83 |
| 4,375,841 | 06/274,840 | 3/08/83 |
| 4,375,852 | 06/300,403 | 3/08/83 |
| 4,375,856 | 06/236,924 | 3/08/83 |
| 4,375,862 | 06/330,142 | 3/08/83 |
| 4,375,873 | 06/302,389 | 3/08/83 |
| 4,375,874 | 06/240,908 | 3/08/83 |
| 4,375,875 | 06/275,302 | 3/08/83 |
| 4,375,879 | 06/299,431 | 3/08/83 |
| 4,375,888 | 06/244,139 | 3/08/83 |
| 4,375,892 | 06/257,775 | 3/08/83 |
| 4,375,899 | 06/224,909 | 3/08/83 |
| 4,375,901 | 06/223,895 | 3/08/83 |
| 4,375,903 | 06/241,675 | 3/08/83 |
| 4,375,904 | 06/228,911 | 3/08/83 |
| 4,375,905 | 06/318,133 | 3/08/83 |
| 4,375,913 | 06/314,590 | 3/08/83 |
| 4,375,924 | 06/292,613 | 3/08/83 |
| 4,375,925 | 06/218,840 | 3/08/83 |
| 4,375,945 | 06/222,886 | 3/08/83 |
| 4,375,947 | 06/339,665 | 3/08/83 |
| 4,375,949 | 06/220,747 | 3/08/83 |
| 4,375,962 | 06/317,479 | 3/08/83 |
| 4,375,991 | 06/224,212 | 3/08/83 |
| 4,375,997 | 06/378,012 | 3/08/83 |
| 4,376,007 | 06/249,341 | 3/08/83 |
| 4,376,010 | 06/254,181 | 3/08/83 |
| 4,376,020 | 06/219,840 | 3/08/83 |
| 4,376,024 | 06/219,501 | 3/08/83 |
| 4,376,025 | 06/388,482 | 3/08/83 |
| 4,376,036 | 06/241,319 | 3/08/83 |
| 4,376,041 | 06/319,630 | 3/08/83 |
| 4,376,046 | 06/268,872 | 3/08/83 |
| 4,376,049 | 06/334,918 | 3/08/83 |
| 4,376,058 | 06/350,094 | 3/08/83 |
| 4,376,068 | 06/292,392 | 3/08/83 |
| 4,376,078 | 06/246,353 | 3/08/83 |
| 4,376,088 | 06/245,167 | 3/08/83 |
| 4,376,090 | 06/339,666 | 3/08/83 |
| 4,376,107 | 06/272,685 | 3/08/83 |
| 4,376,109 | 06/279,047 | 3/08/83 |
| 4,376,116 | 06/298,325 | 3/08/83 |
| 4,376,123 | 06/216,454 | 3/08/83 |
| 4,376,133 | 06/246,935 | 3/08/83 |
| 4,376,134 | 06/288,091 | 3/08/83 |
| 4,376,135 | 06/321,456 | 3/08/83 |
| 4,376,136 | 06/267,889 | 3/08/83 |
| 4,376,139 | 06/267,620 | 3/08/83 |
| 4,376,141 | 06/218,360 | 3/08/83 |
| 4,376,145 | 06/340,092 | 3/08/83 |
| 4,376,158 | 06/313,424 | 3/08/83 |
| 4,376,159 | 06/340,565 | 3/08/83 |
| 4,376,160 | 06/228,750 | 3/08/83 |
| 4,376,161 | 06/286,987 | 3/08/83 |
| 4,376,181 | 06/302,419 | 3/08/83 |
| 4,376,207 | 06/326,731 | 3/08/83 |
| 4,376,210 | 06/230,789 | 3/08/83 |
| 4,376,213 | 06/344,523 | 3/08/83 |
| 4,376,215 | 06/321,702 | 3/08/83 |
| 4,376,218 | 06/254,164 | 3/08/83 |
| 4,376,223 | 06/372,057 | 3/08/83 |
| 4,376,224 | 06/372,059 | 3/08/83 |
| 4,376,226 | 06/346,150 | 3/08/83 |
| 4,376,239 | 06/373,669 | 3/08/83 |
| 4,376,243 | 06/228,293 | 3/08/83 |
| 4,376,245 | 06/229,609 | 3/08/83 |
| 4,376,263 | 06/228,867 | 3/08/83 |
| 4,376,271 | 06/274,769 | 3/08/83 |
| 4,376,272 | 06/319,797 | 3/08/83 |
| 4,376,276 | 06/302,064 | 3/08/83 |
| 4,376,296 | 06/239,383 | 3/08/83 |

VOL
1126
ISS
3
MY
21
1991
UMI

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,376,306 | 06/250,706 | 3/08/83 |
| 4,648,137 | 06/706,136 | 3/10/87 |
| 4,648,140 | 06/739,285 | 3/10/87 |
| 4,648,141 | 06/746,859 | 3/10/87 |
| 4,648,144 | 06/745,141 | 3/10/87 |
| 4,648,145 | 06/479,841 | 3/10/87 |
| 4,648,151 | 06/737,322 | 3/10/87 |
| 4,648,153 | 06/640,446 | 3/10/87 |
| 4,648,154 | 06/662,882 | 3/10/87 |
| 4,648,162 | 06/490,047 | 3/10/87 |
| 4,648,170 | 06/735,384 | 3/10/87 |
| 4,648,172 | 06/466,747 | 3/10/87 |
| 4,648,182 | 06/808,139 | 3/10/87 |
| 4,648,185 | 06/813,559 | 3/10/87 |
| 4,648,189 | 06/799,598 | 3/10/87 |
| 4,648,190 | 06/766,959 | 3/10/87 |
| 4,648,192 | 06/678,960 | 3/10/87 |
| 4,648,195 | 06/784,597 | 3/10/87 |
| 4,648,197 | 06/808,611 | 3/10/87 |
| 4,648,202 | 06/782,095 | 3/10/87 |
| 4,648,203 | 06/758,037 | 3/10/87 |
| 4,648,217 | 06/771,189 | 3/10/87 |
| 4,648,218 | 06/739,663 | 3/10/87 |
| 4,648,229 | 06/473,106 | 3/10/87 |
| 4,648,232 | 06/581,123 | 3/10/87 |
| 4,648,236 | 06/857,111 | 3/10/87 |
| 4,648,240 | 06/813,203 | 3/10/87 |
| 4,648,242 | 06/758,053 | 3/10/87 |
| 4,648,243 | 06/684,866 | 3/10/87 |
| 4,648,251 | 06/690,109 | 3/10/87 |
| 4,648,262 | 06/881,474 | 3/10/87 |
| 4,648,267 | 06/846,428 | 3/10/87 |
| 4,648,270 | 06/745,383 | 3/10/87 |
| 4,648,271 | 06/806,761 | 3/10/87 |
| 4,648,273 | 06/737,149 | 3/10/87 |
| 4,648,287 | 06/539,537 | 3/10/87 |
| 4,648,299 | 06/745,604 | 3/10/87 |
| 4,648,300 | 06/741,906 | 3/10/87 |
| 4,648,302 | 06/750,306 | 3/10/87 |
| 4,648,306 | 06/569,982 | 3/10/87 |
| 4,648,310 | 06/831,838 | 3/10/87 |
| 4,648,311 | 06/443,749 | 3/10/87 |
| 4,648,312 | 06/736,229 | 3/10/87 |
| 4,648,322 | 06/751,507 | 3/10/87 |
| 4,648,328 | 06/781,520 | 3/10/87 |
| 4,648,329 | 06/752,309 | 3/10/87 |
| 4,648,330 | 06/726,463 | 3/10/87 |
| 4,648,331 | 06/708,060 | 3/10/87 |
| 4,648,342 | 06/786,820 | 3/10/87 |
| 4,648,350 | 06/738,879 | 3/10/87 |
| 4,648,361 | 06/784,541 | 3/10/87 |
| 4,648,366 | 06/730,992 | 3/10/87 |
| 4,648,372 | 06/726,552 | 3/10/87 |
| 4,648,381 | 06/697,306 | 3/10/87 |
| 4,648,382 | 06/503,611 | 3/10/87 |
| 4,648,383 | 06/757,158 | 3/10/87 |
| 4,648,391 | 06/798,936 | 3/10/87 |
| 4,648,402 | 06/783,652 | 3/10/87 |
| 4,648,404 | 06/559,663 | 3/10/87 |
| 4,648,406 | 06/230,640 | 3/10/87 |
| 4,648,408 | 06/731,680 | 3/10/87 |
| 4,648,410 | 06/756,590 | 3/10/87 |
| 4,648,411 | 06/545,209 | 3/10/87 |
| 4,648,414 | 06/641,718 | 3/10/87 |
| 4,648,416 | 06/642,577 | 3/10/87 |
| 4,648,426 | 06/746,879 | 3/10/87 |
| 4,648,428 | 06/684,517 | 3/10/87 |
| 4,648,437 | 06/809,664 | 3/10/87 |
| 4,648,449 | 06/764,718 | 3/10/87 |
| 4,648,459 | 06/793,030 | 3/10/87 |
| 4,648,477 | 06/535,745 | 3/10/87 |
| 4,648,479 | 06/537,771 | 3/10/87 |
| 4,648,482 | 06/791,834 | 3/10/87 |
| 4,648,498 | 06/849,397 | 3/10/87 |
| 4,648,501 | 06/737,411 | 3/10/87 |
| 4,648,525 | 06/783,096 | 3/10/87 |
| 4,648,527 | 06/733,677 | 3/10/87 |
| 4,648,534 | 06/708,585 | 3/10/87 |
| 4,648,535 | 06/669,616 | 3/10/87 |
| 4,648,544 | 06/785,650 | 3/10/87 |
| 4,648,545 | 06/753,962 | 3/10/87 |
| 4,648,548 | 06/793,749 | 3/10/87 |
| 4,648,568 | 06/738,409 | 3/10/87 |
| 4,648,573 | 06/794,511 | 3/10/87 |
| 4,648,579 | 06/742,941 | 3/10/87 |
| 4,648,582 | 06/742,110 | 3/10/87 |
| 4,648,594 | 06/690,991 | 3/10/87 |
| 4,648,596 | 06/430,740 | 3/10/87 |
| 4,648,597 | 06/769,292 | 3/10/87 |
| 4,648,598 | 06/746,070 | 3/10/87 |
| 4,648,599 | 06/722,463 | 3/10/87 |
| 4,648,601 | 06/729,417 | 3/10/87 |
| 4,648,603 | 06/736,277 | 3/10/87 |
| 4,648,608 | 06/706,273 | 3/10/87 |
| 4,648,609 | 06/693,374 | 3/10/87 |
| 4,648,610 | 06/757,680 | 3/10/87 |
| 4,648,611 | 06/739,179 | 3/10/87 |
| 4,648,612 | 06/808,033 | 3/10/87 |
| 4,648,613 | 06/755,920 | 3/10/87 |
| 4,648,615 | 06/795,408 | 3/10/87 |
| 4,648,625 | 06/749,672 | 3/10/87 |
| 4,648,630 | 06/750,888 | 3/10/87 |
| 4,648,636 | 06/754,640 | 3/10/87 |
| 4,648,638 | 06/747,834 | 3/10/87 |
| 4,648,641 | 06/672,481 | 3/10/87 |
| 4,648,644 | 06/757,644 | 3/10/87 |
| 4,648,655 | 06/777,318 | 3/10/87 |
| 4,648,658 | 06/733,753 | 3/10/87 |
| 4,648,659 | 06/648,154 | 3/10/87 |
| 4,648,662 | 06/732,342 | 3/10/87 |
| 4,648,674 | 06/749,970 | 3/10/87 |
| 4,648,697 | 06/737,225 | 3/10/87 |
| 4,648,700 | 06/738,093 | 3/10/87 |
| 4,648,713 | 06/565,246 | 3/10/87 |
| 4,648,719 | 06/728,750 | 3/10/87 |
| 4,648,728 | 06/755,924 | 3/10/87 |
| 4,648,735 | 06/715,232 | 3/10/87 |
| 4,648,739 | 06/713,810 | 3/10/87 |
| 4,648,742 | 06/769,819 | 3/10/87 |
| 4,648,748 | 06/625,144 | 3/10/87 |
| 4,648,749 | 06/729,750 | 3/10/87 |
| 4,648,752 | 06/770,441 | 3/10/87 |
| 4,648,765 | 06/777,721 | 3/10/87 |
| 4,648,770 | 06/742,368 | 3/10/87 |
| 4,648,771 | 06/859,238 | 3/10/87 |
| 4,648,773 | 06/753,221 | 3/10/87 |
| 4,648,794 | 06/730,143 | 3/10/87 |
| 4,648,801 | 06/868,190 | 3/10/87 |
| 4,648,806 | 06/743,850 | 3/10/87 |
| 4,648,810 | 06/734,025 | 3/10/87 |
| 4,648,814 | 06/731,913 | 3/10/87 |
| 4,648,815 | 06/772,886 | 3/10/87 |
| 4,648,817 | 06/722,504 | 3/10/87 |
| 4,648,825 | 06/839,371 | 3/10/87 |
| 4,648,829 | 06/695,856 | 3/10/87 |
| 4,648,839 | 06/768,336 | 3/10/87 |
| 4,648,840 | 06/765,813 | 3/10/87 |
| 4,648,846 | 06/738,751 | 3/10/87 |
| 4,648,849 | 06/721,686 | 3/10/87 |
| 4,648,854 | 06/684,679 | 3/10/87 |
| 4,648,864 | 06/686,592 | 3/10/87 |
| 4,648,878 | 06/812,256 | 3/10/87 |
| 4,648,879 | 06/798,986 | 3/10/87 |
| 4,648,895 | 06/699,488 | 3/10/87 |
| 4,648,910 | 06/767,901 | 3/10/87 |
| 4,648,911 | 06/610,996 | 3/10/87 |
| 4,648,965 | 06/729,335 | 3/10/87 |
| 4,648,969 | 06/703,192 | 3/10/87 |
| 4,648,975 | 06/833,263 | 3/10/87 |
| 4,648,981 | 06/848,700 | 3/10/87 |
| 4,648,982 | 06/779,782 | 3/10/87 |
| 4,648,984 | 06/868,903 | 3/10/87 |
| 4,648,995 | 06/751,552 | 3/10/87 |
| 4,648,997 | 06/822,630 | 3/10/87 |
| 4,649,007 | 06/596,541 | 3/10/87 |
| 4,649,008 | 06/580,569 | 3/10/87 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,649,026 | 06/796,346 | 3/10/87 |
| 4,649,029 | 06/599,896 | 3/10/87 |
| 4,649,030 | 06/616,537 | 3/10/87 |
| 4,649,031 | 06/319,189 | 3/10/87 |
| 4,649,033 | 06/610,998 | 3/10/87 |
| 4,649,034 | 06/744,729 | 3/10/87 |
| 4,649,040 | 06/607,160 | 3/10/87 |
| 4,649,056 | 06/866,621 | 3/10/87 |
| 4,649,068 | 06/725,540 | 3/10/87 |
| 4,649,074 | 06/891,032 | 3/10/87 |
| 4,649,083 | 06/651,977 | 3/10/87 |
| 4,649,092 | 06/689,352 | 3/10/87 |
| 4,649,093 | 06/839,716 | 3/10/87 |
| 4,649,111 | 06/764,967 | 3/10/87 |
| 4,649,126 | 06/761,586 | 3/10/87 |
| 4,649,127 | 06/690,065 | 3/10/87 |
| 4,649,132 | 06/738,134 | 3/10/87 |
| 4,649,145 | 06/803,523 | 3/10/87 |
| 4,649,146 | 06/574,517 | 3/10/87 |
| 4,649,150 | 06/610,958 | 3/10/87 |
| 4,649,171 | 06/751,070 | 3/10/87 |
| 4,649,209 | 06/762,178 | 3/10/87 |
| 4,649,210 | 06/778,820 | 3/10/87 |
| 4,649,212 | 06/719,632 | 3/10/87 |
| 4,649,214 | 06/676,705 | 3/10/87 |
| 4,649,218 | 06/225,043 | 3/10/87 |
| 4,649,222 | 06/821,298 | 3/10/87 |
| 4,649,231 | 06/698,245 | 3/10/87 |
| 4,649,237 | 06/711,896 | 3/10/87 |
| 4,649,241 | 06/669,947 | 3/10/87 |
| 4,649,259 | 06/709,337 | 3/10/87 |
| 4,649,260 | 06/838,398 | 3/10/87 |
| 4,649,265 | 06/707,583 | 3/10/87 |
| 4,649,270 | 06/680,093 | 3/10/87 |
| 4,649,274 | 06/769,457 | 3/10/87 |
| 4,649,284 | 06/699,445 | 3/10/87 |
| 4,649,288 | 06/707,455 | 3/10/87 |
| 4,649,316 | 06/533,493 | 3/10/87 |
| 4,649,319 | 06/657,414 | 3/10/87 |
| 4,649,329 | 06/724,590 | 3/10/87 |
| 4,649,333 | 06/729,156 | 3/10/87 |
| 4,649,344 | 06/606,210 | 3/10/87 |
| 4,649,353 | 06/717,353 | 3/10/87 |
| 4,649,355 | 06/736,697 | 3/10/87 |
| 4,649,369 | 06/775,615 | 3/10/87 |
| 4,649,381 | 06/664,772 | 3/10/87 |
| 4,649,384 | 06/540,267 | 3/10/87 |
| 4,649,285 | 06/517,321 | 3/10/87 |
| 4,649,386 | 06/518,589 | 3/10/87 |
| 4,649,433 | 06/607,071 | 3/10/87 |
| 4,649,466 | 06/630,396 | 3/10/87 |
| 4,649,469 | 06/575,860 | 3/10/87 |
| 4,649,497 | 06/500,816 | 3/10/87 |
| 4,649,506 | 06/588,351 | 3/10/87 |
| 4,649,510 | 06/373,668 | 3/10/87 |
| 4,649,511 | 06/516,620 | 3/10/87 |
| 4,649,524 | 06/525,534 | 3/10/87 |
| 4,649,530 | 06/724,898 | 3/10/87 |
| 4,649,536 | 06/778,902 | 3/10/87 |
| 4,649,538 | 06/657,425 | 3/10/87 |
| 4,649,543 | 06/771,458 | 3/10/87 |
| 4,649,559 | 06/546,962 | 3/10/87 |
| 4,649,562 | 06/670,212 | 3/10/87 |

---

## NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE
### (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
|---|---|---|---|---|
| 4,437,523 | 06/363,653 | 3/20/84 | 3/30/82 | 4/12/91 |
| 4,602,916 | 06/769,612 | 7/29/86 | 8/26/85 | 3/18/91 |
| 4,622,959 | 06/708,393 | 11/18/86 | 3/05/85 | 4/10/91 |

---

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

**4,604,419**, Re. S. N. 07/683,069, Filed Apr. 10, 1991, Cl. 524/318, TREATMENT OF AQUEOUS SUSPENSION OF VINYL CHOLORIDE POLYMERS, Peter V. Smallwood, Owner of Record: *Imperial Chemical Industries, Plc., London, England*, Attorney or Agent: Paul N. Kokulis, Ex. Gp.: 155

**4,672,550**, Re. S. N. 07/678,182, Filed Mar. 29, 1991, Cl. 364, COMPUTOR CONTROLLED MACHINE, Robert J. H. Winterbottom, et al., Owner of Record: *AE Plc., Warwickshire, England*, Attorney or Agent: Michael J. Keenan, Ex. Gp.: 236

**4,682,079**, Re. S. N. 07/681,905, Filed Apr. 8, 1991, Cl. 315/186, LIGHT STRING ORNAMENT CIRCUITRY, Robert E. Sanders, et al., Owner of Record: *Hallmark Cards, Inc., Kansas City, Mo.*, Attorney or Agent: Herbert D. Hart, Ex. Gp.: 252

**4,782,414**, Re. S. N. 07/682,501, Filed Apr. 8, 1991, Cl. 360/113, MAGNETORESISTIVE READ TRANSDUCER WITH INSULATOR DEFINED TRACKWIDTH, M. T. Krounbi, et al., Owner of Record: *International Business Machines Corp., Armonk, N.Y.*, Attorney or Agent: Henry E. Otto, Ex. Gp.: 233

**4,807,600**, Re. S. N. 07/657,078, Filed Feb. 19, 1991, Cl. 128/17, SPECULUM PROTECTOR, Allen L. Hayes, Owner of Record: *Inventor*, Attorney or Agent: William D. Blackman. Ex. Gp.: 339

**4,814,363**, Re. S. N. 07/676,908, Filed Feb. 19, 1991, Cl. 523/143, PHENOLIC RESIN COMPOSITIONS AND THEIR USE IN FOUNDRY BINDERS, Colleen M. Henry, Owner of Record: *Ashland Oil, Inc., Ashland, Ky.*, Attorney or Agent: David L. Hedden, Ex. Gp.: 151

**4,817,304**, Re. S. N. 07/680,549, Filed Apr. 4, 1991, Cl. 36/114, FOOTWEAR WITH ADJUSTABLE VISCOELASTIC UNIT, Mark G. Parker, et al., Owner of Record: *Nike, Inc., Beaverton, Oreg.*, Attorney or Agent: Steven P. Schad, Ex. Gp.: 244

**4,820,937**, Re. S. N. 07/683,941, Filed Apr. 10, 1991, Cl. 307/475, TTL/CMOS COMPATIBLE INPUT BUFFER, Hung-Cheng Hsieh, Owner of Record: *Xilinx, Inc., San Jose, Calif.*, Attorney or Agent: Edel M. Young, Ex. Gp.: 254

**4,823,070**, Re. S. N. 07/683,549, Filed Apr. 10, 1991, Cl. 323/285, SWITCHING VOLTAGE REGULATOR CIRCUIT, Carl T. Nelson, Owner of Record: *Linear Technology Corp., Milpitas, Calif.*, Attorney or Agent: Mark D. Rowland, Ex. Gp.: 212

**4,829,780**, Re. S. N. 07/679,660, Filed Apr. 2, 1991, Cl. 62/288, EVAPORATOR WITH IMPROVED CONDENSATE

VOL
1126
ISS
3
MY
21
1991
UMI

COLLECTION, Gregory G. Hughes, et al., Owner of Record: *Modine Manufacturing Co., Racine, Wisc.*, Attorney or Agent: Wm. A. Van Santen, Ex. Gp.: 344

**4,896,686**, Re. S. N. 07/681,114, Filed Apr. 5, 1991, Cl. 134/167C, PIVOTING HOSE STORAGE REEL AND MOUNTING THEREOF, Ronald L. Schmidt, et al., Owner of Record: *Peabody Meyers Corp., Streator, Ill.*, Attorney or Agent: John D. Kaufmann, Ex. Gp.: 242

**4,903,851**, Re. S. N. 07/680,242, Filed Apr. 1, 1991, Cl. 220/3.9, MOLDED PLASTIC STUD BOX SUPPORT, Donovan L. Slough, Owner of Record: *Inventor*, Attorney or Agent: Frederick W. Niebuhr, Ex. Gp.: 241

**4,957,600**, Re. S. N. 07/680,172, Filed Apr. 3, 1991, Cl. 160/199, BI-FOLD DOOR CONSTRUCTION, Dennis L. Carlson, et al., Owner of Record: *Kelley Company, Inc., Milwaukee, Wisc.*, Attorney or Agent: Glenn O. Starke, Ex. Gp.: 355

**4,985,810**, Re. S. N. 07/681,568, Filed Mar. 27, 1991, Cl. 362/81, LIGHTED RUNNING BOARD ASSEMBLY, Edward Ramsey, Owner of Record: *Inventor*, Attorney or Agent: Frederick S. Burkhart, Ex. Gp.: 346

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

**4,294,178**, Reexam. No. 90/002,316, Requested Apr. 11, 1991, Cl. 110/347, TANGENTIAL FIRING SYSTEM, Richard W. Borio, et al., Owner of Record: *Combustion Engineering, Windsor, Conn.*, Attorney or Agent: Robert L. Olson, Windsor, Conn., Ex. Gp.: 344, Requester: Aptec, Inc., Honey Brook, Pa.

**4,879,445**, Reexam. No. 90/002,317. Requested Apr. 12, 1991, Cl. 219/064, SEAM WELDING, Hitoshi Kawano, et al., Owner of Record: *N. P. W. Technical Laboratory Co., & Shinko Electric Co., Tokyo, Japan*, Attorney or Agent: Shugrue, Mion, Zinn, MacPeak & Seas, Wahington, D. C., Ex. Gp.: 216, Requester: Saudronic AG, Bergdietkon, Switzerland

### Errata

"All reference to Patent No. 4,998,104 to Anthony E. Dombrowski of Omaha, Nebr. for `DRIVER ALERTING DEVICE' appearing in the Official Gazette of March 5, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,004,429 to Masanori Yagi of Japan for `METAL LATCH FOR SIMM SOCKET' appearing in the Official Gazette of April 2, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,004,858 to Gregory J. Gajda of E. White Plains, N.Y. for `BUTENE ISOMERIZATION PROCESS' appearing in the Official Gazette of April 2, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,005,202 to Andrea Pavel of Milan, Italy for `HIGH FIDELITY STEREOPHONIC REPRODUCTION SYSTEM' appearing in the Official Gazette of April 2, 1991 should be deleted since no patent was granted."

### Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Ali Shalian dba Shalian Import/Export, New York, N.Y., Reg. No. 1,618,880, for the mark "ON THE MOVE", Canc. No. 19,479.

JEAN BROWN
*Administrator, Trademark*
*Trial and Appeal Board*
For JEFFREY M. SAMUELS
*Assistant Commissioner*
*for Trademarks*

### Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceeding sent by certified mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Winconia Inc., Lanconia, N.H., Reg. No. 1,296,393, for the mark "LONGJANES", Canc. No. 19,331

Shawn Helda, dba ACTE, Santa Monica, Calif., Reg. No. 1,356,139, for the mark "ACTE" (stylized), Canc. No. 19,475

Glenn O. Stover, Albuquerque, N. Mex., Reg. No. 968,058, for the mark "LIAR'S POKER", Canc. No. 19,590

Semaphore, Inc., New York, N.Y., Reg. No. 1,366,432, for the mark "SEMA 4", Canc. No. 19,386

VLS, Inc. aka Video Laser Systems, Toledo, Ohio, Reg., No. 1,472,899, for the mark "OPTEX", Canc. No. 19,321

California Hots, Inc., Fort Lauderdale, Fla., Reg. No. 1,483,531, for the mark "CALIFORNIA HOTS AND DESIGN", Canc. No. 19,315

Amer-A-Health Charge Corp., Louisville, Ky., Reg. No. 1,376,233, for the mark"AMER-A-HEALTH CHARGE", Canc. No. 19,516

JEAN BROWN
*Administrator, Trademark*
*Trial and Appeal Board*
For JEFFREY M. SAMUELS
*Assistant Commissioner*
*for Trademarks*

# PATENT NOTICES

### Certificates of Correction For Week of May 21, 1991

D. 308,065
Re. 32,971
4,576,909
4,666,829
4,713,454
4,718,630
4,721,677
4,722,950
4,723,556
4,731,269
4,733,823
4,735,146
4,736,145
4,743,295
4,743,572
4,746,163
4,761,483
4,782.540
4,784,556
4,790,296
4,790,336
4,794,188
4,798,969
4,800,703
4,804,271
4,810,394
4,810,423
4,813,224
4,813,822
4,813,934
4,820,798
4,825,059
4,825,637
4,827,418
4,830,944
4,832,802
4,833,665
4,833,891
4,834,525
4,834,733
4,837,348
4,837,784
4,839,654
4,839,660
4,841,185
4,842,762
4,843,395
4,845,617
4,849,211
4,850,428
4,851,069
4,851,535
4,851,644
4,853,384
4,853,766
4,855,072
4,859,776
4,861,459
4,861,703
4,861,847
4,862,185
4,862,264
4,862,907
4,865,648
4,866,590
4,867,299
4,868,751
4,869,878
4,870,500
4,870,897
4,872,460
4,872,831
4,873,541
4,874,084
4,874,247
4,874,382
4,874,943
4,875,506
4,875,979
4,876,809
4,877,894
4,878,179
4,881,376
4,881,936
4,882,040
4,882,320
4,883,379
4,883,411
4,883,755
4,884,277
4,884,804
4,885,085
4,885,933
4,886,195
4,887,505
4,889,241
4,889,279
4,889,566
4,889,611
4,889,899
4,891,422
4,891,612
4,893,266
4,893,677
4,894,103
4,894,615
4,894,686
4,895,812
4,895,932
4,896,436
4,897,172
4,897,410
4,897,561
4,897,736
4,898,579
4,898,654
4,898,822
4,900,741
4,900,757
4,900,759
4.901,049
4,902,241
4,902,779
4,904,691
4,905,704
4,905,761
4,905,770
4,905,785
4,905,967
4,906,045
4,906,369
4,907,092
4,907,381
4,907,479
4,907,728
4,907,781
4,908,088
4,908,422
4,908,641
4,909,503
4,909,990
4,910,227
4,911,917
4,912,047
4,912,385
4,913,054
4,916,495
4,916,891
4,919,520
4,924,236
4,929,166
4,931,974
4,932,637
4,933,565
4,934,333
4,936,200
4,940,626
4,941,657
4,953,947
4,954,967
4,962.983
4,976,680
4,977,682
4,985,808
4,987,639

VOL
1126
ISS
3
MY
21
1991
UMI

## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box ____________
Commissioner of Patents and Trademarks
Washington, D.C. 20231

| | |
|---|---|
| Box 3 | Mail for the Office of personel for NFC |
| Box 4 | Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs. |
| Box 5 | "No Fee" mail related to trademarks. |
| Box 6 | Mail for the Office of Procurement |
| Box 7 | Reissue applications for patents involved in litigation and subsequently filed related papers. |
| Box 8 | All papers for the Office of the Solicitor *except* communications relating to *pending litigation*; papers relating to pending litigation shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215 |
| Box 9 | Coupon orders for U.S. patent and trademark copies. |
| Box 10 | Orders for certified copies of patent and trademark applications. |
| Box 11 | Electronic Ordering Service (EOS). |
| Box 12 | Contributions to the Examiner Education Program. |
| Box 13 | Mail for the Employee and Labor Relations Division. |
| Box 14 | Invoices directed to the Office of Finance. |
| Box 15 | Mail for the Advisory Commission on Patent Law Reform. |
| Box 16 | Deposit Account Replenishment Checks |
| Box 171 | Vacancy Announcement Applications. |
| Box AF | Expedited procedure for processing amendments and other responses after final rejection. |
| Box Assignment | All assignment documents except those filed with new applications. |
| Box DD | Mail related to Disclosure Documents. |
| Box EEO | Mail for the Office of Equal Employment Programs. |
| Box FWC | Requests for File Wrapper Continuation Applications (under 37 CFR 1.62) |
| Box Interference | Communications relating to interferences and applications and patents involved in interference. |
| Box Issue Fee | All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee. |
| Box ITU | All intent to use documents, excluding the initial application and amendments to allege use. |
| Box M. Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box Non-Fee-Amendment | Non-fee amendments to patent applications. (Use Box AF for responses after final rejection). |
| Box OED | Mail for the Office of Enrollment and Discipline |
| Box PATENT APPLICATION | New patent application and associated papers and fees. |
| Box TRADEMARK | New trademark application and associated papers and APPLICATION fees. |
| Box Pat. Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Reexam | Requests for Reexamination for *original* request papers *only*. |
| Box Sequence | Submission of diskette for biotechnical application. |
| Box SN | For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application"). |

---

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Alabama | Auburn University Libraries | (205) 844-1747 |
| | Birmingham Public Library | (205) 226-3680 |
| Alaska | Anchorage: Z. J. Loussac Public Library | (907) 261-2916 |
| Arizona | Tempe: Noble Library, Arizona State University | (602) 965-7607 |
| Arkansas | Little Rock: Arkansas State Library | (501) 682-2053 |
| California | Los Angeles Public Library | (213) 612-3273 |
| | Sacramento: California State Library | (916) 322-4572 |
| | San Diego Public Library | (619) 236-5813 |
| | Sunnyvale Patent Clearinghouse | (408) 730-7290 |
| Colorado | Denver Public Library | (303) 640-8847 |
| Connecticut | New Haven: Science Park Library | (203) 786-5447 |
| Delaware | Newark: University of Delaware Library | (302) 451-2965 |
| Dist. of Columbia | Washington: Howard University Libraries | (202) 806-7252 |
| Florida | Fort Lauderdale: Broward County Main Library | (305) 357-7444 |
| | Miami-Dade Public Library | (305) 375-2665 |
| | Orlando: University of Central Florida Libraries | (407) 823-2562 |
| | Tampa: Tampa Campus Library, University of South Florida | (813) 974-2726 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4508 |
| Hawaii | Honolulu: Hawaii State Public Library System | (808) 586-3477 |
| Idaho | Moscow: University of Idaho Library | (208) 885-6235 |
| Illinois | Chicago Public Library | (312) 269-2865 |
| | Springfield: Illinois State Library | (217) 782-5659 |
| Indiana | Indianapolis-Marion County Public Library | (317) 269-1741 |
| Iowa | Des Moines: State Library of Iowa | (515) 281-4118 |
| Kansas | Wichita: Ablah Library, Wichita State University | (316) 689-3155 |
| Kentucky | Louisville Free Public Library | (502) 561-8617 |
| Louisiana | Baton Rouge: Troy H. Middleton Library, Louisiana State University | (504) 388-2570 |
| Maryland | College Park: Engineering and Physical Sciences Library, University of Maryland | (301) 405-9157 |
| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
| Michigan | Ann Arbor: Engineering Transportation Library, University of Michigan | (313) 764-7494 |
| | Detroit Public Library | (313) 833-1450 |
| Minnesota | Minneapolis Public Library and Information Center | (612) 372-6570 |
| Misssissippi | Jackson: Mississippi Library Commission | Not Yet Operational |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 390 |
| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4281 |
| Nebraska | Lincoln: Engineering Library, University of Nebraska-Lincoln | (402) 472-3411 |
| Nevada | Reno: University of Nevada-Reno Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
| New Jersey | Newark Public Library | (201) 733-7782 |
| | Piscataway: Library of Science and Medicine, Rutgers University | (201) 932-2895 |
| New Mexico | Albuquerque: University of New Mexico General Library | (505) 277-4412 |
| New York | Albany: New York State Library | (518) 473-4636 |
| | Buffalo and Erie County Public Library | (716) 858-7101 |
| | New York Public Library (The Research Libraries) | (212) 714-8529 |
| North Carolina | Raleigh: D.H. Hill Library, North Carolina State University | (919) 737-3280 |
| North Dakota | Grand Forks: Chester Fritz Library, University of North Dakota | (701) 777-4888 |
| Ohio | Cincinnati and Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 292-6175 |
| | Toledo/Lucas County Public Library | (419) 259-5212 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 744-7086 |
| Oregon | Salem: Oregon State Library | (503) 378-4239 |
| Pennsylvania | Philadelphia, The Free Library of | (215) 686-5331 |
| | Pittsburgh, Carnegie Library of | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |

VOL
1126
ISS
3
MY
21
1991
UMI

Reference Collections of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Rhode Island | Providence Public Library | (401) 455-8027 |
| South Carolina | Charleston: Medical University of South Carolina Library | (803) 792-2372 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8876 |
| | Nashville: Stevenson Science Library, Vanderbilt University | (615) 322-2775 |
| Texas | Austin: McKinney Engineering Library, University of Texas at Austin | (512) 471-1610 |
| | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-2551 |
| | Dallas Public Library | (214) 670-1468 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext.2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
| Virginia | Richmond: James Branch Cabell Library, Virginia Commonwealth University | (804) 367-1104 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Library, University of Wisconsin Madison | (608) 262-6845 |
| | Milwaukee Public Library | (414) 278-3247 |

# PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

| PATENT EXAMINING GROUPS | Phone Number Area Code 703 |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director. | 308-0661 |
| ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director | 308-1235 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director | 308-0651 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 308-2351 |
| BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director | 308-0196 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. KELLY, Director | 308-1782 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director | 308-0511 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—GERALD GOLDBERG, Director | 308-0754 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—CARLTON CROYLE Director | 308-0771 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, Director. | 308-0956 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director | 308-0962 |
| DESIGN, GROUP 290—ROBERT E. GARRETT, Director | 308-0511 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 308-1113 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director | 308-1148 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director | 308-0858 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—JOHN KITTLE, Director | 308-0861 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 308-0651 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during April 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

| | |
|---|---|
| Patents | Numbers 3,800,329 to 3,808,603 inclusive |
| Plant Patents | 3,535 to 3,540 inclusive |

OL
126
SS
3
MY
21
991
UMI

## Availability of PatentIn Computer Program Training
## Friday, May 31, 1991 and Monday, July 1, 1991

The Patent and Trademark Office (PTO) has developed a computer program, called PatentIn, that will facilitate compliance with the Requirements for Patent Applications Containing Nucleotide Sequence and/or Amino Acid Sequence Disclosures (sequence rules : 37 CFR 1.821 through 1.825). (Final rules were published in the Federal Register, 55 Fed. Reg. 18230 (May 1, 1990), and in the Official Gazette, 1114 O.G. 29 (May 15, 1990).)

Two one-day training sessions will be held on the use of the PatentIn Computer Program on Friday, May 31, 1991 and Monday, July 1, 1991 from 10:00 am to 4:00 pm. The training will be held at the Department of Agriculture Graduate School Training Facility. The School is located at 600 Maryland Ave., S.W., Washington, D.C. at the L'Enfant Plaza Metro stop.

The training will be hands on, using personal computer equipment and will include (1) the use of PatentIn to prepare the sequence listing file of information, and (2) the use of word processing software to prepare the PatentIn sequence listing file for inclusion as part of the application papers. The class will also include training on the basic file editing and manipulation skills that may be necessary for preparing sequence information for importing into PatentIn.

Because of the limited number of computers available, each class will be limited to no more than 17 participants.

Requests to attend the class should be made in writing, addressed to the Commissioner of Patents and Trademarks; Washington D.C. 20231; Attention: Arthur F. Purcell, Office of the Administrator for Documentation - Crystal Mall 2, Suite 300. Requests should include a check for $100, made payable to the Commissioner of Patents and Trademarks, or an authorization to charge a PTO Deposit Account. Requests authorizing charges to PTO Deposit Accounts may also be sent via facsimile to 703-557-0668. Any questions about the sequence rules or this notice should be directed to Arthur F. Purcell, by telephone at (703) 557-0400.

William
William S. Lawson
Administrator for Documentation

**DEPARTMENT OF COMMERCE**

**Patent and Trademark Office**

**37 CFR Part 2**

**[Docket No. 910364-1064]**

**RIN 0651-AA47**

## Amendment to Interrogatory Practices

**AGENCY:** Patent and Trademark Office, Commerce.

**ACTION:** Proposed rulemaking.

**SUMMARY:** The Patent and Trademark Office (PTO) proposes an amendment to § 2.120(d)(1) of the rules of practice in trademark cases, which limits the total number of interrogatories that may be served by one party upon another in a trademark interference, concurrent use, opposition, or cancellation proceeding. The proposed amendment shifts, from the responding party to the inquiring party, the burden of filing a motion to determine whether an assertion of an excessive number of interrogatories is well taken.

**DATE:** Written comments must be submitted on or before May 30, 1991 to ensure consideration.

**ADDRESSES:** Address written comments to Box 5, Trademark Trial and Appeal Board, Commissioner of Patents and Trademarks, Washington, DC 20231, marked to the attention of Janet E. Rice.

Written comments will be available for public inspection in room 1008, Crystal Square 5, 1755 Jefferson Davis Highway, Arlington, Virginia 22202.

**FOR FURTHER INFORMATION CONTACT:** Janet E. Rice by telephone at (703) 557-3551 or by mail marked to her attention and addressed to Box 5, Trademark Trial and Appeal Board, Commissioner of Patents and Trademarks, Washington, DC 20231.

**SUPPLEMENTARY INFORMATION:** In a notice of proposed rulemaking published in the **Federal Register** on March 7, 1989, at 54 FR 9514, and in the Patent and Trademark Office Official Gazette of March 28, 1989, at 1100 O.G. 137, the PTO proposed amendments to a number of the rules of practice in trademark cases. One of the proposed amendments pertained to § 2.120(d), which then consisted of a single paragraph relating to document production. It was proposed that the section be amended to include a new paragraph (designated "(1)" limiting the number of interrogatories that might be served by one party upon another in a trademark interference, concurrent use, opposition, or cancellation proceeding.

In response to the notice of proposed rulemaking, the PTO received numerous written comments pertaining to proposed § 2.120(d)(1). One individual commented that a party served with excessive interrogatories might make its own count of the questions, answer as many as were allowed under the proposed rule, and not answer the remainder on the ground that supernumerary questions were not authorized. To remedy this problem, the individual suggested that if the proposed rule were adopted, it might be advisable to add "a provision prescribing that relief for an excessive number of interrogatories is a protective order rather than an incomplete response to the interrogatories."

This suggestion, among others, was adopted in the final rule notice published in the **Federal Register** on August 22, 1989, at 54 FR 34886, and in the Patent and Trademark Office Official Gazette of September 12, 1989, at 1106 O.G. 26. Thus, final § 2.120(d)(1) included, as its last sentence, the following provision: "If a party upon which interrogatories have been served believes that the number of interrogatories served exceeds the limitation specified in this paragraph, and is not willing to waive this basis for objection, the party shall, within the time for (and instead of) serving answers and objections to the interrogatories, file a motion for a protective order, accompanied by a copy of the interrogatories which together are said to exceed the limitation."

In addition, the final rule notice indicated that the PTO would monitor the impact of § 2.120(d)(1) carefully and further amend the rule if necessary.

The effective date of the rule amendments specified in the final rule notice was November 16, 1989. Since that time, many attorneys have expressed the opinion, in public meetings relating to trademarks, that it is unfair for a party served with excessive interrogatories to have the burden of filing a motion for a protective order. These attorneys have suggested that the better practice would be to allow the responding party to simply object to the interrogatories on the ground of their excessive number, and leave the propounding party with the burden of filing a motion to compel, if it believes that the objection is not well taken.

Accordingly, § 2.120(d)(1) is proposed to be revised to substitute a motion to compel for the motion for a protective order.

### Discussion of Specific Section Proposed To Be Changed

In this discussion, "Trademark Trial and Appeal Board" is abbreviated as "Board."

Section 2.120(d)(1) now provides, in part, that if a party upon which interrogatories have been served believes that the number of interrogatories served exceeds the limitation specified in the paragraph, and is not willing to waive this basis for objection, the party shall, within the time for (and instead of) serving answers and objections to the interrogatories, file a motion for a protective order, accompanied by a copy of the interrogatories which together are said to exceed the limitation. The paragraph is proposed to be revised to provide instead that if a party upon which interrogatories have been served believes that the number of interrogatories served exceeds the limitation specified in the paragraph, and is not willing to waive this basis for objection, the party shall, within the time for (and instead of) serving answers and specific objections to the interrogatories, serve a general objection on the ground of their excessive number. The paragraph is proposed to be further revised to add a requirement that if the party serving the interrogatories, in turn, files a motion to compel discovery, the motion must be accompanied by a copy of the set(s) of interrogatories which together are said to exceed the limitation, and must otherwise comply with the requirements of paragraph (e) of the section. Paragraph (e) governs motions to compel discovery in inter parties proceedings before the Board, and requires, inter alia, that a motion to compel be supported by a written statement from the moving party that such party or the attorney therefor has made a good faith effort, by conference or correspondence, to resolve with the other party or the attorney therefor the issues presented in the motion and has been unable to reach agreement.

### Environmental, Energy, and Other Considerations

The proposed rule change will not have a significant impact on the quality of the human environment or the conservation of energy resources.

The proposed rule change is in conformity with the requirements of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), Executive Orders 12291 and 12612, and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*

The General Counsel of the Department of Commerce has certified to the Chief Counsel for Advocacy, Small Business Administration, that the proposed rule change will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, 5 U.S.C. 605(b)). The rule change includes no additional or increased fees. Substantive rights to use trademarks are not adversely affected.

The Patent and Trademark Office has determined that this proposed rule change is not a major rule under Executive Order 12291. The annual effect on the economy will be less than $100 million. There will be no major increase in costs or prices for consumers; individual industries; Federal, state or local government agencies; or geographic regions. There will be no significant adverse effects on competition, employment, investment, productivity, or innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The Office has also determined that this notice has no Federalism implications affecting the relationship between the National Government and the States as outlined in Executive Order 12612.

The rule change will not impose any additional burden under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et. seq.*

### List of Subjects in 37 CFR Part 2

Administrative practice and procedure, Courts, Lawyers, Trademarks.

Notice is hereby given that pursuant to the authority contained in section 41 of the Trademark Act of July 5, 1946, 15 U.S.C. 1123, as amended, the Patent and Trademark Office proposes to amend part 2 of Title 37 of the Code of Federal Regulations by revising § 2.120(d)(1) as set forth below. Additions are indicated by arrows (> <) and removals by brackets ([]).

## PART 2—RULES OF PRACTICE IN TRADEMARK CASES

1. The authority citation for 37 CFR part 2 would continue to read as follows:

**Authority:** 15 U.S.C. 1123; 35 U.S.C. 6, unless otherwise noted.

2. Section 2.120 is proposed to be amended by revising paragraph (d)(1) to read as follows:

### § 2.120 Discovery.

* * * * *

(d) *Interrogatories; request for production.* (1) The total number of written interrogatories which a party may serve upon another party pursuant to Rule 33 of the Federal Rules of Civil Procedure, in a proceeding, shall not exceed seventy-five, counting subparts, except that the Trademark Trial and Appeal Board, in its discretion, may allow additional interrogatories upon motion therefor showing good cause, or upon stipulation of the parties. A motion for leave to serve additional interrogatories must be accompanied by a copy of the interrogatories, if any, which have already been served by the moving party, and by a copy of the interrogatories proposed to be served. If a party upon which interrogatories have been served believes that the number of interrogatories served exceeds the limitation specified in this paragraph, and is not willing to waive this basis for objection, the party shall, within the time for (and instead of) serving answers and >specific< objections to the interrogatories, [file a motion for a protective order, accompanied by a copy of the interrogatories which together are said to exceed the limitation.] >serve a general objection on the ground of their excessive number. If the inquiring party, in turn, files a motion to compel discovery, the motion must be accompanied by a copy of the set(s) of interrogatories which together are said to exceed the limitation, and must otherwise comply with the requirements of paragraph (e) of this section.<

* * * * *

Dated: April 8, 1991.

**Harry F. Manbeck, Jr.,**

*Assistant Secretary and Commissioner of Patents and Trademarks.*

[FR Doc. 91-8791 Filed 4-12-91; 8:45 am]

BILLING CODE 3510-16-M

OL 126 SS 3 MY 21 1991 UMI

## Advisory Commission on Patent Law Reform
## Request for Comments

On March 26, 1991, the Assistant Secretary of Commerce and Commissioner of Patents and Trademarks convened the first meeting of the Advisory Commission on Patent Law Reform. The Commission will be submitting a report to the Secretary of Commerce by August 1992 on the state of, and the need for, any reform in the United States patent system. At the March meeting, the Commission identified several issues (listed below) which will be addressed in the report.

To assure that the recommendations of the Commission represent a true consensus of the American public and the patent user community, the Commission hereby invites public comments upon the issues set forth below.

Each issue should be individually addressed. Submissions should be concise statements of position, including supporting material where relevant, and limited to the questions framing each issue. All submissions must include the name and/or professional affiliation of the contributor.

To ensure full consideration, the submissions should be received by July 15, 1991. Please forward all submissions to:

E. R. Kazenske
Executive Assistant to the Commissioner
U.S. Patent and Trademark Office
Box 15
Washington, D.C. 20231

*Summary of issues upon which public commentary is invited:*

I. Protection of Computer Related Inventions

The principal issue to be examined is whether the current U.S. patent laws provide adequate and appropriate protection of novel computer program-related inventions. The relationship of patent protection for computer program-related inventions to other forms of intellectual property protection will also be considered.

a) What problems, if any, exist in the current framework of laws which protect computer-related inventions?

b) What changes, if any, should be made in the domestic and international systems for protection of computer-related inventions?

c) The Supreme Court has found that new and useful computer program-related inventions are eligible for patent

/OL
126
SS
3
MY
21
1991
UMI

protection. What rationale, if any, exists in law or policy for Congress to now remove patent protection for this field of science and technology?

d) What evidence exists, if any, that patents issued on new and useful computer program-related inventions do or do not provide an incentive to conduct research and development on new products, and that such patents do or do not promote the development of new technology?

e) What conflict or overlap is created by the existence of a patent for a new and useful computer program-related invention and either (1) a copyright for original expression embodied in the computer program fixed therein, or (2) a mask work in the invention; and if any exists, is it harmful or helpful?

f) Should Congress legislate the boundary for patents in the computer program area, or is it preferable to permit the courts to continue to define the outer boundary?

g) Are the tests of patentability for computer program-related inventions implemented by the USPTO in the notice published in the *Official Gazette* on August 9, 1989, consistent with the patent statute and/or court decisions? If there are inconsistencies, what are they?

h) What concrete steps should be taken, if necessary, to revise the PTO examination procedure for computer program-related inventions in order to achieve high-quality issued patents, particularly with respect to:

1. Providing patent examiners with complete, up-to-date prior art;
2. Providing patent examiners with training in this field to raise/maintain their expertise;
3. Recognizing computer science as a "science" for the purpose of qualification to take the PTO registration examination and recruiting computer scientists as patent examiners;
4. Providing an optimum system of classification to maximize the searchability of inventions in this field; and
5. Taking steps to reduce the PTO pendency time for patent applications in this field?

i) What procedures, not currently available, should be considered to correct problems caused by improperly granted patents (i.e., post grant oppositions, court nullification), and how would these procedures

particularly relate to computer program-related inventions?

## II. Federal Protection for Trade Secrets

Trade Secret statutes now exist only at the state level, and are not uniform in the states wherein they exist. The principal issue to be examined is whether Federal statutory protection should be enacted and if so, how it should relate to state statutes.

a) Is there a need for a Federal law on trade secrets? What problems have been caused by the absence of such a law? What problems would such a law create?

b) If there is need for a Federal trade secrets law, on what legal theories (i.e., tort, contract, etc.) should it be based? How should it relate to state laws and to what extent, if any, should it preempt state laws?

c) If there are specific areas of trade secrets that are inadequately protected by present state laws or by their nature cannot be adequately protected by state laws, would it be possible to enact Federal laws in those areas only, leaving to state law what is currently adequately protected? Would such a bifurcated system create more problems that it would solve?

## III. Cost and Complexity of Patent Enforcement

Although many patents are enforced through negotiation, resort is frequently made to either litigation in the Federal district courts, or to arbitration or one of several other forms of alternative dispute resolution (ADR). Patent litigation is said to be complex, expensive, unpredictable and heavily dependent on the ability of the judge to exert fair and effective control. Arbitration and other forms of ADR would seem to offer significant advantages in many types of dispute, but are not frequently used.

a) Is the cost of patent enforcement too high? If so, what can be done within the existing Federal Rules to achieve determinations of validity, infringement and damages more efficiently and economically? Which, if any, of the Federal Rules should be changed to improve patent litigation, and how? Would provisions in the Civil Justice Reform Act of 1990 improve patent litigation?

b) Is there a need for a "small claims" type of patent proceeding in the Federal courts, with simplified procedures and limited recovery? If so, describe the characteristics such a proceeding should have, e.g., how

OL
1126
ISS
3
MY
21
1991
UMI

procedures would be simplified, what the limits on recovery should be, etc.

c) Should the use of arbitration and other forms of ADR be increased? How? What, if any, deterrents are there to using ADR and how can they be overcome? What additional forms of ADR should be considered for patent disputes?

## IV. Grounds for Holding Patents Unenforceable

In the United States, a party charged with infringement of a patent can raise an equitable defense of unenforceability which, if sustained, may preclude exercise of the patent rights even though the patent is valid and infringed. Historically, the defense has usually been based on alleged misconduct occurring after the patent is granted, e.g., restrictive conditions in patent licensing agreements. In more recent years, conduct before the Patent and Trademark Office has frequently been claimed to give rise to the defense, e.g., misrepresentations or alleged failure to comply with the standard for disclosing to the Office information in the patent applicant's possession. Such claims, some argue, are often frivolous and unsupported.

a) What are the benefits and drawbacks of permitting an unenforceability defense in patent litigation, based on alleged misconduct either before or after patent grant?

b) Should any change be made in the present Patent and Trademark Office standard relating to the submission of prior art information, recognizing the need of the Office to consider information bearing on patentability before the patent issues?

c) Are existing judicial procedures and standards for resolving unenforceability defenses adequate? If not, is legislation desirable and, if so, what kind? Discuss any other changes believed desirable.

d) Once inequitable conduct has been found, whether based on conduct before or after grant, is unenforceability the appropriate remedy? If not, what other types of remedies might be applied and in what types of situations?

## V. Licensee Challenges to Patent Validity

Since 1969, when the U.S. Supreme Court in Lear v. Adkins, 395 U.S. 653, abrogated the doctrine of licensee estoppel, the courts have been dealing ad hoc with a variety of issues flowing from that decision. These include the right of the patent owner to terminate the license agreement and sue for patent infringement, the right of the licensee to recover royalties should the patent be declared invalid, the extent to which the parties should be permitted to contract in advance for the various eventualities, etc. It is asserted by some that this has created considerable uncertainty. Some would provide for all post-Lear eventualities by statute. Others would permit a licensor and licensee to bargain for provisions necessary to protect their respective interests.

a) Is legislation desirable to clarify the results of the Lear decision? If so, what should it provide?

b) Should any restraints, beyond the normal law of contracts, be imposed on the rights of licensee and licensor to bargain for the results of a potential challenge by the licensee of the licensed patent's validity?

## VI. First-to-File System

In the United States patent system, when more than one patent application is filed claiming the same invention, the patent is awarded to the applicant who establishes the earliest acts of invention in the United States and who has not thereafter suppressed, abandoned or concealed his invention ("first-to-invent" system). In international treaty negotiations aimed at more uniform patent laws throughout the world, particularly the World Intellectual Property Organization (WIPO) patent harmonization proceedings, the United States is being urged to adopt a different procedure, almost universally used in other countries, under which we would award the patent to the first applicant to file a patent application for the invention ("first-to-file" system). The principal issue presented is whether the United States should change from a first-to-invent procedure to a first-to-file procedure (1) only as part of a comprehensive treaty to harmonize all of the world's patent systems, (2) without regard to a harmonization treaty, or (3) not at all. The following questions are designed to help frame this issue:

a) What benefits do United States patent holders and the public realize from the first-to-invent procedure? What detriments are there, particularly those that might not be addressed by further simplification of the procedure to determine priority of inventorship?

b) What benefits are United States patent holders and the public expected to realize from a first-to-file procedure? What detriments should be expected?

VOL
1126
ISS
3
MY
21
1991
UMI

c) What benefits are United States patent holders and the public expected to realize from a harmonization treaty? What detriments should be expected?

d) If the United States retains the first-to-invent procedure, a partial step toward harmonization could be a change permitting applicants to establish dates of invention by reference to knowledge, or use, or other activity in foreign countries in addition to such activities in the United States. Should such an expansion of admissible evidence of inventorship be adopted (1) only as part of a comprehensive treaty to harmonize all of the world's patent systems, (2) without regard to a harmonization treaty, or (3) not at all? Should such an expansion of admissible evidence of inventorship be adopted (1) only in respect to foreign countries that provide for practicable and effective judicial discovery of foreign inventorship activity, (2) only on a limited basis reflecting credibility of the foreign evidence, or (3) without regard to the legal procedures available in foreign countries?

e) If the United States adopts a first-to-file procedure, should it condition this adoption on a grace period during which activities of the inventor or derived through the inventor will not be a bar to patentability by the inventor? Should the oath and its attendant sanctions be strengthened in respect to the requirement of originality?

f) If the United States adopts a first-to-file procedure, would it be desirable to codify the rights, if any, of a prior user of the invention? If so, should such a user have (1) no defense or rights in respect to the subsequent patent, (2) a personal exemption to continue existing commercial use, or (3) some other right? Should the prior user rights, if any, extend to one not an actual user, but who has made effective and serious preparations for such use? Should it matter if the prior user had elected to practice the invention as a trade secret? Should any prior user right be transferrable to someone else? Should any such right extend only to use in the United States (a feature in other patent systems)? Should any prior user right extend to such users who were not originators of the invention?

g) Would a first-to-file patent procedure run afoul of the reference to "inventors" in Article I, Section 8, Clause 8 of the *Constitution*?

## VII. Automatic Publication of Applications

In the United States patent system, patent applications are held in confidence by the Patent and Trademark Office and not published until a patent is granted. Patent rights begin on the date of grant. In international treaty negotiations aimed at more uniform patent laws throughout the world, it has been proposed that patent applications be published and confer provisional protection commencing on the date of publication. The Japanese and European patent systems provide for publication of patent applications 18 months after their effective filing dates and feature provisional protection, generally a right to compensation from infringers with actual notice. The principal issue is whether United States patent applications should be published before grant of a patent (1) only as part of a comprehensive system to harmonize all of the world's patent system, (2) without regard to a harmonization treaty, or (3) not at all. The following questions are designed to help frame this issue:

a) What benefit do United States patent holders and the public realize from keeping patent applications confidential until a patent is granted? What are the detriments?

b) What benefits are United States patent holders and the public expected to realize from a procedure requiring automatic publication of patent applications? What are the detriments?

c) Should U.S. patent applications be published by some fixed time measured from their U.S. or foreign priority filing dates? Does the need for a pre-grant publication differ depending upon whether patent terms are measured from filing date or issue date?

d) If pre-grant publication becomes part of the U.S. patent system, is there a need for provisional protection starting from the date of publication? Does the need for provisional protection depend upon how the term of the patent is measured?

e) If provisional protection is appropriate, what should it include?

## VIII. Patent Term

In the United States patent system the term of a patent is 17 years from the date when the patent is granted. Many other countries provide a 20-year term for their patents from the date when the application for the patent was filed. The appropriate term for a patent is under consideration in

VOL 1126 ISS 3 MY 21 1991 UMI

negotiations aimed at more uniform patent laws throughout the world, as well as in the negotiations on the Trade-Related Aspects of Intellectual Property (TRIPs) in the current General Agreement on Tariffs and Trade (GATT) Round. The principal issue is whether the United States should measure the life of a patent from the date when the application for it was filed (1) only as part of comprehensive treaties to harmonize all of the world's patent systems, (2) without regard to harmonization treaties, or (3) not at all. The following questions are designed to help frame this issue.

a) What benefits do United States patent holders and the public realize from measuring the life of a patent from its date of grant? What detriments are there?

b) What benefits are United States patent holders and the public expected to realize from a procedure that would measure the life of a patent from its filing date? What would the detriments be?

c) If the term of a United States patent is to be measured from the filing date, should the term be extended to compensate for delays due to (1) secrecy orders, (2) marketing delays due to FDA or EPA regulatory procedures, (3) NASA or DOE ownership proceedings, (4) appeals, or (5) any other delays outside of the control of the patent applicant?

d) Should a United States patent application be permitted to rely upon the date of more than one foreign-filed application for priority, and, if so, should the term of the United States patent be measured from the earliest priority date (recognizing that a modification of the Paris Convention probably would be necessary for adoption of any procedure to measure the life of a patent from any foreign priority date)?

e) If the term of a United States patent is to be measured from a filing date, should that date be (1) the earliest United States filing upon which priority is based, (2) the earliest filing upon which priority is based, be it a foreign or United States filing date, or (3) the filing date of the application on which the patent is granted?

f) If the United States adopts a patent term based upon a filing date, should that term be 20 years? If not, how long should the term be?

## IX. Deferred Examination

United States patent laws permit an applicant to petition for a deferral of the examination process only for a short period, and then only for "good and sufficient cause." Deferred examination at the option of the applicant is a feature of several foreign patent systems.

a) What would be the benefits of a procedure whereby a patent application is not examined in due course, but instead, the applicant is given the option, for a period of years, to request that the application be examined? What would be the detriments?

b) If optional deferred examination were adopted, what necessary or desirable companion changes (such as mandatory publication of applications) should be made, if any, in the United States patent law or procedures? Should a third party have the right to request examination?

c) If optional deferred examination were adopted, should a patent application be deemed abandoned if the applicant fails to request examination within a fixed time after filing? Should the applicant be permitted thereafter to re-file an application for the same invention?

d) Should the applicant have the option, in lieu of requesting formal examination, to obtain a lower-cost patent of shortened term and reduced enforcement rights?

## X. *In re Hilmer*

Under the interpretation of United States patent law in the case of *In re Hilmer* (and other cases), a United States patent has a patent-defeating effect (becomes a "reference") as of the earliest filing date in the United States to which it is entitled, but *not* the earliest foreign filing date to which it is entitled. In other patent systems, patents or applications are effective as references as of their earliest filing date, be it domestic or foreign.

a) If the effective date of a United States patent as a reference should be based on a foreign application filing date, should that foreign priority date be the effective date for anticipation purposes only and not for obviousness purposes so that the *Hilmer* rule is partially retained in that the United States patents with a foreign priority date are effective only as a reference for obviousness purposes as of the filing date in the United States?

VOL
1126
ISS
3
MY
21
1991
UMI

b) Is there rationale for abolishing the Hilmer rule totally so that foreign-origin United States patents will be effective as references for all purposes as of their foreign priority filing dates?

c) What changes in procedure, if any, should the Patent and Trademark Office adopt to ensure adequate consideration of the disclosures in foreign-origin United States patents in the examination of United States patent applications?

d) Should bilateral reciprocity be applied when deciding whether or not a United States patent is entitled to an earlier foreign filing priority date in a particular country for reference purposes?

## XI. Reexamination

The reexamination statute permits any person to file, with the requisite fee, a request for the reexamination of a patent in view of prior art limited to prior patents and printed publications. Issues of inequitable conduct, public use and sale, and the like, may not be addressed in reexamination. If the USPTO determines that the request raises "a substantial new question of patentability," the patent is reexamined under the same procedures applicable to the examination of new applications and concludes with the issuance of a reexamination certificate. The reexamination process is basically *ex parte* in nature, with very limited participation by a third party requestor. Since the present system of reexamination was established by Congress in 1980, there have been numerous proposals to modify reexamination to increase the degree of participation of the requestor and/or to enlarge the scope of reexamination.

a) Do you believe the present reexamination system is working effectively? If not, identify each deficiency that you believe exists in the system.

b) Do you believe that the present reexamination system should be modified to permit complete *inter partes* participation by a protestor at all phases of the reexamination proceeding? If so, explain why. If not, explain why.

c) If your answer to question b) is "no," to what extent, if any, should third parties be allowed greater participation than at present in reexamination proceedings?

d) Would you be in favor of modifying the present reexamination system to permit or require one or more of the following:

(1) Permitting a reexamination petitioner other than the patentee to comment on any claims in their finally allowed form, so as to provide the examiner with the petitioner's views prior to a final decision as to whether to issue a reexamination certificate?

(2) Permitting a reexamination petitioner to appeal both to the PTO Board of Patent Appeals and Interferences and to the Federal Circuit from any final decision favorable to a patentee in a reexamination proceeding?

(3) Conditioning the appeal noted in subparagraph (2) on the petitioner's agreement to forego litigating in any other forum any issue raised or which could have been raised on appeal?

(4) Precluding an accused infringer from relying as a defense on any prior art of printed publication unless that prior art or printed publication has been previously considered by the PTO either during the original prosecution of a patent or in a reissue or reexamination proceeding involving that patent?

(5) Precluding a party or its privies, against whom a judgment of invalidity of a patent claim or claims has been entered, from seeking or maintaining reexamination of that claim or claims?

(6) Requiring that claims of a reexamined application be construed under the same standards as those claims would be construed in a district court infringement proceeding?

e) Should the scope of issues considered by the examiner during reexamination be broadened? If so, how (e.g., by permitting consideration of public use or on sale bars, Section 112 issues, inequitable conduct, etc.)?

f) In what other ways, if any, should reexamination proceedings be changed?

## XII. Assignee Filing of Applications

The United States currently requires the actual inventor or inventors to file patent applications, subject to a few limited exceptions such as death, unavailability, or insanity. Each application must be accompanied by an oath from the actual inventor which states that the applicant believes he was the first to invent the claimed invention. Nearly all foreign patent systems permit the owner of an invention (whether the actual inventor or the assignee) to

VOL
126
ISS
3
MY
21
1991
UMI

file the patent application without an oath signed by the inventor.

a) Should the United States allow filing of patent applications by assignees?

b) What benefits and drawbacks would occur by allowing filing of patent applications by assignees?

c) What contours should an assignee filing proposal have, including possible safeguards for inventors and the public?

## XIII. PTO Funding and Fee Structure

The Patent and Trademark Office historically recovered its costs through a combination of fees and funding from general tax revenues. The major patent fees are filing fees, and issue and maintenance fees in a two-tier system with lower rates for small entities. These fees have undergone substantial increases recently as Congress and the Administration have changed from a policy under which applicants and patent owners paid only a portion of these costs to one under which they pay full costs.

a) What impact, if any, will a system in which PTO costs are almost entirely user-fee funded have on (1) U.S. inventors generally, (2) on small entities, including independent inventors, and (3) the public?

b) What realistic and practical alternatives can you suggest, other than user-fee funding, for funding PTO operations?

c) Congress historically has provided fiscal oversight for the PTO. Will this attention by Congress continue at the same level in the absence of a significant allocation of taxpayer funds and, if not, what other fiscal oversight is appropriate?

d) Should the more public-oriented functions of the PTO, e.g., public search room operations, be funded by user fees, or should such operations be supported by appropriated funds?

e) Would it be desirable to increase the average application pendency time in the PTO to a level above 18 months if such increase permitted a significant reduction in PTO fees?

f) What are the advantages and disadvantages of retaining a two-tier fee structure?

g) Should large entities subsidize small entities in a two-tier structure, or should public funds be used to supplement small entity fees?

h) As part of a two-tier fee structure, what would the pros and cons be of (1) redefining a small entity to include fewer than 500 employees, (2) providing a tax credit (e.g., 50%) in lieu of part or all of the 50% subsidy for small entities, (3) denying 50% subsidy benefits, on a need basis, to small entities who receive a defined minimum (e.g., $200,000) in technology transfer fees during the preceding year, and (4) imposing a flat (e.g., 10%) across-the-board fee increase if this permitted the continuance of the current small entity reduced fee structure?

i) A major current cost of the PTO is that of automating the search files and system. How should this cost be recovered, if not through fees?

j) Is there a mechanism in the Government for long-term investments, such as computer equipment, to be capitalized and paid off over their useful life? Would it be possible and desirable to have such investments paid for by a bond over a period of years (e.g., 20 years) instead of by user fees?

k) Should the current relation among filing, issue and maintenance fees be changed and, if so, how? Are there other fee strategies which will better balance the need to recover costs and the need to keep the patent system accessible to inventors?

l) In discussions of patent harmonization, the question of pre-issuance publication of U.S. patents has been raised. Given the possible reluctance of Congress to fund the costs of such publication from general revenues, would you support such publication if its cost were totally user-funded?

5/7/91
Date

Harry F. Manbeck Jr.
Assistant Secretary of Commerce and
Commissioner of Patents and Trademarks

**DEPARTMENT OF COMMERCE**

**Patent and Trademark Office**

**37 CFR Parts 1 and 2**

**[Docket No. 910373–1073]**

**RIN 0651–AA45**

## Revision of Patent and Trademark Fees

**AGENCY:** Patent and Trademark Office, Commerce.

**ACTION:** Notice of proposed rulemaking.

**SUMMARY:** The Patent and Trademark Office (PTO) proposes to amend the rules of practice in patent and trademark cases, parts 1 and 2 of title 37, Code of Federal Regulations, to adjust certain patent and trademark fee amounts and to amend certain procedures in accordance with the applicable provisions of H.R. 1613.

In brief, the PTO is proposing to establish a two-year fee cycle for fiscal years 1992 and 1993. During the 1992–1993 fee cycle, fees set under 35 U.S.C. 41 (a) and (b) would remain at the present level. Fees set under 35 U.S.C. 41(d), 35 U.S.C. 376, and section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. 1113), would be adjusted. The small entity subsidy would be continued, but would apply only to patent application filing fees.

**DATES:** Written comments must be submitted on or before June 12, 1991; a public hearing will be held on June 12, 1991, at 9 a.m. Requests to present oral testimony should be received on or before June 11, 1991.

**ADDRESSES:** Address written comments and requests to present oral testimony to the Commissioner of Patents and Trademarks, Washington, DC 20231, Attention: Frances Michalkewicz, suite 507, Crystal Park 1, or by FAX to (703) 557–8664. The hearing will be held in suite 912 on the 9th floor of Building 2, Crystal Park, located at 2121 Crystal Drive, Arlington, Virginia. Written comments and a transcript of the hearing will be available for public inspection in suite 507 of Building 1, Crystal Park, at 2111 Crystal Drive, Arlington, Virginia.

**FOR FURTHER INFORMATION CONTACT:** Frances Michalkewicz by telephone at (703) 557–1610 or by mail marked to her attention and addressed to the Commissioner of Patents and Trademarks, Washington, DC 20231.

**SUPPLEMENTARY INFORMATION:** This proposed rule change is designed to adjust the Patent and Trademark Office fees in accordance with the provisions of H.R. 1613.

Patent and trademark fees were set on October 1, 1982, in accordance with the provisions of title 35, United States Code, and the provisions of section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. 1113).

On November 5, 1990, the Omnibus Budget Reconciliation Act of 1990 (Pub. L. 101–508) imposed a 69 percent surcharge on all patent fees set under 35 U.S.C. 41 (a) and (b). Section 10101 of Public Law 101–508 requires the Commissioner to make recommendations for any statutory changes necessary to implement new fee proposals. Furthermore, the PTO's authorizing legislation (Pub. L. 100–703) will expire on September 30, 1991. Legislation to authorize appropriations for the Patent and Trademark Office for fiscal years 1992 and 1993 and for other purposes has been introduced as H.R. 1613.

## Background

### *Statutory Provisions*

Patent fees are authorized by 35 U.S.C. 41 and 35 U.S.C. 376. Subsections 41 (a) and (b) of title 35, United States Code, establish a number of statutory fees. Among them are fees for filing a patent application, issuing a patent, and maintaining a patent in force.

Section 10101 (a) of Public Law 101–508 imposes a 69 percent surcharge on all fees authorized by 35 U.S.C. 41 (a) and (b), effective November 5, 1990. Section 1(c) of H.R. 1613 would require the Commissioner to keep section 41 (a) and (b) fees at this level.

Section 41(h) of title 35, United States Code, authorizes the 50 percent reduction in the fees paid under 35 U.S.C. 41(a) and 35 U.S.C. 41(b) by independent inventors, small business concerns, and nonprofit organizations, who meet the prescribed definitions. Section 4(d) of H.R. 1613 would amend 35 U.S.C. 41(h) to apply the 50 percent reduction only to patent application filing and claim fees when those fees are paid upon filing the application.

Section 4(a) of H.R. 1613 would amend 35 U.S.C. 41(d) to allow the Commissioner to establish fees for all other processing, services, or materials related to patents and not specified in 35 U.S.C. 41(a) and (b) to recover, in the aggregate with other revenues, the estimated cost of the operations of the PTO.

Section 376 of title 35, United States Code, authorizes the Commissioner to set fees for patent applications filed under the Patent Cooperation Treaty. H.R. 1613 makes no modifications to 35 U.S.C. 376.

Section 4(b) of H.R. 1613 would amend subsection 41(f) of title 35, United States Code, to provide that all fees set under 35 U.S.C. 41(a) and (b) may be adjusted every two years beginning October 1, 1993, by fluctuations in the Consumer Price Index (CPI) over the previous two years.

Section 4(c) of H.R. 1613 would amend subsection 41(g) of title 35, United States Code, to allow new fee amounts established after October 1, 1991, to take effect thirty days after notice in the **Federal Register.**

Section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. 1113), authorizes the Commissioner to establish fees for the filing and processing of an application for the registration of a trademark or other mark, and for all other services and materials relating to trademarks and other marks. The current section 31 also precludes any fee for the filing or processing of an application for the registration of a trademark or other mark or for the renewal or assignment of a trademark or other mark from being adjusted more than once every three years.

Section 42(c) of title 35, United States Code, provides that trademark fees available to the Commissioner are to be used exclusively for the processing of trademark registrations and for other services and materials related to trademarks. Section 4(f) of H.R. 1613 would modify 35 U.S.C. 42(c) so that trademark fees could be used to support a fair share of trademark-related activities including administrative, legislative, international and outreach programs that to date have been funded from taxpayer revenues. Trademark fees could be reprogrammed for other authorized PTO activities not specified above only upon compliance with the guidelines for reprogramming set forth in the Department of Commerce's annual appropriations act.

Section 4(g) of H.R. 1613 would allow trademark fees to be adjusted every two years, and after October 1, 1991, would allow new fee amounts to take effect thirty days after notice in the **Federal Register.**

### *General Procedures*

#### Recovery Level Determinations

The PTO proposes to recover its operating costs for fiscal years 1992 and 1993 as stated in the President's Fiscal Year 1992 Budget. The budget request for fiscal year 1992 totals $461,790,000 and the estimate for fiscal year 1993 totals $554,899,000. Recovery levels were guided by OMB Circular A–25, "User Fees," and OMB Circular A–130, "Management of Federal Information Resources."

#### Workload Projections

Determination of future year workloads varies by fee code. Principal workload projection techniques are as follows:

Patent and trademark application workloads were projected from statistical regression models using recent application trends. Patent issues are projected from an in-house patent productivity model and reflect examiner production achievements and goals. Patent maintenance fee workloads utilize patents issued 3.5, 7.5 and 11.5 years prior to payment and assume payment rates of 80 percent, 50 percent and 25 percent, respectively. Trademark affidavit projections are based on filing trends for marks registered five to six years prior. Trademark renewal projections are based on marks registered 20 years prior to 1989. Service fee workloads follow linear trends from prior year activities. Workload estimates are calculated by the Office of Budget and the office responsible for the fee activity.

#### Income Projections

For each patent statutory fee, the amount of each fee set forth in the **Federal Register** of November 26, 1990, at 55 FR 49040 was multiplied by the projected workload for 1992 and 1993 to project the income from that fee item during the two-year period. The sum of the projected incomes from all patent statutory fees for the two-year period was subtracted from the two-year budget requests of $913,433,000 for patents. The result was the amount that would have to be recovered from patent non-statutory fees and Patent Cooperation Treaty fees.

Section 4(a) of H.R. 1613, along with 35 U.S.C. 376, would allow the PTO to set fees to recover in the aggregate with revenues projected to be generated from patent statutory fees, the estimated cost of patent operations for the two-year period, 1992–1993. Each of the proposed fee amounts was multiplied by the projected workload during the fee cycle to project the income from that fee item. The sum of revenues projected to be generated from patent statutory fees, patent non-statutory fees, and Patent Cooperation Treaty fees equals the President's Budget request for patents for fiscal years 1992 and 1993.

Section 4(g) of H.R. 1613 would allow the PTO to set trademark fees to recover the estimated cost of the trademark operations for the two-year period, 1992–1993. The two-year budget request for trademarks is $99,958,000.

A comparison of existing and proposed fee amounts is included as an Appendix to this proposed notice.

Any fee amount that is paid on or after October 1, 1991, would be subject to the new fee schedule. Under H.R. 1613, the small entity subsidy would be continued, but would apply only to patent application filing and claims fees. Fees set in 35 U.S.C. 41(a)(1) for additional claims would be subject to reduction for small entities only if the additional claims were included in the application as filed. No small entity reduction would apply for claims presented later than on filing the application. Fee amounts established by 35 U.S.C. 41(a)(2), (a)(3)(c), (a)(3)(d), (a)(5)–(a)(8), and 41(b) that are paid on or after October 1, 1991, would no longer be reduced by 50 percent for small entities.

For purposes of determining the amount of the fee to be paid, the date of mailing indicated on a proper Certificate of Mailing, where authorized under 37 CFR 1.8, will be considered to be the date of receipt in the PTO. A "Certificate of Mailing under section 1.8" is not "proper" for items which are specifically excluded from the provisions of § 1.8. Section 1.6 should be consulted for those items for which a Certificate of Mailing is not "proper." Such items include, inter alia, the filing of national and international applications for patents and the filing of trademark applications. The provisions of 37 CFR 1.10 relating to filing papers and fees with an "Express Mail" certificate, however, do apply to any paper or fee (including patent and trademark applications) to be filed in the PTO. If an application or fee is filed by "Express Mail" with a proper certificate dated on or after the effective date of the rules, the amount of the fee to be paid is the fee established herein if a change is being made in the fee. In order to ensure clarity in the implementation of the fee proposals, a discussion of specific sections is set forth below.

## Discussion of Specific Rules

### *37 CFR 1.12 Assignment Records Open to Public Inspection*

Section 1.12, paragraph (a), if amended as proposed, would change the reference for payment of a fee to § 1.19(b)(3), and add a reference to the fee set in the trademark rules at § 2.6(b)(5). Section 1.12, paragraph (d), if amended as proposed, would change the reference for payment of a fee to § 1.21(j), and add a reference to the fee set in the trademark rules at § 2.6(b)(10).

### *37 CFR 1.13 Copies and Certified Copies*

Section 1.13, if amended as proposed, would revise paragraph (b) to be consistent with proposed revisions to paragraphs 1.19(b) and 2.6(b).

### *37 CFR 1.16 National Application Filing Fee*

Section 1.16, paragraphs (b)–(d), (i) and (j), if revised as proposed, would clarify that the reduced fee amounts to be paid by a small entity are applicable only when the claims are filed with the original application. Fees for presentation of claims in an original application later than on filing are set forth in proposed new 37 CFR 1.17 (p) and (q).

Section 1.16, paragraph (e), if revised as proposed, would adjust the patent application surcharge fee as authorized by section 4(a) of H.R. 1613, and would eliminate the two-tier fee structure, as authorized by section 4(d) of H.R. 1613. All applicants would pay the same fee amount.

### *37 CFR 1.17 Patent Application Processing Fees*

Section 1.17, paragraphs (a)–(g), (l) and (m), if revised as proposed, would eliminate the two-tier fee structure as authorized by section 4(d) of H.R. 1613. All applicants would pay the same amount.

Section 1.17, paragraphs (h)–(k) and (n)–(o), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

Section 1.17, if revised as proposed, would add new paragraphs (p) and (q).

Proposed new paragraph (p) would set forth fees for presentation to claims in an original application later than on filing.

Proposed new paragraph (q) would set forth fees for presentation of claims in a reissue application later than on filing

### *37 CFR 1.18 Patent Issue Fees*

Section 1.18, if revised as proposed, would eliminate the two-tier fee structure as authorized by section 4(d) of H.R. 1613. All applicants would pay the same amounts.

### *37 CFR 1.19 Document Supply Fees*

Section 1.19, if revised as proposed, would establish that the Office would sell certified or uncertified copies of documents at the same flat fee. Most requests for documents are for certified copies. Customers who need uncertified copies of documents or copies of portions of documents also would be able to make those copies themselves at a self-service copy charge, per page. The Office no longer would compare and certify documents that were not made by Office staff.

Section 1.19, subparagraph (a)(1), if revised as proposed, would adjust the fee amount as authorized by section 4(a) of H.R. 1613. Subparagraph (a)(1), if revised as proposed, also would clarify and set fees for different levels of service available for obtaining copies of patents in black and white. In addition to regular service, the PTO would provide for expedited local service to be fulfilled within one workday for orders delivered to the Public Service Window at double the fee amount set for regular service; and expedited service via electronic ordering service and delivered by overnight express delivery service as previously provided by subparagraph (a)(6). There are two Public Service Windows at the PTO: One in the Patent Search Room and another in the Trademark Search Library. Unless otherwise requested, copies of patents would be delivered to the Public Service Window in the Patent Search Room.

Section 1.19, subparagraph (a)(2), if revised as proposed, would adjust the fee amount as authorized by section 4(a) of H.R. 1613, and delete reference to copies of statutory invention registrations, which would be provided by renumbered subparagraph (a)(3).

Section 1.19, if revised as proposed, would delete existing subparagraph (a)(3). In the future, the PTO only would provide certified or uncertified copies of documents at a flat fee, as set forth in renumbered subparagraph (b)(3).

Section 1.19, renumbered subparagraph (a)(3), if revised as proposed, would clarify and set fees for different levels of service available for obtaining copies of utility patents or statutory invention registrations containing color drawings. In addition to regular service, the PTO would provide for expedited local service to be fulfilled within one work day for orders delivered to a Public Service Window at double the fee amount set for regular service.

Section 1.19, if revised as proposed, would delete subparagraphs (a)(5) and (a)(6). The service formerly provided under subparagraph (a)(5) would be provided under subparagraphs (a)(1)(ii) and (a)(2)(iii), and the service formerly provided under subparagraph (a)(6) would be provided under (a)(1)(iii).

Section 1.19, subparagraph (b)(1), if revised as proposed, would adjust the fee amount as authorized by section 4(a) of H.R. 1613, and also clarify and set fees for different levels of service available for obtaining certified copies of patent applications as filed. In addition to regular service, the PTO would provide for expedited service, fulfilled within five work days, excluding mailing time, at double the fee amount set for regular service.

Section 1.19, subparagraph (b)(2), if revised as proposed, would reduce the fee for providing a certified or uncertified copy of a patent file wrapper and contents.

Section 1.19, if revised as proposed, would delete subparagraphs (b)(3) and (b)(4). Certified or uncertified copies of Office records would be provided under the renumbered (b)(3). Expedited service as currently provided under subparagraph (b)(4) would be provided under subparagraph (b)(1)(ii).

Section 1.19, if revised as proposed, would renumber subparagraph (b)(5) as (b)(3), and adjust the fee amount as authorized by section 4(a) of H.R. 1613. Section 1.19, subparagraph (b)(3), if revised as proposed, would establish that the PTO provides copies of certified documents, but does not certify documents provided by the public.

Section 1.19, if revised as proposed, would renumber subparagraph (b)(6) as (b)(4) and would adjust the fee amount as authorized by section 4(a) of H.R. 1613.

Section 1.19, paragraphs (d)–(f), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

Section 1.19, if revised as proposed, would delete paragraph (g) because the PTO no longer would certify copies that are not prepared by the PTO.

Section 1.19, if revised as proposed, would renumber paragraph (h) as (g), and adjust the fee amount in renumbered paragraph (g) as authorized by section 4(a) of H.R. 1613.

### *37 CFR 1.20 Post-Issuance Fees*

Section 1.20, paragraphs (a)–(c), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

Section 1.20, paragraph (d), if revised as proposed, would eliminate the two-tier fee structure as authorized by section 4(d) of H.R. 1613. All would pay the same amounts.

Section 1.20, paragraphs (e)–(g), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613 to make them comparable to the amounts established by § 41(b) and set forth in the **Federal Register** of November 26, 1990, at 55 FR 49040 under 37 CFR 1.20(h)–(j), respectively.

Section 1.20, paragraphs (e)–(g), if revised as proposed, would provide for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on all applications filed on or after December 12, 1980. Paragraphs (e)–(g) formerly provided for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, but before August 27, 1982. Paragraphs (h)–(j), which are proposed to be deleted, provided for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after August 27, 1982. The distinction in the maintenance fee due based on the application filing date would be eliminated by section 4(a) of H.R. 1613. Section 4(d) of H.R. 1613 would eliminate the two-tier fee structure for the payment of maintenance fees. All would pay the same amounts.

Section 1.20, if revised as proposed, would delete paragraphs (h)–(j). The fees for maintaining all original or reissue patents, except design or plant patents, including those based on applications filed on or after August 27, 1982, would be set forth in paragraphs (e)–(g).

Section 1.20, if revised as proposed, would renumber paragraph (k) as paragraph (h), and adjust the fee amounts as authorized by section 4(a) of H.R. 1613. This paragraph would provide for a surcharge for payment of a maintenance fee during the six-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after December 12, 1980. Paragraph (h) formerly provided for a surcharge for late payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, but before August 27, 1982. Paragraph (l), which is proposed to be deleted, provided for a surcharge for late payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after August 27, 1982. Section 4(d) of H.R. 1613 would eliminate the two-tier fee structure for the payment of maintenance fees. All would pay the same amounts.

Section 1.20, if revised as proposed, would delete paragraph (l). The fees for the late payment of a maintenance fee for all original or reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, are set forth in proposed renumbered paragraph (h).

Section 1.20, if revised as proposed, would renumber paragraphs (m) and (n) as paragraphs (i) and (j), and adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

### *37 CFR 1.21 Miscellaneous Fees and Charges*

Section 1.21, if revised as proposed, would reserve paragraph (f) and delete paragraphs (p) and (q).

Section 1.21, paragraphs (a), (c)-(e), (h), and (l)-(n), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

Section 1.21, subparagraph (a)(4), if revised as proposed, would provide a certificate of good standing for $10.00 and a certificate that is suitable for framing at double that fee amount.

Section 1.21, subparagraph (b)(1), if revised as proposed, would eliminate the fee requirement for reinstating a deposit account. This fee requirement has been found to be unnecessary because the Office no longer suspends accounts when there is no activity. The fee amount for establishing a deposit account would remain at $10.00.

Section 1.21, if revised as proposed, would delete paragraph (f), since this service would be provided under revised paragraph (j). Paragraph (f) would be reserved.

Section 1.21, paragraph (g), if revised as proposed, would establish a self-service copy charge amount, per page. The self-service copy charge would be applied to the per copy amounts on CopiShare cards as previously provided by this paragraph, and the marginal cost for each printed page generated from the Automated Patent System, as previously provided by paragraph (q).

Section 1.21, paragraph (j), if revised as proposed, would eliminate the fee for providing duplicate passes. The Office would continue to provide duplicate passes free of charge.

Proposed new paragraph (j) would establish one fee amount for each hour of service, or fraction thereof, requested from the PTO. Examples of services would be searching PTO records, as previously provided by this paragraph; PTO staff assistance to conduct a search using the Automated Patent System, as previously provided in paragraph (p); and other miscellaneous requests for services where PTO staff are providing direct labor support to customers.

Section 1.21, paragraph (k), if revised as proposed, would require the payment of the actual cost for performing special services provided by the PTO. Generally, services provided by the PTO would be charged at the $40.00 hourly rate set forth in paragraph (f) of this section. Paragraph (k) is reserved for non-labor charges, such as computer services, special supplies, extra mailing costs, etc., that are authorized by the customer.

### *37 CFR 1.24 Coupons*

Section 1.24, if revised as proposed, would adjust the fee for the purchase of coupons for patents and trademarks to make it comparable to the fee required for the purchase of copies of patents and trademarks, and to adjust the amount of the coupon books.

### *37 CFR 1.26 Refunds*

Section 1.26, paragraph (c), if revised as proposed, would provide for a refund of $2,250 if the Commissioner decides not to institute reexamination proceedings. The $2,250 refund would apply to those instances where the proposed reexamination fee of $3,000 under 37 CFR 1.20(c) was paid. The current $1,500 refund would be made in those cases where the current $2,000 reexamination fee was paid.

### *37 CFR 1.27 Statement of Status as Small Entity*

Section 1.27, if revised as proposed, would clarify that small entity status is available only when paying the application filing fees, in accordance with section 4(d) of H.R. 1613.

### *37 CFR 1.28 Effect on Fees of Failure to Establish Status as a Small Entity*

Section 1.28, if amended as proposed, would revise paragraphs (a) and (c), and delete paragraph (b) to clarify that small entity status is available only when paying the application filing fees, in accordance with section 4(d) of H.R. 1613. Paragraph (b) would be reserved.

### *37 CFR 1.171 Application for Reissue*

Section 1.171, paragraph (a), if revised as proposed, would change the reference for payment of a fee to § 1.19(b)(4).

### *37 CFR 1.296 Withdrawal of Request for Publication of Statutory Invention Registration*

Section 1.296, if revised as proposed, would adjust the handling fee for withdrawal of a statutory invention registration as authorized by section 4(a) of H.R. 1613.

### *37 CFR 1.362 Time for Payment of Maintenance Fees*

Section 1.362, if amended as proposed, would revise paragraphs (a) and (e) to refer to renumbered paragraphs in § 1.20, and would revise paragraph (b) to clarify that maintenance fees are not required for any plant or design patents.

### *37 CFR 1.366 Submission of Maintenance Fees*

Section 1.366, if amended as proposed, would revise paragraph (d) to delete reference to small entity status when paying maintenance fees, in accordance with section 4(d) of H.R. 1613. There would be no reduction in any maintenance fee paid after the effective date of these rules for small entity status.

Section 1.366, if amended as proposed, would delete paragraph (f) since it refers exclusively to a change in small entity status prior to, or at the time of paying, the first maintenance fee. Section 4(d) of H.R. 1613 would eliminate the two-tier fee structure for the payment of maintenance fees. All would pay the same amounts.

Section 1.366, if amended as proposed, would renumber paragraph (g) as paragraph (f), and eliminate the reference to § 1.28(a) since the small entity provisions would no longer apply to maintenance fees.

### *37 CFR 1.378 Acceptance of Delayed Payment of Maintenance Fee in Expired Patent to Reinstate Patent*

Section 1.378, if amended as proposed, would revise paragraphs (a)-(c) and (e) to refer to renumbered paragraphs in § 1.20.

### *37 CFR 1.445 International Application Filing, Processing, and Search Fees*

Section 1.445, if revised as proposed, would adjust the fees authorized by 35 U.S.C. 376 for international application processing as set forth in 37 CFR 1.445(a) in accordance with section 4(a) of H.R. 1613.

### *37 CFR 1.482 International Preliminary Examination Fees*

Section 1.482, if revised as proposed, would adjust the fees in paragraph (a) in accordance with section 4(a) of H.R. 1613.

### *37 CFR 1.492 National Stage Fees*

Section 1.492, if revised as proposed, would adjust the fees in paragraphs (a)-(f) in accordance with section 4(a) of H.R. 1613. Section 1.492, if revised as proposed, would eliminate the two-tier fee structure in paragraphs (a)-(e).

Section 1.492, if revised as proposed, would add new subparagraph (a)(5) to set forth a fee upon entering the national stage when a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office. The portions of documents also would be able to make those copies themselves at a self-service copy charge, per page. The Office no longer would compare and certify documents that were not made by Office staff.

Section 1.19, subparagraph (a)(1), if revised as proposed, would adjust the fee amount as authorized by section 4(a) of H.R. 1613. Subparagraph (a)(1), if revised as proposed, also would clarify and set fees for different levels of service available for obtaining copies of patents in black and white. In addition to regular service, the PTO would provide for expedited local service to be fulfilled within one workday for orders delivered to the Public Service Window at double the fee amount set for regular service; and expedited service via electronic ordering service and delivered by overnight express delivery service as previously provided by subparagraph (a)(6). There are two Public Service Windows at the PTO: One in the Patent Search Room and another in the Trademark Search Library. Unless otherwise requested, copies of patents would be delivered to the Public Service Window in the Patent Search Room.

Section 1.19, subparagraph (a)(2), if revised as proposed, would adjust the fee amount as authorized by section 4(a) of H.R. 1613, and delete reference to copies of statutory invention registrations, which would be provided by renumbered subparagraph (a)(3).

Section 1.19, if revised as proposed, would delete existing subparagraph (a)(3). In the future, the PTO only would provide certified or uncertified copies of documents at a flat fee, as set forth in renumbered subparagraph (b)(3).

Section 1.19, renumbered subparagraph (a)(3), if revised as proposed, would clarify and set fees for different levels of service available for obtaining copies of utility patents or statutory invention registrations containing color drawings. In addition to regular service, the PTO would provide for expedited local service to be fulfilled within one work day for orders delivered to a Public Service Window at double the fee amount set for regular service.

Section 1.19, if revised as proposed, would delete subparagraphs (a)(5) and (a)(6). The service formerly provided under subparagraph (a)(5) would be provided under subparagraphs (a)(1)(ii) and (a)(2)(iii), and the service formerly provided under subparagraph (a)(6) would be provided under (a)(1)(iii).

Section 1.19, subparagraph (b)(1), if revised as proposed, would adjust the fee amount as authorized by section 4(a) of H.R. 1613, and also clarify and set fees for different levels of service available for obtaining certified copies of patent applications as filed. In addition to regular service, the PTO would provide for expedited service, fulfilled within five work days, excluding mailing time, at double the fee amount set for regular service.

Section 1.19, subparagraph (b)(2), if revised as proposed, would reduce the fee for providing a certified or uncertified copy of a patent file wrapper and contents.

Section 1.19, if revised as proposed, would delete subparagraphs (b)(3) and (b)(4). Certified or uncertified copies of Office records would be provided under the renumbered (b)(3). Expedited service as currently provided under subparagraph (b)(4) would be provided under subparagraph (b)(1)(ii).

Section 1.19, if revised as proposed, would renumber subparagraph (b)(5) as (b)(3), and adjust the fee amount as authorized by section 4(a) of H.R. 1613. Section 1.19, subparagraph (b)(3), if revised as proposed, would establish that the PTO provides copies of certified documents, but does not certify documents provided by the public.

Section 1.19, if revised as proposed, would renumber subparagraph (b)(6) as (b)(4) and would adjust the fee amount as authorized by section 4(a) of H.R. 1613.

Section 1.19, paragraphs (d)–(f), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

Section 1.19, if revised as proposed, would delete paragraph (g) because the PTO no longer would certify copies that are not prepared by the PTO.

Section 1.19, if revised as proposed, would renumber paragraph (h) as (g), and adjust the fee amount in renumbered paragraph (g) as authorized by section 4(a) of H.R. 1613.

### *37 CFR 1.20 Post-Issuance Fees*

Section 1.20, paragraphs (a)–(c), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

Section 1.20, paragraph (d), if revised as proposed, would eliminate the two-tier fee structure as authorized by section 4(d) of H.R. 1613. All would pay the same amounts.

Section 1.20, paragraphs (e)–(g), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613 to make them comparable to the amounts established by § 41(b) and set forth in the **Federal Register** of November 26, 1990, at 55 FR 49040 under 37 CFR 1.20(h)–(j), respectively.

Section 1.20, paragraphs (e)–(g), if revised as proposed, would provide for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on all applications filed on or after December 12, 1980. Paragraphs (e)–(g) formerly provided for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, but before August 27, 1982. Paragraphs (h)–(j), which are proposed to be deleted, provided for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after August 27, 1982. The distinction in the maintenance fee due based on the application filing date would be eliminated by section 4(a) of H.R. 1613. Section 4(d) of H.R. 1613 would eliminate the two-tier fee structure for the payment of maintenance fees. All would pay the same amounts.

Section 1.20, if revised as proposed, would delete paragraphs (h)–(j). The fees for maintaining all original or reissue patents, except design or plant patents, including those based on applications filed on or after August 27, 1982, would be set forth in paragraphs (e)–(g).

Section 1.20, if revised as proposed, would renumber paragraph (k) as paragraph (h), and adjust the fee amounts as authorized by section 4(a) of H.R. 1613. This paragraph would provide for a surcharge for payment of a maintenance fee during the six-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after December 12, 1980. Paragraph (h) formerly provided for a surcharge for late payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, but before August 27, 1982. Paragraph (l), which is proposed to be deleted, provided for a surcharge for late payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after August 27, 1982. Section 4(d) of H.R. 1613 would eliminate the two-tier fee structure for the payment of maintenance fees. All would pay the same amounts.

Section 1.20, if revised as proposed, would delete paragraph (l). The fees for the late payment of a maintenance fee for all original or reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, are set forth in proposed renumbered paragraph (h).

Section 1.20, if revised as proposed, would renumber paragraphs (m) and (n) as paragraphs (i) and (j), and adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

### *37 CFR 1.21 Miscellaneous Fees and Charges*

Section 1.21, if revised as proposed, would reserve paragraph (f) and delete paragraphs (p) and (q).

Section 1.21, paragraphs (a), (c)-(e), (h), and (l)-(n), if revised as proposed, would adjust the fee amounts as authorized by section 4(a) of H.R. 1613.

Section 1.21, subparagraph (a)(4), if revised as proposed, would provide a certificate of good standing for $10.00 and a certificate that is suitable for framing at double that fee amount.

Section 1.21, subparagraph (b)(1), if revised as proposed, would eliminate the fee requirement for reinstating a depnsit account. This fee requirement has been found to be unnecessary because the Office no longer suspends accounts when there is no activity. The fee amount for establishing a deposit account would remain at $10.00.

Section 1.21, if revised as proposed, would delete paragraph (f), since this service would be provided under revised paragraph (j). Paragraph (f) would be reserved.

Section 1.21, paragraph (g), if revised as proposed, would establish a self-service copy charge amount, per page. The self-service copy charge would be applied to the per copy amounts on CopiShare cards as previously provided by this paragraph, and the marginal cost for each printed page generated from the Automated Patent System, as previously provided by paragraph (q).

Section 1.21, paragraph (j), if revised as proposed, would eliminate the fee for providing duplicate passes. The Office would continue to provide duplicate passes free of charge.

Proposed new paragraph (j) would establish one fee amount for each hour of service, or fraction thereof, requested from the PTO. Examples of services would be searching PTO records, as previously provided by this paragraph; PTO staff assistance to conduct a search using the Automated Patent System, as previously provided in paragraph (p); and other miscellaneous requests for services where PTO staff are providing direct labor support to customers.

Section 1.21, paragraph (k), if revised as proposed, would require the payment of the actual cost for performing special services provided by the PTO. Generally, services provided by the PTO would be charged at the $40.00 hourly rate set forth in paragraph (f) of this section. Paragraph (k) is reserved for non-labor charges, such as computer services, special supplies, extra mailing costs, etc., that are authorized by the customer.

### *37 CFR 1.24 Coupons*

Section 1.24, if revised as proposed, would adjust the fee for the purchase of coupons for patents and trademarks to make it comparable to the fee required for the purchase of copies of patents and trademarks, and to adjust the amount of the coupon books.

### *37 CFR 1.26 Refunds*

Section 1.26, paragraph (c), if revised as proposed, would provide for a refund of $2,250 if the Commissioner decides not to institute reexamination proceedings. The $2,250 refund would apply to those instances where the proposed reexamination fee of $3,000 under 37 CFR 1.20(c) was paid. The current $1,500 refund would be made in those cases where the current $2,000 reexamination fee was paid.

### *37 CFR 1.27 Statement of Status as Small Entity*

Section 1.27, if revised as proposed, would clarify that small entity status is available only when paying the application filing fees, in accordance with section 4(d) of H.R. 1613.

### *37 CFR 1.28 Effect on Fees of Failure to Establish Status as a Small Entity*

Section 1.28, if amended as proposed, would revise paragraphs (a) and (c), and delete paragraph (b) to clarify that small entity status is available only when paying the application filing fees, in accordance with section 4(d) of H.R. 1613. Paragraph (b) would be reserved.

### *37 CFR 1.171 Application for Reissue*

Section 1.171, paragraph (a), if revised as proposed, would change the reference for payment of a fee to § 1.19(b)(4).

### *37 CFR 1.296 Withdrawal of Request for Publication of Statutory Invention Registration*

Section 1.296, if revised as proposed, would adjust the handling fee for withdrawal of a statutory invention registration as authorized by section 4(a) of H.R. 1613.

### *37 CFR 1.362 Time for Payment of Maintenance Fees*

Section 1.362, if amended as proposed, would revise paragraphs (a) and (e) to refer to renumbered paragraphs in § 1.20, and would revise paragraph (b) to clarify that maintenance fees are not required for any plant or design patents.

### *37 CFR 1.366 Submission of Maintenance Fees*

Section 1.366, if amended as proposed, would revise paragraph (d) to delete reference to small entity status when paying maintenance fees, in accordance with section 4(d) of H.R. 1613. There would be no reduction in any maintenance fee paid after the effective date of these rules for small entity status.

Section 1.366, if amended as proposed, would delete paragraph (f) since it refers exclusively to a change in small entity status prior to, or at the time of paying, the first maintenance fee. Section 4(d) of H.R. 1613 would eliminate the two-tier fee structure for the payment of maintenance fees. All would pay the same amounts.

Section 1.366, if amended as proposed, would renumber paragraph (g) as paragraph (f), and eliminate the reference to § 1.28(a) since the small entity provisions would no longer apply to maintenance fees.

### *37 CFR 1.378 Acceptance of Delayed Payment of Maintenance Fee in Expired Patent to Reinstate Patent*

Section 1.378, if amended as proposed, would revise paragraphs (a)-(c) and (e) to refer to renumbered paragraphs in § 1.20.

### *37 CFR 1.445 International Application Filing, Processing, and Search Fees*

Section 1.445, if revised as proposed, would adjust the fees authorized by 35 U.S.C. 376 for international application processing as set forth in 37 CFR 1.445(a) in accordance with section 4(a) of H.R. 1613.

### *37 CFR 1.482 International Preliminary Examination Fees*

Section 1.482, if revised as proposed, would adjust the fees in paragraph (a) in accordance with section 4(a) of H.R. 1613.

### *37 CFR 1.492 National Stage Fees*

Section 1.492, if revised as proposed, would adjust the fees in paragraphs (a)-(f) in accordance with section 4(a) of H.R. 1613. Section 1.492, if revised as proposed, would eliminate the two-tier fee structure in paragraphs (a)-(e).

Section 1.492, if revised as proposed, would add new subparagraph (a)(5) to set forth a fee upon entering the national stage when a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office. The proposed fee amount includes a reduction equivalent to approximately 20 percent of the cost of conducting a search.

*37 CFR 1.740 Application for Extension of Patent Term*

Section 1.740, paragraph (a)(14), if revised as proposed, would change the reference to the rule for extension of a patent term to § 1.20(j).

*37 CFR 1.770 Express Withdrawal of Application for Extension of Patent Term*

Section 1.770, if revised as proposed, would change the reference to the rule for extension of a patent term to § 1.20(j).

*37 CFR 2.6 Trademark Fees*

Section 2.6, if revised as proposed, would be divided into two sections. Revised paragraph (a) would include all Trademark process fees and revised paragraph (b) would include all Trademark service fees. Paragraphs (a) and (u) would be renumbered as subparagraphs (a)(1) and (a)(2); paragraphs (v), (b), (s), (c)–(l) would be renumbered as subparagraph (a)(4)–(a)(16), respectively; and paragraph (m) would be renumbered as subparagraph (a)(18). New subparagraphs (a)(3) and (a)(17) would be added.

Paragraph (n) would be renumbered as subparagraph (b)(1); paragraphs (o), (q), (r), and (w) would be renumbered as subparagraphs (b)(5)–(b)(8), respectively; and paragraph (t) would be renumbered as subparagraph (b)–(11). New subparagraphs (b)(2)–(b)(4), (b)(9) and (b)(10) would be added.

Subparagraph (a)(1), if revised as proposed, would adjust the fee amount established pursuant to the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. 1113), in accordance with section (g) of H.R. 1613.

Subparagraph (a)(2), if revised as proposed, would delete reference to filing an amendment for a statement of use. New subparagraph (a)(3) would be established for filing a statement of use under section (1)(d)(1) of the Act, per class. This would clarify that a $100 fee amount is due for each action requested.

Subparagraph (a)(5), if revised as proposed, would delete the words "an application" from the rule.

Subparagraph (a)(6), if revised as proposed, would clarify the requirement for paying an additional fee for a renewal application made within three months of the expiration of the registration. Subparagraph (a)(6), if revised as proposed, would adjust the fee amount established pursuant to the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. 1113), in accordance with section (g) of H.R. 1613.

Subparagraphs (a)(12)–(a)(16), if revised as proposed, would adjust the fee amounts in accordance with section (g) of H.R. 1613.

Subparagraph (a)(16), if revised as proposed, would delete reference to filing a notice of opposition. New subparagraph (a)(17) would be established for filing a notice of opposition, per class. This would clarify that the proposed $400 fee amount is due for each class requested.

Subparagraph (a)(18), if revised as proposed, would adjust the fee amount in accordance with section (g) of H.R. 1613.

Section 2.6(b), if revised as proposed, would establish that the Office would sell certified or uncertified copies of documents at the same flat fee. Most requests for documents are for certified copies. Customers who need uncertified copies of documents or copies of portions of documents also would be able to make those copies themselves for a self-service copy charge, per page. The Office no longer would compare and certify documents that were not made by Office staff.

Subparagraph (b)(1), if revised as proposed, would adjust the fee amount in accordance with section (g) of H.R. 1613, and would delete reference to a copy showing title and/or status. In addition, this subparagraph would clarify the levels of service available for obtaining printed copies of trademarks. In addition to regular service provided by subparagraph (b)(1)(i), the PTO would provide, in new subparagraph (b)(1)(ii), for expedited local service to be fulfilled within one workday for orders delivered to a Public Service Window at double the fee amount for regular service. There are two Public Service Windows at the PTO: One in the Patent Search Room and another in the Trademark Search Library. Unless otherwise requested, all copies of trademarks would be delivered to the Public Service Window in the Trademark Search Library. New subparagraph (b)(1)(iii) would establish a fee for providing expedited service for a copy of a registered mark ordered by electronic ordering service and delivered to the customer within two workdays.

Under proposed new subparagraph (2), the PTO would provide a certified copy of a trademark application as filed. In addition to regular service provided under (b)(2)(i), the PTO would provide, in subparagraph (b)(2)(ii), for expedited service fulfilled within five workdays, excluding mailing time, at double the fee amount for regular service.

Under subparagraph (b)(3), the PTO would provide certified or uncertified copies of trademark file wrappers and contents at the same flat fee amount.

Subparagraph (b)(4), if revised as proposed, would adjust the fee amount in accordance with section (g) of H.R. 1613, and would provide certified copies of registered marks, showing title and/or status, as provided under the current § 2.6(n). In addition to regular service provided by (b)(4)(i) at a fee, the PTO would provide, in subparagraph (b)(4)(ii), for expedited service fulfilled within five workdays from receipt of request in the Trademark Post-Registration Division, excluding mailing time, at double the fee amount for regular service.

Subparagraph (b)(5), if revised as proposed, would adjust the fee amount in accordance with section (g) of H.R. 1613, and would provide certified or uncertified copies of trademark records, per document, except as otherwise provided in this section, at the proposed flat fee amount. The Office no longer would certify documents that are not prepared by the Office, as is provided for in existing paragraph (o). Further, expedited services are now included as subparagraphs (b)(2)(ii) and (b)(4)(ii).

Section 2.6, if revised as proposed, would delete existing paragraph (p). A self-service copy charge is provided in subparagraph (b)(9) of this section.

Subparagraph (b)(6), if revised as proposed, would adjust the fee amount in accordance with section (g) of H.R. 1613.

Subparagraph (b)(7), if revised as proposed, would adjust the fee amount in accordance with section (g) of H.R. 1613, and would clarify that the fee amount charged would cover a search of assignment records and an abstract of title and certification.

Section 2.6, if revised as proposed, would delete paragraph (x). This service would be provided under proposed subparagraph (b)(9).

Proposed new subparagraph (b)(9) would establish a self-service copy charge, per page, and would be a replacement for the services offered in paragraphs (p) and (x) which are proposed to be deleted. The self-service copy charge would be applied to the per copy amounts on CopiShare cards, and the marginal cost for each printed page generated from the Automated Trademark System, as previously provided by paragraph (x).

Proposed new subparagraph (b)(10) would establish one fee amount for each hour of service, or fraction thereof, requested from the PTO. Examples of services would be searching PTO records, as previously provided by this paragraph, and other miscellaneous requests for services where PTO staff are providing direct labor support to customers.

Subparagraph (b)(11), if revised as proposed, would clarify that the services to be provided would be those that are not specified elsewhere in the statute or rules. Adding this language makes the wording of this rule comparable to § 1.21(k). Generally, services provided by the PTO would be charged at the $40.00 hourly rate set forth in subparagraph (b)(10) of this section. Subparagraph (b)(11) is reserved for nonlabor charges, such as computer services, special supplies, extra mailing costs, etc., that are authorized by the customer.

### Other Considerations

The proposed rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96–354), Executive Orders 12291 and 12612, and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq. There are no information collection requirements relating to patent and trademark fee rules.

The PTO has determined that this notice has no Federalism implications affecting the relationship between the National Government and the States as outlined in Executive Order 12612.

The General Counsel of the Department of Commerce has certified to the Chief Counsel for Advocacy, Small Business Administration, that the rule change would not have a significant adverse impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96–354). Since 1983, PTO has relied on fee income from patent statutory, patent non-statutory, PCT and trademark fees to partially fund its operating program. As a result of the Omnibus Budget Reconciliation Act of 1990, reliance on fee income has increased to 99.9 percent. PTO will recover approximately 76 percent of its budget from statutory patent fees, which are unchanged, and from the elimination of the small entity subsidy for many patent fees, which is required by the proposed legislation. Only approximately 24 percent of PTO's total budget for fiscal years 1992 and 1993 will be obtained from non-statutory patent, PCT and trademark fees. Since non-statutory patent fees are an adjunct to patent statutory fees (e.g., surcharges which can be avoided by timely paying fees and filing papers), it is anticipated that these fees will be paid primarily by other than small entities. Under PCT, fees are paid principally by U.S. nationals or foreign nationals seeking protection on the same invention in a number of countries. PCT is an alternative to filing separate patent applications directly in other countries. Most applicants for protection under PCT appear to be large entities. Less than 10 percent of the revenue generated over the two-year period will come from the payment of trademark fees. Small entities have the option of not registering their marks under the Federal system, but can choose to use their mark under common law. While the trademark filing fee has been increased from $175 to $250, the $175 fee was originally set in 1982. PTO has attempted to keep trademark filing fees as low as practicable to encourage small entities to enter the trademark system.

The PTO has determined that this rule change is not a major rule under Executive Order 12291. The annual effect on the economy would be less than $100 million. There would be no major increase in costs or prices for consumers; individual industries; Federal, state, or local government agencies; or geographic regions. There would be no significant adverse effects on competition, employment, investment, productivity, or innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

### List of Subjects

*37 CFR Part 1*

Administrative practice and procedure, Courts, Freedom of information, Inventions and patents, Reporting and recordkeeping requirements, Small businesses.

*37 CFR Part 2*

Administrative practice and procedure, Courts, Lawyers, Trademarks.

For the reasons set forth in the preamble, the PTO is amending title 37 of the Code of Federal Regulations, Chapter I, as set forth below.

## PART 1—RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

**Authority:** 35 U.S.C. 6, unless otherwise noted.

2. Section 1.12 is proposed to be amended by revising paragraphs (a) and (d) to read as follows:

### § 1.12 Assignment records open to public inspection.

(a) The assignment records relating to original or reissue patents, including digests and indexes, and assignment records relating to pending or abandoned trademark applications and to trademark registrations, are open to public inspection, and copies of any instrument recorded may be obtained upon request and payment of the fee set forth in § 1.19(b)(3) and § 2.6(b)(5) of this chapter.

* * * * *

(d) An order for a copy of an assignment should give the identification of the record. If identified only by the name of the patentee and number of the patent, or in the case of a trademark registration by the name of the registrant and number of the registration, or by the name of the applicant and serial number or international application number of the application, an extra charge as set forth in § 1.21(j) and § 2.6(b)(10) of this chapter will be made for the time consumed in making a search for such assignment.

3. Section 1.13 is proposed to be amended by revising paragraph (b) to read as follows:

### § 1.13 Copies and certified copies.

* * * * *

(b) Such copies will be authenticated by the seal of the Patent and Trademark Office and certified by the Commissioner, or in his name attested by an officer of the Patent and Trademark Office authorized by the Commissioner, upon payment of the fee for requesting certified copies of Office documents.

4. Section 1.16 is proposed to be revised to read as follows:

### § 1.16 National application filing fees.

(a) Basic fee for filing each application for an original patent, except design or plant cases:

| | |
|---|---|
| By a small entity (§ 1.9(f)) | $315.00 |
| By other than a small entity | 630.00 |

(b) In addition to the basic filing fee in an original application, on filing each independent claim in excess of 3 with the original application:

| | |
|---|---|
| By a small entity (§ 1.9(f)) | 30.00 |
| By other than a small entity | 60.00 |

(c) In addition to the basic filing fee in

OL
126
SS
3
MY
21
991
UMI

an original application, on filing each claim (whether independent or dependent) in excess of 30 with the original application.

(Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes):

| | |
|---|---|
| By a small entity (§ 1.9(f)) | 10.00 |
| By other than a small entity | 20.00 |

(d) In addition to the basic filing fee in an original application, if the application as filed contains a multiple dependent claim(s) per application:

| | |
|---|---|
| By a small entity (§ 1.9(f)) | 200.00 |
| By other than a small entity | $100.00 |

(If the additional fees required by paragraphs (b), (c), and (d) are not paid on filing the claims for which the additional fees are due, they must be paid or the claims canceled by amendment, prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

| | |
|---|---|
| (e) Surcharge for filing the basic filing fee or oath or declaration on a date later than the filing date of the application | $300.00 |
| (f) For filing each design application: | |
| By a small entity (§ 1.9(f)) | 125.00 |
| By other than a small entity | 250.00 |
| (g) Basic fee for filing each plant application: | |
| By a small entity (§ 1.9(f)) | 210.00 |
| By other than a small entity | 420.00 |
| (h) Basic fee for filing each reissue application: | |
| By a small entity (§ 1.9(f)) | 315.00 |
| By other than a small entity | 630.00 |
| (i) In addition to the basic filing fee in a reissue application, on filing with the reissue application each independent claim which is in excess of the number of independent claims in the original patent: | |
| By a small entity (§ 1.9(f)) | 30.00 |
| By other than a small entity | 60.00 |
| (j) In addition to the basic filing fee in a reissue application, on filing with the reissue application each claim (whether independent or dependent) in excess of 20 and also in excess of the number of claims in the original patent. (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes): | |
| By a small entity (§ 1.9(f)) | 10.00 |
| By other than a small entity | 20.00 |

**Note:** See § 1.445 for international application filing and processing fees.)

5. Section 1.17 is proposed to be revised to read as follows:

### § 1.17 Patent application processing fees.

| | |
|---|---|
| (a) Extension fee for response within first month pursuant to § 1.136(a) | $100.00 |
| (b) Extension fee for response within second month pursuant to § 1.136(a) | 300.00 |
| (c) Extension fee for response within third month pursuant to § 1.136(a) | 730.00 |
| (d) Extension fee for response within fourth month pursuant to § 1.136(a) | 1,150.00 |
| (e) For filing a notice of appeal from the examiner to the Board of Patent Appeals and Interferences | 240.00 |
| (f) In addition to the fee for filing a notice of appeal, for filing a brief in support of an appeal | 240.00 |
| (g) For filing a request for an oral hearing before the Board of Patent Appeals and Interferences in appeal under 35 U.S.C. 134 | 200.00 |
| (h) For filing a petition to the Commissioner under a section of this part listed below which refers to this paragraph | 200.00 |
| § 1.47—for filing by other than all the inventors or a person not the inventor. | |
| § 1.48—for correction of inventorship. | |
| § 1.182—for decision on questions not specifically provided for. | |
| § 1.183—to suspend the rules. | |
| § 1.295—for review of refusal to publish a statutory invention registration. | |
| § 1.377—for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of patent. | |
| § 1.378(e)—for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in expired patent. | |
| § 1.644(e)—for petition in an interference. | |
| § 1.644(f)—for request for reconsideration of a decision on petition in an interference. | |
| § 1.666(c)—for late filing of interference settlement agreement. | |
| §§ 5.12, 5.13, & 5.14—for expedited handling of foreign filing license. | |
| § 5.15—for changing the scope of a license. | |
| § 5.25—for retroactive license. | |
| (i)(1) For filing a petition to the Commissioner under a section of this part listed below which refers to this paragraph | 200.00 |
| § 1.12—for access to an assignment record. | |
| § 1.14—for access to an application. | |
| § 1.53—to accord a filing date. | |
| § 1.55—for entry of late priority papers. | |
| § 1.60—to accord a filing date. | |
| § 1.62—to accord a filing date. | |
| § 1.103—to suspend action in application. | |
| § 1.177—for divisional reissues to issue separately. | |
| § 1.312—for amendment after payment of issue fee. | |
| § 1.313—to withdraw an application from issue. | |
| § 1.314—to defer issuance of a patent. | |
| § 1.334—for patent to issue to assignee, assignment recorded late. | |
| § 1.666(b)—for access to interference settlement agreement. | |
| (2) For filing a petition to the Commissioner under § 1.102 of this part to make application special | 200.00 |
| (j) For filing a petition to institute a public use proceeding under § 1.292 | 1,340.00 |
| (k) For processing an application filed with a specification in a non-English language (§ 1.52(d)) | 300.00 |
| (l) For filing a petition: | |
| (1) For the revival of an unavoidably abandoned application under 35 U.S.C. 133 or 371, or | |
| (2) For delayed payment of the issue fee under 35 U.S.C. 151 | 100.00 |
| (m) For filing a petition: | |
| (1) For revival of an unintentionally abandoned application, or | |
| (2) For the unintentionally delayed payment of the fee for issuing a patent | 1,050.00 |
| (n) For requesting publication of a statutory invention registration prior to the mailing of the first examiner's action pursuant to § 1.104—$730.00 reduced by the amount of the application basic filing fee paid. | |
| (o) For requesting publication of a statutory invention registration after the mailing of the first examiner's action pursuant to § 1.104—$1,460.00 reduced by the amount of the application basic filing fee paid. | |
| (p) For presentation of claims in an original application later than on filing: | |
| (1) for each independent claim in excess of 3 and in excess of the number previously paid for | 60.00 |
| (2) for each claim (whether independent or dependent) in excess of 20 and in excess of the number previously paid for (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes.) | $20.00 |
| (3) for presentation of the first multiple dependent claim in an application | 200.00 |

(If the additional fees required by paragraph (p) are not paid on presentation of the claims for which the additional fees are due, they must be paid or the claims canceled by amendment, prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

| | |
|---|---|
| (q) For presentation of claims in a reissue application later than on filing: | |
| (1) for each independent claim in excess of the number of independent claims in the original patent and in excess of the number previously paid for | 60.00 |
| (2) for each claim (whether independent or dependent) in excess of 20 and in excess of the number of claims in the original patent and also in excess of the number previously paid for (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes.) | 20.00 |

6. Section 1.18 is proposed to be revised to read as follows:

### § 1.18 Patent issue fees.

| | |
|---|---|
| (a) Issue fee for issuing each original or reissue patent, except a design or plant patent | $1,050.00 |
| (b) Issue fee for issuing a design patent | 370.00 |
| (c) Issue fee for issuing a plant patent | 520.00 |

7. Section 1.19 is revised to read as follows:

### § 1.19 Document supply fees.

The Patent and Trademark Office will supply copies of the following documents upon payment of the fees indicated:

| | |
|---|---|
| (a) Uncertified copies of patents: | |
| (1) Printed copy of a patent, including a design patent, statutory invention registration, or defensive publication document, except patent or statutory invention registration containing color drawing: | |
| (i) Regular service | $3.00 |
| (ii) Expedited local service | 6.00 |
| (iii) Expedited service for copy ordered by electronic ordering service and delivered to the customer within two workdays | 30.00 |
| (2) Printed copy of a plant patent in color | 15.00 |
| (3) Copy of a utility patent or statutory invention registration containing color drawing (see § 1.84(p)) | |
| (i) Regular service | 30.00 |
| (ii) Expedited local service | 60.00 |
| (b) Certified and uncertified copies of Office documents: | |
| (1) Certified copy of patent application as filed | |
| (i) Regular service | 20.00 |
| (ii) Expedited local service | 40.00 |
| (2) Certified or uncertified copy of patent file wrapper and contents | 150.00 |
| (3) Certified or uncertified copies of Office records, per document, except as otherwise provided in this section | 25.00 |
| (4) For a search of assignment records, abstract of title and certification, per patent | 25.00 |
| (c) Library service (35 U.S.C. 13): For providing to libraries copies of all patents issued annually, per annum | 50.00 |
| (d) For list of all United States patents and statutory invention registrations in a subclass | 10.00 |
| (e) Uncertified statement as to status of the payment of maintenance fees due on a patent or expiration of a patent | 10.00 |
| (f) Uncertified copy of a non-United States document, per document | 15.00 |
| (g) Additional filing receipts: duplicate; or corrected due to applicant error | 20.00 |

8. Section 1.20 is proposed to be revised to read as follows:

### § 1.20 Post issuance fees.

| | |
|---|---|
| (a) For providing a certificate of correction for application's mistake (§ 1.323) | $100.00 |
| (b) Petition for correction of inventorship in patent (§ 1.324) | 200.00 |
| (c) For filing a request for reexamination (§ 1.510(a)) | 3,000.00 |
| (d) For filing each statutory disclaimer (§ 1.321) | 100.00 |
| (e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after December 12, 1980, in force beyond four years; the fee is due by three years and six months after the original grant | 830.00 |
| (f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after December 12, 1980, in force beyond eight years; the fee is due by seven years and six months after the original grant | 1,670.00 |
| (g) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after December 12, 1980, in force beyond twelve years; the fee is due by eleven years and six months after the original grant | 2,500.00 |
| (h) Surcharge for paying a maintenance fee during the six-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after December 12, 1980 | 300.00 |
| (i) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable | 700.00 |
| (j) For filing an application fee extension of the term of a patent (§ 1.740) | 1,000.00 |

9. Section 1.21 is proposed to be revised to read as follows:

### § 1.21 Miscellaneous fees and charges.

The Patent and Trademark Office has established the following fees for the services indicated:

| | |
|---|---|
| (a) Registration of attorneys and agents: | |
| (1) For admission to examination for registration to practice, fee payable upon application | $300.00 |
| (2) On registration to practice | 100.00 |
| (3) For reinstatement to practice | 25.00 |
| (4) For certificate of good standing as an attorney or agent | 10.00 |
| Suitable for framing | 20.00 |
| (5) For review of a decision of the Director of Enrollment and Discipline under § 10.2(c) | 200.00 |
| (6) For requesting regrading of an examination under § 10.7(c) | 200.00 |
| (b) Deposit accounts: | |
| (1) For establishing a deposit account | 10.00 |
| (2) Service charge for each month when the balance at the end of the month is below $1,000 | 20.00 |
| (3) Service charge for each month when the balance at the end of the month is below $300 for restricted subscription deposit accounts used exclusively for subscription order of patent copies as issued | 20.00 |
| (c) Disclosure document: For filing a disclosure document | 10.00 |
| (d) Delivery box: Local delivery box rental, per annum | 100.00 |
| (e) International type search reports: For preparing an international type search report of an international type search made at the time of the first action on the merits in a national patent application | 35.00 |

| | |
|---|---|
| (f) Reserved | |
| (g) Self-service copy charge, per page | 0.25 |
| (h) For recording each assignment, agreement or other paper relating to the property in a patent or application per property | 40.00 |
| (i) Publication in Official Gazette: For publication in the Official Gazette of a notice of the availability of an application or a patent for licensing or sale, each application or patent | 20.00 |
| (j) Labor charges for services, per hour or fraction thereof | 40.00 |
| (k) For items and services that the Commissioner finds may be supplied, for which fees are not specified by statute or by this part, such charges as may be determined by the Commissioner with respect to each such item or service | Actual Cost |
| (l) For processing and retaining any application abandoned pursuant to section 1.53(d) unless the required basic filing fee has been paid | 300.00 |
| (m) For processing each check returned "unpaid" by a bank | 60.00 |
| (n) For handling an incomplete or improper application under § 1.53(c), § 1.60 or § 1.62 | 300.00 |
| (o) Marginal cost, paid in advance, for each hour of terminal session time, including print time, using Automated Patent System full-text search capabilities, prorated for the actual time used. The Commissioner may waive the payment by an individual for access to the Automated Patent System full-text search capability (APS-Text) upon a showing of need or hardship, and if such waiver is in the public interest | 40.00 |

10. Section 1.24 is proposed to be revised to read as follows:

### § 1.24 Coupons.

Coupons in denominations of three dollars, for the purchase of patents, designs, defensive publications, statutory invention registrations, and trademark registrations are sold by the Patent and Trademark Office for the convenience of the general public; these coupons may not be used for any other purpose. The three-dollar coupons are sold individually and in books of 50 for $150.00. These coupons are good until used; they may be transferred but cannot be redeemed.

11. Section 1.26 is proposed to be amended by revising paragraph (c) to read as follows:

### § 1.26 Refunds.

* * * * *

(c) If the Commissioner decides not to institute a reexamination proceeding, a refund of $2,250 will be made to the requester of the proceeding. Reexamination requesters should indicate whether any refund should be made by check or by credit to a deposit account.

12. Section 1.27 is proposed to be amended by revising paragraph (a) as follows:

### § 1.27 Statement of status as small entity.

(a) Any person seeking to establish status as a small entity (§ 1.9(f) of this part) for purposes of paying filing fees in an application must file a verified statement in the application prior to or with the filing fee paid as a small entity. Such a verified statement need only be filed once in an application and remains in effect until changed.

* * * * *

13. Section 1.28 is proposed to be amended by revising paragraphs (a) and (c) and removing and reserving paragraph (b) to read as follows:

### § 1.28 Effect on fees of failure to establish status, or change status, as a small entity.

(a) The failure to establish status as a small entity (§§ 1.9(f) and 1.27 of this part) in any application prior to paying, or at the time of paying, any filing fee precludes payment of the filing fee in the amount established for small entities. A refund pursuant to § 1.26 of this part, based on establishment of small entity status, of a portion of the filing fees timely paid in full prior to establishing status as a small entity may only be obtained if a verified statement under § 1.27 and a request for a refund of the excess amount are filed within two months of the date of the timely payment of the full filing fee. The two-month time period is not extendable under § 1.136. Status as a small entity is waived for any filing fee by the failure to establish the status prior to paying, at the time of paying, or within two months of the date of payment of, the fee. Status as a small entity must be specifically established by a verified statement filed in each application in which the status is available and desired, except those applications filed under § 1.60 or § 1.62 of this part where the status as a small entity has been established in a parent application and is still proper. Once status as a small entity has been established in an application, the status remains in that application without the filing of a further verified statement pursuant to § 1.27 of this part unless the Office is notified of a change in status. Status as a small entity in one application does not affect any other application, including applications which are directly or indirectly dependent upon the application in which the status has been established, except those filed under § 1.60 or § 1.62 of this part. Applications filed under § 1.60 or § 1.62 of this part must include a reference to a verified statement in a parent application if status as a small entity is still proper and desired.

(b) [Reserved]

(c) If status as a small entity is established in good faith, and fees as a small entity are paid in good faith, in any application or patent, and it is later discovered that such status as a small entity was established in error or that through error the Office was not notified of a change in status, the error will be excused if:

(1) Any deficiency between the amount paid and the amount due is paid within three months after the date the error occurred or

(2) Any deficiency between the amount paid and the amount due is paid more than three months after the date the error occurred and the payment is accompanied by a verified statement explaining how the error occurred and how and when it was discovered.

* * * * *

14. Sectinn 1.171 is proposed to be revised to read as follows:

### § 1.171 Application for reissue.

An application for reissue must contain the same parts required for an application for an original patent, complying with all the rules relating thereto except as otherwise provided, and, in addition, must comply with the requirements of the rules relating to reissue applications. The application must be accompanied by a certified copy of an abstract of title or an order for a title report accompanied by the fee set forth in § 1.19(b)(4) to be placed in the file, and by an offer to surrender the original patent (§ 1.178).

15. Section 1.296 is proposed to be revised to read as follows:

### § 1.296 Withdrawal of request for publication of statutory invention registration.

A request for a statutory invention registration, which has been filed, may be withdrawn prior to the date of the notice of the intent to publish a statutory invention registration issued pursuant to § 1.294(c) by filing a request to withdraw the request for publication of a statutory invention registration. The request to withdraw may also include a request for a refund of any amount paid in excess of the application filing fee and a handling fee of $300.00 which will be retained. Any request to withdraw the request for publication of a statutory invention registration filed on or after the date of the notice of intent to publish issued pursuant to § 1.294(c) must be in the form of a petition pursuant to § 1.183 accompanied by the fee set forth in § 1.17(h).

16. Section 1.362 is proposed to be amended by revising paragraphs (a), (b) and (e) to read as follows:

### § 1.362 Time for payment of maintenance fees.

(a) Maintenance fees as set forth in § 1.20 (e) through (g) are required to be paid in all patents based on applications filed on or after December 12, 1980, except as noted in paragraph (b) of this section, to maintain a patent in force beyond 4, 8 and 12 years after the date of grant.

(b) Maintenance fees are not required for any plant patents or for any design patents. Maintenance fees are not required for a reissue patent if the patent being reissued did not require maintenance fees.

* * * * *

(e) Maintenance fees may be paid with the surcharge set forth in § 1.20(h) during the respective grace periods after:

(1) 3 years through 3 years and 6 months after grant for the first maintenance fee,

(2) 7 years through 7 years and 6 months after grant for the second maintenance fee, and

(3) 11 years through 11 years and 6 months after grant for the third maintenance fee.

* * * * *

17. Section 1.366 is proposed to be amended by revising paragraph (d), removing paragraph (f), and redesignating paragraph (g) as (f) and revising it to read as follows:

### § 1.366 Submission of maintenance fees.

* * * * *

(d) Payments of maintenance fees and any surcharges should identify the fee being paid for each patent as to whether it is the 3½, 7½ or 11½ year fee, the amount of the maintenance fee and any surcharge being paid, any assigned payor number, the patent issue date and the United States application filing date. If the maintenance fee and any necessary surcharge is being paid on a reissue patent, the payment must identify the reissue patent by reissue patent number and reissue application serial number as required by paragraph (c) of this section and should also include the original patent number, the original patent issue date and the original United States application filing date.

* * * * *

(f) Maintenance fees and surcharges relating thereto will not be refunded except in accordance with § 1.26.

18. Section 1.378 is proposed to be amended to revise paragraphs (a)–(c) and (e) to read as follows:

### § 1.378 Acceptance of delayed payment of maintenance fee in expired patent to reinstate patent.

(a) The Commissioner may accept the payment of any maintenance fee due on a patent after expiration of the patent if upon petition, the delay in payment of the maintenance fee is shown to the satisfaction of the Commissioner to have been unavoidable and if the surcharge required by § 1.20(i) is paid as a condition of accepting payment of the maintenance fee. If the Commissioner accepts payment of the maintenance fee upon petition, the patent shall be considered as not having expired, but will be subject to the conditions set forth in 35 U.S.C. 41(c)(2).

(b) Any petition to accept the delayed payment of a maintenance fee filed under paragraph (a) of this section within six months of the expiration of the patent must include:

(1) The required maintenance fee set forth in § 1.20(e)–(g);

(2) The surcharge set forth in § 1.20(i); and

(3) A showing that the delay was unavoidable since reasonable care was taken to ensure that the maintenance fee would be timely paid. The showing must enumerate the steps taken to ensure timely payment of the maintenance fee.

(c) Any petition to accept the delayed payment of a maintenance fee filed under paragraph (a) of this section more than six months after the expiration of the patent must include:

(1) The required maintenance fee set forth in § 1.20(e)–(g),

(2) The surcharge set forth in § 1.20(i); and

* * * * *

(e) Reconsideration of a decision refusing to accept a maintenance fee upon petition filed pursuant to paragraph (a) of this section may be obtained by filing a petition for reconsideration within two months of, or such other time as set in, the decision refusing to accept the delayed payment of the maintenance fee. Any such petition for reconsideration must be accompanied by the petition fee set forth in § 1.17(h). After decision on the petition for reconsideration, no further reconsideration or review of the matter will be undertaken by the Commissioner. If the delayed payment of the maintenance fee is not accepted, the maintenance fee and the surcharge set forth in § 1.20(i) will be refunded following the decision on the petition for reconsideration, or after the expiration of the time for filing such a petition for reconsideration, if none is filed. The fee set forth in § 1.17(h) for filing the petition for reconsideration will not be refunded unless the refusal to accept and record the maintenance fee is determined to result from an error by the Patent and Trademark Office.

19. Section 1.445 is proposed to be revised to read as follows:

### § 1.445 International application filing, processing and search fees.

(a) The following fees and charges for international applications are established by the Commissioner under the authority of 35 U.S.C. 376:

| | |
|---|---|
| (1) A transmittal fee (see 35 U.S.C. 361(d) and PCT rule 14) | $320.00 |
| (2) A search fee (see 35 U.S.C. 361(d) and PCT rule 16) where: | |
| (i) No corresponding prior United States national application with basic filing fee has been filed | 1,040.00 |
| (ii) A corresponding prior United States national application with basic filing fee has been filed | 720.00 |
| (3) A supplemental search fee when required, per additional invention | 280.00 |

(b) The basic fee and designation fee portions of the international fee shall be as prescribed in PCT rule 15.

20. Section 1.482 is proposed to be revised to read as follows:

### § 1.482 International preliminary examination fees.

(a) The following fees and charges for international preliminary examination are established by the Commissioner under the authority of 35 U.S.C. 376:

(1) A preliminary examination fee is due on filing the Demand:

(i) Where an international search fee as set forth in § 1.445(a)(2) has been paid on the international application

VOL
126
SS
3
MY
21
1991
UMI

| | |
|---|---|
| to the United States Patent and Trademark Office as an International Searching Authority, a preliminary examination fee of | $760.00 |
| (ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office, a preliminary examination fee of | 1,140.00 |
| (2) An additional preliminary examination fee when required, per additional invention: | |
| (i) Where a supplemental search fee as set forth in § 1.445(a)(3) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority | 250.00 |
| (ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office | 380.00 |

(b) The handling fee is due on filing the Demand. Any necessary supplement to the handling fee shall be paid directly to the International Bureau.

21. Section 1.492 is proposed to be revised to read as follows:

**§ 1.492 National stage fees.**

The following fees and charges for international applications entering the national stage under 35 U.S.C. 371 are established by the Commissioner under 35 U.S.C. 376:

| | |
|---|---|
| (a) The basic national fee: | |
| (1) Where an international preliminary examination fee as set forth in § 1.482 has been paid on the international application to the United States Patent and Trademark Office | $560.00 |
| (2) Where no international preliminary examination fee as set forth in § 1.482 has been paid to the United States Patent and Trademark Office, but an international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority | 630.00 |
| (3) Where no international preliminary examination fee as set forth in § 1.482 has been paid and no international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office | 850.00 |
| (4) Where the international preliminary examination fee as set forth in § 1.482 has been paid to the United States Patent and Trademark Office and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness), and industrial applicability, as defined in PCT Article 33 (1) to (4), have been satisfied for all the claims presented in the application entering the national stage (see § 1.496(b)) | 80.00 |
| (5) Where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office | 780.00 |
| (b) In addition to the basic national fee, for filing or later presentation of each independent claim in excess of 3 | 60.00 |
| (c) In addition to the basic national fee, for filing or later presentation of each claim (whether independent or dependent) in excess of 20 (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes) | 20.00 |
| (d) In addition to the basic national fee, if the application contains, or is amended to contain, a multiple dependent claim(s), per application | 200.00 |
| (If the additional fees required by paragraphs (b), (c), and (d) are not paid on presentation of the claims for which the additional fees are due, they must be paid or the claims cancelled by amendment prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.) | |
| (e) Surcharge for filing the basic national fee or oath or declaration later than 20 months from the priority date pursuant to § 1.494(c) or later than 30 months from the priority date pursuant to § 1.495(c) | 300.00 |
| (f) For filing an English translation of an international application later than 20 months after the priority date (§ 1.494(c) or filing an English translation of the international application or of any annexes to the international preliminary examination report later than 30 months after the priority date (§ 1.495 (c) and (e)) | 300.00 |

22. Section 1.740 is proposed to be amended by revising paragraph (a)(14) to read as follows:

**§ 1.740 Application for extension of patent term.**

(a) * * *

(14) The prescribed fee for receiving and acting upon the application for extension (see § 1.20(j)).

* * * * *

23. Section 1.770 is proposed to be revised to read as follows:

**§ 1.770 Express withdrawal of application for extension of patent term.**

An application for extension of patent term may be expressly withdrawn before a determination is made pursuant to § 1.750 by filing in the Office, in duplicate, a written declaration of withdrawal signed by the owner of record of the patent or its agent. An application may not be expressly withdrawn after the date permitted for response to the final determination on the application. An express withdrawal pursuant to this section is effective when acknowledged in writing by the Office. The filing of an express withdrawal pursuant to this section and its acceptance by the Office does not entitle applicant to a refund of the filing fee. (§ 1.20(j)) or any portion thereof.

## PART 2—RULES OF PRACTICE IN TRADEMARK CASES

1. The authority citation for part 2 continues to read as follows:

**Authority:** 15 U.S.C. 1123; 35 U.S.C. 6, unless otherwise noted.

2. Section 2.6 is proposed to be revised to read as follows:

**§ 2.6 Trademark fees.**

The following fees and charges are established by the Patent and Trademark Office for trademark cases:

| | |
|---|---|
| (a) Trademark process fees. | |
| (1) For filing an application, per class | $250.00 |
| (2) For filing an amendment to allege use under section 1(c) of the Act, per class | 100.00 |
| (3) For filing a statement of use under section 1(d)(1) of the Act, per class | 100.00 |
| (4) For filing a request under section 1(d)(2) of the Act for a six-month extension of time for filing a statement of use under section 1(d)(1) of the Act, per class | 100.00 |
| (5) For filing for renewal of a registration, per class | 300.00 |
| (6) Additional fee for filing a renewal application made within three months after the expiration of the registration, per class | 200.00 |
| (7) For filing to publish a mark under section 12(c), per class | 100.00 |
| (8) For issuing a new certificate of registration upon request of assignee | 100.00 |
| (9) For a certificate of correction of registrant's error | 100.00 |
| (10) For filing a disclaimer to a registration | 100.00 |
| (11) For filing an amendment to a registration | 100.00 |
| (12) For filing an affidavit under § 8 of the Act, per class | 150.00 |
| (13) For filing an affidavit under § 15 of the Act, per class | 150.00 |
| (14) For filing a combined affidavit under §§ 8 and 15 of the Act, per class | 300.00 |
| (15) For petitions to the Commissioner | 200.00 |
| (16) For filing to cancel, per class | 400.00 |
| (17) For filing a notice of opposition, per class | 400.00 |
| (18) For ex parte appeal to the Trademark Trial and Appeal Board, per class | 200.00 |
| (b) Trademark service fees. | |
| (1) For printed copy of registered mark, copy only: | |
| (i) Regular service | $3.00 |
| (ii) Expedited local service | 6.00 |
| (iii) Expedited service for copy ordered by electronic ordering service and delivered to the customer within two workdays | 30.00 |
| (2) Certified copy of trademark application as filed: | |
| (i) Regular service | 20.00 |
| (ii) Expedited local service | 40.00 |
| (3) Certified or uncertified copy of a trademark file wrapper and contents | 50.00 |
| (4) Certified copy of a registered mark, showing title and/or status: | |
| (i) Regular service | 25.00 |
| (ii) Expedited local service | 50.00 |
| (5) Certified or uncertified copy of trademark records, per document except as otherwise provided in this section | 25.00 |
| (6) For recording trademark assignments and agreements or other papers relating to the property in a registration or application, per mark | 40.00 |
| (7) For a search of assignment records, abstract of title and certification, per registration | 25.00 |
| (8) Marginal cost, paid in advance, for each hour of terminal session time, including print time, using T-Search capabilities, prorated for the actual time used. The Commissioner may waive the payment by an individual for access to T-Search upon a showing of need or hardship, and if such waiver is in the public interest | 40.00 |
| (9) Self-service copy charge, per page | 0.25 |
| (10) Labor charges for services, per hour or fraction thereof | 40.00 |
| (11) For items and services that the Commissioner finds may be supplied, for which fees are not specified by statute or by this part, such charges as may be determined by the Commissioner with respect to each such item or service | Actual Cost |

BILLING CODE 3510-16-M

NOTE.- The following appendix will not appear in the Code of Federal Regulations.

Appendix A
Page 1

## Comparison of Existing and Proposed Fee Amounts

| 37 CFR Section | | | FEE AMOUNT | | |
|---|---|---|---|---|---|
| Proposed | Existing | DESCRIPTION | Apr 17 1989 | Nov 5 1990 | Oct 1 1991 |
| 1.16(a) | 1.16(a) | Basic Filing Fee | $370 | $630 | $630 |
| 1.16(a) | 1.16(a) | Basic Filing Fee | $185 | $315 | $315 |
| 1.16(b) | 1.16(b) | Independent Claims | $36 | $60 | $60 |
| 1.16(b) | 1.16(b) | Independent Claims | $18 | $30 | $30 |
| 1.16(c) | 1.16(c) | Claims in Excess of 20 | $12 | $20 | $20 |
| 1.16(c) | 1.16(c) | Claims in Excess of 20 | $6 | $10 | $10 |
| 1.16(d) | 1.16(d) | Multiple Dependent Claims | $120 | $200 | $200 |
| 1.16(d) | 1.16(d) | Multiple Dependent Claims | $60 | $100 | $100 |
| 1.16(e) | 1.16(e) | Surcharge - Late Filing Fee | $120 | --- | $300 |
| | 1.16(e) | Surcharge - Late Filing Fee (Small Entity) | $60 | --- | $300 |
| 1.16(f) | 1.16(f) | Design Filing Fee | $150 | $250 | $250 |
| 1.16(f) | 1.16(f) | Design Filing Fee | $75 | $125 | $125 |
| 1.16(g) | 1.16(g) | Plant Filing Fee | $250 | $420 | $420 |
| 1.16(g) | 1.16(g) | Plant Filing Fee | $125 | $210 | $210 |
| 1.16(h) | 1.16(h) | Reissue Filing Fee | $370 | $630 | $630 |
| 1.16(h) | 1.16(h) | Reissue Filing Fee | $185 | $315 | $315 |
| 1.16(i) | 1.16(i) | Reissue Independent Claims | $36 | $60 | $60 |
| 1.16(i) | 1.16(i) | Reissue Independent Claims | $18 | $30 | $30 |
| 1.16(j) | 1.16(j) | Reissue Claims in Excess of 20 | $12 | $20 | $20 |
| 1.16(j) | 1.16(j) | Reissue Claims in Excess of 20 | $6 | $10 | $10 |
| 1.17(a) | 1.17(a) | Extension - First Month | $62 | $100 | $100 |
| | 1.17(a) | Extension - First Month (Small Entity) | $31 | $50 | $100 |
| 1.17(b) | 1.17(b) | Extension - Second Month | $180 | $300 | $300 |
| | 1.17(b) | Extension - Second Month (Small Entity) | $90 | $150 | $300 |
| 1.17(c) | 1.17(c) | Extension - Third Month | $430 | $730 | $730 |
| | 1.17(c) | Extension - Third Month (Small Entity) | $215 | $365 | $730 |
| 1.17(d) | 1.17(d) | Extension - Fourth Month | $680 | $1,150 | $1,150 |
| | 1.17(d) | Extension - Fourth Month (Small Entity) | $340 | $575 | $1,150 |
| 1.17(e) | 1.17(e) | Notice of Appeal | $140 | $240 | $240 |
| | 1.17(e) | Notice of Appeal (Small Entity) | $70 | $120 | $240 |
| 1.17(f) | 1.17(f) | Filing a Brief | $140 | $240 | $240 |
| | 1.17(f) | Filing a Brief (Small Entity) | $70 | $120 | $240 |
| 1.17(g) | 1.17(g) | Request for Oral Hearing | $120 | $200 | $200 |
| | 1.17(g) | Request for Oral Hearing (Small Entity) | $60 | $100 | $200 |
| 1.17(h) | 1.17(h) | Petition - Not All Inventors | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Correction of Inventorship | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Decision on Questions | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Suspend Rules | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Expedited License | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Scope of License | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Retroactive License | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Refusing Maintenance Fee | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Refusing Maintenance Fee - Expired Patent | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Interference | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Reconsider Interference | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Late Filing of Interference | $120 | --- | $200 |
| 1.17(h) | 1.17(h) | Petition - Refusal to Publish SIR | $120 | --- | $200 |

NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.

---

## Comparison of Existing and Proposed Fee Amounts

Appendix A
Page 2

| 37 CFR Section | | | FEE AMOUNT | | |
|---|---|---|---|---|---|
| Proposed | Existing | DESCRIPTION | Apr 17 1989 | Nov 5 1990 | Oct 1 1991 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - For Assignment | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - For Application | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Late Priority Papers | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Suspend Action | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Divisional Reissues to Issue Separately | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - For Interference Agreement | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Amendment After Issue | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Withdrawal After Issue | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Defer Issue | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Issue to Assignee | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Accord a Filing Date Under §1.53 | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Accord a Filing Date Under §1.60 | $120 | --- | $200 |
| 1.17(i)(1) | 1.17(i)(1) | Petition - Accord a Filing Date Under §1.62 | $120 | --- | $200 |
| 1.17(i)(2) | 1.17(i)(2) | Petition - Make Application Special | $80 | --- | $200 |
| 1.17(j) | 1.17(j) | Petition - Public Use Proceeding | $1,200 | --- | $1,340 |
| 1.17(k) | 1.17(k) | Non-English Specification | $30 | --- | $300 |
| 1.17(l) | 1.17(l) | Petition - Revive Abandoned Appl. | $62 | $100 | $100 |
| | 1.17(l) | Petition - Revive Abandoned Appl. (Small Entity) | $31 | $50 | $100 |
| 1.17(m) | 1.17(m) | Petition - Revive Unintentionally Abandoned Appl. | $620 | $1,050 | $1,050 |
| | 1.17(m) | Petition - Revive Unintent Abandoned Appl. (Small Entity) | $310 | $525 | $1,050 |
| 1.17(n) | 1.17(n) | SIR - Prior to Examiner's Action | $400 | --- | $730 |
| 1.17(o) | 1.17(o) | SIR - After Examiner's Action | $800 | --- | $1,460 |
| 1.17(p)(1) | 1.16(b) | Independent Claims - Later than on Filing | --- | --- | $60 |
| 1.17(p)(2) | 1.16(c) | Claims in Excess of 20 - Later than on Filing | --- | --- | $20 |
| 1.17(p)(3) | 1.16(d) | Multiple Dependent Claims - Later than on Filing | --- | --- | $200 |
| 1.17(q)(1) | 1.16(i) | Reissue Independent Claims - Later than on Filing | --- | --- | $60 |
| 1.17(q)(2) | 1.16(j) | Reissue Claims in Excess of 20 - Later than on Filing | --- | --- | $20 |
| 1.18(a) | 1.18(a) | Issue Fee | $620 | $1,050 | $1,050 |
| | 1.18(a) | Issue Fee (Small Entity) | $310 | $525 | $1,050 |
| 1.18(b) | 1.18(b) | Design Issue Fee | $220 | $370 | $370 |
| | 1.18(b) | Design Issue Fee (Small Entity) | $110 | $185 | $370 |
| 1.18(c) | 1.18(c) | Plant Issue Fee | $310 | $520 | $520 |
| | 1.18(c) | Plant Issue Fee (Small Entity) | $155 | $260 | $520 |
| 1.19(a)(1)(i) | 1.19(a)(1) | Copy of Patent | $1.50 | --- | $3 |
| 1.19(a)(1)(ii) | 1.19(a)(5) | Patent Copy - Expedited Local Service | $3 | --- | $6 |
| 1.19(a)(1)(iii) | 1.19(a)(6) | Patent Copy Expedited Service Via EOS | $25 | --- | $30 |
| 1.19(a)(2) | 1.19(a)(2) | Plant Patent Copy | $10 | --- | $15 |
| 1.19(a)(3)(i) | 1.19(a)(4) | Copy of Utility Patent or SIR in Color | $20 | --- | $30 |
| 1.19(a)(3)(ii) | 1.19(a)(4) | Copy of Utility Patent or SIR in Color Expedited | $20 | --- | $60 |
| 1.19(b)(1)(i) | 1.19(b)(1) | Certified Copy of Patent Application as Filed | $10 | --- | $20 |
| 1.19(b)(1)(i) | 1.19(b)(4) | Certified Copy of Patent Application as Filed, Expedited | $20 | --- | $40 |
| 1.19(b)(2) | 1.19(b)(2) | Cert. or Uncert. Copy of Patent File Wrapper and Contents | $170 | --- | $150 |
| 1.19(b)(3) | 1.19(b)(5) | Cert. or Uncert. Copies of Office Records, per Document | $3 | --- | $25 |
| 1.19(b)(4) | 1.19(b)(6) | Search of Assignment Records | $15 | --- | $25 |
| 1.19(c) | 1.19(c) | Library Service | $50 | --- | $50 |
| 1.19(d) | 1.19(d) | List of Patents in Subclass | $2 | --- | $10 |
| 1.19(e) | 1.19(e) | Uncertified Statement | $5 | --- | $10 |

NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.

OL
126
SS
3
MY
21
991
JMI

Appendix A
Page 3

## Comparison of Existing and Proposed Fee Amounts

| 37 CFR Section Proposed | 37 CFR Section Existing | DESCRIPTION | FEE AMOUNT Apr 17 1989 | FEE AMOUNT Nov 5 1990 | FEE AMOUNT Oct 1 1991 |
|---|---|---|---|---|---|
| 1.19(f) | 1.19(f) | Copy of Non-US Document | $10 | --- | $15 |
| 1.19(g) | 1.19(h) | Duplicate or Corrected Filing Receipt | $15 | --- | $20 |
| 1.20(a) | 1.20(a) | Certificate of Correction | $60 | --- | $100 |
| 1.20(b) | 1.20(b) | Petition - Correction of Inventorship | $120 | --- | $200 |
| 1.20(c) | 1.20(c) | Reexamination | $2,000 | --- | $3,000 |
| 1.20(d) | 1.20(d) | Statutory Disclaimer | $62 | $100 | $100 |
|  | 1.20(d) | Statutory Disclaimer (Small Entity) | $31 | $50 | $100 |
| 1.20(e) |  | Maintenance Fee - 3.5 Years | * | --- | $830 |
| 1.20(f) |  | Maintenance Fee - 7.5 Years | ** | --- | $1,670 |
| 1.20(g) |  | Maintenance Fee - 11.5 Years | *** | --- | $2,500 |
| 1.20(h) |  | Surcharge - Maintenance Fee - 6 Months | **** | --- | $300 |
| 1.20(i) | 1.20(m) | Surcharge - Maintenance After Expiration | $550 | --- | $700 |
| 1.20(j) | 1.20(n) | Extension of Term of Patent | $600 | --- | $1,000 |
| 1.21(a)(1) | 1.21(a)(1) | Admission to Examination | $270 | --- | $300 |
| 1.21(a)(2) | 1.21(a)(2) | Registration to Practice | $90 | --- | $100 |
| 1.21(a)(3) | 1.21(a)(3) | Reinstatement to Practice | $10 | --- | $25 |
| 1.21(a)(4) | 1.21(a)(4) | Certificate of Good Standing | $10 | --- | $10 |
| 1.21(a)(4) | 1.21(a)(4) | Certificate of Good Standing, Suitable Framing | $100 | --- | $20 |
| 1.21(a)(5) | 1.21(a)(5) | Review of Decision of Director, OED | $100 | --- | $200 |
| 1.21(a)(6) | 1.21(a)(6) | Regrading of Examination | $100 | --- | $200 |
| 1.21(b)(1) | 1.21(b)(1) | Establish Deposit Account | $10 | --- | $10 |
| 1.21(b)(2) | 1.21(b)(2) | Service Charge Below Minimum Balance | $20 | --- | $20 |
| 1.21(b)(3) | 1.21(b)(3) | Service Charge Below Minimum Balance | $20 | --- | $20 |
| 1.21(c) | 1.21(c) | Filing a Disclosure Document | $6 | --- | $10 |
| 1.21(d) | 1.21(d) | Box Rental | $50 | --- | $100 |
| 1.21(e) | 1.21(e) | International Type Search Report | $30 | --- | $35 |
| 1.21(g) |  | Self-Service Copy Charge | $0.15 | --- | $0.25 |
| 1.21(h) | 1.21(h) | Recording Patent Property | $8 | --- | $40 |
| 1.21(i) | 1.21(i) | Publication in the OG | $20 | --- | $20 |
| 1.21(j) |  | Labor Charges for Services | --- | --- | $40 |
| 1.21(k) | 1.21(k) | Unspecified Other Services | Actual Cost | --- | Actual Cost |
| 1.21(l) | 1.21(l) | Retaining Abandoned Application | $120 | --- | $300 |
| 1.21(m) | 1.21(m) | Processing Returned Checks | $50 | --- | $60 |
| 1.21(n) | 1.21(n) | Handling Fee - Incomplete Application | $20 | --- | $300 |
| 1.21(o) | 1.21(o) | Terminal Use APS-TEXT | $40 | --- | $40 |
| 1.296 | 1.296 | Handling Fee - Withdrawal SIR | $120 | --- | $300 |

* Incorporates maintenance fees payable at 3.5 years under PL 96-517 currently set at $245, and maintenance fees set under PL 97-247 currently set at $490 for large entities and $495 for small entities.

** Incorporates maintenance fees payable at 7.5 years under PL 96-517 currently set at $495, and maintenance fees set under PL 97-247 currently set at $990 for large entities and $495 for small entities

*** Incorporates maintenance fees payable at 11.5 years under PL 96-517 currently set at $740, and maintenance fees set under PL 97-247 currently set at $1480 for large entities and $740 for small entities.

**** Incorporates surcharge for payment of maintenance fees during the 6 months grace period under PL 96-517 currently set at $120 and surcharge set under PL 97-247 currently set at $120 for large entities and $60 for small entities.

**NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.**

---

Appendix A
Page 4

## Comparison of Existing and Proposed Fee Amounts

| 37 CFR Section Proposed | 37 CFR Section Existing | DESCRIPTION | FEE AMOUNT Apr 17 1989 | FEE AMOUNT Nov 5 1990 | FEE AMOUNT Oct 1 1991 |
|---|---|---|---|---|---|
| 1.445(a)(1) | 1.445(a)(1) | Transmittal Fee | $170 | --- | $320 |
| 1.445(a)(2)(i) | 1.445(a)(2) | PCT Search Fee - No U.S. Application | $550 | --- | $1,040 |
| 1.445(a)(2)(ii) | 1.445(a)(2) | PCT Search Fee - Prior U.S. Application | $380 | --- | $720 |
| 1.445(a)(3) | 1.445(a)(3) | Supplemental Search | $150 | --- | $280 |
| 1.482(a)(1)(i) | 1.482(a)(1) | Preliminary Exam Fee | $400 | --- | $760 |
| 1.482(a)(1)(ii) | 1.482(a)(1) | Preliminary Exam Fee | $600 | --- | $1,140 |
| 1.482(a)(2)(i) | 1.482(a)(2) | Additional Invention | $130 | --- | $250 |
| 1.482(a)(2)(ii) | 1.482(a)(2) | Additional Invention | $200 | --- | $380 |
| 1.492(a)(1) | 1.492(a)(1) | Preliminary Examining Authority | $330 | --- | $560 |
|  | 1.492(a)(1) | Preliminary Examining Authority (Small Entity) | $165 | --- | $560 |
| 1.492(a)(2) | 1.492(a)(2) | Searching Authority | $370 | --- | $630 |
|  | 1.492(a)(2) | Searching Authority (Small Entity) | $185 | --- | $630 |
| 1.492(a)(3) | 1.492(a)(3) | PTO Not ISA nor IPEA | $500 | --- | $850 |
|  | 1.492(a)(3) | PTO Not ISA nor IPEA (Small Entity) | $250 | --- | $850 |
| 1.492(a)(4) | 1.492(a)(4) | Claims - IPEA | $50 | --- | $80 |
|  | 1.492(a)(4) | Claims - IPEA (Small Entity) | $25 | --- | $80 |
| 1.492(a)(5) |  | Filing with EPO/JPO Search Report | --- | --- | $780 |
| 1.492(b) | 1.492(b) | Claims - Extra Individual (Over 3) | $36 | --- | $60 |
|  | 1.492(b) | Claims - Extra Individual (Over 3) (Small Entity) | $18 | --- | $60 |
| 1.492(c) | 1.492(c) | Claims - Extra Total (Over 20) | $12 | --- | $20 |
|  | 1.492(c) | Claims - Extra Total (Over 20) (Small Entity) | $6 | --- | $20 |
| 1.492(d) | 1.492(d) | Claims - Multiple Dependents | $120 | --- | $200 |
|  | 1.492(d) | Claims - Multiple Dependents (Small Entity) | $60 | --- | $200 |
| 1.492(e) | 1.492(e) | Surcharge | $120 | --- | $300 |
|  | 1.492(e) | Surcharge (Small Entity) | $60 | --- | $300 |
| 1.492(f) | 1.492(f) | English Translation - After 20 Months | $30 | --- | $300 |
| 2.6(a)(1) | 2.6(a) | Application for Registration | $175 | --- | $250 |
| 2.6(a)(2) | 2.6(u) | Amendment to Allege Use | $100 | --- | $100 |
| 2.6(a)(3) | 2.6(u) | Statement of Use | $100 | --- | $100 |
| 2.6(a)(4) | 2.6(v) | Extension for Filing Statement of Use | $100 | --- | $100 |
| 2.6(a)(5) | 2.6(b) | Application for Renewal | $300 | --- | $300 |
| 2.6(a)(6) | 2.6(s) | Surcharge for Late Renewal | $100 | --- | $200 |
| 2.6(a)(7) | 2.6(c) | Publication of Mark Under§12(c) | $100 | --- | $100 |
| 2.6(a)(8) | 2.6(d) | Issuing New Certificate of Registration | $100 | --- | $100 |
| 2.6(a)(9) | 2.6(e) | Certificate of Correction of Registrant's Error | $100 | --- | $100 |
| 2.6(a)(10) | 2.6(f) | Filing Disclaimer to Registration | $100 | --- | $100 |
| 2.6(a)(11) | 2.6(g) | Filing Amendment to Registration | $100 | --- | $100 |
| 2.6(a)(12) | 2.6(h) | Filing Affidavit Under Section 8 | $100 | --- | $150 |
| 2.6(a)(13) | 2.6(i) | Filing Affidavit Under Section 15 | $100 | --- | $150 |
| 2.6(a)(14) | 2.6(j) | Filing Affidavit Under Sections 8 & 15 | $200 | --- | $300 |
| 2.6(a)(15) | 2.6(k) | Petitions to the Commissioner | $100 | --- | $200 |
| 2.6(a)(16) | 2.6(l) | Petition to Cancel | $200 | --- | $400 |
| 2.6(a)(17) | 2.6(l) | Notice of Opposition | $200 | --- | $400 |
| 2.6(a)(18) | 2.6(m) | Ex Parte Appeal to the TTAB | $100 | --- | $150 |

**NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.**

BILLING CODE 3510-16-C

OL
126
SS
3
MY
21
991
UMI

Appendix A
Page 5

**Comparison of Existing and Proposed Fee Amounts**

| 37 CFR Section Proposed | 37 CFR Section Existing | DESCRIPTION | FEE AMOUNT Apr 17 1989 | FEE AMOUNT Nov 5 1990 | FEE AMOUNT Oct 1 1991 |
|---|---|---|---|---|---|
| 2.6(b)(1)(i) | 2.6(n) | Copy of Registered Mark | $1.50 | --- | $3 |
| 2.6(b)(1)(ii) | | Copy of Registered Mark, Expedited | $1.50 | --- | $6 |
| 2.6(b)(1)(iii) | | Copy of Registered Mark Expedited Service Via EOS | --- | --- | $30 |
| 2.6(b)(2)(i) | | Certified Copy of TM Application as Filed | --- | --- | $20 |
| 2.6(b)(2)(ii) | | Certified Copy of TM Application as Filed, Expedited | --- | --- | $40 |
| 2.6(b)(3) | | Cert. or Uncert. Copy of TM File Wrapper and Contents | --- | --- | $50 |
| 2.6(b)(4)(i) | 2.6(n) | Cert. Copy of Registered Mark, Title or Status | $6.50 | --- | $25 |
| 2.6(b)(4)(ii) | | Cert. Copy of Registered Mark, Title or Status - Expedited | $6.50 | --- | $50 |
| 2.6(b)(5) | 2.6(o) | Certified or Uncertified Copy of TM Records | $3.50 | --- | $25 |
| 2.6(b)(6) | 2.6(q) | Recording Trademark Property | $8 | --- | $40 |
| 2.6(b)(7) | 2.6(r) | Abstracts of Title | $12 | --- | $25 |
| 2.6(b)(8) | 2.6(w) | Terminal Use T-SEARCH | $40 | --- | $40 |
| 2.6(b)(9) | | Self-Service Copy Charge | --- | --- | $0.25 |
| 2.6(b)(10) | | Labor Charges for Services | --- | --- | $40 |
| 2.6(b)(11) | 2.6(t) | Unspecified Other Services | Actual Cost | --- | Actual Cost |

NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.

Dated: May 7, 1991.

**Harry F. Manbeck, Jr.,**
*Assistant Secretary and Commissioner of Patents and Trademarks.*

[FR Doc. 91-11223 Filed 5-7-91; 4:25 pm]

BILLING CODE 3510-16-M

---

# REEXAMINATIONS

## MAY 21, 1991

Matter enclosed in heavy brackets **[ ]** appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

### B1 4,118,754 (1466th)
### ELECTRICAL PANEL HAVING MOLDED BASE PAN

**J. E. Duggan, Atlanta, Ga., assignor to Siemens-Allis, Inc.**
**Reexamination Request Nos. 90/002,068, Jun. 25, 1990 and 90/002,131, Sep. 10, 1990.**
**Reexamination Certificate for Patent No. 4,118,754, issued Oct. 3, 1978, Ser. No. 772,442, Feb. 28, 1977.**
**Int. Cl.$^5$ H02B** *1/20*

U.S. Cl. 361—355

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The Patentability of claims **1-10** is confirmed.

1. An electrical panel assembly including a single member defining an insulating base, first and second main buses supported on said base in front thereof on a first set of formations formed integrally with said base; circuit breaker engageable stab means extending from said buses and disposed in general alignment between said buses and in front of said base; a second set of formations formed integrally with said base for mechanically holding circuit breakers in engagement with said stab means; a neutral bus supported on said base in front thereof on a third set of formations formed integrally with said base.

---

### B1 4,125,297 (1467th)
### UNIVERSAL DRAWER SLIDER

**Paul M. Mertes, Granada Hills, Calif., assignor to GWN Inc.**
**Reexamination Request No. 90/001,918, Dec. 27, 1989.**
**Reexamination Certificate for Patent No. 4,125,297, issued Nov. 14, 1978, Ser. No. 857,234, Dec. 5, 1977.**
**Continuation-in-part of Ser. No. 704,649, Jul. 12, 1976, Pat. No. 4,061,375, which is a continuation-in-part of Ser. No. 576,349, May 12, 1975, abandoned**
**Int. Cl.$^5$ A47B** *88/00, 95/00;* **F16C** *21/02*

U.S. Cl. 312—348

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-10, 16-21** is confirmed.

Claim **11** is determined to be patentable as amended.

Claims **12-15**, dependent on an amended claim, are determined to be patentable.

1. An economical universal drawer slide assembly comprising:
a fixed cabinet guide member having transversely extending side rails, having a predetermined length, having a groove extending for most of its length, said groove terminating in a positive stop near the front of said cabinet guide member;
a drawer having a depth from front to rear substantially equal to the length of said cabinet guide member;
a generally rectangular drawer slide body having a width slightly greater than said cabinet guide member, and a length less than two-thirds of the length of said guide member;
an integral flange extending at right angles from one end of said drawer slide body and overlying the rear of said drawer;
means for securing the front end of said slide body to an intermediate point on the bottom of a drawer;
means for securing the rear of said slide body to the rear of a drawer;
means including two laterally extending members integrally secured to said drawer slide body for engaging the transversely extending side rails of the cabinet guide member at the rear of said drawer slide;
means located along the length of said drawer slide body for engaging the cabinet guide member for maintaining the drawer slider member in alignment with the cabinet guide member; and
a selectively releasable depending hook means integral with said slide body for normally riding in said groove, and for engaging said stop on said cabinet guide, to positively prevent accidental movement of said drawer slide out of engagement with said cabinet guide.

---

### B1 4,209,506 (1468th)
### ALUMINUM TRIS-(N-OXYPYRIDINE-2-THIOLATE); COSMETIC OR PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME AND THE USE OF SAID COMPOSITIONS

**Claude Bouillon, Eaubonne, and Georges Rosenbaum, Asnieres, both of France, assignors to Societe Anonyme dite: L'Oreal**
**Reexamination Request No. 90/001,639, Nov. 18, 1988.**
**Reexamination Certificate for Patent No. 4,209,506, issued Jun. 24, 1980, Ser. No. 928,312, Jul. 26, 1978.**
**Int. Cl.$^5$ C07D** *213/89;* **A61K** *31/44, 7/38*

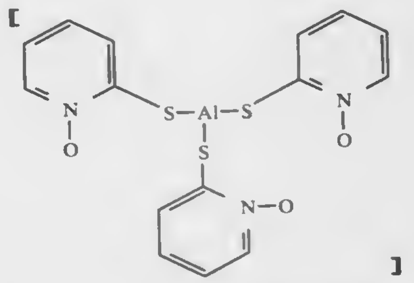
U.S. Cl. 424—68

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1-15** are cancelled.

New claims **16-23** are added and determined to be patentable.

**[**1. Aluminum tris-(N-oxypyridine-2-thiolate) of the following formula:



**]**

**[**4. A method for the treatment of pityriasis, onyxis, intertrigos, dermatomycosis, dermatophytosis, impetigo, dermatosis with a secondary infection, athletes foot, pruritus of infectious origin, hyperhidrosis, or parasitosis, which comprises administering in a suitable vehicle an effective amount of aluminum tris-(N-oxypyridine-2-thiolate).**]**

**B1 4,355,986 (1469th)**

### OUTBOARD MOTOR WITH ELEVATED HORIZONTAL PIVOT AXIS

**Myron T. Stevens, Kenosha, Wis.**
**Reexamination Request No. 90/002,030, May 21, 1990.**
**Reexamination Certificate for Patent No. 4,355,986, issued Oct. 26, 1982, Ser. No. 159,480, Jun. 16, 1980.**
**Int. Cl.**$^5$ **B63H** *21/26*

**U.S. Cl. 440—53**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-40** is confirmed.

New claims **41** and **42** are added and determined to be patentable.

**1**. An outboard motor comprising a transom bracket adapted to be fixed to the transom of a board and having a mounting surface for engagement with the back of the transom, a unitary swivel bracket, a tilt pin directly pivotally connecting said transom bracket and said swivel bracket rearwardly of said mounting surface for tilting movement of said swivel bracket between a normal operating position and a raised tilt position and about a tilt axis which is generally horizontal when said transom bracket is fixed to the boat transom, a propulsion unit including a powerhead and a lower unit secured to said powerhead, and means connecting said propulsion unit to said swivel bracket so as to enable pivotal steering movement of said propulsion unit relative to said swivel bracket about an axis transverse to the tilt axis, and such that said propulsion unit only pivots about the transverse axis with respect to said swivel bracket, and such that said propulsion unit remains substantially rearwardly of said transom bracket mounting surface throughout movement of said swivel bracket from the normal operating position to the tilt position, and such that the totality of said means connecting said propulsion unit and said swivel bracket is wholly located below the tilt axis.

---

**B1 4,757,267 (1470th)**

### TELEPHONE SYSTEM FOR CONNECTING A CUSTOMER TO A SUPPLIER OF GOODS

**Bernard N. Riskin, Lambertville, N.J., assignor to Applied Telematics, Inc., Wayne, Pa.**
**Reexamination Request No. 90/002,151, Oct. 1, 1990.**
**Reexamination Certificate for Patent No. 4,757,267, issued Jul. 12, 1988, Ser. No. 64,127, Jul. 17, 1987.**
**Int. Cl.**$^5$ **H04M** *3/42*

**U.S. Cl. 379—113**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **20**, **22**. **30** and **37** are cancelled.

Claims **1-4**, **6**, **11**, **12**, **14**, **16**, **17**, **21**, **23**, **25**, **29**, **31-34**, and **38**, **42** are determined to be patentable as amended.

Claims **5**, **7-10**, **13**, **15**, **18**, **19**, **24**, **26-28**, **35**, **36**, **39-41**, dependent on an amended claims, are determined to be patentable.

New claims **43**, **44** and **45** are added and determined to be patentable.

**1**. A system for routing a telephone call from a first party who dials a telephone number including digits uniquely characteristic of a given item to [a nearby] *one* second party out of a group of second parties who can supply said given item *and who is located geographically nearest to the first party*, the telephone system comprising:
first routing means for routing said telephone call to a telephone service center relatively near said first party;
location determining means *including information associating each second party with a geographic location* for determining the location of said [relatively nearby] *one* second party *which is located the shortest geographic distance from the location of the first party* based at least in part on the telephone number dialed by said first party; and
second routing means for routing said telephone call from said first party through said telephone service center to said [nearby] *one* second party who can supply said item *based upon the geographic location of the second party.*

---

**B1 4,797,170 (1471st)**

### SYSTEM FOR HOLDING CARPET IN PLACE WITHOUT STRETCHING

**Merle R. Hoopengardner, Lafayette, Calif., assignor to JacTac Inc, Lafayette, Calif.**
**Reexamination Request No. 90/001,837, Sep. 6, 1989.**
**Reexamination Certificate for Patent No. 4,797,170, issued Jan. 10, 1989, Ser. No. 882,173, Jul. 7, 1986.**
**Int. Cl.**$^5$ **E04B** *2/00*

**U.S. Cl. 156—71**

AS A RESULT OF REEXAMINATION IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-11** is confirmed.

Claims **12-13** are cancelled.

**1**. A method of installing a carpet with a carpet cushion, comprising:
applying an adhesive to a floor surface;
positioning a carpet cushion on the floor surface to adhere it thereto and trimming as required, said carpet cushion having a preapplied pressure-sensitive adhesive on its upper surface and a removable release film on the pressure-sensitive adhesive;
positioning the carpet on top of the release film on the carpet cushion and cutting and seaming the carpet as required;
folding back the carpet and removing the release film from the exposed area of the carpet cushion;
pressing the carpet down onto the exposed pressure-sensitive adhesive on the upper surface of the carpet cushion;
folding back another portion of the carpet and removing the release film from that area and then pressing that portion of the carpet onto the exposed pressure-sensitive adhesive of the carpet cushion; and
performing final trimming at the carpet edges as required when the entire carpet has contacted the adhesive.

---

**B1 4,882,120 (1472nd)**

### DC CONTENT CONTROL FOR AN INVERTER

**Derrick I. Roe, Rockford, Ill.; Christopher J. Rozman, Delavan, Wis., and Bradley J. Recker, Rockford, Ill., assignors to Sunstrand Corporation**
**Reexamination Request No. 90/001,992, Apr. 11, 1990.**
**Reexamination Certificate for Patent No. 4,882,120, issued Nov. 21, 1989, Ser. No. 285,119, Dec. 16, 1988.**
**Int. Cl.**$^5$ **H02P** *13/18;* **H02M** *5/458*

**U.S. Cl. 363—98**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **6** and **7** is confirmed.

Claims **1**, **3** and **5** are determined to be patentable as amended.

Claims **2** and **4**, dependent on an amended claim, are determined to be patentable.

**1**. A control for an inverter having a switch which is operated in accordance with a waveform having spaced rising and falling edges, comprising:

means for detecting the magnitude of a DC component in the inverter AC output power; and

means responsive to the detecting means for adjusting the time of selected rising or falling edges *in an amount dependent upon the magnitude of the DC component* to reduce the magnitude of the DC component.

---

**B1 4,896,955 (1473rd)**

### EYEGLASS FRAME INCLUDING SHAPE-MEMORY ELEMENTS

**Robert B. Zider, Portola Valley, and John F. Krumme, Woodside, both of Calif., assignors to CVI/Beta Ventures, Inc., Menlo Park, Calif.**
**Reexamination Request Nos. 90/002,118, Aug. 28, 1990 and 90/002,133, Sep. 12, 1990.**
**Reexamination Certificate for Patent No. 4,896,955, issued Jan. 30, 1990, Ser. No. 309,205, Dec. 5, 1988.**
**Continuation-in-part of Ser. No. 876,077, Jun. 19, 1986, Pat. No. 4,772,112, which is a continuation-in-part of Ser. No. 676,823, Nov. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 558,604, Dec. 6, 1983, abandoned**
**Int. Cl.**$^5$ **G02C** *1/04*

**U.S. Cl. 351—41**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-8** is confirmed.

**1**. An eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy, said portion being in the work-hardened pseudoelastic metallurgical state, said portion having been subjected to work-hardening and having a low effective elastic modulus giving a soft, springy feel, said portion having greater than 3% elasticity over a temperature range from −20° C. to +40° C.

# REISSUES

MAY 21, 1991

Matter enclosed in heavy brackets **[ ]** appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

## Re. 33,590

## METHOD FOR EXAMINING, LOCALIZING AND TREATING WITH ULTRASOUND

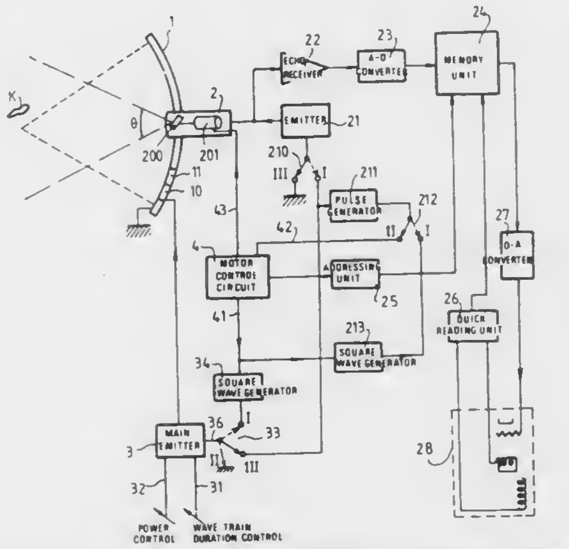
**Jacques Dory, Coupvray-Esblay, France, assignor to EDAP International, S.A.**

**Original No. 4,658,828, dated Apr. 21, 1987, Ser. No. 728,905, Apr. 30, 1985. Continuation-in-part of Ser. No. 674,889, Nov. 26, 1984, Pat. No. 4,617,931. Application for reissue Nov. 22, 1988, Ser. No. 276,431**

**Claims priority, application France, Dec. 14, 1983, 83 20041; May 3, 1984, 84 06877**

**Int. Cl.$^5$ A61B** *8/00;* **A61N** *5/00*

**U.S. Cl. 128—660.03** **4 Claims**



1. Apparatus for ultrasonically heating a subject volume comprising:

(i) a first transducer having a curved transmitting surface for generating a single first ultrasound beam focused in a restricted focal zone and drive means for exciting ultrasonic vibrations within the first transducer;

(ii) means for displacing the first transducer with respect to predetermined axes of coordinates successively to irradiate subject volume with said ultrasound beam focal zone;

(iii) a second transducer for generating a second ultrasound beam, said second transducer having an active surface which is substantially smaller than that of the transmitting surface of the first transducer, said second transducer having a point which is fixed with the fist transducer during the displacement of the first transducer, and

(iv) an echography device comprising said second transducer, electric pulse generator means coupled to said second transducer, means for effecting a scanning of an examination volume with the second ultrasound beam, receiver means coupled to said second transducer for receiving the echoes formed through reflection of the second ultrasound beam on reflecting surfaces within the examination volume and image forming means coupled to the receiver means for displaying images of the examination volume, said focal zone being located in a predetermined relative position within the examination volume, and said image forming means further displaying a mark which materializes said predetermined position of the focal zone.

## Re. 33,591

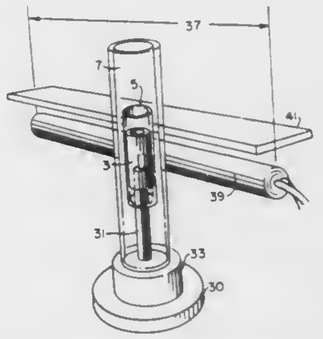
## METHOD OF PREFABRICATING AN ELECTRICAL CONNECTOR

**Richard J. Feeny, Greenville; James A. Zilligen, Simpsonville, and Hans J. Klaeui, Piedmont, all of S.C., assignors to FTZ Industries, Inc., Simpsonville, S.C.**

**Original No. 4,547,240, dated Oct. 15, 1985, Ser. No. 502,615, Jun. 9, 1983. Application for reissue Sep. 6, 1989, Ser. No. 405,092**

**Int. Cl.$^5$ B29C** *27/30*

**U.S. Cl. 156—85** **3 Claims**



1. A process for prefabricating an electrical connector, comprising the steps of:

placing a crimpable ferrule having an insulation sleeve thereon upon a first support in a vertical orientation with respect to the longitudinal axis of said ferrule and said insulation sleeve;

placing an outer sleeve coaxially about said ferrule and insulation sleeve upon a second support, said second support being at a lower elevation than said first support, said outer sleeve formed of a coextruded, multilayer material with at least one layer thereof being oriented and heat-shrinkable, and with the inner layer thereof being a heat-activable adhesive;

passing said first and second supports horizontally through a heating zone **[**to shrink only a portion of said outer sleeve into adhesion with said insulation sleeve.**]**; *and directing jets of heated air within said heating zone toward said first and second supports and outer sleeve to shrink only a portion of said outer sleeve adjacent said insulation sleeve uniformly into adhesion with said insulation sleeve so that shrinkage occurs only in the central area and not in other areas.*

---

## Re. 33,592

## COLOR DISPLAY TUBE WITH REDUCED DEFLECTION DEFOCUSSING

**Jan Gerritsen, and Johannes C. J. Aerts, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Original No. 4,742,279, dated May 3, 1988, Ser. No. 2,065, Jan. 12, 1987. Application for reissue Aug. 31, 1989, Ser. No. 402,001**

**Claims priority, application Netherlands, Jan. 21, 1986, 8600117**

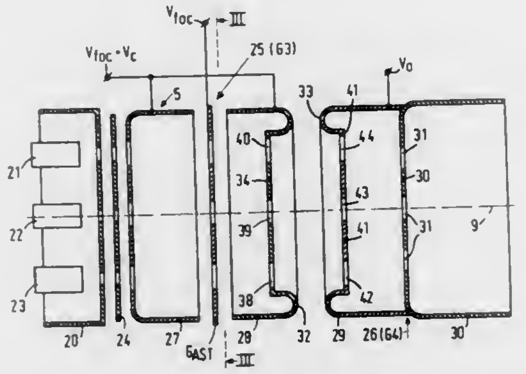
**Int. Cl.$^5$ H01J** *29/58*

**U.S. Cl. 315—382** **22 Claims**

*10. A color display tube comprising on envelope containing a luminescent screen, and an electron gun for producing deflectable central and first and second outer in-line electron beams directed toward said screen, characterized in that said electron gun comprises, in succession:*

OL
126
SS
3
MY
21
991
UMI

- *a. a plurality of in-line cathodes for emitting respective ones of the electron beams;*
- *b. first electrode means including a first prefocusing electrode having central and first and second outer apertures for passing the respective electron beams;*
- *c. second electrode means including:*
  - *(1) a second prefocusing electrode, having central and first and second outer apertures for passing respective ones of the electron beams, disposed adjacent the first prefocusing electrode, upon application of respective voltages thereto said prefocusing electrodes producing therebetween a prefocusing lens field for prefocusing the electron beams;*
  - *(2) a first main-focusing electrode having central and first and second outer apertures for passing respective ones of the electron beams, disposed remotely from the first electrode means; and*
  - *(3) four pole field producing means disposed in the vicinity of the second prefocusing electrode and the first main-focusing electrode which, upon application of at least a first voltage, produces a quadripolar field in the region between the second prefocusing electrode and the first main-focusing electrode which quadripolar field astigmatically affects the cross sectional shapes of the electron beams;*
- *d. third electrode means including a second main-focusing electrode disposed adjacent the first main-focusing electrode and having central and first and second outer apertures for passing respective ones of the electron beams, upon application of respective voltages thereto said main focusing electrodes producing therebetween a main focusing lens field for focusing the electron beams onto the screen; and*
- *e. means for applying a second voltage on at least said first main-focusing electrode so that variation of said second voltage affects the astigmatism of the electron beams in a first direction substantially independent of said astigmatism in a direction perpendicular to said first direction.*



---

### Re. 33,593

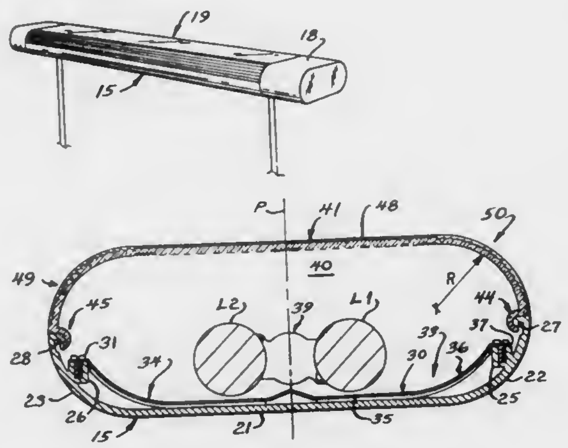
### LUMINAIRE FOR INDIRECT LIGHTING

**Douglas J. Herst, Ross, and Peter Y. Y. Ngai, Lafayette, both of Calif., assignors to Peerless Lighting Corporation, Berkeley, Calif.**

**Original No. 4,667,275, dated May 19, 1987, Ser. No. 742,591, Jun. 7, 1985. Continuation of Ser. No. 46,970, Jun. 8, 1979, abandoned. Application for reissue Jan. 30, 1990, Ser. No. 472,171**

Int. Cl.$^5$ F21S *3/00*

U.S. Cl. 362—223 29 Claims



1. A luminaire for indirect lighting comprising

a source of light,

an opaque housing extending upwardly about saidlight source, and

lens means mounted above said housing,

said lens means being formed to permit light from said light source to be directed to a horizontal surface above said luminaire to provide a directly overhead luminance pattern thereon, and

said lens means further including a lateral lens portion having a prismatic surface for collecting a portion of the light from said light source, *said lateral lens portion extending generally upwardly above said housing so as to be in the field of view of persons located below and to the side of said luminaire, and* said prismatic surface of said lateral lens portion being formed to refract substantially all of said collected light laterally of said luminaire so as to spread same away from said directly overhead luminance pattern to provide a laterally extended overhead distribution of light.

---

# PLANT PATENTS

## GRANTED MAY 21, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

### 7,526

### APPLE TREE HIDALA

**John Hill, and Sue Hill, both of "Hill Well" Orchard, Ormond Road, R.D. 5, Hastings, New Zealand**

**Filed Apr. 26, 1989, Ser. No. 344,110**

**Claims priority, application New Zealand, Apr. 27, 1988, PV3/15/53**

**Int. Cl.$^5$ A01H *5/00***

**U.S. Cl. Plt.—34** **1 Claim**

1. A new and distinct variety of apple tree which is a mutation of the Braeburn variety (an unpatented New Zealand variety) substantially as shown and described, characterized by the bright red color of the fruit which extends substantially over the entire surface of the fruit.

---

### 7,527

### NECTARINE TREE CARLSON VARIETY

**H. David Carlson, P.O. Box 9304, Yakima, Wash. 98909**

**Filed Jan. 8, 1990, Ser. No. 462,139**

**Int. Cl.$^5$ A01H *5/00***

**U.S. Cl. Plt.—41** **1 Claim**

1. A new and distinct variety of nectarine tree, substantially as illustrated and described, characterized by the regular and productive bearing of yellow-fleshed, semi-freestone fruit which ripens intermediate to the RedGold and the Firebrite nectarine varieties; it is further characterized by red color which overspreads the entire fruits at harvest time.

---

### 7,528

### RASPBERRY PLANT NAME PSI 168

**Stephen M. Ackerman, Salinas, Calif., assignor to Plant Sciences, Inc., Watsonville, Calif.**

**Filed Aug. 25, 1989, Ser. No. 398,431**

**Int. Cl.$^5$ A01H *5/00***

**U.S. Cl. Plt.—46** **1 Claim**

1. A new and distinct variety of red raspberry plant named PSI 168, as herein described and illustrated.

---

### 7,529

### MAPLE TREE NAMED 'KEITHSFORM'

**Keith S. Warren, Gresham, Oreg., assignor to J. Frank Schmidt & Son Co., Boring, Oreg.**

**Filed Jan. 5, 1990, Ser. No. 461,539**

**Int. Cl.$^5$ A01H *5/00***

**U.S. Cl. Plt.—51** **1 Claim**

1. A new and distinct variety of *Acer truncatum* tree, substantially as herein shown and described, characterized particularly as to novelty by its rapid rate of growth, its very straight trunk, branches of one year trees which are extremely symmetrical; and of substantially equal length and which angle from the trunk at approximately forty five degrees, a brilliant red autumn color which is initiated relatively late in the fall, and a relatively large leaf size.

---

### 7,530

### AZALEA HYBRID 'BILLIE DEE'

**Rose M. Mossholder, Fallbrook, Calif., assignor to Hines Nurseries Inc., Irvine, Calif.**

**Filed May 16, 1989, Ser. No. 352,306**

**Int. Cl.$^5$ A01H *5/00***

**U.S. Cl. Plt.—57** **1 Claim**

1. A new variety of hybrid evergreen azalea characterized by a compact, dense branching and symmetrical form and a prolific blooming habit, with flowers that appear in clusters of five to ten, blooms being of single form with a diameter of about 6.4 to 7.6 cm and having pale lilac centers bordered with rose-purple lobes.

---

### 7,531

### CHRYSANTHEMUM PLANT NAMED SANDY

**Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barbeton, Ohio**

**Filed Dec. 29, 1989, Ser. No. 459,364**

**Int. Cl.$^5$ A01H *5/00***

**U.S. Cl. Plt.—74** **1 Claim**

1. A new and distinct Chrysanthemum plant named Sandy, as described and illustrated.

# PATENTS

## GRANTED MAY 21, 1991

### ERRATA

| For<br>CLASS | See<br>PATENT NO. |
|---|---|
| 114-045 | 5,016,685 |
| 280-243 | 5,016,726 |
| 221-022 | 5,016,766 |
| 411-432 | 5,017,079 |
| 267-136 | 5,017,328 |
| 392-386 | 5,017,759 |
| 329-325 | 5,017,841 |
| 357-014 | 5,017,950 |
| 355-027 | 5,017,951 |

OL
126
SS
3
MY
21
991
UMI

# PATENTS

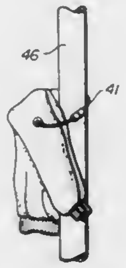
## GRANTED MAY 21, 1991

## GENERAL AND MECHANICAL

**5,016,284**

### LOCKABLE CLOTHING

**Jack E. Brown, 2402 Stockton Pl., Marietta, Ga. 30066**
**Filed Jun. 8, 1990, Ser. No. 534,939**
**Int. Cl.$^5$ A41D** *1/02, 1/06;* **E05B** *69/00*
U.S. Cl. 2—69 **11 Claims**



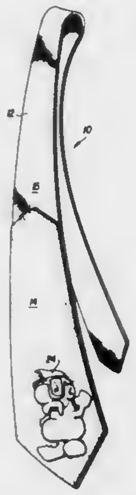
1. An article of manufacture comprising:
a garment;
a length of cable being attached to a major portion of the garment along a substantial portion of said length of cable, the cable having a free end; and
means operatively associated with said free end for locking said cable to a stationary object; whereby
said garment is secured against theft by locking said operatively associated means to said stationary object.

---

**5,016,285**

### NECKTIE

**William J. Just, Suite 200, 91 W. Wieuca Rd., Atlanta, Ga. 30342**
**Filed May 15, 1990, Ser. No. 523,424**
**Int. Cl.$^5$ A41D** *25/00*
U.S. Cl. 2—144 **10 Claims**



1. A necktie comprising:
a front panel;
said front panel including means for removably receiving one or more ornaments thereon;
said front panel and said ornament including a hook-and-loop fastener system whereby said ornament is easily affixed to said front panel for one of decorative and display purposes;
said means for removeably receiving said ornaments, including an overlay fixedly attached to said front panel, said overlay extending continually over a substantial portion of said front panel and comprising a plurality of loops for receiving hooks projecting from the rear surface of said ornament to be placed thereon.

---

**5,016,286**

### PROTECTIVE GLOVE

**Henning R. Henriksen, Dronningensgade 25, DK-1420 Copenhagen K, Denmark**
**Continuation of Ser. No. 391,654, Aug. 8, 1989, abandoned, which is a continuation of Ser. No. 124,014, Nov. 23, 1987, abandoned. This application Feb. 2, 1990, Ser. No. 478,051**
**Claims priority, application Fed. Rep. of Germany, May 29, 1987, 8707585[U]**
**Int. Cl.$^5$ A41D** *19/00, 19/02*
U.S. Cl. 2—161 R **7 Claims**

1. A flat protective glove made from a pair of substantially planar superposed contoured flexible sheets of polymer material having mutually sealed edge portions, at least one of said sheets being non-elastically stretchable, said glove comprising:
a palm portion;
four finger portions for receiving the first, second, third and fourth finger, respectively, of a human hand, the finger portions extending from the palm portion, the width of at least one of the finger portions increasing from a first value at a first position adjacent to the palm portion to a second, maximum value at a second position intermediate of said first position and the free end of said finger portion;
a thumb portion extending from the palm portion in diverging relationship with the finger portions, the longitudinal axis of the thumb portion and the longitudinal axis of the finger portion for receiving the second finger of the hand defining the angle of 40°-60°; and
a wrist or sleeve portion defining a hand entrance opening at its free end and having a width decreasing from a first value at the free end of the wrist or sleeve portion to a second minimum value adjacent to the palm portion, the palm portion having a concavely curved edge portion defining an indentation located opposite to the thumb portion between the fourth finger portion and the wrist portion so as to define a tortuous passage for the hand when inserted into the glove through the hand entrance opening, and wherein at least one edge portion interconnecting adjacent, mutually spaced finger portions is concavely curved so as to substantially define a circular arc of predetermined radius where the radii of the circular edge portions between the first and second finger, the second and third finger, and the third and fourth finger are 6 mm, 5 mm, and 5.5 mm, respectively, and wherein the radius of the circular arc-shaped edge portion between the thumb portion and the first finger portion is 14 mm.

---

**5,016,287**

### EVAPORATIVE COOLED CLOTH HOOD

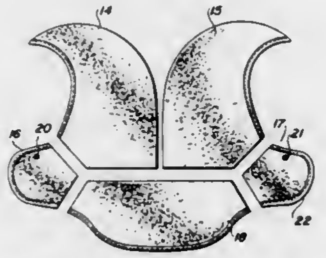
**John R. Harris, 8541 N. 31st Ave., Phoenix, Ariz. 85051**
**Continuation of Ser. No. 398,464, Aug. 25, 1989. This application Aug. 28, 1990, Ser. No. 573,860**
**Int. Cl.$^5$ A42B** *1/04*
U.S. Cl. 2—202 **2 Claims**

1. An evaporative cooled cloth hood worn wet for cooling purposes comprising:
a pair of arcuate shaped portions one a mirror image of the other which when secured together along a common edge form a cap portion of the hood.
said arcuate shaped portions fit over the forehead and down over the chest area of the wearer.
a pair of tab portions one secured to a common edge of each of said arcuate shaped portions in the chest area for engaging each other.

OL
126
SS
3
MY
21
1991
UMI

clasp means having a pair of engaging parts one connected to each of said tab portions for aiding in holding said tab portions together; and

a shoulder portion secured to common edges of each of said arcuate shaped portions and said tab portions thereby forming a unitary hood assembly,



said pair of arcuate shaped portions, said pair of tab portions and said shoulder portion being formed of 100% cotton terry cloth.

---

### 5,016,288
### SCARF

**Peter Pan, 15F-3, No. 127, Fu-Hsin S. Road, Taipei, Taiwan**
**Filed Sep. 5, 1990, Ser. No. 577,533**
**Int. Cl.$^5$ A41D** *23/00*
U.S. Cl. 2—207 **2 Claims**

1. A scarf comprising:

a middle flap having a pattern;

a first side flap connected to one side of said middle flap, having same size as said middle flap and a pattern different from that of said middle flap; and

a second side flap connected to the other side of said middle flap, having same size as said middle flap and a pattern different from that of said middle flap;

whereby said middle flap, first flap and second flap may be foled in different ways thereby providing said scarf with different patterns.

---

### 5,016,289
### EPAULET STIFFENER

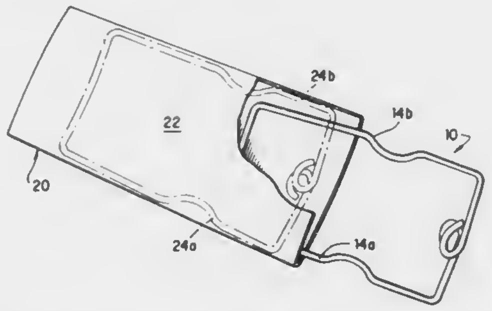
**Jack Greenberg, Stamford, Conn., assignor to DME Industries, Inc., New York, N.Y.**
**Filed Oct. 4, 1989, Ser. No. 417,085**
**Int. Cl.$^5$ A41D** *27/08, 29/00*
U.S. Cl. 2—246 **4 Claims**

1. An epaulet adapted to be mounted on the shoulder of a garment comprising:

a tubular, non-rigid, elongate body of sheet material adapted to form a substantially rectilinear, planar surface disposed between opposed lateral edges; and

means for stiffening said body of sheet material comprising a resilient wire frame mounted within said tubular body, said frame having an elongate base member of a length substantially equal to the distance between said opposed lateral edges when said surface is substantially planar, a leg extending angularly from each end of the base member in substantially the same direction as each opposed lateral edge and defining therebetween an open space, each leg being of a length less than the length of the side edge of said body along which said leg is disposed and having a free distal end disposed away from the base member;

said base member resiliently biasing each leg transversely outwardly to cause said planar surface of the body to assume a stiffened, planar condition;



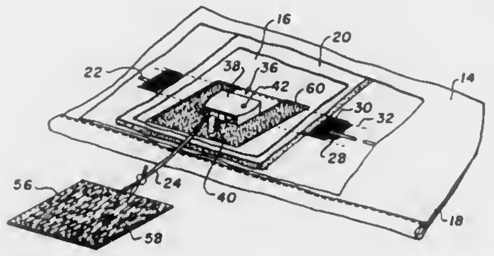
said base member and legs being substantially coplanar and said base member having an arcuate section when said frame is in unrestrained condition;

said arcuate section extending toward said open space.

---

### 5,016,290
### CLOSURE SYSTEM

**Robert J. Askew, Richmond, Canada, assignor to Mustang Industries, Inc., Richmond, Canada**
**Filed May 25, 1990, Ser. No. 528,994**
**Int. Cl.$^5$ A41D** *27/10*
U.S. Cl. 2—270 **12 Claims**



1. A closure system for a flexible tube having an outer surface and an inner surface and comprising:

a cord to extend around the flexible tube, between the inner and the outer surfaces;

an opening in the inner surface through which a first end of the cord passes;

a releasable anchor to engage the first end of the cord; and

a fixed anchor for the other end of the cord whereby pulling on the first end of the cord with the releasable anchor released contracts the inner surface of the tube, the first end of the cord being that part of the cord that extends through the opening when the tube is fully contracted.

---

### 5,016,291
### NAPPED ELASTIC WAISTBAND

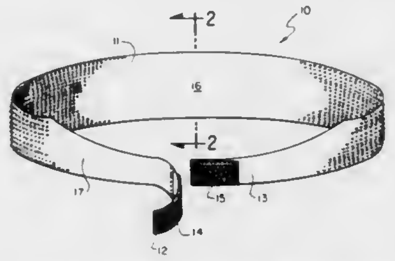
**Montague Capper, 7539 Madora Ave., Canoga Park, Calif. 91306**
**Filed Mar. 26, 1990, Ser. No. 498,402**
**Int. Cl.$^5$ A41F** *9/00*
U.S. Cl. 2—312 **1 Claim**

1. In a waistband device interposed between garments, as pants and shirt or blouse and skirt, the improvement which comprises:

an elongated band disposed between pants and shirt or blouse and skirt and of elastic fabric having opposite ends and opposite surfaces defined between top and bottom edges;

said opposite surfaces characterized as having a continuous tufted and napped irregular surface texture covering both surfaces providing frictional means separable and engageable with opposing exterior surfaces of garments worn by the user;

said tufted and napped surfaces are woven into said band fabric thereby outwardly extending from both of said opposite surfaces into frictional engagement with the worn garments;



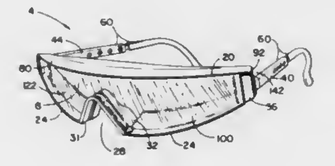
said opposing ends terminate in a reduced width between said top and said bottom edges from the width of the major band length; and

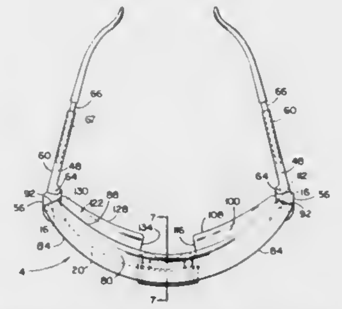
said band is flexible and expandable.

---

### 5,016,292
### COMBINATION GAMMA, ULTRAVIOLET AND X-RADIATION GOGGLES

**Mark Rademacher, 3222 Royal Dr., Cameron Park, Calif. 95682**
**Filed Dec. 7, 1989, Ser. No. 448,015**
**Int. Cl.$^5$ A61F** *9/02*
U.S. Cl. 2—431 **13 Claims**





1. Safety goggles for effectively decreasing UV, Gamma, and X-ray radiation exposure to a user's eye tissue, comprising:

(a) a sterilizable, essentially UV, Gamma, and X-ray radiopaque leaded polymer lens of generally uniform thickness with an elongated outer perimeter border having two opposing essentially parallel short side edges and opposing outwardly curved upper and lower long edges with said lower long edge having a nose rest receiving notch midway between said short side edges, wherein said lens is formed to curve in a smooth arc, coextensive with said long edges, over the surface of said user's face to substantially cover both eyes of said user;

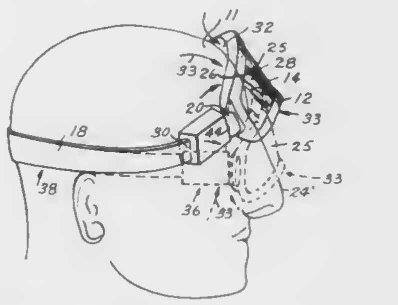
(b) a sterilizable radiolucent polymer nose rest attached in said receiving notch in said lower long edge of said lens; and

(c) two sterilizable and adjustable radiolucent polymer ear pieces wherein each of said ear pieces has front and back surfaces, upper and lower edges, and first and second end regions with said first end region having at opposite terminal portions a lens attachment terminal portion and one half of a hinge and said second end region having at opposite terminal portions one half of a hinge that mates with said first end region half hinge to form hinge and an opposing terminal portion having a form adapted for holding over said user's ear whereby each of said ear pieces is attached from said first end region to said opposing short side edge of said lens.

---

### 5,016,293
### AIR INDUCTION SYSTEM FOR GOGGLE

**Brett Lickle, 115 Lua Hine Pl., Haiku, Hi. 96708**
**Filed Jul. 25, 1990, Ser. No. 557,028**
**Int. Cl.$^5$ A61F** *9/02*
U.S. Cl. 2—436 **9 Claims**



1. A goggle comprising:

a lens;

a frame for securing the lens therein;

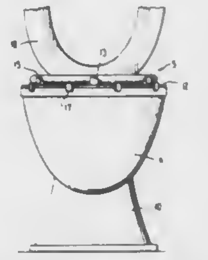
a headband secured to lateral portions of the frame for securing the frame in position in contact against the head of a wearer; and

slider means slidably positioned on the headband proximate the frame for supporting the frame in a spaced relationship with respect to the head of the wearer to thereby allow ventilation of the goggle when so positioned, said slider means being retractable along said headband away from the frame for allowing the goggle to rest against the head of the wearer when so positioned.

---

### 5,016,294
### ODORLESS TOILET

**Enrique A. Canovas, P.O. Box 6937, Tamuning, Guam 96911**
**Filed May 31, 1990, Ser. No. 531,424**
**Int. Cl.$^5$ E03D** *9/04;* **A47K** *13/00*
U.S. Cl. 4—217 **10 Claims**



1. A toilet comprising: a toilet bowl, a toilet seat, and a toilet seat adapter unit disposed between a lower surface of said toilet seat and an upper surface of a rim of said toilet bowl, said toilet seat adapter unit comprising a substantially flat plastic plate having a shape and dimensions generally conforming to said toilet seat, a first set of plastic clips attached to a lower surface of said flat plate around an outer edge thereof and fitting around an outer edge of said rim of said toilet bowl, a second set of clips attached to an upper surface of said flat

OL
126
SS
3
MY
21
991
UMI

plate, and a flexible perforated hose received in said second clips, a height of said second set of clips being less than a diameter of said hose.

---

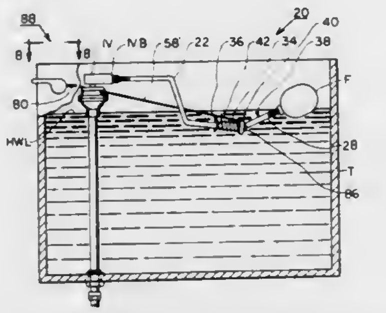
### 5,016,295
### TWO POSITION FLOAT ARM

**David R. Criswell, 534 Logsden Rd. East, Siletz, Oreg. 97380**

**Filed Jul. 16, 1990, Ser. No. 553,240**

**Int. Cl.$^5$ E03D** *1/14, 1/00;* **F16K** *31/18*

**U.S. Cl. 4—324** **8 Claims**



8. In a flush toilet tank, having a water inlet valve controlled by a float connected to the inlet valve by a rod screwed into a boss of the inlet valve and a boss of the float, and a water outlet valve controlled by an arm connected to a handle mounted in an aperture of the tank wall, a two position float arm, comprising:

a first member having a threaded end and a hinge end, said threaded end screwed into the threaded boss of the water inlet valve, said hinge end having a slot, a first hole, a first pin and a wall adjacent said slot;

a second member having a threaded end and a hinge end, said threaded end screwed into the threaded boss of the float, said hinge end having a second pin and a tongue, said tongue having a second hole, said tongue having a shoulder;

a hinge pin, said tongue inserted in said slot and said hinge pin inserted in said first and said second holes, said tongue thus pivotably mounted on said hinge pin;

a helical spring;

a sleeve having a collar, said sleeve slidably mounted over said first member hinge end, said spring mounted over said sleeve between said first pin and said collar, said spring urging said sleeve to abut said second pin so that said sleeve covers said first member hinge end and said second member hinge end so that said first member and said second member cannot move relative to each other, the float thus assuming a first position relative to the water inlet valve boss;

means for radially moving the outlet valve arm to open the outlet valve, said moving means having a cannon and a groove connecting to said cannon, said cannon inside the toilet tank wall, said groove outside the toilet tank wall;

a shaft rotatably mounted inside said cannon, said shaft having an axis, an inner end and an outer end;

a post mounted in said shaft inner end and generally normal to said axis, said post having an upper end;

a cable having a first end and a second end, said first end attached to said collar, said second end attached to said post upper end; and

a lever outside the toilet tank wall attached to said shaft outer end substantially normal to said axis and lying in said groove;

whereby radial movement of said lever is communicated through said shaft to said post and said cable to said collar for pulling said sleeve away from said second member hinge end to allow said second member to rotate, on said hinge pin, relative to said first member until said shoulder abuts said wall, said float thus assuming a second position relative to said water inlet valve boss.

---

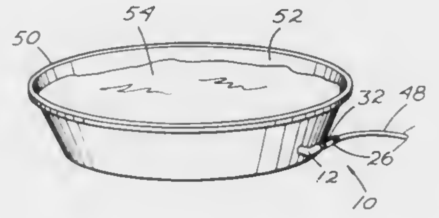
### 5,016,296
### AUXILIARY DRAIN AND FILLER DEVICE FOR PLASTIC POOLS

**M. William Beaumont, P.O. Box 435, Chico, Calif. 95927**

**Filed Jan. 16, 1990, Ser. No. 465,934**

**Int. Cl.$^5$ E04H** *4/00*

**U.S. Cl. 4—507** **1 Claim**



1. In combination with a plastic pool, an auxiliary drain and filler attachment comprising in combination a threaded elbow having at a first end a threaded male fixture, and at a second end there being a threaded female fixture, a shoulder surrounding said first end adjacent said threads, said threaded male fixture removably inserted into an opening cut through material of a plastic pool and removably being sealed therein, there being a cap opened at both ends removably screwed down on said elbow so as to be located on said threaded male fixture, O-rings positioned on each side of said pool material against said pool material and between said shoulder and cap on said threaded elbow, whereby said threaded elbow is sealingly affixed to said pool material, a coupling having a first end threadably connected to said second end of said threaded elbow, and a second end threadedly connected to a hose adapter, said hose adapter including a controllable water flow on and off valve and and having a fitting adapted for removable attachment to a cooperative fitting on a garden hose.

---

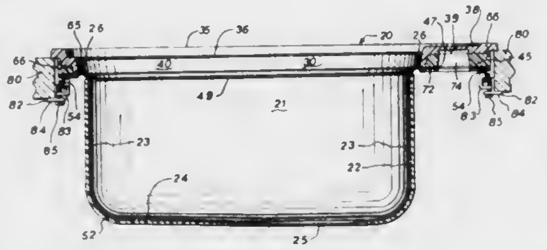
### 5,016,297
### SINK ASSEMBLY

**Bruce M. Sauter, Schaumberg, Ill.; Jeffrey F. Tempas, Oostburg, and Robert B. Sandman, Sheboygan, both of Wis., assignors to Kohler Co., Kohler, Wis.**

**Filed Mar. 30, 1990, Ser. No. 502,463**

**Int. Cl.$^5$ A47K** *1/04;* **E03C** *1/33*

**U.S. Cl. 4—619** **6 Claims**



1. A sink assembly, comprising:

a support rim having an opening therethrough;

a basin having a lower bowl and an upper flange, the flange being positioned under a lower side of the support rim so that the bowl is visible from the top of the support rim through the opening;

a coupler bonded to the support rim, the coupler having a first portion attached to the lower side of the support rim and a second portion positioned under a part of the basin, the second portion being located so as to restrict the basin's movement relative to the support rim, the coupler having been formed in a molding operation that used the support rim as part of the mold; and

a J-channel connected to the coupler, the J-channel having an upper attachment surface and a hook downwardly spaced from the attachment surface, the coupler being formed to cover the attachment surface but not the hook.

---

### 5,016,298
### ACCESSORY SET FOR KITCHEN SINKS

**Max Ris, Wangen/bei Olten, and André Monnard, Olten, both of Switzerland, assignors to Niro-Plan AG, Zug, Switzerland**

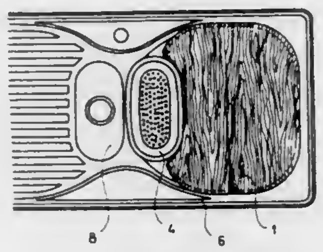
**Continuation of Ser. No. 238,091, Aug. 29, 1988, abandoned.**

**This application Feb. 28, 1990, Ser. No. 490,499**

**Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3730072**

**Int. Cl.$^5$ A47K** *1/00*

**U.S. Cl. 4—654** **3 Claims**



1. Accessory set for a kitchen sink having a first drainage basin (7) and a second, smaller, drainage basin (8), comprising

a cutting board which can be placed on a rim of said first basin of said sink a colander (4), with at least two edges, which is adapted and dimensioned for mounting on a peripheral rim of said smaller drainage basin (8),

wherein said cutting board (1) and said colander (4) each have a circumferential contour, a portion of which matches a portion of the contour of the other, so that a user can place said colander (4), selectively, either covering said smaller drainage basin (8) or alongside the cutting board on a portion of the rim of the first drainage basin of said sink (7), said portion of the rim and board supporting respective colander edges;

an upper portion of said colander (4) has an outwardly extending rim (4*a*) and

said cutting board (1) is formed with a profiled edge (3) having a step (5) which matches and supports said outwardly extending rim (4*a*) so that said cutting board (1) and said colander (4) fit together all along their adjacent peripheries without an intervening gap;

and wherein said cutting board (1) and said colander (4) have respective top surfaces which are at the same elevation and fit flushly together.

---

### 5,016,299
### EMERGENCY EVACUATION HARNESS

**Claude Boulanger, 1212 Pine Avenue West, Apt. No. 405, Montreal, Quebec, Canada H3G 1A9**

**Continuation-in-part of Ser. No. 355,415, May 23, 1989, abandoned. This application Jan. 24, 1990, Ser. No. 469,240**

**Int. Cl.$^5$ A61G** *7/10, 7/08*

**U.S. Cl. 5—81 R** **34 Claims**

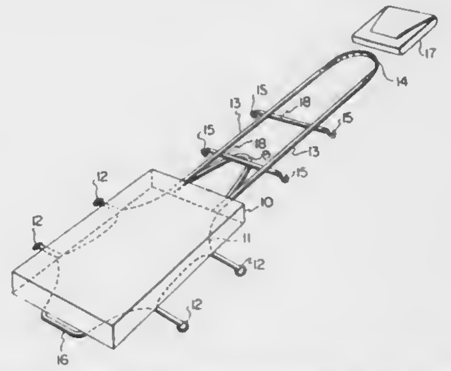
1. An emergency evacuation harness for fitting over a mattress for moving immobile persons, said harness comprising:

a bottom harness member for positioning beneath a mattress;

spaced attachment means on each side of said bottom harness member;

a plurality of longitudinal straps extending from one end of said bottom harness member, said longitudinal straps extendable in use over said mattress and a patient on said mattress to the other end of said bottom harness member;

spaced fastening means on said longitudinal straps, said fastening means positioned to engage with said attachment means when said longitudinal straps extend over said mattress.



---

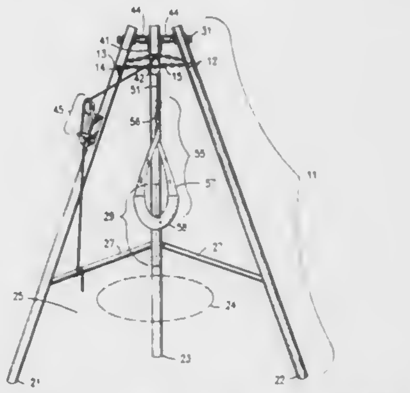
### 5,016,300
### PATIENT STANDING ASSISTANCE APPARATUS

**Joyce A. Jandrakovic, 1408 Magnolia Ave., Zephyrhills, Fla. 34248**

**Filed Jun. 19, 1989, Ser. No. 367,620**

**Int. Cl.$^5$ A22B** *1/00;* **A61G** *7/10*

**U.S. Cl. 5—85** **2 Claims**



1. A portable apparatus for supporting an invalid person through a range of vertical positions from sitting to standing, the apparatus comprising a collapsible tripod with support means;

said support means being of adequate strength to support the weight of a person and further comprising an upper support member, said upper support member being further adapted with a pulley through which a flexible line of adequate strength to support a person may be passed and suspended through an area for supporting an invalid person in a vertical position;

said flexible line further comprising a rope being adapted at one end with a holding means comprising a padded loop which may be passed over the torso of an invalid person;

locking means for locking said flexible line at a selected point along its length which is further mounted upon said support means, said locking means further comprising a line-locking bracket upon which is pivotally mounted a cylindrical line passing means though which said flexible line may freely pass in one direction but through which the attempted passage of said flexible line in the opposite direction will cause said cylindrical line passing means to pivot towards and compress said flexible line upon said bracket at some point along the length of said flexible line and lock said flexible line at said point of compression;

guiding means for guiding said flexible line through said line locking means, said pulley, and through said vertical

OL
126
SS
3
MY
21
1991
UMI

invalid support area which is further mounted upon said support means;

said collapsible tripod further comprising a first leg, said first leg being centrally pivotally mounted to said upper support member so as to pivot about said support member in one plane and second and third tripod legs being pivotally mounted upon said support member on either side of said first leg so as pivot about said support member in planes substantially perpendicular to the plane of rotation of said first leg;

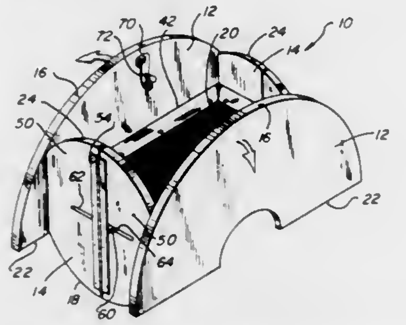
a stabilizing chain;

each of said tripod legs further being adapted at points near to and equidistant from said support member with a hook extending from each said tripod leg generally in the direction of pivot, two of said hooks being of adequate size to accept a link of said stabilizing chain and one said hook being of adequate size to accept two links of said stabilizing chain; and

said stabilizing chain being of adequate length to surround said tripod legs at the point of said hooks and of adequate strength to stabilize said apparatus bearing the weight of an invalid person.

---

### 5,016,301
## INFANT ROCKER/CRADLE
**Mary A. Combs, 12328 W. Grand Pl., Morrison, Colo. 80465**
**Filed Oct. 16, 1990, Ser. No. 598,138**
**Int. Cl.⁵ A47D *9/04***
**U.S. Cl. 5—105** **12 Claims**



1. A device for use on a generally flat surface to rock and cradle an infant comprising:

a generally rectangular frame having two generally parallel, opposing and spaced sides which are joined to each other by two generally parallel, opposing and spaced ends which join said sides at generally right angles, each side defining a first arcuate rocking edge which is parallel to that defined by the other side, each end defining a second arcuate rocking edge which is parallel to that defined by the other end, said first and second arcuate rocking edges also being oriented with respect to each other so that they generally face opposite directions and are generally disposed at right angles with respect to each other; and

infant support means attached to said frame within said ends and said sides for supporting an infant when either said first or said second arcuate rocking edges are in contact with the generally flat surface.

---

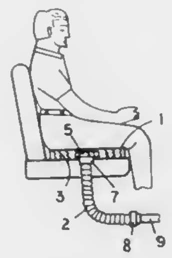
### 5,016,302
## MOTIVE AIR SEAT CUSHION
**Kaung M. Yu, 13618 Braeswest Dr., Houston, Tex. 77482**
**Filed Dec. 13, 1989, Ser. No. 449,751**
**Int. Cl.⁵ A47C *31/00***
**U.S. Cl. 5—423** **11 Claims**

1. An air conditioned seat cushion for providing a cooling/-warming sensation to a person, comprising:

a flexible envelope having edges which connect a top and a bottom,

a flexible air distribution box, having a plurality of holes around edge walls, and located inside said envelope,

padding means embedded inside said envelope and said box, said padding being flexible and having void spaces for diffusing air within said box and said envelope,

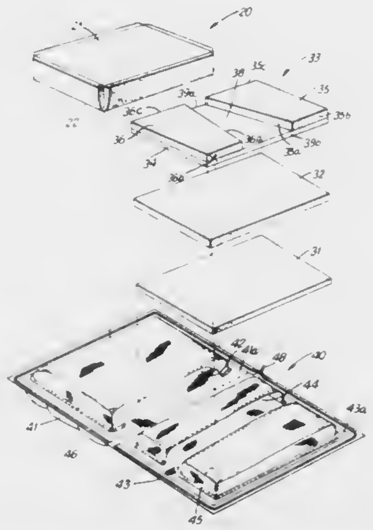


means defining an air inlet opening formed at an outside of said envelope and connected to said box for permitting air to enter said envelope,

means defining air discharge openings formed along substantially the entire length of each edge of said envelope for discharging air out of said envelope.

---

### 5,016,303
## CERVICAL AND HEAD SUPPORT PILLOW
**Kazuna Tanaka, Cos Cob; Jeffrey Kapec, Westport, both of Conn., and Allan Chochinov, Brooklyn, N.Y., assignors to Lumex, Inc., Bay Shore, N.Y.**
**Filed Jun. 9, 1989, Ser. No. 364,023**
**Int. Cl.⁵ A47C *20/02***
**U.S. Cl. 5—437** **15 Claims**



1. A cervical and head support pillow comprising:

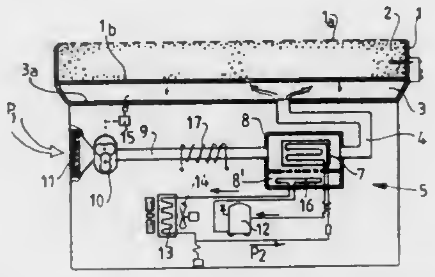
an outer covering having a top half and a bottom half;

receiving means on a first side of the bottom half of the outer covering;

a v-shaped foam insert located in the receiving means, the v-shaped foam insert having first and second angled side portions defining a depression in the v-shaped foam insert, the depression having the approximate shape of a "v" wherein the first and second angled side portions converge toward one another toward a first edge of the insert and diverge from one another at a second edge of the insert; and

means for securing the top half of the outer covering to the bottom half of the outer covering.

### 5,016,304
## FLUIDIZED BED WITH MOISTURE REMOVING MEANS
**Victor G. Ryhiner, Tilburg, Netherlands, assignor to Redactron B.V., Eersel, Netherlands**
**Filed Feb. 22, 1989, Ser. No. 313,540**
**Claims priority, application Netherlands, Mar. 29, 1988, 8800792**
**Int. Cl.⁵ A61G *7/057***
**U.S. Cl. 5—453** **9 Claims**



1. A device for supporting a moisture-containing body and for accepting moisture emanating from said body, said device comprising:

bed means defining an air-permeable upper surface on which a moisture-emitting body can be placed and a porous floor, said bed means providing a chamber between said upper surface and said porous floor,

a bed of beads contained in said chamber, said bed of beads being capable of absorbing moisture flowing into said chamber from said body through said air-permeable upper surface,

plenum means below said bed means for supplying a uniform flow of air upwardly through said porous floor of said bed means and into said chamber to uniformly fluidize said bed of beads and for accepting moisture flowing downwardly from said bed of beads through said porous floor, said plenum means defining a floor, and

an air-supply system connected to said floor of said plenum means for supplying treatment air to said plenum means at a controlled temperature and relative humidity and for draining moisture out of said plenum means, said air-supply system including an air treatment chamber in which air from the environment around said device is cooled and water vapor therein removed as moisture, thereby providing said treatment air, and a first heating means for evaporating said moisture into water vapor for return to said environment.

---

### 5,016,305
## INNERSPRING CONSTRUCTION FOR MATTRESSES, CUSHIONS, AND THE LIKE AND PROCESS FOR MANUFACTURING SAID CONSTRUCTION
**Albert J. Suenens, and Marcel Ghysels, both of St.-P.-Leeuw, Belgium, assignors to NV B'Linea, Beersel-Lot, Belgium**
**Filed Feb. 26, 1990, Ser. No. 484,801**
**Claims priority, application Belgium, Oct. 5, 1989, 08901067**
**Int. Cl.⁵ A47C *27/04***
**U.S. Cl. 5—477** **9 Claims**

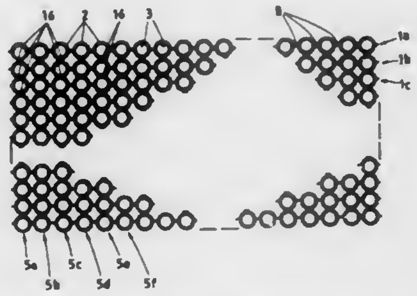
1. An innerspring construction for at least mattresses and cushions comprising:

strings of jackets encasing separate coil springs, said springs being arranged in a parallel fashion according to longitudinal axes of said springs,

wherein the jackets are manufactured from oblong strips of material which have been adhered at contact surfaces by means of an adhesive such that separate coil springs are arranged so that each of their longitudinal axes is substantially transverse to longitudinal axes of the strips of material,

wherein the coil springs are put in said jackets, said jackets being close-fitting, and

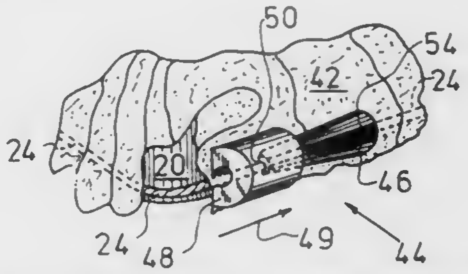
wherein said adhesive consists of a relatively flexible coating of adhesive which is spread substantially continuously



over a main part of a contact surface between at least certain adjacent jackets of adjoining strips of material, in such a way that deformation of both the coating and the covers stuck together is possible in a direction according to the longitudinal axes of said coil springs.

---

### 5,016,306
## GRIPPER DEVICE
**Gerald J. Grivna, 1001 County Rd. 837, Bailey, Colo. 80421, and Robert N. Thompson, 9888 E. Vassar Dr., Apt. D-105, Denver, Colo. 80231**
**Filed Oct. 10, 1989, Ser. No. 419,266**
**Int. Cl.⁵ A47C *21/02***
**U.S. Cl. 5—498** **21 Claims**



1. A device used with similar separate devices for gripping a flexible flat surface in a plurality of spaced apart positions around an elongated form such as a cord, rope, protruding edge or the like to hold the flexible flat surface tightly in juxtaposition around the elongated form at the plurality of spaced apart positions, comprising:

(a) an inner short hinged gripper having a hinge area separating two remaining areas, the gripper being designed for positioning partly around the elongated form with the flexible flat surface positioned over the elongated form and held around the form by the gripper, the hinged gripper having an outer surface and having the hinged area formed thinner than the two remaining areas of the gripper so that the two remaining areas may pivot around the hinge area;

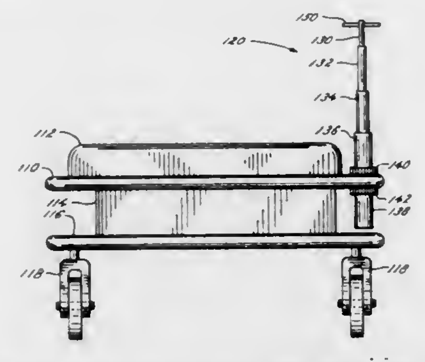
(b) an outer short clamp for positioning partly around the hinged gripper after the hinged gripper is positioned over the elongated form with the flexible flat surface between the hinged gripper and the form, the outer short clamp having an inner surface; and

(c) means, associated with the hinged gripper and the clamp to exert a force on the hinged gripper to tightly hold the hinged gripper in place on the elongated form and on the flexible flat surface.

OL
126
SS
3
MY
21
1991
UMI

### 5,016,307
### INTEGRAL STRETCHER AND INTRAVENOUS FLUID CARRIER/GRAVITY DEPENDENT DRAINAGE SUPPORT

**Linda Rebar, 3213 N. Kenmore, Apt. B, Chicago, Ill. 60611**
**Filed Mar. 23, 1990, Ser. No. 498,346**
**Int. Cl.$^5$ A61G** *7/06*
**U.S. Cl. 5—503** **7 Claims**

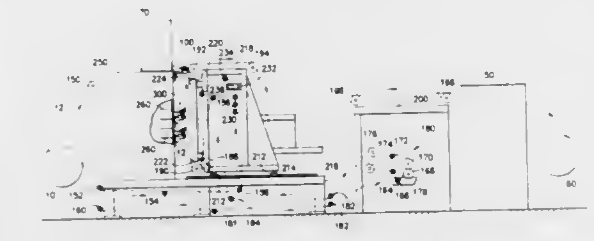


1. A patient transportation apparatus comprising a stretcher having a substantially horizontal surface with a perimeter for supporting a patient and a vertically collapsible stanchion; said stanchion being substantially perpendicular to and connected with said horizontal surface inside said perimeter; a stanchion housing being connected with said horizontal surface directly below said stanchion, the stanchion being capable of being extended above the plane of the horizontal surface and being collapsed within said stanchion to a position below or equiplanar with the horizontal surface; the stanchion being located so that in all positions, including all intermediate, partially collapsed positions of said stanchion, said stanchion does not extend beyond the perimeter of said horizontal surface.

---

### 5,016,308
### METHOD AND APPARATUS FOR PATTERNING SUBSTRATES USING GAS STREAMS

**Daniel T. McBride, Chesnee, and William H. Stewart, Jr., Campobello, both of S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.**
**Continuation of Ser. No. 399,361, Aug. 28, 1989, abandoned, which is a continuation of Ser. No. 180,406, Apr. 12, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 473,124**
**Int. Cl.$^5$ D06B** *1/02. 11/00*
**U.S. Cl. 8—149** **7 Claims**

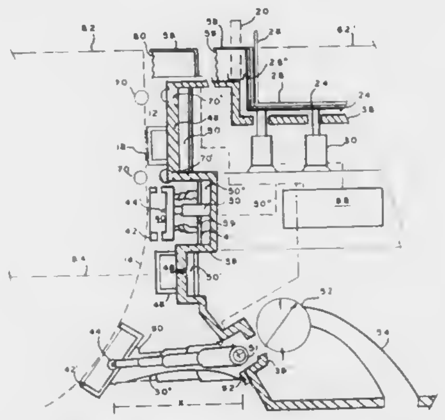


1. A method for patterning the surface of a textile substrate, comprising the steps of:
- (a) applying a quantity of liquid dye to said substrate by spraying said substrate with droplets of liquid dye;
- (b) maintaining said dye in a substantially unfixed condition;
- (c) contacting said substrate with a plurality of pressurized displacing gas streams, said streams being directed at said dye on said surface with sufficient energy to displace a quantity of said liquid dye on said substrate surface in the area impinged upon by said streams, and
- (d) moving said substrate along a path which includes said gas streams, wherein said plurality of gas streams are positioned across said path, and wherein said pressurized gas streams are interrupted individually in accordance with pattern information.

---

### 5,016,309
### LATERAL ACCESS RIVER TRANSIT SYSTEM

**Robert H. Vollmerhausen, 1809 Anderson Road, Falls Church, Va. 22043**
**Continuation-in-part of Ser. No. 59,602, Jun. 8, 1987, abandoned. This application Aug. 5, 1988, Ser. No. 228,443**
**Int. Cl.$^5$ E02C** *5/00*
**U.S. Cl. 14—71.7** **7 Claims**

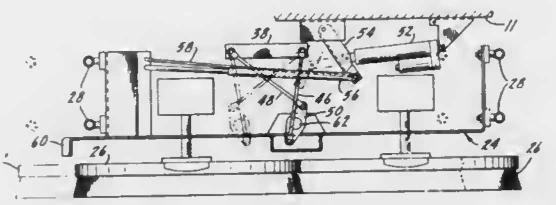


1. A river transit apparatus, comprising a vacuum actuated means for biasing at least one shuttleboat hull to a riverboat hull, said vacuum actuated biasing means having elevating means disposed therewith,
- said shuttleboat hull having as least one deck member disposed therewith,
- said riverboat having a plurality of deck members,
- each one of said riverboat deck members having said elevating means disposed therewith, said elevating means having control means, whereby as said riverboat and said shuttleboat are respectively biased one to the other, and as said elevating means is actuated, at least one of said riverboat deck members is leveled with said shuttleboat deck member.

---

### 5,016,310
### FLOOR SCRUBBER HAVING LATERALLY VARIABLE SCRUB BRUSH POSITION

**Robert A. Geyer, Champlin, and Terence A. Peterson, Plymouth, both of Minn., assignors to Tennant Company, Minneapolis, Minn.**
**Filed Aug. 21, 1989, Ser. No. 396,132**
**Int. Cl.$^5$ A47L** *11/16*
**U.S. Cl. 15—49.1** **14 Claims**

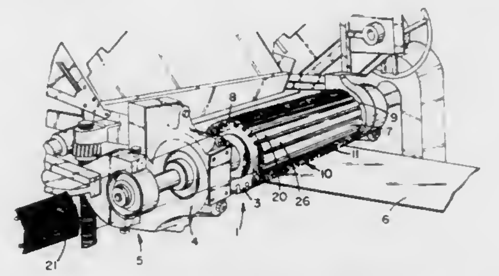


1. An improved machine for scrubbing a floor, comprising a plurality of wheels including one or more front wheels and one or more rear wheels supporting the machine for movement over the floor, a frame including two side members, one or more rotating floor engaging tools driven by one or more motors, the tools and motors being mounted in a scrub head, the scrub head being movably attached to the frame, means for raising the scrub head to a transport position where the tools do not contact the floor and lowering the scrub head to a working position where the tools do contact the floor, means for selectively positioning the scrub head in a normal position generally centered between the two side members and, at least in the working position, in an extended position where at least a portion of the scrub head extends laterally outside one of the side members, means for applying a generally vertical force other than gravity to the scrub head when it is in its working position, the improvement consisting of means to assure that the rotating tools engage a flat floor with an essentially uniform pressure over the entire floor area which they engage when the scrub head is in the working position and in the normal and the extended position.

---

### 5,016,311
### APPARATUS AND BRUSH SEGMENT ARRANGEMENT FOR FINISHING WHEEL BRUSHES; AND METHOD

**John B. Young, and Roger C. Lokken, both of Woodbury, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Continuation of Ser. No. 186,907, Apr. 27, 1988, abandoned. This application Feb. 5, 1990, Ser. No. 477,192**
**Int. Cl.$^5$ A46B** *13/02*
**U.S. Cl. 15—88.3** **7 Claims**

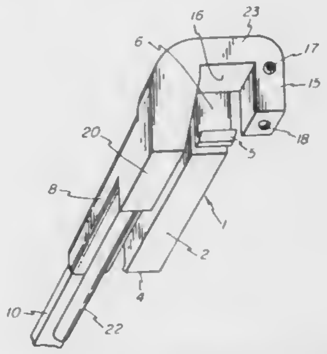


1. A cylinder brush finishing device comprising:
- (a) a cylindrical hub having opposite ends and an outer surface; said hub including a plurality of substantially parallel, longitudinal, slots in communication with said hub outer surface; each of said slots extending between said hub opposite ends; said hub outer surface having a first radius of curvature;
- (b) means mounting said hub for rotation about a longitudinal axis thereof;
- (c) a drive mechanism for selectively rotating said cylindrical hub;
- (d) a first arcuate substrate removably mounted on said hub and having first and second opposite surfaces and first and second side edges; said first arcuate substrate defining an arc between said first arcuate substrate side edges; said first arcuate substrate first surface being generally convex and said first arcuate substrate second surface being generally concave; said first arcuate substrate second surface having a radius of curvature smaller than said hub outer surface first radius of curvature, when said first substrate is not mounted in said finishing device;
- (e) a carpet of bristles secured to said first substrate to extend outwardly from said first substrate first surface;
- (f) at least one first substrate longitudinal root member projecting outwardly from said first arcuate substrate concave side and extending generally parallel to, and spaced from, said first substrate side edges; said first substrate root member being constructed and arranged for sliding engagement with a selected one of said cylindrical hub longitudinal slots by entering same at one of said hub end edges, to mount said first arcuate substrate to said cylindrical hub;
- (g) means distorting said first substrate second, concave, surface toward a radius of curvature approximately equal to said hub outer surface radius of curvature, when said first substrate is mounted in said finishing device;
- (h) a second arcuate substrate removably mounted on said hub and having first and second opposite surfaces and first and second side edges; said second arcuate substrate defining an arc between said second arcuate substrate side edges; said second arcuate substrate first surface being generally convex and said second arcuate substrate second surface being generally concave; said second arcuate substrate second surface having a radius of curvature smaller than said hub outer surface first radius of curvature, when said second substrate is not mounted in said finishing device;
- (i) a caret of bristles secured to said second substrate to extend outwardly from said second substrate first surface;
- (j) at least one second substrate longitudinal root member projecting outwardly from said second arcuate substrate concave side and extending generally parallel to, and spaced from, said second substrate side edges; said second substrate root member being constructed and arranged for sliding engagement with a selected one of said cylindrical hub longitudinal slots by entering same at one of said hub end edges, to mount said second substrate to said cylindrical hub;
- (k) means distorting said second substrate second, concave, surface toward a radius of curvature approximately equal to said hub outer surface radius of curvature, when said second substrate is mounted in said finishing device;
- (l) when said finishing device is operably assembled, said second substrate being oriented radially adjacent to said first substrate, with one of said first substrate side edges generally aligned parallel with and adjacent to one of said second substrate side edges; and,
- (m) means enabling said first and second substrates to be independently mounted on, and removed from, said cylindrical hub, while said hub is mounted in said finishing device.

---

### 5,016,312
### WASHER ARRANGEMENT FOR A WINDSCREEN WIPER

**Charles H. Frimley, Windsor, England, assignor to Trico Products Corporation, Buffalo, N.Y.**
**Filed Feb. 23, 1989, Ser. No. 314,524**
**Claims priority, application United Kingdom, Feb. 25, 1988, 8804359**
**Int. Cl.$^5$ B60S** *1/46*
**U.S. Cl. 15—250.04** **16 Claims**



1. A washer arrangement for a windscreen wiper comprising a windscreen wiper blade, a windscreen wiper arm for driving the windscreen wiper blade and a connector element for connecting the windscreen wiper arm and the windscreen wiper blade, where the wiper blade includes a central opening therein and the connector is at least partially received within said central opening and pivotally retained therein, and the connector element is fixedly mounted to the wiper arm, the connector element including at least one washing nozzle in communication with a passage within said connector element adapted to direct fluid to said nozzle.

/OL
126
SS
3
MY
21
1991
UMI

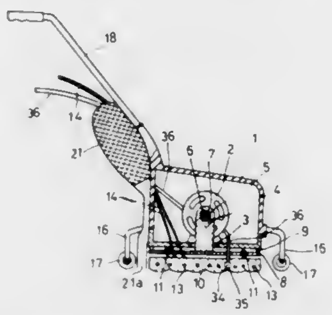
## 5,016,313
## SURFACE FINISHING DEVICE

**Takashi Yonehara, Tokyo, Japan, assignor to Tokyo Copal Chemical Co., Ltd., Tokyo, Japan**

**Filed May 16, 1989, Ser. No. 352,506**

**Int. Cl.$^5$ A47L** *11/12, 11/20*

**U.S. Cl. 15—320** **7 Claims**



1. A surface finishing device comprising:

a device body;

vibration generating means fixedly supported to the device body;

vibration transmitting means disposed at a lower portion of said device body opposing a floor surface and for transmitting the vibration of said vibration generating means of the device body to the exterior of the same;

wherein said vibration transmitting means is vertically vibrated through mechanical means and incorporates a heat source positioned substantially all over the surface of the portion opposed to the floor surface.

---

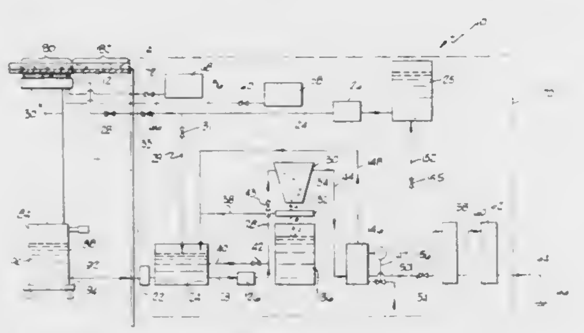
## 5,016,314
## ASBESTOS-CONTAINING MATERIALS REMOVAL ASSEMBLY

**Dennis H. Green, Arvada, and Stephen C. Johnson, Lakewood, both of, CO, assignors to EnviRestore Technologies, Inc., Lakewood, Colo.**

**Filed Sep. 28, 1989, Ser. No. 413,858**

**Int. Cl.$^5$ B08B** *7/04*

**U.S. Cl. 15—320** **12 Claims**



1. An ACM removal assembly comprising:

(a) nozzle means for directing a pressurized fluid against ACM which is supported on a building structure for dislodging the ACM;

(b) pressurized fluid supply means operably connected to said nozzle means for supplying fluid under pressure thereto;

(c) housing means for supporting said nozzle means therein and for capturingly receiving spent fluid and dislodged ACM; and

(d) flexible mechanical seal means for forming a seal at an interface between said housing and a building region from which ACM is to be removed for inhibiting discharge of waste fluid and dislodged ACM into the environment outside said housing means, said flexible mechanical seal means being displaceable across the surface of said interfacing building region without disrupting said seal between said housing means and the interfacing building region.

---

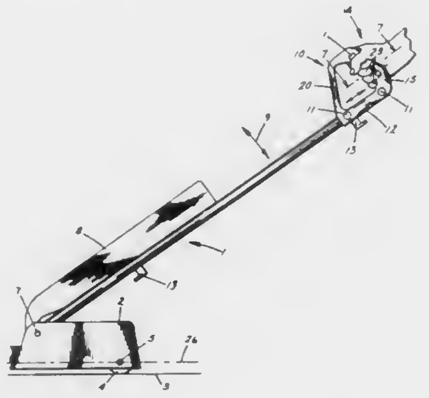
## 5,016,315
## FLOOR CLEANING DEVICE WITH IMPROVED HANDLE GRIP

**Susan G. Bledsoe, New Lenox, Ill., and Gordon W. Goodrich, Grand Rapids, Mich., assignors to Bissell Inc., Grand Rapids, Mich.**

**Continuation of Ser. No. 793,917, Nov. 1, 1985, abandoned. This application Nov. 24, 1987, Ser. No. 124,918**

**Int. Cl.$^5$ A47L** *9/32*

**U.S. Cl. 15—410** **8 Claims**



1. An upright floor cleaner comprising in combination:

(a) a base unit for reciprocable translation over a floor to be cleaned,

(b) wheel means mounted on axle means and adapted to support said base unit on said floor,

(c) an elongated handle pivotally mounted at its inner end to said base unit and thus pivotable relative to said base unit and to said floor during said translation, said handle being sufficiently long that said floor cleaner can be manipulated by a user in a standing position when said base unit is engaging the floor,

(d) a handle grip mounted on the outer end of said handle forming a straight extension of said handle and mounted for movement with said handle during use in a plane disposed vertically to a said floor and normal to said axle means,

(e) said handle grip including a graspable arm attached to the outer end of said handle grip and extending generally laterally upwardly in a direction away from the floor when in use and at substantially a right angle with respect to the longitudinal axis of said handle during use and being graspable by the hand of a standing operator,

(f) said arm being sufficiently long in a direction generally laterally and upwardly away from said handle that it will accommodate the width of a user's hand grasping said arm, so that the forces applied by the said standing operator to translate the device over the floor are applied generally parallel to the operator's fingers to thereby provide a strong wrist position for the operator during said reciprocable translation, and so that said arm positions said handle below the operator's hand to thereby minimize the angle of said handle relative to said floor during use.

---

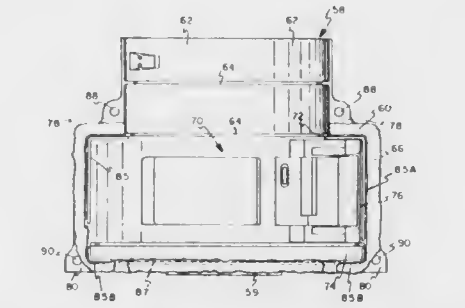
## 5,016,316
## MOTOR FAN COVER AND SEALING ARRANGEMENT

**Gregg A. McAllise, North Canton, and Dean H. Buchtel, Canton, both of Ohio, assignors to The Hoover Company, North Canton, Ohio**

**Filed Dec. 22, 1989, Ser. No. 454,940**

**Int. Cl.$^5$ A47L** *9/22*

**U.S. Cl. 15—412** **4 Claims**



1. A housing arrangement for a motor-fan system in a cleaner shell including;

(a) a partial housing having vertically upstanding walls and positioned in said cleaner shell,

(b) a supplementary housing disposed over said partial housing, and having generally vertically extending walls,

(c) a motor-fan system mounted on said partial housing and positioned between it and said supplementary housing,

(d) a gasket extending along and between said vertical walls to provide at least partial sealing for said motor-fan system,

(e) a resilient sealing ring disposed around said motor-fan system,

(f) said resilient sealing ring received between said partial housing and said supplementary housing and said motor-fan system in sealing relation, and

(g) said gasket extending between said walls of said partial housing and said supplementary housing to said resilient sealing ring to aid in sealing said motor-fan system.

---

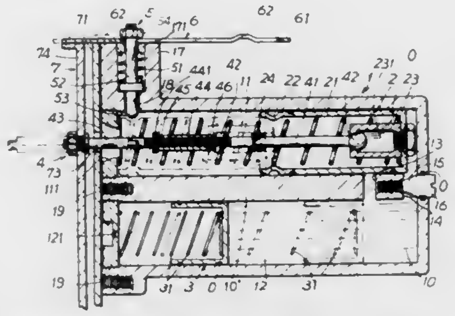
## 5,016,317
## LIGHTLY-OPERATING AUTOMATIC DOOR CLOSER WITH DOUBLE CYLINDERS

**Sheng-Hu Hung, P.O. Box 55-1670, Taipei, Taiwan**

**Filed May 14, 1990, Ser. No. 547,137**

**Int. Cl.$^5$ E05F** *3/20*

**U.S. Cl. 16—54** **8 Claims**



1. An automatic door closer comprising:

a casing having a primary cylinder and a secondary cylinder juxtapositionally formed on a movable leaf of a door hinge fixed with a door, said door hinge having a fixed leaf fixed on a door frame pivotally secured to the movable leaf, said primary cylinder partitioned from said secondary cylinder by a partition wall formed with a main hole and a throttling hole in an outer end portion in said casing for communicating said two cylinders;

a driving piston resiliently held in said primary cylinder and normally urged by a first tensioning spring towards two said holes in said casing;

a link set disposed therearound by said first tensioning spring pivotally connected between said fixed leaf of said door hinge and said driving piston;

a follower piston resiliently held in said secondary cylinder and normally urged by a second tensioning spring towards the outer portion of said casing;

a hydraulic oil filled in both said cylinders defined between the driving piston and the follower piston;

a positioning pin resiliently protruding downwardly from a pin holder formed on an inner portion of said casing for operatively engaging an annular recess formed in an inner periphery of said driving piston for locking the door at an opening state; and a biasing plate pivotally secured and horizontally suspended to said fixed leaf of said door hinge having a longitudinal slot formed therein for free passing said pin and having a convex portion extending upwardly from said plate for operatively lifting said pin for desengaging said pin from said driving piston, whereby upon an opening of said door from said door frame said driving piston is moved inwardly to compress said first tensioning spring to suck the hydraulic oil from said secondary cylinder to said primary cylinder through said two holes and to extend the follower piston to tension the second tensioning spring for accelerating the door opening operation for saving the door-opening operational force, and upon a closing for the door, the compressed first spring is restored to automatically close the door and to urge the driving piston to return the oil into the secondary cylinder for compressing the second spring in said secondary cylinder through said main hole and said throttling holes for damping any shock caused in closing the door.

---

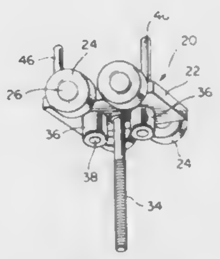
## 5,016,318
## MULTI-DIRECTIONAL RADIAL WHEEL TROLLEY AND TRACK FOR OPERABLE WALLS

**Donald L. Harris, Key Largo, Fla., assignor to Panelfold, Inc., Miami, Fla.**

**Filed Jul. 13, 1989, Ser. No. 379,186**

**Int. Cl.$^5$ E05D** *16/26*

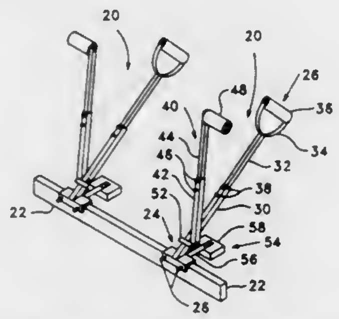
**U.S. Cl. 16—95 R** **27 Claims**



1. A track and trolley system for movably supporting wall panels, said track including spaced track flanges defining a track slot, said trolley including four radial wheels mounted in laterally spaced tandem pairs on a rigid trolley body for rotation about parallel horizontal axes, said wheels rollingly engaging said track flanges, a supporting member extending through said track slot and connecting said trolley with a panel, said track including at least one track intersection, characterized in that said trolley upon entering said intersection from at least one direction can exit said intersection in any of at least two directions without stopping.

### 5,016,319
## HANDLE ASSEMBLY

**Charles L. Stigen, R.R. 3, P.O. Box 67A, Mora, Minn. 55051**
**Filed Apr. 16, 1990, Ser. No. 509,476**
**Int. Cl.⁵ E05B** *7/00*
**U.S. Cl. 16—114 R** **15 Claims**



1. A handle assembly for use with a screed, the handle assembly comprising:

clamp means for attachment to a screed;

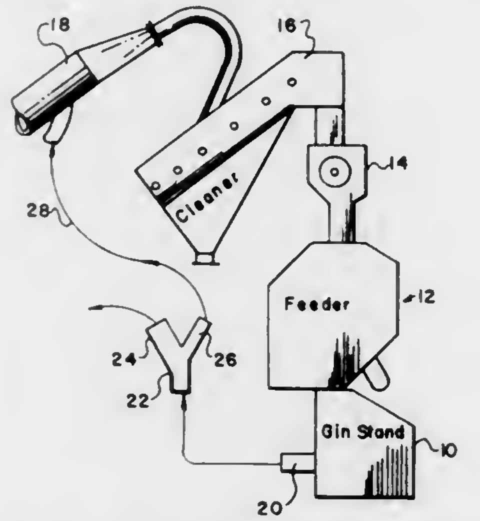
power handle means for controlling the attitude of the screed and applying power to pull the screed fixed at one end to said clamp means and extending upwardly at a predetermined angle relative to said clamp means to a hand grip means at another end; and

pivoted handle means for applying downward pressure and lifting forces to said screed having an orthogonal handle means at one end and another end pivotally attached relative to said power handle means about a generally horizontally extending pivot means disposed on said power handle means, said pivot means selectively accommodating pivoting of said pivoted handle means on either side of said power handle means.

---

### 5,016,320
## COTTON GIN FEEDER AND PREGINNER

**Arvel L. Vandergriff, Visalia, Calif., assignor to Consolidated HGM Corp., Lubbock, Tex.**
**Filed Mar. 5, 1990, Ser. No. 489,476**
**Int. Cl.⁵ D01B** *1/06*
**U.S. Cl. 19—40** **12 Claims**



8. In a cotton gin system having, at least one gin stand; the improved feeder equipment for feeding seed cotton to the gin stand comprising:

a. at least three horizontal spiked rollers designated as roller One, roller Two, and roller Three, each having an axis parallel to the axes of each other roller,

b. the roller One is higher than roller Two which is higher than roller Three,

c. power means attached to each roller for rotating each roller in the same direction so that the top of roller One turns toward roller Two,

d. a top scroll above at least part of roller Two and above roller Three,

e. said top scroll including concave surfaces of adjacent cylindrical segments one each of said segments over one each of said roller, and

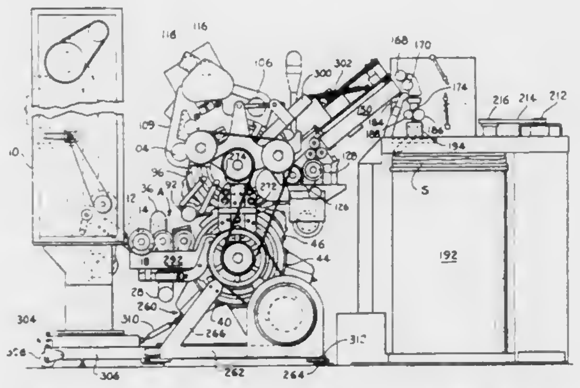
f. a separation ridge between said adjacent segments,

g. said separation ridge being a distance from a plane containing the axes of the adjacent rollers which is less than one third the diameter of one of said adjacent rollers.

---

### 5,016,321
## COMPACT CARDING APPARATUS WITH SILVER THREAD-UP AND METHOD

**John D. Hollingsworth, Greenville; Joe K. Garrison, Piedmont; Joel C. Collins, Easley, all of S.C.; William A. Warnock, deceased, late of Lyman; by Lillith M. Weiskel, legal representative, Nahant, Mass.; by Charles F. Warnock, legal representative, Ft. Collins, Colo.; by Lormine Pergande, legal representative, Winter Haven, and Muriel R. Nyberg, legal representative, Lake Worth, both of Fla., assignors to John D. Hollingsworth On Wheels, Inc., Greenville, S.C., a part interest**
**Division of Ser. No. 106,521, Oct. 9, 1987, Pat. No. 4,831,691.**
**This application May 16, 1989, Ser. No. 352,394**
**Int. Cl.⁵ D01G** *15/00*
**U.S. Cl. 19—98** **17 Claims**



1. A method of carding textile fibers on a pair of clothed carding cylinders which includes a first carding cylinder and a second carding cylinder arranged one above the other and automatically threading a sliver produced from said textile fibers into a coiler can; said method comprising:

(a) feeding fibers to said first cylinder;

(b) carding said fibers over a surface area of said first carding cylinder substantially more than 50 percent of the total surface area of said first cylinder;

(c) transferring said fibers from said first cylinder to said second carding cylinder at a fiber transfer zone;

(d) carding said fibers over a surface area of said second carding cylinder substantially more than 50 percent of the total surface area of said second cylinder;

(e) doffing said fibers from said second cylinder and forming a web;

(f) collecting said web and condensing said web into a sliver;

(g) subjecting said sliver to excessive drafting causing fibrous parts of said sliver to be separated from said sliver and forming a thread-up end on said sliver;

(h) conveying said fibrous parts away from said sliver;

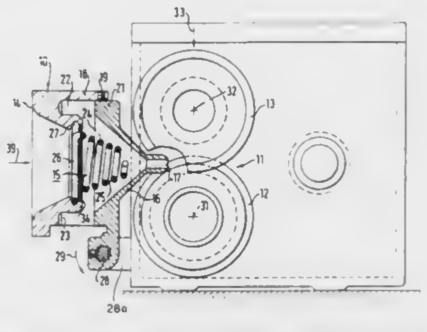
(i) terminating said fibrous separation and fiber conveying; and

(j) threading said thread-up end into a coiler and depositing said sliver in a coiler can.

---

### 5,016,322
## FUNNEL ARRANGEMENT AT THE OUTLET OF A CARD MACHINE

**Daniel Erni, Frauenfeld, and Paul Staeheli, Wilen, both of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland**
**Filed Nov. 21, 1989, Ser. No. 439,415**
**Claims priority, application Fed. Rep. of Germany, Nov. 22, 1988, 3839413**
**Int. Cl.⁵ D01G** *15/46*
**U.S. Cl. 19—150** **26 Claims**

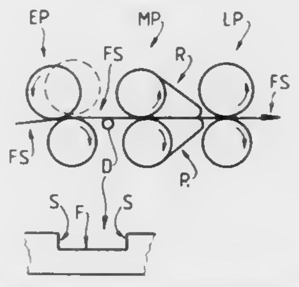


1. A funnel arrangement for bringing together a sliver and adapted to be interposed between an outlet of a card machine or drawing frame and a nip region of a calender roll pair, the funnel arrangement including a tapered funnel and an air squeeze-out means for squeezing air out of the sliver, the air squeeze-out means being connected after said funnel, the air squeeze-out means providing continuation of the tapering of the funnel along a direction of movement of the sliver and including lateral openings for discharging air squeezed out of the sliver by the air squeeze-out means, the air squeeze-out means having a pair of opposed axial ends spaced apart in said direction of movement with at least one of said lateral openings extending continuously from one of the axial ends to the other one of the axial ends.

---

### 5,016,323
## HIGH-DRAFT DRAFTING DEVICE FOR A FLYERLESS SPINNING PROCESS

**Rudolf Wehrli, Winterthur, and Herbert Stalder, Kollbrunn, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland**
**Filed Aug. 31, 1989, Ser. No. 401,621**
**Claims priority, application Switzerland, Aug. 30, 1988, 03260/88**
**Int. Cl.⁵ D01H** *5/32*
**U.S. Cl. 19—258** **10 Claims**



1. A high-draft drafting device for a flyerless spinning process comprising

at least one main drafting zone defined between a first pair of separated nips for drafting a flow of fiber material for spinning;

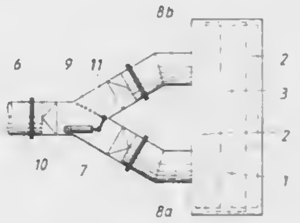
at least one preliminary drafting zone defined between a second pair of separated nips for drafting and delivering the flow of fiber material to said main drafting zone; and

means centrally disposed in said preliminary drafting zone for deflecting the flow of fiber material extending therein to impose a frictional force thereon in a direction perpendicular to a straight line between said second pair of separated nips.

---

### 5,016,324
## FEEDER FOR SUPPLYING FIBERS TO AN APPARATUS FOR FORMING A PRELIMINARY WEB

**Franz König, Linz, Austria, assignor to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft, Leonding, Austria**
**Filed Feb. 7, 1990, Ser. No. 477,043**
**Claims priority, application Austria, Feb. 23, 1989, 405/89**
**Int. Cl.⁵ D01G** *23/04*
**U.S. Cl. 19—296** **2 Claims**



1. In a feeder for supplying fibers to an apparatus for forming a preliminary web, comprising

a holding shaft having top and bottom ends,

a conveying line for supplying fibers to the top end of said shaft,

means comprising a discharge roller for closing said shaft at said bottom end, said holding shaft having a width in the axial direction of said discharge roller, and

a distributor, disposed between said conveying line and said holding shaft and serving distribute fibers coming from said conveying line over the width of said holding shaft, the distributor comprising at least two distributing lines for receiving fibers from said conveying line and open into said shaft at locations distributed over the width of said shaft,

The improvement comprising

a change-over valve connecting said distributing lines to said conveying line in alternation.

---

### 5,016,325
## STRAP CONNECTOR

**Donald D. Rasmussen, P.O. Box 250, Tualatin, Oreg. 97062**
**Filed May 17, 1990, Ser. No. 524,567**
**Int. Cl.⁵ A44B** *21/00*
**U.S. Cl. 24—68 R** **5 Claims**

1. A strap connector for use with a strap having a pair of free ends, said connector comprising:

a body portion having a strap receiving area therein,

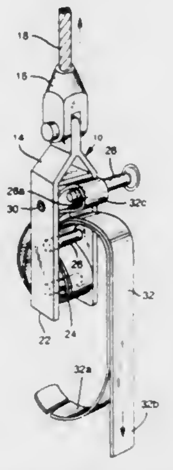
said body portion having opposite ends.

one of said ends comprising an attaching end for powered tension means and the other of said ends being open into the strap receiving area,

a pair of anchor bars mounted in said body portion and receiving a doubled back and looped end of the strap thereover with the free ends of the strap comprising a strap excess end portion and a load connected end portion.

said anchor bars being positioned such that one of them pinches the strap excess end portion between said one bar and the load connected end portion by a pulling tension on the latter and with the strap excess portion extending freely from said anchor bars and from said body portion to allow either of said free ends of the strap to be the strap excess portion or the load connected end portion,

and pin means mounted removably in said body portion, said pin means being disposed in said strap receiving area between said pair of anchor bars and said attaching end



arranged for insertion in the loop of the looped end of the strap for holding the latter in a secured position on said body portion with the free end of the strap inched between said one anchor bar and the load connected end portion and also arranged for removal from the strap receiving area to release the strap from said body portion.

---

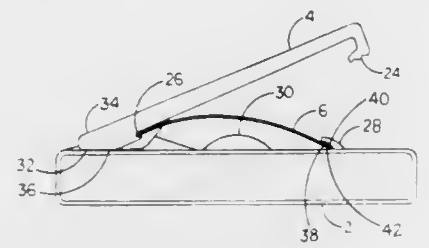
### 5,016,326
### BELT CLIP

**Michael P. Goldenberg, 1175 SW. 27th Pl., Boynton Beach, Fla. 33426**

**Continuation of Ser. No. 391,056, Aug. 9, 1989, abandoned. This application Dec. 10, 1990, Ser. No. 624,455**

**Int. Cl.$^5$ A45F** *5/02*

**U.S. Cl. 24—3 J** **9 Claims**



1. A selective call receiver comprising:

a housing,

a clip means coupled to said housing, for securing said housing to another object, said clip means having an open and closed position relative to said housing such that one end of said clip means substantially contacts said housing in the closed position and said end one of said clip means pivots away from said housing in the open position, and

a biasing element, coupled to said housing and said clip means, for securing said clip means to said housing and continually biasing the clip means toward the closed position, said biasing element providing a maximum resistance against pivotal movement of the clip means in the closed position and a reduced resistance against pivotal movement of the clip means in the open position.

---

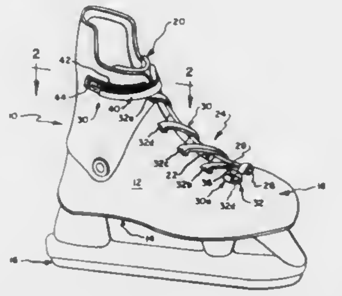
### 5,016,327
### FOOTWEAR LACING SYSTEM

**Fred P. Klausner, 768 King Road, Burlington, Ontario, Canada L7T 3K6**

**Continuation-in-part of Ser. No. 336,343, Apr. 10, 1989. This application Apr. 25, 1990, Ser. No. 514,106**

**Int. Cl.$^5$ A43C** *7/00*

**U.S. Cl. 24—713.3** **30 Claims**



1. In footwear of the type having an upper adapted to be snugly engaged with the foot of a user wherein a lace is passed through eyelets of said upper, which eyelets are arranged in two rows placed on opposite sides of a slot defined by said upper and extend rearwardly of a toe portion toward an ankle portion thereof, and said lace is tensioned to draw opposite sides of the slot toward one another and releasably secured for releasably maintaining said tension, the improvement comprising; an upper with eyelets having essentially straight lace bearing edges; lace bearing edges of eyelets in one row arranged in a divergent relationship with transversely associated eyelets in the other row, in a direction away from the toe portion of the footwear; a lace in the form of an elongated strip of material of generally rectangular cross section, dimensioned to generally pull through said eyelets and having first and second end portions; means for releasably attaching said first end portion of said lace at an eyelet adjacent the toe portion of said footwear sufficient to prevent pulling said first end portion through the eyelet; hook and loop means for releasably attaching said second end portion of said lace, to the upper of said footwear, sufficient to prevent pulling said second end portion through said eyelets.

---

### 5,016,328
### CARPET PATTERNING MACHINE AND METHOD

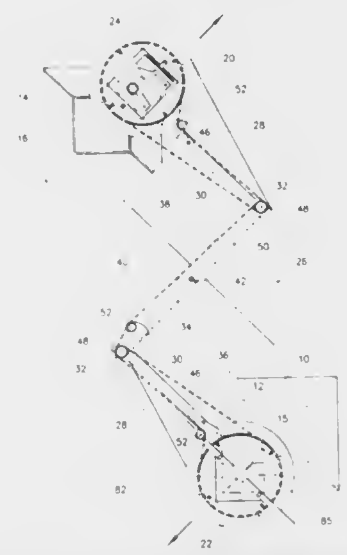
**Michael W. Gilpatrick, Chesnee, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Apr. 9, 1990, Ser. No. 506,105**

**Int. Cl.$^5$ D06C** *13/00*

**U.S. Cl. 26—7** **8 Claims**

3. Apparatus to sculpture the surface of a pile fabric comprising: a template to be traced, a cutting apparatus to cut the surface of a pile fabric, said cutting apparatus having a cutting blade with a cutting axis located in a position at an angle to the surface to be cut, said cutting apparatus having a bottom portion with an opening to allow the cutting blade to project thereof, said bottom having a sloped ramp on one side of said opening and a v-shaped member fixedly attached on a side opposite side sloped ramp to interact with said cutting blade and a means to trace said template and simultaneously move said cutting apparatus to cut said pile fabric surface in the configuration traced by said means.



---

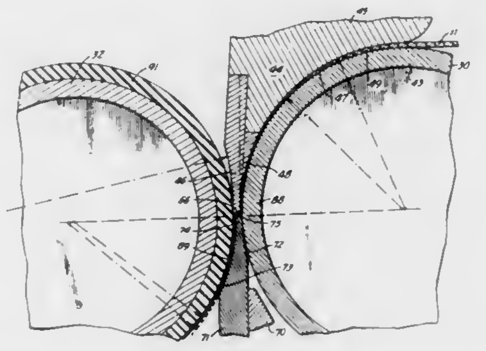
### 5,016,329
### APPARATUS FOR COMPRESSIVE SHRINKAGE OF TUBULAR KNITTED FABRICS AND THE LIKE

**William D. Milligan, Matthews, N.C., and Andrew P. Cecere, Valley Stream, N.Y., assignors to Compax Corp., Lexington, N.C.**

**Division of Ser. No. 334,785, Apr. 6, 1989, Pat No. 4,802,819, which is a continuation of Ser. No. 107,953, Oct. 13, 1987, abandoned. This application Oct. 13, 1989, Ser. No. 421,127**

**Int. Cl.$^5$ D06C** *21/00, 23/04, 29/00*

**U.S. Cl. 26—18.5** **14 Claims**



1. Compressive pre-shrinking apparatus for knitted fabrics and the like comprising

(a) a fabric feeding roller,

(b) an entry-side fabric confining shoe generally conforming to a surface portion of said feeding roller and defining therewith a confined entry path for the controlled advancement of fabric by said feeding roller,

(c) means for adjustably relatively positioning said entry-side confining shoe and fabric roller to bear with limited controlled pressure upon fabric confined in said entry path,

(d) a fabric retarding roller mounted for rotation closely adjacent and parallel to said feeding roller,

(e) the axes of said feeding and retarding rollers defining a reference plane passing through the region at which said feeding and retarding rollers most closely approach each other,

(f) said rollers, at said reference plane, being spaced apart a distance substantially greater than the thickness of said fabric,

(g) an exit-side confining shoe conforming to a surface portion of said retarding roller and defining therewith an exit path for the controlled discharge of fabric by said retarding roller,

(h) means for adjustably relatively positioning said exit-side confining shoe and said retarding roller to bear with limited controlled pressure upon fabric confined in said exit path,

(i) said confining shoes having blade-like extensions projecting toward each other and into the space between said rollers and meeting in the general region of the plane containing the axes of said rollers,

(j) means comprising confronting surfaces of said blade-like extensions engaging opposite surfaces of said fabric and forming a confinement zone for the confined and controlled passage of said fabric during its transit from said entry path to said exit path, and

(k) means for controllably and resiliently urging said blade-like extensions toward each other to controllably confine said fabric during its transit from said entry path to said exit path.

---

### 5,016,330
### PERSONALIZED PET ANIMAL MEMORIAL PRODUCT

**Susan Botsch, Rte. 4, P.O. Box 294, Dexter, Mo. 63841**

**Division of Ser. No. 390,091, Aug. 7, 1989, abandoned. This application Mar. 21, 1990, Ser. No. 497,777**

**Int. Cl.$^5$ A61G** *17/00*

**U.S. Cl. 27—1** **1 Claim**

1. A personalized pet animal memorial product produced from the ashes of a cremated pet animal, said product comprising:

(a) a shaped image of a deceased pet animal selected from the group consisting of a dog, a cat and a bird whose expired remains have been cremated to produce a resultant particulant ash product,

(b) said shaped image being formed by mixing at least a portion of the particulate ash product with particulate moldable materials to form a moldable mixture and shaping the moldable material to produce a shaped surface in the form of the pet animal form from which the particulate ash product has been obtained in the cremation process,

(c) the portion of the particulate ash of the cremated remains having been first pulverized to a size sufficient to adequately and compatibly blend into the mixture of said particulate multiple materials, and

(d) means for permanently bonding the particulate ash products and moldable materials together within the mixture to fix the image with the shaped surface conforming to the shape of the deceased pet animal,

(e) the shaped surface of the image including surface indicia descriptive of the identity of the personal pet animal including body markings which are shaped and disposed on the shaped surface to duplicate the appearance of the pet animal,

(f) the surface indicia including means providing legible documentation of facts identifying the shaped image as a personalized replica of the deceased pet animal from which the particulate ash of its cremated remains are integrally formed within the shaped image.

VOL 126 SS 3 MY 21 1991 UMI

### 5,016,331
## DEVICE ON NEEDLING MACHINES FOR THE PRODUCTION OF NEEDLE-BONDED FABRIC WEBS OR THE LIKE

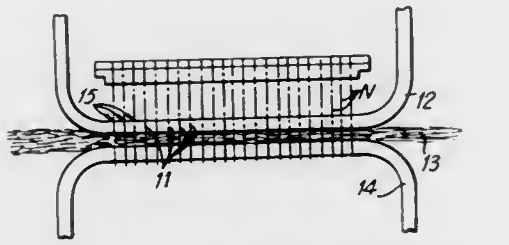
**Johann P. Dilo, Eberbach, Fed. Rep. of Germany, assignor to Oskar Dilo Maschinenfabrik K.G, Eberbach, Fed. Rep. of Germany**

**Filed Jun. 1, 1989, Ser. No. 359,986**

**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1988, 3824341**

**Int. Cl.$^5$ D04H** *18/00*

**U.S. Cl. 28—115** **11 Claims**



1. A device on needling machines for the production of needle-bonded fabric webs or the like, having above a fiber fleece to be needled comprising: a holding-down means having an underside provided with openings of a cylindrical shape for needles which include needle shafts, with said fiber fleece being advanced along a likewise perforated needle plate, and plugs, each of said plugs being of cylindrical shape and having an outer diameter and having a lower face of elastic material, each said plug plug to be pierced by a needle, and are inserted into the needle openings of said holding-down means, with said plugs surrounding the needle shafts, the lower face of said plugs being flush or approximately flush with the underside of said holding-down means.

---

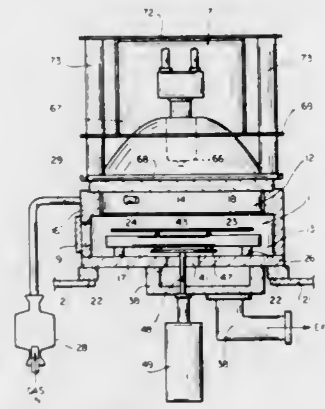
### 5,016,332
## PLASMA REACTOR AND PROCESS WITH WAFER TEMPERATURE CONTROL

**Richard F. Reichelderfer, deceased, late of Pleasanton by Desirée Reichelderfer, legal representative ; Janice I. McOmber, Redwood City; Andrew P. Ryan, Napa, and John T. Davies, El Sobrante, all of Calif., assignors to Branson International Plasma Corporation, Hayward, Calif.**

**Filed Apr. 13, 1990, Ser. No. 509,379**

**Int. Cl.$^5$ H01L** *21/30, 21/324*

**U.S. Cl. 29—25.01** **12 Claims**



1. In a system for treating a workpiece with a gas plasma: a processing chamber, a platen for supporting the workpiece in the chamber with the front side of the workpiece facing away from the platen, means for providing a gaseous plasma in the chamber, means for heating the platen, means including a plurality of lift pins engageable with the back side of the workpiece for lifting the workpiece away from the platen, and means for heating the front side of the workpiece with a controlled amount of radiant heat energy.

---

### 5,016,333
## METHOD FOR MANUFACTURING PIEZOELECTRIC POLYMER TRANSDUCERS

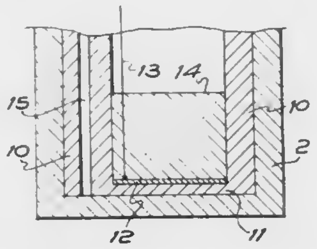
**Peter A. Payne, and Mark Nicholls, both of Manchester, United Kingdom, assignors to Cogent Limited, United Kingdom**

**Division of Ser. No. 206,198, Jun. 13, 1988. This application Dec. 18, 1989, Ser. No. 452,202**

**Claims priority, application United Kingdom, Jun. 18, 1987, 8714259**

**Int. Cl.$^5$ H01L** *41/22*

**U.S. Cl. 29—25.35** **11 Claims**



1. A method of manufacturing a piezoelectric transducer comprising the steps of:

forming a transducer assembly in a mold having inner and outer mold parts, the transducer assembly comprising a transducer film and a body integral with the film, the transducer film and body being made of piezoelectric plastic materials;

removing the inner mold part from the transducer assembly exposing a first opposite side of the transducer film;

forming a first electrode on the first opposite side, the transducer film being supported by the outer mold part during the step of forming the first electrode;

placing backing material within the body;

removing the outer mold part from the transducer assembly to expose a second opposite side of the transducer film;

forming a second electrode on the second opposite side, the backing material supporting the transducer film during the step of forming the second electrode; and

activating the piezoelectric film.

---

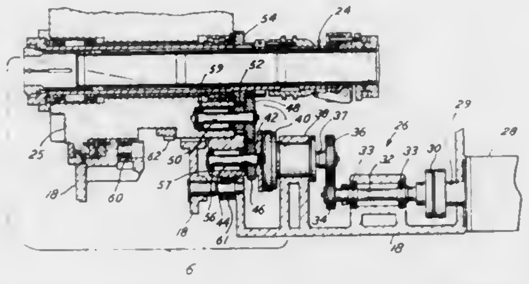
### 5,016,334
## MULTIPLE SPINDLE BAR MACHINE

**Thomas R. Kovalenko, Elkhart, Ind., and Lu B. Xin, Shenyang, China, assignors to Shenyang No. 3 Machine Tool Works, Shenyang, China and Key Machine Tool, Incorporated, Elkhart, Ind.**

**Filed Jul. 31, 1989, Ser. No. 387,004**

**Int. Cl.$^5$ B23B** *9/04*

**U.S. Cl. 29—38 B** **1 Claim**



1. A multiple spindle bar machine comprising a plurality of spindles supported by a rotatable carrier, said carrier being supported by a frame and indexable to position each of said spindles at successive work stations, each spindle constituting means for carrying and securing a piece of bar stock to be machined, a plurality of independent rotative drive means each for rotating a spindle, one of said drive means being operatively associated with each of said spindles, each drive means including a motor supported by said frame for independently rotating its associated spindle, each of said motors being at a fixed location relative to said frame, each drive means including a power transmitting means for transferring rotative motion from its associated motor to the motor's associated spindle, said power transmitting means being shiftable into a disassociated position to disrupt rotative motion to said spindle, said power transmitting means being a clutch having first and second clutch parts wherein said first clutch part is rotatably connected to said motor and said second clutch part is rotatably connected to said carrier, said clutch separating said first and second clutch parts upon being deactivated, said locking means operatively associated with said rotatable carrier for preventing rotative movement of said carrier during turning of said bar stock, said locking means including engagement members, one of said engagement members being connected to said carrier and the other of said engagement members connected to said frame, said engagement members being separated and said first and second clutch parts being further separated upon said carrier being shifted away from said motors to allow indexing of the carrier.

---

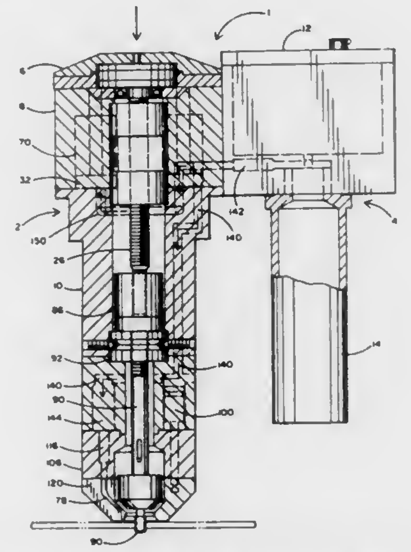
### 5,016,335
## TAPPING ATTACHMENT FOR A PUNCH PRESS

**Mark H. Becker, Vista, and Scott D. Maynard, Newport Beach, both of Calif., assignors to Robotics Automation Consulting Engineering Industries, Inc., La Mirada, Calif.**

**Filed Apr. 24, 1989, Ser. No. 345,792**

**Int. Cl.$^5$ B23G** *3/00*

**U.S. Cl. 29—57** **25 Claims**



1. A tapping attachment having a threaded tap by which to tap a hole formed in a workpiece and a body to be received at and supported by a press of the type having reciprocally movable force generating means, said tapping attachment comprising:

surface means aligned with the press to receive a force generated thereby and movable linearly from a first position to a second position in response to the force generated by the press;

shaft means interfaced with said surface means and movable linearly therewith in response to the force generated by the press;

means located between said shaft means and the tap to convert the linear movement of said shaft means into both linear and rotary movements of the tap to advance the tap into and thread the hole in the workpiece; and

pneumatically operated means cooperating with said surface means and adapted for movement therewith for returning said surface means to the first position from the second position when the force generated by the discontinued so as to withdraw the tap from the hole in the workpiece.

---

### 5,016,336
## DEVICE FOR FIXING BUNDLE OF ELONGATE MEMBERS HAVING NON-CYLINDRICAL OUTER SURFACE TO A SUPPORT

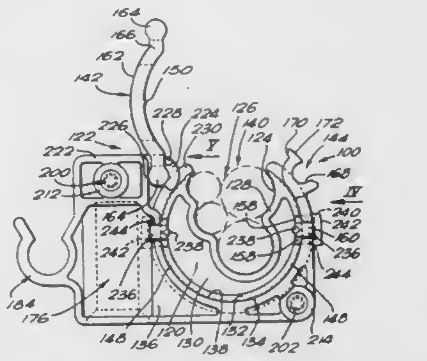
**Barry R. M. Barnett, and Richard E. Wiffin, both of Aylesbury, England, assignors to TRW United-Carr Limited, Buckinghamshire, England**

**Filed May 5, 1989, Ser. No. 347,991**

**Claims priority, application United Kingdom, May 23, 1988, 8812183**

**Int. Cl.$^5$ B25B** *27/14*

**U.S. Cl. 29—281.5** **6 Claims**

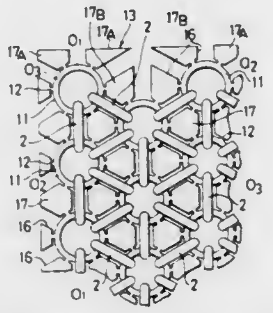


1. A device for fixing elongate members having a non-cylindrical outer surface profile to a support surface, said device comprising a locator means for being non-rotatably located on the elongate members, and a mount means adapted to be mounted on the support surface, connecting means joning said locator means to the mount means for permitting the angular orientation of the locator means with respect to the mount means to be adjusted to adjust the angular orientation of the elongate members relative to the support surface, the connecting means including a circumferentially extending array of rounded ribs provided on said locator means and spaced apart ribs provided on the mounted means, said rounded ribs being snap-engageably cooperative with said spaced apart ribs for retaining the locator means in a selected one of a plurality of predetermined angular positions relative to said mount means, the locator means further comprising a locating member provided with a through-passage for non-rotatably locating the elongate members, the through-passage having an opening transverse its through direction such that the locating member is fittable transversely onto said elongate members, said mount means comprising a body provided with a recess in which said locating member is rotatably received, said recess extending through said body and defining a through axis, said recess further being generally part-cylindrical and having an opening transverse to the through axis and terminating in a laterally open mouth, a closure member fittable across the mouth to close said opening, and the size of the mouth is such as to allow the locating member to be moved transversely into and out of said recess through said mouth.

### 5,016,337

### PRODUCTION METHOD FOR NET STRUCTURES

**Kimie Ejima, 1-10-14-801, Kaga, Itabashi-ku Tokyo, Japan**
**Filed Feb. 26, 1990, Ser. No. 484,547**
**Int. Cl.$^5$ B23P** *17/00*
**U.S. Cl. 29—418** **8 Claims**



1. A method of producing net structures by connecting a plurality of annular net elements with connectors, said method comprising:

forming a net strip having a plurality of annular sections for forming net elements, the annular sections being arranged in a predetermined pattern and joined with each other through a respective joints;

connecting all adjacent annular sections of the net strip to each other with a connector in a position where no joint is provided; and

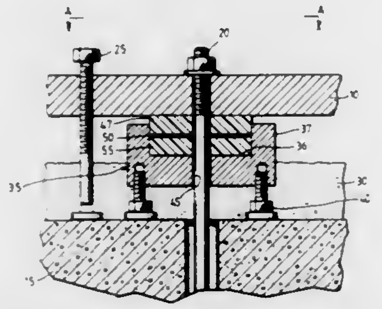
separating each annular section from the net strip for formation of the net elements by cutting off the joints.

---

### 5,016,338

### METHOD FOR ADJUSTING THE VERTICAL POSITION OF A FRAME ON A FOUNDATION

**Robert L. Rowan, Jr., 3816 Dacoma St., Houston, Tex. 77092**
**Continuation-in-part of Ser. No. 248,272, Sep. 21, 1988, abandoned, which is a continuation of Ser. No. 77,614, Jul. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 50,484, May 18, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,393**
**Int. Cl.$^5$ B23P** *17/00;* **B32B** *31/06;* **E04B** *1/00*
**U.S. Cl. 29—423** **1 Claim**



1. A method of adjusting the vertical position of a frame or other weight located on a foundation, comprising the steps of:

(a) applying a fairing compound to the underside of said frame and to the upper surface of said foundation;

(b) leveling a base chock in said fairing compound previously applied to said foundation, said base chock having a tapered upper surface and being located between said frame or other weight and said foundation;

(c) applying a nonstick agent to an engine chock, said engine chock having a tapered lower surface;

(d) pushing said engine chock between said frame and said base chock to a nominal neutral position at which said frame is adjusted vertically, thereby squeezing out excess fairing compound;

(e) allowing said fairing compound to set;

(f) removing said engine chock; and

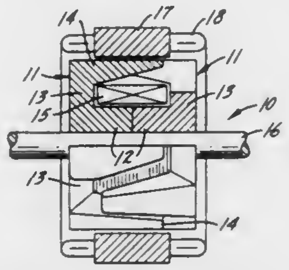
(g) sawing off a portion of said engine chock to allow for travel by said engine chock past said neutral position.

---

### 5,016,340

### METHOD OF MANUFACTURE OF A ROTOR CORE MEMBER FOR A DYNAMOELECTRIC MACHINE

**Masa Kato, Ibaragi, Japan, assignor to Kato Iron Works, Ltd., Hitachi, Japan**
**Filed Aug. 16, 1990, Ser. No. 568,218**
**Int. Cl.$^5$ H02K** *15/02*
**U.S. Cl. 29—598** **15 Claims**



1. An improved method of manufacture of a magnetic rotor core member of predetermined volume for a dynamoelectric machine of the rotating-field type, the rotor core member including a cylindrical hub section mountable on a rotor shaft, an integral disc section extending radially outwardly from one end of the hub section, and a plurality of annularly spaced integral pole pieces projecting from the outer edge of the disc section in a direction parallel to the hub axis, the method comprising the following steps:

A. forging a segment of steel bar stock, having a volume less than twenty percent greater than the required volume of the rotor core member to form a preliminary core blank, the preliminary core blank having a general approximation of the desired configuration for the rotor core member, the preliminary core blank including a central hub section, an integral disc section having a generally planar end surface extending radially outwardly from one end of the hub section, a plurality of pole piece fingers equally spaced around the outer edge of the disc section and projecting outwardly therefrom at an acute angle a to the end surface of the disc section, the angle a being in a range of 45° to 80°, the pole piece fingers having a shorter length than the finished predetermined lengths of the pole pieces of the desired final core member;

B. de-burring the preliminary core blank to form a secondary core blank essentially free of burrs;

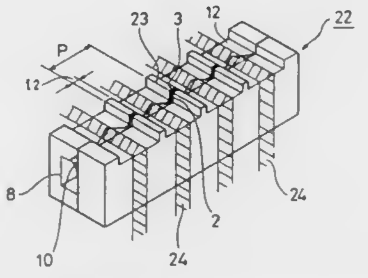
C. cold punching the central part of the secondary core blank to form a shaft aperture therethrough, bending the pole piece fingers to approximately 90° to the end surface of the disc section, and ironing the pole piece fingers to shape those fingers into close conformity with the required configuration for the pole pieces of the rotor core member; and then

D. compressing the secondary core blank to final form and dimensions to complete a finished rotor core member.

### 5,016,341

### A PROCESS FOR PRODUCING MAGNETIC HEADS OF THE FLOATING TYPE

**Takahiro Ogawa, Osaka; Atsushi Inoue, Yao; Kiyotaka Ito, Daito; Yutaka Ueta, Yao, and Kazuhiko Koga, Daito, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan**
**Filed May 4, 1989, Ser. No. 347,372**
**Claims priority, application Japan, May 6, 1988, 63-111324; Oct. 27, 1988, 63-271274**
**Int. Cl.$^5$ G11B** *5/42*
**U.S. Cl. 29—603** **12 Claims**



1. A process for producing magnetic heads of the floating type, comprising the steps of:

preparing sliders of nonmagnetic material;

fabricating core chips, each composed of a pair of core segments joined together, and a gap spacer and a thin ferromagnetic metal film provided at the joint between the pair of core segments; and

securing each of the core chips to the slider,

wherein the core chip fabricating step includes the steps of:

preparing first and second base plates made of a ferrimagnetic oxide and forming on the surface of the first base plate to be bonded to the second base plate a plurality of strips, each composed of a thin ferromagnetic metal film and a gap spacer over the metal film and having a width larger than a desired track width,

bonding together the first base plate and the second base plate with a first glass to prepare a core block, wherein the first glass is melted so that the molten glass fills up every corner around the strips of metal film and gap spacer between the two base plates,

cutting track width defining grooves in the core block to form a plurality of medium facing ridges, each including the metal film and the gap spacer and having a width equal to the desired track width, and

cutting the resulting core block into core chips, each including the metal film and the gap spacer, wherein substantial portions of inner surfaces of the two base plates constructing each of the core chips directly contact opposing surfaces of said first glass, respectively,

wherein each of the core chips obtained from the cutting step is bonded to the slider with a second glass having a lower softening point than the first glass.

---

### 5,016,342

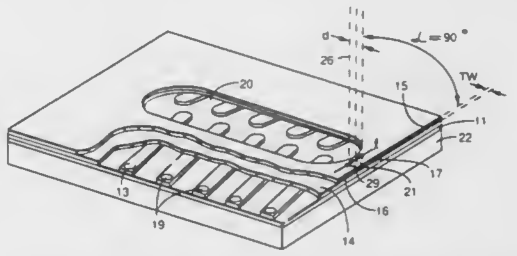
### METHOD OF MANUFACTURING ULTRA SMALL TRACK WIDTH THIN FILM TRANSDUCERS

**Raghavan K. Pisharody, Palo Alto, and Beverley R. Gooch, Sunnyvale, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.**
**Filed Jun. 30, 1989, Ser. No. 373,762**
**Int. Cl.$^5$ G11B** *5/42*
**U.S. Cl. 29—603** **12 Claims**

1. A method of providing a thin film magnetic transducer, comprising the steps of:

depositing a layer of magnetic material on a non-magnetic substrate, said layer having a thickness defining a track width of said transducer;

directing a focused ion beam on said layer of magnetic material to separate said layer by etching to obtain two coplanar confronting magnetic poles defining a transducing gap therebetween, said tranducing gap having predetermined length and depth; and



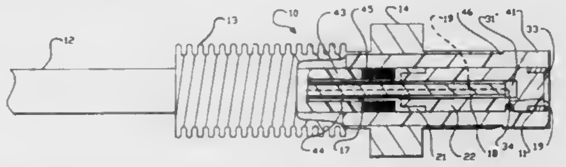
depositing a layer of non-magnetic material over said layer of magnetic material to fill said transducing gap.

---

### 5,016,343

### METHOD OF MAKING A PROXIMITY SENSOR

**Mark E. Schutts, Reno, Nev., assignor to Bently Nevada Corp., Minden, Nev.**
**Division of Ser. No. 318,133, Mar. 2, 1989. This application Oct. 12, 1990, Ser. No. 596,514**
**Int. Cl.$^5$ H01F** *7/06*
**U.S. Cl. 29—605** **6 Claims**



1. A process for making a proximity sensor having a metal case with a sensing coil at one end and a coaxial cable extending out of the other end for connecting to an electrical processing unit, the coaxial cable having an outer insulating jacket and a wire braid outer conductor surrounding an inner cylindrical insulator carrying a center conductor, the process comprising the following steps:

forming a metal cylinder having a predetermined inner diameter with an enlarged stepped end;

molding onto said enlarged end a bobbin of insulating material having an internal cavity of a diameter similar to said inner diameter, and having at a closed end spool means for carrying said sensing coil, the other end mating with said enlarged stepped end of said metal cylinder to interlock said metal cylinder at said enlarged stepped end to resist axial and torsional forces along the axis of said metal cylinder and said cavity;

trimming an end of said coaxial cable so that said jacket is cut away to expose said outer conductor and a portion of said outer conductor is trimmed to expose said center conductor;

inserting said outer conductor into said metal cylinder and electrically and mechanically connecting said outer conductor to said cylinder to resist axial forces;

capping said interlocked bobbin and metal cylinder and coaxial cable with an insulating cylindrical cap and adhering said cap thereto;

and coupling said case to said cap.

OL
126
SS
3
MY
21
991
UMI

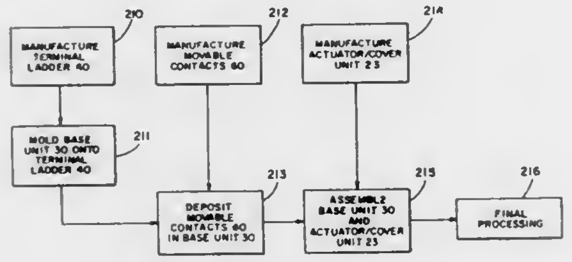
### 5,016,344
## METHOD FOR CONSTRUCTING A MINIATURE DUAL IN-LINE PACKAGE ELECTRICAL SWITCH

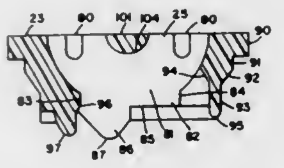
**Peter Brouillette, Manchester, N.H., and Salvatore D. Ciufetti, Fitchburg, Mass., assignors to Augat, Inc., North Andover, Mass.**

**Division of Ser. No. 451,371, Dec. 25, 1989, Pat. No. 4,975,543. This application May 31, 1990, Ser. No. 531,235**

**Int. Cl.⁵ H01H** *11/00*

U.S. Cl. 29—622 **4 Claims**


210
MANUFACTURE TERMINAL LADDER 40
212
MANUFACTURE MOVABLE CONTACTS 60
214
MANUFACTURE ACTUATOR/COVER UNIT 23
211
MOLD BASE UNIT 30 ONTO TERMINAL LADDER 40
213
DEPOSIT MOVABLE CONTACTS 60 IN BASE UNIT 30
215
ASSEMBL2 BASE UNIT 30 AND ACTUATOR/COVER UNIT 23
216
FINAL PROCESSING



1. A method for constructing a multiple pole switch of the dual in-line package type comprising the steps of:

- A. manufacturing a base unit with a predetermined plurality of terminal means aligned along a plurality of parallel pole planes, said manufacturing producing a cavity in the base unit for each terminal means,
- B. manufacturing movable contacts having first and second end portions and first and second intermediate portions,
- C. depositing each of the movable contacts produced by said movable contact manufacturing step into a corresponding cavity,
- D. double injection molding a cover actuator including the steps of a primary molding of a rotatable actuator and secondary molding of a cover capturing said actuator for limited rotation therein, and
- E. assembling said cover onto said base unit thereby to capture said movable contacts in the corresponding cavities with the first intermediate portion of each said contact means being held against a corresponding terminal means.

---

### 5,016,345
## APPARATUS FOR ASSEMBLING WIRE HARNESSES

**Jordi C. Aligué , Reus, and Manuel A. Vazquez, Albiol, both of Spain, assignors to Mecanismos Auxiliares Industriales, S.A., Valls, Spain**

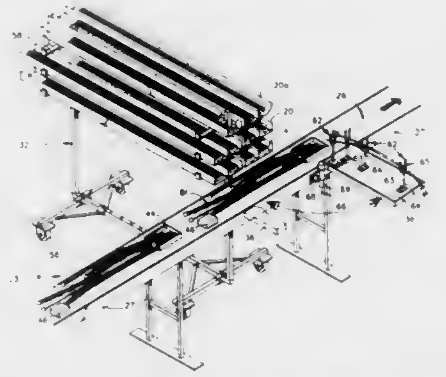
**Filed Aug. 17, 1989, Ser. No. 395,384**

**Int. Cl.⁵ B23P** *19/00*

U.S. Cl. 29—742 **8 Claims**

1. A wire storage and dispensing arrangement for use in a system for the fabrication of wire harnesses having multiple wires, the fabrication system including a mechanical conveyor having multiple work stations therealong, comprising:

means for temporarily storing quantities of wires at various ones of said working stations, said wires being precut to various appropriate lengths, said storing means being so configured and said wires being so disposed therein as to facilitate manual removal of respective said wires for use at a work station, each said storing means comprising a plurality of channel trays supported on a carriage, said wires being of various different function-type, the wires of a respective said function-type being stored in a respective one of said channel trays, said channel trays being generally U-shaped such that they are substantially open along an upper side for introduction of said wires and are open at an end to provide manual access thereto for removing a wire in a direction longitudinally of said channel.



---

### 5,016,346
## APPARATUS FOR APPLYING A BUNG SEAL TO AN ELECTRICAL LEAD

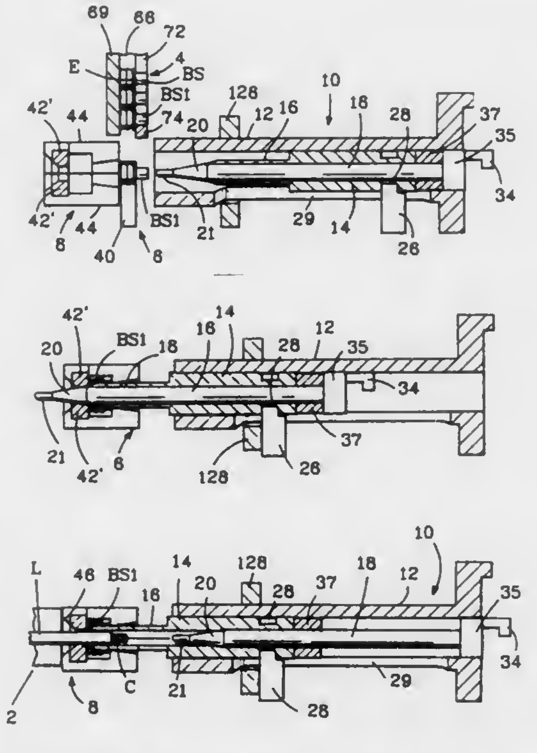
**Michael Gerst, Worms; Wolfgang Schröder, Eltville, and Lothar Bauer, Wiesbaden-Norderstadt, all of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Jul. 20, 1990, Ser. No. 556,061**

**Claims priority, application United Kingdom, Jul. 27, 1989, 8917145**

**Int. Cl.⁵ B23P** *19/00*

U.S. Cl. 29—754 **9 Claims**



1. Apparatus for applying a hollow bung seal to an electrical lead, the apparatus comprising; a bung seal source (4); a bung seal receptacle (6) for receiving a leading bung seal (BS1) from the bung seal source (4); a bung seal transfer device (10) comprising a guide structure (12) which supports for axial movement relative thereto, a bung seal expansion sleeve (14) and a bung seal expansion pin (18) within said sleeve (14); means (2) fo: inserting an electrical lead (L) into the sleeve (14); and drive means (22,30) for sequentially causing; the expansion pin (18) to enter and expand the bung seal (BS1) in the bung seal receptacle (6); the sleeve (14) to enter and further expand the bung seal (BS1); the expansion pin (18) to be withdrawn from the bung seal (BS1) leaving said bung seal secured to the sleeve (14) by its own resilience, and permitting a lead (L) to be inserted into the sleeve (14) by the lead insertion means (2); and the sleeve (14) to be withdrawn from the bung seal (BS1) leading said bung seal secured to the lead (L) by its own resilience; characterized in that the guide structure (12), the seal receptacle 6) and the bung seal source (4) are mounted in mutually fixed relationship, a bung seal transfer clamp (8) being provided for withdrawing the leading seal (BS1) from the bung seal source (4) and placing said leading seal between the bung seal receptacle (6) and the expansion pin (18) for transfer thereby into the bung seal receptacle (6), the lead insertion means (2) being mounted for movement towards and away from the side of the bung seal receptacle (6) remote from the guide structure (12), the seal receptacle having a pair of jaws 44) having an open and a closed position and containing resilient members (42') which, in the closed position of the jaws, co-operate to provide a grommet through which the leading end (20) of the expansion pin (18) and the lead (L) are passed, and which serves as an abutment against which an end of the seal (BS1) is forced by the expansion pin (18) after said expansion pin has transferred the seal (BS1) from the bung seal clamp (8) to the bung seal receptacle (6).

---

### 5,016,347
## METHOD AND APPARATUS OF MAKING TERMINALS OF CABLES

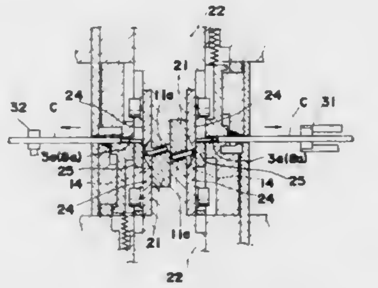
**Takashi Okazaki; Eiji Suzuki, both of Toyonakashi, and Takashi Shinohara, Takarazukashi, all of Japan, assignors to Nippon Acchakutanshi Seizo Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 4, 1990, Ser. No. 503,955**

**Claims priority, application Japan, Apr. 19, 1989, 1-99596**

**Int. Cl.⁵ H01R** *43/00;* **B23P** *23/00*

U.S. Cl. 29—825 **8 Claims**



1. A method for treating terminals of a shield cable in producing electrical harnesses, the method comprising the steps of:

cutting the shield cable into two cable portions each including a sheath portion;

making shallow cuts in each sheath portion of the two cable portions;

pulling the two cable portions in opposite directions while the respective sheath portions are retained so as to separate the sheath portions from the respective cuts so that tip ends of uncovered terminals of the cable portions remain in the sheath portions; and

cutting the uncovered terminals outside the respective sheath portions so as to align the cut ends thereof.

---

### 5,016,348
## PROCESS FOR THE MANUFACTURE OF A TUBULAR CRANKSHAFT

**Walter Knoess, Fuessen-Weissensee, Fed. Rep. of Germany, assignor to Sinterstahl Gesellschaft m.b.H., Fussen, Fed. Rep. of Germany**

**Filed Oct. 6, 1989, Ser. No. 418,123**

**Claims priority, application Fed. Rep. of Germany, Oct. 10, 1988, 3834401**

**Int. Cl.⁵ B23P** *15/00*

U.S. Cl. 29—888.1 **15 Claims**

1. A process for the manufacture of a tubular camshaft having a prefabricated tubular shaft and at least one cam, comprising the steps of:

providing said prefabricated tubular shafts having an interior;

providing a powdery cam material;

providing a compression molding jacket having an interior including a cam area;

placing said shaft and said cam material in said compression molding jacket;

isostatically compressing said shaft, cam material and jacket by means of a compression medium said compression medium having unobstructed access to the interior of the tube during the compression operation; and

sintering said camshaft.

---

### 5,016,349
## METHOD FOR MANUFACTURE OR REPAIR OF A GLOBE VALVE

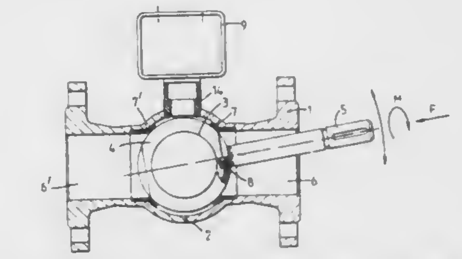
**Pekka J. Kivipelto, Helsinki, Finland, assignor to Neles Cy, Helsinki, Finland**

**Filed Jun. 28, 1989, Ser. No. 372,329**

**Claims priority, application Finland, Jun. 29, 1988, 883103**

**Int. Cl.⁵ B21D** *53/00*

U.S. Cl. 29—890.121 **5 Claims**



1. In a method of manufacturing or repair of a ball valve of the type having a housing including two parts including the step of welding together the two parts to form the housing around a closing member in the form of a ball having a through bore with a rotation shaft attachable to said ball at a fastening portion on said ball, the housing having a pair of flow openings each including a sealing face and the step of, prior to attachment of the shaft to the ball, turning the ball in the housing to bring the fastening portion to a position facing one of the flow openings of the housing and the step of inserting the shaft through said one of the flow openings so that the shaft engages the ball at the fastening portion and the opposite side of the ball faces away from the fastening portion, the improvement comprising the steps of pressing the opposite side of the ball against the sealing face of the other of said flow openings, grinding the sealing face of the other of said flow openings with the opposite side of the ball.

OL
126
SS
3
MY
21
1991
UMI

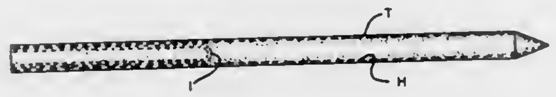
### 5,016,350
### METHOD FOR MANUFACTURING REINFORCED TINES

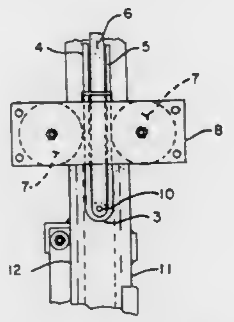
**Thomas I. Burenga, Montgomery, Ill., assignor to Worksaver, Inc., Litchfield, Ill.**

**Continuation of Ser. No. 345,888, May 1, 1989, abandoned, which is a division of Ser. No. 740,392, Jun. 3, 1985, Pat. No. 4,859,136. This application Jun. 20, 1990, Ser. No. 540,298**

**Int. Cl.$^5$ B21H** *7/08;* **B23P** *19/02*

U.S. Cl. 29—891.2 **1 Claim**





1. A method for forming a reinforcing means for an agricultural and other instrument tines of the type used for loading of a material, comprising: arranging a pair of guide rollers symetrically upon a support, said rollers having axes which are perpendicular and symmetrical with respect to a center axis of said support, arranging a metallic bar upon said support, arranging an equipment tine under said pair of guide rollers, said tine is in alignment with said center axis of said support, arranging a ram above said metallic bar, said ram having a working axis which is in alignment with said center axis of said support, pressing said ram against said metallic bar thereby bending said bar at a location that is in alignment with said center axis of said support, continuously shifting said ram downwardly in said working axis thereby forcing said bar into a bent configuration which is slidably secured between said pair of rollers until forming a pair of substantially parallel legs, thereby forming a reinforcing means, and further shifting the ram against said reinforcing means while guiding it thereby inserting said reinforcing means into the aligned equipment tine thereby attaining a permanent reinforcement tine through locating of the bent metallic bar said reinforcing means therein.

---

### 5,016,351
### DISPOSABLE SAFETY RAZOR SYSTEM

**Denis P. Drahus, 6956 Cinnamon Loop, Columbus, Ga. 31909**

**Filed Mar. 15, 1990, Ser. No. 493,736**

**Int. Cl.$^5$ B26B** *19/40, 21/00, 21/40*

U.S. Cl. 30—41 **3 Claims**

1. A disposable safety razor system having a shaving head, a control head assembly and a pressurized foam canister,

the foam canister having an elongated shape with a distal end and a proximal end,

the proximal end of the canister having a tapered neck and a shoulder for mounting the control head assembly in operative position about the neck and shoulder,

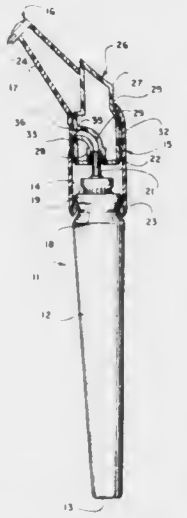
the proximal end of the canister further having a dispensing nozzle for reciprocation into the canister at predetermined times to dispense the contents of the canister,

the control head assembly comprising a tubular outer sleeve having a lower end mounted upon the head and shoulder of the proximal end of the canister, and further having an upper end mounting the shaving head,

the control head assembly further having a first aperture at the proximal end and a second aperture located in the sidewall of said assembly,

activating means reciprocately positioned within the control head assembly, a portion of said activating means projecting through the aperture in the proximal end of the control head assembly.

the activating means having one end of a dispensing tube mounted in juxtaposition with the dispensing nozzle of the canister, the other end of the tube terminating adjacent the control head assembly sidewall aperture whereby when the activating means is moved against the dispensing nozzle an amount of foam is dispensed through the tube and out of the control head assembly sidewall aperture,



locking means positioned in the control head assembly sidewall aperture to selectively prevent movement of said activating means.

---

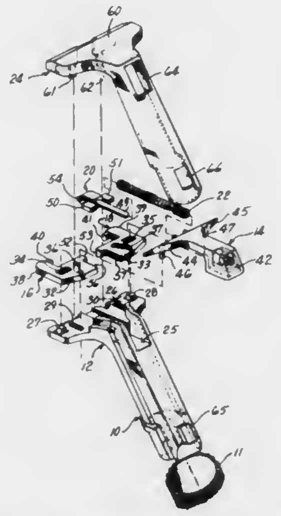
### 5,016,352
### SINGLE BUTTON RAZOR

**Stephan C. Metcalf, Waltham, Mass., assignor to The Gillette Company, Boston, Mass.**

**Filed Mar. 22, 1990, Ser. No. 498,259**

**Int. Cl.$^5$ B26B** *21/26, 21/00, 21/14*

U.S. Cl. 30—85 **10 Claims**



1. A razor head for engagement with a blade supporting cartridge comprising:

a pair of finger plates extending forward of said razor head, each said plate having a finger facing inwardly for engagement with a blade supporting cartridge;

a unitary button member movable forwardly toward said pair of finger plates; and

means interconnecting said unitary button with said pair of movable arms to cause movement of said fingers in an outwardly and inwardly direction long a substantially straight line which extends substantially at right angles to the movement of the said unitary button.

---

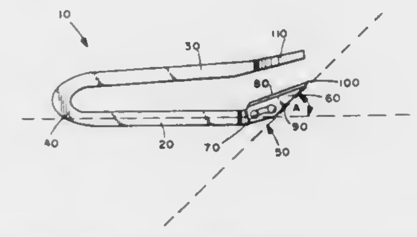
### 5,016,353
### SUTURE CUTTER

**Clemens A. Iten, Staunton, Va., assignor to American Safety Razor Company, Verona, Va.**

**Filed Feb. 19, 1986, Ser. No. 830,873**

**Int. Cl.$^5$ B25F** *3/00*

U.S. Cl. 30—124 **12 Claims**



1. A suture cutter for cutting a suture in a skin surface, comprising:

a handle assembly including a first arm and a second arm substantially longitudinally coextensive with and coupled at one end to said first arm, said second arm having a free end spaced away from an opposed free end of said first arm;

cutting means attached to said free end of said first arm for insertion between said suture and said skin surface, said cutting means comprising a blade having a straight suture-side cutting edge and a skin-surface-side noncutting edge meeting at a leading point, with said noncutting edge oriented at a nonzero angle with respect to the length of said first are so that said first arm assumes said nonzero angle with respect to said skin surface when said noncutting edge is parallel to said skin surface; and

an anvil disposed on said free end of said second are and movable into cooperative engagement with said cutting edge of said blade as said first and second arms are adducted, said suture-side cutting edge engaging said anvil front-to-back when said first and second arms are adducted, with said leading point engaging said anvil first.

---

### 5,016,354
### CIRCULAR CUTTING DEVICE

**James R. Baine, 9374 Kempster Ave., Fontana, Calif. 92335**

**Filed Aug. 21, 1989, Ser. No. 395,979**

**Int. Cl.$^5$ B27B** *9/04*

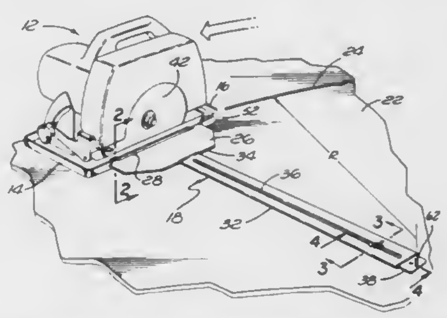
U.S. Cl. 30—371 **2 Claims**

1. A circular cutting device for cutting planar material along a predetermined radius utilizing a saw having a blade member, said saw being mounted on a saw base having a raised edge with a slot and depression formed in said raised edge comprising:

an end plate having a front end positioned adjacent said saw base raised edge and having attachment means for securing said end plate to said saw base comprising an upwardly extending tang and a downwardly extending tang formed on said end plate front edge and positionable in said slot and depression of said saw base raised edge, respectively;

an adjustment bar having a longitudinal slot formed therein being attached to said end plate at a side opposite to said end plate front edge;

an extension bar having an axis generally parallel to the axis of said adjustment bar and being slidably movable with respect to said adjustment bar;



means for securing said extension bar to said adjustment bart along said axes; and

means for securing said extension bar to said material to be cut.

---

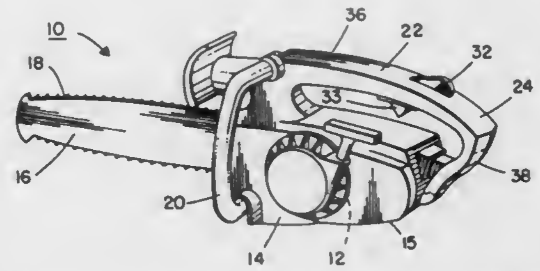
### 5,016,355
### VIBRATION REDUCING CHAIN SAW HANDLE

**James R. Gassen, and Lakhbir S. Suchdev, both of Charlotte, N.C., assignors to Textron Inc., Providence, R.I.**

**Filed Jun. 25, 1990, Ser. No. 544,200**

**Int. Cl.$^5$ B23D** *57/02*

U.S. Cl. 30—383 **16 Claims**



1. A chain saw having a motor, a saw chain, a chain guide and a housing, said housing comprising:

a first body section substantially surrounding said motor; and

a second rear handle section having a bottom portion, a cantilevered top portion, and means for limiting deflection of said top portion, said top portion being comprised of a substantially rigid, but slightly flexible material and having a first end fixedly connected to said first body section and a relatively free cantilevered second end, said bottom portion being fixedly connected to said first body section, and said means for limiting deflection of said top portion comprising said top portion second end and said bottom portion being suitably positioned relative to each other and being suitably sized and shaped to allow only limited movement of said top portion second end relative to said bottom portion to thereby limit deflection of said top portion second end relative to a home position.

---

### 5,016,356
### SAW AND SAW BLADE FOR USE THEREIN

**Anthony B. Trench, 390 Midwest Road, Scarborough, Ontario, Canada M1P 3B5**

**Filed Nov. 21, 1989, Ser. No. 439,872**

**Claims priority, application Canada, Sep. 28, 1989, 613957**

**Int. Cl.$^5$ B23D** *49/04;* **B27B** *33/02*

U.S. Cl. 30—393 **11 Claims**

1. A saw blade comprising:

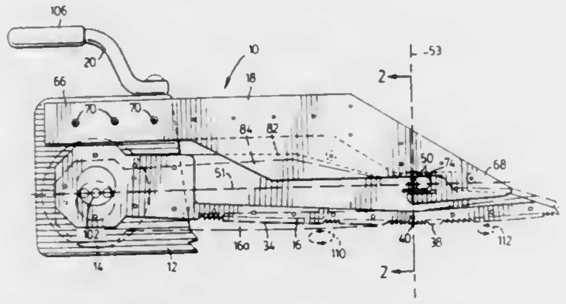
(a) an elongated body having a proximal end and a distal

VOL
1126
ISS
3
MY
21
1991
UMI

end, a cutting edge extending along the first edge of the body, said cutting edge having first and second portions of its length which are angularly inclined with respect to one another from an apex located at the junction of the first and second portions,

(b) first saw teeth formed on said first portion of said cutting edge, said first saw teeth being angularly inclined with respect to the first portion of the cutting edge in a direction toward said proximal end,

(c) second saw teeth formed on said second portion of said cutting edge, said second saw teeth being angularly inclined with respect to the second portion of the cutting edge in a direction toward said distal end such that, in use, when the apex of the blade rests in a kerf and the proximal end of the blade is displaced in an orbital path the first and second portions of the cutting edge will be driven in opposite orbital directions in first and second orbital cutting paths to cut and displace material in opposite directions from opposite sides of the apex.



4. A saw comprising;

(a) a blade support structure and at least two saw blades each having a proximal end and a distal end,

(b) said saw blades each having a cutting edge and being arranged with their cutting edges located in a side-by-side relationship to form a common kerf in use,

(c) coupling means slideably and pivotally connecting the saw blades to the support structure intermediate the ends of the saw blade to permit relative movement of the saw blades with respect to the support structure and one another,

(d) drive means at the proximal end of the support structure, said drive means engaging the proximal ends of the blades and being operable to drive the proximal ends in orbital paths, the proximal ends of the saw blade being spaced from one another along the orbital path so as to be out of phase with one another to enhance the efficiency of the cutting action.

---

### 5,016,357
### ARTWORK ANALYSIS DEVICE

**Paulina K. Leonard, 6642 Main St., Kansas City, Mo. 64113**
**Continuation-in-part of Ser. No. 95,131, Sep. 11, 1987, abandoned. This application May 30, 1990, Ser. No. 530,897**
**Int. Cl.$^5$ G01C** *3/00*

U.S. Cl. 33—277 **1 Claim**

1. An artwork analysis device for visually aiding an observer in perceptually determining the existence of and analyzing geometric interrelationships among the artistic elements making up a work of art, said device comprising;

(a) a sheet having an indicia receiving portion constructed of transparent material;

(b) a handle extending from said sheet adapted to be held by a user so as to allow a user to view through said indicia receiving portion while said device is being held by the user; and

(c) a plurality of contrasting indicia impressed on said indicia receiving portion of the sheet; said indicia being opaque as compared to a remainder of said indicia receiving portion so as to be adapted to allow a user to view a work of art through said indicia receiving portion while comparing a pattern formed by said indicia with the artistic elements of the work of art; said indicia including:

(1) a square fully within said indicia receiving portion of said sheet and having a center point, four sides and two pairs of diagonally opposed corners; each of said sides having a midpoint;

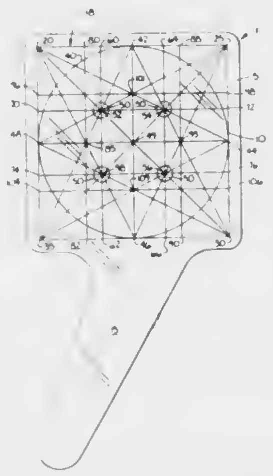
(2) two diagonal lines extending between said opposed corners respectively;

(3) four isosceles triangles each presenting a base and an opposed apex; each base of said triangles being coextensive with a respective one of said sides; and each apex of said triangle coinciding with a respective one of said midpoints opposite the square side associated with the base of the triangle;

(4) first, second, third and fourth indicator circles respectively surrounding and drawing attention to a first, second, third and fourth point of intersection of one of said diagonals and two of said isosceles triangles, said circles being equally spaced from nearest sides of said square and from one another so as to be positioned at four separate corners of a square configuration;

(5) a fifth circle circumscribed by said square and touching each of the sides of said square;

(6) a first vertical line and a first horizontal line each passing through said first point;



(7) a second vertical line passing through said second point; said first horizontal line passing through said second point;

(8) a second horizontal line passing through said third point; said second vertical line passing through said third point;

(9) a third vertical line passing through said center point;

(10) a third horizontal line passing through said center point;

(11) fourth and fifth vertical lines respectively passing through fifth and sixth points; said fifth and sixth points each located at an intersection of said third horizontal line and two of said isosceles triangles; and

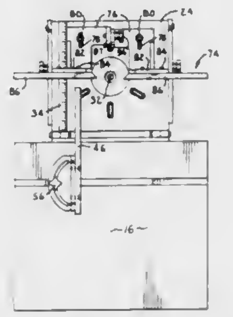
(12) fourth and fifth horizontal lines respectively passing through seventh and eighth points; said seventh and eighth points each located at an intersection of said third vertical line and two of said isosceles triangles; and

(13) said first and second vertical lines visually dividing said square into vertically aligned thirds; and first and second horizontal lines visually dividing said square into horizontally aligned thirds; said third, fourth and fifth vertical lines visually dividing said square into vertically aligned fourths; and said third, fourth and fifth horizontal lines visually dividing said square into horizontally aligned fourths.

### 5,016,358
### GUIDE FENCE AND MITRE GUIDE ASSEMBLY FOR ROUTER MOUNTING TABLE

**Verle L. Rice, Harrisonville, Mo. 64701, and Richard A. Keener, Garden City, Mo. 64747**
**Division of Ser. No. 190,894, May 6, 1988, Pat. No. 4,884,604. This application Aug. 14, 1989, Ser. No. 393,141**
**Int. Cl.$^5$ B27B** *25/10*

U.S. Cl. 33—569 **3 Claims**



1. A mitre gauge for use with a power woodworking tool mounted on a table having a stationary horizontal surface and a second surface adjacent said stationary surface, said second surface being movable between a first position in planar alignment with said stationary surface and a second position perpendicular to said stationary surface, said stationary surface having a groove extending the length thereof, said mitre gauge comprising:

an elongated member adapted to be slidably received within said groove;

a support plate pivotably mounted on said member for rotation about a vertical axis, said support plate including at least two support holes extending therein, said support holes having relative positions with respect to each other;

a guide surface member having first and second ends and at least two guide holes extending therein, said guide holes being closer to said first end than to said second end and having relative positions with respect to each other which allow respective ones of said support holes and said guide holes to be substantially aligned in first and second guide positions of said guide surface member, said first guide position being defined by said guide surface member extending perpendicular to and across only said stationary surface, such that said second surface of said table may be in said second position, and said second guide position being defined by said guide surface member extending perpendicular to and across both said stationary surface and said second surface of said table, when said second surface of said table is in said first position, and;

means for releasably fixing said guide surface member to said support plate with said respective ones of said support holes maintained in substantial alignment, whereby said guide surface member may be selectively fixed to said support plate in either of said guide positions.

---

### 5,016,359
### LINEAR SCALE ARRANGEMENT

**Kazuo Nagaoka; Tadao Hatano; Sadao Wakabayashi, and Takamitsu Shimizu, all of Tokyo, Japan, assignors to Sony Magnescale Inc., Tokyo, Japan**
**Filed May 30, 1989, Ser. No. 357,943**
**Claims priority, application Japan, May 31, 1988, 63-72638[U]; May 31, 1988, 63-133032; Jun. 9, 1988, 63-142278; Jun. 9, 1988, 63-142279; Jul. 8, 1988, 63-90842[U]**
**Int. Cl.$^5$ G01B** *7/14, 11/04*

U.S. Cl. 33—702 **8 Claims**

1. A scale arrangement for monitoring relative displacement between first and second members, comprising:

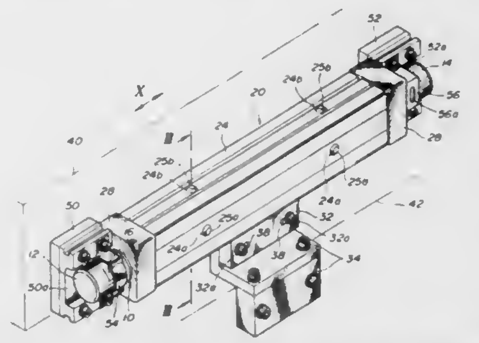
an elongated scale having end portions at both ends thereof;

a pair of receptacles respectively receiving said end portions, said pair of receptacles adapted to be mounted on an associated one of said first and second members;

a hollow member, having a reference plane defined thereon, receiving said scale therein;

a head slidingly mounted on said scale for axial movement therealong for reading the scale and to generate a read scale indicative signal;

a head slider associated with said head for axial movement with said head, said slider adapted to be mounted on an associated other one of said first and second members;



said elongated scale being positioned in said hollow member parallel to said reference plane;

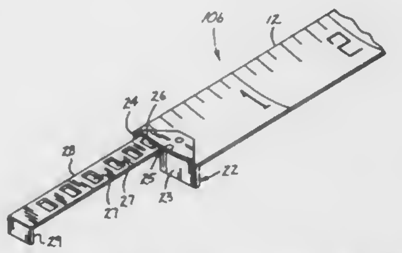
wherein said reference plane is used to determine the relative positions of said end portions of said scale on said one associated one of said first and second members and the position of said head slider on the other associated one of said first and second members to ensure that said head and scale are in parallel alignment.

---

### 5,016,360
### TAPE MEASURING APPARATUS

**Lee E. Starcevich, 6436 W. 167th St., Tinley Park, Ill. 60477**
**Filed Mar. 15, 1990, Ser. No. 493,634**
**Int. Cl.$^5$ G01B** *3/10*

U.S. Cl. 33—758 **4 Claims**



1. A tape measuring apparatus comprising, in combination,

a housing including spaced parallel side walls, and a forward wall including an opening, and

a flexible tape line of a predetermined width retractably mounted within the housing and extending through the opening, and

the tape line including a forward terminal end, the forward terminal end including a tape line hook mounted integrally to the forward terminal end, with the tape line hook including a vertical leg mounted orthogonally to the forward terminal end of the tape line, and

an extension web, the extension web including a rear terminal end, and

the extension web including an extension web hook cooperatively mounted relative to a forward terminal end of the extension web, and

wherein the extension web hook is integrally mounted to the forward terminal end of the extension web, and the extension web hook includes an extension web hook leg verti-

VOL 126
ISS 3
MY 21 1991
UMI

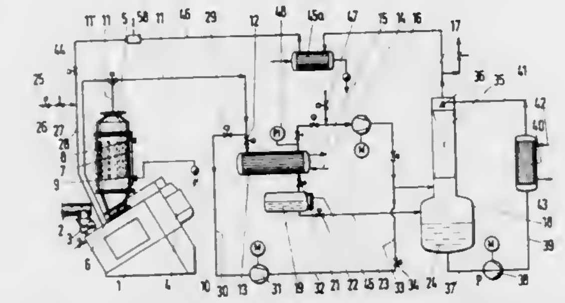
cally mounted orthogonally to the forward terminal end of the extension web, and

wherein the extension web is formed of a rigid material the rigid extension web and the extension web hook leg are each further defined by a width substantially equal to one-half the predetermined width, and the width of the vertical leg of the tape line hook is substantially equal to one-half the predetermined width, and the extension web is adjustably and slidably mounted relative to the tape line vertical leg and the forward terminal end of the tape line.

---

## 5,016,361
## METHOD OF EXTRACTING LIQUID FROM WET MATERIAL

**Herbert Dürr, Buchen, Fed. Rep. of Germany, assignor to Maschinenfabrik Gustav Eirich, Hardheim, Fed. Rep. of Germany**
**Filed Jan. 31, 1989, Ser. No. 304,780**
**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1988, 3803109**
**Int. Cl.$^5$ F26B** *3/08*
**U.S. Cl. 34—10** **18 Claims**



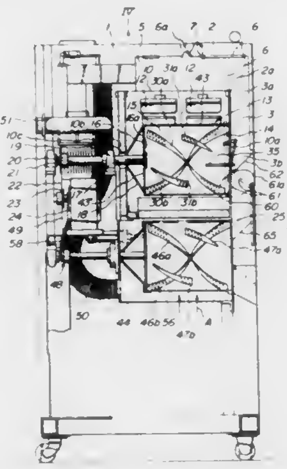
1. A method of extracting liquid from a fluidised bed of wet material having a heat potential, comprising the steps of circulating a fluidised bed of said material created mechanically by mixing means, said fluidised bed circulating with a vertical and tangential component, the material being substantially thoroughly mixed; in a first stage utilizing the heat potential of the wet material to at least partially evaporate the liquid contained at below atmospheric pressure, and in a second stage immediately following the first stage, passing heated gas through the fluidised bed, the extraction process being completed by at least partial saturation of the gas with vapour from the liquid which is to be extracted.

---

## 5,016,362
## COFFEE BEAN ROASTING DEVICE

**Akihiko Nakamura, Nagoya, and Takashi Ito, Okazaki, both of Japan, assignors to NGK Insulators, Ltd. and Pokka Corporation, both of Aichi, Japan**
**Continuation of Ser. No. 404,407, Sep. 8, 1989, abandoned. This application Jun. 12, 1990, Ser. No. 537,148**
**Claims priority, application Japan, Sep. 13, 1988, 63-119985[U]; Sep. 13, 1988, 63-119986[U]; Sep. 13, 1988, 63-119987[U]; Mar. 29, 1989, 1-36990[U]**
**Int. Cl.$^5$ F26B** *19/00*
**U.S. Cl. 34—51** **8 Claims**

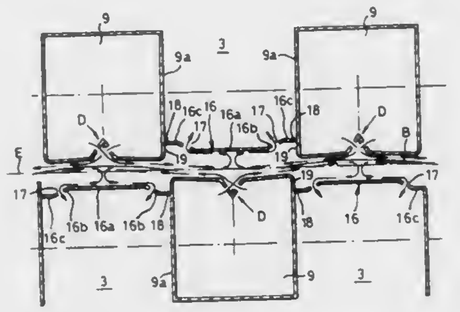
1. A coffee bean roasting device comprising a heating oven formed by a heat insulating material, a roasting drum in the form of a bottomed cylinder formed with a number of small apertures and rotatably provided in the heating oven, infrared heating means attached on inner walls of the heating oven to surround the roasting drum for heating it, a cooling drum in the form of a bottomed cylinder formed with a number of small apertures and connected with a rotating shaft of the roasting drum through interlocking means, agitating blades spirally provided on inner walls of the roasting drum and the cooling drum and having smooth inner circumferential edges, a suction blower for sucking air in either of the roasting drum and the cooling drum, an exhaust passage for exhausting burnt gases produced in the roasting drum out of it, a pressure sensor provided in a passage from an opening of the roasting drum to the exhaust passage, pressure regulating means for regulating pressures in the roasting drum with the aid of differences between pressures detected by the pressure sensor and atmospheric pressure, a temperature sensor provided on an inner wall of the heating oven in opposition to the opening of the roasting drum, and a water spray nozzle for spraying water into the roasting drum through its opening.



---

## 5,016,363
## DEVICE FOR FLOAT-CONVEYING OF WEBS OF MATERIAL

**Kurt Krieger, Asternweg 47, Monchengladbach 2, Fed. Rep. of Germany D-4050**
**PCT No. PCT/DE88/00275, § 371 Date Feb. 16, 1989, § 102(e) Date Feb. 16, 1989, PCT Pub. No. WO88/08950, PCT Pub. Date Nov. 17, 1988**
**PCT Filed May 6, 1988, Ser. No. 315,893**
**Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715533**
**Int. Cl.$^5$ F26B** *13/00*
**U.S. Cl. 34—156** **25 Claims**

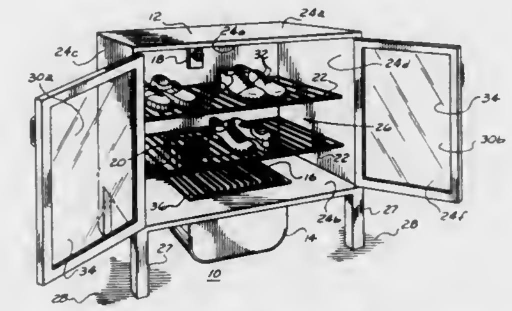


1. A device for acting upon and float-conveying webs of material travelling in a web path using a fluid medium for drying the web, comprising:
a plurality of spaced-apart ducts for conducing the fluid medium on at least one side of the path of the web and in the form of nozzle chambers, each chamber comprising a side thereon facing the web path, and at least one nozzle region extending over the width of the web path transverse to the direction of travel of the web for directing the fluid medium toward the web path;
air outlets between said nozzle chambers;
a guide element disposed between each adjacent pair of nozzle chambers and between an adjacent air outlet and the web path and extending in the direction transverse to the direction of travel of the web substantially the same length as said nozzle chambers;
joint means between each guide element and the adjacent pair of nozzle chambers set back relative to said side of said nozzle chambers facing the web path;
a closed central region on each guide element having a width extending in the direction of travel of the web; and
outlet orifices at the ends of the width of said central region, said outlet orifices being spaced in the direction of travel of the web and opening into the adjacent air outlet.

---

## 5,016,364
## SHOE DRYER

**Russell D. Cochrane, Rte. 1, Box 247-C, Highlands, N.C. 28741**
**Filed Apr. 23, 1990, Ser. No. 512,324**
**Int. Cl.$^5$ F26B** *19/00*
**U.S. Cl. 34—202** **18 Claims**



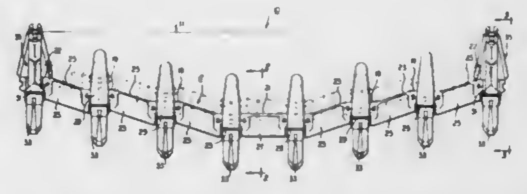
1. An apparatus for drying articles and for protecting said articles from damage, said apparatus comprising:
enclosure walls completely surrounding a drying space,
said drying space being configured to hold said articles, and
said enclosure walls being configured to include an exhaust port therein;
an air exchanger coupled to said enclosure walls proximate a bottom portion of said drying space, said air exchanger including:
a circulation chamber having an inlet located proximate said exhaust port and having an outlet, both of said chamber inlet and outlet being in pneumatic communication with said drying space, and
first air propelling means coupled to said circulation chamber to move air through said circulation chamber;
a grate having an inlet baffle portion positioned above said circulation chamber inlet and an outlet baffle portion positioned above said circulation chamber outlet;
a heater, coupled to one of said air exchanger and said enclosure walls; and
second air propelling means coupled to said enclosure walls within said exhaust port, said second air propelling means being for selectively urging air out from said drying space.

---

## 5,016,365
## WEAR PARTS FOR EXCAVATION APPARATUS

**Howard W. Robinson, Grapevine, Tex., assignor to GH Hensley Industries, Inc., Dallas, Tex.**
**Continuation of Ser. No. 362,702, Jun. 6, 1989, abandoned. This application Jun. 6, 1990, Ser. No. 533,900**
**Int. Cl.$^5$ E02F** *9/28*
**U.S. Cl. 37—141 T** **8 Claims**

1. A wear assembly for a bucket of an excavation apparatus comprising:
a wear plate which, in use, provides a forward lower lip of the bottom wall of the bucket;
a plurality of adapters mounted at spaced apart locations on the forward edge of the wear plate;
a plurality of hollow, replaceable excavating teeth mounted on the adapters;
a plurality of wear shroud means each mounted on the forward edge of the wear plate, said wear shroud means each occupying the space between adjacent adapters being secured to the adjacent adapters by locking pins engaged in registering apertures in the shroud means and adapters. and covering the bottom of the adjacent adapters to provide a wear bearing lower surface of the bucket;

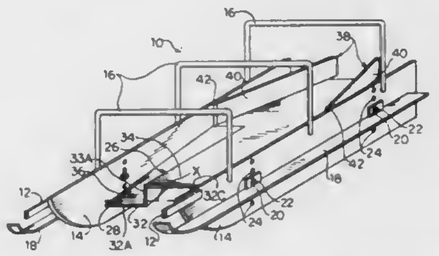


said shroud means being further secured on the wear plate by laterally extending locking portions of the excavating teeth which prevent motion of the shroud means away from the wear plate.

---

## 5,016,366
## SNOW RIDGER

**David E. Watson, P.O. Box 608, Oxbow, Saskatchewan, Canada S0C 2B0**
**Filed Nov. 3, 1989, Ser. No. 431,230**
**Claims priority, application Canada, Nov. 16, 1988, 583301**
**Int. Cl.$^5$ E01C** *19/22*
**U.S. Cl. 37—220** **13 Claims**



1. An apparatus for ridging a snow covering on a landscape comprising:
support means supporting the apparatus for travel across the snow covering;
row severing means for simultaneously severing two, spaced apart, parallel rows of snow from the snow covering as the apparatus travels thereacross;
row elevating means for elevating the rows to a height above the surrounding snow covering to leave two spaced, parallel trenches in the snow covering; and
row deflecting means for deflecting each of the elevated row of snow towards one another for deposition on the snow covering between the trenches.

---

## 5,016,367
## IRONING BOARD HAVING SWINGABLE EXTENSIONS AND A DETACHABLE SUSPENDED TABLE, FOR IRONING TROUSERS, SHIRTS, AND LARGE ITEMS

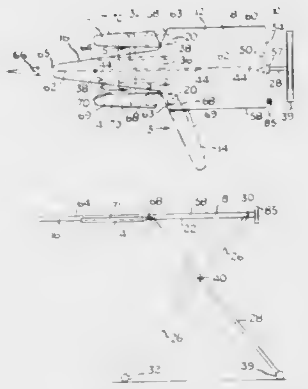
**Christine O. Breen, 8 Belleview Blvd., Apt. 508, Belleair, Fla. 34616, and Joseph M. Breen, 60 Cove St., East Norwalk, Conn. 06855**
**Filed Jun. 11, 1990, Ser. No. 536,315**
**Int. Cl.$^5$ D06F** *81/12. 81/02. 81/04*
**U.S. Cl. 38—135** **14 Claims**

1. An ironing board comprising a main board and two board extensions;
said main board comprising a first relatively wide section and a second relatively narrow section, said wide and narrow sections having a common longitudinal centerline;
said relatively wide section of the main board having two parallel side edges spaced equidistantly from said longitudinal centerline, a first end edge connecting said side

OL
1126
ISS
3
MY
21
1991
UMI

edges, and two shoulder edges extending from said side edges partway toward the longitudinal centerline;

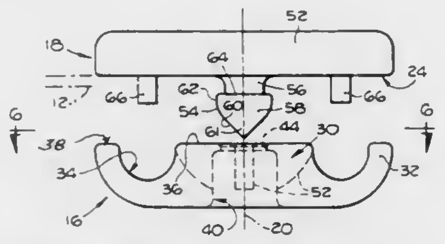
said relatively narrow section of the main board comprising two slightly convergent side edges extending from said shoulder edges away from the wide section of the board, and a second end edge connecting said slightly convergent side edges;



each board extension having two relatively long side edges spaced relatively close together so that the board extension is elongated in the direction of the side edges, pivot means mounting each said extension for swinging motion around a vertical axis on the main board in near proximity to one of the shoulder edges; each board extension having a retracted position extending parallel to the main board centerline, and an extended position projecting laterally away form the main board centerline.

---

### 5,016,368
### CLOTHING IDENTIFIER
Orrin J. Cassata, Schaumburg, Ill., assignor to Mr. Tool Manufacturing, Inc., Roselle, Ill.
Filed Jan. 16, 1990, Ser. No. 465,754
Int. Cl.$^5$ G09F *3/10*
U.S. Cl. 40—299 6 Claims



1. A clothing identifier, comprising:

a pair of parts separate and normally unconnected from each other, adapted to be secured together with an element of clothing gripped therebetween,

the parts consisting of a one-piece base and a one-piece cover, and together constituting the entire identifier,

the parts, when so secured together, being in superposed relation and having surfaces that interface,

the base having a central hole opening through its said interfacing surface, the hole having a lower main portion of predetermined size, and including a lip directed radially inwardly at a position adjacent its said interfacing surface and distributed circumferentially around the hole and forming and surrounding an upper smaller portion of the hole, and the lip forming a downwardly directly locking surface,

the cover including a locking pin projectable into the hole in putting the parts together in superposed position, and positioned in the hole when they are in superposed position,

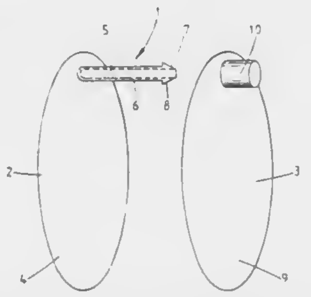
the locking pin including a head that has a leading camming surface operable for flexing the lip in putting the parts together to enable the locking pin to enter the hole and the head having a posterior shoulder engageable with said locking surface for retaining the parts secured together,

the base including a central raised boss, the central hole extending upwardly through the boss, the boss having cross slots in its top surface, forming separated sections of the lip and boss, and

the material of the base being rigid, and the cross slots rendering said sections flexible in radial direction, and the locking pin being thereby capable of flexing said sections radially outwardly in response to its being projected into the hole.

---

### 5,016,369
### TAG ASSEMBLIES
John S. Parry, Stroud, England, assignor to Sterimatic Holdings Limited, Tortola, British Virgin Isls.
Continuation of Ser. No. 892,426, Aug. 4, 1986, abandoned. This application Oct. 19, 1990, Ser. No. 600,998
Claims priority, application United Kingdom, Aug. 3, 1985, 8519557
Int. Cl.$^5$ G09F *3/00*
U.S. Cl. 40—301 1 Claim



1. An animal tag assembly comprising a male tag member having a projecting portion terminating in an enlarged head for extending through the part of the animal to be tagged, a female tag member having a laminar portion and a sealed container projecting from the laminar portion when the male and female tag members are fitted together to form said tag assembly, and a substance having specific chemical properties sealed in said container, said container having a wall confronting said enlarged head immediately prior to the fitting together of said members, said wall maintaining said container sealed until penetrated, and said wall, after being penetrated by said projecting portion, engaging behind said enlarged head to maintain said male member assembled with said female member and to displace said substance from the container back through the aperture formed in said wall by penetration of said projecting portion so as to sterilize the wound formed in the part of the animal tagged.

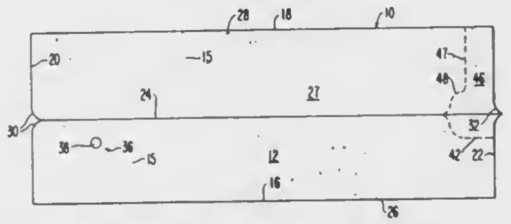
---

### 5,016,370
### ONE PIECE ADHESIVE FOLDER TAB EXTENSION
Walter G. Rhian, Hattiesburg, Miss., and Kent E. Niequist, West Chicago, Ill., assignors to Murray Envelope Corporation, Hattiesburg, Miss.
Filed May 7, 1990, Ser. No. 519,470
Int. Cl.$^5$ B42F *21/06*
U.S. Cl. 40—359 14 Claims

1. A one piece adhesive tab for forming a cantilevered extension along an edge of a planar sheet to permit labeling of the planar sheet at a location beyond the borders of said planar sheet, said adhesive tab comprising:

an elongated planar member having planar, opposed first and second surfaces which extend between first and second longitudinal edges and first and second lateral edges of said member; a fold line which runs along a longitudinal axis of the planar member parallel to said first and second longitudinal edges for substantially the entire length of said elongated planar member, said fold line dividing said elongated planar member into a first longitudinal side, and a second longitudinal side; and wherein said elongated planar member is foldable along said fold line to form said adhesive tab;

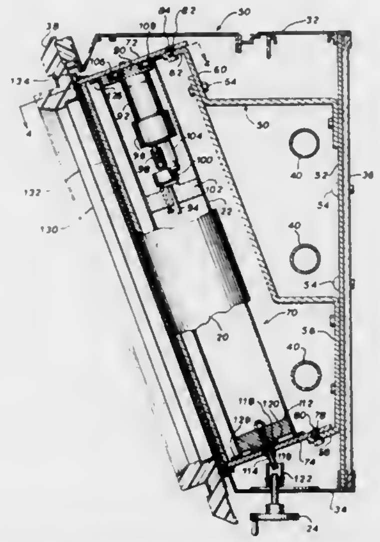
visual alignment means disposed on said elongated planar member for facilitating straight and uniform positioning of said adhesive tab on the edge of the planar sheet, said visual alignment means for alignment with the edge of the planar sheet and including an opening formed through said first longitudinal side of said elongated planar member between said first and second surfaces and through which, in use, a portion of the edge of the planar sheet is viewable, and at least one longitudinal line disposed on said second surface extending from said opening parallel to said fold line for aligning with the portion of the edge of the planar sheet; and



adhesive means for securing at least a portion of said first surface of said first longitudinal side of the elongated planar member to a first side of the planar sheet and for securing at least a portion of said first surface on said second longitudinal side of said elongated planar member to a second side of the planar sheet.

---

### 5,016,371
### SCROLLING SIGN APPARATUS
Robert B. Aiken, 1970 Bobolink Ave., Grafton, Wis. 53024
Filed May 4, 1988, Ser. No. 190,034
Int. Cl.$^5$ G09F *11/18*
U.S. Cl. 40—518 18 Claims



1. A scrolling sign apparatus suitable for incorporation in a sign enclosure having one or more of an upper wall, back wall, and lower wall, said enclosure having means formed in the interior thereof capable of engaging parts of said apparatus for retaining same in the enclosure, said apparatus comprising:

bracket means positionable within said enclosure, said bracket means having an upper arm portion, a lower arm portion, and an intermediate portion extending between said upper and lower arms, said intermediate portion having parts formed for engaging the means in the interior of the enclosure for positioning and retaining said bracket means within the enclosure; and

a web and web roll assembly comprising:

first and second spaced plates, said plates being coupled together to form a frame for said assembly, said assembly being removably connected to said upper arm portion and to said lower arm portion so that one of said first and second plates lies above said upper arm portion and the other of said first and second plates lies above said lower arm portion, said assembly being positioned within the sign enclosure when said assembly is connected to said arms, said bracket means being formed such that the portions of said assembly adjacent said upper arm portion are tilted toward a viewer of the sign,

a pair of spaced web rolls journalled for rotation in said plates,

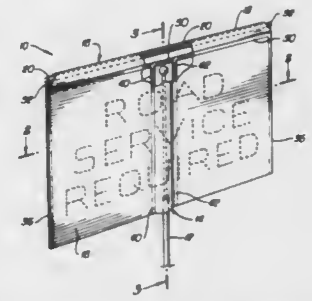
a web extending between said web rolls for being unwound and rewound on said rolis, said web being suitable for having informational material arranged in series therealong,

means for rotating said web rolls to unwind and rewind said web, and

an inner sheet extending between said first and second spaced plates and over which said web travels between said rolls.

---

### 5,016,372
### ROAD SERVICE SIGN
Albert A. Goid, Santa Monica, Calif., assignor to GBD Inc. dba Gold Graphics, Pacoima, Calif.
Filed Dec. 14, 1989, Ser. No. 450,835
Int. Cl.$^5$ G09F *21/04*
U.S. Cl. 40—591 8 Claims



1. A sign for requesting road service, comprising:

a sheet having a vertical sleeve and a horizontal sleeve, said vertical sleeve being located in the interior of the sign and sized sufficiently to receive an upper portion of a vehicle antennae and said horizontal sleeve being located across the top of the sheet; and

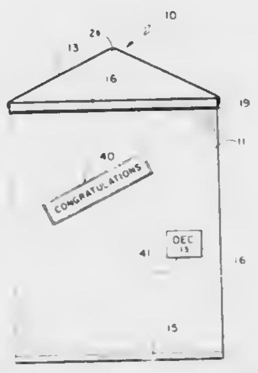
a stiffening member adapted to be received in said horizontal sleeve;

said sheet bearing indicia representative of a message relating to road service.

OL
126
SS
3
MY
21
1991
UMI

### 5,016,373
### COLLAGE SHEET HAVING ROLLABLE RELEASABLE ADHESIVE SURFACE

**Mark H. Theno, 3206 Second Ave. East, Hibbing, Minn. 55746**
**Continuation of Ser. No. 245,509, Sep. 19, 1988, abandoned. This application Nov. 6, 1990, Ser. No. 611,461**
**Int. Cl.⁵ G09F** *7/12*
**U.S. Cl. 40—594** **7 Claims**



1. A kit to permit a user to temporarily fastening greeting cards or like planar objects thereto comprising:

a collage sheet of decorative flexible material having a first surface and a second surface with said first surface having a pressure sensitive adhesive thereon to permit a user to temporarily attach an article thereto, said sheet of decorative flexible material having a first end;

a hollow cylindrical support for winding said decorative flexible material thereon, said sheet of decorative material wound on said hollow cylindrical support to provide a roll of decorative flexible material that is adhesively secured to itself and can be unwound from said roll of flexible material to allow said article to be attachable to an unwound portion of said sheet of decorative flexible material;

a rib attached to said first end of said decorative flexible material to hold said decorative flexible material in a flat condition, said rib comprising a triangular shape with a pair of edges that normally resiliently engage each other to grip an object therebetween, said edges forming engagement with said first surface and said second surface of said sheet to thereby grip said sheet;

a weight for holding said sheet in a flat condition with said weight being secured to the first end of said sheet by the adhesive surface of said sheet extending into contact with said weight to thereby prevent disengagement of said weight from said sheet; and

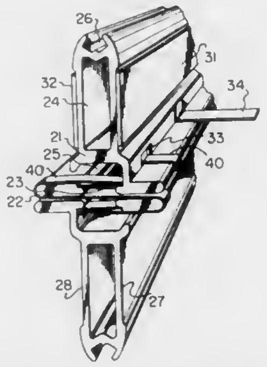
a greeting card or like planar object for attaching to said pressure sensitive adhesive to permit a user to temporarily form said decorative material and said greeting card or the like into a decorative wall collage.

---

### 5,016,374
### BUILDABLE DEVICE INCLUDING MODULAR FRAME ASSEMBLY

**Carl-Otto Engström, Stockholm, Sweden, assignor to Ahlberg & Co. AB, Stockholm, Sweden**
**PCT No. PCT/SE88/00171, § 371 Date Sep. 13, 1989, § 102(e) Date Sep. 13, 1989, PCT Pub. No. WO88/08186, PCT Pub. Date Oct. 20, 1988**
**PCT Filed Apr. 8, 1988, Ser. No. 399,510**
**Claims priority, application Sweden, Apr. 10, 1987, 8701511**
**Int. Cl.⁵ G09F** *7/00*
**U.S. Cl. 40—605** **11 Claims**

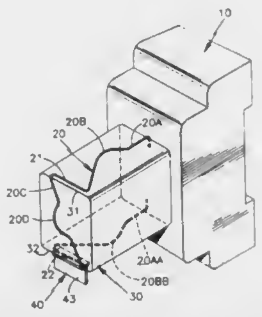
1. An assembly for mounting and displaying suitably dimensioned planar elements, said assembly including a plurality of frame members which are formed by profiled mouldings, each said molded frame member being defined by first and second longitudinal flanges, said first flange being arranged at right angles to said second flange in a T-shaped configuration, said first flange having two opposed wide flat surfaces and two opposed relatively narrower surfaces, said relatively wide flat surfaces and said relatively narrower surfaces each being substantially perpendicular to said second flange, wherein said second flange is located adjacent said relatively narrower surfaces of said first flange, each said frame being constructed to receive a planar element between opposed pairs of said frame members, wherein at least two said frame members in a said assembly are located adjacent each other with the said second flange of a frame member of one being in substantially face to face relationship with the said second flange of a frame member of the other, and wherein said assembly further includes band-shaped hinges between said face to face second flanges to releasably and hingedly secure together said adjacent frame members, said band-shaped hinges each having a pair of ends with resilient bent up portions adapted to engage a said frame member, and wherein frame assembly has up of four said frame members arranged as a rectangle with the outermost surface of said second flanges of each of said up to four frame members defining the perimeter of said rectangle, the innermost surface of said second flanges of each of said up to four frame members defining an engaging surface for a suitably dimensioned said planar element, and the flat surfaces of the first flanges of said up to four frame members forming a surface against which a planar element may be mounted.



---

### 5,016,375
### LABEL CLIP FOR ELECTRICAL COMPONENT HOUSING

**Jenna P. C. Ngian, New Britain, and William F. Barkman, Canton, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.**
**Filed Jun. 5, 1989, Ser. No. 361,624**
**Int. Cl.⁵ G09F** *3/18*
**U.S. Cl. 40—642** **12 Claims**



1. A two-part housing for an electrical or electronic component, including a base on which the component is carried and a removable enclosure cap which is supported on the base, and a resilient, wire-like clip attached to the base and extending along and over the cap for compressively holding the base and cap together covering over the component, wherein the clip comprises:

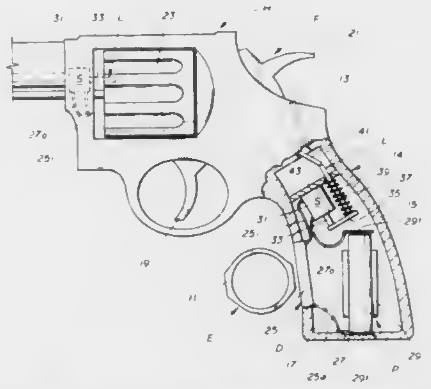
wire-like material having a laterally extending portion extending across a substantial amount of the width of the cap, at least a portion of said wire-like material being displaceable to allow the enclosure cap to be removed; and

an indicia carrying holder suspended from said laterally extended portion and having a frontally presented surface upon which identifying indicia may be presented.

---

### 5,016,376
### MAGNETIC ACTUATED FIREARMS LOCKING MECHANISM

**Kenneth J. Pugh, 5326 Spanish Oak, Houston, Tex. 77066**
**Filed Oct. 20, 1989, Ser. No. 424,541**
**Int. Cl.⁵ F41A** *17/06*
**U.S. Cl. 42—70.11** **29 Claims**



1. A safety device for preventing unauthorized firing of a weapon of the type having a trigger and mechanical firing means for firing the weapon, the invention comprising:

a solenoid means for controllably actuating or deactuating upon the application of an electrical signal;

a decoder means mounted with the weapon for detecting an authorization signal from an authorized user and selectively activating the solenoid means upon the signal from the authorized user, such decoder means being electrically connected to at least a power source and to the solenoid means; said decoder means comprises at least one magnetically actuable switch means electrically connected for opening or closing an electrical circuit when actuated by a magnetic field having a desired field strength;

an encoder means for creating the signal indicating that the possessor is authorized to use the weapon; and

linkage means connecting the solenoid means and the firing means for controllably enabling or disabling the weapon from being fired upon the desired activation of the solenoid means.

---

### 5,016,377
### FIREARM LOADING LOCKOUT DEVICE

**Dade Gunning, 1845-A S. Main St., Waterbury, Conn. 06706**
**Filed Jan. 2, 1990, Ser. No. 459,513**
**Int. Cl.⁵ F41A** *17/02*
**U.S. Cl. 42—70.11** **3 Claims**

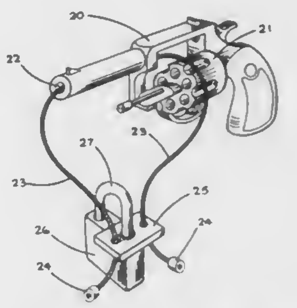
1. A firearm loading lockout device that prevents a firearm from being loaded and discharged either accidentally or intentionally comprising in combination:

(a) a flexible member that is passed through the bore of the barrel of said firearm, thereby blocking a cartridge from being loaded into firing position, or, thereby preventing the mechanism of the firearm from being closed into the firing position, or both;

(b) at least one termination fitting that is affixed to at least one end of said flexible member, and which is smaller in cross section than the bore of said firearm;

(c) a plate that has a hole through which the shackle of a lock and said termination fitting may pass independently, and a slot that adjoins said hole through which said flexible member may pass freely, but through which said termination fitting cannot pass;

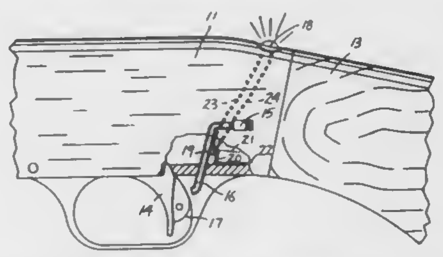
(d) a lock that has a shackle that passes freely through said hole, but said shackle is sufficiently large in cross section that said termination fitting cannot pass through said hole when said shackle occupies said hole.



---

### 5,016,378
### FIREARM SAFETY APPARATUS

**Kenneth D. Sain, 3200 Hodges, Amarillo, Tex. 79103**
**Filed May 29, 1990, Ser. No. 529,534**
**Int. Cl.⁵ F41A** *17/52*
**U.S. Cl. 42—70.06** **4 Claims**



1. A firearm safety apparatus comprising, in combination,
a firearm mechanism, including a housing,
and
a firearm stock extending rearwardly of the housing, and a trigger pivotally mounted underlying the housing to effect actuation of the firearm mechanism,
and
a slidably mounted safety bolt directed through the housing, including an "S" shaped safety leg, wherein the "S" shaped safety leg includes a lower terminal end,
and
the trigger includes a rear surface,
and
the lower terminal end of the "S" shaped safety leg arranged for selective abutment with the rear surface of the trigger,
and
the lower terminal end of the "S" shaped safety leg in abutment with the rear surface of the trigger in a first lowered position,
and
the "S" shaped safety leg spaced from the rear surface of the trigger in an extended second position,
and
a first electrical contact mounted to the "S" shaped safety leg,
and
a second contact mounted within the housing, wherein the first and second contacts are spaced apart in the first

VOL
126
ISS
3
MY
21
1991
UMI

position and in electrical communication in the second position,

and

a battery and an illumination member, wherein the battery, illumination member, and first and second contacts are in electrical association relative to one another,

and

the illumination member mounted extending through the housing for visual observation, wherein the first and second contacts in the second position effect illumination of the illumination member,

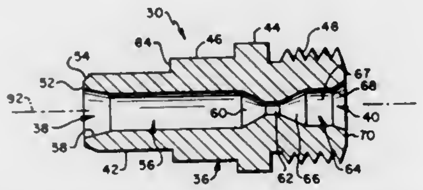
and

wherein the illumination member includes a shading member mounted over the illumination member to effect selective shading of the illumination member.

---

### 5,016,379
### BLACK POWDER PERCUSSION NIPPLE

**Fred R. Lambert, Mineral Wells, W. Va., assignor to Mountain State Muzzleloading Supplies, Inc., Williamstown, W. Va.**
**Filed Dec. 28, 1989, Ser. No. 458,491**
**Int. Cl.⁵ F41A** *21/00*
**U.S. Cl. 42—83** **9 Claims**



1. A percussion nipple for use with black powder firearms comprised of an elongated body having a first end for slidably receiving a percussion cap thereover and a second end, the exterior of which is threaded for mounting to the firearm, said body including means defining a primary hollow chamber extending axially inwardly from said first end and having a first diameter, means defining a second hollow chamber extending axially inwardly from said second and end having a second diameter larger than said first diameter, means defining an interconnecting port in fluid communication with both the primary and second chambers and having a third diameter smaller than said first diameter so that said port and said primary and second chambers together form a through bore within said body.

---

### 5,016,380
### WEAPON APPARATUS

**Robert B. Jones, 7119 Ohio River Blvd., Pittsburgh, Pa. 15202**
**Filed Feb. 9, 1990, Ser. No. 477,428**
**Int. Cl.⁵ F41C** *27/00;* **B25G** *1/08*
**U.S. Cl. 42—90** **14 Claims**

1. Combination tool apparatus for use with a muzzle loading weapon, said apparatus comprising

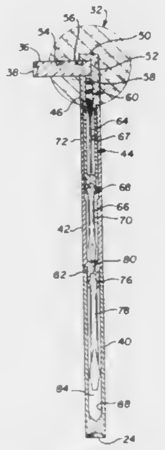
An elongated body member constructed and arranged to facilitate translational movement within a hollow barrel of said weapon, and

Ball starter means connected to one end of said body member, and

Said body member being constructed and arranged to provide a land and groove setting rod on said tool apparatus, and

Said body member being closed at its end distal from said ball starting means, and

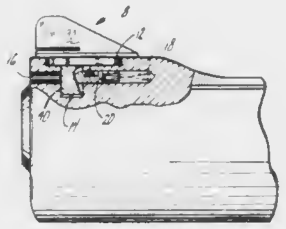
Said body member having formed therein a plurality of chambers, each of said chambers being constructed and arranged to contain at least one of a plurality of tools adapted for use with said weapon.



---

### 5,016,381
### REMOVABLE FRONT SIGHT FOR HANDGUNS

**Robert J. Ferraro, Ludlow, Mass., assignor to Smith & Wesson Corp., Springfield, Mass.**
**Filed Sep. 12, 1990, Ser. No. 581,594**
**Int. Cl.⁵ F41G** *1/02*
**U.S. Cl. 42—100** **6 Claims**



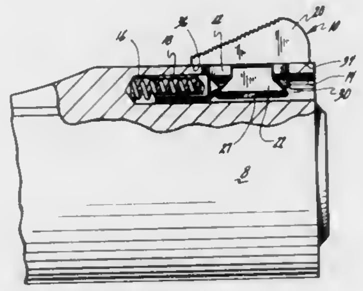
1. Removable front sight for the barrel of a fire-arm comprising an upwardly opening bore disposed adjacent the muzzle end of the barrel, a longitudinal hole extending on the muzzle of the barrel communicating with the bore and extending rearwardly thereof, a spring and detent disposed in the inner end of the hole so that the detent extends into said bore and a discrete front sight having an outer blade portion and a depending shank adapted to be removably fitted into the bore, said shank including a sculptured outer surface inter-engageable with the detent to enable longitudinal and angular movement of the shank in said bore for selective removal and remounting of said sight onto said barrel.

---

### 5,016,382
### REMOVABLE FRONT SIGHT FOR HANDGUNS

**Linwood A. Pickle, South Hadley, Mass., assignor to Smith & Wesson Corp., Springfield, Mass.**
**Filed Mar. 1, 1990, Ser. No. 486,882**
**Int. Cl.⁵ F41G** *1/02*
**U.S. Cl. 42—100** **3 Claims**

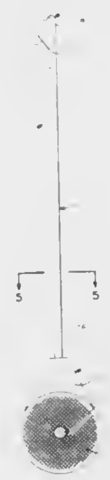
1. Removable front sight in combination with retaining means for the barrel of a firearm having an upwardly opening recess disposed adjacent the muzzle end of the barrel and a hole extending longitudinally from the front surface of the barrel, communicating with the recess and extending rearwardly thereof, the combination comprising a spring and detent pin disposed in the inner end of the hole and a cross-pin disposed across the forward end of the recess, the cross-pin and detent pin being longitudinally spaced apart a predetermined distance and providing paid retaining means, a discrete front sight having an outer blade portion and an undercut keel portion adapted for removably fitting into the recess with the blade contacting upper surfaces of the barrel, the keel portion of the sight including oppositely inclined front and rear edge portions and a lower edge portion of greater length than said predetermined distance so that the keel portion of the sight is removably retained in the barrel recess by the inclined rear edge of the keel engaging the detent pin and the inclined front edge engaging the retaining means and being removable by compressing the spring by rearward movement of the keel against the detent pin.



---

### 5,016,383
### FISH BAIT APPLICATOR

**Randall Rizzetto, 1000 Estes St., #46, El Cajon, Calif. 92020**
**Filed Mar. 1, 1990, Ser. No. 486,811**
**Int. Cl.⁵ A01K** *97/00*
**U.S. Cl. 43—4** **6 Claims**



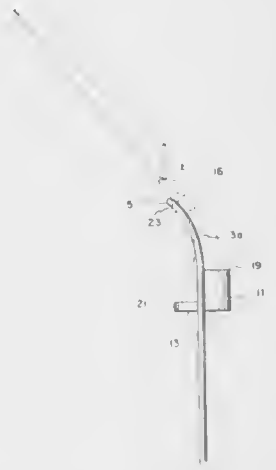
6. A fish bait applicator comprising:

a. a fingergrip made of a material with a specific gravity less than 1.0;
b. an attaching port in the fingergrip;
c. a textured surface on the fingergrip;
d. a light-reflective surface on the fingergrip;
e. a shaft with one end connected to the fingergrip;
f. a hook on a other end of the shaft;
g. the hook having a sharp leading edge;
h. a latch means port in the shaft near the hook;
i. a latch means to restrict access to the hook pivotally mounted in the latch means port and extending over an end of the hook; and
j. a recess in the shaft near the latch means port between the latch means port and the fingergrip to receive the latch means when the latch means is not over the hook.

---

### 5,016,384
### PISTOL GRIP FISHING POLE STAND

**Joseph H. Johnson, 4483 Papal Dr., Florissant, Mo. 63033**
**Filed Aug. 31, 1990, Ser. No. 576,072**
**Int. Cl.⁵ A01K** *97/10*
**U.S. Cl. 43—21.2** **5 Claims**



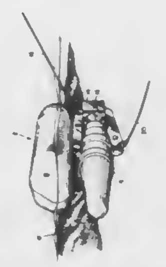
1. A fishing pole stand for a fishing pole having a pistol handle shaped handle comprising:

(a) a frame member;
(b) a receptacle attached to said frame member, said receptacle further comprising:
  (i) a first sidewall;
  (ii) a second sidewall; and
  (iii) a base;
  (iv) said first sidewall, second sidewall and said base forming a generally elliptically shaped chamber to engage and support said pistol handle shaped handle pole;
  (v) said first sidewall having a height greater than said second sidewall to aid in preventing removal of said pistol handle shaped handle during unattended fishing.

---

### 5,016,385
### SELF-POWERED BAIT TROLLING MECHANISM

**Wilfred J. Blease, Merrimack, N.H., assignor to Pioneer Plastics, Inc., Greenville, N.H.**
**Filed Apr. 25, 1990, Ser. No. 514,509**
**Int. Cl.⁵ A01K** *97/00*
**U.S. Cl. 43—26.1** **3 Claims**



1. A floating, self-powered bait trolling mechanism, comprising:

(a) a battery-operated motor in a watertight housing for rotating a propeller about a primary axis;
(b) a first stabilizing fin located above the primary axis and projecting upwardly from the housing and a second stabi-

lizing fin coplanar with the first fin located below the primary axis and projecting downwardly from the housing;

(c) an airtight flotation chamber having greater width than the housing and mounted on the first stabilizing fin, the chamber being spaced from the housing;

(d) a pin extending between the first and second stabilizing fins on an axis which is normal to the primary axis and behind the propeller;

(e) a rudder press fit onto the pin with sufficient angular rigidity to control the direction of movement of the mechanism when the propeller is rotated;

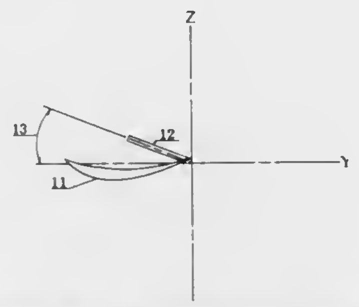
(f) the press fit force between the rudder and the pin being insufficient to prevent angular movement relative to the pin by water pressure against the rudder caused by a sharp tug applied to the mechanism;

(g) a control line attached to the first stabilizing fin rearwardly of the propeller and above the rudder; and,

(h) a bait attaching line attached to the second stabilizing fin forwardly of the propeller and below the rudder.

### 5,016,386
### ROTATABLE BLADE FOR FISHING LURE

**Daryle Lamonica, 8796 N. Sixth St., and Wayne V. Tatti, 8497 N. Millbrook, both of Fresno, Calif. 93710**
**Filed Apr. 23, 1990, Ser. No. 511,274**
**Int. Cl.⁵ A01K** *85/00*
**U.S. Cl. 43—42.14** **11 Claims**



1. A rotatable blade for a fishing lure comprising a blade attached to a hollow bearing assembly, said blade having a bowl shape along a base line defining an interior concave surface and an exterior convex surface, said blade having a teardrop form with a point at one end of the base line and a bowl at the other end of the base line, the bearing being attached on the concave surface of the blade near the pointed end of the teardrop wherein said bearing is upwardly offset from the base line of the blade in the Y-Z plane at an angle of between 10° to 30°.

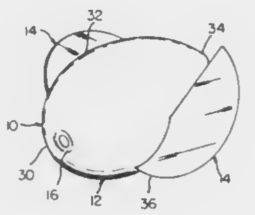
### 5,016,387
### FISHING LURE HAVING A SPINNABLE BUOYANT BODY EQUIPPED WITH REFLECTIVE SURFACED FINS

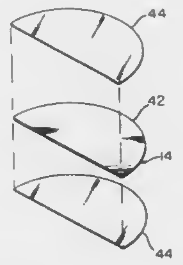
**Paul A. Beaupre, 1802 37th Way SE., Auburn, Wash. 98002**
**Filed Sep. 8, 1989, Ser. No. 404,648**
**Int. Cl.⁵ A01K** *85/00*
**U.S. Cl. 43—42.33** **7 Claims**

1. A fishing lure having a spinnable buoyant body equipped with reflective surfaced fins to create flashes, when the fishing lure is pulled through the water, comprising:

(a) a buoyant plastic body having a longitudinal center hole adapted to slidably receive a leader portion of an overall fishing line, and a hydrodynamically shaped tear drop exterior;

(b) port and starboard fins made of a clear cellulose acetate, having a memory to always return to the original shape and contour of the fins, are diagonally secured to the buoyant plastic body, to cause this body to spin about the leader, when this fishing lure is being pulled through the water, said port and starboard fins having upper and lower surfaces, said upper surfaces being visible from corresponding lower surfaces; and

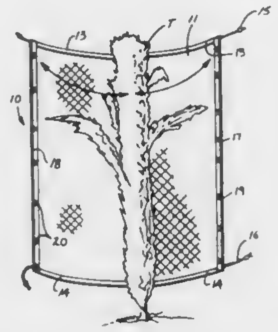




(c) Mylar materials having reflective surfaces which are laminated onto the port and starboard fins, whereby upon the spinning of this fishing lure flashes are created.

### 5,016,388
### PROTECTIVE TREE GUARD

**J. David Burress, and Deborah S. Burress, both of 15 Locustwood St., Las Vegas, Nev. 89110**
**Filed Feb. 13, 1989, Ser. No. 309,488**
**Int. Cl.⁵ A01G** *13/10*
**U.S. Cl. 47—23** **1 Claim**



1. A protective tree guard for securement about mature trees, comprising,

a finite flexible net including an upper perimeter, a lower perimeter, a right perimeter, and left perimeter, and

securement means for joining said right perimeter and said left perimeter together, and

auxiliary securement means for selective tightening of said upper perimeter and said lower perimeter about said tree when said right perimeter and said left perimeter are joined together, and

wherein said finite flexible net includes a matrix of intersecting polypropylene fabric lines including knotted intersections at the intersecting of the lines for maintaining a geometric integrity of the net, and

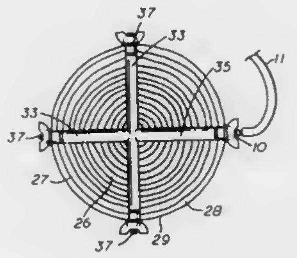
wherein said flexible net includes an upper hollow tubular sheath integrally secured to an upper perimeter net strand, and a lower hollow tubular sheath integrally secured to a lower perimeter net strand wherein said upper and lower perimeter strands respectively define said upper and lower perimeters, and wherein each of said upper and lower hollow tubular sheaths include slidingly therethrough a drawstring of finite length extending exteriorly through each tubular sheath, and wherein the upper and lower drawstrings and the upper and lower hollow tubular sheaths define said auxiliary securement means, and

wherein said securement means includes a right perimeter webbing and a left perimeter webbing to respectively define said right and left perimeter, and wherein said right perimeter webbing includes a series of first snap fasteners, and wherein said left perimeter webbing includes a plurality of second snap fasteners wherein said right and left snap fasteners are equally spaced along said right and left perimeter webbing to enable securement of said left perimeter webbing in an overlying relationship to said right perimeter webbing, and

wherein said right and left perimeter webbing are coextensive with said right and left perimeter.

### 5,016,389
### METHOD AND APPARATUS FOR SUPPLY OF WATER AND NUTRIENTS TO PLANTS

**Harold A. Odom, Jr., 2318 Masters La., Missouri City, Tex. 77459**
**Filed Apr. 10, 1989, Ser. No. 335,760**
**Int. Cl.⁵ A01G** *27/00*
**U.S. Cl. 47—48.5** **11 Claims**



1. An apparatus for maintaining plant life by supplying water and nutrients to a plant severed from its root system comprising:

(a) an injection nozzle adapted at one point to introduce fluids into a plant by insertion into and through an opening of a bore made through the outer plant layers into the inner sap carrying layers and adapted at a second point for connection to a fluid conduit wherein said nozzle is provided with expandable means for substantially hermetic sealing and releasing connection where said nozzle is inserted; and,

(b) a flexible fluid conduit adapted at one end for connection to a microporous filter situated within a remotely positioned holding vessel for said water and nutrients, and adapted at the other end for connection to the injection nozzle.

### 5,016,390
### SHUTTER ASSEMBLY

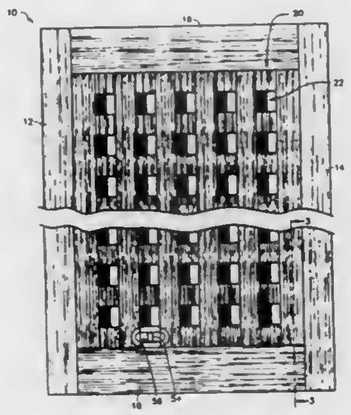
**Daniel B. Johnson, 5838 Walnut Dr., Eureka, Calif. 95501**
**Filed Nov. 6, 1989, Ser. No. 432,208**
**Int. Cl.⁵ E06B** *7/02*
**U.S. Cl. 49—38** **6 Claims**

1. A shutter closure for an opening in a building comprising:

a stationary panel defined by a plurality of cross rails forming a substantially uniform array of openings throughout a major area thereof;

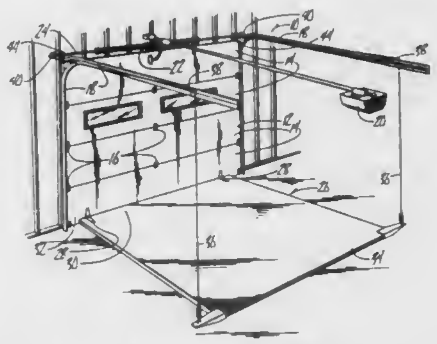
a movable panel formed of a complementary plurality of cross rails forming a corresponding array of openings and movable relative to said first panel for alternately covering and uncovering said openings in said first panel; and

said stationary panel and said movable panel are each made from a unitary structure, and said rails are defined by spaced vertical slots on a front face and horizontal slots on a back face, said vertical slots are at an angle other than ninety degrees to the horizontal, and said openings are defined by intersection of said vertical slots with said horizontal slots.



### 5,016,391
### DOOR AND DOCK COVER

**Paul Miller, and Tommy L. Thompson, both of Waverly, Iowa, assignors to Energy Concepts, Inc., Waverly, Iowa**
**Filed Jul. 20, 1990, Ser. No. 555,309**
**Int. Cl.⁵ E06B** *7/00*
**U.S. Cl. 49—70** **10 Claims**



1. A door and dock cover comprising,

a door having upper and lower ends adapted to move vertically between raised and lowered positions to open and close a wall opening, and

a horizontally disposed dock cover extending perpendicular to said door, said dock cover being connected to the lower end of said door for vertical movement between raised and lowered positions with said door and adapted to cover a dock when in said lowered position and be in a raised position above a dock when in said raised position.

### 5,016,392
### REGULAR FOR FLUSH WINDOW

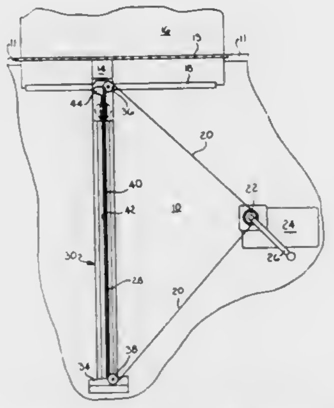
**Gary R. Thomas, Livonia, and Mark A. Huebner, St. Clair Shores, both of Mich., assignors to Wickes Manufacturing Company, Southfield, Mich.**
**Filed Feb. 23, 1990, Ser. No. 483,666**
**Int. Cl.⁵ E05F** *11/48*
**U.S. Cl. 49—352** **5 Claims**

1. A window regulator for a flush window comprising:

a track for guiding window movement, the track including a slot having a straight portion terminating in a cam portion at the top of the slot,

a drive assembly slidably mounted in the slot for guidance along the track, drive means,

a flexible drive member coupled to the drive means and defining a path parallel to the track which is aligned with the slot, and is centrally attached to the drive assembly for moving the drive assembly only parallel to the straight portion of the slot,



the drive assembly including a cam follower slidably disposed in the slot and elongated in the direction of the slot for alignment with the slot and for rotation by the cam portion upon window-closing movement, and

means coupling the drive assembly to the window and responsive to the rotation of the cam follower for moving the window outwardly during window closing movement of the drive assembly along the track.

---

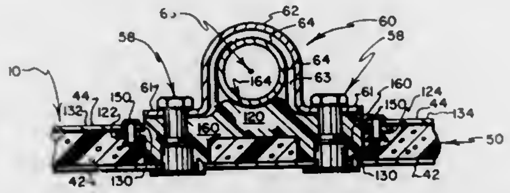
### 5,016,393
### DOOR CONSTRUCTION

**Lee S. Weinerman, Medina, Ohio, assignor to The Eastern Company, Cleveland, Ohio**

**Filed Apr. 30, 1990, Ser. No. 516,260**

**Int. Cl.$^5$ E06B** *7/16*

**U.S. Cl. 49—395** **24 Claims**



1. A door control mechanism for securing a door, swingable about an axis, in a closed position closing at least a portion of a door opening that is defined between opposed, spaced first and second door frame structures, wherein the door has a width that is configured to extend in a width direction between the spaced first and second door frame structures; with the door having a thickness that is defined by an inner skin, an outer skin and a space that extends therebetween to define a central cavity; with material providing a core that is interposed between at least selected portions of the inner and outer skins within said cavity to hold the first and second skins in spaced relationship; with the inner and outer skins being formed from substantially dimensionally stable material that is relatively thin in comparison with the thickness of the cavity space that extends between the inner and outer skins; with a selected one of the inner and outer skins having designated portions that extend in a common plane but are discontinuous in that the designated portions have opposed edge portions that extend substantially parallel to each other and substantially parallel to said width direction so as to define an elongate opening therebetween that extends substantially in said width direction, with the opening being in communication with the central cavity and opening through the selected one of the skins in a forward direction that is defined as extending away from said common plane and away from the central cavity; and, with the door control mechanism comprising:

a) elongate shaft means having first and second opposed end regions that are drivingly connected for concurrent movement by central region means configured to extend in said width direction at a location that overlies the opening, and for extending along at least a major portion of the length of the opening with the central region means defining substantially cylindrical formation means of substantially uniform diameter for extending coaxially along a common axis that substantially parallels the length of the opening at a substantially uniform distance from the opening as measured in said forward direction between said common axis and said common plane;

b) elongate structural member means having opposed side formation means for extending substantially adjacent to, and for being connected to said designated portions of the selected one of the inner and outer skins, having central portion means for extending between and connecting the opposed side formation means, and having a length that extends substantially the full length of the opening so as to substantially close the opening, and with the central portion means including central formation means for extending in said forward direction in at least one location that is situated between the opposed edge portions for defining concave surface portion means extending parallel to but spaced from said common axis at a location between said common axis and said common plane for opening toward said common axis to engagingly receive at least segments of said substantially cylindrical portions;

c) bearing bracket means connected to the elongate structural member means and extending into engagement with the elongate shaft means for causing at least said segments of said substantially cylindrical portions to be retained in pivotally movable engagement with the concave surface portion means for establishing a pivotal connection between the door and the elongate shaft means that permits relative movement therebetween about said common axis;

d) handle means for pivoting the elongate shaft means about said common axis between angularly related positions referred to as latching and unlatching positions;

e) first keeper means for being connected to the first of the two opposed door frame structures and defining a first receiving formation;

f) second keeper means for being connected to the second of the two opposed door frame structures and defining a second receiving formation;

g) first latch member means for being secured to the first end region of the elongate shaft means for rotation therewith about said common axis between said latching and unlatching positions, for being releasably engaged with the first receiving formation of the first keeper means when the swingable door moves to its closed position while said handle means has pivoted the elongate shaft means to said unlatching position, and for being movable into latching interengagement with the first receiving formation of the first keeper means when the handle means pivots the elongate shaft means from the unlatching position to the latching position while maintaining engagement between the first latch member means and the first keeper means; and,

h) second latch member means for being secured to the second end region of the elongate shaft means for rotation therewith about said common axis between said latching and unlatching positions, for being releasably engaged with the second receiving formation of the second keeper means when the swingable door moves to its closed position while said handle means has pivoted the elongate shaft means to said unlatching position, and for being movable into latching interengagement with the second receiving formation of the second keeper means when the handle means pivots the elongate shaft means from the unlatching position to the latching position while maintaining engagement between the second latch member means and the second keeper means.

---

### 5,016,394
### GLASS RUNNER STRUCTURE OF AUTOMOTIVE DOOR

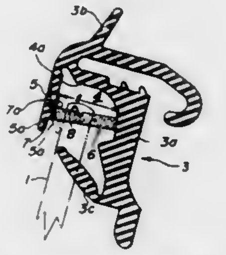
**Nozomi Iida, Hadano; Shuichi Hannya, Chigasaki, and Kazuaki Omote, Isehara, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Dec. 26, 1989, Ser. No. 456,696**

**Claims priority, application Japan, Dec. 27, 1988, 63-329793**

**Int. Cl.$^5$ E06B** *7/22*

**U.S. Cl. 49—441** **8 Claims**



1. In a glass runner structure disposed on an outer surface of an automotive door sash for guiding upward and downward movements of a window glass over said door sash, comprising:

an elongate base portion of solid rubber extending along said automotive door sash and secured to said outer surface of said sash;

an elongate outer wall portion integral with said base portion, said outer wall portion projecting downward from an outermost portion of said base portion thereby to define a guide groove between said outer wall portion and said base portion;

an elongate lip portion integral with said elongate outer wall portion and extending downward from the same;

a bridge portion constructed of a flexible material, said bridge portion spanning between said outer wall portion and said base portion adjacent said elongate lip portion; and

a longitudinally extending ridge integrally formed on said outer wall portion and projecting toward said guide groove, said ridge having one end of said bridge portion fixed thereto,

whereby said outer wall portion and said lip flex toward an outer surface of said window glass to cause said lip portion to contact said outer surface of said window glass when an uppermost edge of said window glass flexes said bridge portion upwardly.

---

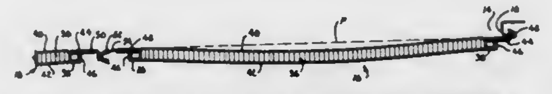
### 5,016,395
### BOXCAR DOOR HAVING BALSA CORE SANDWICH CONSTRUCTION

**Del E. Walker, Lake Quivira, and Stephen R. Early, Olathe, both of Kans., assignors to Aera Transportation Products, Inc., Kansas City, Mo.**

**Filed Apr. 21, 1989, Ser. No. 341,207**

**Int. Cl.$^5$ E06B** *3/00*

**U.S. Cl. 49—501** **7 Claims**



1. A boxcar door for a railroad boxcar, comprising:

a generally rectangular balsa core having opposite inside and outside surfaces and a generally rectangular periphery including opposite side edges and top and bottom edges, said core having a balsa wood construction and curving both from one side edge to the other side edge and from said top edge to said bottom edge to provide said inside surface with a concave configuration and said outside surface with a convex configuration;

rigid stiffeners extending around the periphery of said balsa core and defining a common plane; and

a fiberglass skin substantially enclosing said balsa core and said stiffeners, said skin comprising a pair of fiberglass sheets extending along and conforming in curvature with the respective inside and outside surfaces of said core and having edges mating with one another adjacent said periphery.

---

### 5,016,396
### FIXING STRUCTURE OF SASHES OF MOTOR VEHICLE DOOR

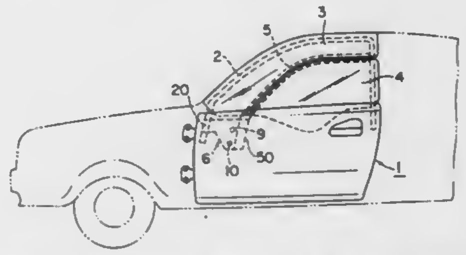
**Keiichi Ishitsuka, and Shinji Tsunoda, both of Gunma, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 4, 1990, Ser. No. 592,591**

**Claims priority, application Japan, Oct. 12, 1989, 1-119536**

**Int. Cl.$^5$ B60J** *5/04*

**U.S. Cl. 49—502** **6 Claims**



1. A fixing structure of sashes of a motor vehicle door, having a main door sash defining an upper and front contour of the door, and a middle door sash extending below and along the main door sash, said structure comprising:

a coupling reinforcing member fixedly secured to leading ends of said main and middle door sashes at mutually spaced leading and trailing end portions of the coupling reinforcing member;

bolt means for mounting the coupling reinforcing member to a leading part of a window shoulder of the door, between said leading and trailing end portions; and

adjusting means for adjustably mounting a lower end portion of the coupling reinforcing member to the door to angularly adjust the attitude of the middle door sash.

---

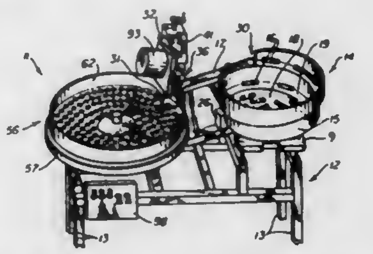
### 5,016,397
### METHOD AND APPARATUS FOR REMOVING WRAPPERS FROM COIN ROLLS

**Daryle Higginbotham, 287 Maple Ave., Marietta, Ga. 30064**

**Filed Mar. 23, 1990, Ser. No. 498,011**

**Int. Cl.$^5$ B24B** *7/12, 5/18;* **G07D** *9/00;* **B65F** *3/02*

**U.S. Cl. 51—80 A** **11 Claims**



1. An apparatus for removing wrappers from coin rolls with said apparatus comprising:

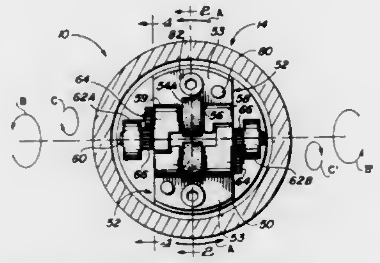
an elongated transfer means having first and second end portions;

/OL 126
SS 3
MY 21 1991
UMI

means for moving coin rolls from said first end portion of said transfer means to said second end portion, thereof;
feeder means for feeding wrapped coin rolls sequentially to the first ned portion of said transfer means;
first and second contra-rotatable abrasive members positioned adjacent said transfer means with said abrasive members being spaced and positioned to bear against wrapped coin rolls moving along said transfer means to tear the wrappers therefrom;
receiving means for receiving coins and torn wrappers from the second end portion of said transfer means;
said receiving means including separator means for separating coins from their torn wrappers; and
collector means for collecting the separated coins.

---

### 5,016,398
## WIRE STRIPPING APPARATUS
**Akio Fukunaga, 4623 Sunnyhill Street, Westlake Village, Calif. 91362**
**Filed Jun. 6, 1989, Ser. No. 362,088**
**Int. Cl.$^5$ B24B *7/00***
**U.S. Cl. 51—80 R** **37 Claims**

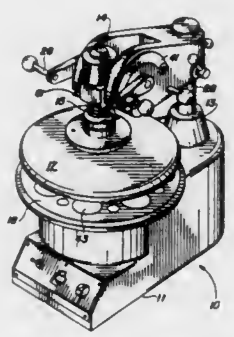


1. Wire stripping apparatus comprising:
a frame member supported for rotation about a central axis;
a generally cylindrical housing at least partially enclosing said frame member and having wall means extending transversely along one end of the housing, said wall means having means defining an opening in line with said central axis for receiving wire to be abraded for the stripping of unwanted material therefrom;
a pair of opposed assemblies mounted on the frame member for rotation therewith, each assembly including an abrading wheel mounted for rotation about an axis orthogonal to said central axis and displaced therefrom in order to abrade an adjacent surface of a wire received through said opening by relative movement of the peripheral surface of said wheel against said wire in a direction parallel to said central axis when said wheel is rotated about its axis; and
means in each assembly for driving the abrading wheel thereof to rotate about its axis as said assembly revolves with said frame about said central axis.

---

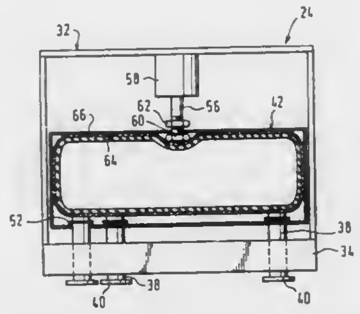
### 5,016,399
## PLANETARY LAP
**Paul Vinson, P.O. Box 5264, Valdosta, Ga. 31603**
**Filed Apr. 9, 1990, Ser. No. 506,295**
**Int. Cl.$^5$ B24B *7/00***
**U.S. Cl. 51—118** **5 Claims**

1. A lapping machine for abrading the surfaces of at least one workpiece comprising:
a frame,
a post vertically mounted on said frame
an arm extending laterally from said post,
a spindle extending substantially vertically from said arm,
a first lap plate mounted on the end of said spindle,
a second lap plate rotatably mounted on said frame adjacent to and in axial alignment with said first lap plate,
a carrier for at least one workpiece axially mounted on said frame between said first and second lap plates,
an electric motor means for rotating said carrier and said second lap plate at different speeds,
a first means mounted on said spindle for selectively adjusting the pressure of said first lap plate against said carrier and said second lap plate, and
a second means mounted on said arm for selectively rotating said spindle and said first lap plate from adjacent said carrier and said second lap plate through an arcuate path of approximately 180 degrees in a plane parallel to said arm for exposing the lapping surface of said first lap plate, and
a third means vertically movable on said frame for selectively locking said arm in one position to prevent rotation thereof laterally of the axis of said spindle when said first lap plate is juxtapositioned to said second lap plate and in a second position when moved away from said second lap plate for unlocking said arm to permit said lateral rotation of said arm.



---

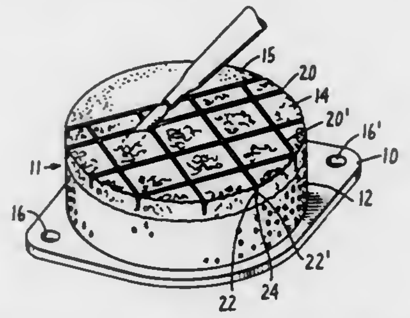
### 5,016,400
## PRESSURE BAR FOR A BELT GRINDING MACHINE
**Georg Weber, Friesener Strabe 27,, D-8640 Kronach, Fed. Rep. of Germany**
**Filed Mar. 28, 1990, Ser. No. 500,787**
**Claims priority, application Fed. Rep. of Germany, Mar. 31, 1989, 8903949**
**Int. Cl.$^5$ B24B *21/00***
**U.S. Cl. 51—141** **11 Claims**



1. A pressure bar for the grinding belt of a belt grinding machine, said pressure bar including an elongated carrier with a base plate facing the grinding belt and having a plurality of bores arranged in a matrix, a plurality of pressure members supported in said bores in said base plate for free axial movement relative to said base plate, said pressure members being adapted to engage the grinding belt with their free ends and being urged toward said grinding belt by a hose located on the opposite side of said base plate from said grinding belt inflatable by a pressure fluid, said hose being surrounded by a plurality of frame shaped pressure shoes arranged next to one another in the longitudinal direction of the carrier and each of which shoes is adjustable perpendicularly to said base plate by a positioning device, said pressure shoes each having a frame side facing said base plate with bores registering with said bores of said base plate for receiving said pressure members, and a flexible pressure distributing element arranged inside each of said pressure shoes between said hose and adjacent ends of said pressure members, said pressure distribution element having a higher stiffness than the material of said hose.

---

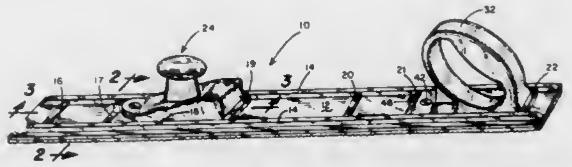
### 5,016,401
## CAUTERY TIP CLEANER AND HOLDER
**Donald J. Mangus, 500 Cohasset Rd., Ste. 27, Chico, Calif. 95926**
**Continuation-in-part of Ser. No. 247,763, Sep. 21, 1988. This application Mar. 2, 1990, Ser. No. 487,614**
**The portion of the term of this patent subsequent to Mar. 5, 2008, has been disclaimed.**
**Int. Cl.$^5$ B24B *1/00;* B24D *11/00;* A47L *17/08, 25/00***
**U.S. Cl. 51—328** **12 Claims**



1. A method for cleaning surgical cautery tips using a cautery tip cleaner comprising a relatively thick sterilizable, compressible pad mounted on a substantially non-compressible, puncture resistant base having a means for attaching the cautery tip cleaner to a surface within easy reach of a user, said compressible pad including a upper fibrous abrasive portion having a top surface, said upper fibrous abrasive portion being sufficiently thick so that if a cautery tip is pushed into said abrasive portion and withdrawn, any coagulum or debris attached to said tip will be substantially removed by the fibrous abrasive material, said method comprising:
attaching the cautery tip cleaner to a surface within easy reach of a user;
pushing the point of the cautery tip through the top surface of the upper fibrous abrasive portion and well into the compressible pad of the cautery tip cleaner; and,
withdrawing the cautery tip from the compressible pad of the cautery tip cleaner.

---

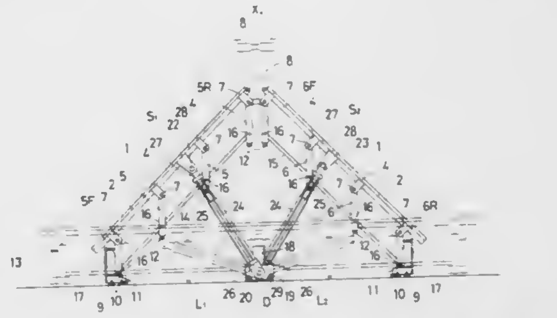
### 5,016,402
## SANDING APPARATUS WITH INTERCHANGEABLE BASES AND HANDLES
**John P. Reiter, 10407 Quebec Ave. South, Bloomington, Minn. 55438**
**Filed Jul. 10, 1989, Ser. No. 377,329**
**Int. Cl.$^5$ B24D *15/00***
**U.S. Cl. 51—393** **12 Claims**



1. An abrasive sanding kit having component parts capable of being assembled in the field for abrading workpieces of differing shapes, the kit comprising the combination of:
(a) at least one generally flat and rigid plate member having first and second opposed major surfaces, said plate member being of a predetermined length and width dimension and exhibiting limited flexibility in a direction transverse of the length dimension;
(b) a plurality of handle members of differing shape configuration adapted to be individually releasably clamped to said first major surface of said plate member at any one of plural locations along said length dimension; and
(c) a plurality of generally planar, elastomeric pads, said pads being adapted for releasable attachment individually to said second major surface of said plate member, said pads adapted to support a strip of abrasive sheet material thereon, the arrangement being such that strips of abrasive sheet material of differing abrasive characteristics can be affixed to different ones of said plurality of pads and a desired one of said pads selected for attachment to said plate member.

---

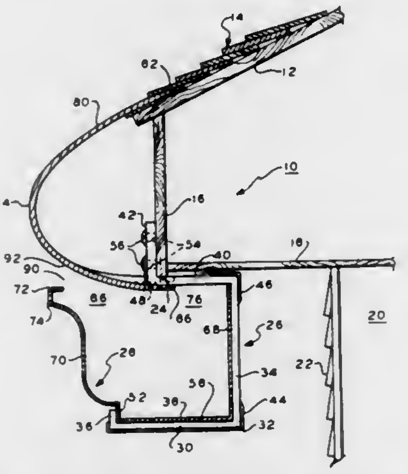
### 5,016,403
## ELECTRICALLY-OPERATED FOLDING STAGE SYSTEM
**Kazuo Fujita, No. 1, Hagiyamada 1-chome, Seto-shi, Aichi-ken, Japan**
**Filed Jan. 16, 1990, Ser. No. 465,326**
**Int. Cl.$^5$ E04H *3/28***
**U.S. Cl. 52—7** **14 Claims**



1. An electrically-operated folding stage system comprising
(a) a pair of first and second stage components connected to each other and each including a platform,
(b) plural operating means each having a pair of output shafts and located directly below a borderline between the platforms of the stage components,
(c) a first link means with a lower end fixed to one of the output shafts,
(d) a second link means with a lower end fixed to the other output shaft,
(e) means for pivotally connecting an upper end of the first link means to a bottom of the platform of the first stage component,
(f) means for pivotally connecting an upper end of the second link means to the bottom of the platform of the second stage component,
(g) the platforms of the first and second stage components providing a single continuous surface when the first and second stage components are in horizontal positions on a floor, and
(h) the first and second link means making arcing motions, when the operating means are operated, so that the first link means causes the first stage component to move from the horizontal position to a first vertical position while the second link means causes the second stage component to move from the horizontal position to a second vertical position which faces the first vertical position.

### 5,016,404
### GUTTER AND BRACKET ASSEMBLY

**Jeffrey M. Briggs, 48 Hemlock Dr., Newton, N.J. 07860**
**Filed Mar. 21, 1990, Ser. No. 496,911**
**Int. Cl.$^5$ E04D** *13/06*
**U.S. Cl. 52—12** **19 Claims**



1. A gutter and bracket assembly for receiving water from a building roof comprising:

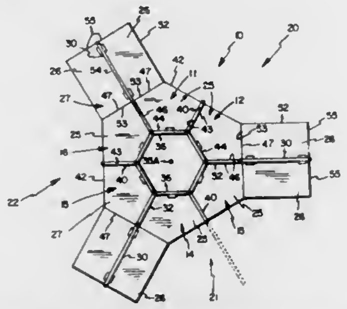
an elongated channel member forming a rain gutter having a bottom wall and two spaced upstanding side walls normal to the bottom wall defining an open water receiving channel, said side walls having upper edges defining a mouth between the side walls; and

a channel member support bracket comprising first and second legs extending in a direction generally normal to each other from a junction therebetween, a lip extending upstanding from an end of the first leg distal said junction juxtaposed with and spaced from the second leg, a third leg extending from an end of the second leg distal said junction and juxtaposed over and spaced from the first leg, said lip having a length shorter than that of the second leg for receiving the channel member in the region between said lip and third leg, the dimensions of the channel member and the first, second, third legs and lip are such so as to releaseably secure the channel member to the bracket to preclude rotational release in a given direction.

---

### 5,016,405
### MODULAR WORKSTATIONS

**Michael E. Lee, Wolverton, Minn., assignor to Rosemount Office Systems, Inc., Lakeville, Minn.**
**Continuation of Ser. No. 339,963, Apr. 18, 1989, abandoned, which is a continuation of Ser. No. 164,574, Mar. 7, 1988, abandoned. This application Sep. 14, 1990, Ser. No. 582,988**
**Int. Cl.$^5$ A47B** *5/00*
**U.S. Cl. 52—36** **10 Claims**



1. A linkable cluster workstation arrangement comprising a first cluster of workstations supported on a floor surface having:

at least first, second third and fourth workstations arranged around a central open core, the core has upright partition walls joined at upright edges and forming a perimeter of a regular equal sided polygon of at least five and no more than six sides, the core having a central axis with the corners of the polygon on radial lines from the central axis, each workstation comprising a first work surface panel having a generally horizontal work surface bounded by five outer peripheral edges defining the shape of an irregular pentagon, the work surface panel, comprising a first straight line edge facing toward a space for a person working at the work surface panel, a second edge joining the first edge and extending inwardly toward the open core at an angle less than 180° relative to the first edge, the second edge lying substantially on a radial line from the central axis and defining a dividing line between the first work surface panel for a first workstation and the first work surface panel for a second workstation;

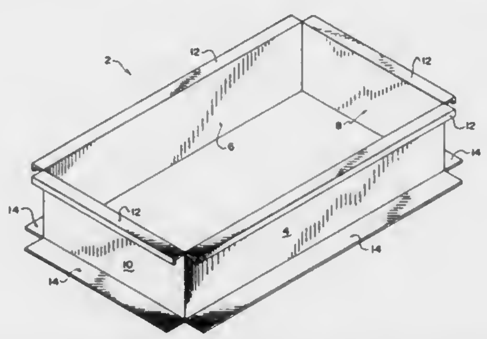
each work surface panel having a third straight line edge joining the second edge at a corner of the polygon core and arranged at an angle less than 180° to the second edge, said third edge abutting on one upright partition wall forming the perimeter of open core, a fourth edge joining the third edge at a corner of the respective upright partition wall abutted by the third edge, the fourth edge extending away from the open core a desired amount substantially along a radial line from the central axis and defining a divider line between the first work surface panel for the first workstation and the first work surface panel for a third workstation, and a fifth straight line edge of the work surface panel joining the first edge and the fourth edge thereof, said polygon central core being bounded by the third edges of at least the four work surface panels and the corners between the third edges and the respective second and fourth edges of each work surface panel defining the corners of such polygon core; and

the fifth edges of adjacent work surface panels aligning to form a straight line, the fifth edges facing outwardly from the central axis and being unobstructed to receive further work surface panels abutted thereagainst to extend outwardly from the first mentioned work surface panels of the first cluster.

---

### 5,016,406
### INTERLOCKING ROOFCURB JOINT

**Bruce T. Calam, Surrey, and Rudy Karlowee, Burnaby, both of Canada, assignors to TNS Holdings Ltd. and RHC Investments Ltd., both of Richmond, Canada**
**Filed Feb. 14, 1990, Ser. No. 479,770**
**Int. Cl.$^5$ E04D** *1/36*
**U.S. Cl. 52—58** **6 Claims**

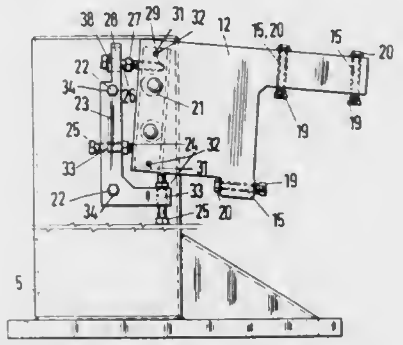


1. An interlocking joint for a roof curb which comprises a male joint member secured to an inner face of a side section of a first curb section, the male joint member being constructed to have an "L" shape, the stem of the "L" being jogged so that an upper portion of the jogged stem adheres to the inner face of the side section, the lower portion of the jogged stem defining a space with the inner face of the side section, and the foot of the "L" extending inwardly from the inner face of the side section, and a female joint member secured to an inner face of an end section of a second curb section, the male joint member and female joint member being adapted to mate with one another and arrange the first curb section and the second curb section at right angles with one another.

---

### 5,016,407
### ROBOT CONVEYOR SYSTEM

**Eberhard Becker, Hagen; Hartwig Sprung, and Roland Staggl, both of Wetter, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany**
**Filed Jun. 1, 1989, Ser. No. 360,843**
**Claims priority, application Fed. Rep. of Germany, Jun. 2, 1988, 3818922**
**Int. Cl.$^5$ E01G** *1/08*
**U.S. Cl. 52—126.1** **1 Claim**



1. Support structure for a beam comprising:

support means for supporting the beam;

at least one bracket means for being connected to said support means for connecting the beam to said support means;

each said bracket means being adapted to be moved in the direction of the y and z axes and adapted to be rotated on said support means around the x axis with movement of the beam in the x direction being possible by means of insertion grooves in the beam;

each said bracket means including adjustment means for being attached to said support means;

each said bracket having at least one binding post hole for receipt of a binding screw for binding strap means with a wall of said support means with each said binding post hole being a larger diameter than the diameter of said binding screw;

said bracket means, said wall of said support means and said strap means each defining hole means for receipt of insertion pins for securing said bracket means and said strap means to said wall of said support means;

said bracket means having boom means which extend above the beam and which connect to the beam;

said insertion grooves of the beam having sliding blocks inserted therein;

said bracket means having bracket straps for receipt of a screw which connects the beam to said bracket strap by means of said screw being inserted within said sliding block and said sliding block being inserted within said insertion groove of the beam;

said bracket means including first and second brackets each being on opposite sides of said support means from one another;

said adjustment means being L-shaped and fastened to said support means by screw means with said screw means including three set screws each of which being in contact with said bracket means;

a first of said set screws extending through a lower leg of said L-shaped adjustment means with a second of said set screws projecting horizontally through a vertical leg of said L-shaped adjustment means and a third of said set screws being guided through a vertical slot in said vertical leg;

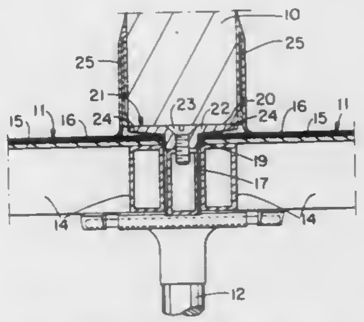
said set screws each being inserted in nuts and supported by spherical disc washers which are secured by said nuts; and

said support having a box profile and a cover plate on a top end with said top end having a handhole which is capable of being covered by a handhole cover.

---

### 5,016,408
### SEALED WALL CONNECTION TO RAISED FLOOR FOR USE IN GERM-FREE CHAMBERS OR THE LIKE

**Martin Brillinger, Würzburg; Wolfgang Hiller, Karlstadt-Laudenbach; Ulrich Klingelhoefer, Waldbuettelbrunn, and Manfred Radtke, Margetshoechheim, all of Fed. Rep. of Germany, assignors to Mero-Werke Dr. Ing. Max Mengeringhausen GmbH & Co., Fed. Rep. of Germany**
**Filed Jul. 14, 1988, Ser. No. 218,900**
**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1987, 3723907**
**Int. Cl.$^5$ E04B** *2/82*
**U.S. Cl. 52—126.6** **1 Claim**



1. Sealed wall connection with a raised floor for use in germ-free chambers or the like, wherein the floor comprises floor tiles that are laid out on upright posts, characterized in that:

(a) the wall (10) has a bottom edge (20), socket profile rails (21) are connected to said bottom edge (20) and have a greatest width that corresponds substantially to the thickness of said wall (10);

(b) upright support members are provided on the upright posts (12), and the socket profile rails (21) are supported on said upright support members between the floor tiles (11);

(c) the socket profile rails (21) have a middle portion and bottom surfaces (24) that extend from said middle portion outwardly in opposite directions obliquely outwardly and upwardly;

(d) the wall (10) has two sides, and an elastically flexible gasket (25) extends between each side of the wall and the adjacent portions of the floor tiles (11);

(e) the socket profile rails (21) have a longitudinal fillet (22) extending downwardly from said bottom surface at said middle portion thereof;

(f) the floor tiles (11) along the sides of the wall (10) define a gap (19), and said longitudinal fillet (22) extends downwardly through said gap (19); and

(g) the longitudinal fillet (22) of the socket profile rails (21) is connected with said upright support members on said posts (12) between the floor tiles (11).

### 5,016,409

## METHOD FOR RESTRAINING RESPONSE OF A STRUCTURE TO OUTSIDE DISTURBANCES AND APPARATUS THEREFOR

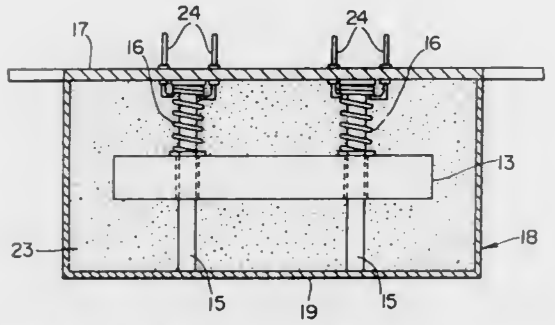
**Takanori Sato, Tokyo, Japan, assignor to Shimizu Construction Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 186,613, Apr. 27, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 445,912**

**Claims priority, application Japan, Apr. 28, 1987, 62-64951; Apr. 28, 1987, 62-105571[U]**

**Int. Cl.$^5$ E04H** *9/02*

**U.S. Cl. 52—167 DF** **4 Claims**



1. An apparatus for restraining vibration of a structure, having at least one natural mode of vibration, the apparatus comprising:

(a) an enclosure defining an inner space therein;

(b) a main weight having mass and being enclosed in the enclosure, said enclosure further comprising a guide means for permitting a movement of the main weight exclusively in a vertical direction, and said main weight being in a closed form defining a chamber therein, and liquid having a free surface being retained in the chamber, whereby the main weight is able to vibrate at a vertical natural frequency in a vertical direction and the liquid is capable of sloshing at a horizontal natural frequency in response to a horizontal movement of the main weight together with said enclosure;

(c) a resilient member connecting the weight to the enclosure and exerting on the weight, a restoring force proportional to the relative displacement of the weight with respect to the enclosure;

(d) viscous liquid retained in said inner space, said liquid having a viscosity which provides to the weight, a damping force proportional to a relative velocity of the weight with respect to the enclosure, said resilience of said resilient member and said mass of said main weight providing said apparatus with at least one natural frequency of vibration; and

(e) adjustment means for adjusting said resilience of said resilient member and/or the mass of said weight, so as to be capable of adjusting said natural frequency of said apparatus to correspond to at least one said natural mode of vibration in said structure so as to restrain vibration in said structure, whereby said natural frequency of said apparatus is capable of being changed as said natural mode of vibration as said structure changes naturally and gradually over time.

---

### 5,016,410

## DEVICE FOR THE LOCALIZED FASTENING OF ELEMENTS HAVING AN EDGE, ESPECIALLY OF PLATES TO A SUPPORTING STRUCTURE

**Uriel P. Moch, 14, rue Claude Génin, F-38000 Grenoble, France**

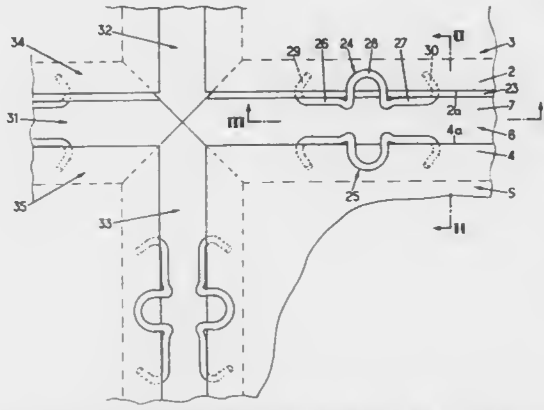
**PCT No. PCT/FR88/00371, § 371 Date Mar. 15, 1989, § 102(e) Date Mar. 15, 1989, PCT Pub. No. WO89/00634, PCT Pub. Date Jan. 26, 1989**

**PCT Filed Jul. 19, 1988, Ser. No. 347,891**

**Claims priority, application France, Jul. 21, 1987, 87 10310; Jan. 7, 1988, 88 00104**

**Int. Cl.$^5$ E04F** *19/00*

**U.S. Cl. 52—235** **8 Claims**



1. A device for the localized fastening of a plate to a supporting member having a catching lug extending behind the plate, said plate having a front face, a rear face, an edge, and an end face, said catching lug having an edge, said supporting member having an edge parallel to the end face of the plate, the fastening device comprising:

a gripping element having a first part bearing against the front face of the plate, a second part engaged behind the rear face of the plate and a third part connecting the first and second parts thereof and extending across the end face of the plate,

said gripping element being elastically deformable parallel to the end face of said plate so as to bring closer said first and second parts thereof,

said second part of the gripping element having an end lug means engaged behind said catching lug of the supporting member so as to grip the edge of the catching lug,

said elastically deformable gripping element generating an elastic effect for simultaneously gripping the edge of said plate and the edge of said catching lug, said first and second parts of said gripping element being forced to spread apart when opposite forces are exerted on the third part of said gripping element, wherein the edge of the plate and the edge of the catching lug are simultaneously released and the gripping element is movable along the edge of the plate and the edge of the catching lug.

---

### 5,016,411

## BUILDING STRUCTURE AND METHOD AND ELEMENT FOR MAKING SAME

**Ola O. Thorsnes, Oslo, Norway, assignor to A/S Selvaagbygg, Oslo, Norway**

**PCT No. PCT/NO88/00070, § 371 Date Mar. 16, 1990, § 102(e) Date Mar. 16, 1990, PCT Pub. No. WO89/02959, PCT Pub. Date Apr. 6, 1989**

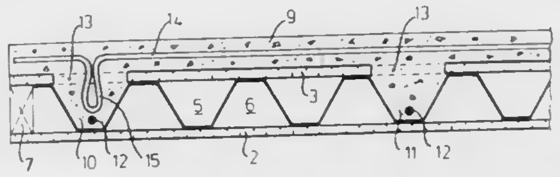
**PCT Filed Sep. 23, 1988, Ser. No. 469,534**

**Claims priority, application Norway, Sep. 24, 1987, 874020**

**Int. Cl.$^5$ E04B** *5/48*

**U.S. Cl. 52—220** **12 Claims**

1. A building structure comprising a first plate having means attached thereto forming parallel channels, at least some of which are filled with concrete which forms ribs, a second plate disposed parallel to said first plate and attached to the channel forming means, said plates being generally continuous, said ribs being provided with reinforcement, as needed, in any portion of said structure to be subjected to strong tensile loads, and said second plate being provided with a cover of concrete, the concrete in said cover and the concrete in said ribs being connected to each other through holes made in said second plate and forming a monolithic connection between said ribs and said cover.



---

### 5,016,412

## COMPOUND THERMAL INSULATING SYSTEM

**Peter Grochal, Waldshut-Tiengen, Fed. Rep. of Germany, assignor to Sto AG, Stuhlingen, Fed. Rep. of Germany**

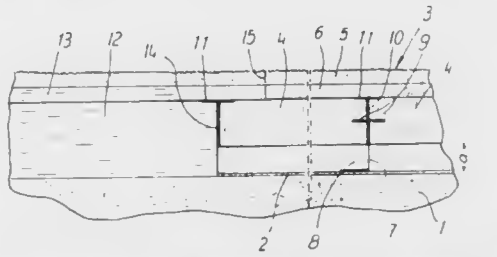
**PCT No. PCT/EP89/00267, § 371 Date Nov. 14, 1989, § 102(e) Date Nov. 14, 1989**

**PCT Filed Mar. 14, 1989, Ser. No. 438,417**

**Claims priority, application Fed. Rep. of Germany, Mar. 14, 1988, 3808482**

**Int. Cl.$^5$ F24J** *2/04, 2/00;* **E04B** *1/74*

**U.S. Cl. 52—302** **20 Claims**



1. Compound thermal insulating system attachable to a building wall having a light absorbent exterior wall surface, the system comprising:

an at least partially transparent insulating material;

a weather-resistant transparent plaster-like protective coating on the outer side of said insulating material for protecting said insulating material externally against the effects of weather, said protective coating having a thickness in the range between 0.5 mm and 6 mm and comprising at least partially transparent filler containing a hardening binder on a scale so that the radiation transmission ratio thereof for vertical sunlight is greater than 20%; and

a transparent reinforcement between said insulating material and said protective coating.

---

### 5,016,413

## RESILIENT FLOOR SYSTEM

**James Counihan, 50 Griffin Mill Rd., Piedmont, S.C. 29673**

**Filed Feb. 14, 1990, Ser. No. 480,209**

**Int. Cl.$^5$ E04F** *13/08*

**U.S. Cl. 52—391** **32 Claims**

1. A resilient flooring system for assembly on a base surface to provide a resilient floor comprising:

a plurality of sub-floor sections arranged generally coextending with said floor in a side-by-side arrangement;

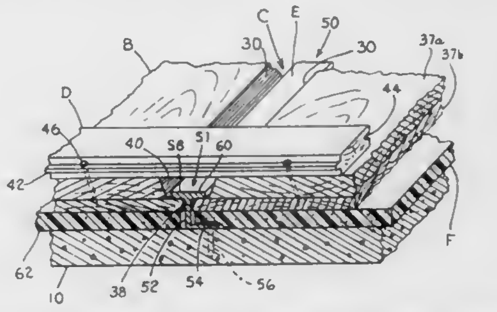
a resilient layer of a resilient material carried on said base surface underneath said sub-floor sections;

slot means defined between adjacent floor sections having an open top;

limit means carried in said slot means for limiting vertical movement of said sub-floor sections in an upward direction while permitting vertical movement in an opposite downward direction;

a plurality of flooring strips extending transverse to said sub-floor sections bridging said open top of said slot means, said flooring strips having an upper floor surface defining an exterior floor; and

means for attaching said flooring strips to said sub-floor sections so that said exterior floor and sub-floor sections move unitarily as limited by said limit means.



---

### 5,016,414

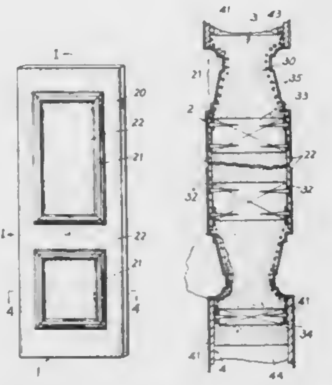
## IMITATED CARVED WOODEN DOOR HAVING THREE-DIMENSIONAL PANEL STRUCTURE

**Guo-Chi Wang, P.O. Box 55-1670, Taipei, Taiwan**

**Filed Jul. 8, 1990, Ser. No. 553,575**

**Int. Cl.$^5$ E06B** *3/78;* **E04C** *2/36*

**U.S. Cl. 52—456** **5 Claims**



1. An imitated carved wooden door comprising:

a pair of surface plastic leathers imitating a true wooden material having wooden texture and surfaces disposed on a front side and a rear side of an imitated carved wooden door, having at least a recess portion and an extending portion formed therein after;

at least a lining core body each said core body secured between said pair of surface plastic leathers and each said core body integrally made to have a plurality of recess portions engageable with and backed under the recess portions formed in said surface plastic leathers and a plurality of extending panels engageable with and backed under the extending portions of said plastic leathers; and

a supporting framework securing said lining core body thereon having said pair of surface plastic leathers disposed on a front side and a rear side of said supporting framework for forming an imitated carved wooden door having said lining core body and said supporting framework sandwiched between said pair of surface plastic leathers;

said lining core body including a filler core integrally formed by a foaming or molding process, a plurality of reinforcing plates transversely formed in the filler core disposed between said pair of extending panels, and a

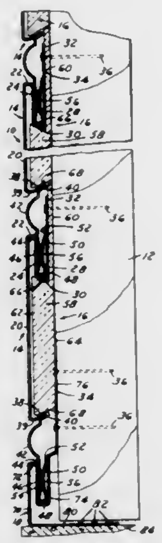
VOL
1126
ISS
3
MY
21
1991
UMI

plurality of wire meshes reinforced under a surface of the filler core, each said reinforcing plate and each said extending panel of the lining core body defining an aperture therebetween for inserting each said wire mesh in said aperture; and

said filler core being selected from plastic materials or foam material preformed with at least a recess portion therein and an extending portion thereon.

---

### 5,016,415
## INSULATED PANEL SIDING
**Warren D. Kellis, 2970 Quail Run, Troy, Mich. 48098**
**Filed Nov. 21, 1989, Ser. No. 439,846**
**Int. Cl.$^5$ E04D** *1/00;* **E04B** *2/08*
U.S. Cl. 52—522 **17 Claims**



8. A panel system useful for side walls and the like comprising:
a plurality of elongated plastic panels,
each said panel having being made of a relatively thin strip which is relatively stiff,
each said panel having parallel longitudinal edges,
each said panel having a front wall and a rearwardly turned first wall extending laterally away from one edge of said front wall,
an integral second wall extending from said laterally extending first wall spaced from the front wall to define a groove,
a third integral wall extending laterally from said second wall, and
a fourth integral wall extending from said third wall and extending generally parallel to said second wall and cooperating with said second wall and third wall to define a groove,
a generally U-shaped integral tongue extending from the other edge of said front wall,
said tongue comprising spaced walls connected by an integral arcuate connecting portion,
one of said walls of said tongue extending from said front wall,
the other of said walls of said tongue extending from said connecting portion along the rear of the front wall of the tongue,
said walls of said tongue being arcuate and spaced apart at the top and bottom and have intermediate arcuate portions,
the distance on said tongue between the one wall and the free edge of the other wall of said tongue at the top and bottom of the tongue in the free, unflexed condition of the tongue being slightly greater than the width of said groove of the adjacent panel such that the tongue of one panel functionally engages the groove of an adjacent panel at the top and bottom and at the arcuate connecting portion.

---

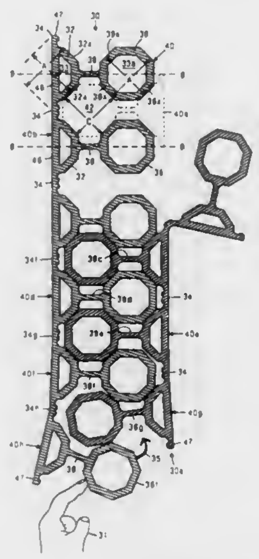
### 5,016,416
## ELONGATE COVER PROFILE AND APPARATUS FOR AND METHOD OF MANUFACTURING THE SAME
**Edmund Munk, Oberstenfeld, Fed. Rep. of Germany, assignor to Werzalit AG & Cl., Oberstenfeld, Fed. Rep. of Germany**
**Filed May 26, 1989, Ser. No. 359,095**
**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1988, 88118489**
**Int. Cl.$^5$ E03B** *5/60;* **E04D** *1/20*
U.S. Cl. 52—539 **2 Claims**

1. A pressed elongate cover profile to be assembled with another such cover profile, said cover profile being made from a mixture of a fiber material and a binding material and having opposite end portions, said cover profile having a wall thickness which increases continuously from one of the opposite end portions to the other of opposite end portions so that in assembled condition the end portion with a greater wall thickness of one cover profile rests on the end portion with a smaller wall thickness of another profile, the end portion with a greater wall thickness having a packing greater than a packing of the end portion with a smaller wall thickness.

---

### 5,016,417
## MODULAR UNIVERSAL CONSTRUCTION UNITS EMPLOYING FLEXIBLE WEB WITH INTERLOCKABLE HEADS
**Robert Mentken, 51 E. 97th St., New York, N.Y. 10029**
**Filed Nov. 6, 1989, Ser. No. 432,461**
**Int. Cl.$^5$ E04B** *2/08*
U.S. Cl. 52—571 **20 Claims**

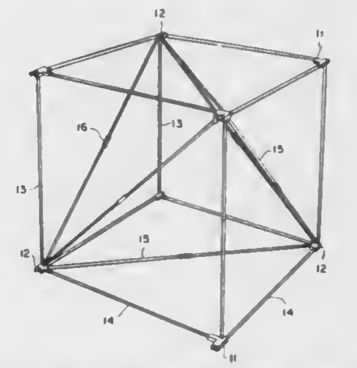
1. A standard construction unit for modular use, comprising:
(a) a flat sheet of material having opposed major surfaces,
(b) a plurality of sets of locking elements attached to one of said major surfaces of said sheet,
(c) each set of locking elements comprising a base member, a neck member attached to said base member, and a head member attached to said neck member,
(d) said base members each:
  (1) being elongated in a first direction parallel to said sheet and having a predetermined dimension in a second direction parallel to said sheet and perpendicular to said first direction,
  (2) extending away from one surface of said sheet in a third direction perpendicular to said sheet so as to form an elongated platform having an upper surface spaced from said one major surface of said sheet in said third direction,
  (3) being attached to said one surface of said sheet,
  (4) extending parallel to all other base members in said first direction,
  (5) being evenly spaced from adjacent base members on said sheet in said second direction so as to define a uniform spacing between all adjacent pair of base members, and
  (6) being separated from each adjacent base member by an elongated web portion of said sheet,
(e) each neck member:
  (1) having lower and upper end, said lower end attached to said upper surface of said platform formed by a corresponding base member, said neck member extending away form said upper surface of said platform in said third direction,
  (2) extending in said first direction and being parallel to all other neck members,
  (3) being evenly spaced in said second direction from adjacent neck members so as to define a uniform spacing between each adjacent pair of neck members, and
  (4) being flexible enough to be repeatedly bent by 90 degrees and having a thickness, as measured in said second direction, which is less than the thickness of the head and base members which it interconnects, such that the space between any pair of adjacent neck members is greater than the space between any corresponding adjacent pair of head members and any corresponding adjacent pair of base members,



(f) said head members each:
  (1) being attached to and extending away from said upper end of said neck member in said third direction,
  (2) extending in said second direction and being parallel to each other,
  (3) being evenly spaced in said second direction so as to define a space between each adjacent pair of head members,
  (4) having a predetermined cross-sectional area, when seen from said first direction,
(g) each of said base members having a predetermined cross-sectional area, when seen from said first direction, which is about half of said cross-sectional area, of each of said head members,
(h) said sheet being sufficiently flexible that it can be repeatedly bent by 90 degrees and returned without breaking along a bend line along any of said web members.

---

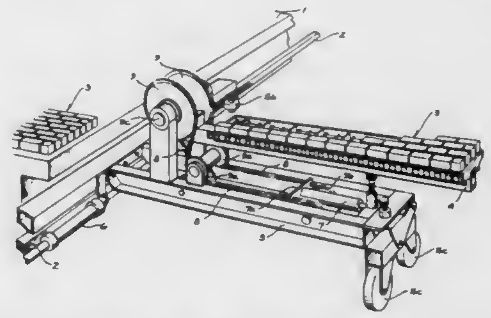
### 5,016,418
## SYNCHRONOUSLY DEPLOYABLE DOUBLE FOLD BEAM AND PLANAR TRUSS STRUCTURE
**Marvin D. Rhodes, Yorktown, Va., and John M. Hedgepeth, Santa Barbara, Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**
**Filed Aug. 22, 1986, Ser. No. 899,683**
**Int. Cl.$^5$ E04H** *12/18*
U.S. Cl. 52—646 **6 Claims**



1. A synchronously deployable structural unit comprising:
eight connection nodes, arranged so as to form the corners of a parallelepiped, each connection node being provided with means for one rigid connection and three hinged connections located in a plane perpendicular to the axes of a rigidly connected member and arranged at 90°—90° C. intervals around the rigid connection;
four rigid structural members, each rigidly connecting two separate connection nodes; and
eight rigid structural members, each connecting two connection nodes by means of hinged connections.

---

### 5,016,419
## BRICK PLACING MACHINE
**Phillip Boot, Nth. Turramurra; Dare Hurst, and Robert Lasseter, both of New South Wales, all of Australia, assignors to Panelbrick Industries Pty. Ltd., New South Wales, Australia**
**Filed Jun. 16, 1989, Ser. No. 366,923**
**Int. Cl.$^5$ B65G** *61/00*
U.S. Cl. 52—749 **7 Claims**



1. A brick placing machine, comprising:
a receptacle having a length substantially corresponding to a maximum width or height of a brick panel to be formed;
a mold adjacent said receptacle on which said brick panel can be formed, wherein said mold receives a plurality of bricks which make up said brick panel, and wherein said plurality of bricks are arranged on said receptacle in a configuration in which said bricks are to be placed on said mold;
brick locating means for positioning each brick in a predetermined position on said receptacle so as to provide spaces

VOL
1126
ISS
3
MY
21
1991
UMI

between said bricks, wherein said spaces between said bricks receive mortar;

brick clamping means for holding said bricks on said receptacle in said predetermined positions;

a first receptacle moving means for moving said receptacle along a side of said mold;

a second receptacle moving means for moving said receptacle from a first position to a second position over said mold; and

brick releasing means for releasing said bricks from said receptacle to said mold in said predetermined positions, wherein said second receptacle moving means moves said receptacle from said second position over said mold to said first position after said bricks are released onto said mold, and wherein said receptacle can be refilled with additional bricks when said receptacle is on said first position.

---

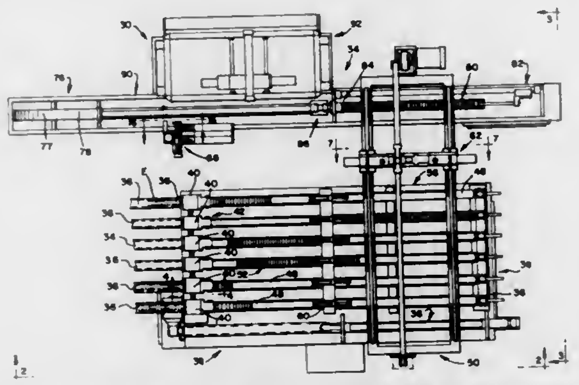
### 5,016,420
### APPARATUS AND METHOD FOR PACKAGING GROUPS OF ARTICLES

**Wayne T. Chiappe, Hinsdale, Ill.; Larry R. Ambrose, Apopka, Fla.; Donald P. Dalmon, Winter Park, Fla.; Bernard R. Juskie, Apopka, Fla., and Raymond E. Godwin, Orlando, Fla., assignors to Sardee Industries, Inc., Alsip, Ill.**

**Continuation of Ser. No. 366,284, Jun. 13, 1989, abandoned, which is a continuation of Ser. No. 251,651, Sep. 30, 1988, abandoned. This application Dec. 8, 1989, Ser. No. 449,311**

**Int. Cl.$^5$ B65B** *9/13, 9/14, 7/08, 35/40*

**U.S. Cl. 53—138.1** **70 Claims**



1. An apparatus for successively packaging groups of articles in a tubular sleeve, said apparatus including means for receiving a group of substantially identical articles arranged in end-to-end relation, means for receiving a continuous length of pre-formed wrapping sleeve material and positioning it for feeding its free end downstream to a package-forming mechanism, and a package-forming mechanism which comprises in combination, reciprocable means for engaging the margin of said sleeve adjacent said free end of said sleeve material, transport means for advancing said margin-engaging means and a package-forming section of said sleeve in a downstream direction from a first position to a second position adjacent an article group insertion area, means for positioning said sleeve margin in said insertion area so as to provide an end opening in said sleeve for entry of said article group, means for releaseably retaining said free end margin in said open position in said insertion area, said transport means further including means for returning said sleeve margin engaging means to said first position, means for inserting said group of articles into said open ended sleeve, first and second, spaced apart clamping means for engaging said sleeve and thereby subdividing said sleeve section into a central portion containing said group of articles and first and second end flap forming portions of said sleeve section lying respectively downstream of said first clamping means and upstream of said second clamping means, means spaced upstream of said second clamping means for cutting said sleeve material means so as to separate the package formed from said sleeve section from said continuous length of sleeve material and form a new free end thereon, means for folding said end flap forming portions such that end flaps closing off the end portions of said package body are created, and means for transferring said packages thus formed to a package storage area.

---

### 5,016,421
### WRAPPING MACHINE, PARTICULARLY FOR SWEETS AND SIMILAR FOOD PRODUCTS

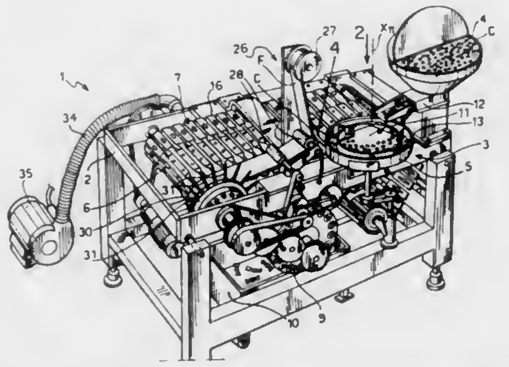
**Pietro Ferrero, Brussels, Belgium, assignor to Ferrero S.p.A., Alba, Italy**

**Filed May 23, 1990, Ser. No. 527,405**

**Claims priority, application Italy, May 24, 1989, 67394 A/89**

**Int. Cl.$^5$ B65B** *11/34*

U.S. Cl. 53—233 **3 Claims**



1. A wrapping machine for wrapping preformed articles such as pieces of candy in wrapper cut from sheet material in which each article is positioned in a central portion of a wrapper which is then wrapped around the articles, and in which ends of each wrapper are gripped by rotary pincers and twisted to form corresponding bow like end twists, the machine having means for individually feeding the pieces of candy to be wrapped to a conveyor for conveying the pieces of candy while being wrapped, means for cutting individual wrappers from a roll of sheet material, means for associating one individual wrapper with one piece of candy, means for gripping each individual piece and folding an associated wrapper around it while moving on the conveyor, movable rotary pincer means for twisting the ends of each wrapper, and means for discharging the wrapped piece, with improvements comprising:

a plurality of plates carried by the conveyor, each plate having a recess generally larger than the shape of an individual piece to be wrapped plus elongated extensions, a biased thrust member positioned in the recess and shaped to receive an individual piece in a central cell portion thereof while having two opposite side flanges, each plate also having grooves separate from the recess and on opposite sides thereof, a source of vacuum connected to the grooves, vacuum from the source and surfaces of the plate acting to hold an individual wrapper on a piece positioned in the cell to keep the piece safely in the cell until the piece is wrapped and to accurately and correctly position the wrapper relative to the piece, and wherein the conveyor means has an upper and a lower horizontal run, the means for feeding the individual pieces is positioned adjacent the upper run and the wrapping of the pieces is accomplished while on the lower run of the conveyor.

### 5,016,422
### APPARATUS FOR SCREW-COUPLING TWO HEAVY WEIGHT COMPONENTS HAVING A COMMON VERTICAL AXIS

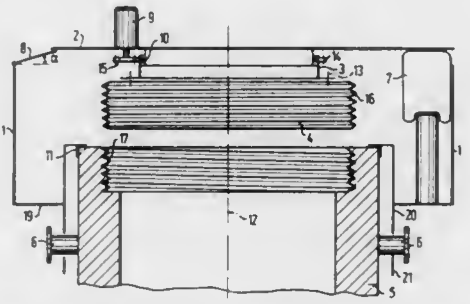
**Franz-Wolfgang Popp, Wedemark; Erwin Krammer, Edemissen-/Abbensen; Wolfgang Genannt, and Dietmar Flebr, both of Celle, all of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft fur Wiederaufarbeitung Von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany**

**Filed Feb. 9, 1989, Ser. No. 307,936**

**Claims priority, application Fed. Rep. of Germany, Feb. 11, 1988, 3804276**

**Int. Cl.$^5$ B67B** *1/06;* **B65B** *7/28;* **B23P** *19/04*

U.S. Cl. 53—330 8 Claims



1. An apparatus for screw-coupling two heavy weight components having a common vertical axis, comprising:

resilient, adjustable length means for keeping the components at an adjustable spacing from each other;

a rotary drive means for relatively rotating the components;

wherein the resilient means is also for maintaining forces, acting in an axial direction along the vertical axis between the components, below a threshold value;

a stationary member which is centered and fixed against rotation on one of the components;

a platform which is displaceable along the vertical axis and which supports at least the other of the components during the threading operation such that it can be rotated with respect to the platform about the vertical axis, the platform being supported in a vertical direction with respect to the stationary member by the resilient means; and

support means coupling the platform and the stationary member for guaranteeing torque support, permitting vertical movement, and ensuring centering between the platform and the stationary member, wherein the support means includes a plurality of link rods each of which is hingedly connected to the platform and the stationary member along the circumference of the stationary member.

---

### 5,016,423
### METHOD AND A DEVICE FOR FOLDING THE ENDS OF TUBULAR WRAPPINGS

**Mario Spatafora; Bruno Grandi, and Antonio Gamberini, all of Bologna, Italy, assignors to G.D. Societa Per Azioni, Bologna, Italy**

**Filed Nov. 13, 1989, Ser. No. 434,712**

**Claims priority, application Italy, Nov. 14, 1988, 3660 A/88**

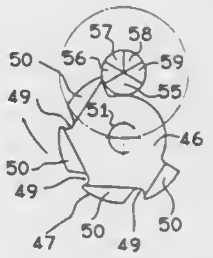
**Int. Cl.$^5$ B65B** *7/16*

U.S. Cl. 53—476 **11 Claims**

1. A method of folding an endmost projecting strip of a tubular wrapper into contact with a corresponding end surface of a commodity convolutely enveloped by the wrapper about a longitudinal axis of the wrapper, comprising the steps of:

(a) utilizing a first folding device to flatten a first portion of said projecting strip against said end surface of said commodity in such a way as to cover an area of said end surface extending through an angle less than 180° around a first axis that coincides with said longitudinal axis of the wrapper;

(b) flattening a succession of further portions of said projecting strip against said end surface, utilizing a plurality of respective second folding devices distributed about a second axis on a common support that is separate from said first folding device, said second axis being parallel to said longitudinal axis and coinciding with an axis of rotation of said support, by which the second folding devices are carried in a position facing said end surface of the commodity in such a way as enables said second folding devices to be brought singly and successively into contact with said further portions of the projecting strip by causing said support to simultaneously rotate about said second axis one and continuous complete revolution for each time that step (a) is conducted, and to orbit about said longitudinal axis with at least one second folding device remaining in contact with said projecting strip against said end surface of said commodity through step (b).



---

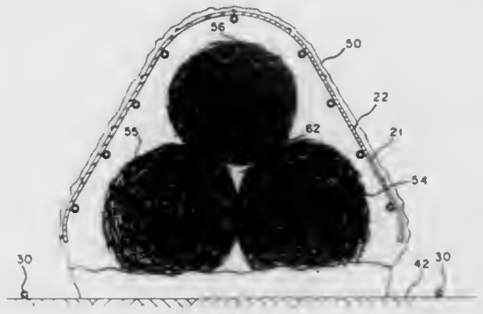
### 5,016,424
### DEVICE FOR DEPLOYING TUBULAR SHEET MATERIAL, AND METHODS OF UTILIZATION THEREOF

**William Stirling, P.O. Box 202, Lower Nicola, B.C., Canada V0K 1Y0**

**Continuation-in-part of Ser. No. 116,062, Oct. 1, 1987, abandoned. This application Nov. 1, 1989, Ser. No. 430,135**

**Int. Cl.$^5$ B65B** *9/15, 25/02, 39/00, 31/08*

U.S. Cl. 53—459 **9 Claims**



1. A method of bagging a plurality of cylindrical bales of forage comprising moving a compressed assembly of tubular sheet material away from an anchored end of such material whereby to deploy said material as an extended tube, and inserting into such extended tube,a plurality of cylindrical bales of forage in an end-for-end series, wherein said bales are also arranged in a triangular array with two bales side-by-side on a lower portion of the tube and a third bale resting on and between said two bales, the three bales defining a central space between them, said space extending along the end-for-end series of bales.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,425
### DISPENSER FOR THE VAPORIZATION OF ACTIVE SUBSTANCES TO BE INHALED

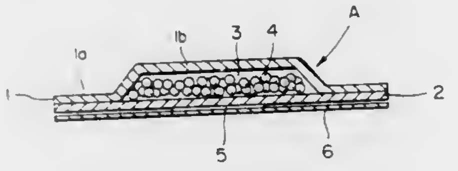
**Heinz H. Weick, 94, rue de la Servette, 1202 Geneva, Switzerland**

**Division of Ser. No. 327,128, Mar. 22, 1989, Pat. No. 4,955,945. This application May 18, 1990, Ser. No. 525,064**

**Claims priority, application Switzerland, Jul. 13, 1988, 02661/88; Sep. 19, 1988, 03483/88; Dec. 21, 1988, 04713/88**

**Int. Cl.$^5$ B65B** *47/10*

**U.S. Cl. 53—453** **18 Claims**



1. A method for the manufacture of a dispenser of active substances, said method comprising:
   receiving a first layer of absorbent air penetrable material,
   deforming the layer to form at least one dish-like deformation,
   placing micro-capsules in the deformation,
   pasting a second layer on the first layer to form a lid,
   providing an adhesive layer on the second layer,
   placing on adhesive layer a peelable protective foil that covers the entire second layer and which upon peeling the adhesive layer in an adhesive state,
   punching the peripheral area of said dispenser to separate the dispenser from said layers,
   subjecting the dish-like deformation at least, before the placing of micro-capsules on it, until the second layer is pasted over it, to an indraft that flows through the first layer within the area of the deformation,
   wherein the second layer located above the deformation is provided with the adhesive layer the surface area of which is smaller than the outline of the dispensers of active material, in such a way that the punched peripheral sections forming the dispensers of active substances will be located in zones that are free of adhesive layers.

---

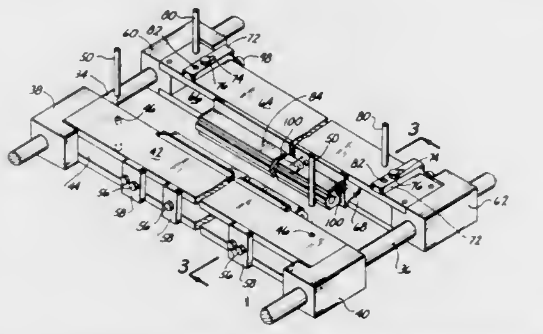
### 5,016,426
### BIASED CROSS SEAL FOR PACKAGING MACHINE

**Steven D. Davis, Yuciapa, Calif., assignor to W. A. Lane, Inc., San Bernardino, Calif.**

**Filed Aug. 11, 1989, Ser. No. 393,524**

**Int. Cl.$^5$ B65B** *9/02, 51/12;* **B30B** *5/00*

**U.S. Cl. 53—554** **9 Claims**



4. In combination with a form, fill and seal packaging machine of the type having a housing with left and right cross seals guide rods fixedly mounted on said housing, an improvement comprising:
   an elongated seal bar;
   a slide assembly operatively mounted on said left and right guide rods to reciprocally slide on said guide rods;
   activator means for sliding said slide assembly on said guide rods;
   adjustment means for variably positioning said slide assembly with respect to said activator means axially in a direction parallel with the axes of said guide rods;
   said adjustment means operatively interspaced between said slide assembly and said activator means whereby motion is transferred from said activator means to said slide assembly through said adjustment means;
   a plurality of connecting means for movably attaching said seal bar to said slide assembly; and
   biasing means for biasing said seal bar from a position wherein said seal bar is juxtapositional with said slide assembly towards a distal position wherein said seal bar is spaced from said slide assembly.

---

### 5,016,427
### FILM UNWINDING CARRIAGE FOR A PACKAGING MACHINE

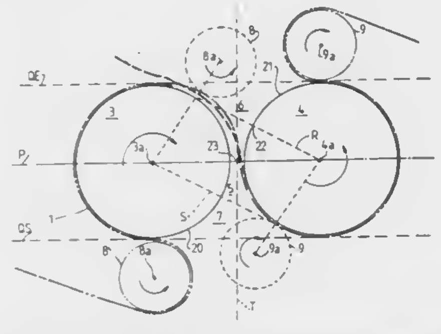
**Jacques Thimon, St. Louis, Mo., and Jack Morantz, Westmount, Canada, assignors to Newtec International (Societe Anonyme), Aix-Les-Bains, France**

**Filed Aug. 31, 1990, Ser. No. 576,698**

**Claims priority, application France, Sep. 6, 1989, 89 11638**

**Int. Cl.$^5$ B65B** *41/16*

**U.S. Cl. 53—44** **21 Claims**



1. A process for using a carriage for unwinding packaging film, comprising a stand; a supporting shaft for a film reel, to allow the pivoting of the reel and the unwinding of the film; a device with rollers of axes parallel to that of the supporting shaft; this carriage being intended to be incorporated in a packaging machine;
   an initial phase of associating a reel with a supporting shaft;
   a subsequent phase of positioning the film web in the roller device (2) comprising of one upstream and one downstream main rollers (3, 4), defining between them a passage (5) having an entry orifice (6) and an exit orifice (7) and designed to rotate about their axes (3*a*, 4*a*) in opposite directions, and one upstream and one downstream guide rollers (8, 9) of axes (8*a*, 9*a*) parallel to the main roller axes (3*a*, 4*a*) which guide rollers, in their final film feeding operational location, are respectively set apart upstream from the entry orifice (6) and downstream from the exit orifice (7) relative to the direction of movement of the film;
   a phase of unwinding the film for the packaging of the load, wherein, in the phase of positioning the film web:
   the starting point is an initial state of displacing the upstream and downstream guide rollers (8, 9) from their said operational location to a temporary initial positioning location, where they are respectively nearest to the entry orifice (6) and to the exit orifice (7);
   in an initial introduction phase, introducing an initial end (19) of the film (1) between the upstream main roller (3) and the upstream guide roller (8) and in the direction of the downstream main roller (4);

   in a subsequent running phase, rotating the upstream and downstream main rollers (3, 4) about their axes (3*a*, 4*a*), and a particular length of film (1) is made to run in the direction of its introduction into the device (2) between the downstream guide roller (9) and the downstream main roller (4);
   and in a final positioning phase, displacing the upstream and downstream guide rollers (8, 9) from their initial location to their final operational location to bend the film (1), around and at the same time laying it against the upstream and downstream main rollers (3, 4).

---

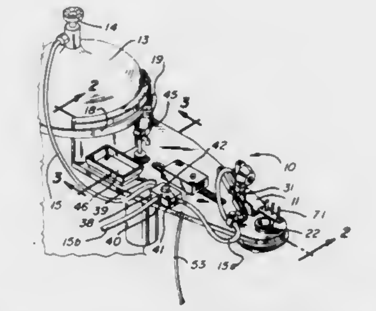
### 5,016,428
### INFLATING APPARATUS AND METHOD

**Robert W. Helling, 11214 Quivas Way, Westminster, Colo. 80234, and Daniel J. Helling, 8288 Pecos St., Denver, Colo. 80221**

**Filed Jan. 3, 1990, Ser. No. 460,584**

**Int. Cl.$^5$ B65B** *67/12, 67/06, 31/06, 43/26*

**U.S. Cl. 53—403** **23 Claims**



1. Apparatus for inflating a balloon comprising:
   means for supporting a balloon having a main body from which extends a neck portion terminating in an annular end section defining a fill opening, said means for supporting including a mounting sleeve having an inside through passage and a top lip portion with said annular end section being expanded around and compressing against an outer peripheral surface of said top lip portion to form an airtight seal, said neck portion extending over a top edge portion of said top lip portion and downwardly through said through passage and said main body being disposed below said mounting sleeve,
   means for inflating said balloon with a gas via said fill opening, and
   means for closing said fill opening in said balloon to retain the gas in the inflated balloon.

---

### 5,016,429
### APPARATUS FOR DEHEADING WRAPPED PAPER ROLLS

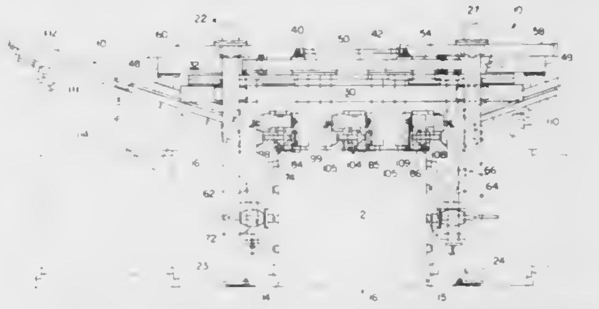
**Robert H. Kubsik, West Bloomfield, and Mir Q. Ali, Troy, botb of Mich., assignors to Jervis B. Webb Company, Farmington Hills, Mich.**

**Filed May 25, 1990, Ser. No. 529,190**

**Int. Cl.$^5$ B65B** *69/00;* **B26D** *5/34*

**U.S. Cl. 53—381.1** **8 Claims**

1. Apparatus for deheading a wrapped cylindrical paper roll, having a longitudinal axis and a pair of oppositely facing generally circular end surfaces each covered with a head at a deheading station provided with supporting means for rotating said paper roll about said longitudinal axis, said apparatus comprising:
   frame structure positioned at said station in fixed relation with said roll supporting means, said frame structure including a trackway extending substantially parallel to the longitudinal axis of a paper roll positioned on said supporting means and in spaced relation with the periphery of said paper roll;
   a carriage supported by said frame structure for movement on said trackway, and actuating means interposed between said carriage and said frame structure for moving said carriage axially relative to said paper roll;
   locating means attached to said carriage for defining the axial positioning of said carriage relative to said paper roll, said locating means including a locating member disposed in facing relation with one of said head covered paper roll end surfaces and extending in transverse oblique relation to said longitudinal axis, said locating member being engageable with a portion of said one head covered end surface spaced radially from said longitudinal axis in response to axial movement of said carriage by said actuating means;
   cutter means mounted on said carriage for movement between clearance and contacting relation with the periphery of said paper roll, and means for defining an axial cutting position of said cutter means relative to said locating means whereby the head covering the end surface of said paper roll engaged by said locating head is severable in response to movement of said cutter means to said contacting relation and in response to rotation of said paper roll by supporting means.



---

### 5,016,430
### CRIMPING APPARATUS USED IN WRAPPING CYLINDRICAL OBJECTS

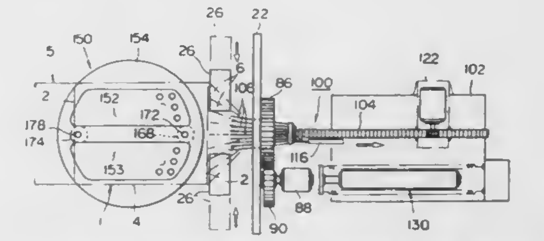
**Kiyochika Itoh, Tokyo, and Toshi Doyoshita, Komatsu, both of Japan, assignors to Tokyo Winder Co., Ltd., Tokyo, Japan**

**Filed Feb. 7, 1990, Ser. No. 477,259**

**Claims priority, application Japan, Feb. 8, 1989, 1-29245; Feb. 8, 1989, 1-29247; Sep. 12, 1989, 1-236615**

**Int. Cl.$^5$ B65B** *7/14, 11/54*

**U.S. Cl. 53—370.2** **8 Claims**



1. A crimping apparatus used for crimping at least one end of a sheet form wrapping material applied around a cylindrical object, wherein said cylindrical object defines an outer peripheral surface of circular cross section, two end surfaces, and a longitudinal axis parallel to said outer peripheral surface, the wrapping material being wrapped around the outer peripheral surface of the cylindrical object in such a manner as to extend beyond at least one end surface of the cylindrical object, thereby forming at least one extension of the wrapping material, the crimping apparatus including a sheet folding mechanism comprising:
   (a) a plurality of movable plates disposed in a ring formation such that when said cylindrical object is moved into position for crimping of said at least one extension of the

VOL
1126
ISS
3
MY
21
1991
UMI

wrapping material, said plurality of movable plates are disposed circumferentially around said at least one extension of the wrapping material with each movable plate oriented approximately radially with respect to the extension of the wrapping material, each of the movable plates being of an elongated shape a lengthwise direction of which is disposed approximately along the radial direction of the cylindrical object, said plurality of movable plates being movable centrally in unison in approximately a radial direction in only a plane parallel to said end surface of said cylindrical object, whereby said at least one extension of the wrapping material, is folded inward and against the respective end surface of the cylindrical object along each line where each movable plate comes into contact with said extension of the wrapping material thereby creating a plurality of folds in said extension of the wrapping material;

(b) a rotating means for rotating said plurality of movable plates in unison in a plane parallel to said end surface of said cylindrical object, thereby flattening said plurality of folds and causing said plurality of folds to fold flush against said end surface;

wherein said movable plates each comprise a folding edge oriented approximately parallel to said extension of the wrapping material prior to crimping, said folding edges coming into contact with the outer peripheral surface of said extension of the wrapping material when said plurality of movable plates move centrally in unison, each of said movable plates further comprising a pair of spreaders oriented approximately parallel to said end surface of the cylindrical object, and moving substantially parallel and adjacent to said end surface of the cylindrical object, each spreader of said pair of spreaders including a pivot joint at the end of said spreader closest to said folding edge of said movable plate, whereby each spreader can open in a manner analogous to the opening of scissors, said opening of said pair of spreaders occurring approximately in a plane parallel to said end face of said cylindrical object while said movable plate is moving centrally, whereby adjacent spreaders on adjacent movable plates move into an approximately parallel, adjacent relationship, thereby compressing one of said plurality of folds into an approximately flat configuration.

---

## 5,016,431
## THREAD DEFLECTORS, PARTICULARLY FOR A HOLLOW SPINDLE MACHINE

**Henri Genevray, Guebwiller, France, assignor to N. Schlumberger Et Cie, S.A., Guebwiller, France**

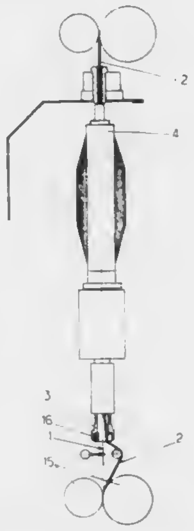
**Filed Jul. 7, 1989, Ser. No. 376,606**

**Claims priority, application France, Jul. 12, 1988, 88 09657**

**Int. Cl.$^5$ D02G** *03/36*

**U.S. Cl. 57—19** **7 Claims**

1. In a hollow spindle machine of the winding type having a twisting device (3) for thread (2) from a spindle to twist the thread on itself; the improvement comprising a deflection member (1) for deflecting the thread against the twisting device (3), displacement means (5) for displacing said deflection member (1) from a first position (6), during normal operation of the machine, in which the thread (2) is out of contact with the deflection member (1) and out of contact with the twisting device (3), to a second position (7) only during the phases of acceleration, deceleration and stoppage of the machine, in which second position (7) the thread (2) is applied by the deflection member (1) with which it is in contact against the twisting device (3), so as to impart to the thread (2) during only the phases of acceleration, deceleration and stoppage of the machine the false tension necessary to ensure to the thread during those phases constant tension and winding independently of the speed of thread travel, and control means responsive to acceleration, deceleration, stoppage and normal operation of the machine to actuate said displacement means (5).



---

## 5,016,432
## YARN PIECING ARRANGEMENT FOR TWO COMPONENT PRESTRENGTHENED YARN SPINNING MACHINE

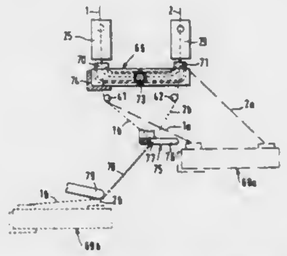
**Fritz Stahlecker, Bad Überkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Fed. Rep. of Germany, a part interest**

**Filed May 11, 1989, Ser. No. 350,350**

**Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817221**

**Int. Cl.$^5$ D01H** *1/115, 15/00*

**U.S. Cl. 57—261** **22 Claims**



1. Spinning machine apparatus comprising yarn component transfer means for transferring a pair of yarn components supplied by a pair of substantially spaced apart false twisting means to yarn connecting means for connecting the yarn components with a pair of previously formed closed adjacent yarn components,

wherein said yarn component transfer means includes suction gripper means for simultaneously gripping the yarn components at the spaced apart false twisting means, gripper moving means for moving the gripper means and gripped yarn components from the false twisting means to a yarn connecting means and yarn component guide means for guidably moving the yarn components substantially closer together to form a double yarn during movement of the gripper means from the false twisting means to the yarn connecting means,

wherein the suction gripper means has two distinct suction openings connected to a common suction pipe, said suction openings being spaced from one another by a distance corresponding to the distance between the yarn component outlets of the spaced apart false twisting means.

---

## 5,016,433
## METHOD AND APPARATUS FOR MONITORING, GRASPING AND RELEASE OF YARN TUBES BY AN AUTOMATIC BOBBIN CHANGER FOR A TEXTILE RING SPINNING OR TWISTING MACHINE

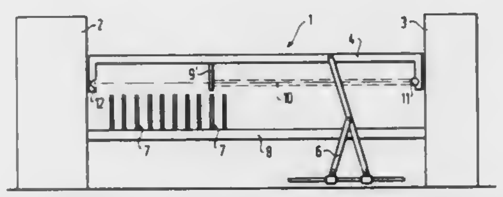
**Oliver Putz, Ostfildern, and Herbert Konig, Ebersbach/Fils, both of Fed. Rep. of Germany, assignors to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany**

**Filed Oct. 23, 1989, Ser. No. 425,428**

**Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836330**

**Int. Cl.$^5$ D01H** *9/02*

**U.S. Cl. 57—264** **25 Claims**



13. In combination with a textile ring spinning machine, ring twisting machine, and like textile machines, and an automatic bobbin changer of the type having a plurality of grasping members selectively operable for simultaneously grasping and then simultaneously releasing a plurality of yarn tubes for selective supply and removal of yarn tubes to and from the textile machine, apparatus for monitoring the bobbin changer comprising (a) means operative after an operation of the bobbin changer for grasping a plurality of tubes for generating and directing a first light beam through an area previously occupied by the tubes upon which the bobbin changer performed the tube grasping operation and operative after an operation of the bobbin changer for releasing a plurality of grasped tubes for generating and directing a second light beam through an area previously occupied by tubes upon which the bobbin changer performed the tube releasing operating, and (b) means associated with the light beam generating and directing means for determining whether the first light beam is interrupted by any tube which the bobbin changer failed to grasp, for determining whether the second light beam is interrupted by any tube which the bobbin changer failed to release, and for generating a failure signal when interruption of either light beam is determined.

---

## 5,016,434
## RING SPINNING AND SPOOLING FRAME

**Heinz Kamp, Wegberg, Fed. Rep. of Germany, assignor to W. Schlafhorst AG & Co., Monchen-Gladbach, Fed. Rep. of Germany**

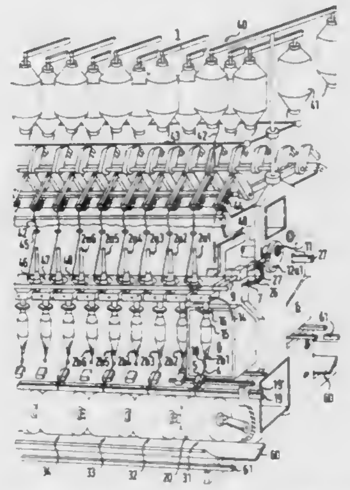
**Filed Sep. 11, 1989, Ser. No. 405,640**

**Claims priority, application Fed. Rep. of Germany, Sep. 10, 1988, 3830852**

**Int. Cl.$^5$ D01H** *7/00, 9/00*

**U.S. Cl. 57—313** **16 Claims**

1. Ring spinning and spooling frame, comprising spooling stations, bearing plates, a plurality of spindles pointing in opposite vertical directions in pairs on each of said bearing plates, at least two of said pairs of said spindles being associated with one of said spooling stations, said bearing plates being movable in position between a ring spinning position and an unreeling swiveled position of said spindles, and an apparatus carrying said bearing plates, said apparatus pivoting one of said bearing plates through 180° about a horizontal axis out of the vicinity of adjacent bearing plates between said ring spinning position and said unreeling swiveled position of said spindles.



---

## 5,016,435
## METHOD OF CONTROLLING A PFBC PLANT IN THE EVENT OF OPERATIONAL DISTURBANCE IN THE GAS TURBINE UNIT

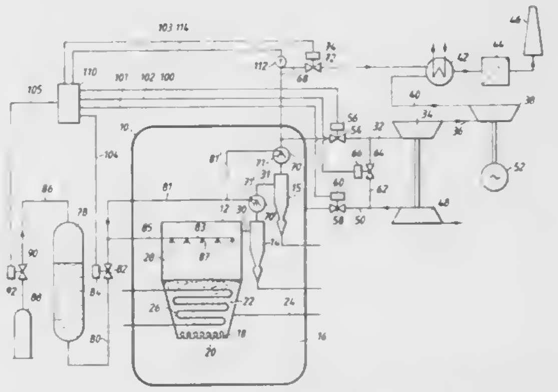
**Roine Brännström, Finspong, Sweden, assignor to ABB Stal AB, Sweden**

**Continuation of Ser. No. 278,894, Dec. 2, 1988, abandoned. This application Sep. 28, 1990, Ser. No. 598,823**

**Claims priority, application Sweden, Dec. 2, 1987, 8704823**

**Int. Cl.$^5$ F02C** *3/26*

**U.S. Cl. 60—39.05** **5 Claims**



1. A method of controlling a PFBC plant in the event of operational disturbance in the turbine unit, the PFBC power plant having a bed vessel enclosed within a pressure vessel and surrounded by compressed combustion air, the bed vessel containing a bed of fluidizable particulate material; a gas turbine-compressor unit driven by combustion gases from the bed vessel; a first cut-off valve in a supply conduit for propellent gas to a turbine; a second cut-off valve in the conduit from a compressor to the bed vessel; a third cut-off valve in a by-pass conduit between the turbine and the compressor; and a blow-off valve in a conduit for dumping combustion gases from the bed vessel, said method comprising the steps of:

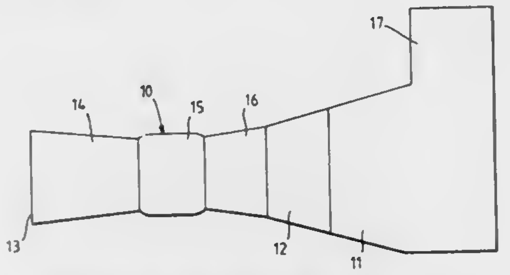
isolating the gas compressor-turbine unit from the bed vessel by closing the first cut-off valve in the supply conduit and the second cut-off valve in the conduit from the compressor to the bed vessel;

VOL
1126
ISS
3
MY
21
1991
UMI

- short-circuiting the compressor-turbine unit by opening the valve in the bypass conduit;
- dumping the combustion gases by opening said blow-off valve; and
- injecting cooling water into the combustion gases being dumped in the conduit for dumping the combustion gases at a location between the bed vessel and said blow-off valve such that said combustion gases are cooled before reaching said blow-off valve.

---

### 5,016,436
## INTERTURBINE DUCT
**Bryan L. Belcher, and Michael T. Todman, both of Warwick, England, assignors to Rolls-Royce plc, London, England**
**Filed Aug. 29, 1988, Ser. No. 237,710**
**Claims priority, application United Kingdom, Oct. 20, 1987, 8724537**
**Int. Cl.$^5$ F02K** *3/04*
**U.S. Cl. 60—264** **6 Claims**

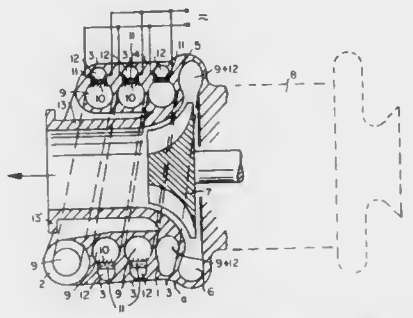


1. An interturbine duct interconnecting an exhaust nozzle of a gas turbine engine with an inlet of a power turbine which is adapted to be driven by exhaust efflux of the gas turbine engine, said interturbine duct being of generally frusto-conical configuration and having an inner and outer skin radially spaced apart and of generally corresponding configuration so that said skins cooperate to define an annular cross-section volume of generally frusto-conical configuration, said radially inner skin defining an open ended passage, means being provided at a larger diameter extent of said duct to introduce a cooling fluid into said defined volume in a direction which is generally tangential to the circumference of said duct so that said cooling fluid follows a generally spiral-shaped path through said defined volume to a smaller diameter extent of said duct, means being provided at said smaller diameter extent too exhaust said cooling fluid from said defined volume, said duct including additional means to introduce a cooling fluid into said defined volume at a position intermediate said first fluid introduction means and said smaller diameter extent of said interturbine duct, said additional cooling fluid introduction means being so disposed as to cause the cooling fluid flow introduced thereby to reinforce the flow of said initially introduced cooling fluid along said generally spiral path.

---

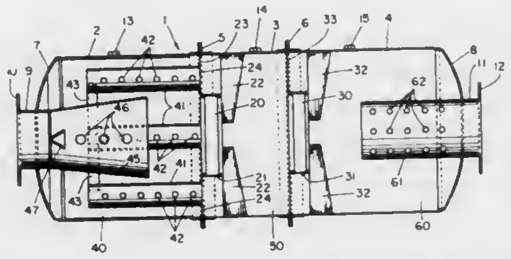
### 5,016,437
## APPARATUS FOR CLEANING DIESEL ENGINE EXHAUST GAS
**Werner M. Huether, deceased, late of Karlsfeld; by Berta L. Huether, heir, Fuerth, and Axel Rossmann, Karlsfeld, all of Fed. Rep. of Germany, assignors to MTU Motoren- und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany**
**Filed Sep. 1, 1989, Ser. No. 402,049**
**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1988, 3830761**
**Int. Cl.$^5$ F01N** *3/02*
**U.S. Cl. 60—280** **14 Claims**

1. An apparatus for cleaning diesel engine exhaust gas, comprising flow channel housing means forming an exhaust gas flow channel having a plurality of windings shaped for causing an exhaust gas flow exposed to centrifugal force, said flow channel housing means having an inlet for connection to an engine exhaust and outlet means for discharging cleaned exhaust gas, said gas flow channel having radially outer, inwardly facing surface areas for collecting soot particles by centrifugal force, heating means positioned for combusting soot collected by said soot collecting surfaces, said exhaust gas flow channel having two channel sections (9, 12) forming said windings, so that one channel section (9) is located radially inwardly of the other channel section (12) and filter means (11) positioned between said two channel sections for forming said soot collecting surfaces.



---

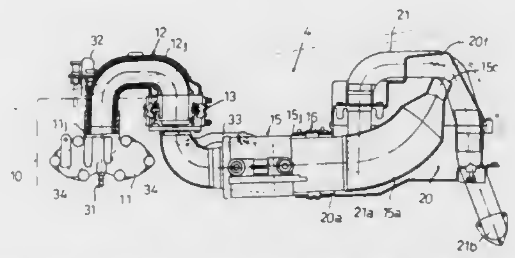
### 5,016,438
## EMISSION CONTROL APPARATUS
**Harold L. Harris, Houston, Tex., assignor to Harris International Sales Corporation, Houston, Tex.**
**Filed Sep. 25, 1989, Ser. No. 411,818**
**Int. Cl.$^5$ F01N** *3/28*
**U.S. Cl. 60—299** **27 Claims**



1. Improved emission control apparatus for use with an internal combustion engine, said apparatus having an enclosed cylindrical housing with an inlet at one end thereof for connection with the exhaust of said engine and an outlet at the opposite end thereof; converter means being mounted in said housing for reducing noxious gases emitted from said engine by converting nitrogen oxides, carbon monoxides and unburned hydrocarbons to less noxious compounds for discharge through said outlet, wherein said converter means comprises: a first catalytic cell transversely disposed in said cylindrical housing at a fixed distance from said housing inlet and a second catalytic cell transversely disposed in said cylindrical housing at a fixed distance from said first catalytic cell, the cross-sectional area of said first catalytic cell being less than the cross-sectional area of said cylindrical housing leaving one or more return areas which allow at least some of said engine exhaust passing through said first catalytic cell to return through said return areas for recirculation through said first catalytic cell, all of said engine exhaust passing through said second catalytic cell prior to discharge through said outlet.

---

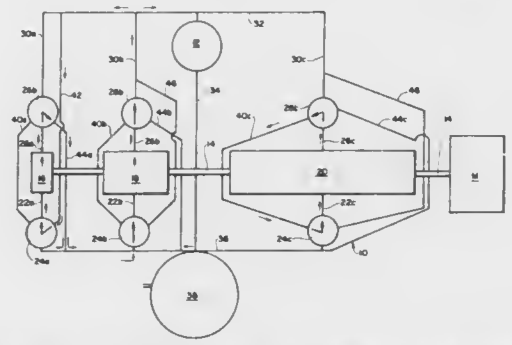
### 5,016,439
## EXHAUST SYSTEM FOR A SMALL WATERCRAFT ENGINE
**Shigemitsu Nitta, Kakogawa, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan**
**Filed Oct. 5, 1989, Ser. No. 417,750**
**Claims priority, application Japan, Oct. 8, 1988, 63-131990; Oct. 8, 1988, 63-131992; Jan. 5, 1989, 1-58021**
**Int. Cl.$^5$ F01N** *3/04*
**U.S. Cl. 60—310** **5 Claims**



1. An engine exhaust system for a small watercraft having a hull with an engine room and an engine in said engine room fixed to the hull through a damper and having an exhaust port, said system comprising an expansion chamber fixed to the hull and having an inlet, said engine and expansion chamber being mounted independently of each other along a longitudinal direction of the engine room, an exhaust pipe having an outlet fixed to the engine and connecting said exhaust port of said engine and said inlet of said expansion chamber, a fitting provided with thermal durability and flexibility connecting said inlet of said expansion chamber and said outlet of said exhaust pipe, and a muffler following said expansion chamber, and at least half of said expansion chamber is inserted into said muffler.

---

### 5,016,440
## APPARATUS FOR DELIVERING A CONTROLLABLE VARIABLE FLOW OF PRESSURIZED FLUID
**William F. Sager, 1552 John Anderson Dr., Ormond Beach, Fla. 32074**
**Filed Oct. 13, 1989, Ser. No. 421,353**
**Int. Cl.$^5$ F16D** *31/02*
**U.S. Cl. 60—429** **26 Claims**

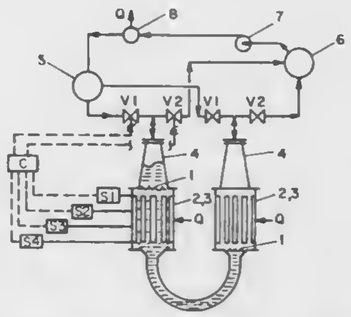


1. Apparatus for delivering a controllable, variable flow of pressurized fluid, which comprises:

conduits defining a circulating fluid flow system, said flow system passing through transducer means for transferring energy as a mechanical input or output to or from pressurized fluid circulating in said system; at least first and second nonadjustable, constant volumetric pump means operatively connected between high pressure and lower pressure fluid flow conduits of said flow system, said pump means being in parallel flow relation to each other and in operative flow communication with said transducer for transferring power through and out of said apparatus; operating shaft means engaging said first and second pump means, and means for selectively isolating fluid flow through said first and second pump means from said transducer, whereby energy applied to said fluid flow system through one of said shaft means or transducer may be applied to the other of said shaft means or transducer with variable pressure and fluid flow velocity in said flow system, depending on whether one or both pump means are in operating mode with the flow system.

---

### 5,016,441
## HEAT REGENERATION IN ENGINES
**Adolf P. Pinto, 369 Hartert Dr., Idaho Falls, Id. 83404**
**Continuation-in-part of Ser. No. 108,538, Oct. 7, 1987, abandoned. This application Jan. 30, 1989, Ser. No. 308,929**
**Int. Cl.$^5$ F01B** *29/08*
**U.S. Cl. 60—516** **4 Claims**



1. A method for using heat regeneration in a piston-cylinder engine for the purpose of obtaining improved thermal efficiency, the engine comprising a heat regenerator, one end of which is connected to a cylinder in which a piston seals and operates on a working gas, the cylinder being provided with means to add heat to the working gas, the method consisting of:

(a) receiving a charge of working gas into the end of the regenerator not connected to the cylinder, the charge of working gas received into the regenerator hereafter referred to as the fresh working gas and the working gas already present in the regenerator and cylinder when the fresh working gas is received into the regenerator hereafter referred to as the residual working gas, the pressure of the fresh working gas being approximately equal to the pressure of the residual working gas,

(b) expanding the fresh and the residual working gas in the regenerator and the cylinder with the addition of heat,

(c) expelling the expanded fresh working gas from the regenerator, the expanded fresh working gas being expelled through the end of the regenerator into which the fresh working gas was received in step (a) above,

(d) compressing the residual working gas remaining in the regenerator and the cylinder to approximately the same pressure as the fresh working gas about to be received into the regenerator for the next cycle.

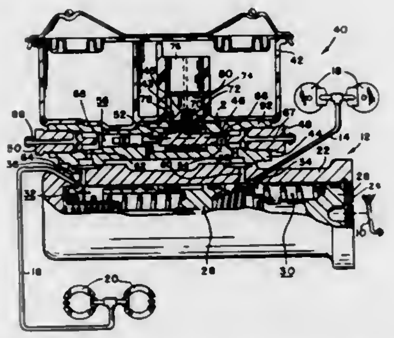
---

### 5,016,442
## MASTER CYLINDER WITH FLUID LEVEL AND PRESSURE FAILURE DETECTOR
**Richard A. Zander, Niles; Robert F. Gaiser, Stevensville, both of Mich., and Donald A. Crumb, Granger, Ind., assignors to Allied-Signal Inc., Morristown, N.J.**
**Filed Jul. 27, 1989, Ser. No. 385,502**
**Int. Cl.$^5$ F15B** *7/00*
**U.S. Cl. 60—535** **4 Claims**

1. A master cylinder comprising a housing having a first bore for retaining a pair of pistons which move to develop fluid pressure in a pair of pressure chambers to effect a brake application, a reservoir containing fluid which is in communication with the pair of pressure chambers when the pistons are in a rest position, a differential area piston connected to said pres-

VOL 1126 ISS 3 MY 21 1991 UMI

sure chambers and operable during a brake application to actuate a signal circuit in response to a failure mode in either pressure chamber, a float located in the reservoir and having a first magnet for actuating a switch in the signal circuit when the fluid level in the reservoir is below a predetermined level, characterized in that said housing has a second bore for receiving said differential area piston and first and second passages connected to said pair of pressure chambers for presenting fluid pressure to said differential area piston, said switch having a reed assembly located in alignment with said first magnet carried by said float in the reservoir and a second magnet carried by said differential area piston, said second bore receiving a shield member having first and second openings such that on movement of the differential area piston as a result of a failure mode, the magnetic field associated with the second magnet passes through one of the first and second openings to activate the reed switch and close the circuit to inform an operator of a failure mode condition.



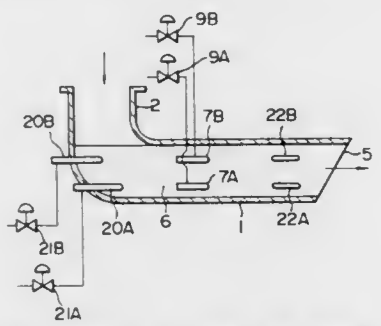
---

### 5,016,443
### FUEL-AIR PREMIXING DEVICE FOR A GAS TURBINE

**Nobuo Shimizu; Michio Kuroda; Seiichi Kirikami; Isao Sato, and Osamu Arai, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 7, 1989, Ser. No. 404,314**
**Claims priority, application Japan, Sep. 7, 1988, 63-223819**
**Int. Cl.$^5$ F02C *3/14***

U.S. Cl. 60—737 3 Claims



1. A fuel-air premixing device of a gas turbine of the type having a double-cylinder structure composed of an inner cylinder and an outer cylinder defining therebetween flow passages such that a fuel is supplied into air flowing through said passages so that a premixture of the fuel and air is formed and discharged, said premixing device comprising:

- a plurality of radially spaced rod-type fuel nozzles each being provided with a plurality of nozzle ports oriented in a plurality of different directions for supplying said fuel into said passages, each of said rod-type nozzles being supported by said inner cylinder and arranged along a circle; and
- means for independently controlling the rates of supply of the fuel from said radially spaced rod-type nozzles.

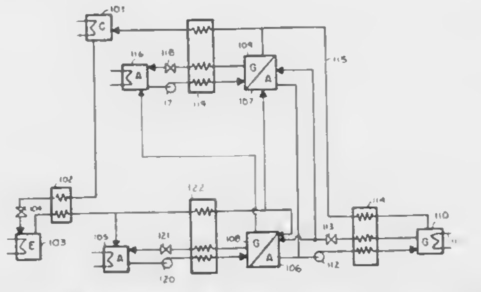
---

### 5,016,444
### ONE-AND-A-HALF EFFECT ABSORPTION CYCLE

**Donald C. Erickson, 1704 S. Harbor La., Annapolis, Md. 21401**

**Filed Dec. 11, 1989, Ser. No. 448,260**
**Int. Cl.$^5$ F25B *7/00***

U.S. Cl. 62—79 15 Claims



1. A process for raising the temperature of a supply of heat to a higher temperature comprising:

- a. boiling a liquid with said heat to form a low pressure vapor;
- b. absorbing part of said low pressure vapor in an absorbent solution which is at a first concentration and which is at said higher temperature;
- c. supplying said liquid by condensing a vapor at approximately said higher temperature and at a first pressure;
- d. desorbing a vapor at said first pressure by supplying high temperature heat to an absorbent solution which is at said first pressure and which is above said first concentration;
- e. supplying a second vapor at said first pressure by heating a second absorbent solution which is at a concentration no higher than said first concentration; and
- f. desorbing at a second pressure at least part of the solution from said absorbing step by heating it with at least part of the solution from said high temperature desorbing step, which is absorbing the remainder of said low pressure vapor.

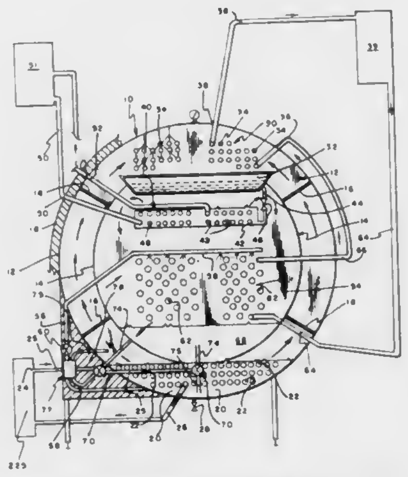
---

### 5,016,445
### ABSORPTION APPARATUS, METHOD FOR PRODUCING A REFRIGERANT EFFECT, AND AN ABSORBENT-REFRIGERANT SOLUTION

**Don H. Wehr, Pine, Colo., assignor to Darrell H. Williams and George A. Griffin, both of Wichita, Kans.**

**Continuation-in-part of Ser. No. 882,166, Jul. 7, 1986, abandoned, which is a continuation of Ser. No. 804,179, Nov. 18, 1985, abandoned. This application Jun. 15, 1987, Ser. No. 61,668**
**Int. Cl.$^5$ F25B *15/00***

U.S. Cl. 62—101 91 Claims



1. An absorption apparatus comprising a housing;

- an absorber means contained within said housing for producing a strong refrigerant solution means;
- a generator refrigerant reservoir means positioned within said housing for producing a rising refrigerant vapor means;
- a condensor means situated within said housing for condensing the refrigerant vapor means into a refrigerant liquid means;
- an evaporator means disposed in said housing for receiving the refrigerant liquid means from the condensor means and vaporizing the same to create a refrigerant effect;
- at least one pump means for pumping the strong refrigerant solution means from said absorber means to said generator refrigerant reservoir means including a pump inlet means in communication with said strong refrigerant solution means of said absorber means;
- a first chamber means in communication with said pump inlet means;
- a first back pressure valve means positioned between said pump inlet means and said first chamber means for allowing the unidirectional passage of fluid refrigerant solution means from the pump inlet means into said first chamber means, but not from said first chamber means back into said pump inlet means;
- a second chamber means in communication with said first chamber means;
- a second back pressure valve means positioned between said first chamber means and said second chamber means for allowing the unidirectional passage of refrigerant solution means from said first chamber means into said second chamber means, but not from said second chamber means back into said first chamber means;
- a heating coil means having a coil inlet and a coil outlet and circumscribing helically both said first and said second chamber means such that when a hot coil fluid means enters said coil inlet and commences a circuitous flow through the heating coil means and around the first and second chamber means, the hot coil fluid means flows circuitously around the second chamber means first and prior to flowing circuitously around the first chamber means;
- a reservoir conduit means in communication with said second chamber means for receiving the refrigerant solution and transporting the same to said generator refrigerant reservoir means; and
- a third back pressure valve means positioned between said second chamber means and said reservoir conduit means for allowing the unidirectional passage of refrigerant solution means from the second chamber means towards and into said reservoir conduit means, but not from said reservoir conduit means back into said second chamber means.

36. A process for producing a refrigerant effect comprising the steps of:

- (a) flowing a refrigerant vapor around a spherical inner housing;
- (b) condensing the refrigerant vapor of step (a) into a refrigerant liquid;
- (c) flowing the refrigerant liquid of step (b) into an evaporative zone wherein the refrigerant liquid evaporates to cool any evaporative coils that are in the evaporative zone;
- (d) absorbing the refrigerant liquid evaporate of step (c) into a condensed refrigerant solution and collecting the same in the bottom of the spherical inner housing; and
- (e) pumping the condensed refrigerant solution of step (d) from the bottom of the spherical inner housing into the bottom of a spherical outer housing that houses the spherical inner housing wherein it may be vaporized into the refrigerant vapor of step (a).

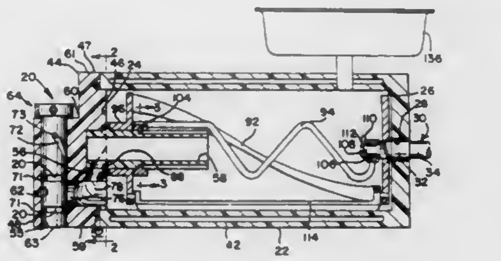
---

### 5,016,446
### RECIRCULATION SYSTEM FOR SOFT SERVE ICE CREAM APPARATUS

**Armin Fiedler, Chicago, Ill., assignor to International Freezer Corporation, Chicago, Ill.**

**Filed Jan. 18, 1990, Ser. No. 467,026**
**Int. Cl.$^5$ A23G *9/12***

U.S. Cl. 62—342 25 Claims



12. A soft serve ice cream machine comprising:

- a tank open at one end;
- means for refrigerating said tank;
- a closure plate for closing said one end of said tank, said closure plate including a dispensing chamber having an exit orifice and a recirculation passageway;
- means for recirculating ice cream in a recirculation loop from said tank through said recirculation passageway and back to said tank, said recirculating means includes a hollow tube having a recirculation orifice adapted to communicate with said recirculation passageway carried by said closure plate;
- means for selectively dispensing the soft serve ice cream from said dispensing chamber; and
- means for sealing off said recirculation passageway from said dispensing chamber when soft serve ice cream is not being dispensed.

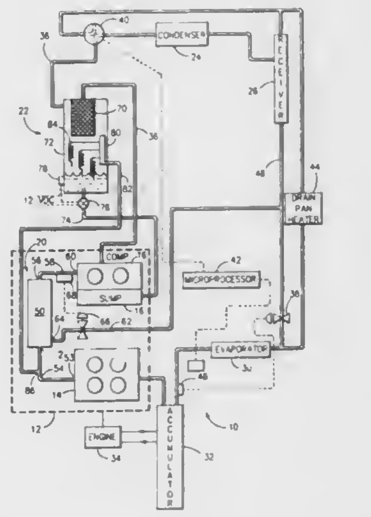
---

### 5,016,447
### OIL RETURN FOR A TWO-STAGE COMPRESSOR HAVING INTERSTAGE COOLING

**L. Thomas Lane; Bruce A. Fraser, both of Manlius, and Thomas E. Brendel, Fayetteville, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**

**Filed May 2, 1990, Ser. No. 517,777**
**Int. Cl.$^5$ F25B *43/02***

U.S. Cl. 62—470 4 Claims



1. A refrigeration system comprising:

a compressor, a condenser, an expansion device and an

VOL 126
ISS 3
MY 21
1991
UMI

evaporator serially interconnected to form a closed refrigeration circulation path, said compressor including;

a low pressure stage having an inlet and outlet, and a high pressure stage having an inlet and an outlet, said compressor being lubricated with lubricating oil which mixes with the refrigerant being compressed therein, said outlet of said high pressure stage discharging compressed refrigerant mixed with lubricating oil;

interstage cooling means for cooling the refrigerant flowing from said outlet of said low pressure stage to said inlet of said high pressure stage;

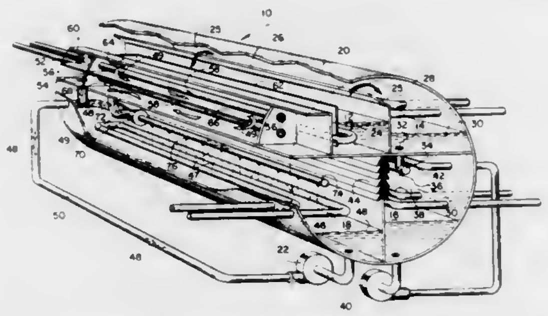
means for receiving the mixture of compressed refrigerant and lubricating oil discharged from said outlet of said high pressure stage and for substantially separating the oil from said mixture; and

means for conducting the separated oil to said interstage cooling means and for mixing the oil with the refrigerant flowing through said interstage cooling means.

---

### 5,016,448
## INTERNAL HEAT EXCHANGER FOR AN ABSORPTION APPARATUS

**William J. Plzak, La Crescent, Minn., assignor to American Standard Inc., New York, N.Y.**
**Filed Nov. 9, 1987, Ser. No. 118,679**
**Int. Cl.$^5$ F25B *15/00***
**U.S. Cl. 62—476** **9 Claims**



1. An absorption refrigeration apparatus comprising:

a. a hermetic shell;

b. a generator and an absorber disposed inside side shell;

c. means, contained inside said shell, for conveying a strong solution from said generator to said absorber; and

d. a pump, disposed outside said shell for pumping a weak solution from said absorber to said generator, further comprising means, disposed inside said shell, for mixing said weak and said strong solutions, said means for mixing being an eductor.

---

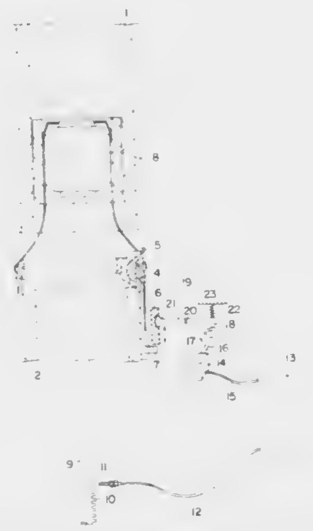
### 5,016,449
## METHOD OF PRODUCING QUALITY HOSIERY BY CHANGING STITCH LENGTH IN CIRCULAR KNITTING MACHINES AND A DEVICE FOR ITS IMPLEMENTATION

**Ettore Negri, Florence, Italy, assignor to Savio, S.p.A., Pordenone, Italy**
**Filed Feb. 6, 1990, Ser. No. 475,809**
**Claims priority, application Italy, Feb. 10, 1989, 19406 A/89**
**Int. Cl.$^5$ D04B *9/46***
**U.S. Cl. 66—54** **13 Claims**

1. A method of producing knitted hosiery having regulated stitch loops in circular knitting machines wherein the knitting machines have needles, sinkers, a tensioning device, and a cam, and wherein movement of the needles is controlled by the cam; the method comprising:

(a) determining the amount of axial movement of the tensioning device, wherein the tensioning device draws the hosiery and applies a constant force thereto during knitting;

(b) comparing said determined amount of axial movement of the tensioning device with a predetermined amount of axial movement wherein said predetermined amount of axial movement corresponds to a desired length of the stitch loops in the hosiery; and

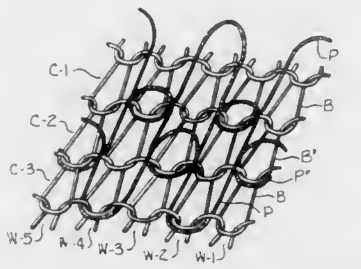


(c) correcting the relative difference in level between the sinkers and the needles by moving the cam when said amount of axial movement of the tensioning device differs from said predetermined amount of axial movement so that the length of the stitch loops are consequently regulated.

---

### 5,016,450
## KNIT FABRIC WITH INLAY PILE YARN AND METHOD

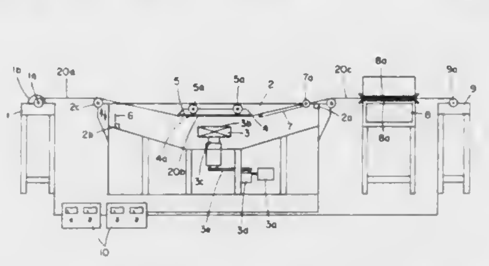
**Bruce M. Pernick, Glendale, N.Y., assignor to Monarch Knitting Machinery Corporation, Glendale, N.Y.**
**Filed Oct. 10, 1989, Ser. No. 419,265**
**Int. Cl.$^5$ D04B *9/12***
**U.S. Cl. 66—93** **5 Claims**



1. A circular knit pile fabric including successive courses knot of body yarn and forming plain jersey stitch loops in every needle wale of said successive courses, alternating single courses including pile yarn inlaid in alternating single wales of the plain jersey stitch loops of body yarn and forming pile loops extending inwardly of the machine direction and across intervening single wales of the plain jersey stitch loops of body yarn, and intervening single courses including pile yarn inlaid in intervening single wales of the plain jersey stitch loops of body yarn and forming pile loops extending inwardly of the machine direction and across alternating single wales of the plain jersey stitch loops of body yarn, said inwardly extending pile loops being free from said body yarn stitch loops and being of a substantially greater length than said body yarn stitch loops.

### 5,016,451
## APPARATUS FOR TREATING CARBON FIBER FABRICS

**Kazuo Tsukabayashi; Takashi Yamamoto, and Yasunari Sawanoi, all of Ishikawa, Japan, assignors to Ishikawa Prefecture, Ishikawa and Nippon Oil Co., Ltd., Tokyo, both of, Japan**
**Filed Jul. 31, 1989, Ser. No. 387,698**
**Claims priority, application Japan, Aug. 3, 1988, 63-193900; Oct. 24, 1988, 63-267641**
**Int. Cl.$^5$ D06B *13/00***
**U.S. Cl. 68—2** **4 Claims**

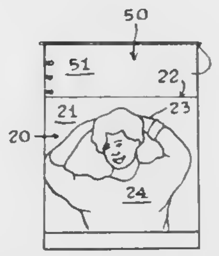


1. An apparatus for disintegrating a carbon fiber fabric, comprising a water vessel (**2**), an ultrasonic wave oscillator (**3**) mounted in an immersed state in said water vessel, a guide plate (**4**) extending into said water from above the level thereof and positioned parallel to the longitudinal axis of and above said wave oscillator, and a conveyor means (**7**) for conveying the carbon fiber fabric (**20**) continuously along an oscillator-side face (**4***a*) of said guide plate, said carbon fiber fabric being brought into pressure contact with said face of the guide plate by acoustic pressure induced through said ultrasonic wave oscillators so as to expand said fabric and disintegrate the latter.

---

### 5,016,452
## METHOD OF TRANSFERRING PHOTOGRAPHS TO LEATHER

**Ronald Alexander, 463 Classon Ave., Brooklyn, N.Y. 11238**
**Filed Oct. 27, 1989, Ser. No. 427,434**
**Int. Cl.$^5$ C14B *1/56***
**U.S. Cl. 69—21** **9 Claims**



1. A method of producing a replication of a photographic image on a leather surface involving the steps of:

(a) selecting a photographic image to be replicated on the leather surface;

(b) transferring the photographic image to a xerographic copy;

(c) moistening the surface of the leather;

(d) positioning the xerographic copy on the moistened surface of the leather;

(e) using a tracing implement to impress the outline and selected internal lines of the xerographic image onto the moistened surface of the leather;

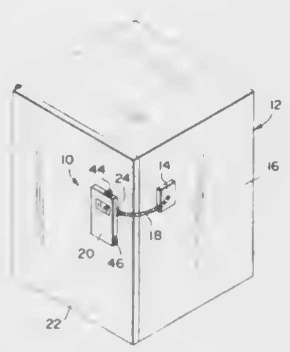
(f) using a first specialized leather working tool to produce shallow cuts over the traced lines; and,

(g) using a second specialized leather working tool to raise selected portions of the leather surface.

---

### 5,016,453
## TIMED REFRIGERATOR LOCK

**Richard Bonnice, 1418 E. 52nd St., Brooklyn, N.Y. 11234, and George Spector, 233 Broadway Rm. 3815, New York, N.Y. 10007**
**Filed Sep. 19, 1990, Ser. No. 584,694**
**Int. Cl.$^5$ E05B *65/00, 43/00***
**U.S. Cl. 70—93** **5 Claims**



1. A timer controlled lock operating device for a refrigerator or the like comprising;

(a) a plate affixed to the side wall of the refrigerator;

(b) a link chain having one end secured to said plate;

(c) a housing affixed to the front door of the refrigerator;

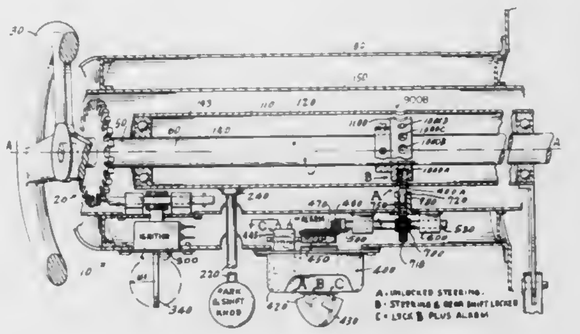
(d) a shackle extending from within said housing and engaging an opposite end of said link chain; and

(e) means within said housing for opening said shackle at a predetermined period of time so that a person can remove said link chain from said shackle and open the front door of the refrigerator to gain access therein to obtain food.

---

### 5,016,454
## MOTOR VEHICLE SUPPLEMENTARY LOCKING MECHANISM

**Edward G. Al-Sheikh, 466 W. Hollywood, Detroit, Mich. 48203**
**Filed Jul. 13, 1988, Ser. No. 218,579**
**Int. Cl.$^5$ B60R *25/02, 25/06***
**U.S. Cl. 70—185** **1 Claim**



1. A supplemental locking apparatus for a motor vehicle having a steering column and a shift column, each having a longitudinal central axis partially encased in an outer cylindrical sleeve, adapted to cooperatively and simultaneously lock the steering column and the shift column against rotational movement, said apparatus comprising:

(a) an auxiliary locking unit integrally positioned on the exterior periphery of the outer cylindrical sleeve, said locking unit having receptacle means to receive a male key member to actuate such locking unit;

(b) first cylindrical shaft means within said locking unit and rotatably movable by actuation of said locking unit, said first cylindrical shaft means extending through said outer cylindrical sleeve and being disposed in a direction that is

OL
126
ISS
3
MY
21
1991
UMI

perpendicular to the longitudinal central axis of said shift column and a position that is external to the shift column;

(c) a power transfer means disposed on a portion of said first cylindrical shaft means, said means adapted to transfer rotational movement of said first cylindrical shaft means, said power transfer means comprising a concentric cam gear on the inner end of such first cylindrical shaft means, and a follower gear that transfers any motion of the first cylindrical shaft means in a perpendicular direction to said cylindrical shaft means;

(d) second cylindrical shaft means concentrically and coaxially mounted to said follower gear, said second cylindrical shaft means having gear means on a portion of its outer surface;

(e) longitudinally extending ratchet member, adapted for reciprocating movement and geared to the gear means on said second cylindrical shaft means and said longitudinally extending ratchet member having a finger member on the end thereof which is disposed away from the power transfer means, and inwardly towards the shift column;

(f) a plurality of openings disposed in the outer circumference of the shift column, which openings are adapted to receive the end of the finger member in reciprocating fashion, said openings extending through the shift column;

(g) a plurality of openings disposed in the steering column, said openings being also adapted to receive in a reciprocating manner the end of said finger member.

---

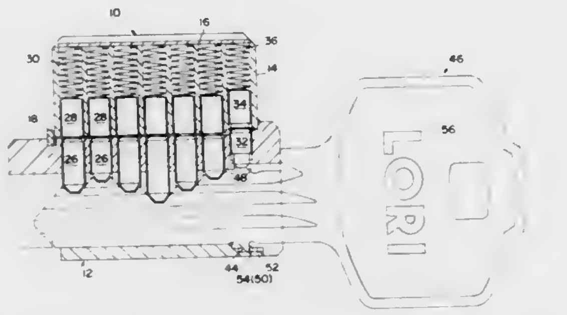
### 5,016,455
## KEY UNLOCKING AND RETAINING METHOD AND APPARATUS

**Thomas F. Hennessy, Bristol, Conn., assignor to Lori Corporation, Southington, Conn.**

**Filed Jun. 8, 1990, Ser. No. 535,334**

**Int. Cl.$^5$ E05B** *27/00*

U.S. Cl. 70—493 7 Claims



1. A lock system comprising:

a key comprising a bow portion and a blade which longitudinally extends from said bow portion to a tip, said blade having a pair of spaced parallel edges which are interconnected by opposed side faces, said blade being provided with surface irregularities which define the key bitting, a shaped camming projection transversely extending from each of said edges, said projections being at least in part in alignment, a second of said projections extending outwardly from the edge of the key a greater distance when compared to the oppositely disposed first projection;

shell means including a shell having a longitudinal axis, said shell including a first cylindrical portion having a first diameter, at least a first row of primary pin tumbler means receiving chambers being located in said first portion, said shell having a second cylindrical portion which is also coaxial with said first portion, said second portion having a second diameter which is greater than said first diameter, an auxiliary pin tumbler means receiving chamber being provided in said second portion, said shell further having a circumferential groove intermediate the ends of said second portion, said auxiliary pin tumbler means receiving chamber intercepting said groove;

plug means rotatably mounted in said shell means, said plug means having a face and further having a longitudinally extending keyway formed therein, said keyway having a first portion in registration with said shell first portion and a second portion in registration with said shell second portion, said keyway second portion opening through said face and extending into registration with said shell second portion, said plug means also having first and second cylindrical portions of different diameter which are generally complementary to and received in said shell first and second portions, said plug means defining at least a first row of primary pin tumbler means receiving chambers in said first portion thereof, said first row of primary pin tumbler means receiving chambers being alignable with said shell primary pin tumbler means receiving chambers, said plug means defining an auxiliary pin tumbler means receiving chamber in the said second portion thereof, said auxiliary pin tumbler means receiving chamber being alignable with said shell auxiliary pin tumbler means receiving chamber, first and second shear lines respectively being defined between said shell means and said plug means first and second portions; and

pin tumbler means reciprocally mounted in said receiving chambers, said pin tumbler means each including at least a bottom pin and a driver pin, said pin tumbler means including biasing means for urging a pin of each of said pin tumbler means to a position of bridging a shear line when a key is not present in said keyway, insertion of a properly bitted key into the keyway displacing said pin tumbler means against associated biasing means whereby the interface between the bottom and driver pins is located on a shear line, the displacement of the pin tumbler means positioned in said auxiliary pin tumbler means receiving chambers being caused by contact with a first of said key edge camming projections, rotation of said plug means relative to said shell means being permitted by said pin tumbler means displacement, the other of said key blade edge projections travelling in said shell means groove during such relative rotation, withdrawal of said key subsequent to said relative rotation being prevented by interference between said second projection and a side wall of said shell means groove.

---

### 5,016,456
## PROCESS FOR MAKING HOLLOW BILLETS INTO TUBES

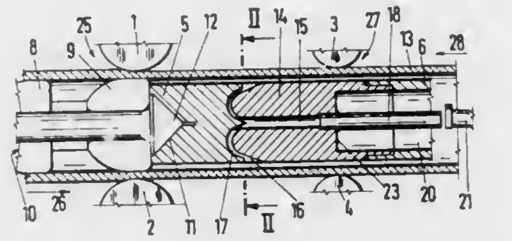
**Hansjörg Furrer, Ziefen, Switzerland; Raimo Peltoniemi, Bay Village, Ohio; Norbert Richle, Remetschwill, Switzerland, and Dietrich Ulrich, Nestlake, Ohio, assignors to Lonza Ltd., Gampel/Valais, Switzerland**

**Filed Mar. 30, 1989, Ser. No. 330,700**

**Claims priority, application Switzerland, Mar. 30, 1988, 01203/88**

**Int. Cl.$^5$ B21B** *17/02, 9/00, 45/02;* **B21C** *43/00*

U.S. Cl. 72—38 21 Claims



1. A process for making hollow billets (13) into tubes, comprising:

(a) applying a lubricant on the inside wall of the hollow billet (13);

(b) advancing the hollow billet (13) over a first piercer (10) which has been placed on the front end (5) of a piercer rod (6), and while the hollow billet (13) is advanced relative to said first piercer (10); applying a lubricant behind said first piercer (10) on that part of the inside wall of the hollow billet (13) which has already been processed by the first piercer (10);

(c) removing said first piercer (10) from said piercer rod (6);

(d) returning the hollow billet (13) to the position relative to said piercer rod (6) which it had at the beginning of step (b); and

(e) placing a second piercer on said piercer rod (6), said second piercer having a greater diameter than said first piercer (10) and thereafter advancing said hollow billet (13) over said second piercer.

---

### 5,016,457
## METHOD OF FORMING METAL

**Donald G. Richardson, Clontarf, Australia, assignor to Research Foundation Institute Pty. Limited, Australia**

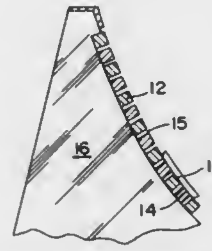
**PCT No. PCT/AU88/00113, § 371 Date Dec. 8, 1989, § 102(e) Date Dec. 8, 1989, PCT Pub. No. WO88/07899, PCT Pub. Date Oct. 20, 1988**

**PCT Filed Dec. 15, 1988, Ser. No. 444,144**

**Claims priority, application Australia, Apr. 15, 1987, PI1467**

**Int. Cl.$^5$ B21D** *26/08*

U.S. Cl. 72—56 12 Claims



1. A method of forming sheet metal comprising the steps of:

forming a female mold of a desired shape, the mold being of cage-like construction having spaces therein, said cage-like construction defining an envelope of the desired shape,

placing the mold in a supporting means extending therearound,

lining the mold with the sheet metal to be formed into the desired shape,

filling the lined mold with a liquid medium, and

detonating an explosive charge at a predetermined location within the medium to cause deformation of the sheet metal, passage of air in a space between the mold and the sheet metal through the spaces, and taking up by the sheet metal of the shape defined by the envelope of the female mold.

---

### 5,016,458
## METHOD AND DEVICE FOR PRESSING SHEET MATERIAL WITH A DEFORMABLE PUNCH UNDER A RAM

**Gabriel De Smet, Nogent Sur Oise, France, assignor to Isoform, Puteaux, France**

**Filed Dec. 28, 1989, Ser. No. 458,335**

**Claims priority, application France, Dec. 30, 1988, 88 17524**

**Int. Cl.$^5$ B21D** *26/02*

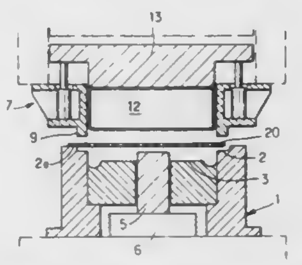
U.S. Cl. 72—57 16 Claims

1. Method for pressing a blank of sheet metal, on a press by means of a cushion composed of an elastic material, said method comprising:

disposing a sheet blank to be formed on a support having a peripheral part constituting a fixed lower blank holder and a central part constituting a die, said die comprising a fixed part and a vertically movable part,

applying, under the action of an outer slide, an upper blank holder on a peripheral portion of the sheet blank so as to grip the peripheral portion of the sheet blank between the upper blank holder and the lower blank holder, said method further comprising,

applying, under the action of a ram, the elastic cushion which constitutes a deformable punch, in a downward direction on the sheet blank toward the die so as to effect a preforming of the sheet blank in such manner as to impart thereto a surface area which is substantially equal to a surface area of the finished part to be obtained,



continuing, under the action of the ram, the descent of the elastic cushion and

simultaneously displacing said vertically movable part of the die in a direction opposite the punch for finally shaping the part to be obtained.

---

### 5,016,459
## METHOD AND GUIDE ROLL STAND FOR GUIDING AND SHAPING STRIP MATERIAL IN A PIPE MILL

**Ryosuke Kuramoto, Tondabayashi, Japan, assignor to Nakata Manufacture Company Limited, Osaka, Japan**

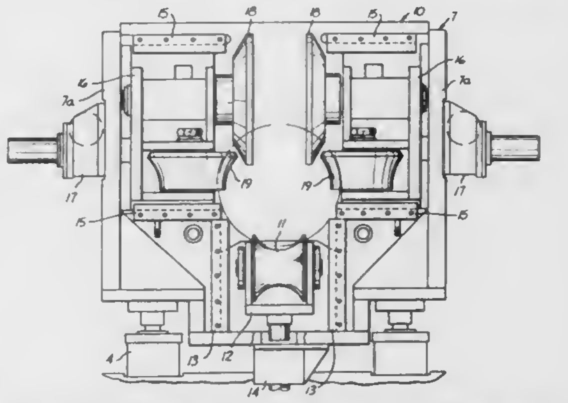
**PCT No. PCT/JP87/01016, § 371 Date Jun. 14, 1989, § 102(e) Date Jun. 14, 1989, PCT Pub. No. WO88/04968, PCT Pub. Date Jul. 14, 1988**

**PCT Filed Dec. 23, 1987, Ser. No. 368,313**

**Claims priority, application Japan, Dec. 26, 1986, 61-313975; Feb. 10, 1987, 62-28889**

**Int. Cl.$^5$ B21D** *5/14, 5/12*

U.S. Cl. 72—178 2 Claims



1. A guide roll stand for forming a pipe by bending a generally U-shaped strip (20) of material in a pipe mill, the stand comprising a main frame (7); means for vertically adjusting said mainframe in said stand; a face plate (10); means for removably mounting said face plate in the frame; a bottom shaping roll (11); means for vertically adjusting said bottom shaping roll in the face plate, said bottom shaping roll being positioned for supporting a bottom outer surface of said U-shaped strip (20) of pipe material being processed in said mill; two roll frames (16); means for horizontally adjusting said roll frames within the stand, each of said roll frames carrying both a fin-

VOL
1126
ISS
3
MY
21
1991
UMI

pass roll (**18**), for contacting and shaping a respective edge face (**21**) of the U-shaped strip, and a side roll (**19**) positioned with an axis orthogonal to and intersecting the axis of a respective fin-pass roll, each of said side rolls having shaping surface extending only from a respective edge face to a point above a maximum width of said U-shaped strip for contacting and shaping outwardly facing side surfaces of said U-shaped strip adjacent to the respective edge faces (**21**) of the U-shaped strip, said bottom shaping roll being positioned for supporting said U-shaped strip by contacting said bottom outer surface only in a region below said maximum width of said U-shaped strip.

---

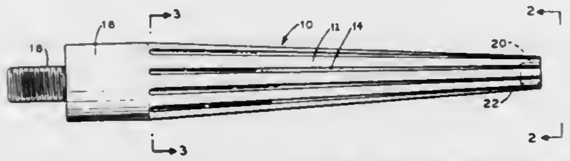
### 5,016,460

## DURABLE METHOD FOR PRODUCING FINNED TUBING

**Jimmy C. England, Ashland, Ky.; John R. Hensley, Huntington, W. Va.; Frederick E. Moehling, Huntington, W. Va.; Everett M. Roberts, Milton, W. Va., and Hugh-Hiram Ruble, Jr., Huntington, W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.**

**Filed Dec. 22, 1989, Ser. No. 455,239**
**Int. Cl.$^5$ B21B** *25/00*

U.S. Cl. 72—208 **6 Claims**



1. A method of making operable diameter internally finned tubing comprising the steps of:

(a) placing a metal tube containing at least 30 wt % nickel and 10 wt % chromium at least partially over an elongated mandrel having an oversized diameter, oversized land portions projecting radially outward from said mandrel and extending longitudinally along said mandrel, and valley portions located between said land portions extending longitudinally along said mandrel,
(b) inserting said metal tube and said oversized mandrel between a pair of opposed roller dies in a tube reducer,
(c) reciprocating said roller dies over said metal tube at a stroke rate of at least 40 strokes per minute and a feed rate of at least 0.635 cm per stroke to form oversized diameter internally finned tubing with said oversized mandrel, said internally finned tubing having fins corresponding to said valley portions and radially overspaced depressions corresponding to said overspaced land portions, said fins having a height substantially equal to a finished height, and having said depressions laterally overspaced, and
(d) sinking said oversized diameter internally finned tubing to a finished diameter to reduce radial spacing between said fins and to elongate said oversized diameter internally finned tubing in a manner which does not substantially reduce the height of said fins.

---

### 5,016,461

## METHOD AND APPARATUS FOR STAMPING WELD ADAPTERS

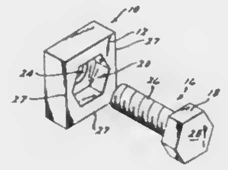
**William R. Walker, Rochester, and George W. Lukowski, Bloomfield Hills, both of Mich., assignors to Hydro-Craft, Inc., Rochester Hills, Mich.**

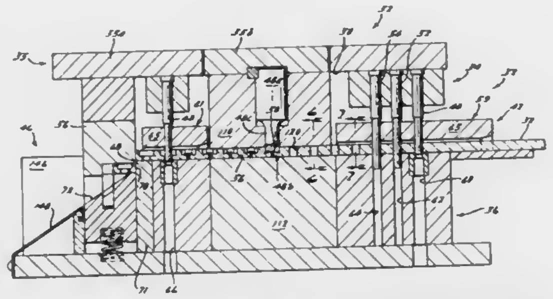
**Filed Sep. 1, 1989, Ser. No. 402,067**
**Int. Cl.$^5$ B21D** *28/06*

U.S. Cl. 72—336 **10 Claims**

1. A progressive die apparatus for repetitively making substantially identical weld adapters in a coining press, each such adapter having a hexagonal collar-like configuration and a centrally-located hole for stationarily holding a fastener having a shank portion and a head end by its head end such that the shank portion projects through the hole, the apparatus having at least four working stations where, during successive strokes of the press, metal is formed and removed from an elongated strip of metal stock having a substantially rectangular transverse cross-section and a thickness of at least about ⅜ inch, the die apparatus comprising:

means for restraining the elongated strip of metal stock in two directions substantially normal to the longitudinal direction of movement of the metal stock as the metal stock is advanced downstream;
first punch means, located at the first working station, for repetitively forming first substantially circular thru-holes having a predetermined diameter in successive segments of the metal stock advanced through the first working station;
pilot means, downstream from the first working station, for helping stabilize the metal stock when metal-forming pressure from the press is applied to said stock, said pilot means including at least one pilot tool which enters at least one of said first holes in the metal stock;





coining means, located at a second working station downstream from the pilot means, for repetitively cold-forming said metal stock in regions surrounding successive ones of the first holes to make in each segment of stock passing therethrough a collar-like configuration having a hollow hexagonal region for receiving a head end of a fastener, the coining means being arranged to reduce the diameter of the first holes without restricting the inward flow of metal stock into such holes during the diameter reduction;
second punch means, located at a third working station downstream from the second working station, for repetitively reforming the first holes in successive segments of the metal stock advanced through the third working station;
means, located at a fourth working station, for successively shearing segments of the metal stock including reformed first holes from the upstream portion of the metal stock; and
means, located near the fourth working station, for limiting longitudinal advancement of the metal stock between strokes of the press.

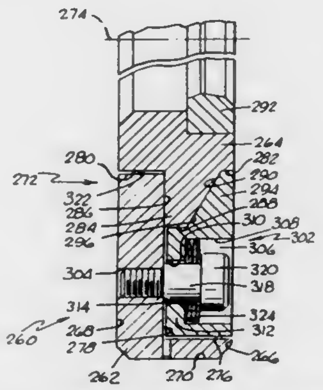
### 5,016,462

## APPARATUS FOR ALIGNING A TOOL MEMBER

**Conrad M. Grims; Bruce A. Moen, both of Golden, and Jaroslav F. Pardubicky, Westminster, all of Colo., assignors to Adolph Coors Company, Golden, Colo.**

**Continuation of Ser. No. 376,762, Jul. 7, 1989, Pat. No. 4,926,669. This application May 11, 1990, Ser. No. 521,991**
**The portion of the term of this patent subsequent to May 22, 2007, has been disclaimed.**
**Int. Cl.$^5$ B21D** *22/28*

U.S. Cl. 72—349 **11 Claims**



1. Apparatus for use in positioning a tool member means for contacting a workpiece which is moved through the tool member means comprising:

a hollow housing having a central opening extending therethrough and a longitudinal axis;
at least one workpiece engaging tool member means for performing operations on a workpiece and having a central opening and a longitudinal axis;
at least one holding means for receiving and supporting said workpiece engaging tool member means and having a longitudinal axis;
support means mounted in said housing for supporting said holding means and preventing movement of said holding means in radial and axial directions;
movement permitting means cooperating with said holding means and said workpiece engaging tool member means so that said workpiece engaging tool member means is capable of radial movement in any direction relative to said longitudinal axis thereof when a sufficient radially directed force is applied thereto;
movable support means for supporting said workpiece and moving said workpiece through said central opening in said workpiece engaging tool member means, said movable support means and said workpiece each having a longitudinal axis;
said workpiece applying a radially directed force to said workpiece engaging tool member means when being moved by said movable support through said workpiece engaging tool member means if said longitudinal axis of said workpiece engaging tool member means is not in coaxial relationship with said longitudinal axis of said workpiece to move said workpiece engaging tool member means in at least one radial direction to a new location wherein said longitudinal axes of said workpiece engaging tool member means and said workpiece are in a coaxial relationship;
retaining means for retaining said workpiece engaging tool member means at said new location until it is moved again by an out of alignment workpiece; and
said movement permitting means permitting rotational movement of said workpiece engaging tool member means relative to said holding means when a sufficient force is applied thereto.

---

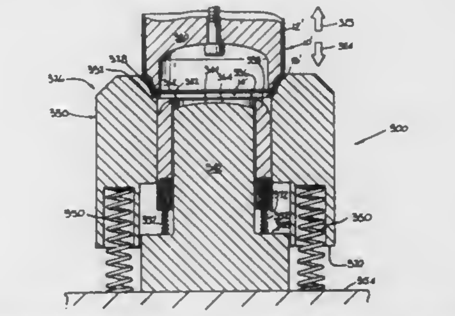
### 5,016,463

## APPARATUS AND METHOD FOR FORMING CAN BOTTOMS

**Bert E. Johansson, and Conrad M. Grims, both of Golden, Colo., assignors to Coors Brewing Company, Golden, Colo.**

**PCT No. PCT/US89/00337, § 371 Date Sep. 4, 1990, § 102(e) Date Sep. 4, 1990, PCT Pub. No. WO89/07021, PCT Pub. Date Aug. 10, 1989**
**PCT Filed Aug. 10, 1989, Ser. No. 548,951**
**Int. Cl.$^5$ B21D** *51/26*

U.S. Cl. 72—354.8 **6 Claims**



1. An apparatus (**300**) for forming a predetermined can bottom configuration (**310**) in a can body (**10'**) having a cylindrical sidewall (**12'**) and an integrally formed bottom wall (**14'**) characterized by

(a) punch means (**320**) insertable within the can body (**10'**) in engagement with the interior bottom surface (**322**) thereof for urging the can body against die means (**326**),
(b) die means (**326**) for coacting with said punch means (**320**) to form said can bottom configuration comprising:
  (i) axially reciprocally movable outer die ring means (**330**) for forming an outer portion of said can bottom configuration (**301**);
  (ii) axially reciprocating movable middle die ring means (**336**) for forming a middle portion of said can bottom configuration, said outer die ring means being positioned in encompassing adjacent relationship with said middle die ring means; and
  (iii) inner die means (**342**) for forming an inner portion of said can bottom configuration; said middle die ring means (**336**) being positioned in encompassing adjacent relationship with said inner die means (**342**).

---

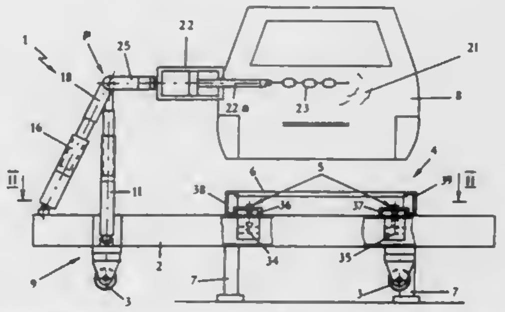
### 5,016,464

## APPARATUS FOR REPAIRING ACCIDENT-DAMAGED BODIES IN MOTOR VEHICLES

**Raffaele Tomelleri, Verona, Italy, assignor to Garda Impranti, Verona, Italy**

**Filed Nov. 27, 1989, Ser. No. 442,296**
**Claims priority, application Italy, Dec. 22, 1988, 84975 A/88**
**Int. Cl.$^5$ B21D** *01/12*

U.S. Cl. 72—447 **11 Claims**



1. An apparatus for reporting a damaged body of a motor vehicle comprising:

VOL
1126
ISS
3
MY
21
1991
UMI

a horizontally extending base;

wheels supporting said base for translation thereon;

anchoring means connected to one end of said base for locking said base to a work bench;

a pair of linear actuators each hinged at one end thereof to the opposite end of said base, the other actuator ends being joined together at a junction point, said junction point being elevated above said base;

a third linear actuator connected at one end to said junction point, the other end of said actuator being subject to connection to said damaged body.

---

### 5,016,465

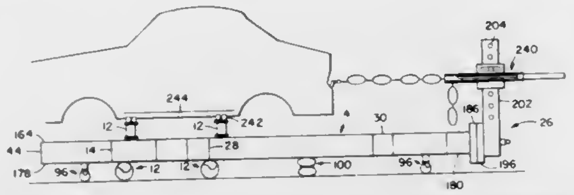
### BENCH MOUNT PULLER SUPPORT

**Thomas S. Papesh, 1915 N. Broadway, Crest Hill, Ill. 60435**

**Filed Jul. 3, 1989, Ser. No. 375,234**

**Int. Cl.$^5$ B21D** ***1/12***

**U.S. Cl. 72—457** **22 Claims**



1. A vehicle having a damaged body portion in combination with a dual support assembly for supporting both said vehicle having a said damaged body portion and a pulling mechanism to straighten such damaged body portion, including said pulling mechanism, said dual support assembly comprising vehicle support means to hold said vehicle on said dual support assembly at a first location and pulling mechanism support means to hold said pulling mechanism on said dual support assembly at a second location spaced apart from said first location and said vehicle support means, said pulling mechanism including puller connecting means to connect said pulling mechanism on said pulling mechanism support means to a said vehicle having a damaged body portion when held on said spaced apart vehicle support means, said pulling mechanism support means being detachably connected to said vehicle support means for use of said pulling mechanism support means with other vehicle support means and vehicles mounted thereon for repair while said first mentioned vehicle remains on said first mentioned vehicle support means and said pulling mechanism remains on said pulling mechanism support means, said pulling mechanism support means including transport means to transport it from one vehicle support means after use therewith to another vehicle support means and vehicle thereon for repair.

---

### 5,016,466

### TEST APPARATUS AND METHOD FOR BLOOD PRESSURE MEASURING EQUIPMENT

**Dale C. Ness, 4601 E. 16th, Tucson, Ariz. 85711, and Dirk B. Call, 6709 Half Moon Pl., Tucson, Ariz. 85741**

**Filed Oct. 27, 1989, Ser. No. 427,475**

**Int. Cl.$^5$ G01L** ***27/00***

**U.S. Cl. 73—4 R** **13 Claims**

1. Apparatus for testing and verifying the accuracy of blood pressure measuring equipment, said apparatus comprising:

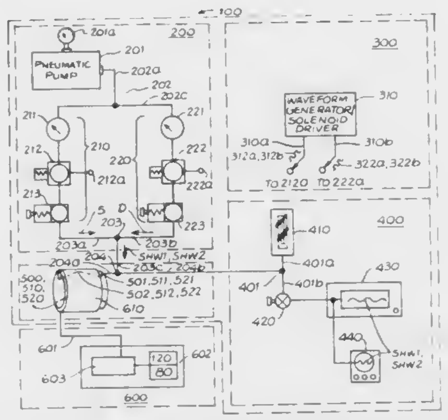
fluid pressure generating means for producing simulated human systolic and diastolic blood pressures;

electronic means electrically coupled to said fluid pressure generating means for delivering control signals that enable delivery of said simulated human systolic and diastolic blood pressures; and

interface means for transferring said simulated human systolic and diastolic blood pressures from said fluid pressure generating means to said blood pressure measuring equipment, said fluid pressure generating means comprising:

pneumatic pump means for providing a continuous stream of pressurized air,

a first pressure regulated line pneumatically coupled to said pneumatic pump means, and



a second pressure regulated line pneumatically coupled to said pneumatic pump means, said first and second pressure regulated lines carrying pressurized air at pressures corresponding to simulated human systolic and diastolic arterial blood pressures, respectively.

---

### 5,016,467

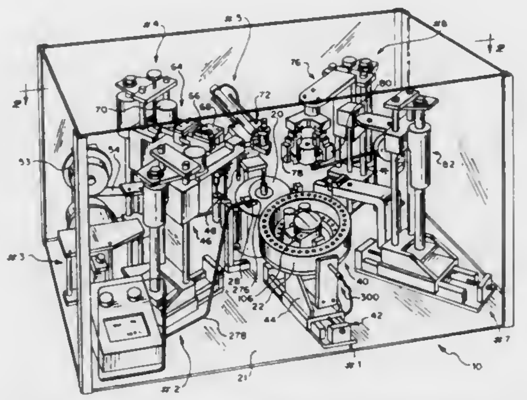
### AUTOMATED FLOW RATE MACHINE

**Jerome J. Marcec; James O. Phillips, both of Naperville; Albert T. Grzybowski, Diamond Lake, all of Ill., and Bohdan Grzybowski, Sarasota, Fla., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Jun. 7, 1989, Ser. No. 362,727**

**Int. Cl.$^5$ G01N** ***11/06***

**U.S. Cl. 73—56** **36 Claims**



1. An apparatus for automated flow rate measurements of a polymer comprising:

a table;

at least one heating block attached to the table;

a test cavity positioned in the heating block, the test cavity having a cylindrical shape with an upper end of the test cavity defining an orifice for receiving the polymer and a lower end of the test cavity defining an extrusion die;

means for maintaining the heating block at a predetermined temperature;

means for receiving the polymer said means for receiving the polymer being removably attached to said table;

means for transferring the polymer from the polymer receiving means into the test cavity;

a piston rod having an upper collar fixed thereon, a lower knurled collar slidable thereon and a piston foot located at the end of the piston rod opposite to the upper collar;

means for holding and transferring said piston rod between said means for holding and transferring said piston rod and the test cavity;

at least one test weight;

means for holding and transferring said piston rod between said means for holding and transferring said test weight and the piston rod;

means for timing a sequence of stages of the flow rate measurement after the polymer has been received in the test cavity, the piston rod has been transferred to the test cavity, the test weight has been transferred to the piston rod and whereby the test weight acting on the piston rod causes the piston rod to move downwardly through the test cavity and to extrude the polymer through the extrusion die;

means for calculating the flow rate of the thermoplastic from the timed sequence of stages;

means for cleaning the test cavity said means for cleaning the test cavity attached to said table; and

means for cleaning the piston rod said means for cleaning the piston rod attached to said table.

---

### 5,016,468

### METHOD AND APPARATUS FOR THE DETERMINATION OF MOISTURE IN MATERIALS

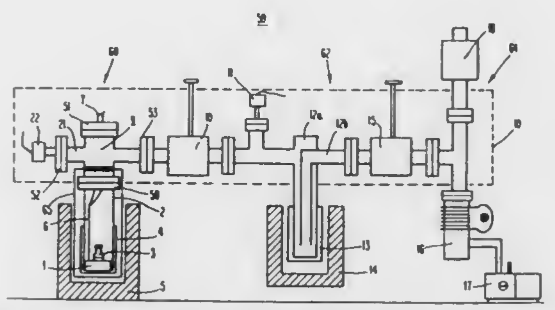
**Thomas A. Jennings, Bala Cynwyd, Pa., assignor to T. A. Jennings Associates, Inc., Bala Cynwyd, Pa.**

**Filed Apr. 5, 1989, Ser. No. 333,761**

**Continuation-in-part of Ser. No. 177,634, Apr. 6, 1988, abandoned.**

**Int. Cl.$^5$ G01N** ***7/16, 25/56***

**U.S. Cl. 73—73** **42 Claims**



14. Apparatus for analyzing the moisture content in a sample which comprises:

(a) a sample receiving vacuum chamber including means to selectively cool said vacuum chamber to below about −150° C. and means to heat said vacuum chamber;

(b) means for providing an inert gas environment surrounding a sample within said chamber;

(c) a moisture trap, selectively linked in series with said vacuum chamber, said moisture trap including means to selectively cool said moisture trap to below about −150° C. and means to heat said moisture trap;

(d) pressure reducing means selectively connected in series with said moisture trap to selectively reduce the pressure in said vacuum chamber and said moisture trap to below about $1\times10^{-5}$ Torr;

(e) means to isolate said moisture trap from said vacuum chamber and said pressure reducing means;

(f) means to isolate said vacuum chamber; and

(g) means to measure sample temperature means to measure pressure in said vacuum chamber and means to measure pressure in said moisture trap.

---

### 5,016,469

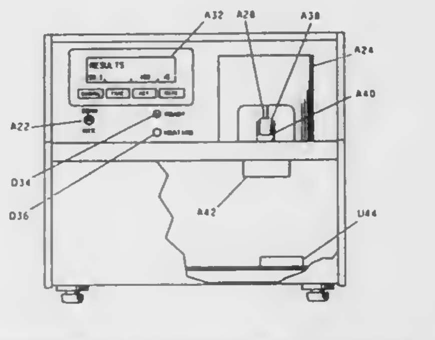
### FLUID VISCOELASTIC TEST APPARATUS AND METHOD

**Jon H. Henderson, Westminster, Colo., assignor to Sienco, Inc., Morrison, Colo.**

**Filed Sep. 29, 1989, Ser. No. 414,682**

**Int. Cl.$^5$ G01N** ***11/10, 33/49***

**U.S. Cl. 73—64.1** **22 Claims**



1. An instrument for measuring one or more viscoelastic properties of a fluid sample, the instrument comprising:

probe means disposed in contact with the fluid sample;

electromechanical transducer means coupled to the probe means for providing mechanical displacement of the probe means relative to the fluid sample;

first circuit means, connected to the electromechanical transducer means, said first circuit means comprising drive circuitry providing a drive signal for generating oscillatory mechanical displacement of the probe means relative to the fluid sample, said first circuit means further comprising response circuitry for monitoring a response signal generated by the electromechanical transducer means, the response signal being representative of the one or more viscoelastic properties of the fluid sample, said drive circuitry and response circuitry forming a feedback loop wherein the drive signal is developed from the response signal and vice versa;

second circuit means for regulating an amplitude of a first signal within said feedback loop, while allowing said feedback loop to operate at resonant oscillatory frequency determined by said probe means, said electromechanical transducer means, and said first circuit means; and

microcontroller means for receiving and analyzing said response signal to determine the one or more viscoelastic properties of the fluid sample represented by said response signal, said microcontroller means being responsive to said response signal for computing a time period thereof between a measurement start time and the occurrence of a viscoelastic change in the fluid sample represented by said response signal.

---

### 5,016,470

### APPARATUS FOR TESTING MOTOR VEHICLE TIRES

**Günther Himmler, Darmstadt, Fed. Rep. of Germany, assignor to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik, Pfungstadt, Fed. Rep. of Germany**

**Filed Jul. 27, 1990, Ser. No. 558,350**

**Claims priority, application Fed. Rep. of Germany, Oct. 17, 1989, 3934626**

**Int. Cl.$^5$ G01M** ***17/02***

**U.S. Cl. 73—146** **19 Claims**

19. Apparatus for testing a motor vehicle tire comprising:

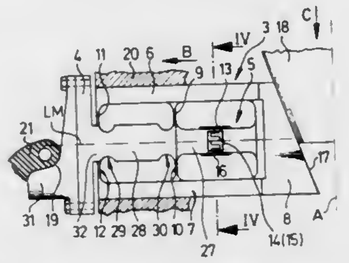
a support structure;

a plurality of clamping jaws disposed in a circular array on the support structure;

actuating means for displacing the respective clamping jaws radially outwardly in relation to said circular array, thereby to bring them into contact against the bead of a tire to be tested;

VOL 1126
ISS 3
MY 21
1991
UMI

a plurality of force measuring means each associated with a respective said clamping jaw and operable to detect the compression force applied to a respective portion of said tire bead by the clamping jaw when said clamping jaws are moved radially outwardly, each said force measuring means comprising: a support body portion; a movable structure engageable by said actuating means and slidable in said support body portion in guided relationship therewith in said radially outward direction, the respective clamping jaw being carried by said movable structure, the movable structure comprising a frame means defining a space therewithin, a central force transmission portion extending within said space radially with respect to the axis of the tire and operatively connected to said clamping jaw, and a plurality of flexurally resilient support portions extending substantially perpendicularly to the direction of actuation of said movable structure and connecting said force transmission portion to said frame means while permitting movement of said force transmission portion relative to said frame means by virtue of resilient flexural deformation of said support portions; and strain gauge means disposed on said force transmission portion and connected into a measuring bridge configuration; and



display means for displaying the forces detected by the force measuring means.

---

### 5,016,471
### TEST METHOD AND TESTING DEVICE FOR DETECTING ANY FAULTS, OR INACCURACIES, IN SPLINED WHEELS OR OBJECTS WITH SIMILAR PROFILES

**Rudolf Och, Nürnberg, Fed. Rep. of Germany, assignor to Firma Frenco Verzahnungslehren GmbH, Altdorf, Fed. Rep. of Germany**

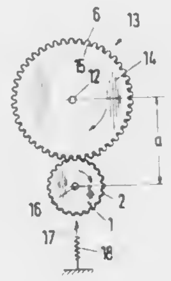
**Filed Sep. 29, 1989, Ser. No. 414,752**

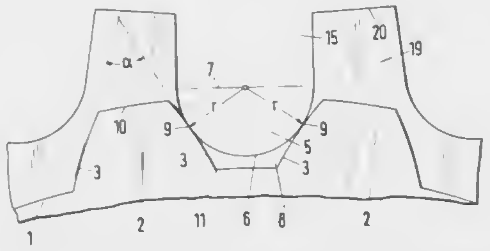
**Claims priority, application Fed. Rep. of Germany, Oct. 6, 1988, 8812569[U]; Feb. 4, 1989, 3903333**

**Int. Cl.$^5$ G01M** ***13/02***

**U.S. Cl. 73—162** **19 Claims**

1. A method for detecting faults and inaccuracies in a test object which is splined wheel having an axis of rotation and substantially uniformly shaped teeth, comprising the steps of:
  providing a testing device with a toothed test wheel having an axis of rotation;
  providing the test device with a plurality of gauging elements which are introducible into spaces between adjacent teeth of the test object, each gauging element having a curved testing cross-section adapted for engaging in the spaces between the test object teeth;
  alternately inserting only one testing cross-section, then two testing cross-sections, and again only one testing cross-section, in the spaces between the test object teeth;
  measuring and recording differences between a depth of insertion when only one testing cross-section is inserted and when two testing cross-sections are inserted by determining a corresponding change in a distance between the axes of rotation of the test wheel and the test object; and





  providing the roller wheel with a number of testing cross-sections and rotating the test wheel so as to continuously perform the above inserting, measuring and testing.

---

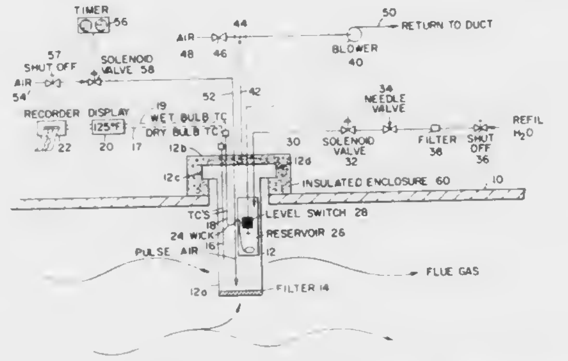
### 5,016,472
### DUSTY ENVIRONMENT WET BULB INDICATOR

**Gerald T. Amrhein, Louisville, and Paul S. Nolan, North Canton, both of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.**

**Filed Mar. 9, 1990, Ser. No. 491,139**

**Int. Cl.$^5$ G01N** ***25/64***

**U.S. Cl. 73—338** **7 Claims**



1. An apparatus for measuring wet and dry bulb temperatures of a flue gas stream flowing in a duct, comprising;
  a sample sheath extending into the gas duct with one end of said sample sheath being secured to the duct and the opposite end of said sample sheath having a filter within the gas duct;
  a first sensor for measuring a dry bulb temperature of the flue gas situated in said sample sheath;
  a second sensor for measuring a wet bulb temperature of the flue gas situated in said sample sheath;
  a wick surrounding said second sensor;
  a reservoir located within said sample sheath for providing water to said wick which is partly immersed in said reservoir, said reservoir being connected to a water supply line;
  a level switch for regulating an amount of water in said reservoir, said level switch activating a valve on the water supply line; and

  means for drawing the flue gas into the sample sheath.

---

### 5,016,473
### ALTIMETER

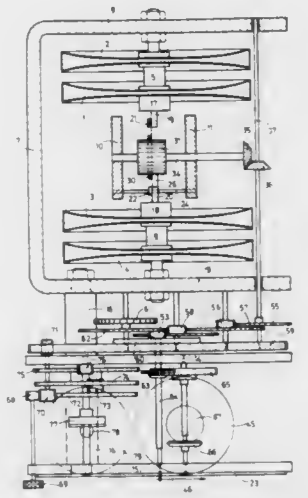
**Philippe Bonello, Grand-Saconnex, Switzerland, assignor to Sarcem Automation, Meyrin, Switzerland**

**Filed Jul. 17, 1990, Ser. No. 553,271**

**Claims priority, application Switzerland, Aug. 18, 1989, 3010/89**

**Int. Cl.$^5$ G01L** ***7/14***

**U.S. Cl. 73—387** **9 Claims**



1. A small altimeter comprising a frame, a display having drums and a dial cooperating with a hand and a multiplying gear train driving the display from the displacement obtained by the aneroid element, characterized by the fact that it comprises several aneroid cylindrical and coaxial elements connected together and to the frame forming a stacking; by the fact that this stacking is divided in two opposed groups; by the fact that the free faces of the two groups of aneroid elements of the stacking are cinematically connected to a same movable member, this common movable member meshing at diametrically opposed points with two toothed elements belonging each to one of said cinematical linkages; by the fact that this movable member drives the display through the intermediary of the multiplying gear train; and by the fact that the axis of the stacking of aneroid element is parallel to the axis of the hand of the display i.e. to the longitudinal axis of the altimeter or of its housing.

---

### 5,016,474
### ULTRASONIC TRANSDUCER

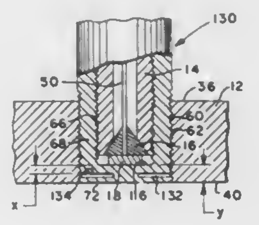
**Dov Hazony, University Heights, and Richard E. Berris, Jr., Chagrin Falls, both of Ohio, assignors to J. W. Harley Inc., Twinsburg, Ohio**

**Continuation-in-part of Ser. No. 219,076, Jul. 14, 1988, Pat. No. 4,907,454, which is a continuation-in-part of Ser. No. 25,943, Mar. 16, 1987, Pat. No. 4,757,713, which is a continuation-in-part of Ser. No. 706,926, Feb. 19, 1985, Pat. No. 4,649,749. This application Mar. 7, 1990, Ser. No. 490,824**

**Int. Cl.$^5$ G01N** ***29/00***

**U.S. Cl. 73—597** **7 Claims**

1. An ultrasonic transducer device for measuring the thickness of a member comprising a piezoelectric element, means for biasing said piezoelectric element against the member whose thickness is to be measured, said biasing means comprising a sleeve having a recess provided in one end thereof and spacer means received within said recess in said sleeve, said spacer means operatively contacting said piezoelectric element, and a plurality of means for producing reference thicknesses, each of said reference thickness producing means being a surface formed within the member whose thickness is to be measured and positioned in a spaced apart relationship with one another and located opposite said piezoelectric element, said reference thickness producing surfaces being substantially parallel to a wear surface on the member whose thickness is to be measured, said reference thickness producing surfaces and



said wear surface intercepting signals produced by said piezoelectric element in response to actuation thereof, said plurality of reference thickness producing means being responsive to changes in the temperature of the member whose thickness is to be measured.

---

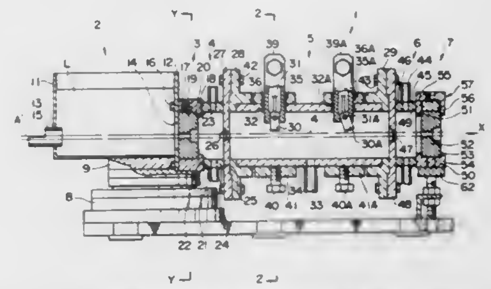
### 5,016,475
### WIREDRAWING APPARATUS INCLUDING AN ULTRASONIC FLAW DETECTOR

**Kenji Aburatani, and Tamotsu Shozaki, both of Kobe, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan**

**Filed Sep. 12, 1989, Ser. No. 406,038**

**Int. Cl.$^5$ G01N** ***29/00***

**U.S. Cl. 73—644** **3 Claims**



1. A wiredrawing apparatus including an ultrasonic flaw detector, the wiredrawing apparatus having a drawing die box containing a drawing die and supported on a die stand, comprising:
  a cleaning tank disposed contiguously with and downstream from the drawing die box with respect to the running direction of a drawn wire;
  a first partition disk having a hole for passing the drawn wire and attached to the cleaning tank with the hole thereof coaxial with the drawing die;
  an ultrasonic testing tank joined to the downstream end of the first partition disk and provided with ultrasonic testing means for detecting flaws in the drawn wire and a supply port for receiving an ultrasonic testing medium therein;
  a second partition disk having a hole for passing the drawn wire and attached to the downstream end of the ultrasonic testing tank with the hole thereof coaxial with the drawing die;
  a drain tank having an upstream end attached to the second partition disk and a downstream end attached to a guide die box containing a guide die and supported at an end of the die stand, and drawing ports for draining the ultrasonic testing medium;
  wherein the hole of the first partition disk is sized sufficiently larger than the drawing die so that the ultrasonic testing medium can flow from the ultrasonic testing tank into the cleaning tank while the drawn wire is being drawn through the drawing die and the hole of the first partition

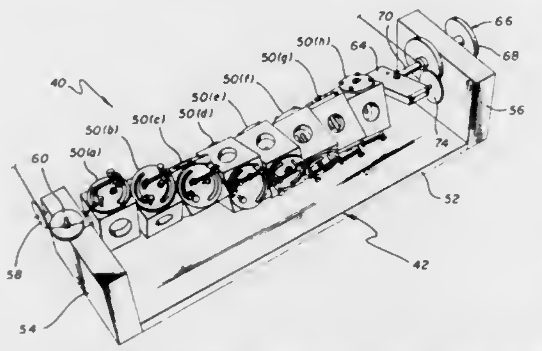
VOL
1126
ISS
3
MY
21
1991
UMI

disk, so as to clean the drawn wire, the cleaning tank is provided with drawing ports to discharge the ultrasonic testing medium so that the ultrasonic testing tank, the cleaning tank and the drawing tank are always filled up with the ultrasonic testing medium, and the hole of the second partition disk is formed so as to allow the ultrasonic testing medium to leak from the ultrasonic testing tank into the drain tank.

---

### 5,016,476
## OPTICAL FIBER BENDING STRESS PROOF TESTER

**Stanley P. D. Peterson, and Rudolph A. Eisentraut, both of Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.**
**Filed Jul. 25, 1989, Ser. No. 385,030**
**Int. Cl.$^5$ G01N** *3/08*
U.S. Cl. 73—829 **5 Claims**



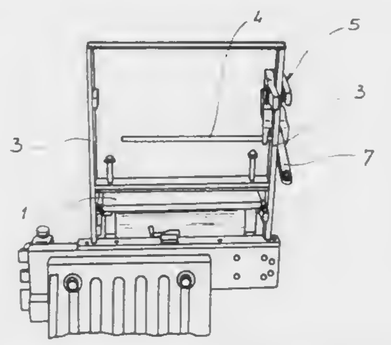
1. An optical fiber bending stress proof tester comprising:
first roller means for bending an optical fiber along the longitudinal axis of said optical fiber to cause tension in a first plane and compression in a second plane, diametrically opposed to said first plane, on the periphery thereof;
second roller means mounted parallel to said first roller means for bending said optical fiber along said longitudinal axis to cause tension in said second plane and compression in said first plane; and
first roller block means for retaining said first and second roller means in a first or a second angular orientation with respect to the longitudinal axis of said fiber, said first roller block including pivot means for allowing said second roller means to be movable relative to said first roller means from a first loading position to a second test position at which said tension and compression stresses are exerted on the fiber and a rotary plate means having a pin and slot arrangement for providing said second roller means to be movable relative to said first roller means from a first loading position to a second test position at which said tension and compression stresses are exerted on the fiber.

---

### 5,016,477
## APPARATUS FOR MEASURING THE FLEXURAL RESISTANCE OF RIBBED PATTERNS

**Giuseppe Crespi, Corso Novara, 225 - 27029 Vigevano (Pavia), Italy**
**Filed Jan. 26, 1990, Ser. No. 471,275**
**Claims priority, application Italy, Feb. 2, 1989, 19296 A/89**
**Int. Cl.$^5$ G01N** *3/20*
U.S. Cl. 73—849 **6 Claims**

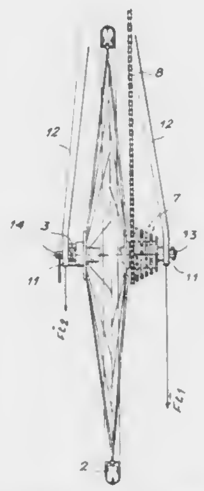
1. An apparatus for instantaneously measuring a flexural resistance characteristic of a ribbed cardboard sheet, comprising a frame including two parallel uprights, a clamp member for clamping a ribbed cardboard sheet, said clamp member being slidably supported on said uprights and comprising a pair of flat sliding plates which can be abutted against one another and are slidably mounted between said parallel uprights, driving means for upward and downward driving said clamp member, at least a roller thereagainst a ribbed portion of said cardboard sheet can be engaged as said driving means upward drive said clamp member, a load cell coupled to said at least a roller and adapted to measure a force required for folding said ribbed portion and display means for displaying said force.



---

### 5,016,478
## METHOD FOR MEASURING THE TORQUE TRANSMITTED TO THE DRIVING WHEEL OF A CYCLE OR LIKE VEHICLE AND A DEVICE FOR CARRYING OUT SAID METHOD

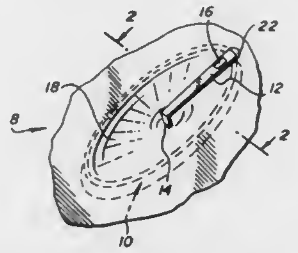
**Jean-Pierre Mercat, Chateau-Renault, France, assignor to Ste Look, Nevers, France**
**Filed Feb. 22, 1990, Ser. No. 482,971**
**Claims priority, application France, Feb. 28, 1989, 8902558**
**Int. Cl.$^5$ G01L** *3/14*
U.S. Cl. 73—862.19 **7 Claims**



1. A method for measuring the torque transmitted to the driving wheel of a cycle or like vehicle by means of detector elements incorporated in the hub of said wheel and connected to an electric circuit comprising an apparatus for indicating the value of said torque, wherein electric strain gages are employed as detector elements and disposed on one end of the spindle of the corresponding wheel or on a member mounted on said spindle end, said strair gages being placed in such a manner as to ensure that they can be influenced only by variations in the force applied to said spindle end in the horizontal plane which passes through the center of the wheel spindle in order to measure solely the horizontal component of the shearing force applied to said spindle, thus making it possible to deduce therefrom the value of torque transmitted to said wheel.

### 5,016,479
## TENSION GAUGE FOR THIN MATERIALS

**Israel Taback, Newport News, Va., assignor to The Bionetics Corporation, Hampton, Va.**
**Continuation-in-part of Ser. No. 337,139, Apr. 12, 1989, abandoned. This application Apr. 5, 1990, Ser. No. 504,851**
**Int. Cl.$^5$ G01L** *5/04, 5/10*
U.S. Cl. 73—862.45 **22 Claims**

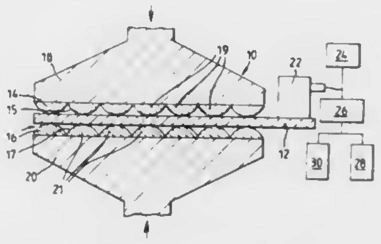


7. A method for determining the sum of the tensions in an elastic sheet material comprising the steps of:
(a) holding an elastic sheet material in contact with a supporting frame structure;
(b) deflecting a side of the elastic material a known distance at the center of the supporting frame structure by an elastic material contacting surface fixed relative to the supporting frame structure, one of the frame structure or the contacting surface being non-symmetric about two orthogonal axes parallel to the elastic sheet;
(c) measuring the force required to deflect the elastic material the known distance at the center of the supporting frame structure;
(d) rotating one of the contacting surface or the supporting frame structure relative to the elastic sheet material;
(e) repeating steps (a) to (c); and
(f) calculating the sum of the tensions in the elastic material from the two obtained force measurements.

---

### 5,016,480
## STRESS WAVE LOAD CELL

**Trevor J. Holroyd, Derby, England, assignor to Stresswave Technology Limited, Derby, England**
**Filed Feb. 16, 1990, Ser. No. 480,836**
**Claims priority, application United Kingdom, Mar. 14, 1989, 8905822**
**Int. Cl.$^5$ G01L** *1/00*
U.S. Cl. 73—862.59 **13 Claims**

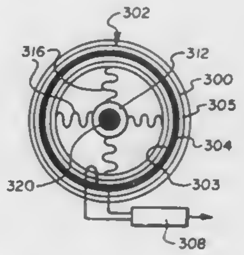


1. stress wave load cell comprising a propagation member which allows the propagation of stress waves therethrough, the propagation member having at least one surface,
at least one damping member arranged such that when a load is applied to the load cell a damping load is applied on the at least one surface of the propagation member by the damping member, the damping load applied by the damping member increasing with the load, the at least one damping member having a variable area of damping contact with the at least one surface of the propagation member such that when a load is applied to the load cell the area of damping contact between the propagation member and the at least one surface of the damping member increases with the load, the at least one damping member being resilient such that the area of damping contact between the damping member and the at least one surface of the propagation member is variable in a repeatable manner when a load is applied to the load cell,
at least one transducer acoustically coupled to the propagation member, the at least one transducer being arranged to launch a stress wave signal into the propagation member,
at least one means acoustically coupled to the propagation member to detect the stress wave signal after it has propagated through the propagation member and been damped by any damping contact between the damping member and the propagation member, the at least one means to detect the stress wave signal being arranged to convert any detected stress waves into an electrical signal,
a processor being arranged to process the electrical signal to give an electrical output signal as a measure of the load applied on the load cell.

---

### 5,016,481
## FIELD-BASED MOVEMENT SENSOR

**Stephen C. Jacobsen, and John E. Wood, both of Salt Lake City, Utah, assignors to Sarcos Group, Salt Lake City, Utah**
**Division of Ser. No. 332,593, Apr. 3, 1989, Pat. No. 4,964,306. This application Sep. 11, 1990, Ser. No. 580,779**
**Int. Cl.$^5$ G01B** *7/16*
U.S. Cl. 73—862.64 **6 Claims**



1. A force transducer comprising
an annular frame,
a center hub disposed within the frame to move generally in the plane thereof and with respect to the frame when subjected to a force,
flexible spring means joining the hub to the frame to hold the hub within the frame while allowing movement thereof relative to the frame,
means disposed on the hub for producing a force field which emanates outwardly toward the frame, and
detection means disposed on the frame for detecting variation in the intensity of the force field and thus movement of the force field producing means within the frame.

---

### 5,016,482
## METHOD OF TAKING A PROPORTIONAL SAMPLE OF FLOWING GAS IN A LINE

**William H. Clingman, Jr., 4416 McFarlin, University Park, Tex. 75205, and Lyn R. Kennedy, 2705 Whitewood, Dallas, Tex. 75233**
**Continuation-in-part of Ser. No. 143,126, Jan. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 33,919, Apr. 1, 1987, abandoned, which is a continuation of Ser. No. 688,910, Jan. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 518,963, Aug. 1, 1983, abandoned, which is a division of Ser. No. 272,204, Jun. 10, 1981, Pat. No. 4,396,299. This application Aug. 16, 1989, Ser. No. 395,135**
**Int. Cl.$^5$ G01N** *1/22*
U.S. Cl. 73—863.61 **4 Claims**

1. A method of taking a flowing sample of gas flowing through a line, which flowing sample is constantly proportionate to the flow rate of said flowing gas, said method comprising:

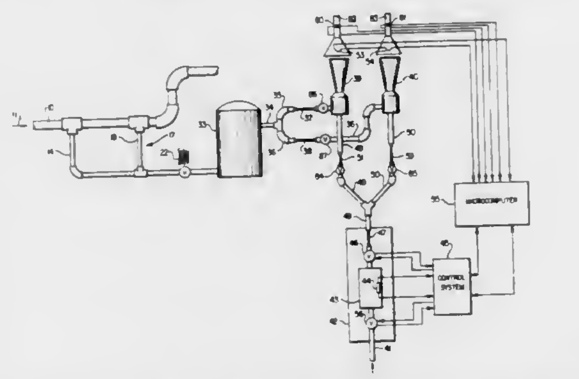
VOL
1126
ISS
3
MY
21
1991
UMI

a) passing said gas flowing through said line through a first flow restriction in said line;

b) drawing a flowing sample of said gas from said line at a point upstream of said first flow restriction into a sample line;

c) passing said flowing sample of said gas in said sample line through a second flow restriction in said sample line, the interior of said line, said first flow restriction, said sample line, and said second flow restriction each being substantially cylindrical, the interior diameter of each of said four elements above being sequentially identified by the following symbols: $D_{15}$, $d_{15}$, $D_{12}$, and $d_{12}$;

d) equalizing the pressure downstream of said first and second restrictions; and



e) said first and said second flow restrictions being so sized with respect to each other and said line and sample line that the equation $F(b_{15})+530\sqrt{in}/(D_{15})^{\frac{1}{2}}=F(b_{12})+530\sqrt{in}/(D_{12})^{\frac{1}{2}}$ is true in the case of flange taps adjacent said restrictions when $D_{12}$ and $D_{15}$ are expressed in the same units of measurement and the equation $F(b_{15})+875\ in/(D_{15})=F(b_{12})+875\ in/D_{12}$ is true in the case of pipe taps adjacent said restrictions when $D_{12}$ and $D_{15}$ are expressed in the same units of measurement, $b_{15}$ is a parameter of said second flow equal to the dimensionless quotient produced by having $d_{15}$ divided by $D_{15}$, $b_{12}$ is equal to the dimensionless quotient produced by having $d_{12}$ divided by $D_{12}$,

$F(b_{15})=d_{15}$ (830 *per inch* $-$ 5,000 *per inch* $b_{15}$ + 9,000 *per inch* $b_{15}^2$ $-$ 4200 *per inch* $b_{15}^3+B_{15}$)

wherein

$$B_{15}=\frac{530\sqrt{\text{inch}}}{\sqrt{D_{15}}}$$

for flange taps

$$B_{15}=\frac{875\ \text{inch}}{D_{15}}+75$$

for pipe taps, and $F(b_{12})=d_{12}$ (830 *per inch* $-$ 5000 *per inch* $b_{12}$ + 9000 *per inch* $b_{12}^2$ $-$ 4200 *per inch* $b_{12}^3+b_{12}$)

wherein $B_{12}=$

$$B_{12}=\frac{530\sqrt{\text{inch}}}{\sqrt{D_{12}}}$$

for flange taps

$$B_{12}=\frac{875\ \text{inch}}{D_{12}}+75$$

for flange taps.

---

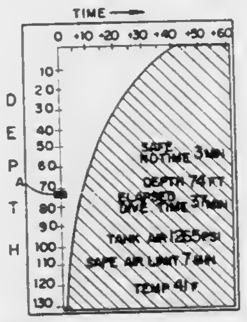
### 5,016,483
## METHOD AND APPARATUS FOR DETERMINATION AND DISPLAY OF CRITICAL GAS SUPPLY INFORMATION

**William D. Budinger, 16 Southridge Dr., Kennett Square, Pa. 19348**

**Division of Ser. No. 308,509, Feb. 9, 1989, Pat. No. 4,926,703, which is a division of Ser. No. 169,651, Mar. 21, 1988, Pat. No. 4,876,903, which is a continuation-in-part of Ser. No. 142,370, Jan. 11, 1988, abandoned. This application Jan. 24, 1990, Ser. No. 469,664**

Int. Cl.$^5$ G06F *15/42*

U.S. Cl. 73—865.1 **2 Claims**



**1**. An apparatus for predicting the amount of breathable gas that would be consumed by a diver ascending to the surface from a particular depth by following a safe ascent profile representing the diver's optimum safe route to the surface comprising:

means for determining the current depth of the diver;

means for determining the estimated degree of dissolved gas levels in the diver's tissues;

means for determining the diver's projected optimum safe ascent profile from the particular depth, taking into account the degree of dissolved gas levels in the diver's tissues and any delay for time to be spent during the ascent at depth levels required for decompression;

means for determining the diver's present gas consumption rate;

means for determining the gas consumption rate for ambient pressures to be encountered by the diver during the projected optimum safe ascent profile and for determining the amount of gas to be consumed during the projected ascent;

means for determining the gas consumption rate for time to be spent during the ascent at depth levels required for decompression and for determining the total amount of gas to be consumed during the compression delays; and

means for determining the total projected gas consumption (Air Ascent Requirement) for ascending to the surface and for providing an indication of the Ascent Air Requirement to the diver.

---

### 5,016,484
## STARTER MOTOR

**Hiroyuki Morikane, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 22, 1989, Ser. No. 411,292**

**Claims priority, application Japan, Oct. 24, 1988, 63-138310[U]**

Int. Cl.$^5$ F02N *11/00*

U.S. Cl. 74—6 **1 Claim**

**1**. A started motor comprising:

a solenoid switch (**6**) having an axially movable plunger (**6***a*);

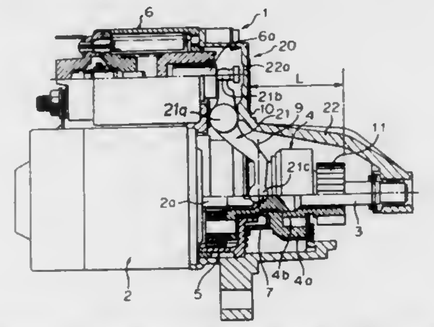
an electric motor (**2**) arranged below the switch and axially parallel thereto;

an armature shaft (**2***a*) driven by the electric motor;

a reduction gear unit (**5**) coaxially surrounding the armature shaft and driven thereby, and including an output shaft (**3**) extending outwardly of the armature shaft and axially aligned therewith:

a one-way clutch unit (**4**), including a pinion gear (**11**), carried coaxially on the output shaft so as to be slidable thereon, said clutch unit being driven by the reduction gear unit, and the reduction gear unit being axially interposed between the motor and the clutch unit;

a shift lever (**21**) having an upper end (**21***b*) engaged with the movable plunger, and a lower end (**21***e*) engaged in a peripheral groove (**7**) in the one-way clutch unit, the shift lever being rockable about a fulcrum part (**21***a*) which is positioned between the upper end and the lower end of the lever, and which is in engagement with an inner surface of a wall (**22***a*) of a front housing enclosing the clutch unit;



wherein the lever is shaped as a dogleg, the upper end and the fulcrum part thereof are positioned axially inwardly, towards the motor and switch, with respect to the lower end, and the fulcrum part is positioned immediately above an outer circumference of the reduction gear unit to maximize an axial distance between an engine mounting surface (**10**) of the starter motor and a retracted position of the pinion gear.

---

### 5,016,485
## LEVER APPARATUS

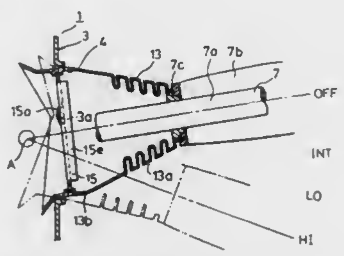
**Hiroyuki Kato, Aichi, Japan, assignor to Kabushiki Kaisha Toka-Rika-Denki-Seisakusho, Aichi, Japan**

**Continuation of Ser. No. 292,421, Dec. 30, 1988, abandoned. This application Apr. 23, 1990, Ser. No. 512,584**

**Claims priority, application Japan, Jan. 12, 1988, 63-2298[U]**

Int. Cl.$^5$ **F16J** *15/50*

U.S. Cl. 74—18.1 **21 Claims**



**1**. A lever apparatus, comprising:

a body having an opening and a pivot support apparatus provided in the interior thereof;

a lever extending outwardly from the interior of said body through said opening in said body, said lever being pivotally supported by said pivot support apparatus in said interior of said body;

an elastic covering member having a first end and a second end, and a substantially tapered shape, said second end having a larger diameter than said first end, said covering member protruding from an inner boundary of said opening through and out of said opening so as to substantially cover said opening of said body, said first end being supported at the circumferential periphery of an intermediate portion of said lever, said lever extending outward through said opening into and through said covering member, and protruding through said first end of said covering member; and

pivotally supporting means for supporting said second end of said covering member and allowing said second end to pivot with respect to said body in conjunction with the pivoting of said lever.

---

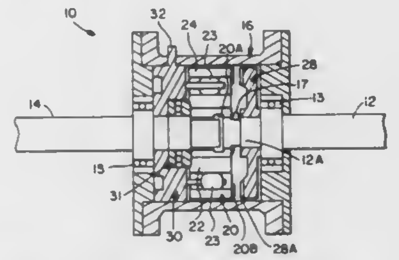
### 5,016,486
## REVERSING DRIVE MECHANISM

**William L. Watson, Mitchell, and Kenneth E. Watson, Morrill, both of Nebr., assignors to Watson Welding & Mfg. Inc., Morrill, Nebr.**

**Filed Apr. 25, 1990, Ser. No. 514,176**

Int. Cl.$^5$ F16H *15/00*

U.S. Cl. 74—205 **12 Claims**



**1**. Reversing drive mechanism comprising:

(a) a housing;

(b) an input shaft having first and second ends; said first end extending into and being rotatably supported in said housing; wherein said input shaft is axially fixed relative to said housing;

(c) an output shaft having first and second ends; said first end extending into and being rotatably supported in said housing; wherein said output shaft is axially fixed relative to said housing;

(d) disk means secured to said input shaft adjacent said first end;

(e) a bearing carried by said first end of said output shaft; said bearing including an inner race member is an outer race member; wherein said inner race member is rotationally fixed to said output shaft; wherein said bearing is axially movable thereon between first and second positions;

(f) thrust means for moving said bearing axially on said output shaft between said first and second positions;

wherein when said bearing is in said first position, said input shaft is adapted to drive said output shaft rotationally in the same direction as said input shaft; and wherein when said bearing is in said second position, said disk means is adapted to drive said outer race member rotationally in a manner such that said inner race member and said output shaft are driven rotationally in a direction opposite to said input shaft.

---

### 5,016,487
## BALL BEARIG GEARS

**Dieter Bollmann, Reinheim, Fed. Rep. of Germany, assignor to Bollmann Hydraulik GmbH, Fed. Rep. of Germany**

**Filed Jun. 10, 1988, Ser. No. 204,725**

**Claims priority, application Fed. Rep. of Germany, Nov. 19, 1987, 3739204; Jan. 23, 1988, 3801930**

Int. Cl.$^5$ F16H *13/04, 15/40*

U.S. Cl. 74—206 **20 Claims**

**1**. A transmission gear comprising:

a drive part positioned to rotate about a center axis, said drive part displaying an endless guide groove;

a driven part positioned to rotate around said center axis, said driven part displaying an endless guide groove

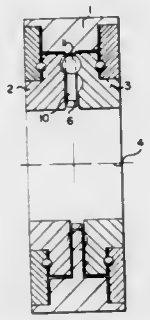
VOL
1126
ISS
3
MY
21
1991
UMI

wherein said drive guide groove and said driven guide groove are configured at an angle to each other;

at least one force transmission ball placed between said drive part and said driven part at an intersection of said drive guide groove and said driven guide groove;

means for limiting motion of said force transmission ball so that said ball effects a transfer of rotational force and change in angle of rotation from said drive part to said driven part;

wherein said drive part is a drive disk and said drive guide groove is an eccentric circular groove relative to said axis;



said driven part is a driven disk and said driven guide groove exhibits a plurality of curve segments centered around said axis;

wherein said means for limiting motion comprises at least;

a fixed flange arranged between said drive disk and said driven disk;

said flange exhibiting elongated hole guides covering a radial deflection of each of said drive disk and driven disk guide grooves, and containing a respective force transmission ball, wherein said flange secures said balls against rotation around said axis; an equalizing ring axially bearingly supported in said drive disk and carrying said drive guide groove.

---

### 5,016,488

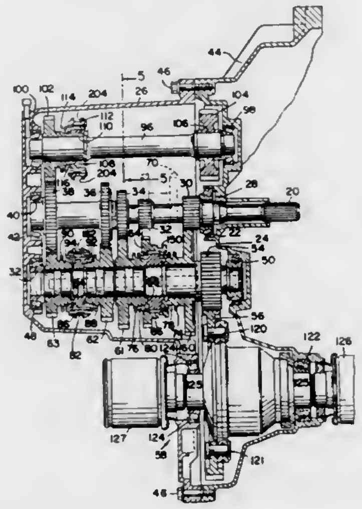
## SHIFT MECHANISM FOR ENGAGING SLIDING GEAR IN MANUAL TRANSMISSION

**Eldon L. Goates, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 1, 1989, Ser. No. 430,042**

**Int. Cl.$^5$ B60K *20/00***

U.S. Cl. 74—475 14 Claims



1. A mechanism for controlling gear shifts in a manual transmission comprising:

a gear selector mounted for rotation and axial displacement in response to control of the vehicle operator, defining shift planes containing gear engagement positions, each gear engagement position corresponding to a gear selected for operation;

a guide rail driveably connected to the gear selector shaft for movement therewith among shift planes and gear engagement positions corresponding to those of the gear selector, carrying a selector pin extending outward therefrom;

a first gear and second gear, the first gear slidably mounted for movement into and out of engagement with the second gear;

a lever having an arm extending outward from a pivotable support, engaging the first gear and causing the first gear to slide on the support shaft as the lever arm pivots; and

means for releaseably connecting the selector pin and lever and for pivoting the lever arm as the selector pin moves toward the first shift plane.

---

### 5,016,489

## MULTIARTICULATION ROBOT

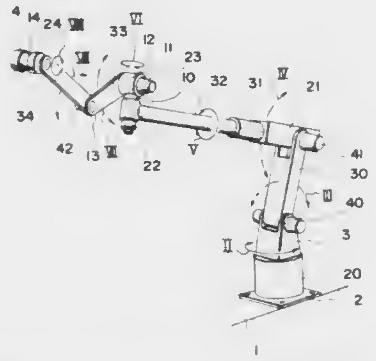
**Akira Yoda, Yokohama, Japan, assignor to Tokyo Sharyo Seizo Kabushiki Kaisha, Yokohama, Japan**

**Filed Oct. 23, 1989, Ser. No. 425,576**

**Claims priority, application Japan, Oct. 24, 1988, 63-138384[U]**

**Int. Cl.$^5$ B25J *18/00***

U.S. Cl. 74—479 3 Claims



1. A multiarticulation robot comprising a rotatable stand; a first rotary articulation mechanism for rotating said stand; a first arm pivotally journalled on said stand; a first rocking articulation mechanism for rocking said first arm; a second arm pivotally mounted at the opposite end of said first arm; a second rocking articulation mechanism for rocking said second arm; a third arm slideably extending from said second arm; a second rotary articulation mechanism for rotting said third arm; a first shaft rotatably mounted at the end of said third arm at an axis intersecting the axis of said third arm; a third rotary articulation mechanism for rotating said first shaft; a second shaft rotatably mounted at the end of said first shaft at an axis intersecting, at right angles, said first shaft; a third rocking articulation mechanism for rocking said second shaft about an axis; a fourth arm mounted on said second shaft and conjointly rocking therewith; a third shaft mounted at the end of said fourth arm, having an axis extending transversely to the plane in which said fourth arm rocks; a fourth rocking articulation mechanism for rocking said third shaft; a fifth arm mounted at one end to said third rotary shaft and conjointly rocking therewith; a fourth rotary shaft mounted at the end of said fifth rm, having an axis extending transversely to the plane in which said fifth arm rocks; a fourth rotary articulation mechanism for rotating said fourth shaft.

---

### 5,016,490

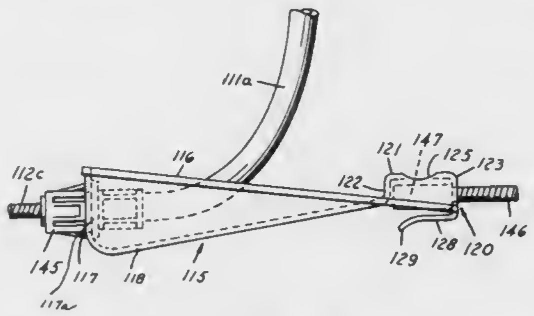
## CABLE CONTROL SYSTEM FOR DUAL ACTUATORS

**Miroslav Jaksic, Farmington Hills, Mich., assignor to Babcock Industries Inc., Fairfield, Conn.**

**Filed Jul. 10, 1989, Ser. No. 351,969**

**Int. Cl.$^5$ F16C *1/10;* B60T *1/00;* F16B *9/00***

U.S. Cl. 74—501.5 R 21 Claims



6. A cable control system for dual actuators comprising:

(a) a one-piece force equalizing device having spaced parallel walls with aligned openings therethrough,

(b) a first cable having a first strand and an associated conduit fixed to one wall of said device and extending to a first actuator, and

(c) a second cable having a second strand fixed to the other end of said device and extending to another actuator such that a force is transmitted to one of the actuators through said first cable and the reaction force on said conduit surrounding said first strand is transmitted through said device through said second strand to the other of the actuators through said device,

one of said walls having an elongated open ended slot of receiving said second strand, said second strand having an enlarged end engaging a surface of said wall for retaining said strand in position,

said device having a peripheral flange lying in a single plane with one of said walls extending laterally from said plane in one direction and the other of said walls extending laterally in the opposite direction,

said device including integral spaced portions adjacent each wall, each portion being concave in cross section on a surface adjacent the flange and convex in cross section adjacent its outer surface.

---

### 5,016,491

## GEAR ASSEMBLY

**Antti M. Poro, Hämeenlinna, Finland, assignor to Innoke Oy, Hameenlinna, Finland**

**PCT No. PCT/FI88/00117, § 371 Date Jan. 9, 1990, § 102(e) Date Jan. 9, 1990, PCT Pub. No. WO89/00651, PCT Pub. Date Jan. 26, 1989**

**PCT Filed Jul. 14, 1988, Ser. No. 457,695**

**Claims priority, application Finland, Jul. 15, 1987, 873139**

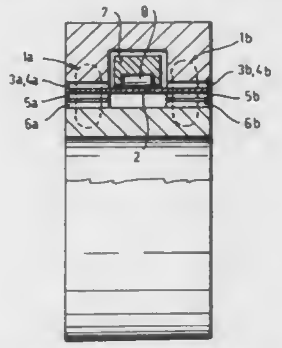
**Int. Cl.$^5$ F16H *37/06***

U.S. Cl. 74—640 5 Claims

1. A gear assembly including two strain wave gearings, each having inwardly facing gear teeth on a first gear member, outwardly facing gear teeth on a second gear member and an annular flexspline disposed intermediate said gear members having gear teeth on the inner and outer surfaces thereof in meshing engagement with said gear teeth on said first and second gear members, respectively, the invention comprising:

said flexspline extending between and being common to both of said strain wave gearings to interconnect them for parallel operation; and

a wave generator carried by said gear assembly including means for giving said flexspline an elliptical form and for transmitting a torsional moment between said wave generator and said flexspline.



---

### 5,016,492

## CONTINUOUSLY VARIABLE AUTOMATIC TRANSMISSION

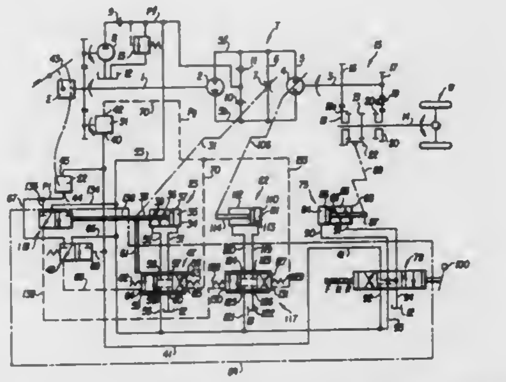
**Takashi Iino, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 303,428, Jan. 30, 1989, abandoned, which is a continuation of Ser. No. 21,072, Mar. 3, 1987, abandoned. This application Sep. 14, 1989, Ser. No. 407,716**

**Claims priority, application Japan, Mar. 6, 1986, 61-49202**

**Int. Cl.$^5$ B60K *41/22***

U.S. Cl. 74—733.1 17 Claims



1. A method of controlling a continuously variable automotive transmission for continuously varying the speed ratio between input and output rotational speeds according to an indication of the driver's intention of acceleration or deceleration, an indication of an engine power output, and alternative selection of forward and neutral transmission positions, and for transmitting the engine power output to wheels dependent on the operation of a clutch means, said method comprising the step of:

detecting and feeding back the operating condition of said clutch means for the control of the transmission in order to perform speed changing operation of the transmission more quickly when the clutch means is operated toward a shut-off position upon automobile deceleration than when ordinary speed changing operation is effected by the transmission.

VOL
1126
ISS
3
MY
21
1991
UMI

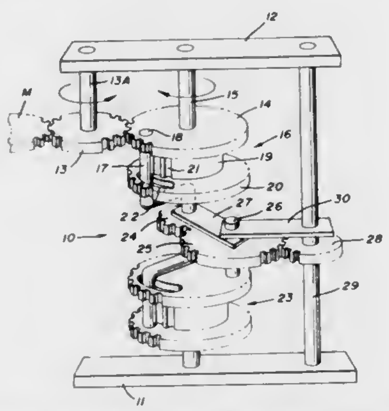
### 5,016,493
### VARIABLE SPEED GEARING ASSEMBLY

**Kyung S. Han, 1922 Coe's Post Run, Westlake, Ohio 44145**

**Filed Jan. 2, 1990, Ser. No. 459,648**

**Int. Cl.$^5$ F16H** *35/00*

**U.S. Cl. 74—840** **5 Claims**



1. A transmission device for variable speed output from a common source of rotatable power, said transmission device comprising, a output gear on a input shaft driven by said source of rotatable power, a secondary input gear on a mai shaft driven by said input gear, a control gear assembly on said main shaft, a variation control drive crank shaft is axially offset and extending from said input gear through said control gear assembly driving same. a variation gear keyed to said crank shaft, a following gear on a free shaft in meshed engagement with said variation gear and an output gear on an output shaft, connecting rods interconnecting said crank shaft adjacent said variation gear, said free shaft and said output shaft, said control gear assembly having a crank positioning element, means for selectively engaging said crank shaft with said crank positioning element, said crank shaft has a angular inclination dependent on said control gear assembly.

---

### 5,016,494
### JOLT CONTROL FOR DRIVE SYSTEM

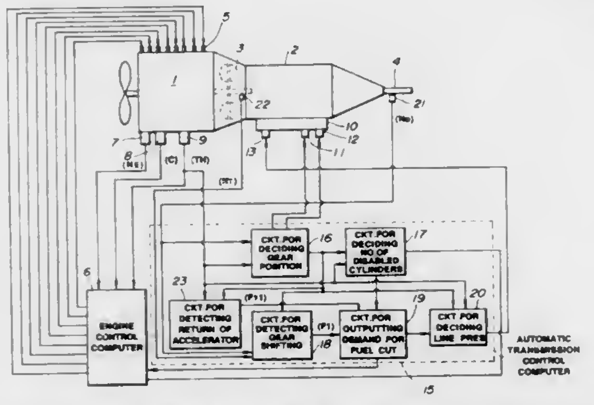
**Hiroshi Yamaguchi, Yokohama City, Japan, assignor to Nissan Motor Co., Ltd., Yokohama City, Japan**

**Filed Aug. 8, 1989, Ser. No. 390,907**

**Claims priority, application Japan, Aug. 8, 1988, 63-196076**

**Int. Cl.$^5$ B60K** *41/18*

**U.S. Cl. 74—858** **6 Claims**


5
3
2
4
1
22
21
10
12
11
7
8
13
6
CKT FOR DECIDING GEAR POSITION
16
CKT FOR DECIDING NO OF DISABLED CYLINDERS
17
23
(P11)
19
20
CKT FOR DETECTING RETURN OF ACCELERATOR
CKT FOR DETECTING GEAR SHIFTING
(P1)
18
CKT FOR OUTPUTTING DEMAND FOR FUEL CUT
CKT FOR DECIDING LINE PRES
ENGINE CONTROL COMPUTER
AUTOMATIC TRANSMISSION CONTROL COMPUTER
15

1. In a drive system including a prime mover provided with manually operable means for controlling output torque of the prime mover, and an automatic transmission, the automatic transmission undergoing a gear shift operation, a jolt control system for the automatic transmission when the automatic transmission undergoes the gear shift operation, comprising:

sensor means for sensing a position of the manually operable output torque controlling means and generating an output signal indicative of said position sensed;

means for effecting an output torque alteration control, wherein the output torque of the prime mover is altered, when the automatic transmission undergoes the gear shift operation: and

means for detecting a predetermined change in said output signal when the automatic transmission undergoes the gear shift operation and rendering said output torque alteration control effecting means inoperable upon detecting said predetermined change, whereby the automatic transmission undergoes the gear shift operation without the output torque alteration control.

---

### 5,016,495
### ENGINE BRAKE RUNNING CONTROL FOR AUTOMATIC TRANSMISSION IN AUTOMATIC DRIVE RANGE

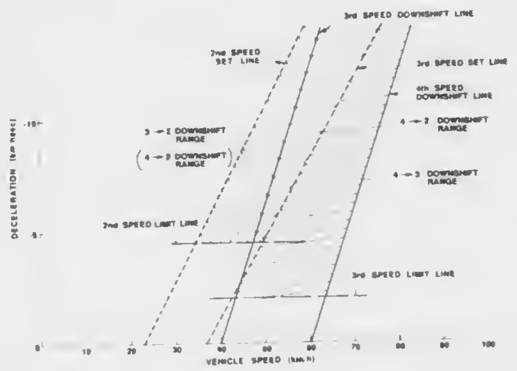
**Satoshi Takizawa, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jul. 6, 1989, Ser. No. 375,967**

**Claims priority, application Japan, Jul. 6, 1988, 63-166984**

**Int. Cl.$^5$ F16H** *59/48. 59/54. 59/68*

**U.S. Cl. 74—866** **4 Claims**



1. An engine brake running control system for an automotive vehicle including a brake pedal and an automatic transmission shiftable in gear position according to a predetermined shift point mapping when the automatic transmission operates in an automatic drive range, the engine brake running control system comprising:

means for detecting a depression of the brake pedal;

means for determining a vehicle speed which the automotive vehicle is running at;

means for determining a deceleration which the automotive vehicle is running at;

means for detecting a present gear position which the automatic transmission is conditioned in;

means for determining a reference deceleration value in response to said present gear position detected and said vehicle speed detected, comparing said deceleration determined with said reference deceleration value determined and producing a result and determining a new gear position lower than said present gear position which the automatic transmission should be downshifted to in response to said result; and

means for effecting a downshift from the present gear position in the automatic transmission to said new gear position determined to condition same in a state for engine brake running at said new gear position when the automatic transmission operates in the automatic drive range.

---

### 5,016,496
### SHIFT CONTROL SYSTEM FOR ENGINE BRAKING IN AN AUXILIARY TRANSMISSION

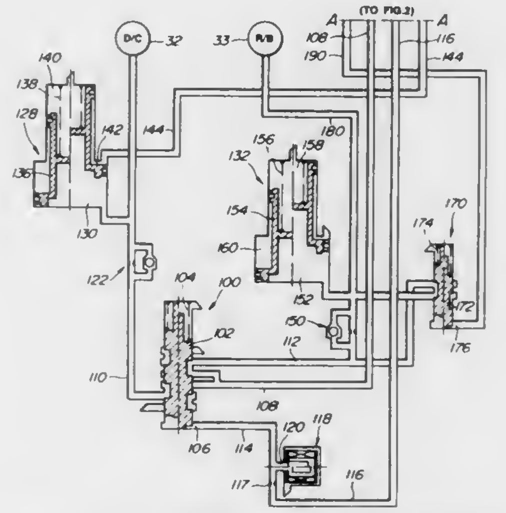
**Kazuhiko Sugano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jul. 25, 1989, Ser. No. 384,692**

**Claims priority, application Japan, Jul. 25, 1988, 63-183634**

**Int. Cl.$^5$ D16H** *61/04*

**U.S. Cl. 74—868** **5 Claims**



1. A shift control system for an automatic transmission, the automatic transmission including a main gear train and an auxiliary gear train operatively coupled therewith, the auxiliary gear train including a first friction element for high gear position and a second friction element for low gear position, the shift control system comprising:

a source of hydraulic fluid;

a first hydraulic passage;

a second hydraulic passage connected with the first friction element;

a third hydraulic passage connected with the second friction element;

a one-way orifice means connected between said first and third hydraulic passage for delaying transmission of an increase in hydraulic fluid pressure in said first hydraulic passage to said third hydraulic passage;

a shift valve connected with said first hydraulic passage and including a spool movable between a first position where said first passage is connected with said source and hydraulic fluid is discharged from said second passage, and a second position where said second passage is connected with said source and hydraulic fluid is discharged from said first passage;

a bypass valve connected with said first and third hydraulic passages in parallel with said one-way orifice means, said bypass valve including a spool, a spring and a pilot port, said spool including means for defining a bypass passage and being movable between an interrupting postion where said first passage is prevented from communicating with said third passage through said bypass passage, and a connecting position where said first passage is allowed to communicate with said third passage through said bypass passage, said spool being pressed to said interrupting position by said spring, said spool being pressed in the direction opposite to a force of said spring when said pilot port is supplied with a predetermined hydraulic pressure; and

means for supplying said predetermined hydraulic pressure when an engine brake is required.

---

### 5,016,497
### METHOD AND APPARATUS FOR GRINDING TEETH IN A STEEL STRIP TO FORM SAWS

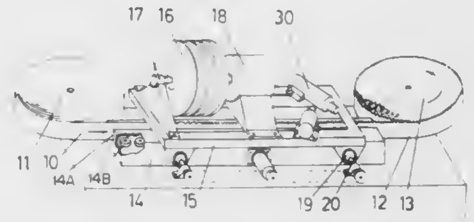
**Erik Sundström, Sandviken, Sweden, assignor to Sandvik AB, Sandviken, Sweden**

**Filed Nov. 30, 1989, Ser. No. 443,181**

**Claims priority, application Sweden, Nov. 30, 1988, 8804335**

**Int. Cl.$^5$ B23D** *63/12*

**U.S. Cl. 76—25.1** **13 Claims**



1. A method for grinding saw teeth in an edge of an elongated metal strip, comprising the steps of:

continuously moving said strip in the direction of its length, whereby said strip passes adjacent a grinding unit comprised of a rotary abrasive element, and

oscillating said unit in an endless path lying within a plane disposed parallel to a plane of said strip, whereby said abrasive element makes intermittent contact with said continuously moving strip to grind said teeth.

---

### 5,016,498
### METHOD AND APPARATUS FOR MANUFACTURING SUPER ABRASIVE CUTTING SAW

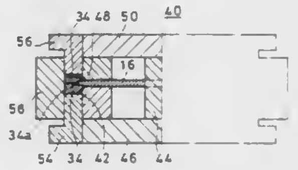
**Yusaku Matsuda, Osaka, Japan, assignor to Sanwa Diamond Industrial Co., Ltd., Japan**

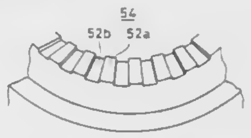
**Filed Aug. 28, 1987, Ser. No. 91,011**

**Claims priority, application Japan, May 30, 1987, 62-137212**

**Int. Cl.$^5$ B23D** *63/00:* **B29C** *33/42*

**U.S. Cl. 76—25.1** **5 Claims**





1. An apparatus for manufacturing a super abrasive cutting saw from pressed powder that is formed from a powder including super abrasives and respectively divided into two powder masses which are sintered and pressed together onto a cutting saw plate, forming a sinter around the periphery of the plate, the apparatus comprising:

cooperating press molds shaped for defining a doughnut-shaped space portion which is shaped for accommodating the entire periphery of the cutting saw plate and all of the two pressed powder masses, the molds together having main top and bottom, opposite, facing surfaces which are formed with uneven portions on the main surfaces for engaging the main surfaces of the pressed powder masses,

the space portion being shaped and placed for the periphery of the cutting saw plate to be located in the space portion of the press molds, the molds being shaped for bringing the two pressed powder masses to oppose each other and to hold the periphery of the cutting saw plate for engagement, the press molds being engaged to be pressed to-

VOL
1126
ISS
3
MY
21
1991
UMI

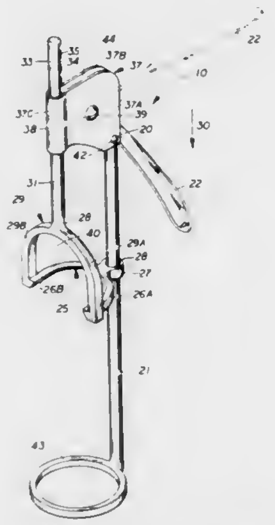
gether and fixed for sintering the masses onto the cutting saw plate,

wherein the press molds comprise an upper mold and a lower mold, the space portion is formed between the molds, the uneven portions on each mold are formed with alternate concave and convex portions to form corrugations in the main surfaces of the sinter.

---

### 5,016,499
### BEVERAGE BOTTLE STOPPER REMOVER

**Lee Saveland, P.O. Box 7893, Auburn, Calif. 95604**
**Filed Sep. 10, 1990, Ser. No. 579,565**
**Int. Cl.$^5$ B67B** *7/06*
**U.S. Cl. 81—3.37** **7 Claims**



1. A device for the removal of a stopper having an accessible underside, from a champagne-type bottle which comprises in combination:

a. a frame having two side walls, and a front wall, and being open at the rear,

b. a first generally vertical shaft secured at one end to the frame member between the two side walls distant from said front wall;

c. a second generally vertical shaft having a rack disposed at one end thereof in the same axis with said second shaft, said rack disposed within said frame member adjacent the front wall thereof;

d. a platform having an opening therein for receipt of a champagne bottle-type stopper, with said platform configured such that a section of the underside of said stopper rests on said platform, said platform being slidably mounted on said first shaft, and said platform also being connected to said second shaft;

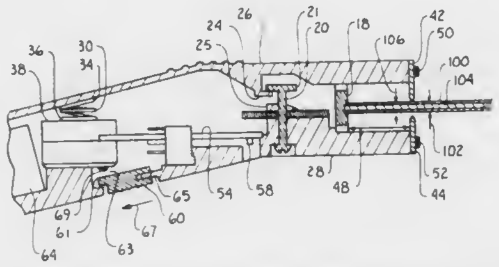
e. a handle comprising a lever having an axially aligned pinion on one end, said pinion end being pivotally mounted within said frame member, and said pinion engaging said rack;

whereby when said handle is moved from an upper position to a lower position the pinion engages the rack thus raising the second shaft and the platform connected thereto, such that the platform pushes up on the underside of the stopper to raise the stopper from the mouth of the bottle.

---

### 5,016,500
### BATTERY POWERED TEMPERATURE-CONTROLLED WIRE STRIPPER

**Alta Conrad, Vista, Calif.; George E. Mayer, Pittsburgh, Pa., and Donald A. Utke, Carlsbad, Calif., assignors to Teledyne Kinetics, Solana Beach, Calif.**
**Filed Apr. 10, 1990, Ser. No. 508,194**
**Int. Cl.$^5$ H02G** *1/12*
**U.S. Cl. 81—9.4** **26 Claims**



1. A portable device for stripping insulation from a wire for use with a source of direct current which comprises:

a heating element;

means to chop direct current from said source into pulses of direct current;

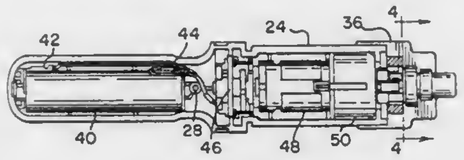
means to vary the duration of said pulses; and

switching means for inductively coupling said direct current power to said heating element to heat said heating element in proportion to the duration of said pulses.

---

### 5,016,501
### AUTOMATIC SHAFT LOCK

**Michael Holzer, Jr., Chicago, Ill., assignor to Skil Corporation, Chicago, Ill.**
**Filed Jul. 29, 1988, Ser. No. 226,366**
**Int. Cl.$^5$ B25B** *17/00*
**U.S. Cl. 81—57.11** **10 Claims**



1. An automatic shaft lock for a power tool having a housing and a motor disposed within the housing to rotate an implement, the automatic shaft lock preventing rotation of the implement with respect to the housing when torque is applied to the implement or to the housing, the automatic shaft lock comprising:

a locking ring fixed to the housing and defining an annular space;

a spindle shaft at least partially contained in the housing and rotatably supported in the housing, the spindle shaft having an end projecting into the annular space of the locking ring, the spindle end having at least one flat side partially bisecting the annular space;

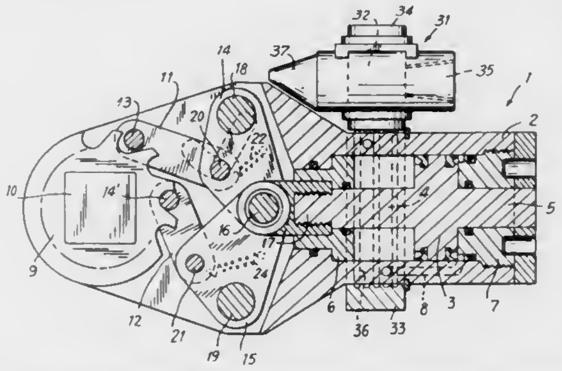
a single wedging pin located between each flat side of the spindle end and the locking ring such that slight rotational movement of one of the spindle end and the locking ring causes the wedging pin to be wedged between the flat side and the locking ring;

an output shaft at least partially contained in the housing and rotatably supported in the housing, the output shaft having at least one pair of elements projecting into the annular space, the output shaft being slightly rotatably movable relative to the spindle end such that when the output shaft is driven in either direction one element of the pair drives the spindle end at one of the flat sides while the other element of each pair traps the wedging pin in a position in which it will not wedge between the flat side of the spindle end and the locking ring.

---

### 5,016,502
### POWER WRENCH

**John K. Junkers, 7 Arrowhead Ln., Saddle River, N.J. 07458**
**Filed Mar. 30, 1990, Ser. No. 502,545**
**Int. Cl.$^5$ B25B** *13/46*
**U.S. Cl. 81—57.39** **18 Claims**

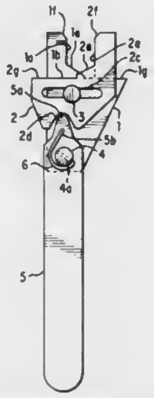


1. A power wrench for tightening and loosening of threaded connectors, comprising fluid operated drive means including a cylinder and a piston movable in said cylinder and having an end and an axis; engaging means arranged to engage and turn a threaded connector for tightening or loosening the latter; a ratchet-pawl mechanism including a ratchet provided in said engaging means and at least two pawls arranged to engage different teeth of said ratchet for turning said ratchet; and means for connecting said drive means with said pawls and including at lest two levers both pivotally connected to said end of said piston and turnable about different axes and each connected with a respective one of said pawls, said levers being located at opposite sides of said axis of said piston.

---

### 5,016,503
### ADJUSTABLE OPEN END WRENCH

**Carlyle D. Morton, 1447 Lynn St., Erie, Pa. 16503**
**Continuation of Ser. No. 386,000, Jul. 27, 1989, abandoned, which is a continuation of Ser. No. 226,440, Aug. 1, 1988, abandoned. This application Jun. 25, 1990, Ser. No. 542,806**
**Int. Cl.$^5$ B25B** *13/12*
**U.S. Cl. 81—127** **6 Claims**

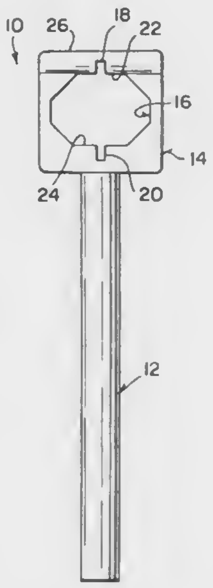


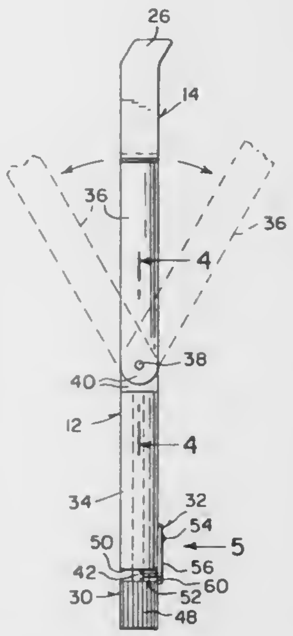
1. A self-adjusting open end ratchet wrench for use with nuts of multiple sizes comprising first and second generally flat jaw members which lie one on top of the other with surfaces engaging in sliding relation for relative movement of the jaws toward and away from each other, said jaws having opposed nut gripping surfaces which thickened portions which project in opposite directions from said engaging surfaces so the nut gripping forces on the projections are balanced, said first jaw having a guide surface 1*b* on its thickened portion presented to and engaging an edge guide surface 2*g* on said second jaw, said second jaw having a guide surface 2*b* on its thickened portion presented to and engaging an edge guide surface 1*g* on said first jaw, a handle pivoted between its ends to said first jaw, one end of the handle being adapted to receive a nut turning force and the other end of such handle having one or more teeth mating with corresponding teeth on said second jaw for moving the second jaw toward said first jaw to clamp a nut between the jaws, the pivot point of the handle being selected so that the force moving the second jaw toward such first jaw is always greater than the nut turning force applied to the handle, and non-load carrying retainer means for holding said jaws assembled and for permitting said relative movement.

---

### 5,016,504
### AIR VENT OPENER

**Thomas Brunetto, 20 Greenwich Ave., Lakehurst, N.J. 08733, and George Spector, 233 Broadway, Rm 3815, New York, N.Y. 10007**
**Filed May 25, 1990, Ser. No. 528,606**
**Int. Cl.$^5$ B25B** *9/00;* **A47F** *13/06*
**U.S. Cl. 81—488** **4 Claims**





1. An extension device for opening and closing an air vent lever, said extension device comprising:

(a) an elongated handle to be grasped at one end thereof by a user of said extension device;

(b) an enlarged head at other end of said elongated handle, whereby said enlarged head having an enlarged aperture therethrough transversely positioned to said elongated handle;

(c) means within said enlarged aperture of said enlarged head, for opening and closing the air vent lever; wherein said opening and closing means includes said enlarged head further having a pair of slots in which one of said slots is formed extending from an upper portion of said enlarged aperture, while other of said slots is formed extending from a lower portion of said enlarged aperture

VOL
1126
ISS
3
MY
21
1991
UMI

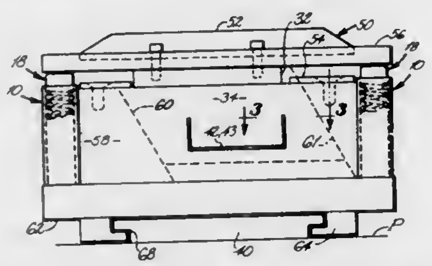
so that one of each of said slots can push and pull the air vent lever to open and close an air vent depending how the air vent lever is positioned on the air vent; further including the upper portion of said enlarged head being angularly positioned with respect to said elongated handle so that said upper slot will be in a better position to push and pull the air vent lever.

---

**5,016,505**

### SPRING RETURN MECHANISM FOR FLYING SHEARS

**Ward W. Chapman, 2700 W. Third Ct., Hialeah, Fla. 33010**
**Filed Dec. 14, 1989, Ser. No. 450,415**
**Int. Cl.$^5$ B26D *1/60***
**U.S. Cl. 83—198** **2 Claims**



1. In a flying shear having an upright stationary blade connected atop a horizontal base plate and a diagonally movable upright cutting blade slidably mounted against said stationary blade, each of said blades having longitudinal apertures which are alignable and matable one to another when said movable blade is in its at rest position, each of said apertures which, when aligned one to another, longitudinally slidably sized to receive a continuous length of stock material for longitudinal passage therethrough, and a horizontal slide plate connected above said movable blade for receiving a downward force to momentarily drive said movable blade diagonally downward from its at rest position whereby said mating apertures are moved out of alignment to sheer the stock material each time said movable blade is driven downwardly, said base plate horizontally translatable back and forth on a press base during sheering of the stock material whereby the movement of the stock material is uninterrupted, the improvement comprising:
- an upright return spring mechanism positioned on either side of said stationary and movable blades, said return spring mechanism including an elongated spring housing, a guide button, and a compression spring;
- said return spring mechanism upwardly acting between said slide plate and said base plate to return said slide plate upwardly back to its at rest position after said slide plate is struck;
- said compression spring within each said spring housing supportively positioning said guide button to extend above the upper end of said spring housing and said guide button spring biasingly translatable vertically within each said spring housing above and against said compression spring;
- said guide button having an upper surface freely permitting said diagonal downward movement and return of said slide plate to the at rest position.

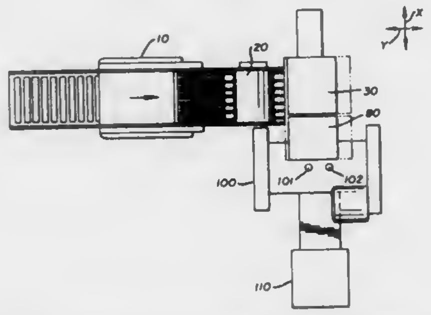
---

**5,016,506**

### METHOD FOR MULTIDIRECTIONAL SHEET FEEDING

**Joseph D. Bulso, Jr., Canton, and William R. Lewers, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio**
**Continuation-in-part of Ser. No. 246,772, Sep. 20, 1988, Pat. No. 4,926,724. This application May 21, 1990, Ser. No. 526,575**
**Int. Cl.$^5$ B65H *5/16***
**U.S. Cl. 83—35** **3 Claims**

1. A method of feeding sheets of material from a stack of sheets to a work station comprising the steps of:
- (a) receiving a first sheet from the stack of sheets onto a loader;
- (b) aligning the loader with a feeder positioned between the loader and the work station and advancing the first sheet onto the feeder along a principal feed path;
- (c) advancing the first sheet a predetermined distance into the work station;
- (d) performing at least one operation on the first sheet;
- (e) moving the first sheet at an acute angle with respect to the principal feed path whereby the first sheet is simultaneously advanced further into the work station and laterally thereof, as required, between work station operations;



- (f) repeating steps c through e until the work station has performed its last operation on the first sheet;
- (g) receiving a second sheet from the stack of sheets onto the loader following step b;
- (h) repeating step b prior to performance of the work station of its last operation on the first sheet, and
- (i) repeating steps a through h as required.

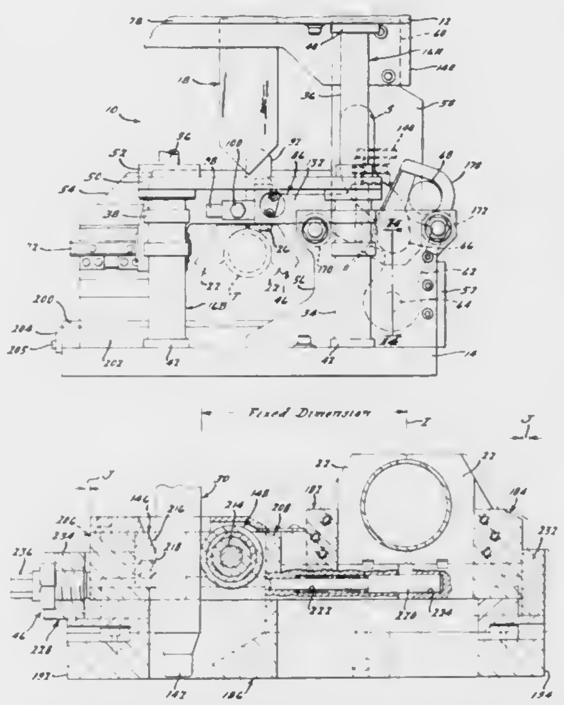
---

**5,016,507**

### APPARATUS FOR SEVERING A TUBULAR WORKPIECE

**John F. Riera, 3689 Sandburg Dr., Troy, Mich. 48084; Billy J. Bielawski, Sr., 2270 Flanders Dr., Rochester Hills, and John J. Pavelec, 413 Dalton, Rochester, both of Mich. 48063**
**Filed Jul. 22, 1988, Ser. No. 222,947**
**Int. Cl.$^5$ B23D *21/00***
**U.S. Cl. 83—384** **41 Claims**

1. A tube cut-off machine for severing elongated material moving continuously longitudinally of its length, comprising
- a lower die shoe defining a horizontal plane,
- tube clamping means for releasably clamping said tube during the severing operation and including two jaw members,
- a cam follower operably connected to one jaw member,
- a ram assembly vertically reciprocable relative to said die shoe and including a tube severing blade and a cam, the improvement characterized in that
- said tube clamping means comprises a cartridge that is removably mounted as a unit to said die shoe, said cartridge comprising
- a base mounted to and stationary relative to said die shoe,
- bias means for laterally biasing the jaw members apart, and
- a frame slidably mounted on said base to hold said cam follower and jaw members in a predetermined side-by-side relation, said follower and jaw members being adapted to slide relative to said frame and said base in a direction transverse to the tube axis, operation of said ram assembly simultaneously causing said cam to engage the follower and drive the jaw members into clamping relation with the tube and the blade to be driven into the tube such that the tube is severed;
- further including a second cam follower, the respective cam followers and jaw members being confronting and each mounted on a holder slidably disposed relative to the frame, one and the other cam holder abutting, respectively, one short tie bar and one jaw holder and the other jaw holder abutting the other short tie bar, the cam followers engaging the cam driven therebetween, the adjustment means includes a threaded adjustment member threadably extending through said one short tie bar to drive the second cam holder towards the first cam holder when engaging the cam driver whereby the jaw holders and their jaw members move laterally toward or away from one another.

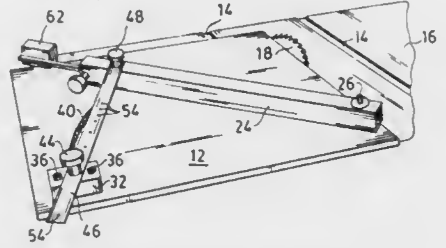


---

**5,016,508**

### MITER GAUGE FOR WOODWORKING MACHINE

**Edward S. Hallenbeck, 15 Courtenay Cir., Pittsford, N.Y. 14534**
**Filed Feb. 7, 1990, Ser. No. 476,600**
**Int. Cl.$^5$ B26D *7/06;* B27B *27/08***
**U.S. Cl. 83—435.001** **30 Claims**



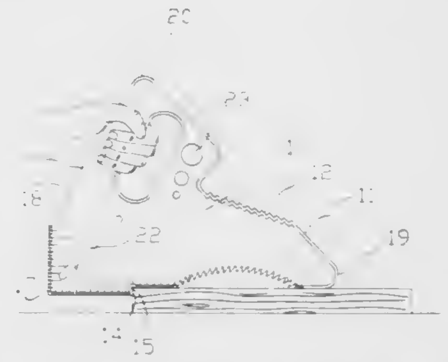
14. A mitering gauge for making miter cuts in work pieces comprising:
- three legs of a triangle connected at three vertices, two of said legs having fixed lengths and a third leg having an adjustable length;
- one of said fixed length legs is defined in a plate that is mountable on a machine table top for relative movement in a feed direction;
- the other of said fixed length legs is defined in a fence for orienting work pieces with respect to the feed direction, and one end of said fence is mounted about a pivot axis that is located in a fixed position on said plate;
- said adjustable length leg is defined in a gauge bar having a first pin-hole and a series of pin-holes that are spaced at predetermined distances from said first pin-hole along the length of said gauge bar;
- a first of said vertices is defined by said pivot axis and interconnects one end of each of said two fixed length legs;
- a second of said vertices is aligned with one of said first pin-hole and said series of pin-holes in the gauge bar and interconnects the other end of said one fixed length leg with said adjustable length leg;
- a third of said vertices is aligned with the one of the other of said first pin-hole and said series of pin-holes in the gauge bar and interconnects the other end of said other fixed length leg with said adjustable length leg;
- said first and second vertices define between them a first length (a) of said one fixed length leg in a fixed angular orientation to the feed direction through a fixed first angle (D) measured between said one fixed length leg and a line perpendicular to the feed direction;
- said first and third vertices define between them a second length (b) of said other fixed length leg in a variable orientation to the feed direction through a variable second angle (E) measured between said other fixed length leg and the feed direction;
- said second and third vertices define between them a series of different third lengths (c) of said adjustable length leg in a variable orientation to the feed direction;
- said different third lengths (c) of the adjustable length leg together with said respective first and second lengths (a and b) of the two fixed length legs define a variable third angle (C) measured between said two fixed length legs; and
- said fence is adjustable to predetermined angular amounts with respect to the feed direction through said variable second angle (E) corresponding to said different third lengths (c) of the adjustable length leg by aligning different pin-holes of said series of pin-holes in the gauge bar with one of said second and third vertices.

---

**5,016,509**

### COMBINATION HANDGUIDE AND MEASURING TOOL FOR USE WITH TABLE MOUNTED WOOD WORKING EQUIPMENT

**Richard Stottman, 342 Blue Ridge, Louisville, Ky. 40223**
**Filed Aug. 19, 1988, Ser. No. 233,810**
**Int. Cl.$^5$ B27B *25/10***
**U.S. Cl. 83—437** **20 Claims**



1. A combination safety guide and measuring tool for use with table mounted wood working equipment comprising a generally four sided device wherein the first side contains a plurality of stepped insets, the second side is set at approximately a 45 degree angle to the first side and contains a hooked step portion, the third side is set at approximately a 90 degree angle to side two and the fourth side is set at approximately 30 degrees from the angle of the third side in the direction of the first side.

VOL
1126
ISS
3
MY
21
1991
UMI

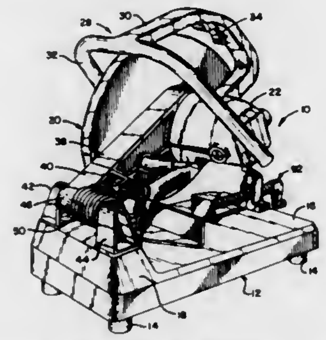
### 5,016,510
### POWER SAW ARRANGEMENT

**Frederick P. Gardner, 2601 Blakely Ave., Eau Claire, Wis. 54701**

**Filed Aug. 18, 1989, Ser. No. 395,464**

**Int. Cl.⁵ B27B** *5/18*

U.S. Cl. 83—471.002 **22 Claims**



1. An improved power saw arrangement which is convertible between a chop-saw and a cut-off saw, comprising:

a base having an upper surface;

a power saw assembly;

a support member pivotally mounted to said upper surface of said base;

means for releasably securing said power saw assembly to said support member, said securing means comprising at least one guide rail on one of said support member and power saw assembly which slidingly engages at least one guide track in the other of said support member and power saw assembly and a movable looking member for selectively locking said guide rail in said guide track; and

means for biasing said support member with respect to said base in a first angular direction, so that said power saw is biased away from said upper surface toward a non-cutting position, whereby said power saw assembly may be used as a chop saw when secured to said support member, and as a cut-off saw when it is not secured to said support member.

### 5,016,511
### TAPE CUTTER

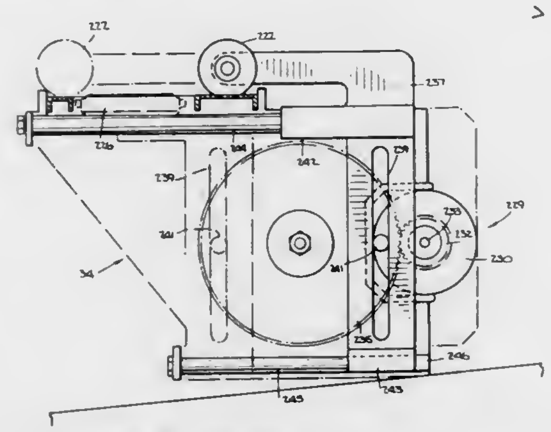
**Hugh St. L. Dannatt, Bethel, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.**

**Filed Dec. 28, 1988, Ser. No. 291,466**

**The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.**

**Int. Cl.⁵ B26D** *1/20*

U.S. Cl. 83—487 **3 Claims**



1. A combination comprising:

a tape dispensing means for dispensing an end portion of tape from a continuous tape supply through a dispensing exit, said tape dispensing means being laterally positionable to and from a first position to a second position at which second position said tape dispensing means dispenses said tape end portion; and,

a cutting device means for cutting said tape and portion dispensed from said tape dispensing means dispensing exit, said cutting device means comprising a cutter, a frame means for displacing said cutter across said dispensing exit of said tape dispensing means when said tape dispensing means is in said second position such that said tape end portion extends longitudinally beyond said cutter, said frame means including,

a base having a generally vertical extending support post;

a motor fixably mounted to said base having an output shaft and output drive gear fixably mounted to said output shaft;

a second drive gear rotatively mounted to said support post and having a pin extending from a side face of said second drive gear;

link means having said cutter mounted thereto and driven by said pin for displacing said cutter in a reciprocal manner to and between a first and second position regardless of the direction of rotation of said motor; and,

means for providing a co-active cutting surface with said cutter such that said cutter is co-active with said means when displaced across said tape end portion to effectuate cutting of said tape end portion.

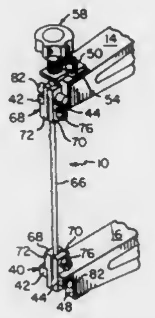
### 5,016,512
### SCROLL SAW BLADE HOLDING SYSTEM

**Chun-Chi Huang, Taiwan Sakura Corporation, 11th Fl., No. 2 Taichung Kang Rd., Sec. 1, Tai-chung, Taiwan**

**Filed Jan. 2, 1990, Ser. No. 459,907**

**Int. Cl.⁵ B27B** *19/02*

U.S. Cl. 83—783 **15 Claims**



1. A blade holding system for a scroll saw comprising:

a scroll saw arm having a forked end, which includes a notch opening away from a table of an associated scroll saw;

plate means for clamping an end of a scroll saw blade;

means for releasably attaching said plate means to said blade; and

pin means, spaced from said blade, attached to and extending from said plate means and being shaped to be received in said notch whereby said pin means and said notch engage to form a pivotable connection between a blade retained by said plate means and said arm.

### 5,016,513
### METHOD AND APPARATUS FOR REPRODUCING PEDALING EFFECTS IN A PIANO PERFORMANCE

**Wayne L. Stahnke, 11434 McCune Ave., Los Angeles, Calif. 90066**

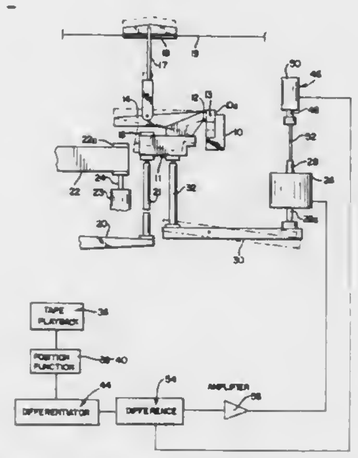
**Filed Jan. 19, 1990, Ser. No. 466,969**

**Int. Cl.⁵ G10C** *3/26, 3/28;* **G10F** *1/02*

U.S. Cl. 84—19 **9 Claims**

1. A method for reproducing in a player piano pedal mechanism movements which approximate those of the original performance from a medium on which is recorded data representative of the sequential positions of the piano pedal mechanism during the original performance, said method comprising the steps of:

(a) playing back the pedal mechanism position data recorded on the medium,



(b) differentiating said data as a function of time to convert said data into a signal representative of pedal mechanism velocity, and

(c) transducing said signal into corresponding movements of said pedal mechanism.

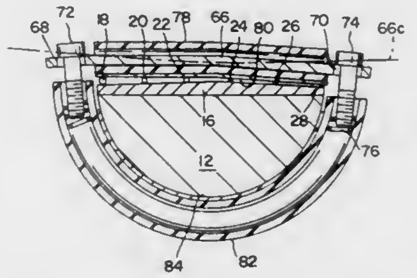
### 5,016,514
### CAPO FOR STRINGED INSTRUMENTS

**Jay S. Kaufman, 138 W. Glaucus St., Encinitas, Calif. 92024**

**Continuation-in-part of Ser. No. 492,483, Mar. 12, 1990, abandoned. This application Aug. 6, 1990, Ser. No. 562,827**

**Int. Cl.⁵ G10D** *3/04*

U.S. Cl. 84—318 **18 Claims**



1. A capo for raising the pitch of a fretted stringed musical instrument having an elongated neck, comprising:

an elongated spring bar for extending across the strings of an instrument and shaped for uniformly distributing force thereto for progressively biasing all strings into engagement with frets on the neck of the instrument, said elongated spring bar varying in width along the length thereof for varying the spring rate over the length thereof;

an elongated elastic sheath means having a first portion for extending over said bar and a second portion for encircling the neck of a stringed instrument; and

elongated elastic means connected to opposite ends of the spring bar and extending across the back of the neck of the instrument for pulling the spring bar into engagement with the strings and the strings into and against the frets of the instrument.

9. A capo for mounting on the neck of a fretted stringed musical instrument for selectively raising the pitch of the instrument comprising:

an elongated spring bar having a length for extending across the strings on the neck of an instrument and a curved configuration for uniformly distributing force thereto;

an elongated elastic means extending from one end of the bar and extending across the back of the neck of the instrument for pulling the bar into the strings and the strings into and against the frets of the instrument, said elongated elastic means comprising a coiled tension spring having a first screw on one end thereof for connecting to one end of said spring bar, and a second screw on the other end for connecting to the other end of the spring bar; and

elongated flexible cover means having a first portion with a wear resistant surface for extending over and covering said spring bar for engaging said strings, and a second portion with a low friction surface for extending over and covering said elastic member and engaging the neck of said instrument.

14. A capo for detachably mounting on the neck of a fretted stringed musical instrument for selectively raising the pitch of the instrument comprising:

an elongated spring bar having a length for extending across and a curved configuration for first engaging the center strings on the neck of an instrument and substantially uniformly distributing force thereto;

an elongated coiled spring tension member connected to opposite ends of said spring bar and extending across the back of the neck of the instrument for pulling the strings into engagement with the frets of the instrument; and

elongated flexible cover means having a first portion with a wear resistant surface for extending over and covering said spring bar for engaging said strings, and a second portion with a low friction surface for extending over and covering said elastic member and engaging the neck of said instrument.

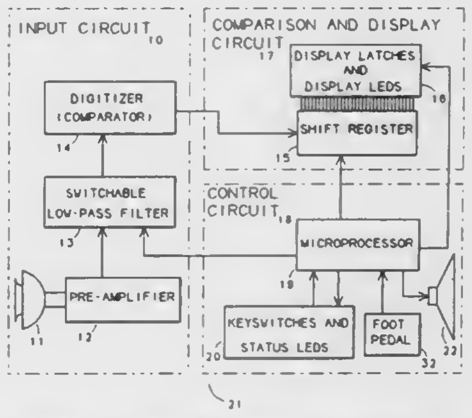
### 5,016,515
### PRECISE ELECTRONIC AID TO MUSICAL INSTRUMENT TUNING

**Robert L. Scott, 6384 Crane Rd., Ypsilanti, Mich. 48197, assignor to Robert L. Scott, Ypsilanti, Mich.**

**Filed Oct. 29, 1990, Ser. No. 604,091**

**Int. Cl.⁵ G10G** *1/00*

U.S. Cl. 84—454 **10 Claims**



1. A tuning aid for musical instruments comprising:

A. an input circuit with means for detecting an audio signal and generating a digital input signal of said audio signal;

B. a reference circuit for generating a reference load signal whose frequency is controlled, together with another clock signal whose frequency is an exact multiple of the said reference load signal; and

C. a frequency comparison and display circuit comprising:

i. a digital serial shift register, whose serial data input is derived from the said digital input signal, and whose serial shift clock is derived from the said clock signal;

ii. a parallel-load latch whose input is derived from the

VOL
1126
ISS
3
MY
21
1991
UMI

parallel output of the said digital serial shift register, and whose parallel-load strobe is derived from the said reference load signal; and

iii. a plurality of display means, each display means responsive to one of the parallel outputs of the said parallel-load latch.

---

5,016,516

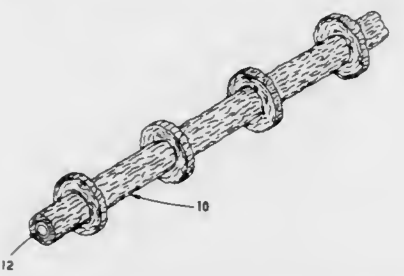
### FIBER REINFORCED RESIN PREFORM

**Donald C. Aldrich, Kennett Square, Pa.; Robert C. Buchanan, Greenville, and John F. Sollinger, Newark, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 34,313, Apr. 3, 1987, Pat. No. 4,846,908. This application Apr. 20, 1989, Ser. No. 341,038**

**Int. Cl.$^5$ D04C** *1/00*

U.S. Cl. 87—8 **2 Claims**



1. A self-supporting braided-to-shape fiber reinforced resin matrix preform for a composite article wherein said preform has: a shape that approximates the net shape of said composite article; is braided with 32 carriers at a braiding angle of from about 54 to about 63 degrees with respect to the longitudinal axis of the article; a total volatile content of from about 1% to about 5% by weight of the preform and a fiber volume of from about 40% to about 50%.

---

5,016,517

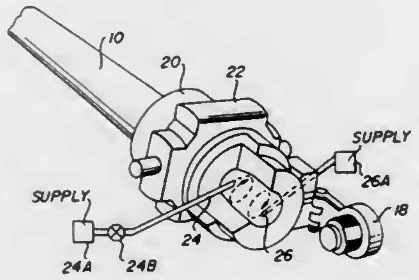
### LIQUID PROPELLANT GUN

**Robert A. Pate, Pittsfield, Mass., and Alma J. Pate, Provo, Utah, assignors to General Electric Company, Pittsfield, Mass.**

**Filed Dec. 26, 1989, Ser. No. 456,417**

**Int. Cl.$^5$ F41A** *1/04*

U.S. Cl. 89—7 **9 Claims**



1. A gun cycle for a liquid propellant gun having a combustion chamber comprising:

filling the chamber with a charge of monopropellant to a range of 30% through 90% of full volume, thereby providing a significant ullage volume.

---

5,016,518

### METHOD AND APPARATUS FOR ACCELERATING PROJECTILES

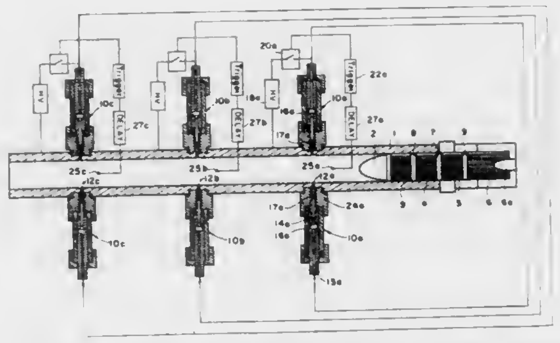
**Zvi Kaplan; Gideon Engler, both of Rehovot, and Avi Loeb, Jerusalem, all of Israel, assignors to The State of Israel, Atomic Energy Commission, Soreq Nuclear Research/Center, Israel**

**Continuation of Ser. No. 318,139, Mar. 2, 1989, abandoned. This application Mar. 21, 1990, Ser. No. 496,806**

**Claims priority, application Israel, Mar. 3, 1988, 85622**

**Int. Cl.$^5$ F41B** *6/00*

U.S. Cl. 89—8 **12 Claims**



1. In a method for accelerating within a launching tube a projectile driven by the combustion of a multi-stage granular chemical propellant charge disposed within the tube at the rear of the projectile, the steps of:

generating an electrical discharge externally of the tube of a magnitude such as to produce a plasma jet or hot gas, and

injecting the thus produced hot gas plasma jet or hot gas into the tube at each stage of the multi-stage propellant charge located in the tube, thus igniting said granular chemical propellant charge at each said stage thereof and increasing the rate of combustion of each said granular chemical propellant charge at each said stage thereof beyond that obtainable by ignition without injected plasma jet hot gas, thus producing increased thrust on the projectile as a result of the increased rate of combustion proportionally to the projectile velocity and increased rate of trapped gases at the rear of the projectile, thereby increasing the speed of the projectile as it passes through the launching tube.

---

5,016,519

### LINEAR DRIVE

**Wolf-Dieter Goedecke, Bachweg 12, D-7731 Unterkirnach; Reinhard Schwenzer, Rosstrasse 78, D-4000 Düsseldorf, and Ralf Huber, Hauptstrasse 33, D-7734 Brigachtal, all of Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 784,477, Oct. 4, 1985, abandoned. This application Dec. 18, 1987, Ser. No. 113,644**

**Claims priority, application Fed. Rep. of Germany, Oct. 9, 1984, 3436946**

**Int. Cl.$^5$ F15B** *9/02, 15/00*

U.S. Cl. 91—361 **18 Claims**

1. A modular handling system having a first module being made as a linear drive for displacing along one axis of a second module, said linear drive comprising:

a cylinder block with a cylindrical bore extending along said one axis and having first and second cylinder heads sealing off said cylindrical bore in said cylinder block at its end faces;

a piston having first and second lateral sides aand being accommodated in said cylindrical bore and adapted to travel along said bore;

a carriage running on said cylinder block along said one axis;

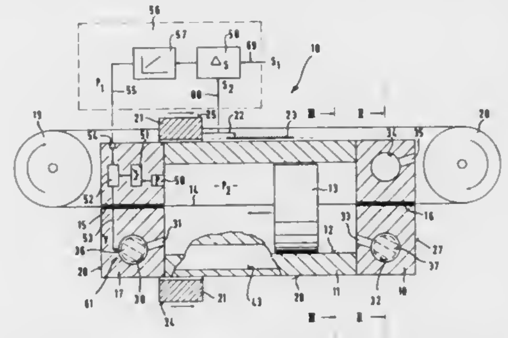
said piston being connected on both lateral sides solely to a flexible elongated member, said flexible elongated member passing through pressure-tight lead-throughs in said

first and second cylinder head and being returned by deflection rollers and then connected with rear end and front end sides, respectively, of said carriage, whereby said carriage travels along said cylinder block in the opposite direction of said when said piston is actuated to travel;

said first and second cylinder head being provided with elongate first and second mounting cavities, respectively, to fully recieve first and second cartridge-type valves, respectively, said second cylinder head being further provided with a third mounting cavity for receiving a third cartridge-type valve, said first, second and third valves being arranged transversely to said one axis;

said first, second and third valves having each first input connecting means for feeding electrical control signals to a driving stage, further having each second input connecting means for feeding a pressurized fluid to a main stage, operated and displaced by said driving stage and having each output connecting means to which alternatively said pressurized fluid is fed or an exhaust line is connected according to displacement of said main stage;

said first and second valves having each their output connecting means connected via a first duct and a second duct, respectively, to opposite ends of said cylindrical bore for feeding, in one operational position, said pressurized fluid into a first portion of said cylindrical bore on said one lateral side of said piston by means of said first valve and for exhausting said pressurized fluid, respectively from a second portion of said cylindrical bore on said other lateral side of said piston by means of said second valve to thereby displace said carriage in one direction;



said third valve having its output connecting means connected via a third duct to a flange surface of said second cylinder head, said flange surface being adapted for connection with said second module controlled by said third valve;

a linear displacement measuring device, cooperating with said flexible member to measure a first signal representing the axial position of said piston along said one axis, said measuring device cooperating with an electronic control circuit, said unit receiving a predetermined second signal representing a reference position valve and supplying said electrical control signal to said first input connecting means of said first and second valves in dependence on a difference between said first and second signals; wherein

said first valve is a pressure-servo-valve having first valve control means for feeding back a signal corresponding to a pressure prevailing at said first valve output connecting means for operating said first valve main stage and wherein, further, said second valve is a displacement-servo-valve having second valve control means for feeding back a signal corresponding to a displacement of a second valve spool of said second valve main stage for operating said second valve main stage, said second valve control means being designed such that output preassure v. operating current characteristics of said first and second valve intersect with the output pressure/operating current operational range of said first and second valve.

---

5,016,520

### PROCESS FOR ADJUSTING THE VALUE OF THE JUMP OF A BRAKE BOOSTER

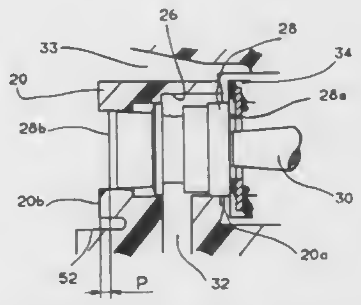
**Jean-Pierre Gautier, Aulnay Sous Bois, France, assignor to Bendix Europe Services Techniques, Drancy, France**

**Filed May 7, 1990, Ser. No. 519,694**

**Claims priority, application France, May 31, 1989, 89 07147**

**Int. Cl.$^5$ F15B** *9/00*

U.S. Cl. 91—471 **8 Claims**



1. A process for adjusting the value of the jump of a brake booster, in which is movably mounted a hollow boosting piston, a control rod carrying a plunger seated in the piston and a push rod, boosting means being controlled as a result of a forward movement of the plunger and the effect being to move the piston forwards, a reaction disc being interposed between an annular front face of the piston and a rear face of the push rod, the booster being intended for actuating a master cylinder, the process involving the following steps:

determining the force which the booster must exert on the push rod in order to actuate the master cylinder,

exerting the force on the push rod equipped with the reaction disc,

measuring the deformation of a central part of a rear face of the reaction disc,

measuring the distance between the annular front face of the piston and the front face of the plunger when the boosting means is in a position of equilibrium, and

making the distance equal to the deformation of the central part of the rear face of the reaction disc.

---

5,016,521

### SELF-ADJUSTING SERVO MECHANISM FOR ACTUATING A FRICTION BAND ASSEMBLY IN A PLANETARY GEAR SET

**Raymond J. Haka, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 20, 1990, Ser. No. 481,539**

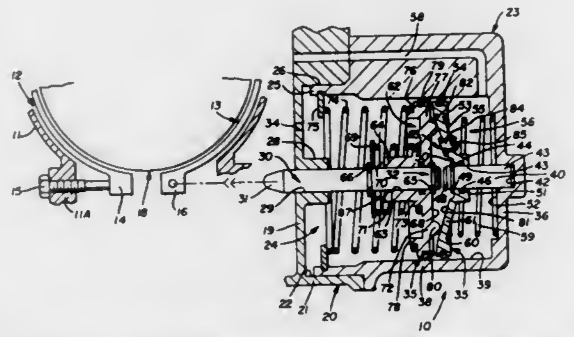
**Int. Cl.$^5$ F01B** *31/14;* **F15B** *15/24*

U.S. Cl. 92—13.1 **4 Claims**

1. A self-adjusting servo mechanism comprising: a housing; said housing presenting a socket cavity; and actuating piston received within said socket cavity; said actuating piston adapted for axial reciprocation through a predetermined distance; a servo pin supported for axial displacement by said housing; a hydraulic coupling means operative to move said servo pin through an axial distance equal to or greater than the axial displacement of said actuating piston; said hydraulic coupling means being axially expandable within a predetermined range in response to the displacement required of said servo pin; a pilot bore provided in said housing; said pilot bore being axially aligned with said socket cavity; said servo pin received within said pilot bore for axial reciprocation; said hydraulic coupling means employs a drive piston; a lost motion device connects said drive piston to said servo pin; an accumu-

VOL
1126
ISS
3
MY
21
1991
UMI

lating chamber disposed between said drive and actuating pistons; a pressure chamber; and means to permit unidirectional flow of hydraulic fluid from said pressure chamber into said accumulating chamber.



---

### 5,016,522
## MULTI-STAGE AIR PRESSURE CYLINDER

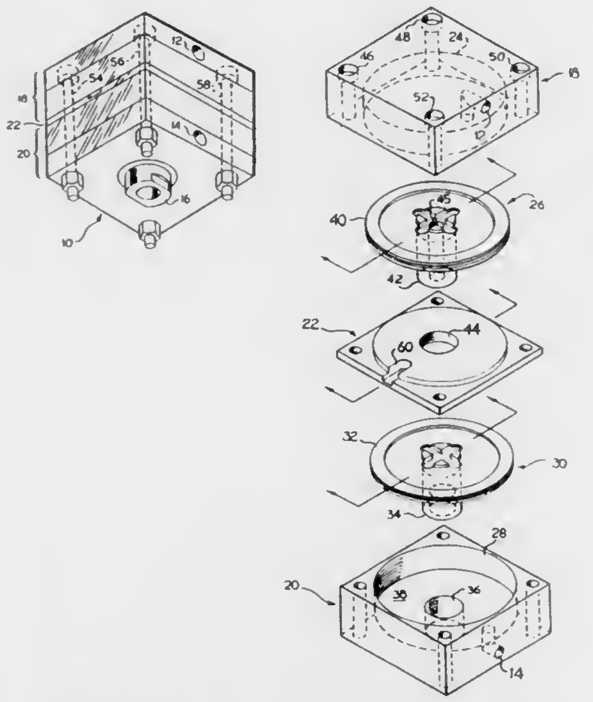
**Jean A. Allardin, 2810, Tourterelles, Laval, Quebec, Canada H7L 3T9**

**Filed Jun. 22, 1989, Ser. No. 370,185**

**Claims priority, application United Kingdom, Jul. 4, 1988, 8815819**

**Int. Cl.⁵ F01B** *7/00*

**U.S. Cl. 92—62** **10 Claims**



1. A multi-stage air pressure cylinder comprising:

a first and second separate end wall members, each provided with a cylindrical recess said end wall members mounted so that the recesses face each other, each of the wall members being provided with an air passage extending outwardly,

a flat partition wall member separating both end wall members and both recesses for forming a first compression chamber in the recess of the first end wall member and a second compression chamber in the recess of the second end wall chamber, said partition wall member being provided with a central circular perforation giving access to both chambers, said partition wall member being provided with a vennthole fluidly connecting said second chamber with the surrounding atmosphere outside said cylinder, said venthole being characterized by a portion of the periphery of the partition wall member having a reduced thickness,

a one-piece first piston in said first chamber comprising a first circular plate and a first cylindrical projection centrally extending from said first plate on one side thereof, said first circular plate adapted to sealingly slide in said first chamber and said first cylindrical projection adapted to sealingly slide in a central aperture through said first end wall member,

a one-piece second piston in said second chamber comprising a second circular plate and a second cylindrical projection centrally extending from said second plate on one side thereof, said second plate adapted to sealingly slide in said second chamber, said second cylindrical projection extending up to said partition wall member and adapted to sealingly slide in the perforation of said partition wall member and having a conduit therethrough for allowing fluid communication between both chambers, said second cylindrical projection adapted to abut against said first circular plate upon introduction of air in said air passages, and fastening means for tightly sealing both end wall members against said partition wall member,

whereby an inflow of air pressure in the air passage of said second end wall member causes said second cylindrical projection to abut against the first circular plate of said first piston for projecting said first cylindrical projection through said aperture of said first end wall member, said second piston adapted to close said air passage in said first end wall member for building up pressure in both chambers and applying pressure upon said first cylindrical projection.

---

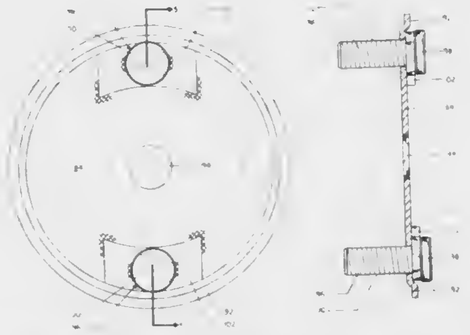
### 5,016,523
## ADJUSTABLE MOUNTING APPARATUS FOR AIR-OPERATED DIAPHRAGM BRAKES

**John P. Bowyer, Muskegon, Mich., assignor to Anchorlok Corp., Muskegon, Mich.**

**Filed Dec. 18, 1989, Ser. No. 452,698**

**Int. Cl.⁵ F01B** *7/00*

**U.S. Cl. 92—63** **20 Claims**



1. In an air-operated diaphragm brake for a vehicle having a mounting support and a pneumatic supply line, said brake comprising a housing which at least partially defines a chamber, a push rod extending outwardly from within the chamber for reciprocating movement along a generally longitudinal axis thereof between operative and inoperative positions, a diaphragm within said chamber for actuating the push rod in response to the delivery and exhaust of pressurized air, and a pneumatic port in the housing for receiving air from the pneumatic supply line, the improvement comprising:

said housing having first and second members, said first member being adapted to be fixedly mounted to the mounting support, said pneumatic port being located on the second member; and

said first and second members having interengaging portions to permit movement of the second member and the pneumatic port with respect to the first member in a manner whereby the housing can be mounted to different vehicles which have different relationships between mounting supports and pneumatic supply lines.

---

### 5,016,524
## SEALING ARRANGEMENT FOR A PISTON IN A COMPRESSOR

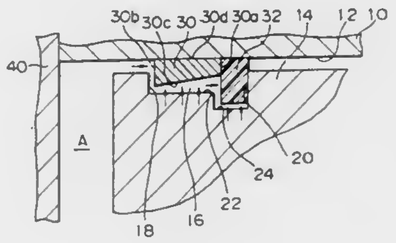
**Katsunori Kawai; Hayato Ikeda; Shinichi Ishihara, and Toshihiro Kawai, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan**

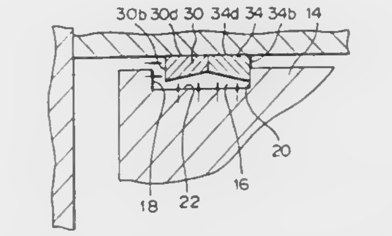
**Filed Mar. 9, 1990, Ser. No. 491,351**

**Claims priority, application Japan, Mar. 14, 1989, 01-28739[U]**

**Int. Cl.⁵ F01B** *31/00*

**U.S. Cl. 92—182** **7 Claims**





1. A sealing arrangement for a piston in a compressor having a cylinder block with a cylinder bore formed therein to axially displaceably accommodating said piston and a cylinder head attached to said cylinder block for forming a compression chamber on one side of said piston, the sealing arrangement comprising:

means for forming a ring groove on an outer surface of said piston, said ring groove comprising opposite side surfaces and a bottom surface between the side surfaces;

a continuous seal ring member fitted in said ring groove, said seal ring member having an initial shape provided with an internal diameter smaller than an outer diameter of said outer surface of said piston, an inner peripheral portion, and an outer peripheral portion whereby at least said inner peripheral portion is expanded when said seal ring member is fitted in said ring groove beyond said outer surface of said piston and said outer peripheral portion is axially and inwardly collapsed relative to said inner peripheral portion so that one of said side surfaces of the initial seal ring member constitutes an outer sealing surface for engagement with an inner surface of said cylinder bore and said outer peripheral portion in the original shape is arranged on the side of said compression chamber; and

a backup ring member fitted in said ring groove on the side of said continuous seal ring member remote from said compression chamber, said backup ring member having a surface area abutting against said side surface of said ring groove on the side remote from said compression chamber and sufficient to retain said continuous seal ring member in said ring groove.

---

### 5,016,525
## AIR OUTLET FOR IMPARTING A SPIN FLOW TO AIR PASSING THERETHROUGH

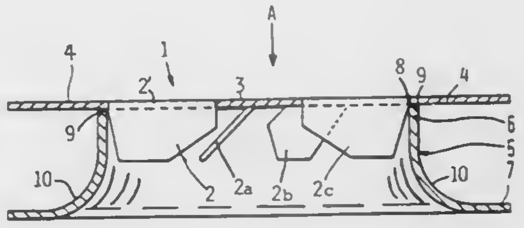
**Franz Weck, Herzogenrath, Fed. Rep. of Germany, assignor to H. Krantz GmbH & Co., Aachen, Fed. Rep. of Germany**

**Filed Aug. 20, 1990, Ser. No. 570,139**

**Claims priority, application Fed. Rep. of Germany, Aug. 23, 1989, 8910061[U]**

**Int. Cl.⁵ F24F** *13/062*

**U.S. Cl. 98—40.12** **14 Claims**



1. An air outlet for imparting a spin flow to air passing through said outlet, comprising first means including a sheet metal plate having flow holes therein and air guide vanes cut and bent out of said sheet metal plate in a flow direction to form said flow holes and for causing said spin flow, second means including a sheet metal detector piece having a neck section and a collar section merging into said neck section, said air guide vanes extending into said neck section of said connector piece, and means securing said first means to said second means.

---

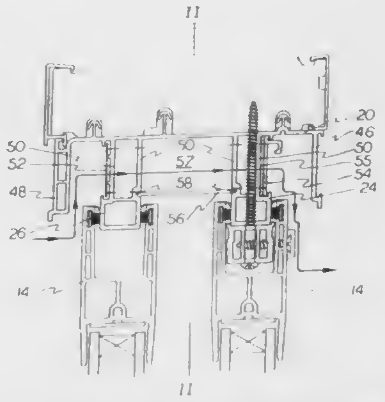
### 5,016,526
## VENTILATED SLIDING CLOSURE ASSEMBLY

**Raymond Dallaire, and Dominique Dallaire, both of St. David, Canada, assignors to Dallaire Industries Ltd., Lauzon, Canada**

**Filed Nov. 13, 1989, Ser. No. 435,029**

**Int. Cl.⁵ E06B** *7/02*

**U.S. Cl. 98—98** **23 Claims**



1. A ventilated sliding closure assembly which provides ventilation in a closure frame head over both a horizontally sliding and fixed panels, comprising:

at least two panels, at least one of said panels being the horizontally sliding panel;

a frame including jambs, the frame head and a sill for supporting said panels;

said frame head including first and second spaced apart

VOL
1126
ISS
3
MY
21
1991
UMI

parallel support rails for guiding a top rail of said sliding panel and removably affixing a top rail of any fixed panels;

said support rails including ventilation apertures and defining a ventilation chamber between their opposed sides which extends substantially the full length of the frame head, said chamber being closed by a bottom wall;

said ventilation apertures permitting a flow of air through said frame head; and

said bottom wall blocking the passage of air through said frame head except that which flows through said apertures.

---

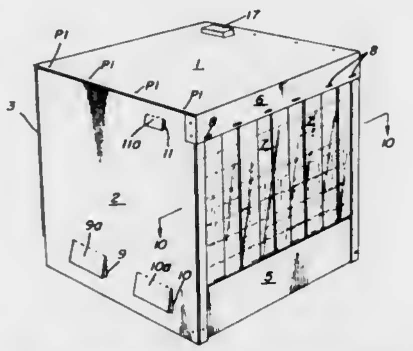
### 5,016,527
### PRODUCT DISPLAY ENCLOSURE

**William S. Spamer, Roswell; J. David Robertson; David C. F. Stoddard, both of Atlanta, and James L. Hanna, Athens, all of Ga., assignors to The Mead Corporation, Dayton, Ohio**

**Filed Apr. 10, 1990, Ser. No. 508,002**

**Int. Cl.$^5$ E04H** *15/14;* **F25D** *1/00*

**U.S. Cl. 98—115.3** **5 Claims**



1. A product display enclosure comprising front, back and side walls interconnected along their side edges and having a top cover joined along its edges to the top edges of said front, back, and side walls to form a box-like structure adapted to overlie and surround a stack of procuct items so as to afford protection of such items against undesirable environmental conditions including dust, dirt, mositure, sunlight, and temperature variations, at least one of said walls being constructed to afford a view and ready access to such product items and side and back walls and said cover being formed of lightweight, corrugated, radiation reflecting material.

---

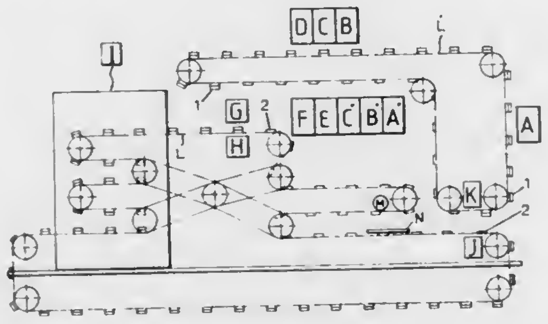
### 5,016,528
### BAKING APPARATUS

**Tsai-An Chen, 201, Sec. 3, Ba-Dar Road, Taipei, Taiwan**

**Filed Jun. 20, 1990, Ser. No. 540,799**

**Int. Cl.$^5$ A21B** *5/00;* **A47J** *37/00*

**U.S. Cl. 99—353** **4 Claims**



1. A baking apparatus comprising

a first mold having top edges and bottom edges and formed with a plurality of semi-spherical recesses for insertion of dough therein and adapted to be positioned in a first position with the recesses facing upwardly and a second position with the recesses facing downwardly;

a second mold formed with a plurality of semi-spherical recesses for insertion of dough therein, adapted to be positioned in a first position with recesses facing upwardly and a second position with the recesses facing downwardly and to be engaged with the first mold with the semi-spherical recesses thereof matching the semi-spherical recesses of the first mold to define spherical chambers therebetween as the first mold being positioned in its second position and the second mold being positioned in its first postion;

T-shaped body members mounted on two side portions of the first mold;

lifting means mounted above the second mold including displaceable claw devices, said lifting means having actuating means for moving it along a vertical direction between a first position where said claw devices can reach and seize the T-shaped body members on the first mold which rests on the second mold and a second position over the first position thereof for lifting the first mold into a third position;

cover mold carrying means having an elongated body and a plurality of L-shaped retainer members with vertical shafts thereof rotatably mounted in the elongated body, said L-shaped retainer members being orientable between a first position with lower ends connected to the shafts engaging the bottom edges of the first mold as it is being positioned in its third position and a second position with said lower ends thereof disengaging the first mold thus positioned;

an oven having an inlet through which engaged first and second molds enter and an outlet through which engaged first and second molds exit; and,

conveyer means adapted to transport the engaged first and second molds into and out from the oven along an endless route.

---

### 5,016,529
### SHEET-FED ROTARY PRINTING PRESS FOR MULTI-COLOR PRINTING

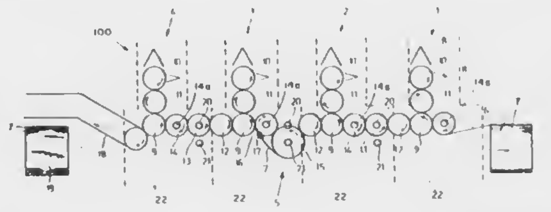
**Hans-Georg Jahn, Weisenbach, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed Feb. 5, 1990, Ser. No. 475,220**

**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1989, 8901222[U]**

**Int. Cl.$^5$ B41J** *5/00*

**U.S. Cl. 101—211** **12 Claims**



1. A method of configuring a printing unit selectively for recto printing and for recto-and-verso printing, said method comprising the steps of:

providing said printing unit with support frame means;

mounting at least a plate cylinder, a blanket cylinder and an impression cylinder, each of which has a first predetermined diameter, for rotation within said support frame means;

mounting at least one transfer drum, having said first predetermined diameter, for rotation within said support frame means in cooperation with said impression cylinder;

selectively supporting at one time only one of:

a first transfer drum during said recto printing, and

a turning drum during said recto-and-verso printing, at first bearing support means for causing said one of:

said first transfer drum, and

said turning drum at said first bearing support means, to be in cooperation with said impression cylinder, each of said first transfer drum and said turning drum having said first predetermined diameter;

selectively supporting a second transfer drum during said recto printing at second bearing support means for being in cooperation with said first transfer drum, said second transfer drum having said first predetermined diameter;

selectively supporting a storage drum during said recto-and-verso printing at third bearing support means for being in cooperation with said turning drum, said storage drum having a second predetermined diameter which is twice that of said first predetermined diameter;

utilizing said first transfer drum in said first bearing support means and said second transfer drum in said second bearing support means during said recto printing; and

utilizing said turning drum in said first bearing support means and said storage drum in said third bearing support means during said recto-and-verso printing.

---

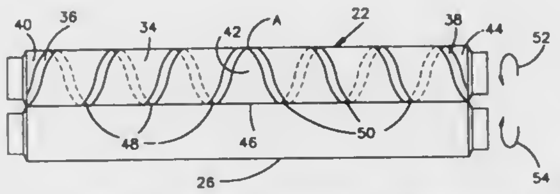
### 5,016,530
### INK MOVER DISTRIBUTOR ROLL

**Roland T. Palmatier, Durham, N.H., assignor to Harris Graphics Corporation, Dover, N.H.**

**Filed Nov. 2, 1989, Ser. No. 430,878**

**Int. Cl.$^5$ B41F** *31/00*

**U.S. Cl. 101—349** **8 Claims**



1. Apparatus for use in a printing press, said apparatus comprising first and second rotatable inker rolls defining a nip therebetween at which ink is transferred between said rolls under pressure as said rolls rotate, said first roll having opposite ends, a center between said ends, and means for moving ink from said opposite ends toward said center as said rolls rotate, said means for moving ink comprising an outer peripheral surface portion of said first roll in which pockets form in response to said pressure at said nip, said pockets moving said ink from said opposite ends of said first roll toward said center of said first roll as said rolls rotate, whereby said means for moving ink reduces ink build-up at said opposite ends of said first roll.

---

### 5,016,531
### DOUBLE TRUCK PRINTING REGISTRATION SYSTEM FOR A ROTARY PRINTING PRESS

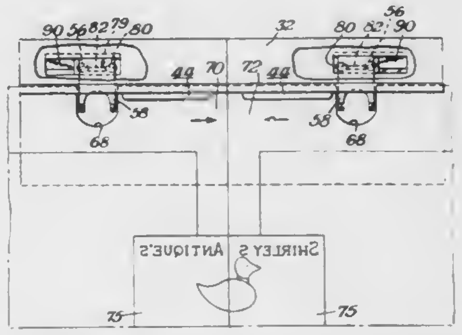
**Richard B. Schroeder, Wilmington, Del., assignor to Hercules, Incorporated, Wilmington, Del.**

**Filed Jan. 19, 1989, Ser. No. 298,988**

**Int. Cl.$^5$ B41F** *27/06, 27/12*

**U.S. Cl. 101—415.1** **16 Claims**

1. In a rotary printing press having a plate cylinder with two aligned locking means in a peripheral channel in the plate cylinder for releaseably locking a pair of side by side printing plates to the plate cylinder, one of said locking devices being provided for each respective printing plate, and each locking means having registration means engaged with complementary registration structure in its printing plate for orienting its printing plate laterally on the plate cylinder, the improvement being in that a housing is in said channel for each of said locking means, said registration means including two spaced stop surfaces defining two positions, one of said two positions being a single truck position and the other of said positions being a double truck position, said double truck positions of said two locking means being disposed toward each other and said single truck positions of said two locking means being disposed remote from each other, a contact member for each of said registration means, each of said registration means of said two aligned locking means being laterally slidably mounted in its respective housing to selectively dispose its said contact member in contact with said two stop surfaces, the adjacent sides of said side by side printing plates being spaced from each other when both of said registration means are in their said single truck positions for standard printing, and said adjacent sides of said side by side printing plates abutting each other when both of said registration means are in their double truck positions for double truck printing to permit the forming of a continuous joint image from said side by side printing plates.



---

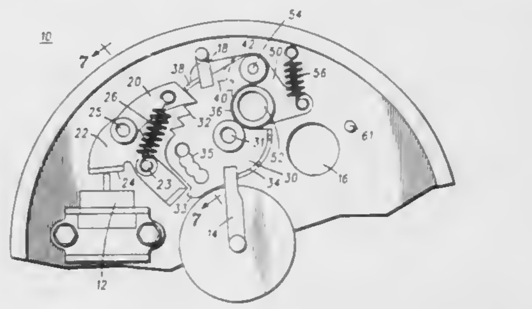
### 5,016,532
### SAFE AND ARM DEVICE

**Robert E. Edminster, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation-in-part of Ser. No. 431,253, Nov. 3, 1989, abandoned. This application Jul. 5, 1990, Ser. No. 547,526**

**Int. Cl.$^5$ F42C** *15/34, 15/40, 19/00*

**U.S. Cl. 102—254** **18 Claims**



1. A safe and arm device which operates without the use of energy stored in the safe and arm device wherein the safe and arm device is adapted to a fuze which is armed only when the safe and arm device aligns explosive elements within the fuze, the safe and arm device comprising:

shutter having a detonating device secured thereto;

first means for locking said shutter in a safe position;

second means for unlocking said shutter from said first means;

third means for removing said shutter from said first means in a sudden motion to align the explosive elements of the fuze;

said shutter secured to said first means until said second means unlocks said shutter;

said third means secured to said shutter; and

said third means supplying no force on said shutter until said second means begins to unlock said shutter from said first means.

VOL 126
ISS 3
MY 21 1991
UMI

### 5,016,533
### BOMBLET PROJECTILE INCLUDING A STABILIZATION BAND

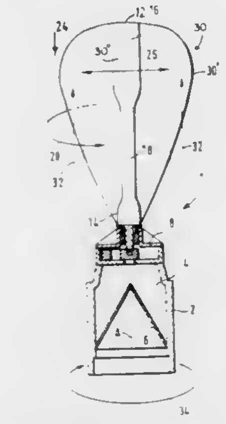
**Lutz Börngen, Köln, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany**

**Filed Jul. 18, 1990, Ser. No. 555,348**

**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1989, 3923885**

**Int. Cl.$^5$ F42B** *12/58*

**U.S. Cl. 102—386** **13 Claims**



1. A bomblet projectile, comprising:
a projectile body having a rear end;
a fuse housing on the body at said rear end; and
unwindable stabilization band means for stabilizing the position of the projectile while dropping; the band means forming, in a deployed state, a loop having leg portions terminating in fastening regions secured to the fuse housing and a dome portion flanked by said leg portions; said band means having a length and different widths along the length; said band means being formed of at least one unwindable stabilization band each having a varying width along a length thereof; each band having a greatest width in said dome portion and a smallest width in said leg portions externally of said fastening regions.

---

### 5,016,534
### MISSILE FOR SETTING DOWN A LOAD

**Hubert Nöhren, Hamburg; Gerhard Siebrand, Quickborn, and Werner Moritzen, Elmshorn, all of Fed. Rep. of Germany, assignors to Autoflug GmbH & Co., Rellingen, Fed. Rep. of Germany**

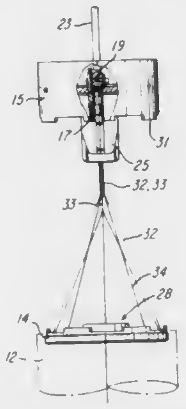
**Filed Aug. 9, 1989, Ser. No. 391,452**

**Claims priority, application Fed. Rep. of Germany, Aug. 10, 1988, 3827123**

**Int. Cl.$^5$ B64D** *17/54;* **F42B** *10/56*

**U.S. Cl. 102—387** **21 Claims**

1. In a missile for setting down a load ejected from the missile after its launch, with at least one parachute that is attached to said load via cords being packed in a container mounted in said missile, the improvement wherein:
said container is a two-part casing, including a substantially plate-shaped lower part to which an upper part is separably connected, with said lower part of said casing having a portion that is fixedly secured to said load and also having a support plate that is attached to said cords of said parachute, with means being provided to interconnect said portion of said lower part and said support plate thereof yet permit the same to be folded out from one another.



---

### 5,016,535
### ARRANGEMENT FOR MINE CONSTRUCTION

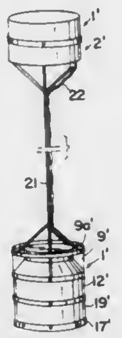
**Stig Hallström, Karlskoga, Sweden, assignor to Aktiebolaget Bofors, Bofors, Sweden**

**Filed Sep. 20, 1989, Ser. No. 409,663**

**Claims priority, application Sweden, Sep. 20, 1988, 8803318**

**Int. Cl.$^5$ F42B** *22/10*

**U.S. Cl. 102—411** **11 Claims**



1. A mine assembly, comprising:
at least one charge module having a cylindrical shape, and an upper and lower circular surface end;
an activating module for detonating said at least one charge module operatively connected thereto, said activating module having at least a lower cylindrical end;
interconnecting means provided at said upper circular end of said charge module and including a ring-shaped element having an inner diameter which corresponds to an outer diameter of said lower end of said activating module and of other charge modules, said ring-shaped element forming an upwardly extending projection along said circular upper end surface of said charge module to provide a space thereon adapted for receiving a cylindrical end of one of said modules.

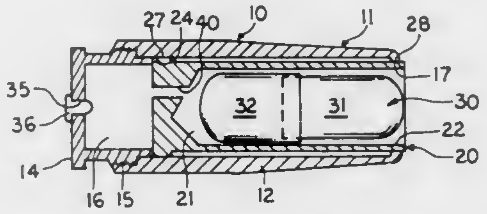
### 5,016,536
### NON-LETHAL PRACTICE ROUND FOR AUTOMATIC AND SEMIAUTOMATIC FIREARMS

**Richard W. Brighton, London, Canada, assignor to Rainier International, Inc., Carson City, Nev.**

**Filed Apr. 11, 1988, Ser. No. 179,741**

**Int. Cl.$^5$ F42B** *5/02*

**U.S. Cl. 102—430** **8 Claims**



1. A round for firing in a firearm chamber having a forward wall forming an opening, said round comprising:
a casing forming an enclosed cavity and sized to fit within said chamber;
a primer cap held y said casing in a position to be detonated and cause a gas pressure rise in said cavity;
a projectile held by said casing in a position to be propelled through the forward wall opening by said gas pressure rise caused by detonation of said primer cap;
an insert held in said casing cavity and positioned to be propelled against the forward wall of said chamber and having a wall member positioned transversely to the longitudinal axis of said casing and having an opening therethrough to limit the further escape of pressured gas from the casing cavity after the projectile is propelled through the forward wall opening and thereby cause the casing to be moved away from the chamber forward wall and out of the chamber by the pressured gas in said casing; and means to prevent the separation of said insert from said casing cavity.

---

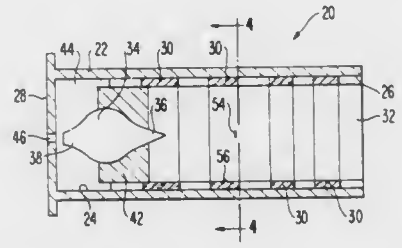
### 5,016,537
### CONTROLLED EXPLOSIVE, HYPERVELOCITY SELF-CONTAINED ROUND FOR A LARGE CALIBER GUN

**George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.**

**Filed Mar. 8, 1990, Ser. No. 490,378**

**Int. Cl.$^5$ F42B** *5/16*

**U.S. Cl. 102—443** **13 Claims**



1. A round for selective removable placement in and firing from a large caliber gun comprising:
a cartridge case defining a cylindrical chamber having axially opposed open and closed ends;
a plurality of annular explosive charges disposed in said chamber in axial succession from a first charge spaced from said closed end to a last charge proximate said open end, said annular charges defining a bore coaxial with said chamber and each said annular charge being shaped to generate on detonation a predetermined shock wave;
a projectile having leading and trailing ends and being disposed in chamber proximate said closed end, the trailing end of said projectile being shaped to convert to projectile acceleration the shock waves generated on successive detonation of said annular charges;
means in said chamber for selectively initially propelling said projectile axially through said bore toward said open end; and
means responsive to axial movement of said projectile in said bore for electrically detonating each said annular charge in axial succession from said first to said last.

---

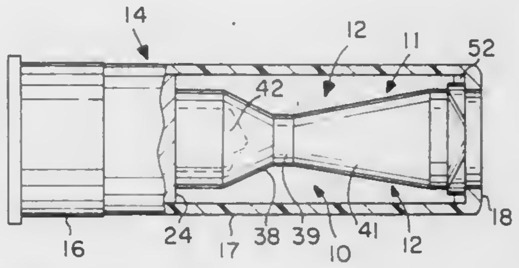
### 5,016,538
### SABOT BULLET

**Robert P. Sowash, Soquel, Calif., assignor to Olin Corporation, Stamford, Conn.**

**Continuation of Ser. No. 246,898, Sep. 16, 1988, abandoned, which is a continuation of Ser. No. 31,721, Mar. 30, 1987, abandoned. This application Aug. 22, 1989, Ser. No. 397,363**

**Int. Cl.$^5$ F42B** *14/06*

**U.S. Cl. 102—520** **1 Claim**



1. A sabot bullet comprising:
a bullet body having an outer surface, a front part and a rear part, the front and rear parts being spaced apart from each other, each part having a conical portion and a cylindrical portion, the cylindrical portion of each part being remote from the other part, the front part being substantially solid throughout its entire length, the front part being axially longer than the rear part, said rear part having a hollow space extending inwardly from the rear end thereof, there being a plug in the space, whereby the rear part is substantially solid throughout, the conical portion of each part increasing in diameter as such conical part extends away from the other part, there being a cylindrical connecting member extending longitudinally of the bullet body for interconnecting the parts, said member being solid throughout and integral with the conical and cylindrical portions of said parts to form therewith a one-piece construction; and
a number of sabot segments for engaging the bullet body and forming a shell in surrounding relationship to the bullet body, each segment having an inner surface substantially complementary to the adjacent outer surface of the bullet body, said inner surface of each segment having a cylindrical surface portion for engaging a respective cylindrical surface portion of the outer surface of the cylindrical connecting member, the outer surface of the conical parts being at respective angles sufficiently shallow relative to the longitudinal axis of the connecting member to permit the sabot segments to be readily separable from the bullet body.

OL
126
SS
3
MY
21
1991
UMI

### 5,016,539
## TRACK INSTALLATION FOR THE VEHICLES OF A TRANSPORT INSTALLATION, ESPECIALLY A REVOLVING AERIAL CABLE TRANSPORT INSTALLATION

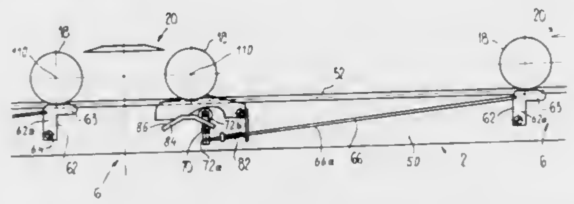
**Fritz Feuz, Thun; Ferdinand Hora, Burgdorf, and Fritz Linder, Heimberg, all of Switzerland, assignors to Von Roll Transportsysteme AG, Thun, Switzerland**

**Filed Sep. 6, 1988, Ser. No. 240,969**

**Claims priority, application Switzerland, Sep. 9, 1987, 3488/87**

**Int. Cl.$^5$ B61B** *3/00;* **B61K** *7/16*

**U.S. Cl. 104—28** **11 Claims**



1. A track installation for vehicles of a transport installation, especially a revolving aerial cable transport installation, each of the vehicles having a vehicle carriage, comprising:

track means possessing a vehicle inbound side and a vehicle outbound side;

said track means serving for supporting the vehicles at said vehicle carriages for movement in a predetermined direction of travel;

conveyor means provided for said track means for transporting the vehicles in said predetermined direction of travel;

said conveyor means including entrainment means for entrainingly engaging said vehicles for the transport of said vehicles in said predetermined direction of travel;

said track means comprising a generally horizontally extending track which extends along essentially the entire length of said track means;

a plurality of operatively interconnected stop means distributively arranged along said generally horizontally extending track;

each of said stop means defining a parking position for the vehicles;

actuation means provided for each of said stop means for the selective placement of each of said stop means into a position for parking a vehicle at an associated parking position;

a vehicle sensor provided for each parking position;

interrupter means provided for each parking position;

means for operatively connecting each vehicle sensor with the actuation means and the interrupter means of a parking position located upstream with respect to the parking position of said respective vehicle sensor;

said interrupter means acting upon the entrainment engagement between an entrainment member of the conveyor means and a vehicle;

the vehicle carriage of each vehicle supporting travel wheels of the associated vehicle; and

spring means acting upon each vehicle sensor for retaining the vehicle sensor in a position protruding into a path of travel of the travel wheels of the vehicles.

---

### 5,016,540
## AMUSEMENT RIDE

**Gerald L. Barber, 10 Whittington Ct., Greenville, S.C. 29615**

**Division of Ser. No. 228,759, Aug. 5, 1988, Pat. No. 4,920,890. This application Jan. 18, 1990, Ser. No. 467,416**

**Int. Cl.$^5$ A63G** *25/00*

**U.S. Cl. 104—53** **21 Claims**

1. A track-guided vehicle, adapted for use with a track of the type having a guidance channel formed therein with an upwardly-facing slot therealong, said vehicle comprising:

a chassis;

wheels supported on said chassis for carrying same over the track; and

vehicle guide means, extending between said chassis and the track guidance channel, for causing said vehicle to follow the track guidance channel as said vehicle travels over such track; wherein said vehicle guide means includes

a generally rigid, vertical shaft supported on said chassis and extending therebeneath towards the track guidance channel,

a gimbal mount secured to the end of said generally rigid shaft extending beneath said chassis towards the track guidance channel,

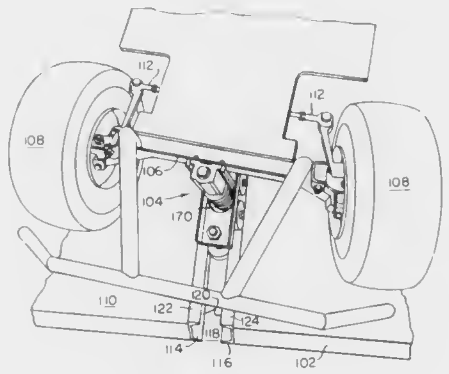
at least one track engagement member supported on said gimbal mount for multi-axis pivoting thereof relative said vertical shaft, and adapted to extend therefrom the track guidance channel slot so that at least a portion thereof resides substantially within the guidance channel to be deflected thereby as said vehicle travels over the track,

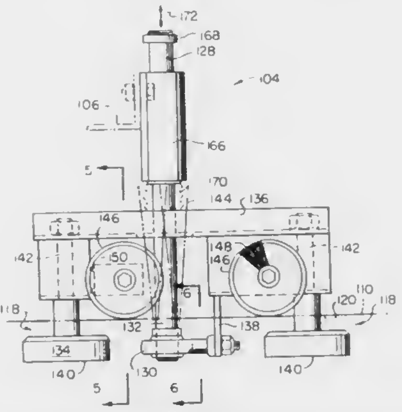
wherein said generally rigid, vertical shaft is interconnected with said chassis so that said vehicle follows the guidance channel; said vehicle further comprising

a guide head assembly supported directly on said gimbal mount, and supporting thereon said track engagement member; and

linear bearing means secured to said chassis for supporting said generally rigid, vertical shaft thereon, with relative vertical freedom of movement to accommodate depth changes of the track guidance channel relative said chassis as said vehicle travels over such track; and

wherein said engagement member comprises a rotatably mounted wheel element extending from said guide head assembly generally perpendicularly to the surface of the track, and being rotatable in a plane parallel to the track surface for absorbing side-to-side deflections from the track guidance channel with minimal frictional engagement therewith by rotating relative thereto whenever contacting such guidance channel.





---

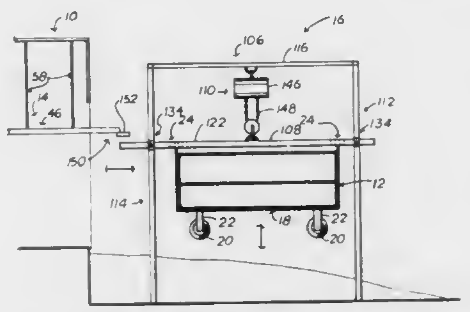
### 5,016,541
## GREENHOUSE TRANSPORT SYSTEM

**William L. Feaster, Jr., 84 Spoonbill La., Ellenton, Fla. 34222-4213**

**Filed Dec. 14, 1989, Ser. No. 450,458**

**Int. Cl.$^5$ B65G** *1/00;* **B66B** *17/18*

**U.S. Cl. 104—129** **6 Claims**



3. A greenhouse transport system for moving plants and plant trays through a greenhouse comprising a cart including a carriage assembly having at least one carriage assembly section including a roller extending upwardly from the cart, an overhead track assembly including a first track channel to receive said roller to support said cart thereon, and at least one lift station including a lift member coupled to a lift frame by a lift means to selectively move said lift member between lower and upper positions having a lift channel formed thereon to receive said roller therein and an alignment means disposed to engage said lift member when in said upper position comprising a pair of alignment members extending downwardly from said lift frame and an alignment cam surface formed on the lower portion of each said alignment member to direct said lift channel member to an alignment slot formed therebetween such that when said lift member is in said lower position said roller is operatively disposed in said lift channel and said lift channel is axially aligned relative to said first track channel by said alignment means as said lift member is moved from said lower position to said upper position to permit said cart to be moved from said lift channel to said first track channel whereby said roller is disposed within said first track channel for movement through the greenhouse on said overhead track assembly.

---

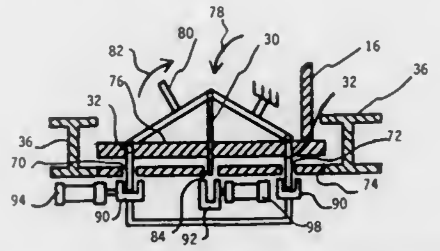
### 5,016,542
## TRANSIT SYSTEM

**Bruce Mitchell, 2078 North 1025 E., Terreton, Id. 83450**

**Filed Dec. 18, 1989, Ser. No. 451,593**

**Int. Cl.$^5$ E01B** *26/00*

**U.S. Cl. 104—130** **13 Claims**



1. An improved closed loop passenger vehicle transit system comprising:

a. an overhead main line track suspended above a ground surface;

b. a plurality of passenger loading and unloading stations adjacent the main line having a station entry portion and a station exit portion;

c. a metal deck at each station entry portion and each station exit portion having a pair of side guide slots and a center slot;

d. a pair of hydraulically movable side guide vanes cooperating with the side guide slots at each station entry portion and having a normally "exit" position;

e. a hydraulically movable center guide vane cooperating with the center slot at each station entry portion and having a normally "no exit" position;

f. a plurality of passenger vehicles having wheels supported on the main line;

g. a tow bar pivotally mounted under each vehicle;

h. a plurality of motors mounted under the main line having drive wheels in rotational engagement with longitudinal edges of the tow bar;

i. a movable manual control lever within the vehicles having a center pin and a pair of side pins to engage said center slot and side guide slots; wherein when the passenger desires to exit from the main line, the control lever is moved to engage the side pins in the side guide so as to exit the main line unless the hydraulically movable side guide vanes have been moved to a "no exit" position by controller system means, and when the passenger desires to proceed past a station entry portion, the control lever is moved to engage the center pin in the center slot and center guide vane so as to proceed past the station entry portion unless the hydraulically movable center guide vane has been moved to an "exit" position by a remote master controller;

j. means to exit and accelerate a start position vehicle from the station;

k. means to decelerate the vehicles at the station entry portion;

means to advance the vehicles within the station; and

m. said controller system means to count and control vehicle starting, station entry, and station exit operation.

---

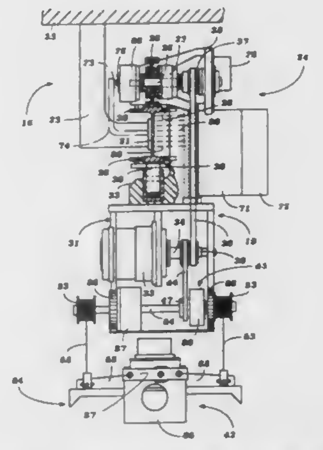
### 5,016,543
## FREIGHT SYSTEM

**Osamu Ohara; Hiroshi Kawashima, and Hiroshi Takata, all of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Jul. 26, 1989, Ser. No. 385,576**

**Int. Cl.$^5$ B60L** *15/40*

**U.S. Cl. 105—150** **11 Claims**



1. A monorail type conveying system comprising a single I beam guide rail, a combined drive and supporting mechanism carried by said guide rail, a drive and support wheel engaging the upper flange of said I beam guide rail for supporting said mechanism upon the upper surface above the web thereof, and an electric motor disposed adjacent one of the flanges of said I beam guide rail, first selectively engageable transmission means for driving said drive and supporting wheel along said guide rail, gripping means carried by said supporting mechanism, and second selectively engageable transmission means for effecting vertical movement of said gripping means relative

VOL
126
SS
3
MY
21
1991
UMI

to said guide rail between a wide variety of heights from said electric motor, at least one of said selectively engageable transmission means being disposed at one side of said I beam guide rail, said electric motor means having a drive shaft, said drive and supporting wheel being rotatable about a shaft, and said means for effecting vertical movement of said gripping means further including a shaft, each of said shafts extending transversely to said I beam guide rail both of said first and second selectively engageable transmission means being driven by said electric motor said electric motor being positioned with its center of gravity vertically between the sides of the guide rail for stability.

---

### 5,016,544
### ROAD/RAIL POWER UNIT

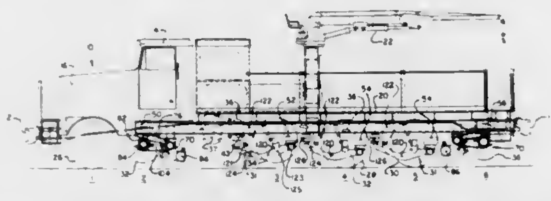
**Ronald F. Woollam, New Glasgow, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of Highways and Transportation, Saskatchewan, Canada**

**Filed Oct. 10, 1989, Ser. No. 419,189**

**Claims priority, application Canada, Sep. 15, 1989, 611565**

**Int. Cl.$^5$ B61F *13/00***

**U.S. Cl. 105—215.2** **24 Claims**



1. A convertible road/rail power vehicle including a vehicle frame, a group of road wheels mounted to said vehicle frame for road use; a group of rail wheels mounted to said vehicle frame for rail use; at least said group of rail wheels being movable between a lowered position wherein the weight of said vehicle is carried by the rail wheels in a rail mode and a raised position wherein the vehicle weight is carried by the road wheels in a road mode; some of said rail wheels being rail drive wheels; some of said road wheels being road drive wheels; drive engine and power transmission means selectively connectable to either said rail drive wheels or said road drive wheels; said rail drive wheels being located sufficiently close to the longitudinal center of gravity of said vehicle as to enable a substantial amount of the total vehicle weight to be applied to said rail drive wheels to enable the latter to provide a desired amount of tractive effort, and wherein said group of rail wheels includes front and rear sets of rail wheels, said rail drive wheels being located intermediate the front and rear sets of rail wheels so the rail drive wheels provide, in use, a redundant support point between the support points provided by the front ad rear sets of rail wheels to enable the proportions of the loadings carried by the front and rear sets of rail wheels and the rail drive wheels to be controlled, fluid pressure activated means to move at least the rail drive wheels into contact with the rails to provide tractive force and means to selectively control the amount of force said fluid pressure activated means applies to the rail drive wheels when in contact with the rails to increase or decrease the total loading on the rail drive wheels and the tractive effort the rail drive wheels are capable of exerting.

---

### 5,016,545
### ADJUSTABLE DISPLAY STAND

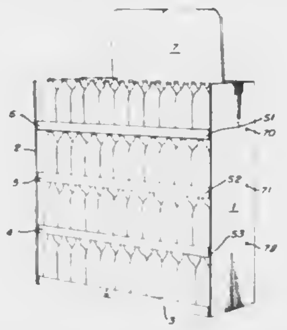
**J. D. Robertson, Atlanta, and Ladd M. Orr, Clarkston, both of Ga., assignors to The Mead Corporation, Dayton, Ohio**

**Filed May 22, 1990, Ser. No. 527,540**

**Int. Cl.$^5$ A47B *3/00***

**U.S. Cl. 108—111** **14 Claims**

1. An adjustable display stand comprising a pair of spaced apart separate upright supports, a plurality of shelves supported at their ends by said upright supports, each of said shelves having a length and including means to reduce said shelf length and having holding apertures, said means including a plurality of transverse severance lines formed on said shelves which define severable components, whereby said shelf length is reduced by severing one or more of said components from an adjacent component, a pair of shelf ends each having a pair of holding tabs projecting downwardly therefrom and respectively secured to opposite ends of each of said shelves by insertion of said holding tabs into corresponding ones of said holding apertures respectively, at least one shelf end of each pair of shelf ends being disjointable from and reconnectable with its associated shelf, by removing and reinserting said holding tabs into said holding apertures, and mounting means for securing each of said shelf ends to an associated one of said upright supports.



---

### 5,016,546
### DEVICE FOR THE INSERTION, STORAGE, AND REMOVAL OF OBJECTS TO BE STORED IN STRONGBOXES AND OF SHEET-LIKE MATERIAL

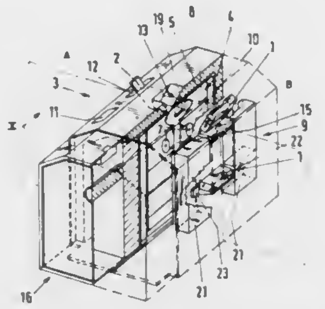
**Ernst Haueter, Bowil, Switzerland, assignor to Ascom Autelca AG, Gumligen, Switzerland**

**Filed Feb. 17, 1989, Ser. No. 311,734**

**Claims priority, application Switzerland, Mar. 10, 1988, 911/88**

**Int. Cl.$^5$ E05G *1/00***

**U.S. Cl. 109—45** **10 Claims**



1. A device for depositing and dispensing of objects to be stored in boxes (1) and for dispensing of sheet-like material (2), comprising

a housing (3) surrounding an interior space (4), said housing having an opening (12),

first storage means (9) having a plurality of storage sites (21) therein,

a plurality of boxes (1) inserted respectively in said plurality of storage sites (21) in said first storage means (9),

second storage means (10) for storing said sheet-like material (2),

an issuance and introduction unit (20) connected adjacent said opening (12) in said housing (3) for individually issuing and reintroducing said boxes (1) through said opening (12) and for issuing said sheet-like material (2) through said opening (12);

first conveying means (22, 23) for individually conveying said boxes (1) from said storage sites (21) of said storage means (9) to said issuance and introduction unit (20) and vice versa; second conveying means (15, 18) for conveying said sheet-like material (2) from said second storage means (10) to said issuance and introduction unit (20);

said issuance and introduction unit (20) having

a support and guide member (29) being pivotally connected relative to said housing,

first transfer means (66, 67) for transferring said boxes (1) from said first conveying means (22, 23) to said support and guide member (29) and along said member (29) and through said opening (12) in said housing (3) and vice versa,

second transfer means (101) for transferring said sheet-like material (2) from said second conveying means (15, 18) to said support and guide member (29) and along said member (29) and through said opening (12) in said housing (3),

said pivotal connection for pivoting said support and guide member (29) comprising a pivoting mechanism (31, 32) having a first position, in which first position said support and guide member (29) is in an approximately horizontal first position (FIGS. 5*a*, 5*b*), a second position, in which second position said support and guide member (29) is in a second position (FIG. 5*c*) tilted upwards with respect to said approximately horizontal first position and aligned with said opening (12) in said housing (3), and a third position, in which third position said support and guide member (29) is in a third position (FIG. 5*d*) tilted further upwards with respect to said second position (FIG. 5*c*) and aligned with said opening (12) in said housing (3),

said support and guide member (29) having an underside (76), a topside (75) and opposite lateral sides, and including a pair of guide rails (122) respectively connected to the opposite lateral sides on the underside (76) of said support and guide member (29),

said first transfer means (66, 67) including pushing means (77, 81) for pushing a said box (1) along the underside (76) of said support and guide member (29) and through said opening and for transferring back a said box, the box (1) pushed by said pushing means (77, 81) being engaged by and moved along said guide rails (122) on the underside (76) of said support and guide member (29),

said second transfer means (101) comprising belt means including belt drive mechanism (101, 102, 99, 94), holddown means (103) arranged on the topside (75) of said support and guide member (29) and means resiliently urging said holddown means (103) downwards towards said belt means (101) of said belt drive mechanisms (101, 102, 99, 94), whereby both a single piece of sheet-like material (2) and a bundle of sheet-like material (2) are engageable between said holddown means (103) and said belt means (101) and transferred by said second transfer means (101) along the topside (75) of said support and guide member (29) and through said opening (12) and held in place until withdrawn from outside said housing (3), and

said pivoting mechanism (31, 32) being

in said first position, when a said box (1) or said sheet-like material (2) is transferred from said first or second conveying means (22, 23) towards said support and guide member (29) or vice versa,

in said second position, when said sheet-like material (2) is transferred through said opening (12) in said housing (3) from the topside (75) of said support and guide member (29); and

in said third position, when a said box (1) is transferred through said opening (12) in said housing (3) and vice versa from the underside (76) of said support and guide member (29);

so that both, said boxes (1) and said sheet-like material (2) are issued by said issuance and introduction unit (20) at the same site and in the same grasp position, protruding from said opening (12), wherein said box (1) or box content or sheet-like material (2), respectively, can be readily grasped from outside said housing (3).

---

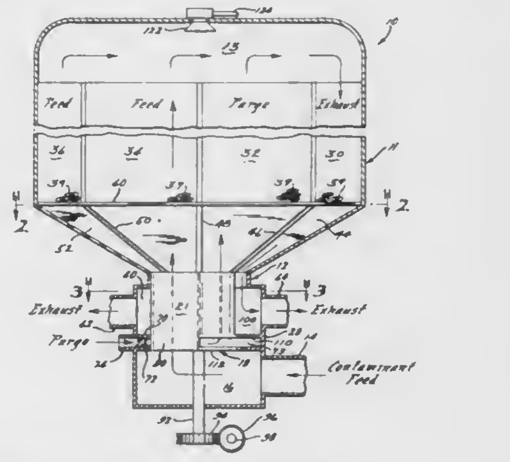
### 5,016,547
### REGENERATIVE INCINERATOR

**Michael C. Thomason, Brighton, Mich., assignor to Salem Industries, Inc., South Lyon, Mich.**

**Filed May 4, 1990, Ser. No. 519,414**

**Int. Cl.$^5$ F23B *5/00;* F23C *9/00;* F23G *7/06***

**U.S. Cl. 110—211** **4 Claims**



1. A regenerative incinerator comprising

a combustion chamber;

a regenerator comprising a plurality of discrete segments disposed in a circumferentially spaced circular array about a central axis and in fluid flow communication with said combustion chamber;

a heat exchange material inn each of said segments;

a cylindrical valve housing having a central axis aligned with the central axis of said segments and having inlets for the acceptance of contaminated feed gas and purge gas and an outlet for the discharge of cleansed exhaust gas, and

a generally cylindrical valve core disposed internally of said valve housing and mounted for rotation about the central axis thereof, said valve core having a longitudinally extending feed passage connected to said feed inlet, a longitudinally extending exhaust passage diametrically related to said feed passage and connected to said outlet, and a pair of diametrically related longitudinally extending purge gas passages connected to said purge gas inlet, said feed, exhaust and purge gas passages being orientated in a circumferentially spaced circular array complementary to the array of said regenertor segments and in fluid flow communication therewith, one of said purge gas passages being disposed at each circumferentially spaced end of said feed and exhaust gas passages whereby both feed and exhaust gas is immediately exposed to purge gas upon rotation of said valve core to sequentially direct contaminated feed gas, purge gas and cleansed exhaust gas to and from discrete segments of said regenerator.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,548
### METHOD OF PLANTING SEEDLINGS

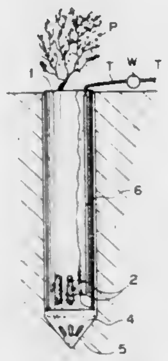
**Yoshihide Ito, No. 406, Sun Heights Hozumi, 4-5-11, Kasuga, Ibaragi-shi, Osaka-fu, Japan**

**Continuation of Ser. No. 316,950, Feb. 28, 1989, abandoned. This application Sep. 17, 1990, Ser. No. 584,504**

**Claims priority, application Japan, Mar. 4, 1988, 63-50645**

**Int. Cl.$^5$ A01C** *11/02;* **A01G** *9/10*

**U.S. Cl. 111—114** **4 Claims**



1. A method of planting a seedling in a seedling planting place comprised of an area dry in the upper levels but containing water at a lower level, comprising

(i) determining the depth of the water-containing level;

(ii) selecting a seedling breeder having a length corresponding to the depth of the water-containing level, said breeder comprising an elongated cylindrical body having an opened upper end, a plurality of openings in the periphery of at least the lower portion of the body, a length which corresponds to the depth of water-containing soil in said planting place, means covering said plurality of openings and a thin tube extending to the deep portion of said body for supplying water thereto;

(iii) filling said seedling breeder with culture soil;

(iv) planting the seedling in the seedling breeder;

(v) breeding the planted seedling in the breeder until the roots of the seedling reach said plurality of openings;

(vi) removing said cover means; and

(vii) implanting the breeder in a seedling planting place by inserting the breeder in to the ground of said planting place.

---

### 5,016,549
### ATTACHING A STRIP OF CLOTH WITH A ZIP-FASTENER COMPONENT TO A TROUSER FOREPART

**Werner Sadlack, Bünde; Siegfried Vogt, Leopoldshöhe; Egon Upmeier, Lage, and Wolfram Schulze, Bielefeld, all of Fed. Rep. of Germany, assignors to Kochs Alder Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jan. 11, 1990, Ser. No. 463,416**

**Claims priority, application Fed. Rep. of Germany, Jan. 24, 1989, 3901922**

**Int. Cl.$^5$ D05B** *3/12, 21/00*

**U.S. Cl. 112—104** **14 Claims**

1. A sewing unit for attaching a strip of cloth provided with a zip-fastener component (67) to one trouser forepart (103) of two trouser foreparts (103, 115) comprising:

a sewing machine (2); and

a guiding device (16) with a workpiece holder (37) movable relative to the sewing machine;

wherein a preparatory station (42) is provided comprising:

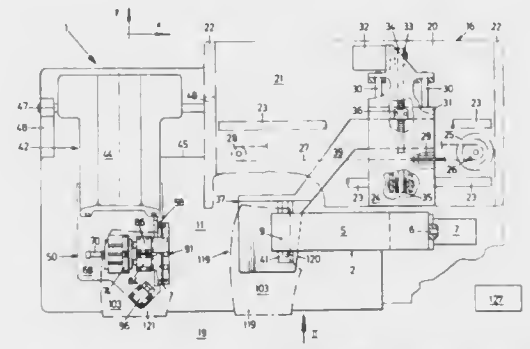
a bearing plate (11) extending to the sewing machine (2) and provided with holding devices for the trouser forepart (103),

a zip-fastener reception (58) for receiving and positioning a strip of cloth (66) provided with the zip-fastener component (67) relative to a folding edge (62),

and a folding device (50), comprising a cloth-strip side slider (80) slidable between two end positions for folding a rim (81) of the strip of cloth (66) over the folding edge (62),

a trouser sliding plate (69), slidable between two end positions and having a folding edge (77),

and a trouser side slider (85) slidable between two end positions for folding a rim (107) of the trouser forepart (103) over the folding edge (77) of the trouser sliding plate (69);



wherein the zip-fastener reception (58) and the folding device (50) are movable above one another and on to one another;

and wherein the guiding device (16) is formed for a common transport to the sewing machine (2) of the trouser forepart (103) and the strip of cloth (66) both positioned relative to each other.

---

### 5,016,550
### SEWING MACHINE FOR STITCHING SELECTED PATTERNS

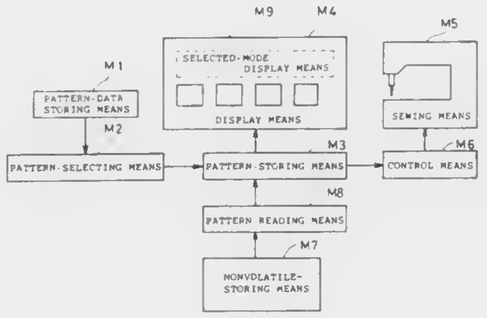
**Fujio Horie, Nagoya, and Kenji Matsubara, Aichi, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

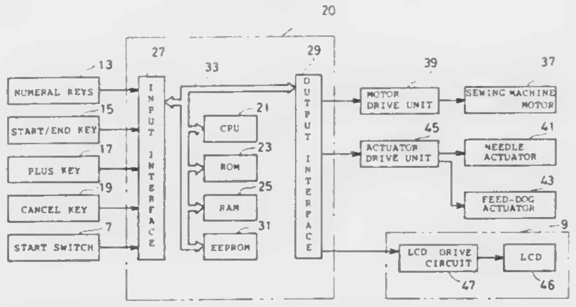
**Filed Jul. 17, 1990, Ser. No. 553,452**

**Claims priority, application Japan, Jul. 28, 1989, 1-197525**

**Int. Cl.$^5$ D05B** *3/02*

**U.S. Cl. 112—454** **18 Claims**





1. A sewing machine comprising:

sewing means for forming stitches under control of pattern data;

pattern-data storing means for storing pattern data;

pattern-storing means for storing at least two patterns in a sewing order as a selected pattern arrangement;

nonvolatile-storing means for storing selected pattern arrangements in a nonvolatile condition;

pattern-selecting means for selecting at least two patterns represented by the pattern data stored in the pattern-data storing means to form a selected pattern arrangement and selectively storing the selected pattern arrangement in the pattern-storing means or the nonvolatile-storing means; and

control means for selectively sending the pattern data corresponding to the selected pattern arrangement stored in the pattern-storing means or the nonvolatile-storing means to the sewing means such that the sewing means stitches the patterns of the selected pattern arrangement in the sewing order.

---

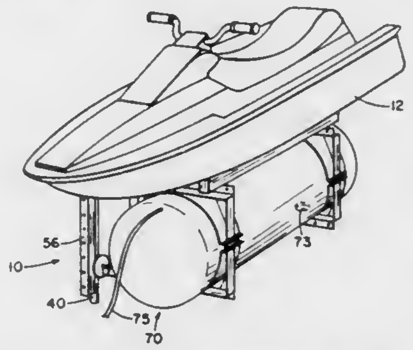
### 5,016,551
### LIFT FOR WATER VEHICLES

**Ralph E. Peck; Todd E. Elson, and Masoud Toofan, all of Claremore, Okla., assignors to National Hydrohoist Company, Claremore, Okla.**

**Filed May 15, 1990, Ser. No. 523,484**

**Int. Cl.$^5$ B63C** *1/02*

**U.S. Cl. 114—045** **5 Claims**



1. A lift for water vehicles comprising a pair of vertical pipes attached adjacent their upper ends to one side only of a dock structure which is positioned alongside a body of water, a tank assembly having a roller assembly thereon for engaging the sides of the pipes for rolling upwardly and downwardly thereon, the tank assembly having a tank mounted thereon and an upper opening for introducing air into the tank to displace water therefrom through a lower opening at the bottom of the tank so as to cause the tank to rise, the tank assembly having a pair of spaced padded blocks for supporting a water vehicle thereon, the roller assembly having rollers thereon adapted to ride along the inboard sides of the pipes when the tank assembly moves vertically in response to the introduction of air to and removal of air from the tank, whereby, when a water vehicle is supported on the padded blocks and the tank assembly is in its lowermost position, air can be introduced into the tank through the upper opening while water is forced outwardly from the lower opening so that the vehicle can be elevated above the body of water.

---

### 5,016,552
### BOAT HULL

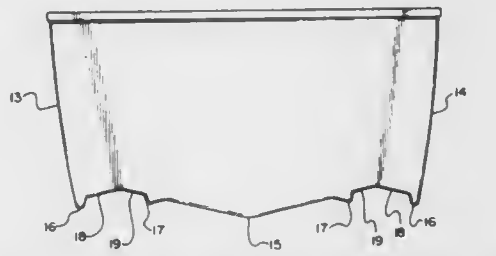
**Roy S. Ludlow, 3045 West 2100 S., Salt Lake City, Utah 84104**

**Filed Feb. 5, 1988, Ser. No. 152,879**

**Int. Cl.$^5$ B63B** *1/32*

**U.S. Cl. 114—56** **1 Claim**

1. A boat hull comprising, a stern; a pair of spaced apart sidewalls extending from the stern and converging to meet at a bow; a keel interconnecting the bow and the stern; a chine formed at a lowermost edge of each sidewall; a rib formed inwardly from each sidewall adjacent the stern and intermediate the keel and the chine formed on said sidewall and extending forwardly from the stern and merging into strakes that extend to proximate the bow; said chines for their full lengths, extend downwardly from each sidewall below the lower most extremities of said ribs when the keel is placed on level with said chines merging into strakes that extend to proximate the bow; and the surfaces between which chines and ribs are each an inverted V-shaped planar surface.



---

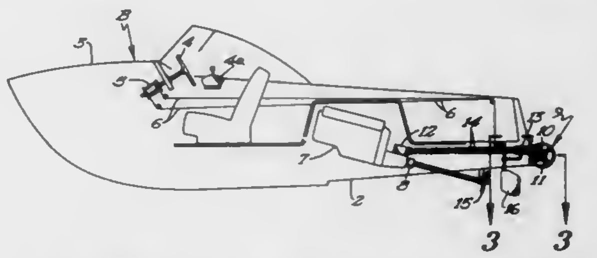
### 5,016,553
### VECTOR STEERING CONTROL SYSTEM

**William P. Spencer, 6252 Chesshire La. N., Maple Grove, Minn. 55369**

**Filed Dec. 4, 1989, Ser. No. 445,361**

**Int. Cl.$^5$ B63H** *25/46*

**U.S. Cl. 114—151** **8 Claims**



1. In combination with a small boat having a hull, including a transom at its stern, said boat hull having a longitudinal center line, an engine having water engaging propulsion means, high speed steering means positioned in the water and pivotally connected to said boat, and operator means operably connected to said high speed steering means and being operable for shifting the high speed steering means for high speed steering of the boat,

a low speed vector steering assembly for low speed steering of the boat comprising a rotary thruster assembly mounted on said boat exteriorly of the boat transom below the water surface, a reversible rotary motor having an output shaft and having a propeller mounted on said shaft, the axis of rotation of said motor propeller being arranged at right angles to the longitudinal center line of the boat hull, and

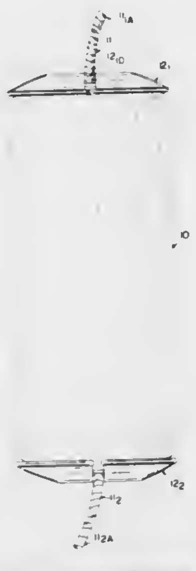
adjustable control means operatively connected to said motor and being selectively adjustable between right turning, left turning, and neutral positions, said control means, when in the right turning position, causing the motor propeller to rotate in one direction and, when in the left turning position, causing the motor propeller to rotate in the opposite direction whereby the stern of the boat will be shifted laterally in one direction or the other when the rotary motor is operated in the right turning or left turning directions, and means interconnecting the control means to said operator means of the boat for shifting the control means between right turning, left turning, and neutral positions.

OL
1126
ISS
3 .
MY
21
1991
UMI

### 5,016,554
## LINE STORAGE REEL FOR BOAT FENDERS, RESPECTIVELY, BOAT FENDERS EQUIPPED WITH LINE STORAGE REELS

**Rano J. Harris, Jr., Baton Rouge, La., and Nicholas E. Barker, Seattle, Wash., assignors to Romar Technologies, Inc., Baton Rouge, La.**

**Filed Mar. 29, 1990, Ser. No. 501,243**
**Int. Cl.⁵ B63B** *59/02*
**U.S. Cl. 114—219** **16 Claims**



1. A boat fender for suspension from a line alongside the hull of a craft from a hitching device located on the craft for protection of the hull on contact thereof with a mooring site, which comprises
- a body constituted of an enclosing wall providing a substantially central opening of generally tubular shape, and an object of three-dimensional shape, the external surface of which can contact said mooring site for protection of the hull,
- a line storage reel having a stem which can be projected within said central opening and affixed to said body about which said line can be wound, turn-by-turn for containment and storage of the suspending line when the boat fender is not in use, and a cover is provided thereover creating in effect a chamber within which said wound line is contained, hidden and stored.

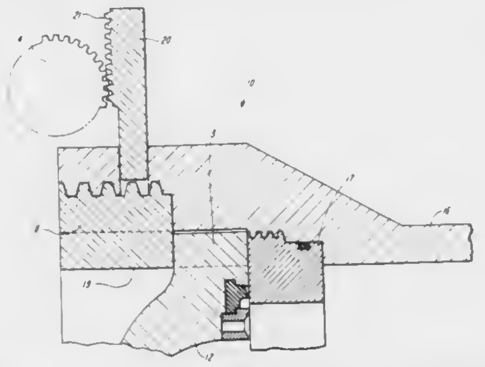
---

### 5,016,555
## SUBMARINE TORPEDO TUBE PRIMARY SEAL INTERLOCK

**Paul E. Moody, Barrington, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 13, 1990, Ser. No. 565,784**
**Int. Cl.⁵ B63G** *8/00*
**U.S. Cl. 114—238** **7 Claims**

1. A mechanical interlock system for a torpedo tube having a breech end defining a mouth and a muzzle end, a breech door and breech door actuator associated with the mouth of the breech end, a muzzle door and muzzle door actuator associated with the muzzle end, and having a slide valve and associated slide valve actuator, said mechanical interlock system preventing actuation of either the slide valve or muzzle door actuators whenever the breech door is open and has begun to be opened and preventing the opening of the breech door whenever the slide valve and muzzle door are opened and have begun to be opened, comprising:
- an interlock member;
- means for mounting the interlock member for rotation about a circumference of and external to the torpedo tube between an open condition and a closed condition;
- a locking ring;
- means for mounting the locking ring to an inside circumferential wall of the mouth of the breech end of the torpedo tube for rotation between an open condition and a closed condition;
- means coupled to the interlock member and to the locking ring and cooperative with the interlock member remounting means and with the locking ring mounting means for rotating the locking ring and interlock member together in such a way that the locking ring is in its closed condition when the interlock member is in its open condition, and vice versa;
- means cooperative with the interlock member, and with the muzzle door and slide valve actuators, for enabling actuation of the slide valve and muzzle door actuators only if said interlock member is in its open condition;



- means cooperative with the interlock member and breech door actuator for enabling actuation of the breech door actuator only if said interlock member is in its closed condition;
- means cooperative with said rotating means for freezing said locking ring in its open condition in response to actuating the breech door actuator opening the breech door and therewith freezing the interlock member in its closed condition, thereby preventing actuation of either the slide valve or muzzle door actuators so long as the locking ring is in its open condition or has begun to be opened; and
- means cooperative with said rotating means and responsive to actuation of either said slide valve or breech door actuators for freezing said interlock member in its open condition, and therewith the locking ring in its closed condition, thereby preventing opening the breech door or the attempt to actuate the breech door actuator so long the interlock member is in its open condition.

---

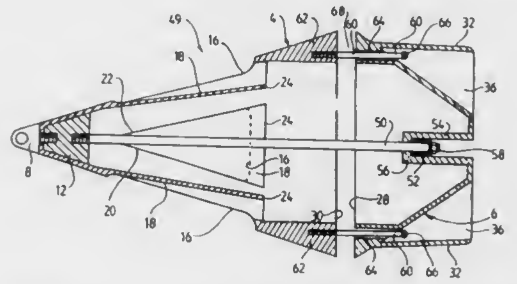
### 5,016,556
## SEA ANCHOR OR DROGUE

**William J. Abernethy, Woodville, R.M.B. 128, Delegate, New South Wales 2633, Australia**

**PCT No. PCT/AU88/00041, § 371 Date Aug. 17, 1989, § 102(e) Date Aug. 17, 1989, PCT Pub. No. WO88/06117, PCT Pub. Date Aug. 25, 1988**

**PCT Filed Feb. 15, 1988, Ser. No. 408,496**
**Claims priority, application Australia, Feb. 17, 1987, P10398**
**Int. Cl.⁵ B63B** *21/48*
**U.S. Cl. 114—311** **13 Claims**

1. A sea anchor or drogue comprising:
- a hollow body having a front part having rear and forward ends, a rear part having a forward end, and at least one water outlet located adjacent to the rear end of the front part;
- said front part having water inlet openings and being generally conical in shape;
- said rear part being generally frustoconical in shape and movable relative to the front part between first and second positions and wherein, in the first position, the forward end of the rear part engages the rear end of said front part and said at least one water outlet is closed, and wherein, in the second position, the forward end of the rear part is separated from the rear end of said front part to thereby define said at least one water outlet, and
- attachment means for attaching a line to the forward end of the front part for towing the body in a forward direction.

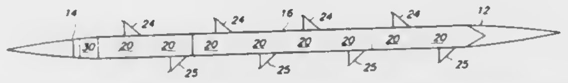


---

### 5,016,557
## MODULAR ROWING SHELL

**William J. Miller, 309 Washington St., Duxbury, Mass. 02332**

**Filed Dec. 6, 1989, Ser. No. 446,656**
**Int. Cl.⁵ B63B** *35/00/35/71*
**U.S. Cl. 114—347** **15 Claims**



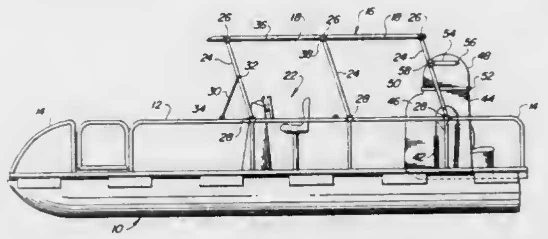
1. A modular rowing shell having a keelson and a seat deck supporting a plurality of seat assemblies:
- a bow section including N rowing stations;
- a stern section including N rowing stations; and
- a center section including 2N rowing stations;
- the beam of each of said sections at each of said stations being the same,
- each of said stations including a said seat assembly, a rowing station framing assembly, and either a port outrigger attached to the port side of the respective station or a starboard outrigger attached to the starboard side of the respective station,
- each of said framing assemblies, said port outriggers, and said starboard outriggers being substantially identical, and
- each of said framing assemblies including a knee, a portion of said seat deck, and a portion of said keelson.

---

### 5,016,558
## BOAT WITH RETRACTABLE ROOF

**William P. Oebler, 8430 E. Cresco La., Inverness, Fla. 32650**

**Filed Jun. 15, 1990, Ser. No. 538,434**
**Int. Cl.⁵ B63B** *17/00*
**U.S. Cl. 114—361** **11 Claims**



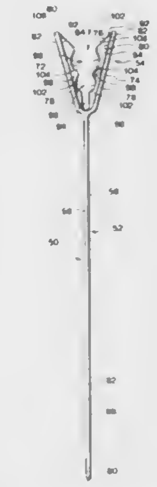
1. A boat having a body part including longitudinal fore-and-aft sides spaced transversely of the length of the body part, a fore-and-aft roof part overlying the body part and disposed in a normal position spaced above the body part sides, a plurality of normally generally upright supports pivoted at their upper and lower ends respectively to the body part sides and to the roof part on the transverse axis and swingable downwardly and lengthwise of the body part in one direction to retract the roof part to a low-level position, releasable means selectively operative between the supports and one of said parts to retain the supports generally upright or to release the uprights for retraction of the roof part, upright structure carried by the body part intermediate the sides and ends of the body part and including a base element rising to an upper portion at about the level of the retracted roof part and further including a top element disposed in a normal position as an upward extension of the base element to a higher level above the level of the retracted roof part, means connecting the top element to the base element for selective movement of the top element between its normal position and a retracted lower position at about the level of the retracted roof part, and means connected between at least one support and the top element for moving the top element between its normal and retracted positions in response, respectively, to movement of the roof part between its normal and retracted positions.

---

### 5,016,559
## BOOKMARK HAVING INTEGRAL PENCIL HOLDER

**Vada J. Larson; Roger L. Larson, both of 8675 Scandia Rd., Waconia, Mich. 55387, and Walter I. Bieger, St. Paul, Minn., assignors to Vada J. Larson and Roger L. Larson, both of Waconia, Mich.**

**Filed Jun. 30, 1989, Ser. No. 374,464**
**Int. Cl.⁵ B42D** *9/00*
**U.S. Cl. 116—234** **5 Claims**



1. A combination bookmark and holder for a writing instrument comprising:
- an elongated, generally planar marking strip having a lower margin and an upper portion; and
- retaining means for removably holding a writing instrument integrally molded with said marking strip along said upper portion, said retaining means comprised of a pair of opposed jaws comprised of a neck portion, a writing instrument engaging midportion, and a generally outwardly flared, mouth portion for guiding said writing instrument into said midportion, each jaw further comprised of a generally planar back plate including an inner surface and an outer surface, and writing instrument retaining brackets projecting inwardly from said inner surface.

VOL
126
ISS
3
MY
21
1991
UMI

### 5,016,560
## DEVICE FOR IMAGE TONER DISTRIBUTION ON A DEVELOPING DEVICE

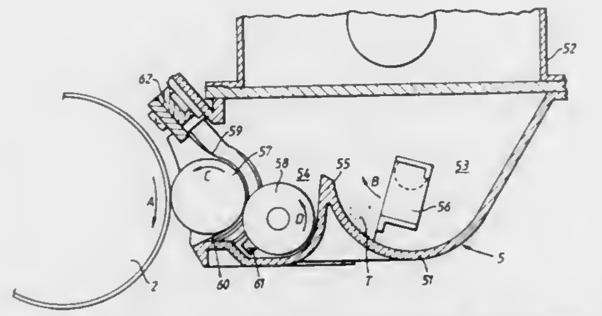
**Tomoyuki Asada; Kaoru Nishida; Mamoru Shimono, all of Yokohama; Hideyuki Shinohara, and Koichi Ando, both of Setagaya, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 25, 1989, Ser. No. 342,812**

**Claims priority, application Japan, Apr. 28, 1988, 63-104114**

**Int. Cl.$^5$ C03G *15/06***

U.S. Cl. 118—653 5 Claims



1. A device for developing an electrostatic latent image formed on the surface of an image carrier by applying a developer to said latent image at a developing position facing said image carrier, comprising:

means for transferring the developer to the developing position, said transferring means including a developing roller facing the image carrier and a toner supply roller which comes in contact with said developing roller and supplies toner particles to said developing roller; and

a porous foam member having holes adapted for storing said developer, said foam member contacting a surface of said toner supply roller with a nip width of below 1 mm, for increasing friction between said developer, said toner supply roller, and said foam member to increase a frictionally generated electrical charge on said developer so that said developer is better attracted to said transferring means.

---

### 5,016,561
## CONTINUOUS VACUUM PROCESSING APPARATUS

**Masaie Tokai, Ryugasaki; Minoru Kuroiwa, Abiko, and Shinobu Ezaki, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 3, 1988, Ser. No. 201,758**

**Claims priority, application Japan, Jun. 5, 1987, 62-139751; Jun. 5, 1987, 62-139754; Jun. 5, 1987, 62-139755**

**Int. Cl.$^5$ C23C *14/56***

U.S. Cl. 118—718 4 Claims

1. A continuous vacuum processing apparatus comprising:

a vacuum processing chamber;

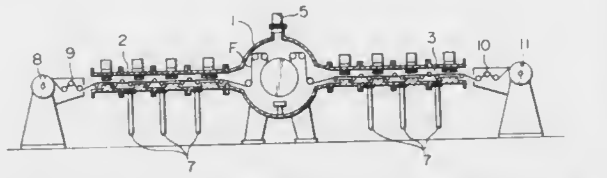
at least one preliminary vacuum chamber disposed in advance of said vacuum processing chamber; and

at least one post vacuum chamber disposed subsequent to said vacuum processing chamber;

wherein each of said vacuum chambers has a slit-type sealing device through which an object to be processed is passed and which is adapted to seal said vacuum processing chamber from the outside thereof;

wherein a guide member for guiding said object to be processed is provided at each of two sides of each of said sealing devices or at one side thereof in such a manner as to be movable in a direction perpendicular to the direction in which said object to be processed is conveyed in accordance with tension of said object being detected by a tension detecting means;

wherein a slit forming member of each of said sealing devices is made movable in the direction perpendicular to the direction of conveyance of said object to be processed; and



wherein each of said sealing devices is comprised of a flat plate-like first member, a second member having a recessed surface which faces said first member, a flat-plat member accommodated in said recessed portion of said second member, said flat-late member having a surface which faces said first member and which forms a slit through which said object to be processed is passed, and means for moving said flat plate member in a direction perpendicular to the direction in which said object to be processed is conveyed.

---

### 5,016,562
## MODULAR CONTINUOUS VAPOR DEPOSITION SYSTEM

**Arun Madan, Golden, and Bolko Von Roedern, Wheat Ridge, Colo., assignors to Glasstech Solar, Inc., Perrysburg, Ohio**

**Continuation-in-part of Ser. No. 186,633, Apr. 27, 1988, abandoned, which is a continuation-in-part of Ser. No. 946,855, Dec. 29, 1986, abandoned. This application Feb. 7, 1989, Ser. No. 307,836**

**Int. Cl.$^5$ C23C *16/50***

U.S. Cl. 118—719 16 Claims

1. A modular vapor deposition system for depositing amorphous silicon on discrete glass sheets to form semiconductor devices as the glass sheets are continuously transported through the deposition system, comprising:

a first deposition module having an input port and an exit port;

a first gas source for supplying a flow of decomposable silicon gas through said first deposition module at a predetermined pressure;

a first conveyor for transporting the glass sheets through said first deposition module at a first predetermined velocity;

a first glow discharge apparatus for generating a glow discharge in said first deposition module to decompose said silicon gas and to deposit a layer of amorphous silicon of a first predetermined thickness on the glass sheets as the glass sheets are transported through said first deposition module at said first predetermined velocity;

an input valve having a closed state sealing said input port of said first deposition module and an open state allowing the glass sheets to be received in said first deposition module;

a first isolation module having an input port sealingly connected to said exit port of said first deposition module to form a first exit passageway and an exit port;

a first exit valve having a closed state sealing said first exit passageway to isolate said first deposition module from said first isolation module and an open state permitting the glass sheets to be transported by said first conveyor into said first isolation module;

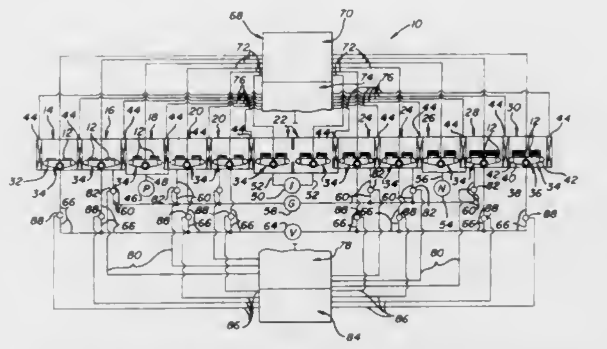
a second exit valve having a closed state sealing said exit port of said first isolation module and an open state permitting the glass sheets to be transported through said exit port of said first isolation module;

a second conveyor for transporting the glass sheets through said first isolation module and through said exit port of said first isolation module at a second predetermined velocity when said second exit valve is in said open state;

a second isolation module having an input port sealingly connected to said exit port of said first isolation module to form a second exit passageway and an exit port;

a third exit valve having a closed state sealing said exit port of said second isolation module and an open state permitting the glass sheets to be transported through said exit port of said second isolation module;

a third conveyor for transporting the glass sheets through said second isolation module and through said exit port of said second isolation module at a third predetermined velocity when said third exit gate valve is in said open state;



a second deposition module having an input port sealingly connected to said exit port of said third isolation module to form a third exit passageway and an exit port;

a second gas source for supplying a flow of decomposable silicon gas through said second deposition module at a pressure substantially equal to said predetermined pressure;

a fourth conveyor for transporting the glass sheets through said second deposition module at a fourth predetermined velocity;

a second flow discharge apparatus for generating an uninterrupted glow discharge in said second deposition module to deposit a second layer of amorphous silicon of a second predetermined thickness on the glass sheets by the decomposition of said silicon gas by said glow discharge as the glass sheets are transported through said second deposition module at said fourth predetermined velocity;

a third isolation module having an input port sealingly connected to said exit port of said second deposition module to form a fourth exit passageway and an exit port;

a fifth conveyor for transporting said glass sheets through said third isolation module at a fifth predetermined velocity;

a fourth exit valve having a closed state sealing said fourth exit passageway to isolate said second deposition module from said third isolation module and an open state permitting the glass sheets to be transported by said fourth conveyor into said third isolation module;

a fourth isolation module having an input port sealingly connected to the exit port of said third isolation module to form a fifth exit passageway and an exit port;

a fifth exit valve having a closed state and an open state permitting the glass sheets to be transported by said fifth conveyor into said fourth isolation module;

a sixth exit valve having a closed state sealing said exit port of said fourth isolation module and an open state permitting the glass sheets to be transported through said exit port of said fourth isolation module;

a sixth conveyor for transporting the glass sheets through said fourth isolation module and through said exit port of said fourth isolation module at a sixth predetermined velocity;

a third deposition module having an inlet port sealingly connected to the exit port of said fourth isolation module to form a sixth exit passageway and an exit port;

a seventh conveyor for conveying the glass sheets through said third deposition module at a seventh predetermined velocity;

a third gas source for supplying a flow of decomposable silicon gas through said third deposition module at a pressure substantially equal to said predetermined pressure;

a third glow discharge apparatus for generating an uninterrupted glow discharge in said third deposition module to deposit a third layer of amorphous silicon of a third predetermined thickness on said glass sheets by the decomposition of a decomposable silicon gas by said glow discharge as said glass sheets are transported through said third deposition module at said seventh predetermined velocity;

a vacuum system for evacuating said first, second, third and fourth isolation modules;

a back-fill gas source for back-filling said first, second, third and fourth isolation modules with a back-fill gas to a pressure substantially equal to said predetermined pressure of said silicon gas in said first deposition module; and

a control for activating said vacuum system and said back-fill gas source to periodically evacuate and backfill said first, second, third and fourth isolation modules with said back-fill gas in a predetermined sequence and for opening and closing said input valve, said first, second, third, fourth, fifth and sixth exit valves in coordination with the evacuation and back-filling of said first, second, third and fourth isolation modules to permit the glass sheets to be continuously transported through said first, second, third and fourth isolation modules and said first, second and third deposition modules by said first, second, third, fourth, fifth, sixth and seventh conveyors at their respective predetermined velocities while maintaining the pressure of said decomposable silicon gas in said first, second, and third deposition modules at substantially the same pressure as said predetermined pressure so that the first, second, and third amorphous silicon layers of the glass sheets is deposited to said first predetermined thickness, said second predetermined thickness, and said third predetermined thickness in accordance with said first predetermined velocity, said fourth predetermined velocity, and said seventh predetermined velocity while not interrupting said glow discharge.

OL
1126
ISS
3
MY
21
1991
UMI

### 5,016,563
### METHOD OF MANUFACTURING THIN COMPOUND OXIDE FILM AND APPARATUS FOR MANUFACTURING THIN OXIDE FILM

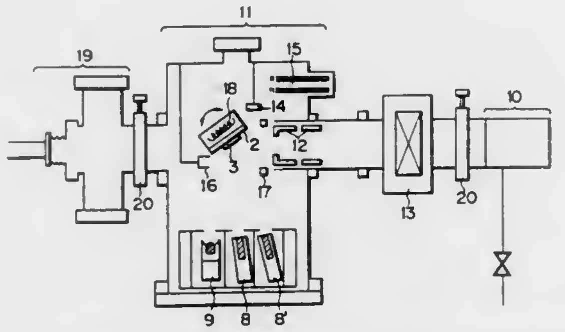
**Toshiaki Murakami, and Kazuyuki Moriwaki, both of Mito, Japan, assignors tn Nippon Telegraph and Telephone Corporation, Tokyo, Japan**

**Division of Ser. No. 76,737, Jul. 23, 1987, Pat. No. 4,888,202. This application Aug. 29, 1989, Ser. No. 400,151**

**Claims priority, application Japan, Jul. 31, 1986, 61-180661; Oct. 23, 1986, 61-252486**

**Int. Cl.$^5$ C23C** *14/08, 14/48, 14/54*

**U.S. Cl. 118—723** **5 Claims**



1. An apparatus for manufacturing a thin oxide film, comprising:

- means for generating oxygen ions;
- mass separating means for separating oxygen ions from an oxygen plasma generated by said oxygen ion generating means, in order to measure the value of ion current density and to ascertain the number of oxygen atoms;
- oxygen ion decelerating means for decelerating the separated oxygen ions to a speed corresponding to an energy of 10 to 200 eV and for implanting the decelerated oxygen ions as an oxygen ion beam in a thin oxide film which is being formed on a substrate;
- a film formation chamber in which the substrate is placed, said chamber being arranged separate from said oxygen ion generating means and adapted to be evacuated so as to have a higher vacuum than that of said oxygen ion generating means; and
- material feed means for feeding material of a thin oxide film to be formed on the substrate.

---

### 5,016,564
### PLASMA APPARATUS

**Seiichi Nakamura; Satoshi Nakayama, and Takashi Inoue, all of Amagasaki, Japan, assignors to Sumitomo Metal Industries Ltd., Osaka, Japan**

**Division of Ser. No. 364,585, Jun. 12, 1989, which is a continuation of Ser. No. 137,052, Dec. 23, 1987, abandoned. This application Sep. 29, 1989, Ser. No. 414,511**

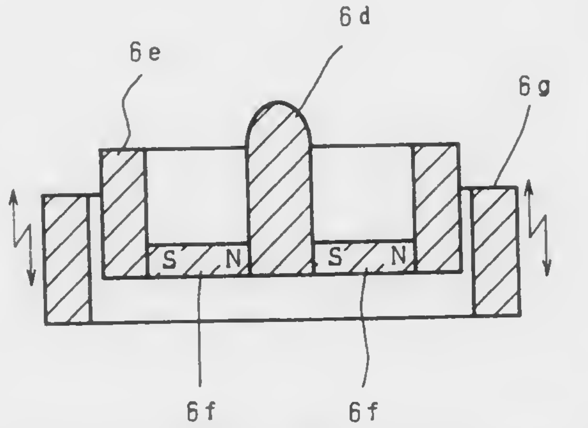
**Claims priority, application Japan, Dec. 29, 1986, 61-309560; Jun. 30, 1987, 62-164981; Jun. 30, 1987, 62-164982; Jul. 31, 1987, 62-193542; Sep. 16, 1987, 62-231343**

**Int. Cl.$^5$ C23C** *16/48*

**U.S. Cl. 118—723** **1 Claim**

1. A plasma apparatus comprising:

- a sample chamber provided with a sample stage for supporting a sample;
- means for introducing plasma into said sample chamber, said introducing means including a plasma outlet window; and
- means, disposed in said sample chamber on a side opposite to the plasma outlet window relative to the sample on said sample stage, for forming a magnetic field, said magnetic field forming means including
- a rod-shaped yoke,



- a circular yoke disposed concentrically with said rod-shaped yoke,
- a plurality of permanent magnets disposed in a space between the rod-shaped yoke and the circular yoke, and
- a second circular yoke disposed concentrically with said circular yoke, the second circular yoke being movable toward and away from the sample stage.

---

### 5,016,565
### MICROWAVE PLASMA CHEMICAL VAPOR DEPOSITION APPARATUS FOR FORMING FUNCTIONAL DEPOSITED FILM WITH MEANS FOR STABILIZING PLASMA DISCHARGE

**Keishi Saitoh, Nagahama; Ryuji Okamura, Shiga; Hirokazu Otoshi, and Koichi Matsuda, both of Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 29, 1989, Ser. No. 399,900**

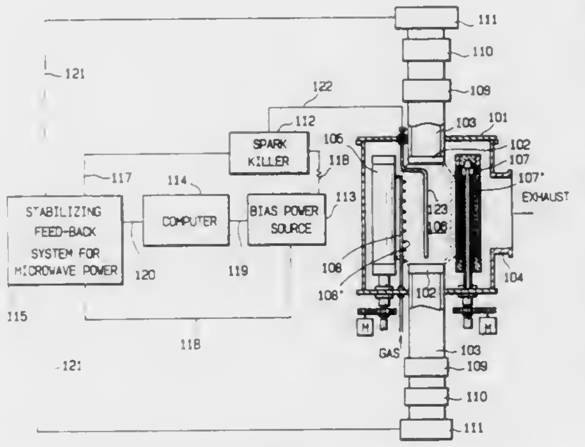
**Claims priority, application Japan, Sep. 1, 1988, 63-216307; Jun. 19, 1989, 1-154743**

**Int. Cl.$^5$ C23C** *16/50*

**U.S. Cl. 118—723** **3 Claims**

1. In a microwave plasma CVD apparatus for forming a functional deposited film which comprises a film-forming chamber having a discharge space, a substrate holder for a substrate to be positioned thereon, within said discharge space, means for introducing a film-forming raw material gas into the film-forming chamber, means, including a microwave power source, for transmitting microwaves into the flim-forming chamber to apply microwave energy to the raw material gas so that the raw material gas is converted into plasma, and means, including a bias electrode positioned in said film-forming chamber and a bias power source, for simultaneously applying a bias voltage to the plasma generated in the discharge space to control the plasma potential, the improvement comprising:

means for monitoring fluctuation of the bias voltage applied to the plasma, and means for temporarily suspending the application of the bias voltage to the plasma in response to said monitoring means to prevent the occurrence of abnormal discharge.



---

### 5,016,566
### APPARATUS FOR FORMING FILMS BY EVAPORATION IN VACUUM

**Georgy T. Levchenko, prospekt Svobody, 17B, kv. 104., and Alexandr Radzikovsky, ulitsa Cheshskaya, 9, kv.25., both of Kiev, U.S.S.R.**

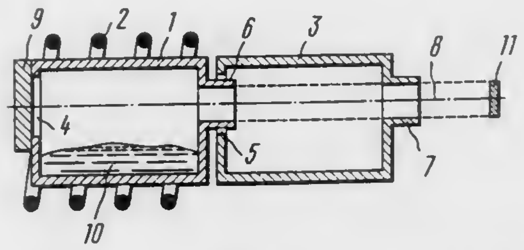
**PCT No. PCT/SU89/00017, § 371 Date Jan. 24, 1990, § 102(e) Date Jan. 24, 1990, PCT Pub. No. WO89/12117, PCT Pub. Date Dec. 14, 1989**

**PCT Filed Jan. 20, 1989, Ser. No. 458,674**

**Claims priority, application U.S.S.R., May 31, 1988, 4434256; Nov. 15, 1988, 4601808; Nov. 15, 1988, 4601810; Nov. 15, 1988, 4601811; Nov. 15, 1988, 4601812**

**Int. Cl.$^5$ C23C** *14/26*

**U.S. Cl. 118—726** **7 Claims**



1. An apparatus for forming films by evaporation in vacuum, comprising a chamber (1) for evaporating a coating material, a heating element (2) provided outside the evaporation chamber, and a collimating chamber (3) communicating therewith, the chambers being identically constructed and each having a pair of ports (4, 5) which are aligned on one and the same axis (8), characterized in that the axis (8) of the ports (4, 5) extends horizontally, the chamber (1) for evaporating a coating material and the collimating chamber (3) each has a pipe socket (6, 7) positioned on one of their ports, the pipe socket (6) of the chamber (1) for evaporating a coating material being received in the other port (5) of the collimating chamber (3), the chamber (1) for evaporating a coating material being provided with sealing member (9) provided in the other port (4) thereof, the coating material (10) being contained directly in the chamber (1) for evaporating the coating material.

---

### 5,016,567
### APPARATUS FOR TREATMENT USING GAS

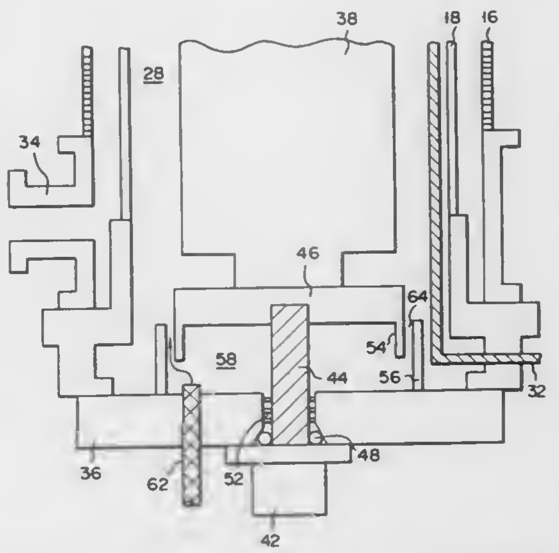
**Katsuhiko Iwabuchi; Osamu Yokokawa, both of Sagamihara, and Eiichiro Takanabe, Shiroyama, all of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan**

**Filed Aug. 17, 1989, Ser. No. 394,929**

**Claims priority, application Japan, Aug. 26, 1988, 63-211770; Sep. 22, 1988, 63-237948**

**Int. Cl.$^5$ C23C** *16/00*

**U.S. Cl. 118—733** **7 Claims**



1. A treatment apparatus for supplying a treatment gas into a treatment space to treat an object, comprising:

- means for defining said treatment space;
- a corrodible portion forming part of the treatment apparatus and contained therein, and susceptible to corrosion in an atmosphere within the treatment space;
- means for defining an enclosing space by enclosing the corrodible portion contained in the treatment space; and
- means for supplying a noncorrosive shield gas into the enclosing space, wherein:
- said enclosing space is held in a positive pressure higher than that of said treatment space by supplying the shield gas during the treatment,
- said treatment space defining means is comprised of a reaction tube and a lid for opening/closing the reaction tube, and said corrodible portion is located on the lid, and
- a gas pipe for said shield gas supplying means is divided into a primary pipe located on said reaction tube, and a secondary pipe on said lid, and said primary and secondary pipes

VOL 1126
ISS 3
MY 21
1991
UMI

are automatically connected to each other in an air-tight state by closing said lid.

---

### 5,016,568
### ODOR CONTROLLING ANIMAL LITTER WITH PINE OIL

**Anna G. Stanislowski, Walnut Creek, and J. Bruce England, Pleasanton, both of Calif., assignors to The Clorox Company, Oakland, Calif.**

**Continuation of Ser. No. 370,472, Jun. 23, 1989, abandoned. This application Aug. 22, 1990, Ser. No. 570,986**

**Int. Cl.$^5$ A01K** *29/00*

U.S. Cl. 119—173 8 Claims

1. An odor controlling animal litter comprising:

(a) absorbent or absorbent particles; and

(b) an ammonia-controlling-effective amount of pine oil carried onto said particle via an aqueous dispersion containing a dispersion aid therefor, said dispersion aid being selected from the group consisting of anionic, nonionic cationic, amphoteric surfactants, and mixtures thereof.

---

### 5,016,569
### AUTOMATIC MILK COUNTER OF MILKING UNIT

**Gennady A. Moskvin, Elgava, U.S.S.R., assignor to Latviiskaya Selskhokhozyaistvennaya Akademia, Elgava, U.S.S.R.**

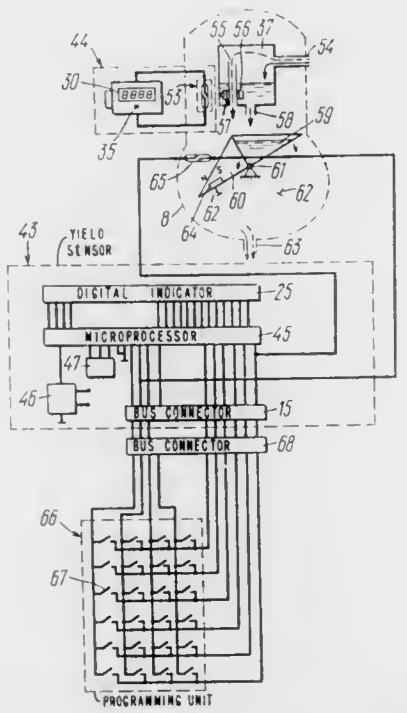
**PCT No. PCT/SU89/00089, § 371 Date Jan. 23, 1990, § 102(e) Date Jan. 23, 1990, PCT Pub. No. WO89/10686, PCT Pub. Date Nov. 16, 1989**

**PCT Filed Apr. 11, 1989, Ser. No. 458,672**

**Claims priority, application U.S.S.R., May 5, 1988, 4413032**

**Int. Cl.$^5$ A01J** *7/00*

U.S. Cl. 119—14.08 3 Claims



1. An automatic milk counter of a milking unit, comprising a metering device including for each quarter of a cow's udder a continuous milk flow receiving chamber **(37)** with a vertically disposed air drawoff pipe **(55)** and a drain hole **(58)** under which there is a proportioning unit **(39)** connected with means **(41)** for producing electrical signals indicative of metered portions of milk, and a unit **(14)** adapted for recording milk flow parameters and including for each quarter of the cow's udder a milking timer **(44)** and a yield sensor **(43)** connected with the respective means **(41)** for producing electrical signals indicative of metered portions of milk, characterized by a programming unit **(66)** and the yield sensor **(43)** of each quarter of the cow's udder is made as a microprocessor device with leads for its individual connection to the programming unit **(66)**, the milking timer **(44)** of each quarter of the cow's udder being provided with a sensitive element **(53)**, while each continuous milk flow receiving chamber **(37)** includes a milk flow start and end sensor for each quarter of the cow's udder, said milk flow start and end sensor comprising a float **(56)** with a magnet **(57)** installed in a manner allowing the float to engage in reciprocating motion along the air drawoff pipe **(55)** in the process of filling the continuous milk flow receiving chamber **(37)** whose drain hole **(58)** has a cross-sectional area corresponding to a milk flow rate at the milk flow start and end moments of each quarter of the cow's udder, when the sensitive element **(53)** of the milking timer **(44)** of each quarter of the cow's udder interacts with the magnet **(57)** of the milk flow start and end sensor of each quarter of the cow's udder.

---

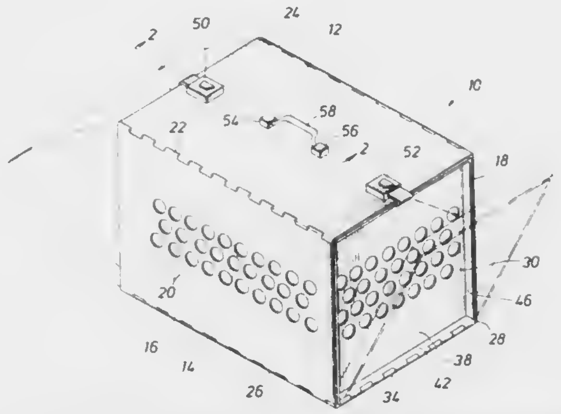
### 5,016,570
### COLLAPSIBLE CARRYING CONTAINER FOR ANIMALS

**J. Peter Henson, 9719 Folknoll, Stafford, Tex. 77477**

**Filed May 4, 1990, Ser. No. 518,879**

**Int. Cl.$^5$ A01K** *1/03*

U.S. Cl. 119—19 8 Claims



1. An integral collapsible carrying container for animals being adapted to fold substantially flat for efficient storage, comprising:

(a) generally rectangular bottom, top and side walls being formed of sheet material;

(b) hinge means hingedly connecting said top and bottom walls to said side walls, thereby forming a generally rectangular enclosure capable of collapsing in the manner of a parallelogram to a substantially flat form;

(c) opposed generally rectangular end wall means being hingedly connected to said bottom wall means and being positionable within the respective ends of said generally rectangular enclosure, said end wall members having out-turned structural flanges at the top, bottom and sides thereof which, when said carrying container is upstanding, are positioned respectively in substantially abutting coextensive relation with the respective inner surfaces of said top, bottom and side walls to provide end walls for said enclosure and to provide enhanced structural integrity for the respective ends of said top, bottom and side walls; and

(d) means for securing said end walls in locked assembly with respect to said top, bottom and side walls.

---

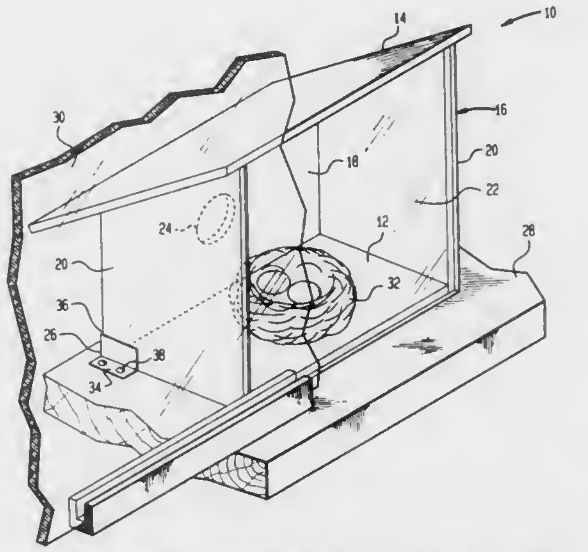
### 5,016,571
### BIRD OBSERVATORY

**Charles C. Totaro, 506 Hemlock Hill Dr., Toms River, N.J. 08753**

**Filed Aug. 2, 1990, Ser. No. 561,915**

**Int. Cl.$^5$ A01K** *31/14*

U.S. Cl. 119—23 18 Claims



1. In a birdhouse, including an exterior housing which defines an interior compartment for housing birds, said exterior housing including side walls, which surround said interior compartment, and a roof, the improvement wherein said exterior housing includes one-way viewing means for allowing an observer to view birds in said interior compartment without allowing birds in said interior compartment to see their observer, whereby said birdhouse functions as both a habitat for birds and a bird observatory, and wherein said roof is made out of a light-transmitting material, whereby light entering said interior compartment through said roof illuminates said interior compartment to an extent sufficient to enhance an observer's view through said one-way viewing means.

---

### 5,016,572
### PET FOOD PACKAGE AND DISPENSER

**Frank J. Weber, St. Louis, Mo.; Lance R. Liljeqvist, Norwalk, and Richard S. Prisco, Milford, both of Conn., assignors to Ralston Purina Company, St. Louis, Mo.**

**Filed Jan. 30, 1990, Ser. No. 472,023**

**Int. Cl.$^5$ A01K** *39/00*

U.S. Cl. 119—52.1 9 Claims

1. A pet food dispenser comprising:

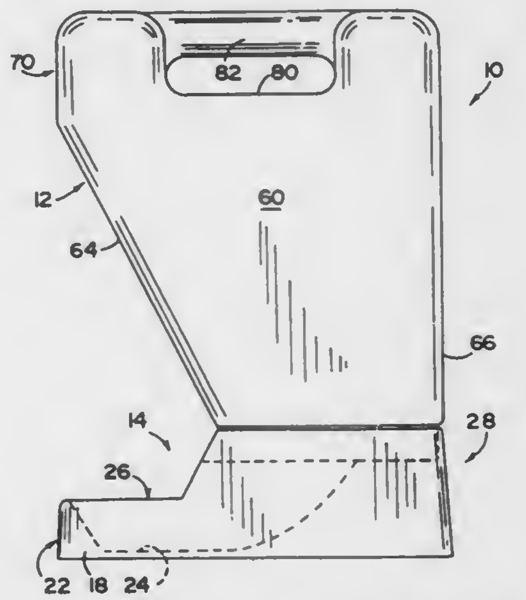
a food container having joined walls and defining a discharge opening;

handle means on said container for defining a carrying handle;

removable closure means on said container for closing said discharge opening after the container is filled with pet food, said closure means including a flexible sheet covering and sealing the discharge opening and permitting the container to be used for shipping, storing, selling and dispensing of pet food;

a dispensing tray having a forward portion defining a feeding area and a rear container mounting portion said portions being joined together by a sloping ramp; and

mounting means on said tray and said container for mounting said container to said tray in a positive, detent fashion so that the closure means can be removed, said container can be secured to said tray and food within the container will be dispensed into said feeding area of said tray, and wherein said mounting means comprises:



a pair of spaced, elongate guide tracks extending along opposed, lateral sides of said container mounting portion, said container defining a pair of outwardly opening grooves dimensioned and configured to receive said guide tracks; and

retaining means on said container and said tray for retaining said container on said guide tracks.

---

### 5,016,573
### BIRD OBSERVATION ENCLOSURE, SELECTIVELY LIMITING, SQUIRREL RESISTANT

**Donald E. Power, 3588 Raber Ter., Uniontown, Ohio 44685**

**Filed Mar. 6, 1990, Ser. No. 488,616**

**Int. Cl.$^5$ A01K** *39/00*

U.S. Cl. 119—57.9 9 Claims

1. An enclosure for encompassing a bird feed or drink receptacle, said enclosure comprising:

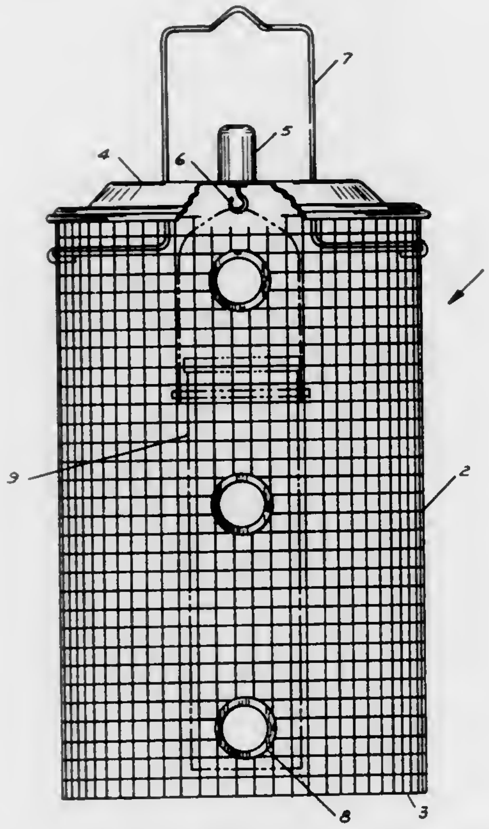
A. a body, substantially open structure, squirrel-gnaw-resistant material, surrounding an axis, a sidewall of said body being laterally spaced from said axis sufficiently to allow ample envelope for select birds clinging or perching on said feed or drink receptacle within interior confines;

B. said body extending along said axis sufficiently to provide envelope for installing said feed or drink receptacle within interior confines of said enclosure:

C. said body sidewalls having a plurality of spaced apart ports therein, said ports having substantially circular openings sized to selectively limit bird access to the interior of said enclosure;

VOL
1126
ISS
3
MY
21
1991
UMI

D. said body comprising a first end opening and a second end opening;



E. a squirrel-gnaw-resistant lower closure sealing the first end opening of said body.

---

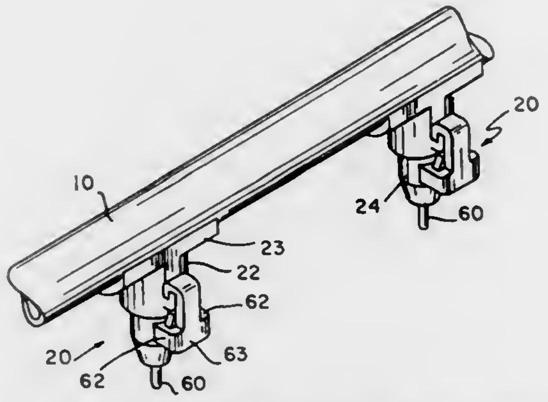
### 5,016,574
### SAFETY LOCK

**Eldon Hostetler, Middlebury, Ind., assignor to Ziggity Systems, Inc., Middlebury, Ind.**

**Filed Jan. 28, 1988, Ser. No. 149,386**

**Int. Cl.⁵ A01K** *7/00*

**U.S. Cl. 119—72.5** **12 Claims**



1. A safety lock for a watering device for poultry and small animals including a valve housing adapted to be connected to a fluid supply line and having an inlet, an outlet, and a valve chamber; said valve chamber being formed from first and second telescopically inter-fitting elements; said first and said second telescopically inter-fitting elements releasably secured together with interlocking hooks, comprising:
- a rotation limiting means separate from said first and said second telescopically inter-fitting elements for preventing substantial rotation of said first and second telescopically inter-fitting elements relative to each other;
- said first and said second telescopically inter-fitting elements have complimentary external hooks thereon which re adapted to be releasably rotationally interlocked when said parts are in selected telescopic positions; said first telescopically inter-fitting element having an external boss and said second telescopically inter-fitting element having a hooking means including an opening adjacent said boss; and
- a clip provides said rotation limiting means and is inserted within said opening and partially surrounds said boss.

---

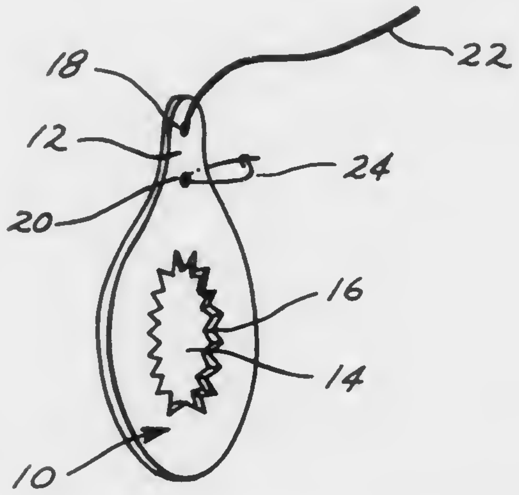
### 5,016,575
### ANIMAL COLLAR

Richard A. Gordon, 95 W. 3rd St., Freeport, N.Y. 11520

Filed Jun. 30, 1989, Ser. No. 375,201

Int. Cl.⁵ A01K *27/00*

U.S. Cl. 119—106 **9 Claims**



1. An odorless, substantially non-tearable, moisture-resistant animal collar comprising a planar generally circular, flexible, rubber-like body member having an extended portion disposed on the circumference thereof and a generally circular central opening therein for disposition about the neck of an animal, said central opening being provided with an irregular peripheral pattern directed radially inward to hold said collar more securely about said neck without choking said animal, and being flexible out of the plane of said body to enlarge said opening permitting a quick release thereof from the neck of the animal.

### 5,016,576
### FLUIDIZING COMBUSTION CHAMBER

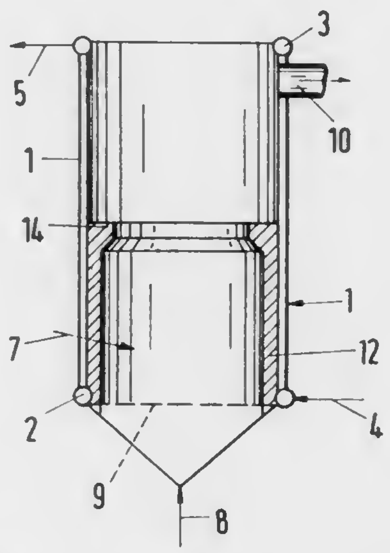
**Gert Bornemann, Erlensee, and Hans-Jürgen Heibel, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 15, 1990, Ser. No. 480,413**

**Claims priority, application Fed. Rep. of Germany, Feb. 23, 1989, 3905553**

**Int. Cl.⁵ F22B** *1/00*

**U.S. Cl. 122—4 D** **2 Claims**



1. An apparatus for combusting fine-grained fuels in a fluidized bed at high temperature, the apparatus including a combustion chamber having a wall, said wall containing tubes for flow therethrough of cooling water, a refractory lining on the inside surface of the lower portion of the wall, and a cornice comprising a ledge of enlarged width on the top of the lining and shaped to maintain a bed of solid particles, said wall being free of said refractory lining above said ledge, the width of the cornice being at least 1.5 times the thickness of the lining below the cornice.

---

### 5,016,577
### HEAT EXCHANGER

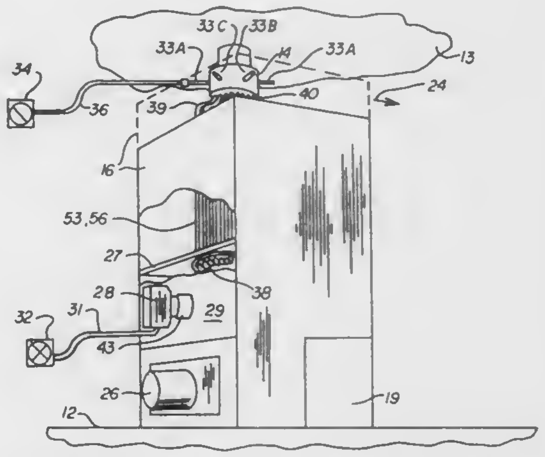
**Thomas C. Hunt, P.O. Box 369, Bainbridge, Ind. 46105**

**Filed Apr. 17, 1990, Ser. No. 510,113**

**Int. Cl.⁵ F22B** *7/12*

**U.S. Cl. 122—182.1** **15 Claims**

1. A heat exchanger assembly comprising:
- a fire box;
- a first combustion chamber riser chamber having a vertically oriented longitudinal axis and located above the fire box and communicating with the fire box for delivering combustion products upward out of the fire box;
- a first plurality of exhaust gas passageways in a radially extending circular array around the riser chamber, each passageway having an entrance at the top of the riser chamber and extending from the entrance upward and then radially outward relative to the axis and then downward and then outward relative to the axis and then upward and then inward toward the axis and then upward generally parallel to the axis to exhaust.



---

### 5,016,578
### INTAKE MANIFOLD

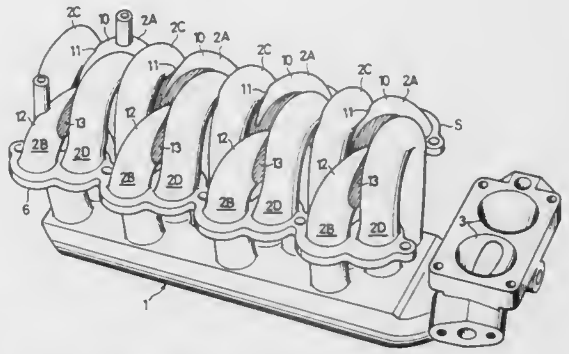
**Seiichi Ogawa; Minobu Sukimoto, and Hitoshi Akiyoshi, all of Tochigi, Japan, assignors to Showa Aluminum Corporation, Sakai, Japan**

**Filed Sep. 7, 1990, Ser. No. 578,987**

**Claims priority, application Japan, Sep. 8, 1989, 1-10626[U]**

**Int. Cl.⁵ F02M** *35/10*

**U.S. Cl. 123—52 MC** **7 Claims**



1. An intake manifold comprising an aluminum plenum chamber having an air inlet and a plurality of air outlets, and a plurality of branch pipes of wrought aluminum connected to the respective air outlets of the plenum chamber and each having an inner peripheral surface of circular cross section, at least one of the branch pipes being deformed at a lengthwise intermediate portion thereof, the outer peripheral surface of

/OL
1126
ISS
3
MY
21
1991
UMI

the deformed portion having a clearance area so as to be free from contact with another one of the branch pipes.

---

### 5,016,579
### INTAKE SYSTEM FOR V TYPE ENGINE

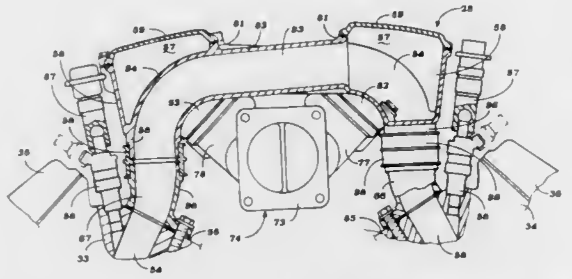
**Takamitsu Suzuki, and Minoru Yonezawa, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Feb. 16, 1990, Ser. No. 481,975**

**Claims priority, application Japan, Feb. 17, 1989, 1-37728; Mar. 10, 1989, 1-58589; Mar. 10, 1989, 1-58590**

**Int. Cl.$^5$ F02B** *75/22*

**U.S. Cl. 123—52 MV** **22 Claims**



1. An induction system for a V type of engine having a pair of angularly disposed cylinder banks defining a valley therebetween, each of said cylinder banks having a plurality of intake ports facing said valley, first and second plenum chambers extending along the length of said valley in side by side relationship, each being adjacent and spaced inwardly of a respective one of said cylinder banks, and a plurality of intake passages extending from a side of each of said plenum chambers generally facing the opposed cylinder bank to the intake ports of the opposed cylinder bank.

---

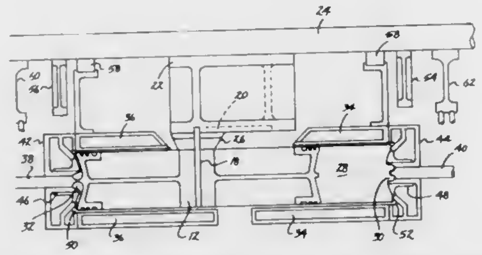
### 5,016,580
### CAM DRIVE DIESEL ENGINE UTILIZING DOUBLE ACTING PISTONS

**Walter J. Gassman, P.O. Box 128, Hackensack, N.J. 07602**

**Filed Oct. 27, 1989, Ser. No. 427,772**

**Int. Cl.$^5$ F02B** *75/26*

**U.S. Cl. 123—58 A** **2 Claims**



1. A new and improved double acting piston internal combustion engine comprising,

at least one double acting piston positioned in an internal combustion engine cylinder having first and second combustion chambers located at opposed ends thereof, said at least one double acting piston having first and second piston heads on opposed ends thereof, said first and second piston heads communicating with said first and second combustion chambers respectively, and

cam drive means operably associated with said at least one double acting piston, said cam drive means operably converting a combustion actuated reciprocable movement of said at least one double acting piston into a rotational drive movement, thereby to effect a rotation movement of a drive shaft means so that said drive shaft means functions as a power takeoff for said internal combustion engine, and

further including cam groove means positioned in said cam drive means, said follower means operably engaging said cam groove means to effect said rotational drive movement, and

wherein said follower means comprises a radially extending pin orthogonally positioned relative to a reciprocable movement axis of said at least one double acting position, and

further including a drive ring means slidably movable over a circumferential surface of said cam drive means, said drive ring means retaining said follower means therein and directing said follower means into said cam groove means.

---

### 5,016,581
### VALVE MECHANISMS

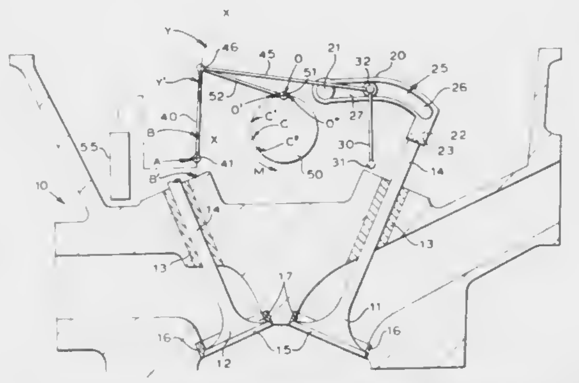
**Bryan N. V. Parsons, Stoney Stanton, United Kingdom, assignor to Jaguar Cars Limited, United Kingdom**

**Filed Sep. 6, 1990, Ser. No. 578,785**

**Claims priority, application United Kingdom, Sep. 8, 1989, 8920361**

**Int. Cl.$^5$ F01L** *1/30*

**U.S. Cl. 123—90.25** **13 Claims**



1. A valve mechanism comprising a valve having a valve stem which is located for axial movement in a valve guide and a valve head adapted, at one extreme of movement of the valve, to locate against and close a valve seat, a valve lever is pivotally mounted at one end and is attached adjacent the other end to the end of the valve stem remote from the valve head, said valve lever defines a track, a drive pin engages in said track, said drive pin being mounted at one end of a first link, the other end of the first link being pivotally mounted at a fixed pivot, so as to constrain the drive pin to move in a fixed arcuate path, a second link is pivotally mounted at one end about a movable pivot, the first and second links being interconnected by an intermediate link pivotally attached to said first and second links at positions separated from their pivots, a drive link being pivotally connected at one end to the second link or intermediate link at or adjacent the interconnection of said second link and intermediate link and at the other end to a crank, so that rotation of the crank will cause the linkage to oscillate and the drive pin to perform a reciprocating motion along its arcuate path, the track in the valve lever having a first portion which is engaged by the drive pin when the valve is closed and coincides with the arcuate path of the drive pin and a second portion which diverges from the path of the drive pin, so that engagement of the second portion by the drive pin will cause the valve lever to move opening and closing the valve, means being provided for moving the pivot of the second link to vary the timing and duration of opening of the valve.

---

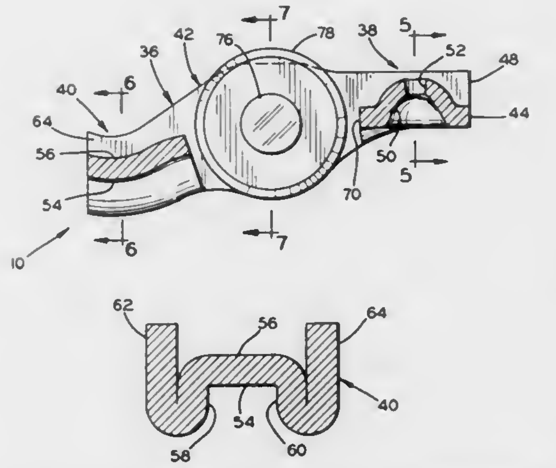
### 5,016,582
### ROCKER ARM

**Jesse V. Mills, Toledo, Ohio, assignor to Henley Manufacturing Holding Company, Inc., Hampton, N.H.**

**Filed Oct. 12, 1990, Ser. No. 596,359**

**Int. Cl.$^5$ F01L** *1/18*

**U.S. Cl. 123—90.39** **18 Claims**



1. A one-piece, cold-formed, rocker arm of the cam-follower type comprising a one-piece metal body having a first end portion, a second end portion, and an intermediate portion between said first and second end portions, said first end portion of said body having a first bottom wall and two first upwardly-extending, structurally-integral side walls, said bottom wall and said side walls forming an upright, generally square U-shaped configuration in transverse cross section, said bottom wall having a rounded recess with a concave side facing away from said side walls for receiving an end of a lifter post on which said rocker arm can pivot, said second end portion of said body having a second bottom wall, two downwardly-extending side walls structurally-integral therewith, and two doubled-back, second upwardly-extending side walls which are structurally integral at lower edges with lower edges of said downwardly-extending side walls, said second bottom wall and said downwardly-extending side walls forming a groove having an inverted, generally square U-shaped configuration in transverse cross section for receiving an upper end of a valve stem, said intermediate portion of said body having two substantially parallel side walls structurally integral with the upwardly-extending side walls of said first and second end portions, said parallel side walls having axially-aligned openings therein, an axle extending through said aligned openings and affixed to said parallel side walls for prevention of longitudinal movement of said axle, and a roller rotatably mounted around said axle and being positioned to engage an overhead cam.

---

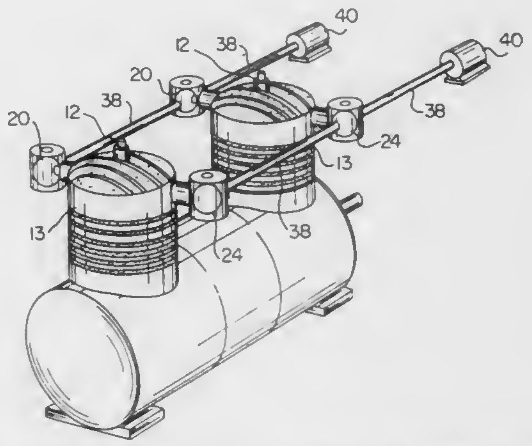
### 5,016,583
### VARIABLE INTAKE AND EXHAUST ENGINE

**Nelson A. Blish, 302 Cove Creek La., Houston, Tex. 77042**

**Division of Ser. No. 144,549, Jan. 13, 1988, Pat. No. 4,964,984, which is a continuation-in-part of Ser. No. 902,633, Sep. 2, 1986, abandoned. This application Jun. 2, 1989, Ser. No. 360,320**

**Int. Cl.$^5$ F01L** *7/00*

**U.S. Cl. 123—190 BC** **6 Claims**



1. An internal combustion engine having at least one cylinder and piston improvements therein comprising:

an exhaust valve on said cylinder;

means for opening and closing said exhaust valve capable of being advanced and retarded independently of the movement of said piston.

---

### 5,016,584
### ENGINE BLOCK CONSTRUCTION WITH SKELETAL FRAME

**Kazuo Inoue; Tsuneo Konno; Takashi Moriya; Naomi Warashina; Masaki Ueyama; Toshinobu Hata; Kenji Hamabe; Tomoyoshi Matsuno; Hiroo Shimada; Tetsuo Gotou, and Morimasa Nagata, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 10, 1989, Ser. No. 418,853**

**Claims priority, application Japan, Oct. 11, 1988, 63-255623; Oct. 28, 1988, 63-272409**

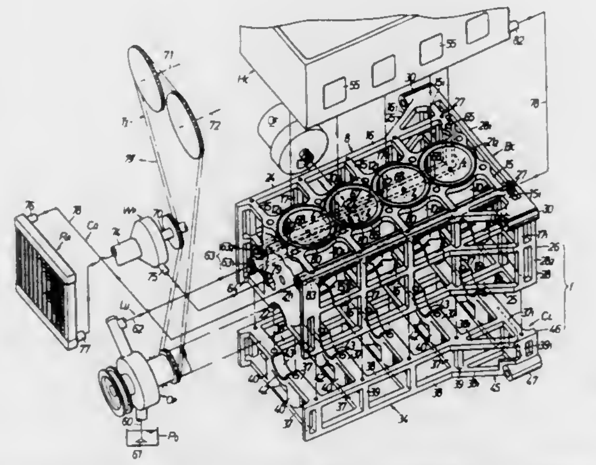
**Int. Cl.$^5$ F02F** *7/00*

**U.S. Cl. 123—195 R** **30 Claims**

1. An engine block comprising a cylinder block provided with cylinder barrels with each cylinder barrel having a piston slidably fitted therein and a lower case integrally joined to a lower surface of the cylinder block, a crankshaft being operatively connected to said pistons and rotatably supported be-

VOL
1126
ISS
3
MY
21
1991
UMI

tween joined surfaces of the cylinder block and the lower case, said lower case comprising a lower case frame of a three-dimensional latticework structure and rigid film members disposed at least on lateral outer side surfaces of the lower case frame extending along the crankshaft axis, said lower case frame comprising a plurality of crossbeam bone members each having a bearing cap portion in the central portion thereof for the crankshaft and laterally extending in a direction of substantially perpendicularly intersecting the crankshaft axis, a plurality of longitudinal beam bone members for integrally connecting outer ends of said cross-beam members in a direction parallel to crankshaft axis, and a plurality of post bone members for integrally connecting the outer ends of said crossbeam bone members in a direction of the stroke of said piston, said rigid film members being provided on lateral outer side surfaces of said longitudinal beam bone members and said post bone members.



---

### 5,016,585
### ANTICORROSIVE AND RUST FREE SYSTEM FOR MARINE-USING ENGINE

**Daisuke Ito, Kochi, Japan, assignor to Tosa Plastic Zosen Corporation, Kochi, Japan**

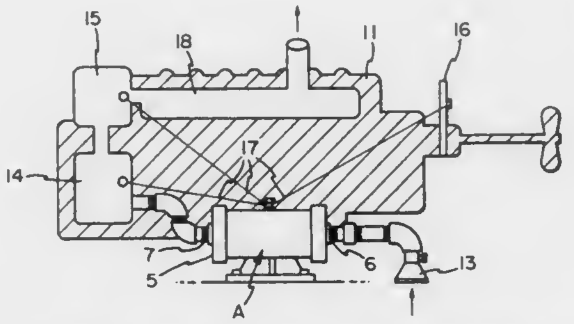
**Filed Jul. 9, 1990, Ser. No. 550,088**

**Claims priority, application Japan, Mar. 5, 1990, 2-54489**

**Int. Cl.$^5$ F02B** ***77/00***

**U.S. Cl. 123—198 E** **8 Claims**

1. An anticorrosion device for engines used in a marine environment, comprising:
  - (a) a cylindrical casing made of electrically conductive material, said casing being provided with two lids which are detachably fixed on both ends of said casing;
  - (b) first connection pipe means for connecting one of said lids to a water intake unit of an engine to be protected;
  - (c) second connection pipe means for connecting the other lid to an engine cooling system of the engine to be protected;
  - (d) a low potential metal member formed in a hollow cylinder shape with a through hole and a longitudinal slit, being set in the interior of said casing so that sea water drawn from the water intake unit flows through the through hole and the longitudinal slit of said low potential metal members; and



  - (e) means for electrically connecting said cylindrical casing to several portions of the engine body.

---

### 5,016,586
### APPARATUS FOR CONTROLLING A THROTTLE VALVE

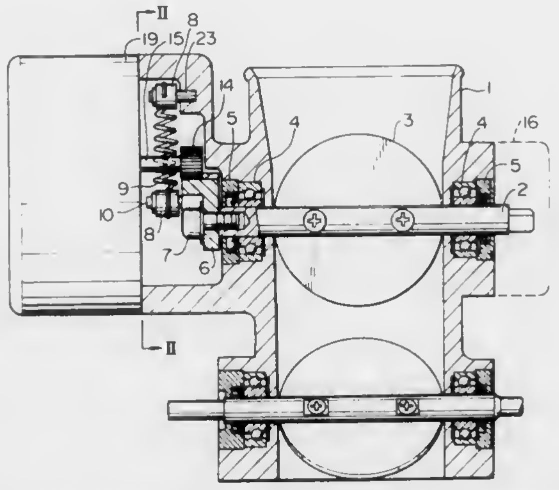
**Kazunori Imamura, Fukuoka, and Yoshikazu Hoshi, Ibaraki, both of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Ibarabi, both of, Japan**

**Filed Nov. 20, 1989, Ser. No. 438,015**

**Claims priority, application Japan, Nov. 30, 1988, 63-300579**

**Int. Cl.$^5$ F02D** ***9/00***

**U.S. Cl. 123—336** **9 Claims**



1. An apparatus for controlling a throttle valve, comprising:
  - a motor for rotating a throttle valve so as to adjust the valve opening degree;
  - a gearing disposed between said motor and said throttle valve for transmitting driving force of said motor to said throttle valve; and
  - a return means for serving to return said throttle valve to a regular set position thereof and including a tension spring, wherein said return means includes a first spring support portion provided on a gear secured to said throttle valve and a second spring support portion provided on a housing which envelopes said gearing so that said tension spring is stretched between said two spring support portions.

---

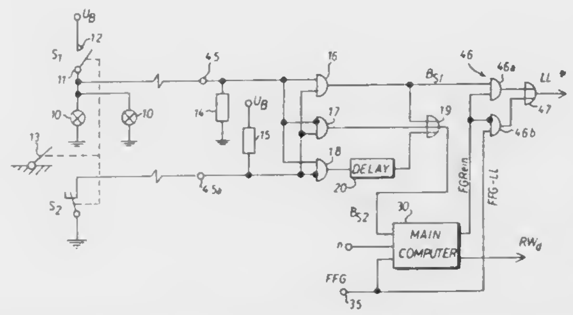
### 5,016,587
### BRAKE STOP LIGHT CIRCUIT ARRANGEMENT FOR A VEHICLE HAVING ELECTRONIC DIESEL CONTROL

**Joachim Berger, Winterbach, and Ulrich Gerstung, Vaihingen/-Enz, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 330, Apr. 19, 1988. This application Dec. 19, 1989, Ser. No. 452,399**

**Int. Cl.$^5$ F02D** ***41/38, 41/22;*** **B60Q** ***1/44***

**U.S. Cl. 123—359** **5 Claims**



1. A brake stop light circuit arrangement for a motor vehicle equipped with a diesel engine having electronic diesel control with a driving-speed controller (FGR), the circuit arrangement comprising:
  - a first brake switch actuated by the brake pedal of the vehicle for supplying a first brake switch signal;
  - a second brake switch also actuated by the brake pedal for supplying a second brake switch signal, said second brake switch being electrically independent of said first brake switch;
  - first circuit means for receiving and evaluating said first and second brake switch signals for issuing a first actuating signal $B_{S2}$ for switching off the driving-speed controller (FGR) when either one of said brake signals indicates an actuation of the brake; and,
  - second circuit means for receiving and evaluating said first and second brake switch signals for issuing a second actuating signal $B_{S1}$ for determining a redundant idle speed signal LL,*.

---

### 5,016,588
### THROTTLE ACTUATOR AND CONTROL SYSTEM

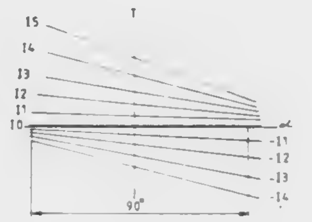
**Brian C. Pagdin, and Alastair M. McQueen, both of Birmingham, Great Britain, assignors to Lucas Industries Public Limited Company, Birmingham, England**

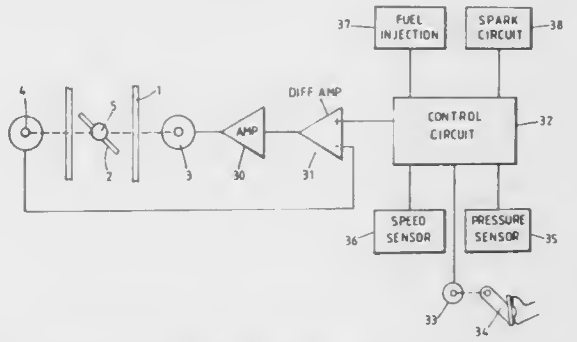
**Filed Jun. 1, 1990, Ser. No. 532,070**

**Claims priority, application United Kingdom, Jun. 1, 1989, 8912537**

**Int. Cl.$^5$ F02D** ***11/10***

**U.S. Cl. 123—399** **5 Claims**





1. A throttle actuator comprising a throttle which is pivotable over a range of angular positions between a closed position and a fully open position, a return spring providing a throttle-closing bias force, and a torque motor for driving said throttle, said throttle actuator having a single-valued transfer function of throttle angular position against torque motor current over said range of angular positions of said throttle.

---

### 5,016,589
### THROTTLE CONTROL DEVICE

**Tadashi Terazawa, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Jan. 30, 1990, Ser. No. 472,164**

**Claims priority, application Japan, Jan. 31, 1989, 1-22189**

**Int. Cl.$^5$ F02D** ***11/10***

**U.S. Cl. 123—399** **11 Claims**

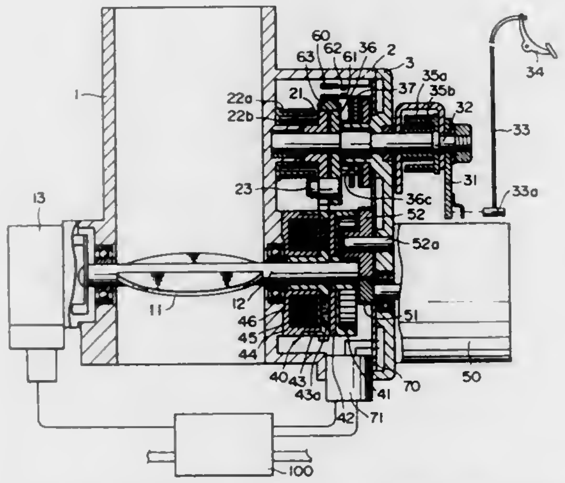
1. A throttle control device for controlling an opening of a throttle valve disposed in a throttle body and rotatably supported by a throttle shaft mounted thereon, in response to operation of an accelerator operating mechanism, comprising:
  - throttle operating means connected to said throttle valve for opening and closing said throttle valve;
  - first driving means connected to said accelerator operating mechanism and arranged to engage with said throttle operating means for driving said throttle operating means

VOL
1126
ISS
3
MY
21
1991
UMI

in a direction to open said throttle valve, said first driving means driving said throttle operating means within a predetermined displacement in response to operation of said accelerator operating mechanism when said first driving means is engaged with said throttle operating means;

biasing means mounted on said throttle body for biasing said throttle operating means in a direction to close said throttle valve;

second driving means rotatably mounted on said throttle shaft for driving said throttle operating means in a direction to open and close said throttle valve independently of said first driving means;



a driving power source connected to said second driving means for driving said second driving means in response to operation of said accelerator operating mechanism at least; and

clutch means disposed between said throttle operating means and said second driving means for selectively taking one of a first position of said throttle operating means engaged with said second driving means and a second position of said throttle operating means disengaged therefrom, said second driving means being disposed between said clutch means and said driving power source.

---

### 5,016,590
## SYSTEM FOR CONTROLLING IGNITION TIMING OF AN INTERNAL COMBUSTION ENGINE

**Hiroya Ohkumo, Musashino, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 29, 1990, Ser. No. 546,525**

**Claims priority, application Japan, Jul. 26, 1989, 1-195244**

**Int. Cl.$^5$ F02P** *5/14*

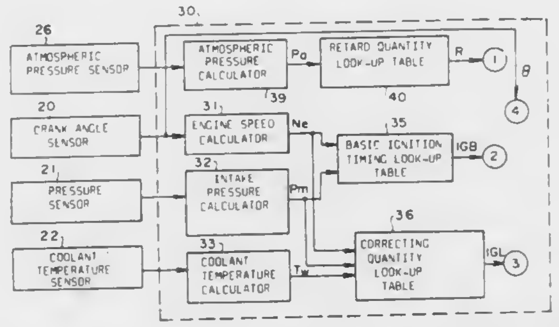
**U.S. Cl. 123—412** **3 Claims**

1. An ignition timing control system for an engine having a first memory storing a plurality of basic ignition timings in accordance with engine speed and absolute pressure of intake air and an ignition timing calculator for calculating an ignition timing based on the basic ignition timing derived from said first memory, the system comprising:

an atmospheric pressure sensor detecting the atmospheric pressure;

a second memory storing a plurality of retard quantities in accordance with the atmospheric pressure;

means for deriving one of retard quantities from said second memory in accordance with the detected atmospheric pressure; and


30
26
ATMOSPHERIC PRESSURE SENSOR
ATMOSPHERIC PRESSURE CALCULATOR
Pa
RETARD QUANTITY LOOK-UP TABLE
R
1
θ
39
40
4
20
CRANK ANGLE SENSOR
31
ENGINE SPEED CALCULATOR
Ne
35
BASIC IGNITION TIMING LOOK-UP TABLE
IGB
2
21
PRESSURE SENSOR
32
INTAKE PRESSURE CALCULATOR
Pm
36
22
COOLANT TEMPERATURE SENSOR
33
COOLANT TEMPERATURE CALCULATOR
Tw
CORRECTING QUANTITY LOOK-UP TABLE
IGL
3

correcting means for retarding said basic ignition timing with said derived retard quantity in proportion to said atmospheric pressure so as to prevent knocking at any operating conditions.

---

### 5,016,591
## SYSTEM AND METHOD FOR CONTROLLING A COMBUSTION STATE IN A MULTI-CYLINDER ENGINE FOR A VEHICLE

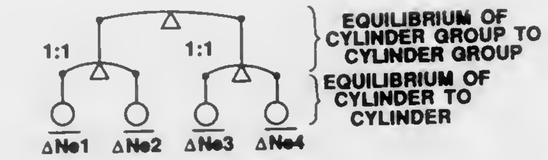
**Yasutoshi Nanyoshi, Hyogo, and Hiroshi Komatsu, Kanagawa, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Aug. 30, 1989, Ser. No. 400,711**

**Claims priority, application Japan, Aug. 30, 1988, 63-217180**

**Int. Cl.$^5$ F02D** *5/15*

**U.S. Cl. 123—419** **17 Claims**


1:1
1:1
EQUILIBRIUM OF CYLINDER GROUP TO CYLINDER GROUP
EQUILIBRIUM OF CYLINDER TO CYLINDER
ΔNe1
ΔNe2
ΔNe3
ΔNe4

1. A system for controlling combustion state during idling for a multi-cylinder engine, comprising:

(a) first means for detecting engine operating conditions;

(b) second means for detecting an engine idling state;

(c) third means for detecting rotations of an engine crank shaft, the third means outputting a first signal by which a cylinder in a combustion stroke is identified by number, and a second signal corresponding to a predetermined unit crank angle;

(d) fourth means for measuring an angular speed for a certain interval whenever a predetermined crank angle is reached and detecting a combustion state of one of the cylinders in the combustion stroke according to a change in the angular speed when the engine is idling;

(e) fifth means for calculating change quantities of the angular speed for a predetermined interval with respect to the crank angle for each engine cylinder and for calculating correction quantities for the respective cylinders on the basis of the change quantities so that a difference between the change quantities for the respective cylinders become a predetermined value;

(f) sixth means for calculating a basic ignition timing on the basis of the engine operating conditions and for correcting the basic ignition timing for each engine cylinder according to one of the correction quantities for the corresponding cylinder derived by the fifth means when the engine is transferred to an idling condition;

(g) seventh means for igniting air-fuel mixture sucked into the corresponding cylinder at a timing based on the corrected basic ignition timing derived by the sixth means;

(h) eighth means for calculating a basic fuel injection quantity on the basis of the engine operating conditions and correcting the basic fuel injection quantity for each engine cylinder according to the correction quantity for the corresponding cylinder derived by the fifth means when the engine is transferred into an idling condition; and

(i) ninth means for supplying fuel into the corresponding engine cylinder. the quantity of which is determined according to the basic fuel injection quantity corrected by the eighth means.

---

### 5,016,592
## CYLINDER HEAD AND VALVE TRAIN ARRANGEMENT FOR MULTIPLE VALVE ENGINE

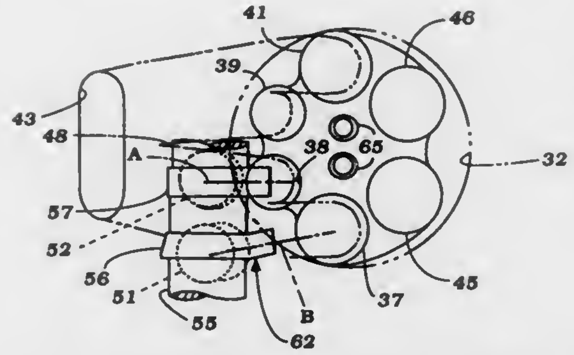
**Hiroki Onodera, Iwata, Japan, assignor to Yamaha Hatsudoki Kabusbika Kaisba, Iwata, Japan**

**Filed Feb. 13, 1990, Ser. No. 483,404**

**Claims priority, application Japan, Feb. 14, 1989, 1-32587; Feb. 14, 1989, 1-32588; Feb. 14, 1989, 1-32589; Mar. 31, 1989, 1-78302**

**Int. Cl.$^5$ F02B** *15/00*

**U.S. Cl. 123—432** **38 Claims**



1. A cylinder head arrangement for an overhead valve engine, said cylinder head defining in part a combustion chamber with an associated cylinder bore, a first set of only four poppet valves supported for reciprocation within said cylinder head and having their head portions lying substantially on one side of a plane passing through the center of said cylinder bore when said first set of poppet valves is in their closed position, and a second set of only two poppet valves supported for reciprocation by said cylinder head and having their head portions lying on the other side of said plane when said second set is closed, one set of said valves comprising intake valves and the other set of valves comprising exhaust valves.

---

### 5,016,593
## METHOD AND APPARATUS FOR PREVENTING SURGING OF VEHICLE HAVING INTERNAL COMBUSTION ENGINE

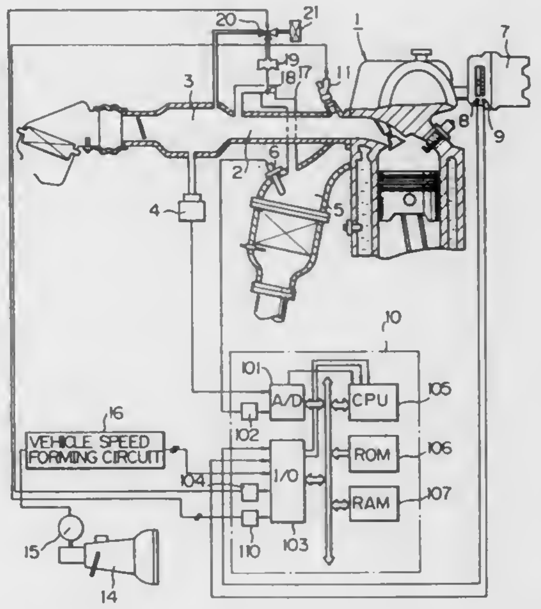
**Toshio Takaoka, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Apr. 30, 1990, Ser. No. 516,970**

**Claims priority, application Japan, May 1, 1989, 1-109150; May 1, 1989, 1-109151**

**Int. Cl.$^5$ F02D** *41/14*

**U.S. Cl. 123—436** **26 Claims**



1. A method of preventing surging due to variations of a combustion cycle of an internal combustion engine of a vehicle, comprising the steps of:

detecting a vibration period and a vibration amplitude of said vehicle;

storing a natural vibration period in accordance with a drive condition of a transmission system of said vehicle;

determining whether or not said detected vibration amplitude is larger than a predetermined value;

determining whether or not said detected vibration period is equal to said natural vibration period in accordance with a driving condition underwhich said vibration period is detected;

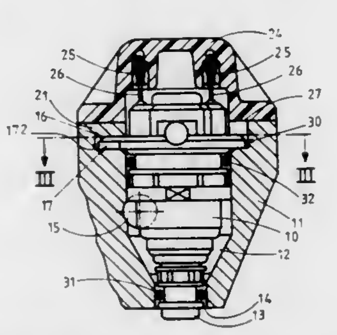
determining that surging of said vehicle due to said variations of the combustion cycle of the engine is occurring when said detected vibration amplitude is larger than said predetermined value and said detected vibration period is equal to said natural vibration period, in accordance with a driving condition underwhich said vibration period is detected; and

increasing the torque of said engine when surging due to said variations of the combustion of said engine is occurring.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,594
## FUEL DISTRIBUTOR FOR FUEL INJECTION SYSTEMS OF INTERNAL COMBUSTION ENGINES

**Udo Hafner, Ludwigsburg, and Heinz-Martin Krause, Korntal-Muenchingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Filed Jan. 11, 1990, Ser. No. 463,572**
**Claims priority, application Fed. Rep. of Germany, Mar. 10, 1989, 3907764**
**Int. Cl.$^5$ F02M** *61/14. 69/04. 51/06*
U.S. Cl. 123—470 7 Claims

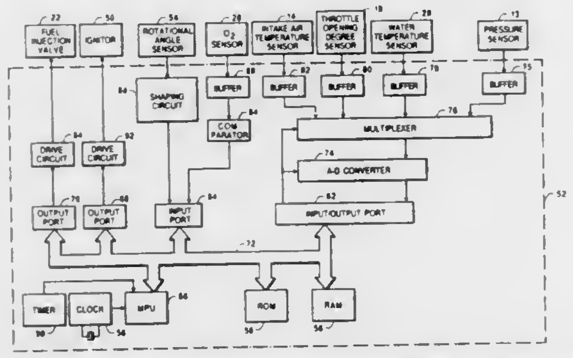


1. A fuel distributor for fuel injection systems of internal combustion engines, having at least one electrically actuatable fuel injection valve and at least one valve carrier, said at least one valve carrier has at least one axially open stepped receiving bore, that communicates with a fuel supply line for the fuel injection valve and an end flange surrounding the receiving bore, said fuel injection valve includes a collar which is axially supported on said end flange, said end flange of said valve carrier (**11**) and said collar of said fuel injection valve (**10**) are embodied as mutually corresponding parts (**16**, **17**) of a bayonet mount (**30**).

---

### 5,016,595
## AIR-FUEL RATIO CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

**Taiyo Kawai, Susono, and Narihisa Nakagawa, Numazu, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**
**Filed May 24, 1990, Ser. No. 528,565**
**Claims priority, application Japan, May 29, 1989, 1-135087**
**Int. Cl.$^5$ F02M** *51/00*
U.S. Cl. 123—478 20 Claims

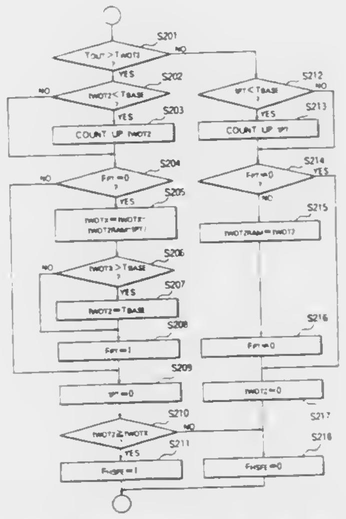


1. An air-fuel ratio control device for an internal combustion engine comprising:
means for detecting one of an inlet pipe pressure and an intake air quantity;
means for detecting an engine speed;
means for detecting a degree of throttle opening;
means for calculating a basic fuel injection time on the basis of the engine speed and the one of the inlet pipe pressure and the intake air quantity;
means for calculating a correction factor on the basis of the engine speed and the one of the inlet pipe pressure and the intake air quantity that is used for controlling the air-fuel ratio to the lean side rather than to a stoichiometric air-fuel ratio;
means for controlling the air-fuel ratio on the basis of the basic fuel injection time and the correction factor; and
means for correcting the correction factor on the basis of at least the degree of throttle opening in a high load range of the engine.

---

### 5,016,596
## AIR-FUEL RATIO CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

**Akira Fujimura; Sachito Fujimoto, and Fumio Hosoda, all of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan**
**Filed Apr. 27, 1990, Ser. No. 516,100**
**Claims priority, application Japan, May 1, 1989, 1-112888; Sep. 11, 1989, 1-236126; Sep. 11, 1989, 1-236127**
**Int. Cl.$^5$ F02D** *41/14*
U.S. Cl. 123—489 12 Claims

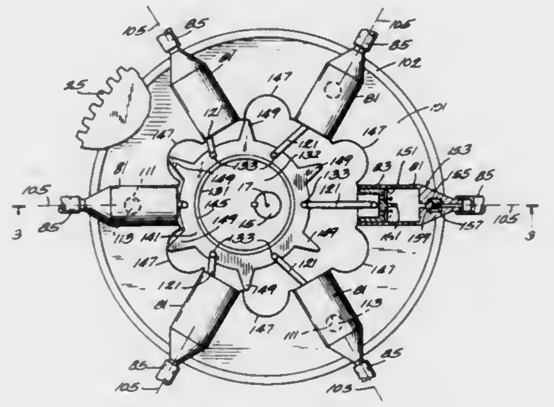


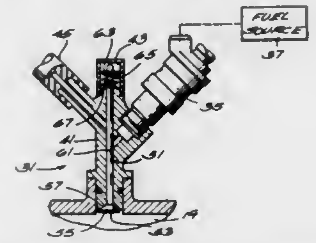
1. In a method of controlling the air-fuel ratio of an air-fuel mixture supplied to an internal combustion engine having an exhaust system having an exhaust gas ingredient concentration sensor arranged therein, including the steps of:
detecting load on said engine;
detecting a value of the concentration of an exhaust gas ingredient by said exhaust gas ingredient concentration sensor;
carrying out feedback control of the air-fuel ratio of said air-fuel mixture to a predetermined value in response to the value of the concentration of said exhaust gas ingredient detected by said exhaust gas ingredient concentration sensor; and
interrupting the feedback control of the air-fuel ratio of said air-fuel mixture and enriching the air-fuel ratio of said air-fuel mixture after a high load operating condition of said engine in which the detected load on said engine is above a predetermined reference value has continued over a predetermined time period;
the improvement comprising the steps of:
(1) calculating a value of a parameter dependent on a ratio of a time period over which the detected load on said engine continued to be above a predetermined value to a time period over which the detected load on said engine continued to be below said predetermined value; and
(2) setting said predetermined time period based on the calculated value of said parameter dependent on said ratio.

---

### 5,016,597
## CRANKSHAFT DRIVEN COMPRESSOR FOR SUPPLYING AIR TO A FUEL INJECTION MECHANISM

**Gaylord M. Borst, Gurnee, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.**
**Filed May 17, 1989, Ser. No. 352,874**
**Int. Cl.$^5$ F02M** *67/02*
U.S. Cl. 123—533 20 Claims





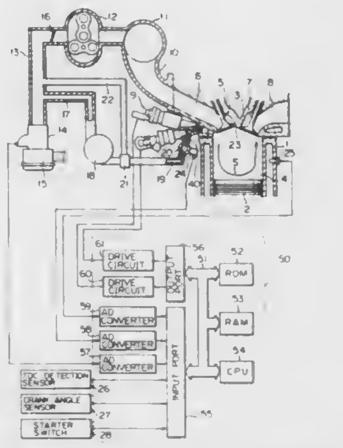
12. An engine comprising an engine block defining an engine cylinder, a fuel injection mechanism including a bore communicating with said engine cylinder, a fuel injector communicating with said bore and adapted to be connected to a source of fuel, a crankshaft rotatably mounted on said engine block, means for compressing air in response to crankshaft rotation, and exclusively mechanical means for supplying compressed air from said air compressing means to said bore in preselected timed relation to crankshaft rotation.

---

### 5,016,598
## FUEL INJECTION CONTROL APPARATUS OF TWO-STROKE ENGINE

**Takahiro Kushibe; Yuuichi Takano, and Takeshi Sato, all of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**
**Filed Sep. 20, 1990, Ser. No. 585,676**
**Claims priority, application Japan, Sep. 29, 1989, 1-113555[U]**
**Int. Cl.$^5$ F02M** *67/02*
U.S. Cl. 123—533 16 Claims

1. A fuel injection control apparatus of a twostroke engine comprising:
an air pump driven by the engine;
an air blast valve provided with a nozzle opening connected to said air pump through a compressed air passage, a fuel injector for injecting fuel into said compressed air passage, and an opening and closing valve for controlling the opening and closing of the nozzle opening;
judgement means for judging if the compressed air pressure in said compressed air passage is more than a predetermined set pressure; and
control means for controlling said fuel injector and said opening and closing valve to inject fuel from said fuel injector during the opening of the opening and closing valve and cause the injected fuel to be ejected from said nozzle opening by inertia force when the said compressed air pressure is less than said set pressure and to inject fuel

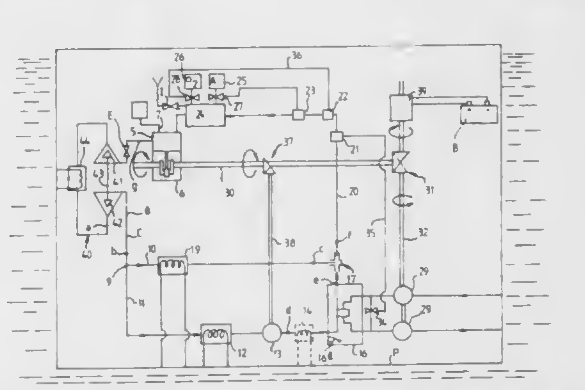


from said fuel injector during the closing of the opening and closing valve and cause the injected fuel to be ejected from said nozzle opening by compressed air during the opening of the opening and closing valve when the compressed air pressure is higher than said set pressure.

---

### 5,016,599
## CLOSED CYCLE INTERNAL COMBUSTION ENGINE

**Albert Jubb, Kenilworth, United Kingdom, assignor to Cosworth Deep Sea Systems Limited, United Kingdom**
**PCT No. PCT/GB89/00984, § 371 Date May 30, 1990, § 102(e) Date May 30, 1990, PCT Pub. No. WO90/02254, PCT Pub. Date Mar. 8, 1990**
**PCT Filed Aug. 24, 1989, Ser. No. 474,012**
**Claims priority, applicatioo United Kingdom, Aug. 27, 1988, 8820412**
**Int. Cl.$^5$ F02M** *25/07*
U.S. Cl. 123—570 12 Claims



1. A closed cycle apparatus comprising an internal combustion engine having a combustion chamber, delivery means to deliver inert carrier gas, combustion supporting gas and fuel into the combustion chamber, means to cause the fuel to burn in the combustion chamber, a circuit through which exhaust gas is ducted from the combustion chamber and returned to the combustion chamber to provide the carrier gas, the circuit including means by which the exhaust gas is treated to remove carbon dioxide from the exhaust gas wherein the whole of the exhaust gas is fed by the circuit into driving relationship with turbo charger turbine means and then into compressing relationship with turbo charger impeller means, whereby the whole of the exhaust gas is pre-compressed and means are provided to separate the pre-compressed exhaust gas downstream of the impeller means into a first part which is passed

VOL
1126
ISS
3
MY
21
1991
UMI

through a first conduit to be further compressed and then treated to remove carbon dioxide and a second part which is passed through a second conduit to be returned to the combustion chamber without being further compressed and treated to remove carbon dioxide.

---

### 5,016,600

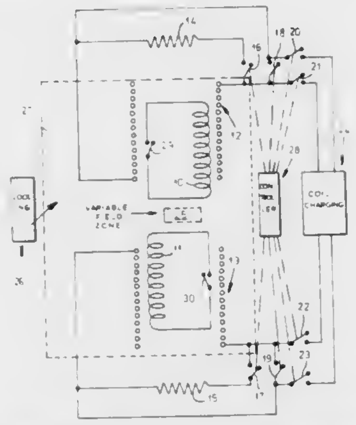
### METHODS OF GENERATING AND CONTROLLING A MAGNETIC FIELD WITHOUT USING AN EXTERNAL POWER SUPPLY SPECIFICATION

**Mohamed A. Hilal, Madison, Wis., assignor to International Superconductor Corp., Riverdale, N.Y.**

**Filed Feb. 1, 1989, Ser. No. 305,372**

**Int. Cl.⁵ F41B** *6/00;* **H01F** *36/00*

**U.S. Cl. 124—3** **16 Claims**



6. An apparatus for generating and controlling a magnetic field at a predetermined location, which comprises:
- a superconductive primary coil having a pair of terminals and spaced distally from said location;
- a superconductive closed-loop secondary coil coaxially overlapping with said superconductive primary coil and extending axially beyond said primary coil proximal to said location;
- means for charging said primary coil with an electric current across terminals of said primary coil and then shunting said terminals to form a closed loop from said primary coil thereby storing electric current in said primary coil; and
- means including a resistive load connectable in series with said primary coil and for quenching superconductivity in said primary coil for causing the stored electric current in said primary coil to decay at least partially, thereby generating a varying magnetic field and inducing with said varying magnetic field an electric current in said secondary coil so that a magnetic field is generated by said secondary coil at said location.

---

### 5,016,601

### SLINGSHOT WITH ADJUSTABLE SIGHT

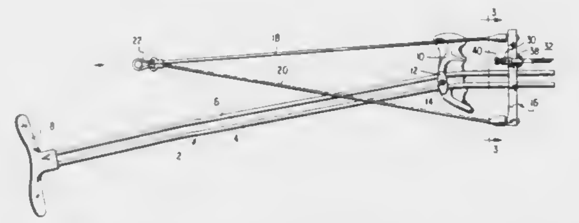
**James C. Ferguson; Marvin C. Hanz, and Galen A. Moeller, all of 423 S. Irving, San Angelo, Tex. 76903**

**Filed Sep. 12, 1989, Ser. No. 406,272**

**Int. Cl.⁵ F41B** *3/02*

**U.S. Cl. 124—20.1** **10 Claims**

1. A slingshot comprising a stock, shoulder engaging means attached to said stock for engaging the shoulder of a user, hand grip means attached to said stock for being engaged by the hand of said user and held in a generally vertical orientation, and crotch means attached to said stock and opening away from said stock in a generally horizontal direction for supporting resilient elements for propelling a projectile, and hand grip adjusting means for adjusting the position of said hand grip means with respect to said stock, wherein said crotch comprises adjustable sight means for being aligned with a target by said user, said adjustable sight means comprises an elongate element on the side of said crotch opposite said stock and extending in a generally vertical direction, a carrier mounted to said elongate element for movement therealong, and a sighting element carried by said carrier, wherein said sighting element extends into said crotch and comprises means for permitting it to move out of said crotch if struck by said projectile.



---

### 5,016,602

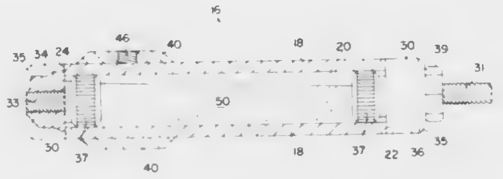
### NOISE AND RECOIL REDUCING BOW STABILIZER FOR ARCHERY BOWS

**Robert S. Mizek, 1119 Westchester Blvd., Westchester, Ill. 60154**

**Filed Jan. 19, 1990, Ser. No. 467,664**

**Int. Cl.⁵ F41B** *5/00*

**U.S. Cl. 124—89** **19 Claims**



1. A bow stabilizer for an archery bow, said bow stabilizer comprising:
- an elongated hollow body, said elongated hollow body defining a sealed chamber;
- a first end plug and a second end plug, said first end plug and said second end plug each having a cap portion, said first end plug and said second end plug each having a connecting portion, said connecting portion having a knurled surface, a connecting portion diameter being less than a cap portion diameter;
- said first end plug and said second end plug sealably secured to said elongated hollow body;
- a threaded shaft secured to said first end plug, said archery bow having an internally threaded female coupling, said threaded shaft mateable with said internally threaded female coupling;
- a counterweight, said counterweight fixedly adjustable along a longitudinal axis of said elongated hollow body; and granular solids, said sealed chamber partially filled with said granular solids.

---

### 5,016,603

### CUSHIONED NOCK

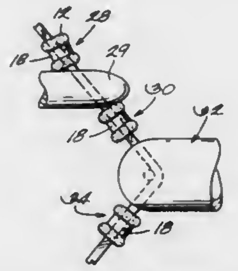
**Lynn A. Tentler, Fond du Lac, Wis., assignor to Tru-Fire Corporation, Ford du Lac, Wis.**

**Continuation-in-part of Ser. No. 139,903, Dec. 31, 1987, abandoned, which is a continuation-in-part of Ser. No. 40,308, Apr. 20, 1987, abandoned. This application Jun. 8, 1989, Ser. No. 364,207**

**Int. Cl.⁵ F41B** *5/14*

**U.S. Cl. 124—91** **12 Claims**

1. A cushioned nock for use with an archer bow including a bow string, said nock mounted on said string to locate an arrow at a nocking point below said string nock with said cushioned nock comprising:
- an elastomeric cushioned cylinder having an axial hose therethrough and a slit extending from said hole to the outside of the cylinder enabling the cylinder to be opened at the slit to place the cylinder on said bow string,
- a cushioned flange at each end of said cylinder forming a groove around said cylinder between said flanges,
- and a generally C-shaped retainer releasingly disposed in said groove with the ends of the retainer spaced far enough for a bow string to pass therebetween and for said cylinder to be opened far enough to receive a bow string,
- said retainer being squeezed closed on said elastomeric cushioned cylinder releasably securing the cylinder on the bow string and being able to be opened for adjustment or removal.



---

### 5,016,604

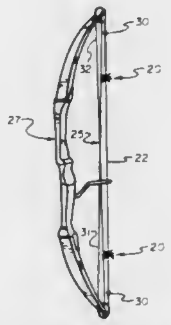
### STRING SILENCERS FOR ARCHERY BOWS

**V. John Tilby, Salt Lake City, Utah, assignor to Sportsmen's Outdoor Products, Salt Lake City, Utah**

**Filed Mar. 13, 1990, Ser. No. 493,131**

**Int. Cl.⁵ F41B** *5/00*

**U.S. Cl. 124—92** **9 Claims**



1. A silencer for the bowstring of an archery bow comprising a flat sheet of soft resilient fabric material, formed into:
- a central body portion;
- a first set of legs arranged in a side by side relationship extending from said body portion; and
- a second set of legs arranged in a corresponding number to said first set of legs and extending normal from said body portion opposite said first set of legs.

---

### 5,016,605

### STEAM-OPERATED AND/OR GAS-OPERATED FURNACE

**Jean LaForet, Cachan, and André Rigaud, Bry-Sur-Marne, both of France, assignors to Gaz de France, France**

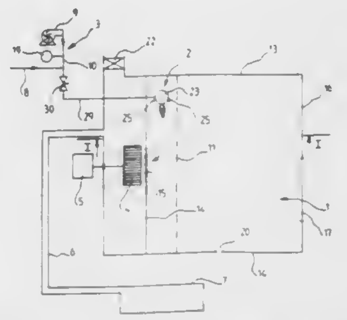
**Filed Jul. 9, 1990, Ser. No. 549,807**

**Claims priority, application France, Jul. 19, 1989, 89 09726**

**Int. Cl.⁵ A21B** *1/08*

**U.S. Cl. 126—20** **4 Claims**

1. A furnace for cooking food products with steam and/or gas, the furnace comprising:
- an enclosure with a top wall; a gas burner located within the enclosure; a system for supplying a mixture of gas and combustion air under pressure, the system being connected to the burner; a turbine for providing circulation within the enclosure; and a steam generator which is connected to the enclosure;
- wherein the burner is mounted at an upper portion of the enclosure, in an inverted position and pointing downwardly with respect to the enclsoure, such that condensates and/or water within the enclosure do not affect the burner;
- wherein the burner is formed of a tube with a central axis and slots which extend orthogonally with respect to the central axis, and wherein the tube is secured to the top wall; and
- wherein at least two deflectors are securd to bases of the slots at the outside of the tube for piloting the flames of the burner, the deflectors extending along planes, and wherein a flame distributing perforated metal sheet extends inside of the tube along a plane which is substantially orthogonal to those of the deflectors.



---

### 5,016,606

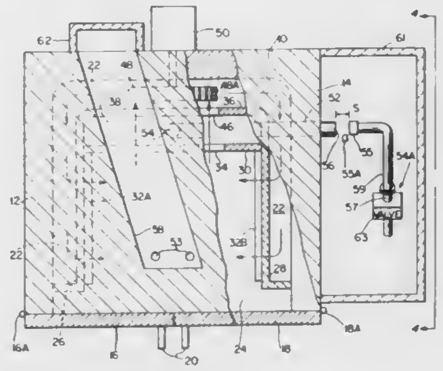
### GAS-FIRED OVEN

**Robert L. Himmel, and Frank E. Parobecbek, both of Cleveland, Ohio, assignors to Gas Research Institute, Chicago, Ill.**

**Filed Aug. 31, 1989, Ser. No. 401,166**

**Int. Cl.⁵ F24C** *15/32*

**U.S. Cl. 126—21 A** **26 Claims**



1. A gas-fired oven, comprising:
- a housing including walls defining a chamber;
- partition means arranged within said housing chamber for separating said chamber into at least a first portion and a second portion in which items such as food products can be placed to be heated, said partition means having openings to permit air flow between said first and second chamber portions;
- blower means located within said first chamber portion for discharging and circulating air within said first chamber portion through at least one of said partition openings into said second chamber portion, said blower means further having a return air inlet for drawing air through at least another one of said partition openings in a return air path from said second chamber portion;
- air conduit means for directing air to said blower return air inlet, said air conduit means extending only partially into

VOL
1126
ISS
3
MY
21
1991
UMI

said first chamber portion and having an open inlet end outside said housing chamber and a discharge end inside said first chamber portion adjacent to said blower return air path; and

gas flame source means located outside said housing chamber for producing heated air at said conduit inlet end which flows through said conduit means into said first chamber portion.

---

**5,016,607**

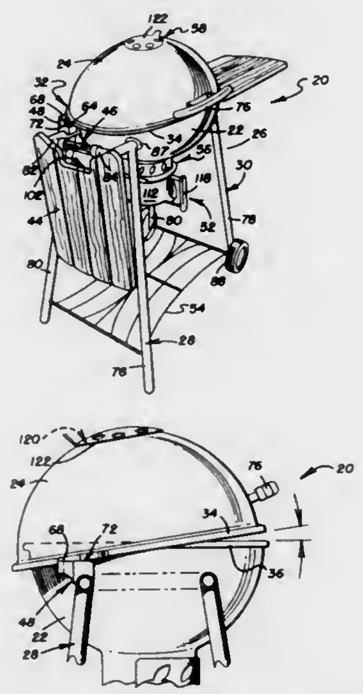
### BARBECUE GRILL ASSEMBLY

**Frederick G. Doolittle, Dublin; Jon L. Ellgen, Pleasant Hill; Ronald E. Heiskell, Tracy; Lipton, Thomas M., Concord, and James R. Parent, Dublin, all of Calif., assignors to The Clorox Company, Oakland, Calif.**

**Filed Feb. 9, 1989, Ser. No. 308,256**

**Int. Cl.$^5$ A47J** *37/00*

**U.S. Cl. 126—25 R** **34 Claims**



1. A barbecue grill assembly for cooking foods, comprising

a bowl and domed, free-standing lid mating with each other and having a curved configuration at their intersection,

support means for the bowl,

a handle adjacent one side of the lid,

cradle means for catching and supporting the lid, the cradle means including two brackets arranged on the bowl generally opposite the handle, the two brackets having extended surfaces facing each other and spaced apart less than a corresponding dimension of the lid with stop means arranged on end portions of the extended surfaces whereby lifting the lid by the handle causes the lid to move horizontally along the extended bracket surfaces and to rotate into a generally vertical position upon engagement with the stop means, the lid then being cradled by the bracket surfaces and stop means, and

the support means comprising leg assemblies adjacent opposite longitudinal ends of the bowl, the brackets being mounted on the respective leg assemblies.

---

**5,016,608**

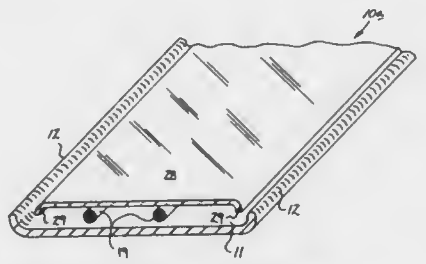
### PORTABLE GRILL APPARATUS

**Brenda C. Evans, 5713 Willowcrest St., Bakersfield, Calif. 93313**

**Filed Jan. 25, 1990, Ser. No. 470,306**

**Int. Cl.$^5$ F24C** *3/08*

**U.S. Cl. 126—41 R** **2 Claims**



1. A portable grill apparatus comprising,

an opaque ceramic cooking tray including a central planar web, spaced first and second side walls, and spaced first and second end walls, wherein the walls extend around the tray to define a top cooking pocket, and

a "U" shaped handle member mounted to each external surface of each end wall medially thereof, and

an angulated electrical heating coil operably associated with the central planar web to effect heating of foods positioned thereon, and

wherein the heating coil is positioned overlying the central planar web, and an inverted "U" shaped tray is mounted overlying the central planar web and the heating coil with space legs of the "U" shaped tray directed downwardly and interiorly of the first and second side walls of the tray to direct fluids onto the tray, and

further including a drain opening directed through the central planar web, the drain opening cooperating with an underlying catch tray to receive and collect fluids effected by a cooking procedure.

---

**5,016,609**

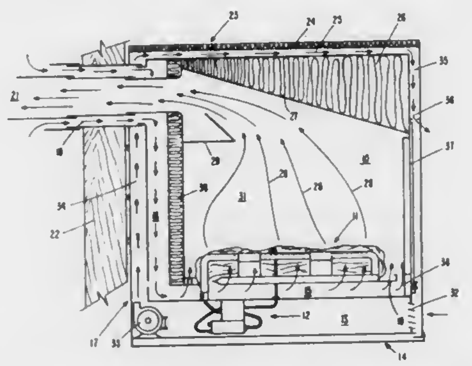
### DIRECT VENTED MULTI GLASS SIDE FIREPLACE

**Ronald J. Shimek, 8944 W. 154th St., Prior Lake, Minn. 55372; Daniel C. Shimek, 5260 W. 132nd St., Apple Valley, Minn. 55124, and James F. Wolf, 6168 Marlen Cir., Prior Lake, Minn. 55032**

**Filed Apr. 27, 1990, Ser. No. 515,716**

**Int. Cl.$^5$ F24C** *3/00;* **F24B** *1/189*

**U.S. Cl. 126—85 B** **18 Claims**



1. A zero clearance fireplace of the type adapted to be installed against an outside wall of an interior space to be heated, comprising:

a box shaped fireplace having six walls comprising four substantially vertical walls, a top wall and a bottom wall,

at least one of said four vertical walls having an airtight glass side wall connected to the sides of the fireplace structure,

one of the remaining side walls or the top wall having an exhaust connection for insertion through an outside wall of the space to be heated,

a combustion chamber in said box shaped fireplace located within and spaced away from the outer dimensions of said six walls,

said vertical side wall which is adapted to be placed against an outside wall having a plenum into which fresh outside air is drawn to provide one of a plurality of heat insulating sub walls,

said outside air insulating subwall being connected to a heat insulating subwall in the bottom wall of said fireplace,

said outside air insulating subwall in said bottom wall having openings therein directly under a gas burner system to provide sufficient outside combustion air to promote complete efficient combustion,

said outside air heat insulating subwall in said bottom wall further having elongated apertures therein along the side edges of the vertical side walls which are provided with said airtight glass panels to provide cooling air for said glass side walls in said combustion chamber,

an exhaust stack connected to said combustion chamber,

said top wall having a tapered shape subwall which directs the exhaust gases nonreversibly from said gas burner system in said combustion chamber and said cooling air from along said glass side walls at high velocity into said exhaust stack to generate a high draft aspiration effect through said combustion chamber.

---

**5,016,610**

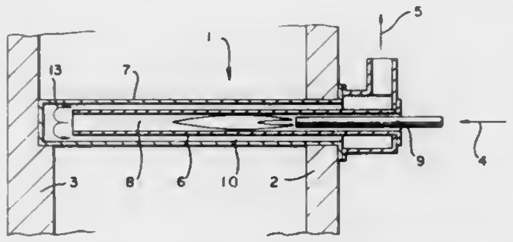
### RADIANT TUBE TYPE HEATER

**Kazunori Meguro; Toshiaki Itoh, and Shigeru Abe, all of Oguni, Japan, assignors to Toshiba Ceramics Co., Ltd., Japan**

**Filed Oct. 21, 1988, Ser. No. 260,754**

**Int. Cl.$^5$ F23C** *11/00*

**U.S. Cl. 126—91 A** **13 Claims**



1. A radiant heater for use in a metallurgical heating furnace, comprising an outer tube fixed to the heating furnace and an inner tube concentric with the outer tube defining an annular space therebetween, at least one of said inner and outer tubes having a grain structure in which silicon carbide particles are joined together by a sintering aid in pressureless sintering, said grain structure consisting essentially of silicon carbide, carbon and 3–15 wt % of a sintering aid, the sintering aid being selected from the group consisting of aluminum compounds and boron compounds.

---

**5,016,611**

### CAMPING LANTERN AND COOKING STOVE SET

**Kou Y. Lai, No. 32, Alley 27, Lane 127, Nan Shan Rd., Chung Ho City, Taipei Hsien, Taiwan**

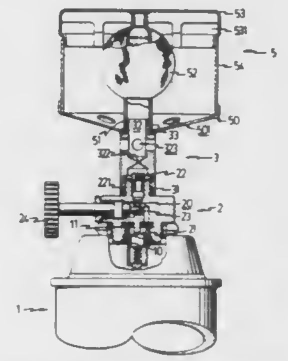
**Filed Apr. 23, 1990, Ser. No. 512,404**

**Int. Cl.$^5$ F24C** *5/04;* **F21H** *1/00*

**U.S. Cl. 126—258** **3 Claims**

1. A camping lantern and cooking stove set, for use with a gas canister, formed on an upper end thereof with an outlet disposed within a first flange, comprising a valve formed on a lower end thereof with a socket for receiving said first flange and provided with a through passage with a nozzle for allowing an outflow of gas from said canister, an outlet for gas through said through passage regulatable by means of a stem disposed within said through passage, said stem being formed at an end of an adjustable knob for adjusting the blockade of said through passage; the improvement comprising:

a mixing tube attachable to said valve for further regulating or mixing the outflow of gas from said canister, a socket being formed on a lower end of said mixing tube for receiving and securably attaching to said valve, a second flange being formed on an upper end of said mixing tube for selective connection with either a camping lantern or



a cooking stove, said mixing tube having a central gas through passage, said central gas through passage having a pin hole passage to form an hourglass-like section at a lower portion thereof, a plurality of breadth holes being formed on an outer periphery of said mixing tube, each said breadth hole communicating with said central gas through passage at a point above said hourglass-like section, for providing oxygen to a flame of either said camping lantern or said cooking stove.

---

**5,016,612**

### FILTERING HOOD FOR KITCHEN COOKERS, FITTED WITH IONIC FILTERING UNIT

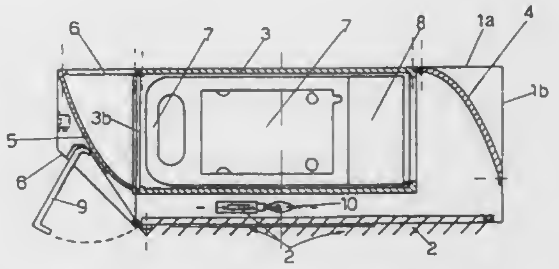
**Giovanni Berardi, Via Vincenzo Monti, 32, Fabriano (AN), Italy**

**Filed May 25, 1989, Ser. No. 356,869**

**Claims priority, application Italy, Dec. 16, 1988, 598/88[U]**

**Int. Cl.$^5$ F24C** *15/20*

**U.S. Cl. 126—299 D** **6 Claims**



1. A filtering hood for kitchen use fitted with an exhaust device to move the air and an ionic filtering unit wherein air which is drawn into the hood through an inlet flows along a horizontal axis in the filtering hood and its exhausted through an outlet, the filtering hood comprising:

a casing having an inlet end and an outlet end;

a duct suspended from the casing along the horizontal axis;

an inlet panel mounted at the inlet end of the casing to direct incoming air into the duct;

a removable panel mounted on the casing; the panel having plurality of parallel deflecting tabs, the deflecting tabs directing the incoming air to the inlet panel;

the exhaust device mounted in the duct adjacent to the inlet panel such that incoming air is directed along the horizontal axis to enter and pass through the exhaust device;

the ionic filter mounted in the duct adjacent to the exhaust device such that air leaving the exhaust device along the

VOL
1126
ISS
3
MY
21
1991
UMI

horizontal axis enters and passes through the ionic filter; and

an outlet panel mounted at the outlet end of the casing to direct outgoing air from the ionic filter back into the kitchen.

---

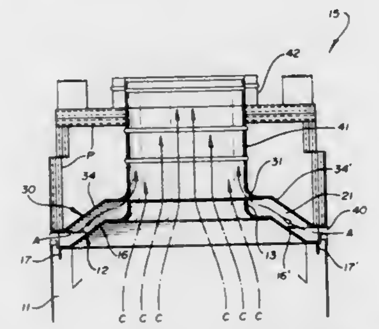
### 5,016,613
### FIREPLACE TOP WALL ASSEMBLY AND COOLING SYSTEM

**Kenneth R. Maitland, Humboldt, Tenn., assignor to Majco Building Specialties, L.P., Huntington, Ind.**

**Filed Jul. 12, 1990, Ser. No. 552,255**

**Int. Cl.⁵ F23J** *11/00*

**U.S. Cl. 126—312** **16 Claims**



1. A top wall assembly for a combustion chamber for a fireplace comprising:

primary and secondary vertically aligned flue outlet assemblies that form between them a primary air conduit means and a secondary flue-gas conduit means; and both of said conduit means being adapted to be mounted in fluid communication with the inlet opening of a chimney flue of a fireplace so that flue gases drawn from a combustion chamber of the fireplace through said secondary flue-gas conduit means to the chimney flue mixes air from the primary air conduit means thereby promoting cooling of the top wall assembly and the chimney flue, wherein said primary and secondary flue outlet assemblies comprise generally rectangular upper and lower, spaced apart, top wall members, each wall member having a flue outlet opening with said flue outlet openings being in vertical alignment; each wall member having an inwardly curved portion defining a converging nozzle mounted in surrounding relation with its respective flue outlet opening, said nozzles being concentrically positioned with respect to each other, and both of said nozzles being adapted to be mounted in fluid communication with the inlet opening of a chimney flue.

---

### 5,016,614
### ENDOTRACHEAL INTUBATION APPARATUS

**Niall P. MacAllister, Rte. 1, Box 473, Cooper Road, Eden, Md. 21822**

**Continuation of Ser. No. 796,321, Nov. 7, 1985, abandoned, which is a continuation of Ser. No. 407,143, Aug. 11, 1982, abandoned. This application May 4, 1987, Ser. No. 52,138**

**Int. Cl.⁵ A61B** *1/00*

**U.S. Cl. 128—4** **30 Claims**

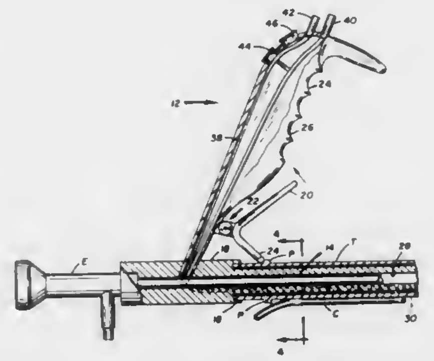
18. A medical instrument for facilitating endotracheal intubation or the like in a patient by a selected endotracheal tube comprising:

handle means for gripping by one hand of a user, said handle means including a plurality of finger undulations to facilitate the grasping thereof by said user;

elongated obturator means having first and second ends and being fixedly secured adjacent to said first end thereof to said handle means, said obturator means for releasably retaining thereon a selected endotracheal tube, said obturator means having a longitudinal lumen disposed therein extending from said first end of said obturator means to said second end thereof, said obturator means also for removably receiving in said longitudinal lumen at least a portion of an endoscope thereby permitting visualization by said endoscope at said second end of said obturator means;

means for selectively retaining and ejecting the selected endotracheal tube when disposed upon said obturator means, said selective retaining and ejecting means including means for frictionally retaining the selected endotracheal tube and means for overcoming said frictional retaining means, said frictional overcoming means including collar means mounted on said obturator means adjacent to said first end thereof, said collar means for engaging the end of the selected endotracheal tube falling adjacent to said first end of said elongated obturator means when the selected endotracheal tube is disposed thereon, said frictional overcoming means including a lever having one end thereof for engaging a portion of the selected endotracheal tube, said lever being configured as a trigger and being pivotally mounted on said handle means, pivoting of said lever terminating retention of the selected endotracheal tube by said frictional retaining means;

means for providing controlled delivery of a gas to said second end of said obturator means as desired by a user, said controlled gas delivery means including a longitudinal gas delivery lumen having two ends disposed in said elongated obturator means such that said longitudinal gas delivery lumen opens on one end thereof through said second end of said elongated obturator means, said other end of said longitudinal gas delivery lumen being disposed adjacent to said handle means, and means for controlled supply of gas to the other end of said longitudinal gas delivery lumen, said controlled gas supply means including a gas conduit having two ends and being in communication at one end thereof with said other end of said longitudinal gas delivery lumen at the juncture of said handle means and said obturator means, the other end of said gas conduit for communicating, with a supply of gas, and vent means intermediate said ends of said gas conduit and opening through said handle means, said vent means being configured such that said gas conduit is substantially precluded from delivering gas to said longitudinal gas delivery lumen unless said vent means is closed, said gas conduit being disposed in said handle means and said vent means having a finger receiving portion for closing by a finger of the user; and



means for providing controlled suction at said second end of said obturator means, said controlled suction means including a longitudinal suction lumen having two ends and being disposed in said elongated obturator means such that said lumen opens on one end thereof through said second end of said elongated obturator means, said other end of said longitudinal suction lumen being disposed adjacent to said handle means, and means for controlled delivery of suction to the other end of said longitudinal suction lumen, said controlled suction delivery means including a suction conduit having two ends and being in communication at one end thereof with the other end of said longitudinal suction lumen at the juncture of said handle means and said obturator means, said other end of said suction conduit for communicating with a suction apparatus, and suction vent means intermediate said ends of said suction conduit, said suction vent means being configured such that said suction conduit is substantially precluded from delivering suction to said suction lumen unless said suction vent means is closed, said suction conduit being disposed in said handle means and said suction vent means having an opening through said handle means for closing by a finger of the user;

wherein said trigger, said gas conduit vent means, and said suction vent means are controlled by the one hand of the user when said handle means is gripped by the one hand of the user.

---

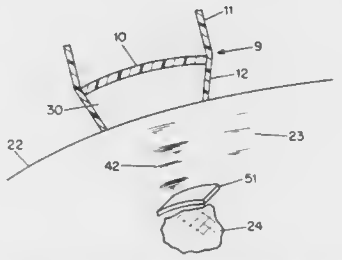
### 5,016,615
### LOCAL APPLICATION OF MEDICATION WITH ULTRASOUND

**Jack Driller, Ridgewood, N.J.; William J. Faulkenberry, Long Island City, N.Y., and Frederic L. Lizzi, Tenafly, N.J., assignors to Riverside Research Institute, New York, N.Y.**

**Filed Feb. 20, 1990, Ser. No. 482,313**

**Int. Cl.⁵ A61B** *17/00;* **A61M** *37/00*

**U.S. Cl. 128—24 A** **14 Claims**



1. A method for applying a therapeutic substance to body tissue of a person or animal, comprising the steps of:

supplying said therapeutic substance in a receptacle having a surface portion formed of porous material having a selected porosity;

implanting said receptacle in said person or animal with said surface portion adjoining said body tissue; and

irradiating said implanted receptacle with ultrasonic radiation thereby to cause said therapeutic substance to diffuse through said porous surface portion at a greater rate than in the absence of said radiation and thereby applying said therapeutic substance to said tissue so that the rate of application of said therapeutic substance to said tissue is controlled by the exposure of said receptacle to said ultrasonic radiation.

---

### 5,016,616
### PLASTIC HEALTH MASSAGE DISK

**Chen Hu, Taipei, Taiwan**

**Filed Jul. 24, 1989, Ser. No. 383,747**

**Int. Cl.⁵ A61H** *1/00*

**U.S. Cl. 128—32** **4 Claims**

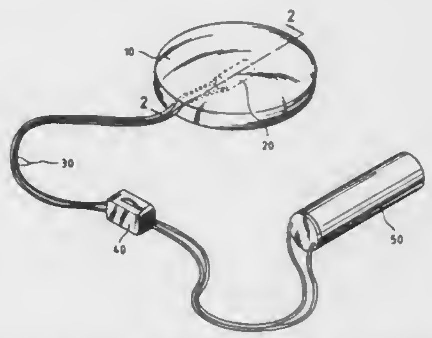
1. A massage disk comprising:

a disk shaped sack filled with plasticly deformable material formed of a mixture of a plurality of materials so that the sack can be bent at random into a multiplicity of contours, to follow the contours of various parts of the human body;

a vibration motor embedded in the plasticly deformable material and positioned inwardly of the outersurface of the sack so that when the vibration motor is activated, it transmits vibrations through the plasticly deformable material to the outer surface of the sack;

an external power supply;

connecting wires connecting the external power supply to the vibration motor, said wires extending through the outer surface of the sack; and



a switch in at least one of the wires for connecting and disconnecting power from the power supply to the vibration motor to activate the motor.

---

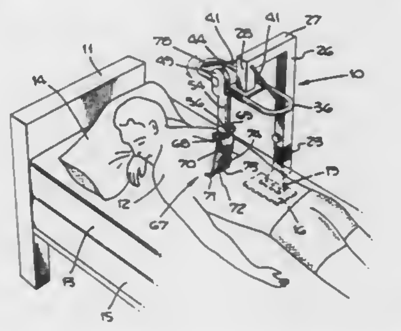
### 5,016,617
### AUTOMATIC BODY MASSAGING APPARATUS

**Kenneth A. Tarlow, Marina del Rey, Calif.; Russell P. Wood, and Christi K. Wood, both of 1000 W. Huntington Dr., Unit C, Arcadia, Calif. 91006, assignors to Russell P. Wood and Christi K. Wood, both of Arcadia, Calif.**

**Filed Dec. 27, 1989, Ser. No. 457,260**

**Int. Cl.⁵ A61H** *7/00*

**U.S. Cl. 128—52** **19 Claims**



1. Apparatus for massaging the body of a user comprising:

a support;

an endless track mounted on said support;

a roller movable along said endless track;

motive means coupled to the roller for moving said roller along said track; and

massaging means associated with said roller for moving a plurality of flexible elements along the body of a user as the roller moves along said track, said support including a flange plate adapted to be inserted between a mattress and a box spring of a bed, an upright generally vertical first support member coupled to said flange plate, a generally horizontal second support member integral with and extending from said first support member and an integral generally vertical third support member extending from said second support member and generally parallel to said first support member, said endless track being mounted on said third support member.

---

### 5,016,618
### METHOD AND APPARATUS FOR MASSAGE

**Thomas R. Simmons, 3510 Lobit, Dickinson, Tex. 77539**

**Filed Aug. 23, 1988, Ser. No. 235,206**

**Int. Cl.⁵ A61H** *9/00*

**U.S. Cl. 128—66** **9 Claims**

1. An apparatus for massage of the human body, said apparatus comprising:

VOL
1126
ISS
3
MY
21
1991
UMI

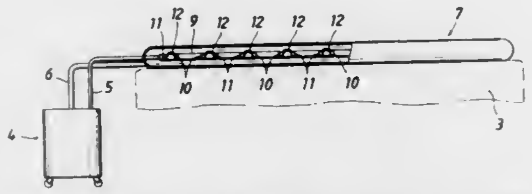
a container adapted to receive a volume of water or other liquid medium therein, said container having at least one wall of flexible liquid impervious sheet material of an areal expanse and configuration suitable for accommodating the human body in reclined position thereon or for supporting a large portion of the human body;

reservoir means for containing a quantity of water or other liquid medium;

first and second piping structures within said container in spaced apart positions therein;

diverter means for alternately connecting said reservoir means in fluid communication with said first and second piping structures;

pumping means operatively associated with said reservoir means and said diverter means for generating and delivering pressured flows of liquid medium from said reservoir means to said first and second piping structures;



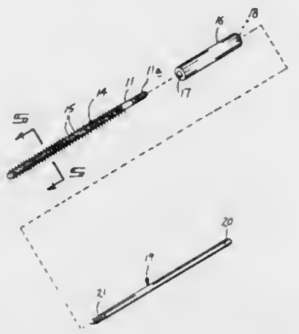
a plurality of nozzle means interconnecting with said first and second piping structures and arranged and adapted for directing pressured jet streams of liquid from said first and second piping structures in an oscillating arcuate motion against the flexible wall of said container at locations opposite the surfaces of the flexible wall which yieldably support a person's body reclined thereon whereby a massage of the person's body is effected by the oscillating streams without wetting of the body; and

a return conduit means interconnecting said container and said reservoir means for returning an excess of liquid in the container beyond a predetermined amount to the reservoir means.

---

## 5,016,619
## MASSAGING DEVICE

**Margaret Fitzpatrick, 11 Thomas Ct., San Mateo, Calif. 94401**
**Filed Nov. 20, 1989, Ser. No. 439,152**
**Int. Cl.$^5$ A61H** ***7/00***
**U.S. Cl. 128—67** **2 Claims**



1. A massaging device organization comprising, in combination,

an elongate cylindrical shaft including a matrix of bristles directed exteriorly of an external surface defined by the shaft, wherein the bristles extend over a major portion of the shaft from a forward terminal end of the shaft rearwardly thereof, and

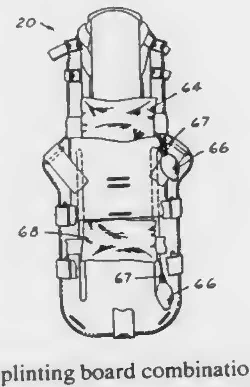
a handle selectively securable to an upper terminal end of the shaft, wherein a smooth surface is defined by the shaft between the handle and the major portion of the shaft to prevent undesirable projection of the bristles with an individual's hand secured about the handle, and

including a further handle defined by an elongate cylinder with a through-extending bore directed coaxially through the further handle, and the further handle threadedly securable to the upper terminal end of the shaft, and a further rod handle securable to the further handle in coaxial alignment with the shaft and the further handle, and wherein the further rod handle includes a forward threaded end receivable within the further handle remote from the shaft, wherein the further handle is securable to the shaft upon disengagement of the handle relative to the shaft.

---

## 5,016,620
## SPLINE AND SPLINTING BOARD COMBINATION

**Max Matthews, Auburn Hills, Mich., assignor to Medical Concepts, Inc., Rochester Hills, Mich.**
**Filed Jan. 4, 1990, Ser. No. 460,692**
**Int. Cl.$^5$ A61F** ***5/01***
**U.S. Cl. 128—78** **9 Claims**



1. A spline and splinting board combination that is adjustable to accommodate various size patients comprising:

an upper board;

a lower board;

means for adjustably connecting said upper and lower board such that the distance between the top of said upper board and the bottom of said lower board may be adjusted to accommodate various size patients:

said upper board member being usable by itself to support patients of relatively lesser height;

belts to secure a patient to said upper board, and said upper board having belt slots to receive said belts;

said upper board has two groups of said belt slots, one of said groups being spaced vertically above the other of said groups to provide a choice of belt slots to accommodate various size patients;

said means for adjustably connecting said upper and lower boards comprises a pair of adjustment slots passing through one of said upper and lower boards and a pair of thumb screws received in the other of said upper and lower boards, said thumb screw passing through said adjustment slots and adjustably connecting said upper and lower boards;

two air cushion support members with one positioned to correspond to the cervical area of a patient and a second positioned to correspond to the lumber area of the patient;

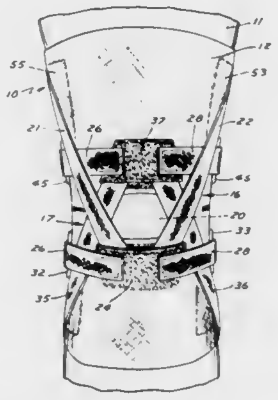
each of said support members have a vent valve and a bulb at one lateral side to provide inflation and deflation of said support members; and

said upper board member having a handle portion extending rearwardly near a vertically uppermost position and head and neck belt slots extending forwardly near a vertically uppermost position, said head and neck belt slots receiving belts to secure the head and neck of a patient.

---

## 5,016,621
## KNEE BRACE

**Kelly M. Bender, Ashland, Wis., assignor to Mikros U.S.A., Inc., Ashland, Wis.**
**Filed Feb. 26, 1990, Ser. No. 484,897**
**Int. Cl.$^5$ A61F** ***3/00***
**U.S. Cl. 128—80 C** **18 Claims**



8. A knee brace comprising:

a tubular sleeve configured to fit a leg with an upper sleeve edge located at the lower thigh region and a lower sleeve edge located at the upper calf region, and a front surface with a kneecap accommodating site;

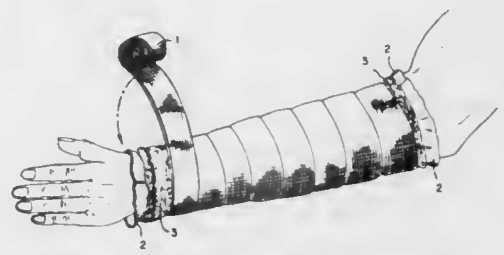
an upper strap assembly including a first elastic support strap having a first end connected to one side of the sleeve proximate the upper edge and a second movable end, a second elastic support strap having a first end connected to the opposite side of the sleeve proximate the upper edge and a second movable end, means connecting the movable ends of the first and second support straps of the upper support strap assembly, first means located adjacent and below the kneecap site for attaching the second ends of the first and second support straps of the upper strap assembly to the sleeve in adjacent relationship at a location beneath the kneecap site whereby the first and second support straps of the upper strap assembly straddle the kneecap in tension;

a lower strap assembly including a first elastic support strap having a first end connected to one side of the sleeve proximate the lower edge and a second movable end, a second elastic support strap having a first end connected to the opposite side of the sleeve proximate the lower edge and a second movable end, means connecting the movable ends of the first and second support straps of the lower support strap assembly, second means located adjacent and above the kneecap site for attaching the second ends of the first and second support straps of the lower strap assembly to the sleeve in adjacent relationship at a location above the kneecap site whereby the first and second support straps of the lower strap assembly straddle the kneecap in tension.

---

## 5,016,622
## WATER IMPERMEABLE, WATER VAPOR PERMEABLE ORTHOPEDIC CAST

**Jean Norvell, 30 Park Dr., Silverbrook, Newark, Del. 19713**
**Continuation of Ser. No. 180,650, Apr. 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 43,201, Apr. 27, 1987, abandoned. This application Apr. 4, 1990, Ser. No. 504,709**
**Int. Cl.$^5$ A61F** ***5/04***
**U.S. Cl. 128—91 R** **2 Claims**



1. An immobilizing orthopedic cast, comprising:

(a) an inner protective sleeve adjacent the skin, said sleeve consisting essentially of a composite membrane comprising a liquid water impermeable water vapor permeable polymeric membrane layer and a hydrophilic layer attached to the polymeric layer;

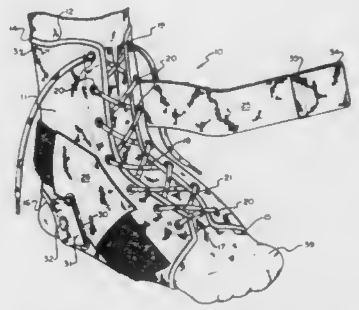
(b) a layer of resilient padding positioned around said inner protective sleeve; and

(c) an outer immobilizing layer positioned around said layer of resilient padding.

---

## 5,016,623
## ANKLE SUPPORT

**Doug W. Krahenbuhl, 878 E. Dupler Rd., Sandy, Utah 84070**
**Filed Mar. 14, 1990, Ser. No. 493,317**
**Int. Cl.$^5$ A61F** ***3/00, 13/06, 5/37***
**U.S. Cl. 128—80 H** **6 Claims**

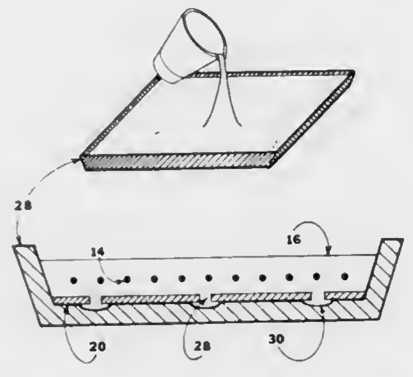


1. An ankle support comprising a foot support that is open at a top and has an open front; means to fit said foot support snugly to a user's foot, including means to close said foot support open front; a non-stretchable support strap secured to said foot support to extend across an area of said foot support that is over a user's fifth metatarsal bone; a flexible sleeve secured at its edges onto said foot support surface over the outer ankle bone and is bent to form a straight sleeve that is angled upwardly rearwardly of said support to direct said strap fitted therethrough across the outer ankle bone area and around the achilles tendon and across the inside ankle bone; and means affixed to said foot support adjacent to the heel area and the same side as said flexible sleeve to receive and to secure said strap.

OL
126
ISS
3
MY
21
1991
UMI

### 5,016,624
### REFORMABLE SUPPORT STRUCTURE

**R. Patrick Garrett, and Miles S. Krivoshia, both of 5849 Bartlett St., Pittsburgh, Pa. 15217**
**Filed Apr. 2, 1990, Ser. No. 502,976**
**Int. Cl.$^5$ A61N** *15/00;* **A61F** *5/04*
U.S. Cl. 128—82.1 **6 Claims**



1. An improved method of forming a reformable structure comprising the steps of:

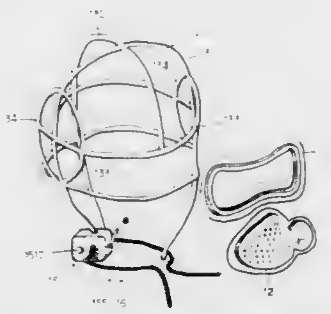
orienting flexible heating means within a mold;

heating thermoplastic material which becomes formable at temperatures less than 200° F. to a liquid state; and

introducing the thermoplastic material into said mold and around said flexible heating means.

### 5,016,625
### FULL HEAD RESPIRATOR

**Chi-Hsueh Hsu, 4F, No. 144, Chu Lin Road, Yung Ho, Taipei, Taiwan; Wen-Li Yang, No. 57, Lane 20, Chih Yu Road, Sec. 2, Shih Lin District, Taipei, Taiwan, and Shien-Yu Chuang, No. 92-1, Pai Ma Chuang, Chung Li, Taoyuan Hsien, Taiwan**
**Filed Aug. 23, 1989, Ser. No. 397,399**
**Int. Cl.$^5$ A62B** *18/10, 7/10, 19/00, 23/02*
U.S. Cl. 128—201.25 **1 Claim**



1. A full head respirator to filter air of smoke and fumes comprising:

a flexible, generally continuous infrastructure, said infrastructure adjustably sized to fit over a human head;

said infrastructure comprising a plurality of intersecting conducting tubes in communication;

said tubes having a common inlet end;

a cover mounted on said infrastructure and secured thereto, said cover constructed of a flexible, heat-resistant material;

said cover including a cranium portion, a face portion, and a neck portion, said portions enveloping the head and neck of the wearer;

said face portion having a viewing window which covers the eyes of the wearer, and a vent portion covering the nose and mouth of the wearer for inhalation and exhalation;

said viewing window fitted with a transparent eyepiece;

said vent device having a perforated front wall and a perforated rear wall, said rear wall having an inlet, said perforated walls defining therebetween a chamber filled with a textile material;

an actuation means that generates foam, said actuation means having a housing that is divided into three compartments;

a first compartment that is filled with clear water, a second compartment that is filled with a filtering chemical in liquid form, and a third compartment disposed between said first and second compartments, and separated from said second compartment by means of a resilient side wall, and separated from said first compartment by means of a rupturable side wall, said third compartment being filled with soda powder;

said common inlet end of said tubes being in communication with said second compartment;

means for rupturing said rupturable side wall and thereby mixing said water and soda to generate said foam, the foam expanding and filling said tubes so as to fit them about the head of the wearer;

conduit means interconnecting said second compartment with said inlet of said vent device, said conduit feeding said liquid filtering chemical to said textile material, whereby air inhaled by the wearer through said front perforated wall is filtered; and,

a fastening string for securing said cover on the wearer by tightening of the string around the neck of the wearer.

### 5,016,626
### VENTILATORS FOR PROMOTING LUNG FUNCTION

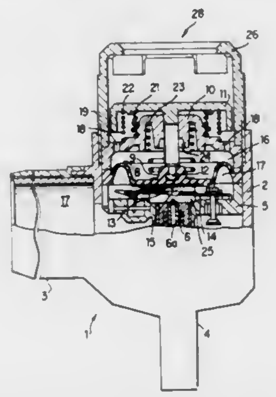
**Norman S. Jones, Stanbridge, England, assignor to Instruments and Movements Limited, London, England**
**Filed May 17, 1989, Ser. No. 352,930**
**Claims priority, application United Kingdom, May 23, 1988, 8812128**
**Int. Cl.$^5$ A61M** *16/00*
U.S. Cl. 128—204.26 **10 Claims**

1. A ventilator system comprising a pneumatic oscillator controlling breathable gas flow in a flow path from a source to an output, said oscillator providing a ventilation cycle consisting of an exhalation phase having a first duration and an inhalation phase having a second duration; a demand valve in parallel with said oscillator, said demand valve enabling demand gas flow therethrough in response to a demand for gas at said output; and means for detecting gas flow in the supply to the demand valve and adapted to output a signal to the oscillator to modify or inhibit the operation thereof in relation to the volume of demand has taken from the demand valve, to vary said first duration of said exhalation phase of said ventilation cycle of the oscillator.

---

### 5,016,627
### LUNG-GOVERNED VALVE

**Klaus D. Dahrendorf; Peter Kling, and Ulrich Kriems, all of Berlin, Fed. Rep. of Germany, assignors to Auergesellschaft GmbH, Fed. Rep. of Germany**
**Filed Nov. 27, 1989, Ser. No. 441,829**
**Claims priority, application Fed. Rep. of Germany, Nov. 28, 1988, 3840058**
**Int. Cl.$^5$ A62B** *18/02*
U.S. Cl. 128—205.24 **9 Claims**



1. A lung-governed valve for use with a breathing mask comprising: a valve casing having a first nozzle for providing breathing gas and a second nozzle for discharging breathing gas to the breathing mask; a control diaphragm which divides the lung-governed valve into an outer chamber connected to environmental pressure and a breathing chamber for conveying the breathing gas to the breathing mask; a spring mechanism for biasing the control diaphragm; a lever system connected between the underside of the control diaphragm and a breathing-gas inlet valve; the breathing-gas inlet valve connected to the first nozzle, and a manually accessible actuating button; wherein a central region of the control diaphragm is formed with a resilient raised portion thereon which as a recess therein such that when the actuating button is released after being depressed, a push-rod integrally formed on the actuating button is positively lockable in the recess such that the control diaphragm is entrained by the actuating button through the push-rod and is guided into a stand-by position wherein the resilient raised portion closely abuts and is contained within a recess in a pot-like insertion member permanently disposed above the control diaphragm in the casing; and wherein the control diaphragm can be in an operative position such that the push-rod is disengaged from the recess.

### 5,016,628
### DISPOSABLE CARBON DIOXIDE ABSORBER

**Barnum B. Lambert, San Jose, Calif., assignor to Environmental Support Systems, Inc., San Jose, Calif.**
**Filed Apr. 23, 1990, Ser. No. 512,389**
**Int. Cl.$^5$ A62B** *23/02*
U.S. Cl. 128—205.28 **7 Claims**

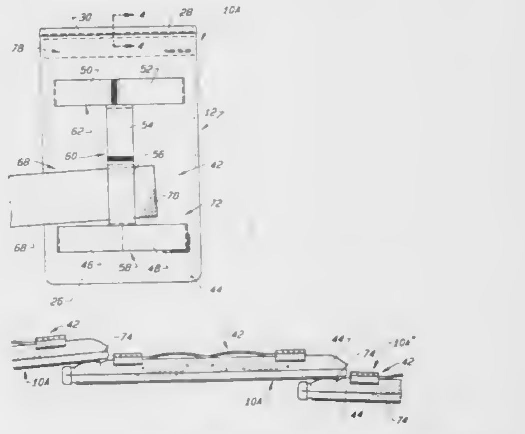
1. Apparatus for rebreathing gas containing $CO_2$ comprising:

granular means for absorbing $CO_2$; and

a bag shaped packet made from a flexible film material flexible for containing the granular means, the container having an intake port for the gas to enter the container and an exhaust port for the gas to exit the container after the gas has flowed through the granular means.

### 5,016,629
### HOT AND COLD BODY PACK

**Donald Kanare, 2610 St. Margaret Ct., Alameda, Calif. 94501**
**Filed Jul. 20, 1989, Ser. No. 382,392**
**Int. Cl.$^5$ A61F** *7/08*
U.S. Cl. 128—402 **5 Claims**



1. A hot or cold body pack utilizing a heat transferring element; comprising:

a. a bag including a first heat insulative portion and a second heat porous and mechanically retaining portion, said bag further including an opening thereto to permit entry of the heat transferring element, said bag having an outer surface adjacent said first insulative portion;

b. a first loop extending along a first dimension of said outer surface of said bag;

c. a second loop extending along a second dimension of said outer surface of said bag said second dimension being angularly oriented relative to said first dimension;

d. strap means for selectively passing through said first and second loops;

e. means for holding said strap means relative to said bag, said strap holding means including substantially said entire outer surface of said bag forming a pile fastener for connecting with hook material located on said strap means; and

f. a strip of hook material connected to the outer surface of said bag along an edge of said second heat porous and mechanically retaining portion of said bag, said strip allowing for connection of said pack to a second pack.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,630
### HEART PACEMAKER WITH HYSTERESIS FUNCTION

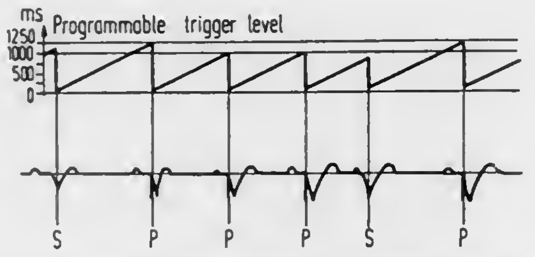
**Lennart Moberg, Spanga, Sweden, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jan. 30, 1989, Ser. No. 302,978**

**Claims priority, application European Pat. Off., Feb. 1, 1988, 88101405**

**Int. Cl.$^5$ A61N** *1/362*

**U.S. Cl. 128—419 PG** **3 Claims**



1. A pacemaker for stimulating a human heart in a patient comprising:

means for generating stimulating pulses;

means for supplying said stimulating pulses to the heart;

means for sensing a heart event and inhibiting pulse generation upon the sensing of said heart event;

time base means for controlling said means for generating pulses to produce a basic escape interval between pulses so that said pulses are supplied to said heart at a basic rate in the absence of said heart event; and

means in said time base means for adding a hysteresis interval, calculated as a fixed percentage of said basic escape interval, to said basic escape interval to form an extended escape interval upon the sensing of said heart event.

---

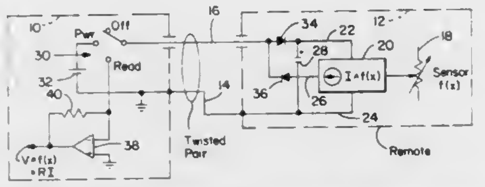
### 5,016,631
### MINIMUM INTERFACE BIOMEDICAL MONITORING SYSTEM

**Arthur F. Hogrefe, Laurel, Md., assignor to The Johns Hopkins University, Baltimore, Md.**

**Filed Mar. 23, 1990, Ser. No. 498,114**

**Int. Cl.$^5$ A61N** *1/372*

**U.S. Cl. 128—419 PS** **15 Claims**



1. An electrical apparatus for a main implant module interfaced with at least one implant sensor module, comprising:

a power source located in the main implant module;

first and second wires running from the main implant module to a particular sensor module, said first wire connected to ground;

a switching means located in the main implant for selectively connecting said second wire to said power source during a powering phase and to electronics located in said main implant during a reading phase;

a sensor means located in the sensor module for detecting a physiological parameter;

processing electronics internal to said sensor module and operably coupled to said sensor means for providing a current, I, along the second wire to the electronics located in said main implant, said current I being functionally related to the sensed physiological parameter;

a capacitor means located in the sensor module and positioned across said first and second wires that is charged during the powering phase and for providing power to said processing electronics during the reading phase; and

a diode means located in the sensor module for disconnecting said capacitor from said second line during the reading phase.

---

### 5,016,632
### MEDICAL DEVICE AND METHOD FOR STIMULATING A PHYSIOLOGICAL EVENT IN A PATIENT WITH A STIMULATION INTENSITY AUTOMATICALLY ADAPTING TO THE PHYSICAL ACTIVITY OF THE PATIENT

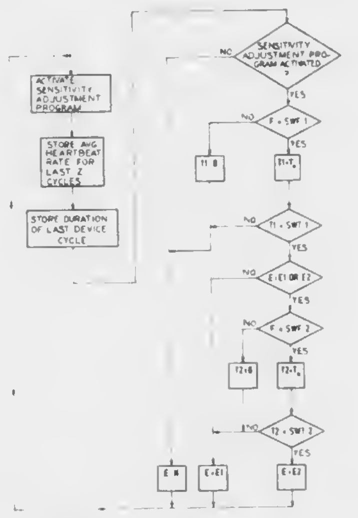
**Kurt Hoegnelid, Sundbyberg, and Jan Ljungstroem, Solna, both of Sweden, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Aug. 27, 1990, Ser. No. 572,417**

**Claims priority, application European Pat. Off., Aug. 28, 1989, 89115849.5**

**Int. Cl.$^5$ A61N** *1/365*

**U.S. Cl. 128—419 PG** **9 Claims**


SENSITIVITY ADJUSTMENT PROGRAM ACTIVATED ?
NO
YES
ACTIVATE SENSITIVITY ADJUSTMENT PROGRAM
STORE AVG HEARTBEAT RATE FOR LAST Z CYCLES
STORE DURATION OF LAST DEVICE CYCLE
F < SWT 1
T1 0
T1+T0
T1 < SWT 1
E=E1 OR E2
F < SWT 2
T2=0
T2+T0
T2 < SWT 2
E N
E=E1
E=E2

1. A medical device implantable in a patient, comprising:

means for stimulating a physiological event in a patient at an adjustable stimulation intensity;

means for automatically adapting adjustment of the stimulation intensity to the physical activity of said patient, including sensor means for generating a signal corresponding to said physical activity and means for setting a sensitivity of said stimulation intensity to said signal, said sensitivity normally having a normal value;

means for calculating a value corresponding to said stimulation intensity;

means for comparing said value to a threshold;

means for calculating a duration during which said value is below said threshold;

means for comparing said duration to a minimum duration; and

means for lowering said sensitivity to a sensitivity value less than said normal value if said duration exceeds said minimum duration.

---

### 5,016,633
### ARTIFICIAL RETINA DEVICE

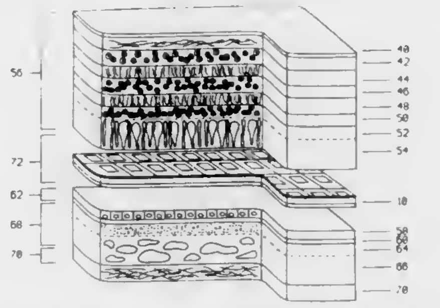
**Alan Y. Chow, 191 Palamino Pl., Wheaton, Ill. 60187**

**Filed Aug. 8, 1989, Ser. No. 390,562**

**Int. Cl.$^5$ A61N** *1/00;* **A61F** *2/14*

**U.S. Cl. 128—419 R** **15 Claims**

1. An artificial retina device, comprising: a plurality of discrete photodiodes disposed on one surface of a substrate, said photodiodes each including an active electrode layer overlaying a photosensitive layer, each photodiode being connected to an electrical ground, said photodiodes having electrical outputs that correspond to the amplitude of the light incident on said device, whereby said device can be implanted in the eye intermediate the inner retinal layer and the retinal pigment epithelium of outer layer of the retina, so that each of said photodiodes will stimulate directly individual or small groups of cells in the inner retinal layer corresponding to the light incident on said device.



---

### 5,016,634
### IMPLANTABLE MEDICAL DEVICE WITH MEANS FOR TELEMETRIC TRANSMISSION OF DATA

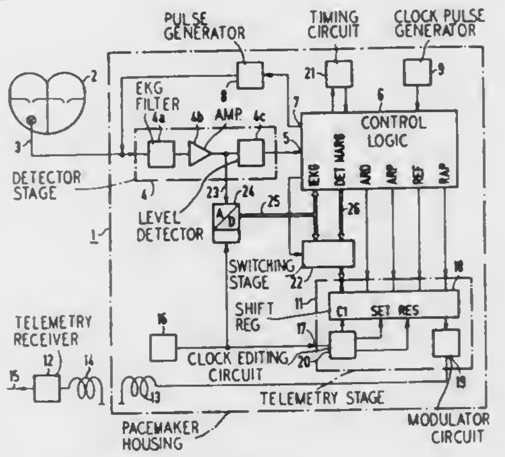
**Josef Vock, Spanga; Jan Ljungstroem, Solna, and Christer Ekwall, Spanga, all of Sweden, assignors to Siemens Aktiengesellschaft, Berlio and Munich, Fed. Rep. of Germany**

**Filed Apr. 6, 1990, Ser. No. 505,509**

**Claims priority, application European Pat. Off., Apr. 18, 1989, 89106275.4**

**Int. Cl.$^5$ A61N** *1/37*

**U.S. Cl. 128—419 PT** **9 Claims**



1. A medical device comprising:

therapeutic means adapted for physiologically interacting with a patient;

control logic means connected to said therapeutic means for monitoring and controlling the operation of said therapeutic means, said control logic means having outputs for delivering data corresponding to a series of momentary logic states defining the operation of said control logic means;

said therapeutic means and said control logic means being contained in a housing adapted for implantation in said patient;

data acquisition means connected to said outputs of said control logic means for gaining access to data from said logic means corresponding to a logic state of said control logic means and including means for continuously transmitting said data from a location in said patient to the exterior of said patient; and

clock generator means for enabling access to said data repeatedly at successive points in time and for activating transmission of data from said logic means to said data acquisition means at said points in time.

---

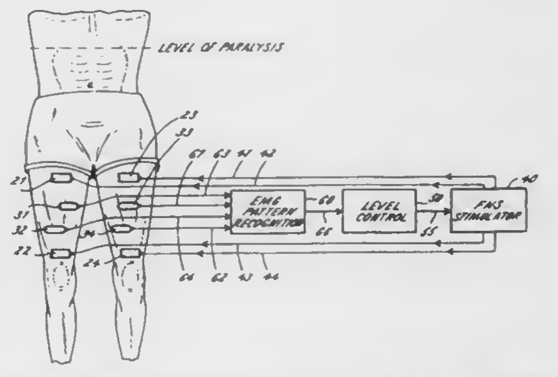
### 5,016,635
### CONTROL OF FNS VIA PATTERN VARIATIONS OF RESPONSE EMG

**Daniel Graupe, Highland Park, Ill., assignor to Sigmedics, Inc. of Delaware, Northfield, Ill.**

**Filed Nov. 29, 1988, Ser. No. 277,323**

**Int. Cl.$^5$ A61B** *5/05*

**U.S. Cl. 128—421** **16 Claims**



1. A functional neuromuscular stimulation system comprising:

FNS electrodes for coupling to the skin at the vicinity of a muscle to be stimulated;

FNS stimulation means for selectively outputting FNS stimulus signals coupled to said FNS electrodes;

Stimulus-Response-EMG electrodes for coupling in the vicinity of said muscle to be stimulated, for sensing Response-EMG signals responsive to said FNS stimulation means;

EMG pattern recognition means for recognition of fatigue patterns for selectively analyzing multiple Response-EMG signals and for selectively providing FNS control signals responsive to recognized deviations beyond a predefined threshhold level of change in patterns of said Response-EMG signals wherein said changes of said pattern over time are changes relative to an EMG reference pattern which is the pattern of the response EMG within a specified small time interval after initial application of the FNS stimuli, and after each successive readjustment of FNS stimuli wherein pattern recognition is in terms of measuring the point wise difference over a given fixed number of points in the Response-EMG voltage vs. time signals as obtained at the Response-EMG electrodes between their voltage values at discrete time points immediately after any adjustment of stimulus level vs. the corresponding value at any time later when fatigue may have started to take an effect, wherein the time scales are all with respect to the time instant of the initiation of each stimulus in a train of FNS stimuli, and wherein each point considered in the two patterns that are compared is the same distance from the time instant of initiation point for each pattern; and,

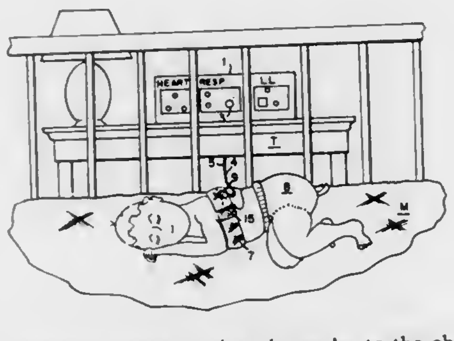
FNS adjustment means for automatically adjusting the FNS stimulus signals responsive to the pattern recognition means responsive to changes over time in the EMG pattern as recognized by said EMG pattern recognition means, so as to prevent fatigue.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,636

### BELT FOR RETAINING SENSING ELECTRODES ON THE CHEST OF AN INFANT AFFLICTED WITH APNEA

**Phyllis Kulakowski, 16 Tucker's Ct., Peabody, Mass. 01960**
**Filed Jun. 8, 1989, Ser. No. 363,921**
**Int. Cl.$^5$ A61B** *5/408*
**U.S. Cl. 128—644** **7 Claims**



1. A belt for securing sensing electrodes to the chest of an infant afflicted with Apnea, said belt comprising:
an elongated band of fabric of sufficient length to encircle and to be fastened around the chest of said infant, said band having an inner side and an outer side and two ends;
tunnel means disposed on said band, said tunnel means extending over the length of said band and adapted to removably receive and house wires for connecting sensing electrodes to a monitor,;
first and second port means disposed on said tunnel means, said first port means being formed as openings at each end of said tunnel means to allow wires to extend from each of the ends of said tunnel means and be connected to said monitor, said second port means disposed centrally about said band, said second port means being arranged to allow wires to extend from said band to connect to said sensing electrodes;
an interrelated, two component, adjustable fastener means disposed on each end of said band, one of the two components of said fastener means being disposed on the inner side of said band and the other of said components being disposed on the outer side of said band, whereby the components of the fastener means can overlap and attach to each other to form an adjustable belt that can be fastened over the back of the infant and provide for disposition of said sensing electrodes on the chest of said infant and whereby said wires can emerge from a rear of the belt when worn.

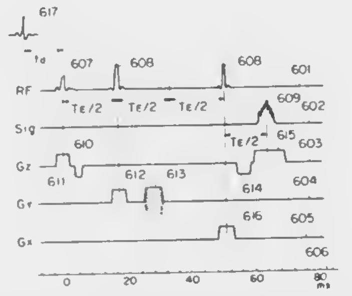
---

### 5,016,637

### MRI METHOD

**Hideaki Koizumi, Katsuta; Ryuzaburo Takeda, Mito; Koichi Sano, Sagamihara, and Tetsuo Yokoyama, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed May 25, 1989, Ser. No. 356,418**
**Claims priority, application Japan, May 27, 1988, 63-129937**
**Int. Cl.$^5$ A61B** *5/055*
**U.S. Cl. 128—653 OAF** **6 Claims**

1. An MRI method comprising the steps of:
(a) locating a body to be examined in a space defined by a Cartesian coordinate system of X, Y, and Z directions and in which a direction of a static magnetic field is in the Z-direction;
(b) monitoring movement of a first region of interest of said body including detecting movement of liquid in said first region of interest;
(c) exciting said first region in which said liquid moving in said body is present, by using a nuclear magnetic resonance phenomenon, when said liquid is temporarily nonmovable in said first region so that said liquid becomes excited;
(d) detecting a nuclear magnetic resonance signal which is produced from said excited liquid at a second region different from said first region, when said excited liquid moves through said second region; and
(e) reconstructing an image of a flow path of said excited liquid on the basis of said detected nuclear magnetic resonance signal;
wherein said step of exciting comprises the steps of:
(1) applying a high frequency 90° pulse and at the same time a gradient magnetic field in the Z-direction after a predetermined period of time measured from a specified movement of said first region;
(2) applying a first high frequency 180° pulse and at the same time a gradient magnetic field pulse in the Y-direction after a period of time of $T_E/2$, $T_E$ representing two times of a period of time from the application of said high frequency 90° pulse to said first high frequency 180° pulse;



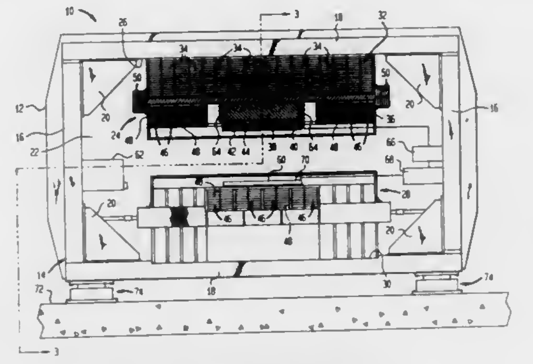
(3) applying said gradient magnetic field pulse in the Y-direction as a phase encoded pulse after said Step (2); and
(4) applying a second high frequency 180° pulse and at the same time a gradient magnetic field pulse in the X-direction after a period of time of $T_E$ measured from the application of said first high frequency 180° pulse; and
said step of detecting the nuclear magnetic resonance signal comprises the step of applying a gradient magnetic field pulse in said Z-direction and detecting said nuclear magnetic resonance signal after a period of time of $T_E/2$ measured from the application of said second high frequency 180° pulse.

---

### 5,016,638

### VIBRATION CONTROL IN NMR MAGNET STRUCTURES

**Chi H. Hsieh, 120 Juniper Ave., Ronkonkoma, N.Y. 11779**
**Filed Mar. 1, 1989, Ser. No. 317,296**
**Int. Cl.$^5$ A61B** *5/055*
**U.S. Cl. 128—653 A** **16 Claims**



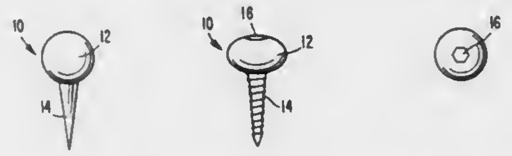
1. A medical NMR scanner comprising:
(a) a frame,
(b) means mounted to said frame for producing a magnetic field, said magnetic field producing means and said frame cooperatively defining a patient-receiving space adapted to receive a human body, said magnetic field producing means being operative to produce a magnetic field within said patient-receiving space; and,
(c) means for applying radio frequency radiation and detecting nuclear magnetic resonance signals in said patient-receiving space; and
(d) means for supporting said frame on a base structure and attenuating transmission of vibrations from the base structure to said frame and said magnetic field producing means in order to reduce scanner image degradation.

---

### 5,016,639

### METHOD AND APPARATUS FOR IMAGING THE ANATOMY

**George S. Allen, 628 Westview Ave., Nashville, Tenn. 37205**
**Division of Ser. No. 223,975, Jul. 18, 1988, Pat. No. 4,945,914.**
**This application Feb. 13, 1990, Ser. No. 479,263**
**Int. Cl.$^5$ A61B** *6/03*
**U.S. Cl. 128—653 R** **3 Claims**



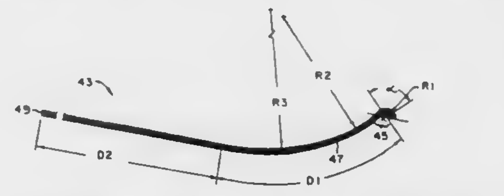
1. A method for locating a target on a portion of anatomy having n fiducial implants, where $n>4$ and is an integer, comprising:
a. taking a first series of cross-sectional image slices of the portion of the anatomy;
b. choosing three of the n fiducial implants;
c. defining an internal coordinate system with respect to the three fiducial implants;
d. defining an external coordinate system with respect to the three fiducial implants;
e. locating the target in the portion of the anatomy with respect to the internal coordinate system; and
f. locating the target with respect to the external coordinate system.

---

### 5,016,640

### ANGIOGRAPHIC CATHETER FOR USE IN THE RIGHT CORONARY ARTERY

**Oscar F. Ruiz, Coconut Grove, Fla., assignor to Sherwood Medical Company, St. Louis, Mo.**
**Division of Ser. No. 141,208, Jan. 6, 1988, Pat. No. 4,883,058.**
**This application Nov. 13, 1989, Ser. No. 435,317**
**Int. Cl.$^5$ A61M** *25/00*
**U.S. Cl. 128—658** **12 Claims**



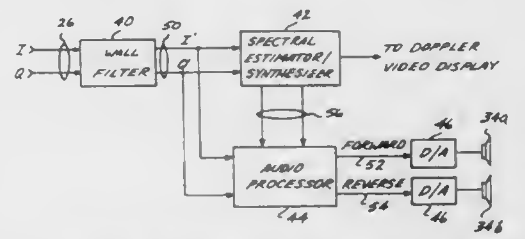
1. An angiographic catheter for use in the right coronary artery of a patient comprising:
an elongate tubular member having a proximal and a distal end,
a tip portion at said distal end of said tubular member,
a body portion extending from said tip portion to said proximal end of said tubular member, said body portion including a first segment and second segment, said first segment extending from said proximal end of said tubular member, and said second segment extending along said body portion of said tubular member from said first segment to said tip portion,
said tip portion having a preformed curvature extending from said distal end of said tubular member to said second segment of said body portion in a first direction,
said first segment of said body portion being preformed generally straight along its entire length,
said second segment of said body portion having a preformed curvature extending from said tip portion to said first segment in a second direction, said second direction of curvature being generally opposite said first direction of curvature, and
said elongated tubular member forming a lumen therein, said lumen extending from said distal end of said elongated tubular member, through said tip portion and through at least a substantial part of said body portion, said lumen having a diameter suitable for the injection of angiographic dye therethrough.

---

### 5,016,641

### SPECTRAL INTERPOLATION OF ULTRASOUND DOPPLER SIGNAL

**Gary Schwartz, Seattle, Wash., assignor to Advanced Technology Laboratories, Inc., Bothell, Wash.**
**Filed Nov. 13, 1989, Ser. No. 435,077**
**Int. Cl.$^5$ A61B** *8/00*
**U.S. Cl. 128—661.09** **20 Claims**



1. In a Doppler medical ultrasound method that includes transmitting ultrasound energy into a body, receiving echoes of the ultrasound energy and processing the echoes to produce a Doppler signal that includes information representing the velocity within the body, converting the Doppler signal into an audio signal, and converting the audio signal into audible sound, the transmitting and receiving steps alternating between first time intervals during which the Doppler signal is produced and second time intervals, an improved method for synthesizing the audio signal during the second time intervals, the method comprising:
producing at least one actual spectrum of the Doppler signal based upon the Doppler signal produced during one of the first time intervals;
producing a synthetic spectrum of the Doppler signal for a second time interval adjacent to said one first time interval, based at least in part upon said actutal spectrum;
converting the synthetic spectrum into a corresponding time domain data set; and
producing the audio signal for the second time interval based at least in part upon said time domain data set.

---

### 5,016,642

### SLOW MOTION CARDIAC IMAGING

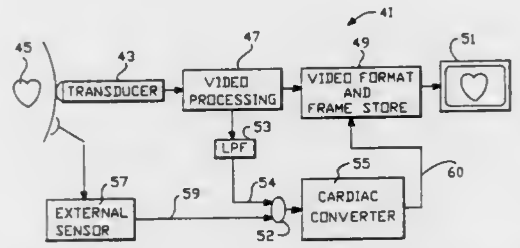
**John N. Dukes; Paul Lum, both of Los Altos, and John D. Larson, Palo Alto, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**
**Filed Apr. 11, 1990, Ser. No. 508,377**
**Int. Cl.$^5$ A61B** *5/04*
**U.S. Cl. 128—696** **14 Claims**

1. A method for representing slow motions of an oscillating heart, the method comprising the steps of:
providing an oscillatory electrical signal of frequency $f_h$

VOL
126
SS
3
MY
21
1991
UMI

representing an estimate of the oscillation cycle of the heart; and

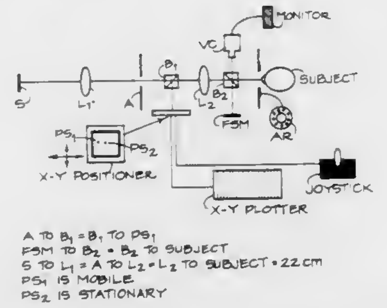
using the signal of frequency $f_h$, providing a sequence of electrical image signals of the heart at a frequency



$f=(1+m/N)f_h$, where N is a predetermined positive integer and m is an integer satisfying $-(N-1)\leqq m<N$, so that each of this sequence of electrical signals occurs in a different oscillation cycle of the heart.

### 5,016,643
### VASCULAR ENTOPTOSCOPE

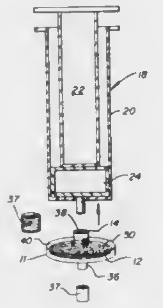
**Raymond A. Applegate, San Antonio, Tex., and Arthur Bradley, Bloomington, Ind., assignors to Board of Regents, The University of Texas System, Austin, Tex.**
**Filed May 2, 1990, Ser. No. 518,065**
**Int. Cl.$^5$ A61B** ***13/00***
**U.S. Cl. 128—745** **93 Claims**



1. An apparatus for entoptically perceiving and mapping the foveal area vasculature of the retina of a human subject's eye under examination, the apparatus comprising:
(a) a means to establish and maintain translational and rotational alignment of said eye with said apparatus;
(b) a main light source which is imaged in or near the eye's entrance pupil plane and a means of moving said main light source or said image along a path in space, said main light source being of variable intensity and shape;
(c) a means of directing said main light image into said eye's entrance pupil, resulting in an angle of illumination of said eye's retina changing with time;
(d) a means to image an aperture at optical infinity or other plane of interest to correct for any refractive error as an optical field stop for said apparatus, said aperture being of variable size and shape;
(e) a fixation light source and a means to form a fixation light image on the retina of said eye, said fixation light source being of variable intensity;
(f) a tracking light source and a means to form an image of tracking light from said source on the retina of the eye, said tracking light source being of variable intensity;
(g) a means of moving said tracking light retinal image with respect to said fixation light retinal image;
(h) a means of transducing movement of said tracking light retinal image to yield coordinates of its present location on said eye's retina with respect to said fixation light retinal image;
(i) a means of compiling or displaying said coordinates of said tracking light retinal image movement, said compilation or display comprising a map of said tracking light retinal image positions with respect to said fixation light retinal image; and
(j) a means to detect and indicate magnitude and direction of translation of said eye with respect to said apparatus.

### 5,016,644
### URINE TESTING MODULE AND METHOD OF COLLECTING URINE ANTIGEN

**Raouf A. Guirguis, Rockville, Md., assignor to La Mina Ltd., British Virgin Isls.**
**Continuation-in-part of Ser. No. 408,547, Sep. 18, 1989, which is a continuation-in-part of Ser. No. 308,763, Jan. 10, 1989, Pat. No. 4,961,432, and a continuation-in-part of Ser. No. 396,655, Aug. 22, 1989, which is a continuation-in-part of Ser. No. 369,610, Jun. 21, 1989. This application Sep. 25, 1989, Ser. No. 412,019**
**Int. Cl.$^5$ A61B** ***5/00***
**U.S. Cl. 128—771** **14 Claims**

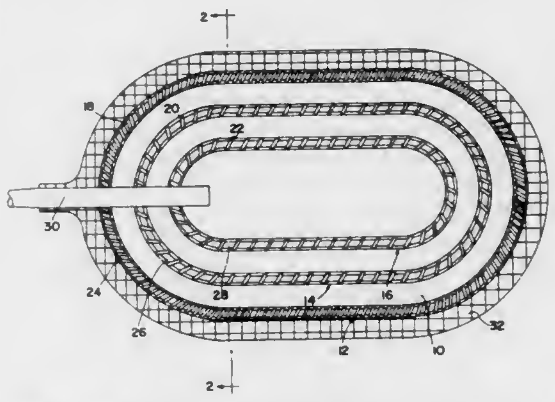


1. A method of testing for the presence of cancer antigen comprising the steps of:
a. collecting urine into an apparatus for collecting biological fluids;
b. passing the urine through a urine treatment container holding an immobilized antibody bead means to capture antigen from the urine;
c. washing the bead means antibody-antigen complex formed in step b to remove non bound materials,
d. mixing the bead means antibody complex with a prelabelled primary antibody solution to form a sandwich complex of antibody antigen prelabelled primary antibody;
e. washing the sandwich complex bead means to remove non bound materials; and
f. immersing the washed sandwich bead means in a coloring reagent which reacts with the prelabelled primary antibody to produce a color which indicates cancer presence.

### 5,016,645
### MEDICAL ELECTRODE LEAD

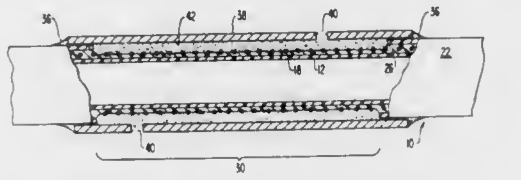
**Terrell Williams, 1444 - 97th Ave. NW., Coon Rapids, Minn. 55433; John G. Keimel, 1888 9th St. NW., New Brighton, Minn. 55112; Roger Rugland, 1935 134th La. NE., Anoka, Minn. 55303; Richard Sandstrom, 12959 Mayberry Trail N., Scandia, Minn. 55073, and Timothy Holleman, 13600 Yancy St., Ham Lake, Minn. 55303**
**Continuation-in-part of Ser. No. 63,371, Jun. 18, 1987, Pat. No. 4,817,634. This application Oct. 31, 1988, Ser. No. 264,916**
**Int. Cl.$^5$ A61N** ***1/05***
**U.S. Cl. 128—784** **9 Claims**

1. A medical electrical lead comprising:
an elastic base pad having an outer periphery;
means for reinforcement mounted to said base pad and limited to the periphery of said base pad, said reinforcement means comprising a fabric mesh;
a plurality of spaced electrodes which take the form of segments of one or more elongated electrode coils arrayed on said base pad interior to said reinforcement means, said base pad free of said reinforcement means in the spaces intermediate said electrodes.



### 5,016,646
### THIN ELECTRODE LEAD AND CONNECTIONS

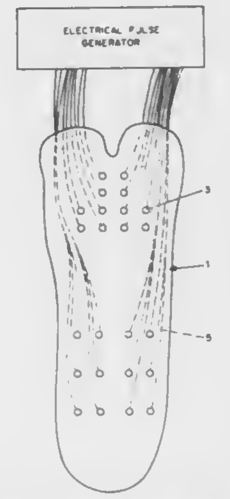
**Gerhard Gotthardt, Castle Hill; Zoran Milijasevic, Elanora Heights; Akira Nakazawa, Balmain, and Michael Skalsky, Waverly, all of Australia, assignors to Telectronics, N.V., Netherlands Antilles**
**Continuation of Ser. No. 277,419, Nov. 29, 1988, abandoned, which is a continuation of Ser. No. 38,785, Apr. 15, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 385,990**
**Int. Cl.$^5$ A61N** ***1/05***
**U.S. Cl. 128—784** **7 Claims**



1. A body implantable electrode lead, comprising:
a first layer of non-conductive material forming an elongated tube;
an intermediate layer of non-conductive material disposed coaxially about said first layer;
a conductor disposed about said first layer and imbedded within said intermediate layer, the conductor being regularly disposed about said first layer and comprising a first conductor;
a second layer of body-compatible non-conductive material formed over said first conductor, said intermediate layer and said first layer, with an annular portion of said second layer and said intermediate layer having been eliminated to expose a section of said regularly disposed first conductor and facilitate electrical connection therewith;
a second conductor provided coaxially about said exposed section of said regularly disposed first conductor, said second conductor effectively forming a conductive ring; and
a conductive adhesive interposed between said regularly disposed first conductor and said conductive ring for electrically and mechanically coupling said conductive ring to said regularly disposed first conductor.

### 5,016,647
### METHOD FOR CONTROLLING THE GLOTTIC OPENING

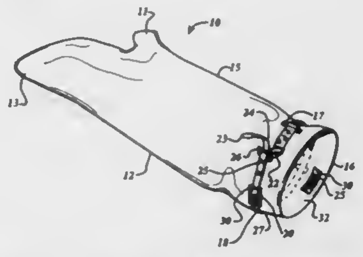
**Ira Sanders, New York, N.Y., assignor to Mount Sinai School of Medicine of the City University of New York, New York, N.Y.**
**Division of Ser. No. 42,440, Apr. 24, 1987, Pat. No. 4,907,602, which is a continuation-in-part of Ser. No. 788,748, Oct. 18, 1985, abandoned. This application Nov. 3, 1989, Ser. No. 431,439**
**Int. Cl.$^5$ A61N** ***1/18***
**U.S. Cl. 128—787** **22 Claims**



1. A method for controllably indirectly stimulating the glottic opening of an animal comprising generating a periodic electrical stimulus and applying the periodic electrical stimulus to a predetermined anatomical site such that the stimulus is transmitted from said predetermined anatomical site to the recurrent laryngeal nerve, said stimulus having a frequency which is selected to evoke a predetermined amount of stimulation in at least one intrinsic larynegeal muscle, and having a current effective to selectively stimulate at least a portion of the recurrent larynegeal nerve.

### 5,016,648
### LIMB PROTECTIVE COVERING

**Ronald E. Brown, 2207 Bowman La., Franklin, Tenn. 37064, and Jack M. Grinwis, 7354 La Costa Dr., Hudson, Ohio 44236**
**Filed Feb. 23, 1990, Ser. No. 485,140**
**Int. Cl.$^5$ A61F** ***13/00***
**U.S. Cl. 128—846** **10 Claims**



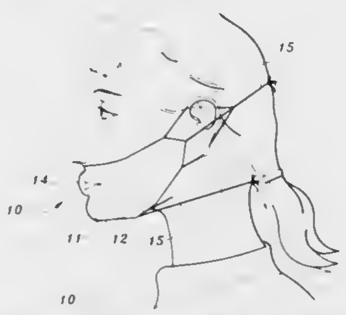
1. A protective covering for a limb comprising:
a. an elongated, generally tubular, flexible, and waterproof member closed at one end and having an opening at another end for receiving said limb, said elongated tubular member also having a sleeve, said sleeve comprising an inner wall and an outer wall;
b. an elongated closure member attached to said sleeve below said opening on said outer wall, said closure member having a first end and a second end;
c. said closure member first end and second end releasably

VOL
1126
ISS
3
MY
21
1991
UMI

attached together for tightening said sleeve around said limb;
d. a cuff exposed and defined by folding said sleeve above said closure member over said closure member;
e. an inner panel attached to said inner wall of said sleeve; and
f. a belt encircling said limb releasably attached to said inner panel.

### 5,016,649
### PROTECTIVE MASK

**Joseph T. Johnson, 8028 Regency Park La., Charlotte, N.C. 28210**
**Filed Oct. 10, 1989, Ser. No. 419,502**
**Int. Cl.$^5$ A61F** *13/12*
**U.S. Cl. 128—859** **3 Claims**

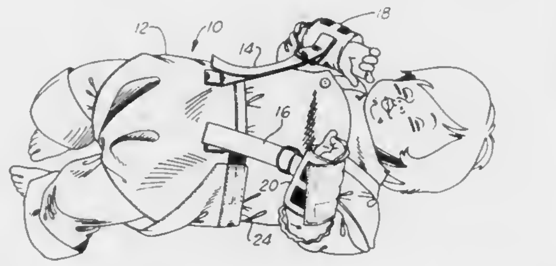


1. A protective device for emergency use by a rescuer in the administration of mouth-to-mouth resuscitation to a patient comprising: p1 (a) a protective mask comprising an elongate, generally planar membrane of a tough film material having, when lying flat, a longitudinal axis and an outline configuration which is asymmetrical about said axis, said membrane being of such a width on either side of said axis as to cover, when worn, are area of the face extending from immediately beneath the nostrils to below the chin and jaw, and substantially all of the cheeks, said outline configuration having a lateral extension portion which, when worn, extends downwardly over and rearwardly under the chin of a wearer, and means secured to end portions of said membrane and to said lateral extension portion for securing the mask wrapped in place over the lower face of a wearer while permitting free movement of the jaw, lips and tongue of the wearer;
(b) a breathing tube insertable through said membrane of said mask, said breathing tube including:
  (i) a tubular member forming a central passageway and having a rescuer end and a patient end;
  (ii) a valve means positioned within the tubular member for permitting the passage of fresh air from the rescuer to the patient but preventing passage of air in the reverse direction; and
  (iii) vent means in a wall of said tubular member between the valve means and the patient end of said tubular member for permitting passage of air leaving the patient's mouth of the atmosphere without reaching the mouth of the rescuer.

### 5,016,650
### ARM RESTRAINT DEVICE FOR CHILDREN AFFLICTED WITH A COMPULSIVE BITING DISORDER

**Brian A. Marlar, 23727 Tuscany, East Detroit, Mich. 48021**
**Filed Mar. 27, 1990, Ser. No. 500,006**
**Int. Cl.$^5$ A61F** *5/37*
**U.S. Cl. 128—878** **5 Claims**

1. A restraint for restraining an individual from making contact between his or her arms and a preselected location upon his or her head, said restraint comprising:
a brief, said brief being structured for placement around the individual's waist and groin, the waist of the individual defining a waist line of said brief;
a first extension member connected to said brief adjacent said waist line, said first extension member being constructed of an inelastic, flexible material;
a second extension member connected to said brief adjacent said waist line, said second extension member being constructed of an inelastic flexible material;
a first wrist band interconnected with said first extension member, said first wrist band being constructed of a flexible material that is structured to wrap around a substantial portion of the forearm of a first arm of said individual between the elbow and the wrist of said first arm, said first wrist band being dimensioned so as to permit the individual to jointably move both the elbow and the wrist of said first arm;
a second wrist band interconnected with said second extension member, said second wrist band being constructed of a flexible material that is structured to wrap around a substantial portion of the forearm of a second arm of said individual between the elbow and the wrist of said second arm, said second wrist band being dimensioned so as to permit the individual to jointably move both the elbow and wrist of said second arm;
first releasable fastener means connected with said first wrist band for releasably securing said first wrist band in a selectively wrapped configuration about the forearm of said first arm of said individual; and
second releasable fastener means connected with said second wrist band for releasably securing said second wrist band in a selectively wrapped configuration about the forearm of said second arm of said individual;
wherein said individual is able to move his or her arms in substantial freedom, yet he or she is unable to move his or her arms such as to effect contact between his or hers arms and his or her mouth.

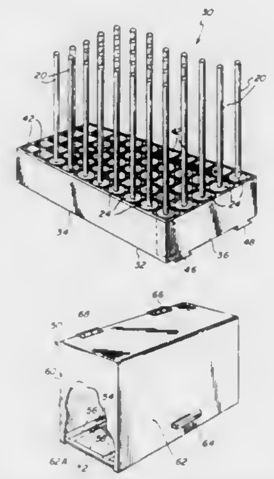


### 5,016,651
### METHOD OF PROVIDING TOPOICAL ANESTHETIC IN A SANITARY AND CONVENIENT MANNER

**Robert W. Stalcup, 21152 Pepopertree La., Mission Viejo, Calif. 92691, and Robert G. McCall, 7468 E. Raintree Ct., Scottsdale, Ariz. 85258**
**Filed Aug. 29, 1989, Ser. No. 400,281**
**Int. Cl.$^5$ A61B** *19/00*
**U.S. Cl. 128—898** **4 Claims**

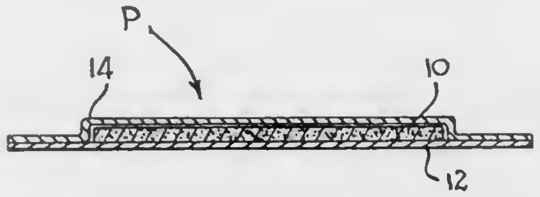
1. A method of providing topical anesthetic in a sanitary and convenient manner for use on patients, said method for use with a base having a selectively openable cover, comprising the steps of:
providing a topical anesthetic suitable for use with mucosal tissue;
providing an applicator having an elongated handle and an applicator member mounted on one end of said elongated handle;
providing a dispenser for removably receiving said applicator, said dispenser being sized to allow insertion thereof into the base and so that the selectively openable cover of the base may close over said dispenser;

applying a predetermined amount of said anesthetic to said applicator member of said applicator; and
placing said applicator within said dispenser so that said handle protrudes to facilitate removal of said applicator from said dispenser for use on patients.



### 5,016,652
### METHOD AND APPARATUS FOR AIDING IN THE REDUCTION OF INCIDENCE OF TOBACCO SMOKING

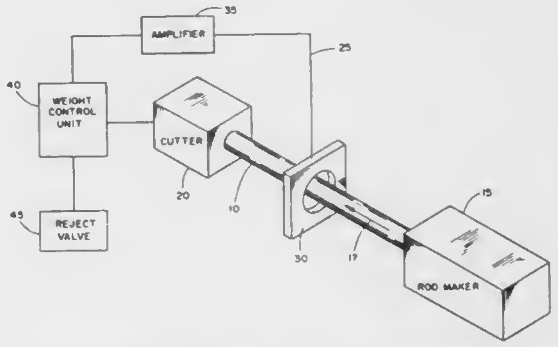
**Jed E. Rose, Venice, and Murray E. Jarvik, Santa Monica, both of Calif., assignors to The Regents of the University of California, Berkely, Calif.**
**Continuation of Ser. No. 727,525, Apr. 25, 1985. This application Feb. 19, 1988, Ser. No. 157,627**
**Int. Cl.$^5$ A24F** *47/00*
**U.S. Cl. 131—270** **24 Claims**



1. A patch adapted for application to the skin of a user for the transdermal administration of nicotine to the user, said patch comprising:
(a) an outer layer which is impermeable to the passage of nicotine,
(b) an inner layer adapted to be placed on the surface of a user's skin, said inner layer being sufficiently porous to enable the passage of nicotine therethrough for transdermal application to the bloodstream of a user,
(c) means associated with said patch to enable said patch to be temporarily and releasably attached to the skin of a user, and
(d) said outer layer and said inner layer forming a nicotine receiving area for receiving nicotine to allow the nicotine to pass through the inner layer.

### 5,016,653
### METHOD AND APPARATUS FOR MANUFACTURING CIGARETTE RODS FREE OF METAL

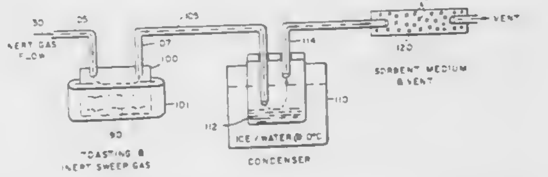
**Wallace R. Lassiter, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**
**Filed Aug. 25, 1986, Ser. No. 900,015**
**Int. Cl.$^5$ A24C** *5/00*
**U.S. Cl. 131—286** **1 Claim**



1. An apparatus for separating rods of predetermined lengths and having detectable metal particulates therein from rods of predetermined lengths and substantially free of detectable metal particulates, the apparatus comprising:
(a) means for forming a moving continuous tobacco rod;
(b) magnetic field variance means for sensing metal particulates within the moving continuous tobacco rod, the magnetic field variance means including a detection means;
(c) means for dividing the moving continuous rod into a plurality of rods, each of predetermined length; and
(d) means for isolating rods of predetermined lengths and containing detectable metal particulates sensed in the moving continuous rod, the means for isolating rods including a weight control device having a reject valve, said weight control device being connected to said detection means.

### 5,016,654
### FLAVOR SUBSTANCES FOR SMOKING ARTICLES

**Edward Bernasek; William M. Hildebolt, both of Winston-Salem; Michael D. Shannon, Lewisville; Gary R. Shelar, Greensboro, and Jackie L. White, Pfafftown, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**
**Filed Dec. 21, 1988, Ser. No. 287,939**
**Int. Cl.$^5$ A24B** *15/18, 15/24*
**U.S. Cl. 131—302** **38 Claims**



1. A process for producing flavor substances from tobacco, comprising:
(a) heating tobacco in an inert atmosphere at a temperature sufficient to drive off volatile materials;
(b) condensing a portion of the volatile materials; and
(c) collecting, as flavor substances, at least a portion of the uncondensed volatile materials.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,655

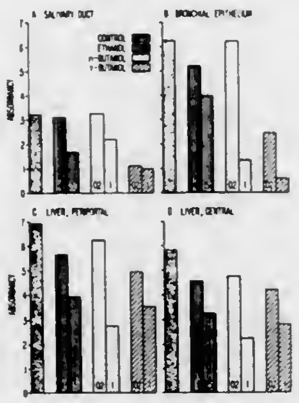
### CIGARETTE MANUFACTURING PROCESS

**William J. Waddell; Carolyn Marlowe, both of Prospect, and L. Douglas Keeney, Louisville, all of Ky., assignors to C.A. Blockers, Inc., Louisville, Ky.**

**Continuation-in-part of Ser. No. 149,482, Jan. 28, 1988, which is a continuation-in-part of Ser. No. 921,823, Oct. 21, 1986, which is a continuation of Ser. No. 834,129, Feb. 26, 1986, abandoned, which is a continuation of Ser. No. 506,824, Jun. 23, 1983, abandoned, said Ser. No. 921,823, is a continuation-in-part of Ser. No. 84,798, Aug. 13, 1987. This application Jan. 27, 1989, Ser. No. 302,284**

**Int. Cl.$^5$ A24B** *15/30*

U.S. Cl. 131—310 40 Claims



1. A tobacco smoking article comprising:
smoking tobacco;
a container in which said smoking tobacco is contained; and
a compound supported by said container, said compound being associated with said smoking tobacco such that when said smoking tobacco is smoked the vapor of said compound is inhaled by the smoker in the tobacco smoke stream, and said compound being present in an amount sufficient to inhibit the selective localization of nitrosamines and metabolities thereof in the tissues of the smoker of said smoking tobacco but not to produce any toxic side effects in the smoker who is inhaling the vapor thereof in the tobacco smoke stream;
wherein said compound is sprayed onto said smoking tobacco before said smoking tobacco is placed in said container.

### 5,016,656

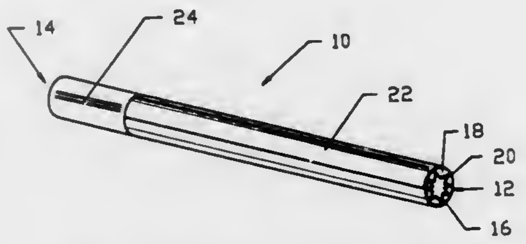
### CIGARETTE AND METHOD OF MAKING SAME

**Andrew McMurtrie, Louisville, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.**

**Filed Feb. 20, 1990, Ser. No. 481,925**

**Int. Cl.$^5$ A24D** *1/00*

U.S. Cl. 131—364 8 Claims



1. A cigarette comprising:
a tube of tobacco material having a circumferential wall fabricated of a tobacco material formed with longitudinally extending grooves and ridges in its outside peripheral surface and longitudinally extending grooves and ridges formed in its inside peripheral surface;
a wrapper of combustible material circumscribing the outside peripheral surface of the tobacco tube in contact with the ridges of the tobacco tube;
a smoke filter rod coaxially located with the tobacco tube at one end thereof; and,
tipping material circumferentially overlapping the wrapped tobacco tube at the end thereof adjacent the filter rod.

### 5,016,657

### HAIR TREATMENT PROCESS AND END WRAP LAMINATE

**William G. Bustance, and Robert E. Borey, both of Traverse City, Mich., assignors to Totally, Inc., Traverse City, Mich.**

**Continuation of Ser. No. 459,055, Jan. 19, 1983, Pat. No. 4,632,132. This application Dec. 29, 1986, Ser. No. 946,988**

**The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.**

**Int. Cl.$^5$ A45D** *7/00*

U.S. Cl. 132—202 10 Claims

1. A process for shielding hair from undesired chemical hair treatment comprising wrapping the hair to be shielded with a protective laminate comprising a layer of a flexible impermeable plastic that prevents penetration of undesired chemicals through the laminate, a layer of a flexible absorbent paper material that retains chemical and resists chemical flow across the laminate, and an adhesive layer that bonds the other two layers together.

### 5,016,658

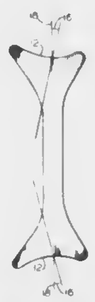
### MAKEUP SHIELD FOR LEFT AND RIGHT EYELASHES

**Kathrine W. Green, 6803 Harbor View Way, Tampa, Fla. 33615**

**Filed Apr. 30, 1990, Ser. No. 516,795**

**Int. Cl.$^5$ A45D** *40/30*

U.S. Cl. 132—216 4 Claims



1. A device for use in the application of eyelash makeup comprising: a narrow elongated handle having a first end and second end; a pair of shields, said first shield attached to said first handle end and said second shield attached to said second handle end; said first shield having a dual radius conforming generally to the shape of user's left lower eyelid; said first shield also curving down and returning inwardly under on both sides, reducing to the width of said handle in such curvatures as required to shape sides of the shield and handle over, around and between facial bone structures of the nose and cheek of the left side of the user's face; said second shield shaped identically to said first shield, except that all curvatures and shapes are in a reverse fashion so as to fit the right side of the user's face; said shield attached to each end of said handle at offset angles causing the respective left or right shields to fit safely and comfortably over the left or right lower eyelids when the device handle is pressed vertically against the user's face; whereby the user may comfortably and safely shield the left or right lower eyelids during lower eyelash makeup applications by pressing the device against the face using only one finger.

---

### 5,016,659

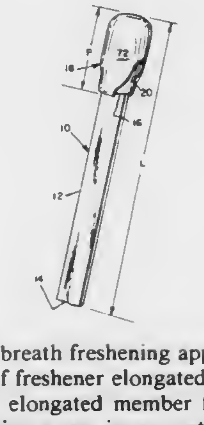
### COMPACT MOUTH AND BREATH FRESHENER APPARATUS

**Eduardo M. Mas, 1528 W. 222nd St., Torrance, Calif. 90501**

**Filed Apr. 2, 1990, Ser. No. 502,998**

**Int. Cl.$^5$ A61C** *15/00*

U.S. Cl. 132—321 21 Claims



15. A mouth and breath freshening apparatus comprising:
a. a multiplicity of freshener elongated members;
b. each freshener elongated member further comprising a freshener retaining means impregnated with a mouth and breath freshening agent, and an elongated stem having an end generally embedded in the freshener retaining means; and
c. a sealing means covering said freshener retaining means of each freshener elongated member, the sealing means having a multiplicity of individual chambers aligned adjacent one another, where the freshener retaining means of a respective freshener elongated member is placed within an individual chamber such that the stem of the respective freshener elongated member extends away from the chamber.

### 5,016,660

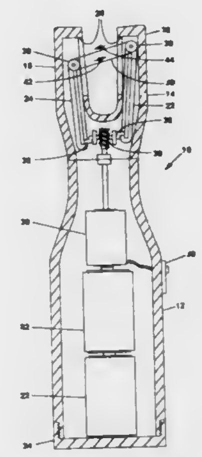
### AUTOMATIC FLOSSING TOOL

**Michael S. Boggs, 106 N. Bryan St., Hicksville, Ohio 43526**

**Filed Mar. 23, 1990, Ser. No. 497,918**

**Int. Cl.$^5$ A61C** *15/00*

U.S. Cl. 132—322 12 Claims



1. A dental flossing tool comprising:
a hollow, generally cylindrical handle,
a bifurcated head portion mounted on one end of said handle and having a pair of arms extending upwardly from said handle,
means carried by the arms of said head portion and movable within said arms for supporting a quantity of dental flossing material,
a motor located within said handle, and
drive means coupling said motor to move the flossing material supporting means to provide movement to said flossing material in a direction substantially parallel to the longitudinal axis of said tools.

### 5,016,661

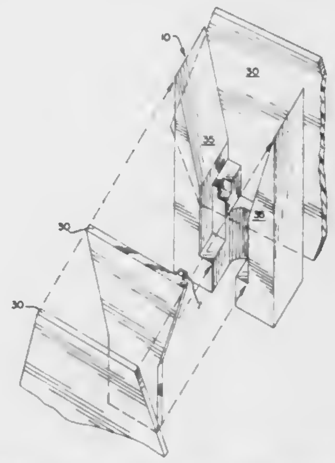
### APPARATUS FOR HOLDING DENTAL FLOSS CONTAINERS

**Gina Israel, 555 Cornelia #1601, Chicago, Ill. 60657, and Bonnie S. LaRussa, 234 N. Rose Ave., Park Ridge, Ill. 60068**

**Filed Jul. 29, 1988, Ser. No. 225,775**

**Int. Cl.$^5$ A61C** *15/00*

U.S. Cl. 132—324 18 Claims



1. A dental floss container holder and floss dispenser for dental floss, comprising:
a housing, said housing having a front and back portion, said front and back portions each having an interior and exterior and defining an interior;
contoured resilient means for retaining various shaped dental floss containers inside the exterior of said housing, said retaining means affixed to the interior of said back portion of said housing;
guide means for directing floss from the dental floss container retained within said contoured retaining means to the exterior of said front and back portions of said housing;
cutting means for detaching the floss said cutting means positioned on the exterior of said front portion of said housing; and
releasable fastening means for fastening said front and back portions of said housing together.

### 5,016,662

### ROLLOVER VEHICLE WASHING APPARATUS WITH HIGH AND LOW PRESSURE SPRAY SYSTEMS

**Lonnie M. Crotts, Greensboro, N.C., and William W. Rambo, Keeling, Va., assignors to Bivens Winchester Corporation, Danville, Va.**

**Continuation of Ser. No. 410,112, Sep. 20, 1987, abandoned, which is a continuation of Ser. No. 225,857, Oct. 11, 1988, Pat. No. 4,865,058. This application Jul. 16, 1990, Ser. No. 552,344**

**Int. Cl.$^5$ B60S** *3/04*

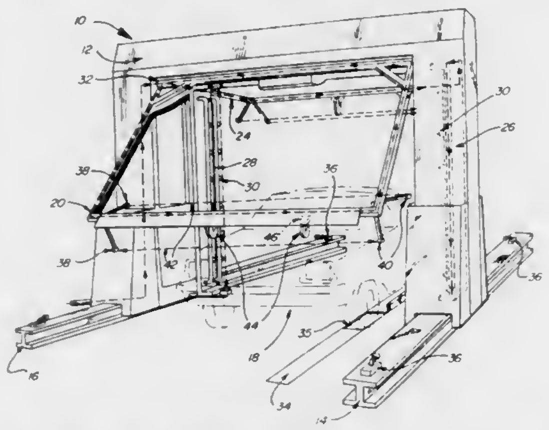
U.S. Cl. 134—45 15 Claims

1. A brushless washing apparatus for washing vehicles comprising:
support means mounted adjacent a vehicle washing area;
a pair of spray arms pivotally mounted on the support means and extending outwardly therefrom in opposite directions over and along the path of relative vehicle travel;

VOL
1126
ISS
3
MY
21
1991
UMI

a spray system mounted on each of said arms having nozzles for spraying a vehicle; and

non-contact drive means for independently moving said spray arms through respective arcs up and down relative to said vehicle during relative movement between the vehicle and the support means in a predetermined sequence of operations in which the spray arms essentially follow the contour of the vehicle.



## 5,016,663
## METHOD OF DETERMINING END OF CLEANING OF SEMICONDUCTOR MANUFACTURING APPARATUS

**Yasukazu Mase, Tokyo; Masahiro Abe, Yokohama, and Osamu Hirata, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

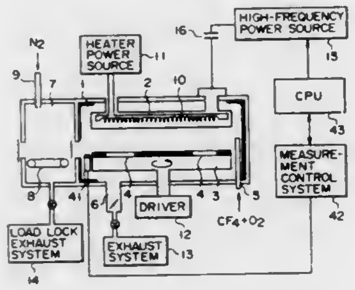
**PCT No. PCT/JP88/00327, § 371 Date Nov. 30, 1988, § 102(e) Date Nov. 30, 1988, PCT Pub. No. WO88/07757, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 31, 1988, Ser. No. 320,643**

**Claims priority, application Japan, Mar. 31, 1987, 62-78505**

**Int. Cl.$^5$ H01L** *21/465, 21/66;* **B08B** *7/00*

U.S. Cl. 134—1 2 Claims



1. An improved method of determining an end of cleaning of a semiconductor manufacturing apparatus having a semiconductor substrate process chamber, comprising the steps of:

cleaning an interior of the chamber using plasma discharge etching;

monitoring a temperature in the chamber using a temperature sensor; and

detecting the end of cleaning by detecting a transition in a rate of change of the monitored temperature.

## 5,016,664
## AUTOMATIC SWITCHING VALVE

**Mark F. Cole, 3520 N. Fiesta Del Sol W., Tucson, Ariz. 85715**

**Filed Aug. 6, 1990, Ser. No. 563,520**

**Int. Cl.$^5$ F16K** *11/02*

U.S. Cl. 137—1 14 Claims

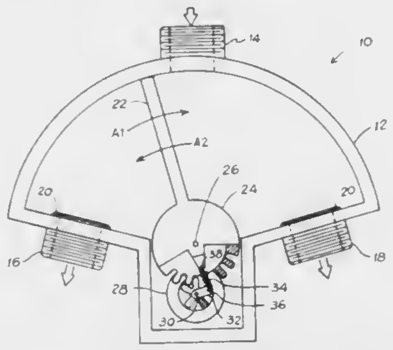
8. A method for automatically and alternately switching the direction of fluid flow between two outlets from a single inlet, comprising the following steps:

(a) providing an enclosed housing containing one central input port, one first and one second output ports located laterally on each side of said input port, and a rotatable gate, wherein said gate is pressed against either one of said output ports by the fluid pressure in the system to hermetically seal it, whereby a fluid connection exists between said inlet port and said other outlet port;

(b) providing a first means for cyclically causing said gate to swing away from said sealed output port to a point past said inlet port when the fluid pressure is released, whereby creating a new fluid path connecting said input port and said previously sealed output port;

(c) providing a second means for causing said first means to be repositioned when the fluid pressure is reestablished with the result that said gate is pushed by the pressure to complete its motion away from said previously sealed output port and to press against said other output port to hermetically seal it, so that said first means is in position to cause said gate to swing in the opposite direction away from said other newly sealed output port to a point past said inlet port when the fluid pressure is again released, whereby creating the same fluid connection existing prior to the beginning of the pressure cycle; and

(d) periodically interrupting the flow of fluid to said input port, so as to cause a pressure drop sufficient to allow the functioning of said first means, and subsequently reestablishing the flow of fluid to said input port, so as to cause a pressure increase sufficient to effect the functioning of said second means.



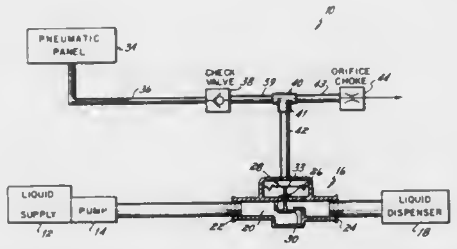
## 5,016,665
## METHOD AND APPARATUS OF ISOLATING PNEUMATIC PANELS IN LIQUID APPLICATION SYSTEMS

**Ronald D. Konieczynski, North Royalton, Ohio, assignor to Nordson Corporation, Westlake, Ohio**

**Filed Mar. 7, 1990, Ser. No. 489,519**

**Int. Cl.$^5$ G05D** *16/18*

U.S. Cl. 137—1 14 Claims



14. The method of protecting an air supply device in a system for applying liquid material, comprising:

supplying liquid material from a source to a pneumatically operated pressure regulator connected to a liquid dispenser;

opening a one-way valve located between the air supply device and a pressure regulator to permit the flow of pressurized air downstream from the air supply device to the pressure regulator so as to control the pressure at which liquid is discharged from the pressure regulator into the liquid dispenser;

closing the one-way valve in the event of a failure of the pressure regulator to block the flow of liquid upstream from the pressure regulator into the air supply device;

venting operating air located between the pressure regulator and the one-way valve to prevent a buildup of pressurized air therebetween during operation of the pressure regulator.

## 5,016,666
## AUTOMATED CHEMICAL STORAGE AND CHEMICAL FEED SYSTEM

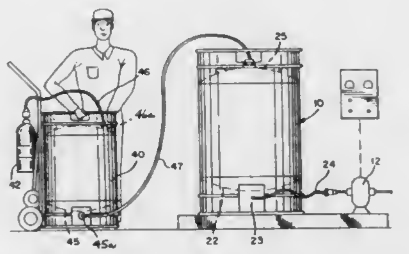
**John M. McKinney, Indian Head Park; Ali D. Ata, Downers Grove; Robert B. Wierzba, Bridgeview, and William F. Flowers, Naperville, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Division of Ser. No. 496,407, Mar. 20, 1990, which is a continuation-in-part of Ser. No. 385,989, Jul. 21, 1989, which is a continuation of Ser. No. 223,862, Jul. 25, 1988, abandoned.**

**This application Sep. 28, 1990, Ser. No. 590,663**

**Int. Cl.$^5$ B67D** *5/54*

U.S. Cl. 137—1 1 Claim



1. A method of transporting a refill tank containing a chemical product to a base tank and transferring the product into the base tank, which includes the use of a wheeled hand truck having a frame for receiving a refill tank and a nitrogen tank and for positioning the truck in one position for wheeling, another for elevating the bottom of the tank, and another for standing the tank upright for transfer of the product to the base tank, and a nitrogen control and feed means for feeding a pressure regulated supply of nitrogen to the refill tank during transfer to the base tank, wherein said refill tank includes a fitting on top for connection to the nitrogen control and feed means and a discharge outlet on the bottom, and wherein said base tank includes a product transfer line connected to the base tank and connectable to the refill tank, the method including the steps of loading a refill tank, a nitrogen cylinder and a nitrogen control and feed means onto the hand truck, wheeling the hand truck to the base station, tilting the hand truck to the position for elevating the bottom of the refill tank, connecting the transfer line from the base tank to the discharge outlet of the refill tank, positioning the hand truck upright for transfer of product, connecting the nitrogen control and feed means between the nitrogen cylinder and the refill tank, and operating the control and feed means to feed a regulated pressure of nitrogen to the refill tank to unload the product and transfer the product to the base tank.

## 5,016,667
## DEVICE FOR A DISH-WASHER

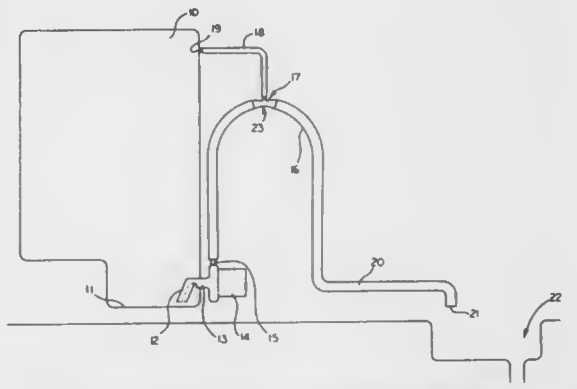
**Anders K. H. Tolf, Jönköping, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden**

**Continuation of Ser. No. 472,579, Jan. 30, 1990, abandoned. This application Nov. 8, 1990, Ser. No. 611,445**

**Claims priority, application Sweden, Feb. 7, 1989, 8900407**

**Int. Cl.$^5$ A47L** *15/42;* **F04F** *10/00*

U.S. Cl. 137—143 3 Claims



1. A device for a dishwasher comprising a tub (10) in which liquid is circulated for cleaning dishes, a drain pump (14) having an inlet which is placed near the bottom of said tub, and a conduit (16) through which the liquid is emptied from the machine, said conduit having a highest point which is situated at the upper part of the machine, wherein the conduit adjacent the highest point has an ejector (17) through which the liquid flows during the emptying procedure and the suction side of which communicates with said tub, said injector having a constricted throat (23) that creates a negative pressure when discharge water flows through said injector, said negative pressure drawing air from the tub thereby preventing any contaminated water from entering the tub during discharge.

## 5,016,668
## CONNECTION FOR EXTENSIONS OF INFLATING VALVES OF MOTOR VEHICLE TIRES

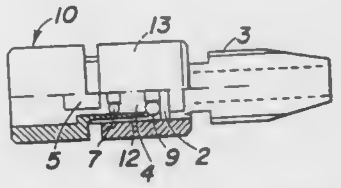
**Aldo Nicolino, Strada Contessa 35, Caselette, and Maurizio D. Cero, Via S. Rocco 7, Piossasco, both of Italy**

**Filed Jan. 22, 1990, Ser. No. 467,901**

**Claims priority, application Italy, Jan. 23, 1989, 52827/89[U]**

**Int. Cl.$^5$ F16K** *15/20*

U.S. Cl. 137—231 5 Claims



1. A vehicle tire valve assembly, comprising:

a vehicle tire valve including a valve stem and a movable valve element, said movable valve element being positioned within said valve stem for opening and closing said valve;

an extension for connecting said vehicle tire valve to an air line; and

connection means for coupling said valve stem and said extension, said connection means including a connection body having first and second axially aligned body elements and a flange separating said body elements, said first body element including connection means for engaging

VOL 1126 ISS 3 MY 21 1991 UMI

said extension, said second body element including valve stem connecting and sealing means opening said valve after sealing connection is established between said valve stem and said connection body, said valve stem connection and sealing means comprising an axial appendage for actuating said movable valve element, said axial appendage forming an end part of said second body element, remote from said flange, a cylindrical portion positioned between said flange and said appendage, said cylindrical portion having a substantially smooth inner side surface and having a radial dimension which is greater than said axial appendage, an annular groove formed between said axial appendage and said cylindrical portion, said annular groove defining a seat, a sealing gasket positioned in said seat arranged for exerting a radial sealing action against an inner surface of said valve stem when said second body element is received therein.

---

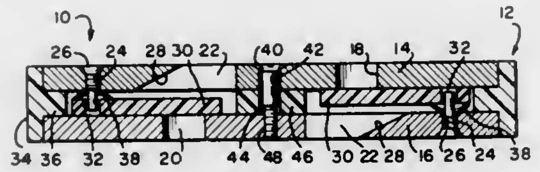
### 5,016,669
### VALVE ASSEMBLY

**Richard A. Jamieson, Horseheads, N.Y., assignor to Dresser-Rand Company, Corning, N.Y.**

**Filed Jun. 4, 1990, Ser. No. 532,846**

**Int. Cl.$^5$ F16K** *15/16*

**U.S. Cl. 137—512** **7 Claims**



1. A valve assembly, for a fluid-handling machine, comprising:

a valve body;

said body having inlet and discharge ports formed therein; and

valving elements confined within said body; wherein

said body comprises a pair of substantially identical plates coupled together; and further including

means fastened to each of said plates, and in penetration of said valving elements, holding said valving elements in place; and wherein

each of said plates has a tapped hole formed therein;

each of said valving elements has a hole formed therein; and

said holding means comprises a fastener threadedly engaged with said tapped hole and having a shank portion engaged with said hole in said element.

---

### 5,016,670
### FUEL TANK STRUCTURE FOR AUTOMOTIVE VEHICLE

**Michiaki Sasaki, Hadano, and Katsunori Ozaki, Zama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Dec. 7, 1989, Ser. No. 446,521**

**Claims priority, application Japan, Dec. 7, 1988, 63-307781**

**Int. Cl.$^5$ F02M** *37/00*

**U.S. Cl. 137—574** **12 Claims**

12. In a fuel tank structure for an automotive vehicle, a fuel collector unit comprising:

a fuel tank body;

a collector body fixed relative to a bottom wall of said fuel tank body,

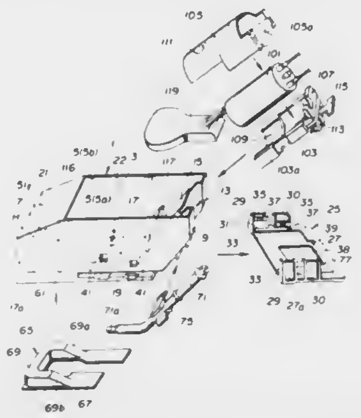
said collector body including a fuel collecting chamber and fuel passage means, formed just below said fuel collecting chamber and having an inlet adjacent to said bottom wall of said fuel tank body and an outlet opening upwards to communicate with said fuel collecting chamber, for conducting fuel in said fuel tank body into said fuel collecting chamber,

said fuel passage means including dam means, located between said inlet and said outlet, for preventing fuel located below a predetermined vertical level which is higher than said inlet from flowing out through said inlet, said dam means comprising

a first passage extending from said inlet,

a second passage extending from said outlet, and

a third passage connecting said first and second passage, said third passage being positioned at the highest vertical level through a length of said first, second, and third passage,



said first and second passages each having a slanted portion which connects said highest vertical level to a lower vertical level; and

ejecting means for ejecting oversupplied return fuel into said first passage through said inlet so as to suck the fuel therearound, said sucked fuel being mixed with said ejected return fuel and being introduced into said first passage trough said inlet to be conducted into said fuel collecting chamber trough said third passage, said second passage, and said outlet.

---

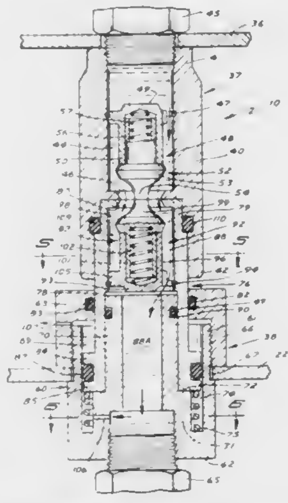
### 5,016,671
### HYDRAULIC COUPLING

**Robert D. Barwise, Rte. 2, Box 208, Bovey, Minn. 55709**

**Filed Mar. 12, 1990, Ser. No. 492,494**

**Int. Cl.$^5$ F16L** *37/28*

**U.S. Cl. 137—614.04** **19 Claims**



12. A hydraulic coupling comprising:

a first connector having a generally cylindrical housing with a first fluid passage extending through the first housing from a distal end at a distal end opening to a proximal end at a proximal end opening;

means on the first housing for connection to a first hydraulic fluid line at the distal end opening thereof;

a first pintle valve assembly located in the first fluid passage in stationary relationship to the first housing, said first pintle valve assembly including a first valve seat located in the first fluid passage recessed relative to the proximal end opening, a first pintle, means for movement of the pintle into and out of closing engagement with the valve seat from a direction behind the valve seat relative to the proximal end of the housing, said first pintle having a pintle head engagable with the first valve seat and a pintle tip extended outward of the pintle head, and a first pintle spring biasing the pintle in engagement with the valve seat;

a second connector having a second housing having an interior chamber and a distal end opening at a distal end, and a proximal end opening at a proximal end, means on the second housing at the distal end opening for connection to a second hydraulic fluid line;

a plunger having an elongate barrel portion with an inboard end movably located in the chamber of the second housing and spaced from the walls thereof, and an outboard end extended outward of the housing through the proximal end opening, a second fluid passage extending through the barrel portion of the plunger and communicating with the distal end opening of the second housing at the outboard end;

a second pintle valve assembly assembled in stationary relationship to the plunger located in the second fluid passage of the plunger including a second valve seat at the outboard end of the barrel portion of the plunger, a second pintle located in the second fluid passage, means for movement of the second pintle into and out of closing engagement with the second valve seat, said second pintle having a pintle head engageable with the second valve seat and a pintle tip extended outward of the pintle head, and a second pintle spring biasing the pintle head in engagement with the second valve seat;

sealing means located between the plunger and the interior chamber of the second housing making sliding sealing engagement between the plunger and the walls of the interior chamber;

a plunger spring situated in the chamber of the second housing and acting on the inboard end of the plunger to bias the plunger in a proximal direction outward of the housing; and

annular flange means located on the barrel portion of the plunger toward the inboard end thereof.

---

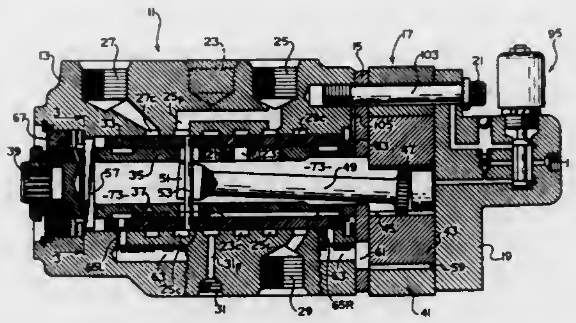
### 5,016,672
### STEERING CONTROLLER WITH INTEGRAL PARALLEL CONTROL

**Dwight B. Stephenson, Savage, Minn., assignor to Eaton Corporation, Cleveland, Ohio**

**Filed Apr. 23, 1990, Ser. No. 513,366**

**Int. Cl.$^5$ F15B** *13/04*

**U.S. Cl. 137—625.24** **36 Claims**



1. A controller operable to control the flow of fluid from a source of pressurized fluid to a fluid pressure operated device; said controller being of the type including housing means defining an inlet port for connection to the source of pressurized fluid, a return port for connection to a reservoir, and first and second control fluid ports for connection to the fluid pressure operated device; valve means disposed in said housing means, and comprising a primary, rotatable valve member and a cooperating, relatively rotatable follow-up valve member, said primary and follow-up valve members defining a neutral rotary position and a first rotary operating position in which said primary valve member is rotatably displaced from said neutral rotary position, relative to said follow-up valve member; said primary valve member defining first and second fluid passages, and said follow-up valve member defining a first fluid port in continuous fluid communication with said inlet port, and a second fluid port in continuous fluid communication with said first control fluid port; said first fluid port being blocked from fluid communication with said first fluid passage, and said second fluid port being blocked from fluid communication with said second fluid passage when said valve members are in said neutral rotary position; said first fluid port being in fluid communication with said first fluid passage, to define a first variable flow control orifice, and said second fluid port being in fluid communication with said second fluid passage, to define a second variable flow control orifice when said valve members are in said first rotary operating position; said housing means and said valve members cooperating to define a first main fluid path providing fluid communication between said first and second variable flow control orifices when said valve members are in said first rotary operating position; characterized by:

(a) said primary and follow-up valve members defining a neutral axial position and a first axial operating position;

(b) said controller including means operable to bias said valve members toward said neutral axial position, and means operable to displace said valve members to said first axial operating position;

(c) said primary valve member defining first and second axial fluid passages, and said follow-up valve member defining a first axial fluid port in continuous fluid communication with said inlet port, and a second axial fluid port in continuous fluid communication with said first control fluid port;

(d) said first axial fluid port being blocked from fluid communication with said first axial fluid passage, and said second axial fluid port being blocked from fluid communication with said second axial fluid passage when said valve members are in said neutral axial position; and

(e) said first axial fluid port being in fluid communication with said first axial fluid passage to define a first variable axial flow control orifice, and said second axial fluid port being in fluid communication with said second axial fluid passage to define a second variable axial flow control orifice when said valve members are in said first axial operating position, said valve members cooperating to define a first parallel fluid path providing fluid communication between said first and second variable axial flow control orifices when said valve members are in said first axial operating position.

---

### 5,016,673
### FLOW SELECTOR DEVICE

**William Carter, Indianapolis; David A. Meadows, Danville; Jay L. Hayes, and John S. Voege, both of Indianapolis, all of Ind., assignors to Puritan-Bennett Corporation, Overland Park, Kans.**

**Filed Jul. 1, 1988, Ser. No. 214,488**

**Int. Cl.$^5$ F16K** *3/32, 51/00*

**U.S. Cl. 138—45** **30 Claims**

1. A flow selector device, comprising, in combination,

a housing body means provided with an inlet means and an outlet means, and an intermediate outlet means intermediate the inlet means and the outlet means, the said housing

VOL
1126
ISS
3
MY
21
1991
UMI

body means' intermediate outlet means having an upstream end and a downstream end, each of the said upstream end and downstream end having an opening,

a rotor body supported by the housing body means to be rotationally movable with respect thereto, and there being means holding the rotor body axially with respect to the housing body means,

the support of the rotor body being such as to provide an optionally selectable setting of a plurality of optionally selectable rotor body settings, each of the settings providing a certain flow of fluid from the intermediate outlet means of the housing body means;

a selector control for rotating the rotor body about a rotor body axis in rotational movement relative to the housing body means to an optionally selected one of the plurality of rotor body settings to achieve optionally-desired flow from the intermediate outlet means of the housing body means,

the rotor body being provided with a face extending transverse to said rotor body axis, and with a plurality of passageways extending in the direction of the said rotor body axis, through the rotor body, and each of said passageways having an inlet and an outlet,

the inlet of all of such passageways being open to the housing body means' inlet means but the outlet of only one of such passageways being registrable with the upstream end of the housing body means' intermediate outlet means in any particular rotational setting of the rotor body with respect to the housing body means, although the outlet of all said passageways open to said rotor body face,

the support of the rotor body, and the rotor body, and the rotor body's said face, being such that said rotor body's face is in axial alignment with the upstream end's opening of the intermediate outlet means of the housing body means, regardless of the rotational setting of the rotor body, even though at any setting of the rotor body only a particular one of the passageway outlets can be in registry with the upstream end's opening of the intermediate outlet means of the housing body means,

the rotor body including a shank extending outwardly of the housing body means and operatively concentric with the axis of rotation of the rotor body,

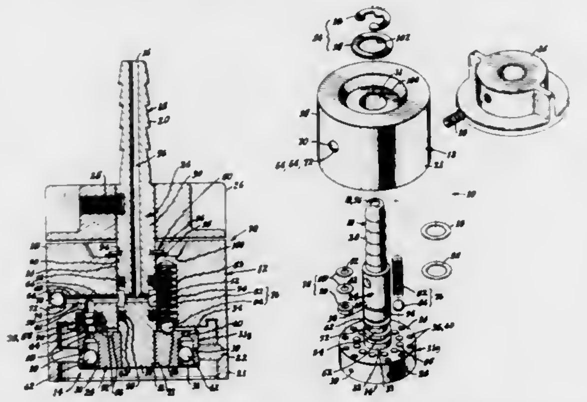
the downstream end of the housing body means' intermediate outlet means being at an offset location with respect to said rotor body axis,

the housing body means being provided with a housing body means' passageway extending in the housing body means transversely to the said rotor body axis, and communicating with the downstream end opening of the housing body means' intermediate outlet means, and providing the outlet means for the housing body means,

the shank being provided with a passageway extending in the shank and transversely to the rotor body axis,

one of the housing body means and the shank being provided with a circumferentially-extending annular groove operatively communicating the housing body means' said passageway with the shank's said passageway regardless of the rotational position of the rotor body and the shank's said passageway,

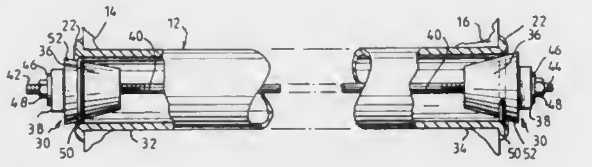
and the shank is provided with an outlet passageway communicating with the shank's said transversely-extending passageway and operatively concentric with the shank and the rotor body, and the rotor body's axis of movement, and providing an outlet for the flow selector device operatively concentric with the axis of rotation of the rotor body.



---

### 5,016,674
### ROD PLUG CAPS

**Stephen J. Kiss, 371 Sapir St., Valley Stream, N.Y. 11580**
**Filed Jan. 22, 1990, Ser. No. 468,004**
**Int. Cl.$^5$ F16L** *55/16*
**U.S. Cl. 138—91** **2 Claims**



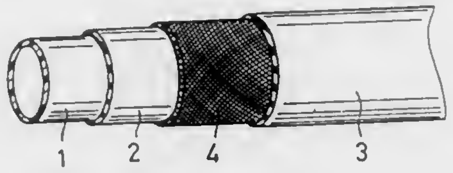
1. A plug for leaky tubes of a heat exchanger, said leaky tubes having ends with outside surfaces and diameters, comprising:

(a) a frustrum shaped tapered hollow plug having a top, a length, and a diameter at the top, said diameter of said top being the widest of said plug;
(b) a plug nut formed on said top of said plug, said plug nut and said plug being formed from one homogeneous piece of material;
(c) a threaded rod disposed longitudinally through the leaky tube, said threaded rod passing through said plug and said plug nut and then through a gasket washer and a rod nut; and
(d) an "O"-ring disposed inside the leaky tube around said plug, said plug diameter at the top being less than the outside diameter of the end of the tube so that nothing extends or protrudes past the outside surface of the end of the tube and therefore, allowing the stopped tubes to be disposed in close proximity to each other and to the other tubes of the heat exchanger.

---

### 5,016,675
### REFRIGERANT TRANSPORTING HOSE

**Ichiro Igarashi, Komaki, and Hiroaki Ito, Kasugai, both of Japan, assignors to Tokai Rubber Industries, Ltd., Aichi, Japan**
**Filed Oct. 16, 1989, Ser. No. 421,758**
**Claims priority, application Japan, Oct. 18, 1988, 63-262054**
**Int. Cl.$^5$ F16L** *11/12*
**U.S. Cl. 138—125** **14 Claims**



1. A refrigerant transporting hose comprising:

an inner tube;

an outer tube located radially outwardly of said inner tube; and

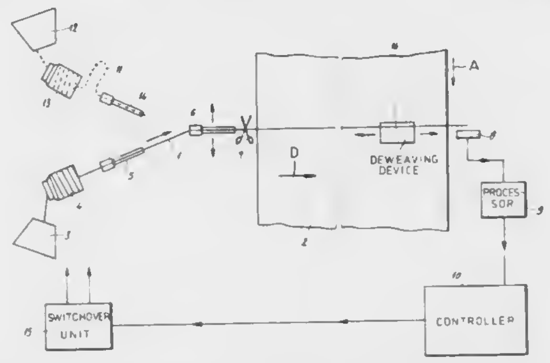
a reinforcing fiber layer interposed between said inner and outer tubes, such that said reinforcing fiber layer and the inner and outer tubes constitute an integral tubular body;

said inner tube including a resinous layer formed of a composition containing as a major constituent thereof a blend of at least one aliphatic polyamide and at least one aromatic polyamide, said resinous layer having a thickness of 0.05 to 1.0 mm.

---

### 5,016,676
### SYSTEM FOR DETECTING AND CORRECTING WEFT MISFEEDS

**Roger Fourneaux, La Tour Du Pin, and Gilles Grandvallet, Bourgoin Jallieu, both of France, assignors to S. A. Saurer Diederichs, Bourgoin Jallieu, France**
**Filed Feb. 7, 1990, Ser. No. 477,359**
**Claims priority, application France, Feb. 7, 1989, 89 01918**
**Int. Cl.$^5$ D03D** *47/34, 51/34*
**U.S. Cl. 139—116.2** **4 Claims**



1. In a loom wherein:

a weft filament is fed from a supply and inserted in a weft direction through a warp so as to project from a downstream edge of the warp;

a sensor is provided at the downstream edge for detecting the presence of a weft filament thereat and generating an output corresponding thereto;

a deweaving device operates in a deweaving step when the sensor detects no weft filament at the downstream edge after the weft is inserted by stripping a filament from the warp and ejecting it from the warp past the sensor; a control system comprising:

control means connected to the sensor and loom for

shutting down the loom when the sensor detects that no filament is ejected by the deweaving device during and immediately after the deweaving step,

shutting down the loom when the sensor detects a filament immediately after the deweaving step, and

restarting the loom when the sensor detects a filament during but not immediately after the deweaving step.

---

### 5,016,677
### AUTOMATIC COP CHANGING DEVICE FOR A WEAVING MACHINE

**Fumio Murakami, Saitama; Sadaaki Okazaki, Tokyo; Takayoshi Aoyagi, Kanagawa; Tokuji Iwasaki, Chiba, and Tetsuya Konno, Kanagawa, all of Japan, assignors to Nippon Felt Co., Ltd., Tokyo, Japan**
**Filed Nov. 29, 1989, Ser. No. 443,609**
**Claims priority, application Japan, Dec. 7, 1988, 63-309598; Dec. 7, 1988, 63-309599**
**Int. Cl.$^5$ D03D** *45/20*
**U.S. Cl. 139—245** **16 Claims**

1. An automatic cop changing device for a weaving machine in which a shuttle carrying a cop consisting of a bobbin around which a weft is wound is reciprocated between warps so as to weave said weft between said warps, comprising:

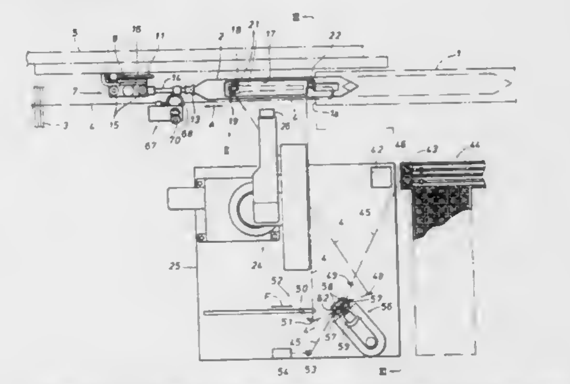
cop positioning means for keeping said shuttle stationary near a terminal point of its reciprocating movement when the weft of a current cop mounted on said shuttle is consumed by more than a prescribed amount;

cop storage means for storing a plurality of new cops;

weft pulling means for drawing the weft from said current cop and a weft from one of said new cops stored in said cop storage means, and crossing said two wefts;

weft tying means for tying said crossed part of said wefts;

weft trimming means for trimming an extraneous part of said tied weft; and



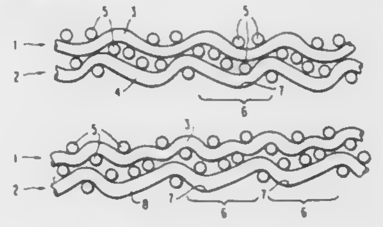
cop replacing means for removing said current cop from said shuttle, and mounting said new cop on said shuttle;

said cop replacing means consisting of a single robot arm comprising a base rotatable around a vertical axis, an arm assembly movable both radially and vertically with respect to said base, and a hand assembly carried by a free end of said arm assembly to manipulate said shuttles.

---

### 5,016,678
### DOUBLE-LAYER PAPERMAKING FABRIC HAVING A SINGLE SYSTEM OF NON-SYMMETRICALLY EXTENDING LONGITUDINAL THREADS

**Georg Borel, Reutlingen, and Dagmar Arnold, Beuren, both of Fed. Rep. of Germany, assignors to Hermann Wangner GmbH & Co., Fed. Rep. of Germany**
**Filed May 11, 1989, Ser. No. 350,284**
**Claims priority, application Fed. Rep. of Germany, May 19, 1988, 3817144**
**Int. Cl.$^5$ D03D** *15/00*
**U.S. Cl. 139—383 A** **6 Claims**



6. A double-layer fabric for the sheet forming section of a papermaking machine comprising an upper and lower layer of transverse threads which are interwoven with a system of longitudinal threads to define a plurality of weave repeats, the transverse threads of the lower layer forming transverse thread floats each having a lowest point which is offset from the center of each float towards one side, wherein successive transverse threads of the lower layer form pairs and within a pair a lowest point of the transverse thread floats are in alignment in longitudinal direction and the lowest point of the float of the one transverse thread of a pair is offset from the center of the float in the direction opposite to the direction in which the lowest point (7) of the float (6) of the other transverse thread of the pair is offset and wherein said longitudinal threads within each fabric weave repeat are woven twice into the lower layer to define two binding pints, each longitudinal thread (5) when descending into the lower layer extending beneath a transverse thread, over two transverse threads and again beneath a transverse thread in the lower layer and then rising toward the upper layer, said transverse threads of the lower layer over which the longitudinal thread extends between said binding points forms one of the pairs and wherein

VOL
1126
ISS
3
MY
21
1991
UMI

the distribution of the binding points is an atlas distribution on opposite sides of the fabric.

---

### 5,016,679

### ELASTICALLY MOUNTED PNEUMATIC THREAD FEED DEVICE

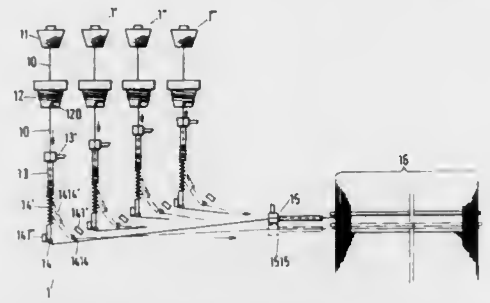
**Geradus Cox, Geldrop, Netherlands, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Mar. 13, 1990, Ser. No. 493,963**

**Claims priority, application Switzerland, Mar. 28, 1989, 1120/89**

**Int. Cl.⁵ D03D** *47/34*

**U.S. Cl. 139—450** **24 Claims**



1. A thread feed device comprising

an intermediate store for receiving a supply of thread from a thread supply;

a first nozzle for conveying the thread therethrough;

a second nozzle downstream of said first nozzle and said store for picking the thread into a warp shed; and

a spring-biased thread guide element for guiding the thread into said second nozzle, said guide element being disposed to deflect the thread in a direction into said second nozzle, said guide element being movable in said direction towards said second nozzle during a braking of a thread at a point upstream of said guide element and being biased in an opposite direction after said braking of the thread to retract the thread relative to said second nozzle.

---

### 5,016,680

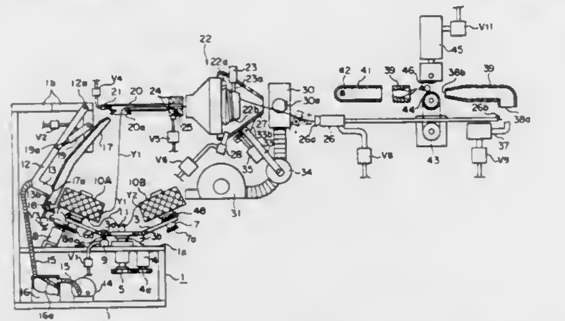
### WEFT PROCESSING AND RELEASING APPARATUS IN A JET LOOM

**Kinpei Mitsuya, and Masahiko Murata, both of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan**

**Filed Feb. 26, 1990, Ser. No. 485,330**

**Int. Cl.⁵ D03D** *47/34*

**U.S. Cl. 139—452** **18 Claims**



1. A weft processing apparatus in a jet loom including a weft supply having a peripheral surface around which a weft is wound, and means for measuring a length of weft fed from said weft supply and for reserving the measured weft therein, the weft length-measuring and reserving means having a weft introducing port to receive therein the weft fed from the weft supply, said apparatus comprising:

means for releasing the leading end of the weft from the peripheral surface of the weft supply;

means for jetting a fluid to move, by the jetted fluid, the weft leading end released by said releasing means to the weft introducing port of the weft length-measuring and reserving means; and

means for guiding the weft leading end, which is moving toward the weft introducing port together with said jetted fluid from said fluid jetting means, into said weft introducing port.

---

### 5,016,681

### ELECTROMAGNETIC BLOCKING UNIT FOR A WEFT STORAGE DRUM

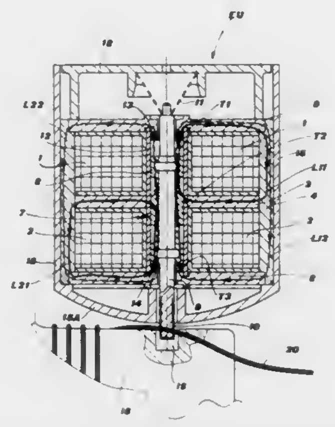
**Fiorenzo Ghiardo, Vigliano Biellese, Italy, assignor to ROJ Electrotex S.p.A., Biella, Italy**

**Filed Oct. 16, 1989, Ser. No. 421,933**

**Claims priority, application Italy, Oct. 14, 1988, 22324 A/88**

**Int. Cl.⁵ D03D** *47/36*

**U.S. Cl. 139—452** **5 Claims**



1. In combination with a weft feeding device winding drum, an electromagnetic unit comprising a stem movable along its axis to a first position laterally engaging a weft yarn on said drum to stop unwinding thereof, and a second position permitting free unwinding thereof, said electromagnetic unit further comprising first and second adjacent coaxial electromagnetic coils, energization of said first coil moving said stem to said first position and energization of said second coil moving said stem to said second position wherein the electro magnetic coils are adapted to reduce any recoils of the stem as it reaches its first position.

---

### 5,016,682

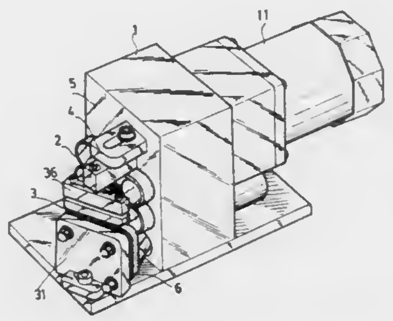
### ELECTRIC WIRE TWISTING MACHINE

**Chuang P. Young, 1 Fl., No. 3, 4 Alley, 225 Lane, Chung Hsiao E. Road, Sec. 6, Taipei, Taiwan**

**Filed Jan. 22, 1990, Ser. No. 467,955**

**Int. Cl.⁵ B21F** *7/00*

**U.S. Cl. 140—149** **11 Claims**



1. An electric wire twisting machine, including:

a transmission mechanism comprising a motor, a driving rod set and a driving gear set, said driving rod set and driving gear set being carried to rotate by said motor;

an electric wire top clamping mechanism carried to operate by said driving gear set; and electric wire twisting mechanism carried to operate by said driving rod set; and

a position adjusting mechanism to adjust the positioning of said electric wire twisting mechanism relative to said electric wire top clamping mechanism;

wherein said electric wire top clamping mechanism clamps and carries in a linear direction the threads of the wire top of an electric wire inserted therein while simultaneously said electric wire twisting mechanism twists and carries in a linear direction the root portion of such an electric wire so as to let the threads of the wire top of such an electric wire be twisted into a cored.

---

### 5,016,683

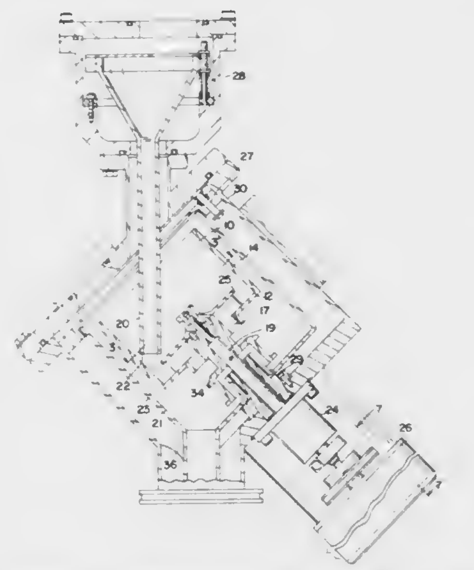
### APPARATUS FOR CONTROLLABLY FEEDING A PARTICULATE MATERIAL

**Henry C. Latka, Rochester, N.Y., assignor to General Signal Corporation, Rochester, N.Y.**

**Filed Mar. 27, 1990, Ser. No. 499,583**

**Int. Cl.⁵ B65B** *1/04;* **B01F** *15/02*

**U.S. Cl. 141—1** **22 Claims**



1. Apparatus for replenishment of a silicon material in a crucible of a crystal growing furnace, comprising:

means for injecting said silicon material into said crystal growing furnace;

means for controlling the feeding rate of said silicon material, said feeding rate being determined by detected conditions in said crucible;

said means for controlling the feeding rate including: a drum mounted for rotation about an axis tilted at an acute angle with reference to a horizontal axis, said drum including a bottom wall having an inner surface, an outer periphery and a center and an annular, upstanding wall;

at least one cavity, at least a portion of which is formed in the inner surface of said bottom wall, said cavity extending from about the outer periphery of said bottom wall at one end and towards the center thereof at an other end;

said cavity at one of its said ends communicating with at least one outlet means means for storing said silicon material located at a position elevated above said cavity;

means for supplying said particulate material from said storing means into said at least one cavity, said supplying means having an outlet port for said material, said supplying means being so positioned in relation to the drum that said outlet port directs the material into the cavity only when said cavity is in a rotational position in which its end having said outlet means is elevated with respect to a horizontal plane above the opposite end of the same cavity, said supplying means being also so positioned that its said outlet end pours the material into that portion of the receiving cavity which is remote from the outlet means for such receiving cavity;

means for blocking the flow of said particulate material to said cavity when the level of said particulate material above said cavity reaches a predetermined level;

means for rotating said drum about said tilted axis; and

means for controlling the rate of rotation of said drum;

whereby upon rotation of said drum, said at least one cavity is being filled with said particulate material fed from said supplying means during the rotation of said drum through a first angular portion of its rotation when said outlet means for said cavity is disposed above the already filled portion of the cavity and is emptied to discharge said material through said at least one outlet means by gravitational force during the rotation of said drum through a second angular portion of its rotation when said outlet means for the cavity is below the said filled portion of the cavity, the feeding rate of said material being discharged through said outlet means being controlled by the rate of rotation of said drum; and

means for receiving material from said outlet means of said drum, and supplying said material at said selected feeding rate to said injecting means which communicates with said crystal growing furnace for delivering said silicon material into said crucible.

---

### 5,016,684

### METHOD AND APPARATUS FOR DISPENSING CARBONATED LIQUIDS, ESPECIALLY BEVERAGES, INTO CONTAINERS UNDER COUNTER PRESSURE

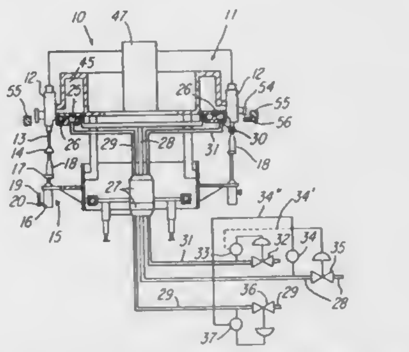
**Ludwig Clüsserath, Bad Kreuznach, Fed. Rep. of Germany, assignor to Seitz Enzinger Noll Maschinenbau Aktiengesellschaft, Mannheim, Fed. Rep. of Germany**

**Continuation of Ser. No. 318,729, Mar. 3, 1989, abandoned. This application Aug. 10, 1990, Ser. No. 566,864**

**Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807046**

Int. Cl.⁵ B67C *3/08*

**U.S. Cl. 141—6** **24 Claims**



1. In a method of dispensing a carbonated liquid, especially a beverage, into a container, such as a bottle, under counterpressure, whereby the introduction of said liquid, which is under a filling pressure, into said container, which is in a sealing position with a filling element, is effected during a filling phase that follows pressurizing of said container, whereby return gas displaced by incoming liquid is withdrawn from said container, at least for a while, via a return gas passage of said filling element, and whereby after termination of said filling phase, with said container still in a sealing position with said filling element, first a pre-relief of pressure in said container to a pre-relief pressure is effected in a prerelief phase, and subsequently a predetermined relieving of pressure in said container to atmospheric pressure is effected, comprising the improvement steps wherein:

VOL
1126
ISS
3
MY
21
1991
UMI

regulating of said pre-relief pressure occurs in such a way for variable adjusting in a stepless manner to a pressure that is between atmospheric pressure and the saturation pressure of said liquid, that during said pre-relief phase it is still just possible for released carbon dioxide to rise in the dispensed liquid without there occurring during said relieving to atmospheric pressure an undesired escaping of liquid from a filled container as a result of disadvantageous foaming of said liquid, said regulating of the relief pressure for said variable adjusting to a stepless manner to the pressure that is between atmospheric pressure and the saturation pressure of said liquid thus effecting greatly increased efficiency and output during dispersion of carbonated liquid.

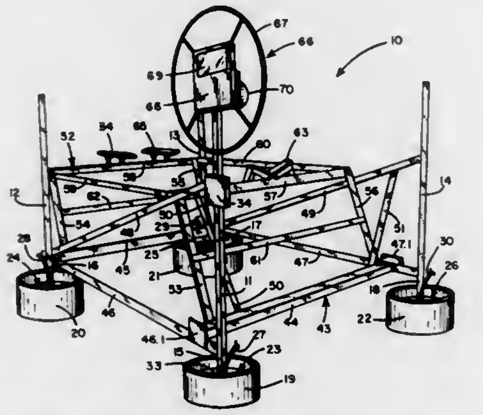
---

### 5,016,685
### DEVICE FOR SLIDING AND FLOATING A BOAT LIFT

**Norman N. Fender, 520 Shady La., Posey Lake, Hudson, Mich. 49247**

**Filed Mar. 23, 1989, Ser. No. 327,905**
**Int. Cl.⁵ B63C** ***1/02***

**U.S. Cl. 114—45** **4 Claims**



4. A floatable and pneumatically-operated support for docks and boat lifts which are supportable above the water surface by legs standing in the water, comprising:
- (a) a plurality of air containers, one air container independently associated with each of said legs, each container having an air chamber comprising an inner tube attached about one of said legs;
- (b) means for introducing air into each of said containers to increase the buoyancy thereof and to expand said air chamber;
- (c) means for bleeding air from each said air chamber to reduce the buoyancy of each said container.

---

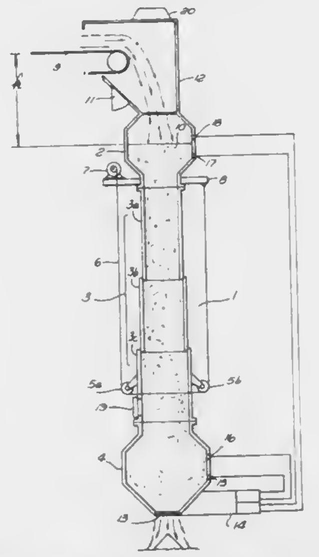
### 5,016,686
### METHOD AND APPARATUS FOR LOADING PARTICULATE MATERIALS

**Ralph Gerstenkorn, Garden Grove, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Oct. 6, 1989, Ser. No. 418,064**
**Int. Cl.⁵ B65G** ***65/32***

**U.S. Cl. 141—96** **3 Claims**

1. A loading chute for loading particulate material into a transport vehicle, comprising:
- a product charge hopper;
- a major chute portion having a first end in communication with said product charge hopper and a second, opposite end;
- a product discharge hopper having a first end in communication with said second end of said major chute portion and a second, opposite end;
- valve means for controlling discharge of said particulate material from said second end of said product discharge hopper;
- lower level control means for determining when said particulate material accumulates above a predetermined maximum or fails below a predetermined minimum level, said lower level control means being located downstream of said major chute portion;
- upper level control means for determining when said particulate material accumulates above a predetermined maximum or falls below a predetermined minimum level, said upper level control means being located upstream of said major chute portion; and
- valve control means for regulating said valve means in response to said lower level control means or said upper level control means, each of said lower and upper level control means comprising at least one low level sensor means for determining when particulate material falls below a predetermined minimum level and at least one high level sensor means for determining when particulate material accumulates above a predetermined maximum level, wherein said valve control means causes said valve means to close when said at least one low level sensor means senses a predetermined minimum level and said valve control means causes said valve means to open when said at least one high level sensor means senses a predetermined maximum level, said valve control means further including switching means for changing which of said lower level control means and said upper level control means controls said valve control means.



---

### 5,016,687
### DEVICE FOR PREVENTING LIQUID FROM DRIPPING FROM FILLING NOZZLE OF LIQUID FILLING MACHINE

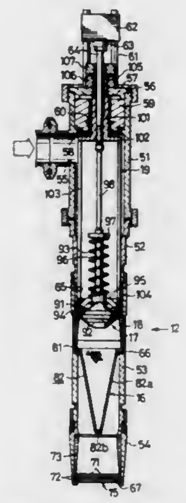
**Seizo Kawamura, Tokushima, Japan, assignor to Shikoku Kakoki Co., Ltd., Tokushima, Japan**

**Filed Jun. 12, 1989, Ser. No. 365,152**
**Int. Cl.⁵ B67C** ***3/02***

**U.S. Cl. 141—116** **3 Claims**

1. A liquid filling machine comprising:
- a metering cylinder for housing a piston;
- a filling nozzle having an upper end connected to the metering cylinder;
- a check valve means having a valve element reciprocally mounted in a valve seat disposed in an intermediate portion of the filling nozzle between the upper and lower ends thereof for permitting liquid to flow down through the filling nozzle while preventing the reverse flow

thereof, the check valve seat being movable upward or downward;
- a porous member means attached to the lower end of the filling nozzle for preventing the liquid from flowing down through the filling nozzle due to gravity, the check valve means upon upward movement thereof produces a negative pressure in a space between the check valve means and the porous member means within the filling nozzles to thereby prevent the liquid from dripping from the filling nozzle;
- a means for preventing the liquid from dripping from the filling nozzle, wherein the liquid drip prevention means includes:



- a valve guide means for guiding the check valve means when the check valve means is moved upward or downward by a change in the internal pressure of the metering cylinder due to the operation of the piston and for permitting the upward movement of the check valve means,
- a movable upper stopper means for restricting the upward movement of the check valve means,
- a lower stopper means for restricting the downward movement of the check valve means,
- a stopper guide means for guiding the upper stopper means for an upward or downward movement, and
- means for adjusting the position of the upwardly or downwardly movable upper stopper means in the upward or downward direction.

---

### 5,016,688
### ROLLER BOTTLE FILLING AND HARVESTING SYSTEM

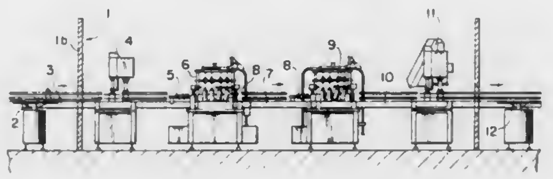
**Akira Suzuki; Shoichi Matsuda, both of Tokyo; Yasutami Muto, Akayama, and Kazuo Aoki, Tokyo, all of Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 5, 1989, Ser. No. 417,645**

**Claims priority, application Japan, Oct. 7, 1988, 63-253553; Oct. 7, 1988, 63-253554; Oct. 7, 1988, 63-253555; Oct. 18, 1988, 63-262069; Oct. 18, 1988, 63-262070**

**Int. Cl.⁵ B65B** ***31/02***

**U.S. Cl. 141—170** **8 Claims**



1. A roller bottle filling and harvesting system wherein a decapper, a medium harvesting and cleaning apparatus, a medium filling apparatus and a capper are disposed in an aseptic chamber, comprising a medium harvesting and cleaning apparatus provided with a roller bottle feed that aligns the pitch of a plural number of roller bottles, simultaneously tilts said plural number of roller bottles from the upright position and to a predetermined angle and withdraws medium from said roller bottles, and returns said roller bottles to the upright position, a roller bottles inner surface cleaning apparatus to introduce cleaning liquid into said roller bottles, a roller bottle tilt and roll apparatus to tilt said roller bottles to a predetermined angle and rotate the same for a predetermined time and then transfer the same to a supply conveyor provided adjacently, and means for simultaneously tilting to a predetermined angle said plural number of roller bottles aligned and supplied from said medium filling apparatus, withdraw said cleaning liquid from the inside of said roller bottles, return said roller bottles to the upright position, introduce predetermined amounts of medium and $CO_2$ simultaneously into said roller bottles through a double nozzle, and transfer said roller bottles to a supply conveyor provided adjacently thereof, said roller bottle feeder further comprising:
- a plural number of bottle feed levers adapted to advance the roller bottles along a horizontal table of the apparatus, said feed levers being fixed to a tact rod that rises from and sinks at a predetermined cycle from slits in said horizontal table,
- a support bracket that axially supports support rollers supporting said tact rods so as to be freely reciprocating in the horizontal direction,
- a drive shaft fixed to a raising and lowering cam that causes said roller support brackets to rise and fall at a predetermined cycle,
- a rocking lever to produce a rocking motion in said bottle feed levers so that they reciprocate horizontally at a predetermined cycle, and
- a feed cam fixed to said drive shaft so that a rocking motion of a predetermined angle is transferred to said rocking lever.

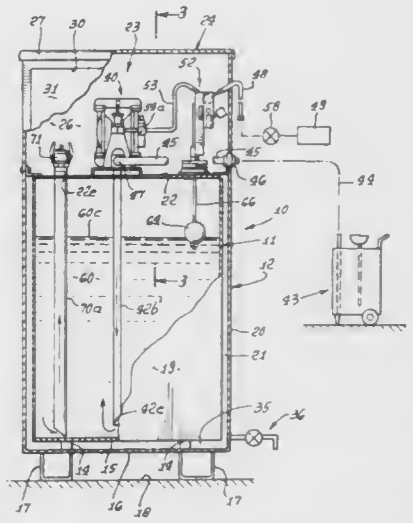
---

### 5,016,689
### SAFETY TANK APPARATUS FOR LIQUID STORAGE

**David C. McGarvey, San Gabriel, and David C. Whitman, Victorville, both of Calif., assignors to LRS, Inc., South El Monte, Calif.**

**Filed Jan. 8, 1990, Ser. No. 462,634**
**Int. Cl.⁵ B65B** ***88/06***

**U.S. Cl. 141—198** **26 Claims**



1. In safety tank apparatus for installation to receive and store a liquid hydrocarbon or hydrocarbons, or the like, and

VOL
1126
ISS
3
MY
21
1991
UMI

from which the liquid may be withdrawn, the combination comprising:

(a) tank structure including an inner metallic tank, and an outer metallic tank protectively receiving the inner tank, the outer tank having a side wall, there being an upper interior space above the inner tank and within the tank structure,

(b) the tank structure including a cover extending over said inner and outer tanks,

(c) an opening in an upper continuation of said side wall, and a locking closure closing said opening, the closure movable to expose said upper interior space to direct sideward access from the exterior,

(d) and control means below said cover, and directly horizontally accessible through said opening for controlling flow of said liquid into the inner tank from the exterior of said safety apparatus and via said upper interior space,

(e) said locking closure at all times being above the level of liquid in the inner tank.

---

### 5,016,690
### DOSING DEVICE ON A FILLING PLANT, IN PARTICULAR FOR LIQUID AND PASTY PRODUCTS, AND PROCESS FOR ITS OPERATION

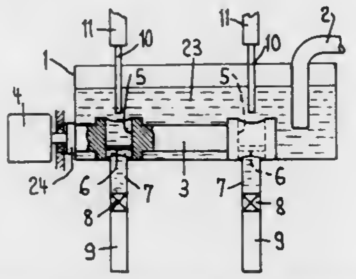
**Billy Ljung-crantz, Brunnmattstrasse 40, 3007 Bern, Switzerland**

**Continuation of Ser. No. 221,513, Jun. 13, 1988. This application May 11, 1990, Ser. No. 523,267**

**Claims priority, application Switzerland, Oct. 14, 1986, 4092/86**

**Int. Cl.$^5$ B65B** *1/00, 3/04*

**U.S. Cl. 141—242** **18 Claims**



1. A dosing device on a filling plant, in particular for liquid and pasty products, having a product storage container having at least one outlet, a rotatable shaft disposed in said product storage container, said shaft being provided with at least one bore extending perpendicular to the longitudinal axis of said rotatable shaft, said bore being in vertical alignment with said outlet to allow said products to flow from said container through said bore and out of said container outlet, a bilaterally operable piston disposed in said bore, the stroke of said piston determining the desired volume of product to be dosed from the bore, an actuating stand which engages said piston, said actuating stand secured to an actuating shaft which moves the stand into and out of engagement with said piston, wherein said actuating shaft is vertically adjustable in an adjustment device in order to determine the stroke of said piston, and wherein said actuating stand is a tripod.

---

### 5,016,691
### APPARATUS FOR CENTERING TEMPLATE GUIDE ON ROUTER

**Lucien Bernier, 570 Citation Way, Thousand Oaks, Calif. 91320**

**Filed Jun. 19, 1990, Ser. No. 540,095**

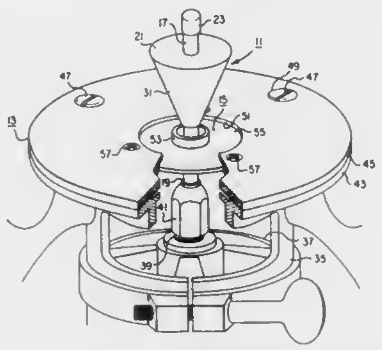
**Int. Cl.$^5$ B27C** *5/10*

**U.S. Cl. 144—134 D** **8 Claims**

1. A centering apparatus for centering a hollow cylindrical template guide in a router, comprising:

(a) a shaft having first and second ends, said shaft being adapted to be received by said router so as to extend through said guide;

(b) a conical member having first and second ends, said conical member having an exterior surface extending between said conical member first and second ends, said exterior surface being conical in shape, said exterior surface being adapted to engage said hollow guide;



(c) said conical member having a passage extending between said conical member first and second ends, said passage receiving said shaft such that said conical member can slide along said shaft, wherein said conical member can move along said shaft to center said guide when said shaft is received by said router.

---

### 5,016,692
### VENEER CUTTING MACHINE FOR TREE TRUNKS WITH IMPROVED ANTIBENDING DEVICE

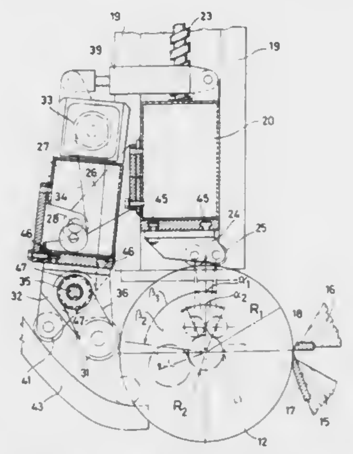
**Lorenzo Cremona, Monza, Italy, assignor to Angelo Cremona & Figlio S.p.A., Milan, Italy**

**Filed May 2, 1990, Ser. No. 517,668**

**Claims priority, application Italy, May 5, 1989, 21021/89[U]**

**Int. Cl.$^5$ B27L** *5/02*

**U.S. Cl. 144—213** **11 Claims**



1. A rotary veneer cutting machine for cutting sheets of veneer from tree trunks comprising rotating means for rotatably supporting a trunk to be cut, a cutting blade having a cutting edge, means for bringing the cutting blade toward said tree trunk with its cutting edge extending parallel to the axis of rotation of the trunk, two sets of rollers mounted for rotation about axis parallel to the axis of the trunk, a first set of rollers comprising a plurality of idling rollers spaced along the length of the tree trunk and located substantially in a first plane that is perpendicular to a second plane that passes through the axis of rotation of the trunk and the edge of the cutting blade and a second set comprising a plurality of driven rollers spaced along the axial length of the tree trunk and substantially located opposite the cutting blade in said second plane, means for rotating said second set of rollers and thrust and actuator means for thrusting both said sets of rollers against the perimeter of the trunk to counteract bending and twisting of the trunk during cutting thereof and for keeping the said sets of rollers in contact with the trunk as its diameter varies.

---

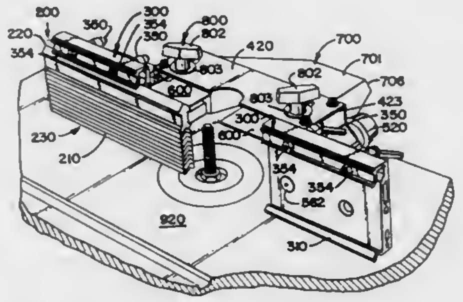
### 5,016,693
### GUIDE FENCE FOR POWER TOOLS

**Jeff L. Haffely, Gibsonia; Mark G. Stahler, Oakmont, and Barry D. Wixey, Pittsburgh, all of Pa., assignors to Delta International Machinery Corporation, Pittsburgh, Pa.**

**Filed May 22, 1990, Ser. No. 525,266**

**Int. Cl.$^5$ B27B** *31/00*

**U.S. Cl. 144—253 J** **14 Claims**



2. A guide fence comprising:

(a) a plurality of longitudinally elongated members having (i) first and second longitudinal ends, (ii) first and second lateral sides, and (iii) first and second transverse surfaces wherein the first surface is laterally convex and the second surface is laterally concave, and

(b) a means for releasability coupling at least two nested elongated members so as to create a flat surface from the first lateral sides of the coupled members.

---

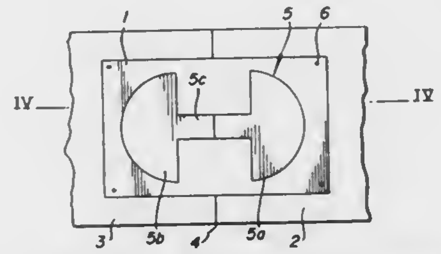
### 5,016,694
### CLAMPING ASSEMBLY

**Richard L. Wagner, 2801 SW. 156 Ave., Davie, Fla. 33331, and William C. Weber, 3460 SW. 19th St., Fort Lauderdale, Fla. 33312**

**Filed Mar. 9, 1990, Ser. No. 491,265**

**Int. Cl.$^5$ B27C** *5/00*

**U.S. Cl. 144—144.5 R** **8 Claims**



6. Kit for interconnecting two work-pieces, comprising a jig for cutting recesses in surfaces of two abutting workpieces to be connected together along a separating line, said jig including a jig body having two substantially D-shaped cutouts formed therein defining substantially semi-circular edges and substantially flat edges of the jig body at said D-shaped cutouts, said flat edges having a given length, and said jig body having an elongated cutout formed therein interconnecting said flat edges, said elongated cutout having a width being less than said given length; and a clamping assembly including at least two clamping members with inner surfaces facing towards each other and outer surfaces facing away from each other, a bolt passing through holes formed in said clamping members, said bolt including a bolt head and a threaded section, and said inner surfaces including means for gripping the work surface when said clamping assembly is placed in the recesses cut into the workpieces, with said clamping members fitting into the recesses defined by said D-shaped cutouts and said bolt fitting into the recess defined by said elongated cutout.

---

### 5,016,695
### PNEUMATIC TIRE HAVING THE HIGHEST RIGIDITY TREAD RIB OFFSET FROM THE EQUATORIAL LINE

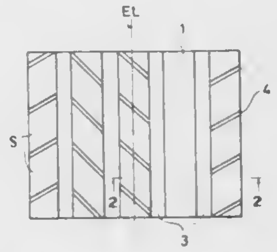
**Tetsuya Kuze, and Toshihiko Suzuki, both of Hiratsuka, Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan**

**Filed Apr. 18, 1989, Ser. No. 339,832**

**Claims priority, application Japan, Apr. 19, 1988, 63-94552**

**Int. Cl.$^5$ B60C** *11/04*

**U.S. Cl. 152—209 A** **4 Claims**



1. A pneumatic radial tire having a tread pattern and a shoulder side of the tire located on an outer side of a vehicle when the tire is mounted on the vehicle which smoothly blends from a tread surface to a sidewall portion of the tire when viewed in cross-section, comprising: at least one rib provided in the circumferential direction of the tire and a plurality of blocks each formed by partitioning the tread surface into a plurality of main grooves provided in the circumferential direction of the tire and a plurality of subgrooves provided in the direction crossing the circumferential direction of the tire, wherein a rib having the highest rigidity in the circumferential direction of the tire of said at least one rib is offset from the equatorial line of the tire to said shoulder side of the tire; a group of said blocks are formed on both sides of said rib having the highest rigidity in the circumferential direction of the tire and in a rib having the highest rigidity in the circumferential direction of the tire of said at least one rib, when the distance from the equatorial line of the tire to the center in the widthwise direction of said rib is a, the width b of said rib is 12 to 25 mm, the width and depth of the main groove provided on the shoulder side adjacent to said rib are c and e, respectively, and the distance from the equatorial line of the tire to the ground-contacting end of the shoulder portion is d, the distance a of said rib and the width c of said main groove satisfy respectively the following relationships:

$$0.2d \leqq a \leqq 0.65d \qquad (I)$$

$$(e/2) \leqq c \leqq (2b/3) \qquad (II).$$

---

### 5,016,696
### SELF-CLEANING TIRE TREAD

**Mark L. Bonko, Hartville, and Loran C. Lopp, Jr., Wadsworth, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Oct. 11, 1989, Ser. No. 419,879**

**Int. Cl.$^5$ B60C** *11/08*

**U.S. Cl. 152—209 B** **12 Claims**

1. An agricultural tread, having an equatorial plane and a net-to-gross ratio in the range of 25% to 40%, the tread comprising:

an inner tread surface;

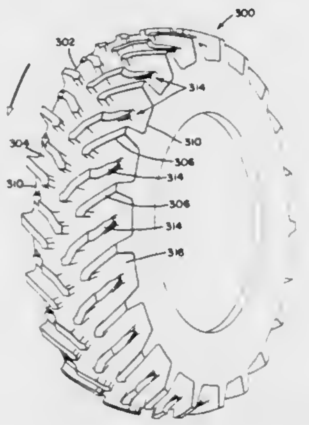
a first and a second lateral edge;

two sets of circumferentially spaced primary lugs extending radially outwardly from the inner tread surface to a

VOL 1126
ISS 3
MY 21 1991
UMI

ground contacting surface, the first set of primary lugs extending generally axially inwardly from the first lateral edge, the second set of primary lugs extending generally axially inwardly from the second lateral edge;

two sets of circumferentially spaced secondary lugs extending radially outwardly from the inner tread surface to a ground contacting surface, the lugs of the first set of secondary lugs extending generally axially inwardly from an axial outermost end spaced axially inwardly of the first lateral edge, the lugs of the first set of secondary lugs being disposed circumferentially between the lugs of the first primary set of lugs, the lugs of the second set of secondary lugs extending generally axially inwardly from an axial outermost end spaced axially inwardly of the second lateral edge, the lugs of the second set of secondary lugs being disposed circumferentially between the lugs of the second set of primary lugs; and



a plurality of tread elements, each element having a height measured perpendicularly from a radial outer surface to the inner tread surface that is less than the radial height of a lug as measured perpendicularly at a plane perpendicular to the equatorial plane of the tread from a ground contacting surface of the lug to the inner tread surface, each of the elements being disposed generally axially outwardly of the axially outermost end of a second lug, elements axially outward of lugs of the first set of secondary lugs being circumferentially between lugs of the first set of primary lugs and extending toward the first lateral edge, elements axially outward of lugs of the second set of secondary lugs being circumferentially between lugs of the second set of primary lugs and extending toward the second lateral edge, wherein each tread element is more flexible than the lugs circumferentially adjacent to the tread element to promote a cleaning action.

---

## 5,016,697
## SAFETY TIRE HAVING DEFINED CARCASS CURVATURE FROM THE POINT OF MAXIMUM WIDTH TO THE BEAD

**Hiroyuki Noma; Saneto Saitou, and Masaharu Ono, all of Kobe, Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**

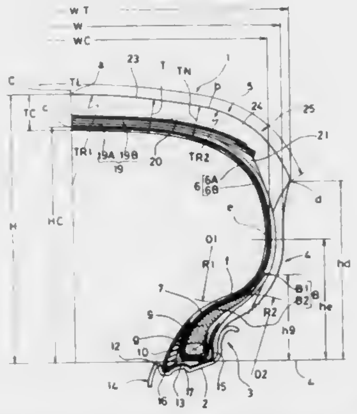
**Filed Oct. 25, 1988, Ser. No. 262,300**

**Claims priority, application Japan, Oct. 27, 1987, 62-272557**

**Int. Cl.$^5$ B60C** *3/04, 17/00*

**U.S. Cl. 152—454** **3 Claims**

1. A pneumatic tire having
a tread portion,
a pair of bead portions,
a pair of sidewall portions therebetween,
a pair of bead cores one disposed in each bead portion,
a carcass extending between said bead portion through said sidewall portions and said tread portion and turned up in both edges around said bead cores to be secured thereto and to form carcass turnup portions and a carcass main portion therebetween,
a tread disposed on said carcass,
a belt disposed between said tread and said carcass and having cords laid at a relatively small angle to the tire equator, and
a pair of bead apexes one disposed between said carcass main portion and each of said carcass turnup portions,
wherein, in a state that the tire is assembled on a specified rim and inflated to a specified pressure,
the aspect ratio of the tire defined as the tire sectional height/the tire maximum width is not more than 80%,
the axial width WT of said tread is greater than the maximum width WC of the carcass,
each edge of said tread is positioned at a height within a range 50 to 100% of the sectional height HC of said carcass,



said carcass being provided on each side of the tire equator with a convex arc part with a radius **R1** and a concave arc part with a radius **R2**, said arc parts smoothly contacting each other at an inflection point therebetween,
said convex arc part having the center of curvature positioned inside the tire and extending radially inwardly from the point of the maximum width WC of said carcass to said inflection point,
said concave arc part having its center of curvature positioned outside the tire and extending radially inwardly from said inflection point to the vicinity of a contact point at which the carcass contacts with the bead core,
the radius **R2** of said concave arc part is greater than the radius **R1** of said convex arc part, and
at least one of said bead portions being provided with a radially inwardly extending toe located axially inside said bead core to be inserted into an annular groove formed on the rim, and a groove located axially outside said toe to be fitted into a hump formed on the rim.

---

## 5,016,698
## PNEUMATIC RADIAL TIRES WITH IMPROVED POLYVINYL ALCOHOL BELT CORDS

**Shizuo Iwasaki, and Norio Inada, both of Kodaira, Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed Aug. 21, 1990, Ser. No. 570,560**

**Claims priority, application Japan, Aug. 24, 1989, 1-216114; Feb. 20, 1990, 2-37157**

**Int. Cl.$^5$ B60C** *9/20, 9/26*

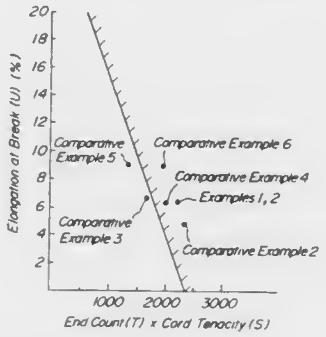
**U.S. Cl. 152—527** **5 Claims**

1. A pneumatic radial tire comprising at least two belt reinforcing layers, at least one of which layers being a belt reinforcing layer composed of high modulus polyvinyl alcohol fiber (PVA) cords or PVA fiber cords embedded in rubber, characterized in that a cord tenacity S (kg) and a cord elongation at break U (%) of said PVA fiber cord taken out from said belt reinforcing layer and an end count T per 5 cm of said belt

reinforcing layer at a crown center portion satisfy the following relationship:

$$12(S\times T)+1000U>28000 \qquad (1),$$

and a cord diameter L (mm) of said PVA fiber cord and said end count T per 5 cm satisfy the following relationship:



$$(L\times T)/50\times 100<80 \qquad (2),$$

and a dynamic modulus of elasticity E′ at 100° C. and 30 Hz of said PVA fiber cord taken out from said belt reinforcing layer satisfies the following relationship:

$$0.7\times 10^{11}dyn/cm^2<E'<2.0\times 10^{11}dyn/cm^2 \qquad (3).$$

---

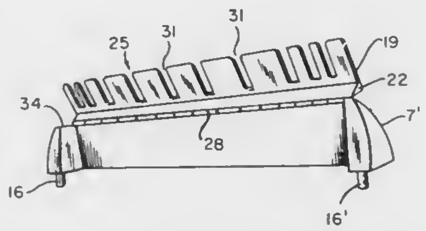
## 5,016,699
## AWNING COVER

**Oliver C. Akers, 110 Honeysuckle La., and Verlin C. Spurlock, 5642 Shawnee Dr., both of Huntington, W. Va. 25701**

**Filed Jun. 8, 1989, Ser. No. 362,970**

**Int. Cl.$^5$ E04F** *10/00*

**U.S. Cl. 160—22** **35 Claims**



1. An awning cover particularly suitable for use in protecting awnings installed on recreational vehicles and mobile homes or the like, said awning cover comprising:
an elongated hood member including open rear and bottom portions, protective top and front portions, and opposing protective side portions extending rearwardly and downwardly from said front and top portions, respectively;
said front portion including a trough which extends along a lower edge thereof adapted to collect and divert water which runs downwardly from an upper portion of said hood member to said lower edge;
drainage means positioned in at least one of said side portions in communication with said trough to permit water collected by said trough to be diverted to and discharged from a side of said hood member; and
an L-shaped mounting bracket having first and second legs, said first leg having an end joining said second leg and an end remote therefrom having means pivotally attached to the rear of said top portion of said hood member, said second leg comprising means for attaching said bracket to a vertical mounting surface, thereby permitting said hood member to be rotated upwardly and rearwardly upon mounting of said hood member on said vertical mounting surface.

---

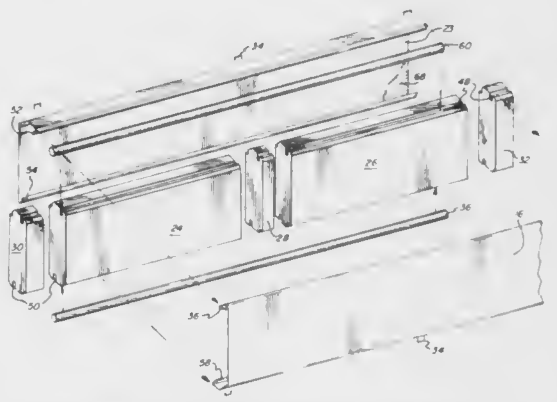
## 5,016,700
## INSULATED METAL PANEL GARAGE DOOR

**David K. Wegner, Milford, and Larry J. Schlicht, Oxford, both of Mich., assignors to The Stanley Works, New Britain, Conn.**

**Filed Jul. 5, 1990, Ser. No. 548,074**

**Int. Cl.$^5$ E06B** *3/12*

**U.S. Cl. 160—232** **19 Claims**

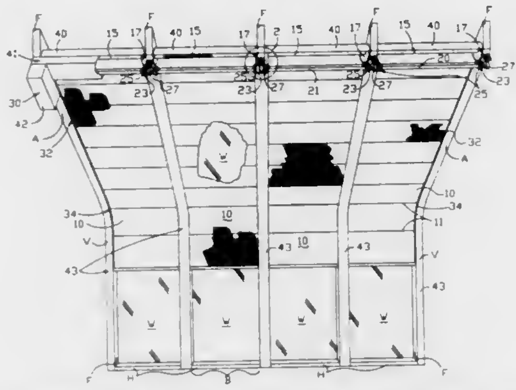


1. In a garage door, the combination comprising:
(A) a multiplicity of transversely extending panels each comprising
  (i) a preformed core of synthetic resin having front and rear faces and upper and lower edges; and
  (ii) integrally formed metallic front and rear skins having a vertically extending face portion and top and bottom edge portions, said front and rear skins of each panel being of the same configuration but with one skin rotated 180° about the horizontal axis of the door relative to the other skin so that it is reversed and said skins face oppositely from said core, the front skin having its face portion extending along the front face of said core and the top edge portion having a configuration extending rearwardly from said face portion and comprising, seriatim, (a) an inwardly and then upwardly extending wall portion defining a shelf-like recess adjacent the front face, (b) a generally horizontal top wall portion and (c) a depending lip portion, the bottom edge portion of said outer skin having a configuration extending rearwardly from said face portion comprising, seriatim, (a) a generally U-shaped portion extending downwardly from said core and configured and dimensioned to be received within said shelf-like recess of the next lower panel, (b) a generally horizontal portion, and (c) an upwardly extending lip portion, the rear skin having its face portion bearing against the rear face of said core and having the top and bottom edges reversed from the orientation of said front skin to provide an upstanding inverted U-shaped lip portion along its upper edge portion and a shelf-like portion on its lower edge portion, the upper and lower edge portions of said skins being spaced apart, said core having its top edge formed with a shelf-like recess adjacent its front face and having a channel-like recess spaced rearwardly therefrom, the bottom edge having a shelf-like recess adjacent its rear face, and a channel-like recess spaced forwardly therefrom, said depending lip portions on the upper edge portions of said skins extending into said channel-like recess in said top edges of said core and the upwardly extending lip portions on the bottom edge portions of said skins extending into said channel-like recess on the bottom edge of said core,
(B) hinge means hingedly connecting said panels.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,701
### WINDOW SHADE CONVEYOR SYSTEM

**Danny D. Vore, Rte. 1, Box 192, Eaton, Ind. 47338**
**Filed Aug. 20, 1990, Ser. No. 569,856**
**Int. Cl.$^5$ A47H *5/00***
**U.S. Cl. 160—241** **12 Claims**



1. A window shade conveyor system for use with a window assembly having parallel frame members supporting a window pane therebetween, the frame members being non-vertically oriented, said conveyor system comprising:

a shade roller rotatably supported between the frame members at an upper portion of the frame members, the roller carrying a window shade wound thereon, said window shade having a first end connected to said shade roller, an opposite second free end, and opposing lateral free edges, said roller being rotatable in a rotary first direction so that the shade is unwound therefrom in a linear second direction to cover the window pane between frame members

a conveyor assembly mounted to each of the frame members, each said conveyor assembly including;

a rotatable driving member;

an idler supported by said frame member at a portion distal said driving member;

a continuous conveyor belt mounted between said driving member and said idler to form a continuous loop, whereby rotation of said driving member causes said conveyor belt to move linearly around said continuous loop, said conveyor belt having a shade supporting surface;

wherein one of said lateral edges of said window shade is supported by said conveyor belt at said shade supporting surface when said shade is unwound from said roller; and

first rotary means for rotating said driving member so that said conveyor belt moves linearly in said second direction when said window shade is being unwound from said shade roller.

---

### 5,016,702
### METHOD OF PRODUCING OPEN-CELLED METAL STRUCTURES

**Olaf Ahlers, Hamburg, Fed. Rep. of Germany, assignor to Eska Medical Lubeck Medizintechnik GmbH & Co., Lubeck, Fed. Rep. of Germany**
**Filed Aug. 24, 1990, Ser. No. 572,725**
**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1989, 3928394**
**Int. Cl.$^5$ B22C *3/00, 7/02;* B22D *23/00, 25/00***
**U.S. Cl. 164—34** **13 Claims**

1. A method for producing an open-celled metal structure comprising the steps of:

(a) cleaning an open-pored plastic substrate formed over a wave foundation, wherein the pores have an average width of about 1 to about 3 mm;

(b) applying at least one layer of a strengthening agent selected from the group consisting of poly(methyl methacrylate) and polyester resin in a solvent to the cleaned plastic substrate, whereby the solvent partly dissolves the substrate surface, which layer, after hardening, produces a strengthened porous substrate;

(c) embedding the strengthened substrate as a whole in a ceramic mass;

(d) heating the ceramic mass to melt the wax foundation an dincinerate the strengthened plastic substrate, leaving voids in the remaining ceramic mass;

(e) filling the voids in the ceramic mass with molten metal;

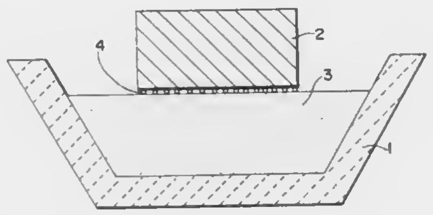
(f) allowing the metal to harden; and

(g) removing the ceramic material.

---

### 5,016,703
### METHOD OF FORMING A METAL MATRIX COMPOSITE BODY BY A SPONTANEOUS INFILTRATION TECHNIQUE

**Michael K. Aghajanian, Bel Air, Md., and Alan S. Nagelberg, Wilmington, Del., assignors to Lanxide Technology Company, LP, Newark, Del.**
**Filed Nov. 10, 1988, Ser. No. 269,377**
**Int. Cl.$^5$ B22D *19/14***
**U.S. Cl. 164—97** **38 Claims**



1. A method for making a metal matrix composite, comprising:

providing a permeable mass comprising a substantially nonreactive filler material and preform;

providing a source of matrix metal;

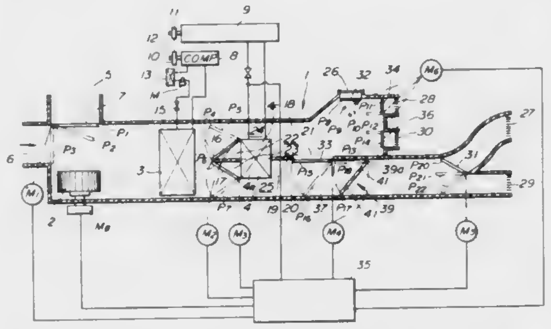
supplying a material comprising an infiltration enhancer precursor to at least a portion of an interface between said matrix metal source and said permeable mass; and

spontaneously infiltrating at least a portion of said permeable mass with said molten matrix metal.

---

### 5,016,704
### AIR CONDITIONER SYSTEM FOR AUTOMOTIVE VEHICLE

**Hitoshi Ono, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan**
**Filed Jun. 3, 1988, Ser. No. 201,896**
**Claims priority, application Japan, Jun. 15, 1987, 62-148358**
**Int. Cl.$^5$ F24F *3/044***
**U.S. Cl. 165—1** **3 Claims**



1. A method of assembling an air conditioner system for an automotive vehicle compartment comprising:

providing a partition means for dividing an internal space defined in a conditioning air duct into front and rear air mix chambers, said partition means defining front and rear conditioning air paths respectively communicated to outlets in front and rear portions of the vehicle compartment;

further providing a communication path means for communicating between said front and rear air mix chambers, said communication path means being formed in said partition means; and

further providing either one of two exchangeable replacement parts (A) or (B), wherein

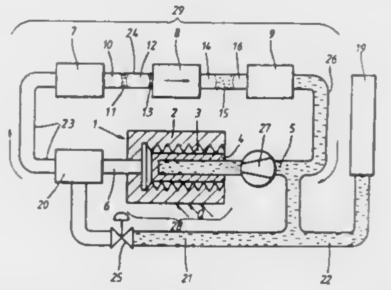
(A) is a first exchangeable part comprising a portion of said partition means which includes a separation door associated with said communication path means operable between a first position in which said separation door fully closes said communication path means and said front and rear air mix chambers are independent and separate from one another, and a second position in which said separation door fully opens said communication path and blocks said rear conditioning air path defined within said rear air mix chamber and a communication duct means for communicating said rear air mix chamber with a connecting member which is provided on said conditioning air duct connected to a rear duct for introducing conditioning air into a rear discharge outlet; and

(B) is a second exchangeable part comprising a portion of said partition means which includes a small partition wall section inserted so as to prevent direct communication between said rear air mix chamber and said rear duct having said rear discharge outlet.

---

### 5,016,705
### PASSENGER COMPARTMENT HEATING SYSTEM, IN PARTICULAR BUS HEATING SYSTEM

**Friedrich Bährle, Kernen-Rommelshausen; Helmut Wulf, Ostfildern, and Helmut Kreeb, Meersburg, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**
**Filed Mar. 16, 1990, Ser. No. 494,561**
**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1989, 3908994**
**Int. Cl.$^5$ F28D *15/02;* B60H *1/02***
**U.S. Cl. 165—41** **16 Claims**



1. A passenger compartment heating system having a heat-emitting part with a plurality of heaters which are arranged in series on a heat emission side of a closed heating circuit, comprising

a heat transfer medium flowing through the closed heating circuit unidirectionally;

a heat-absorbing part with at least one heat exchanger means to serve as a heat source; and

a buffer tank of variable volume for controlled removal or replenishment of the heat transfer mechanism connected on a liquid side of the passenger compartment heating system;

wherein the heat exchanger has a primary side adjacent a heat generating means;

the heat transfer medium enters the heat-emitting part with a particular inlet temperature;

the particular inlet temperature and the heat transfer medium are matched to one another such that a two-phase mixture of liquid and vapor of the heat transfer medium in a saturation vapor state is present in the heat-emitting part;

the heat exchanger means is operated as vaporizer and has at least one of a porous wall and a capillary block that separates a liquid-only side and vapor side of the passenger compartment heating system from one another;

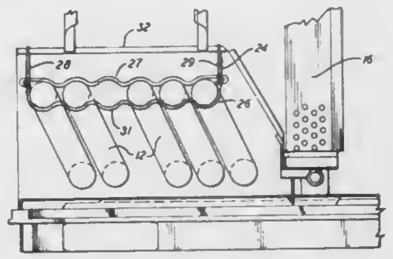
the at least one of the porous wall and capillary block has capillary-active channels within the closed heating circuit; and

the heat generating means on the primary side is fed with liquid through the at least one of the porous wall and the capillary block and is located on the vapor side of the latter.

---

### 5,016,706
### HEAT EXCHANGER TUBE SUPPORT

**Ben P. Dimarco; Ralph J. Tolone, both of Clay, and Lester N. Miller, East Syracuse, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**
**Filed Oct. 30, 1989, Ser. No. 428,679**
**Int. Cl.$^5$ F28F *9/00***
**U.S. Cl. 165—162** **13 Claims**



1. An improved support structure for a heater of the type having a heat exchanger with a plurality of parallel tubes over the outer side of which air is caused to flow for transferring heat to the air, wherein the improvement comprises:

a first wire-formed bracket member for extending across one side of the plurality of parallel tubes, said member being secured to a frame member of the heater and functioning to locate and support the tubes in their installed positions; and

a second wire-formed bracket member for extending across the other side of the plurality of parallel tubes, said first and second members being connectable on at least one end thereof by the interlocking of a hook member on one bracket member with an open-ended slot on the other bracket member to secure said second bracket member and thereby sandwich said tubes between said first and second bracket members.

---

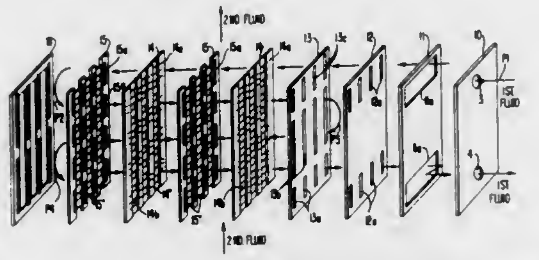
### 5,016,707
### MULTI-PASS CROSSFLOW JET IMPINGEMENT HEAT EXCHANGER

**Dam C. Nguyen, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**
**Filed Dec. 28, 1989, Ser. No. 458,296**
**Int. Cl.$^5$ F28F *3/04***
**U.S. Cl. 165—167** **28 Claims**

1. A heat exchanger for exchanging heat between at least a first fluid and a second fluid, the exchanger including at least one first plate means forming an inlet and outlet manifold means for the first fluid, at least one second plate means forming a fluid impingement plate means for the first fluid and a finned heat exchanger plate means for the second fluid, and at least one third plate means for forming an end manifold means, said fluid impingement plate means including a plurality of spaced orifice means for enabling a flow of the first fluid through said fluid impingement plate means, said at least one

VOL
1126
ISS
3
MY
21
1991
UMI

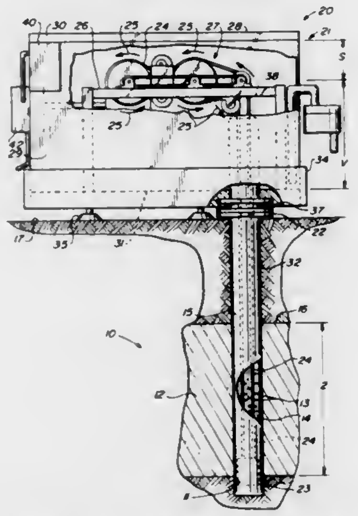
first, second and third plate means being stacked to form a laminated heat exchanger core, said end manifold means including means for deflecting the flow of the first fluid flowing in a first direction from said impingement plate means back toward an through said fluid impingement plate means in at least a second direction toward said inlet and outlet manifold means and a plurality of spaced recess means for forming channel means for the flow of the second fluid, and wherein said first and second directions are orthogonal to a flow direction of the second fluid through said finned heat exchanger plate means.



---

### 5,016,708
## APPARATUS AND METHOD FOR PRODUCING AND CLEANING AN OIL WELL

**Robert L. Baer, 949 Scott St., Palo Alto, Calif. 94301, and Ben H. Kimball, 25125 Linwood, Visalia, Calif. 93277**
**Filed Nov. 8, 1989, Ser. No. 433,659**
**Int. Cl.$^5$ E21B** *33/03, 37/00;* **F16G** *1/21*
U.S. Cl. 166—75.1 **31 Claims**



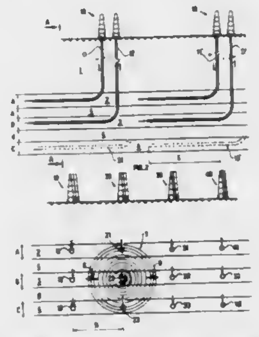
1. An apparatus for enhancing production of formation fluids from an earth formation penetrated by a wellbore having a wellhead using an endless belt driven by drive means, comprising:

(i) tank means including inlet means attached to said wellhead, said tank means also supporting drive and squeeze assembly means adjacent to said inlet means;
(ii) downhole sheave assembly means located downhole within said wellbore for returning said endless belt back up said wellbore,
(iii) endless belt means operationally interconnected between said drive and squeeze means and said downhole sheave assembly means, whereby said endless belt means is driven in positive manner relative to said wellbore by said drive and squeeze assembly means through said inlet means into and through said formation fluids,
(iv) said endless belt means comprising first and second layers including separate fastening means positioned on opposed surfaces thereof, said fastening means including wedge means that forms a sprocketed tread along said belt means whereby said belt can be more efficiently moved into and out of said wellbore by said drive and squeeze assembly means and lift and remove said formation fluids from said earth formation.

---

### 5,016,709
## PROCESS FOR ASSISTED RECOVERY OF HEAVY HYDROCARBONS FROM AN UNDERGROUND FORMATION USING DRILLED WELLS HAVING AN ESSENTIALLY HORIZONTAL SECTION

**Jean Combe, Bougival; Gerard Renard, Rueil-Malmaison, and Emmanuel Valentin, Le Vesinet, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**
**Filed Jun. 5, 1989, Ser. No. 361,312**
**Claims priority, application France, Jun. 3, 1988, 88 07460**
**Int. Cl.$^5$ E21B** *43/24, 43/30*
U.S. Cl. 166—245 **6 Claims**



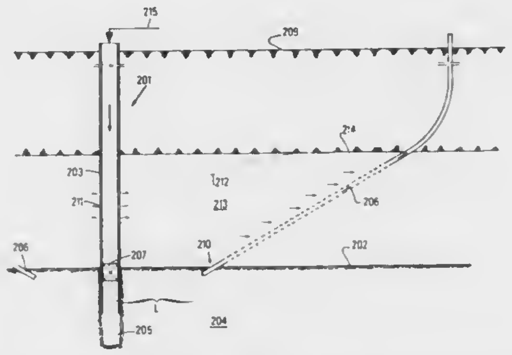
1. A process for assisted recovery of heavy hydrocarbons from an underground formation having an essentially horizontal section by drilled wells, said wells having, starting at the surface a substantially vertical initial section followed by an inclined or horizontal section extending into the formation, said formation comprising at least two reservoirs of said hydrocarbons which are superimposed and separated by an impermeable secondary rock-containing layer, which comprises injecting a jet of steam into the formation through a first series of horizontal wells arranged in the at least two reservoirs; extracting the hydrocarbon from the formation by a second series of horizontal wells arranged in the at least two reservoirs, a horizontal section of a first well of the first series of wells extending into a reservoir and being located essentially vertically below a horizontal section of a second well of the second series of wells located in an immediately adjacent reservoir; and using said first well as a steam-injection well and said second well as a hydrocarbon-producing well.

4. An assembly of drilling wells for the assisted recovery of heavy hydrocarbons from a deep horizontal underground formation, said formation including a plurality of superimposed reservoirs of said hydrocarbons separated by impervious secondary rock-containing layers, which comprises a plurality of wells each having, starting at the surface, a practically vertically initial section followed by an inclined or horizontal section extending into the formation, a horizontal section of a first well extending into a reservoir and being located essentially vertically below a horizontal section of a second well located in an immediately adjacent reservoir, said first well serving as a steam-injection well and said second well serving as a hydrocarbon-producing well; the horizontal sections of the wells for steam injection and of the wells for hydrocarbon production each being arranged quincuncially in a network formed in successive vertical planes extending through the formation, with horizontal sections of the wells located in a reservoir being arranged parallel to each other.

---

### 5,016,710
## METHOD OF ASSISTED PRODUCTION OF AN EFFLUENT TO BE PRODUCED CONTAINED IN A GEOLOGICAL FORMATION

**Gërard Renard, Rueil Malmaison, and Jean-Francois Giannesini, Saint Cloud, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison and Societe Nationale Elf Aquitaine (Production), Paris La Defense, both of, France**
**Filed Jun. 26, 1987, Ser. No. 66,534**
**Claims priority, application France, Jun. 26, 1986, 86 09419; Jun. 26, 1986, 86 09420; Jun. 26, 1986, 86 09422**
**Int. Cl.$^5$ E21B** *43/22, 43/24, 43/30*
U.S. Cl. 166—245 **26 Claims**



1. A method for producing a viscous oil effluent contained in a geological formation providing a producing formation and forming a reservoir for said effluent, said geological formation overlying another geological formation at least substantially impermeable to said effluent to define an interface between said geological formations, the interface between the geological formations comprising a wall of the reservoir, which comprises:

providing a central well extending from the surface into said producing formation;
drilling at least one subhorizontal well from the surface to pass through said producing formation and into said impermeable formation;
joining an end portion of said at least one subhorizontal well to said central well; and
injecting a displacement agent into said producing formation via said at least one subhorizontal well serving as a production simulation well;
said displacement agent causing migration of the effluent from the producing formation into said central well.

26. A system for producing an effluent contained in a geological formation including a central well and subhorizontal wells, said central well having a perforated zone at a level of said geological formation, an injection pipe connecting said perforated zone to a source for injecting a displacement agent into said perforated zone; said subhorizontal wells each extending from the surface into and through said geological formation, and each of said subhorizontal wells having a length so as to enter the geological formation at a distance far from an axis of said central well and terminate at a distance near the axis of said central well, a portion of each subhorizontal well within the geological formation having a perforated zone whereby said displacement agent causes migration of the effluent from the geological formation into said subhorizontal wells.

---

### 5,016,711
## CEMENT SEALING

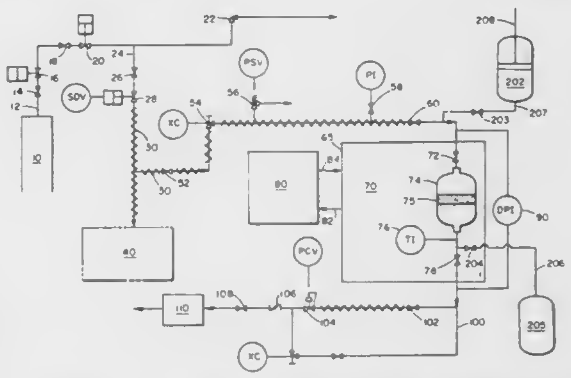
**Kenneth M. Cowan, Sugarland, Tex., assignor to Shell Oil Company, Houston, Tex.**
**Filed Feb. 24, 1989, Ser. No. 316,119**
**Int. Cl.$^5$ E21B** *33/13*
U.S. Cl. 166—250 **10 Claims**

2. A process for cementing a selected part of a well, comprising, determining a surfactant capable of reducing the volumetric shrinkage of an aqueous cement slurry from about 10% to about 75% during setting and hardening, ascertaining the amount of the surfactant necessary to accomplish the reduction in volumetric shrinkage, and injecting the slurry with the necessary amount of surfactant into the selected part of the well.

---

### 5,016,712
## METHOD AND APPARATUS FOR LOCATING SOLVENT INJECTION APPARATUS WITHIN A NATURAL GAS WELLBORE

**Alvin S. Cullick, and Robert E. Roach, both of Dallas, Tex., assignors to Mobil Oil Corporation, Fairfax, Va.**
**Filed Mar. 6, 1990, Ser. No. 489,111**
**Int. Cl.$^5$ F21B** *47/06, 47/09, 47/08*
U.S. Cl. 166—250 **4 Claims**



1. A method for locating a solvent injection apparatus within a natural gas wellbore to reduce the deposition of hydrocarbonaceous solids which are at least partially soluble in the solvent

(a) estimating temperature and pressure profiles at flow conditions through the depth of the natural gas wellbore over the production life of the natural gas well;
(b) withdrawing a sample stream from a production natural gas well;
(c) depressuring the withdrawn natural gas sample stream of step (b) to a selected pressure within the natural gas wellbore pressure range estimated in step (a);
(d) providing a solid nonporous surface maintained under conditions of substantially constant temperature selected from the range of estimated natural gas wellbore temperatures determined in step (a);
(e) flowing the depressured natural gas sample of step (c) in contact with the solid nonporous surface of step (d);
(f) measuring the quantity of natural gas contacted by said solid surface; and
(g) measuring the quantity of precipitate formed on said solid surface; and
(h) establishing a functional relationship defining the rate of precipitate formation as a function of wellbore depth and relative time in said production life of said natural gas well; and
(i) locating said solvent injection apparatus within said natural gas wellbore at wellbore depth below that corresponding to precipitate formation rates sufficient to interfere with the production of said natural gas well.

4. A device for measuring the precipitation of solid hydrocarbonaceous materials from a natural gas stream under selected conditions of temperature and pressure comprising:

(a) a valved sample conduit for withdrawing a sample stream from a production natural gas well;
(b) a pressure control valve in the sample conduit for depressuring the withdrawn natural gas stream to a preselected pressure;
(c) heating means for controlling the temperature of the valved sample conduit and the pressure control valve;

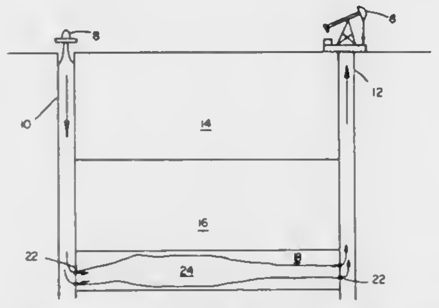
VOL
1126
ISS
3
MY
21
1991
UMI

(d) a precipitate collection vessel downstream from the pressure control valve, the precipitate collection vessel being operatively connected to the valved sample conduit;
(e) means for maintaining the precipitate collection vessel at a constant preselected temperature;
(f) a metallic surface within the precipitate collection vessel for collecting hydrocarbonaceous precipitate from the depressured natural gas stream; and
(g) a differential pressure indicator connected in parallel with the precipitate collection vessel.

---

### 5,016,713
### METHOD OF PREHEATING A HEAVY OIL ZONE THROUGH EXISTING BOTTOM WATER AND THEN DIVERTING STEAM INTO THE OIL ZONE

**J. Michael Sanchez, and E. Thomas Strom, both of Dallas, Tex., assignors to Mobil Oil Corporation, Fairfax, Va.**
**Filed Mar. 14, 1990, Ser. No. 493,259**
**Int. Cl.$^5$ E21B** *33/138, 43/22, 43/24*
**U.S. Cl. 166—270** **6 Claims**



1. A method for recovering viscous oil from a formation having a bottom water zone therebelow comprising:
(a) injecting steam into said bottom water zone via fluidly communicating injector and producer wells for a time sufficient to heat oil in a zone above said water zone to a temperature sufficient to mobilize said oil;
(b) thereafter injecting into said formation a gellable composition in an amount sufficient to form an in-situ solid gel in said bottom water zone substantially near said producer well;
(c) allowing said composition to remain in said bottom water zone for a time sufficient to form a solid gel thereby blocking said water zone to steam flow therethrough;
(d) perforating the producer well sufficiently above the solid gel so as to cause fluid communication with a heated oil containing zone; and
(e) injecting steam into the injection well which steam flows upwardly over said solid gel and removes oil from said heated zone via said producer well.

---

### 5,016,714
### BIOCIDAL WELL TREATMENT METHOD

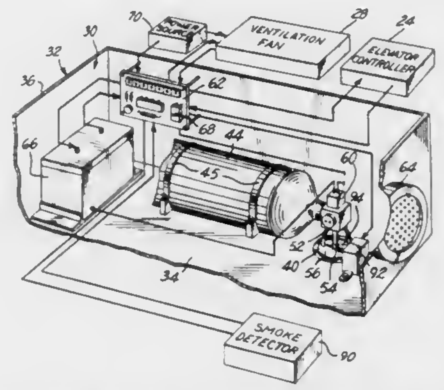
**Michael A. McCabe; J. Michael Wilson; Jimmie D. Weaver, and James J. Venditto, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.**
**Filed May 9, 1990, Ser. No. 521,815**
**Int. Cl.$^5$ E21B** *43/267, 37/00*
**U.S. Cl. 166—308** **11 Claims**

1. A method of treating a previously fractured bacteria contaminated subterranean formation penetrated by a well bore whereby said bacteria contamination is substantially reduced or eliminated comprising the steps of:
mixing a bactericide with a carrier fluid in an amount effective to contact and kill bacteria contained in said formation when the resultant mixture is pumped thereinto, said carrier fluid having high fluid loss characteristics;
pumping said mixture into said formation through said well bore so that bacteria contained in near-well bore portions of said formation are contacted with bactericide
mixing a bactericide with a fracturing fluid in an amount effective to contact and kill bacteria contained in said formation when the resulting mixture is pumped thereinto; and
pumping said mixture into said formation through said well bore at a rate and pressure sufficient to refracture said formation and thereby cause said bactericide to be distributed throughout said formation and to contact and kill at least a portion of any bacteria contained therein.

---

### 5,016,715
### ELEVATOR CAB FIRE EXTINGUISHING SYSTEM

**Victor Alasio, 196 Palisade Ave., Cliffside Park, N.J. 07010**
**Continuation-in-part of Ser. No. 247,711, Sep. 22, 1988, Pat. No. 4,895,208. This application Nov. 2, 1989, Ser. No. 430,597**
**The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.**
**Int. Cl.$^5$ A62C** *37/12, 3/00, 3/07, 35/13*
**U.S. Cl. 169—61** **14 Claims**



1. An elevator cab fire extinguishing system for use in extinguishing a fire within the interior of the cab of an elevator in response to the presence of the fire itself, the elevator cab fire extinguishing system comprising:
a source of non-toxic fire extinguishing agent maintained under superatmospheric pressure;
a conduit communicating with the source and the interior of the elevator cab; and
a valve in the conduit, the valve including combustion-responsive means associated with the interior of the elevator cab for maintaining the conduit closed in the presence of normal operating conditions in the interior of the elevator cab and for opening the conduit in response to the presence of a combustion condition associated with a fire within the interior of the elevator cab to discharge the fire extinguishing agent from the source into the interior of the elevator cab.

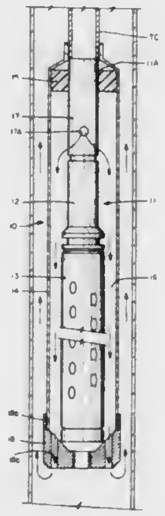
---

### 5,016,716
### TUBING CARRIED PERFORATING GUN WITH INSULATION JACKET

**Joseph F. Donovan, Spring, and Donald N. Yates, Jr., Palacios, both of Tex., assignors to Baker Hughes Incorporated, Houston, Tex.**
**Filed Apr. 25, 1990, Ser. No. 514,850**
**Int. Cl.$^5$ E21B** *36/00, 21/14, 41/116*
**U.S. Cl. 175—17** **5 Claims**

1. A method of insulating a tubing carried perforating gun which is run through a subterranean well bore, comprising the steps of:
(1) making up at the well surface a tubing string for introduction within said well, said tubing string carrying a perforating gun assembly comprising:

(a) a tubular housing securable at one end to a tubular conduit member;
(b) a firing head disposed interiorly within said housing;
(c) a perforating gun activated by said firing head and carried by said housing;
(d) a tubular heat shield disposed around the exterior of said housing and secured relative to one end of said housing, said tubular heat shield having an opening extending immediate the lowermost end thereof;
(e) an annular area defined between the interior of said heat shield and the exterior of said tubular housing; and



(f) a fluid passageway extending from the interior of said tubular housing through the annular area and through the opening in said heat shield.
(2) running said tubing string with said perforating gun assembly carried thereon into the well to a pre-selected location; and
(3) simultaneously while performing Step (2) introducing through the tubing string at the top of the well bore a cooling fluid and circulating said cooling fluid down the tubing string, through the fluid passageway and upwardly around the exterior of the gun assembly to the top of the well bore.

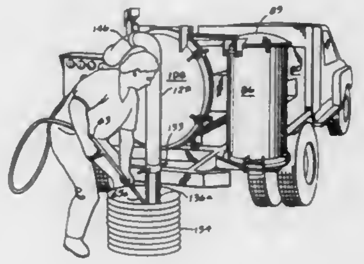
---

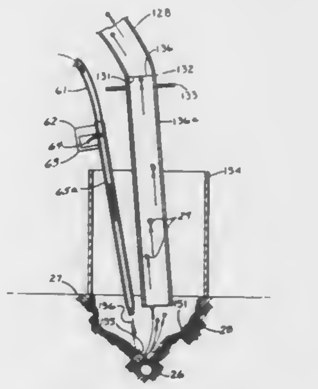
### 5,016,717
### VACUUM EXCAVATOR

**Billy R. Simons, Arcadia, Kans.; Ben K. Turner, Macks Creek, and James T. Brell, Camdenton, both of Mo., assignors to Aqua-Vac Locators, Inc., Camdenton, Mo.**
**Filed Mar. 14, 1989, Ser. No. 322,998**
**Int. Cl.$^5$ E21B** *7/18;* **E21C** *25/60*
**U.S. Cl. 175—66** **20 Claims**

1. An excavation apparatus, which comprises:
(a) vehicle means adapted for transporting said excavation apparatus and including an engine;
(b) a liquid jet system including:
  (1) liquid source means;
  (2) a liquid pump mounted on said vehicle and drivingly connected to said vehicle engine; and
  (3) a liquid spray wand connected to said pump and including a spray nozzle;
(c) a suction system including:
  (1) a blower subsystem drivingly connected to said engine;
  (2) a suction tank having an outlet pneumatically communicating with said blower and an inlet; and
  (3) a suction hose connected to said suction tank and communicating with said inlet; and
(d) said suction tank including a first end, an open second end, a hatch adapted for selectively covering the storage tank second end, and said suction tank being tiltable with respect to said vehicle means whereby said storage tank first end is raised for discharging the contents of said suction tank through its open second end.

**11.** An excavation method, which comprises the steps of:
(a) forming a liquid jet by pumping a liquid through a liquid dispenser;
(b) dislodging ground material with said liquid jet;
(c) creating a partial vacuum in a suction tank;





(d) drawing at least a portion of said dislodged material and at least a portion of said dispensed liquid into said suction tank;
(e) mounting said suction tank on a vehicle; and
(f) selectively opening said suction tank and tilting said suction tank with respect to said vehicle and discharging the contents of said suction tank.

---

### 5,016,718
### COMBINATION DRILL BIT

**Geir Tandberg, Biskop Sigurdsgt. 11,, N-7042 Trondheim, Norway, assignor to Geir Tandberg and Arild Rodland, both of Trondheim, Norway**
**Filed Jan. 24, 1990, Ser. No. 469,244**
**Claims priority, application Norway, Jan. 26, 1989, 890327**
**Int. Cl.$^5$ E21B** *10/04, 10/14*
**U.S. Cl. 175—333** **5 Claims**

1. A combination drill bit for continuously drilling an annular, downwardly deepening hole coaxially surrounding an upwardly projecting cylindrical core having an upper end, and progressively crushing axially successive increments of said core from the upper end of said core,
said drill bit comprising:
a generally cylindrical drill bit body having an upper end provided with means for fastening the drill bit body to means for rotating the drill bit; said drill bit body having a radially outer sidewall surface, and, coaxially therewith, means defining a downwardly opening internal cavity, thereby defining an annular cylindrical portion of said drill bit body, having an annular, axially downwardly facing lower end; said cavity increasing in diameter at a level which is above said lower end, whereby said internal cavity is undercut and has an axially short band of reduced internal diameter adjacent said lower end;

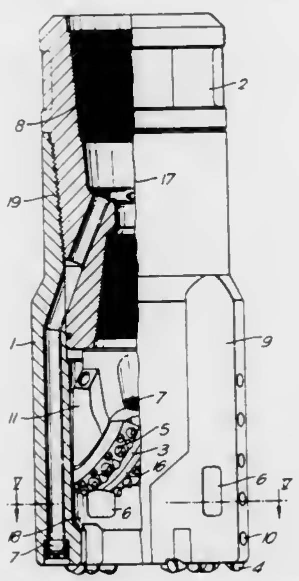
VOL
1126
ISS
3
MY
21
1991
UMI

a plurality of downwardly acting cutting elements mounted on said lower end of said drill bit body and distributed across the radial extent of said lower end, so that as said drill bit body is rotated in a rock formation said cutting elements cut a downwardly deepening annular hole into the rock formation, leaving a coaxial, upwardly projecting core of rock having an upper end, said core progressively entering said cavity from below as said annular hole is deepened; said cutting elements being made of at least one of polycrystalline diamond compact and ceramic material;

means defining internal drilling fluid delivery channels extending downwards in said drill bit body and opening into said cavity and at sites arranged for supplying drilling fluid to said cutting elements mounted on said lower end of said drill bit body;

means defining channels opening generally radially through said drill bit body between said cavity and said radially outer sidewall surface of said drill bit body;

means defining a plurality of angularly spaced external longitudinal channels on said radially outer sidewall surface of said drill bit body for circulating drilling fluid and cuttings upwards in said hole in said rock formation;



a core crushing tool mounted to said drill bit body and disposed in said cavity above said band of reduced internal diameter; said core crushing tool including downwardly acting rotary crushing means having an effective diameter which is greater than that of said band of reduced internal diameter; said crushing means being mounted for rotation relative to downwardly acting cutting elements mounted on said lower end of said drill bit body;

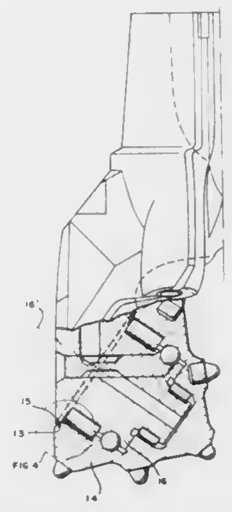
said channels having inlet ends opening into said cavity at respective sites located axially between said core crushing tool and said band of reduced internal diameter of said drill bit body;

the distance axially of said drill bit body between said core crushing tool and said downwardly acting cutting elements on said lower end of said drill bit body being such as to provide, in use, that said core has an axial length which is between 0.5 and 2 times the outer diameter of said core; and

the inner diameter of said band of reduced internal diameter and the outer diameter of said radially outer sidewall surface of said drill bit body being such as to provide, in use, that said core has an outer diameter which is at least 0.4 times the outer diameter of said hole in said rock formation.

### 5,016,719
## ROTARY CONE TYPE ROCK BITS

**Kenneth M. White, Calgary, Canada, assignor to Western Rock Bit Company Limited, Calgary, Canada**
**Filed Jan. 24, 1990, Ser. No. 469,356**
**Int. Cl.$^5$ E21B *10/22***
**U.S. Cl. 175—353** **8 Claims**

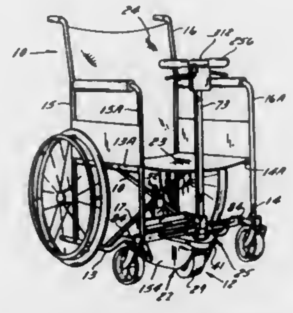


1. An earth boring bit of the type having three head sections joined together, each head section having a bearing pin and shirttail, the bearing pin carrying on its rotary axis a rotatably mounted, generally conical cutter having a rear surface juxtaposed to the shirttail, the shirttail having a surface extending to the radially outermost portion of the shirttail, which surface is complementary in shape to the rear surface of the conical cutter and defines with the rear surface a clearance, at least the radially outermost portion of the rear surface being formed as a female truncated conical surface defined by major and minor diameters perpendicular to the rotary axis, whereby the truncated conical surface partially encloses the shirttail.

---

### 5,016,720
## DETACHABLE ELECTRIC DRIVE UNIT FOR COLLAPSIBLE WHEELCHAIR

**Theodore R. Coker, 5500 N. Bay Ridge Ave., Whitefish Bay, Wis. 53217**
**Filed Jun. 2, 1989, Ser. No. 360,581**
**Int. Cl.$^5$ B60K *1/00***
**U.S. Cl. 180—13** **7 Claims**



1. In an electric drive unit for a collapsible wheelchair having a pair of laterally spaced apart, laterally movable frame members near the lower part of said wheelchair and a pair of movable cross members pivotally connected together by a pivot pin:

support means for disposition between said pair of frame members and forward of said pivot pin;

adjustable connecting means mounted on said support means for releasably connecting said drive unit to said frame member sand to said pivot pin, said adjustable connecting means including connectors disposed on opposite lateral sides of said support means, each one of said connectors having an opening which faces laterally outwardly and being laterally movable into and out of mating engagement with its respective frame member, and means including a lever located between said pair of frame members near the lower part of said wheelchair and operable to effect outward lateral movement of said connectors whereby both connectors are forced into tight locking engagement with their respective frame members;

drive means pivotally mounted on said supported means and comprising a reversible electric motor and a wheel driven thereby and an electrically operable brake;

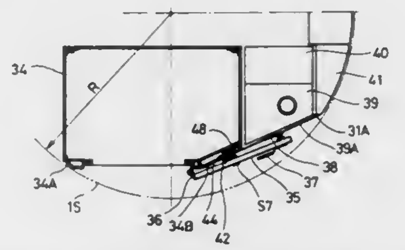
steering means mounted on said support means and comprising a rotatable steering column and a steering mechanism connecting said steering column to said drive means;

and control means comprising switch means supported on said steering column for controlling the direction and speed of rotation of said motor and operation of said brake.

---

### 5,016,721
## FULL-TURN TYPE WORKING MACHINE

**Nobuyoshi Yamamoto, Tsuchiura; Yasuhiko Murata, Ushiku; Fumimasa Saeki, Tsuchiura, and Hirosige Kurosaka, Ibaraki, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan**
**Continuation of Ser. No. 254,862, Oct. 7, 1988, Pat. No. 4,907,667. This application Oct. 27, 1989, Ser. No. 427,568**
**The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.**
**Int. Cl.$^5$ B02F *3/32***
**U.S. Cl. 180—89.13** **8 Claims**



1. A full-turn type working machine including a lower travelling body, and an upper rotary body swivellably mounted on said lower travelling body for rotation about a vertical axis and having a machine room, an operator's cabin, a fuel tank and a counterweight located within a circle of a predetermined rotational radius R defined by an outermost portion of said upper rotary body spaced from said vertical axis, wherein said working machine comprises:

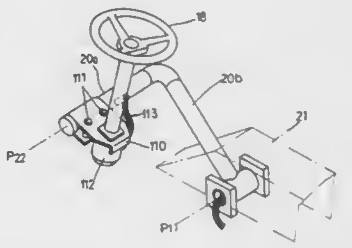
a door fitted in an opening of an exterior facing wall of said operator's cabin, said exterior facing wall having forward and rearward vertical edges, said forward edge intersecting said circle of predetermined rotational radius R;

means for swingably mounting said door to said rearward edge for pivotal movement between a closed position substantially parallel with said exterior facing wall and a fully opened position through an angle greater than 180 degrees; and

a chamfered wall portion extending between said rearward edge of said exterior facing wall and an edge of a rearwardly facing wall of said operator's cabin, said chamfered wall portion being located a sufficient distance inwardly of said circle of predetermined rotational radius R so as to permit said door to lie against said chamfered wall portion and remain within said circle of predetermined rotational radius R while in said fully opened position.

### 5,016,722
## CAB STRUCTURE FOR RIDING TYPE WORKING VEHICLE

**Shigeru Morita; Terutaka Takei; Yoshihiro Kawahara, and Yoshikazu Togoshi, all of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan**
**Filed Oct. 20, 1989, Ser. No. 425,646**
**Claims priority, application Japan, Jan. 31, 1989, 1-23391; Apr. 27, 1989, 1-50793[U]**
**Int. Cl.$^5$ B62D *33/06, 1/18***
**U.S. Cl. 180—89.14** **5 Claims**



1. A cab structure for a riding type working vehicle comprising:

a driver's seat,

a curved steering column including a vertical arm portion extending from a region outwardly of said driver's seat forwardly of a vehicle body, and a horizontal arm portion extending from an upper end of said vertical arm portion toward a longitudinal centerline of the vehicle body, the vertical and the horizontal arm portions together forming an inverted L,

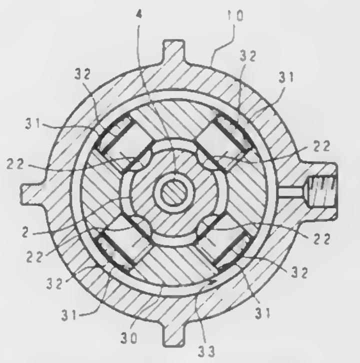
a steering wheel and means connecting and attaching the steering wheel to a free end region of said horizontal arm portion to be pivotable about an axis of said horizontal arm portion, the connecting and attaching means supporting the entire steering wheel substantially above said axis so that a substantial free space is provided under said horizontal arm portion however the steering wheel is pivoted, and

link means extending through said steering column for transmitting movement of said steering wheel to steerable wheels.

---

### 5,016,723
## HYDRAULIC POWER STEERING APPARATUS

**Osamu Sano, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan**
**Filed Nov. 9, 1989, Ser. No. 435,240**
**Claims priority, application Japan, Nov. 15, 1988, 63-288143; Apr. 7, 1989, 1-88259**
**Int. Cl.$^5$ B62D *6/02***
**U.S. Cl. 180—143** **3 Claims**



1. A power steering apparatus comprising:

a hydraulic actuator for generating steering assisting force

VOL
1126
ISS
3
MY
21
1991
UMI

by hydraulic pressure being supplied from a pressure source to a low pressure side;

a hydraulic control valve for controlling said hydraulic pressure to be supplied to said hydraulic actuator according to a quantity of relative movement between a valve body and a casing thereof accompanying a steering operation;

a first restriction means for exerting restriction force corresponding to at least vehicle speed against the relative movement between said valve body and said casing, wherein said first restriction means has plungers being installed movably at a part of said casing and a reaction chamber being formed at one side in the direction of movement of said plunger so as to supply hydraulic pressure from a vehicle speed pump to said plungers corresponding to vehicle speed, said first restriction means applying its restriction force corresponding to said hydraulic pressure being introduced to said reaction chamber so as to exert it against said relative movement through said plungers wherein said first restriction means exerts restriction force corresponding to hydraulic pressure being supplied from a vehicle speed pump for generating hydraulic pressure corresponding to vehicle speed;

a second restriction means for exerting restriction force corresponding to said quantity of relative movement against the relative movement between said valve body and said casing;

wherein said second restriction means has a throttled path being provided between said reaction chamber and low pressure side and whose opening is controlled according to the movement of said plungers being generated due to said relative movement.

---

**5,016,724**

### INTER-AXLE DIFFERENTIAL HAVING A FRICTION-TYPE BIASING CLUTCH AND WHEEL SLIP SENSING CONTROL MEANS THEREFOR

**Horst G. Steinhagen, and Paul C. Blank, both of Rockford, Ill., assignors to Twin Disc, Incorporated, Racine, Wis.**

**Filed Aug. 8, 1989, Ser. No. 390,777**

**Int. Cl.$^5$ B60K** *17/35*

**U.S. Cl. 180—197** **9 Claims**

1. In a power transmission system for a vehicle:

a change gear transmission (**2**) having a rotatable transmission power input shaft (**34**) connected to be driven by a prime mover (E), at least one selectively operable transmission clutch pack (**37,38**) and a rotatable transmission power output shaft (**39**);

a gear range selector (SW) for selectively operating said transmission clutch pack (**37,38**)

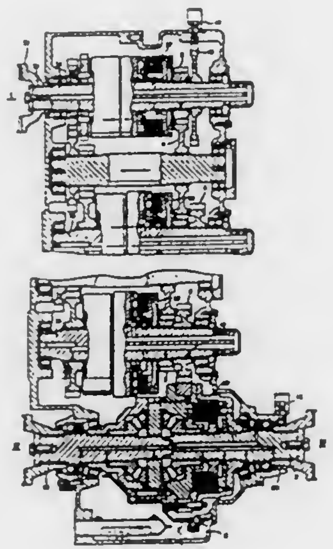
a differential (BD) comprising a pair of differential outputs shafts (**9,10**) for driving vehicle wheels and which proportions torque to said output shafts (**9,10**) by means of differential gearing regardless of the speeds of said output shafts (**9,10**);

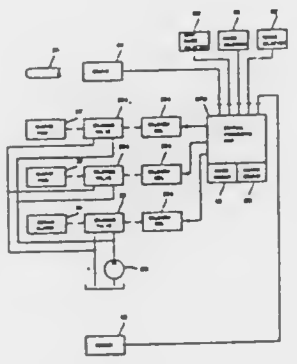
means including a rotatable power input member (**11**) driven by said transmission power output shaft (**39**) for effecting rotation of said output shafts (**9,10**);

a selectively operable biasing clutch (**28**) engageable to effect rotation of both output shafts (**9,10**) at the same speed regardless of the torque proportioning ratio between said output shafts (**9,10**);

and control means, responsive to a predetermined speed ratio band between the rotational speeds of said power input member and one of said output shafts (**9,10**) indicative of a difference in rotational speed between said output shafts (**9,10**) resulting from wheel slip, to effect engagement of said biasing clutch (**28**), said control means comprising:

a first sensor (**41**) for sensing the rotational speed of said rotatable transmission power input shaft (**34**),





a second sensor (**43**) for sensing the rotational speed of only one of said differential out shafts (**9,10**),

means for providing a status signal indicative of the status of said one transmission clutch pack (**37,38**),

and an electronic central processing unit (CPU) for receiving and processing a signal from said first sensor (**41**) and said status signal to calculate the input speed of said differential and for receiving and processing a signal from said second sensor (**43**) and said calculated input speed of said differential to ascertain if there is a predetermined difference in rotational speed between said differential output shafts (**9,10**) resulting from wheel slip, and for providing a control signal to effect engagement of said biasing clutch (**28**) in the event of said predetermined difference.

---

**5,016,725**

### MOTORCYCLE HAVING ENCLOSED RUNNING COMPONENTS

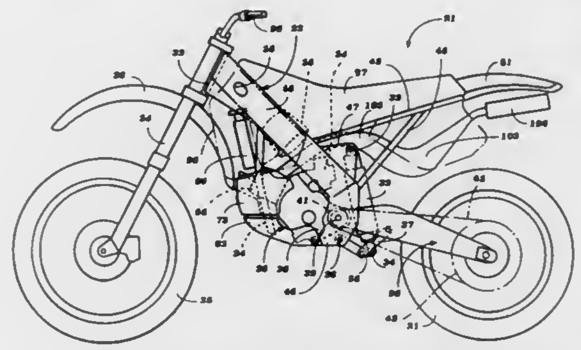
**Takayoshi Muramatsu, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushihiki Kaisha, Iwata, Japan**

**Filed Mar. 15, 1990, Ser. No. 493,894**

**Claims priority, application Japan, Mar. 18, 1989, 1-67124; Mar. 18, 1989, 1-80291**

**Int. Cl.$^5$ B62D** *61/02;* **B62K** *11/08;* **B60K** *13/02*

**U.S. Cl. 180—225** **19 Claims**



1. A motorcycle construction comprising a frame assembly, a front wheel dirigibly supported at the front of said frame assembly, a rear wheel journaled at the rear of said frame assembly, an engine supported by said frame assembly, and means for driving said rear wheel from said engine, said engine having a cylinder block inclined forwardly from the vertical with a cylinder head affixed to its cylinder block and extending forwardly therefrom, an induction system for said engine extending from the rear of said frame forwardly to the rear side of said cylinder block to deliver a charge thereto, and an exhaust pipe extending rearwardly from said cylinder block toward the rear of said frame said induction system and said exhaust pipe being positioned in their entirety behind said cylinder block.

---

**5,016,726**

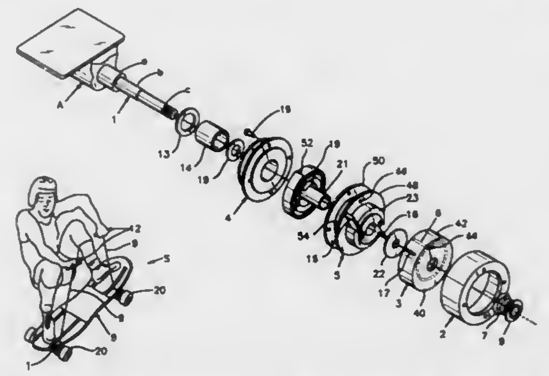
### SELF-PROPULSION DEVICE FOR SKATEBOARDS OR THE LIKE

**Walter W. Metcalf, 9005 Metcalf Rd., Kirtland, Ohio 44094**

**Filed Jul. 12, 1990, Ser. No. 552,315**

**Int. Cl.$^5$ B62M** *1/14*

**U.S. Cl. 280—243** **9 Claims**



1. A self-propulsion device of the type for use with a skateboard comprising, a self-propulsion device which may be mounted, as a unit, for replacement to the existing axle of a conventional skateboard, the self-propulsion device comprising an axle having at least one drive roller rotatably mounted adjacent one end thereof, said axle being non-rotatable and being fixedly secured to a skateboard, the axle mounting thereon at least one spool member which receives a plurality of turns of a pull cord for rotating said spool in one direction upon actuation of said pull cord, a roller member rotatably journaled adjacent the free end of said axle for receiving added rotational force upon actuation of said pull cord, clutch means disposed on said axle between said drive spool and said roller for selectively imparting rotational movement of said spool to said roller, and resilient spring means disposed around said axle adjacent said first drive spool for automatically retracting said pull cord when a user releases said pull cord.

---

**5,016,727**

### METHOD AND DEVICE OF SEISMIC PROSPECTION IN WELLS AND PARTICULARLY DEVIATED WELLS

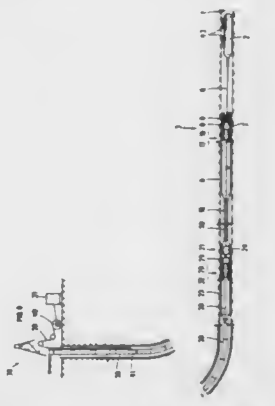
**Christian Wittrisch, Rueil-Malmaison, France, assignor to Institut Francais du Petrole, Rueil Malmaison, France**

**Filed Apr. 6, 1990, Ser. No. 505,902**

**Claims priority, application France, Apr. 6, 1989, 89 04554**

**Int. Cl.$^5$ G01V** *1/40;* **E21B** *47/00*

**U.S. Cl. 181—102** **18 Claims**



1. A method of prospection in wells using acoustic waves and particularly in deviated wells, comprising:

introducing into a well an acoustic wave transmission and reception assembly comprising:

reception means having at least one probe with directional sensor means for sensing acoustic waves and means for applying said sensor means against the wall of the well, said probe being connected to a surface control device by a rigid column and being able to be mechanically uncoupled therefrom intermittently,

acoustic wave transmitting means comprising at least one acoustic wave source inserted in the rigid column between the probe and the control device,

a multi-conductor cable for controlling the transmission and reception assembly to a control and recording assembly disposed on the surface, and

a connection system for automatically providing a delayed electric connection between successively the source and the probe after the probe has been lowered in the well and between the control and recording assembly and said source after the source has been lowered in the well;

(b) mechanically uncoupling said probe from the rigid column and applying said sensor means against the wall of the well;

(c) said sensor means being held in a fixed position, triggering said source from said acoustic and recording assembly to cause the transmission of acoustic waves;

(d) transmitting to the control and recording assembly through the multi-conductor cable, signals reflected by the discontinuities surrounding the well and received by the sensor means;

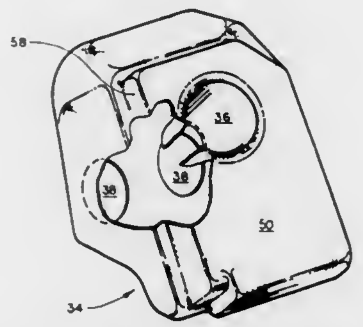
(e) pulling on the rigid column for displacing successively said transmission and reception assembly to a plurality of positions along the well, and mechanically coupling said probe with the rigid column and at each position repeating the two preceding steps.

VOL 1126 ISS 3 MY 21 1991 UMI

**5,016,728**

### AIR INTAKE NOISE SUPPRESSOR

**Dennis P. Zulawski, St. Hilaire, Minn., assignor to Arctco, Inc., Thief River Falls, Minn.**
**Filed Mar. 12, 1990, Ser. No. 491,514**
**Int. Cl.$^5$ F02M *35/00***
U.S. Cl. 181—229 15 Claims



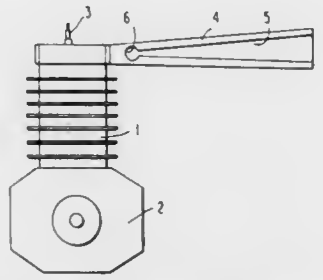
1. An air intake noise suppressor for attenuating noise from carburetors of a snowmobile engine, the suppressor comprising an irregularly shaped enclosure having a front face and a rear face canted relative to the front face, a truncated conical inlet integral with the reàr face extending into the enclosure from the rear face, and outlet apertures for connection to carburetors in the front face, whereby noise emanating from the carburetors and entering the enclosure through the outlet apertures does not directly impinge on an open end of the truncated cone and is reflected within the enclosure.

---

**5,016,729**

### EXHAUST SYSTEM FOR COMBUSTION ENGINE

**Claes Lindén, Arrud, S-710 27 Dyltabruk, Sweden**
**PCT No. PCT/SE88/00337, § 371 Date Dec. 18, 1989, § 102(e) Date Dec. 18, 1989, PCT Pub. No. WO88/10361, PCT Pub. Date Dec. 29, 1988**
**PCT Filed Jun. 17, 1988, Ser. No. 438,408**
**Claims priority, application Sweden, Jun. 18, 1987, 8702564**
**Int. Cl.$^5$ F01N *7/10***
U.S. Cl. 181—240 10 Claims



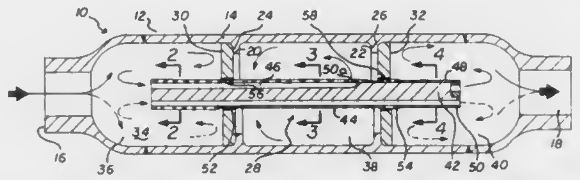
1. An exhaust outlet conduit for an internal combustion engine, characterized by: the conduit (**4**; **7**; **13**; **15**; **16**; **22**) having an exhaust through flow area which increases outwardly from an end portion of the conduit connected to a cylinder (**1**) of the engine such that said conduit functions as a resonator for exhaust waves exiting from said cylinder, and a wall of said conduit having one or more openings (**5**; **8**; **12**; **17**; **18**; **23**) so configured that a total opening area increases along the conduit outwardly from a point on said end portion of the conduit connected to the cylinder, so as to increase a frequency range over which the conduit functions as a resonator.

---

**5,016,730**

### ACOUSTIC FILTER HAVING ACOUSTIC ISOLATION OF INTERNAL FLOW ELEMENT

**John E. Kaiser, Jr.; James J. Lockshaw, both of Huntington Beach; Juan J. Ruiz, Yorba Linda, and William L. Stevens, Santa Ana, all of Calif., assignors to Tolo, Inc., Santa Ana, Calif.**
**Filed Jan. 17, 1990, Ser. No. 466,037**
**Int. Cl.$^5$ F01N *1/08***
U.S. Cl. 181—265 18 Claims



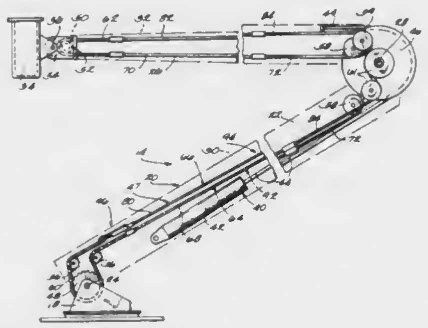
1. Low noise, acoustic filter for fluid flow systems, said filter comprising a vessel having a wall defining an enclosed volume and having an inlet and an outlet, a bulkhead cooperating with said wall to define at least one chamber within said vessel enclosed volume, said wall having an inwardly extending means for engaging said bulkhead, and an internal flow element communicating said inlet and outlet through said bulkhead, said flow element comprising means for reverse fluid flow within said chamber, said bulkhead being supported within said vessel by said element freely of fixed connection to said wall such that said wall is capable of expansion or contraction movement unrestrained by said bulkhead, whereby said element is acoustically decoupled from said vessel for lowered noise around said acoustic filter.

---

**5,016,731**

### ARTICULATED BOOM INCLUDING TENSIONING APPARATUS

**William K. Holmes, Delafield, Wis., assignor to Hi-Ranger, Inc., Waukesha, Wis.**
**Filed Apr. 8, 1987, Ser. No. 36,009**
**Int. Cl.$^5$ B66F *11/04***
U.S. Cl. 182—2 15 Claims



1. An aerial lift comprising
a frame,
an articulated boom including a first boom portion having an upper end, and a lower end pivotally mounted on said frame for pivotal movement relative thereto about a generally horizontal axis, means for causing pivotal movement of said first boom portion relative to said frame, a second boom portion having an upper end, and a lower end mounted on said upper end of said first boom portion for pivotal movement relative thereto about a generally horizontal axis, means for causing pivotal movement of said second boom portion relative to said first boom portion, a workman support structure mounted on said upper end of said second boom portion for pivotal movement relative thereto about a generally horizontal axis, and

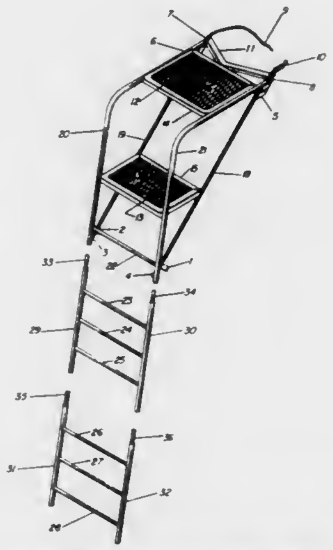
means for leveling said workman support structure throughout the range of movement of said first and second boom portions, said means for leveling including a first section of elongate material extending through said first and second boom portions from said lower end of said first boom portion to said workman support structure, and a second section of elongate material extending through said first and second boom portions from said lower end of said first boom portion to said workman support structure, and
means for maintaining tension in said second section, said means for maintaining tension including a hydraulic assembly connected to said second section and including a hydraulic cylinder, a piston dividing said cylinder into first and second chambers, and a piston rod having one end fixedly connected to said piston, and a hydraulic accumulator communicating with one of said chambers.

---

**5,016,732**

### PORTABLE COMBINATION HUNTING AND OBSERVATION STAND

**Stewart A. Dunn, P.O. Box 898, Forest City, Ark. 72335**
**Filed Aug. 22, 1988, Ser. No. 234,738**
**Int. Cl.$^5$ A45F *3/26***
U.S. Cl. 182—116 8 Claims



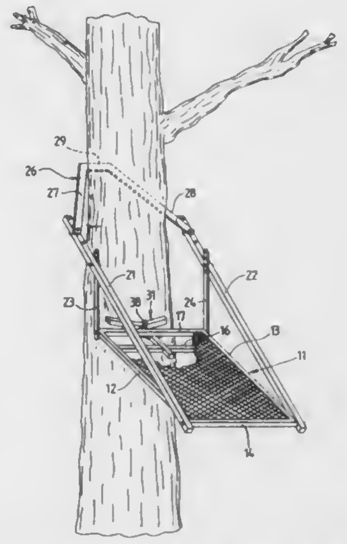
1. For use as an observation and hunting stand comprising a ladder assembly of three connectible parts consisting of a lower section of outer vertical rail components separated by horizontal rails, or rungs, a middle section of outer vertical rail components separated by horizontal rails, or rungs, the length of said outer vertical rails to be equal to the length of the outer vertical rails of the lower section, and an upper section of outer vertical rail components which curve at a 96 degree angle to become outer horizontal rail components and are separated by a horizontal rail, or rung, and further separated at a point below the curve by a metal standing platform spaced generally the same distance above the next lower horizontal rail, or rung, and in a plane with said rung, and topped with a second, larger, metal seating platform attached to the horizontal portion of the outer horizontal rails, spaced generally the same distance above the standing platform as the standing platform is above the next lower horizontal rail, or rung, with eyelets attached at various points on said upper section to facilitate the attachment of removable strapping devices to secure the stand to a tree or other support structure and to secure the three sections together when disassembled and arranged for transport.

---

**5,016,733**

### WEDGING TREE STAND

**Ralph E. Bradley, 219 Mobile St., Aberdeen, Miss. 39730**
**Continuation-in-part of Ser. No. 282,754, Dec. 12, 1988, Pat. No. 4,331,216, which is a continuation-in-part of Ser. No. 177,185, Apr. 4, 1988, abandoned. This application Mar. 2, 1990, Ser. No. 487,384**
**Int. Cl.$^5$ A01M *31/02;* A45F *3/22***
U.S. Cl. 182—187 5 Claims



1. Apparatus supporting a person at an elevation on a column-like member such as a tree, comprising:
(a) frame assembly having a generally rectangular bottom section and a pair of lateral members extending at an acute angle from one end of said bottom section;
(b) a platform member affixed to said bottom section for supporting a person thereon; and
(c) an engagement bar in the form of an extended V having a first and second leg, with each leg detachably affixed to one of said lateral members distal said one end of said bottom section, said first and second legs being offset at an included angle of about 50 degrees and positioned to receive a column-like member of variable diameter in wedging engagement.

---

**5,016,734**

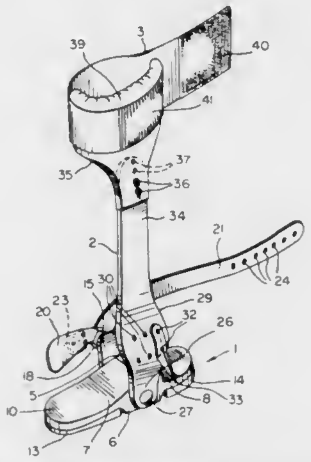
### POLE CLIMBING DEVICE

**Peter Greenway, P.O. Box 242, Canmore, 0M0**
**Filed Feb. 26, 1990, Ser. No. 484,671**
**Int. Cl.$^5$ A63B *27/00***
U.S. Cl. 182—221 **6 Claims**

1. A climbing device for attachment to an article of footwear to facilitate pole climbing comprising solid, electrically nonconducting sole plate means; for supporting the foot of a wearer; said sole plate means including a top instep projection for conforming the shape of the top surface of said sole plate to the sole of the footwear article; a bottom transversely extending instep projection; and toe and heel resilient pad means defining a substantially planar bottom surface with said bottom projection; electrically nonconducting side bar means extending upwardly from said sole plate means during use for carry-

VOL
1126
ISS
3
MY
21
1991
UMI

ing climbing gaff; pivot means for rotatably connecting said side bar means to said base plate means to facilitate movement of a wearer's foot; and coupling means for connecting said sole plate means and side bar means to the foot and leg of a user.

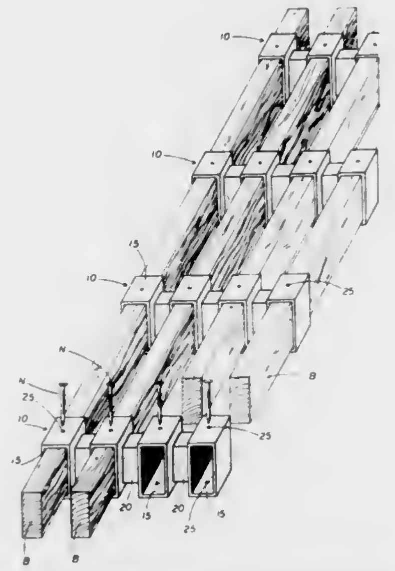


---

### 5,016,735
### SCAFFOLD PLANKING STABILIZER

**Todd D. Hodge, 630 New Rd., Raleigh, N.C. 27608**
**Filed Jan. 30, 1990, Ser. No. 472,127**
**Int. Cl.⁵ E04G *5/08***

U.S. Cl. 182—223 5 Claims



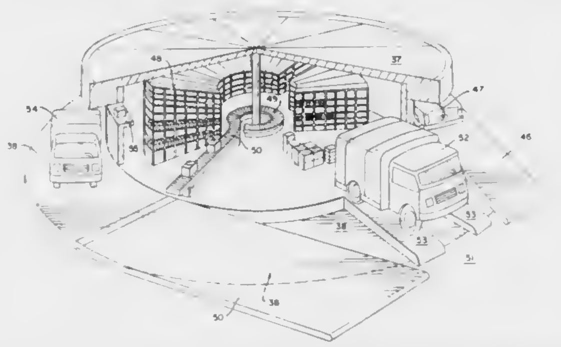
1. A connector for mounting the floor elements of a scaffold in a fixed spaced relation that utilizes to advantage the structural properties of the floor elements and comprising:
- a plurality of independent sleeves, each of said sleeves defining an opening having opposite side walls and opposite end walls and being adapted to receive a respective one of a plurality of similarly sized floor elements;
- spacer means for rigidly interconnecting said independent sleeves connected to the side walls of said sleeves;
- said plurality of sleeves and said spacer means for rigidly interconnecting said sleeves being of unitary construction; and
- means for attaching said sleeves to the respective floor elements associated with at least some of the end walls of said sleeves.

---

### 5,016,736
### TIMED CYCLE SINGLE STOP SHOPPING FACILITY

**Mark Vayda, 8380 Greensboro Dr., Suite 917, McLean, Va. 22102**
**Division of Ser. No. 280,922, Dec. 7, 1988, which is a division of Ser. No. 87,288, Aug. 20, 1987, Pat. No. 4,805,738. This application Jan. 23, 1990, Ser. No. 468,506**
**The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.**
**Int. Cl.⁵ E04H *3/04***

U.S. Cl. 186—53 7 Claims



1. A method of vending consumer merchandise comprising the steps of
- storing consumer merchandise in a circular building;
- providing a vehicle entry location and a vehicle exit location adjacent the exterior of said building;
- transferring a vehicle from said vehicle entry location onto a moving track that at least partially surrounds the exterior of said circular building, said vehicle being placed on said track in a substantially radial orientation relative to said circular building;
- continuously moving said track at substantially constant speed and in a single direction around said circular building during the placement of said vehicle on said track;
- utilizing said moving track to continuously move said radially oriented vehicle around the exterior of said building from said vehicle entry location to said vehicle exit location in a predetermined time interval while said vehicle remains in its said substantially radial orientation relative to said circular building;
- during said predetermined time interval providing an occupant of said continuously moving substantially radially oriented vehicle with merchandise stored in said circular building while said occupant remains in or adjacent said vehicle and while said substantially radially oriented vehicle is moving around the exterior of said building; and
- removing said radially oriented vehicle from said moving track at the end of said predetermined time interval for exit of said vehicle via said exit location.

---

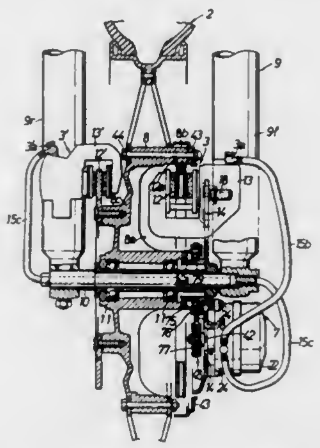
### 5,016,737
### BRAKE DEVICE FOR VEHICLES

**Tsutomu Hayashi, Tokyo; Takeshi Kawaguchi, and Tetsuo Tsuchida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 208,842, Jun. 17, 1988, abandoned, which is a continuation of Ser. No. 119,822, Nov. 12, 1987, abandoned, which is a continuation of Ser. No. 737,390, May 23, 1985, Pat. No. 4,733,757. This application Sep. 18, 1989, Ser. No. 409,965**
**Claims priority, application Japan, May 26, 1984, 59-106916; Oct. 26, 1984, 59-225396**
**Int. Cl.⁵ B60F *8/08***

U.S. Cl. 188—181 A 9 Claims

1. A brake device for a motorcycle having a wheel carried on a wheel supporting member via an axle extending substantially perpendicularly with respect to said axle, comprising a master cylinder, a disc brake actuated by output hydraulic

pressure from the master cylinder to apply a brake force to said wheel, an antilock control unit incorporating a transmission device, an inertia type wheel angular deceleration sensor driven by said wheel through the transmission device and controlling the output hydraulic pressure of said master cylinder in response to an output from the sensor, an annular recess formed on the wheel and open to one side of said wheel, said disc brake being housed in said annular recess, a disc brake caliper of said disc brake and a fixed panel, said disc brake caliper and said antilock control unit are supported on said fixed panel disposed so as to close an opening of said annular recess, wherein said antilock control unit and said disc brake caliper are located on opposite sides of said wheel supporting structure when viewed in a lateral direction of the motorcycle and wherein said transmission device is housed in said annular recess.

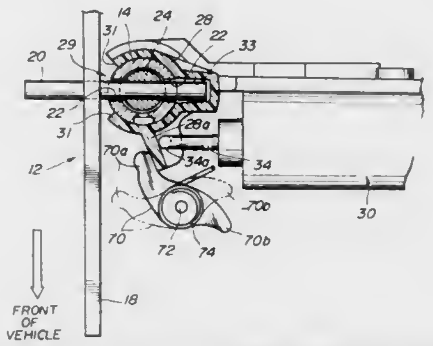


---

### 5,016,738
### AUTOMATIC TRANSMISSION SHIFT CONTROL DEVICE

**Katsunori Shirahama, Atsugi; Satoshi Kobayashi, Hiratsuka; Michihiro Okuda, Zama; Takashi Maruta, Hiratsuka; Motohiro Saito, Kosai, and Hiroshi Yamazaki, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama; Nissan Shatai Company, Limited, Hiratsuka; Ohi Seisakusbo Co., Ltd., Yokohama and Fuji Kiko Co., Ltd., Tokyo, all of, Japan**
**Filed Nov. 27, 1989, Ser. No. 441,867**
**Claims priority, application Japan, Nov. 28, 1988, 63-301267**
**Int. Cl.⁵ B60K *41/26***

U.S. Cl. 192—4 A 10 Claims



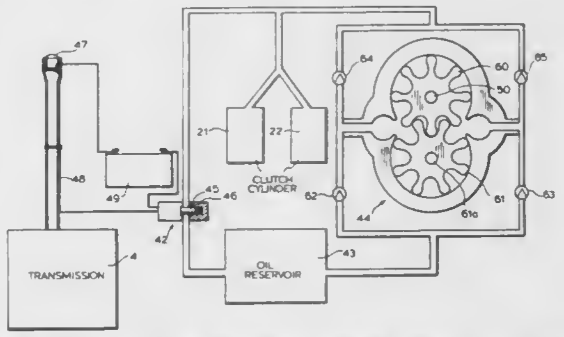
1. An automatic transmission shift control device for a vehicle having a brake pedal and an ignition key, comprising:
- a selector lever movable into a plurality of gear positions including park position and having a hollow cylindrical post formed with a pair of diametrically opposed openings; and
- means for preventing movement of said selector lever out of the park position unless the brake pedal is depressed;
- said means including a position plate having an opening defining said gear positions, a position pin installed transversely of said post in said openings for up-and-down movement and releasably engaged with said position plate for positioning said selector lever in one of said gear positions, a reciprocative rod installed in said post for up-and-down movement and attached at the lower end thereof to said position pin, a bushing mounted on said post for rotational movement, but against axial movement and having diametrically opposed openings which said position pin is movable into for disengagement from said position plate, a solenoid operatively connected to said bushing for driving, when energized, said bushing into a first position where said openings of said bushing are aligned with said position pin, first biasing means for urging said bushing toward a second position where said openings of said bushing are misaligned with said position pin when said solenoid is deenergized, a rocking lever rotatable between a first position where it is engaged with said bushing for holding the same in said first position and a second position where it is disengaged with said bushing for allowing the same to move into said second position under the bias of said first biasing means, second biasing means for driving said rocking lever against the bias of said first biasing means into said first position of said rocking lever when said selector lever is one of the gear positions other than the park position, stopper means for driving said rocking lever against the bias of said second biasing means into said second position of said rocking lever when said selector lever is in the park position, and electric circuit means for engaging said solenoid only when the brake pedal is fully depressed under the condition where the ignition key is in an "ON" position and said selector lever is in the park position.

---

### 5,016,739
### FRICTION CLUTCH SYSTEM

**Kwan-Soon Im, 132 O'Connor Drive, Toronto, Ontario, Canada M4J 2S4**
**Filed Jun. 1, 1989, Ser. No. 360,057**
**Int. Cl.⁵ B60K *41/28;* F16D *25/02***

U.S. Cl. 192—0.08 12 Claims



9. In a vehicle with an engine having output drive shaft means and transmission means with input driven shaft means; a plurality of gear settings, and gearshift lever means movable to select the gear settings;
- a friction clutch system to releasably couple the drive shaft means to the driven shaft means comprising:
- first clutch means rotatable about an axis, the first clutch means coupled to the drive shaft means for rotation therewith,
- second clutch means journalled for rotation about said axis adjacent the first clutch means,
- the second clutch means coupled to the driven shaft means for rotation therewith,
- one of the first clutch means and second clutch means axially

VOL 1126 ISS 3 MY 21 1991 UMI

displaceable into frictional engagement with the other to rotate the driven shaft means and the drive shaft means together,

hydraulic circuit means comprising pump means; clutch cylinder means; and oil valve means, connected by oil line means with the pump means to circulate oil from the pump means to the clutch cylinder means, and then back to the pump means,

the oil valve means movable between an open position to permit oil flow therethrough and a closed position to prevent oil flow therethrough, the oil valve means biased to assume the closed position,

the clutch cylinder means operable when pressurized by oil from said pump means when said oil valve means is closed to urge said first clutch means and said second clutch means together into frictional engagement,

one way means preventing reverse flow of oil through said pump means from said clutch cylinder means,

the pump means mechanically coupled between the drive shaft means and the driven shaft means to pump oil to the clutch cylinder means at flow rates which increase with an increase in the difference in rotational speeds of the driven shaft means and the driven shaft means;

the hydraulic circuit means maintaining pressure in the clutch cylinder means when the oil valve means is closed,

gearshift switch means activated during movement of the gearshift lever, the gearshift switch means while activated maintaining the oil valve means in the open position,

when the oil valve means is open, oil pumped by the pump means circulates through the hydraulic circuit means and resistance in the hydraulic circuit means to circulation of oil pumped therethrough causes transfer through the pump means of rotational forces between the drive shaft means and driven shaft means urging them to change their speed of rotation to approach that of the other.

---

### 5,016,740

## TORQUE RESPONSIVE ENGAGING CLUTCH

**Kenichiro Ito, Shizuoka; Hiromi Nojiri, and Kenro Adachi, both of Iwata, all of Japan, assignors to NTN Corporation, Osaka, Japan**

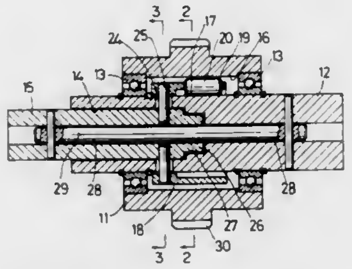
**Filed May 31, 1989, Ser. No. 359,260**

**Claims priority, application Japan, Jul. 14, 1988, 63-93300[U]; Sep. 20, 1988, 63-235731**

**The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.**

**Int. Cl.⁵ F16D** *15/00, 43/20*

U.S. Cl. 192—38 3 Claims



1. A clutch comprising:

an outer ring formed on its inner periphery with a first cam surface;

an output shaft rotatably supported in said outer ring and formed on its periphery with a second cam surface;

an input shaft rotatably mounted in said outer ring and coupled with said output shaft;

a pair of bearings, one of which is for supporting said output shaft and the other is for supporting one of said output shaft and said input shaft;

a cage interposed between said outer ring and said output shaft and formed with a plurality of pockets;

a plurality of cam members disposed between said bearings and mounted in said pockets for engagement with said first and second cam surfaces;

elastic means mounted in said pockets for biasing said cam members into engagement with said cam surfaces;

means for providing a clearance in the direction of rotation between said input shaft and one of said outer ring and said output shaft; and

a torque setting elastic member mounted between said input shaft and one of said outer ring and said output shaft for holding said cam members in a neutral position with said clearance in said direction of rotation between said input shaft and said one of said outer ring and said output shaft so as to be deformed until said clearance disappears when said torque setting elastic member is subject to a torque larger than a predetermined torque;

said cam members being out of engagement with one of said first and second cam surface in said neutral position.

---

### 5,016,741

## DOUBLE CAGE FREEWHEEL ASSEMBLY

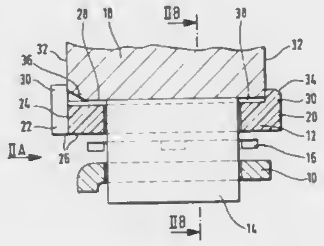
**Hermann Leitz, Heidelberg, Fed. Rep. of Germany, assignor to Borg-Warner Automotive, GmbH, Heidelberg, Fed. Rep. of Germany**

**Filed Nov. 17, 1989, Ser. No. 439,207**

**Claims priority, application European Pat. Off., Nov. 19, 1988, 88119278.5**

**Int. Cl.⁵ F16D** *41/07*

U.S. Cl. 192—45.1 12 Claims



1. A freewheel assembly comprising, an internal cage ring made of a rigid metal material, an external cage ring having opposed frontal surfaces made of a flexible plastic material and surrounding said internal cage ring, and catch means on said external cage ring, said catch means including projections attached adjacent said frontal surfaces of said external cage ring, said projections extending axially beyond said frontal surfaces, said projections defining cams for engaging a surrounding member, said projections on one side of said external cage ring having a radially smaller height than said projections on the other side of said external cage ring, the lower projections on the side having a radially smaller height being provided with a bevel, whereby during assembly said external cage ring elastically deforms and the higher projections form an axial stop.

---

### 5,016,742

## LIQUID FRICTION COUPLING

**Othmar Peier, Pöllau, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria**

**Filed May 1, 1990, Ser. No. 517,321**

**Claims priority, application Austria, May 2, 1989, 1035/89**

**Int. Cl.⁵ F16D** *31/00*

U.S. Cl. 192—58 C 1 Claim

1. In a liquid friction coupling comprising

a housing,

a viscous liquid contained in said housing,

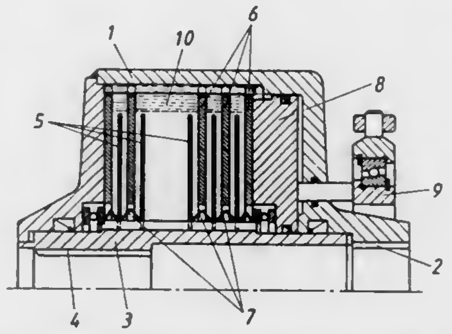
a shaft protruding into said housing,

a first set of axially spaced apart inner blades, which are axially slidably mounted on and non-rotatably connected to said shaft and have outer peripheries which are radially inwardly spaced from said housing and define with said housing an annular space,

a second set of axially spaced apart outer blades, which alternate and interdigitate with said inner blades and are axially slidably mounted in and non-rotatably connected to said housing and extend radially through said annular space,

a plurality of annular expanding springs, each of which is disposed between adjacent blades of one of said sets and urges said adjacent blades apart, and

an annular piston, which is axially slidably mounted and sealed in said housing and is axially operable from the outside of said housing to act on said blades in order to control the axial spacing of adjacent ones of said blades and is axially movable to and from a predetermined position which determines a largest possible axial spacing of said blades and in which said annular space inasmuch as it is not occupied by said outer blades has a predetermined volume,



the improvement residing in that the quantity of said viscous liquid which is contained in said housing has in a gas-free state a volume which is not in excess of said predetermined volume.

---

### 5,016,743

## VEHICLE HAVING A WET TYPE MAIN CLUTCH

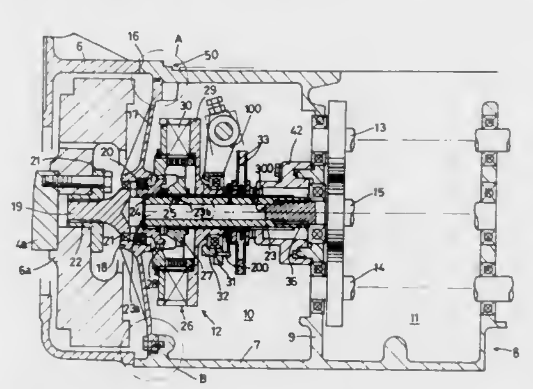
**Masayor Kajino, Osaka, Japan, assignor to Kubota Ltd., Japan**

**Filed Sep. 14, 1989, Ser. No. 407,249**

**Claims priority, application Japan, Sep. 21, 1988, 63-124394[U]; Dec. 28, 1988, 63-170136[U]; Mar. 13, 1989, 1-28879[U]**

**Int. Cl.⁵ F16D** *13/58*

U.S. Cl. 192—70.12 4 Claims



1. A transmission for transmitting an engine drive from an engine to wheels, comprising:

a clutch housing (7);

a flywheel housing removably attached to a forward end of said clutch housing adjacent to the engine;

a partition wall (17) sealably removably connected at the forward end of said clutch housing;

a rear wall disposed at a rear end of the clutch housing (7) for defining an oil bath in the clutch housing together with the clutch housing and the partition wall;

a flywheel connected to an engine output shaft and housed in the flywheel housing;

a clutch input shaft (19) supported by said partition wall (17) through a bearing (20) and including a forward end splined to the flywheel and a rearward end projecting into the oil bath;

a clutch output shaft having a forward end freely rotatably supported by the rearward end of the clutch input shaft at a front end thereof, said clutch output shaft being disposed in the oil bath;

a wet type clutch disposed in the oil bath and including an input portion connected to the clutch input shaft and an output portion connected to the clutch output shaft;

a main change speed shaft supported by the rear wall of the clutch housing through a bearing and having a projecting portion projecting into the oil bath, said main shange speed shaft being coaxial along a longitudinal axis with the clutch output shaft, said projecting portion being connected to a rear end of the clutch output shaft by spline connection means;

wherein the rear end of the clutch output shaft receives the projecting portion of the main change speed shaft and aligns longitudinal axes of the clutch output shaft and the main change speed shaft, and allows the rear end of the clutch output shaft to be supported by the partition wall through the projecting portion of the main change speed shaft.

---

### 5,016,744

## CLUTCH DISC FOR A FRICTION CLUTCH

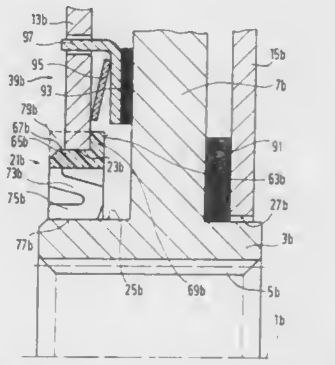
**Matthias Fischer, Euerbach; Rainer Wiedmann; Kurt Fädler, both of Neiderwerrn, and Harald Jeppe, Schweinfurt, all of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany**

**Filed Jan. 23, 1990, Ser. No. 468,561**

**Claims priority, application Fed. Rep. of Germany, Feb. 8, 1989, 3903651; Jun. 29, 1989, 3921283**

**Int. Cl.⁵ F16D** *3/66*

U.S. Cl. 192—106.2 7 Claims



1. A clutch disc for a friction clutch, in particular for a motor vehicle, comprising a hub (3) having a hub disc (7), which projects from the hub radially to an axis of rotation (1) of the hub, and having a cylindrical bearing face (25) axially to the side of the hub disc (7), two lateral discs (13, 15) which are arranged axially on either side of the hub disc (7), are rigidly connected to one another, are rotatable relative to the hub disc (7) through a limited angle of rotation and each have a central opening (23, 27) through which the hub (3) passes, a plurality of springs (31) coupling the lateral discs (13, 15) rotatably to the hub disc (7) and a plastic mounting ring (21) which is held non-rotatably in the central opening (23) of one (13) of the two lateral discs and has an annular part (65), which is closed in the form of a ring and rests on the lateral disc (13), and has a radially resilient connecting region (73) which is inclined to the axis of rotation (1), extends from the annular part (65) to the

VOL
1126
ISS
3
MY
21
1991
UMI

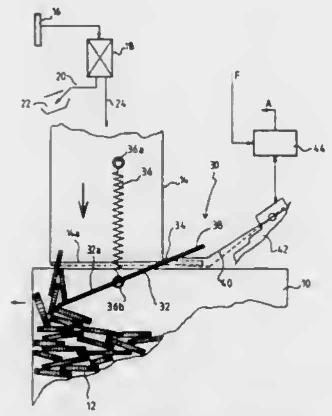
hub (3) and is supported on the cylindrical bearing face (25) of the hub (3), wherein the annular part (65) is held with its outer periphery (67) in the central opening (23) of the lateral disc (13) and carries an annular flange (69) which projects radially outward and axially fixes the annular part (65) relative to the lateral disc (13), and wherein the connecting region (73) projects from the internal periphery of the annular part (65) and carries a cylindrical opposing bearing face (77) resting substantially without radial tension on the cylindrical bearing face (25) of the hub (3), at least three stop blocks (79) which are mutually offset in the peripheral direction and project beyond the annular part (65) radially to the hub (3), but end at a radial distance from the hub (3), are formed on the annular part (65) to limit the radial deflection of the connecting region (73), the connecting region (73) at least on either side of each stop block (79), being provided directly adjacently with radial slots (71) wnich are open toward the opposing bearing face (77) and extends substantially to the annular part (65).

### 5,016,745

### DETECTION DEVICE FOR DETECTING THAT A COIN RECEPTACLE IS FULL

**Pascal Schoeb, and Dominique Holtzer, both of Besancon, France, assignors to Schlumberger Industries, Montrouge, France**

**Filed Oct. 28, 1988, Ser. No. 263,153**
**Claims priority, application France, Nov. 9, 1987, 8715478**
**Int. Cl.$^5$ G07F *9/06***
**U.S. Cl. 194—346 16 Claims**



1. A device for detecting that a coin storage receptacle is full of stored coins, said stored coins having different sizes and being piled up in said receptacle in a random way, said device comprising:

a coin receptacle with an opening in its top;

a coin inlet passage having a bottom end which opens toward the receptacle opening to direct coins into the receptacle;

a movable member having a rest position blocking passage of coins from the coin inlet passage into the receptacle and a displaced position permitting passage of coins from the coin inlet passage into the receptacle;

return means coupled to the movable member for, after the movable member has been away from its rest position toward its displaced position, returning said movable member to its rest position, said return means being incapable of returning the movable member to its rest position against the weight of a coin lying on the movable member; and

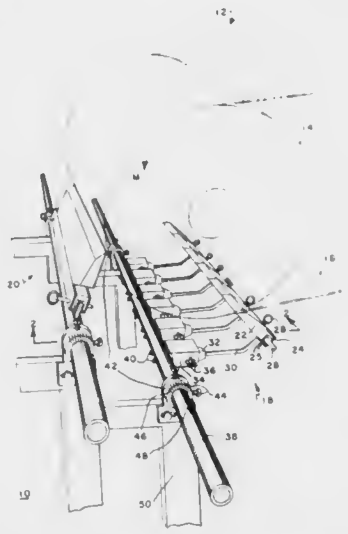
monitoring means for generating a signal when it detects a condition of, with no coin passing through said coin inlet passage, the movable member being away from its rest position, whereby said signal is indicative of the receptacle being full.

### 5,016,746

### CONVEYOR BELT SCRAPING APPARATUS

**A. Todd Gibbs, Allentown, Pa., assignor to ASGCO Manufacturing, Inc., Allentown, Pa.**

**Continuation of Ser. No. 209,457, Jun. 20, 1988, abandoned. This application Feb. 9, 1990, Ser. No. 483,959**
**Int. Cl.$^5$ B65G *45/16***
**U.S. Cl. 198—499 12 Claims**



1. Apparatus for cleaning a conveyor belt by shaving debris therefrom, said apparatus comprising:

a plurality of elastomeric scrapers blades positioned in side by side relation in a common plane with side edges of said blades abutting, each of said blades having a scraping edge extending from one of its side edges to the other, said scraping edges being normally aligned so as to form a continuous shaving edge for transverse engagement with a moving conveyor belt, each blade being inclined at an angle directed against the conveyor belt,

a rotatable shaft positioned transversely of the belt in spaced parallel relation to the aligned scraping edges forward of said aligned scraping edges relative to the direction of movement of the conveyor belt,

an individual blade support means for each blade supporting the blade for movement toward and away from the conveyor belt with its scraping edge parallel to the normal alignment of said scraping edges comprising a trailing arm connected at one end to the associated blade and at the other end to said shaft, at least one of said connections being resilient to bias said scraping edge of the blade for said parallel movement toward the conveyor belt and limiting displacement of the blades out of said common plane,

each blade having sufficient thickness and length along the length of its side edges where it abuts an adjacent blade to support itself and the adjacent blade against twisting in their resilient connections whereby said support means and the abutting side edges of adjacent blades cooperate to provide lateral support to prevent twisting of the blade in said resilient connection in response to irregularities in the conveyor belt or the debris carried by the conveyor belt, and

a frame having a collar surrounding said shaft for mounting said shaft for rotation whereby rotation of said shaft adjusts the bias applied by the resilient connection tending to displace the blade towards the conveyor belt, and

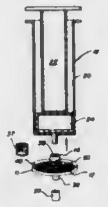
index means comprising index marks spaced circumferentially about said collar, and a reference line on said shaft operable to register with index marks to provide a visual indication of the rotary position of said shaft in said frame and thereby a reference for the bias of the blade against the belt.

### 5,016,747

### BARRIER SEAL FOR CONVEYOR SKIRTBOARD

**Willem D. Veenhof, El Cajon, Calif., assignor to Martin Engineering Company, Neponset, Ill.**

**Continuation-in-part of Ser. No. 226,858, Aug. 1, 1988, abandoned, which is a continuation-in-part of Ser. No. 71,381, Jul. 9, 1987, abandoned. This application Jun. 21, 1990, Ser. No. 541,628**
**Int. Cl.$^5$ B65G *47/44***
**U.S. Cl. 198—525 25 Claims**



1. In a conveyor belt installation wherein a conveyor belt is movable along an axis between a head pulley and a tail pulley, said belt having an upwardly facing belt surface terminating in a lateral edge, a barrier seal assembly for preventing particulate material in a working region on said upwardly facing belt surface from entering a clear region on said upwardly facing belt surface, said barrier seal assembly comprising, in combination:

a downwardly extending material retaining wall defining a relatively rigid primary seal having a first side surface exposed to said working region and an opposite side surface exposed to said clear region, said retaining wall terminating in a lower edge positioned above said upwardly facing belt surface to define therebetween a small gap bordering said working region, whereby said primary seal confines the bulk of said particulate material to said working region;

a flexible sheetlike secondary seal having first and second opposite major side surfaces, said secondary seal having an upper attachment end portion and a lower free end portion, said upper attachment end portion and a lower free end portion extending along the length of said secondary seal and being spaced apart by the width of said secondary seal, said first and said second major side surfaces being separated by the thickness of said secondary seal, said thickness being less than either said length or said width; and,

mounting apparatus suspending said upper attachment end portion adjacent to and in contact with said retaining wall a given distance above said upwardly facing belt surface, said secondary seal forming a flexible web which extends angularly outwardly from said upper attachment end portion adjacent said retaining wall to said lower free end portion spaced outwardly from said retaining wall, said secondary seal being deflected away from said working region and toward said clear region by contact between said upwardly facing belt surface and a sealing portion of said second major side surface, said sealing portion resting with light sealing pressure against the upwardly facing belt surface lying between said gap and the lateral edge of said belt, whereby said secondary seal prevents particulate material leaking through said gap from entering said clear region.

### 5,016,748

### ACCUMULATING CONVEYOR

**Thomas L. Garzelloni, Worth, Ill., assignor to Automotion, Incorporated, Worth, Ill.**

**Filed Jul. 10, 1989, Ser. No. 377,563**
**Int. Cl.$^5$ B65G *13/06***
**U.S. Cl. 198—781 17 Claims**

1. An accumulating conveyor, comprising:

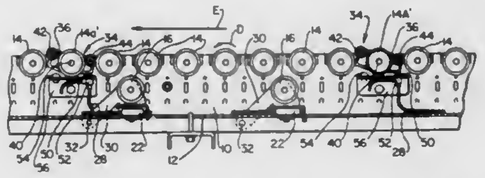
frame means having generally parallel sides;

a plurality of load-carrying rollers rotatably mounted between the frame sides;

a plurality of lifting rollers rotatably mounted between the frame sides beneath the load-carrying rollers;

a drive belt extending between the load-carrying rollers and the lifting rollers for rotating the load-carrying rollers in response to the lifting rollers lifting the belt into engagement with the load-carrying rollers;

a plurality of lightweight non-load-carrying sensing rollers disposed between selected pairs of load-carrying rollers, the sensing rollers being mounted on vertically reciprocating carriages and normally being biased to positions above a plane defined by the tops of the load-carrying rollers in



the path of movement of articles moving along the conveyor, each said carriage being pivotally mounted on a load-carrying roller for pivoting its respective non-load-carrying sensing roller into the path of movement of the articles along the conveyor; and

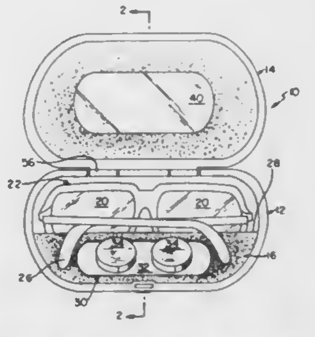
actuator means operatively associated between the sensing rollers and the lifting rollers in a manner such that a sensing roller is associated with a lifting roller immediately upstream of the respective sensing roller whereby depression of any given sensing roller is effective to lower the immediately upstream lifting roller and thereby stop movement of upstream articles until downstream articles have moved down the conveyor off the given sensing roller.

### 5,016,749

### EYEGLASS AND CONTACT LENS HOLDER

**Kenneth Kaye, and Barbara Kaye, both of 310 E. Lincoln Ave., Cranford, N.J. 07016**

**Filed May 29, 1990, Ser. No. 529,604**
**Int. Cl.$^5$ B65D *85/38***
**U.S. Cl. 206—5.1 12 Claims**



1. A carrying case for spectacles and contact lenses which comprises:

(a) a hollow open base for containing said spectacles;

(b) a partial partition affixed to the interior of said hollow base which divides said base into an open anterior and an open posterior compartment, said posterior compartment receiving the lens frame portion of said spectacles and said anterior compartment accommodating the earhorns of said spectacles;

(c) a pair of contact lens cups affixed to the surface of said partition facing said anterior compartment, said lens cups for holding at least a pair of contact lenses in a liquid solution;

VOL
1126
ISS
3
MY
21
1991
UMI

(d) a lid hingedly connected to said base for covering said open base.

7. A carrying case for spectacles and contact lenses which comprises:

(a) a hollow open base for containing said spectacles;

(b) a contact lens case secured to an interior surface of said base for containing said contact lenses;

(c) a plinth interposed between said base and said lens case for spacing said lens case away from said base a distance approximating the thickness of the lens frame portion of said spectacles whereby said lens frame portion is captured between said base and said lens case when said spectacles are stored in said case and wherein said plinth has a cross-sectional shape substantially complimentary to the shape of the nose bridge portion of said glasses whereby said nose bridge fits snugly over said plinth when said spectacles are stored in said case.

11. A carrying case for spectacles and contact lenses which comprises:

(a) a hollow open base for containing said spectacles;

(b) a contact lens case secured to an interior surface of said base for containing said contact lenses;

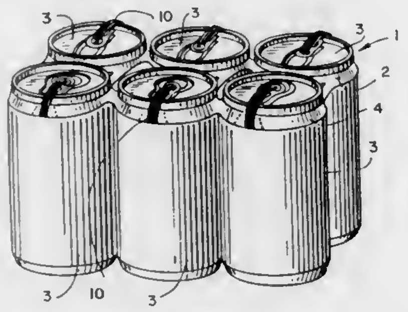
(c) a plinth interposed between said base and said lens case for spacing said lens case away form said base a distance approximating the thickness of the lens frame portion of said spectacles whereby said lens frame portion is captured between said base and said lens case when said spectacles are stored in said case and wherein said lens case is removably affixed to said base.

---

### 5,016,750

## ENVIRONMENTALLY SOUND CARRIER PACKAGE

**Joan E. Gordon, 260 E. Chestnut St., Chicago, Ill. 60611**
**Continuation-in-part of Ser. No. 385,228, Jul. 25, 1989, Pat. No. 4,925,020. This application Nov. 16, 1989, Ser. No. 437,652**
**The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.**
**Int. Cl.$^5$ B65D** *75/58*
U.S. Cl. 206—150 20 Claims



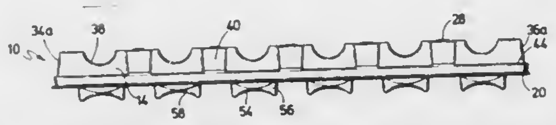
1. A container package comprising:
a series of similarly configured containers;
a series of interconnected rings formed from a resilient deformable material, each surrounding and engaging one of an array of containers for maintaining the containers in adjacent relation;
connection means for linking each ring to the container with which it is engaged; and
rupture means for breaching the continuity of each of the rings on removal of the container it engages from the container package.

---

### 5,016,751

## MOLDED FLOURESCENT TUBE DUNNAGE ELEMENT

**David E. Creaden, Lawrence, Kans., assignor to Lawrence Paper Company, Lawrence, Kans.**
**Filed Aug. 16, 1990, Ser. No. 568,014**
**Int. Cl.$^5$ B65D** *85/42*
U.S. Cl. 206—419 3 Claims



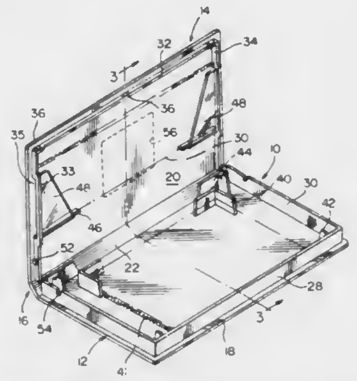
1. In a fluorescent tube support formed of synthetic resin material and presenting an integral body having concavo-convex walls defining a number of elongated, open-top, parallel, juxtaposed, concave tube-receiving regions, said region-defining walls including a first plurality of axially spaced apart, upwardly opening and diverging tube-engaging arcuate first wall sections, a second plurality of axially spaced apart, downwardly opening and diverging tube-engaging arcuate wall sections alternating with said first wall sections, and connecting walls extending between and interconnecting said alternating first and second walls, the improvement which comprises at least certain of said connecting walls each including outwardly extending, arcuate ridges thereon for preventing complete nesting of a pair of said supports when stacked together.

---

### 5,016,752

## PICTURE AND NEGATIVE STORAGE CONTAINER

**John M. Haugen, Jr., P.O. Box 1298, Everett, Wash. 98206**
**Filed Apr. 24, 1990, Ser. No. 513,875**
**Int. Cl.$^5$ B65D** *85/00*
U.S. Cl. 206—455 5 Claims



1. A container for photographic prints and negatives comprising a base panel and a cover panel, means pivotally connecting the cover panel to the base panel along an edge portion of said panels to enable the cover panel to pivot between open and closed positions in relation to the base panel, said base panel and cover panel including edge flanges to define an enclosure when the cover panel is in closed position, means on the interior surface of the base panel positioning and supporting a plurality of photographic prints and means on the interior surface of the cover panel supporting negatives from which the photographic prints supported on the base panel were made, said container being of one-piece construction, said cover panel and base panel being generally of rectangular configuration, said means pivotally connecting the panels including a spine in the form of a narrow, elongated rectangular panel with the opposed, longer side edges of the spine being connected to the base panel and cover panel by hinges to space the base and cover panels apart with the edge flanges on the base and cover panels cooperating to form an enclosure when the cover panel is pivoted to a position parallel to the base panel, means interengaging the flanges on the base and cover panels to retain the base and cover panels in closed position with the edge flanges

in telescopic side-by-side relation to reinforce the base and cover panels, said means supporting the photographic prints including a pair of L-shaped corner guide members mounted on the inner surface of the base panel in spaced relation to the edge flanges on the base panel engaging around the corners of photographic prints of one size on the base panel, and a second pair of L-shaped corner guides mounted on the base panel inwardly of the L-shaped guide members to engage the corners of smaller standard size photographic prints, each of said corner guides including a pair of components arranged in perpendicular relation to each other and the base panel, said pair of components being detachably connected to the base panel along juncture areas.

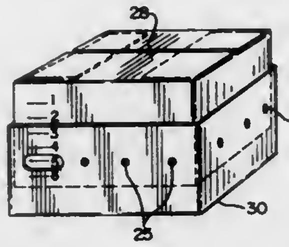
3. A container for photographic prints and negatives comprising a base panel and a cover panel, means pivotally connecting the cover panel to the base panel along an edge portion of said panels to enable the cover panel to pivot between open and closed positions in relation to the base panel, said base panel and cover panel including edge flanges to define an enclosure when the cover panel is in closed position, means on the interior surface of the base panel positioning and supporting a plurality of photographic prints and means on the interior surface of the cover panel supporting negatives from which the photographic prints supported on the base panel were made, said container being of one-piece construction, said cover panel and base panel being generally of rectangular configuration, said means pivotally connecting the panels including a spine in the form of a narrow, elongated rectangular panel with the opposed, longer side edges of the spine being connected to the base panel and cover panel by hinges to space the base and cover apart with the edge flanges on the base and cover panels cooperating to form an enclosure when the cover panel is pivoted to a positioned parallel to the base panel, means interengaging the flanges on the base and cover panels to retain the base and cover panels in closed position with the edge flanges in telescopic side-by-side relation to reinforce the base and cover panels, said means supporting the negatives on the cover panel including a pair of laterally extending shelf members perpendicular to the cover panel and extending inwardly from opposed and edge flanges on the cover panel, and a pair of retainers spaced from the inner surface of the cover panel to receive the ends of negatives, each retainer having one edge connected to the outer edge of a shelf member, a second edge connected to an end edge flange on the cover panel and an inner inclined edge to form opposed pockets to receive

---

### 5,016,753

## TELESCOPING PACKAGING SYSTEM

**Donald M. Henderson, 30 Romiga, Palos Park, Ill. 60464**
**Filed Jul. 28, 1989, Ser. No. 386,355**
**Int. Cl.$^5$ B65D** *5/42*
U.S. Cl. 206—459 33 Claims



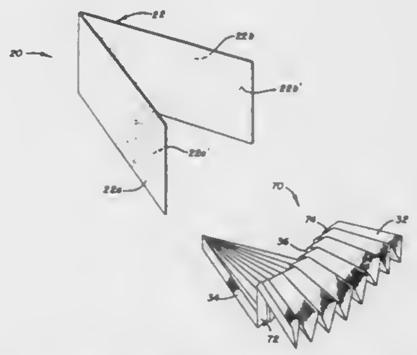
1. A packaging system for producing a container of variable volume comprising:
an inner sleeve and an outer sleeve, said inner sleeve and said outer sleeve formed so that said inner sleeve slidably fits within said outer sleeve to form a closable container;
means for temporarily securing said inner sleeve at a first position in relation to said outer sleeve, said first position creating a container having a first volume; and
means for permanently securing and holding said inner sleeve in a second position in relation to said outer sleeve, said second position creating a container having a second volume.

---

### 5,016,754

## COLLAPSIBLE ASHTRAY

**Patricia Gilda, Monterey, Calif.; William F. Mann, and Winthrop D. Allen, III, both of Bisbee, Ariz., assignors to Ashaway, Ltd., Monterey, Calif.**
**Continuation of Ser. No. 803,352, Dec. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 735,799, May 17, 1985, abandoned. This application May 10, 1988, Ser. No. 195,390**
**Int. Cl.$^5$ B65D** *73/00*
U.S. Cl. 206—496 12 Claims



1. A collapsible ashtray comprising:
a pair of panels composed of a first material; and
a continuous pleated sheet composed of a second material and extending between said panels, said sheet defining an upper horizontal segment, a lower horizontal segment, and a vertical wall joining the upper and lower horizontal segments, wherein the lower horizontal segment and the vertical wall together define a receptacle for receiving ashes and the upper horizontal segment defines a ledge adjacent the receptacle adapted to hold a cigar or cigarette and wherein said first material is different than said second material.

---

### 5,016,755

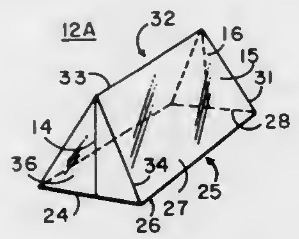
## HEAT SEALED DISPOSABLE PAINT BAG AND METHOD

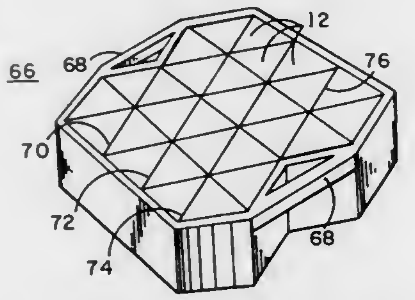
**Dae S. Kim, 1178 Walnut St., Newton, Mass. 02161**
**Division of Ser. No. 388,575, Aug. 1, 1989, Pat. No. 4,977,724. This application Jun. 18, 1990, Ser. No. 539,564**
**Int. Cl.$^5$ B65D** *30/28*
U.S. Cl. 206—526 3 Claims

1. A disposable compressible plastic paint bag comprising:
an elongated strip of compressible plastic forming a rectangular bottom and folding upwardly at an acute angle on two long edges of the bottom to form two rectangular sides meeting at a ridge along the top, and triangular segments folded over each end from each side to meet in vertical heat sealed seams forming triangular ends and the triangular ends heat sealed to the bottom to form an enclosed tent-shaped bag for holding paint to be used in a

VOL
1126
ISS
3
MY
21
1991
UMI

paint applicator wherein the bag is punctured and compressed to squeeze paint into a paint applying surface



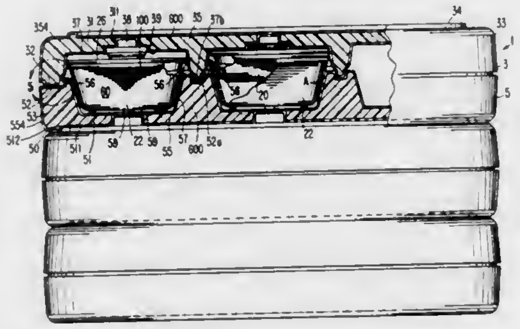


wherein the paint bags are filled, sealed, stored and carried in a plastic molded tote tray having tent-shaped compartments to receive a number of the paint bags.

---

### 5,016,756
## MULTI-PARTITION FOOD STORAGE AND MULTIPLE SERVING APPARATUS

**Heiner Wischhusen, and Hans Kehlbeck, both of Bremen, Fed. Rep. of Germany, assignors to Aladdin Synergetics, Inc., Nashville, Tenn.**
**Filed Jun. 1, 1989, Ser. No. 360,145**
**Int. Cl.$^5$ A45G** *11/20*
**U.S. Cl. 206—545** **23 Claims**

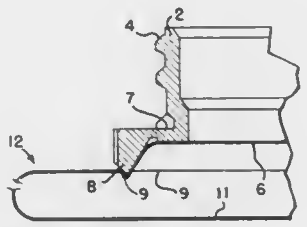


1. A multi-partition and multiple portion food storage and service apparatus comprising:
- a tray portion including a plurality of tray cavities formed therein, said tray cavities having an identical shape and size, said tray portion formed of an insulating material such that said tray cavities are insulated from each other;
- a plurality of bowls, any of said bowls removably disposable in any of said tray cavities, each said cavity being sized to hold one or more bowls, and said bowls being sized to hold a plurality of serving portions, said insulating material insulating said one or more bowls disposed in one of said tray cavities from said one or more bowls disposed in any other of said tray cavities;
- a plurality of lids for covering said bowls;
- a cover portion including a plurality of cover cavities formed therein, said cover portion formed substantially of an insulating material, each said cover cavity corresponding to one of said tray cavities, said cover portion securely fitting onto said tray portion to substantially completely insulate said one or more bowls disposed in any of said tray cavities from said one or more bowls disposed in any other of said tray cavities and from the surrounding environment.

---

### 5,016,757
## OPENING-CLOSING DEVICE FOR A BAG OF FLEXIBLE SYNTHETIC MATERIAL WITH LIMITED PENETRATION

**Daniel Chatourel, Vittel, France, assignor to Societe Generele des Eaux Minerals de Vittel, Vittel, France**
**Filed Jun. 22, 1989, Ser. No. 370,387**
**Claims priority, application France, Jun. 22, 1988, 88 08568**
**Int. Cl.$^5$ B65D** *33/16*
**U.S. Cl. 206—603** **10 Claims**

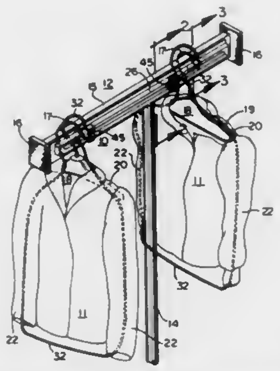


1. A bag of flexible synthetic film material having an opening-closing device attached to wall portions of the bag, the opening-closing device comprising a threaded neck portion attached to the wall portions of the bag, a stopper for threaded engagement with the neck portion and including teeth for engaging, cutting and opening said wall portions of the bag, and means for preventing contact between the teeth of the stopper and other wall portions of the bag remote from said wall portions having the opening-closing device attached thereto, to protect said other wall portions from being cut.

---

### 5,016,758
## SECURITY DEVICE FOR CLOTHING

**Richard Ward, 529 Poplar St., Lansdale, Pa. 19446**
**Filed May 14, 1990, Ser. No. 522,646**
**Int. Cl.$^5$ A47F** *5/00*
**U.S. Cl. 211—4** **1 Claim**

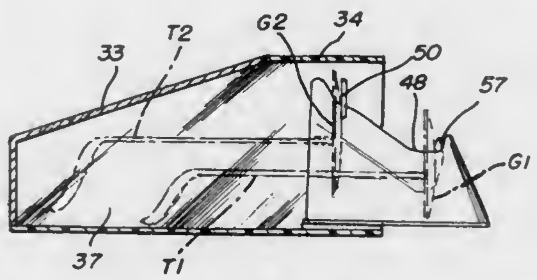


1. In combination with a rack for displaying a plurality of clothing articles side by side which rack has a rail onto which garment hangers carrying the clothing articles are individually hung, apparatus to provide security for said garments which comprises
- a flexible cable for each garment which extends through a portion of the clothing article,
- said rail has a raised U-shaped channel thereon,
- a lengthwise slot in said channel,
- said cable having a know on one end of said cable in said slot and free to move therealong,
- said cable having a lock at the other end,
- box means to which said lock is detachably connected, said box means having a knob extending therefrom in said slot retaining said box means to said channel and free to move therealong, so that when said lock is disconnected from said box means said clothing articles can be individually removed and replaced without disturbing adjacent clothing articles.

---

### 5,016,759
## ARTICLE DISPLAY DEVICE

**William S. Spamer, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio**
**Filed Aug. 17, 1990, Ser. No. 569,076**
**Int. Cl.$^5$ A47F** *7/00*
**U.S. Cl. 211—13** **12 Claims**

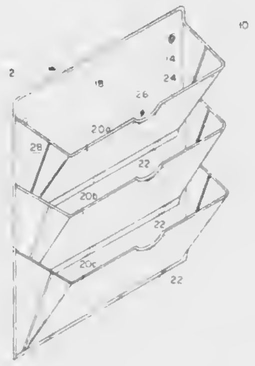


1. A holder for displaying a plurality of articles at a point of purchase, said holder comprising top, bottom and side panels interconnected to form a tubular display cavity having an open access, a support beam mounted on said bottom panel and having an upper ridge portion in which a recess is formed for removably receiving a part of a displayed article, and holding means spaced from said recess in a direction away from said access end of said display cavity and arranged to receive and hold a second displayed article.

---

### 5,016,760
## COLLAPSIBLE ORGANIZATIONAL RACK

**Stephen I. Mayo, New York, N.Y., assignor to Artistic Desk Pad & Novelty Co., Inc., New York, N.Y.**
**Filed Sep. 18, 1989, Ser. No. 408,645**
**Int. Cl.$^5$ A47F** *5/00*
**U.S. Cl. 211—55** **7 Claims**

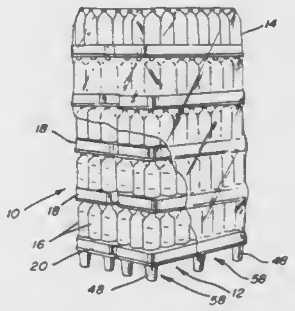


1. An organizational rack comprising a rigid backboard, a plurality of substantially rigid face elements hingedly connected adjacent their bottoms to said backboard, and a pair of flexible side flaps for each of said face elements, each flap being essentially triangular in configuration with an apex pointing downward and connecting one full side of a face element with the backboard, whereby the top of each face element can be pivoted about its bottom as a fulcrum from flat position adjacent said backboard to a position spaced from said backboard so as to form a pocket with said backboard, the bottom of one face element extending into the pocket just below at a distance corresponding to about 25 to 50% of the height of the pocket, the lateral location where the lower face element is connected with said backboard being beyond the corresponding side of the upper face element.

---

### 5,016,761
## TRANSPORTABLE DISPLAY MODULE

**David C. F. Stoddard; James D. Robertson, both of Atlanta; William S. Spamer, Roswell; James Hanna, Athens; Randall E. Bailey, Alpharetta, and Dennis E. Parham, Social Circle, all of Ga., assignors to The Mead Corporation, Dayton, Ohio**
**Filed Jun. 7, 1989, Ser. No. 362,731**
**Int. Cl.$^5$ A67F** *5/00*
**U.S. Cl. 211—59.4** **12 Claims**



1. A transportable display module for a plurality of containers each having a top and a bottom, comprising:
- a base member supporting a first layer of containers;
- a plurality of layers each comprising a tier sheet alternating with a plurality of containers;
- each of said tier sheets being identical and having a top surface, a bottom surface, and a circumferential skirt surrounding substantially the complete periphery of said tier sheet;
- said top surface having an array of container bottom receiving recesses, and said bottom surface having an array of container top receiving recesses disposed concentric with said bottom receiving recesses;
- each of said tier sheets having formed about said circumferential skirt an outwardly-extending flange;
- said module further being surrounded by a wrapper of plastic film, said plastic film being placed in direct contact with said circumferential skirts about substantially the complete periphery of said tier sheets.

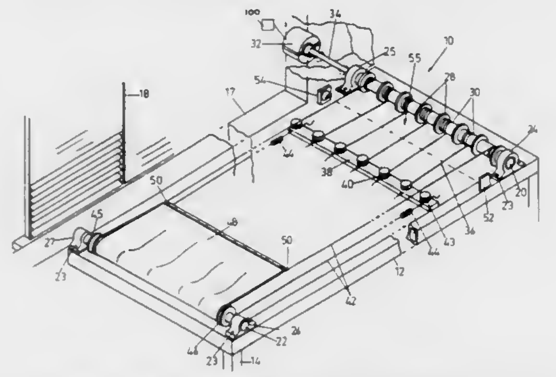
---

### 5,016,762
## MULTIPLE-FEED CLOTHESLINE DRYING APPARATUS

**Rafi Tsabar, 33 Ussishkin St., Ramat Hasharon, Israel**
**Filed Apr. 19, 1989, Ser. No. 340,364**
**Claims priority, application Israel, Jan. 18, 1989, 88983**
**Int. Cl.$^5$ D06F** *53/00*
**U.S. Cl. 211—119.1** **14 Claims**

1. A multiple-feed clothesline drying apparatus comprising:
- a first shaft supported for rotation at the ends thereof;
- a plurality of adjacent clotheslines each having a first end and a second end, said first end wound about a portion of said first shaft along adjacent selected portions of the length of said first shaft;
- means for retaining the second end of each of said clotheslines, said retaining means having attached to at least a first point thereon a first end of a flexible cord, a second end of said flexible cord being wound about said first shaft

VOL
1126
ISS
3
MY
21
1991
UMI



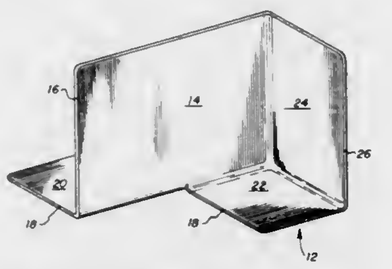
in opposite sense to that of said clotheslines along a second portion of the length of said first shaft; and

drive means operable to rotate said first shaft in take-up and feed operations for simultaneously retracting and feeding said plurality of clotheslines in coordinated fashion such that said retaining means moves toward and away from said first shaft in accordance with said take-up and feed operations,

and wherein each one of said plurality of clotheslines is connected to said retaining means, said retaining means further comprising adjustment means for maintaining said adjacent ones of said plurality of clotheslines taut and eliminating interference with one another.

---

### 5,016,763
### PRINTED MATERIAL ORGANIZER
**Donald L. Martin, Box 513, The Plains, Va. 22171**
**Filed Aug. 2, 1989, Ser. No. 388,526**
**Int. Cl.$^5$ A47F *5/00***
**U.S. Cl. 211—184** **9 Claims**



1. A printed material organizer comprising:

a flat generally horizontal base;

a first vertical portion perpendicular to said base and aligned along a center axis of said base;

a second vertical portion perpendicular to said vertical center portion and perpendicular to said base, said second vertical portion extending in only one direction from said first vertical portion and extending only upward from said base.

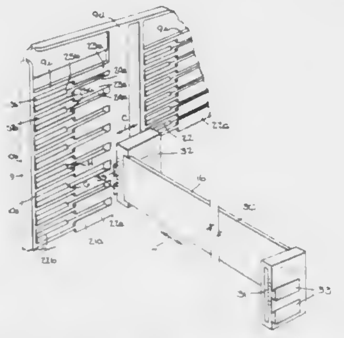
---

### 5,016,764
### MERCHANDISE DISPLAY UNIT
**Jamie D. Bauer, New Providence, N.J., assignor to Scholl, Inc., Memphis, Tenn.**
**Filed Nov. 13, 1989, Ser. No. 436,305**
**Int. Cl.$^5$ A47B *47/00***
**U.S. Cl. 211—189** **24 Claims**

1. Merchandise display unit, comprising

an arrangement of a plurality of generally vertical parallel panels in side by side facing relation along a lateral display area, such that the panels extend crosswise thereof and the facing sides of a given pair of adjacent panels define a given display space therebetween, each facing side having a modular lattice of side by side generally vertical rows of horizontal tiers of panel joint formations correspondingly arranged for coaction with those of the lattice of the other facing side to form a plurality of facing cooperating pairs of panel joint formations in the display space, and

at least one crossbar for mounting one or more merchandise display elements thereon in the given display space, the crossbar having opposed ends provided with a pair of opposed generally vertical parallel flanges, one flange extending on one crosswise direction away from the crossbar and the other flange extending in the opposite crosswise direction away from the crossbar and an opposed pair of counterpart crossbar joint formations located respectively on the outermost faces of the flanges and forming a composite unitary structure with the crossbar and flanges, the opposed pair of counterpart crossbar joint formations overlapping laterally with and mating with each facing cooperating pair of panel joint formations and forming a pair of opposed locking joints therewith, to mount removably the crossbar between the given pair of adjacent panels at the location of any facing cooperating pair of panel joint formations thereon in the display space and to interlock laterally said pair of panels via the opposed joints in response to the crossbar being rotated angularly about a generally vertical axis between the panels from a position in which its flanges are at an angle to the panels to a position in which the outermost faces of the flanges are in close generally parallel relationship to the panels to move the crossbar joint formation on its one end face into locking engagement with a panel joint formation on one panel and to move the crossbar joint formation on its other end face into locking engagement with the cooperating panel joint formation forming the respective cooperating pair therewith on the other panel.



---

### 5,016,765
### MODULAR FRAME ASSEMBLY AND METHOD FOR MAKING SAME
**Stephen V. Leonardo, 1128 Blanchard St., Downers Grove, Ill. 60515**
**Filed Aug. 23, 1989, Ser. No. 397,115**
**Int. Cl.$^5$ A47F *5/00***
**U.S. Cl. 211—189** **15 Claims**

1. A frame subassembly made from modular components comprising:

a first frame member;

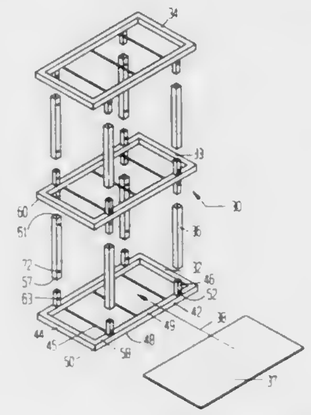
a tubular post member extending outwardly from said first frame member and having a side wall;

said post member having an opening through its side wall adjacent one end thereof;

means within said post member accessible through said opening for fixing the interior of said one end of said post member to the exterior of said first frame member;

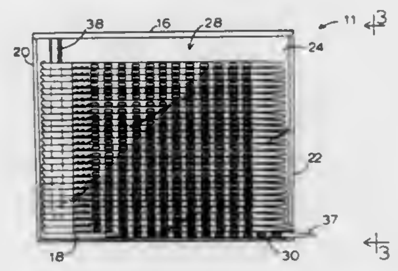
resilient means disposed within said post member having a portion extending through an aperture defined in said side wall; and,

a tubular frame member movable onto said post member and having a side wall defining an aperture adapted to receive the extending portion of said resilient means, whereby the tubular frame member is releasably mounted to the post member and thereby attached to the first frame member.



---

### 5,016,766
### ANTI-CONTAMINATION ORTHODONTIC DEVICE DISPENSER
**Paul E. Klein, 928 Lake Shore Rd., Lak Oswego, Oreg. 97034**
**Filed May 31, 1989, Ser. No. 359,988**
**Int. Cl.$^5$ A61C *7/00;* B65G *59/06***
**U.S. Cl. 221—22** **10 Claims**



1. Anti-contamination-seriatim, presenting/dispensing apparatus for plural orthodontic devices capable of allowing dispensing solely through external contact which is limited to contact with a device in the apparatus, where each device includes at least one intra-oral unit and a manipulation carrier detachably joined to and bearing such unit, such carrier including a tongue extending a certain distance from adjacent to beyond such units, said apparatus comprising:

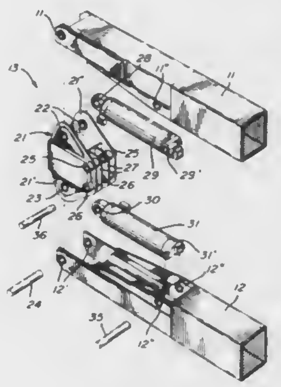
an anti-contamination container including presenting/dispensing aperture structure, and

guide structure formed with said container and cooperable with said aperture structure to direct successive devices held within said container, successively in time, to a pair of predispense conditions including a terminal predispense (presented) condition, and a preterminal predispense (nonpresented) condition,

each next-to-be dispensed device being presented in its presented condition via frictional contact occurring between interengageable components formed on adjacent devices within said container.

---

### 5,016,767
### BOOM ARTICULATION MECHANISM WITH, SIMULTANEOUSLY OPERABLE, CYLINDERS
**Francois Thibault, Victoriaville, Canada, assignor to Posi-Plus Technologies Inc., Victoriaville, Canada**
**Filed Mar. 10, 1989, Ser. No. 321,386**
**Int. Cl.$^5$ B66C *23/42***
**U.S. Cl. 212—188** **9 Claims**



1. A boom articulation mechanism for interconnecting and displacing a pair of boom members, said mechanism comprising a connector link having a pair of opposed external boom pivot connections, each said boom having a pivot end connected spaced apart to a respective one of said external pivot connections, said connector link also having a pair of internal cylinder pivot connections spaced apart closer than said external pivot connections, said external boom pivot connections and said internal cylinder pivot connections being disposed on parallel planes which are spaced apart a distance not greater than the distance between both external boom pivot connection axes less the distance between both cylinder pivot connection axes, a first hydraulic cylinder pivotally connected at one end to a first of said booms and having a piston rod end connected to an associated one of said internal cylinder pivot connections, a second hydraulic cylinder pivotally connected at one end to a second of said booms and having a piston rod end connected to an associated one of said internal cylinder pivot connections, said cylinders and said booms being disposed in the same plane, and a hydraulic circuit for simultaneous synchronized operation of said cylinders to articulate one of said booms relative to the other along a common arc, said hydraulic circuit having a control valve provided with a first port connected to a piston side of both said cylinders and a second port connected to a rod side of said cylinders, said control valve selectively connecting said ports to either a hydraulic pump or a hydraulic reservoir of aid hydraulic circuit, and flow control means for synchronous displacement of the respective piston in said cylinder.

---

### 5,016,768
### PICKUP TRUCK DERRICK WITH TRAVELING SHEAVES
**Dwight C. Kennard, Jr., 3830 Incochee Trail, Traverse City, Mich. 49684; James C. Kennard, P.O. Box 76, Maple City, Mich. 49664, and Carl J. Wick, Gladstone, Mich., assignors to David C. Kennard, Jr., Traverse City and James C. Kennard, Maple City, both of, Mich.**
**Filed Nov. 2, 1989, Ser. No. 430,884**
**Int. Cl.$^5$ B66C *23/82***
**U.S. Cl. 212—262** **45 Claims**

8. A collapsible derrick assembly adapted for mounting on a pickup truck or a trailer, said assembly comprising:

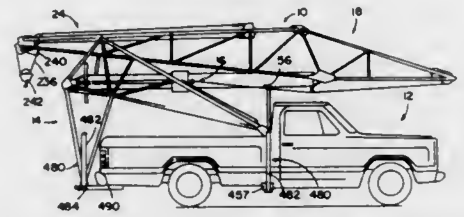
a base frame;

a derrick tower having a base pivotal to said base frame;

tower erection means connected to said tower for moving

VOL
1126
ISS
3
MY
21
1991
UMI

said tower from a collapsed position to an erected position;
an elongated boom pivotally mounted on said tower for movement about a pitch axis;
tail traveling sheave and cable means interconnecting a tail end of said boom and said tower for raising and lowering said tail end to cause said boom to move about said pitch axis;
a hoist cable on said boom; and
hoist means connected to said hoist cable for raising and lowering said hoist cable, and

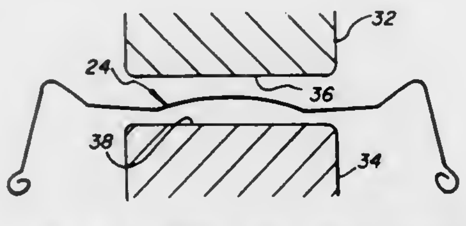


wherein said tail traveling sheave and cable means comprises:
a traveling sheave assembly including a plurality of traveling sheaves and mounting means for mounting and traveling sheaves for longitudinal movement on said boom;
a fixed sheave assembly including a plurality of fixed sheaves mounted on said boom;
a cable having a pair of ends secured to said tower, said cable being reaved over said sheaves; and
drive means on said boom for moving said traveling sheave assembly towards and away from said fixed sheave assembly so that said boom moves about said pitch axis.

---

### 5,016,769
### CLOSURE WITH HIGH ENERGY BUTTON

**Robert J. Heilman, Orland Park, Ill., assignor to Continental White Cap, Inc., Norwalk, Conn.**
**Filed Jul. 9, 1990, Ser. No. 550,044**
**Int. Cl.$^5$ B65D** *51/14*
**U.S. Cl. 215—230** **10 Claims**



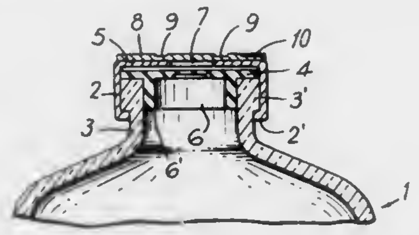
1. A closure for a container, said closure including an end panel having a button which initially has an "up" position and is drawn to a "down" position by a vacuum generated in an associated container, said button when in said "down" position having stored energy operable to flip said button upwardly when said vacuum is released, said closure being improved by having said button mechanically reformed to a state of compressive residual stress.

---

### 5,016,770
### SEALING CAP ESPECIALLY FOR ANTIBIOTIC, INFUSION AND TRANSFUSION BOTTLES

**Napoleone Rizzardi, Via Zambeletti, 10, 20129 Milan, Italy**
**Filed Apr. 18, 1989, Ser. No. 340,559**
**Claims priority, application Italy, Apr. 18, 1988, 21082[U]**
**Int. Cl.$^5$ B65D** *41/00*
**U.S. Cl. 215—232** **5 Claims**

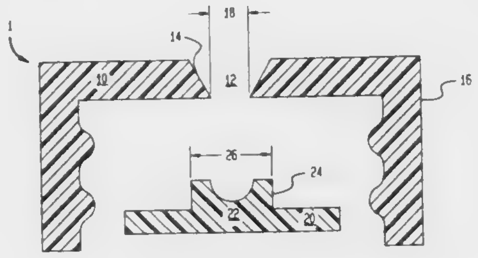
1. A sealing cap made of a metallic material for closing antibiotic, infusion and transfusion bottles, said sealing cap comprising an upper wall and a through hole formed therein; and a metallic foil for tightly closing said hole, said metallic foil being congruent with and abutting the entire upper surface of said upper wall and having a knurled grip tongue that does not project beyond a periphery of said sealing cap.



---

### 5,016,771
### CAP CLOSURE AND LINER

**James G. Finneran, Vineland, N.J., assignor to J. G. Finneran Associates, Vineland, N.J.**
**Filed Sep. 4, 1990, Ser. No. 577,270**
**Int. Cl.$^5$ B65D** *41/20*
**U.S. Cl. 215—341** **3 Claims**



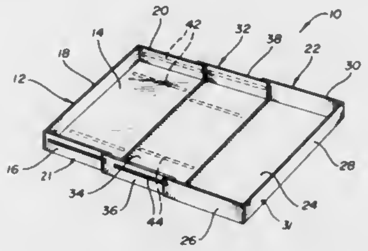
1. A cap closure comprising a top member with a center opening, said center opening having a diameter and an opening sidewall surrounding said opening, a dependent skirt for engaging a neck finish of a container, and a liner underlying said top member, said liner having an outer surface, said outer surface having a central raised portion with a central raised portion diameter surrounded by a central raised portion sidewall, the diameter of said central raised portion being at least at one point, greater than the smallest center opening diameter of said top member, wherein said central raised portion sidewall is straight and said center opening sidewall has an outward flare and the height of said central raised portion sidewall is no greater than that of said opening sidewall, said opening sidewall and said central raised portion sidewall adapted to mate with one another with an interference fit therebetween.

---

### 5,016,772
### COLLAPSIBLE RECEPTACLE ASSEMBLY AND RELATED METHOD

**Peter J. Wilk, 185 West End Ave., New York, N.Y. 10023**
**Filed Mar. 2, 1990, Ser. No. 488,296**
**Int. Cl.$^5$ B65D** *6/16*
**U.S. Cl. 220—8** **8 Claims**

1. A collapsible receptacle assembly comprising:
a first box member having one open face and one open side;
a second box member having one open face and one open side, said second box member being larger in at least one dimension than said first box member so that said first box member is nestable within said second box member, said first box member being slidably inserted in said second box member;
locking means for preventing said first box member from being disconnected from said second box member upon a pulling of said first box member from said second box member through the one open side of said second box member;

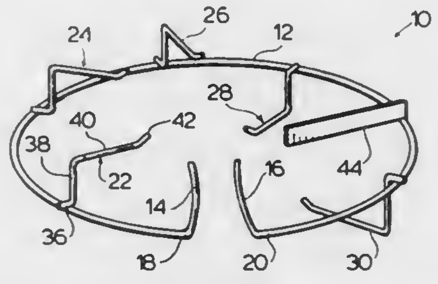


sealing means permanently attached in part to at least one of said first box member and said second box member for forming a substantially liquid tight seal between said first box member and said second box member.

---

### 5,016,773
### PAINT BRUSH HOLDER

**Larry E. Lockwood, 341 Wilson Dr., Unit 4, Milton, Ontario, Canada L9T 3Y9**
**Continuation of Ser. No. 339,696, Apr. 18, 1989, abandoned. This application May 30, 1990, Ser. No. 529,701**
**Int. Cl.$^5$ B65D** *25/10*
**U.S. Cl. 220—90** **9 Claims**

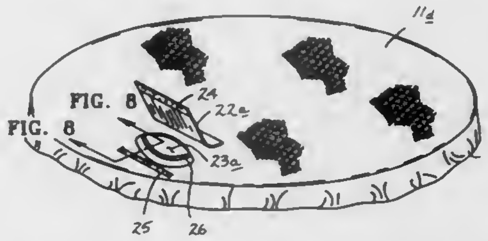


1. A paint brush support for removable insertion into a container having an internal diameter, comprising:
frame means dimensioned to be located within said container and comprising a ring member which is located in a plane and which is resiliently deformable from a first diameter corresponding to the inside diameter of the container at the location of insertion therein to a lesser diameter to permit said paint brush support to be inserted into and removed from said container and to be mounted in said container with said ring member resiliently engaging an inner wall of said container,
paint brush holder means in the form of a plurality of elongate prongs mounted in fixed relation to and extending radially inwardly from said ring member to a free end and dimensioned to be received at said free end through openings in paint brush handles to support paint brushes thereby in a substantially vertical orientation,
bar means mounted in fixed relation to and extending radially inwardly from said ring member in said plane to a free end to act as a scraping bar for removal of excess paint from a brush, and
a pair of arms integrally formed with said ring member and extending generally radially inwardly in said plane from circumferential ends of said ring member to free ends adjacent one another to permit said pair of arms to be gripped and to be drawn towards each other to effect said resilient deformation of said ring member to said lesser diameter.

---

### 5,016,774
### PAINT CONTAINER CLOSURE CAP

**Frank W. Rodriguez, 109 E. Lang St., Hanford, Calif. 93230**
**Filed Jul. 19, 1990, Ser. No. 554,565**
**Int. Cl.$^5$ B65D** *51/18*
**U.S. Cl. 220—254** **6 Claims**

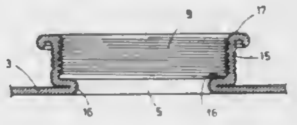


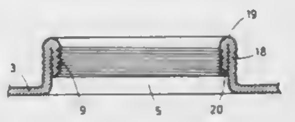
1. A paint container closure cap in combination with a container wherein the container includes an open upper end and wherein the paint closure cap includes a disk-shaped flexible fabric web to overly the open upper end,
the disk-shaped flexible fabric web having an elongate opening defining a slot
the closure cap further including a skirt downwardly depending from the periphery of the disk-shaped flexible fabric web
and
the skirt including a continuous elastomeric ring mounted continuously within the skirt to effect securement of the skirt relative to the open upper end.

---

### 5,016,775
### BUNG-TYPE CONTAINER

**Bernd Büdenbender, Schubertweg 5, 2160 Stade, Fed. Rep. of Germany**
**Filed Aug. 14, 1989, Ser. No. 393,702**
**Claims priority, application Fed. Rep. of Germany, Aug. 13, 1988, 3827551; Aug. 29, 1988, 3829240; Aug. 29, 1988, 3829230**
**Int. Cl.$^5$ B65D** *41/04*
**U.S. Cl. 220—288** **7 Claims**





1. A bung-type container, comprising:
a container body;
a container bottom closing one end of said container body;
a cover closing an opposite end of said container body, said cover being formed with at least one bunghole defining an opening and, bounding said opening and formed in one piece with said cover, a tube stub having an internal screwthread and defining an annular sealing surface surrounding said opening and located on a side of said cover turned away from said container body; and
an externally threaded bung threadedly received removably in said tube stub, forming a stopper for said opening and having a sealing ring pressed against said sealing surface, said tube stub extending outwardly away from the interior of said container and being shaped to define said at least one bunghole, said tube stub having a free upper end formed with an outwardly turned collar, said tube stub being formed with an inwardly directed folded double

VOL 1126
ISS 3
MY 21 1991
UMI

walled corrugation formed on a lower end of said tube stub and joining said tube stub to said cover.

---

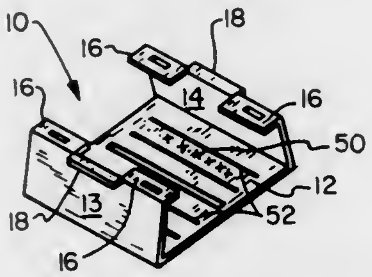
## 5,016,776

## NUCLEAR FUEL CONTAINER TAMPER-PROOF CLOSURE

**Michael J. Falzarano, Simsbury, and Adrian P. Wivagg, Tolland, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Jun. 12, 1989, Ser. No. 365,270**
**Int. Cl.⁵ B65D *51/12***

**U.S. Cl. 220—305** **11 Claims**



1. A tamper-proof closure for receipt in a container opening of a given plane geometric figure having opposite sides comprising:

a closure base, the extremities of which base lie along the perimeter of a similar geometric figure slightly smaller than said plane geometric figure having on opposite sides of said base;

closure walls transversely connected to said base along said opposite sides of the similar geometric figure;

said walls extending outwardly along said opposite sides of said container opening when said closure is in place in said opening with first projecting portions extending inwardly substantially parallel to said base and second projecting portions extending outwardly substantially parallel to said base in engagement with said container such that the application of force on said first inwardly projecting portions of said walls flex the unsupported base and thereby pivotally free the outwardly extending portions from engagement with said container for removal of the closure; and

means for indicating that said base has been flexed and therefore indicating whether said closure has been tampered with or removed.

---

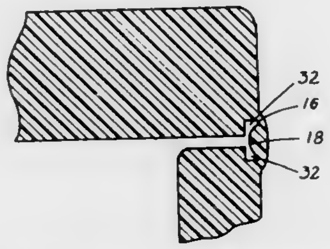
## 5,016,777

## EXPANDABLE POLYSTYRENE CONTAINER HINGE AND METHOD OF FORMING

**Morley Marvin, R.D. 1, Canastota, N.Y. 13032**

**Filed Jan. 11, 1990, Ser. No. 463,526**
**Int. Cl.⁵ B65D *43/16***

**U.S. Cl. 220—339** **2 Claims**



1. A container molded of expandable polystyrene beads having a top section and a bottom section that are hinged along one edge,

said bottom section having side walls that terminate in a plane that describes the top surface of said bottom section,

said top section having side walls that terminate in a plane that describes the bottom surface of said top section so that the bottom surface of the top section can close against the top surface of the bottom section,

a hinge integral with the two sections that joins one sidewall edge of the top section with an adjacent sidewall edge of the bottom section,

said hinge having a web of a predetermined width joined to the adjacent sidewall edges and a raised rib centered upon the web between the adjacent sidewall edges, the width of the rib being less than the width of the web, the beads in the web on either side of the rib being compressed to a solid,

each adjacent sidewall edge having a recessed shoulder formed along the edge thereof so that the bottom surface of the shoulders are in coplanar alignment with the top surface of the web when the top and bottom sections are turned 180° to an opened position and said shoulders having a width to provide clearance for the rib when the top and bottom surfaces of the container sections are closed against each other to house the rib within the shoulders without contact between the rib and the shoulders.

---

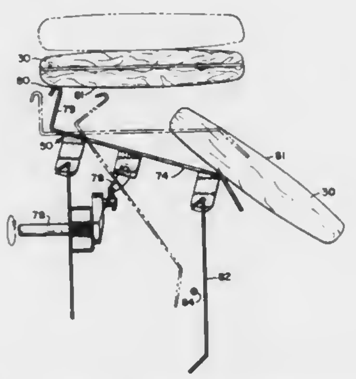
## 5,016,778

## SYSTEM FOR LOW COST DISPENSING OF SOFT PACKAGED ARTICLES

**Kenneth H. Reiland; Mary J. Reiland, both of Apple Valley, and Ronald J. Herold, Little Canada, all of Minn., assignors to Four D, Incorporated, Apple Valley, Minn.**

**Continuation-in-part of Ser. No. 52,014, May 19, 1987, abandoned. This application May 20, 1988, Ser. No. 196,984**
**Int. Cl.⁵ G07F *11/24***

**U.S. Cl. 221—154** **1 Claim**



1. A tamper resistant low cost system for mechanically dispensing soft packaged articles comprising:

a) a plurality of soft packaged articles having:

i) precision cut forming means constructed and arranged for attachment and precise shaping of a pliant article thereon; the forming means comprising a forming member constructed in the shape of a flat plate having an upper surface, a lower surface, and fared corner portions; the forming member comprising means for folding one of the articles over the forming member upper surface and lower surface;

ii) tension wrapped and heat shrinked protective means enclosing each article and each forming member; the protective means being placed around the article and the forming member so that the soft packaged article is substantially equally shaped in the cross section above the top surface and below the bottom surface of the forming member;

iii) the forming means and the protective means providing soft packaged articles having a uniform and predetermined shape wherein each of the soft packaged articles

comprises a convex cambered crown shape above and below the forming member, the cambered crown shape permitting reduced surface area contact between adjacent articles and therefore substantially aiding the dispensing of only one soft packaged article at a time;

b) a precision cut modular dispenser having means for holding and selectively releasing one soft packaged article at a time, the dispenser comprising:

i) housing means for enclosing the soft packaged articles having an enclosure with a dispensing chute lower opening, the enclosure having inner and outer faces including a front surface with an access door, a back surface, a pair of side surfaces, a top surface, and a bottom surface, the enclosing outer face having a smooth appearance resistent to tampering, and the dispensing chute lower opening being defined by the housing front surface beneath the access door, the dispensing chute lower opening providing a location for accessing the dispensed article;

ii) stacking means for maintaining vertical stacking and alignment of soft packaged articles;

iii) flapper means beneath the stacking means comprising a horizontal support surface, a vertical member, actuating arm means, and depending security gate means, the flapper means having a first retaining position and a second release position per operating cycle, in the first retaining position each successive soft packaged article to be dispensed rests on the flapper means horizontal support surface; and the movement of the flapper means from the first retaining position to the second release position dispenses one soft packaged article and positions the flapper means vertical member beneath the cambered surface of the next soft packaged article so that only one soft packaged article is dispensed during each flapper means operating cycle;

iv) biasing means for urging the soft packaged articles toward the flapper means and for maintaining the forming member in each soft packaged article in a plane consistently oriented in relation to the stacking means and for preventing the operation of the flapper means when all soft packaged articles have been dispensed;

v) coin-operated payment means coupled to the flapper means for receiving payment for each article and for permitting actuation of the flapper means between the first and the second positions;

vi) a dispensing chute for receiving a soft packaged article released from the flapper means; and

c) means for preventing tampering with the soft packaged articles within the modular dispenser comprising:

i) an access door recessed hinge portion located within the front surface of the housing, the recessed hinge portion being spaced away from a side surface of the housing and being constructed and arranged for permitting selective movement of the access door between open and closed positions;

ii) chassis latch means extending substantially the entire vertical length of the access door, the chassis latch means including:

a) a key operated lock mechanism located on the access door; and

b) a chassis latch member hingably mounted within the housing, the chassis latch member being moved into locking engagement with the access door by operation of the lock mechanism;

iii) mounting lip means for securely mounting the stacking means and the flapper means within the housing enclosure independent of any requirement for penetrating the outer surface of the enclosure;

iv) security gate means attached in depending relation from the flapper means horizontal support surface, the security gate means providing protection to the articles within the housing from unauthorized removal through the dispensing chute lower opening.

---

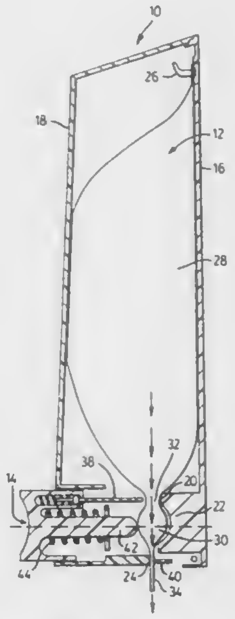
## 5,016,779

## APPARATUS FOR DISPENSING MEASURED AMOUNTS OF FLUID FROM AN OPEN-ENDED POUCH

**Nic Williamson, 3447 No. 1 Sideroad, Burlington, Ontario, Canada L7R 3Y4**

**Filed Feb. 9, 1990, Ser. No. 477,421**
**Int. Cl.⁵ B65D *35/28***

**U.S. Cl. 222—95** **1 Claim**



1. In a fluid dispenser of the type which is used to dispense a fluid such as soap from a container, of the type having a flexible discharge tube through which fluid may be discharged along a fluid dispensing path that extends through a dispenser station, the dispenser having:

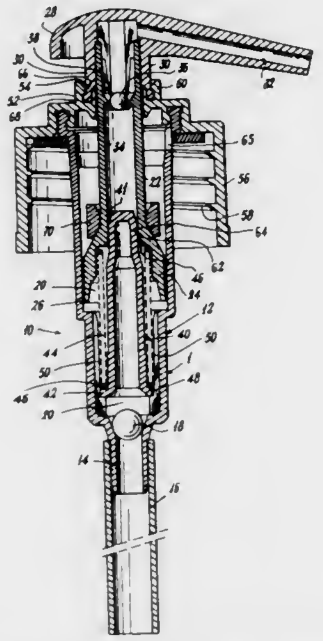
(i) upper and lower tube pinching means each having a fixed jaw and a movable jaw located opposite one another, and said fixed jaws being arranged one on a first side and one on a second side of the fluid dispensing path, the movable jaws being mounted for movement along a second path which intersects said fluid dispensing path so as to be movable toward their associated fixed jaw to a closed position in which they cooperate therewith to pinch the discharge tube and thereby prevent the discharge of fluid from the discharge tube and for movement away from their associated fixed jaw to an open position in which they permit the discharge tube to open to allow the discharge of fluid therefrom, the upper and lower movable jaws are arranged one on said first side of said dispensing path and are interconnected by an actuator means which is mounted in said dispenser station for movement to and fro along said second path from a first position, in which the upper movable jaw is in its open position and the lower movable jaw is in its closed position, to a second position, in which the upper movable jaw is in its closed position and the lower movable jaw is in its open position; and,

(ii) tube compression means carried by said actuator means and located in a first position in which it will not compress said tube when said actuator means is located in its first position and carried by said actuator means into compressive contact with said tube, to expel fluid therefrom as the actuator means moves from its first position to its second position, said tube compression means being carried by said actuator means out of compressive contact with said tube to permit said fluid to enter said tube as said actuator means moves from its second position to its first position.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,780
## HAND PUMP FOR DISPENSING BOTTLES WITH SHUTOFF ARRANGEMENT FOR PREVENTING SPILLAGE THEREFROM

**Remo Moretti, Cremona, Italy, assignor to Lumson S.r.l., Italy**
**Continuation of Ser. No. 462,584, Jan. 9, 1990, abandoned. This application Sep. 7, 1990, Ser. No. 578,947**
**Claims priority, application Italy, Mar. 31, 1989, 19978 A/89**
**Int. Cl.$^5$ G01F *11/04***
U.S. Cl. 222—153 8 Claims

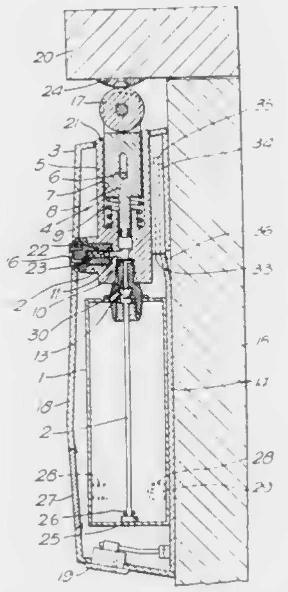


1. A hand pump for dispensing liquid or paste from a bottle, said hand pump assembly comprising:
- a hollow body open at both ends;
- means connected to one of said both ends of said hollow body for conducting liquid or paste from said bottle into said body;
- an inlet valve located within said hollow body and being movable to allow said liquid or paste to flow through said means for conducting liquid into said hollow body;
- a hollow stem projecting from the other of said both ends of said hollow body;
- a piston integral with said hollow stem, said piston being hollow and slidable with said stem within said hollow body;
- a spring having an upper end butting a shoulder of said piston,
- a dispenser knob affixed to said stem, said dispenser knob functioning, when in an unlocked position, to form an outlet channel allowing liquid or paste to flow outward through said hand pump from said bottle; and
- a shutoff element axially disposed within said hollow body and having an outside mating surface,
- said shutoff element having an elongated substantially cylindrical shape and comprising a lower flange abutted by a lower end of said spring, said lower flange of said shutoff element being held within said hollow body by ribs,
- said outside mating surface of said shutoff element mating with an inside mating surface of said hollow stem when said dispenser knob is in a locked position, said mating surfaces of said stem and said shutoff element forming a seal substantially preventing any of said liquid or said paste from spilling or leaking from said bottle through said hand pump regardless of the position of said movable inlet valve.

---

### 5,016,781
## DEVICE WITH REPLACEABLE CONTAINER FOR ATOMIZING LIQUID

**Anne W. Ten Wolde, Bentveld, Netherlands, assignor to Williams Trading B.V., AA Heemstede, Netherlands**
PCT No. PCT/NL87/00028, § 371 Date Aug. 11, 1988, § 102(e) Date Aug. 11, 1988, PCT Pub. No. WO88/03033, PCT Pub. Date May 5, 1988
PCT Filed Oct. 20, 1987, Ser. No. 224,775
Claims priority, application Netherlands, Oct. 21, 1986, 8602639
Int. Cl.$^5$ B67D *5/64*
U.S. Cl. 222—162 2 Claims

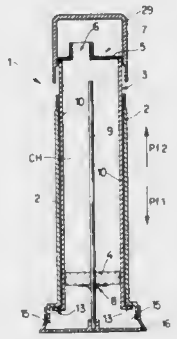


1. A device for emitting a finely divided stream of liquid into the atmosphere from a container, comprising:
- a support to be rigidly attached to a movable element;
- a housing releasably received on said support;
- a pump housing in said housing having a recess and bore therein;
- a container in said housing for liquid to be dispensed;
- a nipple with a first non-return valve and suction tube at the top of the container, with the suction tube extending into the container, said nipple fitting into the recess of the pump housing;
- a pump piston inside the pump housing bore, said piston having a piston part extending outside the pump housing;
- a fixed abutment cooperating with said piston part such that upon engagement of said piston part with said abutment the piston performs a pressure stroke against the pressure of a spring and during movement away from the abutment performs a return or suction stroke;
- wherein said pump housing communicates with the pump piston on one side and with the first non-return valve and suction tube on the other side;
- a pressure channel with a second non-return valve leading to an atomizer, said pressure channel communicating with the pump housing;
- wherein the container, nipple with suction tube and first non-return valve form a replaceable unit, the pump housing recess is adapted to slidably and sealingly receive the nipple and wherein the pump housing forms a unit with the housing; and
- wherein said support is a backing plate including pins and said container includes cavities, with said pins projecting into said cavities to hold the container in the correct position.

---

### 5,016,782
## DISPENSER FOR VISCOUS MATERIALS

**Erich Pfanstiel, Haus Nr. 3, D-7853 Steinen-Kirchhausen, Fed. Rep. of Germany**
**Filed Jun. 13, 1989, Ser. No. 365,423**
**Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 8807843[U]; Jun. 16, 1988, 8807844[U]**
**Int. Cl.$^5$ G01F *11/00***
U.S. Cl. 222—257 24 Claims



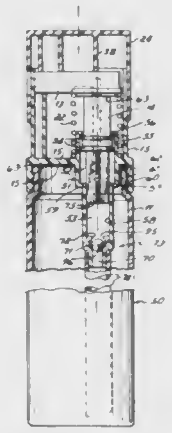
1. A dispenser for paste and other viscous materials, comprising a carrier including a housing having an open end; a cylinder movably mounted in and extending into said housing through said open end, said cylinder defining a material-confining chamber having a first end and a second end and said cylinder including a tubular wall surrounding said chamber and a wall member at said one end of said chamber, said wall member having at least one material-discharging outlet in communication with said chamber; a piston movably installed in said tubular wall at the other end of said chamber, said piston including a bottom wall adjacent said chamber and a skirt adjacent said tubular wall, said cylinder being movable relative to said housing in a first direction to move said wall member toward said piston with resulting expulsion of material from said chamber by way of said at lest one outlet and a reduction of the effective volume of said chamber, and in a second direction counter to said first direction; and means for coupling said cylinder with said piston for movement in said second direction so that the effective volume of the chamber remains at least substantiallly unchanged during joint movement of said cylinder and said piston in said second direction, said coupling means including resilient means for biasing said skirt against said tubular wall.

---

### 5,016,783
## PUMP DISPENSER PACKAGE

**Thomas H. Hayes, Lancaster, and Lewis C. LoMaglio, Pickerington, both of Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio**
**Continuation-in-part of Ser. No. 186,262, Apr. 26, 1988, Pat. No. 4,836,423. This application Jun. 5, 1989, Ser. No. 361,379**
**The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.**
**Int. Cl.$^5$ B67D *5/42***
U.S. Cl. 222—321 19 Claims

1. A pump dispenser package for a fluent material comprising:
- a body having a hollow interior for receiving the fluent material the hollow interior of said body being in communication with atmosphere;
- a hollow pump chamber having first and second openings and interior walls, said pump chamber being mounted on one end of said body;
- a reciprocating hollow pump wherein one end thereof is inserted into the interior of said pump chamber through the first opening, said pump slideably and sealingly engaging the interior walls of said pump chamber during reciprocation of said pump;
- a nozzle having an outlet, said nozzle being positioned at the opposite end of said pump and in communication with the interior of said pump chamber via said pump;
- a hollow tube connected to one end of said pump chamber for providing a passageway for the fluent material in said body into said pump chamber via the second opening;
- means for selectively closing the second opening of said pump chamber;

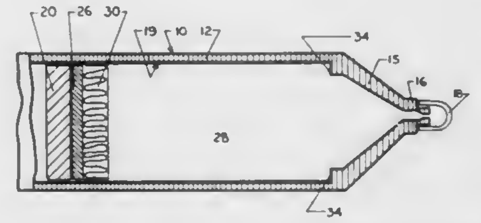


- a hollow cover mounted on said body adjacent said nozzle for rotational and reciprocal motion;
- said cover operatively coupled to said pump for reciprocating said pump; and
- means for moving said nozzle outlet into and out of said cover during the rotary movement of said cover.

---

### 5,016,784
## APPLICATOR FOR HIGHLY REACTIVE MATERIALS

**Robert E. Batson, Newington, Conn., assignor to Dexus Research Inc., Newington, Conn.**
**Filed Feb. 15, 1990, Ser. No. 481,448**
**Int. Cl.$^5$ B67D *5/42***
U.S. Cl. 222—386 19 Claims



1. A syringe for containing and dispensing a reactive material, said syringe comprising:
- a container having an interior cylindrical surface defining a cylindrical barrel having a rear end and a forward end, and further having a nozzle section terminating in a dispensing nozzle secured to the forward end of the cylindrical barrel;
- a plunger disposed within the cylindrical barrel for advancing forwardly within said barrel to dispense reactive material from the dispensing nozzle, said plunger having a forward surface comprising a non-stick polymeric seal adapted to slidably engage the interior surface of the cylindrical barrel; and
- a layer of hydrocarbon grease disposed intermediate and adjacent to the forward surface of the polymeric seal and the rearward surface of the reactive material contained in the cylindrical barrel, whereby said layer of grease lubricates the interior surface of the cylindrical barrel with a thin film of the grease as the plunger advances forwardly therein for enhanced slidable forward movement of said plunger within said barrel.

VOL
1126
ISS
3
MY
21
1991
UMI

19. A method of producing a syringe for containing and dispensing a reactive material, said method comprising the steps of:

providing a syringe having an interior cylindrical surface defining a cylindrical barrel, said cylindrical barrel fitted with a plunger operative to advance forwardly within the barrel to dispense the reactive material contained therein, and with the plunger forward face comprising a non-stick polymeric seal which slidably engages the interior surface of the cylindrical barrel; and

providing a layer of hydrocarbon grease intermediate and adjacent to the forward surface of the polymeric seal and the rearward surface of the reactive material contained in the barrel, whereby said layer of grease lubricates the interior surface of the cylindrical barrel with a thin film of the grease as the plunger advances forwardly therein for enhanced slidable forward movement of said plunger within said barrel, and further forms a moisture-impervious seal between the polymeric seal and said interior surface for sealing the reactive material contained in said barrel from the atmosphere.

---

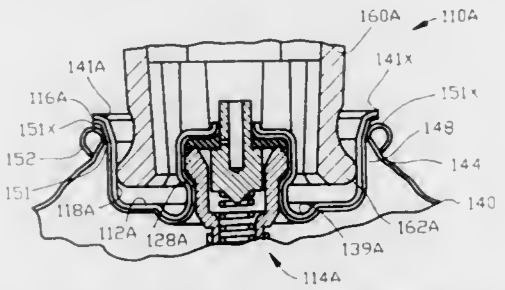
## 5,016,785
## SKIRTLESS MOUNTING CUP

**James E. Greenebaum, II, Highland Park, Ill., assignor to Pittway Corp., Cary, Ill.**

**Continuation of Ser. No. 464,728, Jan. 16, 1990, abandoned, which is a continuation of Ser. No. 326,218, Mar. 20, 1989, abandoned, which is a continuation-in-part of Ser. No. 862,282, May 12, 1986, Pat. No. 4,813,576, which is a continuation-in-part of Ser. No. 733,207, May 13, 1985, Pat. No. 4,792,067. This application Jun. 28, 1990, Ser. No. 545,776**

**Int. Cl.$^5$ B65D** *83/14*

U.S. Cl. 222—402.1 **16 Claims**



1. An improved mounting cup for sealing with a container of an aerosol dispensing device, the container having an annular bead extending about an opening in the container with the annular bead having an inner surface contour, comprising in combination:

a mounting cup comprising a central area and a peripheral rim for sealing with the annular bead of the container;

said peripheral rim having an inner region contour being substantially different from the inner surface contour of the annular bead of the container for allowing only a portion of said inner region contour of said peripheral rim to contact the inner surface contour of the annular bead when said mounting cup is disposed upon the container;

said peripheral rim being void of an outer region contour; and

said inner region contour of said peripheral rim being deformed when said mounting cup is crimped to the annular bead of the container to reform said inner region contour of said peripheral rim to be substantially the same as the inner surface contour of the annular bead to provide a sealing engagement between said mounting cup and the container.

13. The method of forming a seal between a mounting cup and a container of an aerosol dispensing device, the container having an annular bead extending about an opening in the container with the annular bead having an inner surface contour, comprising the steps of:

forming a peripheral rim in the mounting cup with the peripheral rim having an inner region contour being substantially different from the inner surface contour of the annular bead of the container and with the peripheral rim being void of an outer region contour;

placing the peripheral rim of the mounting cup on the annular bead of the container; and

crimping the mounting cup in proximity to the inner region contour of peripheral rim to reform the inner region contour of the peripheral rim to be substantially the same as the inner surface contour of the annular bead to provide a sealing engagement between said mounting cup and the container.

---

## 5,016,786
## DRAUGHT BEER DISPENSING SYSTEM

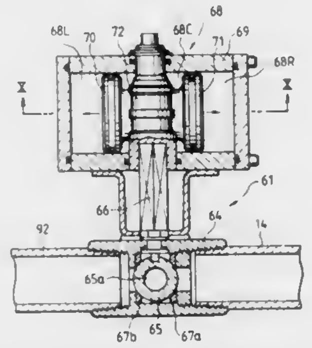
**Morikatsu Horino; Manabu Kawabe, and Yoshiaki Yagi, all of Tokyo, Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 234,894, Aug. 22, 1988, Pat. No. 4,864,396. This application Aug. 18, 1989, Ser. No. 395,805**

**Claims priority, application Japan, Aug. 24, 1987, 62-208250; Aug. 24, 1987, 62-208251; Jun. 30, 1988, 63-85698; Jul. 15, 1988, 63-93081**

Int. Cl.$^5$ **B67D** *1/00*

U.S. Cl. 222—504 1 Claim



1. A draught beer dispensing system for dispensing draught beer within a draught beer receiving receptacle comprising:

a beer dispensing valve from which draught beer is dispensed into the receptacle under the pressure of carbon dioxide gases;

a source of supplying carbon dioxide gases; and

said beer dispensing valve including an automatic ball valve having a through hole and capable of being operated by carbon dioxide gases supplied from said source and automatically controlled in a fully open position, a partly open position and a fully closed position taken in accordance with a position of the through hole of the automatic ball valve so that the draught beer can be dispensed without foam in the fully open position and can be dispensed with foams in the partly open position.

---

## 5,016,787
## SIDE ORIFICE DISPENSING CLOSURE

**James M. Beck, Carol Stream, Ill., assignor to Creative Packaging Corp., Wheeling, Ill.**

**Continuation-in-part of Ser. No. 349,158, May 9, 1989, abandoned. This application Nov. 29, 1989, Ser. No. 442,849**

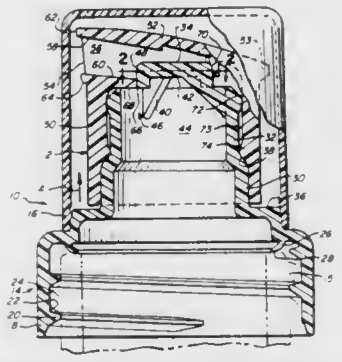
**Int. Cl.$^5$ B67D** *3/00*

U.S. Cl. 222—522 **17 Claims**

1. A dispensing closure for directing the contents out of a container comprising:

a central post having a top surface and a substantially cylindrical imperforate peripheral wall with an opening to said top surface for metering the contents to be dispensed;

a spout body reciprocally mounted on said central post and having an inner periphery which cooperates with said post peripheral wall to form a variable opening between said spout body inner periphery and said post peripheral wall to provide a closed position and a plurality of dispensing positions for dispensing the contents of said container at a plurality of different rates as said spout body is moved on said post away from said closed position, said spout body being rotatable on said central post in said closed position and said plurality of dispensing positions and including an orifice positioned remote from said top surface of said central post and in operable communication with said opening to said top surface for directing the contents out of the container in a plurality of directions around the periphery of and substantially normal to the central longitudinal axis of said central post; and



channel means within said spout body for returning to the container at least a portion of the contents that remain between said orifice and said opening to said top surface upon completion of dispensing when said closure is positioned in any of said plurality of dispensing positions.

---

## 5,016,788
## POURING SPOUT FOR SERVO-ASSISTED OPENING, DEVICE INCORPORATING IT AND IMPLEMENTATION PROCESS

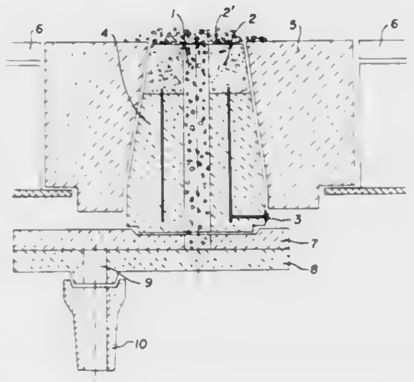
**Eric Hanse, Elouges, Belgium, and Gilbert Rancoulle, Bedford, Mass., assignors to Vesuvius Crucible Company, Pittsburgh, Pa.**

**Filed Feb. 24, 1989, Ser. No. 314,906**

**Claims priority, application France, Feb. 26, 1988, 88 02407**

**Int. Cl.$^5$ B22D** *41/58*

U.S. Cl. 222—590 **8 Claims**



1. A spout for placement in a well block of a bottom teeming ladle of the type used in casting molten metal, said spout comprising:

A refractory body having an axial bore therethrough for forming a taphole in said ladle bottom, said refractory body including an upper gas permeable portion and a lower gas impermeable portion, said gas permeable portion having an upper planar surface surrounding an inlet end of said taphole and said gas impermeable portion surrounding said axial bore of the taphole along a substantial portion thereof and around an outlet end thereof to prohibit the presence of a pressurized gas within a lower portion of said taphole, channel means formed in said refractory body communicating with said upper gas permeable portion at one end and adapted to be placed in communication with a source of pressurized gas, whereby in use, said pressurized gas permeates said upper gas permeable portion of the refractory body and exits at said upper planar surface thereof adapted to break a crust formed above said taphole to permit the teeming of molten metal therethrough.

---

## 5,016,789
## DISPENSER FOR GRANULAR MATERIALS

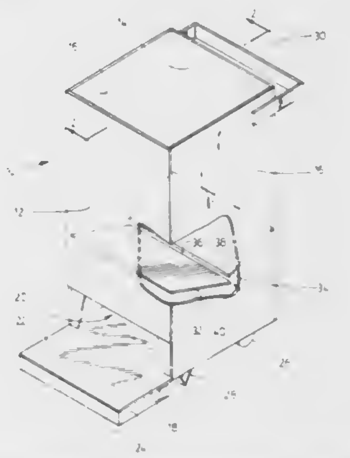
**Ramnaraine Singh, 130 Ashton Crescent, Brampton, Ontario, Canada L6S 3J9**

**Filed Jul. 3, 1989, Ser. No. 374,767**

**Claims priority, application Canada, Jul. 15, 1988, 572224**

**Int. Cl.$^5$ B67D** *5/06;* **G01F** *11/28*

U.S. Cl. 222—608 **8 Claims**



1. A mobile dispenser for granular safety material and comprising:

a container portion having walls defining an upper end and a lower end and front and back and side wall portions,

a floor panel at the lower end of said container;

wheel means on said floor panel, whereby the same may be wheeled about;

opening means in a lower portion of said front portion of said walls of said container portion;

a dispensing tray portion extending forwardly from and substantially level with said floor panel, adjacent to said opening means;

a front baffle plate fixedly located within said container portion above said opening means, and joined to said front portion and said side portions of said walls and extending rearwardly towards said back portion thereof, and angled downwardly away from said opening means, said front baffle plate defining a front free edge extending between said side wall portions intermediate said front and back wall portions;

a rear baffle plate fixedly located within said container portion, and joined to said back portion and said side portions of said walls and extending forwardly towards said front portion thereof, and angled downwardly toward said opening means, said rear baffle plate defining a rear free edge extending between said side wall portions intermediate said front and back wall portions;

a flow restricting gap defined by said free edges of said front and rear baffle plates, said front free edge of said front

VOL
1126
ISS
3
MY
21
1991
UMI

plate being located lower than said rear free edge of said rear plate, wherein said gap opens rear-wardly with respect to said front wall portion, and,
handle means for controlling said dispenser.

---

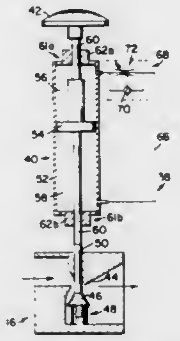
### 5,016,790
### APPARATUS AND METHOD FOR DISPENSING A DETERGENT SOLUTION

**John E. Thomas, River Falls, Wis.; Darrell Saby, Minneapolis, Minn., and Richard Mehus, Bershire, United Kingdom, assignors to Ecolab Inc., St. Paul, Minn.**

**Continuation of Ser. No. 272,546, Nov. 17, 1988, abandoned, which is a continuation of Ser. No. 80,208, Jul. 30, 1987, abandoned, which is a continuation of Ser. No. 768,870, Aug. 23, 1985, abandoned. This application Dec. 19, 1989, Ser. No. 453,078**

**Int. Cl.$^5$ B67D** *5/08*

**U.S. Cl. 222—639** **18 Claims**



1. A detergent dispensing system for reproducibly dispensing a predetermined quantity of detergent derived from a larger detergent source, comprising: an apparatus for placing a liquid solvent supply with a flowline in fluid communication with a solid detergent supply to produce a predetermined amount of liquid detergent solution, further comprising:

(a) a normally closed valve in the solvent flowline controlling fluid communication with the solid detergent supply, said valve controlling flow of solvent through the flowline to said detergent supply and having an open state and a closed state;

(b) timing means operatively connected to the valve for selectively activating the valve to change it from its closed state to its open state and for maintaining the valve in its open state for a predetermined period of time, the timing means comprising:

(i) a chamber containing a timing fluid;

(ii) a movable piston in substantially sealing engagement within the chamber having a first state and a second state, said movable piston forming a first subchamber and a second subchamber, the first subchamber and the second subchamber being of relatively equal volumetric capacity, such that the movable piston travels over a relatively small proportion of the chamber when transitioning from the first state to the second state;

(iii) an external flowpath including a check valve in fluid communication with the subchambers for substantially freely permitting flow of timing fluid from the second subchamber to the first subchamber and for substantially preventing flow of timing fluid from the first subchamber to the second subchamber;

(iv) adjustable restriction means defining a bypass for the check valve in fluid communication with the flowpath in parallel with the external check valve for adjustably restricting the flow of timing fluid from the first subchamber to the second subchamber, wherein the movable piston is substantially freely selectively moved by a first piston rod segment and actuator extending from the piston to externally of the chamber from its first state to its second state due to the substantially free flow of timing fluid from the second subchamber to the first subchamber by the opening of the check valve, but wherein the movable piston resists movement from its second state to its first state due to the restricted flow of timing fluid through the bypass from the first subchamber to the second subchamber; and

(v) a second segment of piston rod extending in an opposite direction from said piston than said first segment for connecting the valve to the piston, said first and second segments comprising a rod of differing diameter such that the rod first segment will abut the chamber to define a stop of the movable piston, wherein when the piston is in the first state the valve is closed; and when the piston is in the second state the valve is open;

(c) means for biasing the movable piston and external of the housing for urging the movable piston from its second state to its first state, wherein the timing means is activated by pushing the movable piston through the actuator from its first state to its second state, and wherein the biasing means causes the movable piston to move from its second state to its first state in a predetermined period of time, wherein the predetermined period of time that the valve is open is a result of the rate of flow of timing fluid from the first subchamber to the second subchamber through the restriction, wherein a higher rate of flow of timing fluid through the restriction is associated with a shorter predetermined period of time and a lower rate of flow is associated with a longer predetermined period of time; and

(d) said solvent supply placing a portion of the detergent from the solid detergent supply in fluid solution with the predetermined amount of solvent, whereby the predetermined amount of liquid detergent solution is produced and dispensed to a point of use.

---

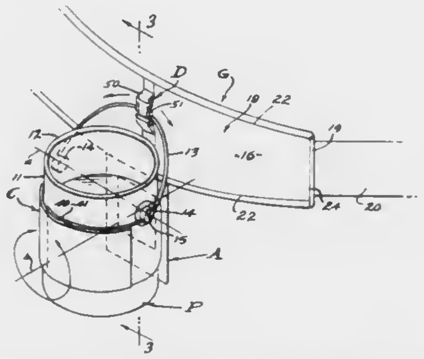
### 5,016,791
### PAINTER'S HIP LEVEL PAIL CARRIER

**Charles F. Burow, Santa Maria, Calif., assignor to Richard A. Cosca, Santa Barbara, Calif.**

**Filed Jan. 23, 1990, Ser. No. 468,767**

**Int. Cl.$^5$ A45F** *3/00*

**U.S. Cl. 224—148** **11 Claims**



1. A hip level carrier for swinging a vertically disposed open topped pail on a horizontal axis, and including;

a girdle of flexible strapping for encircling the hips of a person at waste level,

a substantial flat apron of flexible strapping depending from one side of the girdle to overly the thigh of said person for stabilized support when contiguously engaged against said thigh,

an anti-friction bearing means having a horizontally disposed axis projecting normal from the flat apron and supporting thigh, said bearing means having a first plate member secured to the flat apron and a second plate member rotatable on said axis, and with a bearing carried in opposed circular races of said first and second plate members for free rotation of said second plate member, and pail securement means on the second plate member and carrying the pail with the pail's center of gravity below said horizontally disposed axis.

---

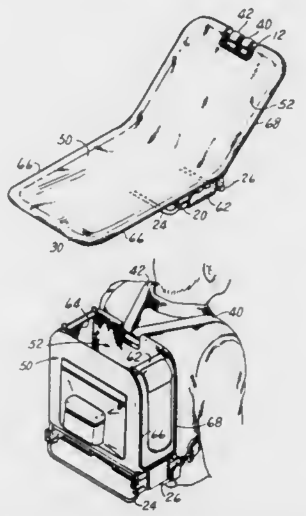
### 5,016,792
### BACKPACK CONVERTIBLE CHAIR

**John C. Jay, 18 Sea St., Manchester, Mass. 01944**

**Filed Feb. 21, 1990, Ser. No. 482,637**

**Int. Cl.$^5$ A45F** *4/02*

**U.S. Cl. 224—155** **1 Claim**



1. A convertible backpack assembly for enclosing and carrying items on the back of a carrier, said assembly adaptable to a multi-position chair, comprising:

a rearward webbed frame portion defining a backside of said backpack assembly and also comprising a backside of said multi-position chair;

a forward webbed frame portion defining a front side of said backpack assembly and comprising a leg support of said multi-position chair;

a base portion of webbed material defining the bottom of said backpack assembly and also comprising a seat portion of said multi-position chair, a base frame portion the rearward and forward frame portions attached through a ratchet arrangement to said base frame portion; and

a rearward leg member secured to a rearward end of said base frame portion and a forward leg member hingedly attached to a forward end of said base frame portion so as to be pivoted away from the carrier's lower back to permit ease of carrying by a shoulder strap arrangement disposed between said forward frame portion and said base frame portion of said backpack assembly by allowing the forward leg member to be pivoted out of contact with the carrier thereof;

said forward and rearward webbed frame portions being comprised of tubular members in a generally inverted U-shaped configuration, with an envelope of webbed material disposed thereover said webbed base portion connected to said forward and rearward webbed frame portions; and

said webbed base seat portion having tension adjustment means arranged therewith, so as to permit compliance with the user of the multi-position chair;

said tension adjustment means comprising strap means interconnecting portions of said web material of said seat portion and wrapped around said base frame portion for tensioning said webbed base seat portion around said base frame portion.

---

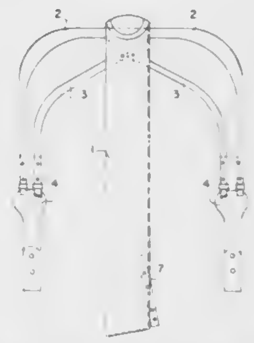
### 5,016,793
### GUN HOLSTER

**Keith Derkatz, P.O. Box 1118, Stn. 'A', Kelowna, B.C., Canada V1Y 7P8**

**Filed Oct. 11, 1989, Ser. No. 419,842**

**Int. Cl.$^5$ A45F** *3/04*

**U.S. Cl. 224—209** **9 Claims**



1. In combination, a gun having a long barrel and a holster for carrying said gun, said holster including an elongated sheath fitted to the barrel of said gun and a harness adapted to fit over the body of a wearer such that the sheath extends down the back of the body of the wearer, whereby said gun in said holster does not impede the activity of the wearer and is readily accessible to the wearer on reaching back over his shoulder, whereby the wearer can quickly and easily withdraw the gun from the holster.

---

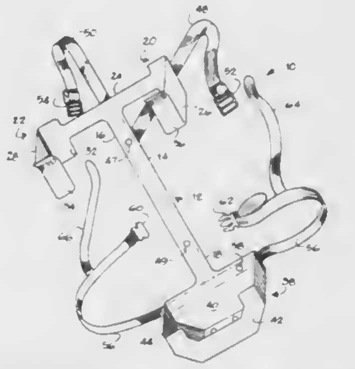
### 5,016,794
### QUICK RELEASE SKATEBOARD BACKPACK

**Donald L. Beagle, Jr., 4528 Tabony St., Apt. A, Metairie, La. 70006**

**Filed Mar. 26, 1990, Ser. No. 498,559**

**Int. Cl.$^5$ A45F** *3/04*

**U.S. Cl. 224—211** **20 Claims**



16. A quick release skateboard backpack comprising:

a. a frame means for slidably receiving and holding a skateboard, said frame means including an upper end and a lower end, said lower end having nose support means connected thereto for receipt of the front end of said skateboard, said upper end having guide means connected thereto for guiding said front end of said skateboard to said nose support means and for holding said skateboard against said frame,

said nose support means including:

- i. a back plate,
- ii. a front plate parallel to said back plate, and
- iii. a nose support bottom connecting said front plate to said back plate,

said guide means including:

- i. a cross-member connected to said frame means,

VOL
1126
ISS
3
MY
21
1991
UMI

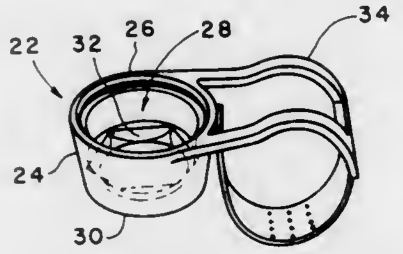
  ii. side walls connected perpendicularly to said cross member, and
  iii. front walls connected perpendicularly to said side walls on the inside thereof,
  and,
b. a plurality of strap means for strapping said frame to the back of the user of said skateboard backpack.

---

**5,016,795**

### DENTAL PASTE CUP WITH MULTI-FACET INNER BASE

**Paul D. Porteous, 607 Island View Dr., Port Hueneme, Calif. 93041**
**Continuation-in-part of Ser. No. 353,776, May 18, 1989. This application Nov. 22, 1989, Ser. No. 440,106**
**Int. Cl.⁵ B65D** *25/10, 1/42*
**U.S. Cl. 224—217** **7 Claims**



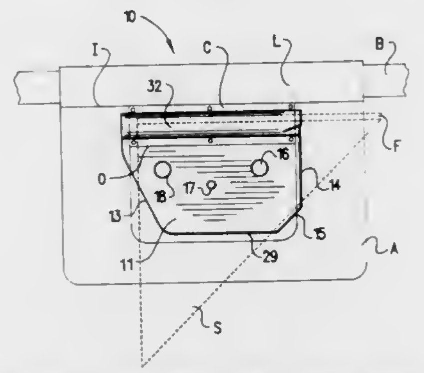
1. A finger mountable dental paste dispensing apparatus comprising:
  a molded plastic cup having an open mouth defined by a rim and having an interior for containing dental paste material;
  locking means disposed within the interior for preventing rotation of the dental paste material, said locking means comprising an interior sidewall of said cup having a non-continuous radius, and a finger mounted formed on said cup.

---

**5,016,796**

### SPEED SQUARE HOLDER

**Earnest E. Johnson, 2666 W. Hwy. 45, Fayetteville, Ark. 72703**
**Filed Oct. 23, 1990, Ser. No. 601,344**
**Int. Cl.⁵ B65D** *25/10*
**U.S. Cl. 224—245** **20 Claims**



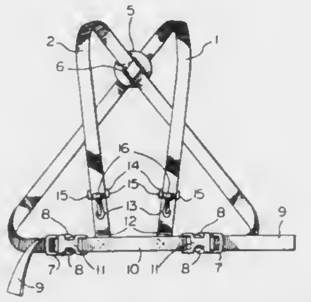
1. A holder for a generally right triangular speed square having a transverse flange extending along one side, said holder comprising:
  a housing having a hollow interior portion dimensioned for at least partial reception of a speed square;
  a front opening in said housing communicating with said hollow interior portion and dimensioned for at least partial insertion of the speed square in a direction parallel with a longitudinal axis of the transverse flange of the speed square;
support means in said housing dimensioned for at least partial abutment with the transverse flange of the speed square; and
stop means in said housing dimensioned for abutment with a leading edge of the transverse flange of the speed square to prevent removal of the speed square through said front opening in said housing.

---

**5,016,797**

### ARTICLE CARRIER

**Darrel Rowledge, 2428 Capitol Hill Crescent NW, Calgary, Alberta, Canada T2M 4C2**
**Filed Apr. 7, 1989, Ser. No. 335,184**
**Claims priority, application Canada, Apr. 14, 1988, 564224**
**Int. Cl.⁵ A45F** *5/00*
**U.S. Cl. 224—257** **16 Claims**



1. A small article carrier comprising a pair of shoulder strap means for extending from a front chest portion of a user over shoulders of the user, crossing in the back and under arms of the user; chest strap means connected to front, bottom portions of the pair of shoulder strap means, said chest strap means maintaining the front bottom ends of the should strap means in spaced apart relationship to each other; connector means for interconnecting said shoulder strap means in overlapping relationship in a back area of the user; buckle means for connecting ends of said chest strap means to other, front free ends of said pair of shoulder strap means; and hook means pivotally and slidably mounted on said pair of shoulder strap means for releasably retaining a small article suspended form a chest area of said pair of shoulder strap means, whereby the article can be slid vertically and rotated around a horizontal axis.

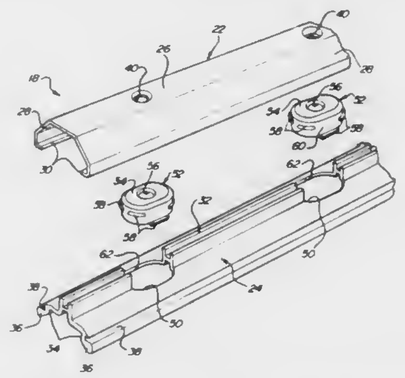
---

**5,016,798**

### SPACER INSERT FOR LOAD-BEARING SLATS

**Craig A. Stapleton, and Robert S. Zauner, both of Port Huron, Mich., assignors to Huron/St. Clair Incorporated, Port Huron, Mich.**
**Filed Apr. 5, 1990, Ser. No. 505,340**
**Int. Cl.⁵ B60R** *9/00*
**U.S. Cl. 224—326** **6 Claims**

1. A load-bearing slat for an article carrier adapted to be mounted to an exterior surface of a vehicle, said slat comprising:
  a slat body having a load-bearing wall;
  an insulator having a top surface, said slat body engaging said insulator to prevent contact between said slat body and the vehicle surface;
  at least one spacer insert attachable to said top surface of said insulator and engaging said load-bearing wall of said slat body to support said load-bearing wall of the slat; said insulator includes at least one opening formed in said top surface for receiving said at least one spacer insert, said at least one spacer insert lockingly seated within said at least one opening; and said at least one spacer insert includes vertically spaced peripheral flanges forming a groove therebetween for lockingly seating said at least one spacer within said insulator, said peripheral flanges engaging an edge of said at least one opening in said insulator to prevent vertical displacement of said at least one spacer insert within said corresponding opening.

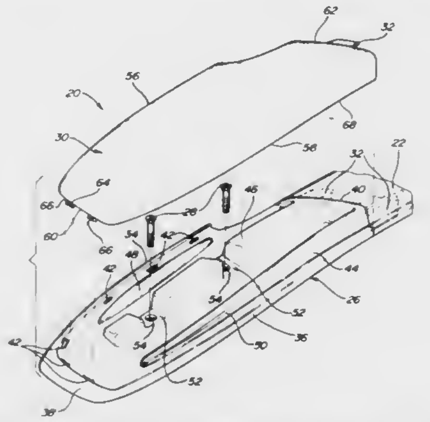


---

**5,016,799**

### SUPPORT STANCHION FOR LUGGAGE CARRIER

**Craig A. Stapleton, Port Huron, Mich., assignor to Huron/St. Clair Incorporated, Port Huron, Mich.**
**Continuation of Ser. No. 362,643, Jun. 7, 1988, abandoned. This application Sep. 10, 1990, Ser. No. 581,250**
**Int. Cl.⁵ B60R** *9/00*
**U.S. Cl. 224—326** **17 Claims**



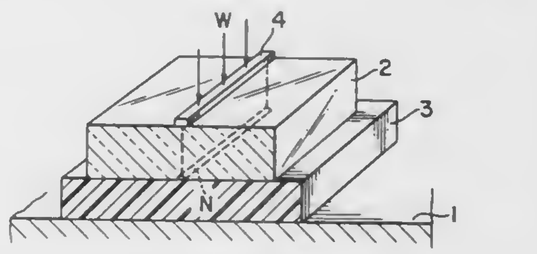
1. A support stanchion for a vehicle luggage carrier adapted to be secured to a surface of the vehicle, said stanchion comprising:
  a base member secured to the vehicle surface using at least one fastener extending therethrough, said base member including at least one slot formed along at least a first peripheral edge of said base and a raised ridge along at least a second peripheral edge of said base, said ridge having an elongated groove extending longitudinally along an outwardly disposed surface of said ridge; and
  a cover detachably secured to said base member forming said stanchion body while concealing said at least one fastener, said cover including locking tab means engageable with said at least one slot of said base and elongated lip formed along a side edge of said cover on an inwardly disposed surface thereof lockingly received within said elongated groove of said base to detachably secure said cover to said base permitting selective access to said at least one fastener, said cover extending over said ridge such that said ridge supports said cover.

---

**5,016,800**

### METHOD OF CUTTING WORKPIECE

**Yasuo Sato, 9-8, Kami-Takaido 2-Chome, Suginami-ku, Tokyo-to, and Kunio Saeki, 18-7, Higashi-Tamagawagakuen 1-Chome, Machida-shi, Tokyo-to, both of Japan**
**Continuation of Ser. No. 149,727, Jan. 29, 1988, abandoned. This application Aug. 23, 1990, Ser. No. 572,339**
**Claims priority, application Japan, Sep. 10, 1987, 62-227185**
**Int. Cl.⁵ C03B** *33/03*
**U.S. Cl. 225—2** **6 Claims**



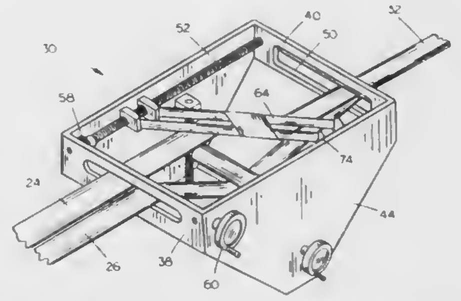
1. A method of cutting a workpiece comprising the steps of:
preparing a workpiece having a substantially flat surface on which an incision is previously formed;
placing a flat plate having a Young's modulus smaller than that of said workpiece on a surface plate;
placing said workpiece in full contact on said flat plate so that said one surface having the incision thereon of said flat plate; and
applying a pressing load downwardly to a surface opposite to the surface having the incision thereon of said workpiece locally along a shape of the incision, thereby cutting the workpiece along the incision.

---

**5,016,801**

### MULTIPLE-PLY WEB REGISTRATION APPARATUS

**Ronen Gilat, and David B. Boyd, both of Omaha, Nebr., assignors to Industrial Label Corporation, Omaha, Nebr.**
**Filed Aug. 28, 1990, Ser. No. 574,270**
**Int. Cl.⁵ B65H** *23/32*
**U.S. Cl. 226—197** **3 Claims**



2. A multiple-ply web registration apparatus for juxtaposing a first web having individual printed portions thereon onto a second web having individual printed portions thereon, with the respective printed portions in registration, comprising:
  a frame having a forward end, rearward end and opposing side panels;
  means for feeding said first and second webs through said forward end of said frame such that said webs are parallel and coplanar upon entering the frame;
  said first and second webs exiting the frame through said second end with said first web registered on top of said second web, and exiting within a plane generally coplanar with the plane in which the webs entered the frame;
  a first turning bar connected between said side panels and

VOL
1126
ISS
3
MY
21
1991
UMI

located within a generally horizontal plane, said first turning bar oriented obliquely with respect to the direction of travel of said first web through said frame;

a second turning bar operably connected between said side panels, parallel to and coplanar with said first turning bar;

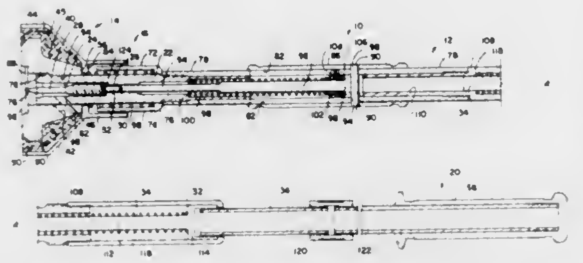
said first web entering said frame, traveling to and wrapping around said turning bars, and then extending to exit the rearward end of the frame, such that said first web exits the frame shifted laterally and parallel to the path of travel of the first web entering the frame;

an idler roller means connected between said side panels and spaced below the plane in which the second web enters and exits the frame for redirecting the travel of said second web from the forward end to the rearward end of the frame, to adjust the distance traveled from the entrance to the exit; and

means for selectively adjustably mounting said idler roller means for selective movement within a generally vertical plane, whereby the distance traveled by the second web from the entrance to the exit on the frame may be selectively adjusted.

---

### 5,016,802
### EXPLOSIVE ACTUATED EXTENDABLE DRIVING TOOL
**Harry M. Haytayan, 32 Indian Rock Rd., Nashua, N.H. 03063**
**Continuation of Ser. No. 273,988, Nov. 21, 1988, abandoned. This application Feb. 2, 1990, Ser. No. 476,121**
**Int. Cl.$^5$ B25C *1/18***
**U.S. Cl. 227—11** **16 Claims**



1. A manually actuated extendable driving tool for driving a fastening element into a work surface by an explosive charge, said tool comprising:

(a) a housing;

(b) a retainer mounted to a back end of said housing;

(c) a barrel connected to a front end of said housing, said barrel formed with a bore, an explosion chamber at an inner end of said bore, said explosion chamber configured to receive an explosive charge, said bore sized to receive a fastening element;

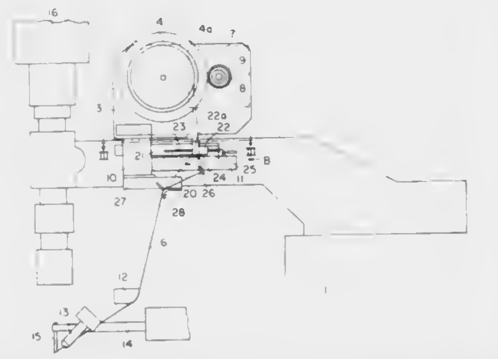
(d) self-aligning muzzle means mounted to said front end of said housing and constrained for limited movement relative to said barrel to compensate for any unevenness in the work surface into which the fastening element is to be driven, a front end of said self-aligning muzzle means configured to press against the work surface, said self-aligning muzzle means being biased towards a front end of the driving tool, a tip of the fastening element projecting outwardly from said bore when the fastening element is received in said bore, said muzzle means including a spall guard and a splash guard, said spall guard mounted to said housing and constrained for limited movement relative to said barrel, said splash guard disposed about said spall guard and constrained for limited movement relative thereto; and

(e) trigger means slidably received in said retainer, said trigger means constrained for limited longitudinal movement relative to said barrel, said trigger means biased rearwardly towards said back end of said housing;

(f) the fastening element is driven from the driving tool when (1) the tip of the fastening means is pressed against the work surface and (2) said trigger means is driven towards the front end of the driving tool so as to cause the fastening element to be driven backwards into the explosive charge with sufficient force to ignite the explosive charge.

---

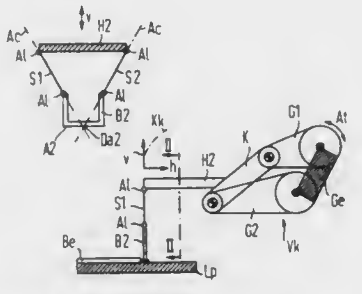
### 5,016,803
### WIRE BONDING APPARATUS
**Yuji Ohashi; Yoshimitsu Terakado, and Hijiri Hayashi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Shinkawa, Tokyo, Japan**
**Filed Oct. 31, 1989, Ser. No. 429,760**
**Claims priority, application Japan, Nov. 1, 1988, 63-274553**
**Int. Cl.$^5$ H05K *3/32;* H01L *21/60;* B23K *20/26***
**U.S. Cl. 228—4.5** **3 Claims**



1. A wire bonding apparatus in which an air guide which blows air against a bonding wire so that tension is applied to said bonding wire is provided between a spool on which said bonding wire is wound and a bonding tool of said apparatus, wherein a wire-contact which is to be contacted by said bonding wire is installed to face a direction in which said air is blown by said air guide, and a light sensor is provided in close proximity to said wire-contact to detect said bonding wire without contacting said bonding wire when said bonding wire is in contact with said wire-contact and such that the center of optical axis of said light sensor is positioned on a wire-contact surface of said wire-contact whereby a wire abnormality is detected.

---

### 5,016,804
### SOLDERING APPARATUS HAVING AT LEAST ONE STIRRUP ELECTRODE
**Rudolf Schuster, Heimstetten, and Georg Ketzer, Unterhaching, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed Jan. 2, 1990, Ser. No. 459,946**
**Claims priority, application Fed. Rep. of Germany, Jan. 10, 1989, 3900522**
**Int. Cl.$^5$ B23K *20/02***
**U.S. Cl. 228—51** **10 Claims**



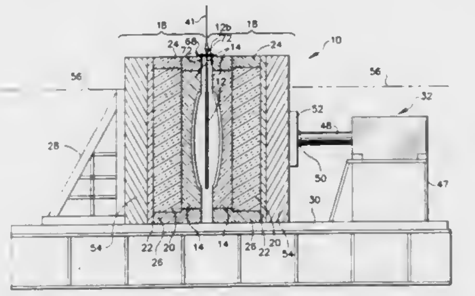
1. A soldering apparatus, comprising:

at least one stirrup electrode having a generally rectangular working surface for placement onto a soldering location;

a pivotable suspension connected to said at least one stirrup electrode, said pivotable suspension operating to move said at least one stirrup electrode about a rotational axis lying in a plane of said working surface, said rotational axis lying substantially along a center perpendicular of longer sides of said rectangular working surface.

---

### 5,016,805
### METHOD AND APPARATUS FOR DUAL SUPERPLASTIC FORMING OF METAL SHEETS
**Gilbert C. Cadwell, Lakeside, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.**
**Filed Oct. 31, 1988, Ser. No. 264,984**
**Int. Cl.$^5$ B21C *37/02***
**U.S. Cl. 228—118** **30 Claims**



1. A method of dual super plastic forming comprising the steps of:

selecting a pair of sheets of a metal capable of exhibiting superplasticity;

placing the sheets in overlapping relationship and joining the peripheral edges of the sheets to provide a gas impervious seal;

lowering the joined metal sheets into a press so that they extend vertically between a pair of horizontally spaced apart, vertically extending heated dies;

moving at least one of the dies horizontally toward the other one of the dies so that the joined metal sheets are positioned closely adjacent to the dies;

allowing the metal sheets to be heated to a predetermined temperature at which they will be capable of exhibiting superplasticity;

introducing a pressurized gas between the joined metal sheets so that the sheets are pushed outwardly against corresponding ones of the dies and formed against the same;

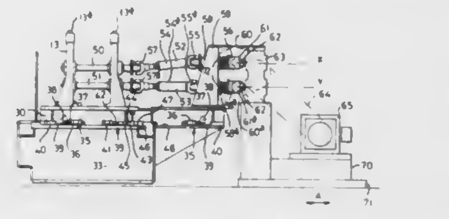
moving at least one of the dies horizontally away from the other one of the dies and lifting the formed metal sheets out of the press; and

cutting the formed metal sheets apart to produce two formed pieces.

---

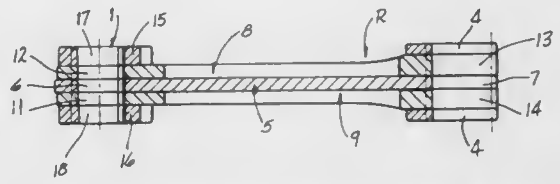
### 5,016,806
### TUBE WELD MILL
**John R. Yapp, Kingswinford, and Peter R. Hill, Birmingham, both of United Kingdom, assignors to 501 Senior Bigwood Limited, West Midlands, United Kingdom**
**Filed May 1, 1990, Ser. No. 517,238**
**Int. Cl.$^5$ B21J *5/14***
**U.S. Cl. 228—147** **8 Claims**

1. A tube weld mill comprising a plurality of successively disposed roll stands to form a strip to a desired generally tubular configuration and a weld means to weld together the adjacent edges of the thus formed strip, each roll stand having a pair of co-operating rolls, a drive transmission to transmit a rotary drive from a driving means to each of said rolls, means removably to secure at least one of said roll stands to a base, wherein the drive transmission comprises a flexible coupling means to couple at least one roll of the stand to a first clutch member at a fixed location, the first clutch member being drivingly connectable to a second clutch member at said fixed location which is drivingly connected to a driving means.



---

### 5,016,807
### METHOD FOR PRODUCING WORKPIECES OF METAL
**Johannes Haack, Lyss, Switzerland, assignor to Feintool International Holding, Lyss, Switzerland**
**Filed Nov. 27, 1989, Ser. No. 441,890**
**Claims priority, application Fed. Rep. of Germany, Dec. 7, 1988, 3841205**
**Int. Cl.$^5$ B23K *31/02***
**U.S. Cl. 228—170** **9 Claims**



1. A method for producing complex composite metal workpieces having profiled contours comprises forming a plurality of fine-blanked sample metal part-profiles of varying thicknesses and shapes by precision blanking and thereafter joining said plurality of part-profiles together so as to form the complex composite profile.

---

### 5,016,808
### IMPLANTABLE TAPERED SPIRAL ENDOCARDIAL LEAD FOR USE IN INTERNAL DEFIBRILLATION
**Ronald W. Heil, Jr., Roseville, and Robert C. Owens, Forest Lake, both of Minn., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.**
**Division of Ser. No. 407,052, Sep. 14, 1989. This application Jan. 8, 1990, Ser. No. 461,980**
**Int. Cl.$^5$ A61N *1/00***
**U.S. Cl. 228—176** **5 Claims**

1. A method of fabricating an endocardial defibrillating lead comprising the steps of:

(a) depositing a conductive electrode on the exterior surface of an elongated flexible, plastic tube;

(b) advancing said plastic tube over a rigid mandrel having a helical shape;

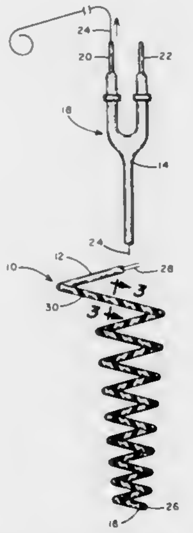
(c) heating said plastic tube and mandrel to the softening point of said plastic;

(d) allowing said tube and mandrel to cool;

(e) stripping said tube free of said mandrel;

VOL
1126
ISS
3
MY
21
1991
UMI

(f) affixing a conductive tip electrode to the distal end of said tube; and



(g) electrically joining said conductive electrode and said tip electrode to terminal means at the proximal end of said tube.

---

### 5,016,809
### THERMAL DEGREASING IN REACTIVE ATMOSPHERES AND SUBSEQUENT BRAZING OF ALUMINUM-BASED SHEETS OR PARTS

**Walter L. Winterbottom, Farmington Hills; J. Scott Badgley, Dearborn, and Linda J. Baumgartner, Livonia, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Sep. 5, 1989, Ser. No. 402,300**
**Int. Cl.$^5$ B23K** *1/20*

**U.S. Cl. 228—205** **20 Claims**

1. A solventless, thermal decreasing process for cleaning an aluminum-based sheet or part to product a more readily brazable aluminum-based part sheet or part, comprising:
   (a) providing said aluminum-based sheet or part having organic contaminants thereon and in need of cleaning to improve its brazability, and
   (b) heating said sheet or part in the presence of a reactive gas at least at atmospheric pressure and at a temperature of between about 300 and 400° C. for about 10 minutes to about 30 minutes to volatize and remove said organic contaminants by reacting said organic contaminants with said reactive gas without significantly disturbing the underlying aluminum oxide layer.

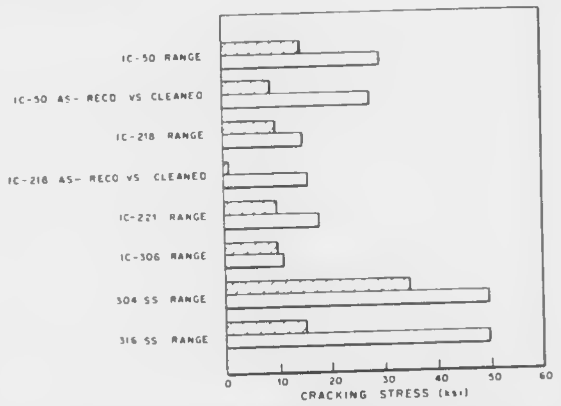
---

### 5,016,810
### METHOD FOR IMPROVING WELDABILITY OF NICKEL ALUMINIDE ALLOYS

**Vinod K. Sikka, Clinton, Tenn., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Aug. 25, 1989, Ser. No. 398,575**
**Int. Cl.$^5$ B08B** *5/00*

**U.S. Cl. 228—206** **1 Claim**



1. A process for welding aluminides comprises treating the surface to be welded with a solution consisting essentially of ferric chloride in an inert carrier medium and subsequently welding said surface.

---

### 5,016,811
### END WALL MEMBER FOR USE WITH BOXES

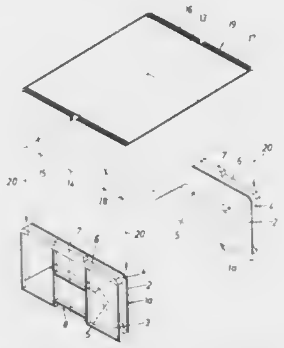
**Gunnar Kapare, S-421 47 Västra Frölunda, Kantyxegatan 2 A, Sweden**

**PCT No. PCT/SE88/00695, § 371 Date Aug. 24, 1990, § 102(e) Date Aug. 24, 1990, PCT Pub. No. WO89/06209, PCT Pub. Date Jul. 13, 1989**

**PCT Filed Dec. 21, 1988, Ser. No. 536,582**

**Claims priority, application Sweden, Dec. 28, 1987, 8705159**
**Int. Cl.$^5$ B65D** *5/44*

**U.S. Cl. 229—23 R** **10 Claims**



1. An end wall member designed to be used together with boxes of cardboard, corrugated paperboard and the like, said boxes being formed by erecting four side walls vertically from a floor section and by folding flaps flat against the external faces of two opposite ones of said four box side walls, characterized therein that the end wall member comprises two plane-parallel walls which are separated by a gap, and a transverse wall forming the bottom of the gap, and in that the end wall member is arranged to be connected to one of those box side walls that are provided with the flaps by inserting said flaps into the gap sufficiently far to ensure that the flaps engage said transverse wall.

---

### 5,016,812
### SIFT-PROOF CARTON AND METHOD AND ADHESIVE DISPENSING MEANS FOR PRODUCING SAME

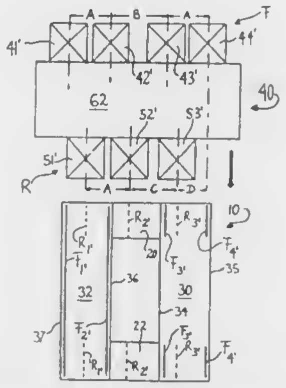
**Colin Pedigrew, Erkrath, Fed. Rep. of Germany, assignor to Nordson Corporation, Westlake, Ohio**

**PCT No. PCT/US88/00099, § 371 Date Sep. 6, 1989, § 102(e) Date Sep. 6, 1989, PCT Pub. No. WO88/05382, PCT Pub. Date Jul. 28, 1988**

**PCT Filed Jan. 19, 1988, Ser. No. 435,514**

**Claims priority, application European Pat. Off., Jan. 20, 1987, 87100689.6**
**Int. Cl.$^5$ B65D** *5/06*

**U.S. Cl. 229—132** **15 Claims**



8. A high integrity closure carton, comprising:
spaced side walls defining a carton depth dimension therebetween, and spaced end walls defining a carton width dimension therebetween;
at least one pair of opposed minor flaps each having a flap surface and a fold line at one of said end walls, said minor flaps each being inwardly foldable from a spread position to a folded position;
at least one strip of adhesive extending along said flap surface of each said minor flaps;
at least one pair of opposed inner and outer major flaps each having a flap surface, a leading side edge and a fold line at one of said side walls, said inner and outer major flaps each having opposed ends which receive at least one strip of adhesive material in a position to contact an underlying flap surface upon folding of said inner major flap atop said minor flaps and upon folding said outer major flap atop said inner major flap and said minor flaps;
at least one strip of adhesive material extending between said opposed ends of said outer major flap substantially parallel to said fold line thereof;
all of said strips of adhesive being formed of foamed adhesive material, and all of said strips of adhesive extending substantially parallel to one another.

---

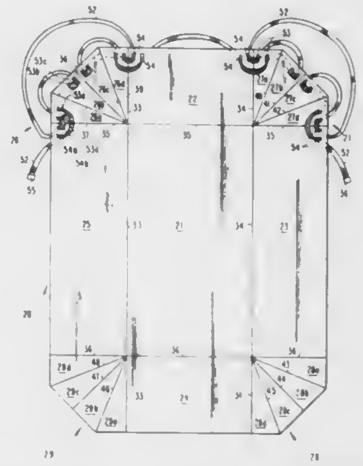
### 5,016,813
### FOLD-UP CONTAINER AND CONSTRUCTION METHOD

**Einar L. E. Simons, Aptdo. N°55-0374, Panama, Panama**

**Filed Mar. 1, 1990, Ser. No. 486,791**
**Int. Cl.$^5$ B65D** *5/20*

**U.S. Cl. 229—189** **19 Claims**

1. A fold-up and knock-down structure which begins in a flat form and can be manually folded into an upright configuration and unfolded back into said flat form comprises:
a main body arranged with a plurality of panels defined by score lines which denote folds to be made in the main body, the plurality of panels including a base panel, four side panels and four corner panels, each of the four corner panels being arranged with a plurality of sections defined by score lines which denote folds to be made in the corresponding corner panel;
flexible securement means threaded through each of said corner sections for drawing together and securing the corner sections of each corner panel; and



said sections of each corner panel being arranged such that in the folded, upright configuration each corner of the structure having three thicknesses.

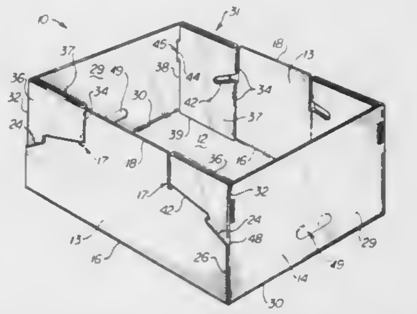
---

### 5,016,814
### COLLAPSIBLE BOX WITH IMPROVED CORNER LOCKS

**James T. Fullerton, P.O. Box 8158, Valley, Ala. 36872**

**Filed Sep. 19, 1990, Ser. No. 584,699**
**Int. Cl.$^5$ B65D** *5/30*

**U.S. Cl. 229—196** **3 Claims**



1. A box adapted to be erected from a cardboard blank comprising a bottom panel; two side panels hingedly connected to said bottom panel along bottom side folds with each of said side panels having a top edge located distally from said bottom side fold and connected thereto by a pair of side edges, each of said side panels having a pair of notches extending from said top edge adjacent to said pair of side edges to define a pair of corner tongues between said side edges and notches; two end panels each having a central section hingedly connected to said bottom panel along bottom end folds and with each of said end panels central sections straddled by a pair of substantially rectangular wing flaps hingedly connected to said central section along wing folds, each of said wing flaps having an inner wing flap section located adjacent said central section and an outer wing flap section hingedly connected to said inner wing flap section along a dihedral fold, each said dihedral fold is oriented obliquely to said wing fold, each of said wing flaps also having a wing flap slot sized and positioned to receive one of said corner tongues for interlocking engagement therewith, whereby during box erection the corner tongues may be inserted through the wing flaps slots and interlocked between the end panel central sections and the wing flaps dihedral folds thereby preventing the box from collapsing by limiting movement of the end panels with respect to the side panels, and whereby during box erection the angle of the dihedral fold

VOL
1126
ISS
3
MY
21
1991
UMI

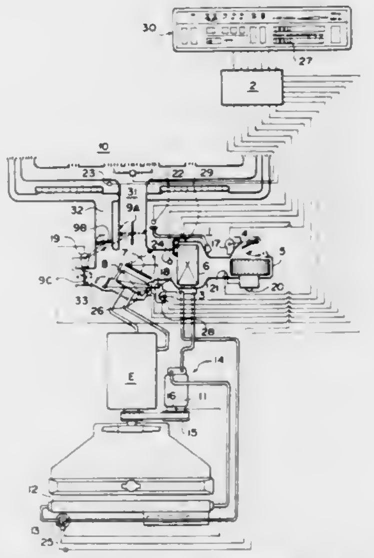
causes the outer wing flap to jam against the bottom panel as the outer wing flap is folded.

---

### 5,016,815
### AIR CONDITIONER CONTROL SYSTEM FOR VEHICLES

**Shigetoshi Doi, and Yoshiaki Nagayama, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Oct. 27, 1989, Ser. No. 427,485**
**Claims priority, application Japan, Oct. 28, 1988, 63-270849**
**Int. Cl.$^5$ B60H** *1/04*
**U.S. Cl. 236—49.3** **3 Claims**



1. An air conditioner control system for a vehicle which switches the operational mode of the air conditioner at least between a heat mode and a heat/defrost mode according to the conditions inside and outside the passenger room and a desired temperature in the passenger room set by a room temperature setter, characterized in that

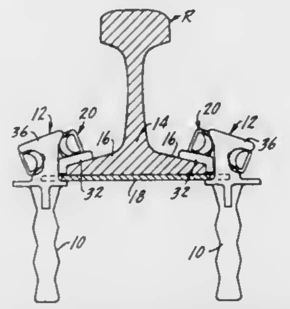
said air conditioner control system is provided with an ambient temperature sensor, which detects the ambient temperature, and a solar radiation sensor, which detects how much solar radiation is present, and effects the switching between the heat mode and the heat/defrost mode on the basis of the ambient temperature and the amount of solar radiation present.

---

### 5,016,816
### RESILIENT RAIL FASTENER

**Mark E. Lanham, Kansas City, Mo., assignor to Unit Rail Anchor Company, Hillside, Ill.**

**Filed Jan. 16, 1990, Ser. No. 465,345**
**Int. Cl.$^5$ E01B** *9/00*
**U.S. Cl. 238—349** **4 Claims**



1. In a resilient rail fastener system where a rail supported by a cross tie is to be secured against movement by a spring clip applying forces to the rail, said spring clip to be applied to a shoulder member embedded in the tie:

a generally U-shaped one-piece spring clip having a rounded head of predetermined radius and a pair of spaced apart symmetrical arms extending forwardly therefrom to be spread apart by an interference distance when driving the clip to home position between the rail and shoulder member, and the outside diameter of the head along with said arms establishing a predetermined spring rate for the clip;

said spring clip, including the head and arms, being symmetrical about a longitudinal axis between the arms and symmetrical about a horizontal plane bisecting the head and arms;

a one-piece spike-like shoulder member having a shank portion to be embedded in the cross tie, said shoulder member having an exposed neck when the shank is embedded and an exposed head above the neck;

said neck on one side having a recess into which one arm of the clip is to fit and said neck on the opposite side presenting a sloped reaction surface angled downwardly and inwardly from the head to define a wedging recess for the other clip arm, said recesses being vertically displaced along the vertical axis of the shoulder member so that upon insertion of the arms into said recesses to clasp said neck the clip is cocked into a plane angled with respect to the horizontal;

said arms in the uninstalled state of the spring clip being separated by a distance less than the lateral distance separating said recesses so that said arms are spread apart by a corresponding interference distance when the clip is advanced to home position thereby creating a load on the spring clip;

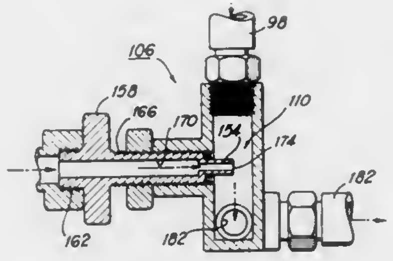
and said other arm of the spring clip when installed creating a shoulder reaction at said reaction surface so that the spring clip when installed has a toe load impressed thereon which is a vector sum of the clip load and shoulder reaction applying a downward force to the rail.

---

### 5,016,817
### PESTICIDE SPRAYING DEVICE AND METHOD

**Suhas R. Ghate, and Sharad C. Phatak, both of Tifton, Ga., assignors to University of Georgia Research Foundation, Inc., Athens, Ga.**

**Filed Nov. 8, 1989, Ser. No. 433,503**
**Int. Cl.$^5$ B05B** *7/32, 15/02, 9/04*
**U.S. Cl. 239—113** **5 Claims**



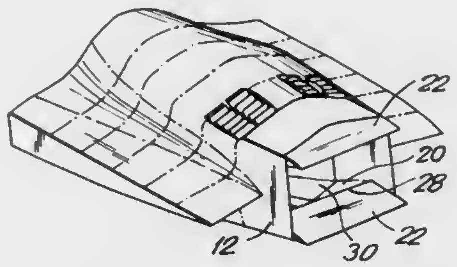
2. A sprayer comprising:
a. a first reservoir for containing a first fluid to be sprayed;
b. a second reservoir for containing a second fluid to be sprayed;
c. means for pressurizing the first fluid;
d. means, at least partially independent of the first fluid pressurizing means, for pressurizing the second fluid;
e. a mixing chamber having a first inlet for permitting entry of a stream of the first fluid, a second inlet for permitting entry of the second fluid, and an outlet; and
f. a hollow needle interposed between the second reservoir and the mixing chamber and extending into the stream of first fluid entering the mixing chamber for precisely controlling the volume of the second fluid entering the mixing chamber and precisely mixing it with the first fluid.

---

### 5,016,818
### INTEGRAL TRANSITION AND CONVERGENT SECTION EXHAUST NOZZLE

**Dudley O. Nash, Cincinnati, and David A. Nold, Lisbon, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio**

**Filed Aug. 21, 1989, Ser. No. 396,399**
**Int. Cl.$^5$ B64C** *15/02*
**U.S. Cl. 239—127.1** **18 Claims**



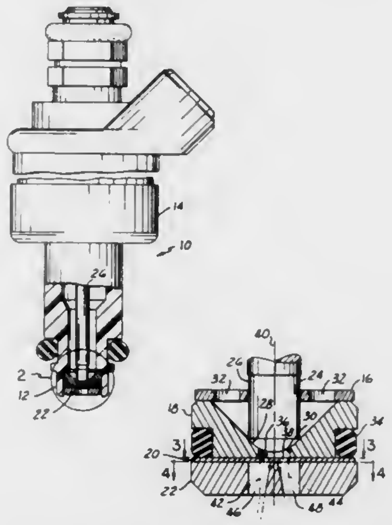
1. A two dimensional convergent-divergent nozzle for use with a turbojet engine, said nozzle symmetric in two perpendicular planes about a nozzle centerline and comprising convergent flap means for converting axisymmetric exhaust gas flow from said engine to substantially two dimensional flow within said nozzle.

---

### 5,016,819
### ELECTROMAGNETIC FUEL INJECTOR HAVING SPLIT STREAM FLOW DIRECTOR

**Ross W. Wood, Newport News, Va., assignor to Siemens-Bendix Automotive Electronics L.P., Auburn Hills, Mich.**

**Filed Jul. 20, 1989, Ser. No. 383,386**
**Int. Cl.$^5$ B05B** *1/26*
**U.S. Cl. 239—522** **9 Claims**



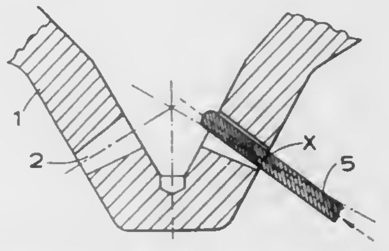
1. In an electromagnetic fuel injector wherein liquid fuel under pressure is introduced into the injector body and thereafter emitted from the injector body at a tip end, said tip end containing a seat member having a seat bounding a hole through which fuel emitted by the injector must pass before being emitted from the injector tip end, said injector having a needle that is operated by an electromagnetic coil and coacts with said seat to control fuel flow through said hole, and a thin disc orifice member disposed at said tip end downstream of said seat member, the improvement comprising said thin disc orifice member containing plural orifices that meter fuel that has passed through said hole such that the metered fuel is emitted from the orifices as parallel flow streams, and a flow director member disposed at said tip end downstream of said thin disc orifice member, said flow director member having plural holes through which the respective flow streams from said orifices pass before being emitted from the injector, each orifice being in communication with a corresponding one of aid flow director member holes, each flow director member hole having an entrance whose periphery is abutted with the corresponding orifice so that the stream from each orifice does not pass to any of said flow director member holes other than the corresponding flow director member hole, at least one of said flow director member holes having a curved wall portion disposed in the path of the corresponding flow stream from the corresponding orifice to direct such corresponding flow stream in diverging relation both to the direction from which it entered said at least one hole and to another of the flow streams exiting another of said flow director holes, said flow director member holes being sized so as to impose substantially no metering effect on the flow streams through them.

---

### 5,016,820
### FUEL INJECTORS FOR INTERNAL COMBUSTION ENGINES

**David J. Gaskell, Sudbury, England, assignor to Lucas Industries public limited company, England**

**Filed Jul. 6, 1989, Ser. No. 376,237**
**Claims priority, application United Kingdom, Jul. 26, 1988, 8817774**
**Int. Cl.$^5$ F02M** *61/04*
**U.S. Cl. 239—533.12** **3 Claims**



1. A fuel injector for an internal combustion engine, said injector being of the valve-covered orifice type comprising an injection body, said body terminating in a nozzle and said nozzle having a plurality of delivery holes therein, each of said holes having a substantially round cross-section and having an inner end portion inside said nozzle and an outer end portion at an outside surface of said nozzle, said inner end portions of said holes being substantially larger than said outer ends and said holes have, starting from said inner end portions, a diametrical cross-section of said holes decreasing in a substantially continuous taper from a relatively large inner end diameter to a relatively small outer end diameter, said holes producing a bushy spray pattern, thereby significantly altering the spray issuing from said holes as compared to the spray which would issue from holes having a cross-section of uniform diameter at said inner end portions, and a valve member, said valve member being movable in said body between a first position in which said inner end portions of said holes are uncovered and a second position in which said valve member substantially covers said inner end portions of said holes.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,821
### FUEL INJECTION VALVE

Waldemar Hans; Wilhelm Kind, both of Bamberg; Manfred Kirchner, Nuremburg, and Siegfried Werner, Bamberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

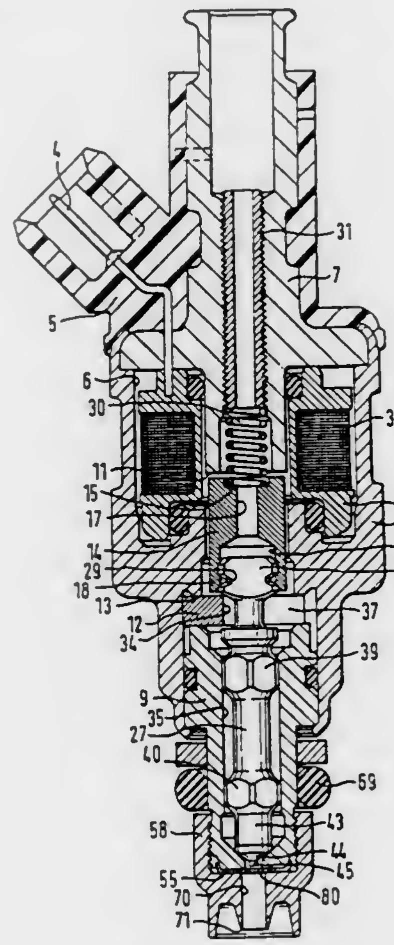
Division of Ser. No. 272,885, Oct. 13, 1988, Pat. No. 4,934,605. This application Mar. 19, 1990, Ser. No. 495,601

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1986, 3710467; May 31, 1986, 3618413

The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.

Int. Cl.$^5$ F02M *61/18*

U.S. Cl. 239—585 7 Claims



1. A fuel injection valve for use in fuel injection systems of internal combustion engine, said fuel injection valve comprising:

a housing;
a nozzle body located in said housing and having a valve seat and an opening located downstream of said valve seat;
a valve needle located in said housing and cooperating with said valve seat for defining a flow area therebetween, said valve needle having a peg at an end thereof, said peg extending into said downstream opening of said nozzle body and defining therewith an annular space;
a processing sleeve connected with said housing and having a processing opening defining an edge; and
a platelet located between said nozzle body and said processing sleeve, extending transverse to said downstream opening of said nozzle body and having a plurality of bores extending therethrough, said bores having an inlet facing said annular space.

---

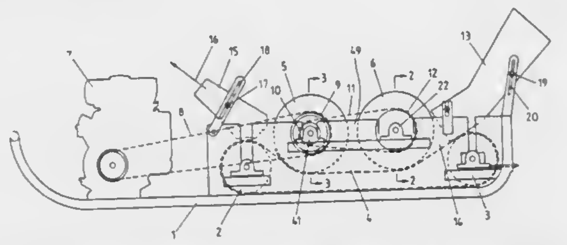
### 5,016,822
### PARTICULATE MATERIAL LOADERS

Reginald V. Dutschke, P.O. Box 88, Brinkworth, South Australia, Australia

Filed Nov. 22, 1989, Ser. No. 440,241

Int. Cl.$^5$ A01C *17/00*

U.S. Cl. 239—651 15 Claims



1. A particulate material thrower comprising an endless belt running over a pair of spaced apart rollers thereby providing a loading end and a discharge end, spaced lengthwise from the loading end, on the belt, a thrower wheel running on the belt adjacent the roller at the discharge end, characterized by the thrower wheel including side flanges and a plurality of vanes extending between the side flanges, the vanes being shaped so as to collect material moving along the belt from the loading end before throwing, and by pre-acceleration means whereby to pre-accelerate material placed on the belt before the material reaches the thrower wheel.

---

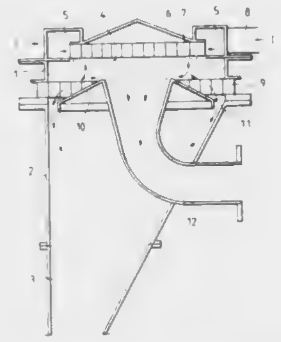
### 5,016,823
### AIR CURRENT CLASSIFIER, PROCESS FOR PREPARING TONER, AND APPARATUS FOR PREPARING TONER

Masayoshi Kato, Kawasaki, and Hitoshi Kanda, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,635

Int. Cl.$^5$ B02C *19/06*

U.S. Cl. 241—5 24 Claims



1. A separator for classifying powder with air current, comprising;

a powder feed pipe and a classifying chamber, provided in said separator;
a guide chamber provided at an upper part of said classifying chamber to communicate with said powder feed pipe;
a plurality of introducing louvers provided between said guide chamber and said classifying chamber, at which the powder is flowed in from said guide chamber to said classifying chamber through openings between said introducing louvers together with carrying air.
an inclined classifying plate raised at its central part, provided at the bottom of said classifying chamber;
classifying louvers provided along the side wall of said classifying chamber, through openings of which the air is flowed to produce a whirling stream by which said powder fed into said classifying chamber together with carrying air is centrifugally separated into fine powder and coarse powder;
a discharge opening provided at the central part of said classifying plate and from which the classified fine powder is discharged.
a fine powder discharge chute connected to said discharge opening; and
a discharge opening formed along the periphery of said classifying plate and from which the classified coarse powder is discharged.

---

### 5,016,824
### METHOD AND APPARATUS FOR CONTROLLING THE PRODUCTION OF THERMOMECHANICAL PULP

Pertti Pietinen, Korpikuja 31 as 10, 87200 Kajaani, and Aslak Savonjousi, Vanha Rastalantie 10, 02620 Espoo, both of Finland

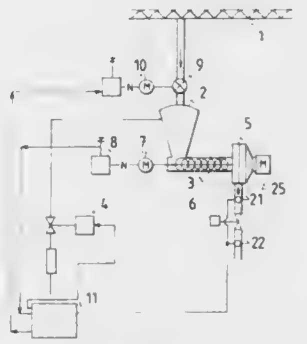
PCT No. PCT/FI88/00118, § 371 Date Jan. 10, 1990, § 102(e) Date Jan. 10, 1990, PCT Pub. No. WO89/00624, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 15, 1988, Ser. No. 457,723

Claims priority, application Finland, Jul. 15, 1987, 873120

Int. Cl.$^5$ B02C *25/00*

U.S. Cl. 241—21 14 Claims



1. A method for controlling a thermomechanical pulp refiner comprising the steps of:

metering chips to a feed chest of the thermomechanical pulp refiner;
transferring the chips by a feeder from the feed chest to thermomechanical pulp refiner discs;
adding water to the chips prior to feeding the chips between the thermomechanical pulp refiner discs;
semicontinuously measuring moisture content of a combination of thermomechanical pulp and steam after the thermomechanical pulp refiner by at least one IR-reflection measurement device; and
controlling on a basis of measured moisture content a quantity of chips during the step of metering and a quantity of water during the step of adding in order to regulate the moisture content to a desired level having a generally constant value, the step of controlling further comprising at least one of the following steps:
(A) for an increasing trend in moisture content, implementing one of the following steps:
increasing volume of metered chips,
decreasing the quantity of fed water, and
increasing the volume of metered chips and decreasing the quantity of fed water; and
(B) for a decreasing trend in moisture content, implementing one of the following steps:
decreasing the volume of metered chips,
increasing the quantity of fed water, and
decreasing the volume of metered chips and increasing the quantity of fed water.

---

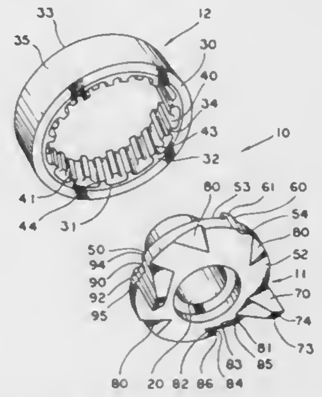
### 5,016,825
### GRINDING IMPELLER ASSEMBLY FOR A GRINDER PUMP

Roger E. Carpenter, Clearcreek Township, Ashland County, Ohio, assignor to McNeil (Ohio) Corporation, St. Paul, Minn.

Filed Feb. 14, 1990, Ser. No. 480,110

Int. Cl.$^5$ B02C *18/06*

U.S. Cl. 241—46.06 17 Claims



1. A grinding impeller assembly for a grinder pump having an axial inlet, a pumping chamber communicating with the axial inlet, a rotatable shaft extending axially through said chamber and normally rotating in a single direction, the grinding impeller assembly comprising a disk member carried by and rotatable with the shaft; an annular ring positioned generally within the axial inlet and around said disk member; said disk member having an outer annular edge, a side distal to the inlet and a side proximal to the inlet; said distal and proximal sides being separated by said annular edge of said disk member; said distal side of said disk member having at least one projection extending generally axially from said disk member; said proximal side of said disk member having at least one cutting member extending generally axially from said disk member; said distal and proximal sides each having at least one recess therein extending generally radially inward of said disk member; said annular ring having a first edge, a second edge, and an inner circumferential surface facing said disk member; said inner circumferential surface axially separating said first and second edges and carrying a plurality of cutting teeth; said cutting teeth extending from said first or second edges of said annular ring.

---

### 5,016,826
### TUBE MILL PARTITION

Ralph Michelsen, Eschede; Udo Schulze-Brockhausen, Everswinkel; Herbert Weit, and Erwin Schmitz, both of Beckum, all of Fed. Rep. of Germany, assignors to Christian Pfeiffer Maschinenfabrik GmbH & Co., KG, Beckum, Fed. Rep. of Germany

Filed Jan. 16, 1990, Ser. No. 464,134

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1989, 3903255

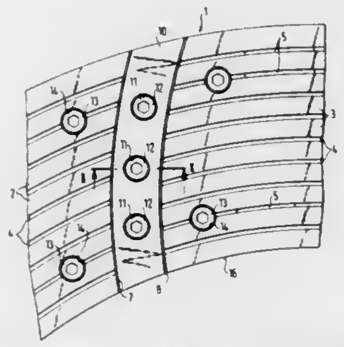
Int. Cl.$^5$ B02C *17/18*

U.S. Cl. 241—72 12 Claims

1. In a tube mill partition having a front slotted wall functioning for discharge or transfer and a substantially closed rear wall positioned downstream of the front slotted wall, the slotted and rear walls in each case having a ring segmental construction with a central, axially substantially closed air passage opening and with substantially radially oriented lifting blades between the slotted wall and the rear wall and at least the slotted wall has radially disposed ring segments of slotted plates, the improvement comprising radially oriented wearing beams provided in high wear areas between the slotted plates which project at least slightly out of a plane containing the

VOL 1126 ISS 3 MY 21 1991 UMI

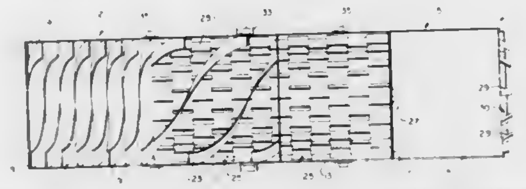
slotted wall and screw fastenings for fastening the slotted plates and the wearing beams, each screw fastening being equipped with a rotation locking means for preventing rotation and axial locking means for preventing axial displacement.



---

### 5,016,827
### SAND RECLAIMING DRUM

**Charles J. Didion, St. Charles County, Mo., assignor to Didion Manufacturing Company, St. Peters, Mo.**
**Filed Apr. 9, 1990, Ser. No. 506,102**
**Int. Cl.⁵ B02C** *17/02*
**U.S. Cl. 241—79.3** **6 Claims**



1. A sand reclaiming drum for use in removal of clinging mold casting sand from a molded cast iron part, said reclaiming drum comprising a rotary drum including:

a. said rotary drum having various sections along its length, at least one of said sections including a series of plates mounted in rows on the inner surface of said drum, said plates in adjacent rows being staggered, each plate being approximately twelve inches in width and twenty-four inches in length, being mounted along one edge to the inner surface of said drum, said plates functioning to agitate the castings by lifting them up and letting them fall during operations of the reclaiming drum;

b. a final section of said rotary drum including a plurality of perforations through which said sand exits the drum as the castings are urged towards the outlet of said rotary drum; and

c. a base for the reclaiming drum, and said drum being approximately horizontally mounted on said base, and driving means upon the base to provide rotation for the rotary drum during its operation.

---

### 5,016,828
### SHREDDING MACHINE

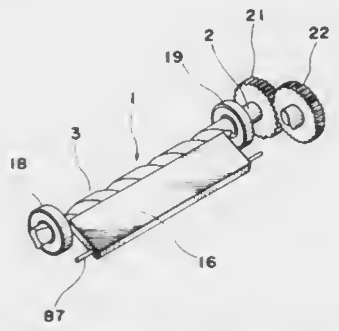
**Tatsuya Utsumi, Yamatokouriyama; Shinji Kawamura, Sakurai, both of Japan; Tetsuya Itoh, Hamburg, Fed. Rep. of Germany; Hiroshi Moriyama, Yamatokouriyama, and Naofumi Okada, Tenri, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**
**Filed Aug. 7, 1989, Ser. No. 390,000**
**Claims priority, application Japan, Aug. 12, 1988, 63-202353; Aug. 12, 1988, 63-202354; Aug. 12, 1988, 63-202356; Aug. 12, 1988, 63-202358**
**Int. Cl.⁵ B02C** *18/08*
**U.S. Cl. 241—158** **14 Claims**

1. A shredding machine comprises:

a rotary cutter including a cutter part with a spiral cutting edge and a column part, the cutter part and the column part being of a unitary construction;

a fixed cutter arranged to contact with the cutter part of said rotary cutter;

rotary cutter holding means for rotatably holding at least the column part of said rotary cutter for rotation of said rotary cutter, wherein said fixed cutter is made of a relatively softer material than said rotary cutter;



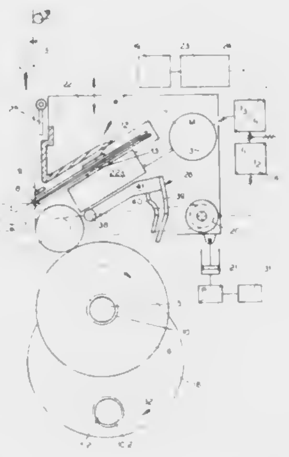
means for biasing said fixed cutter against said rotary cutter; and

means for continuously rotating the rotary cutter in one direction.

---

### 5,016,829
### TAKEUP MACHINE

**Heinz Schippers; Erich Lenk; Siegmar Gerhartz, all of Remscheid; Herbert Schiminski, Huckeswagen, and Herbert Turk, Remschied, all of Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany**
**PCT No. PCT/DE89/00094, § 371 Date Oct. 18, 1989, § 102(e) Date Oct. 18, 1989, PCT Pub. No. WO89/07573, PCT Pub. Date Aug. 24, 1989**
**PCT Filed Feb. 17, 1989, Ser. No. 427,122**
**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1988, 3805347**
**Int. Cl.⁵ B65H** *67/048*
**U.S. Cl. 242—18 A** **11 Claims**



1. An apparatus for continuously winding an advancing yarn onto bobbin tubes serially delivered to a winding position, and comprising

a revolver rotatably mounting at least two spindles having parallel rotational axes, with each spindle being adapted to mount at least one bobbin tube coaxially thereon, and such that each spindle and associated bobbin tube may be selectively moved between a winding position and a doffing position upon rotation of said revolver,

means for winding an advancing yarn onto a bobbin tube at the winding position and including means for rotating the spindle and associated bobbin tube at the winding position, and traversing means mounted at a location upstream of a winding position for traversing an advancing yarn to form a cross wound package,

rotary drive means for selectively rotating said revolver to move each spindle between said winding position and said doffing position, and

means for automatically transferring the advancing yarn from the rotating full package which has been moved to the doffing position, to a rotating empty bobbin tube on a spindle which has been moved to the winding position, and comprising

(a) yarn lifting means for selectively removing the advancing yarn from the traversing means and then conveying the advancing yarn laterally to a yarn catching plane which is perpendicular to the axes of said spindles and which is located beyond the normal traverse stroke, and

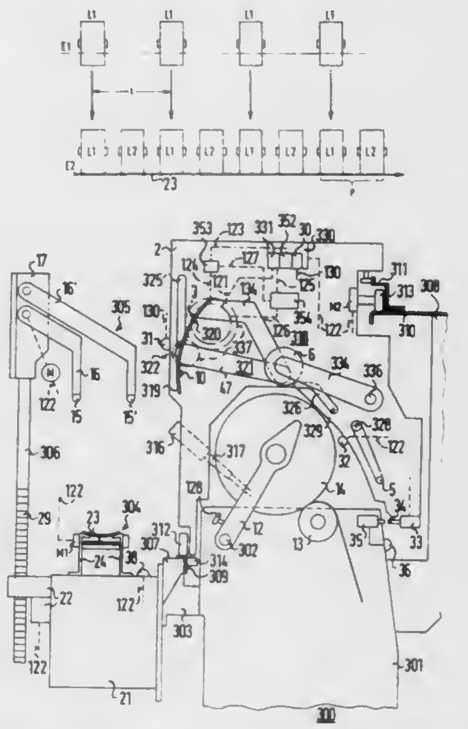
(b) yarn shifting means which is selectively movable into an operative position extending into the yarn path between the empty bobbin tube and the full package, and which includes slot means for engaging the advancing yarn and retaining the same in a bead plane which is parallel to said catching plane and is within the normal traverse stroke and so that the yarn advances to the rotating full package in said bead plane, and yarn displacing means positioned upstream of said slot means for conveying the advancing yarn laterally from said slot means to said yarn catching plane, and such that the advancing yarn runs in said yarn catching plane from said yarn lifting means to said shifting means and so as to be adapted to engage a yarn catching slot in the rotating empty bobbin tube at said winding position and which is located in said yarn catching plane, and the advancing yarn is then deflected laterally from said yarn catching plane to said bead plane by said yarn shifting means.

---

### 5,016,830
### METHOD AND DEVICE FOR COMBINING PAIRS OF CHEESES

**Edmund Wey, Netteltal, Fed. Rep. of Germany, assignor to W. Schlafhorst AG & Co., Monchen-Gladbach, Fed. Rep. of Germany**
**Filed Dec. 27, 1988, Ser. No. 291,249**
**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744041**
**Int. Cl.⁵ B65H** *67/04*
**U.S. Cl. 242—35.50 A** **19 Claims**

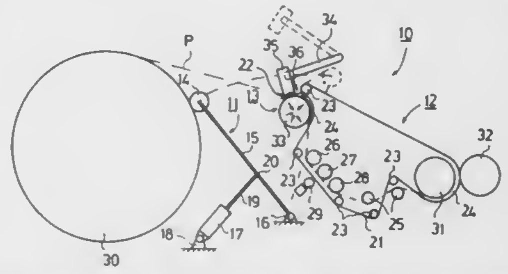
1. A method of combining cheese pairs made up of cheeses of different types in a cheese-producing textile machine having a plurality of adjacent winding stations and a cheese transporter disposed along the machine, the cheese transporter having an end at which the cheeses become disposed for further availability, the cheese transporter including at least one mobile automatic cheese exchanger for removing the cheeses from the winding stations and readying them for further transport, which comprises automatically transferring the cheeses to and depositing them on the cheese transporter pairwise in cooperation with the mobile automatic cheese exchanger while avoiding tipping and rolling of the cheeses; thereafter setting the cheese transporter into motion only when at least one of the following has been determined by automatic devices: that the winding stations have delivered the cheeses in a given manner and in a given amount, that a given amount of cheese pairs is present, that irregular pairs of cheeses and unpaired cheeses are identified as such and that the original winding station of irregular cheeses has been identified.



---

### 5,016,831
### METHOD AND DEVICE FOR THREADING THE END OF A WEB

**Seppo Saukkonen, Vantaa, Finland, assignor to Valmet Paper Machinery Inc., Helsinki, Finland**
**Continuation of Ser. No. 398,327, Aug. 23, 1989, abandoned, which is a continuation of Ser. No. 194,470, May 16, 1988, abandoned. This application May 17, 1990, Ser. No. 526,547**
**Claims priority, application Finland, May 20, 1987, 872222**
**Int. Cl.⁵ B65H** *19/28, 20/16*
**U.S. Cl. 242—55** **20 Claims**



1. A method for threading the end of a web from a jumbo roll or the like along a selected path through a web processing arrangement, comprising:

(a) grasping the end of the web on the roll,

(b) transferring the end of the web by a fetching and grasping device to a position such that the web extends adjacent a web holding device,

(c) holding the web by the web holding device,

(d) detaching the web from the fetching and grasping device, attaching the web to a threading member, and releasing the web from the web holding device, and

(e) advancing the threading member along the selected path.

VOL 1126 ISS 3 MY 21 1991 UMI

### 5,016,832

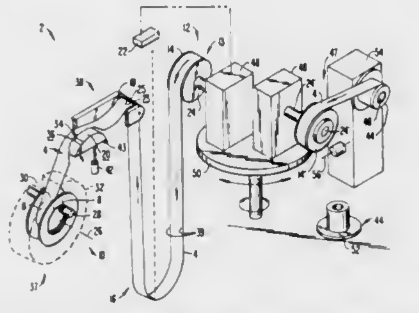
### METHOD AND APPARATUS FOR WINDING AN AMORPHOUS MAGNETIC TOROIDAL TRANSFORMER CORE

**Joe E. Curtis, Jr.; Douglas Burns, both of Lexington, and John E. Cloyd, Versailles, all of Ky., assignors to Kuhlman Corporation, Lexington, Ky.**

**Continuation of Ser. No. 396,487, Aug. 21, 1989, abandoned. This application May 30, 1990, Ser. No. 533,960**

**Int. Cl.⁵ B65H** *19/30, 23/10;* **H02K** *15/04*

**U.S. Cl. 242—58.6** **28 Claims**



1. Apparatus for winding a continuous ribbon of magnetic core material, having lateral edges, into an annular cavity defined by a bobbin within a partial toroidal transformer assembly, the magnetic core material passing through an entrance gap between windings of the partial toroidal transformer assembly and into the annular cavity, the apparatus comprising:

a first spool with a supply of the magnetic core material wound thereon with a first end of the magnetic core material at an inside of the spooled magnetic core material;

a backwinding assembly including:

first and second spindles, the first spindle adapted to receive the first spool, the second spindle adapted to receive a second spool for receipt of the magnetic core material from, the first spool;

means for supporting the first spindle at a horizontal orientation, at which the magnetic material is removed from the first spool, and at a generally vertical orientation, at which the first spool with the magnetic material thereon is mounted on the first spindle; and

backwinding means for unwinding the magnetic core material from the first spool and onto the second spool so the first end of the magnetic core material is at an outside of the magnetic core material on the second spool;

a core wind-in machine supporting the partial torodial transformer assembly and the bobbin;

the core wind-in machine including a bobbin drive coupled to the bobbin, which rotates the bobbin within the windings and around an axis of the bobbin;

the magnetic core material extending along a path from the supply through the entrance gap and into the annular cavity so the magnetic core material is wound into the annular cavity by the rotation of the bobbin by the bobbin drive;

a drag surface between the supply and the entrance gap along which the magnetic core material moves; and

means for pulling the magnetic core material against the drag surface to supply a distributed drag force on the magnetic core material as it moves to the bobbin.

17. A method for winding a ribbon of magnetic core material, having lateral edges, into an annular cavity of a rotatable bobbin, the bobbin within a partially assembled toroidal transformer assembly, the transformer assembly having an entrance gap through which the magnetic core material enters the annular cavity, the method comprising:

mounting a first spool, holding the magnetic core material wound in a spiral orientation thereon, onto a generally vertical first spindle and then reorienting the first spindle, with the first spool thereon, to a horizontal position;

backwinding the magnetic core material from the first spool onto a second spool to create a supply of the magnetic core material;

directing the magnetic core material along a path from the supply of the magnetic core material, past a drag surface, through the entrance gap and into the annular cavity;

rotating the bobbin to pull the magnetic core material into the annular cavity, the magnetic core material, when wound into the annular cavity of the bobbin, exhibiting said spiral orientation; and

pulling the magnetic core material against the drag surface thereby creating a distributed drag force on the magnetic core material.

---

### 5,016,833

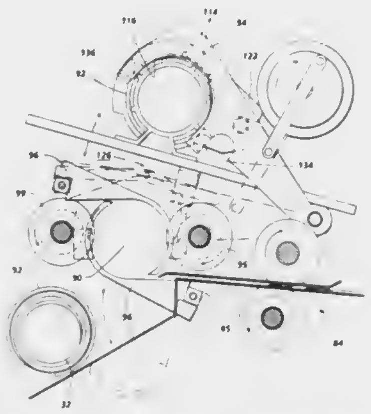
### DOCUMENT ROLL-UP SYSTEM

**Thomas J. Hamlin, Macedon, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 16, 1990, Ser. No. 494,385**

**Int. Cl.⁵ B65H** *18/16*

**U.S. Cl. 242—66** **3 Claims**



3. The apparatus for rolling one or more media sheets into a tubular configuration, the apparatus including:

a plurality of generally curved opposed, retractable baffle members arranged along a central axis coincident with a media transport path, said baffle member, in a closed position, defining a generally circular interior roll-up space,

means for conveying a C-ring from a first storage location to a second location coincident with the same central axis as said baffle members, and

means for feeding said media sheets into the interior space of said C-ring in a scrolling operation.

---

### 5,016,834

### ADAPTOR FOR A SMALL-SIZED TAPE CASSETTE

**Seizi Sato, Kanagawa, and Eiji Yano, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Oct. 30, 1989, Ser. No. 429,170**

**Claims priority, application Japan, Nov. 25, 1988, 63-297837**

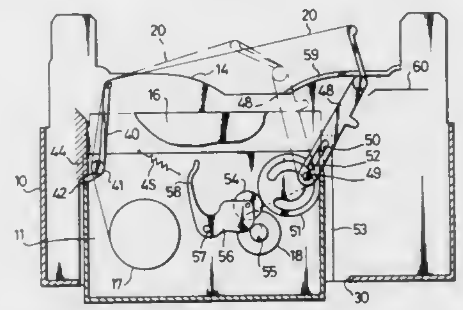
**Int. Cl.⁵ G11B** *23/04*

**U.S. Cl. 242—199** **21 Claims**

1. A tape cassette adaptor system, in which a small-sized tape cassette smaller than a standardized tape cassette is accommodated in an adaptor whose size is the same as that of the standardized tape cassette, for enabling the small-sized tape cassette to be loaded onto a recording and/or reproducing apparatus utilizing the standardized tape cassette, wherein the small-sized tape cassette houses a magnetic tape, said tape cassette adaptor system comprising:

(a) a set of tap withdrawing levers mounted within the small-sized tape cassette for withdrawing the magnetic tape; and

(b) a guide means mounted within the adaptor outside the small-sized tape cassette for rotating the tape withdrawing levers, wherein said guide means is mounted in such a position that the guide means engages and rotates the tape withdrawing levers upon insertion of the small-sized tape cassette into the adaptor.



---

### 5,016,835

### GUIDED MISSILE

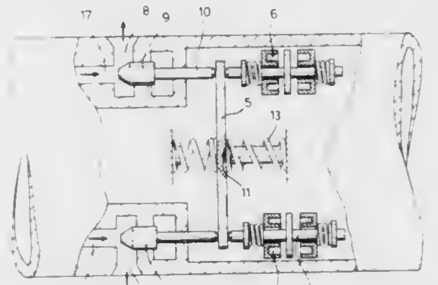
**Walter Kranz, Taufkirchen, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, München, Fed. Rep. of Germany**

**Filed Dec. 1, 1989, Ser. No. 444,819**

**Claims priority, application Fed. Rep. of Germany, Jan. 14, 1989, 3901041**

**Int. Cl.⁵ F42B** *15/033*

**U.S. Cl. 244—3.22** **12 Claims**



1. A guided missile having a hot gas generator for providing a gas penetrating a plurality of blow-out nozzles arranged at regular intervals along a circumference of the missile and extending substantially perpendicularly to a longitudinal missile axis, the gas having a flow rate, the flow rate of the gas being regulated through the individual ones of the blow-out nozzles by a control device, the control device having a star coupling comprising a plurality of arms corresponding to the number of blow-out nozzles, each arm having a positioning element disposed in proximity to the respective blow-out nozzle, the respective blow-out nozzle associated with the positioning element being closable by said positioning element such that said positioning element can at least partially close the respective blow-out nozzle, and further comprising a control element coupled to each positioning element for controlling the position of said positioning element.

---

### 5,016,836

### GUIDANCE/CONTROL DEVICE FOR A CARRIER COMPRISING A MOVABLE NOZZLE

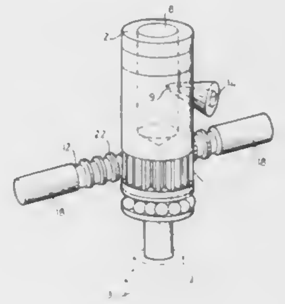
**René Thouron, La Ferte St. Aubin, France, assignor to Thomson-Brandt Armements, Boulogne Billancourt, France**

**Filed Jul. 19, 1989, Ser. No. 381,866**

**Claims priority, application France, Jul. 22, 1988, 88 09941**

**Int. Cl.⁵ F42B** *10/66*

**U.S. Cl. 244—3.22** **12 Claims**



1. A device for at least one of guidance and control of a carrier having a longitudinal center axis, the device comprising:

at least two cylindrical nozzle units each having an axis of rotation parallel to the longitudinal center axis of the carrier;

at least one nozzle fixed to each of the cylindrical nozzle units by a neck for conducting a continuous flow of gas to generate continuously a thrust force having a transverse outwardly directed component; and

a rotating-driving device for rotating each of the cylindrical nozzle units about their respective axes of rotation by 180 degrees and less and for orienting each at least one nozzle of the respective cylindrical nozzle units to steer the carrier.

---

### 5,016,837

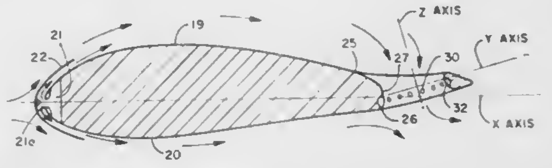
### VENTURI ENHANCED AIRFOIL

**Mark T. Willis, San Diego, Calif., assignor to Venturi Applications, Inc., San Diego, Calif.**

**Continuation of Ser. No. 66,223, Jun. 25, 1987, abandoned. This application Oct. 24, 1989, Ser. No. 426,536**

**Int. Cl.⁵ B64C** *21/04*

**U.S. Cl. 244—12.1** **26 Claims**



1. An aircraft comprising:

an airfoil, said airfoil defining an upper surface, a lower surface, a leading edge, and a trailing edge, said airfoil further defining a slot extending therethrough between said upper surface and said lower surface, said slot thus defining an entrance port in said upper surface and an exit port in said lower surface, said exit port being located farther aft on said airfoil than said entrance port, said slot being located adjacent to said tailing edge and defined by a throat portion, a converging portion extending from said entrance port and converging inwardly toward said throat portion, and a diverging portion extending from said throat portion and diverging outwardly therefrom toward said exit port, said diverging portion terminating on said lower surface.

VOL
1126
ISS
3
MY
21
1991
UMI

said airfoil further defining a first plenum chamber located adjacent to said slot, and a plurality of ejector nozzles extending through a wall defining said slot, said ejector nozzles being in fluid communication with said first plenum chamber; and

means for supplying pressurized gas coupled to said first plenum chamber, said first plenum chamber in turn ejecting the pressurized gas through said ejector nozzles and into said diverging portion of said slot.

---

**5,016,838**

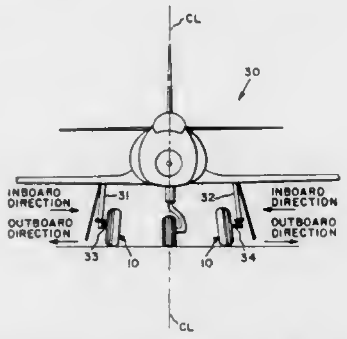
## AIRCRAFT TIRE HAVING ASYMMETRIC TREAD

**Lawrence W. Brooks, and Thomas A. Dwenger, both of Uniontown, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Sep. 8, 1987, Ser. No. 94,969**

**Int. Cl.$^5$ B60C** *11/06*

**U.S. Cl. 244—103 R** **2 Claims**



1. The combination of an aircraft and a pair of tires mounted upon the landing gear of an aircraft, said aircraft comprising a pair of landing gear struts which are disposed at an angle that is not parallel to a centerline of the aircraft when the landing gear is in position for the aircraft to taxi, each said landing gear strut being adjoined to a landing gear axle such that the axle is not perpendicular to the centerline of the aircraft, a wheel is attached to each said landing gear axle and a tire is mounted upon each said wheel, each said tire comprising:

(a) a carcass structure and belt structure which are symmetrical with respect to a centerplane that is perpendicular to the axis of rotation of the tire and is disposed midway between a pair of sidewall portions of the tire; and

(b) a tread portion disposed radially outwardly of said carcass structure and belt structure, the tread portion having a radially outer surface that generally follows a single radius of curvature laterally across a central portion of the tread with the center of said radius of curvature being located on said centerplane, a central groove in the tread portion extends circumferentially thereabout and is intersected by said centerplane, on one side of the central groove the tread portion is devoid of any other grooves and on the other side of the central groove the tread portion has at least two other grooves therein which extend circumferentially thereabout, each central portion extending on each side of said centerplane a lateral distance at least equal to the distance from the centerplane to the laterally innermost edge of the laterally outermost circumferentially extending groove, each central groove having a greater depth and lateral width than the other grooves, the depth and lateral width of the other circumferentially extending grooves begin less than the depth and lateral width of the next adjacent laterally inward circumferentially extending groove, each said tire being mounted upon the aircraft such that the portion of the tread which is devoid of grooves is inboard with respect to the centerline of the aircraft, and the portion of the tread that has the circumferentially extending grooves therein is disposed outboard with respect to the centerline of the aircraft.

---

**5,016,839**

## DEVICE FOR THE LOCKING AND UNLOCKING OF TWO ELEMENTS OF A PROJECTILE, NOTABLY OF A PARACHUTE CONTAINER

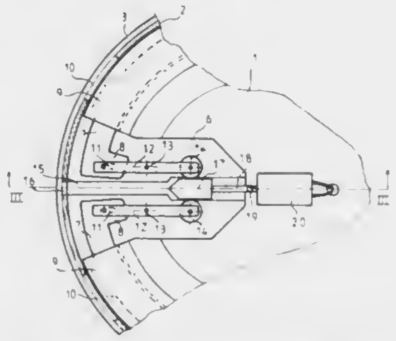
**Jean-Pierre Frehaut, and Jean-Pierre Pineau, both of Orleans, France, assignors to Thomson-Brandt Armements, Boulogne Billancourt, France**

**Filed Nov. 13, 1989, Ser. No. 434,310**

**Claims priority, application France, Nov. 15, 1988, 88 14802**

**Int. Cl.$^5$ F42B** *10/56;* **F16H** *21/54, 25/18*

**U.S. Cl. 244—147** **8 Claims**



1. A device for the locking and unlocking of first and second elements of a projectile, said device being provided in said first element, said second element, which is to be locked thereto being mounted on said first element, comprising:

a peripheral housing opened outwards;

a circlip engaged in said housing, the ends of which are spread out int he resting position, said circlip having, on its external rim, teeth for engaging a retaining means provided in the wall of said second element,

a means to bring the ends of the circlip closer together in order to retract it and disengage said teeth from said retaining means; and

delaying means for actuating said means to bring the ends of the circlip closer together.

---

**5,016,840**

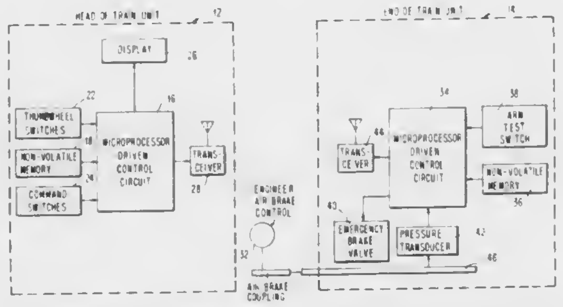
## METHOD TO AUTHORIZE A HEAD OF TRAIN UNIT TO TRANSMIT EMERGENCY COMMANDS TO ITS ASSOCIATED REAR UNIT

**Angel P. Bezos, Rockville, Md., assignor to Pulse Electronics, Inc., Frederick, Md.**

**Filed Oct. 30, 1989, Ser. No. 428,590**

**Int. Cl.$^5$ B61L** *23/00*

**U.S. Cl. 246—187 R** **5 Claims**



1. A method for arming a head of train unit to control emergency functions at a rear of train unit upon command over a telecommunication unit link, comprising the steps of:

manually initiating at the head of train unit a change in pressure in the brake pressure pipe coupled between the head of train unit and the rear of train unit;

sensing at said rear of train unit said change in pressure;

transmitting from said end of train unit an indication of said change in pressure to said head of train unit;

displaying said indication of said change in pressure at said head of train unit; and

manually initiating the transmission of a predetermined signal to said end of train unit over said telecommunications link within a predetermined short time interval following the display of said pressure change.

---

**5,016,841**

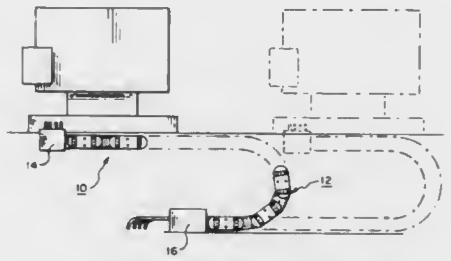
## ROLLING CONDUCTOR SUPPORT

**P. Richard Schumann, West Bend, and Paul R. Schmidt, Burnett, both of Wis., assignors to Gleason Reel Corp., Mayville, Wis.**

**Filed Jul. 23, 1990, Ser. No. 557,230**

**Int. Cl.$^5$ F16L** *3/00*

**U.S. Cl. 248—51** **11 Claims**



1. A rolling conductor support for supporting a conductor between a stationary supply and moving consumer, including a plurality of chains, each chain comprising:

a follower link extending between follower ends along a follower longitudinal axis and defining at least two follower orifices adjacent each follower end of said follow link, said follower orifices disposed along a line which is substantially perpendicular to the longitudinal axis;

a lubricating member having at least two lubricating orifices conformal with said follower orifices and contiguous with said follower link near said follower orifices;

a control link extending between control ends along a control longitudinal axis and defining at least one arcuate control slot having a predetermined radius of curvature about a center of curvature, said control link contiguous with said lubricating member near said at least two lubricating orifices;

a connecting first pin having a head end and a groove end portion adjacent a distal end, said groove end portion having a plurality of parallel circumferential grooves spaced at predetermined intervals along the cylindrical axis of said pin, said pin connecting said follower link and said control link;

a connecting second pin having a head end and a groove end portion adjacent a distal end, said groove end portion having a plurality of parallel circumferential grooves spaced at predetermined intervals along the cylindrical axis of said pin, said pin connecting said follower link and said control link;

at least one of said first pin and said second pin extending through one said follower orifices and said lubricating orifices, and said control slot to delimit relative rotation between said links; and

a planar toothed fastener defining at least two toothed orifices, each accommodating said one of said connecting pins, said fastener situated in a predetermined one of said grooves on a respective pin to secure said fastener to said pin and positively position said follower link, said lubricating member, and said control link between the locating head end of said pin and said fastener.

---

**5,016,842**

## PROTECTOR FOR WIRE HARNESS

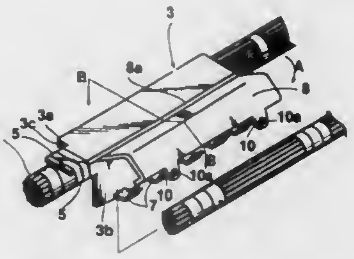
**Katsuya Suzuki, Shizuoka; Yoshihiro Nakajima, and Tomoyuki Ishii, both of Kanagawa, all of Japan, assignors to Yazaki Corporation and Nissan Motor Co., Ltd., Japan**

**Filed Aug. 30, 1989, Ser. No. 400,735**

**Claims priority, application Japan, Aug. 30, 1988, 63-112869[U]**

**Int. Cl.$^5$ F16L** *3/22*

**U.S. Cl. 248—68.1** **7 Claims**



1. A wire harness protector adapted to be mounted on a side sill of a motor vehicle, comprising:

a first protector body for protectively covering a first wire harness to be secured therein, the first protector body being defined by at least two substantially vertical lateral walls which are arranged substantially in parallel with each other, and a first lateral wall having means for engaging the protector with the side sill, and a second lateral wall having upper and lower sides;

a second protector body provided adjacent to and in side-by-side relationship with the first protector body at the side of the second lateral wall, for protectively covering a second wire harness which is to be optionally secured therein as the need arises after the first wire harness has been secured in the first protector body, the second protector body having a substantially L-like shape in cross section and having upper and lower sides;

means for supporting the second wire harness thereon, the supporting means being adapted to secure the second wire harness inside the second protector body in cooperation with the second protector body; and

a hinge member provided between the upper side of the second lateral wall of the first protector body and the upper side of the second protector body for enabling pivotal movement of the second protector body with respect to the first protector body so as to enable the second protector body to receive the second wire harness inside the second protector body under the condition that the first wire harness has been secured in the first protector body.

---

**5,016,843**

## PIPE CLAMP

**John F. Ward, Ontario, Canada, assignor to Canplas Industries Limited, Barrie, Canada**

**Continuation of Ser. No. 222,664, Jul. 21, 1988, abandoned. This application May 8, 1990, Ser. No. 522,398**

**Claims priority, application Canada, Jul. 8, 1988, 572556**

**Int. Cl.$^5$ F16L** *3/22*

**U.S. Cl. 248—68.1** **6 Claims**

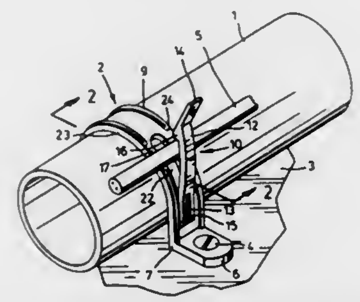
1. A clamp for simultaneously securing a pipe to a surface and releasably securing at least one following electrical wire, said clamp comprising:

a u-shaped body for retaining said pipe therein, said u-shaped body in cross-section having a semi-circular portion, ending in two straight portions having opposed outwardly extending feet, the length of each straight portion being at least equal to the radius of the semi-circular portion, said straight portions and said feet forming L-shaped ends for securing said body to a surface,

said body having reinforcing ribs and opposed material

VOL
1126
ISS
3
MY
21
1991
UMI

saving openings and a clasp disposed in one of said openings said clasp comprising a resilient cantilever having a profile corresponding to the profile of the u-shaped body, whereby in a rest position said cantilever is coincident with said u-shaped body, within said opening, and in a displaced position said cantilever is displaced outwardly from said opening and is biased towards said rest position, said clasp including a first protrusion extending outwardly from said clasp and outwardly from an outer surface of said u-shaped body said first protrusion allowing said clasp to be manually actuable from said rest position to said displaced position and means for retaining said electrical wire between said clasp and said u-shaped body said



retaining means comprising a second protrusion adjacent a free end of said cantilever and projecting inwardly generally towards a centre of said u-shaped body and a relieved portion extending past said second protrusion in said reinforcing ribs to retain said wire between said clasp and said u-shaped body, both the first and second protrusions extending beyond the profile of the u-shaped body when the cantilever is in the rest position,

said clamp, in use retaining said pipe within said u-shaped body, securing said pipe to a surface and releasably securing and at least partially strain relieving said following wire between said clasp and said outer surface of said u-shaped body.

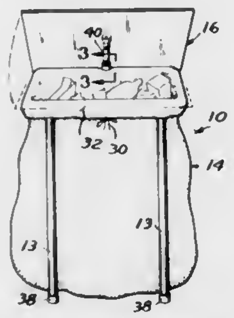
---

### 5,016,844
## OPEN TOP TRASH BAG HOLDER
**William D. Garvin, 2115 NW. 12th, Apt. 1, Oklahoma City, Okla. 73112**

**Filed Nov. 5, 1990, Ser. No. 609,313**

**Int. Cl.$^5$ A63B *55/04***

**U.S. Cl. 248—97** **2 Claims**



1. In a knockdown manually assembled without hand tools holder for a normally open top draw string closed bag of predetermined size and generally rectangular transverse cross section formed from pliable plastic sheet material, the improvement comprising:

an endless rectangular normally horizontal rigid frame of a predetermined perimeter dimension for removably supporting said bag top with the draw string portion of the bag top disposed outwardly,

said frame being formed from parallel tubular end rails and side rails respectively joined in slip joint fashion by tubular elbows for defining right angular corners of the frame;

a tubular tee interposed in slip joint fashion in the respective side rail adjacent the respective elbow, each said tee having an internally threaded bullhead opening with its axis disposed vertically downward normal to the axis of the respective side rail and normal to the plane of the frame;

a tubular leg depending from the threadedly engaged at its upper end portion with the respective said tee bullhead opening;

a lid overlying said frame for temporarily closing the bag open top; and,

hinge means removably connecting said lid with one said frame side rail,

said hinge means comprising a tubular tee-shaped member having the bar portion of the tee-shape defined by a transversely arcuate wall encompassing a transverse arc of at least 200° for frictionally gripping a companion arc of the periphery of said one frame side rail intermediate its ends.

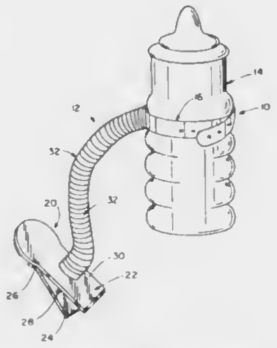
---

### 5,016,845
## INFANT FEEDING ASSEMBLY
**Wendy M. Pellegrino, 82 Cypress Neck Rd., Lincroft, N.J. 07738**

**Filed Jan. 2, 1990, Ser. No. 460,245**

**Int. Cl.$^5$ A47D *15/00***

**U.S. Cl. 248—104** **9 Claims**



1. An infant feeding assembly comprising:

(A) a support unit which includes
  (1) a spring-loaded clamp element which is adapted to be releasably mounted on a crib and which includes a top jaw and a bottom jaw which are held together by a pivot element and which are biased into a crib contacting position by a clamp spring
  (2) an elongate flexible gooseneck assembly mounted at one end thereof on said top jaw, said gooseneck assembly including
    (a) a longitudinal centerline extending from said top jaw,
    (b) a first spring element which is mounted at one end thereof on said clamp element top jaw and which is biased to resist movement of said gooseneck assembly in a plane parallel to a plane containing said top jaw, and
    (c) a second spring means connected to said first spring element and being biased to resist a twisting movement of said gooseneck assembly about said gooseneck assembly longitudinal centerline,
  (3) a snap fastener ball element mounted on a second end of said first spring element, and
  (4) a flexible sleeve releasably mounted at one end thereof on said top jaw and releasably containing said first spring and said second spring means;

(B) a strap unit having ends and releasably attached to said gooseneck assembly and including
  (1) a plurality of fasteners near one end thereof,

  (2) a plurality of fastener-receiving holes defined therethrough near another end thereof,
  (3) a snap fastener ball receiving socket located between said strap ends; and

(C) an infant feeding container unit being releasably mounted onto said support unit by said strap unit and which includes
  (1) a top adapted to receive a fluid dispensing element releasably mounted thereon,
  (2) a bottom,
  (3) a sidewall connecting said top to said bottom,
  (4) a longitudinal centerline extending between said bottom and said top,
  (5) a transverse centerline extending perpendicular to said longitudinal centerline, said strap unit engaging said infant feeding container unit between said transverse centerline and said container, and
  (6) a weight assembly in said sidewall and including
    (a) a plurality of weight elements, each having a weight which is different from the weight of all other weight elements,
    (b) said weight elements being positioned in a linear arrangement and spaced apart from each other along said container sidewall from adjacent to said bottom to adjacent to said transverse centerline,
    (c) said weight elements being arranged to have the heaviest weight element located closest to said bottom and the lightest weight located adjacent to said transverse centerline and to have the heavier of any two adjacent weight elements located closer to the bottom than the lighter of said any two adjacent weight elements, and
    (d) said weight elements having a total combined weight which lowers a center of gravity of said container unit beneath said transverse centerline.

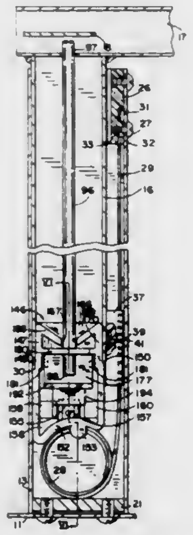
---

### 5,016,846
## SPRING AND LOCK SUPPORT FOR OVERBED TABLE
**Robert A. Solomon, Kalamazoo, Mich., assignor to Bissell Amfab, Inc., Kalamazoo, Mich.**

**Filed Jan. 6, 1989, Ser. No. 294,757**

**Int. Cl.$^5$ A47B *9/00***

**U.S. Cl. 248—161** **21 Claims**



1. An apparatus comprising: an elongate tubular first member extending in a first direction and having therein an inwardly facing locking surface which extends in said first direction lengthwise of said first member, an elongate second member extending in said first direction and having a portion disposed within said tubular first member, said second member being movable reciprocally relative to said first member in said first direction and in a second direction opposite said first direction; releasable locking means cooperable with said first and second members for releasably holding said second member against movement in said first direction with respect to said first member; and selectively actuable operating means cooperable with said locking means for effecting a release thereof; wherein said locking means includes means defining on said second member at a location spaced from said locking surface on said first member first and second positioning surface portions, said first positioning surface portion facing approximately in said first direction and said second positioning surface portion facing approximately in said second direction and being spaced in said first direction from said first positioning surface portion, and including means defining on said second member a third positioning surface portion which faces said locking surface and which is disposed on a side of said first and second positioning surface portions remote from said locking surface; wherein said locking means includes a locking member having first and second edge portions at opposite ends thereof, said first edge portion being disposed against said third positioning surface portion and said locking member extending away from said third positioning surface portion and between said first and second positioning surface portions in a direction toward said locking surface and in said first direction, said locking member being movable about a pivot axis which is in the region of said first and second positioning surface portions and is approximately parallel to said locking surface between a locking position in which said second edge portion thereof engages said locking surface and a release position in which said second edge portion thereof is spaced from said locking surface, said second edge portion of said locking member moving approximately in said first direction as said locking member moves away from the locking position toward the release position; wherein said operating means is cooperable with said locking member and, when actuated, effects movement of said locking member from the locking position to the release position; and including means for moving said locking member from the release position to the locking position when said operating means is deactuated.

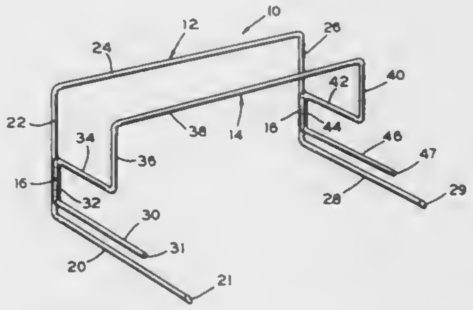
---

### 5,016,847
## OBJECT RETAINING APPARATUS FOR A VEHICLE
**Paul A. Herzig, 11059 Alscot La., Whitehouse, Ohio 43571**

**Filed May 15, 1990, Ser. No. 523,760**

**Int. Cl.$^5$ A47F *7/00***

**U.S. Cl. 248—175** **12 Claims**



1. An apparatus including a formed member for supporting an object comprising:

a pair of generally horizontally extending, spaced apart, generally parallel lower legs each having a free end and an opposite end;

a pair of vertically extending first uprights, each said first upright connected at a lower end to said opposite end of one of said lower legs;

a generally horizontally extending first cross beam connected at opposite ends to upper ends of said first uprights;

a pair of generally horizontally extending arms each connected at one end to one of said first uprights between said upper and lower ends, said arms extending generally in the

VOL
1126
ISS
3
MY
21
1991
UMI

same direction as said lower legs and having opposite ends;

a pair of generally vertically extending second uprights each connected at a lower end to one of said opposite ends of said arms;

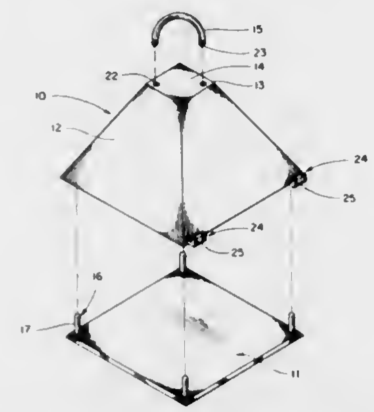
a generally horizontally extending second cross beam connecting at opposite ends to upper ends of said second uprights; and

a pair of upper legs each having one end connected to one of said first uprights and a free end and extending generally horizontally parallel to and spaced above an adjacent one of said lower legs from said one first upright toward said free end of said adjacent lower leg whereby said second uprights are spaced from said first uprights a distance for receiving an object to be retained between said first and second uprights with the object resting upon said arms.

---

### 5,016,848
### PYRAMIDAL SHAPED BALLOON HOLDER

**Kurt W. Metz, 83 Mineola Rd., Fox Lake, Ill. 60020**
**Filed Aug. 17, 1989, Ser. No. 394,972**
**Int. Cl.$^5$ F16M *11/00***
**U.S. Cl. 248—176** **20 Claims**



1. A helium party balloon holder comprising a base plate, a pyramidal shaped cap member mounted on the base plate, the cap member being truncated and having an uppermost flat surface, an arch-shaped member secured with said flat surface to enable balloon strings to be attached thereto, means between said cap member and said base plate enabling these components to be attached, in snug assembly, and a chamber defined between said base plate and said cap member for receiving a ballast within the chamber to affix the helium party balloon holder in place thus enabling a predetermined number of balloons to be secured to the helium party balloon holder.

---

### 5,016,849
### SWIVEL MECHANISM FOR A MONITOR OF A LAPTOP COMPUTER

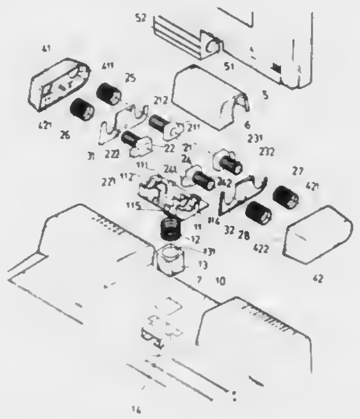
**Sunny Wu, Kuang Hsi, Taiwan, assignor to Datatech Enterprises Co., Ltd., Taoyuan County, Taiwan**
**Filed Nov. 17, 1989, Ser. No. 437,594**
**Int. Cl.$^5$ F16M *13/00***
**U.S. Cl. 248—183** **2 Claims**

1. A swivel mechanism for a monitor of a laptop computer comprising:

having a vertical axle at the bottom thereof fixed seat, a spring and a positioning block, said positioning block being disposed on a fixed frame rigidly mounted within a main body of the laptop computer and having a vertical hole for receiving the spring, vertical axle tightly fitted within said spring thereby enabling said fixed seat to rotate with respect to the fixed frame in said positioning block; and

a horizontal axle having four longitudinal axles extending in the same direction, four springs, two positioning plates, two side covers and a protective cover, each longitudinal axle being formed with a fixed block wherein a first one extends through its respective fixed block thereof to connect to a threaded hole of said fixed seat and kept in position by a screw, a second one passes through its respective fixed block thereof to connect to another threaded hole of said fixed block, and the remaining two are disposed beside an inner side of the monitor, said springs of the horizontal axle being connected at their outer ends with the side covers;

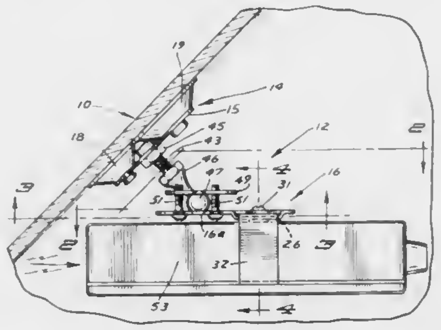
whereby the monitor may be rotated with respect to a vertical axis and a horizontal axis when pushed by a user thereby widening vision range.



---

### 5,016,850
### ARTICLE HOLDING BRACKET

**Katherine C. Plahn, 7829 Ithaca Ln., Maple Grove, Minn. 55369**
**Filed Aug. 23, 1990, Ser. No. 571,177**
**Int. Cl.$^5$ F16B *47/00***
**U.S. Cl. 248—206.3** **2 Claims**



1. A bracket removably mounting a radar detector on the windshield of an automotive vehicle, having in combination

a planar windshield mounting plate member,

means carried by said plate member releasably securing the same to said windshield,

a supporting plate member retaining a radar detector comprising a planar top wall,

spaced inwardly from the rear end of said top wall are a pair of separated transversely aligned slots,

a pair of extensible strap members disposed transversely of said top wall having their respective adjacent end portions overlying said slots,

securing means extending through each of said adjacent ends and the respective slots thereof,

the remote end portions of said strap members respectively extending downwardly depending from the side edges of said top wall,

the lower end portions of said depending strap portions being angled inwardly in facing relationship forming flanges,

said flanges being arranged to be disposed in grooves respectively at each side of a radar detector,

a universally pivotal swivel means connecting said mounting plate member and said supporting plate member in operating relationship,

said swivel means comprises

a bolt secured to said mounting plate member extending downwardly therefrom,

a plate member spaced above said top wall of said supporting plate member,

a plurality of bolts holding said spaced plate members in spaced relation,

said spaced plate members having aligned apertures,

a ball disposed between said spaced plate members and extending into said apertures,

said ball having an upwardly extending internally threaded sleeve,

said bolt being threaded into said sleeve operatively connecting said mounting plate member and said support plate member,

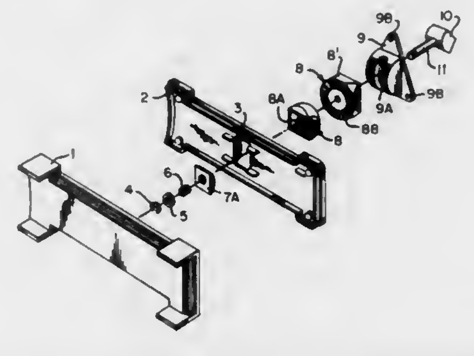
said bolts adjusting the tension upon said ball between said spaced plate members, and

whereby said support plate member is universally rotatable vertically and horizontally relative to said mounting plate member.

---

### 5,016,851
### ATTACHMENT SYSTEM FOR THE HOLDER OF THE OPERATING DEVICE OF A RADIOPHONE

**Pentti A. Koskinen, Halikko, and Antti S. Timari, Sääksjärvi, both of Finland, assignors to Nokia Mobile Phones, Salo, Finland**
**Filed Jan. 22, 1990, Ser. No. 468,372**
**Claims priority, application Finland, Feb. 3, 1989, 890539**
**Int. Cl.$^5$ F16M *11/00***
**U.S. Cl. 248—278** **3 Claims**



1. Attachment system for a holder of the operating device of a radiophone with which the holder can be turned step-by-step in various directions, comprising:

A. a grooved convex surface on the outside of a rear portion of the holder, a smooth concave surface being located on the other side opposite the convex surface thereof, and said holder defining a slot in the surface of the rear portion that is generally perpendicular to the grooves;

B. a joint including
  (i) a first joint piece with a grooved concave surface on one side that corresponds to, and is placed against, the convex surface of the holder, said first piece defining an opening therein, the other side of the first joint piece being a planar surface having radial grooves,
  (ii) a second joint piece with a similar shape to the first joint piece including a grooved concave surface on one side, a planar radially grooved surface on the other side, and an opening, said second joint piece being placed so that its planar surface is against the planar surface of the first joint piece, and
  (iii) a third joint piece with a convex grooved surface on one side that corresponds to, and is placed against, the concave surface on the one side of the second joint piece, a smooth concave surface being located on the other side opposite the convex surface thereof, said third joint piece defining a slot through its convex surface that is generally perpendicular to the grooves therein;

C. first and second counterpieces with smooth convex surfaces on one side, the surface of the first counterpiece being placed against the concave surface of the rear portion of the holder and the surface of the second counterpiece being placed against the concave surface of the third joint piece, said smooth surfaces of said counterpieces being formed so that they are able to slide along the smooth concave surfaces of the holder and the third joint piece respectively;

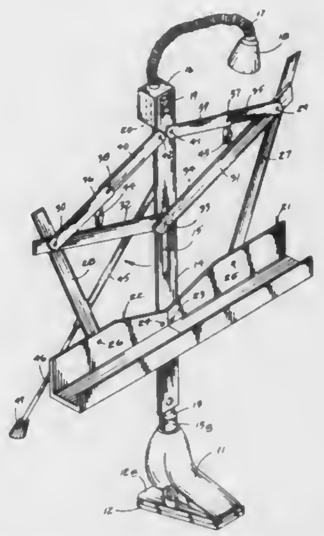
D. an attachment piece that extends between the first couterpiece, the rear portion of the holder, the joint pieces and the second counterpiece, said attachment piece being movable in the slots in the rear portion of the holder and the third joint piece; and

E. locking means joining the counterpieces to the attachment means, whereby turning of the joint pieces in relation to each other allows the holder to be set in various positions.

---

### 5,016,852
### PORTABLE BOOKSTAND APPARATUS

**Bella E. Herendeen, 4924 Nellie Springs Ct., Las Vegas, Nev. 89110**
**Filed Jun. 21, 1990, Ser. No. 541,390**
**Int. Cl.$^5$ A47B *19/00***
**U.S. Cl. 248—461** **1 Claim**



1. A portable bookstand apparatus comprising, in combination,

a central spine plate, including a lower terminal end and an upper terminal end, the lower terminal end including a spring clip member mounted thereto, and

the upper terminal end of the central spine plate including a housing mounted thereon, the housing including a flexible neck mounted thereto, the flexible neck mounting an illumination member to the flexible neck spaced from the housing, the housing including a switch member to effect selective illumination of the illumination member, and

a first "U" shaped tray pivotally mounted to the spine plate in alignment with a second "U" shaped tray mounted to the spine plate, when the first and second "U" shaped trays are in a first lowered position, and wherein the first and second "U" shaped trays are arranged parallel relative

VOL
1126
ISS
3
MY
21
1991
UMI

to one another when the first and second "U" shaped trays are in a second folded position, and

wherein the spring clip member includes a support foot mounted to the spine plate, and a spring clip plate biased against the support foot, including a resilient pad mounted to the spring clip plate between the support foot and the spring clip plate, and a pivot connection mounting the lower terminal end of the spine plate to support the foot, and

including a pivot lock directed through the pivot connection to selectively lock the spine plate to the pivot connection in a predetermined angular orientation, and

wherein the spine plate includes a longitudinally aligned and enclosed slot directed through the spine plate spaced above the first and second "U" shaped tray, and each first and second "U" shaped tray including a respective first and second rear wall, a first link pivotally mounted medially of the first rear wall, and the second link pivotally mounted rearwardly of the second rear wall, and the first and second links including a respective first and second linkage pivot axle adjacent an upper terminal end of each respective first and second link, and a third and fourth link each including a respective third and fourth link rear terminal end mounted to the respective first and second link at a respective first and second linkage pivot axle, and the third and fourth link including a third linkage pivotal axle mounted through and adjacent a forward terminal end of each respective first and second linkage pivot axle to secure the first and second linkage pivotal axles together in an overlying relationship and to simultaneously secure the forward terminal ends of each third and fourth link overlying and slidable relative to the slot, and the third linkage pivot axle directed through the slot, and a third linkage pivot axle clamp selectively clamping the third linkage pivot axle within the slot, wherein the third linkage pivot axle arranged in an upper orientation within the slot in the first position and positioned adjacent a lower terminal end of the slot in a second position, and

including a fifth link mounted to the first linkage pivot axle and a sixth link mounted to the second linkage pivot axle, and a seventh link mounted to the fifth link, and an eighth link pivotally mounted to the sixth link, wherein the seventh and eighth links are also mounted to the spine plate adjacent the housing, and

including a first pivot leg mounted to a rear surface of the spine plate above the slot, wherein the first pivot leg includes a second pivot leg telescopingly received within the first pivot leg, and the second pivot leg includes a frictional foot covering overlying a free terminal end of the second pivot leg, and

wherein the apparatus further includes a flexible transport housing, the flexible transport housing including a handle mounted to the top wall of the housing, and including an elongate zipper mounted through a forward wall of the housing to define a cavity within the housing to receive the apparatus when the apparatus is in the second position.

---

**5,016,853**

### COLLAPSIBLE SUPPORT DEVICE

**Jarrell H. Cox, 2207 Irving, Muskogee, Okla. 77403**
**Filed Aug. 7, 1990, Ser. No. 564,028**
**Int. Cl.⁵ F16M *13/00***
**U.S. Cl. 248—523** **15 Claims**

1. A collapsible support device which comprises:

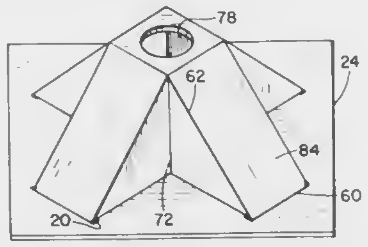
a base member;

an outer flat foldable support member with four corners, a central passage means through which a vertical object may be inserted and which, when folded, forms sloping walls;

an inner flat foldable support member which when folded leaves an intact center section for supporting and receiving said vertical object, and forming a plurality of upward pointing V-shaped wedges which extend above said intact center section and which support said outer support member;

first means for attaching said inner support member to said base member; and

second means for attaching said outer support member to said base member.

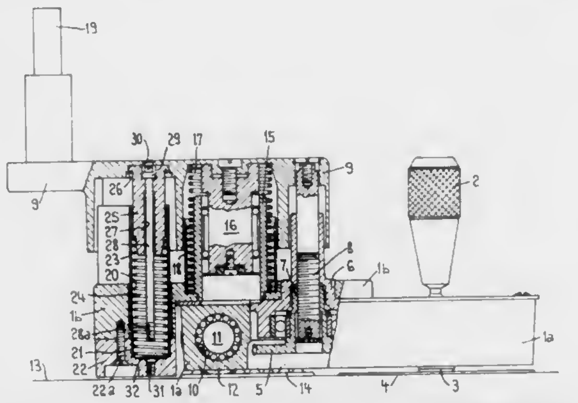


---

**5,016,854**

### HEIGHT ADJUSTABLE SUPPORTING DEVICE FOR AN INSTRUMENT

**Franz Papritz, and Hansruedi Widmer, both of Niederscherli, Switzerland, assignors to Haag-Streit AG, Liebefeld, Switzerland**
**Filed Jun. 7, 1989, Ser. No. 362,812**
**Claims priority, application Switzerland, Jun. 16, 1988, 2333/88**
**Int. Cl.⁵ F16M *13/00***
**U.S. Cl. 248—563** **14 Claims**



1. A supporting device for an instrument, more particularly an ophthalmological instrument, comprising a part adjustable in height and designed to support said instrument, means for adjusting the height of said part, adjustable compensating spring means acting on said part for compensating the weight of said part and of an instrument supported thereon, wherein said adjustable spring means comprises a first spring means continuously and invariably acting on said part and at least one additional compensating spring selectively acting on said part, coupling means being provided for rendering said additional compensating spring effective or ineffective in that its extremities are coupled together or uncoupled from each other respectively during operation by said coupling means.

---

**5,016,855**

### BEAM CLAMP SYSTEM

**Morris Huggins, 5479 Sunrise Blvd., Delray Beach, Fla. 33445**
**Continuation-in-part of Ser. No. 845,598, Mar. 28, 1986. This application Nov. 20, 1989, Ser. No. 439,632**
**Int. Cl.⁵ E04G *13/04***
**U.S. Cl. 249—21** **21 Claims**

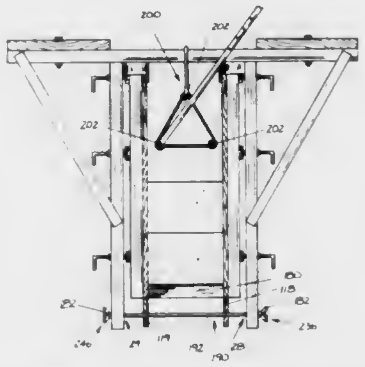
1. An apparatus for containing liquid concrete until it hardens comprising:

(a) a pair of spaced apart forms disposed to contain said liquid concrete therebetween and establish the dimensions of the concrete upon hardening;

(b) clamp means for maintaining the forms in said spaced apart relation; and

(c) means mounted on the clamp means for applying an inward force against each of the forms to enable the apparatus to be pressed against a structure to define the apparatus to be pressed against a structure to define a confined space: and

(d) means mounted on the force applying means for vertically retaining the forms relative to the clamp means while permitting relative horizontal movement between the forms and the clamp means.

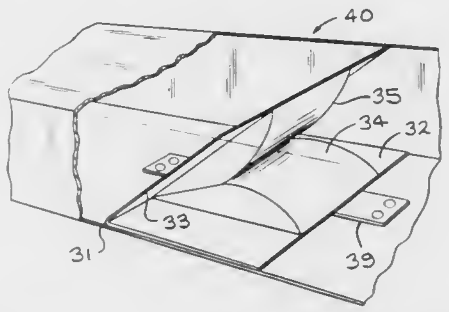


---

**5,016,856**

### INFLATABLE BLADDER FOR CONTROL OF FLUID FLOW

**Jerry J. Tartaglino, 4911 W. Hanover, Dallas, Tex. 75209**
**Filed May 8, 1990, Ser. No. 520,632**
**Int. Cl.⁵ F16K *7/10***
**U.S. Cl. 251—61** **21 Claims**



1. A bladder assembly for use in controlling fluid flow in a fluid flow passage, comprising a bladder having a base layer of semi flexible fluid impermeable material,

an overlayer of fluid impermeable and conformable material sealed at the edges of said bladder to said base layer,

said bladder having a bending region between two opposite edges which functions as a pivot region about which the portions of said bladder on opposite sides of said bending region can be moved,

said assembly including means for setting a normal angular relation between said opposite side portions of said bladder,

means for fixedly mounting said base layer by at least one of said opposite portions of said bladder in said passage whereby the other of said opposite side portions can be moved toward and away from said one portion about said bending region and,

said other side portion of said bladder comprising flow restricting blade means of size and shaped for restriction of fluid flow through the cross section of said passage,

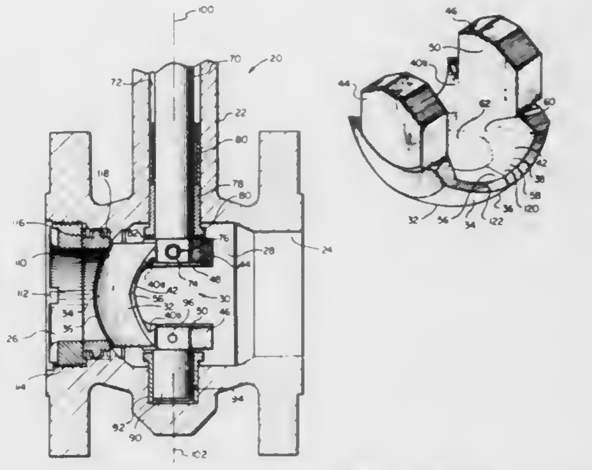
connection means associated with said bladder for connecting a pressurized supply of inflating fluid thereto to move said opposite portions further apart and means for deflating said bladder to move said opposite portions closer together whereby the bladder can be arranged to selectively position said blade means for control of flow of fluid in said passage.

---

**5,016,857**

### CONTROL ELEMENT FOR A BALL VALVE

**Loren L. Bovee, and Larry J. Weber, both of Marshalltown, Iowa, assignors to Fisher Controls International, Inc., Clayton, Mo.**
**Filed Sep. 15, 1989, Ser. No. 408,126**
**Int. Cl.⁵ F16K *5/06***
**U.S. Cl. 251—304** **10 Claims**



1. A control element for a fluid valve, comprising:

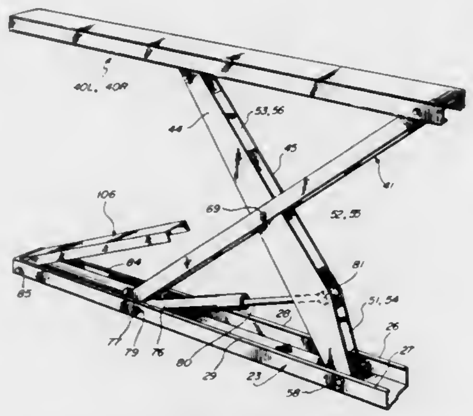
a main body having a rounded outer surface on a first side, an inner base surface having surfaces defining a bowl-shaped depression and first and second opposed inner side surfaces adjacent the inner base surface on a second side; and

first and second ears joined to the main body at spaced locations and extending away from the main body on the second side thereof and having opposed inner surfaces adjacent the inner side surfaces of the main body to form opposed passage surfaces which diverge from one another at first and second ends.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,858
## HYDRAULIC LIFT MECHANISM FOR CAMPER SHELLS

**William D. Mitchell, 10655 Morada Dr., Orange, Calif. 92669**
**Filed Jan. 24, 1989, Ser. No. 301,236**
**Int. Cl.$^5$ B66F *7/26***
**U.S. Cl. 254—45** **9 Claims**



1. An apparatus for selectably raising and lowering loads above the cargo compartment of a vehicle comprising:

a. a first, base frame comprised of at least two symetrically positioned, right and left lower side beam members defining a generally flat lower surface for attachment to said vehicle, a generally flat upper surface parallel to said lower surface, and a transverse member joining said right and left lower side beam members,

b. a second, load support frame comprised of two symetrically positioned, right and left side upper beam members defining an upper surface adapted to support loads, and a generally flat lower surface adapted to congruently overlie corresponding right and left side lower beam members, respectively, of said base platform in parallel alignment therewith, and a transverse member joining said right and left upper side beam members,

c. a first, right side pivotable X-frame disposed vertically between said lower right side beam member of said base platform and said upper right side beam member of said load support frame, said right side X-frame comprising first and second elongated, generally straight crossarms of approximately the same length, said first elongated crossarm being vertically pivotably joined near one lateral edge to said lower right side beam member of said base frame, the opposite lateral end of said crossarm being horizontally slidably secured with respect to said load support frame, said second crossarm member being vertically pivotably joined near one lateral edge to said upper right side beam member of said load support frame in a vertically aligned position with said lower pivotable joint, the opposite lateral end of said crossarm being horizontally slidably secured with respect to said load support frame and said first and second first side X-frame crossarm members being pivotably joined near their mid points, and

d. a first, right-side linear power actuator vertically pivotably joined at a first end to said lower right side beam member of said base platform, and vertically pivotably joined at a second end to one of said first side X-frame crossarm members, whereby longitudinal extension of said linear power actuator raises said upper right side beam member of said load support frame relative to said corresponding lower right side beam member of said base platform, and longitudinal retraction of said linear power actuator lowers said load support platform member relative to said base platform member.

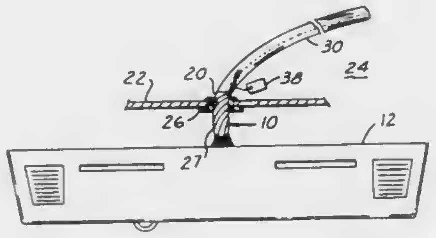
e. a second, left-side pivotable X-frame identical in structure and function to said first, right side pivotable X-frame, and

f. a second, left-side linear power actuator identical in structure and function to said first, right-side, linear power actuator, said side beam members which form said base frame being constructed of straight elongated U-shaped channel sections having an upward facing opening, transversely disposed end walls closing the ends of said channel sections and said side beam members forming said load support frame being elongated U-shaped channel sections substantially identical to said channel sections of said base frame, said load support frame beam members having a downward facing opening, said apparatus being thereby so constructed that when said load support frame rests on said base frame, substantially all of the operating elements of the lifting portion of the mechanism are enclosed within said channel sections.

---

### 5,016,859
## WIRING HARNESS INSTALLATION ACCESSORY

**Anita F. Zimmer, Birmingham, and Ronald R. Billbury, Algonac, both of Mich., assignors to The Mead Corporation, Dayton, Ohio**
**Filed Oct. 12, 1989, Ser. No. 420,355**
**Int. Cl.$^5$ B65H *59/00***
**U.S. Cl. 254—134.3 R** **12 Claims**



1. A kit for installing a wiring harness comprising a bundle of electrical wires, each of said wires having at a respective free common end an electrical apparatus or connector adapted to be connected to various electrical apparatus, said wiring harness commonly being adapted to be inserted through a narrow opening within a wall member or other similar type narrow pathway to a final position thereby allowing the individual wires to be coupled with a respective one of said various electrical apparatus to complete the electrical circuitry from a control panel to the electrical device being controlled or monitored, said kit comprising:

a substantially rigid tube,

a flexible sleeve of a length considerably greater than said rigid tube, said flexible sleeve being elastically expanded onto said rigid tube,

said flexible sleeve being axially folded on said rigid tube from a leading end thereof, thereby having a folded length no greater than said rigid tube,

said flexible sleeve having a separable seam closed by a quick-release type chain stitch,

said flexible sleeve further including stitch release means for quickly releasing said chain stitch beginning at one end of said flexible tube.

---

### 5,016,860
## "NO-NICK" PART-HANDLING APPARATUS AND METHOD

**John W. Smith, Brighton, Mich., assignor to Holcroft Inc., Livonia, Mich.**
**Filed Jan. 31, 1990, Ser. No. 472,978**
**Int. Cl.$^5$ C21D *1/62***
**U.S. Cl. 266—112** **13 Claims**

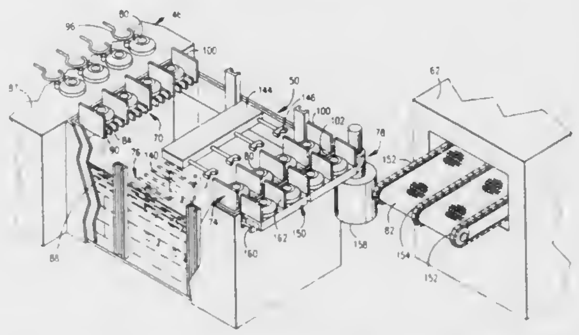
1. Part-handling apparatus for transporting metal parts along a travel path of a continuous heat-treating furnace system while avoiding contact between the parts and without carrying the parts in trays or containers, comprising:

a tank for containing cooling fluid to a selected level;

a charge elevator mounted at a first end of said tank and including a plurality of spaced charge rails extending parallel to the longitudinal axis of the tank for supporting said parts and also including means for moving said rails vertically between a first position above said selected level and a second position below said selected level;

a discharge elevator mounted at a second end of said tank and including a plurality of spaced discharge rails parallel to said charge rails for supporting said parts and also including means for moving said discharge rails vertically between a third position below said selected level and a fourth position above said selected level;

a plurality of spaced stationary rails extending parallel to said charge rails and located near said second position, said stationary rails extending along the tank between said charge rails and said discharge rails;



a plurality of movable rails parallel to said charge rails and being meshable with said charge rails, said discharge rails, and said stationary rails;

means for cycling said movable rails to alternately move vertically and horizontally in a manner to transport parts from said charge rails at said second position to said discharge rails at said third position, the vertical portion of the travel path of the movable rails extending from below to above the top of said stationary rails;

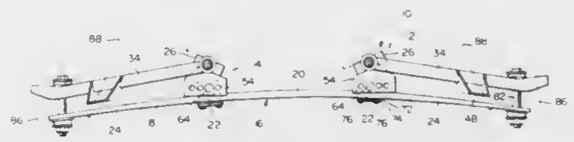
means for moving parts onto said charge rails at said first position; and

means for removing parts from said discharge rails at said fourth position.

---

### 5,016,861
## MOUNTING OF A SINGLE TRANSVERSE LEAF SPRING FOR VEHICLES

**John E. Thompson; Angelo Gonzalez, both of St. Petersburg; Joseph S. Bursel, Sarasota, and Hampton L. Aust, III, Treasure Island, all of Fla., assignors to Vette Products, Inc., St. Petersburg, Fla.**
**Continuation of Ser. No. 162,131, Feb. 29, 1988, abandoned.**
**This application Oct. 26, 1989, Ser. No. 428,015**
**Int. Cl.$^5$ F16F *1/26***
**U.S. Cl. 267—44** **13 Claims**

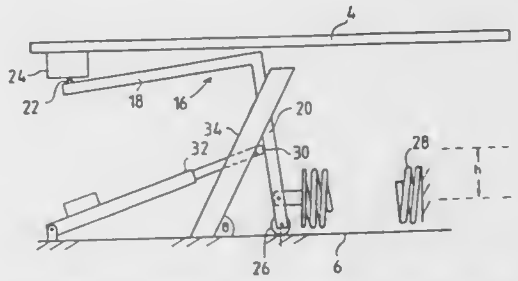


1. In combination, a vehicle incorporating a suspension system including opposite vehicle side ground wheel portions mounted for up and down guided movement and stationary central frame portions horizontally spaced apart and between said wheel mounting portions, an elongated, generally horizontal and transverse vehicle mono-leaf spring disposed transverse to the longitudinal axis of said vehicle including an upwardly bowed static condition, with the weight of the vehicle thereon, and having a pair of longitudinally spaced central mounting areas for mounting from said vehicle frame portions and opposite end portions for mounting relative to said opposite vehicle side ground wheel mounting portions, a pair of stationary mount portions mounted from said frame portions, a pair of mounting members, pivot means mounting said mounting members from said mount portions for pivotal oscillation relative thereto about generally horizontal parallel axes disposed transverse to said spring, said mounting members including mounting means releasably mounting said leaf spring central mounting areas for substantial stationary support of said mounting areas relative to said mounting means, said central mounting areas being spaced predetermined distances beneath said parallel axes, such that upward displacement of said opposite end portions of said spring due to downward loading on said spring central mounting areas by said mount portions and the resultant flexure of the longitudinal central zone of said spring extending between said central mounting areas toward a straightened condition and the attendant increase in the effective horizontal spacing between said central mounting areas will automatically be compensated for by angular displacement of said mounting members in opposite directions about said parallel axes to increase the effective horizontal spacing between said mounting means and eliminate substantially all shear forces, due to flexing of said leaf spring, acting upon said mounting means, said leaf spring, between said mounting areas, being free of contact and connection with portions of said vehicle.

---

### 5,016,862
## VIBRATION ISOLATION ARRANGEMENT

**David R. Leyshon, Brighton, Great Britain, assignor to Bath Institute of Medical Engineering Limited, Bath, United Kingdom**
**PCT No. PCT/GB87/00808, § 371 Date Jul. 17, 1989, § 102(e) Date Jul. 17, 1989, PCT Pub. No. WO88/03619, PCT Pub. Date May 19, 1988**
**PCT Filed Nov. 12, 1987, Ser. No. 359,670**
**Claims priority, application United Kingdom, Nov. 15, 1986, 8627343**
**Int. Cl.$^5$ F16F *15/06;* A61G *3/00***
**U.S. Cl. 267—136** **12 Claims**



1. A vibration isolation arrangement for supporting a mass on a structure which is subject to vibration, the arrangement comprising a lever extending between the structure and the mass, the lever being pivotable against the action of resilient means about a fulcrum,, characterized in that fulcrum is displaceable relatively to the lever along a predetermined path and in that displacement of the fulcrum along the predetermined path, in a direction to displace the lever against the action of the resilient means, increases the distance between the fulcrum and the point at which the resilient means acts on the lever.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,863
### ADJUSTABLE LONGITUDINAL FOLDING FORMER SYSTEM

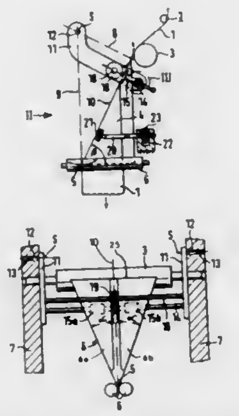
**Hubert Birkmair, Friedberg, Fed. Rep. of Germany, assignor to MAN Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany**

**Filed Apr. 9, 1990, Ser. No. 507,370**

**Claims priority, application Fed. Rep. of Germany, Apr. 21, 1989, 3913112**

**Int. Cl.$^5$ B41L** *43/04*

**U.S. Cl. 270—41** **9 Claims**



1. Longitudinal folding system for folding a traveling web (1), particularly a printed web received from a rotary printing machine, having

a frame (7);

a folding former (4, 4*a*, 4*b*) having triangular or funnel shape and defining ax apex (5), a center or ridge line (10) and a transversely extending base line (25);

a supply roller (3) guiding the web (1) towards the former (4);

a pair of pulling rollers (6) pulling the web from the former (4).

said former (4) being pivotably located with its apex (5) close to the nip between said pulling rollers (6) and its base line (25) close to the supply roller (3) and essentially parallel thereto; and

pivotable support means (11-15) coupled to the former for pivotable movement with respect to the frame, and pivoting about a pivot point or axis (S),

wherein, in accordance with the invention,

said pivot point or axis (S) is located at the side of the web passing over the former (4) which is opposite the side of the web facing the former, whereby said pivot axis (S) will be located at that side of the former which faces the web, and

wherein the pivot point or axis (S) of the former (4) is positioned approximately at eh intersection of two theoretical straight lines (8, 9),

a first one (8) of said lines extending through the base line (25) at the center line (10) of the former and perpendicular to the angle of the inclination angle ($\beta$) of the former; and

a second one (9) of said lines extending vertically from the apex (5) of the former.

---

### 5,016,864
### APPARATUS FOR FEEDING SHEET MATERIAL

**Hidetaka Nonami, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 12, 1989, Ser. No. 420,517**

**Claims priority, application Japan, Oct. 31, 1988, 63-273041**

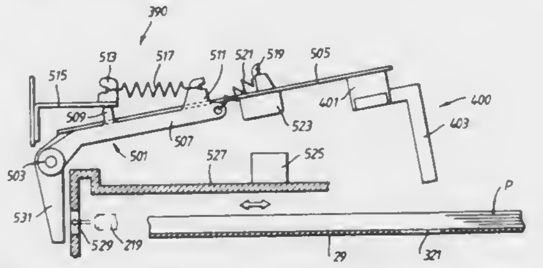
**Int. Cl.$^5$ B65H** *1/18*

**U.S. Cl. 271—38** **12 Claims**

1. An apparatus for feeding sheet materials, the apparatus including a housing and a path defined in the housing into which is removably inserted a storing means for storing said plurality of sheet materials, the storing means being inserted in a first direction, the apparatus comprising:

means for feeding the sheet material along a second direction different from the first direction;

means for detecting the presence of the sheet material in the storing means; and



means for moving the detecting means so that the detecting means is placed in a position removed from the path of movement of the storing means during insertion and removal of the storing means into and from the housing, without contact between the detecting means and the storing means.

---

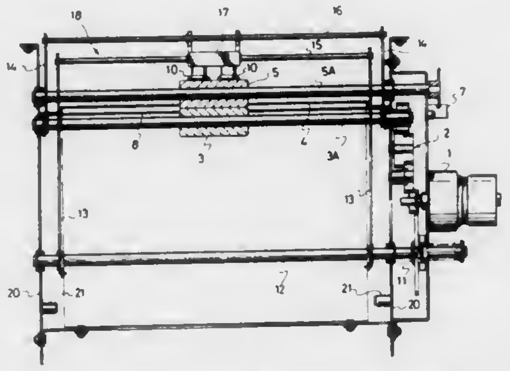
### 5,016,865
### SHEET FEEDING DEVICE FOR IMAGE RECORDING APPARATUS

**Tsunejiro Ioka; Tatsuji Saigo, and Michio Tomita, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan**

**Filed Jan. 3, 1989, Ser. No. 293,115**

**Int. Cl.$^5$ B65H** *3/08*

**U.S. Cl. 271—103** **5 Claims**



5. An apparatus for lifting and moving image recording paper comprising:

suction-creating means movable between first and second positions for creating a suction force on a sheet of image recording paper and for lifting the paper by suction from the first position and moving the paper to the second position;

driving means for driving the suction-creating means between the first and second positions; and

force adjusting means for adjusting the suction force on the paper at the first position to prevent damage to the paper, the force means adjusting means comprising a friction gearing mechanism.

### 5,016,866
### SHEET FEED MECHANISM FOR AN IMAGE RECORDER

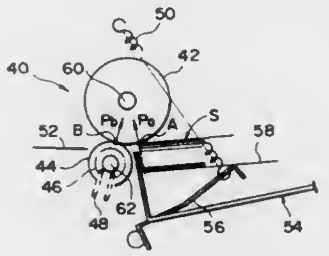
**Shuji Takahashi, Urawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Nov. 17, 1989, Ser. No. 437,810**

**Claims priority, application Japan, Nov. 17, 1988, 63-288952; Mar. 27, 1989, 1-71892; May 1, 1989, 1-109193**

**Int. Cl.$^5$ B65H** *3/52*

**U.S. Cl. 271—122** **7 Claims**



1. A sheet feed mechanism for a sheet feeding apparatus of an image recorder which has a sheet cassette loaded with a stack of sheets, comprising:

a feed roller driven in a rotary motion at a predetermined timing in a direction for feeding a topmost sheet of said stack;

a reverse roller pressed against said feed roller with a reverse pressure and driven in a rotary motion by a predetermined torque in a direction for returning the sheet, wherein said feed roller and said reverse roller constitute separating means for separating the sheets which are fed by said sheet feeding means;

spring means for biasing said sheets in said cassette upwards against said feed roller with a feed pressure, said feed roller alone constituting sheet feeding means which feeds sheets one by one out of the sheet cassette;

a reverse shaft formed integrally with said reverse roller;

a torque limiter having a fixed hub and a free hub, said fixed hub being provided integrally with said reverse shaft;

a stop gear having one-way clutch and engaged with said free hub; and

a sheet biasing spring for generating a reverse torque in said reverse shaft.

---

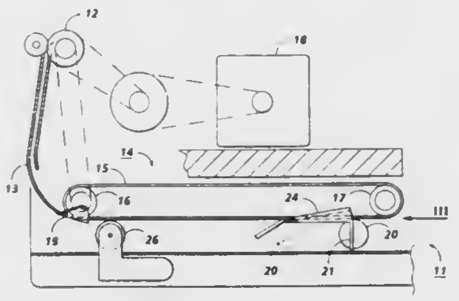
### 5,016,867
### SHEET STACKING APPARATUS

**Venkatesh H. Kamath, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 4, 1989, Ser. No. 445,224**

**Int. Cl.$^5$ B65G** *31/00*

**U.S. Cl. 271—209** **5 Claims**



1. Sheet stacking apparatus including means for feeding sheets to form a stack at a stacking location, said means comprising a device arranged to impart a corrugated/curved configuration to sheets in a direction transverse to the direction of travel of the sheets; a drive belt positioned to convey sheets in the corrugated/curved configuration to the stacking location; an output roll arranged to cooperate with the drive belt at the output end of the feeding means, and wherein the position of the output roll relative to the length of the belt is adjustable to vary the length of the sheet path through the feeding means; a baffle associated with the output roll and movable therewith to maintain the said corrugated/curved configuration in sheets that are fed out, from the feeding means, to be deposited at the stacking location, and wherein the stacking location comprises a tray having an end guide which is adjustable to vary the length of the tray and wherein the output roll and the said baffle are movable with the end guide.

---

### 5,016,868
### AUTOMATIC DOCUMENT TRANSFER DEVICE

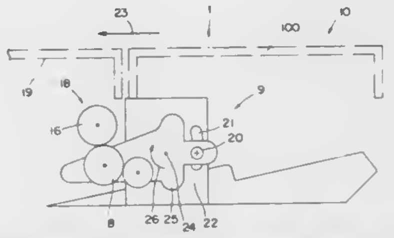
**Nobukazu Ohtsuka; Hiroyuki Nagai; Mitsugu Shibanaka, all of Osaka, and Toshikazu Matsui, Kyogo, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 16, 1989, Ser. No. 438,351**

**Claims priority, application Japan, Nov. 17, 1988, 63-292012**

**Int. Cl.$^5$ B65H** *5/06*

**U.S. Cl. 271—273** **1 Claim**



1. An automatic document transfer device comprising a document feeding means mounted at a document feeding section of a main body of the image forming equipment, means for transferring documents to a position of exposure on a document table, which is mounted at a document pusher plate attached to an upper portion of the document table of the main body of the image forming equipment, first and second linkage gears which can mutually be engaged to be connected and disconnected together with an opening closing of the document pusher plate provided between the document feeding means and the transferring means, whereby a drive force is transmitted from the document feeding means to the transferring means by way of the first and the second linkage gears, and characterized in that:

a guide plane on which the first linkage gear is mounted and which is pivotally supported at the document feeding section so that the guide plate is swingable in a vertical direction thereof, is fixed at the document feeding section by means of a fixing member at a position where the first and the second linkage gears are engaged with each other.

---

### 5,016,869
### HUMAN BIPEDAL LOCOMOTION DEVICE

**G. John Dick, Claremont, and Eric A. Edwards, Menlo Park, both of Calif., assignors to Applied Motion, Claremont, Calif. Continuation-in-part of Ser. No. 375,955, Jul. 5, 1989, abandoned. This application Jul. 3, 1990, Ser. No. 548,161**

**Int. Cl.$^5$ A63B** *25/00, 25/02, 25/06*

**U.S. Cl. 272—70** **27 Claims**

10. A human bipedal jumping device comprising:

a back frame for attachment to the upper torso of a user;

an articulated right leg frame pivotally attached to a lower portion of the back frame;

an articulated left leg frame pivotally attached to a lower portion of the back frame adjacent the right leg frame;

means for attaching each leg frame to a corresponding foot of the user;

means for contacting the ground with a portion of each leg

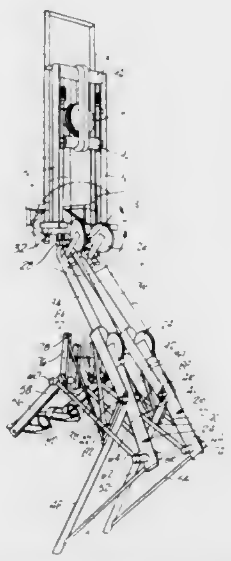
VOL
1126
ISS
3
MY
21
1991
UMI

frame behind the point where the user's foot is attached to the corresponding leg frame;

spring means carried on the back frame;

a spring-actuating member carried on the back frame and arranged to move so as to stretch the spring means;

pivot means on each leg frame arranged so the leg frame can move between a normal at-rest position and a compressed condition caused by downward movement of the user's feet and the weight of the user's body downwardly on the leg frames; and

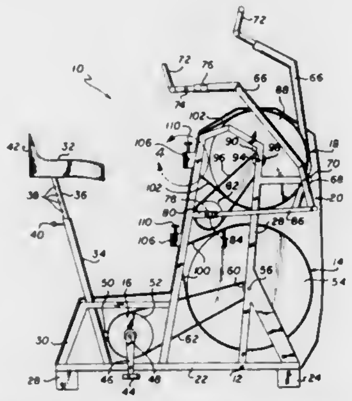


tension means extending separately from each leg frame to the spring-actuating member and arranged to be placed in tension when either of the leg frames is compressed to thereby move the spring-actuating member to stretch the spring means to develop energy in the spring means which is then transferred back to the upper torso of the user and to the user's feet to cause the user to jump into the air by a distance above the ground proportional to the amount of compression of the leg frame and the amount of stretch transferred to the spring means.

---

### 5,016,870
### EXERCISE DEVICE

**Russell G. Bulloch, 578 E. 1090 North, Orem, Utah 84057, and Craig K. Garrick, 1720 N. 1450 East, Provo, Utah 84604**
**Filed Feb. 9, 1990, Ser. No. 477,610**
**Int. Cl.⁵ A63B *21/00***
U.S. Cl. 272—73 **1 Claim**



1. A dual action exercise device, comprising:

a ground supported frame having a seat, wherein the seat includes a lower-back support, and wherein the frame includes a rearwardly disposed, upwardly extending tubular member which telescopingly receives a seat supporting member therein for positioning the seat;

means for adjustably locking the seat supporting member within the upwardly extending tubular member in a manner permitting selective height adjustment of the seat, the locking means including a spring-loaded pin supported by the upwardly extending tubular member and extending therethrough for engagement with one of a plurality of apertures provided in the seat supporting member;

pedal means supported by the frame and including a first crank, a first crank shaft, a first bearing housing supported by the frame and surrounding the first crank shaft, and a first drive sprocket carried by the first crank shaft;

first flywheel means supported for rotation by the frame and operatively connected to the pedal means such that rotation of the pedal means causes rotation of the first flywheel means, the first flywheel means including a first flywheel and a first driven sprocket which is coplanar with the first drive sprocket and connected thereto by a silent chain whereby rotation of the first drive sprocket causes rotation of the first driven sprocket, which, in turn, causes rotation of the first flywheel, wherein the first flywheel means further includes a first free-wheel clutch connecting the first flywheel to the first driven sprocket, whereby the first free-wheel clutch permits motion to be transmitted from the first driven sprocket to the first flywheel in one direction only;

first friction band means anchored to the frame and engaging at least a portion of the first flywheel means to provided controlled resistance to rotation of the first flywheel means, wherein the first friction band means includes a first band brake extending around at least a portion of the periphery of the first flywheel, and means for adjusting the tension of the first band brake about the first flywheel, whereby one end of the first band brake is anchored to the frame, and another end of the first band brake is adjustably positioned with respect to the frame by the first band brake adjusting means to provide selectively adjustable resistance to the first flywheel means;

handlebar means including a handlebar pivotally supported by the frame, a second crank shaft, a second bearing housing supported by the frame and surrounding the second crank shaft, a second drive sprocket carried by the second crank shaft, and means for connecting the handlebar to the second crank shaft such that alternately pushing and pulling on the handlebar causes rotation of the second crank shaft, wherein the means for connecting the handlebar to the second crank shaft includes a link connected at a first end to the second crank shaft, and a connecting bar pivotally attached to a second end of the link at one end, and pivotally attached to the handlebar at another end;

second flywheel means supported for rotation by the frame and operatively connected to the handlebar means such that alternately pushing and pulling on the handlebar means causes rotation of the second flywheel means, wherein the second flywheel means includes a second flywheel and a second driven sprocket which is coplanar with the second drive sprocket and connected thereto by a silent chain whereby rotation of the second drive sprocket causes rotation of the second driven sprocket, which in turn causes rotation of the second flywheel, wherein the second flywheel means includes a second free-wheel clutch connecting the second flywheel to the second driven sprocket, whereby the second free-wheel clutch permits motion to be transmitted from the second driven sprocket to the second flywheel in one direction only; and

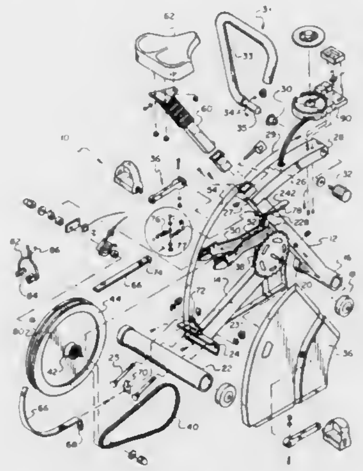
a second friction band means anchored to the frame and engaging at least a portion of the second flywheel means to provided controlled resistance to rotation of the second flywheel means, wherein the second friction band means includes a second band brake extending around at least a portion of the periphery of the second flywheel, and means for adjusting the tension of the second band brake about the second flywheel, whereby one end of the second band brake is anchored to the frame, and another end of the second band brake is adjustably positioned with respect to the frame by the second band brake adjusting means to provide selectively adjustable resistance to the second flywheel means;

whereby lower body exercise can be achieved by foot activating the pedal means while upper body exercise can be achieved, either simultaneously or independently, by pushing and pulling the handlebar means.

---

### 5,016,871
### EXERCISE MACHINE RESISTANCE CONTROLLER

**William T. Dalebout, and Curt G. Bingham, both of Logan, Utah, assignors to Proform Fitness Products, Inc., Logan, Utah**
**Filed Nov. 1, 1989, Ser. No. 428,214**
**Int. Cl.⁵ A63B *23/04***
U.S. Cl. 272—73 **32 Claims**



1. A controller for use with an exercise machine having resistance means for variably resisting the movement of interconnected operable structure, said controller comprising:

sensing means positioned proximate operable structure of an exercise machine to sense the movement of said operable structure and to supply movement signals reflective of said movement;

conversion means secured to said exercise machine and connected to said sensing means to receive said movement signals, said conversion means having a driver and being configured to move said driver in relation to said movement signals;

cam means positioned proximate said driver for movement thereby, said cam means having a cam surface with variations preselected by the user reflective of the desired resistance of the resistance means of said exercise machine;

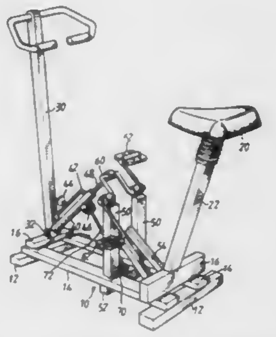
reading means positioned proximate said cam surface to generate signals reflective of said variations and to supply resistance signals reflective of said variations; and

receiving means connected to said reading means to receive said resistance signals and to said resistance means to operate said resistance means to variably resist movement of said operable structure in accordance with said resistance signals.

---

### 5,016,872
### HYDRAULIC TYPE STATIONARY CYCLE EXERCISE

**Sunny Lee, 3 Fl., No. 31, Alley 27, Lane 372, Sec. 5, Chung Hsiao E. Rd., Taipei, Taiwan**
**Filed Jun. 11, 1990, Ser. No. 536,420**
**Int. Cl.⁵ A63B *21/00***
U.S. Cl. 272—73 **4 Claims**



1. A hydraulic type stationary cycle exerciser comprising:

a base frame;

a seat support being mounted on a rear portion of said base frame and a seat being mounted on said seat support;

a pedal mounting means being mounted on a middle portion of said base frame, a pedaling means being mounted on said pedal mounting means;

a primary cylinder being pivotably mounted to a front portion of said base frame at one end thereof, a piston of said primary cylinder being attached to a middle point of said pedaling means at a distal end thereof, a lever arm being fixedly mounted to a pivot point of said primary cylinder at one end thereof such that said lever arm follows said primary cylinder to pivotally move between a forwardmost position and a backwardmost position upon revolution of said pedaling means;

a beam being mounted to said base frame beneath said pedal mounting means;

an auxiliary cylinder being fixedly mounted on said beam at an end thereof and having an acute angle with said pedal mounting means, a piston of said auxiliary cylinder being attached to an underside of said primary cylinder at a pivot thereof.

---

### 5,016,873
### PLAYSWING ASSEMBLY

**David W. Bossa, 5 Spruce St., Braintree, Mass. 02184**
**Filed Jan. 16, 1990, Ser. No. 465,755**
**Int. Cl.⁵ A63G *33/00***
U.S. Cl. 272—85 **12 Claims**

1. A swing set assembly for supporting children safely in a swing arrangement comprising;

a horizontal beam having two ends;

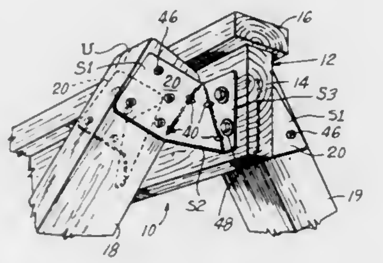
a pair of leg timbers angularly attachable to each end of said horizontal beam;

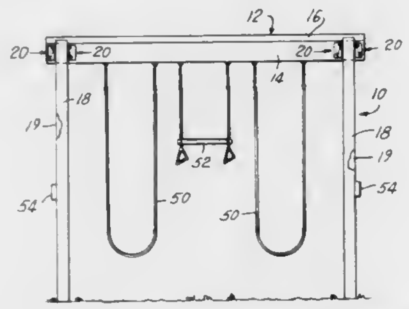
an arrangement of support braces securable between each of said leg timbers and said horizontal beam, said support braces comprising a formed quadrilateral plate which permits said leg timbers to support said horizontal beam without said leg timbers requiring a diagonal cut at their upper ends, thus permitting full support of said horizontal beam;

said quadrilateral plate having a first bend and a second bend each formed diagonally thereacross to define three planar surfaces on said plate; and

VOL
1126
ISS
3
MY
21
1991
UMI

said first bend and said second bend each form angles of about 135 degrees between contiguous planar surfaces,



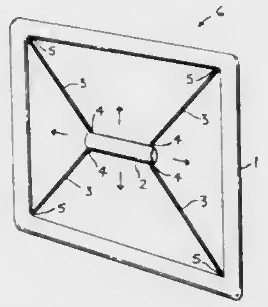


both bends being formable together by a single strike of a die.

---

### 5,016,874
### MULTI-DIRECTIONAL EXERCISE DEVICE

**Perry K. Boardman, P.O. Box 3073, Sierra Vista, Ariz. 85636-3073**
**Continuation-in-part of Ser. No. 346,558, May 1, 1989, abandoned. This application Jul. 14, 1989, Ser. No. 379,966**
**Int. Cl.$^5$ A63B** *21/04*
**U.S. Cl. 272—137** **2 Claims**



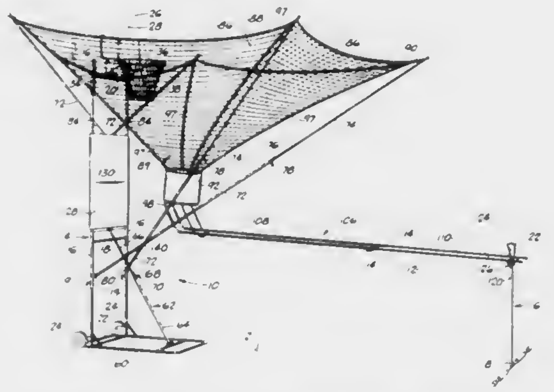
1. An exerciser comprising:
a frame consisting of four tubular sides of equal length with four inside corners, said frame defining a plane;
a straight tubular bar having ends remote from each other and a top and bottom edge at each said end; and
elastic members mounted to said corners of said frame and said edges of said bar such that said bar is contained within the plane of said frame when said bar is in a rest position.

---

### 5,016,875
### PORTABLE BASKETBALL RETRIEVAL APPARATUS

**John Joseph, 3305 C.H. 47, Upper Sandusky, Ohio 43351**
**Filed Apr. 20, 1990, Ser. No. 512,164**
**Int. Cl.$^5$ A63B** *69/00*
**U.S. Cl. 273—1.5 A** **23 Claims**

1. A free-standing basketball retrieval and return apparatus comprising:
a portable vertically-extensible and collapsible support frame for vertical orientation on a playing surface;
a plurality of support arms pivotally connected to the support frame;
stretched netting material attached to the support arms for extension therebetween to form a funnel-shaped collector with an inward and downwardly converging end;
a chute for receiving basketballs from a basketball hoop on the backboard and guiding the basketballs therethrough, the chute being secured to the converging end of the collector;

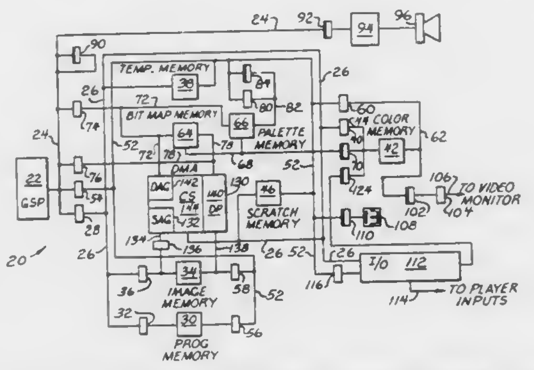


a guideway located below the chute and defining a passageway for the basketballs;
an elongated, extensible ramp oriented to receive basketballs from the guideway and serving to direct basketballs, received from the guideway, along the ramp's length from a proximate ramp end to a distal ramp end; and
means on the support frame for selective attachment of a backboard member at the top of the support frame to project upwardly in the same general vertical plane of the support frame, for use in basketball practice shooting.

---

### 5,016,876
### VIDEO DISPLAY CO-PROCESSOR FOR USE IN A VIDEO GAME

**Mark D. Loffredo, Ingleside, Ill., assignor to Williams Electronics Games, Inc., Chicago, Ill.**
**Filed Oct. 14, 1988, Ser. No. 257,724**
**Int. Cl.$^5$ A63F** *9/22;* **G09G** *5/00*
**U.S. Cl. 273—437** **20 Claims**



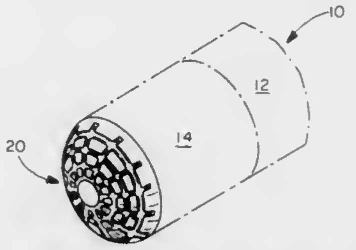
1. In a video game having a display system including a raster scan line video display unit, a supervisory digital computer for supervising the operation of the display system, a program memory that contains a computer program executed by the supervisory digital computer, an image memory that contains data for a plurality of images, a bit map memory for receiving and storing image data and for supplying such stored image data for display on the video display unit, and means for allowing a player of the video game to interact with the supervisory digital computer's execution of the computer program to change the scene presented on the video display unit, the improvement which comprises:

a Direct Memory Access ("DMA") co-processor operable under the control of signals from the supervisory digital computer for processing a raster scan video image, said DMA co-processor including:
a) Source Address Generation ("SAG") means for generating addresses of locations in the image memory from which image data is retrieved;
b) Data Pipe ("DP") means for receiving image data from locations in said image memory addressed by said SAG means, and for permitting pixel and image manipulation of such image data to adapt it for display on the video display unit prior to storing the manipulated data into the bit map memory;
c) Destination Address Generation ("DAG") means for generating addresses of locations in said bit map memory into which image data is stored after having been manipulated by said DP means;
d) Control Section ("CS") means for controlling the operation of said SAG means, said DP means and said DAG means in response to supervisory control signals received by said CS means from the supervisory digital computer;
e) a first data bus between said DP means and said image memory for transferring said image data from said image memory to said DP means prior to manipulation by said DP means, and;
f) a second data bus between said DP means and said bit map memory for transferring said image data from said DP means to said bit map memory after manipulation by said DP means.

---

### 5,016,877
### BILLIARD CUE TIP

**Jimmie L. Lowery, 4005 W. Madison St., Bellwood, Ill. 60104**
**Filed Jan. 16, 1990, Ser. No. 465,501**
**Int. Cl.$^5$ A63D** *15/12*
**U.S. Cl. 273—70** **9 Claims**

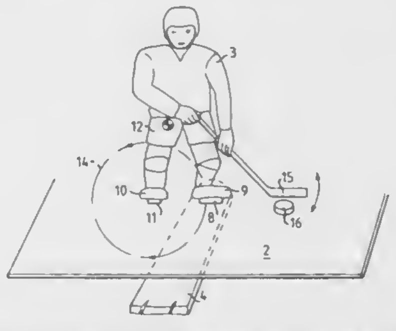


1. A billiard cue tip formed of resilient plastic material and adapted to be adhesively secured to a relatively flat surface at one end of a billiard cue, said cue tip comprising:
(a) a solid generally hemi-spherical body having a slightly roughened, convex upper surface for contact with a billiard ball;
(b) said cue tip upper surface having formed therein a plurality of intersecting annular and radial grooves that define therebetween a plurality of separate pads capable of expanding laterally into said grooves upon contact with a billiard ball to provide increased surface contact between said cue tip and ball;
(c) said cue tip body having a slightly concave lower surface adapted, when placed against a flat surface of a cue end, to form therebetween a generally conical cavity for receiving adhesive to attach said tip to said cue and for allowing limited rearward deflection of said cue tip upon impact with a ball;
(d) said cue tip body also having, extending upwardly from said lower surface a centrally located, relatively small single indentation adapted to absorb some of the force of an impact between said cue tip and a billiard ball.

---

### 5,016,878
### GAME HAVING MAGNETICALLY OPERABLE PIECES

**Eric Hay, Johanneshov, and Anders Nordström, Kungsägen, both of Sweden, assignors to NH Produkter Handelsbolag, Kungsangen, Sweden**
**Division of Ser. No. 170,373, Mar. 18, 1988, Pat. No. 4,834,371. This application Apr. 24, 1989, Ser. No. 341,965**
**Claims priority, application Sweden, Mar. 25, 1987, 8701251**
**Int. Cl.$^5$ A63F** *7/06*
**U.S. Cl. 273—85 F** **5 Claims**

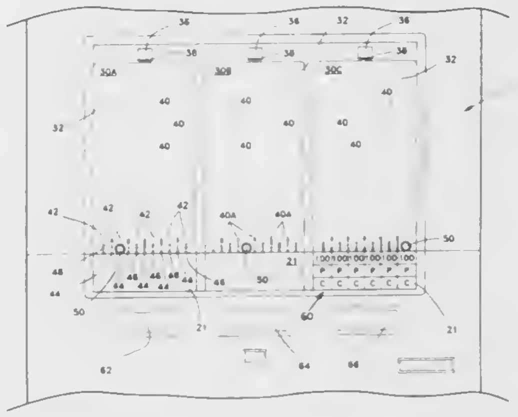


1. A piece provided with a magnet and intended to be used in a game wherein said piece **(3)** is movable on a game board **(2)** by means of an operating means **(4)** located below the game board and having a magnet **(8)**, said piece having two spaced apart supports **(9, 10)** downwardly exposed for direct contact with the game board, said magnet **(8)** constituting a lowermost downwardly exposed supporting surface on one of the supports **(9)**, and the supporting surface **(11)** on the other support **(10)** being a lowermost downwardly exposed surface of a high friction material, whereby said high friction material serves as a pivot, around which said piece **(3)** swings, to enable said supporting surface **(11)** on the other support **(10)** to turn in place while said magnet **(8)** is enabled to describe a circle as said operating means **(4)** are moved in a circular path.

---

### 5,016,879
### PACHINKO GAME

**J. J. Parker; Sandy Tiedeman, and William J. Baugh, all of Las Vegas, Nev., assignors to James and Rosemarie Parker Family Trust, Las Vegas, Nev.**
**Filed Dec. 8, 1989, Ser. No. 447,686**
**Int. Cl.$^5$ A63F** *3/00*
**U.S. Cl. 273—126 A** **118 Claims**



1. A method of playing a game comprising:
(a) providing a vertical playing field having at least one pachinko maze comprising a back wall and a front wall, a

VOL
1126
ISS
3
MY
21
1991
UMI

plurality of deflection pins disposed at right angles to the back wall and extending approximately to the front wall, a plurality of scoring slots at a lower end of the playing field and at least one opening for inserting a playing disk at a top end of the playing field,

(b) inserting at least one playing disk in the top opening,

(c) allowing the disk to fall by gravity through the deflection pins and into a scoring slot,

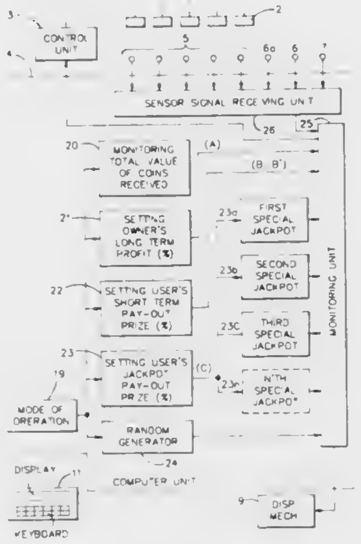
(d) allocating a value for each scoring slot for a particular game and randomly varying the value allocated to each scoring slot from game to game, and

(e) determining the score for a particular game from the value given to the scoring slot in which the disk comes to rest in that particular game.

### 5,016,880

### COIN OR TOKEN-RELEASED GAMING MACHINE

**Harald Berge, Bjerkeallen 33 A, N-1322 Hovik, Norway**
**Filed Feb. 15, 1990, Ser. No. 480,555**
**Int. Cl.$^5$ A63F** *7/00*
**U.S. Cl. 273—138 A** **12 Claims**



1. In a coin-or token-released gaming machine having a number of pay-out slots arranged in a coin panel, into which coin panel a user shoots a coin in an attempt to hit one of said pay-out slots, the hitting of any of said pay-out slots with a coin triggering a dispenser mechanism to release a certain number of coins stored in said machine for the pay-out of a prize, whereas missing any of said pay-out slots brings the used coin into a coin store or for internal or external recirculation for further use, said gaming machine also comprising in combination:

(a) means for monitoring the total value of the total number of coins received;

(b) means for monitoring the total value of prizes paid out;

(c) means for setting a long term profit;

(d) means for setting a short term pay-out prize;

(e) means for setting a special pay-out prize larger than said short term pay-out prize; and

(f) means for setting further special pay-out prizes.

### 5,016,881

### NUMERIC GENERATOR APPARATUS

**Kyle Lindsey, 852 W. "C" St., Colton, Calif. 92324**
**Filed Dec. 29, 1989, Ser. No. 459,205**
**Int. Cl.$^5$ A63B** *71/06*
**U.S. Cl. 273—138 A** **1 Claim**

1. A numeric generator apparatus in combination with and secured selectively to an upper terminal end of an elongate writing instrument, the apparatus comprising,

a housing including a plurality of spaced side walls, a forward wall, a rear wall, a top wall, and a bottom wall,

and

a numeric LED display for displaying a sequential series of digit integers, wherein the display is mounted on the forward wall,

and

a button means mounted on a wall of a housing for manually controlling the initiation and cessation of the sequential display of integers,

and

a mounting means for mounting the housing onto an upper terminal end of the writing instrument,

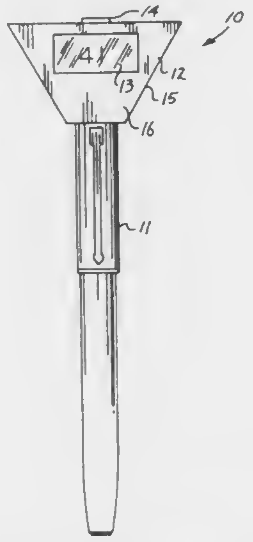
and

wherein the bottom wall includes a coaxially aligned mounting bore,

and

further including a resilient cylindrical toothed insert positioned within the mounting bore to secure the upper terminal end of the writing instrument therewithin;

and



wherein the toothed insert is defined by a main cylindrical support including a series of external ribs extending radially exteriorly of the cylindrical toothed insert, and a series of internal radial ribs directed interiorly of the cylindrical toothed insert, wherein the external and internal ribs are aligned relative to one another to enhance frictional engagement of an interior surface of the bore and an exterior surface of the writing instrument,

and

further including a pivotally mounted scraper blade secured to one of said side walls, wherein the scraper blade includes a medially aligned hinge, the hinge in alignment with an upper terminal edge of the one of said side walls, and the scraper blade including a lower support plate fixedly mounted to the one of said side walls and an upper plate pivotally mounted to the lower support plate by the hinge,

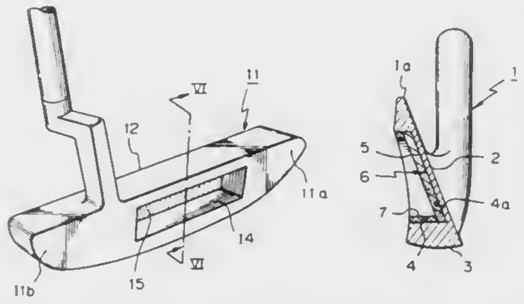
and

wherein the lower support plate includes a first magnet to secure the upper blade at a lower position, and a second magnet positioned in alignment with the top wall adjacent the one of said side walls to secure the upper blade in a raised position.

### 5,016,882

### METALLIC GOLF CLUB HEAD

**Masaki Fujimura, and Toyohiko Tadokoro, both of Shizuoka, Japan, assignors to Yamaha Corporation, Japan**
**Division of Ser. No. 113,441, Oct. 23, 1987, Pat. No. 4,848,747.**
**This application May 3, 1989, Ser. No. 346,910**
**Claims priority, application Japan, Oct. 24, 1986, 61-163233; Dec. 23, 1986, 61-197637**
**The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.**
**Int. Cl.$^5$ A63B** *53/04*
**U.S. Cl. 273—167 H** **6 Claims**



1. A metallic golf club head comprising a main body member having a front side, a rear side, a toe and a heel, said main body having a lateral axis extending between said toe and said heel and a predetermined central location centrally located between said toe and said heel along said lateral axis, said rear side including a recess, said front side including a wall section having an inner surface in communication with said recess and a shooting surface remote from said inner surface, said recess having a predetermined length defined by two recess ends and a recess center between said recess ends, said recess center being in a predetermined laterally offset position with respect to said predetermined central location along said lateral axis thereby offsetting said recess laterally between said toe and said heel, said laterally offset position providing the optimum center of gravity of said golf club head so that a ball struck with said shooting surface will travel a substantially stabilized course.

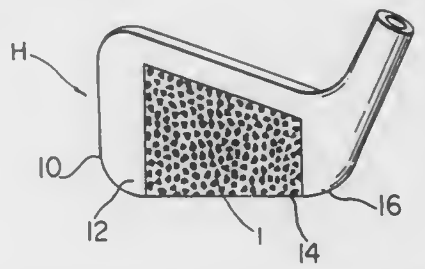
### 5,016,883

### GOLF CLUB HEADS AND FABRICATION PROCESS THEREOF

**Masashi Kobayashi, Kawaguchi, Japan, assignor to Maruman Golf Kabushikikaisha, Tokyo, Japan**
**Filed Aug. 23, 1989, Ser. No. 397,552**
**Claims priority, application Japan, Aug. 26, 1988, 63-210426**
**Int. Cl.$^5$ A63B** *53/04*
**U.S. Cl. 273—167 R** **8 Claims**

1. A golf club head having a front face, a sole face and a rear face, said golf club head comprising a composite body, wherein said composite body includes:

a porous ceramic body having a plurality of pores formed therein; and

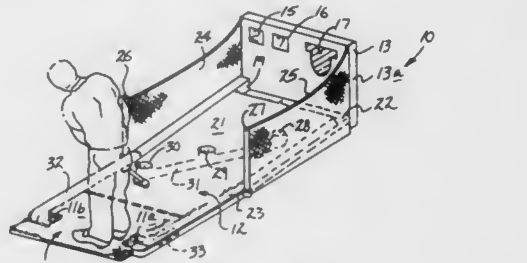


a filler selected from the group consisting of metals, synthetic resins, fiber-reinforced metals and fiber-reinforced resins, said filler being impregnated into said pores.

### 5,016,884

### GOLF PUTTING GAME

**Nick Psiol, 91 Twelveoak Hill Dr., and Mike Lucchesi, 27 Tan Oak Cir., both of, both fo San Rafael, Calif. 94903**
**Filed Jul. 18, 1989, Ser. No. 381,468**
**Int. Cl.$^5$ A63B** *69/36*
**U.S. Cl. 273—176 FA** **7 Claims**



1. A golf putting apparatus comprising, in combination,

a golf ball of a predetermined diameter, and

a planar first platform, and

an elongate forward second platform fixedly secured to a forward edge of the first platform sloping upwardly at an obtuse included angle relative to the first platform, and

a vertically disposed backboard of a predetermined height spaced beyond a forward edge of the second platform, and

a return trough spaced below the forward edge of the second platform, and

an abutment wall orthogonally disposed across the forward trough at a first end of the forward trough with the abutment wall aligned with the left side of the second platform wherein the forward trough includes a sloping floor directed from the abutment wall to a second end adjacent a right side of the backboard in communication with a first ball return channel arranged coextensively adjacent a right side of the second platform and the first platform, and

a plurality of target cups positioned within the second platform, and

a single tunnel in communication between the target cups and a second ball return channel arranged adjacent a left side of the second platform and the first platform, and

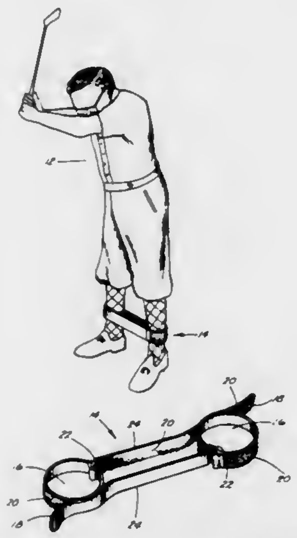
a first switch member arranged within each target cup to indicate a predetermined point score awarded, and

a first indicator panel arranged in a forward face of the backboard to indicate the point award.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,885
### GOLF TRAINER

**Gary F. Quigley, 2283 S. Thrush Ct., SE., Grand Rapids, Mich. 49546**
**Filed May 10, 1990, Ser. No. 521,599**
**Int. Cl.⁵ A63B *69/36***
**U.S. Cl. 273—188 R** **13 Claims**

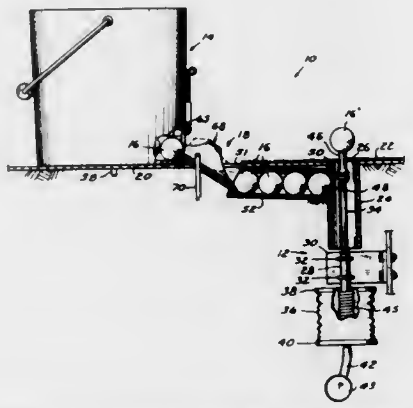


1. A device for improving the swing of a golfer by restricting the movement of said golfer's legs, causing a sensation of a loss of balance when said golfer is swinging incorrectly, comprising:
- a strap means for fastening about each leg of a golfer;
- means having an aperture therein at one end of each of said straps;
- each of said straps being capable of having an end portion thereof slidably passed through said aperture such that a loop can be formed in said strap for placement about a portion of a golfer's leg; and
- means on said strap means for fastening said strap means together to restrict the movement of said golfer's legs.

---

### 5,016,886
### AUTOMATIC GOLF BALL TEE APPARATUS

**Bobby J. Gould, Rte. 3, P.O. Box 224, Ada, Okla. 74820**
**Filed Sep. 24, 1990, Ser. No. 586,924**
**Int. Cl.⁵ A63B *57/00***
**U.S. Cl. 273—201** **8 Claims**

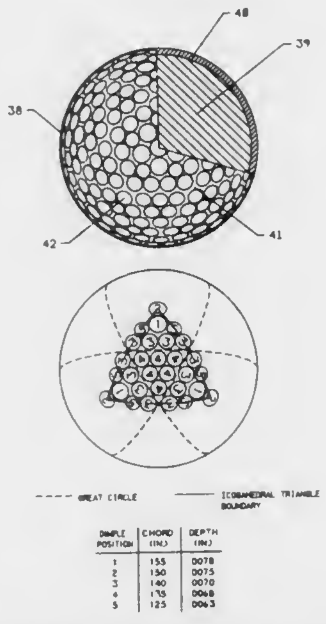


1. A teeing apparatus for golf ball driving practice, comprising:
- a horizontal base having first and second apertures therein;
- a sleeve housing axially disposed below the base first aperture;
- ball elevator means vertically moveable through said sleeve housing and said first aperture from a lower ball loading position to an upper ball teed position,
  - said ball elevator means including a guide sleeve rigidly mounted below said base in axial alignment with said base first aperture;
- an elongated open end tube slidably received by said guide sleeve and having upper and lower end portions projecting beyond respective ends of said guide sleeve,
  - said tube having a wall aperture intermediate said end portions;
- a collapsible side wall cylindrical member having an upper end wall surrounding in sealing relation said upper end portion of said guide sleeve above said aperture and a lower end wall surrounding in sealing relation said lower end portion of said tube below said aperture for forming a vacuum chamber;
- power means connected to said lower end of said tube whereby said chamber is caused to contract for raising said elevator means in response to the presence of a ball on the elevator means for causing expansion of said chamber and lowering said elevator means in response to the absence of a ball on said elevator means,
- ball reservoir means including an inclined ramp having a row of balls for gravity discharge in sequence toward said elevator means; and,
- feeder means for transferring a ball by gravity from said ball reservoir to said elevator means each time said elevator means is disposed in said loading position.

---

### 5,016,887
### GOLF BALL

**Gail C. Jonkouski, Chicago, Ill., assignor to Wilson Sporting Goods Co., River Grove, Ill.**
**Filed Jun. 5, 1990, Ser. No. 534,128**
**Int. Cl.⁵ A63B *37/14***
**U.S. Cl. 273—232** **7 Claims**



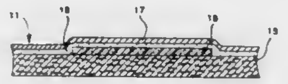
| DIMPLE POSITION | CHORD (IN.) | DEPTH (IN.) |
|---|---|---|
| 1 | 155 | 0078 |
| 2 | 150 | 0075 |
| 3 | 140 | 0070 |
| 4 | 135 | 0068 |
| 5 | 125 | 0063 |

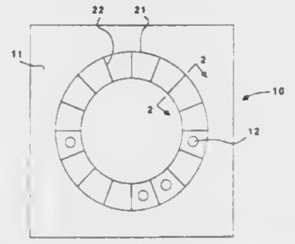
1. A two-piece golf ball comprising a core and a cover having a spherical surface with a plurality of sets of spherical dimples formed therein, the dimples of each set having a circular periphery of a different diameter and having a different depth than the dimples of the other sets, the aspect ratio of all of the dimples being substantially the same, the dimples being arranged by dividing the spherical surface into a plurality of regular polygons, each polygon having a plurality of vertexes which are formed by the sides of the polygons, the largest dimples being located just inside each of the vertexes and the next largest sized dimples being located at the vertexes.

---

### 5,016,888
### MAGNETIC GAME SYSTEM

**Donald B. Huston, Menasha, and William L. Rackow, Appleton, both of Wis., assignors to George Banta Co., Inc., Menasha, Wis.**
**Filed Aug. 29, 1988, Ser. No. 238,014**
**Int. Cl.⁵ A63F *3/00***
**U.S. Cl. 273—239** **8 Claims**





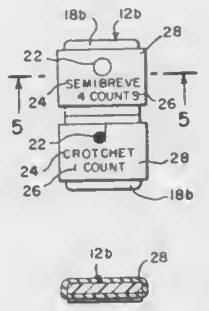
6. A game board for use in a game system including a board and a plurality of pieces which may be releasably secured to the board by magnetic attraction, comprising:
- a backing layer;
- a magnetically attractable layer disposed on said backing layer, which magnetically attractable layer consists essentially of magnetically attractable metallic particles coated by and dispersed in a matrix of a crosslinked, flexible acrylic resin
- a covering layer disposed on said magnetically attractable layer which completely covers said magnetically attractable layer, said covering layer having means defining game information on a portion of the game board surface, said magnetically attractable layer underlies and has substantially the same shape as said game information, said magnetically attractable layer having a substantial thickness wherein only the portion of the covering layer containing the game information visibly protrudes from the surrounding game board surface in order to make the game information more visually distinguishable from the rest of the game board surface;
- and adhesive means for securing said layers together.

---

### 5,016,889
### GAME TILE STRUCTURE

**Oden K. Moss, P.O. Box CB 11875, Nassau, The Bahamas, and George Spector, 233 Broadway, New York City, N.Y. 10007**
**Filed Sep. 21, 1990, Ser. No. 586,562**
**Int. Cl.⁵ A63F *9/20***
**U.S. Cl. 273—293** **1 Claim**

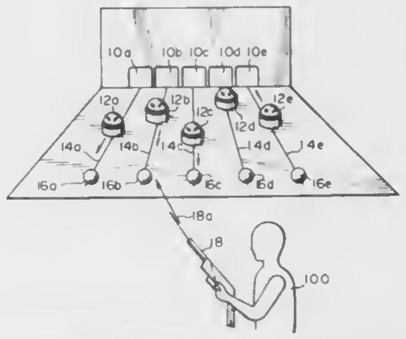
1. A music educational game comprising a plurality of small rectangular game tiles, each said tile having a face divided into halves, each half being either blank or marked by a music note symbol representing a value count of one to six whereby each player must match the face half of one said tile with the face half of another said tile during the play of the game until the first player left with no tiles wins the game;
- each half face on each said tile further includes the name of the music note symbol and its value count marked thereon next to the respective music note symbol so that each player can visually match the music note symbol and its value count with another said tile with the same music note symbol and its count during the play of the game;
- each half face on each said tile further includes a continuous belt thereabout in which two different music note symbols are each marked on opposite sides thereon with their respective names and value counts so that during the play of the game each said continuous belt is manually rotatable to change the music note symbol and its value count to vary the play of the game.



---

### 5,016,890
### SHOOTING GAME MACHINE

**Yoshinori Sato, Kawasaki; Tatsuhisa Yabushita, Katsushika; Yoshihiro Mieda, Ohta; Hiroyuki Kobayashi, Katsushika; Yasufumi Tanabe, Yokohama; Satoshi Watanabe, Yokohama, and Hideyo Oguri, Yokohama, all of Japan, assignors to Namco Ltd., Tokyo, Japan**
**Filed Aug. 6, 1990, Ser. No. 563,208**
**Claims priority, application Japan, Aug. 8, 1989, 1-205365; Aug. 8, 1989, 1-205366**
**Int. Cl.⁵ F41J *5/02, 9/02***
**U.S. Cl. 273—312** **19 Claims**



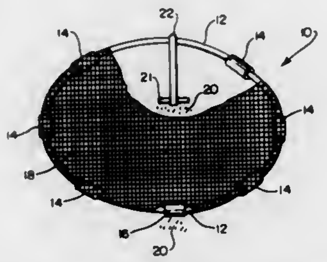
1. A shooting game machine comprising:
- (a) a plurality of lanes having a starting point and a turning point at ends thereof respectively;
- (b) a plurality of movable members which are able to start from said starting point and are able to turn at the respective turning points to march toward a goal;
- (c) hitting means adapted to be operated by a player for hitting said movable members in an effort to prevent the movable members from reaching the goal;
- (d) movable member control means for returning said hit movable members to the starting point and restarting them therefrom; and
- (e) means for moving the turning point toward the starting point so as to shorten the distance between the starting point and the goal and to make the game more difficult each time said movable members reach the turning point.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,891
## PROJECTILE-TARGET GAME APPARATUS

**Donald E. Nelson, 301 Newark Rd., Mt. Vernon, Ohio 43050**
**Filed Feb. 8, 1990, Ser. No. 477,029**
**Int. Cl.$^5$ A63B *67/00***

U.S. Cl. 273—407 **7 Claims**



1. A projectile toss game apparatus comprising a generally circular shaped landing surface of perforate thermoplastic fabric being ultra violet resistant, rot and mildew resistant, vinyl covered polyester, a circular formed tube of extruded polyethylene generally conforming to the outer circumference of said landing surface, said circular formed tube being held generally circular end to end by connector means, a plurality of tube sections of extruded flexible poly vinyl chloride tube, said tube sections being insertably positioned incurvate to said circular formed tube, whereby said tube sections are rotateable having a moderate friction fit on said circular formed tube, said tube sections being the substrate for bonding to said landing surface, whereby a cushion action is provided to said landing surface by the rotational give of said tube sections, a pivot arm support rotateably affixed to said connector means being positioned between ends of said circular formed tube, said pivot arm support extended from the pivot point to ground playing surface being generally vertical to said ground playing surface whereby the game target is held positioned on and angular to said ground playing surface said pivot arm rotateable to a position generally parallel to said landing surface for handling and storage, a horizontal arm support extending outwardly from lower end of said pivot arm support, whereby said horizontal arm support provides lateral support to said landing surface, in position to receive generally frusto conical shaped palm held projectiles launched by hand at said landing surface, said projectiles comprising a hollow conical frustum, a generally round, resiliant nose section of an organic compound affixed to the smaller end of said frustum, said projectile sized shorter and heavier than a standard badminton shuttlecock, being nominally 2" in length and 1 oz. weight with weight distribution providing a generally level flight pattern as said projectile is tossed at said game target.

---

### 5,016,892
## DRILL TOOL HOLDER

**Jean-Jacques Lafforgue, Tournon, and Claude Schwartz, Gournay, both of France, assignors to Societe de Prospection et D'Inventions Techniques (S.P.I.T.), Bourg-les-Valance Cedex, France**
**Filed Mar. 29, 1989, Ser. No. 330,014**
**Claims priority, application France, Apr. 1, 1988, 88 4369**
**Int. Cl.$^5$ B23B *31/22***

U.S. Cl. 279—82 **9 Claims**

1. A tool-holder system for interchangeably housing a plurality of tools, comprising:

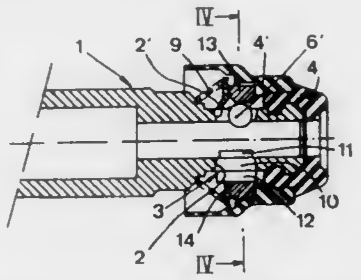
an annular cylindrical housing portion having a bore extending axially therethrough for receiving a portion of a tool to be secured within said housing portion;

cavity means, defined within a sidewall portion of said housing portion and extending through said sidewall portion of said housing so as to provide communication between a position external to said housing portion and said bore of said housing portion;

a locking element having a first predetermined configuration;

a driving element having a second predetermined configuration which is different from said first predetermined configuration of said locking element;

said cavity means having a predetermined configuration for alternatively housing either said locking element having said first predetermined configuration or said driving element having said second predetermined configuration, and wherein said predetermined configuration of said driving element is substantially the same as that of said cavity means while said predetermined configuration of said locking element is substantially different from that of said cavity means such that said locking element or said driving element can be introduced into said cavity means from said position external to said housing portion so as to only partially project into said axial bore of said housing portion in order to perform its respective locking or driving function with respect to said tool disposed within said housing portion; and



means mounted upon said housing portion of said tool holder system and disposed externally of said housing portion for engaging said driving or locking element disposed within said cavity means and for retaining said driving or locking element within said cavity means so as to, in turn, engage said tool disposed within said tool holder housing portion and thereby achieve said driving or locking operation in connection therewith,

whereby the same cavity means may be employed so as to selectively house both said locking or driving elements depending upon the particular type of tool being disposed and held within said tool holder housing portion.

---

### 5,016,893
## COLLAPSIBLE SUPPORT AND TRANSPORT STAND FOR PERSONAL WATERCRAFT

**Charles R. Hart, Jr., 12400 Wilshire Blvd. #450, Los Angeles, Calif. 90025**
**Filed Feb. 12, 1990, Ser. No. 479,048**
**Int. Cl.$^5$ B62B *1/12***

U.S. Cl. 280—35 **19 Claims**

1. A collapsible support and transport stand for personal watercraft comprising:

an elongated support cradle extending in a substantially horizontal plane for supporting a personal watercraft, said cradle having a forward end, an aft end, a starboard side, and a port side;

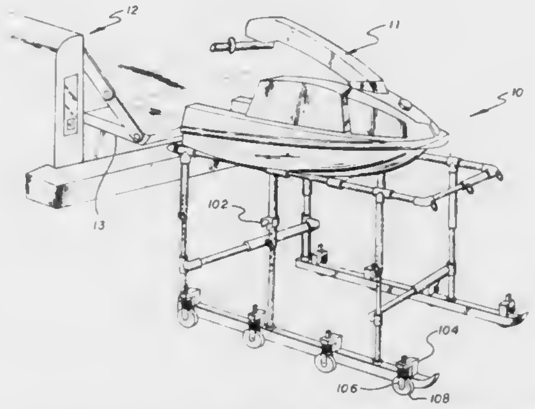
means to adjust the width of the elongated personal watercraft support cradle between the starboard side and the port side to accommodate different types of personal watercraft;

first and second skids disposed beneath said elongated cradle, each of said skids having a plurality of spring-biased retractable wheels to extend below said skid but movable to a retracted position;

a forward pair of legs pivotably extending from the forward end of said cradle to the forward end of said first and second skids respectively, each of said pair of forward legs pivotable from said cradle from an extended position substantially transverse to the plane formed by said cradle to a stowed, position underneath said cradle and substantially parallel to said plane;

a forward telescoping cross brace extending between the forward pair of pivotable legs to position and maintain said forward pair of legs transverse to said cradle while in their extended position;

an aft pair of legs pivotably extending from the aft end of said cradle to the aft end of said first and second skids respectively, each of said pair of aft legs pivotable from said cradle from an extended position substantially transverse to the plane formed by said cradle to a stowed position substantially underneath and parallel to said plane; and



an aft telescoping cross brace extending between the aft pair of pivotable legs to position and maintain said aft pair of legs transverse to said cradle while in their extended position.

---

### 5,016,894
## COMBINATION SEAT POST AND AIR PUMP FOR BICYCLE

**Kevin J. Alioto, 40 Locksly La., San Rafael, Calif. 94901**
**Continuation of Ser. No. 199,420, May 27, 1988, Pat. No. 4,842,290. This application Mar. 16, 1989, Ser. No. 324,148**
**The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.**
**Int. Cl.$^5$ B62B *3/04***

U.S. Cl. 280—201 **11 Claims**

1. An air pump comprising:

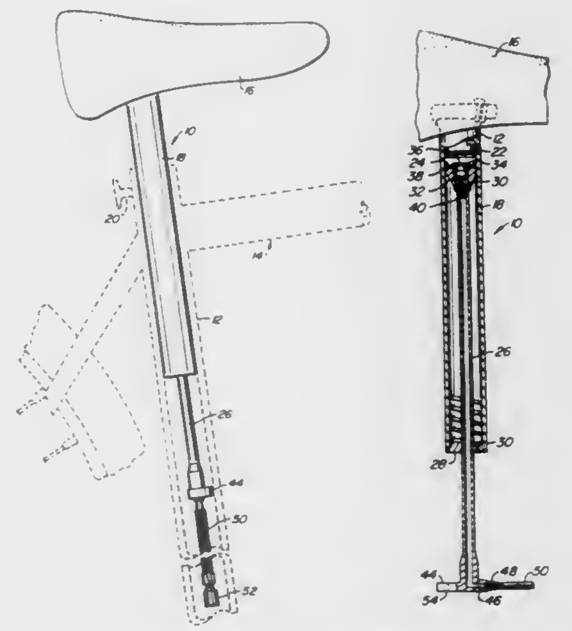
a hollow post having an inner surface, an upper end and a lower end;

means mounted on the upper end of the post for allowing the post to be gripped;

a tube partially extending into the post through the lower end thereof, said tube having an inner end within the post and an opposite end;

a diaphragm secured to the inner end of the tube and in sliding engagement with the inner surface of the post;

a check valve adjacent to the diaphragm for providing a one-way flow of air through the tube; and



a hose mounted on the opposite end of the tube for connecting the tube to a device to be inflated.

---

### 5,016,895
## CYCLE FORK WITH FIBER REINFORCED RESIN BLADES AND CROWN AND METHOD OF MAKING SAME

**Ritch Hollingsworth, Fair Oaks, and John Mouritsen, New Castle, both of Calif., assignors to Cycle Composites, Inc., Watsonville, Calif.**
**Filed Jul. 19, 1989, Ser. No. 382,127**
**Int. Cl.$^5$ B62K *21/04***

U.S. Cl. 280—280 **35 Claims**

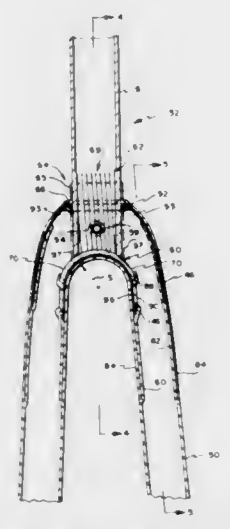
30. A fork assembly for a cycle comprising:

a steerer assembly having a tubular portion and an anchor means, said anchor means including an anchor member extending radially beyond said tubular portion; and,

a generally hollow crown and blade component extending longitudinally between and connecting said steerer assembly and a wheel support means for supporting a wheel assembly, said crown and blade component comprising a substantially continuous wall of a fibrous material impregnated with a synthetic resin extending around at least a portion of an interior cavity of said crown and blade component, said substantially continuous wall having at least two opposing wall sections each of which comprises

VOL 1126 ISS 3 MY 21 1991 UMI

at least one cured layer of said resin-impregnated fibrous material, said opposing wall sections being bonded together to enclose and engage at least a portion of said anchor member to mechanically lock said crown and blade component to said steerer assembly.



---

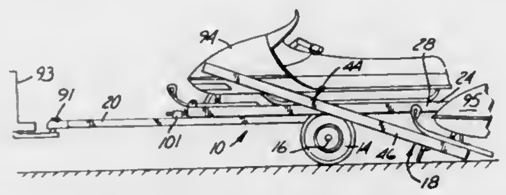
### 5,016,896
### DOUBLE BED TRAILER

**Robert L. Shafer, 5826 Scribner Rd., N.W., Bemidji, Minn. 56601**

**Filed Aug. 11, 1989, Ser. No. 392,469**

**Int. Cl.$^5$ B60P *1/24***

U.S. Cl. 280—400 11 Claims



1. A double bed trailer for receiving, transporting over the road and discharging a pair of relatively narrow vehicles, said trailer including:

(a) an elongate, horizontally extending, axle assembly;

(b) trailer support wheels rotatably mounted with respect to the axle assembly to rotate about a common axle axis;

(c) a pair of elongate trailer beds, each mounted to said axle assembly to pivot independently of the other about the common axle axis between a first position wherein its rear end portion is in close proximity to the ground and situated to receive a forwardly moving vehicle and a second generally horizontal over-the-road vehicle transport position;

(d) an elongate trailer draw bar mounted at its inner end with respect to a central portion of the axle assembly in position to extend forwardly in normal relation to a vertical plane including the common axle axis;

(e) means to hitch an outer end of the draw bar to the rear of a tow vehicle;

(f) means to releasably fasten each trailer bed to the draw bar to prevent trailer bed rotation with respect to the draw bar about the common axle axis when that trailer bed is in its second position;

(g) wherein each of the trailer beds is mounted to the axle assembly to pivot independently of the other from said second generally horizontal over-the-road vehicle transport position to a third position wherein its front end portion is in close proximity to the ground and the trailer bed is situated to discharge a forwardly moving vehicle.

---

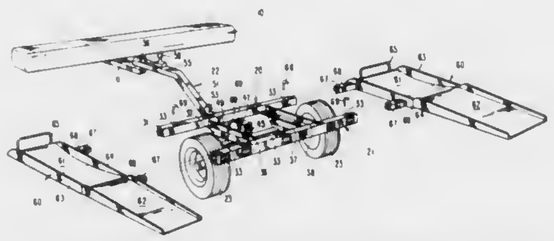
### 5,016,897
### MULTI-FUNCTION TOWING TRAILER

**Frank Kauffman, 1506 College Ave., Goshen, Ind. 46526**

**Filed Feb. 6, 1989, Ser. No. 307,672**

**Int. Cl.$^5$ B60P *3/073;* B62D *53/04***

U.S. Cl. 280—402 8 Claims



1. A vehicle towing apparatus for detachable connection to a towing vehicle, comprising:

a substantially H-shaped carriage having a longitudinal axis including;

an elongated beam member extending in parallel with said longitudinal axis;

a wheel assembly connected to said beam member; said wheel assembly including a pair of rotatable ground engaging wheels, each of said ground engaging wheels having a transverse axle;

a pair of parallel tubular members affixed transversely to said beam member and straddling each of said ground engaging wheels; and

a channel beam affixed to a forward one of said pair of tubular members, said channel beam including a downwardly opening channel having a pair of opposing channel walls;

wheel supporting means for supporting a pair of wheels of a vehicle to be towed, said wheel supporting means including;

a pair of elongated ramps, each of said pair of ramps having a wheel well at a forward portion of said ramp for receiving a wheel of the towed vehicle thereon and a rear ground engaging edge;

a transverse midline through the wheel well of each of said pair of ramps; and

mounting means for mounting each of said pair of ramps to opposite transverse sides of said pair of tubular members;

an elongated tow bar including means at a forward end of said tow bar for detachably engaging the towing vehicle;

connecting means for removably connecting said tow bar to said carriage with said tow bar at least partially extending between said pair of channel walls, said connecting means including;

a removable pivot pin extending through a rear end of said tow bar and said pair of channel walls, said pivot pin defining a pivot axis about which said carriage pivots relative to said tow bar; and

pivot means for permitting pivoting said carriage about said pivot axis when said tow bar is engaged with the towing vehicle between a loading position in which the rear edge of each of said pair of ramps engages the ground and towing position in which each of said pair of ramps is generally parallel with the ground, such that the transverse midline of said wheel wells moves from a position rearward of said transverse axle corresponding to said loading position, to a position forward of said transverse axle corresponding to said towing position as the wheels of the towed vehicle are advanced along said pair of ramps; and

means for releasably securing said tow bar to said channel beam to prevent pivoting of said carriage relative to said tow bar about said pivot axis.

---

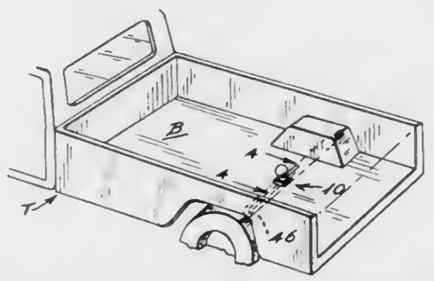
### 5,016,898
### FIFTH WHEEL TRAILER HITCH ASSEMBLY FOR PICKUP TRUCKS AND FLAT BED VEHICLES

**Joseph W. Works, R.R. #1 Box 165, and Roger D. Baker, 915 N. 7th, both of Humboldt, Kans. 66748**

**Filed May 8, 1990, Ser. No. 520,409**

**Int. Cl.$^5$ B62D *53/06;* B60D *1/52, 1/06***

U.S. Cl. 280—433 7 Claims



1. A fifth wheel trailer hitch assembly for use with vehicles having load beds wherein the load bed is provided with an opening therein comprising a reinforcing frame, said reinforcing frame being mounted to the under side of the vehicle load bed so as to extend outwardly with respect to the opening in the vehicle bed, a retention sleeve mounted to said reinforcing frame, said retention sleeve having upper and lower ends, a first opening in said lower end of said retention sleeve and having a first dimension, a second opening in said upper end of said retention sleeve, generally flush with the load bed, a hitch ball means, said hitch ball means including a ball element and a base portion having an end opposite said ball element, said base portion being selectively receivable within said retention sleeve so that said ball element extends through the second opening in the retention sleeve and upwardly with respect to the load bed of the vehicle, said ball element being of a second dimension which is slightly less than said first dimension of said first opening in said retention sleeve wherein said base portion is generally flush with said load bed, and means for securing said hitch ball means within said retention sleeve.

---

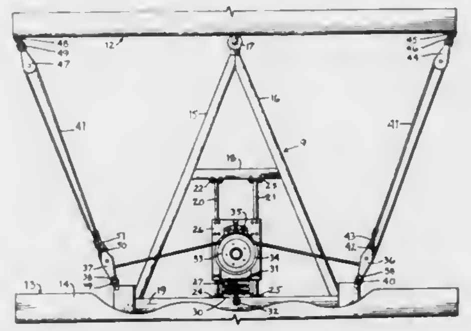
### 5,016,899
### NO-SLACK RESTRICTED-DRUM STABILIZER FOR COMMERCIAL MULTITRAILER COMBINATIONS

**Leonard Euteneier, Lancaster Rd., Selah, Wash. 98942**

**Filed Dec. 14, 1989, Ser. No. 450,916**

**Int. Cl.$^5$ B60D *1/30***

U.S. Cl. 280—446.1 9 Claims



1. Apparatus for controlling yaw between a towed trailer and a towing trailer in highway operation of commercial multitrailer combinations wherein the combination includes a tractor vehicle, said tractor vehicle having a compressed air system capable of supplying compressed air to all vehicles in the combination, and wherein a towing connection between any two adjacent trailers is a dolly having a frame under the forward portion of the towed trailer, and said dolly having a tongue, said tongue comprising converging arms extending forwardly from the dolly frame and having a pintle hitch at the point of convergence of the dolly arms, said apparatus comprising:

a horizontally-disposed cable-and-pulley system connecting the dolly of the towed trailer to the towing trailer, said cable-and-pulley system including a rotatable drum mounted on a dolly tongue of the towed trailer, the drum having a vertical axis of rotation;

a means to maintain constant tension on the cable of the cable-and-pulley system, said means comprising a means to controllably move the drum in a fore-and-aft direction;

a means to restrict cable movement caused by relative yaw between the towing trailer and the dolly of the towed trailer.

---

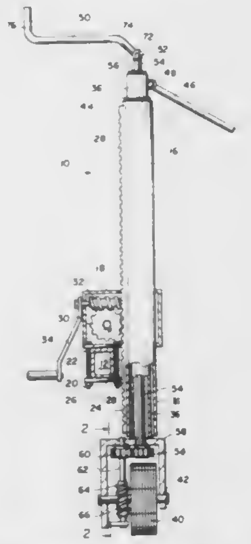
### 5,016,900
### DEVICE FOR ACCOMPLISHING DIRECTIONAL MOVEMENT OF A TRAILER

**Clyde E. McCully, P.O. Box 3565, Paradis, La. 70080**

**Filed Dec. 20, 1989, Ser. No. 453,674**

**Int. Cl.$^5$ B60D *1/36;* B62D *51/04***

U.S. Cl. 280—477 11 Claims



1. A device for directionally moving a trailer, the device comprising:

an elongated support member having a longitudinally axis;

securing means operatively connected to the support member and connectable to the trailer for securing the support member on the trailer;

a wheel mount;

a wheel mounted for rotation about a rotation axis to the wheel mount;

steering means connected to the wheel mount for rotating the wheel mount about the longitudinal axis; and

wheel driving means connected between the wheel mount and the wheel for rotating the wheel about the rotation axis;

said wheel mount comprising a hollow shaft mounted for rotation about the longitudinal axis to the support member, and a bracket connected to a lower end of the hollow shaft, the wheel being mounted for rotation about the rotation axis to the bracket;

said support member comprising a hollow tube for rotatably receiving said hollow shaft therein, and retaining means

VOL 1126
ISS 3
MY 21 1991
UMI

connected to said hollow shaft for fixing the relative axial position between the hollow shaft and the hollow tube;

said steering means comprises a steering bar operatively connected to the hollow shaft for rotation of the hollow shaft about the longitudinal axis;

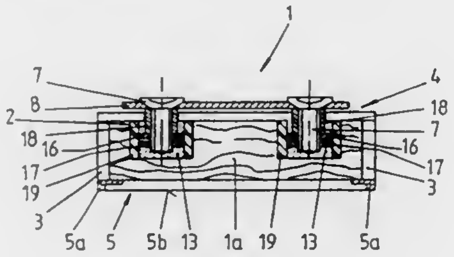
said driving means comprising an inner shaft mounted for rotation about said longitudinal axis in said hollow shaft, a gear train operatively connected between the inner shaft and the wheel for rotation of the wheel with rotation of the inner shaft about the longitudinal axis; and

a crank handle connected to the inner shaft for rotation of the inner shaft with rotation of the crank handle.

---

### 5,016,901
### SKI

**Bernhard Mayr, Hard, Austria, assignor to TMC Corporation, Baar/Zug, Switzerland**
**Filed Jul. 17, 1989, Ser. No. 380,610**
**Claims priority, application Austria, Aug. 11, 1988, 2022/88; Feb. 17, 1989, 370/89**
**Int. Cl.$^5$ A63C** *5/04*
**U.S. Cl. 280—607** **17 Claims**



1. A ski, comprising:

at least one lower cover;

at least one upper cover;

a core disposed between said at least one upper cover and said at least one lower cover, said core including recessed grooves in a side thereof proximate said upper cover;

strip-shaped receiving parts disposed in said grooves, said receiving parts including at least two layers, one of said at least two layers including metal, and the other of said at least two layers including an elastomeric material; and

spacer sleeves extending through said elastomeric material layer and including distal ends which extend beyond said at least one upper cover, said distal ends for bearing a base plate thereon and said spacer sleeves for receiving fastening screws to connect the base plate with the receiving parts.

---

### 5,016,902
### SAFETY SKI BINDING

**Gilles R. Goud, Gevrier, and Jean-Pierre Boussemart, Choisy, both of France, assignors to Salomon S.A., Annecy Cedex, France**
**Filed Dec. 22, 1989, Ser. No. 456,154**
**Claims priority, application France, Dec. 26, 1988, 88 17188**
**Int. Cl.$^5$ A63C** *9/10*
**U.S. Cl. 280—630** **40 Claims**

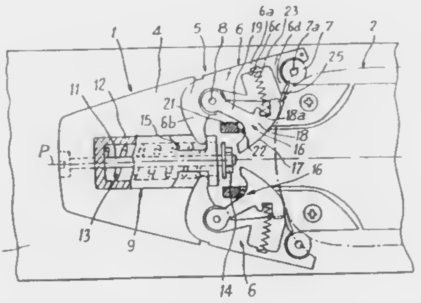
21. A safety ski binding having a front and rear and a longitudinal plane of symmetry, and being adapted to hold a ski boot having a sole on a ski, said binding having a locked position and a release position, said safety binding comprising:

(a) a body;

(b) a retention jaw including two lateral retention wings being journalled on said body for movement about respective journal axes, each said journal axis being located on opposite sides of said plane of symmetry;

(c) an energization mechanism for elastically biasing each of said lateral retention wings towards said plane of symmetry;

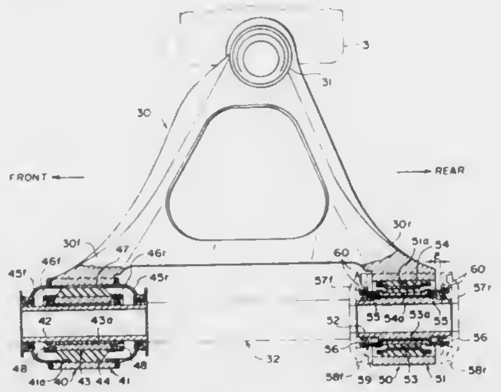
(d) two frontal support elements, each being journalled on said body adjacent a respective lateral retention wing, each frontal support element being able to rotate relative to a respective lateral retention wing, said frontal support elements each including a rolling surface, the sole of the boot being adapted to contact and move with respect to each said rolling surface during release of the boot from the binding, said rolling surface having a directrix having a variable radius of curvature.



---

### 5,016,903
### VEHICLE SUSPENSION SYSTEM

**Takao Kijima; Haruyuki Taniguchi; Makoto Arai, and Nobuyuki Sugitani, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**
**Filed May 25, 1990, Ser. No. 528,486**
**Claims priority, application Japan, May 29, 1989, 64-136380; Oct. 24, 1989, 64-124902[U]**
**Int. Cl.$^5$ B60G** *7/02*
**U.S. Cl. 280—663** **7 Claims**



1. A vehicle suspension system comprising an arm member whose outer end is connected to a wheel and whose inner end is connected to the vehicle body by way of front and rear rubber bushings at positions spaced from each other in the longitudinal direction of the vehicle body so that the arm member can vertically rotate relative to the vehicle body characterized in that

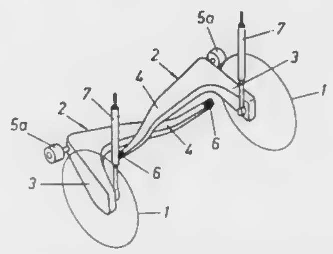
each of the front and rear rubber bushings comprises an outer tubular member which is substantially cylindrical and extends in the longitudinal direction of the vehicle body, an inner tubular member which is received in the outer tubular member substantially coaxially therewith, and a rubber member interposed between the inner and outer tubular member, and

one of the inner and outer tubular members is connected to the vehicle body and the other is connected to the suspension arm, the inner and outer tubular members of one of the front and rear rubber bushings being slidable relative to each other in the axial direction of the tubular members and those of the other rubber bushing not being slidable relative to each other in the axial direction of the tubular members.

---

### 5,016,904
### WHEEL SUSPENSION FOR VEHICLES

**Georg Weber, Graz, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria**
**Filed Oct. 31, 1989, Ser. No. 429,416**
**Claims priority, application Austria, Nov. 11, 1988, A2766/88**
**Int. Cl.$^5$ B60G** *11/00, 11/18*
**U.S. Cl. 280—664** **7 Claims**



1. A wheel suspension for use in a vehicle, comprising

a substantially L-shaped hollow member associated with each wheel on an axle, said L-shaped member having an apex portion and first and second legs extending therefrom, said first leg constituting a torsion bar and said second leg constituting a wheel control arm which extends from said apex portion transversely to said torsion bar, said wheel control arm being integral with said torsion bar,

each of said legs having a free end remote from said apex portion,

said torsion bar being of rectangular cross-section which gradually tapers from said apex portion to its free end,

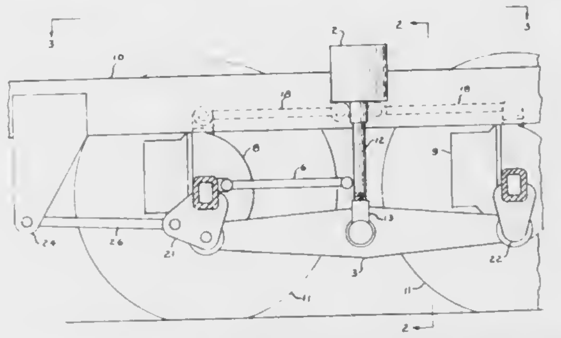
torsion bar holding means adjacent to said free end of said torsion bar for holding said torsion bar against rotation at a distance from said apex portion, and

pivotal mounting means for defining with said torsion bar holding means a pivotal axis for said wheel control arm.

---

### 5,016,905
### TANDEM AXLE VEHICLE SUSPENSION SYSTEM

**Vincent Licari, 5217 N. Baltimore, Gladstone, Mo. 64118**
**Filed Apr. 17, 1989, Ser. No. 339,992**
**Int. Cl.$^5$ B60G** *5/02*
**U.S. Cl. 280—677** **13 Claims**



1. A suspension system for tandem axle vehicles comprising:

a spring assembly located on each side of vehicle frame and in the "V" space between closely spaced tandem tires, two walking beams located adjacent to tires with opposite ends connected to the tandem axles below axle centers, a transverse beam extending through said walking beams, two vertical members, each one located between closely spaced tandem tires, with lower ends of said members connected to opposite ends of said transverse beam and upper ends engaging said spring assemblies, two radius arms in parallel for longitudinal restraint of

tandem axles in relation to vehicle frame, two torque arms for vehicle braking torques, each

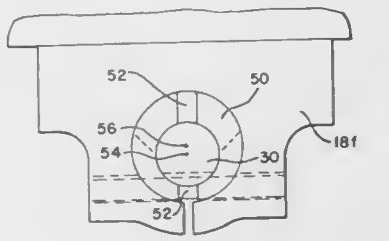
one connecting an axle to vehicle frame,

means for lateral restraint of tandem axles in relation to vehicle frame.

---

### 5,016,906
### SUSPENSION ADJUSTMENT

**Robert L. Cadden, Victoria, Australia, assignor to The Boler Company, Itasca, Ill.**
**Filed Jan. 4, 1990, Ser. No. 461,025**
**Int. Cl.$^5$ B60G** *11/10*
**U.S. Cl. 280—680** **7 Claims**



1. A suspension for a vehicle having a chassis frame and at least one pair of opposed transport wheels on opposite sides of a fore-and-aft axis of said vehicle, an axle extending transversely between the wheels of each said pair, said suspension including a pair of spring hangers attached to each opposite side of said chassis frame, and a leaf spring assembly on each side of said chassis frame interconnecting each said pair of spring hangers with opposite ends of said axle in resilient load transfer relationship, each said leaf spring assembly having a leaf spring with a spring eye at one end and a spring pin extending through said spring eye and through an aperture in an aperture-providing means rotatably mounted in one of said spring hangers to which said end of said leaf with said spring eye is interconnected, said one of said spring hangers having an upper portion by which it is attached to said chassis frame and a depending portion having a transverse opening in which said aperture-providing means is rotatably mounted, said depending portion being bifurcated from the bottom up in a transverse direction by a slot extending upwardly into said transverse opening therein, a horizontal bolt-receiving opening extending fore-and-aft through said depending portion and fore-and-aft through the lower portion of said aperture-providing means, a clamping bolt extending through said bolt-receiving opening, said lower portion of said aperture-providing means being bifurcated from the bottom up by a fore-and-aft slot which straddles said clamping bolt with sufficient upward clearance permitting said aperture-providing means to be rotated through a substantial angle, the outboard side of said aperture-providing means having a tool-engageable formation thereon to permit adjustment thereof by a tool and the aperture in said aperture-providing means being eccentrically located therein.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,907

## ANTI-ROLLING CONTROL SYSTEM FOR AUTOMOTIVE ACTIVE SUSPENSION SYSTEM

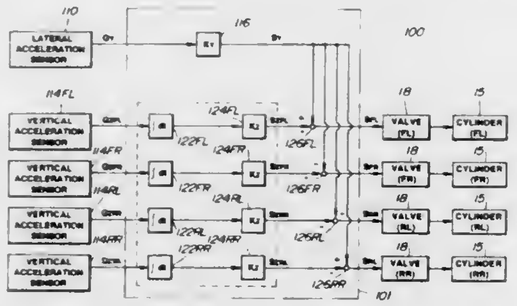
**Yohsuke Akatsu; Naoto Fukushima; Itaru Fujimura, and Yukio Fukunaga, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Jul. 31, 1989, Ser. No. 387,271**

**Claims priority, application Japan, Jul. 29, 1988, 63-190327**

**Int. Cl.$^5$ B60G *17/08***

**U.S. Cl. 280—707 14 Claims**



1. An anti-rolling control system for an active suspension system for an automotive vehicle comprising:

a first suspension system disposed between one lateral side of a vehicular body and a suspension member rotatingly supporting a first rod wheel, said first suspension system including a first hydraulic means having hydraulic damping characteristics which are variable between a first set of characteristics at which the damping force to be generated is a maximum and a second set of characteristics at which the damping force to be generated is a minimum across a predetermined neutral set of characteristics;

a second suspension system disposed between another lateral side of said vehicular body and a suspension member rotatingly supporting a second rod wheel, said second suspension system including a second hydraulic means having hydraulic damping characteristics which are variable between said first set of characteristics and said second set of characteristics across said predetermined neutral set of characteristics;

a first pressure control means, connected to said first hydraulic means, for controlling fluid pressure in said first hydraulic means for varying said damping characteristics between said first and second sets of characteristics;

a second pressure control means, connected to said second hydraulic means, for controlling fluid pressure in said second hydraulic means for varying said damping characteristics between said first and second sets of characteristics;

a first sensor means for monitoring a lateral acceleration exerted on the vehicular body and for producing a lateral acceleration indicative signal indicative of the magnitude of the monitored lateral acceleration and the direction thereof; and

a control means for deriving first and second lateral acceleration dependent control signals on the basis of said lateral acceleration indicative signal for varying the damping characteristics of one of said first and second suspension systems toward said first set of characteristics and for varying the damping characteristics of the other of said first and second suspension systems toward said second set of characteristics for suppressing vehicular rolling, said controlling means setting control characteristics so that said damping characteristics of said one of said first and second suspension systems reaches said first set of characteristics at a first predetermined magnitude of lateral acceleration and said damping characteristics of the other of said first and second suspension systems reaches said second set of characteristics at a second predetermined magnitude of lateral acceleration, which second predetermined magnitude is at least as large as said first predetermined magnitude.

---

### 5,016,908

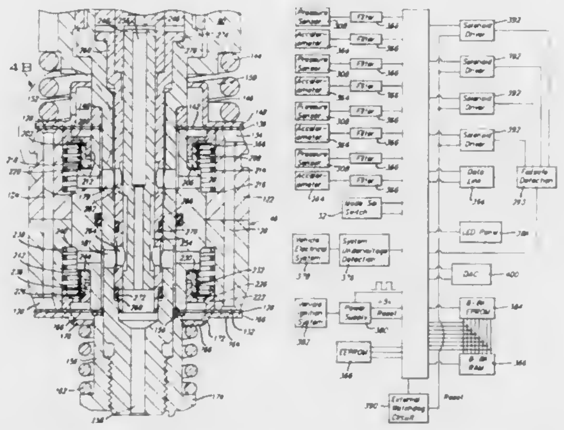
## METHOD AND APPARATUS FOR CONTROLLING SHOCK ABSORBERS

**David S. Athanas, Toledo, Ohio; Gary W. Groves, Monroe; Fahrey M. Hammoud, Woodhaven, both of Mich., and David L. Perry, Sylvania, Ohio, assignors to Monroe Auto Equipment Company, Monroe, Mich.**

**Filed Mar. 13, 1989, Ser. No. 322,774**

**Int. Cl.$^5$ B60G *17/01***

**U.S. Cl. 280—707 63 Claims**



1. An apparatus for damping the movement of the body of an automatic comprising:

a shock absorber having a pressure cylinder, said pressure cylinder forming a working chamber having first and second portions operable to store damping fluid;

first sensor means for determining the difference in pressure between the damping fluid in said first and second portions of said working chamber, said first sensor means operable to generate a first electrical signal in response to the difference in pressure between the damping fluid stored in said first and second portions;

second sensor means for determining movement of the body of said automobile, said second sensor means operable to generate a second electrical signal in response to the movement of the body of said automobile;

means for generating an electrical control signal in response to said first and second electrical signals, said means for generating an electrical control signal comprises an electronic control module having a microprocessor operable to receive said first and second electrical signals, said microprocessor being operable to compare the movement of the body of said automobile to a first threshold range, said microprocessor being further operable to generate firm damping during compression of said shock absorber when the movement of the body of said automobile exceeds said first threshold range, said microprocessor operable to generate firm damping during rebound of said shock absorber when the movement of the body of the automobile is below said first threshold range; and

electrical controllable flow means for regulating the flow of damping fluid between said first and second portions of said working chamber in response to said electrical control signal, said electrical controllable flow means including a plunger operable to generate firm damping during compression and rebound of said shock absorber while maintaining the position of said plunger with respect to said electrical controllable flow means.

---

### 5,016,909

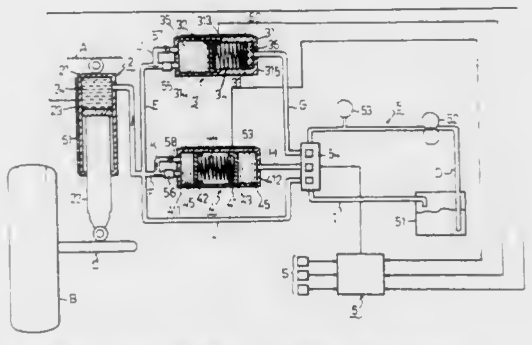
## AUTOMOBILE SUSPENSION SYSTEM

**Chien-Hung Lin, No. 150, Chung-Hsiao Rd., Chia-Li Chen, Tainan Hsien, Taiwan**

**Filed May 17, 1990, Ser. No. 525,139**

**Int. Cl.$^5$ B60G *17/00***

**U.S. Cl. 280—707 7 Claims**



1. An automobile suspension system comprising:

a suspending hydraulic cylinder including a suspending cylinder body adapted to be connected pivotally to a bottom of an automobile body, a suspending piston rod adapted to be connected pivotally to a swing arm of an automobile wheel, and a suspending piston connected to said piston rod at an upper end thereof defining an oil storing space above said suspending piston in said suspending cylinder body;

a tensing hydraulic cylinder including a tensing cylinder body fixed on said automobile body and having a thin upper wall portion which defines an upper chamber therein and a thick lower wall portion which defines a lower chamber therein, an upper tensing piston disposed slidably in said upper chamber defining an upper oil storing space above said upper tensing piston in said tensing cylinder body, a lower tensing piston disposed slidably in said lower chamber defining a lower oil storing space below said lower tensing piston in said tensing cylinder body, and a tensing spring interposed between said upper tensing piston and said lower tensing piston so as to bias said upper and lower tensing pistons to separate, said upper wall portion and said lower wall portion defining a shoulder therebetween, said upper tensing piston being positioned near, but not in contact with said shoulder and said lower tensing piston being positioned in a lower end of said lower chamber when said automobile is unloaded;

an absorbing hydraulic cylinder including an absorbing cylinder body fixed on said automobile body defining an interior chamber therein, an upper absorbing piston disposed in said absorbing cylinder body, a lower absorbing piston disposed in said absorbing cylinder body, and an absorbing spring interposed between said upper absorbing piston and said lower absorbing piston so as to bias said upper and lower absorbing pistons to separate, said upper absorbing piston being positioned in an upper end of said interior chamber of said absorbing cylinder body and said lower absorbing piston being positioned in a lower end of said interior chamber of said absorbing cylinder body when said automobile is unloaded;

a hydraulic piping system including an oil tank, a two-way valve, a first damper, a second damper, a first conduit intercommunicating said oil tank and said two-way valve, an oil pump forcing oil in said oil tank to said two-way valve, an accumulator installed on said first conduit between said oil pump and said two-way valve, a second conduit intercommunicating said oil storing space of said suspending hydraulic cylinder and said upper oil storing space of said tensing hydraulic cylinder, a third conduit intercommunicating said oil storing space of said suspending hydraulic cylinder and said upper oil storing space of said absorbing hydraulic cylinder, a fourth conduit intercommunicating said two-way valve and said lower oil storing space of said tensing hydraulic cylinder, a fifth conduit intercommunicating said two-way valve and said lower oil storing space of said absorbing hydraulic cylinder, and a sixth conduit intercommunicating said two-way valve and said oil tank so that oil can flow back from said two-way valve to said oil tank, said first damper being installed on said second conduit so as to stabilize spring movement of said tensing spring, said second damper being installed on said third conduit so as to stabilize spring movement of said absorbing spring; and

a processing system including a logical circuit unit for detecting steering, braking or acceleration of said automobile body to signal said two-way valve, so as to open said fifth conduit, thereby activating said lower absorbing piston to move upward, upward movement of said lower absorbing piston preventing downward movement of said upper absorbing piston, said logical circuit unit including two piston-position sensors installed respectively on said tensing hydraulic cylinder and said absorbing hydraulic cylinder, said piston-position sensor installed on said tensing hydraulic cylinder signaling said two-way valve, in response to increase of load on said automobile body, to push hydraulically said lower tensing piston, thereby impelling said upper tensing piston with said tensing spring, and in response to decrease of load on said automobile body, to return oil in said lower oil storing space of said tensing hydraulic cylinder to said oil tank through said sixth conduit.

---

### 5,016,910

## SUSPENSION CYLINDER CONTROL SYSTEM FOR MOTOR VEHICLES

**Takao Nagai, Kanagawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**PCT No. PCT/JP89/00769, § 371 Date May 29, 1990, § 102(e) Date May 29, 1990, PCT Pub. No. WO90/01427, PCT Pub. Date Feb. 22, 1990**

**PCT Filed Jul. 27, 1989, Ser. No. 469,470**

**Claims priority, application Japan, Jul. 29, 1988, 63-099961[U]**

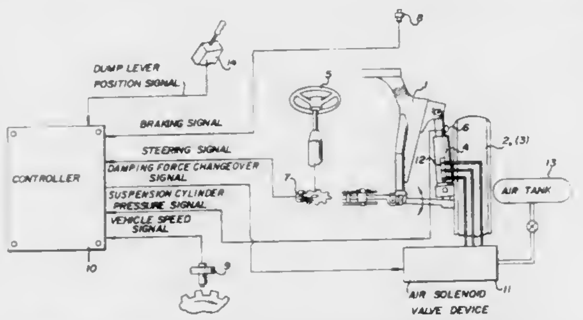
**Int. Cl.$^5$ B60G *17/015***

**U.S. Cl. 280—707 4 Claims**

1. A suspension cylinder control system for motor vehicles comprising suspension cylinders mounted between a vehicle body and right and left front wheels and between the vehicle

VOL
1126
ISS
3
MY
21
1991
UMI

body and right and left rear wheels; a pressure sensor which detects an inside oil pressure of each of said suspension cylinders; a steering angle sensor which detects the steering angle of a vehicle steering wheel; and a controller which receives detection signals from said sensors, and outputs a signal to increase the damping force of said suspension cylinders in accordance with the steering angular velocity from said steering angle sensor until an oil pressure difference of said right and left suspension cylinders of the front and left wheels decreases below a fixed value.


DUMP LEVER POSITION SIGNAL
BRAKING SIGNAL
STEERING SIGNAL
DAMPING FORCE CHANGEOVER SIGNAL
SUSPENSION CYLINDER PRESSURE SIGNAL
VEHICLE SPEED SIGNAL
CONTROLLER
10
5
7
9
12
2,(3)
13
AIR TANK
AIR SOLENOID VALVE DEVICE
11

---

### 5,016,911

### AUTOMOTIVE SUSPENSION SYSTEM

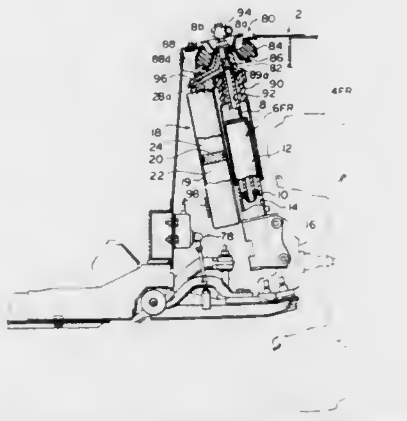
**Shin Takehara; Takeshi Edahiro; Toshiki Morita, and Hiroyoshi Kumada, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Jul. 26, 1989, Ser. No. 385,144**

**Claims priority, application Japan, Jul. 29, 1988, 63-190102; Sep. 6, 1988, 63-223317**

**Int. Cl.⁵ B60G *15/12***

**U.S. Cl. 280—708** **12 Claims**



1. A hydropneumatic suspension system for a vehicle comprising a hydraulic cylinder-piston device which is connected between the vehicle body and each of the wheels and includes a cylinder which defines a hydraulic chamber together with a piston slidably received therein, a piston rod being connected to the piston and projecting upward from the cylinder, and a plurality of gas springs each of which has a fluid chamber and a gas chamber which are defined in a cylindrical casing and are separated from each other by a movable partition wall, the fluid chamber being communicated with the hydraulic chamber of the hydraulic cylinder-piston device so that each gas spring exerts a spring force according to the hydraulic pressure in the hydraulic chamber of the cylinder-piston device characterized in that the upper end portion of the piston rod is supported by the vehicle body by way of a mount, the piston rod is provided with a fluid passage which axially extends through the piston rod and the lower end of which opens to the hydraulic chamber of the cylinder-piston device, a support member is fixed to the piston rod at an upper portion below the mount, and the upper end portions of the casings of the gas springs are mounted on the support member, the fluid chamber of each gas spring being communicated with the fluid passage in the piston rod by way of a fluid passage formed in the support member.

---

### 5,016,912

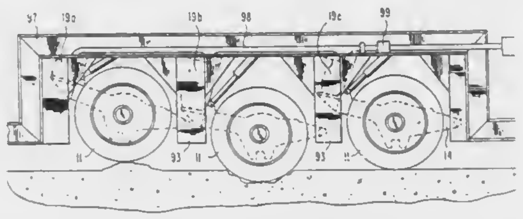
### TRAILER SUSPENSION APPARATUS

**Earl D. Smith, Scottsdale; Josef P. deFazekas, Fountain Hills, and Herbert E. Cooper, Scottsdale, all of Ariz., assignors to DBX Corporation, Scottsdale, Ariz.**

**Continuation of Ser. No. 314,812, Feb. 22, 1989, Pat. No. 4,934,733. This application Apr. 2, 1990, Ser. No. 503,307**

**Int. Cl.⁵ B60G *11/26***

**U.S. Cl. 280—711** **26 Claims**



1. A wheeled vehicle for movement along a support surface, said wheeled vehicle including at least one pair of first and second wheels positioned on opposite sides of the vehicle and being secured thereto, which comprises:

a vehicle body including a planar floor;
first and second wheel support members;
first attachment means for attaching said first wheel support member to one side of said vehicle body to be movable in a vertical direction about a first, horizontal pivot axis, said first wheel support member being movable between a first, uppermost position and a second, lowermost position;
second attachment means for attaching said second wheel support member to the other side of said vehicle body to be movable in a vertical direction about a second, horizontal pivot axis, said second wheel support member being movable between a first, uppermost position and a second, lowermost position;
first and second wheels;
first wheel mounting means for mounting said first wheel to said first wheel support member to be rotatable about a first horizontal, pivot axis, the rotation axis of said first wheel being vertically above the floor when said first wheel support member is in its first, uppermost position;
second wheel mounting means for mounting said second wheel to said second wheel support member to be rotatable about a second, horizontal rotation axis, the rotation axis of said second wheel being vertically above the floor when said second wheel support member is in its first, uppermost position;
first biasing means for biasing said first wheel support member to an intermediate position between the first and second positions and permitting resisted movement of said first wheel support member away from the intermediate position; and
second biasing means for biasing said second wheel support member to an intermediate position between first and second positions and permitting resisted movement of said second wheel support member away from the intermediate position;
said first and second attachment means including first and second arm means, respectively, for connecting said first and second wheel support members to the vehicle frame to provide lateral stabilization of said first and second wheels, said first and second arm means connecting with said first and second wheel support members at locations displaced from the first and second rotation axes and the first and second pivot axes, respectively.

---

### 5,016,913

### AIR BAG IN AIR BAG EQUIPMENT

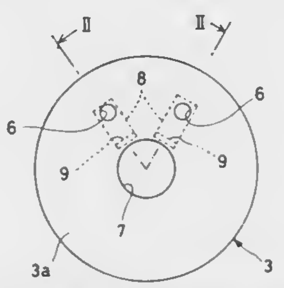
**Hideo Nakajima, and Toshio Takamiya, both of Hikone, Japan, assignors to Takata Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 12, 1990, Ser. No. 552,969**

**Claims priority, application Japan, Jul. 14, 1989, 1-182153**

**Int. Cl.⁵ B60R *21/30***

**U.S. Cl. 280—738** **1 Claim**



1. An air bag in an air bag equipment, comprising and exhaust outlet to discharge internal gas and alleviating the impact of collision when a person in a vehicle equipped with said air bag equipment hits the air bag by decreasing pressure through discharge of internal gas from the exhaust outlet, characterized in that a material with heat-shrinking property is provided, to block at least part of said exhaust outlet in a normal case and which shrinks in a direction so as to increase the passage area of said exhaust outlet when reaction gas is introduced from the an inflator.

---

### 5,016,914

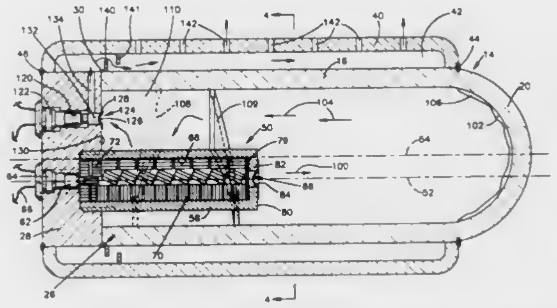
### VEHICLE OCCUPANT RESTRAINT SYSTEM

**Ernst M. Faigle, Imlay City; John H. Semchena, Royal Oak, and Richard J. Thompson, Imlay City, all of Mich., assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio**

**Filed Feb. 14, 1990, Ser. No. 480,075**

**Int. Cl.⁵ B60R *21/08***

**U.S. Cl. 280—741** **22 Claims**



16. A source of gas for inflating a vehicle occupant restraint, said source comprising:

means defining a container;
gas generating material in said container, said gas generating material comprising an alkali metal azide and an oxidizer, said gas generating material when ignited producing heated nitrogen gas;
a stored supply of pressurized nitrogen gas in said container;
ignitor means for igniting said gas generating material to create a heated nitrogen gas;
means for separating said stored nitrogen gas from said gas generating material, said means for separating being releasable to enable said heated nitrogen gas and said stored nitrogen gas to commingle; and
means for directing said stored nitrogen gas and said heated nitrogen gas through a tortuous path toward the vehicle occupant restraint;
said container including at least two burst disks which burst at respective predetermined pressures to release gas for flow past the burst disks;
a first one of said burst disks comprising said means for separating said stored nitrogen gas and said gas generating material and opening to enable flow of said heated nitrogen gas into said stored nitrogen gas;
a second one of said burst disks controlling flow of gas from said container, and means for heating said second burst disk to weaken said second burst disk so that it bursts due to said stored nitrogen gas pressure.

---

### 5,016,915

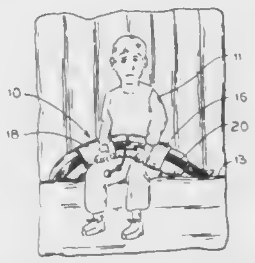
### CHILD RESTRAINT FOR USE WITH A SEAT BELT IN AN AUTOMOBILE

**Pauline R. Perry, 1814 Dee Ave., Columbus, Ga. 31903**

**Filed Jul. 9, 1990, Ser. No. 550,300**

**Int. Cl.⁵ B60R *22/00***

**U.S. Cl. 280—801** **9 Claims**



1. A child restraint for use with a seat belt in an automobile comprising:

an elongated pillow-like cushion;
means for attaching said pillow-like cushion to said seat belt associated with a seat of the automobile, said means for attaching adapted to hold said pillow-like cushion against said child when seated in said seat in a fastened position of said seat belt, said pillow-like cushion having a length adapted to extend across said child from said seat on opposite sides of said child in the fastened position of the seat belt.

---

### 5,016,916

### MECHANISM FOR ADJUSTING THE POSITION OF SHOULDER ANCHOR

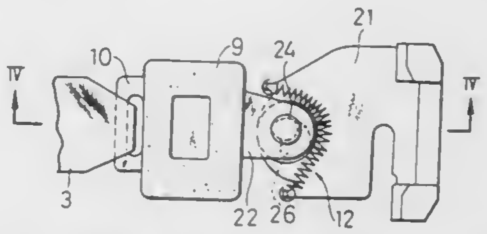
**Yoshihiro Yokote, Yokobama, and Yoshito Hashimoto, Yamato, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 18, 1989, Ser. No. 452,231**

**Claims priority, application Japan, Dec. 24, 1988, 63-167226[U]; Feb. 2, 1989, 1-11624[U]; Feb. 6, 1989, 1-12766[U]**

**Int. Cl.⁵ B60R *22/20***

**U.S. Cl. 280—808** **8 Claims**



1. A mechanism for adjusting the position of a shoulder anchor in a seat belt system of a vehicle, comprising:

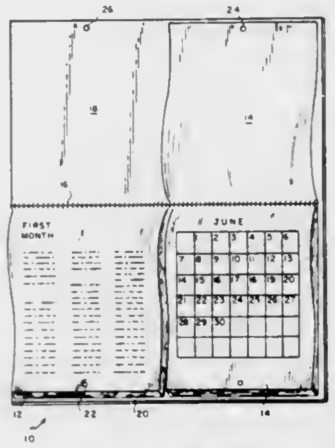
a base plate for transmitting a load to a body of the vehicle;
an anchor plate having a webbing-connecting portion to which a webbing for restraining an occupant is connected; and
connecting means disposed between said base plate and said

VOL 1126 ISS 3 MY 21 1991 UMI

anchor plate for connecting said base plate and said anchor plate in such a way that said anchor plate can be selectively held at a first position or at a second position, said connecting means comprising a first connection point for said first position and a second connection point for said second position disposed in a vehicle downward direction with respect to said first connection point;
wherein at said first position the webbing-connecting portion is situated in a vehicle forward direction with respect to the connecting means; and
wherein at said second position said anchor plate has been rotated a predetermined angle about said connecting means.

### 5,016,917
### REGIMEN CALENDAR

**Daniel W. Dubner, 46 Dalton Rd., Chelmsford, Mass. 01824, and D. Gregory Felch, 350 Stearns St., Carlisle, Mass. 01741**
**Filed Jan. 16, 1990, Ser. No. 465,462**
**Int. Cl.$^5$ B42D *5/04***
**U.S. Cl. 283—4 12 Claims**

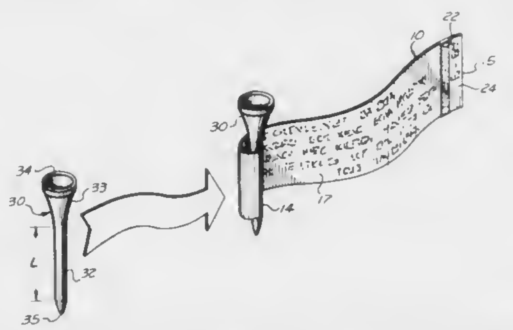


1. A calendar for correlating time periods of a predetermined regimen with calendar time periods in which the predetermined regimen is being performed comprising:
a plurality of sequentially arranged first means, each of which contains information concerning the regimen for a given time period;
a plurality of sequentially arranged second means, each of which contains indicia of a selected calendar time period; and
means for mounting said first and second means such that one of said first means and one of said second means is displayed side by side and that the first and second means being displayed may be independently changed so that any first means may be displayed with any second means;
there being more calendar time periods for said second means than said first means, whereby said regimen may commence at a calendar time period later than the earliest calendar time period for which there is a second means, with correlation between the first and second means still being possible through the regimen time periods represented by the first means.

### 5,016,918
### APPARATUS AND METHOD FOR TRANSMITTING A MESSAGE

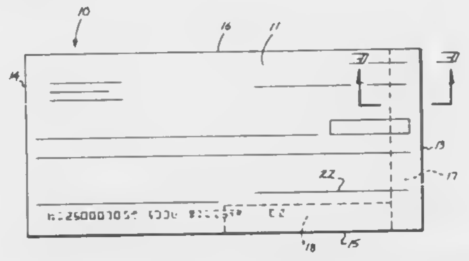
**Doug E. Tidwell, 8330 N. 19 Ave. #2126, Phoenix, Ariz. 85021**
**Filed Jul. 10, 1989, Ser. No. 377,054**
**Int. Cl.$^5$ B42D *15/00***
**U.S. Cl. 283—67 6 Claims**

1. An apparatus especially adapted for use with a transmittable object having an elongate shank of predetermined length and circumference and for transmitting a selected message therewith, said apparatus comprising:
(a) an elongate flexible sheet member having a width not greater than said predetermined length and a length substantially greater than said predetermined circumference, said sheet member including
(i) a first side having indicia printed thereon for displaying said message,
(ii) a second side,
(iii) a first end, and
(iv) a second end; and
(b) attachment means for detachably securing said sheet member in a spiral configuration comprising a plurality of coils around the shank of the object, with said first side of said sheet member facing the shank such that the indicia on said first side is hidden from view, said attachment means including
(i) first low tack adhesive means carried on said first side of said sheet member proximate the first end thereof for releasably securing said first end to the shank of the object; and
(ii) second low tack adhesive means carried on said first side of said sheet member proximate the second end thereof for releasably securing a terminal coil of said sheet member to a penultimate coil.



### 5,016,919
### CHECK AND MAGNETIC STRIP ARRANGEMENT

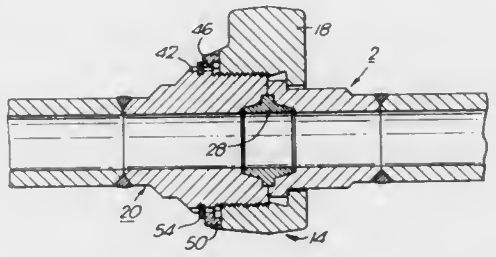
**Frank Rotondo, c/o Vito Sciancalepore, 435 60th St., West New York, N.J. 07093**
**Filed Mar. 10, 1989, Ser. No. 321,712**
**Int. Cl.$^5$ B42D *15/00***
**U.S. Cl. 283—82 1 Claim**



1. A negotiable instrument comprising a check including, in combination,
a forward face is defined overlying a rear face wherein said forward face is further defined by a right side edge, a left side edge, a top edge, and a bottom edge,
and
said forward face includes a first signature endorsement line spaced above said bottom edge and adjacent the right side edge,
and
the rear face includes a second signature line spaced adjacent the left side edge,
and
a magnetic strip means is integrally secured to said rear face for storing information regarding the negotiable instrument, and
wherein said magnetic strip means includes a first magnetic strip positioned coextensively with the right side edge intersecting a second magnetic strip positioned adjacent the bottom edge underlying the first signature endorsement line, and
wherein the first magnetic strip is spaced adjacent the right side edge spaced from the first and second signature endorsement lines, and
wherein the second magnetic strip extends along the bottom edge to a position substantially medially of the length of the bottom edge to space the first and second magnetic strips from the first signature endorsement line, and
wherein the first and second magnetic strips each includes a scuff coat to protect the first and second magnetic strips from debris, and
wherein the first and second magnetic strips include identical information to provide backup information on the negotiable instrument and enable directing either the bottom edge or the right side edge through a magnetic strip reading device.

### 5,016,920
### PIPELINE COUPLING

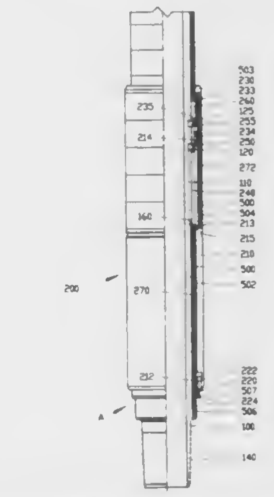
**Robert W. Anderson, Northumberland, England, assignor to Anson Limited, United Kingdom**
**Filed Aug. 2, 1990, Ser. No. 561,906**
**Claims priority, application United Kingdom, Aug. 8, 1989, 89.18093.9**
**Int. Cl.$^5$ F16L *35/00***
**U.S. Cl. 285—39 7 Claims**



1. A pipeline coupling comprising a length of pipe having first and second ends thereto, each said end having an end face, a first substantially annular connecting piece at the first end of said length of pipe, an internally-threaded nut located on, to surround, said first connecting piece, a second substantially annular connecting piece at the second end of said length of pipe, an external screw-thread formed around said second end and corresponding with the internal thread of said nut, and a sealing ring for location between adjacent end faces of two lengths of pipe to be connected, the arrangement being such that, on securing of the nut onto the externally threaded portion of the second connecting piece, the two connecting pieces are drawn axially towards one another to compress the sealing ring therebetween and to effect a seal between the two connecting pieces, the coupling further comprising a substantially annular locking ring mounted on the second connecting piece to be movable axially therealong but means for rotatably fixing said annular locking ring relative thereto, corresponding projections and recesses being provided on said locking ring and on said nut on the first connecting piece and adapted to engage with one another to prevent relative rotation between the first and second connecting pieces, and releasable means for retaining the projections and recesses on the locking ring and on the nut in engagement with one another, said releasable means comprising a retaining ring having a rear surface thereto, a continuous circumferential groove being defined in the second connecting piece to receive said retaining ring, the retaining ring reacting between said groove and the rear surface of the locking ring and being selectively releasable from within said groove.

### 5,016,921
### DURABLE BLAST JOINT WITH HYDROSTATIC DRIVER

**Jack R. Claycomb, 8226 Waynemer, Houston, Tex. 77040**
**Filed Mar. 14, 1990, Ser. No. 493,300**
**Int. Cl.$^5$ F16L *35/00***
**U.S. Cl. 285—39 8 Claims**



6. A pipe joint resistant to erosion, comprising:
an inner pipe;
a cylindrical lower housing mounted on the inner pipe near a lower end of the inner pipe having a surface suitable for gripping with power tongs;
means for locating the lower housing longitudinally on the inner pipe;
means for securing the lower housing against angular movement relative to the inner pipe;
a cylindrical upper housing mounted on the inner pipe near an upper end of the inner pipe including a unitary housing having a first surface suitable for gripping with power tongs and a second surface suitable for gripping with pipe slips, said cylindrical upper housing and said unitary housing monolithically formed as one unit;
a plurality of internal and external annular recesses on the lower and upper housings, with the external recesses overlapping the internal recesses at their ends;
a plurality of erosion-resistant rings arranged in the internal and external annular recesses and between the housings concentrically with the inner pipe in a vertically continuous arrangement from a point near the lower end of the inner pipe to a point above the upper end of the inner pipe without a vertical gap between the erosion resistant rings; and
means for imposing a vertical load on the plurality of erosion-resistant rings arranged between the upper and lower housings to prevent separations between the rings.

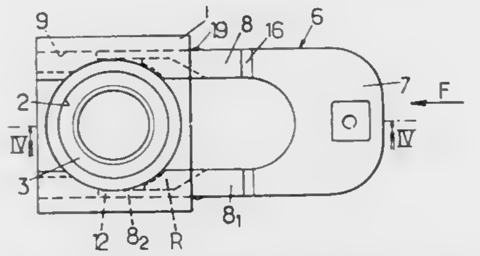
### 5,016,922
### PIPE COUPLINGS

**Joseph Le Mer, St Thegonnec, and Jean-Luc Derrien, Pordic, both of France, assignors to Chaffoteaux et Maury, France**
**Filed Jul. 3, 1990, Ser. No. 547,134**
**Claims priority, application France, Jul. 3, 1989, 89 08894**
**Int. Cl.$^5$ F16L *35/00***
**U.S. Cl. 285—81 3 Claims**

1. A pipe coupling comprising a male end-piece adapted to be permanently and sealingly fixed on one end of a first pipe

VOL
1126
ISS
3
MY
21
1991
UMI

said male end piece having a free end terminating in a flat end ring, a female end-piece adapted to be permanently and sealingly fixed on an end of a second pipe, said female end piece having bearing areas, two surfaces of revolution provided respectively on the two end-pieces and adapted for defining together an annular cavity, an annular seal housed in said cavity so as to be applied simultaneously against the two surfaces, two parallel slides formed transversely in the female end-piece and defining substantially parallel rectilinear slides, a collar provided on the male end-piece, which collar has a flat annular surface in the transverse plane of the slides, and a pin having two arms of which are adapted to cooperate with the two slides, said slides and arms having opposing axially directed faces, said arms comprising respectively two end portions spaced sufficiently apart from each other to let the collar pass axially between them and two base sections too close together to allow the collar to pass between them and said axially directed faces of said arms adapted for abutting axially against said flat annular surface of said collar thereby preventing the mutual axial separation of the two end-pieces and surrounding, with slight play, the portion of the male end-piece adjacent said collar, the ends of the arms of the pin ending in hooks adapted to abut against said bearing areas of the female end-piece when the pin reaches the end of its normal outgoing travel, the positions of said bearing areas being determined so that abutment of the hooks against said bearing areas corresponds just to the complete axial release of the collar by the arms of the pin by alignment of said end portions with said collar, characterized in that the surfaces of revolution defining the housing for the annular seal are respectively a cup formed in the female end-piece, open axially towards the exit of said female end-piece and said flat end ring of said axially directed male end piece, in that the face, of each base section of the pin, adapted to bear axially on said flat annular surface of said collar, comprises a flat transverse face which is extended at the end, of said base section, the furthest away from the bottom of the pin, by a ramp arranged so as to facilitate the beginning of sliding contact between the pin and the collar to be locked, and in that the opposing axially directed faces of the pin and of the slides have complementary hollows and reliefs for mutually cooperating when the pin reaches it most transversely engaged position to thereby prevent involuntary movement of this pin towards its exit.



---

**5,016,923**

## EROSION RESISTANT ELBOW CONDUIT

**Karl Adamaitis, 22913 SE. 47th St., Camas, Wash. 98607**

**Filed Jun. 4, 1990, Ser. No. 533,014**

**Int. Cl.$^5$ F16L *43/00***

**U.S. Cl. 285—127** **2 Claims**

1. An erosion resistant elbow conduit comprising, in combination,

a first longitudinally aligned conduit defined by a first diameter, and a first axis in fluid communication with a second conduit, wherein the second conduit is defined by a second axis and a second diameter, wherein the first axis is angularly oriented relative to the second axis, and

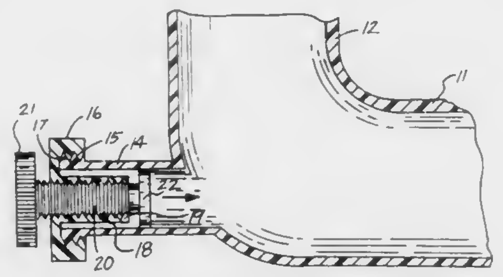
a bull head pipe in fluid communication with the first conduit projecting beyond the first conduit, wherein the bull head pipe is defined by a third axis and defined by a predetermined internal diameter, and

wherein the bull head pipe predetermined internal diameter is substantially equal to one-half the first diameter defined by the first conduit, and

wherein the third axis is parallel to and offset relative to the first axis, and

wherein the first diameter is substantially equal to the second diameter, and

wherein the bull head pipe is defined by a predetermined length, and includes a cap mounted to the bull head pipe spaced from the first conduit, and the cap includes a tube orthogonally and integrally mounted to the cap projecting interiorly of the bull head pipe a predetermined distance less than the predetermined length, and the tube includes internal threads formed therethrough, and an externally threaded boss positioned within said bull head pipe, wherein the internal threads cooperate with said externally threaded boss, the externally threaded boss is defined by a boss length substantially equal to the predetermined length, and the boss includes a head member mounted at a forward end of the boss exteriorly of the bull head pipe and includes a piston member mounted integrally and orthogonally to the boss interiorly of the bull head pipe.



---

**5,016,924**

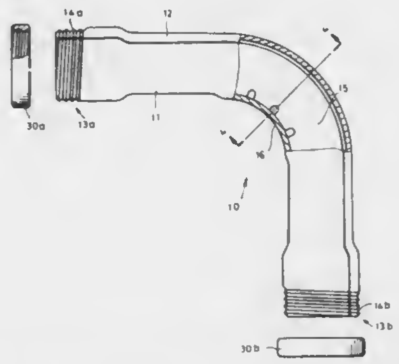
## JOINT ELBOW ASSEMBLY FOR WIRING

**Lieh-Chao Lin, 293 Pei Tun Road, Taichung, Taiwan**

**Filed Nov. 7, 1989, Ser. No. 432,510**

**Int. Cl.$^5$ F16L *43/00***

**U.S. Cl. 285—127** **1 Claim**



1. A joint elbow assembly for wiring comprising:

a pipe elbow with a plurality of threads formed on the outer peripheries of a first and second end portions of said pipe elbow respectively;

said pipe elbow comprising a lower housing and a detachable upper housing, the cross-sectional width of said detachable upper housing being approximately one third of that of said lower housing;

a first and a second annular nuts screwing on to said first and second end portions of said pipe elbow respectively;

a first and a second grooves defined by a first and a second upper edges of said lower housing;

a first and a second protrusions defined by a first and a second lower edges of said detachable upper housing;

at least two flanges spacedly formed on the outer peripheries of the central lower portion of said lower housing respectively;

a seat formed on the inner surface of each said flange;

a pair of a first and a second female lugs formed on a first and second protruding ends of each said seat respectively;

a corresponding roller assembly inserted in each pair of said first and second female lugs;

each said roller assembly comprising a central roller, a first and a second sleeves with hollow interior, and a first and a second needle bearing sets;

each said needle bearing set comprises a plurality of needle bearings;

each said needle bearing set inserted in the hollow interior of each said first and second sleeves respectively;

a first and a second ends of each said central roller rotatably secured by said first and second sleeves respectively;

each said sleeve having a protruding spindle;

each said protruding spindle fixedly inserted into each pair of said first and second female lugs respectively;

an adhesive applied to the edges of said first and second protrusions and said first and second grooves;

whereby said upper housing and lower housing are snappedly connected by said first and second protrusions and said first and second grooves respectively and joined by said adhesive and said first and second nuts.

---

**5,016,925**

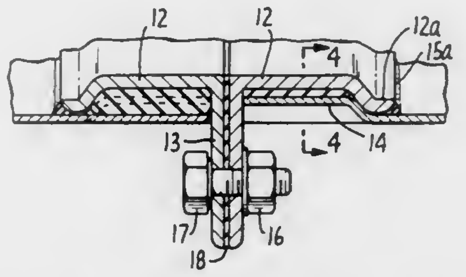
## PIPE COUPLING AND METHOD OF FORMING

**Paul K. Davis, 106 Holly Oak La., Alameda, Calif. 94501**

**Filed Apr. 27, 1987, Ser. No. 42,721**

**Int. Cl.$^5$ F16L *17/02***

**U.S. Cl. 285—363** **11 Claims**



1. A coupling for joining the ends of two pipe sections comprising a pair of flanged collars, each collar having a sleeve that fits within one end of a pipe and an integral radial flange that extends radially outward of the pipe section circumference; a pair of gaskets, one gasket being disposed around each sleeve between the inside surface of the pipe and the sleeve, the ends of each pipe section being crimped to form indentations in the exterior surface, said indentations compressing said gaskets and forming a seal between said sleeves and the end of the pipe sections; contact means between said sleeves and indentations to prevent axial removal of said sleeves from said pipe sections; and means for sealingly connecting the radial flanges of said pair of flanged collars.

---

**5,016,926**

## LATCHING MECHANISM

**Douglas J. Sharp, Arlington, and E. W. Smith, Burleson, both of Tex., assignors to Doskocil Manufacturing Company, Inc., Arlington, Tex.**

**Continuation of Ser. No. 196,248, May 20, 1988, Pat. No. 4,930,819. This application Mar. 23, 1990, Ser. No. 497,999**

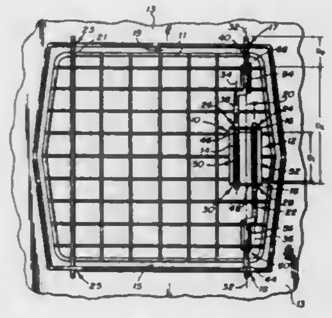
**Int. Cl.$^5$ E05C *9/04***

**U.S. Cl. 292—42** **11 Claims**

1. A latching mechanism having utility in holding a door-like member in a fixed position with respect to an opening in an enclosure, comprising:

a housing adapted to be affixed to said door-like member, said housing having first and second flanges located adjacent opposite sides of said housing, each flange having at least two openings disposed therein, said at least two openings sized as to slidably receive a pair of rods;

a first and second elongate rod slidably mounted with respect to said housing in each of said at least two openings, each rod having an inner segment and an outer segment as considered with respect to said housing, the respective outer segment of each of said pair of rods extending outwardly from said housing at opposite ends of said housing;



a stub affixed to each of said rods at a point within said inner segment wherein each stub shall protrude from said housing between said first and second flange, each stub having a length which permits manipulation by a person's digit; and

biasing means mounted within said housing and adapted to urge said first and second elongate rod outward from said housing.

---

**5,016,927**

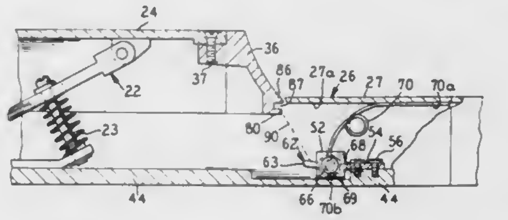
## DOGGING DEVICE FOR PANIC EXIT DEVICE

**George Toledo, Fall Brook, Calif., assignor to Thomas Industries Inc., Los Angeles, Calif.**

**Filed Oct. 9, 1990, Ser. No. 594,284**

**Int. Cl.$^5$ E05C *3/08***

**U.S. Cl. 292—92** **20 Claims**



1. A dogging arrangement for holding a panic exit device in an unlatched condition, the panic exit device having a push bar resiliently mounted to a base, and having mechanical means communicating to an external latch to unlatch a door from a door frame when said push bar is translated toward said base, comprising:

a ledge portion mounted to said push bar movable toward said base, said ledge portion having a first side toward said base and a second side away from said base;

a dogging device mounted to said base having:

a tongue aligned fronting said first side of said approaching ledge portion in a first axial position of said tongue,

a shaft mounted to said tongue at a first end of said shaft and providing an actuator button at a second end,

a journal portion mounted to said base and holding said shaft to said base and allowing movement of said shaft along an axis of said shaft,

said tongue mounted for rotational movement about the axis of said shaft,

said tongue and said shaft arranged such that axial translation of said actuator button translates said tongue to a

VOL
1126
ISS
3
MY
21
1991
UMI

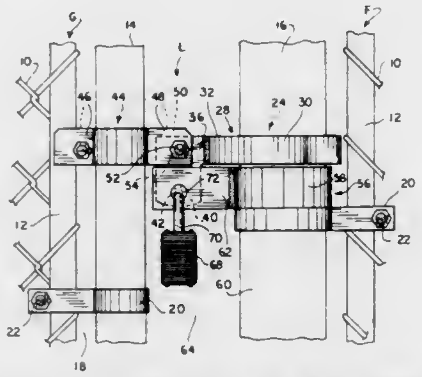
second axial position clearing said tongue from alignment with said approaching ledge portion wherein said tongue can thereafter be rotated to a first rotational position, about the axis of said shaft, passing said second side of said ledge portion opposite said base, wherein said tongue and said shaft can thereupon be axially retracted by releasing said actuator button, whereupon said tongue retains a position fronting and abutting said second side of said ledge portion, and

a means for limiting rotation of said tongue about said shaft away from said base, to thus capture said ledge portion between said tongue and said base and hold said push bar in an inward position toward said base.

---

## 5,016,928
## GATE LOCKING MECHANISM

**Jose F. Segovia, 509 Bayonne, Laredo, Tex. 78041**
**Filed Apr. 25, 1990, Ser. No. 514,264**
**Int. Cl.$^5$ E05C *5/02, 3/04***
U.S. Cl. 292—213 7 Claims



1. In a locking mechanism for a gate having a gate post and adapted to be moved to close a gate opening adjacent a fence end post, the improvement comprising;

a gate arm affixed to said gate post and provided with an outwardly projecting end portion having an opening therethrough,

an oarlock including a substantially U-shaped post engaging member having a pair of spaced apart arms joined to a base portion,

a mounting flange projecting from said base portion and provided with an opening therethrough,

a lock tab depending from said mounting flange and having an opening therethrough,

pivot means joining said oarlock to said gate arm end portion, said pivot means passing through said gate arm end portion opening and said mounting flange opening,

a lock collar mounted upon said fence end post in a plane beneath said oarlock mounting flange, a flange projecting from said lock collar and having an opening therethrough,

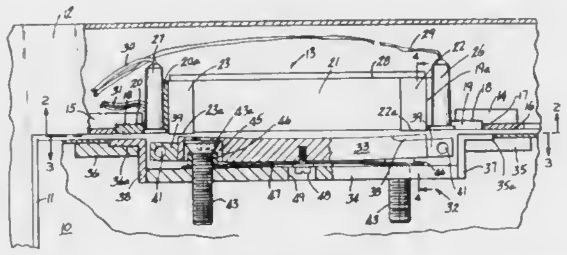
said oarlock displaceable about said pivot means to capture said fence end post therebetween with said lock tab thereupon being juxtapositioned said lock collar flange with said lock tab and lock collar flange openings coaxially aligned, whereby

a removable locking device is capable of being inserted through said aligned openings to preclude vertical displacement of said oarlock about said pivot means to thwart opening of said gate relative said fence end post.

---

## 5,016,929
## ELECTROMAGNETIC SHEAR LOCK

**George Frolov, Farmington, Conn., assignor to Harrow Products, Inc., Grand Rapids, Mich.**
**Filed Jun. 13, 1989, Ser. No. 366,864**
**Int. Cl.$^5$ E05C *17/56***
U.S. Cl. 292—251.5 18 Claims



1. An electromagnetic shear lock comprising an electromagnet assembly adapted to be mounted to a doorway and an armature adapted to be mounted t a door in a position to be attracted to the electromagnet,

said electromagnet assembly comprising an elongated core having an E--shaped cross section with an energizing coil positioned about the middle leg of said E-shaped core and between the outer legs of said E-shaped core,

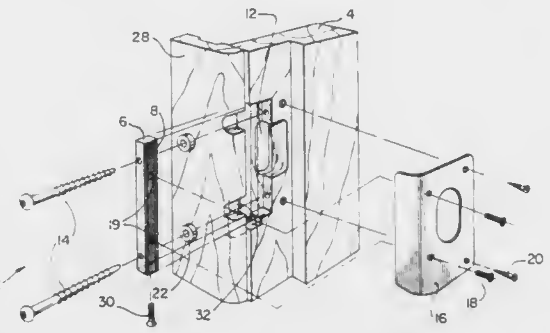
said electromagnet assembly comprising support means for supporting said electromagnet in said doorway, said support means having projections at both ends of said electromagnet assembly extending beyond the surfaces of said legs,

an armature member having a generally rectangular surface adapted to be mounted to a door, said armature member being relieved at the ends thereof whereby when said armature is attracted to said electromagnet, said projections extend into the relieved portions of said armature member.

---

## 5,016,930
## BALANCED LATCH BOLT KEEPER SUPPORT SYSTEM

**William J. Hamilton, 1180 Woodroff Avenue, Ottawa, Ontario, Canada K2C 2T3**
**Continuation-in-part of Ser. No. 162,598, Mar. 1, 1988, abandoned. This application Sep. 22, 1989, Ser. No. 410,962**
**Int. Cl.$^5$ E05B *15/02***
U.S. Cl. 292—340 11 Claims



1. A security device for a door frame for fastening in a door frame cavity adjacent to a latch bolt receptacle, the device comprising the combination of:

(a) a vertically oriented short length of flat bar fastened in the cavity at the height of the latch bolt receptacle so that a relatively large area of a surface of the bar forms a contact surface for the latch bolt when in the latch bolt receptacle, the bar thereby serving as a latch bolt keeper;

(b) a plurality of apertures extending through the bar in a direction perpendicular to the contact surface at spaced locations which are above and below the latch bolt receptacle when the bar is in position;

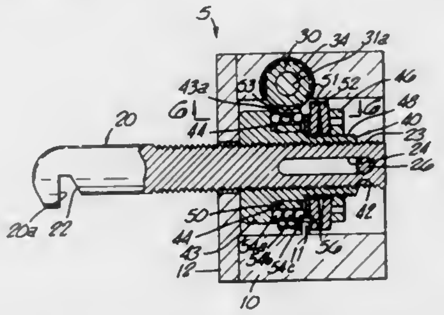
(c) long common fasteners extending centrally through the bar in said apertures to hold the bar firmly in position in the frame; and

(d) a thin sheet cover-plate-and-strike releasably secured to the bar so as to be surface mounted on the frame by screws securable through the cover-plate-and-strike to the bar in a direction 90° to that of the long common fasteners, thereby forming an integral assembly and serving as both a strike plate and reinforced engagement surface for the latch bolt, the sheet itself not engaging the latch bolt to maintain door closure.

---

## 5,016,931
## LATCHING MECHANISM HAVING A PRE-ADJUSTED LOAD

**Frank T. Jackson, Corona, Calif., assignor to The Hartwell Corporation, Placentia, Calif.**
**Filed Jun. 20, 1989, Ser. No. 369,026**
**Int. Cl.$^5$ E05C *21/02***
U.S. Cl. 292—341.18 19 Claims



1. A mechanism for releasably latching a first body to a second body, comprising

(1) a latch housing connectable to the first body;

(2) a latch portion comprising

(a) a latch end including a means for engaging the second body, and

(b) a threaded stud end; and

(3) a drive mechanism for axially translating said latch portion, including

(a) a main drive nut rotatably mounted in said housing and threadably connected onto said threaded stud end wherein rotation of said main drive nut axially translates said latch portion;

(b) a drive shaft rotatably mounted in said housing,

(c) a drive gear portion connected to said drive shaft,

(d) a driven gear operably engaging said drive gear, and

(e) means for rotatably engaging said main drive nut with said driven gear including a slip clutch means.

---

## 5,016,932
## BUMPER WITH STORAGE COMPARTMENT

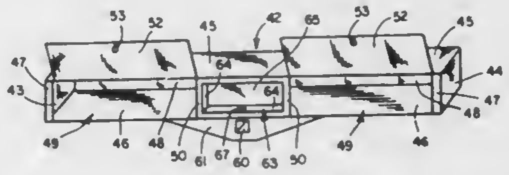
**Robert E. Carter, P.O. Box 156, Pleasant Grove, Utah 84062**
**Filed Mar. 16, 1990, Ser. No. 494,329**
**Int. Cl.$^5$ B60R *19/02***
U.S. Cl. 293—106 9 Claims

1. Bumper apparatus for an automotive vehicle, comprising

an elongate, hollow housing having opposite, closed ends, an outer side surface which is at least partially open, and upper, lower and inner side surfaces which are closed;

means for mounting the housing adjacent to an end of a motor vehicle, with the inner side surface facing the end of the vehicle and with the open outer side surface facing away from the vehicle; and

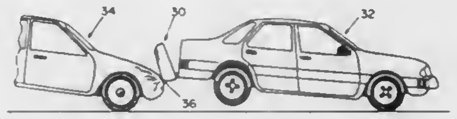
at least one door hingedly mounted at the outer edge of the upper side surface of the housing for pivotal movement between a closed portion extending over the access opening and an open position extending away from said access opening.



---

## 5,016,933
## AUTOMOTIVE BUMPER AND TAILGATE

**Huug W. Smit, Rte. 3, Box 33B, Clanton, Ala. 35045**
**Filed Mar. 23, 1989, Ser. No. 327,730**
**Int. Cl.$^5$ B60R *19/48***
U.S. Cl. 293—117 6 Claims

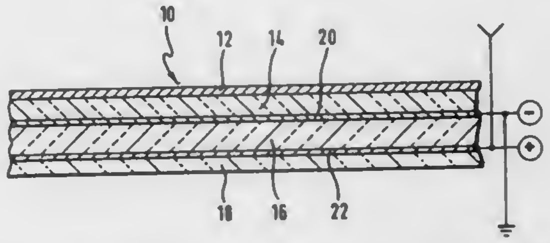


1. A vehicle bumper comprising a tailgate assembly, a supporting arm for each lateral end of the tailgate, bracket means supporting the tailgate support arms from the rear of a vehicle and means responsive to impact of a trailing vehicle for movement of the tailgate from a generally vertical rear position toward the front of the vehicle and then about a generally horizontal pivot axis to an inclined position to deflect the impact forces and yieldably absorb the impact forces.

---

## 5,016,934
## PREFABRICATED INNER ROOF LINING FOR MOTOR VEHICLES

**Peter Pelz, Geretsried, Fed. Rep. of Germany, assignor to Ernst Pelz-Vertriebs GmbH & Co., Fed. Rep. of Germany**
**Filed Apr. 30, 1990, Ser. No. 516,768**
**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1988, 3837171**
**Int. Cl.$^5$ B60J *7/00***
U.S. Cl. 296—214 38 Claims



1. A prefabricated roof lining for motor vehicles, comprising:

a layer structure including a first surface for facing the interior of the vehicle and a second surface facing opposite said first surface;

a plurality of electrical conductors carried by said layer structure spaced from said first surface and adapted for connection to receive electrical energy; and

means for extending through said layer structure and to connect to said electrical conductors to tap electrical energy therefrom at any location of the roof lining.

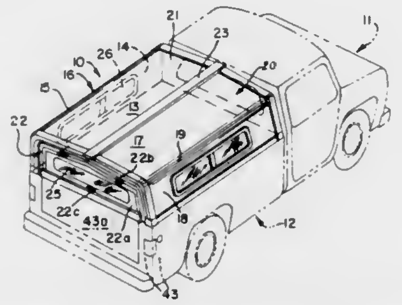
VOL 1126
ISS 3
MY 21 1991
UMI

**5,016,935**

### COLLAPSIBLE CAP FOR A PICKUP TRUCK BOX

**James S. Semple, 784 Leicester Rd., Elk Grove Village, Ill. 60007**

**Filed Oct. 26, 1987, Ser. No. 112,617**
**Int. Cl.$^5$ B60P *3/34***
**U.S. Cl. 296—26** **12 Claims**



1. A collapsible cap for a pickup truck box wherein the box includes sidewalls onto which the cap is mounted, said cap comprising:
interconnectible panel members including front and rear panel members forming the front and rear of the cap, and a pair of intermediate hinged panel members having top and side panel portions thereof for respectively forming the top and sides of the cap, said hinged panel members including front edges mating with the front panel member and rear edges mating with the back panel member;
manually releasable clamping means for connecting the front and rear panel members to the hinged panel members;
means between the front and rear panel members and the top and side panel portions of said hinged panel members defining a seal therebetween;
manually releasable clamping means for connecting the front, and hinged panel members to said sidewalls of the box;
means between said panel members and said box sidewalls defining a seal therebetween;
the top panel portions of said hinged panel members extending toward each other to define a seam therebetween, a connecter strip means joining said hinged panel members along said seam, said connector strip means including a channel member secured to one of said top panel portions having a slot facing the other top panel portion to matingly receive the edge portion of said other top panel portion in sealing engagement therewith,
manually releasable clamping means for connecting said hinged panel members along said connector strip means; and,
said hinged panel members including flexible hinge means connecting said top panel portions to side panel portions thereof to allow said panel portions to be coplanar for storage.

---

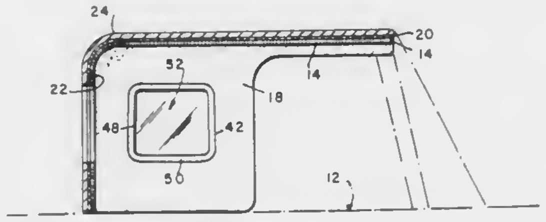
**5,016,936**

### COMPOSITE LINER FOR MOTOR VEHICLES

**David Goodrich, 78 Chestnut St., Andover, Mass. 01810**

**Filed Mar. 9, 1990, Ser. No. 491,439**
**Int. Cl.$^5$ B62D *25/00***
**U.S. Cl. 296—39.3** **10 Claims**

1. A flexible composite liner structure for the interior of a motor vehicle having a profiled contoured surface, said composite liner structure comprising:
a sheet section comprising a backing portion of flexible material and an outer surface portion of plush fibers;
a flexible layer of heat reflective material disposed upon the backing portion of said sheet section;
a pressure sensitive adhesive layer disposed upon the layer of heat reflective material for attaching said composite liner structure to the interior surface of a motor vehicle; and
a releasable non-adhesive material covering said adhesive layer;



said composite liner structure having a predetermined profiled contoured configuration matching the profiled contoured interior surface of the motor vehicle to be lined.

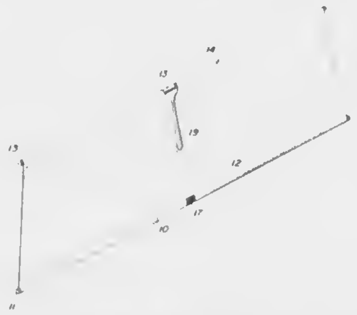
---

**5,016,937**

### SHIELD FOR A VEHICLE WINDSHIELD

**Edward B. White, 858 N. Heritage, Mesa, Ariz. 85201**

**Filed Apr. 9, 1990, Ser. No. 506,286**
**Int. Cl.$^5$ B60J *3/02***
**U.S. Cl. 296—97.7** **10 Claims**



1. A shield for inhibiting light and heat transfer through the windshield of a vehicle including in combination:
a sheet of substantially rectangular flexible opaque material having a top, a bottom and first and second sides;
a first stiff elongated rod attached to the bottom of said sheet of material;
first attaching means located substantially near the center of the bottom of said sheet of material for securing said sheet and said first rod near the bottom of a vehicle windshield, said first rod being sufficiently flexible to substantially conform to a curve at the bottom of the windshield of a vehicle when the center of the bottom of said sheet of material is secured near the bottom of such vehicle windshield;
a second stiff elongated rod attached to the top of said sheet of material; and
second attaching means for releasably attaching at least one of said second rod and the top of said sheet of material near the top of a vehicle windshield.

---

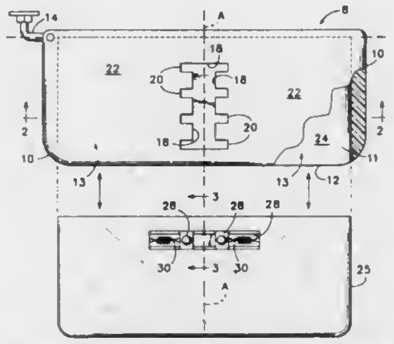
**5,016,938**

### SUN VISOR WITH EXTENSIBLE PANEL

**Grace J. Tschan, 587 N. Portland Blvd., #4, Portland, Oreg. 97217**

**Filed Jun. 29, 1990, Ser. No. 545,904**
**Int. Cl.$^5$ B60J *3/02***
**U.S. Cl. 296—97.8** **12 Claims**

1. A sun visor, comprising:
(a) a substantially planar first panel defining an elongate slot having a plurality of notches spaced therealong;
(b) a substantially planar second panel;
(c) means for holding said second panel in a plane parallel to said first panel and for allowing said second panel to slidably move along a first axis within a range of positions between a first position where said first and second panels substantially overlap one another and a second position where said second panel projects beyond said first panel; and



(d) detent means, attached to said second panel and projecting substantially perpendicularly from a plane defined by said second panel and through said elongate slot, for engaging with one of said plurality of notches to hold said second panel in a selected position within said range of positions, and further including means for biasing said detent means into one of said plurality of notches.

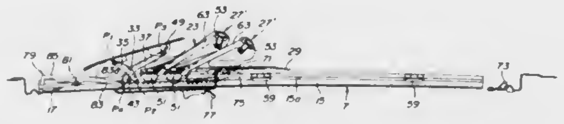
---

**5,016,939**

### CANVAS TOP TYPE SUNROOF STRUCTURE FOR MOTOR VEHICLE

**Hiromitsu Nishikawa, and Yuichi Kato, both of Yokohama, Japan, assignors to Ohi Siesakusho Co., Ltd., Yokohama, Japan**

**Filed Apr. 6, 1989, Ser. No. 334,285**
**Claims priority, application Japan, Apr. 7, 1988, 63-84119; Apr. 7, 1988, 63-84120; Apr. 7, 1988, 63-84122**
**Int. Cl.$^5$ B60J *7/06***
**U.S. Cl. 296—219** **19 Claims**



1. A sunroof structure for a motor vehicle having an apertured roof, said sunroof structure comprising:
a pair of guide members which extend along respective sides of the aperture of said roof;
a canvas top adapted to cover said aperture;
a front carry member having a front part of said canvas top secured thereto;
guided carry members carrying thereon a major middle part of said canvas top;
a free carry member connected to each of said guided carry members, each free carry member carrying thereon the major middle part of said canvas top;
biasing means for biasing each free carry member upward relative to the corresponding guided carry member;
a rear carry member having a rear part of said canvas top secured thereto;
means for slidably guiding said front carry member, said guided carry members, and said rear carry member on said guide members;
electric drive means for driving said front carry member forward and rearward along said guide members; and
lock means for selectively locking and unlocking said rear carry member to a rear given portion of said roof;
a first lifting means interposed between each guide member and one lateral side of said front carry member, for inclining the front carry member forwardly when said front carry member comes to a front given portion of the roof aperture;
said first lifting means comprising:
first and second arms which are pivotally connected to each other to constitute an X-like structure;
a front bracket secured to said front carry member and having a portion to which one end of said first arm is pivotally connected;
a driven slider connected to said guide member and being slidably guided by said guide member and having a portion to which the other end of said first arm is pivotally connected;
a roller carried by said first arm and rotatably mounted on a raised wall defined by said guide member;
a rear bracket secured to said front carry member and having a portion to which one end of said second arm is pivotally connected through a pivot pin, said rear bracket having an elongate slot through which said pivot pin is slidably passed; and
a drive slider connected to said guide member and slidably guided by said member and having a portion to which the other end of said second arm is pivotally connected.

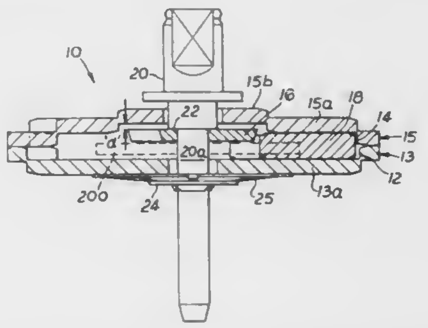
---

**5,016,940**

### SEAT RECLINING MECHANISM

**Ian Holloway, Stratford-Upon-Avon, United Kingdom, assignor to I.H.W. Engineering Ltd., United Kingdom**

**Filed Mar. 3, 1989, Ser. No. 319,258**
**Claims priority, application United Kingdom, Mar. 5, 1988, 8805290**
**Int. Cl.$^5$ B60N *1/02***
**U.S. Cl. 297—362** **8 Claims**



1. A seat reclining mechanism including a cushion arm pivotally connected to a squab arm by a planetary gear arrangement, the planetary gear arrangement including a pair of side by side ring gears, one of the ring gears being secured to the squab arm and the other of the ring gears being secured to the cushion arm, a sun and planetary gear arrangement common to both ring gears, the sun and planetary gear arrangement including radially moving planetary gears surrounding at least one sun gear having a frusto-conical form which is biased in an axial direction so as to urge the planetary gears in a radially outwards direction and into contact with the ring gears.

---

**5,016,941**

### STRUCTURE OF VEHICLE SEAT

**Masaaki Yokota, Akishima, Japan, assignor to Tachi-S Co. Ltd., Tokyo, Japan**

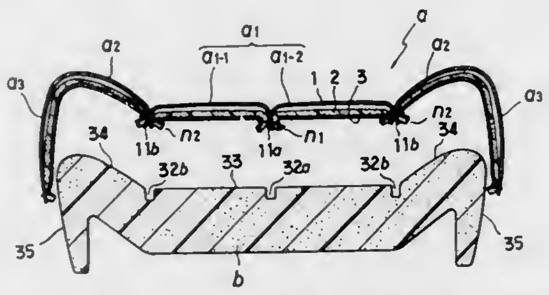
**Filed Mar. 13, 1990, Ser. No. 492,673**
**Int. Cl.$^5$ A47C *7/18***
**U.S. Cl. 297—452** **6 Claims**

1. A structure of a vehicle seat comprising:
a trim cover assembly comprising an animal-leather surface covering layer, a foam wadding and a wadding cover; and
a foam padding covered with said trim cover assembly, said

VOL
1126
ISS
3
MY
21
1991
UMI

foam padding being formed into a configuration conforming to that of said seat by being formed in a mold such that a central seating part is defined on an upper surface of said padding in a manner being lower in level than other parts thereof,

wherein said trim cover assembly is formed in a configuration conforming to that of said foam padding, having a central seating section corresponding to said central seating part of said foam padding, wherein said central seating section of said trim cover assembly includes at least two separate base sections which are sewn together in such a manner that the resulting sewn central section lies upon and along said central seating part of said foam padding in conformity therewith, wherein said central seating section of said trim cover assembly is sewn with peripheral sections of the same assembly corresponding to said other parts of said foam wadding, wherein said animal-leather surface covering layer is placed upon said foam padding without being bonded thereto, whereas said wadding cover is bonded integrally to said upper surface of said foam padding where it has said central seating part thereof defined inclusive, whereby there is no creation of wrinkle or crease on said trim cover assembly.



---

### 5,016,942
### ANCHOR BORING UNIT

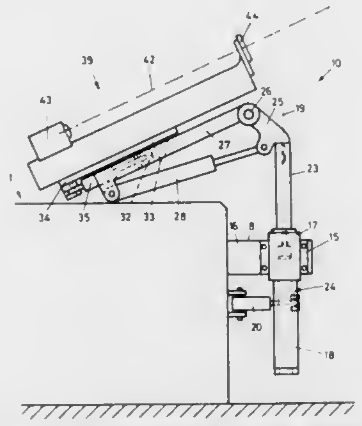
**Erhard Spross, Neunkirch, and Hans-Rudolf Ruttimann, Rafz, both of Switzerland, assignors to Sony Corporation, Tokyo, Japan**

**Filed Mar. 28, 1990, Ser. No. 500,391**

**Claims priority, application Switzerland, Apr. 7, 1989, 1319/89-7**

**Int. Cl.$^5$ E21C** *11/02;* **E21D** *20/00*

**U.S. Cl. 299—33** **7 Claims**



1. An anchor boring unit for a section advance machine, including a base plate attached to the machine, a mount, a drilling machine on the mount movable along a boring axis, a motor for moving the drilling machine on the mount along the boring axis, as well as a swivel mechanism to swivel the mount relative to the base plate, characterized in that the swivel mechanism includes means for swivelling the mount to bore boreholes with the drilling machine unit in both a roof and also in a wall, wherein the swivel mechanism includes a first carrier pivotable around a first axis and movable in a height direction in relation to the base plate and a second carrier articulated movably at a second axis transversely to the first axis at the first carrier, and to which the mount is attached, and a second motor to swivel the first carrier around the first axis relative to the base plate, a third motor to move the first carrier in the height direction relative to the base plate, and a fourth motor to shift the second carrier around the second axis relative to the first carrier.

---

### 5,016,943
### MILLING DEVICE FOR CUTTING UP ROAD SURFACES

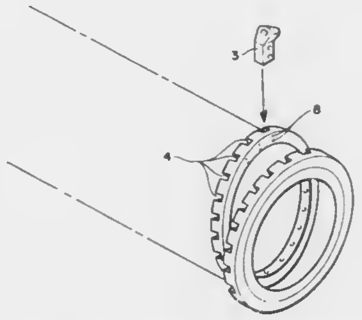
**Reinhard Wirtgen, Hohner Strasse 2, D-5469 Windhagen, Fed. Rep. of Germany**

**Filed Mar. 15, 1990, Ser. No. 494,240**

**Claims priority, application Fed. Rep. of Germany, Mar. 23, 1989, 3909695**

**Int. Cl.$^5$ F01C** *23/12;* **E21C** *25/10*

**U.S. Cl. 299—87** **4 Claims**



1. A milling device for cutting up road surfaces and comprising:

(a) a roller-type milling body including a rotatably-mounted spiral conveyor;

(b) a plurality of rotary cutters carried on said spiral conveyor, said rotary cutters mounted for free rotation about their respective longitudinal axes;

(c) a plurality of retaining boxes, each retaining box detachably connected by at least one screw in a respective trapezoidally-shaped positive radial recess in a wall of said spiral conveyor, each retaining box having a bore hole therein for receiving a respective one of said rotary cutters; and

(d) said retaining boxes each having a trapezoidally-shaped shaft part for being matingly received in the trapezoidal recess with the narrow side of the trapezoidally-shaped shaft facing towards the spiral conveyor.

---

### 5,016,944
### DISPLAY HUB CAP APPARATUS

**Francis J. Schultz, 6 Starwood Drive, Lenox, Mass. 01240**

**Filed May 24, 1990, Ser. No. 527,849**

**Int. Cl.$^5$ B60B** *7/20*

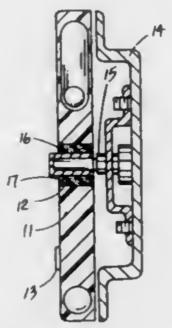
**U.S. Cl. 301—37 N** **6 Claims**

1. A display hub cap apparatus for securement to an automotive wheel rim, wherein the wheel rim includes a wheel axle projecting coaxially and orthogonally relative to the wheel rim, and wherein the apparatus comprises,

a cylindrical hub cap disk, the disk including a central axial aperture directed orthogonally therethrough, and

wherein the hub cap disk includes the annular perimeter edge, a message slot mounted on an exterior surface of the hub cap disk between the axial aperture and the annular perimeter edge arranged orthongonally relative to an axis defined by the axial aperture, and

a first weighted member mounted within a first cavity, the first cavity defined by a complementary configuration to the first weighted member, and the first cavity positioned between the annular perimeter edge and the message slot a predetermined spacing, and



an elongate cavity diametrically aligned with the first weighted member, wherein the elongate cavity includes a second weighted member rotatably mounted therewithin.

---

### 5,016,945
### ARRANGEMENT FOR CONNECTING AND MOVING THE PLATES OF A CATERPILLAR TRACK OF EARTH-MOVING MACHINES

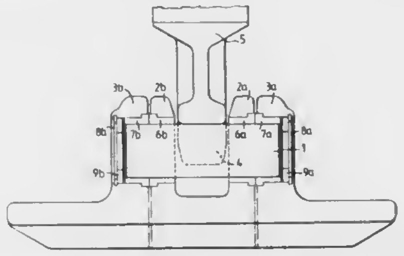
**Helmut Bentz, Dortmund, Fed. Rep. of Germany, assignor to O & K Orenstein & Koppel Aktiengesellschaft, Dortmund, Fed. Rep. of Germany**

**Filed Jan. 26, 1990, Ser. No. 471,770**

**Claims priority, application Fed. Rep. of Germany, Feb. 8, 1989, 3903617**

**Int. Cl.$^5$ B62D** *55/21*

**U.S. Cl. 305—58 PC** **4 Claims**



1. In an arrangement for connecting and moving track plates of a caterpillar track of earth-moving machines in which adjacent track plates are bridged over on a common axis by, respectively, two inner straps or outer straps having bore holes, the improvement comprising

a solid chain pin which is moveable in circumferential direction and has a central region which is free for engagement in sprocket-wheel teeth of a drive sprocket wheel, wherein said chain pin is turnably mounted in the bore holes.

---

### 5,016,946
### MODULAR STORAGE CONTAINER FOR DISKETTES

**Naum Reznikov, San Francisco, and Marc T. Protiva, San Jose, both of Calif., assignors to Innovative Concepts, Inc., San Jose, Calif.**

**Filed Mar. 5, 1990, Ser. No. 489,404**

**Int. Cl.$^5$ A47B** *87/00*

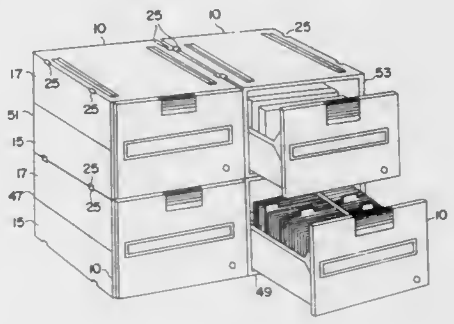
**U.S. Cl. 312—108** **10 Claims**

1. A storage container comprising:

two molded units which are joined to form a housing, each of said molded units including a base, two side walls and a rear wall, each of said walls having an edge that is attached to said base and an open edge opposing said attached edge;

said open edges of said walls of each said molded unit being formed such that two of said molded units may be joined together at a mating joinder of said open edges;

portions of said open edges of said walls including a plurality of tabs that extend upwardly beyond said open edge, and portions of said open edges including a plurality of recesses that extend into portions of said open edges; said tabs and said recesses being disposed in an alternating relationship along said open edges; whereby said tabs and recesses of one of said two molded units will interdigitate with said tabs and recesses of another of said molded units when said two molded units are joined together, in order to align and secure said molded units together to form said housing;



fastening means for securing the joinder of said open edges of said two molded units of said housing; said fastening means including a guide bracket; said guide bracket having a clamping means that functions to hold portions of said tabs thereto;

each of said tabs on said side walls including a hole being formed therethrough proximate its center, and said clamping means including a plurality of restraints, said restraints being disposed to protrude into said holes of said tabs; and

a drawer being sized to fit inside said housing.

---

### 5,016,947
### CABLE CARRYING METHOD AND APPARATUS FOR MODULAR COMPUTER CABINETS AND THE LIKE

**Sawyer C. Y. Hsu; Carlo V. Daleo, both of San Diego; Sidney L. Valentine, Poway; James Fratis, San Diego, and Robert W. Fischer, Jr., Lakeside, all of Calif., assignors to NCR Corporation, Dayton, Ohio**

**Continuation of Ser. No. 370,944, Jun. 23, 1989, Pat. No. 4,597,333. This application Apr. 26, 1990, Ser. No. 514,796**

**The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.**

**Int. Cl.$^5$ A47B** *87/00*

**U.S. Cl. 312—108** **6 Claims**

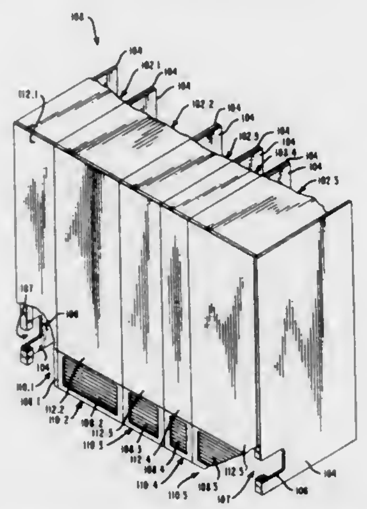
1. A cabinet housing electronic circuitry comprising:

a plurality of end walls, at least one of which has a notch at a first edge of said end wall, said notch for receiving interconnect cables which span through planes projected by said end walls;

a closure member corresponding to each said notch for closing said notch to prevent cable ingress or egress through said notches, but not preventing the extension of interconnect cables through said notch and through the projected planes of said end walls; and

VOL 1126 ISS 3 MY 21 1991 UMI

structural members spanningly coupled to said first edges, but not completely covering said notch;



wherein said closure members are removably coupled to said structural members, and a portion of each said end wall wraps around one of said structural members.

---

5,016,948

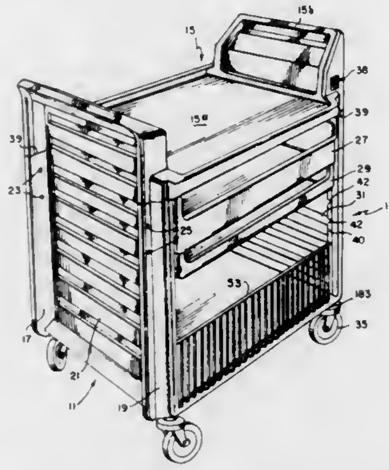
### MODULAR UTILITY CART

**Robert J. Welch, Dallas; Robert H. Nattress, Shavertown; Robert E. Nitkowski, Mountaintop, and Westcoat Beakley, Wyoming, all of Pa., assignors to InterMetro Industries Corporation, Wilkes-Barre, Pa.**

**Filed Feb. 2, 1989, Ser. No. 305,274**

**Int. Cl.$^5$ A47B *91/00***

U.S. Cl. 312—250 **12 Claims**



1. A modular cart comprising:

a pair of identical, rigidly formed, unitary side members each having a generally upstanding side portion integrally formed with a generally laterally extending bottom portion, said bottom portion of each said side member being formed with means for interengaging identical means formed with the bottom portion of the other said side member, said interengaging means on each said side member comprising first and second fingers located asymmetrically and in side by side spaced relation in the longitudinal direction of said bottom portion and projecting laterally from said bottom portion, said first and second fingers of each one of the pair of bottom portions thereby being interlaceable with said first and second fingers of the other one of said bottom portions whereby said bottom portions define a bottom of said cart.

---

5,016,949

### SWING DOOR AND DOOR FRAME ASSEMBLY

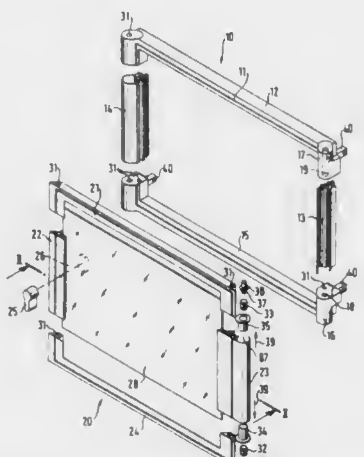
**Hans Knurr, Kirchheim, Fed. Rep. of Germany, assignor to Knurr-Mechanik Fur Die Elektronik Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Aug. 14, 1989, Ser. No. 394,124**

**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828288**

**Int. Cl.$^5$ A47B *88/00***

U.S. Cl. 312—296 **13 Claims**



1. A swing door assembly for a cabinet comprising a cabinet frame defining a door jamb and a peripheral door frame for supporting a door on the jamb, a cabinet frame comprising first upper and lower horizontal beams interconnected with a first hinge side hollow profile vertical beam at one end of the cabinet frame to which the door is hinged and a first closure-side hollow profile vertical beam at an opposite end of the cabinet frame, the door frame also comprising upper and lower horizontal beams interconnected with a second hinge side hollow profile vertical beam at one end of the door frame which is hinged to the cabinet and a second closure-side hollow profile vertical beam at an opposite end of the door frame, the second hinge side hollow profile beam having an elongate portion defining upper and lower hinge pin seats, upper and lower hinge pins received in the respective hinge pin seats, hinge pin retaining sockets formed on the first upper and lower horizontal beams respectively at said one end of the cabinet frame for receiving the respective hinge pins, the first hinge side hollow profile beam having front and rear walls defining therebetween an outwardly open recess for receiving said elongate portion of the second hinge side hollow profile beam when the door is opened, the second hinge side hollow profile beam having a wall portion adjacent said elongate portion for approaching said front wall of the first hinge side hollow profile beam when the door is closed and a sealing bead on one of the front wall and the wall portion for sealing against the other of said front wall and wall portion.

5,016,950

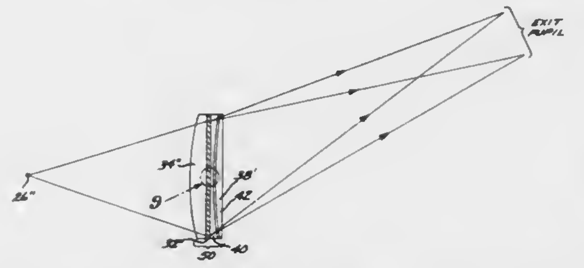
### FULL-COLOR ZERO-ORDER SUPPRESSED DIFFRACTION OPTICS DIFFUSING SCREEN/LOUVER FILTER LAMINATE

**Ronald T. Smith, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jul. 5, 1988, Ser. No. 215,474**

**Int. Cl.$^5$ G02B *5/32***

U.S. Cl. 350—3.7 **4 Claims**



1. An optical apparatus, comprising:

a first plano-convex lens for focusing light incident thereon;

a holographic optical element positioned adjacent to said plano-convex lens to receive said focused light and comprising means for diffracting a beam of white light incident upon any particular point on said holographic optical element from a predetermined direction toward substantially overlapping red, green and blue exit pupils;

a louver filter positioned with respect to said holographic element so that light passing through said element impinges on said filter, the diffracted light being transmitted through said filter and the undiffracted light being blocked by said filter, said filter comprising a thin flexible translucent substrate and a plurality of opaque louvers which are aligned parallel to each other when the substrate is planer; and

a plano-concave lens and a second plano-convex lens, said louver filter being laminated between said respective lens, the curvature of the respective concave and convex surfaces of said lens being selected so that each of the louvers comprising said louver filter are aligned with a viewer's line of sight at the exit pupil.

---

5,016,951

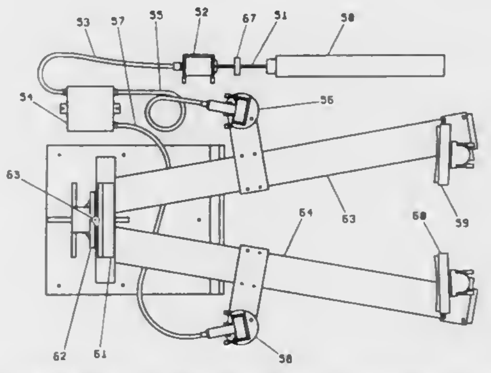
### FIBER OPTIC DIFFRACTION GRATING MAKER

**Vance A. Deason, and Michael B. Ward, Idaho Falls, both of Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 3, 1989, Ser. No. 388,870**

**Int. Cl.$^5$ G03H *1/10***

U.S. Cl. 350—3.67 **12 Claims**



1. An apparatus for the manufacture of diffraction gratings comprised of:

a source of a beam of coherent light,

coupling means for coupling said beam of coherent light into a polarization maintaining, single mode optical fiber,

beam splitting means for splitting said beam of coherent light from said optical fiber into at least two beams of mutually coherent light,

collimating means, directing said mutually coherent beams onto a point of intersection at which is located a substrate coated with light sensitive material, and

means for fixing said beam splitting means in relation to said collimating means and in relation to said point of intersection so that alteration of the angle between said collimated beams will not alter the position of said point of intersection.

---

5,016,952

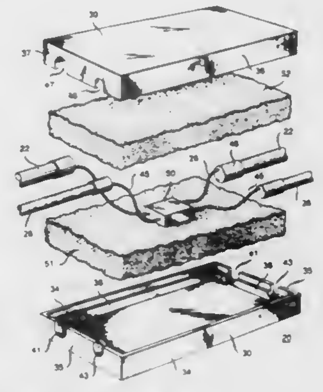
### CABLE CLOSURE INCLUDING SUPERABSORBENT FOAM WATER BLOCKING SYSTEM AND METHODS OF USING SAME

**Candido J. Arroyo, Lithonia; David J. Meskell, Jr., Snellville, and Francis J. Mullin, Chamblee, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Dec. 22, 1989, Ser. No. 455,106**

**Int. Cl.$^5$ G02B *6/36***

U.S. Cl. 350—96.20 **16 Claims**



1. A cable closure, which includes:

a housing which includes:

a first member; and

a second member which is adapted to be assembled to said first member and to be secured thereto with at least one of said first and second members including a plurality of openings through which are adapted to extend cables having transmission media which are to be connected together within said housing; and

a pad comprising a superabsorbent foam material which is disposed within at least one of said first and second members in such a manner that when said first and second members are assembled together to provide said housing, said pad of superabsorbent foam material is compressed to conform about the connections therein, said superabsorbent foam material upon contact with water swelling into interstices among transmission media of cables which extend into said closure.

---

5,016,953

### REDUCTION OF NOISE IN COMPUTER GENERATED HOLOGRAMS

**Gaylord E. Moss, Marina del Rey, and John E. Wreede, Monrovia, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Aug. 31, 1989, Ser. No. 401,328**

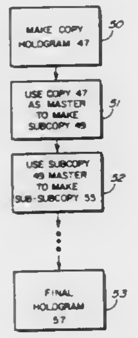
**Int. Cl.$^5$ G03H *1/20, 1/08***

U.S. Cl. 350—3.66 **9 Claims**

5. In an improved method for producing intermediate copy holograms from a master hologram, wherein the improvement comprises the steps of:

VOL 1126 ISS 3 MY 21 1991 UMI

making a succession of intermediate copy holograms from one another while decreasing an exposure of each inter-

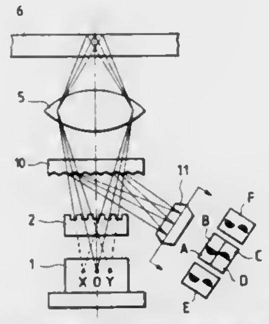

MAKE COPY HOLOGRAM 47
50
USE COPY 47 AS MASTER TO MAKE SUBCOPY 49
51
USE SUBCOPY 49 MASTER TO MAKE SUB-SUBCOPY 55
52
FINAL HOLOGRAM 57
53

mediate copy hologram over a previously made intermediate copy hologram from which said former intermediate copy hologram was made.

---

### 5,016,954
## OPTICAL PICKUP AND HOLOGRAM THEREFOR

**Shuichi Onayama, and Kazuhiko Nosaka, both of Osaka, Japan, assignors to NEC Home Electronics Ltd., Osaka, Japan**
**Division of Ser. No. 227,330, Aug. 2, 1988, Pat. No. 4,907,847. This application Jan. 2, 1990, Ser. No. 446,820**
**Claims priority, application Japan, Sep. 28, 1987, 62-243488; Sep. 28, 1987, 62-243489**
**Int. Cl.$^5$ G02B** *26/10*
**U.S. Cl. 350—3.71** **4 Claims**



1. An optical pickup for picking up signals from a signal surface of an optical disk, comprising:

a laser light source for emitting a laser beam;

splitting means, formed by a diffraction grating, for splitting said laser beam emitted from said laser light source into three light beams;

an object lens disposed in front of said optical disk, for focusing said three light beams coming from said splitting means on said signal surface of said optical disk;

diffraction means, formed by a first surface of a hologram, disposed between said splitting means and said object lens, for diffracting return light beams reflected from said signal surface; and

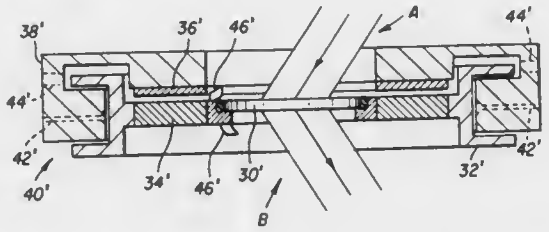
a 6-piece-divided photodetector disposed in a direction of diffracted return light beams from said diffraction means, for detecting said diffracted return light beams,

wherein said diffraction grating which forms said splitting means is formed on a second and opposite surface of said hologram.

---

### 5,016,955
## HOLOGRAPHIC LASER SCANNER MOTOR

**Haribhajan S. Kocher, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**
**Filed Apr. 19, 1990, Ser. No. 511,132**
**Int. Cl.$^5$ G02B** *26/10, 5/32*
**U.S. Cl. 350—3.71** **22 Claims**

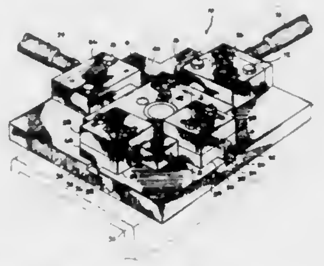


1. A holographic scanning motor comprising: a ring shaped rotor; a hologon scanning disc located within the ring shaped rotor; an air bearing assembly on which the rotor rides; and a stator assembly coupled to the air bearing assembly by a sleeve structure; wherein the sleeve structure includes at least one vent slot.

---

### 5,016,956
## LIGHTING PANEL FOR LIQUID CRYSTAL DISPLAY

**Bernard V. Gasparaitis, Tamarac, and William J. Knutson, Coral Springs, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Oct. 2, 1989, Ser. No. 415,849**
**Int. Cl.$^5$ G02B** *6/00*
**U.S. Cl. 350—96.10** **10 Claims**



1. A lighting panel, comprising:

a mat comprising a plurality of transparent optical fiber strands woven together;

a transparent panel element molded over the mat:

an end formed by the optical fiber strands as a bundle for receiving light;

a ferrule connected to the bundle; and

a light source for fitting within the ferrule.

---

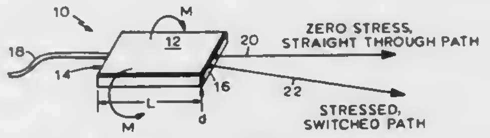
### 5,016,957
## PHOTOELASTIC OPTICAL SWITCH AND OPTICAL SYSTEMS EMPLOYING THE OPTICAL SWITCH AND A METHOD OF USE THEREOF

**George Seaver, 19 Mystery La., Cataumet, Mass. 02534**
**Filed Nov. 20, 1989, Ser. No. 439,710**
**Int. Cl.$^5$ G02B** *6/10, 6/26, 6/42*
**U.S. Cl. 350—96.13** **21 Claims**

1. An optical switch for altering the path of an optical beam, which optical switch comprises:

(a) a photoelastic, optically transparent material having a defined thickness and whose index of refraction changes with mechanical stress and which optical material has an inlet window adapted to receive an optical beam from an optical source, an outlet window adapted to pass an optical beam from the photoelastic transparent material to an optical receptor, the photoelastic, transparent material permitting an optical beam to pass between the inlet and outlet windows; and

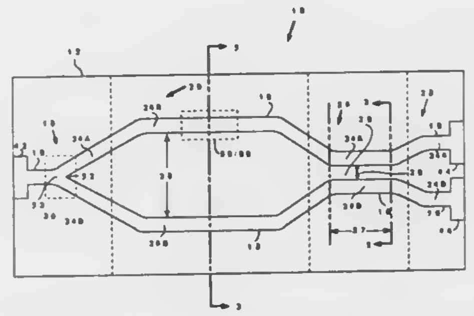
(b) means to apply a predetermined force to the photoelastic, optically transparent material to form a mechanical stress gradient within such material which changes the index of refraction of said material concurrent with the change in stress gradient to alter the optical beam path of the optical beam and said stress gradient being applied generally perpendicularly to said optical beam path within said transparent material so as to alter the optical beam between an unstressed optical beam path and a stressed optical beam path thereby providing for the change in the output angle and position of the unstressed and stressed optical beam paths from the outlet window.



---

### 5,016,958
## OPTICAL SWITCH HAVING A PHASE CHANGE REGION THEREIN

**Bruce L. Booth, West Chester, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**
**Filed Feb. 7, 1989, Ser. No. 307,059**
**Int. Cl.$^5$ G02F** *1/00*
**U.S. Cl. 350—96.13** **26 Claims**



1. An optical switch for switching light in an optical circuit comprising:

a photohardenable film having a waveguide formed therein, the film having a first and a second surface thereon, the film forming a part of the optical circuit;

the waveguide having an input region branching into a first and a second leg, the legs passing sequentially through a phase change region and a distinct evanescent coupling region, a predetermined percentage of light launched into the input region splitting into each of the legs;

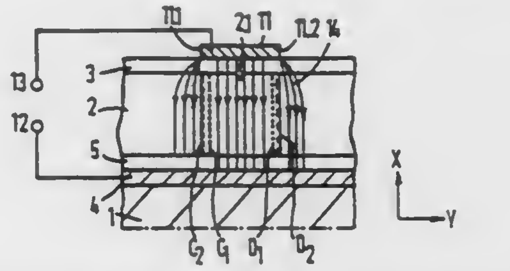
a first and a second buffer layer respectively disposed on the first and second surface of the film in respective positions above and below the waveguide;

means for changing the temperature of at least a selected one of the legs in the phase change region by a predetermined amount in a predetermined direction thereby altering the phase relationship between light carried in the legs by a predetermined amount so that, in the coupling region, there occurs a corresponding predetermined transfer of light from one leg to the other.

---

### 5,016,959
## ELECTRO-OPTICAL COMPONENT AND METHOD FOR MAKING THE SAME

**Martinus B. J. Diemeer, Zoetermeer, Netherlands, assignor to Koninklijke PTT Nederland N.V., Groningen, Netherlands**
**Filed May 22, 1989, Ser. No. 354,741**
**Claims priority, application Netherlands, May 30, 1988, 8801377**
**Int. Cl.$^5$ G02B** *6/10;* **H01L** *49/00*
**U.S. Cl. 350—96.14** **17 Claims**



1. An electro-optical (e/o) component comprising:

a mainly plane light-conducting layer supported on a substrate and having a potentially electro-optically active area, and at least two partly co-operating electrodes disposed against said layer in preselected patterns for generating an electric field with an effect extending into the potentially electro-optically active area by applying a difference in voltage between said electrodes, characterized in that

the light conducting layer consists of a material having a potentiality for e/o activity which is destructible under exciting radiation, in which material a potentially electro-optically active area has been left undisturbed beforehand by a selective irradiation procedure by which potentiality for e/o activity was destroyed in at least one area of said material, and in that

the electrodes are positioned, with regard to said area left undisturbed by said irradiation in such a way that a difference in voltage applied across the electrodes induces such a field distribution that at least in a border area on either side of the place where said area left undisturbed by said irradiation borders on irradiated material, the electric field will show a high degree of intensity or uniformity or both intensity and uniformity.

---

### 5,016,960
## HYBRID OPTICAL Y-JUNCTION

**Elliot Eichen, Arlington, and Paul Melman, Newton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**
**Filed Dec. 22, 1989, Ser. No. 455,526**
**Int. Cl.$^5$ G02B** *6/26*
**U.S. Cl. 350—96.15** **7 Claims**

1. A hybrid optical Y-junction, comprising:

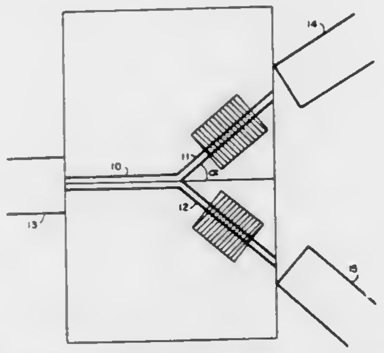
a 1×N optical fiber coupler having a fiber input and N fiber outputs;

a plurality of semiconductor optical amplifiers fabricated on a common substrate, each of said amplifiers having an input and an output;

means for fiber coupling each of the fiber outputs of said

VOL 1126
ISS 3
MY 21
1991
UMI

optical fiber coupler to the input of a respective one of said amplifiers; and

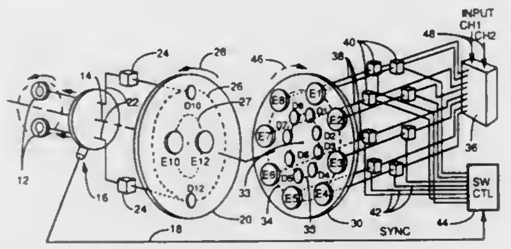


a plurality of fiber connecting means each coupled to the output of a respective amplifier.

---

### 5,016,961
### OPTICAL APPARATUS FOR ELECTRICALLY INTER-COUPLING ROTATING AND STATIONARY DEVICES

**William N. Aldrich, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.**
**Filed Dec. 14, 1989, Ser. No. 450,895**
**Int. Cl.$^5$ G02B *6/28***
**U.S. Cl. 350—96.15** **17 Claims**



1. Apparatus for bi-directionally transmitting, between a stationary member and a rotatable member, at least one electrical signal along at least one channel, said transmitting being between optical means having at least one optical emitter for generating an optical signal and at least one optical detector for re-generating the electrical signal in response to the optical signal, comprising:

an optical emitter disposed on a preselected circumference of either the stationary member or the rotatable member;

an optical detector concentrically disposed on the other of the stationary member of the rotatable member along a matching circumference and in facing registration with the optical emitter, with a preselected gap therebetween; and

switching means responsive to the rotatable member for switching the optical means on the stationary member in sync with rotation of the rotatable member to supply the electrical signal.

---

### 5,016,962
### METHOD OF REPAIRING AN OPTICAL FIBER

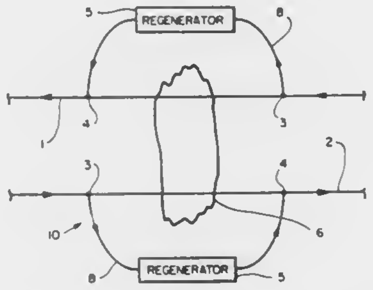
**Donald J. Martin, Fremont; Ralph A. Narciso, Woodside; David T. Lowe, Mill Valley, and Clifford H. Greenman, Palo Alto, all of Calif., assignors to Raynet Corporation, Menlo Park, Calif.**
**Filed Mar. 19, 1990, Ser. No. 495,661**
**Int. Cl.$^5$ G02B *6/02***
**U.S. Cl. 350—96.16** **8 Claims**

1. A method of insuring optical signal transmission in an optical fiber network which has a fiber section which may not be capable of transmitting optical signals and may be in need of work, comprising the steps of:

attaching a first passive coupler at a location upstream of the fiber section for withdrawing an optical signal out of a core of the optical fiber by passing the signal through a side of a fiber cladding;

attaching a second passive coupler at a location downstream of the fiber section for injecting the withdrawn optical signal into the optical fiber core by passing the signal through the side of an optical fiber cladding;

optically connecting the first coupler to the second coupler so as to allow the optical signal withdrawn by the first coupler to be injected by the second coupler;



repairing the section so as to enable optical signal transmission therethrough;

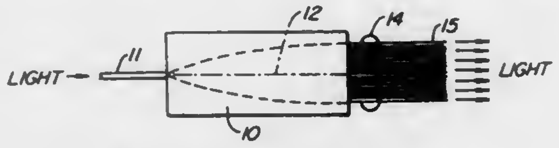
attaching third and fourth couplers for reading and writing, respectively, onto a further fiber traversing the fiber section and optically interconnecting these third and fourth couplers so as to allow a further optical signal in the further fiber to bypass the section by being withdrawn by the third coupler and being injected by the fourth coupler;

removing the first, second, third, and fourth couplers from the optical fibers subsequent to completing the work on the fiber section.

---

### 5,016,963
### FIBER OPTIC COUPLER AND METHOD OF MAKING SAME

**Jing-Jong Pan, San Jose, Calif., assignor to E-Tek Dynamics, Inc., San Jose, Calif.**
**Filed Aug. 8, 1989, Ser. No. 390,795**
**Int. Cl.$^5$ G02B *6/32***
**U.S. Cl. 350—96.18** **38 Claims**



1. A 1×N fiber optic coupler comprising

a GRIN lens having first and second opposite sides;

a first optical fiber having a microlens formed at a first end, said first end of said optical fiber fixed in relation to said GRIN lens at said first side; and

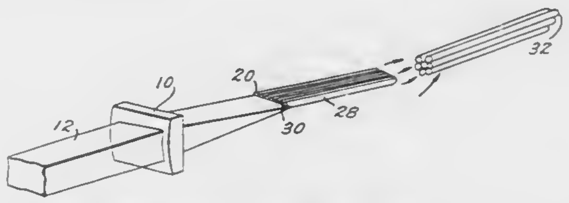
a plurality of N second optical fibers, each of said second fibers having a tapered end section, said second optical fiber tapered end sections fixed in a bundle at said second side of said GRIN lens;

whereby a light signal from said first optical fiber is split into N light signals in said second optical fibers.

---

### 5,016,964
### OPTICAL FIBER COUPLER WITH LINEAR INPUT

**Michael B. Donnelly, Colorado Springs, Colo., assignor to Spectranetics Corporation, Colorado Springs, Colo.**
**Filed Oct. 4, 1989, Ser. No. 417,245**
**Int. Cl.$^5$ G02B *6/32***
**U.S. Cl. 350—96.18** **17 Claims**



1. A laser transmission system, comprising:

lens means for focusing a laser beam to a focused line;

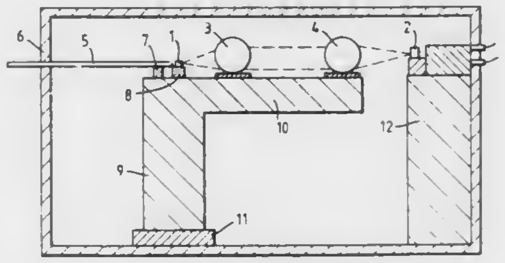
means for projecting a laser beam through the lens means;

a plurality of optical fibers, each fiber having a proximal end, the proximal ends being arranged in linear configuration to accept the focused line.

---

### 5,016,965
### OPTICAL PACKAGE

**Ian W. Marshall, Woodbridge, and Philip D. Constantine, Ipswich, both of England, assignors to British Telecommunications public limited company, United Kingdom**
**PCT No. PCT/GB88/00842, § 371 Date Nov. 13, 1989, § 102(e) Date Nov. 13, 1989, PCT Pub. No. WO89/03539, PCT Pub. Date Apr. 20, 1989**
**PCT Filed Oct. 7, 1988, Ser. No. 435,400**
**Claims priority, application United Kingdom, Oct. 8, 1987, 8723595**
**Int. Cl.$^5$ G02B *6/32***
**U.S. Cl. 350—96.18** **9 Claims**



1. A device package comprising:

a light emitting element supported on a first mounting;

a light receiving element supported on a second mounting;

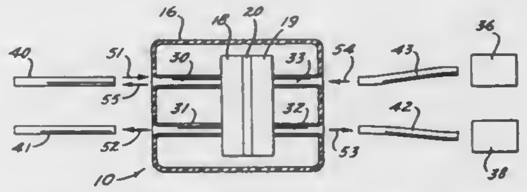
said light emitting element and said light receiving element having; when operating, relative movement therebetween; and

a lens assembly supported on said first mounting for directing light from the light emitting element on to the light receiving element, the lens assembly including a first lens located with the light emitting element at its focus and a second lens aligned with the first lens and with the light receiving element located within the focal range of the second lens.

---

### 5,016,966
### ASYMMETIC OPTICAL FIBER TAP

**Terry P. Bowen, Etters, Pa., and John R. Rowlette, Clemmons, N.C., assignors to AMP Incorporated, Harrisburg, Pa.**
**Filed Apr. 12, 1990, Ser. No. 508,745**
**Int. Cl.$^5$ G02B *6/34, 5/32***
**U.S. Cl. 350—96.19** **51 Claims**



1. An asymmetric fiber optic tap for optically coupling an ingoing fiber, an outgoing fiber and a tap fiber, comprising:

a housing;

at least one wavelength compensated holographic optical element (HOE) in said housing;

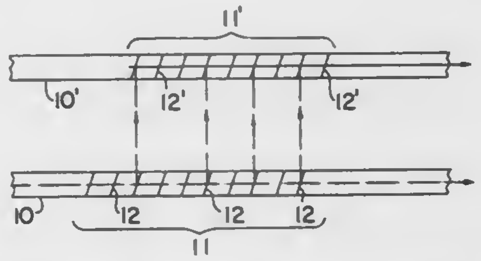
said housing having first, second and third guide means therein, said first, second and third guide means being adapted to guide the ingoing fiber, the outgoing fiber and the tap fiber, respectively, to said at least one HOE;

said at least one HOE being adapted to reflectively couple optical energy from said first guide means to said second guide means, and to transmissively coupled optical energy from said first guide means to said third guide means.

---

### 5,016,967
### MULTI-CORE OPTICAL WAVEGUIDE BRAGG GRATING LIGHT REDIRECTING ARRANGEMENT

**Gerald Meltz, Avon, and William W. Morey, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**
**Filed Dec. 26, 1989, Ser. No. 456,439**
**Int. Cl.$^5$ G02B *6/34***
**U.S. Cl. 350—96.19** **4 Claims**



1. A multi-core optical waveguide light redirecting arrangement comprising:

an optical waveguide having two spaced end portions and including at least two solid material waveguiding portions of substantially constant cross sections and each capable of guiding light between said end portions in a path extending along a predetermined axis and arranged substantially parallel to one another at a predetermined transverse distance from one another; and

a grating region embedded in each of said waveguiding portions between said end portions and substantially coextensively with said grating region of the respectively other of said waveguiding portions, each of said gratings having a multitude of grating elements constituted by periodic index of refraction variations and extending at substantially identical periodic spacings as considered in the direction of said axis and at substantially the same angle relative to said axis to redirect light reaching said grating elements and having a wavelength in a range depending on said periodic spacings between said path of a first of

VOL
1126
ISS
3
MY
21
1991
UMI

said waveguiding portions and that of a second of said waveguiding portions.

---

### 5,016,968

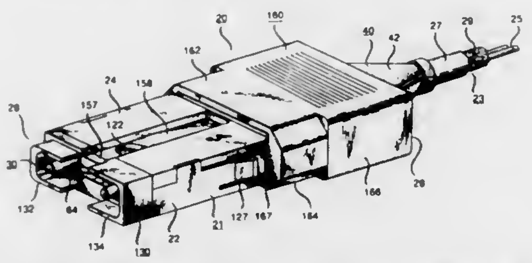
### DUPLEX OPTICAL FIBER CONNECTOR AND CABLES TERMINATED THEREWITH

**Rodney W. Hammond, Norcross; Clyde J. Myers, Stone Mountain, and Ruben Travieso, Alpharetta, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Sep. 27, 1989, Ser. No. 413,501**

**Int. Cl.$^5$ G02B** *6/36*

**U.S. Cl. 350—96.20** **19 Claims**



1. A duplex optical fiber connector for terminating two optical fibers of a cable and being adapted to be connected optically to another connector, said duplex connector comprising:

a housing which comprises first and second mating portions and which includes a cable entry end and a free end with one of said mating portions including a keyway;

two plug assemblies disposed within said housing adjacent to said free end of said housing, each said plug assembly including a ferrule being adapted to be associated with and to terminate one of the optical fibers of a cable and having a portion which protrudes from said free end of said housing; and

protective means being mounted in a fixed position on said free end of said housing for protecting end portions of the ferrules which protrude from said housing and being capable of being removed to expose said end portions of said ferrules, said protective means including a keyway which becomes aligned with said keyway of said housing when said protective means is mounted on said free end of said housing, wherein said housing is capable of having any one of a plurality of protective means having keyways of different cross sectional dimensions mounted thereon to allow said connector to be keyed to a desired receptacle having a mating key formed on an inner wall thereof.

---

### 5,016,969

### MECHANISM FOR NESTING AN OPTICAL FIBER IN AN OPTICAL COUPLER AND PROVIDING POSITIVE STOP OPENING AND CLOSING POSITIONS FOR THE COUPLER

**Louis S. Saiia, San Jose, and Whitfield G. Halstead, San Mateo, both of Calif., assignors to Raynet Corporation, Menlo Park, Calif.**

**Filed Aug. 28, 1989, Ser. No. 399,684**

**Int. Cl.$^5$ G02B** *6/36, 7/26*

**U.S. Cl. 350—96.20** **12 Claims**

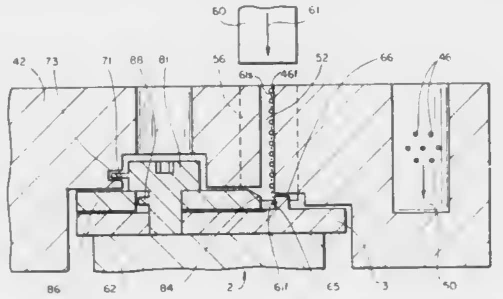
1. An optical fiber coupler mechanism, comprising:

a coupler body;

a slideable member engageable and disengageable with the coupler body, the slideable member and coupler body forming an optical fiber coupling region therebetween for an optical fiber when engaged;

rotating means for sliding the slideable member towards and away from the optical fiber coupling region;

means for limiting movement of the rotating means at a first movement limiting position such that at the first movement limiting position the slideable member is either in its disengaged position whereat the optical fiber is optically disengaged from the coupling region or the slideable member is in its engaged position whereat an optical fiber is optically engaged with the coupling region.



---

### 5,016,970

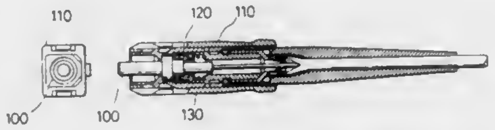
### FERRULE FOR OPTICAL FIBER TRANSMITTING LINEARLY POLARIZED LIGHT AND OPTICAL FIBER CONNECTOR USING THIS FERRULE

**Ryo Nagase, Mito; Juichi Noda, Machida, and Etsuji Sugita, Tachikawa, all of Japan, assignors to Nippon Telegraph and Telephone Corp., Japan**

**Filed Aug. 10, 1989, Ser. No. 392,069**

**Int. Cl.$^5$ G02B** *6/38*

**U.S. Cl. 350—96.21** **17 Claims**



1. A ferrule for optical fibers transmitting linearly polarized light, comprising:

an insertion portion having a puncture for an optical fiber; and

a flange portion having an open end for receiving a coated optical fiber, having a tapering inner diameter between a part including the open end which has a smaller diameter and another part including another end to be attached to the insertion portion which has a larger diameter;

said ferrule including at least two paths connecting a region in a vicinity of an end of the puncture inside the flange portion with the outside of the ferrule.

---

### 5,016,971

### AUTOMATED LASER FUSION SYSTEM FOR HIGH STRENGTH OPTICAL FIBER SPLICING

**Hui-Pin Hsu, Northridge; Soon Jang, Los Angeles, and Lee R. Hinze, Simi Valley, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Oct. 20, 1989, Ser. No. 424,794**

**Int. Cl.$^5$ G02B** *6/38*

**U.S. Cl. 350—96.21** **10 Claims**

1. An optical fiber splicing system comprising:

positioning means for moving end portions of at least two optical fibers until said portions are in relative alignment at a junction;

means for directing a high intensity beam of energy along a beam path intersecting said junction; and

focus control means for controlling the focus of said beam and thereby controlling a temperature profile of the energy at said junction; said focus control means including a first lens intersecting and selectively movable along said beam path for adjusting said temperature profile at said junction, as needed during the splicing process thereby splicing said at least-two optical fibers into a single optical fiber.

---

### 5,016,972

### DETACHABLE MULTIPLE SPLICING CONNECTOR FOR LIGHT WAVEGUIDES

**Helmut Schlaak, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

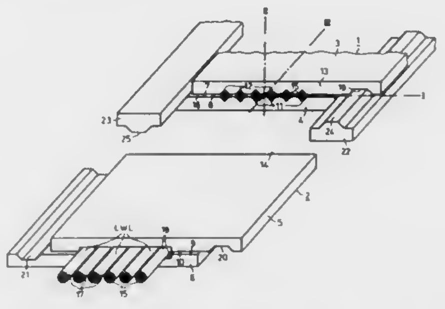
**PCT No. PCT/DE88/00502, § 371 Date Feb. 9, 1990, § 102(e) Date Feb. 9, 1990, PCT Pub. No. WO89/01641, PCT Pub. Date Feb. 23, 1989**

**PCT Filed Aug. 11, 1988, Ser. No. 473,954**

**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3728053**

**Int. Cl.$^5$ G02B** *6/40, 6/38*

**U.S. Cl. 350—96.22** **3 Claims**



1. A detachable multiple-fiber splice connector for optical waveguides having two splice halves meeting on front sides thereof, each splice half comprising two bearing parts having surfaces facing each other, said surfaces defining a connecting area, said connecting area being adapted for carrying optical waveguide sections, and further comprising adapters disposed laterally and parallel to the optical waveguide sections in guide grooves, said guide grooves being disposed on said surfaces, said adapters providing means for aligning the two splice halves with one another relative to the optical waveguide sections to be coupled, each bearing part having at least one guide groove on the respective surface, the guide grooves projecting freely from the respective bearing parts such that the guide grooves freely extend past the bearing part which they face, the adapters comprising a guide support insertable into said freely extending guide grooves for aligning said two splice halves.

---

### 5,016,973

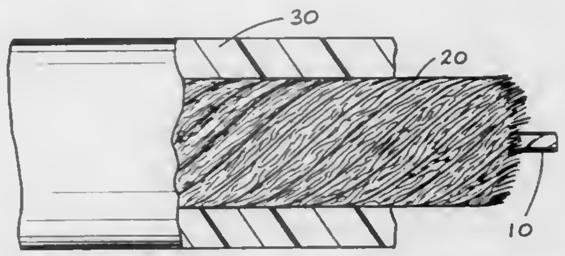
### CABLE REINFORCEMENT FOR AN OPTICAL FIBER CABLE

**Thomas P. Hager, Westerville, Ohio, and Ralph S. Dale, Aiken, S.C., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Aug. 25, 1989, Ser. No. 398,861**

**Int. Cl.$^5$ G02B** *6/44*

**U.S. Cl. 350—96.23** **14 Claims**



1. An optical cable member comprising at least one optical fiber wrapped with a sheath of yarn, said yarn consisting of a core member encased with spun synthetic staple fibers and an outer jacket surrounding said yarn wrapped optical fiber.

---

### 5,016,974

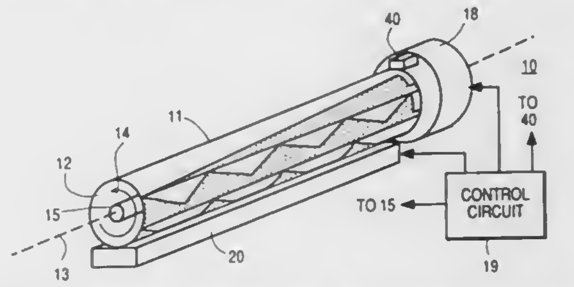
### SPIN INITIALIZATION PROCEDURE

**Charles Lee, deceased, late of Berkeley Hgts., N.J., by Marjorie Lee, administrator, assignor to Photon Imaging Corp., Edison, N.J.**

**Filed Apr. 7, 1989, Ser. No. 335,196**

**Int. Cl.$^5$ G02B** *6/04*

**U.S. Cl. 350—96.24** **10 Claims**



1. A combination of a tube having an axis, a first length and a periphery, said tube comprising a transparent film having said first length and being arranged to define said periphery of said tube, said film having formed hereon a multistage pattern of opaque shapes, said pattern being aligned with said axis, successive stages of said pattern having successively higher resolution to provide predictably changing different patterns of light intensities along a sequence of position defined along a linear path aligned with said axis and external to said periphery when said tube is spun about said axis, said tube having a light source positioned along the length of said axis and including a means for spinning said tube, said combination also including a fiber optic bundle having a linear face being coupled to an array of analog photo sensors, said linear face being aligned with said linear path wherein said array comprises a plurality of sensors for each fiber end in said array.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,016,975

## ELECTRONIC ENDOSCOPE PROVIDED WITH A SAMPLE-HOLD CIRCUIT

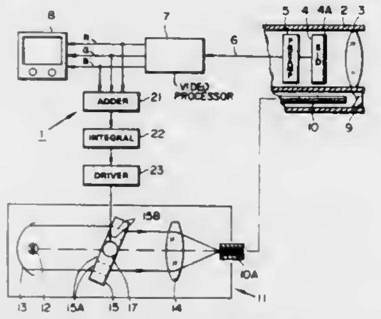
**Masahiko Sasaki; Tadashi Kato; Hiroyoshi Fujimori, all of Hachioji; Tatsuo Nagasaki, Musashino; Fumiyuki Onoda, Tokyo; Toshiaki Nishikori, Sagamihara; Hideo Tomabechi, Higashiyamato; Kazutake Sugawara; Kazuo Nakamura, both of Hachioji; Ootaro Ando, and Koichi Karaki, both of Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 760,427, Jul. 30, 1985, abandoned. This application Jun. 8, 1989, Ser. No. 364,504**

**Claims priority, application Japan, Jul. 31, 1984, 59-162523; Aug. 21, 1984, 59-173832; Jan. 31, 1985, 60-16910; May 28, 1985, 60-114829**

**Int. Cl.$^5$ G02B** *23/26*

**U.S. Cl. 350—96.26** **12 Claims**



1. An electronic endoscope comprising:
an elongated insertable part;
a light emitting means for emitting an illuminating light from the tip side of said insertable part;
an objective lens, provided on the tip side of said insertable part, for forming an image from the area illuminated by said emitted light;
a solid state imaging device, whose light receiving plane is on an image forming position of said objective lens, for forming an output signal from said formed image; and
a sample-holding circuit, provided within said electronic endoscope, for sample-holding an output signal from said solid state image device.

---

### 5,016,976

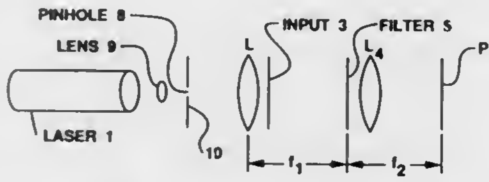
## MODIFIED COMPACT 2F OPTICAL CORRELATOR

**Joseph L. Horner, Belmont; Kenneth H. Fielding, Hanscom Air Force Base, and Charles K. Makekau, Bedford, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Mar. 30, 1990, Ser. No. 502,486**

**Int. Cl.$^5$ G02B** *27/46;* **G06K** *9/00*

**U.S. Cl. 350—162.13** **10 Claims**



1. In an optical correlation system comprising:
(a) first Fourier transform lens means for taking the Fourier transform of a first signal representing an input image and forming said Fourier transform at a first position along an optical axis;
(b) a filter located at said first position providing information obtained from a second signal which is to be correlated with said first signal;
(c) second Fourier transform lens means in optical alignment with said filter for taking the inverse Fourier transform of the product of the Fourier transform of said first signal, and said information of said second signal, and for forming said inverse Fourier transform at a second position along said optical axis, said inverse Fourier transform being substantially equivalent to the mathematical correlation function between said first signal and said second signal;
(d) input signal producing means for producing said first input signal behind said first Fourier transform lens to introduce a wavefront distortion quadratic phase term; and
(e) means for positioning said second Fourier transform lens means behind said filter, said second Fourier transform lens means having a focal length which removes said quadratic phase term from said wavefront while concurrently inverse Fourier transforming the disturbance behind the filter to produce a correlation signal at said second position;
(f) a collimating lens positioned in front of said first Fourier transform lens means for directing collimated coherent light thereat;
(g) the improvement comprising combining said collimating lens means with said Fourier transform lens means to produce a single Fourier transform lens means having a focal length about equal to $f_5$ where $f_5$ is determined by solving the equation $1/f_5 = 1/f_c = 1/f_1$;
Where $f_c$ equals the focal length of said collimating lens means and $f_1$ equals the focal length of said first Fourier transform lens means.

---

### 5,016,977

## OPTICAL LENS FOR CORRECTING ASTIGMATISM

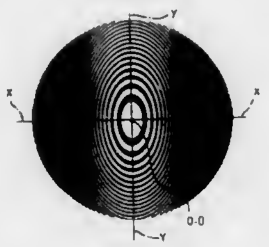
**Dominique Baude, Saint Ouen; Pierre Chavel, Chilly Mazarin; Denis Joyeux, Les Ulis, and Jean Taboury, Sceaux, all of France, assignors to Essilor International-Compagnie Generale, Cedex, France**

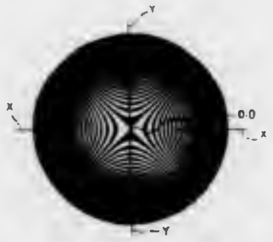
**Filed Feb. 5, 1990, Ser. No. 475,159**

**Claims priority, application France, Feb. 6, 1989, 89 01472**

**Int. Cl.$^5$ G02B** *5/18;* **G02C** *7/02, 7/04;* **A61F** *2/16*

**U.S. Cl. 350—162.17** **7 Claims**





1. A lens for correcting astigmatism, including adjacent hyperbolic- or elliptical-outline diffractive components whose periodicity in two mutually orthogonal X and Y directions intersecting at the axis of the lens and coinciding with the main axes of the hyperbolas or the ellipses are respectively determined by the equations:

$$\Delta r_x^2 = 2\lambda|f_x|; \text{ and}$$

$$\Delta r_y^2 = 2\lambda|f_y|;$$

in which:
$\Delta r_x^2$ represents the periodicity in $r^2$ along the X direction;
$\Delta r_y^2$ represents the periodicity in $r^2$ along the Y direction;
$\lambda$ represents the means utilization wavelength;
$f_x$ represents the desired focal length in the X direction; and
$f_y$ represents the desired focal length in the Y direction.

---

### 5,016,978

## MAGNETICALLY CONTROLLED OPTICAL SWITCH

**Alain Fargette, 3, Rue Nungesser, FR-93150, Le Blanc-Mesnil; André Marland, 35, Avenue Chevreul, FR-92270, Bois-Colombes; Fabrice Thomas, 28, Rue Taine, FR-75012, Paris, and Alain Souloumiac, 38, Avenue du Presidente Allende, FR-93100, Montreuil, all of France**

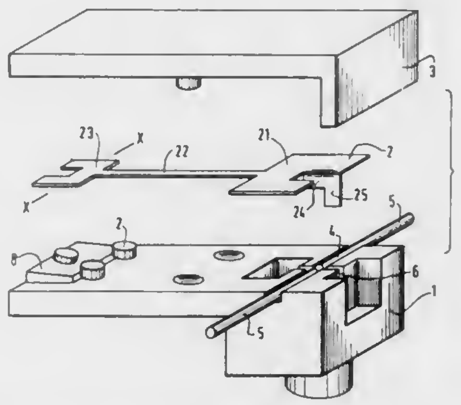
**PCT No. PCT/FR88/00394, § 371 Date Mar. 28, 1989, § 102(e) Date Mar. 28, 1989, PCT Pub. No. WO89/01173, PCT Pub. Date Feb. 9, 1989**

**PCT Filed Jul. 29, 1988, Ser. No. 350,733**

**Claims priority, application France, Jul. 31, 1987, 87 10880**

**Int. Cl.$^5$ G02B** *26/02, 6/02, 26/00*

**U.S. Cl. 350—269** **9 Claims**



1. An optical switch comprising:
a base receiving at least one optical fiber, the base defining a light path across which light from the optical fiber passes, and a guide slot intersecting said light path;
a movable shutter displaceable at least partially inside said guide slot between a position where the shutter allows light to pass along said light path and a position where the shutter interrupts said passage of the light, and a return spring for the shutter; and,
wherein said shutter and said spring constitute portions of a deformable blade, the return spring being fixed at one of its ends to the base, and a moving portion of said blade having a surface which is large enough to be capable of responding to magnetic force exerted against the action of said spring.

---

### 5,016,979

## ANTI-GLARE INSIDE REARVIEW MIRROR ASSEMBLY FOR MOTOR VEHICLE

**Kunio Yoshino, Saitama, Japan, assignor to Kabushiki Kaisha Matsuyama Seisakusho, Tokyo, Japan**

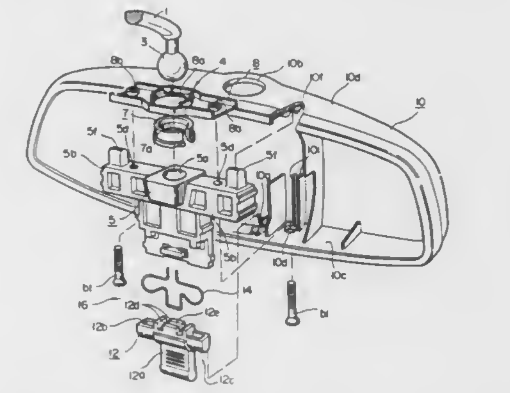
**Filed May 30, 1990, Ser. No. 531,514**

**Claims priority, application Japan, May 31, 1989, 1-63579[U]**

**Int. Cl.$^5$ B60R** *1/04;* **G02B** *5/08*

**U.S. Cl. 350—281** **6 Claims**

3. An anti-glare inside rearview mirror assembly for use in a motor vehicle having a motor vehicle body, comprising:
a support adapted to extend from the motor vehicle body and including a spherical body at one end thereof;
bracket means having a recess engaging at least a portion of said spherical body;
clamping means for clamping said spherical body in cooperation with said bracket means;
a housing accommodating said bracket means therein, said housing having an upper wall, a lower wall, an open front wall, and a rear wall;
a mirror mounted in said open front wall of the housing; and
angle adjusting means for adjusting the angle of said housing with respect to said bracket;
said housing having at least one hole defined in said lower wall for insertion of a tool therethrough to adjust the force with which said spherical body is clamped by said clamping means in cooperation with said bracket means; and



said clamping means comprises:
an annular cap engaging at least a portion of said spherical body, said annular cap being partly cut off;
at least one bolt inserted through said hole in the lower hole of said housing; and
a holder plate having a hole in which said cap is fitted and a threaded hole in which said bolt is threaded.

---

### 5,016,980

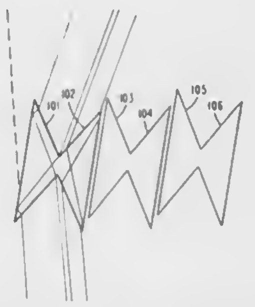
## SYSTEMS FOR DEVIATING AND (OPTIONALLY) CONVERGING RADIATION

**Robert D. Waldron, 15339 Regalado St., Hacienda Heights, Calif. 91745**

**Division of Ser. No. 796,957, Nov. 12, 1985, Pat. No. 4,867,514. This application Apr. 6, 1989, Ser. No. 334,685**

**Int. Cl.$^5$ G02B** *5/04*

**U.S. Cl. 350—286** **12 Claims**



1. A system for changing the direction of propagation of radiation incident of the system comprising a periodic array of pairs of dove prisms, said dove prisms being light-transmissive, and being adapted to change said direction of propagation internally to said prisms, wherein the apexes of the dove prisms in each pair face one another.

VOL
1126
ISS
3
MY
21
1991
UMI

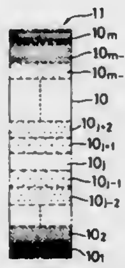
### 5,016,981
### MASK

**Norman A. Peppers, Belmont; James R. Young, Palo Alto; Gerald A. Pierce, Redwood City, all of Calif.; Kazuo Katsuki, and Ken Yamashita, both of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan**

**Filed Apr. 14, 1987, Ser. No. 38,636**

**Int. Cl.$^5$ G02B *5/22***

**U.S. Cl. 350—314 17 Claims**



1. A mask for transmitting a predetermined optical image composed of at least one projection component for display on a display screen, said projection component having a shape and location subject to statistical variations, said mask comprising:

(a) a first area of maximum transmittance $\tau_j$ corresponding in shape to said shape of said projection component; and

(b) a second area of transmittance $\tau_{j-1}$ less than said maximum transmittance $\tau_j$, said transmittances of said first and second areas selected as a function of the probability of said projection component being projected onto said areas.

---

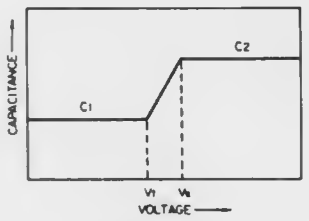
### 5,016,982
### LIQUID CRYSTAL DISPLAY HAVING A CAPACITOR FOR OVERVOLTAGE PROTECTION

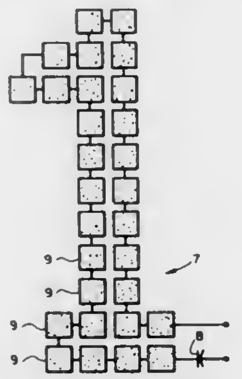
**James L. Fergason, Atherton, and Manoochehr Mohebban, Foster City, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 176,522, Apr. 1, 1988, abandoned, which is a continuation-in-part of Ser. No. 889,046, Jul. 22, 1986, abandoned. This application Nov. 17, 1989, Ser. No. 437,326**

**Int. Cl.$^5$ G02F *1/13***

**U.S. Cl. 350—331 R 12 Claims**





1. An electrical apparatus comprising

(a) a liquid crystal display comprising a positive dielectric anisotropy liquid crystal and having a capacitance $C_1$ below its threshold voltage and a capacitance $C_2$ above its saturation voltage and

(b) a capacitor connected in series with said display and having a substantially constant capacitance $C_0$ satisfying the inequality

$$C_0 < C_2.$$

---

### 5,016,983
### DRIVE METHOD OF LIQUID CRYSTAL DEVICE

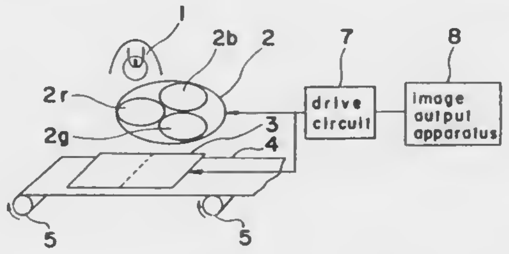
**Mitsuaki Shioji, Yamatokoriyama; Kenichi Morimoto; Shinji Kato, both of Nara; Takeshi Nakamura, Yamatokoriyama, and Nobuharu Nozaki, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 946,196, Dec. 24, 1986, abandoned. This application Jun. 27, 1989, Ser. No. 372,152**

**Claims priority, application Japan, Dec. 25, 1985, 60-296040**

**Int. Cl.$^5$ G02F *1/13***

**U.S. Cl. 350—332 14 Claims**



1. A method for driving a liquid crystal shutter comprising the steps of:

utilizing a liquid crystal shutter having a pair of transparent substrates positioned opposite to each other, a pair of transparent electrodes each formed on a plane of the transparent substrate to form a pattern and arranged opposite to each other so that overlapping parts of the patterns form a desired display area, a pair of aligning films each applied on the patterned transparent electrodes and on a portion of the transparent substrate not covered by the pattern, a liquid crystal material contained in a space between the transparent substrates, the liquid crystal material having a viscosity of 70 cps or less at 25° C., the liquid crystal material also having a threshold voltage of 3 volts or less and a transition temperature of 55° C. or more for changing from a nematic phase to an isotropic phase, and a pair of polarizers, the polarizers being of a transmission type, each polarizer being formed on a respective transparent substrate opposite the plane of the patterned transparent electrode from said liquid crystal material, the polarizers having a wavelength transmittance dependence of +/−10% or less for light having a wavelength between 430 and 680 nm, the transmittance ($T_p$) in a parallel direction being 15% or more, the transmittance ($T_t$) in a transverse direction being 0.007% or less, and degree of polarity, $\{(T_p-T_t)/(T_p+T_t)\}*100$, being 99.96% or more;

applying an electric voltage to the transparent electrodes to prevent reception of incident light by using a static or multiplex drive when no image signal is received from an external apparatus; and

stopping the application of the electric voltage to the transparent electrodes which are related to the pixels selected according to the image signal, thereby transmitting the incident light when the image signal is received from the external apparatus.

### 5,016,984
### LIQUID CRYSTAL MOTION PICTURE PROJECTOR WITH MEMORY

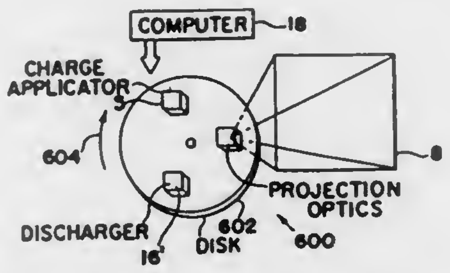
**James L. Fergason, Atherton, Calif., assignor to Manchester R & D Partnership, Pepper Pike, Ohio**

**PCT No. PCT/US87/01821, § 371 Date Apr. 29, 1988, § 102(e) Date Apr. 29, 1988, PCT Pub. No. WO88/01068, PCT Pub. Date Feb. 11, 1988**

**Continuation-in-part of Ser. No. 892,497, Aug. 1, 1986, Pat. No. 4,693,557, which is a continuation-in-part of Ser. No. 585,884, Mar. 2, 1984, Pat. No. 4,603,945, and a continuation-in-part of Ser. No. 608,135, May 8, 1984, Pat. No. 4,613,207. This PCT application Jul. 30, 1987, Ser. No. 189,311**

**Int. Cl.$^5$ G02F *1/13;* G03B *21/00***

**U.S. Cl. 350—334 9 Claims**



1. A liquid crystal moving picture projector comprising a liquid crystal imager means for creating characteristics of an image, and

projection optics means for projecting images sequentially created by the imager,

said imager means including a liquid crystal material capable of temporarily storing information at respective areas thereof to create image characteristics capable of being projected sequentially by said projection optics means,

said liquid crystal material comprising a disk-like structure of liquid crystal in a containment medium.

---

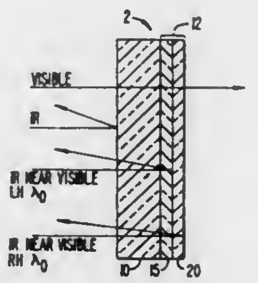
### 5,016,985
### INFRARED FILTER USING CHOLESTERIC LIQUIDS

**Michael Kalmanash, Los Altos, and Arthur L: Berman, Milpitas, both of Calif., assignors to Kaiser Aerospace & Electronics Corporation, Oakland, Calif.**

**Filed Jun. 24, 1988, Ser. No. 210,894**

**Int. Cl.$^5$ G02F *1/133***

**U.S. Cl. 350—335 13 Claims**



6. An infrared optical filter comprising:

an infrared filter for blocking transmission of light over a wide infrared band, said infrared filter having a nearly visible corner wavelength; and

a cholesteric liquid crystal filter for blocking transmission of infrared light in a narrow band, said narrow band including said corner wavelength.

---

### 5,016,986
### DISPLAY DEVICE HAVING AN IMPROVEMENT IN INSULATING BETWEEN CONDUCTORS CONNECTED TO ELECTRONIC COMPONENTS

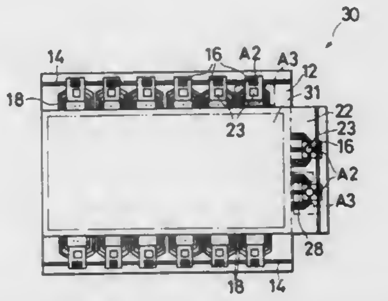
**Akihiro Kawashima, Tenri; Hirokazu Yoshida, Osaka; Yasunobu Tagusa, Kitakatsuragi; Kiyoshi Inada, Joyo; Hideshi Makita, Tenri, and Yoshihisa Dotta, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 12, 1989, Ser. No. 337,155**

**Claims priority, application Japan, Apr. 12, 1988, 63-91178**

**Int. Cl.$^5$ G02F *1/13;* G03C *5/00***

**U.S. Cl. 350—339 R 12 Claims**



1. An electronic apparatus including a plurality of conductors and an electrically insulating layer formed by photolithography, formed in this order, on an electrically insulating substrate, the apparatus further including an electronic device formed in an electronic device forming region on the electrically insulating substrate, connected to the plurality of conductors and the electrically insulating layer, the apparatus further comprising:

electronic circuit components to which bonding electrodes are connected;

the plurality of conductors being formed not only in the electronic device forming region but also in a region other than the electronic device forming region on the insulating substrate;

the electrically insulating layer being formed so as to insulate the plurality of conductors formed in the region other than the electronic device forming region on the substrate, from each other; and

the bonding electrodes being bonded to a bond region of the plurality of conductors not covered with the electrically insulating layer on the substrate, so as to electrically connect the electronic component to the plurality of conductors.

---

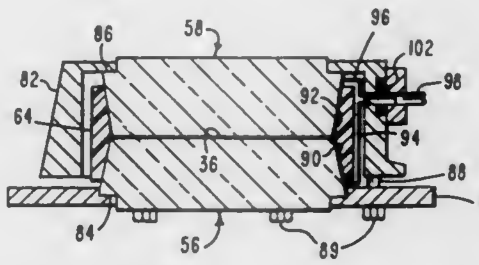
### 5,016,987
### LIQUID CRYSTAL CELL SEALANT ASSEMBLY

**Willis H. Smith, Jr., Newbury Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 5, 1990, Ser. No. 533,548**

**Int. Cl.$^5$ G02F *1/13***

**U.S. Cl. 350—344 19 Claims**



1. A liquid crystal light valve (LCLV) assembly, comprising:

VOL
1126
ISS
3
MY
21
1991
UMI

first and second transparent annular substrates having mutually opposed and spaced apart faces, and peripheral edges flaring outward and away from said opposed faces at predetermined angles,

an annular sealant ring encircling said substrates and sealing the space between said opposed faces, said sealant ring being formed from a stiffly resilient material having an inner surface with a chevron profile facing said substrates and chevron angles complementary to said predetermined substrate edge angles, said sealant ring having an unstressed inner diameter slightly smaller than the corresponding outer diameters of said substrates so that said sealant ring bears against said substrates and is slightly deformed outwardly thereby to hermetically seal said space, and

a liquid crystal layer and means for modulating said liquid crystal layer in response to a signal received through one of said substrates, said liquid crystal layer and modulating means located within said space between said opposed substrate faces.

---

### 5,016,988

## LIQUID CRYSTAL DISPLAY DEVICE WITH A BIREFRINGENT COMPENSATOR

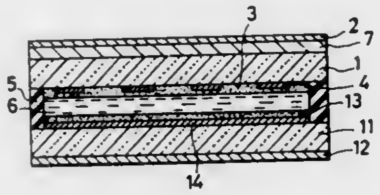
**Haruo Iimura, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

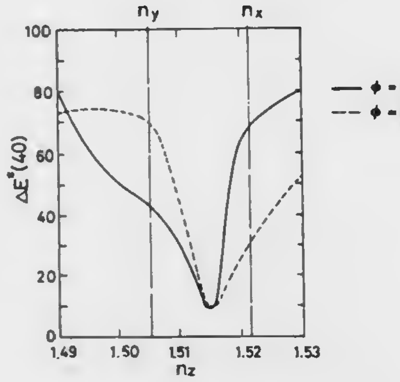
**Filed Feb. 5, 1990, Ser. No. 475,214**

**Claims priority, application Japan, Feb. 10, 1989, 1-32219; Dec. 20, 1989, 1-330244**

**Int. Cl.⁵ G02F *1/133***

**U.S. Cl. 350—347 R** **2 Claims**





1. A liquid crystal display device comprising:

(1) a liquid crystal cell having a structure in which a liquid crystal layer is sandwiched between a pair of substrates each having at least one electrode, and liquid crystal molecules in said liquid crystal layer are oriented substantially in parallel to the surface of said substrate and twisted at an angle of from 120° to 360° in the thickness direction of said liquid crystal layer when the voltage is not applied,

(2) a pair of polarizers disposed so as to sandwich said liquid crystal cell therebetween, and

(3) a birefringence layer disposed between the liquid crystal layer and at least one of the polarizers, wherein the angle ($\beta_1$) of the polarized light transmission axis ($P_1$) of said polarizer adjacent to said birefringence layer formed to the maximum refractive index direction (X) in said birefringence layer face parallel to said substrate surface is in the range of from 20° to 70° (as an absolute value), and the maximum refractive index $n_x$ and minimum refractive index $n_y$ in said birefringence layer face parallel to said substrate surface, and the refractive index $n_Z$ of said birefringence layer in the direction perpendicular to said substrate surface have a relationship represented by the following formula (I):

$$n_Y<n_Z<n_X \qquad (I).$$

---

### 5,016,989

## LIQUID CRYSTAL ELEMENT WITH IMPROVED CONTRAST AND BRIGHTNESS

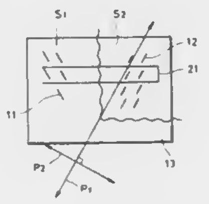
**Shinjiro Okada, Hiratsuka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

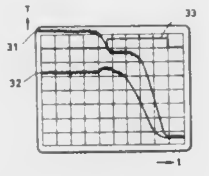
**Continuation of Ser. No. 245,299, Sep. 16, 1988, abandoned. This application Oct. 3, 1990, Ser. No. 593,350**

**Claims priority, application Japan, Sep. 18, 1987, 62-234034; Sep. 19, 1987, 62-235990**

**Int. Cl.⁵ G02F *1/13***

**U.S. Cl. 350—350 S** **15 Claims**





1. A liquid crystal element comprising:

(a) two electrode substrates;

(b) a chiral smectic liquid crystal disposed between said two electrode substrates having orientation states with a relationship $Is_1>Is_2$, where $Is_1$ is an amount of light transmitted during no voltage application after (1) setting two polarizers in the darkest state during no voltage application after the application of a voltage of one polarity greater than threshold voltage between the electrodes, and (2) the subsequent application and interruption of a voltage of another polarity greater than the threshold voltage between the electrodes, and $Is_2$ is an amount of light transmitted during no voltage application after (1) setting two polarizers in the darkest state during no voltage application after the application of a voltage of another polarity greater than the threshold voltage between the electrodes, and (2) the subsequent application and interruption of a voltage of one polarity greater than the threshold voltage between the electrodes; and

(c) two polarizers set in said dark state produced during no voltage application after the application of said voltage of another polarity greater than the threshold voltage between the electrodes, said polarizers being disposed having said pair of substrates thereinbetween.

---

### 5,016,990

## METHOD OF MODULATING AN OPTICAL BEAM

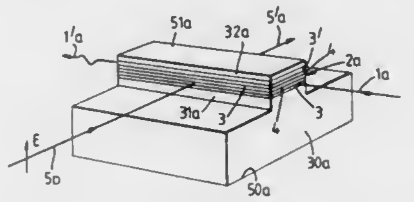
**Peter J. Dobson, South Croydon, England, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Jan. 26, 1989, Ser. No. 302,717**

**Claims priority, application United Kingdom, Feb. 12, 1988, 8803294**

**Int. Cl.⁵ G02F *1/01;* G02B *5/30;* H01L *27/12, 49/02***

**U.S. Cl. 350—353** **12 Claims**



1. A method of modulating an optical beam, which method comprises providing an etalon structure having an absorption edge in the vicinity of the wavelength of the optical beam and comprising material of a smaller band gap sandwiched between layers of material of a larger band gap so that the smaller band gap material forms a quantum size effect confinement region for electrons and holes, directing the optical beam through the quantum size effect confinement region of the etalon structure and directing a polarised control optical beam at the etalon structure with the electric field of the polarised control optical beam perpendicular to a direction of quantum size effect confinement of the etalon structure for causing the absorption edge of the etalon structure and the amplitude of the optical beam to be modulated by the control optical beam at a frequency which is twice the frequency of the polarised control optical beam.

---

### 5,016,991

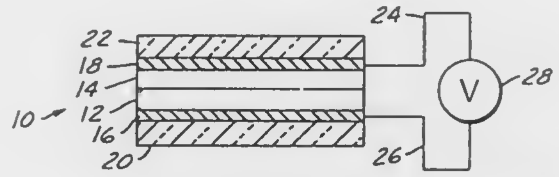
## FLEXIBLE, SOLID ELECTROLYTE USEFUL IN ELECTROCHROMIC DEVICES

**Claude F. Mason, Ypsilanti, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Mar. 27, 1989, Ser. No. 329,057**

**Int. Cl.⁵ H07M *6/04;* H01M *6/16;* G02F *1/17***

**U.S. Cl. 350—357** **37 Claims**



37. An electrochromic device comprising two substrates and therebetween: one electrode layer; an electrochromic layer; and another electrode layer, at least one of said one electrode layer and said other electrode layer being transparent and each electrode layer being in contact with a respective one of said substrates, an ion conductive layer to communicate ions to and from said electrochromic layer upon application of a voltage across said electrode layers, wherein said ion conductive layer comprises an interpenetrating polymer network of: (A) alkali metal doped, sol-gel component and (B) epoxy-amine component, said alkali metal doped, sol-gel component (A) being the reaction product of materials comprising: (i) metal oxide precursor containing hydrolyzable alkoxy groups, (ii) polyether having at least one hydroxyl group per molecule, and (iii) alkali metal salt, and said epoxy-amine component (B) being the reaction product of materials comprising: (i) polyepoxide and (ii) polyamine crosslinking agent containing at least two reactive amine groups.

---

### 5,016,992

## METHOD OF AND APPARATUS FOR THE READING OF MAGNETICALLY STORED INFORMATION

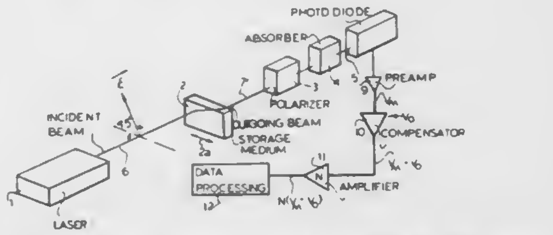
**Theo Woike, Cologne; Detlef Kerkmann, Jülich; Thomas Beier, Hürth; Wolfgang Krasser, and Danilo Pescia, both of Jülich, all of Fed. Rep. of Germany, assignors to Forschungszentrum Julich GmbH, Julich, Fed. Rep. of Germany**

**Filed Mar. 13, 1990, Ser. No. 493,129**

**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1989, 3908587**

**Int. Cl.⁵ G02F *1/09;* G11B *7/00, 11/00***

**U.S. Cl. 350—376** **20 Claims**



20. An apparatus for reading stored information, especially binary information, on a storage medium having information stored in a form of residual electromagnetic fields oriented in a particular direction, said apparatus comprising:

a light source for directing against said storage medium in regions thereof having information stored in the form of said residual electromagnetic fields oriented in said direction an incident light beam perpendicular to said direction, thereby generating an outgoing light beam from said storage medium coplanar with said incident light beam and perpendicular to said direction of the residual electromagnetic field in a respective region thereof;

an optoelectric detector in the path of said outgoing beam for detecting said outgoing light beam in a common plane of said light beams perpendicular to said direction and transducing said outgoing light beam into an output signal;

electric circuit means including:

a preamplifier connected to said detector for preamplifying an output signal thereof and producing an electrical signal $V_M$ of an amplitude which is a function of said intensity,

a compensator for modifying said electrical signal $V_M$ to produce an output signal,

an amplifier connected to said compensator for electronically amplifying said output signal to produce an amplified output signal, and

a signal processor connected to said amplifier for evaluating said information; and

a polarizer between said storage medium and said detector in said path so positioned as to intercept all light ray components from said storage medium except those which contribute to evaluation of the stored information.

---

### 5,016,993

## ZOOM MECHANISM FOR ZOOM LENSES

**Hiroshi Akitake, Hachioji, Japan, assignor to Olympus Optical Company Ltd., Japan**

**Filed Sep. 30, 1988, Ser. No. 252,504**

**Claims priority, application Japan, Oct. 2, 1987, 62-250440; Oct. 6, 1987, 62-251848**

**Int. Cl.⁵ G02B *15/00***

**U.S. Cl. 350—429** **30 Claims**

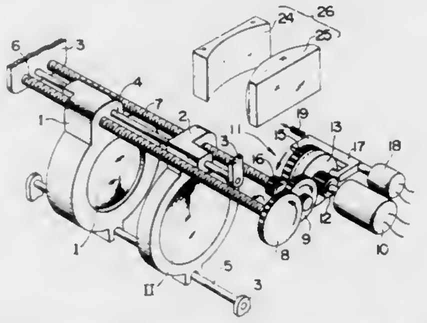
1. A zoom mechanism for zoom lenses which performs a zooming operation by moving a plurality of lens groups including a focusing lens group in a direction of an optical axis, comprising:

VOL
1126
ISS
3
MY
21
1991
UMI

a drive source;

a first drive mechanism for linearly driving said focusing lens group by said drive source in the optical axis direction;

a second drive mechanism for linearly driving at least one of said plurality of lens groups other than said focusing lens group in the optical axis direction; and



connection change-over means for connecting said first and second drive mechanisms to said drive source during the zooming operation and for disconnecting said second drive mechanism from said drive source during the focusing operation.

---

## 5,016,994
## PROJECTION-LENS SYSTEM

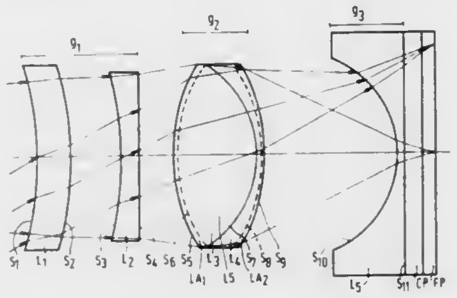
**Josephus J. M. Braat, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed May 13, 1985, Ser. No. 733,566**

**Claims priority, application Netherlands, Feb. 18, 1985, 8500453**

**Int. Cl.$^5$ B29D** *11/00*

**U.S. Cl. 350—432** **9 Claims**



1. A projection-lens system for projecting a magnified image of a scene reproduced by means of a reproduction element into a projection screen, which lens system comprises, in this order and from the image side, a first group, of which at least one outer surface is aspheric, a positive second or main group, of which at least the outer surface which faces the object side is aspheric, and a third group comprising a negative lens whose surface which faces the image side is concave and aspheric, the elements of the first group and the third group being made of transparent plastic, characterized in that the main group provides substantially the entire power of the system and comprises a glass lens substrate, the outer surface of said substrate which faces the object side being provided with a layer of a transparent plastic having an aspheric outer profile, said layer having a thickness which is substantially smaller than that of the glass lens substrate, said layer having negligible refractive power.

---

## 5,016,995
## RADIATION GATHERING AND FOCUSSING APPARATUS AND DEVICES

**William J. Pullen, V, P.O. Box 10202, Santiago, Chile**

**Filed Feb. 22, 1989, Ser. No. 313,490**

**Claims priority, application United Kingdom, Apr. 28, 1988, 8810127**

**Int. Cl.$^5$ G02B** *23/00, 5/08*

**U.S. Cl. 350—537** **8 Claims**

1. An astronomical optical telescope for receiving radiant energy from sources external thereto having:

a symmetry axis,

an eyepiece located at said symmetry axis,

a first reflecting surface extending circumferentially around said symmetry axis, facing towards said symmetry axis and being part of a surface of a cone coaxial with said symmetry axis, said first reflecting surface being oriented to receive radiant energy from sources external to said telescope, and

a second reflecting surface which is a focussing surface and is at least part of a surface of revolution generated by rotation of a parabolic arc about said symmetry axis, said parabolic arc belonging to a parabola having a principal axis which is at a non-zero angle $\theta$ degrees to said symmetry axis, a focus which lies on said symmetry axis and a vertex which lies on the opposite side of said symmetry axis from said parabolic arc,

wherein (i) the half angle of said cone is $90-\theta/2$ degrees and (ii) the axial position of said second reflecting surface is positioned relative to said first reflecting surface such that rays of radiation which are parallel to said symmetry axis and incident upon said first reflecting surface are reflected from said second reflecting surface convergently, said eyepiece being located so as to receive said rays of radiation reflected from said second reflecting surface.

---

## 5,016,996
## REARVIEW MIRROR WITH OPERATING CONDITION DISPLAY

**Yasushi Ueno, 2-34-2, Hino, Kohnan-ku, Yokohama, Japan**

**Filed Nov. 3, 1989, Ser. No. 431,069**

**Int. Cl.$^5$ B60R** *1/04;* **B60Q** *1/28, 1/54*

**U.S. Cl. 350—600** **14 Claims**

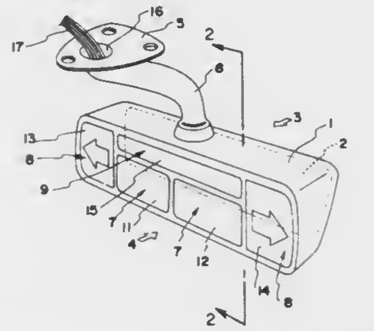
1. A rearview mirror in combination with an operating condition display for a motor vehicle, comprising:

a box-type housing;

means for mounting said housing upon said motor vehicle;

mirror means mounted within one side of said box-type housing and disposed rearwardly with respect to said vehicle for serving as a rearview mirror upon said vehicle for a driver of said vehicle; and

operating condition display means mounted within an opposite side of said box-type housing in front of said mirror means and disposed forwardly with respect to said vehicle for providing visual operating condition information to oncoming vehicular traffic and pedestrians disposed forwardly of said motor vehicle,



said operating condition display means including left and right turn indicating means operatively connected to left and right turn switching means disposed upon said vehicle, vehicle braking indicating means operatively connected to braking means disposed upon said vehicle, and vehicle speed indicating means operatively connected to speedometer means disposed upon said vehicle.

---

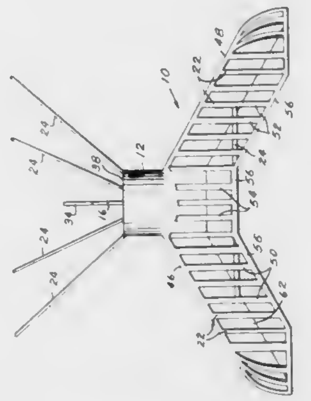
## 5,016,997
## PARTIALLY SEGMENTED DEFORMABLE MIRROR

**Erlan S. Bliss, Danville; James R. Smith; J. Thaddeus Salmon, both of Livermore, and Julio A. Monjes, San Ramon, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed May 15, 1990, Ser. No. 523,504**

**Int. Cl.$^5$ G02B** *5/08*

**U.S. Cl. 350—607** **9 Claims**



1. A partially segmented deformable mirror comprising

a mirror plate having a smooth and continuous front surface and a back surface which is parallel to said front surface and divided into triangular areas by straight grooves, said triangular areas each defining three vertices and a plurality of said grooves joining at each of said vertices, and

a plurality of actuator means each attached to said back surface at different one of said vertices for displacing said mirror plate perpendicularly to said front surface.

---

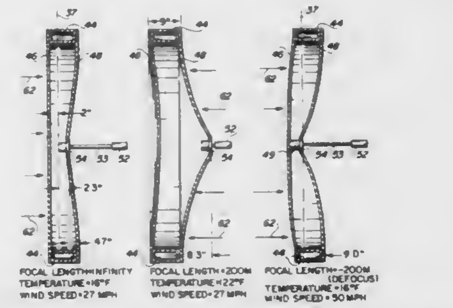
## 5,016,998
## FOCUS CONTROL SYSTEM FOR STRETCHED-MEMBRANE MIRROR MODULE

**Barry L. Butler, Solana Beach, and Kelly J. Beninga, San Diego, both of Calif., assignors to Science Applications International Corporation, San Diego, Calif.**

**Filed Apr. 10, 1989, Ser. No. 335,898**

**Int. Cl.$^5$ G02B** *5/10, 7/18*

**U.S. Cl. 350—608** **20 Claims**



1. Apparatus for setting and maintaining the focus of a stretched-membrane mirror module, said mirror module including spaced apart membranes stretched between a perimeter support defining a closed plenum space therebetween, said perimeter support being oriented relative to a reference plane, a first of said membranes having a reflective coating thereon that reflects energy incident thereon to a focal point determined by the curvature of said first membrane relative to said reference plane, said apparatus comprising:

means for inserting a mass of fluid into said closed plenum space at a first pressure, said first pressure causing said first membrane to assume a first curvature relative to said reference plane when in equilibrium with atmospheric pressure; and

means for controllably changing the volume of said plenum space without changing the mass of fluid in said closed plenum space;

said changed plenum volume causing said first pressure to change to a second pressure, said second pressure causing said first membrane to alter its curvature relative to said reference plane when in equilibrium with atmospheric pressure, thereby causing the focal point of said first membrane to change.

---

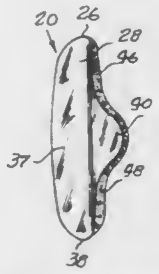
## 5,016,999
## DISCRETE LENS EYEGLASSES

**Ronnie E. Williams, 352 Kilarney Dr., Durham, N.C. 27703**

**Filed Oct. 27, 1989, Ser. No. 427,573**

**Int. Cl.$^5$ G02C** *7/04*

**U.S. Cl. 351—41** **5 Claims**



1. A discrete lens eyeglass for positioning against the face in front of and spaced from an eye, comprising a shallow concave-convex lens body of transparent plastic material to be worn rearwardly concave toward an eye, and an integral rearwardly projecting peripheral flange on said lens body for substantial engagement with the skin of a face in the vicinity of

VOL
1126
ISS
3
MY
21
1991
UMI

an eye, and means on said flange including adhesive means for securing said eyeglass to the skin of a face, and further including a protuberance on said flange for positioning alongside of the nose.

---

**5,017,000**

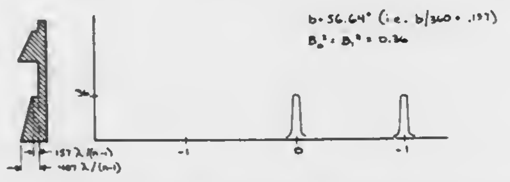
### MULTIFOCALS USING PHASE SHIFTING

**Allen L. Cohen, 10108 Windsong Ter., Richmond, Va. 23233**

**Filed May 14, 1986, Ser. No. 863,069**

**Int. Cl.$^5$ G02B** *27/44, 5/18;* **G02C** *7/04;* **A61F** *2/16*

**U.S. Cl. 351—161** **17 Claims**



1. A multiple focal point profiled phase plate having a plurality of annular concentric zones spaced according to the formula

$$r(k) = \sqrt{\text{constant} \times k}\ ,$$

where r(k) is the zone radii and k is a zone; in which a repetitive step is incorporated in the profile and has an optical path length greater or less than one-half wavelength.

---

**5,017,001**

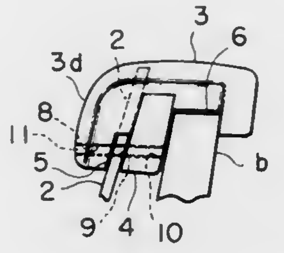
### FRONT LENS FOR SUNGLASSES

**Norio Kooketsu, 6 Senjudookitamachi 1-chome, Gifushi, Gifuken, Japan**

**Filed Oct. 27, 1989, Ser. No. 428,499**

**Int. Cl.$^5$ G02C** *9/00, 7/08*

**U.S. Cl. 351—86** **3 Claims**



1. A front lens (1) for sunglasses or subsidiary uses which comprises a lens (2) composed of a synthetic resin and three fasteners each formed of a synthetic resin in the shape of an arch, an inner projection (4) made of a synthetic resin being provided at about the middle of each fastener (3) to form a front (5) and a rear (6) fitting portions at the front and rear of said projection (4), respectively, three grooves (7*a*, 7*b* and 7*c*) being provided on the peripheral edge (2*a*) of the lens frame (2) and three fasteners (3*a*, 3*b* and 3*c*) being fitted to said grooves (7*a*, 7*b* and 7*c*) so that the lines connecting said fasteners form a triangle and the distance (L) between the upper (3*a*) and lower (3*b*) fasteners located near the bridge (d) of ordinary eyeglasses (a) is larger than the outside diameter (l) in the vertical direction of the lens frame (b) of the ordinary eyeglasses (a), and means securing said fasteners to said lens (2), whereby the lens (2) can be fitted to and removed from the lens frame b of the ordinary eyeglasses (a) in the direction transverse thereto, and the front fitting portions (5) of the respective fasteners (3) being fitted and fixed to the grooves (7*a*, 7*b* and 7*c*) on the peripheral edge (2*a*) of the lens (2).

---

**5,017,002**

### OVERHEAD PROJECTOR

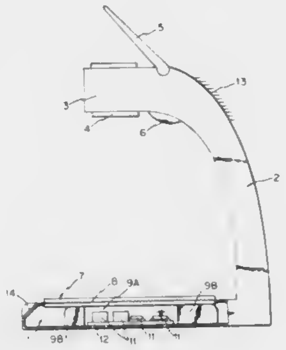
**Peter H. Grunwald, Schlattstrasse 215, FL 9491 Ruggell, Liechtenstein**

**Filed Jun. 4, 1987, Ser. No. 58,155**

**Claims priority, application Fed. Rep. of Germany, Jun. 5, 1986, 3618992**

**Int. Cl.$^5$ G03B** *21/132, 21/16*

**U.S. Cl. 353—66** **7 Claims**



1. An overhead projector comprising, a hollow base comprising a writing plate, a reflective Fresnel lens below said writing plate and a botto mspaced downwardly from said Fresnel lens with an air space between said bottom and said Fresnel lens,

a hollow support arm extending up from one side of said hollow base, the interior of said hollow arm being in communication with said air space of said hollow base,

a projection head and light source mounted on said hollow support arm above said base, said projection head comprising an objective lens and a deflection mirror and said light source directing light onto said writing plate and Fresnel lens,

electronic elements comprising power supply and control circuitry of said projector disposed in said space in said base below said writing plate and Fresnel lens,

said base having air openings in a side thereof opposite said support arm and said support arm having air openings adjacent said projection head, and

means for producing air flow between said air openings of said base and said air openings of said support arm to cool said electronic elements, Fresnel lens and writing plate,

a plurality of dividers extending between said air openings of said base and said support arm to divide said space of said base into a pluraliyt of air flow channels extending from said air openings of the base to said support arm said electronic elements being disposed in said air flow channels in position to be cooled by air flowing from said air openings to said support arm.

---

**5,017,003**

### AUTOMATIC SORTING OVOSCOPE

**Bernard Keromnes, Morlaix, and Jean-Pierre Breuil, Taule, both of France, assignors to Breuil, S.A., Landivisiau, France**

**PCT No. PCT/FR89/00015, § 371 Date Sep. 20, 1989, § 102(e) Date Sep. 20, 1989, PCT Pub. No. WO89/06797, PCT Pub. Date Jul. 27, 1989**

**PCT Filed Jan. 19, 1989, Ser. No. 415,329**

**Claims priority, application France, Jan. 20, 1988, 88 00628**

**Int. Cl.$^5$ G01N** *33/08*

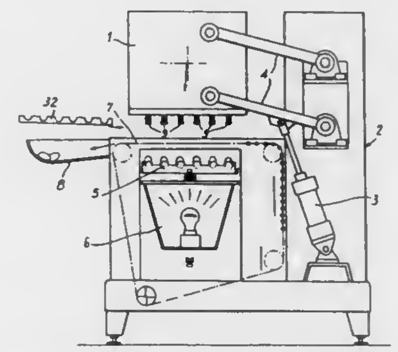
**U.S. Cl. 356—53** **17 Claims**

1. An automatic sorting candler, comprising:

(a) a light box;

(b) a candling head above said light box, said candling head comprising at least one suction cup to hold an egg by suction, each said at least one suction cup including means for holding an egg by vacuum, and light sensitive means for detecting transmitted light and providing a signal; and

(c) control means for evaluating the transparency of eggs with respect to output of light emanating from said light box, said control means being associated with said light sensitive means and said means for holding an egg by vacuum to permit each said at least one suction cup to hold an egg by suction when the signal of the light sensitive means indicates that a predetermined transparency of the egg has been exceeded.



---

**5,017,004**

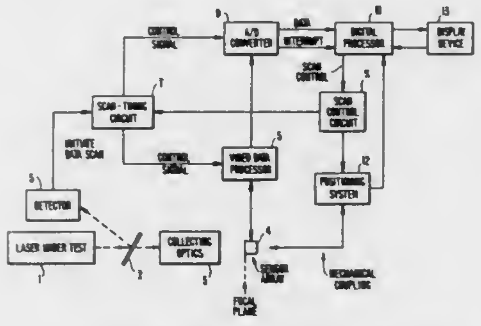
### MULTIFUNCTION ELECTRO-OPTICAL SYSTEM TEST TOOL

**Michael A. Cross, Severna Park, and Edward W. Nichols, Reisterstown, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 22, 1988, Ser. No. 288,387**

**Int. Cl.$^5$ G01J** *1/00*

**U.S. Cl. 356—121** **18 Claims**



1. An electro-optical testing apparatus for testing a laser beam with a pre-determined pulse repetition frequency (PRF) of a system under test, comprising:

collecting optics means for receiving said laser beam and translating said laser beam along an optical axis and including attenuating means for attenuating said laser beam and relay means for increasing the effective focal length of said collecting optics means;

boresight error measuring means disposed in the optical axis of said laser beam for measuring boresight error of said system under test;

rangefinding means disposed in the optical axis for receiving said laser beam for range simulation and rangefinding of said system under test;

electronic shutter means disposed at a focal point of the optical path for sensing said laser beam, said shutter means being operative to output a video signal corresponding to the sensed beam;

shutter control means responsive to the pulse repetition frequency (PRF) of the sensed laser beam for effectively opening and closing said electronic shutter means in synchronization with the PRF of the pulsed laser beam for operating said shutter means to output a video signal corresponding to each pulse of the sensed beam; and

signal processing means for non-linearly processing said video signal.

---

**5,017,005**

### FOCAL POINT DETECTING OPTICAL APPARATUS

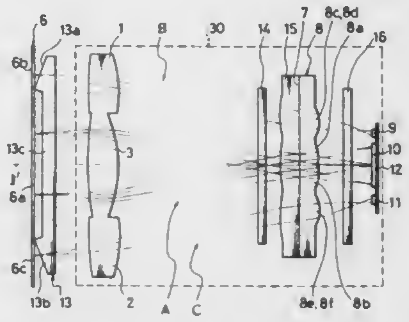
**Osamu Shindo, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 17, 1989, Ser. No. 324,715**

**Claims priority, application Japan, Mar. 18, 1988, 63-64836**

**Int. Cl.$^5$ G01B** *9/00;* **G02B** *7/09*

**U.S. Cl. 356—125** **9 Claims**



1. A focal point detecting optical apparatus comprising:

a first focal point detecting optical system, positioned along an optical axis, for reimaging a portion of a primary image formed in the vicinity of an optical axis through a taking lens onto a first line sensor, said portion of said primary image being reimaged as a pair of images, said firt focal point detecting optical system further comprising means for detecting a focusing state in the vicinity of the optical axis,

a second focal point detecting optical system positioned outside of said optical axis for reimaging a portion of said primary image which is formed outside of the optical axis onto a second line sensor, said second focal point detecting optical system comprising means for detecting a focusing state exteriorly of the optical axis; and

light deflecting means positioned to minimize distance between an imaging surface on which said primary image is formed and said light deflecting means, and disposed between a taking lens forming part of a taking optical system, and a condenser lens forming part of said focal point detecting optical systems, said light deflecting means comprising means for deflecting said primary image portion located outside of the optical axis toward said optical axis.

---

**5,017,006**

### LASER WARNING SENSOR

**Hans Poisel, Dachau, and Gert Trommer, Munich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany**

**Filed Oct. 4, 1989, Ser. No. 416,912**

**Claims priority, application Fed. Rep. of Germany, Oct. 4, 1988, 3833635**

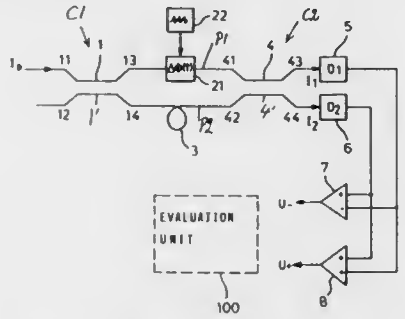
**Int. Cl.$^5$ G01J** *1/42;* **G01B** *9/02*

**U.S. Cl. 356—218** **9 Claims**

1. A laser warning detector comprising means for differentiating between laser radiation to be detected and extraneous light radiation, said differentiating means comprising optical input means for receiving laser and light radiation, two light conductor paths, a first coupling means (C1) connected to said optical input means and to said two light conductor paths for distributing received radiation into said two light conductor paths, a second coupling means (C2) connected to said two light conductor paths, photo-detector means connected to said

VOL
1126
ISS
3
MY
21
1991
UMI

second coupling means for converting received light signals into respective electrical signals, amplifier means connected to said photo-detector means, and signal evaluating circuit means connected to said amplifier means for providing a respective warning information, one of said light conductor paths between said first and second coupling means (**C1, C2**) comprising a signal delay means (**3**) for determining the optical length of said one light conductor path, the other light conductor path comprising phase shifter means (**21**) and control signal generator means (**22**) connected to said phase shifter means (**21**) for varying a phase shift as a function of time, whereby said second coupling means (**C2**) functioning as a phase/amplitude transformer, receives phase dependent signals that are supplied to said photo-detector means, and wherein said signal delay means (**3**) in said one light conductor path are so selected that an optical path length difference between said two light conductor paths corresponds to a coherence length of a respective laser light to be detected.



---

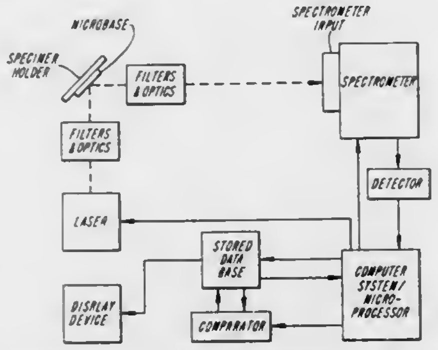
### 5,017,007
### APPARATUS AND MICROBASE FOR SURFACE-ENHANCED RAMAN SPECTROSCOPY SYSTEM AND METHOD FOR PRODUCING SAME

**Christopher G. Milne, #170 4831 E. Summitt Cr., Knoxville, Tenn. 37919; Paulus P. Shelby, Jr., 3115 B Marion Dr., Knoxville, Tenn. 37918, and David L. Bailey, 3700 Sutherland Ave., Apt. Y-3, Knoxville, Tenn. 37919**

**Filed Jul. 27, 1989, Ser. No. 386,564**

**Int. Cl.$^5$ G01J** *3/44*

**U.S. Cl. 356—301** **67 Claims**



1. A surface-enhanced Raman spectroscopy assembly comprising:

(a) a radiant energy source for directing a beam of radiant energy toward a target microbase,

(b) said target microbase including a substrate, a first roughened surface layer contiguously disposed on the substrate, and a sample-adsorption surface layer contiguously disposed on said first roughened layer, and

(c) said sample-adsorption surface layer being effective to enhance a scattered Raman signal intensity for adsorbates adjacent said sample-adsorption surface layer by a factor of greater than $10^6$ times,

(d) said sample-adsorption surface including a plurality of submicron needles having a length of at least 3500 angstroms and a width of at least 500 angstroms,

(e) means for exposing a predetermined portion of the sample-adsorption surface to said radiant energy source,

(f) means for positioning said predetermined portion of the sample-adsorption surface in a predetermined relationship with respect to said radiant energy source, and

(g) spectrometer means for detecting a surface Raman signal from said predetermined portion of said sample adsorption surface.

---

### 5,017,008
### PARTICLE MEASURING APPARATUS

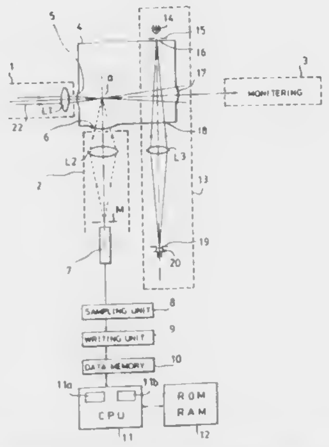
**Koichi Akiyama, Tsukuba, Japan, assignor to Kowa Company Ltd., Japan**

**Filed Mar. 23, 1989, Ser. No. 328,030**

**Claims priority, application Japan, Mar. 24, 1988, 63-68074**

**Int. Cl.$^5$ G01N** *15/02, 21/51*

**U.S. Cl. 356—336** **3 Claims**



1. A particle measuring apparatus in which a laser beam is projected into a measuring area in a fluid of a predetermined refractive index containing particles to be measured and light scattered from the particles is received and photoelectrically converted into an electrical signal to evaluate particle characteristics, comprising:

a measuring cell for containing a fluid which is caused to flow through the measuring area and having a first cell window through which the laser beam is projected and a second cell window through which the light scattered from the particles passes;

a laser beam projector for projecting the laser beam through said first window, said laser beam being focused at a convergence point in the measuring area;

light receiving means for receiving light scattered from the particles in the measuring area through said second cell window;

means for photoelectrically converting the received light into an electrical signal to evaluate characteristics of the particles;

wherein said second cell window on the measuring cell has a spherical surface with a predetermined radius of curvature whose center is set at the convergence point; and

means for measuring the refractive index of the fluid in the measuring cell.

---

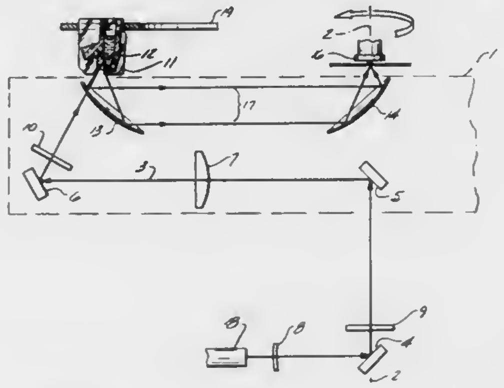
### 5,017,009
### SCATTERED TOTAL INTERNAL REFLECTANCE IMMUNOASSAY SYSTEM

**Ernest G. Schutt, Long Valley; Richard S. Dondero, Riverdale, both of N.J.; William P. Hansen, Middleboro, Mass.; George B. Hovorka, Hyde Park, Mass.; Raymond E. Meyer, Arlington, Mass.; Karen L. Utberg, Bridgewater, and David L. Greenwood, Bound Brook, both of N.J., assignors to Ortho Diagnostic Systems, Inc., Raritan, N.J.**

**Continuation-in-part of Ser. No. 879,236, Jun. 26, 1986, abandoned. This application Jan. 27, 1988, Ser. No. 149,243**

**Int. Cl.$^5$ G01N** *21/49*

**U.S. Cl. 358—338** **19 Claims**



2. An apparatus for detecting the presence of an analyte of interest in a sample which comprises:

a light source;

housing means for receiving an optically transparent member having a sample contacting surface, said member in said housing means being disposed such that the sample contacting surface is illuminated with light emitted from said light source which propagates through the optically transparent member at angles between the plane of the sample contacting surface and the critical angle for total internal reflectance; and

photodetection means which excludes the detection of light which propagates in a geometric optical path from the light source, said photodetection means being capable of detecting elastically--scattered light which propagates through the optically transparent member from the illuminates sample contacting surface between the plane of the sample contacting surface and the total internal reflectance critical angle; said photodetection means comprising a rotatable optical means comprising a first reflecting means and a second reflecting means whose optical axis is nearly coincident with the optical axis of said first reflecting means, whereby said elastically-scattered light is concentrated to facilitate detection thereof, said first reflecting means located to receive said elastically-scattered light and said second reflecting means located to receive light reflected from said first reflecting means.

---

### 5,017,010
### HIGH SENSITIVITY POSITION SENSOR AND METHOD

**Harry J. Mamin, and Daniel Rugar, both of Palo Alto, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 16, 1989, Ser. No. 352,804**

**Int. Cl.$^5$ G01B** *9/02*

**U.S. Cl. 356—345** **17 Claims**

1. A highly sensitive apparatus for sensing the position of a member, said apparatus comprising:

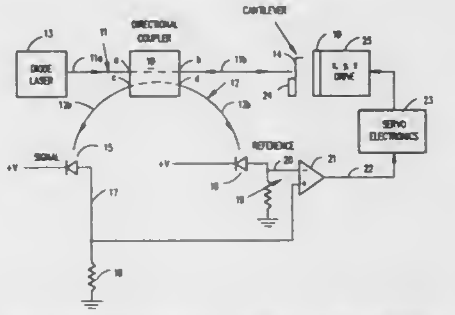
an optical directional coupler having one port for receiving injected light;

a single mode optical fiber extending from another port of the coupler;

first photodetector means optically connected to a third port of the coupler;

means, including other photodetector means, adjacent to a fourth port of the coupler for providing, as a reference, an output signal proportional to the light injected into said one port; and

means responsive to said output signals for minimizing the effect of power fluctuations in said injected light;



said coupler being operative to direct to said member via the fiber one portion of said injected light and direct to said first photodetector means via said fiber and third port part of said portion reflected concurrently from the member and from the end of said fiber for causing said first photodetector means to provide an output signal based upon the relative phase of said concurrent reflections, the amplitude of which signal is indicative of the position of the member.

---

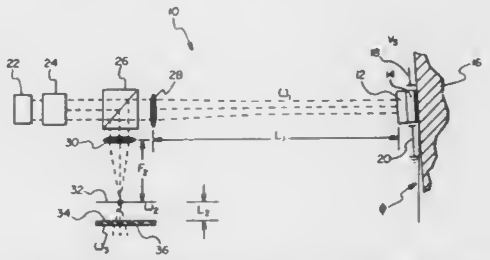
### 5,017,011
### ASSEMBLY AND METHOD FOR MONITORING THE ALIGNMENT OF A WORKPIECE

**Jerold B. Lisson, Henrietta, and Richard A. Stark, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 108,254, Oct. 13, 1987, Pat. No. 4,846,575, and a continuation-in-part of Ser. No. 212,814, Jun. 29, 1988, Pat. No. 4,887,905. This application Jul. 12, 1988, Ser. No. 218,404**

**Int. Cl.$^5$ G01B** *9/02*

**U.S. Cl. 356—363** **3 Claims**



1. A method utilizing radiation for monitoring the alignment of a workpiece, comprising the steps of:

(a) positioning an assembly for monitoring the alignment of the workpiece, the assembly comprising:

(i) first element means for reflecting at least a portion of radiation incident thereupon at a first incident angle, said first element means capable of reflecting the radiation at a first reflection angle different from said first incident angle when the incident angle is not substantially normal to the reflection angle;

(ii) second element means for reflecting at least a portion of radiation incident thereupon at a second incident angle, said second element means reflecting the radiation at a second reflection angle substantially equal to said second incident angle;

(iii) means for applying an electrical signal selected from the group consisting of a sinusoidal signal and a saw-

VOL
1126
ISS
3
MY
21
1991
UMI

tooth signal, to the second element means for generating a known phase shift in the radiation reflected at the second reflection angle; and

(iv) detector means for receiving the radiation reflected from said first element means and the radiation reflected from said second element means;

(b) generating radiation for uitlization by the assembly as defined; and

(c) generating the known phase shift in the radiation reflected at the second reflection angle, for producing in the detector means at least one signal indicative of the alignment of the workpiece with respect to a reference.

---

### 5,017,012

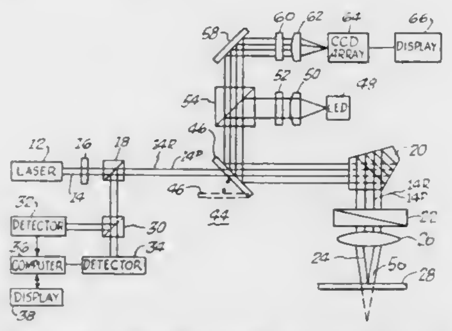
### VIEWING SYSTEM FOR SURFACE PROFILER

**Edward J. Merritt, Jr., Caledonia; Joan E. Samuels, and Joseph R. Bietry, both of Rochester, all of N.Y., assignors to Chapman Instruments, Inc., Rochester, N.Y.**

**Filed Aug. 4, 1989, Ser. No. 389,430**

**Int. Cl.$^5$ G01B *11/30***

**U.S. Cl. 356—371** **24 Claims**



1. In a topology scanning system in which a first beam of polarized light is directed by various optical elements along a defined path and is focused on a surface of an object to be scanned, one of said optical elements separating said first beam into a plurality of different polarization component beams prior to being focused on said surface, the improvement of optical viewing apparatus for viewing the area surrounding said defined path comprising:

means for providing a polarized second beam of light;

optical display means for providing a visual display manifested by light provided thereto;

light reflecting means for being selectively inserted into said path prior to the separation of said beam, said light reflecting means permitting a portion of said first beam to pass therethrough; and

means for directing said second beam towards said light reflecting means and along a portion of said defined path towards said surface and for directing the light from said first and second beams being reflected from said surface towards said light reflecting means to said optical display means for displaying the area surrounding said defined path.

---

### 5,017,013

### METHOD OF DETERMINING THE POSITION OF A REFERENCE POINT OF A SCANNER RELATIVE TO AN INCREMENTAL SCALE AS WELL AS A REFERENCE POINT COMMUNICATOR

**Helmut Kellner, Moormerland, Fed. Rep. of Germany, assignor to E.M.S. Technik GmbH, Leer, Fed. Rep. of Germany**

**Filed Mar. 15, 1990, Ser. No. 493,936**

**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1989, 3909856**

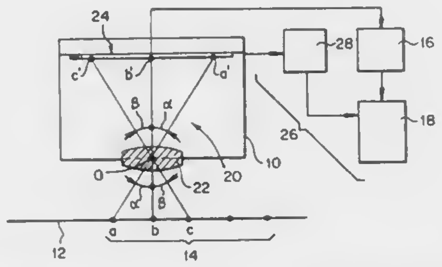
**Int. Cl.$^5$ G01B *11/00;* B23Q *17/22***

**U.S. Cl. 356—373** **9 Claims**

1. A method of determining the position of a reference point of a scanner relative to an incremental scale with marks having a constant spacing arranged thereon comprising:

passing the scanner by the marks;

evaluating the marks passed by the scanner by counting the marks and by multiplying by the spacing, whereby a rough determination of the position along the scale is made;



determining the projection angles between the reference point and at least three marks adjacently arranged on the scale;

and calculating the coordinates of the reference point based on trigonometric functions;

whereby an interpolation between the marks is made for a fine determination of the position along the scale of the reference point.

---

### 5,017,014

### PHOTOGRAPHIC PRINTING EXPOSURE DETERMINING APPARATUS AND FILM TYPE DATA PROCESSING APPARATUS FOR PHOTOGRAPHIC PRINTER

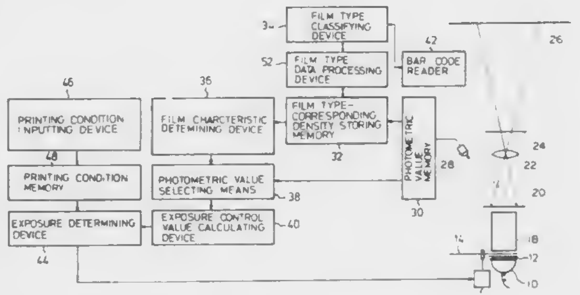
**Takaaki Terashita, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 25, 1989, Ser. No. 398,681**

**Claims priority, application Japan, Sep. 29, 1988, 63-245810; Sep. 29, 1988, 63-245811**

**Int. Cl.$^5$ G01J *3/40;* G01N *21/25;* G03B *27/72***

**U.S. Cl. 356—404** **19 Claims**


34
FILM TYPE CLASSIFYING DEVICE
52
FILM TYPE DATA PROCESSING DEVICE
42
BAR CODE READER
26
46
PRINTING CONDITION INPUTTING DEVICE
36
FILM CHARCTERISTIC DETEMINING DEVICE
FILM TYPE-CORRESPONDING DENSITY STORING MEMORY
32
PHOTOMETRIC VALUE MEMORY
28
24
22
48
PRINTING CONDITION MEMORY
PHOTOMETRIC VALUE SELECTING MEANS
38
30
20
EXPOSURE DETERMINING DEVICE
EXPOSURE CONTROL VALUE CALCULATING DEVICE
40
18
14
12
44
16
10

1. An apparatus for determining a photographic printing exposure comprising:

a light measuring means for measuring light with respect to each of a plurality of film image portions into which images on films to be subjected to printing are divided, and for outputting photometric values obtained by the measurement of light;

a reading means for reading codes which are recorded on said films and which are indicative of film types of said films;

a classifying means for classifying, on the basis of the read codes, said films into a plurality of film types to which said films belong;

a storing means for storing image densities calculated on the basis of said photometric values, each of said image densities corresponding to each of the film types;

a density-value for calculating a reference value on the basis of an image density corresponding to one of the film types to which one of said films that is to be subjected to printing belongs, for determining a specific color region on the basis of said reference value, and for calculating, on the basis of photometric values belonging to said specific color region, image density values for three colors; and

an exposure determining means for determining the exposure of said film to be subjected to printing on the basis of said image density values for three colors and a reference printing exposure condition already stored.

---

### 5,017,015

### DIRECT PROCESSING OF POLYMER WITH PULVERULENT ADDITIVES IN INJECTION MOULDING MACHINES

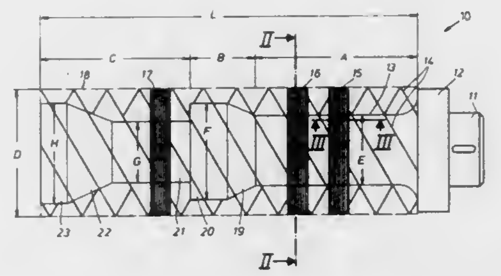
**Hans-Peter Schlumpf, Oftringen; Hans J. Pfister, Zofingen, and Edwin Oshsner, Vordemwald, all of Switzerland, assignors to Plüss-Staufer AG, Switzerland**

**Continuation-in-part of Ser. No. 122,205, Nov. 18, 1987, abandoned. This application Jun. 5, 1989, Ser. No. 361,223**

**Claims priority, application Fed. Rep. of Germany, Jan. 27, 1987, 3702348**

**Int. Cl.$^5$ B29B *7/42***

**U.S. Cl. 366—82** **6 Claims**



1. Screw for an injection moulding machine for processing polymer with pulverulent additives comprising a feed zone (A) having a constant screw core diameter (E), an intermediate zone (B) including a compression section and a metering section and a discharge zone (C) comprising at least one mixing element array (**17**), wherein the screw (**10**) has screw lands (**14**) and in its feed zone (A) comprises at least two mixing element arrays (**15,16**) and wherein each mixing element array (**15,16,17**) consists of spaced apart annular segment portions forming passage areas (K), the sum of passage areas in an array of a mixing element arrangement is so dimensioned that it is greater than the cross-sectional area extending perpendicularly between two adjacent screw lands (**14**).

---

### 5,017,016

### METHOD OF PROCESSING ASBESTOS CHIPS AND APPARATUS

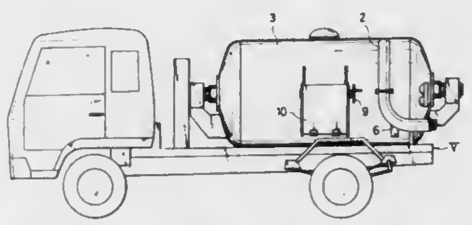
**Kazuhito Nasu, Urawa, Japan, assignor to Takehito Nasu, Japan**

**Filed Nov. 7, 1988, Ser. No. 267,936**

**Claims priority, application Japan, Jan. 28, 1988, 63-15862**

**Int. Cl.$^5$ B01F *13/06***

**U.S. Cl. 366—139** **3 Claims**



1. An apparatus for processing asbestos chips comprising a tank for collecting asbestos chips; and means for agitating and kneading said asbestos chips inside said tank;

said tank having an exhaust pipe connected to a vacuum pump, a water supply pipe, a cement supply pipe, and a discharge port, and

dust collecting means between said tank and said vacuum pump.

---

### 5,017,017

### STIRRING APPARATUS FORMING AN ACCESSORY FOR SELECTIVE STIRRING OF THE BASE COLORS ON PAINT STIRRING MACHINES

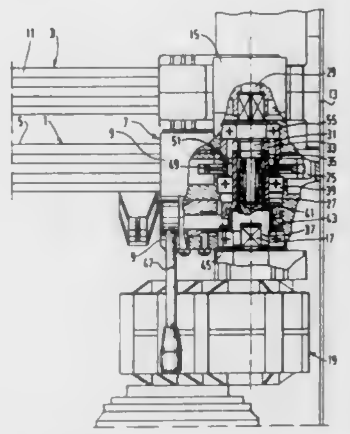
**Jean Godat, Olivet, and Alain Krzywdziak, Orleans, both of France, assignors to Fonderie & Ateliers des Sablons, Orleans, France**

**Filed Nov. 6, 1989, Ser. No. 432,226**

**Claims priority, application France, Nov. 8, 1988, 88 14567**

**Int. Cl.$^5$ B01F *7/16***

**U.S. Cl. 366—251** **5 Claims**



1. A stirring arrangement comprising an accessory for selective stirring of the base colors contained in hanging paint pots in paint stirring machines, said stirring machines having racks for suspending said pots and means for stirring the colors therein, said stirring arrangement including a further rack receiving at least one stirring lid with an associated paint pot, suspended between cantilever slides on the rack; the lid and a stirrer which is attached thereto being rotated by a chain extending along the length of the further rack and actuating a drive pinion thereon, a drive means for driving said chain connected to a drive shaft of the stirring machine so as to disengage the machine in the operating condition of said stirring lid on said further rack (**5**) without the racks on the stirring machine being activated, and in the inoperative condition of said further rack intermittently activating the racks of the stirring machine, said accessory stirring arrangement being mounted so as to be fixed by a drive housing (**9**) along a machine upright (**13**) forming a shaft structure for operating the machine racks (**11**) extending between a first bottom rack (**11**) on said machine and a gear motor unit (**19**), said further rack (**5**) adjoining said drive housing (**9**) and being located below said bottom rack (**11**) adjacent to and at a spacing therefrom.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,018

## CLINICAL THERMOMETER

**Tohru Iuchi; Yukio Nakamori; Atsushi Kawasaki; HIrokatsu Yashiro, and Yoh-ichi Nagatake, all of Kawasaki, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

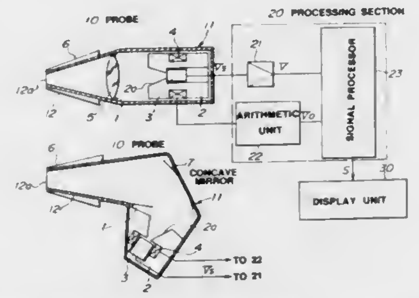
**PCT No. PCT/JP88/01294, § 371 Date Aug. 18, 1989, § 102(e) Date Aug. 18, 1989, PCT Pub. No. WO89/06348, PCT Pub. Date Jul. 13, 1989**

**PCT Filed Dec. 23, 1988, Ser. No. 397,466**

**Claims priority, application Japan, Dec. 25, 1987, 62-328613; Dec. 25, 1987, 62-328614**

**Int. Cl.$^5$ A61B** *5/00;* **G01J** *5/00;* **G01K** *1/08*

**U.S. Cl. 374—130** **14 Claims**



1. A clinical thermometer, comprising:

a housing having a tip portion, the top portion having an opening therein;

an infrared sensor mounted in said housing;

an optical system in said housing having one of a lens and a concave mirror for focusing on said infrared sensor infrared radiation incident on said opening from a body whose temperature is to be measured, said infrared sensor having means for measuring the amount infrared radiation incident thereon and for producing a first signal indicative of the measured amount of infrared radiation, the first signal containing an error which corresponds to the ambient temperature of the infrared sensor;

a temperature measuring means for measuring, and producing a second signal indicative of, the ambient temperature of said infrared sensor, said temperature measuring means being unexposed to any of the infrared radiation focused by said optical system;

means, including a heat insulator means attached to said tip portion, for heat insulating said tip portion so as to reduce an entry of heat into the housing through the tip portion and thereby reduce a temperature variation of the infrared sensor;

a processing section having means, responsive to said first and second signals, for correcting the error in the first signal and producing a body temperature signal indicative of the temperature of the body based on the corrected first signal; and

a display unit which receives the body temperature signal and displays the body temperature visually.

---

### 5,017,019

## RADIATION DETECTOR FOR DIFFERENTIAL BIOLOGICAL TEMPERATURE READINGS

**Francesco Pompei, Wellesley Hills, Mass., assignor to Exergen Corporation, Newton, Mass.**

**Filed Apr. 14, 1989, Ser. No. 339,073**

**Int. Cl.$^5$ G01J** *5/16, 5/10;* **G01K** *1/20*

**U.S. Cl. 374—133** **18 Claims**

1. A radiation detector comprising:

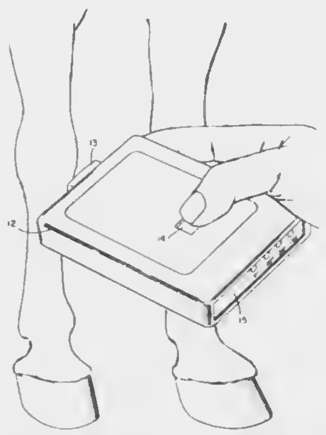
thermopile means mounted to view target surfaces for sensing the heat flux from said target surfaces and to determine the temperature of said target surfaces;

a temperature sensor for sensing ambient temperature;

an electronic circuit coupled to the thermopile means and temperature sensor and responsive to the voltage across the thermopile means and the temperature sensed by the sensor to provide a difference between temperatures of target surfaces viewed by the thermopile means, the difference being adjusted to provide a normalized temperature differential compensated for difference in surface temperature which results from a deviation of actual ambient temperature to which the surface is exposed from a predetermined ambient temperature; and

a display for providing an indication of the normalized temperature differential.

18. A method of providing a differential thermal reading representing the difference in temperatures of surface areas comprising:



sensing heat flux from first and second surface areas to determine the temperature of said first and second surface areas;

sensing ambient temperature;

providing a normalized temperature differential representing the difference in temperatures of the first and second surface areas compensated for difference in surface temperature which results from a deviation of actual ambient temperature to which the surface is exposed from a predetermined ambient temperature; and

providing a display of the normalized temperature differential.

---

### 5,017,021

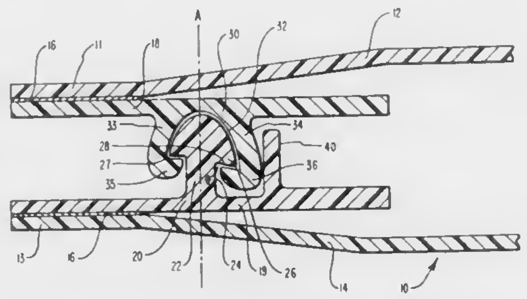
## RECLOSABLE PROFILE HAVING IMPROVED CLOSURE MEMBERS

**Steve H. Simonsen; Mladomir Tomic, and Wayne M. Wegner, all of Appleton, Wis., assignors to Reynolds Consumer Products, Inc., Appleton, Wis.**

**Filed May 19, 1989, Ser. No. 354,141**

**Int. Cl.$^5$ B65D** *33/16*

**U.S. Cl. 383—63** **21 Claims**



1. A profile for use in reclosable packages comprising:

a package having an open end, and a package end;

first and second profile strips attached to said package at said open end;

rib means formed on said first profile strip;

post means formed on said first profile strip and located between said rib means and said package end;

groove means formed on said second profile strip and capable of mating with said rib means under pressure, thereby closing said package;

said groove means also being capable of disengagement from said rib means due to pressure;

said first profile strip being attached to said package in a first limited area located between said rib means and said open end, and said second profile strip being attached to said package in a second limited area located between said groove means and said open end, whereby disengagement forces that originate from said package end are translated to said profile in the same manner as disengagement forces that originate from said open end; and

said post means being of sufficient height and positioned close enough to said rib means to contact a portion or said groove means during disengagement prior to any contact with said second profile strip.

---

### 5,017,022

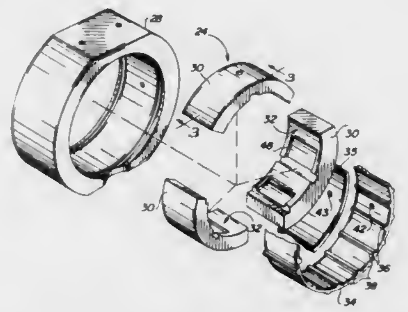
## HIGH TEMPERATURE BEARING

**John F. Ruggles, Phoenix, and Gary L. Boyd, Tempe, both of Ariz., assignors to Allied-Signal, Inc., Morris Township, Morris County, N.J.**

**Continuation of Ser. No. 269,215, Nov. 9, 1988, abandoned. This application Jun. 7, 1990, Ser. No. 535,226**

**Int. Cl.$^5$ F16C** *32/06*

**U.S. Cl. 384—100** **11 Claims**



1. A high speed, non-lubricated bearing assembly for providing rotational support within a stationary housing in a hot gas environment, comprising:

an axially extending, rotatable shaft having a ceramic outer surface with a lapped, smooth surface finish of approximately 8 microinches or less; and

a plurality of carbon-graphite bearing segments circumferentially surrounding said shaft, said segments together presenting an inner diameter surface adjacent and uniformly closely fitting said ceramic outer surface, said inner diameter surface of said segments having a nonlapped finish from about 30 to about 60 microinches, each of said segments having a gas receiving pocket on said inner diameter surface, said pocket comprising a depression of rectangular configuration bounded on three sides by lands, and having an axial slot extending the entire axial width of said segment and communicating said unbounded side of said pocket with said hot gas environment on both sides of said bearing, said pockets configured and arranged to self-generate a gas film support between said adjacent inner and outer diameter surfaces upon rotation of said shaft, said axial slot being of sufficient depth and circumferential length to provide adequate hot gas flow into said pocket without additional pressurization to develop the gas film.

---

### 5,017,023

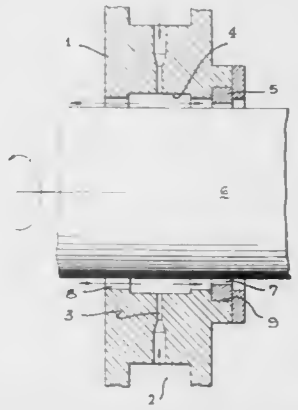
## ASYMMETRICALLY STEPPED HYDROSTATIC BEARING

**Joseph K. Scharrer, Newbury Park; Robert F. Beatty, West Hills, and Arpad Csomor, Westlake Village, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 24, 1990, Ser. No. 528,406**

**Int. Cl.$^5$ F16C** *32/06*

**U.S. Cl. 384—114** **12 Claims**



1. An asymmetrically stepped hydrostatic bearing comprising:

a journal in close proximity to a hydrostatic bearing having a manifold for introducing a fluid into a recess between the journal and the bearing,

a small clearance between the bearing and the journal extending axially in both directions from the recess for the fluid to flow out from the recess along the journal wall,

a rub ring extending radially intermediate the bearing and the journal to partially block the fluid flow in one direction resulting in increased stiffness and damping of the bearing and decreasing the fluid leak rate during high speed operation,

the rub ring also preventing contact between the journal and the bearing during low speed operation.

---

### 5,017,024

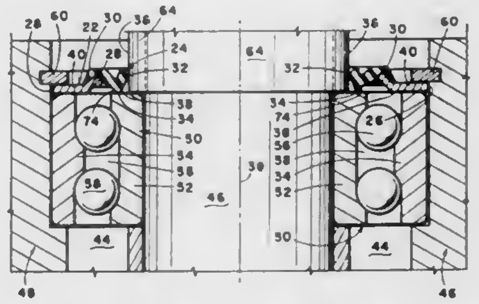
## SEAL ASSEMBLY

**Paul H. Clark, 1921 S. Xanthus, Tulsa, Okla. 74104; Deborah A. Yager, 9932 N. Memorial, Owasso, Okla. 74055, and Randal W. Clark, Jr., 8017 S. Sandusky, Tulsa, Okla. 74136**

**Continuation of Ser. No. 224,664, Jul. 27, 1988, abandoned. This application Apr. 11, 1990, Ser. No. 512,090**

**Int. Cl.$^5$ F16C** *33/78;* **F16J** *15/32, 15/34*

**U.S. Cl. 384—482** **15 Claims**



1. A seal assembly for sealing a cavity formed between radially-spaced, coaxially disposed, relatively-rotatable inner and outer members having an antifriction device coaxially disposed between the inner and outer members; the antifriction device having radially spaced, coaxially-disposed, relatively-

VOL 1126
ISS 3
MY 21 1991
UMI

rotatable inner and outer rings spaced apart by antifriction elements, the inner and outer rings having end faces at each axial end of the antifriction device; the seal assembly comprising:

a stiff case of endless annular shape comprising a radial flange having a peripheral edge and a skewed flange having a peripheral edge, the skewed flange being connected to and forming an obtuse angle with the radial flange, the radial flange being connectable between a protuberance located juxtaposed a respective axially adjacent ring end face of the antifriction device and extending from one of the outer member and the inner member, the protuberance axially restraining the antifriction device so that the radial flange is axially supported by the axially adjacent ring end face and held between the protuberance and the axially adjacent ring end face with the skewed flange extending axially away from the antifriction device and radially away from the radial flange; and

a resilient seal of endless annular shape, the annular seal including:

an outer peripheral rim and an inner peripheral rim, one peripheral rim being sealingly connected to the skewed flange in such a manner that at least an annular portion of the radial flange axially coincident with the axially adjacent ring end face and contiguous with the peripheral edge of the radial flange is not resiliently covered by the resilient seal, the other peripheral rim extending radially from the case for resiliently radially sealing against a first surface spaced radially from the case; and

an intermediate rim extending axially relative to the seal and the case for resiliently axially sealing against an end face of the one of the inner and outer ring which is not axially supporting the radial flange.

---

5,017,025

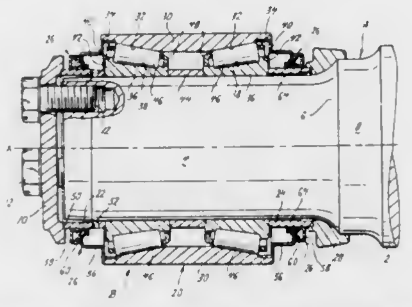
## BEARING ASSEMBLY FOR A SHAFT JOURNAL

**Samuel R. Williams, Canton, Ohio, assignor to The Timken Company, Canton, Ohio**

**Filed Apr. 5, 1990, Ser. No. 505,147**

**Int. Cl.$^5$ F16C *43/04, 33/78***

**U.S. Cl. 384—584** **15 Claims**



1. In combination with a shaft having a shoulder and a journal of smaller diameter projecting beyond the shoulder, an improved bearing assembly fitted to the journal to permit relative rotation between the shaft and another structure about an axis of rotation, said bearing assembly comprising: an antifriction bearing including an inner race located around the journal and having an outwardly presented raceway, an outer race having an inwardly presented raceway, and rolling elements located between and contacting the raceways of the inner and outer races; a backing ring located firmly against the shoulder such that it is incapable of moving radially with respect to the journal; a circular ring interposed between the inner race of the bearing and the backing ring, the circular ring being spaced radially outwardly from the journal and being captured radially by the backing ring so that it is centered with respect to the axis of rotation.

---

5,017,026

## APPARATUS FOR AUTOMATICALLY EXCHANGING A PASSBOOK

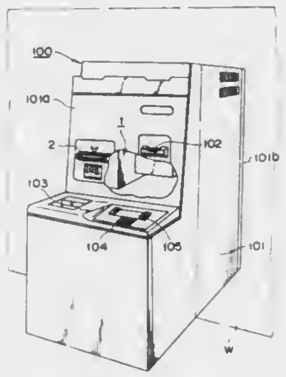
**Sumiyoshi Takesako, Yamato, and Akira Morito, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 18, 1990, Ser. No. 524,926**

**Claims priority, application Japan, May 19, 1989, 1-125904**

**Int. Cl.$^5$ B41J *3/28;* G06F *15/30***

**U.S. Cl. 400—24** **19 Claims**



1. An apparatus for dealing with a passbook, comprising:

an access opening for inserting or drawing a pass-book having a plurality of data recording surfaces;

passbook conveying means for receiving the passbook inserted into the access opening and returning the received passbook to the access opening;

means for recording data on a space in a plurality of data recording surfaces of the passbook received in the passbook conveying means via the access opening;

a plurality of passbook storing means, arranged along the passbook conveying means, for storing a plurality of new passbook which are the same kind as the above described passbook;

passbook detecting means for detecting the presence or absence of the passbook in each of the plurality of passbook storing means;

passbook supplying means for supplying a new passbook from one of the passbook storing means to the passbook conveying means when all spaces in the plurality of data recording surfaces of the passbook received in the passbook conveying means are used up, so that the remains of data are recorded on one of the data recording surfaces of the new passbook by the data recording means; and

means for controlling the passbook supplying mean such that one new passbook is supplied from another passbook storing means to the passbook conveying means when the passbook detecting means is detecting the absence of the passbook in one of the passbook storing means.

---

5,017,027

## IMPACT PRINTER

**Kiyofumi Koike, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan**

**Filed Aug. 16, 1989, Ser. No. 394,452**

**Claims priority, application Japan, Aug. 22, 1988, 63-207679**

**Int. Cl.$^5$ B41J *11/08***

**U.S. Cl. 400—54** **20 Claims**

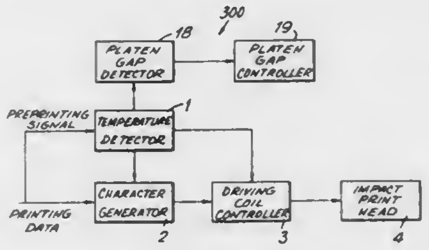
1. A printer that prints by impacting a transfer medium in response to a print signal to transfer printing material from the transfer medium to a recording medium, comprising:

signal means for providing a print signal having a preprinting signal portion followed by a data signal portion;

impact means including at least one impact member for impacting the transfer medium;

temperature detecting means for measuring the temperature of the printer, comparing the temperature to a selected value and providing a warm-up signal if the temperature is less than or equal to the selected value, the temperature detecting means being responsive to the preprinting signal;

impact driving means responsive to the warm-up signal and the data signal for displacing the impact member in response to said data signal between a first home position away from the transfer medium and a second printing position in contact with the transfer medium and between the first home position and a third warm-up position in response to said warm-up signal, not contacting the transfer medium; and



positioning means responsive to the data and warm-up signals for positioning the impact member close enough to contact the transfer medium in response to the data signal and widening the distance between the impact member in the first home position and the transfer medium so that the impact member is far enough away from the transfer medium so that it does not contact the transfer medium in response to the warm-up signal.

---

5,017,028

## SUBSTRATE CLAMPING APPARATUS FOR A THERMAL PRINTER

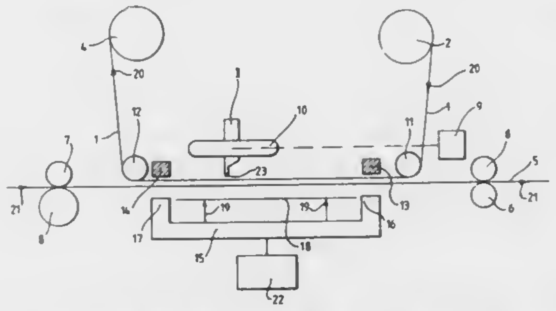
**Paul R. Harding, Ewell, United Kingdom, assignor to Compular Limited, United Kingdom**

**Continuation of Ser. No. 185,151, Apr. 22, 1988, abandoned. This application Sep. 25, 1989, Ser. No. 412,569**

**Claims priority, application United Kingdom, Apr. 28, 1987, 8710059**

**Int. Cl.$^5$ B41J *2/315;* B41F *1/28***

**U.S. Cl. 400—120** **16 Claims**



1. A flat bed thermal printing machine adapted to print information at a printing area within the machine on to a defined printing space of a substrate or on to a defined printing space on products disposed upon said substrate using either a thermally sensitive ribbon or a thermally sensitive substrate, said substrate being movable through the machine in a step by step movement whereby each step brings a new printing space into the printing area, the substrate being stopped for printing between each step and being moved along a path which causes a printing space of the substrate to be disposed in a substantially flat position at the printing area as the substrate is stopped for printing, the machine comprising:

a printing head having thermal printing means, including a multiplicity of individually energisable dot type thermal elements for printing over a given portion of the surface of said defined printing space when the printing head is moved relative to the substrate;

means for moving the printing head relative to the substrate while the substrate is stationary at the printing area between its stepwise movements;

means for selectively energizing said thermal elements during movement of the printing head to effect printing;

means for positively clamping the substrate stationary at the printing area during each printing operation, and for releasing the substrate for movement between printing operations, said clamping and releasing means being disposed such that the substrate is gripped at a plurality of points which lie in substantially the same plane as the surface of the defined printing space; and

flat bed means, extending over the whole of the printing area, for providing localized support for the substrate when at the printing area such that said machine is adapted to use a substrate having a substantially rigid printing area portion without significantly bending said portion.

---

5,017,029

## CORROSION SUPPRESSING INK RIBBON

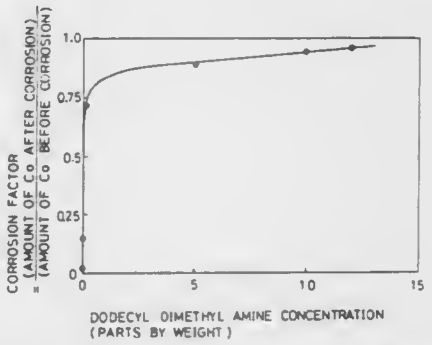
**Hirokazu Andou; Hiroshi Kikuchi, and Hiroki Murakawa, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Jun. 5, 1989, Ser. No. 361,166**

**Claims priority, application Japan, Jun. 6, 1988, 63-137376; Jun. 6, 1988, 63-137377**

**Int. Cl.$^5$ B41J *31/00***

**U.S. Cl. 400—237** **2 Claims**



1. An ink ribbon for a printer comprising a ribbon substrate and an ink containing an organic pigment as coloring material, said ink containing 5.0–10.0 parts by weight of graphite per 100 parts by weight of ink.

---

5,017,030

## ERGONOMICALLY DESIGNED KEYBOARD

**Jay A. Crews, 721 Johnson Ave., San Luis Obispo, Calif. 93401**

**Filed Jul. 7, 1986, Ser. No. 882,633**

**Int. Cl.$^5$ B41J *5/10***

**U.S. Cl. 400—485** **35 Claims**

1. A keyboard comprising:

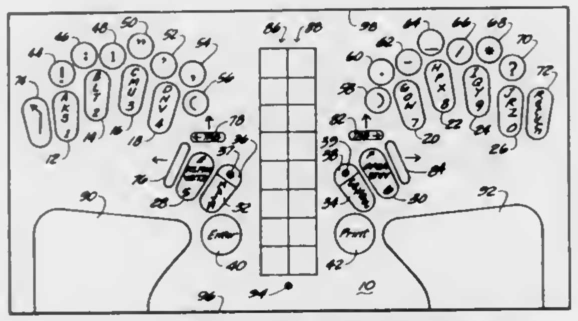
a body;

home keys attached to said body and on which the fingers of the user normally remain;

actuating means for mode changing, attached to said body and operable while the fingers remain on said home keys, and that when actuated alter the mode of the keyboard by

VOL 1126 ISS 3 MY 21 1991 UMI

assigning an alternative set of characters to said home keys; and,



punctuation keys attached to said body and that produce characters that remain unchanged regardless of which mode the keyboard is in.

### 5,017,031
### PRINTING APPARATUS HAVING AN AUTOMATIC PAPER INSERTION FUNCTION

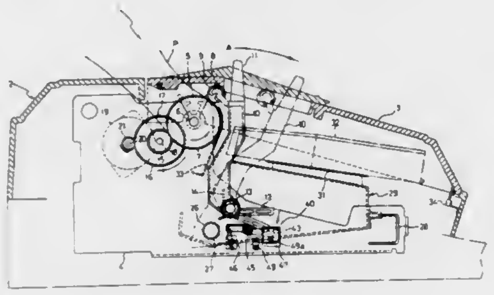
**Yulchi Harada, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Apr. 23, 1990, Ser. No. 513,061**

**Claims priority, application Japan, Jul. 8, 1989, 1-176378**

**Int. Cl.$^5$ B41J** *13/36, 13/20*

U.S. Cl. 400—636.1 **10 Claims**



1. A printing apparatus comprising:
a platen;
a carriage movable on a movement path along said platen;
carriage driving means for driving said carriage;
paper feed means for feeding a printing sheet by the rotation of said platen;
a paper bail unit movable between a pressed position being abutted on said platen and a released position being released from said platen;
a detection switch for outputting a detection signal, said detection switch outputting said detection signal in response to an occurrence of a first condition in which said carriage reaches a certain position on said movement path, and in response to an occurrence of a second condition in which said paper bail unit is moved to said released position;
origin setting control means for locating said carriage at an origin position of said carriage on said movement path based on said detection signal;
judgment means for judging to which of said first condition and said second condition said detection signal was responsive;
stop control means for stopping said origin setting operation when it is judged by said judgment means that said detection signal is outputted responsive to said second condition while said origin setting operation is being executed; and
paper feed control means for controlling said paper feed means to feed said printing paper by a predetermined stroke when it is judged by said judgment means that said detection signal is outputted responsive to said second condition while said origin setting operation is not being executed.

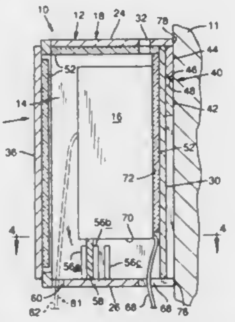
### 5,017,032
### PRINTER ENCLOSURE

**Dennis L. Green, 17821 SW. Tamara Ave., Lake Oswego, Oreg. 97035**

**Filed Mar. 30, 1990, Ser. No. 501,779**

**Int. Cl.$^5$ B41J** *29/02*

U.S. Cl. 400—693 **7 Claims**



1. A printer enclosure for a paper-outputting printer that has a paper-exit port and back and bottom boundaries, the printer enclosure comprising:
an enclosure body defining a printer cavity and including a bottom face with a gravity-outputting slot formed therein; and
means extending from the body into the cavity for supporting the printer in the cavity and orienting the printer therein so that gravity will cause paper outputted from the printer to be directed downwardly to the slot.

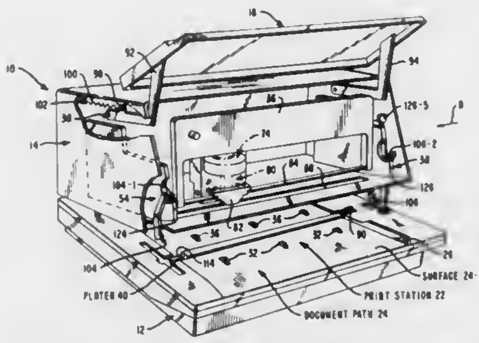
### 5,017,033
### METHOD OF PRODUCING A PRINTER WHICH FACILITATES CLEARING A JAMMED DOCUMENT

**Thomas L. Hermann, Springfield, and George J. Eberhardt, Centerville, both of Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed Dec. 11, 1987, Ser. No. 448,389**

**Int. Cl.$^5$ B41J** *29/02*

U.S. Cl. 400—693 **10 Claims**



1. A method of producing a printer so as to effect a low profile for sit/stand operations by an operator using said printer and also to facilitate the removal of a jammed document from a print station in said printer, comprising the steps:
(a) forming a bottom portion and a top portion of a housing for said printer so that said print station and a document path leading to said print station lie between the bottom and top portions when the top portion is positioned over the bottom portion in assembled relationship therewith;

(b) providing a pivot for the bottom and top portions to enable the top portion to be pivoted from the assembled relationship mentioned in step (a) to an opened position which exposes said print station and said document path to facilitate removing said jammed document;
(c) forming said bottom portion so that its overall height is small in relation to the overall height of said top portion; however, the overall height of the bottom portion is made substantially small to make it conducive for sit/stand operations and for housing pinch rollers associated with a document feed mechanism associated with said printer;
(d) locating drive rollers associated with said feed mechanism in said top portion so that said drive rollers are in operative relationship with said pinch rollers when said top and bottom portions are in said assembled relationship to enable said feed mechanism to feed a document to said print station;
(e) locating a printing mechanism including a print head in said top portion so that said print head is in operative relationship with said print station when said top and bottom portions are in said assembled relationship;
(f) locating a platen associated with said printing mechanism in said bottom portion;
(g) providing a moveable panel on said top portion to enable an operator to gain access to the interior of said top portion and said printing mechanism; and
(h) providing latching means for detachably latching said bottom and top portions in said assembled relationship and said opened position.

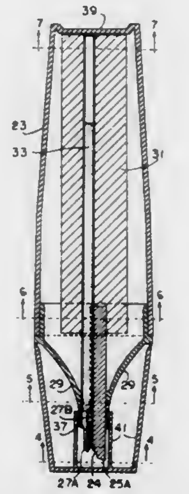
### 5,017,034
### MARKER AND PEN COMBINATION EMPLOYING TRANSVERSE AND LONGITUDINALLY SPACED TIPS

**Jeffrey D. Stary, 2523 Marsh Dr., San Ramon, Calif. 94583, and Victor H. Goulter, 485 Molimo Dr., San Francisco, Calif. 94127**

**Filed Mar. 28, 1990, Ser. No. 500,705**

**Int. Cl.$^5$ B43K** *27/08*

U.S. Cl. 401—35 **20 Claims**



1. A writing instrument which a user can use to write with either or both of two different marking lines, comprising:
an elongated body, said body having a longitudinal axis, and
a pair of writing tips projecting from an end of said body, the ends of said tips being spaced apart in a transverse direction perpendicular to said axis and in a longitudinal direction parallel to said axis, said tips being elongated and parallel to each other, said tips being continuations of respective body portions within said housing which are also elongated and parallel to each other, and each body portion being coaxial with its respective tip
whereby said user can write with either of said tips by holding said elongated body at either of two different angles tilted toward user's body, and can use said pen to write double lines which are parallel to the front of said user's body by holding said elongated body at a comfortable and customary angle tilted toward said user's body and at an acute angle to a writing surface.

### 5,017,035
### BREACH LOADING CARTRIDGE PEN

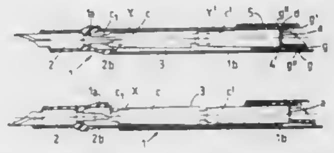
**Andrew C. Peters, c/o Helix Engine Lane, Lyo Stourbridge, West Midlands DY9 7AJ, England, and Anthony C. L. Wass, The Mousehole, Duddington, Stamford, Lincolnshire, both of England**

**Filed Jul. 15, 1988, Ser. No. 219,720**

**Claims priority, application United Kingdom, Jul. 16, 1987, 8716818**

**Int. Cl.$^5$ B43K** *5/14*

U.S. Cl. 401—132 **13 Claims**



1. A pen employing a fluid refill cartridge comprising a barrel having a writing nib at one end, said barrel comprising an inner holder having a cavity for receiving a refill cartridge and a cylindrical cover disposed over said holder, said cover having an opening in its side conforming to an opening of the cavity in said holder, said holder and said cover having interconnecting means permitting relative rotation between an open position wherein said opening is aligned with said cavity to permit lateral loading of the refill cartridge, and a closed position occluding said cavity to retain the refill cartridge therein.

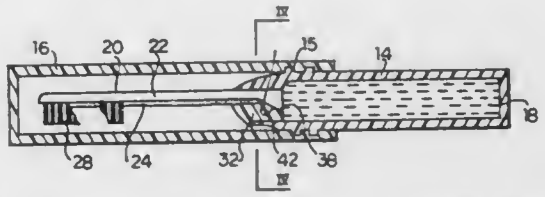
### 5,017,036
### TOOTHBRUSH WITH ABSORBENT PAD

**Gerda Vidovic, 446-3rd Street, South, Kenora, Ontario, Canada P9N 1J1**

**Division of Ser. No. 108,050, Oct. 13, 1987, Pat. No. 4,886,389. This application Oct. 10, 1989, Ser. No. 418,844**

**Int. Cl.$^5$ A46B** *11/04*

U.S. Cl. 401—283 **3 Claims**



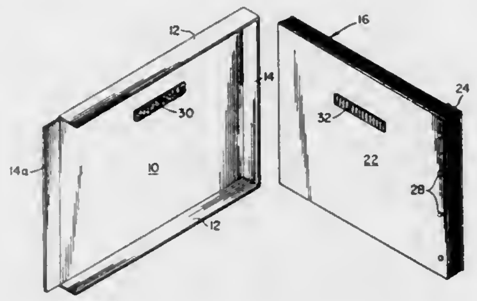
1. A toothbrush comprising a container including an elongate tubular reservoir and a cap removably attached to one end of the reservoir, a liquid dentifrice in said reservoir, a brush projecting from said one end of the reservoir and housed within the cap, the brush having a brush back, a liquid absorbent pad on one side of the back, the pad being exposed for engagement with a user's teeth, and bristles projecting from said one side of the back adjacent at least part of the pad, fluid passage means leading from the reservoir to a position adjacent the absorbent pad, and valve means in said fluid passage means, normally closing said fluid passage means and selectively operable to open the fluid passage means to allow liquid dentifrice to run freely from the reservoir into the absorbent pad.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,037
### POCKET DISPLAY AND PROTECTIVE ENCLOSURE

**Emily B. Sturtevant, 3408 Lowell St., NW., Washington, D.C. 20016**

**Filed Oct. 6, 1989, Ser. No. 418,209**
**Int. Cl.$^5$ B42F** *13/00. 13/12*
**U.S. Cl. 402—73** **10 Claims**



1. A multiple leaf-like assembly for leafing display and containment of keepsake memorabilia, and comprising:
- a plurality of leaf-like superposed pockets each formed of transparent flexible plastic sheeting forming an interior pocket space with one edge of each pocket remaining open for access to the interior space and with another edge of each pocket providing a pocket mounting area;
- fastener means for securing together the mounting areas of the pockets;
- a plurality of foldable mounting sheets, one disposed within each pocket and substantially coextensive with the interior pocket space to resist collapse or inadvertent folding of the pockets with the assembly in upwardly inclined positions for viewing and terminating short of the mounting area of the corresponding pocket whereby to be freely insertable and removable from the pocket space for attachment and replacement of memorabilia to opposite sides thereof for viewing through the transparent walls of the pockets as they are leafed about the mounting areas;
- and a relatively stiff backing member underlying the multiple leaf-like assembly with the fastener means cooperating with the backing member in securing the mounting areas of the pockets, and facilitating handling of the leaf-like assembly.

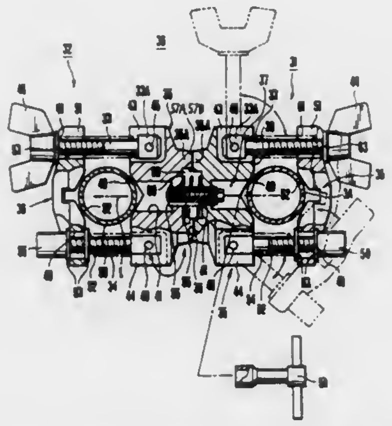
---

### 5,017,038
### CLAMPING APPARATUS

**Makoto Kurosaki, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan**

**Filed May 11, 1989, Ser. No. 350,208**
**Claims priority, application Japan, May 13, 1988, 63-62996[U]**
**Int. Cl.$^5$ E04G** *7/16;* **F16B** *7/00*
**U.S. Cl. 403—385** **9 Claims**

1. A clamping apparatus comprising:
- two tightening tools each including a base plate, a press plate, and urging means for tightening said base plate and said press plate of each tool toward one another while a member to be clamped is clamped therebetween, each of said urging means including first and second bolts and first and second nuts, one end of the first bolt being positioned in a notched recess formed in the respective base plate and being connected to a shaft disposed in the notched recess so that the first bolt can pivot about the axis of the shaft, the opposite end of the first bolt extending through an insertion hole formed in the respective press plate, said first nut threadably engaging the opposite end of the first bolt to secure the first bolt to the respective press plate whereby said press plate pivots with the first bolt when the first bolt is pivoted about the axis of the shaft to which the first bolt is connected;
- connecting means for connecting said tightening tools to one another with said base plates facing in opposite directions and for permitting said base plates to move relative to one another so that said tightening tools can freely pivot relative to each other, said connecting means extending through a substantially centrally located insertion hole in both of the base plates and said base plates having rear surfaces that face one another; and



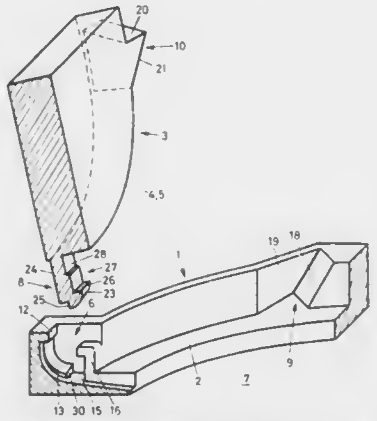
- spring means positioned between the facing rear surfaces of the two base plates for urging the two base plates away from each other, to thereby inhibit the connecting means from becoming loosened.

---

### 5,017,039
### COVERING FOR A GROUND OPENING

**Hansruedi Spiess, Pervenches 31, CH-2800 Delemont, and Francois Galvanetto, Le Lomont 7, CH-2942 Alle, both of Switzerland**

**Filed Jul. 5, 1989, Ser. No. 375,774**
**Claims priority, application Switzerland, Jul. 5, 1988, 2546/88**
**Int. Cl.$^5$ E02D** *29/14*
**U.S. Cl. 404—25** **6 Claims**



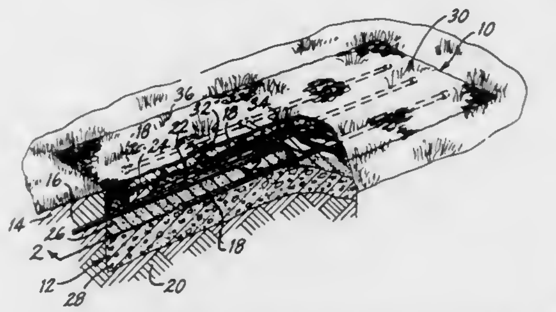
1. A covering for an opening provided in the ground, comprising a frame placed in the ground and a cover for covering said frame and being removable from said frame to give access to the opening, said frame including a bearing surface provided on the inside thereof for supporting said cover, said cover including at least one retaining web shaped on said cover, said frame having at least one recess on the inside thereof receiving said web and being provided with a hinge means, said cover further including at least one cam on an outer circumference thereof, said cam being spaced from the retaining web and provided with a supporting wall sloping towards a plane of the cover, said frame being formed on the inside thereof with at least one niche for receiving said cam and having a bearing surface, said frame further including means for supporting said retaining web as said cover is moved to a closed position, said supporting wall of said cam in said closed position of the cover engaging on said bearing surface of said niche to permit the retaining web supported by said supporting means to be moved into a clearance-free locked position in said recess when said cover is in the closed position,
- said frame having an opening, said supporting means including a hook-shaped web, said recess of said frame being separated from said opening by said hook-shaped web provided on said frame, said retaining web having a bottom resting on said hook-shaped web in the closed position of said cover, and wherein a set-back surface is provide don said bottom at the transition from said retaining web to a major part of said cover,
- said hook-shaped web engaging on said set-back surface in the closed position of said cover,
- said retaining web of the cover being provided at a free end thereof with a convex end portion which forms a sliding surface supported on a respective concave portion provided on said recess,
- said convex end portion of said retaining web being bounded at both sides by set-back portions of which one set-back portion in cooperation with said hook-shaped web is adapted to prevent an undesired outward tilting of said cover when the cover is fully open, wherein said recess has a bottom wall thereof a concave portion forming a shoulder, and in the case of an undesired tilting of the opened cover is an inward direction another of said set-back portions is supported against said shoulder and said one set-back portion engages on said hook-shaped web so that the cover is held positively in its open position.

---

### 5,017,040
### SEWAGE DISPOSAL SYSTEM AND METHOD

**Edward B. Mott, 25 Kendall Dr., Ringwood, N.J. 07456**

**Filed Apr. 25, 1990, Ser. No. 514,281**
**Int. Cl.$^5$ F02B** *11/00, 13/00*
**U.S. Cl. 405—32** **18 Claims**



1. In a sewage disposal system of the type in which sewage is distributed to an effluent absorption area in the earth for dissipation to the earth, the improvement comprising a layer of peat moss overlying the effluent absorption area to essentially cover the effluent absorption area for enabling air circulation to the effluent absorption area while reducing odor, and facilitating access to the effluent absorption area for maintenance of the sewage disposal system.

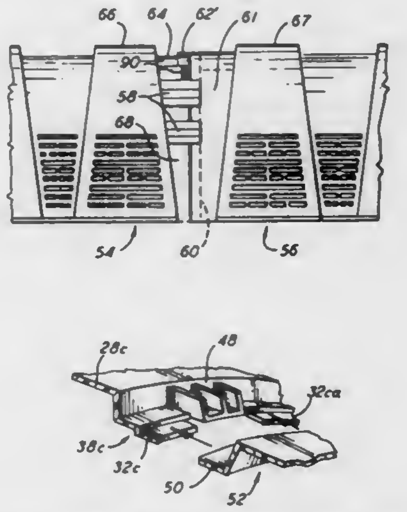
---

### 5,017,041
### LEACHING SYSTEM CONDUIT WITH HIGH RIGIDITY JOINT

**James M. Nichols, Old Saybrook, Conn., assignor to Infiltrator Systems Inc., Old Saybrook, Conn.**

**Filed Apr. 24, 1989, Ser. No. 341,902**
**Int. Cl.$^5$ E02B** *13/00*
**U.S. Cl. 405—48** **4 Claims**

1. A conduit for burial in the earth to disperse or gather liquids therein, having an arch shape cross section and alternating peak corrugations and valley corrugations along its length, with the top of the device during use being the top of the arch; an overlapped end and an opposing overlapping end, the ends adapted to mate in shiplap fashion with the corresponding overlapping and overlapped ends of like devices; at least one valley corrugation end having a sub-arch at the top of its arch shape, the top of the sub-arch being nominally level with the top of the adjacent peak corrugation; and, a peak corrugation with a continuous web proximate to the valley corrugation and the sub-arch.



---

### 5,017,042
### FLUID DIRECTING SYSTEMS

**Robert N. Minor, and Kjell E. Berg, both of 51 Springfield Rd., Stafford Springs, Conn. 06076**

**Filed Dec. 15, 1989, Ser. No. 451,317**
**Int. Cl.$^5$ E02B** *11/00, 13/00*
**U.S. Cl. 405—50** **18 Claims**

1. Apparatus for defining a path for the flow of fluid comprising:
- a three-dimensional collapsible cellular array, the array being defined by a series of multi-sided individual cells, said cells having a predetermined geometric shape and being open on at least one side whereby all the cells of the array may be filled with a material in particulate form when the array is in the expanded use state, sides of said cells being defined by walls which each have a predetermined size and shape in the unstressed condition, the serial array of cells including a pair of end cells and a plurality of intermediate cells, said array being formed from a fluid pervious material and adjacent cells of the array being separated by dividing walls; and
- means for establishing a flow path through all of the cells of the serial array, said flow path establishing means extending through the dividing walls between adjacent cells of the array.

---

### 5,017,043
### METHOD OF AN MEANS FOR CONTROLLING PRECIPITATION IN EVAPORATION PONDS

**Gad Assaf, Rehovot, and Benjamin Doron, Jerusalem, both of Israel, assignors to Geophysical Engineering Company, Seattle, Wash.**

**Filed Feb. 13, 1990, Ser. No. 479,619**
**Int. Cl.$^5$ B01D** *1/00, 9/02;* **C01D** *3/06*
**U.S. Cl. 405—52** **20 Claims**

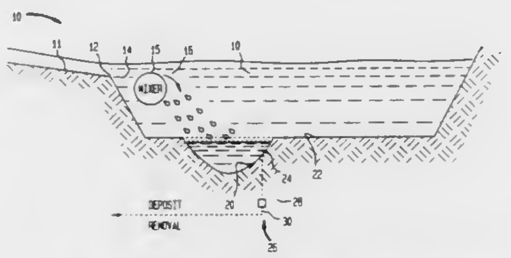
1. A method for controlling precipitation in ponds containing brine comprising the steps of:
- (a) introducing brine for concentration into a pond at at least one brine pond entrance; and
- (b) enhancing mixing in the vicinity of said entrance producing a region of enhanced mixing between the brine intro-

VOL
1126
ISS
3
MY
21
1991
UMI

duced into the pond and the brine present in the pond such that precipitation of salts occurs and precipitants form in the vicinity of said entrance and settle as deposits in a collection area.

**14**. An evaporation pond comprising:

(a) at least one brine pond entrance for introducing brine to be concentrated into said pond;



(b) enhanced brine mixing means for enhancing mixing in the vicinity of said brine entrance between brine introduced into said pond and brine present in the pond such that precipitation of salts occurs and precipitants form in the vicinity of said entrance; and

(c) a collection basin in the form of an indentation in the floor of the pond substantially adjacent said entrance for collecting said precipitants as deposits.

### 5,017,044

## FIBROUS REINFORCED RESINOUS STORAGE TANKS WITH STRENGTHENED WALLS

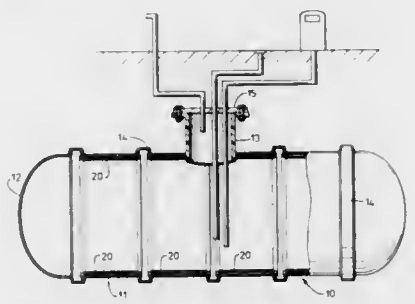
**Bruce R. Sharp, 4090 Rose Hill Ave., Cincinnati, Ohio 45229**

**Filed Apr. 26, 1989, Ser. No. 343,859**

**The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.**

**Int. Cl.⁵ B65D** *87/00, 6/34, 8/08;* **B65G** *5/00*

**U.S. Cl. 405—53** **17 Claims**



**1**. A method of building a strengthened ribbed underground storage tank system from a storage tank formed of a fibrous reinforced resinous material, said storage tank having a cylindrical-shaped main body, end caps and a set of substantially evenly spaced support ribs along the length of the main body which extend circumferentially around said main body and are integral therewith, further wherein said storage tank's interior wall is generally contoured with rib recesses, the improvement comprising bonding a series of wall sections circumferentially around the interior wall of the storage tank to substantially cover interior wall areas between the rib recesses, said wall sections being at least partially separated from the interior wall areas.

**11**. A strengthened ribbed underground storage tank system, comprising:

(a) a fibrous reinforced resinous storage tank having a cylindrical-shaped main body, end caps and a set of substantially evenly spaced support ribs along the length of the main body which extend circumferentially around the main body and are integral therewith, further wherein said storage tank's interior wall is generally contoured with rib recesses; and

(b) a series of wall sections extending circumferentially around the interior wall of the storage tank to substantially cover interior wall areas between the rib recesses, said wall sections being at least partially separated from the interior wall areas.

### 5,017,045

## METHOD AND APPARATUS FOR CONTROLLING ATTITUDE OF SHIELD EXCAVATOR

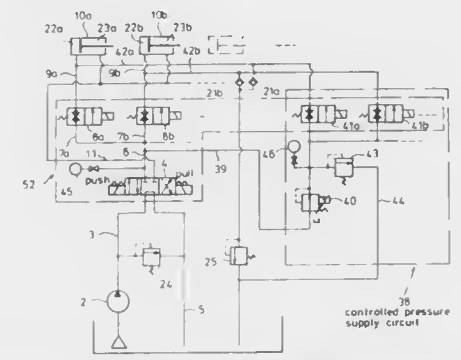
**Yoshiharu Kiritani, Urawa; Yutaka Onishi, Yokohama; Shigeyoshi Tagata, Ogaki, and Koichi Umeno, Tokyo, all of Japan, assignors to Sato Kogyo Co., Ltd., Toyama; Ishikawajima Harima Jukogyo Kabushiki Kaisha and Tokyo Keiki Co., Ltd., both of Tokyo, all of, Japan**

**Filed Jul. 26, 1990, Ser. No. 557,736**

**Claims priority, application Japan, Mar. 24, 1989, 72199**

**Int. Cl.⁵ E02D** *9/06*

**U.S. Cl. 405—143** **2 Claims**



**1**. A method for controlling an attitude of a shield excavator which comprises dividing a plurality of thrust jacks in a shield excavator into two groups of mutually adjacent thrust jacks, one of said group being operated by a load pressure while the other group is operated by a controlled pressure, position of said division of the jacks into two groups being set depending upon a direction or rotational moment to which the shield excavator is desired to be directed, a magnitude of said controlled pressure being set depending upon a desired magnitude of the rotational moment.

### 5,017,046

## METHOD OF PROTECTING A STRUCTURE CONSTRUCTED ON GROUND LIABLE TO BE LIQUEFIED

**Tadao Sugimoto; Shigeki Tsuchiyama, both of Nagoya; Makoto Hayakawa, Kariya; Yozo Goto, Tokyo; Tadao Koide, Sayama; Tamotsu Endoh, Yokohama; Makoto Toriihara, Hidaka, and Joji Ejiri, Tokyo, all of Japan, assignors to Ohbayashi Corporation, Osaka and Chubu Electric Power Company, Incorporated, Aichi, both of, Japan**

**Filed Nov. 8, 1989, Ser. No. 433,205**

**Int. Cl.⁵ E02D** *19/00*

**U.S. Cl. 405—229** **6 Claims**

**1**. A method of protecting a structure constructed on ground which is liable to be liquefied, said method comprising the steps of:

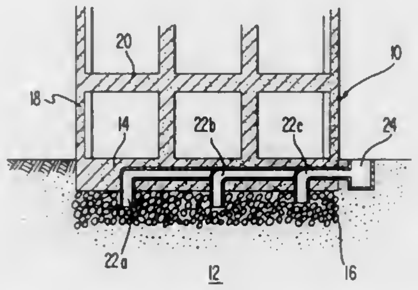
forming a conglomerate layer of a predetermined thickness horizontally on base ground which is liable to be liquefied by pore water including pore water flowing into said conglomerate layer from below;

forming an underground base of the structure on said conglomerate layer;

providing one or more drainpipes, each said drainpipe having at least first and second length portions, each said drainpipe having opposite first and second open ends, and each said open end having an area substantially equal to the cross-sectional area of the respective said drainpipe; and

arranging each of said one or more drainpipes such that said first open end thereof is positioned within said conglomerate layer, said second open end thereof communicates with the surface of the ground and is at a level higher than said first open end, said first length portion thereof extends substantially vertically through said conglomerate layer into said underground base, and said second length portion thereof extends substantially horizontally within and through said underground base;

whereby excessive pore water in the ground first is collected in said conglomerate layer, flows through said first open end of each said drainpipe into said vertical first length portion thereof, and then flows through said horizontal second length portion thereof and discharges through said second open end thereof to the surface of the ground.



### 5,017,047

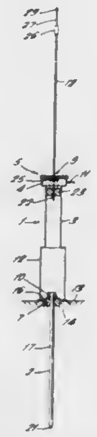
## SOIL NAILING

**Bernard Myles, Chepstow, and Ronald J. Bridle, Gwent, both of United Kingdom, assignors to University College Cardiff Consultants Limited, Cardiff, United Kingdom**

**Filed May 2, 1989, Ser. No. 346,539**

**Int. Cl.⁵ E21D** *21/00;* **B25C** *5/10*

**U.S. Cl. 405—259** **23 Claims**



**11**. Apparatus for use in soil nailing comprising an elongate member, a launcher for firing the member into the ground, a barrel of the launcher coaxially receiving the member in a loaded position thereof, an annular sabot mounted on the member in sliding contact with the barrel, the member having a first stop means limiting movement of the sabot relative to the member towards a forward end of the member beyond a first position and second stop means limiting movement of the sabot relative to the member towards a rear end of the member beyond a second position whereby during firing of the launcher the sabot in its first position guides the member within the barrel and is movable upon engagement with the ground to its second position to constitute a radial enlargement of the member which limits the depth to which the member penetrates the ground.

**22**. A method of soil nailing in which a soil nail is placed in the ground including the steps of loading a first elongate tubular member into a barrel of a launcher such that the first member is a loose fit in the barrel, providing the first member with a first sabot which is a sliding fit in the barrel and which guides the first member coaxially in the barrel during firing, admitting pressurized gas to the barrel thereby firing the first member from the launcher by gas pressure acting on the sabot, allowing the first member to thereafter penetrate and become embedded in the ground under its own momentum, arresting the first member after it has penetrated the ground to a predetermined extent by means of the first sabot, loading a second elongate member into the barrel such that the second member is a loose fit in the barrel, providing the second member with a second sabot which is a sliding fit in the barrel and which guides the second member coaxially in the barrel during firing, admitting pressurized gas to the barrel thereby firing the second member from the launcher by gas pressure acting on the sabot, and allowing the second member under its own momentum to thereafter enter and travel through a bore defined by the first member whereby the second member is driven into the ground while guided by the first member into a position in which it forms an extension thereto.

### 5,017,048

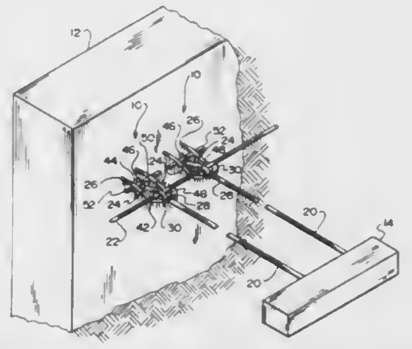
## "U" ANCHOR AND "T" CONNECTOR RETAINING WALL ANCHOR SYSTEM

**Donald Preston, and John H. Luke, both of Tampa, Fla., assignors to MMI Products, Inc., Houston, Tex.**

**Filed Aug. 8, 1990, Ser. No. 564,386**

**Int. Cl.⁵ E02D** *29/02*

**U.S. Cl. 405—262** **21 Claims**



**1**. A retaining wall anchor system of the type primarily intended for use in combination with a retaining wall and a dead man, said system comprising:

at least one wall anchor, said wall anchor comprising a pair of spaced apart legs, each of said legs having a first end and a second end, said second ends being joined one to the other such that said legs define a substantially U-shaped portion, and said first ends being connected to the retaining wall, such that said U-shaped portion extends therefrom;

at least one tie rod having a first end and a second end, said second end being attached to a dead man; and a cross member attached proximal to said first end of said tie rod, said cross member being longer than the distance between said spaced apart legs; said tie rod having a first curved section being so curved that with said first curved section of said tie rod inserted between said legs, said curved section is located on one side of said legs, and said attached cross member and a segment of said tie rod adjacent to said U-shaped portion are located on the opposite side of said legs; and

a locking means insertable through said curved section of said tie rod between said tie rod and said legs, such that said tie rod may be connected to said wall anchor.

VOL
1126
ISS
3
MY
21
1991
UMI

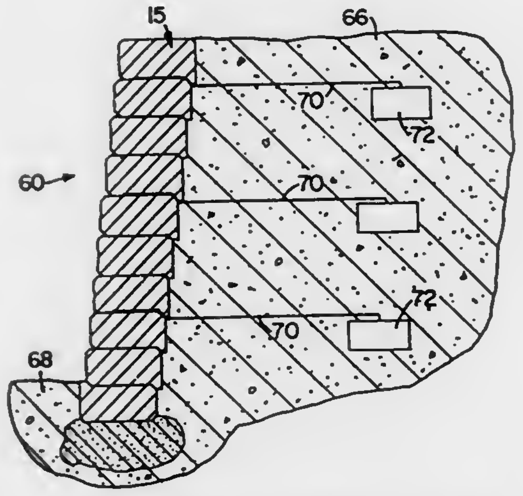
### 5,017,049
## COMPOSITE MASONRY BLOCK

**Dick J. Sievert, New Richmond, Wis., assignor to Block Systems Inc., No. St. Paul, Minn.**

**Division of Ser. No. 493,925, Mar. 15, 1990, which is a continuation-in-part of Ser. No. 412,272, Sep. 29, 1989. This application Jul. 26, 1990, Ser. No. 558,563**

**Int. Cl.⁵ E02D** *29/02*

U.S. Cl. 405—284 12 Claims



1. A composite masonry block suitable for use in the construction of substantially vertical mortarless retaining walls comprising:

(a) a block body having generally planar, generally parallel, spaced top and bottom surfaces, a pair of spaced side surfaces, each side surface intersecting the top and bottom surfaces, and front and rear surfaces at opposite ends of the block body; and

(b) means for interlocking and automatically setting back successive courses of said block comprising a rearwardly-facing bevelled surface extending the width of the block and intersecting the top and rear surfaces of the block body at angles of less than 90 degrees and a flange extending the width of the block body and also extending downwardly from the rear and bottom surfaces of the block body and including a forwardly-facing locking surface extending the width of the block body and intersecting the bottom surface of the block body, said locking surface being substantially parallel to said bevelled surface, wherein the horizontally-measured thickness of the flange in the plane of the bottom surface is greater than the predetermined set back distance, thus providing for minimal setbacks, and resulting substantially vertical walls, while at the same time providing strength in the flange so that it may withstand the loading on the wall, as well as resist damage during packing, shipping, handling and installation; and wherein

(c) the line of intersection of the bevelled surface with the top surface of the block body is displaced rearwardly on the block body with respect to the line of intersection of the locking surface with the bottom surface of the block body,

whereby a second course of blocks made according to this invention, when placed upon a first course of such blocks so that the locking surfaces of the blocks of the second course seat upon the bevelled surfaces of the blocks of the first course, will be automatically set back from the first course by a predetermined distance, and will be interlocked with the first course of blocks so as to resist the loading on the rear surfaces of the wall caused by earth and water retained therebehind.

---

### 5,017,050
## BUILDING ELEMENT FOR SUPPORTIVE GRID WALLS WITH A BULK MATERIAL FILLING

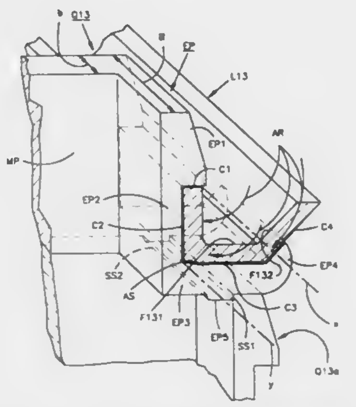
**Felix P. Jaecklin, Geissbergstrasse 46, CH-5400 Ennetbaden, Switzerland**

**Continuation of Ser. No. 721,858, Apr. 9, 1985, abandoned. This application Mar. 18, 1987, Ser. No. 24,846**

**Claims priority, application Fed. Rep. of Germany, Apr. 10, 1984, 3413479**

**Int. Cl.⁵ E04C** *1/39*

U.S. Cl. 405—284 2 Claims



1. A wall structure for forming a substantially planar grid wall for receiving and supporting a bulk material filling, comprising at least one first structural element extending substantially at an angle, particularly transverse, to the wall plane and at least one second structural element extending substantially parallel to the wall plane, said first element including means defining at least one recess for embracing said second element at least partially along the cross-sectional contour thereof in a plane transverse to the wall plane so as to connect and secure together said first and second elements in a predetermined relative position in said structure, wherein at least one connection portion of said first element comprising said recess is substantially larger in a first cross-sectional dimension measured in a first direction parallel to the wall plane, in comparison to a second cross-sectional dimension of the first element measured in a second direction which is parallel to said first direction but spaced apart from said connection region of said first element, in which said first element is a transverse beam and said second element a longitudinal beam with regard to the wall plane, said first cross-sectional dimension being the breadth of said transverse beam in said region comprising said recess measured in parallel to said longitudinal beam and said second cross-sectional dimension being the minimum breadth of said first element measured in parallel to said longitudinal beam.

---

### 5,017,051
## ELECTROHYDRAULIC CONTROL MEANS FOR HYDRAULIC SELF-ADVANCING SUPPORT UNITS

**Heinrich Kowalik; Peter Pletsch, both of Wuppertal, and Gerald Kohl, Erkrath, all of Fed. Rep. of Germany, assignors to Hermann Hemscheidt Maschinenfabrik GmbH & Co., Wuppertal, Fed. Rep. of Germany**

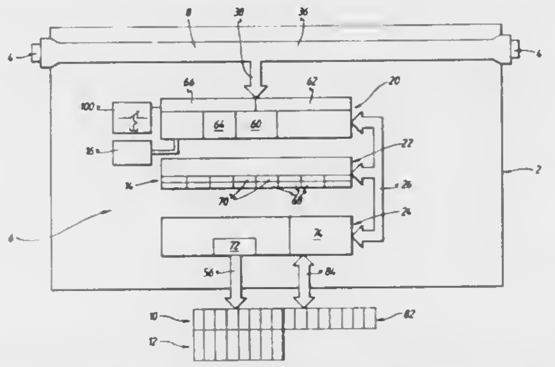
**Filed Oct. 17, 1989, Ser. No. 422,539**

**Claims priority, application Fed. Rep. of Germany, Oct. 20, 1988, 3835755**

**Int. Cl.⁵ E21D** *23/12*

U.S. Cl. 405—302 36 Claims

1. A control means for hydraulic self-advancing support units for underground working, the control means including at least one electrohydraulic control device comprising an electric circuit for energising electromagnets adapted to actuate hydraulic valves, a command keyboard connected to the energising circuit, a display connected to the energising circuit, and two multipole connectors for connecting the control device to respective adjacent devices, the multipole connectors being connected to one another and to the energising circuit by respective electric line connections inside the control device, wherein the energising circuit is substantially made up of a CPU control sub-assembly, a keyboard and display sub-assembly, and a magnet control sub-assembly, these three sub-assemblies being interconnected by a common bus line, and wherein the line connection between the two multipole connectors comprises at least one flexible printed circuit board connected by at least one ribbon cross-connection to one of the three sub-assemblies, the magnet control sub-assembly being connected by electric line connections to the electromagnets, which electromagnets are disposed outside the control device and are incorporated in the hydraulic valves.



---

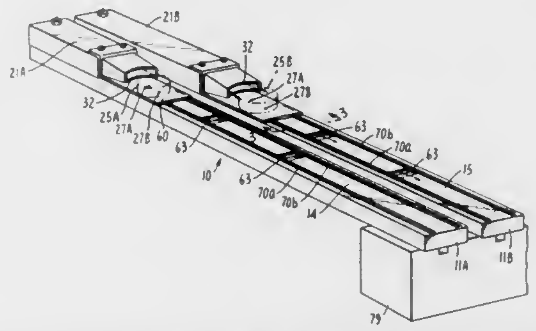
### 5,017,052
## CUP CONVEYOR

**James G. Bartylla, 16495 Rustling Oak Ct., Morgan Hill, Calif. 95037**

**Continuation-in-part of Ser. No. 231,903, Aug. 15, 1988, abandoned, which is a continuation of Ser. No. 881,068, Jul. 2, 1986, abandoned. This application Aug. 15, 1989, Ser. No. 394,195**

**Int. Cl.⁵ B65G** *51/03, 51/02*

U.S. Cl. 406—88 5 Claims



1. A device for conveying cup-shaped objects adapted for use in a space defined between the bed of a mechanical press and a lower die shoe mounted on the press which forms said cup shaped objects, said device comprising means for establishing a pressurized source of air and means for feeding the pressurized air to a plenum wherein said plenum is characterized as having an upper deck surface having a cup-shaped object receiving zone where said objects are successively deposited, one or more holes located within said upper deck surface at said receiving zone for the discharge of air from said plenum and an upstream exhaust duct positioned to direct a flow of air longitudinally above said upper deck surface for moving said cup-shaped objects longitudinally along said upper deck surface, said upstream exhaust duct having an air discharge port being concave and circular in shape wherein its circular curvature is radially equidistant from a center point defined by a geometric center established at the point at which said cup-shaped objects are received upon said receiving zone.

---

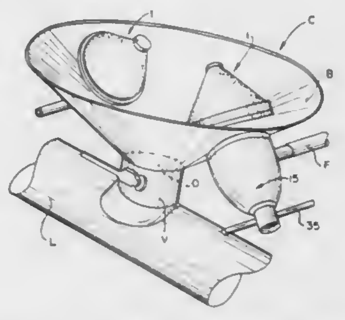
### 5,017,053
## AERATION DEVICE FOR BULK MATERIAL CONTAINERS

**David E. Sisk, R.R. 1, Box 340, Bonne Terre, Mo. 63628**

**Continuation-in-part of Ser. No. 286,240, Dec. 19, 1988. This application Jan. 25, 1989, Ser. No. 302,310**

**Int. Cl.⁵ B65G** *53/38*

U.S. Cl. 406—138 8 Claims



1. An aeration device to facilitate the flow and discharge of bulk material granules and the like through a discharge opening in a bulk material container, comprising at least one rigid, and independently self-supporting molded plastic hollow body adapted to overlie an air inlet in said bulk material container at a predetermined distance above the discharge opening thereof, each said molded plastic hollow body having an inner arched wall adapted to face the air inlet in said bulk material container, and an outer arched wall, a plurality of openings of predetermined porosity along said inner arched wall, a plurality of openings of predetermined smaller porosity along said outer arched wall, inner tortuous pathways within said molded plastic hollow body between said openings in said inner and outer arched walls, the plurality of openings of predetermined smaller porosity along said outer arched wall are smaller than the size of the bulk material granules in said bulk material container, said molded plastic hollow body comprising a plurality of molded and bonded plastic particles which are formed in closer proximity to one another at least along the outer arched wall provided with openings of predetermined smaller porosity, the plurality of molded and bonded plastic particles being in closer proximity to one another at least along said outer arched wall are compressed into a more compact and dense relationship as a coherent mass with said openings of predetermined smaller porosity therein, said molded plastic hollow body having a general frusto-conical configuration with a closed planar top wall and a downwardly and outwardly extending peripheral continuous side wall which terminates at an open bottom at an outer free end thereof, and said outer free end of said peripherally continuous side wall being adapted to be secured in proximity to an inner surface of the bulk material container in overlying and sealed relationship to the air inlet in the bulk material container, and said outer free end of said peripherally continuous side wall being secured to an air inlet fitting which is also adapted to be mounted relative to the air inlet of the bulk material container.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,054
## DELIVERY LINE FOR THE CONVEYING OF VISCOUS OR PASTY MATERIAL

**Jurgen Gideon, Verden/Aller; Dieter Krieger, Langwedel-Etelsen, and Erich Mengel, Verden/Borstel, all of Fed. Rep. of Germany, assignors to Effem GmbH, Verden/Aller, Fed. Rep. of Germany**

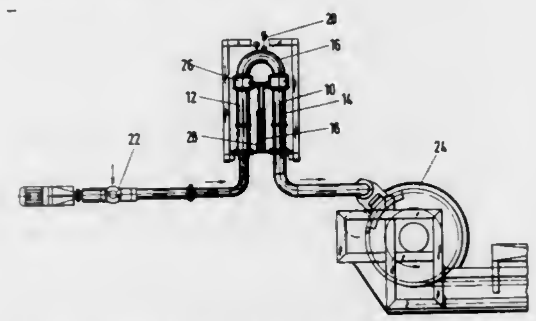
PCT No. PCT/DE89/00238, § 371 Date Dec. 21, 1989, § 102(e) Date Dec. 21, 1989, PCT Pub. No. WO89/10515, PCT Pub. Date Nov. 2, 1989

PCT Filed Apr. 19, 1989, Ser. No. 458,651

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813574

Int. Cl.$^5$ B65G *53/52, 53/66*

U.S. Cl. 406—191 4 Claims



1. A delivery line for conveying viscous or pasty material to be filled into a food can from a conveyer pump to a filling machine, comprising a delivery path developed in the form of a trombone tube having two sections which extend parallel to each other and a U-shaped arch, said delivery path extending in a vertical plane and being provided with a vent means at the highest point of said U-shaped arch, said sections having legs which cooperate telescopically and means for acting on said U-shaped arch and against the pressure of the conveyed material in said delivery path in a direction toward the shortening of the path.

---

### 5,017,055
## INDEXABLE CUTTER INSERT

**Osamu Tsujimura, Kawasaki; Tatsuo Arai, Kitamoto; Masaaki Nakayama, Tokyo, and Masayuki Okawa, Kawasaki, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

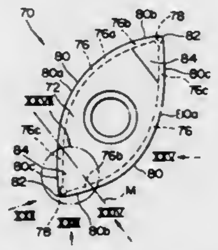
Continuation of Ser. No. 164,441, Mar. 4, 1988, abandoned. This application Nov. 2, 1989, Ser. No. 430,928

Claims priority, application Japan, Mar. 4, 1987, 62-31257[U]; Sep. 16, 1987, 62-141236[U]; Sep. 25, 1987, 62-146266[U]; Oct. 16, 1987, 62-158600[U]; Nov. 26, 1987, 62-179931[U]

The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

Int. Cl.$^5$ B23C *5/10, 5/14*

U.S. Cl. 407—113 2 Claims



1. An indexable cutter insert for a ball end mill comprising a plate of a generally elongated elliptical shape defined by a front face, a rear face, a pair of first side faces and a pair of second side faces lying between and disposed alternately about a periphery of said front and rear faces, each of said first side faces cooperating with said front face to define a main cutting edge which is generally arcuately shaped when viewed in a direction perpendicular to said front face, each of said second side faces cooperating with said front face to define a second cutting edge which is short and generally straight, each of said main cutting edges having a leading end portion which intersects a respective one of said second cutting edges at an obtuse angle, said front face serving as a rake surface for said main and second cutting edges and having a pair of marginal surface portions each disposed adjacent to a respective one of said second cutting edges, each of said marginal surface portions being convexly curved so as to slope toward said rear face and toward said respective second cutting edge, said leading end portion and at least that portion of said main cutting edge disposed adjacent to said leading end portion being formed to assume such a quadrantal shape when viewed in a direction perpendicular to said front face that, when the insert is disposed on the ball end mill with the leading end portion of the main cutting edge disposed adjacent to an axis of rotation of the ball end mill and with the second cutting edge extending from the leading end portion beyond the axis of rotation of the ball end mill when viewed in a direction generally perpendicular to said front face, the leading end portion of the cutting edge to be formed to assume such part of an elongate ellipse that a contour generated by the leading end portion during rotation of the rotary cutter defines an approximately true hemispherical shape.

---

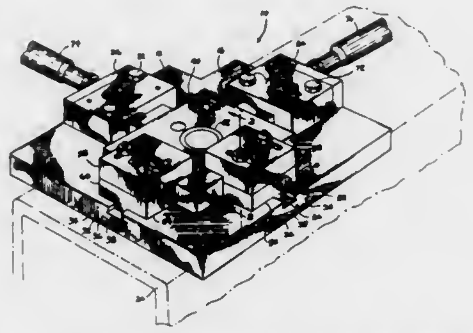
### 5,017,056
## POSITIONER FOR ACCURATELY DRILLING A HOLE IN A TOOL BALL PAD

**Dean C. Morash, Huntington Beach, Calif., assignor to Northrop Corporation, Hawthorne, Calif.**

Filed Jul. 21, 1988, Ser. No. 222,459

Int. Cl.$^5$ B23B *35/00*

U.S. Cl. 408—1 R 5 Claims



1. A method of drilling a hole in a tool ball pad blank secured to a jig at a precisely predetermined location comprising:

providing a base plate, a drill pate having means forming a reference hole therein and a target,

said base plate having a thickness approximately equal to the height of said pad blank and,

forming an aperture in said base plate having generally the same dimension as said ball pad blank for permitting the said base plate to be slidably received about said ball pad blank,

providing said drill plate with means forming a reference hole therein,

positioning a target in the reference hole of the drill plate,

optically sighting the target while in the reference hole of the drill plate,

adjusting the drill plate with respect to the base plate, pad and jig until the target has been moved to the precise determined location overlying the location to be drilled,

positively securing the base plate with respect to the jig and tool ball pad blank secured thereto,

removing the target from the reference hole in the drill plate,

drilling the tool pad blank through the reference hole in the drill plate,

removing the base plate, drill plate, and other parts from the drilled pad blank, and

placing a tool ball into the drill pad blank.

---

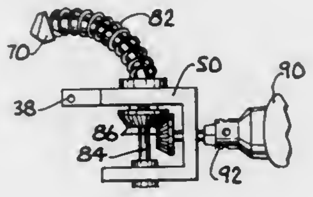
### 5,017,057
## APPARATUS FOR DRILLING A CIRCULARLY CURVED BORE

**Tom F. Kryger, Stanhope, N.J., assignor to Ronald J. Harms, Phillipsburg, N.J., a part interest**

Filed Sep. 5, 1989, Ser. No. 403,565

Int. Cl.$^5$ B23B *41/00, 45/14*

U.S. Cl. 408—68 17 Claims



1. An apparatus for forming in a workpiece a curved hole following a circular path, the apparatus comprising:

a support shaped to at least partly engage said workpiece for fixing the support relative to the workpiece;

a chassis pivotally mounted to the support on a means defining pivot axis, the pivot axis corresponding to a center of said circular path;

a drilling bit mounted on a distal end of a shaft fixed to the chassis and a power transmission section connected to the drilling bit and disposed along an arc coaxial with the pivot axis, the power transmission section including a flexible drive, said drive including a flexible powertransmitting tube mounted on a shaft; and,

means for applying power to the power transmission section while forcing the chassis around the pivot axis, the drilling bit being guided through the workpiece with pivoting of the chassis relative to the workpiece and the support.

---

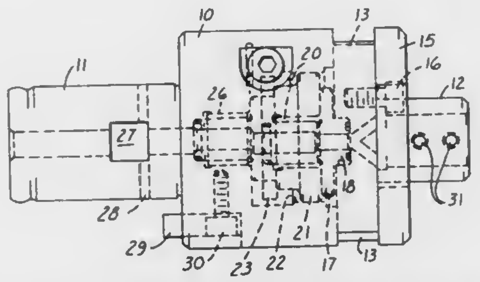
### 5,017,058
## MECHANICAL FINE ADJUST BORING HEAD

**Wayne Robinson, and Kenneth Noggle, both of West Bloomfield, Mich., assignors to GTE Valenite Corporation, Troy, Mich.**

Filed Dec. 23, 1988, Ser. No. 289,148

Int. Cl.$^5$ B23B *29/03*

U.S. Cl. 408—173 4 Claims



1. A mechanical fine adjust boring head comprising an annular body having a radial cross slot, a tool holder slide mounted for radial adjustment in said slot, a secondary cross slot in said slide extending normal to said radial cross slot, a drive key engageable in an orbital path with said secondary cross slot to effect radial adjustment displacement of said slide, cam means rotatably mounted in said body with an exterior annular surface coaxial with said annular body and an internal eccentrically oriented cylindrical surface corresponding to said eccentric orbital path, said drive key including a cylindrical stub shaft extending within said eccentrically oriented cylindrical surface and a flatted drive projection engaging said secondary cross slot, and means including a worm and worm wheel means for rotating said cam means to effect an orbital adjustment actuation of said drive key and corresponding linear displacement of said slide in said radial cross slot.

---

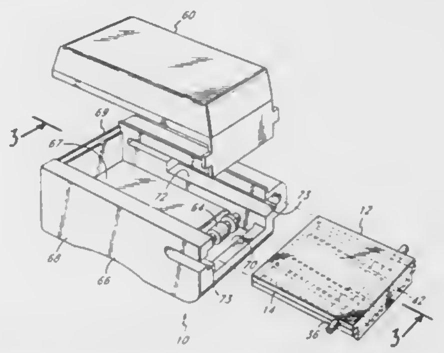
### 5,017,059
## INFUSION DEVICE WITH DISPOSABLE ELEMENTS

**David L. Davis, San Diego, Calif., assignor to Patient Solutions, Inc., San Diego, Calif.**

Division of Ser. No. 194,865, May 17, 1988. This application Oct. 25, 1989, Ser. No. 427,174

Int. Cl.$^5$ B23C *3/08*

U.S. Cl. 409—131 3 Claims



1. A method of shaping the contour of a cam to squeeze fluid from a tube at a uniform rate, comprising:

calculating the differential volume of said tube caused by an incremental decrease in the width of said tube at each of plural tube widths;

calculating the radius of a cam at each of plural, equally spaced angular positions, to provide an incremental decrease in the width of said tube which, at the tube's current width, will provide identical differential volumes, and

shaping the contour of said cam in accordance with the radius calculated for each of said plural, equally spaced angular positions.

---

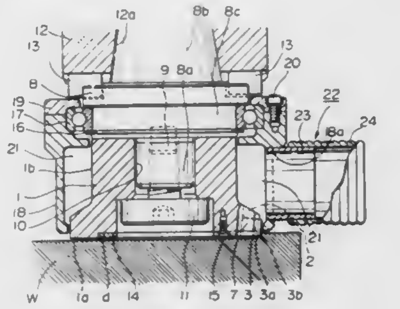
### 5,017,060
## ROTARY CUTTING TOOL

**Hidehisa Shiratori, and Kazuo Iizuka, both of Tokyo, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan**

Filed Apr. 16, 1990, Ser. No. 508,818

Int. Cl.$^5$ B27G *3/00*

U.S. Cl. 409—137 5 Claims



1. A rotary cutting tool comprising:

(a) a cutter body including an axis of rotation therethrough and including a forward end portion having an outer circumferential surface and a forward end face, said cutter

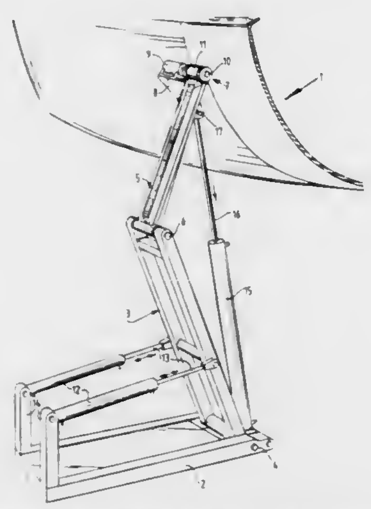
VOL 1126
ISS 3
MY 21 1991
UMI

body including chip pocket means for collecting cutting chips;
- (b) cutting means provided on said cutter body and having at least one end cutting edge disposed in an end cutting position and at least one outer peripheral cutting edge disposed in an outer peripheral cutting position, said cutting means being disposed adjacent said chip pocket means so as to be displaced therefrom circumferentially in a direction of rotation of the cutter body;
- (c) a covering of a generally cylindrical shape disposed rotatably relative to said cutter body so as to surround said outer circumferential surface of said forward end portion of said cutter body to define a chip disposal space therebetween;
- (d) a guide member attached to said forward end portion of said cutter body for leading chips produced during a cutting operation to said chip disposal space; and
- (e) suction means connected to said covering for removing the chips in said chip disposal space outwardly, said guide member being formed so as to cover said chip pocket means and being disposed adjacent to said cutting means so as to define gaps between said edges of said cutting means and said guide member, whereby chips produced during the cutting operation are led through said gaps into said chip disposal space by an airflow drawn into said suction means.

---

### 5,017,061
### APPARATUS FOR THE PEELING OF SURFACES, INCLUDING NONPLANAR SURFACES

**Johannes M. Mombers, Waalwijk, Netherlands, assignor to ARBA Holding S.A., Luxembourg, Luxembourg**
**Filed Oct. 4, 1989, Ser. No. 416,769**
**Int. Cl.$^5$ B23C *1/20***
U.S. Cl. 409—139 **8 Claims**

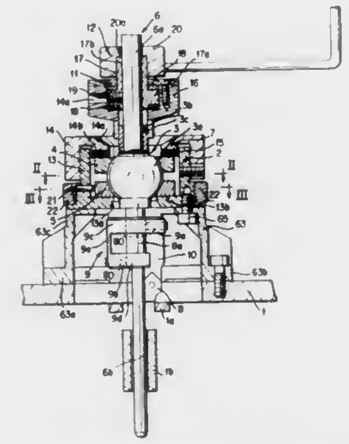


1. An apparatus for peeling a layer from a surface, including a nonplanar surface, said apparatus comprising:
- (a) a substantially cylindrical support, said substantially cylindrical support being axially rotatable;
- (b) a first annular guiding element circumferentially surrounding a first end of said substantially cylindrical support and a second annular guiding element circumferentially surrounding a second end of said substantially cylindrical support, wherein said first and second annual guiding elements have different diameters;
- (c) at least two peeling knives projecting from an outer surface of said substantially cylindrical support and extending along the outer surface of said substantially cylindrical support between said first and second annular guiding elements wherein each of said at least two peeling knives are parallel to each other and are spaced unequally around a circumference of said substantially cylindrical support;
- (d) driving means for axially rotating said substantially cylindrical support; and
- (e) support means for supporting said substantially cylindrical support against the surface to be peeled, said support means comprising:
  - (i) a first arm connected at an upper end thereof to said substantially cylindrical support such that said substantially cylindrical support is axially rotatable independent of said first arm;
  - (ii) a second arm connected at an upper end thereof to a lower end of said first arm, a lower end of said second arm rotatably connected to a bottom frame; and
  - (iii) hydraulic or pneumatic control means cooperating with said first arm, said second arm and said bottom frame for controlling movement of said substantially cylindrical support against a surface to be peeled.

---

### 5,017,062
### TOOL FOR PRECISION MACHINING

**Jacques Leroux, Annecy Le Vieux, and Francois Gallez, Annecy, both of France, assignors to Serdi - Societe D'Etudes De Realisation Et De Diffusion Industrielles, Annecy, France**
**Filed May 22, 1990, Ser. No. 526,905**
**Claims priority, application France, May 22, 1989, 89 06970; Jun. 22, 1989, 89 08580**
**Int. Cl.$^5$ B23C *1/20;* B23B *41/00***
U.S. Cl. 409—179 **9 Claims**



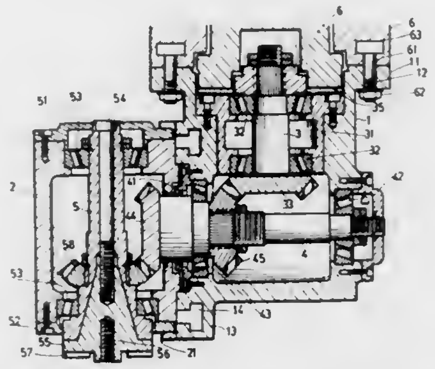
1. A tool for precision machining, for example for the grinding of thermal-engine valve seats, comprising:
- a housing,
- a means for fixing the housing relative to the part to be machined, for example the cylinder head of the thermal engine,
- a sleeve equipped with a spherical orientation plug mounted inside the housing,
- two seats of concave sphericity complementary with the spherical plug and arranged inside the housing on either side of said plug,
- a spindle mounted freely in terms of rotational and translational motion in the transverse bore of the sleeve, the housing possessing respectively, on either side of the spherical plug, two orifices each allowing the passage of the spindle with movement,
- a pilot rod coaxial with the axis of the spindle, extending the latter at one end and intended for penetrating with an exact fit into a reference hole, for example the guide of a valve stem,
- a means for blocking the sleeve in terms of orientation,
- a rotary machining tool mounted at the end of the spindle on the same side as the pilot rod,
- a means for adjusting the height of the spindle together with the pilot rod in relation to the sleeve, said means being mounted on the latter outside the housing and opposite to the machining tool,
- a means for driving the spindle together with the pilot rod in rotation, at the end of the housing and opposite to the machining tool,

wherein, in combination:
- (a) the spindle and the pilot rod are constructed in one piece to form an interchangeable machining shaft, comprising in terms of its height a first part or hub, forming the spindle, having a nominal diameter, and a second part of smaller diameter forming the pilot rod,
- (b) the part or parts of said tool which are located outside the housing and on the opposite side to the machining tool, and especially the height adjustment means of the machining shaft, together define a hole for the extraction of said machining shaft, aligned along the axis of the transverse bore of the sleeve and of a diameter at least equal to the nominal diameter,
- (c) the means for adjusting the height of the machining shaft comprises, on the one hand, a bush for rotational coupling to the hub of the machining shaft, movable in terms of translational motion relative to the sleeve and, on the other hand, a reversible means for blocking the bush in terms of rotation relative to the hub, accessible to a manipulation by the user from outside.

---

### 5,017,063
### UNIVERSAL TOOL REST FOR A MILLING PLANER

**Han-Tsun Tsay, 33, Lane 85, Tzu Yu I Rd., San Min District, Kao Hsiung, Taiwan**
**Filed Feb. 13, 1990, Ser. No. 479,460**
**Int. Cl.$^5$ B23C *1/12***
U.S. Cl. 409—215 **1 Claim**



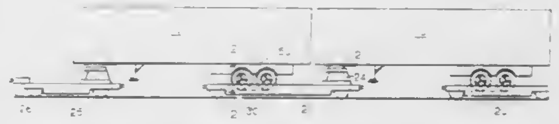
1. A universal tool rest for a milling planer comprising:
- a first housing provided at the upper end with a connection disc rotatably engaging a lower end of a driving stand of the milling planer and at the front side with a second connection disc having a T-shaped annular groove;
- a second housing provided at the rear side with a connection disc engaged with the second connection disc of said first housing so that said second housing may be adjusted in position as required;
- a first transmission shaft vertically mounted into said first housing via a sleeve and two bearings and having a bevel gear at the lower end and a transmission disc at the upper end, said transmission disc having two opposite slots for engaging the driving stand thereby connecting the driving stand with the transmission shaft;
- a second transmission shaft horizontally mounted into the lower part of the housing by means of a front cover, a rear cover and two bearings and having a front end extending into said second housing and a first bevel gear at the front end and a second bevel gear at the intermediate portion, said second bevel gear being engaged with the bevel gear of said first transmission shaft thereby enabling said transmission gear to drive said second transmission shaft;
- a third transmission shaft vertically mounted into said second housing via an upper cover, a lower cover and two bearings, a tool post being fitted into a lower end of said second housing by means of a bolt and having at the lower end a threaded hole and an engaging member by means of which a milling cutter may be mounted thereon by a bolt, said third transmission shaft having a bevel gear for engaging with the first bevel gear of said second transmission shaft such that said first transmission shaft may drive said milling cutter via said first and second transmission shafts;

whereby said milling cutter may be rotated by the driving stand via said first, second and third transmission shafts and can be randomly rotated as required.

---

### 5,017,064
### INTERMODAL TRANSPORT SYSTEM

**George B. Kirwan, 1940 Old Miller Rd., Huntington, W. Va. 25701, and Victor A. Nelson, 5514 Flag Run Dr., Springfield, Va. 22151**
**Filed Sep. 25, 1989, Ser. No. 411,659**
**Int. Cl.$^5$ B61D *3/14;* B65F *9/00;* B60T *3/00***
U.S. Cl. 410—53 **8 Claims**



1. An intermodal transportation system for use in combination with semi-trailers (10) and railway bogies wherein said semi-trailers (10) have a fifth wheel (12) on the front thereof and wheels (11) on the rear thereof,
- wherein said railway bogie has a rear portion (24) which is elevated to receive a fifth wheel of a first of said semi-trailers (10),
- wherein said railway bogie has a front portion with a turntable means (30) mounted thereon for receipt of the rear wheels (11) of a second of said semi-trailers,
- wherein said turntable means (30) has a spring-loaded chock (50) mounted thereon to provide means wherein said wheels (11) may be automatically held against longitudinal movement,
- wherein said turntable (30) has a wheel-receiving compartment (33) formed on the top portion thereof,
- wherein said wheel-receiving compartment has lateral edges (34, 35) formed thereon to prevent side-to-side motion of the wheels (11) once loaded onto said bogie,
- wherein said chock (50) is mounted to said wheel-receiving compartment (33),
- wherein said chock (50) is mounted at substantially the midpoint of said wheel-receiving compartment,
- wherein said chock (50) has an outer cover element (51) with an upper spring retaining element (52) mounted thereto.

---

### 5,017,065
### RETRACTABLE RAILCAR HITCH

**John A. Krug; James C. Hammonds; Kenneth D. Schmidt, all of St. Charles, and Dennis F. Paglusch, St. Louis, all of Mo., assignors to ACF Industries, Incorporated, Earth City, Mo.**
**Filed Sep. 6, 1989, Ser. No. 403,318**
**Int. Cl.$^5$ B60P *7/08***
U.S. Cl. 410—58 **18 Claims**

14. A retractable trailer hitch for use on a railcar, said hitch being movable between a first or hitch erect position and a second or hitch retracted position, said hitch comprising:
- first support means, one end of which is pivotably mounted to the railcar for movement between said hitch erect and retracted positions;
- second support means, one end of which is movable in a horizontal direction as said hitch is moved between its said

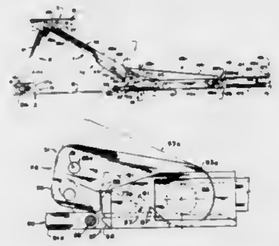
VOL
1126
ISS
3
MY
21
1991
UMI

hitch erect and hitch retracted positions, the second support means comprising a strut having one end movable generally horizontally with respect to said car, said first support means being generally vertical when the hitch is in its erect position and said strut extending generally diagonally when the hitch is erect;

a hitch head carried on the respective other ends of the first and second support means, said hitch head being elevated above the railcar when the hitch is in its hitch erect position and engaging a portion of a trailer loaded on the railcar to hold it in place during movement of the railcar;

means for locking said strut and said hitch in said hitch erect position, the locking means including a locking plate connected to the movable end of the strut and a latch for capturing the plate as the one end of the strut moves horizontally with respect to said car;

means for biasing said locking means in its locking position thereby to maintain said strut and said hitch in said hitch erect position, the biasing means including a spring urging the plate against the latch, said latch being an upwardly projecting generally triangular shaped latch mounted on said car, the plate having a notch formed in the base thereof intermediate its length in which the latch is received, the spring having one end connected to the strut and its other end bearing against the plate to urge the plate against the latch; and,



manually operable means for overcoming said biasing means and removing said locking means from its locking position to enable retraction of the hitch, said manually operable means including a cam acting on one end of the plate to lift the plate of the latch whereby the weight of the first and second support means and the hitch head will retract the hitch, the cam being attached to a rod extending outwardly toward the side of the car, the outer end of the rod having a socket for insertion of a tool by which the rod is rotated to have the cam act on the plate and lift it thereby to move the plate away from the latch.

---

### 5,017,066
## WELL CAR ADJUSTABLE GUIDE APPARATUS

**Eugene R. Tylisz, Michigan City, Ind., and Bradford Johnstone, Flossmoor, Ill., assignors to Trinity Industries, Inc., Dallas, Tex.**

**Filed Jan. 3, 1990, Ser. No. 460,576**
**Int. Cl.$^5$ B60P *7/135***
**U.S. Cl. 410—121** **20 Claims**

1. In a railway car adapted for carrying cargo containers of first and second predetermined widths, said car having side and end walls defining a well of fixed width and length for accommodating either of said containers;

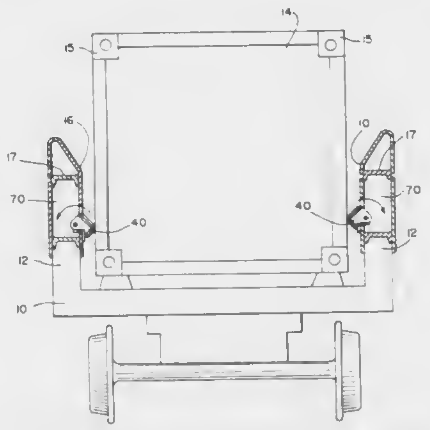
guide means for maintaining the containers in a selected lateral position with respect to the vehicle, comprising;

a fixed guide mounted on a side wall and projecting thereabove and having a surface overlapping the side wall and inclined downwardly toward the interior of the well and terminating in an end portion substantially flush with the interior of the car adjacent to the top of the side wall;

a vertical bearing portion positioned against the interior of the side wall and extending downwardly from adjacent said end portion below said fixed guide, said vertical portion adapted to contact the wall of a container of said first predetermined width after it slides off said surface of said fixed guide into the well;

a guide housing in the side wall outboard of the well being located below the bearing portion and the upper edge of the side wall;

a retractable guide mounted in the housing entirely below said fixed guide and separated therefrom and having a container contact portion swingable in an arc tangential to a side of a container of narrow width placed in the well to facilitate retraction and extension of the retractable guide while the narrow width container is in the well, said housing being entirely within the respective side wall in shielding relation to the retractable guide when positioned in the housing.

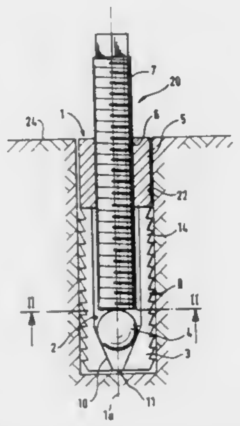


---

### 5,017,067
## ANCHORING BOLT DEVICE

**Stig D. Ohlin, Växjö , Sweden, assignor to Scantool Handelsbolag, Lidingö, Sweden**

**Filed May 29, 1990, Ser. No. 529,574**
**Claims priority, application Sweden, May 29, 1989, 8901907**
**Int. Cl.$^5$ F16B *13/06***
**U.S. Cl. 411—45** **8 Claims**



1. An anchoring bolt device for insertion into a material having a predrilled bore formed therein, the anchoring bolt device comprising:

a sleeve-like body defining a longitudinal axis and having an upper portion, a mid portion and a lower portion having a bottom end face defining an opening;

said body having a bore formed therein so as to extend along said axis and through said upper portion and said mid portion;

said lower portion having a passage formed therein along said axis to terminate in said opening; said opening having a diameter less than the diameter of said bore; and, said passage being defined by an inner wall surface extending from said bore and tapering downwardly to said opening;

partition interface means formed at least in said lower portion for partitioning said lower portion into a plurality of legs extending in the direction of said axis;

a ball disposed in said bore so as to rest against the tapered inner wall surface;

a thread formed in said bore so as to extend along said upper portion;

a fixing bolt threadably engaging said thread and extending downwardly into said bore so as to be in contact engagement with said ball;

said fixing bolt being rotatable in said thread so as to be displaceable along said axis between a first position wherein said ball is resting on the tapered inner wall surface and a second position wherein said bolt imparts a thrust force to said ball so as to cause said ball to press downwardly against said tapered inner wall surface thereby causing said legs to move outwardly in a direction radially of said axis and press tightly against the wall of the predrilled bore to anchor said body therein;

said bore having a first diameter and said ball having a second diameter less than said first diameter; and,

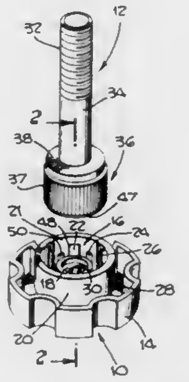
said thread having an inner diameter less than said second diameter thereby trapping said ball in said bore.

---

### 5,017,068
## PLASTIC SCREW ACCESSORY

**James D. Cooksey, El Toro, Calif., assignor to The Cooksey Corp., Laguna Hills, Calif.**

**Filed Oct. 12, 1990, Ser. No. 596,320**
**Int. Cl.$^5$ F16B *23/00***
**U.S. Cl. 411—373** **6 Claims**



1. An improved plastic accessory for use with a socket head cap screw in which said accessory has a retaining socket for engagingly receiving the head of said screw and a hub concentrically positioned within said retaining socket and coaxial therewith for engaging by a shearing and re-shaping relationship with said socket in the head of said screw, wherein the improvement comprises:

a plurality of primary grips positioned on the inside wall of said retaining socket for absorbing tolerance and gripping the peripheral surface of the head of said screw; and

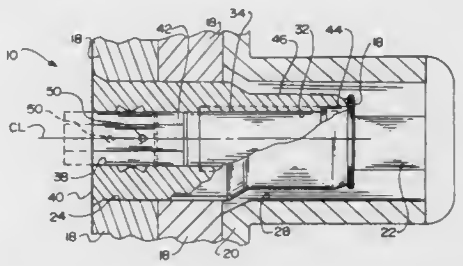
a plurality of secondary grips positioned on the inside wall of said retaining socket and shorter than said primary grips for absorbing tolerance and securely engaging the peripheral surface of the head of said screw.

---

### 5,017,069
## SLEEVE BOLT

**Edgar L. Stencel, Alta Loma, Calif., assignor to Northrop Corporation, Los Angeles, Calif.**

**Filed Aug. 30, 1989, Ser. No. 401,218**
**Int. Cl.$^5$ F16B *23/00, 35/06***
**U.S. Cl. 411—403** **9 Claims**



1. A sleeve bolt for passing through an aperture in a panel to form a flush head fastener therefor and adapted to be screwed with a driver to be a complementary threaded fastener affixed to a substructure and extending therefrom through said aperture, comprising

a hollow sleeve having a circularly cylindrical exterior and terminating in a head at one end,

means forming internal threads in said sleeve at the other end thereof to couple to said threaded fastener,

means forming a drive recess extending inwardly from the head end of said sleeve, said recess having a polygonal shape in radial cross section,

a drive plug having a complementary polygonal shape to said recess in radial cross section and of a size for sliding movement within said drive recess,

said drive plug and drive recess being shaped so that when the plug is fully inserted in the end of the sleeve it forms a smooth continuous surface with the head,

means interiorly coupling the plug to the sleeve and for defining and limiting movement of the plug between two stable positions, the first an inserted position fully home within the sleeve with the head and the end of the plug forming said smooth continuous surface, and the second, a partially withdrawn position with the plug extended from the head for being turned by a driver,

said coupling means requiring effort to move said plug between said stable positions, and

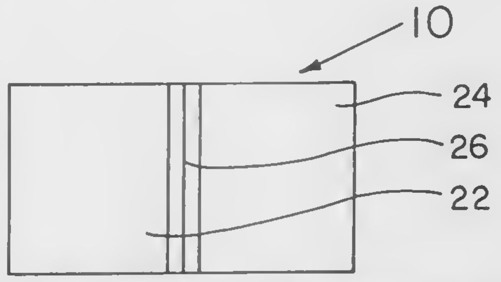
means forming a lifting point accessible from the head end of said bolt for a tool to move the plug from an inserted position to said partially withdrawn position.

---

### 5,017,070
## BOOK BINDING REINFORCEMENT

**Charles J. Barnette, Akron, Ohio, assignor to Kent Adhesive Products Co., Kent, Ohio**

**Division of Ser. No. 182,221, Apr. 15, 1988, Pat. No. 4,879,149.**
**This application Sep. 7, 1989, Ser. No. 404,196**
**Int. Cl.$^5$ B42C *11/02***
**U.S. Cl. 412—4** **5 Claims**



1. A method for repairing a book, comprising the steps of: removing a first strip of a backing sheet of an adhesive

VOL 1126
ISS 3
MY 21
1991
UMI

laminate, thereby exposing a first area of an adhesive layer maintained upon a back side of a face sheet, said first strip being interposed between second and third strips of said backing sheet removably attached to said adhesive layer;

securing said exposed first area of said adhesive layer to the book;

removing said second strip of said backing sheet, further exposing a second area of said adhesive layer on said back side of said face sheet, and thereafter securing said second area of said exposed adhesive layer to said book; and

removing said third strip of said backing sheet, further exposing a third area of said adhesive layer on said back side of said face sheet, and thereafter securing said exposed third area of said adhesive layer to said book.

---

### 5,017,071

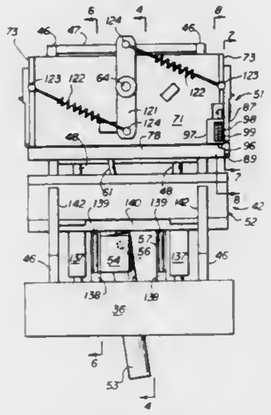
## MACHINE FOR AUTOMATICALLY BINDING BOOKS WITH FLEXIBLE STUD BINDING STRIPS

**Frank A. Todaro, Clinton, and Peter Hntkowski, Chester, both of Conn., assignors to VeloBind, Inc., Fremont, Calif.**

**Filed Jun. 2, 1989, Ser. No. 360,880**

**Int. Cl.⁵ B42B** *9/00*

U.S. Cl. 412—43 18 Claims



1. Apparatus for binding books from a plurality of sheets formed spaced along one edge with a plurality of first holes, a first binding strip comprising a thin narrow member having flexible studs projecting therefrom spaced the same distances as the first holes and a second thin narrow binding strip formed with second holes spaced the same distances as the first holes and having grooves extending inwardly from each second hole, said apparatus comprising

- first support means supporting the sheets with the first holes aligned,
- a carriage,
- a first section mounted on said carriage, second support means for supporting a first binding strip on said first section,
- a second section on said carriage supporting a second binding strip with the second holes aligned with the studs, ways on said carriage guiding relative movement of said first and second sections,
- transport means for moving the sheets and said carriage relative to each other until the first holes are aligned with the studs,
- advancing means for advancing the first binding strip on said ways in the direction of the studs until the studs penetrate the first and second holes, and
- bending means on said second section for bending into the grooves the portions of the studs extending beyond the second strip.

---

### 5,017,072

## DUAL LANE CONVERSION SYSTEM

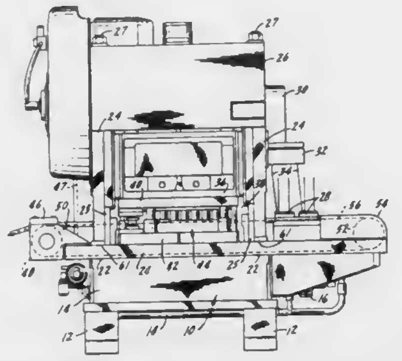
**Frank J. Herdzina, Schaumburg, and Rollie M. Goodrich, Palatine, both of Ill., assignors to Service Tool Die & Mfg. Co., Elk Grove Village, Ill.**

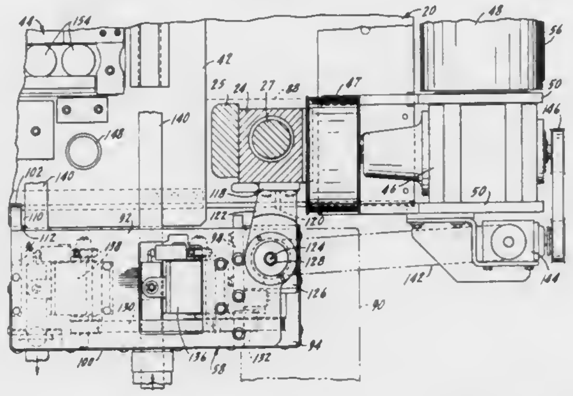
**Continuation of Ser. No. 254,142, Oct. 6, 1988, Pat. No. 4,854,799, which is a division of Ser. No. 143,585, Jan. 13, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 366,144**

**The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.**

**Int. Cl.⁵ B21D** *51/44*

U.S. Cl. 413—66 9 Claims





1. A press for converting work pieces into parts, comprising a bed, a plurality of columns mounted on the bed and having a way attached to each column, main drive means mounted on the column, a ram slidable upon the ways and driven by the main drive means to reciprocate toward and away from the bed, upper and lower tooling means attached to the ram and bed, respectively, having a plurality of stations for processing said work pieces into parts, a feeder carrier mounted on a column opposite the tooling means and pivotable about a hinge line away from the tooling means to provide service access thereto, stock feed means mounted on the feeder carrier for feeding a strip stock into the stations of the tooling means, feeder drive means connected to the main drive means for driving said stock feed means, the feeder drive means including a drive shaft mounted coaxially with the hinge line so as to permit pivoting of the feeder carrier without disconnecting the feeder drive means from the stock feed means.

---

### 5,017,073

## TRANSPORT SYSTEM FOR CONVEYING WORKPIECE BETWEEN FIRST AND SECOND MEDIA

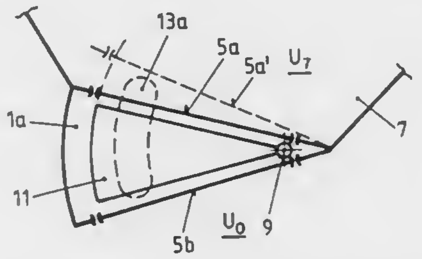
**Gregor Strasser, Vaduz, Liechtenstein; Gerald Zöhrer, Weite, Switzerland; Roman Schertler, Wolfurt, Austria, and Heinrich Fischer, Triesen, Liechtenstein, assignors to Balzers Aktiengesellschaft, Balzers, Liechtenstein**

**Filed Nov. 9, 1989, Ser. No. 434,417**

**Claims priority, application Switzerland, Nov. 17, 1988, 4267/88**

**Int. Cl.⁵ B65G** *49/07*

U.S. Cl. 414—217 16 Claims



1. In a transport system for conveying a workpiece from a first medium into a second medium, the improvement wherein the conveying is done substantially without one medium affecting the other, comprising at least one lock chamber arrangement; said lock chamber arrangement comprising:

- at least one transport lever having one arm, first and second ends and opposite length sides between said ends;
- said arm being pivotally mounted at said first end to pivot around a pivot axis and having a workpiece receiving portion at said second end;
- said transport lever being pivotable from a first position, through an intermediate position and to a second position around said pivot axis;
- a lock chamber with wall means defining an interior enclosing said lever in its intermediate position;
- said pivot axis of said lever being arranged eccentrically of said chamber and adjacent said wall means within said chamber;
- said wall means comprising wall portions extending along both opposite length sides of said lever in its intermediate position, one of said wall portions being provided for separating the interior of said chamber from said first medium, the other of said wall portions being provided for separating said interior of said chamber from said second medium;
- each of said wall portions comprising an opening through which said lever may pivot into its first and into its second positions respectively;
- each of said openings being provided with a lock gate for opening and closing said openings respectively.

---

### 5,017,074

## BAR LOADER FOR A MULTI-CHUCK MACHINE

**Vladimiro Fabbri, Faenza, Italy, assignor to I.E.M.C.A. Spa Industria Elettromeccanica Complessi Automatici, Faenza, Italy**

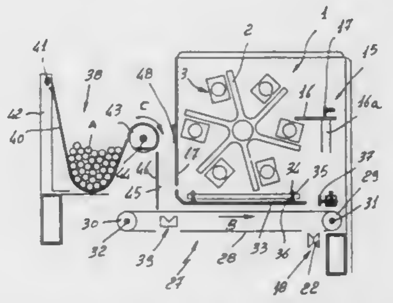
**Filed Sep. 30, 1988, Ser. No. 252,482**

**Claims priority, application Italy, Oct. 14, 1987, 3651 A/87**

**Int. Cl.⁵ B65H** *3/00*

U.S. Cl. 414—224 14 Claims

1. In combination, a bar loader and a multi-chuck machine, said multi-chuck machine having a number of chucks, said bar loader comprising: a star-shaped structure defining a vertical plane; a number of guides for bars, said guides being supported by said star-shaped structure, said number of guides being equal to said number of chucks of said multi-chuck machine, said guides being openable to receive bars to be machined at a loading position, said loading position being arranged laterally to said star-shaped structure; a bundle magazine having an exit, said bundle magazine being arranged laterally to said star-shaped structure opposite to said loading position and being capable of feeding a preset number of bars; a bar sorter including a horizontal conveyor, said horizontal conveyor extending below said star-shaped structure, parallel to said vertical plane defined by said star-shaped structure, and a plurality of sprung strips, said sprung strips being arranged above said conveyor and defining therewith a passage for bars; a first elevator for lowering said bars from said exit of said bundle magazine onto said horizontal conveyor; a second elevator for lifting individual bars from said horizontal conveyor to said loading position, said first elevator and said second elevator being oscillatable vertically; means for inserting individual bars in said guides.



---

### 5,017,075

## APPARATUS FOR AUTOMATICALLY TRANSPORTING TEXTILE LAPS TO A COMBER

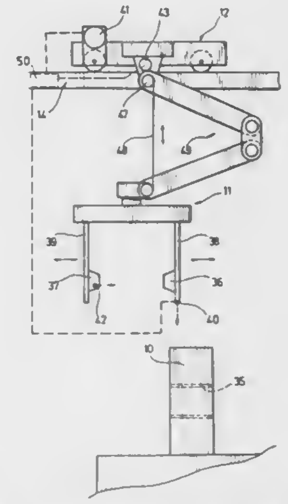
**Karl-Heinz Block, Stuttgart, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany**

**Filed Oct. 20, 1989, Ser. No. 424,805**

**Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836245**

**Int. Cl.⁵ B65H** *5/14*

U.S. Cl. 414—225 6 Claims



1. In combination with a textile comber having a plurality of generally aligned work stations each adapted for supporting a textile lap thereat, apparatus for automatically transporting textile laps wound on supporting tubes to the work stations of the comber, said transporting apparatus comprising a lap storage station for storing a plurality of laps in a serial arrangement, an elevated bridge structure movable between the lap storage station and the comber, a trolley movable along the bridge structure transversely with respect to the direction of movement of the bridge structure for movement along the aligned work stations of the comber, a drive motor associated with the trolley for actuating movement thereof, a lap gripping

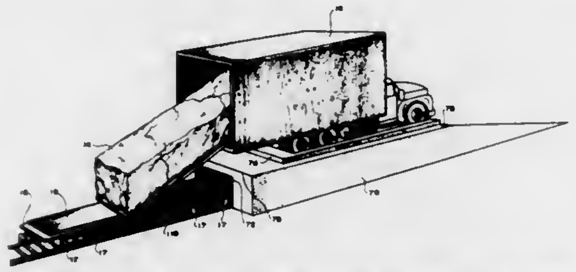
VOL 1126 ISS 3 MY 21 1991 UMI

device having gripping elements for gripping engagement with the supporting tube of a lap to be transported, a lifting device supporting the lap gripping device in suspended relation from the trolley, a drive motor associated with the lifting device for lowering the lifting device to position the lap gripping device for engaging a lap to be transported at the storage station and for depositing the lap at the comber and for raising the lifting device during transport between the storage station and the comber, a first sensor associated with the lap gripping device for detecting the presence of a lap at the lap storage station and generating a corresponding signal, another sensor associated with the lap gripping device for detecting the presence of the supporting tube of a lap and generating a corresponding signal, and a controller for receiving the signals generated by the sensors, the controller being associated with the drive motor of the trolley for positioning of the lap gripping device centrally with respect to the detected lap and the controller being associated with the drive motor of the lifting device for positioning the gripping elements of the lap gripping device at generally the center of the detected tube.

### 5,017,076

### SYSTEM FOR HANDLING COTTON MODULES

**Tommy Condrey, 100 Graham St., Lake Providence, La. 71254**
**Filed Nov. 3, 1989, Ser. No. 431,435**
**Int. Cl.$^5$ B65G** *67/24*
**U.S. Cl. 414—345** **9 Claims**



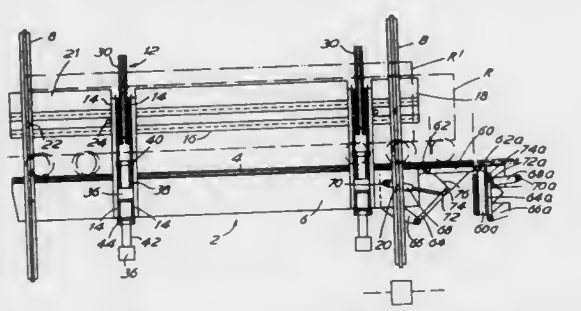
1. An apparatus for conveying cotton modules, comprising:
a network of railway tracks;
means for supporting at least one cotton module comprising a carrier having a plurality of wheels adapted for movement along the railway tracks; and
means for loading said cotton modules on said carrier, comprising a ramp for receiving a transportation means thereon, said ramp having a generally horizontally oriented unloading end elevated above at least a portion of said railway tracks to a vertical level slightly above the carrier positioned on the railway tracks, said elevated end being provided with an opening sized and shaped to removably receive a major part of said carrier under the same ramp with one end of said carrier extending outwardly from under said ramp prior to an unloading operation, so as to receive one end of said module thereon and slide outwardly from under said ramp as module gradually positions itself on the carrier during the unloading operation.

### 5,017,077

### RAIL CAR DUMPERS

**Paul J. Dowden, Bristol, England, assignor to Strachan & Henshaw Limited, Bristol, England**
**Filed Aug. 3, 1989, Ser. No. 389,171**
**Claims priority, application United Kingdom, Aug. 10, 1988, 8819012**
**Int. Cl.$^5$ B65G** *67/42*
**U.S. Cl. 414—360** **12 Claims**

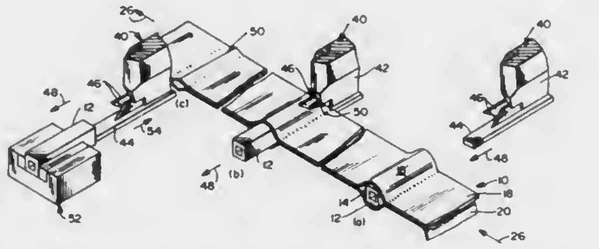
1. A rotary dumper for dumping the contents of a rail car, the rotary dumper comprising: a tipping structure having a platform for the rail car and coaxial ring members at or adjacent the ends of the structure, clamping means mounted on said structure for clamping the rail car on said platform, rotary mountings supporting said ring members for rotation of the tipping structure about the common axis of the ring members from an upright position to dump the contents of the rail car clamped on the platform, and flexible connection means which provide a connection between the rail car platform and the ring members that limits the transmission to the ring members of bending moments produced by loads on the rail platform when the tipping structure is in the upright position.



### 5,017,078

### METHOD AND APPARATUS FOR UNLOADING COMPONENTS FROM TAPE CARRIER PACKAGING

**Peter Ingwersen, Gilberts, and Bernard M. West, Clarendon Hills, both of Ill., assignors to Molex Incorporated, Lisle, Ill.**
**Filed Jan. 24, 1990, Ser. No. 471,996**
**Int. Cl.$^5$ B65B** *69/00*
**U.S. Cl. 414—417** **19 Claims**



1. An apparatus for dispensing components from a packing assembly having a plurality of component-containing cavities constructed as open-ended tube-like passageways, said apparatus comprising:
actuator means for ejecting said component from its cavity; and
knife means coupled to said actuator means for cutting at least one side of said cavity as said component is ejected, said knife means having a notch structure formed by at least two opposing knife edges, whereby said knife means cuts said packaging assembly at said notch structure during the component dispensing operation.

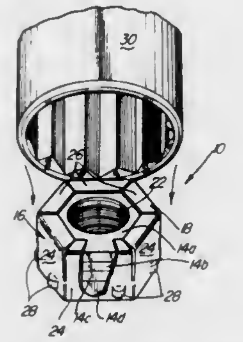
### 5,017,079

### LAMINATED NUT WITH ONE WAY INSTALLATION

**Richard L. Reynolds, Pointe Shores, Mich., assignor to Pac-Fasteners, Southfield, Mich.**
**Continuation of Ser. No. 939,490, Dec. 8, 1986, abandoned. This application Jun. 9, 1988, Ser. No. 206,954**
**Int. Cl.$^5$ F16B** *23/00, 37/08*
**U.S. Cl. 411—432** **18 Claims**

1. A threaded fastener assembly comprising:
a threaded bolt member, a laminated nut having a plurality of circumferentially, externally disposed corners adapted to be gripped by mating surfaces on a wrenching tool for installation onto said bolt member, said nut comprising a plurality of conical spring disc washers, said disc washers oriented to provide load retention when threaded onto

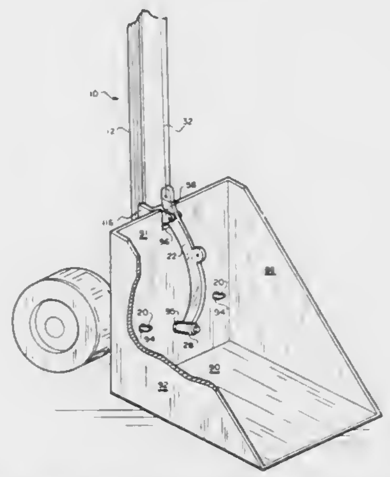
said bolt member with one axial end being the leading end on said bolt member, a cage for receiving and holding said disc washers in a stacked, aligned relationship to define a central opening threaded to be matably received upon said bolt member, said cage including a ring portion and a plurality of axially extending fingers cooperating with said ring portion to hold said disc washers in said stacked, aligned relationship, and protrusion means extending radially, outwardly from a location proximate to said one axial end of said cage to prevent gripping of said nut by the wrenching tool at said one axial end whereby said nut will only be threaded onto said bolt member by engagement of the wrenching tool with the opposite end of said nut, said protrusion means being substantially non-load bearing after installation onto said bolt member, and said nut having an external configuration which, except for the interference provided by said protrusion means, would permit gripping by the wrenching tool at said one axial end.



### 5,017,080

### HAND TRUCK

Charles E. Thorndike, Meredith, and Vaino J. Holopainen, Moultonboro, both of N.H., assignors to Blue Arrown Enterprises, Inc., Meredith, N.H.
Continuation-in-part of Ser. No. 908,175, Sep. 16, 1986, Pat. No. 4,729,711. This application Mar. 7, 1988, Ser. No. 164,785
**The portion of the term of this patent subsequent to Mar. 8, 2005, has been disclaimed.**
**Int. Cl.$^5$ B65G** *7/12*
U.S. Cl. 414—454 7 Claims

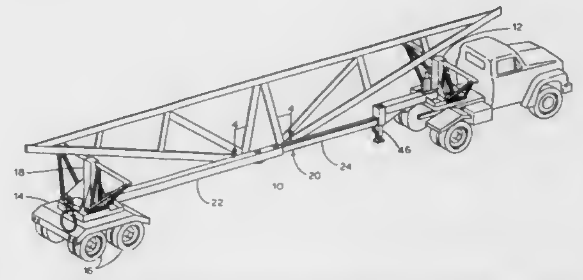


7. For use with a hand truck, a coupling plate for selectively coupling an accessory apparatus to the hand truck at a movable carriage adapted to freely travel along the length of the hand truck frame, the carriage having a static protrusion and a movable seizing arm, the coupling plate comprising a generally vertically extending wall, the wall with a first opening adapted to receive the static protrusion of the movable carriage, and a second opening adapted to receive the movable seizing arm.

### 5,017,081

### TRUSS TRANSPORTATION TRAILER

**Jesse D. Helton, Box 638, Crocker, Mo. 65452**
**Continuation-in-part of Ser. No. 64,833, Jun. 22, 1987, Pat. No. 4,750,785. This application Jun. 13, 1988, Ser. No. 206,486**
**Int. Cl.$^5$ B60P** *1/16, 3/40*
**U.S. Cl. 414—470** **18 Claims**



1. A trailer assembly suitable for hauling pre-manufactured trusses consisting of:
(1) a front bolster assembly comprising a means for attaching the trailer to the fifth wheel of a conventional tractor, a bolster base mounted thereon, an inner bolster riser mounted upon said bolster base, an outer bolster riser slidably surrounding said inner bolster riser, left and right truss supports mounted on the left and right sides of said outer bolster riser, each of which consists of a bolster riser pivot plate rigidly mounted to said outer bolster riser, an inner truss support riser having a first end pivotally mounted to said bolster riser pivot plate adjacent to said outer bolster riser and a second end remote therefrom, an outer truss support riser longer than said inner truss support riser having a first end pivotally mounted to said bolster riser pivot plate at a point separated from the point where the inner truss support riser is pivotally attached and a second end remote therefrom, a truss support having a first end pivotally attached to said second end of said inner truss support riser and a second end pivotally attached to said second end of said outer truss support riser whereby the differential length of said inner truss support riser and said outer truss support riser when they are rotated around their respective pivot points on the bolster riser pivot plate causes said truss support to move laterally away from said outer bolster riser before any significant angular change of said truss support with respect to said outer bolster occurs, locking means to hold said inner truss support riser in parallel relationship with said outer bolster riser, and power means for causing said inner and outer truss support risers to rotate around their respective pivot points on said bolster riser pivot plate and thus cause said truss support to move from a horizontal, truss-supporting position to an angled, truss-unloading position, said power means also acting to return said truss supports from said angled position to said horizontal position, and mechanical means for locking each truss support in said horizontal, truss supporting position, wherein said mechanical means comprises a first threaded member affixed to said outer bolster riser adjacent said inner truss support riser and a second fixture mounted on said inner truss support riser, which second fixture comprises a second threaded member sized to mate with said first threaded member and an engaging member affixed to said inner truss support riser, said second threaded member being releasably engaged with said engaging member;
(2) a rear trailer comprising a wheel and axle mechanism, a bolster base mounted thereon, an inner bolster riser mounted upon said bolster base, an outer bolster riser slidably surrounding said inner bolster riser, left and right

VOL
1126
ISS
3
MY
21
1991
UMI

truss supports mounted on the left and right sides of said outer bolster riser, each of which consists of a bolster riser pivot plate rigidly mounted to said outer bolster riser, an inner truss support riser having a first end pivotally mounted to said bolster riser pivot plate adjacent to said outer bolster riser and a second end remote therefrom, an outer truss support riser longer than said inner truss support riser having a first end pivotally mounted to said bolster riser pivot plate at a point separated from the point where the inner truss support riser is pivotally attached and a second end remote therefrom, a truss support having a first end pivotally attached to said second end of said inner truss support riser and a second end pivotally attached to said second end of said outer truss support riser whereby the differential length of said inner truss support riser and said outer truss support riser when they are rotated around their respective pivot points on the bolster riser pivot plate causes said truss support to move laterally away from said outer bolster riser before any significant angular change of said truss support with respect to said outer bolster occurs, locking means to hold said inner truss support riser in parallel relationship with said outer bolster riser, and power means for causing said inner and outer truss support risers to rotate around their respective pivot points on said bolster riser pivot plate and thus cause said truss support to move from a horizontal, truss-supporting position to an angled, truss-unloading position, said power means also acting to return said truss support from said angled position to said horizontal position, and mechanical means for locking each truss support in said horizontal, truss supporting position wherein said mechanical means comprises a first threaded member affixed to said outer bolster riser adjacent said inner truss support riser and a second fixture mounted on said inner truss support riser, which second fixture comprises a second threaded member sized to mate with said first threaded member and an engaging member affixed to said inner truss support riser, said second threaded member being releasably engaged with said engaging member; and

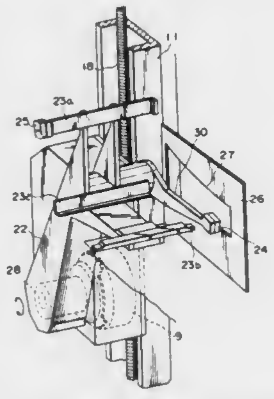
(3) an extendable/retractable mechanism connecting said rear trailer to said front bolster assembly, said mechanism comprising an outer box beam slidably surrounding an inner box beam, means for changing the lateral relationship between said inner box beam and said outer box beam so as to shorten or lengthen the distance between said rear trailer and said front bolster assembly, and a positive means for locking the relative position of said outer box beam and said inner box beam so as to maintain the distance between said rear trailer and said front bolster assembly.

---

### 5,017,082
## HANDLING APPARATUS

**Isao Kobayashi, Kofu, Japan, assignor to Tokyo Electron Limited, Tokyo, Japan**
**Continuation of Ser. No. 320,223, Mar. 7, 1989, abandoned. This application Jul. 30, 1990, Ser. No. 560,287**
**Claims priority, application Japan, Mar. 7, 1988, 63-51595**
**Int. Cl.$^5$ B25J** *9/16*
**U.S. Cl. 414—729** **6 Claims**

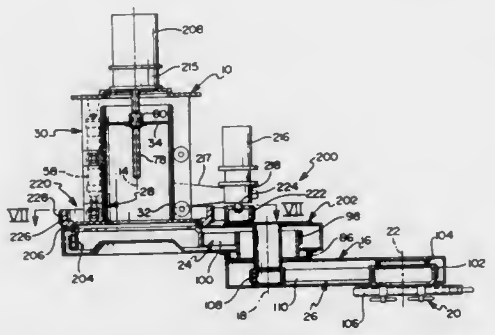
1. A handling apparatus comprising:
holding means for holding an object to be handled;
driving means for driving said holding means;
locus indicating means for indicating a locus along which said holding means is to be moved, said locus indicating means being provided in a fixed position which is not driven by the driving means;
sensing means for monitoring movement of said holding means along said locus and detecting deviation of the movement of the holding means from said locus, said sensing means being provided on said holding means; and
stopping means for stopping movement of said holding means when the deviation of movement of said holding means is detected wherein said sensing means comprises at least three reflection-type optical sensors, and said locus detection line is located between two of the at least three optical sensors so that the locus of the holding means can be detected.



---

### 5,017,083
## APPARATUS FOR LOADING AND/OR UNLOADING INDUSTRIAL PRESSES

**Richard T. Sahlin, Bloomfield Hills, Mich., assignor to Sahlin International, Inc., Birmingham, Mich.**
**Continuation-in-part of Ser. No. 918,346, Oct. 14, 1986, Pat. No. 4,921,395, which is a continuation of Ser. No. 368,914, Apr. 16, 1982, abandoned. This application Aug. 30, 1989, Ser. No. 400,334**
**Int. Cl.$^5$ B25J** *13/04*
**U.S. Cl. 414—744.3** **19 Claims**

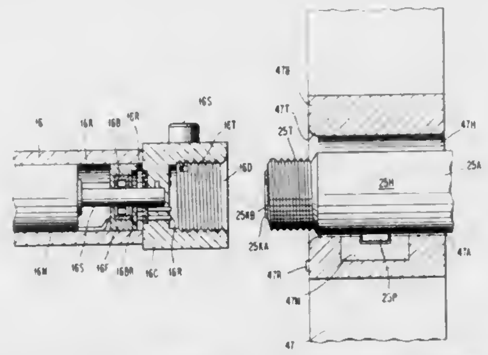


1. Heavy duty workpiece handling apparatus for loading and unloading an industrial press or the like comprising a carrier adapted to be mounted on a support surface for said apparatus, a tubular carriage having a longitudinal axis, carriage support means supporting said carriage on said carrier so that said longitudinal axis is vertical and so that said carriage is linearly reciprocable along said vertical longitudinal axis but is constrained against angular movement around said longitudinal axis and so that substantially all load on said carriage is transmitted into said carrier, power operated means for linearly reciprocating said carriage along said vertical longitudinal axis, said axis defining a first pivot axis, a first horizontally extending cantilever arm, first means pivotally supporting said first arm on said carriage to pivot in a horizontal plane about said first axis and to transfer substantially all load on said first arm into said carriage, a second horizontally extending cantilever arm, second means pivotally supporting said second arm on an end of said first arm to pivot in a horizontal plane about a second vertical pivot axis and to transfer substantially all load on said second arm into said first arm, work-supporting means adjacent an end of said second arm, third means pivotally supporting said work-supporting means on said end of said second arm to pivot in a horizontal plane about a third vertical pivot axis and to transfer substantially all load on it into said second arm, said first and third pivot axes being located predetermined fixed distances from said second axis, movement coordinating means supported on and movable with said first and second arms and arranged to so coordinate movement about said pivot axes that said work-supporting means moves in a predetermined horizontal path and with a predetermined angular orientation about said third axis, said coordinating means comprising belt means extending along said first and second arms and pulleys for said belt means disposed about each of said three axes, power operated arm actuating means affixed to said non-pivotal tubular carriage for generating horizontal movement of said arms, and drive means for coupling said power operated arm actuating means to said first arm to pivot said first arm around said first axis, whereby movement of said first arm causes said movement coordinating means to pivot said first and second arms relative to each other whereby said work-supporting means moves along said horizontal path with said predetermined angular orientation.

---

### 5,017,084
## AUTOMATIC MANIPULATION SYSTEM AND METHOD

**Jerome H. Lemelson, 868 Tyner Way, Call Box 14-286, Inclive Village, Nev. 89450**
**Division of Ser. No. 941,554, Dec. 11, 1986, Pat. No. 4,773,815, which is a continuation of Ser. No. 639,301, Aug. 9, 1984, abandoned, which is a continuation-in-part of Ser. No. 200,347, Oct. 24, 1980, abandoned, which is a continuation of Ser. No. 910,998, May 30, 1978, abandoned, which is a continuation of Ser. No. 753,321, Dec. 20, 1976, abandoned, which is a continuation of Ser. No. 544,832, Jan. 29, 1975, abandoned, which is a continuation-in-part of Ser. No. 436,073, Jan. 24, 1974, abandoned, and a continuation-in-part of Ser. No. 251,656, Apr. 10, 1981. This application Sep. 23, 1988, Ser. No. 249,404**
**The portion of the term of this patent subsequent to Sep. 27, 2005, has been disclaimed.**
**Int. Cl.$^5$ B25J** *17/02, 15/04*
**U.S. Cl. 414—744.3** **14 Claims**

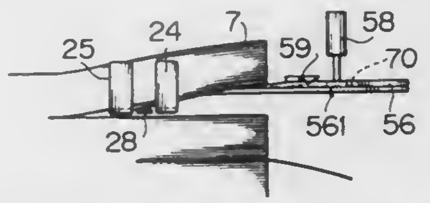


1. An automatic manipulator comprising in combination:
a) first support means,
b) a manipulator arm assembly carried by said first support means for multi-axis movement,
c) an operating head operatively connected to and supported by said arm assembly,
d) a plurality of power-operated tools for performing different functions with respect to work, each of said tools having a coupling means which is operable to releasably electrically and mechanically connect each tool to said operating head,
e) first and second motor means located on said first support means for driving said arm assembly in said multiaxis movement to carry said operating head connected to a tool through a multitude of paths adjacent first said support means for performing a multitude of operations with respect to work disposed adjacent said first support means,
f) means located within the operating range of said arm assembly for positioning said plurality of tools for use with said operating head,
g) master control means including means for automatically controlling the operation of said first and second motor means to cause said manipulator arm assembly to position said operation head in operable alignment with a selected tool disposed on said positioning means and means for controllably moving said head in a path such as to effect the operative connection between the coupling means of said select tool and the operating head,
h) said master control means being also operable to control said first and second motor means to drive said arm assembly to cause it to automatically remove said selected tool from said tool positioning means and to predeterminately move thereafter and control the operation of said tool so as to cause said selected tool to perform a first predetermined operation with respect to work located adjacent said first support means, and
i) when it is required to perform another operation with respect to work with another took, said operation controlling means for the first and second motor means is effective to position said operating head in alignment with a select location of said tool positioning means,
j) means for disconnecting the tool coupling means from the operating head at said tool positioning means, and
k) said operation controlling means being effective to thereafter control said first and second motor means to move said operating head in a manner to effect the positioning of said operating head in alignment with the coupling means of a second select tool to effect the operable electrical and mechanical connecting of said second tool with said operating head and to thereafter move and control the operation of said second tool to cause said second tool to perform a further predetermined operation with respect to work adjacent said first support means.

---

### 5,017,085
## METHOD AND APPARATUS FOR SEPARATING PAPER SHEETS INTO UNITS AND DISTRIBUTING THEM

**Makoto Ishikawa, Fuji, Japan, assignor to Maruishi Iron Works Co., Ltd., Shizuoka, Japan**
**Filed Nov. 14, 1989, Ser. No. 435,998**
**Int. Cl.$^5$ B65H** *3/24, 3/50*
**U.S. Cl. 414—796** **7 Claims**



7. An apparatus for separating paper sheets into units and distributing them, comprising the steps of:
raising a pile of paper sheets having markers for grouping the paper sheets into reams along with an insertion member which is positioned under a ream of paper sheets to be separated from said pile and distributed;
stopping the ascent of said pile of paper sheets and further raising said insertion member so as to form in said pile a gap into which distribution forks are inserted; and
distributing said ream of paper sheets by advancing said distributing forks, and meanwhile bringing said insertion member under the next ream of paper sheets that is to be separated from said pile and distributed.

VOL 1126 ISS 3 MY 21 1991 UMI

5,017,086

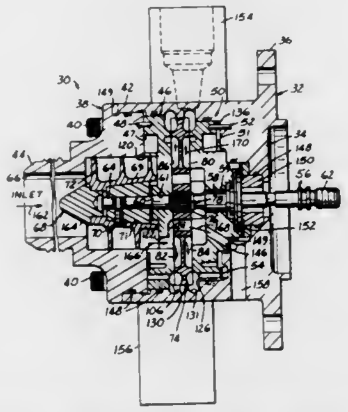
### HYDRAULIC PERIPHERY PUMPS

**Lowell D. Hansen, Jackson, Miss., assignor to Vickers Incorporated, Troy, Mich.**

**Filed May 8, 1989, Ser. No. 349,324**

**Int. Cl.$^5$ F04D** *5/00*

**U.S. Cl. 415—55.5** **18 Claims**



1. A hydraulic periphery pump that includes a housing, a drive shaft mounted for rotation about its axis within said housing, an impeller coupled to said shaft for rotation within said housing and having a disc-shaped body with at least one axially oriented substantially flat side face and a circumferential array of peripheral vanes, backup means in said housing having a flat face opposed to said impeller side face, means in said housing forming an arcuate fluid chamber around said impeller with angularly spaced chamber fluid inlet and outlet means, and means for feeding fluid to said inlet means; characterized in that said fluid-feeding means comprises:

- at least one radially oriented channel in said impeller side face having closed radially inner and outer ends, first means including an inlet passage positioned in said backup means to register with said inner end of said channel during rotation of said impeller for feeding inlet fluid to said radially inner end of said channel during one arcuate portion of rotation of said impeller, and second means including arcuate outlet means positioned in said backup means at a greater radius from said axis than said inlet passage to register with said outer end of said channel during a second arcuate portion of rotation of said impeller for feeding fluid from said radially outer end of said impeller channel to said chamber during said second arcuate portion of rotation of said impeller.

---

5,017,087

### MULTI-FUNCTIONAL ROTARY HYDRAULIC MACHINE SYSTEMS

**John L. Sneddon, 18 Eilean Rise, Ellon, Aberdeenshire, Scotland, Great Britain AB4 9NF**

**Continuation-in-part of Ser. No. 57,684, May 26, 1987, abandoned, which is a continuation of Ser. No. 754,831, Jul. 12, 1985, abandoned. This application Feb. 22, 1989, Ser. No. 314,646**

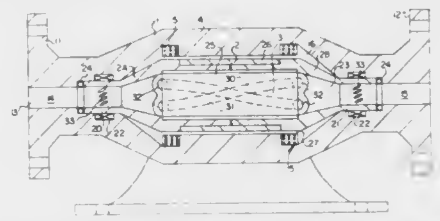
**Claims priority, application United Kingdom, Jul. 13, 1984, 8417929; Nov. 13, 1984, 8428693**

**Int. Cl.$^5$ F04D** *3/02*

**U.S. Cl. 415—72** **20 Claims**

1. A multi-functional rotary hydraulic machine comprising:

- (a) a static outer casing;
- (b) a prime mover comprising a stator assembly and a rotor assembly, said stator assembly being mounted within and encased by said static outer casing;
- (c) said rotor assembly comprising a pair of half-shafts by which said rotor assembly is rotatably mounted within said stator assembly;
- (d) said rotor assembly comprising mounting and coupling means by which a selected one of a plurality of mechanically interchangeable and hydraulically functionally different rotary hydraulic machine units is mounted within and coupled to said rotor assembly for rotation therewith.



---

5,017,088

### GAS TURBINE ENGINE COMPRESSOR CASING WITH INTERNAL DIAMETER CONTROL

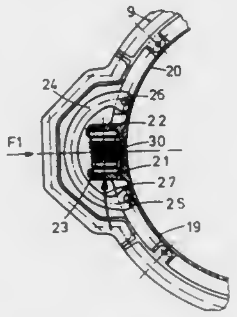
**Carmen Miraucourt, Brie Comte Robert, and Gilles L. E. Delrieu, Montgeron, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A.", Paris, France**

**Filed Dec. 21, 1989, Ser. No. 454,650**

**Claims priority, application France, Dec. 21, 1988, 88 16888**

**Int. Cl.$^5$ F01D** *5/20*

**U.S. Cl. 415—173.2** **7 Claims**



1. In a compressor of a gas turbine engine, a casing including at least one radially inner jacket formed by two half-shells provided with coupling flanges, and control means for controlling the inner diameter of the inner jacket depending on the operating conditions of the engine, said control means comprising a plurality of cylindrical bellows secured between said coupling flanges of said two half-shells and connecting said flanges together, said bellows being deformable to vary the length thereof in response to variation of the pressure within said bellows, air bleed ducting communicating said bellows with the air under pressure at the downstream end of the compressor, and further connection means arranged between said two half-shells flexibly securing them together.

---

5,017,089

### PROPELLER SPEED GOVERNOR HAVING A DERIVATIVE INHIBIT AT HIGH FLIGHT SPEEDS

**Roy W. Schneider, Ellington, and Eugenio DiValentin, Enfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

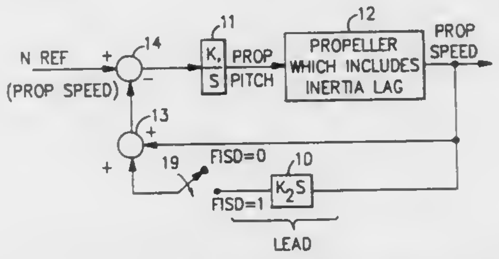
**Filed Apr. 11, 1989, Ser. No. 336,273**

**Int. Cl.$^5$ B63H** *3/00;* **B64C** *3/18*

**U.S. Cl. 416—35** **5 Claims**

1. Apparatus for governing the speed of a propeller by changing propeller blade pitch, comprising:

- speed integrator means, for providing a signal indicative of desired blade pitch, said blade pitch signai comprising an integration of a propeller speed signal;
- feedback means, responsive to said propeller speed signal, for providing a predetermined lead compensation to said speed integrator means, said predetermined lead compensation comprising a derivative of said propeller speed signal; and
- control means, responsive to an air speed signal indicative of actual air speed, for inhibiting said feedback means above a predetermined air speed from being provided to said speed integrator means, and having a hysteresis band through which said air speed signal passes, whereby the value of said predetermined lead compensation is greater than the value which would cause governing instability above said predetermined air speed.



---

5,017,090

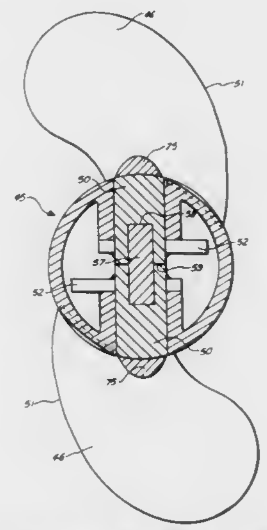
### VARIABLE PITCH PROPELLER BLADES AND DRIVE AND ADJUSTING MECHANISM THEREFOR

**Douglas M. Morrison, Box 733A, Highway 304, Thibodaux, La. 70301**

**Continuation-in-part of Ser. No. 174,428, Mar. 28, 1988, abandoned. This application Feb. 7, 1989, Ser. No. 308,329**

**Int. Cl.$^5$ B63H** *1/06, 3/08*

**U.S. Cl. 416—168 R** **49 Claims**



1. A hollow hub having disposed at locations around the exterior perimeter thereof a plurality of arcuate recesses; and having disposed on and extending from the hub a plurality of unitary propeller blades, each such propeller blade having (i) a planar configuration, (ii) an inner end portion (iii) an outer end portion, (iv) a relatively sharp, outwardly swept back leading edge portion, and (v) a cylindrical stub axially aligned with the plane of the blade and affixed to the inner end portion of the blade, each said stub being adapted upon axial rotation to rotate the entire unitary blade to which it is affixed, the respective stubs of the blades extending radially into the hollow portion of the hub and adapted for axial rotation, at least the innermost end of the leading edge portion of the respective blades being disposed in and adapted for arcuate movement within at least a substantial portion of the respective arcuate recesses upon axial rotation of the respective stubs.

---

5,017,091

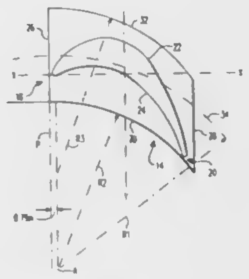
### FREE STANDING BLADE FOR USE IN LOW PRESSURE STEAM TURBINE

**Mank H. Tran, Orlando, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Feb. 26, 1990, Ser. No. 484,760**

**Int. Cl.$^5$ F01D** *5/30*

**U.S. Cl. 416—193 A** **7 Claims**



1. A turbine blade comprising:

- an airfoil portion having an inlet face, a trailing edge, a convex surface, a concave surface and a lower end;
- a platform portion having an inlet face and being formed at the lower end of the airfoil portion;
- a root portion extending downwardly from the platform portion and having a root center line, a root pivot center and a root center line radius;
- wherein the root pivot center is located in proximity to a plane encompassing the inlet face of the platform portion;
- wherein relative to an x—x and y—y axis, the location of the root pivot center is defined by a ratio of distance from the y—y axis to the distance from the x—x axis, wherein the ratio is approximately 0.36.

---

5,017,092

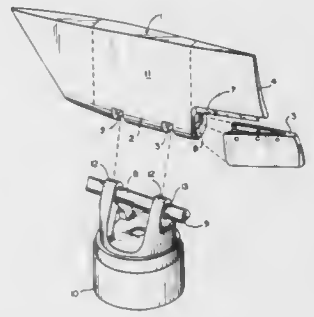
### ROTOR BLADE RETENTION

**John A. Violette, Granby, and Thomas Mashey, Avon, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 16, 1989, Ser. No. 422,190**

**Int. Cl.$^5$ F01D** *5/30*

**U.S. Cl. 416—204 A** **6 Claims**



1. A system for retaining and restoring the position of a rotor blade installed in a rotatable hub, comprising:

- a retention member, including at least one retention tenon mounted thereon,
- a rotor blade, including:
  - a blade root with a shape slot chordwisely disposed therein,
  - a first arcuate bearing surface disposed within the chordwisely disposed shaped slot,
  - at least one mortise radially-outwardly extending from the blade root, intersecting with the slot, said mortise

VOL
1126
ISS
3
MY
21
1991
UMI

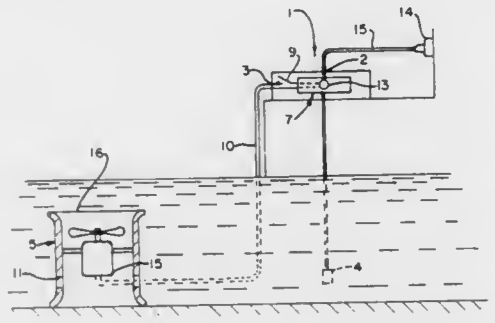
adapted to receive said retention tenon mounted on said retention member, and

a pin, essentially non-cylindrical in cross-section, received within the slot and extending into the mortise, the pin further being received within an opening disposed in the tenon including a second lengthwise arcuate bearing surface disposed thereon, said second bearing surface mateable with the first bearing surface disposed within the chordwisely disposed slot contained within the rotor blade, wherein the radius of curvature of the first bearing surface is substantially larger than the radius of curvature of the second bearing surface, said bearing surfaces in combination effecting a restoring moment upon said rotor blade when a force external to the system is imposed thereon, said restoring moment produced by centrifugal force acting through a moment arm defined by said rotor blade's angular displacement at its center of gravity, wherein said pin is restrained against rotation by a tenon surface shaped complimentary to the pin's non-cylindrical surface.

---

### 5,017,093
## THERMOSTATICALLY CONTROLLED BOAT DE-ICER

**Oscar L. Naes, 2043 Kehrs Mill Rd., Chesterfield, Mo. 63017**
**Filed Nov. 17, 1989, Ser. No. 437,841**
**Int. Cl.$^5$ F04B *49/00;* F02B *3/12***
**U.S. Cl. 417—14** **1 Claim**



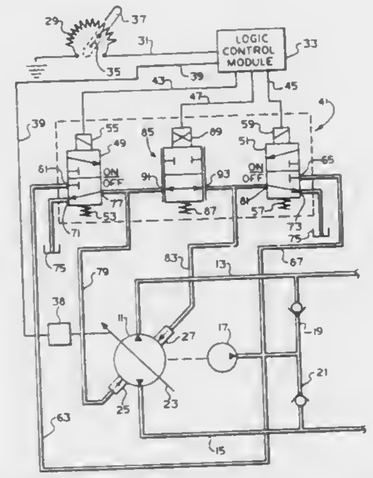
1. A control device for a boat de-icer which controls the application of electrical energy from a source thereof to the de-icer, comprising:

- a boat de-icer including an electric motor driving a water pump and electrical connection means for connecting the motor to a source of electrical energy;
- a control device interposed between said motor and the source of electrical energy, said control device including a housing having at least one electrical receptacle mounted in it, the connection means of the motor being removably electrically interconnected to said control device through said electrical receptacle a temperature sensor to be located in an outdoor body of water, and adjustment means mounted to said enclosure, said adjustment means including a thermostat connected to the temperature sensor and settable to a predetermined temperature so that said control device permits the supply of electrical energy to said motor only when the sensed water temperature drops below the temperature to which the thermostat is set and, said enclosure being a unitary device; and
- means for connecting or disconnecting said control device to the source of electrical energy, said last mention means including an electrical connector and plug electrically permanently connected to said enclosure.

---

### 5,017,094
## SOLENOID VALVE CONTROL SYSTEM FOR HYDROSTATIC TRANSMISSION

**Kevin J. Graf; James J. Hastreiter, both of Eden Prairie, and Duane A. Anderson, Edina, all of Minn., assignors to Eaton Corporation, Cleveland, Ohio**
**Filed Mar. 12, 1990, Ser. No. 491,776**
**Int. Cl.$^5$ F04B *49/06, 1/26***
**U.S. Cl. 417—218** **7 Claims**



1. A control system for use with a variable displacement hydraulic unit having first and second fluid operable means for varying the displacement of said unit in response to variations in an electrical input signal, said sYstem having a source of control fluid pressure, and a reservoir; said control system comprising first and second ON-OFF electromagnetic valves, said first ON-OFF valve having an inlet adapted for fluid communication with said source of control fluid pressure, and an outlet adapted for fluid communication with said first fluid operable means, said second ON-OFF valve having an iniet adapted for fluid communication with said source of control fluid pressure, and an outlet adapted for fluid communication with said second fluid operable means; said control system including logic control means operable, in response to said electrical input signal, to generate first and second direction command signals and transmit said command signals to said first and second ON-OFF valves, respectively; characterized by:

(a) a third electromagnetic valve having first and second ports, said first port being in fluid communication with said outlet of said first ON-OFF valve, and said second port being in fluid communication with said outlet of said second ON-OFF;

(b) said logic control means being operable to generate a displacement signal representative of desired displacement of said hydraulic unit, and to transmit said displacement signal to said third valve;

(c) said first ON-OFF valve having a drain port and a valve member movable, in response to said first direction command signal being ON, to a position permitting fluid communication from said inlet to said outlet, and blocking fluid communication from said outlet to said drain port, and in response to said first direction command signal being OFF, to a position permitting fluid communication from said outlet to said drain port, and blocking fluid communication from said inlet to said outlet;

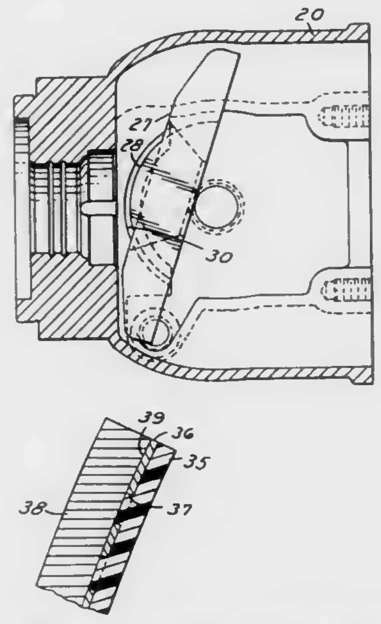
(d) said second ON-OFF having a drain port and a valve member movable, in response to said second direction command signal being ON, to a position permitting fluid communication from said inlet to said outlet, and blocking fluid communication from said outlet to said drain port, and in response to said second signal being OFF, to a position permitting fluid communication from said outlet to said drain port, and blocking fluid communication from said inlet to said outlet; and

(e) said third electromagnetic valve including a valve member movable, in response to variations in said displacement signal, between a minimum displacement position (FIG. 1) in which said first and second ports are in relatively unrestricted fluid communication with each other, and a maximum displacement position in which said first and second ports are substantially prevented from fluid communication with each other.

---

### 5,017,095
## POWER TRANSMISSION

**Roy T. Burgess, Troy; Gregory P. Campau, Livonia; Leslie M. Claar, Farmington Hills; Robert C. Hodges, Troy; Douglas G. Snow, Walled Lake, all of Mich., and Roy Taylor, Omaha, Nebr., assignors to Vickers, Incorporated, Troy, Mich.**
**Continuation-in-part of Ser. No. 328,065, Mar. 23, 1989, abandoned, which is a continuation-in-part of Ser. No. 150,933, Feb. 1, 1988, Pat. No. 4,862,789. This application Jul. 17, 1989, Ser. No. 381,094**
**The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.**
**Int. Cl.$^5$ F04B *27/08;* F01B *13/00;* F16C *33/02, 33/18***
**U.S. Cl. 417—222 R** **12 Claims**



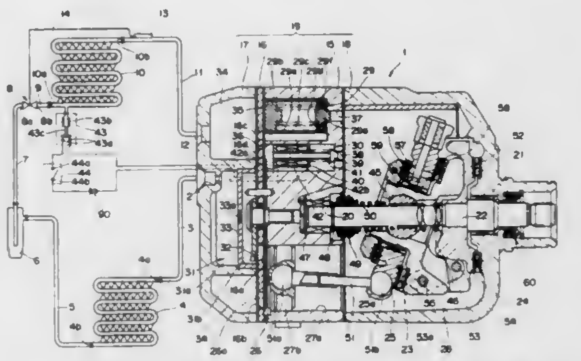
1. In a variable speed pressure energy translating device which includes a plurality of axially extending pistons and associated cylinders and a yoke engaged by the pistons and pivoted on a transverse axis for varying the displacement thereof, the improvement comprising

- a housing having spaced saddle bearing seats,
- said yoke having spaced complementary saddle bearing engaging portions,
- and an arcuate bearing seated in each of said seats,
- each said bearing comprising an arcuate body of polymeric material and an arcuate reinforcing member embedded in said body and having a plurality of perforations extending
- said reinforcing member comprising a thin metal sheet having perforations therein,
- said thin metal sheet having the surface thereof adjacent the polymeric material roughened.

---

### 5,017,096
## VARIABLE CAPACITY COMPRESSOR

**Hiroyuki Sugiura; Nobuyuki Nakajima, and Takeo Iijima, all of Saitama, Japan, assignors to Diesel KikiCo., Ltd., Tokyo, Japan**
**Filed Apr. 7, 1988, Ser. No. 178,469**
**Claims priority, application Japan, Apr. 22, 1987, 62-099223**
**Int. Cl.$^5$ F04B *1/28***
**U.S. Cl. 417—222 S** **19 Claims**



1. A variable capacity vane-type compressor for use in a heat-exchange circuit including an evaporator having an outlet for a refrigerant gas, said compressor comprising:

- a plurality of compression chambers defined respectively between adjacent vanes mounted in a rotor for radial sliding movement;
- a low pressure chamber connected to said outlet of said evaporator;
- a pressure controlled chamber;
- communication passageway means extending between said low pressure chamber and said pressure controlled chamber;
- pressure responsive valve means provided in said communication passageway means and movable, in response to pressure within said low pressure chamber, between a closed position where said pressure responsive valve means closes said communication passageway means to bring said low pressure chamber and said pressure controlled chamber out of communication with each other and an open position where said pressure responsive valve means opens said communication passageway means to bring said low pressure chamber and said pressure controlled chamber into communication with each other, to control pressure within said pressure controlled chamber, thereby varying the capacity of the compressor in such a manner as to reduce the capacity when the pressure within said low pressure chamber decreases to a level lower than a predetermined value;
- detecting means for detecting either one of pressure and temperature of the refrigerant gas in said evaporator, to generate a signal; and
- electrically operated control means operative in response to the signal from said detecting means for maintaining the capacity of the compressor large independently of operation of said pressure responsive valve means, even if the pressure within said low pressure chamber decreases to a level lower than said predetermined value.

---

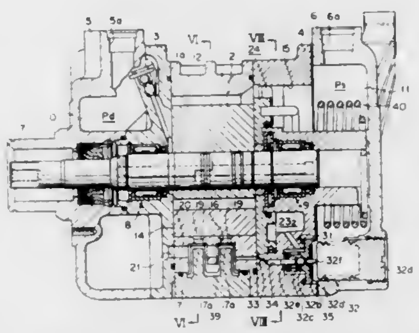
### 5,017,097
## CONTROL VALVE DEVICE FOR VARIABLE CAPACITY COMPRESSORS

**Nobuyuki Nakajima, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan**
**Filed Jan. 29, 1990, Ser. No. 471,510**
**Claims priority, application Japan, Jan. 30, 1989, 1-20565**
**Int. Cl.$^5$ F04B *49/00***
**U.S. Cl. 417—295** **4 Claims**

1. In a variable capacity compressor including a suction

VOL 1126 ISS 3 MY 21 1991 UMI

chamber, a space within which discharge pressure prevails, a control element for determining timing of start of compression of a refrigerant gas, said control element having a pressure-receiving portion, a high-pressure chamber defined by said pressure-receiving portion and within which control pressure prevails and acts on said pressure-receiving portion of said control element, a communicating passage communicating said high-pressure chamber with said suction chamber, and a control valve device for opening and closing said communicating passage to change said control pressure within said high-pressure chamber, said control valve device including a valve body disposed to open and close said communicating passage, a spring urging said valve body in a closing direction, and a



bellows expansible and contractible in direct response to suction pressure within said suction chamber for urging said valve body in an opening direction against the force of said spring when it is expanded,

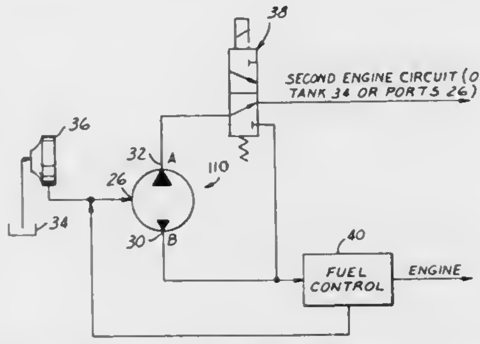
the improvement comprising:
- a high pressure-introducing passage which has one end opening into said space and another end facing said valve body, said discharge pressure from said space prevailing within said high pressure-introducing passage; and
- a plunger slidably fitted in said high pressure-introducing passage and projecting out of said another end thereof, said plunger being responsive to said discharge pressure within said high pressure-introducing passage for urging said valve body in a closing direction.

---

## 5,017,098
## POWER TRANSMISSION

**Lowell D. Hansen, Jackson, Miss.; J. Richard Hurley, Clayton, Ind.; Jean J. Schweitzer, Brandon, Miss., and Walter J. Zoya, Scottsdale, Ariz., assignors to Vickers, Incorporated, Troy, Mich.**

**Filed Mar. 3, 1989, Ser. No. 318,553**
**Int. Cl.$^5$ F04B** *49/00*
U.S. Cl. 417—302 4 Claims



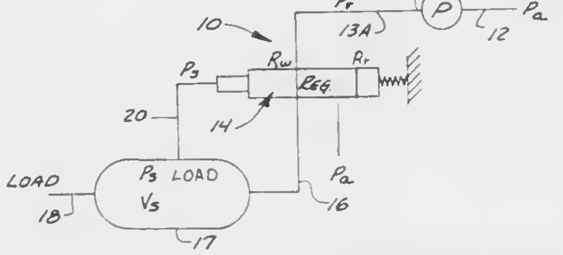
1. A rotary hydraulic machine that comprises: a housing, a rotor mounted for rotation within said housing and having a plurality of radially extending peripheral slots, a plurality of vanes individually slidably mounted in said slots, means forming a cam ring within said housing surrounding said rotor and having a radially inwardly directed surface forming a vane track and at least one fluid pressure cavity between said surface and said rotor, and fluid inlet and outlet means in said housing coupled to said cavity; characterized in that said fluid inlet and outlet means comprises:
- means for receiving hydraulic fluid and directing such fluid to said cavity through a cavity inlet port adjacent to one circumferential edge of said cavity, means including a first cavity outlet port adjacent to an opposing circumferential edge of said cavity for directing fluid from said cavity along a first outlet path, means including a second cavity outlet port positioned circumferentially of said rotor between said inlet port and said first outlet port for directing fluid from said cavity along a second flow path different from said first flow path and at flow characteristic different from that in said first flow path, and means for selectively directing fluid at outlet pressure from at least one of said first and second outlet ports to said inlet port.

---

## 5,017,099
## FLUID REGULATOR VALVE

**Jinglu Tan, St. Paul, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.**

**Filed May 4, 1990, Ser. No. 518,810**
**Int. Cl.$^5$ F04B** *49/00*
**U.S. Cl. 417—307** **16 Claims**



1. A fluid system including a pump, a fluid load and a regulator between the pump and load, said regulator comprising a first port to the load, a second port to the pump, and an auxiliary port to an ambient pressure; first and second valves for controlling flow through the first port and auxiliary port, respectively, the second valve being closed when the pump is moving fluid and the load is in other than a selected fluid condition, an actuator for moving the second valve to connect the pump to the ambient pressure through the regulator when the load is in a first selected fluid condition, the first valve closing under fluid forces when the second valve opens to relieve the load on the pump, the second valve being closed and the first valve open when the fluid condition of the load reaches a second selected fluid condition.

---

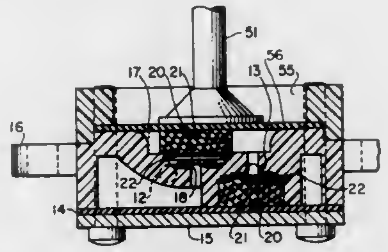
## 5,017,100
## INTEGRAL PUMP AND CHECK VALVE APPARATUS

**Edward J. Arkans, 9249 Glenoaks Blvd., Sun Valley, Calif. 91352**

**Filed Apr. 9, 1990, Ser. No. 506,025**
**Int. Cl.$^5$ F04B** *43/04*
**U.S. Cl. 417—413** **1 Claim**

1. In a fluid pump having an inlet orifice and an outlet orifice separated by an integral check valve, the improvement which comprises:
- a housing body having a cavity interconnecting said inlet and said outlet orifices;
- a fluid pump mounted on said body having a flexible diaphragm covering said cavity;
- said check valve disposed in said body cavity adapted to regulate flow of fluid between said orifices;
- said check valve consisting of a movable sealing element situated next to at least one of said orifices and a self-biasing means forcibly urging said movable sealing element into closure with said orifice;

- said self-biasing means including a member composed or a foam-like composition compressed within said cavity and having a portion expandable into engagement with said movable sealing element to yieldably bias said movable sealing element into closure with said orifice;
- said self-biasing member is composed of a porous, compliant material situated in the fluid path to filter and conduct the flow of fluid therethrough;
- said self-biasing member is pre-shaped to conform in configuration to the shape of said cavity;

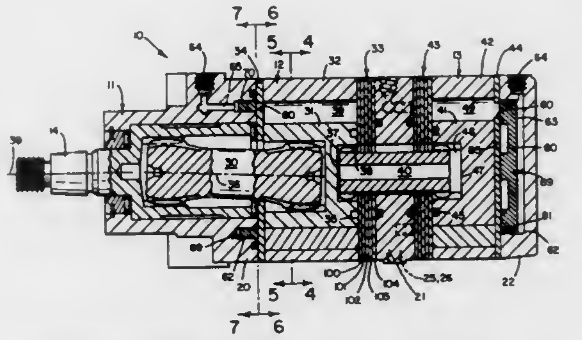


- said fluid pump includes a motor mounted on said housing body interconnected with said flexible diaphragm by an eccentric cam and a reciprocating rod;
- said sealing element is responsive to fluid pressure to seat and unseat with respect to said orifice;
- said flexible diaphragm separates said connected rod and said self-biasing means;
- said self-biasing means being disposed between said flexible diaphragm and said sealing element;
- said sealing element is an elongated flexible strip having a circular midsection coaxially disposed with respect to said orifice; and
- means cooperating with said housing body for retaining said sealing element in said coaxial related disposition.

---

## 5,017,101
## SELECTIVELY OPERATED GEROTOR DEVICE

**Jeffrey White, 243 Pyle La., Hopkinsville, Ky. 42240**
**Continuation of Ser. No. 174,966, Mar. 29, 1988, abandoned. This application Jan. 9, 1990, Ser. No. 463,012**
**Int. Cl.$^5$ F04B** *49/08*
**U.S. Cl. 417—310** **25 Claims**



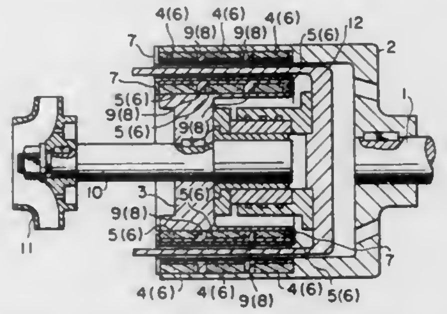
1. In a device using a pressure differential between expanding and contracting working chambers to rotate a shaft, the working chambers having a fixed plate adjoining such chambers, the improvement of equalization means within the body of the device to equalize the pressure between the working chambers, said equalization means including a fluid bypass chamber and holes extending through the fixed plate adjoining the working chambers directly to said fluid bypass chamber, with flow of fluid through said holes equalizing the pressure between the working chambers, and said equalization means preventing the flow of fluid through said holes in the engaged condition of the device.

---

## 5,017,102
## MAGNETICALLY COUPLED PUMP AND NUCLEAR REACTOR INCORPORATING SAID PUMP

**Takashi Shimaguchi; Toshihiro Yamada, both of Ibaraki; Tatsuo Natori, Kashiwa; Akihisa Okada, and Hiroshi Misumi, both of Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 28, 1989, Ser. No. 441,962**
**Claims priority, application Japan, Nov. 30, 1988, 63-300507**
**Int. Cl.$^5$ F04B** *17/00*
**U.S. Cl. 417—420** **8 Claims**



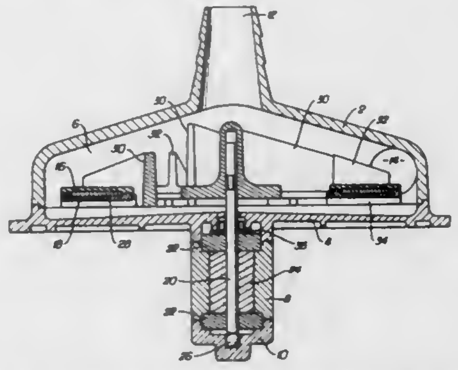
1. A magnet pump having a magnet coupling for magnetically coupling an inner ring yoke and an outer ring yoke so as to magnetically transmit a torque from driving part to driven part of the pump to rotate the driven part, said magnet pump comprising: magnetized magnet pieces bonded to the outer peripheral surface of said inner ring yoke and magnetized magnet pieces bonded to the inner peripheral surface of said outer ring yoke; non-magnetic cylindrical covers respectively covering the surface of said inner ring yoke carrying said magnet pieces and the surface of said outer ring yoke carrying said magnet pieces; and molded resin parts filling the gap between said surface of said inner ring yoke and the associated non-magnetic cylindrical cover and the gap between said surface of said outer yoke ring and the associated non-magnetic cylindrical cover.

---

## 5,017,103
## CENTRIFUGAL BLOOD PUMP AND MAGNETIC COUPLING

**Terrance J. Dahl, Salt Lake City, Utah, assignor to St. Jude Medical, Inc., St. Paul, Minn.**

**Filed Mar. 6, 1989, Ser. No. 320,212**
**Int. Cl.$^5$ F04D** *29/00, 29/12*
**U.S. Cl. 417—420** **26 Claims**



22. In a centrifugal blood pump composed of an impeller housing having a generally circular cross section and a longitudinal axis and delimiting a blood pumping chamber having a

VOL
1126
ISS
3
MY
21
1991
UMI

blood inlet port extending along the longitudinal axis and a blood outlet port located at the periphery of the chamber, an impeller provided with a plurality of radially extending vanes disposed in the chamber, a shaft supporting the impeller for rotation about the longitudinal axis of the blood pumping chamber, and drive means for rotating the impeller in a sense to cause the vanes to propel blood radially from the inlet port to the outlet port, the improvement wherein said drive means comprise: a plurality of magnetizable plates secured to said impeller and spaced apart about the longitudinal axis; and a rotatable magnetic drive assembly disposed outside of said impeller housing and mounted for rotation about the longitudinal axis, said drive assembly comprising means producing a magnetic field which passes through each said plate for attracting said plates to said drive assembly and rotating said impeller with said drive assembly.

---

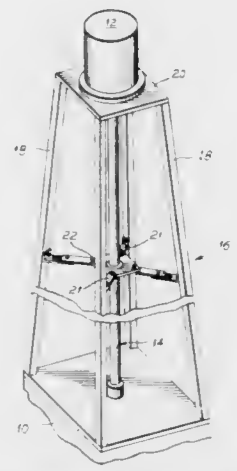
### 5,017,104
### STABILIZER FOR VERTICALLY DRIVEN PUMPS

**Marvin B. Baker, Rte. 1, Box 103 and Edmund R. Kirkland, Rte. 3, Box 412, both of Lumberton, N.C. 28358**

**Filed Dec. 12, 1988, Ser. No. 282,584**

**Int. Cl.$^5$ F04B** *39/00*

**U.S. Cl. 417—423.12** **5 Claims**



1. A stabilizer for securing a bearing on an elongated driven shaft between a driving means and a driven means, in which,
   - said stabilizer includes two pair of adjustable support arms for securing said bearing on said elongated driven shaft and to a support frame;
   - said two pair of adjustable support arms are oppositely disposed arms,
   - one pair of said arms are formed with two separate pieces which are secured together for adjusting their length and one pair are of one piece in which each arm is adjustable relative to said bearing.

---

### 5,017,105
### METERING PUMP

**Franz Röttel, Höchstädt, Fed. Rep. of Germany, assignor to Grunbeck Waseraufbereitung GmbH, Hochstadt, Fed. Rep. of Germany**

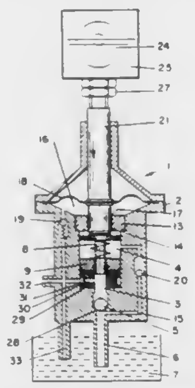
**Filed Aug. 20, 1990, Ser. No. 570,147**

**Claims priority, application Fed. Rep. of Germany, Aug. 23, 1990, 3928411**

**Int. Cl.$^5$ F04B** *39/00*

**U.S. Cl. 417—439** **7 Claims**

1. A metering pump comprising a diaphragm chamber with a diaphragm, a suction conduit connecting said diaphragm chamber with a metering agent tank, a pump cylinder defining a compression space and a cylinder,.space and having an inlet connected to said diaphragm chamber and an outlet connected to the metering point through a metering conduit, a hollow metering piston being provided in said pump cylinder and having a through-bore and an annular seal disk at the side thereof opposite to said metering conduit, a tappet for actuating said piston, means for pressing said seal disk against one end of said tappet, the tappet side of said cylinder space being defined by a stop ring of a size such that said tappet is free to pass therethrough while leaving an annular gap, a piston guide provided in an outlet side of said cylinder space for guiding said piston during entire suction and pressure stroke thereof, whereby the distance between said compression space and said seal disk, the position of said stop ring in said cylinder space and the stroke of said tappet are selected to provide a sealing abutment of said seal disk against said stop ring in a second phase of the suction stroke and to allow a flow of the metering agent from said diaphragm chamber into said compression chamber through said through-bore of said hollow piston at the end of the suction stroke and in a first phase of the metering stroke.



---

### 5,017,106
### PUMP FOR CONVEYING GASES AND PROVIDING A DIFFERENTIAL PRESSURE

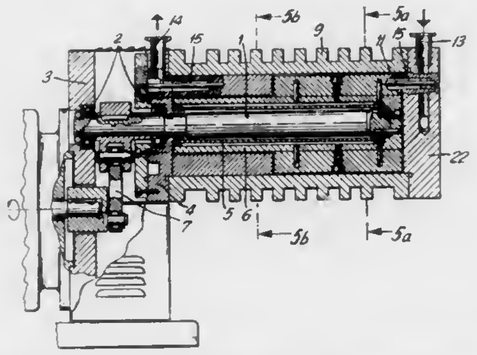
**Kurt Hölss, Hüttenberg, Fed. Rep. of Germany, assignor to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH**

**Filed Apr. 11, 1990, Ser. No. 508,266**

**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1989, 3914042**

**Int. Cl.$^5$ F04C** *21/00*

**U.S. Cl. 417—481** **6 Claims**



1. Pump for conveying gases and providing a differential pressure between a pump inlet and a pump outlet, comprising an axially elongated shaft (I) having a first end and a second end, a drive unit (7) connected to said first end, said drive unit imparting an oscillating rotary motion to said shaft about the axis thereof, wherein the improvement comprises that said shaft (1) is enclosed by a container (6) elongated in the direction of said shaft and spaced outwardly therefrom, said container is connected to said shaft, said container has an inner surface and an outer surface, means in combination with said

container for forming a pumping space extending outwardly from the outer surface of said container and in the axial direction thereof, a hollow member (5) capable of torsional movement encircles said shaft and is located between the inner surface of said container and said shaft for forming a hermetic seal between said drive shaft and said pumping space.

---

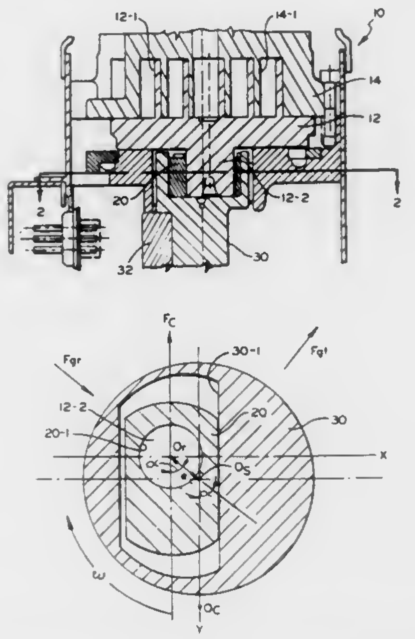
### 5,017,107
### SLIDER BLOCK RADIAL COMPLIANCE MECHANISM

**Howard H. Fraser, Jr., LaFayette, N.Y., and Shahrokh Etemad, Stratford, Conn., assignors to Carrier Corporation, Syracuse, N.Y.**

**Filed Nov. 6, 1989, Ser. No. 432,249**

**Int. Cl.$^5$ F04C** *18/04, 27/00*

**U.S. Cl. 418—55.5** **4 Claims**



1. In a scroll compressor means having an orbiting scroll means having an axis, a fixed scroll means, crankshaft means having a first and a second end and adapted to rotate about an axis of said crankshaft means, counterweight means having a center of gravity spaced from said axis of said crankshaft means and rotatable with said crankshaft means, a slider block radial compliance mechanism comprising:
   - a recess means formed in said first end of said crankshaft means in the direction of said axis of said crankshaft means and elongated in a direction parallel to an asymmetrically located with respect to a plane defined by and axis of said crankshaft means and said center of gravity;
   - a slider block means located in said recess means and coacting therewith such that substantially only relative reciprocating movement of said slider block means in said elongated direction of said recess means is possible;
   - said slider block means and said orbiting scroll means coacting together such that relative rotary motion about said axis of said orbiting scroll means is possible between said slider block means and said orbiting scroll means and said orbiting scroll means is moved with said slider block means when said slider block means moves in relative reciprocating movement in said recess means;
   - said axis of said orbiting scroll means being spaced from said plane defined by said axis of said crankshaft means and said center of gravity.

---

### 5,017,108
### SCROLL COMPRESSOR WITH FIRST AND SECOND OIL PUMPS IN SERIES

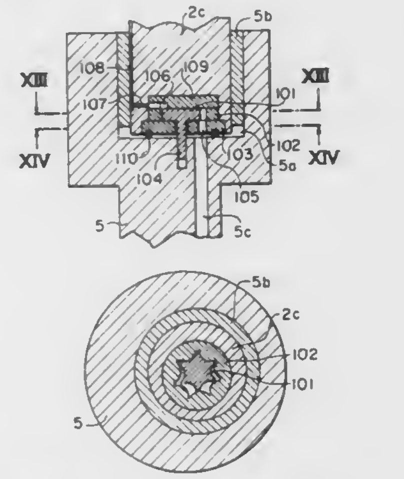
**Akira Murayama; Naoshi Uchikawa; Takahiro Tamura; Takao Mizuno, all of Shimizu, and Kazuo Sakurai, Shizuoka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 185,380, Apr. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 895,301, Aug. 11, 1986, abandoned. This application Mar. 5, 1990, Ser. No. 488,942**

**Claims priority, application Japan, Aug. 23, 1985, 60-184171; Oct. 14, 1985, 60-226730**

**Int. Cl.$^5$ F04C** *18/04, 29/02;* **F04B** *23/12*

**U.S. Cl. 418—55.6** **3 Claims**



1. A scroll compressor comprising:
   - a housing having an oil sump defined therein;
   - a compressor section contained in the housing and including orbiting and stationary scrolls, the orbiting and the stationary scrolls each having an end plate and a spiral wrap formed uprightly on the end plate and being assembled together with the spiral wraps meshing with each other;
   - driving means connected to the compressor section through a driving shaft for moving the orbiting scroll in an orbiting motion to compress fluid in spaces defined by the spiral wraps and end plates of both scrolls, said orbiting scroll has a portion formed thereon for connection to the driving shaft;
   - a first oil supply pump means communicating with the oil sump, the first oil supply pump means being associated with the driving shaft to rotate therewith for delivery of oil in the oil sump by a centrifugal force; and
   - a second oil supply pump means provided in a connection between the driving shaft and the orbiting scroll and associated, for driving thereof, with at least one of the driving shaft and the orbiting scroll, the second oil supply pump means communicating with a discharge side of the first oil supply pump means so as to raise a pressure of oil, which has been once raised by the first oil supply pump means, for supplying sufficient oil to at least two sliding bearings disposed in series on a discharge side of the second oil supply pump means, said second oil supply pump means comprises a gear pump including inner and outer rotors, said inner rotor having outer teeth and said outer rotor having inner teeth profiled to be operatively engageable with the outer teeth of said inner rotor, said outer rotor being rotatably accommodated in a hole which is formed in one of an end of the connection portion of the orbiting scroll and an end of the driving shaft opposite thereto, said inner rotor being eccentrically disposed in said outer rotor and connected, for driving thereof, to the other of the connection portion of the orbiting scroll member and the driving shaft so that said inner rotor rotates relative to said outer rotor to compress oil in

VOL
1126
ISS
3
MY
21
1991
UMI

spaces between the teeth of both rotors meshing with one another.

---

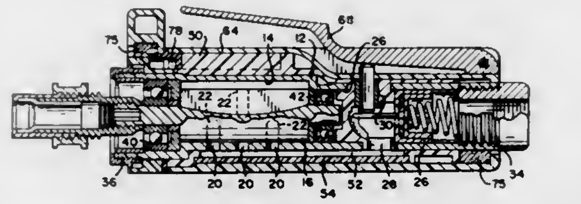
### 5,017,109
### CYLINDER AND HOUSING ASSEMBLY FOR PNEUMATIC TOOL

**Gregory P. Albert, Waverly, N.Y., and Kenneth J. Dubuque, Sheshequin, Pa., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Jan. 26, 1990, Ser. No. 470,714**

**Int. Cl.$^5$ F01C** *1/344, 13/02, 21/10*

**U.S. Cl. 418—152** **8 Claims**



1. A fluid operated mechanism comprising:
a cylinder having a fluid motor chamber and fluid inlet and exhaust ports on the circumferential surface of the cylinder in fluid communication with the motor chamber;
an inner housing formed in situ on the cylinder and having circumferentially adjacent fluid channels communicating with said inlet and exhaust ports extending axially along the surface of the inner housing thereby defining a fluid inlet channel and two mutually oppositely directed fluid exhaust channels; and
an outer housing sleeve surrounding the inner housing and fixed to the inner housing to seal the edges of the fluid channels so as to form fluid passageways, said sleeve having an opening at each axial end to permit flow of exhaust from one of said oppositely directed fluid exhaust channels.

---

### 5,017,110
### APPARATUS FOR PRODUCING HIGH-TEMPERATURE RESISTANT POLYMERS IN POWDER FORM

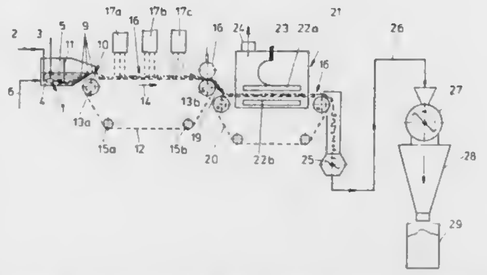
**Erich Wanek, Vöcklabruck; Josef Baumgartinger, Ungenach; Manfred Schobesberger, Seewalchen; Rupert Stadlbauer, Lenzing, and Klaus Weinrotter, Vöcklabruck, all of Austria, assignors to Lenzing Aktiengesellschaft, Austria**

**Division of Ser. No. 155,372, Feb. 12, 1988, Pat. No. 4,897,227. This application Nov. 13, 1989, Ser. No. 436,193**

**Claims priority, application Australia, Feb. 16, 1987, 322/87**

**Int. Cl.$^5$ B29B** *9/04*

**U.S. Cl. 425—7** **6 Claims**



1. A plant for producing high-temperature resistant polymers in powder form by preparing a concentrated solution of a polymer in an aprotic polar solvent, comprising means for expressing said concentrated polymer solution continuously into the region of a twisting cone of hot aqueous precipitant by forming short irregular wormy formations, means for uniting said formations to a fleece-like web, means for washing said formations with aqueous solvents and finally with water, and means for drying and comminuting said formations, said plant further comprising:
a binary spinneret receiving feeding duct means for said concentrated polymer solution and for said aqueous precipitant,
a precipitation trough provided with at least one precipitant feeding duct and having a discharge opening, said binary spinneret positioned within said precipitation trough and producing said twisted cone of said hot aqueous precipitant,
a movable perforated belt having its feed end below said discharge opening of said precipitation trough,
washing means provided above said perforated belt substantially over its entire length,
a drying means having an intake immediately downstream from the delivery end of said perforated belt and an outlet,
a one- or multi-stage comminuting means immediately downstream from said outlet of said drying means.

---

### 5,017,111
### APPARATUS FOR CHARGING A TIRE HEATING PRESS

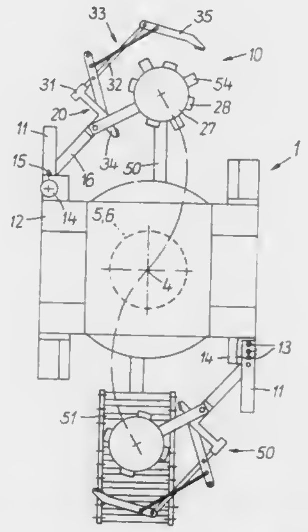
**Günter Drewel, Seevetal; Horst Enoch, and Klaus Grotkasten, both of Hamburg, all of Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany**

**Filed May 25, 1990, Ser. No. 528,413**

**Claims priority, application Fed. Rep. of Germany, Jun. 3, 1989, 3918209**

**Int. Cl.$^5$ B29C** *35/02*

**U.S. Cl. 425—28.1** **4 Claims**



1. In a tire press for vulcanizing a tire having a tire axis and axially spaced and aligned first and second circular tire beads having a bead diameter measured diametrically relative to the tire axis; the tire press having a press axis and being arranged to receive the tire in a working position in which the tire axis substantially coincides with the press axis; the tire press further having two rotationally symmetrical vulcanizing tools situated inside the tire in the working position thereof and having a tool diameter greater than said bead diameter; the improvement wherein said tire press has an apparatus for introducing the tire in the working position; said apparatus including
(a) a carrier;
(b) moving means for displacing said carrier parallel to said press axis and for displacing said carrier in a plane perpendicular to said press axis between a tire-receiving position and a position at said vulcanizing tools;
(c) an auxiliary frame mounted on said carrier to be pivotal with respect thereto about an axis perpendicular to said press axis;
(d) tool means mounted on said auxiliary frame for grasping the first tire bead;
(e) spreading arms attached to said auxiliary frame;
(f) spreading shoes mounted on said spreading arms for grasping the second tire bead; and
(g) means for moving the spreading arms away from one another to a distance exceeding an outer diameter of the tire, whereby said spreading arms are movable past the tire in the working position without contacting the same and for moving the spreading arms towards one another to an extent as to allow introduction of said spreading shoes into a tire opening defined by said second bead.

---

### 5,017,112
### MELT-BLOWING DIE

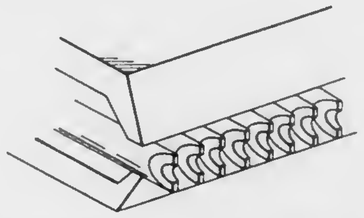
**Takayuki Mende, and Takanobu Sakai, both of Yamaguchi, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Filed Mar. 22, 1989, Ser. No. 327,252**

**Claims priority, application Japan, Mar. 25, 1988, 63-73021; Mar. 28, 1988, 63-75420**

**Int. Cl.$^5$ B29C** *47/12*

**U.S. Cl. 425—72.200** **11 Claims**



1. A melt-blowing die comprising a plurality of capillaries and orifices, said capillaries being arranged in a series and having outlets, and said orifices being provided in a periphery of the outlets of said capillaries, said melt-blowing die being adapted to extrude a thermoplastic resin through said capillaries while said resin is in a molten state, and to simultaneously draw said resin into a fibrous form by the use of a high-speed gas blowing from said orifices, said melt-blowing die further including notches formed in tip portions of said capillaries so that the flow of said molten resin being extruded through each of said capillaries is divided into at least two parts.

---

### 5,017,113
### FILLETING ATTACHMENT FOR A CAULKING GUN

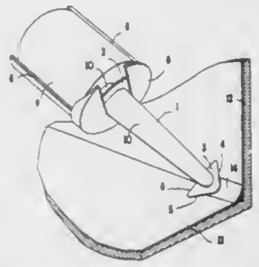
**Donald E. Heaton, 18 Brackencrest Rd., St. Catharines, Ontario, Canada L2P 1S0 , and John E. Roepke, R.R. #1, Jordan, Ontario, Canada L0R 1S0**

**Continuation-in-part of Ser. No. 188,852, May 2, 1988, abandoned. This application May 17, 1989, Ser. No. 352,876**

**Int. Cl.$^5$ B28B** *3/00*

**U.S. Cl. 425—87** **10 Claims**

1. A fillet forming caulking tool for use with a caulking cartridge having a conical plastic nozzle said tool comprising:
(a) a conical body member terminated at its larger end with means to retain said caulking tool on said plastic nozzle and at its smaller end with a partial closure;
(b) a fillet forming member having planar surfaces attached to said smaller end; and said planar surfaces of said forming member lying essentially on the centre line of said conical body member;
(c) an orifice in said closure of said body member immediately beneath said surface of said fillet forming member;
wherein said fillet forming member is a flexible resilient triangular member having two edges at approximately forty five degrees to the said centre line of said body member and a third edge substantially at right angles to said centre line of said body member.



---

### 5,017,114
### DEVICE FOR MANUFACTURING FOAM CUSHIONS WITH A COVERING

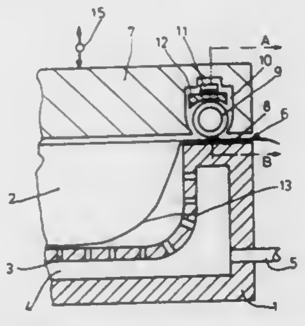
**Volker Onnenberg, Wiehl, and Günter Möllmann, Hagen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen and Fritsche Mollmann GmbH & Co., Lotte, both of, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 269,511, Nov. 10, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 482,424**

**Claims priority, application Fed. Rep. of Germany, Nov. 18, 1987, 3739257**

**Int. Cl.$^5$ B29C** *39/10, 67/20*

**U.S. Cl. 425—112** **7 Claims**



1. A device for manufacturing foam cushions with coverings comprising:
(i) a mold having an upper half and a lower half, wherein at least one half of said mold consists of a cavity and a surrounding stretching rim, the inner walls of said cavity having suction channels therein, said suction channels being connected to a vacuum source such that when a vacuum is applied, a covering is sucked into said cavity and against said inner walls, and
(ii) a tenter adapted to be placed over said rim, said tenter having
  (1) an elastic, flexible roller element rotatably mounted in a groove in said tenter, said roller element
(a) being capable of twisting around its axis,
(b) being located in the region of the tenter which comes into contact with said rim, and
(c) allowing said covering to slide when said covering is being sucked into said cavity, and
  (2) an elastic bearing member which presses down upon said roller element over the full length of said roller element, to thereby press said roller element against said covering.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,115
### MOLD ASSEMBLY FOR MOLDING FRAME-INSTALLED AND SKIN-COVERED SEAT CUSHION STRUCTURE

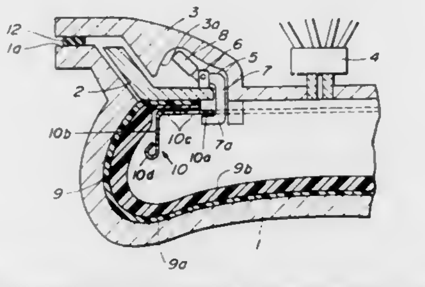
**Norio Yanagishita; Ichiro Matsuura; Kiichiro Ishimaru, and Mikio Akai, all of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase City, Japan**

**Continuation of Ser. No. 283,851, Dec. 13, 1988, abandoned. This application Apr. 27, 1990, Ser. No. 517,546**

**Claims priority, application Japan, Mar. 30, 1988, 63-41196**

**Int. Cl.$^5$ B29C** *39/10, 39/22*

**U.S. Cl. 425—125** **6 Claims**



1. A mold assembly for molding a frame-installed and skin-covered seat cushion structure, which comprises:
- a mold having a cavity formed therein;
- a frame like retainer jig capable of being put on said mold having an aperture exposed to the cavity of the mold;
- clamps held by said retainer jig for clamping a frame inside said seat cushion and sandwiching peripheral portions of a skin member of the seat cushion structure which is to be produced between said retainer jig and said frame, each clamp including a bracket connected to said retainer jig, a lever pivotally connected to said bracket and having a jaw-like leading end portion which is projectable into said cavity through said aperture to clamp said frame and sandwiching said peripheral portions of the skin member between said frame and said retainer jig, and a handle fixed to a head of said lever to be manually handled;
- a lid capable of being put on said mold for closing said cavity of said mold and said aperture of said retainer jig interposed therebetween, said lid having recesses for neatly receiving therein said bracket, said handle and an upper part of said lever of said clamps when the lid is properly put on said mold; and
- sealing means for achieving a sealing between said mold and said lid upon proper putting of said lid on said mold.

---

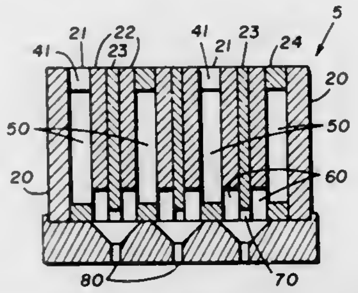
### 5,017,116
### SPINNING PACK FOR WET SPINNING BICOMPONENT FILAMENTS

**Don E. Carter, St. Louis, Mo.; Arnold L. McPeters, Raleigh, and Hobson L. Skeen, High Point, both of N.C., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation of Ser. No. 291,891, Dec. 29, 1988, abandoned. This application Nov. 27, 1989, Ser. No. 442,499**

**Int. Cl.$^5$ B29C** *47/30*

**U.S. Cl. 425—131.5** **4 Claims**



1. A rectangular spinning pack for wet spinning bicomponent acrylic filaments comprising thin metal rectangular plates arranged side by side, said plates comprising:
- a. a pair of end plates
- b. a plurality of first and second spacer plates, each having a central cavity and an opening in the top edge thereof leading to said central cavity, said central cavity being a distance X from the bottom edge thereof;
- c. a plurality of capillary plates, each having a plurality of slots extending inwardly from the bottom edge thereof a distance greater than said distance X; and
- d. a plurality of divider plates, each having slots corresponding in number and shape to the slots of said first and second capillary plates except that the slots extend inwardly from the bottom edge thereof a distance less than said distance X;
- said spacer, capillary and divider plates being arranged between said pair of end plates such that the order thereof is first spacer plate, capillary plate, divider plate, capillary plate and second spacer plate, whereby said slots in said capillary and divider plates define orifices, means for forcing a first acrylic polymer solution through said orifices via said openings and said cavities in said first spacer plates and means for forcing a second acrylic polymer solution through said orifices via said openings and said cavities in said second spacer plates.

---

### 5,017,117
### EXTRUDER NOZZLE

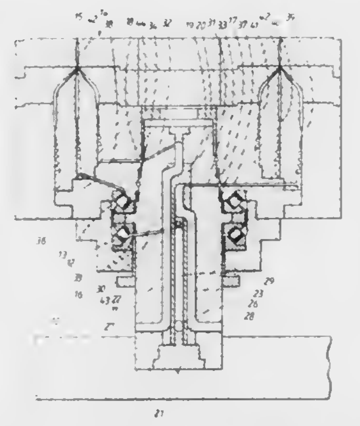
**Marie Iacconi, 29, Ch de la Miliere, Vessey Geneve, Switzerland 30.7.1//CH-1234**

**Filed May 29, 1990, Ser. No. 530,002**

**Claims priority, application Sweden, Jun. 9, 1989, 89020796**

**Int. Cl.$^5$ B29C** *47/24*

**U.S. Cl. 425—133.1** **9 Claims**



1. An extruder nozzle for the extrusion of at least two streams of plastic material, said extruder nozzle comprising a stationary member, a rotary head rotatably carried by said stationary member by at least one roller bearing whereby said rotary head and said stationary member cooperatively rotate along at least one cylindrical interface, said stationary member including at least two supply conduits for each of said at least two streams of plastic material, and said rotary head including a corresponding number of continuation flow passages whereby said at least two streams of plastic material can be transferred from said stationary member to said rotary head at said at least one cylindrical interface, and said at least one cylindrical interface including a first portion having a first diameter, one of said at least two supply conduits and said corresponding one of said continuation passages associated therewith being located at an intermediate location along said first portion of said at least one cylindrical interface, said corresponding one of said continuation passages including said at least one roller bearing whereby said one of said at least two streams of plastic material passing through said one of said at least two supply conduits passes through said at least one roller bearing and packing means fitted on opposite sides of said at least one roller bearing along said at least one cylindrical interface to prevent said plastic material from leaking from said extruder nozzle.

---

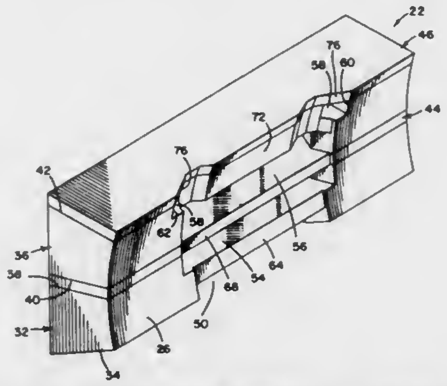
### 5,017,118
### APPARATUS FOR FORMING A COEXTRUSION FROM EXTRUDED STRIPS

**Ernest W. Looman, Tallmadge, and Harold A. Wolbert, North Canton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 367,269, Jun. 16, 1989, abandoned. This application Jul. 31, 1990, Ser. No. 560,800**

**Int. Cl.$^5$ B29C** *47/06, 47/14*

**U.S. Cl. 425—133.5** **10 Claims**



10. A roller die extrusion apparatus for combining two or more extruded strips of elastomeric materials into a single coextrusion, said apparatus having a roller with an axis circumvented by a roller surface and means for rotating said roller about said axis, a die head having flow channels in communication with extruders for supplying said strips, a die holder mounted on said die head and positioned adjacent to said roller surface, a laminated die means mounted in said die holder and having a cylindrical surface conforming substantially to said roller surface, said laminated die means comprising a grooved die member having grooved surfaces forming preform passages extending from said flow channels to openings in said cylindrical surface of said laminated die means, an interchangeable downstream plate die disposed between said grooved die member and said die holder, at least one of said grooved surfaces of said grooved die member being in abutting engagement with flat surfaces of said downstream plate die forming at least one of said preform passages, and strip shaping indentations at an edge of said downstream plate die and at an edge of said grooved die member adjoining said roller surface for shaping and guiding said strips after application to said roller surface to form said single coextrusion.

---

### 5,017,119
### CUTTING MEANS FOR UNDERWATER PELLETIZER

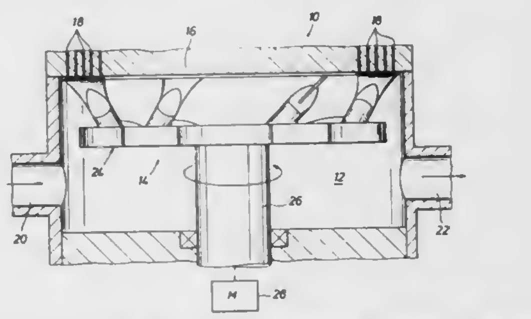
**Lauri Tokoi, P.O. Box 500183, Houston, Tex. 77250**

**Filed Apr. 3, 1990, Ser. No. 503,767**

**Int. Cl.$^5$ B29B** *9/06*

**U.S. Cl. 425—142** **5 Claims**

1. In an underwater pelletizer having a die plate with orifices for the extrusion of plastic material, and a water chamber adjacent the die plate having an inlet and an outlet;
- an improved cutter assembly positioned in the chamber adjacent the die plate for cutting plastic material extruded through the orifices, said improved cutter assembly comprising:
- a small diameter shaft having an extending end thereof adjacent said die plate and adapted for rotation;
- an increased diameter hub mounted on said end of said shaft for rotation about a longitudinal axis and positioned adjacent an outer face of the die plate; said hub including a plurality of integral raised bosses extending from said hub toward said die plate and spaced circumferentially about said hub with each boss defining a central opening having a longitudinal axis extending toward said die plate at an inclination of between around 30° and around 60° with respect to the axis of rotation of said shaft;



- an elongate blade and holder assembly mounted on each boss and including a straight support rod received within the central opening of the associated boss, and a blade mounted on said holder and extending outwardly therefrom to provide a cutting edge for said die plate, the longitudinal axes of said opening and said blade and holder assembly being axially aligned; and
- means removably securing each blade and holder assembly within the central opening of the associated boss.

---

### 5,017,120
### TIE-ROD ASSEMBLY FOR AN INJECTION MOLDING PRESS

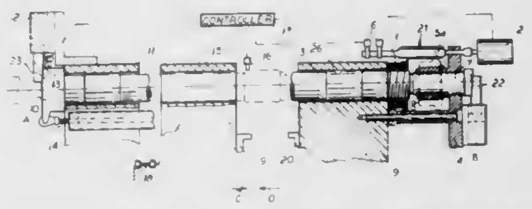
**Reinhard Holzinger, Neuried, and Gerhard Weiss, Lalling, both of Fed. Rep. of Germany, assignors to Krauss Maffei Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Oct. 17, 1989, Ser. No. 422,394**

**Claims priority, application Fed. Rep. of Germany, Oct. 22, 1988, 3836097**

**Int. Cl.$^5$ B29C** *45/80*

**U.S. Cl. 425—150** **11 Claims**



1. An apparatus for changing tools of a press, said apparatus comprising:
- an inside fixed mold end plate;
- an outside fixed end plate spaced axially from the inside plate;
- a movable mold plate between the end plates, the movable mold plate and one of the end plates being adapted to carry respective interfittable tools;
- means for displacing the movable mold plate toward the inside mold plate for pressing the tools together in a closing direction and for moving the tools apart in an opposite opening direction; and
- a tie-rod assembly comprising:
  - a tie rod extending axially through the movable plate and having a threaded inside end mounted movably on the inside end plate and an outside end mounted on the outside end plate,
- a threaded element carried on the inside end plate and axially aligned with the tie rod, the element and inside tie rod end having a substantially identical screwthread;

VOL
1126
ISS
3
MY
21
1991
UMI

a nut engageable on the element and on the inside tie rod end,
an actuator for displacing the tie rod axially and independently of the movable plate relative to the end plates between a use position with the inside tie rod end projecting through the inside end plate and closely juxtaposed with the threaded element and a changeover position with the threaded end withdrawn in the opening direction and spaced from the inside end plate,
means engageable with the nut for screwing the nut from a bearing position on the inside tie-rod end and braced in the opening direction against the inside end plate and a position out of engagement with the inside tie rod end and on the threaded element,
inside bracing means engageable between the inside tie rod end and the inside end plate in the bearing position of the nut for pressing the inside tie rod end and the nut in the opening direction against the inside end plate, and
outside bracing means engageable between the outside tie rod end and the outside end plate for pressing the outside tie rod end in the closing direction against the inside end plate.

---

### 5,017,121
### INJECTION MOLDING MACHINE COMPRISING A PROTECTIVE COVERING

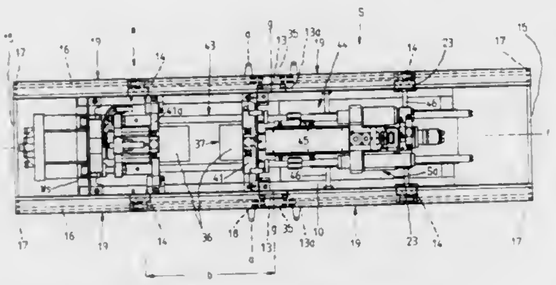
**Karl Hehl, Arthur-Hehl-Strasse 32, D-7298 Lossburg 1, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 286,066, Dec. 19, 1988, abandoned, and a continuation-in-part of Ser. No. 406,833, Sep. 11, 1989. This application Jan. 12, 1990, Ser. No. 464,597**

**Claims priority, application Fed. Rep. of Germany, Dec. 30, 1987, 3744523; Sep. 12, 1988, 3830964**

**Int. Cl.$^5$ B29C** *45/42*

U.S. Cl. 425—151 19 Claims



1. An injection molding machine comprising:
a pedestal defining a vertical longitudinal plane, said pedestal having front and rear vertical walls extending in a longitudinal direction, said vertical walls defining interior chambers,
a mold carried by said pedestal, said mold being disposed in a first region; said mold defining a vertical parting line oriented transversely to said longitudinal direction,
a clamping unit mounted on said pedestal; said clamping unit being horizontally operable to open and close said mold,
an injecting unit including a plasticizing cylinder; said injecting unit being mounted on said pedestal and operable in said longitudinal direction into and out of engagement with said mold, said plasticizing cylinder being disposed in a second region,
two horizontal carrying bars supported by said pedestal in cooperation with a plurality of vertical columns; one of said horizontal carrying bars being a front bar and one of said horizontal carrying bars being a rear bar; the carrying bars extending above said clamping unit and being oriented parallel to said vertical longitudinal plane; said carrying bars defining a distance between themselves; said distance corresponding to the distance between the walls of the pedestal; some of the vertical columns being front columns and some of the vertical columns being rear columns; at least the rear columns being disconnectably mounted on the pedestal and at least the rear bar being disconnectably mounted on the rear columns,
crosspiece means for interconnecting said horizontal carrying bars,
a front protective covering carried by said pedestal; said front protective covering including a stationary protective carrier, at least two of said vertical columns and two vertical protective doors; said stationary protective carrier extending parallel to said vertical longitudinal plane; said two vertical columns being spaced from the carrier; said two vertical protective doors having top horizontal edges extending in said longitudinal direction, said vertical protective doors extending parallel to said front vertical wall and said protective doors being adapted to assume a first covering position in which the two doors respectively cover said first and second regions,
stationary track means mounted on the front bar and being adapted to guide said protective doors in said longitudinal direction; said stationary track means extending adjacent said top horizontal edges,
track rails mounted on each of the carrying bars and extending at least in part above the clamping unit,
a first carriage mounted on the track rails for travel thereon, and
an additional carriage supported on the first carriage; said additional carriage forming a vertically operating hoisting means for individually lifting moldings, molds and plasticizing cylinders.

---

### 5,017,122
### LUBRICATING ROTARY TABLET PRESS

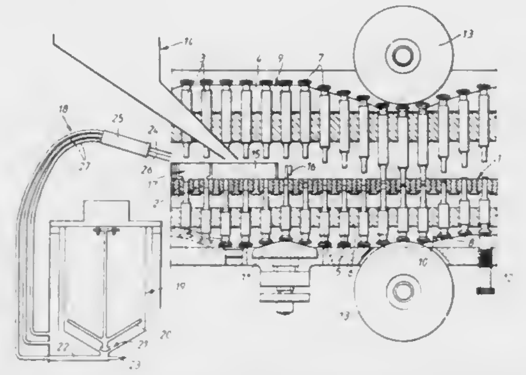
**John N. Staniforth, Bath, England, assignor to University of Bath, Bath, England**

**Division of Ser. No. 940,021, Dec. 10, 1986, Pat. No. 4,832,880. This application May 22, 1989, Ser. No. 354,979**

**Claims priority, application United Kingdom, Dec. 10, 1985, 8530365**

**Int. Cl.$^5$ B29C** *43/00*

U.S. Cl. 425—100 14 Claims



1. A rotary tablet press for the manufacture of a tablet by compression of a tablet material in the form of a powder or granules, the rotary press comprising:
a plurality of dies rotatable around a central axis of the press;
a plurality of upper and lower punches rotatable with the dies;
first feed means for introducing electrically charged lubricant particles to a fixed region of the press through which the dies and punches are arranged to pass subsequent to the introduction of said charged lubricant particles into said region, wherein the lubricant particles are introduced into said fixed region and subsequently attracted onto each of the upper and lower punches and into each of the dies by virtue of their electrical charge while the respective dies and punches are rotating and passing through said region subsequent to the introduction of the individual lubricant particles which are attracted thereto;

second feed means for feeding tablet material to each of said dies at a filling station after each of said dies has passed through said fixed region;
means for maintaining the electrical potential of the dies and punches at a potential different from that of the lubricant particles;
compressing means for compressing the tablet material in the dies between working faces of the upper and lower punches to form tablets; and
ejecting means for ejecting the tablets from the dies.

---

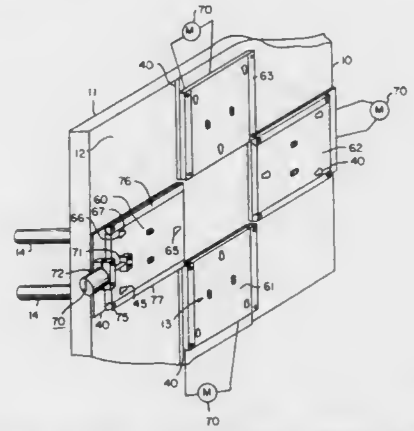
### 5,017,123
### KNOCKOUT BAR MOUNTING FOR INJECTION MOLDING MACHINES

**Paul G. Sloane, 39830 86th St. W., Leona Valley, Calif. 93551**

**Filed Mar. 7, 1990, Ser. No. 490,036**

**Int. Cl.$^5$ B29C** *45/40*

U.S. Cl. 425—182 6 Claims



1. Mounting means for mounting knockout bars to the knockout plate of a molding machine, said knockout plate having a first face, a second face, and a standard pattern of mounting holes therethrough from face to face, said mounting means comprising;
a socket bolt having a head at one end, a shank, an external thread at the other end, and a pin passage extending from end to end, said shank fitting in said hole, said head bearing against said first face, and said thread extending beyond said second face;
a retainer plate contiguous to said second face, said retainer plate having an array of threaded holes conforming to the array of holes in the knockout plate, at least one of said socket bolts being threaded into at least one of said threaded holes;
a latch pin having a threaded end adapted to be threaded into a knockout bar, a shank slidably fitted in said pin passage, a head at the other end, and a groove adjacent to the head, spaced from said other end, said latch pin when threaded into a knockout bar and inserted into a pin passage having its respective groove adjacent to the threaded end of the socket bolt;
a latch plate contiguous to said retainer plate, said latch plate having an array of keyhole slots in an array respective to the array of holes in the knockout plate, each keyhole slot having an opening large enough to pass the head of the latch pin, and a slot of width to enter said groove but not to pass the head;
slidable mounting means mounting said latch plate to said retainer plate enabling the latch plate to move in an in-plane movement relative to the retainer plate without separation from the retainer plate; and
means to move said latch plate in plane to and from a position in which the opening is aligned with the latch pin and a position in which it is not.

---

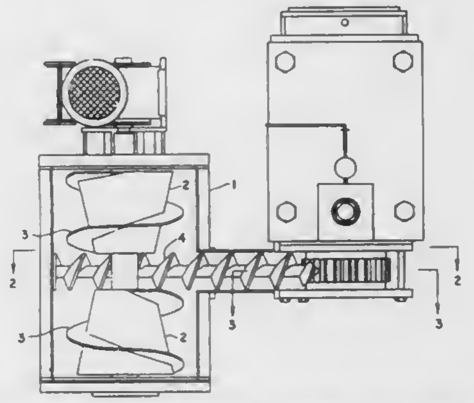
### 5,017,124
### BIOMASS BRIQUETTER

**Carl A. Holley, 14315 Tall Oaks, Riverview, Mich. 48192**

**Filed Oct. 4, 1990, Ser. No. 592,795**

**Int. Cl.$^5$ B29C** *43/08*

U.S. Cl. 425—204 3 Claims



1. A briquetter for low density materials comprising a vertically extending cylindrical hopper, an auger contained centrally therein having a threaded leading portion extending outwardly at substantially right angles to said hopper, a cylinder enclosing said leading portion having an inner diameter slightly greater than said leading portion, a pair of vertically extending feed screws in said housing on opposite sides of said auger having threads tapering in the direction of said auger, a pair of rolls fed therebetween by said leading portion, said pair of rolls having briquette forming pockets extending in spaced relationship along their circumferences, arranged to form complementary pockets for shaping briquettes transversely of said rolls, said leading portion having a thread of smaller diameter than those of said leading portion and which is pointed at its forward end and which extends between said pair of rolls in close proximity to said briquette forming pockets to concentrate pressure on low density materials entering said pockets.

---

### 5,017,125
### APPARATUS FOR FEEDING A LABEL TO A CAVITY OF A MOLDING DEVICE FOR THERMOFORMING PLASTIC CONTAINERS

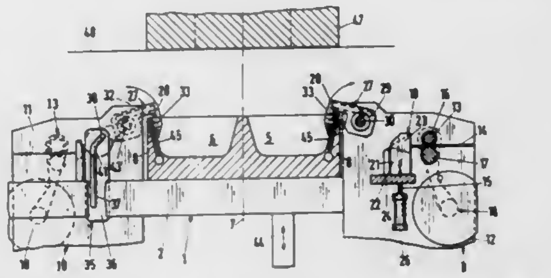
**Josef Finnah, Ahaus, Fed. Rep. of Germany, assignor to GEA Finnah GmbH, Ahaus, Fed. Rep. of Germany**

**Filed Mar. 15, 1990, Ser. No. 494,069**

**Claims priority, application Fed. Rep. of Germany, Mar. 17, 1989, 3908774**

**Int. Cl.$^5$ B29C** *49/24*

U.S. Cl. 425—504 20 Claims



1. Molding apparatus including means for for feeding a label to a mold cavity having an upper edge and a side wall extending downwardly from said upper edge, said mold cavity being disposed on a moveable part of a molding apparatus which is operable to thermoform plastic containers in said mold cavity, comprising a support means juxtaposed to said moveable part

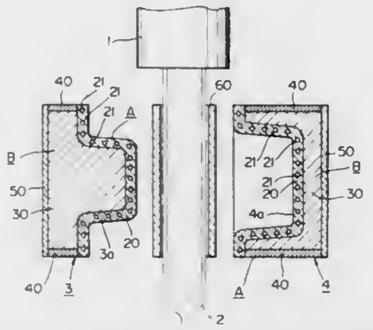
VOL
1126
ISS
3
MY
21
1991
UMI

of said molding apparatus, means for feeding and severing mounted on said support means and operable to cut and successively feed labels, a transfer means mounted on said support means for movement between a label-receiving position and a label-applying position, said means for feeding and severing feeding said labels to said transfer means when said transfer means is in said label-receiving position, said transfer means when in said label-applying position being juxtaposed to an inside surface of said side wall of said mold cavity, and pivoted means operable to pivot said transfer means from said label-receiving position and over said top edge of said mold cavity into said mold cavity to said label-applying position juxtaposed to said inside surface of said side wall of said mold cavity to transfer said label to said inside surface.

---

### 5,017,126
### BLOW MOLDING APPARATUS

**Akiyosbi Yamada, and Yoshiaki Kanob, both of Ube, Japan, assignors to Ube Industries, Ltd., Japan**
**Filed Sep. 26, 1989, Ser. No. 412,998**
**Claims priority, application Japan, Sep. 27, 1988, 63-239841**
**Int. Cl.$^5$ B29C** *49/64*
**U.S. Cl. 425—526** **11 Claims**



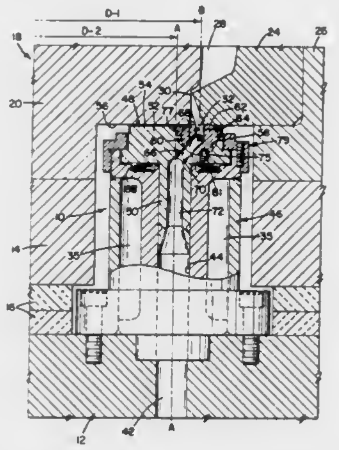
1. In a blow molding apparatus for producing hollow plastic articles including an extruder and a mold having heat medium passages formed therein and having a heat medium source to be coupled with the mold, said mold being alternately subjected to positive heating and cooling, an improvement wherein said mold includes two mold halves, each said mold half comprising a shell housing including an inner shell part, the inner shell part being contoured so that the mold halves define a mold cavity at the inner shell parts thereof, the inner shell contoured part being made of a metallic material having a high thermal conductivity; and a heat insulating area defined within the shell housing, said heat insulating area including means for reinforcing said shell housing against a blow molding pressure and a mold clamping pressure and said heat insulating area providing substantial thermal insulation against a transmission of heat from the inner shell contoured part to the shell housing.

---

### 5,017,127
### SELF ALIGNING NOZZLE FOR INJECTION MOLDING

**Norbert Majerus; Larry E. Chlebina, and John S. Rambacher, all of Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Filed Apr. 18, 1990, Ser. No. 510,720**
**Int. Cl.$^5$ B29C** *45/22*
**U.S. Cl. 425—549** **9 Claims**

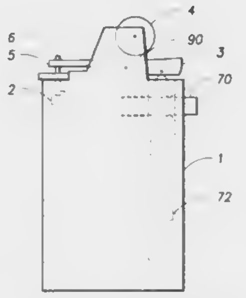
1. A nozzle assembly for communicating a fluid molding material between a first mold part and a second mold part, said nozzle assembly comprising a housing mounted on said first mold part, said housing having a bore in communication with a source of fluid molding material, a nozzle member positioned between said housing and said second mold part, said nozzle member having a shaft portion mounted in said bore and a cap portion connected to said shaft portion, said cap portion having a surface positioned close to a surface of said second mold part, a mold cavity in said second mold part, a nozzle opening in said surface of said cap portion being positioned in alignment with a mold orifice in said surface of said second mold part, said mold orifice being in communication with said mold cavity, a nozzle passage in said nozzle member extending between said nozzle opening and said bore, and said nozzle member being movable in said housing to position said nozzle opening in alignment with said mold orifice.



---

### 5,017,128
### CHILD-RESISTANT DISPOSABLE LIGHTER WITH SPARK WHEEL ARRESTER

**Robert M. Hunter, 320 S. Willson Ave., Bozeman, Mont. 59715**
**Continuation-in-part of Ser. No. 300,752, Jan. 23, 1989, abandoned. This application Oct. 16, 1989, Ser. No. 421,786**
**Int. Cl.$^5$ F23Q** *25/00;* **F23D** *11/36*
**U.S. Cl. 431—277** **4 Claims**



1. A lighter improved to provide child resistance having a lighter body, a portion of which contains a compressed, flammable fluid, a valve on an opening in said body portion that allows the fluid to discharge from said body portion, a means for opening and closing said valve, and a means for igniting said discharged fluid, both of said means requiring at least one motion to operate, the improvement comprising

at least one first rotatable part for blocking the motion of said means for opening and closing said valve, said blocking action occurring only when said first rotatable part is in at least one position,

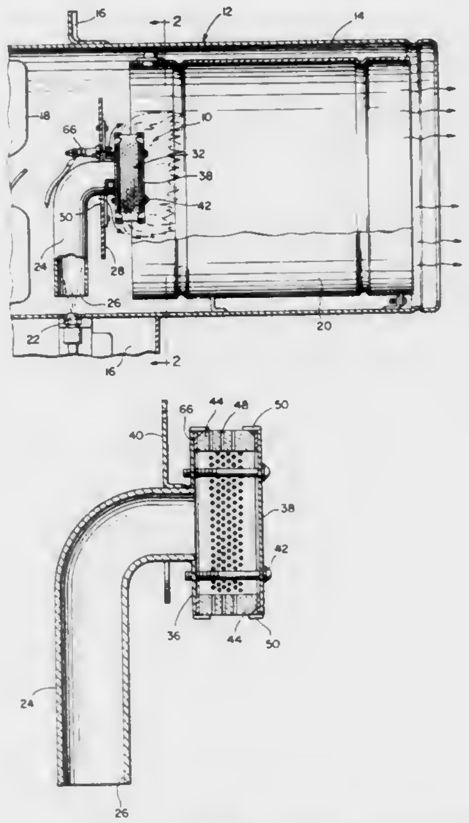
wherein said first rotatable part is movably attached to said lighter body and the movement of said rotatable part occurs only in a single plane of rotation about an axis parallel to the axis of said lighter body, and wherein said blocking of the motion of at least said means for opening and closing said valve occurs while both the means for opening and closing said valve and the means for igniting said discharged fluid are accessible to attempts at manual manipulation,

at least one means for preventing the motion of said means for igniting said discharged fluid, said preventing action occurring only when said means for preventing is in at least one position, said means for preventing being attached to said means for opening and closing said valve.

---

### 5,017,129
### POROUS CERAMIC GAS BURNER

**Wallace W. Velie, Alta Loma; William T. Lewis, San Dimas, and Donald C. Haney, Rancho Cucamonga, all of Calif., assignors to Scheu Manufacturing Company, Upland, Calif.**
**Filed Feb. 6, 1990, Ser. No. 475,964**
**Int. Cl.$^5$ F23D** *3/40;* **F24C** *3/04*
**U.S. Cl. 431—326** **11 Claims**

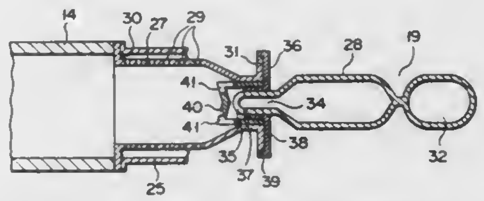


1. A burner for use in forced air heaters comprising a porous ceramic peripheral wall having an internal cavity, the peripheral wall being porous for transmitting a gaseous fuel and air mixture from the cavity to the external periphery of the ceramic wall, means supplying a gaseous fuel and air mixture to the cavity and means supply secondary air to the periphery of the ceramic wall with the movement of the fuel and air mixture through the peripheral wall being radial and in perpendicular relation to the flow of secondary air over the periphery of the ceramic wall, said ceramic peripheral wall including a plurality of small, uniformly spaced holes extending radially from the cavity to the periphery of the wall, said ceramic peripheral wall being constructed of a plurality of ceramic elements, and means retaining the ceramic elements in assembled relation to form a peripheral wall with a hollow cavity.

---

### 5,017,130
### BURNER FOR A COMBUSTION DEVICE

**Shigeto Sumitani, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Jul. 27, 1990, Ser. No. 558,481**
**Claims priority, application Japan, Sep. 14, 1989, 1-237198**
**Int. Cl.$^5$ F23D** *14/00*
**U.S. Cl. 431—352** **10 Claims**

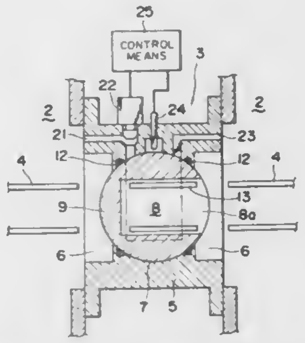


1. A burner for a combustion device, comprising:
a fuel gas nozzle for supplying a fuel gas;
a mixer into which the fuel gas nozzle is inserted on one side and including an inlet section for introducing combustion air via a gap defined therearound to mix a fuel gas with the combustion air in the mixer;
a jetting outlet section integrally projected on the other side of the mixer and having jetting holes for jetting the fuel gas and combustion air which are mixed in the mixer;
a cylinder fixed to the jetting outlet section, having a substantially rectangular open end and adapted to allow the mixture to be burned; and
a burner head fixed to the cylinder and including diffusion holes for diffusing the mixture which is jetted from the jetting holes.

---

### 5,017,131
### ATMOSPHERE FURNACE

**Syoji Sato, Neyagawa; Yutaka Makino, Kobe; Kazumi Ishimoto, Katano, and Yasuo Izumi. Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Jun. 29, 1990, Ser. No. 545,891**
**Claims priority, application Japan, Jun. 30, 1989, 1-170146**
**Int. Cl.$^5$ F27B** *9/04*
**U.S. Cl. 432—152** **6 Claims**



1. An atmosphere furnace comprising:
a plurality of divided furnace units different in atmospheric conditions and aligned,
a plurality of work transfer means arranged between said adjacent divided furnace units or between one of said divided furnace unit on either side and outside space, each transfer means comprising a connecting frame tubular and having on both sides thereof an inlet side and an outlet side openings opening in said adjacent divided furnace unit or the outside space; and a transfer member housed in said connecting frame having formed therein a work housing space with one opening, said transfer member being rotatably housed with three alternative switching positions, namely a first work transfer position where said housing space opens in the inlet side opening of said connecting

VOL
1126
ISS
3
MY
21
1991
UMI

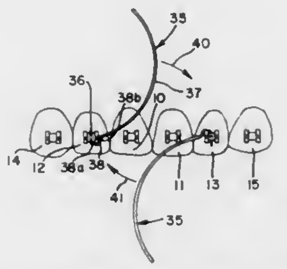
frame, a second work transfer position where it opens in said outlet side opening of said connecting frame and a middle position amid between said first work transfer position and said second work transfer position where said work housing space is closed facing an inner surface of said connecting frame; and

an atmosphere introducing means which introduces atmosphere in any divided furnace unit or in outside space into said work housing space of said one divided furnace when said transfer member is at said middle position.

---

### 5,017,132
## INDIVIDUAL ROOT TORQUING AUXILIARY

**Christopher K. Kesling, LaPorte, Ind., assignor to TP Orthodontics, Inc., Westville, Ind.**
**Filed Mar. 16, 1990, Ser. No. 494,616**
**Int. Cl.$^5$ A61C** *3/00*
U.S. Cl. 433—18 **16 Claims**

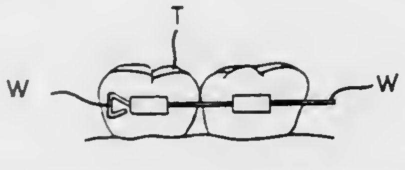


1. An individual torquing auxiliary for torquing the root of a single tooth either labially or lingually and used in combination with a main archwire, said auxiliary being a wire of highly resilient material such that it will not easily deform permanently when stressed from its passive or unstressed state and when stressed will tend to return to its passive state, said auxiliary having a torquing arm adapted to be received in a vertical slot of a bracket on the tooth to be torqued, a tail/lever arm received within a horizontally open archwire slot of a bracket on an adjacent tooth, and connecting means between the torquing arm and the tail/lever arm.

---

### 5,017,133
## ORTHODONTIC ARCHWIRE

**Fujio Miura, Sakae, Japan, assignor to GAC International, Inc., Central Islip, N.Y.**
**Filed May 1, 1990, Ser. No. 517,141**
**Claims priority, application Japan, Jun. 20, 1989, 1-71288[U]**
**Int. Cl.$^5$ A61C** *3/00*
U.S. Cl. 433—20 **20 Claims**



1. An orthodontic shape-memory alloy archwire for ligating to orthodontic appliances, comprising:

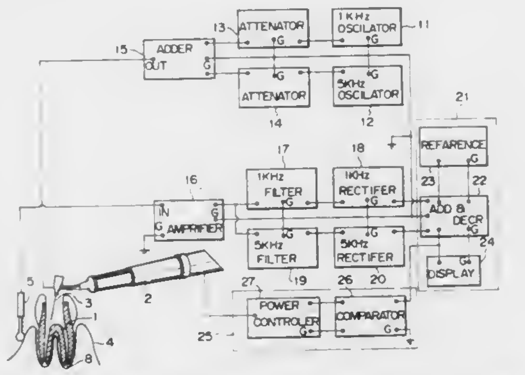
a shape-memory alloy wire formed into an arch shape and exhibiting superelastic properties for imparting a substantially constant force upon deflection within a patient's mouth, the shapememory alloy wire being heat treated so that at least one section of the archwire exhibits a predetermined modulus of elasticity and thus imparts a predetermined range of force when deflected,

the distal ends of the archwire being treated to exhibit substantially diminished superelastic properties in comparison to the at least one other section of the archwire, the distal ends thus being deformable into shapes to prevent them from slipping through orthodontic appliances when mounted thereto.

---

### 5,017,134
## DENTAL SYSTEM FOR TREATING A ROOT CANAL

**Tsuyoshi Saito, 4-20-9-307, Kamisaginomiya, Nakano-ku, Tokyo, and Masaru Yamaoka, Chiba, both of Japan, assignors to Tsuyoshi Saito; Masaru Yamaska and Masaichi Tanaka, all of Tokyo, Japan**
**Filed Apr. 6, 1990, Ser. No. 505,885**
**Claims priority, application Japan, Apr. 14, 1989, 1-94478**
**Int. Cl.$^5$ A61C** *19/04*
U.S. Cl. 433—72 **5 Claims**



1. A dental system for treating a root canal for detecting any given position in the root canal by means of impedance variations between a probe and a counter electrode corresponding to two different frequency signals, comprising:

first means for detecting respective impedance variations corresponding to said two different frequency signals;

second means for detecting a difference between the impedances at a given position in the root canal and determining a reference on the basis of said difference, said reference being used to detect the difference between the respective impedance variations; and

third means for detecting a predetermined position in the root canal by said difference between the respective impedances obtained through said reference and a clinically determined value.

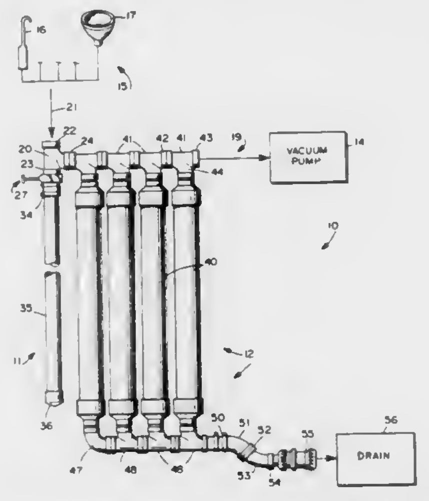
---

### 5,017,135
## TRAP AND SEPARATOR FOR DENIAL VACUUM SYSTEMS

**Robert A. Meyer, Spearfish, S. Dak., assignor to Ramvac Corporation, Spearfish, S. Dak.**
**Filed Oct. 18, 1989, Ser. No. 423,234**
**Int. Cl.$^5$ A61C** *17/06*
U.S. Cl. 433—92 **14 Claims**

1. A dental vacuum system including a source 5 of vacuum operatively connected by a fluid conducting line to a plurality of operatories, and comprising a sludge trap means located in said conducting line between said operatories and said vacuum source;

said sludge trap means comprising: a first conduit element for dividing the flow in said conducting line so that fluids continue to move in a first path toward said vacuum source while sludge is separated from said first path into a second, downward, path; a downwardly extending, closed end, trap element connected to said first conduit element for receiving sludge flowing in said second path;

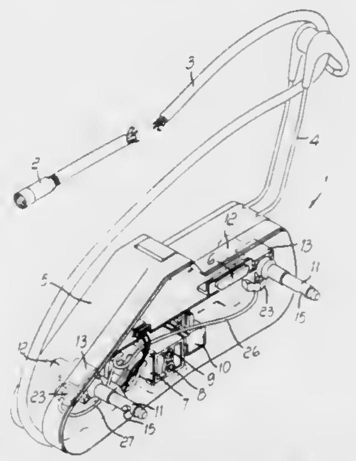


and valve means disposed between said first conduit element and said trap element.

---

### 5,017,136
## APPARATUS WITH MODULAR OPERATIVE BLOCKS FOR DENTISTRY

**Armando Gatti, Bologna, Italy, assignor to Eurodent Industriale S.p.A., San Lazzaro Di Savena, Italy**
**Filed Sep. 27, 1990, Ser. No. 588,904**
**Claims priority, application Italy, Oct. 2, 1989, 3638 A/89**
**Int. Cl.$^5$ A61C** *1/00, 3/00, 1/02*
U.S. Cl. 433—98 **9 Claims**

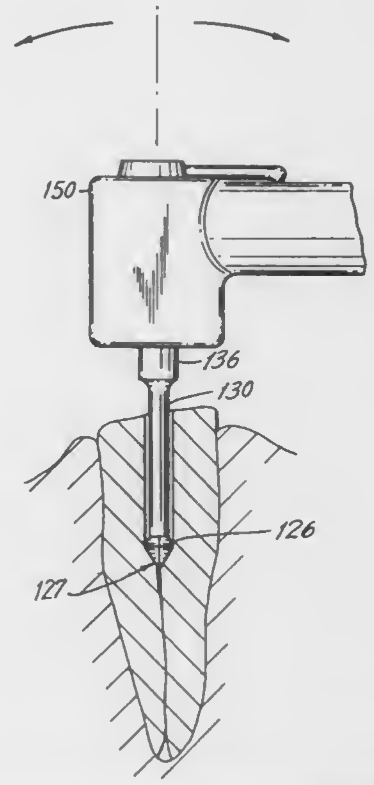


1. Apparatus with modular operative blocks for dentistry, each block bearing a respective instrument and having electric coupling means and means for the hydraulic and pneumatic power supply of said instrument which are connectable to similar connectors and power supply channels, wherein said operative blocks are mutually associable in series by means of coupling means which comprises at least one pin which protrudes from a front face of each operative block and is connectable to a corresponding seat arranged on a rear face of an adjacent one of said operative blocks, said pin being retained by locking means which are pneumatically actuated by means of a duct which is connectable to said pneumatic power supply channel of the instrument.

---

### 5,017,137
## DENTAL TOOL REAMER CAPABLE OF FOLLOWING NATURAL CURVATURE OF TOOTH CANAL

**Bernard Weissman, 225 E. 48th St., New York, N.Y. 10017**
**Continuation of Ser. No. 273,377, Nov. 18, 1988, abandoned.**
**This application Sep. 11, 1990, Ser. No. 580,896**
**Int. Cl.$^5$ A61C** *5/02*
U.S. Cl. 433—102 **8 Claims**

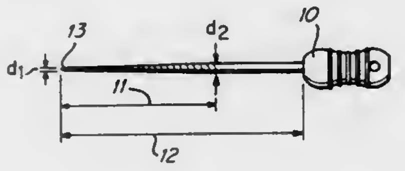


1. A dental tool for the boring out of a tooth canal following its natural curvature, the tool comprising a first holder end portion and a second cutting end portion; and an intermediate shank portion interconnecting the two end portions; the holder end portion being designed to be receivable in a dental tool holder such that the dental tool holder can rotate the dental tool; the second cutting end portion having a continuously varying effective cross sectional diameter transverse to the longitudinal axis, the effective cross sectional diameter increasing from a tip having a minimum effective diameter to a plane of maximum effective cutting diameter and reducing thereafter to a plane of reduced effective cutting diameter in the direction from the second cutting end portion to the first holder end; the surface of the cutting end between the tip of minimum effective diameter and the plane of maximum effective cutting diameter being substantially triangular facets intersecting along sharp cutting edges extending from the plane of maximum effective cutting diameter to the tip, and the surface of the cutting end between the plane of maximum cutting diameter and the reduced effective cutting diameter being truncated triangles, intersecting along sharp cutting edges extending up to the shank portion; the shank portion having a diameter less than that of the maximum effective cutting diameter, and not greater than the reduced effective cutting diameter; such that the tool generally follows the natural curvature of the tooth canal when rotated within the canal, by permitting swiveling of the tool shank laterally within the tooth canal while reaming out the canal so as to increase the internal diameter of the tooth canal.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,138
### SET OF ENDODONTIC INSTRUMENTS

**Herbert Schilder, 12 Lorna Road, Newton, Mass. 02159**
**Filed May 5, 1989, Ser. No. 347,714**
**Int. Cl.$^5$ A61C** *5/02*
**U.S. Cl. 433—102** **15 Claims**

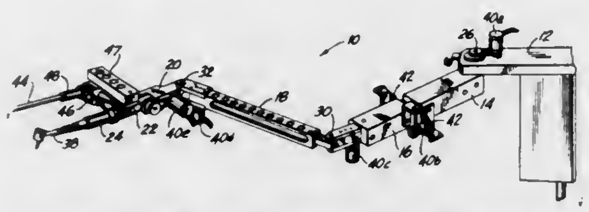


1. A set of elongated endodontic cutting instruments with each having different cutting diameters wherein said diameters increase from the smallest to the largest at a constant percentage of the diameter.

---

### 5,017,139
### MECHANICAL SUPPORT FOR HAND-HELD DENTAL/MEDICAL INSTRUMENT

**David R. Mushabac, 919 Ocean Ave., Brooklyn, N.Y. 11226**
**Filed Jul. 5, 1990, Ser. No. 548,687**
**Int. Cl.$^5$ A61C** *19/04, 3/02, 1/02, 1/08, 1/18*
**U.S. Cl. 433—109** **10 Claims**

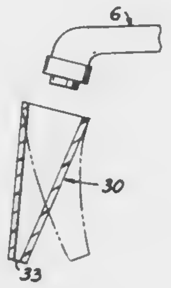


1. A device for use with a dental/medical operating instrument to obtain three-dimensional contour information, comprising:
- a plurality of arm segments pivotally connected in sequence to one another to form an articulated assembly of said arm segments, said assembly having a first end and a second end,
- first mounting means for mounting a first end of said articulated assembly to a stationary platform,
- second mounting means for attaching an operating instrument to the second end of said articulated assembly,
- a plurality of encoders, each of said encoders being associated with one of said segments to provide an electrical signal indication of the position of each of said segments,
- wherein the position of the operating instrument can be tracked on a continuous basis.

---

### 5,017,140
### REMOVABLE AND DISPOSABLE EXTENSION FOR A LIGHT GUIDE OF A DENTAL CURING LIGHT AND ITS METHOD OF USE

**Jay Ascher, 2871 Alfred Ct., Oceanside, N.Y. 11572**
**Filed May 15, 1989, Ser. No. 352,115**
**Int. Cl.$^5$ A61C** *5/00*
**U.S. Cl. 433—215** **14 Claims**

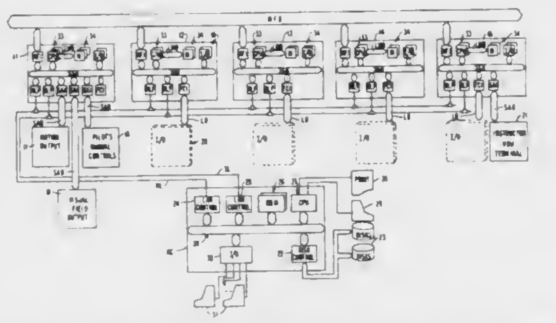


1. A removable and disposable extension adapted for application to a light guide of a dental curing light and to a rigid air/water syringe, the light guide having a rigid body with an optical glass fitted in the body, the syringe having a rigid body for discharge of a fluid jet of air or water, said extension comprising a hollow empty body having an aperture therein, and means by which said body can be detachably fitted on the rigid body of the light guide or the rigid body of the syringe, said extension when fitted on said light guide having the aperture in the hollow body facing the optical glass in the light guide, said hollow body being opaque to light and providing a pathway for light from the optical glass to and through said aperture, said aperture being of relatively small size compared to the optical glass to permit a relatively narrow beam of light to exit from said aperture, said hollow body being tubular and made of bendable material which is self-sustaining in shape in a bent condition so that when the extension is fitted on the rigid body of the air/water syringe, the hollow body can be bent to direct a narrow jet of fluid to lingual surfaces of the front teeth and distal tooth surfaces of molars.

---

### 5,017,141
### COMPUTING SYSTEM

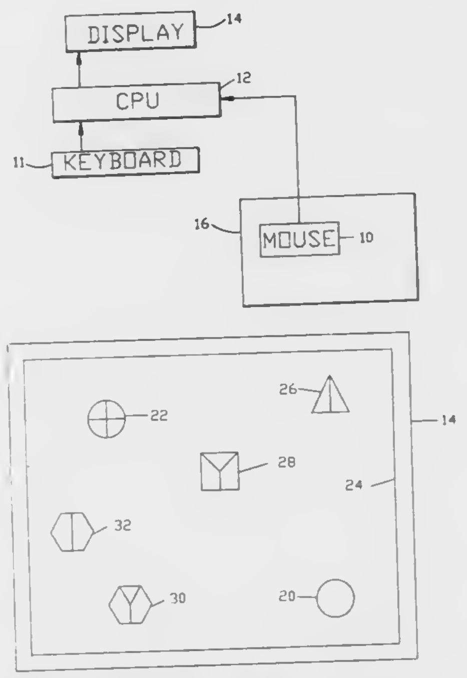
**Richard S. Relf, 29 Durrington Gardens, The Causeway, Goring-by-Sea, Sussex; Lawrence G. Marini, 107 South Street, Tarring, Worthing, Sussex, and David Parkinson, 104 Sompting Road, Lancing, Sussex, all of England**
**Filed May 8, 1986, Ser. No. 860,974**
**Int. Cl.$^5$ G09B** *9/02*
**U.S. Cl. 434—29** **14 Claims**



1. A computing system comprising a common bus, a plurality of processing units coupled to said common bus, and means for generating a start signal at times separated by regular intervals, each of said units including a memory means organized into regions allocated to the plurality of processing units for storing data processed by the plurality of units, means for reading the data in the region allocated to that unit and in at least one other region, means for writing data updated by the activity of that unit into the region allocated to that unit and into no other region, means for placing on said bus data stored in the region allocated to that unit, and means for writing data placed on the bus by the other units into the other regions, each processing unit being adapted to carry out predetermined operations during each of said regular intervals, said operations including writing data placed on said bus by the respective other units into said other allocated regions, and placing the data stored in the region allocated to that unit on said bus and wherein at least one of the units includes means for causing during a portion of each of said regular intervals each of the units in succession to place on said bus the data written into the respective allocated region during the previous one of said regular intervals.

### 5,017,142
### INTERACTIVE METHOD FOR TESTING WORKING MEMORY

**Suzanne V. Bemis, San Diego; Ernst A. Winer, Oceanside, both of Calif.; Jeffrey L. Leeds, Tempe, Ariz., and Kevin D. Athey, Anaheim, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Nov. 7, 1989, Ser. No. 433,070**
**Int. Cl.$^5$ G09B** *19/14*
**U.S. Cl. 434—220** **6 Claims**



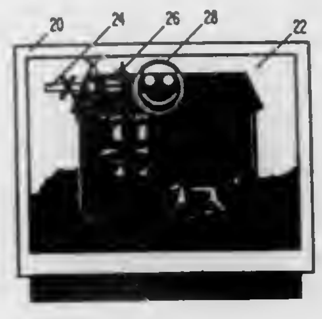
1. A method for testing working memory of a test subject, comprising the steps of:
- displaying a first set of pictograms in a stationary pattern on a video display for observation by said test subject, each said pictogram having Cartesian coordinates with respect to said video display and a predetermined priority corresponding to a distance between said pictogram and a reference position on said video display;
- deleting said first set of pictograms from said video display after expiration of a predetermined period of time;
- displaying a second set of pictograms in said stationary pattern on said video display after the step of deleting, said pictograms of said second set of pictograms being identically shaped and colored with respect to one another;
- providing a priority assignment for each of said pictograms of said second set of pictograms from said test subject after displaying said second set of pictograms; and
- providing an output functionally related to comparisons between said priorities of said pictograms of said first set of pictograms and said priorities of said pictograms of said second set of pictograms.

---

### 5,017,143
### METHOD AND APPARATUS FOR PRODUCING SUBLIMINAL IMAGES

**Alan Backus, Los Angeles, and Ronald Popeil, Beverly Hills, both of Calif., assignors to Popeil Industries, Inc., Beverly Hills, Calif.**
**Filed Apr. 4, 1989, Ser. No. 333,423**
**Int. Cl.$^5$ G09B** *19/00*
**U.S. Cl. 434—236** **5 Claims**

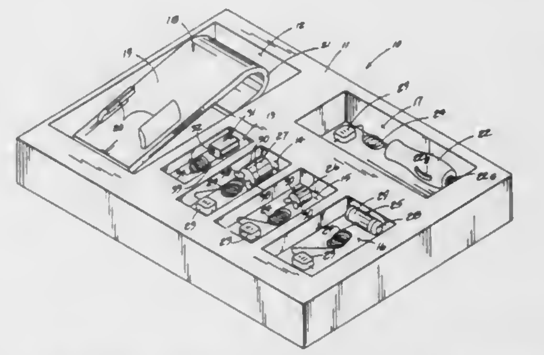
1. A method of producing subliminal images comprising the steps of:
- forming a subliminal raster image for video display for less than a full raster refresh cycle, and said image having a plurality of rasters missing from an otherwise complete image.



---

### 5,017,144
### RADAR DETECTOR ADAPTOR

**Michael Waidhofer, 12003 Cedar Pass, Houston, Tex. 77077**
**Filed May 29, 1990, Ser. No. 529,539**
**Int. Cl.$^5$ H01R** *13/73*
**U.S. Cl. 439—34** **2 Claims**



1. A radar detector adaptor kit for mounting a radar detector in electrical communication with electrical circuitry within an automotive interior, the adaptor kit comprising,
- a visor mount for securement to an automotive visor, the visor mount defined by a "J" shaped configuration including a planar member and an arcuate leg overlying the planar member wherein the planar member includes a plurality of arcuate legs parallel to each other and in confronting relationship to receive the radar detector therebetween, and
- at least one adaptor plug, the adaptor plug including a cylindrical body, the cylindrical body including a flexible electrical conductor, and
- the flexible electrical conductor connected to the adaptor plug at one end and to a dipole electrical plug at its other end for electrical communication with the radar detector, and
- wherein the adaptor plug includes a cylindrical body defined by a first diameter, and an electrical nose contact and spaced ring contacts mounted on the cylindrical body for electrical communication with an electrical socket within the automobile, and
- including a second adaptor plug, the second adaptor plug defined by a cylindrical body defined by a second diameter wherein the second diameter is greater than the first diameter, and a third adaptor plug wherein the third adaptor plug is defined by a cylindrical body defined by a third diameter wherein the third diameter is greater than the first diameter, and the second adaptor plug and the third adaptor plug each include a plurality of offset projections

VOL
1126
ISS
3
MY
21
1991
UMI

integrally mounted and diametrically opposed to one another on each cylindrical body for reception within a light receptacle socket wherein the light receptacle socket includes slots to receive the projections, and the second and third adaptor plug each include an elongate flexible electrical conductor in electrical association with a dipole plug for electrical communication with the radar detector, and

further including a "U" shaped clip, the "U" shaped clip defined by an elongate body, the elongate body including a "U" shaped channel formed therewithin wherein the "U" shaped channel defines spaced leg resiliently biased towards one another to permit securement to the "J" shaped visor mount, and the "U" shaped clip further including an elongate rigid spine longitudinally aligned with the body and spaced parallel to the "U" shaped channel and including a helical wound wire support mounted at a remote terminal end of the spine and spaced from the body for reception and winding of an electrical conductor thereabout.

---

5,017,145

### MATRIX SWITCHING DEVICE AND METHOD OF MANUFACTURING THE SAME

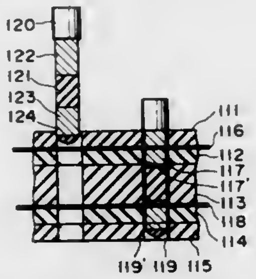
**Tsuneo Kanai, Tokorozawa; Shigefumi Hosokawa, Iruma; Yasuo Kumakura; Shigeru Umemura, both of Tokyo, and Shuichiro Inagaki, Yokohama, all of Japan, assignors to Nippon Telegraph & Telephone Corporation, Tokyo, Japan**

**Filed Apr. 24, 1989, Ser. No. 342,743**

**Claims priority, application Japan, Apr. 27, 1988, 63-102767; Nov. 9, 1988, 63-283201**

**Int. Cl.$^5$ H01R** *29/00, 9/09*

U.S. Cl. 439—45 5 Claims



1. A matrix switching device comprising:

a matrix board including X- and Y-conductor patterns respectively corresponding to upper and lower surfaces of a printed board and arranged in a matrix form, cylindrical contacts connected to said X- and Y-conductor patterns at crossing points thereof, and intermediate isolation portions for interrupting conduction between said cylindrical contacts, said cylindrical contacts and said intermediate isolation portions defining through holes formed in said matrix board; and

a connecting pin comprising a pin main body and conductive contact members having spring portions brought into contact with the cylindrical contacts formed in each of the through holes of said matrix board, said spring portions each having at least two legs, said conductive contact members being fixed to said pin main body by said at least two legs.

---

5,017,146

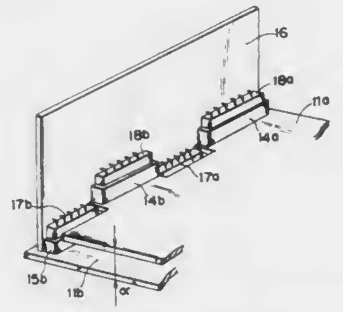
### STRUCTURE FOR COUPLING PLURAL SUBSTRATES

**Yukiyasu Uehara, and Kazuhiko Migita, both of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan**

**Filed Mar. 27, 1990, Ser. No. 499,950**

**Int. Cl.$^5$ H05K** *1/00*

U.S. Cl. 439—65 1 Claim



1. A structure for coupling a plurality of substrates comprising:

a first transverse substrate and a second transverse substrate disposed above and parallel to said first transverse substrate;

a first transverse substrate connector fixed on an upper surface of said first transverse substrate so that a coupling motion of said first transverse substrate connector is effected in a perpendicular direction of said upper surface of said first transverse substrate;

a cutout or aperture formed in said second transverse substrate to permit said coupling motion of said first transverse substrate connector;

a second transverse substrate connector fixed on an upper surface of said second transverse substrate at a position aligned with said first transverse substrate connector on a line along their length direction so that a coupling motion of said second transverse substrate connector is effected in a perpendicular direction of said upper surface of said second transverse substrate;

a longitudinal substrate to be mounted perpendicularly with respect to said first and second transverse substrates;

a front longitudinal substrate connector fixed on an upper surface of said longitudinal substrate so that a coupling motion of said front longitudinal substrate connector is effected in a parallel direction with said upper surface of said longitudinal substrate, said front longitudinal substrate connector being coupled to said first transverse substrate connector; and

a rear longitudinal substrate connector fixed on said upper surface of said longitudinal substrate at a position behind said front longitudinal substrate connector so that a coupling motion of said rear longitudinal substrate connector is effected in a parallel direction with said upper surface of said longitudinal substrate, said rear longitudinal substrate connector being coupled to said second transverse substrate connector.

---

5,017,147

### CONNECTORS WITH COVER PROVIDING CONNECTION SEQUENCE CONTROL

**Masaaki Sugiyama, and Naoki Manabe, both of Kosai, Japan, assignors to Yazaki Corporation, Tokyo, Japan**

**Filed May 11, 1990, Ser. No. 521,942**

**Claims priority, application Japan, May 15, 1989, 1-054443[U]**

**Int. Cl.$^5$ H01R** *13/44, 13/639*

U.S. Cl. 439—144 5 Claims

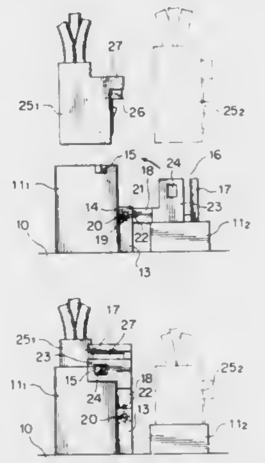
1. An electric junction box comprising:

an insulating box;

a plurality of connector receiving sockets mounted on the insulating box, said connector receiving sockets including a first socket and a second socket, each connector receiving socket having a locking means to hold a mating connector in the connected condition;

a locking cover rotatably mounted to a side wall of said first socket, which faces said second socket, said locking cover being adapted to cover said first socket in an erected position and to extend over said second socket in a fallen position and thereby prevent connection of a mating connector to said second socket, said locking cover in the erected position being adapted to hold the corresponding mating connector in the connected position in said first socket; and

a locking means provided between said first socket and said locking cover for holding said locking cover in the erected position.



---

5,017,148

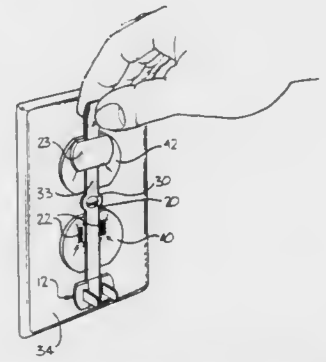
### SAFETY CAP FOR ELECTRICAL OUTLET

**Dennis J. Buckshaw, 9610 Melrose, Livonia, Mich. 48154**

**Filed Oct. 4, 1990, Ser. No. 592,596**

**Int. Cl.$^5$ H01R** *13/44*

U.S. Cl. 439—148 6 Claims



1. An electrical outlet safety cover of the type being made of an electrical non-conducting material such as plastic having an electrical socket safety plug having an essentially planar plug cover plate having a pair of prongs simulating a pair of prongs on a standard electrical appliance, which are adapted to be received in a pair of live terminals of a socket, said prongs projecting normally from said plug cover plate; and a flexible tether having said safety plug integrally formed at one end thereof and having an aperture remotely spaced from said safety plug for attachment to a conventional electrical outlet cover plate screw, characterized in that:

the length of the tether is substantially greater than the distance between the outlet cover plate screw and the terminals such that the prongs extend away from the outlet when unplugged and the safety plug may be folded over the tether to plug the prongs in the terminal sockets with the tether between the prongs, such that the longitudinal axis of the tether remains, the fold forming a tab operative to remove the prongs from said outlet.

---

5,017,149

### TWO-PIECE CONNECTOR AND METHOD OF PRESS-CONNECTING FLAT CABLES TOGETHER

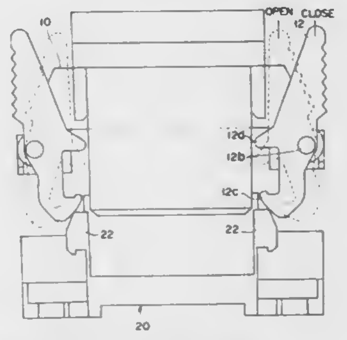
**Mutsuo Hatanaka, Tama, Japan, assignor to Kel Corporation, Tokyo, Japan**

**Filed Mar. 14, 1990, Ser. No. 493,251**

**Claims priority, application Japan, Mar. 18, 1989, 1-66529**

**Int. Cl.$^5$ H01R** *13/62*

U.S. Cl. 439—157 17 Claims



1. A two-piece connector comprising:

a header connected with a printed board and having a header insulator and a plurality of contacts arranged in the header insulator;

a receptacle removably inserted in said header and having a receptacle insulator and a plurality of contacts electrically and detachably connected with the contacts of said header;

lock lever engaging bodies having a substantially rectangular cross section and formed at predetermined positions on the end portions of said header insulator;

lock levers pivotally supported at the ends of said receptacle insulator, and each having a holding portion on an upper portion thereof, an arcuate surface on a side of said receptacle insulator, a lift pawl engageable with an upper surface of the receptive lock lever engaging body, and a lock pawl abutting on the sides of said receptacle insulator, said lift pawl and said lock pawl being arranged such that said lock lever engaging body is positioned therebetween when said receptacle is inserted in said header; and

means for automatically moving said lock levers to an unlock position when said receptacle is inserted into said header as said lock pawls of said lock levers approach each other to take a closed state.

---

5,017,150

### LOW FORCE CABLE DISCONNECT

**Paul E. Moody, Barrington, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 24, 1990, Ser. No. 527,978**

**Int. Cl.$^5$ H01R** *13/523*

U.S. Cl. 439—197 5 Claims

1. A low force cable disconnect comprising:

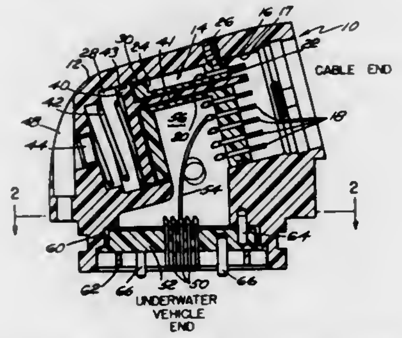
an end cap/hermetic seal insert sub-assembly having an end cap and hermetic seal insert with each of said end cap and hermetic seal insert having at least one aperture connected by at least one pipe, said hermetic seal insert having at least one electrical contact;

a housing comprising holding means for holding said end cap/hermetic seal insert sub-assembly, said holding means comprises a piston chamber holding said end cap;

VOL
1126
ISS
3
MY
21
1991
UMI

a piston located within said piston chamber and arranged for sliding along the inner walls of said piston chamber, said piston located in alignment with said end cap for increasing and decreasing the volume within said piston chamber between said piston and said end cap;

a filter located at the end of said piston chamber and exposed to the outside of said housing, said filter being permeable to selected fluids and said filter being located for permitting said selected fluids to exert pressure upon said piston;

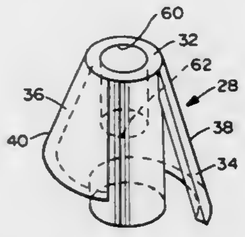


a connector disc separate from said hermetic seal insert within said housing, said connector disc having at least one electrical contact; and

at least one electrical wire connecting said at least one electrical contact of said hermetic seal insert to said at least one electrical contact of said connector disk.

### 5,017,151
### FLOATING PANEL MOUNT FOR ELECTRICAL CONNECTORS

**Bruce A. Peterson, Schaumburg, Ill., assignor to Molex Incorporated, Lisle, Ill.**
**Filed Oct. 5, 1990, Ser. No. 594,804**
**Int. Cl.$^5$ H01R *13/64***
**U.S. Cl. 439—248** **11 Claims**



1. A floating panel mount for mounting an electrical connector to a panel, said panel having at least one mounting aperture therein, said floating panel mount comprising:

a mounting flange;

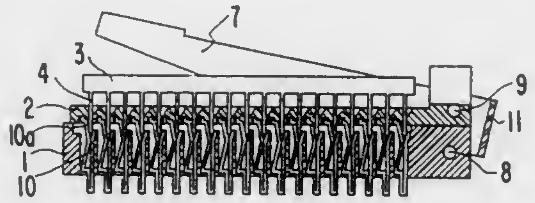
a support post extending from said mounting flange, said support post having a cross-sectional dimension less than the cross-sectional dimensions of the mounting aperture and having a length greater than the thickness of the panel, the post being generally circular in cross-section throughout substantially the entire length thereof; and

a pair of vanes extending from opposite sides of said support post at locations thereon spaced from said mounting flange, said vanes extending generally spirally about said support post in spaced relationship thereto, portions of said vanes in proximity to the mounting flange defining a cross-sectional dimension greater than the cross-sectional dimension of the mounting aperture, said vanes being resiliently deflectable inwardly toward said support post to define a cross-sectional dimension less than the cross-sectional dimension of the mounting aperture, whereby the vanes are deflectable inwardly to permit passage of the vanes through the mounting aperture, and are resiliently returnable to an undeflected condition with the panel floatably engaged between the mounting flange and the vanes; and

wherein said support post has a bore extending axially from a distal end thereof to decrease the force required to insert said floating panel mount into said aperture.

### 5,017,152
### SOCKET FOR AN ELECTRIC PART

**Noriyuki Matsuoka, Tokyo, Japan, assignor to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan**
**Filed Dec. 20, 1989, Ser. No. 453,994**
**Claims priority, application Japan, Dec. 27, 1988, 63-330607**
**Int. Cl.$^5$ H01R *13/15***
**U.S. Cl. 439—263** **3 Claims**



1. A socket for supporting an electric part having at least one terminal, said socket comprising:

a socket body having opposite ends, a side surface extending between said ends, an upper surface, and at least one electrical contact;

a movable plate mounted to said socket body on the upper surface thereof and adapted to receive an electric part having at least one terminal, said movable plate having opposite ends and a side surface extending between the ends thereof,

said movable plate slidable relative to said socket body in opposite directions, extending between the ends of said socket body along said upper surface thereof, between a contacting position at which the at least one terminal of an electric part when received by said movable plate contacts the at least one contact of said socket body and a noncontacting position at which the at least one terminal of an electric part when received by said movable plate is out of contact with the at least one contact of said socket body;

an operating lever connected to said socket body and to said movable plate for mounting said movable plate to said socket body, and operable to move said movable plate from said contacting position to said noncontacting position,

said operating lever having one end including both an upper portion pivotally connected to said movable plate and a lower portion pivotally connected to said socket body a free end, and at least one lever portion extending, in a direction between the ends of said socket body, alongside the side surface of said socket body from said one end of the operating lever to said free end thereof;

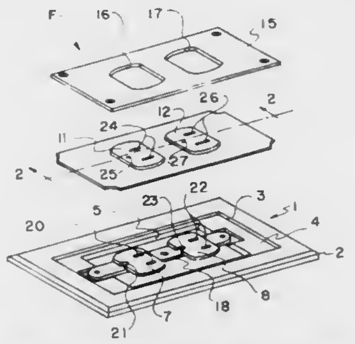
transmission shaft means for pivotally connecting said one end of said operating lever, at the upper portion thereof, to the side surface of said movable plate at one of the ends thereof; and

supporting shaft means for pivotally connecting said one end of said operating lever, at the lower portion thereof, to the side surface of said socket body at one of the ends thereof.

---

### 5,017,153
### MEMBRANE FOR OUTLET FITTINGS

**Timothy S. Bowman, Parkersburg, W. Va., assignor to Butler Manufacturing Company, Kansas City, Mo.**
**Continuation of Ser. No. 391,947, Aug. 10, 1989, abandoned. This application Aug. 20, 1990, Ser. No. 569,966**
**Int. Cl.$^5$ H01R *13/00***
**U.S. Cl. 439—426** **12 Claims**



1. A penetrable membrane for use in a flush floor outlet fitting to be disposed at the surface of a concrete floor and mounting an electrical receptacle horizontally and substantially flush with said surface comprising:

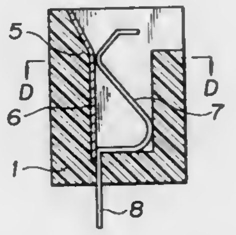
a body made of material which is flexible and which has memory;

said body having first means providing for the blades of an electrical plug to engage and be forced through the first means to engage the contacts in said electrical receptacle; and

said body having second means providing for the end of an electrical low-tension cable to engage the second means and be forced through the second means.

### 5,017,154
### CONNECTOR FOR AN ELECTRIC PART

**Noriyuki Matsuoka, Tokyo, Japan, assignor to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan**
**Filed Dec. 28, 1989, Ser. No. 458,378**
**Claims priority, application Japan, Dec. 29, 1988, 63-331971**
**Int. Cl.$^5$ H01R *13/00***
**U.S. Cl. 439—492** **7 Claims**



1. A connector for providing electrical contact by holding a terminal of an electric part, comprising:

a connector body having a socket formed therein for receipt of the terminal of the electric part, said socket having an inner wall with a molded holding portion for holding the terminal of the electric part;

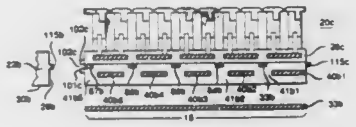
a layer of conductive material deposited on and along a surface of said inner wall of said socket;

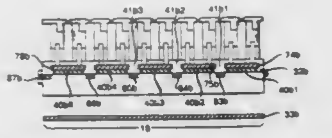
pressing means for pressing the terminal of the electric part against said conductive layer, said pressing means comprising a resilient pressurizing piece mounted in said socket opposite said conductive layer such that a portion of said resilient pressurizing piece normally contacts said conductive layer adjacent said holding portion of said inner wall of said socket; and

a male terminal in direct contact with a portion of said conductive layer spaced from said portion of said conductive layer adjacent said holding portion of said inner wall of said socket.

### 5,017,155
### TERMINAL BOARDS AND FRAME THEREFOR

**Clarence E. Doyle, Chester, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Dec. 18, 1989, Ser. No. 452,524**
**Int. Cl.$^5$ H01R *9/24***
**U.S. Cl. 439—532** **6 Claims**





1. A terminal board panel comprising: frame means enclosing a rectangular space and comprising, a pair of longitudinal rail means on laterally opposite sides of said space and a pair of tie means at longitudinally opposite ends of said space and each laterally extending between such two rail means to join them together, a plurality of terminal boards fitted end-to-end in said space to form therein a longitudinal column of such boards, inner flange means disposed in the length of each rail means on its inside to project inwards towards the other rail means, and a pair of outer flange means disposed on each terminal board on its laterally opposite sides to each project outward from one such side so as to laterally overlap with the inner flange means of the rail means on that side, the pairs of outer flange means on said boards being each cooperable with the inner flange means overlapping therewith of said two rail means to provide for each of said boards two longitudinally extending tongue and groove couplings which each has an inner flange means and an outer flange means respective thereto, and by which such board is coupled on each of its laterally opposite sides to one of said two rail means to thereby be held in said space by said frame means, each of the inner and outer flange means of at least one of such two couplings for at least one of said terminal boards being a double flange means comprising first and second means transversely spaced from each other to provide therebetween the groove for such tongue and groove coupling, and projecting outward from the bottom of such groove to constitute respective flanges in relation to such bottom, and each of the inner and outer flange means of at least one of such two couplings for at least one of said terminal boards comprising an alternation along the longitudinal extent of such flange means of projecting tabs and of gaps between such tabs, the alternations of such two flange means being respectively configured to permit the tabs of each by transverse movement relative to the other, to pass through the gaps of the other, when such board is in a first longitudinal phase position relative to said frame means, to thereby effect by such transverse movement the insertion of a tongue for such coupling into a groove thereof, and the alternations of such two flange means being further respectively configured to produce at least part registration between the tabs of the one and the tabs of the other, when said board is subsequently shifted from said first

VOL
1126
ISS
3
MY
21
1991
UMI

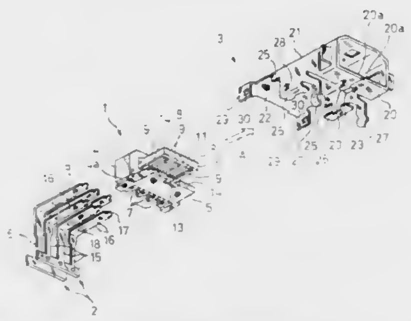
position to a second longitudinal phase position relative to said board, so as by such registration to prevent subsequently such a transverse movement of said two flange means, and so as to thereby subsequently maintain such tongue of such coupling in such groove thereof.

---

### 5,017,156

### ELECTRICAL CONNECTOR

**Keishi Sugiyama, Yao, Japan, assignor to Hosiden Electronics Co., Ltd., Yao, Japan**
**Filed Feb. 1, 1990, Ser. No. 473,452**
**Claims priority, application Japan, Feb. 28, 1989, 1-23658[U]**
**Int. Cl.$^5$ H01R *13/648***
**U.S. Cl. 439—607** **12 Claims**



1. An electrical connector comprising:

L-shaped contact pieces having terminal portions and horizontal portions turned therefrom, with contact being formed on said horizontal portions;

a contact piece supporting member having a main body which houses parts of said terminal portions of said contact pieces; and

a frame having: (i) casing portion for surrounding the entire circumference of said horizontal portions of said contact pieces projecting from said main body of said contact piece supporting member; (ii) a U-shaped portion formed at the rear end of said casing portion for surrounding the top surface and the left-hand and right-hand lateral sides of said main body; and (iii) a flat-plate portion formed at the rear end of the upper plate of said U-shaped portion and adapted to be turned at the boundary thereof with respect to said U-shaped portion, thereby covering the back side of said main body.

---

### 5,017,157

### RECEPTACLE FOR CABLE CONNECTOR WITH LOCKING MECHANISM AND ELECTRIC SHIELDING PROPERTY

**Yun-Yu Liu, and Hsiao-Lei Shih, both of Taipei, Taiwan, assignors to Pan-International Industrial Corp., Hsin-Tien-Taipei Hsien, Taiwan**
**Filed Apr. 17, 1990, Ser. No. 510,182**
**Int. Cl.$^5$ H01R *13/648***
**U.S. Cl. 439—609** **4 Claims**

1. A receptacle for a cable connector, including: a casing;

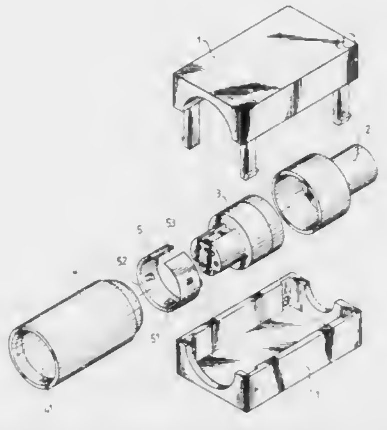
a dielectric core received in said casing and having a plurality of holes for insertion of plug pins;

a metal cap mounted on the rear end of said dielectric core and received in said casing;

a separate metal hoop having resilient means projecting from a wall surface thereof, and an opening along the wall surface to provide the metal hoop with an elastic resilient property, said metal hoop being mounted on the front end of said dielectric core and received in said casing;

a metal socket having a circular recessed portion on its inner wall at the front end thereof and being received in said casing and sleeved on said metal hoop and said dielectric core to connect to said metal cap in series for electric shielding;

wherein a gap is formed between said dielectric core and said socket for the insertion therein of a metal fastening tube of a cable plug to squeeze the resilient means of said metal hoop, and a channel is formed between said metal hoop and the recessed portion of said socket for the fastening therein of a unitary hook portion on the metal fastening tube of said cable plug permitting said plug be firmly retained in the receptacle.

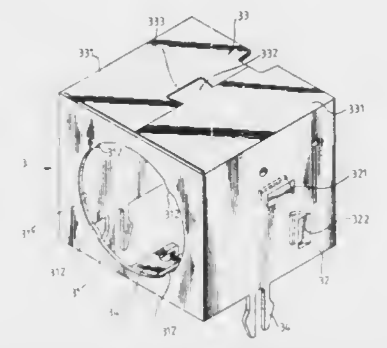


---

### 5,017,158

### STRUCTURE OF RECEPTACLE FOR ELECTRIC CONNECTOR WITH SELF-LOCKING AND ELECTRIC SHIELD MECHANISM

**Yun-Yu Liu, and Hsiao-Lei Shih, both of Taipei Hsien, Taiwan, assignors to Pan-International Industrial Corp., Taipei Hsien, Taiwan**
**Filed May 2, 1990, Ser. No. 517,753**
**Int. Cl.$^5$ H01R *13/648, 19/00***
**U.S. Cl. 439—609** **19 Claims**



1. A receptacle for electric connectors with a self-locking and electric shielding mechanism, comprising:

a rubber core integrally made of rubber material through a shape molding process and having a top and two opposite sides, a circular slot in said top, two opposite retaining holes in said top at the outer side of said circular slot, two recessed holes and two fastening holes at said opposite sides, said fastening holes each comprising a tapered guide slot extending to said top;

a metal ring having an inner wall surface and a bottom end and comprising a plurality of unitary, elastic clamping members, a semi-circular side hole, a plurality of elastic projections extending from said inner wall surface, two positioning pins bilaterally extending downward from said bottom end, said two opposite positioning pins each having a unitary retainer plate; and

a metal casing comprising a front wall, two side walls and a top wall, a hole in said front wall having a plurality of arch-shaped convex portions around the circumference of said hole, said two side walls each comprising an inner wall surface and two clamping members respectively projecting inwardly from said inner wall surface on said metal casing, said top wall being formed of two unitary wing portions extending from said two side walls, said two wing portions being respectively connected together by means of a tongue on one wing portion and a groove on the other wing portion;

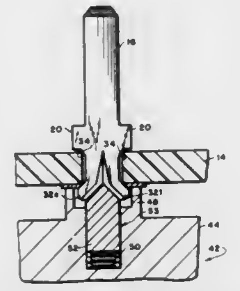
so that said positioning pins of said metal ring are respectively inserted in said retaining holes of said rubber core permitting said metal ring to be firmly retained in said circular slot, and said metal casing is externally connected to said rubber core with said clamping members of said casing respectively fastened in said recessed holes, and said fastening holes of said rubber core permit said arch-shaped convex portions of said metal casing to contact said clamping members of said metal ring.

---

### 5,017,159

### SOLID SINGLE LEG TERMINAL

**Janos Legrady, Putnam Valley, N.Y., assignor to Zierick Manufacturing Corporation, Mount Kisco, N.Y.**
**Filed Oct. 2, 1989, Ser. No. 415,964**
**Int. Cl.$^5$ H01R *13/415***
**U.S. Cl. 439—741** **17 Claims**



1. A solid single leg terminal comprising an electrical conductor end portion at one end and an opposing substantially solid mounting end portion for mounting through a hole of a printed circuit board, said mounting end portion forming an elongate mounting leg of substantially uniform cross section and defining a longitudinal axis, said mounting leg being dimensioned to be substantially freely receivable within the hole from one side of the printed circuit board through to the other side of the printed circuit board; and two elongate indentations in said mounting end portion substantially parallel to said longitudinal axis to facilitate splitting of said mounting leg along said indentations into two half leg portions and splaying same into abutment against the other side of the printed circuit board to secure the position of the terminal on the printed circuit board, said two indentations being provided and comprising coins formed on opposite sides of said mounting leg, each coin being defined by two inwardly convergent surfaces meeting at a frangible joining line of minimum thickness material, and each of said coins having triangular cross sections of decreasing dimensions in the direction of said connector end portion in planes normal to said longitudinal axis.

---

### 5,017,160

### REPLACEABLE SEAL FOR ELECTRICAL CABLES IN A SEVERE ENVIRONMENT

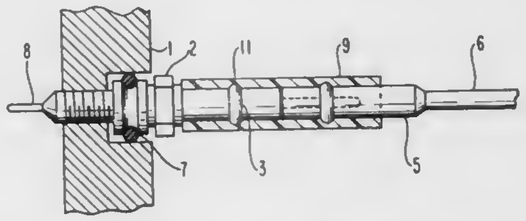
**Rudy J. Garcia, Round Rock, Tex., assignor to W. L. Gore & Associates, Inc., Newark, Del.**
**Filed Mar. 28, 1990, Ser. No. 502,155**
**Int. Cl.$^5$ H01R *13/40***
**U.S. Cl. 439—750** **1 Claim**

1. A connector assembly for use in severe environments comprising in operation relationship:

(a) a bulkhead connector, including a raised ring or bead protuberance circumscribing said connector;

(b) a matching molded electric cable connector, including a raised ring or bead protuberance circumscribing said connector; and

(c) fitted over said connectors when joined together, a matching cylindrical high-temperature and corrosion resistant elastomeric sealing boot, said boot having molded internal grooves spaced from each end of said boot to fit closely over said matching raised ring or bead protuberances circumscribing said cable connectors at predetermined locations on said connectors thereby to effect a liquid-tight seal of and a mechanically locked connection of said connectors when joined together, said boot being selected from the group consisting essentially of Viton fluoroelastomer, fluorosilicone rubber, fluoroelastomers, chlorinated rubber, nitrile rubber, and elastomeric polyurethane.

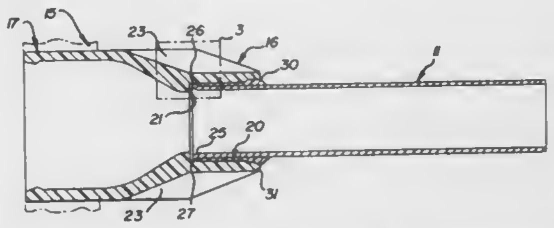


---

### 5,017,161

### ELECTRIC TERMINAL CONNECTOR

**Patrick Hauchard, Deville Les Rouen, and Francois Loisel, Maromme, both of France, assignors to Legrand, Limoges, France**
**Filed Jun. 19, 1989, Ser. No. 368,045**
**Claims priority, application France, Jun. 21, 1988, 88 08293**
**The portion of the term of this patent subsequent to Nov. 13, 2007, has been disclaimed.**
**Int. Cl.$^5$ H01R *4/18***
**U.S. Cl. 439—750** **8 Claims**



1. An electrical terminal connector for an insulated electric conductor having a conductive core and insulation covering the core, the connector comprising a generally tubular metal part adapted to fit over a bared end of the conductive core of the insulated electric conductor and an insulative sleeve having a front portion in engagement with said tubular metal part, said front portion having an extreme distal end, said insulative sleeve also having a rear portion of cross section larger than that of said extreme distal end and adapted to fit over a corresponding end of the insulation of the electric conductor, said tubular metal part having a flared in place inner end, said flared inner end having an end surface between radially inside and outside edges, said outside edge being anchored to said insulative sleeve, said insulative sleeve including an interior transverse shoulder having an inside diameter which is less than the diameter of said inside edge of said end surface of said inner end of said tubular metal part, and said inner end of said tubular metal part being in alignment with said transverse shoulder.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,162

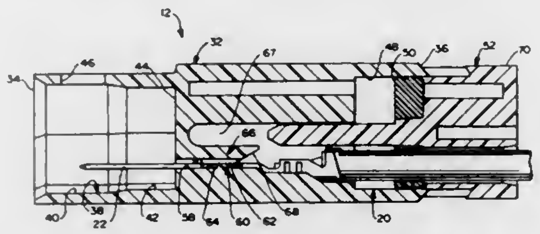
### ELECTRICAL CONNECTOR WITH TERMINAL ALIGNMENT AND POSITION ASSURANCE COMPONENT

**Fred L. Krehbiel, Chicago; Bill B. Wilson, Montgomery, and Stephen A. Colleran, Lisle, all of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Filed Apr. 9, 1990, Ser. No. 506,315**

**Int. Cl.$^5$ H01R** *13/514*

U.S. Cl. 439—752 **15 Claims**



1. An electrical connector comprising: a housing having a forward mating end, a rear end and a plurality of terminal receiving cavities extending therebetween, each said terminal receiving cavity comprising terminal engaging means inwardly projecting and rigidly disposed in each terminal receiving cavity for lockingly engaging a terminal upon sufficient insertion of said terminal into a selected one of said terminal receiving cavities and a terminal positioning beam, generally located opposite said terminal engaging means forcing said terminal into engagement with said terminal engaging means, having a smooth surface directly opposite said terminal engaging means, being disposed for deflection during insertion of the terminal into the housing and for resilient return to an undeflected condition after complete insertion of the terminal, the terminal positioning beams being disposed in spaced relationship to one another, said connector further comprising a terminal position assurance component having a base selectively lockingly engageable with the rear end of the housing and a wedge member projecting forwardly from said base for slidable insertion intermediate the spaced apart terminal positioning beams when said beams are undeflected, wherein the improvement comprises:

terminal alignment means defined in said terminal position assurance component located in an end of said base allowing for the visual alignment of the terminal in the terminal alignment means prior to the insertion of said terminal into said terminal alignment means thereby also aligning said associated terminal with the terminal engaging means in one of said terminal receiving cavities.

---

### 5,017,163

### TERMINAL ENGAGING APPARATUS OF CONNECTOR

**Hideki Ohsumi, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan**

**Filed Jul. 24, 1990, Ser. No. 556,475**

**Claims priority, application Japan, Aug. 2, 1989, 1-90416**[U]**; Nov. 21, 1989, 1-134538**[U]

**Int. Cl.$^5$ H01R** *13/436*

U.S. Cl. 439—752 **7 Claims**

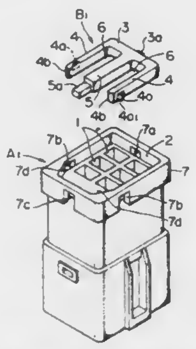
1. A terminal engaging apparatus of a connector, comprising a connector housing having a rearwardly opening accommodation chamber formed in the rear end portion thereof and surrounded by a peripheral wall, and a terminal engaging means having a frame-shaped configuration adapted to be detachably engaged with the accommodation chamber, said terminal engaging means comprising a base side member, at least one leg member, and an intermediate member having a leading end, said at least one leg member and said intermediate member both being connected integrally to the base side member;

wherein said base side member is arranged to be engaged with or disengaged from said connector housing;

wherein said at least one leg member has an engaging projection formed integrally on the outer surface of a free end portion thereof, and said intermediate member has an engaging projection formed integrally at the leading end thereof;

wherein said connector housing has engaging holes formed in the peripheral wall thereof for engaging said engaging projections; and

wherein said connector housing further has at least one tapered driving portion formed on the inner surface of the peripheral wall, said at least one tapered driving portion being adapted to be brought into contact with the free end portion of said at least one leg member during removal of said terminal engaging means from said accommodation chamber so as to initiate flexing of the free end portion to allow disengagement of said engaging projections from said engaging holes.



---

### 5,017,164

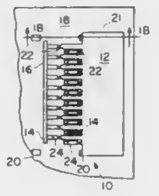
### SURFACE MOUNT I.C. PIN ARRAY SYSTEM

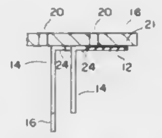
**Andrew H. Gibbs, 2313 Saidel Way, San Jose, Calif. 95124**

**Filed May 16, 1990, Ser. No. 524,156**

**Int. Cl.$^5$ H01R** *13/02*

U.S. Cl. 439—885 **24 Claims**





1. A surface mount printed circuit board connector system comprising:

a first plurality of contact pins each pin having a first end for being soldered to contact pads on a printed circuit board and a second end; and

a rip strip carrier attached to said first end of the first plurality of contact pins by a first plurality of joints each having a weakened area and a rip notch, and the rip strip carrier having a rip tab at one end, whereby after soldering of the contact pins to the printed circuit board the rip strip carrier may be pulled off and torn across said weakened areas beginning at the respective rip notches nearest said rip tab.

### 5,017,165

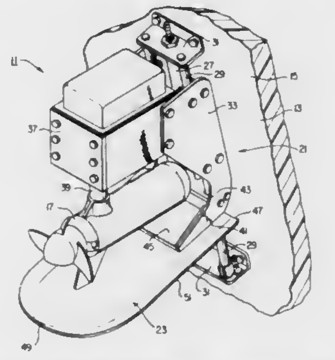
### APPARATUS FOR AUTOMATICALLY RAISING AND LOWERING BOAT MOTORS

**Felton H. Havins, Graham, Tex., assignor to Aero Marine Engineering, Inc., Bryson, Tex.**

**Continuation-in-part of Ser. No. 283,587, Dec. 13, 1988, Pat. No. 4,995,839. This application Nov. 13, 1989, Ser. No. 434,428**

**Int. Cl.$^5$ B63H** *5/12*

U.S. Cl. 440—6 **52 Claims**



1. An apparatus for automatically raising first propulsion means on a boat, said boat having second propulsion means, comprising:

(a) mounting means for mounting said first propulsion means to said boat, said mounting means comprising track means for guiding the movement of said first propulsion means and travelling means for moving along said track means, said travelling means being constrained as to movement along said track means, said first propulsion means being coupled to one of said track means or said traveling means with the other of said track means or said travelling means coupled to said boat such that said first propulsion means can move between a submerged position and an unsubmerged position when said boat is in the water;

(b) hydrofoil means for raising said first propulsion means from said submerged position to said unsubmerged position when said boat is being propelled by said second propulsion means, said hydrofoil means being coupled to said mounting means, said hydrofoil means being adapted to be submerged when said first propulsion means is in the submerged position.

---

### 5,017,166

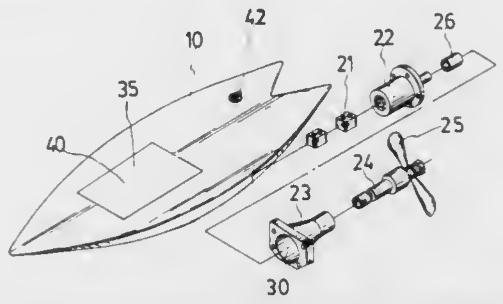
### POWER-DRIVEN SURFBOARD

**Pao-Yuan Chang, No. 66, Alley 228, Wen Chang St., Nan Tun Area, Taichung, Taiwan**

**Filed Jul. 30, 1990, Ser. No. 559,919**

**Int. Cl.$^5$ A63C** *15/04*

U.S. Cl. 440—7 **1 Claim**



1. A power-driven surfboard comprising a recessed hole on the bottom, said hole covered with a wire guard for mounting therein a propeller holder to hold a propeller, a separate hollow chamber for holding a motor and a DC power supply, said motor having a motor shaft inserted through the division wall between said hollow chamber and said recessed hole into the bore of said propeller holder to couple with a transmission shaft through a tube coupling, said transmission shaft being inserted through two bearings fastened inside said bore of said propeller holder and having an end coupled with said propeller, said bore of said propeller holder being sealed with an oil seal at each of its two opposite ends, and a pressure board mounted on the top face of said surfboard with a pressure-controlled power switch attached at the bottom of said pressure board said power switch being connected in series between said DC power supply and said motor to control the operation of said propeller when said pressure board is stepped on.

---

### 5,017,167

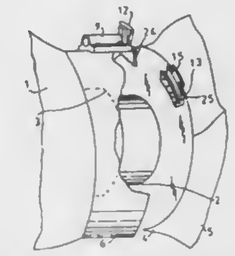
### LINE AND WEED CUTTER

**Donald T. Govan, Box 350246, Fort Lauderdale, Fla. 33335**

**Filed Jul. 11, 1990, Ser. No. 550,896**

**Int. Cl.$^5$ B63H** *5/16*

U.S. Cl. 440—73 **7 Claims**



1. An apparatus that cuts foreign matter including lines, wires, nets and weeds of the type that may be encountered by propeller driven vessels when under way, said vessels of the type where the propeller is mounted to a rotatable propeller shaft that extends from a propeller shaft housing connected to the vessel's hull, and in which there is axial movement of said shaft, said apparatus comprising:

(A) at least one first blade means for cutting, said first blade means having a first shearing plane, said first blade means arranged to rotate in conjunction with said propeller with said first shearing plane substantially perpendicular to the axis of said shaft;

(B) first support means for supporting said first blade means in position extending radially and beyond said first support means to engage said foreign matter, said first support means including means for fixedly attaching to at least one member of the pair consisting of said shaft and said propeller;

(C) at least one second blade means for cutting, said second blade means having a second shearing plane, said second blade means arranged with said second shearing plane substantially parallel to said first shearing plane of said first blade means;

(D) second support means for supporting said second blade means in a position extending radially parallel to said first blade means to engage said foreign matter for shearing said foreign matter between said first and second blade means, said second support means including attaching means for fixedly attaching to a non-rotating member of said hull;

(E) said first blade means and said second blade means each having radially extending, shearing edges at at least one margin of said shearing planes for cutting said foreign matter, when said propeller rotates;

(F) said second support means arranged to provide limited axial movement of said second blade means;

(G) a combination of a slot means and a slot follower means for regulating the axial position of said second blade means, one of said combination connected to said first blade means and the other connected to said second blade means, each arranged in a plane perpendicular to said axis of said shaft and extending through an arc so that said slot

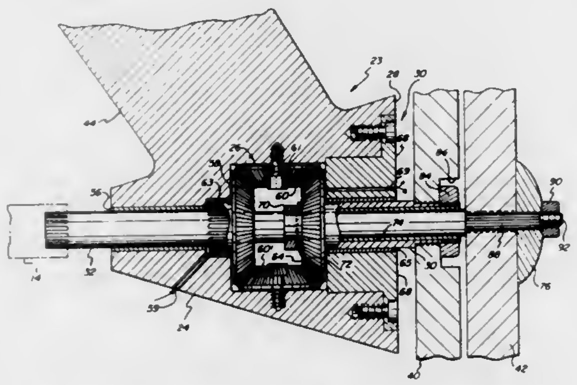
VOL
1126
ISS
3
MY
21
1991
UMI

follower means fits within said slot means during a fraction of each rotation of said shaft to regulate the axial position of said second blade means for close approximation of said first and second shearing planes for enhanced shearing action between said blade means.

---

### 5,017,168
### COUNTER-ROTATING BOAT PROPELLER DRIVE

**William V. Ackley, 2423 Norfolk Rd., Orlando, Fla. 32803**
**Filed Mar. 12, 1990, Ser. No. 492,975**
**Int. Cl.$^5$ B63H** *5/10*
**U.S. Cl. 440—82** **10 Claims**



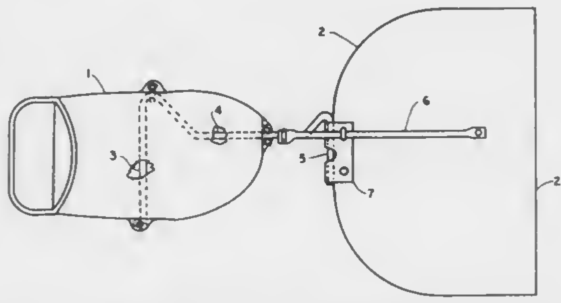
1. A counter-rotating propeller system for boats having an inboard engine which rotates a drive shaft that extends in an aft direction through a lower part of the boat hull, comprising:
  first and second propellers, each of said propellers having a hub;
  coaxially-mounted inner and outer propeller shafts, each shaft having a said propeller mounted at an aft end and with the inner propeller shaft being coupled in axial alignment to the drive shaft externally of the boat hull;
  conversion means located externally to the boat hull and coupled in interlocked relationship to the inner propeller shaft for converting drive shaft rotation to counter rotation of the inner and outer propeller shafts;
  a housing enclosing the conversion means, said housing having a forward open end through which said inner propeller shaft extends for coupling to the drive shaft and having an aft end from which the coaxial propeller shafts extend; and
  a strut connected to the lower part of the boat hull and to the housing, the strut being sufficiently sized and shaped to rigidly support the housing while maintaining proper alignment of the conversion means with the drive shaft to reduce lateral vibrations, said strut further having a lateral crossectional area selected to present a streamlined shape to the flow of water while extending sufficiently longitudinally to rigidly support the housing.

---

### 5,017,169
### SWIM FIN

**Stephen S. Ciccotelli, P.O. Box 1414, Deming, N. Mex. 88031**
**Filed Nov. 13, 1989, Ser. No. 434,252**
**Int. Cl.$^5$ A63B** *31/11*
**U.S. Cl. 441—61** **3 Claims**

1. In a swim fin comprising in combination:
(a) a foot pocket, the foot pocket having a toe portion;
(b) a blade having a leading edge and a trailing edge, the blade being spaced from the toe portion of the foot pocket;
(c) a support beam having a portion attached to the bottom of the foot pocket and the remainder of the support beam projecting to the leading edge of the blade;
(d) a rigid member attached to the portion of the support beam that is under the foot pocket an also to the foot pocket;
(e) a pivotal connection to pivotally attach the support beam to the blade, the pivotal connection being attached to the support beam at a position which is located at the end of the portion of the support beam that projects from the bottom of the foot pocket, and to the blade at a position that is generally located at the center of the leading edge of the blade;

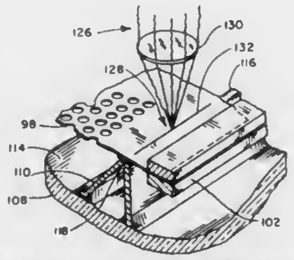


(f) a strut fixedly attached to the blade and projecting to a position near the toe of the foot pocket; and
(g) a link connected to the end of the strut and to said support beam.

---

### 5,017,170
### BRAZING METHOD FOR MOUNTING A TENSION SHADOW MASK

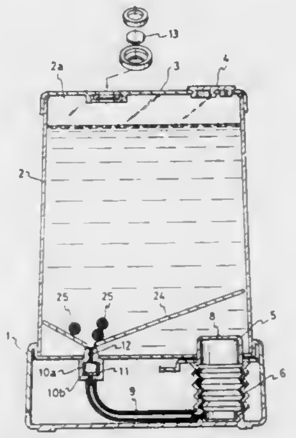
**Lawrence W. Dougherty, Sleepy Hollow, and William N. Roberts, Niles, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**
**Filed Mar. 17, 1987, Ser. No. 26,926**
**Int. Cl.$^5$ H01J** *9/00;* **B23K** *1/01*
**U.S. Cl. 445—30** **14 Claims**



1. In the manufacture of a color cathode ray tube, the process comprising:
  providing a flat glass faceplate having on its inner face a centrally located phosphor screen;
  providing a metal color selection electrode support structure having an electrode-receiving surface, and securing said structure to said inner face of said faceplate on opposed sides of said screen;
  providing a foil color selection electrode composed of hardened metal and having a surface for engaging said electrode-receiving surface of said support structure;
  expanding said color selection electrode;
  inserting meltable filler metal means between said surfaces and placing said surfaces in conjunction;
  applying heat to said surfaces by means effective to melt said filler metal means with minimal annealing and no melting of said hardened metal of said electrode and said metal electrode support structure; and
  cooling said filler metal means to permanently secure said color selection electrode in tension on said support structure.

### 5,017,171
### TOY UTILIZING BUBBLES IN LIQUID

**Akio Shiina, Tayoma, Japan, assignor to Sente Creations Co., Ltd., Japan**
**Division of Ser. No. 344,596, Apr. 28, 1989, Pat. No. 4,990,118. This application Aug. 3, 1990, Ser. No. 562,569**
**Claims priority, application Japan, Jul. 19, 1988, 63-95431**
**Int. Cl.$^5$ A63H** *29/10, 3/52, 23/00;* **A63B** *67/00*
**U.S. Cl. 446—197** **6 Claims**

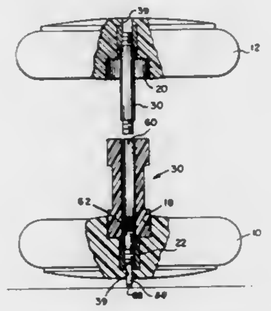


1. A toy utilizing bubbles in liquid, comprising at least one in-liquid movable member, a transparent sealed vessel adapted to contain a liquid and said in-liquid movable member, said vessel having a lower portion, an upper portion and an opening adapted to permit introduction of said liquid into said vessel, such that a volume of air will remain in the upper portion of said sealed vessel, a lid for closing said opening to seal said vessel, a bubble generating means adapted to manually introduce air into said sealed vessel through a bubble generating opening in the lower portion of said vessel thereby creating air bubbles which will ascend through said liquid, which bubbles are capable of engaging and moving said in-liquid moveable member, whereby the air from said bubbles will be collected in said volume of air remaining in the upper portion of said sealed vessel, means associated with said bubble generating opening sufficient to permit said air to pass therethrough without permitting said liquid to pass therethrough, and a means in the upper poriton of said sealed vessel sufficient to permit air to egress from said volume of air without permitting egression of said liquid, to thereby prevent an increase in pressure of said volume of air.

---

### 5,017,172
### CONVERTIBLE YO-YO AND TOP

**C. Vaughn Seifert, 300 Flag Hill Rd., Boxboro, Mass. 01719**
**Filed Jan. 16, 1990, Ser. No. 464,926**
**Int. Cl.$^5$ A63H** *1/30, 1/08, 1/06*
**U.S. Cl. 446—250** **18 Claims**

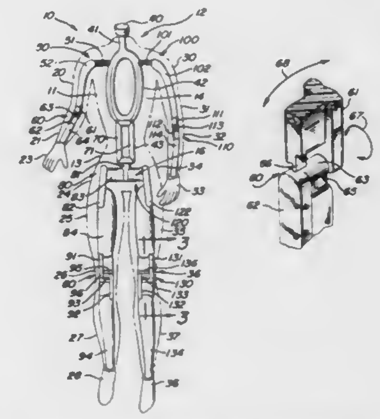


1. A yo-yo convertible to a free spinning surface top comprising:
  first and second yo-yo halves each having opposite faces;
  a yo-yo axle detachably connecting one of the yo-yo halves to the other;
  a spindle detachably connectable to a yo-yo half that is detached from the yo-yo axle, the attached spindle extending centrally from one face of the detached yo-yo half and defining a spinnable top section;
  means defining a nib at the opposite face of the detached yo-yo half on which the top section can rotate as a free spinning top, the spindle providing a means by which the top section may be spun.

---

### 5,017,173
### TORSIONAL JOINT SKELETON FOR POSEABLE FIGURE

**Wallace H. Shapero, West Hills, and John Sneddon, Santa Monica, both of Calif., assignors to Mattel, Inc., El Segundo, Calif.**
**Filed Oct. 19, 1989, Ser. No. 424,026**
**Int. Cl.$^5$ A63H** *3/04, 3/46, 3/02*
**U.S. Cl. 446—374** **13 Claims**



1. For use in a poseable figure, an armature comprising:
  a plurality of generally rigid members;
  a plurality of joints interconnecting selected ones of said rigid members to form an articulated armature, each of said joints including a substantially perpendicular torsion absorbing member for undergoing torsional deformation during relative pivotal motion of said rigid members interconnected by the torsion absorbing member; and
  web portions attaching said torsion absorbing member to said rigid members and retaining said torsion absorbing member in a substantially perpendicular attitude,
  whereby said torsion absorbing member retains the angular position of said rigid members set by a user.

---

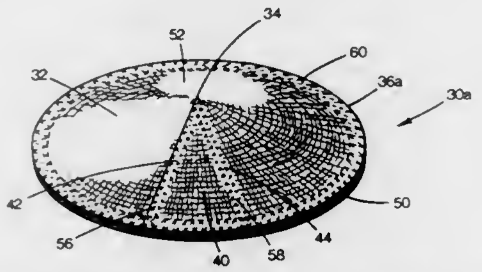
### 5,017,174
### NURSING PAD

**Felicia B. Gowrylow, 19721 NE. 13th St., Camas, Wash. 98607**
**Filed Jan. 18, 1990, Ser. No. 510,713**
**Int. Cl.$^5$ A41C** *3/04*
**U.S. Cl. 450—37** **13 Claims**

1. A nursing pad for placement inside a cup-like portion of a bra-like garment, the nursing pad comprising:
  a plurality of layers of an absorbent material, each of the layers having a generally circular periphery and a center with a radial cut extending therebetween, the layers being superimposed upon each other with the radial cuts in register, each cut in each layer forming a first and a second radial edge, the first radial edges of all the layers being rotated about the centers of the layers to overlap the second radial edges thereof to form a conical structure having a generally isosceles triangular area with double the number of layers of material, said radial edges forming the legs of the isosceles triangular area; and

VOL
1126
ISS
3
MY
21
1991
UMI

attachment means for attaching all the layers together as a unit at least along both the legs of the isosceles triangular area, said conical structure having an outer boundary, an outer convex surface and an inner concave surface,



whereby the nursing pad outer convex surface may be placed adjacent an interior surface of the cup-like portion of the bra-like garment for use by a wearer of the garment to absorb discharge of milk from the wearer.

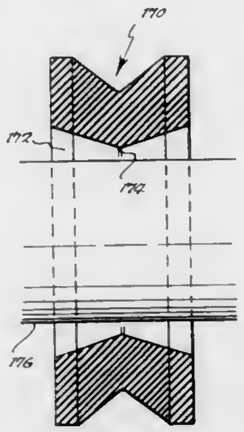
### 5,017,175
### BRAKE-SIZING DEVICES FOR FOOD STUFFING APPARATUS AND METHODS OF USE

**Galen J. Klusmire, Carmel, Calif., assignor to Teepak, Inc., Westchester, Ill.**

**Continuation-in-part of Ser. No. 312,991, Feb. 17, 1989, Pat. No. 4,932,103. This application May 7, 1990, Ser. No. 519,720**

**Int. Cl.$^5$ A22C *21/00***

U.S. Cl. 452—38 **15 Claims**



1. A food casing braking device, which comprises a resilient, generally sheave-like sizing ring in combination with means for pressing together said sizing ring, said sizing ring having a grooved outer rim and an inner rim defining a double tapered bore for receiving a filling horn of a stuffing apparatus, said sizing ring being adapted to compress against the food casing and said filling horn when axially compressed.

### 5,017,176
### COIN HOPPER AND DISPENSER

**Remi D. Swierczek, Concord, Ohio, assignor to Dixiw-Narco, Inc., Ranson, W. Va.**

**Filed Jan. 25, 1990, Ser. No. 470,381**

**Int. Cl.$^5$ G07D *1/00***

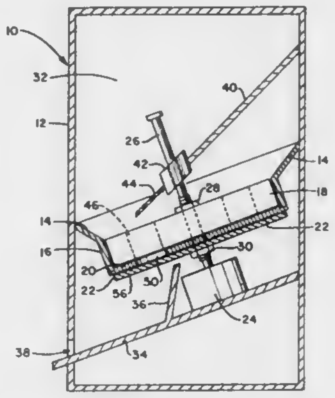
U.S. Cl. 453—49 **9 Claims**

1. A coin dispenser, comprising:

a hopper for receiving a bulk supply of coins;

first and second rotatable plates positioned at a bottom end of said hopper. said first rotatable plate comprising a disc having a plurality of bores passing therethrough, said bores adapted to receive coins from said hopper, and said second rotatable plate comprising a plurality of arms extending from a central axis, said arms being in fixed registration with said bores, there being an equal number of said bores and arms, said first and second rotatable plates being affixed to a common rotatable shaft;

a third stationary plate interposed between said first and second rotatable plates, said third stationary plate having



a bore passing therethrough in periodic alignment with said bores of said first rotating plate; and

a baffle plate within said hopper, shielding said first rotatable plate from coins received within said hopper, said baffle plate extending from a collar received by said shaft to a back wall of said hopper.

### 5,017,177
### MAIZE SHELLER

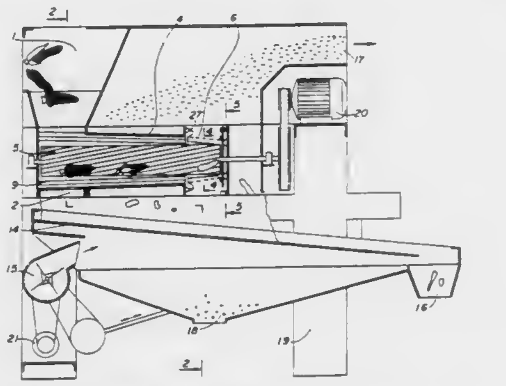
**Atanas L. Mitkov; Ivan N. Georgiev; Atanas K. Atanassov; Peter T. Radulov, and Iliya Y. Stoyanov, all of Russe, Bulgaria, assignors to VTU "Angel Kantchev", Russe, Bulgaria**

**Continuation-in-part of Ser. No. 197,059, May 13, 1988. This application Oct. 4, 1989, Ser. No. 416,884**

**Claims priority, application Bulgaria, Feb. 3, 1987, 78312**

**Int. Cl.$^5$ A01F *12/26***

U.S. Cl. 460—46 **4 Claims**



1. In a maize sheller comprising

a receiving hopper, a drum arrangement, an output chute, and a waste chute;

said drum arrangement comprising a cylindrical rod drum and a conical rod counter drum, said cylindrical drum being arranged coaxial with and surrounded by said counter drum, said conical counter drum having a large base and a small base, said large base being disposed adjacent said receiving hopper;

a screen located between said drum arrangement and said output chute, said screen defining a passage to said waste chute;

the rods of the cylindrical drum and the conical counter drum being disposed along a helicoidal line, the improvement comprising

said conical counter drum comprising a non-adjustable stationary part and an adjustable part, said adjustable part comprising at least three sectors, said sectors each linked at one end by an articulation joint to the small base of the non-adjustable part of the conical counter drum and said sectors linked together at another end through a regulating means for regulating the clearance between the cylindrical drum and the adjustable part of the conical counter drum, the rods of the cylindrical drum and of the conical counter drum arranged along the helicoidal line forming with respective cylindrical and conical generatrices and angle ranging from 0 to 50 degrees, each of said sectors being provided with a regulating pin, and said regulating means for regulating clearance between said cylindrical drum and said adjustable part of the counter drum comprises

a flange fitted frontally behind the adjustable part of the counter drum and mounted on profiled rollers said flange provided with eccentrically disposed slot shaped orifices, the regulating pins engaging said orifices, whereby rotation of said flange causes movement of said pins within said orifices, and movement of said pins, in turn, causing movement of said sectors.

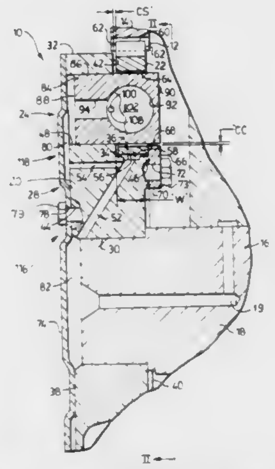
### 5,017,178
### RESILIENT COUPLING APPARATUS

**Roger D. Krikke; Benny Ballheimer; Nelson A. Jones, all of Peoria, and Dwight V. Stone, East Peoria, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

**Continuation of Ser. No. 260,426, Oct. 19, 1988, abandoned. This application Oct. 13, 1989, Ser. No. 423,520**

**Int. Cl.$^5$ F16D *3/12, 3/80;* F16H *57/00, 57/04***

U.S. Cl. 464—7 **20 Claims**



1. A coupling apparatus for coupling a driving mechanism to a driven mechanism, comprising:

an annular plate member rigidly connected to the driven mechanism;

a gear member adapted to be drivingly connected to the driving mechanism and connected to the annular plate for relative oscillation therebetween wherein an operating clearance between the annular plate and the gear forms an interface therebetween;

means for resiliently transmitting torque from the gear to the annular plate, said resilient transmitting means includes a pin assembly positioned in mechanical connection between the annular plate member and the gear member;

means for dampening a backlash motion from the annular plate to the gear, said dampening means includes a pin assembly, piston, operatively associated with the pin assembly and means for biasing the piston into contact with one of the members; and

means for lubricating the interface between the annular plate and the gear, said means including a fluid passage in the annular plate communicating with the interface and adapted to be connected to a source of lubricating fluid.

### 5,017,179
### FLEXIBLE COUPLING WITH LOAD VARIABLE DAMPING

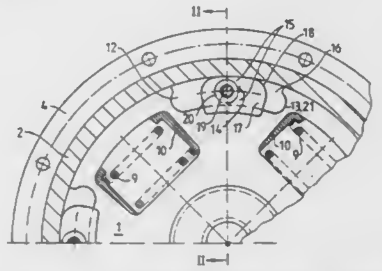
**Wolfgang Hanke, Heidenheim, and Viktor Kühne, Bopfingen, both of Fed. Rep. of Germany, assignors to J.M. Voith GmbH, Fed. Rep. of Germany**

**Filed Jun. 22, 1989, Ser. No. 369,825**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1988, 3820998; Dec. 10, 1988, 3841692**

**Int. Cl.$^5$ F16D *3/80;* F16F *15/16***

U.S. Cl. 464—24 **22 Claims**



1. A flexible coupling of disk construction, comprising:

a first coupling half comprising a hub and at least one middle disk on the hub rotatable around the axis of the hub;

a second coupling half also rotatable around the axis of the hub independently of the rotation of the first coupling half, the second coupling half being comprised of two axially spaced apart side disks disposed on opposite sides of the at least one middle disk, and the side disks being connected to each other to rotate together; means radially outward of the middle disk joining the side disks for defining an inner space over the middle disk and in which damping fluid may be located;

at least one displacement chamber being defined within the inner space between the side disks, the displacement chamber being formed at one circumferential side by a radially extending surface on at least one middle disk and being formed on the other circumferential side by a radially extending surface attached to the side disks such that the first radial surface and the second radial surface move circumferentially toward and away from each other with the relative twisting of the first and second coupling halves with respect to each other;

axially between the middle disk and the side disks associated therewith, an axial gap being defined of an axial width sufficient to permit radially inward flow of damping fluid from within the displacement chamber axially out of the displacement chamber into the axial gap and then radially inwardly through the axial gap; and

means for progressively preventing exit of damping fluid from the displacement chamber directly into the axial gap by adjusting the circumferential length of the axial side of the displacement chamber, thereby controlling the radially inward flow of damping fluid from the displacement chamber depending upon the relative angular twist of the first and second coupling halves.

### 5,017,180
### SPEED REDUCTION DEVICE

**James E. Berkeley, Dayton, Ohio, assignor to Shopsmith, Inc., Dayton, Ohio**

**Filed Nov. 29, 1989, Ser. No. 442,752**

**Int. Cl.$^5$ F16H *9/00***

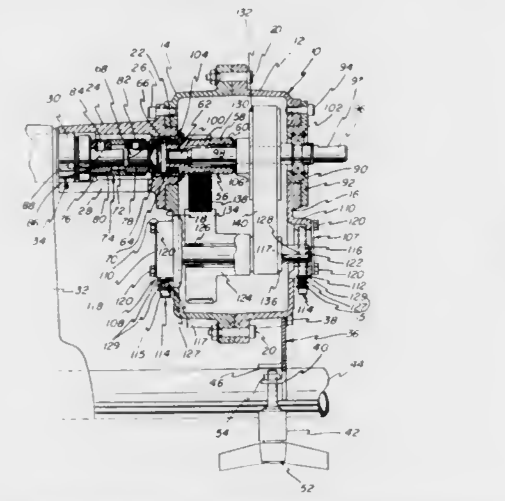
U.S. Cl. 474—84 **20 Claims**

1. A speed changing device for use with a woodworking tool comprising:

a front and a rear portion located opposite from one another;

VOL
1126
ISS
3
MY
21
1991
UMI

an input shaft partially supported by said rear portion such that an end thereof is located between said front and rear portions;
an output shaft partially supported by said front portion such that an end thereof is located between said front and rear portions;
one of said input and output shafts being provided with means defining a hole in said end thereof located between said front and rear portions, said hole receiving an end of the other of said shafts therein, such that said shafts act to prevent one another from pivoting about the locations at which they are supported by said front and rear portions;



rotating transmission means having an axis of rotation parallel to said input and output shafts;
first engagement means for connecting said input shaft to said rotating transmission means; and
second engagement means for connecting said output shaft to said rotating transmission means;
said input shaft acting to drive said output shaft through said engagement means and said transmission means such that, as said input shaft is rotated at a first speed, said output shaft is driven at a second speed different from said first speed.

## 5,017,181
## BELT TENSIONER, KIT THEREFOR AND METHODS OF MAKING THE SAME

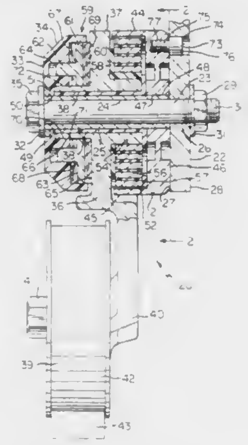
**Dewey D. Henderson, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio**

**Division of Ser. No. 513,635, Apr. 24, 1990, Pat. No. 4,981,461, which is a division of Ser. No. 443,990, Nov. 30, 1989, Pat. No. 4,950,207, which is a division of Ser. No. 364,284, Jun. 12, 1989, Pat. No. 4,902,267. This application Oct. 2, 1990, Ser. No. 591,657**

**Int. Cl.⁵ F16H *7/12***

**U.S. Cl. 474—133 17 Claims**

1. In the combination of a support means having a mounting surface means, a single bolt means, and a belt tensioner having a housing means secured to said support means in abutting relation to said mounting surface means thereof by said single bolt means that is carried by said housing means and said support means, said support means having opening means interrupting said mounting surface means in offset relation to said bolt means, said housing means having a certain removable pin means provided with a free end means extending therefrom and being received in said opening means of said support means to orient said tensioner relative to said support means and to prevent rotation of said housing means on said bolt means, the improvement wherein said housing means has a plurality of mounting arrangements each being adapted to have a removable pin means attached thereto for being received in an opening means of a support means, said certain removable pin means being attached to one of said mounting arrangements and having a removable part attached to said free end means thereof so as to be carried thereby and thereby enlarge said free end means to a size that is compatible with said opening means.



---

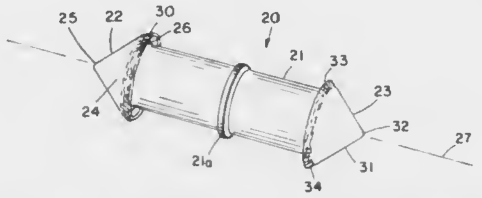
## 5,017,182
## BELT CONNECTOR WITH IMPROVED FLEXIBLE BITE FEATURE

**Norman H. Mabie, Claremont, N.H., assignor to L.M. & L. Corporation, Claremont, N.H.**

**Filed Nov. 30, 1989, Ser. No. 443,731**

**Int. Cl.⁵ F16G *7/00***

**U.S. Cl. 474—256 12 Claims**



1. An integral connector for joining recessed ends of a flexible belt of resilient material having end recesses thereby to form an endless belt assembly, said connector comprising an elongate central body portion having a given transverse dimension and gripping head portions at each end of said central body portion, each said gripping head portion being rigid and bounded by a tapered surface and by a base planar surface with a transverse dimension that exceeds the transverse dimension of the belt recesses and of said central body portion, said tapered and base planar surfaces extending toward an intersection about the periphery of said gripping head portion, each said gripping head portion further comprising a metal ring located proximate said intersection, a diverse material forming said elongate central body portion and portion of said gripping head portion that supports said metal ring, a roughened, feathered edge portion being formed integrally with and continuously about said metal ring at said intersection and being supported flexibly thereby for biting into the belt at the recessed ends thereof.

## 5,017,183
## POWER TRANSMISSION APPARATUS

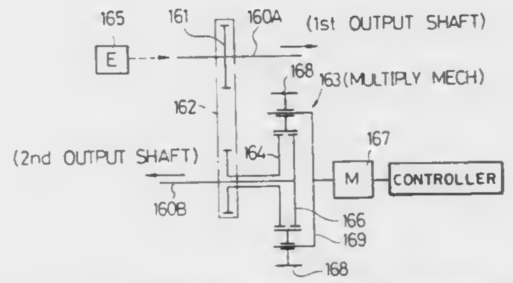
**Masao Teraoka, Tochigi, Japan, assignor to Tochigifujisangyo Kabushi Kaisha, Japan**

**Filed Apr. 17, 1989, Ser. No. 339,080**

**Claims priority, application Japan, Apr. 22, 1988, 63-99793**

**Int. Cl.⁵ F16H *1/38;* B60K *17/344***

**U.S. Cl. 475—150 4 Claims**



3. A power transmission apparatus for transmitting engine power to the front and rear wheels of a four-wheel drive vehicle, comprising:
(a) a first output shaft directly driven by the engine power;
(b) a second output shaft rotatable relative to said first output shaft;
(c) a multiplying gear mechanism disposed between said first output shaft and said second output shaft, for allowing relative rotation between said first and second output shafts, said multiplying gear mechanism including:
  (1) a first gear rotatably coupled to said first output shaft;
  (2) a second gear rigidly fixed to said second output shaft, the number of teeth of said second gear being different from that of said first gear;
  (3) a carrier rotatably supported and driven by an electrically powered motor; and
  (4) planetary gears rotatably supported on said carrier at regular angular intervals and in mesh with said first and second gears;
(d) said electrically powered motor coupled to said multiplying gear mechanism, for alternatively restricting and promoting said relative rotation by driving said multiplying gear mechanism in any one of relative rotation restricting and promoting directions; and
(e) a controller coupled to said motor, for controlling rotative direction and torque to said motor by adjusting supply voltage polarity and motor current magnitude to control differential operation between said two output shafts.

---

## 5,017,184
## CUT LENGTH ADJUSTING APPARATUS

**Mutsuo Takahori, and Hidehumi Hirahara, both of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

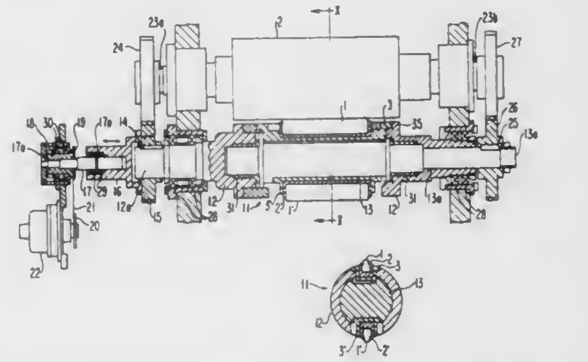
**Filed Oct. 6, 1989, Ser. No. 418,330**

**Claims priority, application Japan, Oct. 19, 1988, 63-135434**

**Int. Cl.⁵ B65H *35/08;* B26D *1/62, 7/26***

**U.S. Cl. 493—368 4 Claims**

1. In a folding machine of a rotary press consisting of a cutting drum have two knife blades disposed at nearly equal intervals along the circumference thereof, a folding drum, and drive means for rotating the folding drum synchronously with but in the opposite direction to said cutting drum, a cut-length adjusting apparatus for adjusting the length at which sheets are to be cut by said cutting drum, said cut-length adjusting apparatus characterized in that said cutting drum comprises an outer cylinder and an inner cylinder each having one knife blade respectively projecting therefrom and rotatable therewith, and said cut-length apparatus further including a respective helical gear provided at an axial end of at least one of said outer cylinder and said inner cylinder, and a respective helical gear provided at at least one axial end said folding drum and respectively meshing with the helical gear provided at the axial end of at least one of said outer cylinder and said inner cylinder, one of a said helical gear at the axial end of either said outer or inner cylinder and a said helical gear at one axial end of said folding drum being movable in the axial direction, said outer and inner cylinders being rotatable relative to one another by moving said one of said helical gears in the axial direction.



---

## 5,017,185
## PERMANENT MAGNETIC ARRANGEMENT FOR THERAPEUTIC PURPOSES

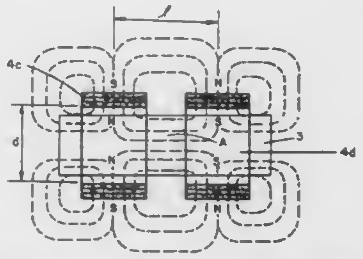
**Horst Baermann, Roesrath, Fed. Rep. of Germany, assignor to Rheinmagnet, Horst Baermann, GmbH, Neunkirchen, Fed. Rep. of Germany**

**Continuation of Ser. No. 220,406, Jun. 20, 1988, abandoned, which is a continuation of Ser. No. 73,919, Jul. 13, 1987, abandoned, which is a continuation of Ser. No. 845,575, Mar. 28, 1986, abandoned. This application Feb. 23, 1990, Ser. No. 485,753**

**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511395**

**Int. Cl.⁵ A61N *1/00***

**U.S. Cl. 600—15 3 Claims**

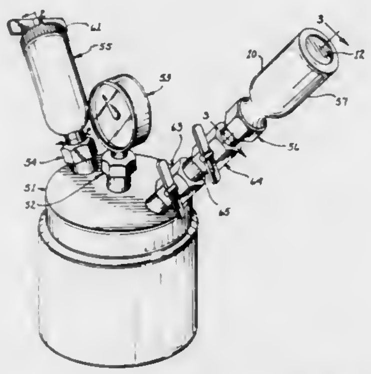


1. A permanent magnetic arrangement for application to a generally tubular member portion of a human body to direct a magnetic flux field thereinto, said magnetic arrangement comprising two rubber-like flexible magnetic foil strips having high coercive permanent magnetic particles embedded in fine distribution in a thermoplastic binder layer, said strips being of identical tubular form for closely surrounding said portion of said body and positioned axially adjacent to but separate from and in axially spaced relationship to one another, each of said tubular strips having a radially inner surface and a corresponding radially outer surface, said inner surfaces of said two axially spaced tubular magnetic foil strips being formed one as a north magnetic pole and the other as a south magnetic pole and the outer surfaces of said two tubular strips being formed as a magnetic pole of opposite polarity to the corresponding inner surface, all of said poles being of equal strength and oriented only perpendicularly to the longitudinal axis of said tubular forms to thereby create a magnetic field therebetween extending longitudinally of the axis of said tubular forms and spanning the axial spacing between the two tubular strips.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,186
### DEVICE AND METHOD FOR MAINTAINING STERILITY OF MULTI-DOSE MEDICAMENT VIALS

**Victor A. Arnold, 3715 N. 12th Pl., Phoenix, Ariz. 85014**
**Filed Jul. 11, 1989, Ser. No. 378,063**
**Int. Cl.$^5$ A61M** *31/00*
**U.S. Cl. 604—48** **10 Claims**

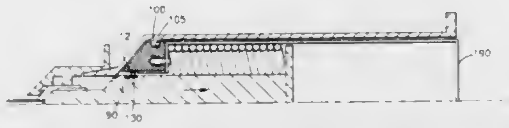


1. Apparatus comprising a container having a charge of sterile air under pressure, a medicament injection adjunct vessel, means communicating between the interior of said container and said vessel for transferring a measured value low pressure charge of sterile air from said container to said vessel, and means for closing said vessel after receiving said charge of sterile air from said container, said vessel having air impermeable walls and an aperture sealed by a puncturable, self-sealing closure.

---

### 5,017,187
### SELF RETRACTING HYPODERMIC SYRINGE

**Robert J. Sullivan, 15 Floramar, Rancho Santa Margarita, Calif. 62688**
**Filed May 4, 1990, Ser. No. 519,281**
**Int. Cl.$^5$ A61M** *5/00*
**U.S. Cl. 604—110** **4 Claims**

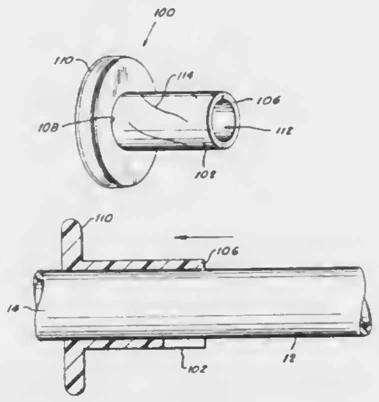


1. A self retracting hypodermic syringe comprising; a tubular syringe body having an injection end supporting an unlatching means; a needle assembly mounted in a locked position on said injection end; a plunger assembly comprising an elongated plunger having a sealing end and a driven end, an annular sealing means mounted on said sealing end, an elongated actuation means having an unlocking end, a retaining end, and a latch means, said actuation means being mounted within said sealing means with said latch means preventing said actuating means from passing through said sealing means, an actuation spring held compressed between said sealing means and said retaining end, said plunger assembly held movably within said syringe body with said unlocking end facing said needle assembly, said sealing means forming a tight sliding seal with said syringe body and a tight static seal against said actuation means forming an air tight chamber for holding an injection fluid, whereby for completing an injection, said driven end of said plunger assembly is manually driven into said syringe body ejecting said injection fluid from said needle assembly until said unlocking end of said plunger assembly is pressed against said injection end of said syringe body forcing said needle assembly into an unlocked position, locking said needle assembly to said actuation means, and forcing said unlatching means to contact and unlatch said latch means thereby allowing said actuation means from fully passing through said sealing means, driven by the expansion force of said actuation spring thereby retracting said needle assembly into said syringe body.

---

### 5,017,188
### TRACHEAL CANNULAS AND STENTS

**Lewis H. Marten, Quincy, and Charles Lane, Duxbury, both of Mass., assignors to Hood Laboratories, Pembroke, Mass.**
**Filed Mar. 6, 1989, Ser. No. 319,534**
**Int. Cl.$^5$ A61M** *25/02*
**U.S. Cl. 604—178** **6 Claims**



1. An assembly, which comprises;
(a) an elongate tube member, having an outer surface; and
(b) a unidirectional retention sleeve, which comprises;
hollow, elastomeric, flexible, polymeric resin tube means having
1. a first open end;
2. a second open end;
3. an open lumen traversing the tube from first to second end;
4. an outer surface between and joining together the first and the second ends;
5. finger grasping means mounted on the first end; and
6. a tube member capture means in the outer surface of the sleeve tube means, said capture means comprising (i) a plurality of slits in the outer surface of the sleeve tube means and (ii) the sleeve tube means portion located between the slit, said slits

communicating with the lumen; said elongate tube being mounted in a sliding fit within the sleeve tube means lumen, whereby the sleeve may be moved in a first direction on the tube member surface with low frictional contact; said sleeve resisting withdrawal in a second direction which is opposite the first direction, due to functioning of the capture means; said withdrawal being facilitated by rotation of the sleeve around the outer surface of the tube.

---

### 5,017,189
### PROTECTIVE CAP FOR A HYPODERMIC SYRINGE

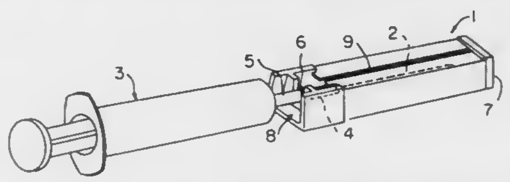
**Frank Boumendil, Boulogne, France, assignor to Michel Gordon, Paris, France, a part interest**
**Filed Jan. 29, 1990, Ser. No. 471,520**
**Claims priority, application France, Feb. 3, 1989, 89 01387**
**Int. Cl.$^5$ A61M** *5/32*
**U.S. Cl. 604—192** **4 Claims**

1. A protective cap for the needle of an injection syringe having at its base a mounting sleeve, said cap being comprised by a hollow elongated body open at one end and having along all its length a longitudinal opening (9) for the lateral introduction of the needle (2) of a syringe (3) through the corresponding side of said hollow body,

on the side opposite this longitudinal opening (9), said elongated body (1) having a flat baring surface (8) permitting resting said body in a stable position on a flat surface,

along opposite sides of the longitudinal opening (9) said body having flexible strips which are inwardly inclined, said strips being adapted both to let a used needle (2) of a syringe pass between them during its introduction through said opening (9) and to exert pressure thereafter on said mounting sleeve (4) at the base of the needle (2) so as to immobilize the needle, and

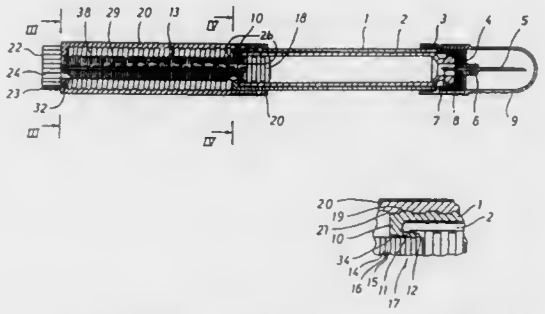
two other flexible strips (10) which cover the first-mentioned said strips and form a valve for closing said opening.



---

### 5,017,190
### DOSAGE UNIT FOR DOSING A NUMBER OF MEASURED QUANTITIES OF A LIQUID, SUCH AS AN INSULIN PREPARATION, FROM A CONTAINER, PREFERABLY A CARTRIDGE

**Bernd Simon, Wolfenbüttel, Fed. Rep. of Germany; Niels E. Holm, Birkerd, and Fritz F. Bonnichsen, Lynge, both of Denmark, assignors to D.C.P. AF 1988 A/S, Vaerlose, Denmark**
**PCT No. PCT/DK88/00064, § 371 Date Oct. 5, 1989, § 102(e) Date Oct. 5, 1988, PCT Pub. No. WO88/07874, PCT Pub. Date Oct. 20, 1988**
**PCT Filed Apr. 7, 1989, Ser. No. 411,506**
**Claims priority, application Denmark, Apr. 7, 1987, 1771/87**
**Int. Cl.$^5$ A61M** *5/00*
**U.S. Cl. 604—207** **14 Claims**

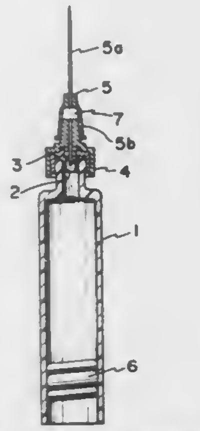


1. A dosage unit for dosing a number of measured quantities of a liquid, such as an insulin preparation, from a container, preferably a separate cartridge, said dosage unit comprising a cylindrical casing for the container, the distal end of the casing being provided with means for fastening a double-pointed injection needle, one point thereof being provided to pierce a membrane closing one end of the container, and said dosage unit comprising a piston rod for exerting a force on a piston closing the other end of the container, and an adjustment means provided with an internal thread, said adjustment means being in rotatable engagement with an external thread on the casing and adapted to adjust the length of the stroke of the piston rod according to the dosage needed in each case, the dosage being adjusted to be readable on a scale located on the dosage unit, characterised in that the dosage unit is provided with a first ratchet means (17) between the casing (1) and the piston rod (13), said ratchet means allowing the displacement of the piston rod (13) in a direction towards the distal end of the casing and preventing the displacement in the opposite direction, and with a second ratchet means (32) between the adjustment means (20) and the casing (1) or a second part of the dosage unit, which is unturnable in relation to the casing, and in relation to which the adjustment means is rotatable, said second ratchet means allowing the rotation of the adjustment means (20) in a direction forward towards the distal end of the casing (1) and preventing the rotation in the opposite direction.

---

### 5,017,191
### INJECTOR

**Hideo Yamada; Shozo Nakayama, both of Hyogo; Mitsuhisa Iinuma, Aichi, and Hisao Tobiki, Hyogo, all of Japan, assignors to Nihon Medi-Physics Co., Ltd., Takarazuka, Japan**
**Filed Mar. 8, 1989, Ser. No. 320,608**
**Claims priority, application Japan, Mar. 11, 1988, 63-32868[U]**
**Int. Cl.$^5$ A61M** *5/00*
**U.S. Cl. 604—243** **3 Claims**



1. An injector pre-filled with a radiopharmaceutical liquid, which comprises:
a syringe containing the radiopharmaceutical liquid, said syringe having a top opening;
a stopper made of an elastic material fitted at said top opening;
a holder having a central part with a hole therethrough, said holder being fitted on the stopper to keep it firmly in position at said top opening;
an adaptor having a body portion of which the lower part forms a cap portion, a passage for the radiopharmaceutical liquid penetrating the body portion, and a hollow needle portion continuously extending from the passage in the lower direction, said adaptor being detachably fitted on said syringe, the stopper being pierceable by the needle portion extending from said adaptor; and
a disposable needle head comprising a needle having a passage for the radiopharmaceutical liquid therein and a cap portion, said disposable needle head being detachably fitted on the body portion of said adaptor to form a gap at the top part of the cap portion of said needle head, the cap portion of said needle head being, at least partly, made of an inside observable material.

---

### 5,017,192
### FREE FLOW PREVENTION SYSTEM FOR INFUSION PUMP

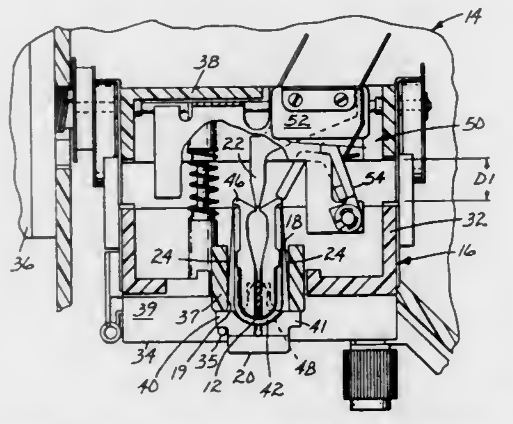
**Larry H. Dodge, and Stanford C. Stone, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Oct. 20, 1989, Ser. No. 424,386**
**Int. Cl.$^5$ A61M** *5/00*
**U.S. Cl. 604—250** **36 Claims**

1. A free flow prevention system comprising:
IV tubing having a lumen through which fluid may be pumped for administration to a patient;
a pumping assembly including pumping means for pumping fluid through the IV tubing, and releasable holding means for holding the IV tubing during operation of the pumping assembly;
a flexible clamp associated with the IV tubing and having a

VOL 1126
ISS 3
MY 21
1991
UMI

pair of clamping arms defining a variable width slot along which the IV tubing may be moved between a first position wherein the width of the slot is sufficient to permit the clamp to be positioned longitudinally along the IV tubing, and a second position wherein the width of the slot is normally less than the width of the slot at the first position, the clamping arms being resiliently biased to a closed position wherein the IV tubing is squeezed when in its second position to close the lumen to prevent fluid flow, the clamping arms being movable against the bias to an open position wherein the lumen of the IV tubing is allowed to open so that flow through the lumen is permitted;

clamp-receiving means on the pumping assembly for releasably receiving the flexible clamp; and



releasable clamp-opening means for separating the clamping arms of the flexible clamp and moving the arms from their closed position to the open position before operation of the pumping assembly;

the clamp-receiving means and clamp-opening means being mounted on the infusion pump for movement of the clamp-opening means relative to the flexible clamp received in the clamp-receiving means between an unloading position, wherein the clamp-opening means does not hold the arms of the flexible clamp in their open position, and an operating position, wherein the clamp-opening means moves the arms of the flexible clamp to their open position and holds the arms in the open position.

---

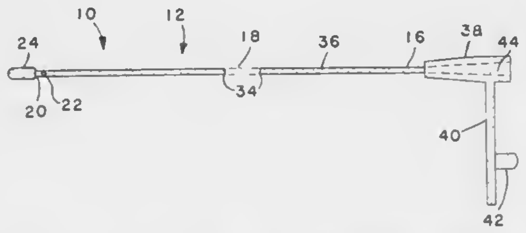
### 5,017,193
### INFANT FEEDING DEVICE

**Charlie B. Fields, Ypsilanti, Mich., assignor to Tri-State Hospital Supply Corp., Howell, Mich.**

**Continuation-in-part of Ser. No. 249,430, Sep. 26, 1988, abandoned. This application Feb. 9, 1990, Ser. No. 478,289**

**Int. Cl.$^5$ A61M *31/00***

**U.S. Cl. 604—270** **7 Claims**



1. An infant feeding device for nasogastric feeding, the feeding device comprising:

a flexible, elongated tube including a longitudinal bore therethrough for delivering liquid into the stomach of the infant, the elongated tube having an inlet for communicating the tube to a reservoir of the liquid, an intermediate portion connected to the inlet for delivering liquid through the bore, and also having an outlet including a terminal end connected to the intermediate portion, the outlet including a plurality of laterally extending ports communicated to the bore so that the liquid may be delivered outwardly through the ports into the stomach of the infant after insertion of the feeding device into the nasogastric passages of the infant;

a plug member sealingly mounted in said terminal end of the outlet;

a pliable plastic tip affixed to the terminal end of the tube; the tip including a sleeve portion mounting the tip on the terminal end of the tube, an annular rib adjacent the sleeve portion providing a seat for abutting engagement with the terminal end, a probe portion connected to the sleeve portion with the annular rib therebetween, the probe portion defined by a cavity therewithin of sufficient volume and being charged with gaseous fluid therein to impart sufficient pliability to said plastic, the cavity providing cushioning for the pliable tip thereby protecting delicate membranes and tissues of the infant as the feeding device is inserted into and removed from the nasogastric passages.

---

## CHEMICAL

### 5,017,194
### SEQUENTIAL OXIDATIVE AND REDUCTIVE BLEACHING OF PIGMENTED AND UNPIGMENTED FIBERS

**Mustafa Arifoglu, Wyndmoor, and William N. Marmer, Fort Washington, both of Pa., assignors to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C.**

**Continuation-in-part of Ser. No. 299,174, Jan. 19, 1989. This application Dec. 6, 1989, Ser. No. 446,826**

**Int. Cl.$^5$ D06L *3/02***

**U.S. Cl. 8—111** **14 Claims**

1. A process for oxidative and reductive bleaching of fibers comprising:

contacting fibers with hydrogen peroxide and at least one persulfate containing compound under conditions which provide oxidative bleaching of said fibers to produce bleached fibers in contact with unspent hydrogen peroxide;

adding to said bleached fibers in contact with unspent hydrogen peroxide, an inactivating material in an amount at least sufficient to inactivate all of said unspent hydrogen peroxide to form an inactivated media; and

subsequent to said inactivation of all unspent hydrogen peroxide, reductively bleaching said bleached fibers by addition of a reductive bleaching agent to said inactivated media.

---

### 5,017,195
### NON-DUSTABLE GRANULAR DYE: DYE PARTICLES COATED WITH HYDROXYLPROPYL CELLULOSE OR CARBOHYDRATE

**Fumitaka Satou, Urawa, and Fumio Ogawa, Oomiya, both of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan**

**PCT No. PCT/JP88/00625, § 371 Date Mar. 17, 1989, § 102(e) Date Mar. 17, 1989, PCT Pub. No. WO89/00183, PCT Pub. Date Jan. 12, 1989**

**PCT Filed Jun. 23, 1988, Ser. No. 315,688**

**Claims priority, application Japan, Jul. 1, 1987, 62-162384**

**Int. Cl.$^5$ C09B *67/08***

**U.S. Cl. 8—526** **6 Claims**

1. A non-dustable granular dye composition which comprises dye particles in granular form coated with a monosaccharide, an oligosaccharide or hydroxypropyl cellulose.

---

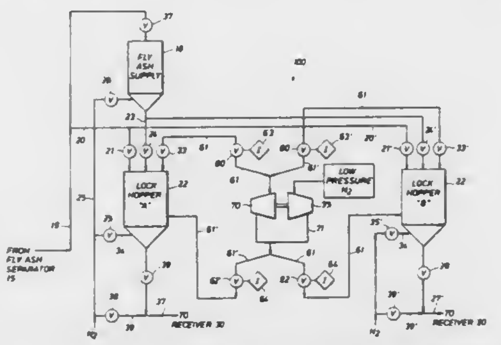
### 5,017,196
### METHOD FOR ENHANCING ENERGY RECOVERY FROM A HIGH TEMPERATURE, HIGH PRESSURE SYNTHESIS GAS STREAM

**Thomas S. Dewitz, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed Sep. 27, 1990, Ser. No. 588,892**

**Int. Cl.$^5$ C10J *3/46, 3/84***

**U.S. Cl. 48—210** **7 Claims**



1. A process for the production of synthesis gas wherein coal is partially oxidized at an elevated temperature and pressure by feeding finely divided coal and oxygen to a gasification zone of a reactor, the ratio of coal to oxygen being such as to maintain a reducing atmosphere, and producing raw synthesis gas having a temperature of from about 2000° F. to 3000° F., said raw synthesis gas carrying with it a minor amount of at least one contaminating substance which is normally solid in form at room temperature, and partially cooling said synthesis gas sufficient to solidify said contaminating substance carried thereby, the process further comprising the steps of:

separating the major portion of the partially cooled solid contaminating substance in particle form from the synthesis gas flow stream under substantially high pressure conditions present during the partial combustion of the coal and the partial cooling of the resultant product synthesis gas;

discharging the separated solid contaminating substance under high pressure conditions and storing a selected volume at a storage point together with a minor amount of synthesis gas entrained therewith;

providing a first and second pressure-isolatable chamber, each having an inlet, an outlet and a vent line, into which chambers a selected mass of solid substance and said entrained gas may be selectively received at high pressure conditions from said storage point and selectively discharged therefrom at substantially atmospheric pressure in a batchwise manner, wherein said first and second chambers are selectively placed in fluid communication with each other, and wherein each of said vent lines is selectively and alternately placed in fluid communication with a common line and with a pressure recovery means located in said common line;

transferring a selected first mass of said solid contaminating substance and any synthesis gas entrained therewith under high pressure conditions to said first pressure-isolatable chamber with its outlet closed;

selectively isolating said first chamber from said high pressure storage point by closing said chamber inlet after said selected first mass of solid contaminating substance and entrained synthesis gas has been transferred thereto;

depressurizing said first chamber through said pressure recovery means thereby driving said pressure recovery means and partially pressurizing said second chamber;

generating additional pressure energy by said pressure recovery means; and

supplying said additional pressure energy to said second chamber for additional pressurization thereof.

---

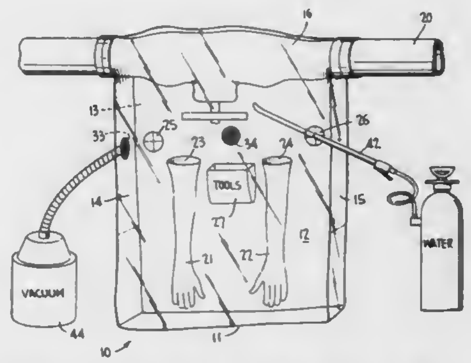
### 5,017,197
### GLOVE BAG AND METHOD OF USE

**Thomas F. McGuire, Rte. 231, Box 330A, Hughesville, Md. 20637, and John Noyes, III, 18933 Glendower Rd., Gaithersburg, Md. 20879**

**Filed Nov. 9, 1989, Ser. No. 433,950**

**Int. Cl.$^5$ B01D *49/00;* F24F *11/00***

**U.S. Cl. 55—1** **20 Claims**



11. A method for utilizing a collapsible glove bag to contain and dispose of hazardous material such as asbestos particles

VOL
1126
ISS
3
MY
21
1991
UMI

released during work on a pipe section located in work space enclosed and defined by said glove bag, said method comprising the steps of:

(a) providing continuous negative ventilation through said glove bag via an exhaust, without collapsing said glove bag, port while work is being done on said pipe section;

(b) providing ambient air through an air inlet port in said glove bag to replace air exhausted from said glove bag in step (a); and

(c) filtering air with a high efficiency particulate air filter at said inlet port to prevent hazardous material from escaping from said glove bag via said inlet port.

### 5,017,198
### PROCESS FOR THE TREATMENT OF MATERIAL-GAS MIXTURES

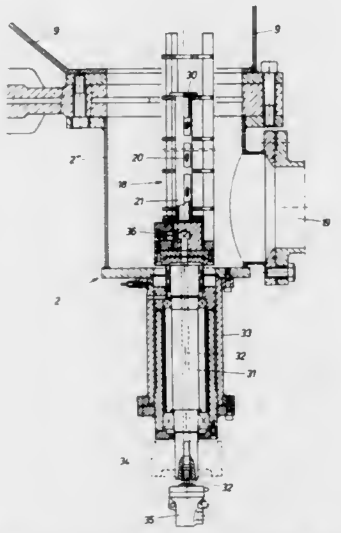
**Rudolf Schieg, and Johann Tesch, both of Graz, Austria, assignors to Maschinenfabrik Andritz Actiengesellschaft, Graz, Austria**

**Filed Jan. 29, 1990, Ser. No. 471,487**

**Claims priority, application Austria, Jan. 31, 1989, 190/89; Jan. 31, 1989, 191/89; Jan. 15, 1990, 72/90**

**Int. Cl.$^5$ B01D *19/00***

**U.S. Cl. 55—21** **106 Claims**



1. A process for the treatment of material-gas mixtures to be pumped, the gas being separated prior to a separate pumping operation wherein material separated from the material-gas mixture is pumped through a pump housing, comprising the steps that preceding the pumping operation on the separated material, the material-gas mixture is subjected to a rotation produced by one single cage-like rotor for gas separation within a special container separated from the pump housing, while directly and only in the center of the rotating motion, separated gas is sucked from the material-gas mixture by vacuum means.

### 5,017,199
### SPENT SOLVENT RECOVERY IN CIRCUIT PROCESSING

**Eduard E. Etchepare, El Toro, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Oct. 2, 1989, Ser. No. 415,827**

**Int. Cl.$^5$ B01D *53/00***

**U.S. Cl. 55—57** **20 Claims**

1. A method of removing solvent from a manufacturing system during processing, comprising the steps of:

connecting a substantially fluid tight chamber to said manufacturing system, said chamber having input means for receiving air laden with solvent from the system, exhaust means for removing cleaned air from the chamber, and a fluid output port disposed on a sidewall of said chamber adjacent a bottom portion thereof through which spent solvent is transferred out of said chamber;

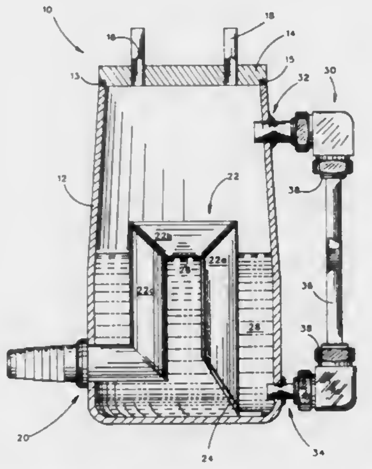
connecting an inverted U-shaped tubing member on one end to said output port;

positioning a second end of said tubing member adjacent the chamber bottom;

extending said tubing upward away from said output port and then downward toward said chamber a bottom in a generally inverted U configuration within said housing interior;

applying a negative pressure to said exhaust means so as to draw solvent laden air into said housing and reduced solvent content air out of said chamber; and

providing a predetermined minimum volume of solvent within said chamber so as to maintain a predetermined minimum pressure barrier between said applied negative pressure and pressure exterior of said chamber to which said tubing member is connected.



### 5,017,200
### BAGHOUSE

**Thomas L. Price, Whitefish; Richard A. Walli, Oshawa, all of Canada, and Peter G. Phipps, Sudbury, Canada, assignors to Inco Limited, Canada**

**Filed Sep. 19, 1990, Ser. No. 584,697**

**Claims priority, application Canada, Oct. 2, 1989, 2000025**

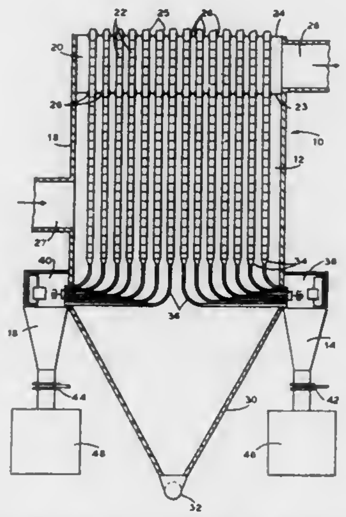
**Int. Cl.$^5$ B01D *46/04***

**U.S. Cl. 55—96** **20 Claims**

1. A gas cleaning system employing at least one fabric filter bag having an inside and outside surface of said fabric filter bag and be filtered thereby;

A. means for causing gas laden with particulate to impinge on one of said surfaces of said fabric filter bag and be filtered thereby;

B. means operable to move fresh portions of said at least one fabric filter bag or an extension thereof into gas impingement position; and



C. means within said gas cleaning system operating in conjunction with said means of "B" to collect filtered particulate and used fabric filter.

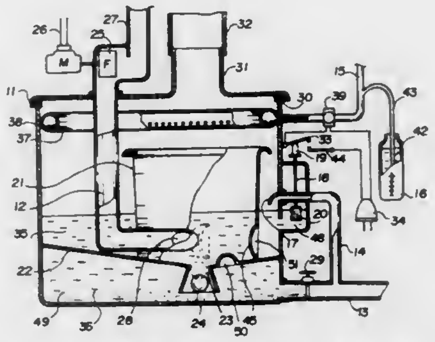
### 5,017,201
### TANK TYPE LIQUID AIR CLEANER

**Chul Park, 1837 Green Place Ter., Rockville, Md. 20850**

**Filed Apr. 20, 1990, Ser. No. 511,755**

**Int. Cl.$^5$ B01D *47/02***

**U.S. Cl. 55—227** **7 Claims**



1. A tank type liquid air cleaner which passes dirty air over a surface of a liquid, which comprises:

a liquid tank containing liquid, said liquid tank provided with a float containing room extending therefrom,

an overflow cylinder disposed within said liquid tank, said overflow cylinder having a plurality of C-shaped valves in the wall thereof for accelerating liquid flow,

an air inlet having an L-shaped end at the one end thereof for inserting into a lower portion of said overflow cylinder for forcefully mixing air with the liquid, said air inlet connected to an air supply duct at the other end thereof,

a tank cover slidably and tightly attached to said liquid tank,

a centerwardly inclined partition disposed below said overflow cylinder, said partition having a plurality of C-shaped valves therein,

a tapered tube disposed at the center of said partition and disposed within said plurality of C-shaped valves of said partition,

a ball valve disposed within said tapered tube for tightly fitting the tapered tube,

a venting outlet disposed at said tank cover for connecting to an air outlet duct,

a tubular ring configurated nozzle member disposed at the upper portion of said liquid tank, said nozzle member having a plurality of injection nozzles for completely washing and cleaning walls of said liquid tank and said overflow cylinder,

a float disposed within said float containing room for maintaining the liquid in said liquid tank,

a fan housing including a fan, said fan housing communicating with said air supply duct and said air inlet tube and,

a motor connected to an electric source for actuating said fan, whereby the air cleaner can effectively clean dirty air and completely clean the internal surface of the overflow cylinder and the liquid tank, and serves another function as a humidifier.

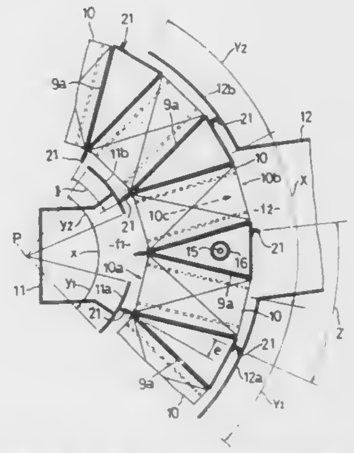
### 5,017,202
### GAS TREATING APPARATUS

**Hiromasa Ogata; Koji Morioka, and Susumu Ohmori, all of Tokyo, Japan, assignors to Taikisha Ltd. and Toyo Boseki Kabushiki Kaisha, Tokyo, both of, Japan**

**Filed Apr. 13, 1989, Ser. No. 337,390**

**Int. Cl.$^5$ B01D *39/00***

**U.S. Cl. 55—390** **4 Claims**



1. A gas treating apparatus for dehumidifying, deodorizing or heat exchanging including:

a rotary frame having a pair of spaced apart plates, defining a space therebetween;

a plurality of frame members mounted to said rotary frame, each of said frame members spaced apart to define an accommodating space;

a gas treating passage through the accommodating space radially supported on said rotary frame;

means for rotating the frame;

a plurality of removable element blocks filled with a porous substance;

means for slidingly accepting and removing said element blocks from the accommodating space including rails mounted on one of said plates;

said treating passage having a first opening and a second opening through which the treatment-target gas flows to be treated;

a pair of ducts for transporting the gas or regenerating gas through said element blocks and respectively having a third opening and a fourth opening opposing to each other across the said treating passage;

said rotary frame being unidirectionally rotatable relating to the pair of ducts;

said pair of plates movable with respect to ducts;

a plurality of sealing walls formed substantially along rotatable faces of the first and second openings and positioned on both sides of the third and fourth openings; and

a plurality of first sealing members attached to each said frame members and disposed between adjacent first openings and between adjacent second openings;

wherein said each first sealing member comes into sliding

VOL
1126
ISS
3
MY
21
1991
UMI

contact with one of said sealing walls disposed with both sides in said relative rotational direction and at the sides of said first opening and said second opening, thereby providing gas-tightness with respect to said relative rotational direction between said third and fourth openings and said treating flow passage and said pair of ducts disposed adjacent thereto.

---

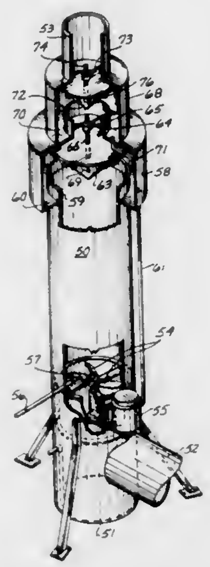
### 5,017,203
### GAS SCRUBBING APPARATUS AND PROCESS

**James P. Cox, and Kelly K. Cox, both of 246 E. Bartlett Rd., Lynden, Wash. 98264**

**Continuation of Ser. No. 148,330, Jan. 25, 1988, abandoned, which is a division of Ser. No. 739,647, May 31, 1985, Pat. No. 4,734,108. This application Oct. 17, 1989, Ser. No. 423,727**

**Int. Cl.⁵ B01D** *45/12*

**U.S. Cl. 55—457** **3 Claims**



1. Scrubbing apparatus for purifying gas comprising a tower through which gas moves upwardly, a first conical baffle mounted in the upper portion of said tower with its apex projecting downwardly for spreading gas flowing upward through said tower to said baffle, a first surface encircling said first conical baffle and located sufficiently close to the base of said baffle as to form a venturi passage past the periphery of the conical baffle base, a liquid collecting trough adjacent to said first surface for collecting liquid precipitated from air passing said first conical baffle, said tower including an upper section having a passage located above the base of said first conical baffle and having a cross section substantially smaller than the base of said first conical baffle, and a second conical baffle in said upper tower section of a size smaller than the base of said first conical baffle, a second surface encircling said second conical baffle and located sufficiently close to the base of said second conical baffle as to form a venturi passage past the base of said second conical baffle, a liquid collecting trough adjacent to said second surface for collecting liquid precipitated from air passing said second conical baffle, and an outlet from said upper chamber of said tower of a size in cross section smaller than the base of said second conical baffle.

---

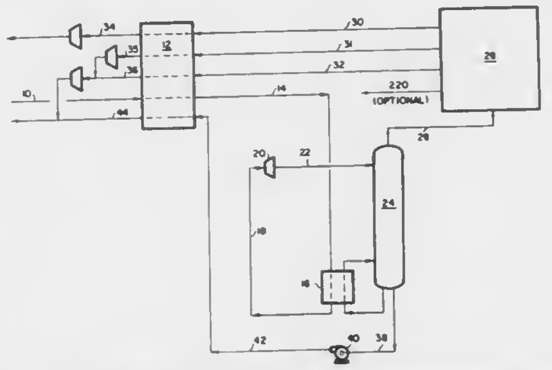
### 5,017,204
### DEPHLEGMATOR PROCESS FOR THE RECOVERY OF HELIUM

**Gerry N. Gottier, Emmaus, and Donn M. Herron, Fogelsville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Jan. 25, 1990, Ser. No. 471,300**

**Int. Cl.⁵ F25J** *3/00*

**U.S. Cl. 62—11** **21 Claims**



1. In a process for separating a crude helium product having a helium concentration greater than thirty percent by volume from a pressurized, helium-containing feed gas mixture, wherein the pressurized, helium-containing feed gas mixture is separated to produce a helium-enriched stream and a helium-lean stream, and wherein the helium-enriched stream is further upgraded to produce the crude helium product and at least one residue gas product stream, the improvement for more effectively upgrading the helium-enriched stream to produce the crude helium product comprises the steps of:

(a) rectifying the helium-enriched stream in a dephlegmator heat exchanger thereby producing a helium-rich overhead stream and a dephlegmator helium-lean liquid stream;
(b) removing the helium-rich overhead stream from the dephlegmator heat exchanger as the crude helium product and warming the crude helium product to recover refrigeration for the dephlegmator heat exchanger;
(c) expanding and warming the helium-lean liquid stream to recover refrigeration for the dephlegmator heat exchanger thereby producing a residue stream; and
(d) further warming the residue stream and the crude helium product to recover refrigeration for the liquefaction of the pressurized, helium-containing feed gas mixture.

---

### 5,017,205
### NOZZLE PLATE FOR SPINNING GLASS FIBRES

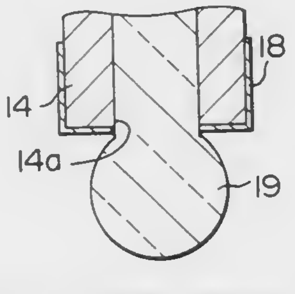
**Kozo Shioura, Fukushima, and Hideo Taguchi, Nihonmatsu, both of Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan**

**Filed Mar. 30, 1990, Ser. No. 502,178**

**Claims priority, application Japan, Apr. 14, 1989, 01-094755**

**Int. Cl.⁵ C03B** *37/095*

**U.S. Cl. 65—1** **9 Claims**



4. An arrangement for spinning glass fibre, comprising:

a flat plate portion;
a plurality of elongated nozzles projecting from said flat plate portion each defining a channel therethrough, each of said nozzles having an inlet portion and an exit portion, said inlet portion being closer to said flat plate portion than is said exit portion and being of a greater diameter than said exit portion, said exit portion having an inner periphery which defines a portion of said channel, said exit portion having an outer face which is outside of said channel and extends radially outward from a location immediately adjacent to said inner periphery to a radially outward location, said exit portion also having an outer peripheral portion extending in the direction of elongation of the nozzle from said radially outward location towards said flat plate portion, and
a metallic layer coating said face and said outer peripheral portion, the metallic layer having a contact angle greater than 58 degrees against molten glass at a temperature of 1100° C. to 1500° C., said metallic layer differing in composition from said nozzles.

---

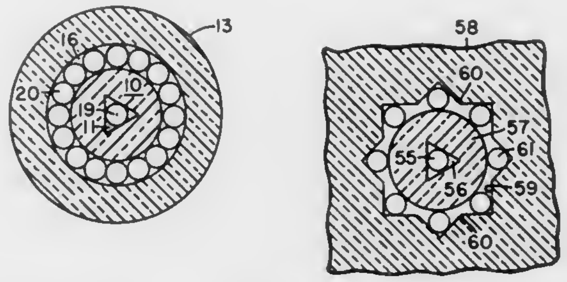
### 5,017,206
### METHOD OF PROVIDING A 1XN FIBER OPTIC COUPLER

**William J. Miller; Daniel A. Nolan, and Gregory E. Williams, all of Corning, N.Y., assignors to Corning Incorporated, Corning, N.Y.**

**Filed Jan. 4, 1990, Ser. No. 461,054**

**Int. Cl.⁵ C03C** *25/02*

**U.S. Cl. 65—3.11** **16 Claims**



5. A method of making a fiber optic coupler comprising the steps of

providing an inner glass tube having first and second ends and an axially disposed aperture,
inserting a portion of a first optical fiber into said axially disposed aperture, the remainder of said first fiber extending from said first end of said inner tube,
providing an outer glass tube having an aperture,
inserting said inner tube into the aperture of said outer tube, a gap existing between said inner and outer tubes,
inserting the ends of a plurality of optical fibers into said gap, the device so formed constituting a coupler preform, said coupler preform having a midregion, said first fiber and said plurality of fibers extending through the midregion of said coupler preform,
collapsing said glass tubes of said coupler preform at said midregion onto said fibers, and
stretching the central portion of said midregion to reduce the diameter thereof wherein said collapsing and said stretching position said optical fibers to provide coupling of optical transmissions in said first fiber with said plurality of fibers.

---

### 5,017,207
### METHOD AND APPARATUS FOR FORMING GLASS FLAKES

**Charles J. Watkinson, 331 Leeds Road, Scholes Leeds, England LS15 4DF , and John H. Elvidge, Applegarth, 303 High St., West Yorkshire, England LS23 6AL**

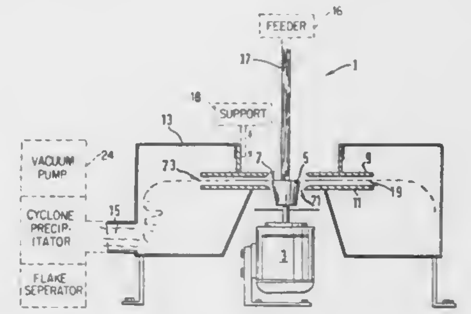
**PCT No. PCT/GB88/00314, § 371 Date Dec. 21, 1989, § 102(e) Date Dec. 21, 1989, PCT Pub. No. WO88/08412, PCT Pub. Date Nov. 3, 1988**

**PCT Filed Apr. 22, 1988, Ser. No. 424,262**

**Claims priority, application United Kingdom, Apr. 23, 1987, 8709608**

**Int. Cl.⁵ C03B** *37/00*

**U.S. Cl. 65—66** **11 Claims**



1. Apparatus for forming flakes of frangible material from a heated stream of molten material, which comprises

(a) a cup having an open mouth defined by an edge and which faces upwardly,
(b) means for rotating the cup so that molten material supplied to the cup is caused to flow upwardly over said edge of the cup and radially outwardly therefrom under centrifugal force,
(c) a chamber having an opening through which the material and external air can enter the chamber, the opening being positioned adjacent said edge of the cup,
(d) means for generating reduced pressure within the chamber, and
(e) a pair of spaced apart substantially parallel plates defining a gap therebetween, positioned relative to the cup and to the chamber opening so that molten material flowing outwardly from the edge of the cup and external air are drawn through the gap between the plates without the molten material touching the plates and in turn so that the molten material and air are drawn via the gap into the chamber through the opening under a pressure differential induced by the means for generating reduced pressure.

---

### 5,017,208
### APPARATUS FOR FORMING A GROOVE IN A GLASS TUBE

**Jonathan M. Gregory, Berwick, Me., and Thomas G. Brophy, Gloucester, Mass., assignors to GTE Products Corporation, Danvers, Mass.**

**Continuation of Ser. No. 405,923, Sep. 11, 1989, abandoned. This application Nov. 14, 1990, Ser. No. 614,559**

**The portion of the term of this patent subsequent to May 8, 2007, has been disclaimed.**

**Int. Cl.⁵ C03B** *27/04*

**U.S. Cl. 65—277** **23 Claims**

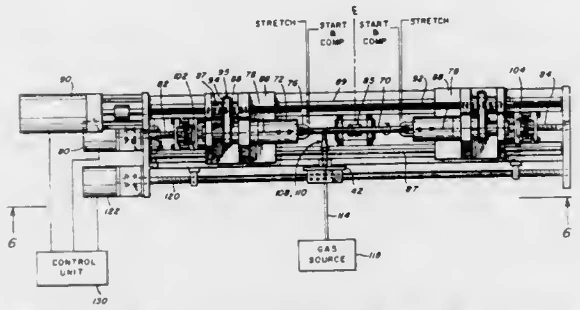
1. Apparatus for forming a groove in a glass tube, comprising:

first means for holding the glass tube and for rotating the glass tube about its longitudinal axis, said first means

VOL
1126
ISS
3
MY
21
1991
UMI

comprising a first mechanical chuck and a second mechanical chuck for gripping opposite end portions of the glass tube;

second means for noncontact heating of a localized area of the glass tube sufficiently to soften the glass tube in the localized area; and



third means for successively stretching and then compressing the glass tube along its longitudinal axis when the glass tube has been softened in the localized area, said third means comprising mechanical means for axially and simultaneously moving said first and second chucks by equal distances in opposite directions.

---

### 5,017,209
## HIGH TEMPERATURE FURNACE WITH THERMAL INSULATION

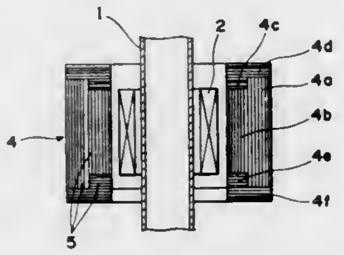
**Ichiro Yoshimura, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed May 17, 1989, Ser. No. 352,951**

**Claims priority, application Japan, May 19, 1988, 63-120532**

**Int. Cl.⁵ C03B** *37/029;* **F27D** *1/00*

**U.S. Cl. 65—13** **3 Claims**



1. A furnace comprising a cylindrical heater and a cylindrical insulation around the heater, wherein the insulation comprises a plurality of anisotropic insulation parts, at least one of the parts being positioned such that its direction along which thermal conductivity is low blocks heat transfer from a direction along which thermal conductivity of at least one other of the parts is high.

---

### 5,017,210
## METHOD AND APPARATUS FOR POSITIONING OF A GLASS SHEET RELATIVE TO CAMBERING AND/OR OTHER HEAT TREATMENT TOOLS

**Jean-Marc Petitcollin, and Gerard-Jean Harle, both of Thourotte, France, assignors to Saint-Gobain Vitrage International, Courbevoie, France**

**Filed Mar. 23, 1990, Ser. No. 497,670**

**Claims priority, application France, Mar. 24, 1989, 89 03934**

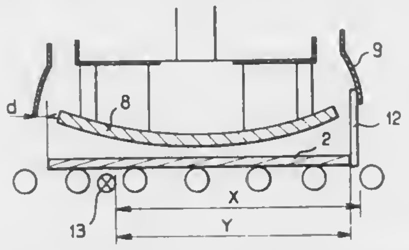
**Int. Cl.⁵ C03B** *23/02*

**U.S. Cl. 65—106** **18 Claims**

1. A process for positioning a glass sheet, heated to beyond its softening point, relative to a heat treatment tool, comprising the steps of:

moving a horizontally oriented glass sheet on a conveyor to a position beneath the heat treating tool;

stopping movement of the glass sheet by stop means fixed to the heat treatment tool and positioned to be abutted by an upstream edge of the glass sheet on the conveyor,



whereby said glass sheet is precisely positioned with said heat treatment tool; and

treating the glass sheet with said heat treatment tool.

---

### 5,017,211
## HETEROCYCLIC COMPOUNDS

**Jean Wenger, Uster; Paul Winternitz, Greifensee, and Martin Zeller, Dübendorf, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**PCT No. PCT/CH88/00163, § 371 Date May 19, 1989, § 102(e) Date May 19, 1989, PCT Pub. No. WO89/02891, PCT Pub. Date Apr. 6, 1989**

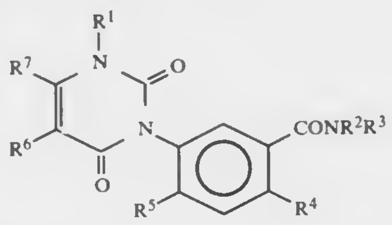
**PCT Filed Sep. 19, 1988, Ser. No. 362,417**

**Claims priority, application Switzerland, Sep. 23, 1987, 3677/87**

**Int. Cl.⁵ A01N** *43/48;* **C07D** *239/54*

**U.S. Cl. 71—92** **12 Claims**

1. Compounds of the formula



I

wherein

$R^1$ signifies hydrogen, $C_{1-4}$-alkyl, $C_{1-4}$-haloalkyl, $C_3$ or $_4$-alkenyl or $C_3$ or $_4$-alkynyl,

$R^2$ and $R^3$ each independently signify hydrogen, $C_{1-8}$-alkyl, $C_{2-8}$-alkenyl, $C_{3-8}$-alkynyl, $C_{1-8}$-haloalkyl, $C_{1-8}$-hydroxyalkyl, $C_{1-4}$-alkoxy-$C_{1-8}$-alkyl, $C_{1-4}$-alkylthio-$C_{1-8}$-alkyl, $C_{1-4}$-haloalkoxy-$C_{1-8}$-alkyl, $C_{2-8}$-cyanoalkyl, $C_{1-8}$-nitroalkyl, $C_{2-9}$-carboxyalkyl, $C_{2-5}$-alkoxycarbonyl-$C_{1-8}$-alkyl, $C_{1-4}$-alkylsulphonyl-$C_{1-8}$-alkyl, di($C_{1-4}$-alkyl)-phosphono-$C_{1-8}$-alkyl, $C_{3-8}$-cycloalkyl, $C_{1-8}$-alkoxy or phenyl or phenyl-$C_{1-4}$-alkyl optionally substituted with halogen, hydroxy, $C_{1-4}$-alkyl, $C_{1-4}$-haloalkyl, $C_{1-4}$-alkoxy, $C_{1-4}$-alkylthio, $C_{1-4}$-haloalkoxy, cyano, nitro, carboxy and/or $C_{2-5}$-alkoxycarbonyl, whereby this optionally substituted phenyl can have a fused, saturated, carbocyclic five- to seven-membered ring or a fused, saturated, heterocyclic five- to seven-membered ring containing 1 or 2 oxygen atoms, whereby $R^2$ and $R^3$ cannot both stand for $C_{1-8}$-alkoxy,

$R^2$ and $R^3$ together with the nitrogen atom to which they are attached signify a four- to seven-membered heterocyclic ring which is optionally mono- or multiply substituted with $C_{1-6}$-alkyl and which, in addition to the nitrogen atom, can also have in the ring an oxygen atom, a sulphur atom and/or a second nitrogen atom,

$R^4$ signifies halogen or cyano,

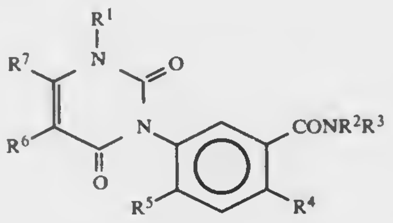
$R^5$ signifies hydrogen or halogen,

$R^6$ signifies hydrogen, halogen or $C_{1-4}$-alkyl,

$R^7$ signifies $C_{1-4}$-alkyl or, where $R^1$ is different from $C_{1-4}$-haloalkyl, also $C_{1-4}$-haloalkyl, or

$R^6$ and $R^7$ together signify tri- or tetramethylene, and the corresponding enol ethers of those compounds of formula I in which $R^1$ signifies $C_{1-4}$-alkyl, $C_3$ or $_4$-alkenyl or $C_3$ or $_4$-alkynyl, $R^6$ signifies hydrogen, halogen or $C_{1-4}$-alkyl and $R^7$ signifies $C_{1-4}$-haloalkyl, as well as salts of those compounds of formula I or enol ethers in which $R^1$ and/or $R^2$ signify hydrogen.

**10**. A weed control composition, characterized in that it contains an effective amount of at least one compound of the formula



I

wherein

$R^1$ signifies hydrogen, $C_{1-4}$-alkyl, $C_{1-4}$-haloalkyl, $C_3$ or $_4$-alkenyl or $C_3$ or $_4$-alkynyl,

$R^2$ and $R^3$ each independently signify hydrogen, $C_{1-8}$-alkyl, $C_{2-8}$-alkenyl, $C_{3-8}$-alkynyl, $C_{1-8}$-haloalkyl, $C_{1-8}$-hydroxyalkyl, $C_{1-4}$-alkoxy-$C_{1-8}$-alkyl, $C_{1-4}$-alkylthio-$C_{1-8}$-alkyl, $C_{1-4}$-haloalkoxy-$C_{1-8}$-alkyl, $C_{2-8}$-cyanoalkyl, $C_{1-8}$-nitroalkyl, $C_{2-9}$-carboxyalkyl, $C_{2-5}$-alkoxycarbonyl-$C_{1-8}$-alkyl, $C_{1-4}$-alkylsulphonyl-$C_{1-8}$-alkyl, di($C_{1-4}$-alkyl)-phosphono-$C_{1-8}$-alkyl, $C_{3-8}$-cycloalkyl, $C_{1-8}$-alkoxy or phenyl or phenyl-$C_{1-4}$-alkyl optionally substituted with halogen, hydroxy, $C_{1-4}$-alkyl, $C_{1-4}$-haloalkyl, $C_{1-4}$-alkoxy, $C_{1-4}$-alkylthio, $C_{1-4}$-haloalkoxy, cyano, nitro, carboxy and/or $C_{2-5}$-alkoxycarbonyl, whereby this optionally substituted phenyl can have a fused, saturated, carbocyclic five- to seven-membered ring or a fused, saturated, heterocyclic five- to seven-membered ring containing 1 or 2 oxygen atoms, whereby $R^2$ and $R^3$ cannot both stand for $C_{1-8}$-alkoxy, or

$R^2$ and $R^3$ together with the nitrogen atom to which they are attached signify a four- to seven-membered heterocyclic ring which is optionally mono- or multiply substituted with $C_{1-6}$-alkyl and which, in addition to the nitrogen atom, can also have in the ring an oxygen atom, a sulphur atom and/or a second nitrogen atom,

$R^4$ signifies halogen or cyano,

$R^5$ signifies hydrogen or halogen,

$R^6$ signifies hydrogen, halogen or $C_{1-4}$-alkyl,

$R^7$ signifies $C_{1-4}$-alkyl or, where $R^1$ is different from $C_{1-4}$-haloalkyl, also $C_{1-4}$-haloalkyl, or

$R^6$ and $R^7$ together signify tri- or tetramethylene, or of an enol ether of such a compound in which $R^1$ signifies $C_{1-4}$-alkyl, $C_3$ or $_4$-alkenyl or $C_3$ or $_4$-alkynyl, $R^6$ signifies hydrogen, halogen or $C_{1-4}$-alkyl and $R^7$ signifies $C_{1-4}$-haloalkyl or of a salt of such a compound or of such an enol ether in which $R^1$ and/or $R^2$ signifies hydrogen, as well as formulation adjuvants.

---

### 5,017,212
## SULFONYLUREA COMPOUNDS AND HERBICIDAL USE

**Yasuo Ishida, Suita; Kazunari Ohta, Ashiya; Tatsuo Nakahama, Akashi, and Harutoshi Yoshikawa, Yawata, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

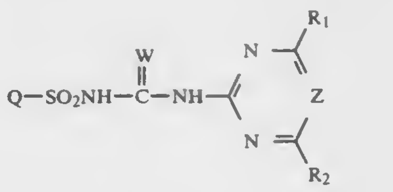
**Filed Mar. 17, 1987, Ser. No. 26,989**

**Claims priority, application Japan, Mar. 20, 1986, 61-63740; Dec. 23, 1986, 61-311419**

**Int. Cl.⁵ A01N** *43/54;* **C07D** *401/14, 403/14, 413/14*

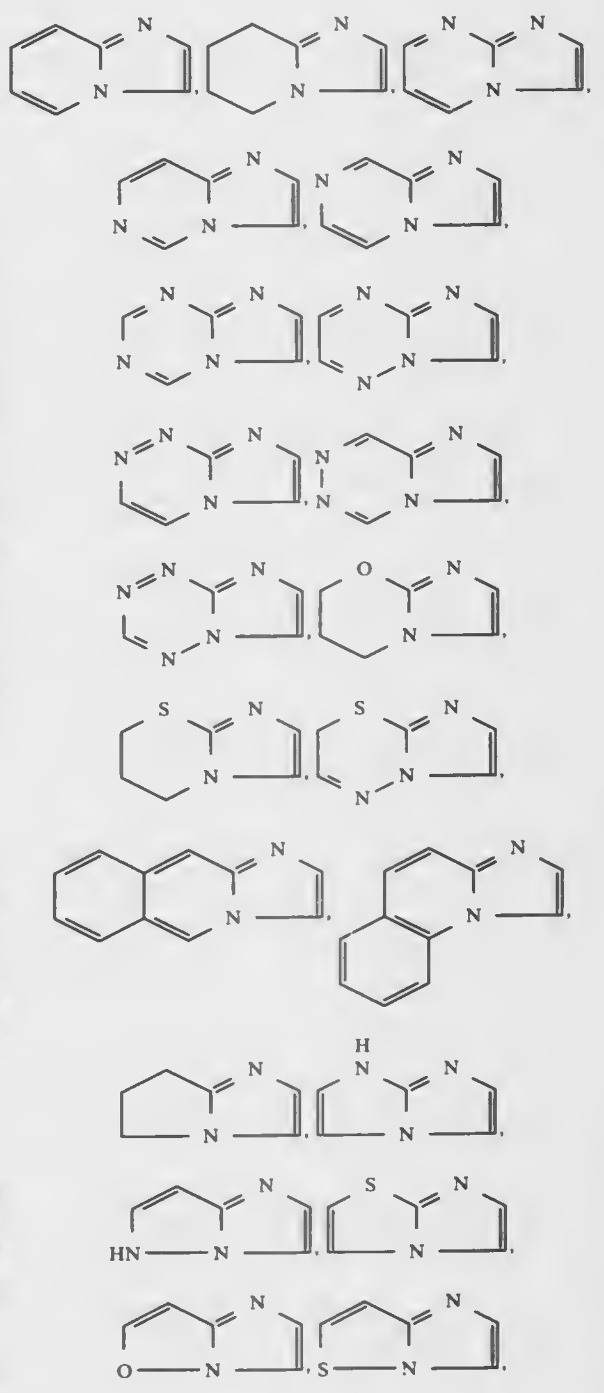
**U.S. Cl. 71—92** **22 Claims**

1. A compound of the formula



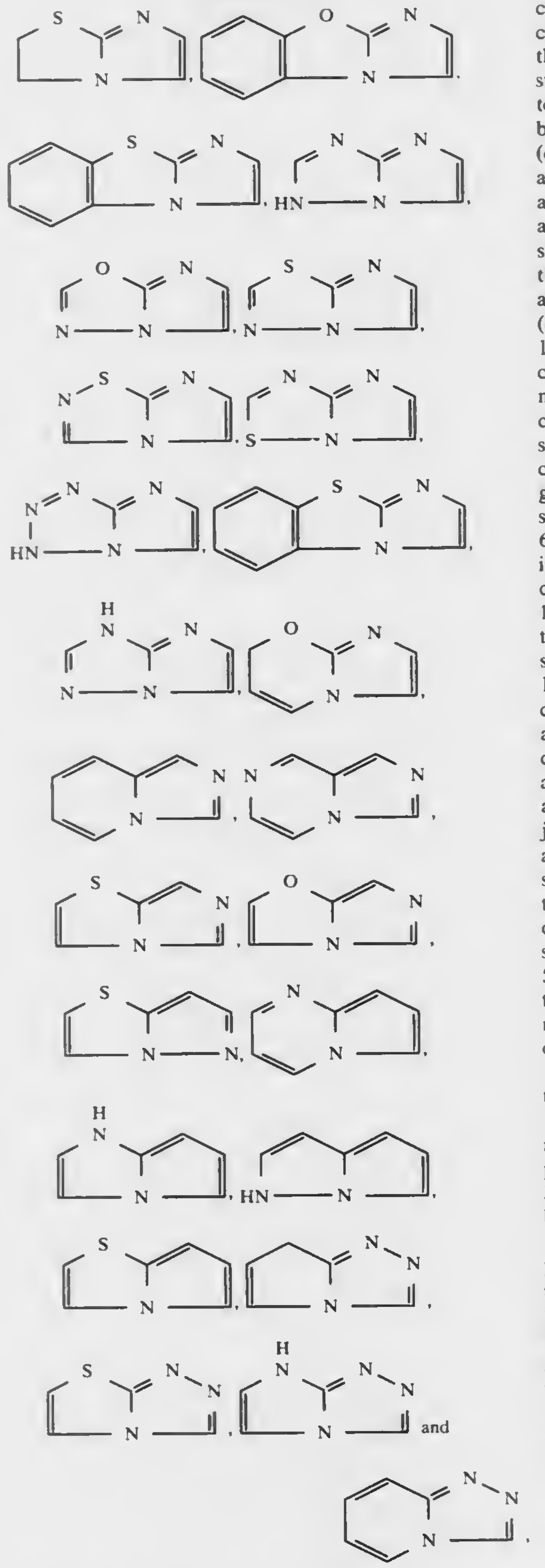
(I)

wherein Q is a condensed heterocyclic group which is formed by removing one hydrogen atom bonded to a heterocyclic ring-constituting carbon atom at a position other than a bridgehead from a condensed heterocyclic ring selected from the group consisting of

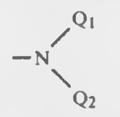


VOL
1126
ISS
3
MY
21
1991
UMI

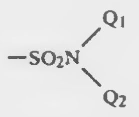
-continued



which sulfur atom may be in mono- or di-oxidized form, wherein bonding of Q to $SO_2$ in formula (I) always occurs through a heterocyclic ring of Q, which condensed heterocyclic group is unsubstituted or substituted by the same or different one to three substituents selected from the group consisting of (1) hydroxy, (2) amino, (3) cyano, (4) sulfamoyl, (5) sulfamoyloxy, (6) mercapto, (7) nitro, (8) a halogen, (9) a straight chain, branched chain or cyclic alkyl group containing 1 to 6 carbon atoms, which is unsubstituted or substituted by one to three members selected from the group consisting of (a) a straight chain or branched chain alkylthio group containing 1 to 4 carbon atoms, (b) a halogen, (c) a straight chain or branched chain alkoxy group containing 1 to 6 carbon atoms, (d) nitro, (e) an alkoxycarbonyl group containing 1 to 6 carbon atoms in the alkoxy moiety and (f) a mono- or di-($C_{1-6}$ alkyl) amino group, (10) a straight chain, branched chain or cyclic alkenyl group containing 3 to 6 carbon atoms, which is unsubstituted or substituted by one to three members selected from the group consisting of (a) a straight chain or branched chain alkylthio group containing 1 to 4 carbon atoms, (b) a halogen, (c) a straight chain or branched chain alkoxy group containing 1 to 6 carbon atoms, (d) nitro, (e) an alkoxycarbonyl group containing 1 to 6 carbon atoms in the alkoxy moiety and (f) a mono or di-($C_{1-6}$ alkyl) amino group, (11) an alkynyl group containing 3 to 6 carbon atoms, which is unsubstituted or substituted by one to three members selected from the group consisting of (a) a straight chain or branched chain alkylthio group containing 1 to 4 carbon atoms, (b) a halogen, (c) a straight chain or branched chain alkoxy group containing 1 to 6 carbon atoms, (d) nitro, (e) an alkoxycarbonyl group containing 1 to 6 carbon atoms in the alkoxy moiety and (f) a mono- or di-($C_{1-6}$ alkyl) amino group, (12) an aryl group containing 6 to 14 carbon atoms, which is unsubstituted or substituted by one to three members selected from the group consisting of (a) a straight chain, branched chain or cyclic alkyl group containing 1 to 6 carbon atoms, (b) a straight chain, branched chain or cyclic alkenyl group containing 3 to 6 carbon atoms, (c) an alkynyl group containing 3 to 6 carbon atoms, (d) a straight chain or branched chain alkoxy group containing 1 to 6 carbon atoms, (e) an acyl group derived from an organic carboxylic acid, (f) an acyloxy group in which the acyl group is as defined just above in (e), (g) nitro, (h) cyano, (i) a halogen, (j) an acylamino in which acyl is as defined above in (e), and (k) a straight chain or branched chain alkylthio group containing 1 to 4 carbon atoms, (13) an aralkyl group containing 7 to 19 carbon atoms, (14) a 5 or 6 membered heterocyclic group selected from the group consisting of 2- or 3-pyrrolyl, 3-, 4- or 5-pyrazolyl, 2-, 4- or 5-imidazolyl, 1,2,3-triazol-4-yl, 1,2,4-triazol-3-yl, 1H- or 2H-tetrazol-5-yl, 2- or 3-furyl, 2- or 3-thienyl, 2-,4- or 5-oxazolyl, 3-, 4- or 5-isoxazolyl, 1,2,3-oxadiazol-4- or 5-yl, 1,2,4-oxadiazol-3 or 5-yl, 1,2,5-oxadiazol-3 or 4-yl, 1,3,4-oxadiazol-2- or 5-yl, 2-, 4- or 5-thiazolyl, 3-, 4- or 5-isothiazolyl, 1,2,3-thiadiazol-4 or 5-yl, 1,2,4-thiadiazol-3 or 5-yl, 1,2,5-thiadiazol-3 or 4-yl, 1,3,4-thiazol-2 or 5-yl, 2- or 3-pyrrolidinyl, 2-,3- or 4-pyridyl, 3- or 4-pyridazinyl, 2-, 4- or 5-pyrimidinyl, pyrazinyl, 2-, 3- or 4-piperidinyl, piperazinyl, 3H-indol-2 or 3-yl, 2-, 3- or 4-pyranyl, 2-, 3-or 4-thiopyranyl, benzopyranyl, quinolyl, pyrido[2,3-d]pyrimidinyl, 1,5-, 1,6-, 1,7- 1,8-, 2,6- or 2,7-naphthyridinyl, thieno[2,3-d]pyridyl, pyrazinoquinolyl and chromenyl, in which the nitrogen and sulfur atoms may be oxidized, which is unsubstituted or substituted by one to three members selected from the group consisting of the substituents (9) to (13) as defined above, an acyl group derived from an organic carboxylic acid and a halogen, (15) an acyl group derived from an organic carboxylic acid, (16) a group of the formula —T— $Q_0$ in which $Q_0$ is any one of the substituents (9) to (15) as defined above, and T is O, S—(O)n or S—S, n being 0, 1 or 2, (17) a group of the formula



in which $Q_1$ is hydrogen or any one of the substituents (9) to (13) and (15) as defined above and $Q_2$ is any one of the substituents (9) to (13) and (15) as defined above, (18) a group of the formula



in which $Q_1$ and $Q_2$ are as defined above, (19) a carbamoyl, carbamoyloxy, ureido or thiocarbamoyl group which is unsubstituted or substituted by the same or different 1 or 2 substituents of (9) to (15) as defined above, (20) carboxyl, (21) a group of the formula —O—$SO_2$—$Q_2$ in which $Q_2$ has the same meaning as defined above, and (22) sulfo,

the acyl group derived from an organic carboxylic acid in the above items (12)(e), (14) and (15) being one selected from the group consisting of an alkanoyl group containing 1 to 7 carbon atoms, an arylcarbonyl group containing 6 to 14 carbon atoms, an alkoxycarbonyl group containing 1 to 6 carbon atoms, an aryloxycarbonyl group containing 6 to 14 carbon atoms, an aralkylcarbonyl group containing 7 to 19 carbon atoms, 2-,3- or 4-pyrrolylcarbonyl, 3-,4- or 5-pyrazolylcarbonyl, 2-,4- or 5-imidazolylcarbonyl, 1,2,3-triazol-4-ylcarbonyl, 1,2,4-triazol-3-ylcarbonyl, 1H- or 2H-tetrazol-5-ylcarbonyl, 2- or 3-furylcarbonyl, 2- or 3-thienylcarbonyl, 2-,4-or 5-oxazolylcarbonyl, 3-,4- or 5-isoxazolylcarbonyl, 1,2,3-oxadiazol-4 or 5-ylcarbonyl, 1,2,4-oxadiazol-3 or 5-ylcarbonyl, 1,2,5-oxadiazolyl-3 or 4-carbonyl, 1,2,4-oxadiazol-2 or 5-ylcarbonyl, 2-,4- or 5-thiazolylcarbonyl, 3-,4- or 5-isothiazolylcarbonyl, 1,2,3-thiadiazol-4 or 5-ylcarbonyl, 1,2,4-thiadiazol-3 or 5-ylcarbonyl, 1,2,5-thiadiazol-3 or 4-ylcarbonyl, 1,3,4-thiadiazol-2 or 5-ylcarbonyl, 2- or 3-pyrrolidinylcarbonyl, 2-,3- or 4-pyridylcarbonyl, 2-,3- or 4-pyridyl-N-oxide-carbonyl, 3- or 4-pyridazinylcarbonyl, 3- or 4-pyridazinyl-N-oxide-carbonyl, 2-,4- or 5-pyrimidinylcabonyl, 2-,4- or 5-pyrimidinyl-N-oxide-carbonyl, pyrazinylcarbonyl, 2-,3- or 4-piperidinylcarbonyl, piperazinylcarbonyl, 3H-indol-2 or 3-ylcarbonyl, 2-,3-or 4-pyranylcarbonyl, 2-,3- or 4-thiopyranylcarbonyl, 3-,4-,5-,6-,7- or 8-quinolylcarbonyl, pyrido[2,3-d]pyrimidinylcarbonyl, 1,5-, 1,6-, 1,7-, 1,8-, 2,6- or 2,7-naphthyridinylcarbonyl, thieno[2,3-d]pyridylcarbonyl, pyrazinoquinolylcarbonyl, chromenylcarbonyl, 2-pyrrolylacetyl, 3-imidazolylacetyl and 5-isoxazolylacetyl,

W is O or S,

$R_1$ and $R_2$ each are a straight chain, branched chain or cyclic alkyl group containing 1 to 6 carbon atoms, a straight chain or branched chain alkoxy group containing 1 to 6 carbon atoms, or a halogen, and

Z is CH,

or a salt thereof.

**11.** A herbicidal composition comprising as an active ingredient an effective amount of a compound or salt of claim **1**, and a carrier therefor suitable for herbicidal use of the composition.

---

## 5,017,213
## 1-PHENYLPYRROLES

**Toyohiko Kume; Toshio Goto; Atsumi Kamochi; Akihiko Yanagi; Hiroshi Miyauchi, and Tadao Asami, all of Tokyo, Japan, assignors to Nihon Tokushu Noyaku Seizo K. K., Tokyo, Japan**

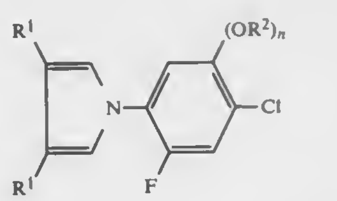
**Filed Jul. 7, 1989, Ser. No. 376,719**

**Claims priority, application Japan, Jul. 18, 1988, 63-177042; Oct. 22, 1988, 63-266662**

**Int. Cl.⁵ C07D *401/10;* A01N *43/40***

**U.S. Cl. 71—95** **11 Claims**

1. A 1-phenylpyrrole of the formula

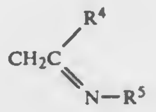


(I)

wherein

each $R^1$ represents methyl or together form a tetramethylene group,

$R^2$ represents hydrogen, $C_{1-6}$ alkyl, cyclopropylmethyl, $C_{1-4}$ alkoxy-$C_{1-2}$ alkyl, $C_{1-4}$ alkylthio-$C_{1-2}$ alkyl, $C_{1-4}$ alkylsulfinyl-$C_{1-2}$ alkyl, $C_{1-4}$ alkylsulfonyl-$C_{1-2}$ alkyl, or $R^2$ represents benzyl or phenylethyl which are optionally substituted by halogen, or $R^2$ furthermore represents $C_{3-4}$ alkenyl, $C_{3-4}$ alkynyl, $C_{3-4}$ haloalkenyl, $C_{2-3}$ cyanoalkyl or carbamoylmethyl, thiocarbamoylmethyl, trimethylsilylmethyl, $CH_2COOR^3$,



$$CH_2C(R^4)=N-R^5$$

or a $C_{1-2}$ alkyl group which is connected with a heterocyclic ring consisting of triazole, oxadiazole, thiadiazole, thiazole, pyridine and pyrimidine wherein said heterocyclic ring may be substituted with $C_{1-2}$ alkyl or $C_{1-2}$ alkoxy

$R^3$ represents $C_{1-6}$ alkyl or $C_{5-6}$ cycloalkyl,

$R^4$ represents hydrogen, methyl, ethyl or cyclopropyl,

$R^5$ represents $OR^6$ or $N(CH_3)_2$, in which

$R^6$ represents hydrogen, $C_{1-5}$ alkyl, allyl, propargyl or benzyl, and

n represents 0 or 1.

---

## 5,017,214
## HERBICIDAL SULFONAMIDES

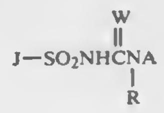
**George Levitt, 3218 Romilly Rd., Wilmington, Del. 19810**

**Division of Ser. No. 238,781, Aug. 31, 1988, Pat. No. 4,913,726, which is a division of Ser. No. 114,584, Oct. 30, 1987, Pat. No. 4,786,311, which is a continuation-in-part of Ser. No. 934,118, Nov. 24, 1986, Pat. No. 4,746,353, which is a continuation-in-part of Ser. No. 849,618, Apr. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 739,214, May 30, 1985, abandoned. This application Nov. 15, 1989, Ser. No. 436,581**

**Int. Cl.⁵ C07D *401/14, 403/14, 409/14;* A01N *43/653***

**U.S. Cl. 71—92** **57 Claims**

1. A compound of the formula:

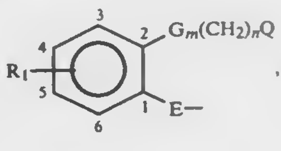


$$J-SO_2NH\overset{\overset{W}{\|}}{C}\underset{\underset{R}{|}}{N}A$$

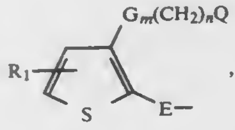
I

wherein

J is



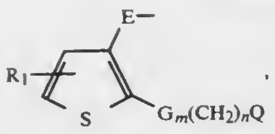
J-1



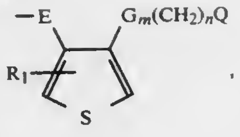
J-2

VOL
1126
ISS
3
MY
21
1991
UMI

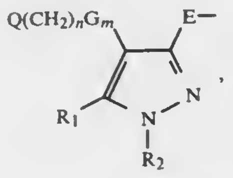
-continued



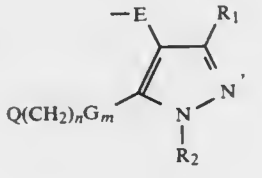
J-3



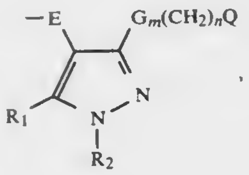
J-4



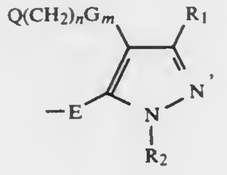
J-5



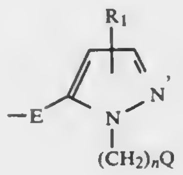
J-6



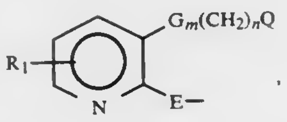
J-7



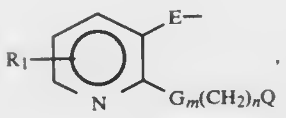
J-8



J-9

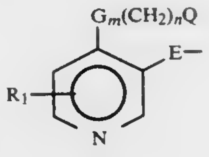


J-10

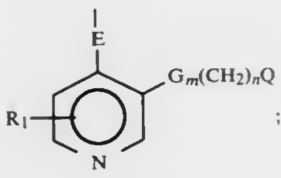


J-11

or



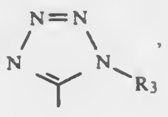
J-12



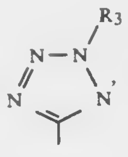
J-13

W is O or $NR_X$;
$R_X$ is H, OH, $C_1$–$C_3$ alkoxy, allyloxy, propargyloxy, $C_1$–$C_3$ haloalkyl, $C_1$–$C_3$ haloalkoxy or $NR_YR_Z$;
$R_Y$ is H or $C_1$–$C_3$ alkyl;
$R_Z$ is $C_1$–$C_3$ alkyl;
G is O, S, SO or $SO_2$;
m is 0 or 1;
n is 0, 1 or 2;
R is H or $CH_3$;
E is a single bond, $CH_2$ or O;

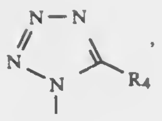
Q is



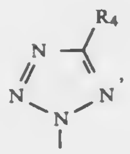
Q-1



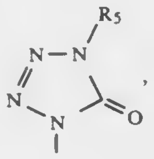
Q-2



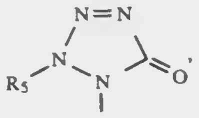
Q-3



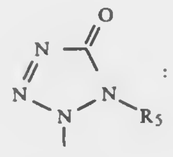
Q-4



Q-5



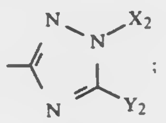
Q-6



Q-7

$R_1$ is H, $C_1$–$C_3$ haloalkyl, halogen, nitro, $C_1$–$C_3$ alkoxy, $SO_2NR_aR_b$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, CN, SCN, $CO_2R_c$, $C_1$–$C_3$ haloalkoxy, $C_1$–$C_3$ haloalkylthio, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino or $C_1$–$C_2$ alkyl substituted with $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ haloalkoxy, $C_1$–$C_2$ alkylthio, $C_1$–$C_2$ haloalkylthio or CN;
$R_2$ is H, $C_1$–$C_3$ alkyl, allyl or phenyl;
$R_3$ is H, $C_1$–$C_6$ alkyl, $C_3$–$C_6$ cycloalkyl, $C_1$ –$C_6$ haloalkyl, $CH_2$-($C_2$–$C_5$ alkenyl), $CH_2$($C_2$–$C_5$ haloalkenyl), $CH_2$($C_2$–$C_5$ alkynyl), $CH_2$($C_2$–$C_5$ haloalkynyl), $C_6H_5$ or $C_1$–$C_4$ alkyl substituted with $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ alkylthio, $C_1$–$C_2$ alkylsulfinyl or $C_1$–$C_2$ alkylsulfonyl;
$R_4$ is H, halogen, $C_1$–$C_6$ alkyl, $C_3$–$C_6$ cycloalkyl, $C_1$–$C_6$ haloalkyl, $C_2$–$C_6$ alkenyl, $C_2$–$C_6$ haloalkenyl, $C_2$–$C_6$ alkynyl, $C_3$–$C_6$ haloalkynyl, $C_6H_5$, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ alkylthio, $C_1$–$C_4$ alkylsulfinyl, $C_1$–$C_4$ alkylsulfonyl, $OCH_2CH_2O$-($C_1$–$C_2$ alkyl) or di($C_1$–$C_3$ alkyl)amino;
$R_5$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, allyl or propargyl;
$R_a$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy or ethoxy;
$R_b$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or
$R_a$ and $R_b$ may be taken together as —$(CH_2)_3$—, —($CH_2$-$)_4$—, —$(CH_2)_5$-13 or —$CH_2CH_2OCH_2CH_2$-13 ;
$R_c$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_1$–$C_2$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl or $C_2$–$C_4$ alkoxyalkyl;

A is



A-5

$X_2$ is $CH_3$, $C_2H_5$ or $CH_2CF_3$; and
$Y_2$ is $OCH_3$, $OC_2H_5$, $SCH_3$, $SC_2H_5$, $CH_3$ or $CH_2CH_3$; and their agriculturally suitable salts; provided that
(a) when J is J-9 and n is 0, then Q is Q-1 or Q-2;
(b) when E is 0, then J is J-1;
(c) when J is J-1 and m is 0, then n is 0; and
(d) when n is 0 and m is 1, then Q is Q-1 or Q-2.

**53**. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim **1**.

---

### 5,017,215
## HERBICIDES FOR WEED CONTROL IN RICE

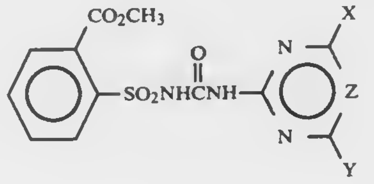
**Robert C. Ackerson, Newark, Del., and Takeshi Yuyama, Inashiki, Japan, assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 407,066, Sep. 14, 1989, abandoned, which is a continuation-in-part of Ser. No. 288,511, Dec. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 219,270, Jul. 15, 1988, abandoned, which is a continuation-in-part of Ser. No. 194,549, May 16, 1988, abandoned, which is a continuation-in-part of Ser. No. 157,548, Feb. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 82,697, Aug. 7, 1987, abandoned. This application Nov. 17, 1989, Ser. No. 437,802**

**Int. Cl.$^5$ A01N** *43/64*

**U.S. Cl. 71—93** **1 Claim**

**1**. A method for controlling the growth of undesired vegetation in a rice crop by applying to the crop after transplantation or emergence an effective amount of a compound of Formula I



I

wherein
X is $CH_3$;
Y is $OCH_3$; and
Z is N.

---

### 5,017,216
## POSTEMERGENT HERBICIDE COMPOSITIONS CONTAINING SILICONE GLYCOL ADJUVANTS

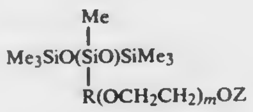
**Lenin Petroff, Bay County; David J. Romenesko, and Robert A. Ekeland, both of Midland County, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Continuation-in-part of Ser. No. 274,067, Nov. 21, 1988, abandoned, which is a continuation-in-part of Ser. No. 232,737, Aug. 15, 1988, abandoned. This application Apr. 11, 1990, Ser. No. 508,029**

**Int. Cl.$^5$ A01N** *37/38*

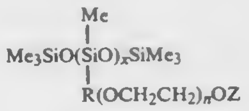
**U.S. Cl. 71—116** **27 Claims**

**1**. A composition consisting essentially of:
(I) a diphenyl ether herbicide; and
(II) from about 0.01 to 50 parts by weight, for each part by weight of said herbicide (I), of a silicone glycol adjuvant consisting essentially of
(i) from 20 to 95 weight percent of a silicone glycol having the average structure



$$Me_3SiO(\overset{\overset{\textstyle Me}{|}}{\underset{\underset{\textstyle R(OCH_2CH_2)_mOZ}{|}}{Si}}O)SiMe_3$$

wherein Me denotes a methyl radical, R is a divalent alkylene group having 2 to 6 carbon atoms, Z is selected from the group consisting of hydrogen, an alkyl radical having 1 to 3 carbon atoms and an acyl group having 2 to 4 carbon atoms, and m is 4 or 5, and
(ii) from 80 to 5 weight percent of a silicone glycol dispersant having the average formula



$$Me_3SiO(\overset{\overset{\textstyle Me}{|}}{\underset{\underset{\textstyle R(OCH_2CH_2)_nOZ}{|}}{Si}}O)_xSiMe_3$$

wherein Me, R and Z have their previously defined meanings, n is about 8 to 24 and x is 1 to 5.

---

### 5,017,217
## CERAMIC/METAL OR CERAMIC/CERAMIC COMPOSITE ARTICLE

**Thomas M. Clere, Willowick, Ohio; Gholamreza J. Abbaschian, Gainesville, Fla.; Douglas J. Wheeler, Cleveland Heights, and Albert L. Barnes, Wickliffe, both of Ohio, assignors to Eltech Systems Corporation, Boca Raton, Fla.**

**Division of Ser. No. 945,116, Jan. 6, 1987, Pat. No. 4,961,902, which is a continuation-in-part of Ser. No. 825,402, Feb. 3, 1986, abandoned. This application Aug. 21, 1990, Ser. No. 557,425**

**Int. Cl.$^5$ B22F** *1/00*

**U.S. Cl. 75—244** **19 Claims**

**1**. A composition having a microstructure comprising interconnected grains, of a grain size less than about one micron, the grains being of a ceramic product of a first metal selected from one of more Group IVb, Vb or VIb metals of the periodic table, said interconnected grains being in a ceramic or metal product of a second metal selected from the group consisting of aluminum, nickel, chromium, iron, cobalt and mixture thereof, wherein the composition is produced by the method comprising:
providing a mixture of solid, particulate reactants in finely divided form including a second metal reactant that in the manufacture goes through peritectic decomposition;
heating said mixture up to a first temperature that is below peritectic decomposition temperature, at a moderate rate of increasing temperature;
reducing said moderate rate of increasing temperature and continuing heating above said first temperature, but below peritectic decomposition temperature, at a lowest rate of increasing temperature of less than 10° C. per minute;
maintaining said lowest rate of increasing temperature of less than 10° C. per minute at least substantially through peritectic decomposition of said second metal reactant;
greatly elevating the rate of temperature increase following said lowest rate to a most substantial rate of increasing temperature of above 20° C. per minute;
maintaining said most substantial rate of increasing temperature of above 20° C. per minute to attain a maximum reaction sintering temperature; and
cooling the resulting reaction product resulting from said maximum reaction sintering temperature.

---

### 5,017,218
## METHOD AND APPARATUS FOR THE PRODUCTION OF METAL GRANULES

**Per-Åke Lundström; Gunnar A. Andersson, both of Hagfors; Åke West, Rada, and Juhan Mägi, Hagfors, all of Sweden, assignors to Uddholm Tooling Aktiebolag, Hagfors, Sweden**

**Filed Jun. 12, 1989, Ser. No. 365,144**

**Int. Cl.$^5$ B01J** *2/02*

**U.S. Cl. 75—388** **7 Claims**

**1**. A method for the production of metal granules from molten metal comprising the steps of:
(a) forming the molten metal into a falling stream; and
(b) impacting the falling stream of molten metal against an impact element located above the surface of a water-containing tank, whereby the stream of molten metal is disintegrated, by the impact against the impact element, into drops which
  (1) spread out in substantially all radial directions from the impact element;
  (2) fall down into the water in an annular region at a given

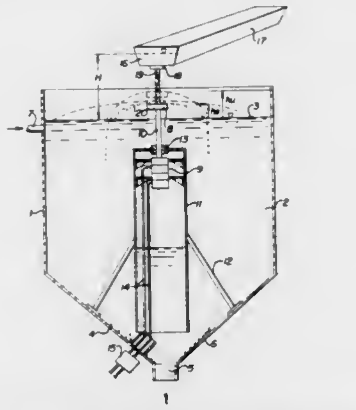
VOL
1126
ISS
3
MY
21
1991
UMI

radial distance from the impact element, wherein the radial distance is determined by

(i) the velocity of the stream of molten metal compared to the velocity of the impact element at the instant of impact, and

(ii) the height of the impact element above the water surface;

and wherein said radial distance is periodically varied during the disintegration of the molten metal by periodically varying the height of said impact element above said water surface by periodically moving said impact element in a vertical direction by an upward stroke from a lower position to an upper position and from said upper position in a downward stroke back to said lower position, said disintegration taking place substantially only during said upward stroke;



(3) sink towards the bottom of the tank; and

(4) solidify so that when the drops reach the bottom of the tank they are solidified at least on a surface thereof.

---

### 5,017,219

### UTILIZATION OF SPONGE METAL FINES

**Randy W. Wahlquist, Ogden; John M. Reinarts, North Ogden, and Timothy L. Francis, Ogden, all of Utah, assignors to Westinghouse Electric Company, Pittsburgh, Pa.**

**Filed May 21, 1990, Ser. No. 526,739**

**Int. Cl.$^5$ C22B *34/00***

U.S. Cl. 75—415 5 Claims

1. A method of utilizing sponge metal fines of a metal selected from the group consisting of zirconium, hafnium and mixtures thereof, comprising forming an initial reduction charge of a tetrachloride of the metal concerned, of magnesium metal, and of said sponge metal fines; applying heat to said charge to reduce the tetrachloride to sponge metal in which said fines form a sponge metal layer at the bottom of the charge; and subjecting the so reduced charge to vacuum distillation to produce a sponge metal regulus having a lower portion in which said reject sponge metal fines are incorporated.

---

### 5,017,220

### METHOD FOR SMELTING REDUCTION OF NI ORE

**Haruyoshi Tanabe; Katsuhiro Iwasaki; Masahiro Kawakami; Chihiro Taki, and Toshio Takaoka, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan**

**Filed Feb. 1, 1990, Ser. No. 473,338**

**Claims priority, application Japan, Feb. 21, 1989, 1-42276**

**Int. Cl.$^5$ C22B *23/00***

U.S. Cl. 75—629 16 Claims

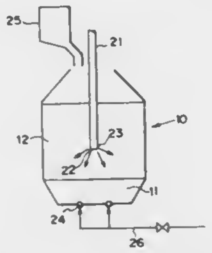
1. A method for a smelting reduction of Ni ore comprising:

providing a molten metal comprising iron into a converter smelting reduction furnace,

charging a Ni ore, a carbonaceous material and a flux into said converter smelting reduction furnace;

smelting and reducing the Ni ore by blowing oxygen through a top blow oxygen lance, thereby forming slag and providing Ni and carbon in said molten metal;

controlling post-combustion inside the converter smelting reduction furnace to provide a post-combustion ratio of at least 0.3 by blowing oxygen through the top flow oxygen lance and blowing a stirring gas into said converter smelting reduction furnace through at least one bottom blow tuyere disposed in the bottom of said converter smelting reduction furnace, said postcombustion ratio being determined by the formula of $(H_2O+CO_2)/(H_2+H_2O+CO+CO_2)$, wherein said $H_2$, CO, $CO_2$ and $H_2O$ are gases produced after said post-combustion is performed; and



controlling the relationship between the carbon content in said molten metal containing Ni and the amount of the slag to satisfy the formula of $C \geqq Sl/3$, where C is the wt. % of the carbon in said molten metal containing Ni, and Sl is the amount of the slag produced per ton of said molten metal containing Ni.

---

### 5,017,221

### POLYMETHYLALKYLSILOXANE EMULSIONS AND METHODS

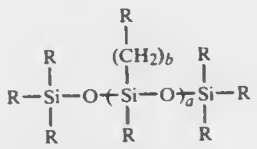
**Gary E. Legrow, and Donald T. Liles, both of Midland County, Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Dec. 5, 1989, Ser. No. 446,510**

**Int. Cl.$^5$ C09K *3/18***

U.S. Cl. 106—2 15 Claims

1. An emulsion comprising a mixture including water, at least one surfactant, and a polymethylalkylsiloxane, the polymethylalkylsiloxane having the formula:



$$R{-}\underset{R}{\overset{R}{Si}}{-}O{+}\underset{R}{\overset{\overset{R}{|}}{\overset{(CH_2)_b}{Si}}}{-}O{+}_a\underset{R}{\overset{R}{Si}}{-}R$$

wherein R is a methyl radical, *a* is an integer from one to about three thousand, and *b* is an integer from two to about ten, the emulsion including a polyglycol selected from the group consisting of ethylene glycol, propylene glycol, butylene glycol, mixtures, and copolymers thereof.

---

### 5,017,222

### POLISH CONTAINING MICRONIZED WAX PARTICLES

**Martin E. Cifuentes, and Suzanne M. Greenleaf, both of Midland County, Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Dec. 7, 1989, Ser. No. 447,280**

**Int. Cl.$^5$ C09G *1/08;* C08L *91/06***

U.S. Cl. 106—10 14 Claims

1. In a water in oil polish emulsion containing as components thereof a wax, an abrasive and optionally at least one member selected from the group consisting of solvents, surfactants, thickening agents, detergent resistant additives, colorants, odorants and other ingredients normally used in making polishes, the improvement comprising incorporating into the oil phase of the water in oil polish emulsion at least cne wax in the form of micronized particles having an average diameter of from about two to about forty-five microns in an amount of from about 0.5 to 3 parts per hundred per total parts polish emulsion.

---

### 5,017,223

### RECORDING MATERIAL

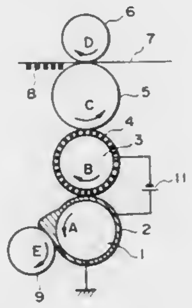
**Motokazu Kobayashi, Yokohama; Kohzoh Arahara; Toshiya Yuasa, both of Kawasaki; Takashi Kai, Hadano, and Hiroshi Fukumoto, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 27, 1989, Ser. No. 385,365**

**Claims priority, application Japan, Jul. 29, 1988, 63-187982; May 19, 1989, 1-124250**

**Int. Cl.$^5$ C09D *11/02***

U.S. Cl. 106—20 11 Claims



1. A recording material, comprising at least a liquid dispersion medium in an amount of 40–95 wt % of the recording material and an electrolyte contained therein in an amount of 0.05 wt. part to the saturation solubility with respect to 100 wt. parts of the liquid dispersion medium; said electrolyte providing substantially no halogen ion in the liquid dispersion medium under electrolytic dissociation; said recording material being adhesive under no voltage application and losing its adhesiveness on one of a pair of electrodes when imparted with a voltage by means of the pair of electrodes, so that the recording material is selectively attached to the other of said pair of electrodes on voltage application.

---

### 5,017,224

### WATER-RESISTANT INK COMPOSITION

**Hajime Tomita, and Yasuo Sonoda, both of Gunma, Japan, assignors to Kabushiki Kaisha Pilot, Tokyo, Japan**

**Filed Jun. 21, 1990, Ser. No. 541,763**

**Int. Cl.$^5$ C09D *11/02***

U.S. Cl. 106—22 2 Claims

1. A water resistant ink composition comprising an aqueous vehicle which contains a polyamine containing primary amino groups in proportion of 3–20% of amino groups contained in a molecule, a stabilizing agent selected from urea, thiourea, ethylene urea, hydroxyethyl urea, hydroxyproplyl urea, ethylene thiourea, diothyl-thiourea, 2-pyrrolidone, polyvinyl pyrrolidone, soribitol, dimethylsulfone, and mixtures therefore and water, and an amionic dye having a solubility of 10% by weight or more in said aqueous vehicle.

---

### 5,017,225

### MICROENCAPSULATED PHOTOCHROMIC MATERIAL, PROCESS FOR ITS PREPARATION AND A WATER-BASE INK COMPOSITION PREPARED THEREFROM

**Masayuki Nakanishi; Takashi Iwasaki, both of Kanagawa, and Shuichi Maeda, Saitama, all of Japan, assignors to Japan Capsular Products Inc. and Mitsubishi Kasei Corporation, both of, Japan**

**PCT No. PCT/JP88/01215, § 371 Date Jul. 27, 1989, § 102(e) Date Jul. 27, 1989, PCT Pub. No. WO89/05335, PCT Pub. Date Jun. 15, 1989**

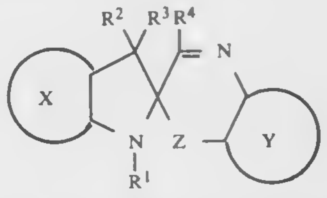
**PCT Filed Dec. 1, 1988, Ser. No. 392,913**

**Claims priority, application Japan, Dec. 2, 1987, 62-305082; Oct. 19, 1988, 63-263303; Oct. 19, 1988, 63-263304; Oct. 19, 1988, 63-263306**

**Int. Cl.$^5$ C09D *11/00;* B41M *5/165***

U.S. Cl. 106—21 10 Claims

1. A microencapsulated photochromic material comprising an effective amount of a spirooxazine compound in microcapsules in the form of a solution, said compound being of the Formula



[I]

wherein $R^1$, $R^2$ and $R^3$ each represent an optionally substituted alkyl group, an optionally substituted alkenyl group, a cycloalkyl group, or an aryl group; $R^2$ and $R^3$ may bind to each other to form a ring; $R^4$ represents a hydrogen atom or an alkyl group having 1 to 5 carbon atoms; $R^1$ optionally contains another spirooxazine ring via an alkylene or arylene group, X and Y each represent an optionally substituted hydrocarbon aromatic ring or heterocyclic aromatic ring; and Z represents an oxygen atom or a sulfur atom.

---

### 5,017,226

### INK AND METHOD FOR THE DEVELOPMENT OF CONCEALED IMAGES

**Michael Kulisz, Roselle, Ill., assignor to A. B. Dick Company, Chicago, Ill.**

**Filed Oct. 3, 1988, Ser. No. 252,675**

**Int. Cl.$^5$ C09D *11/00***

U.S. Cl. 106—21 4 Claims

1. A marking material for use in developing concealed images which have been formed from a water-soluble oxidizing agent on either alkali-based or acid-based paper stock which contains starch, polyvinyl alcohol, or a mixture thereof, wherein said marking material comprises:

(a) a water-soluble iodide;

(b) acetic acid;

(c) a water-soluble reducing agent;

(d) a water-soluble or water-dispersible dye or pigment; and

(e) water,

wherein the amount of the reducing agent is sufficient to maintain essentially all of the iodide in reduced state prior to application to said paper stock.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,227
## RECORDING LIQUID AND INK-JET RECORDING PROCESS USING SAME

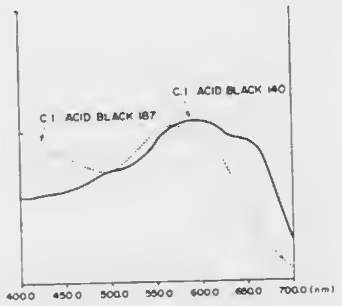
**Shoji Koike; Tsuyoshi Eida, both of Yokohama, and Takao Yamamoto, Isehara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 26, 1989, Ser. No. 385,153**

**Claims priority, application Japan, Jul. 26, 1988, 63-184744**

**Int. Cl.$^5$ C90D** *11/00*

**U.S. Cl. 106—22** **28 Claims**



1. A recording liquid comprising:
- (a) a black dye selected from the group consisting of C.I. Food Black 1, C.I. Acid Black 140 and C.I. Acid Black 187;
- (b) at least one water soluble dye selected from the group consisting of a magenta dye and a yellow dye; and
- (c) a liquid medium for dissolving said dyes, wherein said black dye is present in a proportion of from 40 to 95% by weight based on the total weight of said dyes in said recording liquid.

---

### 5,017,228
## LIQUID INK FOR SELECTIVE PRINTING

**Hitoshi Goda, Osaka, Japan, assignor to Fuji Kagakushi Kogyo Co., Ltd., Osaka, Japan**

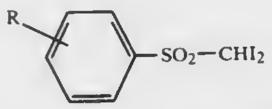
**Filed Dec. 9, 1988, Ser. No. 282,149**

**Claims priority, application Japan, Dec. 10, 1987, 62-312633**

**Int. Cl.$^5$ C09D** *11/06*

**U.S. Cl. 106—28** **3 Claims**

1. In a liquid ink composition for use in an ink ribbon or ink roller for selective printing comprising a coloring agent and a vehicle comprising a non-drying oil as a main component and a dispersing agent, the improvement which comprises said ink containing 0.1 to 6% by weight an iodine-containing compound, sufficient to act as an effective antifungal agent, having the general formula (I):



(I)

wherein R is a lower alkyl group or a halogen atom and which has an initial viscosity in cPs at 25° C. such that the product of the initial viscosity and the concentration is between 50 and 3000.

---

### 5,017,229
## WATER INSOLUBLE DERIVATIVES OF HYALURONIC ACID

**James W. Burns, Holliston; Steven Cox, Boston, and Alan E. Walts, Reading, all of Mass., assignors to Genzyme Corporation, Cambridge, Mass.**

**Filed Jun. 25, 1990, Ser. No. 543,163**

**Int. Cl.$^5$ A61K** *47/26;* **C08L** *1/00*

**U.S. Cl. 106—162** **25 Claims**

1. A method for making a water insoluble biocompatible gel, said method comprising

combining an aqueous solution of HA at a concentration in the range between 0.4% and 2.6% w/w, a polyanionic polysaccharide, and an activating agent under conditions sufficient to form said gel.

---

### 5,017,230
## ASPHALT ADDITIVE COMPOSITIONS

**David L. Hopkins, Dover, and John S. Perz, Mentor, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Continuation-in-part of Ser. No. 24,299, Mar. 9, 1987, Pat. No. 4,836,857. This application Jun. 5, 1989, Ser. No. 361,185**

**The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.**

**Int. Cl.$^5$ C09D** *4/00*

**U.S. Cl. 106—284.3** **27 Claims**

1. An asphalt additive composition comprising:
- (A) a metallic organic strength improving compound, wherein the metal is selected from the group consisting of manganese, cobalt, copper, vanadium, molybdenum, cerium, iron, nickel, lead, zirconium, barium, calcium and zinc, and wherein the organic part of said metallic organic compound is derived from one or more organic compounds selected from the group consisting of carboxylic acids, phenols and ketones either alone or in combination with other metallic organic compounds; and
- (B) at least 10 weight percent of an anti-strip compound prepared by reacting a carboxylic acid with an amine or polyamine containing at least one primary or secondary amino group.

---

### 5,017,231
## PROCESS FOR PREPARING COATED PIGMENTS

**Akira Nishihara, and Makoto Tsunashima, both of Tokyo, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 64,245, Jun. 19, 1987, abandoned. This application Jan. 3, 1990, Ser. No. 460,642**

**Claims priority, application Japan, Jun. 20, 1986, 61-142808; Jun. 20, 1986, 61-142809; Jun. 20, 1986, 61-142810**

**The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.**

**Int. Cl.$^5$ C09C** *1/10;* **C08J** *7/04*

**U.S. Cl. 106—452** **11 Claims**

1. A process for preparing a coated cadmium-based pigment having acid-, alkali, and heat-resistance, consisting essentially of:
- (a) contacting a hydrophilic cadmium-based pigment with a metal alkoxide selected from the group consisting of an alkoxide of titanium, silicon, zirconium, zinc and boron in an organic solvent which is at least partially water-miscible; and
- (b) drying or firing or drying and firing said coated pigment.

---

### 5,017,232
## POMICE CONTAINING COMPOSITION

**Joseph J. Miceli, 7902 Limoges Dr., Jacksonville, Fla. 32210**

**Filed Mar. 13, 1990, Ser. No. 492,668**

**Int. Cl.$^5$ C04B** *7/02*

**U.S. Cl. 106—711** **3 Claims**

1. A composition for forming a high strength, hard material with good insulation properties upon the addition of water, comprising a mixture of crushed pumice, type S mortar and glass fibers, where the weight of the crushed pumice is from 60 to 75 percent of the total weight of the mixture, the weight of the type S mortar is from 25 to 40 percent of the total weight of the mixture, and the weight of the glass fibers is significantly less than 1 percent of the total weight of the mixture.

---

### 5,017,233
## METHOD OF RENDERING SOILS IMPERVIOUS AND PRODUCTS FOR CARRYING OUT THE METHOD

**Daniel Gouvenot, Clichy, France, assignor to Soltanche, France**

**Continuation of Ser. No. 196,749, May 20, 1988, abandoned, which is a division of Ser. No. 891,776, Jul. 30, 1986, abandoned. This application Apr. 12, 1990, Ser. No. 511,996**

**Int. Cl.$^5$ C09K** *17/00*

**U.S. Cl. 106—600** **7 Claims**

1. A composition for rendering porous materials impervious consisting essentially of a fine powder of a calcium containing compound having a solubility in water of between approximately 0.01 and approximately 2 g/l mixed into a silica solution having a ration of $SiO_2$ to $Na_2O$ of between 1 and 1.3 said composition requiring at least approximately one hour to set.

---

### 5,017,234
## PROCESSING ADDITIVES FOR BLENDED CEMENTS

**Ellis M. Gartner, Silver Spring; David F. Myers, Columbia, and James M. Gaidis, Ellicott City, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.**

**Continuation-in-part of Ser. No. 418,437, Oct. 6, 1989, Pat. No. 4,943,323. This application Jul. 13, 1990, Ser. No. 554,040**

**The portion of the term of this patent subsequent to Jul. 24, 2007, has been disclaimed.**

**Int. Cl.$^5$ C04B** *7/02*

**U.S. Cl. 106—781** **21 Claims**

1. A strength enhanced blended cement comprising a mixture of clinker having at least 4% $C_4AF$, gypsum, 5% to 80% by weight filler or clinker substitute together with an effective amount of a strength enhancing additive to increase the 7 and 28-day strength, wherein the additive comprises a higher trialkanolamine having at least one $C_3$–$C_5$ hydroxyalkyl group.

---

### 5,017,235
## SMOKING COMPOSITIONS CONTAINING A 2,5-DIACYLPYRAZINE FLAVORANT ADDITIVE

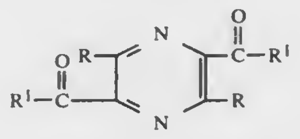
**David L. Williams, and Everett W. Southwick, both of Richmond, Va., assignors to Philip Morris Inc., Richmond, Va.**

**Filed Aug. 11, 1986, Ser. No. 895,398**

**Int. Cl.$^5$ A24B** *3/12, 15/38*

**U.S. Cl. 131—278** **9 Claims**

1. A smoking composition comprising an admixture of (1) combustible filler selected from natural tobacco, reconstituted tobacco and tobacco substitutes, and (2) between about 0.0001–5 weight percent, based on the total weight of filler, of a 2,5-diacylpyrazine additive corresponding to the formula:



where R is hydrogen or an alkyl radical containing between about 1–4 carbon atoms; and $R^1$ is an alkyl radical containing between about 1–10 carbon atoms.

---

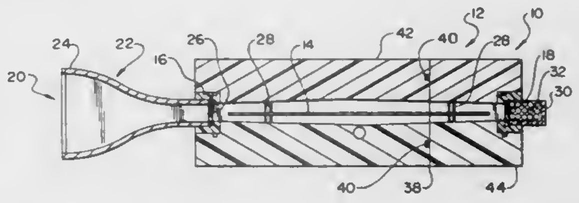
### 5,017,236
## HIGH FREQUENCY SONIC SUBSTRATE PROCESSING MODULE

**Sherman U. Moxness, Golden Valley, and Robert W. Grant, Excelsior, both of Minn., assignors to FSI International, Inc., Chaska, Minn.**

**Filed Aug. 21, 1989, Ser. No. 396,116**

**Int. Cl.$^5$ B08B** *7/00*

**U.S. Cl. 134—1** **31 Claims**



1. A sonic processing module for processing a substrate comprising:

a substrate chamber for maintaining a substrate immersed in liquid processing solution, said chamber minimally sized to the dimensions of the substrate, and said substrate chamber provided with first and second sonic wave permeable membranes forming first and second ends of said chamber along a sonic wave path through said chamber;

means exterior to said substrate chamber for generating a sonic wave through a sonic wave conducting liquid medium, said liquid medium being in contact with the first membrane exterior to the substrate chamber, and said liquid medium shaped by a sonic wave guide to intensify and concentrate the sonic wave, said sonic wave being transmitted through said liquid medium and said first membrane to provide sonic excitation to said processing solution to enhance processing of said substrate in the substrate chamber; and

means exterior to said substrate chamber in contact with the second membrane for absorbing and dissipating said sonic wave after passing through said second membrane.

---

### 5,017,237
## CONTAMINATION REMOVAL PROCESS

**Sigfrid Svensson, Furulund, Sweden, assignor to Bioboat AB, Furulund, Sweden**

**PCT No. PCT/SE88/00322, § 371 Date Jan. 16, 1990, § 102(e) Date Jan. 16, 1990, PCT Pub. No. WO88/10156, PCT Pub. Date Dec. 29, 1988**

**PCT Filed Jun. 14, 1988, Ser. No. 438,447**

**Claims priority, application Sweden, Jun. 17, 1987, 8702535; Nov. 20, 1987, 8704588**

**Int. Cl.$^5$ B08B** *7/00*

**U.S. Cl. 134—4** **22 Claims**

1. A process for facilitating the removal of undesired contamination from a surface, comprising the steps of:
- (a) applying a solution containing a polysaccharide and a solvent therefor onto said surface before the surface is subjected to contamination, said polysaccharide being capable of forming a redissolvable or swelling solid film upon drying;
- (b) allowing the applied solution to dry to form a solid film on said surface;
- (c) treating the coated surface with a liquid capable of redissolving the film or providing for swelling thereof; and
- (d) removing the undesired contamination by removing the dissolved or swelled surface layer of the film;

wherein the polysaccharide has a molecular weight of at least about 1000 and the solution applied to the surface contains no more than about 10% by weight of the polysaccharide.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,238
### AQUEOUS CLEANING DISPERSIONS USING ADSORPTIVE POLYMERIC POWDER AND METHOD OF USING

**Richard C. Chromecek, Litchfield County, Conn., and Milan F. Sojka, Orange County, N.Y., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Aug. 30, 1989, Ser. No. 400,832**
**Int. Cl.$^5$ B08B** *3/04, 3/08*
**U.S. Cl. 134—7** **16 Claims**

1. An aqueous cleaning dispersion comprising a homogeneous mixture of:
(a) water and
(b) a liquid-adsorbable homopolymer of tetraethylene glycol dimethacrylate in powder form.

---

### 5,017,239
### CLEANING VERTICAL WINDOW BLINDS

**Allan R. Morrison, 481 Simco Street, Winnipeg, Manitoba, Canada R3G 1W4**

**Filed Nov. 27, 1989, Ser. No. 441,658**
**Int. Cl.$^5$ A46B** *13/04*
**U.S. Cl. 134—15** **19 Claims**

1. A method of cleaning vertical blinds comprising a plurality of strips of a flexible fabric material and a support system including an upper support means for supporting strips such that they hang in parallel vertical arrangement, the method comprising attaching a plurality of the strips to a carrying frame separate from the support system, removing the attached strips from the upper support means, transporting the strips carried on the carrying frame from the support system to a cleaning bath containing a cleaning liquid, inserting the strips and the carrying frame into the bath and causing the liquid to flow in a direction from the carrying frame longitudinally of the strips to cause a cleaning action on the strips while the strips are supported by the carrying frame.

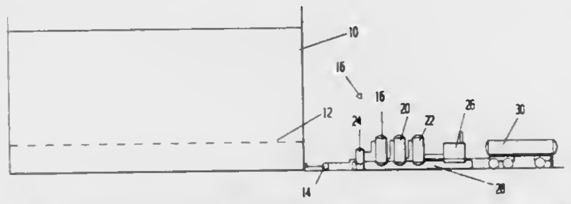
14. Apparatus for cleaning vertical blinds comprising a plurality of strips of a flexible fabric material and a support system including an upper support means for supporting strips such that they hang in parallel vertical arrangement, the apparatus comprising a carrying frame arranged for attachment to a plurality of the strips including a plurality of projecting engagement member such that each strip has a lower end thereof mounted on a respective one of said engagement member and a cleaning bath arranged to contain a cleaning liquid and having an elongated channel arranged to receive the strips such that said strips extend longitudinally of the channel, means for supporting the carrying frame at one end of the channel and means for causing the liquid to flow in a direction from the carrying frame longitudinally of the strips to cause a cleaning action on the strips while the strips are supported by the carrying frame.

---

### 5,017,240
### VAPOR TREATMENT FACILITIES FOR PETROLEUM STORAGE TANK CLEANING

**Earnest D. Brown, 8001 Cheshire Cir., La Palma, Calif. 90623**

**Filed Feb. 2, 1990, Ser. No. 474,514**
**Int. Cl.$^5$ B08B** *9/00, 5/00*
**U.S. Cl. 134—22.1** **16 Claims**



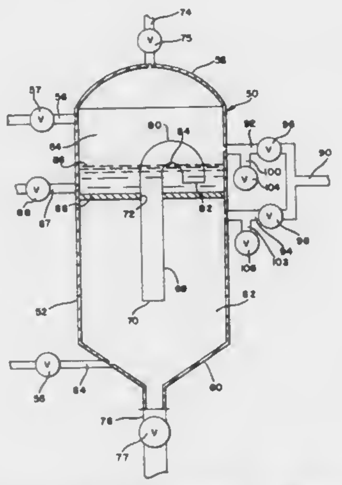
1. In a method for cleaning a stationary petroleum storage tank which is permanently located at a tank station and which has a capacity of at least 5000 barrels, wherein the tank is emptied of its liquid contents, and ventilated until it is safe for workmen to enter the tank to wash the walls and interior thereof, the improved method of reducing the hydrocarbon content in the air/vapor mixture occupying the vapor space within said tank prior to workmen entering said tank without discharging said air/vapor mixture to the atmosphere, which comprises:
a. moving a portable vapor treatment facility having a condenser train with a first condenser stage, a second condenser stage, and a final condenser stage to said tank station and connecting said condenser train to said tank;
b. connecting a portable supply of liquid nitrogen to said condenser train;
c. withdrawing the air/vapor mixture from said tank and passing it to said condenser train;
d. condensing water vapor contained within said air/vapor mixture in a first condenser stage, and separating the condensed water from an air/hydrocarbon mixture therein;
e. passing the air/hydrocarbon mixture to a succeeding condenser stage, and condensing higher boiling hydrocarbons therein;
f. passing the resultant air and volatile hydrocarbons to a final condenser stage, and controlling the temperature within said final condenser stage to a temperature not greater than −100° F.;
g. exhausting said air from said final condenser stage; and
h. maintaining the condensation temperatures in said condenser stages by expanding liquidified nitrogen from said portable supply of liquid nitrogen and passing the expanded nitrogen to said condenser train into heat transfer contact with said air/vapor mixture; and
i. recycling said air to said tank.

---

### 5,017,241
### BACKWASH METHOD AND APPARATUS

**Leo Ryan, Bridgewater, N.J., assignor to The Graver Company, Union, N.J.**

**Filed Oct. 16, 1990, Ser. No. 598,540**
**Int. Cl.$^5$ B08B** *9/00;* **B01D** *25/32*
**U.S. Cl. 134—22.12** **6 Claims**



1. A method for cleaning a plurality of filter elements having inner cores vertically positioned within a filter vessel that has a tube sheet dividing the filter vessel into a lower filter compartment and an upper plenum compartment, said filter elements being positioned within said filter compartment and having upper portions that are in fluid communication with said plenum compartment through openings formed in said tube sheet, said method comprising:
draining at least a portion of the liquid from the filter vessel;
establishing a fixed volume of backwash liquid in said plenum compartment immediately above said tube sheet;

directing a gas into said filter compartment and said plenum compartment so as to establish a pressurized condition therein; and
reducing the pressure in said filter compartment so as to cause said fixed volume of backwash liquid to move downward through the cores of said filter elements and surge radially outward through the filter surfaces thereof.

---

### 5,017,242
### CAN-CONVEYOR SYSTEM AND RINSER

**Jon V. Anderson, P.O. Box 116, Ocoee, Fla. 34761**

**Filed Oct. 3, 1989, Ser. No. 416,349**
**Int. Cl.$^5$ B08B** *7/04*
**U.S. Cl. 134—22.18** **11 Claims**

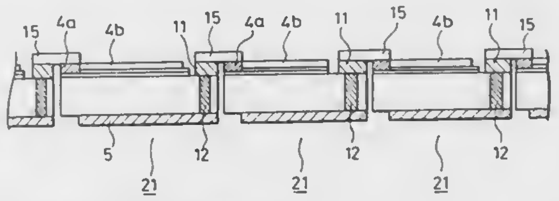
1. A method of maintaining a preselected speed of at least one can passing through a gravity feed can rinser, the at least one can including a sidewall and a closed end wall defining a chamber within the at least one can, and an open end communicating with the chamber, the gravity feed rinser including chute means for the gravity passage therethrough of the at least one can, and a plurality of water nozzles, the method comprising the steps of:
applying water from successive respective ones of the nozzles into the chamber of the at least one can during the can's gravity passage through the chute means and tending to effect a reduction from the preselected speed of the at least one can in response to the applying step; and
directing water from successive respective other ones of the nozzles intermediate the successive respective ones of the nozzles onto the sidewall of the at least one can exteriorly thereof during the gravity passage of the at least one can through the chute means and counteracting thereby the tending step so as to maintain the preselected speed of the at least one can during the can's passage through the chute means.

---

### 5,017,243
### SOLAR CELL AND A PRODUCTION METHOD THEREFOR

**Mutsuyuki Otsubo, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Nov. 13, 1989, Ser. No. 434,984**
**Claims priority, application Japan, Jan. 6, 1989, 1-1510**
**Int. Cl.$^5$ H01L** *31/05, 31/18*
**U.S. Cl. 136—244** **8 Claims**



1. A solar cell comprising:
a first conductivity type semiconductor substrate body having opposed first and second major surfaces;
a second conductivity type semiconductor layer disposed on a part of the first major surface of siad semiconductor substrate for receiving incident light and forming a pn junction with said substrate for generating a photovoltage in response to incident light;
a first electrode disposed on siad semiconductor layer;
a second electrode dipsosed on the second major surface of said semiconductor substrate;
a connection electrode disposed on a part of the first major surface of siad semiconductor substrate where siad semiconductor conductor layer is absent and electrically insulated from said semiconductor layer; and
an electrical conductor electically connecting siad second electrode and siad connection electrode extending through said semiconductor substrate from the first major surface to the second major surface.

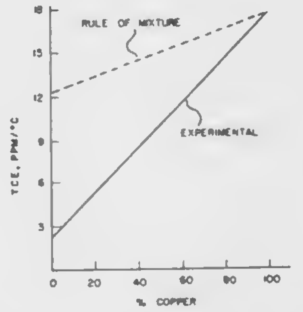
3. A solar cell device including a plurality of solar cells as defined in claim 1 and a plurliaty of cell interconnectors wherein adjacent cells are serrially connected by respective interconnectors disposed on said first electrode of one cell and said connection electrode at the first major surface of an adjacent cell.

---

### 5,017,244
### PROCESS FOR IMPROVING THE ELECTRICAL CONDUCTIVITY OF A COPPER-NICKEL-IRON ALLOY

**Ashok Sankaranarayanan, Bethany; Jacob Crane, Woodbridge, and Julius C. Fister, Hamden, all of Conn., assignors to Olin Corporation, Cheshire, Conn.**

**Division of Ser. No. 28,846, Mar. 23, 1987, Pat. No. 4,822,693. This application Dec. 14, 1988, Ser. No. 284,621**
**Int. Cl.$^5$ C22C** *9/01*
**U.S. Cl. 148—3** **4 Claims**



1. A process for improving the electrical conductivity of a copper-nickel-iron alloy comprising:
casting an alloy consisting essentially of a first phase of from about 20% to about 80% copper and the balance a second phase of iron and nickel with the ratio of iron to nickel being in the range of from about 1.5:1 to about 2.0:1; and
spheroidizing the iron-nickel phase of said alloy to minimize its surface volume, said cast alloy comprising a first phase consisting essentially of a copper matrix and a second discontinuous phase consisting essentially of a spheroidized iron-nickel alloy.

---

### 5,017,245
### PROCESS OF FABRICATING BERYLLIUM PLATE MEMBER WITH LARGE MECHANICAL STRENGTH

**Kunio Suzuki, and Kenji Takeuchi, both of Shizuoka, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan**

**Filed Apr. 14, 1989, Ser. No. 337,824**
**Claims priority, application Japan, Apr. 15, 1988, 63-92845**
**Int. Cl.$^5$ C21D** *8/12;* **G21K** *1/00;* **B23P** *17/04, 25/00*
**U.S. Cl. 148—11.5 R** **17 Claims**

1. A process of fabricating a high-density metal plate member, comprising the steps of:
preparing a base structure by covering a substrate with a protection film;
depositing a metal film of a substance selected from the group consisting of beryllium and beryllium alloys;
removing the base structure; and
rolling said metal film so as to increase its density.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,246
### MARTENSITIC STAINLESS STEELS EXCELLENT IN CORROSION RESISTANCE AND STRESS CORROSION CRACKING RESISTANCE AND METHOD OF HEAT TREATMENT OF THE STEELS

**Akihiro Miyasaka, and Hiroyuki Ogawa, both of Sagamihara, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Mar. 2, 1990, Ser. No. 487,116**

**Claims priority, application Japan, Mar. 8, 1989, 1-53926**

**Int. Cl.$^5$ C22C *38/38;* C21D *9/08***

**U.S. Cl. 148—135** **15 Claims**

1. Oil Country Tubular Goods (OCTG) formed of high-strength martensitic stainless steel excellent in corrosion resistance and stress corrosion cracking resistance, said steel containing:

under 0.03% carbon, 1% or less silicon, 2.3-7.0% manganese, 8-14% chromium, 0.005-0.2% aluminum, 0.005-0.15% nitrogen and the balance of iron except incidental elements, all the numerical figures being expressed on the basis of percent by weight, and said steel having microstructures consisting essentially of martensitic phase, said OCTG being heat-treated by the following steps comprising:

the step of austenitizing said OCTG at temperature of 920° C. to 1,100° C. followed by cooling at a cooling rate equal to or higher than the air cooling rate and the step of tempering said OCTG at temperature between 580° C. and A c1 point followed by cooling at a cooling rate equal to or higher than the air cooling rate.

---

### 5,017,247
### RARE EARTH MAGNET ALLOY

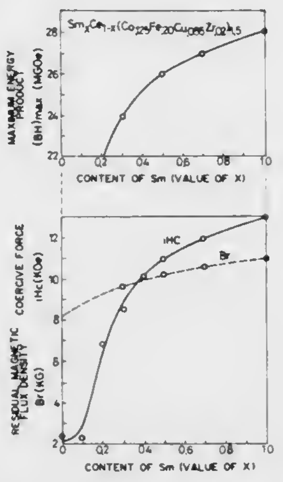
**Yoshinobu Honkura; Yasuji Fukui; Tooru Matsuo, and Chisato Mishima, all of Tokai, Japan, assignors to Aichi Steel Works, Limited, Aichi, Japan**

**Filed Dec. 26, 1989, Ser. No. 457,041**

**Claims priority, application Japan, Dec. 26, 1988, 63-328621; Mar. 31, 1989, 63-82536; Mar. 31, 1989, 63-82537**

**Int. Cl.$^5$ H01F *1/053***

**U.S. Cl. 148—302** **42 Claims**



1. A rare earth magnet alloy consisting essentially of, by weight, 8-20% of Sm, 6-20% of one or more of elements selected from the group consisting of Nd, Pr and Y, 10-25% of Fe, 5-10% of Cu, 0.1-1.0% of Ti, 1-4% of Zr, 0.1-1.0% of Mn, 0.003-0.015% of B, and remainder being Co, with a proviso that the total sum of the amount of elements selected from the group consisting of Nd, Pr and Y and the amount of Sm is within a range from 22% to 28%.

---

### 5,017,248
### HOT ROLLED STEEL SHEET WITH HIGH STRENGTH AND DISTINGUISHED FORMABILITY

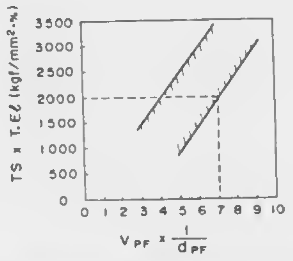
**Osamu Kawano, Oita; Manabu Takahashi, Tokyo; Junichi Wakita, and Kazuyoshi Esaka, both of Oita, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 201,408, Jun. 2, 1988, abandoned. This application Nov. 27, 1989, Ser. No. 442,445**

**Claims priority, application Japan, Jun. 3, 1987, 62-138060; Feb. 29, 1988, 63-44527**

**Int. Cl.$^5$ C22C *38/04, 38/02***

**U.S. Cl. 148—320** **4 Claims**



1. A hot rolled steel sheet with a high strength and a distinguished formability,

consisting essentially of 0.15 to 0.4% by weight of C, 0.5 to 2.0% by weight of Si, 0.5 to 2.0% by weight of Mn and 0.0005 to 0.0100% by weight of Ca, with S being limited to not more than 0.010% by weight and the balance being iron and inevitable impurities, and

having a microstructure composed of ferrite, bainite and retained austenite phase with the ferrite phase being in a ratio ($V_{PF}/d_{PF}$) of polygonal ferrite volume fraction $V_{PF}$ (%) to the polygonal ferrite average grain size $d_{PF}$(μm) of 7 or more and the retained austenite phase being contained in an amount of 5% by volume or more on the basis of the total phases,

wherein said steel sheet has a uniform elongation of 20% or more.

---

### 5,017,249
### NICKEL-BASE ALLOY

**Gaylord D. Smith; Curtis S. Tassen; Pasupathy Ganesan, all of Huntington, and Jack M. Wheeler, Lesage, all of W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.**

**Continuation-in-part of Ser. No. 242,732, Sep. 9, 1988, Pat. No. 4,877,461. This application Jul. 10, 1989, Ser. No. 377,675**

**The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.**

**Int. Cl.$^5$ C22C *19/05***

**U.S. Cl. 148—410** **10 Claims**

1. A nickel-chromium alloy having enhanced stress rupture strength and grain size stability at elevated temperatures up to about 1260° C. (2300° F.), the alloy consisting essentially of about 18-25% chromium, up to about 12% molybdenum, up to about 15% tungsten, up to about 15% cobalt, up to about 8% iron, the summation of molybdenum and tungsten ranging between about 10-16%, the summation of cobalt and iron ranging between about 3-18%, up to about 3% aluminum, up to about 5titanium, about 0.04-0.15% carbon, up to about 0.04% nitrogen, up to about 0.02% boron, about 0.05-0.75% silicon, up to about 0.05% zirconium, the balance nickel and trace elements, the alloy further characterized by a substantially recrystallized equiaxed microstructure including about 0.5-3.0% $M_6C$ carbide, the $M_6C$ carbide generally less than about 3 microns in diameter.

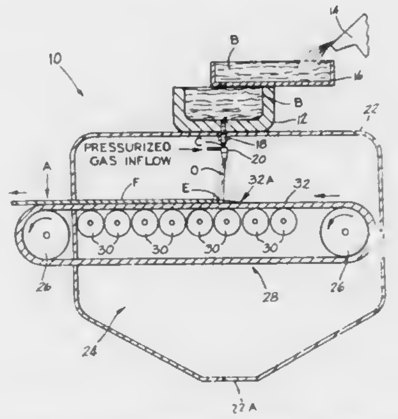
### 5,017,250
### COPPER ALLOYS HAVING IMPROVED SOFTENING RESISTANCE AND A METHOD OF MANUFACTURE THEREOF

**Sankaranarayanan Ashok, Bethany, Conn., assignor to Olin Corporation, New Haven, Conn.**

**Filed Jul. 26, 1989, Ser. No. 385,034**

**Int. Cl.$^5$ C22C *9/00***

**U.S. Cl. 148—411** **14 Claims**



1. A spray cast copper base alloy having improved resistance to thermally induced softening, comprising:

a coalesced multitude of droplets, each said droplet consisting essentially of:

copper; and

an alloying component selected from the group consisting of chromium, boron, vanadium, titanium and magnesium present in a concentration of from about 50 percent above to about 20 percent below the solid solubility point of said alloying component in copper and forming a uniformly dispersed second phase of peritectic or eutectic dispersoids throughout a matrix of said copper base alloy, said dispersoid having a mean particle size of from about 0.1 to about 1.0 micron.

---

### 5,017,251
### SHOCK-RESISTANT, LOW DENSITY EMULSION EXPLOSIVE

**Lawrence D. Lawrence, Sandy, and Walter B. Sudweeks, Orem, both of Utah, assignors to IRECO Incorporated, Salt Lake City, Utah**

**Filed Dec. 26, 1989, Ser. No. 457,085**

**Int. Cl.$^5$ C06B *45/00***

**U.S. Cl. 149—2** **11 Claims**

1. A shock-resistant permissible emulsion explosive comprising a water immiscible organic fuel as a continuous phase; an emulsified aqueous inorganic oxidizer salt solution as a discontinuous phase; an emulsifier; from about 1% to about 10% by weight of the explosive of small, hollow, dispersed spheres having a strength such that a maximum of about 10% of the spheres by volume collapse under a pressure of 500 psi; and sensitizing gas bubbles dispersed throughout the explosive and produced by the reaction of chemical gassing agents, in an amount sufficient to reduce the density of the explosive to less than 1.0 g/cc.

---

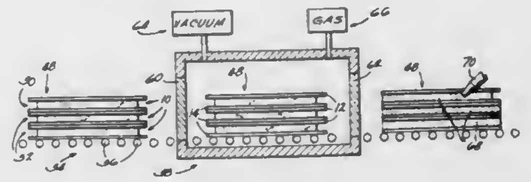
### 5,017,252
### METHOD FOR FABRICATING INSULATING GLASS ASSEMBLIES

**Darrell L. Aldrich, Sellersville, Pa., and John R. Jacobs, Madison, Wis., assignors to Interpane Coatings, Inc., Deerfield, Wis.**

**Continuation of Ser. No. 280,773, Dec. 6, 1988, abandoned. This application Jun. 12, 1990, Ser. No. 536,509**

**Int. Cl.$^5$ C03C *27/06;* E06B *3/66***

**U.S. Cl. 156—109** **16 Claims**



1. A method for fabricating a plurality of insulating glass assemblies, said method comprising the steps of

providing a plurality of glass assemblies each including a pair of generally parallel, spaced glass panes having therebetween an endless spacer, said spacer and said panes defining an interior space between said panes and inside said spacer, and said spacer having therethrough a passage affording gas flow into and out of said space,

stacking said glass assemblies one on top of another to provide an uppermost assembly and at least one supporting assembly beneath said uppermost assembly, with said panes extending generally horizontally and with a pane of each supporting assembly supporting a pane of an adjacent assembly,

placing said glass assemblies in a chamber,

creating a vacuum in said chamber so as to remove substantially all of the air from said spaces,

introducing into said chamber a gas having a coefficient of thermal conductivity lower than that of air so that said gas fills said spaces,

removing said glass assemblies from said chamber, and closing said passages in said glass assemblies.

---

### 5,017,253
### METHOD FOR APPLYING TIRE MATERIAL

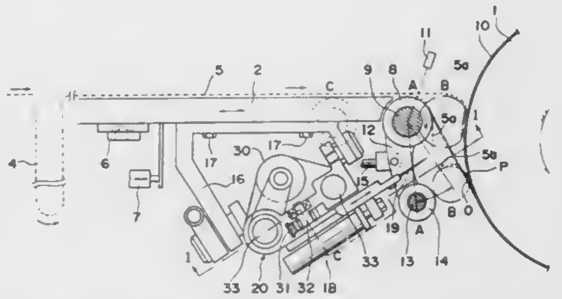
**Kazuo Satoh, Kobe, and Tsutomu Nosaka, Hyogo, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**

**Continuation of Ser. No. 140,753, Jan. 4, 1988, abandoned, which is a division of Ser. No. 829,542, Feb. 10, 1986, Pat. No. 4,738,743, which is a continuation of Ser. No. 413,062, Aug. 30, 1982, abandoned. This application Jun. 6, 1989, Ser. No. 364,569**

**Claims priority, application Japan, Aug. 31, 1981, 56-136432; Aug. 31, 1981, 56-136433**

**Int. Cl.$^5$ B29D *30/08, 30/00;* B65C *9/04***

**U.S. Cl. 156—130.3** **2 Claims**



1. In a method for applying a strip of tire material onto a building drum including the steps of feeding a leading end of the tire material toward a surface of the building drum, then winding the tire material onto said building drum surface under

VOL
1126
ISS
3
MY
21
1991
UMI

the rotation of the building drum in one direction, next cutting the tire material in a predetermined length thereof while the tire material is being wound around the building drum, after temporarily stopping the rotation of the building drum, and then completing the winding of the cut tire material around the building drum upon the resumed rotation of the building drum,

the improvement comprising the steps of, after feeding the leading end of the tire material toward said surface of the building drum and before winding the material around the building drum with the rotation of the building drum, pressing a predetermined portion of the tire material positioned slightly behind a leading edge of said leading end against the building drum by a roller, which is shifted downwardly from a position above the building drum to contact with and press the tire material on the building drum, and causing said leading end of the tire material with a given length from said predetermined portion to said leading edge to be pressed and applied along the building drum by said roller, which is moved a certain distance around said surface of the building drum toward said leading edge while pressing the tire material onto the building drum.

---

### 5,017,254
### METHOD OF MAKING INFLATABLE BODIES

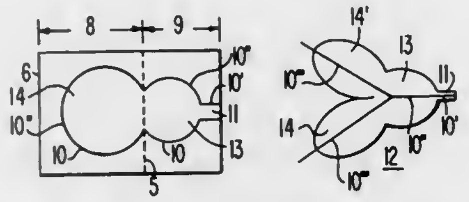
**Tatsuo Noguchi, Osaka, Japan, assignor to Nihonmatal Co., Ltd., Tokyo, Japan**

**Filed Nov. 7, 1988, Ser. No. 268,477**

**Claims priority, application Japan, Mar. 19, 1988, 63-66368; May 2, 1988, 63-109784**

**Int. Cl.$^5$ B32B *31/00***

**U.S. Cl. 156—227** **6 Claims**



1. A method for producing a floating body such as a balloon which has a fist swelling portion with a gas inlet port and a plurality of second swelling portions each communicating with said first swelling portion, comprising the steps of:

folding a single multi-layer film having a sealing capability to form a nonpleat portion and pleat portions so that said nonpleat portion corresponds to said first swelling portion of said floating body correspond to said plurality of second swelling portions;

sealing the folded multi-layer film along a continuous seal line which extends over both said pleat and nonpleat portions and forms said gas inlet port in said nonpleat portion, to produce said first swelling portion and said plurality of second swelling portions; and

cutting and removing material located externally of the sealed multi-layer film along a line substantially parallel to said seal line.

---

### 5,017,255
### METHOD OF TRANSFERRING AN INORGANIC IMAGE

**Clyde D. Calhoun, Stillwater, and David C. Koskenmaki, St. Paul, both of Minn., assignors to Clyde D. Calhoun, Stillwater, Minn.**

**Filed Jan. 23, 1989, Ser. No. 300,334**

**Int. Cl.$^5$ B32B *31/14***

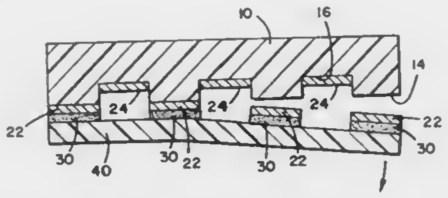
**U.S. Cl. 156—230** **12 Claims**

1. A method of transferring an image to a transfer substrate comprising the steps of:

a) providing an embossed substrate having a relief surface with a pattern formed therein, said relief surface having a raised surface portion and a recessed surface portion;

b) depositing an inorganic layer directly onto said relief surface, thereby providing an image layer on said raised surface portion, wherein a bond of strength X is formed between said image layer and said raised surface portion of said embossed substrate.

c) providing a layer of adhesive over at least said image layer;



d) contacting said layer of adhesive provided over said image layer with a transfer substrate;

e) forming an adhesive bond of strength Y between said transfer substrate and said image layer, wherein Y is greater than X; and

f) separating said embossed substrate and said transfer substrate, wherein said image layer is transferred to said transfer substrate.

---

### 5,017,256
### METHOD OF USING A HEAT-SENSITIVE MELT-TRANSFER RECORDING MEDIUM

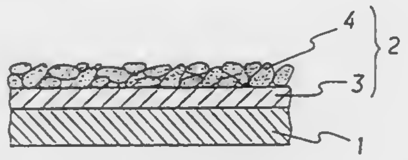
**Yasuyuki Ohtomo, Suita, and Yoshiyuki Obata, Ibaraki, both of Japan, assignors to Fuji Kagakushi Kogyo Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 46,814, Apr. 8, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 289,505**

**Claims priority, application Japan, Aug. 10, 1985, 60-176283**

**Int. Cl.$^5$ B41M *5/26***

**U.S. Cl. 156—240** **2 Claims**



1. A process for producing printed images on a film for an overhead projector which comprises:

providing a heat-sensitive melt-transfer recording medium comprising a support and a heat-sensitive melt-transfer ink layer provided on one side thereof, said ink layer comprising a colored ink layer (A) containing a wax and a layer (B) which is formed on the surface of said colored ink layer (A) and which comprises a wax in the form of microcrystals as a main component, wherein said layer (B) is formed by applying onto the ink layer (A) a dispersion of a wax in the form of microcrystals in a medium comprising at least a solvent for said wax and drying the resultant wet layer at a temperature at which the wax microcrystals do not dissolve and the amount of said layer (B) is from 0.1 to 2 g/m$^2$ of the surface of said colored ink layer (A); and

transferring said heat-sensitive melt-transfer ink layer from said recording medium to a film for an overhead projector by application of heat to give a printed image on the film wherein said layer (B) containing said wax is adjacent to the film.

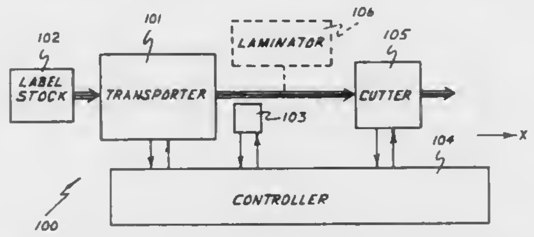
### 5,017,257
### VARIABLE LENGTH DIE CUTTER AND METHOD OF CUTTING COMPOSITE LABEL

**William J. Murphy, South Acworth, N.H., assignor to Imtec Inc., Bellows Falls, Vt.**

**Filed Dec. 26, 1989, Ser. No. 456,494**

**Int. Cl.$^5$ B32B *31/00;* B26D *5/00, 5/20, 5/28***

**U.S. Cl. 156—268** **32 Claims**



26. A method of cutting a composite label in two dimensions with or without cutting the backing of the composite label on which is disposed a plurality of labels, that comprises:

transporting the composite accurately translationally in a direction;

ascertaining the exact location of individual labels on the composite and providing signals to permit the transporting to be achieved accurately translationally in said direction;

providing a cutter and actuator assembly comprising a two-dimensional cutter of fixed dimensions capable of cutting in two axes, the cutter and actuator assembly being interconnected to provide signals to enable the transporting accurately translationally;

effecting accurate cuts of labels in said direction while moving the composite in the said direction, said accurate cuts being variable in length in said direction; and

controlling said length of the variable cut in the said direction.

---

### 5,017,258
### PIPE REHABILITATION USING EPOXY RESIN COMPOSITION

**Ralph E. Brown; Marlene Canahuati, and Roy J. Jackson, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Continuation of Ser. No. 876,555, Jun. 20, 1986, abandoned. This application Nov. 6, 1987, Ser. No. 120,190**

**Int. Cl.$^5$ B29C *63/26***

**U.S. Cl. 156—294** **13 Claims**

1. A method for lining the interior of a pipe comprising impregnating an adsorbent substrate with a composition comprising an epoxy resin having an average of more than one vicinal epoxide group per molecule and from about 0.5 to about 15 weight percent, based on the weight of the epoxy resin, of a non-1-substituted imidazole, placing the thus-impregnated substrate within the pipe to be lined and in contact with an interior surface thereof, and curing the epoxy resin, thereby causing the impregnated substrate to harden and form an essentially cylindrical interior liner for the pipe.

---

### 5,017,259
### PREPARATION OF CATHETER INCLUDING BONDING AND THEN THERMOFORMING

**Tadashi Kohsai, Fuji, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 10, 1989, Ser. No. 419,033**

**Claims priority, application Japan, Oct. 13, 1988, 63-257845**

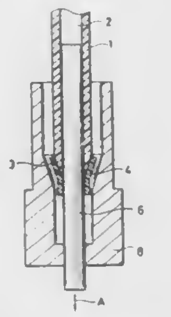
**Int. Cl.$^5$ A61M *25/00;* B29C *65/02, 65/48***

**U.S. Cl. 156—294** **10 Claims**

1. A method for preparing a catheter, comprising the steps of preparing a catheter body having a distal portion with a distal end, and a lumen axially extending through the body to the distal end,

processing the distal portion of the catheter body such that the outer diameter of the distal portion reduces toward the distal end,

bonding a hollow cylindrical tip member of a material softer than the catheter body and having an inner diameter substantially equal to that of the catheter body to the diameter-reducing distal portion of the catheter body, and



next thermoforming the catheter body distal portion and the tip member such that outer and inner wall surfaces of the tip member connect smoothly to those of the catheter body.

---

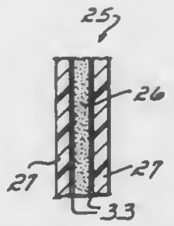
### 5,017,260
### ANTI-STATIC COATED PAPERBOARD OR SIMILAR RIGID MATERIAL

**Judsoo A. Bardford, Holland, Mich., assignor to Bradford Company, Holland, Mich.**

**Continuation-in-part of Ser. No. 336,733, Apr. 12, 1989, which is a continuation-in-part of Ser. No. 190,044, May 4, 1988. This application Jun. 15, 1989, Ser. No. 366,434**

**Int. Cl.$^5$ B65B *81/24, 27/10, 7/00***

**U.S. Cl. 156—308.2** **2 Claims**



1. A method of forming a multiple-ply anti-static material comprising the steps of:

forming a relatively rigid ply of material, said ply having first and second surfaces;

forming a layer of precast, amine-free permanently anti-static/static-dissipative plastic which has been subjected to high-energy, electron-beam radiation,

applying a layer of molten adhesive to at least one surface of said rigid ply of material or said plastic, and

laminating said layer of plastic onto at least one of said first and second surfaces of said rigid ply of material while said adhesive is in a molten state so that said layer of plastic is secured to said at least one surface by said adhesive after cooling of said adhesive, said layer of plastic having been rendered permanently anti-static/static-dissipative prior to lamination to said one of said first and second surfaces, said anti-static plastic having a surface resistivity of greater than $10^5$ but less than $10^{12}$ ohms per square.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,261

## LABELLING MACHINE FOR OBJECTS SUCH AS BOTTLES OR THE LIKE

**Rudolf Zodrow, and Rainer Buchholz, both of Düsseldorf, Fed. Rep. of Germany, assignors to ETI-TEC Maschinenbau GmbH, Erkrath, Fed. Rep. of Germany**

**Filed Apr. 7, 1989, Ser. No. 335,177**

**Claims priority, application Fed. Rep. of Germany, Apr. 9, 1988, 3811869; Jul. 14, 1988, 3823893; Jul. 14, 1988, 3823894**

**Int. Cl.$^5$ B65C** *9/12, 9/22, 9/36*

**U.S. Cl. 156—568** **27 Claims**

1. Labelling machine for supplying labels to bottles or the like; said labelling machine including a plurality of stations located one behind another along a track; the plurality of stations including an adhesive application station, a label feed station, and a label transfer station; said labelling machine comprising:

a rotating support mounted on a central axis for rotation by each of the plurality of stations;
at least one extracting means for the labels;
each said extracting means including a drive shaft means and being mounted at said drive shaft means for rotation on said rotating support for movement by each of the stations during each rotation of said rotating support:
means for rotating each said extracting means including cam means and follower means;
said cam means including a first cam disc and a second cam disc;
said first cam disc and said second cam disc being disposed below said rotating support at said central axis;
said first cam disc including a first outer cam surface extending about said central axis:
said second cam disc including a second outer cam surface extending about said central axis;
said first cam disc being disposed axially above and separated from said second cam disc by an axial space therebetween;
means for operably connecting said follower means to said drive shaft means;
said follower means being mounted for rotation about a follower axis on said rotating support to cause said rotation of said extracting means;
means including a follower support element dispersed in a plane axially above said first cam disc;
said follower means including a first pair of followers aligned with said first cam disc for making contact with said first outer cam surface and a second pair of followers aligned with said second cam disc for making contact with said second outer cam surface;
said first pair of followers being mounted on said follower support element at substantially opposite sides of said follower axis to extend below said follower support element;
said follower means including a bridge element disposed in said axial space between said first cam disc and said second cam disc;
said second pair of followers being mounted on said bridge element al substantially opposite sides of said follower axis to extend below said bridge element; and
means for mounting said bridge element to said follower support element at locations thereon which are radially disposed from said follower axis to prevent interfering contact with said first cam disc during rotation of said follower means about said cam means.

---

### 5,017,262

## MATERIAL-WEB MARKING BY MEANS OF BAR CODE

**Johann Riesing, Vienna, Austria, assignor to Oesterrechisches Forschungszentrum Seibersdorf Ges. M.B.H., Vienna, Austria**

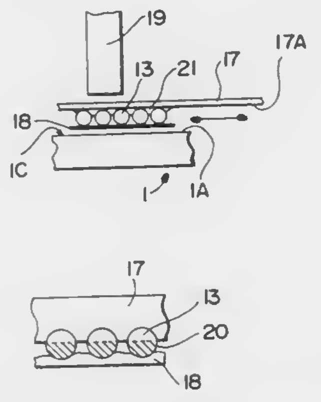
**PCT No. PCT/AT88/00053, § 371 Date Jan. 16, 1990, § 102(e) Date Jan. 16, 1990, PCT Pub. No. WO89/00740, PCT Pub. Date Jan. 26, 1989**

**PCT Filed Jul. 19, 1988, Ser. No. 477,854**

**Claims priority, application Austria, Jul. 21, 1987, 1851/87**

**Int. Cl.$^5$ B32B** *31/00;* **B44C** *1/22, 1/165;* **C23F** *1/02*

**U.S. Cl. 156—630** **54 Claims**



1. A method of coating an object, comprising the steps of:

placing a code containing a predeterminate number of code markings having a predeterminate dimension at predeterminate spacings between each other on a flat surface portion of the object;
using, as said predeterminate number of code markings, code markings having different reflectivities for electromagnetic radiation used for scanning said predeterminate number of code markings for identifying the object;
said step of placing said code on said flat surface portion of said object entailing the step of imparting to preselected ones of said predeterminate number of code markings an increased reflectivity for said electromagnetic scanning radiation in comparison to the reflectivity for said electromagnetic scanning radiation of remaining ones of said predeterminate number of code markings; and
said step of imparting said increased reflectivity to said preselected code markings for said electromagnetic scanning radiation entailing the step of adhesively bonding to preselected surface areas of said flat surface portion of the object, glass beads having a diameter in the range of 0.01 mm to 1 mm and a refractive index above 1.5.

---

### 5,017,263

## OPTOELECTRONIC DEVICE PACKAGE METHOD

**Harold R. Clark, Fanwood, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

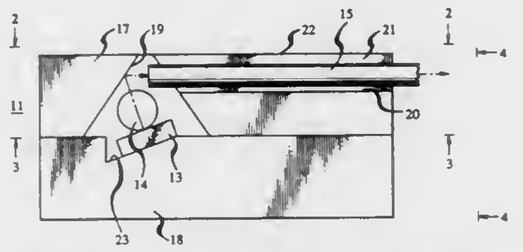
**Filed Dec. 23, 1988, Ser. No. 289,093**

**Int. Cl.$^5$ H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—633** **12 Claims**

1. A method for making an optoelectronic device package comprising the steps of mounting an optical fiber such that it extends in a first direction; defining a reflective surface; mounting an optoelectronic device such that an optical path is described between the optoelectronic device and the optical fiber by way of the reflecting surface, characterized in that:

the reflecting surface is defined by masking and etching a first monocrystalline element to a first crystallographic plane, the plane extending at a first angle with respect to the first direction,
defining a mounting surface by masking and etching a second monocrystalline element along a second crystallagraphic plane at a second angle with respect to the first direction, the second monocrystalline element having a crystal orientation different from that of the first monocrystalline element;



and mounting the optoelectronic device on the mounting surface, whereby the optoelectronic device is oriented at a predetermined angle with respect to the optical path.

---

### 5,017,264

## METHOD OF ELIMINATING CARBON MATERIAL BY CHEMICAL VAPOR REACTION

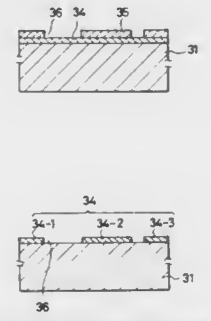
**Shunpei Yamazaki, Tokyo, and Kenji Itoh, Zama, both of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Division of Ser. No. 324,663, Mar. 17, 1989, Pat. No. 4,975,144. This application Sep. 14, 1990, Ser. No. 582,769**

**Claims priority, application Japan, Mar. 22, 1988, 63-67573; Mar. 22, 1988, 63-67574; Mar. 26, 1988, 63-72891**

**Int. Cl.$^5$ B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643** **4 Claims**



1. An etching process of a carbon film formed on a substrate comprising the steps of:

disposing said substrate with the carbon film in a reaction chamber;
inputting an etchant gas selected from the group comprising of $H_2$ and $O_2$ into said reaction chamber;
supplying an electrical energy to said etchant gas so that said etchant gas is excited;
etching at least a portion of said carbon film by virtue of said excited etchant gas.

---

### 5,017,265

## METHOD FOR REMOVING RESIDUAL MATERIAL FROM A CAVITY DURING THE MANUFACTURE OF A SEMICONDUCTOR DEVICE BY UTILIZING PLASMA SCATTERING

**Hae S. Park; Sang I. Kim; Sea C. Kim; Kye S. Park, and Jin G. Park, all of Seoul, Rep. of Korea, assignors to Hyundai Electronics Industries Co., Ltd., Ichon-Kuni, Rep. of Korea**

**Filed Dec. 20, 1989, Ser. No. 453,593**

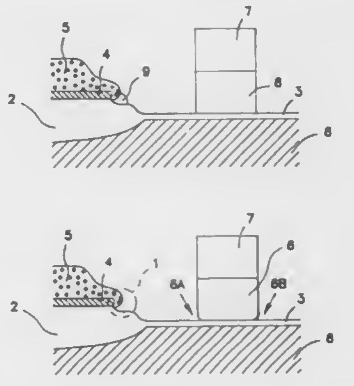
**Claims priority, application Rep. of Korea, Dec. 20, 1988, 88-17007**

**Int. Cl.$^5$ H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643** **4 Claims**

1. A method for removing residual material which remains in a cavity after an anisotropic etching process in the manufacture of a partially completed multi-layer semiconductor device, the cavity being in contact with at least one anisotropic etch-stop layer and where the cavity is accessible by an etchable layer, said method comprising the steps of:

providing a plasma etching apparatus having a chamber:
etching the etchable layer by anisotropic etching utilizing the plasma etching apparatus under predetermined conditions in the chamber of the plasma etching apparatus until a top of the etch-stop layer is exposed; and,
performing a plasma scattering etching process to remove the residual material in the cavity by changing the predetermined conditions of the anisotropic etching process to produce plasma scattering upon completion of the exposure of the top of the etch-stop layer, thereby removing the residual material from the cavity.



---

### 5,017,266

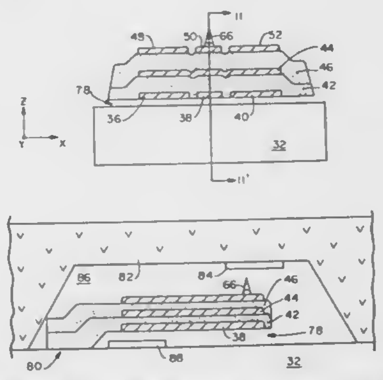
## METHOD OF MAKING AN INTEGRATED SCANNING TUNNELING MICROSCOPE

**Mark Zdeblick, Los Altos Hills, and Thomas R. Albrecht, Stanford, both of Calif., assignors to Stanford University, Stanford, Calif.**

**Division of Ser. No. 348,704, May 8, 1989, which is a division of Ser. No. 149,236, Jan. 27, 1988, Pat. No. 4,906,840. This application Jan. 10, 1990, Ser. No. 463,056**

**Int. Cl.$^5$ H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00;* **C23F** *1/02*

**U.S. Cl. 156—643** **1 Claim**



1. A method of forming a piezoelectric motion transducer comprising:

forming a membrane in a substrate by etching a pit in a first surface of said substrate;
forming by any suitable microfabrication techniques a piezoelectric bimorph having first and second ends, said bimorph formed on a surface of a substrate opposite said first surface, said bimorph comprising first and second thin film piezoelectric layers sandwiched between a plurality of thin film conductors arranged relative to said thin

VOL 1126
ISS 3
MY 21
1991
UMI

piezoelectric films such that, when said bimorph has said second end freed from said substrate, three dimensional motion can be imparted to said second end by application of suitable voltage differences between pairs of said electrodes, said second end being formed over said membrane; and

freeing said second end of said bimorph from said substrate by etching through said membrane to leave said first end of said bimorph integrally attached to said substrate and thereby leaving said second end of said bimorph cantilevered in free space.

---

### 5,017,267

### COMPOSITION AND METHOD FOR STRIPPING TIN OR TIN-LEAD ALLOY FROM COPPER SURFACES

**John L. Cordani, Waterbury, Conn., assignor to MacDermid, Incorporated, Waterbury, Conn.**

**Filed Jul. 17, 1990, Ser. No. 554,126**

**Int. Cl.$^5$ B44C** *1/22;* **C23F** *1/02;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—656** **22 Claims**

10. A method for stripping tin or tin-lead alloy, and any underlying copper-tin alloy, from a copper surface, comprising contacting said surface with a composition comprising an aqueous solution of an alkane sulfonic acid, ferric nitrate and a solution-soluble source of chlorate ion, each present in said composition in amounts such that the composition is effective for said stripping without bringing about substantial formation of sludge, precipitate or suspended by-products, for a time and at a temperature effective to bring about said stripping.

---

### 5,017,268

### FILLER COMPOSITIONS AND THEIR USE IN PAPERMAKING

**Barbara M. Clitherow, Harpenden; Trevor W. R. Dean, Arlesey; John A. Gascoigne, Hitchin, all of United Kingdom, and Bernhard E. Van Issum, Geneva, Switzerland, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**PCT No. PCT/GB87/00613, § 371 Date Jun. 27, 1988, § 102(e) Date Jun. 27, 1988, PCT Pub. No. WO88/02048, PCT Pub. Date Mar. 24, 1988**

**PCT Filed Sep. 2, 1987, Ser. No. 192,879**

**Claims priority, application United Kingdom, Sep. 9, 1986, 8621680**

**Int. Cl.$^5$ D21H** *23/02*

**U.S. Cl. 162—146** **8 Claims**

1. An improved process for the manufacture of a fibrous sheet material by dewatering an aqueous slurry of fibers, and in which (a) filler particles are added to the aqueous slurry, before the dewatering, wherein the improvement is characterized by first making a filler/fiber composition of the filler particles (a) with (b) synthetic organic hydrophobic fibers by treating the fibers (b) with the filler particles (a) and with (c) a polymer that coats the fibers (b) and functions as a coupling agent between the filler particles (a) and the said fibers (b), and then incorporating said filler/fiber composition in the aqueous slurry.

---

### 5,017,269

### METHOD OF CONTINUOUSLY CARBONIZING PRIMARILY ORGANIC WASTE MATERIAL

**Bernard A. Loomans; James E. Kowalczyk, both of Saginaw; Harold A. Lange, Freeland, and Jerry W. Jones, Bay City, all of Mich., assignors to APV Chemical Machinery Inc., Saginaw, Mich.**

**Continuation-in-part of Ser. No. 291,131, Dec. 28, 1988, Pat. No. 4,908,104. This application Nov. 20, 1989, Ser. No. 438,099**

**The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.**

**Int. Cl.$^5$ C10B** *53/02, 57/14*

**U.S. Cl. 201—25** **23 Claims**

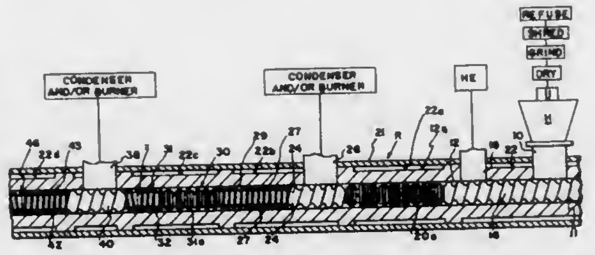
1. A method of continuously carbonizing a mixture of waste material from vehicles which are being junked to recycle the metallic material which consists in large proportion of shredded synthetic plastic material, and reducing the mixture to a useful char product comprising the steps of:

a. continuously feeding a stream of the shredded waste material into one end of a twin screw mixer having an axially extending, elongate barrel, with a barrel chamber of uniform size figure-eight cross section from said one end to the other end, and housing a pair of co-rotating axially extending shafts;

b. progressively compressing the material fed into said one end of the mixer by advancing the material continuously through co-rotating mixing and material conveying elements on said shafts which leave a reduced volume of space in the uniform size barrel for the material to the extent of forming a barrel-filling mass of moving material functioning as a first vapor block, and utilizing the work energy imparted to the material required to compress the material to squeeze out entrapped air, and without applying any material external heat to the mixer for transfer to the material, to maintain the temperature of the material adiabatically;

c. venting air at a first vent region upstream from said first vapor block;

d. continuing to advance the material in a downstream direction from said first vapor block by advancing the material through co-rotating mixing and material conveying elements on said shafts and decompressing the material in a second vent region, having a vent, to provide a traveling mass of material which does not so fill the barrel as to be forced out the vent in said second vent region;



e. progressively recompressing the material in the absence of air in a first recompression region by passing the material through co-rotating mixing and material conveying elements on said shafts which leave a relatively reduced volume of space in the uniform size barrel for the material to the extent of forming a mass of moving material filling the barrel and functioning as a second vapor block, while utilizing the work energy required to recompress the material, without applying any material external heat to the mixer for transfer to the material, to maintain the temperature of the material adiabatically at lighter volatile vaporizing temperatures;

f. venting lighter volatiles from said second vent region;

g. continuing to advance the material by advancing it through co-rotating mixing and material conveying elements on said shafts and decompressing the material in a third vent region, having a vent, to provide a traveling mass of material which does not so fill the barrel as to be forced out the vent in said third vent region;

h. progressively again advancing and recompressing the material in the absence of air in a second recompression region by passing the material through co-rotating mixing and material conveying elements on said shafts which leave a relatively reduced volume of space in the uniform size barrel for the material to the extent of forming a mass of moving material filling the barrel and functioning as a third vapor block, while utilizing the work energy required to recompress the material, without applying any material external heat to the mixer for transfer to the moving material, to maintain the temperature of the material adiabatically at material carbonizing and heavier volatile releasing temperatures in the neighborhood of the range 450° F.–600° F.;

i. venting heavier volatiles from said third vent region; and

j. discharging a friable particulate char from the other end of the mixer.

---

### 5,017,270

### METHOD OF REDUCING NOX-CONTENT IN FLUE GAS DURING HEATING OF COKING OVEN

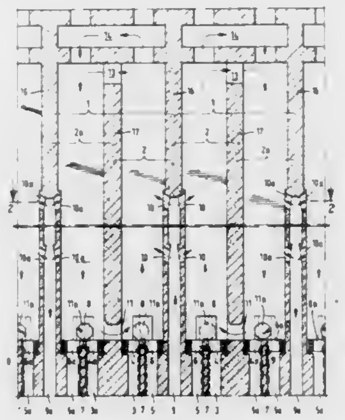
**Johannes Janicka, Oberhausen; Günter Meyer, and Heinz Dürselen, both of Essen, all of Fed. Rep. of Germany, assignors to Krupp Koppers GmbH, Essen, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 339,235, Apr. 14, 1989, abandoned. This application Aug. 2, 1990, Ser. No. 561,941**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1988, 3812558**

**Int. Cl.$^5$ C10B** *5/04, 21/22*

**U.S. Cl. 201—41** **3 Claims**



1. A method of reducing $NO_x$-content in a flue gas during heating of a coking oven having a plurality of heating trains cooperating in pairs with a flue gas return passage in each of said pairs at the height of the heating train sole defining a lower combustion stage and an upper combustion stage arranged the lower combustion stage, said method comprising the steps of:

adjusting a circulating stream rate defined by a volume stream of a returned flue gas divided by a flue gas volume stream without returned flue gas to between 20% and 50%;

maintaining a stage ratio for a combustion stage number equal at least to 2 defined as an air volume stream of the lower combustion stage divided by a total air volume stream, equal to between 80/l% and 140/l% wherein l is the number of combustion stages;

arranging the upper combustion stage at $(45 \pm 10\%) \times (l-1)$ of the heating train height;

providing a plurality of poor gas supply points only at the height of the heating train sole for supplying poor gas only at the height of the heating train sole and providing a plurality of primary air supply points at the height of the heating train sole for admixing air to the poor gas; and

providing a plurality of secondary air supply points at the level of the upper combustion stage for supplying only air to the upper combustion stage.

---

### 5,017,271

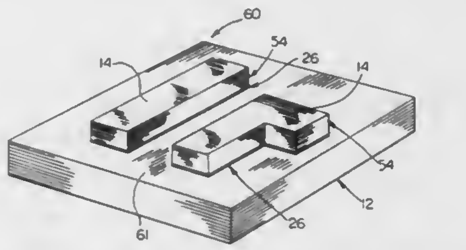
### METHOD FOR PRINTED CIRCUIT BOARD PATTERN MAKING USING SELECTIVELY ETCHABLE METAL LAYERS

**Christopher J. Whewell, Chesterland; Sidney J. Clouser, Chardon, and Chin-ho Lee, Lyndhurst, all of Ohio, assignors to Gould Inc., Eastlake, Ohio**

**Filed Aug. 24, 1990, Ser. No. 572,849**

**Int. Cl.$^5$ C25D** *5/02;* **B05D** *03/04, 5/10*

**U.S. Cl. 204—15** **30 Claims**



1. A method of producing a circuit board comprising the steps of:

(A) depositing a layer of a first metal upon a layer of a second metal having a different chemical composition than the layer of first metal;

(B) attaching the layers of first and second metal to a support such that the layer of first metal is located between the support and the layer of second metal;

(C) removing the layer of second metal from the layer of first metal to form a thin metal laminate;

(D) applying a photoresist to the layer of first metal and irradiating portions of the photoresist;

(E) removing portions of the photoresist so as to uncover portions of the layer of first metal and form a pattern; and

(F) depositing a layer of third metal having a different chemical composition than the layer of first metal upon the uncovered portions of the layer of first metal.

---

### 5,017,272

### METHOD FOR FORMING A CONDUCTIVE FILM ON A SURFACE OF A CONDUCTIVE BODY COATED WITH AN INSULATING FILM

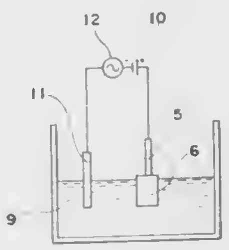
**Hidenori Kamigawa, Saga, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi and Saga Sanyo Industry Co., Ltd., Saga, both of, Japan**

**Filed Jun. 19, 1990, Ser. No. 540,061**

**Claims priority, application Japan, Jun. 20, 1989, 1-157399; Jul. 18, 1989, 1-185598**

**Int. Cl.$^5$ C25D** *9/02*

**U.S. Cl. 204—56.1** **13 Claims**



1. Electrolytic coating method for a conductive body on the surface of which an insulating film has been formed comprising the following steps

(a) forming an insulating film on a surface of a conductive body,

(b) dipping said conductive body and a counter electrode in an electrolyte,

(c) applying a pulse-like current between said conductive body and said counter electrode through said electrolyte

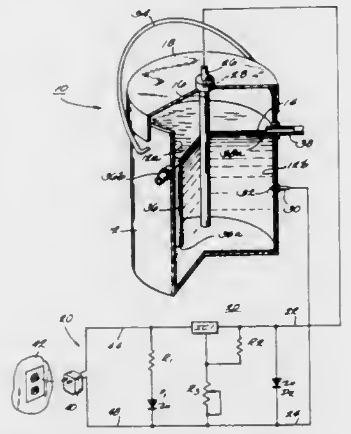
VOL
1126
ISS
3
MY
21
1991
UMI

and said insulating film in such a manner that any negative voltage is not applied to said conductive body and
(d) thereby forming a conductive high-polymer film on said insulating layer by electrolytic polymerization.

---

### 5,017,273
### DISPOSABLE CELL FOR RECOVERING CONDUCTIVE METAL AND METHOD OF USING

**Gunter Woog, 5435 Bauers Dr., West Bend, Wis. 53095**
**Continuation-in-part of Ser. No. 208,767, Jun. 20, 1988, abandoned. This application Mar. 23, 1989, Ser. No. 327,998**
**The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.**
**Int. Cl.$^5$ C25C *1/00***
**U.S. Cl. 204—105 R** **21 Claims**



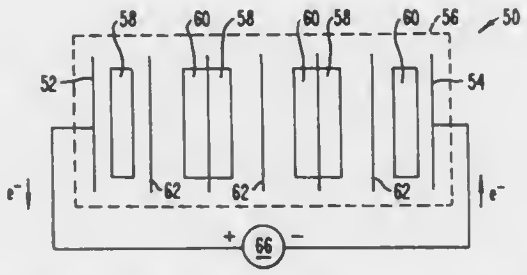
1. An apparatus for recovering a conductive metal from a liquid containing said metal in solution, said apparatus comprising:
- a first container for containing an amount of said liquid;
- a second container defining a cavity, in liquid communication with said first container and constructed of a material which is easily removed from said metal by smelting;
- a first electrode removably affixed partially within said cavity;
- a second electrode comprising a thin film applied to the inside surface of said container;
- a pump having an outlet in said second container, for pumping said liquid from said first container into said second container, said liquid returning to said first container via return means; and
- a power supply electrically connected to said electrodes in such a way as to result in said first electrode being an anode and said second electrode being a cathode, thus causing said metal to be deposited on said second electrode.

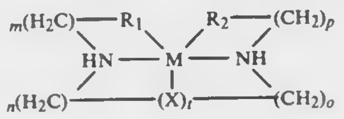
---

### 5,017,274
### METHOD AND SYSTEMS FOR EXTRACTING OXYGEN EMPLOYING ELECTROCATALYSTS

**John B. Kerr, Oakland; Emory S. De Castro, Emeryville, and Bruce Zenner, Hercules, all of Calif., assignors to Aquanautics Corporation, Alameda, Calif.**
**Continuation-in-part of Ser. No. 18,888, Feb. 25, 1987, abandoned. This application Jul. 20, 1989, Ser. No. 383,381**
**Int. Cl.$^5$ C25B *1/02***
**U.S. Cl. 204—129** **31 Claims**

1. A method for extracting molecular oxygen from a fluid mixture feedstock, said method comprising:
exposing a carrier fluid to the feedstock, said carrier fluid including a carrier compound able in a first oxidation state of binding oxygen and in a second oxidation state of releasing bound oxygen;
exposing the carrier fluid to a first electrode of an electrochemical cell using an electrocatalyst to transfer electrons between the electrode and the carrier compound, whereby the first oxidation state of the carrier compound is converted to the second oxidation state to release bound oxygen, and wherein the electrocatalyst is selected from the group consisting of substituted ferrocenes and iodide ion; and
exposing the carrier fluid to a second electrode of the electrochemical cell, whereby the carrier compound is converted back to the first oxidation state so that said carrier compound is again able to bind oxygen; and
wherein the carrier compound is of the formula:



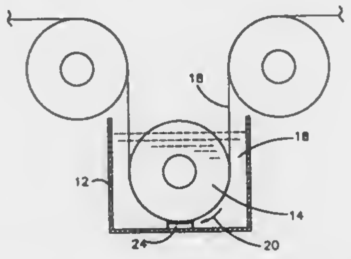


where,
- each of $R_1$ and $R_2$ is independently an organic group including a nitrogen coordinated to M;
- each of m, n, o, and p is independently 1, 2, 3, or 4;
- t is 0 or 1;
- X is selected from the group consisting of substituted heterocyclic amines, —O—, —S—, $>P—R_3$, and $>N—R_3$, where $R_3$ is hydrogen, lower alkyl, or aralkyl; and
- M is a transition metal ion selected from titanium, manganese, chromium, iron, cobalt, nickel, copper, ruthenium, rhodium, palladium, osmium, iridium, and platinum.

---

### 5,017,275
### ELECTROPLATING CELL ANODE

**Andrew J. Niksa, Concord, and Gerald R. Pohto, Mentor, both of Ohio, assignors to Eltech Systems Corporation, Boca Raton, Fla.**
**Filed Oct. 23, 1989, Ser. No. 425,084**
**Int. Cl.$^5$ C25D *17/00, 17/10***
**U.S. Cl. 204—206** **35 Claims**



21. An electroplating cell for depositing a coating onto a moving cathode in strip form comprising:
an electroplating bath;
means guiding said cathode strip so that it follows a predetermined path of travel in said bath;
an anode, immersed in said electroplating bath, and comprising a thin a resilient, but solid and flexible anode sheet having a broad, active anode surface, and an anode substructure for said anode sheet, said anode substructure having a configuration which matches said path of travel of said cathode strip;
said anode sheet having a non-flexed configuration different from said anode substructure configuration and a flexed configuration which conforms to said substructure configuration; and
means for holding said anode sheet on said anode substructure in said flexed configuration with a broad anode surface, opposite said active anode surface, being in intimate, flexed contact with a broad surface of said anode substructure.

---

### 5,017,276
### METAL ELECTRODES FOR ELECTROCHEMICAL PROCESSES

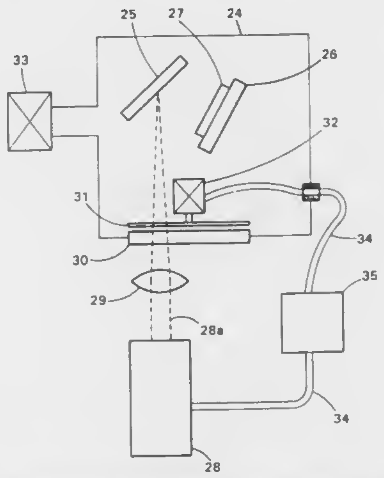
**Raymond E. Alford, West Vancouver, and deceased Warren, late of Richmond, both of Canada by Judith A. Warren, executor , assignors to Chemetics International Company Ltd., Vancouver, Canada**
**Filed Dec. 26, 1989, Ser. No. 456,738**
**Int. Cl.$^5$ C25B *11/04***
**U.S. Cl. 204—290 R** **7 Claims**

1. A metallic electrode for electrochemical processes comprising a metal support and on at least a portion of said support, a conductive coating consisting essentially of a mixed oxide compound of (i) a compound of the general formula $ABO_4$ having a rutile structure, where A is an element in the trivalent state selected from the group consisting Al, Rh, and Cr, and B is an element in the pentavalent state selected from the group consisting of Sb and Ta, (ii) $RuO_2$, and (iii) $TiO_2$; wherein the mole fraction of $ABO_4$ is in the 0.01 to 0.42 range and the mole fraction of $RuO_2$ is in the range 0.03 to 0.42 and the mole fraction of $TiO_2$ is in the range of 0.14 to 0.96.

---

### 5,017,277
### LASER SPUTTERING APPARATUS

**Yoshikazu Yoshida; Kunio Tanaka; Yukio Nishikawa, and Yusuke Takada, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Jul. 6, 1989, Ser. No. 376,087**
**Claims priority, application Japan, Jul. 7, 1988, 63-169440; Dec. 21, 1988, 63-322647; Feb. 10, 1989, 1-31791**
**Int. Cl.$^5$ C23C *14/34***
**U.S. Cl. 204—298.02** **10 Claims**



1. A laser sputtering apparatus, comprising a vacuum chamber, a target holder mounted in the vacuum chamber, a substrate support arranged to oppose a target mounted on said holder in the vacuum chamber, a pulsed laser beam source which emits pulsed laser beams onto the target through a window provided in the vacuum chamber wall, movable slit means aligned with said window for controllably passing the pulsed laser beams into said chamber, and means for synchronizing the position of said slit means with respect to the frequency of said pulsed laser beams.

---

### 5,017,278
### MULTI-STAGE REFORMING PROCESS

**Bernard Mulaskey, Fairfax; Stephen J. Miller, San Francisco; Dennis L. Holtermann, Crockett, and Robert L. Jacobson, Vallejo, all of Calif., assignors to Chevron Research and Technology Company, San Francisco, Calif.**
**Filed Mar. 2, 1990, Ser. No. 488,156**
**Int. Cl.$^5$ C10G *35/06***
**U.S. Cl. 208—65** **23 Claims**

22. A staged reforming process comprising:
contacting a penultimate zone reforming catalyst in a penultimate reforming zone with a feed having less than 1 ppm sulfur at a temperature between 800° and 1100° F., a liquid hourly space velocity (LHSV) between 0.5 and 6LHSV, a pressure between 50 and 500 psig, and a hydrogen recycle ratio between 1 and 20 $H_2/HC$, to form a reformate, the penultimate zone reforming catalyst comprises between 0.1 and 2.5 weight percent platinum, between 0.1 and 5.0 weight percent rhenium, and between 0.5 and 1.5 weight percent chloride on alumina, the ratio of rhenium to platinum being in the range from 1:1 to 6:1;
separating the reformate into a gaseous hydrogen fraction and a hydrocarbon fraction; and
contacting the hydrocarbon fraction in a final reforming zone with a final zone reforming catalyst at a temperature between 700° and 1000° F., a liquid hourly space velocity between 0.3 and 5LHSV, and a pressure between 15 and 75 psig in the absence of recycle hydrogen, the final zone reforming catalyst comprising between 0.1 and 2.5 weight percent platinum on silicalite and an alkali or alkaline earth metal.

---

### 5,017,279
### MULTISTEP PROCESS FOR THE MANUFACTURE OF NOVEL POLYOLEFIN LUBRICANTS FROM SULFUR CONTAINING THERMALLY CRACKED PETROLEUM RESIDUA

**Alexis A. Oswald, Annandale; Frank J. Chen, Edison; Ramon L. Espino, Califon, and Kuo L. Peng, Edison, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**
**Continuation of Ser. No. 291,801, Dec. 29, 1988, abandoned. This application Feb. 13, 1990, Ser. No. 479,328**
**Int. Cl.$^5$ C10G *69/02, 69/06;* C07C *00/00***
**U.S. Cl. 208—67** **8 Claims**

1. A multistep process for the manufacture of polyolefin lubricants, derived mostly from $C_8$ to $C_{24}$ linear olefin components of coker distillate fractions containing more than 0.1% sulfur which are produced by the high temperature thermal cracking of petroleum residua, comprising the following three steps:
(a) enrichment of coker distillate feed in 1-n-olefin and n-paraffin components by one or more separation processes including urea adduction or crystallization,
(b) oligomerization of the $C_8$ to $C_{24}$ olefin components of an enriched coker distillate fraction to produce sulfur containing $C_{30}$ to $C_{60}$ polyolefins,
(c) hydrogenation of sulfur containing polyolefins to isoparaffins with the simultaneous removal of the sulfur.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,280

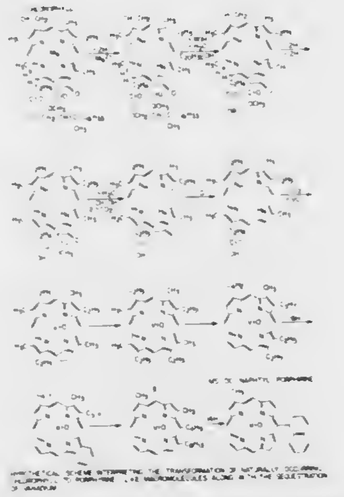
### PROCESS FOR RECOVERING METALS AND FOR REMOVING SULFUR FROM MATERIALS CONTAINING THEM BY MEANS OF AN OXIDATIVE EXTRACTION

**Lucinda C. Paris-Marcano, Maracaibo, Venezuela, assignor to Laboratorios Paris, C.A., Maracaibo, Venezuela**

**Filed May 8, 1990, Ser. No. 520,549**

**Int. Cl.$^5$ C10G** *17/02*

U.S. Cl. 208—223 16 Claims



**1**. A process for recovering vanadium, nickel, cobalt and iron and removing sulfur from materials, comprising the steps of:

- a. mixing a material with an aqueous solution containing a hypochlorite and a mineral acid to produce a suspension;
- b. stirring the suspension at a temperature ranging from about 20° to 100° C;
- c. separating an aqueous phase of the stirred suspension from residual said material in the stirred suspension;
- d. adjusting the pH of the aqueous phase of step c to pH 7 or higher by adding a basic material, thereby forming a first precipitate in the aqueous phase;
- e. separating said first precipitate from the aqueous phase, said first precipitate containing substantially all of the iron, nickel and cobalt originally present in said material;
- f. adjusting the pH of the aqueous solution from steps d and e to pH 6 or less by adding a mineral acid thereby forming a second precipitate in the aqueous phase; and
- g. separating the second precipitated formed at step f from the aqueous phase, said second precipitate consisting essentially of vanadium pentoxide whereby substantially all of the vanadium originally contained in the material is recovered, and whereby substantially all of the sulfur originally contained in the material is present as a soluble salt in the aqueous phase.

### 5,017,281

### TREATMENT OF CARBONACEOUS MATERIALS

**Mohammad-Ali Sadeghi, Pasadena; Kazem Sadeghi, Goleta; Jih-Fen Kuo, Los Angeles; Long-Kuan Jang, Long Beach, and Teh F. Yen, Altadena, all of Calif., assignors to Tar Sands Energy Ltd., Santa Barbara, Calif.**

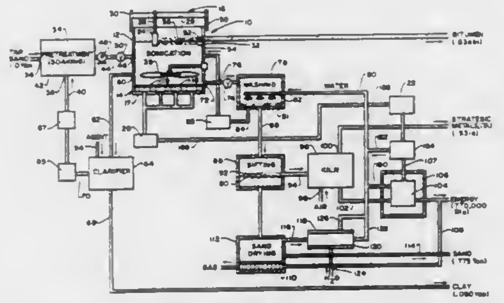
**Division of Ser. No. 684,945, Dec. 21, 1984, Pat. No. 4,891,131. This application May 30, 1989, Ser. No. 358,636**

**Int. Cl.$^5$ C10G** *1/04*

U.S. Cl. 208—390 6 Claims

**1**. A system for recovering a lighter, hydrocarbon liquid oil from: an asphaltene containing solid, carbonaceous material which contains metals comprising in combination:

- a vessel having a top and a bottom for receiving a suspension of the carbonaceous material in an aqueous solution of an inorganic base, said vessel having an upper liquid outlet near the top of the vessel and a lower solid particle outlet near the bottom of the vessel;
- ultra sonic generating means connected to the vessel for agitating the suspension to remove from the particles an organic phase which separates into a liquid hydrocarbon oil having a low metal content which rises to the top of the suspension and enters said liquid outlet and solid agglomerates containing a major portion of the asphaltene and a metal content higher than the liquid oil which fall to the bottom of the suspension; and
- means for recovering the agglomerate particles from the lower particle outlet.



### 5,017,282

### SINGLE-STEP COAL LIQUEFACTION PROCESS

**Alberto Delbianco, Magenta, and Ermanno Girardi, San Donato Milanese, both of Italy, assignors to Eniricerche, S.p.A., Milan, Italy**

**Filed Sep. 22, 1988, Ser. No. 247,855**

**Claims priority, application Italy, Oct. 2, 1987, 22119 A/87**

**The portion of the term of this patent subsequent to Nov. 6, 2007, has been disclaimed.**

**Int. Cl.$^5$ C10G** *1/06*

U.S. Cl. 208—414 2 Claims

**1**. A process for single-step liquefaction of coal, which comprises:

- reacting coal in an aqueous suspension with carbon monoxide in the presence of a CO conversion catalyst selected from the group consisting of an alkaline hydroxide and a carbonate, wherein the reaction occurs in the presence of a hydrogenation catalyst selected from the group consisting of transition metals and compounds thereof, wherein a reaction temperature is maintained up to a reaction time of 20 minutes equal to a value within the range of from 300° to 370° C., then increased over a time within the range of from 20 to 40 minutes, until a reaction temperature value is reached within the range of from 420° to 450° C., and maintained constant for a reaction time of up to 20 minutes.

### 5,017,283

### METHOD OF MAGNETIC SEPARATION AND APPARATUS THEREFORE

**Robin R. Oder, Export, Pa., assignor to EXPORTech Company, Inc., New Kensington, Pa.**

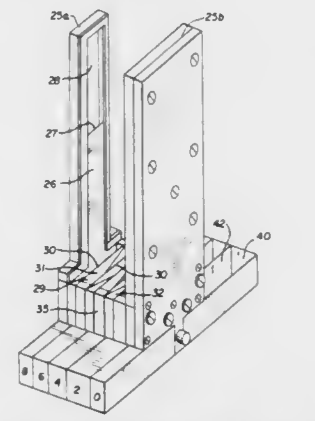
**Continuation of Ser. No. 251,111, Sep. 28, 1988, abandoned. This application Dec. 21, 1989, Ser. No. 462,331**

**Int. Cl.$^5$ B03C** *1/00*

U.S. Cl. 209—212 9 Claims

**1**. A splitter means for use in conjunction with a magnetic separator means for separating and collecting particulate matter fractions of a raw sample according to relative magnetic susceptibilities of each said fraction so collected, said splitter means comprising;

- a. at least one elongated end member, said elongated end member adapted to collect strongly diamagnetic particles contained in said raw sample, thereby preventing said particles from being thrown free of said magnetic separator means as a result of magnetic forces acting upon said particles and thereby enabling separation of said particles from said raw sample and further enabling collection of said particles, said elongated end member further including a drop chute defined by an inner wall and an outer wall spaced therefrom, said inner wall extending only partially the length of said elongated end member such that the outer wall is partially exposed near the top of said elongated end member, thereby permitting said strongly diamagnetic particles to access said drop chute by being thrown over said inner wall and towards said outer wall by said magnetic separator means and dropping down said drop chute for collection;



- b. at least one splitter chamber arranged adjacent said elongated end member, said splitter chamber including two spaced-apart side walls facing one another and having an open top for receiving one of said fractions of said sample, each said elongated end member and each said splitter chamber having a bottom opening, each said bottom opening accessing a collection means positioned in communication with each said opening, each said splitter chamber further including an inclined surface positioned between said spaced-apart side walls, said inclined surface being inclined downwardly toward said bottom opening, thereby permitting each said fraction being collected by said splitter chamber to run down said inclined surface through said bottom opening and into said collection means positioned beneath said splitter chamber.

### 5,017,284

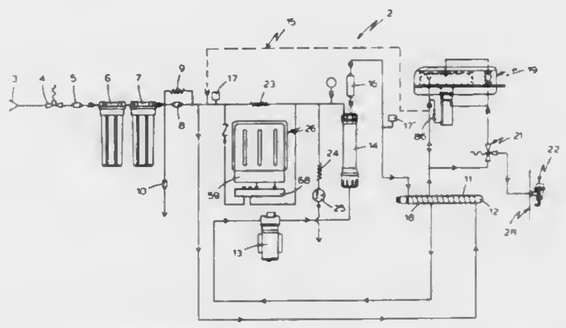
### FLUID PURIFYING APPARATUS AND METHOD OF PURIFYING FLUIDS

**Steven L. Miler, Shelbyville; Ronald L. Wathen, and Raymond E. Palazzo, Jr., both of Louisville, all of Ky., assignors to Environmental Water Technology, Inc., Louisville, Ky.**

**Filed Apr. 27, 1990, Ser. No. 515,459**

**Int. Cl.$^5$ B01D** *61/08*

U.S. Cl. 210—97 42 Claims



**1**. A liquid purification apparatus comprising:

- walled housing means having an ambient inlet opening therein, said housing means defining a plenum chamber preselectively sized to contain a liquid purification system therein to communicatively extend between a liquid inlet and liquid outlet in said walled housing means. A liquid purification system disposed in said housing including a pump to move said liquid from said inlet to said outlet, a liquid storage receptacle having a heat transfer means with a heat exchange element associated therewith and a blower mounted in said chamber in communication with said ambient inlet opening in said walled housing means to circulate air over said heat exchange element;
- a walled drain receptacle positioned below and in communication with said plenum chamber with the side walls thereof in spaced relation to said walled housing means to define a linearly extending passage therebetween narrowed sufficiently to provide both sound baffling and air exhaustion, said drain receptacle serving to receive and evaporate condensed liquids from said liquid purification system in said plenum chamber thereabove with said air exhaust passage being sized and positioned adjacent the bottom periphery of said walled housing mean to serve as a dispersing and sound baffling exhaust for air circulated by said blower over said heat exchange element and through the remainder said liquid purification system.

### 5,017,285

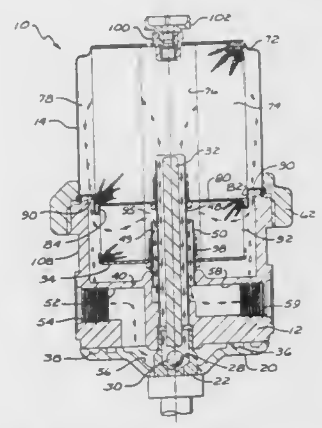
### FUEL FILTER AND CARTRIDGE ASSEMBLY

**Leon P. Janik, Suffield, and M. Craig Maxwell, Colchester, both of Conn., assignors to Stanadyne Automotive Corp., Windsor, Conn.**

**Continuation-in-part of Ser. No. 372,645, Jun. 28, 1989, Pat. No. 4,976,852. This application Sep. 8, 1989, Ser. No. 404,849**

**Int. Cl.$^5$ B01D** *27/08, 27/14*

U.S. Cl. 210—232 25 Claims



**19**. A fuel filter assembly comprising:

- base means comprising a base having a fuel inlet passage, a fuel outlet passage, central first conduit means for interiorly defining a first axial passage communicable with said inlet passage and second conduit means surrounding said first conduit means for defining a second axial passage communicating with said outlet passage, said base means comprising a lip;
- filter cartridge means mountable on said base means for filtering fuel, said cartridge means comprising:
  - housing means comprising a container and a first endcap connecting said container along a seam configured to form a retaining shoulder, said first endcap defining first opening means for receiving said first conduit means in fluid tight relationship;
  - first filter means enclosed in said housing means comprising a first filter element defining a first chamber communicating with said first axial passage and a second chamber surrounding said first chamber;
  - second filter means comprising a second endcap defining

VOL
1126
ISS
3
MY
21
1991
UMI

second opening means for receiving said second conduit means in fluid tight relationship and comprising a second filter element generally impervious to the passage of water extending exteriorly of said housing means between said first and second endcaps and defining with said base means a third chamber and a fourth chamber surrounded by said third chamber, said third chamber communicating with said second chamber and said fourth chamber;

sealing means for fluidly sealing said cartridge means to said base means comprising a sealing ring compressively sealable between said lip and said first endcap; and

retainer means comprising a collar threadably engageable with said base means and axially engageable against said seam shoulder for retaining said cartridge to said base means.

---

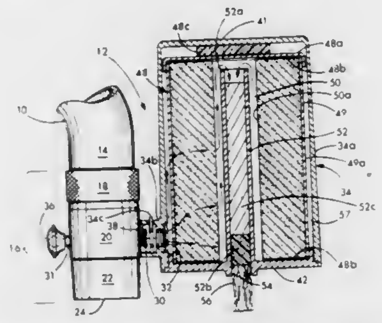
### 5,017,286
## FAUCET-MOUNTED WATER FILTER WITH WALL INLET AND ANNULAR CHAMBER

**Randy B. Heiligman, 2301 Indian Road West, Minnetonka, Minn. 55343**

**Continuation of Ser. No. 488,700, Mar. 5, 1990, abandoned. This application Sep. 10, 1990, Ser. No. 579,787**

**Int. Cl.$^5$ B01D *24/10***

**U.S. Cl. 210—266** **15 Claims**



1. A water faucet-mounted water filter comprising a diverter having an upright diverter body which has a water inlet at the top thereof connected to the water faucet, said diverter body having a water outlet at the bottom thereof, a valve in the diverter body with a valve outlet duct projecting from one side of the diverter body, a manually movable valve handle projecting from the diverter body and connected to the valve for selectively directing water flow either through the water outlet or through the duct, the outlet duct defining a filter housing support, a filter housing defining a filter chamber having side, top and bottom walls, said housing being mounted upon the filter housing support and being connected to the diverter thereby, a filter element in the filter housing, said filter element having a vertical water inlet surface on a side wall thereof and a water outlet, the filter housing having an annular water distribution chamber for unfiltered water surrounding the filter element, the outlet duct of the valve being connected through a wall of the filter housing so as to communicate through the annular water distribution chamber with the water inlet surface of the filter element, and the water outlet of the filter element communicating with a dispensing opening in the filter housing for expelling filtered water from the filter housing, whereby the filter housing is supported upon the upright diverter in close proximity or in contact therewith.

---

### 5,017,287
## DUAL CUP-SHAPED SUPPORTING FILTER BODY

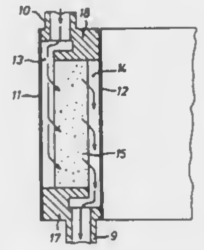
**Günther Kuntz, Munich, and Johann Baarfüsser, Gauting, both of Fed. Rep. of Germany, assignors to Agfa Gevaert AG, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 12, 1990, Ser. No. 491,536**

**Claims priority, application Fed. Rep. of Germany, Mar. 22, 1989, 3909382**

**Int. Cl.$^5$ B01D *27/08***

**U.S. Cl. 210—433.1** **4 Claims**



1. In a filtering element, for liquids to be filtered under pressure, comprising a cylindrical housing and a coaxial annular filter cartridge disposed therein, the liquid to be filtered flowing radially through this filter cartridge, the improvement which comprises the housing **(1)** consist of a pressure-resistant, cup-shaped outer supporting body **(2)** and a coaxial, also cup-shaped, pressure-resistant inner supporting body **(3)**, the bottom surfaces **(4, 5)** of which can be firmly connected to one another, and wherein a single annular filter cartridge **(6)** is disposed in the annular gap open towards the top between the supporting bodies **(2, 3)**, said filter cartridge **(6)** consisting of an annular base portion **(17)** and cover portion **(18)** having inlet and outlet holes **(9, 10)**, and wall portions **(11, 12)** between the base **17** and cover **18** adjacent to the inner and outer wall portions respectively of the supporting bodies, and wherein between the wall portions **11** and **12** the single annular filter cartridge **6** has a filtering material **(15)** separating the hollow space between wall portions **11** and **12** into an outer chamber **13** and an inner chamber **14** and through which the liquid to be filtered is pressed radially from chamber **13** to chamber **14**.

---

### 5,017,288
## CYCLONE SEPARATOR

**Martin T. Thew, Bitterne; Ian C. Smyth, Eastleigh, both of England, and Noel Carroll, Victoria, Australia, assignors to Conoco Specialty Products, Houston, Tex.**

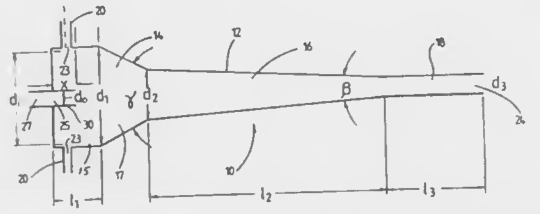
**PCT No. PCT/AU88/00057, § 371 Date Oct. 11, 1989, § 102(e) Date Oct. 11, 1989, PCT Pub. No. WO88/06491, PCT Pub. Date Sep. 7, 1988**

**PCT Filed Mar. 2, 1988, Ser. No. 415,316**

**Claims priority, application Australia, Jan. 19, 1987, PI6355/87; Mar. 3, 1987, PI0637/87**

**Int. Cl.$^5$ B01D *21/26***

**U.S. Cl. 210—512.1** **5 Claims**



1. A cyclone separator of the dewatering type comprising an elongated separating chamber having a longitudinal axis of symmetry between opposite first and second ends, the separating chamber being of greater cross-sectional dimension at the first end than at the second end, the cyclone separator further including at least one inlet which enters the separating chamber in an inlet plane perpendicular to the longitudinal axis of the separating chamber and which inlet is adjacent said first end, at least one overflow outlet for the less dense component and at least one underflow outlet for the more dense component, said separating chamber including a first section which contains at least one feed inlet, said first section being of reduced cross-sectional dimension $d_2$ at its downstream end relative to the upstream end, characterized in that the ratio of cross-sectional dimension $d_0$ of said overflow outlet for the less dense component to the cross-sectional dimension $d_2$ of the first section at its downstream end is as follows:

$$0.25 < \frac{d_o}{d_2} < 0.65,$$

a vortex finder disposed adjacent the outlet for the less dense component, wherein the opening to said vortex finder outlet terminates within 3 $d_2$ of the inlet plane and wherein the following relationship applies:

$$3 \leqq \frac{\pi d_2 d_i}{4A_i} \leqq 30$$

where $A_1$ is the total cross-sectional area of the or each feed inlet and $d_1$ is twice the radius at which flow enters the cyclone measured as the minimum distance of the tangential component of the inlet center line from the cyclone axis.

---

### 5,017,289
## PROCESS FOR IN SITU BIODEGRADATION OF HYDROCARBON CONTAMINATED SOIL

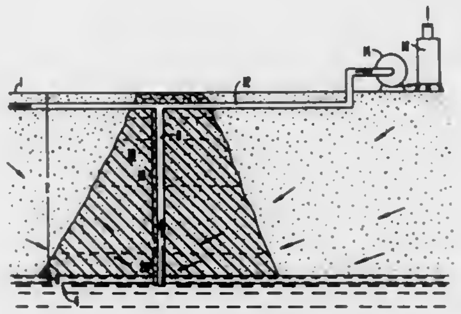
**Douglas L. Ely, Novato, and David A. Heffner, El Sobrante, both of Calif., assignors to Chevron Research & Technology Company, San Francisco, Calif.**

**Continuation of Ser. No. 234,990, Aug. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 101,358, Sep. 25, 1987, Pat. No. 4,765,902. This application Apr. 3, 1989, Ser. No. 333,048**

**The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.**

**Int. Cl.$^5$ C02F *3/02***

**U.S. Cl. 210—610** **24 Claims**



1. An in situ process for biodegrading hydrocarbons by drawing oxygen into an undisturbed hydrocarbon contaminated zone in a fluid permeable soil, comprising:

establishing a borehole extending from the earth's surface through a hydrocarbon contaminated zone having hydrocarbon degrading microbes therein;

lining said borehole with a fluid impermeable liner coaxially spaced and sealingly connected to the inside surface of said borehole and extending from the earth's surface to the hydrocarbon-contaminated zone;

said liner including a fluid permeable portion extending from the lower end thereof and through at least a portion of said hydrocarbon contaminated zone,

fluidly connecting a source of negative pressure to said fluid impermeable liner;

evacuating gas from said borehole through the fluid permeable portion of said liner at a rate sufficient to draw air from the earth's surface into the hydrocarbon containing zone; and

adjusting the flow rate of the evacuated gas so that the amount of hydrocarbon biodegradation therein is within 50% of the maximum hydrocarbon biodegradation rate as detected by the volume of carbon dioxide in the evacuated gas.

---

### 5,017,290
## SEPARATION AGENT COMPRISING ACYL- OR CARBAMOYL-SUBSTITUTED POLYSACCHARIDE

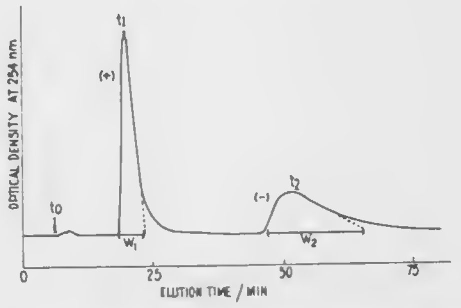
**Hajime Namikoshi; Tohru Shibata, and Ichiro Okamoto, all of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan**

**Division of Ser. No. 246,449, Sep. 19, 1988, Pat. No. 4,879,038, which is a continuation-in-part of Ser. No. 716,791, Mar. 27, 1985, abandoned. This application Aug. 11, 1989, Ser. No. 392,764**

**Claims priority, application Japan, Mar. 29, 1984, 59-59365**

**Int. Cl.$^5$ B01D *15/08***

**U.S. Cl. 210—635** **9 Claims**



8. A method effective for separating chemical substances from mixtures thereof and for separating optical isomers from mixtures thereof, which comprises the step of contacting said mixture, under conditions effective for chromatographic separation, with a chromatographic separating agent comprising amylose tricinnamate.

---

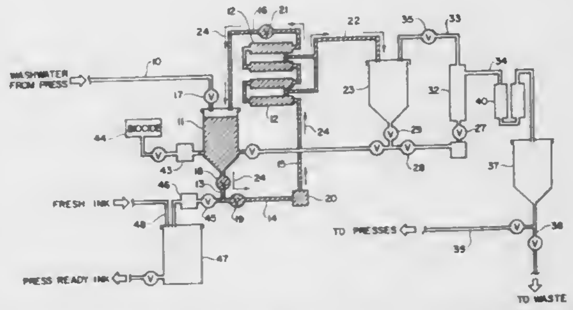
### 5,017,291
## PROCESS FOR RECYCLING AND RECONSTITUTING FLEXOGRAPHIC INKS

**Loren H. Semler, Lake Forest; Joseph M. Palm, Lombard; Paul B. Englram, Carol Stream, and Jon Y. Clegg, Elmhurst, all of Ill., assignors to Semler Industries, Inc., Franklin Park, Ill.**

**Filed Oct. 24, 1990, Ser. No. 605,190**

**Int. Cl.$^5$ B01D *61/58***

**U.S. Cl. 210—641** **6 Claims**



1. A process for recycling water-based printing inks comprising the steps of circulating wash water obtained from washing the rollers of a flexographic press through an ultrafil-

VOL 1126
ISS 3
MY 21 1991
UMI

ter to separate an optically-clear filtrate and a fluid first concentrate containing suspended ink solids; directing said optically-clear filtrate through a reverse-osmosis filter to separate from said filtrate a fluid second concentrate containing dissolved ink components and bacteria; combining said first and second concentrates with a compatible biocidal agent to form a stable, biologically-inactive additive suitable for mixing with fresh ink concentrate to form pressready printing ink.

---

### 5,017,292

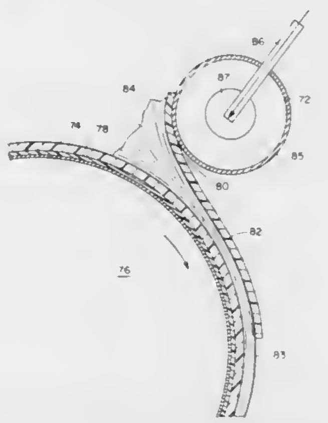
### MEMBRANE, PROCESS AND SYSTEM FOR ISOLATING VIRUS FROM SOLUTION

**Anthony J. DiLeo, Westford; Anthony E. Allegrezza, Jr., Milford, and Edmund T. Burke, Winchester, all of Mass., assignors to Millipore Corporation, Bedford, Mass.**

**Filed May 10, 1990, Ser. No. 521,784**

**Int. Cl.$^5$ B01D** *16/14*

**U.S. Cl. 210—645** **20 Claims**



1. A composite asymmetric membrane designed for selectively separating particles having a size within a size range characteristic of the size of virus particles from a solution containing said particles which comprises a substrate having pores of an average size between about 0.05 and 10 microns, a surface skin and an intermediate porous zone being positioned between said substrate and said skin, said intermediate zone being porous and free of voids which extend from said skin to said membrane substrate, said composite membrane having a protein molecular weight cut-off of between about $5\times10^2$ and $5\times10^6$ Daltons and having properties for producing a log reduction value of at least about 3 and said log reduction value being a monotonically increasing function of particle diameter in the particle size range between about 10 and 100 nanometer diameter.

12. A process comprising: selectively removing particles of a size between about 10 and 100 nanometers from a solution at a log reduction value of at least about 3 by, in a first filtration step, passing said solution in direct contact with the skin of the composite membrane designed for selectively separating particles having a size within a size range characteristic of the size of virus particles from a solution containing said particles which comprises a substrate having pores of an average size between about 0.05 and 10 microns, a surface skin and an intermediate porous zone being positioned between said substrate and said skin, said intermediate zone being porous and free of voids which extend from said skin to said membrane substrate, said composite membrane having a protein molecular weight cut-off of between about $5\times10^2$ and $5\times10^6$ Daltons and having properties for producing a log reduction value of at least about 3 and said log reduction value being a monotonically increasing function of particle diameter in the particle size range between about 10 and 100 manometer diameter retaining said particles by said skin sufficient to form a particle-rich solution while allowing solute in said solution substantially free of said particles to pass through said composite membrane sufficient for causing the log reduction value of particle removal is a monotonically increasing function of the diameter of said particles.

---

### 5,017,293

### MULTI-PASS BLOOD WASHING AND PLASMA REMOVAL DEVICE AND METHOD

**John M. Radovich, and Richard W. Schofield, both of Bend, Oreg., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.**

**Filed Aug. 24, 1989, Ser. No. 398,065**

**Int. Cl.$^5$ B01D** *61/26*

**U.S. Cl. 210—646** **8 Claims**

1. A method comprising simultaneously washing and concentrating cellular blood components and removing plasma from fluid blood having a Hematocrit as low as 15 by,

(a) providing lumens of elongate microporous hollow fiber membranes arranged into at least two discrete fiber bundles, said hollow fiber membranes permitting the permeation of at least a portion of non-cellular blood components through the walls thereof while preventing the permeation of cellular blood components, the lumens of the hollow fiber membranes of said fiber bundles being in fluid communication with each other and feeding said fluid blood to said lumens;

(b) contacting said blood with wash fluid at at least one point between said discrete fiber bundles;

(c) withdrawing a fluid containing wash fluid and non-cellular blood components, including plasma, from the outside of the walls of said hollow fiber membranes; and

(d) withdrawing a fluid containing cellular blood components in concentrated form from the lumens of the hollow fiber membranes of the last of said at least two discrete fiber bundles.

---

### 5,017,294

### APPARATUS FOR THE SEPARATION OF TWO IMMISCIBLE LIQUIDS AND USE OF SAID APPARATUS IN THE DESALTING OF A HYDROCARBON FEEDSTOCK

**Marc Durrieu, Sainte Adresse, France, assignor to Compagnie de Raffinage et de Distribution Total France, Levallois-Perret, France**

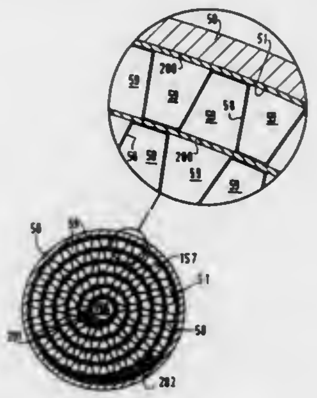
**Filed Mar. 26, 1990, Ser. No. 499,036**

**Claims priority, application France, Mar. 24, 1989, 89 03921**

**Int. Cl.$^5$ B01D** *17/022*

**U.S. Cl. 210—708** **7 Claims**

7. A process for the desalting of a hydrocarbon feedstock, comprising feeding an emulsion of water and the hydrocarbon feedstock to at least one desalter, and treating at least one of the emulsion or the hydrocarbon feedstock discharged from the desalter by means of an apparatus comprising at least one pipe for feeding an emulsion of the two liquids to an assembly of tubes in each of which there is disposed, in the direction of its length and over at least a portion thereof, a bundle of fibers that is preferentially wettable by one of the two liquids, said assembly being connected to a decanter in which the two liquids separate, the decanter being equipped with pipes for the separate respective discharge of each of the two liquids, wherein the assembly of tubes is formed by spaced walls, separated by a substantially constant distance and by a corrugated element inserted between said walls and alternately in contact with each of said walls through its corrugations.



---

### 5,017,295

### DIVALENT SILVER BACTERICIDE FOR WATER TREATMENT

**Marvin S. Antelman, Rebovot, Israel, assignor to N. Jonas & Co., Inc., Bensalem, Pa.**

**Filed May 1, 1990, Ser. No. 517,169**

**Int. Cl.$^5$ C02F** *1/50*

**U.S. Cl. 210—764** **5 Claims**

1. A method for controlling the growth of bacteria in the water of swimming pools and industrial cooling water which comprises adding to the water a stable divalent silver complex compounds, said silver complex compound comprising divalent silver attached to an inorganic ligand.

---

### 5,017,296

### LIQUID DETERGENT COMPOSITION CONTAINING A SMELTITE CLAY SOFTENING AGENT

**Yvon J. Nedonchelle, Lille, France, assignor to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.**

**Continuation of Ser. No. 930,583, Nov. 13, 1986, abandoned. This application Apr. 13, 1989, Ser. No. 338,499**

**Claims priority, application United Kingdom, Nov. 22, 1985, 8528798**

**Int. Cl.$^5$ C11D** *3/12, 3/14;* **D06M** *11/79*

**U.S. Cl. 252—8.6** **6 Claims**

1. A liquid detergent composition for washing fabrics and imparting softness thereto which comprises:

(i) an aqueous base,

(ii) from 2% to 45% by weight detergent active material or a mixture thereof,

(iii) 5 to 35% weight of a detergency builder and

(iv) from 3 to 7% by weight of a lamella smectite fabric softening clay material containing exchangeable sodium and calcium cations and having a swellability in water of more than 36% and a swellability in an 8% sodium tripolyphosphate solution of less than 25% the viscos of said composition being 650 and 850 of cps measured at 20° C. and at a show rate of 21 $\sec^{-1}$.

---

### 5,017,297

### MICROEMULSIONS FOR TREATING FIBROUS MATERIALS CONTAINING THE REACTION PRODUCT OF A SILANE AND A SILOXANE

**Konstantinos Spyropoulos, Geneva, Switzerland, and Paul A. Yianni, Limal, Belgium, assignors to Dow Corning Limited, Barry, Wales**

**Filed Aug. 17, 1989, Ser. No. 395,232**

**Claims priority, application United Kingdom, Aug. 17, 1988, 8819569**

**Int. Cl.$^5$ D06M** *15/643, 15/65;* **C08K** *5/04*

**U.S. Cl. 252—8.8** **11 Claims**

1. An oil-in-water microemulsion comprising a discontinuous oil phase (I), one or more emulsifying agents (II) and a continuous water phase (III) wherein the oil phase (I) comprises a reaction product of (A) an organosilicon compound having at least one silicon-bonded substituent of the general formula $-R'-NHR''$, wherein R' is a divalent hydrocarbon group having up to 8 carbon atoms, and R'' is selected from the group consisting of hydrogen, alkyl groups and groups of the general formula $-R'NH_2$, and (B) an organosilicon compound having at least one substituent of the general formula $-R'-Y$, wherein R' is as defined above and Y denotes an epoxy group containing moiety, whereby the molar ratio of amino groups in (A) to epoxy groups in (B) is greater than 1/1, wherein one of the compounds (A) or (B) is a silane, and the other is a siloxane there being present in the reaction product at least two silicon-bonded —OR groups, wherein R is selected from the group consisting of alkyl, aryl, alkoxyalkyl, alkoxyaryl and aryloxyalkyl groups having up to 8 carbon atoms.

---

### 5,017,298

### LUBRICATING COMPOSITION CONTAINING ANTI-WEAR/EXTREME PRESSURE ADDITIVES

**Sean P. O'Connor, Beverley, England, assignor to BP Chemicals Limited, London, England**

**Division of Ser. No. 195,099, May 17, 1988, Pat. No. 4,956,118. This application Mar. 12, 1990, Ser. No. 492,098**

**Claims priority, application United Kingdom, Jun. 2, 1987, 8712931**

**Int. Cl.$^5$ C10M** *133/40*

**U.S. Cl. 252—47** **9 Claims**

1. Compounds suitable for use as extreme pressure (EP)/anti-wear (AW) agents in lubricating oil compositions, which compounds have the formula:

$$R^1-S-X-S-S-R \qquad (I)$$

wherein $R^1$ is either R—S— or hydrogen,

R is independently either hydrocarbyl or substituted hydrocarbyl, and

X is a benzadiazine.

---

### 5,017,299

### NOVEL ETHYLENE ALPHA-OLEFIN COPOLYMER SUBSTITUTED MANNICH BASE LUBRICANT DISPERSANT ADDITIVES

**Antonio Gutierrez, Mercerville; Won R. Song, Short Hills; Robert D. Lundberg, Bridgewater, and Robert A. Kleist, Bayonne, all of N.J., assignors to Exxon Chemical Patents, Inc., Linden, N.J.**

**Filed Aug. 1, 1988, Ser. No. 226,604**

**Int. Cl.$^5$ C10M** *159/16*

**U.S. Cl. 252—51.5 R** **25 Claims**

1. A lubricating oil dispersant additive useful in oleaginous compositions which comprises a condensation product obtained by the reaction of:

(a) at least one alkyl-substituted hydroxyaromatic compound formed by the alkylation of at least one hydroxy aromatic compound with at least one terminally unsaturated ethylene alpha-olefin polymer of 300 to 10,000 number average molecular weight, at least 30% of said polymer's chains contain terminal ethenylidene unsaturation;

VOL
1126
ISS
3
MY
21
1991
UMI

(b) at least one aldehyde reactant; and
(c) at least one nucleophilic reactant, said dispersant additive having a VR' value of less than 4.1.

---

**5,017,300**

### COMPOSITIONS AND PROCESS FOR USE IN REFRIGERATION

**Stuart Raynolds, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 3, 1989, Ser. No. 388,922**

**Int. Cl.$^5$ C09K** *5/04*

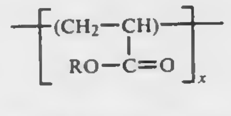
**U.S. Cl. 252—67** **11 Claims**

1. A composition for use in compression refrigeration comprising:

(a) a saturated hydrocarbon selected from the group consisting of 1,1,1,2-tetrafluoroethane, 1,1,2,2,-tetrafluoroethane and pentafluoroethane; and

(b) sufficient amount to provide lubrication of at least one polymer selected from the following:

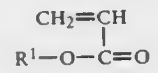
(1) an acrylic polymer having the formula



$$\left[ \begin{array}{c} (CH_2-CH)- \\ | \\ RO-C=O \end{array} \right]_x$$

where R is at least one alkyl group selected from CH3, C2H5, C3H7 and C4H9, and x is an integer from 3 to 20; and

(2) a copolymer of at least one alkyl acrylate monomer having the formula



$$\begin{array}{c} CH_2{=}CH \\ | \\ R^1-O-C{=}O \end{array}$$

wherein R1 may be anywhere from CH3—to C18H37—, provided that the average chain length of the alkyl groups in a major portion of said polymer contains from 1 to 4 carbon atoms, with at least one other vinyl monomer;

said polymer or copolymer having a SUS viscosity at 100° F. of at least 50.

---

**5,017,301**

### METHOD FOR PERMANGANATE BLEACHING OF FABRIC AND GARMENTS

**Samuel L. Bean, Wilmington, Del.; Mark D. Dulik, West Chester, Pa., and Peter A. Monopoli, Wilmington, Del., assignors to General Chemical Corporation, Parsippany, N.J.**

**Continuation-in-part of Ser. No. 149,217, Jan. 27, 1988, Pat. No. 4,795,476. This application Dec. 2, 1988, Ser. No. 278,833**

**Int. Cl.$^5$ C11D** *7/54;* **D06L** *3/00;* **B01D** *19/00*

**U.S. Cl. 252—105** **10 Claims**

1. A reducing composition for use in permanganate bleaching comprising sodium metabisulfite and sodium sulfite which can be added to wash cycle during permanganate bleaching to produce a final concentration in the wash cycle of from 0.4% to 1.0% reducing composition, wherein the metabisulfite and the sulfite are present in amounts such that substantially no sulfur dioxide odor is detectable upon addition of the composition to a permanganate-containing bleaching solution.

---

**5,017,302**

### BAR SOAP HAVING IMPROVED RESISTANCE TO CRACKING

**Dennis J. Colwell, East Windsor, and James J. Pflug, Bordentown, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.**

**Filed Aug. 15, 1989, Ser. No. 393,934**

**Int. Cl.$^5$ C11D** *9/26, 13/10, 13/18, 17/02*

**U.S. Cl. 252—134** **3 Claims**

1. A bar soap which is resistant to wet cracking during use consisting essentially of about 60 to 85 percent tallow, 15 to 40 percent coco soap chip and 1.5 to 5 percent of a saturated straight chain primary alcohol of 16 to 18 carbon atoms in the molecule selected from the group consisting of stearyl alcohol, cetyl alcohol (1 hexadecanol) and myristyl alcohol.

---

**5,017,303**

### PAINT PEELING COMPOSITION AND PAINT PEELING METHOD

**Keisaku Komatsu; Takashi Yamada, and Toshimi Owatari, all of Youkaichi, Japan, assignors to Kaken Tech Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 248,247, Sep. 19, 1988, Pat. No. 4,844,833, which is a continuation of Ser. No. 7,300, Jan. 27, 1987, abandoned. This application May 1, 1989, Ser. No. 345,585**

**Claims priority, application Japan, Jan. 28, 1986, 61-17630; Apr. 18, 1986, 61-90684**

**Int. Cl.$^5$ C11D** *10/00;* **B08B** *7/00*

**U.S. Cl. 252—174.13** **5 Claims**

1. An aqueous paint peeling composition for forming a coating on a surface of an object thereby to permit ready removal of undesired paint subsequently applied onto the coating surface, comprising as effective components thereof:

2 to 12 weight percent of an acrylic resin or polyvinylacetate; and

a substance which when heated is in the form of minute shells enclosing a gas or vapor, the shells being thermally expandable without rupturing.

---

**5,017,304**

### LIQUID-CRYSTALLINE POLYMER

**Kenji Hijikata, Mishima, Japan, assignor to Polyplastics Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 110,883, Oct. 21, 1987, abandoned. This application Jul. 20, 1989, Ser. No. 383,261**

**Claims priority, application Japan, Oct. 22, 1986, 62-251424**

**Int. Cl.$^5$ C09K** *19/52*

**U.S. Cl. 252—299.01** **10 Claims**

1. A liquid-crystalline polymer which consists essentially of a copolymer consisting essentially of

one constituent for the main chain thereof containing two or more different naphthalene groups,

wherein said naphthalene groups are individually attached to the main chain at two or more substituting positions, said substituting positions composed of 2,6-position and at least one member selected from the group consisting of 1,2-position, 1,4-position, 1,5-position, 1,8-position, 2,3-position and 2,7-position, the naphthalene group attached at the substituting 2,6-position is present in an amount of more than 50 mol % of the total amount of the naphthalene groups, and

wherein said constituent containing said naphthalene groups are formed from monomers each having two different functional groups,

said polymer being capable of forming the anisotropic phase in the molten state.

---

**5,017,305**

### FREE-FLOWING PEARLESCENT CONCENTRATE

**Horst Hoeffkes, and Anke Kaczich, both of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Division of Ser. No. 303,373, Jan. 27, 1989, Pat. No. 4,948,528, which is a division of Ser. No. 125,506, Nov. 25, 1987, Pat. No. 4,824,594. This application May 3, 1990, Ser. No. 518,357**

**Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 3640755**

**Int. Cl.$^5$ B01J** *13/00;* **B01F** *17/56*

**U.S. Cl. 252—311** **7 Claims**

1. A pearlescent concentrate in the form of a free-flowing dispersion at room temperature consisting essentially of from about 5 to about 15% by weight of one or more pearlescing ester corresponding to the formula

$$R^1—(OC_nH_{2n})_x—OR^2 \qquad (I)$$

in which $R^1$ is a linear $C_{16}$–$C_{22}$ fatty acyl group, $R^2$ is hydrogen or an $R^1$ group, n is 2 or 3, and x is a number from 1 to 4; and about 1 to about 6% by weight of one or more monoethanolamide of a $C_{12}$–$C_{22}$ fatty acid; wherein the concentrate contains as an emulsifier from about 2 to about 8% by weight of one or more compound corresponding to formula II below,

$$R^7—(OC_2H_4)_r—OCH_2—COOH \qquad II$$

being an ether carboxylic acid, in which $R^7$ is a $C_{12}$–$C_{16}$ alkyl group and r is equal to 2 to 8, and from about 70 to about 90% by weight of water, all weights being based on the weight of said concentrate.

---

**5,017,306**

### CORROSION INHIBITOR

**Donald A. Bansleben, Columbia; Charles G. Carter, Silver Spring, and Ranjit Kumar, Columbia, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.**

**Filed Nov. 9, 1988, Ser. No. 269,209**

**Int. Cl.$^5$ C07F** *9/09*

**U.S. Cl. 252—389.23** **23 Claims**

1. A method of preparing phosphonate compositions comprising—a mixture of hydroxymethylphosphonic acid and—di-(phosphonomethyl) formal, comprising the steps of:

(a) forming an intimate mixture of a first components consisting of hydroxymethylphosphonic acid and a second component selected from the group consisting of formaldehyde and formaldehyde condensates; said intimate mixture having at least about 0.5 equivalents of formaldehyde per equivalent of hydroxymethylphosphonic acid; and

(b) subjecting the intimate mixture formed in step (a) to a temperature of between about 100° C. and 180° C. for a time sufficient to allow the first and second components to react to form a reacted mixture—wherein at least about 25 mole percent of the phosphonate groups in the phosphonate composition are present as—di-(phosphonomethyl) formal.

---

**5,017,307**

### ELECTRICALLY CONDUCTIVE MICROEMULSIONS BASED ON PERFLUOROPOLYETHERS

**Alba Chittofrati, Milan, and Daria Lenti, Alessandria, both of Italy, assignors to Ausimont S.r.l., Milan, Italy**

**Filed Oct. 24, 1988, Ser. No. 261,227**

**Claims priority, application Italy, Oct. 28, 1987, 22421 A/87**

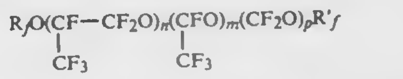
**Int. Cl.$^5$ H01B** *1/00*

**U.S. Cl. 252—500** **7 Claims**

1. A water-in-oil microemulsion having an electrical conductivity of at least 10 microSiemens.cm$^{-1}$, consisting of a liquid, limpid or opalescent, macroscopically monophase substance, obtained by mixing:

(a) water;

(b) a liquid compound with perfluoropolyethereal structure having perfluoroalkyl end groups having the structure of formulas 1 to 6, with an average molecular weight from 500 to 10,000, and perfluoropolyethers of formulas 1 to 6 as herein above defined having an average molecular weight from 1,500 to 10,000, and from 0.1 to 2 non-perfluoroalkyl functional end groups for each chain, selected from: carboxyl, polyoxyalkylene-OH, alcoholic, aminic, amidic hydroxyl, quaternary ammonic ester selected from perfluoropolyethers of formulas 1 to 6:

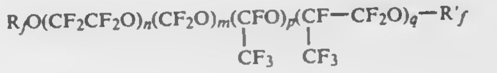


(1)

$$R_fO(\underset{\displaystyle CF_3}{\underset{|}{C}}F-CF_2O)_n(\underset{\displaystyle CF_3}{\underset{|}{C}}FO)_m(CF_2O)_pR'_f$$

with a random distribution of the perfluorooxylalkylene units, where $R_f$ and $R'_f$, like or different from each other, are $—CF_3$, $—C_2F_5$, $—C_3F_7$, and m, n, p have such average values to meet molecular weight requirements;

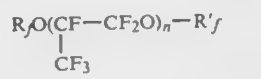
(2) $R_fO(CF_2CF_2O)_n(CF_2O)_mR'_f$ with a random distribution of the perfluorooxylalkylene units, where $R_f$ and $R'_f$, like or different from each other, are $—CF_3$ or $—C_2F_5$, and m and n have such average values to meet the average molecular weight requirements;



(3)

$$R_fO(CF_2CF_2O)_n(CF_2O)_m(\underset{\displaystyle CF_3}{\underset{|}{C}}FO)_p(\underset{\displaystyle CF_3}{\underset{|}{C}}F-CF_2O)_q-R'_f$$

with a random distribution of the perfluorooxyalkylene units, with $R_f$ and $R'_f$, like or different from each other, are $—CF_3$, $—C_2F_5$ or $—C_3F_7$, and m, n, p, q have such average values to meet the average molecular weight requirements;



(4)

$$R_fO(\underset{\displaystyle CF_3}{\underset{|}{C}}F-CF_2O)_n-R'_f$$

wherein $R_f$ or $R'_f$, like or different from each other, are $—C_2F_5$ or $—C_3F_7$ and n has such a value to meet the average molecular weight requirements;

5) $R_fO(CF_2CF_2O)_nR'_f$ where $R_f$ and $R'_f$, like or different from each other, are $—CF_3$, $—C_2F_5$, and n has such an average value as to meet the average molecular weight requirements; and

6) $R_fO(CF_2CF_2CF_2O)_nR'_f$ where $R_f$ and $R'_f$, like or different from each other, are $—CF_3$ or $—C_2F_5$ or $—C_3F_7$, and n has such an average value to meet the average molecular weight requirements, and

(c) a fluorinated surfactant.

---

**5,017,308**

### SILICON THIN FILM AND METHOD OF PRODUCING THE SAME

**Shigeru Iijima, Matsudo; Kazunobu Tanaka, Niihari; Akihisa Matsuda, Yatabe; Mitsuo Matsumura, Kasukabe, and Hideo Yamamoto, Ohi, all of Japan, assignors to Toa Nenryo Kogyo K.K., Tokyo, Japan**

**Continuation-in-part of Ser. No. 689,036, Jan. 7, 1985, abandoned, which is a continuation of Ser. No. 562,688, Dec. 19, 1983, abandoned, which is a continuation-in-part of Ser. No. 394,996, Jun. 11, 1982, abandoned. This application Jul. 11, 1989, Ser. No. 377,985**

**Claims priority, application Japan, Oct. 15, 1980, 55-143010**

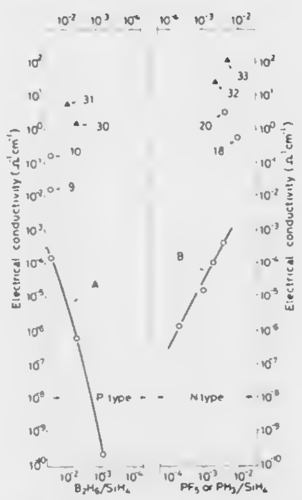
**Int. Cl.$^5$ H01C** *13/00, 31/0392*

**U.S. Cl. 252—501.1** **13 Claims**

1. A substrate and a silicon thin film deposited n said substrate, said thin film having an electrical conductivity of more than $5\times10^0\ \Omega^{-1}\ cm^{-1}$ for a P type film and more than $1\times10^2\ \Omega^{-1}\ cm^{-1}$ for an N type film, said film comprising primarily

VOL
1126
ISS
3
MY
21
1991
UMI

silicon atoms, 2 to 5 atm % of hydrogen, fluorine and a dopant impurity element, wherein at least about 80%, but less than

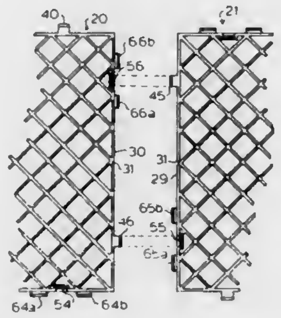


100%, of the film volume comprises microcrystalline grains, which grains are interspersed in an amorphous phase.

---

### 5,017,309
## LIQUID CONTACT PLATE AND SUPPORT SYSTEM FOR COOLING TOWERS

**Charles A. Peterson, 2201 Lord Ashley Dr., Sanford, N.C. 27330**
**Filed Jul. 11, 1990, Ser. No. 551,566**
**Int. Cl.$^5$ B01F** *3/04*
**U.S. Cl. 261—111** **2 Claims**

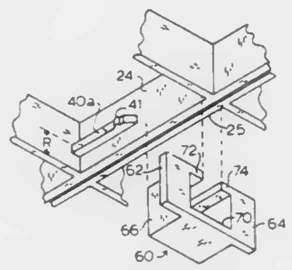


1. A liquid contact plate which is one of a plurality of similarly constructed liquid contact plates forming a series of vertically spaced horizontal tiers within a liquid cooling tower, said liquid contact plate being formed as an integral molded piece and comprising:
  (a) side bars forming a rectangular frame and having inner and outer side surfaces;
  (b) a plurality of intersecting ribs extending between and integrally joined to said side bars inner surfaces and forming a perforate planar structure for cooling a liquid passed therethrough;
  (c) a pair of spaced apart bar supports appended to and protruding outwardly from each said side bar outer surface and shaped for supporting a side bar of another liquid contact plate in abutting relation;
  (d) a female-latch receptacle located between each said pair of bar supports and defining a generally vertical hollow channel protruding outwardly from the side bar outer surface therebetween and formed by a pair of side walls, an outer wall joining outer ends of said side walls and a portion of the side bar outer surface enclosed thereby; and
  (e) a downwardly extending generally vertical male-latch member appended to and supported outwardly from each said side bar outer surface at a location spaced from the location at which said bar supports are located, said male-latch member being shaped to be received by a said female-latch receptacle channel on a side bar of another liquid contact plate to be abutted against the side bar on which the said male-latch member is located and having a ledge portion adapted to engage a bottom edge of the female-latch receptacle outer wall to lock the engaged male-latch member and female-latch receptacle together to hold the respective side bars on which each is located together in abutting relation.

---

### 5,017,310
## INTERCONNECTING LIQUID CONTACT PLATE SUPPORT SYSTEM FOR COOLING TOWERS

**Charles A. Peterson, 2201 Lord Ashley Dr., Sanford, N.C. 27330**
**Filed Jul. 11, 1990, Ser. No. 551,561**
**Int. Cl.$^5$ B01F** *3/04*
**U.S. Cl. 261—111** **6 Claims**



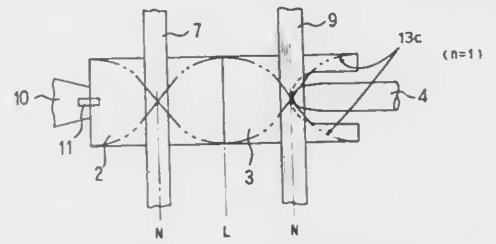
1. A fill assembly for a cooling tower, comprising:
- (a) a liquid contact plate which is one of a plurality of similarly constructed liquid contact plates forming a series of vertically spaced horizontal tiers within a liquid cooling tower, said liquid contact plate being formed as an integral molded piece and comprising:
  - (i) side bars forming a rectangular frame and having inner and outer side surfaces;
  - (ii) a plurality of intersecting ribs extending between and integrally joined to said side bars inner surfaces and forming a perforate planar structure for cooling a liquid passed therethrough; and
  - (iii) a pair of spaced apart inwardly protruding locking ribs appended to and protruding inwardly from each said side bar inner surface and shaped for receiving a clamping member for joining the side bars of two similarly constructed liquid contact plates in abutting relation; and
- (b) means for releasably engaging said locking ribs to clamp one side bar of said liquid contact plate to another side bar of another similarly constructed liquid contact plate in abutting relation.

---

### 5,017,311
## METHOD FOR INJECTION MOLDING INTO A RESONATING MOLD

**Toshihiro Furusawa; Atsushi Satoh, both of Sodegaura; Takashi Nakajima, and Noriaki Matsugishi, both of Tokyo, all of Japan, assignors to Idemitsu Kosan Co., Ltd. and Seidensha Electronics Co., Ltd., both of Tokyo, Japan**
**Filed Jul. 17, 1989, Ser. No. 381,054**
**Claims priority, application Japan, Jul. 21, 1988, 63-180238; Mar. 16, 1989, 1-62196**
**Int. Cl.$^5$ B29C** *45/00*
**U.S. Cl. 264—23** **4 Claims**

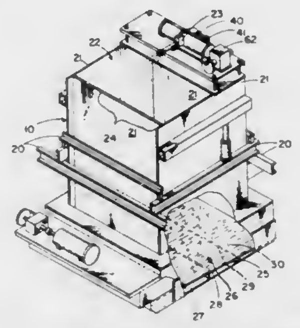
1. An injection molding method in which a molding material is injected into a cavity in a mold, the mold having opposite sides comprising a step of resonating the mold so that a resonance wave measured from one opposite side to the other opposite side has n wavelengths, where n=m/2 and m is a positive integer.



---

### 5,017,312
## ORIENTED CHOPPED FIBER MATS AND METHOD AND APPARATUS FOR MAKING SAME

**Thomas E. Peters, Boise, Id.; James D. Logan, Pullman, Wash.; Eugene R. Bennett, Boise, Id.; Clarence L. Dieter, Boise, Id., and David J. Henckel, Boise, Id., assignors to The Coe Manufacturing Company, Painesville, Ohio**
**Continuation-in-part of Ser. No. 686,840, Dec. 27, 1984, Pat. No. 4,664,856. This application Apr. 27, 1987, Ser. No. 43,093**
**Int. Cl.$^5$ D04H** *1/74, 1/64*
**U.S. Cl. 264—24** **17 Claims**



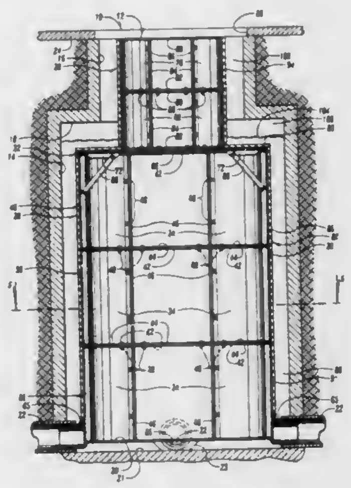
1. A process of manufacturing a nonwoven mat from electrically nonconductive fiber feedstock, comprising the steps of:
  increasing the conductivity of said feedstock by condensation of a gas containing electrical conductive material on the fiber feedstock to form treated fibers that are conductive;
  chopping said feedstock into fibers of a predetermined length;
  causing said treated fibers to fall under the influence of gravity through a directional electric field of sufficient strength to orient the fibers substantially parallel to a predetermined orientation axis;
  collecting said oriented fibers on a transfer surface to create an oriented, nonwoven mat; and
  causing an electric current to flow within said mat on said transfer surface to produce a directional electric field immediately above said mat substantially parallel to the desired orientation.

---

### 5,017,313
## METHOD AND MEANS FOR REPAIRING EXISTING MANHOLE

**Carroll O. Trimble, Springdale, Ark., assignor to Action Products Marketing Corporation, Johnston, Iowa**
**Continuation-in-part of Ser. No. 441,880, Nov. 27, 1989, which is a continuation-in-part of Ser. No. 240,073, Sep. 2, 1988, abandoned. This application Sep. 27, 1990, Ser. No. 589,280**
**Int. Cl.$^5$ B28B** *1/16, 7/28;* **E02D** *29/12;* **E04G** *11/20*
**U.S. Cl. 264—32** **8 Claims**

1. A casting form assembly for casting a lining wall in an existing manhole comprising an upstanding lower cylindrical sidewall having a first diameter and upper and lower ends, an upstanding upper cylindrical sidewall having upper and lower ends and having a second diameter smaller than said first diameter, and a substantially horizontal annular wall joining said upper end of said lower cylindrical wall to said lower end of said upper cylindrical wall, said form assembly comprising:
  a lower form assembly comprising a plurality of ring forms stacked vertically upon one another in radially inwardly spaced relation to said lower cylindrical sidewall of said existing manhole, each of said ring forms comprising a plurality of ring segments joined to one another, said lower form assembly having an outer cylindrical surface and an upper circular edge spaced below said horizontal annular wall of said manhole;
  an annular horizontal form assembly supported by said upper circular edge of said lower form assembly and having an upwardly presented horizontal surface in downward spaced relation from said horizontal annular wall of said manhole;



  said horizontal form assembly having an outer circular edge spaced radially outwardly from said upper sidewall of said manhole and having an inner circular edge spaced radially inwardly from said upper sidewall of said manhole;
  an upper form assembly having an outer cylindrical surface spaced radially inwardly from said cylindrical upper sidewall of said manhole, said upper form assembly having a circular bottom edge registered with said inner circular edge of said horizontal form assembly and having an upper edge;
  first securing means for securing said bottom edge of said upper form assembly to said inner circular edge of said horizontal form assembly;
  said horizontal form assembly comprising a plurality of horizontal form segments; and
  second securing means for detachably securing said horizontal form segments together.

---

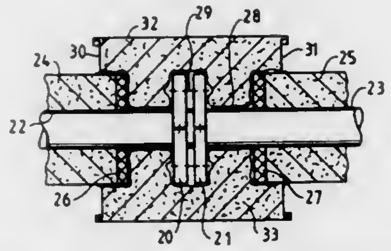
### 5,017,314
## PROCESS FOR PRODUCING SHELLS, MOLDINGS AND A DETACHABLE INSULATION

**Jan Zemanek, Munich; Manfred Timpert, Schermbeck, and Karl Rudolph, Bottrop, all of Fed. Rep. of Germany, assignors to Rheinhold & Mahla GmbH, Fed. Rep. of Germany**
**Filed Jun. 2, 1989, Ser. No. 360,470**
**Claims priority, application Fed. Rep. of Germany, Jun. 6, 1988, 3819229**
**Int. Cl.$^5$ B28B** *1/16, 1/30;* **B32B** *35/00*
**U.S. Cl. 264—35** **9 Claims**

1. A process for producing a detachable insulation for inaccessible hollow spaces on warm installations of pipelines, fittings and containers, comprising the steps of:

VOL
1126
ISS
3
MY
21
1991
UMI

- surrounding a first readily accessible portion of the installation with a sheet metal jacket;
- supporting the sheet metal jacket at a spaced location from the first portion of the installation by means defining ends of a hollow space formed between the sheet metal jacket and the first portion of the installation;
- filling the hollow space through at least one opening in the sheet metal jacket with free-flowing insulating material comprising small particles and a heat-resistant curable binder for moistening the small particles;

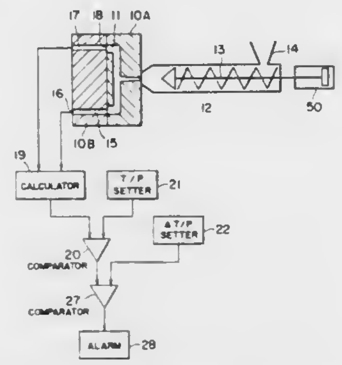


- curing the binder to form a rigid insulating shell; removing the sheet metal jacket; and,
- cutting the insulating shell by appropriate axial and radial cuts to form individually detachable insulation sections and removing the sections from the first portion of the installation for transfer to the inaccessible hollow spaces of equal configuration on the installation.

---

### 5,017,315
### METHOD AND APPARATUS OF JUDGING QUALITY OF INJECTION MOLDED PRODUCTS

**Hirosbi Kumazaki, Numazu, Japan, assignor to Tosbiba Kikai Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 275,987, Nov. 25, 1988, abandoned. This application Oct. 10, 1990, Ser. No. 595,701**
**Claims priority, application Japan, Nov. 25, 1987, 62-296370; Nov. 25, 1987, 62-296371; Nov. 25, 1987, 62-296372**
**Int. Cl.$^5$ B29C** *45/77, 45/78*
**U.S. Cl. 264—40.1** **11 Claims**



1. A method of judging a quality of an injection molded product, comprising the steps of:

- measuring a temperature T of an operating member of an injection molding machine during a pressure holding step at a time t elapsed after commencement of said pressure holding step of said injection molding machine;
- measuring a pressure P of an operating member of said injection molding machine at said time t;
- repeating said measuring temperature and measuring pressure steps at different times during said pressure holding step;
- calculating a time function $A = f(t)$ using both said temperature T and said pressure P, where A is a function from the group consisting of T/P, P/T, T×P, T+P or T±P at said different times;
- obtaining a reference time function having values at said different times of said pressure holding step that represent a satisfactory product;
- comparing said reference time function with the calculated time functions; and
- determining that said injection molded product is bad when said calculated time function differs from said reference time function, at any of said different times, by more than a predetermined amount.

---

### 5,017,316
### INTERNALLY MODIFIED CERAMIC FIBER

**Harold G. Sowman, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Division of Ser. No. 830,651, Feb. 18, 1986, Pat. No. 4,797,378. This application Oct. 3, 1988, Ser. No. 252,820**
**Int. Cl.$^5$ C04B** *35/00*
**U.S. Cl. 264—60** **22 Claims**

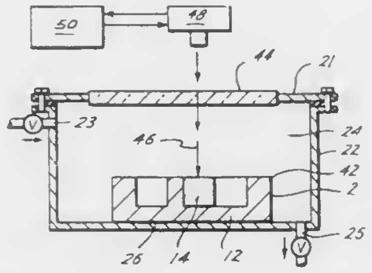
7. A method for forming an article having a heterogenous composition comprising a continuous ceramic precursor first phase and in the range of 0.05 to 50 weight percent of a discontinuous precursor second phase which provides at least one phase selected from the group consisting of metal and ceramic, the diameter of said second phase being at least one micrometer, the second phase being a string of spherical particles, a line of connected spheroidal shapes, or fibrils, all of which are oriented in one direction, said first and second phases being derived from immiscible precursor liquids, which method comprises the steps of:

- a) preparing an emulsified viscous concentrate of immiscible precursor ceramic liquids or ceramic/metal precursor liquids, said concentrate being a blend of said precursor liquids,
- b) shaping said viscous concentrate into an article, and
- c) evaporatively gelling or hydrolyzing the resultant article to provide a non-refractory article of heterogeneous composition.

---

### 5,017,317
### GAS PHASE SELECTIVE BEAM DEPOSITION

**Harris L. Marcus, Austin, Tex., assignor to Board of Regents, The Uni. of Texas System, Austin, Tex.**
**Filed Dec. 4, 1989, Ser. No. 444,882**
**Int. Cl.$^5$ B29C** *35/08, 35/12, 47/92;* **B23K** *9/00*
**U.S. Cl. 264—81** **38 Claims**



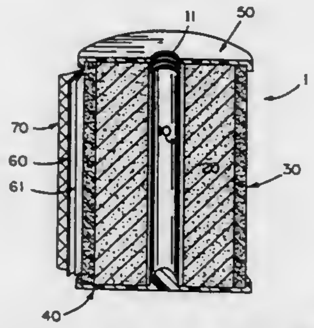
1. A method of producing a part comprising the steps of:

- positioning a first gas phase proximate a target area;
- scanning the aim of at least one directed energy beam relative to said target area and selectively depositing material from said first gas phase in a first layer on said target area;
- positioning a second gas phase proximate said target area;
- scanning the aim of at least one directed energy beam relative to said target area and selectively depositing material from said second gas phase in a second layer on said target area, including the substeps of
  - joining said first and second layers during the scanning and depositing of the second layer; and
  - positioning successive gas phases over said target area and scanning the aim of at least one directed energy beam over said target area and selectively depositing material to produce successive layers joined to a previously deposited layer and producing a part comprising a plurality of joined layers.

---

### 5,017,318
### METHOD OF MAKING A WATER FILTER

**Herbert J. Vanderbilt, Lowell, and Timothy D. Modert, Grand Rapids, both of Mich., assignors to Amway Corporation, Ada, Mich.**
**Continuation of Ser. No. 150,882, Feb. 1, 1988, Pat. No. 4,859,386, which is a division of Ser. No. 849,167, Apr. 7, 1986, Pat. No. 4,753,728. This application Feb. 17, 1989, Ser. No. 312,747**
**The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.**
**Int. Cl.$^5$ B32B** *1/10*
**U.S. Cl. 264—113** **1 Claim**



1. A method of making a carbon particle filter comprising:

- providing a mold defining the exterior configuration of said filter;
- mixing the carbon particles with a binder and filling it into said mold,
- said binder comprising a low melt index polymeric material having a melt index of less than 1 gram per 10 minutes as determined by ASTM D 1238 at 190 degrees C. and 15 kilograms load, whereby said polymeric material will tackify at elevated temperatures without becoming sufficiently liquid to substantially wet the carbon particles in order that diminution of the effective carbon surface is eliminated; and
- subjecting said carbon particles and said binder to heat and pressure to cause said carbon particles to bind to each other whereby a carbon particle filter can be obtained.

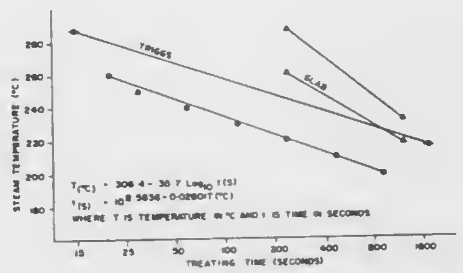
---

### 5,017,319
### METHOD OF MAKING COMPOSITE PRODUCTS FROM LIGNOCELLULOSIC MATERIALS

**Kuo C. Shen, 2118 Radford Court, Ottawa, Ontario, Canada K1J 8K1**
**Continuation-in-part of Ser. No. 209,973, Jun. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 918,895, Oct. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 665,710, Oct. 29, 1984, abandoned. This application May 16, 1990, Ser. No. 524,700**
**Claims priority, application Japan, Mar. 30, 1984, 59-62946; Canada, Jun. 22, 1989, 603574**
**Int. Cl.$^5$ B27N** *3/12;* **B27K** *3/15*
**U.S. Cl. 264—124** **31 Claims**

1. Process for converting hemicellulose of lignocellulosic material into a thermoset, water proof adhesive, comprising:

- (a) bringing lignocellulosic material in divided form and containing at least 10% hemicellulose, rapidly into contact with high pressure steam at a temperature high enough to release the hemicellose without carbonization thereof;
- (b) maintaining the lignocellulosic material in contact with high pressure steam for a time sufficient only for the non-catalytic decomposition and hydrolization of hemicellulose into essentially low molecular weight, water soluble resin material selected from the group consisting of pentose and hexose sugars, sugar polymers, dehydrated carbohydrates, furfural products, organic acids and other minor decomposition products, with negligible carbonization of the hemicellulose and negligible degradation of cellulose;

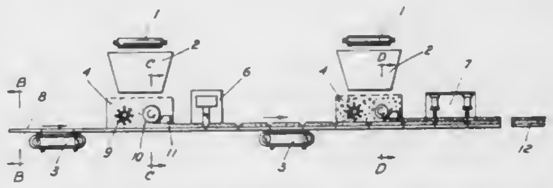


- (c) heating and pressing the water soluble resin materials thus produced in a concentrated form against a surface to be adhered thereto, at a temperature, time and pressure sufficient to polymerize, cross link and thermoset this material into a water proof adhesive adhering to the surface.

---

### 5,017,320
### PROCESS FOR THE MANUFACUTURE OF STRATIFIED PIECES SUCH AS ROOF TILES AND WALL TILES

**Rafael Velazquez Garcia, Torrejon de Ardoz, Spain, assignor to Uralita, S.A., Madrid, Spain**
**Continuation-in-part of Ser. No. 759,056, Jul. 25, 1985, abandoned. This application May 19, 1986, Ser. No. 864,796**
**Claims priority, application Spain, Nov. 20, 1984, 282.723; Dec. 6, 1984, 538.325**
**Int. Cl.$^5$ B28B** *1/16, 11/12, 11/14;* **B29C** *47/06*
**U.S. Cl. 264—148** **3 Claims**



1. Process for the manufacture of stratified pieces such as tiles by successive and independent extrusions of cement mortars, comprising the steps of:

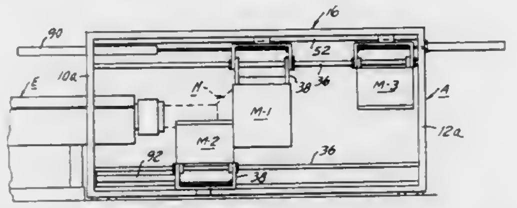
- (a) molding a first mortar layer by extrusion of mortar onto a plurality of consecutive contacting molds to produce a shaped layer having a width which is narrower than that of said molds, said width being limited by side limiters thereby leaving the molds uncovered along bands at each side of said first mortar layer;
- (b) dislodging said mortar from cross strips at each area of contact between two consecutive molds to provide a separate molding by mortar on each mold;
- (c) molding by extrusion a second mortar layer over said separate moldings, without causing deterioration or alteration of said separate moldings, said second layer covering said molds at said bands and said cross strips to produce a layered product having a desired final thickness of said stratified pieces; and
- (d) cutting said layered product coincident with said area of contact of said molds to provide said stratified pieces with said first molding covered by said second layer on each side of said first molding not in contact with said mold thereby obtaining homogeneous facing surfaces of said second layer on said stratified pieces.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,321

## PROCESS FOR PLASTIC TUBING MANUFACTURE

**Gordon A. Comfort, 5423 Sutton Rd., Britton, Mich. 49229**
**Division of Ser. No. 232,137, Aug. 15, 1988, Pat. No. 4,911,633. This application Jan. 5, 1990, Ser. No. 461,300**
**Int. Cl.$^5$ B29C *53/30***
**U.S. Cl. 264—167** **5 Claims**



1. A method of producing plastic tubing, which comprises introducing molten plastic material into a mold cavity, forming said material while in said cavity to the contours thereof to produce a predetermined length of plastic tubing, removing said cavity from said length of plastic tubing and advancing said cavity forwardly along a linear path to a downstream location, moving said cavity along a linear path from said downstream location rearwardly in a straight line direction to an upstream location, and advancing said mold cavity from said upstream location forwardly along a linear path into close adjacency to a second mold cavity whereinto molten plastic material is introduced prior to its introduction into said closely adjacent mold cavity

---

### 5,017,322

## PROCESS FOR INHIBITING FOULING OF AN UNDERWATER SURFACE

**Rodney R. Brooks, Gateshead, England, assignor to International Paint public limited company, United Kingdom**
**Filed Feb. 14, 1989, Ser. No. 311,167**
**Claims priority, application United Kingdom, Feb. 15, 1988, 8803458**
**Int. Cl.$^5$ B29C *41/22;* B32B *27/26***
**U.S. Cl. 264—255** **25 Claims**

1. A process for inhibiting fouling on an underwater surface comprising applying to the surface of a mold for the production of a boat hull or part thereof a coating composition comprising:

(a) a curable polyorganosiloxane,
(b) a curing agent capable of curing the polyorganosiloxane (A) to a silicone elastomer,
(c) a polyisocyanate, and
(d) a compound having more than one active hydrogen group or hydrolyzable to a compound having more than one active hydrogen group, said active hydrogen group being capable of reacting with the polyisocyanate (C) to form a polyurethane, polyurea or poly (urethane-urea),

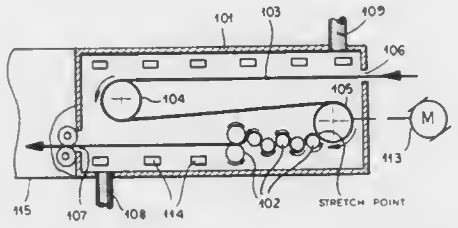
into which mold are applied layers of curable resin which are cured in the mold to form a boat hull or part thereof having the coating composition as its outermost layer.

---

### 5,017,323

## METHOD AND APPARATUS FOR STRETCHING THERMOPLASTIC FILMS

Hermann Balk, Troisdorf, Fed. Rep. of Germany, assignor to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany
Continuation-in-part of Ser. No. 201,380, May 25, 1988, abandoned, which is a continuation of Ser. No. 824,624, Jan. 31, 1986, abandoned. This application Aug. 10, 1989, Ser. No. 392,220
Claims priority, application Fed. Rep. of Germany, Jan. 31, 1985, 3503249
Int. Cl.$^5$ B29C *55/06*
U.S. Cl. 264—288.4 2 Claims



1. A method of stretching a thermoplastic film, the method comprising the steps of:

passing the film through a heating chamber along a non-straight path from an inlet to an outlet over a plurality of guide members including a rotatable upstream member and a rotatable downstream member;
heating the interior of the chamber and the film therein to a temperature generally in excess of the softening point of the film;
maintaining the travel speed of the film into the inlet at an input speed;
pulling the film from the downstream member at an output speed substantially greater than the input speed; and
impeding movement of the film upstream of the downstream member to a speed not generally exceeding the input speed by limiting rotation of the downstream member to a peripheral speed at most equal to the input speed, whereby the film is stretched substantially only at and downstream of the downstream member; and passing the downstream stretch of the web alternately over and under a multiplicity of stretching rollers in the chamber downstream of the second member.

2. An apparatus for stretching a thermoplastic film, the apparatus comprising:

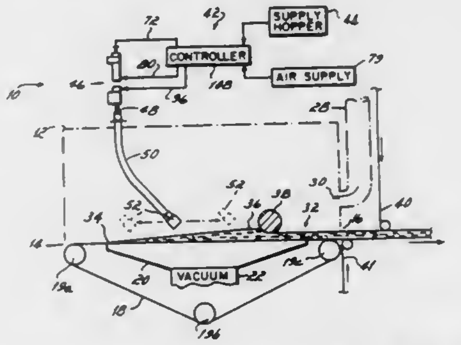
a heating chamber having an inlet and an outlet;
a rotatable upstream guide and a rotatable downstream guide member in the chamber;
means for introducing the film through the inlet into the chamber at an inlet speed
means including a multiplicity of stretching rollers in the chamber downstream of the second member for withdrawing the film from the chamber through the outlet at an outlet speed substantially higher than the input speed and for passing it in the chamber along a path passing over the upstream and downstream members;
means for heating the film in the chamber to a temperature generally above the softening point of the film;
means associated with the upstream member for permitting the film to pass thereover with substantially no friction; and
means associated with the downstream member for inhibiting rotation of same to a peripheral speed less than the input speed and for thereby inhibiting movement of the film thereover at a speed substantially greater than the input speed, whereby the film will not stretch upstream of the downstream member.

---

### 5,017,324

## METHOD FOR DEPOSITING PARTICULATE MATERIAL INTO A PAD OF FIBROUS MATERIAL IN A FORMING CHAMBER

**Thomas A. Kaiser, Vermilion; Douglas C. Mulder, Wellington, both of Ohio; David E. O'Ryan, Clarkston, Mich.; Douglas A. Schnelder, Lorain, and Rodney L. Ward, Wellington, both of Ohio, assignors to Nordson Corporation, Westlake, Ohio**
**Division of Ser. No. 348,149, May 2, 1989, Pat. No. 4,927,346, which is a continuation of Ser. No. 939,093, Dec. 8, 1986, abandoned. This application Jan. 19, 1990, Ser. No. 469,078**
**Int. Cl.$^5$ D04H *1/04***
**U.S. Cl. 264—510** **16 Claims**



1. A method of forming a non-woven pad of fibrous material with a second material interspersed throughout a selected portion of the thickness thereof, comprising:

introducing fibrous material into a chamber having an inlet and an outlet;
applying a vacuum in said chamber to draw said fibrous material onto a conveyor moving through said chamber, said fibrous material forming a non-woven pad having a bottom surface resting atop said conveyor and a top surface which slopes upwardly relative to said conveyor from the inlet toward the outlet of said chamber;
dispensing the second material from a dispenser means located within said chamber at a predetermined position along said upwardly sloping top surface of said non-woven pad, said second material being intermixed with a portion of said fibrous material being drawn onto said conveyor at said predetermined position to form a layer of intermixed fibrous material and second material within a predetermined portion of said thickness of said pad while maintaining another portion of said thickness of said pad substantially free of said second material.

---

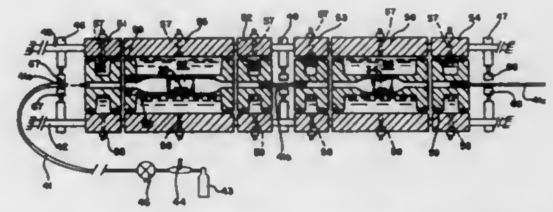
### 5,017,325

## STRETCH-BLOW MOLDING METHOD FOR MANUFACTURING BALLOONS FOR MEDICAL DEVICES

**Stefan Jackowski, Hollywood, and Leonard Pinchuk, Miami, both of Fla., assignors to Cordis Corporation, Miami Lakes, Fla.**
**Division of Ser. No. 384,418, Jul. 24, 1989, Pat. No. 4,938,676, which is a continuation-in-part of Ser. No. 253,070, Oct. 4, 1988, abandoned. This application Dec. 19, 1989, Ser. No. 452,715**
**Int. Cl.$^5$ B29C *49/10, 49/16, 49/18***
**U.S. Cl. 264—521** **11 Claims**

1. A process for fabricating medical device balloons, the process comprising:

feeding an elongated tubularly shaped parison into and through a molding apparatus including an upstream biaxial orientation chamber and a downstream blow molding chamber until one portion of the parison is in the upstream chamber and another portion of the parison is in the downstream blow molding chamber;
axially stretching to longitudinally orient at least the portion of the parison within the upstream chamber to provide an axially oriented parison length;
biaxially orienting the axially oriented parison length within the upstream chamber by infusing pressurized fluid thereinto to provide a biaxially oriented parison length;
axially stretching at least the portion of the biaxially oriented parison length until its diameter is decreased while moving the biaxially oriented parison length into the downstream chamber; and



blow molding the biaxially oriented and axially stretched parison length by infusing pressurized fluid thereinto while same is within the downstream blow molding chamber to provide a molded parison useful as a medical device balloon.

---

### 5,017,326

## FILM MID ROLL INTERRUPT PROTECTION FOR A CAMERA USING MAGNETIC AZIMUTH RECORDING ON FILM

**Michael L. Wash, Pittsford; Douglas H. Pearson, Rochester, and Richard R. Kelbe, Fishers, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Filed Oct. 5, 1989, Ser. No. 417,345**
**Int. Cl.$^5$ G03B *17/24***
**U.S. Cl. 354—207** **13 Claims**

1. In a photographic camera employing film having a magnetic layer for magnetically recording information in said film and which exposes successive frames in said film, a double exposure protection system comprising:

means for magnetically pre-recording a signal on said film characterized by a first magnetic head azimuth angle and for detectably altering the signal so recorded in each of said film frames upon its being exposed by said camera; and
means for sensing whether said recorded signal has been altered in a particular one of said frames prior to the exposure thereof and preventing a double exposure of said frame in response said signal being altered.

---

### 5,017,327

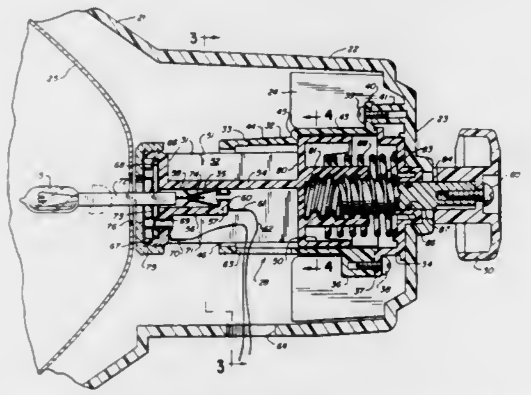
## ADJUSTABLE LIGHT

**David J. Bamber, Wichita, Kans., assignor to Colemann Outdoor Products, Inc., Wichita, Kans.**
**Filed Aug. 16, 1989, Ser. No. 394,496**
**Int. Cl.$^5$ F21V *19/00***
**U.S. Cl. 362—389** **12 Claims**

1. An adjustable light comprising a casing, a reflector mounted on the casing, a piston housing mounted in the casing, a piston slidably and non-rotatably mounted in the piston housing and having an internally threaded bore, the piston housing and the piston having flat surfaces which are engageable with each other for preventing relative rotational movement between the piston and the piston housing, a bulb carried by the piston, a screw rotatably mounted in the casing and being restrained against axial movement, the screw being threadedly

VOL
1126
ISS
3
MY
21
1991
UMI

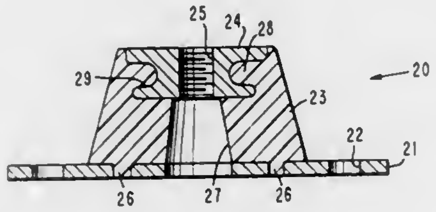
engaged with the bore of the piston, and a knob connected to the screw and positioned outside of the casing whereby rotation of the knob rotates the screw and slides the piston and the bulb relative to the reflector.



---

### 5,017,328
### VIBRATION DAMPENING MOTOR MOUNT

**John D. Mazurek, 303 Cedar Rd., Vista, Calif. 92083**
**Filed May 4, 1989, Ser. No. 348,520**
**Int. Cl.$^5$ F16F** *1/36*
**U.S. Cl. 267—136** **13 Claims**



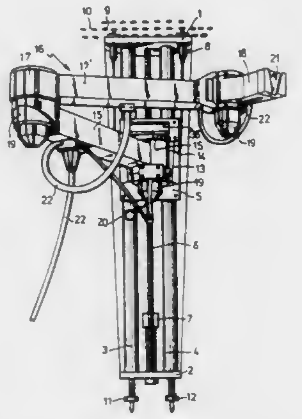
1. A mounting arrangement comprising:
a base plate having an opening;
a resilient member affixed to the base plate and having an opening extending therethrough that is substantially aligned with the opening in the base plate;
a disk-like member secured in the resilient member and having an opening therein that is substantially aligned with the opening in the resilient member for securably engaging an object to be held by the mounting arrangement, and having a peripheral edge containing a continuous, smoothly contoured, concave groove into which the resilient member is disposed, which groove provides a mechanical linkage between the disk-like member and the resilient member.

---

### 5,017,329
### APPARATUS FOR INSPECTING AND REPAIRING THE TUBES OF A NUCLEAR POWER PLANT

**Huibrecht P. Vermaat, Av Rockanje, Netherlands, assignor to Vermaat Technics B.V., Rockanie, Netherlands**
**Filed Jan. 2, 1990, Ser. No. 459,949**
**Int. Cl.$^5$ G21C** *17/00*
**U.S. Cl. 576—249** **5 Claims**

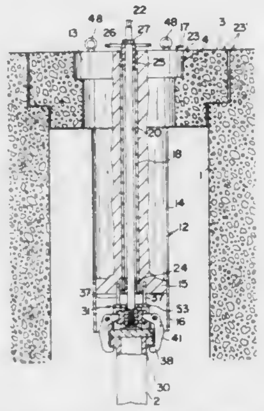
1. Apparatus for inspecting and repairing the tubes of a boiler of a nuclear power plant, which apparatus can be hoisted through a manhole of the boiler to a tube sheet and which apparatus comprises upper and lower plates connected by guide bars along which a carriage can be moved back and forth, to which carriage an arm assembly consisting of a shoulder with pivotably connected upper arm, an elbow with pivotably connected lower arm and a wrist can be connected, which arm assembly can be connected to inspection and or repair tools at the wrist, which faces away from the carriage, wherein aid carriage and said arm assembly comprise drive means for remote-controlling the inspection or repair tools, and wherein the upper plate can be fixed by means of first span fingers in two passages of the tube sheet, characterized in that a yoke **(36)** has been mounted on the shoulder **(15)** that can receive an anchoring piece **(35)** of an auxiliary tool **(23)** connected to the wrist **(18)**, said tool comprising two additional span fingers **(37, 38)** that can be fixed in other passages **(9)** of the tube sheet **(10)** so as to permit the transfer of the first span fingers **(8)** of the upper plate **(1)** to another set of passages of the tube sheet, the transfer being accomplished without opening the manhole of the boiler.



---

### 5,017,330
### DEVICE FOR OPENING AND CLOSING A FILTER IN A NUCLEAR PLANT AND PROCESS FOR REPLACING THE FILTER PACKING

**Alain Hurdiel, Eaubonne, France, assignor to Framatome, Courbevoie, France**
**Filed Jun. 8, 1989, Ser. No. 362,994**
**Claims priority, application France, Jun. 8, 1988, 88 07634**
**Int. Cl.$^5$ G21C** *19/30*
**U.S. Cl. 376—260** **6 Claims**



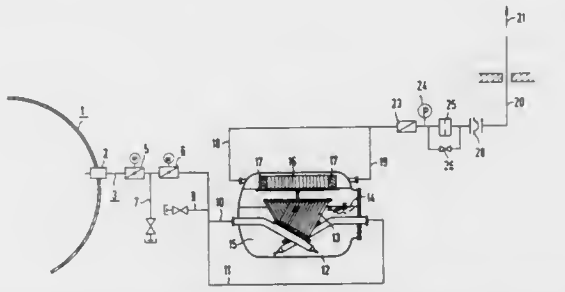
1. Device for opening and closing a filter (2) in a fluid circuit of a nuclear plant, arranged inside a biological protection housing (1) having an upper part with an opening for access (4) to said filter (2), said opening being adapted to be closed by a closure plug (13) equipped with lifting means (48), said filter (2) comprising a body (5) having an upper part with an opening adapted to be closed by a closure head (30) and located in vertical alignment with said opening (4) in said housing (1), said device consisting of a unit comprising

(a) said closure plug (13), extended by a cylindrical body **(14)** in its axial direction and pierced by an opening **(18)** passing through said closure plug **(13)** and said cylindrical body **(14)** along their common axis and along their entire length;
(b) a maneuvering rod **(20)** mounted along the axis of said opening **(18)** passing through said closure plug **(13)** and said cylindrical body **(14)**, bearing on said closure plug **(13)**, mounted for rotation about its axis in said opening **(18)** and comprising a first end projecting relative to said closure plug **(13)** forming a part **(22)** for driving in rotation around its axis and a second, opposite end projecting relative to said cylindrical body **(14)**;
(c) a device **(25, 26)** for moving said maneuvering rod **(20)** axially in either direction, over a limited length, consisting of a threaded sleeve **(25)** engaged in a tapped part of said opening **(18)** inside said closure plug **(13)** on which said maneuvering rod rests, by means of a ring **(27)** fastened to said first end of said maneuvering rod projecting relative to said closure plug **(13)**, said threaded sleeve being equipped with means for manual actuation **(26)** for causing it to rotate in a screwing direction and in an unscrewing direction inside said closure plug **(13)**;
(d) said closure head **(30)** of said filter, connected to said second end of said maneuvering rod **(20)**; and
(e) means for locking **(36, 38, 41)** said closure head **(30)** onto said body **(5)** of said filter **(2)** carried by said closure head **(30)** and comprising a maneuvering device consisting of a nut **(38)** engaged onto a threaded part **(36)** of said second end of said maneuvering rod **(20)**.

---

### 5,017,331
### NUCLEAR POWER PLANT HAVING A CONTAINMENT

**Bernd Eckardt, Bruchkoebel, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**
**Filed Apr. 10, 1989, Ser. No. 335,699**
**Claims priority, application Fed. Rep. of Germany, Apr. 18, 1988, 3812893**
**Int. Cl.$^5$ G21C** *19/42*
**U.S. Cl. 376—313** **17 Claims**

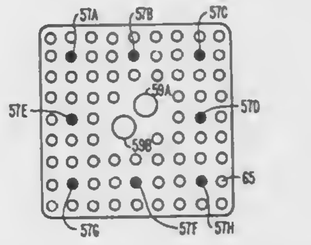


1. Nuclear power plant, comprising a containment for the retention of radioactivity having an overpressure safety outlet; a filter connected to said outlet including a vessel for receiving a scrubbing liquid up to a given liquid level, a venturi scrubber disposed in said vessel having an outlet disposed above said given liquid level, an impact plate disposed at said outlet of said venturi scrubber for mist collection, a metal-fiber filter downstream of said venturi scrubber having at least first and second layers with a thickness of from 10 to 20 mm, said first layer being a moisture collector with a fiber thickness of from 8 to 20 $\mu$ and said second layer being an aerosol collector with a fiber thickness of from 2 to 7 $\mu$, and a mist collector downstream of said metal-fiber filter, said vessel having a top with a gas outlet downstream of said mist collector; and a stack connected to said gas outlet and leading to the atmosphere.

---

### 5,017,332
### TWO-PHASE PRESSURE DROP REDUCTION BWR ASSEMBLY DESIGN

**Gary E. Dix; Russell L. Crowther, both of Saratoga; Mark J. Colby, San Jose; Bruce Matzner, San Jose, and Robert B. Elkins, San Jose, all of Calif., assignors to General Electric Company, San Jose, Calif.**
**Continuation-in-part of Ser. No. 176,975, Apr. 4, 1988. This application Jul. 3, 1989, Ser. No. 375,646**
**Int. Cl.$^5$ G21C** *15/00*
**U.S. Cl. 376—370** **2 Claims**



1. An improved fuel assembly for a boiling water reactor, comprising in combination:
a fuel channel having vertically extending walls, said channel being open at the bottom for engagement to a lower tie plate, and open at the upper end for engagement to an upper tie plate;
a lower tie plate closing the bottom of said channel, said lower tie plate further providing defined apertures for the inflow of water in said channel;
an upper tie plate at the top of said channel, said upper tie plate further providing defined apertures for the outflow of water in said channel;
said lower tie plate and said upper tie plate defining a two-dimensional matrix having a plurality of rows and columns for placement of fuel rods within said fuel channel;
a plurality of rows and columns of fuel rods positioned in said matrix, each said rod containing fissile material for producing nuclear reactions when in the presence of sufficient moderated neutron flux;
at least one water rod positioned in said fuel channel;
a plurality of said fuel rods being partial length rods extending from said lower tie plate toward said upper tie plate, and terminating before reaching said upper tie plate, the remainder of said fuel rods being full length fuel rods extending between said lower tie plate and said upper tie plate, said full length fuel rods, partial length fuel rods, and water rods being positioned in said matrix such that each of said full length rods is adjacent to a matrix position, said adjacency including spacing selected along a row, a column or diagonal which is occupied by a component selected from the group consisting of partial length rods and water rods.

---

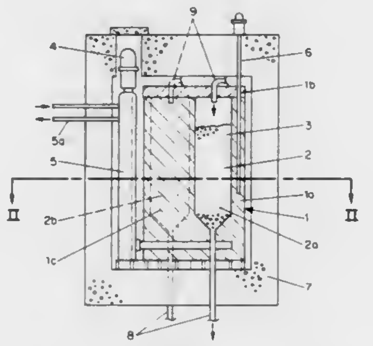
### 5,017,333
### MULTI-REGION REACTOR CORE PEBBLE BED HIGH TEMPERATURE GAS REACTOR

**Takao Hayashi, and Masao Yamada, both of Kanagawa, Japan, assignors to Japan Atomic Power Co., Ltd. and Fuji Electric Co., Ltd., both of, JPX**
**Filed Feb. 6, 1990, Ser. No. 475,693**
**Claims priority, application Japan, Feb. 8, 1989, 1-29238; Nov. 14, 1989, 1-295202**
**Int. Cl.$^5$ G21C** *15/00*
**U.S. Cl. 376—382** **2 Claims**

1. A multi-region high temperature nuclear reactor utilizing fuel in the form of spherical fuel pellets through which coolant gas is conducted and then gives up its heat to steam generating means, said reactor comprising, in combination:
means including a substantially circular outer reflector wall and at least two partition walls integral with the outer wall

VOL
1126
ISS
3
MY
21
1991
UMI

and extending substantially radially from the center of the outer wall for dividing the volume defined by the outer wall into at least two chambers for containing a respective bed of fuel pellets and forming the core of a respective separate reactor, each wall comprising a layered structure of graphite reflector blocks and including a tapered key removably wedged between two adjacent blocks of each layer for forcing adjacent blocks of the layer against one another to secure them together and which when removed releases the force and permits removal and replacement of a single block,



fuel charging and discharging means for each reactor,

separate steam generating means for each reactor,

means defining separate paths for flow of gas through the bed of fuel elements of respective reactors and to the steam generating means for that reactor, and

a plurality of control rods positioned at spaced locations within said outer wall and said partition walls for individual up and down movement relative to said walls for controlling each reactor independently.

---

5,017,334

### PROCESS FOR PREPARING SELF-SUPPORTING BODIES AND PRODUCTS PRODUCED THEREBY

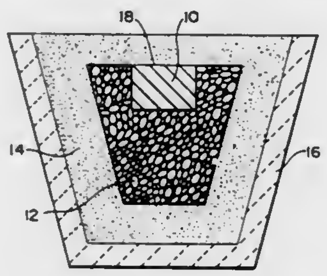
**Terry D. Claar, Newark, Del., and Steven M. Mason, Norwood, Pa., assignors to Lanxide Technology Company, LP, Newark, Del.**

**Continuation of Ser. No. 296,771, Jan. 18, 1989, Pat. No. 4,885,130, which is a continuation-in-part of Ser. No. 137,044, Dec. 23, 1987, which is a continuation-in-part of Ser. No. 73,533, Jul. 15, 1987. This application Dec. 5, 1989, Ser. No. 446,433**

**The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.**

**Int. Cl.$^5$ B22F *3/26***

**U.S. Cl. 419—12** **9 Claims**



1. A method for producing a self-supporting body, comprising:

selecting a parent metal;

heating said parent metal in a substantially inert atmosphere to a temperature above its melting point to form a body of molten parent metal;

contacting said body of molten parent metal with a preform comprising boron carbide and at least one donor material selected from the group consisting of a boron donor material and a carbon donor material;

maintaining said temperature for a time sufficient to permit infiltration of molten parent metal into said preform and to permit reaction of said molten parent metal with at least a portion of said preform; and

continuing said infiltration and reaction for a time sufficient to produce said self-supporting body, said self-supporting body having a configuration corresponding to said preform.

---

5,017,335

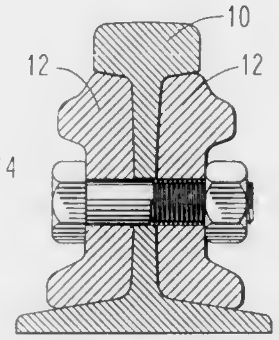
### MICROALLOYED STEEL AND PROCESS FOR PREPARING A RAILROAD JOINT BAR

**Bruce L. Bramfitt, and Steven S. Hansen, both of Bethlehem, Pa., assignors to Bethlehem Steel Co., Bethlehem, Pa.**

**Filed Jun. 29, 1989, Ser. No. 374,264**

**Int. Cl.$^5$ C21D *7/13;* C22C *38/06***

**U.S. Cl. 420—127** **10 Claims**



1. A fully killed steel having a composition, in weight percent, consisting essentially of from about 0.20 to about 0.45 percent carbon, from about 0.90 to about 1.70 percent maganese, from about 0.01 to about 0.04 percent aluminum, from about 0.05 to about 0.20 percent vanadium, from about 0.008 to about 0.024 percent nitrogen, less than about 100 parts per million oxygen, balance iron.

---

5,017,336

### ZIRONIUM ALLOY FOR USE IN PRESSURIZED NUCLEAR REACTOR FUEL COMPONENTS

**Yutaka Matsuo, Tokyo; Takeshi Isobe, and Kazuyosi Adachi, both of Omiya, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 501,375, Mar. 29, 1990, abandoned, which is a continuation of Ser. No. 300,325, Jan. 20, 1989, abandoned. This application Jul. 26, 1990, Ser. No. 558,797**

**Claims priority, application Japan, Jan. 22, 1988, 63-12324; Jan. 19, 1989, 1-10448**

**Int. Cl.$^5$ C22C *16/00***

**U.S. Cl. 420—422** **9 Claims**

1. A zirconium alloy for use as a nuclear reactor fuel component material which consists essentially by weight of:

0.2 to 0.9% Sn;

0.18 to 0.6% Fe;

0.07 to 0.4% Cr;

at least one of 0.05 to less than 0.5% Nb and 0.01 to 0.2% Ta;

at least one of 0.05 to 1% V and 0.05 to 1% Mo; and the balance Zr and incidental impurities.

---

5,017,337

### ALUMINUM ALLOY FOR MAGNETIC DISC SUBSTRATE EXECELLENT IN PLATABILITY

**Motohiro Nabae, and Kunihiko Kishino, both of Nikko, Japan, assignors to Furukawa Aluminum Co., Ltd., Tokyo, Japan**

**Filed Sep. 26, 1989, Ser. No. 412,431**

**Claims priority, application Japan, Sep. 30, 1988, 63-246726**

**Int. Cl.$^5$ C22C *21/06***

**U.S. Cl. 420—532** **2 Claims**

2. An aluminum alloy for use as a magnetic disc substrate consisting essentially of aluminum and from 0.01–0.03 wt. % of copper, from 2.0–6.0 wt. % of magnesium, from 0.5–2.0 wt. % of zinc, from 0.005–0.05 wt. % of zirconium, from 0.01–0.05 wt. % of at least one member of the group consisting of manganese and chromium, wherein said alloy contains as impurities no greater than 0.1 wt. % of silicon, no greater than 0.1 wt. % of iron, no greater than 0.02 wt. % of titanium and no greater than 0.02 wt. % of any other individual impurity.

---

5,017,338

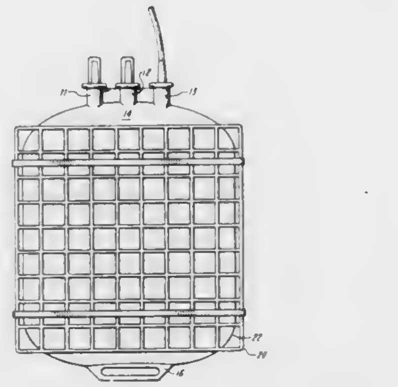
### PLATELET CONCENTRATES

**Douglas M. Surgenor, Carlisle, Mass., assignor to The Center for Blood Research, Inc., Boston, Mass.**

**Filed Apr. 11, 1986, Ser. No. 850,759**

**Int. Cl.$^5$ A61B *19/00***

**U.S. Cl. 422—41** **9 Claims**



1. A method of storing and preserving platelets suspended in a fluid and carried in a thin wall, non-rigid, plastic bag having first and second yieldable side walls,

said method comprising compressing said side walls to form a substantially thin layers of said fluid within said bag,

said compressing being carried out by rigid grid means which permit gas circulation to at least one of said side walls,

and positioning said bag for storage in a desired position.

---

5,017,339

### APPARATUS FOR MEASURING THE COMPONENTS OF A SAMPLE

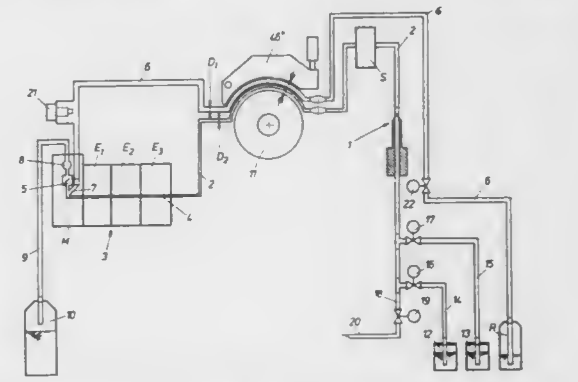
**Hermann Marsoner, Steinberg; Fritz Fischer, and Erich Kleinhappl, both of Graz, all of Austria, assignors to AVL AG, Schaffhausen, Switzerland**

**Filed Mar. 28, 1989, Ser. No. 329,837**

**Claims priority, application Austria, Mar. 28, 1988, 830/88**

**Int. Cl.$^5$ G01N *27/00, 31/00***

**U.S. Cl. 422—82.04** **16 Claims**



1. An apparatus for measuring chemical and physico-chemical properties of a sample, comprising

a sensor block with at least one sensor module for indirect measurement of at least one sample property, said sensor module comprising a housing which contains a sample channel and a measuring chamber which is contacted by a sensor,

a removable mixer part containing a mixing chamber with a magnetic stirrer and having at least one connection for said sample and a reagent medium and a channel leading into said measuring chamber, said mixer part being positionable in said housing of said sensor module, and

two magnetic conductors positioned in said mixer part which are connectable with a magnetizing coil and are directed towards said magnetic stirrer in said mixing chamber, wherein for indirect measurement of at least one of said sample properties said sample and said reagent medium are mixed in said mixing chamber.

---

5,017,340

### TEMPERATURE COMPENSATED RESISTIVE TYPE SENSOR FOR THE MEASUREMENT OF RELATIVE CONCENTRATIONS OF FLUID REACTIVE SPECIES

**Didier Pribat, Paris; Joel Perret, Plaisir, and Jean-Claude Rouffy, Poissy, all of France, assignors to Thomson-CSF, Puteaux, France**

**Filed Sep. 12, 1989, Ser. No. 406,305**

**Claims priority, application France, Sep. 16, 1988, 88 12127**

**Int. Cl.$^5$ G01N *27/00***

**U.S. Cl. 422—98** **20 Claims**

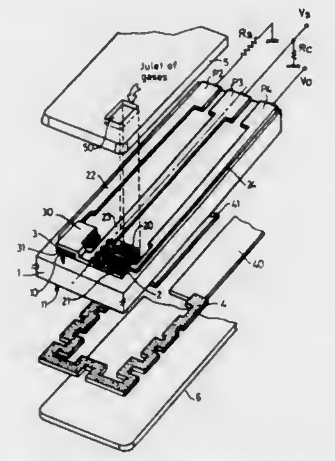
1. A resistive sensor for the measurement of relative concentrations of fluid reactive species comprising the following elements, made in layers, on a substrate:

at least one sensitive element, the resistivity of which is sensitive to an excess of one of the reactive species with respect to a determined stoichiometry;

at least one thermistor undergoing temperature variations proportionate to the temperature variations undergone by

VOL 1126 ISS 3 MY 21 1991 UMI

the sensitive element, this thermistor being mounted as a resistance bridge with the sensitive element;



a heating resistor for heating the sensitive element and the thermistor and fixing a minimum temperature threshold of operation.

---

### 5,017,341

### AGGLUTINATION ANALYZING VESSEL

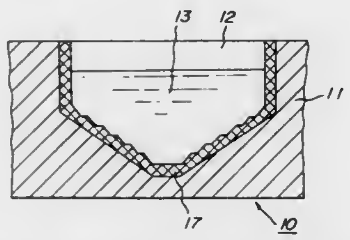
**Hiroshi Takekawa, Sagamihara, Japan, assignor to Olympus Optical Co., LTD., Tokyo, Japan**

**Filed Apr. 14, 1989, Ser. No. 338,151**

**Claims priority, application Japan, Apr. 19, 1988, 63-94674**

**Int. Cl.$^5$ B01C** *3/02*

**U.S. Cl. 422—102** **11 Claims**



1. An agglutination analyzing vessel for analyzing a solution of particles in a test liquid for the presence of an agglutination reaction, comprising:

a main body made of solid material;

a well formed in said main body and having a bottom surface, at least part of said bottom surface of said well being inclined; and

means for absorbing and retaining the solution therein, said absorbing and retaining means being formed on the entirety of said bottom surface of said well;

whereby the solution is absorbed in said absorbing and retaining means when introduced into said well, said absorbing and retaining means causing a downward flow of the test liquid which promotes sedimentation of the particles in the test liquid.

---

### 5,017,342

### DEVICE FOR IMMUNOASSAY DETERMINATIONS

**Cecelia Haberzettl, Flemington, N.J.; Jack Geltosky, Doylestown, Pa., and Renée Perst, Lebanon, N.J., assignors to Ortho Diagnostic Systems Inc., Raritan, N.J.**

**Filed Jun. 1, 1988, Ser. No. 201,515**

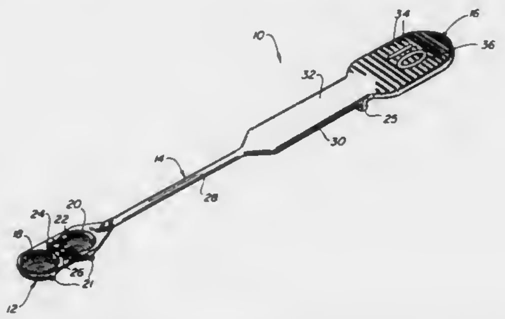
**Int. Cl.$^5$ B01L** *3/00*

**U.S. Cl. 422—102** **18 Claims**

1. An assay support, generally planar and elongated in shape, and comprising a gripping section, a sample receiving well section, and a connecting section therebetween, each of said sections being aligned along a longitudinal axis;

said sample receiving well section comprising at least two spaced-apart receiving wells; each of said wells having an open end on a first face of said support, a concave inner surface extending concavely into said support, and a convex outer surface which projects convexly from an opposed face of said support;

said convex outer surface of at least one of said wells provided with at least one stabilizing leg constructed and arranged to preclude rotation of said wells when resting on a flat surface;



said assay support provided with a leveling projection extending from said opposed face so as to cooperate with said at least one stabilizing leg to maintain said support level when resting on a flat surface;

said sample receiving section in the space between said wells comprises a dam means projecting from the first face of said support so as to preclude the flow of a liquid sample from one of said wells to another of said wells.

---

### 5,017,343

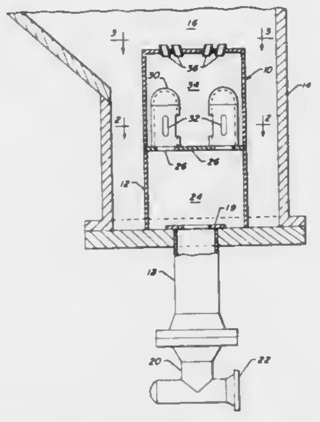
### LOW PRESSURE MIXING APPARATUS FOR ATOMIZING FLUIDS

**Ismail B. Cetinkaya, Palatine, Ill., assignor to UOP, Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 5,044, Jan. 16, 1987, Pat. No. 4,861,459, which is a continuation-in-part of Ser. No. 712,298, Mar. 15, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 270,556**

**Int. Cl.$^5$ B01J** *8/22, 8/18;* **B05B** *7/08, 1/26*

**U.S. Cl. 422—140** **12 Claims**



1. An apparatus for mixing a liquid hydrocarbon and a gaseous material and discharging the mixture into contact with FCC catalyst particles, said apparatus comprising:

(a) a conduit having first and second ends;

(b) a partition in said conduit dividing the interior of said conduit into a first chamber located at said first end of said conduit and a second chamber;

(c) means for introducing said hydrocarbon and gaseous material into said first chamber;

(d) means in said conduit for mixing said hydrocarbon and said gaseous material upstream of said second chamber and forming a well dispersed mixture;

(e) means for communicating said well dispersed mixture from said first chamber to said second chamber and dividing said well dispersed mixture into a plurality of discrete streams;

(f) means in said second chamber for directing the projection of each of said discrete streams into impingement with an impact medium, said impact medium comprising at least one of an imperforate wall section and another of said discrete streams;

(g) a discharge device at the second end of said conduit defining a plurality of openings that define a restricted flow area; and

(h) means for transferring said mixture from said second chamber to said discharge device through said plurality of openings that define said restrictive flow area.

---

### 5,017,344

### PROCESS FOR THE SEPARATION OF IRON FROM AN ORGANIC SOLUTION CONTAINING URANIUM

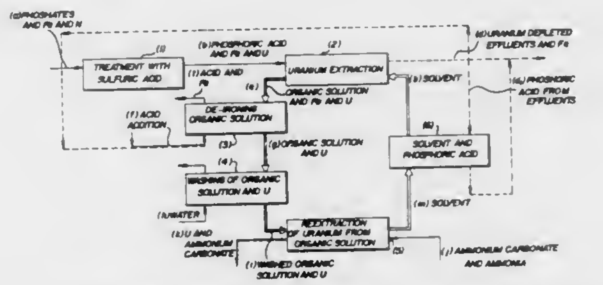
**André Textoris, Bessines; Georges Lyaudet, Limoges, and André Bathelier, Sceaux, all of France, assignors to Compagnie Generale des Matieres Nucleaires (Cogema), Velizy Villacoublay Cedex, France**

**Continuation of Ser. No. 30,518, Mar. 27, 1987, abandoned. This application Jul. 11, 1989, Ser. No. 379,701**

**Claims priority, application France, Mar. 28, 1986, 86 4558**

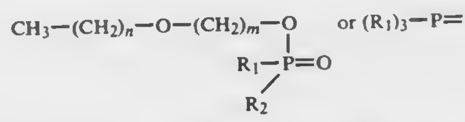
**Int. Cl.$^5$ C01G** *43/00*

**U.S. Cl. 423—10** **20 Claims**


(a) PHOSPHATES AND Fe AND U
(1)
TREATMENT WITH SULFURIC ACID
(b) PHOSPHORIC ACID AND Fe AND U
(2)
URANIUM EXTRACTION
(d) URANIUM DEPLETED EFFLUENTS AND Fe
(c) SOLVENT
(k) PHOSPHORIC ACID FROM EFFLUENTS
(1) ACID AND Fe
(e)
ORGANIC SOLUTION AND Fe AND U
(f) ACID ADDITION
DE-IRONING ORGANIC SOLUTION
(3)
(g) ORGANIC SOLUTION AND U
(6)
SOLVENT AND PHOSPHORIC ACID
(4)
WASHING OF ORGANIC SOLUTION AND U
(h) WATER
(m) SOLVENT
REEXTRACTION OF URANIUM FROM ORGANIC SOLUTION
(k) U AND AMMONIUM CARBONATE
(i) WASHED ORGANIC SOLUTION AND U
(5)
(j) AMMONIUM CARBONATE AND AMMONIA

1. A process for selectively removing iron having a valence of 3, from an organic solution which contains uranium having a valence of 6, which initially contains at least 1 g/l of iron and which comprises:

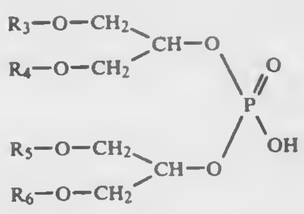
a neutral phosphine oxide of the formula:



$$CH_3-(CH_2)_n-O-(CH_2)_m-O \quad \text{or } (R_1)_3-P=O$$
$$R_1-P=O, \quad R_2$$

in which: $R_1$ and $R_2$, which may be identical or different, are each a straight-chain or branched alkyl of 4 to 10 carbon atoms, m is an integral of 1 to 3, and n is an integer of 4 to 10; and

an acid organophosphorous compound of the formula:



in which: $R_3$, $R_4$, $R_5$ and $R_6$, which may be identical or different, are each a straight-chain or branched alkyl of at least 4 carbon atoms or an aryl of 6 to 10 carbon atoms;

said process comprising the step of:

contacting said organic solution with an aqueous acid chosen from the group consisting of: oxalic acid and a mixture of phosphoric acid and sulfuric acid; wherein iron in said organic solution passes into said aqueous acid.

---

### 5,017,345

### METHOD OF PRODUCING URANIUM (IV) FLUORIDE

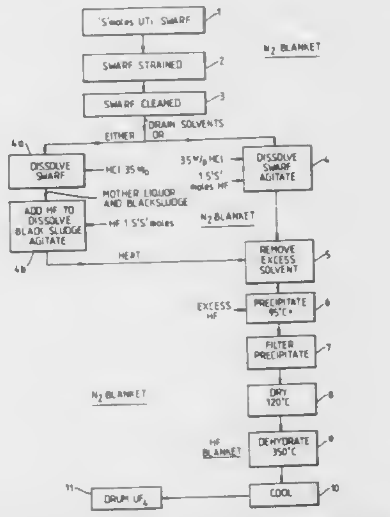
**Paul Gilchrist, Fulwood, and Graham Hodgson, Blackpool, both of United Kingdom, assignors to British Nuclear Fuels plc, Risley, United Kingdom**

**Filed Aug. 22, 1989, Ser. No. 396,642**

**Claims priority, application United Kingdom, Sep. 9, 1988, 8821189**

**Int. Cl.$^5$ C01G** *43/06*

**U.S. Cl. 423—18** **10 Claims**



1. A method of producing uranium (IV) fluoride from a feedstock comprising uranium metal or an alloy thereof, the method comprising dissolving the feedstock in an aqueous solution consisting essentially of hydrochloric acid and a controlled quantity of hydrofluoric acid in relation to the quantity of uranium in the feedstock effective to produce a clear solution, and heating the clear solution and adding excess hydrofluoric acid to the clear solution to produce a precipitate comprising uranium (IV) fluoride.

VOL 1126 ISS 3 MY 21 1991 UMI

### 5,017,346

## PROCESS FOR TREATING ZINC OXIDE BEARING MATERIALS

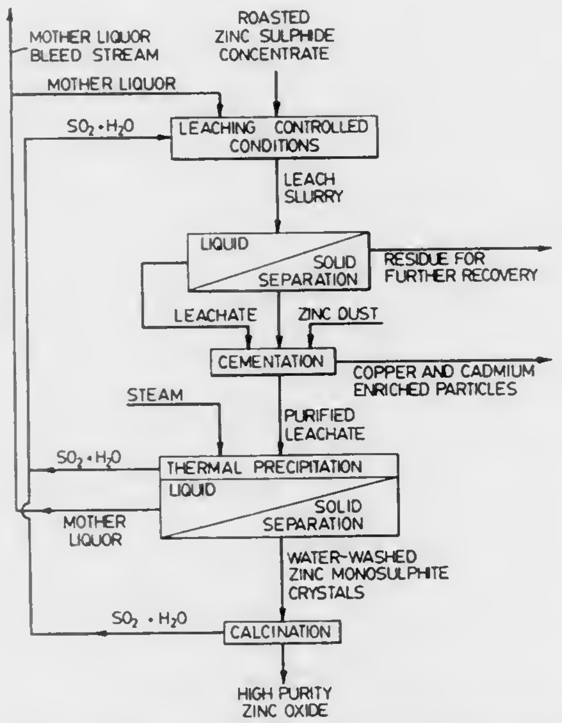
**Donald R. Spink, Waterloo; Murry C. Robinson, Don Mills, and Kim D. Nguyen, Waterloo, all of Canada, assignors to Ecolomics Inc., Don Mills, Canada**

**Filed May 11, 1988, Ser. No. 192,566**

**Claims priority, application United Kingdom, May 13, 1987, 8711287**

**Int. Cl.$^5$ C22B** *19/00, 3/00;* **C01G** *9/00*

U.S. Cl. 423—101 16 Claims



1. A process for the refining of zinc oxide bearing material comprising the steps of:

(a) leaching the zinc oxide bearing material by slurrying it in an aqueous sulphur dioxide solution, maintaining the slurry at a feed pulp density of about 100 to about 350 grams per liter, a temperature of about 0° C. to about 25° C., a pH value from about 2.0 to about 3.5, and the leaching residence time is adjusted to obtain maximum extraction of zinc consistent with minimum extraction of impurities;

(b) subjecting the leach slurry of step (a) to liquid-solid separation to yield a zinc bearing leachate and a zinc depleted residue;

(c) precipitating zinc monosulphite crystals from said leachate to produce a zinc depleted mother liquor by increasing the pH of the leachate not to exceed about 5.0 by heat treating said leachate;

(d) subjecting the leachate of step (c) to liquid-solid separation to yield a zinc depleted mother liquor and zinc monosulphite crystals;

(e) recycling the zinc depleted mother liquor to step (a); and,

(f) calcining the separated zinc monosulphite crystals to yield purified zinc oxide and wet sulphur dioxide gas, said gas being subsequently returned to leaching step (a).

---

### 5,017,347

## PROCESS FOR NITROGEN OXIDES REDUCTION AND MINIMIZATION OF THE PRODUCTION OF OTHER POLLUTANTS

**William R. Epperly, New Canaan; James C. Sullivan, Norwalk; Barry N. Sprague, Bethlehem, and John H. O'Leary, Danbury, all of Conn., assignors to Fuel Tech, Inc., Stamford, Conn.**

**PCT No. PCT/US88/02751, § 371 Date May 23, 1989, § 102(e) Date May 23, 1989, PCT Pub. No. WO89/02781, PCT Pub. Date Apr. 6, 1989**

**Continuation-in-part of Ser. No. 50,198, May 14, 1987, Pat. No. 4,780,289, and Ser. No. 14,431, Feb. 13, 1987, Pat. No. 4,770,863, and Ser. No. 22,799, Mar. 6, 1987, abandoned, and Ser. No. 25,350, Mar. 13, 1987, and Ser. No. 25,493, Mar. 13, 1987, abandoned, and Ser. No. 39,013, Apr. 15, 1987, Pat. No. 4,803,059, and Ser. No. 100,128, Sep. 23, 1987, and Ser. No. 108,779, Oct. 14, 1987, and Ser. No. 132,801, Dec. 14, 1987, Pat. No. 4,803,839, and Ser. No. 155,864, Feb. 29, 1988, and a continuation-in-part of Ser. No. 207,292, Jun. 15, 1988. This PCT application Aug. 12, 1988, Ser. No. 411,902**

**The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.**

**Int. Cl.$^5$ C01B** *21/00;* **B01J** *8/00*

U.S. Cl. 423—235 42 Claims

1. A process for reducing the concentration of nitrogen oxides in an effluent from the combustion of a carbonaceous fuel while minimizing the production of other pollutants, the process comprising:

a. determining the effluent conditions existing at a location for intrduction of a treatment agent;

b. effecting a treatment regimen which comprises introducing a treatment agent selected from the group consisting of urea, ammonia, hexamethylenetetramine, a paraffinic hydrocarbon, an olefinic hydrocarbon, an aromatic hydrocarbon, an oxygenated hydrocarbon, an ammonium salt of an organic acid having a carbon to nitrogen ratio of greater than 1:1, a hydroxy amino hydrocarbon, a heterocyclic hydrocarbon having at least one cyclic oxygen, a five or six membered heterocyclic hydrocarbon having at least one cyclic nitrogen, hydrogen peroxide, guanidine, guanidine carbonate, biguanidine, guanylurea sulfate, melamine, dicyandiamide, calcium cyanamide, biuret, 1,1'-azobisformamide, methylol urea, methylol urea-urea condensation product, dimethylol urea, methyl urea, dimethyl urea and mixtures thereof into the effluent to treat the effluent under introduction conditions effective to reduce the nitrogen oxides concentration in the effluent under said determined effluent conditions while minimizing the production of other pollutants;

c. monitoring the condition of the effluent until a significant alteration in the condition of the effluent is observed;

d. adjusting said treatment regimen by varying at least one of the following parameters

(i) dilution and introduction rate of said treatment agent;

(ii) components of said treatment agent; and

(iii) relative presence of treatment agent components,

to effect an adjusted treatment regimen, wherein said adjusted treatment regimen operates under conditions effective to reduce the nitrogen oxides concentration in the effluent under said altered effluent condition while minimiz.ing the production of othe pollutants.

---

### 5,017,348

## TREATMENT OF NITROGEN OXIDES

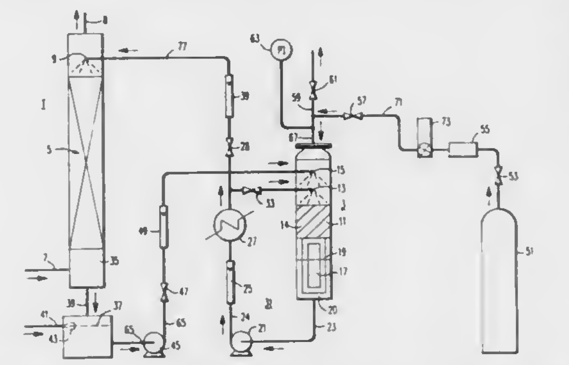
**Bernard J. Lerner, Pittsburgh, Pa., assignor to Beco Engineering Company, Glenshaw, Pa.**

**Filed Jan. 26, 1989, Ser. No. 301,851**

**Int. Cl.$^5$ C01B** *21/00, 21/40*

**U.S. Cl. 423—235 14 Claims**

1. The method of producing nitric acid while reducing the emissions of nitrogen oxides into the atmosphere with apparatus including an absorber and a closed vessel; the said method including: conducting nitrogen oxides through said absorber countercurrent to water or nitric acid to generate nitric acid and nitrous acid, supplying oxygen to said closed vessel under a positive pressure differential, supplying said nitric and nitrous acids to said closed vessel under a positive pressure differential to contact said nitrous and nitric acid from said absorber by said oxygen in said closed vessel, and recycling the product of the contacting of said nitrous and nitric acid with said oxygen as an absorbant to said absorber.



---

### 5,017,349

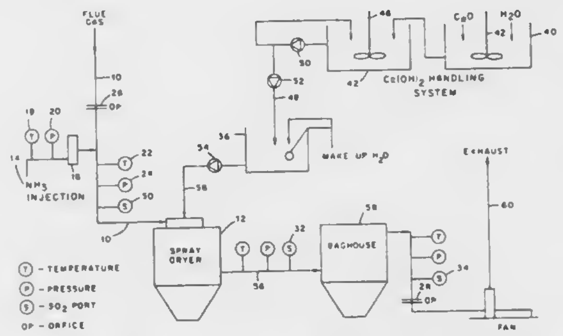
## METHOD FOR DESULFURIZATION OF FLUE GASES

**Wayne T. Davis; Gregory D. Reed, both of Knoxville, Tenn., and Timothy C. Keener, Cincinnati, Ohio, assignors to The University of Tennessee Research Corporation, Knoxville, Tenn.**

**Filed Mar. 21, 1989, Ser. No. 326,378**

**Int. Cl.$^5$ C01B** *17/00;* **B01J** *8/00*

U.S. Cl. 423—242 6 Claims



1. A method for the removal of sulfur-oxide compounds from the flue gas stream from a high-sulfur coal combustion unit employing a spray dryer apparatus characterized in that the flue gas stream is contacted in the spray dryer apparatus with gaseous ammonia an a slurry of calcium hydroxide present in a combined stoichiometric ratio of greater than about 0.5 with said contacting being at a temperature sufficient to effect ammonia-sulfur compound and calcium-sulfur compound forming reactions of the ammonia and the calcium hydroxide with sulfur oxide in the flue gas stream and the sublimation of the ammonia-sulfur compounds to form solid particulates.

---

### 5,017,350

## GAS SCRUBBING PROCESS

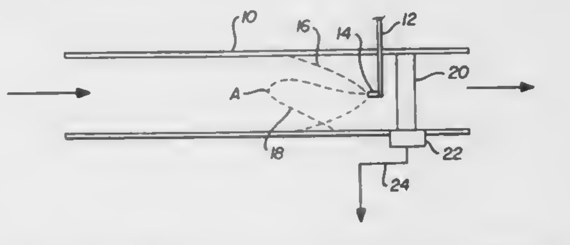
**Leo E. Hakka, Dollard Des Ormeaux, and John N. Sarlis, Laval Des Rapides, both of Canada, assignors to Union Carbide Canada Limited, Danbury, Conn.**

**Continuation-in-part of Ser. No. 360,404, Jun. 2, 1989, Pat. No.**

**Int. Cl.$^5$ C01B** *17/00*

U.S. Cl. 423—243 19 Claims

1. A process for the removal of sulfur dioxide from a sulfur dioxide-containing gas stream comprising contacting said gas stream in a substantially horizontal contact zone with finely-divided droplets of absorbing medium which comprises (i) water in an amount of at least about 1 mole for each mole off sulfur to be absorbed up to about 80 weight percent of the absorbing medium and (ii) amine sorbent having at least one amine group which is, when in free form, a group having a pKa in an aqueous medium at 25° C. of about 4.5 to 6.7, at a temperature up to about 60° C., wherein the velocity of the gas stream is at least about 1.5 meters per second and the contact is for a time sufficient that a portion of the finely-divided droplets sorbs sulfur dioxide to provide a concentration of sulfur dioxide in the portion of liquid droplets greater than the projected vapor-liquid equilibrium concentration under the conditions of the gas stream as it exits from the contact zone, coalescing in the contact zone a portion of the droplets which contain a greater concentration of sulfur dioxide than the projected vapor-equilibrium concentration under the conditions of the gas stream as it exits the contact zone; contacting the coalesced droplets with gas stream having a concentration of sulfur dioxide below the projected vapor-equilibrium concentration under the conditions of the coalesced droplets; and removing the coalesced droplets from the contact zone before the sulfur dioxide in the coalesced droplets equilibrates with the gas stream.



---

### 5,017,351

## PROCESS FOR REMOVING VOLATILE ORGANIC COMPOUNDS FROM AIR STREAMS

**Harold J. Rafson, 1852 Dale Ave., Highland Park, Ill. 60035**

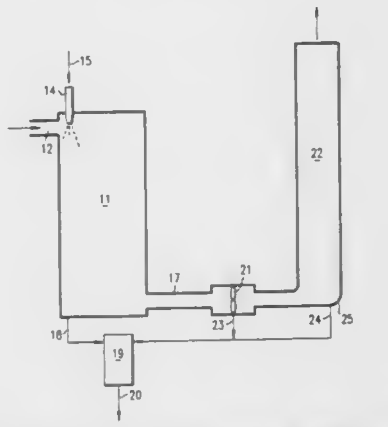
**Filed Jul. 21, 1989, Ser. No. 383,357**

**Continuation-in-part of Ser. No. 154,879, Feb. 11, 1988, Pat. No. 4,863,495.**

**The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.**

**Int. Cl.$^5$ B01J** *8/00*

U.S. Cl. 423—245.2 23 Claims



1. A method for removing volatile organic compounds which are normally non-soluble in water and other contaminants from a gas stream wherein the improvement comprises:

contacting the gas stream with tiny, aqueous spray droplets for a time sufficient to achieve substantial transfer of said volatile organic compounds from the gas into the droplets, said droplets displaying an internal pressure substantially greater than atmospheric;

VOL
1126
ISS
3
MY
21
1991
UMI

causing said droplets, now containing volatile organic compounds, to grow and to coalesce;

removing said coalesced droplets from the gas stream to obtain an aqueous liquid effluent having volatile organic compounds contained therein; and

treating said aqueous liquid effluent so that the captured volatile organic compounds contained in the effluent are not released to the environment.

---

5,017,352

### NOVEL CERIUM OXIDE PARTICULATES

**Jean-Yves Chane-Ching, and Jean-Yves Dumousseau, both of Paris, France, assignors to Rhone-Pulenc Specialites Chimique, Courbevoie, France**

**Continuation of Ser. No. 749, Jan. 6, 1987, abandoned, which is a division of Ser. No. 703,558, Feb. 20, 1988, Pat. No. 4,663,137.**

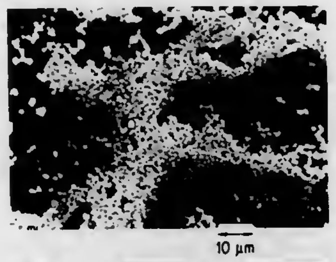
**This application Dec. 29, 1989, Ser. No. 459,361**

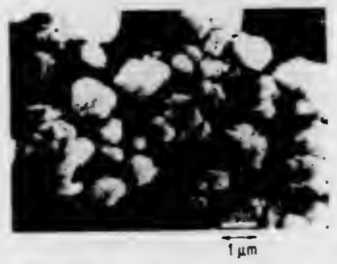
**Claims priority, application France, Feb. 20, 1984, 84 02506**

**The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.**

**Int. Cl.$^5$ C01F** *17/00*

U.S. Cl. 423—263 **7 Claims**





1. A ceric oxide particulate composition, consisting essentially of ceric oxide particulates having a B.E.T. specific surface of from 100 to 130 $m^2/g$, measured at a temperature ranging from 400° C. to 450° C., said B.E.T. specific surface varying but slightly in response to an increase in temperature, said particulates having an aggregate mean diameter ranging from 0.9 to 1.1 µm.

---

5,017,353

### RECYCLED ZEOLITE L PREPARATION

**Johannes P. Verdnijn, Spijkenisse, Netherlands, assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Continuation of Ser. No. 870,352, Jun. 4, 1986, abandoned, which is a continuation of Ser. No. 667,979, Nov. 5, 1984, abandoned. This application Aug. 5, 1988, Ser. No. 228,877**

**Claims priority, application United Kingdom, Nov. 10, 1983, 8329973**

**Int. Cl.$^5$ C01B** *33/34*

U.S. Cl. 423—328 **6 Claims**

1. A process for the preparation of zeolite L comprising cylindrical crystallites, in which process a first L crystallization gel comprising an alkaline reaction mixture of water, a source of silicon and a source of aluminum and having a composition falling within the following molar ratios (expressed as oxides):

| | |
|---|---|
| $M_{2/n}O/SiO_2$ | 0.22–0.36 |
| $H_2O/M_{2/n}O$ | 25–90 |

-continued

| | |
|---|---|
| $SiO_2/Al_2O_3$ | 5.7–15 |

(wherein M is potassium or a mixture of K+M′ wherein M′ is an alkali metal or alkaline earth metal and the ratio $K_2O/(M'_{2/n}O+K_2O)$ is at least 0.7) is heated to a temperature of from at least 75° C. up to about 225° C. to form the said cylindrical crystalline zeolite L having at least 50% of its crystallites in the form of cylinders having an aspect ratio of 0.5 to 1.5 and a mean diameter of at least 0.5 micron, the formed zeolite L is separated from a mother liquor, the separated mother liquor is heated to a temperature of at least about 175° C. for at least about 12 hours, until sufficient zeolite W nuclei and/or crystallites are converted to non-zeolitic phases, and the separated mother liquor is then used in the formation of a second crystallization gel and is present in an amount of from 10 to 90 wt % of said second gel which has a composition as defined hereinbefore and in which the alkalinity is such that the antecedent ratio of $K_2O$ to $Al_2O_3$ is 2.8 to 3.0, zeolite W formation being thereby suppressed, and the second gel is heated to form further cylindrical crystallite zeolite L wherein the ratio of zeolite W to zeolite L is less than 0.3.

---

5,017,354

### PROCESS FOR PRODUCTION OF HIGH PURITY SILICA GEL

**Barbara L. Simms, North White Plains, and Chihang R. Chu, Yonkers, both of N.Y., assignors to Akzo America Inc., New York, N.Y.**

**Filed Sep. 2, 1988, Ser. No. 240,014**

**Int. Cl.$^5$ C01B** *33/12*

U.S. Cl. 423—338 **6 Claims**

1. A process for preparing essentially pure, particulate silica gel which is substantially free of trace contaminants which comprises:

(a) forming a silica gel composition by the hydrolysis and condensation of a silicon alkoxide in a non-metal lined tumble dryer;

(b) drying the silica gel composition in the tumble dryer;

(c) washing the dried silica gel composition, which is in particulate form, with an aqueous washing solution in the tumble dryer to remove trace contaminants therefrom; and

(d) drying the washed, particulate silica gel composition.

---

5,017,355

### PROCESS FOR PRODUCING CYANAMIDE

**Hiroshi Shibafuchi, Hiratsuka; Masanori Sasaki, Tokyo; Hidenori Nitta, and Masahiko Yoshida, both of Hiratsuka, all of Japan, assignors to Nippon Carbide Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 352,339, May 16, 1989, abandoned. This application Sep. 10, 1990, Ser. No. 581,131**

**Claims priority, application Japan, May 18, 1988, 63-119176**

**Int. Cl.$^5$ C01C** *3/16*

U.S. Cl. 423—369 **3 Claims**

1. A process for producing cyanamide from lime nitrogen, which comprises dispersing lime nitrogen in an organic liquid containing methanol and blowing carbon dioxide gas into the resulting dispersion to react lime nitrogen, methanol and carbon dioxide under conditions such that the water content of the reaction system is not more than 5% by weight.

---

5,017,356

### PREPARATION OF CYANOGEN FROM GLYOXIME

**Rodney L. Willer, Newark; Dennis Park, Wilmington, both of Del., and Alfred G. Stern, Elkton, Md., assignors to Thiokol Corporation, Ogden, Utah**

**Filed May 21, 1990, Ser. No. 526,163**

**Int. Cl.$^5$ C01C** *3/00*

U.S. Cl. 423—384 **2 Claims**

1. A process for the preparation of cyanogen comprising reacting glyoxime with acetic anhydride at an elevated temperature to form N,N′-diacetoxyglyoxime and pyrolyzing said N,N′-diacetoxyglyoxime at an elevated temperature to produce cyanogen.

---

5,017,357

### CATALYTIC PROCESS FOR OXIDATION OF CARBON MONOXIDE

**John H. Kolts, Ochelata, Okla.; and Scott H. Brown, Bartlesville, Okla., Patricia A. Tooley, Camden, Tenn., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 366,946, Jun. 14, 1989, Pat. No. 4,943,550. This application Mar. 16, 1990, Ser. No. 494,711**

**Int. Cl.$^5$ C01B** *31/20;* **C10K** *1/34*

U.S. Cl. 423—437 **20 Claims**

1. In a process for oxidizing carbon monoxide with free oxygen to a carbon dioxide in the presence of a catalyst composition comprising (a) a support material selected from the group consisting of alumina, magnesium aluminate and mixtures thereof, (b) platinum metal, and (c) an iron component selected from the group consisting of iron oxide, iron metal and mixtures thereof, wherein said catalyst composition has undergone a reducing treatment, the improvement which comprises:

(1) treating said catalyst composition, which has undergone a reducing treatment, with an acidic liquid;

(2) heating the material obtained in step (1) under such conditions as to substantially remove said acidic liquid from said material obtained in step (1); and

(3) treating the material obtained in step (2) with a reducing gas under such conditions as to enhance the activity of said material for catalyzing the reaction of carbon monoxide with free oxygen to carbon dioxide.

---

5,017,358

### PREPARATION OF ELASTIC GRAPHITE MATERIALS

**Yasuhiro Yamada, Tosu; Masaki Fujii, Sakai, and Seiji Shimomura, Chikushino, all of Japan, assignors to Dir. General, Agency of Industrial Science and Technology and Koa Oil Company, Ltd., both of Tokyo, Japan**

**Filed Sep. 15, 1989, Ser. No. 407,642**

**Claims priority, application Japan, Sep. 22, 1988, 63-237921**

**Int. Cl.$^5$ C01B** *31/04*

U.S. Cl. 423—449 **5 Claims**

1. A method for producing an elastic graphite material having a packing density of 1.0 $g/cm^3$ or lower and a recovery of 50% or higher at a compressibility of 10 to 90%, which comprises:

heating a carbonaceous material so rapidly as to elevate the temperature of the carbonaceous material up to 200° to 400° C. over the period of 2 minutes to 45 minutes while brining the carbonaceous material into contact with nitric acid for expansion and foaming, and

graphitizing the thus expanded and foamed carbonaceous material.

---

5,017,359

### AEROSOL COMPOSITIONS FOR IN VIVO IMAGING AND THERAPY

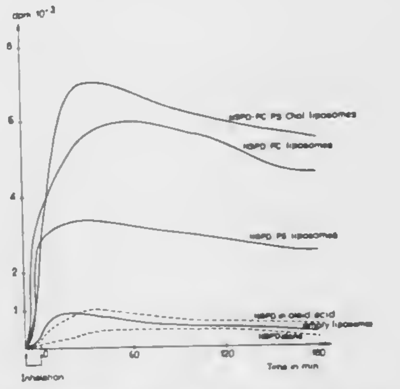
**Yves-Claude Nicolau, La Chapelle; Alain LePape, Langeais, and Rita Barot-Ciorbaru, Fontenay-aux-Roses, all of France, assignors to Centre National de la Recherche Scientifique, France**

**Continuation-in-part of Ser. No. 794,500, Nov. 1, 1985, abandoned. This application Nov. 12, 1986, Ser. No. 930,409**

**The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.**

**Int. Cl.$^5$ A61K** *43/00, 49/00, 49/02, 9/127*

U.S. Cl. 424—1.1 **10 Claims**



1. Aerosol composition for application to humans or animals comprising one or more soluble fragments of bacterial wall peptidoglycan or bacterial cell peptidoglycan, wherein the peptidoglycan includes NSPD, encapsulated in liposomes; and a carrier gas suitable for aerosol administration.

2. Aerosol composition according to claim 1, wherein, for in vivo imaging or ex vivo diagnosis of tumors, said one or more soluble fragments of bacterial wall peptidoglycan or bacterial cell peptidoglycan are labelled with a radioactive, paramagnetic, or fluorescent element.

---

5,017,360

### SURFACE MODIFIED ALUMINUM AND ALUMINUM-ZIRCONIUM SALTS

**Dimitris E. Katsoulis, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Apr. 20, 1990, Ser. No. 511,686**

**Int. Cl.$^5$ A61K** *7/32, 7/34, 7/38*

U.S. Cl. 424—45 **12 Claims**

1. A aluminum salt composition comprised of a composition having an empirical formula

$$Al_a(OH)_b(Z)_cCl_d$$

wherein Z is an anionic part of an organophilic compound; a/(c+d) has the value of 0 to 3, inclusive; c+d=3a−b; and c is greater than 0.

VOL
1126
ISS
3
MY
21
1991
UMI

5,017,361

### ALLERGEN ABSORBENT AND BLOCKING AEROSOL COMPOSITION

**Thomas W. Powell, Jr., Las Vegas, Nev.; Anthony A. Schulz, Floyds Knobs, Ind., and Gary W. Beall, Fairfield, Ky., assignors to United Catalysts, Inc., Louisville, Ky.**

**Division of Ser. No. 99,960, Sep. 23, 1987, Pat. No. 4,861,584, which is a continuation-in-part of Ser. No. 940,946, Dec. 12, 1986, abandoned, which is a continuation-in-part of Ser. No. 785,167, Oct. 10, 1985, abandoned. This application Aug. 8, 1989, Ser. No. 390,862**

**The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.**

**Int. Cl.$^5$ A61K** *9/14, 31/74*

U.S. Cl. 424—46 13 Claims

1. An aerosol allergen barrier composition for topical application consisting essentially of:

A. a barrier composition comprising

(1) from about 5% to about 15% by weight of a smectite clay having an ion exchange capacity of at least 50 milliequivalents per 100 grams, said clay having been ion exchanged with at least 50 milliequivalents per 100 grams of said clay of a quaternary ammonium compound having at least one alkyl group containing more than 10 carbon atoms, and

(2) from about 95% to about 85% by weight of a pharmaceutically acceptable non-toxic vehicle; and

B. an aerosol propellant.

---

5,017,362

### ANTICALCULUS ORAL COMPOSITION

**Abdul Gaffar, Princeton, and Thomas G. Polefka, Somerset, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.**

**Continuation of Ser. No. 307,718, Feb. 8, 1989, Pat. No. 4,889,713, which is a continuation of Ser. No. 938,938, Dec. 2, 1986, Pat. No. 4,808,400, which is a continuation of Ser. No. 775,851, Sep. 13, 1985, Pat. No. 4,627,977. This application Dec. 8, 1989, Ser. No. 447,967**

**The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.**

**Int. Cl.$^5$ A61K** *7/18*

U.S. Cl. 424—52 20 Claims

1. A method of inhibiting the occurrence of calculus on tooth surfaces as by inhibiting the transformation of amorphous calcium phosphate to a hydroxapatite crystal structure normally associated with calculus comprising applying to such tooth surfaces a calculus inhibiting amount of anticalculus oral composition containing in an orally acceptable vehicle one or a mixture of water soluble tripolyphosphate salts as essential anticalculus agents, and an amount of dentally acceptable fluoride ion source sufficient to supply about 25 ppm. to about 2,000 ppm. of fluoride ions.

---

5,017,363

### STABILIZED STANNOUS FLUORIDE TOOTHPASTE

**Christopher H. Suhonen, San Jose, Calif., assignor to Gillette Canada, Inc., Montreal, Canada**

**Division of Ser. No. 437,470, Nov. 15, 1989, Pat. No. 4,961,924. This application Jul. 25, 1990, Ser. No. 557,880**

**Int. Cl.$^5$ A61K** *7/18, 33/16*

U.S. Cl. 424—52 5 Claims

1. An aqueous toothpaste composition consisting essentially of water-unstable stannous fluoride and a lower alkyl vinyl ether and maleic anhydride copolymer as the essential stannous ion chelate forming stabilizer in an amount sufficient to effectively stabilize the stannous fluoride concentration against stannous oxide precipitation by providing oxidation protection to the stannous ion, the composition being substantially free from soluble pyrophosphates, silica containing compounds, and aldehyde group containing compounds.

---

5,017,364

### PASTE-LIKE DENTIFRICE COMPOSITION

**Hiromi Mitsutake, Yokohama; Hideomi Saitoh, Sagamihara, and Koichiro Nagata, Yokkaichi, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Filed Oct. 17, 1989, Ser. No. 422,460**

**Claims priority, application Japan, Oct. 20, 1988, 63-264464**

**Int. Cl.$^5$ A61K** *7/16, 7/22*

U.S. Cl. 424—54 3 Claims

1. A paste-like dentifrice composition containing, as its essential foaming agent, from 0.1 to 0.5% by weight of N-long-chain acylglutamate itself containing not more than 1.0% by weight of impurities that remain unreacted during the acylation reaction, including higher fatty acid(s) either in free form or in salt form, as contaminants, said composition not imparting the well-known change in the taste of orange juice ingested after tooth brushing, known as the orange juice aftertaste phenomenon.

---

5,017,365

### SUNSCREEN COMPOSITION AND APPLICATOR SYSTEM

**Raymond S. Niedbala, Allentown, Pa., assignor to SolarCare Technologies Corporation, Bethlehem, Pa.**

**Continuation-in-part of Ser. No. 191,861, May 9, 1988, abandoned. This application Oct. 3, 1990, Ser. No. 593,534**

**Int. Cl.$^5$ A61K** *7/42, 7/44;* **B65D** *8/122, 73/00*

U.S. Cl. 424—59 9 Claims

1. A sunscreen package comprising a fibrous sheet impregnated with a sunprotective, aqueous based emulsion, said impregnated sheet incorporated in a vapor and moisture impermeable container, said aqueous based emulsion having a specific gravity of 0.90–1.05 and comprising:

(1) about 1–25 wt. % of a substantially water insoluble UV absorbing component capable of absorbing in at least the 290–320 nm range;

(2) about 5–20 wt. % of a cosmetically acceptable alcohol;

(3) about 1–10 wt. % of a nonionic emulsifier component;

(4) about 0.01–0.5 wt. % of a hydrophilic acrylic acid polymer having a molecular weight of at least about $4.5 \times 10^5$;

(5) an effective amount of an alkaline neutralizer for the acrylic acid polymer;

(6) about 2.5–20 wt. % of an emollient component; and

(7) at least about 50 wt. % water.

---

5,017,366

### PHARMACEUTICAL COMPOSITIONS

**Werner K. Stiefel, Coral Gables, Fla., and Charles F. Breunig, Greenville, N.Y., assignors to Stiefel Laboratories, Inc., Coral Gables, Fla.**

**Continuation-in-part of Ser. No. 291,670, Dec. 29, 1988, abandoned. This application May 14, 1990, Ser. No. 522,648**

**Int. Cl.$^5$ A61K** *7/40, 7/42, 7/44, 31/075*

U.S. Cl. 424—59 15 Claims

1. A topical pharmaceutical composition comprising a mixture of (i) at least one topically acceptable UV absorber in a concentration sufficient to block a substantial quantity of sun-generated UV radiation and (ii) an antibacterially effective amount of erythromycin in (iii) an pharmaceutically acceptable topical carrier.

---

5,017,367

### SKIN TREATMENT PREPARATION

**Radmila G. Stojkoski, 35026 Lana La., Sterling Heights, Mich. 48077**

**Continuation-in-part of Ser. No. 656,520, Oct. 1, 1984, abandoned, which is a continuation-in-part of Ser. No. 601,426, Apr. 18, 1984, abandoned. This application Jan. 6, 1987, Ser. No. 835**

**Int. Cl.$^5$ A61K** *7/21*

U.S. Cl. 424—63 3 Claims

1. A skin treatment composition suitable for topical application consisting of an effective skin cleansing, moisturizing and healing amount of a composition consisting of:

an organic carrier medium consisting of (a) olive oil, the olive oil being present in an amount of between 0.24 to about 0.55 parts per 1 part carrier medium; (b) butter present in an amount between 0.40 to 0.75 parts per 1 part carrier medium; and (c) honey present in an amount between 0.005 to 0.01 parts per 1 part carrier medium;

an organic thickening and adsorptive agent consisting of cornstarch present in a ratio of about 0.25 to about 1 part adsorptive agent to about 1 part carrier medium;

sodium acid pyrophosphate present in a ratio of between about 0.001 to about 0.1 part sodium acid pyrophosphate to about 1 part carrier medium;

a preservative selected from the group consisting of: salicylic acid, alkali metal salicylates and mixtures thereof present in a ratio of between about 0.001 and 0.1 part preservative per one part carrier medium;

bismuth subnitrate present in a ratio between about 0.001 and about 0.1 part bismuth subnitrate to about 1 part carrier medium;

a coloring agent consisting of cocoa powder present in a ratio of between 0.001 and about 1.0 parts to 1 part carrier medium; and

distilled water present in a ratio of about 0.001 to about 1 part water to about 1 part carrier medium.

---

5,017,368

### COMPOSITION FOR APPLICATION TO HAIR OR SCALP

**Keikichi Sugiyama, No. 18-13, Ishigamidai 1-chome, Oiso-machi, Naka-gun, Kanagawa-ken; Koji Takada; Akira Fukushima, both of Fujisawa, and Makoto Egawa, Odawara, all of Japan, assignors to Keikichi Sugiyama, Kanagawa, Japan**

**Continuation of Ser. No. 201,019, Jun. 1, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 472,438**

**Claims priority, application Japan, Jun. 1, 1987, 62-137982; Jun. 3, 1987, 62-139118**

**Int. Cl.$^5$ A61K** *7/06, 31/35*

U.S. Cl. 424—70 6 Claims

1. A method for preventing graying of the hair or restoring grayed hair to its natural color, said method comprising applying to the scalp a sufficient amount of a solution comprising an effective amount of (A) at least one compound selected from the group consisting of forskolin and derivatives thereof.

---

5,017,369

### FILM-FORMING TEAT SEALER FOR PREVENTION OF MASTITIS AND USE THEREOF

**Virginia C. Marhevka, 519 Crestview Dr., Maplewood, Minn. 55119**

**Continuation of Ser. No. 21,169, Mar. 3, 1987, abandoned, which is a continuation-in-part of Ser. No. 801,938, Nov. 26, 1985, abandoned. This application Jun. 27, 1989, Ser. No. 372,283**

**Int. Cl.$^5$ A61K** *31/74*

U.S. Cl. 424—78 11 Claims

1. A method for the prophylactic treatment of mastitis in a dairy cow in between milkings, said method comprising the steps of:

A. coating the teats of the cow with an aqueous composition comprising:

at least about 2% but less than about 12% by weight of partially hydrolyzed grade polyvinyl alcohol having an average degree of hydrolysis ranging from about 70 to 96 mole-%;

from 0% to about 10% opf an opacifier comprising emulsoid, dispersoid, or suspensoid polymer solids distributed uniformly through the water of said aqueous composition;

about 0.1% to 10% by weight of an antimicrobial agent, said antimicrobial agent being a biguanide salt, an (alkyl)alkylenaminoglycine, a quaternary ammonium salt, zinc pyridine thione, or combinations thereof; and

at least 65% water;

B. permitting the resulting coating to flow down to the teat end and form a plug-like deposit which is more resistant to solution in water than the film extending upward from it and to dry to form an adherent film on the teats, whereby the resulting adherent film and said plug-like deposit are removable with water, the adherent film being more easily removable than said plug-like deposit;

C. prior to milking the dairy cow, removing said adherent film and said plug-like deposit by means of a water wash with water heated to non-scalding temperatures moderately elevated above room temperature.

---

5,017,370

### IMPROVED METHOD OF PERFORMING ANGIOPLASTY PROCEDURES

**Robert L. Hunter, Tucker, and Alexander Duncan, Dunwoody, both of Ga., assignors to Emory University, Atlanta, Ga.**

**Continuation of Ser. No. 403,017, Sep. 5, 1989, abandoned, which is a continuation of Ser. No. 303,791, Jan. 30, 1989, abandoned, which is a division of Ser. No. 45,459, May 7, 1987, Pat. No. 4,801,452, which is a continuation-in-part of Ser. No. 43,888, Apr. 29, 1987, abandoned, which is a continnation of Ser. No. 863,582, May 15, 1986, abandoned. This application May 3, 1990, Ser. No. 518,510**

**Int. Cl.$^5$ A61K** *31/745;* **A61M** *31/00*

U.S. Cl. 424—83 33 Claims

1. A method of preventing tissue damage associated with an angioplasty procedure in an animal or human, comprising the step of injecting into the animal or human undergoing the angioplasty procedure a solution of an effective amount of a surface-active copolymer of the following formula:

$$HO(C_2H_4O)_b(C_3H_6O)_a(C_2H_4O)_bH$$

wherein a is an integer such that the hydrophobe represented by ($C_3H_6O$) has a molecular weight of approximately 950 to 4000, and b is an integer such that the hydrophile portion represented by ($C_2H_4O$) constitutes approximately 50% to 90% by weight of the copolymer.

---

5,017,371

### METHOD FOR REDUCING SIDE EFFECTS OF CANCER THERAPY

**Joseph M. Cummins, Amarillo, Tex., assignor to Amarillo Cell Culture Company, Incorporated, Amarillo, Tex.**

**Filed Jan. 6, 1988, Ser. No. 141,621**

**Int. Cl.$^5$ A61K** *37/66*

U.S. Cl. 424—85.6 19 Claims

1. A method for reducing side effects resulting from the administration of cancer therapy utilizing chemotherapeutic agents or radiation therapy in a patient receiving such therapy for treatment of cancer, said method comprising contacting the oral and pharyngeal mucosa of said patient with alpha-interferon or beta-interferon in an amount effective to reduce said side effects.

---

5,017,372

### METHOD OF PRODUCING ANTIBODY-FORTIFIED DRY WHEY

**Donald H. Hastings, Bismarck, N. Dak., assignor to Medicis Corporation, New York, N.Y.**

**Continuation of Ser. No. 851,472, Apr. 14, 1986, abandoned. This application Oct. 19, 1988, Ser. No. 259,735**

**Int. Cl.$^5$ A61K** *39/395*

U.S. Cl. 424—85.8 20 Claims

1. A dry whey protein powder fortified with polyclonal antibodies against preselected infectious intestinal disease antigens made according to a method comprising the steps of:

a. immunizing a pregnant ungulate by administration to the

VOL
1126
ISS
3
MY
21
1991
UMI

ungulate of the preselected infectious intestinal disease antigens in a non-pathogenic condition;

b. collecting and maintaining the milk from the ungulate after parturition, the milk containing a higher than normal concentration of antibodies against the preselected infectious intestinal disease antigens because of the immunization step;

c. producing unfractionated whey fortified with naturally occurring polyclonal antibodies against the preselected infectious intestinal disease antigens from the milk by removing milk casein; and

d. concentrating and drying the unfractionated whey to produce a whey protein powder fortified with naturally occurring polyclonal antibodies against the preselected infectious intestinal disease antigens.

---

### 5,017,373
### CLONING AND EXPRESSION OF BACILLUS THURINGIENSIS GENE TOXIC TO BEETLES OF THE ORDER COLEOPTERA

**Corinna Herrnstadt, San Diego, and Edward Wilcox, Escondido, both of Calif., assignors to Mycogen Corporation, San Diego, Calif.**

**Continuation of Ser. No. 282,143, Dec. 9, 1988, abandoned, which is a division of Ser. No. 767,227, Aug. 16, 1985, Pat. No. 4,865,981. This application Oct. 31, 1989, Ser. No. 430,090**

**Int. Cl.$^5$ C12N** *1/21, 15/32, 15/74;* **A01N** *63/00*

**U.S. Cl. 424—93** **6 Claims**

1. A live *Pseudomonas fluorescens* capable of proliferating in the phytosphere of vegetation, wherein said microorganism contains a 5.8 kb DNA fragment from *Bacillus thuringiensis* M-7, said fragment comprising a gene encoding a toxin toxic to beetles of the order Coleoptera expressed in said microorganism wherein said toxin is maintained at a biocidal level in said microorganism, so that upon ingestion by said pest of said microorganism in normal feeding, a biocidal level is ingested.

3. A method for protecting vegetation from beetles of the order Coleoptera which comprises administering to the environment of said vegetation, a live *Pseudomonas fluorescens* according to claim 1.

---

### 5,017,374
### CROP GROWTH PROMOTION

**Robert E. Humphrey, Aylmer, Canada, assignor to Agro Elements, Toronto, Canada**

**Filed Apr. 15, 1988, Ser. No. 182,007**

**Int. Cl.$^5$ A01N** *63/00;* **A01C** *1/06;* **C12N** *1/14, 1/16, 1/18;* **A61K** *37/54*

**U.S. Cl. 424—93** **13 Claims**

1. A seed dressing material effective in enhancing the growth of and trace element uptake in corn plants, said material comprising effective amounts of fungal spores of the species *Coprinus comatus* and GTF chromium.

---

### 5,017,375
### METHOD TO PREPARE A NEUROTROPHIC COMPOSITION

**Stanley H. Appel, and Yasuko Tomozawa, both of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.**

**Continuation-in-part of Ser. No. 768,887, Aug. 23, 1985, abandoned, which is a division of Ser. No. 444,293, Nov. 24, 1982, abandoned. This application May 18, 1987, Ser. No. 52,087**

**Int. Cl.$^5$ A61K** *37/02, 35/34*

**U.S. Cl. 424—570** **17 Claims**

1. A method to prepare a neurotrophic composition, which method comprises:

(a) extracting factors from caudate-putamen tissue of a normal mammal;

(b) assaying the caudate-putamen extract for trophic effects on dopaminergic neurons obtained from substantia nigra as measured by the ability to stimulate dopamine uptake by said neurons; and

(c) isolating factors having said trophic effects.

---

### 5,017,376
### DELAYED HYDROLYSIS OF METAL PHOSPHIDES

**Wolfgang Friemel, Heppenheim; Volker Barth, Ludwigshafen, and Hildegund Dierks, Erbach, all of Fed. Rep. of Germany, assignors to Detia Freyberg GmbH, Laudenbach, Fed. Rep. of Germany**

**Division of Ser. No. 138,772, Dec. 29, 1987, Pat. No. 4,894,230. This application Oct. 11, 1989, Ser. No. 420,503**

**Claims priority, application Fed. Rep. of Germany, Jan. 5, 1987, 3700176**

**Int. Cl.$^5$ A01N** *25/06*

**U.S. Cl. 424—409** **30 Claims**

1. A method of producing an alkaline earth or alkaline earth metal phosphide-based hydrogen phosphide generating pest control agent, which comprises coating each of a plurality of molded or shaped even surfaced bodies of a hydrolyzable alkaline earth or earth metal phosphide with an uninterrupted coating of a moisture permeable solid organic material which initially restricts and later permits free access of moisture to the phosphide, thereby retarding the phosphine gas generation for an initial delay period after the pest control agent is exposed to ambient moisture of one or more hours, during which delay period phosphine gas generation is substantially prevented and after which delay period bursting of the coating occurs and generation of phosphine gas begins substantially uninhibited by the coating, the duration of the delay period and the timing of the commencement of uninhibited generation of phosphine gas being determined by the moisture permeability of the coating.

---

### 5,017,377
### CONTROLLED RELEASE INSECT PEST REPELLENT

**Yasuo Sikinami; Kunihiro Hata, and Masaki Yasuhara, all of Osaka, Japan, assignors to Takiran Co., Ltd., Osaka, Japan**

**Filed Oct. 31, 1989, Ser. No. 429,428**

**Claims priority, application Japan, Oct. 31, 1988, 63-274662; Mar. 22, 1989, 1-69491**

**Int. Cl.$^5$ A01N** *25/08;* **A61K** *31/74, 31/745*

**U.S. Cl. 424—409** **4 Claims**

1. A controlled release insect pest repellent comprising p-menthane-3,8-diol with an ethylene/vinyl acetate copolymer, wherein said ethylene vinyl acetate copolymer contains a vinyl acetate unit at a content of approximately from 15 to 40% by weight.

---

### 5,017,378
### INTRAORGAN INJECTION OF BIOLOGICALLY ACTIVE COMPOUNDS CONTAINED IN SLOW-RELEASE MICROCAPSULES OR MICROSPHERES

**Terry L. Turner, and Stuart S. Howards, both of Charlottesville, Va., assignors to The University of Virginia Alumni Patents Foundation, Charlottesville, Va.**

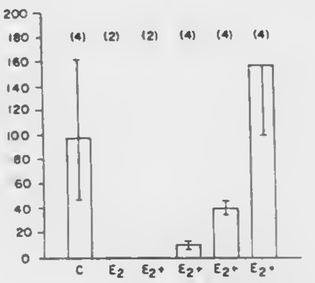
**Filed May 1, 1989, Ser. No. 345,226**

**Int. Cl.$^5$ A61F** *2/00*

**U.S. Cl. 424—422** **1 Claim**

1. A method for increasing fertility in males with impairment of testosterone synthesis, comprising the step of:

injecting slow-release microcapsules or microspheres containing testosterone directly into testes, wherein the microcapsules or microspheres containing testosterone act as temporary Leydig cells and release testosterone directly into a testicular parenchyma and maintain intratesticular concentration of testosterone sufficient for spermatogenesis, wherein the slow-release microcapsules or microspheres are slow-release biodegradable polyactone microcapsules or microspheres.



---

### 5,017,379
### DRUG UNITS AND METHODS FOR TREATING BLOOD CLOTS

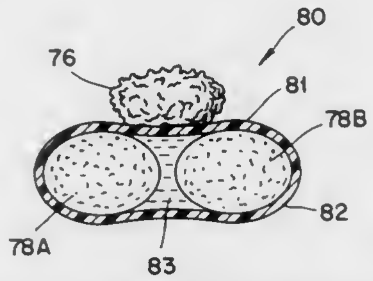
**Jerome H. Lemelson, 48 Parkside Dr., Princeton, N.J. 08540**

**Continuation-in-part of Ser. No. 809,207, Dec. 16, 1985, Pat. No. 4,764,359, and a continuation-in-part of Ser. No. 631,605, Jul. 17, 1984, Pat. No. 4,674,480, and a continuation-in-part of Ser. No. 614,038, May 25, 1984, Pat. No. 4,665,897, and a continuation-in-part of Ser. No. 614,021, May 25, 1984, Pat. No. 4,671,256. This application Aug. 4, 1988, Ser. No. 228,011**

**The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.**

**Int. Cl.$^5$ A61K** *37/22*

**U.S. Cl. 424—450** **17 Claims**



1. A method for controllably destroying a blood clot in a blood vessel of a living being said method comprising:

(a) administering to the bloodstream of a living being having a blood clot in a blood vessel thereof, a dose of drug units each containing means for targeting same to matter of said blood clot and each also containing a small quantity of a blood clot dissolving material stored in a bio-degradable microcontainer to which said targeting means is attached,

(b) permitting a quantity of said drug units to flow freely in the circulatory system of said living being and to become targeted to said blood clot matter,

(c) thereafter causing same small quantity of blood clot dissolving material of each targeted drug unit to be released from its microcontainer and to react on said blood clot for dissolving a respective quantity of said blood clot,

(d) whereby the combined effect of the quantities of blood clot dissolving material released from each of said drug units targeted to said blood clot is effective to remove said blood clot from said blood vessel of said living being.

---

### 5,017,380
### GELATIN HARD CAPSULE CONTAINING CRYSTALLINE HYDRATE OF ORAL CEPHALOSPORIN

**Yoshio Hamashima, Kyoto; Kyoji Minami, Nara; Kyozo Kawata; Teruo Sakamoto, both of Osaka; Toyohiko Takeda, Hyogo; Yusuke Suzuki, Osaka, and Masanori Tujikawa, Nara, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

**Division of Ser. No. 275,093, Nov. 21, 1988, Pat. No. 4,933,443, which is a division of Ser. No. 68,333, Jul. 1, 1987, Pat. No. 4,812,561. This application Feb. 9, 1990, Ser. No. 478,278**

**Claims priority, application Japan, Jul. 2, 1986, 61-156954; Sep. 12, 1986, 61-216160**

**Int. Cl.$^5$ B65B** *51/02*

**U.S. Cl. 424—454** **3 Claims**

1. A gelatin hard capsule containing a crystalline hydrate of 7β-[(Z)-2-(2-aminothiazol-4-yl)-4-carboxybut-2-enoylamino]-3-cephem-4-carboxylic acid having the X-ray diffraction pattern as follows:

| d | $I/I_o$ | d | $I/I_o$ | d | $I/I_o$ | d | $I/I_o$ |
|---|---|---|---|---|---|---|---|
| 5.90 | 12 | 20.95 | 100 | 28.70 | 17 | 35.93 | 08 |
| 7.35 | 08 | 21.15 | 70 | 29.40 | 27 | 36.38 | 24 |
| 9.45 | 92 | 21.75 | 25 | 29.60 | 11 | 37.00 | 07 |
| 10.15 | 21 | 22.25 | 49 | 29.90 | 16 | 38.30 | 26 |
| 12.08 | 46 | 23.85 | 62 | 30.40 | 19 | 38.65 | 10 |
| 14.87 | 30 | 24.50 | 39 | 31.10 | 53 | 39.20 | 15 |
| 15.65 | 14 | 24.80 | 16 | 31.60 | 23 | 39.60 | 21 |
| 16.25 | 13 | 25.50 | 34 | 31.78 | 34 | 40.27 | 15 |
| 18.35 | 24 | 25.85 | 66 | 33.02 | 28 | 41.22 | 22 |
| 18.90 | 71 | 26.60 | 16 | 33.55 | 23 | 42.55 | 08 |
| 19.14 | 77 | 27.02 | 59 | 33.86 | 17 | 44.20 | 09 |
| 19.40 | 60 | 27.30 | 35 | 35.20 | 16 | | |
| 20.58 | 88 | 28.35 | 54 | 35.65 | 10 | | |

which is characterized by having a gelatin seal around the circumference at the joint of cap and body of the capsule.

---

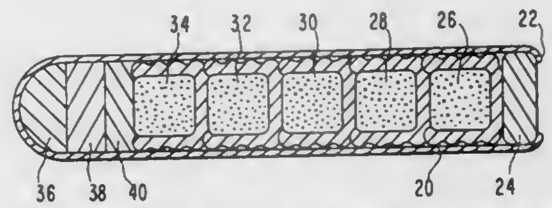
### 5,017,381
### MULTI-UNIT PULSATILE DELIVERY SYSTEM

**Frederick Maruyama, San Jose, and Richard Cortese, Los Gatos, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.**

**Filed May 2, 1990, Ser. No. 517,912**

**Int. Cl.$^5$ A61K** *9/24*

**U.S. Cl. 424—472** **23 Claims**



1. An active agent dispenser for use in a fluid-containing environment comprising, in combination:

a. a rigid housing open at one end to provide outlet means therefor, at least a portion of said housing proximate the end of said housing opposite said outlet means permitting passage of the fluid in said environment to the interior of said housing;

b. a fluid-activated driving member within said housing in fluid-transmitting relationship with said fluid-passing portion of said housing proximate the end of said housing opposite said outlet means, said driving member, upon exposure of said dispenser to said fluid environment, being the source of motive power for moving the contents of said housing through said outlet; and

c. a plurality of discrete active agent dosage units, each unit comprising:

(i) a fluid-impermeable cup-shaped member, and

(ii) an active agent filling contained within said cup-shaped member, wherein said active agent dosage units are longitudinally disposed within said housing between said driving member and said outlet means and are oriented within said housing with the base of said cup-shaped members facing said outlet means; whereby said active agent dosage units will be sequentially displaced from said housing into said fluid environment by said driving member upon exposure of said dispenser to said fluid environment, said active agent dosage units dispensing their active agent content into said fluid environment after their displacement from said housing into said environment.

---

### 5,017,382

### CONTROLLED RELEASE COMPOSITIONS (II)

**Mostyn P. Embrey, Oxford, England, and Neil B. Graham, Dunbartonshire, Scotland, assignors to National Research Development Corporation, London, England**

**Division of Ser. No. 188,674, Apr. 29, 1988, Pat. No. 4,931,288, which is a continuation of Ser. No. 16,453, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 815,780, Jan. 3, 1986, abandoned, which is a continuation of Ser. No. 724,949, Apr. 22, 1985, abandoned, which is a continuation of Ser. No. 212,734, Nov. 5, 1980, abandoned. This application Jan. 23, 1990, Ser. No. 469,045**

**Int. Cl.$^5$ A61K** *9/14, 31/74;* **A61F** *9/70, 13/00*

U.S. Cl. **424—486** **30 Claims**

1. A process for the preparation of a controlled release composition, which composition comprises a prostaglandin and a polymeric carrier therefor, said polymeric carrier comprising residues having a ratio of number average molecular weight to functionality greater than 1,000 which comprise polyethylene oxide and are cross-linked through urethane groups, said process comprising:

(i) contacting said polymeric carrier with a solution of a prostaglandin and permitting said polymeric carrier to swell therein; and

(ii) removing the swollen polymeric carrier from said solution thereby obtaining a controlled release composition comprising the prostaglandin.

---

### 5,017,383

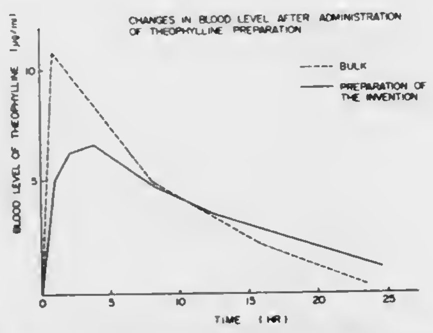
### METHOD OF PRODUCING FINE COATED PHARMACEUTICAL PREPARATION

**Yasuo Ozawa, Ageo; Ikuo Koyama, Hasuda, and Kimihide Shimano, Ageo, all of Japan, assignors to Taisho Pharmaceutical Co., Ltd., Japan**

**Filed Aug. 18, 1989, Ser. No. 395,594**

**Int. Cl.$^5$ A61K** *9/16*

U.S. Cl. **424—490** **14 Claims**



1. A method of producing a coated pharmaceutical preparation, which comprises:

cooling liquid droplets composed of a liquid medium and a drug dissolved or suspended in the liquid medium to a temperature of not higher than the freezing point of the liquid medium to form frozen particles containing the drug;

classifying the frozen particles to isolate a desired particle size fraction having an average particle diameter of 5–500 microns;

mixing the isolated fraction of frozen particles in a fluidized bed a powder of a coating material having a particle diameter not more than 1/5 the diameter of said particles at a temperature higher than the freezing point of the liquid medium to cause the powder of the coating material to adhere to the surfaces of said particles; and

then removing the liquid medium from the coated particles.

---

### 5,017,384

### MEDICINAL COMPOSITION FOR REGULARIZING HORMONAL SECRETION AND FOR TREATING STERILITY

**Bernard Letourneur, Le Champ du Bourray, Route de Oizé , Guecelard, Arnage, France 72230**

**Filed Aug. 2, 1989, Ser. No. 388,632**

**Claims priority, application France, Aug. 2, 1988, 88 10432**

**Int. Cl.$^5$ A61K** *33/42, 33/14, 33/04*

U.S. Cl. **424—601** **8 Claims**

1. A medicinal composition for regularizing hormonal secretion and for treating sterility in women and female animals, comprising effective amounts of the elements sulfur, calcium chloride and phosphorous pentoxide, wherein said effective amounts are effective for regularizing hormonal secretion and for treating sterility when provided in the composition.

---

### 5,017,385

### CHEWING GUM

**Horst P. Wienecke, Gross-Gerau, Fed. Rep. of Germany, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Nov. 17, 1989, Ser. No. 438,556**

**Claims priority, application United Kingdom, Nov. 25, 1988, 8827683; Jun. 21, 1989, 8914238**

**Int. Cl.$^5$ A23G** *3/00, 3/30*

U.S. Cl. **426—5** **14 Claims**

1. A chewing gum candy product having improved organoleptic properties and which comprises a matrix of confectionary ingredients having distributed therein multiple discrete regions of a chewing gum composition together with multiple discrete regions of a hardboiled candy composition.

---

### 5,017,386

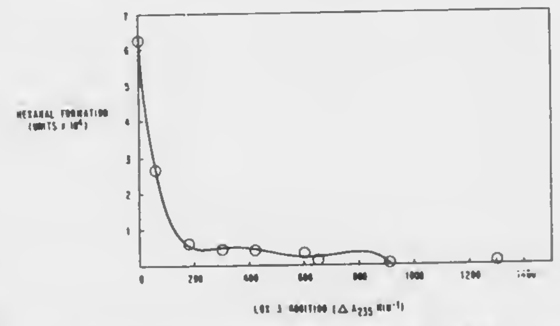
### METHOD OF REDUCING ODOR ASSOCIATED WITH HEXANAL PRODUCTION IN PLANT PRODUCTS

**David F. Hildebrand; Thomas R. Kemp; Roger Andersen, all of Lexington, and John H. Loughrin, Alton, all of Ky., assignors to University of Kentucky Research Foundation, Lexington, Ky.**

**Filed Oct. 5, 1989, Ser. No. 416,674**

**Int. Cl.$^5$ A21D** *2/00, 8/02;* **A23L** *1/10*

U.S. Cl. **426—18** **20 Claims**



1. A method of reducing the formation of hexanal by plant parts, comprising

breaking up hexanal producing parts of a plant;

adding thereto an agent comprising lipoxygenase 3 enzyme; and

allowing the plant parts to remain in contact with the enzyme under conditions effective to attain a reduction of hexanal content in the plant parts.

---

### 5,017,387

### NOVEL NATURAL YOGHURT COMPOSITIONS AND METHOD OF PREPARATION

**Endel Karmas, Kendall Park, N.J., and Marc R. Bachmann, Winterthur, Switzerland, assignors to Rutgers, The State University of New Jersey, New Brunswick, N.J.**

**Continuation of Ser. No. 808,155, Dec. 12, 1985, abandoned. This application Jun. 8, 1990, Ser. No. 535,981**

**Int. Cl.$^5$ A23L** *1/20;* **A23C** *9/13*

U.S. Cl. **426—43** **17 Claims**

1. A natural yoghurt composition comprising a fermented, pasteurized mixture of about 30 to about 85 percent soymilk made by milling a mixture of water and soybeans and removing the solid portion of said milled mixture to provide said soymilk, about 15 to about 70 percent fresh cow or ewe milk, to which said soymilk is added to make said mixture, and a yoghurt producing culture comprising a combination of *Lactobacillus bulgaricus* and *Streptococcus thermophilus,* said yoghurt having a firm consistency without the use of a thickening agent and having without addition of sugar a flavor like or substantially indistinguishable from a yoghurt made by fermentation using 100 percent pasteurized fresh milk.

---

### 5,017,388

### PROCESS FOR THE PREPARATION OF VANILLIN

**Jürgen Rabenhorst, Bevern, and Rudolf Hopp, Holzminden, both of Fed. Rep. of Germany, assignors to Haarmann & Reimer GmbH, Holzminden, Fed. Rep. of Germany**

**Filed Jun. 5, 1990, Ser. No. 533,601**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1989, 3920039**

**Int. Cl.$^5$ A23L** *1/221*

U.S. Cl. **426—44** **5 Claims**

1. A process for the preparation of vanillin which comprises oxidizing in a culture broth, 0.2 to 100 g/1 of culture broth of eugenol, isoeugenol or a mixture of eugenol and isoeugenol microbially, in the presence of an effective amount of a microorganism selected from the genera Serratia, Klebsiella or Enterobacter, to form vanillin and isolating the vanillin which has formed from the culture broth.

---

### 5,017,389

### NUTRITIONAL DRINK COMPOSITIONS

**Scott T. Green, 760 E. Main St., Frankfort, Ky. 40601**

**Continuation-in-part of Ser. No. 232,809, Aug. 16, 1988, abandoned. This application Mar. 13, 1989, Ser. No. 325,059**

**Int. Cl.$^5$ A23K** *1/00*

U.S. Cl. **426—72** **5 Claims**

1. A nutritional drink composition for dogs and for cats, consisting essentially of

by percentage of total weight, substantially
90–98% water;
1.0–5.0% dextrose;
0.1–1.0% glycine;
0.1–1.0% sodium choloride;
0.1–0.75% electrolyte selected from a group consisting of potassium citrate, potassium chloride and any mixtures thereof;
0.01–0.1% of sodium fluoride as a tooth strengthening agent;
0–0.15% buffer selected from a group consisting of citric acid and sodium bicarbonate;
0–0.05% vitamin and mineral supplement;
0.01–0.25% breath freshening agent and said composition having a pH of substantially 7.

---

### 5,017,390

### CONFECTION AND METHOD AND APPARATUS FOR MANUFACTURING IT

**Vijay A. Sawant, Wellingborough, Great Britain, assignor to Conopco, Inc., Englewood Cliffs, N.J.**

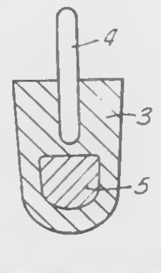
**PCT No. PCT/EP88/01155, § 371 Date Jun. 26, 1989, § 102(e) Date Jun. 26, 1989, PCT Pub. No. WO89/05588, PCT Pub Date Jun. 29, 1989**

**PCT Filed Dec. 14, 1988, Ser. No. 381,671**

**Claims priority, application United Kingdom, Dec. 14, 1987, 8729152; Apr. 20, 1988, 8809328.1**

**Int. Cl.$^5$ A23G** *9/04*

U.S. Cl. **426—100** **9 Claims**



1. A texturally contrasting frozen confection product, comprising: (a) a chilled material selected from the group consisting of ice confection and chilled mousse material; and (b) at least one particle of an aerated, fat-based glaze material having a cellular structure and an overrun of at least 50%, the smallest dimension of said at least one particle being in excess of 1.5 mm.

---

### 5,017,391

### PACKAGED FOODSTUFF CONTAINING A LACTATE SALT

**Robert J. Anders, Middleton; John G. Cerveny, and Andrew L. Milkowski, both of Madison, all of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.**

**Division of Ser. No. 287,252, Dec. 20, 1988, Pat. No. 4,888,191, which is a continuation of Ser. No. 120,769, Nov. 13, 1987, Pat. No. 4,798,729, which is a continuation of Ser. No. 808,319, Dec. 12, 1985, abandoned. This application Dec. 11, 1989, Ser. No. 448,341**

**Int. Cl.$^5$ A23L** *1/315, 1/325*

U.S. Cl. **426—129** **11 Claims**

1. In a packaged foodstuff, said foodstuff being selected from the group consisting of fish and poultry, said fish or poultry being cooked, but not sterilized, being packaged in an anaerobic plastic barrier package and intended to be stored under refrigeration, said foodstuff being subject to the growth of *Clostridium botulinum* under temperature abuse, the improvement wherein the foodstuff comprises a lactate salt in an amount of from 1 to 7% by weight and sufficient to delay growth of *Clostridium botulinum* in the foodstuff.

---

### 5,017,392

### SUGAR FREE CHOCOLATE COATING

**Wanda K. Bombardier, Mechanicsville; Kim Ferryman, Richmond, both of Va., and Nessim Khalil, Waukesha, Wis., assignors to Eskimo Pie Corporation, Richmond, Va.**

**Continuation of Ser. No. 284,715, Dec. 14, 1988, abandoned. This application Jul. 9, 1990, Ser. No. 550,199**

**Int. Cl.$^5$ A23L** *1/42*

U.S. Cl. **426—659** **19 Claims**

1. A sugar-free chocolate coating for a frozen dairy dessert or the like comprising from 4.5 to 10% milk solids, from 16.0–19.1% chocolate flavoring substance, from 5.0–10.0% mannitol, from 0.35 to 0.5% lecithin, from 12.0 to 25.0% polydextrose, from 0.11 to 0.13% aspartame, from 0 to 2.0% black cocoa, from 0.0 to 8.0% cocoa butter, and the balance vegetable oil.

VOL
1126
ISS
3
MY
21
1991
UMI

## 5,017,393
## PROCESS FOR PREPARING RESTRUCTURED MEAT

**Maurice Fradin, Résidence Le Jean Bart - 19. Esplanade de la Mer 85160, Saint Jean de Monts, France**

**Continuation of Ser. No. 352,674, May 10, 1989, abandoned, which is a continuation of Ser. No. 124,790, Oct. 27, 1987, abandoned. This application Feb. 16, 1990, Ser. No. 481,810**

**Claims priority, application France, Feb. 28, 1986, 86 02793**

**Int. Cl.$^5$ A23L** *1/317*

U.S. Cl. 426—272 **3 Claims**

1. A process for making a final piece of restructured meat having a sheet texture, comprising the successive steps of:

(i) preparing pieces of meat;

(ii) compacting said pieces together to form elongate olocks;

(iii) cutting said blocks for obtaining ultrathin sheets having a surface area substantially exceeding one cm2 while being substantially smaller than 20 cm2 and a thickness substantially below 1 mm;

(iv) mixing the sheets together while preserving their integrity to form a relatively homogeneous sheet structure and than

(v) compacting and shaping the sheet structure into glocks while integrally preserving said sheet structure.

---

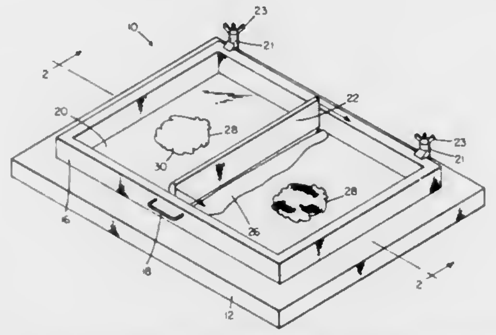
## 5,017,394
## METHOD FOR MAKING EDIBLE BASE SHAPES HAVING PICTORIAL IMAGES FOR DECORATING FOODSTUFFS

**John W. Macpherson, Gig Harbor, and Lee M. Acree, Tacoma, both of Wash., assignors to The Lucks Company, Seattle, Wash.**

**Continuation of Ser. No. 925,413, Oct. 13, 1986, abandoned, which is a continuation-in-part of Ser. No. 924,610, Oct. 28, 1986, abandoned. This application Nov. 29, 1988, Ser. No. 277,484**

**Int. Cl.$^5$ A21D** *2/00;* **A23L** *1/10*

U.S. Cl. 426—302 9 Claims



1. A method of manufacturing at least one edible base shape having at least one edible pictorial image thereon; wherein said base shape is dimensioned and adapted to be placed on and adhere to a foodstuff to decorate said foodstuff; wherein said base shape has a predetermined, two dimensional configuration and has thickness; wherein said edible base shape is manufactured from at least one edible, fluid material; and wherein said method comprises the steps of:

(a) selecting said edible, fluid material to have a composition such that when said edible, fluid material is dried said edible base shape formed therefrom has the properties when at room temperature of being both flexible and free standing:

(b) shaping said edible, fluid material into said predetermined, two dimensional configuration by filling at least one printing opening in a printing screen in a screen printing means with said edible, fluid material, wherein said at least one printing opening has said predetermined, two dimensional configuration, and by screen casting said edible, fluid material through said at least one printing opening while simultaneously depositing said edible, fluid material in said predetermined, two dimensional configuration onto a releasable carrier medium by using said screen printing means to form said base shape; wherein said base shape has a thickness in the range of from about two one-thousandths of an inch to about fifty one-thousandths of an inch; wherein said edible fluid material is selected to have a composition such that it is able to flow relatively easily through said at least one printing opening, and yet be tacky enough to adhere to said releasable carrier medium, but not be so tacky that said edible fluid material adheres unduly to said printing screen after said edible base shape has been formed, to enable said printing screen to be easily removed from said edible base shape without ruining the formed base shape;

(c) drying said edible, fluid material in said predetermined, two dimensional configuration until it is firm enough when it is at room temperature to be removed intact from said releasable carrier medium as said edible base shape; and

(d) screen printing said at least one edible pictorial image onto said edible base shape.

---

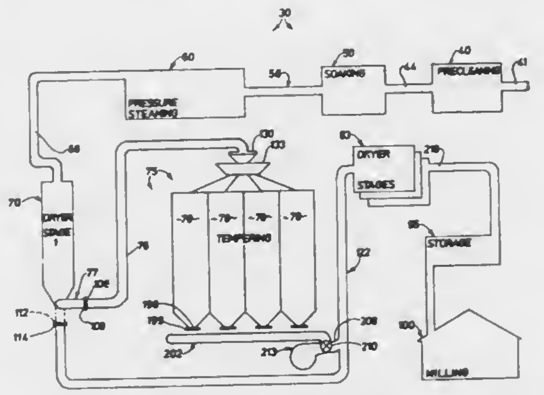
## 5,017,395
## METHOD OF MAKING A STEAMTABLE QUALITY PARBOILED RICE PRODUCT

**Don R. McCaskill; Frank T. Orthoefer, and Steven D. Danforth, all of Stuttgart, Ark., assignors to Riceland Foods, Inc., Stuttgart, Ark.**

**Filed Apr. 11, 1990, Ser. No. 507,445**

**Int. Cl.$^5$ A23B** *4/03;* **A23L** *1/182*

U.S. Cl. 426—459 4 Claims



1. A process for immunizing parboiled rice from steam table degradation by making it highly resistant to breakdown and stickiness over extended periods of exposure to water and heat in a steam table, said process comprising the steps of:

(a) providing a source of raw, precleaned rice;

(b) soaking said precleaned rice to provide a uniformly distributed grain moisture content of approximately 43–49% d.s.b.;

(c) steaming the soaked rice outputted from step at between 10–20 p.s.i.g. for one to ten minutes to effectuate substantially complete and uniform gelatinization of the rice starch;

(d) predrying the rice from step (c) to quickly reduce the moisture content thereof to an overall moisture content of approximately 25–33% d.s.b.;

(e) tempering the rice of step (d) for at least two hours between 38 and 66 degrees Celsius so as to accelerate bonding between the starch molecules to encourage substantial starch reassociation and crystallization for increasing the resistance of the rice to breakdown, starch leach-out, and stickiness to particularly adapt said rice for steam table use;

(f) drying the tempered rice of step (e); and,

(g) milling the dried rice of step (f) to provide said high integrity rice.

## 5,017,396
## METHOD OF CENTRIFUGING CHEESE MILK

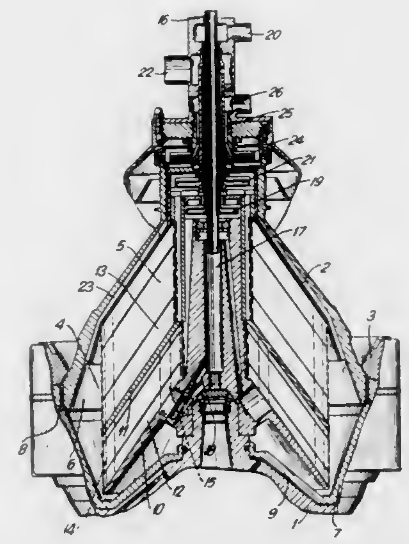
**Hanno Lehmann, and Karl-Heinz Zettier, both of Oelde, Fed. Rep. of Germany, assignors to Westfalia Separator AG, Oelde, Fed. Rep. of Germany**

**Filed Dec. 4, 1989, Ser. No. 445,566**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1988, 3842980**

**Int. Cl.$^5$ A23C** *9/00*

U.S. Cl. 426—491 **3 Claims**



1. In a method of centrifuging cheese milk including skimming cheese milk in a self-emptying centrifuge, returning a portion of separated cream to skim milk to adjust it to a desired level of fat, and centrifuging the skim milk again to precipitate microorganisms and dirt particles, the improvement comprising skimming and centrifuging in only one centrifuge having a separation space and a processing space, preliminarily skimming the raw cheese milk down to a desired fat content in a first section of the separation space to obtain a standardized milk, forwarding the standardized milk to a periphery of a second section of the separation space, purifying the standardized milk of microorganisms and dirt while flowing radially inward through the second section, and extracting the standardized and purified milk from the processing space with a first peeler and constantly extracting low microorganism concentrate with a second peeler.

---

## 5,017,397
## PROCESS FOR EXTRACTING ANTIOXIDANTS FROM LABIATAE HERBS

**Uy Nguyen, 4635 - 37 Avenue, Edmonton, Alberta, Canada T6L 3V2 ; Grigory Frakman, 5504 - 179 Street, Edmonton, Alberta, Canada T6M 1X1 , and David A. Evans, 141 Tudor Lane, Edmonton, Alberta, Canada T6J 3T5**

**Filed Apr. 25, 1990, Ser. No. 514,311**

**Int. Cl.$^5$ A23L** *1/28*

U.S. Cl. 426—542 **8 Claims**

1. A process for extracting antioxidants from the Labiatae family of domestic herbs, comprising:

grinding the dried leaves of the herbs into a fine powder;

extracting the powdered leaves with supercritical fluid carbon dioxide under conditions effective to extract antioxidant from the leaves, said conditions comprising a pressure of from about 350 bar to about 1000 bar, a temperature of from about 31° C. to about 120° C., and a fluid density of from about 0.6 kg/l to about 1.0 kg/l; and

precipitating the antioxidant from the supercritical fluid under conditions effective to precipitate antioxidant from the fluid, said conditions comprising a first precipitation under a pressure of from about 100 bar to about 150 bar, at a temperature of from about 40° C. to about 100° C., and a fluid density of from about 0.2 kg/l to about 0.4 kg/l.

---

## 5,017,398
## IMPROVED MARGARINE COMPOSITIONS/CONTAINING SOLID SUCROSE POLYESTERS

**Ronald J. Jandacek, Greenhills, and James C. Letton, Forest Park, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 36,836, Apr. 10, 1987, Pat. No. 4,797,300. This application Oct. 7, 1988, Ser. No. 254,744**

**The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.**

**Int. Cl.$^5$ A23D** *7/00*

U.S. Cl. 426—603 **11 Claims**

1. A bread spread comprising:

(a) from about 50% to about 90% of a mixture consisting essentially of:

  (i) an edible oil selected from the group consisting of triglyceride oils and non-digestible oils, and mixtures thereof, said oil having a solid fat content of 1% or less at 50° F. and 0% at 70° F.;

  (ii) a solid fatty acid ester of sucrose, the fatty -acid groups consisting essentially of saturated straight chain short chain fatty acid radicals containing from 2 to 10 carbon atoms and saturated straight chain long chain fatty acid radicals containing from 20 to 24 carbon atoms, the molar ratio of short chain to long chain radicals being from about 4:4 to 3:5 and the degree of esterification being from about 7 to about 8;

the weight ratio of (i) to (ii) being from about 3:1 to about 9:1;

(b) from about 0.01% to about 10% of an emulsifier;

(c) from about 0.5% to about 5% milk solids;

(d) from about 0.5% to about 3.5% salt; and

(e) the balance, water.

---

## 5,017,399
## APPARATUS FOR SUB-DIVIDING HAY BALES

**Donald Montano, 193 Alpine Dr., and Ernest Montano, 230 W. 19th, Apartment D, both of Merced, Calif. 95340**

**Division of Ser. No. 217,622, Jul. 11, 1988, Pat. No. 4,909,139. This application Jan. 9, 1990, Ser. No. 462,639**

**Int. Cl.$^5$ A23K** *1/00*

U.S. Cl. 426—636 **6 Claims**

1. A method for sub-dividing a generally oblong bale of hay or forage having parallel ends, sides, and a top and bottom, said bale having been formed by compressing successive quantities of loose hay using pressure applied to its opposite ends to form compressed transverse flake layers of hay extending across opposite sides of the bale, said method comprising:

moving the bale of hay continuously along a path generally parallel with its longitudinal axis;

cutting the bale along a first series of spaced apart horizontal planes that are parallel to the top and bottom of the bale and extend between opposite sides of the bale;

cutting the bale along a second series of spaced apart vertical planes that are parallel to the sides and extend between the top and bottom of the bale, thereby forming elongated subsections of the bale; and

moving said cut subsections while allowing them to fall upon a hard surface so that they will tend to break apart further along at least some of said transverse flake layers.

VOL 1126
ISS 3
MY 21
1991
UMI

### 5,017,400
## NON-CARIOGENIC SWEETENER

**Philip M. Olinger, St. Charles, Ill., and Christof Krüger, Hamburg, Fed. Rep. of Germany, assignors to Suomen Xyrofin Oy, Kotka, Finland**

**Filed Jun. 10, 1988, Ser. No. 205,457**

**Int. Cl.$^5$ A23G** *1/00*

**U.S. Cl. 426—660** **9 Claims**

1. A chocolate product comprising from about 5 to about 55% by weight of solid maltitol having a purity of at least 80% maltitol and about 55-5% by weight of solid xylitol, wherein said maltitol reduces the burning aftertaste and cooling effect of said xylitol in the chocolate product.

---

### 5,017,401
## METHOD AND ARRANGEMENT AND METHOD FOR THE MANUFACTURING OF COATED MOULDINGS, IN PARTICULAR OF CAPSULES CONTAINING PHARMACEUTICAL MATERIALS AND ARE MEANT TO BE USED AS MEDICINE

**Johannes R. van Drunen, Van der Duinstraat 113, The Hague, Netherlands 2515 NH**

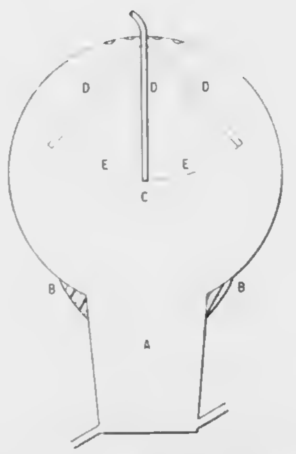
**PCT No. PCT/NL88/00019, § 371 Date Oct. 17, 1989, § 102(e) Date Oct. 17, 1989, PCT Pub. No. WO88/08292, PCT Pub. Date Nov. 3, 1988**

**PCT Filed Apr. 28, 1988, Ser. No. 425,204**

**Claims priority, application Netherlands, May 1, 1987, 8701041**

**Int. Cl.$^5$ A61K** *9/00;* **B05D** *7/00*

**U.S. Cl. 427—3** **23 Claims**



1. Apparatus for coating a plurality of articles, comprising:
(A) a holder base for initially holding the articles to be coated and having a base end, and opened upper end and a holder cavity therebetween;
(B) a removable upper container having an opened bottom end which is in fluid communication with the said opened upper end and which is secured to said opened upper end in a substantially gas tight manner, and said upper container having at least one gas discharge outlet disposed near an upper portion thereof;
(C) at least one gas inlet disposed in said holder cavity and disposed at an angle to a diameter of said holder cavity;
(D) adjustable pressurized gas supply means connected to said at least one gas inlet for supplying an adjustable volume of gas to the holder cavity, and wherein the gas supply means is sufficiently adjustable that the volumn of gas passed through said at least one gas inlet is sufficient to cause a swirling motion of the gas within the holder cavity and within the upper container so that the articles to be coated are entrained in the swirling gas and are continually suspended and rotated by the gas in a swirling zone of the upper container; and
(E) a coating material feeder means for passing a coating material into said upper container and having a feeder outlet disposed in or near said swirling zone and said feeder outlet is rotatable in or near said swirling zone; and
wherein coating material passing through said feeder outlet substantially uniformly coats the articles suspended and rotated in said swirling zone.

16. A method for coating a plurality of articles with a coating material, comprising:
(A) placing a plurality of articles to be coated in a coating apparatus having a holder cavity in a holder base for containing the articles and an upper container surmounting the holder base and in fluid communication therewith;
(B) continuously passing a pressurized gas into the holder cavity in a direction and in a volume sufficient to cause a swirling motion of the gas within the holder cavity and within the upper container so that the articles to be coated are entrained in the swirling gas and are continually suspended and rotated by the gas in a swirling zone in the upper container;
(C) feeding a coating material through a feeder having an outlet in or near said swirling zone and causing the said feeder outlet to rotate in or near said swirling zone wherein the coating material is substantially uniformly dispersed on said articles; and
(D) passing the gas through at least one gas discharge outlet disposed near the upper portion of said upper container.

---

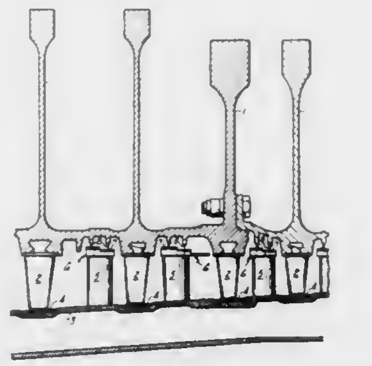
### 5,017,402
## METHOD OF COATING ABRADABLE SEAL ASSEMBLY

**Charles C. McComas, Palm City, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 21, 1988, Ser. No. 287,221**

**Int. Cl.$^5$ B05D** *1/00*

**U.S. Cl. 427—34** **1 Claim**



1. In the method of coating an initial assembly of an abradable seal system including an abradable seal located and adapted to interact with a relatively moving engine component, the improvement which comprises:
applying a thin layer of colloidal ceramic particles to the moving component, said ceramic particles being nonwettable by the abradable seal constituents, whereby adverse interactions between the seal and the moving component are minimized during initial engine operation.

---

### 5,017,403
## PROCESS FOR FORMING PLANARIZED FILMS

**Stella W. Pang, Arlington, and Mark W. Horn, North Chelmsford, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

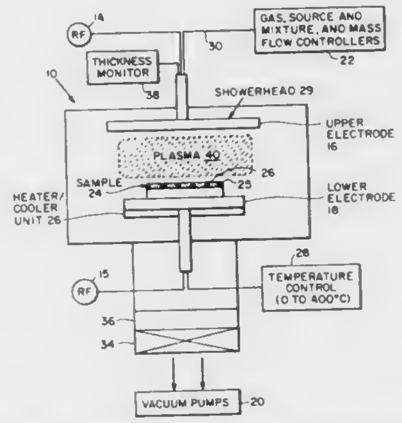
**Filed Apr. 13, 1989, Ser. No. 337,299**

**Int. Cl.$^5$ C23C** *16/08, 16/26, 16/50, 16/56*

**U.S. Cl. 427—39** **19 Claims**

1. In a plasma enhanced chemical vapor deposition chamber, having two oppositely disposed electrodes, a method of forming a planarization film on a substrate comprising the steps of:
(a) providing a substrate in said chamber;
(b) flowing a reactant gas in said chamber;
(c) generating a plasma between said electrodes by R.F. power to dissociate said gas and deposit a predetermined planarization layer of carbonaceous material on said substrate; while maintaining said substrate at a relatively low temperature wherein the layer is soft as deposited and is then hardened by thermal or plasma treatment.

12. In a plasma enhanced chemical vapor deposition chamber, having two oppositely disposed electrodes, a method of forming a planarization film on a substrate comprising the steps of:
(a) providing a substrate in said chamber;
(b) flowing a metal containing reactant gas in said chamber;
(c) generating a plasma between said electrodes by R.F. power to dissociate said gas and deposit a predetermined planarization layer of metallic material on said substrate; while maintaining said substrate at a relatively low temperature wherein the layer is soft as deposited and is then hardened by thermal or plasma treatment.



---

### 5,017,404
## PLASMA CVD PROCESS USING A PLURALITY OF OVERLAPPING PLASMA COLUMNS

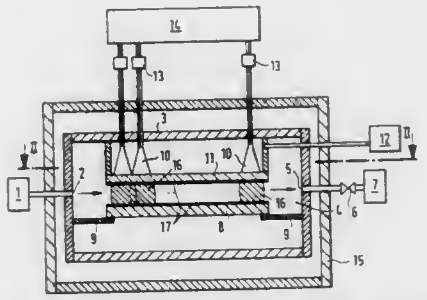
**Volker Paquet, Mainz; Ulrich Ackermann, Mainz-Goosenhelm; Heniz-W. Etzkorn, Neu-Ansbach; Ralf T. Kersten, Bremthal, and Uwe Rütze, Mainz, all of Fed. Rep. of Germany, assignors to Schott Glaswerke, Mainz, Fed. Rep. of Germany**

**Filed Sep. 6, 1989, Ser. No. 403,429**

**Claims priority, application Fed. Rep. of Germany, Sep. 6, 1988, 3830249**

**Int. Cl.$^5$ B05D** *3/06*

**U.S. Cl. 427—45.1** **34 Claims**



1. In a plasma-CVD-process for simultaneously applying a dielectric coating to planar substretes, wherein an area or volume plasma zone covering the whole area to be coated of one or more substrates is generated from a plurality of plasma electrodes, the improvement comprising:
in a reaction zone containing one or more substrates to be coated, propagating overlapping plasma columns from the plasma electrodes substantially perpendicular to the surfaces to be coated and on either or both sides of the surfaces to be coated while maintaining the plasma electrodes and substrates stationary, and
individually controlling the strength and duration of each plasma column, thereby controlling the properties and uniformity of the coating deposited at each site on the substrates.

---

### 5,017,406
## UV CURABLE COMPOSITIONS CURED WITH POLYSILANE AND PEROXIDE INITIATORS

**Michael A. Lutz, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Dec. 8, 1988, Ser. No. 281,359**

**Int. Cl.$^5$ C08G** *77/08, 77/20*

**U.S. Cl. 427—54.1** **11 Claims**

9. A method of coating a substrate which comprises applying to said substrate, a composition comprising (a) a UV curable compound polymerizable by a free radical process and containing reactive unsaturated groups selected from the group consisting of acrylics, methacrylics, styrenics, acrylamides, acrylonitriles, vinyl acetates, alkynes, and alkenes, (b) a polysilane photoinitiator selected from the group consisting of $(RR'Si)_x$, $Me(Me_2Si)_x$, and $Me(PhMeSi)_xMe$ in which R and R' are independently selected from aliphatic and aromatic radicals, x is an integer of from 4 to 7, Me is methyl, and Ph is phenyl, and (c) a peroxide photoinitiator selected from the group consisting of dibenzoyl peroxide, cumene hydroperoxide, di-t-butyl peroxide, diacetyl peroxide, hydrogen peroxide, peroxydisulfates, and 2,2-bis(terbutylperoxy)-2,5-dimethylhexane, and curing said composition with UV radiation.

---

### 5,017,407
## STABILISATION OF JET WIPED WIRE

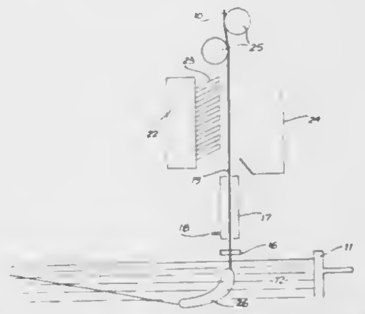
**Malcolm A. Robertson, East Maitland, Australia, assignor to Australian Wire Industries Pty. .Limited, Sydney, Australia**

**Filed Aug. 10, 1989, Ser. No. 392,077**

**Claims priority, application Australia, Aug. 24, 1988, PJ0030**

**Int. Cl.$^5$ B05D** *3/04*

**U.S. Cl. 427—349** **12 Claims**



1. A method for the coating of a metallic filament with a molten metal comprising the steps of drawing the filament from a molten metal bath, passing the filament through a gas jet wiping nozzle having a gas orifice spaced apart from the molten metal bath to direct a wiping gas stream against the filament to wipe excess molten metal from the filament, passing the wiped filament through a gas containment vessel containing a reactive gas atmosphere including sulphide or chloride radicals or materials which will decompose to produce such radicals, the containment vessel being spaced from the gas jet wiping nozzle sufficiently to allow the venting of wiping gas therebetween such that the reactive gas is not adversely diluted and the gas containment vessel being sufficiently long that the filament has a long enough residence time in the container to allow the reactive gas to react with the molten metal on the filament, and then cooling the filament by applying thereto a fluid coolant.

VOL
1126
ISS
3
MY
21
1991
UMI

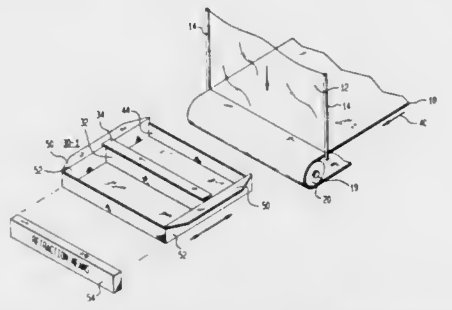
### 5,017,408
### CURTAIN COATING START/FINISH METHOD AND APPARATUS

**Stephen J. Kuzak, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 8, 1990, Ser. No. 564,277**

**Int. Cl.$^5$ B05D** *1/30*

**U.S. Cl. 427—420** **18 Claims**



1. A method of improving the start-up and shut-down of the curtain coating of a support or object, comprising the steps of:

(a) moving the support or object along a path through a coating zone;

(b) forming a free-falling curtain of one or more flowing layers of coating liquids between a first and a second edge guide within said coating zone and onto a surface of the moving support or object; and

(c) intercepting the free-falling curtain with a catch pan comprising resiliently flexible means for engaging and deforming around the first and second edge guides to catch coating liquids in the curtain out to the first and second edges guides and to strip the first and second edge guides of coating liquids as the catch pan is stationary in the coating zone, or is being withdrawn from, and inserted into, the coating zone during start-up and shut-down, respectively.

---

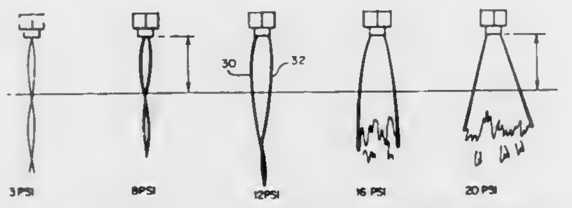
### 5,017,409
### METHOD OF CONFORMAL COATING

**Hendrik F. Bok, Acushnet, Mass., assignor to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.**

**Filed Jun. 13, 1988, Ser. No. 205,889**

**Int. Cl.$^5$ B05D** *1/02*

**U.S. Cl. 427—424** **11 Claims**



1. A method of preventing a railroad of fish pattern for conformal coating of a surface comprising:

(a) pressurizing the coating;

(b) longitudinally advancing the coating over a surface to be coated, while

(c) simultaneously feeding the coating onto the surface in a flat spray pattern which reduces tails at the edge of the pattern; and

(d) continuously triggering "ON/OFF" said feeding, so as to proportion the amount of coating being fed onto the surface in such a manner as to prevent a railroad or fish pattern.

---

### 5,017,410
### WEAR RESISTANT ELECTROLESS NICKEL-BORON COATING COMPOSITIONS

**Henry M. Hodgens, II, Jupiter, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed May 23, 1988, Ser. No. 197,791**

**Int. Cl.$^5$ C23C** *26/00*

**U.S. Cl. 427—443.1** **8 Claims**

1. A process of electroless plating a nickel-boron coating onto a metal substrate material comprising admixing a composition consisting essentially of a water soluble nickel salt, a chelating agent, an alkali metal hydroxide in an amount sufficient to produce a pH of about 12 to 14, and a boron containing reducing agent and $1\times10^{-7}$ mole per liter to $5\times10^{-5}$ mole per liter of thiocarbanilide as a stabilizer, to produce a solution heating the solution to a temperature of 185° F. to 215° F., immersing the substrate in the solution, and removing the coated substrate from the solution, resulting in a nickel boron coated substrate having improved wear resistance.

---

### 5,017,411
### POLYMER BLEND COMPRISING POLYCARBONATE, ACRYLONITRILE-METHYLACRYLATE COPOLYMER, AND IMIDE-ACRYLATE COPOLYMER

**Charlotte H. Chen-Tsai, Murrysville, Pa.; Isaac C. Sanchez, Austin, Tex., and William L. Burton, Harrison Township, Allegheny County, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed May 1, 1989, Ser. No. 345,669**

**Int. Cl.$^5$ C08L** *69/00, 51/04*

**U.S. Cl. 428—36.6** **18 Claims**

1. A polymer blend comprising:

(a) about 30–70 wt % of an aromatic polycarbonate,

(b) about 25–60 wt % of an acrylonitrile-methyl acrylate copolymer, and

(c) about 5–20 wt % of an imide-acrylate copolymer containing acidic or anhydride groups which have been alkylated or esterified.

---

### 5,017,412
### METHOD AND DEVICE FOR DISPENSING OF LABELS

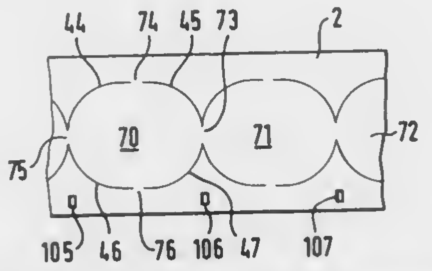
**Per Bekker-Madsen, Vojens, Denmark, assignor to R. Ancker Jorgensen A/S, Birkerod, Denmark**

**Filed Sep. 22, 1989, Ser. No. 411,393**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832239; Aug. 23, 1989, 3927820**

**Int. Cl.$^5$ B32B** *3/10*

**U.S. Cl. 428—43** **7 Claims**



1. A single-layer strip of labels from which individual labels are dispensed, comprising

a strip of sheet material with two longitudinal edges, having no pressure sensitive adhesive or carrier sheet, in which a plurality of labels are pre-punched over the entire periphery of each label with the exception of a plurality of narrow bridges numbering between two and eight, inclusive, said bridges being distributed over said label periphery, wherein adjacent labels in said label strip share a common one of said bridges, and wherein said bridges occupy at most ten percent of the extent of said periphery;

the pre-punching of said strip of label material leaving a free margin between the labels and each longitudinal edge of the strip, which free margins later form part of a label skeleton;

the sheet material being sufficiently stiff so that the bridges may be severed and the label skeleton deflected in a direction diverging considerably from the plane of the strip before severing, whereupon the severed label will continue to advance substantially in its prior direction of travel.

---

### 5,017,413
### METHOD OF AND DEVICES FOR ATTACHING COVERING LAYERS TO SUPPORTING STRUCTURES

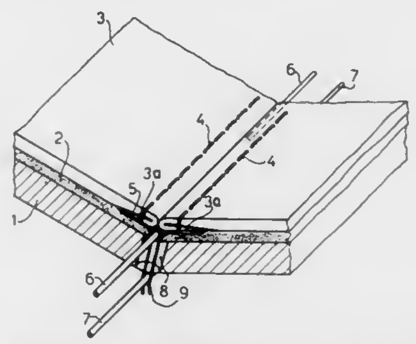
**Franco Moschini, Tolentino, Italy, assignor to Poltrona Frau S.p.A., Tolentino, Italy**

**Continuation of Ser. No. 76,650, Jul. 23, 1987, abandoned. This application Oct. 30, 1989, Ser. No. 428,457**

**Claims priority, application Italy, Jul. 23, 1986, 22620/86[U]**

**Int. Cl.$^5$ B32B** *3/10*

**U.S. Cl. 428—61** **18 Claims**



1. The combination of a supporting structure and an exposed covering layer, having a first side facing toward and a second side facing away from the supporting structure, with an attachment for maintaining the layer in a position of overlap with the supporting structure, said attachment comprising a substantially plane insert adjacent a selected portion of the first side of the covering layer; means for mechanically fastening the insert only to the covering layer; and means for securing the insert only to the supporting structure.

---

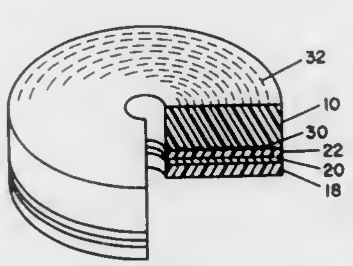
### 5,017,414
### METHOD FOR MANUFACTURING A SECOND SURFACE OPTICAL STORAGE DEVICE

**David P. Gregg, Culver City, Calif., assignor to Del Mar Avionics, Irvine, Calif.**

**Filed Jan. 17, 1989, Ser. No. 296,782**

**Int. Cl.$^5$ B32B** *3/02*

**U.S. Cl. 428—64** **19 Claims**



11. A process for manufacturing a second surface optically recordable disc formatted with tracking grooves and limited data, comprising the steps of:

positioning in a planar orientation a sheet of optically recordable lamination having a reflective lamination and a first surface optically recordable lamination;

placing a formatted surface embossed with tracking grooves and limited data of an optically transparent disc on said first surface of said optically recordable lamination;

compressing said first surface of said optically recordable lamination with said formatted surface of said optically transparent disc to create a permanent and sealed bond thereof, thereby creating a formatted second surface optically recordable disc upon which additional data may be written; and

die cutting said second surface optically recordable disc from said sheet of optically recordable lamination.

---

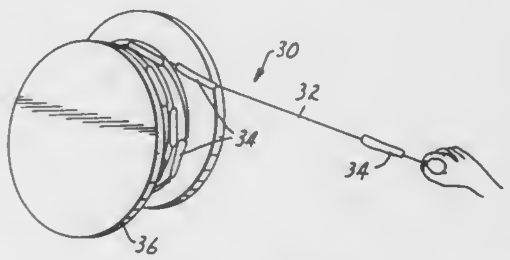
### 5,017,415
### SELF-DISPENSING SPACED ELECTRONIC MARKERS

**Armond D. Cosman, Austin; Gary H. Knippelmier, Travis, and Joe T. Minarovic, Williamson, all of Tex., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sep. 18, 1989, Ser. No. 409,523**

**Int. Cl.$^5$ F16L** *57/00;* **G01V** *3/08*

**U.S. Cl. 428—77** **10 Claims**



1. An article for electronically marking a buried conduit, comprising:

a plurality of generally cylindrical, electronic markers;

a cord maintaining spacing of said markers at predetermined intervals; and

means attached said markers to said cord.

---

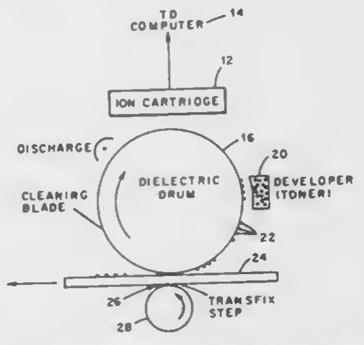
### 5,017,416
### PAPER FOR USE IN ION DEPOSITION PRINTING

**George R. Imperial, Highland Mills, N.Y.; Hsiang-Ching Kang, Appleton, Wis.; Paul A. Makarewicz, Erie, Pa.; Bonnie J. McCormick, Monroe, and Lori S. Slovik, Spring Valley, both of N.Y., assignors to International Paper Company, Tuxedo Park, N.Y.**

**Filed Oct. 17, 1989, Ser. No. 422,589**

**Int. Cl.$^5$ B32B** *9/00*

**U.S. Cl. 428—195** **6 Claims**



1. A sheet or web useful in ion deposition printing employing a polymeric-based toner and comprising a sheet or web substrate, a coating on at least one surface of said substrate, said coating comprising a polymeric latex having a Tg of about −30° C. to about +30° C. and a solubility parameter in the range of about 8 to about 12 with respect to the binder of the toner employed int he ion deposition printing wherein when said toner disposed on said material is subjected to transfixation

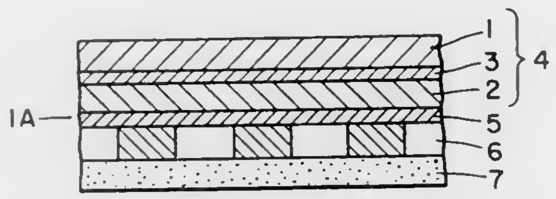
VOL
1126
ISS
3
MY
21
1991
UMI

in an unheated nip, at least greater then 80% of said toner is retained on said material after said toner-bearing material has been subjected to a tape test, and wherein said polymeric latex is present on said substrate in an amount of between about 1.0 and about 5 lbs. per 3,000 ft$^2$ of substrate surface.

---

### 5,017,417
### MULTILAYER BASE FILM FOR THREE-DIMENSIONAL CONFORMABILITY

**Kazushi Miyazawa; Takao Terauchi, both of Tokyo; Keiji Hanamoto, Miyoshi, and Fumio Takagi, Tokyo, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan**
**Division of Ser. No. 779,124, Sep. 23, 1985, Pat. No. 4,777,077. This application Jul. 8, 1988, Ser. No. 216,293**
**Claims priority, application Japan, Sep. 26, 1984, 59-201141**
**Int. Cl.$^5$ B32B** *27/08*
**U.S. Cl. 428—195** **1 Claim**



1. A transfer sheet comprising:

a base film for three-dimensional conformability having dimensional stability, formability and heat resistance, wherein said base film is a multilayer laminate comprising a first film layer having dimensional stability and formability and a second film layer having heat resistance and formability, said first film layer comprising material selected from the group consisting of polyvinyl chloride resin films, acrylic resin films, non-oriented polyethylene terephthalate resin films and non-oriented polypropylene resin films, and said second film layer comprising a material selected from the group consisting of polyamide resin films, acrylic resin films, acrylonitrile resin films, polyacrylate resin films, polycarbonate resin films and films of cellulosic resins;

a printed pattern provided on the side of the second film layer of the base film; and

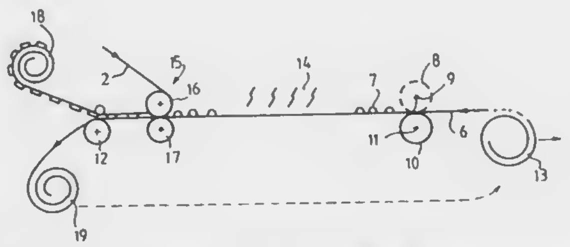
a resin layer on the base film comprising a material selected from the group consisting of formaldehyde resins, phenolic resins, amino resins, epoxy resins, polyurethane resins and polyester resins, and resin layer partially inhibiting the elongation of the base film during forming and having the printed pattern provided thereon.

---

### 5,017,418
### PROCESS FOR THE PRODUCTION OF A HOT-SEALABLE TEXTILE PRODUCT FOR USE IN GARMENTS

**Pierre Groshens, Peronne, France, assignor to Lainiere de Picardie, Peronne, France**
**Continuation of Ser. No. 903,523, Sep. 4, 1986, Pat. No. 4,906,492. This application Jan. 26, 1990, Ser. No. 471,469**
**Claims priority, application France, Sep. 4, 1985, 85 12143**
**Int. Cl.$^5$ A41D** *27/00, 27/06;* **B32B** *3/10, 7/14*
**U.S. Cl. 428—196** **2 Claims**

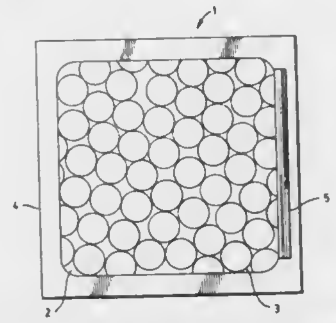
1. A heat-sealable textile product for use in garments comprising a textile substrate which may be either of a very heat-sensitive or not so heat-sensitive nature and discrete elements of heat-sealable adhesive material adhered to an outer surface of the textile substrate essentially without penetrating into the interior of the textile substrate in the thickness direction, said heat-sealable textile product having been produced by transferring to said textile substrate discrete drops of said heat-sealable adhesive material disposed on an adhesion-limiting surface of a transfer support without heating said textile substrate or pressing said transfer support onto said textile substrate.



---

### 5,017,419
### NON-MOIRé SHIELDED WINDOW

**David C. Smith, Chelmsford, Mass., assignor to Chomerics, Inc., Woburn, Mass.**
**Filed Apr. 13, 1989, Ser. No. 337,683**
**Int. Cl.$^5$ H05K** *9/00*
**U.S. Cl. 428—209** **20 Claims**



1. A transparent article comprising a transparent substrate and an electrically conductive pattern on a surface of the substrate, the pattern being formed of a series of randomly oriented, non-linear, interconnecting elements and which pattern does not generate moiré patterns.

---

### 5,017,420
### PROCESS FOR PREPARING ELECTRICALLY CONDUCTIVE SHAPED ARTICLES FROM POLYBENZIMIDAZOLES

**Y. M. Faruq Marikar, Scotch Plains, and Michael M. Besso, West Orange, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.**
**Division of Ser. No. 189,769, May 3, 1988, Pat. No. 4,868,008, which is a division of Ser. No. 922,431, Oct. 23, 1986, Pat. No. 4,759,986. This application Jun. 6, 1989, Ser. No. 362,157**
**Int. Cl.$^5$ B01D** *39/16, 71/64;* **B32B** *7/02, 27/02;* **C08J** *5/06, 5/22;* **C09J** *7/00;* **H01B** *1/20*
U.S. Cl. 428—212 27 Claims

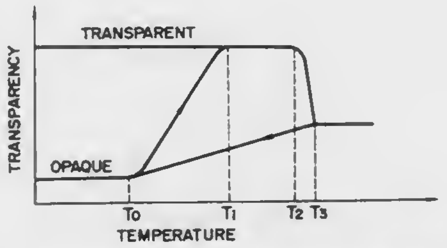
1. An electrically conductive film comprising polybenzimidazole film material in association with approximately 5 to 60 percent by weight of covellite copper sulfide, based upon the total weight of the product.

8. A monolithic electrically conductive composite article comprising electrically conductive polybenzimidazole fibrous material in association with approximately 5 to 60 percent by weight of covellite copper sulfide based upon the total weight of the conductive fibrous product, incorporated within a substantially continuous polymeric matrix.

---

### 5,017,421
### REVERSIBLE THERMOSENSITIVE RECORDING MATERIAL

**Yoshihiko Hotta, Numazu, and Keishi Kubo, Yokohama, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**
**Continuation-in-part of Ser. No. 165,901, Mar. 9, 1988, abandoned. This application Mar. 10, 1989, Ser. No. 321,854**
**Claims priority, application Japan, Mar. 10, 1987, 62-055650; Jun. 19, 1987, 62-152550**
**Int. Cl.$^5$ B41M** *5/26*
U.S. Cl. 428—216 **11 Claims**



1. A reversible thermosensitive recording material comprising: (a) a support, (b) a reversible thermosensitive recording layer formed thereon which comprises as the main components a matrix resin and an organic low-molecular-weight material dispersed in said matrix resin, and has a temperature-dependent transparency, and (c) an overcoat layer comprising as the main component an ultraviolet-light setting resin, formed on said reversible thermosensitive recording layer.

---

### 5,017,422
### CAST FILMS OF ABS PLASTICS

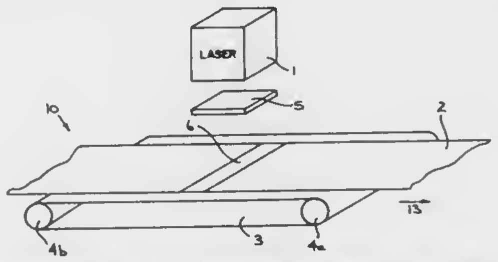
**Werner Schumann, Pulheim, and Werner Tischer, Dormagen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**
**Filed Jun. 3, 1988, Ser. No. 202,019**
**Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719489**
**Int. Cl.$^5$ B32B** *27/00*
U.S. Cl. 428—216 **5 Claims**

1. A transparent, self-supporting film which comprises one or more ABS plastics which has a thickness of from 1 to 200 $\mu$m.

---

### 5,017,423
### FIBER, FILAMENT, YARN AND/OR FLAT ARTICLES AND/OR NONWOVEN MATERIAL CONTAINING THESE, AS WELL AS A PROCESS FOR PRODUCING THE FORMER

**Adelgund Bossmann, Krefeld, and Eckard Schollmeyer, Kempen, both of Fed. Rep. of Germany, assignors to German Textile Research Center North-West, Fed. Rep. of Germany**
**Filed Nov. 14, 1986, Ser. No. 930,876**
**Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540411; Sep. 10, 1986, 3630769; Oct. 25, 1986, 3636395**
**Int. Cl.$^5$ D02G** *3/00*
U.S. Cl. 428—224 **38 Claims**



1. A process for manufacturing a filament, fiber, yarn, and/or textile or nonwoven goods formed therefrom including the step of irradiating the fiber, filament, yarn, textile and/or nonwoven goods with a laser radiation beam having an energy density in a range of 5 mJ/cm$^2$ to 500 mJ/cm$^2$ for heating localized portions of the surface to which the laser radiation beam is applied to melt material of a filament or fiber and/or to thermally remove material from said portions to form a surface microstructure comprising linear depressions and/or elevations on a filament and/or fiber extending primarily transversely with respect to the longitudinal axis of the fiber and/or filament, said depressions and/or elevations having widths up to about 1 micrometer, a spacing between them of about 1 micrometer to 5 micrometers, and a depth or height, respectively, of up to 100 micrometers, said microstructure extending over about 10% to about 100% of the surface of the fiber and/or filament.

**36**. A filament, fiber, yarn, and/or textile or non-woven goods formed therefrom produced by the process according to claim **1**.

---

### 5,017,424
### SKIN TIGHT CHEMICAL/BIOLOGICAL PROTECTIVE SUIT

**Brian Farnworth, Kinburn, and James K. Dix, Ottawa, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada**
**Filed Feb. 25, 1988, Ser. No. 160,286**
**Claims priority, application Canada, May 21, 1987, 537566**
**Int. Cl.$^5$ A41D** *13/00, 31/02;* **B32B** *5/18, 5/32*
U.S. Cl. 428—230 **17 Claims**

1. A composite laminate material of adhered layers resistant to passage therethrough of noxious substances, comprising,

a first inner layer of water and particulate material impermeable, vapour permeable, sebaceous secretion-resistant, material;

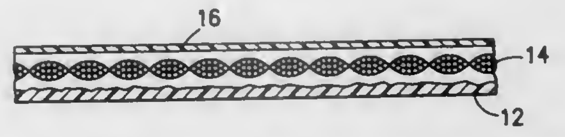
a second outer layer of vapour permeable, stretchable fabric material; and disposed between said first and second layers;

a third intermediate layer of vapour permeable, stretchable fabric material containing a particulate absorbent material for said noxious substances, wherein the composite material is stretchable to an extent ob 30 to 500 percent, and wherein either the third layer or the first and second layers or all three layers are repellent to organic liquids.

---

### 5,017,425
### TRICOT KNITTING MACHINE IMPROVEMENT

**Kenneth H. Sanders, Jonesville, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.**
**Filed Jul. 12, 1990, Ser. No. 551,295**
**Int. Cl.$^5$ B32B** *7/00*
U.S. Cl. 428—253 **4 Claims**



1. A pressure sensitive tape comprising: a layer of plastic film, a layer of warp knit, weft inserted, all synthetic fabric laminated to said film and a pressure sensitive adhesive adjacent to said fabric and connected to said fabric and said film, said weft inserted fabric having 5–12 weft yarns inserted per inch.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,426

### LAMINATE

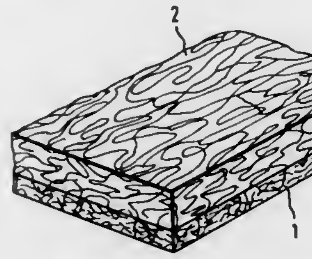
**Wolfgang Greiser, Neusäss/Hainhofen; Kurt Plötz, Bobingen; Hans Wagner, Bobingen, and Karl-Christian Zerfass, Bobingen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation of Ser. No. 263,536, Oct. 27, 1988, abandoned, which is a continuation of Ser. No. 780,392, Sep. 26, 1985, abandoned. This applicatioo Feb. 20, 1990, Ser. No. 481,885**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1984, 3435643**

**Int. Cl.⁵ D04H** *1/08*

**U.S. Cl. 428—280** **6 Claims**



1. A laminate as a carrier web for roofing and sealing sheets made of a layer of synthetic fibers and a layer of mineral fibers, comprising a non-woven of synthetic fiber preconsolidated by needling or by a binder and a nonwoven of mineral fiber preconsolidated by needling or by a binder which, after preconsolidation, are bonded to each other by needling, wherein the weight of the synthetic fiber nonwoven is 50 to 350 $g/m^2$, and the individual denier is a 3 to 8 dtex, the mineral fiber nonwoven has a weight between 30 to 60 $g/m^2$, and wherein 10 to 100 needling stitches per $cm^2$ have been applied.

### 5,017,427

### LAMINATE HAVING INDICATOR FUNCTION

**Morihisa Machida, Hayama; Yoshio Tajima, Ito; Hideo Nakatsumi, Ichikawa; Tatsuo Isahai, Takasaki, and Daijiro Shiroki, Nagareyama, all of Japan, assignors to The Yokohama Rubber Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan**

**PCT No. PCT/JP87/00945, § 371 Date Aug. 5, 1988, § 102(e) Date Aug. 5, 1988, PCT Pub. No. WO88/04234, PCT Pub. Date Jun. 16, 1988**

**PCT Filed Dec. 7, 1987, Ser. No. 243,559**

**Claims priority, application Japan, Dec. 8, 1986, 61-290530**

**Int. Cl.⁵ B32B** *5/16;* **A41D** *19/00*

**U.S. Cl. 428—323** **7 Claims**

1. A laminate, having a function of an indicator, comprising a rubber or resin inner layer which contains an acid/base indicator which changes color upon contact with an acid or an alkali; and an acid or alkali resistant outer layer.

### 5,017,428

### MULTIPLE IMPRESSION THERMAL TRANSFER RIBBON

**Norbert Mecke, Hanover, and Heinrich Krauter, Neustadt, both of Fed. Rep. of Germany, assignors to Pelikan Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Continuation of Ser. No. 152,641, Feb. 5, 1988, abandoned. This application Jun. 13, 1989, Ser. No. 366,289**

**Claims priority, application Fed. Rep. of Germany, Feb. 7, 1987, 3703813**

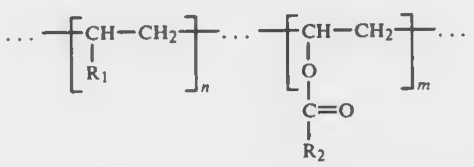
**Int. Cl.⁵ B41M** *5/26*

**U.S. Cl. 428—336** **5 Claims**

1. A thermal transfer ribbon, suitable for making multiple impressions, comprising:

a substrate; and

a fusible colorant layer on one side of said substrate, said layer consisting essentially of about 10–40% colorant substance, optionally a dispersant in an effective amount for dispersing said colorant substance and a fusible binder which is a wax that is a copolymer of the formula:



$$\cdots\!-\!\left[\begin{array}{l}\mathrm{CH-CH_2}\\ \;|\\ \mathrm{R_1}\end{array}\right]_n\!-\cdots-\!\left[\begin{array}{l}\mathrm{CH-CH_2}\\ \;|\\ \mathrm{O}\\ \;|\\ \mathrm{C{=}O}\\ \;|\\ \mathrm{R_2}\end{array}\right]_m\!-\cdots$$

wherein $R_1$ is hydrogen, $R_2$ is methyl, n and m are the numbers of the monomer units in the copolymer, and the ratio of m to n is between about 0.01 and 0.07, said binder being the principal fusible and transferable ingredient in said colorant layer, and wherein said copolymer is a modified ethylene wax having a melting point of about 87° to 92° C., solidification point of about 83° to 87° C., Hoppler hardness at 23° C. of about 100 to 140 bar, melt viscosity at 120° C. of about 1650 to 1850 $nm^2/s$, average molecular weight (visometric) of about 6500 to 7000, and vinyl acetate content of about 8.5 to 9.5%.

### 5,017,429

### PACKAGING MATERIAL FOR PHOTOSENSITIVE MATERIALS

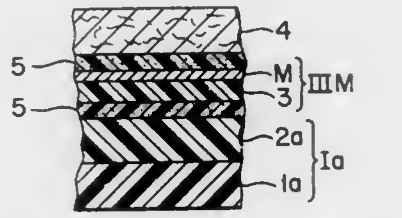
**Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan**

**Continuation of Ser. No. 194,092, May 16, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 464,664**

**Claims priority, application Japan, May 15, 1987, 62-118559**

**Int. Cl.⁵ C09J** *7/02;* **B32B** *15/08*

**U.S. Cl. 428—349** **7 Claims**



1. A packaging material for photosensitive materials, comprising a laminated film comprising a thermoplastic resin heat seal layer comprised of coextruded thermoplastic resin layer and an ethylene copolymer layer, a layer of metallized flexible sheet, and a layer of linear low density polyethylene resin extrusion laminating adhesive positioned therebetween, wherein said layer or linear low density polyethylene resin extrusion laminating adhesive comprises a blend of 30 to 90 wt. % linear low density polyethylene resin in the form of a copolymer of ethylene and α-olefin, and 10 to 70 wt. % high pressure low density polyethylene resin, said layer of linear low density polyethylene resin extrusion laminating adhesive having a melt index of 5 to 20 g/10 minutes, a density of 0.870 to 0.930 $g/cm^3$, an optical density of transmitted light or more than 4.0, and a moisture permeability of less than 2.0 $g/m^2$ per 24 hours.

### 5,017,430

### HEAT SEALABLE PACKAGING FILM WITH DRAWABLE PRIMER

**Shaw-Chang Chu, West Winsor, N.J., and Kevin A. Kirk, Macedon, N.Y., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Filed Nov. 25, 1988, Ser. No. 276,071**

**Int. Cl.⁵ B32B** *7/12*

**U.S. Cl. 428—353** **15 Claims**

1. A biaxially oriented heat sealable multilayer structure comprising:

(a) a substrate layer comprising a polyolefin film;

(b) a drawable, thermoplastic primer coating on at least one surface of the substrate layer, the primer having a glass transition temperature (Tg) from about 0° and 50° C.;

(c) a heat sealable acrylic or polyvinylidene chloride (PVDC) coating applied to at least one primer coated surface.

### 5,017,431

### ADHESION STRUCTURES AND METHOD OF PRODUCING THE SAME

**Sugio Otani, Kiryu, and Hiroya Kakegawa, Yoro, both of Japan, assignors to Ibiden Company, Ltd., Ohagaki, Japan**

**Division of Ser. No. 938,253, Dec. 5, 1986, Pat. No. 4,911,983. This application Jan. 3, 1990, Ser. No. 460,620**

**Claims priority, application Japan, Dec. 10, 1985, 60-278800; Dec. 11, 1985, 60-279683; Oct. 29, 1986, 61-257715**

**Int. Cl.⁵ B32B** *11/00, 11/08, 15/08, 17/10*

**U.S. Cl. 428—420** **22 Claims**

1. An adhesion structure, comprising an adhesive made from a thermosetting resin composition obtained by a reaction of (a) a condensed polycyclic aromatic compound having at least two rings, (b) an aromatic crosslinking agent having one or more aromatic rings with at least two hydroxymethyl or halomethyl groups, wherein a molar ratio of (b) to (a) is 0.5–4.0, and (c) an acid catalyst added to a mixture of (a) and (b) in an amount of 0.1–10 wt %, bonded to at least one surface of at least a pair of adherends having at least one moiety selected from the group consisting of hydrogen atom, halogen atom, hydroxyl group, carbonyl group, carboxyl group, aldehyde group, epoxy group, lactone group, ether group and acid anhydride group, through 0.01–5 wt% of a surface treating agent comprising said aromatic crosslinking agent.

### 5,017,432

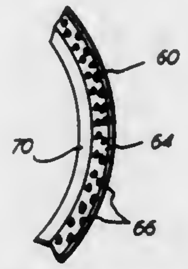
### FUSER MEMBER

**Clifford O. Eddy, Webster; Arnold W. Henry, Pittsford; Lynn Lorenzo, Penfield; Che C. Chow, Penfield; Robert M. Ferguson, Penfield, and Robert N. Finsterwalder, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 166,577, Mar. 10, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 405,392**

**Int. Cl.⁵ B32B** *27/08, 15/08*

**U.S. Cl. 428—422** **9 Claims**



1. A fuser member for fusing thermoplastic resin toner images to a substrate in a fuser system of the type wherein a polymeric release agent having functional groups is applied to the surface of the fuser member, the fuser member comprising a base member and an elastomer fusing surface comprising poly(vinylidenefluoride-hexafluoropropylene-tetrafluoroethylene) where the vinylidenefluoride is present in an amount less than 40 mole percent, a metal oxide present in said fusing surface in an amount sufficient to interact with a polymeric release agent having functional groups to provide an interfacial barrier layer between said fusing surface and toner and being substantially unreactive with said elastomer, said elastomer having been cured from a solvent solution thereof with a nucleophilic curing agent soluble in said solution and in the presence of less than 4 parts by weight of inorganic base per 100 parts of polymer, said inorganic base being effective to at least partially dehydrofluorinate the vinylidenefluoride.

### 5,017,433

### GLASS LAMINATE AND METHOD OF FORMING A GLASS LAMINATE

**Pierre Chevreux, and Christiane A. R. Chevreux, both of Ferney-Voltaire, France, assignors to Deltaglass S. A., Switzerland**

**Division of Ser. No. 91,369, Aug. 28, 1987, abandoned, which is a continuation of Ser. No. 548,437, Nov. 3, 1983, abandoned. This application Feb. 13, 1989, Ser. No. 309,363**

**Claims priority, application United Kingdom, Nov. 5, 1982, 8231736**

**Int. Cl.⁵ B32B** *27/40*

**U.S. Cl. 428—425.6** **25 Claims**

1. A method of forming a laminate by bonding a glass sheet to a plastics foil by interposing a layer of a radiation-curable adhesive composition between said sheet and said foil and thereafter exposing the assembly of said sheet and said foil with said layer inbetween to irradiation to cure the adhesive and bond the sheet to the foil, wherein there is used as the adhesive composition a radiation-curable clear, homogeneous liquid adhesive composition consisting essentially of urethane acrylate in a liquid α,β-ethylenically unsaturated diluent and said urethane acrylate comprises (i) a first urethane acrylate component which is generally difunctional, at least a major proportion of which is material having a molecular weight (MN) in the range 1,5000 to 10,000 and which is obtainable by reaction of an oligomeric urethane intermediate having end groups selected from —OH and —NCO with an α,β-ethylenically unsaturated compound which has a group reactive with an end group of the intermediate and also a carboxy (—COOH) group attached to a carbon atom which is attached to a methylene group by a double bond and substantially all of the unsaturation in the urethane acrylate is terminal alpha-beta unsaturation, and (ii) an effective amount of a second urethane acrylate component which has a functionality of at least about 3 and a molecular weight (MN) above 1,200 and which is obtainable by reaction of an urethane intermediate having end groups selected from —OH an d—NCO with an α,β-ethylenically unsaturated compound which has a group reactive with an end group of the intermediate and also a carboxy (—COOH) group attached to a carbon atom which is attached to a methylene group by a double bond and substantially all of the unsaturation in the urethane acrylate is terminal alpha-beta unsaturation;

the urethane intermediate of said urethane acrylate component is derived from polyisocyanate material selected from the group consisting of polyisocyanates in which the isocyanate groups are attached to aliphatic carbon atoms and polyisocyanate material in a major proportion of which the isocyanate groups are attached to aliphatic carbon atoms, and polyol selected from the group consisting of polyether polyols and polyol material a major proportion of which is polyether polyol;

the urethane intermediate of said second urethane acrylate component is derived from polyisocyanate material selected from the group consisting of polyisocyanates in which the isocyanate groups are attached to aliphatic carbon atoms and polyisocyanate material in a major proportion of which the ioscyanate groups are attached to aliphatic carbon atoms, and polyol material selected from the group consisting of polyester polyols and polyol material a major proportion of which is polyester polyol; and

component (i) is present in an amount of at least 80% by weight based on the combined weights of component (i) and component (ii).

VOL
1126
ISS
3
MY
21
1991
UMI

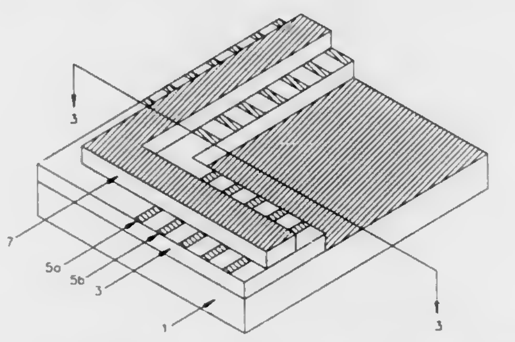
### 5,017,434
### ELECTRONIC PACKAGE COMPRISING ALUMINUM NITRIDE AND ALUMINUM NITRIDE-BOROSILICATE GLASS COMPOSITE

**Jack H. Enloe, 8535 Hayshed La., Columbia, Md. 21045; John W. Lau, 14309 Night Hawk Way, Gaithersburg, Md. 20878, and Roy W. Rice, 5411 Hopark Dr., Alexandria, Va. 22310**

**Continuation-in-part of Ser. No. 148,829, Jan. 27, 1988, Pat. No. 4,920,040. This application Dec. 19, 1988, Ser. No. 286,557**

**Int. Cl.$^5$ C03C** *10/00;* **B32B** *15/00*

U.S. Cl. 428—428 6 Claims



1. An electronic package having a ceramic support structure comprising a densified AlN base layer and at least one densified AlN-borosilicate glass composite layer bonded thereto, said borosilicate glass comprising about 10 to 28 wt % $B_2O_3$, 60 81 wt % $SiO_2$, 1 to 4 wt % $Al_2O_3$ and 2 to 10 wt % of one or more members of the group $Li_2O$, $Na_2O$, $K_2O$ or CaO; and wherein the weight ratio of AlN to borosilicate glass is 1:0.45–0.70.

---

### 5,017,435
### MULTI-COMPONENT COATING COMPOSITION COMPRISING AN ANHYDRIDE CONTAINING POLYMER, A GLYCIDYL COMPONENT AND A MONOMERIC OR OLIGOMERIC ANHYDRIDE COMPONENT

**Robert J. Barsotti, Franklinville, N.J.; Lili W. Altschuler, Wynwood, and Lee R. Harper, Media, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jun. 27, 1988, Ser. No. 212,055**

**The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.**

**Int. Cl.$^5$ B32B** *27/42;* **C08L** *63/00*

U.S. Cl. 428—502 15 Claims

1. A coating composition comprising 20–80% by weight of reactive binder components and 80–20% by weight of an organic liquid carrier; wherein the binder consists essentially of about

(a) 25–90% by weight, based on the weight of the binder, of an anhydride acrylic polymer having at least two reactive anhydride groups and consists of polymerized monomers of an ethylenically unsaturated anhydride or an ethylenically unsaturated dicarboxylic acid and polymerized monomers selected from the group consisting of alkyl methacrylate, alkyl acrylate and any mixtures thereof, wherein the alkyl groups have 1-8 carbon atoms and the polymer has a weight average molecular weight of about 2,000-50,000;

(b) 5–50% by weight, based on the weight of the binder, of a glycidyl component having at least two reactive gylcidyl groups;

(c) 5–40% by weight, based on the binder, of a monomeric oligomeric anhydride component; and

the composition contains about 0.1–5 % by weight, based on the weight of the binder, of a catalyst.

---

### 5,017,436
### CLEAR THERMOPLASTIC POLYMER COMPOSITE MATERIAL

**Dick Schwarz, 807 Whitecap Dr., Seabrook, Tex. 77586; Bob Warrer, 1816 Lazy Creek La., Pearland, Tex. 77581; Mike Musgrave, 4510 Briar Hollow Pl., #310, Houston, Tex. 77027; Bob Cruson, Rte. 1, Box 325, Roanoke, Tex. 76262; Christa Gordon, 2624 Rogers St., Fort Worth, Tex. 76109, and Todd Weinert, 23506 Elmwood Ct., Spring, Tex. 77389**

**Filed Dec. 1, 1988, Ser. No. 278,383**

**Int. Cl.$^5$ B32B** *25/08, 25/14, 27/06, 27/30*

U.S. Cl. 428—519 7 Claims

1. A multilayered polymeric sheet material comprising:

a first layer of material comprising an olefinic polymer;

a second layer of material comprising a styrene-ethylene-butadiene-styrene block copolymer rubber integrally bonded to said first layer;

a third layer of material comprising a monovinyl aromatic polymer integrally bonded to said second layer;

wherein said olefinic polymer is chosen from the group consisting of polypropylene, polyethylene and ethylene-propylene copolymers;

wherein said monovinyl aromatic polymer is chosen from the group consisting of polystyrene, polymers of alpha-methyl styrene, polymers of alpha-ethyl styrene, polymers of ring-substituted alkyl styrenes and polymers of ring-substituted halostyrenes; and wherein said olefinic polymer layer comprises from about ten to forty percent by weight of the sheet material, said rubber layer comprises from about three to about ten percent by weight of the sheet material, and said monovinyl aromatic polymer layer comprises from about fifty to about eighty-seven percent of the sheet material.

---

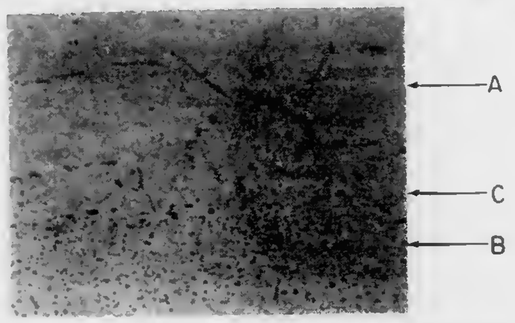
### 5,017,437
### PROCESS FOR MAKING CLAD ARTICLES AND ARTICLE MADE THEREBY

**James W. Martin, Sinking Spring; Robert S. Brown, Leesport; E. Lance Buck, Reinholds, and Gregory J. Del Corse, Sinking Spring, all of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.**

**Filed Jul. 20, 1990, Ser. No. 556,298**

**Int. Cl.$^5$ B22F** *7/04*

U.S. Cl. 428—558 14 Claims



1. A process for making a shaped article having improved workability and formability, said article including a core formed of densified metal powder within a compatible metal cladding, said process comprising the steps of

heating metal powder that is substantially free of oxides to a temperature within a first temperature range defined by a first lower temperature that is high enough to remove moisture from and prevent the adsorption of moisture by the metal powder and a first upper temperature that is low enough to prevent oxidation of the metal powder in air;

feeding the heated metal powder into a heated metal container having an interior surface that is substantially free of oxide contamination, said container being at a temperature within a second temperature range defined by a second lower temperature that is high enough to remove moisture from and prevent the adsorption of moisture by the interior surface and a second upper temperature that is low enough to prevent oxidation of the interior surface in air;

controlling the temperature of the metal powder such that it is maintained within the first temperature range during said feeding step;

sealing the metal container while it is within said second temperature range; and

consolidating the sealed container so as to densify the metal powder and metallurgically bond the container to the densified metal powder across an interface therebetween so as to form the metal cladding;

whereby, following said consolidation step the core has a zone adjacent the interface wherein the average oxide volume fraction is not significantly greater than the average oxide volume fraction of the remainder of the core so as to provide local ductility in said core zone that is essentially equal to that of the remainder of the core.

---

### 5,017,438
### SILICON CARBIDE FILAMENT REINFORCED TITANIUM ALUMINIDE MATRIX WITH REDUCED CRACKING TENDENCY

**Paul A. Siemers, Clifton Park, and Ann M. Ritter, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 22, 1989, Ser. No. 455,041**

**Int. Cl.$^5$ C22C** *1/09, 14/00*

U.S. Cl. 428—614 9 Claims

1. A reinforced structure which comprises,

a set of reinforcing silicon carbide filaments,

a partial and irregular coating of plasma-spray deposited beta-phase stabilizer metal on the silicon carbide filaments, and

a matrix of a titanium base alloy having an alpha-2 crystal form extending between said coated filaments as a matrix of a composite structure.

---

### 5,017,439
### MICRO-CONTAMINATION-FREE COATING FOR DIE-CAST COMPONENT IN MAGNETIC DISK DRIVE

**Amarjit S. Brar, Edina, and Prativadi B. Narayan, Eden Prairie, both of Minn., assignors to Seagate Technology, Inc., Scotts Valley, Calif.**

**Filed Jul. 19, 1989, Ser. No. 382,098**

**Int. Cl.$^5$ C23C** *14/02, 22/24*

U.S. Cl. 428—629 8 Claims

1. A process for treating the surface of a die-cast metal article which consists essentially of aluminum alloy or magnesium alloy, comprising:

chemically cleaning the surface;

cleaning the surface with an argon plasma;

depositing an ion vapor generated aluminum coating upon the cleaned surface;

mechanically treating the deposited aluminum coating; and chromate converting the mechanically treated coating.

8. An article prepared by the process of claim 1.

---

### 5,017,440
### ADHESION BETWEEN PHOSPHOR AND TOPCOAT LAYERS OF AN X-RAY INTENSIFYING SCREEN

**William D. Bills, Towanda; Theodore P. Christini, Dushore, both of Pa.; Reid E. Kellogg, Wilmington, Del.; Richard B. Maynard, Owego, N.Y., and William J. Zegarski, Towanda, Pa., assignors to E. I. de Pont de Nemours and Company, Wilmington, Del.**

**Filed Sep. 29, 1989, Ser. No. 414,410**

**Int. Cl.$^5$ G01J** *1/58*

U.S. Cl. 428—690 8 Claims

1. An X-ray intensifying screen comprising a support having a dry active layer comprising a phosphor dispersed in a binder and a topcoat layer coated on the dry active layer, said topcoat layer comprising a copolymer of 5 to 50 weight percent of acrylonitrile and 95 to 50 weight percent of styrene, said copolymer being mixed with a carboxylated acrylic polymer, wherein the copolymer represents 80 to 95 weight percent thereof, the improvement comprising the addition to the dry active layer of an adhesion promoting amount of a soluble, inorganic salt selected from the group consisting of magnesium sulfate, magnesium chloride, magnesium acetate, magnesium perchlorate, aluminum chloride, calcium chloride, barium chloride, lead chloride, zinc chloride and mixtures thereof said inorganic salt being present in a range of about 0.001 to about 0.008 gram of salt per gram of organic material present in the dry active layer.

---

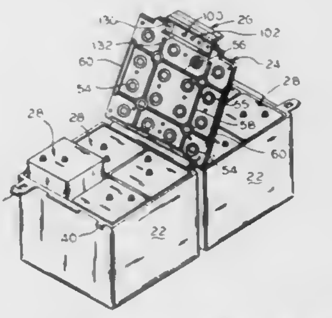
### 5,017,441
### BATTERY PACK

**Henry Lindner, Elgin, Ill., assignor to Elgin Molded Plastics, Inc., Elgin, Ill.**

**Filed Aug. 8, 1989, Ser. No. 391,118**

**Int. Cl.$^5$ H01M** *2/10, 2/20*

U.S. Cl. 429—9 19 Claims



1. An improved power source including at least one container means adapted to accept a plurality of dry cell batteries each having an external axially extending polygonal configuration, said batteries each having their positive and negative terminals extending axially from one end of said battery, one of said terminals being disposed on the axis of said battery while the other of said terminals being disposed adjacent one corner of said polygon, integrated universal connector means contacting said terminals providing a circuitry that is the same regardless of the angular disposition of any of said batteries relative to their individual axis.

VOL
1126
ISS
3
MY
21
1991
UMI

**5,017,442**

### COILED LITHIUM BATTERY

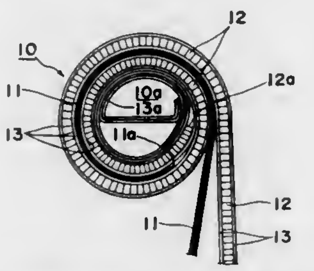
**Osamu Watanabe, Toyonaka; Osamu Kajii, Kashiwara; Toshiyuki Edamoto; Tomio Kitamura, both of Suita; Kaoru Hisatomi, Takatsuki; Hiroshi Yoshida, Suita, and Yoshiki Somatomo, Osaka, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan**

**Filed Mar. 17, 1989, Ser. No. 324,737**

**Claims priority, application Japan, Mar. 19, 1988, 63-66301; Mar. 19, 1988, 63-66302; Mar. 19, 1988, 63-66303**

**Int. Cl.$^5$ H01M** *2/02*

**U.S. Cl. 429—94** **4 Claims**



1. A coil type lithium battery having a coil electrode body comprising a strip-like negative electrode plate of lithium or lithium alloy, a strip-like positive electrode, a separator interposed between said negative electrode plate and said positive electrode, and an insulating film over the entire outer cylindrical surface of said coiled electrode body extending onto a bottom surface of said electrode body inclusive of a peripheral, lower edge portion thereof.

---

**5,017,443**

### BATTERY HOUSING DEVICE

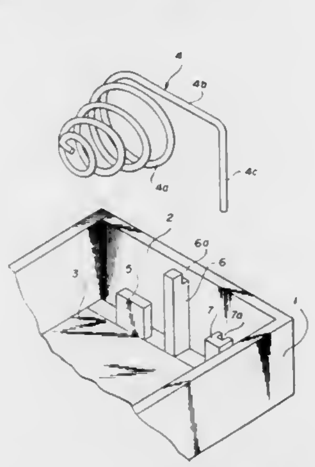
**Tomohisa Tominaga; Kazuichi Sato; Kouichi Otsuka; Toshiya Endo, all of Furukawa, and Susumu Oikawa, Miyagi, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Jul. 28, 1989, Ser. No. 386,930**

**Claims priority, application Japan, Oct. 6, 1988, 63-130438[U]**

**Int. Cl.$^5$ H01M** *2/10*

**U.S. Cl. 429—99** **1 Claim**



1. In a battery housing device including a case for receiving at least two batteries in a parallel condition, retaining means provided in the vicinity of one of the inside surface of an end wall of said case, said end wall being laterally adjoined on opposite sides by first and second side walls, and an electrode spring adapted to be retained by said retaining means, wherein positive and negative electrodes of said batteries are electrically connected to each other through said electrodes spring, the improvement wherein

said electrode spring comprises a spiral turn portion and an L-shaped portion continuing from a radially outermost turn of said spiral turn portion, and

said retaining means comprises:

a retainer provided to stand from a bottom surface of said case in such a manner as to be separated from said first and second side walls and opposed to said end wall of said case with a predetemined gap defined between said retainer and said end wall;

a pocket is provided at a lower portion of said end wall, said pocket having a blind hole therein; and

a rib is provided on said end wall at a position between said retainer and said pocket, said rib having a recess at an upper end thereof;

wherein when said electrode spring is retained to said case, a lower portion of said spring turn portion is inserted into said predetermined gap qetween said retainer and said end wall, and a free end of said L-shaped portion is inserted into said blind hole of said pocket, and a connecting portion between said spiral turn portion and said L-shaped portion is inserted into said recess of said rib.

---

**5,017,444**

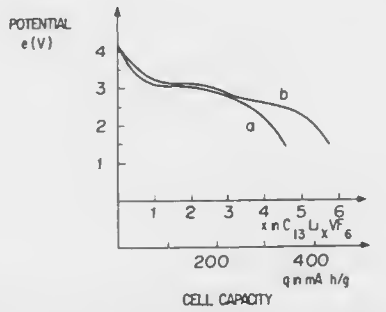
### LITHIUM CELL

**Tsuyoshi Nakajima, Nishisakaidani, and Rachid Yazami, Higashi, both of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan**

**Filed Aug. 31, 1990, Ser. No. 575,564**

**Int. Cl.$^5$ H01M** *4/58*

**U.S. Cl. 429—218** **9 Claims**



1. A lithium cell comprising a negative pole made of lithium and a positive pole made of a vanadium fluoride-graphite intercalculation compound of the formula $C_xVF_6$ wherein x is from 8.0 to 80.

---

**5,017,445**

### DRY CELL

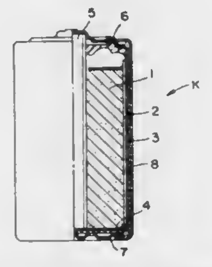
**Ryohei Ashihara, Neyagawa; Kikumitsu Suehiro, Kadoma; Kazuo Sugino; Jun Miyoshi, both of Hirakata, and Masatsugu Eri, Kurume, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 291,787, Dec. 29, 1988, abandoned. This application Dec. 6, 1989, Ser. No. 446,769**

**Claims priority, application Japan, Dec. 29, 1987, 62-334457**

**Int. Cl.$^5$ H01M** *4/62*

**U.S. Cl. 429—224** **4 Claims**



1. In a dry cell comprising an anode made of zinc and cathode mixture which includes manganese dioxide acting as active agent and conductor, the improvement comprising:

acetylene black having a specific surface area of 110 to 150 m$^2$/g measured by a BET type nitrogen gas adsorption method, which is used as the conductor; and

a mixing ratio in weight of the manganese dioxide to the acetylene black ranging from 7/1 to 12/1.

---

**5,017,446**

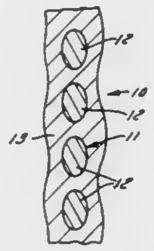
### ELECTRODES CONTAINING CONDUCTIVE METAL OXIDES

**Benjamin Reichman, Bayside, and James I. Strebe, Germantown, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.**

**Filed Oct. 24, 1989, Ser. No. 426,580**

**Int. Cl.$^5$ H01M** *4/68*

**U.S. Cl. 421—225** **28 Claims**



1. In an electrode including a conductive current collector and an active lead material in contact with said collector, the improvement wherein said active material contains an electrically conductive, sulfuric acid-resistant transition metal oxide.

---

**5,017,447**

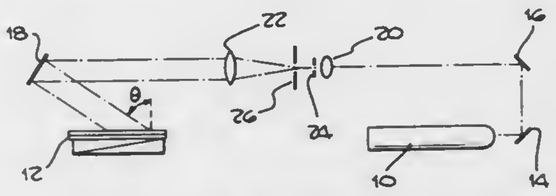
### PHOTOSENSITIVE EMULSION FOR HOLOGRAPHIC PLATES AND METHOD

**Jane Wallner, Northridge, and Kevin Yu, Temple City, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jan. 23, 1989, Ser. No. 299,855**

**Int. Cl.$^5$ G03C** *1/66*

**U.S. Cl. 430—2** **7 Claims**



1. A gel suitable for use as a photosensitive emulsion in a hologram wherein said gel is exposed to radiation and a recorded image is formed, said gel consisting essentially of gelatin having dispersed therein from 2 to 10 weight percent of a sizing agent and a sufficient amount of a photosensitive agent to provide a recordable image when said gel is exposed to radiation, wherein said photosensitive agent is ammonium dichromate, and wherein said sizing agent comprises a polyvinly-pyrrolidone-polyvinly acetate copolymer.

4. An improved holographic plate comprising:

a substrate;

a photosensitive emulsion coating on at least a portion of said substrate wherein said photosensitive emulsion includes a dichromated gelatin homogeneously combined with from 2 to 10 weight percent of a sizing agent wherein said sizing agent strengthens the structure of said dichromated gelatin to thereby reduce uneven shrinkage during chemical development of said photosesitive emulsion and improve the image quality of said holographic plate, wherein said sizing agent comprises a polyvinyl-pyrrolidone homopolymer.

---

**5,017,448**

### ELECTROPHOTOGRAPHIC LITHOGRAPHIC PRINTING PLATE PRECURSOR

**Eiichi Kato, and Kazuo Ishii, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 27, 1989, Ser. No. 302,300**

**Claims priority, application Japan, Jan. 27, 1988, 63-14576**

**Int. Cl.$^5$ G03G** *5/087*

**U.S. Cl. 430—49** **13 Claims**

1. An electrophotographic lithographic printing plate precursor which utilizes an electrcphotographic photoreceptor comprising a conductive support having provided thereon at least one photoconductive layer containing photoconductive zinc oxide and a resin binder, said resin binder comprising a partially cross-linked resin which contains at least one kind of functional group capable of producing at least one carboxyl group through decomposition, said cross-linking being sufficient to improve the stain resistance of the non-image area of the printing plate.

---

**5,017,449**

### ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER WITH SUBSTITUTED NYLON INTERLAYER

**Toshiyuki Yoshihara, Mitaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 19, 1990, Ser. No. 468,838**

**Claims priority, application Japan, Jan. 21, 1989, 1-12254**

**Int. Cl.$^5$ G03G** *5/047, 5/14*

**U.S. Cl. 430—59** **5 Claims**

1. An electrophotographic photosensitive member, which comprises an electroconductive support, and at least an undercoating layer, a charge generation layer and a charge transport layer, laid successively on the electroconductive support in this order, the undercoating layer containing N-methoxymethylated nylon 6 containing not more than 10 ppm of components having a molecular weight of not more than 1,000.

2. An electrophotographic photosensitive member according to claim 1, wherein a charge transport material contained in the charge transport layer has an oxidation potential of not less than 0.7 eV.

3. An electrophotographic photosensitive member according to claim 2, wherein the charge transport material is selected from the group consisting of pyrazoline-based compounds, hydrazone-based compounds, stilbenzene-based compounds, triphenylamine-based compounds, benzidine-based compounds and oxazole-based compounds.

---

**5,017,450**

### COLOR TONER COMPOSITION FOR ELECTROSTATIC DEVELOPER

**Yoshiyuki Iwanari, Tokyo; Shinji Amaya, Saitama; Seiichi Shimizu, Saitama, and Toshiro Kogawara, Saitama, all of Japan, assignors to Dainippon Ink & Chemicals, Inc., Tokyo, Japan**

**Filed Jun. 2, 1989, Ser. No. 360,697**

**Claims priority, application Japan, Jun. 3, 1988, 63-135469**

**Int. Cl.$^5$ G03G** *9/087, 9/097*

**U.S. Cl. 430—106** **3 Claims**

1. A color toner composition for an electrostatic developer, comprising a cyan pigment, a magenta pigment or yellow pigment, a binder resin and a negative charging-controlling agent, wherein said binder resin is a vinyl-modified polyester resin as obtained by graft polymerizing

(b) a vinyl monomer component containing an aromatic vinyl monomer and an amino group-containing vinyl monomer to

(a) an unsaturated polyester component containing at least aliphatic unsaturated dibasic acid and polyhydric alcohol, said component (a) constituting at least 50% by weight of

VOL
1126
ISS
3
MY
21
1991
UMI

the vinyl-modified polyester and said amino group-containing vinyl monomer constitutes 0.1 to 2.0% by weight of the vinyl-modified polyester resin, wherein the weight average molecular weight of said component (a) is from 5,000 to 15,000.

---

### 5,017,451
### CONTINUOUS PROCESS FOR PREPARING RESIN PARTICLES IN A LIQUID

**James R. Larson, West Chester, and Kenneth W. Leffew, Kennett Square, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 22, 1989, Ser. No. 440,155**

**Int. Cl.$^5$ G03G** *9/13*

**U.S. Cl. 430—137** **55 Claims**

1. A continuous process for the preparation of a dispersion of liquid and thermoplastic resin or polymer particles having at least one additive dispersed in the thermoplastic resin or polymer particles for use in the preparation of electrostatic liquid developers comprising, in order,

A. introducing an intimate blend of resin and at least one additive continuously into an apparatus having means for melting the resin and dispersing the additive in the resin,

B. melting the resin in said apparatus at an elevated temperature but below that at which the resin and/or additive decomposes,

C. moving continuously the blend of melted resin and additive through at least one mixing element of said apparatus whereby the additive is thoroughly dispersed in the melted resin to form a molten blend of resin and additive,

D. forming a dispersion by introducing into said molten blend while it is still in the at least one mixing element of said apparatus a liquid in which the resin and at least one additive are substantially insoluble and mixing said molten blend thoroughly in the liquid, the temperature in the at least one mixing element being maintained above the temperature at which said molten blend remains in its molten state, and

E. introducing continuously the dispersion into a high shear cooling apparatus wherein the molten blend solidifies forming a stable dispersion of resin particles in the liquid, the resin particles having an average by area particle size of less than 30 $\mu$m.

---

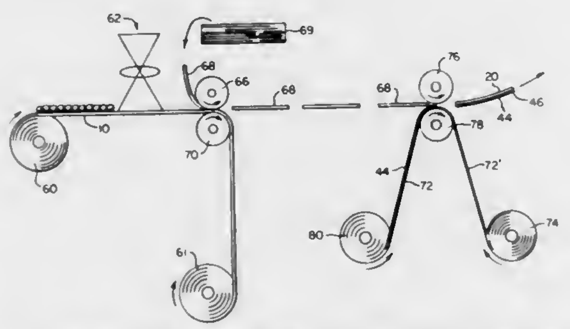
### 5,017,452
### METHOD FOR IMAGE DEVELOPING ON PLAIN PAPER UTILIZING A DEVELOPER-DONOR SHEET

**Lyudmila Feldman, Centerville, Ohio, assignor to The Mead Corporation, Dayton, Ohio**

**Filed Dec. 20, 1989, Ser. No. 454,102**

**Int. Cl.$^5$ G03C** *1/733*

**U.S. Cl. 430—138** **6 Claims**



1. A method for forming images on plain paper comprising the steps of:

image-wise exposing an image sheet, said imaging sheet comprising a support having a layer of photosensitive microcapsules on the surface thereof, said microcapsules containing a photohardenable or photosoftenable composition and a color precursor;

assembling said image-wise exposed imaging sheet with a sheet of plainpaper;

subjecting said assembly of said imaging sheet and said plain paper to a uniform rupturing force to cause said photosensitive microcapsules to rupture and transfer an image-wise pattern of said color precursor to said plain paper thereby forming a latent image thereon;

separating said imaging sheet from said plain paper;

assembling said plain paper bearing said latent image with a developer-donor sheet comprising a support having layer of a developer on the surface thereof to form a second assembly;

subjecting said second assembly to a uniform force to transfer said developer form said developer-donor sheet to said plain paper bearing said latent image whereupon said developer reacts with said color precursor to form a visible image on said plain paper; and

separating said plain paper bearing said visible image from said developer-donor sheet.

---

### 5,017,453
### A SILICONE RESIST MATERIALS CONTAINING A POLYSILOXANE AND A PHOTO-SENSITIVE AGENT

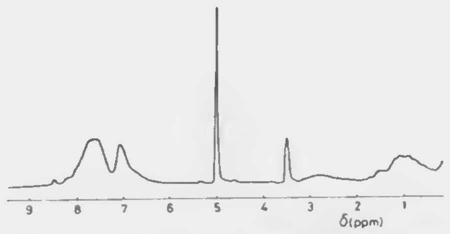
**Yasunobu Onishi; Shuji Hayase; Rumiko Horiguchi, all of Kanagawa, and Akiko Hirao, Chiba, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Division of Ser. No. 938,874, Dec. 8, 1986, Pat. No. 4,822,716. This application Jan. 31, 1989, Ser. No. 304,231**

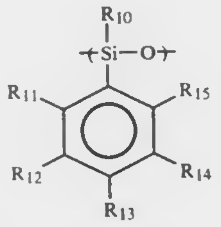
**Claims priority, application Japan, Mar. 31, 1985, 61-71107; Dec. 27, 1985, 60-293182; May 21, 1986, 61-114673; Jun. 4, 1986, 61-128081**

**Int. Cl.$^5$ G03C** *1/52, 1/495*

**U.S. Cl. 430—176** **9 Claims**



1. A silicone resist material comprising an admixture of a polysiloxane that contains a structure shown by the formula



(II)

as an indispensable structure, wherein

a substituent group $R_{10}$ represents an alkyl group, vinyl group, allyl group, aryl group or substituted aryl group, or siloxy group or substituted siloxy group.

at at least one of substituent groups other than the hydroxyl groups among the substituent groups $R_{11}$ to $R_{15}$ is a hydroxyl group, the remaining groups $R_{11}$ to $R_{15}$ may be identical or may be different, and each of them represents a hydrogen atom, halogen atom, alkyl group or substituted alkyl group, carboxyl group, alkylcarbonyl group, alkoxycarbonyl group, alkoxy group, acyloxy group, allyl group, aryl group or substituted aryl group and an effective photosensitive amount of a photosensitive agent.

---

### 5,017,454
### HEAT-DEVELOPABLE COLOR LIGHT-SENSITIVE MATERIAL

**Takeshi Nakamine; Ken Kawata, and Toshiki Taguchi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

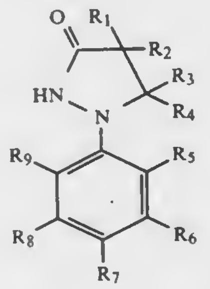
**Filed Aug. 17, 1989, Ser. No. 394,983**

**Claims priority, application Japan, Aug. 17, 1988, 63-204424**

**Int. Cl.$^5$ G03C** *5/54, 7/26, 5/30*

**U.S. Cl. 430—203** **19 Claims**

1. A heat-developable color light sensitive material comprising a support having thereon at least a light-sensitive silver halide, a binder, a non-diffusible compound capable of releasing a diffusible dye upon reduction, an electron donor compound or an electron donor precursor, and an electron transfer agent, said electron transfer agent being represented by formula (I):



(I)

wherein $R_1$, $R_2$, $R_3$ and $R_4$, which may be the same or different, each represents hydrogen, a substituted or unsubstituted alkyl group, or a substituted or unsubstituted aryl group; $R_5$ represents a halogen atom, a hydroxyl group, a substituted or unsubstituted alkyl group, or a substituted or unsubstituted alkoxy group; at least one of $R_6$, $R_7$, and $R_8$, which may be the same or different, represents an electron donative group which is a member selected from the group consisting of an alkyl group, an alkoxy group and an amino group, and the others represent a hydrogen atom; and R9 represents a hydrogen atom.

5. The heat-developable color light-sensitive material as claimed in claim 1, further comprising a second support having thereon at least one dye-fixing layer comprising a mordant and a binder capable of receiving said diffusible dye after its release.

---

### 5,017,455
### PROCESS FOR RECOVERING SUPPORT FROM PHOTOGRAPHIC FILM

**Goichi Hayashi; Sajuro Fujimagari; Kensaku Nakamura, and Ryuichi Ishida, all of Kanagawa, Japan, assignors to Fuji Photo Film Co. and Panac-Industries Inc., Kanagawa, both of, Japan**

**Filed Apr. 11, 1990, Ser. No. 507,439**

**Claims priority, application Japan, Apr. 26, 1989, 1-106841**

**Int. Cl.$^5$ G03C** *11/12*

**U.S. Cl. 430—256** **20 Claims**

1. A process for recovering a support from a photographic film which comprises the support and an undercoating layer provided thereon, said support being made of cellulose triacetate film base, and said undercoating layer containing gelatin and cellulose nitrate,

wherein the process comprises the steps of:

(I) treating the photographic film with an aqueous solution of a surfactant; and then

(II) treating the photographic film with an aqueous solution of a protease to remove the undercoating layer from the support.

---

### 5,017,456
### SILVER HALIDE PHOTOGRAPHIC MATERIAL

**Hisashi Okamura, and Kazunobu Katoh, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

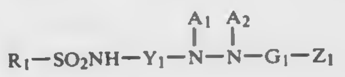
**Filed Jan. 26, 1990, Ser. No. 470,658**

**Claims priority, application Japan, Jan. 27, 1989, 1-018379**

**Int. Cl.$^5$ G03C** *1/06*

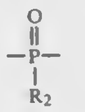
**U.S. Cl. 430—264** **13 Claims**

1. A silver halide photographic material which comprises a support having thereon at least one hydrophilic colloid layer, wherein at least one hydrophilic colloid layer is a silver halide photographic emulsion layer, and at least one hydrophilic colloid layer contains a compound represented by the following general formula (I):



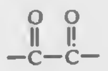
$$R_1-SO_2NH-Y_1-\overset{\overset{A_1}{|}}{N}-\overset{\overset{A_2}{|}}{N}-G_1-Z_1 \qquad (I)$$

wherein $A_1$ and $A_2$ both represent a hydrogen atom, or one of $A_1$ and $A_2$ is a hydrogen atom and the other is a sulfonyl group or an acyl group; $R_1$ represents an aliphatic group or an aromatic group; $Y_1$ represents a divalent linking group; $G_1$ represents a carbonyl group, a sulfonyl group, a sulfinyl group, a sulfoxy group, a group of



$$-\underset{\underset{R_2}{|}}{\overset{\overset{O}{\|}}{P}}-$$

wherein $R_2$ is an alkoxy group or an aryloxy group, a group of



$$-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-$$

or an iminomethylene group; and $Z_1$ represents a nitrogen-containing heterocyclic ring in which a carbon atom of said heterocyclic ring is bonded to $G_1$.

---

### 5,017,457
### PRESENSITIZED PRINTING PLATE FOR WATERLESS LITHOGRAPHIC PRINTING AND PROCESS FOR PRODUCTION THEREOF

**Heinz Herrmann, Wiesbaden, and Susanne Billino, Ruesselsheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 1, 1988, Ser. No. 239,468**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 3730213**

**Int. Cl.$^5$ G03C** *1/492*

**U.S. Cl. 430—272** **11 Claims**

1. A presensitized printing plate for waterless lithographic printing comprising:

a substrate;

a printing ink-repellent crosslinked silicone elastomer coating situated on said substrate;

an intermediate coating overlying said silicone elastomer; and

a radiation-sensitive coating overlying said intermediate coating,

wherein the intermediate coating comprises one each of an intermediate coating of amorphous silicic acid and of an exposed photosensitive organic halogen compound.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,458

### METHOD FOR PRODUCTION OF GRAFT COPOLYMER, PATTERN REPLICATION METHOD, AND BASE POLYMER AND RESIST FOR GRAFT COPOLYMERIZATION

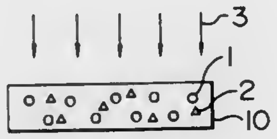
**Yasunari Soda; Kozo Mochiji, both of Hachioji; Hiroaki Oizumi, Kokubunji, and Takeshi Kimura, Higashimurayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 22, 1989, Ser. No. 354,116**

**Claims priority, application Japan, May 27, 1988, 63-128394**

**Int. Cl.$^5$ G03F** *7/26*

**U.S. Cl. 430—296** **9 Claims**



1. A method for replication of pattern which includes the steps of adding to a resist capable of forming first radicals when irradiated with radiation an additive capable of combining with said first radicals to form second radicals stable against oxygen; coating said resist containing the additive on a substrate; selectively irradiating the resist with radiation; introducing a monomer under an atmosphere free from oxygen, thereby to graft copolymerize said selectively irradiated resist and said monomer; and developing the resist to remove the resist of the area other than the graft copolymerized area.

9. A method according to claim 1 wherein the radiation is ultraviolet ray, electron beam, γ-ray or X-ray.

---

### 5,017,459

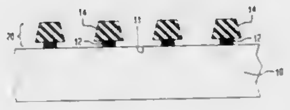
### LIFT-OFF PROCESS

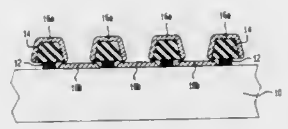
**William C. McColgin, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

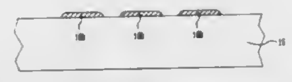
**Filed Apr. 26, 1989, Ser. No. 343,316**

**Int. Cl.$^5$ G03C** *5/00*

**U.S. Cl. 430—299** **25 Claims**







1. A process for providing a patterned film on a surface of a substrate comprising the steps of:

- forming for use as a mask a dual layer over said surface, said dual layer comprising a bottom assisting layer of a thickness no greater than about 2000 Angstroms and a top layer of photoresist of a thickness of at least about 4000 Angstroms;
- patterning photolithographically the dual layer, with an etchant selected to anisotropically etch the top layer and isotropically etch the bottom layer, in a manner to form sidewalls in the openings of the resulting pattern that have an undercut profile with an aspect ratio of at least one in the assisting layer, the pattern in the photoresist layer essentially corresponding to the pattern desired for the film;
- depositing the desired film non-directionally over the surface of the photoresist layer and over portions of the substrate exposed by the openings of the pattern in the photoresist layer, such that said film is discontinuous between said portions deposited on the substrate and said portions deposited on said photoresist layer; and
- removing selectively the dual layer and leaving the portions of the film deposited on the substrate.

2. The process of claim 1 in which the patterning of both layers of the dual layer is done in a common development step.

---

### 5,017,460

### METHOD OF MANUFACTURING A SHEAR PLATE FOR A DRY-SHAVER

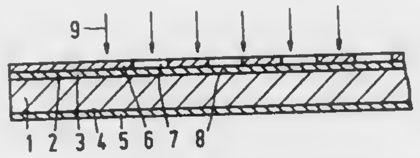
**Arend Schuurman, Drachten, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Apr. 11, 1989, Ser. No. 336,194**

**Claims priority, application Netherlands, Apr. 20, 1988, 8801017**

**Int. Cl.$^5$ G03C** *5/00*

**U.S. Cl. 430—320** **3 Claims**



1. A method of manufacturing a shear plate for a dry-shaver, which shear plate is formed with perforations in a multi-stage procedure wherein in each stage at least one side of a metal sheet is provided with a layer of a photosensitive material, which photosensitive material is exposed to radiation via a mask formed with a pattern of holes corresponding to the pattern of the perforations, after which the photosensitive material is developed and the perforations are formed in the metal sheet by etching, and wherein a positive photosensitive material is used and in at least two stages at least two masks are applied to one side of the sheet, the method being carried out in the first stage using a first mask, after which in the second stage using a second mask that part of the positive photosensitive material which was covered by the first mask is exposed to radiation, after which said material is developed and the etching process is continued.

---

### 5,017,461

### FORMATION OF A NEGATIVE RESIST PATTERN UTILIZE WATER-SOLUBLE POLYMERIC MATERIAL AND PHOTOACID GENERATOR

**Naomichi Abe, Tokyo, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Mar. 13, 1989, Ser. No. 322,037**

**Claims priority, application Japan, Mar. 15, 1988, 63-59328**

**Int. Cl.$^5$ G03F** *7/30, 7/40*

**U.S. Cl. 430—325** **13 Claims**

1. A process for the formation negative of resist pattern, comprising preparing a mixture consisting of a water-soluble polymeric material having at least one hydroxyl group with a photo-acid generator capable of releasing an acid as a result of radiation exposure for patterning to prepare a resist material, coating a solution of said resist material onto a substrate to form a resist layer, exposing said resist layer to patterning radiation to cause a reaction of said polymeric material and said photo-acid generator and a release of said acid, heating the expose resist layer in the presence of said acid as a catalyst to remove water from the resulting reaction product in said resist layer, thereby insolubilizing said reaction product in water, and developing said resist layer with water to remove said water-soluble polymeric material in unexposed areas of said layer to form resist patterns on said substrate.

---

### 5,017,462

### PROCESS OF PRODUCING NEGATIVE RELIEF COPIES UTILIZING PHOTOSENSITIVE COPYING MATERIAL WITH THERMAL HARDENING TRIAZINE COMPOUND

**Paul Stahlhofen, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

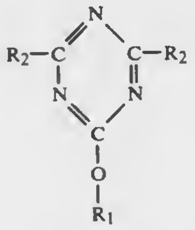
**Division of Ser. No. 177,411, Apr. 4, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 443,849**

**Claims priority, application Fed. Rep. of Germany, Apr. 3, 1987, 3711263**

**Int. Cl.$^5$ G03C** *5/00, 1/52;* **G03F** *7/022, 7/039*

**U.S. Cl. 430—325** **7 Claims**

1. A process for the production of negative relief copies, in which a photosensitive copying material comprising a layer support and a photosensitive layer comprising a binder which is insoluble in water and soluble in aqueous-alkaline solutions, a photosensitive 1,2-quinone-diazide or a photosensitive mixture comprising a compound which splits off acid upon exposure to light and a compound containing at least one acid-cleavable C—O—C group, and a thermal-hardening substance, is exposed imagewise to actinic radiation to produce a latent positive image, thereafter heated to about 80° to 150° C. to thermally harden exposed areas, cooled, and, after cooling, subjected to an overall exposure to actinic radiation to produce a latent negative relief image which is then developed by means of an aqueous-alkaline developer, wherein the thermal-hardening substance comprises at least one compound of the general formula I



wherein

$R_1$ may be alkyl or aryl group and

$R_2$ may be an alkoxy or aryloxy group or an amino group which has one or two alkyl, cycloalkyl or aryl substituents, and wherein the photosensitive compound or mixture is present in an amount sufficient to render exposed areas soluble in developer and the thermal-hardening substance is present in an amount sufficient to cause hardening of exposed areas under the action of heat.

---

### 5,017,463

### DEVELOPMENT PROCESSING METHOD FOR SILVER HALIDE PHOTOGRAPHIC MATERIALS

**Nobuaki Inoue, and Katsumi Hayashi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Oct. 13, 1989, Ser. No. 421,037**

**Claims priority, application Japan, Oct. 14, 1988, 63-258564**

**Int. Cl.$^5$ G03C** *3/00*

**U.S. Cl. 430—398** **11 Claims**

1. A process for developing a silver halide photographic material having, on a support, at least one silver halide emulsion layer comprising a silver halide emulsion spectrally sensitized by an infrared-sensitizing dye, which is subjected to image-wise exposure, then development and fixing processing and then washing or stabilization processing, wherein the silver halide in the silver halide emulsion layer contains 90 mol% or more of silver chloride, the swelling rate for hydrophilic colloid layers containing the silver halide emulsion layer is 150% or less, and the replenishment in the washing or stabilization processing is 1,200 ml or less per square meter of the photographic material.

---

### 5,017,464

### SILVER HALIDE LIGHT-SENSITIVE PHOTOGRAPHIC MATERIAL HAVING IMPROVED LIGHT FASTNESS

**Toyoki Nishijima, and Kaoru Onodera, both of Odawara, Japan, assignors to Konica Corporation, Tokyo, Japan**

**Continuation of Ser. No. 220,910, Jul. 19, 1988, abandoned, which is a continuation of Ser. No. 9,994, Feb. 2, 1987, abandoned. This application Feb. 20, 1990, Ser. No. 483,336**

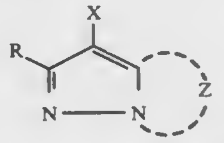
**Claims priority, application Japan, Feb. 6, 1986, 61-24888; Feb. 7, 1986, 61-25521**

**The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.**

**Int. Cl.$^5$ G03C** *1/34*

**U.S. Cl. 430—551** **14 Claims**

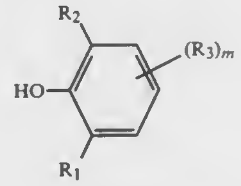
1. A light-sensitive silver halide photographic material comprising a support having provided thereon at least one silver halide emulsion layer, wherein at least one layer of said silver halide emulsion layer contains a compound represented by General Formula [I],



[I]

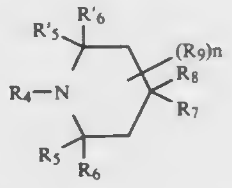
(wherein Z represents a group of non-metallic atoms necessary to complete a nitrogen-containing heterocyclic ring which may have a substituent; X represents a hydrogen atom or a substitutent capable of being split off upon reaction with an oxidation product of a color developing agent; and R represents a hydrogen atom or a substituent), said silver halide emulsion layer containing the compound of Formula [I] further containing

- a metal complex having a quenching rate constant of singlet oxygen more than $3\times10^7$ $M^{-1}sec^{-1}$, and
- a compound having the General Formula



[a-1]

(wherein $R^1$ and $R^2$ are independently selected from an alkyl group; $R^3$ is selected from the group consisting of an alkyl group, a —NR'R" group, a —SR' group and a —COOR" group, in which R' is a monovalent organic group and R" is a hydrogen atom or a monovalent organic group; and m is an integer of 0 to 3); or



[a-2]

(where $R^4$ is selected from the group consisting of a hydrogen atom, a hydroxyl group, an oxy radical group, —SOR' group, in which R' is a monovalent organic group, a —$SO_2R$" group, in which R" is a hydrogen atom or a monovalent organic group; $R^5$, $R^6$, $R^{5'}$, $R^{6'}$, and $R^9$ are independently selected from an alkyl group; $R^7$ and $R^8$ are independently selected from the

VOL 1126
ISS 3
MY 21 1991
UMI

group consisting of a hydrogen atom and a —OCOR$^{10}$ group, in which R$^{10}$ is a monovalent organic group, provided that R$^{7}$ and R$^{8}$ may be combined with each other to form a heterocyclic group; and n is an integer of 0 to 4).

---

### 5,017,465
### LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL

**Toyoki Nishijima, Odawara, Japan, assignor to Konica Corporation, Tokyo, Japan**

**Filed Dec. 24, 1987, Ser. No. 138,283**

**Claims priority, application Japan, Dec. 27, 1986, 61-314146; Oct. 1, 1987, 62-245824**

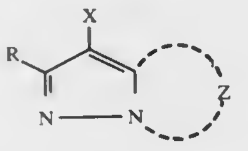
**The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.**

**Int. Cl.$^{5}$ G03C** ***1/34, 7/38***

**U.S. Cl. 430—551** **7 Claims**

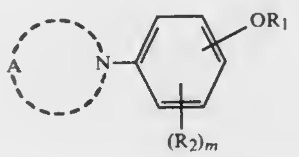
1. A light-sensitive silver halide photographic material comprising a support having at least one silver halide emulsion layer thereon, wherein at least one said silver halide emulsion layer contains silver halide grains having a silver chloride content of not less than 80 mol %, a magenta dye-forming coupler represented by Formula (M-I), and at least one compound in accordance with Formulas (A) and (B);

Formula (M-I)



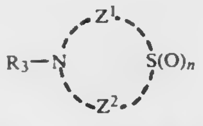
wherein Z represents a group of non-metal atoms necessary to form a nitrogen-containing heterocyclic ring including a substituted ring; X is selected from the group consisting of a hydrogen atom and a group capable of splitting off upon reaction with an oxidation product of a color developing agent; and R represents a hydrogen atom or a substituent;

Formula (B)



wherein $R_1$ represents a cycloalkyl group, an alkenyl group, an aryl group, a heterocyclic group, an acyl group, a bridged hydrocarbon group, an alkylsulfonyl group, or an arylsulfonyl group; $R_2$ represents a substituent on a benzene ring, provided that $R_2$ may form a ring together with $OR_1$; m is an integer of 0 to 4, provided that the $R_2$'s may be the same or different when m is 2 or more; and A represents a group of non-metal atoms necessary to form a 5- to 8-membered ring;

Formula (A)



wherein $R_3$ represents an aryl group or a heterocyclic group; $Z_1$ and $Z_2$ represent independently an alkylene group having 1 to 3 carbon atoms, provided that the total of said carbon atoms is 3 to 6; and n is 1 or 2.

---

### 5,017,466
### COLOR-FORMING AMINOPYRIMIDINE COUPLERS AND SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS CONTAINING THE COUPLER

**Hidetoshi Kobayashi; Reiichi Ohi, and Kei Sakanoue, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

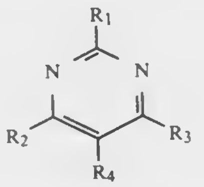
**Filed May 23, 1990, Ser. No. 527,376**

**Claims priority, application Japan, May 24, 1989, 1-130985**

**Int. Cl.$^{5}$ G03C** ***7/38***

**U.S. Cl. 430—558** **16 Claims**

1. A silver halide color photographic material having photographic constitutive layers comprising at least one silver halide emulsion layer on a support, wherein at least one layer of the photographic constitutive layers contains at least one color-forming aminopyrimidine coupler of formula (I):



(I)

wherein $R_1$, $R_2$, and $R_3$ independently represent a hydrogen atom, a halogen atom, an alkoxy group, an aryloxy group, a heterocyclic-oxy group, an alkylthio group, an arylthio group, a heterocyclic-thio group, a substituted or unsubstituted amino group, a heterocyclic group bonding to the pyrimidine ring via a nitrogen atom thereof, an alkyl group or an aryl group; provided that at least one of $R_1$, $R_2$ and $R_3$ is an unsubstituted or substituted amino group, and that when any one of $R_1$, $R_2$ or $R_3$ contains a sulfonic acid group or a salt thereof, $R_1$, $R_2$ or $R_3$ contains at least one linear or branched alkyl group and that the total carbon atoms in the alkyl group(s) are to be more than 8; and $R_4$ represents a hydrogen atom, a halogen atom, an alkoxy group, an aryloxy group, a heterocyclic-oxy group, an alkylthio group, an arylthio group, a heterocyclic-thio group, a substituted or unsubstituted amino group, or a heterocyclic group bonding to the pyrimidine ring via a nitrogen atom thereof.

---

### 5,017,467
### PHOTOGRAPHIC MATERIAL WITH IMIDAZOLE CYAN COUPLER

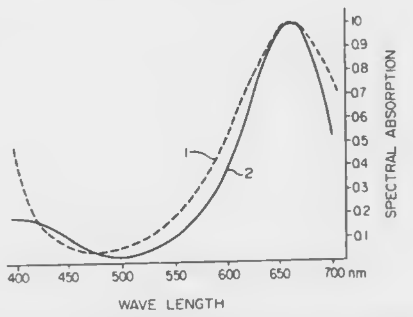
**Toyoaki Masukawa, and Noritaka Nakayama, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan**

**Continuation of Ser. No. 492,300, Feb. 28, 1990, abandoned, which is a continuation of Ser. No. 235,279, Aug. 22, 1988, abandoned. This application Oct. 12, 1990, Ser. No. 596,742**

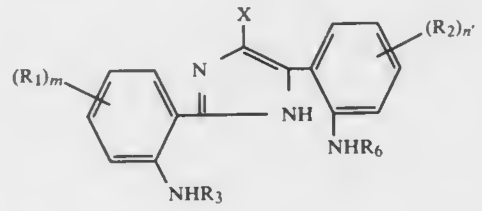
**Claims priority, application Japan, Aug. 24, 1987, 62-211067**

**Int. Cl.$^{5}$ G03C** ***7/38***

**U.S. Cl. 430—558** **7 Claims**



1. A light-sensitive silver halide photographic material comprising a support having thereon at least one silver halide emulsion layer containing a cyan coupler represented by the following formula:



wherein $R_1$ and $R_2$ each represent a substituent; $R_3$ and $R_6$ each represent a $—COR_4$ group, a $—COOR_4$ group, or an $—SO_2R_4$ group in which $R_4$ represents an alkyl group, an aryl group, or a heterocyclic group, X represents a hydrogen atom or a group capable of being split off upon reaction with the oxidized product of a color developing agent; m represents an integer of from 0 to 4; and n′ represents an integer of from 0 to 4.

---

### 5,017,468
### PROCESS FOR THE PREPARATION OF SILVER HALIDE EMULSIONS

**Ludovicus P. Joly, Hove, and Antonius A. Rutges, Boechout, both of Belgium, assignors to Agfa-Gevaert, N.V., Mortsel, Belgium**

**Filed Feb. 16, 1990, Ser. No. 480,978**

**Claims priority, application European Pat. Off., Feb. 17, 1989, EP89200381.5**

**Int. Cl.$^{5}$ G03C** ***1/02***

**U.S. Cl. 430—569** **10 Claims**

1. A method for preparing a silver halide emulsion which comprises the step of precipitating silver halide grains in an aqueous solution of peptizer initially and finally under pAg values suitable for forming cubic silver halide crystals characterized in that at least once during the precipitation stage the pAg is increased for at least 10 percent by weight of the total amount of silver salt used during the precipitation by at least 1.5 units to such value whereby the formation of octahedral crystals would occur if that value were to persist over the entire precipitation stage, and that during the entire precipitation the pAg value is maintained about the pAg neutrality value.

---

### 5,017,469
### TWINNED EMULSIONS MADE FROM SILVER IODIDE SEED CRYSTALS HAVING AN ASPECT RATIO OF AT LEAST 2:1

**Clive W. Mowforth, Kingshill; James F. Bullock, Macclesfield, and Trevor J. Maternaghan, Knutsford, all of United Kingdom, assignors to Ilford Limited, Knutsford, United Kingdom**

**Filed Sep. 1, 1989, Ser. No. 402,037**

**Claims priority, application United Kingdom, Sep. 13, 1988, 8821427**

**Int. Cl.$^{5}$ G03C** ***1/02***

**U.S. Cl. 430—569** **18 Claims**

1. A method of preparing a silver halide emulsion wherein the silver halide crystals are of the twinned type which comprises the steps of (a) providing as seed crystals forming in a colloid dispersing medium tabular silver halide crystals containing at least about 90 mole % iodide, at least 90% of said seed crystals being of the hexagonal lattice structure with a mean thickness of less than 0.6 microns and a mean aspect ratio of greater than 2:1;

(b) mixing in the dispersing medium containing the said seed crystals an aqueous solution of a silver salt and an aqueous solution of at least one salt selected from the group consisting of chloride and bromide salts of alkali metals and ammonium and mixtures thereof and continuing the addition of said aqueous solutions until dissolution of said seed crystals is substantially complete thereby forming twinned silver halide crystals containing iodide and the halide being added and having a mean aspect ratio of greater than 1:1.

---

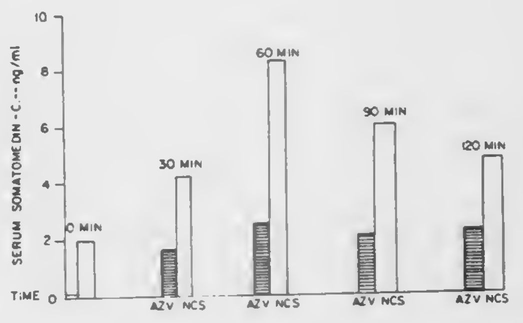
### 5,017,470
### METHOD OF DIAGNOSING ALZHEIMER'S DISEASE AND SENILE DEMENTIA

**Chaovanee Aroonsakul, 6907 S. Constance, Chicago, Ill. 60649**

**Division of Ser. No. 156,242, Feb. 16, 1988, Pat. No. 4,898,856, and a continuation-in-part of Ser. No. 666,254, Oct. 29, 1984, Pat. No. 4,791,099, and Ser. No. 852,645, Apr. 16, 1986, Pat. No. 4,727,041. This application Dec. 4, 1989, Ser. No. 456,516**

**Int. Cl.$^{5}$ H01H** ***55/00, 53/00;*** **H01F** ***7/18***

**U.S. Cl. 435—4** **8 Claims**



1. A method of diagnosing senile dementia in human beings comprising:

(a) subjecting a patient suspected of suffering from senile dementia to a somatotropin secretion-stimulation test;

(b) determining the levels of somatotropin in at least one blood serum sample taken from the patient after the somatotropin secretion-stimulation test; and

(c) comparing the levels from the at least one blood serum sample obtained during said step (b) with the levels of normal subjects within the age group of the patient being diagnosed to see if any increase of somatotropin caused by said step (a) statistically-match the increases thereof in normal subjects; and

(d) diagnosing the patient and determining if the patient is suffering from senile dementia.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,471
### REAGENT FOR PEROXIDASE DETECTION

**Jack H. Fellman, Portland, Oreg., assignor to Epitope, Inc., Beaverton, Oreg.**

**Filed Aug. 26, 1988, Ser. No. 236,896**

**Int. Cl.$^5$ C12Q** *1/70, 1/28;* **G01N** *33/544, 33/53*

**U.S. Cl. 435—5** **17 Claims**

1. In the Western Blot procedure for enzyme immunoassay for the detection of antibodies present in human blood serum or plasma and comprising the sequential steps of
   (1) electroblotting a viral antigen onto a test piece of absorbent material,
   (2) applying to the test piece a blood serum or plasma sample suspected of containing antibodies to the viral antigen, followed by washing,
   (3) contacting the test piece with a conjugate of antihuman antibody and a peroxidase enzyme, and washing,
   (4) exposing the test piece to a reagent comprising a peroxide and a chromogen, and thereafter,
   (5) determining the appearance or absence of color in the test piece,

the improvement which comprises:

exposing the test piece in step (4) to a reagent comprising an aqueous solution of a peroxide and a chromogen containing at least one member selected from the group consisting of

5 amino-indole,
7 amino-indole,
5 amino-benzimidazole,
7 amino-benzimidazole,
5 amino-benzothiazole,
7 amino-benzothiazole,
5 amino-benzoxazole,
7 amino-benzoxazole,
5 amino-indazole and
7 amino-indazole

the chromogen being used in amount sufficient to generate a detectable coloration of the reagent upon contacting the reagent with the peroxidase,

the solution being buffered to a pH level predetermined to maintain the chromogen in solution.

---

### 5,017,472
### MICROFLOTATION DEVICES USED FOR IMMUNOASSAYS AND CELL/MOLECULAR FRACTIONATION

**Richard B. Bankert, 148 Capen Blvd., Amherst, N.Y. 14226, and Elizabeth A. Repasky, 66 Frankhauser Rd., Williamsville, N.Y. 14221**

**Filed Sep. 9, 1987, Ser. No. 94,520**

**Int. Cl.$^5$ G01N** *33/53, 33/543, 33/537, 33/531*

**U.S. Cl. 435—7.25** **26 Claims**

3. An immunoassay for the detection of an antibody which comprises contacting a sample suspected of containing an antibody with a solid floatable matrix comprising milk fat globules to which an antigen complementary to the suspected antibody is coupled; allowing time sufficient for an antigen-antibody complex to form if the test sample contains the suspected antibody; subsequently adding a visualizable indicator to which the antibody complementary to the antigen coupled to the maxtrix is attached; allowing time sufficient for an antigen-antibody complex to form between the antigen coupled to the matrix and the complementary antibody coupled to the indicator in the event that the test sample does not contain the antibody complementary to the antigen coupled to the matrix; and detecting the presence of the antibody by observing the position of the indicator system in a reaction tube, so that if antibody is present in the test sample, the color settles to the bottom, and if no antibody is present, the color rises to the top.

---

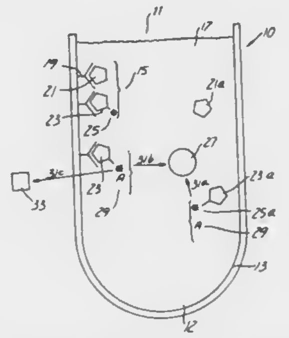
### 5,017,473
### HOMOGENEOUS CHEMILUMINESCENCE IMMUNOASSAY USING A LIGHT ABSORBING MATERIAL

**Daniel B. Wagner, Raleigh, N.C., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.**

**Filed May 26, 1987, Ser. No. 54,466**

**Int. Cl.$^5$ G01N** *33/53, 21/76, 33/543;* **C12Q** *1/28*

**U.S. Cl. 435—7.92** **18 Claims**



1. A method for determining an unknown quantity of an analyte in a fluid comprising:
   (a) preparing a mixture comprising an antianalyte attached to the surface of a tube, an analyte in a fluid, a light absorbing material, and a tracer for said analyte, said tracer including a chemiluminescent label;
   (b) causing binding involving immunologically specific pairs of said antianalyte, said analyte and said tracer whereby bound tracer is formed on the surface of said tube;
   (c) adding to said mixture a composite comprising an activator of a chemiluminescence source whereby chemiluminescence is induced;
   (d) measuring chemiluminescence associated with said bound tracer; and
   (e) determining the quantity of said analyte in said fluid by comparing the magnitude of said chemiluminescence with the magnitude of chemiluminescence established for a known quantity of the analyte.

---

### 5,017,474
### WASH SOLUTION, TEST KIT AND METHOD FOR THE DETERMINATION OF AN IMMUNOLOGICAL LIGAND

**Gregory J. McClune, Portage, Mich., and Margaret J. Smith-Lewis, Pittsford, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 12, 1988, Ser. No. 155,670**

**Int. Cl.$^5$ G01N** *33/53, 33/48, 33/543, 33/536*

**U.S. Cl. 435—7.5** **11 Claims**

1. A method for the determination of an immunological ligand comprising the steps of:
   A. contacting a specimen suspected of containing an immunological ligand with one or more receptors to said ligand, at least one of which is labeled for detection, to form a detectable immunological complex between said ligand and said one or more receptors,
   B. separating said detectable complex from uncomplexed materials by washing with an aqueous wash solution buffered to a pH of from about 5 to about 9 and comprising at least about 0.01 weight percent of a compound comprising a dodecyl sulfate anion and an alkali metal or ammonium cation, and
   C. detecting either the amount of detectable complex or uncomplexed labeled receptor as a determination of said immunological ligand.

### 5,017,475
### FLUORESCENT DETECTION METHOD BASED ON ENZYME ACTIVATED CONVERSION OF A FLUOROPHORE PRECURSOR SUBSTRATE

**Richard A. Harte, Redwood City, Calif., and Stephen H. Mastin, Rockville, Md., assignors to Microbiological Associates, Inc., Rockville County, Md.**

**Continuation-in-part of Ser. No. 801,671, Nov. 25, 1985, abandoned. This application Aug. 25, 1987, Ser. No. 89,605**

**Int. Cl.$^5$ C12Q** *1/28, 1/30;* **G01N** *33/53*

**U.S. Cl. 435—7.9** **29 Claims**

1. A method for detecting an analyte of interest in a liquid sample which comprises:
   (a) contacting the sample with a first reagent capable of forming a complex with the analyte of interest so as to form a first reagent:analyte complex;
   (b) contacting the first reagent:analyte complex with an oxidase-labelled reagent capable of forming a complex with the first reagent:analyte complex so as to form a first reagent:analyte:oxidase-labelled reagent complex;
   (c) treating the first reagent:analyte: oxidase-labelled reagent complex with a nitrogen-substituted, cyclic compound and an oxidizing agent so as to enzymatically oxidize the nitrogen-substituted, cyclic compound to produce an amine-substituted, ortho-fused pyrazine wherein neither nitrogen of the pyrazine ring is fused or substituted; and
   (d) exciting the amine-substituted. ortho-fused pyrazine so as to cause it to fluoresce and thus to emit radiation;
   (e) detecting the radiation so emitted, thereby by detecting the analyte of interest.

---

### 5,017,476
### METHOD FOR THE BIOCATALYTIC REACTION OF ORGANIC SUBSTANCES

**Peter Miethe, Halle; Harald Voss, Halle-Neustadt, and Ronald Gruber, Halle, all of German Democratic Rep., assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed May 8, 1989, Ser. No. 350,364**

**Claims priority, application German Democratic Rep., May 6, 1988, 3154774**

**Int. Cl.$^5$ C12P** *33/02, 7/24, 7/64;* **C12N** *11/14*

**U.S. Cl. 435—61** **7 Claims**

1. A method for the biocatalytic reaction of organic substances which comprises immobilizing a biocatalyst in a lyotropic mesophase in a two-phase region of a two-component mixture consisting of lyotropic mesophase and organic solvent, supplying at lest one substrate and removing at least one product in the two-phase region wherein the supplying of substrate and the removal of product taking place via the organic solvent phase in said two phase system.

---

### 5,017,477
### ENHANCING DNA SEQUENCIES DERIVED FROM THE SACQ GENE

**Alan Sloma, Watertown; Rosalind C. Lee, Waltham, and Janice Pero, Lexington, all of Mass., assignors to BioTechnica International, Inc., Cambridge, Mass.**

**Continuation-in-part of Ser. No. 791,350, Oct. 25, 1985, abandoned. This application Oct. 20, 1986, Ser. No. 921,343**

**Int. Cl.$^5$ C12N** *15/03, 15/63, 15/75, 15/67*

**U.S. Cl. 435—69.1** **24 Claims**

1. A vector comprising a hybrid DNA sequence capable of enhancing the expression of a protease gene in a Bacillus cell, said hybrid DNA sequence including

a first sequence comprising the sacQ DNA sequence

GATCTTTCAAAAAAAGGAGTGTGGAAACGGTGGAAA

AGAAATTAGAAGAAGTAAAGCAATTATTATTCCGAC

TTGAAAATGATATCAGAGAAACAACCGACTCATTAC

-continued

GAAACATTAACAAAAGCATTGATCA,

said first sequence by itself not being capable of said enhancing, said first sequence being linked in said vector 5′ to 3′ with a second Bacillus DNA sequence which is not a portion of a sacQ sequence.

---

### 5,017,478
### TRANSFECTED CELLS CONTAINING PLASMIDS HAVING GENES ORIENTED IN OPPOSING DIRECTIONS AND METHODS OF USING

**Linda Cashion, San Carlos; Kathi Begley, San Francisco, both of Calif.; Wendy Colby, Sisters, Oreg., and Michael J. Morser, San Francisco, Calif., assignors to Berlex Laboratories, Inc., Cedar Knolls, N.J.**

**Continuation-in-part of Ser. No. 74,083, Jul. 16, 1987, abandoned. This application Sep. 29, 1988, Ser. No. 251,159**

**Int. Cl.$^5$ C12N** *15/00, 15/63, 15/79*

**U.S. Cl. 435—69.1** **21 Claims**

15. A method for producing a desired protein comprising transfecting a eukaryotic host cell with a recombinasnt plasmid comprising:
   (a) a selectable gene cassette; and
   (b) a second gene cassette comprising an LTR promotor controlling the transcription of a nucleic acid sequence encoding a desired protein;

wherein the selectable gene cassette and the second gene cassettes are adjacent to each other in oppoiste and divergent transcriptional orientation; applying selective pressure specific for the selectable gene cassette; and culturing the cells under conditions which permit expression of the protein.

---

### 5,017,479
### PROCESS FOR MULTIPLICATION OF POLYSACCHARIDE-PRODUCING MICROORGANISMS AND USE THEREOF IN A POLYSACCHARIDE PRODUCTION PROCESS

**Bruno Eyssautier, Carentan, France, assignor to Sanofi, Paris, France**

**Filed Feb. 17, 1989, Ser. No. 311,775**

**Claims priority, application France, Feb. 18, 1988, 88 01933**

**Int. Cl.$^5$ C12P** *19/04;* **C12R** *1/00, 1/645;* **C12N** *1/22*

**U.S. Cl. 435—101** **10 Claims**

1. A process for obtaining a mass of polysaccharide-producing microorganisms, comprising the step of growing an inoculum of polysaccharide-producing microorganisms in a growth medium to produce a mass of said microorganisms, wherein said microorganisms produce polysaccharide in the course of their growth, and wherein said growth is effected in a medium containing an enzyme which hydrolyzes said polysaccharide.

---

### 5,017,480
### PROCESS FOR RECOVERING L-AMINO ACID FROM FERMENTATION LIQUORS

**Shigenori Mori; Kinzo Iitani; Masaki Yamamoto, all of Raleigh, N.C.; Masashi Miyazawa, Yokohama, Japan; Toyokazu Kaneko, Sagamihara, Japan; Tetsuya Kaneko, Kawasaki, Japan, and Ken-ich Yarita, Yokohama, Japan, assignors to Ajimomoto Co., Inc., Tokyo, Japan**

**Continuation-in-part of Ser. No. 83,590, Aug. 10, 1987. This application Jun. 24, 1988, Ser. No. 211,268**

**The portion of the term of this patent subsequent to Mar. 5, 2008, has been disclaimed.**

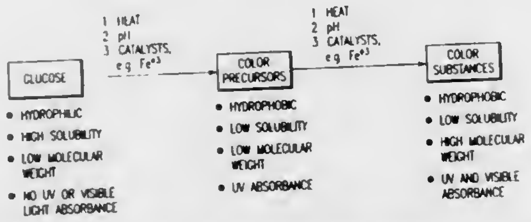
**Int. Cl.$^5$ C12P** *13/04*

**U.S. Cl. 435—106** **11 Claims**

1. A process for recovering a high purity L-glutamine from a fermentation liquor obtained by fermentation or an enzymic method, which comprises removing the impurities contained in said fermentation liquor by passing said fermentation liquor

VOL
1126
ISS
3
MY
21
1991
UMI

through an ultrafilter membrane and then through an adsorbent resin selected from the group consisting of weakly basic anion-exchange resins and amphoteric ion-exchange resins;



concentrating or cooling the effluent thus obtained to result in crystallization of said L-glutamine, and isolating said crystalline L-glutamine from said fermentation liquor.

---

## 5,017,481

## CORYNEFORM BACTERIA CARRYING RECOMBINANT DNA AND PROCESS FOR PRODUCING AN AROMATIC AMINO ACID BY USING THE SAME

**Kazuhiko Matsui, Kawasaki; Kiyoshi Miwa, Matsudo, and Konosuke Sano, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Continuation of Ser. No. 780,256, Sep. 26, 1985, abandoned. This application Aug. 24, 1989, Ser. No. 397,370**

**Claims priority, application Japan, Sep. 27, 1984, 59-202334**

**Int. Cl.$^{5}$ C12N** *1/21, 15/52, 15/77;* **C12P** *13/22*

**U.S. Cl. 435—108** **14 Claims**

9. A process for producing an aromatic amino acid, which comprises:

culturing a bacterium selected from the genus Brevibacterium containing a recombinant DNA molecule constructed by operatively connecting a gene coding for shikimate kinase isolated from *Brevibacterium lactofermentum* to a plasmid vector capable of replicating in said bacterium, and

collecting the aromatic amino acid which accumulates in the culture medium.

---

## 5,017,482

## PROCESS FOR PRODUCING L-ARGININE

**Ryoichi Katsumata, and Haruhiko Yokoi, both of Machida, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan**

**Filed Sep. 22, 1987, Ser. No. 99,798**

**Claims priority, application Japan, Sep. 22, 1986, 61-224189**

**Int. Cl.$^{5}$ C12P** *13/10;* **C12N** *1/21, 15/52, 15/74*

**U.S. Cl. 435—114** **3 Claims**

1. A process for producing L-arginine which comprises culturing in a culture medium a microorganism belonging to the species *Corynebacterium glutamicum, Corynebacterium herculis* or *Brevibacterium flavum* that carries the recombinant DNA pCarg110; accumulating L-arginine in the culture broth; and recovering L-arginine therefrom.

---

## 5,017,483

## PROCESS FOR PRODUCING L-THREONINE

**Satoru Furukawa; Akio Ozaki; Toshihide Nakanishi; Yukinobu Kotani, all of Hofu, and Masahiro Sugimoto, Chiba, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan**

**Filed Feb. 12, 1987, Ser. No. 13,797**

**Claims priority, application Japan, Feb. 20, 1986, 61-36164; Feb. 20, 1986, 61-36165; Jul. 10, 1986, 61-162569; Dec. 19, 1986, 61-303138**

**Int. Cl.$^{5}$ C12P** *13/08;* **C12N** *1/20, 15/00*

**U.S. Cl. 435—115** **7 Claims**

1. A process for producing L-threonine which comprises culturing in a medium *Escherichia coli* H-4258 (FERM BP-985), H-4435 (FERM BP-1094), H-4436 (FERM BP-1095), H-4225 (FERM BP-1236), H-4226 (FERM BP-1237) or H-4257 (FERM BP-984), accumulating L-threonine in the culture liquor and recovering L-threonine therefrom.

---

## 5,017,484

## PROCESS FOR PREPARING 3-CHLORO-1,2-PROPANEDIOL

**Yoshio Nakamura, Takasago; Masahiro Ogura, Ono; Yoshio Shimada, Kakogawa; Kiyoshi Watanabe, Akashi, and Hideyuki Takahashi, Kakogawa, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 24, 1986, Ser. No. 933,822**

**Claims priority, application Japan, Nov. 25, 1985, 60-264567; Nov. 25, 1985, 60-264568; Jan. 6, 1986, 61-409; Jul. 31, 1986, 61-181164**

**Int. Cl.$^{5}$ C12P** *7/18, 7/04;* **C10N** *1/38*

**U.S. Cl. 435—158** **6 Claims**

1. A process for preparing (R)-3-chloro-1,2-propanediol, which comprises subjecting (R,S)-3-chloro-1,2-propanediol to the action of microorganism capable of selectively metabolizing (S)-3-chloro-1,2-propanediol, and then collecting the residual (R)-3-chloro-1,2-propanediol, wherein the microorgansim is selected from the group consisting of *Dipodascus magnusiii* CBS 164.32, *Sporidiobolus johnsonii* IFO 6903, *Geotrichum candidum* CBS 187.67, *Hansenula anomala* IFO 0707, *Lodderomyces elongisporus* IFO 1676, *Kluyveromyces fragilis* IAM 4763, *Nadsonia elongata* IFO 0665, *Pichia burtonii* IFO 0844, Saccharomyces cerevisiae IFO 0267, *Saccharomycopsis lipolytica* IFO 0717, *Rhodosporidium toruloides* IFO 0871, *Rhodotorula rubra* IFO 0383, *Wickerhamia fluorescens* IFO 1116, *Candida humicola* CBS 2774, *Candida utilis* IFO 0626, *Stephanoascus ciferrii* IFO 1854, *Candida Gropengiesseri* IFO 0659, Pachysolen tannophilus IFO 1007, *Schizosaccharomyces pombe* IFO 0362, *Sporobolomyces salmonicolor* IAM 12249, *Brettanomyces custersianus* IFO 1585, *Escherichia coli* IFO 12734, *Aeromonas hydrophila* IFO 3820, *Acidiphilium cryptum* IFO 14242, *Micrococcus luteus* IFO 12708, *Bacillus cereus* IFO 3001, *Enterobacter aerogenes* IFO 13534, *Nocardia globerula* IFO 13510, *Protaminobacter alboflavus* IFO 3707, *Pseudomonas fragi* IFO 3458, *Pseudomonas cruciviae* IFO 12047, *Pseudomonas chlororophis* IFO 3904, *Pimelobacter simplex* IFO 12069, *Hafnia alvei* IFO 3731, *Klebsiella pneumoniae* IFO 12009, *Rhodococcus erythropolis* IFO 12320, *Gluconobacter suboxydans* IFO 3254, *Absidia corymbifera* IFO 4009, *Amauroascus reticulatus* IFO 9196, *Anixiopsis fulvescens* IFO 30411, *Ascosphaera apis* IFO 9831, *Aspergillus ficuum* IFO 4034, *Acremoniella atra* IFO 5937, *Acrodontium crateriforme* IFO 30442, *Arxiella terestris* IFO 30203, *Cladosporium resinae* IFO 6367, *Beauveria bassiana* IFO 8554, *Calonectria hederae* IFO 30427, *Coniochaetidium savoryi* IFO 30424, *Backusella circina* IFO 9231, *Beltraniella japonica* IFO 30443, *Cladobotryum apiculatrum* IFO 7795, *Chloridium chlamydosporis* IFO 7070, *Corticium rolfsii* IFO 30071, *Cunninghamella echinulata* IFO 441, *Circinella simplex* IFO 6412 *Botryoconis japonica* IFO 4862, *Emericella nidulans* IFO 4340, *Gliocladium deliquescens* IFO 6790, *Gliocephalotrichum cylindosporum* IFO 9326, *Helicosporium linderi* IFO 9207, *Melanospora ornata* IFO 8354, *Micronectriella cucumeris* IFO 30005, *Echinopodospora jamaicensis* IFO 30406, *Gliomastrix murrorum* IFO 8269, *Gelasinosipora cerealis* IFO 6759, *Deightoniella torulosa* IFO 7658, *Dendryphiella salina* IFO 8281, *Dichotomomyces cejpii* IFO 8396, *Mortierella humicola* IFO 8188, *Pycnoporus coccineus* IFO 9768, *Sporormiella isomera* IFO 8538, *Syncephalastrum nigricans* HUT 1299, *Talaromyces flavus* IFO 7231, *Pellicularia felamentosa* IFO 6254, *Neosartorya aurata* IFO 8783, *Penicillium janthinellum* IFO 4651, *Thamnostylum piriforme* IFO 6117, *Zygorhynchus moelleri* HUT 1305, *Monascus anka* IFO 5965 and *Periconia byssoides* IFO 9444.

## 5,017,485

## PROCESS FOR OBTAINING SORBITOL AND GLUCONIC ACID BY FERMENTATION, AND CELL MATERIAL SUITABLE FOR THIS PURPOSE

**Stephanie Bringer-Meyer, Krefeld, and Hermann Sahm, Juelich, both of Fed. Rep. of Germany, assignors to Forschungszentrum Juelich GmbH, Fed. Rep. of Germany**

**Filed Dec. 11, 1989, Ser. No. 448,334**

**Claims priority, application Fed. Rep. of Germany, Dec. 10, 1988, 3841702**

**Int. Cl.$^{5}$ C12P** *7/58, 7/18;* **C07C** *31/26, 59/105*

**U.S. Cl. 435—158** **7 Claims**

1. A fermentation process, comprising the steps of:

freezing and thawing *Zymomonas mobilis* cells to produce permeabilized *Zymomonas mobilis* cells, and

fermenting an aqueous glucose/fructose mixture with the permeabilized *Zymomonas mobilis* cells whereby at least 97% of the fructose is converted to sorbitol within five hours.

---

## 5,017,486

## CLONING OF DNA ENCODING ANTIBACTERIAL POLYPEPTIDE PRECURSOR

**Kiichi Sawai, Aichi; Shunji Natori, Tone; Haruo Takahashi, Aichi; Kenichi Tanaka, Aichi; Takahiko Mitani, Aichi, and Masayasu Kurono, Aichi, all of Japan, assignors to Sanwa Kagaku Kenkyusho Co., Ltd., Aichi, Japan**

**Filed Jul. 25, 1988, Ser. No. 223,305**

**Claims priority, application Japan, Aug. 20, 1987, 62-205165**

**Int. Cl.$^{5}$ C12N** *15/00, 15/12*

**U.S. Cl. 435—172.3** **5 Claims**

1. A recombinant DNA molecule comprising about 190 nucleotides which encodes an antibacterial polypeptide precursor, having the following amino acid sequence Met-Asn-Phe-Asn-Lys-Val-Phe-Val-Phe-Phe-Ala-Val-Leu-Met-Val-Ala-Phe-Met-Gly-Gln-Ser-Glu-Ala-Gly-Trp-Leu-Lys-Lys-Ile-Gly-Lys-Lys-Ile-Glu-Arg-Val-Gly-Gln-His-Thr-Arg-Asp-Ala-Thr-Ile-Gln-Thr-Ile-Ala-Val-Ala-Gln-Gln-Ala-Ala-Asn-Val-Ala-Ala-Thr-Leu-Lys-Gly.

5. A process for the preparation of a recombinant DNA molecule comprising about 190 nucleotides which encodes an antibacterial polypeptide precursor, said process comprising

isolating poly(A)RNA from a cell line established from *Sarcophaga peregrina* embryo,

constructing a cDNA library with the poly(A)RNA and vector/primer DNA

transforming *Esherichia coli,*

screening said transformed *Esherichia coli* by hybridization using a probe prepared by cleaving a cDNA clone of a known antibacterial polypeptide obtained from a larva of *Sarcophaga peregrina* with restriction enzymes of PstII and AflIII and labeling the resulting fragment.

---

## 5,017,487

## VACCINIA DNA

**Hendrik G. Stunnenberg, Bammental, Fed. Rep. of Germany, and Riccardo Wittek, Bussigny, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Mar. 27, 1986, Ser. No. 845,014**

**Claims priority, application United Kingdom, Apr. 4, 1985, 8508845**

**Int. Cl.$^{5}$ C12N** *15/00, 7/01, 15/11, 15/64*

**U.S. Cl. 435—172.3** **38 Claims**

1. A transcriptional regulatory sequence capable of functioning as a poxvirus late promoter selected from the group consisting of:

(a) the sequence:

```
5'          CTAGA AGCGA TGCTA
     CGCTA GTCAC AATCA CCACT
     TTCAT ATTTA GAATA TATGT
     ATGTA AAAAT ATAGT AGAAT
     TTCAT TTTGT TTTTT TCTAT
     GCTAT AAAT  3';
```

(b) the sequence:

```
5'          CTAGA AGCGA TGCTA
     CGCTA GTCAC AATCA CCACT
     TTCAT ATTTA GAATA TATGT
     ATGTA AAAAT ATAGT AGAAT
     TTCAT TTTGT TTTTT AAAGG
     ATCTA TAAAT AAAT  3';
```

and (c) the sequence:

```
5'          CTAGA AGCGA TGCTA
     CGCTA GTCAC AATCA CCACT
     TTCAT ATTTA GAATA TATGT
     ATGTA AAAAT ATAGT AGAAT
     TTCAT TTTGT TTTTT TCTAT
     CGATT AAATA AAG   3'.
```

5. A recombinant vector comprising:

(a) a vector origin of replication;

(b) an antibiotic resistance gene;

(c) a chimeric gene comprising a transcriptional regulatory sequence of claim 1 operatively linked to a foreign gene encoding a prokaryotic or eukaryotic polypeptide; and

(d) a DNA segment containing the vaccinia virus thymidine kinase gene flanking said chimeric gene.

32. A method for the manufacture of the recombinant vector of claim 5 comprising the steps of:

(a) preparing a vector containing poxvirus DNA, said DNA comprising:
   (i) a transcriptional regulatory sequence, and
   (ii) a restriction endonuclease site up or down stream of said transcriptional regulatory sequence, and
   (iii) DNA from a non-essential segment of the poxvirus genome flanking said regulatory sequence and said restriction endonuclease site; and

(b) inserting at least one foreign gene encoding a prokaryotic or eukaryotic polypeptide into said restriction endonuclease site next to said transcriptional regulatory sequence.

---

## 5,017,488

## HIGHLY EFFICIENT DUAL T7/T3 PROMOTER VECTOR PJKF16 AND DUAL SP6/T3 PROMOTER VECTOR PJFK15

**William T. McAllister, Metuchen, N.J., and John F. Klement, Bethesda, Md., assignors to University of Medicine and Dentistry of New Jersey, Newark, N.J.**

**Continuation-in-part of Ser. No. 846,931, Apr. 1, 1986. This application Oct. 17, 1986, Ser. No. 920,327**

**Int. Cl.$^{5}$ C12N** *7/01, 9/12, 15/10, 15/00*

**U.S. Cl. 435—194** **14 Claims**

1. A dual phage RNA polymerase promoter vector having a polylinker with a multiple cloning site, which polylinker is linked at one of its ends to a T3 phage RNA polymerase promoter, which has a consensus sequence recognized specifically by a recombinant-synthesized T3 polymerase and on the other of its ends, to a second phage RNA polymerase promoter, other than the T3 RNA polymerase promoter, the T3 promoter being capable of initiating efficient transcription of DNA at a concentration of ribonucleoside triphosphates of 10 micromolar or less, wherein said promoter does not contain a thymidine residue in the first ten nucleotides downstream of

VOL
1126
ISS
3
MY
21
1991
UMI

the initiation site, wherein transcription from either of the phage promoters proceeds toward the other promoter and in a direction opposite from the direction of transcription of the other phage promoter and the phage polymerase capable of transcription from said promoters is specific and does not recognize the other phage promoter.

13. A kit for genetic applications especially for transcription of DNA to synthesize RNA transcripts complementary to either strand of a DNA sequence, which kit comprises in combination the following components: a recombinant-synthesized T3 RNA polymerase, a recombinant-synthesized T7 RNA polymerase and a dual promoter transcription vector having a T3 phage RNA promoter for said T3 polymerase and a T7 phage RNA promoter for said T7 polymerase, the respective promoters being linked at opposite ends of the polylinker and in opposite orientation, said T3 having a consensus sequence recognized by T3 polymerase, wherein the first ten nucleotides downstream of the initiation site do not contain a thymidine residue, with which kit, components and cleaved vector, RNA transcripts can be synthesized that are complementary to either one of the strands of cloned DNA sequence, the T3 promoter being capable of efficient transcription of DNA at low concentrations of ribonucleoside triphosphates of 10 micromolar or less, wherein transcription from either of the phage promoters proceeds toward the other promoter and in a direction opposite from the direction of transcription of the other phage promoter and the phage polymerase capable of transcription from said promoters is specific and does not recognize the other phage promoter.

---

### 5,017,489

### CYTOTOXIC T LYMPHOCTE SERINE ESTERASE AND METHOD FOR STIMULATION AND INHIBITION

**Mark S. Pasternack, Brookline, and Herman S. Eisen, Waban, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Aug. 22, 1988, Ser. No. 234,906**

**Int. Cl.$^5$ C12N** *9/16, 9/48;* **A61K** *39/395, 39/44*

**U.S. Cl. 435—196** **12 Claims**

1. An antibody specifically binding to an intracellular serine esterase wherein the serine esterase is produced by cytotoxic T lymphocytes and has an apparent molecular weight of approximately 28,000–31000 as determined by SDS gel electrophoresis under reducing conditions and trypsin-like activity inhibited by diisopropylfluorophosphate and phenylmethylsulfonyl fluoride but not inhibited by N-α- tosyl lysyl chloromethyl ketone at a concentration inhibiting the cytotoxicity of cytotoxic T lymphocytes.

---

### 5,017,490

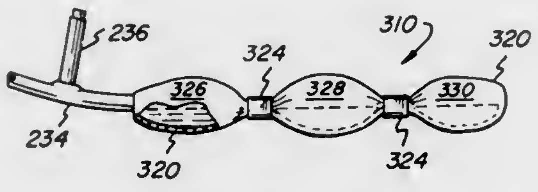
### METHOD FOR IN VITRO REPRODUCTION AND GROWTH OF CELLS IN CULTURE MEDIUM

**Van Taiariol, Redwood City; Robert V. Oakley, Lafayette, and Peter Ventura, Daly City, all of Calif., assignors to Baxter International Inc., Deerfield, Ill.**

**Filed Mar. 10, 1989, Ser. No. 321,765**

**Int. Cl.$^5$ C12N** *5/06*

**U.S. Cl. 435—240.2** **11 Claims**



1. A method for the in vitro culturing of animal cells in a culture medium to produce, from an initial viable cell mass of particular cell number, a viable cell mass of larger cell number, comprising the steps of:

(a) providing a series of animal cell culture sub-compartments, each sub-compartment comprising a culture space for animal cells and for culture medium, defined by a flexible material permeable to oxygen, said series further comprising regulating means, operable external of the culture space, for variably permitting or precluding liquid communication between any given sub-compartment in said series and at least a next serial sub-compartment in said series;
(b) arranging said series of animal cell culture sub-compartments in a controlled gaseous environment, comprising oxygen, suitable for in vitro animal cell culture;
(c) introducing culture medium and a viable cell mass of particular cell number into a first culture sub-compartment of said series, isolated by said regulating means from liquid communication with any other sub-compartment of said series;
(d) maintaining in said first culture sub-compartment conditions effective to cause said viable cell mass therein to increase in cell number
(e) thereafter establishing liquid communication, by said regulating means, between said first culture sub-compartment and a next serial culture sub-compartment of said series provided with at least additional culture medium or culture space, and transferring said viable cell mass of increased cell number, and culture medium, from said first culture sub-compartment to said next serial culture sub-compartment;
(f) maintaining in said next serial sub-compartment conditions effective to cause said cell mass therein to further increase in cell number; and
(g) withdrawing from said next serial culture sub-compartment said viable cell mass of further increased cell number.

---

### 5,017,491

### PROCESS FOR REGENERATING SUNFLOWERS BY EMBRYOGENESIS

**Georges Freyssinet, and Martine Freyssinet, both of St Cyr Au Mont d'Or, France, assignors to Rhone-Poulenc Agrochimie, Lyons, France**

**Filed Oct. 30, 1987, Ser. No. 115,055**

**Claims priority, application France, Oct. 30, 1986, 86 15299**

**Int. Cl.$^5$ C12N** *5/00*

**U.S. Cl. 435—240.5** **12 Claims**

1. A process for regenerating cultivars of sunflower plants from *Helianthus annuus* by somatic embryogenesis comprising the steps of: (a) culturing immature embryos of sunflower plants in a nutrient induction medium containing from 2.2–4.4 μm of 6-benzylaminopurine to form embryogenic calluses and somatic embryos, and between 8%–12% of sucrose, (b) further culturing said embryos on a plantlet growth medium containing 0.44–4.4 μm of 6-benzylaminopurine to permit germination of said embryos and development of said embryos to plants and between 2%–4% of sucrose.

---

### 5,017,492

### REVERSE TRANSCRIPTASE AND METHOD FOR ITS PRODUCTION

**Michael L. Kotewicz, Columbia; James M. D'Alessio, and Gary F. Gerard, both of Frederick, all of Md., assignors to Life Technologies, Inc., Gaithersburg, Md.**

**Filed Feb. 27, 1986, Ser. No. 834,629**

**Int. Cl.$^5$ C12N** *1/20, 15/00*

**U.S. Cl. 435—252.3** **5 Claims**

1. A plasmid carrying genetic material derived from murine leukemia virus, wherein said genetic material encodes a protein truncated three amino acids or more from the carboxy terminus of native murine leukemia virus reverse transcriptase,

wherein said protein exhibits reverse transcriptase activity with a half-life of 26–35 minutes.

---

### 5,017,493

### DNA SEQUENCE

**Henrik D. Andersen, Charlottenlund, Denmark; Hans H. M. Dahl, Parville, Australia, and Thorkild Christensen, Allerod, Denmark, assignors to Nordisk Gentofte A/S, Gentofte, Denmark**

**Continuation of Ser. No. 3,380, Jan. 20, 1987, abandoned. This application Jan. 25, 1990, Ser. No. 470,396**

**Claims priority, application Denmark, Apr. 3, 1985, 1525/85**

**Int. Cl.$^5$ C12N** *15/00, 15/03, 15/11, 15/67*

**U.S. Cl. 435—252.3** **7 Claims**

1. A recombinant sequence containing a ribosome binding site with the SD sequence AGGA and the start codon ATG, comprising a nucleotide sequence whose +strand has the formula:

AGCTTAAGGAGGT$X_1X_2$. . . $X_n$CGATG

wherein X is A, C or T, n is 5-8.

---

### 5,017,494

### BIO-THERMO TIP SENSOR

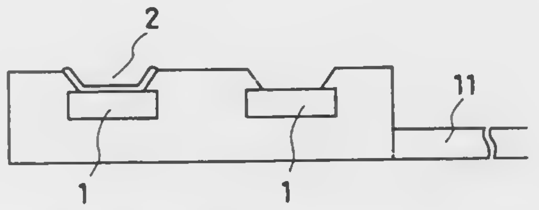
**Isao Karube, Tachikawa, and Hiroshi Muramatsu, Tokyo, both of Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan**

**Filed Apr. 2, 1986, Ser. No. 847,186**

**The portion of the term of this patent subsequent to Apr. 21, 2005, has been disclaimed.**

**Int. Cl.$^5$ C12M** *1/40*

**U.S. Cl. 435—288** **22 Claims**



1. A bio-thermo tip sensor for detecting chemical substances contained in a solution, said sensor comprising:

(a) a plurality of IC thermal sensors for providing a reference voltage and for converting temperature change to an output voltage relative to the reference voltage;
(b) wires for connecting said IC thermal sensors to an external power supply and voltmeters;
(c) electrically inert insulating material for encapsulating said IC thermal sensors and the wires except for the surfaces of detecting parts of said IC thermal sensors; and
(d) a membrane coated on the surface of at least one of the IC thermal sensors, said membrane having an enzyme immobilized thereon for generating heat when exposed to a solution containing a specific chemical substance to apply the temperature change to the IC thermal sensor.

---

### 5,017,495

### PLASMID ENCODING THE *PSEUDOMONAS MENDOCINA* TOLUENE MONOOXYGENASE GENE

**Kwang-Mu Yen, Thousand Oaks, and Lawrence M. Blatt, Sherman Oaks, both of Calif., assignors to Amgen Inc., Thousand Oaks, Calif.**

**Filed Apr. 5, 1988, Ser. No. 177,631**

**Int. Cl.$^5$ C12N** *1/00, 9/02, 1/22;* **C12P** *21/06, 21/04;* **C12R** *1/38*

**U.S. Cl. 435—320.1** **21 Claims**

1. A plasmid derived from *Pseudomonas mendocina* KR-1 comprising the toluene monooxygenase genes, said plasmid being capable of transferring the ability to convert toluene to p-cresol to a microorganism host cell.

---

### 5,017,496

### METHOD FOR DETERMINING THE RESPIRATION RATE OF A RESPIRING MATERIAL IN THE FORM OF A CONTINUOUS PROCESS CURRENT, AS WELL AS A DEVICE SUITABLE FOR SUCH AN APPLICATION

**Abraham Klapwijk, Bennekom, and Henricus L. F. M. Spanjers, Oss, both of Netherlands, assignors to Ecotechniek B.V., Beneluxlaan, Netherlands**

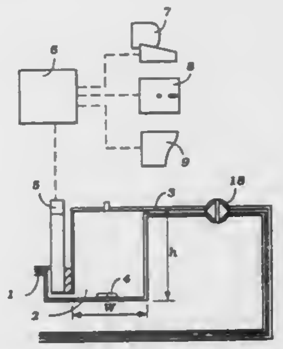
**PCT No. PCT/NL87/00004, § 371 Date Oct. 15, 1987, § 102(e) Date Oct. 15, 1987, PCT Pub. No. WO87/05114, PCT Pub. Date Aug. 27, 1987**

**PCT Filed Feb. 13, 1987, Ser. No. 123,109**

**Claims priority, application Netherlands, Feb. 17, 1986, 8600396**

**Int. Cl.$^5$ G01N** *33/18, 33/483*

**U.S. Cl. 436—62** **9 Claims**



1. A method for determining the respiration rate of a respiring material contained in a continuous process flow by measuring the oxygen content in the continuous process flow before and after residence of the continuous process flow in a respiration chamber sealed off from the atmosphere, comprising the steps of measuring the oxygen content in the continuous process flow at a single measurement location by passing the continuous process flow in a first direction past the single measurement location and taking a first measurement of the oxygen content in the continuous process flow just before the continuous process flow enters the chamber and then, after residence of the continuous process flow in the chamber, reversing the continuous process flow past the single measurement location in a second direction and taking a second measurement of the oxygen content in the continuous process flow before continuing the movement of the continuous process flow in the first direction.

6. A device for determining the respiration rate of a respiring material in a continuous process flow by means of measuring the oxygen content in the continuous process flow before and after residence of the continuous process flow in a respiration chamber, which is completely filled with liquid and sealed off from the atmosphere, comprising at least a supply line for the continuous process flow, a respiration chamber in communication with said supply line free of aeration elements and sealed off from the atmosphere, at least a drainage line for the continuous process flow in communication with and leading from said chamber, an oxygen measuring cell positioned next to said chamber and means for sequentially reversing the continuous process flow through said respiration chamber.

VOL
126
ISS
3
MY
21
1991
UMI

5,017,497

### PARTICLE DISCRIMINATOR AND METHOD

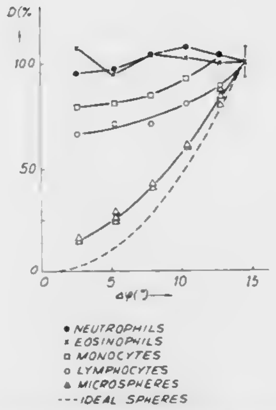
**Bernard Gerard de Grooth; Jan Greve, both of Oldenzaal, and Leonardus W. M. M. Terstappen, Enschede, all of Netherlands, assignors to Sequoia-Turner Corporation, Mountain View, Calif.**

**Continuation of Ser. No. 31,478, Mar. 27, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 327,416**

**Claims priority, application Netherlands, Apr. 21, 1986, 8601000**

Int. Cl.$^5$ G01N *33/48, 21/00*

U.S. Cl. 436—63 10 Claims



1. A method of distinguishing and characterizing at least two distinct types of particles which have different depolarizing structures, said method comprising,

directing a suspension of particles containing the distinct particle types through an optical sensing zone,

illuminating the particles in the zone with an incident beam of linearly polarized light,

by said illuminating, producing from each of the distinct types of particles, depolarized scattered light whose intensity, at a selected scattering angle, is dependent on the particle's depolarizing structure, and is within an intensity distribution range which is (a) characteristic of one of the particle types and (b) substantially non-overlapping with the intensity distribution of the other particle types in the suspension, in a particle-feature space which is defined in one dimension by depolarized light scattering intensity measured at the selected angle,

measuring the intensity of the depolarized scattered light from each particle at the selected angle, and

based on the intensity of the measured scattered light in the particle-feature space, distinguishing and characterizing at least two distinct particle types in the suspension.

---

5,017,498

### INDICATOR COMPOUNDS, METHOD OF THEIR PREPARATION AND USE OF THOSE COMPOUNDS IN AN IRON ASSAY SYSTEM

**Piero Fossati, Lissone, Italy; Holger Heldenreich, Kuden, Fed. Rep. of Germany; Herbert Hugl, Gladbach, Fed. Rep. of Germany, and Klaus Wehling, Wuppertal, Fed. Rep. of Germany, assignors to Miles Inc., Elkhart, Ind.**

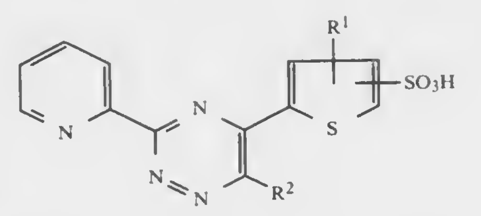
**Filed Mar. 1, 1989, Ser. No. 317,450**

**Claims priority, application Italy, Mar. 3, 1988, 47682 A/88**

Int. Cl.$^5$ G01N *33/20*

U.S. Cl. 436—84 5 Claims

1. Compounds of the general formula (I)



(I)

wherein

$R^1$ denotes hydrogen, halogen or $C_1$–$C_4$ alkyl and

$R^2$ denotes $C_1$–$C_4$ alkyl, aryl or heteroalkyl or a substituted $C_1$–$C_4$ alkyl, aryl or heteroaryl.

---

5,017,499

### METHOD FOR ANALYZING FLUORINE CONTAINING GASES

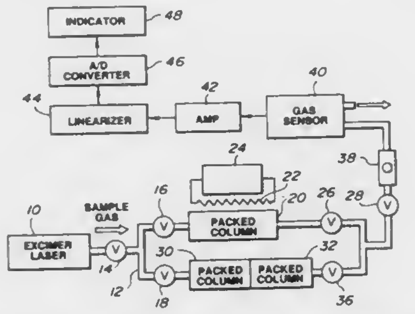
**Kohzo Hakuta, Fuchu; Minoru Aramaki, Tokyo; Takashi Suenaga, Yamaguchi; Mitsuo Kodama, Ube; Hisaji Nakano, Ube, and Shinsuke Nakagawa, Ube, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan**

**Filed Mar. 31, 1989, Ser. No. 330,898**

**Claims priority, application Japan, Mar. 31, 1988, 63-79088; Dec. 16, 1988, 63-317658; Dec. 27, 1988, 63-330115**

Int. Cl.$^5$ G01N *33/00*

U.S. Cl. 436—124 16 Claims



1. A method of analyzing a mixed gas containing fluorine gas to determine at least the concentration of the fluorine gas, the method comprising the steps of:

(a) passing the mixed gas through a packed column comprising a solid compound which has no halogen atom and reacts with fluorine gas to form a first solid fluoride and molecular oxygen, said first solid fluoride being retained in said packed column;

(b) measuring the concentration of molecular oxygen in a gas flowing out of said packed column;

(c) passing said mixed gas through another packed column comprising an element which reacts with fluorine gas to form a second solid fluoride without forming molecular oxygen said second solid fluoride being retained in said another packed column;

(d) measuring the concentration of molecular oxygen in a gas flowing out of said another packed column to thereby determine the concentration of molecular oxygen in said mixed gas;

(e) subtracting the concentration measured at step (d) from the concentration measured at step (b) to thereby determine a corrected concentration of molecular oxygen formed in said packed column at step (a); and

(f) converting said corrected concentration of molecular oxygen to the concentration of fluorine gas in said mixed gas.

---

5,017,500

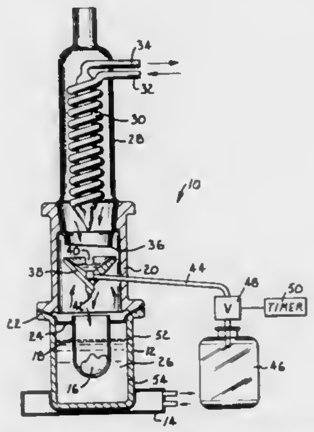
### FAT EXTRACTION PROCESS AND APPARATUS

**Alfred Langer, Bornheim-Hersel, Fed. Rep. of Germany, assignor to C. Gerhardt Fabrik & Lager Chemischer Apparate GmbH & Co K.G., Bonn, Fed. Rep. of Germany**

**Filed Oct. 11, 1988, Ser. No. 255,745**

Int. Cl.$^5$ G01N *1/00;* B01D *11/02;* C11B *1/10*

U.S. Cl. 436—178 20 Claims



1. A fat extraction process comprising the steps of:

immersing a sample containing fat in a solvent which is held in a sample vessel;

heating the solvent to effect vaporization thereof;

cooling the solvent vapors to effect condensation thereof;

returning the condensed solvent to the sample vessel during a boiling phase;

directing the condensed solvent to a collection vessel during a level lowering phase which follows the boiling phase and which is terminated when the solvent level in the sample vessel drops below the level of the sample;

directing the condensed solvent onto the sample during a washing phase which follows the level lowering phase; and

directing the condensed solvent to the collection vessel during a solvent recovery phase which follows the washing phase and which is terminated when the sample vessel is substantially depleted of solvent.

---

5,017,501

### PREPARATION OF UNIFORMLY SIZED LIPOSOMES ENCAPSULATING AN AQUEOUS LIQUID

**Martin Wong, Grayslake, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.**

**Division of Ser. No. 125,505, Nov. 25, 1987, Pat. No. 4,873,035. This application Jan. 19, 1989, Ser. No. 300,002**

Int. Cl.$^5$ G01N *33/544;* B01J *13/02;* A61K *37/22;* C12N *11/02*

U.S. Cl. 436—528 3 Claims

1. A dispersion of substantially homogeneously sized multilamellar lipid vesicles having means vesicle diameters within the range of from about 150 to about 3000 nanometers, said dispersion being prepared by:

(1) adding to a vessel one or more lipids in an organic solvent, said organic solvent being in an amount which allows said lipids to be dried as a film on the walls of said vessel;

(2) drying said lipids to a thin film onto the walls of said vessel;

(3) adding to said vessel an aqueous liquid and a collection of contact masses having mean diameters within the range of from about 50 to about 3,000 microns, said aqueous liquid being in an amount sufficient to result in a concentration of lipid which is less than about 1 mole per liter of said lipid in said aqueous liquid, and said contact masses being in an amount which is not: (a) so numerous that agitation of said masses in said vessel cannot be performed; and (b) so small that collisions between said contact masses and said walls cannot occur; and

(4) agitating said vessel to form said dispersion of substantially homogeneously sized multilamellar vesicles.

---

5,017,502

### IMAGE SENSOR AND MANUFACTURING METHOD FOR THE SAME

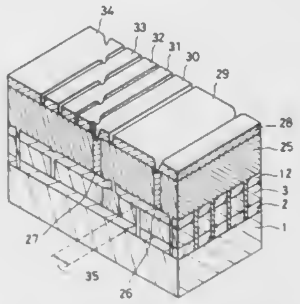
**Mitsunori Sakama, Hiratsuka; Takeshi Fukada, Ebina; Naoya Sakamoto; Nobumitsu Amachi, Atsugi; Shigenori Hayashi, Atsugi, and Takashi Inushima, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Division of Ser. No. 211,225, Jun. 22, 1988, Pat. No. 4,943,710. This application Jan. 22, 1990, Ser. No. 468,069**

**Claims priority, application Japan, Jun. 25, 1987, 62-158334; Jun. 30, 1987, 62-162925**

Int. Cl.$^5$ H01L *21/328*

U.S. Cl. 437—2 2 Claims



1. A method for producing image sensors having a plurality of sensing elements, said method comprising the steps of:

forming a first conductive film on an insulating surface;

forming a photosensitive semiconductor film on said first conductive film;

projecting laser rays on said semiconductor film in order to sever a sensing area from said semiconductor film by a groove;

filling said groove with an insulating material;

forming a second conductive film on said semiconductor film;

projecting laser rays on said first conductive film, said semiconductor film and said second conductive film in order to sever said three films into said sensing elements by parallel grooves and provide a first lead electrode strip for each sensing element;

forming an insulating film on said second conductive film in order to fill said parallel grooves therewith; and

forming a groove in said insulating film in a direction diagonal to said parallel grooves to thereby facilitate the eventual formation of second lead electrode strips extending normal to said first lead electrode strips.

---

5,017,503

### PROCESS FOR MAKING A BIPOLAR TRANSISTOR INCLUDING SELECTIVE OXIDATION

**Hiroshi Shiba, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Division of Ser. No. 886,945, Jul. 23, 1986, abandoned, which is a continuation of Ser. No. 506,257, Jun. 20, 1983, abandoned, which is a continuation of Ser. No. 11,582, Feb. 12, 1979, Pat. No. 4,450,470. This application Mar. 6, 1989, Ser. No. 319,198**

**Claims priority, application Japan, Feb. 10, 1978, 53-14251; Feb. 10, 1978, 53-14252**

Int. Cl.$^5$ H01L *21/331*

U.S. Cl. 437—31 3 Claims

1. A method of manufacturing a semiconductor integrated circuit device, said method comprising the steps of

forming a field insulating film selectively on a major surface

VOL
126
ISS
3
MY
21
1991
UMI

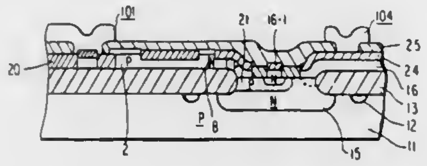
of a semiconductor substrate, at least one transistor forming region being surrounded by said field insulating film and continuously exposed at said major surface of said substrate with an elongated shape in plan view with narrow width and a longer length and being extended in one direction,

forming base, collector and emitter contact portions of said transistor in said transistor forming region in the lengthwise direction of said transistor forming region,

forming a polycrystalline silicon film entirely on said substrate including said transistor forming region and on said field insulating film;

carrying out a selective thermal oxidation of said polycrystalline silicon film so as to form first, second and third polycrystalline silicon layers from said polycrystalline silicon film and to also form silicon oxide films converted from said polycrystalline silicon film and contacted to sides of said polycrystalline silicon layers to delineate said polycrystalline silicon layers;

introducing impurities into said first, second and third polysilicon layers to obtain a first polycrystalline silicon layer of one conductivity type on said field insulating film and connected to said base contact portion at one end thereof, said first silicon layer having a resistor element formed therein, a second polycrystalline silicon layer of the opposite conductivity type on said field insulating film and connected too said collector contact portion at one end thereof, and a third polycrystalline silicon layer of said opposite conductivity type on said field insulating film and crossing said transistor forming region at said emitter contact portion thereof, said third silicon layer being contacted to said emitter contact portion with the entire width of said third silicon layer and connected to said fist silicon layer on said field insulating film to form a PN junction therebetween, the upper surface of said first, second and third silicon layers being coplanar such that they are free from any overlapping with one another, the width of said resistor and the width of said PN junction being defined by said silicon oxide films, and



forming a conductive film selectively on said first, second and third silicon layers to reduce electrical resistance thereof, to short said PN junction, and to define the length of said resistor element in said first silicon layer.

---

### 5,017,504

## VERTICAL TYPE MOS TRANSISTOR AND METHOD OF FORMATION THEREOF

**Tadashi Nishimura; Kazukyuki Sugahara; Shigeru Kusunori, and Akihiko Ohsaki, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 127,138, Dec. 1, 1987, Pat. No. 4,845,537**

**This application Apr. 21, 1989, Ser. No. 341,596**

**Claims priority, application Japan, Dec. 1, 1986, 61-287322**

**Int. Cl.$^5$ H01L *21/70***

**U.S. Cl. 437—40** **10 Claims**

1. A method of forming a vertical type MOS transistor comprising the following steps:

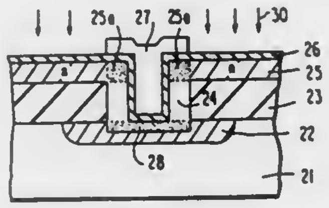
(a) forming a first source-drain region (220 of a first conductivity type selectively in a major surface of a semiconductor substrate;

(b) forming an insulating layer (23) on a major surface of said semiconductor substrate;

(c) forming a trench (20) extending from the major surface of said insulating layer to at least the major surface of said first source-drain region, said trench having side walls and a bottom;

(d) forming a semiconductor layer (29) along said slide walls and said bottom of said trench and along a surface of said insulating layer at least near said trench;

(e) altering a portion of said semiconductor layer contacting the major surface of said substrate and located near a side wall of said insulating layer facing said trench such that said portion is monocrystalline;



(f) forming a gate insulator (26) on said semiconductor layer at least over said side walls and bottom of said trench;

(g) forming a gate electrode on said gate insulator at least in said trench; and

(h) forming a second source-drain region of said first conductivity type in said semiconductor layer over the major surface of said insulating layer and at least in said trench such that a channel length of said transistor is determined by a a thickness of said insulating layer, independent of a depth of said trench.

---

### 5,017,505

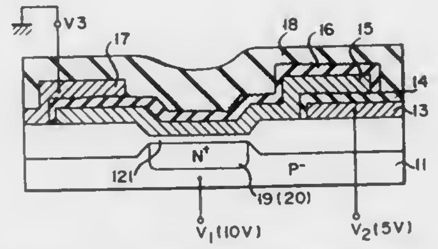
## METHOD OF MAKING A NONVOLATILE SEMICONDUCTOR MEMORY APPARATUS WITH A FLOATING GATE

**Tetsuo Fujii, Toyohashi; Toshio Sakakibara, Nishio, and Nobuyoshi Sakakibara, Hekinan, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Continuation of Ser. No. 210,509, Jun. 23, 1988, abandoned, which is a continuation of Ser. No. 887,062, Jul. 18, 1986, abandoned. This application Feb. 23, 1989, Ser. No. 313,898**

**Int. Cl.$^5$ H01L *21/70***

**U.S. Cl. 437—52** **23 Claims**



1. A method of manufacturing a semiconductor memory apparatus including an erase gate and a floating gate, comprising the steps of:

(a) forming a first polysilicon film, as an erase gate, so that the surface of the first polysilicon film is rough;

(b) thermally treating said first polysilicon film in an oxidation atmosphere at a temperature of 900° to 1,300° C. to form an oxide film on said rough surface of said first polysilicon film, such that the roughness of the surface of said first polysilicon film in step (a) is substantially duplicated on the surface of the oxide film and such that the surface of said first polysilicon film is substantially flattened; and

(c) forming a second polysilicon film, as the floating gate, on at least a portion of the rough surface of said oxide film such that the surface of said second polysilicon film contacting said portion of the oxide film is deposited with a roughness corresponding to the roughness of said surface of said oxide film;

wherein said first polysilicon film comprises polysilicon containing an impurity in the group of phosphorus and arsenic in a concentration of $1\times10^{20}$ to $7\times10^{20}$ atoms/cm$^{-3}$.

---

### 5,017,506

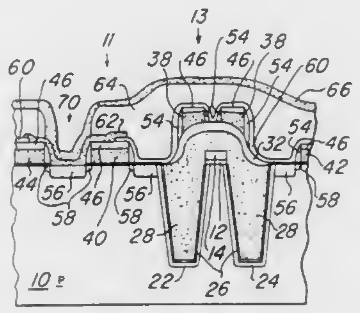
## METHOD FOR FABRICATING A TRENCH DRAM

**Bing-Whey Shen, Richardson; Randy McKee, Plano, and Gishi Chung, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Jul. 25, 1989, Ser. No. 385,344**

**Int. Cl.$^5$ H01L *21/70***

**U.S. Cl. 437—52** **4 Claims**



1. A method for forming a device in a trench comprising the steps of:

forming a trench in a substrate;

depositing a layer of material overall;

depositing a layer of photosensitive material so that the remainder of said trench not occupied by said layer of material is filled and said layer of photosensitive material has a substantially planar top surface;

exposing said photosensitive material to light sufficient to penetrate said photosensitive material except for the portion of said photosensitive material in said trench;

removing said photosensitive material exposed to light; and

etching said layer of material using the photosensitive material remaining in said trench as an etch mask.

---

### 5,017,507

## METHOD OF FABRICATING SEMICONDUCTOR INTEGRATED CIRCUIT DEVICES INCLUDING UPDIFFUSION TO SELECTIVELY DOPE A SILICON LAYER

**Hideyuki Miyazawa, Ohme, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 3, 1989, Ser. No. 331,809**

**Claims priority, application Japan, Apr. 5, 1988, 63-84748**

**Int. Cl.$^5$ H01L *21/225***

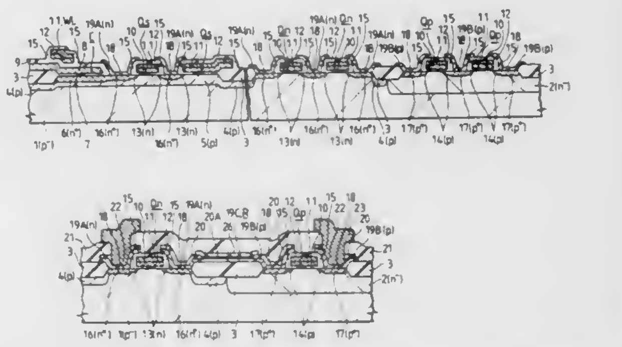
**U.S. Cl. 437—162** **24 Claims**

1. A method of fabricating semiconductor integrated circuit devices comprising:

(a) a step for introducing impurities into the main surface of a semiconductor substrate at a location in which a semiconductor region, that serves as a semiconductor region of a semiconductor integrated circuit device, is to be formed;

(b) a step for forming a silicon film on the main surface of the semiconductor substrate at said location at which said impurities have been introduced; and

(c) a step for heat-treating the impurities that are introduced to diffuse impurities in the semiconductor substrate in order to form the semiconductor region, and to diffuse impurities in the silicon film so that said silicon film selectively possesses electric conductivity, the heat treatment being performed so that a part of the silicon film does not have impurities diffused thereinto, said part forming a resistance element of a semiconductor integrated circuit device.



---

### 5,017,508

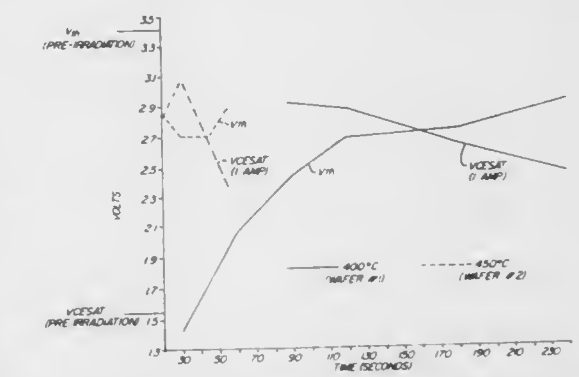
## METHOD OF ANNEALING FULLY-FABRICATED, RADIATION DAMAGED SEMICONDUCTOR DEVICES

**Darcy T. Dodt, Palo Alto, and Walter R. Buchanan, San Jose, both of Calif., assignors to Ixys Corporation, San Jose, Calif.**

**Filed Jun. 29, 1989, Ser. No. 374,217**

**Int. Cl.$^5$ H01L *21/263***

**U.S. Cl. 437—173** **21 Claims**



1. A method of producing a semiconductor device, said semiconductor device having an active area thereon, comprising the steps of:

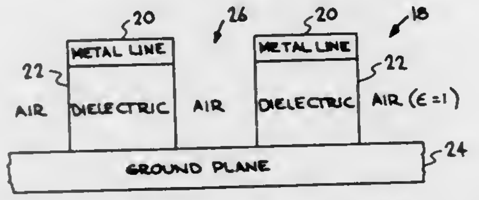
a. irradiating a completely fabricated semiconductor device so as to induce damage to an active area thereon, said step of irradiating using radiation selected from the group consisting of electron beam irradiation, proton irradiation, neutron irradiation, alpha ray irradiation, and gamma ray irradiation; and

b. partially annealing said irradiation induced damage, said annealing step further comprising the step of directing a high intensity light source at said radiation induced damage.

VOL 126
ISS 3
MY 21
1991
UMI

## 5,017,509
## STAND-OFF TRANSMISSION LINES AND METHOD FOR MAKING SAME

**David B. Tuckerman, Livermore, Calif., assignor to Regents of the University of California, Oakland, Calif.**
**Continuation of Ser. No. 221,395, Jul. 19, 1988, abandoned. This application Jul. 18, 1990, Ser. No. 555,814**
**Int. Cl.$^5$ H01L** *21/44*
**U.S. Cl. 437—182** **18 Claims**

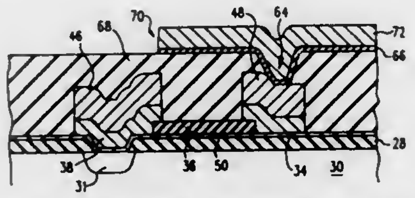


1. A method of forming transmission lines in an integrated circuit structure having a metal ground plane, comprising:
forming a dielectric layer on the ground plane;
forming at least one microstrip transmission line on the dielectric layer, the dielectric layer having a thickness of at least about 40% of the width of a transmission line;
removing the dielectric layer from regions outside each line to form a standoff line supported on a post of dielectric material underneath each line with the post of dielectric material surrounded by open gaps.

---

## 5,017,510
## METHOD OF MAKING A SCALABLE FUSE LINK ELEMENT

**Michael T. Welch, Sugarland; Ronald E. McMann, Rosenberg; Manuel L. Torreno, Jr., Houston, and Evaristo Garcia, Jr., Rosenberg, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**
**Division of Ser. No. 57,064, Jun. 1, 1987, Pat. No. 4,862,243. This application May 25, 1989, Ser. No. 352,789**
**Int. Cl.$^5$ H01L** *21/48*
**U.S. Cl. 437—192** **19 Claims**

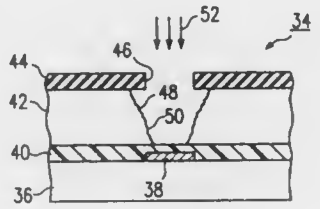


1. A method for forming a fuse link between two interconnects, comprising the steps of:
forming a first conductive layer;
forming a first mask in the shape of a fuse link of desired dimensions on said first conductive layer;
forming a second conductive layer over said mask and over portions of said first conductive layer not covered by said mask;
forming a third conductive layer over said second layer;
forming a second mask over portions of said third conductive layer;
removing portions of said second and third conductive layers not covered by said second mask, the interconnects comprising the remaining portions of said third conductive layer; and
removing portions of said first conductive layer not covered by said first mask or said second mask, remaining portions of said first conductive layer under said first mask forming the fuse link.

---

## 5,017,511
## METHOD FOR DRY ETCHING VIAS IN INTEGRATED CIRCUIT LAYERS

**Jerome L. Elkind, Dallas; Patricia B. Smith, Euless; Larry D. Hutchins; Joseph D. Luttmer, both of Richardson; Rudy L. York, Plano, and Julie S. England, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**
**Filed Jul. 10, 1989, Ser. No. 377,514**
**Int. Cl.$^5$ H01L** *21/00, 21/02, 21/30;* **B44C** *1/22*
**U.S. Cl. 437—225** **33 Claims**

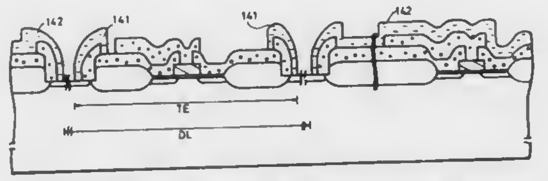


1. A method for etching a wafer made of Group II and Group VI elements comprising the steps of:
introducing a methyl-radical liberating hydrocarbon gas to a low pressure inside of a vacuum chamber containing the wafer; and
generating an in situ plasma within the chamber to produce activated methyl-radicals for etching the wafer.

---

## 5,017,512
## WAFER HAVING A DICING AREA HAVING A STEP REGION COVERED WITH A CONDUCTIVE LAYER AND METHOD OF MANUFACTURING THE SAME

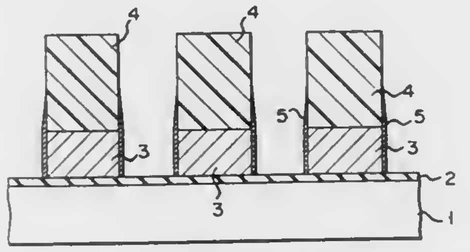
**Hiroshi Takagi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Division of Ser. No. 385,879, Jul. 27, 1989. This application Aug. 17, 1990, Ser. No. 568,930**
**Int. Cl.$^5$ H01L** *21/304*
**U.S. Cl. 437—227** **7 Claims**



1. A method of processing a wafer formed of a plurality of chip regions defining a dicing area for isolating said chip regions to form individual chips, wherein at least one step region is formed between said chip regions through said dicing area, said method comprising the steps of:
forming a conductive layer extending from one chip region to an opposite chip region through said dicing area, said conductive layer overlying said at least one step region;
covering said conductive layer on said at least one step region with a resist film;
patterning said resist film; and
using said resist film as a mask, etching said conductive layer so that only a portion thereof on said at least one step region remains, and subsequently dicing said wafer to form sand chips.

## 5,017,513
## METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE

**Hiroshi Takeuchi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Jan. 18, 1990, Ser. No. 466,944**
**Claims priority, application Japan, Jan. 18, 1989, 1-9595**
**Int. Cl.$^5$ H01L** *21/465*
**U.S. Cl. 437—228** **7 Claims**

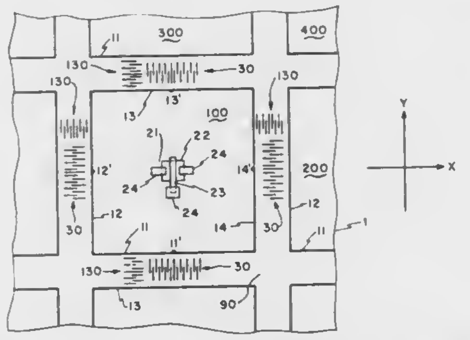


1. A method for manufacturing a semiconductor device comprising the steps of:
forming a treating layer on a semiconductor substrate;
forming an organic film mask pattern on the treating layer;
treating the treating layer by a reactive ion etching;
removing the organic film mask pattern by an oxygen ashing method using at least oxygen molecules; and
exposing, subsequent to the removing step, at least the treating layer and/or its underlying layer to an etching step using an etching medium.

---

## 5,017,514
## METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE USING A MAIN VERNIER PATTERN FORMED AT A RIGHT ANGLE TO A SUBSIDIARY VERNIER PATTERN

**Shozo Nishimoto, Tokyo, Japan, assignor to NEC Corporation, Japan**
**Filed Nov. 27, 1989, Ser. No. 441,522**
**Claims priority, application Japan, Nov. 25, 1988, 63-298606**
**Int. Cl.$^5$ H01L** *21/00, 21/02, 21/30, 21/66*
**U.S. Cl. 437—229** **12 Claims**

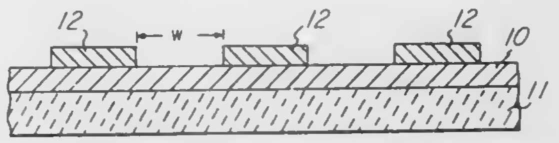


1. A method of manufacturing a semiconductor device having a semiconductor substrate, said substrate including a device section having a first boundary line extending in a first direction and a first peripheral section outside said first boundary line of said device section.
said method comprising the steps of:
forming a first device pattern on said device section and a first check pattern and a first subsidiary pattern on said peripheral section, said first check pattern comprising a first main pattern which includes a first number of rectangular patterns positioned so that their centers are equidistant from each other by a first distance in the widthwise direction, said first main rectangular patterns being arranged in said first direction, and said first subsidiary pattern including a second number of rectangular pattern which are less than said first number', the centers of said second rectangular patterns being equidistant from each other by a second distance in the widthwise direction and being arranged in a second direction at a right angle to said first direction;
forming a film entirely over said substrate;
forming a resist layer entirely over said film and on said substrate;
forming a second device pattern and a second check pattern on said resist layer on said film, said patterns being formed on both said device section and said second check pattern of said resist layer over said film on said peripheral section, selectively irradiating the rays onto said resist layer followed by a development of said resist layer, said second check pattern comprising a second main pattern which includes said first number of rectangular patterns positioned so that their centers are equidistant from each other by a third distance which is different from said first distance in the widthwise direction and which is arranged in said first direction, each one of said rectangular patterns of said second main pattern being formed on or positioned near corresponding ones of said rectangular pattern of said first main pattern to form said first number of pairs of said rectangular patterns of said first main pattern and said rectangular patterns of said second main pattern, and a second subsidiary pattern including said second number of rectangular patterns positioned so that their centers are equally spaced from each other by a fourth distance which is different from said second distance in the widthwise direction, said fourth distance being arranged in said second direction, each one of said rectangular patterns of said second subsidiary pattern being formed on or positioned near corresponding ones of said rectangular patterns of said first subsidiary pattern to form said second member of pairs of said rectangular pattern of said first subsidiary pattern and said rectangular pattern of said second subsidiary pattern; and
inspecting relative positions between said first and second main patterns in every said pair thereof, and between said first and second subsidiary patterns in every said pair thereof.

---

## 5,017,515
## PROCESS FOR MINIMIZING LATERAL DISTANCE BETWEEN ELEMENTS IN AN INTEGRATED CIRCUIT BY USING SIDEWALL SPACERS

**Manzur Gill, Arcola, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**
**Filed Oct. 2, 1989, Ser. No. 415,807**
**Int. Cl.$^5$ H01L** *21/00, 21/02, 21/90*
**U.S. Cl. 437—229** **14 Claims**



1. A process for forming sublithographic distances between elements in an integrated circuit, comprising:
forming and patterning a first layer of photoresist to form first lines of photoresist over a face of an integrated circuit structure, said first lines having a minimum photolithographic width;
forming first elements between said first lines of photoresist, each said first element having an upper surface and opposite edges;
removing said first lines of photoresist;
forming sidewall members on said opposite edges of each of said first elements, said sidewall members formed in a manner to expose said upper surfaces of said first elements;
forming a layer over said structure; and

VOL
126
SS
3
MY
21
1991
UMI

etching said layer to form second elements separated from said first elements in the lateral direction by said sidewall members.

### 5,017,516

### METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

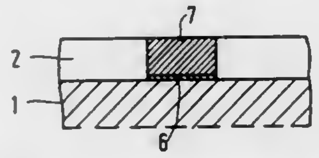
**Andreas M. T. P. van der Putten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 2, 1990, Ser. No. 475,616**

**Claims priority, application Netherlands, Feb. 8, 1989, 8900305**

**Int. Cl.$^5$ H01L** *31/288*

**U.S. Cl. 437—230** **8 Claims**



1. A method of manufacturing a semiconductor device comprising a dielectric layer in which contact holes are etched, after which electrically conductive plugs are formed in the contact holes by means of an electroless metallization bath, said plugs contacting a silicon-containing semiconductor material, characterized in that the contact holes are etched by means of plasma etching and that the electroless metallization operation is preceded by a treatment at a temperature between 40° and 95° C. in an aqueous nucleating solution which contains HF and between $5 \cdot 10^{-4}$ and 0.14 mmol of a palladium salt per liter.

### 5,017,517

### METHOD OF FABRICATING SEMICONDUCTOR DEVICE USING AN SB PROTECTION LAYER

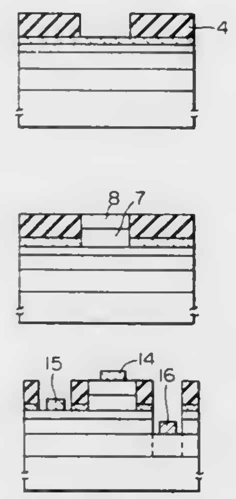
**Kazuhiro Mochizuki, Kodaira; Tomonori Tanoue, Ebina; Chushirou Kusano, Tokorozawa; Hiroshi Masuda, Hachioji, and Katsuhiko Mitani, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 2, 1990, Ser. No. 518,035**

**Claims priority, application Japan, May 10, 1989, 01-115099**

**Int. Cl.$^5$ H01L** *21/20*

**U.S. Cl. 437—90** **23 Claims**



1. A method for fabricating a semiconductor device comprising the steps of:

forming at least, the first semiconductor layer on a semiconductor substrate;

forming a surface protection layer of antimony (Sb) or the material having Sb as its main component on said first semiconductor layer;

forming a film having a predetermined opening pattern on said surface protection film;

removing said surface protection film thus exposed;

forming the second semiconductor layer on at least said first semiconductor layer thus exposed;

forming the third semiconductor layer on at least said second semiconductor layer;

etching a predetermined area to expose at least said first semiconductor layer; and

forming electrodes on predetermined areas of said first semiconductor layer thus exposed and said third semiconductor layer.

### 5,017,518

### PROCESS FOR PRODUCING CALCIUM PHOSPHATE CERAMICS HAVING POROUS SURFACE

**Yasuhiko Hirayama; Tetsuro Ogawa, and Satoshi Ojima, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan**

**Continuation of Ser. No. 243,543, Sep. 13, 1988, abandoned. This application Apr. 18, 1990, Ser. No. 511,814**

**Claims priority, application Japan, Sep. 14, 1987, 62-230747**

**Int. Cl.$^5$ C04B** *35/00, 38/04*

**U.S. Cl. 501—1** **7 Claims**

1. A process for producing calcium phosphate ceramics having a porous surface, comprising the steps of:

a) preparing untreated calcium phosphate ceramics, said untreated ceramics comprising a mixture of hydroxyapatite and tricalcium phosphate;

b) molding said untreated ceramics;

c) firing said untreated ceramics; and

d) contacting said untreated ceramics with an acidic solution to selectively dissolve the tricalcium phosphate in the surface of the ceramics but not selectively dissolve said hydroxyapatite;

wherein the pH of the acidic solution is from 1 to 5.5.

### 5,017,519

### TRANSPARENT AND NONEXPANSIVE GLASS-CERAMIC

**Shigeki Morimoto, Mie, and Kenji Sugiura, Matsusaka, both of Japan, assignors to Central Glass Company, Limited, Ube, Japan**

**Filed Apr. 23, 1990, Ser. No. 512,366**

**Claims priority, application Japan, Apr. 28, 1989, 1-111442**

**Int. Cl.$^5$ C03C** *10/12*

**U.S. Cl. 501—7** **4 Claims**

1. A transparent and low expansion glass-ceramic, which comprises fine crystals of $\beta$-quartz and $\beta$-eucryptite crystallized from a glass and dispersed in a glass matrix provided by the uncrystallized part of the glass, the glass consisting essentially of, expressed as oxides,

63–69 wt % of $SiO_2$,
18–22 wt % of $Al_2O_3$,

3–5 wt % of $Li_2O$,
1–3 wt % of MgO,
4–6 wt % of $ZrO_2$,
0–2 wt % of ZnO,
0–2 wt % of $P_2O_5$,
0–2 wt % of $Na_2O$,
0–2 wt % of BaO, and
0.3–1 wt % of $As_2O_3$,

with the proviso that the inequalities (I) and (II) are both satisfied:

$$\log Z \geqq 8.8 - 4.47 \log S \tag{I}$$

where Z is the content (wt %) of $ZrO_2$ in the glass, and S is the content (wt %) of $SiO_2$ in the glass,

$$0.9 \leqq a/(p+q+r) \leqq 1.1 \tag{II}$$

where a is the molar fraction of $Al_2O_3$ in the glass, and p, q and r are molar fractions of $Li_2O$, MgO and ZnO in the glass, respectively.

### 5,017,520

### FLUOROSPHOSPHATE OPTICAL GLASS

**Masaaki Otsuka; Masayuki Komiya; Naruhito Sawanobori, all of Yono, and Shinobu Nagahama, Kasukabe, all of Japan, assignors to Sumita Optical Glass, Inc., Tokyo, Japan**

**Filed Nov. 22, 1989, Ser. No. 445,991**

**Claims priority, application Japan, Dec. 1, 1988, 63-304621**

**Int. Cl.$^5$ C03C** *3/247, 3/17, 4/00*

**U.S. Cl. 501—44** **3 Claims**

1. A fluorophosphate glass having a refractive index of 1.45 to 1.54 and an Abbe number of 75 to 90, which has a chemical composition, in % by mole, comprising:

| | |
|---|---|
| $P_2O_5$ | 6.8–19.0% |
| $Al_2O_3$ | 1.5–6.0% |
| BaO | 0.3–6.6% |
| $AlF_3$ | 16.6–26.3% |
| $MgF_2$ | 2.5–19.0% |
| $CaF_2$ | 8.0–28.0% |
| $SrF_2$ | 9.7–35.0% |
| $BaF_2$ | 7.9–35.0% |
| NaF | 0.5–4.0% |
| $Gd_2O_3$ | 1.0–6.0% |
| $Y_2O_3$ | 0–3.5% |
| $La_2O_3$ | 0–3.5% |
| $Yb_2O_3$ | 0–3.5% |
| sum of $Gd_2O_3$, $Y_2O_3$, $La_2O_3$ and $Yb_2O_3$ | 1.0–6.0% |
| $GdF_3$ | 0–2.0% |
| CaO | 0–3.5% |
| SrO | 0–3.5% |
| ZnO | 0–3.5% and |
| MgO | 0–3.5%. |

### 5,017,521

### BOROSILICATE GLASS COMPOSITIONS INCORPORATING CERIUM OXIDE

**Brian Yale, Ormskirk, and Kenneth M. Fyles, Wigan, both of England, assignors to Pilkington plc, Merseyside, England**

**Filed Sep. 8, 1987, Ser. No. 93,601**

**Claims priority, application United Kingdom, Sep. 26, 1986, 8623214**

**Int. Cl.$^5$ C03C** *4/08, 3/095*

**U.S. Cl. 501—64** **14 Claims**

1. A low alkali borosilicate glass composition comprising
60 to 78% by weight of $SiO_2$
10 to 25% by weight of $B_2O_3$
3.5 to 6.0% by weight of $R_2O$, wherein $R_2O$ represents $Na_2O$, $K_2O$ and/or $Li_2O$,
2.0 to 6.5 % by weight of $CeO_2$, and
0.25 to 8.0 % by weight of $Sb_2O_3$ and/or $As_2O_3$,

the percentages being based on the total weight of the glass composition.

### 5,017,522

### CERAMIC BODIES OF CONTROLLED POROSITY AND PROCESS FOR MAKING SAME

**Andreas G. Hegedus, San Francisco, Calif., assignor to Hexcel Corporation, Dublin, Calif.**

**Filed Jul. 7, 1989, Ser. No. 377,085**

**Int. Cl.$^5$ C04B** *38/06*

**U.S. Cl. 501—81** **12 Claims**

1. A process for manufacturing a ceramic body of controlled porosity, comprising:

(1) impregnating a plurality of fibers which volatilize upon oxidation with a slurry comprised of a liquid polymer with powdered ceramic material dispersed therethrough,

(2) preliminarily curing said polymer to provide a layer of fiber-reinforced polymer matrix with powdered ceramic material therein,

(3) repeating steps (1) and (2) to provide a plurality of said layers of fiber-reinforced polymer matrix with powdered ceramic material therein,

(4) laminating said layers and

(5) sintering said laminated layers to provide a ceramic body with separate, continuous pores provided therethrough.

### 5,017,523

### METHOD FOR THE PREPARATION OF ULTRA-FINE HOLLOW GLASS SPHERES

**Kunio Kimura; Kazuhiko Jinnai, and Hiroshi Tateyama, all of Tosu, Japan, assignors to Japan as represented by Director General of Agency of Industrial Science and Technology, Tokyo, Japan**

**Filed Mar. 9, 1990, Ser. No. 491,427**

**Claims priority, application Japan, May 9, 1989, 1-116662**

**Int. Cl.$^5$ C04B** *38/00, 38/02;* **C03B** *19/10;* **C03C** *17/00*

**U.S. Cl. 501—85** **2 Claims**

1. A method for the preparation of ultra-fine hollow glass spheres from a powder of volcanic glass which comprises the successive steps of:

(a) heating particles of volcanic glass not exceeding 20 μm in an aqueous solution of hydrochloric acid or sulfuric acid in a concentration in the range from 0.5 to 10% by weight at a temperature in the range from 150° to 200° C. for a length of time of at least 8 hours;

(b) washing the acid-treated particles with water and drying; and

(c) heating the acid-treated and washed and dried particles at a temperature in the range from 900° to 1100° C. for a length of time in the range from 1 to 60 seconds.

### 5,017,524

### CERAMIC CUTTING TOOL

**David Moskowitz, Southfield, Mich., and Reuven Porat, Nahariya, Israel, assignors to Iscar Ltd., Tefen, Israel**

**Continuation-in-part of Ser. No. 309,142, Feb. 13, 1989, abandoned. This application Apr. 11, 1990, Ser. No. 507,968**

**Int. Cl.$^5$ C04B** *35/10, 35/56, 35/58*

**U.S. Cl. 501—87** **4 Claims**

1. A composition for a ceramic cutting tool consisting essentially of 60–80% by weight of alpha aluminum oxide, ($Al_2O_3$) having a hexagonal crystal structure and 20–40% by weight w/w% titanium carbonitride (TiCN) wherein said titanium carbonitride consists essentially of 30–70 mol % titanium carbide and 30–70 mol % titanium nitride.

VOL 126
ISS 3
MY 21
1991
UMI

### 5,017,525

### PRODUCTION OF CERAMIC MATERIALS AND OF PRECURSOR THEREFOR

**James D. Birchall, Mouldsworth; Mary J. Mockford, Upton; David R. Stanley, Knutsford; Paul M. L. Asher, Tarvin, and William R. McCarthy, Warrington, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England**

**Filed Mar. 17, 1988, Ser. No. 169,574**

**Claims priority, application United Kingdom, Mar. 25, 1987, 8707054**

**The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.**

**Int. Cl.$^5$ C04B** *35/58*

**U.S. Cl. 501—87** **27 Claims**

1. In a process for the production of precursor which is a polymeric material comprising at least one metallic or non-metallic element, oxygen and carbon and from which a ceramic material may be produced by pyrolysis, which process comprises reacting

(1) a first reactant having the formula $MX_nY_m$ where M is a metallic or non-metallic element, X is a group which is reactive with hydroxyl groups and Y is a group which is not reactive with hydroxyl groups, n is an integer of at least 2, and m is zero or an integer, and

(2) a second reactant which comprises at least one organic compound having two or more hydroxyl groups,

the improvement which comprises conducting said reaction as a dispersion polymerization in a liquid medium in which the reactants are soluble and in which the polymeric material which is produced by the reaction is insoluble or in which the polymeric material may be caused to be insoluble, precipitating the polymeric material in the liquid medium in particulate form, and recovering from the liquid medium the polymeric material.

---

### 5,017,526

### METHODS OF MAKING SHAPED CERAMIC COMPOSITES

**Marc S. Newkirk, Newark, Del., and Shirley L. Zwicker, Elkton, Md., assignors to Lanxide Technology Company, LP, Newark, Del.**

**Continuation of Ser. No. 861,025, May 8, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,471**

**Int. Cl.$^5$ C04B** *35/10*

**U.S. Cl. 501—89** **33 Claims**

1. A method for producing a ceramic composite body of a desired shape comprising a preform infiltrated by a ceramic matrix obtained by oxidation of a parent metal to form a polycrystalline material comprising an oxidation reaction product of said parent metal with at least one oxidant, said method comprising the steps of: (a) heating said parent metal to a temperature above its melting point but below the melting point of the oxidation reaction product to form a body of molten metal; (b) contacting a zone of a permeable preform with said body of molten metal, said permeable preform being a shaped body of filler material which is capable of supporting its own weight and maintaining dimensional fidelity without any means of support located external to any surface of said preform, and said preform having at least one defined surface boundary spaced from said contacting zone such that formation of said oxidation reaction product will occur into said preform and in a direction toward said defined surface boundary; (c) reacting said molten metal at said temperature with said oxidant to form said oxidation reaction product; (d) maintaining at least a portion of said oxidation reaction product in contact with and between said molten metal and said oxidant, to progressively draw molten metal through the oxidation reaction product towards the oxidant so that fresh oxidation reaction product continues to form at an interface between said oxidant and previously formed oxidation reaction product that has infiltrated the preform; and (e) continuing said reacting until said oxidation reaction product has infiltrated said preform to said defined surface boundary to produce said ceramic composite body having a configuration of said preform.

---

### 5,017,527

### MECHANICAL SEALS OF SIC-COATED GRAPHITE BY RATE-CONTROLLED GENERATION OF SIO AND PROCESS THEREFOR

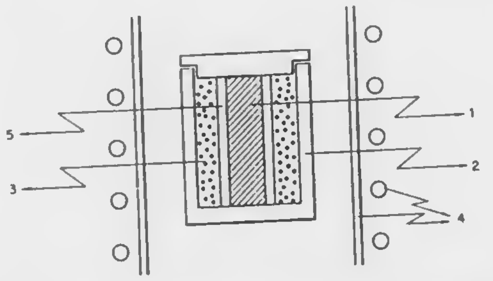
**Lee June-Gunn; Kim Chang-Sam; Choi Heon-Jin, and Park Seong-Hoon, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science & Technology, Seoul, Rep. of Korea**

**Filed Apr. 3, 1989, Ser. No. 332,826**

**Claims priority, application Rep. of Korea, Jul. 20, 1988, 88-9033[U]**

**Int. Cl.$^5$ C04B** *35/52, 35/56*

**U.S. Cl. 501—90** **8 Claims**



1. A process for manufacturing a siliconized graphite product, which comprises embedding graphite in a powder mixture of about 50 wt. % silicon carbide and about 50 wt. % silica, or about 50 wt. % silicon nitride and about 50 wt. % silica, followed by subjection to an elevated temperature ranging from 1800° C. to 2100° C. under a non-oxidizing atmosphere.

2. A process for manufacturing a siliconized graphite product, which comprises loading graphite at the center of an induction furnace, and loading a powder mixture of about 50 wt. % silicon carbide and about 50 wt. % silica, or about 50 wt. % silicon nitride and about 50 wt. % silica around the graphite, followed by subjection to an elevated temperature ranging from 1800° C. to 2100° C. under a non-oxidizing atmosphere.

3. A process for manufacturing a siliconized graphite product, which comprises loading insulating-felt wrapped graphite at the center of an induction furnace, and loading a powder mixture of about 50 wt. % silicon carbide and about 50 wt. % silica, or about 50 wt. % silicon nitride and about 50 wt. % silica around the graphite, followed by subjection to an elevated temperature ranging from 1800° C. to 2100° C. under a non-oxidizing atmosphere.

4. A siliconized graphite product prepared according to any one of claim 1 to 3.

---

### 5,017,528

### MODIFIED SILICON CARBIDE WHISKERS

**Terry N. Tiegs, Lenoir City, and Terrence B. Lindemer, Oak Ridge, both of Tenn., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.**

**Division of Ser. No. 152,276, Feb. 4, 1988, Pat. No. 4,916,092. This application Nov. 30, 1989, Ser. No. 444,583**

**Int. Cl.$^5$ C04B** *35/56*

**U.S. Cl. 501—95** **5 Claims**

5. A silicon carbide whisker comprising an elongated body essentially formed of a monocrystalline silicon carbide microstructure with exposed surfaces thereon, said whiskers having a surface characterized by a silicon dioxide-to-silicon carbide ratio of less than 0.1, and a concentration of calcium oxide less than about 1.5 wt. %, said elongated body having a diameter in the range of about 0.1 μm to about 10 μm and having a length-to-diameter ratio greater than about 10, and said exposed surfaces thereon being coated with a layer of free carbon having a thickness in the range of about 1 to about 100 angstroms.

### 5,017,529

### PROCESS FOR MAKING CERAMIC MATERIALS

**Yigal D. Blum, Menlo Park, and Richard M. Laine, Palo Alto, both of Calif., assignors to SRI International, Menlo Park, Calif.**

**Continuation of Ser. No. 251,560, Sep. 30, 1988, abandoned, which is a division of Ser. No. 907,395, Sep. 15, 1986, Pat. No. 4,801,439. This application Dec. 1, 1989, Ser. No. 449,495**

**The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.**

**Int. Cl.$^5$ C04B** *35/58, 35/56*

**U.S. Cl. 501—95** **19 Claims**

18. A process for preparing a shaped ceramic product, comprising the steps of:

(a) reacting a first reactant that has at least one Z—H bond, where Z represents a Group VA nonmetal, with a second reactant that has at least one M—H bond, where M is a Group IIIA metal, in the presence of a metal catalyst that catalyzes dehydrocoupling of the Z—H and M—H bonds, at a reaction temperature in the range of −20° C. and 250° C., to give a tractable, nonvolatile preceramic compound containing at least one group IIIA metal-Group VA nonmetal bond;

(b) shaping said preceramic compound to give a desired form; and

(c) pyrolyzing said shaped preceramic compound to give a ceramic product in shaped form.

---

### 5,017,530

### SILICON NITRIDE SINTERED BODY AND PROCESS FOR PREPARATION THEREOF

**Toshihiko Arakawa; Toshiyuki Mori, and Yoshihiro Matsumoto, all of Yokohama, Japan, assignors to Tosoh Corporation, Shinnanyo, Japan**

**Continuation of Ser. No. 148,631, Jan. 26, 1988, abandoned. This application Aug. 30, 1989, Ser. No. 401,508**

**Claims priority, application Japan, Nov. 28, 1987, 62-016283**

**Int. Cl.$^5$ C04B** *35/58*

**U.S. Cl. 501—98** **3 Claims**

1. A process for the preparation of a silicon nitride sintered body, which consists essentially of sintering a powdery silicon nitride mixture consisting essentially of 1.5 to 3.0% by weight of yttrium oxide powder, 0.1 to 1.0% by weight of aluminum oxide powder, and 96 to 98.4% by weight of silicon nitride powder, the yttrium oxide/aluminum oxide weight ratio being at least 2.5, the oxygen content in the silicon nitride powder being not more than 2.0% by weight and the total metallic impurity content in the silicon nitride powder being not more than 200 ppm, at a temperature of 1,850° C. to 2,000° C. in a non-oxidizing atmosphere.

---

### 5,017,531

### SILICON NITRIDE CERAMIC SINTERED BODIES

**Noriyuki Ukai; Issei Hayakawa, both of Nagoya; Mithuru Miyamoto, Kariya, and Tadaaki Matsuhisa, Kasugai, all of Japan, assignors to NGK Insulators, Ltd., Japan**

**Continuation of Ser. No. 295,770, Jan. 11, 1989, abandoned, which is a division of Ser. No. 129,135, Dec. 7, 1987, abandoned. This application Jan. 24, 1990, Ser. No. 469,727**

**Claims priority, application Japan, Dec. 16, 1986, 61-297756; Jan. 8, 1987, 62-1132; Feb. 18, 1987, 62-35233; Mar. 31, 1987, 62-78228**

**Int. Cl.$^5$ C04B** *35/58*

**U.S. Cl. 501—98** **4 Claims**

1. A $Si_3N_4$ sintered ceramic body, consisting essentially of:

MgO and/or an Mg compound in an amount of 0.5 to 15.9% by weight when calculated as MgO;

$ZRO_2$ and/or a Zr compound in an amount of 0.5 to 13.9% by weight when calculated as $ZrO_2$;

$Y_2O_3$ and/or a Y compound in an amount of 2 to 14.8% by weight when calculated as $Y_2O_3$; and

the remainder being $Si_3N_4$;

wherein said sintered body has a maximum pore diameter of not more than 10 μm, a porosity of not more than 0.5%, and a four point flexural strength at room temperature of not less than 100 kg/mm$^2$.

---

### 5,017,532

### SINTERED CERAMIC PRODUCT

**Neville Sonnenberg, Johannesburg, South Africa; Angus I. Kingon, Cary, N.C., and Adrian W. Paterson, Pretoria, South Africa, assignors to CSIR, South Africa**

**Continuation of Ser. No. 210,848, Jun. 24, 1988, abandoned. This application May 12, 1989, Ser. No. 355,100**

**Claims priority, application South Africa, Jun. 24, 1987, 87/4575**

**Int. Cl.$^5$ C04B** *35/48*

**U.S. Cl. 501—103** **35 Claims**

1. A sintered ceramic product which is a substantially homogeneous mixture consisting essentially of:

76–92 mole % zirconia;

8–20 mole % ceria; and

0.1–1.2 mole % of a rare earth metal oxide selected from the group consisting of lanthana, praseodymia and mixtures thereof, and at most 0.1 mole % in total of $Nd_2O_3$, $Gd_2O_3$, and $Yb_2O_3$ as impurities, the zirconia, ceria and said rare earth metal oxide forming at least 95% by mass of the mixture.

---

### 5,017,533

### METHOD FOR IN SITU TAILORING THE METALLIC COMPONENT OF CERAMIC ARTICLES

**Marc S. Newkirk; Christopher R. Kennedy, and Robert C. Kantner, all of Newark, Del., assignors to Lanxide Technology Company, LP, Newark, Del.**

**Continuation of Ser. No. 908,454, Sep. 17, 1986, abandoned. This application Aug. 2, 1989, Ser. No. 389,506**

**Int. Cl.$^5$ C04B** *35/10*

**U.S. Cl. 501—127** **24 Claims**

1. A method for producing a ceramic body comprising an oxidation reaction product obtained by oxidation of a precursor metal to form a polycrystalline material comprising (i) an oxidation reaction product of said precursor metal with a vapor-phase oxidant, and (ii) a metallic component, said method comprising the steps of:

(a) heating a source of precursor metal in the presence of a vapor-phase oxidant to a temperature above the melting point of said precursor metal but below the melting point of its oxidation reaction product to form a body of molten precursor metal;

(b) reacting said body of molten precursor metal with said vapor-phase oxidant at said temperature to permit said oxidation reaction product to form; and inducing a flux of molten metal within said oxidation reaction product, said flux comprising said molten precursor metal and at least one second metal, wherein a primary constituent of said at least one second metal comprises at least one material selected from the group consisting of titanium, iron, nickel, copper, zirconium, hafnium, cobalt, manganese, silver, gold and platinum and wherein said second metal is present in an amount greater than about 2.0% by weight of said parent metal when the formation of said oxidation reaction product is begun;

(c) maintaining at least a portion of said oxidation reaction product in contact with and between said molten precursor metal and said vapor-phase oxidant at said temperature to progressively draw molten precursor metal through said oxidation reaction product towards said vapor-phase oxidant to permit fresh oxidation reaction product to continue to form at an interface between said vapor-phase oxidant and previously formed oxidation reaction product, said maintaining being continued for a time sufficient to deplete said precursor metal in said flux relative to said at least one second metal to result in formation or enrich-

VOL
1126
ISS
3
MY
21
1991
UMI

ment of at least one metallic phase comprising at least said second metal; and

(d) continuing step (c) at said temperature for a time sufficient to form said ceramic body comprising (a) said oxidation reaction product; and (b) a metallic component comprising said at least one metallic phase; and

(e) recovering said formed ceramic body, whereby said at least one metallic phase is present in a significant quantity such that at least one property of the formed ceramic body is effected by said at least one metallic phase.

---

### 5,017,534

## METHOD FOR THE FABRICATION OF A CERAMIC MATERIAL BY HYBRID CHEMICAL PROCESS AND MATERIAL OBTAINED THEREBY

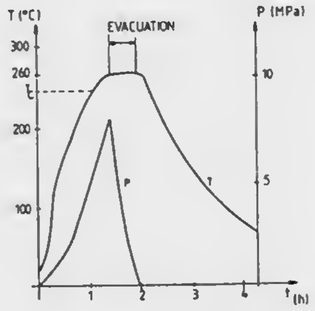
**Frédéric Chaput, Massy, and Jean-Pierre Boilot, Meudon la Foret, both of France, assignors to Compagnie Europeenne de Composants Electroniques -LCC, Courbevoie, France**

**Filed Aug. 30, 1989, Ser. No. 400,708**

**Claims priority, application France, Sep. 2, 1988, 88 11498**

**Int. Cl.$^5$ C04B** *35/46, 35/48*

**U.S. Cl. 501—134** **9 Claims**



1. A method for the fabrication, by chemical process, of a ceramic material comprising a compound belonging to the system:

$$Ba_xSr_{1-x}(Ti_uZr_vHf_w)O_3$$

with $0 \leqq X \leqq 1$, where the coefficients u, v and w may be zero, but at least one of them is not zero and 0.95 u+v+w 1.05, said method comprising the following steps:

(i) mixing the alcohol with at least one alcoholate selected from the group consisting of a titanium alcoholate, a zirconium alcoholate and a hafnium alcoholate, to obtain a solution;

(ii) adding at least one of hydrated barium hydroxide and hydrated strontium hydroxide in the solid state to said solution, with agitation, to obtain a perovskite phase in the form of a paste;

(iii) drying said paste, to obtain a powder; and

(iv) sintering said powder, to obtain said ceramic material.

---

### 5,017,535

## PROCESS FOR THE PREPARATION OF A PRESULFIDED AND SULFIDED CATALYST

**Johannes W. F. M. Schoonhoven, Leusden; Sonja Eijsbouts, Hertogenbosch; Jacobus J. L. Heinerman, Amsterdam, all of Netherlands, and Ludwig Eisenhuth, Obernburg, Fed. Rep. of Germany, assignors to Akzo N.V., Arnhem, Netherlands**

**Filed Jun. 20, 1990, Ser. No. 540,951**

**Int. Cl.$^5$ B01J** *27/30, 37/20, 27/051;* **C10G** *49/04*

**U.S. Cl. 502—30** **5 Claims**

1. A process for the preparation of a presulfided catalyst which following activation is suitable for use in the catalytic hydrotreatment of hydrocarbon-containing feeds comprising providing ex situ a fresh or regenerated catalyst containing a carrier material and one or more catalytically active metals or metal compounds with an effective amount of an organic sulfur compound with a boiling point exceeding 100° C. and having formula

$$X-R^1-S-R^2-{}_pS-R^3-Y \qquad (I)$$

wherein

$p=0$, 1 or 2,

$R^1$, $R^2$, and $R^3$ may be the same or different and represent alkylene groups having 1–4 carbon atoms,

X and Y may be the same or different and have the meaning of —OH, —OR$^4$ or —C(O)OR$^5$, wherein

$R^4$ has the meaning of an alkyl group or acyl group with 1–3 carbon atoms, and

$R^5$ has the meaning of —H, an ammonium group or an alkyl group with 1–3 carbon atoms.

---

### 5,017,536

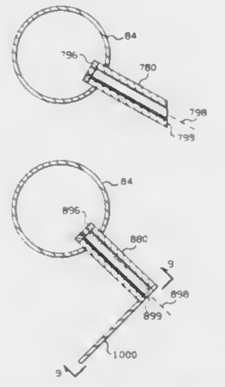
## CATALYST REGENERATION INCLUDING METHOD OF INTRODUCING OXYGEN INTO FLUIDIZED BED

**Frank W. Skraba, Sweeny, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 576,821, Feb. 3, 1984, Pat. No. 4,994,239. This application Apr. 2, 1990, Ser. No. 502,947**

**Int. Cl.$^5$ B01J** *21/20, 38/28, 8/18;* **C10G** *11/18*

**U.S. Cl. 502—41** **8 Claims**



1. In a process for regenerating a cracking catalyst by introducing an oxygen-containing gas into a fluidized bed of cracking catalyst particles through a plurality of nozzles arranged on the sidewalls of a generally horizontally positioned grid of supply lines, wherein each one of the plurality of nozzles has a length which is less than the outside diameter of the supply line, the improvement comprising introducing the oxygen containing gas into the fluidized bed through a nozzle arrangement wherein a minor portion of the plurality of nozzles on the sidewalls of the grid of the supply lines have a length greater than the outside diameter of the supply lines and a major portion of the plurality of nozzles on the sidewalls of the grid of the supply lines have a length less than the outside diameter of the supply lines.

---

### 5,017,537

## PILLARING OF LAYERED COMPOUNDS

**Abraham Clearfield, College Station, Tex., assignor to The Texas A&M University System, College Station, Tex.**

**Continuation of Ser. No. 142,731, Jan. 11, 1988, abandoned. This application Jul. 14, 1989, Ser. No. 382,059**

**Int. Cl.$^5$ B01J** *29/04, 29/06*

**U.S. Cl. 502—63** **15 Claims**

1. A process for pillaring a layered material which comprises:

(a) preparing the layered material in the proton form;

(b) intercalating an amine; and

(c) displacing the intercalate with an inorganic pillaring substance.

### 5,017,538

## CATALYST FOR PURIFYING EXHAUST GAS AND A METHOD OF PRODUCING THE SAME

**Shinichi Takeshima, Shizuoka, Japan, assignor to Toyota Jidosha kabushiki Kaisha, Japan**

**Filed Apr. 18, 1989, Ser. No. 339,838**

**Claims priority, application Japan, Apr. 18, 1988, 63-95026**

**Int. Cl.$^5$ B01J** *29/30*

**U.S. Cl. 502—64** **9 Claims**

1. In the method of producing an exhaust gas purification catalyst comprising a zeolite carried on a refractory support and containing copper introduced thereinto by ion exchange so that said zeolite carries copper ions on the surfaces of its supercage and has a square arrangement of four oxygen atoms around a copper ion, the improvement which comprises dipping said zeolite in a mixed solution of a copper carboxylate and ammonia to cause said ion exchange to take place.

---

### 5,017,539

## POLYMERIZATION OF BUTADIENE

**Derek K. Jenkins, Southampton, and Peter J. Ansell, Stirling, both of United Kingdom, assignors to Enichem Elastomers Ltd., Southhampton, United Kingdom**

**Filed Dec. 22, 1989, Ser. No. 454,917**

**Claims priority, application United Kingdom, Dec. 22, 1988, 8830007**

**Int. Cl.$^5$ B01J** *31/00, 37/00*

**U.S. Cl. 502—102** **10 Claims**

1. A process for preparing a catalyst for the polymerisation of butadiene comprising contacting in hydrocarbon solvent (a) an aluminum hydrocarbyl (other than aluminium triethyl) or an aluminium hydrocarbyl hydride, (b) neodymium neodecanoate or neodymium naphthenate and (c) a source of halogen, the contacting and subsequent mixing being carried out at a temperature of −15° C. to −60° C., and ageing the catalyst for a period of at least 8 hours at −20° C. to −40° C. before use in polymerisation.

---

### 5,017,540

## SILICON HYDRIDE SURFACE INTERMEDIATES FOR CHEMICAL SEPARATIONS APPARATUS

**Junior E. Sandoval, 812 S. Saratoga Ave., #Q111, San Jose, Calif. 95129, and Joseph J. Pesek, 4142 Rosenbaum Ave., San Jose, Calif. 95136**

**Filed Sep. 15, 1989, Ser. No. 407,816**

**Int. Cl.$^5$ B01J** *20/10*

**U.S. Cl. 502—158** **8 Claims**

1. A method for modifying the surface of an inorganic oxide substrate useful for chromatography or electrophoresis separations comprising:

converting surface hydroxyl groups of said substrate to intermediate surface hydride groups; and

reacting said intermediate surface hydride groups with an olefin reagent in the presence of a catalyst to form a reaction product thereof on the surface of the substrate, the reaction product having carbon atoms of the olefin reagent directly linked to the surface of the substrate.

---

### 5,017,541

## CATALYST FOR THE ISOMERIZATION OF ALKANES

**Robert J. Schmidt; Robert S. Haizmann, both of Rolling Meadows; Mark R. Ford, Buffalo Grove; C. David Low, Lisle, and Frank H. Adams, LaGrange Park, all of Ill., assignors to UOP, Des Plaines, Ill.**

**Division of Ser. No. 435,304, Nov. 13, 1989. This application Jun. 27, 1990, Ser. No. 544,569**

**Int. Cl.$^5$ B01J** *31/30, 27/13*

**U.S. Cl. 502—169** **11 Claims**

1. A catalyst particle comprising a refractory inorganic-oxide support, from about 1 to 15 mass % of a Friedel-Crafts metal halide and from about 0.01 to 2 mass % on an elemental basis of a surface-layer platinum-group metal component, wherein the concentration of platinum-group metal component on the surface layer of the catalyst particle is at least 1.5 times the magnitude of the concentration of platinum-group metal component in the central core of the catalyst particle.

9. The catalyst particle of claim 1 further comprising an organic polyhalo component in an amount to add at least 0.1 mass % combined halogen to the catalyst.

---

### 5,017,542

## CATALYST FOR THE OXIDATION AND AMMONOXIDATION OF α-, β-UNSATURATED HYDROCARBONS

**Hans Martan; Wolf D. Mross, both of Frankenthal, and Gerd-Juergen Engert, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Aug. 9, 1989, Ser. No. 391,310**

**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3827639**

**Int. Cl.$^5$ B01J** *23/78, 23/84, 23/88, 35/02*

**U.S. Cl. 502—209** **1 Claim**

1. A catalyst particle of an active material of the formula

$$X_{12}Bi_aY_bZ_cA_dE_eG_fO_x,$$

wherein

X is selected from the group consisting of Mo, V, W and mixtures thereof,

Y is selected from the group consisting of Fe, Ce and mixtures thereof,

Z is selected from the group consisting of Ni, Co, Zn and mixtures thereof,

A is one or more alkali metals,

E is selected from the group consisting of P, As, Sb, B and mixtures thereof,

G is selected from the group consisting of Si, Al, Ti and mixtures thereof,

wherein

a is from 0.1–5,

b is from 0.1–10,

c is from 1–15,

d is from 0.01–2,

e is from 0–2,

f is from 0–30, and

x is the number of oxygen atoms required to saturate the valences of the other components, wherein said particle has the shape of a 3-spoked to 5-spoked wheel, or of a rosette, each of which have wall thicknesses of from 0.5–4 mm and a diameter of from 3–20 mm.

---

### 5,017,543

## PROCESS FOR THE PREPARATION OF A DEHYDROGENATION CATALYST

**Georges E. M. J. De Clippeleir, Sint-Pieters-Leeuw, Belgium; Elizabeth Baumann Ofstad, Jar, and Steinar Kvisle, Oslo, both of Norway, assignors to Labofina, S.A., Brussels, Belgium**

**Division of Ser. No. 310,261, Feb. 13, 1989, Pat. No. 4,962,265. This application May 3, 1990, Ser. No. 519,183**

**Claims priority, application Belgium, Feb. 11, 1988, 8800157; Feb. 11, 1988, 8800158**

**Int. Cl.$^5$ B01J** *23/02, 23/04, 23/58*

**U.S. Cl. 502—328** **20 Claims**

1. A process for the preparation of a dehyudrogenation catalyst comprising submitting a suitable support containing a co-catalyst,

to a first treatment with a metal compound of the platinum group or rhenium followed by a calcination in air and by a reduction in the presence of hydrogen;

then to an intermediate treatment to deposit an alkali or alkaline-earth metal as a promoter followed by a calcination;

VOL 1126 ISS 3 MY 21 1991 UMI

and finally to a second treatment with a metal compound of the platinum group or rhenium followed by a calcination.

---

### 5,017,544
### PRODUCTION PROCESS OF FERRITE STAINLESS STEEL COVERED WITH OXIDE WHISKER

**Yuji Ikegami; Shinichi Sasayama; Noboru Tachino, and Takeshi Kamiya, all of Kawasaki, Japan, assignors to Nippon Yakin Kogyo Co., Ltd., Tokyo, Japan**

**Filed Nov. 29, 1988, Ser. No. 277,649**

**Claims priority, application Japan, Nov. 30, 1987, 62-299711; Jul. 6, 1988, 63-166958; Jul. 6, 1988, 63-166959; Sep. 6, 1988, 63-221279**

**Int. Cl.$^5$ C23C** *8/00*

U.S. Cl. 502—439 11 Claims

1. A process for producing ferrite stainless steel covered with theta-alumina whisker grown from an aluminum coat deposited by mechanical plating, comprising:

mechanically plating ferrite stainless steel with an aluminum layer up to 10 microns in thickness,

diffusing said aluminum into said stainless steel by heating at a temperature between 700 and 1200° C. in an atmosphere of an oxygen partial pressure of 0.04 atmosphere or below so that the surface of said ferrite stainless steel turns into an aluminum-enriched ferrite phase, and

allowing said whisker to grow by heating at a temperature of from 850° to 975° C. in air.

---

### 5,017,545
### HEAT SENSITIVE RECORDING MATERIAL

**Nobuo Kanda, Neyagawa; Ritsuo Mandoh, Sakai; Masaharu Nojima, Amagasaki, and Naoto Arai, Ikeda, all of Japan, assignors to Kanzaki Paper Manufacturing Company, Limited, Tokyo, Japan**

**Filed Jun. 1, 1989, Ser. No. 359,899**

**Claims priority, application Japan, Jun. 8, 1988, 63-142097**

**Int. Cl.$^5$ B41M** *5/18*

U.S. Cl. 503—208 4 Claims

1. A heat sensitive recording material comprising a substrate and a heat sensitive recording layer provided on the substrate, wherein the heat sensitive recording layer contains a colorless or light-colored basic dye and a color acceptor which is reactive with the dye to form a color when contacted with the dye, said heat sensitive recording layer further containing:

(1) a heat-fusible substance which is 1,2-diphenoxyethane said heat-fusible substance exhibiting a weight reduction of at least 5% at 200° C. based on the weight at 25° C. under the condition of a rate of temperature increase of 20° C./minute;

(2) 10–50 parts by weight of a wax per 100 parts by weight of the heat-fusible substance;

(3) 30–60 parts by weight of a lubricant per 100 parts by weight of the heat-fusible substance; and

(4) 50–300 parts by weight of an oil-absorbing pigment per 100 parts of the heat-fusible substance, said oil-absorbing pigment having an oil absorption of at least 85 ml/100 g.

---

### 5,017,546
### ALKYL SALICYLATE DEVELOPER RESIN FOR CARBONLESS COPY PAPER AND IMAGING USE

**Karl M. Brinkman, Box 12C Hudson Dr., Galway, N.Y. 12074; John L. Sullivan, 6 Hills Rd., Ballston Lake, N.Y. 12019, and David R. Hanley, 102 Farmington Ave., Gansevort, N.Y. 12831**

**Continuation of Ser. No. 184,066, Apr. 20, 1988, abandoned. This application Jul. 13, 1990, Ser. No. 552,322**

**Int. Cl.$^5$ B41M** *5/12;* **C08G** *8/28*

U.S. Cl. 503—211 19 Claims

1. In a system in which images are formed selectively in parts of a surface in the form of a colored material by the reaction of one or more colorless chromogenic materials with an acidic developer;

the improvement in which the developer contains a phenol/aldehyde condensation product produced by the reaction together of an alkyl-substituted salicylic acid, an alkyl-substituted phenol, and an aldehyde which condensation product has been reacted with a metal source.

---

### 5,017,547
### USE OF VACUUM FOR IMPROVED DENSITY IN LASER-INDUCED THERMAL DYE TRANSFER

**Charles D. DeBoer, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 26, 1990, Ser. No. 543,631**

**Int. Cl.$^5$ B41M** *5/035, 5/26*

U.S. Cl. 503—227 6 Claims

1. In a process of forming a laser-induced thermal dye transfer image comprising:

(a) contacting at least one dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material with a dye-receiving element comprising a support having thereon a polymeric dye image-receiving layer, said dye-donor and dye-receiver being separated by a finite distance to create a space;

(b) imagewise-heating said dye-donor element by means of a laser; and

(c) transferring a dye image to said dye-receiving element to form said laser-induced thermal dye transfer image,

the improvement wherein a vacuum is applied to said space between said donor and said receiver in order to minimize the mean free path the vaporized dye molecules travel without collision with other molecules for transfer to said receiver.

---

### 5,017,548
### METHOD OF PRODUCING HIGH-TEMPERATURE SUPERCONDUCTING CERAMICS MATERIAL BY MECHANICAL ORIENTATION

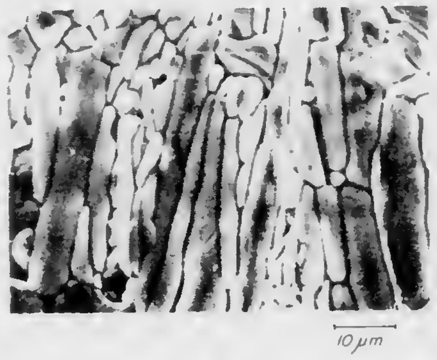
**Kazuyoshi Hirakawa; Hisao Kuriyaki, both of Fukuoka, and Xu-guang Zheng, Kasuga, all of Japan, assignors to Kyushu University, Japan**

**Filed Dec. 1, 1989, Ser. No. 444,788**

**Claims priority, application Japan, Mar. 16, 1989, 1-62297**

**Int. Cl.$^5$ H01L** *39/12*

U.S. Cl. 505—1 4 Claims



1. A method for producing high-temperature superconducting ceramic material through mechanical orientation, the method comprising the steps of:

a. mixing starting materials in powdered form and in proportions effective to produce a mixture for a high-temperature superconducting oxide ceramic having anisotropic crystal grains;

b. shaping the mixture to provide a shaped mixture;

c. calcining the shaped mixture at a temperature ranging from 600° to 900° C. to provide a calcined mixture;

d. firing the calcined mixture at a temperature higher than 1,000° C. in an oxygen atmosphere for a time effective to produce a superconducting oxide ceramic having crystal grains, and cooling the superconducting oxide ceramic;

e. pulverizing the superconductive oxide ceramic of step d with means effective to pulverize same into particles having one of a plate-like form and a needle-like form based on the anisotropic form of the crystal grains to provide pulverized particles;

f. placing pulverized particles of a selected size into a vessel;

g. vibrating the vessel with an acoustic vibrator means under conditions effective to cause the pulverized particles placed therein to turn toward a common preferred orientation to provide oriented particles;

h. shaping the oriented particles by applying pressure to the vessel in a direction perpendicular to the common preferred orientation; and

i. firing the shape and oriented particles at a temperature ranging from 900° to 1,000° C. for a time effective to produce a high-temperature superconducting oxide ceramic material with anisotropic crystal structure.

---

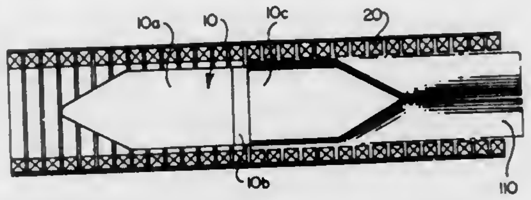
### 5,017,549
### ELECTROMAGNETIC MEISSNER EFFECT LAUNCHER

**Glen A. Robertson, Harvest, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Oct. 31, 1989, Ser. No. 429,515**

**Int. Cl.$^5$ F41B** *6/00*

U.S. Cl. 505—1 9 Claims



1. A superconducting projectile launcher system comprising

a projectile having a front surface and a rear surface, said rear surface including an outer layer of a superconduting material and said projectile further comprising cooling means for selectively maintaining said outer layer in a superconducting state, said cooling means including a tank for liquid coolant contained within said projectile and means for supplying liquid coolant from said tank to the inner surface of said outer layer to provide cooling thereof;

a barrel in which said projectile is received; and

means disposed along said barrel for generating a magnetic field adjacent to said rear surface of said projectile so as to provide propulsion of said projectile and for causing said magnetic field to propagate along said barrel behind said projectile to cause acceleration of said projectile along said barrel.

---

### 5,017,550
### METHOD FOR PRODUCING THIN FILM OF OXIDE SUPERCONDUCTOR

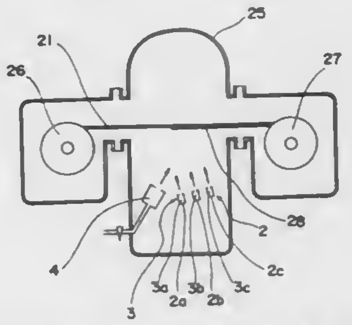
**Jun Shioya; Yoichi Yamaguchi; Akira Mizoguchi; Noriyuki Yoshida; Kenichi Takahashi; Kenji Miyazaki; Satoshi Takano, and Noriki Hayashi, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Mar. 30, 1988, Ser. No. 175,214**

**Claims priority, application Japan, Mar. 30, 1987, 62-79354; Mar. 30, 1987, 62-79355; Mar. 31, 1987, 62-80426; Aug. 21, 1987, 62-208925**

**Int. Cl.$^5$ B05D** *5/12, 3/06;* **C23C** *16/00*

U.S. Cl. 505—1 9 Claims



1. A method for producing a thin film of an oxide superconductor comprising independently vaporizing at least one first material selected from the group consisting of Y, lanthanides and their compounds, at least one second material selected from the group consisting of Ca, Sr and Ba and their compounds, and one third material selected from the group consisting of Cu and its compounds, ionizing the vaporized materials and irradiating a substrate with oxygen ions to deposit the vaporized materials together with oxygen on the substrate to form the thin film of the oxide superconductor.

---

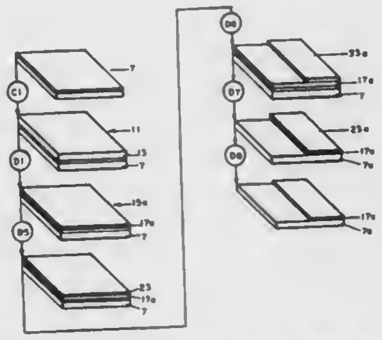
### 5,017,551
### BARRIER LAYER CONTAINING CONDUCTIVE ARTICLES

**John A. Agostinelli, Rochester; Jose M. Mir, Webster; Gustavo R. Paz-Pujalt, Rochester; Mark Lelental, Rochester, and Ralph A. Nicholas, III, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 85,047, Aug. 13, 1987, abandoned, and a continuation-in-part of Ser. No. 46,593, May 4, 1987, Pat. No. 4,880,770. This application Mar. 30, 1989, Ser. No. 330,409**

**Int. Cl.$^5$ B32B** *3/02*

U.S. Cl. 505—1 31 Claims



1. An element comprised of a substrate and an electrically conductive layer located on the substrate

characterized in that

the electrically conductive layer is comprised of at least 45 percent by volume of a crystalline rare earth alkaline earth copper oxide,

the substrate is formed of a material which is capable of

VOL
1126
ISS
3
MY
21
1991
UMI

withstanding temperatures necessary to form the conductive layer and increases the electrical resistance of the conductive layer when in contact with the rare earth alkaline earth copper oxide during its crystallization to an electrically conductive form,

a barrier layer having a thickness of greater than 500 Angstroms is interposed between the electrically conductive layer and the substrate, the barrier layer being comprised of a metal in its elemental form or in the form of an oxide or silicide chosen from the group consisting of (a) group IVa metal or a platinum group metal and (b) magnesium silicide or silicate.

---

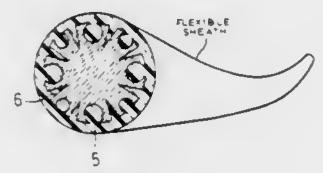
### 5,017,552
### SUPERCONDUCTOR WIRE AND METHOD OF MAKING SAME

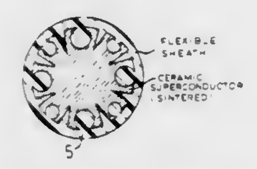
**George Porcell, Riverdale, N.Y., assignor to International Superconductor, Riverdale, N.Y.**

**Filed Mar. 15, 1989, Ser. No. 324,390**

**Int. Cl.$^5$ H01B** *12/00*

**U.S. Cl. 505—1** **15 Claims**





4. A superconductive wire comprising an elongated sintered body of copper oxide based sintered ceramic superconductive material formed along its periphery with a plurality of longitudinally extending grooves.

9. A method of making a superconductive wire, comprising the steps of:
- (a) filling an elongated deformable sheath with a sinterable mass of a composition adapted to form a ceramic superconductive material upon sintering;
- (b) bending said sheath filled with said mass into a nonlinear shape;
- (c) sintering said mass into a superconductive body of said shape; and
- (d) burning off said sheath from said body.

---

### 5,017,553
### HIGH TEMPERATURE SUPERCONDUCTOR HAVING A HIGH STRENGTH THERMALLY MATCHED HIGH TEMPERATURE SHEATH

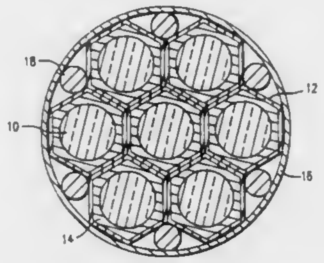
**Graham A. Whitlow, Murrysville, and Natraj C. Iyer, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 25, 1990, Ser. No. 469,976**

**Int. Cl.$^5$ H01B** *12/00*

**U.S. Cl. 505—1** **15 Claims**

1. A superconductor having a core comprising alkaline earth metal copper oxide based material having superconductivity capability, enclosed by a contacting metallic sheath, the sheath comprising a layer of Ag-Pd alloy, containing interdispersed, discrete particles of a metal selected from the group consisting of W, Mo, Ni, and mixtures thereof, where the particles have diameters from 0.05 micrometer to 75 micrometers and constitute from 5 weight % to 45 weight % of the total alloy-particle weight.



---

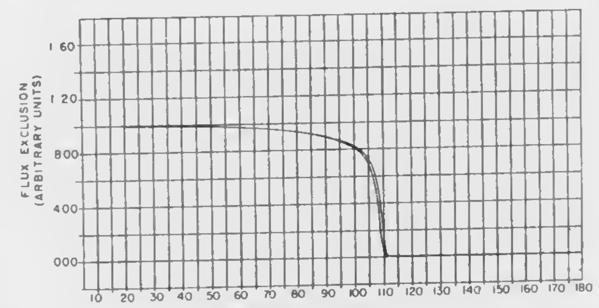
### 5,017,554
### SUPERCONDUCTING METAL OXIDE TL-PB-CA-SR-CU-O COMPOSITIONS AND PROCESSES FOR MANUFACTURE AND USE

**Munirpallam A. Subramanian, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 236,088, Aug. 24, 1988, and a continuation-in-part of Ser. No. 230,631, Aug. 10, 1988. This application Aug. 15, 1989, Ser. No. 415,679**

**Int. Cl.$^5$ C01F** *11/02;* **C01G** *3/02, 21/00;* **H01L** *39/12*

**U.S. Cl. 505—1** **15 Claims**



1. A process for preparing a superconducting composition of the nominal formula $Tl_ePb_aCa_bSr_cCu_dO_x$ wherein a is from about 1/10 to about 3/2, b is from about 1 to about 4, c is from about 1 to about 3, d is from about 1 to about 5, e is from about 3/10 to about 1 and $x=(a+b+c+d+e+y)$ where y is from about ½ to about 3, said process consisting essentially of
- (i) forming a mixture of oxides of Tl, Pb, Ca, Sr and Cu, the relative amounts of said oxides chosen so that the atomic ratio of Tl:Pb:Ca:Sr:Cu is e:a:b:c:d;
- (ii) heating said mixture of oxides to a temperature of about 850° C. to about 940° C. in a controlled atmosphere and maintaining the mixture at said temperature in said atmosphere for about 3 to 12 hours to form said composition; and
- (iii) cooling and recovering said composition.

---

### 5,017,556
### TREATMENT OF BLEEDING DISORDERS USING LIPID-FREE TISSUE FACTOR PROTEIN

**Donogh P. O'Brien, Bromley, England, and Gordon A. Vehar, San Carlos, Calif., assignors to Genentech, Inc., South San Francisco, Calif.**

**Continuation of Ser. No. 110,255, Oct. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 926,977, Nov. 4, 1986, abandoned. This application Mar. 8, 1989, Ser. No. 320,876**

**Int. Cl.$^5$ A61K** *37/02, 37/04;* **C07K** *15/16*

**U.S. Cl. 514—2** **15 Claims**

1. A method of treating an animal with a bleeding disorder selected from the group consisting of congenital coagulation disorders, acquired coagulation disorders, and trauma induced hemorrhagic conditions, comprising administering a therapeutically effective dose of a sterile tissue factor protein composition isotonic to blood, substantially devoid of the naturally occurring lipid of tissue factor and possessing substantially no procoagulant activity prior to administration, to an animal having such a bleeding disorder.

---

### 5,017,557
### TREATMENT OF INFERTILITY WITH SOMATOTROPHIN RELEASING FACTOR

**Andrea Fabbri; Costanzo Moretti, and Laura Forni, all of Rome, Italy, assignors to Industria Farmaceutica Serono S.p.A., Rome, Italy**

**Filed Jul. 8, 1988, Ser. No. 216,805**

**Claims priority, application Italy, Jul. 24, 1987, 48222 A/87; Apr. 26, 1988, 47887 A/88**

**Int. Cl.$^5$ A61K** *37/24, 37/36*

**U.S. Cl. 514—12** **19 Claims**

1. A method of treating infertility comprising administering to a patient in need of such treatment a pharmacologically efficacious quantity of a somatotrophin releasing-factor.

---

### 5,017,558
### SYNTHETIC VACCINE PEPTIDE EPITOMES OF HEPATITIS B SURFACE ANTIGEN

**Girish N. Vyas, Orinda, Calif., assignor to The Regents of the University of California, Oakland, Calif.**

**Continuation of Ser. No. 112,054, Jan. 14, 1980, Pat. No. 4,415,491. This application Sep. 13, 1983, Ser. No. 532,231**

**The portion of the term of this patent subsequent to Nov. 15, 2000, has been disclaimed.**

**Int. Cl.$^5$ A61K** *37/00, 37/02*

**U.S. Cl. 514—14** **4 Claims**

1. A composition comprising:

a conjugate in a physiologically acceptable carrier present in an amount sufficient to induce production of antibodies specific for hepatitis B surface antigen (HBsAg) in a host, wherein said conjugate comprises (a) an oligopeptide of the formula R″—AA$^{1}$″—TYR—PRO—SER—$(CYS)_3$—THR—LYS—PRO—THR—ASP—GLY—ASN—T″ where:

AA$^{1}$″ is a bond or a lysine; R″ is hydrogen, lysine, or a first peptide of the formula H—ILE—PRO—GLY—SER—THY, SER—THR—THR—SER—THR—GLY—SER, LYS—THR—CYS—THR—THR or MET—THR—PRO—ALA—GLN—GLY—ASN—SER—MET, or a fragment thereof;

and T″ is hydroxyl, lysine, cysteine, or a second peptide of the formula CYS—THR—CYS—ILE—PRO—ILE—PRO—SER—SER—TRP—OH or a fragment thereof, covalently conjugated to (b) an immunogen to which said host is preimmunized.

---

### 5,017,559
### AGENT FOR BLOCKING NONSPECIFIC ADSORPTION, PROCESS FOR PREPARING THEREOF AND METHOD OF BLOCKING NONSPECIFIC ADSORPTION

**Shunichi Dosako, Saitamaken, and Hiroshi Shinmoto, Kawagoe-shi, both of Japan, assignors to Snow Brand Milk Products Co., Ltd., Sapporo, Japan**

**Filed Feb. 24, 1989, Ser. No. 314,897**

**Claims priority, application Japan, Feb. 26, 1988, 63-42154; Jul. 27, 1988, 63-185521**

**Int. Cl.$^5$ A61K** *37/16*

**U.S. Cl. 514—21** **9 Claims**

1. An agent for blocking nonspecific adsorption, comprising a combination of milk protein as an effective constituent and a buffer solution containing one or more principal constituents selected from the group comprising organic acids and their salts, wherein the ratio of milk solid concentration(%)/organic acid concentration (mM) is 0.1 and less.

---

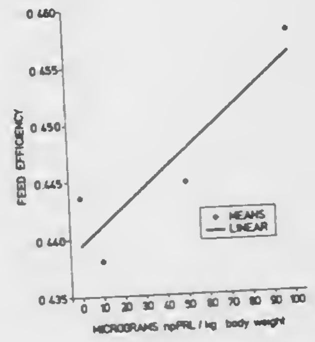
### 5,017,560
### POULTRY GROWTH PROMOTION

**Chauncey D. Baldwin; Brian R. Shricker, and Richard E. Ivy, all of Terre Haute, Ind., assignors to Pitman-Moore, Inc., Lake Forest, Ill.**

**Filed Nov. 6, 1987, Ser. No. 117,303**

**Int. Cl.$^5$ A61K** *9/08, 35/55, 37/02*

**U.S. Cl. 514—21** **11 Claims**



1. A method for promoting growth in poultry, comprising: administering a growth promoting amount of porcine prolactin (pPRL) to the poultry.

---

### 5,017,561
### ANTIBOTIC 6270B AND ITS USE AS AN ANTICOCCIDIOSIS AGENT AND A FEED ADDITIVE

**Yoko Kusakabe, Tokorozawa; Hiroshi Suzuki, Fujieda, and Hidehiko Kudo, Kashiwa, all of Japan, assignors to Kaken Pharmaceutical Co., Ltd., Tokyo, Japan**

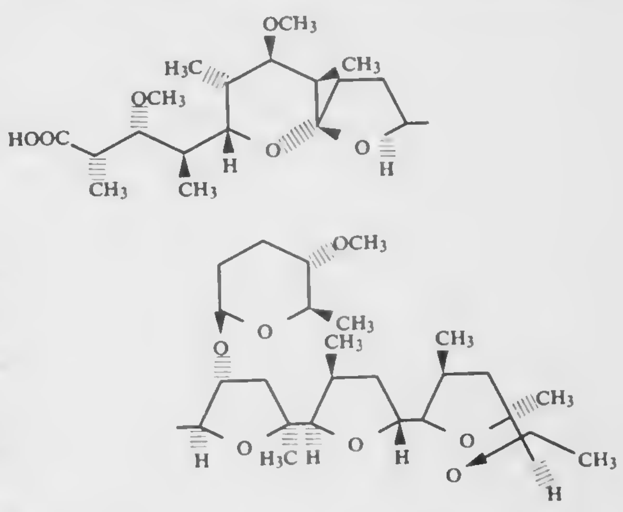
**Filed May 27, 1988, Ser. No. 199,849**

**Claims priority, application Japan, May 30, 1987, 62-133492**

**Int. Cl.$^5$ A61K** *31/71;* **C07H** *15/04*

**U.S. Cl. 514—25** **6 Claims**

1. An antibiotic 6270B having the stereostructural formula:



and a pharmaceutically acceptable salt thereof.

2. A method of preventing coccidiosis of domestic fowl and animals, which comprises:

administering a preventively effective amount of antibiotic 2670B as set forth in claim 1 to domestic fowl and animals.

VOL 1126
ISS 3
MY 21 1991
UMI

### 5,017,562
### CRYSTALLINE SAPONIN-CONTAINING COMPLEX

**Thomas J. Holmes, Saint Paul, and Barbara G. Nygaard, Minneapolis, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.**

**Continuation of Ser. No. 13,464, Feb. 11, 1987, abandoned. This application Oct. 5, 1989, Ser. No. 418,896**

**Int. Cl.$^5$ C07J *21/00***

**U.S. Cl. 514—26** **14 Claims**

1. A composition comprising a crystalline saponin-containing complex of a multiplicity of saponin compounds, each having various glycoside attachments, which upon acid hydrolysis yields at least two sapogenins, and which is derived from a steroidal-saponin-containing plant species selected from the group consisting of *Yucca gloriosa, Yucca mohavensis, Yucca schidigera, Yucca brevifolia, Yucca bacatta, Yucca carnerosana, Yucca schottii, Yucca whipplei, Yucca bacatta, Yucca carnerosana, Yucca schottii, Yucca aloifolia, Agave americana, Agave variegata, Agave lecheguilla, Dioscorea floribunda, Cyamopsis tetragonolobus, Medicago sativa;* contains less than 3 percent by weight plant fats and non-saponin carbohydrates; discolors when heated to a temperature of about 270° to about 280° C.; and melts at a temperature of about 285° to about 305° C.;

which composition is prepared by a process comprising the steps of:

(a) forming a mixture consisting essentially of one volume of an aqueous plant extract containing about 40% by weight of said plant species extract solids, and four volumes of a solvent consisting essentially of methanol, acetone and water in a volume ratio of about 1:1:1, so that the saponins, fats and non-saponin carbohydrates derived from said plant solids are dissolved in solution;

(b) separating any insoluble material from the mixture by filtration to yield a filtrate;

(c) placing the filtrate in a container which constrains evaporation at ambient temperature and pressure in a manner such that evaporation of the filtrate does not proceed at a rate or to an extent which cause the precipitation of the fats and non-saponin carbohydrates which are in solution; and

(d) allowing said filtrate to stand at ambient temperature and pressure for a period of time effective to form saponin-containing complex crystals, while substantially retaining the fats and non-saponin carbohydrates in solution.

3. A composition of matter comprising a crystalline saponin-containing complex of a multiplicity of gylcosylated saponin compound which upon acid hydrolysis yield at least two sapogenins, wherein said crystalline complex is derived from a steroidal-saponin-containing plant species selected from the group consisting of *Yucca gloriosa, Yucca mohavensis, Yucca schidigera, Yucca brevifolia, Yucca augustifolia, Yucca glauca, Yucca elata, Yucca whipplei, Yucca bacatta, Yucca carnerosana, Yucca schottii, Yucca aloifolia, Agave americana, Agave variegata, Agave lecheguilla, Dioscorea floribunda, Cyamopsis tetraganolabus, Medicago sativa;* contains less than 3 percent by weight plant fats and non-saponin carbohydrates; discolors when heated to a temperature of about 270° to about 280° C.; and melts at a temperature of about 285° to about 305° C.

---

### 5,017,563
### CASTANOSPERMINE ESTERS AND GLYCOSIDES

**Paul S. Liu; Barry L. Rhinehart, both of Cincinnati, Ohio, and John K. Daniel, Indianapolis, Ind., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

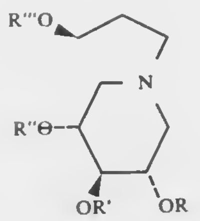
**Continuation of Ser. No. 274,584, Nov. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 69.351, Jul. 2, 1987, abandoned. This application May 1, 1990, Ser. No. 519,350**

**Claims priority, application Canada, Jun. 23, 1988, 570177**

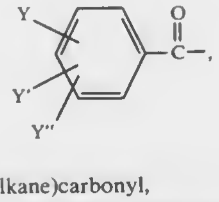
**Int. Cl.$^5$ C07D *471/04;* A61K *31/445***

**U.S. Cl. 514—27** **22 Claims**

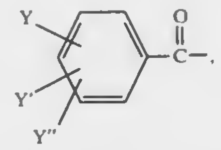
1. A compound of the formula:



wherein R, R′ and R″ are independently hydrogen, $C_{1-18}$ alkanoyl, (R″″—X—) ($C_{2-18}$ alkanoyl), ($C_{1-4}$ alkoxy)—CO—$(CH_2)_n$—



CO—, ($C_{3-6}$ cycloalkane)carbonyl, naphthalenecarbonyl optionally substituted by methyl or halogen; phenyl($C_{2-6}$ alkanoyl) or phenyl[(R″″—X—)$C_{2-6}$ alkanoyl] wherein the phenyl is optionally substituted by methyl or halogen; cinnamoyl; pyridinecarbonyl optionally substituted by methyl or halogen; thiophenecarbonyl optionally substituted by methyl or halogen; furancarbonyl optionally substituted by methyl or halogen; or a glycosyl radical, an O-methylglycosyl radical or a glycosyl radical acylated by Ac, each containing from 1 to 3 hexose or pentose units with attachment at the 1-position of the glycosyl radical; R‴ is hydrogen, $C_{1-18}$ alkanoyl, R″″—X—)-$C_{2-18}$ alkanoyl), ($C_{1-4}$ alkoxy)—CO—$(CH_2)_n$—CO—, ($C_{3-6}$ cycloalkane)carbonyl,



naphthalenecarbonyl optionally substituted by methyl or halogen, phenyl ($C_{2-6}$ alkanoyl) or phenyl[(R″″—X—)$C_{2-6}$ alkanoyl]wherein the phenyl is optionally substituted by methyl or halogen; cinnamoyl; pyridinecarbonyl optionally substituted by methyl or halogen; thiophenecarbonyl optionally substituted by methyl; furancarbonyl optionally substituted by methyl; n is a whole number from 0 to 4; Y is hydrogen, $C_{1-4}$ alkyl, phenyl, $C_{1-4}$ alkoxy, halogen, trifluoromethyl, $C_{1-4}$ alkylsulfonyl, $C_{1-4}$ alkylmercapto, ($C_{1-4}$ alkoxy)carbonyl, cyano, amino, ($C_{1-4}$ alkyl)amino or $(C_{1-4}\ \text{alkyl})_2$ amino; Y′ is hydrogen, $C_{1-4}$ *alkyl*, $C_{1-4}$ alkoxy, halogen or it is combined with Y to give 3,4-methylenedioxy; Y″ is hydrogen, $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy or halogen; Ac is benzoyl or $C_{2-6}$ alkanoyl; R″″ is hydrogen or $C_{1-4}$ alkyl; X is O, S or NH; with R, R′, R″ and R″″ selected in such a way that at least two of them but not more than three of them are hydrogen; or the pharmaceutically acceptable salts of the aforesaid compounds.

### 5,017,564
### SOLID PHARMACEUTICAL PREPARATION AND METHOD OF PRODUCING SAME

**Tadashi Makino, Ibaraki; Koji Doi, Suita; Masayoshi Matsuoka, Habikino, and Toshiharu Tsuboi, Settsu, all of Japan, assignors to Senju Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Jun. 2, 1989, Ser. No. 360,869**

**Claims priority, application Japan, Jun. 3, 1988, 63-137925**

**Int. Cl.$^5$ A01N *43/04, 43/78;* A61K *9/28, 9/30***

**U.S. Cl. 514—47** **10 Claims**

1. A solid pharmaceutical preparation in solid dosage unit form which contains disodium adenosine triphosphate and a compound selected from the group consisting of vitamin $B_1$ salt and vitamin $B_1$ derivatives having vitamin $B_1$ activity in an amount of 0.01 to 5 parts on vitamin $B_1$ basis per part by weight of disodium adenosine triphosphate.

---

### 5,017,565
### USE OF SULFATED POLYSACCHARIDES TO INHIBIT PANCREATIC CHOLESTEROL ESTERASE

**Louis G. Lange, III, 38 Kingsbury Pl., St. Louis, Mo. 63112, and Curtis A. Spilburg, 2230 Willow Ridge La., Chesterfield, Mo. 63017**

**Filed Apr. 20, 1989, Ser. No. 340,868**

**Int. Cl.$^5$ A61K *31/715, 31/725***

**U.S. Cl. 514—54** **2 Claims**

1. A method for inhibiting human pancreatic cholesterol esterase in the alimentary tract of man comprising orally administering an effective pancreatic cholesterol esterase inhibiting amount of a 3-sulfated polysaccharide.

---

### 5,017,566
### REDOX SYSTEMS FOR BRAIN-TARGETED DRUG DELIVERY

**Nicholas S. Bodor, Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.**

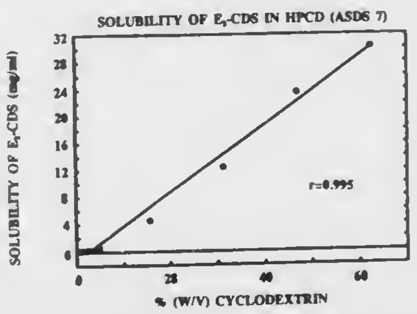
**Continuation-in-part of Ser. No. 139,755, Dec. 30, 1987, which is a continuation-in-part of Ser. No. 174,945, Mar. 29, 1988. This application Nov. 3, 1989, Ser. No. 431,222**

**Claims priority, application Canada, Dec. 13, 1988, 585791; Ireland, Dec. 13, 1988, 3717/88; Mar. 14, 1989, 810/89**

**The portion of the term of this patent subsequent to Jan. 8, 2008, has been disclaimed.**

**Int. Cl.$^5$ A61K *31/735;* C08B *37/16***

**U.S. Cl. 514—58** **72 Claims**


SOLUBILITY OF E₂-CDS IN HPCD (ASDS 7)

1. A method for stabilizing the reduced, biooxidizable, blood-brain barrier penetrating, lipoidal dihydropyridine form of a dihydropyridine ⇄ pyridinium salt redox system for brain-targeted drug delivery, said method comprising complexing said dihydropyridine form with cyclodextrin selected from the group consisting of hydroxyethyl, glucosyl, maltosyl and maltotriosyl derivatives of $\beta$-cyclodextrin and hydroxypropyl, hydroxyethyl, glucosyl, maltosyl and maltotriosyl derivatives of $\tau$-cyclodextrin.

---

### 5,017,567
### CARBOXYALKYL DIPEPTIDES AS ANTIGLAUCOMA AGENTS

**Bernard R. Neustadt, West Orange; David R. Andrews, Bloomfield; Paul E. McNamara, Scotch Plains, and Robert W. Watkins, Great Meadows, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.**

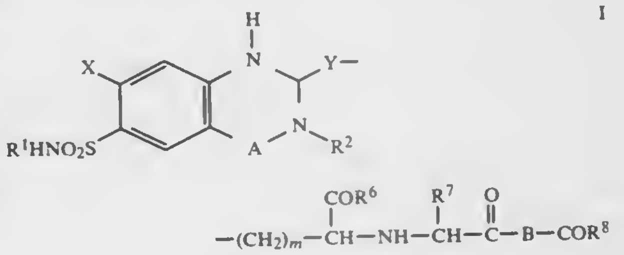
**Division of Ser. No. 220,183, Jul. 18, 1988, Pat. No. 4,906,635, which is a division of Ser. No. 903,545, Sep. 3, 1986, Pat. No. 4,778,795, which is a division of Ser. No. 797,104, Nov. 11, 1985, Pat. No. 4,616,102, which is a continuation-in-part of Ser. No. 555,311, Nov. 25, 1983, Pat. No. 4,559,340. This application Jan. 3, 1990, Ser. No. 460,425**

**Int. Cl.$^5$ A61K *31/56***

**U.S. Cl. 514—171** **26 Claims**

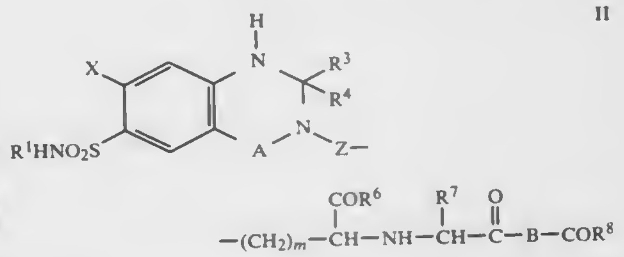
1. A method for reducing and/or controlling elevated intraocular pressure in a mammal which comprises topically administering to an eye of said mammal a composition comprising the combination of an anti-inflammatory amount of an anti-inflammatory steroid an intraocular pressure reducing effective amount of a compound represented by the formulae:

I



$$-(CH_2)_m-\overset{COR^6}{\overset{|}{CH}}-NH-\overset{R^7}{\overset{|}{CH}}-\overset{O}{\overset{\|}{C}}-B-COR^8$$

II



$$-(CH_2)_m-\overset{COR^6}{\overset{|}{CH}}-NH-\overset{R^7}{\overset{|}{CH}}-\overset{O}{\overset{\|}{C}}-B-COR^8$$

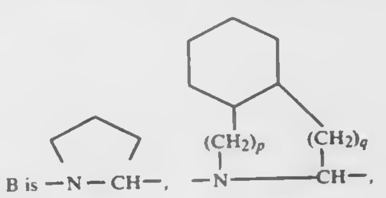
or their isomers or pharmaceutically acceptable salts thereof, in combination with an ophthamologically acceptable carrier for topical use, wherein

$$\text{A is } -SO_2- \text{ or } -\overset{O}{\overset{\|}{C}}-;$$

X is Cl or $CF_3$;

$$\text{Y is } -(CH_2)_a-\overset{O}{\overset{\|}{C}}-\overset{R^5}{\overset{|}{N}}- \text{ or } -(CH_2)_b-\overset{R^5}{\overset{|}{N}}-\overset{O}{\overset{\|}{C}}-;$$

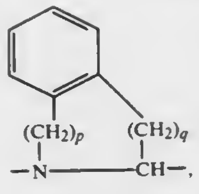
$$\text{Z is } -(CH_2)_b-\overset{O}{\overset{\|}{C}}-\overset{R^5}{\overset{|}{N}}- \text{ or } (CH_2)_c-\overset{R^5}{\overset{|}{N}}-\overset{O}{\overset{\|}{C}}-;$$



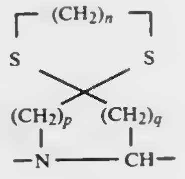
IIIa IIIb

VOL 1126
ISS 3
MY 21
1991
UMI

-continued



IIIc



IIId

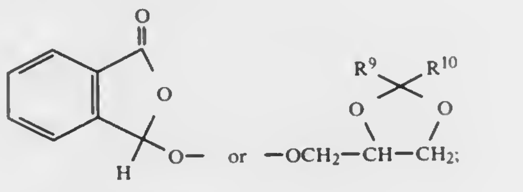
$R^1$ is hydrogen or lower alkyl;

$R^2$ and $R^5$ are independently hydrogen, lower alkyl, phenyl, or phenyl(lower)alkyl;

$R^3$ and $R^4$ are independently hydrogen, lower alkyl, haloloweralkyl, phenyl, or phenyl(lower)alkyl, or $R^3$ and $R^4$ taken together with the carbon to which they are attached can form a 5–7 membered cycloalkyl ring;

$R^6$ and $R^8$ are independently hydroxy, alkoxy having from 1 to 8 carbon atoms, L—$Q_r$—$(CH_2)_s$—O—, wherein L is phenyl, substituted phenyl, 1- naphthyl or 2-naphthyl; Q is oxygen or sulfur; r is 0 or 1 and s is 0 to 4; and wherein the substituents on the phenyl are chosen from group M, wherein M is halogen, hydroxy, trifluoromethyl, alkoxy having from 1 to 6 carbon atoms, alkyl from 1 to 6 carbon atoms, 2-furanyl, 3-furanyl, 2-thienyl, 3-thienyl and phenyl (which phenyl group may be substituted with halogen, hydroxy, trifluoromethyl, alkoxy having from 1 to 6 carbon atoms or alkyl having from 1 to 6 carbon atoms); provided that when s is zero,

r is zero; —$OCH_2$—OCO—alkyl wherein the alkyl has from 3 to 8 carbon atoms, —$OCH_2CO$—phenyl, wherein the phenyl may be substituted



with group M, 1-gylceryl,

$R^7$ is hydrogen, lower alkyl, or aminoloweralkyl;

$R^9$ is hydrogen, lower alkyl, unsubstituted or substituted phenyl, and substituted or unsubstituted phenyl lower alkyl, wherein phenyl may be substituted by group M;

$R^{10}$ is hydrogen or lower alkyl;

a is 0–8;

b is 1–8;

c is 2–8;

m is 1–4;

n is 0 or 1;

p and q are each 0, 1 or 2, provided that in formulae IIIb and IIIc the sum of p and q is 1 or 2, and that in formulae IIId, p is not 0.

---

## 5,017,568

## STERIOD 5-ALPHA-REDUCTASE INHIBITORS

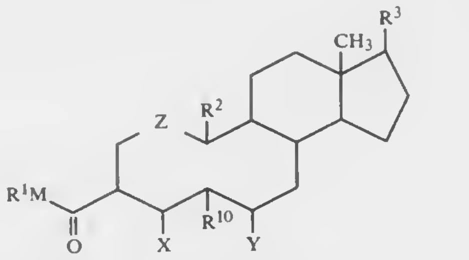
**Dennis A. Holt, Mohnton; Conrad J. Kowalski, Paoli; Mark A. Levy, Wayne; Brian W. Metcalf, Radnor, and Ann M. Tickner, Philadelpbia, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 182,828, Apr. 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 127,147, Dec. 1, 1987, Pat. No. 4,910,226, which is a continuation-in-part of Ser. No. 43,773, Apr. 29, 1987, abandoned. This application Mar. 23, 1990, Ser. No. 499,244**

**Int. Cl.$^5$ A61K** *31/58, 31/56;* **C07J** *71/00, 17/00*

**U.S. Cl. 514—173** **68 Claims**

1. A compound represented by the formula:



(I)

in which:

The A ring has up to 2 double bonds;

The B, C and D rings have optional double bonds where indicated by the broken lines, provided that the A-B rings and the B-C rings do not have adjacent double bonds and the D ring does not have a $C_{16}$–$C_{17}$ double bond when $R^3$ represents two substituents or a divalent substituent;

M is O or S;

Z is $CH_2$ or, when part of a double bond, CH;

X is H, Cl, F, Br, I, $CF_3$, or $C_{1-6}$alkyl;

Y is H, $CF_3$, F, or Cl, $CH_3$, provided that Y is H when there is no $C_5$–$C_6$ double bond;

$R^1$ is H or $C_{1-8}$alkyl;

$R^2$ is absent or present as H or $CH_3$ provided

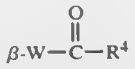
$R^2$ is absent when the carbon to which it is attached is double bonded;

$R^{10}$ is absent when there is a $C_4$–$C_5$, $C_5$–$C_6$, or $C_5$–$C_{10}$ double bond, or present as an alpha hydrogen; and

$R^3$ is

(1) α-hydrogen, α-hydroxyl, or α-acetoxy and/or

(a)



$$\beta\text{-W}-\overset{\displaystyle O}{\overset{\|}{C}}-R^4$$

where W is a bond or $C_{1-12}$alkyl, and $R^4$ is

(i) hydrogen,

(ii) hydroxyl,

(iii) $C_{1-8}$alkyl,

(iv) hydroxy $C_{1-8}$alkyl,

(v) $C_{1-8}$alkoxy,

(vi) $NR^5R^6$, where $R^5$ and $R^6$ are each independently selected from hydrogen, $C_{1-8}$alkyl, $C_{3-6}$cycloalkyl, phenyl; or $R^5$ and $R^6$ taken together with the nitrogen to which they are attached represent a 5–6 membered saturated ring comprising up to one other heteroatom selected from oxygen and nitrogen, or

(vii) $OR^7$, where $R^7$ is hydrogen, alkali metal, $C_{1-18}$alkyl, benzyl, or

(b) β-Alk-$OR^8$, where Alk is $C_{1-12}$alkyl, and $R^8$ is

(i) phenyl$C_{1-6}$alkylcarbonyl,

(ii) $C_{5-10}$cycloalkylcarbonyl,

(iii) benzoyl,

(iv) $C_{1-8}$alkoxycarbonyl,

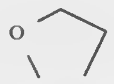
(v) aminocarbonyl, or $C_{1-8}$alkyl substituted aminocarbonyl,

(vi) hydrogen, or

(vii) $C_{1-8}$alkyl,

(2) =CH—W—CO—$R^4$ or =CH—W—$OR^8$, where W is a bond or $C_{1-12}$alkyl and $R^4$ and $R^8$ have the same meaning as above and $R^8$ also is hydrogen or $C_{1-20}$-alkylcarbonyl;

(3)



where the dashed bond replaces the 17-α-hydrogen,

(4) α-hydrogen and β-$NHCOR^9$ where $R^9$ is $C_{1-12}$alkyl or β-$NR^5R^6$ where $R^5$ and $R^6$ have the same meaning as above,

(5) α-hydrogen and β-cyano,

(6) α-hydrogen and β-tetrazolyl, or

(7) keto;

or a pharmaceutically acceptable salt thereof; except compounds in which:

The A ring has a $C_3$-$C_4$ double bond, the B ring has a $C_5$-$C_6$ double double bond, $R^1$ is $CH_3$, and $R^3$ is keto;

The A ring has a $C_3$-$C_4$ double bond, the B ring has a $C_5$-$C_6$ double bond and the D ring has a $C_{16}$-$C_{17}$ double bond, $R^1$ is $CH_3$, and

$R^3$ is $COOCH_3$; and

The B ring has a $C_5$-$C_6$ double bond, $R^1$ is $CH_3$, and $R^3$ is $COCH_3$.

---

## 5,017,569

## CEPHALOSPORIN DERIVATIVES

**Alain M. Bertrandie, Cormontreuil; Thomas G. C. Bird, Witry-les-Reims; Frederic H. Jung, Rilly La Montagne, and Jean-Jacques M. Lohmann, Hermonville, all of France, assignors to ICI Pharma, Gerdey Cedex, France**

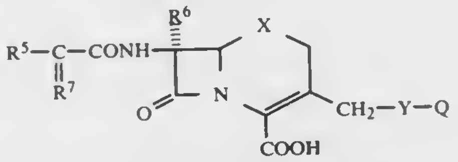
**Filed Nov. 6, 1987, Ser. No. 117,619**

**Claims priority, application European Pat. Off., Nov. 12, 1986, 86402515.0**

**Int. Cl.$^5$ C07D** *501/38;* **A61K** *31/545*

**U.S. Cl. 514—206** **30 Claims**

1. A compound of the formula:



IV

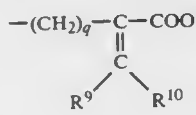
or a pharmaceutically acceptable salt or pharmaceutically acceptable ester thereof, wherein:

X is sulphur or sulphinyl;

$R^6$ is hydrogen, methoxy or formamido;

$R^5$ is 2-aminothiazol-4-yl or 2-aminooxazol-4-yl each unsubstituted or substituted in the 5-position by fluorine, chlorine or bromine, or $R^5$ is 5-aminoisothiazol-3-yl, 5-amino-1,2,4-thiadiazol-3-yl, 3-aminopyrazol-5-yl, 3-aminopyrazol-4-yl, 2-aminopyrimidin-5-yl, 2-aminopyrid-6-yl, 4-aminopyrimidin-2-yl, 2-amino-1,3,4-thiadiazol-5-yl or 5-amino-1-methyl-1,2,4-triazol-3-yl;

$R^7$ is of the formula =N.O.$R^8$ (having the syn configuration about the double bond) wherein $R^8$ is hydrogen, (1–6C)alkyl, (3–8C)cycloalkyl, (1–3C)alkyl(3–6C)cycloalkyl, (3–6C)cycloalkyl(1–3C)alkyl, (3–6C)alkenyl, carboxy(-3–6C)alkenyl, (5–8C)cycloalkenyl, (3–6C)alkynyl, (2–5C-)alkylcarbamoyl, phenylcarbamoyl, benzylcarbamoyl, (1–4C)alkylcarbamoyl(1–4C)alkyl, di(1–4C)alkylcarbamoyl(1–4C)alkyl, (1–4C)haloalkylcarbamoyl(1–4C)alkyl, (1–3C)haloalkyl, (2–6C)hydroxyalkyl, (1–4C)alkoxy,(2–4C)alkyl, (1–4C)alkylthio(2–4C)alkyl, (1–4C)alkanesulphinyl(1–4C)alkyl, (1–4C)alkanesulphonyl(1–4-C)alkyl, (2–6C)aminoalkyl, (1–4C)alkylaminol(1–6C)alkyl, (2–8C)dialkylamino(2–6C)alkyl, (1–5C)cyanoalkyl, 3-amino-3-carboxypropyl, 2-(amidinothio(ethyl, 2–(N-aminoamidinothio)ethyl, tetrahydropyran-2-yl, thietan-3-yl, 2–oxopyrrolidinyl, or 2-oxotetrahydrofuranyl, or R' 3-yl, 2-oxopyrrolidinyl, or 2-oxotetrahydrofuranyl, or $R^8$



$$-(CH_2)_q-\underset{\underset{\displaystyle R^9\quad R^{10}}{\overset{\|}{C}}}{C}-COOH$$

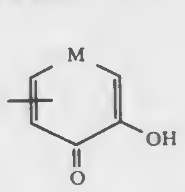
V

wherein q is one or two and $R^9$ and $R^{10}$ are independently hydrogen or $C_{1-4}$alkyl; or $R^8$ is of the formula VI:

$$-CR^{11}R^{12}-(CH_2)_r-COR^{13} \qquad \text{VI}$$

wherein r is 0–3, $R^{11}$ is hydrogen, (1–3C)alkyl or methylthio, $R^{12}$ is hydrogen, (1–3)alkyl, (3–7C)cycloalkyl, cyano, carboxy, (2–5C)carboxyalkyl or methanesulphonylamino, or $R^{11}$ and $R^{12}$ are joined to form, together with the carbon to which they are attached, a (3–7C)carbocyclic ring, and $R^{13}$ is hydroxy, amino, (1–4C)alkoxy, (1–4C)alkylamino or of the formula $NHOR^{14}$ in which $R^{14}$ is hydrogen or (1–4C)alkyl; or $R^7$ may be of the formula =CH.$R^{15}$ wherein $R^{15}$ is hydrogen, halogen, (1–6-C)alkyl, (3–7C)cycloalkyl, (2–6C)alkenyl, (3–7C)cycloalkenyl, phenyl or benzyl;

Q is a group of the formula (III):



wherein M is oxygen or a group $NR^3$

wherein $R^3$ is hydrogen or $C_{1-4}$ alkyl;

ring Q is further unsubstituted or further substituted by $C_{1-4}$ alkyl, halo, hydroxy, hydroxy $C_{1-4}$ alkyl, cyano, trifluoromethyl, nitro, amino, $C_{1-4}$ alkylamino, di-$C_{1-4}$ alkylamino, amino $C_{1-4}$ alkyl, $C_{1-4}$ alkylamino $C_{1-4}$ alkyl, Di-$C_{1-4}$ alkylamino $C_{1-4}$ alkyl, $C_{1-4}$alkanoyl, $C_{1-4}$ alkoxy, $C_{-14}$ alkythio, $C_{1-4}$ alkanoyloxy, carbamoyl, $C_{1-4}$ alkylcarbamoyl, di-$C_{1-4}$ alkyl carbamoyl, carboxy, carboxy $C_{1-4}$ alkyl, sulpho, sulpho $C_{1-4}$ alkyl, $C_{1-4}$ alkanesulphonamido, $C_{1-4}$ alkoxycarbonyl, $C_{1-4}$ alkanoylamino, nitroso, thioureido, amidino, ammonium, mono-, di- or tri-$C_{1-4}$ alkylammonium or pyridinium;

Y, which links into the ring of formula (III) is:

$$-N(R^4)CO-Y^1-,$$

or,

$$-N(R^4)SO_2-Y^1-,$$

where $R^4$ is hydrogen, $C_{1-4}$ alkyl unsubstituted or substituted by any of halo, hydroxy, $C_{1-4}$ alkoxy, carboxy, amino, cyano, $C_{1-4}$ alkanoylamino, phenyl or heteroaryl, or $R^4$ is $C_{2-6}$ alkenyl; and $Y^1$ is a direct covalent bond, $C_{1-4}$ alkylene unsubstituted or substituted by any of $C_{1-4}$ alkyl, cyano, carboxy, $C_{1-4}$ alkoxycarbonyl, nitro, amino, $C_{1-4}$ alkylamino, di-$C_{1-4}$ alkylamino, $C_{1-4}$ alkanoylamino, $C_{1-4}$ alkoxy carbonylamino, hydroxy, halo, carbamoyl, $C_{1-4}$ alkylcarbomoyl, di-$C_{1-4}$ alkylcarbamoyl or trifluoromethyl, or $Y^1$ is carbonyl or $C_{2-4}$ alkenylene unsubstituted or substituted by $C_{1-4}$ alkyl.

---

## 5,017,570

## DIBENZOXAZEPINE COMPOUNDS USEFUL IN THE TREATMENT OF CEREBRAL VASOSPASM OR ITS SEQUELA

**Yukijumi Noda; Makoto Sugawa, both of Tokyo, and Akira Kobda, Kanagawa, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisba, Tokyo, Japan**

**Continuation of Ser. No. 230,651, Aug. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 22,922, Feb. 26, 1987, abandoned. This application Jul. 24, 1990, Ser. No. 560,504**

**Claims priority, application Japan, Mar. 12, 1986, 61-53868; Feb. 17, 1987, 62-32400**

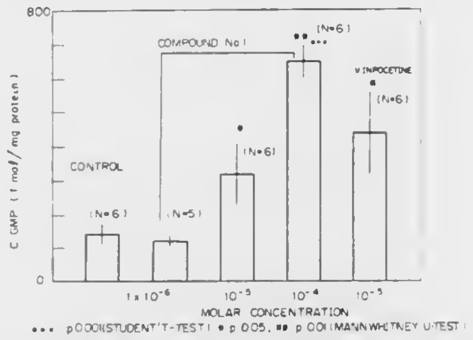
**Int. Cl.$^5$ C07D** *273/06;* **A61K** *31/55*

**U.S. Cl. 514—211** **3 Claims**

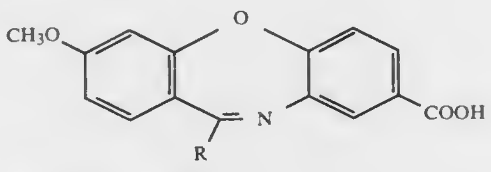
1. A therapeutic method for relaxing smooth muscle and

VOL
1126
ISS
3
MY
21
1991
UMI

increasing cerebral blood flow in the treatment of a cerebral vasospasm on its sequala which comprises administering to a



person in need of said therapy an effective amount of a compound of the following formula or a pharmaceutically acceptable salt thereof:



where R is methyl or ethyl.

---

### 5,017,571

### CARBAMIC ACID ESTER OF SUBSTITUTED 7-HYDROXY-2,3,4,5-TETRAHYDRO-1H-3-BENZAZEPINES

**Kristian T. Hansen, Soborg; Hans Bundgaard, Horsholm, and Peter Faarup, Vaerlose, all of Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark**

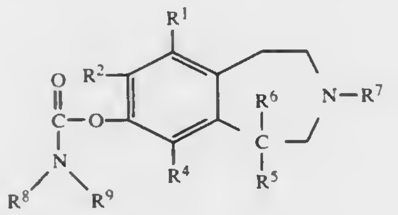
**Filed Feb. 28, 1989, Ser. No. 317,016**

**Claims priority, application Denmark, Mar. 1, 1988, 1076/88**

**Int. Cl.$^5$ C07D *223/16;* A61K *31/55***

**U.S. Cl. 514—213** **10 Claims**

1. Carbamic acid esters selected from 7-hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepines having the formula 1



(I)

wherein

$R^1$ is H, halogen, or $C_{1-4}$ alkyl

$R^2$ is halogen, $CF_3$, CN

$R^4$ is H, or halogen

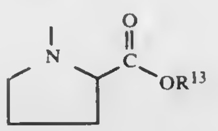
$R^5$ is selected from the group consisting of benzofuranyl and 2,3-dihydrobenzofuranyl,

$R^6$ is H or $CH_3$

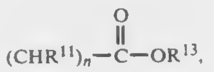
$R^7$ is H or $C_{1-4}$ alkyl

$R^8$ is H, alkyl, alkenyl, phenylalkyl, cycloalkyl, or phenyl

$R^9$ is H, or $R^9$ together with $R^8$ forms the remainder of piperidino, pyrrolidinyl, morpholino, piperazinyl, or

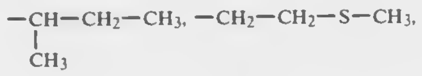


or $R^9$ can be alkyl or alkoxycarbonyl with the formula

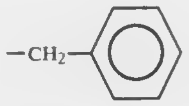


$$(CHR^{11})_n-\overset{\overset{O}{\|}}{C}-OR^{13},$$

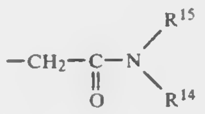
wherein n is 0 or 1,
where $R^{11}$ is H, $CH_3$, $(CH_3)_2CH$, $CH_2CH(CH_3)_2$,



$$\underset{\underset{CH_3}{|}}{-CH}-CH_2-CH_3,\ -CH_2-CH_2-S-CH_3,$$



and $R^{13}$ is H, alkyl, cycloalkyl, aralkyl, or a 2-acetamide group with the formula



where

$R^{15}$ is H, $CH_3$, $C_2H_5$, $C_3H_8$, or $CH(CH_3)_2$, and

$R^{14}$ is H, $CH_3$, $C_2H_5$, $C_3H_8$ or $CH(CH_3)_2$,

and pharmaceutically-acceptable salts thereof, provided that $R^8$ cannot be benzyl when $R^9$ is hydrogen.

9. A method of treating a mental disorder in a subject in need of such treatment comprising the step of administering to the said subject an amount of a compound of claim 1 which is effective for the alleviation of such ailment.

---

### 5,017,572

### DERIVATIVES OF 1-[3-(4-HYDROXYPHENYL) 1-HYDROXY 1-PROPYL] BENZENE SUBSTITUTED IN POSITION 2 BY AN AMINOALKYLENEOXY CHAIN, THE METHOD OF PREPARING SAME AND THE APPLICATION THEREOF TO THERAPEUTICS

**Mona Ward, Courbevoie; Pierre-André Ph.Settembre, Houilles; Alain Renaud, Rueil Malmaison, and Michel Langlois, Buc, all of France, assignors to Delalande S.A., Courbevoie, France**

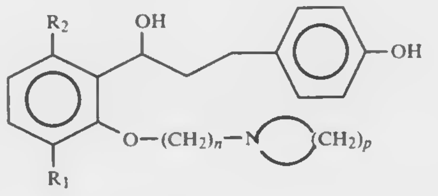
**Filed Apr. 18, 1989, Ser. No. 339,815**

**Claims priority, application France, Apr. 22, 1988, 88 05382**

**Int. Cl.$^5$ C07D *223/04, 211/22, 207/08;* A61K *31/435***

**U.S. Cl. 514—218** **9 Claims**

1. Compounds of formula :



(I)

in which :

$R_1$ and $R_2$ are such that :

either $R_1$ represents a methoxy group in which case $R_2$ is a group chosen from the following : hydroxyl; $C_1$–$C_4$ alkyl $C_2$-$C_8$ alkyloxy $C_5$–$C_7$ cycloalkyloxy benzyloxy; or $R_2$ represents a methoxy group in which case $R_1$ is a group chosen from the following : hydroxyl; $C_2$–$C_8$ lkyloxy ; $C_2$–$C_8$ alkyloxy substituted by a methoxy group; $C_1$–$C_4$ trifluoroalkyloxy $C_3$–$C_4$ alkenyloxy $C_5$–$C_7$

cycloalkyloxy ; benzyloxy ; $C_1$-$C_4$ alkylthio ;

n =2 or 3 ; and

p=4, 5 or 6,

as well as their addition salts with mineral or organic acids.

---

### 5,017,573

### INDAZOLE-3-CARBOXYLIC ACID DERIVATIVES

**Tatsuya Kon, Ashiya; Shiro Kato, Sakai; Toshiya Morie, Matsubara; Tadahiko Karasawa, Toyonaka, and Naoyuki Yoshida, Matsubara, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan**

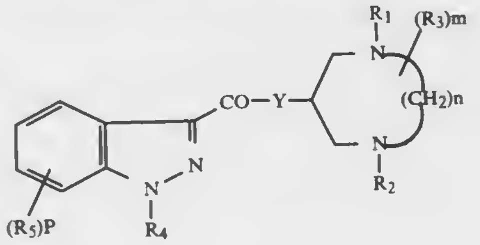
**Filed Jul. 25, 1989, Ser. No. 384,766**

**Claims priority, application Japan, Jul. 29, 1988, 63-191904; Dec. 20, 1988, 63-322986**

**Int. Cl.$^5$ C07D *403/12;* A61K *31/555, 31/415***

**U.S. Cl. 514—218** **16 Claims**

1. An indazole-3-carboxylic acid compound represented by the following formula (I) or a physiologically acceptable acid addition salt or quaternary ammonium salt thereof.



(I)

wherein

Y represents —NH— or —O—;

$R_1$ and $R_2$ are identical or different and each represents

(1) hydrogen;

(2) $C_1$–$C_6$ alkyl;

(3) $C_1$–$C_6$ alkyl substituted by (a) $C_3$–$C_8$ cycloalkyl, (b) $C_5$–$C_8$ cyclo-alkenyl, (c) $C_1$–$C_6$ alkoxy, (d) hydroxy, (e) cyano, (f) oxo, (g) $C_2$–$C_4$ alkanoyloxy, (h) unsubstituted, mono- or di-substituted benzoyloxy wherein said substituent is halogen, $C_1$–$C_4$ alkyl, trifluoromethyl, hydroxy, $C_1$–$C_4$ alkoxy, amino, cyano, nitro or carboxy, (i) amino, (j) mono- or di-$C_1$–$C_4$ alkylamino, (k) $C_2$–$C_4$ alkanoyl-amino, (1) unsubstituted, mono- or di-substituted benzoylamino wherein said substituent is halogen, $C_1$–$C_4$ alkyl, trifluoromethyl, hydroxy, $C_1$–$C_4$ alkoxy, amino, nitro, cyano or carboxy, (m) 5 to 8-membered heteroalicyclic or heteroaromatic having 1 to 2 hetero atoms selected from oxygen, nitrogen and suflur atoms, or (n) halogen;

(4) $C_3$–$C_8$ cycloalkyl;

(5) $C_2$–$C_6$ alkenyl;

(6) $C_5$–$C_8$ cycloalkenyl;

(7) $C_2$–$C_6$ alkynyl;

(8) phenyl-$C_1$–$C_6$ alkyl in which the phenyl is unsubstituted or is substituted by
  (a) halogen, (b) $C_1$–$C_6$ alkyl,
  (c) tribluoromethyl, (d) hydroxy,
  (e) $C_1$–$C_6$ alkoxy, (f) amino,
  (g) mono- or di-$C_1$–$C_6$ alkylamino,
  (h) $C_2$–$C_6$ alkanoylamino, (i) unsubstituted, mono- or di-substituted benzoylamino wherein said substituent is halogen, $C_1$–$C_4$ alkyl, tribluoromethyl, hydroxy, $C_1$–$C_4$ alkoxy, amino, nitro, cyano or carboxy, (j) nitro, (k) cyano, (1) carboxy, or (m) $C_2$–$C_4$ alkoxycarbonyl;

(9) $C_2$–$C_6$ akoxycarbonyl;

(10) phenyl-$C_1$–$C_6$ alkyloxycarbonyl in which the phenyl is unsubstituted or is substituted by (a) halogen, (b) $C_1$–$C_6$ alkyl, (c) trifluoromethyl, (d) hydroxy, (e) $C_1$–$C_6$ alkoxy, (f) amino, (g) nitro, (h) cyano, or (i) carboxy;

(11) $C_2$–$C_6$ alkanoyl; or

(12) benzoyl which is unsubstituted or is substituted by (a) halogen, (b) $C_1$–$C_6$ alkyl, (c) trifluromethyl, (d) hydroxy, (e) $C_1$–$C_6$ alkoxy, (f) amino, (g) nitro, (h) cyano, or (i) carboxy; or

$R_1$ and $R_2$, taken together, form $C_1$–$C_6$ alkylene; $R_3$ represents hydrogen, $C_1$–$C_6$ alkyl, or phenyl; $R_4$ represents

(1) hydrogen;

(2) $C_1$–$C_6$ alkyl;

(3) $C_1$–$C_6$ alkyl substituted by (a) $C_3$–$C_8$ cycloalkyl, (b) $C_5$–$C_8$ cycloalkenyl, (c) $C_1$–$C_6$ alkoxy, (d) hydroxy, (e) cyano, (f) oxo, (g) $C_2$–$C_4$ alkanoyloxy, (h) unsubstituted, mono- or di-substituted benzoyloxy wherein said substituent is halogen, $C_1$–$C_4$ alkyl, trifluoromethyl, hydroxy, $C_1$–$C_4$ alkoxy, amino, nitro, cyano or carboxy, (i) amino, (j) mono- or di-$C_1$–$C_4$ alkylamino, (k) $C_2$–$C_4$ alkanoyl amino, (1) unsubstituted, mono- or di-substituted benzoylamino wherein said substituent is halogne, $C_1$–$C_4$ alkyl, tribluoromethyl, hydroxy, $C_1$–$C_4$ alkoxy, amino, nitro, cyano or carboxy, (m) 5 to 8 membered heteroalicyclic or heteroaromatic having 1 to 2 hetero atoms selected from oxygen, nitrogen and sulfur atoms, or (n) halogen;

(4) $C_3$–$C_8$ cycloalkyl;

(5) $C_2$–$C_6$ alkenyl;

(6) $C_5$–$C_8$ cycloalkenyl;

(7) $C_2$–$C_6$ alkynyl;

(8) phenyl-$C_1$–$C_6$ alkyl in which the phenyl is unsubstituted or is substituted by (a) halogen, (b) $C_1$–$C_6$ alkyl, (c) tribluoromethyl, (d) hydroxy, (e) $C_1$–$C_6$ alkoxy, (f) amino, (g) mono- or di-$C_1$–$C_6$ alkylamino, (h) $C_2$–$C_6$ alkanoylamino, (i) unsubstituted, mono- or di-substituted benzoylamino wherein said substituent is halogen, $C_1$–$C_4$ alkyl, trifluoromethyl, hydroxy, $C_1$–$C_4$ alkoxy, amino, nitro, cyano or carb oxy, (j) nitro, (k) cyano, (l) carboxy or (m) $C_2$–$C_4$ alkoxycarbonyl;

(9) $C_2$–$C_6$ alkoxycarbonyl;

(10) phenyl-$C_1$–$C_6$ alkoxycarbonyl in which the phenyl is unsubstituted or is substituted by (a) halogen, (b) $C_1$–$C_6$ alkyl, (c) trifluoromethyl, (d) hydroxy, (e) $C_1$–$C_6$ alkoxy, (f) amino, (g) nitro, (h) cyano, or (i) carboxy;

(11) $C_2$–$C_6$ alkanoyl; or

(12) benzoyl which is unsubstituted or is mono- or di-substituted by (a) halogen, (b) $C_1$–$C_6$ alkyl, (c) trifluoromethyl, (d) hydroxy, (e) $C_1$–$C_6$ alkoxy, (f) amino, (g) nitro, (h) cyano, or (i) carboxy;

$R_5$ represetns hydrogen, halogen, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ alkoxy, hydroxy trifluoromethyl, nitro, amino, $C_2$–$C_6$ alkanoylamino or benzoylamino;

m represents 1 or 2;

n represents 2 or 3; and

p represents 1, 2, or 3.

---

### 5,017,574

### NOVEL IMIDAZOBENZODIAZEPINES

**Charles J. R. Hedgecock; Stuart D. Jones, and Elizabeth A. Kuo, all of Swindon, United Kingdom, assignors to Roussel Uclaf, Paris, France**

**Filed Apr. 26, 1990, Ser. No. 516,194**

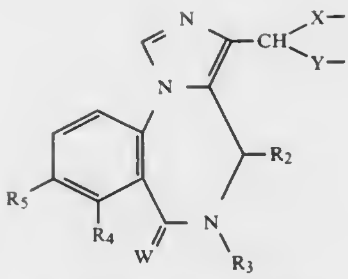
**Claims priority, application United Kingdom, Apr. 27, 1989, 8909700**

**Int. Cl.$^5$ C07D *487/04;* A61K *31/55***

**U.S. Cl. 514—220** **12 Claims**

1. A compound selected from the group consisting of a compound of the formula

VOL
1126
ISS
3
MY
21
1991
UMI



1

wherein the $R_1$'s are the same and are alkyl of 1 to 3 carbon atoms or together are alkylene of 2 to 5 carbon atoms, X, Y and W are individually —O— or —S—, $R_2$ is hydrogen or alkyl of 1 to 3 carbon atoms, $R_3$ is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms and phenyl optionally substituted with at least one member of the group consisting of halogen, alkyl and alkoxy of 1 to 3 carbon atoms and —$CF_3$, $R_4$ and $R_5$ are individually selected from the group consisting of hydrogen, halogen, —OH, alkyl and alkoxy of 1 to 3 carbon atoms and —$CF_3$ with the proviso that when $R_1$ and $R_2$ are alkyl, X and Y are the same and their non-toxic, pharmaceutically acceptable acid addition salts.

9. A method of inducing benzodiazepine inverse agonist activity in warm-blooded animals comprising administering to warm-blooded animals an amount of at least one compound of claim 1 sufficient to induce benzodiazepine inverse agonist activity.

---

### 5,017,575

### TREATMENT OF IMMUNOLOGICALLY BASED DISORDERS, SPECIFICALLY CROHN'S DISEASE

**Daniel H. Golwyn, 701 E. Semoran Blvd., Altamonte Springs, Fla. 32715**

**Filed Jun. 9, 1987, Ser. No. 59,889**

**Int. Cl.$^5$ A61K** *34/55*

**U.S. Cl. 514—220** **10 Claims**

1. A method of treating a patient for Crohn's disease, wherein the lymphocyte profile of such patient is characterized by an abnormally low initial concentration of helper T cells, comprising administering to such patient a triazolo composition from the class consisting of alprazolam and triazolam in an amount effective to restore such T-cell concentration toward a normal level.

---

### 5,017,576

### QUINOLYLOXYACETAMIDES

**Marie-Christine Dubroeucq, Enghien Les Bains; Jean-Marc Paris, Vaires Sur Marne, and Christian Renault, Taverny, all of France, assignors to Rhone-Poulenc Sante, Antony, France**

**Filed Sep. 11, 1989, Ser. No. 405,294**

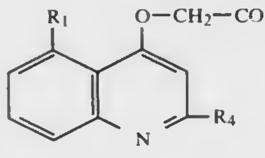
**Claims priority, application France, Sep. 13, 1988, 88 11903**

**The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.**

**Int. Cl.$^5$ C07D** *215/233, 413/12, 417/12*

**U.S. Cl. 514—228.2** **7 Claims**

1. A compound of the formula



(1)

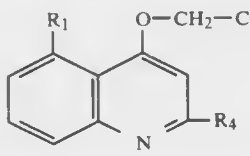
in which

$R_1$ is trifluoromethyl; $R_2$ and $R_3$ form, together with the nitrogen atom to which they are attached, morpholino and $R_4$ is 4-methylphenyl, 4-chlorophenyl, 2-,3- or 4-fluorophenyl, 4-methoxyphenyl, 4-methyl-3-fluorophenyl, 2,4-difluorophenyl or 4-aminophenyl;

or $R_2$ or $R_3$ form, together with the nitrogen atom to which they are attached, thiomorpholino and $R_4$ is 4-methylphenyl;

or $R_2$ is methyl, $R_3$ is 2-methoxyethyl and $R_4$ is 4-methylphenyl.

3. A compound of the formula



(1)

in which $R_1$ is chlorine, fluorine or methoxy; $R_2$ and $R_3$ form, together with the nitrogen atom to which they are attached, morpholino; and $R_4$ is 4-methylphenyl.

4. A pharmaceutical composition useful as an anxiolytic, hypnotic, anticonvulsant or antiepileptic which comprises an anxiolytically-, hypnotically-, anticonvulsantly- or antiepileptically-effective amount of a compound as claimed in claim 1 with a compatible and pharmaceutically acceptable adjuvant, diluent and/or coating.

---

### 5,017,577

### METHODS FOR TREATING VIRAL INFECTION

**Susan M. Daluge; Harry J. Leighton, both of Chapel Hill, and Sandra N. Lehrman, Durham, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.**

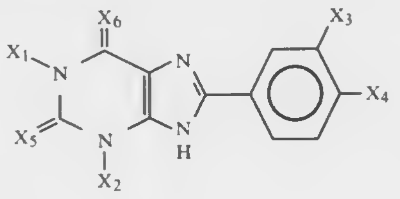
**Continuation of Ser. No. 856,582, Apr. 25, 1986, abandoned. This application Jul. 19, 1989, Ser. No. 383,247**

**The portion of the term of this patent subsequent to May 14, 2008, has been disclaimed.**

**Int. Cl.$^5$ A61K** *31/52*

**U.S. Cl. 514—263** **11 Claims**

1. A method for the treatment of a virus infection in virus infected animal which comprises administering to said animal a therapeutically effective amount of a compound of formula I



(I)

wherein:

$X_1$ and $X_2$ are the same or different and are hydrogen, $C_{1-6}$ alkyl, $C_{2-6}$ alkenyl or $C_{7-12}$ aralkyl optionally substituted in the aryl ring by at least one substituent selected from $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, hydroxy, halo, nitro, amino, azido and cyano, provided that both $X_1$ and $X_2$ are not hydrogen;

one of $X_3$ and $X_4$ is hydrogen, $C_{1-6}$ alkyl, trifluoromethyl, $C_{1-6}$ alkoxy, halo, nitro, amino, $C_{1-6}$ alkoxycarbonyl or carboxy and the other is a group —Y—Z where Y is $C_{2-6}$ alkenylene, or $C_{3-6}$ alkenyleneoxy, $C_{2-6}$ alkynylene or $C_{3-6}$ alkynyleneoxy and Z is carboxy, sulphonyl or phosphonyl or a $C_{1-9}$ alkyl ester, a $C_{7-12}$ aralkyl ester or a $C_{6-12}$ aryl ester thereof, or is 5-tetrazolyl; and

X, and X are the same or different and are oxygen or sulphur;

or a pharmaceutically acceptable salt or solvate thereof.

### 5,017,578

### N-HETEROARYL-PURIN-6-AMINES USEFUL AS ANALGESIC AND ANTICONVULSANT AGENTS

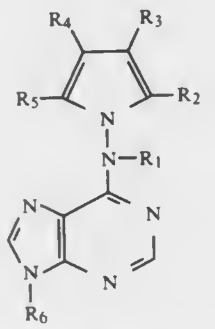
**Richard C. Effland; Joseph T. Klein, both of Bridgewater; Larry Davis, Sergeantsville, and Gordon E. Olson, Somerset, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

**Filed Jun. 9, 1989, Ser. No. 363,837**

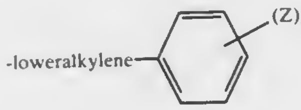
**Int. Cl.$^5$ A61K** *31/52, 31/70;* **C07D** *473/34;* **C07H** *19/173*

**U.S. Cl. 514—266** **47 Claims**

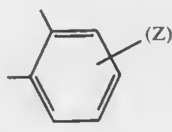
1. A N-heteroaryl-purin-6-amine of the formula



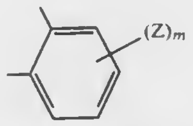
where $R_1$ is hydrogen, lower alkyl, and arylloweralkyl of the formula



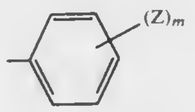
where Z is hydrogen, halogen, loweralkyl, loweralkoxy, $CF_3$, $NO_2$ and $NH_2$ and m is an integer of 1 to 3; $R_2$ and $R_3$ are independently hydrogen, loweralkyl or $R_2$ and $R_3$ taken together are aryl of the formula



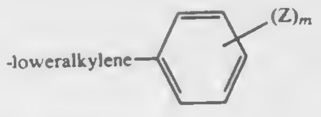
where Z and m are as defined above; $R_4$ and $R_5$ are independently hydrogen, loweralkyl or $R_4$ and $R_5$ taken together are aryl of the formula



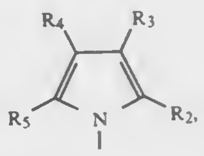
where Z and m are as defined above; $R_6$ is hydrogen, lower alkyl, aryl of the formula



where Z and m are as defined above; arylloweralkyl of the formula

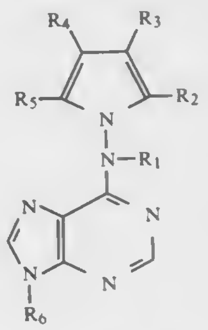


where Z and m are as defined above;

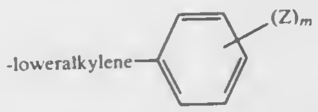


where $R_2$, $R_3$, $R_4$ and $R_5$ are as defined above, and the pharmaceutically acceptable acid addition salts thereof and where applicable the geometric and optical isomers and racemic mixtures thereof.

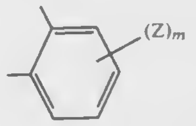
46. A method of alleviating pain in a mammal which comprises administering to a mammal a pain alleviating effective amount of a compound having the formula



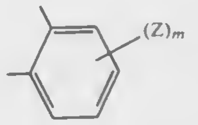
where $R_1$ is hydrogen, lower alkyl, and arylloweralkyl of the formula



where Z is hydrogen, halogen, loweralkyl, loweralkoxy, $CF_3$, $NO_2$ and $NH_2$ and m is an integer of 1 to 3; $R_2$ and $R_3$ are independently hydrogen, loweralkyl or $R_2$ and $R_3$ taken together are aryl of the formula

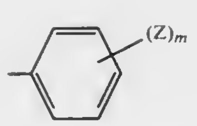


where Z and m are as defined above; $R_4$ and $R_5$ are independently hydrogen, loweralkyl or $R_4$ and $R_5$ taken together are aryl of the formula

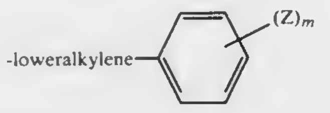


where Z and m are as defined above; $R_6$ is hydrogen, lower alkyl, aryl of the formula

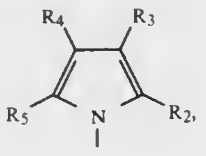
VOL 126
ISS 3
MY 21
1991
UMI



where Z and m are as defined above; arylloweralkyl of the formula

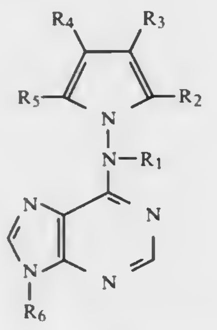


where Z and m are as defined above;

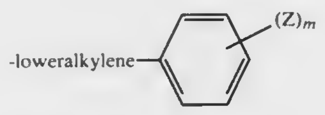


where $R_2$, $R_3$, $R_4$ and $R_5$ are as previously defined, and the pharmaceutically acceptable acid addition salts thereof and where applicable the geometric and optical isomers and racemic mixtures thereof.

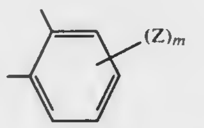
**47**. A method of treating convulsions in a mammal which comprises administering to a mammal an anticonvulsant effective amount of a compound having the formula



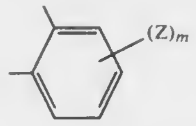
where $R_1$ is hydrogen, lower alkyl, and arylloweralkyl of the formula



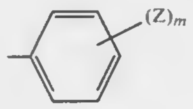
where Z is hydrogen, halogen, loweralkyl, loweralkoxy, $CF_3$, $NO_2$ and $NH_2$ and m is an integer of 1 to 3; $R_2$ and $R_3$ are independently hydrogen, loweralkyl or $R_2$ and $R_3$ taken together are aryl of the formula



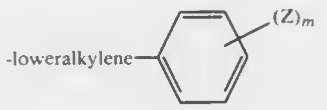
where Z and m are as defined above; $R_4$ and $R_5$ are independently hydrogen, loweralkyl or $R_4$ and $R_5$ taken together are aryl of the formula



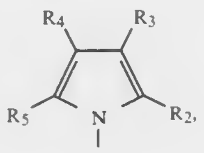
where Z and m are as defined above; $R_6$ is hydrogen, lower alkyl, aryl of the formula



where Z and m are as defined above; arylloweralkyl of the formula



where Z and m are as defined above;



where $R_2$, $R_3$, $R_4$ and $R_5$ are as previously defined, and the pharmaceutically acceptable acid addition salts thereof and where applicable the geometric and optical isomers and racemic mixtures thereof.

---

### 5,017,579

## USE OF AMINOALKOXYPHENYL DERIVATIVES FOR REDUCING AND/OR CONTROLLING EXCESSIVE INTRAOCULAR PRESSURE

**Jean Gubin; Pierre Chatelain, both of Brussels, Belgium; Marcel Descamps, Muret; Dino Nisato, Saint Georges D'Orques, both of France; Henri Inion, Wemmel, Belgium; Jean Lucchetti, Chastre, Belgium; Jean-Marie Mahaux, Brussels, Belgium; Jean-Noel Vallat, Toulouse, and Gerard Le Fur, Montmorency, both of France, assignors to Sanofi, France**

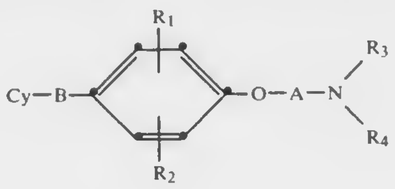
**Continuation-in-part of Ser. No. 82,554, Aug. 7, 1987, Pat. No. 4,957,925, which is a continuation-in-part of Ser. No. 6,233, Jan. 23, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 306,498**

**Claims priority, application France, Feb. 14, 1986, 86 02045**

**Int. Cl.$^5$ A61K** *31/44, 31/535, 31/50*

**U.S. Cl. 514—299** **6 Claims**

**1**. A method of reducing and/or controlling excessive intraocular pressure in a host in need of such treatment comprising topically administering to said host an effective dose for lowering intraocular pressure of an ophthalmologically acceptable aminoalkoxyphenyl compound of the formula:



(1)

in which:

B represents a —S—, —SO— or $—SO_2—$ group,

$R_1$ and $R_2$, which are identical or different, each denote hydrogen, a methyl or ethyl radical or a halogen,

A denotes a straight- or branched-alkylene radical having from 2 to 5 carbon atoms or a 2-hydroxypropylene radical in which the hydroxy is optionally substituted by a lower alkyl radical,

$R_3$ denotes an alkyl radical or a radical of formula

—Alk—Ar

in which Alk denotes a single bond or a linear- or branched-alkylene radical having from 1 to 5 carbon atoms and Ar denotes a pyridyl, phenyl, 2,3-methylenedioxyphenyl or 3,4-methylenedioxyphenyl radical or a phenyl group substituted with one or more substituents, which may be identical or different, selection from halogen atoms, lower alkyl groups or lower alkoxy groups,

$R_4$ denotes hydrogen or an alkyl radical, or $R_3$ and $R_4$ when taken together, denote an alkylene or alkenylene radical having from 3 to 6 carbon atoms and optionally substituted with a phenyl radical or optionally interrupted by —O—, —N= or $—N—R_{11}$, $R_{11}$ denoting hydrogen or a lower alkyl, phenyl, diphenylmethyl, benzyl or halogenbenzyl radical, and

Cy represents an indolizinyl group.

---

### 5,017,580

## MEMORY ENHANCING-R-N-(1-AZABICYCLO[2.2.2.]OCT-3-YL)BENZAMIDES AND THIOBENZAMIDES

**Robert J. Naylor; Brenda Naylor, both of The Old Rectory, Addingham, Ilkley, West Yorkshire, LS29 0QP, Great Britain; Alain Renaud, 16, Place des Arts, 92500 Rueil Malmaison, France, and Michel Langlois, 4, Place Cesar Franck, 78530 Buc, France**

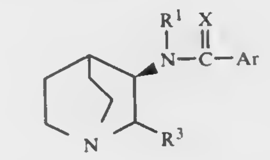
**Filed Aug. 3, 1989, Ser. No. 389,309**

**Claims priority, application European Pat. Off., Aug. 4, 1988, 88402041.3**

**Int. Cl.$^5$ A01N** *43/42;* **A61K** *31/44*

**U.S. Cl. 514—299** **6 Claims**

**1**. A method of enhancing learning or memory, which comprises administering to a mammal in need of learning or memory enhancement a sufficient amount of a compound of general formula I to enhance learning or memory



wherein:

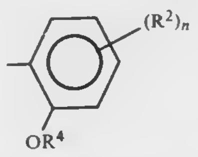
X represents oxygen or sulphur;

each of $R^1$ and $R^3$ independently represents hydrogen or a $C_1–C_4$ alkyl group;

Ar represents:

a phenyl ring optionally substituted by one, two or three $C_1–C_4$ alkoxy groups and/or by one or two halogen atoms;

a phenyl ring of the general formula

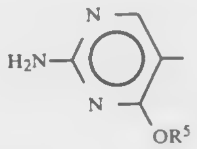


wherein $R^2$ represents halogen, 4,5-benzo, $C_1–C_8$ alkoxy, $C_1–C_4$ alkylcarbonyl or Am, wherein Am represents amino, methylamino or dimethylamino,

$R^4$ represents $C_1–C_8$ alkyl,

n is 1 or 2; or

a pyrimidinyl moiety of the general formula



wherein $R^5$ is $C_1–C_4$ alkyl;

or an N-oxide and/or pharmaceutically acceptable salt thereof.

---

### 5,017,581

## PYRIDONECARBOXYLIC ACIDS AND THEIR ANTI-BACTERIAL COMPOSITIONS

**Yasuhiro Nishitani; Yutaka Nishino, and Tadashi Irie, all of Osaka, Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

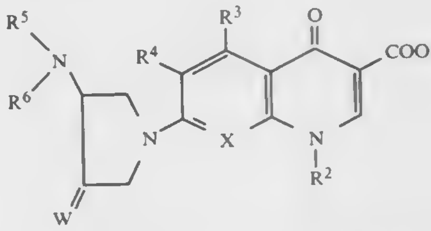
**Filed Sep. 28, 1989, Ser. No. 413,679**

**Claims priority, application Japan, Oct. 3, 1988, 63-249659**

**Int. Cl.$^5$ A61K** *31/47;* **C07D** *215/54, 471/04*

**U.S. Cl. 514—300** **9 Claims**

**1**. A compound of the formula:



(I)

wherein $R^1$ is hydrogen or a protecting group; $R^2$ is $C_1–C_3$ alkyl or $C_3–C_7$ cycloalkyl; $R^3$ is hydrogen, hydroxy, or amino; $R^4$ is halogen; $R^5$ and $R^6$ each is identically or differently hydrogen or $C_1–C_3$ alkyl; W is $C_1–C_3$ alkylidene; X is N or C–Y; Y is hydrogen or halogen; or a pharmaceutically acceptable salt thereof.

---

### 5,017,582

## METHOD OF INDUCING A SEROTONIN M RECEPTOR ANTAGONIST EFFECT WITH N-QUINUCLIDINYL-BENZAMIDES

**Peter Donatsch, Allschwil, Switzerland; Günter Engel, Weil, Fed. Rep. of Germany; Bruno Hügi, Pfeffingen; Brian P. Richardson, Magden, both of Switzerland; Paul A. Stadler, late of Biel-Benken, Switzerland by Hildegard R. Stadler, Brigitte M. Stadler, Sigrid A. Stadler, heirs , and Gerald Breuleux, legal representative, Zürich, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

**Division of Ser. No. 272,030, Nov. 15, 1988, Pat. No. 4,910,207, which is a division of Ser. No. 125,048, Nov. 25, 1987, Pat. No. 4,803,199, which is a continuation of Ser. No. 896,552, Aug. 14, 1986, abandoned, which is a continuation of Ser. No. 637,952, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 508,902, Jun. 28, 1983, abandoned. This application Jan. 17, 1990, Ser. No. 466,550**

**Claims priority, application Switzerland, Jun. 29, 1982, 3979/82; Jul. 13, 1982, 4267/82; Nov. 30, 1982, 6950/82; Nov. 30, 1982, 6951/82; Dec. 22, 1982, 7494/82; Dec. 22, 1982. 7495/82; Mar. 9, 1983, 1256/83**

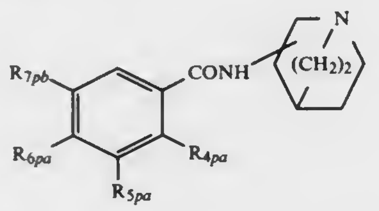
**Int. Cl.$^5$ A61K** *31/44*

**U.S. Cl. 514—305** **2 Claims**

**1**. A method of inducing a serotonin M receptor antagonist

OL
126
SS
3
MY
21
1991
UMI

effect comprising administering to a subject in need of such treatment a therapeutically effective amount of a compound of formula Isb:



Isb

wherein

$R_{4pa}$ is halogen, $(C_{1\text{-}4})$alkylamino or $(C_{1\text{-}4})$alkoxy;

$R_{5pa}$ is hydrogen;

$R_6$pa is amino, $(C_{104})$alkylamino or di$(C_{1\text{-}4})$alkylamino; and

$R_{7pb}$ is hydrogen or halogen;

or a pharmaceutically acceptable acid addition or quaternary ammonium salt thereof.

---

### 5,017,583

### LEUKOTRIENE ANTAGONISTS

**Robert N. Young, Senneville; Joshua Rokach, Chomedy; Haydn R. Williams, Dollard Des Ormeaux; Masatoshi Kakushima, Quebec, and Yvan Guindon, Ile Bizard, all of Canada, assignors to Merck Frosst Canada, Inc., Kirkland, Canada**

**Continuation of Ser. No. 861,942, May 12, 1986, abandoned, which is a division of Ser. No. 591,343, Mar. 19, 1984, Pat. No. 4,609,744, which is a continuation-in-part of Ser. No. 487,331, Apr. 21, 1983, abandoned. This application Feb. 23, 1988, Ser. No. 159,631**

**Int. Cl.$^5$ A61K** *31/47;* **C07D** *215/227, 215/54, 215/56*

**U.S. Cl. 514—312** **2 Claims**

1. A compound which is:

(±)-Erythro-2-methoxy-7-((5-carboxy-2-hydroxy-1-(4-nonylphenyl)pentyl)thio)-3-quinoline-carboxylic acid;

(±)-erythro-2-butoxy-7((5-carboxy-2-hydroxy-1-(4-nonylphenyl)pentyl)thio)-3-quinoline-carboxylic acid;

D,L-erythro-7-((5-carboxy-1-(1,2-dihydro-5-acenaphthalenyl)-2-hydroxypentyl)thio)-2-methoxy-3-quinoline-carboxylic acid disodium salt trihydrate;

D,L-erythro-7-((5-carboxy-2-hydroxy-1-(4-(2-phenylethyl)-phenyl)pentyl)thio)-2-methoxy-3-quinoline-carboxylic acid disodium salt dihydrate; or

D,L-erythro-7-((5-carboxy-2-hydroxy-1-(5,6,7,8-tetrahydro-2-naphthalenyl)pentyl)thio)-2-methoxy-3-quinoline-carboxylic acid disodium salt sesquihydrate.

---

### 5,017,584

### ANTIDEPRESSANT 2-(4,5-DIHYDRO-1H-IMIDAZOLYL)-DIHYDRO-1H-INDOLES, -1,2,3,4-TETRAHYDROQUINOLINES AND -1H-INDOLES, AND METHODS OF USE THEREAS

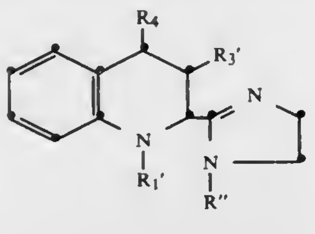
**Dennis J. Hlasta, Clifton Park, N.Y., assignor to Sterling Drug Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 684,406, Dec. 20, 1984, abandoned. This application Nov. 27, 1985, Ser. No. 802,409**

**Int. Cl.$^5$ A61K** *31/415, 31/47;* **C07D** *403/06, 405/06*

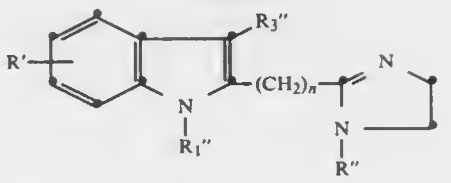
**U.S. Cl. 514—314** **37 Claims**

17. A compound having one of the formulas:



II

-continued



III

where in the compounds of formula II;

R" is hydrogen or lower-alkyl;

$R_1'$ is hydrogen or lower-alkyl;

$R_3'$ is hydrogen or lower-alkyl; and

$R_4$ is hydrogen or phenyl; and

in the compounds of formula III:

R' is hydrogen, halogen selected from chlorine and fluorine or benzyl;

R" is hydrogen or lower-alkyl;

$R_1''$ is lower-alkyl;

$R_3''$ is hydrogen or lower-alkoxy; and

n is 0 or the integer 1;

or a pharmaceutically-acceptable acid-addition salt thereof, and wherein said lower-alkyl and lower-alkoxy groups in all instances contain form one to four carbon atoms.

35. A method for treating depressed states in warm blooded animals which comprises administering an anti-depressantly effective amount of a composition according to claim 17.

---

### 5,017,585

### METHOD OF TREATING CALCIUM OVERLOAD

**Palle Jakobsen, and Jorgen Drejer, both of Vaerlose, Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark**

**Continuation-in-part of Ser. No. 106,154, Oct. 8, 1987, Pat. No. 4,877,799. This application Apr. 13, 1989, Ser. No. 337,301**

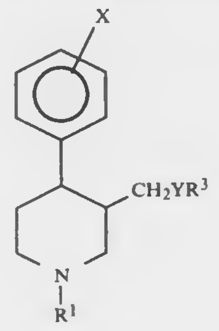
**Claims priority, application Denmark, Nov. 3, 1986, 5232/86; Jun. 25, 1987, 3234/87; Apr. 28, 1988, 2310/88**

**The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.**

**Int. Cl.$^5$ A61K** *31/445*

**U.S. Cl. 514—317** **13 Claims**

1. A method of treating an indication related to calcium overload in brain cells of mammals, including humans, in a subject in need thereof, which comprises the step of administering to the said subject a calcium overload blocking amount of a piperidine compound having the formula I



(I)

wherein

$R^3$ is 3,4-methylenedioxyphenyl, aryl having up to twelve carbon atoms, inclusive, which are optionally substituted with one or more halogen, $C_{1-6}$-alkoxy, aryloxy orarylC$_{1-6}$-alkoxy, cyano, mono or poly halogenated $C_{1-6}$-alkyl, $C_{1-6}$-alkenyl, $C_{1-6}$-alkyl, or $C_{3-5}$-alkylene groups,

$R^1$ is straight or branched $C_{1-8}$-alkyl unsubstituted or substituted with one or more cyano, carboxylic ester, dialkylamino, hydroxy, $-CONH_2$, halogeno, $C_{1-8}$-alkoxy or $C_{3-8}$ cycloalkyl groups,

X is hydrogen, halogen, trifluoromethyl, hydroxy, cyano or $C_{1-8}$-alkoxy,

Y is O or S;

provided that $R^1$ is not unsubstituted $C_{1-8}$-alkyl, $C_{1-6}$-alkoxy-$C_{1-8}$-alkyl or $C_{3-8}$-cycloalkyl-$C_{1-8}$-alkyl, when $R^3$ is 3,4-methylenedioxyphenyl or aryl optionally substituted with one or more $C_{1-6}$-alkyl, $C_{1-6}$-alkoxy, $C_{3-5}$-alkylene, $C_{3-8}$-cycloalkyl or aralkoxy, and at the same time X is hydrogen or halogen or a salt thereof with a pharmaceutically-acceptable acid.

---

### 5,017,586

### 5-DIALKYLAMINOMETHYL-2-FURANOMETHANOL DERIVATIVES HAVING ANTI-HYPERTENSIVE PROPERTIES

**Ludwig H. Schlager, Vienna, Austria, assignor to Gerot-Pharmazeutika Gesellschaft m.b.H., Vienna, Austria**

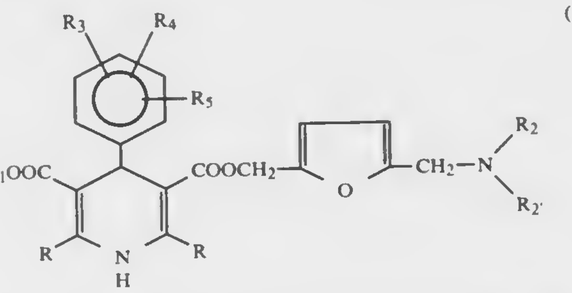
**Filed May 12, 1989, Ser. No. 350,878**

**Claims priority, application Austria, May 13, 1988, 1245/88**

**Int. Cl.$^5$ C07D** *401/13, 405/12, 405/14;* **A61K** *31/435*

**U.S. Cl. 514—318** **5 Claims**

1. A compound of formula (I), or a pharmaceutically acceptable salt thereof:



(I)

wherein R, $R_1$, $R_2$ and $R_2$ each represent a lower alkyl group containing 1 to 4 carbon atoms, or $R_2$ and $R_2'$, together with N, form a 5- or 6-membered saturated heterocyclic ring;

wherein $R_3$ and $R_4$ are each selected from the group consisting of a hydrogen atom, a halogen, a nitro group and a methoxy group; and

wherein $R_5$ is selected from the group consisting of a halogen, a difluoromethoxy group, a trifluoromethyl group, a nitro group, a carbamylmethoxy group, a cyanomethoxy group and a mesyloxy group.

3. A method for lowering blood pressure comprising administering to a hypertensive subject a pharmaceutically effective amount of a compound claimed in claim 1.

---

### 5,017,587

### TREATMENT OF PLANTAR WARTS USING CYCLOHEXIMIDE

**Leopoldo F. Montes, Buenos Aires, Argentina 1121**

**Filed Jan. 12, 1990, Ser. No. 464,173**

**Int. Cl.$^5$ A61K** *31/445*

**U.S. Cl. 514—328** **5 Claims**

1. A method of treating plantar warts which comprises the step of applying an effective amount of cycloheximide in a pharmaceutically acceptable topical carrier to the skin area affected by said warts to reduce the size of said warts.

---

### 5,017,588

### 5-(ω-AMMONIO ACYLOXY METHYLENE) TETRAHYDROFURANS AND TETRAHYDROTHIOPHENES AND A THERAPEUTIC COMPOSITION CONTAINING SAME

**Jean-Jacques Godfroid, Paris; Pierre Braquet, Garches, and Francoise Heymans, Paris, all of France, assignors to Societe De Conseils De Recherches Et D'Applications Scientifiques, France**

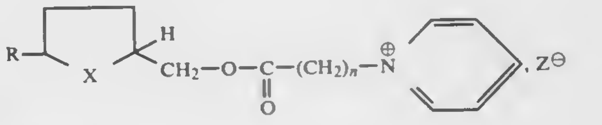
**Continuation-in-part of Ser. No. 199,948, May 27, 1988, abandoned. This application Feb. 27, 1990, Ser. No. 485,448**

**Claims priority, application United Kingdom, May 29, 1987, 8712693**

**Int. Cl.$^5$ C07D** *405/12, 409/12;* **A61K** *31/44*

**U.S. Cl. 514—336** **2 Claims**

1. A tetrahydrofuran or tetrahydrothiophene of the formula

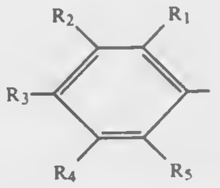


wherein

X stands for O of S;

n is an integer from 1 to 6;

R stands for a straight or branched $C_1$–$C_{13}$ alkyl, a $C_5$–$C_{10}$ cycloalkyl, a phenyl or a substituted phenyl having the formula:



$R_1$ to $R_5$ is H, $CH_3$ or $OCH_3$ and $Z^{\ominus}$ is a pharmaceutically acceptable anion.

2. A therapeutic composition of matter, comprising as an essential ingredient therein an effective amount of a compound according to claim 1 in admixture with the appropriate diluent or carrier.

---

### 5,017,589

### NOVEL AMINO ACID DERIVATIVES

**Masanori Kawamura; Yoshinobu Arai, and Hideki Aishita, all of Osaka, Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed May 5, 1989, Ser. No. 347,673**

**Claims priority, application Japan, May 6, 1988, 63-109191; Oct. 3, 1988, 63-249433**

**Int. Cl.$^5$ A61K** *31/445;* **C07D** *213/56*

**U.S. Cl. 514—352** **3 Claims**

1. An amino acid derivative which is N-(3-mercapto-2RS-benzylpropionyl)-L-glutamic acid α-(4-pyridyl)amide.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,590
### 1,4-DIHYDROPYRIDINE-THREONINE COMPOUNDS WITH CARDIOVASCULAR ACTIVITY

**Jürgen Stoltefuss, Haan; Martin Bechem, Wuppertal; Rainer Gross, Wuppertal; Siegbert Hebisch, Wuppertal, and Matthias Schramm, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

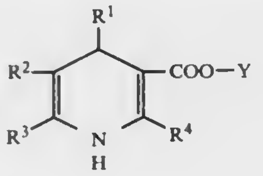
**Filed Jun. 15, 1989, Ser. No. 367,408**

**Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 3821334**

**Int. Cl.$^5$ C07D** *211/90;* **A61K** *31/455*

**U.S. Cl. 514—356** **6 Claims**

1. A dihydropyridine compound of the formula



in which

$R^1$ represents aryl having 6 to 10 carbon atoms which is monosubstituted, disubstituted or trisubstituted by identical or different nitro, cyano, $C_1$–$C_6$-halogenoalkyl, halogen, $C_1$–$C_6$-alkyl or $C_1$–$C_6$-alkoxycarbonyl, or by $C_1$–$C_6$ halogenoalkoxy, $C_1$–$C_4$-halogenoalkylthio, carbamoyl, dialkyl carbamoyl having up to 6 carbon atoms per alkyl group, or $C_2$–$C_8$-alkenyl which can optionally be substituted by $C_1$–$C_6$-alkoxycarbonyl or by phenylsulphonyloxy which is optionally substituted by $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, nitro, halogen, cyano, $C_1$–$C_4$-halogenoalkyl or $C_1$–$C_4$-halogenoalkoxy, or by $C_1$–$C_8$-alkyl-amino or dialkylamino each having up to 6 carbon atoms per alkyl group, or $C_1$–$C_8$-alkyl-amino or dialkylamino each having up to 6 carbon atoms per alkyl group, or $C_1$–$C_8$-acylamino, or by $C_1$–$C_8$-alkoxy or $C_1$–$C_8$-alkylthio, each of which can optionally be substituted by cyclohexyl or phenyl which, in turn, can be substituted by cyclohexyl or phenyl which, in turn, can be substituted by halogen, $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, nitro, $C_1$–$C_4$-halogenoalkyl, $C_1$–$C_2$-alkoxycarbonyl, cyano or $C_1$–$C_4$-halogenoalkoxy,

$R^2$ represents a group of the formula COO—Z—$R^5$

wherein

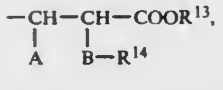
$R^5$ represents hydrogen, or represents a straight-chain, branched or cyclic, saturated or unsaturated hydrocarbon radical having up to 12 C atoms which can be interrupted by an oxygen or sulphur atom and which can be substituted by $NO_3$, hydroxyl, nitro, halogen, $C_1$–$C_6$-acyloxy, carboxyl, $C_1$–$C_6$-alkoxycarbonyl, CN or $C_1$–$C_8$-acyl, or by phenyl or phenoxy which are optionally substituted by halogen, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_2$-halogenoalkyl,

Z-denotes a single bond or a straight-chain or branched alkylene chain having up to 10 C atoms,

$R^3$ represents straight-chain, branched or cyclic alkyl having up to 6 carbon atoms which is optionally substituted by hydroxyl, cyano, phenyl, halogeno or aminoethoxy,

$R^4$ represents straight-chain or branched alkyl or alkenyl having up to 12 carbon atoms and which can optionally be substituted by halogen, hydroxyl, $C_1$–$C_6$-alkoxy, trifluoromethyl, carboxyl, $C_1$–$C_6$-alkoxycarbonyl or phenyl which can be substituted by nitro, halogen, $C_1$–$C_2$-alkyl, $C_1$–$C_4$-alkoxy, trifluoromethyl or trifluoromethoxy,

Y represents a radical



$$-\underset{\textstyle A}{\underset{|}{CH}}-\underset{\textstyle B-R^{14}}{\underset{|}{CH}}-COOR^{13},$$

wherein

A represents hydrogen or methyl,

B represents a group of the formula—NH, —NH—CO—, —NH—CS—, —NH—COO—, —NH—$SO_2$— or —NH—CO—NH— or —NH—CS—NH,

$R^{13}$ represents for hydrogen, or

stands for straight-chain or branched alkyl having up to 12 carbon atoms and which can be substituted by halogen, hydroxyl, carboxy, cyano, $C_1$–$C_8$-alkoxycarbonyl, carbonyl, alkylamino or dialkylamino having up to 8 carbon atoms, carbamoyl, $C_1$–$C_6$-alkoxy or phenyl which can be substituted by nitro, cyano, trifluoromethyl, trifluoromethoxy, halogen, $C_1$–$C_6$-alkyl, and

$R^{14}$ represents hydrogen, or

represents straight-chain or branched alkyl or alkenyl each having up to 12 carbon atoms and which can be substituted by halogen, hydroxyl, $C_1$–$C_8$-alkoxy, nitro, cyano, $C_1$–$C_8$-alkylthio, carboxyl, $C_1$–$C_8$-alkoxycarbonyl or phenyl which can be substituted by nitro, cyano, trifluoromethyl, trigluoromethoxy, $C_1$–$C_8$-alkyl, halogen or $C_1$–$C_8$-alkoxy or

represents cycloalkyl having 3 to 8 carbon atoms, or

represents aryl having 6 to 10 carbon atoms which can be monosubstituted to pentasubstituted by identical or different nitro, cyano, halogen, $C_1$–$C_8$-alkyl, $C_1$–$C_8$-alkoxy, $C_1$–$C_8$-alkylthio, carbamoyl or dialkylcarbamoyl in each case having up to 6 carbon atoms per alkyl group, carboxyl, $C_1$–$C_8$-alkoxycarbonyl, $C_1$–$C_6$-halogenoalkylthio, $C_1$–$C_6$-halogenoalkoxy, $C_1$–$C_6$-halogenoalkylthio, $C_1$–$C_6$-halogenoalkoxy, $C_1$–$C_6$-halogenoalkylthio, $C_1$–$C_6$-alkylsulphonyl, $C_1$–$C_6$-alkylsulphamoyl, amino, $C_1$–$C_8$-alkylamino or dialkylamino in each case having up to 8 carbon atoms per alkyl group or $C_1$–$C_8$-acylamino, or a physiologically acceptable salt thereof.

---

### 5,017,591
### THIAZOLYL METHYL)-2-2′-BI-1H-IMIDAZOLES AND USE AS HYPERTENSIVE AGENTS

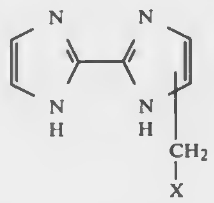
**Donald P. Matthews, West Chester, Ohio; Jeffrey P. Whitten, Zionsville, Ind., and James B. McCarthy, West Chester, Ohio, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio**

**Division of Ser. No. 329,148, Mar. 27, 1989, Pat. No. 4,929,744, which is a division of Ser. No. 78,352, Jul. 28, 1987, Pat. No. 4,839,375. This application Mar. 2, 1990, Ser. No. 487,559**

**Int. Cl.$^5$ A61K** *31/415, 31/38;* **C07D** *277/20, 277/32*

**U.S. Cl. 514—369** **7 Claims**

1. A compound of the general formula



(I)

wherein X is the 2- or 4-thiazolyl groups optionally substituted with 1 or 2 moieties selected from the group consisting of chloro, fluoro, bromo and lower alkyl of from 1 to 6 carbon atoms.

7. A method of treating hypertension in a mammal which comprises administering to said mammal an effective amount of a compound of claim 1 or the therapeutically-acceptable salt thereof.

---

### 5,017,592
### STABLE BIOCIDE COMPOSITION FOR INDUSTRIAL USE

**Osamu Umekawa, 756-26, Nagose, Kaizuka-shi, Osaka 597, Japan**

**Filed Nov. 30, 1989, Ser. No. 443,124**

**Claims priority, application Japan, Dec. 12, 1988, 63-313270**

**Int. Cl.$^5$ A01N** *43/80*

**U.S. Cl. 514—372** **5 Claims**

1. A stable biocide composition for industrial use which comprises 4,5-dichloro-1,2-dithiol-3-one and a mixture of 5-chloro-2-methyl-3-isothiazolone and 2-methyl-3-isothiazolone, together with a substantially anhydrous organic solvent for dissolving 4,5-dichloro-1,2-dithiol-3-one and said mixture of 5-chloro-2-methyl-3-isothiazolone and 2-methyl-3-isothiazolone.

---

### 5,017,593
### CYCLOHEPT[B]INDOLEALKANOIC ACIDS, PHARMACEUTICAL COMPOSITIONS AND USE

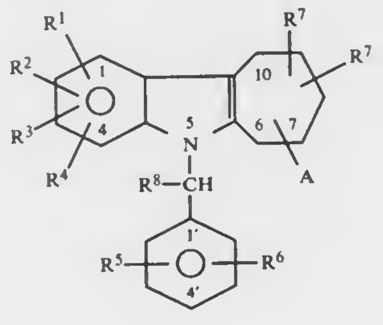
**John W. Gillard, Baie d'Urfe; Yvan Guindon, Montreal, both of Canada; Howard E. Morton, Gurnee, Ill.; Yves Girard, Ile Bizard, and Christiane Yoakim, Laval, both of Canada, assignors to Merck Frosst, Canada, Inc., Kirkland, Canada**

**Continuation-in-part of Ser. No. 211,800, Jun. 27, 1988, Pat. No. 4,906,554, which is a continuation of Ser. No. 76,096, Jul. 21, 1987, Pat. No. 4,775,680. This application Oct. 4, 1989, Ser. No. 417,221**

**Int. Cl.$^5$ A61K** *31/41;* **C07D** *403/02*

**U.S. Cl. 514—381** **10 Claims**

1. A compound of the formula:



I

wherein:

A is —$(CR^9R^{10})_rR^{11}$;

$R^1$, $R^2$, $R^3$, $R^4$, $R^5$ and $R^6$ are each independently selected from:

(1) hydrogen;
(2) alkyl having 1 to 6 carbon atoms;
(3) alkenyl having 2 to 6 carbon atoms;
(4) —$(CH_2)_nM$
wherein n is 0 to 3 and M is
a) —$C(O)R^{15}$;
b) —$C(O)NR^{12}R^{12}$;
c) —CN;
d) —$C(O)R^{16}$;
e) —$C(O)CH_2OH$ (hydroxymethyl ketone);
f) —$CF_3$;
g) —$R^{14}$;
h) —tetrazole;
i) —$OR^{12}$;
j) —$OC(O)R^{16}$;
k) —$OC(O)NR^{12}R^{12}$;
l) —$OC(O)OR^{18}$;
m) —$SR^{13}$;
n) —$S(O)R^{13}$;
o) —$S(O)_2R^{13}$;
p) —$S(O)_2NR^{12}R^{12}$;
q) —$NR^{12}R^{12}$;
r) —$NHC(O)R^{16}$;
s) —$NHS(O)_2R^{13}$;
t) —$N_3$;
u) —$NO_2$; or
v) —halogen;

each $R^7$ is independently H or $C_1$ or $C_6$ alkyl;

each $R^8$ is independently H or $C_1$ or $C_6$ alkyl;

each $R^9$ is independently H or $C_1$ or $C_6$ alkyl;

each $R^{10}$ is independently H, OH, $C_1$ to $C_4$ alkoxy or $C_1$ to $C_4$ alkyl;

$R^{11}$ is tetrazole;

each $R^{12}$ is independently H, $C_1$ to $C_6$ alkyl, benzyl, or $R^{14}$;

each $R^{13}$ is independently $C_1$ to $C_6$ alkyl, $CF_3$, or $R^{14}$;

each $R^{14}$ is independently phenyl, mono-substituted phenyl, or di-substituted phenyl wherein the substituents are independently $C_1$ to $C_3$ alkyl, $C_1$ to $C_3$ perfluoroalkyl, $C_1$ to $C_3$ alkoxy, halogen, CN, —$C(O)OR^{15}$, or —$CH_2$—$C(O)OR^{15}$;

each $R^{15}$ is independently H, phenyl, benzyl, or $C_1$ to $C_6$ alkyl;

each $R^{16}$ independently is H, $R^{13}$, or $(CH_2)_mC(O)OR^{15}$;

each $R^{18}$ is independently $C_1$ to $C_6$ alkyl, benzyl, or phenyl;

m is 0 to 4;
r is 0 to 6; and
t is 0 to 3.

---

### 5,017,594
### 1-HALO-1-AZOLYLPROPENES AND -METHYLOXIRANES AND FUNGICIDES CONTAINING THESE COMPOUNDS

**Rainer Seele; Reiner Kober, both of Fussgoenheim; Norbert Goetz, Worms; Eberhard Ammermann, Ludwigshafen, and Gisela Lorenz, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

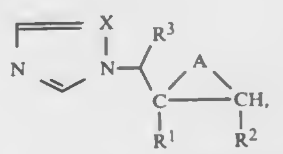
**Filed Jul. 7, 1989, Ser. No. 376,429**

**Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825841**

**Int. Cl.$^5$ A01N** *43/653;* **C07D** *249/08*

**U.S. Cl. 514—383** **6 Claims**

1. A compound of the formula I



I

where $R^1$ and $R^2$ are identical or different and each is $C_5$–$C_8$-cycloalkyl, $C_5$–$C_8$-cycloalkenyl, tetrahydropyranyl or norbornyl, each of these radicals being unsubstituted or mono- to trisubstituted by halogen, nitro, phenoxy, amino, alkyl, alkoxy or haloalkyl, each of 1 to 4 carbon atoms, A is oxygen, $R^3$ is F, Cl or Br, X is N, or their plant-tolerated acid addition salts or metal complexes.

---

### 5,017,595
### AZOLYLMETHYLALLYL ALCOHOLS AND FUNGICIDES CONTAINING THESE COMPOUNDS

**Rainer Seele, Fussgoenheim; Hubert Sauter, Mannheim; Reiner Kober, Fussgoenheim; Eberhard Ammermann, Ludwigshafen, and Gisela Lorenz, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

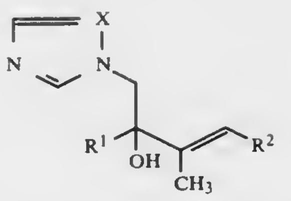
**Filed Mar. 6, 1989, Ser. No. 318,954**

**Int. Cl.$^5$ A01N** *43/653;* **C07D** *249/08*

**U.S. Cl. 514—383** **6 Claims**

1. Azolylmethylallyl alcohol of the formula I

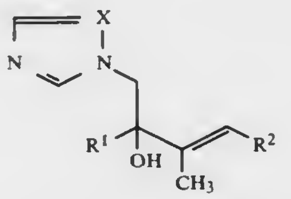
VOL
1126
ISS
3
MY
21
1991
UMI



(I)

wherein $R^1$ is phenyl substituted by halogen; $R^2$ is phenyl substituted by halogen; X is N; and their plant-tolerated acid addition salts and metal complexes thereof.

5. A fungicidal composition containing an inert carrier and a fungicidally effective amount of an azolylmethylallyl alcohol of the formula I



(I)

where $R^1$ is phenyl substituted by halogen; $R^2$ is phenyl substituted by halogen; X is N; or a plant-tolerated acid addition salt or metal complex thereof.

---

### 5,017,596

## ARYLPYRAZOLYLCARBINOL COMPOUNDS WITH ANALGESIC ACTIVITY

**Augusto Colombo, and Juan Pares, North of Barcelone, Spain, assignors to Laboratorios del Dr. Esteve, S.A., Barcelona, Spain**

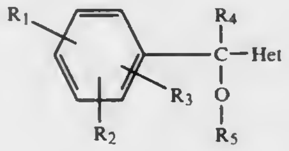
**Continuation of Ser. No. 178,464, Apr. 7, 1988, abandoned. This application Dec. 21, 1989, Ser. No. 456,077**

**Claims priority, application France, Apr. 10, 1987, 87 05118**

**Int. Cl.$^5$ C07D** *231/16;* **A61K** *31/415*

**U.S. Cl. 514—406** **7 Claims**

1. An arylheteroarylcarbinol derivative corresponding to formula I:



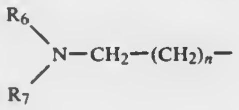
I

or a therapeutically acceptable salt, in which formula:

each $R_1$, $R_2$ and $R_3$ separately represents a member selected from the group consisting of the hydrogen atom, a halogen, a lower alkyl radical, a lower alkoxy radical and a trifluoro-methyl group,

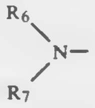
$R_4$ represents a member selected from the groups consisting of the hydrogen atom, a $C_1$ to $C_4$ lower alkyl radical, a cycloalkyl radical, a lower alkenyl radical and a cycloalkylamino radical substituted on the nitrogen atom,

$R_5$ represent a member selected from the group consisting of the hydrogen atom and radicals of the formula:



$$\begin{matrix} R_6 \\ & N-CH_2-(CH_2)_n- \\ R_7 \end{matrix}$$

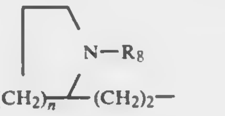
in which n can have the value 1 or 2 and the group:



$$\begin{matrix} R_6 \\ & N- \\ R_7 \end{matrix}$$

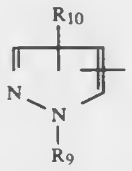
is a member selected from the group consisting of lower dialkylamino groups and pyrrolidino group, or

$R_5$ represents a group of formula:



in which is 1 in which $R_8$ is a lower alkyl group, and

Het represents a pyrazole of formula:



in which $R_9$ is selected from the class consisting of the hydrogen atom, $C_1$ to $C_4$ lower alkyl radicals, the dodecyl radical and the benzyl radical and

$R_{10}$ represents a member of the class consisting of the hydrogen atom, methyl radicals and halogen atoms.

4. A method for treating a person in pain which comprises administering to said patient an analgesically effective amount of at least one derivative of formula I as set forth in claim 1, or a physiologically acceptable salt thereof.

---

### 5,017,597

## CYCLOHEPT(B)INDOLEALKANOIC ACIDS, PHARMACEUTICAL COMPOSITIONS AND USE

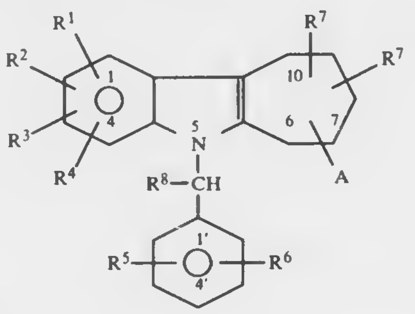
**John W. Gillard, Baie d'Urfe; Yvan Guindon, Montreal; Howard E. Morton, Dollard Des Ormeaux; Yves Girard, Ile Bizard, and Christiane Yoakim, Montreal, all of Canada, assignors to Merck Frosst Canada, Inc., Kirkland, Canada**

**Division of Ser. No. 211,800, Jun. 27, 1988, Pat. No. 4,906,654, which is a continuation of Ser. No. 76,096, Jul. 21, 1987, Pat. No. 4,775,680. This application Dec. 4, 1989, Ser. No. 447,755**

**Int. Cl.$^5$ A61K** *31/40;* **C07D** *209/86, 209/88*

**U.S. Cl. 514—411** **10 Claims**

1. A compound of the formula:



I

wherein:

A is $-(CR^9R^{10})_rR^{11}$;

$R^1$, $R^2$, $R^3$, $R^4$, $R^5$ and $R^6$ are each independently selected from:

(1) hydrogen;

(2) alkyl having 1 to 6 carbon atoms;

(3) alkenyl having 2 to 6 carbon atoms;

(4) $-(CH_2)_nM$ wherein n is 0 to 3 and M is

(a) $-C(O)R^{15}$;

(b) $-C(O)NR^{12}R^{12}$;

(c) $-CN$;

(d) $-C(O)R^{16}$;

(e) $-C(O)CH_2OH$ (hydroxymethyl ketone);

(f) $-CF_3$;

(g) $-R^{14}$;

(h) -tetrazole;

(i) $-OR^{12}$;

(j) $-OC(O)R^{16}$;

(k) $-OC(O)NR^{12}R^{12}$;

(l) $-OC(O)OR^{18}$;

(m) $-SR^{13}$;

(n) $-S(O)R^{13}$;

(o) $-S(O)_2R^{13}$;

(p) $-S(O)_2NR^{12}R^{12}$;

(q) $-NR^{12}R^{12}$;

(r) $-NHC(O)R^{16}$;

(s) $-NHS(O)_2R^{13}$;

(t) $-N_3$;

(u) $-NO_2$; or

(v) -halogen;

each $R^7$ is independently H or $C_1$ to $C_6$ alkyl;

each $R^8$ is independently H or $C_1$ to $C_6$ alkyl;

each $R^9$ is independently H or $C_1$ to $C_6$ alkyl;

each $R^{10}$ is independently H, OH, $C_1$ to $C_4$ alkoxy or $C_1$ to $C_4$ alkyl;

$R^{11}$ is $-C(O)NHS(O)_2R^{13}$;

each $R^{12}$ is independently H, $C_1$ to $C_6$ alkyl, benzyl, or $R^{14}$;

each $R^{13}$ is indepdendently $C_1$ to $C_6$ alkyl, $CF_3$, or $R^{14}$;

each $R^{14}$ is independently phenyl, mono-substituted phenyl, or di-substituted phenyl wherein the substituents are independently $C_1$ to $C_3$ alkyl, $C_1$ to $C_3$ perfluoroalkyl, $C_1$ to $C_3$ alkoxy, halogen, CN, $-C(O)OR^{15}$, or $-CH_2-C(O)OR^{15}$;

each $R^{15}$ is independently H, phenyl, benzyl, or $C_1$ to $C_6$ alkyl;

each $R^{16}$ independently is H, $R^{13}$, or $(CH_2)_mC(O)OR^{15}$;

each $R^{18}$ is independently $C_1$ to $C_6$ alkyl, benzyl, or phenyl;

m is 0 to 4;

r is 0 to 6; and

t is 0 to 3.

---

### 5,017,598

## NOMININE, AND INSECTICIDAL FUNGAL METABOLITE

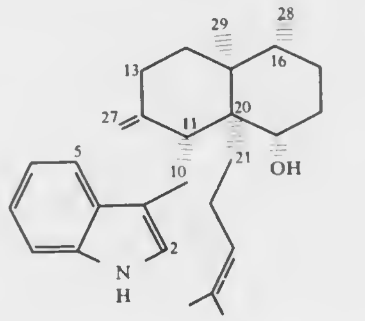
**Patrick F. Dowd; Donald T. Wicklow, both of Peoria, Ill.; James B. Gloer, Iowa City, Iowa, and Brad L. Rinderknecht, Long Beach, Calif., assignors to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C. and University of Iowa Research Foundation, Iowa City, Iowa**

**Filed May 17, 1989, Ser. No. 353,363**

**Int. Cl.$^5$ A61K** *31/40;* **C07D** *209/12*

**U.S. Cl. 514—415** **7 Claims**

1. A substantially pure indole diterpene designated nominine and having the structure:



3. A method for controlling insects comprising applying to a locus of said insects an insecticidally effective amount of nominine.

---

### 5,017,599

## SITE SPECIFIC ALKYLATING AGENTS

**Ettore Lazzari; Federico Arcamone; Sergio Penco; Maria A. Verini, and Nicola Mongelli, all of Milan, Italy, assignors to Farmitalia Carlo Erba, SPA, Milan, Italy**

**Continuation of Ser. No. 336,603, Apr. 7, 1989, abandoned, which is a continuation of Ser. No. 49,987, May 15, 1987, abandoned. This application Feb. 21, 1990, Ser. No. 485,847**

**Claims priority, application United Kingdom, May 15, 1987, 8612218**

**Int. Cl.$^5$ C07D** *207/14;* **A61K** *31/40*

**U.S. Cl. 514—422** **5 Claims**

1. β-[1-methyl-4-[1-methyl-4-[1-methyl-4-4-[N,N-bis(2-chloroethyl) amino-benzene-1-carboxamido]pyrrole-2-carboxamido]pyrrole-2-carboxamido]pyrrole-2-carboxamido]propionamidine, and the pharmaceutically acceptable salts thereof.

---

### 5,017,600

## TRICYCLIC DERIVATIVES

**Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.**

**Division of Ser. No. 132,724, Dec. 11, 1987, Pat. No. 4,816,071, which is a continuation of Ser. No. 801,085, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,355, Nov. 20, 1984, abandoned. This application Aug. 24, 1989, Ser. No. 399,716**

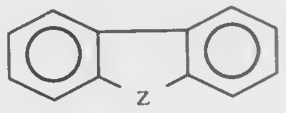
**Int. Cl.$^5$ C07D** *333/76;* **A61K** *31/38*

**U.S. Cl. 514—443** **9 Claims**

1. A compound of the formula (I):

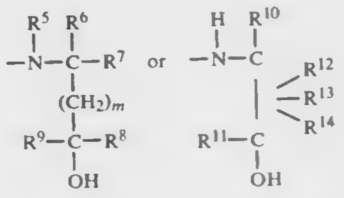
$$ArCH_2R^1 \qquad (I)$$

or a pharmaceutically acceptable acid addition salt thereof wherein Ar is



wherein Z is S

wherein $R^1$ contains not more than eight carbon atoms and is a group:



wherein m is 0 or 1:

$R^5$ is hydrogen;

$R^6$ and $R^7$ are the same or different and each is hydrogen or $C_{1-5}$ alkyl, or $C_{1-5}$ alkyl substituted by hydroxy;

$R^8$ and $R^9$ are the same or different and each is hydrogen or $C_{1-3}$ alkyl;

$-C—C-$

is a five- or six-membered saturated carbocyclic ring;

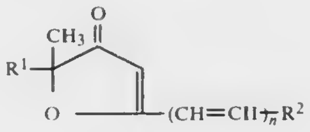
VOL
1126
ISS
3
MY
21
1991
UMI

$R^{10}$ is hydrogen, methyl or hydroxymethyl;
$R^{11}$, $R^{12}$ and $R^{13}$ are the same or different and each is hydrogen or methyl; and $R^{14}$ is hydrogen, methyl, hydroxy or hydroxymethyl.

### 5,017,601
### ANTI-ULCER 5-(2-SUBSTITUTED ETHENYL)-3(2H)-FURANONES

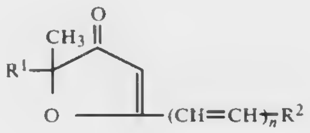
**Steven W. Felman, Langhorne, Pa.; Ivo L. Jirkovsky, Plainsboro, and Kevin A. Memoli, Cranbury, both of N.J., assignors to American Home Products Corporation, New York, N.Y.**
**Division of Ser. No. 449,620, Dec. 12, 1989, Pat. No. 4,966,905. This application Aug. 23, 1990, Ser. No. 572,535**
**Int. Cl.$^5$ A61K** *31/34;* **C07D** *333/56, 409/02*
**U.S. Cl. 514—443** **11 Claims**

1. A compound of the formula:



in which
$R^1$ is alkyl of 1 to 6 carbon atoms, phenyl or halophenyl;
$R^2$ is thienyl or benzothienyl; and
n is 1 or 2.

**10**. A method for preventing gastric ulcers which comprises administering, orally or parenterally, to a mammal in need thereof a cytoprotective amount of a compound of the formula:

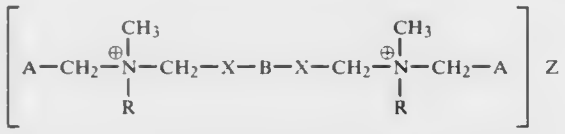


in which
$R^1$ is alkyl of 1 to 6 carbon atoms, phenyl or halophenyl;
$R^2$ is thienyl or benzothienyl; and
n is 1 or 2.

### 5,017,602
### ANTAGONISTS OF ORGANOPHOSPHATE-INDUCED TOXICITY

**Joseph G. Cannon; Ranbir K. Bhatnagar, and J. Paul Long, all of Iowa City, Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa**
**Filed Aug. 10, 1989, Ser. No. 392,763**
**Int. Cl.$^5$ A61K** *31/335;* **C07D** *319/06*
**U.S. Cl. 514—452** **9 Claims**

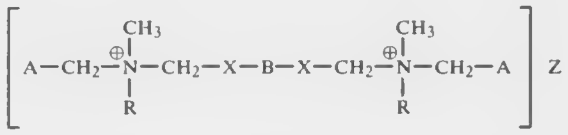
1. A compound of the formula:



$$\left[ A-CH_2-\underset{R}{\overset{CH_3}{N^{\oplus}}}-CH_2-X-B-X-CH_2-\underset{R}{\overset{CH_3}{N^{\oplus}}}-CH_2-A \right] Z$$

wherein "A" is a dioxan ring; "R" is selected from the group consisting of hydrogen and methyl; "X" is selected from the group consisting of keto, methylene and hydroxymethylene; "B" is a biphenyl ring; and Z represents a suitable number of counterbalancing halide anions.

5. A composition for use as an antagonist for organophosphate induced toxicity, comprising:
a small but antagonistic effective amount of a compound of the formula:



$$\left[ A-CH_2-\underset{R}{\overset{CH_3}{N^{\oplus}}}-CH_2-X-B-X-CH_2-\underset{R}{\overset{CH_3}{N^{\oplus}}}-CH_2-A \right] Z$$

wherein "A" is a dioxan ring; "R" is selected from the group consisting of hydrogen and methyl; "X" is selected from the group consisting of keto, methylene and hydroxymethylene; "B" is a biphenyl ring; and Z represents a suitable number of counterbalancing halide anions; and
a pharmaceutically acceptable carrier.

### 5,017,603
### XANTHOMEGNIN, A KNOWN COMPOUND, IS AN ANTIPARASITIC AGENT

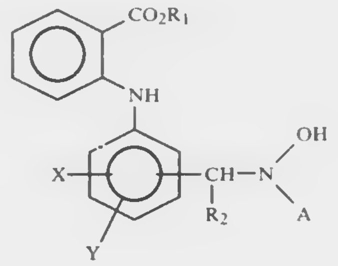
**Dan A. Ostlind, Bound Brook, N.J., and Sagrario Mochales, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.**
**Filed Mar. 21, 1990, Ser. No. 496,738**
**Int. Cl.$^5$ A01N** *43/16, 43/08*
**U.S. Cl. 514—455** **2 Claims**

1. A method for treating animals infected or infested with helminths, acarids, or insects which comprises treating the animal or area infected or infested with helminths, acarids, or insects with an effective amount of xanthomegnin.

### 5,017,604
### NOVEL FENAMIC ACID METHYL HYDROXAMATE DERIVATIVES HAVING CYCLOOXYGENASE AND 5-LIPOXYGENASE INHIBITION

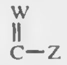
**Thomas R. Belliotti, Ypsilanti, and Catherine R. Kostlan, Saline, both of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**
**Filed Apr. 11, 1990, Ser. No. 508,143**
**Int. Cl.$^5$ A61K** *31/27*
**U.S. Cl. 514—482** **40 Claims**

1. A compound of the formula (I)



I

or a pharmaceutically acceptable base; acid or base salt thereof; or acid addition salt thereof; wherein
$R_1$ is hydrogen or lower alkyl;
$R_2$ is hydrogen or lower alkyl;
X is hydrogen, halogen, trifluoromethyl, lower alkyl, lower alkoxy, or hydroxy;
Y is hydrogen, halogen, trifluoromethyl, lower alkyl, lower alkoxy, or hydroxy;
A is H, lower alkyl, or



$$\overset{W}{\overset{\|}{C}}-Z$$

wherein W is S or O and Z is H, lower alkyl, lower alkoxy or $NR_3R_4$ wherein $R_3$ and $R_4$ are independently hydrogen or lower alkyl.

### 5,017,605
### COSMETIC CREAM PREPARATION CONTAINING WATER/OIL AND OIL/WATER EMULSIONS

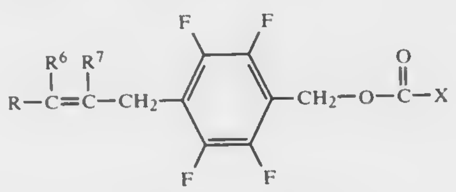
**Wolfgang Stindl, Eisenstadt, Austria, assignor to Schering Wien Ges. m.b.H., Vienna, Austria**
**Continuation of Ser. No. 74,173, Jul. 16, 1987, abandoned, which is a continuation of Ser. No. 815,498, Jan. 2, 1986, abandoned, which is a continuation of Ser. No. 614,926, May 29, 1984, abandoned, which is a continuation of Ser. No. 376,444, May 10, 1982, abandoned. This application Aug. 3, 1989, Ser. No. 388,752**
**Claims priority, application Austria, May 8, 1981, 2071/81**
**Int. Cl.$^5$ A61K** *31/215*
**U.S. Cl. 514—529** **13 Claims**

1. A cosmetic preparation having a cream-like consistency consisting essentially of a stable emulsion system containing a stable oil/water emulsion of cosmetically acceptable ingredients and a stable water/oil emulsion of cosmetically acceptable ingredients,
wherein the identities of both said oil/water emulsion and said water/oil emulsion are maintained in said emulsion system, and
wherein said cosmetic preparation contains jojoba oil.

### 5,017,606
### FLUOROBENZYL ESTERS

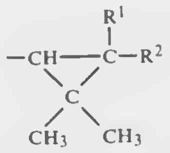
**Michael J. Robson, Bracknell, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England**
**Continuation of Ser. No. 133,665, Dec. 14, 1987, abandoned. This application Jun. 11, 1990, Ser. No. 536,078**
**Claims priority, application United Kingdom, Dec. 12, 1986, 8629806**
**Int. Cl.$^5$ A01N** *53/00*
**U.S. Cl. 514—531** **5 Claims**

1. A compound of formula (I):

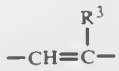


(I)

wherein X represents a group of formula:

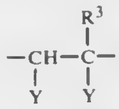


wherein (i) $R^1$ and $R^2$ are each selected from the hydrogen, halo and alkyl of up to four carbon atoms, or (ii) $R^1$ is hydrogen and $R^2$ represents either a group of formula



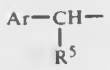
$$-CH=\overset{R^3}{C}-R^4$$

or a group of formula:



$$-\underset{Y}{CH}-\underset{Y}{\overset{R^3}{C}}-R^4$$

wherein $R^3$ and $R^4$ are each selected from methyl, halo or haloalkyl of one or two carbon atoms containing at least two fluorine atoms, and Y is chloro or bromo; or X represents a group of formula:



$$Ar-\underset{R^5}{CH}-$$

wherein $R^5$ represents an alkyl group of up to four carbon atoms and Ar represents a phenyl group optionally substituted with one or two halogen atoms, and R, $R^6$ and $R^7$ are each selected from hydrogen, halogen and alkyl of up to four carbon atoms, provided that at least one of R, $R^6$ and $R^7$ represents halogen, and further provided that R and $R^6$ are not both bromine when $R^7$ is hydrogen.

### 5,017,607
### METHOD TO TREAT PARKINSONS DISEASE

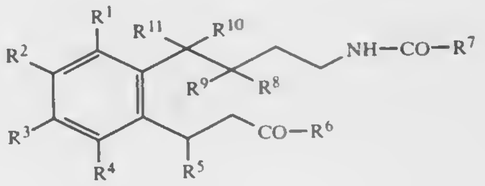
**Paolo Chiesi, Parma, Italy, assignor to Chiesi Farmaceutici S.p.A., Parma, Italy**
**Continuation of Ser. No. 56,372, Jun. 1, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 374,273**
**Claims priority, application Italy, Jun. 10, 1986, 20737 A/86; Jan. 30, 1987, 19221 A/87**
**Int. Cl.$^5$ A61K** *31/24*
**U.S. Cl. 514—534** **1 Claim**

1. The method of treatment of Parkinson's disease and related neurological syndromes which consists of administering by the oral or sublingual route to a patient in need of said treatment an aqueous solution containing 250 mgs of LDME levodopa methyl ester as the active ingredient and onset of therapeutic effect is produced with a single dose after 20–30 minutes.

### 5,017,608
### HYDROCINNAMIC ACID DERIVATIVES

**Werner Aschwanden, Ettingen; René Imhof, Gipf-Oberfrick, both of Switzerland; Roland Jakob-Roetne, Inzlingen, Fed. Rep. of Germany, and Emilio Kyburz, Reinach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**
**Division of Ser. No. 215,003, Jul. 5, 1988, Pat. No. 4,883,815. This application Sep. 6, 1989, Ser. No. 403,532**
**Claims priority, application Switzerland, Jul. 21, 1987, 2764/87**
**Int. Cl.$^5$ A61K** *31/24*
**U.S. Cl. 514—538** **10 Claims**

1. A method for treating cerebral insufficiency characterized by loss of memory capacity, decreased learning capacity, loss of interest in the surroundings and self-care, in alcoholism and in cerebrovascular disorders, in vestibular disorders and in dyslexia in a mammal requiring such treatment which comprises administering to such mammal a therapeutically effective amount of a compound of the formula



1

wherein
one or two of the symbols $R^1$ to $R^4$ are halogen or methoxy and the others are hydrogen;
$R^5$ is hydrogen or phenyl;
$R^6$ is a residue of the formula

$-OR^{12}$ (a) or $-NR^{13}R^{14}$; (b)

VOL
1126
ISS
3
MY
21
1991
UMI

R$^{7}$ is (C$_2$–C$_4$)-alkyl, (C$_2$–C$_5$) -alkanoylamino-(C$_2$–C$_5$)-alkyl, amino or (C$_1$–C$_4$)-alkoxyphenyl;

R$^{8}$ and R$^{9}$ each, independently, are hydrogen or (C$_1$–C$_4$)-alkyl;

R$^{10}$ is hydrogen and R$^{11}$ is hydroxy or R$^{10}$ and R$^{11}$ taken together are oxo;

R$^{12}$ is hydrogen, (C$_1$–C$_{10}$)-alkyl, pyridylmethyl or carbamoylmethyl;

R$^{13}$ is hydrogen, (C$_1$–C$_4$)-alkyl and R$^{14}$ is hydrogen, (C$_1$–C$_4$)-alkyl, pyridyl, phenyl-(C$_1$–C$_4$)-alkyl, carboxy-(C$_1$–C$_4$)-alkyl, carbamoyl-(C$_1$–C$_4$)-alkyl, (C$_1$–C$_4$)-alkoxy -carbonyl-(C$_1$–C$_4$)-alkyl, di-(C$_1$–C$_4$)-alkoxy -carbonyl-(C$_2$–C$_5$)-alkyl, piperidino-(C$_2$–C$_4$) -alkyl or halopyridinecarboxamido-(C$_2$–C$_4$)-alkyl or R$^{13}$ and R$^{14}$ taken together with the nitrogen atom are 4-(C$_1$–C$_4$)-alkyl-piperazin-1-yl,

or a pharmaceutically acceptable salt of a basic compound of formula I with an acid or of an acidic compound of formula I with a base.

---

### 5,017,609
### PHARMACEUTICAL COMPOSITION AND METHOD OF TREATMENT OR PROPHYLAXIS OF CARDIAC DISORDERS

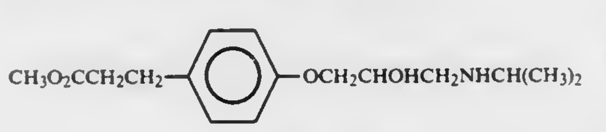
**Agustin Escobar, Aquadilla, P.R.; Dietmar Wagenknecht, Zion, Ill., and Ahmad W. Malick, Edison, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 289,501, Dec. 23, 1988, abandoned, which is a continuation of Ser. No. 810,547, Dec. 18, 1985, abandoned, which is a continuation-in-part of Ser. No. 598,061, Apr. 9, 1984, abandoned. This application Nov. 16, 1989, Ser. No. 437,293**

**Int. Cl.$^{5}$ A61K** *31/24*

**U.S. Cl. 514—538** **10 Claims**

1. A pharmaceutical composition for parenteral administration comprising the $\beta$-adrenergic compound



or its pharmaceutically acceptable salts in an aqueous solution comprising from about 5 to about 60% by volume ethanol; from about 5 to about 60% by volume propylene glycol, and from about 0.5 to about 2 molar physiologically acceptable buffering agent, said solution having a pH of from about 4.0 to about 6.0.

---

### 5,017,610
### DERIVATIVES OF P-SUBSTITUTED PHENYL ESTER OF PIVALIC ACID

**Katsuhiro Imaki; Yoshinobu Arai, and Tadao Okegawa, all of Osaka, Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan**

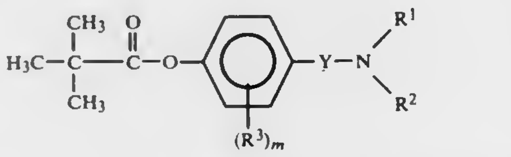
**Filed Jun. 12, 1989, Ser. No. 364,994**

**Claims priority, application Japan, Jun. 13, 1988, 63-145450; Mar. 6, 1989, 1-53541**

**Int. Cl.$^{5}$ A61K** *31/22*

**U.S. Cl. 514—546** **3 Claims**

1. A compound of the formula:



(I)

wherein Y represents a sulfonyl (—SO$_2$) group,

R$^{1}$ and R$^{2}$, which may be the same or different, each represent,

(1) a hydrogen atom, or

(2) an alkyl group of up to 16 carbon atoms;

R$^{3}$ represents

(1) a hydrogen atom, or

(2) an alkyl group of up to 6 carbon atoms; and

m represents an integer of up to 4;

or non-toxic salts or acid addition salts thereof.

---

### 5,017,611
### ETHYL-3-(2-ETHYL-2,2-DIMETHYLHYDRAZINIUM)-PROPIONATE SALTS TO TREAT ARRHYTHMIA

**Gunar A. Bremanis, ulitsa 1905 goda, 18, Jurmala; Felix Z. Meerson, ulitsa Svobodv, 95, kv. 149, Moscow; Ivars Y. Kalvinsh, ulitsa Miera, 17, kv. 8, Salaspils; Nurlan Abdikaliev, ulitsa Dzhambula, 66, kv. 22, Alma-Ata; Petr T. Trapentsier, ulitsa F. Engelsa, 40, kv. 24, Riga; Ma/Ya G. Pshennikova, Panfilovsky pereulok, 5, kv. 42, Moscow; Irene B. Antsena, ulitsa A. Deglava, 106/3, kv. 16, Riga; Edmund Y. Lukevits, ulitsa Ierikju, 43, kv. 10, Riga, and Boris Z. Simkhovich, ulitsa Avotu, 4, kv. 57, Riga, all of U.S.S.R.**

**Division of Ser. No. 170,557, Mar. 21, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 428,901**

**Claims priority, application U.S.S.R., Mar. 25, 1987, 4217356**

**Int. Cl.$^{5}$ A61K** *31/22*

**U.S. Cl. 514—551** **2 Claims**

1. A method of prophylaxis and treatment of arrhythmias in ischaemia, reperfusion and postinfarction cardiosclerosis, in a host which comprises administering to said host an effective amount of a compound selected from the group consisting of ethyl-3-(2-ethyl-2,2-dimethylhydrazinium) propionate chloride, ethyl-3-(2-ethyl-2,2-dimethylhydrazinium) propionate bromide and ethyl-3-(2-ethyl-2,2-dimethylhydrazinium) propionate iodide.

---

### 5,017,612
### PRESERVATIVE COMPOSITION AND METHOD

**James E. Nayfa, 10310 Woodford, Dallas, Tex. 75229**

**Continuation of Ser. No. 766,110, Aug. 15, 1985, abandoned. This application Mar. 23, 1987, Ser. No. 60,705**

**Int. Cl.$^{5}$ A01N** *37/00;* **A61K** *31/19*

**U.S. Cl. 514—557** **10 Claims**

1. A composition capable of preserving moisture-containing agricultural products succeptible to mold spoilage from mold spoilage for an extended period of time comprising a mold-inhibiting agent selected from acetic acid, sorbic acid, propionic acid and their hydrolyzable salts, or mixtures thereof, a quaternary ammonium compound and a polyglycol; said composition containing for each 100 parts by weight of said mold-inhibiting agent an amount of each of said quaternary compound and said polyglycol sufficient to permit said mold-inhibiting agent to preserve said moisture-containing agricultural products at a concentration of said mold-inhibiting agent lower than required when said mold-inhibiting agent is used without said quaternary compound and said polyglycol.

---

### 5,017,613
### VALPROIC ACID PREPARATIONS

**Daniel Aubert, Plaisance du Touch; Francis Blanc, Lattes; Henri Desmolin, Merignac; Michel Morre, Toulouse, and Lucette Sindely, Andre de Cubzac, all of France, assignors to Sanofi, S. A., Paris, France**

**Continuation of Ser. No. 4,303, Jan. 8, 1987, abandoned, which is a continuation of Ser. No. 631,602, Jul. 17, 1984, abandoned. This application Feb. 21, 1989, Ser. No. 313,304**

**Claims priority, application France, Jul. 20, 1983, 83 12375; Jul. 20, 1983, 83 12376**

**Int. Cl.$^{5}$ A61K** *31/185, 31/19*

**U.S. Cl. 514—557** **3 Claims**

1. An orally administrable tablet pharmaceutical composition comprising a ratio of about 25–35% by weight of valproic acid to about 65–75% by weight of sodium valproate.

### 5,017,614
### METHODS OF PREVENTING OXIDATION, QUENCHING SINGLET OXYGEN AND INHIBITING MOLD GROWTH AND NOVEL COMPOSITIONS THEREFOR

**Michael W. Pariza, and Yeong L. Ha, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Feb. 17, 1989, Ser. No. 313,120**

**Int. Cl.$^{5}$ A61K** *31/20, 31/00*

**U.S. Cl. 514—558** **8 Claims**

1. A method of preventing oxidation, quenching singlet oxygen and inhibiting mold growth in a fatty acid containing product which comprises adding to said product a safe and effective amount of CLA.

---

### 5,017,615
### FLEA KILLER COMPOSITIONS

**Lester J. Workman, P.O. Box 5547, Sarasota, Fla. 34277-5547**

**Filed Jan. 14, 1988, Ser. No. 143,954**

**Int. Cl.$^{5}$ A01N** *35/00, 37/00, 37/36, 57/10*

**U.S. Cl. 514—560** **3 Claims**

1. An insecticidal composition for eliminating or controlling ectoparasites on domestic animals, said insecticidal composition consisting essentially of about 12% disctyl sodium sulfosuccinate, about 2% hendecensic acid and a solvent or group of solvents.

---

### 5,017,616
### METHOD FOR IMPROVING VENTILATION DURING SLEEP AND TREATING SLEEP RELATED VENTILATION ABNORMALITIES

**Jeffrey Askanazi, 25 Pine St., Haworth, N.J. 07641**

**Filed Nov. 30, 1989, Ser. No. 443,765**

**Int. Cl.$^{5}$ A61K** *31/195*

**U.S. Cl. 514—561** **16 Claims**

1. A method of treating sleep-related ventilation abnormalities comprising:

administering to a patient in need thereof a therapeutically effective amount of an amino acid solution comprising therapeutically effective amounts of the branched-chain amino acids isoleucine, leucine, and valine.

---

### 5,017,617
### DISINFECTANT COMPOSITION FOR MEDICAL USE

**Koji Kibara, Yamatokoriyama, and Taro Furuta, Kashiwara, both of Japan, assignors to Saraya Kabushiki Kaisha, Osaka, Japan**

**Filed Mar. 13, 1989, Ser. No. 322,767**

**Claims priority, application Japan, Nov. 22, 1988, 63-294962**

**Int. Cl.$^{5}$ A01N** *31/00, 37/12, 37/52, 43/40*

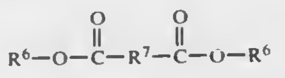
**U.S. Cl. 514—635** **2 Claims**

1. A disinfectant composition for medical use comprising ethanol used for disinfection, a bactericidal agent, and an emollient, wherein

said bactericidal agent is chlorhexidine digluconate;

said emollient is selected from the group consisting of diesters of dibasic acid of the formula (IV), triesters of citric acid of the formula (V), triesters of phosphoric acid of the formula (VI);

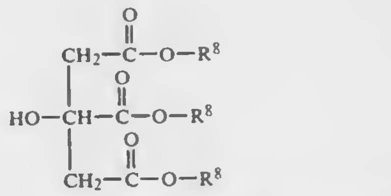
said ethanol used for disinfection is an aqueous solution of ethanol ranging in concentration from 50 to 95% (v/v), said bactericidal agent is contained at a concentration of from 0.01 to 0.5% (wt/v), and said emollient is contained at a concentration of from 0.1 to 1.0% (wt/v):



$$R^6-O-\overset{\overset{O}{\|}}{C}-R^7-\overset{\overset{O}{\|}}{C}-O-R^6 \qquad (IV)$$

wherein R$^{6}$ is alkyl containing 4 to 6 carbon atoms, and

R$^{7}$ is phyenylene or polymethylene of the formula —(CH$_2$)$_n$—, said n being an integer of from 2 to 8;



$$\begin{array}{l} CH_2-\overset{\overset{O}{\|}}{C}-O-R^8 \\ \quad | \\ HO-CH-\overset{\overset{O}{\|}}{C}-O-R^8 \\ \quad | \\ CH_2-\overset{\overset{O}{\|}}{C}-O-R^8 \end{array} \qquad (V)$$

wherein R$^{8}$ is alkyl containing 4 to 6 carbon atoms;

$$(R^9-O-)_3PO \qquad (VI)$$

wherein R$^{9}$ is alkyl containing 4 to 6 carbon atoms.

---

### 5,017,618
### LABILE DERIVATIVES OF KETONE ANALOGS OF 3-SUBSTITUTED-1-ALKYLAMINO-2-PROPANOLS AND THEIR USE AS BETA-ADRENERGIC BLOCKERS

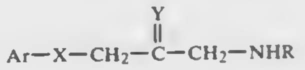
**Nicholas S. Bodor, Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.**

**Continuation-in-part of Ser. No. 338,205, Apr. 14, 1989, abandoned, which is a continuation of Ser. No. 26,002, Mar. 16, 1987, abandoned. This application Sep. 18, 1989, Ser. No. 408,778**

**Int. Cl.$^{5}$ A61K** *31/15;* **C07C** *251/38*

**U.S. Cl. 514—640** **86 Claims**

1. A compound having the formula



$$Ar-X-CH_2-\overset{\overset{Y}{\|}}{C}-CH_2-NHR \qquad (I)$$

or a pharmaceutically acceptable acid addition salt thereof, wherein —X— is —O—, —CH$_2$— or —; =Y is a derivatized keto group which is hydrolyzable or enzymatically convertible to a keto group; R is alkyl having from 1 to 12 carbon atoms or aralkyl having from 7 to 20 carbon atoms; and Ar is the 3-aromatic or heterocyclic residue of a 1-alkylamino-2-propanol having an aromatic or heterocyclic substituent at the 3-position and having $\beta$-adrenergic blocking properties.

---

### 5,017,619
### PHENETHANOLAMINE DERIVATIVES

**Leo Alig, Kaiseraugst, and Marcel Müller, Frenkendorf, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

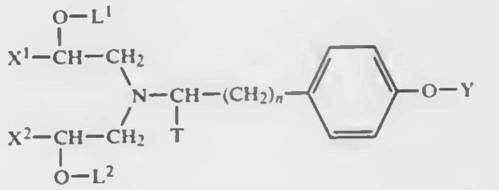
**Continuation of Ser. No. 849,594, Apr. 8, 1986, abandoned. This application Dec. 16, 1988, Ser. No. 285,269**

**Claims priority, application Switzerland, Apr. 16, 1985, 1607/85; Feb. 14, 1986, 599/86**

**Int. Cl.$^{5}$ A61K** *31/135;* **C07C** *215/04, 215/06*

**U.S. Cl. 514—653** **34 Claims**

1. A compound of the formula:



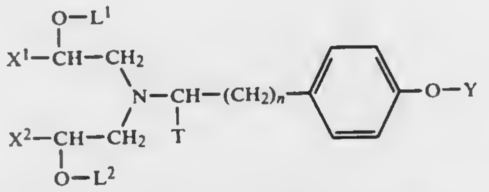
I

wherein n is the number 1 or 2; L$^{1}$ and L$^{2}$ are hydrogen, C$_{1\text{-}3}$-(alkyl)carbonyl or C$_{1\text{-}3}$ (alkoxy)carbonyl; T is hydrogen or methyl; X$^{1}$ and X$^{2}$ are phenyl or phenyl which is monosubstituted in the m-position by Br, Cl, F, CF$_3$ or NO$_2$: Y is —(CH$_2$)$_{1\text{-}6}$—O—G, —(CH$_2$)$_{1\text{-}6}$—CH=CH—C(O)—Z, —C(O)—Z or

VOL
1126
ISS
3
MY
21
1991
UMI

—CH(COOR″)$_2$; G is C$_{1-4}$-alkyl, C$_{1-4}$-alkoxy-C$_{1-4}$-alkyl or —(CH$_2$)$_{1-4}$—Q; Q is phenoxy, phenyl, p-fluorophenyl or p-phenoxyphenyl; Z is a -OR or -N(R,R′); R and R′ are hydrogen or C$_{1-4}$-alkyl or R and R′ together with the N-atom to which they are attached form a 5- or 6-membered saturated ring which optionally contains an O-atom or an additional N-atom; and R″ is C$_{1-4}$-alkyl; as well as the physiologically compatible salts thereof.

32. A method for treating a subject suffering from obese adult diabetes, which method comprises administering to said subject a therapeutically effective amount a compound of the formula



wherein n is the number 1 or 2; L$^1$ and L$^2$ are hydrogen, C$_{1-3}$-(alkyl)carbonyl or C$_{1-3}$ (alkoxy)carbonyl; T is hydrogen or methyl; X$^1$ and X$^2$ are phenyl or phenyl which is monosubstituted in the m-position by Br, Cl, F, CF$_3$ or NO$_2$; Y is —(CH$_2$)$_{1-6}$—O—G, —(CH$_2$)$_{1-6}$—CH═CH—C(O)—Z, —C(O)—Z or —CH(COOR″)$_2$; G is C$_{1-4}$-alkyl, C$_{1-4}$-alkoxy-C$_{1-4}$-alkyl or —(CH$_2$)$_{1-4}$—Q; Q is phenoxy, phenyl, p-fluorophenyl or p-phenoxyphenyl; Z is a -OR or -N(R,R′): R and R′ are hydrogen or C$_{1-4}$-alkyl or R and R′ together with the N-atom to which they are attached form a 5- or 6-membered saturated ring which optionally contains an O-atom or an additional N-atom: and R″ is C$_{1-4}$-alkyl; as well as the physiologically compatible salts thereof.

---

### 5,017,620
## PESTICIDE COMPOSITION

**David L. Grassman, Issaquah; Scott P. Ager, Seattle, and Tamis L. Root, Yakima, all of Wash., assignors to E. M. Matson, Jr., Company, Inc., Seattle, Wash.**

**Filed Aug. 10, 1989, Ser. No. 392,051**

**Int. Cl.$^5$ A01N** *35/00, 35/02*

**U.S. Cl. 514—698** **27 Claims**

1. A weather resistant molluscicide composition in the form of a uniformly dispersed mixture comprising:
- (a) an aqueous carrier;
- (b) a poison in an amount effective to kill molluscs that contact said molluscicide composition;
- (c) an attractant for molluscs;
- (d) a thickener for increasing the viscosity of the molluscicide composition; and
- (e) a humidifying agent.

---

### 5,017,621
## POLYPROPYLENE RESIN PRE-EXPANDED BEADS, MANUFACTURING METHOD THEREOF AND EXPANSION-MOLDING METHOD USING SAID BEADS

**Hitoshi Shiiki, Ibaraki; Minoru Tada, and Kyoichi Nakamura, both of Kamisu, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 282,137, Dec. 9, 1988, Pat. No. 4,931,477. This application Mar. 22, 1990, Ser. No. 497,281**

**Claims priority, application Japan, Dec. 11, 1987, 62-315008**

**Int. Cl.$^5$ C08J** *9/232, 9/22*

**U.S. Cl. 521—58** **10 Claims**

1. A manufacturing method of polypropylene resin pre-expanded beads comprising the steps of reducing the pressure inside polypropylene resin pre-expanded beads originally having a bulk density of not higher than 0.0930 g/cc so that the beads are shrunk to give a bulk volume ratio of 10–75% at normal temperature and pressure, and thereafter bringing said beads into an atmosphere held at normal temperature and normal pressure.

---

### 5,017,622
## SULFONE POLYMER FOAM PRODUCED WITH AQUEOUS BLOWING AGENT

**David G. Bland, Knoxville, Tenn., and Joseph J. Conte, Newark, Ohio, assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 16, 1990, Ser. No. 598,265**

**Int. Cl.$^5$ C08J** *9/12*

**U.S. Cl. 521—79** **26 Claims**

1. A process for the production of sulfone polymer foam comprising forming a flowable gel under conditions of sufficient heat and pressure for the gel to form from a gel forming mixture comprising one or more sulfone polymers and a blowing agent comprising water and releasing the pressure to convert the flowable gel into a cellular mass.

---

### 5,017,623
## PROCESS FOR THE PREPARATION OF POLYURETHANE FOAMS

**Peter Haas, Haan; Hans Hettel, Roesrath, and Andreas Ruckes, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**

**Filed Aug. 21, 1989, Ser. No. 396,481**

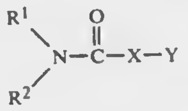
**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3829958**

**Int. Cl.$^5$ C08G** *18/14*

**U.S. Cl. 521—128** **14 Claims**

1. A process for the preparation of polyurethane foams comprising reacting
- (1) a polyisocyanate with
- (2) a compound containing at least two active hydrogen atoms and having a molecular weight of 400 to 10,000 selected from polymer-modified polyols and polyols containing predominantly primary hydroxyl groups,

in the presence of
- (3) water or an organic blowing agent,
- (4) a catalyst, and
- (5) a flameproofing agent which is a compound other than oxamide or biuret having the formula

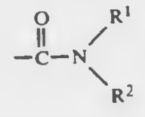


in which

R$^1$ and R$^2$ are independently hydrogen or C$_1$–C$_4$ alkyl;

X is —(CH$_2$)$_n$—wherein n is an interger of from 0 to 5, —CH═CH—, a branched alkylene group, an arylene group, or (NH)$_m$ wherein m is 1 or 2; and

Y is —CN or



wherein R$^1$ and R$^2$ are as defined above or wherein each R$^1$ is as defined above and both R$^2$ together are a bond.

### 5,017,624
## REDUCTION OF SILICONE FOAM DENSITY USING BUFFERS

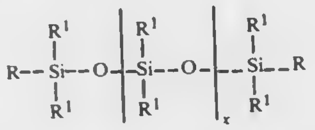
**Donald S. Johnson, Scotia, N.Y., assignor to General Electric Company, Waterford, N.Y.**

**Division of Ser. No. 570,236, Aug. 20, 1990. This application Oct. 15, 1990, Ser. No. 597,253**

**Int. Cl.$^5$ C08J** *9/00*

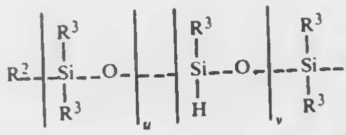
**U.S. Cl. 521—154** **1 Claim**

1. A silicone foam having a reduced density of about 5 to about 6 pounds per cubic foot, comprising the cured product of a foamable composition comprising by weight:
- (A) a silicone composition, comprising by weight:
  - (1) 100 parts of a vinyl-terminated polydiorganosiloxane of the formula:



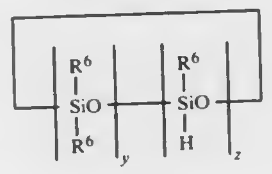
$$R-\overset{R^1}{\underset{R^1}{Si}}-O-\left[\overset{R^1}{\underset{R^1}{Si}}-O\right]_x-\overset{R^1}{\underset{R^1}{Si}}-R$$

wherein R and R$^1$ are selected from the group consisting of substituted or unsubstituted hydrocarbon radicals of from 1 to 20 carbon atoms, such that the polymer contains from 0.0002 to 3% by weight vinyl and x varies such that the viscosity of the polymer varies from 100 to 1,000,000 centipoise at 25° C.;
  - (2) about 0.5 to about 5 parts by weight of an aqueous buffer solution having a pH in the range of about 9 to about 10; and
  - (3) about 25 to about 140 parts per million of a platinum catalyst;
- (B) about 2.5 to about 20 parts of a substantially linear hydride polysiloxane having the formula



$$R^2-\left[\overset{R^3}{\underset{R^3}{Si}}-O\right]_u-\left[\overset{R^3}{\underset{H}{Si}}-O\right]_v-\overset{R^3}{\underset{R^3}{Si}}-R^2$$

wherein R$^2$ is selected independently from the group consisting of hydrogen, alkyl radicals of from 1 to 8 carbon atoms, halo substituted alkyl radicals of from 1 to 8 carbon atoms, aryl radicals of from 6 to 14 carbon atoms, and halo substituted aryl radicals of from 6 to 14 carbon atoms; and R$^3$ is selected from the group consisting of alkyl radicals of from 1 to 8 carbon atoms, aryl radicals of from 6 to 14 carbon atoms, halo aryl radicals of from 6 to 14 carbon atoms, and haloalkyl radicals of from 3 to 8 carbon atoms; u and v are integers which can vary sufficiently to provide a hydride polysiloxane having a viscosity of from about 5 to about 10,000 centipoise at 25° C.;
- (C) about 0.1 to about 15 parts of a cyclic hydride polysiloxane having the general formula:



wherein R$^6$ may be independently hydrogen, an alkyl radical of from 1 to 8 carbon atoms, an aryl radical from 6 to 14 carbon atoms, or a haloalkyl radical of 3 to 8 carbon atoms; y is an integer having a value of 0 to 5 inclusive, z is an integer having a value of from 1 to 8 inclusive, and the sum of y and z has a value of 3 to 8 inclusive; and
- (D) about 0.1 to about 5 parts of a hydroxyl source selected from the group consisting of water, organic alcohol, or a mixture of the foregoing.

---

### 5,017,625
## ADHESIVE THEIR PREPARATION AND USE

**Christopher W. G. Ansell, Sawston, United Kingdom, assignor to Smith & Nephew Associated Companies plc, United Kingdom**

**Continuation of Ser. No. 271,096, Nov. 14, 1988, Pat. No. 4,914,173, which is a continuation of Ser. No. 129,526, Dec. 7, 1987, abandoned. This application Feb. 5, 1990, Ser. No. 475,103**

**Claims priority, application United Kingdom, Dec. 6, 1986, 8629231**

**Int. Cl.$^5$ C08G** *18/14*

**U.S. Cl. 521—159** **14 Claims**

1. An adhesive product suitable for use on skin comprising a substrate coated with a skin friendly pressure sensitive adhesive which comprises an inherently tacky polyurethane gel, which adhesive contains both polyurethane and acrylate residues and which is not self-adherent, and which contains up to 95% by weight of water when hydrated.

---

### 5,017,626
## VISIBLE LIGHT-CURING POLYESTER RESIN COMPOSITION

**Yoshihiro Tomura, and Shigeki Banno, both of Aichiken, Japan, assignors to Nippon Oil & Fats Co., Ltd., Tokyo, Japan**

**Filed Sep. 30, 1988, Ser. No. 251,461**

**Claims priority, application Japan, Oct. 2, 1987, 62-248108; Oct. 2, 1987, 62-248109**

**Int. Cl.$^5$ C08F** *2/50, 4/36, 12/08;* **C08L** *67/06*

**U.S. Cl. 522—9** **5 Claims**

1. A visible light-curing polyester resin composition, consisting essentially of:

100 parts by weight of an unsaturated polyester resin prepared by reacting an ethylenically unsaturated dibasic acid or anhydride with a glycol, and a polymerizable vinyl monomer and a photocuring agent consisting of:
- (a) 0.1 to 5 parts by weight of an $\alpha$-diketone,
- (b) 0.1 to 5 parts by weight of a benzildimethyl ketal, and
- (c) a member selected from the group consisting of:
  - (i) 2 to 15 parts by weight of 2-(dimethylamino)-ethyl benzoate plus 0.01 to 5 parts by weight of a peroxy ketal, and
  - (ii) 0.01 to 5 parts by weight of a peroxy ketal plus 0.1 to 10 parts by weight of a tertiary amine.

---

### 5,017,627
## COMPOSITE MATERIAL FOR USE IN ORTHOPAEDICS

**William Bonfield, Welwyn; Jeremy A. Bowman, Iver, both of England, and Marc D. Grynpas, Newton, Mass., assignors to National Research Development Corporation, United Kingdom**

**Continuation of Ser. No. 721,135, Sep. 30, 1985, abandoned, which is a continuation of Ser. No. 637,692, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 250,664, Apr. 3, 1981, abandoned. This application May 2, 1988, Ser. No. 191,738**

**Claims priority, application United Kingdom, Oct. 9, 1980, 8032647**

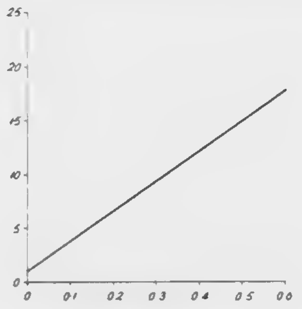
**Int. Cl.$^5$ A61F** *2/00;* **C08K** *3/32;* **C08L** *23/00*

**U.S. Cl. 523—115** **19 Claims**

1. A prosthesis for replacement of bone comprising a composite formed by compounding, in the solid phase, a homo- or copolyolefin having a weight average molecular weight ($M_w$)

VOL
1126
ISS
3
MY
21
1991
UMI

greater than 100,000 with from 30 to 50 percent by volume of a particulate calcium phosphate filler, said composite having a



Young's modulus in the range of values recorded for compact bone.

---

**5,017,628**

## ASPHALT HIGHWAY JOINT SEALANT

**John E. Dietlein, Bay City, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Continuation of Ser. No. 7,181,790, Apr. 15, 1988, abandoned. This application Apr. 11, 1989, Ser. No. 336,542**

**The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.**

**Int. Cl.$^5$ C08K** *9/04*

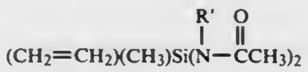
U.S. Cl. 523—200 **11 Claims**

1. A composition which is stable in the absence of moisture but curable at room temperature upon exposure to moisture to a silicone elastomer consisting essentially of a mixture prepared by mixing under anhydrous conditions

(A) 100 parts by weight of a hydroxyl endblocked polydiorganosiloxane having a viscosity at 25° C. of from 5 to 100 Pa.s and in which the organic groups are selected from the group consisting of methyl, ethyl, vinyl, phenyl, and 3,3,3-trifluoropropyl radicals, in said polydiorganosiloxane no more than 50 percent of the organic groups being phenyl or 3,3,3trifluoropropyl radicals and no more than 10 percent of the organic groups being vinyl radicals,

(B) from 25 to 150 parts by weight of non-acidic, non reinforcing filler having an average particle size of from 1 to 8 micrometers, said filler having been treated with a treating agent selected from the group consisting of calcium stearate, stearic acid, salts of stearic acid, and carboxylatepolybutadiene,

(C) from 2.5 to 10 parts by weight of a silane of the general formula



$$(CH_2{=}CH_2)(CH_3)Si(\overset{R'}{\overset{|}{N}}-\overset{O}{\overset{\|}{C}}CH_3)_2$$

in which R' is an organic radical selected from the group consisting of methyl, ethyl, and phenyl, said silane being present in an amount sufficient to provide at least one silane molecule per hydroxyl of the polydiorganosiloxane,

(D) from 1 to 6 parts by weight of an aminoxysilicone compound having from 1 to 100 silicon atoms per molecule and from 3 to 10 aminoxy groups per molecule, said aminoxy group having a general formula —OX in which X is a monovalent amine radical selected from the group consisting of —$NR_2$ and a heterocyclic amine, R is a monovalent hydrocarbon radical, the —OX group being bonded to silicon atoms through an SiO bond, the remaining valences of the silicon atoms in the aminoxysilicone compound being satisfied by divalent oxygen atoms which link the silicon atoms of the aminoxysilicone compounds having two or more silicon atoms per molecule through silicon-oxygen-silicon bonds and by monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals bonded to the silicon atoms through silicon-carbon bonds, there being an average of at least one monovalent hydrocarbon radical or halogenated monovalent hydrocarbon radical per silicon atom,

(E) from 1 to 20 percent by weight of the total composition of a diluent consisting of non-reactive silicone fluid having a viscosity of from 1 to 100 Pa.s at 25° C., said silane (C) and said aminoxysilicone compound being present in amounts sufficient to provide a combined weight of at least 5 parts by weight per 100 parts by weight of (A), and said aminoxysilicone compound being present in an amount which is not greater than the weight of the silane (C), said composition being self leveling when applied to a surface and, when cured for fourteen days at 25° C. exposed to an air atmosphere having 50 percent relative humidity, resulting in a silicone elastomer having an elongation of at least 1200 percent and a modulus at both 50 and 100 percent elongation of less than 25 pounds per square inch.

---

**5,017,629**

## MOLDABLE LOW DENSITY THERMOPLASTIC COMPOSITE WITH HOLLOW GLASS SPHERES AND THE METHOD FOR COMPOUNDING

**Gary F. Wilson, Grafton, and Yona Eckstein, Kent, both of Ohio, assignors to The BF Goodrich Company, Akron, Ohio**

**Filed Mar. 31, 1989, Ser. No. 332,267**

**Int. Cl.$^5$ C08J** *9/32*

U.S. Cl. 523—219 **21 Claims**

1. A method for compounding a low density, moldable thermoplastic resin composite with hollow glass spheres, comprising the steps of:

(a) melting a thermoplastic resin;

(b) adding reinforcing fiber and a concentrate of hollow glass spheres dispersed in a thermoplastic resin to form a composite;

(c) extruding said composite; and

(d) cooling said composite; and wherein the polymer is continuously mixed from the melting step (a) to the extruding step (c).

---

**5,017,630**

## FREE FLOWING PARTICLES OF AN EMULSION POLYMER HAVING $SIO_2$ INCORPORATED THEREIN

**Charles C. Raines, Katy, Tex., and Philip H. Starmer, Avon Lake, Ohio, assignors to Zeon Chemicals USA, Inc., Avon Lake, Ohio**

**Filed Aug. 17, 1989, Ser. No. 394,992**

**Int. Cl.$^5$ C08K** *3/00*

U.S. Cl. 523—334 **10 Claims**

1. A silicon dioxide-emulsion polymer alloy, comprising:

a free flowing emulsion polymer having nonhydrated silicone dioxide incorporated therein derived from a spray dried aqueous solution containing an admixture of dispersed $SiO_2$ is an emulsion polymer latex and wherein the amount of said non-hydrated silicone dioxide is from about 20 to about 1000 parts by weight per 100 parts by weight of said emulsion polymer.

**5,017,631**

## METHOD FOR MAKING A SPRAY DRIED EMULSION POLYMER

**Hubert Rauch, Weiterstadt; Peter J. Arndt, Seeheim-Jugenheim; Wolfgang Klesse, Mainz; Wilhelm Krall, Darmstadt, and Klaus Frank, Muehltal, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany**

**Division of Ser. No. 202,134, Jun. 2, 1988, abandoned. This application Dec. 26, 1989, Ser. No. 462,274**

**Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719241**

**Int. Cl.$^5$ C08K** *3/00*

U.S. Cl. 523—340 **2 Claims**

1. A method for making a spray dried emulsion polymer in the form of powder grains consisting essentially of aggregated latex particles, which method comprises spray drying an aqueous emulsion of a polymer having a Vicat softening point above 60° C. and separating the spray dried emulsion polymer grains from the air stream used in spray drying at an outlet temperature of 40° C. to 90° C., said emulsion containing a plasticizer which is compatible with said polymer, has a boiling point of at least 150° C., and has a melting point below said outlet temperature at which said powder grains are separated from said air stream, said outlet temperature being below that temperature at which said emulsion polymer would melt in the absence of said plasticizer.

---

**5,017,632**

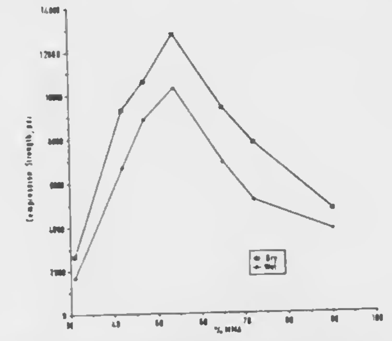
## WATER-BASED COMPOSITES WITH SUPERIOR CURE IN THICK FILMS, AND CHEMICAL AND SHOCK RESISTANCE

**Charles W. Bredow, Doylestown; Frederick J. Schindler, Fort Washington, and Charles E. Warburton, Jr., Ambler, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Filed Dec. 14, 1989, Ser. No. 450,794**

**Int. Cl.$^5$ C08L** *25/10, 35/06, 63/00;* **C08K** *5/54*

U.S. Cl. 523—400 **20 Claims**



1. A coating composition for use in coating or overlaying Portland cement concrete or metal, the composition comprising:

(a) a synthetic polymer latex;

(b) an amine-functional epoxy curing agent, the epoxy curing agent being soluble or dispersible in water;

(c) a silane selected from the class consisting of epoxy-functional silanes and amine-functional silanes;

(d) a liquid epoxy resin; and

(e) filler having a fine particle size.

---

**5,017,633**

## FILLED POLYOLEFINS STABILIZED WITH A COMBINATION OF A HINDERED PHENOL AND A PHENYLPHOSPHONITE

**Guenther Tscheulin, Frick, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland**

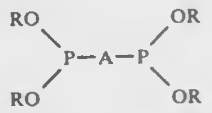
**Continuation of Ser. No. 231,309, Aug. 11, 1988, abandoned, which is a continuation of Ser. No. 103,236, Sep. 30, 1987, abandoned, which is a continuation of Ser. No. 463,347, Feb. 3, 1983, abandoned. This application Jul. 6, 1989, Ser. No. 376,334**

**Claims priority, application Fed. Rep. of Germany, Feb. 8, 1982, 32042566**

**Int. Cl.$^5$ C08K** *5/526, 5/34, 5/53, 5/36*

U.S. Cl. 524—117 **32 Claims**

1. A filled polyolefin containing a stabilizing-effective combined amount of (a) a sterically hindered phenol and (b) one or more compounds of formula I



I

in which each R may be the same or different and is unsubstituted phenyl or phenyl substituted by one or two $C_{1-12}$alkyl groups, and A is a difunctional residue of phenyl, diphenyl or dibenzofuran,

and containing no significant quantity of any sulphur-containing co-stabilizer for sterically hindered phenols.

---

**5,017,634**

## LACQUER COATINGS FOR POLYURETHANE-MOLDED ARTICLES

**Brian J. Falline, and Bruce W. Weihrauch, both of Moline, Ill., assignors to Moline Paint Manufacturing Co., Moline, Ill.**

**Continuation-in-part of Ser. No. 244,553, Sep. 12, 1988, Pat. No. 4,855,347, which is a continuation of Ser. No. 912,766, Sep. 26, 1986, abandoned. This application Jul. 10, 1989, Ser. No. 377,462**

**The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.**

**Int. Cl.$^5$ C08K** *5/54;* **C08L** *75/06*

U.S. Cl. 524—267 **12 Claims**

1. An in-mold lacquer coating for a polyurethane-molded article, which coating is mold-releasable without the aid of an external mold release agent and is re-coatable after de-molding without additional surface preparation, comprising a mixture of a fully-reacted aliphatic polyurethane resin, a polydimethylsiloxane fluid, and a solvent system that is incompatible with said polydimethylsiloxane, having toluene, an acetate solvent, a glycol ether solvent, and alcohol solvents as discrete constituents thereof, which constituents have specific gravities less than said polydimethylsiloxane and have varying rates of evaporation such that the ratio of toluene to the acetate, glycol ether, and alcohol solvent constituents in said solvent system decreases as the constituents of said solvent system evaporate.

---

**5,017,635**

## KNEADED MOLDABLE RESIN COMPOSITION

**Akitaka Senuma; Kiroku Tsukada, and Isao Noda, all of Kanagawa, Japan, assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.**

**Filed Jun. 6, 1990, Ser. No. 533,820**

**Int. Cl.$^5$ C08K** *5/24*

U.S. Cl. 524—269 **2 Claims**

1. A kneaded moldable resin composition comprising 100 weight parts of an ethylene polymer; 0.01–300 weight parts of an organopolysiloxane expressed by the formula

VOL
1126
ISS
3
MY
21
1991
UMI

$$R_a{}^1R_b{}^2SiO_{\frac{4-a-b}{2}} \quad (A)$$

(where $R^1$ is an aliphatic unsaturated group, $R^2$ is a substituted or unsubstituted monovalent hydrocarbon group containing no aliphatic unsaturated group, $0<a<1$, $0.5<b<3$, and $1<a+b<3$); 0.01−30 weight parts of a hydrocarbon compound expressed by the formula

$$CH_2{=}CH(CH_2)_cCH{=}CH_2 \quad (B)$$

(where c is an integer of 1–30) which are heat-kneaded with each other.

---

### 5,017,636

## RUBBER COMPOSITIONS FROM MODIFIED TRANS-POLYBUTADIENE AND RUBBER FOR TIRES

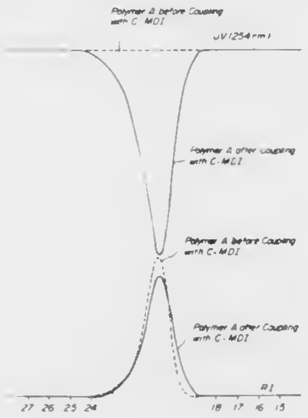
**Iwakazu Hattori Ama; Noboru Shimada, Yokkaichi; Noboru, Oshima Suzuka; Mitsuhiko Sakakibara, Matsudo; Hiroshi Mouri, Kodaira; Tatsuo Fujimaki, and Tatsuro Hamada, both of Tokyo, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Bridgestone Corporation, both of Tokyo, Japan**

**Continuation of Ser. No. 7,254,637, Oct. 7, 1988, abandoned. This application May 10, 1990, Ser. No. 521,008**

**Claims priority, application Japan, Oct. 9, 1987, 62-253875; Nov. 21, 1987, 62-293112; Nov. 21, 1987, 62-293113**

**Int. Cl.$^5$ C08K *5/09*; C08L *19/00***

**U.S. Cl. 524—300** **19 Claims**



1. A rubber composition for tire comprising 20∼70 parts by weight of a butadiene polymer having a trans-1,4 content of 70∼90%, a vinyl content of 2∼10% and a Mooney viscosity ($ML_{1+4,}$ 10020 C.) of 30∼100 and modified at the terminal thereof with a compound selected from the group consisting of (a) isocyanate compounds and/or isothiocyanate compounds, (b) isocyanuric acid derivatives and/or thiocarbonyl containing compounds thereof, (c) urea compounds, (d) amide compounds and/or imide compounds, (e) N-alkyl substituted oxazolydinone compounds, (f) pyridyl substituted ketone compounds and/or pyridyl substituted vinyl compounds, (g) lactam compounds, (h) diesters of dicarboxylic acids, (i) xanthogen compounds, (j) dithio acid compounds, (k) phosphoryl chloride compounds, (l) silane compounds and/or alkoxysilane compounds and (m) carbonate compounds, 30∼80 parts by weight of at least one rubber selected from natural rubber, high cis-1,4 polyisoprene rubber and styrene-butadiene copolymer rubber having a glass transition temperature of not higher than -50° C. and 0∼30 parts by weight of high cis-1,4 polybutadiene and/or low cis-1,4 polybutadiene, and containing 35∼100 parts by weight of carbon black, 0∼50 parts by weight of process oil, 0.5∼5 parts by weight of aliphatic carboxylic acid and 0.1∼3 parts by weight of sulfur based on 100 parts by weight of total amount of the above rubber components.

---

### 5,017,637

## LOW TOXICITY FIRE RETARDANT THERMOPLASTIC MATERIAL

**Philip J. Smith, 211 Schooleys Mountain Rd., Long Valley, N.J. 07853, and Jacques Mortimer, 145 Ramona Blvd., Markham, Ontario, Canada L3P 2K9**

**Filed Mar. 16, 1989, Ser. No. 324,480**

**Claims priority, application United Kingdom, Mar. 18, 1988, 8806497**

**Int. Cl.$^5$ C08K *5/07***

**U.S. Cl. 524—354** **9 Claims**

1. A fire retardant composition having an olefinic base material, wherein compositional components are cross-linked in a hydrophobic/hydrophilic relationship by means of a condensation-type reaction between carboxyl groups contained within said olefinic base material and hydroxyl groups contained within a frame retardant additive, with silanol groups contained in an organopolysiloxane, said composition comprising:

(a) from about 5% to about 60% by weight of olefinic copolymer or terpolymer which includes a substance containing carboxyl groups:
(b) from about 1% to about 15% by weight of an organopolysiloxane;
(c) from about 20% to about 85% by weight of a metal oxide hydrate, wherein said metal is selected from the group consisting of a metal from group I, group II or group III; and
(d) from about 0.1% up to about 10% by weight of a dialdehyde.

---

### 5,017,638

## METALLIC PAINT FILM

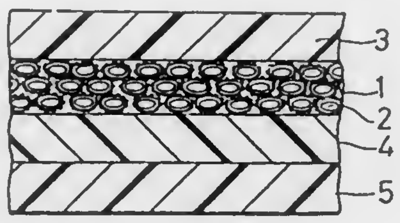
**Junichi Handa, Toyota; Hiroshi Ito, Ichinomiya; Hiroshi Hattori, Toyota, and Akira Suganuma, Okazaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Oct. 3, 1988, Ser. No. 252,329**

**Claims priority, application Japan, Oct. 21, 1987, 62-265796**

**Int. Cl.$^5$ C08K *3/34***

**U.S. Cl. 524—449** **11 Claims**



1. A metallic paint film comprising:

a base paint film containing from 1 to 20 weight % of a pigment comprising a ceramic scaly substrate, an inorganic compound coating film formed on all the surfaces of said ceramic scaly substrate, and a plurality of metal dots formed on the surfaces of said inorganic compound coating film and occupying from 0.05% to 95% of the total surface area of said inorganic compound coating film and the balance being a transparent vehicle.

### 5,017,639

## ADHESIVE FOR BONDING RUBBER TO FIBERS

**Osamu Mori, Kamakura; Motofumi Oyama; Hiroshi Hisaki, both of Yokosuka; Masato Sekiguchi, Mie; Akinobu Okamura, and Haruhiro Tanabe, both of Tsu, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Filed Mar. 29, 1988, Ser. No. 174,866**

**Claims priority, application Japan, Mar. 31, 1987, 62-80741; Apr. 30, 1987, 62-106742**

**Int. Cl.$^5$ C08K *3/20***

**U.S. Cl. 524—510** **11 Claims**

1. An adhesive useful for bonding a nitrile group-containing highly saturated rubber to glass fibers or organic synthetic fibers, said adhesive comprising a latex of a nitrile group-containing highly saturated rubber having an iodine number of not more than 120 and a resorcinol-formaldehyde resin.

---

### 5,017,640

## CONTROLLED POLYMERIZATION OF SILAZANE MONOMERS

**Jean-Jacques Lebrun, Pierre Benite, and Christina Bordone, Rilleu-la-Pape, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France**

**Filed Oct. 16, 1989, Ser. No. 421,994**

**Claims priority, application France, Oct. 14, 1988, 88 13531**

**Int. Cl.$^5$ C08L *83/08***

**U.S. Cl. 524—588** **10 Claims**

1. A process for the preparation of an organopolysilazane or organopoly(disily)silazane comprising polymerizing silazanes in the presence of a catalytically effective amount of a silazane polymerization catalyst, and then, either during or after said polymerization, contacting the polymerization reaction medium with at least one adsorbent material capable of adsorbing the catalyst.

---

### 5,017,641

## PREPARATION OF AQUEOUS NONWOVEN BINDERS OF LOW FORMALDEHYDE EMISSION ON CURING BASED ON UREA, FORMALDEHYDE AND GLYOXAL

**Fritz E. Kempter, Mannheim; Franz Matejcek, Lambsheim; Werner Neubach, Ludwigshafen, and Klaus Flory, Leimen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed May 2, 1989, Ser. No. 347,437**

**Int. Cl.$^5$ C08G *12/12***

**U.S. Cl. 524—598** **7 Claims**

1. A process for preparing an aqueous nonwoven binder of reduced formaldehyde emission on curing that is based on a condensation product of urea, a urea derivative, or a mixture thereof, formaldehyde and glyoxal in a molar ration, based on the solid binder, of from 1.5 to 2.5 moles of formaldehyde and from 0.1 to 0.5 mole of glyoxal per mole of the total urea used, which comprises the following sequential steps:

(A) condensing urea and formaldehyde in an aqueous solution in a molar ratio of 1:(2.0–10) at a pH of from 1 to 10 and at from 20° to 95° C., then
(B) condensing the condensate of step (A) with glyoxal in a molar ratio of urea: glyoxal of 1:(0.1–0.5) at a pH of from 2.0 to 6.8 and at from 60° to 100° C. and then
(C) further reacting the condensate of step (B) with such an amount of urea, 2-oxo-hexahydro-1,3,5-triazine or a 2-oxo-4,6-dial-kyl-hexahydro-1,3,5-triazine in an amount, based on the solid binder, of from 2 to 20% by weight, based on the unsubstituted urea or the urea used for preparing the triazine, at a pH of from 5.0 to 8.5 and at from 20° to 100° C., and with up to 70% by weight of glyoxal, based on the total amount of glyoxal, so as to produce the stated overall molar ratio.

---

### 5,017,642

## PROCESS FOR PRODUCING AQUEOUS SOLUTION OF CATIONIC THERMOSETTING RESIN

**Toshiyuki Hasegawa, Takarazuka; Hisao Takagishi, Soraku, and Hiroshi Horiuchi, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,263**

**Claims priority, application Japan, Dec. 23, 1988, 63-327145**

**Int. Cl.$^5$ C08G *69/48*; C08L *77/06***

**U.S. Cl. 524—608** **4 Claims**

1. A process for producing an aqueous solution of a cationic thermosetting resin containing a very small amount of organic halogen compounds, which comprises steps of:

(i) heating an aliphatic dicarboxylic acid and a polyalkylenepolyamine in a molar ratio of the aliphatic dicarboxylic acid to the polyalkylenepolyamine of 1:1.0 to 1:1.2 until the viscosity at 25° C. of a 50% aqueous solution of resulting polyamidopolyamine reaches 400 to 1000 cps to obtain a polyamidopolyamine;
(ii) reacting the polyamidopolyamine with epihalohydrin in an aqueous medium at a temperature from 10° to 55° C. under such conditions that the amount of epihalohydrin is from 0.85 to 1.40 moles per mole of secondary amino group present in the polyamidopolyamine when the reaction temperature is not lower than 10° C. and lower than 45° C. or from 0.85 to 1.25 moles per mole of said secondary amino group when the reaction temperature is from 45° to 55° C., a total concentration of reactants in the aqueous medium is 20 to 70% by weight until a total amount of unreacted epichlorohydrin and other organic halogen compound does not change substantially;
(iii) maintaining or lowering the concentration of the resulting aqueous solution of the reaction product;
(iv) keeping the temperature of the aqueous solution from 25° to 70° C. until the viscosity at 25° C. of the aqueous solution at a concentration of 15% reaches 10 to 100 cps;
(v) adjusting pH of the resulting aqueous solution of the product to 3 to 5 at 25° C.

---

### 5,017,643

## COMPOSITION AND PROCESS FOR MAKING POLY (ARYLENE SULFIDE) RESINS REINFORCED WITH GLASS FIBERS

**Ricky E. Snelling, Tulsa; Joseph E. Figard, and Robert W. Morton, both of Bartlesville, all of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

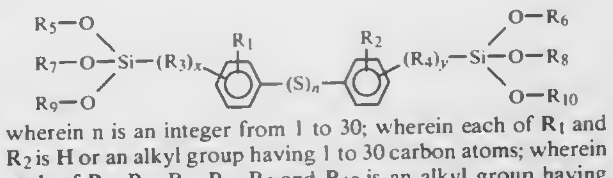
**Filed Mar. 20, 1990, Ser. No. 500,838**

**Int. Cl.$^5$ C08K *3/40***

**U.S. Cl. 524—609** **4 Claims**

1. A method of preparing a glass reinforced thermoplastic composite comprising:

(a) combining poly(arylene sulfide) and at least one silane within the formula:



wherein n is an integer from 1 to 30; wherein each of $R_1$ and $R_2$ is H or an alkyl group having 1 to 30 carbon atoms; wherein each of $R_5$, $R_6$, $R_7$, $R_8$, $R_9$ and $R_{10}$ is an alkyl group having from 1 to 30 carbon atoms; wherein x is 0 or 1; wherein y is 0 to 1; and wherein each of $R_3$ and $R_4$ i an alkylene group having from 1 to 30 carbon atoms;

(b) allowing said mixture to age for a time in the range of about 1 to about 100 hours thereby allowing adsorption of said at least one polysulfide organosilane onto said poly(arylene sulfide);
(c) passing glass fibers through a slurry bath containing said mixture of said poly(arylene sulfide) and said at least one polysulfide organosilane, to impregnate said glass fibers; and

VOL 1126 ISS 3 MY 21 1991 UMI

(d) heating and shaping said impregnated glass fibers.

---

### 5,017,644

### INK JET INK COMPOSITIONS

**Timothy J. Fuller, West Henrietta, N.Y.; Warren E. Solodar, Merion, Pa.; Henry R. Kang, Fairport, N.Y.; Samuel Kaplan, Walworth, N.Y., and Raymond K. Crandall, Pittsford, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed May 22, 1989, Ser. No. 354,970**

**Int. Cl.$^5$ C09D** *11/02, 11/10;* **C08L** *79/00*

**U.S. Cl. 524—612** **50 Claims**

1. An ink jet ink composition comprising a liquid vehicle, a dye, and a linear N-hydroxyl substituted polyethyleneimine polymer.

---

### 5,017,645

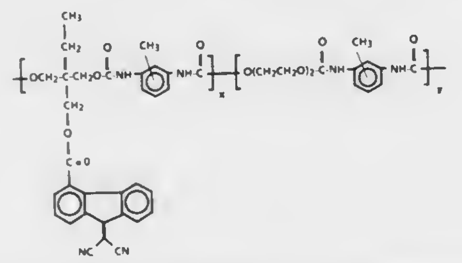
### PHOTORESPONSIVE IMAGING MEMBERS WITH PROTECTIVE COPOLYURETHANE OVERCOATINGS

**Beng S. Ong; Dasarao K. Murti, both of Mississauga, and John R. C. Fuller, Oakville, all of Canada, assignors to Xerox Corporation, Stamford, Conn.**

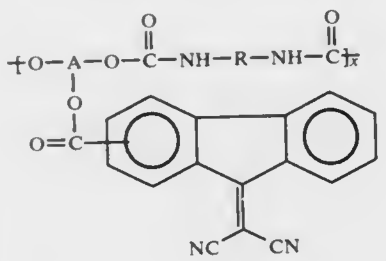
**Division of Ser. No. 150,871, Feb. 1, 1988, Pat. No. 4,820,601. This application Nov. 2, 1988, Ser. No. 266,426**

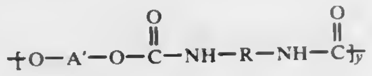
**Int. Cl.$^5$ C08G** *18/67*

**U.S. Cl. 524—726** **12 Claims**



1. A process for the preparation of the copolyurethanes of the formula:





$$\left[O-A'-O-\overset{\overset{O}{\|}}{C}-NH-R-NH-\overset{\overset{O}{\|}}{C}\right]_y$$

wherein A is a trivalent group; A′ is a bivalent group selected from the group consisting of alkylene and arylene; R is selected from the group consisting of alkylene, substituted alkylene, arylene, and substituted arylene; x and y are number mole fractions of from about 0.05 to about 0.95 subsequent to the provision that the sum of x+y is equal to 1.0, which comprises the polycondensation of a dihydroxy-functionalized 9-dicyanomethylenefluorene-4-carboxylate, a diol and a diisocyanate in the presence of a catalyst and a suitable solvent; and wherein the reaction mixture is heated.

---

### 5,017,646

### AQUEOUS VINYL RESIN EMULSION

**Hisaichi Muramoto, 25-3-110, Takadono 3-chome, Asahi-ku, Osaka-shi; Keizuo Ishii, 1-19, Shimizu-cho, Ashiya-shi, Hyogo-ken, and Tadafumi Miyazono, 2-10, Yanagawa-cho 1-chome, Takatsuki-shi, Osaka-fu, all of Japan**

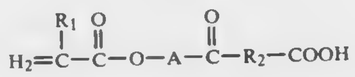
**Filed Jan. 7, 1987, Ser. No. 1,009**

**Claims priority, application Japan, Jan. 8, 1986, 61-001900; Jun. 25, 1986, 61-148985**

**Int. Cl.$^5$ C08L** *43/00*

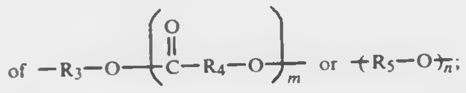
**U.S. Cl. 524—807** **7 Claims**

1. An aqueous vinyl resin emulsion obtained by an emulsion polymerization of (A) 1 to 50% by weight of a salt form or free acid form of an end carboxyl bearing reactive vinyl monomer of the formula (I):



$$H_2{=}\overset{\overset{R_1}{|}}{C}-\overset{\overset{O}{\|}}{C}-O-A-\overset{\overset{O}{\|}}{C}-R_2-COOH \qquad (I)$$

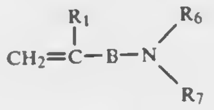
wherein $R_1$ is hydrogen or methyl group; $R_2$ is selected from the group consisting of aliphatic hydrocarbon having 2 to 10 carbon atoms, alicyclic hydrocarbon having 6 to 7 carbon atoms, chlorine-substituted alicyclic hydrocarbon having 6 to 7 carbon atoms, aromatic hydrocarbon having 6 carbon atoms, and —COOH-substituted aromatic hydrocarbon having 6 carbon atoms; A represents a repeating unit



$$\text{of } -R_3-O-\left(\overset{\overset{O}{\|}}{C}-R_4-O\right)_m \text{ or } \left(R_5-O\right)_n;$$

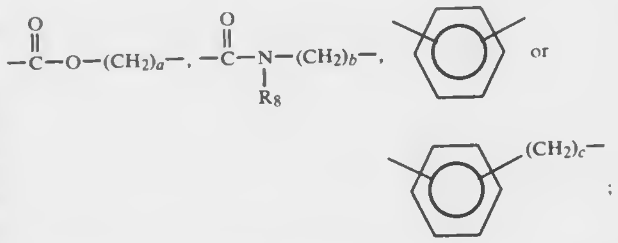
$R_3$ is ethylene or propylene; $R_4$ is alkylene having 2 to 7 carbon atoms; $R_5$ is alkylene having 2 to 5 carbon atoms; m is an integer of 1 to 10; n is an integer of 2 to 50; and (B) 99 to 50% by weight of at least one other α,β-ethylenically unsaturated compounds selected from the group consisting of carboxyl containing monomers, hydroxyl containing monomers, nitrogen containing alkyl acrylates or methacrylates, polymerizable amides, polymerixable nitriles, alkyl acrylates, alkyl methacrylates, polymerizable aromatic compounds, α-olefins, diene compounds, polymerizable unsaturated monocarboxylic acid esters of polyhydric alcohols, polymerizable unsaturated alcohol esters of polycarboxylic acids, aromatic compounds having 2 or more vinyl groups;

vinyl monomers of the formula:



$$CH_2{=}\overset{\overset{R_1}{|}}{C}-B-N\genfrac{}{}{0pt}{}{\diagup R_6}{\diagdown R_7}$$

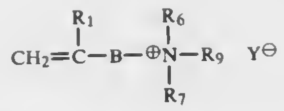
in which $R_1$ is a hydrogen or methyl group; $R_6$ and $R_7$ each represents hydrogen, having 1 to 4 carbon atoms; B is



$$-\overset{\overset{O}{\|}}{C}-O-(CH_2)_a-,\quad -\overset{\overset{O}{\|}}{C}-\underset{\underset{R_8}{|}}{N}-(CH_2)_b-,$$

$R_8$ represents hydrogen or lower alkyl having 1 to 4 carbon atoms; a, b and c each represents an integer of 2 to 6;

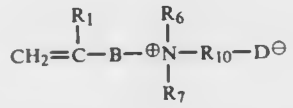
vinyl monomers of the formula:



$$CH_2{=}\overset{\overset{R_1}{|}}{C}-B-{}^{\oplus}\underset{\underset{R_7}{|}}{\overset{\overset{R_6}{|}}{N}}-R_9 \quad Y^{\ominus}$$

in which $R_1$, $R_6$, $R_7$ and B are as defined above; $R_9$ is alkyl having 1 to 12 carbon atoms and Y is an acid residue,

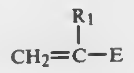
vinyl monomers of the formula:



$$CH_2{=}\overset{\overset{R_1}{|}}{C}-B-{}^{\oplus}\underset{\underset{R_7}{|}}{\overset{\overset{R_6}{|}}{N}}-R_{10}-D^{\ominus}$$

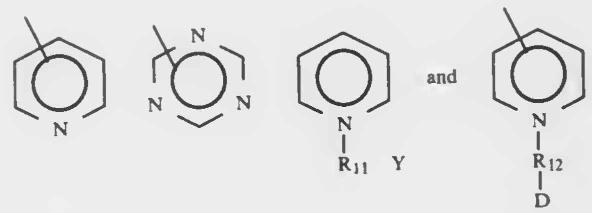
in which $R_1$, $R_6$, $R_7$ and B are as defined above, $R_{10}$ is alkylene having 2 to 6 carbon atoms, and D represents $-SO_3$, —COO or —P(O)OH,

and vinyl monomers of the formula:



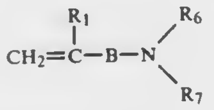
$$CH_2{=}\overset{\overset{R_1}{|}}{C}-E$$

in which $R_1$ is hydrogen or methyl group, E is selected from the group consisting of:

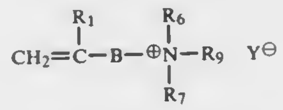


in which $R_{11}$ is alkyl, Y is an acid residue, $R_{12}$ is alkylene having 2 to 6 carbon atoms, D is $-SO_3$, —COO or —P-(O)OH,

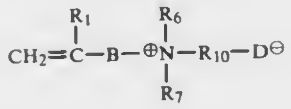
provided that when the vinyl monomer of formula (I) is in the free acid form, then at least one of the α,β-ethyleneically unsaturated compounds (B) are selected from the vinyl monomers of the formulas:



$$CH_2{=}\overset{\overset{R_1}{|}}{C}-B-N\genfrac{}{}{0pt}{}{\diagup R_6}{\diagdown R_7}$$

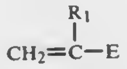


$$CH_2{=}\overset{\overset{R_1}{|}}{C}-B-{}^{\oplus}\underset{\underset{R_7}{|}}{\overset{\overset{R_6}{|}}{N}}-R_9 \quad Y^{\ominus}$$



$$CH_2{=}\overset{\overset{R_1}{|}}{C}-B-{}^{\oplus}\underset{\underset{R_7}{|}}{\overset{\overset{R_6}{|}}{N}}-R_{10}-D^{\ominus}$$

or



$$CH_2{=}\overset{\overset{R_1}{|}}{C}-E$$

in which $R_1$, $R_6$, $R_7$, B, $R_9$, Y, $R_{10}$, D and E are as defined above.

---

### 5,017,647

### BLACK-PIGMENTED POLYMERIC COMPOSITIONS OF MATTER

**Alvin L. Dougal, Jr., Milwaukee, Wis., and Shigeyoshi Hara, Iwakuni, Japan, assignors to Hercules Incorporated, Wilmington, Del.**

**Continuation-in-part of Ser. No. 283,118, Dec. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 151,745, Feb. 3, 1988, abandoned, which is a continuation-in-part of Ser. No. 224,631, Jul. 27, 1988, abandoned. This application Jun. 5, 1990, Ser. No. 534,344**

**Int. Cl.$^5$ C08K** *3/04*

**U.S. Cl. 524—856** **2 Claims**

1. A process of polymerizing norbornene-type monomers or a mixture of norbornene-type monomers by a ring opening metathesis catalyst polymerization reaction, in the presence of carbon black prepared by thermal decomposition processes and which is substantially free of oxygen, said process comprising adding said carbon black to said monomers and polymerizing said monomers wherein said norbornene-type monomer is selected from the group consisting of dicyclopentadiene, trimers and higher oligomers of dicyclopentadiene, norbornene, norbornadiene, tetracyclododecenes and tetracyclododecadienes and mixtures thereof, and wherein the amount of carbon black is from about 0.05 parts to about 25 parts by weight per 100 parts norbornene-type monomer or mixture of such monomers.

---

### 5,017,648

### D-GL CONJUGATE THERAPY

**David H. Katz, La Jolla, Calif., assignor to La Jolla Pharmaceutical Company, San Diego, Calif.**

**Continuation-in-part of Ser. No. 254,597, Oct. 7, 1988, Pat. No. 4,950,469, which is a division of Ser. No. 869,393, May 30, 1986, abandoned. This application Aug. 10, 1990, Ser. No. 565,965**

**Int. Cl.$^5$ A61K** *39/00, 37/66, 43/00*

**U.S. Cl. 525—54.1** **2 Claims**

1. A conjugate of D-GL and a cell surface binding molecule wherein the cell surface binding molecule is a toxin, pain suppressant, antibiotic or cell growth inhibitor.

---

### 5,017,649

### LOW TEMPERATURE MICHAEL ADDITION REACTIONS

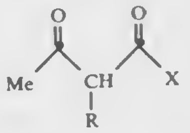
**Robert J. Clemens, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 19, 1988, Ser. No. 144,996**

**Int. Cl.$^5$ C08F** *26/04;* **C08G** *63/48, 2/00;* **C08C** *69/66*

**U.S. Cl. 525—59** **18 Claims**

1. A process for the alkylation of β-dicarbonyl compounds having the structure formula:

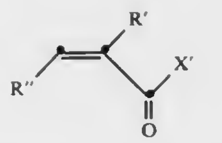


wherein R is selected from the group consisting of H, hydrocarbyl moieties, and substituted hydrocarbyl moieties; with the proviso that no R-group is sufficiently acidic to neutralize the base catalyst employed for said alkylation; and

X is selected from the group consisting of OR, $NR_2$, $CR_3$, aromatic or substituted aromatic moieties having 6 to 10 carbon atoms, and polymeric moieties with

an α,β-unsaturated compound having the structural formula:

VOL
1126
ISS
3
MY
21
1991
UMI

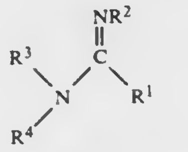


wherein R′ is H, methyl, CN acetyl, or —$CO_2R$; wherein R is as defined above;

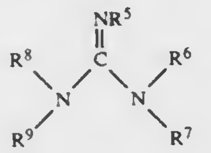
R″ is selected from the group consisting of H, methyl, methoxy, ethoxy, and —$CO_2R$; wherein R is as defined above; and

X′ is selected from the group consisting of OR, $NR_2$ and $CR_3$; wherein R is as defined above; $C_1$–$C_{20}$ alkyl or substituted alkyl; $C_6$–$C_{10}$ aryl or substituted aryl; and a polymeric moiety with the proviso that no group R′, R″, X or X′ is sufficiently acidic to neutralize the base catalyst employed for said alkylation;

said process comprising contacting said β-dicarbonyl compound and said α,β-unsaturated compound in the presence of at least one base selected from the group consisting of compounds having the structural formula:



wherein $R^1$=$C_1$–$C_{20}$ alkyl, aryl, aralkyl or alkaryl moiety; $R^2$, $R^3$ and $R^4$ are each independently selected from H, $C_1$–$C_{20}$ alkyl or aralkyl, wherein any two or more of $R^1$, $R^2$, $R^3$ and $R^4$ can be interconnected as part of a ring structure; and



wherein each of $R^5$–$R^9$ are independently selected from H, $C_1$–$C_{20}$ alkyl or aralkyl, wherein any two or more of $R^5$–$R^9$ can be interconnected as part of a ring structure wherein said contacting results in crosslinking of a thermoset material comprising said β-dicarbonyl compound and said α,β-unsaturated compound and wherein said thermoset material is first applied to a substrate and subjected to a preliminary curing at a temperature in the range of 10°–40° C., followed by a second curing treatment at a temperature in the range of 40°–120° C.

---

### 5,017,650
## COMPOSITION OF POLYESTER, POLYPHENYLENE ETHER, DIGLYCIDYL DICARBOXYLATE AND IMPACT MODIFIER

**Kiyokazu Nakamura; Kiichi Kometani; Akihiko Koshino, and Kenjiro Horiuchi, all of Aichi, Japan, assignors to Toray Industries, Inc., Shiga, Japan**

**Division of Ser. No. 189,314, Mar. 3, 1988, abandoned. This application May 11, 1989, Ser. No. 350,516**

**Claims priority, application Japan, Aug. 4, 1986, 61-181881; Oct. 2, 1986, 61-235297; Oct. 9, 1986, 61-240358**

**Int. Cl.⁵ C08L** *67/02, 71/04*

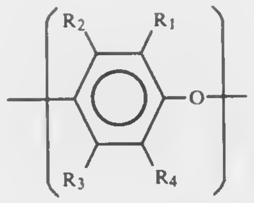
**U.S. Cl. 525—65** **5 Claims**

1. A resin composition comprising:

100 parts by weight of polyester composition comprised of

(A) 5-95% by weight of an aromatic polyester having an inherent viscosity of 0.7–2.5 dl/g,

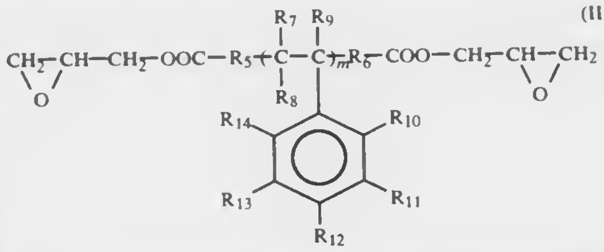
(B) 95–5% by weight of a polyphenylene ether having an inherent viscosity of 0.10–1.5 dl/g and a repeating unit of the formula



(1)

wherein $R_1$ to $R_4$ each represents a hydrogen, chlorine or bromine atom, or a hydrocarbon, substituted hydrocarbon, cyano, alkoxy or phenoxy radical. polyphenylene ether obtained by reacting to a polyphenylene ether having said repeating unit of formula (I) 0.05–20% by weight of an active functional-group containing monomer having in the molecule both of (a) an aliphatic unsaturated carbon-carbon unsaturated double bond or triple bond and (b) one or two or more functional groups selected from the group consisting of carboxyl, acid anhydride, amide, imide, ester, epoxy, amino, hydroxyl and isocyanate radicals,

(C) 0.05–30 parts by weight of an epoxy compound represented by the formula



(II)

wherein $R_5$ and $R_6$ each represents a substituted or unsubstituted hydrocarbon radical having 1–40 carbon atoms, $R_7$ to $R_9$ each represents a hydrogen atom, or a methyl radical, and $R_{10}$ and $R_{14}$ each represents a hydrogen or halogen atom, or a hydrocarbon, substituted or unsubstituted hydrocarbon, cyano, alkoxy, phenoxy or nitro radical; and m being an integer of 0–20, and

(D) 1–60 parts by weight of one or more of the impact modifiers selected from the group consisting of:

(a) epoxy radical containing copolymers comprised of an α-olefin and an epoxy radical containing unsaturated monomers;

(b) modified ethylene copolymers obtained by grafting of 0.01–10% by weight of an unsaturated carboxcylic acid or a derivative thereof to an unmodified ethylene copolymer comprised of ethylene and an α-olefin having 3–20 carbon atoms or an alkyl ester of an unsaturated carboxylic acid; and

(c) block coplymers of a hydrogenated or unhydrogenated conjugated diene and an aromatic vinyl or modified block copolymers obtained by grafting 0.01–10% by weight of an unsaturated carboxylic acid or a derivative thereof to said block copolymer.

---

### 5,017,651
## THERMOPLASTIC RESIN COMPOSITION

**Haruo Tomita; Kouichi Yamashita; Takeshi Kondo; Noriyuki Suzuki; Shigemi Matsumoto, and Masahiro Asada, all of Hyogo, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 15, 1989, Ser. No. 450,970**

**Claims priority, application Japan, Dec. 21, 1988, 63-323936; Dec. 21, 1988, 63-323937; Feb. 28, 1989, 1-49546; May 31, 1989, 1-137974**

**Int. Cl.⁵ C08L** *67/03, 77/02, 77/06*

**U.S. Cl. 525—66** **23 Claims**

17. A thermoplastic resin composition which comprises 20 to 80% by weight of a polyarylate having an acid value of $30\times10^{-6}$ to $150\times10^{-6}$ eq/g and 80 to 20% by weight of a polyamide.

---

### 5,017,652
## PROCESS FOR MAKING A THERMOPLASTIC RESIN COMPOSITION

**Hiroomi Abe; Taichi Nishio; Yasurou Suzuki, and Takashi Sanada, all of Chiba, Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan**

**Filed Sep. 13, 1988, Ser. No. 243,715**

**Claims priority, application Japan, Sep. 18, 1987, 62-235453**

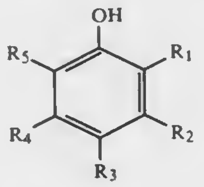
**Int. Cl.⁵ C08L** *51/04, 51/06, 71/12*

**U.S. Cl. 525—68** **4 Claims**

1. A process for making a thermoplastic resin composition which comprises melting and mixing at a temperature of 240°–350° C. 5–95 parts by weight of polyamide and 95–5 parts by weight of a polyphenylene ether composition,

said polyphenylene ether composition being obtained by melting and mixing 100 parts by weight of polyphenylene ether (A), 0.01–5.0 parts by weight of at least one compound (B) which contains in its molecule both (a) carbon-carbon double bond or carbon-carbon triple bond and (b) carboxyl group, acid anhydride group, acid made group, imide group, carboxylic acid ester group, epoxy group, amino group or hydroxyl group, and 1–40 parts by weight of rubber-like materials (C) in the presence of 0.01% or more and less than 0.1 % by weight of radical initiator based on the polyphenylene ether (A),

said polyphenylene ether (A) being obtained by oxidation-polymerization of at least one phenol compound represented by the formula:



wherein $R_1$, $R_2$, $R_3$, $R_4$ and $R_5$ represent a hydrogen atom, a halogen atom, a hydrocarbon or a substituted hydrocarbon group, with a proviso that at least one of them is a hydrogen atom, and said polyphenylene ether (a) having a reduced viscosity $\eta_{sp/c}$ of 0.04–0.58 deciliter/gram.

---

### 5,017,653
## LOW NERVE, LOW TEMPERATURE EXPANDABLE, CURABLE HOT MELT SEALANT

**Thomas K. Johnston, Brentwood, Mo., assignor to United Technologies Automotive Inc., Dearborn, Mich.**

**Continuation of Ser. No. 142,179, Jan. 11, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 464,575**

**Int. Cl.⁵ C08L** *9/06, 51/02*

**U.S. Cl. 525—89** **11 Claims**

1. A hot melt sealant comprising a thermosetting polymeric material of a mixture of a styrene butadiene diblock copolymer having a molecular weight below 150,000, a cross-linkable styrene butadiene terpolymer having a molecular weight greater than 250,000 and a styrene butadiene triblock copolymer and also containing an effective amount of a blowing and curing agent, wherein said constituents of the thermosetting material are present in sufficient proportions and quantities to form a hot melt sealant which is capable of flowing, expanding and curing at temperatures below 300° F.

---

### 5,017,654
## THERMOSETTING ORGANOSILOXANE COMPOSITION

**Atsushi Togashi, Ichihara, and Toshio Saruyama, Narashino, both of Japan, assignors to Toray Silicone Company, Limited, Tokyo, Japan**

**Filed Jun. 28, 1989, Ser. No. 372,579**

**Claims priority, application Japan, Jun. 30, 1988, 63-163877**

**Int. Cl.⁵ C08F** *8/00*

**U.S. Cl. 525—100** **4 Claims**

1. In a thermosetting organosiloxane composition comprising

(A) an organopolysiloxane having at least two silicon-bonded alkenyl groups in each molecule and represented by the average unit formula

$R_aSiO_{(4-a)/2}$

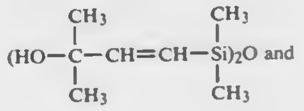
wherein R is a substituted or unsubstituted monovalent hydrocarbon radical an the value of a is from 1.0 to 2.3;

(B) an organohydrogenpolysiloxane containing at least two silicon-bonded hydrogen atoms in each molecule in an amount sufficient to cure said organopolysiloxane;

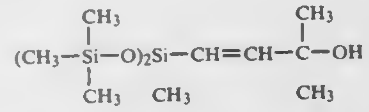
(C) an amount of a hydrosilylation-reaction catalyst sufficient to promote curing of said composition, where said catalyst is microencapsulated by a thermoplastic resin exhibiting a softening point of 40 to 250 degrees Centigrade;

the improvement comprising the presence in said composition of

(D) a hydrosilylation reaction-inhibiting compound selected from the group consisting of (1) compounds containing at least 1 alkynyl group in each molecule, (2) organosilicon compounds selected from the group consisting of



$$(HO-\underset{CH_3}{\overset{CH_3}{C}}-CH=CH-\underset{CH_3}{\overset{CH_3}{Si}})_2O \text{ and}$$



$$(CH_3-\underset{CH_3}{\overset{CH_3}{Si}}-O)_2\underset{CH_3}{Si}-CH=CH-\underset{CH_3}{\overset{CH_3}{C}}-OH$$

and (3) disiloxanes and cyclotetrasiloxanes containing at least one bonding unit in which an alkenyl radical is bonded to each of two silicon atoms joined through an oxygen atom bridge, where the amount of said inhibiting compound is sufficient to accelerate curing of said composition at temperatures above the softening point of said thermoplastic resin.

---

### 5,017,655
## URETHANE COATING RESIN COMPOSITION

**Mitsuo Kase, Chiba; Noboru Okoshi, Sodegaura, and Kazue Tsuyuzaki, Chiba, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan**

**Filed Oct. 19, 1988, Ser. No. 259,915**

**Claims priority, application Japan, Oct. 19, 1987, 62-261644**

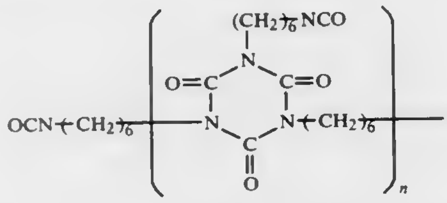
**Int. Cl.⁵ C08G** *18/02*

**U.S. Cl. 525—127** **12 Claims**

1. An urethane coating resin composition comprising as

VOL
1126
ISS
3
MY
21
1991
UMI

essential components (A) an isocyanurate-type polyisocyanate represented by formula:



wherein n is an integer of 1 to 20, derived from hexamethylene diisocyanate and containing at least 65% by weight of a mononuclear compound and (B) an acrylic polyol having a number-average molecular weight of 5,000 to 25,000 and a hydroxyl value of 40 to 160.

---

### 5,017,656
### POLYPHENYLENE ETHER RESINS AND COMPOSITIONS HAVING REDUCED ODOR AND METHOD OF REDUCING ODOR IN SAME

**Richard C. Bopp, West Coxsackie, N.Y., assignor to General Electric Company, Selkirk, N.Y.**

**Filed Jun. 13, 1988, Ser. No. 206,174**

**Int. Cl.$^5$ C08L** *71/12*

U.S. Cl. 525—149 19 Claims

1. A thermoplastic composition comprising
(a) a polyphenylene ether resin, in combination with a polystyrene resin; and
(b) a carboxylic acid, in an amount to effectively reduce the odor of (a).

---

### 5,017,657
### RAPIDLY-CRYSTALLIZING POLYESTER COMPOSITIONS

**Leonardo Fiore, Milan; Italo Borghi, Ferrara, and Andrea Mattiussi, Milan, all of Italy, assignors to Montedipe S.r.l., Milan, Italy**

**Filed Sep. 5, 1989, Ser. No. 402,526**

**Claims priority, application Italy, Sep. 9, 1988, 21882 A/88**

**Int. Cl.$^5$ C08L** *67/02*

U.S. Cl. 525—173 16 Claims

1. Rapidly-crystallizing polyester compositions comprising a thermoplastic polyester resin and an effective amount of nucleating agent, characterized in that said nucleating agent is a styrene polymer having an essentially syndiotactic structure.

---

### 5,017,658
### DYEABLE POLYPROPYLENE FIBERS FOR CLOTHES

**Takeshi Noma, Moriyama; Tadao Matsumoto, Takatsuki, and Taizo Sugihara, Ohmihachiman, all of Japan, assignors to Chisso Corporation, Ohsaka, Japan**

**Filed Aug. 29, 1988, Ser. No. 237,780**

**Claims priority, application Japan, Sep. 22, 1987, 62-237770**

**Int. Cl.$^5$ C08L** *23/32, 33/14;* **C08J** *7/12, 7/14*

U.S. Cl. 525—195 3 Claims

1. Dyeable polypropylene fibers for clothes comprising:
a fiber-finishing agent including a mixture of an adduct obtained by adding ethylene oxide to a saturated or unsaturated fatty acid of 6–20 carbon atoms in a proportion of ethylene oxide of 2 to 25% by mol with an alkyl phosphate salt in a proportion of said adduct of 1–90% by weight, the fiber finishing agent attached onto dyeable polypropylene fibers obtained by blending a copolymer of an amino alkyl acrylate with ethylene with a polypropylene and carrying out melt-spinning using the resulting blend as at least one component of the resulting dyeable polypropylene fibers, the amount of said fiber-finishing agent mixture attached onto said dyeable polypropylene fibers in terms of percent by weight based on the weight of said dyeable polypropylene fibers being adjusted so as to satisfy the following express:

$$0.05 \times \sqrt{d} \leqq \text{attached amount}\ \sqrt{d} \leqq 0.25$$

wherein d represents the denier of the single fiber.

---

### 5,017,659
### POLYMER COMPOSITION, A PROCESS FOR ITS MANUFACTURE, AND A THERMOPLASTIC MOULDING COMPOSITION

**L. A. van der Groep, Gersthove 33, 1112 HN Diemen, Netherlands**

**Continuation-in-part of Ser. No. 167,697, Mar. 14, 1988, Pat. No. 4,877,827. This application Nov. 3, 1988, Ser. No. 266,817**

**Claims priority, application Netherlands, Nov. 5, 1987, 8700606; Nov. 5, 1987, 8702640**

**The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.**

**Int. Cl.$^5$ C08L** *23/16, 23/18, 31/04, 23/08*

U.S. Cl. 525—222 7 Claims

1. A polymer composition comprising per 100 parts by weight of the composition
(a) 30–60 parts by weight of copolymer of ethylene and 1-olefin having at least 6 C atoms,
(b) 35–65 parts by weight of copolymer of ethylene and vinyl acetate,
(c) 1–10 parts by weight of ethylene-propylene-diene rubber, said polymer composition being obtained by reaction of the components at a temperature of at least 200° C.

---

### 5,017,660
### SELECTIVELY, PARTIALLY HYDROGENATED POLYMER AND RUBBER COMPOSITION AND IMPACT RESISTANT STYRENIC RESIN CONTAINING THE SAME

**Yasuo Hattori, and Yuichi Kitagawa, both of Yokohama, Japan, assignors to Asahi Kasei Kogyo kabushiki Kaisha, Osaka, Japan**

**Filed Aug. 3, 1988, Ser. No. 227,985**

**Claims priority, application Japan, Aug. 4, 1987, 62-193793; Sep. 30, 1987, 62-243626**

**Int. Cl.$^5$ C08C** *19/02;* **C08F** *8/04, 279/02;* **C08L** *23/26*

U.S. Cl. 525—338 15 Claims

1. A selectively partially hydrogenated butadiene polymer produced by selectively, partially hydrogenating a butadiene polymer comprising:
(1) a bound styrene content [S] of 0 to 40% by weight;
(2) a vinyl linkage content [V] of 1 to 80% at the butadiene portion;
(3) a weight average molecular weight (Mw) of 10,000 to 1,000,000; and
(4) a molecular weight distribution (Mw/Mn) of 1.2 to 5.0;
wherein the selectively, partially hydrogenated butadiene polymer produced is characterized
(5) a hydrogenation ratio [A] of 3 to 85% of the total butadiene portion; and
(6) a hydrogenation ratio [B] of 20% or more at the vinyl linkage moiety of the butadiene portion;
said [A], [B], [S] and [V] satisfying the relationships of:
(7) $[A]/([S]+[V])^{\frac{1}{2}}$ which is 2 to 8; and
(8) $[B].[V]^{\frac{1}{2}}/[A]$ which is 10 to 16.

---

### 5,017,661
### PROCESS FOR REDUCING THE LEVEL OF T-BUTYL ALCOHOL (TBA) IN VISBROKEN POLYOLEFINS

**Lawrence M. Fodor, and William R. Coutant, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Feb. 12, 1990, Ser. No. 478,340**

**Int. Cl.$^5$ C08F** *8/50*

U.S. Cl. 525—344 8 Claims

1. In a process for visbreaking polymers of at least one mono-1-olefin using at least one peroxide capable of generating t-butyl alcohol, the improvement comprising carrying out the visbreaking in the presence of a strong acidic material selected from the group consisting of acidic zeolites and sulfuric acid/-diatomaceous earth; at a temperature within the range of 170° C. to 350° C.

---

### 5,017,662
### SELECTIVE CATALYTIC PROCESS FOR PREPARING N-HALOTHIOSULFONAMIDE MODIFIED EPDM TERPOLYMERS

**Donald A. White, Edison, N.J., assignor to Exxon Chemical Patents, Inc., Linden, N.J.**

**Continuation-in-part of Ser. No. 244,743, Sep. 15, 1988, Pat. No. 4,956,420. This application Sep. 6, 1989, Ser. No. 403,630**

**Int. Cl.$^5$ C08C** *19/22*

U.S. Cl. 525—351 16 Claims

1. A process for preparing a N-halothiosulfonamide-modified terpolymer, which comprises the step of reacting a terpolymer of ethylene, an alpha-olefin containing from 3 to 16 carbon atoms and a non-conjugated diene, wherein said diene following incorporation in said terpolymer does not include an olefinic carbon atom which is fully substituted, with a N-halothio-sulfonamide selected from the group consisting of N-chlorothiosulfonamide, and N-bromothiosulfonamide; in the presence of a catalyst comprising: (a) a first salt of a weak acid, said first salt being represented by the formula MAn, wherein A is an anion or mixture of anions of a weak acid, and M is a metal selected from the group consisting of zinc, iron and mixtures thereof; and (b) an effective amount of a second salt of a weak acid, said second salt being represented by the formula TAn wherein T is a metal selected from the group consisting of nickel, chromium, a Group IIA metal of the Periodic Table of Elements, and mixtures thereof, and wherein A is an anion or mixture of anions of a weak acid, which is the same or different from the anion of said first metal salt and wherein n in said metal salt and in said second metal salt is a number corresponding to the respective oxidation state of M or T divided by the valence of said anion.

---

### 5,017,663
### RESIN COMPOSITION

**Yukio Mizuno, Ehime; Takashi Maruyama, Ibaraki, and Shinichi Yachigo, Osaka, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan**

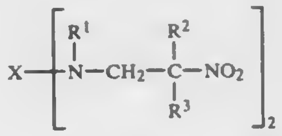
**Filed Apr. 18, 1990, Ser. No. 510,216**

**Claims priority, application Japan, Apr. 18, 1989, 1-99732**

**Int. Cl.$^5$ C08G** *65/48;* **C08L** *77/06, 77/10;* **C08K** *5/32*

U.S. Cl. 525—397 2 Claims

1. A resin composition which comprises:
100 parts by weight of a composition comprising
(A) 5–95% by weight of a polyphenylene ether resin and
(B) 95–5% by weight of a polyamide and
0.01–10 parts by weight, based on said composition comprising (A) and (B), of (D) a compound comprising a dinitrodiamine represented by the formula (I):



$$X-\left[\overset{\displaystyle R^1}{\overset{|}{N}}-CH_2-\underset{\displaystyle R^3}{\underset{|}{\overset{\displaystyle R^2}{\overset{|}{C}}}}-NO_2\right]_2 \qquad (I)$$

wherein X represents a divalent chain aliphatic, cycloaliphatic or aromatic group which may contain halogen or oxygen, $R^1$ represents a hydrogen atom, a chain aliphatic group, a cycloaliphatic group or an aromatic group and when X and $R^1$ are both chain aliphatic groups, the nitrogen atoms may further link to each other through $R^1$; $R^2$ and $R^3$ each independently represents a hydrogen atom or an alkyl group of 1–12 carbon atoms and $R^2$ and $R^3$ may link to each other to form a ring.

---

### 5,017,664
### BIOCOMPATIBLE POLYURETHANE DEVICES WHEREIN POLYURETHANE IS MODIFIED WITH LOWER ALKYL SULFONATE AND LOWER ALKYL CARBOXYLATE

**Timothy G. Grasel, and Stuart L. Cooper, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Division of Ser. No. 57,546, Jun. 3, 1987, Pat. No. 4,880,883. This application Apr. 5, 1989, Ser. No. 333,991**

**Int. Cl.$^5$ C08G** *18/82, 18/87*

U.S. Cl. 525—454 12 Claims

1. A biocompatible device having at least one surface which includes a polyether-polyurethane copolymer based on a mole ratio of about 1.5/0.5/1.0 to about 10/9/1 of an organic diisocyanate, a $C_2$–$C_{14}$ alkyl or aryl diol or diamine and a polyol having a number average molecular weight from about 500 to about 3000, the copolymer being modified wherein about 5 to about 25 percent of the urethane hydrogen atoms are replaced with a combination of lower alkyl ($C_1$–$C_6$) sulfonate groups and lower alkyl ($C_1$–$C_6$) carboxylate groups.

---

### 5,017,665
### SUPPORTED CATALYST FOR 1-OLEFIN AND 1,4-DIOLEFIN COPOLYMERIZATION

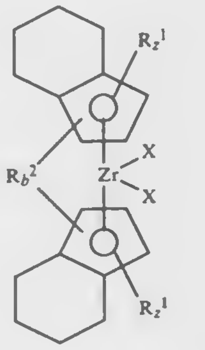
**Main Chang, Houston, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.**

**Filed Jul. 25, 1989, Ser. No. 385,339**

**Int. Cl.$^5$ C08F** *4/643, 236/20*

U.S. Cl. 526—129 13 Claims

1. A process for polymerizing ethylene and 1,4-hexadiene comprising:
(i) contacting ethylene and 1,4-hexadiene with a supported catalyst system comprising the reaction product of a metallocene and methylalumoxane deposited on an inorganic porous support, said metallocene being of the formula:



VOL
1126
ISS
3
MY
21
1991
UMI

wherein $R^2$ bridging group is a linear, branched or cyclic alkylene group having from one to six carbon atoms, an alkyl substituted silaalkylene group having from one to two silicon atoms in place of carbon atoms in the bridge, or a $Si_1$–$Si_2$ alkyl substituted silaalkylene group; "b" is a number 0 to a; each $R^1$ independently is a linear or branched hydrocarbyl radical having from one to twenty carbon atoms; "z" is an integer number from 0 to 2; and each X is a hydride, halide, oxygen bridge or a metallocene dimer, or a hydrocarbyl radical;

(ii) reacting said ethylene and 1,4-hexadiene in the presence of said catalyst to produce a polymer having a diene content of from about 0.1 to about 10 mole %; and

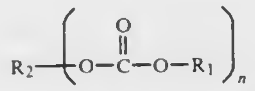
(iii) recovering said polymer.

---

## 5,017,666
## POLYOL(ALLYL CARBONATE) COMPOSITIONS AND POLYMERIZATES PREPARED THEREFROM

**John C. Crano, Akron, and Ronald L. Haynes, Barberton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.**
**Continuation of Ser. No. 690,411, Jan. 10, 1985, abandoned, which is a continuation of Ser. No. 549,850, Nov. 9, 1983, abandoned. This application Feb. 26, 1988, Ser. No. 163,227**
**Int. Cl.⁵ C08F** *4/32, 18/24*
**U.S. Cl. 526—230.5** **12 Claims**

1. A process for preparing liquid, gel-free, partially polymerized polyol(allyl carbonate) having from 20 to 50 percent allylic utilization, which process compromises (a) preparing a mixture of polyol(allyl carbonate) monomer and an organic solvent selected from $C_1$–$C_2$ chlorinated solvents, the ratio of solvent to monomer being from 0.5 to 5 milliliters of solvent per gram of monomer, said polyol(allyl carbonate) monomer being represented by the graphic formula:



$$R_2\left(O-\overset{\overset{O}{\|}}{C}-O-R_1\right)_n$$

wherein $R_1$ is allyl, $R_2$ is derived from an alkylene glycol of from 2 to 4 carbon atoms, a poly ($C_2$–$C_4$) alkylene glycol, or isopropylidene bis(paraphenol), and n is 2, (b) polymerizing said monomer with from 0.5 to 1.5 weight percent of peroxydicarbonate ester initiator until from 20 to 50 percent of the allylic carbon-carbon linkages are consumed, and (c) removing said solvent from the product of the polymerization to produce a gel-free, liquid, polymerizable composition.

---

## 5,017,667
## PREPARATION OF LATEXES OF COLOR COUPLER POLYMERS

**John L. Cawse, Macclesfield, and Philip J. Harris, Stockport, both of England, assignors to Ilford Limited, Cheshire, England**
**Filed Dec. 14, 1988, Ser. No. 284,117**
**Claims priority, application United Kingdom, Dec. 15, 1987, 8729197**
**Int. Cl.⁵ C08F** *26/08*
**U.S. Cl. 526—264** **13 Claims**

1. A method of preparing a latex of a colour coupler polymer which method in characterized in that it comprises dissolving in at least one ethylenically unsaturated non-coupling monomer which is liquid at room temperature at least two monomeric colour couplers the total amount of couplers being from 1 to 50% by weight of the non-coupling monomer, and dispersing this solution in an aqueous solution of a surfactant and a polymerization initiating system, and wherein the melting point of the mixture of monomeric colour couplers is below the reaction temperature of said polymerization system.

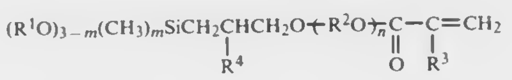
---

## 5,017,668
## ROOM TEMPERATURE CURABLE RESIN COMPOSITION

**Hiroshi Yoshihoka, Tokyo; Masaaki Yamaya, Annaka, and Hideyoshi Yanagisawa, Matsuida, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**
**Filed May 18, 1989, Ser. No. 353,610**
**Claims priority, application Japan, May 19, 1988, 63-123279**
**Int. Cl.⁵ C08F** *299/08*
**U.S. Cl. 526—279** **12 Claims**

1. A room temperature curable resin composition comprising a copolymer of

(A) an acrylic group-containing silane compound represented by the following formula (I):



$$(R^1O)_{3-m}(CH_3)_mSiCH_2\underset{\underset{R^4}{|}}{C}HCH_2O\left(R^2O\right)_n\underset{\underset{O}{\|}}{C}-\underset{\underset{R^3}{|}}{C}=CH_2 \qquad (1)$$

wherein $R^1$ represents a monovalent hydrocarbon group having 1 to 4 carbon atoms; $R^2$ represents an alkylene group having not less than 2 carbon atoms; $R^3$ and $R^4$ are the same or different and each represents a hydrogen atom or a methyl group; m is 0, 1 or 2; and n is an integer not; less than 1, and

(B) a compound having an unsaturated group copolymerizable with said compound (A), wherein said component (A) and compound (B) are present in a ratio of from 0.01 to 0.2 by weight.

---

## 5,017,669
## IMPREGNANT COMPOSITIONS FOR POROUS ARTICLES

**Peter D. Young, Les Blicqs St. Andrews, Guernsey, Channel Islands, Channel Islands**
**PCT No. PCT/GB87/00908, § 371 Date Jun. 9, 1989, § 102(e) Date Jun. 9, 1989, PCT Pub. No. WO88/04675, PCT Pub. Date Jun. 30, 1988**
**PCT Filed Dec. 15, 1987, Ser. No. 368,371**
**Claims priority, application United Kingdom, Dec. 16, 1986, 8630007; Oct. 2, 1987, 8723173**
**Int. Cl.⁵ C08F** *20/26*
**U.S. Cl. 526—320** **16 Claims**

1. A liquid (meth)acrylic ester impregnant composition comprising a free radical catalyst, an inhibitor and a higher alkyl (meth)acrylic ester and/or polyfunctional (meth)acrylic ester which has been obtained by transesterification in the presence of an organotitanium catalyst and from which the catalyst residue has not been removed.

---

## 5,017,670
## METHODS AND COMPOSITIONS FOR PROVIDING ARTICLES HAVING IMPROVED BIOCOMPATIBILITY CHARACTERISTICS

**Jack Frautschi, Grand Prairie, Tex., and Kevin Tingey, Salt Lake City, Utah, assignors to Board of Regents, The University of Texas System, Austin, Tex.**
**Filed Sep. 23, 1987, Ser. No. 100,121**
**Int. Cl.⁵ C08G** *83/00;* **A01N** *1/00*
**U.S. Cl. 527—313** **14 Claims**

1. A method for providing a biocompatible polymer having an affinity for albumin, the method comprising the steps of:

(a) selecting a biocompatible polymer whose polymeric structure includes non-aromatic ring structures having adjacent secondary hydroxy groups;

(b) contacting the polymer with a free radical initiator to provide free radical carbons thereon available for covalent attachment of an organic molecule;

(c) derivatizing the polymer in an aqueous solution at free radical carbons with an organic molecule to form a grafted polymer intermediate, said organic molecule having within its structure a first site and a second site, said

first site being a double bond available for addition to said polymer free radical carbons; and

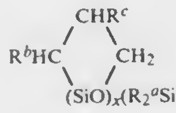
(d) derivatizing said organic molecule second site to include at least one alphatic extension having from 12 to 22 carbon atoms covalently attached to said organic molecule, the degree of derivatization of the organic molecule with aliphatic extensions being effective to improve the biocompatibility of the polymer.

---

## 5,017,671
## POLYCYCLOSILOXANES CONTAINING SILACYCLOBUTANE

**Carl J. Bilgrien, and Chi-long Lee, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.**
**Filed Oct. 16, 1989, Ser. No. 422,209**
**Int. Cl.⁵ C08G** *77/06*
**U.S. Cl. 528—21** **17 Claims**

1. A polycyclosiloxane of the formula



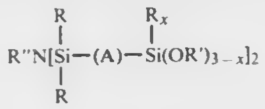
---

## 5,017,672
## POLYALKOXYSILYLALKYLENEDISILAZANES AND SILYLAMINES

**Robert H. Krahnke, and John C. Saam, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.**
**Division of Ser. No. 95,962, Sep. 11, 1987, Pat. No. 4,847,400. This application Feb. 6, 1989, Ser. No. 306,136**
**Int. Cl.⁵ C08G** *77/08*
**U.S. Cl. 528—23** **6 Claims**

1. A method for preparing a polyalkoxysilyl containing polyorganosiloxane in which the polyalkoxysilyl groups are bonded to the polymer through an alkylene linkage comprising

(A) mixing in the absence of moisture,
  (1) silanol containing polyorganosiloxane,
  (2) a polyalkoxysilylalkylenedisilazane of the formula



$$R''N[\underset{\underset{R}{|}}{\overset{\overset{R}{|}}{Si}}-(A)-\overset{\overset{R_x}{|}}{Si}(OR')_{3-x}]_2$$

where x is 0 or 1; R is a saturated alkyl or aryl radical, or mixture thereof; R' is alkyl, aryl, or Cellosolve (R) 2-alkylethanol radical, or mixture thereof; R'' is hydrogen, alkyl, aryl, or arylalkyl radical or mixture thereof; and A is a divalent hydrocarbon radical having 2 to 20 carbon atoms, and

  (3) acidic catalyst, where the molar amount of (2) is in excess of the molar amount of (1), and

(B) allowing the mixture to react until the silanol groups have been replaced with polyalkoxysilylalkylsilyl groups.

---

## 5,017,673
## NONIONICALLY STABILIZED POLYESTER URETHANE RESIN FOR WATER-BORNE COATING COMPOSITIONS

**Sergio E. Balatan, West Bloomfield, Mich., assignor to BASF Corporation, Southfield, Mich.**
**Filed Oct. 12, 1989, Ser. No. 420,794**
**Int. Cl.⁵ C08G** *18/42*
**U.S. Cl. 528—59** **18 Claims**

1. A water-dispersible, laterally stabilized polyester polyurethane resin which is the reaction product of

(a) at least one organic compound having two or more reactive hydrogen functional groups;

(b) a polyisocyanate; and

(c) a polyester prepolymer which is the reaction product of
  (i) an organic compound having at least three reactive carboxyl acid groups; and
  (ii) a polyether alcohol.

---

## 5,017,674
## EPOXY RESIN COMPOSITION FOR COMPOSITE MATERIAL FROM M- OR O-SUBSTITUTED TRIGLYCIDYLAMINOPHENOLS, WITH FORTIFIER AND LATENT CURING AGENTS

**Hisashi Tada, 2-1-1 Nekogahori-dohri, Chigusa-ku, Owariasahi; Yoshinobu Shiraishi, 6-6 Midorigaoka, Midori-cho, Owariasahi, and Shigetsuga Hayashi, 4-4-1 Shinpo-cho, Chigusa-Ku, Nagoya, all of Japan**
**Division of Ser. No. 303,274, Jan. 30, 1989, Pat. No. 4,956,411. This application Jun. 27, 1990, Ser. No. 544,649**
**Claims priority, application Japan, Feb. 5, 1988, 63-25204; Feb. 5, 1988, 63-25205; Feb. 5, 1988, 63-25206**
**Int. Cl.⁵ C08G** *59/46, 59/56, 59/60*
**U.S. Cl. 528—93** **7 Claims**

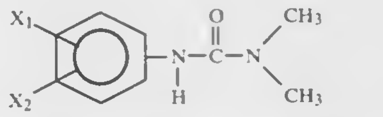
1. An epoxy resin composition for composite materials, comprising:

(A) an epoxy compound containing 10 to 100% by weight of m- or o-methyl-p-N,N-diglycidyl-aminophenylglycidylether or its oligomer,

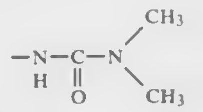
(B) a diaminodiphenylsulfone and/or a diaminodiphenylmethane in an amount of 50 to 200% for the total epoxy equivalent of the epoxy compound,

(C) 1 to 10 parts by weight of at least one compound selected from the group consisting of dicyandiamide, 2,6-xylenylbiguanide, o-tolylbiguanide, diphenylguanidine, adipyl dihydrazide, azelayl dihydrazide, and isophthalic acid dihydrazide for 100 parts by weight of the epoxy compound,

(D) 1.5 to 15 parts by weight of one or more of urea compounds represented by the following general formula:



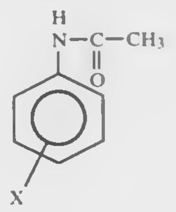
wherein $X_1$ and $X_2$, which may be the same of different, each represents —Cl, —Br, —$NO_2$, —$CH_3$, —H, —$OCH_3$, —$C_2H_5$, or



for 100 parts by weight of the epoxy compound, and

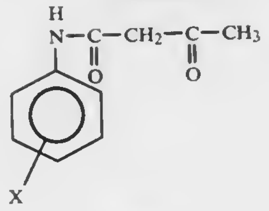
(E) a reaction product obtained by reacting at least one of amide or amine compounds represented by the general formulae (1), (2) or (3) given below with at least one of epoxy compounds represented by the general formulae (4) or (5) given below is additionally contained in an amount of below 100% by weight based on the weight of the epoxy resin composition comprising the components (A) to (D)

(1)

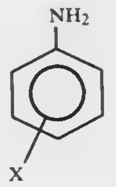


VOL
1126
ISS
3
MY
21
1991
UMI

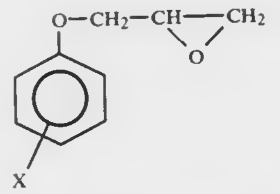
-continued



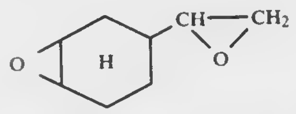
(2)



(3)



(4)



(5)

wherein X represents —H, —Cl, —Br, or —OH.

---

### 5,017,675

### USE OF POLYAMIDOAMINES AS CURING AGENTS FOR EPOXY RESINS AND CURABLE MIXTURES CONTAINING THESE SUBSTANCES WHEREIN THE ACID COMPONENT HAS OXYALKYLENE(REPEATING)UNITS

**Manfred Marten, Mainz; Claus Godau, Kiedrich, and Heinz Schmelzer, Rümmelsheim, all of Fed. Rep. of Germany, assignors to Hoechst AG, Fed. Rep. of Germany**

**Filed Jan. 16, 1990, Ser. No. 465,467**

**Claims priority, application Fed. Rep. of Germany, Jan. 18, 1989, 3901279**

**Int. Cl.$^5$ C08G** *59/40, 59/62, 65/00*

**U.S. Cl. 528—111** **18 Claims**

1. A curable mixture containing a polyamidoamine (A) which has primary and/or secondary amino groups and which has been obtained by polycondensation of (a) a compound of the formula

$$R^2OOC-CH_2-[-O-R^1-]_nO-CH_2-COOR^2 \qquad (I)$$

in which

$R^1$ = an alkylene radical having 2 to 5 carbon atoms;

$R^2$ = independently of one another, hydrogen or an alkyl radical having 1 to 6 carbon atoms;

n = 0 or an integer from 1 to 300

with (b) a polyamine which contains at least two amino groups which are condensable with (a)

an epoxy group-containing compound (B),

optionally a diluent (C) and

optionally an additive (D).

---

### 5,017,676

### ACETOACETOXYETHYL METHACRYLATE IN THE CURE OF EPOXY RESINS

**Michael Cuscurida, Austin, Tex., assignor to Texaco Chemical Company, White Plains, N.Y.**

**Filed Dec. 18, 1989, Ser. No. 451,686**

**Int. Cl.$^5$ C08L** *63/02, 63/04;* **C08G** *59/50, 59/68*

**U.S. Cl. 528—121** **6 Claims**

1. A composition comprising an epoxy resin, an amine curing agent and an amount of acetoacetoxyethyl methacrylate effective for accelerating the cure of the epoxy resin to a hand, stiff product.

---

### 5,017,677

### POLYQUINOLINE COPOLYMERS

**John K. Stille, Fort Collins, Colo., assignor to Colorado State University Research Foundation, Fort Collins, Colo.**

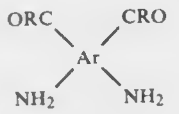
**Filed Nov. 18, 1988, Ser. No. 273,355**

**Int. Cl.$^5$ C08G** *8/02, 69/49, 75/00, 79/02*

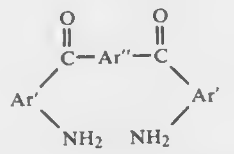
**U.S. Cl. 528—125** **69 Claims**

1. A polyquinoline copolymer composition comprising the reaction product of a mixture of compounds selected from the group of mixtures consisting of (1) at least one type AA compound, at least one type BB compound, and at least one type AB compound; (2) at least one type AA compound and at least one type BB compound, where the total number of different type AA and type BB compounds is at least three; and (3) at least three different type AB compounds, wherein:

the type AA compounds are aromatic compounds containing two sets of ortho-amino carbonyl functions attached to an aromatic nucleus selected from the group consisting of structures represented by the formulas:

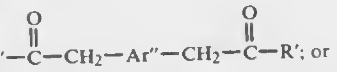


(1)

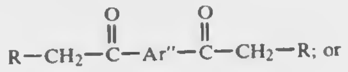


(2)

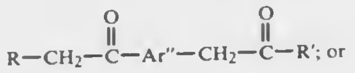
the type BB compounds are aromatic compounds containing two methylene ketone functions attached to an aromatic nucleus selected from the group consisting of structures represented by the formulas:



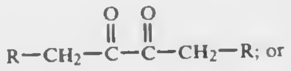
$R'-\overset{\overset{O}{\|}}{C}-CH_2-Ar''-CH_2-\overset{\overset{O}{\|}}{C}-R'$; or



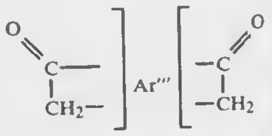
$R-CH_2-\overset{\overset{O}{\|}}{C}-Ar''-\overset{\overset{O}{\|}}{C}-CH_2-R$; or



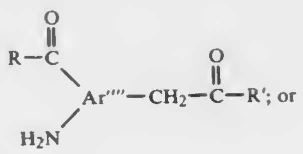
$R-CH_2-\overset{\overset{O}{\|}}{C}-Ar''-CH_2-\overset{\overset{O}{\|}}{C}-R'$; or

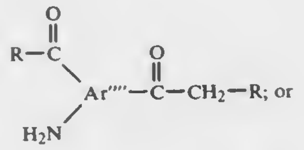


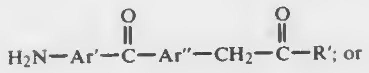
$R-CH_2-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-CH_2-R$; or



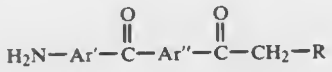
the type AB compounds are aromatic compounds containing one set of ortho-amino carbonyl functions as well as one methylene ketone function attached to an aromatic nucleus selected from the group consisting of structures represented by the formulas:







$H_2N-Ar'-\overset{\overset{O}{\|}}{C}-Ar''-CH_2-\overset{\overset{O}{\|}}{C}-R'$; or



$H_2N-Ar'-\overset{\overset{O}{\|}}{C}-Ar''-\overset{\overset{O}{\|}}{C}-CH_2-R$

wherein R is hydrogen or aryl, R′ is Aryl, and Ar is an aromatic nucleus in which the positions of attachment of each set of carbonyl and amino functions are ortho, Ar′ is any aryl in which the positions of attachment of the amino functions are ortho, Ar″ is any aryl group, Ar‴ is an aryl group, four positions of which are occupied by connections of the methylene carbonyl functions, and Ar⁗ is an aryl group in which the positions of attachment of the set of carbonyl and amino functions is ortho.

---

### 5,017,678

### THERMOTROPIC LIQUID CRYSTALLINE POLYMERS

**Umberto Giannini, Milan; Alfredo Coassolo; Marco Foa', both of Novara; Giampiero Sabarino, Vercelli, and L. Lawrence Chapoy, Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy**

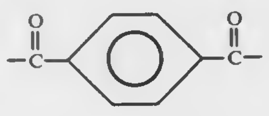
**Continuation of Ser. No. 352,679, May 10, 1989, abandoned, which is a continuation of Ser. No. 203,808, Jun. 8, 1988, abandoned. This application Jun. 4, 1990, Ser. No. 532,349**

**Claims priority, application Italy, Jun. 16, 1987, 20909 A/87**

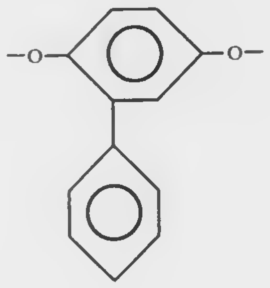
**Int. Cl.$^5$ C08G** *63/02, 63/18*

**U.S. Cl. 528—190** **4 Claims**

1. A thermotropic liquid crystalline polyester which is optically anisotropic in the melted state, containing the following repetitive groups:

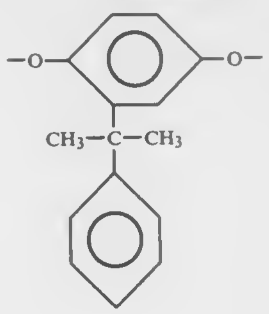


(I)

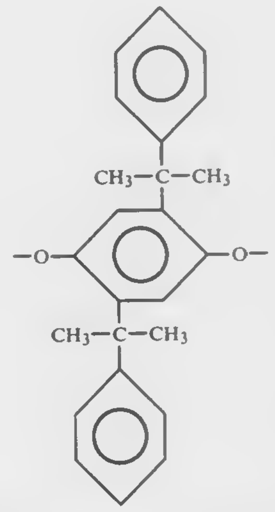


(II)

-continued



(III)



(IV)

with a molar ratio I/II+III+IV) of 1, a molar ratio II/III of between 0.4 and 2.4, while the molar ratio IV/III is between 0 and 0.4.

---

### 5,017,679

### POLYESTERS TERMINATED WITH CARBOXYCYCLOHEXANECARBOXYLATE GROUPS

**Yeong-Ho Chang, and Glenn C. Jones, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 30, 1989, Ser. No. 400,429**

**Int. Cl.$^5$ C08G** *63/02*

**U.S. Cl. 528—272** **7 Claims**

1. A carboxyl polyester having (i) an inherent viscosity of about 0.1 to 0.4, (ii) a glass transition temperature of about 55 to 70° C., (iii) an acid number of about 20 to 50, and (iv) a number average molecular weight of about 1500 to 5000 comprised of:

A. diacid residues comprising at least about 95 mole percent aromatic dicarboxylic acid residues;

B. diol residues comprising at least about 95 mole percent of (i) 2,2-dimethyl-1,3-propanediol residues or (ii) a mixture of at least 40 mole percent 2,2-dimethyl-1,3-propanediol and up to 60 mole percent 1,4-cyclohexanedimethanol and/or 2,2,4,4-tetramethyl-1,3-cyclobutanediol;

C. up to about 5 mole percent of triol residues; and

D. terminal 3- and/or 4-carboxycyclohexanecarboxylate groups.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,680

### PROCESS AND CATALYST-INHIBITOR SYSTEMS FOR PREPARING POLY(ETHYLENE TEREPHTHALATE)

**Bobby J. Sublett, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 3, 1990, Ser. No. 547,702**

**Int. Cl.$^5$ C08G** *63/02, 63/04, 63/34, 63/38*

**U.S. Cl. 528—274** **12 Claims**

1. Process for producing polyesters comprising reacting dimethyl terephthalate with at least one glycol selected from ethylene glycol and combinations of ethylene glycol with up to about 10 mol % 1,4-cyclohexanedimethanol at a temperature sufficient to effect ester interchange and in the presence of a catalyst system comprising

(a) manganese, zinc or calcium salts wherein the manganese, zinc or calcium is present in an amount of about 25–110 ppm,
(b) cobalt salts wherein the cobalt is present in an amount of about 10–100 ppm,
(c) an antimony compound wherein the antimony is present in an amount of about 150–350 ppm,
(d) a phosphorus compound wherein the phosphorus is present in an amount of about 15–240 ppm, and
(e) a complex of titanium alkoxide with an alkali or alkaline earth metal salt wherein the titanium is present in an amount of about 10–100 ppm titanium and wherein the metal: titanium atom ratio is at least 0.25:1,

the ppm in (a) through (e) above being by weight based on the acid fraction of the polyester.

---

### 5,017,681

### HIGH PERFORMANCE THERMALLY STABLE POLYBENZIMIDAZOLE FILM

**Lachman Wadhwa, North Plainfield; Michel Bitritto, Summit, both of N.J., and Edward J. Powers, Charlotte, N.C., assignors to Hoechst Celanese Corp., Somerville, N.J.**

**Division of Ser. No. 98,440, Sep. 18, 1987, Pat. No. 4,927,909. This application Feb. 8, 1990, Ser. No. 478,163**

**Int. Cl.$^5$ C08G** *73/18*

**U.S. Cl. 528—342** **9 Claims**

1. A continuous polybenzimidazole film, having no macroscopic holes, that does not decompose due to heat at a temperature below at least about 500° C.

---

### 5,017,682

### PROCESS FOR THE PRODUCTION OF UNBRANCHED POLYARYLENE SULFIDES OF IMPROVED COLOR QUALITY AND IMPROVED COLOR STABILITY

**Burkhard Köhler; Rolf-Volker Meyer; Ernst-Ulrich Dorf; Wolfgang Rüsseler, and Manfred Schmidt, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany**

**Filed Aug. 14, 1989, Ser. No. 394,120**

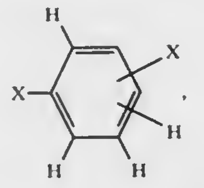
**Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828760**

**Int. Cl.$^5$ C08G** *75/14*

**U.S. Cl. 528—388** **4 Claims**

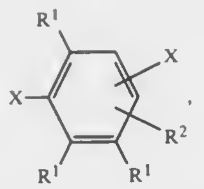
1. A process for the production of high molecular weight polyarylene sulfides from

(a) 50 to 100 mol-% aromatic dihalogen compounds corresponding to the formula



(I)

and 0 to 50 mol-% aromatic dihalogen compounds corresponding to the formula



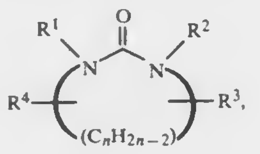
(II)

in which

the X's are halogen atoms selected from chlorine and bromine atoms, in the meta- or para-position to one another and
the $R^1$'s may be the same or different and represent hydrogen, alkyl, cycloalkyl, aryl, alkylaryl, arylalkyl; two substituents $R^1$ in the ortho position to one another are attached to form an aromatic or heterocyclic ring and at least one substituent $R^1$ is not hydrogen, and

(b) alkali sulfides, optionally together with alkali hydroxides, and molar ratio of aromatic dichlorine compounds to sulfides being in the range from 0.85:1 to 1.15:1,

wherein N,N'-dialkylated cyclic ureas corresponding to formula (III)



(III)

in which
$R^1$ and $R^2$ one alkyl or aryl
$R^3$ and $R^4$ represent hydrogen (H) or $C_1$–$C_{22}$ alkyl and
n is the number 2, 3 or 4,

and in that the molar ratio of alkali sulfides to the organic solvent is in the range from 1:2 to 1:5, anhydrous starting materials are introduced first and heated to at least 150° C. and aqueous materials and residues of the anhydrous starting materials are introduced in the form of a solution or melt or in solid form in such a way that the water introduced is removed from the reaction mixture by distillation and the reaction is subsequently carried out at temperatures in the range from 210° C. to 270° C. optionally under a slight excess pressure.

---

### 5,017,683

### CONDENSED POLYCYCLIC, POLYNUCLEAR AROMATIC THERMOSETTING RESIN HAVING GOOD MOLDABILITY AND HEAT RESISTANCE; AND PREPARATION THEREOF

**Sugio Otani, Kiryu; Michio Tsuyuguchi, Urawa; Haruyuki Kano; Yoshihisa Sone, both of Ibaragi; Kenji Kageyama, Tokyo, and Toshiaki Mabuchi, Chofu, all of Japan, assignors to Sumikin Chemical Co., Ltd., Tokyo, Japan**

**Filed Aug. 25, 1989, Ser. No. 398,485**

**Claims priority, application Japan, Feb. 23, 1989, 1-43630**

**Int. Cl.$^5$ C08G** *59/00, 61/00*

**U.S. Cl. 528—396** **11 Claims**

1. A condensed polycyclic, polynuclear aromatic thermosetting hydrocarbon resin which is prevented from forming a cloud on a mold during molding, said resin being a prepolymer derived by condensation polymerization of a starting material with a crosslinking agent in the presence of an acid catalyst, wherein the starting material is selected from the group consisting of condensed polycyclic aromatic hydrocarbon compounds and mixtures of a condensed polycyclic aromatic hydrocarbon compound with a monocyclic aromatic hydrocarbon compound, the crosslinking agent is an aromatic compound having at least two hydroxymethyl groups attached to the aromatic ring, and the resin has a flow temperature of not higher than 150° C., and wherein the acid catalyst is water-insoluble or when it is water-soluble, the resin has an insolubilized acid ratio of at least 50%.

---

### 5,017,684

### METHOD OF POLYMERIZING EPOXY COMPOUND

**Takeshi Endo, Kanagawa; Yoko Nambu, and Keiji Abe, both of Tokyo, all of Japan, assignors to Asahi Denka Kogyo K.K., Tokyo, Japan**

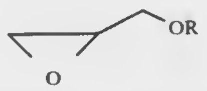
**Filed Mar. 30, 1990, Ser. No. 502,415**

**Claims priority, application Japan, Apr. 21, 1989, 1-102375**

**Int. Cl.$^5$ C08G** *65/22;* **C07F** *7/04*

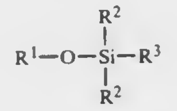
**U.S. Cl. 528—409** **1 Claim**

1. A method of polymerizing an epoxy compound, characterized by polymerizing an epoxy compound represented by the general formula (I):



(I)

wherein R is a substituted or unsubstituted alkyl group, by using an initiator comprising a silyl ether represented by the general formula (II):



(II)

$$R^1-O-\underset{R^2}{\overset{R^2}{Si}}-R^3$$

wherein $R^1$, $R^2$ and $R^3$ are each a substituted or unsubstituted alkyl or aryl group, in the presence of an inorganic fluoride catalyst, thereby preparing a polyether having a silyloxy group in its terminal.

---

### 5,017,685

### PROCESS FOR EXTRACTING METAL RESIDUE FROM POLY(ETHER KETONE KETONES)

**Edward G. Brugel, Wilmington, Del., assignor to E.I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 24, 1989, Ser. No. 315,292**

**Int. Cl.$^5$ C08G** *67/00*

**U.S. Cl. 528—480** **10 Claims**

1. A process for extracting a metal residue from a particulate, solid poly(ether ketone ketone), wherein poly(ether ketone ketone) is contacted with agitation at an elevated temperature for a period of at least about 20 minutes with a $C_2$–$C_{18}$ aliphatic, carboxylic, alpha-hydroxy acid or an aromatic, carboxylic, ortho-hydroxy acid, said extracting agent being in liquid phase, separating the hot liquid phase from the polymer otherwise than by distillation or evaporation, and recovering the purified polymer.

---

### 5,017,686

### PRODUCTION OF AROMATIC POLYAMIDE USING A FUSED RING STABILIZER

**Jürgen Finke, and Roland Felnauer, both of Marl, Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Filed Jan. 31, 1990, Ser. No. 473,068**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905884**

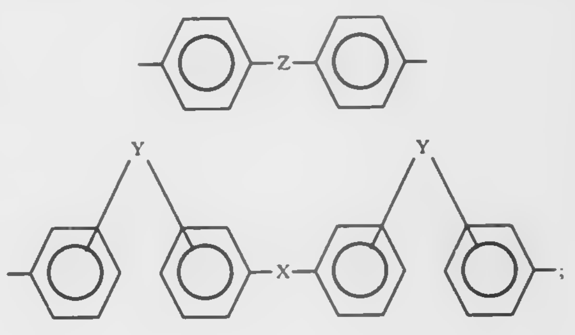
**Int. Cl.$^5$ C08K** *5/3417*

**U.S. Cl. 524—87** **15 Claims**

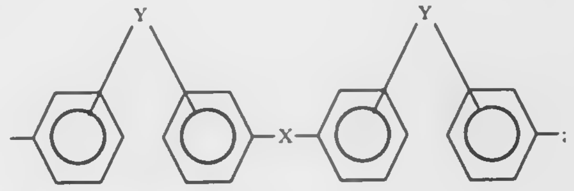
1. A process for improving resistance to thermal oxidation of a thermoplastically processable, aromatic polyamide comprising conducting polycondensation of the following starting monomers:

(A) HOOC—Ar—COOH
(B) $H_2N$—Ar'—$NH_2$

wherein
Ar is 1,3- or 1,4-phenylene, 1,4-, 1,5-, 2,6- or 2,7-naphthylene,

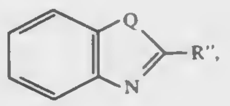


Ar' is:



X is —$SO_2$— or —CO—;
Y is —O— or —S—;
Z is —O—; —S—; —$SO_2$—; —CO— or —$CR_2$—;
R is —H or $C_1$-$C_4$-alkyl;

in the melt in the presence of 0.05–4 mol %, based on the total mols of components (A) and (B), of an acid of the formula $H_3PO_n$ wherein n is 2 to 4 inclusive, or triphenyl phosphite, at a temperature of about 200°–400° C., and, in order to provide the improved resistance to thermal oxidation, performing the polycondensation reaction in the presence of 0.05–4 mol %, based on the total mols of components (A) and (B), of a compound of Formula I



(I)

wherein
Q is —O—; —S—; or N—R'''; and
R'' and R''' are: —H; $C_1$–$C_6$-alkyl; or phenyl

---

### 5,017,687

### PEPTIDES FOR THE DETECTION OF HTLV-1 INFECTION

**Anders Vahlne, Hovas; Bo Svennerholm, Gothenburg; Lars Rymo, Hovas; Stig Jeansson, and Peter Horal, both of Gothenburg, all of Sweden, assignors to Virovahl, S.A., Zug, Switzerland**

**Continuation-in-part of Ser. No. 166,205, Mar. 10, 1988, abandoned. This application Jun. 13, 1988, Ser. No. 206,140**

**Int. Cl.$^5$ C07K** *7/10, 17/00*

**U.S. Cl. 530—324** **26 Claims**

8. A method for detecting antibodies to HTLV-1 in a sample comprising:

contacting the sample with at least one peptide selected from the group consisting of
X-Gly-Leu-Asp-Leu-Leu-Phe-Trp-Glu-Gln-Gly-Gly-Leu-Cys-Lys-Ala-Leu-Gln-Glu-Gln-Cys-Arg-Phe-Pro-Asn-Y-Z,
X-Trp-Thr-His-Cys-Phe-Asp-Pro-Gln-Ile-Gln-Ala-Ile-Val-Ser-Ser-Pro-Cys-His-Asn-Ile-Leu-Y-Z,
X-Tyr-Thr-Cys-Ile-Val-Cys-Ile-Asp-Arg-Ala-Ser-Leu-Ser-Thr-Trp-His-Val-Leu-Tyr-Ser-Pro-Y-Z and

VOL
1126
ISS
3
MY
21
1991
UMI

X-Leu-Asn-Thr-Glu-Pro-Ser-Gln-Leu-Pro-Pro-Thr-Ala-Pro-Pro-Leu-Leu-Pro-His-Ser-Asn-Leu-Asp-His-Ile-Y-Z, wherein X is either a H of the amino terminal NH$_2$ group of the peptide or an additional amino acid bonded to the amino terminal NH$_2$ group of the peptide, the additional amino acid being selected to facilitate the coupling of the peptide to a carrier protein; Y is absent or Cys; and Z is OH or NH$_2$, under conditions such that an immunological complex will form between the peptide and antibodies to HTLV-1 if such antibodies are present in the sample and measuring the formation, if any, of the immunological complex to determine the presence of antibodies to HTLV-1 in the sample.

---

## 5,017,688
## PEPTIDES INVOLVED IN THE PATHOGENESIS OF HIV INFECTION

**Walter Gilbert, Cambridge; Richard A. Fisher, Brookline; Vicki L. Sato, Cambridge, and Kuzhalmannam L. Ramachandran, Natick, all of Mass., assignors to Biogen, Inc., Cambridge, Mass.**

**Continuation of Ser. No. 41,936, Apr. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 873,621, Jun. 12, 1986, abandoned. This application Oct. 30, 1989, Ser. No. 430,898**

**Int. Cl.$^5$ C07K** *7/08;* **A61K** *37/02, 39/12*

**U.S. Cl. 530—326** **1 Claim**

1. A peptide involved in the pathogenesis of the HIV virus selected from the group consisting of peptides characterized by a sequence of amino acids consisting of the formula: EQIWNNMTWMEWD, NSSSGRMIMEKGEIKNCS, SVEINCTRPNNNTRKSI and D-retro forms thereof.

---

## 5,017,689
## DYNORPHIN ANALOGS SPECIFIC FOR KAPPA OPIOID RECEPTORS

**Victor Hruby, and Andrew Kawasaki, both of Tucson, Ariz., assignors to Arizona Technology Development Corporation, Tuscon, Ariz.**

**Filed Jul. 6, 1989, Ser. No. 375,882**

**Int. Cl.$^5$ C07K** *7/12, 7/06*

**U.S. Cl. 530—327** **13 Claims**

1. A cyclic or linear dynorphin having structure I, II or III shown below,

H—XXX$^1$—Gly$^2$—Gly$^3$—WWW$^4$— (I)

—YYY$^5$—Arg$^6$—Arg$^7$—ZZZ$^8$—Arg$^9$—BBB$^{10}$—AAA$^{11}$—E

H—XXX$^1$—Gly$^2$—Gly$^3$—WWW$^4$—YYY$^5$—Arg$^6$— (II)

—Arg$^7$—ZZZ$^8$—Arg$^9$—BBB$^{10}$—AAA$^{11}$—Leu$^{12}$—CCC$^{13}$—E

H-XXX$^1$-Gly$^2$-Gly$^3$-WWW$^4$-YYY$^5$-Arg$^6$-Arg$^7$-ZZZ$^8$-Arg$^9$-BBB$^{10}$-AAA$^{11}$-E (III)

wherein in structure I, XXX$^1$ is a D or L-aromatic amino acid or a halogen, nitro, cyano or C$_{1-6}$ alkyl ring-substituted aromatic amino acid, YYY$^5$ is D-Cys, L-Cys, D-homoCys, L-homoCys, D-Pen or L-Pen; WWW$^4$ is a Dnitro, or L-aromatic or aliphatic amino acid or a halogen, cyano, hydroxy, or C$_{1-6}$ alkyl ring substituted aromatic amino acid; ZZZ$^8$ is L-Ile, L-Val, L-Nle, L-Leu or D-Ala, BBB$^{10}$ is L-Pro, D-Pro, L-Sar or D-Sar and AAA$^{11}$ is D-Cys, L-Cys, D-homoCys, L-homoCys D-Pen or L-Pen, wherein the thiol groups of amino acids YYY$^5$ and AAA$^{11}$ are bonded together so as to form a disulfide ring;

in structure II, XXX$^1$ is as defined above, YYY$^5$ is D-Leu, L-Leu, D-Met or L-Met; WWW$^4$ is a D— or L-aromatic or aliphatic amino acid or a halogen, nitro, cyano, hydroxy, or C$_{1-6}$ alkyl ring substituted aromatic amino acid; ZZZ$^8$ is D-Cys, L-Cys, D-homoCys or L-homoCys, BBB$^{10}$ is as defined above, AAA$^{11}$ is a basic amino acid and CCC13 is D-Cys, L-Cys, D-homoCys, L-homoCys, D-Pen or L-Pen, wherein the thiol groups of amino acids ZZZ$^8$ and CCC$^{13}$ are bonded together so as to form a disulfide ring; in structure III, XXX$^1$, WWW$^4$, ZZZ$^8$, and BBB$^{10}$ are as defined for structure I, YYY$^5$ is a D- or L-aliphatic or aromatic amino acid, and AAA$^{11}$ is a basic amino acid; and wherein

E is a carboxylic acid or a peptidase-stable carboxylic acid derivative.

---

## 5,017,690
## DEBLOCKING N-FORMYL ASPARTAME COMPOUNDS

**Jennifer M. Quirk, Highland, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.**

**Filed Aug. 11, 1989, Ser. No. 392,696**

**Int. Cl.$^5$ A61K** *37/02;* **C07C** *229/00*

**U.S. Cl. 530—335** **10 Claims**

1. A method for removing the formyl group from the nitrogen atom of an N-formyl aspartame compound which comprises heating the N-formyl compound in the presence of a catalytically effective amount of a platinum-containing catalyst in conjunction with a promoting amount of aniline or of methylene dianiline.

---

## 5,017,691
## MAMMALIAN INTERLEUKIN-4

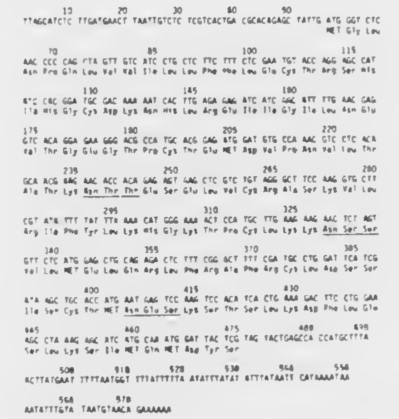
**Frank Lee; Takashi Yokota; Ken-ichi Arai, all of Palo Alto; Timothy Mosmann, Atherton, and Donna Rennick, Los Altos, all of Calif., assignors to Schering Corporation, Madison, N.J.**

**Continuation-in-part of Ser. No. 881,553, Jul. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 843,958, Mar. 25, 1986, which is a continuation-in-part of Ser. No. 799,668, Nov. 19, 1985, abandoned. This application Sep. 17, 1986, Ser. No. 908,215**

**The portion of the term of this patent subsequent to May 7, 2008, has been disclaimed.**

**Int. Cl.$^5$ C12N** *15/00, 5/00, 1/22;* **A61K** *39/00;* **C07K** *21/23, 13/00;* **C12P** *12/06, 21/04, 19/34*

**U.S. Cl. 535—351** **9 Claims**



1. Human interleukin-4 substantially free from any other proteinaceous material.

---

## 5,017,692
## TRUNCATED HUMAN INTERLEUKIN-A ALPHA

**Gerard Zurawski, and Sandra M. Zurawski, both of Redwood City, Calif., assignors to Schering Corporation, Kenilworth, N.J.**

**Filed Sep. 4, 1986, Ser. No. 903,497**

**Int. Cl.$^5$ C07K** *13/00;* **C12P** *21/06, 19/34;* **C12N** *15/00, 1/22;* **C07H** *15/12*

**U.S. Cl. 530—351** **1 Claim**

1. A mutant human interleukin-1$\alpha$ polypeptide defined by the formula:

Met—Arg—Ile—Ile—Lys—Tyr—Glu—Phe—

Ile—Leu—Asn—Asp—Ala—Leu—Asn—Gln—

Ser—Ile—Ile—Arg—Ala—Asn—Asp—Gln—

Tyr—Leu—Thr—Ala—Ala—Ala—Leu—His—

Asn—Leu—Asp—Glu—Ala—Val—Lys—Phe—

Asp—Met—Gly—Ala—Tyr—Lys—Ser—Ser—

Lys—Asp—Asp—Ala—Lys—Ile—Thr—Val—

Ile—Leu—Arg—Ile—Ser—Lys—Thr—Gln—

Leu—Tyr—Val—Thr—Ala—Gln—Asp—Glu—

Asp—Gln—Pro—Val—Leu—Leu—Lys—Glu—

Met—Pro—Glu—Ile—Pro—Lys—Thr—Ile—

Thr—Gly—Ser—Glu—Thr—Asn—Leu—Leu—

Phe—Phe—Trp—Glu—Thr—His—Gly—Thr—

Lys—Asn—Tyr—Phe—Thr—Ser—Val—Ala—

His—Pro—Asn—Leu—Phe—Ile—Ala—Thr—

Lys—Gln—Asp—Tyr—Trp—Val—Cys—Leu—

Ala—Gly—Gly—Pro—Pro—Ser—Ile—Thr—

Asp—Phe—Gln—Ile—Leu—Glu—Asn—Gln—

Ala.

---

## 5,017,693
## METHODS FOR INTRODUCING A SULFHYDRYL AMINO OR HYDROXYL GROUPS TO A COMPOUND

**Mark D. Hylarides, Snohomish County; Ananthachari Srinivasan; Jeffrey N. Fitzner, both of King County, and Vivekananda M. Vrudhula, Snohomish County, all of Wash., assignors to NeoRx Corporation, Seattle, Wash.**

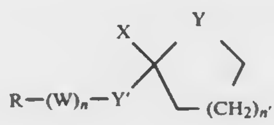
**Continuation-in-part of Ser. No. 127,656, Dec. 2, 1987, abandoned, and a continuation-in-part of Ser. No. 362,355, Jun. 6, 1989, abandoned. This application Dec. 19, 1989, Ser. No. 454,295**

**Int. Cl.$^5$ C07K** *15/28, 3/08;* **C07D** *291/04, 291/06*

**U.S. Cl. 530—390** **10 Claims**

1. A method for introducing into a compound a free sulfhydryl, free amino, or free hydroxyl group, comprising the steps of:

reacting a compound with a reagent having the formula:



where:

R is a chemically reactive moiety;

W is a methylene, methylenoxy, or methylenecarbonyl group or combinations thereof;

n is 0 to 30;

Y' is S, N, or O;

X is H, alkyl group of C$_6$ or less, or alkoxy group of C$_6$ or less;

n' is 1 to 2; and

Y is an O, S or NR', wherein R' is an alkyl group of C$_6$ or less;

to form a reagent-linked compound; and

cleaving the reagent-linked compound at the bond between Y' and the ring, thereby introducing into said compound said free sulfhydryl, free amino, or free hydroxyl group, depending upon whether Y' is S, N, or O, respectively.

---

## 5,017,694
## PROCESS FOR THE PREPARATION OF CERIC HYDROCARBYL SILYLOXIDES BY TRANSETHERIFICATION OF CERIC ALKOXIDES

**Peter S. Gradeff, Pottersville, and Kenan Yunlu, Highland Park, both of N.J., assignors to Rhone-Poulenc, Inc., New Brunswick, N.J.**

**Filed Dec. 3, 1987, Ser. No. 128,248**

**The portion of the term of this patent subsequent to Sep. 21, 2006, has been disclaimed.**

**Int. Cl.$^5$ C07F** *5/00*

**U.S. Cl. 534—15** **15 Claims**

1. A process for preparing ceric hydrocarbyl silyloxides which comprises transetherifying a ceric alkoxide with a hydrocarbyl silanol having from one to three hydroxyl groups under anhydrous conditions at a temperature within the range from about −30° to about 200° C., thereby displacing at least one alkoxy group of the ceric alkoxide as aliphatic alcohol of the ceric alkoxide with a silyloxide group and forming the ceric hydrocarbyl silyloxide.

---

## 5,017,695
## CERIC HYDROCARBYL SILYLOXIDES AND PROCESS FOR THEIR PREPARATION

**Peter S. Gradeff, Pottersville, and Kenan Yunlu, Highland Park, both of N.J., assignors to Rhone-Poulenc, Inc., New Brunswick, N.J.**

**Filed Dec. 3, 1987, Ser. No. 128,245**

**The portion of the term of this patent subsequent to Sep. 21, 2006, has been disclaimed.**

**Int. Cl.$^5$ C07F** *5/00*

**U.S. Cl. 534—15** **17 Claims**

1. A process for preparing ceric hydrocarbyl silyloxides which comprises reacting ceric ammonium nitrate with a hydrocarbyl silanol under anhydrous conditions in the presence of an anhydrous base at a temperature within the range from about −30° C. to about 200° C. until ceric hydrocarbyl silyloxide and the nitrate salt of the base are formed.

### 5,017,696

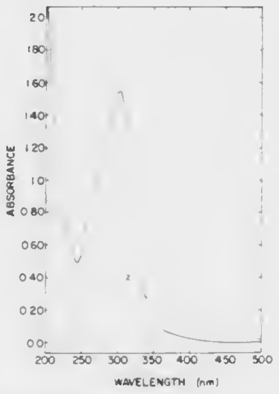
## ADVANCED GLYCOSYLATION END PRODUCTS AND ASSOCIATED METHODS

**James G. Farmar; Peter Ulrich, both of New York, and Anthony Cerami, Shelter Island, all of N.Y., assignors to The Rockefeller University, New York, N.Y.**

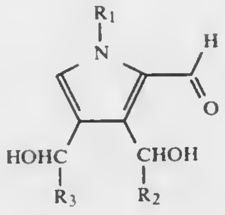
**Continuation of Ser. No. 97,856, Sep. 17, 1987, abandoned. This application Dec. 20, 1989, Ser. No. 453,935**

**Int. Cl.⁵ C07D** *405/14;* **A61K** *7/42, 7/43, 31/40*

**U.S. Cl. 536—18.7** 10 Claims



1. A compound of the formula


I

wherein $R_1$ is a des-amino residue of an amino-containing compound; $R_2$ is a glycosyl residue or hydrogen; and $R_3$ is a glycosyl residue.

---

### 5,017,697

## PROCESS FOR PURIFYING SUCROSE FATTY ACID ESTERS HAVING HIGH HLB

**Shusaku Matsumoto, Kyoto; Yoshio Hatakawa, Higashiosaka, and Akibiko Nakajima, Kyoto, all of Japan, assignors to Dai Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan**

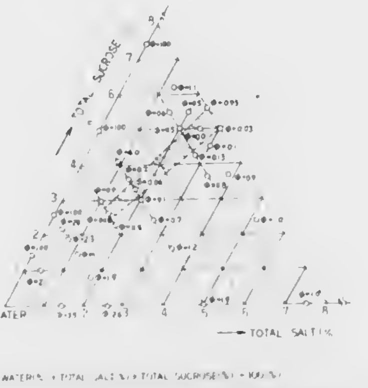
**Filed Jun. 28, 1989, Ser. No. 373,014**

**Claims priority, application Japan, Jun. 29, 1988, 63-162267**

**The portion of the term of this patent subsequent to Feb. 26, 2008, has been disclaimed.**

**Int. Cl.⁵ C07H** *1/00, 13/00;* **C08B** *37/00;* **C13D** *1/00*

**U.S. Cl. 536—127** 25 Claims



1. A process for purifying sucrose fatty acid esters having a high hydrophilic-lipophilic balance included in a reaction mixture formed by a reaction of sucrose and a fatty acid alkyl ester in an organic solvent, said reaction mixture containing sucrose fatty acid esters, unreacted sucrose, unreacted fatty acid alkyl ester, a reaction catalyst, a soap, a fatty acid and the organic solvent as a volatile material, which comprises adjusting the reaction mixture to a neutral pH region, adding water, a neutral salt and sucrose to the reaction mixture to precipitate the sucrose fatty acid esters, separating the resulting precipitate from the liquid phase, washing it with an acidic water, neutralizing the washing liquid and subjecting it to ultrafiltration.

---

### 5,017,698

## SPIROOXAZINE PHOTOCHROMIC COMPOUNDS

**Katsuichi Machida, Hino; Akira Saito, Matsudo, and Teruo Sakagami, Nerima, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

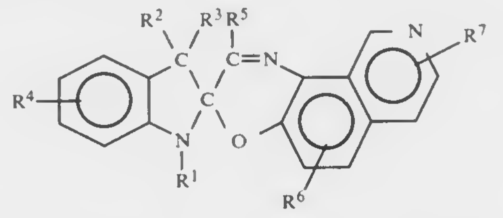
**Filed May 26, 1989, Ser. No. 357,220**

**Claims priority, application Japan, Jul. 5, 1988, 63-165877**

**Int. Cl.⁵ C07D** *498/20*

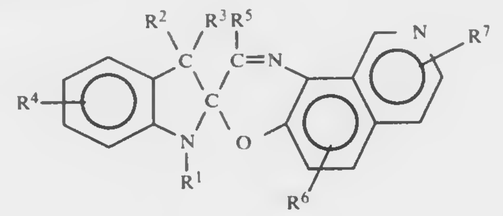
**U.S. Cl. 544—71** 4 Claims

1. A photochromic compound represented by the following general formula (I):


(I)

wherein $R^1$ is a linear or branched alkyl group, having 7-25 carbon atoms, allyl or alkoxyalkyl group, or an aralkyl or aryloxyalkyl group, $R^2$ and $R^3$ individually denote an alkyl group, $R^4$, $R^5$, $R^6$ and $R^7$ stand individually for a hydrogen or halogen atom, or an alkyl, alkoxy, hydroxy, alkoxyalkyl, or amino group.

4. A photochromic compound represented by the following formula (I):


(I)

wherein $R^1$ is an allyl or alkoxyalkyl group, or aralkyl or aryloxyalkyl group, $R^2$ and $R^3$ individually denote an alkyl group, $R^4$, $R^5$, $R^6$ and $R^7$ stand individually for a hydrogen or halogen atom, or an alkyl, alkoxy, hydroxy, alkoxyalkyl, or amino group.

---

### 5,017,699

## PROCESS FOR PREPARING POLYALKOXYMETHYLMELAMINES

**Tzeng J. Suen, 349 Mariomi Rd., New Canaan, Conn. 06840**

**Filed Jul. 19, 1990, Ser. No. 554,681**

**Int. Cl.⁵ C07D** *251/64*

U.S. Cl. 544—196 11 Claims

1. A process for preparing polyalkyl ethers of polymethylol melamine compounds, comprising reacting a polymethylol melamine with a quantity of a monohydric alcohol having 1 to 4 carbon atoms in the presence of a solid superacid catalyst.

### 5,017,700

## PREPARATION OF RIBOFLAVIN-5'-PHOSPHATE (5'-FMN) AND ITS SODIUM SALT, AND OF RIBOFLAVIN-4',5'-CYCLOPHOSPHORIC ACID ESTER CHLORIDE AS AN INTERMEDIATE

**Johannes Grimmer, Ludwigshafen, and Hans Kiefer, Waebenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

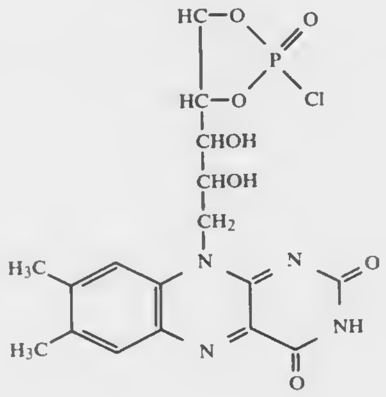
**Filed Sep. 28, 1989, Ser. No. 413,590**

**Claims priority, application Fed. Rep. of Germany, Oct. 19, 1988, 3835563**

**Int. Cl.⁵ C07F** *9/02, 9/14;* **C07D** *475/14*

**U.S. Cl. 544—244** 1 Claim

1. Riboflavin-4',5'-cyclophosphoric acid ester chloride of the formula I


(I)

---

### 5,017,701

## PROCESS FOR THE PREPARATION OF PURINE DERIVATIVES

**Trevor J. Grinter, Betchworth, and Peter M. Kincey, Epsom, both of England, assignors to Beecham Group, p.l.c., Brentford, England**

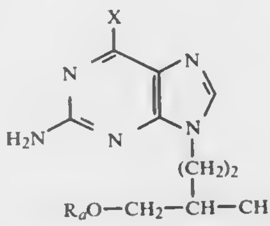
**Filed Jul. 21, 1989, Ser. No. 383,859**

**Claims priority, application United Kingdom, Jul. 23, 1988, 8817607**

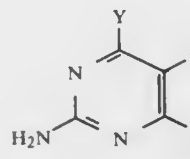
**Int. Cl.⁵ C07D** *473/38, 473/40*

**U.S. Cl. 544—276** 8 Claims

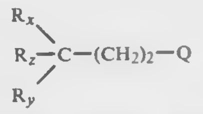
1. A process for preparation of a compound of formula (I) or a pharmaceutically acceptable salt thereof:


(I)

wherein $R_a$ and $R_b$ are independently hydrogen or a group RCO- wherein R is phenyl or $C_{1-18}$ alkyl, which process comprises reacting a compound of formula (II):


(II)

wherein the amino group is optionally protected, Y is iodo, optionally substituted benzylthio optionally substituted by $C_{1-4}$ alkyl, halo or $C_{1-4}$ alkoxy or (phenyacylmethyl)thio, with a compound of formula (III):


(III)

$$R_z-\overset{R_x}{\underset{R_y}{C}}-(CH_2)_2-Q$$

wherein Q is a leaving group, $R_x$ and $R_y$ are protected hydroxymethyl or acyloxymethyl wherein the acyl moiety is —RCO— in which R is phenyl or $C_{1-18}$ alkyl, or group(s) convertible to hydroxymethyl or acyloxymethyl wherein the acyl moiety is —RCO— in which R is phenyl, or $C_{1-18}$ alkyl; and $R_z$ is hydrogen or a group convertible thereto; and thereafter converting Y to X is hydroxy by means of hydrolysis, or to X is hydrogen by means of reduction; converting $R_x$ and $R_y$ when other than hydroxymethyl or acloxymethyl wherein the acyl moiety is —RCO— in which R is phenyl or $C_{1-18}$ alkyl, to hydroxymethyl or acyloxymethyl wherein the acyl moiety is —RCO— in which R is phenyl or $C_{1-18}$ alkyl, optionally converting $R_x/R_y$ hydroxymethyl or acyloxymethyl wherein the acyl moiety is —RCO— in which R is phenyl or $C_{1-18}$ alkyl or vice versa, deprotecting the 2-amino group where necessary and converting $R_z$, (when other than hydrogen) to hydrogen; and optionally forming a pharmaceutically acceptable salt thereof.

8. 9-(4-Acetoxy-3-acetoxymethylbut-1-yl)-2-amino-6-iodopurine,
9-(4-acetoxy-3-acetoxymethylbut-1-yl)-2-amino-6-[(phenylmethyl)thio]purine,
9-(4-acetoxy-3-acetoxymethylbut-1-yl)-2-amino-6- [(4-methylphenyl)methylthio]purine,
9-(4-acetoxy-3-acetoxymethylbut-1-yl)-2-amino-6[(diphenylmethyl)thio]purine,
2-amino-9-(ethyl 2,2-dicarboethoxybutanoate-4-yl)-6[(phenylmethyl)thio]purine,
2-amino-9-(ethyl 2,2-dicarboethoxybutanoate-4-yl)-6iodopurine,
2-amino-9-[1-(2,2-dimethyl-1,3-dioxane-4,6-dione-5- yl)eth-2-yl]-6-[(phenylmethyl)thio]purine,
2-amino-6-iodo-9-[1-(2,2-dimethyl-1,3-dioxane-4,6- dione-5-yl)eth-2-yl]purine potassium salt, or
9-((4-acetoxy-3-acetoxymethylbut-1-yl)-2-amino-6-[(phenacylmethyl)thio]purine.

---

### 5,017,702

## 2,6-POLYALKYL-4-PIPERIDYLAMIDES, USE THEREOF AS STABILIZERS, IN PARTICULAR FOR PLASTICS, AND ORGANIC MATERIAL CONTAINING SAME

**Alexander Aumueller, Diedesheim; Peter Neumann, Mannheim, and Hubert Trauth, Dudenhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

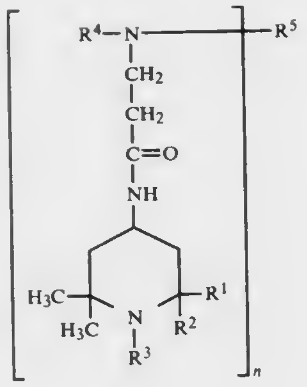
**Filed Jul. 6, 1989, Ser. No. 375,874**

**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1988, 3823112**

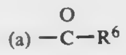
**Int. Cl.⁵ C07D** *401/12, 401/14, 221/14, 211/58*

**U.S. Cl. 546—99** 4 Claims

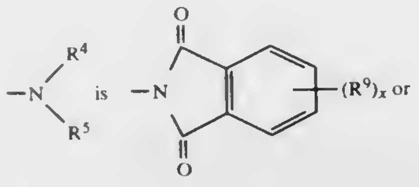
1. A compound of the formula (I)


(I)

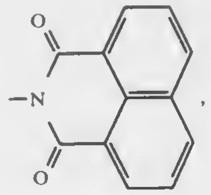
where
R¹ and R² are singly methyl or together tetramethylene or pentamethylene,
R³ is hydrogen, $C_1$–$C_8$-alkyl, $C_1$–$C_8$-alkoxycarbonyl $C_1$–$C_8$-alkanoyl, benzyl, hydroxyethyl, cyanomethyl or aminoethyl,
n is 1, 2 or 3, and—
when n is 1—
R⁴ is hydrogen and
R⁵ is


$$\text{(a) } -\overset{O}{C}-R^{6}$$

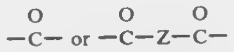
where
R⁵ is hydrogen, $C_1$–$C_{19}$-alkyl, $C_7$–$C_{10}$ -phenylalkyl where the phenyl nucleus is unsubstituted or monosubstituted, disubstituted or trisubstituted by $C_1$–$C_8$-alkyl, chlorine, bromine, fluorine, hydroxyl, $C_1$–$C_4$-alkoxy, phenyl, phenoxy or carboxyl and the substituents can be identical or different, phenoxy-$C_1$–$C_4$-alkyl, unsubstituted or $C_1$–$C_8$-alkyl-monosubstituted, -disubstituted or -trisubstituted $C_3$–$C_{10}$ -cycloalkyl, unsubstituted or $C_1$–$C_8$-alkyl-, chlorine-, bromine-, fluorine-, hydroxyl-, $C_1$–$C_4$-alkoxy-, phenyl-, phenoxy- or carboxyl-monosubstituted, -disubstituted or -trisubstituted phenyl or naphthyl, furan, thiophene or pyridine, unsubstituted or monosubstituted, disubstituted, trisubstituted or tetrasubstituted by $C_1$–$C_4$-alkyl, or $C_1$–$C_{18}$-alkoxy where the alkyl chain may be interrupted by —O—, or phenoxy, naphthoxy, unsubstituted or $C_1$–$C_4$-alkylmonosubstituted or -disubstituted $C_5$- or $C_6$-cycloalkoxy or phenylalkoxy of from 7 to 12 carbon atoms in total, (b) —CO—NH—R⁷ where R⁷ is hydrogen, $C_1$–$C_{18}$ -alkyl, $C_5$- or $C_6$-cycloalkyl, phenyl which may be monosubstituted, disubstituted or trisubstituted by $C_1$–$C_8$-alkyl, chlorine, bromine, fluorine or $C_1$–$C_4$-alkoxy, or phenyl-$C_1$–$C_4$-alkyl, or (c) —$SO_2$—R⁸ where R⁸ is $C_1$–$C_{18}$-alkyl or unsubstituted or $C_1$–$C_4$-alkyl- or chlorine-substituted phenyl, or



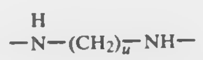
-continued



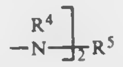
where R⁹ is $C_1$–$C_8$-alkyl, chlorine, bromine or fluorine and x is 0, 1, 2, 3 or 4, or - when n is 2—
R⁴ is hydrogen and
R⁵ is


$$-\overset{O}{C}- \text{ or } -\overset{O}{C}-Z-\overset{O}{C}-$$

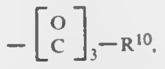
where
Z is a chemical bond, $C_1$–$C_{12}$-alkylene, $C_4$–$C_8$-oxaalkylene, phenylene, cyclohexylene, biphenylene, biphenylene oxide, dioxyphenylene, diaminophenylene, diaminocyclohexylene,


$$-\overset{H}{N}-(CH_2)_{\overline{u}}-NH-$$

where u is from 2 to 6, —O—X—O—, where X is $C_2$–$C_8$-alkylene or $C_4$–$C_8$-oxaalkylene, furan, thiophene or pyridine unsubstituted or monosubstituted, disubstituted, trisubstituted or tetrasubstituted by $C_1$–$C_4$-alkyl, or $C_1$–$C_{18}$-alkoxy where the alkyl chain may be interrupted by —O—, or phenoxy, naphthoxy, unsubstituted or $C_1$–$C_4$-alkylmonosubstituted or -disubstituted $C_5$- or $C_6$-cycloalkoxy or phenylalkoxy of from 7 to 12 carbon atoms in total, or


$$\left.-\overset{R^4}{N}-\right]_2 R^5$$

is a pyromellitimide group, or—when n is 3—
R⁴ is hydrogen and
R⁵ is


$$-\left[\begin{matrix}O\\C\end{matrix}\right]_3-R^{10},$$

where
R¹⁰ is trivalent $C_1$–$C_8$-alkyl or trivalent aryl, or an acid addition salt or hydrate thereof.

---

## 5,017,703
## INDOLYLPIPERIDINE COMPOUNDS, PROCESSES FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME

**Masaaki Matsuo, Toyonaka; Takashi Manabe, Osaka; Shinji Shigenaga, Kobe, and Hiroshi Matsuda, Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 295,569, Jan. 11, 1989, Pat. No. 4,935,432. This application Sep. 28, 1989, Ser. No. 414,022**

**Claims priority, application United Kingdom, Jan. 14, 1988, 8800795; Aug. 1, 1988, 8818260**

**Int. Cl.⁵ C07D** *401/04*

**U.S. Cl. 546—201** **1 Claim**

1. A compound which is 1-[2-{5-(4-hydroxy-3, 5-dimethoxyphenyl)-(2E, 4E)-2, 4-pentadienoylamino}-ethyl]-4-(3-indolyl)-piperidine citrate.

---

## 5,017,704
## FUCOSIDASE INHIBITOR

**George W. J. Fleet, and Sung K. Namgoong, both of Oxford, United Kingdom, assignors to Monsanto Company, St. Louis, Mo.**

**Filed Jun. 27, 1989, Ser. No. 372,415**

**Int. Cl.⁵ C07D** *211/42*

**U.S. Cl. 546—242** **1 Claim**

1. 2,6-Imino-2,6,7-trideoxy-D-glycero-D-gluco heptitol in the free base or biologically acceptable salt form.

---

## 5,017,705
## PRODUCTION OF 3,5,6-TRICHLOROPYRIDIN-2 OL AND NOVEL INTERMEDIATES THEREOF

**Yigal Becker, Tel Aviv, Israel, assignor to Loxembourg Industries (Pamol) Ltd., Israel**

**Filed May 8, 1989, Ser. No. 348,983**

**Claims priority, application Israel, May 11, 1988, 86341**

**Int. Cl.⁵ C07D** *213/64*

**U.S. Cl. 546—250** **20 Claims**

1. Aryl 4-cyano-2,2,4-trichlorobutyrate of the general formula

$$NC-CHCl-CH_2-CCl_2-COOAr \qquad (1)$$

wherein Ar is phenyl, methoxyphenyl, tolyl, naphthyl, pyridyl, phenyl substituted in at least one position by an electron-withdrawing substituent, naphthyl substituted in at least one position by an electron-withdrawing substituent, or pyridyl substituted in at least one position by an electron-withdrawing substituent.

---

## 5,017,706
## MONOKETOPYRROLOPYRROLES

**Alain C. Rochat, Fribourg; Abul Iqbal, Arconciel, and Olof Wallquist, Marly, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

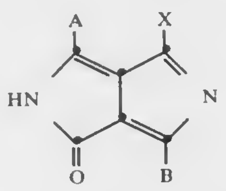
**Filed Apr. 3, 1989, Ser. No. 332,199**

**Claims priority, application Switzerland, Apr. 12, 1988, 1334/88**

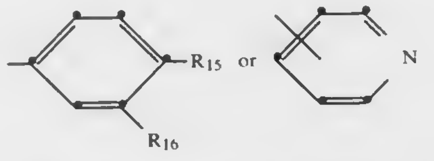
**Int. Cl.⁵ C07D** *401/02, 487/04*

**U.S. Cl. 548—414** **8 Claims**

1. A pyrrolopyrrole of formula I

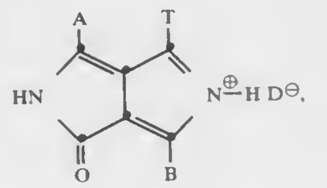

(I)

wherein
A and B are identical and are one of the groups

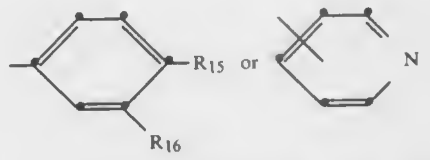


in which one of the substituents $R_{15}$ and $R_{16}$ is a hydrogen, chlorine or bromine atom or a methyl, methoxy, methylmercapto, cyano, phenyl, phenoxy or phenylmercapto group, and the other is a hydrogen atom,
X is a group —SH or —NHR′,
R′ is $C_1$–$C_{12}$-alkyl, phenyl which is unsubstituted or substituted by halogen, by cyano, by nitro, by methyl, by methoxy, by methylmercapto, by methoxycarbonyl or by ethoxycarbonyl, or R′ is a group —Q—EY($C_1$–$C_5$-alkyl),
E is a direct bond or a group —CO— or —CS—,
Y is —O— or —S—, and
Q is o-phenylene or a divalent group of the formula —CH-$R_8$— or —$CR_{13}$=$CR_{14}$—, in which $R_8$ is hydrogen, methyl or phenyl, and $R_{13}$ and $R_{14}$ are hydrogen, methyl or phenyl.

5. A pyrrolopyrrole of formula VIII


(VIII)

wherein
A and B are identical and are one of the groups



in which one of the substituents $R_{15}$ and $R_{16}$ is a hydrogen, chlorine or bromine atom or a methyl, methoxy, methylmercapto, cyano, phenyl, phenoxy or phenylmercapto group and the other is a hydrogen atom,
D is chlorine or bromine, and
T is chlorine, bromine or a group —O—G, wherein G is a group —SOCl, —SOBr, —$POCl_2$, —$POBr_2$, —POClZ or —POBrZ, where Z is phenyl, phenoxy, phenylmercapto, di($C_1$–$C_4$-alkyl)amino, phenylamino, diphenylamino or phenyl($C_1$–$C_4$-alkyl)amino; or where said phenyl groups are substituted by halogen or by $C_1$–$C_5$-alkyl.

---

## 5,017,707
## TETRAINDOLYLHEPTAMETHINE DYESTUFF

**Horst Berneth; Hubert Psaar, both of Leverkusen, and Gert Jabs, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

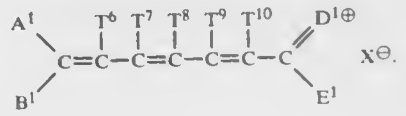
**Filed Oct. 24, 1988, Ser. No. 261,947**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1987, 3738240**

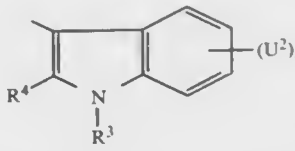
**Int. Cl.⁵ C07D** *403/06*

**U.S. Cl. 548—455** **5 Claims**

1. Tetraindolylheptamethine dyestuffs of the formula



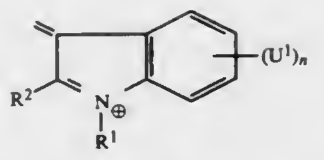
in which
A¹, B¹ and E¹ denote



and can be identical to or different from one another.

OL
126
SS
3
MY
21
991
UMI

$D^{\oplus}$ stands for



and $X^{\ominus}$ stands for an anion

$Q^1$ denotes hydrogen, $C_1$ to $C_{18}$ alkyl which can be substituted by chlorine, $C_1$ to $C_4$ alkoxy, cyano or $C_1$ to $C_4$ alkoxycarbonyl, or allyl, cyclopentyl, cyclohexyl, or benzyl, phenethyl, naphthylmethyl, phenyl or naphthyl radicals, which are optionally substituted by $C_1$ to $C_4$ alkyl, chlorine and/or $C_1$ to $C_4$ alkoxy,

$R^3$ denotes hydrogen, $C_1$ to $C_{18}$ alkyl which can be substituted by chlorine, $C_1$ to $C_4$ alkoxy, cyano or $C_1$ to $C_4$ alkoxycarbonyl, or allyl, cyclopentyl, cyclohexyl, or benzyl, phenethyl, or naphthylmethyl radicals which are optionally substituted by $C_1$ to $C_4$ alkyl, chlorine and/or $C_1$ to $C_4$ alkoxy,

$R^4$ denotes hydrogen, $C_1$ to $C_{18}$ alkyl which can be substituted by chlorine, $C_1$ to $C_4$ alkoxy, cyano or $C_1$ to $C_4$ alkoxycarbonyl, or allyl, cyclopentyl, cyclohexyl, or benzyl, phenethyl, naphthylmethyl, phenyl, or naphthyl, radicals which are optionally substituted by $C_1$ to $C_4$ alkyl, chlorine, bromine, $C_1$ to $C_4$ alkoxy, cyano, nitro and/or $C_1$ to $C_4$ alkoxycarbonyl,

$T^6$ to $T^{10}$ denote hydrogen, $C_1$ to $C_8$ alkyl which can be substituted by chlorine, $C_1$ to $C_4$ alkoxy, cyano or $C_1$ to $C_4$ alkoxycarbonyl, or vinyl, allyl, cyclopentyl, cyclohexyl, fluorine, chlorine, bromine, $C_1$ to $C_8$ alkoxy which can additionally be substituted by $C_1$ to $C_4$ alkoxy, or $C_1$ to $C_4$ dialkylamino, nitro, cyano, $C_1$ to $C_4$ alkoxycarbonyl, or benzyl, phenethyl, naphthylmethyl, phenyl, or naphthyl, radicals which are optionally substituted by $C_1$ to $C_4$ alkyl, chlorine, $C_1$ to $C_4$ alkoxy, $C_1$ to $C_4$ alkylsulphonyl, cyano and/or $C_1$ to $C_4$ alkoxycarbonyl,

$U^2$ denotes hydrogen, $C_1$ to $C_8$ alkyl, allyl, cyclohexyl, benzyl, phenyl, hydroxyl, $C_1$ to $C_4$ alkoxy, chlorine, bromine, $C_1$ to $C_4$ dialkylamino, nitro, cyano, $C_1$ to $C_4$ alkylthio, $C_1$ to $C_4$ alkoxycarbonyl, $C_1$ to $C_4$ dialkylaminocarbonyl, $C_1$ to $C_4$ alkoxycarbonyloxy or $C_1$ to $C_4$ alkylsulphonyl and

n denotes 1 or 2.

---

### 5,017,708
## AZABICYCLOALKANES

**Masaru Ogata, Hyogo; Hiroshi Matsumoto, Osaka; Sumio Shimizu, Hyogo, and Shiro Kida, Osaka, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

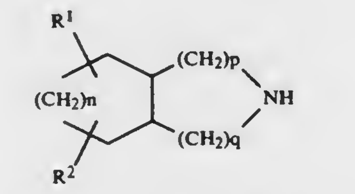
**Filed Sep. 8, 1989, Ser. No. 404,449**

**Claims priority, application Japan, Sep. 12, 1988, 63-227697**

**Int. Cl.$^5$ C07D** *209/52, 209/46, 209/48, 209/44*

**U.S. Cl. 548—515** **12 Claims**

1. A compound of the formula



wherein $R^1$ is hydrogen or hydroxy; $R^2$ is amino or aminomethyl, each of which is substituted by one or two members selected from the group consisting of methyl, ethyl, propyl, formyl and acetyl; n is an integer of 1 to 3; p and q each is an integer of 0 to 2 with the proviso that $p+q=2$ or an acid-addition salt thereof.

---

### 5,017,709
## PROCESS FOR THE PREPARATION OF PERFLUORO-AMINO OXAZIRIDINES

**Walter Navarrini, Boffalora Ticino, Italy, and Darryl D. Desmarteu, Clemson, S.C., assignors to Ausimont S.r.l., Milan, Italy**

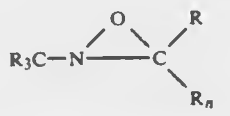
**Division of Ser. No. 268,248, Oct. 7, 1988, Pat. No. 4,874,875. This application Aug. 21, 1989, Ser. No. 396,076**

**Claims priority, application Italy, Nov. 10, 1987, 22576 A/87**

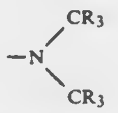
**Int. Cl.$^5$ C07D** *273/01*

**U.S. Cl. 548—959** **3 Claims**

1. Process for the preparation of perfluoro-oxaziridines of the formula:

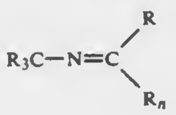


wherein each R is independently either F or a perfluoroalkyl group having from 1 to 5 carbon atoms, while $R_n$ may be either a perfluoroalkyl group having from 1 to 5 carbon atoms, or an amino group of the formula:



$$-N\begin{matrix}CR_3\\CR_3\end{matrix}$$

comprising reacting perfluoroamines of the formula:



$$R_3C-N=C\begin{matrix}R\\R_n\end{matrix}$$

with $H_2O_2$, in the presence of a base in a dipolar aprotic solvent, at a temperature between −50° and +50° C.

---

### 5,017,710
## FLUORAN COMPOUND AND COLORING RECORDING MATERIAL USING IT

**Tetsuo Igaki; Akio Kaneko; Sumio Manaka, and Kimiaki Kinoshita, all of Tokyo, Japan, assignors to Nippon Soda Co., Ltd., Tokyo, Japan**

**PCT No. PCT/JP89/00270, § 371 Date Oct. 24, 1989, § 102(e) Date Oct. 24, 1989, PCT Pub. No. WO89/08656, PCT Pub. Date Sep. 21, 1989**

**PCT Filed Mar. 13, 1989, Ser. No. 444,130**

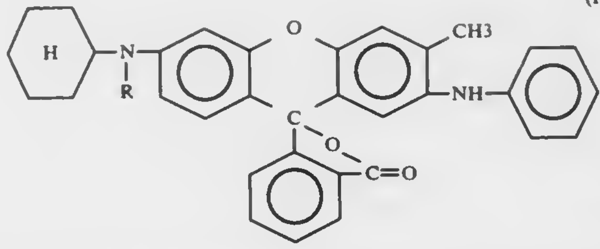
**Claims priority, application Japan, Mar. 16, 1988, 63-62515**

**Int. Cl.$^5$ C07D** *493/10;* **C09B** *11/28;* **C07C** *101/78*

**U.S. Cl. 549—226** **2 Claims**

1. A coloring recording material which comprises containing one or more fluoran compounds represented by the general formula (I)

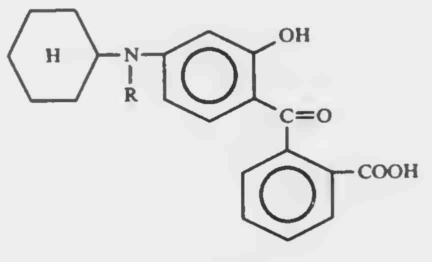
(I)



(where R is an alkyl group having 9 to 12 carbon atoms), as coloring dyes.

2. A benzoic acid derivative represented by the general formula (II)

(II)



(where R is an alkyl group having 9 to 12 carbon atoms.

---

### 5,017,711
## TETRAMETHYL-1-OXASPIRO[2.5]OCTANE

**Christian Chapuis, Petit-Saconnex; Christian Margot, Bassins; Karl-Heinrich Schulte-Elte, Onex, and Hervé Pamingle, Versoix, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland**

**Filed Dec. 13, 1989, Ser. No. 450,148**

**Claims priority, application Switzerland, Dec. 21, 1988, 4759/88**

**Int. Cl.$^5$ C07D** *303/02*

**U.S. Cl. 549—332** **2 Claims**

1. 4,4,5,8-Tetramethyl-1-oxaspiro[2.5]octane.

---

### 5,017,712
## PRODUCTION OF HYDROCARBON-SOLUBLE SALTS OF MOLYBDENUM FOR EPOXIDATION OF OLEFINS

**Masahiro Usui, Chiba, and Yasubiko Higashio, Ichihara, both of Japan, assignors to Arco Chemical Technology, Inc., Wilmington, Del.**

**Continuation of Ser. No. 816,037, Jan. 3, 1986, abandoned, which is a division of Ser. No. 708,480, Mar. 5, 1985, Pat. No. 4,593,012. This application Jul. 8, 1988, Ser. No. 217,119**

**Int. Cl.$^5$ C07D** *301/19*

**U.S. Cl. 549—529** **9 Claims**

1. The method of producing an oxirane compound which comprises reacting an olefinically unsaturated compound with an organic hydroperoxide in the presence of a catalytic amount of a hydrocarbon-soluble molybdenum-containing salt produced by reacting, at a temperature of from about 150° C. to about 250° C., while removing water, an ammonium molybdate with a hydrocarbon monocarboxylic acid containing 4 to about 30 atoms in the presence of an organic amine corresponding to the formula $R_1R_2R_3N$ wherein each of $R_1$, $R_2$, and $R_3$ is independently selected from the group consisting of hydrogen, alkyl or 1 to 10 carbon atoms, and aryl of 6 to 12 carbon atoms with the proviso that at least one of the $R_1$, $R_2$, and $R_3$ is not hydrogen, said amine being employed in a molar ratio of about 0.05 to about 1 with respect to said carboxylic acid.

---

### 5,017,713
## PROCESS FOR PREPARING SUBSTITUTED AMINOANTHRAQUINONES

**Takanori Kondo, Hyogo; Hiroshi Yamachika, Osaka; Kunihiko Tanaka, Nara, and Yasuhiro Nishida, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka and Daiel Chemical Company, Ltd., Hyogo, both of, Japan**

**Filed Nov. 8, 1989, Ser. No. 433,784**

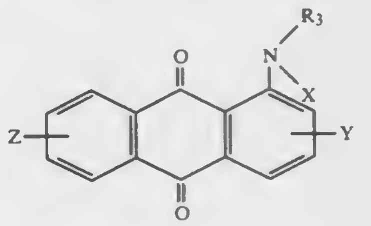
**Claims priority, application Japan, Nov. 10, 1988, 63-285305; Nov. 10, 1988, 63-285306**

**Int. Cl.$^5$ C07C** *97/24, 50/24*

**U.S. Cl. 552—237** **6 Claims**

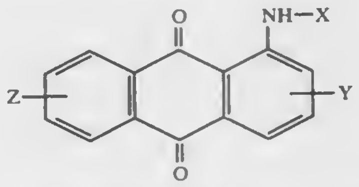
1. A process for preparing substituted aminoanthraquinone compounds represented by the formula (II)

(II)



wherein $R_3$ represents a $C_1$–$C_6$ alkyl group which may be substituted, X represents a hydrogen atom, $—COR_1$ or $—SO_2R_2$ wherein $R_1$ and $R_2$ each represents a substituted or unsubstituted $C_1$–$C_4$ alkyl or $C_6$–$C_{12}$ aryl group, and Y and Z represent independently a hydrogen atom, a halogen atom, a nitro group or a $C_1$–$C_4$ alkyl group, which comprises allowing anthraquinone compounds represented by the formula (I)

(I)



wherein X, Y and Z are as defined above, to react with alkylating agents in organic solvents in the presence of organic quaternary ammonium salts and alkalies.

---

### 5,017,714
## SILICON-BRIDGED TRANSITION METAL COMPOUNDS

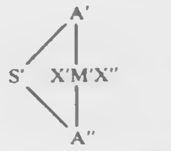
**Howard C. Welborn, Jr., Houston, Tex., assignor to Exxon Chemical Patents Inc, Linden, N.J.**

**Continuation of Ser. No. 170,516, Mar. 21, 1988, abandoned. This application Sep. 7, 1989, Ser. No. 405,090**

**Int. Cl.$^5$ C07F** *7/02*

**U.S. Cl. 556—12** **13 Claims**

1. A transition metal compound said compound having the formula:



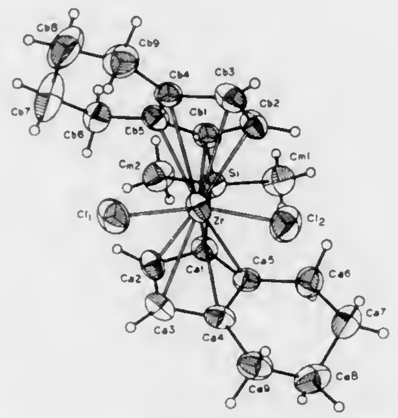
wherein M' is a Group I/B transition metal;

X' and X" are the same or different hydride, halogen, or hydrocarbyl or halohydrocarbyl having up to about 6 carbon atoms;

A' and A" are the same or different asymmetrical mononuclear or polynuclear hydrocarbyl or silahydrocarbyl moieties; and

VOL
1126
ISS
3
MY
21
1991
UMI

S' is a bridge of 1-4 atoms selected from the group consisting of silanylene, silaalkylene, oxasilanylene and oxasilaalkylene.

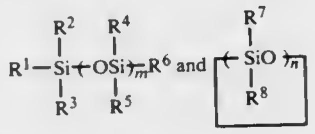


---

## 5,017,715
## IODOTRIMETHYLSILANE COMPOSITIONS

**Katsuyuki Oikawa, Kawasaki; Toshinobu Ishibara, Joetsu; Mikio Endo, Joetsu, and Tohru Kubota, Joetsu, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**
**Filed May 16, 1990, Ser. No. 523,878**
**Claims priority, application Japan, May 17, 1989, 1-123447**
**Int. Cl.$^5$ C07F** *7/08*
**U.S. Cl. 556—401** **4 Claims**

1. An iodotrimethylsilane composition comprising iodotrimethylsilane in admixture with at least one member selected from polysiloxanes of the general formulae:



$$R^1-\overset{R^2}{\underset{R^3}{Si}}\left(O\overset{R^4}{\underset{R^5}{Si}}\right)_m R^6 \text{ and } \boxed{\left(\overset{R^7}{\underset{R^8}{Si}}O\right)_n}$$

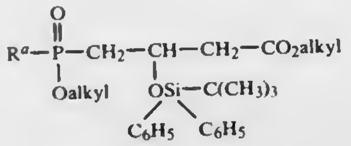
wherein R$^1$, R$^2$, R$^3$, R$^4$, R$^5$, R$^6$, R$^7$, and R$^8$ are independently selected from monovalent hydrocarbon groups having 1 to 6 carbon atoms, letter m is an integer of from 1 to 100, and n is an integer of from 3 to 100.

---

## 5,017,716
## PHOSPHOROUS-CONTAINING HMG-COA REDUCTASE INHIBITORS, NEW INTERMEDIATES AND METHOD

**Donald S. Karanewsky, East Windsor; Scott A. Biller, Ewing, and Eric M. Gordon, Pennington, all of N.J., assignors to E.R. Squibb & Sons, Inc., Princeton, N.J.**
**Division of Ser. No. 182,696, Apr. 18, 1988, Pat. No. 4,904,646, which is a continuation-in-part of Ser. No. 109,680, Oct. 19, 1987, abandoned, which is a continuation-in-part of Ser. No. 53,281, May 22, 1987, abandoned. This application Dec. 1, 1989, Ser. No. 444,336**
**Int. Cl.$^5$ C07F** *7/08*
**U.S. Cl. 556—405** **6 Claims**

1. A compound having the structure



$$R^a-\underset{\text{Oalkyl}}{\overset{O}{\overset{\|}{P}}}-CH_2-\underset{OSi(C_6H_5)_2-C(CH_3)_3}{CH}-CH_2-CO_2\text{alkyl}$$

wherein R$^a$ is lower alkyl or lower alkoxy, including all stereoisomers thereof.

---

## 5,017,717
## SYNTHESIS OF DIFUNCTIONAL HALO ORGANO NONCARBON GROUP IV MAIN GROUP ELEMENT AMIDES

**Antony P. Wright, Rhodes, and Padmakumari J. Varaprath, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**
**Division of Ser. No. 467,868, Jan. 22, 1990. This application Oct. 30, 1990, Ser. No. 607,195**
**Int. Cl.$^5$ C07F** *7/10, 7/22, 7/24, 7/30*
**U.S. Cl. 556—413** **22 Claims**

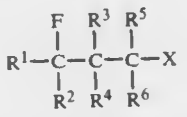
1. The difunctional halo noncarbon Group IV main group element amides obtained by a process comprising: cleaving a noncarbon Group IV main group element-nitrogen bond in a heterocyclic ring with a reactive halide moiety.

---

## 5,017,718
## PROCESS FOR PREPARING POLYFLUOROALKYL-SUBSTITUTED COMPOUNDS

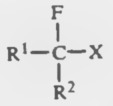
**Iwao Ojima, New York, N.Y., and Takamasa Fuchikami, Kanagawa, Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan**
**Filed Jan. 26, 1984, Ser. No. 574,214**
**Claims priority, application Japan, Jan. 26, 1983, 58-9940; Feb. 16, 1983, 58-22813**
**Int. Cl.$^5$ C07F** *7/08, 7/10, 7/18, 21/18*
**U.S. Cl. 556—466** **15 Claims**

1. A process for preparing a polyfluoroalkyl-substituted compound represented by the formula



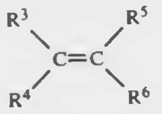
$$R^1-\overset{F}{\underset{R^2}{C}}-\overset{R^3}{\underset{R^4}{C}}-\overset{R^5}{\underset{R^6}{C}}-X$$

wherein X represents a chlorine atom, a bromine atom or an iodine atom; R$^1$ and R$^2$ each represents hydrogen, a halogen atom or a poly- or perfluoroalkyl group having 1 to 20 carbon atoms; and R$^3$, R$^4$, R$^5$ and R$^6$ each represents hydrogen, a halogen atom, a poly- or perfluorocarbon group having 1 to 20 carbon atoms, or a substituted or unsubstituted alkyl, vinyl, aryl, alkyloxy, acyloxy, amino, amide, silyl, silyloxy, alkylthio, alkoxycarbonyl, acyl, formyl or cyano group wherein the alkyl group has 1 to 10 carbon atoms and wherein the substituent is selected from the group consisting of an alkyl group having 1 to 5 carbon atoms, a halogen atom, an alkoxy group having 1 to 5 carbon atoms, a trialkylsilyl or trialkylsilyloxy group having 1 to 5 carbon atoms in each alkyl moiety, a hydroxy group, an alkoxycarbonyl group having 1 to 5 carbon atoms in the alkoxy moiety and an aryl group, which comprises reacting a halopolyfluoroalkane having 1 to 20 carbon atoms represented by the formula



$$R^1-\overset{F}{\underset{R^2}{C}}-X$$

wherein X, R$^1$ and R$^2$ are as defined above, with an unsubstituted or substituted ethylene represented by the formula



$$\overset{R^3}{\underset{R^4}{>}}C=C\overset{R^5}{\underset{R^6}{<}}$$

wherein R$^3$, R$^4$, R$^5$ and R$^6$ are as defined above, in the presence of a carbonyl complex of a metal of the Group VIII of the Periodic Table.

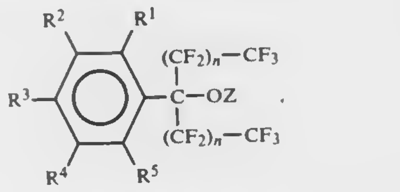
---

## 5,017,719
## ESTERS OF ARYLBISPERFLUOROALKYLCARBINOLS, AND A PROCESS FOR THE PREPARATION OF THESE COMPOUNDS

**Alfred Kruse, Kelkheim; Günter Siegemund, Hofheim am Taunus, and Ingo Ruppert, deceased, late of Bonn, all of Fed. Rep. of Germany by Carl Horst Schroeder, administrator , assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**
**Filed Jul. 28, 1988, Ser. No. 225,547**
**Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3725941**
**Int. Cl.$^5$ C07C** *69/76*
**U.S. Cl 560—106** **35 Claims**

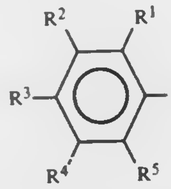
1. A process for the preparation of arylbisperfluoro alkyl compounds of the general formula VIII

(VIII)



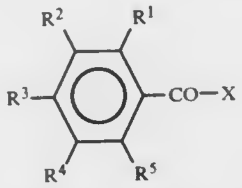
wherein R$^1$ to R$^5$ represent at least one of the substituents hydrogen, halogen, alkyl, alkoxy, alkylthio and perfluorinated alkyl, each having from 1 to 6 carbon atoms, n is 0 or an integer from 1 to 5 and Z represents hydrogen or the aryl carbonyl group V

(V)



which comprises reacting a derivative of an aryl carbonyl compound having the general formula Va

(Va)



wherein R$^1$ to R$^5$ have the above-mentioned meaning and X represents fluorine, chlorine, bromine or a perfluoroalkyl group $—(CF_2)_nCF_3$, with a perfluoroalkyl halide of the general formula $CF_3—(CF_2)_n—Y$ (VI), wherein Y represents chlorine, bromine or iodine and n has the above-mentioned meaning, in the presence of a trisdialkyl amide of phosphorous acid of the general formula $P[N(alkyl)_2]_3$ (VII), the latter being present in an amount at least equimolar to compound Va.

---

## 5,017,720
## METHODS OF PRODUCING AND RESERVING ALKYLENE GLYCOL MONOSORBATES

**Masahiro Nakashima; Yasuo Urata, and Tetsuya Nagaie, all of Minamata, Japan, assignors to Chisso Corporation, Japan**
**Filed Mar. 1, 1990, Ser. No. 486,844**
**Claims priority, application Japan, Mar. 16, 1989, 1-62090**
**Int. Cl.$^5$ C07C** *67/26*
**U.S. Cl. 560—209** **5 Claims**

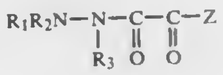
1. A method of producing an alkylene glycol monosorbate, which comprises (a) reacting sorbic acid and an alkylene oxide having 2 to 4 carbon atoms in a system containing a solvent having a boiling point of 150° C. or less at atmospheric pressure and being insoluble or slightly soluble in water and being inactive to the alkylene glycol monosorbate in the presence of one or more catalysts selected from the group consisting of organic acid iron salts and iron halides and one or more compounds selected from the group consisting of phenothiazines and alkylphenols, (b) washing the obtained synthesized liquid with an aqueous solution of a salt selected from the group consisting of sodium carbonate, potassium carbonate, sodium bicarbonate and potassium bicarbonate, and then (c) purifying the washed liquid by distillation.

---

## 5,017,721
## PROCESS FOR THE PREPARATION OF OXALYL- AND OXAMYL-HYDRAZIDES

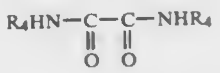
**Giuseppe Messina, Alghero; Loreno Lorenzoni, Porto Torres; Paolo Calaresu, Sassari, and Giovanni M. Sechi, Ozieri, all of Italy, assignors to Enichim ANIC S.p.A., Palermo, Italy**
**Filed Apr. 21, 1989, Ser. No. 341,749**
**Claims priority, application Italy, Apr. 21, 1988, 20276 A/88**
**Int. Cl.$^5$ C07C** *741/02;* **C07D** *295/023, 279/12, 279/06*
**U.S. Cl. 564—151** **8 Claims**

1. A process for the preparation of oxamyl-hydrazide of formula (I)



$$R_1R_2N-\underset{R_3}{N}-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-Z \qquad (I)$$

wherein
- R$_1$ represents a hydrogen atom or an optionally substituted alkyl, cycloalkyl, phenyl, or phenyl-alkyl group,
- R$_2$ designates a hydrogen atom or an optionally substituted alkyl group, or, R$_1$ and R$_2$ taken together with the adjacent nitrogen atom represent a saturated heterocyclic ring,
- R$_3$ is a hydrogen atom or an optionally substituted alkyl group,
- Z is $—NH_2$; which comprises contacting a compound, selected from oxamide or its diacetyl derivative, of formula (II)



$$R_4HN-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-NHR_4 \qquad (II)$$

wherein
- R$_4$ is a hydrogen atom or an acetyl group, with a hydrazine derivative of formula (III)

$$R_1R_2N—NHR_3 \qquad (III)$$

wherein
- R$_1$, R$_2$, and R$_3$ are as defined above.

VOL
126
ISS
3
MY
21
1991
UMI

5,017,723

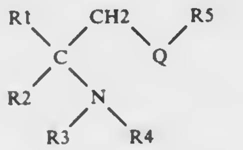
### SUBSTITUTED ETHYLAMINES, THEIR PREPARATION PROCESS, THEIR USE AS MEDICINE AND THEIR SYNTHESISING AGENTS

**Gilbert G. Aubard, Palaiseau; Alain P. Calvet, L'Hay-les Roses; Claude J. Gouret; Agnes M. Grouhel, both of Meudon; Henry L. Jacobelli, Paray Vieille Poste; Jean-Louis Junien, Sevres; Xavier B. Pascaud, Paris; Francois J. Roman, Courbevoie; Claude D. Soulard, Antony, all of France; James P. Hudspeth, Newbury Park, and Yuan Lin, Monterey Park, both of Calif., assignors to Jouveinal S.A., Paris, France**

**Filed Feb. 26, 1990, Ser. No. 484,493**
**Int. Cl.$^5$ C07C *211/08, 211/21***

**U.S. Cl. 564—383** **6 Claims**

1. Substituted ethylamines of the formula



(1)

in which:

R1 is phenyl possibly mono, di or trisubstituted by halogen atoms, by lower alkyl, lower haloalkyl or lower alkoxy radicals,

R2 is lower alkyl

R3 and R4, identical or different, are hydrogen, lower alkyl or lower alkenyl radicals

R5 is phenyl, possibly mono, di or trisubstituted by halogen atoms or by lower alkoxy radicals,

Q represents a —CH=CH— group, their addition salts with acids and their optically active forms.

---

5,017,724

### HYDROFLUORENE DERIVATIVES

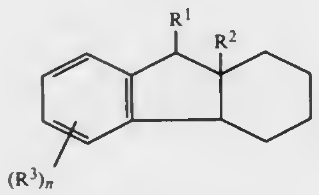
**Yasuo Oshiro; Tatsuyoshi Tanaka; Yoji Sakurai, and Seiji Sato, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 116,698, Nov. 4, 1987, abandoned. This application Jun. 4, 1990, Ser. No. 532,341**

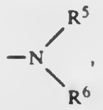
**Claims priority, application Japan, Nov. 4, 1986, 61-263561**
**Int. Cl.$^5$ C07C *211/42***

**U.S. Cl. 564—427** **11 Claims**

1. A hydrofluorene compound or salt thereof of the formula



wherein R$^1$ is a group of the formula



wherein R$^5$ and R$^6$ are each the same or different, and are each a hydrogen atom, an unsubstituted $C_1$–$C_8$ alkyl group, an unsubstituted $C_1$–$C_6$ alkanoyl group or a substituted $C_1$–$C_6$ alkanoyl group having halogen atoms as substituents; R$^2$ is a hydrogen atom; R$^3$ is a $C_1$–$C_6$ alkyl group, a $C_2$–$C_6$ alkenyl group, a hydroxy group, a halogen atom, a $C_3$–$C_8$ cycloalkyl group, a $C_3$–$C_8$ cycloalkenyl group having one double bond in the cycloalkyl ring, or a $C_1$-$C_6$ alkoxy group; n is an integer of 2 or 3; and the substituted position of R$^3$ is at the 5-, 7- or/and 8-positions in the hydrofluorene skeleton.

---

5,017,725

### PREPARATION OF ADDITION SALTS OF CYSTEAMINE WITH ACIDS

**Andreas Hobmann, Ludwigshafen; Wolfgang Reuther, Heidelberg; Rolf Fikentscher, Ludwigshafen, and Theo Proll, Bad Durkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

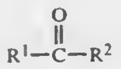
**Continuation of Ser. No. 283,129, Dec. 12, 1988, abandoned. This application Jan. 30, 1990, Ser. No. 471,080**

**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1987, 3742265**

**Int. Cl.$^5$ C07C *323/25***

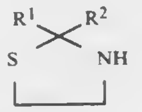
**U.S. Cl. 564—487** **3 Claims**

1. A process for the preparation of an addition salt of cysteamine with an acid by reacting aziridine with an inorganic sulfur compound of oxidation state −2 and with a ketone of the formula I



$$R^1-\overset{\overset{\displaystyle O}{\|}}{C}-R^2 \qquad (I)$$

where R$^1$ and R$^2$ are identical or different and independently of one another are each $C_1$–$C_6$-alkyl, or R$^1$ and R$^2$ together form $C_4$–$C_6$-alkylene, and then subjecting the thiazolidine of the formula II



(II)

where R$^1$ and R$^2$ each have the abovementioned meanings, which is formed as an intermediate, to hydrolysis in the presence of an acid, wherein aziridine and the ketone of the formula I are reacted with ammonium hydrogen sulfide or with a metal hydrogen sulfide with the addition of a moderately strong or strong acid at from −10° to +100° C. and a pH which is greater than or equal to 8.5 is maintained.

---

5,017,726

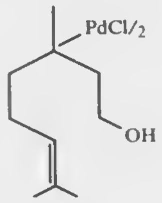
### PROCESSES FOR THE CONVERSION OF MYRCENE TO NEROL AND CITRAL

**James B. Woell, Lawrenceville, N.J., assignor to Union Camp Corporation, Princeton, N.J.**

**Filed Nov. 9, 1988, Ser. No. 269,278**
**Int. Cl.$^5$ C07C *47/02***

**U.S. Cl. 568—448** **45 Claims**

1. A process for producing citral comprising contacting a palladium-myrcene complex of the formula



with a phosphine compound of the formula $PR_1R_2R_3$ wherein $R_1$, $R_2$, and $R_3$ are the same or different and each represents a substituted or unsubstituted $C_1$–$C_{20}$ alkyl, $C_2$–$C_{20}$ alkenyl, $C_2$–$C_{20}$ alkynyl or $C_6$–$C_{20}$ aryl.

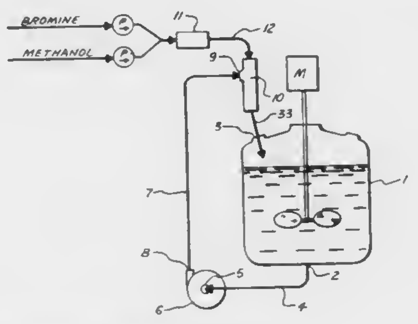
5,017,727

### POLYMERIZABLE ANTIOXIDANT COMPOSITION

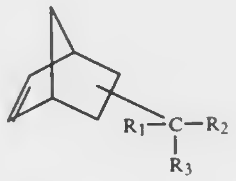
**Errol J. Olivier, Baton Rouge, La., assignor to Copolymer Rubber & Chemical Corporation, Baton Route, La.**

**Filed Jul. 10, 1990, Ser. No. 550,373**
**Int. Cl.$^5$ C07C *39/17***

**U.S. Cl. 568—719** **8 Claims**



1. A compound having the formula:



wherein $R_1$ and $R_2$ are each an aryl group imparting antioxidant properties to the compound, and $R_3$ is hydrogen or an alkyl group.

---

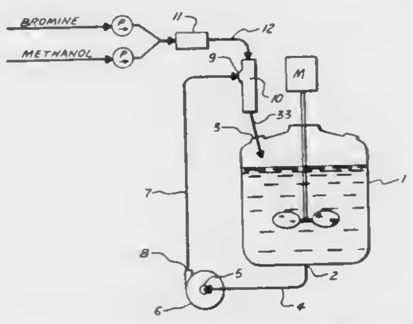
5,017,728

### TETRABROMOBISPHENOL-A PROCESS

**Bonnie G. McKinnie, and Daniel A. Wood, both of Magnolia, Ark., assignors to Ethyl Corporation, Richmond, Va.**

**Filed Aug. 20, 1990, Ser. No. 569,850**
**Int. Cl.$^5$ C07C *37/62, 39/367***

**U.S. Cl. 568—726** **16 Claims**



1. A process for producing a tetrabromobisphenol-A predominant product in a high yield and high purity, said process comprising:

(a) feeding a first stream comprising bromine dissolved in methanol to an impingement mixer;

(b) impinging a second stream with said first stream in said impingement mixer to rapidly mix said streams and to form a reaction mixture thereof, said second stream, at process initiation, comprising bisphenol-A dissolved in methanol and, after at least one cycle of said process, comprising brominated bisphenol-A;

(c) conducting said reaction mixture to a reaction vessel which holds reactor contents which, at process initiation, comprise bisphenol-A dissolved in methanol and, after at least one cycle of said process comprise brominated bisphenol-A;

(d) removing a portion of said reactor contents from said reaction vessel to form said second stream;

(e) continuing steps (a), (b), (c), and (d) until the amount of bromine fed is about 4 moles of bromine per mole of bisphenol-A used in said process and the weight ratio of TBBPA to methanol is about 0.67–0.68 when the bromination reaction is substantially complete; and

(f) subsequent to (e), adding an amount of water to said reaction vessel which holds said reactor contents so as to obtain an increase in recovery of said product predominant in tetrabromobisphenol-A.

---

5,017,729

### PHENOL PREPARATION PROCESS AND PROPYLENE RECOVERY THEREFROM

**Hiroshi Fukuhara, and Fujihisa Matsunaga, both of Chiba, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Filed Sep. 5, 1989, Ser. No. 402,528**
**Claims priority, application Japan, Sep. 30, 1988, 63-246658**
**Int. Cl.$^5$ C07C *37/08, 45/53***

**U.S. Cl. 568—798** **5 Claims**

1. A process for preparing phenol, comprising the steps of:

(a) reacting benzene with propylene in the presence of an aluminum chloride complex at a temperature in the range of from 30° C. to 200° C. under a pressure from atmospheric pressure to 15 kg-f/cm$^2$ to synthesize cumene, said benzene and said propylene being used in a molar ratio of from 1/1 to 10/1;

(b) oxidizing the cumene of step (a) with molecular oxygen at a temperature in the range of from 60° C. to 150° C. under a pressure of from 1 to 10 kg-f/cm$^2$ to convert the cumene into cumene hydroperoxide;

(c) acid cleaving cumene hydroperoxide into phenol and acetone with an acidic compound selected from the group consisting of strong acids, heteropolyacids, and solid acids at a temperature of up to 150° C.;

(d) hydrogenating the acetone of step (c) with hydrogen gas by a fixed bed liquid phase reaction in the presence of a hydrogenation catalyst selected from the group consisting of Raney nickel, nickel, copper-chromium, Raney nickel-copper, copper-zinc, platinum, palladium, ruthenium and rhodium, said catalyst optionally supported on a carrier, at a temperature of from room temperature to 200° C. under a pressure of from atmospheric pressure to 80 kg-f/cm$^2$, to convert the acetone into isopropanol, said hydrogen and said acetone being used in molar ratio of from 1/2 to 10/1;

(e) dehydrating the isopropanol of step (d) into propylene in the presence of an acidic compound at a temperature in the range of from 100° C. to 450° C. under reduced, atmospheric or increased pressure; and

(f) recycling the propylene of step (e) in a liquid state to step (a).

---

5,017,730

### PROCESS OF PREPARING BIS (TRIFLUOROMETHYLPHENYL) METHANOL

**Yoshihiko Gotoh, Kamifukuoka; Toshikazu Kawai, and Junji Negishi, both of Saitama, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan**

**Filed Mar. 12, 1990, Ser. No. 491,969**
**Claims priority, application Japan, Mar. 27, 1989, 1-74696**
**Int. Cl.$^5$ C07C *39/367***

**U.S. Cl. 568—812** **10 Claims**

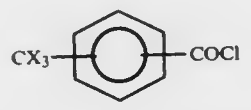
1. A process of preparing bis(trifluoromethylphenyl)methanol, comprising the steps of:

(a) reacting a compound represented by the formula (1) with toluene at an elevated temperature in the presence of a perfluoroalkylsulfonic acid which serves as a strong acid

VOL
1126
ISS
3
MY
21
1991
UMI

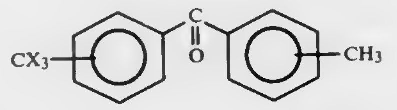
catalyst to form a first benzophenone derivative represented by the formula (2),

(1)



wherein X represents H, F, Cl or Br,

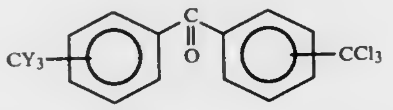
(2)



wherein X represents H, F, Cl or Br;

(b) reacting said first benzophenone derivative with chlorine gas at a temperature in the range of from about 60° C. to about 70° C. to form a second benzophenone derivative represented by the formula (3),

(3)



wherein Y represents F or Cl;

(c) reacting said second benzophenone derivative with a fluorinating agent selected from the group consisting of hydrogen fluoride, antimony pentafluoride, cobalt fluoride and silver fluoride at a temperature in the range of from 80° C. to about 140° C. to form bis(trifluoromethyl)-benzophenone; and

(d) reacting said bis(trifluoromethyl)benzophenone with hydrogen gas at a pressure in the range of from about 1 atm to about 20 atm and at a temperature in the range of from room temperature to about 100° C. to form bis(trifluoromethylphenyl)methanol by reduction of the carbonyl group.

---

### 5,017,731

### DIRECT CONVERSION OF ETHANE TO ALCOHOLS BY HIGH PRESSURE CONTROLLED OXIDATION

**Hyman D. Gesser, 218 Girton Blvd., Winnipeg Man., Canada R3P OA7; Norman R. Hunter, Grp. 4 Box 16, R.R. 1, St., St. Norbert, MB, Canada; Prasad S. Yarlagadda, 19-A Camelot Ct., Buffalo, N.Y. 14214, and Lawrence A. Morton, 19 Temple Bay, Winnipeg, Manitoba, Canada R3T 2V1**

**Continuation of Ser. No. 166,013, Mar. 9, 1988, abandoned. This application Jun. 5, 1990, Ser. No. 534,310**

**Claims priority, application New Zealand, Mar. 13, 1987, 219621**

Int. Cl.$^5$ C07C *29/50, 31/08, 31/04*

U.S. Cl. 568—910 3 Claims

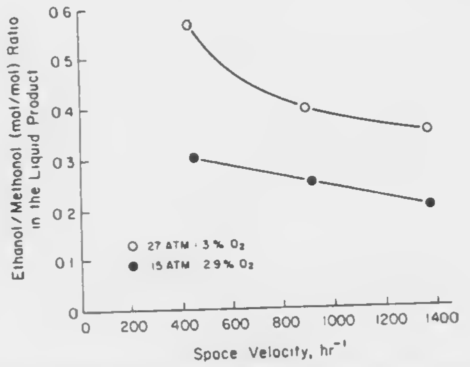
1. A process for converting ethane into ethanol and methanol, baving an ethanol/methanol ratio of about 2.1/1 to about 8/1; which comprises:

(a) intimately mixing ethane with from 2-15% by volume oxygen,

(b) pre-heating said mixture in an induction zone to a temperature of about 150° C. to about 400° C. for an induction period of about 10 to about 1500 seconds;

(c) feeding the resulting pre-heated gas mixture to a lined steel reactor at a pressure within the range of about 10 to about 150 atm, said reactor having an internal surface surrounding a zone in which said gases react, said internal surface being made of a material selected from the group consisting of glass, non-reactive plastics, non-reactive waxes and non-reactive salts; and

(d) reacting said gases in said reactor at a temperature of about 200° C. to about 350° C. for a time of about 10 seconds to about 2000 seconds in the absence in said reaction of any added material which measurably affects the rate of selectivity of the reaction or the yield of the product.



---

### 5,017,732

### PROCESS FOR PREPARING CHLOROFLUOROCARBONS VIA AN IN SITU GENERATED ACTIVATED ALUMINUM TRIHALIDE CATALYST AND PRODUCTS RESULTING THEREFROM

**Robert C. Zawalski, Houston, Tex., assignor to Dixie Chemical Company, Pasadena, Tex.**

**Filed Feb. 16, 1990, Ser. No. 480,744**

**The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.**

Int. Cl.$^5$ C07C *17/24, 19/08;* B01J *31/00*

U.S. Cl. 570—151 23 Claims

8. A process for isomerizing chlorofluorocarbons comprising:

(i) contacting a chlorofluorocarbon of the formula:

CClFYCClFX (I)

wherein
X is —Cl or —F when Y is —Cl; or
X is —F when Y is —F
with anhydrous aluminum trichloride and a metal for a time and at a temperature sufficient for the compound of formula (I) to isomerize to the compound of formula $CCl_2YCF_2X$ (II);

(ii) separating at least the majority of the organic phase from the activated aluminum trihalide catalyst; and

(iii) isolating the isomerized chlorofluorocarbon of formula (II) from the separated organic phase.

---

### 5,017,733

### ELECTRICAL INSULATING OIL COMPOSITION

**Atsushi Sato, Tokyo; Shigenobu Kawakami, Ichikawa; Keiji Endo, Yokosuka, and Hideyuki Dohi, Yokohama, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan**

**Filed Sep. 4, 1987, Ser. No. 93,813**

**Claims priority, application Japan, Sep. 4, 1986, 61-208541**

Int. Cl.$^5$ H01B *3/24;* H01G *4/22*

U.S. Cl. 585—6.3 6 Claims

1. An electrical insulating oil composition which comprises 45% by weight or more of at least 2 members selected from the group consisting of the following 6 components and the remainder of non-condensed bicyclic aromatic hydrocarbons having not more than 17 carbon atoms except said 6 components:

(a) m-ethylbiphenyl,
(b) p-ethylbiphenyl,
(c) o-benzyltoluene,

(d) m-benzyltoluene,
(e) p-benzyltoluene, and
(f) 1,1-diphenylethane

and is characterized in that, when the temperature of said composition is −40° C.,

(I) the total quantity of solid phase obtained by calculating according to the following solid-liquid equilibrium equation is 45% by weight or less relative to the total quantity of said composition, and

(II) in the liquid phase composition caluculated by the following solid-liquid equilibrium equation, the total quantity of said compounds (a) to (f) is 40% by weight or more and the viscosity of this liquid phase is 500 cSt or lower,

$$X_i = \exp\left[\frac{\Delta Hf}{R}\left(\frac{1}{Tf} - \frac{1}{T}\right)\right]$$

wherein
$X_i$ is the equilibrium mole fraction of a component i in the liquid phase of said composition,
$\Delta Hf$ is the heat of fusion (cal.mol$^{-1}$) of said component i as a pure substance,
$Tf$ is the melting point (K) of said component i as a pure substance,
T is the temperature (K) of the system, and
R is the gas constant (cal.mol$^{-1}$.K$^{-1}$).

---

### 5,017,734

### ETHYNYL ADAMANTANE DERIVATIVES AND METHODS OF POLYMERIZATION THEREOF

**Kurt Baum, 3755 Canfield Rd., Pasadena, Calif. 91107; Thomas G. Archibald, 210 N. Arden Blvd., Los Angeles, Calif. 90004, and Aslam A. Malik, 708 N. Bradish Ave., Sam Dimas, Calif. 91773**

**Filed Dec. 11, 1989, Ser. No. 448,349**

Int. Cl.$^5$ C07C *13/615*

U.S. Cl. 585—21 3 Claims

1. A new compound wherein said compound is selected from the group consisting of 1,3-diethynyl-5,7-dimethyladamantane; 1,3,5-triethynyladamantane; 3,3′-diethynyl-1,1′-biadamantane; 1-ethynyldiamantane; 1,4-diethynyldiamantane; 1,6-diethynyldiamantane and 4,9-diethynyldiamantane.

---

### 5,017,735

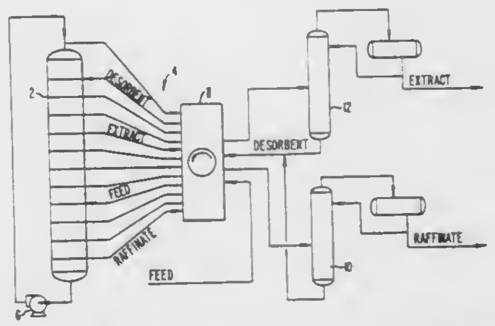
### SELECTIVE SORPTION OF 2,6-DIISOPROPYLNAPHTHALENE

**Jere Fellmann, Livermore; Paul R. Wentrcek, Redwood City, and Peter Kilner, Sunnyvale, all of Calif., assignors to Catalytica, Inc., Mountain View, Calif.**

**Filed Jul. 24, 1989, Ser. No. 384,647**

Int. Cl.$^5$ C07C *7/13*

U.S. Cl. 585—820 31 Claims



1. A process for enriching the fraction of 2,6-diisopropylnaphthalene contained in a feed stream of mixed diisopropylnaphthalenes comprising contacting said feed stream with an adsorbant bed containing one or more crystalline molecular sieves being characterized as having twelve membered oxygen rings and pore aperture dimensions between approximately 5.5 Å and 7.0 Å and which demonstrate shape selective preference for 2,6-diisopropylnaphthalene over other dialkylated naphthalenes, separating said feed stream from said adsorbant bed and contacting the adsorbant bed with a desorbant capable of substantially desorbing said 2,6-diisopropylnaphthalene from the pores of said crystalline molecular sieves.

VOL
1126
ISS
3
MY
21
1991
UMI

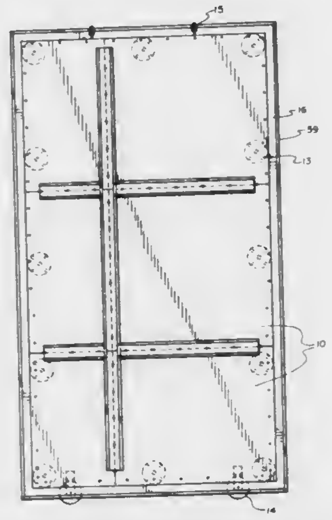
### 5,017,736
### MAGNETICALLY SHIELDED DOOR FOR USE WITH SHIELDED ENCLOSURES

**Eric J. Yarger, Idaho Falls, Id.; Rex D. Yarger, Brigham City, Utah, and Gary D. Clegg, Idaho Falls, Id., assignors to Magneshield Technologies, Inc., Idaho Falls, Id.**

**Filed Nov. 22, 1988, Ser. No. 274,863**

**Int. Cl.$^5$ H05K** *9/00*

**U.S. Cl. 174—35 MS** **12 Claims**



1. A shielded door which comprises, in combination: two identical door subassemblies, each subassembly comprising a substantially rectangular door constructed of RF shielded materials; to the upper edge of said door there being attached two wheels, disposed in an orientation perpendicular or parallel to said door, said wheels being spaced along said upper edge of said door; to the lower edge of said door there being attached two wheels disposed in an orientation parallel to said door, said wheels being spaced along said lower edge of said door; and a plurality of pneumatic expander means disposed equally around the periphery of said door;

connection of said identical door subassemblies being made by pneumatic actuator means and pressure foot means;

a centering guide disposed above said identical door subassemblies along which said perpendicularly or horizontally oriented wheels roll;

an "I" beam disposed below said identical door subassemblies along which said parallel oriented wheels roll, said "I" beam being covered along its upper surface with a nylon insulating/centering strip.

---

### 5,017,738
### CONNECTING APPARATUS

**Hiroki Tsuji; Kyoichiro Kawano, and Teruo Murase, all of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Feb. 22, 1990, Ser. No. 483,170**

**Claims priority, application Japan, Feb. 28, 1989, 1-021289[U]; Mar. 7, 1989, 1-066814**

**Int. Cl.$^5$ H01R** *4/00*

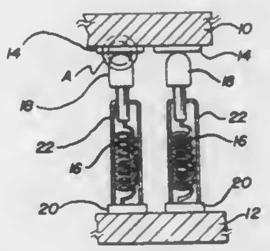
**U.S. Cl. 174—94 R** **7 Claims**

1. A connecting apparatus for electrically connecting a first object and a second object, said first object and second object being opposed to each other, said connecting apparatus, comprising:

a first metal having a first melting point provided on said first object;

a second metal having a second melting point provided on said second object, wherein said second metal, when in contact with said first metal, generates an alloy having a third melting point solely at contact points of said first and second metals, and wherein said third melting point is lower than said first and second melting points;

a first porous metal layer impregnated with said first metal; and



a second porous metal layer, opposed to said first porous metal layer, impregnated with said second metal, wherein said first and second metal layers are selected from the group consisting of silver, nickel and palladium.

---

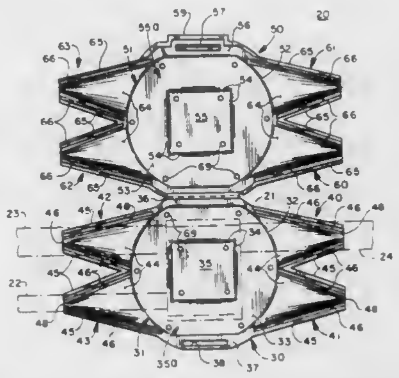
### 5,017,739
### JACKET FOR CABLE CONNECTOR

**Mark R. Hoffman, Barrington; Charles Y. M. Choi, Highland Park; Peder M. Pedersen, Elmhurst, and Niels C. Pedersen, Jr., Spring Grove, all of Ill., assignors to HD Electric Company, Deerfield, Ill.**

**Filed Jul. 9, 1990, Ser. No. 549,971**

**Int. Cl.$^5$ H02G** *15/113;* **H01R** *4/70*

**U.S. Cl. 174—138 F** **11 Claims**



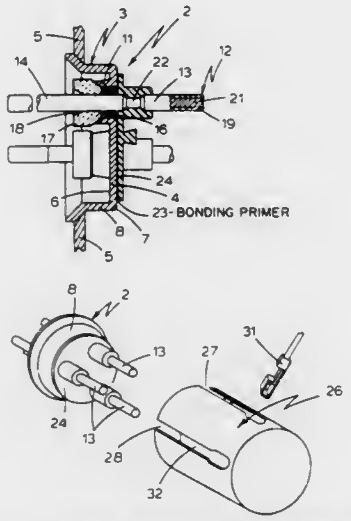
1. A jacket for a cable connector interconnecting as many as four cable portions, comprising: a first body defining a first large cavity, first wall structure projecting from said first body and defining a first small cavity communicating with said first large cavity, two pairs of discrete parallel arms respectively extending from opposite sides of said first body with the arms of one pair being respectively coaxial with the arms of the other pair, a second body defining a second large cavity, second wall structure projecting from said second body and defining a second small cavity communicating with said second large cavity, two pairs of discrete parallel arms respectively extending from opposite sides of said second body with the arms of one pair being respectively coaxial with the arms of the other pair, and means for securing said first and second bodies together in a closed condition respectively disposable on opposite sides of the cable connector wherein said first large and small cavities cooperate with said second large and small cavities to define a stepped chamber for accommodating the cable connector therein, said arms of said first body respectively cooperating with said arms of said second body in said closed condition for defining four discrete tubes for respectively encircling the cable portions when the cable connector is disposed in said chamber.

OL
126
SS
3
MY
21
1991
UMI

### 5,017,740
## FUSED HERMETIC TERMINAL ASSEMBLY INCLUDING A PIN GUARD AND LEAD WIRE END CONNECTION SECURING DEVICE ASSOCIATED THEREWITH

**Glenn A. Honkomp, Warren; Eugene H. Tingley; Thomas O. McNay, both of Clermont, all of Ohio, and Benjamin Bowsky, St. Louis, Mo., assignors to Emerson Electric Co., St. Louis, Mo.**

**Filed Apr. 2, 1990, Ser. No. 503,480**
**Int. Cl.$^5$ H01B** *17/30;* **H01R** *13/74*
**U.S. Cl. 174—152 GM** **22 Claims**



1. A hermetic terminal assembly for a housing comprising:

a cup-shaped body with a bottom having an inner and outer face and a rim extending from said inner face of said bottom, said bottom having at least one hole with a defined perimeter;

a current conducting pin extending through said hole, said pin having an inner pin segment extending internally of said cup-shaped body and an outer pin segment extending externally of said cup-shaped body to receive and electrical lead wire end connection outside of said cut-shaped body with said inner pin segment serving to receive an electrical lead wire end connection disposed in said housing;

a seal bonding said pin to said defincd perimeter of said hole;

said outer pin segment including a fuse-like area adjacent and completely outside said outer face of said bottom of said cup-shaped body; and

an insulating thermally decomposable coating fully covering said fuse-like area, said coating having a lower decomposition temperature point than the melting point of said fuse-like area and including an arc suppressant, said coating when decomposed serving to fully cover the outer end of the inner pin segment and thereby abate electrical flow to said inner pin segment in the event of the melting of said fuse-like area due to abnormally excessive current conditions.

---

### 5,017,741
## ROTARY DIGITAL CONTACT ENCODER SUBSTRATE

**Kenneth Brown, Evansville, Ind., and Richard E. Riley, Riverside, Calif., assignors to Hamilton Standard Controls, Inc., Farmington, Conn.**

**Filed Mar. 29, 1989, Ser. No. 330,016**
**Int. Cl.$^5$ H05K** *1/00;* **H01H** *19/00*
**U.S. Cl. 174—260** **11 Claims**

1. An electrical component, such as, for a digital contacting encoder or the like, comprising:

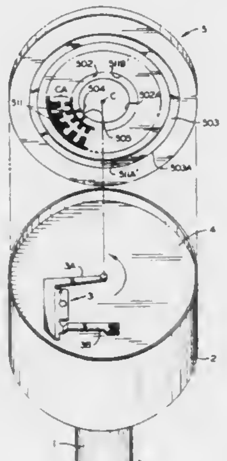
a base having an exterior side and an interior side;

at least two, externally exposed, electrical contacts on the exterior side of said base, one of them being a common contact and the other being a strip contact;

an electrical signal varying element, including:

a substrate of insulating material separate from and located above said base and being on the interior side of said base, said substrate having a top side and an underside with the underside of said substrate being directed toward said base, and

at least one strip of signal affecting, conductive material formed on the top side of said substrate, said strip being electrically connectable to said common contact;



a conductive layer located on the interior side of said base between said substrate and said base serving as an electrical interconnect layer and being electrically connected to said strip contact; and

at least one conductive via formed completely through said substrate, providing a conductive path through the insulating substrate from the conductive strip on the top side of said substrate, with said via extending down through said substrate to the underside of said substrate and being electrically connected to said conductive layer, at least one via being included for each said strip.

---

### 5,017,742
## PRINTED CIRCUIT BOARD

**John J. Bladon, Wayland, Mass., assignor to Shipley Company Inc., Newton, Mass.**

**Division of Ser. No. 244,788, Sep. 15, 1988, Pat. No. 4,895,739, which is a division of Ser. No. 153,357, Feb. 8, 1988, which is a continuation-in-part of Ser. No. 71,865, Jul. 10, 1987, abandoned. This application Nov. 13, 1989, Ser. No. 435,348**
**Int. Cl.$^5$ H05K** *1/09, 3/18*
**U.S. Cl. 174—266** **2 Claims**

1. An article of manufacture comprising a printed circuit board substrate that is an electrically nonconductive plastic clad with copper, said printed circuit board substrate having through holes passing from one surface of the board to the other surface of the board where said through holes have their walls coated with a metal adhered to the plastic surface of the hole walls through an intermediate layer of tin-palladium sulfide.

---

### 5,017,743
## GAS DAMPED DECELERATION SWITCH

**Kevin J. Gunning, Tokyo, Japan, and Lon E. Bell, Pasadena, Calif., assignors to TRW Technar Inc., Irwindale, Calif.**

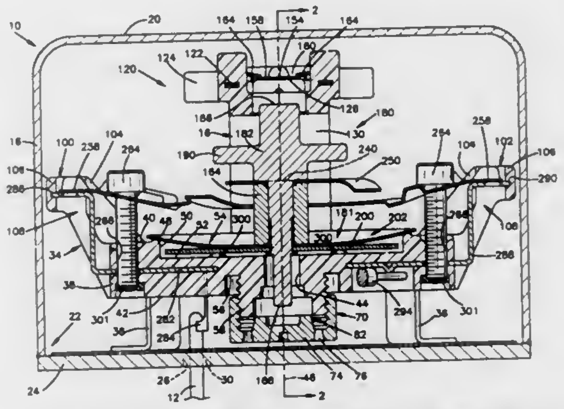
**Filed Mar. 9, 1990, Ser. No. 491,120**
**Int. Cl.$^5$ H01H** *35/14*
**U.S. Cl. 200—61.45 R** **13 Claims**

9. A gas damped deceleration switch for activating a vehicle occupant safety apparatus in response to deceleration of a vehicle, the safety apparatus including an electrical current path, said gas damped deceleration switch comprising:

a movable mass assembly comprising an axis, a mass member, and a damping member connected to said mass member to damp movement of said mass member along said axis;

a structure having a surface spaced radially from said axis;

a spring having a first portion connected to said surface and a second portion connected to said mass assembly, said spring supporting said mass assembly for inertial movement along said axis relative to said surface against the bias of said spring in response to deceleration of the vehicle;



means for enabling electric current to flow along the current path in the vehicle occupant safety apparatus in response to a predetermined amount of said movement of said mass assembly; and

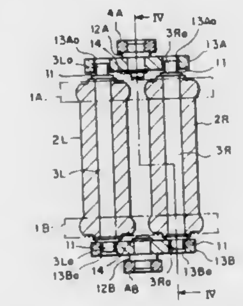
said second portion of said spring being connected to said mass assembly at a location that lies in a plane which is perpendicular to said axis and which contains the center of mass of said mass assembly.

---

### 5,017,744
## ROLLER CONTACT DEVICE

**Kazuo Yoshida, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 25, 1990, Ser. No. 528,984**
**Claims priority, application Japan, May 26, 1989, 1-133232**
**Int. Cl.$^5$ H01H** *1/06, 1/50*
**U.S. Cl. 200—277** **6 Claims**



1. A roller contact device, comprising:

a pair of support shafts each movably supported at one end on a drive are for back and forth movements and constantly urged in a forward direction by a compression spring;

a pair of pivot shafts individually supported on other ends of said support shafts;

a pair of bridge links individually rotatably supported at a middle portion thereof on said pivot shafts;

a pair of roller shafts, each having end portions, and supported parallelly between confronting opposite ends of said bridge links and rotatably and tiltably in back and forth directions;

a pair of roller contacts supported on said pair of roller shafts; and

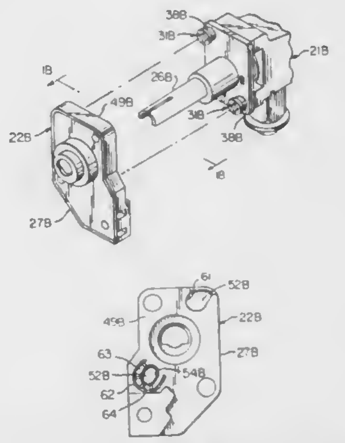
at least a pair of stationary contacts to be connected to each other as said pair of roller contacts are brought into pressed contact therewith.

---

### 5,017,745
## BURNER CONTROL DEVICE AND ELECTRICAL SWITCH UNIT ASSEMBLY, PARTS THERFOR AND METHODS OF MAKING THE SAME

**William J. Lichtenberger, Murrysviile, Pa., assignor to Robertshaw Controls Company, Richmond, Va.**

**Division of Ser. No. 265,037, Oct. 31, 1988, Pat. No. 4,843,198. This application Apr. 19, 1989, Ser. No. 340,379**
**The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.**
**Int. Cl.$^5$ H01H** *9/02*
**U.S. Cl. 200—307** **2 Claims**



1. In an electrical switch unit adapted to be carried by a burner control device and be operated by a selector shaft of said device which has a cover secured thereto by a plurality of screws each having a head, said switch unit having a plurality of cavities therein for respectively receiving said heads of said screws therein, the improvement wherein at least one of said cavities has snap-fit means therein that is adapted to be snap-fitted to its respective head to hold said switch unit to said device, said cavities each being substantially oblong in configuration.

---

### 5,017,746
## LOW COST LIGHT SWITCH EXTENSION ARM

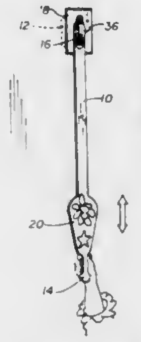
**Henry L. Guimarin, 375 Palm Springs Dr., Apt. 1122, Altamonte Springs, Fla. 32701**

**Filed Feb. 28, 1990, Ser. No. 486,412**
**Int. Cl.$^5$ H01H** *3/46*
**U.S. Cl. 200—331** **6 Claims**

1. An extension device of non-metallic construction for use by a small person in operating an electric toggle switch having a front portion upon which is located a switch plate, and an operating lever protruding therethrough, which switch plate is held in position by a spaced pair of screws, said device comprising an arm of elongate, relatively rigid construction having a handle at one end, and a switch-contacting member at the other end, a portion of said switch-contacting member being configured to be inserted over the operating lever of the toggle switch, a slot in said switch-contacting member closely adjacent said configured portion, and an outwardly curved member for holding captive said switch-contacting member of said arm to the toggle switch, said curved member having a screw-accommodating hole adjacent each end and because of its

OL
126
SS
3
MY
21
1991
UMI

curvature, being caused to extend across the switch at such time as the configured portion of said switch-contacting member has been placed over the operating lever, and each end of said curved member has been secured to the switch plate by a respective one of the screws, the curvature of said curved member providing clearance for motion of the lever component resulting from arm movements, and said slot in said switch-contacting member permitting motion of said arm with respect to one of the aforementioned screws.



---

### 5,017,747
### MICROSWITCH

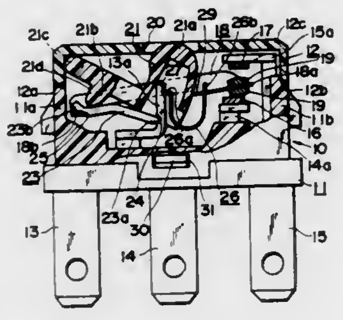
**Toyohiro Nagahara, Shimane; Takashi Niwa, Kyoto; Takezo Sano, Shiga, and Isao Kato, Ootsu, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Apr. 27, 1990, Ser. No. 517,559**

**Claims priority, application Japan, Oct. 8, 1987, 62-254400**

**Int. Cl.⁵ H01H** *5/06*

**U.S. Cl. 200—453** **5 Claims**



1. A microswitch comprising:
a switch casing having a lower base plate portion and a top plate portion
a first common terminal member and at least one second terminal member disposed within said switch casing and fixed to said lower base plate portion, said at least one second terminal member having a fixed contact fixed to an inner end portion thereof;
a swingable lever having a base end and a free end portion, said base end being pivotally supported by an inner end portion of said first common terminal member;
a movable member having a base end and a free end portion, said base end being pivotally attached to the free end portion of said swingable lever and said free end portion being provided with a movable contact which faces said fixed contact;
a substantially U-shaped compression spring, one end of which is engaged with the inner end portion of said first common terminal member and the other end of which is engaged with the free end portion of said movable member; and
a push button comprising:
a lever portion disposed beneath the top plate portion of the switch casing,
a fulcrum portion disposed at one end of the lever portion and pivotally attached to an interior portion of the switch casing,
an operational member portion disposed on the lever portion and extending through a hole a formed in the top plate portion of the switch casing, and
pressing means disposed on the lever portion for pressing the swingable lever,
wherein said substantially U-shaped compression spring has a depression formed therein which opens toward said operational member portion; and
wherein said operational member portion is formed with a recess opening toward said substantially U-shaped compression spring;
such that when said push button is depressed, an end of said push button enters the depression formed in said substantially U-shaped compression spring and an end of said substantially U-shaped compression spring enters the recess formed in said operational member portion.

---

### 5,017,748
### FLOAT SWITCH WITH BUOYANT HOUSING AND SWITCH OPERATING MEANS WITHIN THE HOUSING

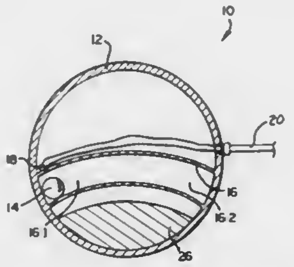
**Andrew J. Sapiro, P.O. Box 282, Rayton, South Africa 1001**

**Filed Jul. 31, 1989, Ser. No. 387,624**

**Claims priority, application South Africa, Aug. 2, 1988, 88/5663**

**Int. Cl.⁵ H01H** *35/18*

**U.S. Cl. 200—84 C** **7 Claims**



1. A float switch which includes a buoyant housing defining an arcuately curved totally enclosed guide path of a constant radius of curvature, switch operating means located displaceably under gravity within the guide path, the switch operating means being operable to activate switch means in at least one position along its path when the housing is tilted, anchoring means pivotally anchoring said housing and including a flexible line, said flexible line being the only non-fluid support for said buoyant housing and the housing further including ballast means for orientating the housing to a generally predetermined orientation while the housing is floating in a liquid medium.

---

### 5,017,749
### RESISTANCE WELDING APPARATUS

**Andrew J. Boyd, Wantage, and Andrea M. Webster, Epsom Downs, both of United Kingdom, assignors to CMB Packaging (UK) Limited, Worcester, United Kingdom**

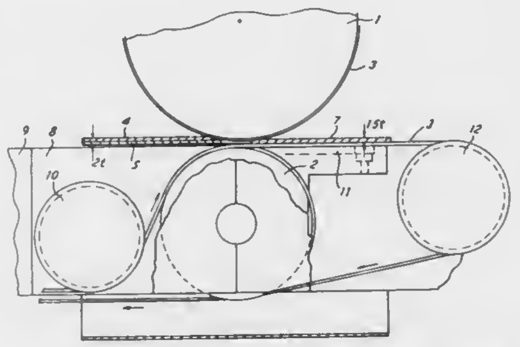
**Filed Dec. 11, 1987, Ser. No. 131,823**

**Claims priority, application United Kingdom, Dec. 17, 1986, 8630157**

**Int. Cl.⁵ B23K** *1/16*

**U.S. Cl. 219—64** **12 Claims**

1. Apparatus for resistance welding an elongate seam in a tubular article, said apparatus comprising:
an electrode wheel defining an external surface of predetermined curvature;
means for mounting the electrode wheel outside the article;
a stationary electrode comprising a stationary block, the stationary block having
a wear plate defining a guide surface having a curvature substantially equal to the predetermined curvature of the electrode wheel,
side plates flanking the wear plate to laterally limit the guide surface, at least one side plate defining a passage for supplying an inert gas to shroud the guide surface during welding and thereby inhibit oxidation, and
means securing said side plates to the wear plate;
holding means for mounting the stationary electrode inside the article;
an electrode wire; and
means for guiding the electrode wire to pass over the electrode wheel and the stationary electrode to provide surfaces of contact between the electrode wheel and the stationary electrode and the seam material so that the contact area of a wire passing over the guide surface with the seam material is substantially equal to the contact area of wire passing over the electrode wheel with the exterior of the seam material.



---

### 5,017,750
### FRAME CONSTRUCTION FOR MICROWAVE OVEN HAVING AN INTEGRALLY FORMED OPEN CHASSIS AND AN INSERTING OPENING

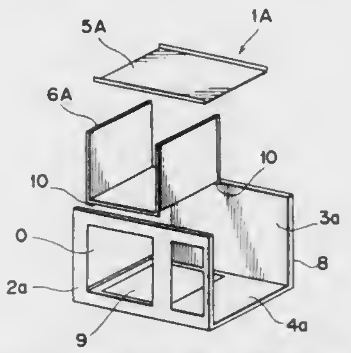
**Noboru Igarashi, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 24, 1990, Ser. No. 513,770**

**Claims priority, application Japan, Apr. 25, 1989, 1-49081[U]**

**Int. Cl.⁵ H05B** *6/64*

**U.S. Cl. 219—10.55 R** **14 Claims**



1. A frame construction for a microwave oven comprising:
an open chassis of a generally U-shaped cross section, said open chassis having a front portion, a rear portion and a first bottom portion disposed between said front and rear portions, said front portion having an opening defined therein for inserting food material;
an oven structure having a generally U-shaped cross section, said oven structure having a first side portion, a second side portion and a second bottom portion disposed between said first and second side portions, each of said first side portion, said second side portion and said second bottom portion having opposed first and second edges, a first edge of the first and second side portion of the oven structure being fixed to said front portion of said open chassis around the opening in the open chassis, a second edge of the first and second side portion of the oven structure being fixed to the rear portion of said open chassis;
a top plate fixed to said front and rear portions of said open chassis so as to form a heating chamber defined by at least said rear portion of the open chassis, said oven structure and said top plate; and
means for receiving joining jigs to attach the oven structure to the open chassis, said means for receiving being located in the first bottom portion of the open chassis, the means for receiving comprising an opening defined in the first bottom portion of the open chassis.

---

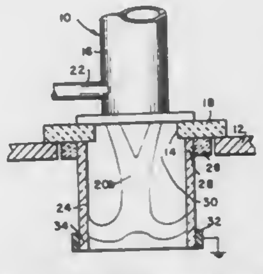
### 5,017,751
### INDUCTIVELY-COUPLED RF PLASMA TORCH

**Charles Brecher, Lexington; Richard C. Assmus, Braintree, and Jonathan S. Brecher, Lexington, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Jun. 21, 1990, Ser. No. 541,576**

**Int. Cl.⁵ B23K** *9/00*

**U.S. Cl. 219—121.52** **7 Claims**



1. An inductively coupled RF plasma generator comprising:
a body including a conduit for the passage of a gas through said body, said conduit having an inlet for introducing said gas to said conduit and an outlet;
induction means associated with a plasma generating region of said conduit for inductively exciting said gas to generate a plasma from said gas, said plasma exiting said conduit at said outlet as a tail flame;
electrically insulating chimney means having an open proximal end positioned at said outlet such that said chimney surrounds said tail flame and no electrical path to ground exists between said outlet and said chimney means, and an open distal end; and
a grounded electrode positioned downstream of said plasma generating region and sufficiently near to said outlet to provide an electrical path to ground from said tail flame which is shorter than other available paths to ground.

---

### 5,017,752
### PLASMA ARC TORCH STARTING PROCESS HAVING SEPARATED GENERATED FLOWS OF NON-OXIDIZING AND OXIDIZING GAS

**Wayne S. Severance, Jr., and Tommie Z. Turner, both of Florence, S.C., assignors to ESAB Welding Products, Inc., Florence, S.C.**

**Filed Mar. 2, 1990, Ser. No. 487,747**

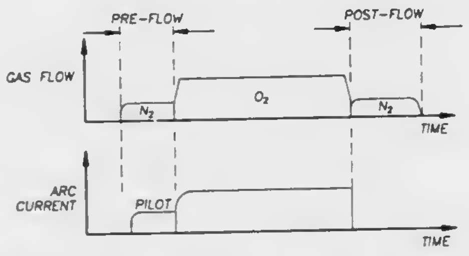
**Int. Cl.⁵ B23K** *9/00*

**U.S. Cl. 219—121.59** **6 Claims**

1. A process of starting a plasma arc torch of the type comprising a metallic electrode and an electrically conductive nozzle assembly positioned adjacent a discharge end of the electrode, and which minimizes the oxidation of the electrode and thereby extends the life of the electrode, said process comprising the steps of
generating a flow consisting essentially of a non-oxidizing gas between the discharge end of the electrode and said nozzle assembly, then
creating a pilot arc between the discharge end of said electrode and said nozzle assembly, then
transferring the pilot arc so as to create a transferred arc

VOL
126
ISS
3
MY
21
1991
UMI

which extends from the discharge end of the electrode to a workpiece positioned on the side of the nozzle assembly opposite the electrode, and while completely terminating the flow of the non-oxidizing gas and generating a flow of an oxidizing gas between the discharge end of the electrode and the nozzle assembly and such that the transferred arc and the oxidizing gas create a plasma gas flow between the discharge end of the electrode and the workpiece.



---

5,017,753

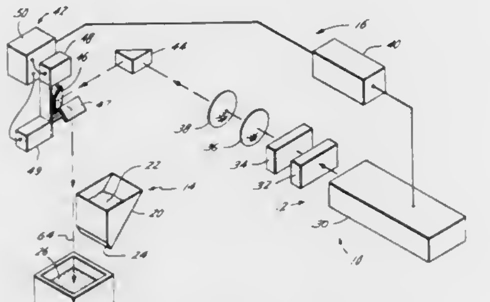
## METHOD AND APPARATUS FOR PRODUCING PARTS BY SELECTIVE SINTERING

**Carl R. Deckard, Austin, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.**

**Continuation of Ser. No. 105,316, Oct. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 920,580, Oct. 17, 1986, Pat. No. 4,863,538. This application Jun. 22, 1990, Ser. No. 545,142**

**Int. Cl.⁵ B23K** *26/00*

**U.S. Cl. 219—121.63** **7 Claims**



1. An apparatus for producing a part comprising:
beam means for selectively emitting a directed energy beam;
structure for providing a target area for producing the part;
means for dispensing powder into said target area including, a drum,
means for moving the drum from one end of the target area to the other end, and
means for counter-rotating the drum;
means for directing air flow through the target area to moderate powder temperature; and
control means for moving the aim of the beam and for modulating the beam means to selectively sinter within defined boundaries a layer of powder dispensed in said target area,
the control means being operable to effect selective sintering of sequential layers of powder within respective defined boundaries to produce a part comprising a plurality of layers sintered together.

---

5,017,754

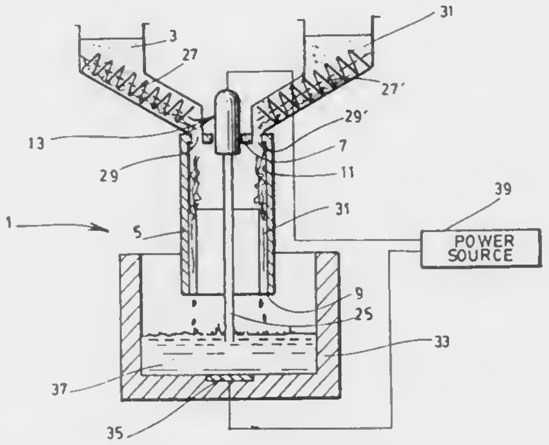
## PLASMA REACTOR USED TO TREAT POWDER MATERIAL AT VERY HIGH TEMPERATURES

**Michel G. Drouet, St Bruno, and Hyun K. Choi, St Lambert, both of Canada, assignors to Hydro Quebec, Montreal, Canada**

**Filed Aug. 29, 1989, Ser. No. 399,997**

**Int. Cl.⁵ B23K** *9/00*

**U.S. Cl. 219—121.36** **3 Claims**



1. A plasma reactor for use to treat an electrically conductive material in powder form at a very high temperature, said reactor comprising:
a vertical electrically insulated sleeve having an upper end, a lower end and an internal wall cylindrical in shape;
a hollow torch coaxially mounted at the upper end of the sleeve, said torch comprising at least one tube-shaped electrode coaxial with said sleeve for use to generate a plasma arc column;
means for injecting a gas tangentially into said hollow torch in order to create a vortex inside the same;
means for dropping the powder material to be treated vertically downwardly inside the sleeve from the upper end thereof beside the hollow torch so as to form a substantially uniform cylindrical curtain of particles falling down into the sleeve, said particles being centrifugally projected against the internal wall of said sleeve by the vortex escaping from the hollow torch and entirely covering said internal wall to shield the same while they are being simultaneously treated by said plasma column;
a crucible positioned under the sleeve to collect the treated particles in molten form that drip down from the sleeve at the lower end thereof; and
another electrode cooperating with said at least one tube-shaped electrode of said hollow torch to generate said plasma column by proper connection of both of said electrodes to an electric power source, said other electrode being located in said crucible and being in electrical contact with the molten material collected in said crucible to cause arc transfer from said at least one tube-shaped electrode of said hollow torch to said molten material with the generated plasma arc column extending vertically through said sleeve,
wherein said means for dropping the powder material includes a plurality of openings which are located around the hollow torch at the upper end of the sleeve and through which the powder material is fed essentially by gravity into the sleeve, said openings being vertically extending and closely adjacent to the internal wall of said sleeve.

---

5,017,755

## METHOD OF REPAIRING LIQUID CRYSTAL DISPLAY AND APPARATUS USING THE METHOD

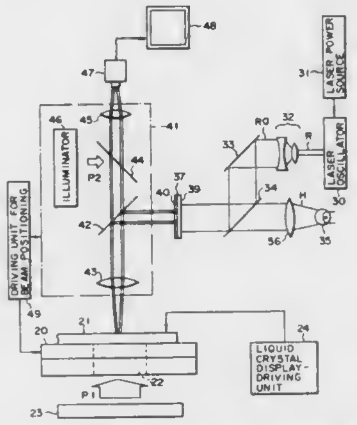
**Susumu Yahagi; Shuichi Ishida, both of Yokohama, and Shigeru Fujimoto, Himeji, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 20, 1989, Ser. No. 424,695**

**Claims priority, application Japan, Oct. 26, 1988, 63-27023; Aug. 9, 1989, 1-204757**

**Int. Cl.⁵ B23K** *26/00*

**U.S. Cl. 219—121.68** **4 Claims**



1. A method of repairing a liquid crystal display which comprises a common electrode, pixel electrodes facing the common electrode, and a liquid crystal sealed between the common and pixel electrodes, and wherein the liquid crystal contains conductive foreign matter short-circuiting the common and pixel electrodes to each other, said method comprising the step of:
irradiating a pixel electrode with a laser beam such that at least a ring-like region of said pixel electrode which corresponds to a ring line completely surrounding a portion touching the foreign matter is removed by the laser beam, whereby a region of said pixel electrode inside of the ring line region and a region of said pixel electrode outside of the ring line region are electrically insulated from each other.

---

5,017,756

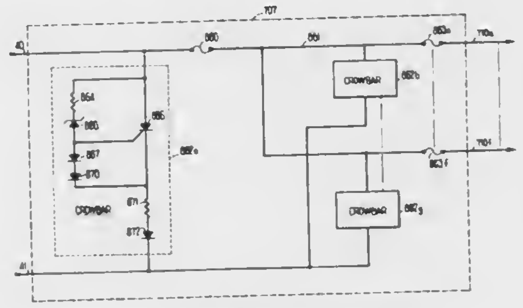
## METHOD AND APPARATUS FOR PREVENTING CHAIN REACTION TRANSISTOR FAILURE IN PARALLELED TRANSISTORS

**Malcolm T. Gilliland, 310 Pine Valley Rd., Marietta, Ga. 30067**

**Division of Ser. No. 62,543, Jun. 12, 1987, Pat. No. 4,896,018, which is a continuation-in-part of Ser. No. 791,224, Oct. 25, 1985, Pat. No. 4,716,274. This application Nov. 9, 1989, Ser. No. 434,039**

**Int. Cl.⁵ B23K** *9/10*

**U.S. Cl. 219—130.32** **21 Claims**



11. An improved welding station, comprising:
current sensing means responsive to an output current for providing a current feedback signal;
first oscillation means responsive to an output condition signal and to said current feedback signal for providing a first drive signal having an automatically adjusting duty cycle;
first switching means connected between said current sensing means and said first oscillation means for selectably applying said current feedback signal to said first oscillation means whereupon said welding station functions as a constant current source;
driver means responsive to said first drive signal for providing a second drive signal;
output means responsive to said second drive signal for providing an output voltage and said output current, said output means comprising a plurality of transistors, each of said transistors having a drive input terminal and an output terminal, said output terminals of said transistors being connected in parallel:
protection means connected between said driver means and said output means for protecting said welding station from a failure of a transistor in said output means, said protection means comprising a plurality of first fusing means, each of said first fusing means being connected between said driver means and said drive input terminal of a corresponding transistor of said plurality of transistors, and first shorting means connected to said driver means and responsive to said failure of said transistor in said output means for disabling the one of said first fusing means connected to said transistor; and
first sensing means responsive to said output voltage for providing said output condition signal.

---

5,017,757

## PULSED ARC WELDING MACHINE

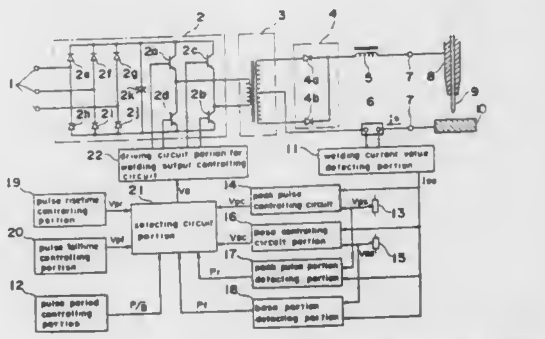
**Naoki Kawai, Ikeda; Koji Hamamoto, Takarazuka, and Masahiro Minooka, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 2, 1990, Ser. No. 502,774**

**Claims priority, application Japan, Apr. 10, 1989, 1-90127**

**Int. Cl.⁵ B23K** *9/09*

**U.S. Cl. 219—130.51** **3 Claims**


1
2
3
4
2e
2f
2g
2a
2c
2k
2d
2b
2h
2i
2j
4a
4b
5
6
7
8
9
10
22
driving circuit portion for welding output controlling circuit
11
welding current value detecting portion
19
pulse risetime controlling portion
21
selecting circuit portion
14
peak pulse controlling circuit
13
16
base controlling circuit portion
15
20
pulse falltime controlling portion
17
peak pulse portion detecting portion
12
pulse period controlling portion
P/B
18
base portion detecting portion

1. A pulse arc welding machine for controlling a peak pulse portion and a base portion of a welding current output therefrom, which includes: a welding current value detecting portion for detecting a welding current value so as to output a welding current value signal; a pulse period controlling portion for outputting a pulse period signal during a period from a leading edge of a pulse current of the welding current to a trailing edge of the pulse current; a peak pulse controlling circuit portion for outputting a pulse peak controlling signal from controlling a peak pulse portion of the welding current so as to maintain it at a preselected given current value using a peak pulse current setting signal output from a pulse peak current setter as an input thereto; a base controlling circuit portion for outputting a base controlling signal for controlling a base portion of the welding current so as to maintain it at a preselected given current value using a base current setting

OL
126
SS
3
MY
21
1991
UMI

signal from a base current setter as an input thereto; the welding machine further comprising: a peak pulse portion detecting portion for outputting a peak pulse portion detecting signal at a time when the welding current has reached a value which is less than a preselected peak pulse current value using a welding current value signal and the peak pulse current setting signal as inputs thereto; a base portion detecting portion for outputting a base portion detecting signal at a time when the welding current is at a value which is a more than a preselected base current value using the welding current value signal and the base current setting signal as inputs thereto; a pulse rise time controlling portion for outputting a pulse risetime controlling signal for controlling a risetime of the pulse current from its base current value to its peak pulse current value; a pulse falltime controlling portion for outputting a pulse falltime controlling signal for controlling a falltime of the pulse current from its peak pulse current value to its base current value; a selecting circuit portion for outputting a driving signal for controlling a driving circuit portion for driving a welding output controlling element, said element controlling the value of the welding current; wherein said selecting circuit selecting as said driving signal one of the peak pulse controlling signal, the base controlling signal, the pulse risetime controlling signal and the pulse falltime controlling signal in accordance with the combination consisting of the pulse period signal, the peak pulse portion detecting signal and the base portion detecting signal so as to optimize the welding current value.

---

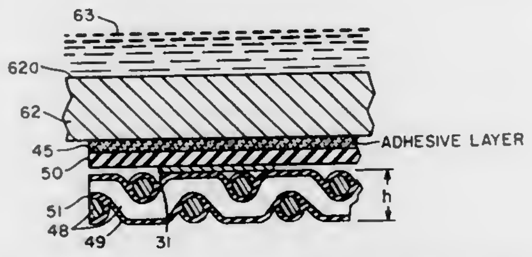
### 5,017,758
### NON-THERMOSTATICALLY CONTROLLED HIGH POWER OIL PAN-HEATER

**Todd A. Kirkman, Hillsdale, Wis., and William D. Heath, Thorp, Wash., assignors to Toddco Research and Development Company, Inc., Yakima, Wash.**

**Filed Jun. 1, 1989, Ser. No. 360,189**

**Int. Cl.⁵ H05B** *3/00;* **F16N** *39/04;* **F01M** *5/02*

U.S. Cl. 219—205 11 Claims



1. An internal combustion engine in combination with a high power thermal balance heater for heating the oil located in the oil pan of the internal combustion engine to a temperature that is less than the oil breakdown temperature by heating the oil pan with the thermal balance heater wherein the thermal balance heater is a non-thermostatically controlled high power oil pan heater comprising:

an internal combustion engine exposed to ambient atmosphere, said internal combustion engine having an oil pan with a reservoir for holding oil, said oil pan having an exterior surface;

a selected quantity of oil for lubricating said internal combustion engine located in said reservoir, said oil having a breakdown temperature in excess of 300 degrees F., said oil pan, said oil and said engine comprising a thermal mass, said thermal mass dissipating heat to the ambient atmosphere in accordance with the air temperature outside said internal combustion engine;

a first layer of heat conducting material having an oil pan engagement surface adapted to be secured to said exterior surface of said oil pan of said internal combustion engine, said first layer of material having an exterior surface for engaging an electrical heating element;

a second protective layer of material having an exterior surface, said second protective layer having an interior surface for engaging an electrical heating element;

an electrical heating element sandwiched between said first layer of material and said second layer of material to provide a heat source for heating said exterior surface of said oil pan of said engine through said first layer, said heating element having a substantially uniform power density of at least about 15 watts per square inch, said heating element power being substantially uniformly distributed over said first layer of material so that said heating element cannot elevate the local temperature of the oil in said oil pan above the oil carbonization or oil breakdown temperature, said heating element having a constant power output within the range of about 20 watts per quart of oil to about 40 watts per quart of oil to thereby have sufficient heat output to heat said oil in said oil pan in excess of 170 degrees F. but less than said oil breakdown temperature;

a heat conducting adhesive fastening the pan engagement surface of said first layer of material to said exterior of said oil pan of said engine, said adhesive having sufficient thermal conductivity so that said heating element can dissipate sufficient heat from itself to said oil pan without destroying the heating element, whereby the heat generated from said heating element and the heat absorbed by said thermal mass of said engine and the heat dissipated to the ambient atmosphere are in thermal balance to continually maintain the engine oil temperature in a predetermined temperature range below the engine oil breakdown temperature without the use of temperature controls even though the heat output of said heating element is constant and the heat dissipation of said thermal mass varies with the ambient atmospheric air temperature outside said engine.

---

### 5,017,759
### STEAM PRODUCING MACHINE WITH IMPROVED DELIVERY NOZZLE ESPECIALLY FOR HEATING BEVERAGES AND RISING FOAM THEREIN

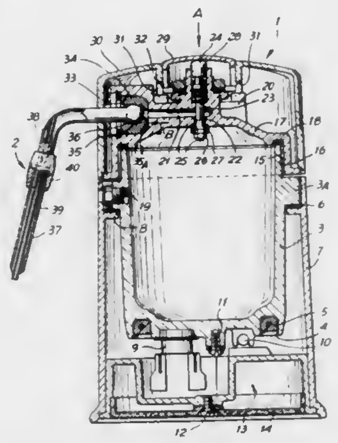
**Lapo Baldacci, Florence, Italy, assignor to Bimak S.p.A., Florence, Italy**

**Filed Jun. 8, 1989, Ser. No. 363,495**

**Claims priority, application Japan, Jun. 17, 1988, 3509 A/88**

**Int. Cl.⁵ H05B** *3/28*

U.S. Cl. 392—386 4 Claims



1. A steam producing machine with a delivery nozzle, especially for heating beverages and rising foam therein, comprising a water boiler with a sealing lid, said water boiler having a bottom with a heating electrical resistance element, said boiler being provided at its top with an outlet for steam intercepted by a manually operated valve and a delivery nozzle fixed to said outlet, said nozzle having a first tubular element which, in an outlet part, has a second tubular element coaxially mounted in said first tube tubular element and having its ends communicating with the atmosphere.

---

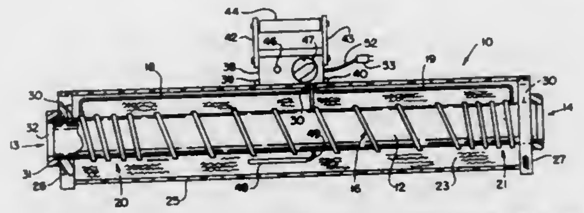
### 5,017,760
### PLASTIC PIPE HEATER

**Lee A. Miller, Novelty, Ohio, assignor to GB Electrical, Inc., Milwaukee, Wis.**

**Filed Jul. 31, 1989, Ser. No. 387,139**

**Int. Cl.⁵ F27D** *11/02;* **F27B** *5/14*

U.S. Cl. 219—390 23 Claims



1. A plastic pipe or conduit heater comprising a heat sink pipe segment open at both ends, a resistance heating element surrounding said pipe segment in tight juxtaposition to the exterior of said pipe segment, heat insulation surrounding said heating element, and a housing surrounding said insulation; said housing including two end walls and one end of said pipe segment projecting slightly beyond one of said end walls with the other end of said pipe segment being slightly recessed within the other of said end walls to facilitate operating a plurality of such heaters in tandem.

---

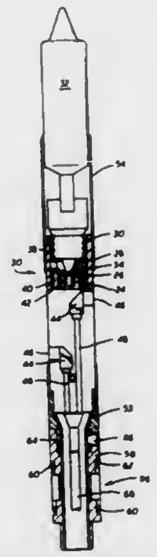
### 5,017,761
### FIBER-OPTIC HEATER PROBE ASSEMBLY FOR HEAT TREATING METALLIC CONDUITS

**Michael G. Brunner, Wilkins Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 18, 1989, Ser. No. 298,442**

**Int. Cl.⁵ H05B** *1/02*

U.S. Cl. 219—502 22 Claims



8. A heater probe for heating a portion of a metallic tube that is surrounded at least in part by a metallic plate to within a selected temperature range, comprising:

an elongated probe body having a first end and a second end, said elongated probe body being insertable into and slidably movable with respect to the tube portion;

a radiant heat source comprising an incandescent light bulb mounted on said first end of said probe body which heats the tube portion to incandescence within the selected temperature range;

temperature monitoring means for monitoring the temperature of the tube portion, said temperature monitoring means comprising optical measuring means for determining the color of the tube portion and optical pyrometer means for translating the optical color measurement of the tube portion into a temperature measurement;

first and second prism means mounted within said probe body for conducting the light of incandescence of the heated tube portion to said optical pyrometer means, said prism means being spaced along the longitudinal axis of said probe body such that said first and second prism means can simultaneously receive the light of incandescence from a longitudinal middle and end of the tube portion as defined by a middle and an end of the metallic plate surrounding the tube portion; and

first and second eddy current sensing coils mounted around said probe body for sensing the opposing edges of the metallic plate surrounding the tube portion, said coils being spaced along the longitudinal axis of said probe body at a distance substantially equal to the distance between opposing edges of the metallic plate.

---

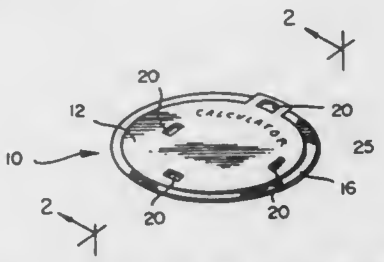
### 5,017,762
### CONCENTRIC ROTATING DISC ASSEMBLY

**Israel Diamond, 731 Dickens Ave., Franklin Square, N.Y. 11010**

**Filed Apr. 4, 1990, Ser. No. 504,010**

**Int. Cl.⁵ G06C** *1/00*

U.S. Cl. 235—78 R 11 Claims



1. A concentric rotating disc assembly, the assembly comprising a first substantially circular disc, a second substantially annular disc and a third substantially circular disc, the second disc being positioned between the first and the third discs in abutting relationship, indicia carried on one of the discs, cursor means for indexing a selected portion of the indicia, the cursor means being carried on another of the discs, each disc being formed of a substantially planar panel, means concentrically mounting the discs for rotation of the second annular disc relative to the first disc, the mounting means comprising a journal, the journal comprising a concentric central circular portion of the panel from which the second annular disc is formed, the second disc being rotatable about the journal, the assembly further including means nonrotatably securing the first and the third discs to the journal.

---

### 5,017,763
### SCANNING APPARATUS STORING BOTH PROCESSED AND UNPROCESSED SCAN DATA SIGNALS FOR SEPARATE READ-OUT AND METHOD OF OPERATING SAME

**David H. Shepard, Greenwich, Conn., assignor to Cognitronics Corp., Stamford, Conn.**

**Division of Ser. No. 40,288, Apr. 20, 1987, Pat. No. 4,760,246. This application Jul. 15, 1988, Ser. No. 219,713**

**Int. Cl.⁵ G06F** *3/12*

U.S. Cl. 235—432 9 Claims

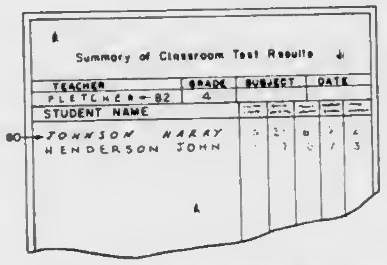
1. The method of processing sheets comprising the steps of:

entering hand-written characters on a sheet;

entering other indicia on said sheet, said other indicia repre-

VOL 1126
ISS 3
MY 21 1991
UMI

senting information related to the information represented by said hand-written characters;
scanning the sheet with a closely-spaced and evenly-spaced series of parallel scan lines including detecting radiation reflected from the sheet along said scan lines;
the scanned region including both said hand-written characters and said other indicia;
producing binary scan spot data signals representing the presence or absence of elements at closely-spaced and evenly-spaced points along each scan line to constitute a rectilinear data array of binary signals representing the presence or absence of character-or-other-indicia elements at the intersections of a rectangular coordinate grid;



processing in a predetermined manner the binary data signals representing said other indicia entered on the sheet to develop processed data signals;
storing the processed data signals for subsequent read-out; and
storing said binary scan spot data signals representing said hand-written characters for a read-out separate from said processed data signals, the storage of said binary scan spot data signals preserving the rectilinear data array character of said data in such a way as to permit their read-out for reproducing the original geometric shape of said hand-written characters, thereby to permit the characters to be read after such reproduction.

---

### 5,017,764
## APPARATUS FOR DRIVING CARD-LIKE RECORD MEDIUM

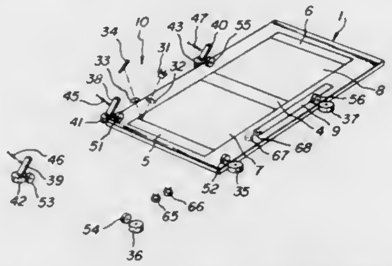
**Akihiko Hashimoto; Toshihiro Kitahara, and Hiroshi Miyajima, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Dec. 21, 1988, Ser. No. 287,040**

**Claims priority, application Japan, Dec. 28, 1987, 62-330288; Dec. 28, 1987, 62-330289**

**Int. Cl.$^5$ G06K** *7/10, 7/14*

**U.S. Cl. 235—454** **11 Claims**



1. An apparatus for driving and optically interacting with a rectangular card-like medium having long side edges, short side edges and first and second opposing surfaces, data to be read from the record medium being recorded on a plurality of longitudinally extending tracks formed on said first surface of the record medium, the apparatus comprising:
a first and a second pair of central rollers having rotational axes extending substantially perpendicular to the tract direction, each roller of said first pair of central rollers and each roller of said second pair of central rollers being spaced from each respective paired roller by a distance substantially equal to a thickness of the record medium held therebetween, said first pair of central rollers being spaced from said second pair of central rollers by a distance substantially equal to a width of the record medium;
means for rotationally driving a driving roller of said first pair of central rollers and a driving roller of said second pair of central rollers contacting the second surface of the record medium, which thereby drive the record medium in a direction of the tracks; and
reading head means for reading data from the record medium by illuminating a beam spot on said first surface of the record medium, said reading head means being arranged in a vicinity of a plane passing through the rotational axes of said first pair of central rollers and said second pair of central rollers which extends substantially perpendicular to the plane of said record medium.

---

### 5,017,765
## HAND HELD BAR CODE SCANNER WITH AUTOMATIC SCANNER DEENERGIZATION

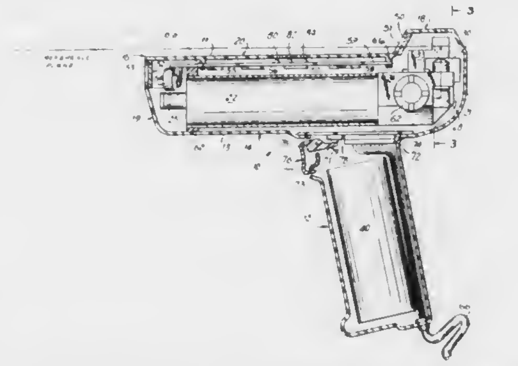
**Howard M. Shepard, Great River; Edward D. Barkan, South Setauket, and Jerome Swartz, Stonybrook, all of N.Y., assignors to Symbol Technologies, Inc., Bohemia, N.Y.**

**Division of Ser. No. 272,545, Nov. 17, 1989, which is a division of Ser. No. 148,555, Jan. 26, 1988, which is a division of Ser. No. 883,923, Jul. 10, 1986, Pat. No. 4,758,717, which is a division of Ser. No. 519,523, Aug. 1, 1983, Pat. No. 4,673,805, which is a division of Ser. No. 342,231, Jan. 25, 1982, Pat. No. 4,409,470.**

**This application Dec. 21, 1989, Ser. No. 454,182**

**Int. Cl.$^5$ G06K** *7/10*

**U.S. Cl. 235—462** **26 Claims**



1. A hand-held bar code scanning device for reading bar code symbols, comprising:
(a) a light source mounted in the hand-held device for generating a light beam, said light beam being directed along a path toward a bar code symbol exterior of the hand-held device;
(b) a scanner in said hand-held device in said path for scanning said light beam along a scan line across the bar code symbol, said scanner including a mirror driven by an electric motor;
(c) a sensor mounted in said hand-held device detecting the intensity of reflected light from said light beam traveling from said bar code symbol back to said hand-held device, and generating an electrical signal responsive to the intensity of said reflected light;
(d) a controller including a manually.activated trigger switch in said hand-held device and coupled to said light source and said motor to energize and de-energize said light source and said motor, said controller energizing said light source and motor in response to said switch and automatically de-energizing said light source and said motor responsive to said generating of said electrical signal after said light has been scanned across said scan line.

---

### 5,017,766
## PORTABLE ELECTRONIC APPARATUS CAPABLE OF CONFIRMING VALIDITY OF TRANSACTION DATA

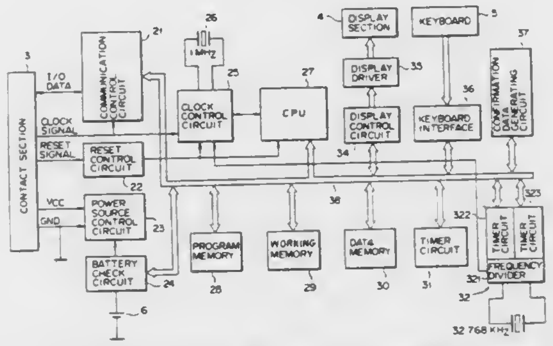
**Masuo Tamada, Yokohama; Tsutomu Tanaka, Tokyo, and Hideo Matsuoka, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 10, 1988, Ser. No. 269,451**

**Claims priority, application Japan, Nov. 13, 1987, 62-288120**

**Int. Cl.$^5$ G06F** *15/21*

**U.S. Cl. 235—492** **12 Claims**



1. A portable electronic apparatus comprising:
data storing means for storing transaction data;
input means for inputting transaction data to be stored in said data storing means and confirmation data for confirming the validity of the transaction data;
additional data generating means for sequentially generating additional data, each additional data generated in a particular transaction being different from additional data which has been generated in an immediately previous transaction;
means for generating internal confirmation data from data which includes the additional data from said additional data generating means and the transaction data input from said input means;
comparing means for comparing the internal confirmation data generated by said internal confirmation data generating means with the confirmation data input from said input means, and outputting a comparing result; and
control means for storing the transaction data input from said input means into said data storing means when the comparison result from said comparing means indicates a coincidence.

---

### 5,017,767
## IC CARD WITH METAL REINFORCING PLATES AND GROUNDING LEAD WIRE

**Yutaka Mizuno, Hachioji, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan**

**PCT No. PCT/JP88/00868, § 371 Date Mar. 22, 1989, § 102(e) Date Mar. 22, 1989, PCT Pub. No. WO89/01874, PCT Pub. Date Mar. 9, 1989**

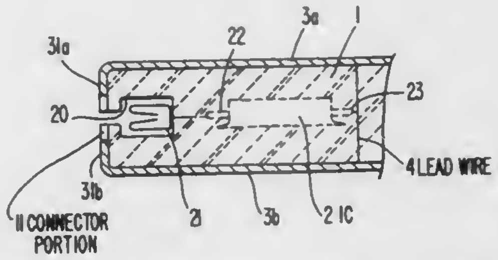
**PCT Filed Aug. 31, 1988, Ser. No. 329,781**

**Claims priority, application Japan, Aug. 31, 1987, 62-217345**

**Int. Cl.$^5$ G06K** *19/06;* **H05K** *1/14*

**U.S. Cl. 235—492** **3 Claims**

1. An IC card having an integrated circuit sealed within, comprising:
a case constructed of a card-shaped synthetic resin material and internally incorporating an integrated circuit board, said case having end faces, side faces and upper and lower surfaces;
a connector portion provided on one of said end faces of said case for connecting said integrated circuit board to an external circuit;
a reinforcing metal plate covering each of said upper and lower surfaces of said case;
each of said metal plates having an integral end portion bent into an L-shaped configuration to cover the peripheral portion of said one end face proximate said connector portion; and



means electrically connecting a ground-connection point of said semiconductor integrated circuit to both of said metal plates.

---

### 5,017,768
## OPTICAL FOCUSING CONTROL APPARATUS

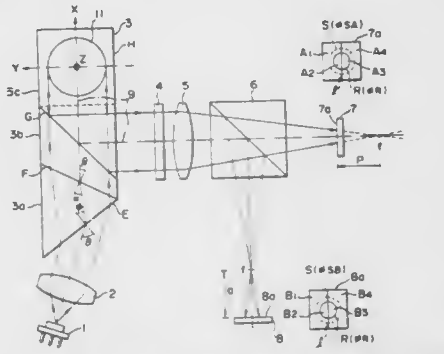
**Masaaki Takagi, Tokyo, Japan, assignor to Copal Company Limited, Tokyo and Fujitsu Limited, Kanagawa, both of, Japan**

**Filed Aug. 10, 1989, Ser. No. 392,114**

**Claims priority, application Japan, Sep. 14, 1988, 63-228397; Sep. 14, 1988, 63-228398; Sep. 14, 1988, 63-228399**

**Int. Cl.$^5$ G01J** *1/20;* **G11B** *7/00*

**U.S. Cl. 250—201.5** **1 Claim**



1. An optical focusing control apparatus for performing focusing control of an objective lens which condenses light on a recording medium and allows reflected light returned from the recording medium to pass therethrough, comprising:
a condenser lens for condensing the returned light which passes through said objective lens;
a beam splitter for splitting light received from said condenser lens into light along first and second optical paths;
a first detector disposed closer to said beam splitter than the focal point of the first optical path of said condenser lens for detecting a quantity of light received from said beam splitter along said optical path;
a second detector disposed further from said beam splitter than the focal point of the second optical path of said condenser lens for detecting a quantity of light received from said beam splitter along said second optical path;
said first detector including a light-receiving surface having a center situated on an optic axis of the first optical path and an area smaller than that of an irradiation pattern of the returned light emerging from said condenser lens;
said second detector including a light-receiving surface having a center situated on an optic axis of the second optical path and an area smaller than that of an irradiation pattern of the returned light emerging from said condenser lens;
said light-receiving surface in said first and second detector divided into four portions by a straight line, which is obtained by projecting a track direction of said recording

VOL 1126
ISS 3
MY 21
1991
UMI

medium, and a circle which is defined by a circumference of the area smaller than that of an irradiation pattern of the returned light emerging from said condenser lens, two portions of the four portions of said light-receiving surface in said first and second detector, which are defined by the circle, for producing a photoelectric output indicative of the detected quantity of light;

said first and second detectors being disposed in such a manner that the respective photoelectric outputs thereof coincide when said objective lens is focused;

a first adder for receiving the photoelectric output from each of the two portions of said light-receiving surface in said first detector and producing a sum of the photoelectric output;

a second adder for receiving the photoelectric output from each of the two portions of said light-receiving surface in said second detector and producing a sum of the photoelectric output;

a subtracter for producing a difference between the sum of the photoelectric output produced by said first adder and the sum of the photoelectric output produced by said second adder; and

said objective lens having its focusing control based on the difference produced by said subtractor.

---

### 5,017,769

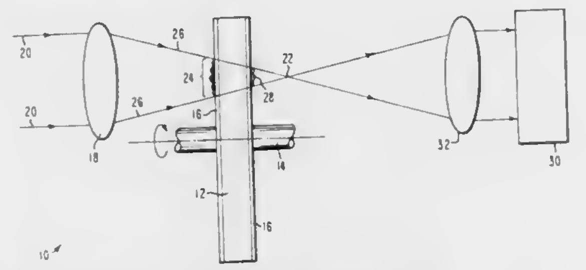
### SURFACE PARTICULATE LASER POWER LIMITER WHICH GENERATES A PLASMA

**David B. Cohn, Torrance; Wayde H. Affleck, El Segundo, and George D. Lawrence, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Mar. 26, 1990, Ser. No. 499,236**

**Int. Cl.$^5$ H01J** *3/14, 5/16, 40/14*

**U.S. Cl. 250—216** **20 Claims**



1. An optical power limiter comprising:

an optically transparent movable support structure;

an optically transmissive layer of particulate material disposed on the movable support structure, which particulate material that is adapted to form a high density plasma when subjected to energy having a predetermined plasma formation energy threshold; and

focussing means adapted to focus incident radiation onto a predetermined focal area of the layer of particulate material, the relative size of the focal area being a function of a predetermined energy threshold and the plasma formation energy threshold of the layer of particulate material;

whereby incident damage level energy concentrated on the focal area of particulate layer generates a plasma that absorbs, reflects and diffracts the damage level energy.

---

### 5,017,770

### TRANSMISSIVE AND REFLECTIVE OPTICAL CONTROL OF SOUND, LIGHT AND MOTION

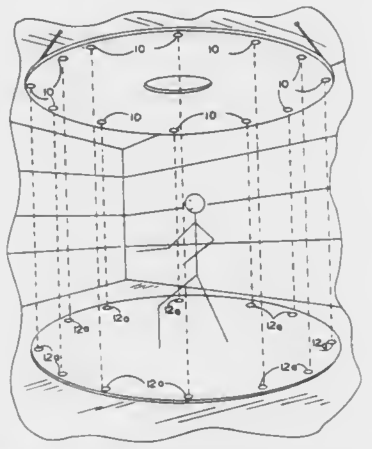
**Hagai Sigalov, 20 Eastside Rd., N.W. 11, London, England**

**Division of Ser. No. 81,007, Jun. 1, 1987, abandoned. This application Aug. 2, 1989, Ser. No. 388,386**

**Int. Cl.$^5$ G01V** *9/04*

**U.S. Cl. 250—221** **25 Claims**

1. An optical control means comprising: means for producing a plurality of light beams; a plurality of directional sensing means arranged to sense cutting of the respective beams by a user and an output signal from said plurality of directional sensing means, the beam producing means being carried on a support means comprising a plurality of arms, the arms being hinged to enable the support means to be collapsed.



---

### 5,017,771

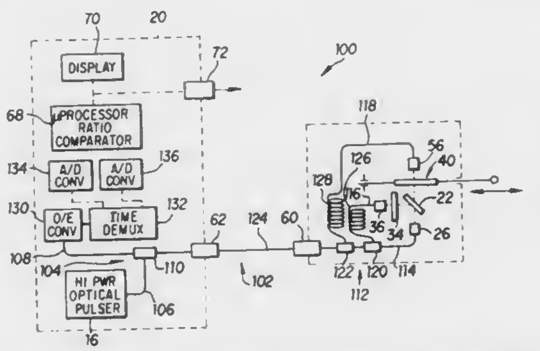
### POSITION SENSOR USING OPTICAL FIBERS AND A VARIABLE FILTER

**Richard D. Bartholomew; Stephen K. Pitalo, both of Huntsville, and James R. Schaffer, Jr., Madison, all of Ala., assignors to The Boeing Company, Seattle, Wash.**

**Filed Nov. 20, 1989, Ser. No. 438,072**

**Int. Cl.$^5$ H01J** *5/16*

**U.S. Cl. 250—227.21** **9 Claims**



1. An optical position sensor for sensing the position of an object movable along a motion axis, said sensor comprising:

a light source for producing an optical beam;

a support member;

beamsplitting means fixedly coupled to said support member and optically coupled to said light source for converting the optical beam into a reference beam and a subject beam, and for projecting the subject beam along a beam axis fixed relative to said support member;

variable filter means positioned along the beam axis, coupled to the object and movably coupled to said support member to be movable along the motion axis in coordination with movement of the object for modulating the subject beam, the transmissivity of said variable filter means being nonuniform along the motion axis to attenuate the subject beam in accordance with the position of the object;

a photodetector optically coupled to said beamsplitting means to convert the reference beam into a reference signal and optically coupled to said variable filter means to convert the subject beam into a subject signal; and

comparing means coupled to said photodetector for comparing the subject signal to the reference signal to determine the position of the object.

### 5,017,772

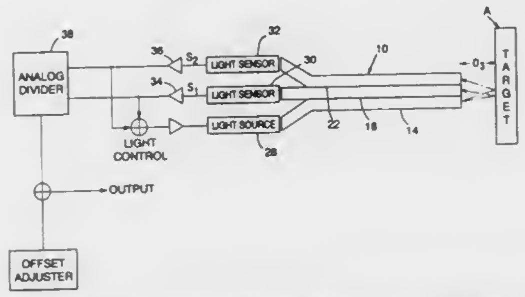
### FIBER OPTIC PROBE SENSOR FOR MEASURING TARGET DISPLACEMENT

**Ralph S. Hafle, Benton, Ark., assignor to BEI Electronics, Inc., San Francisco, Calif.**

**Filed May 30, 1989, Ser. No. 358,831**

**Int. Cl.$^5$ H01J** *5/16*

**U.S. Cl. 250—227.21** **25 Claims**



1. An apparatus for determining displacement of a target of a type which emits light onto and receives light reflected from a target, the apparatus comprising:

a. a plurality of light emitting fibers exclusively occupying a first region and capable of transmitting light from a light source and emitting the transmitted light onto a target so that the emitted light is reflected from the target;

b. a first plurality of light receiving fibers exclusively occupying a second region, said first plurality of light receiving fibers spaced apart from said plurality of light emitting fibers at a distance $D_1$ and capable of receiving light reflected from the target and transmitting the received light;

c. a second plurality of light receiving fibers exclusively occupying a third region, said second plurality of light receiving fibers spaced apart from said light emitting fibers at a distance $D_2$ so that $D_2$ is not equal to $D_1$ and capable of receiving light reflected from the target and transmitting the received light;

d. means responsive to the transmitted light from the first and second pluralities of light receiving fibers, the transmitted light having a first and a second intensity respectively, for generating an output derived from a ratio of the first and second intensities.

---

### 5,017,773

### APPARATUS FOR DETECTING NUMBER OF PACKS INCLUDED IN BUNDLE

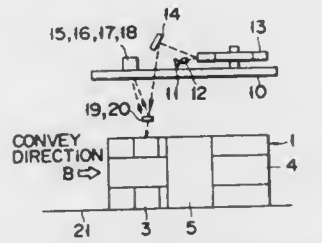
**Masamichi Sato, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 20, 1989, Ser. No. 453,837**

**Claims priority, application Japan, Dec. 22, 1988, 63-322050**

**Int. Cl.$^5$ G01N** *9/04*

**U.S. Cl. 250—223 R** **14 Claims**



1. A pack number detecting apparatus for detecting the number of packs included in a bundle being prepared by binding a predetermined number of packs, and each pack being prepared by binding a predetermined number of sheets with a strip, comprising:

means for radiating light on the bundle;

means for scanning light reflected from the bundle;

means for converting light reflected from the bundle into an electrical signal;

first binary detection means for detecting deflection points corresponding to boundaries between adjacent packs included in the electrical signal which is converted light reflected from the strips of the bundle by said converting means and for binarizing a signal indicative thereof; and

second detection means for detecting the number of packs included in the bundle on the basis of the number of deflection points detected by said first binary detection means.

---

### 5,017,774

### RADIATION IMAGE READ-OUT AND REPRODUCING METHOD

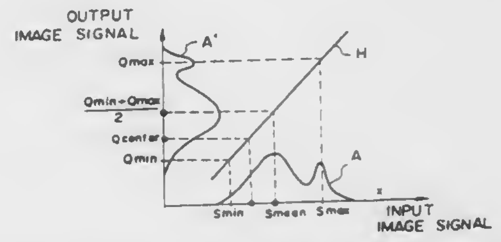
**Toshitaka Agano, and Yuichi Fuseda, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Oct. 17, 1989, Ser. No. 422,465**

**Claims priority, application Japan, Oct. 17, 1988, 63-261173**

**Int. Cl.$^5$ G01N** *23/04*

**U.S. Cl. 250—327.2** **4 Claims**



1. A radiation image read-out and reproducing method wherein a read-out operation is carried out in which a stimulable phosphor sheet having a radiation image stored thereon is exposed to stimulating rays, which cause the stimulable phosphor sheet to emit light in proportion to the amount of energy stored thereon during exposure to radiation, and wherein the emitted light is photoelectrically detected and a read-out image signal is thereby obtained, said read-out image signal representing the radiation image and being used in a reproducing operation in which the radiation image is reproduced as a visible image,

the radiation image read-out and reproducing method comprising the steps of:

(i) carrying out processing which obtains information from said read-out image signal, said information being used to determine optimum image processing conditions under which at least one image processing is to be conducted, and carrying out at least one type of image processing which can be conducted without said information being used, said processing which obtains information and said at least one type of processing being carried out during the period of time from when said read-out operation is being carried out to when said reproducing operation is begun, and

(ii) carrying out further image processing,

wherein the optimum image processing conditions are determined on the basis of said information after said reproducing operation is begun.

/OL 126
SS 3
MY 21
1991
UMI

### 5,017,775
## OPTICAL APPARATUS FOR DETECTING CAVITATION BUBBLES IN LIQUIDS

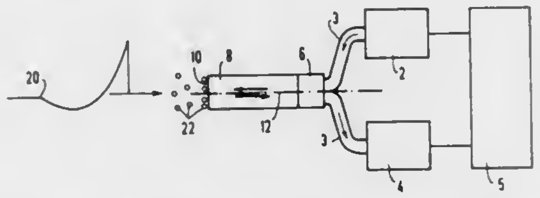
**Bernd Granz, Oberasbach; Ralf Holzapfel, Braeuningshof, and Joachim Niewisch, Nuremberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Mar. 16, 1990, Ser. No. 494,757**

**Claims priority, application European Pat. Off., Mar. 23, 1989, 89105282**

**Int. Cl.⁵ H01J** *5/16*

**U.S. Cl. 250—227.25** **8 Claims**



1. An optical apparatus for detecting cavitation bubbles caused by a shock wave in liquids comprising:
- (a) an optical waveguide having an unattached first end and a second end;
- (b) a light source optically coupled to said second end;
- (c) an opto-receiver also optically coupled to said second end;
- (d) means for detecting a shock wave signal and a cavitation signal resulting from the accumulation of the cavitation bubbles at said unattached first end coupled to said opto-receiver so that the presence of cavitation bubbles caused by the shock wave can be determined.

---

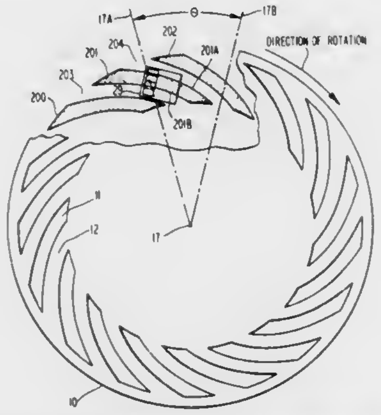
### 5,017,776
## APPARATUS FOR AND METHODS OF OPTICAL ENCODING HAVING SPIRAL SHAPED LIGHT MODULATOR

**Victor D. Loewen, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 321,994, Mar. 10, 1989, Pat. No. 4,952,799. This application Dec. 8, 1989, Ser. No. 448,037**

**Int. Cl.⁵ G01D** *5/34*

**U.S. Cl. 250—231.14** **22 Claims**



1. An optical encoder for generating a signal reflective of the movement of an object along a predetermined route comprising:
- (a) a light source for emitting a light beam along a light path;
- (b) moveable modulating means, positioned in said light path, for modulating said light beam in response to the movement of the object, said modulating means comprising an optical track positioned in said light path to provide spiral shaped light images separated by spiral shaped dark images; and
- (c) an interdigitated photo detector array positioned to receive said modulated light and for generating said signal in response to light incident thereon, wherein said photodetector array is oriented with respect to said images such that the photo detector surface area on which said spiral shaped images are incident is substantially constant as said object moves along its route.

---

### 5,017,777
## DIFFRACTED BEAM ENCODER

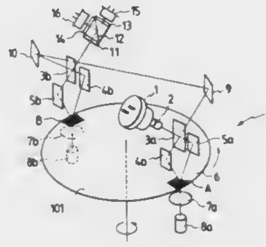
**Koh Ishizuka, Urawa; Masaaki Tsukiji, Tokyo; Yoichi Kubota, Kawasaki; Satoshi Ishii, Tokyo, and Tetsuharu Nishimura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 17, 1989, Ser. No. 437,672**

**Claims priority, application Japan, Nov. 18, 1988, 63-291470**

**Int. Cl.⁵ G01D** *5/34;* **G01B** *11/02*

**U.S. Cl. 250—231.16** **34 Claims**



1. A method for detecting a state of rotation of a rotary scale having a diffraction grating formed thereon and along the direction of rotation said rotary scale, said method comprising the steps of:
- a first generating step in which a radiation beam is caused to pass toward a first place on said diffraction grating in which a first and a second diffracted beam are generated;
- a second generating step in which said first and second diffracted beams are again diffracted at said first place and a first re-diffracted beam is generated from said first diffracted beam and a second re-diffracted beam is generated from said second diffracted beam;
- a step in which said first and second re-diffracted beams are superimposed to be directed to a second place of said diffraction grating which is substantially opposed to said first place with respect to the center of rotation of said rotary scale through a predetermined common beam path;
- a step in which an interference beam is formed by causing a diffracted beam generated by diffracting said first re-diffracted beam and a diffracted beam generated by said second-rediffracted beam to interfere with each other at said second place; and
- a step in which said state of rotation of said rotary scale is detected by converting said interference beam into a signal.

---

### 5,017,778
## METHODS AND APPARATUS FOR EVALUATING FORMATION CHARACTERISTICS WHILE DRILLING A BOREHOLE THROUGH EARTH FORMATIONS

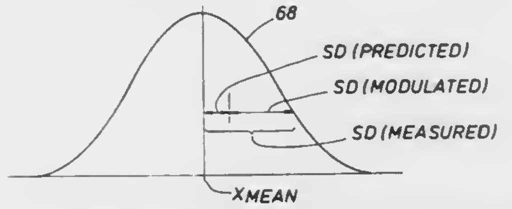
**Peter D. Wraight, Missouri City, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.**

**Filed Sep. 6, 1989, Ser. No. 403,535**

**Int. Cl.⁵ G01V** *5/12*

**U.S. Cl. 250—254** **50 Claims**

1. A method for determining at least one characteristic of an earth formation penetrated by a borehole and irradiated by radiation and comprising the steps of:
- positioning a directional radiation sensor in said borehole adjacent to said irradiated formation and rotating said radiation sensor for obtaining a series of successive measurements that are representative of the radiation returning from circumferentially-spaced locations around said borehole;
- determining the mean as well as the measured standard deviation of said series of successive measurements; and



- correlating said mean and said measured standard deviation of said successive measurements for providing indications which are representative of said one formation characteristic as well as the transverse cross-sectional configuration of said borehole.

---

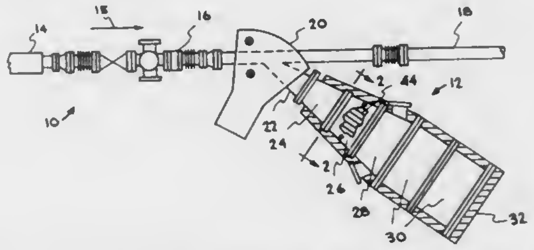
### 5,017,779
## REAL TIME FARADAY SPECTROMETER

**Tommy E. Smith, Jr., Fremont, Calif.; Kenneth W. Struve, Albuquerque, N. Mex., and Nicholas J. Colella, Livermore, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Apr. 30, 1990, Ser. No. 516,402**

**Int. Cl.⁵ H01J** *49/00*

**U.S. Cl. 250—283** **20 Claims**



16. A method for measuring the energy distribution for a plurality of charged particles with trajectories forming a charged particle beam, comprising the steps of:
- passing the charged particles through a magnetic field with magnetic field lines substantially perpendicular to the trajectories of the charged particles, thus causing the trajectories of the charged particles to bend and angularly separate into a plurality of angularly dispersed trajectories;
- passing a charged particle through only one of a plurality of chambers; and
- the magnetic field induced by the current passing through each individual chamber.

---

### 5,017,780
## ION REFLECTOR

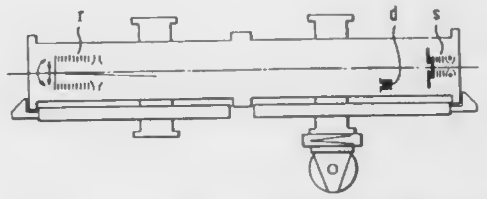
**Roland Kutscher, Dresdener Str. 6, D-6301 Biebertal; Raimund Grix, Waldstr. 2, D-6307 Linden; Gangqiang Li, Hammstr. 8, D-6300 Giessen, and Hermann Wollnik, Auf der Platte 30, D-6301 Fernwald 2, all of Fed. Rep. of Germany**

**Filed Sep. 20, 1989, Ser. No. 409,671**

**Int. Cl.⁵ H01J** *37/47, 49/40*

**U.S. Cl. 250—287** **10 Claims**

1. An ion reflector for a time-of-flight mass spectrometer having a number of electrodes which are arranged in a number of planes one behind the other in the direction of the ion propagation for providing longitudinal focusing characterized in that at least one of the electrodes is substantially in the shape of a truncated cone with the smaller end of the cone forming a grid free aperture through which said ions are propagated, said at least one electrode providing an inhomogeneous electric field for transverse focusing, as well as longitudinal focusing, while minimizing spherical and chromatic lateral aberrations.



---

### 5,017,781
## READ-OUT SYSTEM FOR A LUMINESCENT STORAGE SCREEN IN AN X-RAY DIAGNOSTICS INSTALLATION

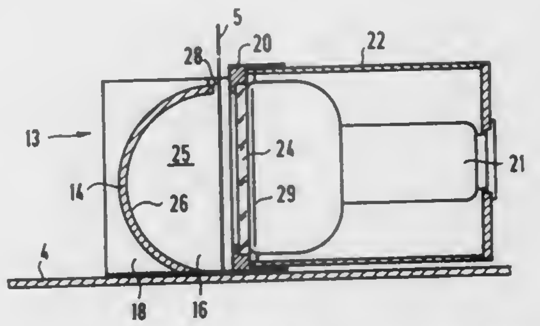
**Gottfried Lange; Hans-Erich Reinfelder, bothof Erlangen, and Guenther Tressl, Bubenreuth, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Oct. 6, 1989, Ser. No. 418,256**

**Claims priority, application European Pat. Off., Oct. 14, 1988, 88117155.7**

**Int. Cl.⁵ G03B** *42/00*

**U.S. Cl. 250—327.2** **10 Claims**



1. In a system for reading-out a latent image from a luminescent storage screen including means for scanning said storage screen with radiation for causing pixels in a cross-machine line of said storage screen to luminesce as said storage screen is advanced line-by-line in the machine direction, and means for displaying a visual reproduction of said latent image, the improvement comprising:
- opto-electrical transducer means for converting light emitted by the pixels of said storage screen into electrical signals for supply to said means for displaying, said opto-

OL
126
SS
3
MY
21
1991
UMI

electrical transducer means having a light entry face disposed substantially parallel to the cross-machine direction;
- a tubular light guide having an interior mirrored surface extending in the cross-machine direction above the advancing storage screen coextensive with and substantially parallel to said lines of said storage screen and formed by a half-shell having a cross-machine opening therein facing and substantially co-extensive with said light entry face of said opto-electrical transducer means so that light from said pixels, is reflected by said light guide directly onto said light entry face, said light guide being spaced from said light entry face to define, in combination with said entry face, a passage for said radiation to said storage screen; and
- two end plates closing opposite ends of said light guide and each being mirrored on a surface thereof facing said light guide.

---

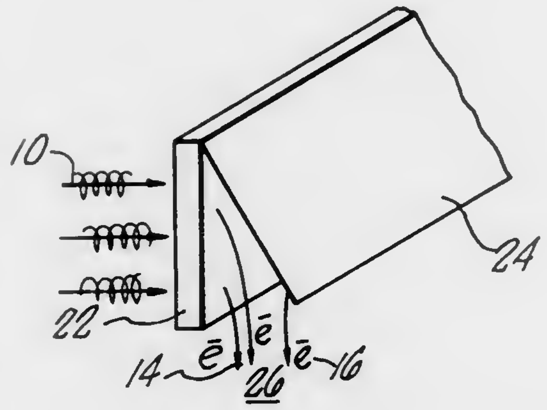
### 5,017,782
### X-RAY DETECTOR FOR RADIOGRAPHIC IMAGING

**Robert S. Nelson, 25511 El Conejo La., Laguna Hills, Calif. 92653**

**Continuation-in-part of Ser. No. 47,028, May 5, 1987, Pat. No. 4,937,453. This application Mar. 2, 1988, Ser. No. 163,395**

**Int. Cl.⁵ G01N** *23/04*

**U.S. Cl. 250—327.2** **12 Claims**



1. A detector for optical photons from a storage phosphor medium comprising,
- a first photocathode, said first photocathode comprising means for receiving optical photons emitted from a storage phosphor medium, and
- a second photocathode arranged to receive photons passing through the first photocathode.

12. A detector for optical photons emitted from a storage phosphor medium employed for radiographic imaging comprising:
- a plurality of individual strip photocathode means structured for enhancement of conversion probability from optical photons emitted from a storage phosphor medium into photoelectrons,
- electron optic means for focusing the photoelectrons, and a vacuum container in which the photoelectrons are focused, and
- a detector for collecting at least a portion of the output of the photocathode means.

---

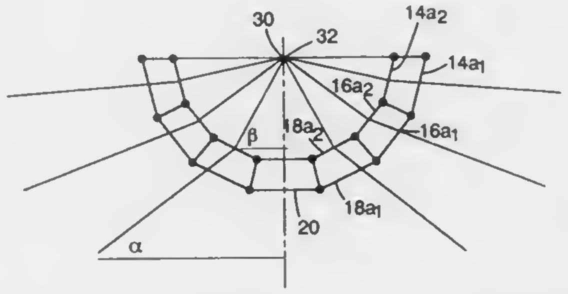
### 5,017,783
### 360 DEGREE FIELD OF VIEW OPTICAL SENSING DEVICE

**Ali R. Mousavi, San Jose, Calif., assignor to C & K Systems, Inc., Folsom, Calif.**

**Filed Oct. 25, 1989, Ser. No. 427,019**

**Int. Cl.⁵ G01T** *5/08*

**U.S. Cl. 250—353** **3 Claims**



1. A three hundred sixty degree (360°) passive infrared radiation intrusion detector for gathering radiation at a distance spaced apart from a ground plane comprising:
- a plurality of infrared radiation gathering and focusing means positioned substantially circumferentially about a central location for gathering infrared radiation from a 360° field of view and for focusing said radiation gathered onto said central location;
- each of said plurality of infrared radiation gathering and focusing means comprises a combination fresnel lens and fresnel prism for directing said infrared radiation onto said central location; and
- a sensor at said central location for receiving radiation from said plurality of infrared radiation gathering and focusing means and for converting same into an electrical signal.

---

### 5,017,784
### THERMAL DETECTOR

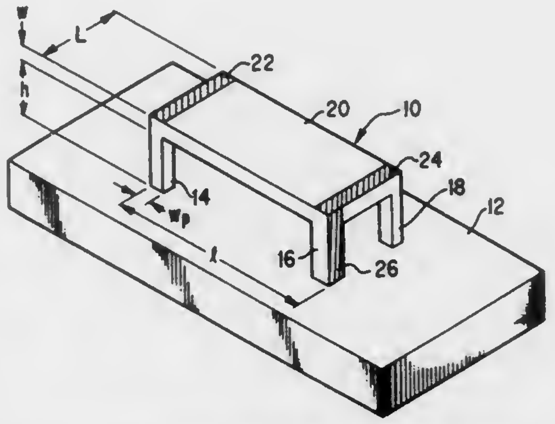
**Arden Sher, Belmont, and Karen Sabo, Newark, both of Calif., assignors to Savin Corporation, Stamford, Conn.**

**Continuation of Ser. No. 877,437, Jun. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 822,833, Jan. 27, 1986, Pat. No. 4,719,026, which is a division of Ser. No. 710,586, Mar. 11, 1985, Pat. No. 4,585,535. This application May 29, 1990, Ser. No. 528,905**

**Int. Cl.⁵ G01J** *1/00, 5/20*

**U.S. Cl. 250—338.1** **4 Claims**

1. A thermal detector including in combination a carrier and a coating of copper particles deposited thereon, said copper particles being encapsulated in a binder comprising a thermoplastic polymer which is insoluble in a low-boiling aliphatic hydrocarbon liquid at ambient or room temperatures and is softenable at temperatures above 70° C., said binder having a plurality of functional sites and having a minor amount of a charge director incorporated therein.



---

### 5,017,785
### IR-SPECTROMETRIC ANALYZING PROCEDURE AND MEANS

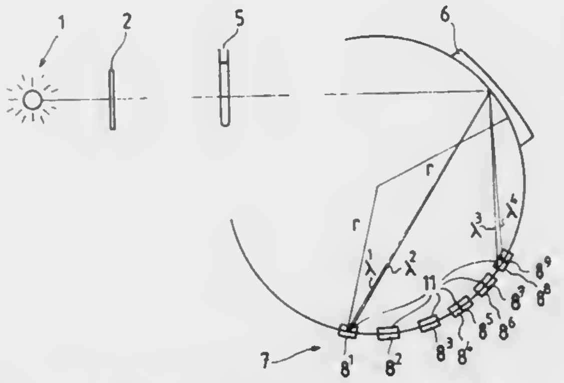
**Jaakko Räsänen, Espoo, Finland, assignor to Oy Dailab Inc., Espoo, Finland**

**Filed Dec. 7, 1989, Ser. No. 447,188**

**Claims priority, application Finland, Feb. 16, 1989, 890758**

**Int. Cl.⁵ G01J** *3/427*

**U.S. Cl. 250—345** **14 Claims**



1. An IR-spectrometric analyzing procedure for analyzing the components of a dispersed system subject to turbulence affecting the spectrometric analysis, wherein an IR light beam is produced; the IR light beam is conducted through a single sample cuvette containing the sample; the IR light beam thus obtained is diffracted to a spectrum; the measuring the absorbance and reference absorbance are detected at a plurality of pairs of predetermined, fixed, adjacent points in the spectrum by dual beam detectors and a quantitative analysis value is determined from the ratio of the difference between the pairs of detected measuring and reference absorbances, characterized in that the pairs of measuring absorbance and reference absorbance are detected simultaneously from the IR light beam conducted through the single sample and diffracted to a spectrum and detected at predetermined pairs of fixed points by dual beam detectors.

---

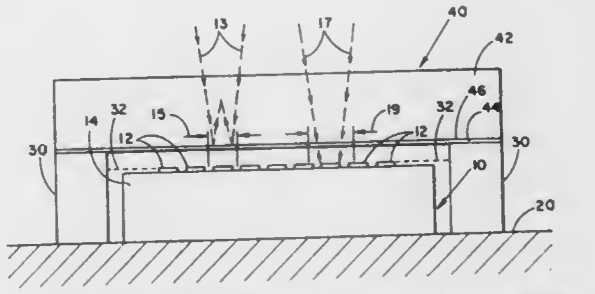
### 5,017,786
### $V_2O_3$ PROTECTION FOR IR DETECTOR ARRAYS AGAINST INTENSE THERMAL RADIATION

**David L. Jungkman, Hudson, N.H., and Timothy E. White, Acton, Mass., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Dec. 19, 1989, Ser. No. 452,753**

**Int. Cl.⁵ G01J** *5/06*

**U.S. Cl. 250—352** **17 Claims**



1. Apparatus in a thermal radiation detection device including optics having a focal plane comprising:
- (a) a cold mounting surface;
- (b) a detector array including a plurality of radiation sensitive detectors mounted on a carrier which is in thermal contact with the cold mounting surface;
- (c) means for defining a cold platform means proximate to the detector array and mounted to the cold mounting surface; and
- (d) a substrate including a film of vanadium trioxide on a first surface, wherein the substrate is mounted to the cold platform means at the first surface and wherein the substrate is structured and arranged to interpose the vanadium trioxide film proximate to the focal plane between the detector array and the radiation source plane, wherein the vanadium trioxide film has a transition temperature above which it becomes reflective and the cold platform means is structured and arranged at a distance from the cold mounting surface to be maintained at a temperature below the transition temperature and so as to maintain the vanadium trioxide film below its transition temperature in the absence of excessive external radiation striking the film.

OL
126
SS
3
MY
21
1991
UMI

### 5,017,787

### DESK TOP TYPE INFRARED RADIATION MOISTURE MEASURING APPARATUS

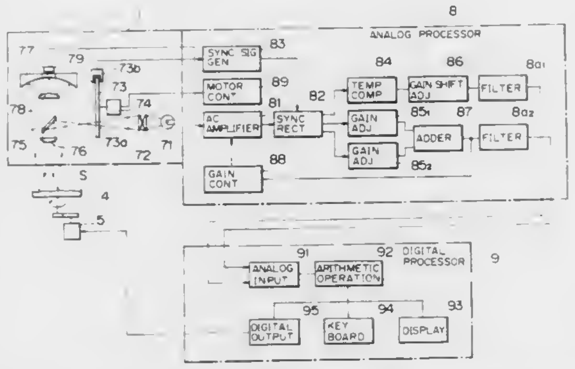
**Kiyomi Sato, and Yasuo Saito, both of Kanagawa, Japan, assignors to Japan Tobacco, Inc., Japan**

**Filed Oct. 31, 1989, Ser. No. 429,583**

**Claims priority, application Japan, Nov. 4, 1988, 63-143422[U]**

**Int. Cl.$^5$ G01N *21/01, 21/35***

**U.S. Cl. 250—360.1** **2 Claims**



1. A desk-top type infrared radiation moisture measuring apparatus, in which a specimen containing moisture therein is exposed to a measurement light easily absorbed into water and to at least one reference light easily absorbed into water and to measure said moisture on the basis of said measurement light and said reference light reflected from said specimen, comprising:

a turntable on which said specimen is placed and which is exposed to both said measurement light and said reference light from above at a portion away from the rotational center thereof; and

a drive means for driving said turntable into rotation;

said specimen placed on said turntable being measured the moisture contained therein while said turntable is being rotated,

wherein said reference light includes a first reference light and a second reference light, said first reference light having a wavelength longer than said measurement and said second reference light having a wavelength shorter than said measurement light, and

wherein said measurement light reflected from said specimen and reference light reflected from said specimen are each averaged with a predetermined time constant over a predetermined time interval while said turntable is rotated.

---

### 5,017,788

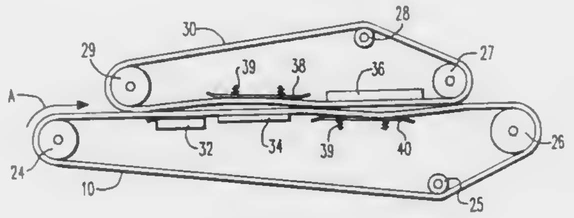
### ALPHA-DETECTING CONVEYOR APPARATUS

**Martin D. Humphrey, Vincentown, and Alfred N. Johnson, Mt. Laurel, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 29, 1989, Ser. No. 414,983**

**Int. Cl.$^5$ G01T *1/16***

**U.S. Cl. 250—385.1** **32 Claims**



32. An apparatus for detecting radioactive contamination in garments comprising:

means for conveying garments along a path;

a first radiation detector positioned below said path;

a second radiation detector positioned above said path, wherein one of said first and second detectors is positioned downstream from the other of said first and second detectors;

first bias means for urging said garments toward said first radiation detector; and

second bias means for urging said garments toward said second radiation detector means.

---

### 5,017,789

### RASTER SCAN CONTROL SYSTEM FOR A CHARGED-PARTICLE BEAM

**Phillip E. Young, and David B. McColl, both of Albuquerque, N. Mex., assignors to Loma Linda University Medical Center, Loma Linda, Calif.**

**Filed Mar. 31, 1989, Ser. No. 332,284**

**Int. Cl.$^5$ H01J *3/14;* G01K *1/08***

**U.S. Cl. 250—396 ML** **16 Claims**

1. A system that scans a target area with a charged-particle beam comprising:

means for generating a charged-particle beam having a described energy;

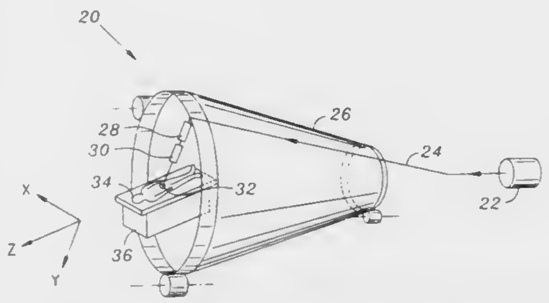
means for directing said beam through a pair of magnets having orthogonally oriented magnetic fields, each magnet having a coil associated therewith;

means for generating a sweeping magnetic field with a first of said magnets, said sweeping magnetic field causing said beam to sweep back and forth across the target area in one direction;

means for generating a stair-stepped magnetic field with a second of said magnets, said stair-stepped magnetic field assuming a first magnetic field strength for a first prescribed period of time, a second magnetic field strength for a second prescribed period of time, a third magnetic field strength for a third prescribed period of time, and so on up to an nth field strength for an nth prescribed period of time, where n is an integer and represents the number of steps in said stair-stepped magnetic field, said stair-stepped magnetic field causing said beam to step across the target area in a direction orthogonal to the direction caused by said sweeping magnetic field; and

means for synchronizing the sweeping magnetic field generating means with the stair-stepped magnetic field generating means so that the sweeping magnetic field begins its sweep coincident with the beginning of one of said prescribed periods of time during which the stair-stepped magnetic field has assumed one of its n magnetic field strengths;

whereby said sweeping and stair-stepped magnetic fields combine to steer the beam across the target area in a desired raster scan pattern.



---

### 5,017,790

### TEMPERATURE CONTROLLER UNITS FOR DENTAL AGAR IMPORESSION MATERIALS

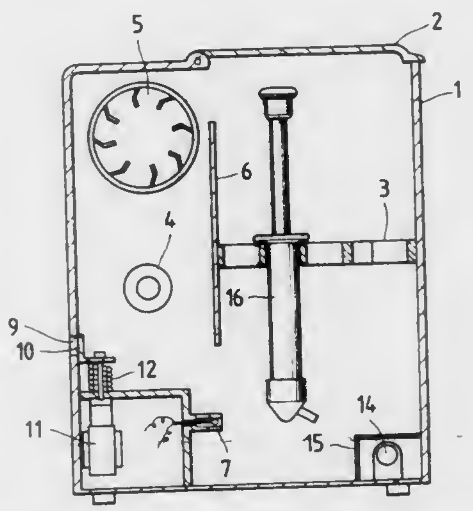
**Norio Kojima, Tokyo, Japan, assignor to G-C Dental Industrial Corp., Tokyo, Japan**

**Filed Sep. 29, 1989, Ser. No. 414,304**

**Claims priority, application Japan, Nov. 2, 1988, 63-276090**

**Int. Cl.$^5$ G01N *23/00***

**U.S. Cl. 250—455.1** **32 Claims**



1. A temperature controller unit for dental agar impression materials, comprising:

a box member having a lid designed to be closed to shut off outside air or prevent substantial entrance of the outside air;

heating means provided within said box member for heating air within said box member to heat a dental agar impression material from a first heating temperature at which it is put in a complete sol state to a second heating temperature at which it remains in a sol state to take an intra-oral impression;

a fan provided within said box member for circulating the air within said box member;

temperature detecting means provided within said box member for detecting the temperature of the air within said box member;

a heating means controlling section provided within said box member for controlling said heating means in receipt of a signal from said temperature detecting means;

a container holder provided within said box member for holding a plurality of containers filled therein with said dental agar impression material; and

a shielding plate interposed between said container holder and said heating means for shielding said container from radiant heat provided by said heating means and permitting air circulation from both sides of said shielding plate, wherein localized heating of said containers is prevented.

---

### 5,017,791

### X-RAY INTENSIFYING SCREEN INCLUDING A TITANIUM ACTIVATED HAFNIUM DIOXIDE PHOSPHOR CONTAINING YTTRIUM TO REDUCE AFTERGLOW

**Philip S. Bryan, Webster; Patrick M. Lambert; Christine M. Towers, both of Rochester, and Gregory S. Jarrold, Henrietta, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 305,222, Feb. 3, 1989. This application Nov. 16, 1989, Ser. No. 437,142**

**Int. Cl.$^5$ C09K *11/67***

**U.S. Cl. 250—483.1** **11 Claims**

1. A screen comprised of

a support and

a fluorescent layer containing a phosphor capable of absorbing X-radiation and emitting longer wavelength electromagnetic radiation comprised of monoclinic crystals of a titanium activated hafnium dioxide phosphor host,

characterized in that the monoclinic crystals consist essentially of oxygen and combined elements satisfying the relationship

$$Hf_{1-z}Zr_zTi_xM_yY_w$$

wherein

M represents at least one alkali metal;

w is in the range of from $1\times10^{-6}$ to $1\times10^{-3}$;

x is in the range of from $3\times10^{-4}$ to 1.0;

y is up to 1; and

z is up to 0.3,

the phosphor exhibiting a reduced afterglow when excited by X-radiation as compared to the phosphor as defined above absent yttrium.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,792

### METHOD AND APPARATUS FOR DETECTING A SHEET STRIP MATERIAL MISFEED CONDITION

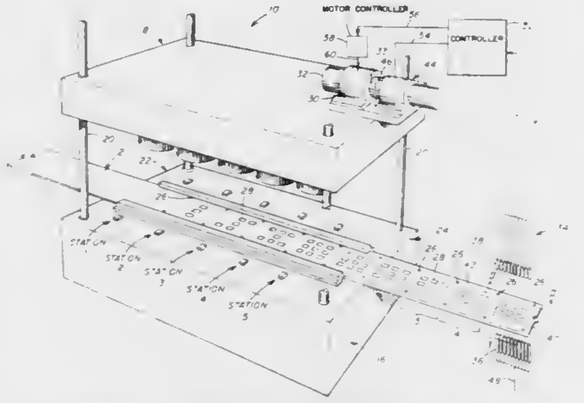
**Harry J. Walters, Pittsburgh, Pa., assignor to Oberg Industries, Freeport, Pa.**

**Continuation-in-part of Ser. No. 326,484, Mar. 20, 1989, Pat. No. 4,886,973, which is a continuation of Ser. No. 84,453, Aug. 12, 1987, Pat. No. 4,855,606. This application Dec. 6, 1989, Ser. No. 446,934**

**The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.**

Int. Cl.$^5$ G01N *21/86*

U.S. Cl. 250—548 10 Claims



1. Apparatus for detecting a sheet strip material misfeed condition in a stamping press having an intermittent feed comprising,

- stamping means having an intermittent feed of sheet strip material,
- said stamping means having an inlet portion and an outlet portion, said stamping means arranged to stamp a sheet strip material passing from said inlet portion to said outlet portion to provide a plurality of individual openings in said sheet strip material,
- monitoring means adjacent said stamping means outlet portion,
- means for passing said plurality of individual openings in said sheet strip by said monitoring means,
- said monitoring means producing a pattern of signals from a plurality of monitoring means signals as each said opening in said sheet strip is passed by said monitoring means,
- controller means having an input for receiving said plurality of monitoring means signals produced as each said opening in said sheet strip is passed by said monitoring means and an output connected to said stamping means,
- said controller means including means for comparing said pattern of signals from a plurality of monitoring means signals produced as one of said openings in said sheet strip passes by said monitoring means to another pattern of signals from a plurality of monitoring means signals produced as a following opening in said sheet strip passes by said monitoring means, and
- said controller means providing a signal to said stamping means to initiate stoppage of said stamping means as soon as said pattern of signals from a plurality of monitoring means signals produced by a following opening in said sheet strip passing by said monitoring means deviates from said pattern of signals from a plurality of monitoring means signals produced when a prior opening in said sheet strip was passed by said monitoring means.

---

### 5,017,793

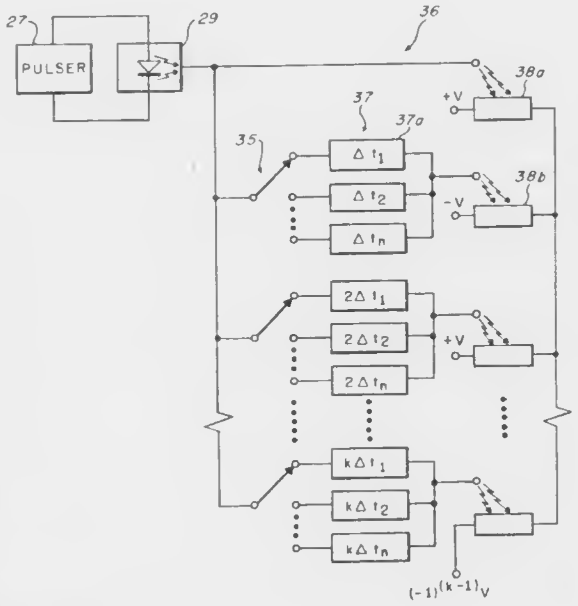
### OPTICALLY DRIVEN RF GENERATOR

**James D. Halsey, Falls Church; Robert F. Riggs, Charlottesville; Lawrence H. Gilligan, Charlottesville, and David W. Gerdt, Charlottesville, all of Va., assignors to Sperry Marine Inc., Charlottesville, Va.**

**Filed Sep. 26, 1989, Ser. No. 412,723**

Int. Cl.$^5$ G02B *27/00*

U.S. Cl. 250—551 10 Claims



1. An apparatus for providing a periodic electrical signal comprising:

- means for providing a sequence of optical energy pulses; and
- means responsive to said sequence of optical energy pulses for providing a substantially sinusoidal electrical signal at a predetermined frequency.

---

### 5,017,794

### APPARATUS AND METHOD FOR VARYING THE TIMING OF A CONTROL SIGNAL

**Gary Linwood, and Wayne Duncan, both of Newark, Del., assignors to United Manufacturing Co., Inc., New Castle, Del.**

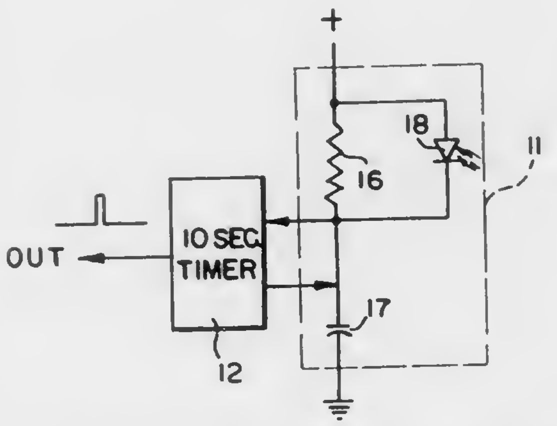
**Continuation of Ser. No. 169,382, Mar. 17, 1988, Pat. No. 4,906,853. This application Feb. 6, 1990, Ser. No. 475,718**

Int. Cl.$^5$ G02B *27/00;* G01V *9/04*

U.S. Cl. 250—551 9 Claims

1. Apparatus for triggering a periodic pulse at random times, comprising:

- a timer for generating a periodic pulse in a defined time cycle in response to a control signal; and
- a signal generator for variably generating said control signal within said defined cycle, said signal generator comprising a light sensitive component for varying in time the generation of said control signal in proportion to light incident on said light sensitive component for a portion of said defined cycle.



---

### 5,017,795

### APPARATUS FOR INSPECTING CAN SEAMS AND THE LIKE

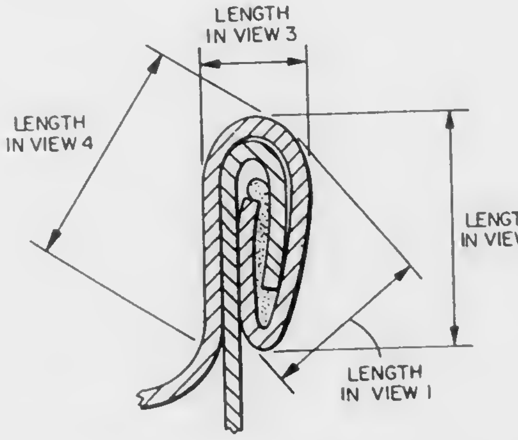
**Roger G. Dower, 501-5775 Toronto Road, Vancouver, British Columbia, Canada V6N 3N6 ; Robert W. Acres, 606-1080 Pacific Street, Vancouver, British Columbia, Canada V6E 4C2 ; Harold R. Davis, 4065 West 13th Avenue, Vancouver, British Columbia, Canada V6R 2T3 ; Andrew N. Donham, 309-8400 Lansdowne Road, Richmond, British Columbia, Canada V6X 3G3 ; Nader Riahi, 101-8751 Citation Drive, Richmond, British Columbia, Canada V6Y 2Y5 ; Richard W. A. Slamka, 644 East 52nd Avenue, Vancouver, British Columbia, Canada V5X 1G8 , and Lechoslaw K. Urbaniak, 154-9451 Prince Charles Boulevard, Surrey, British Columbia, Canada V3V 7G1**

**Continuation of Ser. No. 320,004, Mar. 6, 1989, abandoned. This application May 7, 1990, Ser. No. 519,322**

**Claims priority, application Canada, Mar. 7, 1988, 560755**

Int. Cl.$^5$ G01N *21/86*

U.S. Cl. 250—560 13 Claims



1. Apparatus for detecting an irregularity in the surface of an elongated seam having a curvate surface cross-section, said apparatus comprising:

- (a) irradiation means for irradiating said surface to produce reflected signals;
- (b) a plurality of radiation sensors, each being disposed to have a selected field of view of the surface, each such view being defined by a width extending longitudinally of said seam and a length curvately extending in a plane lying transverse to the longitudinal direction of said seam; each such sensor for receiving such portion of said reflected signals as are reflected within its corresponding field of view and for producing corresponding sensor output signals in response thereto;
- (c) signal processing means for receiving said sensor output signals for a succession of fields of view along the longitudinal length of said seam, and for deriving therefrom signal data representing a dimensional feature of said seam; and,
- (d) signal comparison means for comparing said signal data with signal data representing an acceptable dimensional limit, and for producing a rejection signal in the event that said dimensional feature does not fall within said limit.

---

### 5,017,796

### MOVING BLADE TIP CLEARANCE MEASUREMENT APPARATUS AND METHOD WITH MOVEABLE LENS

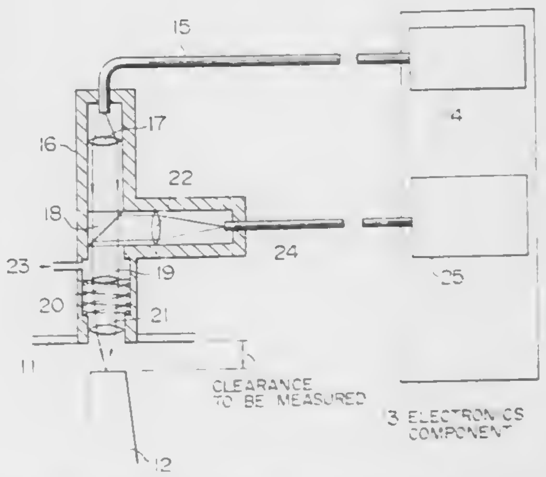
**Haruomi Makita, Nagoya, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 6, 1989, Ser. No. 446,867**

**Claims priority, application Japan, Jan. 11, 1989, 1-4420**

Int. Cl.$^5$ G01N *21/86*

U.S. Cl. 250—561 8 Claims



1. A moving blade tip clearance measuring apparatus comprising:

- an optical fiber cable for transmitting illuminating light;
- a light probe connected to said optical fiber cable for receiving illuminating light therefrom;
- a lens mounted in said light probe for receiving said illuminating light and directing a parallel illuminating light beam toward moving blades;
- a half-mirror mounted in said probe for receiving and transmitting therethrough said illuminating light beam and receiving and reflecting light reflected from the moving blades at an angle to said illuminating light beam to separate said reflected light from said illuminating light beam;
- an object lens mounted in said probe for receiving said illuminating light beam from said half-mirror and directing said illuminating light beam onto the moving blades,

and receiving reflected light from said blades and directing said reflected light toward said half-mirror;

a movable lens means mounted in said probe between said half-mirror and said object lens for changing the focus of said illuminating light beam on said blades and receiving said reflecting light from said object lens;

means for moving said movable lens means to periodically change said focus;

a receiving optical fiber cable connected to said probe for receiving and transmitting said reflected light from said probe; and

a reflection receiving lens mounted in said probe for receiving and directing said reflected light onto said receiving optical fiber cable.

---

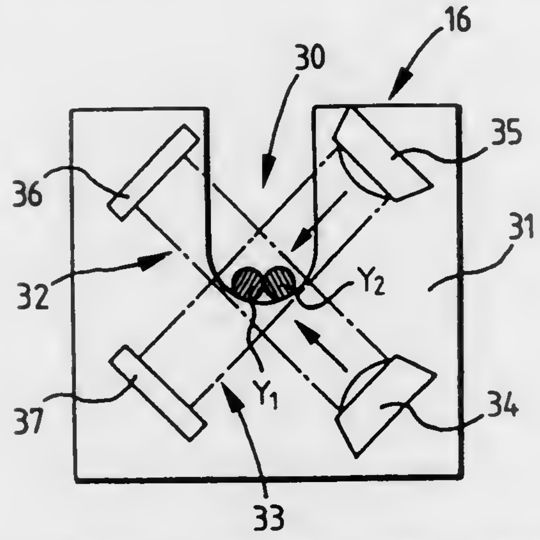
### 5,017,797
## DEVICE FOR DETECTING YARN
**Makoto Uramoto, Uji, and Hideji Sakata, Nagaokakyo, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan**

**Filed Nov. 21, 1989, Ser. No. 440,022**

**Claims priority, application Japan, Nov. 24, 1988, 63-296546; Jan. 17, 1989, 1-3759[U]**

**Int. Cl.⁵ G01N** *21/86*

**U.S. Cl. 250—561** **15 Claims**



1. An apparatus for detecting yarn breakage of at least one yarn strand of a doubled yarn in a yarn doubling and taking-up machine, the apparatus comprising:

light producing means for producing a plurality of intersecting light beams, the doubled yarn passing through an intersection point of said plurality of light beams;

sensing means for sensing the plurality of intersecting light beams, the intersection point being disposed between the light producing means and the sensing means;

calculating means for determining an amount of light sensing by the sensing means; and

means for comparing the determined amount with a reference value to detect a breakage of at least one yarn strand in the doubled yarn.

---

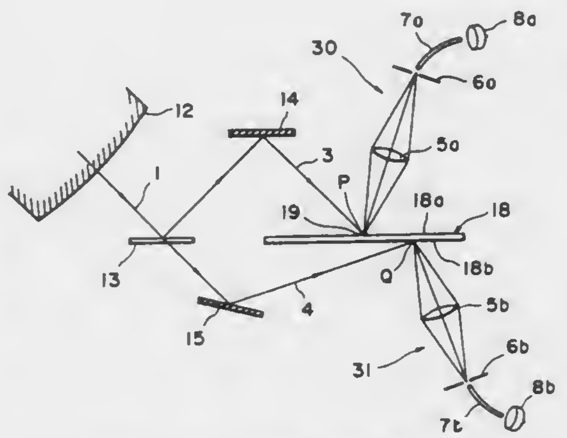
### 5,017,798
## SURFACE EXAMINING APPARATUS FOR DETECTING THE PRESENCE OF FOREIGN PARTICLES ON TWO OR MORE SURFACES
**Eiichi Murakami, Yokohama; Michio Kohno, and Akiyoshi Suzuki, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 348,177, May 2, 1989, Pat. No. 4,886,975, which is a continuation of Ser. No. 14,034, Feb. 12, 1987, abandoned. This application Sep. 12, 1989, Ser. No. 406,090**

**Claims priority, application Japan, Feb. 14, 1986, 61-03062; Mar. 20, 1986, 61-060871; May 23, 1986, 61-118862; May 23, 1986, 61-118863**

**Int. Cl.⁵ G01N** *21/88*

**U.S. Cl. 250—572** **12 Claims**



1. An apparatus usable with an object having a surface, for examining the state of the surface of the object, said apparatus comprising:

light projecting means for emitting convergent light;

light dividing means for dividing the light emitted from said light projecting means into a plurality of light beams to irradiate the object along a plurality of respective light paths at the same time, wherein the light paths of the divided light beams to points irradiated on the object have the same optical path length; and

a plurality of light-receiving means associated with points on the surface of the object being irradiated with the plurality of light beams, said plurality of light-receiving means being arranged to receive light scatteringly reflected from the points on the surface of the object being irradiated with the light beams, each of said light receiving means comprising means for producing outputs corresponding to the state of the surface of the object at the points irradiated with the light beams.

---

### 5,017,799
## AUTOMATIC POWER SUPPLY LOAD SHEDDING TECHNIQUES
**David A. Fishman, Lakewood, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jun. 30, 1989, Ser. No. 374,674**

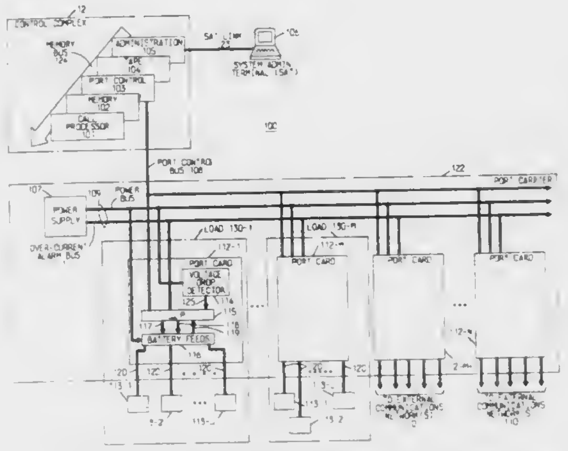
**Int. Cl.⁵ H02J** *1/14;* **H04M** *19/00*

**U.S. Cl. 307—34** **10 Claims**

1. Automatic power supply load shedding apparatus for reducing the power demand of a power supply of a communication system which feeds at least one load, said load including at least one communications device which is connected to said power supply via an interface circuit, the power consumption of said load varying with each of a plurality of operational modes, said apparatus comprising

means for determining the power output demand of said power supply by tracking the activity states of said communications device in said load, said activity states including on-hook and off-hook; and

means in said load responsive to said determined demand for altering the operational mode of said load so as to reduce the power demand of said supply.



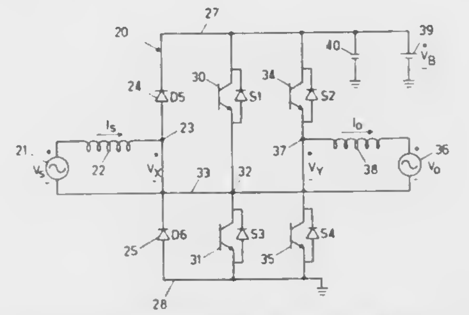
---

### 5,017,800
## AC TO DC TO AC POWER CONVERSION APPARATUS WITH FEW ACTIVE SWITCHES AND INPUT AND OUTPUT CONTROL
**Deepakraj M. Divan, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Sep. 29, 1989, Ser. No. 414,896**

**Int. Cl.⁵ H02J** *9/00;* **H02M** *5/458*

**U.S. Cl. 307—66** **12 Claims**



1. Power conversion apparatus for providing AC to DC to AC power conversion comprising:

(a) AC input terminals adapted to be connected to a single phase AC power source and AC output terminals adapted to be connected to a load;

(b) a pair of DC bus lines;

(c) a rectifier bridge connected to one of the AC input terminals to rectify the current supplied thereto and connected between the DC bus lines;

(d) a DC power source operably connected to provide DC power to the DC bus lines;

(e) an inverter comprised of gate controllable active switching devices connected in a full bridge configuration across the DC bus lines and having two output nodes, the output nodes of the bridge connected to the output terminals for the conversion apparatus;

(f) a common neutral line being common to one of the input terminals to the apparatus, to one of the output terminals of the apparatus and to one of the output nodes of the inverter bridge;

(g) control means for controlling the switching of the controllable switching devices to provide AC output power at a selected frequency at the output terminals of the power conversion apparatus.

---

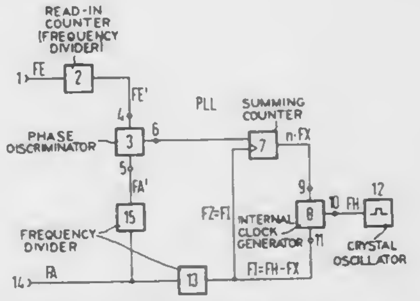
### 5,017,801
## METHOD AND APPARATUS FOR CONVERTING A GAP-INFESTED READ-IN CLOCK INTO A GAP-FREE READ-OUT CLOCK
**Hermann Lang, Wellheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Feb. 8, 1990, Ser. No. 476,714**

**Claims priority, application Fed. Rep. of Germany, Mar. 23, 1989, 3909678**

**Int. Cl.⁵ H03K** *9/06. 5/13*

**U.S. Cl. 307—269** **5 Claims**



1. In a method for converting a gap-free infested read-in clock into a gap-free read-out clock having the same number of pulses on the basis of a phase locked loop shift control, the method comprising the steps of generating a gap-free internal clock having a frequency which is a multiple of the read-out clock, generating the read-out clock while dividing the frequency of the internal clock by a first predetermined factor, dividing the frequency of the read-in clock by a second predetermined factor, identically dividing the frequency of the read-out clock by the second predetermined factor, comparing the logical states of the divided read-in and read-out clocks and generating control pulses during time intervals of identified inequalities, generating an auxiliary clock, summing the pulses of the auxiliary clock during the respective appearances of the control pulses, generating switching pulses upon each attainment of a predetermined final sum of the auxiliary clock pulses, the improvement therein comprising the steps of:

deriving a sequence of n successor auxiliary clocks from the auxiliary clock having identical phase spacings and a pulse duty factor of 1:1 such that the sum of the phase spacings corresponds to a period of the auxiliary clock;

generating an n-fold switching pulse frequency;

connecting through one of the successor auxiliary clocks as an internal clock;

upon the appearance of each switching pulse, connecting through the successor auxiliary clock with its phase spacing following that connected-through successor auxiliary clock as an internal clock as soon as the logical state of the following successor auxiliary clock is equal to that of the previously through-connected successor auxiliary clock.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,802
## BASE CURRENT REGULATION CIRCUIT FOR A SWITCHING TRANSISTOR, IN PARTICULAR A BIPOLAR TRANSISTOR

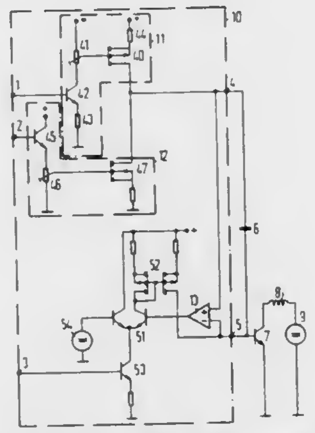
**Martin Feldtkeller, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Oct. 21, 1988, Ser. No. 261,046**

**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1987, 3736182**

**Int. Cl.$^5$ H03K** *3/01, 3/26*

**U.S. Cl. 307—270** **18 Claims**



1. A method for regulating the base current of a switching transistor, in particular a bipolar transistor, comprising the following steps:

switching on the switching transistor by impressing a first predetermined base current on the control terminal of the switching transistor;

feeding a variable second base current to the control terminal, which maintains the switching transistor switched on for a predetermined time interval until the switching transistor switches off;

switching off the switching transistor by impressing a base current with a polarity opposite to that of the first and second base currents on the c control terminal of the switching transistor;

establishing a base current time integral $\Delta Q_2$ when switching off as a measure for the saturation of the switching transistor;

when the base current time integral $\Delta Q_2$ is relatively large, the second base current is reduced when the switching transistor is switched on again; and

when the base current time integral $\Delta Q_2$ is relatively small, the second base current is increased when the switching transistor is switched on again.

---

### 5,017,803
## POWER SUPPLY POTENTIAL RISING DETECTION CIRCUIT

**Masanobu Yoshida, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Mar. 10, 1989, Ser. No. 321,779**

**Claims priority, application Japan, Mar. 16, 1988, 63-060214**

**Int. Cl.$^5$ H03K** *5/00, 17/687;* **G11C** *11/34*

**U.S. Cl. 307—296.5** **6 Claims**

1. A power supply potential rising detection circuit comprising:

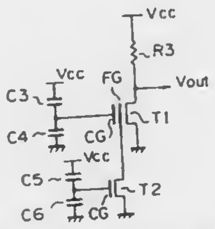
first and second power supply terminals;

a load element;

a transistor having a control gate and a floating gate, said transistor being connected in series with said load element between said first and second power supply terminals;

means for supplying a first potential to said control gate of said transistor, said first potential being dependent on the power supply potential at said first power supply terminal and said transistor being turned On in response thereto; and

a switching element operatively connected between said floating gate and said second power supply terminal and controlled by a second potential, said second potential being dependent on said power supply potential, and said switching element being turned ON in response thereto



and after a predetermined period has elapsed from when said transistor is turned ON for reducing the potential of said floating gate and turning off said transistor when said power supply potential reaches a predetermined value and thereby outputting a power supply potential rising detection signal from the series connection point between said load element and said transitor.

---

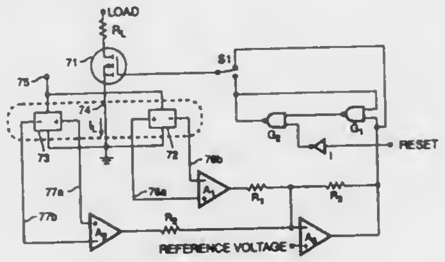
### 5,017,804
## HALL SENSING OF BOND WIRE CURRENT

**James A. Harnden, Los Gatos, and Lorimer K. Hill, Cupertino, both of Calif., assignors to Siliconix Incorporated, Santa Clara, Calif.**

**Continuation-in-part of Ser. No. 76,788, Jul. 23, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 340,445**

**Int. Cl.$^5$ H03K** *17/90, 3/26*

**U.S. Cl. 307—309** **12 Claims**



8. A semiconductor device comprising:

a semiconductor substrate;

one or more Hall effect sensors formed within said semiconductor substrate;

a current controlling element formed in said semiconductor substrate;

a conductor for carrying current flowing through said current controlling element, said conductor being routed in close proximity to said one or more Hall effect sensors, said conductor being placed such that any offsets caused by misplacement of said conductor cancel; and

feedback means for receiving signals from said Hall effect sensors and controlling said current controlling element, thereby adjusting the current flowing through said current controlling element over a range of currents.

### 5,017,805
## OFFSET CANCEL LATCHING COMPARATOR

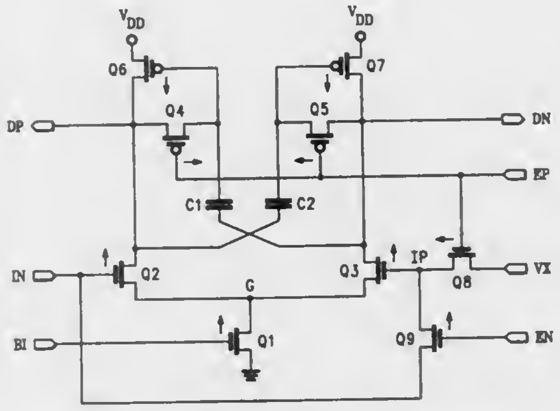
**Kiyoshi Kase, Chiba, Japan, assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Nov. 17, 1989, Ser. No. 438,910**

**Claims priority, application Japan, Nov. 24, 1988, 63-294510**

**Int. Cl.$^5$ H03K** *5/24*

**U.S. Cl. 307—362** **13 Claims**



1. An offset cancel latching comparator, comprising:

first and second input terminals;

first and second output terminals;

current source means having an output for providing a current of predetermined magnitude;

first and second transistors forming a differential pair and each having first and second electrodes and a control electrode, said control electrodes of said first and second transistors being coupled to said first and second input terminals respectively, said first electrodes of said first and second transistors being coupled together to said output of said current source means, said second electrode of said second transistor being coupled to said first output terminal, said second electrode of said first transistor being coupled to said second output terminal;

third and fourth transistors each having first and second electrodes and a control electrode, said first electrodes of said third and fourth transistors being coupled together to a voltage supply, said second electrode of said third transistor being coupled to the second electrode of said first transistor, said second electrode of said fourth transistor being coupled to the second electrode of said second transistor;

a first capacitor having a first terminal coupled to said control electrode of said third transistor and a second terminal coupled to said second electrode of said second transistor;

first switch means coupled between said first terminal of said first capacitor and said second electrode of said third transistor for transferring a charge developed at said second electrode of said third transistor to said first capacitor;

a second capacitor having a first terminal coupled to said control electrode of said fourth transistor and a second terminal coupled to said second electrode of said first transistor; and

second switch means coupled between said first terminal of said second capacitor and said second electrode of said fourth transistor for transferring a charge developed at said second electrode of said fourth transistor to said second capacitor.

---

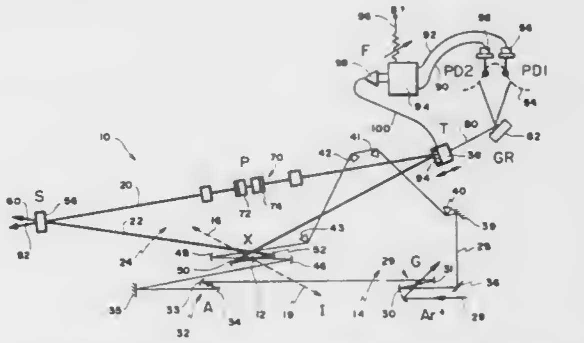
### 5,017,806
## BROADLY TUNABLE HIGH REPETITION RATE FEMTOSECOND OPTICAL PARAMETRIC OSCILLATOR

**Daniel C. Edelstein, White Plains; Elliot S. Wachman, and Chung L. Tang, both of Ithaca, all of N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed Apr. 11, 1990, Ser. No. 507,444**

**Int. Cl.$^5$ H03F** *7/00*

**U.S. Cl. 307—428** **22 Claims**



1. A broadly tunable optical parametric oscillator, comprising:

a first oscillator ring cavity having a closed path which includes means defining an intracavity focus;

a thin crystal of $KTiOPO_4$ located in said first ring cavity at said intracavity focus, said crystal being cut for type II phase matching at normal light incidence;

a laser pumping source producing an output light beam; and

pump means directing said pumping source output light beam onto a surface of said crystal to stimulate oscillation in said first oscillator ring cavity, wherein said pump means comprises a second ring cavity including second means defining an intracavity focus for said second cavity, said crystal being also located in said second cavity intracavity focus.

---

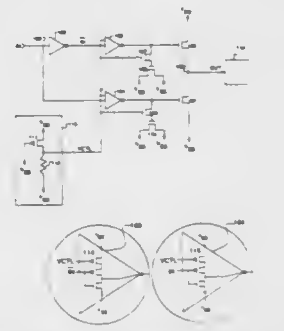
### 5,017,807
## OUTPUT BUFFER HAVING CAPACITIVE DRIVE SHUNT FOR REDUCED NOISE

**John C. Kriz, Palmerton, and Mean-sea Tsay, Emmaus, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jul. 5, 1990, Ser. No. 549,519**

**Int. Cl.$^5$ H03K** *17/14, 4/94*

**U.S. Cl. 307—443** **8 Claims**



1. An integrated circuit comprising a buffer including a pull-up transistor for pulling the voltage on a buffer output node to directly shunt a portion of a driving current to one of said pullup and pulldown transistors towards said constant voltage node through said shunt capacitor, wherein toward a first power supply voltage, and a pull-down transistor for pulling the voltage on said node toward a second power supply voltage in response to a buffer input signal,

characterized in that said buffer further includes a shunt transistor and a shunt capacitor serially connected be-

VOL 1126 ISS 3 MY 21 1991 UMI

tween the control electrode of at least one of said pull-up and pull-down transistors and a constant voltage node to directly shunt a portion of a driving current to one of said pull-up and pull-down transistors towards said constant voltage node through said shunt capacitor, wherein the conductance of said shunt transistor is controlled by compensation means to maintain the switching speed of said buffer more constant with respect to variations in at least one of the factors selected from the group consisting of process speed, operating temperature, and operating voltage.

---

### 5,017,808
## BI-MOS LOGIC CIRCUIT HAVING A SWITCH CIRCUIT FOR DISCHARGING ELECTRICAL CHARGE ACCUMULATED IN A PARASITIC CAPACITOR

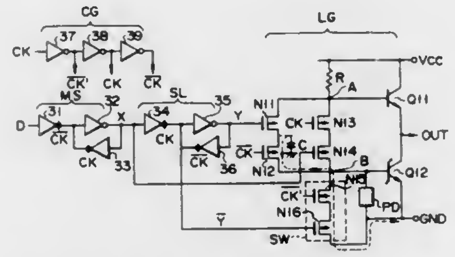
**Masaji Ueno, Chofu, and Kumi Ofusa, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Jan. 30, 1990, Ser. No. 472,272**

**Claims priority, application Japan, Feb. 2, 1989, 1-24543**

**Int. Cl.$^5$ H03K** *19/01*

**U.S. Cl. 307—446** **6 Claims**



1. A Bi-MOS logic circuit comprising:
- a first NPN transistor connected between a power-supply potential terminal and a signal-outputting terminal;
- a second NPN transistor connected between the signal-outputting terminal and a reference potential terminal;
- a load circuit connected between the power-supply potential terminal and the base of the first NPN transistor;
- a first series circuit connected between the base of the first NPN transistor and the base of the second NPN transistor, and including first and second MOS transistors, the first MOS transistor being controlled by a first input data signal, and the second MOS transistor being controlled a first clock signal;
- a second series circuit connected between the base of the first NPN transistor and the base of the second NPN transistor, and including third and fourth MOS transistors, said third MOS transistor being controlled by a second clock signal opposite in phase to the first clock signal, and the fourth MOS transistor being controlled by a second input data signal advanced in phase with respect to the first input data signal; and
- switching means connected between the base of the second NPN transistor and the reference potential terminal, said switching means being on when the first and second MOS transistors are off and on, respectively.

---

### 5,017,809
## METHOD AND APPARATUS FOR PROGRAM VERIFICATION OF A FIELD PROGRAMMABLE LOGIC DEVICE

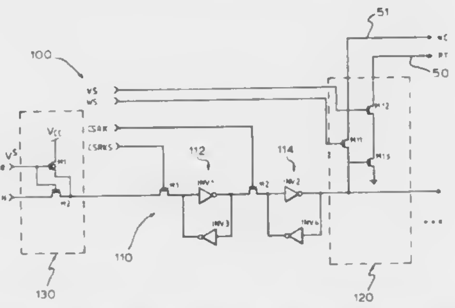
**John E. Turner, Santa Cruz, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Oct. 23, 1989, Ser. No. 425,306**

**Int. Cl.$^5$ H03K** *19/003*

**U.S. Cl. 307—465** **34 Claims**

1. A program verification circuit for a programmable logic array having at least one logic gate and first and second inputs thereto, said program verification circuit comprising:
- shift register means for latching data, said shift register means including means for latching programming data in a first mode of operation and means for latching programming control data in a second mode of operation; and
- first multiplexer means for applying a first control signal to at least one of said inputs to said logic gate in response to the output of said shift register means, said first multiplexer means including verification control means for applying said first control signal to at least one of said inputs in response to the output of said shift register means in said second mode of operation in response to a first verification control signal.



---

### 5,017,810
## INPUT SWITCHING DEVICE USED IN A LOGIC MOS INTEGRATED CIRCUIT

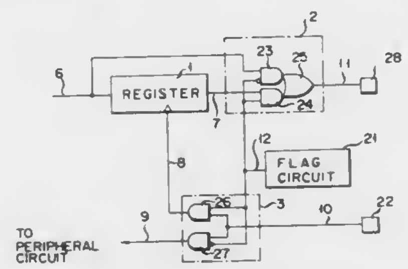
**Yuji Nakano, Kawasaki; Koji Saitoh, Yokohama, and Hiroaki Murakami, Higashimine, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 1, 1990, Ser. No. 486,766**

**Claims priority, application Japan, Mar. 3, 1989, 1-51710**

**Int. Cl.$^5$ H03K** *19/177*

**U.S. Cl. 307—465** **14 Claims**



1. An input switching device comprising:
- logic means for performing logical processing in response to a first input signal, said logic means being controlled by a control signal;
- first selector means for receiving the first input signal and an output signal of said logic means, and selecting and outputting one of the first input signal and the output signal;
- second selector means for selecting one of supplying a second input signal to said logic means as a control signal and supplying the second input signal to a peripheral circuit as an input signal; and
- control means for controlling selecting operations of said first and second selector means to supply the second input signal to said logic means as a control signal when said first selector means selects the output signal of said logic means and to supply the second input signal to the peripheral circuit as an input signal when said first selector means selects the first input signal.

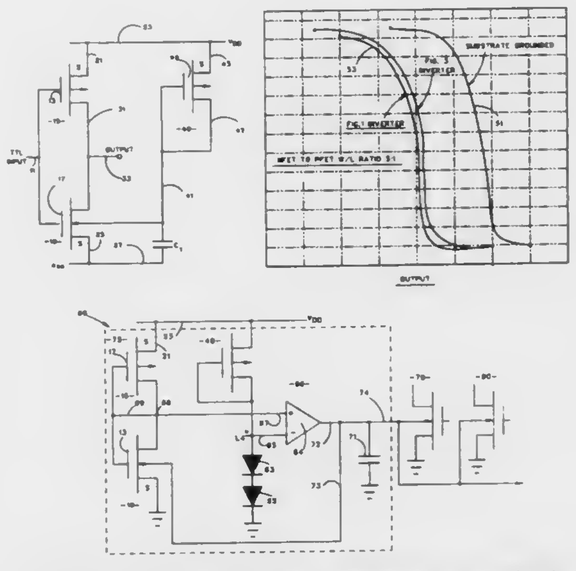
### 5,017,811
## CMOS TTL INPUT BUFFER USING A RATIOED INVERTER WITH A THRESHOLD VOLTAGE ADJUSTED N CHANNEL FIELD EFFECT TRANSISTOR

**Eugene R. Worley, Irvine, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Oct. 27, 1989, Ser. No. 427,383**

**Int. Cl.$^5$ H03K** *19/94, 19/92, 19/03, 17/14*

**U.S. Cl. 307—475** **7 Claims**



1. A TTL level input receiver, comprising in combination:
- a ratioed inverter comprising a series connected CMOS PFET and CMOS NFET for receiving a TTL level input and outputting a CMOS level output; and,
- biasing means connected to the body of the NFET to apply a forward bias current for lowering the threshold voltage of the NFET.

---

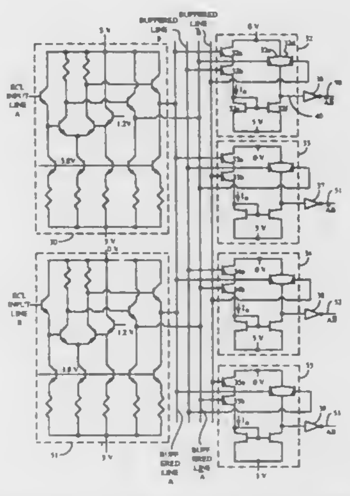
### 5,017,812
## COMBINED ECL-TO-TTL TRANSLATOR AND DECODER

**Chau-Chin Wu, Cupertino, Calif., assignor to Integrated Device Technology, Inc., Santa Clara, Calif.**

**Filed Mar. 20, 1990, Ser. No. 496,470**

**Int. Cl.$^5$ H03K** *19/92*

**U.S. Cl. 307—475** **4 Claims**



1. A combined translator and decoder circuit for translating and decoding a plurality of ECL input signals and for providing a decoded TTL output signal comprising:
- a first transistor having a control line connected to receive a signal indicative of a first of said ECL input signals;
- a second transistor connected in series with said first transistor and having a control line connected to receive a signal indicative of a second of said ECL input signals;
- a third transistor having a control line connected to receive a signal indicative of said first ECL input signal;
- a fourth transistor connected in parallel with said third transistor and having a control line connected to receive a signal indicative of said second ECL input signal; and
- a current mirror circuit connected to said second transistor, to said fourth transistor, and to an output line.

---

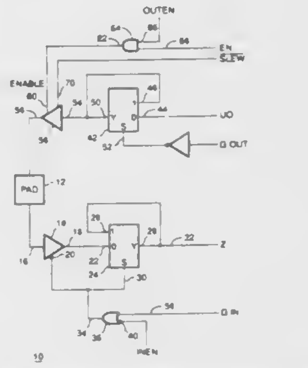
### 5,017,813
## INPUT/OUTPUT MODULE WITH LATCHES

**Douglas C. Galbraith, Fremont, and Jonathan W. Greene, Palo Alto, both of Calif., assignors to Actel Corporation, Sunnyvale, Calif.**

**Filed May 11, 1990, Ser. No. 522,389**

**Int. Cl.$^5$ H04Q** *1/00*

**U.S. Cl. 307—475** **3 Claims**



3. An input/output logic module for use in an integrated circuit, including:
- an input/output node for said integrated circuit,

an input buffer having an input connected to said input/output node, an input buffer enable input, and an output, said input buffer responsive to a signal on said enable input for placing said output in a high impedance state,

an input two-input multiplexer having a first data input connected to the output of said input buffer, a second data input, a select input, and an output, said output connected to said second data input and to a first internal bus of said integrated circuit,

means for driving said input buffer enable input from signals from said integrated circuit,

means for driving the select input of said input two-input multiplexer from signals from said integrated circuit,

an output two-input multiplexer having a first data input connected to a second internal bus of said integrated circuit, a second data input, a select input, and an output, said output connected to said second data input,

an output buffer having an input connected to said output of said output two-input multiplexer, an output connected to said input/output node, and an output buffer enable input,

means for driving said output buffer enable input from signals from said integrated circuit,

means for driving said select input of said output two-input multiplexer from signals from said integrated circuit.

---

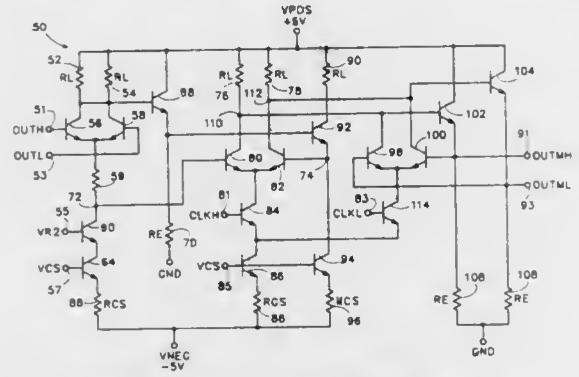
## 5,017,814
## METASTABLE SENSE CIRCUIT

**Randahl B. Lloyd, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Dec. 13, 1989, Ser. No. 450,802**

**Int. Cl.$^5$ H03K** *5/20, 19/086*

**U.S. Cl. 307—480** **11 Claims**



1. A metastable sense circuit comprising:

an input latch having an input and an output, the input latch passing data received at the input to the output in a transparent mode and retaining data at the output in a hold mode;

means for sensing a metastable state of the input latch; and

means for responsive to the sensing means for producing a logic output signifying that the sensed metastable state has occurred.

11. A metastable sense circuit comprising:

(a) an input latch having an input and an output, the input latch passing data received at the input to the output in a transparent mode and retaining data at the output in a hold mode; and

(b) a sense latch having an input coupled to the output of the input latch and an output, the sense latch producing data at the output responsive to an occurrence of a metastable state of the input latch in a transparent mode and retaining data at the output in a hold mode; the sense latch including:

a first differential pair of transistors having a first input, a second input, and a differential output defining the output of the sense latch; and

a second differential pair of transistors having first and second inputs coupled to the output of the input latch, an emitter terminal coupled to the first input of the first differential pair of transistors, and a coupled differential output coupled to the second input of the first differential pair of transistors, and a coupled differential output coupled to the second input of the first differential pair of transistors.

---

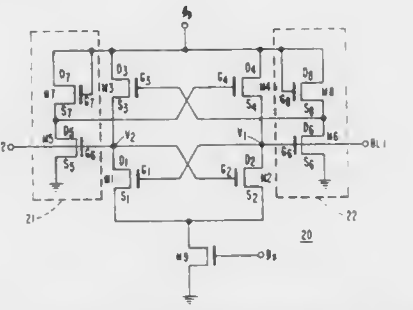
## 5,017,815
## SENSE AMPLIFIER WITH SELECTIVE PULL UP

**Nimish K. Shah, Aurora, Ill., and Michael P. Singh, Seal Beach, Calif., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Dec. 20, 1989, Ser. No. 454,093**

**Int. Cl.$^5$ H03K** *3/284, 3/26*

**U.S. Cl. 307—530** **8 Claims**



1. A sense amplifier including first and second bit lines for receiving sensed signals, the amplifier comprising:

first and second cross-coupled pull down field effect transistors each having a gate electrode and first and second current carrying electrodes with said second current carrying pull down transistor electrodes coupled together and returned to a first control signal and with said first current carrying pull down transistor electrodes each connected to a different one of said bit lines and cross-connected to said gate electrode of the other pull down transistor;

first and second pull up field effect transistors each having a gate electrode and first and second current carrying electrodes with said first current carrying pull up transistor electrodes coupled together and returned to a second control signal and with said second current carrying pull up transistor electrodes each connected to a first current carrying pull down transistor electrode of a corresponding pull down transistor, respectively; and

means connected to said first and second current carrying electrodes of each pull up transistor and cross-connected to said gate electrodes of the other pull up transistor and responsive to said sensed signals on said first and second bit lines for selectively maintaining one of the pull up transistors in the OFF state and the other in the ON state.

---

## 5,017,816
## ADAPTIVE GATE DISCHARGE CIRCUIT FOR POWER FETS

**Milton E. Wilcox, Saratoga, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.**

**Filed Nov. 8, 1989, Ser. No. 433,366**

**Int. Cl.$^5$ H03K** *17/60, 3/01, 3/26*

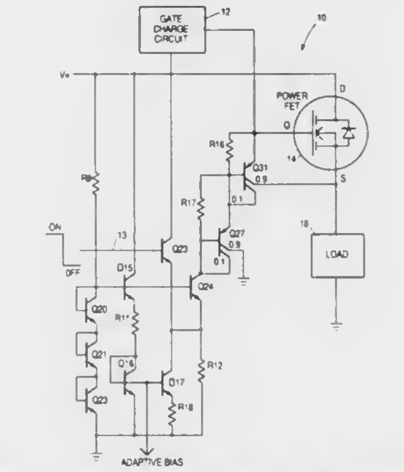
**U.S. Cl. 307—570** **4 Claims**

1. An adaptive gate discharge circuit for discharging the gate of a power FET transistor from its conduction potential, the adaptive gate discharge circuit comprising:

(a) discharge driver circuitry responsive to a control signal for discharging the power FET gate from the conduction potential to below a selected potential;

(b) adaptive bias circuitry for providing an operating signal to the discharge driver circuitry during discharge of the power FET gate, the operating signal being sufficient for operation of the discharge driver circuitry; and

(c) low current biasing circuitry connected to the adaptive biasing circuitry and responsive to the discharge of the power FET gate to below the selected potential to reduce the operating voltage of the adaptive biasing circuitry thereby turning off the adaptive biasing circuitry.



---

## 5,017,817
## BASIC CIRCUITRY PARTICULARLY FOR CONSTRUCTION OF MULTIVALUED LOGIC SYSTEMS

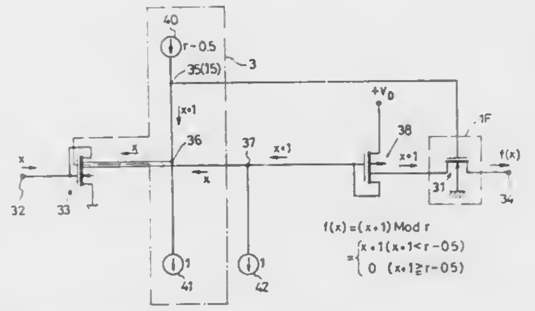
**Takeshi Yamakawa, Kumamoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan**

**Division of Ser. No. 821,289, Jan. 22, 1986, Pat. No. 4,814,644. This application Jan. 13, 1989, Ser. No. 297,034**

**Claims priority, application Japan, Jan. 29, 1985, 60-15987; Jan. 30, 1985, 60-16897; Jan. 31, 1985, 60-17988; Jan. 31, 1985, 60-17989**

**Int. Cl.$^5$ H03K** *17/687, 5/22, 3/01*

**U.S. Cl. 307—571** **2 Claims**



1. A successor comprising:

a first source means for providing a current representing a logical value 1;

a second source means for providing an input current representing a variable x;

a third source means for providing a current representing a value equivalent to $r-1$, which is obtained by subtracting logical value 1 from a radix r;

an adder, connected to said first source means and said second source means, for adding said current representing a logical value 1 to said input current representing a variable x to provide an output current representing a value $x+1$;

a floating switch comprising a MOSFET connected to an output side of said adder to receive said output current representing a value $x+1$; and

a comparator, connected to said second source means and said third source means, which compares said input current representing the variable x and said current representing a value equivalent to $r-1$, which is obtained by subtracting the logical value 1 from a radix r, for generating a control signal which is provided to said floating switch to turn on said floating switch when said input current representing the variable x is smaller than said current representing a value equivalent to $r-1$.

---

## 5,017,818
## VOLTAGE CHANGE AND MOTOR ROTATION REVERSAL DEVICE

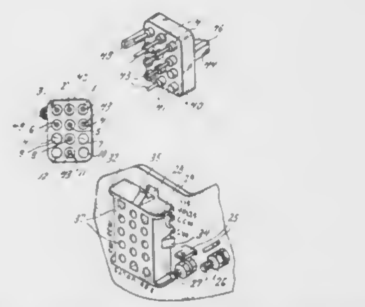
**L. Ranney Dobogne, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.**

**Continuation of Ser. No. 360,355, Jun. 2, 1989, Pat. No. 4,937,482. This application Feb. 5, 1990, Ser. No. 475,316**

**The portion of the term of this patent subsequent to Jun. 26, 2007, has been disclaimed.**

**Int. Cl.$^5$ H02K** *11/00;* **H01R** *27/00*

**U.S. Cl. 310—71** **13 Claims**



1. In a voltage and rotation switching device mounted to a motor housing for connecting motor windings to a power source and changing connections to change the direction of motor shaft rotation, including a connector socket having a plurality of spaced electrical receptacles, one end of each electrical receptacle being adapted to receive a mating connection and the other end of each electrical receptacle being affixed to a circuit lead within said motor housing; the improvement comprising:

a single phase jumper plug mating with said connector socket for completing electrical connections therebetween, said jumper plug having four electrically conductive jumpers disposed for mating engagement with four pairs of electrical receptacles in said connector socket to complete winding and power connections within said connector socket for any one of four unique combinations of simultaneous motor voltage and rotation including high voltage and clockwise rotation, high voltage and counter-clockwise rotation, low voltage and clockwise rotation, and low voltage and counter-clockwise rotation, said single phase jumper plug having a four row by three column orthogonal pattern of positioning stems for selective mating engagement with said connector socket having a five row by three column orthogonal pattern of connector socket electrical receptacles, an electrically conductive jumper extending within said single phase jumper plug between said aforementioned positioning stems, each of said positioning stems including jumper pins extending out through an outer free end of each of said positioning stems for mating engagement with the corresponding electrical receptacle in said connector socket, said positioning stems being configured to align and guide the entry of said jumper pins into corresponding electrical receptacles of said connector socket.

/OL
126
SS
3
MY
21
1991
UMI

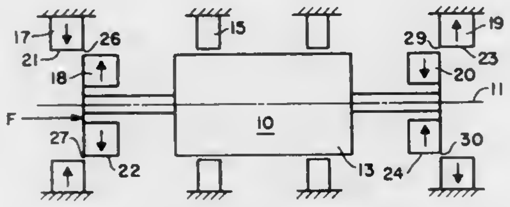
### 5,017,819
## LINEAR MAGNETIC SPRING AND SPRING/MOTOR COMBINATION

**Paul J. Patt, Mt. Kisco, and Fred R. Stolfi, Shrub Oak, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 928,611, Nov. 4, 1986, which is a continuation of Ser. No. 651,391, Sep. 14, 1984, abandoned. This application Jun. 12, 1989, Ser. No. 531,699**

**Int. Cl.$^5$ H02K** *7/09*

U.S. Cl. 310—90.5 **19 Claims**



1. A magnetic spring arrangement providing a linear spring force along at least one of three orthogonal coordinates defined with respect to an axis, comprising

a first magnet poled in a first poling direction along a first coordinate direction orthogonal to said axis, having a first magnet face with a first magnetic polarity substantially parallel to said axis and facing in a first given direction parallel to said first coordinate direction,

a second magnet poled in a second poling direction opposite said first poling direction along said first coordinate direction, having a second magnet face with said first magnetic polarity adjacent and substantially parallel to said face of said first magnet, facing in a direction opposite said first given direction,

a third magnet poled in a third poling direction along said first coordinate direction, having a third magnet face with a second magnetic polarity substantially parallel to said axis, facing in a second given direction,

a fourth magnet poled in a fourth poling direction opposite said third poling direction along said first coordinate direction, having a fourth magnet face with said second magnetic polarity adjacent and substantially parallel to said face of said third magnet, facing in a direction opposite said second given direction,

first means for fixing said first and third magnets with respect to each other, the first and third magnet faces being spaced a first distance from each other along said one coordinate,

second means for fixing said second and fourth magnets with respect to each other, the second and fourth magnet faces being spaced a second distance along said one coordinate less than said first distance, and

means for preventing movement of said first and second means with respect to each other in said first coordinate direction,

in a neutral position in which no net spring force is exerted, said magnets being arranged such that the faces of said first and second magnets are spaced from each other in said first given direction, and offset from each other along said one coordinate so as to exert a first repelling force with respect to each other along a spring direction which is parallel to said one coordinate, and the faces of said third and fourth magnets are spaced from each other in said second given direction, and offset from each other along said one coordinate so as to exert a repelling force equal and opposite in direction to said first repelling force.

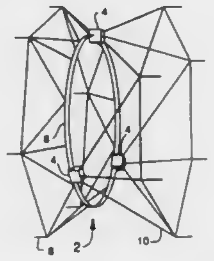
### 5,017,820
## PIEZOELECTRIC ROTARY UNION SYSTEM

**Gordon W. Culp, Van Nuys, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Apr. 23, 1990, Ser. No. 513,132**

**Int. Cl.$^5$ H01L** *41/08*

U.S. Cl. 310—328 **12 Claims**



1. A rotary union system, comprising:

an annular ring attached to a first structure;

a piezoelectric actuator attached to a second structure; and

means associated with said actuator for engaging said ring to form a rotatable connection between said first and second structures.

---

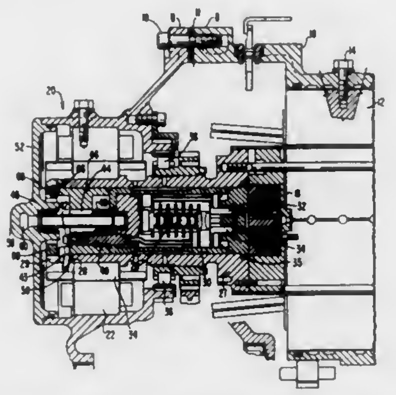
### 5,017,821
## BRUSHLESS DYNAMO ELECTRIC MACHINE WITH ACCESS TO RECTIFIER ASSEMBLY

**Roger M. Shervington; Roy D. Rasmussen, and Jeff A. Stadler, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Feb. 23, 1989, Ser. No. 313,875**

**Int. Cl.$^5$ H02K** *11/00, 5/04, 5/15, 9/16*

U.S. Cl. 310—68 D **12 Claims**



1. A brushless self-excited oil cooled dynamo electric machine comprising:

a housing for said dynamo machine having a split line to divide the housing into different parts;

a main dynamo unit mounted in said housing and having a rotating D.C. field producing structure mounted on a hollow rotor shaft connected to an oil coolant source, said main unit being energized by an exciter dynamo unit having a rotor mounted on the hollow shaft for producing an alternating current;

means for rectifying the alternating current to a direct current for supplying current to said D.C. field including a plurality of diodes positioned on a diode framework, said diode framework having an outer periphery with a shape and size allowing sliding movement along said hollow rotor shaft to an open end thereof;

a cap removably secured to one of said housing parts at a position to allow removal and insertion of said diode housing through the open end of said rotor shaft without separation of said dynamo housing parts along said split line;

a plurality of connecting leads from the exciter positioned over an open end of the rotor shaft adjacent said cap and removably attached to terminals for said diodes;

a main dynamo rotor having sockets aligned with said pins and fixedly positioned in the hollow rotor shaft for carrying direct current to said D.C. field producing structure, said pins being insertable in and removable from said sockets by sliding movement; and

a threaded fastener engaging with a threaded inner surface of said hollow rotor shaft for securing said pins in said sockets; and wherein

the diode framework is positioned in a housing which has opposite end walls with rigid pins extending from one end wall which is opposite the end wall facing said removable cap;

the exciter unit is spaced from said main dynamo unit;

the diode framework is positioned between said units; and

the cap is located adjacent the exciter end of said hollow rotor shaft with the diode framework being removable along a path through a central portion of said exciter unit.

---

### 5,017,822
## THREE-PHASE MAGNETO ARMATURE

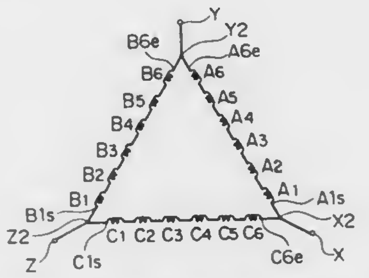
**Yuzuru Shimizu, and Yoshio Hata, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 26, 1990, Ser. No. 498,651**

**Claims priority, application Japan, Mar. 27, 1989, 1-71817**

**Int. Cl.$^5$ H02K** *3/00*

U.S. Cl. 310—207 **3 Claims**



1. An armature of a three-phase magneto for generating three-phase AC output, comprising:

a core having a plurality of magnetic poles arranged in an annular array;

three series winding circuits corresponding to respective phases of said AC output, each series winding circuit including a plurality of windings connected in series and wound on every three magnetic poles of said core, a winding direction of the windings on the magnetic poles of one of the three series winding circuits being opposite to the winding direction of the windings of the other two series winding circuit s such that terminal ends of first and second ones of said winding circuits, starting ends of second and third ones of said winding circuits, and respective starting and terminal ends of first and third ones of said winding circuits are disposed closely proximate each other on said core; and

three relatively short connection conductors for individually connected paired ends of said three series winding circuits so as to form a delta connection, and three relatively short connection conductors providing output terminals for said three-phase AC output.

### 5,017,823
## VIBRATION WAVE DRIVEN ACTUATOR

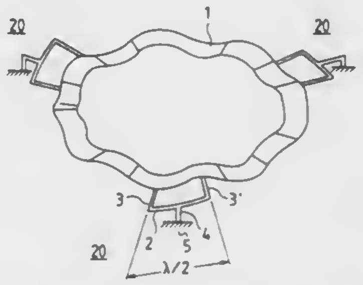
**Ichiro Okumura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 18, 1989, Ser. No. 408,328**

**Claims priority, application Japan, Sep. 19, 1988, 63-234269**

**Int. Cl.$^5$ H01L** *41/08*

U.S. Cl. 310—323 **27 Claims**



1. A vibration wave driven actuator comprising:

(a) a vibration member generating a travelling vibration wave of wavelength λ;

(b) support members fixed to said vibration member along the direction of travel of said travelling vibration wave and with a spacing corresponding substantially to $(\lambda/2+n\lambda)$ (n being an integer including zero); and

(c) means provided substantially at the central position of said support members for pivotably fixing said support members at predetermined positions.

---

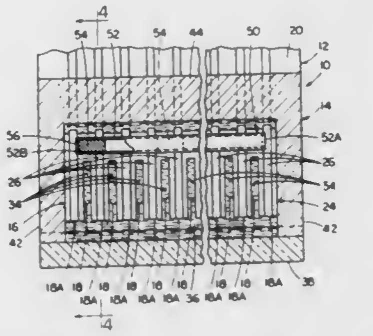
### 5,017,824
## TFEL EDGE EMITTER MODULE AND PACKAGING ASSEMBLY EMPLOYING SEALED CAVITY CAPACITY VARYING MECHANISM

**Norman J. Phillips, Penn Hills; David Leksell, Oakmont; Henry A. Wehrli, III, Monroeville, all of Pa.; William A. Barrow, Beaverton, and Mark S. Kruskopf, Portland, both of Oreg., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 13, 1989, Ser. No. 434,392**

**Int. Cl.$^5$ H01J** *7/24*

U.S. Cl. 313—13 **15 Claims**



1. In combination with a thin film electroluminescent (TFEL) edge emitter module and packaging assembly including a TFEL edge emitter module with an electroluminescent (EL) stack having a light-emitting front edge, an enclosure defining a sealed cavity enclosing at least a portion of said EL stack, and a thermally expansive and contractive liquid substantially filling said sealed cavity, means for varying the liquid-holding capacity of said cavity, comprising:

a capacity expansion and contraction mechanism disposed in communication with said cavity and said liquid therein, said mechanism, in response to thermal expansion or contraction of the volume of said liquid filling said cavity, being operable to correspondingly change from a first to second condition or vice versa and thereby respectively increase or decrease the liquid-holding capacity of said enclosure cavity such that said enclosure cavity liquid-holding capacity is continually maintained substantially equivalent to the enclosed volume of said liquid filling said cavity.

---

### 5,017,825
## FILTER FOR COLORED ELECTRIC LAMP

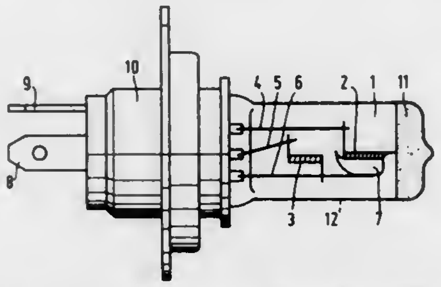
**Godefridus H. C. Heijnen, Vaals; Cornelis A. M. Mulder, and Ernest O. W. Van Der Stelt, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 15, 1989, Ser. No. 437,407**

**Claims priority, application Netherlands, Nov. 29, 1988, 8802938**

**Int. Cl.$^5$ H01J** *5/16, 61/40;* **H01K** *1/30;* **G02B** *5/28*

**U.S. Cl. 313—112** **3 Claims**



1. An electric lamp comprising a sealed lamp vessel containing an electric element for emitting radiation and including, disposed on the vessel, an interference filter having alternating layers of respective high and lower refractive indices for selectively passing light of at least one predetermined color and for reflecting back toward the electric element radiation of a wavelength $\lambda_o$, characterized in that:

a. the lamp vessel consists essentially of a glass having a $SiO_2$ content of at least 95% by weight;
b. the layers of high refractive index each have an optical thickness which is substantially smaller than $\frac{1}{4}\lambda_o$; and
c. the layers of low refractive index each consist essentially of $SiO_2$ and have an optical thickness which is substantially larger than $\frac{1}{4}\lambda_o$.

---

### 5,017,826
## RAPID HEAT-DISSIPATING TYPE SPARK PLUG FOR INTERNAL COMBUSTION ENGINES

**Takafumi Oshima, and Kozuka Kazuhiko, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan**

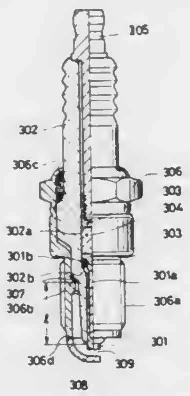
**Filed Aug. 21, 1989, Ser. No. 397,101**

**Claims priority, application Japan, Jan. 9, 1989, 1-2370; Jan. 9, 1989, 1-2371**

**Int. Cl.$^5$ H01T** *13/20*

**U.S. Cl. 313—142** **7 Claims**

1. A spark plug structure comprising;
a cylindrical metallic shell;
a tubular insulator having a center bore, and;
a center electrode placed into the center bore of the insulator to form a spark gap with a ground electrode depending from the metallic shell;



the metallic shell being made of material having a tensile stress of more than 40 Kg/mm$^2$, and having a thermal conductivity of more than 60 W/m·k.

---

### 5,017,827
## COMPACTLY BUILT ELECTRON TUBE AND FABRICATION METHOD THEREOF

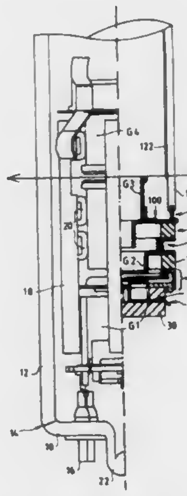
**Umberto Rossini, Saint Egreve; Pierre Simonin, Meylan, and Christine Tremblay, Voreppe, all of France, assignors to Thomson-CSF, Puteaux, France**

**Filed Oct. 23, 1989, Ser. No. 425,000**

**Claims priority, application France, Oct. 25, 1988, 88 13914**

**Int. Cl.$^5$ H01J** *29/82, 9/18, 1/88*

**U.S. Cl. 313—268** **9 Claims**



1. An electron tube comprising:
a neck including a first subassembly formed by a stack of supporting metallic rings and ceramic rings brazed together, among which several specific metallic rings are used for the supporting of and the electrical connection to different internal electrodes of the tube, said internal electrodes being distinct from specific rings, the ceramic rings being used for the electrical insulation and physical separation of the metallic rings, wherein
said neck comprises at least another subassembly of alternating stacked metallic rings and ceramic rings;
each subassembly is terminated at one end by a respective end metallic ring, said respective end metallic rings being soldered together by electrical or laser soldering; and
the specific metallic rings of said first subassembly are shaped in such a way that said internal electrodes may be soldered to said rings by electrical or laser soldering after the stacked rings of the subassembly have been brazed together.

---

### 5,017,828
## IMAGE SENSOR

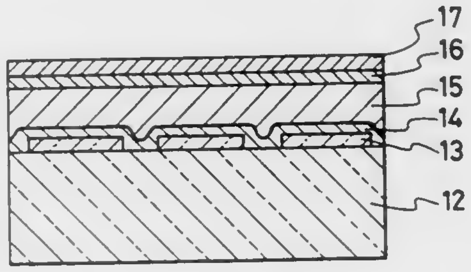
**Takeshi Fukada, Ebina; Mitsunori Sakama, Hiratsuka; Nobumitsu Amachi, Takarazuka; Naoya Sakamoto, Atsugi; Mitsufumi Codama, and Toru Takayama, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Filed Apr. 25, 1989, Ser. No. 342,857**

**Claims priority, application Japan, Apr. 30, 1988, 63-107958**

**Int. Cl.$^5$ H01J** *31/26;* **H01L** *27/14*

**U.S. Cl. 313—367** **6 Claims**



1. An image sensor comprising:
a pair of electrodes for defining a plurality of sensor elements, at least one of said pair being transparent:
a photosensitive semiconductor layer disposed between said pair of electrodes for forming said sensor elements,
wherein the portions of said photosensitive semiconductor layer which contact said pair of electrodes are comprised of either silicon carbide or silicon nitride, and wherein said photosensitive semiconductor layer forming each of said sensor elements is contiguous with the adjacent sensor elements.

---

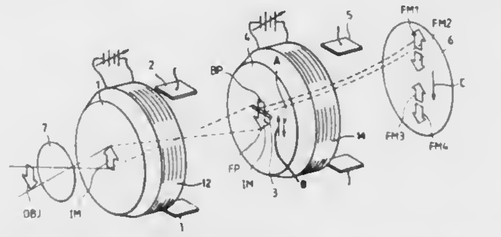
### 5,017,829
## FRAMING CAMERA

**Musubu Koishi, and Motoyuki Watanabe, both of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan**

**Filed Feb. 24, 1989, Ser. No. 314,736**

**Int. Cl.$^5$ H01J** *31/26*

**U.S. Cl. 313—382** **5 Claims**



1. A framing camera, comprising:
a photocathode for receiving a first optical image and emitting first electron beams with a spatial image corresponding to said first optical image;
a slit member having a slit;
first electron lens means for focusing said first electron beams onto said slit member;
first deflection means for scanning said first electron beams in response to a first deflection voltage, said first deflection voltage having a corresponding time varying portion;
said slit passing part of said first electron beams deflected by said first deflection means as a temporal sequence of second electron beams;
a phosphor screen for receiving said second electron beams and converting said second electron beams into optical images;
second electron lens means for focusing said second electron beams onto said phosphor screen; and
second deflection means for scanning said second electron beams in response to a second deflection voltage, said second deflection voltage having a corresponding time varying portion, said corresponding time varying portions of said first and second voltages having different phases and periods;
wherein second optical images of a plurality of framed patterns are formed on said phosphor screen.

---

### 5,017,830
## COLOR CATHODE RAY TUBE HAVING A SHADOW MASK COVERED WITH A POROUS LAYER

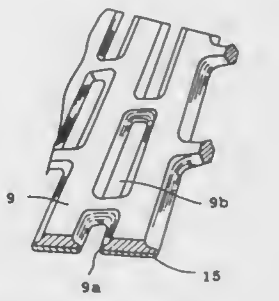
**Norio Koike, Hyougo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Aug. 31, 1989, Ser. No. 401,238**

**Claims priority, application Japan, Oct. 27, 1988, 63-271648**

**Int. Cl.$^5$ H01J** *29/07*

**U.S. Cl. 313—402** **3 Claims**



1. A color cathode ray tube comprising:
a vacuum envelope including a panel with an inner surface, a neck and a funnel connecting the neck to the panel;
a phosphor screen provided on the inner surface of the panel for emitting visible light;
an electron gun provided in the neck for emitting a plurality of electron beams towards the phosphor screen;
a shadow mask provided adjacent to the phosphor screen with a predetermined distance from the phosphor screen and having a front surface facing to the phosphor screen, a rear surface facing to the electron gun and a plurality of apertures for allowing passage of the electron beams towards and screen; and
a porous layer provided on at least one of the front and rear surfaces of the shadow mask and being formed by using metal alkoxide solution containing black pigment, the pigment containing 1.0 wt.% to 15wt.% cobalt oxide and 1.0 wt.% to 15wt.% nickel oxide wherein the weight ratio of cobalt oxide to nickel oxide is about 1.

---

### 5,017,831
## GLOW DISCHARGE LAMP WITH GETTER MATERIAL ON ANODE

**Andre C. Bouchard, Peabody, and John F. Waymouth, Marblehead, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.**

**Continuation of Ser. No. 139,399, Dec. 30, 1987. This application Jan. 8, 1990, Ser. No. 463,800**

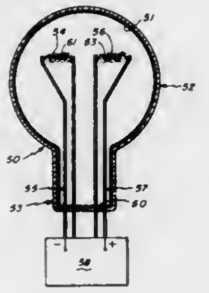
**Int. Cl.$^5$ H01J** *17/24*

**U.S. Cl. 313—558** **11 Claims**

1. A DC-operable glow discharge lamp comprising:
a light transmitting envelope containing a noble gas fill material;
a pair of electrodes disposed in said envelope and comprising at least one anode electrode and at least one cathode electrode, said anode electrode having only a coating of a

VOL
1126
ISS
3
MY
21
1991
UMI

getter material disposed on substantially the entire length thereof, said getter material being located in the path of negatively charged electrons and ions collected upon said anode whereby impurity gases negatively ionized within said envelope are electrically drawn to said getter material for rapid removal; and



lead-in wires coupled to the electrodes, extending through and hermetically sealed within said envelope, and for coupling a power source to the electrodes for establishing a lamp discharge therebetween.

---

5,017,832

## MAGNETIC CANCELLING APPARATUS FOR COLOR CATHODE-RAY TUBE

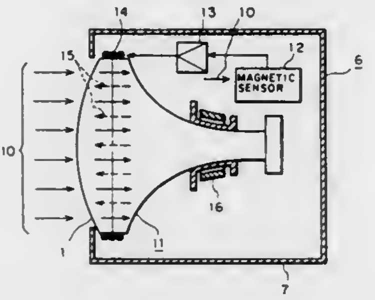
**Hidenori Takita, Nagasaki, Japan, assignor to Mitsubishi Denki Kaisha Kaisha, Tokyo, Japan**

**Filed Oct. 26, 1989, Ser. No. 426,849**

**Claims priority, application Japan, Feb. 6, 1989, 1-25692**

**Int. Cl.⁵ H01J** *29/00*

**U.S. Cl. 315—8** **3 Claims**



1. A magnetic cancelling apparatus for a color cathode-ray tube, comprising:

a magnetic sensor for detecting an external magnetic field acting on said color cathode-ray tube in a direction parallel to the axis of said tube;

an amplifier for amplifying an output signal provided from said magnetic sensor; and

a cancelling coil wound annularly around the periphery of said tube and energized by an output signal from said amplifier for generating a magnetic field cancelling said external magnetic field.

---

5,017,833

## PILOT LIGHT ASSEMBLY

**Geoffrey Clarke, and Geoffrey J. Harris, both of Swindon, United Kingdom, assignors to Square D Company, Palatine, Ill.**

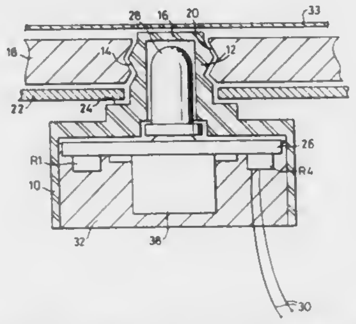
**PCT No. PCT/GB89/00369, § 371 Date Dec. 1, 1989, § 102(e) Date Dec. 1, 1989, PCT Pub. No. WO89/09910, PCT Pub. Date Oct. 19, 1989**

**PCT Filed Apr. 11, 1989, Ser. No. 435,460**

**Claims priority, application United Kingdom, Apr. 13, 1988, 8808704**

**Int. Cl.⁵ H05B** *37/00*

**U.S. Cl. 315—51** **14 Claims**



1. A pilot light assembly for use in indicating presence of relatively high voltages, comprising:

A. a light emitting diode (LED);

B. means for converting the voltage monitored to a relatively low d.c. voltage and applying this to the LED;

C. a housing, made from a transparent or translucent material for containing the LED and the voltage converting means, the housing being adapted for mounting on a supporting panel; and where, the LED is mounted substantially centrally on one side of a printed circuit board (pcb), the other side of which mounts the voltage converting means; and

D. the housing comprises a first, hollow projecting portion adapted for securement in an aperture in the panel and having an end face providing a window for viewing the LED, the window being generally flush with the outside surface of the panel when the pilot light assembly is installed, and a second hollow body portion disposed rearwardly of the projecting portion, such that the projecting portion extends substantially from the centre of the body portion;

E. the pcb being located in the body portion such that the LED extends into the hollow interior of the projecting portion, and the interior volume of the body portion being filled with a potting material to encapsulate the voltage converting means and secure the pcb in the housing.

---

5,017,834

## SIMPLIFIED GASEOUS DISCHARGE DEVICE SIMMERING CIRCUIT

**Robert P. Farnsworth, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 812,865, Dec. 23, 1985, abandoned. This application Nov. 4, 1988, Ser. No. 268,630**

**Int. Cl.⁵ H01J** *7/44*

**U.S. Cl. 315—58** **23 Claims**

1. A simmering circuit for providing a simmering current to a gaseous discharge device comprising:

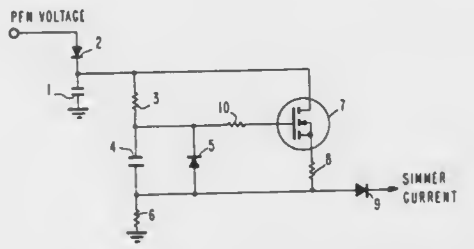
a semiconductor device having an input, an output and a control terminal, said semiconductor device having an impedance substantially greater than the magnitude of the impedance of said discharge device;

a power supply means, said power supply means including a high voltage direct current source for applying high voltage direct current to said input terminal maintaining said direct current substantially constant at the operating voltage of the discharge device;

a bias supply means for providing a bias voltage to said control terminal;

impedance means in series between said output terminal and said discharge device, the impedance being selected such that the voltage drop across said impedance means is substantially greater than the drop across said input and output terminals of said semiconductor device; and

said output terminal of said semiconductor device supplying a substantially constant simmer current at a range of varying voltages during normal operating voltage above one hundred sixty (160) volts to said discharge device.



---

5,017,835

## HIGH-FREQUENCY ION SOURCE

**Hans Oechsner, Vogelweher Strasse 7 B, D-6750 Kaiserslautern, Fed. Rep. of Germany**

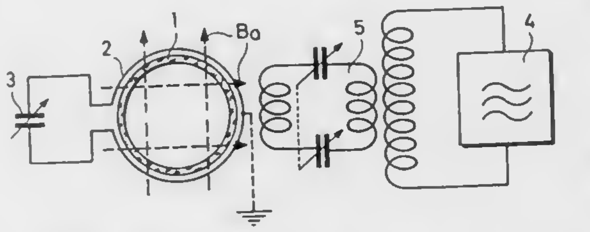
**PCT No. PCT/DE88/00152, § 371 Date Nov. 20, 1989, § 102(e) Date Nov. 20, 1989, PCT Pub. No. WO88/07259, PCT Pub. Date Sep. 22, 1988**

**PCT Filed Mar. 16, 1988, Ser. No. 415,259**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1987, 3708716**

**Int. Cl.⁵ H01J** *27/18;* **H05H** *1/46*

**U.S. Cl. 315—111.81** **6 Claims**



1. High-frequency ion source for the generation of large-area ion beams, the ion source having a vessel for substances, particularly gases, to be ionized, high-frequency energy being capable of being inductively coupled into a plasma and a d.c. magnetic field being superimposed on the plasma, characterized in that a plasma excitation at gas pressures in a high-vacuum can be carried out in a tubular plasma vessel (1) by electron cyclotron waves which are resonant with respect to the dimensions of the plasma vessel, the plasma vessel (1) being matched to the shape of the desired ion beam and being clamped between a carrier plate (7) and a closure plate (8), and an intermediate circuit (5) capable of being resonated being arranged between a high-frequency generator (4) and a load circuit coil (2), a weak, d.c. magnetic field, which is directed perpendicular to the axis of the load circuit coil (2) based on the theory of electron cyclotron wave resonance and has a magnitude given by the theory, being generated by a Helmholtz coil pair (6) whose geometric configuration is matched to the shape of the plasma vessel (1), and an ion-optical system for ion extraction (9), consisting of a plurality of electrodes and matched to the geometry of the desired ion beam, being arranged in the carrier plate (7).

---

5,017,836

## ELECTRONIC FEEDER FOR AN ION PUMP

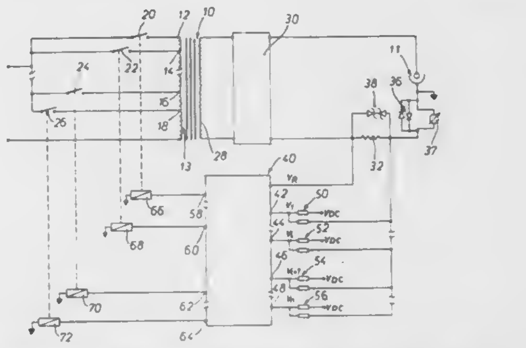
**Mario Busso, Turin, and Mauro Audi, Rivoli, both of Italy, assignors to Varian, S.p.A., Leint, Italy**

**Filed Mar. 30, 1989, Ser. No. 331,636**

**Claims priority, application Italy, Apr. 14, 1988, 67345 A/88**

**Int. Cl.⁵ H01J** *41/12*

**U.S. Cl. 315—111.91** **7 Claims**



1. An improved electronic feeder for an ion pump comprising a transformer and means for rectifying and filtering the alternating current from said transformer, characterized in that said transformer is controlled by means responsive to the current drawn by the ion pump for increasing or decreasing the feed voltage of the primary winding when the current drawn by the ion pump increases or decreases respectively, said control means being connected to keep said voltage constant in a given range of current change and to vary when said current is outside said range.

---

5,017,837

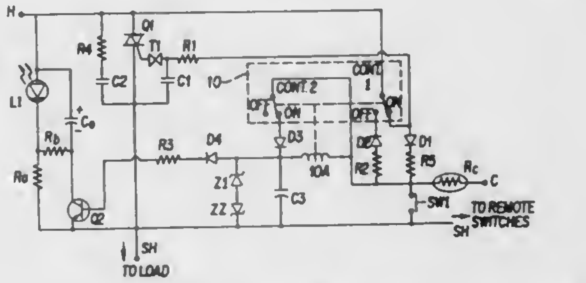
## INDICATOR LAMP SYSTEM

**R. Scott Hanna, Bethlehem, Pa.; Woodie Flowers, Weston, Mass.; David G. Luchaco, Macungie, Pa.; Stephen J. Yuhasz, Zionsville, Pa.; Joel S. Spira, Coopersburg, Pa., and Philip R. Hall, Ottsville, Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.**

**Continuation of Ser. No. 131,776, Dec. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 78,846, Jul. 30, 1987, abandoned. This application Dec. 12, 1989, Ser. No. 453,093**

**Int. Cl.⁵ H01J** *70/42;* **G05B** *23/02*

**U.S. Cl. 315—136** **26 Claims**



1. For use with means for controlling power provided by a source to an electrical load, a circuit that senses whether power to the load is on and that includes a switching power supply, driven by said source, to provide power for an indicator lamp that emits a low light intensity when the power to the load is off and higher light intensity when power to the load is on, said switching power supply comprising a solid state switch means.

'OL
126
SS
3
MY
21
1991
UMI

## 5,017,838

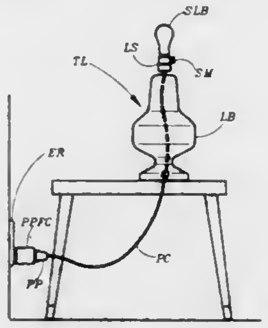
## ELECTRONIC INCANDESCENT LIGHTING PRODUCT

**Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010**

**Continuation of Ser. No. 837,759, Mar. 10, 1986, abandoned. This application Jan. 25, 1990, Ser. No. 470,392**

**Int. Cl.$^5$ H05B** *39/00, 41/14*

**U.S. Cl. 315—200 R** **20 Claims**



1. A lighting system comprising:

frequency converter means operative: i) to be plugged into an ordinary household electric receptacle, thereby to be connected with the low frequency voltage on an ordinary electric utility power line, and ii) to provide a high-frequency voltage at a high-frequency receptacle means adapted to receive and hold an ordinary electric power plug; the frequency of the high-frequency voltage being substantially higher than that of the low-frequency voltage;

lamp base means having: i) power plug operative to be plugged into a receptacle means receptive of an ordinary electric power plug, and ii) lamp socket operative to receive and hold an ordinary electric light bulb; and

special light bulb means being: i) adapted to be inserted into and held by a lamp socket receptive of an ordinary electric light bulb, ii) responsive to and properly operable from the high-frequency voltage provided at the high-frequency receptacle means, and iii) substantially non-responsive to the low-frequency voltage;

whereby the special light bulb means will be responsive and properly operable whenever: i) the frequency converter means is plugged into an ordinary household electric receptacle, ii) the power plug of the lamp base means is plugged into the high-frequency receptacle means, and iii) the special light bulb means is inserted into the lamp socket of the lamp base means;

while the special light bulb means will be non-responsive whenever: i) the power plug of the lamp base means is plugged directly into an ordinary household electric receptacle, and ii) the special light bulb means is inserted into the lamp socket of the lamp base means.

---

## 5,017,839

## ILLUMINATION SYSTEM HAVING A LOW-POWER HIGH-PRESSURE DISCHARGE LAMP AND POWER SUPPLY COMBINATION

**Joachim Arlt, Munich; Alexander Dobrusskin, Taufkirchen; Jürgen Von Scheidt, Berlin, and Jürgen Heider, Munich, all of Fed. Rep. of Germany, assignors to Patent-Treuhand Gesellschaft fur Elektrische Gluhlampen m.b.H, Munich, Fed. Rep. of Germany**

**Filed Dec. 15, 1989, Ser. No. 452,125**

**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1988, 3842771**

**Int. Cl.$^5$ H05B** *41/00*

**U.S. Cl. 315—219** **21 Claims**

1. An illumination system comprising the combination of a low-power high-pressure discharge lamp (1)

with

a power supply (S) connected to said discharge lamp

wherein the power supply (S) supplies ignition or run-up current to the lamp which is between 5 to 10 times the nominal rated current of the lamp; and

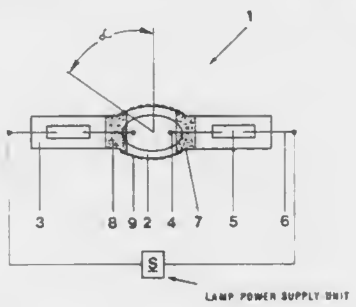
wherein the lamp (1) comprises

a transparent discharge vessel (2);

electrode leads (5, 6) extending into and sealed into the discharge vessel;

electrodes (4) secured to the electrode lead-ins, spaced from each other and having portions defining a discharge space therebetween;

a fill in the discharge vessel including at least one noble gas, optionally mercury, and metal halides wherein said metal halides consist essentially of sodium and a rare earth metal halide or of sodium and a scandium halide,



wherein the lamp further comprises the characteristics that the mass, in grams, of the discharge vessel per unit of rated power of the lamp, in watts, is between about 0.002 and 0.1 grams per watt;

the noble gas fill comprises xenon at a cold fill pressure of at least 3 bar;

the electrode shafts have a diameter, at the most, of 0.3 mm; and

the electrode end portions facing said discharge space or gap are rounded.

---

## 5,017,840

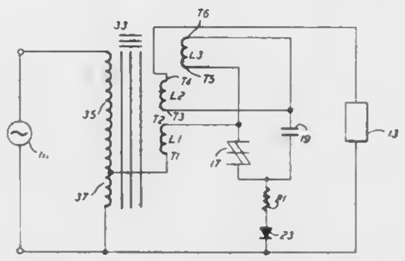
## IGNITOR CIRCUIT FOR DISCHARGE LAMPS WITH NOVEL BALLAST

**Joseph S. Droho, Chicago, Ill., assignor to North American Philips Corporation, New York, N.Y.**

**Division of Ser. No. 133,705, Dec. 16, 1987. This application May 7, 1990, Ser. No. 506,393**

**Int. Cl.$^5$ H05B** *37/02*

**U.S. Cl. 315—291** **14 Claims**



1. A starting and operating circuit for a discharge lamp including a ballast reactance, said ballast reactance having a body including a coil with first, second and third coil segment means, each with a number of windings, at least one of said first and second coil segment means having a substantial number of more windings than said third coil segment means, each coil segment means with two ends, said third coil segment means being electrically connected between said first coil segment means and said second coil segment means and forming electrical connections therewith regardless of the physical location of said third coil segment means on said coil relative to the physical locations of said first and second coil segment means and also comprising a discharge lamp with two terminal means,

one terminal means connected to one end of said second coil segment means and the other terminal means for connection to an AC power supply return, a voltage sensitive switching means with two ends, one end connected to the electrical connection between said first and third coil segment means and a capacitor with two ends, one end of said capacitor connected to the electrical connection between said second and third coil segment means, a resistor with two ends, one end of said resistor connected to the other ends of said voltage sensitive switching means and said capacitor, said resistor having its other end for connection to said AC power supply return and packaging means integral with the body of said reactance for packaging said voltage sensitive switching means, said capacitor and said resistor with said body as an integrated unit.

---

## 5,017,841

## FM DEMODULATOR

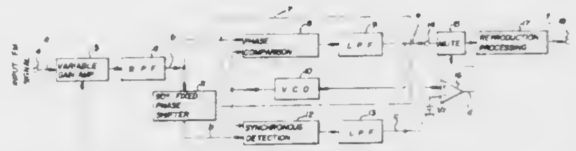
**Katsunori Miura, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed May 14, 1990, Ser. No. 522,937**

**Claims priority, application Japan, May 16, 1989, 1-122360**

**Int. Cl.$^5$ H03D** *3/00*

**U.S. Cl. 329—325** **9 Claims**



1. An FM demodulator for demodulating a predetermined band component of an FM signal comprising:

variable gain amplifier means receiving said FM signal for varying its gain in response to a predetermined control signal,

filter means for passing a predetermined band component of the output signal of said variable gain amplifier means,

phase locked loop means including voltage controlled oscillator means for FM demodulating the output signal of said filter means, and

synchronous detection means responsive to the output signal of said voltage controlled oscillator means for detecting synchronization of the output signal of said filter means with said output signal of said voltage controlled oscillator means and amplitude detecting the synchronized output signal of said filter means to supply an amplitude-detected signal as said predetermined control signal to said variable gain amplifier means so that the amplitude of said predetermined band component of said FM signal may be constant.

---

## 5,017,842

## IMAGE DISPLAY APPARATUS

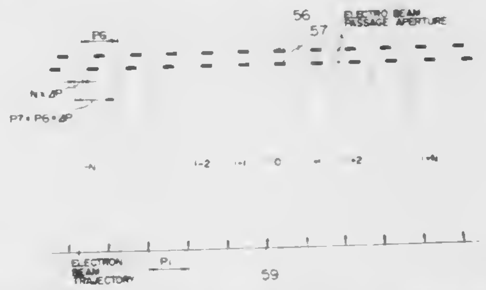
**Kiyoshi Hamada, Sakai; Kinzo Nonomura, Ikoma; Masayuki Takahashi, Katano; Jumpei Hashiguchi, Suita, and Satoshi Kitao, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed May 3, 1990, Ser. No. 518,407**

**Int. Cl.$^5$ G09G** *1/04;* **H01J** *29/70*

**U.S. Cl. 315—366** **10 Claims**

1. An image display apparatus, comprising an electron source for emitting electron beams; a control means for controlling the flow of said electron beams; a display screen irradiated by said electron beams impinging thereon, said control means comprising at least a first electrode having a first arrangement of electron beam passage apertures and a second electrode having a second arrangement of electron beam passage apertures, said second electrode being disposed between said first electrode and said screen, whereby a given electron beam travelling from said electron source to said screen passes through corresponding apertures of said first electrode and said second electrode, and wherein a position of at least one of the apertures of said second electrode is offset laterally with respect to a position of the corresponding aperture of said first electrode relative to a position on said screen; and a beam landing position detecting means provided on the surface of said screen for detecting a beam landing position relative to said screen and generating a beam landing position signal to control a potential difference between said first electrode and said second electrode.



---

## 5,017,843

## COLOR DISPLAY TUBE, DEFLECTION SYSTEM AND ELECTRON GUN

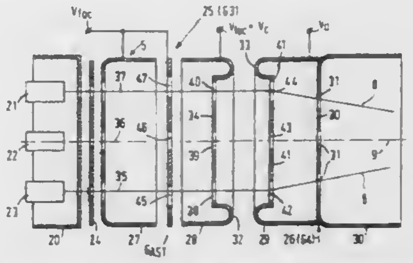
**Piet G. J. Barten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 265,631, Nov. 1, 1988, abandoned. This application Oct. 24, 1989, Ser. No. 426,518**

**Claims priority, application Netherlands, Nov. 4, 1987, 8702631**

**Int. Cl.$^5$ H01J** *29/70, 29/76*

**U.S. Cl. 315—368** **14 Claims**



1. A self convergent color display tube comprising:

a. an envelope having a display window supporting a luminescent screen;

b. an electron gun disposed in the envelope for producing along respective axes central and first and second outer electron beams directed toward the luminescent screen, said electron gun including electrode means for cooperatively affecting focusing of the individual electron beams and convergence of said electron beams to a common point at said luminescent screen; and

c. deflection means for producing a deflection field within the envelope between the electron gun and the luminescent screen for deflecting the electron beams across said screen, said deflection field having an electron beam defocusing astigmatic component of predetermined strength for maintaining said convergence as said electron beams are deflected away from a central region of said screen;

characterized in that;

(1) the deflection means is configured to reduce the strength of the beam defocusing astigmatic component of the deflection field, thereby causing a predetermined overconvergence of the outer electron beams when deflected away from the central region of the screen; and

(2) the electron gun includes convergence correction electrode means for responding to a signal applied to the electron gun by dynamically deflecting the outer

VOL
1126
ISS
3
MY
21
1991
UMI

electron beams away from the central electron beam to the extent necessary to compensate for the predetermined overconvergence in the deflection field.

---

### 5,017,844

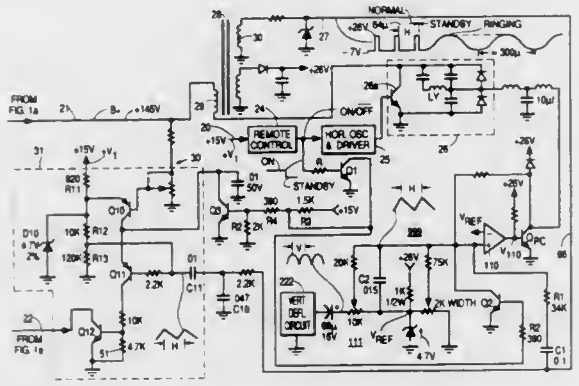
### DISABLING ARRANGEMENT FOR A CIRCUIT OPERATING AT A DEFLECTION RATE

**Jeffery B. Lendaro, Noblesville, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Apr. 30, 1990, Ser. No. 516,384**

**Int. Cl.$^5$ H01J** *29/70, 29/76*

**U.S. Cl. 315—408** **4 Claims**



1. A video display apparatus, comprising:

a source of an on/off control signals that is indicative when operation in a standby mode is required and when operation in a run mode is required;

a horizontal deflection circuit output stage responsive to said on/off control signal for generating a second control signal having signal transitions during said run mode and during a first interval that follows a change in said on/off control signal to said standby mode of operation such that, during said standby mode operation following said first interval, the signal transitions in said second control signal cease;

a source of modulation signal; and

an East-West raster distortion modulator responsive to said modulation signal, having first and second terminals coupled to receive said on/off and second control signals, respectively, and having an output terminal coupled to a control terminal of a transistor for producing a pulse-width modulated switching operation in said transistor during said run mode operation that modulates a deflection current in an East-West manner such that, during said transition interval, the switching operation in said transistor is disabled via said first terminal by the operation of said on/off control signals, and such that during said standby mode operation following said first interval, the switching operation is disabled via at least said second terminal by the operation of said second control signal.

---

### 5,017,845

### BRUSHLESS DIRECT CURRENT MOTOR STARTING AND OPERATING APPARATUS AND METHOD

**Francesco Carobolante; Ermanno Pace, and Mark McCormack, all of Phoenix, Ariz., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.**

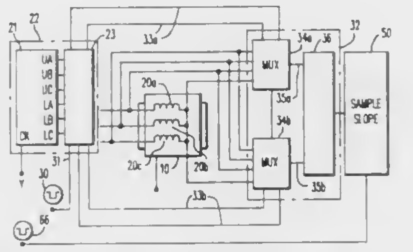
**Filed Oct. 5, 1990, Ser. No. 593,002**

**Int. Cl.$^5$ H02P** *6/02*

**U.S. Cl. 318—138** **22 Claims**

1. In combination with a sensorless brushless direct current motor, said motor including a permanent magnet rotor, a stator having multiple phases, excitation means for sequentially in a plurality of predetermined commutations exciting simultaneously a predetermined number of said multiple phases while maintaining the remainder of said multiple phases in a non-excited state such that during each of said commutations said sequential excitation of said multiple phases, said simultaneously excited phases constitute an excited phase group and said remainder of said multiple phases constitute a non-excited phase group, the improvement which comprises:

a. means for turning off said excitation to said excited phase group at a predetermined time during start-up of said motor for a predetermined off-time period such that none of said multiple phases are excited during said off-time period;



b. means for detecting the differential back electromotive force developed in said non-excited phase group during said predetermined off-time period;

c. means for sampling the magnitude and sign of the slope of said detected back electromotive force of said non-excited phase group for a predetermined sample period during said off-time period, whereby the direction of rotation and torque on said rotor may be determined during start-up.

---

### 5,017,846

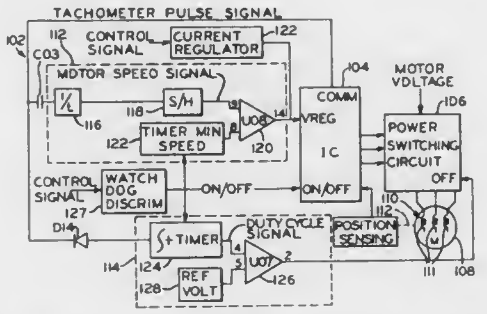
### STALL PROTECTION CIRCUIT FOR AN ELECTRONICALLY COMMUTATED MOTOR

**Glen C. Young, and James R. Kiefer, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.**

**Filed Apr. 5, 1990, Ser. No. 505,163**

**Int. Cl.$^5$ H02H** *7/08*

**U.S. Cl. 318—244** **28 Claims**



1. A control circuit for a system including an electronically commutated motor having a stationary assembly with a plurality of winding stages for carrying a motor current in response to application of a voltage and having a rotatable assembly associated with the stationary assembly in selective magnetic coupling relation therewith for rotation at a motor speed in response to a magnetic field generated by the winding stages, a commutating circuit for the motor responsive to a control signal for applying the voltage to one or more of the winding stages at a time to commutate the winding stages in a preselected sequence to rotate the rotatable assembly, and tachometer pulse signal generating means for generating a pulsed signal representative of the rotational speed of the rotatable assembly and having a duty cycle, said control circuit comprising:

first means for inhibiting application of the motor voltage to the winding stages in response to the tachometer pulse signal when the motor speed is below a preset minimum speed; and

second means for inhibiting application of the motor voltage to the winding stages in response to the tachometer pulse signal when the duty cycle of the tachometer pulse signal is outside a preselected acceptable range whereby application of the motor voltage to the winding stages is inhibited when the motor is stalling as indicated by the motor speed being below the preset minimum speed or as indicated by the duty cycle of the tachometer pulse signal being outside the preselected acceptable range.

---

### 5,017,847

### METHOD AND APPARATUS FOR ADAPTING THE SENSITIVITY OF A SENSOR SYSTEM FOR THE DETECTION OF PRECIPITATIONS DURING THE CONTROL OF WIPING INTERVALS OF A SCREENWIPER

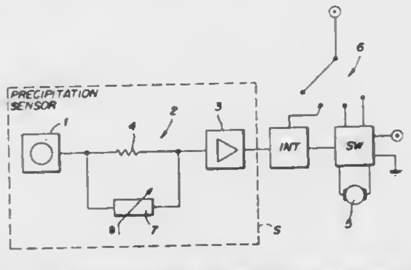
**Raimund Leistenschneider, Merzig-Besseringen, Fed. Rep. of Germany, assignor to Mercedes-Benz AG, Fed. Rep. of Germany**

**Filed Aug. 1, 1990, Ser. No. 561,349**

**Claims priority, application Fed. Rep. of Germany, Aug. 8, 1989, 3926175**

**Int. Cl.$^5$ H02P** *7/00*

**U.S. Cl. 318—443** **13 Claims**



1. A method of adapting the sensitivity of a sensor system for the detection of precipitations during the control of wiping intervals of a screenwiper drive of a motor vehicle as a function of the kinetic energy of striking precipitations, comprising:

detecting striking precipitations with a pressure-sensitive sensor of a sensor system;

converting the detections of striking precipitations into electrical output signals;

transmitting the output signals via a transmission path to an amplifier with an amplification factor for activating a wiper-motor control circuit; and

varying the electrical properties of the transmission path as a function of ambient temperature such that the responsiveness of the sensor system is increased with decreasing temperatures.

---

### 5,017,848

### DRIVE CONTROL CIRCUIT

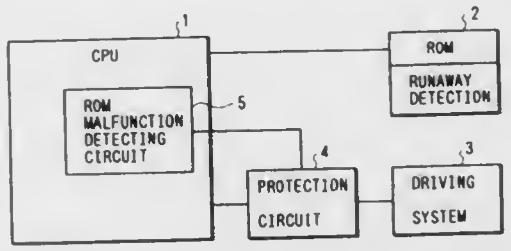
**Atsuhiko Takahashi, Morioka, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Jun. 20, 1990, Ser. No. 541,233**

**Claims priority, application Japan, Jul. 10, 1989, 1-177777**

**Int. Cl.$^5$ H03M** *13/00*

**U.S. Cl. 318—568.1** **1 Claim**



1. A drive control circuit of a type wherein at least one ROM in which a control program for controlling a driving system and a runaway detection program for the prevention of a malfunction which occurs in said driving system as a result of the runaway of said control program have been written therein is connected to a CPU which performs predetermined control of said driving system and when said control program is run out of control, said runaway detection program is executed to reset said CPU, thereby protecting said driving system, said circuit comprising:

protection means provided between said CPU and said driving system and for connecting said CPU to said driving system or disconnecting said CPU therefrom; and

ROM malfunction detecting means for detecting whether or not said ROM is in a normal operation state and for supplying a disconnection actuating signal to said protection means upon malfunction of said ROM.

---

### 5,017,849

### DRIVING CONTROL CIRCUIT FOR ROBOT

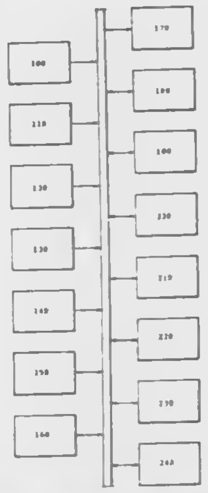
**An Ey-Rang, 168-14 Wonmidong, Joongku, Buchonsi, Kyungkido, and Cho Jung-Whan, Mokdong New Town Apartment 1327-802, 328 shinjungdong, Yangchonku, Seoul, both of Rep. of Korea**

**Filed May 31, 1990, Ser. No. 531,507**

**Claims priority, application Rep. of Korea, May 31, 1989, 7440/1989; May 16, 1990, 6999/1990**

**Int. Cl.$^5$ G05B** *19/22*

**U.S. Cl. 318—568.1** **3 Claims**



1. A driving control circuit for a robot, which robot has a rotational arm, a first arm, a second arm, and a hand to grasp a product, urge the product out of an injection mould, and move the product to a desired location, said circuit comprising:

starting means (110) for outputting starting signals;

rotational arm sensor means (120) for detecting a finishing of rotation of the rotational arm (2) of the robot;

first arm sensor means (130) for detecting a finishing of movement of the first arm of the robot (3);

second arm sensor means (140) for detecting a finishing of movement of the second arm of the robot (4);

first driving means (160) driving the first arm (3) in an operation by the robot in urging the product out of the injection mould, said first driving means (160) driving the first arm (3) according to the signals of said starting means (110) and said first arm sensor means (130);

second driving means (180) driving the second arm (4) in the operation by the robot in urging the product out of an injection mould, said second driving means (180) driving the second arm (4) according to the signals of said starting means (110) and said second arm sensor means (130);

rotational arm driving means (150) for driving the rotational arm (2) in the operation by the robot in urging the product out of the injection mould and in the operation by the

VOL
126
ISS
3
MY
21
1991
UMI

robot in moving the product to the desired location, said rotational arm driving means (**150**) driving the rotational arm (**2**) according to the signals of said starting means (**110**) and said rotational arm sensor means (**120**);

third driving means (**170**) driving the first arm (**3**) in the operation by the robot in moving the product to the desired location, said third driving means (**170**) driving the first arm (**3**) according to the signals of said starting means (**110**) and said first arm sensor means (**130**);

fourth driving means (**190**) driving the second arm (**4**) in the operation by the robot in moving the product to the desired location, said fourth driving means (**190**) driving the second arm (**4**) according to the signals of said starting means (**110**) and said second arm sensor means (**140**);

switching means (**200**) to selectively operate the robot in urging the product out of the injection mould by the selective operation of said second driving means (**180**), said switching means (**200**) selectively operating the robot in moving the product to the desired location by the selective operation of said fourth driving means (**190**);

second arm sensor switching means (**210**) for switching a detected signal of said second arm sensor means (**140**);

detecting means (**220**) for detecting whether or not the product is grasped within a hand (**5**) of the robot;

product gripping control means (**230**) controlling the hand to grasp the product within the injection mould; and

power failure/over load detection control means (**240**) for returning the rotational arm, the first arm, the second arm, and the hand to respective initial positions in the event of power failure and in the event of power overload.

---

### 5,017,850

## MOBILE MEMBER CONTROL APPARATUS

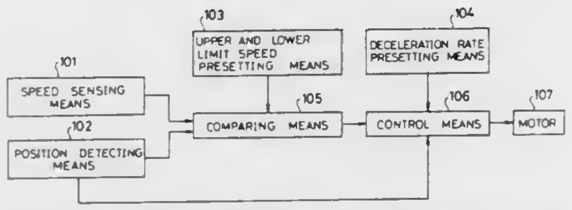
**Hiroyuki Harada, Osaka; Yasumasa Matsuura, Nisbinomiya; Toshihiko Araki, Kobe, and Tetsuji Kajitani, Kawanishi, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 9, 1989, Ser. No. 433,903**

**Claims priority, application Japan, Nov. 12, 1988, 63-286341**

**Int. Cl.⁵ G05B** *11/28*

**U.S. Cl. 318—599** **11 Claims**



1. A mobile member control apparatus having a motor for accelerating a mobile member to move said member from a first position, for decelerating said mobile member after said member reaches a second position, and for stopping said mobile member at a third position, said apparatus comprising:

speed sensing means for sensing the speed of travel of said mobile member;

position detecting means for detecting the position of said mobile member;

speed presetting means for presetting upper and lower speed limit values, said upper and lower limit values being given as a function of the displacement of said mobile member, said values becoming smaller as said mobile member travels closer to said third position;

deceleration rate presetting means for presetting at least two deceleration rates, large and small;

comparing means for comparing a travel speed received from said speed sensing means with said upper and lower limit values; and

motor control means for decelerating the motor according to either of said large or small deceleration rate when said position detecting means detects that said mobile member has reached said second position, for decelerating said motor according to said large deceleration rate when the speed of travel of said mobile member is greater than or equal to said upper limit value, and for decelerating said motor according to said small deceleration rate when the travel speed of said mobile member is less than or equal to said lower limit value, so that the mobile member is permitted to repeatedly decelerate between two different values that correspond to said upper and lower speed limit values.

---

### 5,017,851

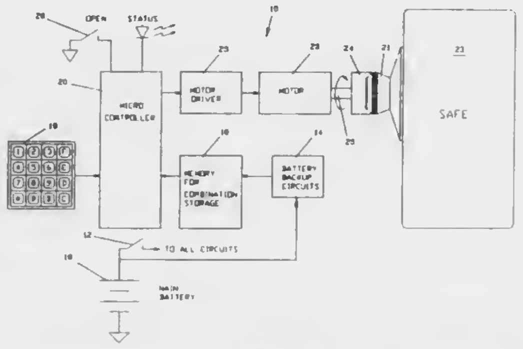
## MECHANICAL ROTATING COMBINATION LOCK OPENING DEVICE

**Fred C. Heinzman, 457 Pine Needles Dr., Del Mar, Calif. 92014**

**Filed Sep. 6, 1988, Ser. No. 240,732**

**Int. Cl.⁵ G05B** *19/40*

**U.S. Cl. 318—685** **9 Claims**



1. A device for opening at least one rotary combination lock of a type having a dial with a face, said face having a number of equally spaced integers about the dial face when the combination is previously known comprising:

a micro controller;

a key pad for inputting information directed to said motor means comprising engaging means for engaging said dial and rotating said dial according to said known combination inputted into said micro controller, said engaging means comprises a motor driven shaft with a dial face engagement means on the distal end thereof, said dial face engagement means comprises a rigid cup member with a plurality of different diameter internal grooves with gripping surface within each of said plurality of grooves; and

energizing means for providing power to said micro controller, key pad and motor means.

---

### 5,017,852

## ELECTRIC CONTROL APPARATUS FOR DISHWASHING MACHINE

**Osamu Nagata, Toyoake; Tokihiro Kuwahara, Kariya; Yukichi Suzawa, Nagoya; Hiroaki Kamino, Toyoake; Tomio Suyama, Toyoake, and Tomoyoshi Konno, Toyoake, all of Japan, assignors to Hoshizaki Denki Kabushiki Kaisha, Toyoake, Japan**

**Filed Jan. 25, 1990, Ser. No. 469,910**

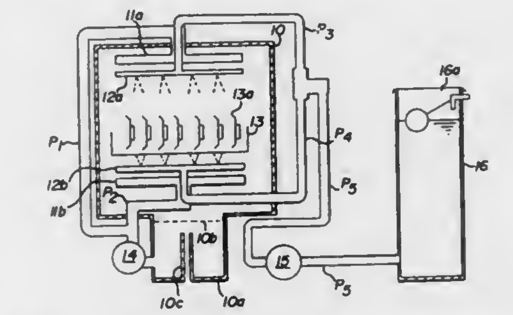
**Claims priority, application Japan, Jan. 25, 1989, 1-15688; Feb. 1, 1989, 1-11035**

**Int. Cl.⁵ A47L** *15/00*

**U.S. Cl. 318—727** **6 Claims**

1. An electric control apparatus for a dishwashing machine having a washing chamber, a wash pump arranged to be driven by an electric motor for pumping up wash water from a wash water storage tank in the washing chamber, and a revolving wash arm arranged within the washing chamber to be supplied with the wash water from the pump for directing jet streams of the wash water to a rack of tableware placed in the washing chamber, comprising:

memory mans for memorizing first and second control data, each of said first and second control data being defined in relation to the lapse of washing time such that the supply amount of wash water to said wash arm is gradually increased up to a predetermined amount at an initial stage of washing operation and is maintained at the predetermined amount during the washing operation;



means for controlling the rotational speed of said electric motor in accordance with the lapse of washing time based on one of said first and second control data; and

selecting means for selecting between the first and second control data depending on the type of tableware to be washed in the washing chamber.

---

### 5,017,853

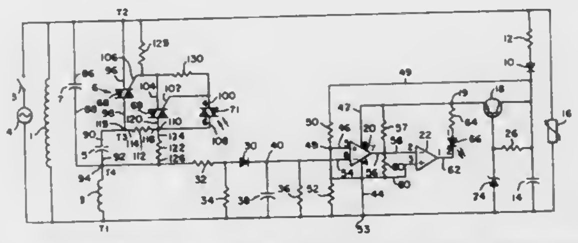
## SPIKELESS MOTOR STARTING CIRCUIT

**Steven F. Chmiel, Milwaukee, Wis., assignor to Rexnord Corporation, Milwaukee, Wis.**

**Filed Feb. 27, 1990, Ser. No. 485,952**

**Int. Cl.⁵ H02P** *1/44*

**U.S. Cl. 318—786** **16 Claims**



1. In a capacitor-start capacitor-run single phase AC induction motor having a main winding and an auxiliary winding both connected to an AC power source, a run capacitor for providing a phase shifted field for starting and running torque, a start capacitor for providing a phase shifted field for starting torque, a start switch for automatically connecting and disconnecting said start capacitor to and from said AC source in starting and running modes, respectively, said run capacitor and said start capacitor being connected in parallel in said starting mode such that during the first cycle of said AC source upon initiation of said starting mode there is an equalization of capacitor voltages and an exchange of current between said run and start capacitors resulting in current flow through a loop including said run and start capacitors and said start switch, which current flow may reach a high peak current spike if there is a large magnitude voltage differential between said run and start capacitors, an inhibit switch responsive to said magnitude of said voltage differential between said run and start capacitors and preventing said start switch from connecting said start capacitor to said AC source until said magnitude drops below a given maximum level, to reduce said first cycle current spike, and reduce damage to and extend the life of said start switch and said start capacitor.

---

### 5,017,854

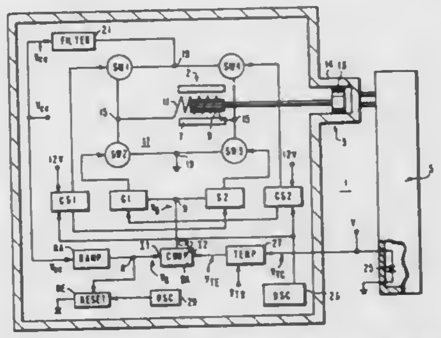
## VARIABLE DUTY CYCLE PULSE WIDTH MODULATED MOTOR CONTROL SYSTEM

**Wilfred J. Gully, Torrance, and Charles A. Goodman, Garden Grove, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Oct. 29, 1990, Ser. No. 604,293**

**Int. Cl.⁵ H02P** *5/34*

**U.S. Cl. 318—811** **18 Claims**



1. A control system for controlling an electric motor coupled to a load, said motor having a coil, comprising:

direct current supply voltage means;

reference voltage means;

oscillator means operable at a first frequency;

a pulse width modulator circuit reset by said oscillator means at a fixed interval of time, and inversely responsive to said direct current supply voltage and directly responsive to said reference voltage for producing a variable duty cycle, pulse width modulated voltage;

commutating circuit means coupled to said coil for reversibly coupling said direct current supply voltage means to said coil at a second frequency lower than said first frequency; and

control circuit means commutated by said commutating circuit means for coupling said variable duty cycle, pulse width modulated voltage to said commutation circuit means to control the electrical power coupled from said direct current supply voltage means to said coil.

---

### 5,017,855

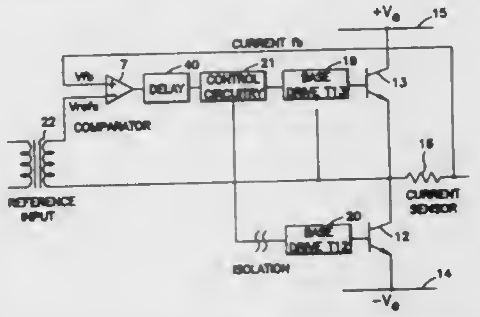
## CURRENT CONTROLLED INVERTER

**David J. Byers, Ilam, and John R. Penny, Tawa, both of New Zealand, assignors to GEC (New Zealand) Limited, New Zealand**

**Filed Mar. 4, 1988, Ser. No. 164,232**

**Int. Cl.⁵ H02P** *5/40*

**U.S. Cl. 318—811** **6 Claims**



1. An AC motor speed controller comprising: a polyphase switching inverter the output phases of which supply power to the controlled motor and the switching of which is determined by a polyphase input signal, a polyphase sinewave generator of variable frequency and amplitude which supplies phase reference waveforms for the inverter, said frequency determining

VOL 1126
ISS 3
MY 21 1991
UMI

the speed of the controlled motor, and in respect of each phase: a low value resistor in series with the inverter output and motor across which a voltage waveform linearly proportional to the current waveform is developed; isolating means having an input port and an outport port with the input port being connected to said generator to receive a reference waveform, the outlet port having first and second terminals; comparator means having one input connected to the first terminal of the output port of said isolating means and a second input connected to the motor side of said resistor; the second terminal of the output port of the isolating means being connected to the inverter side of said resistor which provides a common reference potential for the comparator inputs; and said comparator output forming one phase of said inverter polyphase input signal.

---

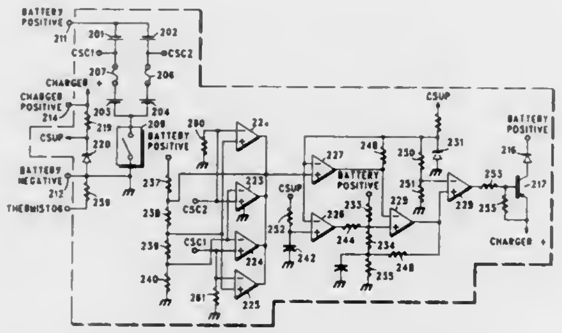
### 5,017,856
### BATTERY CHARGING SYSTEM

**Robert M. Johnson, Jr., Lake Zurich, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jun. 30, 1989, Ser. No. 374,373**

**Int. Cl.$^5$ H01M** *14/00;* **H02J** *7/00*

U.S. Cl. 320—2 19 Claims



1. A battery assembly including a housing enclosing at least one electrochemical cell and having protection from unsuitable charging from a battery charger providing a charging current, the protection disposed within the housing of the battery assembly comprising:

means, disposed within the battery housing, for determining when the voltage of the at least one electrochemical cell is less than a predetermined voltage; and

means, disposed within the battery housing and responsive to said means for determining, for resettably interrupting the charging current.

---

### 5,017,857
### CIRCUIT AND METHOD FOR VOLTAGE REGULATION OF ELECTRIC POWER SOURCES

**David A. Fox, Shawnee Township, Allen County, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 290,388, Dec. 29, 1988, abandoned. This application Sep. 17, 1990, Ser. No. 582,826**

**Int. Cl.$^5$ H02P** *9/00*

U.S. Cl. 322—25 6 Claims

1. A method of regulating output voltage of an electric power source, said method comprising the steps of:

producing a first status signal representative of the output voltage of an electric power source;

combining said first status signal with a reference signal to produce a first control signal;

producing a second status signal representative of the output current of said power source;

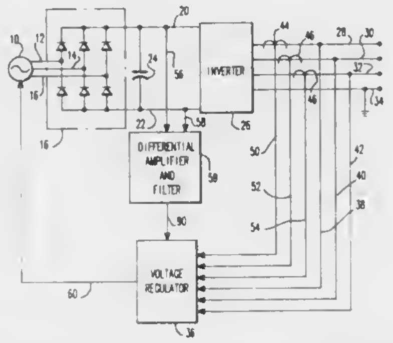
combining said second status signal with said reference signal to produce a second control signal;

supplying a bias voltage signal to a junction point;

coupling said first and second control signals to said junction point through first and second diodes, thereby forming a linear output signal at said junction point;

controlling the output voltage of said power source in response to said output signal;

wherein the magnitude of said first control signal is greater than the magnitude of said bias voltage signal when the output voltage of said power source is less than a preselected magnitude; and



wherein the magnitude of said second control signal is greater than the magnitude of said bias voltage signal when the output current of said power source is less than a predetermined magnitude.

---

### 5,017,858
### CONSTANT-CURRENT REGULATED POWER CIRCUIT

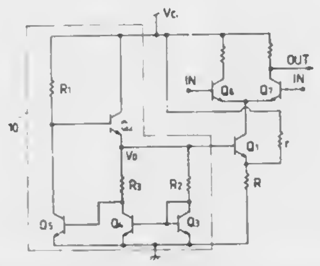
**Shigeo Hayashi, Kanagawa, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Aug. 14, 1990, Ser. No. 567,173**

**Claims priority, application Japan, Aug. 22, 1989, 1-215781**

**Int. Cl.$^5$ G05F** *3/20*

U.S. Cl. 323—316 6 Claims



1. A constant current regulated power circuit, comprising:

a first voltage source;

a second voltage source;

a third voltage source which cooperates with said first voltage source;

a bias circuit connected to said first and second voltage sources for sending out a predetermined output voltage, said bias circuit having an output terminal;

a first resistor;

a second resistor; and

a transistor having a base connected to the output terminal of said bias circuit, an emitter connected to said third voltage source through said first resistor and to said second voltage source through said second resistor, respectively, and a collector operating as an output terminal.

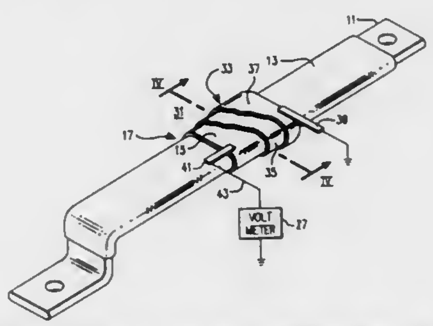
### 5,017,859
### INTEGRAL CAPACITIVE DIVIDER BUS BAR VOLTAGE MEASURING APPARATUS AND COMBINED CURRENT SENSOR

**Joseph C. Engel, Monroeville Boro, Pa.; Denis A. Mueller, Asheville, N.C., and Allan I. Bennett, Murrysville Boro, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Aug. 3, 1989, Ser. No. 389,097**

**Int. Cl.$^5$ G01R** *15/04;* **H01G** *3/00*

U.S. Cl. 324—127 7 Claims



1. Apparatus for measuring a voltage relative to ground, comprising:

a bus bar;

a first electrical insulation layer on said bus bar;

a first electrically conductive layer on a portion of said first electrical insulation layer;

said bus bar, said bus bar electrical insulation layer, and said first electrically conductive layer forming a first capacitor;

an additional electrical insulation layer over said first electrically conductive layer and a second electrically conductive layer disposed over said additional electrical insulation layer such that a second capacitor is formed by said first and second electrically conductive layers having said additional electrical insulation layer disposed therebetween, the first and second capacitors forming a capacitive divider in which the voltage across said second capacitor is proportional to the voltage between the bus bar and ground;

wherein said first and second capacitors are disposed in fixed relation relative to one another and to said bus bar; and

wherein said first electrical insulation layer and said additional electrical insulation layer are each formed of the same dielectric material and said electrical insulation layer is selectively disposed on said bus bar in a predetermined area relative to said first electrically conductive layer.

---

### 5,017,860
### ELECTRONIC METER DIGITAL PHASE COMPENSATION

**Warren R. Germer, Dover, N.H.; Maurice J. Ouellette, North Berwick, Me., and Mehrdad Negahban-Hagh, Irvine, Calif., assignors to General Electric Company, Somersworth, N.H.**

**Continuation of Ser. No. 279,178, Dec. 2, 1988, abandoned. This application Jun. 25, 1990, Ser. No. 542,668**

**Int. Cl.$^5$ G01R** *21/00, 35/04*

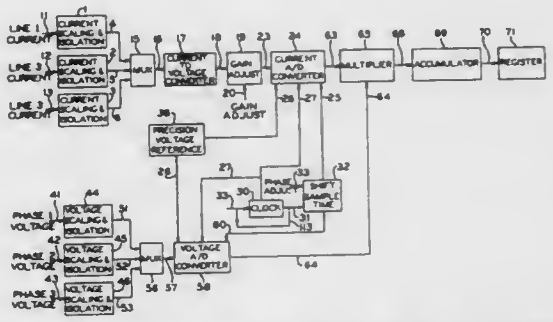
U.S. Cl. 324—142 25 Claims

1. In an electronic watthour meter for metering the consumption of electrical energy in polyphase power lines, the combination comprising:

a first analog to digital converter for providing a first digital signal in response to current flow in each line of said power lines;

a second analog to digital converter for providing a second digital signal in response to voltage applied to each of said power lines;

a multiplier for multiplying said first digital signal and said second digital signal to derive an indication of electrical energy consumption on said power lines; and compensation means for providing a first timing signal to said first analog to digital converter and a second timing signal to said second analog to digital converter, said compensation means including phase shifting means for lead or lag phase errors by shifting the direction and amount of timing of said first timing signal relative to that of said second timing signal to provide said first and second digital signals to said multiplier substantially in time phase for all current and voltage phases of said polyphase power lines through use of a single adjustment.



---

### 5,017,861
### METER DRIVING APPARATUS

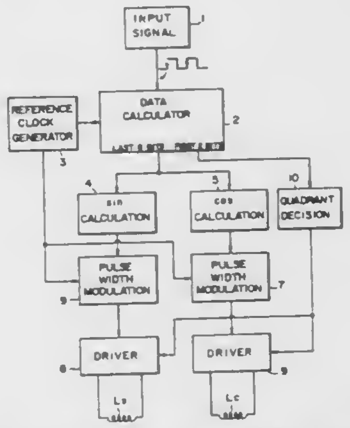
**Kazuyuki Hukuda, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan**

**Filed Nov. 15, 1989, Ser. No. 436,648**

**Claims priority, application Japan, Nov. 24, 1988, 63-296604**

**Int. Cl.$^5$ G01R** *11/36, 11/30*

U.S. Cl. 324—143 6 Claims



1. A meter driving apparatus for indicating the value corresponding to an input corresponding:

a clock signal generator for generating a reference clock signal;

a counter for counting clock signals from said clock signal generator;

a pulse signal inputting means for inputting a pulse signal of the frequency which corresponds to said input;

a period-change detecting means for detecting a change of the period of said pulse signal which is input to said inputting means;

a time counter for adding one to the current count value whenever a predetermined time has elapsed;

a memory for storing the contents of said counter in response to a detection signal from said period-change detecting means or a count signal from said time counter;

a calculator for calculating the digital value which is proportional to said input on the basis of the data stored in said memory in response to said count signal from said time counter;

VOL
1126
ISS
3
MY
21
1991
UMI

a difference calculator for calculating the difference between said digital value calculated by said calculator and the precedent digital value;

a decision circuit for judging whether or not said digital value calculated by said calculator is a digital value which has been calculated on the basis of the data stored in said memory in response to said detection signal from said periodchange detecting means;

a difference polarity decision circuit for judging whether said difference calculated by said difference calculator is positive or negative when the judgement of said decision circuit is NO;

a difference value decision circuit for judging whether or not the absolute value of said difference is not less than a predetermined value when the judgement of said decision circuit is YES or when said difference is judged to be negative by said difference polarity decision circuit;

an output decision circuit for outputting the digital value calculated by said calculator when the judgement of said difference value decision circuit is NO and outputting a predetermined value between said digital value calculated by said calculator and the precedent digital value when the judgement of said difference value decision circuit is YES;

a driving means for energizing first and second exciting coils which are orthogonal to each other in correspondence with said digital value output from said output decision circuit; and

an indicating means for indicating the direction at the angle determined by the torque received in accordance with the magnetic field generated by said first and second exciting coils.

---

### 5,017,862

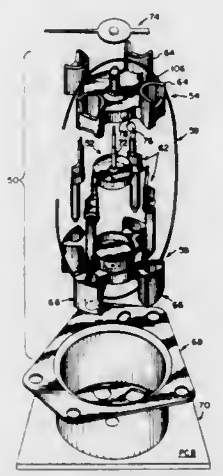
### AIR-CORE METER HAVING IMPROVED BOBBIN DESIGN

**Bradford L. Brooks, Hopkington, N.H., assignor to Beede Electrical Instrument Co., Inc., Penacook, N.H.**

**Filed Dec. 29, 1989, Ser. No. 458,850**

**Int. Cl.$^5$ G01R** *1/02*

**U.S. Cl. 324—146** **3 Claims**



1. An air-core meter movement comprising,

a rotor having a shaft and magnet mounted thereon providing radially disposed magnetic poles and a planar surface perpendicular to the axis of said shaft;

a plurality of orthogonal windings;

a bobbin having a fluid-tight cavity therein and including an axially mating first and second bobbin piece, said first piece partially forming said cavity and having

a first axial bearing surface disposed on an extension axially disposed away from said second piece and adapted to receive said rotor shaft therethrough,

an axially extending protrusion extending inward toward said cavity and confronting said rotor planar surface,

a plurality of posts extending away from said second piece and disposed radially outward from said first axial bearing surface, each said post having rounded outer surfaces which includes at least a portion of a cylindrical surface having a radius of curvature relative to said first axial bearing surface, and each said post having an asymmetrical axial aperture therein which includes a radially outwardly disposed recess providing access and outward communication to said asymmetrical axial aperture, and

a protrusion disposed circumferential to said axis and extending toward said second piece and surrounding at least a portion of said cavity,

said second piece partially forming said cavity and having

a second axial bearing surface disposed away from said first piece and adapted to receive said rotor shaft therein,

a guide disposed circumferential to said axis and extending toward said first piece and being interposed between said cavity and said first piece protrusion,

a recess disposed circumferential to said axis and extending into said second piece away from said first piece and radially outward from said guide and adapted to receive said first piece protrusion, and

a plurality of posts extending outward from said first piece and disposed radially outward from said second axial bearing surface, each said post having rounded outer surfaces which includes at least a portion of a cylindrical surface having a radius of curvature relative to said second axial bearing surface, and each post having an aperture therein being at least axially offset from the corresponding aperture in said first piece post, and further including an axially extending reduced diameter portion having an outer dimension reduced from said post outer surface dimension and extending away from said first piece, wherein

said first and second pieces mate and engage to form a plurality of paths adapted to receive said plurality of orthogonal windings about said bearing surfaces and surround said cavity; and

a plurality of electrically conductive pins, each being received through said first and second piece apertures and having a mounting pin end received through said second piece, and an electrical termination end and an asymmetrical midsection received through said first piece, wherein,

said asymmetrical midsection axially seats against said second piece, and

said electrical termination end is adapted to receive a wire connection from one of said windings; and a cylindrical housing having,

a planar first portion at least partially occluding one end of said cylindrical housing, and including a plurality of apertures disposed therein, said cylindrical housing dimensioned to receive said axial extending reduced diameter portions at a plurality of relative alignment positions of said bobbin first and second pieces and said housing, said planar first portion further includes tab deformations extending from said first portion away from said cylindrical housing, and

a planar second portion extending radially outward from the other end of said cylindrical housing and having a plurality of spaced apertures therein, wherein

said rotor shaft extends beyond said planar second portion.

---

### 5,017,863

### ELECTRO-EMISSIVE LASER STIMULATED TEST

**Richard I. Mellitz, Pepperell, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.**

**Filed Oct. 20, 1989, Ser. No. 424,396**

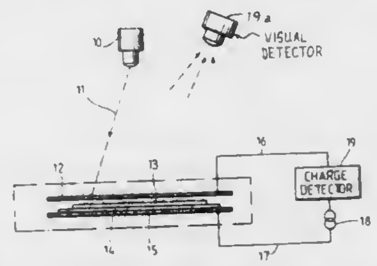
**Int. Cl.$^5$ G01R** *31/28. 31/02*

**U.S. Cl. 324—158 R** **23 Claims**

1. Apparatus for testing an electrical part having a plurality of conductive paths thereon, comprising:

(a) means for directing a laser beam to impinge upon a grid and for scanning said laser beam in a pattern across said grid, said grid being spaced from said part;

(b) said grid generating a local emission of electrons where impinged by said laser beam, said emission of electrons being attracted toward said conductive paths by an electric field;



(c) detector means responsive to the amount of charge transferred by said emission of electrons as said laser beam is scanned in said pattern across said grid.

---

### 5,017,864

### APPARATUS FOR THE INSPECTION OF PRINTED CIRCUIT BOARDS ON WHICH COMPONENTS HAVE BEEN MOUNTED

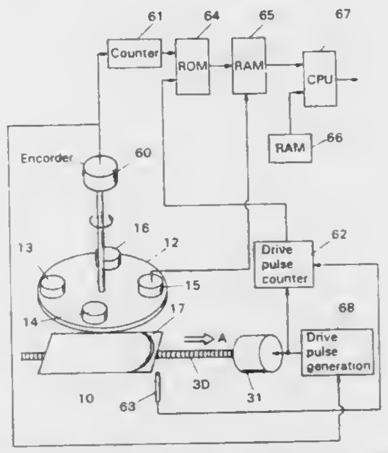
**Kenichi Kaida; Osamu Yamada, and Eiji Okuda, all of Ehime, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 21, 1989, Ser. No. 369,160**

**Claims priority, application Japan, Jun. 22, 1988, 63-153919; Jun. 22, 1988, 63-153920; Jun. 22, 1988, 63-153921; Jun. 22, 1988, 63-153959**

**Int. Cl.$^5$ G01R** *31/02;* **G01P** *3/42*

**U.S. Cl. 324—158 F** **4 Claims**



1. An inspection apparatus for inspecting printed circuit boards on which components have been mounted, comprising:

a rotary object that rotates around its axis;

a conveyance means that conveys said printed circuit board relative to said rotary object;

a plurality of light sources mounted on the rotary object, said plurality of light sources being arranged in a circle with the same axis as that of said rotary object, said plurality of light sources radiating light beams at approximately right angles to said printed circuit board, so that said light beams scan said printed circuit board as said rotary object rotates around its axis; and

a plurality of photoelectric converts mounted on the rotary object, said plurality of photo electric converts being radially arranged around each of said light beams on said rotary object for receiving the light beams reflected from said printed circuit board so as to generate detection outputs corresponding to the position where the light beams from said light sources are reflected on said printed circuit board, said detection outputs corresponding to the unevenness of the surface of said printed circuit board.

---

### 5,017,865

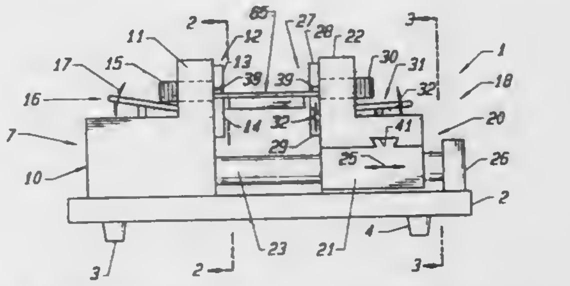
### COAXIAL MICROWAVE DEVICE TEST FIXTURE

**William W. Oldfield, Redwood City, Calif., assignor to Wiltron Company, Morgan Hill, Calif.**

**Filed Jun. 7, 1989, Ser. No. 363,500**

**Int. Cl.$^5$ G01R** *31/02;* **H01P** *5/00*

**U.S. Cl. 324—158 F** **17 Claims**



1. A test fixture for testing a microwave device having a substrate on which is located an electrical circuit member and a ground plane comprising:

a first and a second clamping means, each one of said first and second clamping means including a fixed jaw member and a spring-loaded movable jaw member, said spring-loaded movable jaw member having a spring member coupled thereto for spring biasing said movable jaw member toward said fixed jaw member for resiliently clamping an end of said substrate therebetween;

a coaxial RF connector located in each of said first and second clamping means adjacent to said fixed and movable jaw members therein, said coaxial RF connector having a center conductor which extends into a space provided therefor between the facing surfaces of said fixed movable jaw members for making an electrical contact with said electrical circuit member and an outer conductor electrically connected to said jaw members for making an electrical contact with said ground plane by means of said jaw members when said end of said substrate is clamped therebetween; and

means coupled to said movable jaw member in each of said first and second clamping means which is responsive to a force applied thereto for moving said movable jaw member away from said fixed jaw member against the force of said spring member to thereby open said fixed and movable jaw members.

---

### 5,017,866

### MAGNETIC FIELD SENSOR MOUNTING WITH SENSOR ARM CONTACTING ROTATING BEARING MEMBER

**Alfred J. Santos, Canton Center; James A. Hilby, Watertown, and Scott M. Duncan, Avon, all of Conn., assignors to The Torrington Company, Torrington, Conn.**

**Filed Feb. 8, 1990, Ser. No. 476,924**

**Int. Cl.$^5$ G01P** *3/487;* **F16C** *32/00*

**U.S. Cl. 324—174** **14 Claims**

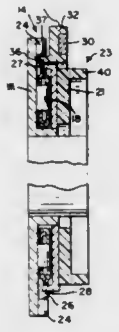
1. In combination:

an annular member having an annular magnetized portion as a magnetic field source;

an arm supporting member having a flexible arm extending from the arm supporting member into contact with the

OL
126
SS
3
MY
21
1991
UMI

annular member, the annular member being rotatable relative to the arm supporting member; and

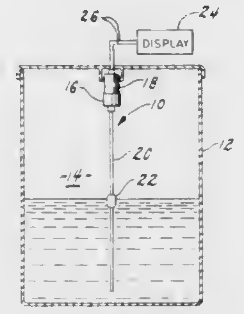


a magnetic field sensor mounted on the flexible arm and positioned to sense the magnetic field from the magnetic field source.

---

### 5,017,867
## MAGNETOSTRICTIVE LINEAR POSITION DETECTOR WITH REFLECTION TERMINATION

**Arthur Dumais, Rochester, and Richard D. Koski, Troy, both of Mich., assignors to MagneTek Controls, Clawson, Mich.**
**Filed Dec. 8, 1989, Ser. No. 448,164**
**Int. Cl.$^5$ G01B** *7/14, 7/26;* **G01F** *23/30*
**U.S. Cl. 324—207.13** **19 Claims**

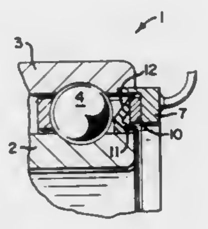


1. A magnetostrictive linear displacement detector comprising:
a magnetostrictive wire anchored at opposite head and foot ends and defining a measurement interval therebetween;
a reflection termination mechanically coupled to said magnetostrictive wire at said foot end placing a predetermined mechanical impedance to torsional motion on said magnetostrictive wire for inducing reflections of torsional motion;
a damping termination mechanically coupled to said magnetostrictive wire at said head end for preventing reflections of torsional motion;
a return wire having a foot end electrically coupled to said foot end of said magnetostrictive wire and a head end;
a magnet disposed for displacement along the said magnetostrictive wire within said measurement interval, the position of said magnet within said measurement interval being the linear displacement detected;
an electrical excitation means electrically coupled to said head end of said magnetostrictive wire and said head end of said return wire for producing a predetermined electrical excitation through said magnetostrictive wire and said return wire; and
a torsional motion sensor disposed proximate to said head end of said magnetostrictive wire for generating an electrical indication of torsional motion within said magnetostrictive wire.

---

### 5,017,868
## BEARING ASSEMBLY WITH ENCODER RING IN SLIDABLE CONTACT WITH SENSOR

**Christian Hajzler, Annecy, France, assignor to The Torrington Company, Torrington, Conn.**
**Filed Mar. 1, 1990, Ser. No. 486,684**
**Claims priority, application France, Apr. 18, 1989, 89 05096**
**Int. Cl.$^5$ F16C** *32/00;* **G01B** *7/30;* **G01P** *3/487*
**U.S. Cl. 324—207.22** **12 Claims**

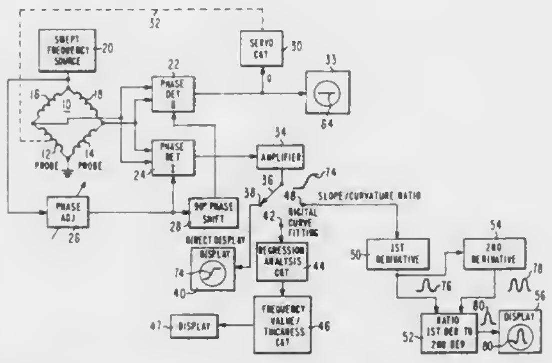


1. A bearing assembly comprising:
an inner race and an outer race providing an inner race—outer race annulus, one of said races being fixed, the other race being rotatable;
rolling members located in said annulus around the inner race circumference;
a magnetic field sensor connected to the fixed race; and
an encoder ring with multiple north and south poles around its circumference and elastically connected to the rotatable race for rotation with rotatable race,
the elastic connection being a biasing means for maintaining the encoder ring in slidable contact with the magnetic field sensor.

---

### 5,017,869
## SWEPT FREQUENCY EDDY CURRENT SYSTEM FOR MEASURING COATING THICKNESS

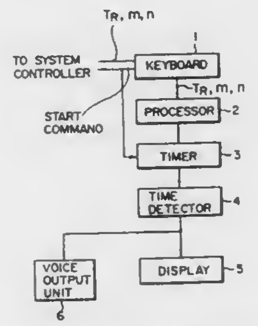
**David W. Oliver, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.**
**Filed Dec. 14, 1989, Ser. No. 450,752**
**Int. Cl.$^5$ G01B** *7/10;* **G01N** *27/72;* **G01R** *33/12*
**U.S. Cl. 324—230** **33 Claims**



1. Apparatus for measuring the thickness of a coating on a substrate having a given substrate material, said apparatus comprising:
means for generating variable frequency eddy currents in the coated substrate, the coating, and an uncoated substrate of the given material; and
means for comparing conductivity changes of the coating and the coated substrate with the uncoated substrate with changes in frequency and for determining a transition frequency, the transition frequency being related to the coating thickness and being a frequency at which current flow transitions substantially between penetration and no penetration into the substrate.

### 5,017,870
## METHOD AND SYSTEM FOR SETTING AND DISPLAYING MAGNETIC RESONANCE IMAGE ACQUISITION DURATION INFORMATION

**Takao Kasugai, and Tadahiro Takeda, both of Tochigi, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Continuation-in-part of Ser. No. 7/143,708, Jan. 14, 1988, abandoned. This application Oct. 24, 1989, Ser. No. 425,932**
**Int. Cl.$^5$ G01V** *3/00*
**U.S. Cl. 324—318** **34 Claims**

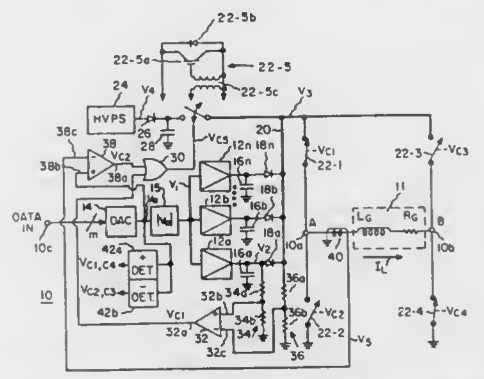


1. A method for calculating a magnetic resonance image acquisition duration and for displaying data representing a remaining magnetic resonance image acquisition duration, the method comprising the steps of:
setting parameters for obtaining the magnetic resonance image acquisition duration;
calculating the magnetic resonance image acquisition duration using the parameters;
counting from an image acquisition start time, associated with the magnetic resonance image acquisition duration, to obtain a duration corresponding to a completion of magnetic resonance image acquisition; and
displaying data representing the remaining magnetic resonance image acquisition duration to a patient such that an anxiety of the patient is minimized, the data obtained by detecting a count value.

---

### 5,017,871
## GRADIENT CURRENT SPEED-UP CIRCUIT FOR HIGH-SPEED NMR IMAGING SYSTEM

**Otward M. Mueller, Ballston Lake; Peter B. Roemer, and William A. Edelstein, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.**
**Filed Sep. 14, 1989, Ser. No. 407,180**
**Int. Cl.$^5$ G01R** *33/20*
**U.S. Cl. 324—318** **20 Claims**

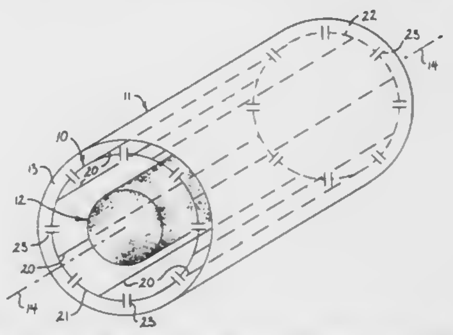


1. A current flow speed-up circuit for use with an associated gradient coil in a NMR imaging system, comprising:
at least one gradient power amplifier, each having an input receiving a common input signal for controlling an output current;
a plurality of switching elements connected to a common bus receiving a total output current from all of the at least one power amplifier;
means for connecting the associated gradient coil between selected ones of the switching elements;
means for operating the switching elements in selected patterns to cause the total output current to be selectively applied to and removed from the coil, responsive to a monitored characteristic of the input signal; and
means for causing a high voltage to be applied to said coil whenever the coil current lags behind an amplitude commanded by said input signal.

---

### 5,017,872
## NMR RADIO FREQUENCY COIL WITH DIELECTRIC LOADING FOR IMPROVED FIELD HOMOGENEITY

**Thomas K. Foo, Pewaukee; Cecil E. Hayes, Wauwatosa, both of Wis., and Yoon-Won Kang, Plainsboro, N.J., assignors to General Electric Company, Milwaukee, Wis.**
**Filed Jan. 19, 1990, Ser. No. 467,475**
**Int. Cl.$^5$ G01R** *33/20*
**U.S. Cl. 324—322** **4 Claims**



1. An RF coil assembly for an NMR instrument, the combination comprising:
a cylindrical coil disposed around a central axis and defining a cylindrical cavity into which a subject to be examined is subjected to a transversely directed RF field produced by the coil;
a cylindrical shield disposed concentrically around the cylindrical coil and spaced outward therefrom to define an annular space between an outer surface of the cylindrical coil and an inner surface of the shield; and
a dielectric material disposed in the annular space to increase the permittivity of the annular space to a value which is substantially greater than the permittivity of air and to thereby increase the radial homogeneity of the RF field produced in the subject being examined.

---

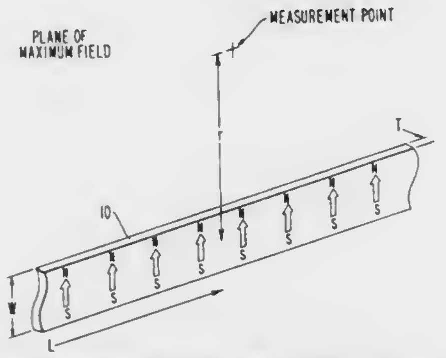
### 5,017,873
## METHODS AND APPARATUS EMPLOYING PERMANENT MAGNETS FOR MARKING, LOCATING, TRACING AND IDENTIFYING HIDDEN OBJECTS SUCH AS BURIED FIBER OPTIC CABLES

**John B. Rippingale, Leesborg, Va.; Charles R. Upton, Silver Spring, Md.; Erick O. Schonstedt, Reston, and Bradley L. Osman, Herndon, both of Va., assignors to Schonstedt Instrument Company, Reston, Va.**
**Division of Ser. No. 428,757, Oct. 30, 1989, which is a continuation-in-part of Ser. No. 323,860, Mar. 15, 1989, abandoned. This application May 18, 1990, Ser. No. 524,976**
**Int. Cl.$^5$ G01V** *3/08, 3/165;* **F16L** *55/00;* **H01F** *1/00*
**U.S. Cl. 324—326** **45 Claims**

1. A method of detecting an elongated object hidden at a first location, comprising providing on said object an elongated permanent magnet device with its length extending along the length of the object and magnetized transverse to its length to provide a magnetic axis transverse to the length of said object, said device having a magnetic field that varies in a predetermined manner along the length of said object to pro-

VOL
1126
ISS
3
MY
21
1991
UMI

vide a characteristic magnetic field signature, the strength of said magnetic field diminishing substantially as the square of the distance from the device along a direction transverse to the length of the device; and detecting said magnetic field and said magnetic field signature by moving a magnetic field detector along the length of said object at a second location spaced transversely from said object and at which said object cannot be seen, thereby to detect said object.

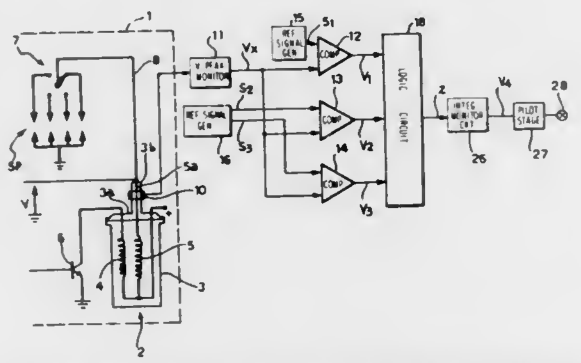


---

### 5,017,874

### METHOD AND APPARATUS FOR DETECTING AND INDICATING ANOMALIES IN THE OPERATION OF THE IGNITION SYSTEMS OF INTERNAL COMBUSTION ENGINES

**Vittorio Di Nunzio, and Francesco D'Onofrio, both of Turin, Italy, assignors to Fiat Auto S.p.A., Turin, Italy**
**Filed Jan. 11, 1988, Ser. No. 141,755**
**Claims priority, application Italy, Jan. 9, 1987, 67010 A/87**
**Int. Cl.$^5$ F02P** *17/00;* **G08B** *21/00*
**U.S. Cl. 324—378** **1 Claim**



1. An apparatus for detecting and indicating anomalies in the operation of the ignition system of an internal combustion engine, the system including a periodic high-voltage pulse in operation from an output of high-voltage generator means;

the apparatus including;

an indicator device arranged to provide a perceptible signal when activated,

monitoring means coupled to the high-voltage generator means and arranged to output pulses having an amplitude proportional to the pulse generated by the generator means, and

processing and comparison circuit means for comparing the peak values of the pulses output by the monitoring means with first and second predetermined threshold values, and for activating the indicator device when the peak values of the pulses generated by the monitoring means fall outside the acceptable range defined between the reference values;

wherein the processing and comparison means include a reference signal generator circuit for generating first and second reference signals,

at least one first threshold comparator circuit and one second threshold comparator circuit for comparing the signals output by the monitoring means with the first and second reference signals,

logic circuit means coupled to the first and second threshold comparators and arranged to output pulsed signals when the peak amplitude of the pulses generated by the monitoring means is less than the level of the first reference signal or above the level of the second reference signal,

an integrating circuit connected to the output of the logic circuit means,

a further threshold comparator circuit connected to the integrating circuit and arranged to output an activation signal to the indicator device each time the signal output by the integrating circuit exceeds a predetermined reference level, and

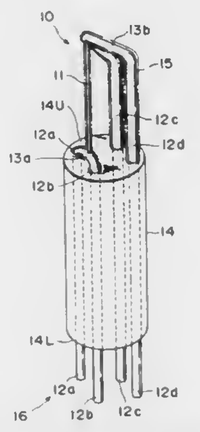
timing means associated with the further threshold comparator circuit and arranged to extend the signal for activating the indicator device for a predetermined period of time with respect to the instant at which the signal output by the integrating circuit falls below the predetermined level.

---

### 5,017,875

### DISPOSABLE SENSOR

**Tomoshige Hori, Kitamoto, and Kensuke Itoh, Kodaira, both of Japan, assignors to Snow Brand Milk Products Co., Ltd., Hokkaido, Japan**
**Filed Sep. 19, 1989, Ser. No. 409,339**
**Claims priority, application Japan, Sep. 26, 1988, 63-240522**
**Int. Cl.$^5$ G01N** *27/02*
**U.S. Cl. 324—446** **12 Claims**



1. A disposable sensor for measuring changes in properties of fluid, including viscosity and convection heat transfer, said disposable sensor comprising:

(1) an elongated heat generating element;

(2) a holder for securing ends of said element;

(3) lead wires associated with each end of the sensor so as to provide four lead wires connected to a four-point-terminal such that two of the said four lead wires are connected at each end of the heat-generating element;

(4) a current source connected to two points of the terminal so that changes in the value of the current passing through the heat-generating element are determinable;

(5) a voltmeter connected to the other two points of the terminal so that changes in the value of the voltage across the heat-generating element are determinable; and

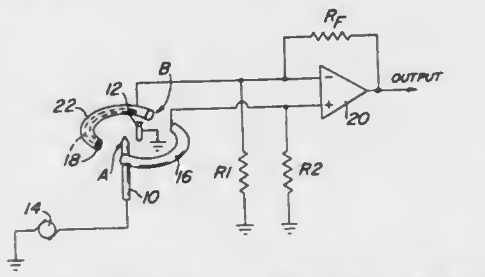
wherein said changes in the properties of the fluid are determinable from a heat transfer coefficient calculated from a value of the current supplied from said current source and a value of voltage measured by said voltmeter.

---

### 5,017,876

### CORONA CURRENT MONITORING APPARATUS AND CIRCUITRY FOR A.C. AIR IONIZERS INCLUDING CAPACITIVE CURRENT ELIMINATION

**William S. Wright, Green Lane, and Mark Blitshteyn, Lansdale, both of Pa., assignors to The Simco Company, Inc., Hatfield, Pa.**
**Filed Oct. 30, 1989, Ser. No. 428,604**
**Int. Cl.$^5$ G01N** *27/62*
**U.S. Cl. 324—464** **27 Claims**



1. In combination with an air ionizer having at least one discharge electrode coupled to an A.C. high voltage power source and adapted to produce corona current at the discharge electrode comprising:

sensing means coupled to at least one discharge electrode for detecting total current of said at least one discharge electrode and developing an A.C. signal proportional to the sum of capacitive and corona current components generated at said electrode by the A.C. high voltage power source,

means for electrically separating the capacitive current component from the corona current component in the total current signal, and

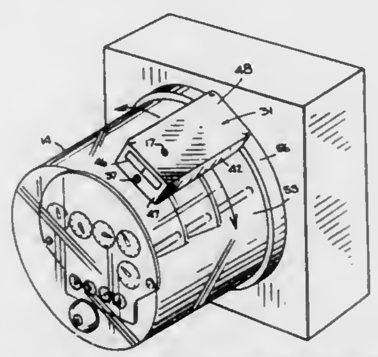
means for monitoring the corona current component independently of the capacitive current component in order to determine the ion generating efficiency of the air ionizer.

---

### 5,017,877

### WATTHOUR METER OPEN POTENTIAL CIRCUIT DETECTING DEVICE

**Paul Z. Haus, Jr., 787 Hartwell St., Teaneck, N.J. 07666**
**Filed Nov. 1, 1989, Ser. No. 429,981**
**Int. Cl.$^5$ G01R** *31/06*
**U.S. Cl. 324—546** **18 Claims**



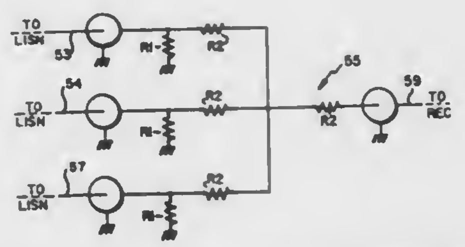
1. A portable hand holdable open-coil detector for detecting the absence of a detectable magnetic field proximate to a voltage coil of an electric power meter, comprising in combination a multi-turn coil mounted on a magnetic core; voltage detecting means coupled to said multi-turn coil and including bi-conditional signalling means; housing means for said multi-turn coil, magnetic core, and voltage detecting means; said housing means having walls and locating said magnetic core in a predetermined disposition relative to said walls such that when said housing is placed in a predetermined orientation in contact with the enclosure encompassing a normally operating electric power meter in a position overlying a meter voltage coil carrying current, sufficient voltage will be induced in said multi-turn coil to alter the condition of said signalling means from a first condition indicative of a non-active voltage coil to a second condition indicative of an active voltage coil, and external indicia associated with said housing for use in placing said housing in said predetermined orientation.

---

### 5,017,878

### MEASURING AND LIMITING EMI WITH A DIFFERENTIAL MODE REJECTION NETWORK

**Mark J. Nave, 11833 93rd Ave. North, Seminole, Fla. 33542**
**Continuation-in-part of Ser. No. 103,398, Oct. 1, 1987, Pat. No. 4,849,685. This application May 24, 1989, Ser. No. 356,074**
**The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.**
**Int. Cl.$^5$ G01R** *27/00*
**U.S. Cl. 324—613** **13 Claims**



1. Differential mode rejection network (DMRN) useful in the measurement of electromagnetic interference (EMI) from electrical equipment powered from a given plurality of electrical transmission lines through respective line impedance stabilization networks, by means of an EMI receiver, and useful in the design of filters for limiting EMI conducted emissions (CE) to such lines, comprising

a like plurality of first circuit elements, each having a given first resistive impedance (R1), for connection in series between the respective transmission lines and ground; and

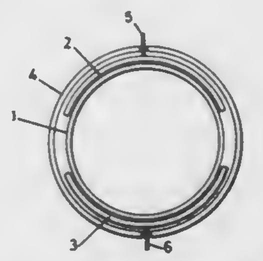
a like plurality of second circuit elements, each having a given resistive impedance (R2) unlike the first, for connection in series from such transmission lines to a junction of second circuit elements, and another such second circuit element for connection in series from such junction to an EMI receiver.

---

### 5,017,879

### CAPACITIVE VOID FRACTION MEASUREMENT APPARATUS

**Gary Lucas, Fieldside; Maurice Beck, Altrincham, and Andrew Hunt, Orwell, all of England, assignors to Schlumberger Technology Corporation, Houston, Tex.**
**Continuation of Ser. No. 243,527, Sep. 12, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,451**
**Claims priority, application United Kingdom, Sep. 17, 1987, 8721858**
**Int. Cl.$^5$ G01R** *27/26*
**U.S. Cl. 324—663** **21 Claims**



1. An apparatus for use in the capacitive measurement of the void fraction in a flowing liquid, comprising:

a body defining a flow passage through which said liquid flows, said body having a radial thickness and a dielectric constant which is substantially equal to the expected dielectric constant of said liquid; and

electrodes supported by said body for producing an electrostatic field within said flow passage, whereby measurement of the capacitance between said electrodes is indicative of the void fraction of said liquid, said radial thickness, of said body having been varied to a set predetermined radial thickness, whereby predetermining said thickness results in a substantially uniform electrostatic field within said flow passage.

---

### 5,017,880

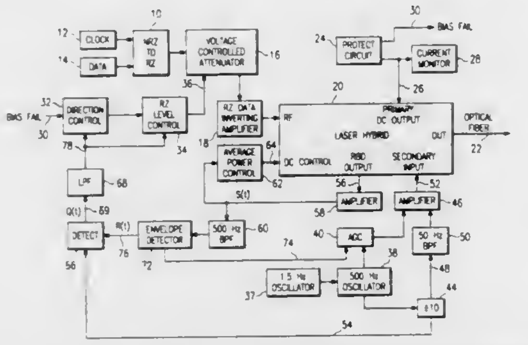
## VARYING OPERATIONAL FREQUENCY CONTROL CIRCUIT APPARATUS WITH NOISE MINIMIZING FEATURE

**John M. Dugan, Richardson, Tex., and Gordon W. Ries, Plano, Tex., assignors to Rockwell International Corporation, El Segundo, Calif. and Rockwell International Corporation, El Segundo, Calif.**

**Filed Jan. 24, 1990, Ser. No. 469,647**

**Int. Cl.$^5$ H01S** *3/10*

**U.S. Cl. 328—165** **5 Claims**



1. A control system, having a given control bandwidth, used as part of a signal feedback mechanism, to control the amplitude of a primary signal flowing through a controlled circuit utilizing at least one non-linear element comprising, in combination:

controlled circuit path means including non-linear element means and control circuitry, having a given control bandwidth, for detecting the operating point of the non-linear element utilizing control tone products, which control products are a function of a derivative of said non-linear element, generated as a control tone is passed through said non-linear element; and

means for modulating the frequency of said control tone over a range of frequencies wider than the control bandwidth of the system.

---

### 5,017,881

## RADIO FREQUENCY ACCELERATING CAVITY HAVING SLOTTED IRISES FOR DAMPING CERTAIN ELECTROMAGNETIC MODES

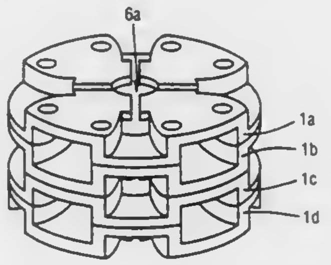
**Robert B. Palmer, Shoreham, N.Y., assignor to Associated Universities, Inc., Washington, D.C.**

**Filed Jun. 12, 1989, Ser. No. 364,304**

**Int. Cl.$^5$ H01J** *23/00, 23/20;* **H01P** *1/16*

**U.S. Cl. 328—233** **15 Claims**

1. A resonance cavity structure for strongly damping undesirable transverse and higher longitudinal electro-magnetic modes that are generated in an associated resonance cavity when it is used as a particle beam accelerating cavity, comprising, at least one iris formed of electrically conductive material and having an aperture of predetermined diameter through its center, wall means in said iris defining a plurality of radial slots that extend, respectively, from said aperture to the outer circumference of the iris, and a plurality of wave guides each operatively connected, respectively, to the outer end of a different one of said slots thereby to transfer unwanted modes from said slots to a damping means or dump disposed in communication with the outer ends of the wave guides.



---

### 5,017,882

## PROTON SOURCE

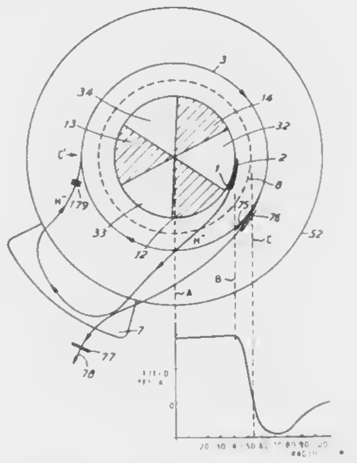
**Martin F. Finlan, Buckinghamshire, England, assignor to Amersham International plc, Buckinghamshire and Oxford Instruments Ltd., Oxford, both of, England**

**Filed Aug. 22, 1989, Ser. No. 396,624**

**Claims priority, application United Kingdom, Sep. 1, 1988, 8820628**

**Int. Cl.$^5$ H05H** *13/00, 31/10*

**U.S. Cl. 328—234** **13 Claims**



1. A pulsed proton source comprising a cyclotron having input means for producing a source of negatively ionized particles and accelerating means for accelerating the ionized particles, a proton storage ring coaxial with the cyclotron, means for directing the accelerated particles from said cyclotron along a path which in a first stage passes radially outside said proton storage ring, in a second stage extends back towards the proton storage ring and in a third stage extends tangentially into said proton storage ring, and means at the point of entry of the accelerated particles into the storage ring for converting said negatively ionized particles into protons.

### 5,017,883

## MULTIPLE SYMBOL DIFFERENTIAL DETECTION

**Dariush Divsalar, Pacific Palisades, and Marvin K. Simon, La Canada, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Jul. 31, 1990, Ser. No. 560,691**

**Int. Cl.$^5$ H04L** *27/22*

**U.S. Cl. 329—304** **4 Claims**

1. A multiple symbol differential detection system comprising:

first means for creating, a first difference phase between first and second symbols;

second means for correlating said first difference phase with plural possible values thereof to provide a first plurality of intermediate output signals;

third means for creating a second difference phase between second and third symbols;

fourth means for correlating said second difference phase with plural possible values thereof to provide a second plurality of intermediate output signals;

fifth means for creating a third difference phase between said first and third symbols;

sixth means for correlating said third difference phase with plural possible values thereof to provide a third plurality of intermediate output signals;

means for combining each of said first plurality of intermediate outputs with each of said second plurality of intermediate outputs and each of said third plurality of intermediate outputs to provide a plurality of possible output values; and

means for making a joint decision by choosing from said plurality of possible output values the value which represents the best combined correlation of said first, second and third difference values with the possible values thereof.

---

### 5,017,884

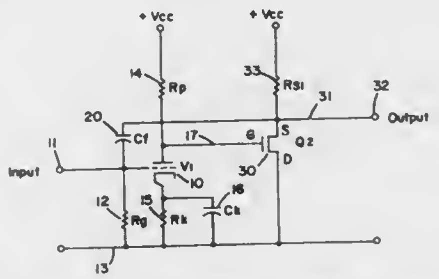
## VACUUM TUBE AND MOSFET TRANSIMPEDANCE AMPLIFIER

**Aado J. Perandi, 3864 Midland Ave., White Bear Lake, Minn. 55110**

**Filed Nov. 1, 1989, Ser. No. 430,170**

**Int. Cl.$^5$ H03F** *5/00*

**U.S. Cl. 330—3** **15 Claims**



1. An amplifier having improved forward transimpedance characteristics, comprising:

a vacuum tube first amplification stage;

a MOSFET second amplification stage;

input means for applying signals to be amplified to said first amplification stage;

means for coupling signals from the output of said first amplification stage to the input of said second amplification stage;

a MOSFET third amplification stage and means for coupling signals from the output of said second amplification stage to said third amplification stage;

output means connected to receive amplified signals from the third amplification stage;

feedback means connected to convey negative feedback signals from the output of said second amplification stage to said input means.

---

### 5,017,885

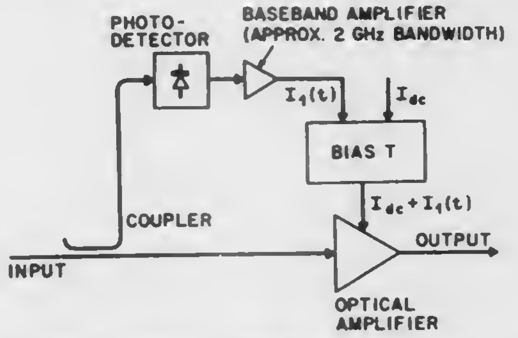
## OPTICAL AMPLIFIER WITH REDUCED NONLINEARITY

**Adel A. M. Saleh, Holmdel, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 352,682, May 10, 1984, abandoned, which is a continuation of Ser. No. 221,952, Jul. 20, 1988, abandoned. This application Sep. 28, 1990, Ser. No. 590,551**

**Int. Cl.$^5$ H01S** *3/06, 3/13*

**U.S. Cl. 330—4.3** **6 Claims**



1. An optical amplifier comprising,

(a) an optical gain medium,

(b) means for coupling light into the optical gain medium,

(c) means for coupling light out of the optical gain medium, and

(d) means for coupling pumping energy into the optical gain medium,

The Invention Characterized in that

the amplifier further comprises a compensation loop which provides additional gain to the amplifier gain medium as the light coupled into the optical gain medium increases,

whereby, signal-induced variations in the gain of the optical amplifier are reduced.

---

### 5,017,886

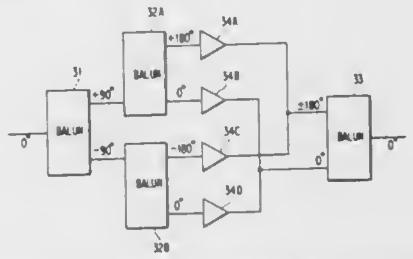
## RF POWER COMBINER USING BALUNS

**Bernard D. Geller, Rockville, Md., assignor to Comsat, Washington, D.C.**

**Filed Dec. 12, 1989, Ser. No. 449,694**

**Int. Cl.$^5$ H03F** *3/26, 3/68*

**U.S. Cl. 330—277** **11 Claims**



1. A power combiner for combining the power of several devices, comprising:

distribution means for receiving a power combiner input signal and providing device input signals to each of said several devices, said distribution means comprising at least one balun receiving said power combiner input and providing first and second outputs and at least second and third baluns each receiving one of said first and second outputs, and means for providing said device input signals in response to outputs of said second and third baluns; and

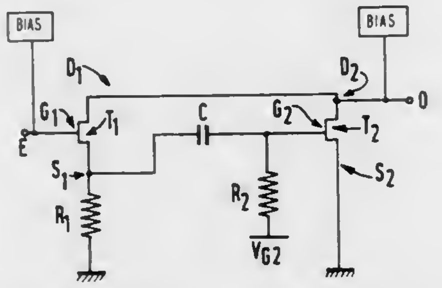
OL
126
SS
3
MY
21
991
UMI

a single balun for receiving outputs from each of said devices and providing a combined output signal

---

### 5,017,887
### HIGH FREQUENCY IC POWER AMPLIFIER

**Patrice Gamand, Yerres, France, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Dec. 7, 1989, Ser. No. 447,965**
**Claims priority, application France, Dec. 9, 1988, 88 16231**
**Int. Cl.$^5$ H03F** *1/34*
U.S. Cl. 330—277 **28 Claims**

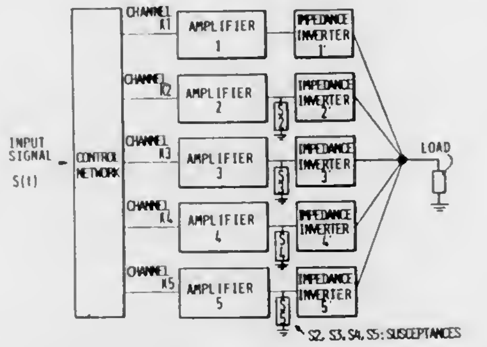


1. An integrated semiconductor arrangement comprising a high-frequency power amplifier stage which comprises: first and second field-effect transistors having first connection means to influence the output power by influencing the unit gate width of the amplifier stage, second connection means to influence the value of the input capacitance of the amplifier stage, means to ensure the feedback of direct current to ground, and D.C. biasing means.

---

### 5,017,888
### BROADBAND NONLINEAR DRIVE CONTROL NETWORK FOR LINEAR AMPLIFIERS ARRANGED IN SEVERAL AMPLIFIER CHANNELS

**Karl Meinzer, Marburg, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany**
**Filed Mar. 1, 1990, Ser. No. 486,951**
**Claims priority, application Fed. Rep. of Germany, Mar. 1, 1989, 3906448**
**Int. Cl.$^5$ H03P** *3/68*
U.S. Cl. 330—295 **4 Claims**

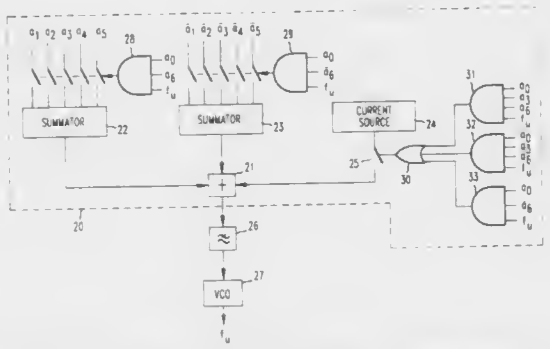


1. A broadband nonlinear control network for driving linear amplifiers arranged in channels, comprising a plurality of network branches, a first branch comprising amplitude adjustable limiter means for limiting a drive signal amplitude, to an adjustable amplitude value which is free of any phase-frequency characteristic, impedance inverter means connecting said limiter means to a signal source, whereby a rising impedance is applied to said signal source when said limiter means is activated, a second branch comprising a constant load impedance and a resistor means connecting said constant load impedance to said signal source, said resistor means having a characteristic such that said resistor means becomes conductive above an adjustable high frequency threshold voltage, whereby said resistor means connects said signal source to said constant load impedance, and wherein an amplitude of a signal at said limiter means and an amplitude at said resistor means when said resistor means becomes conductive, are adjusted to each other so that a conductance, which has been reduced by an activation of said limiter means at said signal source, is compensated by a variable conductivity of the resistor means so that a load of said signal source remains constant, said first branch further comprising power divider means for branching off a portion of an output drive signal from said limiter means to drive a first channel of said amplifier channels, said control network further comprising hybrid circuit means connected to said first and second branches for producing further drive signals for further amplifier channels by a linear signal combination in said hybrid circuit means for performing a phase and amplitude correction, whereby said further drive signals have phase and amplitude characteristics required for said further amplifier channels.

---

### 5,017,889
### DIGITAL PHASE-LOCKED LOOP USING A TAPPED DELAY LINE IN A PHASE METER

**Robert J. M. Verbeek, Hilversum, Netherlands, assignor to AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Jun. 8, 1990, Ser. No. 534,904**
**Claims priority, application Netherlands, Jun. 15, 1989, 8901514**
**Int. Cl.$^5$ H03L** *7/085*
U.S. Cl. 331—1 A **4 Claims**



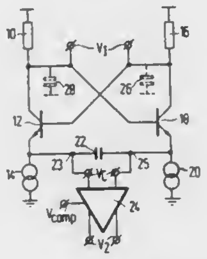
1. Digital Phase-Locked Loop (PLL), comprising a voltagecontrolled oscillator (VCO) and a phase meter including a delay line with taps, characterized in that the phase meter comprises a pulse generator for generating a pulse in response to a level change in the signal with which the PLL is to synchronize, an output of which pulse generator being connected to an input of the delay line, in that the phase meter further includes a processing circuit connected to the taps and to the signal output of the VCO for determining the location of the pulse in the delay line and for generating a control signal for the VCO in response to the determined location and in that the control output of the processing circuit is coupled to the control input of the VCO.

---

### 5,017,890
### PHASE-CONTROLLABLE OSCILLATOR

**Adrianus Sempel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Jan. 23, 1990, Ser. No. 468,500**
**Claims priority, application Netherlands, Jan. 27, 1989, 8900203**
**Int. Cl.$^5$ H03K** *3/282;* **H03B** *27/00*
U.S. Cl. 331—45 **17 Claims**

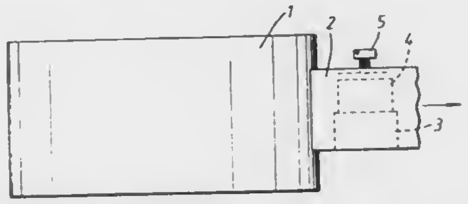
1. An oscillator comprising: a capacitance, means for charging and means for discharging the capacitance, feedback means for activating the charging means and discharging means in dependence on an oscillator signal, and an amplifier having an input coupled to said capacitance for amplifying a voltage developed across said capacitance, characterized in that the amplifier comprises a control input for adjusting a phase difference between a zero-crossing of an amplifier output signal and a reference phase in the oscillator signal by means of an offset voltage.



---

### 5,017,891
### MAGNETRONS WITH RESONATOR ELEMENT FOR STABILIZING OUTPUT RADIATION FREQUENCY

**Paul A. Jerram, Wethersfield, and Stephen Bainbridge, Braintree, both of United Kingdom, assignors to EEV Limited, Essex, United Kingdom**
**Filed Nov. 13, 1989, Ser. No. 433,701**
**Int. Cl.$^5$ H03B** *9/10;* **H01J** *23/54*
U.S. Cl. 331—88 **8 Claims**



1. A magnetron comprising:

an output waveguide along which output radiation generated by said magnetron is arranged to be transmitted, said output waveguide having a portion of reduced transverse sectional area; and

a resonator element positioned in said portion of said waveguide and arranged so that the output radiation is transmitted through said resonator element.

---

### 5,017,892
### WAVEGUIDE ADAPTORS AND GUNN OSCILLATORS USING THE SAME

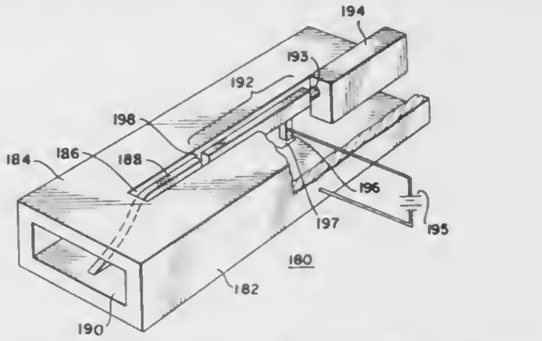
**G. Conrad Dalman, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.**
**Continuation-in-part of Ser. No. 352,368, May 16, 1989, abandoned. This application Feb. 7, 1990, Ser. No. 476,349**
**Int. Cl.$^5$ H03B** *7/14;* **H01P** *5/107*
U.S. Cl. 331—96 **38 Claims**

1. A waveguide adaptor for interfacing a waveguide to an electrical device or another transmission medium comprising:

a waveguide for transmitting electromagnetic waves;

coplanar transmission line means formed integrally on a surface of said waveguide for transmitting electromagnetic waves along said surface of said waveguide, said coplanar transmission line means comprising a slot disposed in a top surface of said waveguide and a first portion of a fin means disposed in said waveguide and extending into, and parallel to, said slot; and,

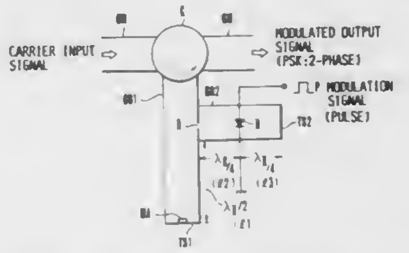
impedance matching means for directing electromagnetic waves between said waveguide and said coplanar transmission line means.



---

### 5,017,893
### MICROWAVE MODULATOR

**Tetsujirou Izumi, and Akihiko Iida, both of Ichikawa, Japan, assignors to Robotech Laboratory Co., Ltd., Tokyo, Japan**
**Filed Feb. 22, 1990, Ser. No. 483,566**
**Claims priority, application Japan, Mar. 10, 1989, 1-58895**
**Int. Cl.$^5$ H03C** *7/02*
U.S. Cl. 332—103 **5 Claims**


CARRIER INPUT SIGNAL
MODULATED OUTPUT SIGNAL (PSK:2-PHASE)
P MODULATION SIGNAL (PULSE)
λ1/4
λ1/4
λ1/2

1. A pathlength type microwave modulation circuit comprising:

first short circuit means;

second short circuit means having a length of $m\times\frac{1}{2}\times\lambda_g$, where $\lambda_g$ is a guide wavelength and m is a positive integer, branched from said first short circuit means by a slit coupling at a position distant from a first short-terminal of said first short circuit means by a length of $m\times\frac{1}{2}\times\lambda_g$;

and a switching diode loaded on said second short circuit means at a position distant from a second short-terminal of said second short circuit means by a length of $\frac{1}{4}\times(2n+1)\times\lambda_g$, where n is 0, or a positive integer.

---

### 5,017,894
### LUMPED CONSTANT NON-RECIPROCAL CIRCUIT ELEMENT

**Norihiro Naito, Tottori, Japan, assignor to Hitachi Ferrite, Ltd., Tokyo, Japan**
**Filed Jan. 4, 1990, Ser. No. 460,802**
**Claims priority, application Japan, Feb. 1, 1989, 1-11686[U]; Sep. 13, 1989, 1-237660**
**Int. Cl.$^5$ H01P** *1/383, 1/36*
U.S. Cl. 333—1.1 **4 Claims**

1. A lumped constant non-reciprocal circuit element comprising:

(a) an insulator substrate;

(b) a ground layer formed on a bottom surface of said insulator substrate;

(c) a predetermined number of conductor layers formed on a top surface of said insulator substrate for forming electrostatic capacitors with said ground layer;

(d) a shielding conductor layer formed on said top surface of

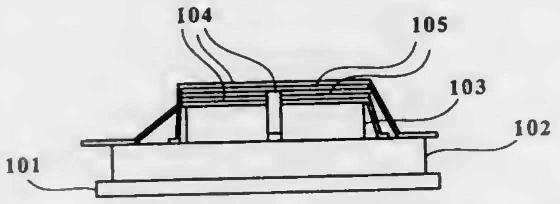
OL
126
SS
3
MY
21
991
UMI

said insulator substrate and conductively connected to said ground layer;

(e) a magnetic ferrite member disposed on said shielding conductor layer formed on said insulator substrate;

(f) the same predetermined number as in (c) of mutually insulated central conductors disposed on said magnetic ferrite member such that one end of each central conductor is connected to said shielding conductor layer and the other end of each central conductor is connected to each electrostatic capacitor-forming conductor layer; and

(g) a means for applying a dc magnetic field to said magnetic ferrite member.



---

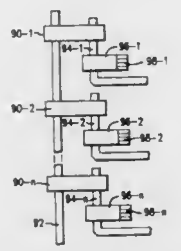
### 5,017,895
### MAGNETOSTATIC WAVE (MSW) FILTER WITH SHARP UPPER CUT-OFF FREQUENCY AND CHANNELIZER FORMED THEREFROM

**Daniel C. Buck, Hanover, and Steven N. Stitzer, Ellicott City, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 11, 1989, Ser. No. 405,714**

**Int. Cl.$^5$ H01P** *1/213, 1/215*

**U.S. Cl. 333—134** **14 Claims**



11. An apparatus for modifying microwave signals above a preselected frequency comprising:

a plurality of magnetostatic wave (MSW) filter elements, each MSW filter element having an input for receiving microwave signals and being responsive to produce magnetostatic waves (MSWs) for propagation therein, and an output, said MSW filter element being tuned to a corresponding first selected band of frequencies and having an output characteristic in which the frequencies are gradually reduced above the band;

an input transducer commonly coupled to the inputs of the MSW filter elements and an output transducer for each MSW filter element output; and

a plurality of upper bank limiting elements (BLE), at least one BLE being associated with and operatively coupled to the output transducer of each corresponding MSW filter element for receiving and carrying the MSWs therein, each corresponding BLE being tuned to a second band of frequencies near an upper end of the corresponding first band for absorbing selected frequencies in said first band to modify the output characteristic of each MSW filter element, so that the output of said MSW filter element above its corresponding first band of frequencies is sharply reduced compared to the output characteristic of such MSW without the corresponding BLE.

---

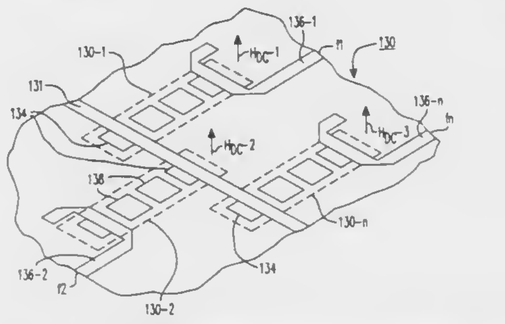
### 5,017,896
### MODE TRAPPED MAGNETOSTATIC WAVE (MSW) FILTERS AND CHANNELIZER FORMED THEREFROM

**John D. Adam, Murrysville, and Salvador H. Talisa, Edgewood, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 16, 1990, Ser. No. 466,146**

**Int. Cl.$^5$ H01P** *1/213, 1/215, 1/19*

**U.S. Cl. 333—134** **21 Claims**



1. A magnetostatic wave filter responsive to multimode RF signals launched therein comprising:

a MSW propagation medium for supporting propagation of MSWs therein formed of a planar ferrite member and having opposed ground planes on opposite faces of said ferrite member, said MSW propagation medium having a region of relatively high attenuation for MSWs and a region of relatively low attenuation for MSWs;

a plurality of mode trapping means disposed in the region of low attenuation for selectively trapping a corresponding desired MSW mode of the multimode MSWs for propagating in the region of low attenuation and rendering other modes thereof untrapped such that the corresponding desired MSW mode propagating in the region of low attenuation is attenuated less than the untrapped modes propagating in the region of high attenuation; and

an RF input transducer magnetically coupled to at least one face of the medium and for coupling the RF signals to the ferrite and at least one RF output transducer magnetically coupled to the medium for coupling MSWs in the medium to the RF output, said input transducer comprising a common manifold for coupling in parallel each of said mode trapping means.

---

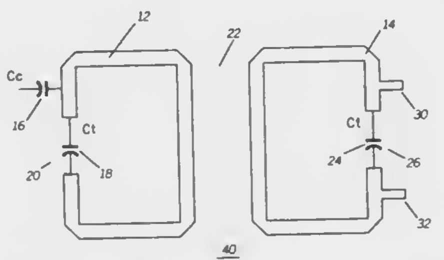
### 5,017,897
### SPLIT RING RESONATOR BANDPASS FILTER WITH DIFFERENTIAL OUTPUT

**Leng H. Ooi; Peter J. Yeh, both of Sunrise, and Branko Avanic, Coral Gables, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 6, 1990, Ser. No. 562,971**

**Int. Cl.$^5$ H01P** *1/203*

**U.S. Cl. 333—204** **12 Claims**



1. A bandpass filter comprising:

a first port;

a first microstrip split-ring resonator, having at least a first edge and a second edge, the first edge having a gap therein, and the first edge being coupled to the first port;

a second microstrip split-ring resonator, having at least a first edge and a second edge, the first edge being coupled to the second edge of the first microstrip split-ring resonator, and the second edge of the second microstrip split-ring resonator comprising a gap therein;

a second port coupled to the second edge of the second microstrip split-ring resonator, the second port comprising a first terminal located at one side of the gap in the second edge of the second microstrip split-ring resonator, and a second terminal symmetrically located at the other side of the gap in the second edge of the second microstrip split-ring resonator.

---

### 5,017,898
### ELECTROMAGNETIC RELAY

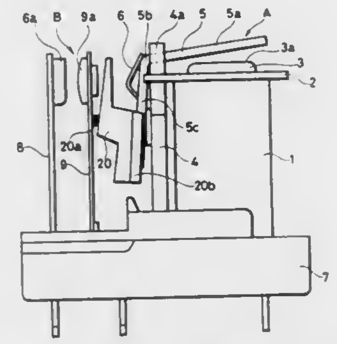
**Kiyoaki Kuzukawa, Ibaraki, Japan, assignor to Omron Corporation, Kyoto, Japan**

**Filed Jul. 12, 1990, Ser. No. 550,755**

**Claims priority, application Japan, Jul. 13, 1989, 1-182240**

**Int. Cl.$^5$ H01H** *67/02*

**U.S. Cl. 335—128** **5 Claims**



1. An electromagnetic relay comprising:

an electromagnetic section including an electromagnet and an armature movable by the attraction of said electromagnet,

switch section including a fixed contact point member and a movable contact point member for switching a circuit, and

a force transmitting member including a pressing portion to abut against said movable contact point member and an attaching portion fixed to said armature, thereby displacing said movable contact point member as said armature moves, to come into contact with said fixed contact point member,

the pressing portion of said force transmitting member being formed of a shape memory material restoring a previously memorized shape at or above a predetermined temperature.

---

### 5,017,899
### CIRCUIT BREAKER

**Martin Critchley, Gwynedd, Great Britain, assignor to Delta Circuit Protection & Controls Ltd., England**

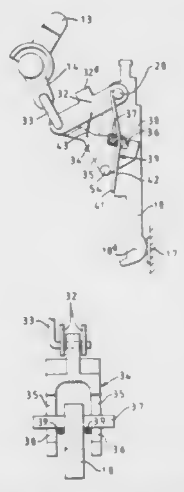
**Filed Feb. 24, 1989, Ser. No. 315,337**

**Claims priority, application United Kingdom, Feb. 27, 1988, 8804645**

**Int. Cl.$^5$ H01H** *9/00, 9/20*

**U.S. Cl. 335—172** **7 Claims**

1. An improved circuit breaker comprising a fixed contact, a movable contact, resilient means operable to urge the movable contact away from the fixed contact, a manually operable lever for moving the movable contact into and out of engagement with the fixed contact, and a linkage for transmitting movement of said lever to said movable contact and for holding said movable contact in engagement with said fixed contact in an "ON" position of said lever, and, fault detection means for initiating movement of the movable contact away from the fixed contact in a fault situation, the improvement comprising releasable latch means coupling said linkage and said movable contact, including a latch member movable with said linkage, and a pin engageable by said latch member and extending transversely of said moving contact, said pin being movable by said latch member during movement of the linkage towards its "ON" position, and there being a resilient element through which movement of the pin arising from movement of the linkage towards its "ON" position is transmitted to the movable contact to move the movable contact towards the fixed contact, said latch member being disengageable from said pin by operation of said fault detection means whereby to permit movement of the movable contact away from the fixed contact under the action of said resilient means urging the movable contact away from the fixed contact, independently of movement of said linkage.



---

### 5,017,900
### DEFLECTION YOKE

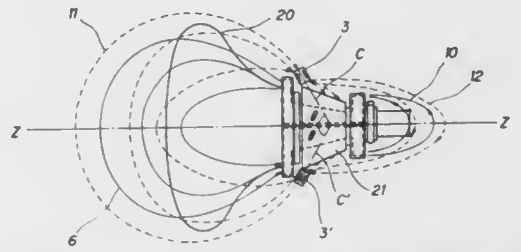
**Mitugu Ura; Yoshihiro Obara, both of Mizusawa, and Kazushi Takahashi, Ichinoseki, all of Japan, assignors to Hitachi Mizusawa Electronics Co., Ltd., Mizusawa, Japan**

**Filed Feb. 9, 1990, Ser. No. 479,760**

**Claims priority, application Japan, Feb. 10, 1989, 64-29908; Dec. 19, 1989, 64-327320**

**Int. Cl.$^5$ H01F** *5/00*

**U.S. Cl. 335—210** **14 Claims**



1. In a deflection yoke comprising a truncated conical hollow core, a pair of saddle-shaped horizontal deflection coils disposed inside said core, and a pair of toroidal vertical deflection coils wound on said core or a pair of vertical deflection coils wound in a saddle-like configuration and arranged in the vicinity of said core, the improvement wherein a pair of cancellation coils opposing each other on an imaginary axis which passes through a central axis of said core in the direction of vertical deflection are arranged near front end sections of said vertical deflection coils, respectively, a central axis of each of said cancellation coils is inclined at a predetermined angle relative to the central axis of said core, and said cancellation

VOL
1126
ISS
3
MY
21
1991
UMI

coils are connected with said horizontal deflection coils, respectively.

---

### 5,017,901

### CONTROLLER FOR A MOVABLE MEMBER

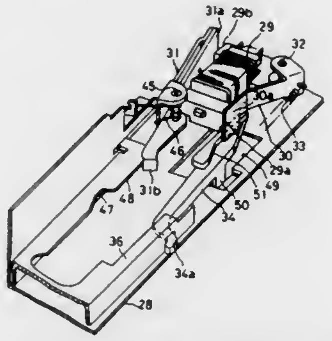
**Toshio Yoshimura, Tokyo, Japan, assignor to Tanashin Denki Co., Ltd., Tokyo, Japan**

**Filed Jun. 25, 1990, Ser. No. 542,885**

**Claims priority, application Rep. of Korea, Jul. 15, 1989, 10415/1989**

**Int. Cl.⁵ H01F** *7/08. 7/18*

**U.S. Cl. 335—265** **1 Claim**



1. A controller for a movable member which is able to move freely between a first and a second position, comprising,

an electromagnet having first and second attracting parts;

first and second attracted parts corresponding to said first and second attracting parts;

a driving member which is driven through a fixed motion by a driving source;

a combining part for moving which is located on said movable member and is separable from said driving member and maintained in a combined state with said driving member by said first attracted part;

a combining part for keeping position which is located on said movable member and the combining part for keeping position to maintain said movable member in said second position by combining with said second attracted part;

a leaving prevention part for preventing the leaving from said driving member of said combining part for moving when said movable member is at a position from halfway between said first and second positions to said second position; and

a separating party which is installed on said moving member or on said combining part for moving, for pulling apart said first attracted part forcibly from said fist attracting part after said combining part for moving has reached said leaving prevention part by movement of said movable member from said first position toward said second position and also before said part reaches said second position; wherein a separated position holding part is mounted on said movable member so as to maintain said second attracted part in the position separated form said second attracting part where said movable member is positioned between said first position and just before said second position.

---

### 5,017,902

### CONDUCTIVE FILM MAGNETIC COMPONENTS

**Alexander J. Yerman, Scotia, N.Y., and Khai D. T. Ngo, Gainesville, Fla., assignors to General Electric Company, Schenectady, N.Y.**

**Filed May 30, 1989, Ser. No. 359,063**

**Int. Cl.⁵ H01F** *27/30*

**U.S. Cl. 336—83** **30 Claims**

1. In a magnetic component, the improvement wherein a winding comprises:

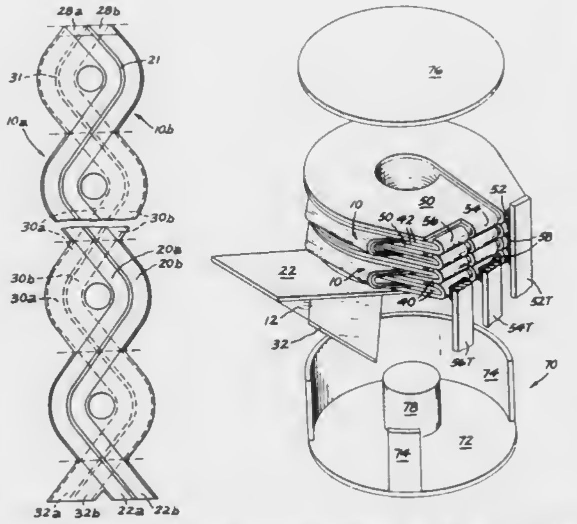
a first conductive film having first and second major surfaces, said film having a generally serpentine configuration when said first major surface is disposed in a plane;

said film being folded upon itself to form a stack of layers having an axis extending at an angle to the plane of said layers;

said serpentine configuration and the pattern of folding of said film combining to configure said film as a winding which encircles said axis in a manner to provide a plurality of turns;

dielectric material disposed between adjacent layers of said stack, said dielectric material including a dielectric membrane having first and second major surfaces, with said first major surface of said conductive film disposed in contact with said first major surface of said membrane; and

said magnetic component including a second conductive film spaced from said first conductive film, disposed on said first major surface of said dielectric membrane and electrically insulated from the first conductive film, said second conductive film having a generally serpentine configuration which in said folded configuration, creates a second winding of said magnetic component encircling said axis.



---

### 5,017,903

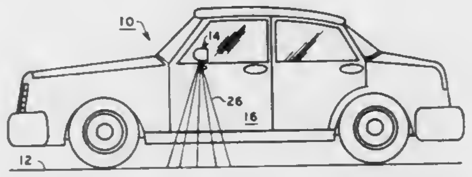
### EMERGENCY LIGHT

**Jacob Krippelz, Sr., 1121 Lebanon St., Aurora, Ill. 60505**

**Filed Feb. 21, 1989, Ser. No. 312,830**

**Int. Cl.⁵ B60Q** *1/52*

**U.S. Cl. 340—472** **8 Claims**



1. An emergency warning light for an automotive vehcile having a window on one side thereof, comprising in combination

light source means for producing a beam of flashing light,

means mounting said light source means to said one side of said vehicle in spaced relationship with said one side in proximity to said window for causing said beam to be directed downwardly from a location along said one side of said vehicle,

said beam of flashing light being generally conical and passing along said one side of said vehicle without directly impinging on said vehicle, and

said beam of flashing light being visible from in front of and from behind said vehicle.

---

### 5,017,904

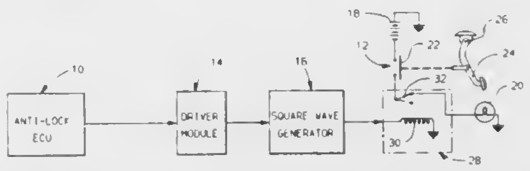
### BRAKING INDICATOR SYSTEM

**Alan L. Browne, and Yuen-Kwok Chin, both of Grosse Pointe, Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 16, 1990, Ser. No. 509,124**

**Int. Cl.⁵ B60Q** *1/46*

**U.S. Cl. 340—479** **3 Claims**



1. A braking indicator system for a vehicle having an anti-lock braking system including an anti-lock electronic control unit, a brake pedal, a stop light lamp mounted on the rear end of said vehicle, an electric circuit including a normally open switch and a normally-closed switch providing for continuous energization of said stop light upon depression of said brake pedal, and means including a square wave generator electrically connected between said anti-lock electronic control unit and said normally closed switch for causing the normally closed switch to provide a flashing signal upon activation of said anti-lock braking system.

---

### 5,017,905

### FIRE ALARM SYSTEM

**Sadataka Yuchi, Kanagawa, Japan, assignor to Hochiki Corporation, Tokyo, Japan**

**Continuation of Ser. No. 277,236, Nov. 29, 1988, abandoned. This application Oct. 2, 1990, Ser. No. 593,471**

**Claims priority, application Japan, Nov. 30, 1987, 62-302834; Dec. 26, 1987, 62-330544**

**Int. Cl.⁵ G08B** *29/00*

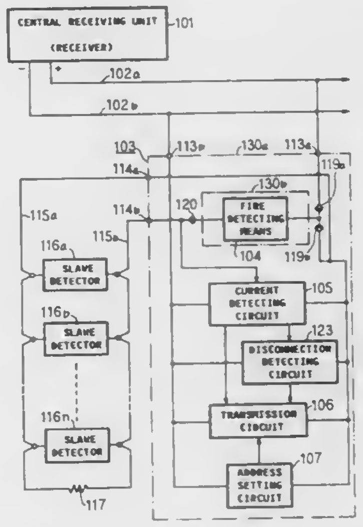
**U.S. Cl. 340—506** **6 Claims**

1. A fire alarm system comprising:

a central receiving unit;

a pair of power supply and signal main lines connected to said central receiving unit; and

a plurality of fire detectors connected to said power supply and signal main lines and forming one or more groups each corresponding to one of the areas under surveillance, said fire detectors including one or more master detectors each thereof being assigned one by one to one of said groups as a group master detector and a plurality of slave detectors one or more thereof being assigned to each of said groups, each of said groups including said one group master detector and said one or more slave detectors connected to said group master detector, each said group master detector including transmission means responsive to the detection of a fire by said group master detector itself or the detection of a fire by each of said one or more slave detectors connected to said group master detector to transmit a fire detection signal and an address signal assigned to each said group to said central receiving unit, said group master detector of each said group is connected with a terminal circuit element for supplying a small steady-state monitor current to a pair of power supply and signal local lines connecting said group master detector and said one or more slave detectors, and disconnection detecting means for generating a disconnection signal when said steady-state monitor current becomes smaller than a predetermined value.



---

### 5,017,906

### APPARATUS AND METHOD FOR COMBINING ANALOG DETECTION SIGNALS TO PROVIDE ENHANCED ALARM INTEGRITY

**Math M. J. Pantus, Brunssum, Netherlands, assignor to Aritech Corporation, Framingham, Mass.**

**Filed Oct. 6, 1989, Ser. No. 418,130**

**Int. Cl.⁵ G08B** *23/00*

**U.S. Cl. 340—517** **9 Claims**

1. An apparatus for combining analog detection signals generated by single sensor technology and mixed sensor technology intrusion detection systems, comprising:

means for generating first and second analog detection signals;

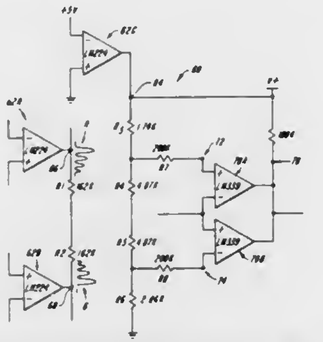
means for combining said first and second analog detection signals to provide an alarm decision signal having an amplitude;

comparator means having at least one predetermined threshold for comparing said amplitude of said alarm decision signal to said at least one predetermined threshold, said comparator means being operative in response to said amplitude exceeding said at least one predetermined

VOL 126
ISS 3
MY 21 1991
UMI

threshold to generate an output signal for triggering a system alarm;

signal limiting means coupled to said first and second analog detection signal generating means for limiting amplitudes of said first and second analog detection signals to a predetermined limit value; and



wherein said combining means provides said alarm decision signal having said amplitude equal to the amplitude of said first analog detection signal multiplied by the amplitude of said second analog detection signal.

---

5,017,907

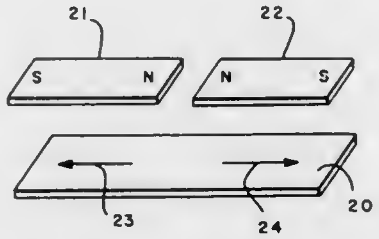
### DOUBLE PULSE MAGNETIC MARKERS

**Robert A. Cordery, Danbury; William L. Kilmartin, West Haven, and Claude Zeller, Monroe, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Jan. 16, 1990, Ser. No. 466,123**

**Int. Cl.$^5$ G08B *13/24***

**U.S. Cl. 340—551** **9 Claims**



1. In a marker for an electronic surveillance system, employing an alternating magnetic surveillance field including a strip of high permeability ferromagnetic material and means for applying a magnetic bias to said strip, the improvement wherein said strip has first and second regions spaced in the longitudinal direction thereof, said biasing means comprising first and second magnets for applying magnetic biases that are directed in first and second different directions in said first and second regions, and first and second magnets extending parallel to said strip adjacent said first and second regions, respectively, and being oppositely magnetized with respect to the longitudinal direction of said strip, whereby the marker produces a double pulse near each zero crossing of the surveillance field.

---

5,017,908

### SOLVENT RESPONSIVE SIGNAL-CARRYING DEVICE

**Hugh Macpherson, 12 Balfour Crescent, Milnathort, Tayside, KY13 7TA, Scotland**

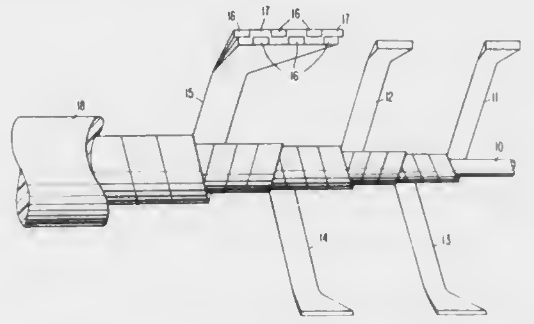
**Filed Mar. 28, 1990, Ser. No. 501,624**

**Claims priority, application United Kingdom, Apr. 4, 1989, 8907548**

**Int. Cl.$^5$ G08B *21/00***

**U.S. Cl. 340—605** **2 Claims**

1. A signal-carrying device for a security or detector system comprising at least two conductors extending in spaced-apart side-by-side relationship and insulated from each other by non-conductive material, a layer containing conductive material in a non-conductive carrier medium so printed over, or otherwise applied over said conductors such that the said conductors are not thereby electrically short circuited, the non-conductive carrier medium being soluble in a solvent such that when said solvent is applied to the layer the non-conductive carrier will dissolve and permit the conductive material to migrate between said conductors and short circuit therebetween.



---

5,017,909

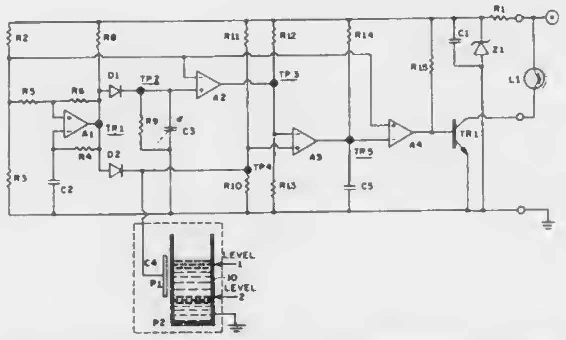
### CAPACITIVE LIQUID LEVEL SENSOR

**Lewis E. Goekler, Cincinnati, Ohio, assignor to Standex International Corporation, Cincinnati, Ohio**

**Filed Jan. 6, 1989, Ser. No. 294,200**

**Int. Cl.$^5$ G08B *21/00;* G01F *23/00;* H01G *5/28***

**U.S. Cl. 340—620** **16 Claims**



15. A non-intrusive capacitive liquid level sensor for detecting a predetermined level of liquid in a container, comprising:

electrically conductive container means for storing liquid, said container means including, as an integral portion of a wall of said container means, a window of non-conductive material;

a single capacitance plate for mounting to said window of non-conductive material, wherein said single capacitance plate is cooperative with said electrically conductive container means and the liquid therein to provide a sensor capacitor having a capacitance which varies in magnitude with respect to the amount of liquid present in said container means;

detection circuit means coupled to said sensor capacitor, said detection circuit means including:

an oscillator circuit coupled to said sensor capacitor for providing an oscillating voltage signal to said sensor capacitor, said sensor capacitor providing a sensor voltage decay signal as the voltage across said sensor capacitor decays over time in response to a negative transition in the oscillating voltage signal;

a reference capacitor circuit coupled to said oscillator circuit for receiving said oscillating voltage signal and providing a reference voltage decay signal, as the voltage across said reference capacitor decays over time in response to a negative transition in the oscillating voltage signal;

a voltage comparator circuit coupled to said sensor capacitor and to said reference capacitor circuit for receiving and comparing said reference voltage decay signal and said sensor voltage decay signal and providing an output signal when a predetermined voltage difference is detected therebetween; and

indicating means coupled to said detection circuit means and responsive to said output signal to provide an indication of the presence or absence of a predetermined level of liquid in the container means.

---

5,017,910

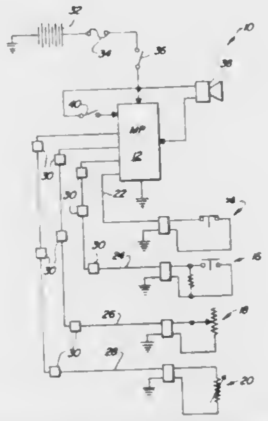
### INTERMITTENT FAULT DETECTION SYSTEM

**Arnold S. Farber, Cedar Falls; Stephen P. Lang, and David C. Smart, both of Waterloo, all of Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Aug. 24, 1989, Ser. No. 397,820**

**Int. Cl.$^5$ G08B *21/00***

**U.S. Cl. 340—635** **2 Claims**



2. A method for detecting intermittent faults in an electrical circuit having a plurality of devices, each connected to a central unit via a corresponding one of a plurality of conductors, the method comprising:

a. storing in a memory a first set of status signals representing electrical parameters associated with the plurality of devices and communicated to the central unit via the conductors;

b. storing a second set of status signals representing electrical parameters associated with the devices at a time subsequent to the storing of the first set of status signals;

c. comparing the second set of status signals to the first set and generating an audible alarm signal if the sets differ from each other;

d. redesignating the second set of status signals as the first set of status signals; and

e. periodically repeating steps a. through d.

---

5,017,911

### METHOD AND APPARATUS FOR MEASURING THE TENSION OF AN ADVANCING YARN

**Manfred Muller, Wuppertal; Bernd Neumann, Radevormwald, and Manfred Stuttem, Kurten, all of Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany**

**Filed Jun. 4, 1990, Ser. No. 532,340**

**Claims priority, application Fed. Rep. of Germany, Jul. 6, 1989, 3922245**

**Int. Cl.$^5$ G08B *21/00***

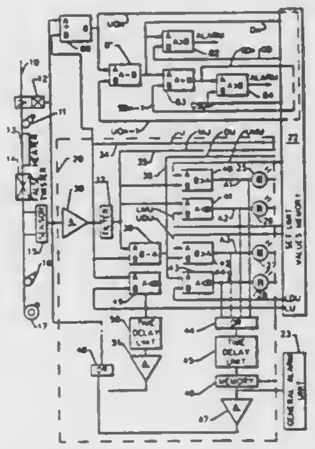
**U.S. Cl. 340—677** **10 Claims**

1. A method of measuring the tension of an advancing yarn which is subject to interruptions in its path, which is characterized by the ability to correct for any errors in the zero point output signal of the tension sensor, and comprising the steps of

continuously monitoring the tension of the advancing yarn with a sensor so that the sensor produces an output signal representative of the tension,

monitoring the output signal of the sensor whenever the yarn path is interrupted to thereby produce a zero point output signal (UOn) upon each interruption, and storing each zero point output signal in a computer memory,

comparing each zero point output signal (UOn) with a previously generated zero output signal (UOn-1) to determine a zero point drift (D), and generating an alarm signal when the drift (D) exceeds a predetermined limit value (GD).



---

5,017,912

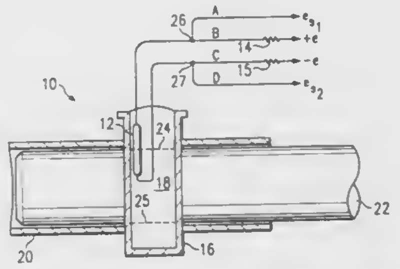
### ELECTRICAL DETECTION OF SHEAR PIN OPERATION

**John M. Willis, Arlington, Tex., assignor to Bell Helicopter Textron Inc., Fort Worth, Tex.**

**Filed Oct. 17, 1989, Ser. No. 422,641**

**Int. Cl.$^5$ G08B *21/00***

**U.S. Cl. 340—679** **17 Claims**



1. An electrical detection circuit for a shearing action, comprising:

a first resistor positioned perpendicular to a shear line of a device shearing under a mechanical load, said first resistor being destructible when said device shears along said shear line and said first resistor being electrically insulated from said device;

said first resistor being connected in series between second and third resistors, said second and third resistors being positioned beyond said shear line;

a first node located between said first and second resistors and a second node located between said first and third resistors, said nodes being positioned beyond said shear line such that a voltage applied to the terminals of said series connected resistors produces an electrical signal $e_{s1}$ at said first node in proportion to the value of said first and second resistors and an electrical signal $e_{s2}$ at said second node in proportion to the value of said first and third

VOL 1126
ISS 3
MY 21 1991
UMI

resistors, whereby the values of $e_{s1}$ and $e_{s2}$ allow for the detection of the shearing of said first resistor and the presence of wire anomalies in said detector circuit.

---

### 5,017,913

### COORDINATES INPUT APPARATUS

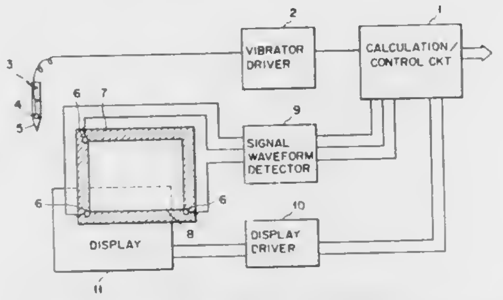
**Kiyoshi Kaneko, Yokohama, and Atsushi Tanaka, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 209,057, Jun. 20, 1988, abandoned. This application Sep. 5, 1990, Ser. No. 579,254**

**Claims priority, application Japan, Jul. 1, 1987, 62-162401; Jul. 1, 1987, 62-162402**

**Int. Cl.⁵ G09G *3/02***

**U.S. Cl. 340—712** **8 Claims**



1. A coordinates input apparatus comprising:

vibration generating means for generating a vibration:

a vibration propagating member to which said vibration generating means touches and which propagates the vibration generated;

a plurality of detecting means, attached to said vibration propagating member, for detecting the vibration generated by said vibration generating means;

measuring means for respectively measuring two periods of time from the vibration input due to the contact with said vibration propagating member by said vibration generating means until the leading and trailing zero-cross timings of a peak wave among a plurality of vibration waves during the vibration detected by said plurality of detecting means;

calculating means for calculating vibration propagating distances from the vibration input point on said vibration propagating member to said plurality of detecting means on the basis of said two periods of time until the leading and trailing edges of the peak wave among the vibration waves measured by said measuring means and a vibrating velocity; and

control means for obtaining coordinate values of the position of the vibration input point on said vibration propagating member on the basis of the vibration propagating distances from the vibration input point calculated by said calculating means to said plurality of detecting means.

---

### 5,017,914

### CIRCUIT FOR DRIVING A LIQUID CRYSTAL DISPLAY PANEL

**Masahide Uchida, and Fumio Shida, both of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Continuation of Ser. No. 201,977, Jun. 3, 1988, abandoned. This application Nov. 20, 1989, Ser. No. 440,418**

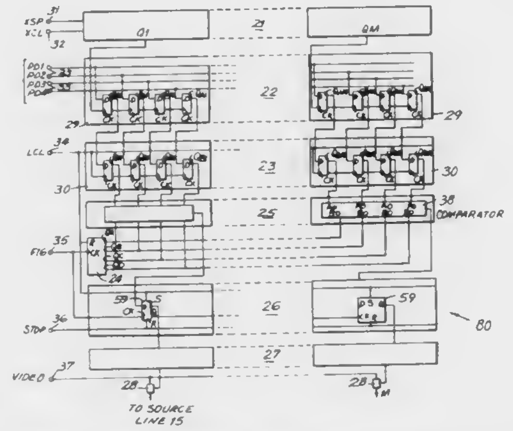
**Claims priority, application Japan, Jun. 4, 1987, 62-140399; May 16, 1988, 63-118713**

**Int. Cl.⁵ G09G *3/36***

**U.S. Cl. 340—784** **16 Claims**

1. A circuit for driving an active matrix liquid crystal display having M rows and N columns by video digital input data consisting of K bits wherein K is an integer at least equal to one, the columns intersecting the rows at a plurality of thin film transistors at least in part forming a pixel at each intersection of a row and a column comprising:

analog switching means capable of an ON and OFF state for receiving a video voltage and a control signal and selectively outputting the video voltage to each column, wherein the video voltage varies in level, sequentially at least between an OFF state of the liquid crystal display and an ON state at least once each horizontal scanning period, the analog switching means including discharging switch means for receiving a discharging signal and a discharge power supply and for selectively applying the discharge power supply input input in response to the discharging signal to the associated column for each scanning period before the application of the video voltage to the column;



a charging switch for receiving the video voltage, in response to the control signal, said video voltage having a higher impedance than the discharge power supply; and

control means for receiving the K bit digital input data and producing the control signal for controlling the time of the ON state of the analog switching means in response to said input data.

---

### 5,017,915

### METHOD OF ENHANCING COMMUNICATION SETUP BETWEEN A COMMUNICATION STATION AND A TELECOMMUNICATIONS NETWORK

**Mieu-Hong Dang, 2100 Taylor Simonetti Ave., Austin, Tex. 78728, and Jorge R. Taborga, 1802 Rainy Meadows Dr., Austio, Tex. 78758**

**Filed Sep. 19, 1988, Ser. No. 246,561**

**Int. Cl.⁵ H04Q *9/00***

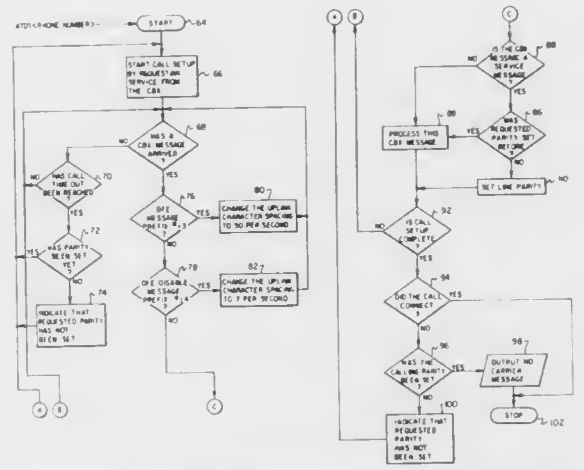
**U.S. Cl. 340—825.06** **3 Claims**

1. A method of enhancing communication setup between a communication station and a telecommunications network, said method comprising the steps of:

storing a selected communications parameter from a previous communication;

comparing said stored selected communication parameter with requested communication parameters for a current communication attempt; and

establishing communication between said communication station and said telecommunications network by setting only those communication parameters not identical to said stored selected communication parameter.


START
64
66
68
70
YES
NO
72
74
76
78
80
82
A
B
C
84
86
88
90
92
94
96
98
100
YES
NO
OUTPUT NO CARRIER MESSAGE
STOP
102
INDICATE THAT REQUESTED PARITY HAS NOT BEEN SET

---

### 5,017,916

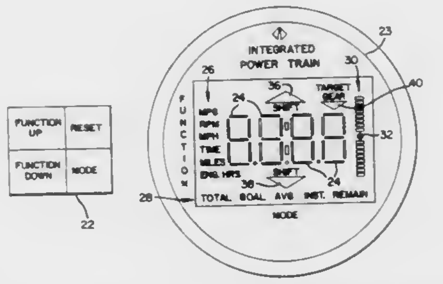
### SHIFT PROMPTER/DRIVER INFORMATION DISPLAY

**Edward E. Londt, Ft. Wayne, and James W. Kruse, New Haven, both of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.**

**Filed Mar. 9, 1989, Ser. No. 321,481**

**Int. Cl.⁵ G06F *3/14;* B60Q *1/00***

**U.S. Cl. 340—870.130** **11 Claims**



1. For a vehicle having a powertrain which comprises an engine that drives a shiftable multi-gear transmission through a clutch, an on-board microcomputer-based display that provides information about the vehicle powertrain's operation to the driver of the vehicle in respective cruising, prompting, and shifting modes of operation and comprises:

a multi-digit numerical display section for displaying decimal values;

information category selection means for selecting a particular category of information about the vehicle powertrain's operation;

means for causing the value of the selected category of information to be displayed on said multi-digit numerical display section in a cruising mode when the vehicle is being operated with the transmission in gear and the clutch engaged;

an information category indicator display section to indicate the particular selected category of information being displayed on said multi-digit numerical display section;

a prompting indicator display section;

means for sensing powertrain conditions to initiate a prompting mode by causing said prompting indicator display section to signal when shifting of the transmission from a presently selected gear to a different gear is desirable;

means to initiate a shifting mode by causing the identity of a target gear to which shifting of the transmission is desirable to be indicated on a particular one or more of the digits of said multi-digit numerical display section in response to initiation of shifting of the transmission from the presently selected gear;

and a further display section that is operable during shifting of the transmission to show when the engine has attained a speed that is substantially synchronous with the meshing speed of the particular target gear whose identity is displayed on said multi-digit numerical display section so that shifting of the transmission to the target gear can be completed substantially at the synchronous meshing speed of the target gear.

---

### 5,017,917

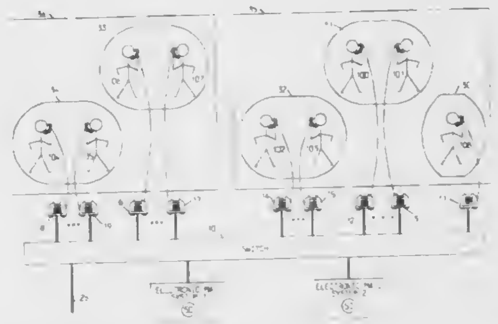
### RESTRICTION OF COMMUNICATION SERVICE ACCESSIBILITY AMONG SUBSCRIBER COMMUNITIES

**Thomas S. Fisher, Westminster, and Martin R. Losty, Broomfield, both of Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Dec. 30, 1988, Ser. No. 292,295**

**Int. Cl.⁵ H04Q *3/00***

**U.S. Cl. 340—825.79** **23 Claims**



1. An arrangement comprising:

first means for assigning persons who are users of a communication system to ones of a plurality of user communities;

second means for defining, for each one of said user communities, communication permissions with respect to individual ones of the other user communities;

third means responsive to an attempted communication between two persons who are users for identifying the two users and determining the two identified users' assigned communities;

fourth means responsive to the determination of the two

VOL
1126
ISS
3
MY
21
1991
UMI

users' assigned communities for determining from the second means whether the attempted communication between the two persons is permitted; and

fifth means responsive to a determination that the attempted communication is permitted for enabling the communication, and further responsive to a determination that the attempted communication is not permitted for preventing the communication.

---

### 5,017,918

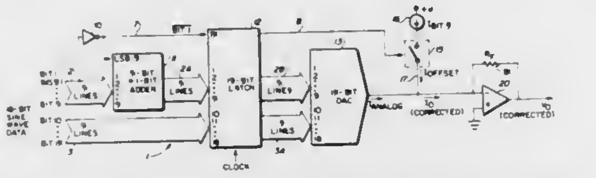
### METHOD AND CIRCUIT FOR ELIMINATING MAJOR BIT TRANSITION ERROR AT THE BIPOLAR ZERO POINT IN A DIGITAL-TO-ANALOG CONVERTER

**Kyoji Matsusako, Hadano, Japan, assignor to Burr-Brown Corporation, Tucson, Ariz.**

**Filed Mar. 26, 1990, Ser. No. 499,099**

**Int. Cl.$^5$ H03M** *13/00*

**U.S. Cl. 341—118** **12 Claims**



1. A digital-to-analog converter for converting a first digital word of M+N bits to an analog signal with reduced major bit switching error, the digital-to-analog converter comprising in combination:

(a) a first group of M input conductors conducting the M most significant bits of the first digital word;

(b) a second group of N input conductors conducting the N least significant bits of the first digital word;

(c) an M bit plus 1 bit adder having M inputs each connected to a conductor of the first group, respectively;

(d) means for coupling a signal representative of the most significant bit of the first digital word to a certain input of the adder, the adder having M output conductors, signals on the N input conductors of the second group together with signals on the M output conductors of the adder comprising a second digital word of M+N bits differing in value from the first digital word;

(e) an M+N bit DAC receiving the second digital word and producing a first analog current corresponding to the value of the second digital word;

(f) a switched current source responsive to the most significant bit of the first digital word and producing an offset current and algebraically summing the offset current with the first analog current to produce a second analog current, the offset current having a value equal in magnitude and opposite in polarity to a shift in the first analog current due to the certain input of the adder, such that the second analog current corresponds to the value of the first digital word.

---

### 5,017,919

### DIGITAL-TO-ANALOG CONVERTER WITH BIT WEIGHT SEGMENTED ARRAYS

**Richard W. Hull, Laguna Hills, and Timothy G. O'Shaughnessy, Norco, both of Calif., assignors to Western Digital Corporation, Irvine, Calif.**

**Filed Jun. 6, 1990, Ser. No. 533,885**

**Int. Cl.$^5$ H03M** *1/68*

**U.S. Cl. 341—136** **23 Claims**

1. An integrated circuit comprising a converter for converting a multi-bit digital signal to an analog signal, the converter comprising:

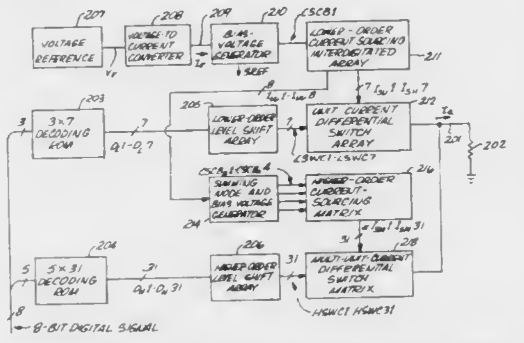
means defining a first flow path for a reference current;

current-to-voltage converting circuit means connected to the first flow path for producing a first bias voltage having a magnitude that depends upon the magnitude of the reference current;

means defining a second flow path for an analog current, the magnitude of which defines the analog signal;

first current-sourcing means biased by the first bias voltage for producing, in parallel, a first plurality of switchable currents that each mirror the reference current;

first switching means controlled by the digital value of a low-order portion of the digital signal for selectively switching the first plurality of switchable currents to the second flow path so as to contribute unit steps to the analog signal;


VOLTAGE REFERENCE
VOLTAGE-TO-CURRENT CONVERTER
BIAS-VOLTAGE GENERATOR
LOWER-ORDER CURRENT SOURCING INTERDIGITATED ARRAY
3×7 DECODING ROM
LOWER-ORDER LEVEL SHIFT ARRAY
UNIT CURRENT DIFFERENTIAL SWITCH ARRAY
HIGHER-ORDER CURRENT-SOURCING MATRIX
5×31 DECODING ROM
HIGHER-ORDER LEVEL SHIFT ARRAY
MULTI-UNIT-CURRENT DIFFERENTIAL SWITCH MATRIX
8-BIT DIGITAL SIGNAL
207
208
209
210
211
212
203
204
205
206
218
202

circuit means biased by the first bias voltage for producing a summed current having a magnitude that is a multiple of the magnitude of the reference current;

circuit means responsive to the summed current for producing a second bias voltage;

second current-sourcing means biased by the second bias voltage for producing, in parallel, a second plurality of switchable currents that each mirror the summed current; and

second switching means controlled by the digital value of a higher-order portion of the digital signal for selectively switching the second plurality of switchable currents to the second flow path so as to contribute multi-unit steps to the analog signal.

---

### 5,017,920

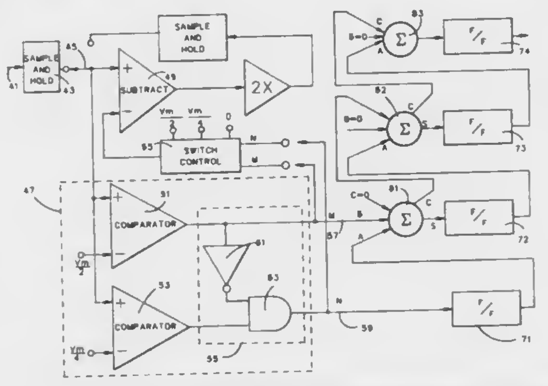
### HIGH-SPEED MODIFIED SUCCESSIVE APPROXIMATION ANALOG TO DIGITAL CONVERTER

**Barry T. French, Fullerton, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 5, 1989, Ser. No. 347,703**

**Int. Cl.$^5$ H03M** *1/40*

**U.S. Cl. 341—163** **29 Claims**



1. A method of converting an input analog signal to a digital signal, comprising:

sampling an input analog signal to produce an input signal sample;

comparing said input signal sample with an upper reference voltage;

producing a first indication if said sample exceeds said upper reference voltage;

comparing said sample with a lower reference voltage that is a fraction of said upper reference voltage;

producing a second indication if said sample exceeds said lower reference voltage;

subtracting from said input sample a first value if said first indication is produced or a second value if said second indication is produced, to generate a reduced sample; and

multiplying said reduced sample by a predetermined factor to generate a new sample.

---

### 5,017,921

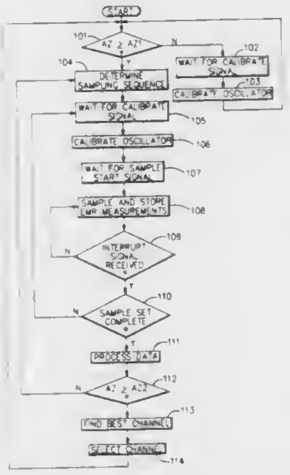
### RADAR SYSTEM AND A METHOD FOR OPERATING A RADAR SYSTEM

**John McGill, Smithtown, and Stanley F. Zoubek, Jr., Bohemia, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Dec. 13, 1989, Ser. No. 450,216**

**Int. Cl.$^5$ H04K** *3/00;* **G01S** *7/36*

**U.S. Cl. 342—18** **20 Claims**



1. A radar system, comprising:

a transmitter-receiver subsystem to generate and to transmit a series of electromagnetic pulses, to scan the pulses across an area of interest a multitude of times, and to receive echoes of the pulses, the transmitter-receiver subsystem including means to transmit the radar pulses at a multitude or frequencies, each of said frequencies being in one of a multitude of channels; and

a least jammed frequency channel selection subsystem to measure electromagnetic interference received by the transmitter-receiver subsystem in each of the channels, during each of at least selected scans of the pulses across the area of interest, and including

(i) means to generate a digital signal representing the amplitude of the electromagnetic interference received by the transmitter-receiver subsystem in a given one of said channels, and

(ii) control means connected to the digital signal generating means to select each of the channels of the radar system as the given channel a multitude of times during each of said selected scans of the area of interest, a multitude of said digital signals are generated for each channel of the radar system,

the control means including a processor to receive said digital signals, to add together the digital values generated during a given scan of the area of interest for each channel of the radar system to derive a respective electromagnetic interference summation value for each of the channels, to determine, using the electromagnetic interference summation values, the one channel receiving the least amount of interference during each of said selected scans of the radar pulses across the area of interest, and to generate a channel signal identifying said one channel;

the transmitter-receiver subsystem including a channel selector for receiving said channel signal from the least jammed frequency selection subsystem, and in response to said channel signal, for selecting a frequency in said one channel to transmit the pulses the next time the pulses are scanned across the area of interest.

---

### 5,017,922

### RADAR SYSTEM HAVING A SYNTHETIC APERTURE ON THE BASIS OF ROTATING ANTENNAE

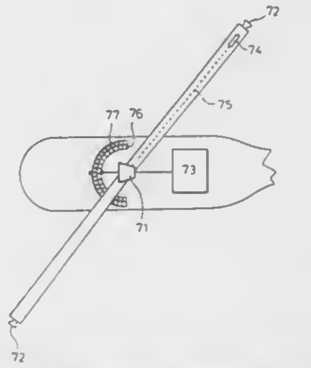
**Helmut Klausing, Bad Aibling, and Horst Kaltschmidt, Neubiberg, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Fed. Rep. of Germany**

**Filed Jun. 7, 1990, Ser. No. 534,284**

**Claims priority, application Fed. Rep. of Germany, Jul. 5, 1989, 3922086**

**Int. Cl.$^5$ G01S** *13/90*

**U.S. Cl. 342—25** **12 Claims**



1. A radar system comprising at least one transmitter and at least one receiver, having at least one antenna for the transmitting and receiving of radar pulses, said antenna being arranged at the end of a rotating arm;

means for demodulating and intermediate storage of reception signals;

means for forming reference functions as a function of illumination geometry of said radar system of range intervals to be measured, of rotating-angle areas, of transmitting pulses as well as the height of said antenna above ground;

means for storing said reference functions;

means for correlating said reception signals with said reference functions; and

means for displaying a correlation result;

wherein the means for forming said reference functions includes:

a geometry module, in which, from an opening angle and a depression angle of said antenna, the length of said rotating arm, and the height of said antenna above ground, the width is determined of a range strip illuminated by said antenna having inner and outer illuminated strip edges, as well as the range difference between the beams from said antenna to said inner and outer illuminated strip edges;

a circuit for dividing said illuminated strip into a specific number of range intervals; and

a module for forming said reference functions for said individual range intervals.

---

### 5,017,923

### OVER THE HORIZON COMMUNICATION SYSTEM

**Jeffrey T. Nemit, Oxnard, Calif., assignor to ITT Corporation, New York, N.Y.**

**Filed Mar. 30, 1990, Ser. No. 503,420**

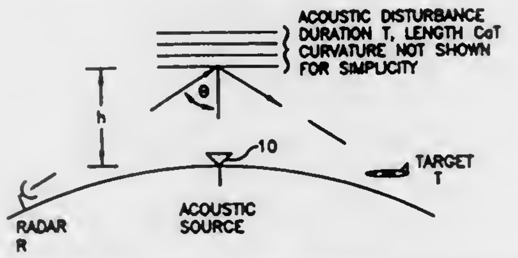
**Int. Cl.$^5$ G01S** *13/86;* **H04B** *13/00*

**U.S. Cl. 342—52** **9 Claims**

1. An over-the-horizon communications system including a

VOL
1126
ISS
3
MY
21
1991
UMI

transmitter for generating a signal to be communicated, an acoustic source located on the earth in a direction from said transmitter that communication is to take place and capable of providing variations in the density of the atmosphere and,



therefore, in the index of refraction, means for directing said transmitter at said variations to cause said signal to be reflected off the extremes of said variations in density and re-directed over the horizon to a target in accordance with the change in said index of refraction.

---

### 5,017,924

## SAMPLE-AND-HOLD UNIT WITH HIGH SAMPLING FREQUENCY

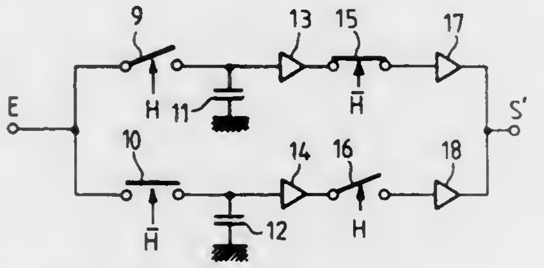
**Christian Guiberteau, Longjumeau; Michéle Le Paih, Bievres, and Stéphane Ruggeri, Viry, all of France, assignors to Thomson Composants Microondes, Puteaux, France**

**Filed Apr. 26, 1990, Ser. No. 514,888**

**Claims priority, application France, May 3, 1989, 89 05871**

**Int. Cl.$^5$ G01S** *7/02*

**U.S. Cl. 342—195** **7 Claims**



1. A sample and hold unit comprising:

an input for receiving an input signal;

at least two parallel circuits, each receiving said input signal and each parallel circuit comprising:

a first follower switch to load a sample of said input signal into a capacitor when said first switch is closed;

a second holder switch to transfer the loaded sample to an output when said second switch is closed;

a sampling clock signal for controlling said first and second switches of a first parallel circuit; and

at least one phase-shifted sampling clock signal for controlling said first and second switches of a respective at least one second parallel circuit;

wherein each of said parallel circuits sequentially transmits to said output the sample loaded in the capacitor of said respective parallel channel when said second switch of said respective parallel channel is closed.

---

### 5,017,925

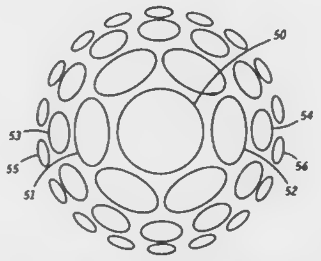
## MULTIPLE BEAM DEPLOYABLE SPACE ANTENNA SYSTEM

**Bary R. Bertiger, Scottsdale; Raymond J. Leopold, Chandler, and Kenneth M. Peterson, Phoenix, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 415,814, Oct. 2, 1989, abandoned. This application Oct. 10, 1990, Ser. No. 596,623**

**Int. Cl.$^5$ H04B** *7/185*

**U.S. Cl. 342—352** **25 Claims**



1. A multiple beam space antenna system for facilitating communications between a satellite and a plurality of earth stations, said multiple beam space antenna system comprising:

a plurality of antenna means disposed in a semi-spherical configuration about a surface of said satellite, each of said plurality of antenna means positioned so that each antenna means establishes said communications with a substantially distinct area of the earth, said plurality of antenna means including:

a first plurality of antenna means circularly disposed;

a second plurality of antenna means disposed circularly about said first plurality of antenna means; and

a third plurality of antenna means disposed circularly about said second plurality of antenna means; and

each of said antenna means for receiving a plurality of communications from said earth stations in a corresponding area and for transmitting a plurality of communications to said earth stations in said corresponding area; and

each of said antenna means being connected to a processor of said satellite for enabling the processor to receive and transmit messages from a number of earth stations.

---

### 5,017,926

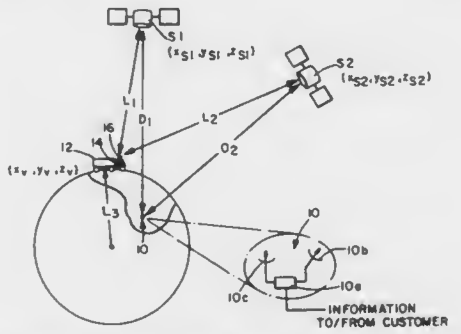
## DUAL SATELLITE NAVIGATION SYSTEM

**William G. Ames, Poway; Irwin M. Jacobs, La Jolla; Lindsay A. Weaver, Jr., and Klein S. Gilhousen, both of San Diego, all of Calif., assignors to Qualcomm, Inc., San Diego, Calif.**

**Filed Dec. 5, 1989, Ser. No. 446,979**

**Int. Cl.$^5$ H04B** *7/185;* **G01S** *5/02*

**U.S. Cl. 342—353** **25 Claims**



1. A method for determining the position of an object in a reference coordinate system using a fixed station and a plurality of earth orbit satellites wherein the positions of said fixed station and said satellites are known in said reference coordinate system with respect to a reference point and the distances from said fixed station to said satellites are also known, said method comprising the steps of:

transmitting from said fixed station a forward periodic signal synchronized to a fixed station transmission clock via first and second satellites to an object whose position is to be determined;

receiving at said object said forward periodic signal;

synchronizing at said object an object clock to said received forward periodic signal transmitted via said first satellite;

measuring at said object a first relative time difference in said forward periodic signal as transmitted via said first and second satellites and received at said object;

transmitting from said object to said fixed station via said first satellite a return signal synchronized with said object clock and modulated with information indicative of said first relative time difference;

receiving at said fixed station said return signal;

synchronizing at said fixed station a fixed station reception clock to said received return signal;

measuring at said fixed station a second relative time difference between said fixed station transmission and reception clocks;

calculating at said fixed station, from said first and second relative time differences, respective distances from said first and second satellites to said object; and

computing the position of said object in said reference coordinate system.

---

### 5,017,927

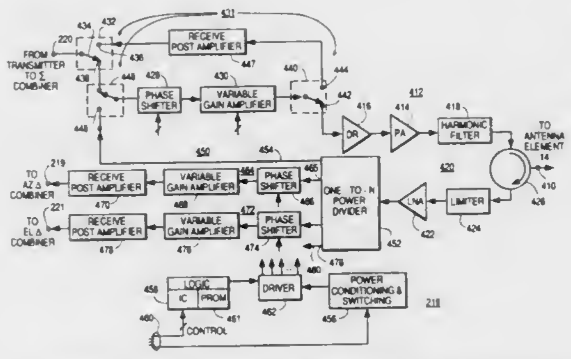
## MONOPULSE PHASED ARRAY ANTENNA WITH PLURAL TRANSMIT-RECEIVE MODULE PHASE SHIFTERS

**Ashok K. Agrawal, and Norman R. Landry, both of Mount Laurel, N.J., assignors to General Electric Company, Morrestown, N.J.**

**Filed Feb. 20, 1990, Ser. No. 481,415**

**Int. Cl.$^5$ H01Q** *3/22;* **G01S** *13/44*

**U.S. Cl. 342—371** **4 Claims**



1. a transmit-receive processor adapted for use together with other similar processors in a monopulse radar system, which monopulse radar system includes a plurality of arrayed radiators, and which also includes an azimuth sum channel combiner defining a combined port and plural separated ports, and at least one of an azimuth difference channel combiner and an elevation difference channel combiner, each of which also includes a combined port and plural separated ports, said combined port of said sum channel combiner being adapted for receiving a transmitter signal during a transmit mode of operation, said processor comprising:

transmit amplifying means including an input port and an output port, for amplifying signals to be transmitted by one of said radiators;

receive amplifying menas including an input port and an output port, for amplifying signals received by said one of said radiators;

radiator coupling means coupled to said output port of said transmit amplifying means, to said input port of said receive amplifying menas, and adapted to be coupled to said one of said radiators, for coupling said signals to be transmitted to said one of said radiators from said transmit amplifying means, and for coupling said signals received by said one of said radiators to said receive amplifying means;

first and second phase shifting means for phase shifting signals passing therethrough;

controllable switch means coupled to said first phase shifting means, and including a first port adapted to be coupled to one of said separated ports of said azimuth sum channel combiner, a second port coupled to said input port of said transmit amplifying means, and a third port, said controllable switch means being for, in a transmit mode, coupling signals to be transmitted by way of said first phase shifting means to said transmit amplifying means, and for, in a receive mode, coupling signals applied to said third port through said first phase shifting means to said first port, whereby transmitted signals and received signals applied to said azimuth sum channel combiner traverse the same phase correction network; and

receive coupling means coupled to said output port of said receive amplifying means, to said third port of said switch means, to said second phase shifting menas, and adapted to be coupled to one of said separated ports of one of said azimuth difference channel combiner and said elevation difference channel combiner, for dividing the amplified received signal produced at said output port of said receive amplifying menas into at least first and second portions, and for coupling said first portion of said amplified received signal to said third port of said switch means, said receive coupling means also being adapted for coupling said second portion of said amplified received signal to said one of said distal ports of said one of the azimuth difference channel combiner and said elevation difference channel combiner by way of said second phase shifting means.

---

### 5,017,928

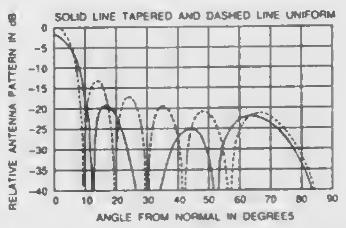
## LOW SIDELOBE ARRAY BY AMPLITUDE EDGE TAPERING THE EDGE ELEMENTS

**Randy L. Haupt, Monument, and Christopher J. McCormack, Colorado Springs, both of Colo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Aug. 22, 1990, Ser. No. 570,670**

**Int. Cl.$^5$ G01S** *3/06*

**U.S. Cl. 342—379** **6 Claims**



1. A phased array antenna system which is fixed to a transmitter which outputs a plurality of electrical transmitter signals, said phased array antenna system receiving and radiating said electrical transmitter signals into free space in a main beam which contains a main lobe and sidelobes, said phased array antenna system comprising:

a set of center subarrays which receive said electrical transmitter signals with a uniform current amplitude, said set of center subarrays thereby radiating said main beam wherein said set of center arrays comprise eight subarrays which are fixed in a row;

a set of edge subarrays which are fixed so that they encompass said set of center subarrays, said set of edge subarrays

OL
1126
ISS
3
MY
21
1991
UMI

receiving said set of electrical transmitter signals with a tapered current amplitude, said set of edge subarrays thereby contributing to said main lobe while reducing said sidelobes of said main beam, and wherein said set of edge subarrays comprise a first and second edge subarray which are respectively fixed on each end of said row; and

a means for supplying said set of center subarrays and said set of edge subarrays respectively with electrical voltage so that said set of enter subarrays receives said electrical voltage with uniform voltage amplitude, and said set of edge subarrays receives said electrical voltage with tapered voltage amplitude, wherein said supplying means comprises a plurality of variable impedance elements which are electrically connected between said corporate feed network and one of said edge subarrays to taper said electrical signals provided thereto, wherein each of said variable impedance elements comprises a potentiometer.

---

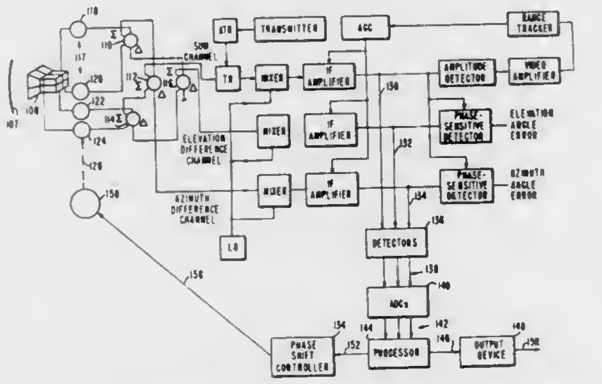
### 5,017,929
### ANGLE OF ARRIVAL MEASURING TECHNIQUE

**George I. Tsuda, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Sep. 6, 1989, Ser. No. 403,426**

**Int. Cl.$^5$ G01S** *5/02, 13/00, 3/16*

**U.S. Cl. 342—427** **8 Claims**



1. A method of providing an angle of arrival measurements having improved accuracy and resolved sidelobe ambiguity in a monopulse antenna system, said method comprising the steps of:

determining the presence of a supposed signal of interest received by the monopulse antenna system;

monitoring the angle of arrival of the supposed signal of interest;

discriminating whether the supposed signal of interest is on the beam main lobe or a sidelobe to resolve sidelobe ambiguity by phase shifting the antenna beam to steer the beam main lobe relative to the supposed signal of interest such that the angle of arrival of the signal of interest should remain in the main lobe subsequent to the phase shift; and

monitoring the angle of arrival of the supposed signal of interest to determine if the signal of interest remains on the main lobe;

whereby if the position of the signal of interest remains on the main lobe, sidelobe ambiguity has been resolved, and if the position of the signal of interest is on a sidelobe, the signal of interest is not detectable and sidelobe ambiguity has been resolved.

---

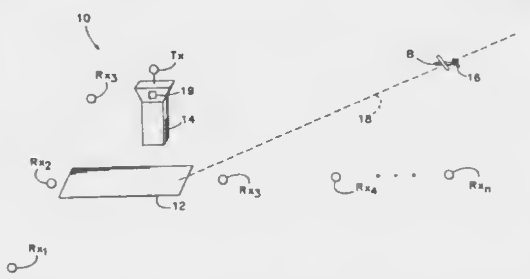
### 5,017,930
### PRECISION LANDING SYSTEM

**John R. Stoltz, 5680 Oregon Rd., Mount Hood, Oreg. 97041, and Carl W. Clawson, Hood River, Oreg., assignors to John R. Stoltz, Hood River, Oreg.**

**Filed Jan. 25, 1990, Ser. No. 470,643**

**Int. Cl.$^5$ G01S** *3/02*

**U.S. Cl. 342—465** **16 Claims**



1. A precision landing system for guiding an aircraft along a predetermined approach path within operable range of a ground-based interrogator which transmits an interrogation signal, said aircraft having onboard a transponder which transmits a transponder reply signal in response to receiving said interrogation signal, said system comprising:

(a) at least four ground-based receiver, each of said receivers being positioned at a predetermined position and comprising
  (i) means for receiving said interrogation signal,
  (ii) means for receiving said transponder reply signal, and
  (iii) means for determining an elapsed time between receiving said interrogation signal and receiving said transponder reply signal;

(b) a computer comprising
  (i) means for receiving said respective elapsed times from said respective receivers,
  (ii) means for calculating from said respective elapsed times a position of said aircraft,
  (iii) for comparing said position with said predetermined approach path, resulting in the determination of a position error; and

(c) means for communicating said position error to said aircraft.

---

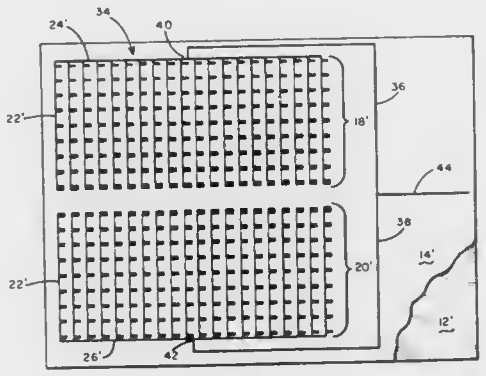
### 5,017,931
### INTERLEAVED CENTER AND EDGE-FED COMB ARRAYS

**William R. Carlyon, Maple Grove, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Dec. 15, 1988, Ser. No. 292,024**

**Int. Cl.$^5$ H01Q** *21/08*

**U.S. Cl. 33—700 MS** **5 Claims**



1. A microstrip antenna for millimeter wave transmitting and receiving systems, comprising in combination:

(a) a center-fed two-dimensional array of parallel, spaced-apart microstrip transmission lines, each having a plurality of radiating elements conductively joined thereto; and

(b) an edge-fed two-dimensional array of parallel, spaced-apart microstrip transmission lines, each having a plurality of radiating elements joined thereto, the transmission lines and radiating elements comprising said edge-fed array being interleaved with said transmission lines and radiating elements comprising said center-fed array.

---

### 5,017,932
### MINIATURE ANTENNA

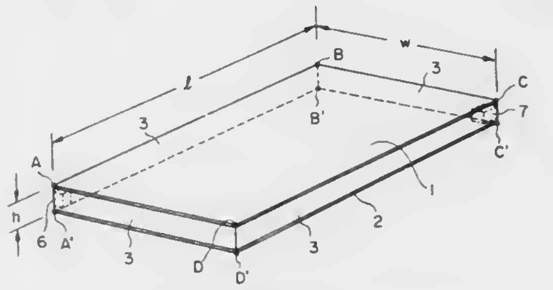
**Katsumi Ushiyama; Sadafumi Sakamoto, both of Tokyo, and Kiyohiko Itoh, Sapporo, all of Japan, assignors to Kokusai Electric Co., Ltd., Tokyo and Kiyohiko Itoh, Sapporo, both of, Japan**

**Filed Oct. 27, 1989, Ser. No. 443,366**

**Claims priority, application Japan, Nov. 4, 1988, 63-277328**

**Int. Cl.$^5$ H01Q** *1/24*

**U.S. Cl. 343—702** **3 Claims**



1. A miniature antenna, comprising:

a pair of square conductor plates disposed in parallel with a spacing sufficiently smaller than a wavelength used and fixed to each other to an insulating frame to form an antenna structure which is used also as a case;

feed terminal means provided at a a pair of opposed positions on one of opposed sides of the conductor plates;

short-circuit elements, provided at a plurality of positions on other opposed sides of the conductor plates to short-circuit in high frequency-wise;

a gravity-direction sensor disposed in the case to produce an output in accordance with the direction of gravity with respect to a plane along any of the conductor plates

to selectively short circuit said short-circuit elements by the output of the gravity-direction sensor so that a plane of polarization established by a seated state antenna is brought into agreement with the direction of gravity.

---

### 5,017,933
### VEHICLE WINDOW ANTENNA WITH ANTENNA ELEMENTS ON TWO SURFACES

**Kaoru Sakurai; Masaru Maeda, both of Kawasaki; Harunori Murakami, Machida, and Hiroshi Iijima, Yokohama, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan**

**Filed Mar. 22, 1989, Ser. No. 327,062**

**Claims priority, application Japan, Mar. 31, 1988, 63-43583[U]**

**Int. Cl.$^5$ H01Q** *1/32*

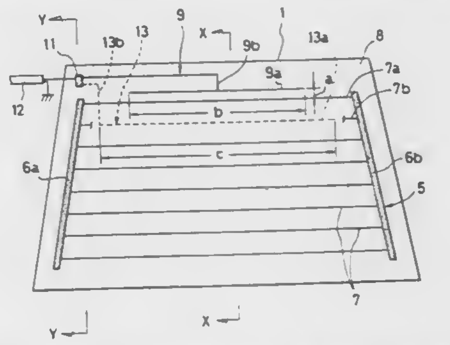
**U.S. Cl. 343—704** **12 Claims**

1. A vehicle window antenna comprising:

a laminated glass for use in a vehicle having inner and outer glasses facing respectively the interior and exterior of the vehicle, and an intermediate layer sandwiched therebetween;

heating conductor means mounted on a first surface of said laminated glass which is selected from all surfaces thereof but the outer surface of said outer glass exposed to the exterior of the vehicle;

first antenna conductor means mounted on a second surface of said laminated glass which is different from said first surface and said outer surface of said outer glass; and



second antenna conductor means mounted on the same surface of said laminated glass as said heating conductor means.

---

### 5,017,934
### PORTABLE ANTENNA

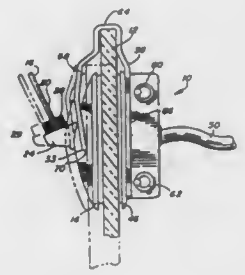
**Herbert R. Blaese, 3314 Olcott Ave., Chicago, Ill. 60634**

**Division of Ser. No. 230,424, Aug. 10, 1988, Pat. No. 4,939,524, which is a division of Ser. No. 164,246, Mar. 4, 1988, Pat. No. 4,804,969. This application Jul. 21, 1989, Ser. No. 383,323**

**The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.**

**Int. Cl.$^5$ H01Q** *1/32*

**U.S. Cl. 343—713** **1 Claim**



1. A portable RF antenna for mounting on a motor vehicle's side window and enabling easy and rapid mounting and removal, which comprises:

an outer RF transfer member comprising a weather-resistant carrier having a first electrically conductive member on its underside for engagement with the outside of the side window;

a radiator for location on the outside of the side window and connected to said first electrically conductive member;

an inner RF transfer member including a housing and having a second electrically conductive member on its underside for engagement with the inside of the side window;

said inner transfer member and said outer transfer member being adapted for alignment so that RF energy is transferred through the side window;

means for connecting said outer transfer member with respect to said inner transfer member, said connecting means bridging said inner transfer member and said outer transfer member so as to overlie the side window when the antenna is mounted thereon;

said connecting means being located so as not to provide a conductive connection between said first and second electrically conductive members;

an electrical antenna wire;

means coupling said electrical antenna wire to said second electrically conductive member with the antenna wire

VOL 1126 ISS 3 MY 21 1991 UMI

being located only on the inside of the side window and not on the outside of the side window.

---

5,017,935

### MULTIBAND ANTENNA SYSTEM FOR USE IN MOTOR VEHICLES

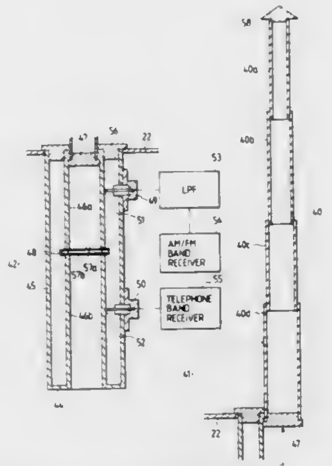
**Akihiko Hayashi, Oogaki; Toru Yamazaki, Chiryu, and Akira Torii, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Mar. 23, 1990, Ser. No. 497,851**

**Claims priority, application Japan, Mar. 23, 1989, 1-71313**

**Int. Cl.$^5$ H01Q** *1/100, 1/320, 1/000, 1/500*

U.S. Cl. 343—715 14 Claims



1. A multiband antenna system for use in a motor vehicle, comprising:

an antenna section, which is composed of a plurality of antenna elements which are telescopically coupled to each other so as to allow extension and retraction of said antenna section, protrusively provided on said motor vehicle and having a predetermined length so as to be responsive to a first frequency band and a second frequency band different from said first frequency band;

first transmission means, which has a cylindrical and tubular configuration and is provided coaxially with respect to said antenna section, coupled to said antenna section for effecting transmission of first and second frequency signals induced by said antenna section in response to said first and second frequency bands, an inner diameter of said first transmission means being arranged to be greater than an outer diameter of said antenna section so that said first transmission means allows accommodation of said antenna section;

capacitor means provided at an end portion of said first transmission means, said capacitor means acting as a short circuit with respect to said first frequency signal and assuming a blocking state with respect to said second frequency signal;

second transmission means, which has a cylindrical and tubular configuration and is provided coaxially with respect to antenna section, coupled through said capacitor means to said first transmission means, an inner diameter of said second transmission means being greater than the outer diameter of said antenna section so that said second transmission means allows accommodation of said antenna section;

first feeding means connected to said first transmission means for deriving said second frequency signal; and

second feeding means connected to said second transmission means for deriving said first frequency signal.

---

5,017,936

### MICROWAVE ANTENNA

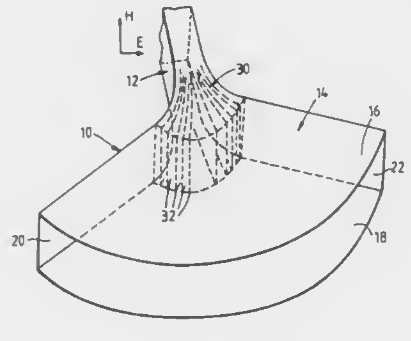
**Peter J. Massey, Crawley, England, assignor to U.S. Philips Corp., New York, N.Y.**

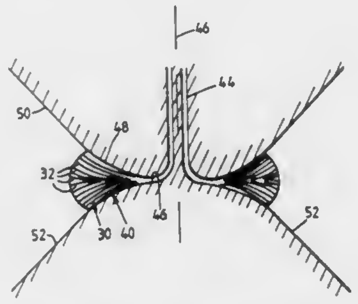
**Filed Sep. 5, 1989, Ser. No. 403,201**

**Claims priority, application United Kingdom, Sep. 7, 1988, 8821009**

**Int. Cl.$^5$ H01Q** *13/02, 13/04*

U.S. Cl. 343—773 8 Claims





1. A microwave antenna comprising a feeder; a horn section comprising oppositely disposed transversely divergent walls which at their wider spaced ends define a mouth and at their narrower spaced ends define a throat which communicates with the feeder, said walls at the throat curving gradually to provide a smooth change in cross-section between the throat and the feeder; and a transition disposed in said throat having a relatively small end facing said feeder and a relatively large end facing said mouth, the transition comprising a plurality of transversely spaced apart, electrically conductive partitions extending generally co-extensively from said relatively small end to said relatively large end, wherein the lengths of the partitions considered in a direction from said relatively small end to said relatively large end are substantially the same, whereby spaces formed between the partitions and spaces formed between said walls and their adjacent partitions comprise waveguides having substantially identical electrical path lengths.

---

5,017,937

### WIDEBAND HORN ANTENNA

**Paul Newham, Stanmore, and Bernard J. Andrews, Garston, both of England, assignors to The Marconi Company Limited, England**

**Continuation of Ser. No. 156,281, Feb. 16, 1988, abandoned. This application Feb. 5, 1990, Ser. No. 475,032**

**Claims priority, application United Kingdom, Mar. 25, 1986, 8607352**

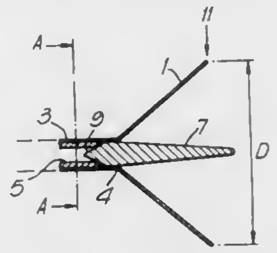
**Int. Cl.$^5$ H01Q** *13/00*

U.S. Cl. 343—785 4 Claims

1. A wideband antenna providing a directional beam whose width is generally independent of frequency over a broad frequency range, the antenna comprising;

(a) a generally conical horn symmetrical about an axis, said horn including a throat having a diameter of approximately 16 millimeters, an aperture having a diameter lying substantially in the range 60 millimeters to 140 millimeters and a flare angle between said throat and said aperture of approximately 60°;

(b) a waveguide feed coupled directly to said throat; and



(c) a dielectric rod having a dielectric constant lying substantially in the range 2.1 to 2.5, said rod extending symmetrically about said axis from said waveguide feed to a point just beyond said aperture and being tapered toward said axis from said throat to said aperture so that at said aperture the rod has a diameter lying substantially in the range 5 millimeters to 7 millimeters.

---

5,017,938

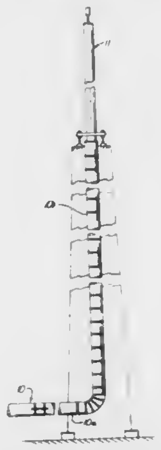
### UHF-TV BROADCAST SYSTEM HAVING CIRCULAR, NON-COAXIAL WAVEGUIDE TRANSMISSION LINE FOR OPERATION IN THE $TE_{11}$ MODE

**Geza Dienes, Claremont, Calif., assignor to Andrew Corporation, Orland Park, Ill.**

**Continuation of Ser. No. 178,244, Apr. 6, 1988, abandoned. This application May 1, 1990, Ser. No. 517,427**

**Int. Cl.$^5$ H01Q** *9/34;* **H01P** *1/162*

U.S. Cl. 343—874 17 Claims



1. A UHF-TV broadcast system, comprising:

an antenna mounted on an elevated supporting structure for broadcasting UHF-TV signals to a prescribed region,

a transmission line having a vertical run leading to said antenna, a substantial portion of the vertical run of said transmission line comprising a circular non-coaxial waveguide having a longitudinal axis and having an inside diameter large enough to support the propagation of electromagnetic energy therethrough in at least the circular, non-coaxial $TE_{11}$ mode, said waveguide in the vertical run having side walls constructed such that at least portions thereof would permit the generation of $TE_{11}$ mode energy that is cross-polarized relative to a desired polarization but said side walls would not permit the escape of cross-polarized energy in the non-coaxial $TE_{11}$ mode through said side walls, and

a multiplicity of conductive elements extending transversely across the interior of said waveguide portions perpendicular to the electric field vector of $TE_{11}$ mode energy having said desired polarization for suppressing the generation of, rather than removing unwanted $TE_{11}$ mode energy that is cross-polarized relative to said desired polarization said conductive elements being located at intervals along the length of said waveguide portions that would otherwise permit the generation of $TE_{11}$ mode energy that is cross-polarized relative to said desired polarization.

---

5,017,939

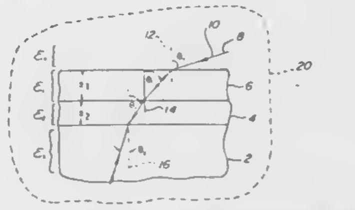
### TWO LAYER MATCHING DIELECTRICS FOR RADOMES AND LENSES FOR WIDE ANGLES OF INCIDENCE

**Te-Kao Wu, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Sep. 26, 1989, Ser. No. 412,703**

**Int. Cl.$^5$ H01Q** *15/008, 19/060, 1/420*

U.S. Cl. 343—911 R 6 Claims



1. A multi-layered structure having a base or support member for receiving and passing incident electromagnetic energy to and from an adjacent ambient dielectric medium, said multi-layered structure comprising:

a first impedance matching layer in contact with said adjacent ambient dielectric medium, said first impedance matching layer having a permittivity higher than that of said adjacent ambient dielectric medium;

a second impedance matching layer in contact with said first impedance matching layer, said second impedance matching layer having a permittivity higher than that of said first impedance matching layer, wherein said permittivity of said second impedance matching layer is greater than a square root of said permittivity of said support or base member, and, wherein said permittivity of said first impedance matching layer divided by said permittivity of said second impedance matching layer is equal to the square root of said permittivity of said adjacent ambient dielectric medium divided by the square root of said permittivity of said support or base member, wherein said permittivity of said second impedance matching layer is 3 times the permittivity of said adjacent ambient dielectric medium, $(3^{*}\epsilon_0)$, wherein said permittivity of said first impedance matching layer is 1.5 times the permittivity of said adjacent ambient dielectric medium $(1.5^{*}\epsilon_0)$, wherein said second impedance matching layer has a thickness of 0.833 centimeters (cm), and wherein said first impedance matching layer has a thickness of 1.441 centimeters (cm);

said support or base member being in contact with said second impedance matching layer, said base member having permittivity higher than that of said second impedance matching layer wherein said permittivity of said support or base member is 4 times (*) the permittivity of said adjacent ambient dielectric medium $(4^{*}\epsilon_0)$; and

said multi-layered structure providing a substantially optimized transmission bandwidth for both transverse electric and transverse magnetic polarizations of said electromagnetic energy for wide angles of incidence.

---

5,017,940

### ELECTROMAGNETIC WAVE REFLECTOR FOR AN ANTENNA AND ITS PRODUCTION METHOD

**Jean-Paul Rigollet, Paris, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France**

**Filed Dec. 19, 1989, Ser. No. 452,776**

**Claims priority, application France, Dec. 21, 1988, 88 16916**

**Int. Cl.$^5$ H01Q** *15/14*

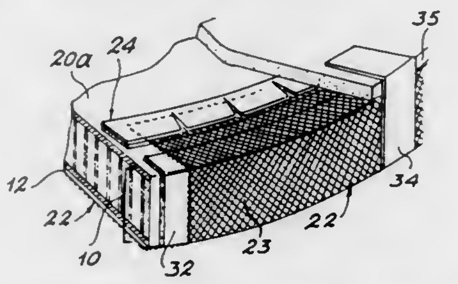
U.S. Cl. 343—912 9 Claims

1. A method for producing a radio electromagnetic wave reflector of the type comprising a rigid curved support provided with a convex active front face and a rear face, a dielec-

VOL
1126
ISS
3
MY
21
1991
UMI

tric and heat-insulating paint coating the support front face, a stretched electrical conductive knitting for reflecting an electromagnetic wave and covering the heat-insulating paint, said knitting comprising a convex active face of the reflector and having a mesh diameter of less than λ/8, and means for securing the knitting to the support, the steps of:

(a) mounting the securing means to the support rear face,
(b) placing on the support front face over the heat-insulating paint a knitting whose size is larger than that of the front face,
(c) stretching said knitting over the entire periphery of the reflector and implanting needles in the stretched knitting at the periphery of the support,



(d) stretching the knitting at a specific distance from the needles and outside the support so that it overcasts said support,
(e) folding down a non-overcast knitting section onto the rear face of the support,
(f) securing said non-overcast knitting section onto the support rear face with the aid of said securing means, and
(g) removing the needles.

---

5,017,941

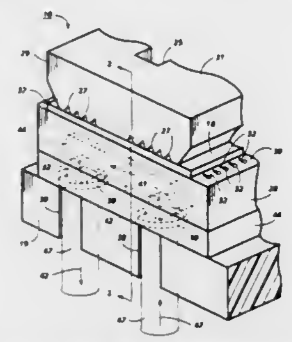
### THERMAL INK JET PRINTHEAD WITH RECIRCULATING COOLING SYSTEM

**Donald J. Drake, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 6, 1989, Ser. No. 432,247**

**Int. Cl.$^5$ B41J** *2/05*

**U.S. Cl. 346—1.1** **14 Claims**



1. An improved thermal ink jet printhead of the type having a channel plate with recesses therein which serve as an ink supply manifold, a plurality of ink channels that communicate with the ink supply manifold, and a plurality of nozzles, when aligned and fixedly mated to one of the opposing surfaces of a heater plate, said heater plate surface contacting the channel plate having a linear array of heating elements, one for each nozzle, the printhead ejecting ink droplets on demand by the selective energization of the heating elements with electrical energy pulses having sufficient magnitude to vaporize instantaneously the ink in contact with the energized heating element, so that temporary vapor bubbles are formed which eject said ink droplets, wherein the improvement comprises:

providing a groove with a bottom in the heater plate surface opposite the one having the heating elements, the groove being aligned with and parallel to the heating elements, the bottom of the groove being a predetermined distance form the heating elements; and

bonding a sealing plate containing a pair of openings therethrough to the heater plate surface having the groove to form a passageway with the sealing plate openings serving as inlet and outlet thereto for the circulation of a cooling fluid therethrough to prevent temperature fluctuation during the printing operation.

---

5,017,942

### INK RIBBON CASSETTE AND RECORDING APPARATUS WHICH CAN BE LOADED WITH THE INK RIBBON CASSETTE

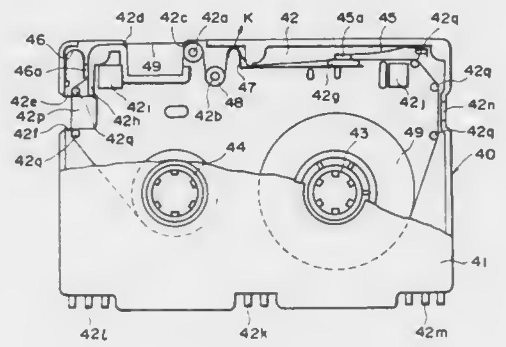
**Osamu Asakura, Tokyo; Yoshio Uchikata, Yokohama; Kenji Kawazoe, and Yuji Kanome, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

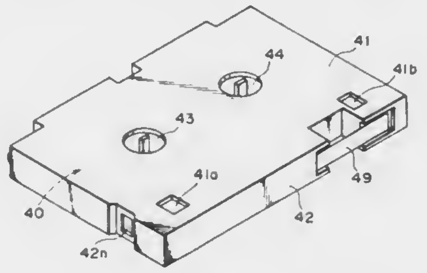
**Continuation of Ser. No. 158,671, Feb. 22, 1988, abandoned. This application Jul. 17, 1990, Ser. No. 553,370**

**Claims priority, application Japan, Feb. 27, 1987, 62-043091; Jun. 26, 1987, 62-159428; Dec. 4, 1987, 62-307326; Dec. 4, 1987, 62-307327; Dec. 4, 1987, 62-307328**

**Int. Cl.$^5$ G01D** *15/10;* **B41J** *35/28*

**U.S. Cl. 346—76 PH** **12 Claims**





1. An ink ribbon cassette which is adapted to be detachably loaded on a recording apparatus having a recording head capable of recording information on a recording medium supported by a platen, said ink ribbon cassette comprising a substantially box-shaped casing having by an upper case and a lower case which are connected to each other at their vertical walls, said casing having a first side wall facing said platen and a second side wall opposing said first side wall, a recessed portion formed in one end of said first side wall and capable of receiving said recording head, engaging portion provided on said second side wall and adapted for engagement with retaining member on said recording apparatus, a pair of through holes constituted by pairs of apertures formed in the portions of said upper and lower cases adjacent to said first side wall, said through holes being adapted for receiving locating members on said recording apparatus so as to locate said ink ribbon cassette, and an ink ribbon extended along said first side wall so as to avert said ink ribbon from said pair of through holes.

5,017,943

### THERMAL TRANSFER TYPE COLOR PRINTER

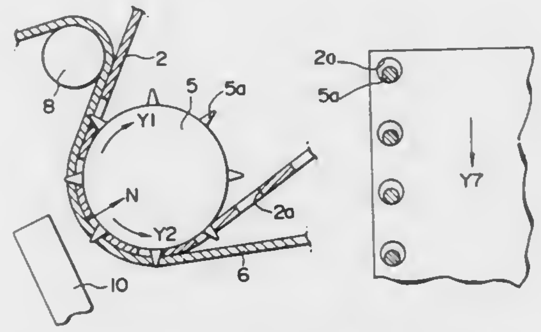
**Hiromitsu Ogita, and Akikazu Toida, both of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan**

**Filed Dec. 9, 1988, Ser. No. 282,302**

**Claims priority, application Japan, Dec. 9, 1987, 62-311615; Dec. 9, 1987, 62-311616**

**Int. Cl.$^5$ G01D** *15/24;* **B41J** *15/24;* **G03B** *1/24*

**U.S. Cl. 346—76 PH** **2 Claims**



1. A thermal transfer type color printer comprising:

(a) an ink film supply roll for supplying an ink film on which plural color inks are painted in turn;
(b) a winding roll for winding up said ink film;
(c) a platen roller for transporting a printing paper, said printing paper being partially wound around an outer peripheral face of said platen roller, while said ink film being partially wound around said platen roller via said printing paper;
(d) a thermal head which can be pressed against and separated from said platen roller, said thermal head being pressed against said platen roller by putting said ink film and printing paper therebetween so that heat applied by said thermal head melts and transfers said color ink on said printing paper during color printing, said thermal head being separated from said platen roller after performing the color printing;
(e) tension applying means for applying tension force to said ink film between said ink supply roll and said thermal head only while said thermal head is pressed against said platen roller, said tension applying means including a frictional clutch mounted to a holding shaft of said ink film supply roll, said frictional clutch working to thereby apply the tension force to said ink film at only a time when said thermal head is pressed against said platen roller, said tension applying means further including tension control means which contains actuator means and a lever having a projection at its tip edge portion, while said frictional clutch including a frictional board and frictional member, said frictional board having plural teeth on its outer peripheral face and revolving around said holding shaft, said actuator means being activated so that said projection of the lever is moved to be matched with one or concave portions between said teeth of the frictional board during the color printing, whereby frictional force generated between said frictional board and said frictional member controls and intermittently stops revolution of said ink film supply roll via said frictional board so that the tension force is applied to said ink film during the color printing.

---

5,017,944

### CONTROL SYSTEM FOR INFORMATION RECORDING LASER BEAM

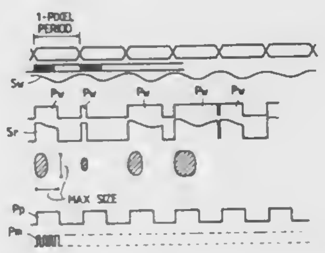
**Hiroki Kitamura, Tokyo; Itsuo Takanashi, Kamakura; Takashi Yamamura, Yokohama; Toshikatsu Ichiton, Kawasaki, and Hiromichi Tai, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Mar. 1, 1990, Ser. No. 486,834**

**Claims priority, application Japan, Mar. 6, 1989, 1-53243; Jul. 25, 1989, 1-192058**

**Int. Cl.$^5$ H04N** *1/21*

**U.S. Cl. 346—108** **7 Claims**



1. A control system for an information recording laser beam, comprising:

means for varying an intensity of a laser beam in a predetermined variation pattern during each of sequential one-pixel periods;
means for periodically activating and deactivating the laser beam in synchronism with a change of the one-pixel periods; and
means for controlling a duration of said activating the laser beam within each of the one-pixel periods in accordance with a density of each pixel of an image to be recorded.

---

5,017,945

### METHOD OF AN APPARATUS FOR RECORDING IMAGES, WHILE AVOIDING DAMAGE DUE TO PROLONGED CONTACT BETWEEN PLATEN AND RECORDING DEVICE

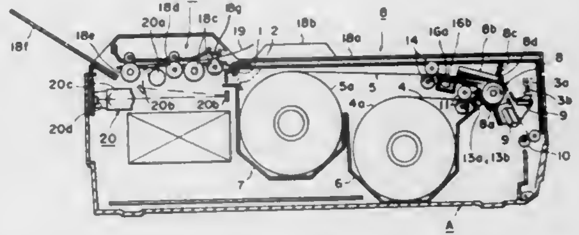
**Keizo Sasai, Yokohama; Kenkichi Sakuragi, Tokyo; Mitsunori Nakamura, Kawasaki; Akio Ohkubo, Tokyo, and Motoaki Yoshino, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 434,550, Nov. 13, 1989, abandoned, which is a continuation of Ser. No. 94,902, Sep. 10, 1987, abandoned. This application May 16, 1990, Ser. No. 524,672**

**Claims priority, application Japan, Sep. 11, 1986, 61-212797; Oct. 27, 1986, 61-253779; Jul. 8, 1987, 62-170455; Jul. 9, 1987, 62-169714**

**Int. Cl.$^5$ G01D** *15/24*

**U.S. Cl. 346—136** **34 Claims**



9. An apparatus for recording an image based on received image information, having a recording section, and in which a recording sheet unwound from one of first and second different-sized sheet rolls is fed to said recording section including a recording head to record an image onto the recording sheet in accordance with image information, said apparatus comprising an arrangement in which one of the first and second sheets is set to a predetermined position in said recording section,

VOL
126
ISS
3
MY
21
1991
UMI

wherein said recording section further includes a platen in which a desired one of the first and second recording sheets that is subjected to recording is set between said platen and said recording head after recording by one communication unit onto the recording sheet is completed.

---

### 5,017,946

### INK JET RECORDING HEAD HAVING SURFACE TPEATMENT LAYER AND RECORDING EQUIPMENT HAVING THE HEAD

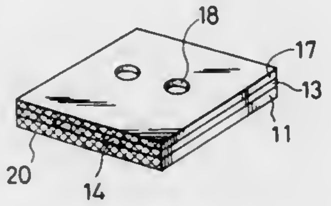
**Kazuaki Masuda, Sagamihara; Akio Saito, Yamato; Toshio Kashino, Chigasaki, and Takashi Watanabe, Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 382,219, Jul. 20, 1989, abandoned. This application Apr. 24, 1990, Ser. No. 512,606**

**Claims priority, application Japan, Jul. 21, 1988, 63-180312; Jul. 21, 1988, 63-180313**

**Int. Cl.$^5$ B41J** *2/14, 2/05*

**U.S. Cl. 346—140 R** **12 Claims**



1. An ink jet recording head having ink-liquid-repellent surface treatment portions close to the discharging ports, wherein said ink-liquid-repellent treatment surface portions are formed by polymerizing and curing a composition containing a fluorine type polymer with a molecular weight of 2,000 or more which is insoluble in water and soluble in organic solvent and a polyfunctional monomer and/or a polyfunctional oligomer having two or more (meth)acryloyl groups in the molecule through a silane coupling agent.

---

### 5,017,947

### LIQUID EJECTION RECORDING HEAD HAVING A SUBSTRATE SUPPORTING A WALL PORTION WHICH INCLUDES SUPPORT WALLS TO FORM OPEN CHANNELS THAT SECURELY BOND A LID MEMBER TO THE WALL PORTION

**Kazuaki Masuda, Hiratsuka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 240,483, Sep. 6, 1988, abandoned, which is a continuation of Ser. No. 57,741, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 711,181, Mar. 13, 1985, abandoned. This application Aug. 14, 1989, Ser. No. 394,166**

**Claims priority, application Japan, Mar. 31, 1984, 59-64106**

**Int. Cl.$^5$ B41J** *2/05*

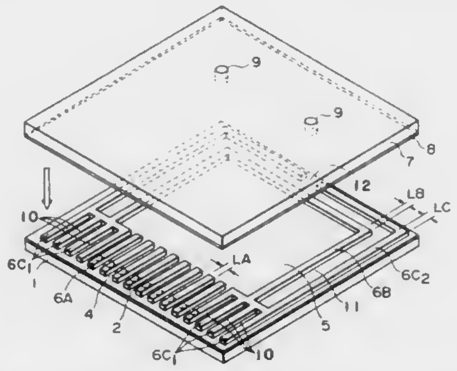
**U.S. Cl. 346—140 R** **41 Claims**

1. A liquid ejection recording head comprising a supporting substrate, a lid member and a wall portion between said supporting substrate and said lid member, wherein:

said wall portion includes a number of adjacent wall members;

a first plurality of said wall members comprises an array of flow path walls forming flow paths having heat generating elements associated therewith, said flow paths being disposed in communication with a liquid chamber and with the exterior of the recording head at orifices for discharging liquid upon actuation of said heat generating elements;

a second plurality of said wall members comprises plural support walls disposed at each side of said array and spaced from said array to form open channels; and



said wall portion and said lid member include cured films of photosensitive resin.

---

### 5,017,948

### INK JET RECORDING DEVICE WITH THERMAL ENERGY ADJUSTMENT

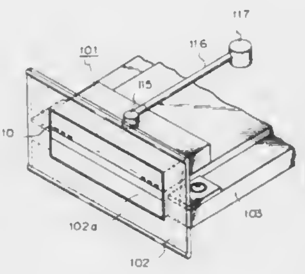
**Ryoichi Koizumi, Hiratsuka; Hideaki Kishida, Yamato, and Akira Katayama, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

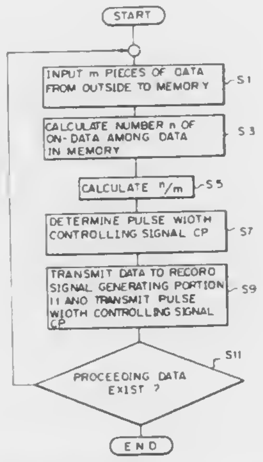
**Continuation of Ser. No. 410,010, Sep. 20, 1989, abandoned, which is a continuation of Ser. No. 276,034, Nov. 25, 1988, abandoned. This application Apr. 24, 1990, Ser. No. 512,600**

**Claims priority, application Japan, Nov. 27, 1987, 62-297794; Nov. 27, 1987, 62-297795**

**Int. Cl.$^5$ B41J** *2/05*

**U.S. Cl. 346—140 R** **29 Claims**




START
INPUT m PIECES OF DATA FROM OUTSIDE TO MEMORY
S1
CALCULATE NUMBER n OF ON-DATA AMONG DATA IN MEMORY
S3
CALCULATE n/m
S5
DETERMINE PULSE WIDTH CONTROLLING SIGNAL CP
S7
TRANSMIT DATA TO RECORD SIGNAL GENERATING PORTION 11 AND TRANSMIT PULSE WIDTH CONTROLLING SIGNAL CP
S9
PROCEEDING DATA EXIST ?
S11
END

1. An ink jet recording apparatus comprising:

plural energy generating means for generating energy used for discharging an ink;

detecting means for detecting the number of said energy generating means actuated at the same time;

adjusting means for adjusting a voltage value of the actuating pulse applied, corresponding to a result detected by said detecting means, to said energy generating means.

---

### 5,017,949

### TABLE ASSEMBLY FOR PATTERN DRAWING APPARATUS

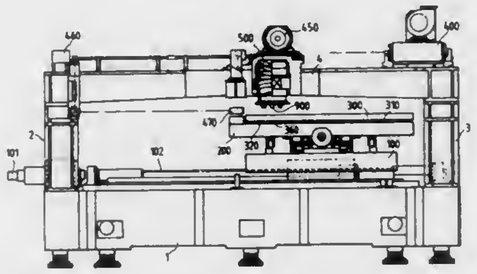
**Hiroaki Andoh; Michio Ohshima; Yuji Matsui; Takashi Okuyama; Toshitaka Yoshimura; Hidetaka Yamaguchi; Yasushi Ikeda; Jun Nonaka; Tamihiro Miyoshi; Mitsuo Kakimoto; Masatoshi Iwama; Hideyuki Morita; Satoru Tachihara; Akira Morimoto, and Akira Obwaki, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan**

**Filed Dec. 1, 1989, Ser. No. 444,245**

**Claims priority, application Japan, Dec. 1, 1988, 63-304784**

**Int. Cl.$^5$ G03B** *41/00*

**U.S. Cl. 354—4** **9 Claims**



8. A table assembly for a pattern drawing apparatus, comprising:

a first master table;

first mounting means for mounting said master table to be slidable in one direction with respect to a fixed portion of said table assembly;

first drive means for causing said first master table to slide in said one direction, said first drive means being directly linked to said first master table;

a first working table;

second mounting means for mounting said first working table to be slidable in said one direction with respect to said fixed portion;

first connecting means having rigidity in said one direction and elasticity in a direction perpendicular to said one direction for linking said first working table to said first master table;

a second master table;

third mounting means for mounting said second master table to be slidable with respect to said first master table in a direction perpendicular to said one direction;

second drive means for causing said second master table to slide in said direction perpendicular to said one direction, said drive means being directly linked to said second master table;

a second working table;

fourth mounting means for mounting said second working table to be slidable with respect to said first master table in said direction perpendicular to said one direction; and

second connecting means having rigidity in said direction perpendicular to said one direction and elasticity in said one direction for linking said second working table to said second master table.

---

### 5,017,950

### VARIABLE-CAPACITANCE DIODE ELEMENT HAVING WIDE CAPACITANCE VARIATION RANGE

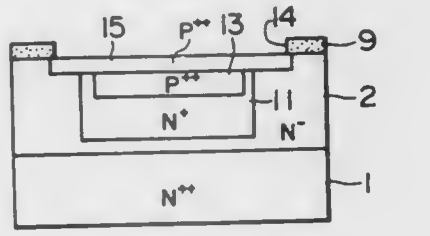
**Takeshi Kasahara, Saitama, Japan, assignor to Toko, Inc., Tokyo, Japan**

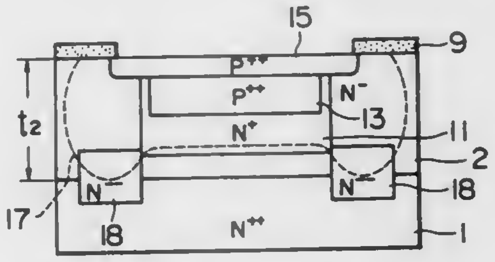
**Filed Jan. 17, 1990, Ser. No. 466,204**

**Claims priority, application Japan, Jan. 19, 1989, 1-10885; Jan. 30, 1989, 1-20496**

**Int. Cl.$^5$ H01L** *29/92*

**U.S. Cl. 357—14** **2 Claims**





1. A variable-capacitance diode element, comprising:

a semiconductor substrate of a first conductivity type having an epitaxial layer of the first conductivity type provided on a major surface thereof, said epitaxial layer having a higher resistivity than that of said semiconductor substrate:

a first diffusion layer of the first conductivity type which is diffused in said epitaxial layer said first diffusion layer having a lower resistivity than that of said epitaxial layer;

a second diffusion layer of a second conductivity type which is surrounded by said first diffusion layer, said second diffusion layer having a shorter diffusion depth than that of said first diffusion layer and a lower resistivity than that of said first diffusion layer; and

a third diffusion layer of the second conductivity type which is diffused in said epitaxial layer, said third diffusion layer covering an exposed portion of a major surface of said first diffusion layer and an exposed portion of a major surface of said second diffusion layer, said third diffusion layer having a shorter diffusion depth than that of said second diffusion layer.

---

### 5,017,951

### PHOTOGRAPHIC PROCESSING APPLICATION WITH REPLACEABLE CASSETTE

**Jozef P. De Prijcker, Hamme; Jan A. Zwijsen, Wilrijk; Albrecht F. Domen, Bornem, and Gino L. De Rycke, Mortsel, all of Belgium, assignors to Agfa-Gevaert, N.V., Mortsel, Belgium**

**Division of Ser. No. 333,020, Apr. 4, 1989, Pat. No. 4,967,221. Filed Apr. 10, 1990, Ser. No. 521,886**

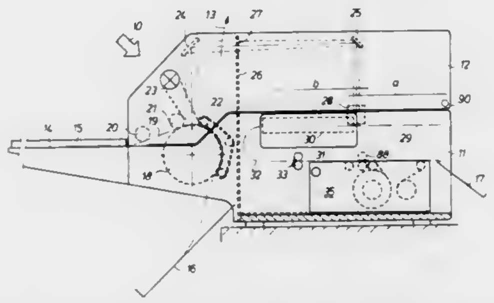
**Int. Cl.$^5$ G03B** *27/52*

**U.S. Cl. 355—27** **6 Claims**

1. Photographic image-forming apparatus which comprises an exposure station for the imagewise exposure of a photographic silver halide emulsion layer element, a developing station wherein a silver halide developer liquid is applied to said imagewise exposed element, and a fixing station wherein a silver halide fixing agent is applied to the imagewise exposed element, and driving means for transporting said element through the stations in sequence, wherein at least said develop-

VOL
1126
ISS
3
MY
21
1991
UMI

ing station is incorporated into a processing cassette that contains developer liquid and removably fits into said apparatus, said cassette houses absorption means effective for absorbing unused developer liquid brought into contact therewith, and



said apparatus comprises means operable in association with the processing cassette for bringing unused developer liquid in said cassette into contact with said absorption means when the cassette is removed from the apparatus.

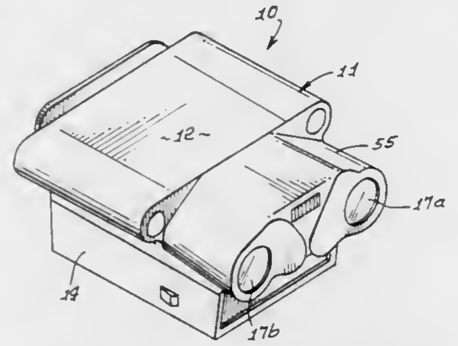
### 5,017,952
### COMBINATION CAMERA TO PRODUCE MULTIPLE PRINTS, AND PRINT VIEWING DEVICE

**Douglas E. Wheeler, 1715 Enclave Pky., Apt. 307, Houston, Tex. 77077**

**Filed Feb. 12, 1990, Ser. No. 478,454**

**Int. Cl.$^5$ G03B** *29/00*

**U.S. Cl. 354—76** **22 Claims**



1. In a combination camera to produce a print or prints from film, and print viewing device,

(a) a housing, and multiple light paths in the housing,
(b) a film receiving zone associated with the housing,
(c) a print receiving zone associated with the housing,
(d) a viewing channel associated with the housing,
(e) and mirror means in the housing to reflect light received from an object to pass via one of said light paths to said film at the film receiving zone for exposing said film, and to reflect light from an illuminated print at the print receiving zone to pass via another of said light paths for viewing, via said viewing channel.

---

### 5,017,953
### AUTOMATIC PHOTOGRAPHIC APPARATUS AND AUTOMATIC FRAME DISPENSING MACHINE

**John V. Biondo, Jr., North Hollywood, Calif., assignor to PVI, Inc., La Cienga Place, Calif.**

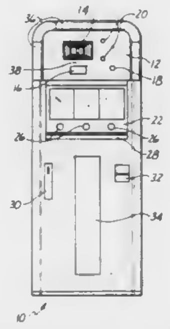
**Continuation-in-part of Ser. No. 277,297, Nov. 29, 1988, Pat. No. 4,891,660. This application Jun. 14, 1989, Ser. No. 366,664**

**Int. Cl.$^5$ G03B** *17/50*

**U.S. Cl. 354—83** **14 Claims**

1. An automatic photographic apparatus for use in combination with a plurality of self-developing film cartridges containing film comprising:

a camera for said self-developing film cartridges;
a film back body coupled to said camera and being accessible for film loading;
a film storage means for storing a plurality of film cartridges in a plurality of stacks; and
nonreciprocating film loading means for conveying film cartridges from said film storage means to said film back body, and for loading said film cartridge into said film body for exposure of film within said cartridge by said camera, said film loading means comprising a continuous and nonreversing belt with a plurality of tabs disposed under said plurality of stacks of said film cartridges, said tabs being arranged and configured to contact successive ones of said film cartridges from said film storage means, said tabs and continuous belt moving said film cartridges into operative position with respect to said film back body without said film cartridges necessarily contacting one another,
whereby said apparatus is adaptable to automatically taking a plurality of self developed photographs.



---

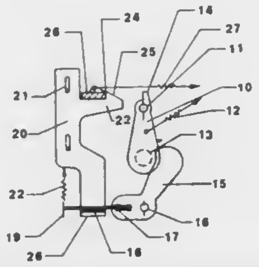
### 5,017,954
### CAMERA SHUTTER WITH THERMAL ACTUATOR

**Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 12, 1990, Ser. No. 478,904**

**Int. Cl.$^5$ G03B** *9/08*

**U.S. Cl. 354—234.1** **14 Claims**



1. An electrically operated photographic shutter including a moveable element for blocking and unblocking an exposure aperture comprising:

bimetallic means which bends in response to heating,
means connecting said bimetallic means to said moveable means to operate said element, and
electric circuit means for heating said bimetallic means.

---

### 5,017,955
### AUTOFOCUS CAMERA WITH FLASH UNIT

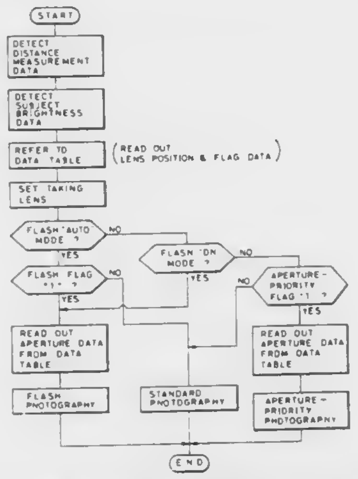
**Takaaki Kotani, Tokyo, Japan, assignor to Fuji Pboto Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 18, 1990, Ser. No. 467,134**

**Claims priority, application Japan, Jan. 18, 1989, 1-9193**

**Int. Cl.$^5$ G03B** *13/36, 7/16, 15/05*

**U.S. Cl. 354—400** **10 Claims**


START
DETECT DISTANCE MEASUREMENT DATA
DETECT SUBJECT BRIGHTNESS DATA
REFER TO DATA TABLE
(READ OUT LENS POSITION & FLAG DATA)
SET TAKING LENS
FLASH "AUTO" MODE ?
NO
YES
FLASH "ON" MODE ?
NO
YES
FLASH FLAG "1" ?
NO
YES
APERTURE-PRIORITY FLAG "1" ?
NO
YES
READ OUT APERTURE DATA FROM DATA TABLE
READ OUT APERTURE DATA FROM DATA TABLE
FLASH PHOTOGRAPHY
STANDARD PHOTOGRAPHY
APERTURE-PRIORITY PHOTOGRAPHY
END

1. A camera having lens positioning means for adjusting a lens position of a taking lens, and a flash unit for emitting flash light, comprising:

a distance measuring device for generating distance measurement data representative of a subject distance;
light measuring means for generating data representative of a subject brightness;
a data table memory having data areas being addressed by a combination of said distance measurement data and said subject brightness data, each said data area storing lens position data for positioning said taking lens and flash flag data of a first or second condition, said flash flag data instructing in the first condition to execute flash photography and in the second condition not to execute flash photography; and
control means for controlling said lens positioning means and said flash unit in accordance with said data read out from said data table memory.

---

### 5,017,956
### FLASH PHOTOGRAPHY SYSTEM

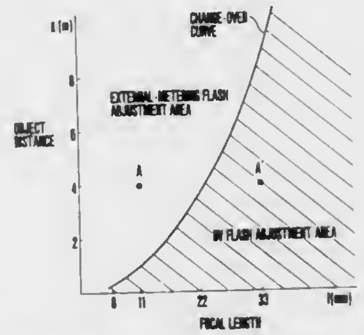
**Yoshitaka Murata, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 17, 1989, Ser. No. 297,438**

**Claims priority, application Japan, Jan. 18, 1988, 63-007895; Jan. 18, 1988, 63-007896; Jan. 18, 1988, 63-007897; Jan. 18, 1988, 63-007898; Jan. 18, 1988, 63-007899**

**Int. Cl.$^5$ G03B** *7/00, 15/05*

**U.S. Cl. 354—416** **11 Claims**



1. A flash photography system having a first mode in which flash photography is carried out by adjusting a flash exposure amount adjusting factor according to a distance to an object to be photographed and a second mode in which flash photography is carried out by adjusting the amount of flash exposure independently of the object distance comprising:

a) an object distance signal forming circuit for forming an object distance signal indicative of the object distance;
b) a focal length signal forming circuit for forming a focal length signal indicative of a focal length; and
c) a change-over circuit, arranged to detect said object distance signal and said focal length signal, for selecting one of said first mode or said second mode according to a combination of said object distance signal and said focal length signal.

---

### 5,017,957
### EXPOSURE CONTROL DEVICE FOR A CAMERA

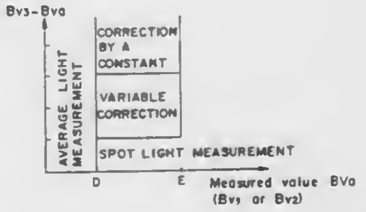
**Masaaki Nakai, Kawachinagano; Shuji Izumi; Akihiko Fujino, both of Sakai; Nobuyuki Taniguchi, Nishinomiya; Toshio Yamaki, Osaka, and Hiromu Mukai, Kawachinagano, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 298,128, Jan. 17, 1989, Pat. No. 4,937,610, which is a continuation of Ser. No. 905,267, Sep. 9, 1986, Pat. No. 4,821,074. This application May 18, 1990, Ser. No. 524,909**

**Claims priority, application Japan, Sep. 9, 1985, 60-200277; Sep. 9, 1985, 60-200278; Sep. 9, 1985, 60-200279; Sep. 9, 1985, 60-200280; Sep. 10, 1985, 60-201126**

**Int. Cl.$^5$ G03B** *7/08*

**U.S. Cl. 354—429** **5 Claims**



1. A light measuring device comprising:

first means for measuring a brightness of a first area in an object field to produce a first brightness signal indicative of the measured brightness of the first area;
second means for measuring a brightness of a second area in the object field to produce a second brightness signal indicative of the measured brightness of the second area;
means for detecting whether a second brightness represented by the second brightness signal is higher than a predetermined highest brightness; and
means for calculating a brightness of the object field in accordance with the first and second brightness signals when the detecting means detects that the second brightness is not higher than the predetermined highest brightness, and for calculating a brightness of the object field in accordance with the first brightness signal and the predetermined highest brightness when the detecting means detects that the second brightness is higher than the predetermined highest brightness.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,017,958
### IMAGE FORMING APPARATUS HAVING CONTROL UNIT FOR REWINDING OPERATION OF PHOTOSENSITIVE RECORDING MEDIUM

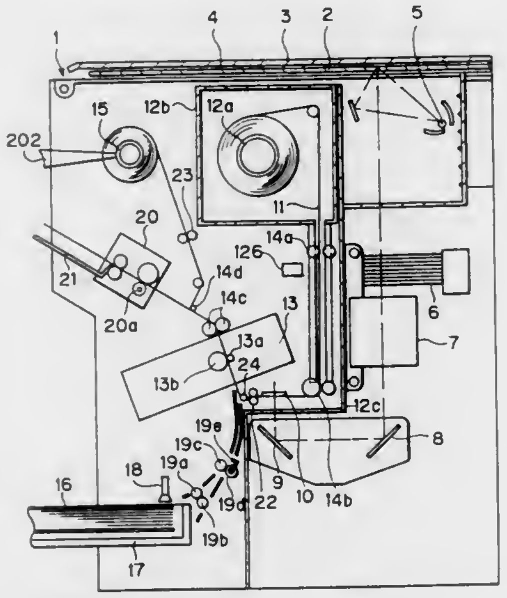
**Tokunori Katoh, Icbinomiya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan**

**Filed Sep. 6, 1990, Ser. No. 578,261**

**Claims priority, application Japan, Sep. 14, 1989, 1-108107[U]; Nov. 21, 1989, 1-302803**

**Int. Cl.$^5$ G03B** *27/32, 27/52*

**U.S. Cl. 355—27** **8 Claims**



1. An image forming apparatus for performing a series of image forming operations in which a photosensitive recording medium is exposed to light to form a latent image on the photosensitive recording medium and superposed over a developer medium under pressure to develop the latent image on the photosensitive recording medium into a visible image on the developer medium, comprising:

- exposing means for exposing the photosensitive recording medium to an image light to form a latent image thereon in a first exposure process;
- pressure-developing means for superposing the photosensitive recording medium having the latent image thereon over a developer medium under pressure, to thereby form a visible image corresponding to the latent image on the developer medium;
- sheet feeding means for feeding the photosensitive recording medium through said exposing means and said pressure-developing means in forward and reverse directions to thereby perform sheet feeding and rewinding operations, respectively, the photosensitive recording medium being fed back in the rewinding operation after pressure-developed by said pressure-developing means to dispose an unexposed area of the photosensitive recording medium in the first exposure process to a predetermined position where the unexposed area is subjected to a second exposure process subsequent to the first exposure process; and
- control means for ceasing all of the image forming operations when any abnormality occurs during at least one of the image forming operations, wherein said control means controls said sheet feeding means to continue the sheet rewinding operation irrespective of occurrence of the abnormality if it is judged that the abnormality does not disturb the sheet rewinding operation.

---

### 5,017,959
### IMAGE FORMING APPARATUS AND MEDIA CARTRIDGE FOR USE IN THE SAME

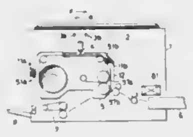
**Yoshiaki Ibuchi, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 23, 1990, Ser. No. 555,730**

**Claims priority, application Japan, Jul. 31, 1989, 1-199728; Aug. 31, 1989, 1-226416**

**Int. Cl.$^5$ G03B** *27/52*

**U.S. Cl. 355—27** **15 Claims**



1. An image forming apparatus comprising;

- a main body;
- an optical means provided in said main body for producing an exposure light of an image signal; and
- a media cartridge detachably mounted to said main body, including a supplying shaft on which unused photosensitive and pressure sensitive sheet is rolled for continuously supplying said unused sheet, an exposure section where said supplied unused sheet is exposed by said exposure light for forming a latent image on said supplied unused sheet, a pressure developing section to which an image receiver sheet is supplied and at which said receiver sheet is superposed and pressed onto said exposed sheet for pressure-developing an image onto said receiver sheet from said latent image, and a winding up shaft for winding up said used sensitive sheet.

---

### 5,017,960
### EXPOSURE OF RADIATION SENSITIVE MATERIALS

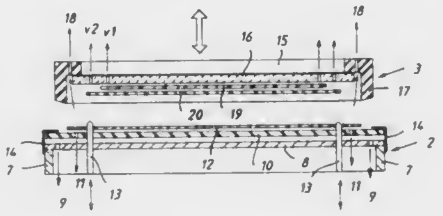
**Tanel Tuulse, Södertälje, Sweden, assignor to STD Engineering AB, Norsborg, Sweden**

**Filed Feb. 8, 1990, Ser. No. 476,957**

**Claims priority, application Sweden, Feb. 14, 1989, 8900501**

**Int. Cl.$^5$ G03B** *27/20, 27/02*

**U.S. Cl. 355—91** **7 Claims**



1. A method of image-wise exposing a radiation sensitive material which comprises the steps of:

- (i) providing a resilient blanket which is secured, at its edges, to a flexible support plate which is also secured at its edges so that the resilient blanket and the support plate can adopt a dome-like configuration,
- (ii) vacuum connecting the resilient blanket to the support plate by a blanket vacuum,
- (iii) superimposing the radiation sensitive material and an original in the form of a transparent film carrying opaque areas,
- (iv) causing the resilient blanket and the support plate to adopt said dome-like configuration by means of a contact vacuum which exerts a force stronger than the force exerted by the blanket vacuum so that the radiation sensitive material and the original are urged together by pressure firstly applied at their central areas and then over a successively widening area from the central areas towards the edges of the radiation sensitive material and of the original so as to expel form said edges of the radiation sensitive material and of the original any air present between the radiation sensitive material and the original whereby the radiation sensitive material and the original are in total contact, and
- (v) directing radiation at the radiation sensitive material through said original.

---

### 5,017,961
### IMAGE FORMING APPARATUS WITH USE OF A LASER BEAM

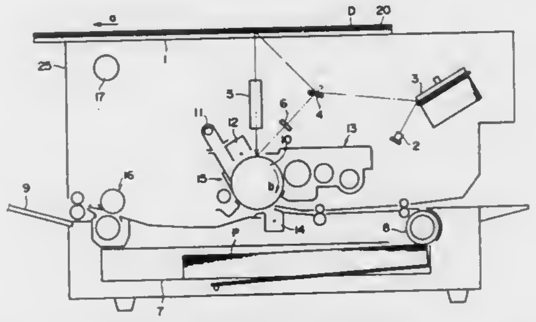
**Hirofumi Hasegawa; Naoto Ohmori; Yukio Yamada, and Narutaka Yoshida, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 29, 1989, Ser. No. 374,289**

**Claims priority, application Japan, Jun. 29, 1988, 63-162209; Aug. 23, 1988, 63-210166; Aug. 23, 1988, 63-210167**

**Int. Cl.$^5$ G03G** *21/00;* **H04N** *1/23*

**U.S. Cl. 355—202** **16 Claims**



1. An image forming apparatus, comprising:

- an original glass for supporting an original, said original glass being provided with an openable original cover;
- a rotatable photosensitive member;
- laser beam radiating means including a radiant element for radiating a laser beam and a scanning device for scanning the laser beam in a first direction;
- control means for turning on and off said radiant element to radiate a laser beam in accordance with image data;
- guiding means for guiding the laser beam radiated from said laser beam radiating means to either said original glass or alternatively to only said photosensitive member;
- optical means for projecting an image reflected from an original onto said photosensitive member; and
- scanning means for relatively scanning the reflected image in a second direction perpendicular to the first direction.

---

### 5,017,962
### IMAGE FORMING APPARATUS WITH PROCESS-CARTRIDGES

**Masaru Tsuji, Nara; Atsuyuki Katoh, Tenri, and Keizo Fukunaga, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

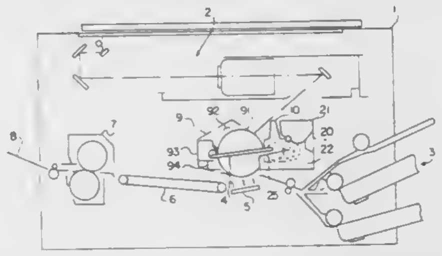
**Filed Jun. 14, 1989, Ser. No. 366,166**

**Claims priority, application Japan, Jun. 20, 1988, 63-152917**

**Int. Cl.$^5$ G03G** *15/06, 21/00*

**U.S. Cl. 355—210** **2 Claims**

1. An apparatus for the formation of images comprising two process-cartridges, one of which is a photosensitive cartridge including a photosensitive drum, a charger, a cleaning device, and the like, and the other of which is a developing cartridge including a developing device, a toner storage container, and a used toner collecting container, said developing cartridge being separated into a first cartridge including said developing device alone and a second cartridge including said toner storage container and said used toner collecting container; wherein the lifetime of said photosensitive cartridge is approximately a first integer times as long as that of said first cartridge, and the lifetime of said first cartridge is approximately a second integer times as long as that of said second cartridge, where each of said first and second integers is greater than one.



---

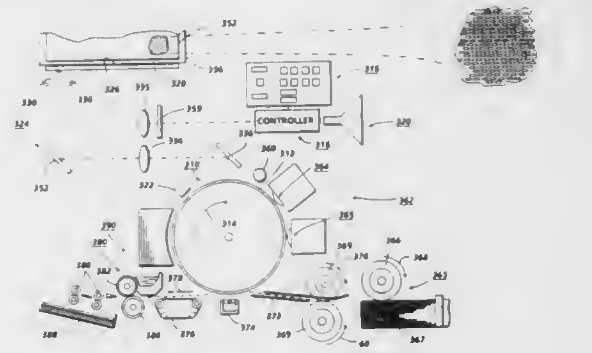
### 5,017,963
### IMAGE INPUT DEVICE PROVIDING BACKGROUND DETECTION ARRANGEMENT

**Richard W. Tuhro, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed May 7, 1990, Ser. No. 536,826**

**Int. Cl.$^5$ G03G** *15/00*

**U.S. Cl. 355—218** **36 Claims**



1. An input scanner comprising:

- an original document support;
- sensor means for providing a stream of image data indicative of sensed light intensity;
- illumination means for illuminating an original document at said original document support, and directing light reflected therefrom to said sensor means for imaging;
- means for providing relative movement between said sensor means and an original document;
- said document support means including a background member having a distinctive background patterning thereon, against which an original document is supported for illumination; and
- means for detecting said distinctive background patterning in said stream of image data, said detection indicating edges of an original document.

---

### 5,017,964
### CORONA CHARGE SYSTEM AND APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING PRESS

**Paul V. Sadwick, Dayton, Ohio, assignor to AM International, Inc., Chicago, Ill.**

**Filed Nov. 29, 1989, Ser. No. 442,880**

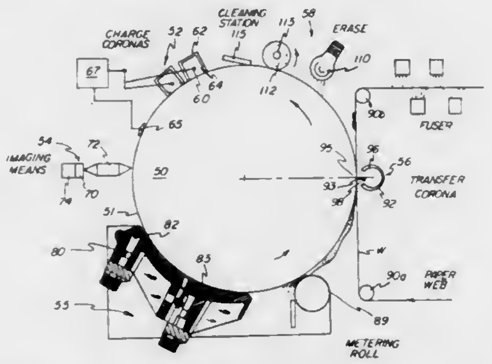
**Int. Cl.$^5$ G03G** *15/02*

**U.S. Cl. 355—219** **23 Claims**

1. High speed electrophotographic printing process of the type including a rotatable cylinder having a photoconductive surface rotating at a peripheral speed of at least about 100

VOL
1126
ISS
3
MY
21
1991
UMI

ft./min., wherein a latent electrostatic image is formed on said surface by imparting a first charge of a desired given polarity and desired potential over said surface and subsequently exposing non-image areas of said surface to dissipate said first charge in said non-image areas to form a second charge in said non-image areas of lesser potential than and common polarity with said first charge, the improvement comprising:



sensing and comparing the potential imparted by said first charge to a predetermined value, and, in response to said sensing and comparing, varying the output of a variable voltage source to adjust the potential imparted by said first charge to correspond to said desired potential.

---

### 5,017,965
### CHARGING MEMBER AND ELECTROPHOTOGRAPHIC APPARATUS USING THE SAME

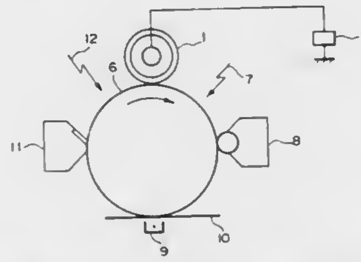
**Yuichi Hashimoto, Tokyo, and Takashi Koyama, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Japan**

**Filed Jul. 5, 1990, Ser. No. 548,221**

**Claims priority, application Japan, Jul. 5, 1989, 1-73225**

**Int. Cl.⁵ G03G** *15/02, 13/02*

U.S. Cl. 355—219 **11 Claims**



1. A charging member comprising a surface layer, which comprises a polyurethane resin prepared from a raw material for polyurethane containing an isocyanate group and a hydroxyl group; the raw material having a molar ratio between the isocyanate (NCO) group and hydroxyl group satisfying the following relationship:

$$1.0<(\text{mol of NCO group})/(\text{mol of OH group})\leqq 2.0.$$

---

### 5,017,966
### TONER CARTRIDGE AND IMAGE FORMING APPARATUS HAVING THE TONER CARTRIDGE

**Takayuki Suga, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 25, 1989, Ser. No. 426,590**

**Claims priority, application Japan, Oct. 31, 1988, 63-273058**

**Int. Cl.⁵ G03G** *15/06, 21/00*

U.S. Cl. 355—260 **23 Claims**

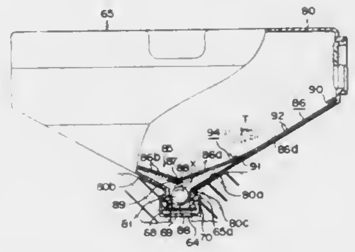
1. A toner cartridge for supplying toner to a developing device having a toner-inlet port, said toner cartridge comprising:

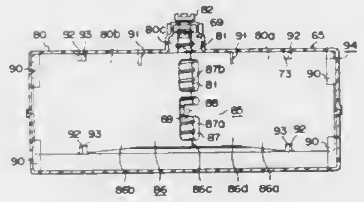
means for storing toner having at least one lower surface inclined downwardly, and a toner outlet port through which toner is supplied to the toner-inlet port of the developing device;

toner transport means located in the toner storage means, for supplying toner to the toner outlet port;

toner guiding means for guiding toner from the toner storage means to the toner transport means, said toner guiding means having an inclined plate or plates substantially superposing each lower surface of the toner storage means, and an opening formed in the lower end or ends of the inclined plate or plates, for guiding toner into the toner transport means; and

vibration means attached to the toner transport means, for vibrating the inclined plate or plates as the toner transport means operates to supply toner to the outlet port.





---

### 5,017,967
### METHOD AND APPARATUS FOR FORMING IMAGES INCLUDING A TONER TRANSPORTING MEMBER HAVING AN INSULATING LAYER

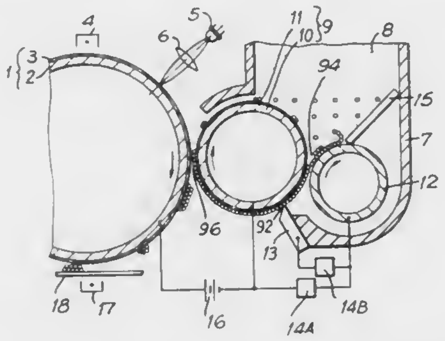
**Yoshiro Koga, Nagano, Japan, assignor to Seiko Epson Corporation, Nagano, Japan**

**Filed Apr. 11, 1989, Ser. No. 336,368**

**Claims priority, application Japan, Apr. 13, 1988, 63-91000; May 9, 1988, 63-111915**

**Int. Cl.⁵ G03G** *15/08*

U.S. Cl. 355—261 **32 Claims**



1. An image forming device, comprising:

a latent image bearing means for forming an electrostatic latent image;

at least one toner transporting means adjacent to said latent image bearing means, for transporting a toner to the latent image bearing means, said toner transporting means having a conductive support substrate and an insulating layer deposited on the conductive support substrate selected to block the effect of the charge of the conductive support substrate on the toner;

at least one conductive member adjacent to and spaced from said toner transporting means for controlling the amount of toner transported; and

a voltage generating means, said voltage generating means being connected to said conductive member adjacent to said toner transporting means, for forming an electric field between said toner transporting means and said conductive member for charging said toner.

---

### 5,017,968
### LIQUID DEVELOPMENT APPARATUS HAVING COMB-LIKE ELECTRODE

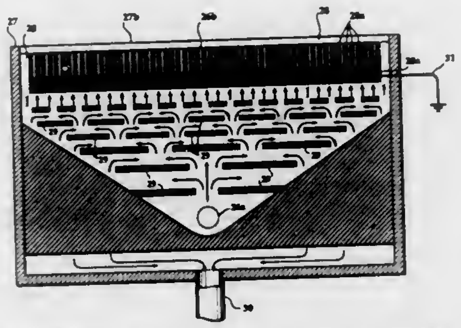
**Shinro Oikawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Nov. 21, 1989, Ser. No. 439,310**

**Claims priority, application Japan, Nov. 21, 1988, 63-295033**

**Int. Cl.⁵ G03G** *15/06*

U.S. Cl. 355—262 **8 Claims**



3. An apparatus for developing a latent electrostatic image, comprising:

a member having a smooth surface capable of having an electrostatically charged image applied thereto and capable of being driven so that said charged image moves past a development zone;

means for applying a latent electrostatically charged image to said surface of said member;

housing means for forming an inlet port, an inner slit, an inner liquid chamber communicating said inlet port to said inner slit, an outer slit located in said development zone and spaced from and aligned with said inner slit, an outlet port, and an outer liquid chamber communicating said inner slit to said outer slit and to said outlet port, said inner slit having a width larger than the width of said outer slit;

a comb-like electrode having a plurality of elements successively arranged along the length of said inner slit and biased at a potential opposite to the potential of said charged image; and

means for supplying developing liquid under pressure into said inner liquid chamber so that the supplied liquid overflows through said inner slit into said outer liquid chamber and constantly wets said outer slit to form a meniscus adjacent said charged image.

---

### 5,017,969
### DEVICE HAVING MOVABLE BELT

**Tatsuo Mitomi, and Yoshihiko Hirose, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 30, 1989, Ser. No. 357,778**

**Claims priority, application Japan, May 30, 1988, 63-131949; Jul. 15, 1988, 63-177756**

**Int. Cl.⁵ G03G** *15/16, 15/01*

U.S. Cl. 355—271 **12 Claims**

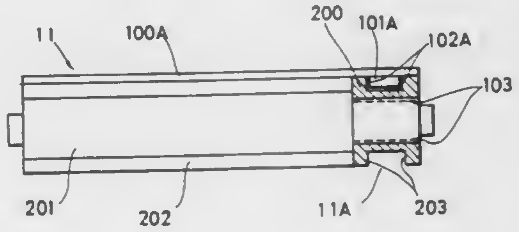
1. A device having a movable belt, comprising:

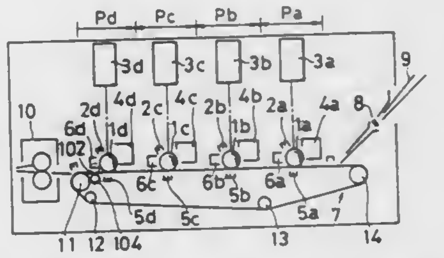
said movable belt;

at least one rotary body around which said belt is wound so as to be supported thereon; and

limiting means for limiting the movement of said belt in the axial direction of said rotary body, wherein said limiting means includes a rib formed on said belt and a groove formed in said rotary body whereby said rib is guided,

said rotary body having a limiting member in which said groove for guiding said rib is formed, the outside diameter of said limiting member in the direction perpendicular to





the axis of said rotary body being smaller than the outside diameter of said rotary body,

wherein the coefficient of friction of said limiting means at an area where the rib and the groove are in contact with each other in the direction orthogonal to the axial direction of the rotary body is smaller than the coefficient of friction between said belt and said rotary body.

---

### 5,017,970
### FIXING DEVICE WITH MOVABLE NIP REGION FOR USE IN COPIERS

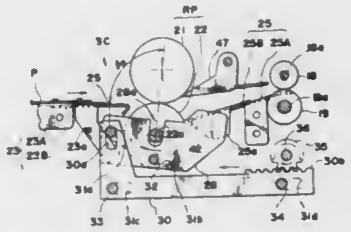
**Toshio Sakata, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

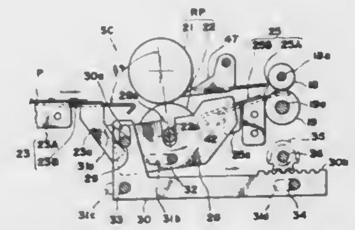
**Filed Jun. 29, 1988, Ser. No. 213,229**

**Claims priority, application Japan, Jun. 30, 1987, 62-164979; Jul. 1, 1987, 62-164175**

**Int. Cl.⁵ G03G** *15/20*

U.S. Cl. 355—290 **10 Claims**





2. A fixing device for fixing a toner image to a substrate, comprising:

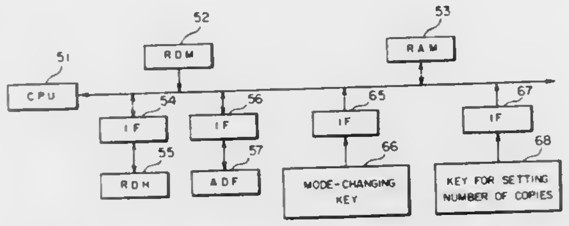
VOL
1126
ISS
3
MY
21
1991
UMI

a first rotatable member having a first axis of rotation;
a second rotatable member disposed downwardly with respect to said first rotatable member and having a second axis of rotation, said second rotatable member contacting said first rotatable member to thereby define a nip region;
means for guiding the substrate in a substrate input direction extending tangentially of said first rotatable member toward said nip region, said first rotatable member being in pressing contact with the guided substrate at a developed image side on which the developed image is formed and said second rotatable member being in pressing contact with the substrate at the side opposite to said developed image side; and
means for changing the position of said nip region relative to said substrate input direction, said means for changing the position of said nip region including means for angularly displacing said second axis of rotation about said first axis of rotation whereby said second axis of rotation remains a substantially constant distance from said first axis of rotation during angular displacement of said second axis of rotation about said first axis of rotation.

---

### 5,017,971
## EXPOSURE DEVICE FOR COPYING APPARATUS

**Yasushi Yamada, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan**
**Filed Jun. 1, 1989, Ser. No. 360,212**
**Claims priority, application Japan, Jun. 15, 1988, 63-147587**
**Int. Cl.⁵ G03G** *21/00*
**U.S. Cl. 355—313** **2 Claims**



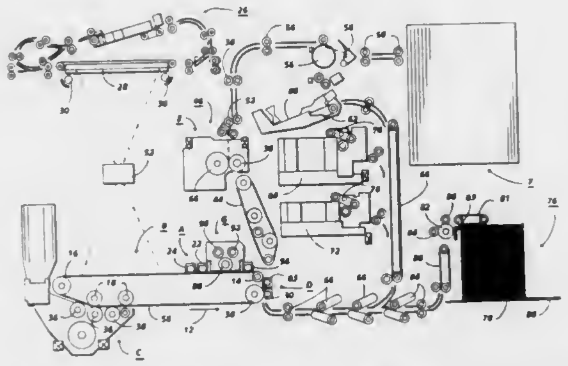
1. An exposure control device for use in copying apparatus capable of performing two kinds of exposure modes, wherein the first exposure mode is a stationary exposure mode in which information on a document is read out by moving an optical scanner while the document is kept stationary, and the second exposure mode is a synchronized exposure mode in which information on a document is read out by moving the document in synchronization with the movement of a photoreceptor while the optical scanner is kept stationary, comprising:
mode-input means for selecting either the stationary exposure mode or the synchronized exposure mode;
number-input means for setting the number of sets of copies to be copied; and
control means for determining a copy exposure mode on the basis of said mode selected by said mode-input means and said number of sets of copies set by said number-input means.

---

### 5,017,972
## ELEVATOR TRAY POSITION CONTROL APPARATUS

**John W. Daughton, Rochester; Jack E. Jones, Macedon, and Michael L. Shaffer, Walworth, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**
**Filed May 30, 1990, Ser. No. 532,282**
**Int. Cl.⁵ G03G** *21/00*
**U.S. Cl. 355—321** **18 Claims**

1. An apparatus for maintaining an outermost sheet of a stack of sheets at a selected position of the type having a tray for holding the stack, a drive system adapted to move the tray, a position sensor detecting the position of the outermost sheet of the stack, and means for controlling the drive system in response to signals received from the position sensor so as to move the outermost sheet of the stack to a predetermined location, wherein the improvement comprises:
first means for sensing the tray at a first selected position and at a second selected position, spaced from the first selected position, said first sensing means transmitting a signal to the controlling means indicating that the tray is at the first selected position or the second selected position, which inhibits movement of the tray and causes the drive system to reverse the direction of subsequent movement of the tray;
second means for sensing motion of the tray, so that a signal, indicative of movement of the tray, is sent from said second sensing means to the controlling means;
a frame, operatively associated with the tray, said frame being adapted to move in unison with the tray;



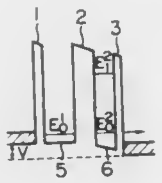
a first sensor actuator, located on said frame and extending outwardly therefrom, for positively actuating said first sensing means in response to the tray being positioned at the first selected position; and
a second sensor actuator, located on said frame and extending outwardly therefrom, for positively actuating said first sensing means in response to the tray being positioned at the second selected position; and
a plurality of uniformly spaced elements, located on said frame, to actuate said second sensing means in response to movement of the tray, so that said second sensing means transmits an alternating binary signal, indicative of movement of the tray, to the controlling means enabling the controlling means to monitor the location of the tray.

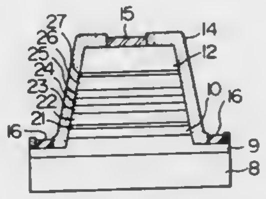
---

### 5,017,973
## RESONANT TUNNELING DEVICE

**Hiroshi Mizuta, Chofu; Tomonori Tanoue, Ebina; Chushirou Kusano, Tokorozawa, and Susumu Takahashi, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Dec. 21, 1988, Ser. No. 287,738**
**Claims priority, application Japan, Dec. 25, 1987, 62-327155**
**Int. Cl.⁵ H01L** *27/12*
**U.S. Cl. 357—4** **18 Claims**

1. A resonant tunneling device comprising:
a cathode electrode;
an anode electrode;
a super-lattice layer having an interlaminated structure comprising first, second, third and fourth barrier layers each made of a semiconductor layer having a wide energy bandgap, a first, a second and a third quantum well layers disposed in an order from said cathode electrode to said anode electrode and each made of a semiconductor layer having a narrow energy bandgap,
wherein a thickness of said third quantum well layer is larger than that of said second quantum well layer and a thickness of said first quantum well layer is larger than that of said third quantum well layer and wherein a resonant tunneling phenomenon is produced between quantum well levels formed in said quantum well layers.

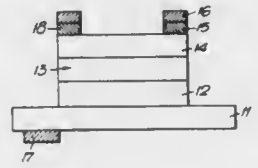


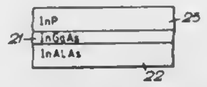


---

### 5,017,974
## OPTICAL MODULATOR WITH SUPERLATTICE HAVING ASYMMETRIC BARRIERS

**Peter D. Greene, Harlow, Great Britain, assignor to STC plc, London, England**
**Filed Apr. 26, 1990, Ser. No. 514,691**
**Claims priority, application United Kingdom, May 12, 1989, 8910993**
**Int. Cl.⁵ H01L** *49/00, 29/205*
**U.S. Cl. 357—4** **6 Claims**



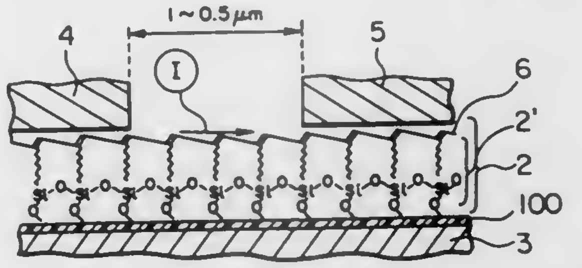


1. A quantum confined Stark effect (QCSE) optical modulator element having an optical transmissivity corresponding to an electric field applied thereto, the modulator element comprising a multi layer quantum well structure disposed in a semiconductor body, wherein said quantum well structure comprises a repetitive sequence of a plurality of similar tri-layer structure, wherein each tri-layer structure consists of a first semiconductor layer constituting the quantum well, a second semiconductor layer on one surface of the first layer, and a third semiconductor layer on the other surface of the first layer, the second and third layers defining respective heterojunctions with the first quantum well layer, wherein the band discontinuity at the heterojunction between the second and first layers is such that the valence band offset exceeds the conduction band offset, and wherein the band discontinuity and the heterojunction between the third and first layers is such that the valence band offset is less than the conduction band offset whereby the quantum well layer is provided with assymetric barrier conditions.

---

### 5,017,975
## ORGANIC ELECTRONIC DEVICE WITH A MONOMOLECULAR LAYER OR MULTI-MONOMOLECULAR LAYER HAVING ELECTROCONDUCTIVE CONJUGATED BONDS

**Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Jul. 12, 1989, Ser. No. 378,910**
**Claims priority, application Japan, Jul. 15, 1988, 63-177812**
**Int. Cl.⁵ H01L** *29/28*
**U.S. Cl. 357—8** **20 Claims**

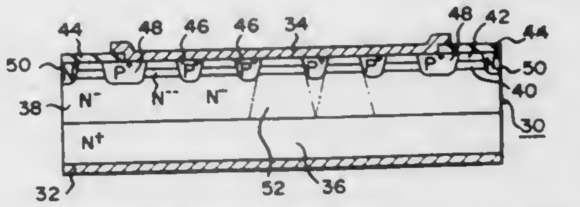


1. An organic electronic device characterized by comprising a monomolecular or built-up multi-monomolecular layer having an insulating layer and an electroconductive group containing conjugated bonds disposed between a first electrode and both a second and a third electrode formed on a substrate, said conjugated bonds connecting the second and third electrodes, said device being operated by applying a voltage between said first electrode and said second electrode or said third electrode as well as between said second electrode and said third electrode, varying the voltage between said first electrode and said second electrode of said third electrode to control the electroconductivity of said electroconductive conjugated bonds via said insulating layer, whereby an electric current flowing across said electroconductive conjugated bonds between said second electrode and said third electrode is controlled.

---

### 5,017,976
## SEMICONDUCTOR DEVICE HAVING INTERMEDIATE LAYER FOR PINCHING OFF CONDUCTIVE PATH DURING REVERSE BIAS APPLICATION

**Naomasa Sugita, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Nov. 30, 1989, Ser. No. 443,333**
**Claims priority, application Japan, Dec. 2, 1988, 63-305767**
**Int. Cl.⁵ A01L** *29/48*
**U.S. Cl. 357—15** **10 Claims**



1. A semiconductor device comprising:
a semiconductor substrate having first and second major surfaces, and comprising:
a first semiconductor layer of a first conductivity type;
a second semiconductor layer of said first conductivity type having an impurity concentration lower than that of the first semiconductor layer; and
a third semiconductor layer formed on said second semi-

VOL
1126
ISS
3
MY
21
1991
UMI

conductor layer in Schottky contact with a second metal film having an impurity concentration lower than that of said first semiconductor layer and higher than that of the second conductor layer;

a first metal film formed on the first major surface of said semiconductor substrate, and contacting said first semiconductor layer;

a second metal film formed on the second major surface of said semiconductor substrate; and

a plurality of fourth semiconductor layers of a second conductivity type, formed in the second major surface of said semiconductor substrate, contacting said second metal film, and extending through said third semiconductor layer and reaching at least said second semiconductor layer.

---

## 5,017,977

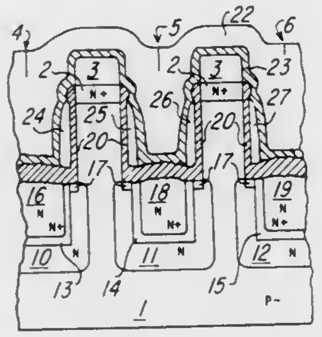
## DUAL EPROM CELLS ON TRENCH WALLS WITH VIRTUAL GROUND BURIED BIT LINES

**William F. Richardson, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 294,980, Jan. 3, 1989, abandoned, which is a continuation of Ser. No. 904,846, Sep. 5, 1986, abandoned, which is a continuation of Ser. No. 716,298, Mar. 26, 1985, abandoned. This application Jan. 19, 1990, Ser. No. 471,019**

**Iot. Cl.⁵ H01L** *27/115*

**U.S. Cl. 357—23.5** **6 Claims**



1. An eraseable programmable read-only memory comprising:

(a) a substrate containing a plurality of elongated, parallel trenches;

(b) a plurality of first source/drain regions formed in said substrate near the bottom of said trenches, all of said first source/drain regions near the bottom of a single one of said trenches being connected together but isolated from all of said first source/drain regions near the bottom of others of said trenches;

(c) a plurality of second source/drain regions formed on the surface of said substrate near the mouth of said trenches;

(d) a plurality of third source/drain regions formed on the surface of said substrate near the mouth of said trenches on the opposite side of said trenches from said plurality of second source/drain regions and directly opposite said second source/drain regions;

(e) a plurality of first channel regions in said substrate extending substantially vertically between said first and said second source/drain regions;

(f) a plurality of second channel regions in said substrate extending substantially vertically between said first and said third source/drain regions;

(g) a plurality of first floating gates disposed on a sidewall of said trenches adjacent to and insulated from said first channel regions;

(h) a plurality of second floating gates disposed on a sidewall of said trenches adjacent to and insulated from said second channel regions;

(i) a plurality of first control gates extending into said trenches adjacent to, insulated from and capacitively coupled to respective corresponding ones of said plurality of first floating gates; and

(j) a plurality of second control gates extending into said trenches adjacent to, insulated from, and capacitively coupled to respective corresponding ones of said plurality of second floating gates.

---

## 5,017,978

## EPROM HAVING A REDUCED NUMBER OF CONTACTS

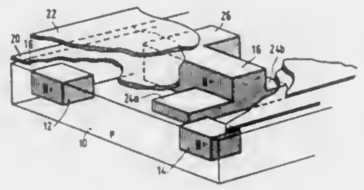
**Jan Middelhoek, Hengelo; Gerrit-Jan Hemink, Enschede, and Rutger C. M. Wijburg, Hengelo, all of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

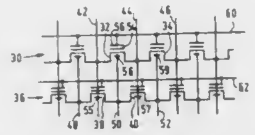
**Filed Mar. 22, 1990, Ser. No. 497,953**

**Claims priority, application European Pat. Off., Mar. 31, 1989, 89200830.1**

**Int. Cl.⁵ H01L** *27/01, 29/00, 29/78*

**U.S. Cl. 357—23.5** **4 Claims**





1. An integrated circuit, comprising a substrate of a first conductivity type and a memory having bit lines, word lines and cells arranged in rows and columns, each cell comprising a transistor connected between two bit lines and having a current channel, a control gate and a charge-storage region therebetween, neighboring cells in a same row having a bit line contact in common, and control gates of transistors in a row being connected to a same word line, characterized in that each transistor has in said substrate of the first conductivity type a source region, a drain region and an injector region of a second conductivity type, mutually separated from each other, the injector regions of the transistors in a first row being connected to the bit line contacts of the transistors in a second row adjacent to said first row.

---

## 5,017,979

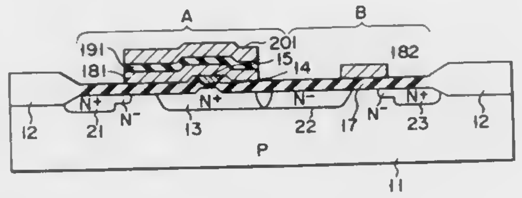
## EEPROM SEMICONDUCTOR MEMORY DEVICE

**Tetsuo Fujii, Toyohashi; Minekazu Sakai, Aichi, and Akira Kuroyanagi, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Apr. 28, 1989, Ser. No. 344,605**

**Int. Cl.⁵ H01L** *29/68, 29/34, 29/04*

**U.S. Cl. 357—23.5** **7 Claims**



1. A semiconductor memory device comprising:

a semiconductor substrate:

a gate insulating film formed on a surface of said semiconductor substrate;

a tunnel insulating film obtained by forming a thin portion into said gate insulating film;

a floating gate formed on said gate insulating film;

a barrier layer for prevention of impurity diffusion into said floating gate, formed above said tunnel insulating film portion of said gate insulating film, and having a width larger than that of said tunnel insulating film so as to cover a portion of said floating gate between said tunnel insulating film and said barrier layer, an impurity concentration of the portion of said floating gate between said barrier layer and said tunnel insulating film being set to be lower than that of other portions of said floating gate; and

a control gate formed on said floating gate, with an insulating layer interposed between said control gate and said floating gate.

---

## 5,017,980

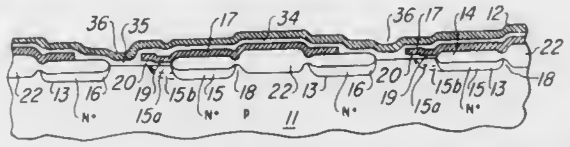
## ELECTRICALLY-ERASABLE, ELECTRICALLY-PROGRAMMABLE READ-ONLY MEMORY CELL

**Manzur Gill, Rosharon; Sebastiano D'Arrigo, and Sung-Wei Lin, both of Houston, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 219,528, Jul. 15, 1988, abandoned. This application Mar. 15, 1990, Ser. No. 494,051**

**Int. Cl.⁵ H01L** *29/68, 29/34;* **G11C** *11/34*

**U.S. Cl. 357—23.5** **14 Claims**



1. An electrically erasable, electrically programmable memory cell formed at a face of a semi-conductor layer of a first conductivity type, comprising:

a source region formed at said face to be of a second conductivity type opposite said first conductivity type;

a drain region formed at said face to be of said second conductivity type, said drain region spaced from said source region by a channel area;

relatively thick oxide layers differentially grown over said respective source and drain regions;

thick insulator regions formed at said face laterally adjacent respective ones of said differentially grown oxide layers, each said thick insulator region on a side of said respective differentially grown oxide layer opposite said channel area, and adapted to laterally isolate said cell from a like, next adjacent cell;

a thin insulative tunneling window formed at said face adjacent said source region;

said source region, said channel area, said drain region and said thick insulator regions linearly arranged in a row direction, a floating gate overlying said tunneling window and insulatively overlying at least a portion of said channel area, said floating gate extending over said differentially grown oxide layer overlying said source region and completely, in said row direction, an adjacent thick insulator region; and

a control gate conductor insulatively overlying said floating gate.

---

## 5,017,981

## SEMICONDUCTOR MEMORY AND METHOD FOR FABRICATING THE SAME

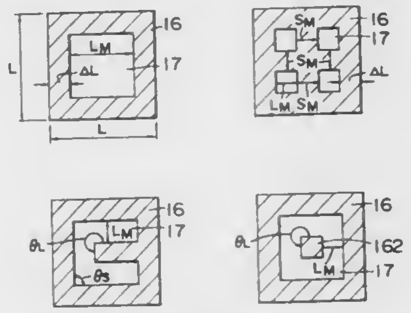
**Hideo Sunami, Tokyo; Tokuo Kure, Kokubunji, and Yoshifumi Kawamoto, Kanagawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Division of Ser. No. 93,160, Sep. 1, 1987, abandoned, which is a continuation of Ser. No. 465,341, Feb. 9, 1983, abandoned. This application Jun. 10, 1988, Ser. No. 204,736**

**Claims priority, application Japan, Feb. 10, 1982, 57-18740**

**Int. Cl.⁵ H01L** *29/68, 29/78, 29/92*

**U.S. Cl. 357—23.6** **11 Claims**



1. A semiconductor memory comprising:

capacitors formed at a main surface of a semiconductor substrate for storing information;

insulated-gate field effect transistors formed at said main surface of the substrate for reading out the signal charges stored in said capacitors;

word lines for applying signals to a gate electrode of the insulated-gate field effect transistors; and

data lines for reading out the information stored in said capacitors,

wherein the capacitors each include an electrode, the electrode having a first side wall and a second side wall, the first and second side walls being formed substantially vertical to the main surface of the substrate, and the second side wall being surrounded by the first side wall, said capacitor further including a capacitor plate, wherein said capacitor plate is formed adjacent to the first and second side walls and is separated from the first and second side walls by an insulating layer so that said first and second side walls respectively face predetermined portions of the capacitor plate and are respectively separated from said predetermined portions of the capacitor plate by said insulating layer,

wherein a source or drain of each of said insulated-gate field effect transistors is respectively connected to said electrode,

wherein a drain or source of each of said insulated-gate field effect transistors is connected to one of said data lines, and

wherein the gate electrode of each of said insulated-gate field effect transistors is connected to one of said word lines.

---

## 5,017,982

## CAPACITOR IN SEMICONDUCTOR DEVICE

**Kiyoteru Kobayashi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 6, 1989, Ser. No. 432,430**

**Claims priority, application Japan, Nov. 15, 1988, 63-289263**

**Int. Cl.⁵ H01L** *29/68*

**U.S. Cl. 357—23.6** **4 Claims**

1. A capacitor comprising:

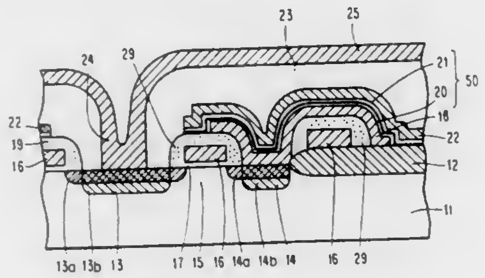
a first electrode layer formed on one major surface of a semiconductor substrate or over said one major surface;

a silicon nitride film formed in contact with the surface of said first electrode layer;

a silicon oxide film formed in contact with the surface of said

VOL
126
ISS
3
MY
21
1991
UMI

silicon nitride film and having a thickness not smaller than 25Å and not larger than 35Å; and

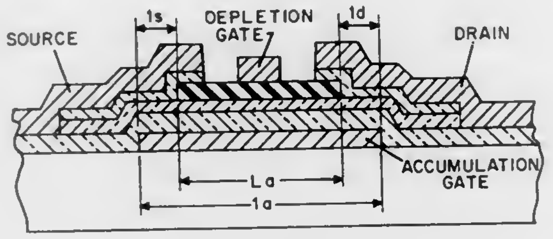


a second electrode layer formed on the surface of said silicon oxide film.

---

### 5,017,983
### AMORPHOUS SILICON THIN FILM TRANSISTOR WITH A DEPLETION GATE

**Biing-Seng Wu, Tainan, Taiwan, assignor to Industrial Technology Research Institute, Taiwan, Taiwan**
**Filed Aug. 3, 1989, Ser. No. 389,227**
**Int. Cl.$^5$ H02L** *22/12, 29/78, 27/01*
**U.S. Cl. 357—23.7** **4 Claims**

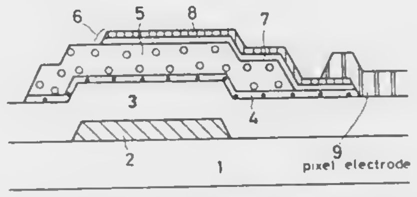


1. An amorphous semiconductor thin film field effect transistor comprising:
(a) an insulating substrate;
(b) an accumulation gate electrode overlying said substrate;
(c) a bottom insulating layer overlying said accumulation gate electrode and said insulating substrate;
(d) an amorphous semiconductor channel layer overlying said bottom insulating layer;
(e) a top insulating layer overlying a portion of said bottom insulating layer and being centered with respect to said accumulation gate electrode;
(f) a source amorphous semiconductor layer and a drain amorphous semiconductor layer, said source and drain semiconductor layers being of a first conductivity type and overlying opposite portions of said top insulating layer and being in contact with respective opposite portions of said channel layer not covered by said top insulating layer, said source and drain semiconductor layers being separated from one another by an intermediate portion of said channel layer overlying said accumulation gate;
(g) metallic source and drain electrodes overlying said source and drain semiconductor layers, respectively; and
(h) a metallic depletion gate disposed on said top insulating layer and over said intermediate portion of said channel layer, said intermediate portion of said channel layer being juxtaposed between said accumulation gate and said depletion gate, said channel layer having charge carrier flow therethrough between said source and drain semiconductor layers that is enhanced by one potential on said accumulation gate and is depleted by an opposite potential on said depletion gate.

---

### 5,017,984
### AMORPHOUS SILICON THIN FILM TRANSISTOR ARRAY

**Sakae Tanaka, and Yoshiaki Watanabe, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan**
**Continuation of Ser. No. 311,304, Feb. 15, 1989, abandoned. This application Jun. 4, 1990, Ser. No. 533,994**
**Claims priority, application Japan, Feb. 29, 1988, 63-46424**
**Int. Cl.$^5$ H01L** *29/78, 45/00, 27/12, 23/48*
**U.S. Cl. 357—23.7** **5 Claims**

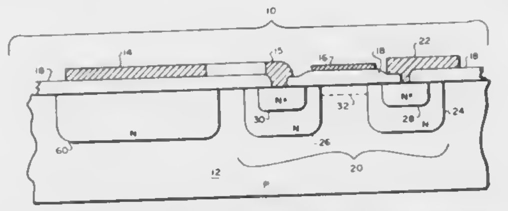


1. An amorphous silicon thin film transistor array substrate comprising:
a plurality of amorphous silicon thin film transistors on a substrate, each of said amorphous silicon thin film transistors having at least a gate, a source electrode and a drain electrode,
a gate wiring on said substrate interconnecting said gates, said gate wiring forming a first electrode of a hold capacitance,
a gate insulating layer on said gate wiring,
an amorphous silicon layer on said gate insulating layer,
a protective insulating layer having an edge that defines a step due to the thickness thereof, said protective insulating layer being located on said amorphous silicon layer,
an upper electrode on said protective insulating layer and covering said step, said upper electrode consisting of at least an n-type silicon layer and forming a second electrode of said hold capacitance, and
a pixel electrode connected to said upper electrode and to one of the electrodes of one of said transistors, said pixel electrode being of a material different from said upper electrode, said capacitance being formed substantially solely by said gate wiring and said upper electrode.

---

### 5,017,985
### INPUT PROTECTION ARRANGEMENT FOR VLSI INTEGRATED CIRCUIT DEVICES

**Chong M. Lin, Shrewsbury, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.**
**Continuation of Ser. No. 606,667, May 3, 1984, abandoned. This application Nov. 17, 1989, Ser. No. 438,706**
**Int. Cl.$^5$ H01L** *29/78*
**U.S. Cl. 357—23.13** **6 Claims**

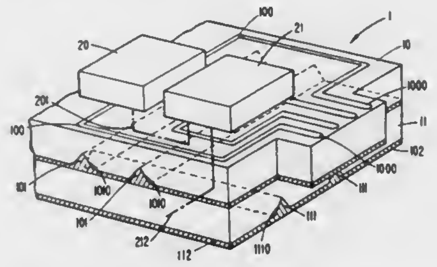


1. An input protection arrangement for an integrated circuit device on a semiconductor substrate of a first conductivity type having a bonding pad for forming an external electrical connection, said bonding pad being supported by an insulating layer and said insulating layer being supported by a doped region comprising a relatively deep well of a second conductivity type, said bonding pad being connected to a conducting path on said substrate for electrically connecting said pad to internal circuitry on said integrated circuit device, said integrated circuit device further including a reference voltage path, said input protection arrangement comprising two regions of the second conductivity type on opposing sides of at least a portion of said conducting path, said two regions and the area therebetween being covered with a layer of insulating material having a substantially uniform thickness corresponding to the thickness of field oxide, apertures in said layer of insulating material for connecting one of said two regions to said pad and means for connecting the other region to said reference voltage path, whereby said two regions define source and drain regions and the conducting path defines the gate terminal of an insulated gate field effect transistor which conducts input current associated with voltages in excess of a selected level between said pad and said reference voltage path.

---

### 5,017,986
### OPTICAL DEVICE MOUNTING APPARATUS

**David M. Rouse, Granville, Ohio, assignor to AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Aug. 28, 1989, Ser. No. 399,648**
**Int. Cl.$^5$ G01V** *9/04;* **H01L** *27/14, 31/06*
**U.S. Cl. 357—30** **8 Claims**



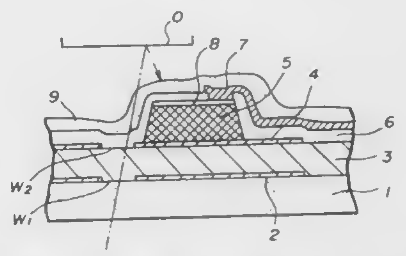
1. Apparatus for mounting and interconnecting optical devices comprising:
means formed of an optical transparent material and having recesses located therein with sides thereof each formed at an acute angle with respect to a line perpendicular to a mounting surface of said means and wherein selected ones of said recess sides are coated with a light reflecting material for receiving multiple parallel coherent light beams emitted by optical devices mounted on said mounting surface and deflecting said multiple light beams through said optical transparent material to others of said coated recess sides for receiving ones of said deflected light beams and deflecting said received one light beams through said optical transparent material to other said mounted optical devices.

---

### 5,017,987
### CONTACT TYPE IMAGE SENSOR

**Takeshi Nanjoh, Sendai, and Kenji Yamamoto, Miyagi, both of Japan, assignors to Ricoh Company, Ltd., Tokyo and Ricoh Research Institute of General Electronics Co., Ltd., Natori, both of, Japan**
**Filed Sep. 22, 1989, Ser. No. 410,847**
**Claims priority, application Japan, Mar. 22, 1989, 64-70231**
**Int. Cl.$^5$ H01L** *27/14, 31/00*
**U.S. Cl. 357—30** **9 Claims**

1. A contact type image sensor comprising:
a transparent substrate;
a non-transparent stop layer formed on said transparent substrate and having first windows;
an insulator layer formed on said stop layer;
a first electrode formed on said insulator layer and having second windows located at positions corresponding to positions of said first windows;
a row of photoelectric conversion elements formed on said first electrode, said row of photoelectric conversion elements starting from a first end and ending at a second end, each of said first window and said second window being provided in correspondence with one of said photoelectric conversion elements so that a number of said first windows are respectively equal to a number of photoelectric conversion elements in said row of photoelectric conversion elements;
a transparent second electrode formed on said photoelectric conversion elements; and

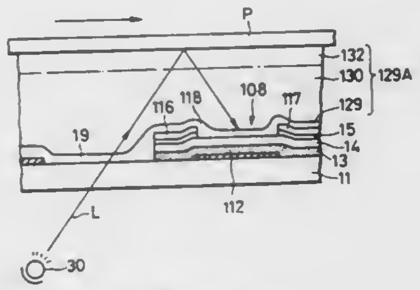


at least one dummy window which does not correspond with one of said photoelectric conversion elements is provided at each of the first and second ends of said row of photoelectric conversion elements, each of said at least one dummy window including a first window section formed in said stop layer and a corresponding second window section formed in said first electrode.

---

### 5,017,988
### IMAGE READING DEVICE WITH PROTECTIVE LAYERS

**Katsumi Komiyama; Masaki Fukaya, both of Isehara; Kojiro Yokono, Yokohama, and Hitoshi Toma, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 384,904, Jul. 25, 1989, Pat. No. 4,924,282, which is a continuation of Ser. No. 310,467, Feb. 15, 1989, abandoned, which is a continuation of Ser. No. 104,072, Oct. 5, 1987, abandoned. This application Feb. 5, 1990, Ser. No. 475,004**
**Claims priority, application Japan, Oct. 7, 1986, 61-237061; Oct. 7, 1986, 61-237062; Oct. 7, 1986, 61-237063; Jun. 12, 1987, 62-145355**
**Int. Cl.$^5$ H01L** *27/14*
**U.S. Cl. 357—30** **5 Claims**



1. An image sensor comprising:
a substrate having a light-permeable section;
a plurality of photosensors disposed on said substrate; and
a protective layer provided on said photosensors,
wherein said protective layer includes a plurality of layers of different materials, one of said layers being provided on said photosensors while another one of said layers is provided on said one of said layers, said another one of said layers being larger in spread than said one of said layers.

VOL
1126
ISS
3
MY
21
1991
UMI

## 5,017,989

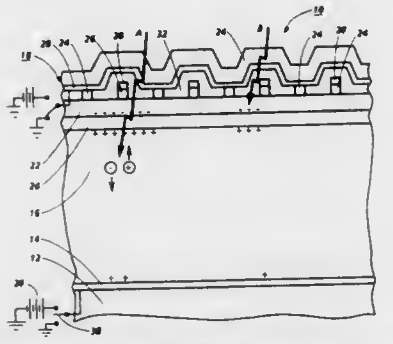
### SOLID STATE RADIATION SENSOR ARRAY PANEL

**Robert A. Street, Palo Alto, and Benjamin Kazan, Los Altos, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 6, 1989, Ser. No. 447,302**

**Int. Cl.$^5$ H01L** *27/14, 31/00, 27/01, 27/13*

**U.S. Cl. 357—30** **17 Claims**



1. A solid state radiation sensor array panel comprising

a generally planar thick deposited radiation detector layer capable of generating electron-hole pairs in response to being irradiated,

a generally planar matrix array of source and drain electrode element disposed over said detector layer,

a generally planar non-single crystal semiconductor charge transport layer located adjacent to said matrix array,

a dielectric layer separating said detector layer and said charge transport layer,

biasing means for establishing an electric field across said detector layer and for forming gate means in said detector layer relative to said source and drain electrode elements when said electric field collapses in irradiated areas for permitting current flow between said source and drain electrode means through said charge transport layer in areas corresponding to said irradiated areas, and

means for reading out currents passing between source and drain electrodes in said matrix array.

---

## 5,017,990

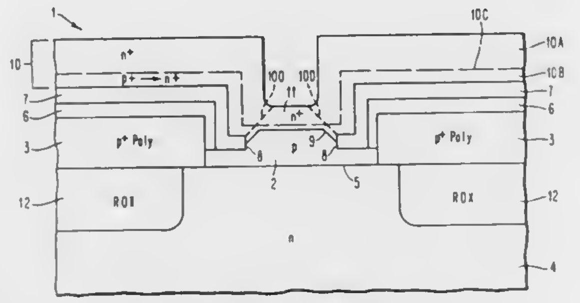
### RAISED BASE BIPOLAR TRANSISTOR STRUCTURE AND ITS METHOD OF FABRICATION

**Tze-Chiang Chen, Yorktown Heights; Ching-Te Kent Chuang, South Salem, both of N.Y.; Guann-Pyng Li, Irving, Calif., and Tak Hung Ning, Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 1, 1989, Ser. No. 445,251**

**Int. Cl.$^5$ H01L** *29/72, 29/04*

**U.S. Cl. 357—34** **19 Claims**



1. A bipolar transistor comprising:

a semiconductor substrate of one conductivity type,

a first layer of semiconductor material of second conductivity type disposed on said substrate said layer containing an aperture which exposes a portion of said substrate,

at least a layer of insulation covering at least a portion of said first layer of semiconductor material,

a second layer of semiconductor material conformally disposed over said layer of insulation and in said aperture said second layer containing a polycrystalline region disposed over said layer of insulation and a single crystal semiconductor region disposed over said exposed portion of said substrate forming at least a single polycrystalline-single crystal interface between said single crystal and said polycrystalline regions,

said second layer of semiconductor material being of said one conductivity type and having a region of said second conductivity type disposed therein over said exposed portion of said substrate forming a semiconductor junction in said single crystal semiconductor region said junction defining the base and emitter regions of said transistor, a portion of said junction being parallel with said at least a single interface and terminating on said insulation said polycrystalline region being electrically connected to said emitter region.

---

## 5,017,991

### LIGHT QUENCHABLE THYRISTOR DEVICE

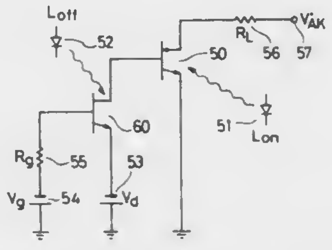
**Jun-ichi Nishizawa; Takashige Tamamushi, and Ken-ichi Nonaka, all of Sendai, Japan, assignors to Jun-Icbi Nishizawa, Sendai, Japan**

**Continuation of Ser. No. 714,678, Mar. 21, 1985, abandoned. This application Oct. 14, 1988, Ser. No. 259,438**

**Claims priority, application Japan, Mar. 22, 1984, 59-54937**

**Int. Cl.$^5$ H01L** *29/74*

**U.S. Cl. 357—38** **21 Claims**



1. A light quenchable thyristor device comprising:

light sensitive thyristor means, having a static induction control electrode for triggering into a conduction state between an anode and a cathode of said thyristor means when illuminated by a first light pulse;

light sensitive transistor means, having first and second conducting electrodes, said first conducting electrode being connected to said static induction control electrode of said thyristor means, and said transistor means having a control electrode, said transistor means conducting between said first and second conducting electrodes when said transistor means is illuminated with a second light pulse and non-conducting between said first and second conducting electrodes when not illuminated with said second light pulse;

first means for emitting said first light pulse as triggering to said thyristor means;

said cathode of said thyristor means being connected to a circuit ground;

a first bias voltage source connected in series between said second conducting electrode and said circuit ground;

a second bias voltage source connected in series between said control electrode of said transistor means and said circuit ground; and

second means located to have an optical path to said transistor means, for emitting a second light pulse to operate said transistor means in a way such that a bias voltage from said second bias voltage source is applied between the control electrode of said transistor means and said cathode of said thyristor means through a resistance when said transistor means is not illuminated with said second light pulse.

---

## 5,017,992

### HIGH BLOCKING-CAPACITY SEMICONDUCTOR COMPONENT

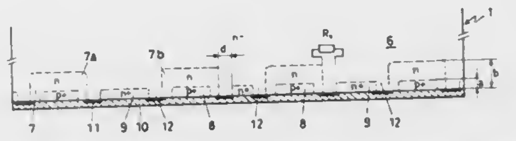
**Peter Roggwiller, Riedt-Neerach, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland**

**Filed Mar. 8, 1990, Ser. No. 490,288**

**Claims priority, application Switzerland, Mar. 29, 1989, 1141/89**

**Int. Cl.$^5$ H01L** *29/74, 29/747*

**U.S. Cl. 357—38** **20 Claims**



1. High blocking-capacity semiconductor component, comprising:

a semiconductor substrate with a first main surface on an anode-side and a second main surface on a cathode-side;

an anode metallization provided on the first main surface and a gate and a cathode metallization provided on the second main surface;

in the semiconductor substrate between an anode and a cathode, an n-type base layer, a plurality of p-type emitter regions on the anode-side and a barrier layer arranged between said n-type base layer and p-type emitter regions;

a plurality of emitter short circuits with short-circuit contact regions, which are arranged between the p-type emitter regions; and

the barrier layer comprising separate barrier layer regions which only surround each of the p-type emitter regions, while the short circuit contact regions are completely set into the p-type base layer;

wherein between each short circuit contact region and each barrier layer region an intermediate region is present in which the n-type base layer meets the anode-side surface of the semiconductor substrate.

---

## 5,017,993

### SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE WITH BUS LINES

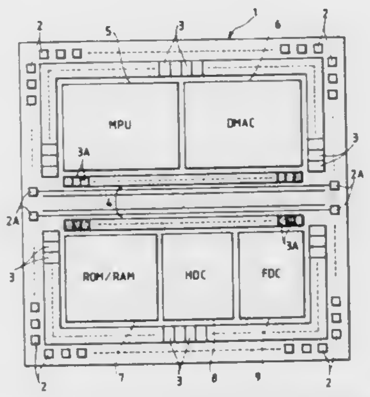
**Manabu Shibata, Takasaki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 20, 1990, Ser. No. 482,077**

**Claims priority, application Japan, Feb. 20, 1989, 1-40528**

**Int. Cl.$^5$ H01L** *27/02*

**U.S. Cl. 357—40** **12 Claims**



1. A semiconductor integrated circuit device comprising:

(a) a semiconductor substrate having a main surface;

(b) a plurality of functional blocks provided on said main surface of the semiconductor substrate, said blocks including at least a microprocessor unit;

(c) a plurality of interface circuits provided around said plurality of functional blocks on the main surface of the semiconductor substrate, said interface circuits being coupled to said functional blocks corresponding thereto;

(d) a plurality of external terminals arranged at a peripheral portion of the main surface of said semiconductor substrate; and

(e) an internal bus comprised of a plurality of signal lines provided on said semiconductor substrate and commonly used between said functional blocks, wherein said plurality of interface circuits and said plurality of external terminals are coupled to one another through said internal bus.

---

## 5,017,994

### SEMICONDUCTOR CIRCUIT

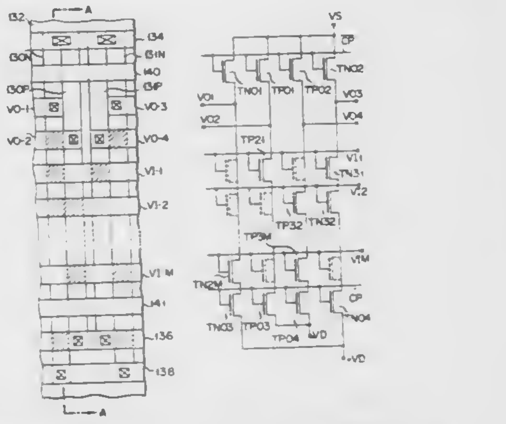
**Hideharu Egawa, Tokyo, and Yasoji Suzuki, Yokosuka, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 378,266, May 14, 1982, Pat. No. 4,883,986. This application May 1, 1989, Ser. No. 345,358**

**Claims priority, application Japan, May 19, 1981, 56-75164; May 19, 1981, 56-75176**

**Int. Cl.$^5$ H01L** *27/02, 27/01, 27/12*

**U.S. Cl. 357—42** **5 Claims**



1. A semiconductor memory device, comprising:

a substrate formed of a substantially insulative material;

a first n-type semiconductor layer, having a first end and a second end formed on said substrate;

a first p-type semiconductor layer, having a first end and a second end formed in contact with said first n-type semiconductor layer;

a plurality of first gate electrode layers formed crosswise over said first n-type and p-type semiconductor layers, with gate insulation layers interposed therebetween, said gate insulation layers having thin and thick portions so that a series circuit of n-channel MOS transistors, with a first end and a second end, and a series circuit of p-channel MOS transistors, with a first end and a second end, are selectively formed in said first n-type and said first p-type semiconductor layers, respectively, at said thin portions;

means for reverse biasing said first n-type and said first p-type semiconductor layers to be electrically isolated from each other, said reverse biasing means including a ground terminal, a positive terminal, and a negative terminal;

a first clock-controlled MOS transistor connected between said first end of said series circuit of n-channel MOS transistors and said ground terminal;

a second clock-controlled MOS transistor connected be-

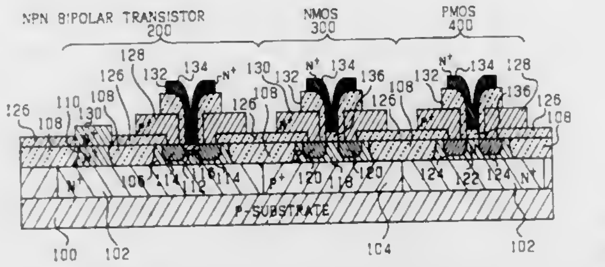
VOL 1126
ISS 3
MY 21 1991
UMI

tween said second end of said series circuit of n-channel MOS transistors and said positive terminal;
a third clock-controlled MOS transistor connected between said first end of said series circuit of p-channel MOS transistors and said ground terminal;
a fourth clock-controlled MOS transistor connected between said second end of said series circuit of p-channel MOS transistors and said negative terminal; and
means for supplying a plurality of clock signals to gates of said first, second, third, and fourth clock-controlled MOS transistors so that said first and third clock-controlled MOS transistors and said second and fourth clock-controlled MOS transistors are not rendered conductive simultaneously.

---

### 5,017,995
## SELF-ALIGNED BI-CMOS DEVICE HAVING HIGH OPERATION SPEED AND HIGH INTEGRATION DENSITY

**Katsumoto Soejima, Tokyo, Japan, assignor to NEC Corporation, Japan**
**Division of Ser. No. 276,781, Nov. 28, 1988, Pat. No. 4,957,874. This application Aug. 16, 1990, Ser. No. 568,414**
**Claims priority, application Japan, Nov. 27, 1987, 62-298996**
**Int. Cl.$^5$ H01L** *27/02, 27/04, 21/00*
**U.S. Cl. 357—43** **4 Claims**

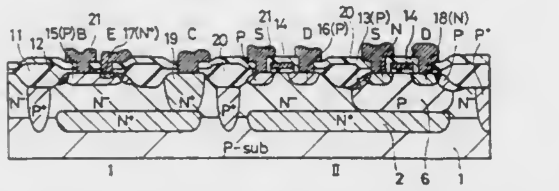


1. A semiconductor device which includes at least one bipolar transistor, one N-channel MOS transistor and one P-channel transistor which are formed in the same semiconductor substrate at the same semiconductor layer level, the bipolar transistor including a collector region formed in the semiconductor substrate, a base region formed in the collector region and an emitter region formed in the base region, each of the base region and the emitter region having a surface area positioned at a principal surface of the semiconductor substrate so that a base-emitter junction is exposed at the principal surface of the semiconductor substrate, and each of the N-channel transistor and the P-channel transistor including a source region and a drain region separated from each other, a channel region formed between the source region and the drain region, a gate insulator formed on the channel region and a gate electrode formed on the gate insulator, each of the source region and the drain region having a surface area positioned at the principal surface of the semiconductor substrate, comprising:
a first insulating layer formed on the principal surface of the semiconductor substrate to extend outwardly from a peripheral portion of said surface area of said base region of said bipolar transistor and from a peripheral portion of said surface area of said source region and said drain region of each of said N-channel transistor and said P-channel transitor;
a first polycrystalline semiconductor layer formed on said first insulating layer and formed on and in contact with said surface area of said base region of said bipolar transistor and said surface area of said source region and said drain region of each of said N-channel transistor and said P-channel transistor;
a second insulating layer formed to cover said first polycrystalline semiconductor layer, said second insulating layer covering said base-emitter junction exposed at said principal surface of the semiconductor substrate and a portion of said surface area of each of said base region and said emitter region adjacent to said exposed base-emitter junction, said second insulating layer also covering an inside edge of said surface area of each of said source region and said drain region of said MOS transistors and portions of said surface area of each of said source region and a surface of said channel region adjacent to said inside edge; and
a second polycrystalline semiconductor layer formed to cover said second insulting layer and said gate insulator of each of said MOS transistors and also to cover a portion of said surface area of said emitter region of said bipolar transistor in contact with said portion of said surface area of said emitter region.

---

### 5,017,996
## SEMICONDUCTOR DEVICE AND PRODUCTION METHOD THEREOF

**Hideki Yasuoka, Takasaki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**
**Continuation of Ser. No. 101,150, Sep. 25, 1987, abandoned. This application May 30, 1989, Ser. No. 358,525**
**Claims priority, application Japan, Sep. 26, 1986, 21-225944**
**Int. Cl.$^5$ H01L** *27/02, 29/72, 29/40, 29/06*
**U.S. Cl. 357—43** **31 Claims**



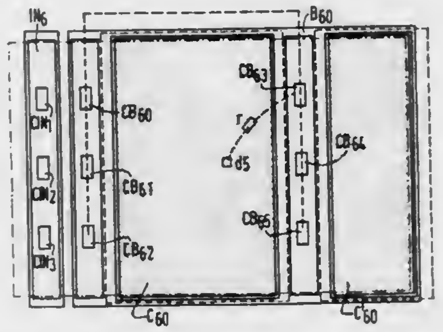
1. A BiMOS semiconductor device comprising a plurality of island semiconductor regions isolated electrically from one another, the plurality of island semiconductor regions being isolated electrically from each other by first thick insulating oxide films, the plurality of island semiconductor regions being formed in one semiconductor substrate, with at least one bipolar transistor formed respectively in at least one of said island semiconductor regions and at least one MOS FET being formed in at least one of the other of said island semiconductor regions, each of the bipolar transistors having emitter, base and collector regions formed in their respective island semiconductor regions, the base region having a periphery with a PN junction formed between the base and collector regions, the PN junction having a curved portion, and with at least one of the bipolar transistors including an impurity region for preventing field concentration at the PN junction between the base and collector of said bipolar transistor, said impurity region being disposed around the periphery of the base region at a boundary portion between the base and collector regions, at the curved portion of the PN junction, said impurity region extending to a location adjacent an edge portion of at least one of the first thick insulating oxide films providing the electrical isolation, so as to reduce field concentration and increase breakdown voltage of the device.

---

### 5,017,997
## INTEGRATED CIRCUIT WITH HIGH OUTPUT CURRENT I$^2$L TRANSISTOR

**Clande E. P. Chapron, Caen, and Jean B. Parpaleix, Paris, both of France, assignors to U.S. Philips Corp., New York, N.Y.**
**Continuation of Ser. No. 173,683, Mar. 24, 1988, abandoned. This application Dec. 1, 1989, Ser. No. 445,897**
**Claims priority, application France, Mar. 24, 1987, 87 04069**
**Int. Cl.$^5$ H01L** *27/082*
**U.S. Cl. 357—44** **6 Claims**

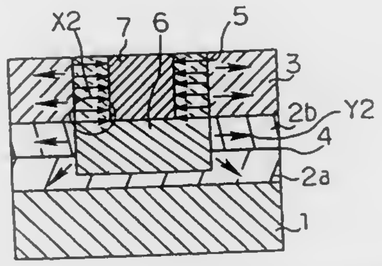
1. An integrated circuit comprising a transistor formed in a first region of a first conductivity type having a surface, said first region forming an emitter of said transistor, an injector of a second conductivity type and a base of the second conductivity type located in said first region of the first conductivity type and spaced apart from each other along said surface, said transistor having an output comprising a single collector region of the first conductivity type located in said base and extending to said surface, said base being provided with a base contact at said surface between said collector region and said injector, wherein said collector region consists of only one part and has at least one row of inclusions through which the base adjoins said surface, and wherein said base is provided with at least two rows of interconnected base contacts, a first row arranged between the collector region and the injector and a second row in which the base contacts are disposed in said inclusions.



---

### 5,017,998
## SEMICONDUCTOR DEVICE USING SOI SUBSTRATE

**Takao Miura, Tokyo; Kazunori Imaoka, Komae, and Fumitoshi Sugimoto, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**
**Filed Aug. 27, 1990, Ser. No. 572,597**
**Claims priority, application Japan, Sep. 14, 1989, 1-239038**
**Int. Cl.$^5$ H01L** *27/12, 27/02, 29/34, 29/06*
**U.S. Cl. 357—49** **10 Claims**

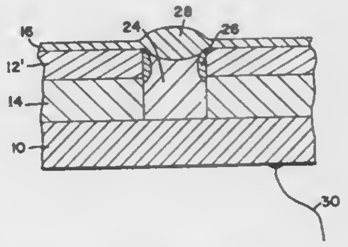


1. A semiconductor device having an active element formed in a semiconductor layer on an insulating layer, comprising:
a first semiconductor layer;
a first insulating layer formed on said first semiconductor layer;
a second insulating layer directly bonded on said first insulating layer;
a second semiconductor layer on said second insulating layer;
a trench in said second semiconductor layer, said trench having a bottom reaching to said first insulating layer through said second semiconductor layer and said second insulating layer; and
a mass filling said trench.

---

### 5,017,999
## METHOD FOR FORMING VARIABLE WIDTH ISOLATION STRUCTURES

**Roger L. Roisen, Shorewood; Curtis H. Rahn, Plymouth; John B. Straight, Crystal, and Michael S. Liu, Bloomington, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**
**Filed Jun. 30, 1989, Ser. No. 374,960**
**Int. Cl.$^5$ H01L** *27/12, 29/06, 27/02*
**U.S. Cl. 357—49** **11 Claims**

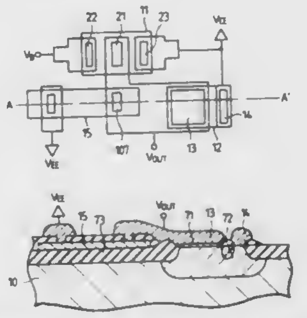


1. A semiconductor device comprising:
(a) a substrate;
(b) a buried oxide layer overlying the substrate;
(c) an active layer overlying the buried oxide layer;
(d) a vertical trench dividing each of the buried oxide layer and active layer into two portions on either side of the trench, each portion of each of the buried oxide layer and active layer bordering the trench;
(e) a monocrystalline silicon isolation structure grown within the trench, the monocrystalline silicon isolation structure abutting each portion of the buried oxide layer and abutting the substrate; and
(f) a dielectric isolation layer lying intermediate between the active layer and the isolation structure, the dielectric isolation layer fully covering the active layer from contact with the isolation structure.

---

### 5,018,000
## SEMICONDUCTOR DEVICE USING MIS CAPACITOR

**Toshio Yamada, Nishitama; Tohru Kobayashi, Iruma; Hirotaka Nishizawa, Akishima; Hiroyuki Itoh, Kodaira, and Tatsuya Saitoh, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Jun. 16, 1989, Ser. No. 367,046**
**Claims priority, application Japan, Jun. 24, 1988, 63-154693**
**Int. Cl.$^5$ H01L** *27/02, 29/92, 29/68, 29/78*
**U.S. Cl. 357—51** **22 Claims**



1. A semiconductor device including a predetermined circuit using a MIS capacitor which comprises:
a buried layer provided on a semiconductor substrate of a first conductivity type, said buried layer being of a second conductivity type which is opposite to said first conductivity type.
a first electrode, corresponding to a buried layer-side electrode of said MIS capacitor, being connected to said buried layer; and
a second electrode, corresponding to a dielectric side electrode of said MIS capacitor, being in contact with said

VOL
1126
ISS
3
MY
21
1991
UMI

buried layer through a dielectric film provided on said buried layer,

wherein said MIS capacitor is connected to said predetermined circuit such that the first electrode of said MIS capacitor is electrically connected at a location in said predetermined circuit having a relatively lower impedance than at a location thereof whereat the second electrode of said MIS capacitor is connected.

wherein said dielectric film has a thickness which is not more than 100 Å, and

wherein said dielectric film is one selected from the group consisting of a silicon oxide film, a silicon nitride film and a tantalum oxide film.

---

**5,018,001**

### ALUMINUM LINE WITH CRYSTAL GRAINS

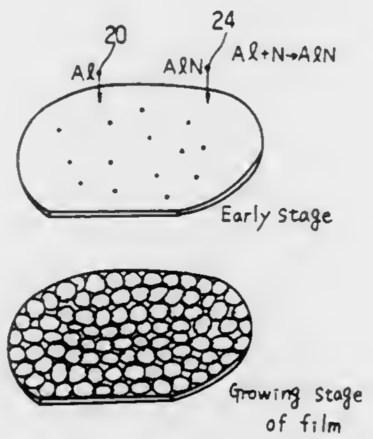
**Kenji Kondo, Hoi; Kazuo Akamatsu, Okazaki; Takeshi Yamauchi, Oobu; Tooru Yamaoka, Oobu, and Atsushi Komura, Oobu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Nov. 29, 1989, Ser. No. 442,669**

**Claims priority, application Japan, Dec. 15, 1988, 63-317161; Aug. 24, 1989, 1-218397**

**Int. Cl.$^5$ H01L** *23/48*

**U.S. Cl. 357—67** **17 Claims**



1. An aluminum film line formed on a substrate comprising:

a plurality of crystal grains made up of plural aluminum atoms and formed on a substrate; and

a plurality of aluminum nitrides formed at multiple surfaces of said crystal grains so that a size of said crystal grains is less than or equal to 0.3 μm in all directions.

---

**5,018,002**

### HIGH CURRENT HERMETIC PACKAGE INCLUDING AN INTERNAL FOIL AND HAVING A LEAD EXTENDING THROUGH THE PACKAGE LID AND A PACKAGED SEMICONDUCTOR CHIP

**Constantine A. Neugebauer, and Wolfgang Daum, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jul. 3, 1989, Ser. No. 375,641**

**Int. Cl.$^5$ H01L** *23/48*

**U.S. Cl. 357—68** **27 Claims**

1. A packaged semiconductor chip comprising:

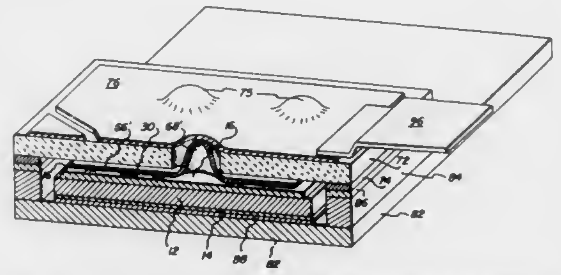
a contact pad on a first surface of said chip;

a conductive foil aligned with and bonded to said contact pad;

a lid including an electrically insulating substrate having first and second major surfaces and an aperture therein, said substrate disposed with said first major surface toward said chip with said aperture disposed in alignment with said conductive foil;

a conductive protrusion electrically continuous with said foil extending into said aperture; and

a package base;



said lid being bonded to said package base in a manner to enclose said chip and said conductive foil within said package.

---

**5,018,003**

### LEAD FRAME AND SEMICONDUCTOR DEVICE

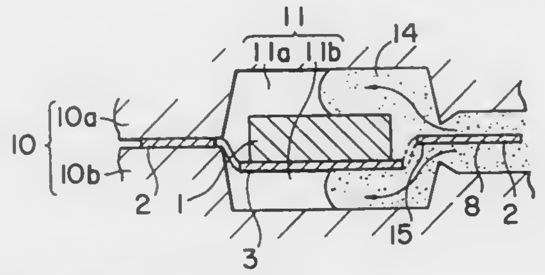
**Masatoshi Yasunaga, and Masanobu Kohara, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 330,212, Mar. 29, 1989, abandoned. This application Aug. 21, 1990, Ser. No. 571,842**

**Claims priority, application Japan, Oct. 20, 1988, 63-265473**

**Int. Cl.$^5$ H01L** *23/50, 21/56*

**U.S. Cl. 357—72** **2 Claims**



1. A lead frame comprising:

a die pad having opposed first and second sides defining a thickness direction perpendicular thereto, said first side for mounting thereon a semiconductor chip including a plurality of electrodes;

a plurality of leads disposed peripherally around said die pad for electrical connection with respective electrodes of the semiconductor chip; and

an outer frame member peripherally disposed around said die pad from which said plurality of leads extend including supporting leads extending to and supporting said die pad and resin guide means extending toward said die pad from said outer frame member for disposition (i) within a molding cavity of a mold that receives said die pad, (ii) centrally disposed, relative to the thickness direction, within a resin gate groove of the mold through which molten resin is supplied to the molding cavity, said gate groove having a height generally parallel to the thickness direction and a width transverse to the thickness direction, and (iii) extending fully across the width of the gate groove for dividing the molten resin into two separated streams in the gate groove and for guiding the two streams of molten resin flowing through the gate groove along the resin guiding means respectively to said first and second sides of said die pad and to the semiconductor chip during resin encapsulation of said lead frame and the semiconductor chip without intermixing of the two streams in the gate groove and adjacent the gate groove in the molding cavity.

---

**5,018,004**

### SEMI-CONDUCTOR DEVICE

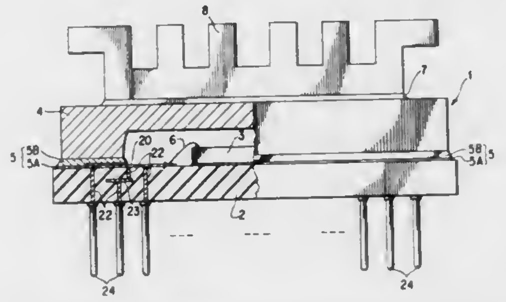
**Takayuki Okinaga; Shouji Matsugami, both of Akishima; Yuuji Shirai, Kodaira; Kanji Otsuka, Higashiyamato; Hiroshi Koguma, and Takashi Emata, both of Akishima, all of Japan, assignors to Hitachi, Ltd., Chiyoda and Hitachi VLSI Engineering Corp., Kodaira, both of, Japan**

**Filed Nov. 28, 1989, Ser. No. 442,098**

**Claims priority, application Japan, Nov. 28, 1988, 63-301905**

**Int. Cl.$^5$ H01L** *23/02, 23/12, 39/02*

**U.S. Cl. 357—74** **18 Claims**



1. A semiconductor device of pin grid array-type package comprising:

a substrate having one side with a semiconductor chip mounting surface at a central portion thereof, a cap mounting surface formed on the periphery of said one side, and a back surface opposite to said one side, a semiconductor chip mounted on said semiconductor chip mounting surface and a plurality of external pins formed on said back surface;

thin conductor films formed on said one side and said films extending from said semiconductor mounting surface to said cap mounting surface, said plurality of external pins being electrically connected to said thin conductor films;

a plurality of wires electrically connecting said thin conductor films and said chip;

a cap for sealing said chip, said cap being attached to said cap mounting surface; and

an adhesion layer for adhering said cap to said cap mounting surface, said adhesion layer covering a portion of said thin conductor films within said cap mounting surface.

---

**5,018,005**

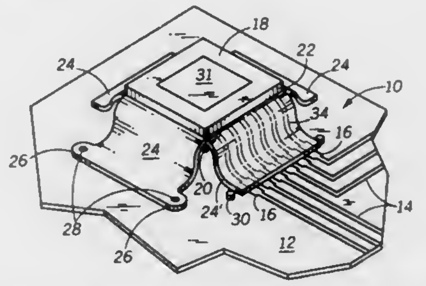
### THIN, MOLDED, SURFACE MOUNT ELECTRONIC DEVICE

**Paul T. Lin, and Michael B. McShane, both of Austin, Tex., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Dec. 27, 1989, Ser. No. 457,648**

**Int. Cl.$^5$ H01L** *39/02, 23/28, 23/02, 29/44*

**U.S. Cl. 357—80** **15 Claims**



1. An electronic device for surface mounting on a printed circuit board (PCB) having bonding lands comprising:

an insulative, flexible substrate having a periphery, where the substrate has an electronic component die receiving area thereon;

a plurality of electrically conductive traces on the substrate extending from the electronic component die receiving area to the periphery, where the traces have

inner bonding areas near the electronic component die receiving area; and

outer bonding areas near the periphery;

where at least two groups of traces are formed into lead arrays to permit the outer bonding areas to contact and be bonded to the bonding lands on a PCB when the package is mounted thereon;

an electronic component die having a plurality of bonding pads thereon, where the electronic component die is located at the electronic component die receiving area on the substrate and the bonding pads are electrically connected by bonding to the inner bonding areas;

a package body encapsulating at least the electronic component die and the inner bonding areas.

---

**5,018,006**

### MULTI-PLATE TYPE IMAGE PICKUP APPARATUS HAVING PICTURE ELEMENTS FOR PRODUCING COLOR AND LUMINANCE SIGNALS

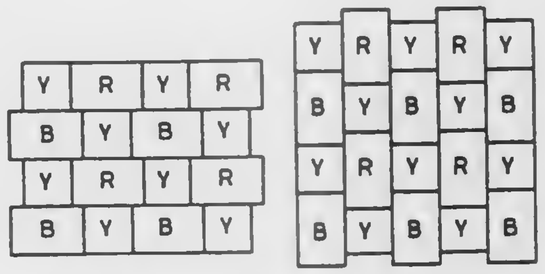
**Seiji Hashimoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 290,802, Dec. 23, 1988, Pat. No. 4,907,074. This application Dec. 26, 1989, Ser. No. 456,966**

**Claims priority, application Japan, Oct. 31, 1985, 60-242697; Oct. 31, 1985, 60-242698; Oct. 31, 1985, 60-242699; Oct. 31, 1985, 60-242700; Oct. 31, 1985, 60-242701**

**Int. Cl.$^5$ H04N** *9/07*

**U.S. Cl. 358—44** **10 Claims**



1. A multi-plate type image pickup apparatus comprising:

a solid-state image pickup device for producing color signals comprising a plurality of picture elements; and

a solid-state image pickup device for producing luminance signals comprising a plurality of picture elements,

wherein the size of at least one of said plurality of picture elements of said solid-state image pickup device for producing color signals is greater than that of each of said plurality of picture elements of said solid-state image pickup device for producing luminance signals, and

wherein a green filter is arranged in front of at least one of said plurality of picture elements for producing luminance signals.

---

**5,018,007**

### THIN PROJECTION SCREEN HAVING A LIQUID CRYSTAL DISPLAY SCREEN OVERLAID A SHEET OF FIBER OPTIC CABLES

**Paul W. Lang, and Franklin C. Gribshaw, both of Newport Beach, Calif., assignors to Universal Applied Sciences Inc., Newport Beach, Calif.**

**Filed Aug. 4, 1989, Ser. No. 389,772**

**Int. Cl.$^5$ H04N** *9/31*

**U.S. Cl. 358—60** **30 Claims**

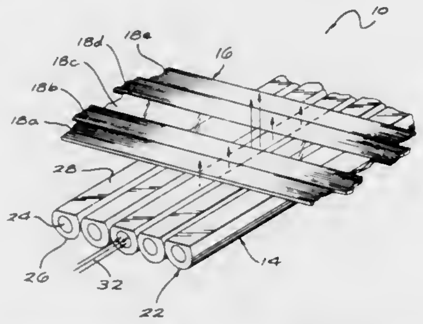
1. An image projection system, comprising:

a medium capable of emitting light laterally from its path;

VOL
1126
ISS
3
MY
21
1991
UMI

means for sequentially feeding light into successive portions of the medium;

means for intercepting light emitted laterally from the medium, the light intercepting means including a plurality of shutters which overlie the medium in a manner controlling transmission of and the intensity of the medium-emitted light permitted to pass therethrough for viewing; and



means for modulating the shutters of the intercepting means in response to an input video signal and in synchronization with light being emitted by successive portions of the medium.

---

### 5,018,008
### METHOD OF AND APPARTUS FOR SETTING COLOR SEPARATION

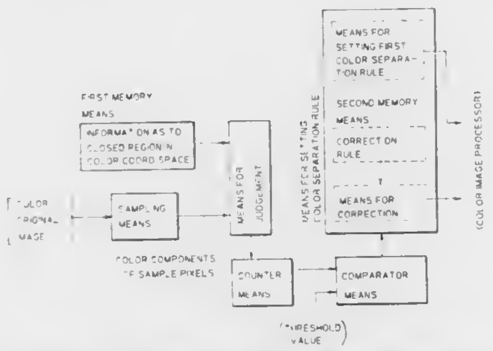
**Shinji Asada, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co. Ltd., Japan**

**Filed Aug. 3, 1989, Ser. No. 389,293**

**Claims priority, application Japan, Aug. 11, 1988, 63-201646**

**Int. Cl.$^5$ H04N *1/46***

U.S. Cl. 358—78 18 Claims



1. A method of setting a color separation rule in a color image processor, said color separation rule being used to separate a color image data into color components suitable for reproducing a color image represented by said color image data, said method comprising the steps of:

(a) designating a memory color,

(b) determining a criterion for judging whether a given color represented by a set of color components matches said memory color within a predetermined allowable error range,

(c) designating sample pixels among pixels of a color original image prepared for image reproduction,

(d) detecting respective color components for each sample pixel,

(e) applying said criterion to said color components for each sample pixel to detect the number of sample pixels whose respective colors match said memory color within said allowable error range,

(f) finding a ratio of said number of sample pixels whose respective colors match said memory color to the total number of said sample pixels, and

(g) determining a first color separation rule in accordance with said ratio to set said first color separation rule in a color image processor which is used for separating said original image into color components in order to reproduce said color original image for each color component.

---

### 5,018,009
### ARRANGEMENT FOR A REMOTE-CONTROLLED TRACK-GUIDED PICTURE TRANSMISSION

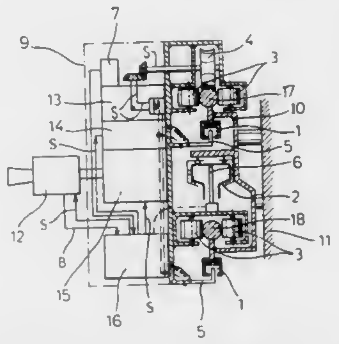
**Peter Koerv, Vaterstetten, Fed. Rep. of Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Fed. Rep. of Germany**

**Filed Jan. 25, 1990, Ser. No. 470,355**

**Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902076**

**Int. Cl.$^5$ H04N *7/18***

U.S. Cl. 358—100 18 Claims



1. An arrangement for a remote-controlled track-guided picture transmission by means of a video camera which is fastened to a movable carriage having at least one carrier wheel which supports itself on a carrier rail, comprising a movable carriage carrying:

a drive for the carrier wheel,

a control arrangement for the drive,

an inductive scanning device which is assigned to the drive, for the position control and location control,

a manipulator for the video camera,

a transmitting and receiving apparatus for remote-controlled signals,

an antenna for the receiving and transmitting of the signals, and

at least one guide roller and stationary supporting structure including:

at least one guide rail on which the guide rollers are supported, and

a slotted wave guide in which the antenna of the carriage engages.

---

### 5,018,010
### DECODER FOR SUBSAMPLED VIDEO SIGNAL

**Takabiko Masumoto, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Feb. 1, 1990, Ser. No. 476,069**

**Claims priority, application Japan, Feb. 3, 1989, 1-26303**

**Iot. Cl.$^5$ H04N *7/12***

U.S. Cl. 358—136 15 Claims

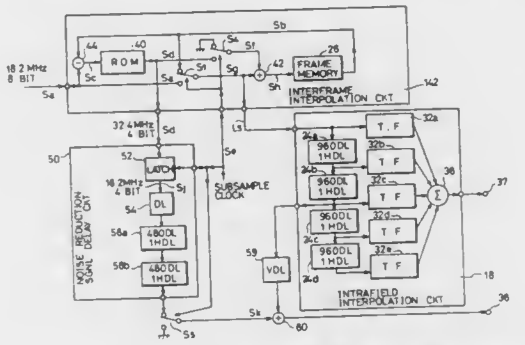
1. An interframe interpolation device for a pixel signal sampled in accordance with interframe offset subsampling and employing first delay means (**24***a*, **24***b*, **62***a*, **62***b*) for motion picture processing, comprising:

holding means (**26**) for holding the pixel signal during two frames period:

first interpolation means (**S1**) connected to receive said sampled pixel signal for interpolating a pixel signal in a previous frame, held by said holding means, between pixel signals in the present frame;

first noise reduction means (**40, 42, 44**) connected to receive said sampled pixel signal for noise-reducing the pixel signal in the present frame in response to the present frame pixel signal and the pixel signal two frames before held;

applying means (**L5, L6**) for applying a pixel signal which is not processed by said first noise reduction means to said first delay means; and



second noise reduction means (**40, 44, 60**) connected to an output of said first delay means for noise-reducing a pixel signal delayed in response to the present frame pixel signal and the pixel signal two frames before held.

---

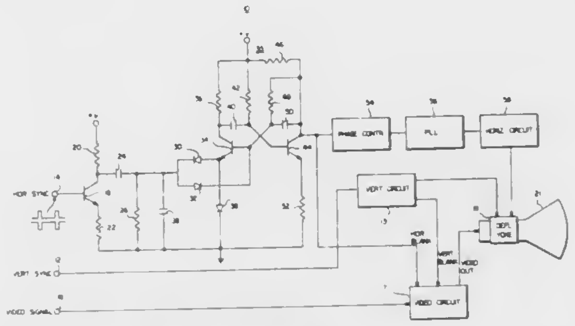
### 5,018,011
### MONOSTABLE TRIGGER CIRCUIT USABLE WITH HORIZONTAL SYNC PULSES OF EITHER POLARITY

**Robert J. Alvord, Elmwood Park; Raymond Bambule, Naperville; Roy W. Orr, Jr., Mundelein, and Thomas L. Sorensen, Berwyn, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Sep. 30, 1987, Ser. No. 102,692**

**Int. Cl.$^5$ H04N *5/04***

U.S. Cl. 358—148 3 Claims



1. A trigger circuit comprising:

monostable means having an input terminal and an output terminal and including first and second cross connected transistors, said first transistor having an emitter and a base; and

input means including a pair of oppositely poled diodes coupled between said input terminal and said emitter and said base of said first transistor for causing said first transistor to change state in response to input signals that are either positive-going or negative-going, whereby an output signal of given polarity is produced at said output terminal, said input signal having a given duration, and the time constant associated with said first transistor of said monostable means being greater than said given duration.

---

### 5,018,012
### VIDEO SIGNAL STRETCHER

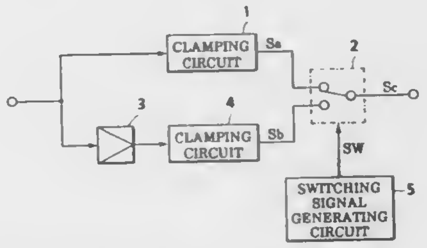
**Takehiro Tsuji, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Jun. 11, 1990, Ser. No. 535,683**

**Claims priority, application Japan, Jul. 21, 1989, 1-084984**

**Int. Cl.$^5$ H04N *5/16***

U.S. Cl. 358—171 7 Claims



1. A video signal stretcher comprising:

signal adjusting means for adjusting a ratio of a range of a synchronizing signal and a range of a video signal, which signals form a composite video signal, to become a predetermined value; and

DC level setting means for setting a DC level of the synchronizing signal to a pedestal level and that a DC level of the video signal to a preliminarily set-up black level;

whereby the black level of the video signal is stretched to the pedestal level by aligning the DC level of the video signal with the DC level of the synchronizing signal.

---

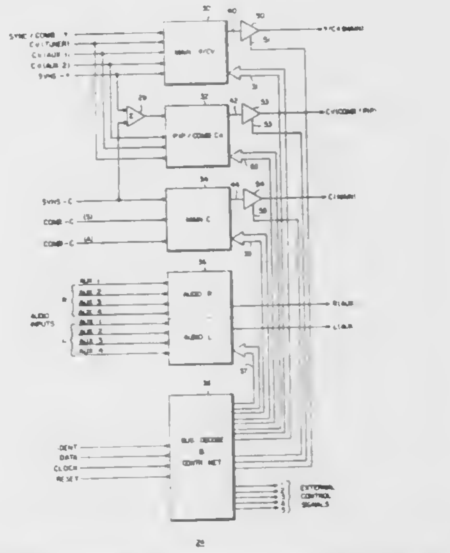
### 5,018,013
### PROGRAMMABLE AUDIO/VIDEO SIGNAL INTERFACE

**Khosro M. Rabii, Arlington Heights, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Dec. 21, 1989, Ser. No. 454,552**

**Int. Cl.$^5$ H04N *5/268***

U.S. Cl. 358—181 7 Claims



1. A programmable audio/video signal interface comprising:

switching means including a plurality of groups of signal input terminals and a plurality of outputs;

a plurality of programmable gain means coupled to selected ones of said plurality of outputs respectively and supplying output terminals;

digitally operated control means operatively connected to

VOL 1126 ISS 3 MY 21 1991 UMI

said switching means and to said programmable gain means for establishing signal connecting pathways between selected ones of said input terminals and said output terminals and for establishing the gain characteristics of said pathways; and

a data bus coupled to said control means for conveying digital commands for selecting among said signal connecting pathways and said pathway gain characteristics.

---

### 5,018,014
### TV RECEIVER AND METHOD FOR CONCURRENTLY DISPLAYING A REPRODUCED STORED PROGRAM AND A RECEIVED PROGRAM

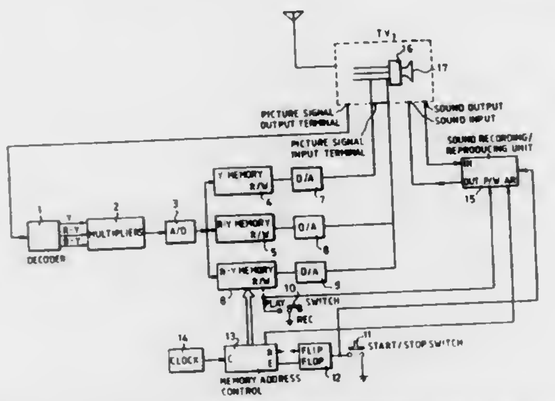
**Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan**

**Filed Ang. 21, 1989, Ser. No. 396,570**

**Claims priority, application Japan, Aug. 24, 1988, 63-210071**

**Int. Cl.$^5$ H04N** *5/272*

**U.S. Cl. 358—183** **6 Claims**



1. A TV receiving device having repeating function, comprising:

means for continuously repeating a short-time video and audio recording operation to an IC having a predetermined storage capacity for a period of t1 seconds while a viewer is watching a main TV picture;

user operable switch means for making a circuit operative for repeatedly reproducing recorded video and sound which have been stored as signals in said IC if the viewer wants to watch in detail an instant spot during the viewing of the main picture;

means for continuously reproducing said recorded video on at least a portion of a TV screen;

means for continuing the displaying of the main picture on said TV screen without any interruption even during the reproduction of said recorded video; and

means for termination of said reproduction of said recorded video and sound whereby only said main TV picture is thereafter displayed on said TV screen.

---

### 5,018,015
### ADAPTIVE KEYED SYNCHRONOUS DETECTOR

**Koichi Sunada, and Hiroshi Sato, both of Osaka, Japan, assignors to NEC Home Electronics Ltd., Osaka, Japan**

**Filed Dec. 29, 1989, Ser. No. 459,274**

**Claims priority, application Japan, Dec. 31, 1988, 63-333176**

**Int. Cl.$^5$ H04N** *5/44. 5/04*

**U.S. Cl. 358—188** **4 Claims**

1. A keyed type synchronization wave detecting circuit comprising:

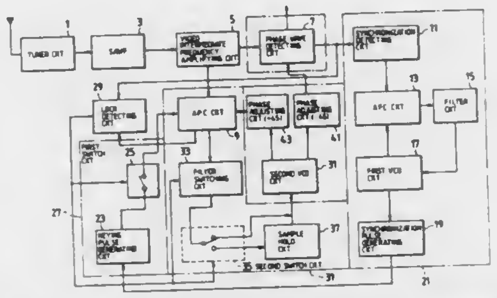
phase wave detecting circuit means for synchronizing and wave detecting a composite video signal, said phase wave detecting circuit means being responsive to a signal for wave detection and a received signal;

synchronizing signal generating means for providing a horizontal control signal controlled by a frequency of a horizontal synchronization portion of said composite video signal;

keying pulse generating means for providing a keying pulse signal responsive to said horizontal control signal;

phase control means for outputting a control signal, said phase control means having a locked and an unlocked state and comprising:

comparator means for outputting a phase error signal responsive to said signal for wave detection and a carrier of said composite video signal, said comparing means in said locked state keying said phase error signal in response to said keying pulse signal,



filter means for removing high frequency components of said phase error signal and outputting a filtered error signal as said control signal in said unlocked state, and

sample-and-hold means for sampling and holding said filtered error signal and for outputting said control signal in said locked state;

lock detecting means for controlling whether said phase control means is in said locked or unlocked state on the basis of whether said signal for wave detection is phase-locked to carrier; and

means for generating the signal for wave detection synchronized with said carrier based on said control signal from said phase control means.

---

### 5,018,016
### DETECTING CIRCUIT WHICH REDUCES BUZZ IN A SOUND SIGNAL

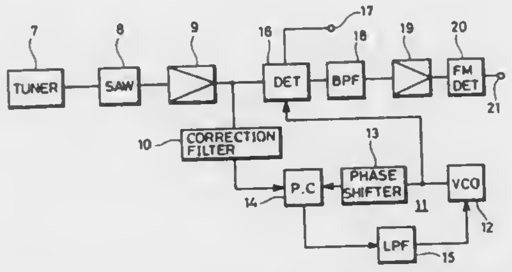
**Hideo Imaizumi, Nitta, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Jun. 14, 1989, Ser. No. 365,885**

**Claims priority, application Japan, Jun. 20, 1988, 63-151766**

**Int. Cl.$^5$ H04N** *5/62*

**U.S. Cl. 358—198** **4 Claims**



1. A detecting circuit for detecting a video signal and a sound signal in response to a video intermediate frequency signal output from video intermediate frequency amplifying means contained in a television receiver, said detecting circuit comprising:

correction filter means for receiving said video intermediate frequency signal and for correcting a slope of said video intermediate frequency signal;

phase-locked loop means for receiving an output signal of said correction filter means and for phase-locking the same to said video intermediate frequency signal;

synchronous detecting means, responsive to an output signal of said phase-locked loop means, for synchronously detecting said video intermediate frequency signal before correction and for outputting a sound FM signal; and

sound signal detecting means, responsive to the sound FM signal output from said synchronous detecting means, for detecting a sound signal.

---

### 5,018,017
### ELECTRONIC STILL CAMERA AND IMAGE RECORDING METHOD THEREOF

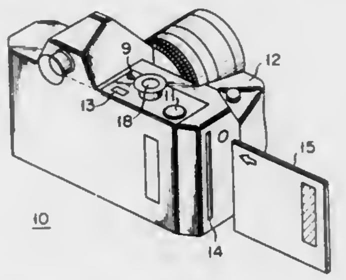
**Minoru Sasaki, Tokyo; Masafumi Umeda, Kawasaki; Yoshitomo Tagami, Yokohama, and Akihiko Sugikawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation-in-part of Ser. No. 289,238, Dec. 23, 1988. This application Dec. 8, 1989, Ser. No. 447,858**

**Claims priority, application Japan, Dec. 25, 1987, 62-327174; Feb. 2, 1989, 1-22521; Mar. 22, 1989, 1-67606; Mar. 22, 1989, 1-67607**

**Int. Cl.$^5$ H04N** *5/30*

**U.S. Cl. 358—209** **18 Claims**



1. An electronic still camera comprising:

photographing processing means for obtaining image data by photographing;

recording mode setting means for establishing a recording mode and for varying an amount of the image data to be obtained by said photographing processing means, in accordance with the recording mode;

a buffer memory for storing the image data obtained from said photographing processing means in accordance with the recording mode set by said recording mode setting means;

a recording medium detachably coupled said buffer memory, for apropriately recording the image data stored in said buffer memory;

determination means for determining whether or not the image data stored in said buffer memory can be recorded on said recording medium by comparing the amount of the image data with recordable capacity of the recording medium; and

recording control means for recording the image data stored in said buffer memory on said recording medium when said determination means determines that said image data can be recorded.

---

### 5,018,018
### APPARATUS FOR DETECTING DISTRIBUTION OF ELECTRIC SURFACE POTENTIAL

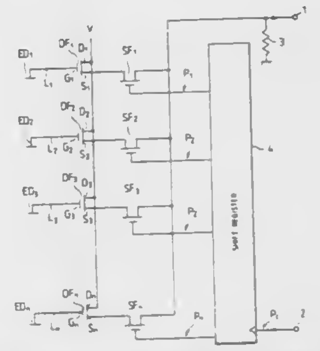
**Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga; Tsuton Asakura, both of Yokohama, and Masato Furuya, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Japan**

**Filed Feb. 13, 1989, Ser. No. 309,504**

**Claims priority, application Japan, Feb. 18, 1988, 63-35524**

**Int. Cl.$^5$ H04N** *3/14*

**U.S. Cl. 358—213.11** **21 Claims**



4. An apparatus for detecting a distribution of an electric surface potential of a charge storage medium, comprising:

a plurality of field effect transistors having gates respectively;

means for enabling said gates being subjected to respective induced voltages corresponding to the distribution of the electric surface potential of the medium;

means for allowing the transistors to output signals corresponding to the induced voltages respectively;

an output terminal; and

means for sequentially transmitting the signals from the transistors to the output terminal to generate an electric signal representative of the distribution of the electric surface potential of the medium,

wherein said signal-transmitting means includes:

switches connected between the transistors and the output terminal for connecting and disconnecting the transistors to and from the output terminal respectively, wherein input sides of the switches are connected to the respective transistors and output sides of the switches are connected in common to the output terminal; and

means for sequentially driving the switches and thereby sequentially transmitting the signals from the transistors to the output terminal to generate an electric signal whose time dependency corresponds to the distribution of the electric surface potential of the medium, and

wherein: the switches comprise a plurality of second field effect transistors;

drains of the second transistors are connected to sources of the first transistors;

sources of the second transistors are connected in common to the output terminal; and

gates of the second transistors are connected to the switch driving means.

---

### 5,018,019
### METHOD AND APPARATUS FOR IMPROVING SIGNAL TO NOISE RATIO IN A TELECINE MACHINE

**Leslie G. Moore, Jr., Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 16, 1989, Ser. No. 422,342**

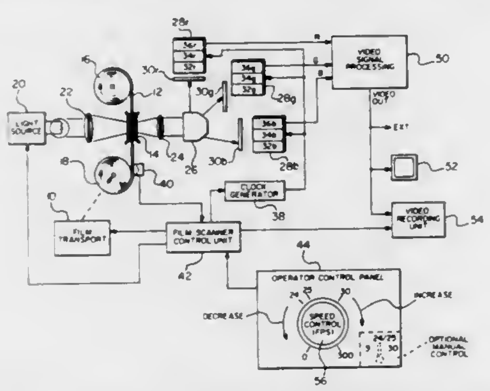
**Int. Cl.$^5$ H04N** *3/40. 5/253*

**U.S. Cl. 358—215** **11 Claims**

1. An apparatus comprising: a film gate; a variable speed film transport mechanism for transporting film through said film gate; a variable output light source; at least one light sensing device; an optical system for passing light generated by said

VOL
1126
ISS
3
MY
21
1991
UMI

variable output light source thorugh said film gate and focusing said light onto said light sensing device; an input unit for generating a signal indicative of a selected operating mode and film transport speed associated therewith; and a control until responsive to said signal to control the operation of said film transport mechanism, said variable output light source and said sensing device, wherein the output form said variable output light source is adjusted so that said light sensing device is operated at full well potential in a first operating mode and at half well potential in a second operating mode thereby preventing saturation of said light sensing device.



---

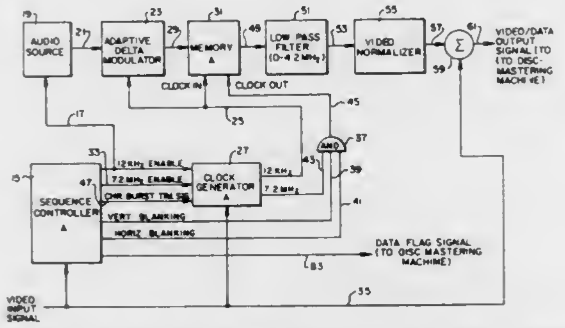
### 5,018,020
## RECORD DISC FOR STORING SEPARATE VIDEO AND AUDIO INFORMATION

**Wayne R. Dakin, Redondo Beach, Calif., assignor to Discovision Associates, Costa Mesa, Calif.**

**Continuation of Ser. No. 458,596, Jan. 17, 1983, abandoned, which is a continuation of Ser. No. 331,958, Dec. 18, 1981, abandoned, which is a division of Ser. No. 66,620, Aug. 15, 1979, abandoned. This application Oct. 2, 1985, Ser. No. 782,166**

**Int. Cl.$^5$ H04N** *5/85*

**U.S. Cl. 358—310** **26 Claims**



1. A record disc for storing a composite signal that includes segments of audio information and corresponding segments of video information, comprising:

a succession of consecutively arranged substantially circular and concentrical information tracks including audio information-containing tracks and separate video information-containing tracks;

each of said audio information-containing tracks having at least a portion of an audio information segment stored therein in time-compressed digital data format, each of said audio information segments includes packets of digital data interleaved with conventional video synchronizing signals, adjacent audio information packets representing a continuous portion of the stored audio information segment;

each of said video information-containing tracks having a video information segment stored therein in real-time, each said video information segment containing a single video frame in conventional video format including conventional video synchronizing signals; and wherein:

the composite signals stored in said disc includes a coded signals, included in said conventional video synchronizing signals in one of said audio information-containing tracks or said video information-containing tracks, which is indicative of the equivalent real-time length of the respective time-compressed audio information segment.

---

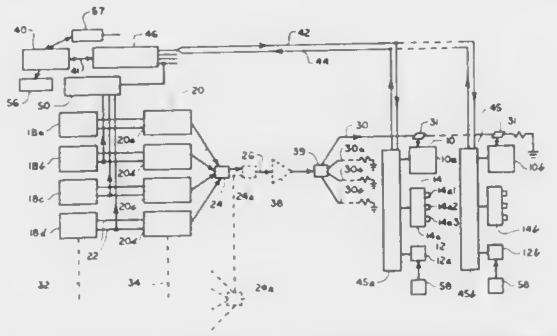
### 5,018,021
## INDIVIDUALIZED VIDEO CENTER

**Daniel Slater, 2320 Westwood La., Palatine, Ill. 60067, assignor to Daniel Slater, Palatine, Ill.**

**Filed Dec. 13, 1989, Ser. No. 449,980**

**Int. Cl.$^5$ H04N** *7/167*

**U.S. Cl. 358—349** **19 Claims**



1. A coin-operated TV system, comprising the combination of

separate TV sets, and an individual coin acceptor and program selector control for each TV set;

means providing signals for a plurality of separate programs and TV modulator means for transmitting said signals for the separate programs on separate channels;

each TV set being spaced from the signal providing means and the TV modulator means and being located remote from each other and placed locally for individual control and viewing;

a control means for operating each separate TV set responsive to specific conditions of its respective coin-acceptor and program selector control;

a computer, and means hard wiring the computer and control means together;

said computer and control means being operable, when the coin acceptor for any particular TV set has not received a suitable deposit or when the selector control for that particular TV set has not been set to receive the signals for any particular program, to connect the channel transmitting the signals for one of the programs to that particular TV set;

said computer and control means being operable, when the coin-acceptor for any particular TV set has received a suitable deposit and when the selector control for that particular TV set has been set to receive the signals for a particular program, to connect the channel transmitting the signals for that particular program to that particular TV set; and

said computer and control means being operable, after the duration paid for at the particular coin acceptor has terminated, to terminate the connection of the signals for the selected particular program to that particular TV set and to then direct either the signals of a properly paid for and subsequentially selected particular program or of the said one program to that particular TV set.

---

### 5,018,022
## FACSIMILE DEVICE FOR TRANSMITTING PORTIONS OF DOCUMENTS AND HOLDING THE TRANSMISSION PROCESS

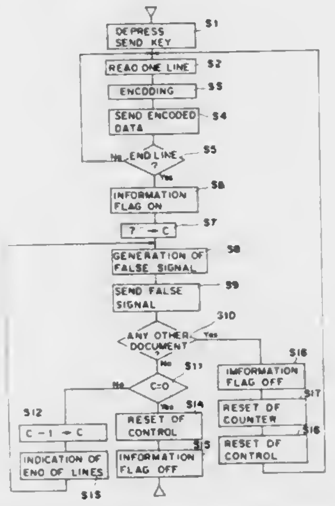
**Takashi Tatsumi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 186,578, Apr. 27, 1988, abandoned. This application Apr. 6, 1990, Ser. No. 506,524**

**Claims priority, application Japan, Apr. 28, 1987, 62-105615; May 27, 1987, 62-130608; Jul. 27, 1987, 62-188146; Jul. 31, 1987, 62-193144**

**Int. Cl.$^5$ H04N** *1/32*

**U.S. Cl. 358—431** **6 Claims**



1. A facsimile device for transmitting a plurality of original documents to a receiving station via a telephone circuit, the facsimile device comprising:

a document scanning plate for stationarily positioning one of the plurality of original documents during a transmission process;

sending means for initiating transmission by the facsimile device of said one original document;

reading means for reading image data contained in said one original document and for generating an output signal upon initiating transmission of a document;

converting means for converting said image data to digital image data;

transmission means for transmitting said digital image data converted by said converting means to the receiving station;

end line detecting means for detecting an end line of said one original document being read;

completion code data generating means for generating completion code data indicative of the presence or absence of a subsequent document to said one original document to be sent;

false fillbit data signal generating means for generating a false fillbit data signal having a plurality of full-white lines or full black lines to said transmission means in response to detecting said end line of said one original document by said end line detecting means;

judging means for judging which of said completion code data or an output signal from said sending means is outputted earlier; and

control means for disconnecting the telephone circuit when said judging means judges that said completion code data is outputted earlier than said output signal from said sending means and for returning to operation of said reading means for executing said transmission process for said subsequent document when said judging means judges that said output signal from said sending means is outputted earlier than said completion code data.

---

### 5,018,023
## IMAGE INPUT METHOD

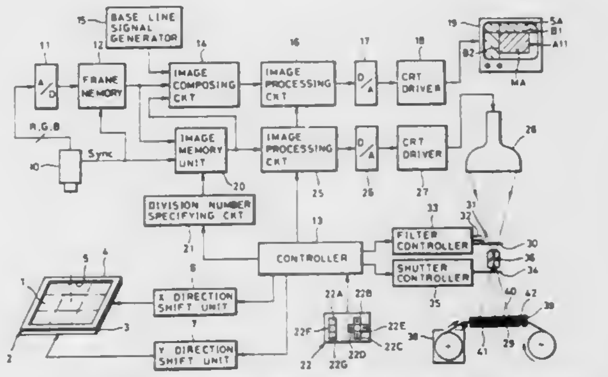
**Kazufumi Kubota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Sep. 14, 1989, Ser. No. 407,087**

**Claims priority, application Japan, Sep. 16, 1988, 63-231521**

**Int. Cl.$^5$ H04N** *1/387, 1/40*

**U.S. Cl. 358—450** **5 Claims**



1. A method of inputting an image of an original by inputting images of a plurality of divisions into which said original is divided, by the use of an image input device, said method comprising the following steps:

displaying an image of one of said divisions of said original input by said image input device in an image scrolling area of a screen of a monitor and displaying an image of part of another of said divisions adjacent to said one of said divisions as a fixed reference image in an image fixing area of said screen adjacent to one side of said image scrolling area, said another of said divisions having been stored in an image memory;

scrolling said image displayed in said image scrolling area so as to avoid discontinuity between said images displayed in said image scrolling and image fixing areas by shifting said original relative to said image input device; and

storing data of said image displayed in said image scrolling area in said image memory.

---

### 5,018,024
## IMAGE PROCESSING APPARATUS USING TWO-DIMENSIONAL SPACE FREQUENCY TO DISCRIMINATE IMAGE TYPE

**Hiroshi Tanioka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 371,643, Jun. 22, 1989, abandoned, which is a continuation of Ser. No. 282,897, Dec. 12, 1988, abandoned, which is a continuation of Ser. No. 682,346, Dec. 17, 1984, abandoned. This application Nov. 17, 1989, Ser. No. 437,310**

**Claims priority, application Japan, Dec. 26, 1983, 58-244162; Dec. 26, 1983, 58-244163; Dec. 26, 1983, 58-244164**

**Int. Cl.$^5$ H04M** *1/40*

**U.S. Cl. 358—457** **28 Claims**

1. An image processing apparatus comprising:

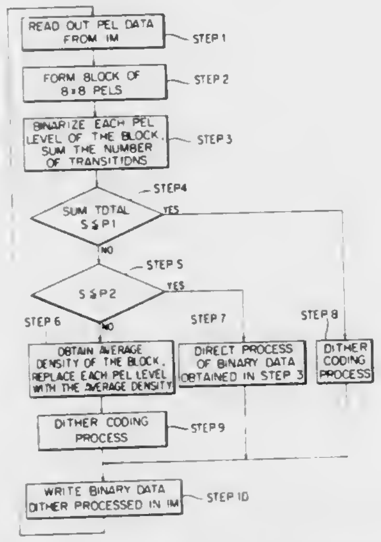
image data input means; and

means for processing image data entered by said input means,

wherein said processing means includes means for binarizing the image data inputted from said input means to produce binary data and means for discriminating image tone by

VOL
1126
ISS
3
MY
21
1991
UMI

examining characteristics of two-dimensional space frequency relating to the inputted image data by discriminat-


READ OUT PEL DATA FROM IM
STEP 1
FORM BLOCK OF 8×8 PELS
STEP 2
BINARIZE EACH PEL LEVEL OF THE BLOCK, SUM THE NUMBER OF TRANSITIONS
STEP 3
STEP4
SUM TOTAL S≦P1
YES
NO
STEP 5
S≦P2
YES
NO
STEP 6
STEP 7
STEP 8
OBTAIN AVERAGE DENSITY OF THE BLOCK, REPLACE EACH PEL LEVEL WITH THE AVERAGE DENSITY
DIRECT PROCESS OF BINARY DATA OBTAINED IN STEP 3
DITHER CODING PROCESS
DITHER CODING PROCESS
STEP 9
WRITE BINARY DATA DITHER PROCESSED IN IM
STEP 10

ing continuity of the adjacent binary data binarized by said binarizing means.

---

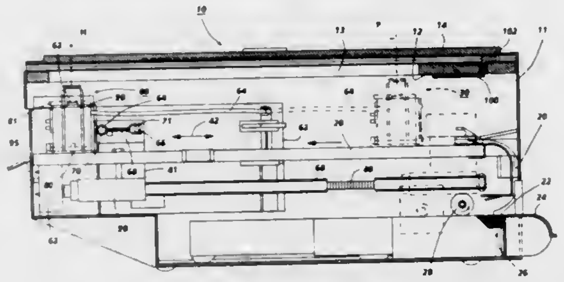
## 5,018,025
## INPUT OF CONTROL INFORMATION TO AN ELECTRONIC IMAGE SCANNER THROUGH THE IMAGING APPARATUS

**Robert P. Herloski, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 17, 1989, Ser. No. 437,703**

**Int. Cl.$^5$ H04M** *1/40*

**U.S. Cl. 358—471** **20 Claims**



1. In an input scanner for deriving an electronic representation of an original image, including an array of photosites detecting the intensity of light from the original image, scanning means for providing relative movement between the photosite array and the original image to allow the original image to be scanned by the photosites; and variable control characteristics selectable by an operator for controlling the processing of the electronic representation of the original image, a control information input arrangement including:

a control information input member having a first surface with a plurality of unique control indicia representative of said variable control characteristics thereon, and supported at a position for scanning by the photosites at a non-image scanning time;

means for moving said first surface in accordance with operator selection of one of the unique control indicia; and

means for varying said variable control characteristics in accordance with detection of one of the unique control indicia.

---

## 5,018,026
## HAND-HELD COPYING APPARATUS

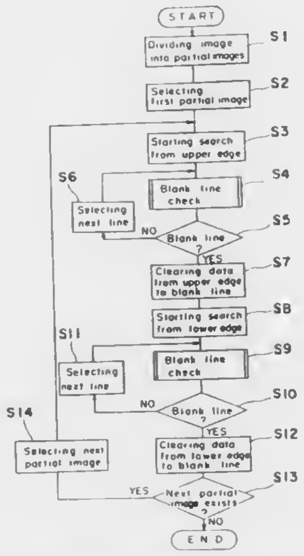
**Yuji Takada, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 340,770, Apr. 20, 1989, Pat. No. 4,931,880. This application Jun. 5, 1990, Ser. No. 533,355**

**Claims priority, application Japan, Apr. 25, 1988, 63-101949**

**Int. Cl.$^5$ H04N** *1/40*

**U.S. Cl. 358—473** **10 Claims**


START
Dividing image into partial images
S1
Selecting first partial image
S2
Starting search from upper edge
S3
Blank line check
S4
S6
Selecting next line
NO
Blank line ?
S5
YES
Clearing data from upper edge to blank line
S7
Starting search from lower edge
S8
S11
Selecting next line
Blank line check
S9
NO
Blank line ?
S10
YES
S14
Selecting next partial image
Clearing data from lower edge to blank line
S12
YES
Next partial image exists ?
S13
NO
END

1. A method of copying an image from a written document comprising the steps of:

reading the image of a portion of the written document, with an image reading means, and generating dot images corresponding to said image having been read;

storing in a memory means, dot images obtained by said image reading means;

dividing said stored dot images into partial images in a direction of print;

extracting only a central portion of said divided partial images by detecting a pair of blank lines between which said central portion is defined; and

printing out said central portions of said divided partial images.

---

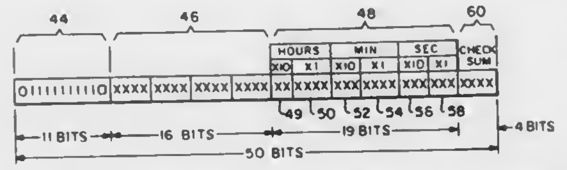
## 5,018,027
## METHOD OF AND MEANS FOR PROVIDING INFORMATION TO EDIT A VIDEO TAPE

**Peter Roggendorf, Kaestrech, Fed. Rep. of Germany, assignor to GSE, Inc., New York, N.Y.**

**Filed May 10, 1989, Ser. No. 349,690**

**Int. Cl.$^5$,G11B** *27/02*

**U.S. Cl. 360—14.2** **28 Claims**



1. A method of applying an information code to identify a predetermined interval on a synchronizing track of a video recording tape of which the synchronizing track contains a magnetized rectangular synchronizing pulse for each frame, the magnetizing pulse including a leading edge that is used to develop a synchronizing signal, the method comprising the steps of:

(a) entering an identifying header on eleven consecutive synchronizing pulses;

(b) entering a four digit BCD user code on sixteen consecutive synchronizing pulses following the header;

(c) entering a time code in BCD on nineteen consecutive synchronizing pulses following the user code; and

(d) entering a check sum on four consecutive synchronizing pulses following the time code to complete entry of the information code

whereby the information code is applied to fifty consecutive bits that span a predetermined interval in a system that operates at fifty Hertz.

---

## 5,018,028
## AUDIO SIGNAL RECORDING APPARATUS AND REPRODUCING APPARATUS

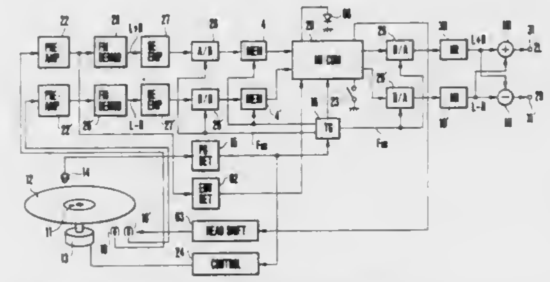
**Tsuguhide Sakata; Norio Kimura, both of Tokyo, and Masahiro Takei, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 449,082, Dec. 8, 1989, abandoned, which is a continuation of Ser. No. 944,672, Dec. 19, 1986. This application Oct. 9, 1990, Ser. No. 594,681**

**Claims priority, application Japan, Dec. 27, 1985, 60-297224**

**Int. Cl.$^5$ G11B** *5/02;* **H04N** *5/60*

**U.S. Cl. 360—27** **14 Claims**



1. An audio signal recording comprising:

(a) first means for generating an L+R signal, wherein said L represents a left channel audio signal and said R represents a right channel audio signal;

(b) second means for generating an L−R or R−L signal;

(c) recording means for recording said L+R signal and said L−R or R−L signal, said recording means recording, with said L−-R or R−L signal, a control signal for inhibiting the possibility of only said L−R or R−L signal being reproduced, wherein said recording means is operative to record said L+R signal and said L−R or R−L signal on different areas of a recording medium and said control signal is combinedly used as a signal which indicates that no audio signal is recorded and wherein said L+R signal and said L−R or R−L signal are those compressed on a time axis and these signals are recorded by said recorded means in time series with said control signal, and wherein said control signal is also used as a start signal for indicating the area where said audio signal is recorded.

---

## 5,018,029
## SHOCK START FOR MEMORY DISK MOTOR DRIVES

**Donald L. Ekhoff, 2600 Day Rd., Gilroy, Calif. 95020, and Robert S. Smith, 1263 Emory St., San Jose, Calif. 95126**

**Filed Jun. 23, 1989, Ser. No. 370,606**

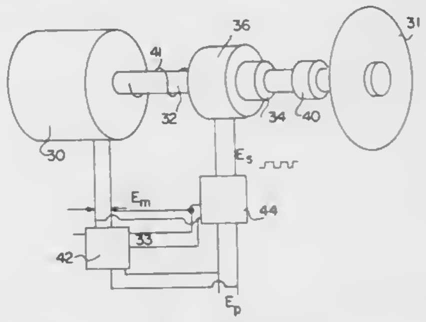
**Int. Cl.$^5$ G11B** *5/40, 17/02*

**U.S. Cl. 360—69** **7 Claims**

1. A means for liberating an assembly of at least one disk mounted coaxially on a rotatable disk shaft and at least one head positioned to record on each said disk driven by a motor means having a motor shaft wherein the disks are restrained from rotating by stiction force between said heads and said disks, said means comprising in operative combination:

a means to generate repeated perturbations on said assembly of disks and heads, each perturbation having a magnitude operably selected to diminish said stiction restraint without damaging said head disk assembly;

a means to test said head disk assembly after each said perturbation to determine when said stiction restraint has been reduced to below a value where said motor can turn said disks without damaging said head disk assembly and then to discontinue said perturbations;



a means to apply full operating power to said head disk assembly by said motor means after said perturbations have been discontinued.

---

## 5,018,030
## CASSETTE LOADING MECHANISM OF A MAGNETIC RECORDING AND REPRODUCING APPARATUS

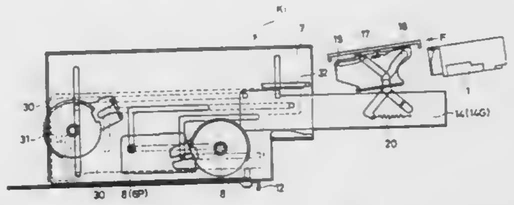
**Keiichi Ohashi, Tochigi, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 13, 1990, Ser. No. 479,464**

**Claims priority, application Japan, Feb. 18, 1989, 1-39029; Apr. 3, 1989, 1-85094**

**Int. Cl.$^5$ G11B** *15/60, 15/665*

**U.S. Cl. 360—94** **12 Claims**



1. A cassette loading mechanism of a magnetic recording and reproducing apparatus, for selectively loading a large-sized cassette and a small-sized cassette containing a magnetic tape as a magnetic recording medium into a position for recording and reproduction, comprising:

a case (K1) provided with a large-sized cassette insertion opening having a form corresponding to a large-sized cassette (3) to be inserted,

large-sized cassette support means (6) for supporting, in a prescribed position, the large-sized cassette inserted into said case from said large-sized cassette insertion opening,

large-sized cassette moving means (7, 8) for moving said large-sized cassette support means between an inlet position (6S) for inserting and taking out the large-sized cassette into and from said case through said large-sized cassette insertion opening and an operation position (6P) for magnetic recording and reproduction of the large-sized cassette,

small-sized cassette support means (14, 19) disposed in said case, for setting a small-sized cassette (1) received outside said case through said large-sized cassette insertion opening and supporting said small-sized cassette in a prescribed position, and

small-sized cassette moving means (30, 31) for moving said small-sized cassette support means between a retreat position (14S) where the small-sized cassette is moved away

VOL 1126
ISS 3
MY 21 1991
UMI

from a movement course of the large-sized cassette when the large-sized cassette is inserted and a setting position (**14G**) where the small-sized cassette is set and taken out outside said case through said large-sized cassette insertion opening, and between said setting position and said operation position (**14D**) for magnetic recording and reproduction of the small-sized cassette,

said small-sized cassette support means being able to be set in said large-sized cassette support means in said operation position.

---

### 5,018,031
### MAGNETIC TAPE APPARATUS WITH LOADING MECHANISM

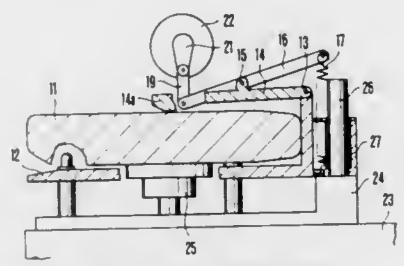
**Satoshi Wada, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Aug. 7, 1989, Ser. No. 389,985**

**Claims priority, application Japan, Aug. 12, 1988, 63-200065**

**Int. Cl.$^5$ G11B** *5/008*

U.S. Cl. 360—96.5 5 Claims



1. A magnetic tape apparatus comprising:

a cartridge holder which supports a magnetic tape cartridge;

a first swinging member having one end which is pivotally supported by a first support shaft mounted to said cartridge holder and another end which extends to a first position where said first swinging member presses against said magnetic tape cartridge;

a second swinging member pivotally mounted to said first swinging member by a second support shaft located between the ends of the first swinging member;

first biasing means arranged at a first end of said second swinging member, and having a biasing force which normally biases said first swinging member in a first direction about said first support shaft away from said magnetic tape cartridge; and

second biasing means arranged at a second end of said second swinging member and having a biasing force greater than the biasing force of said first biasing means, said second biasing means biasing the second end of said second swinging member, forcing said first swinging member to move in a second direction about said first support shaft and extending said first swinging member to said first position, thereby pressing said magnetic tape cartridge against a magnet clutch.

---

### 5,018,032
### AUDIO REPRODUCTION DEVICE WITH HEAD BASE MOVING MECHANISM

**Akira Otsuki, Iwaki, Japan, assignor to Alpine Electronics Inc., Tokyo, Japan**

**Filed Mar. 3, 1989, Ser. No. 318,749**

**Claims priority, application Japan, Apr. 6, 1988, 63-46692[U]**

**Int. Cl.$^5$ G11B** *5/54*

U.S. Cl. 360—105 5 Claims

1. An audio reproduction device comprising:

a motor capable of rotating both ian the forward and in the reverse directions;

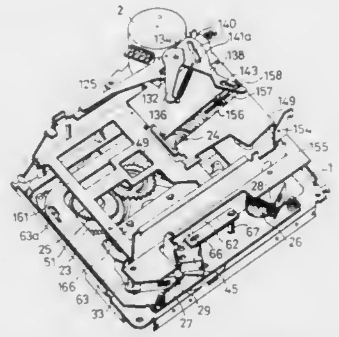
a head base;

a magnetic head mounted to the head base;

a magnetic head forwarding mechanisms driven by said motor and operatively coupled with the head base for forwarding said head base;

a holding mechanism for holding the forwarded magnetic head at a play position;

a stopper mechanism for locking the holding mechanism with the magnetic head at a play position;



a retreat cam mechanism, which is engaged with said head base to forcibly retreat said head base in an operation for ejecting a cassette

a pivoting gear; and

a drive gear, wherein said forwarding mechanism comprises the pivoting gear operatively connected with the drive gear such that the drive gear rotates only in one direction regardless of the direction of said motor.

---

### 5,018,033
### GUIDE MECHANISM FOR HEAD TRANSFER APPARATUS

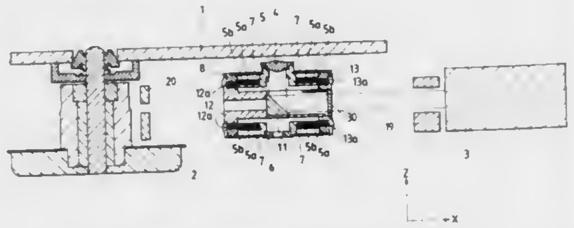
**Benichi Miyazaki; Hiroshi Yamamoto, and Shoji Goto, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Sep. 5, 1989, Ser. No. 401,610**

**Claims priority, application Japan, Sep. 2, 1988, 63-220948**

**Int. Cl.$^5$ G11B** *5/55*

U.S. Cl. 360—106 2 Claims



1. A head transfer apparatus comprising:

(a) a movable unit assembly including an element for recording information on any appropriate information track of a recording medium, regenerating the recorded information from the information track or erasing the recorded information on the track;

(b) an access coil disposed on said movable unit assembly;

(c) a magnetic circuit for causing said access coil to produce an electromagnetic force effective to transfer said movable unit assembly in a first direction perpendicular to the information track;

(d) a bearing disposed on said movable unit assembly;

(e) a guide extending through said bearing for slidably supporting said movable unit assembly in said first direction; and

(f) a magnetic substance disposed on at least one portion of said movable unit assembly and operative, under the force of a leakage flux of said magnetic circuit, to produce a magnetic force acting in a second direction opposite to the direction of gravity in which the weight of said movable unit assembly acts, thereby lowering a bearing pressure imposed on at least one portion of said bearing by the weight of said movable unit assembly.

---

### 5,018,034
### BI-DIRECTIONAL TAPE RECORDER WITH PIVOTED MAGNETIC HEAD

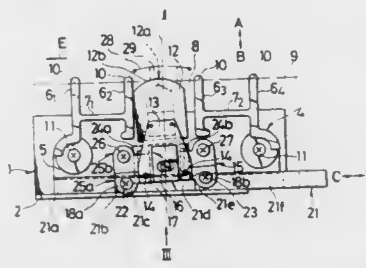
**Shinsaku Tanaka, Tokyo, and Toshio Yoshimura, Kawasaki, both of Japan, assignors to Tanashin Denki Co., Ltd., Tokyo, Japan**

**Filed Apr. 7, 1989, Ser. No. 334,489**

**Claims priority, application Japan, Jul. 20, 1988, 63-96062[U]**

**Int. Cl.$^5$ G11B** *5/55*

U.S. Cl. 360—106 5 Claims



1. A bi-directional tape recorder device wherein reproduction can be made in whichever direction a magnetic tape is fed, comprising:

a head holder;

a magnetic head disposed on said head holder, wherein said head holder is pivotable about an axis which extends parallel to, and is spaced from, a widthwise direction of the magnetic tape;

pivot-limiting means for limiting the amount of pivot of said head holder to the same extent on both sides of a line which extends perpendicular to a plane in which the magnetic tape lies, said pivot-limiting means including a pair of pivot-limiting members; and

a shiftable member having at least one engagement means for engaging said head holder, said shiftable member being shifted forward or backward in response to each change-over operation of the running direction of the magnetic tape so that the head holder is pivoted.

---

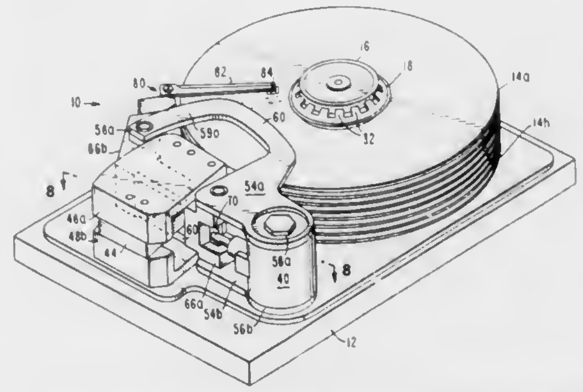
### 5,018,035
### DISC STORAGE APPARATUS HAVING AN ARCUATE PIVOT ASSEMBLY

**James L. Johnson, San Jose, Calif., assignor to Toshiba America Information Systems, Inc., Irvine, Calif.**

**Filed Oct. 30, 1989, Ser. No. 429,156**

**Int. Cl.$^5$ G11B** *5/55, 21/08*

U.S. Cl. 360—106 14 Claims



1. A disc storage apparatus having a base, at least one data storage disc having a center rotatably mounted on said base, and motor means for rotating said discs, wherein the improvement comprising:

a pivot means mounted on said base;

a first support member having an arcuate region arched in a direction to said center and two ends, one end pivotally mounted on said pivot means;

a transducer assembly mounted at said other end of said support member for pivoting about said pivot means to access said data storage disc; and

means for moving said support member pivoting about said pivot means, positioned between the two ends of said support members.

---

### 5,018,036
### ROTARY HEAD TYPE MAGNETIC RECORDING AND REPRODUCING APPARATUS WITH DEDICATED RECORDING AND REPRODUCING MAGNETIC HEADS

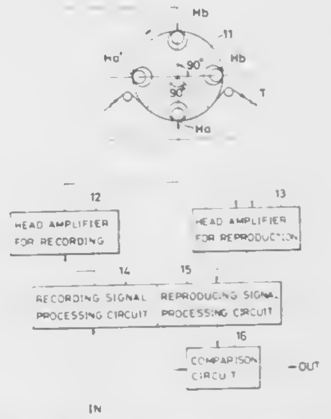
**Tatsumaro Yamashita, Shibata, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Nov. 3, 1989, Ser. No. 431,513**

**Claims priority, application Japan, Dec. 17, 1988, 63-319248**

**Int. Cl.$^5$ G11B** *5/52*

U.S. Cl. 360—107 4 Claims


Hb
11
Ha'
90°
Hb
90°
T
Ha
12
HEAD AMPLIFIER FOR RECORDING
13
HEAD AMPLIFIER FOR REPRODUCTION
14
15
RECORDING SIGNAL PROCESSING CIRCUIT
REPRODUCING SIGNAL PROCESSING CIRCUIT
16
COMPARISON CIRCUIT
OUT
IN

1. A rotary head type magnetic recording and reproducing device in which a drum rotatively driven comprises:

a first pair of magnetic heads exclusively for recording arranged at angle of 180°;

a second pair of magnetic heads exclusively for reproducing deviated by a phase angle in a rotating direction from the first pair of magnetic heads, each magnetic head in said second pair of magnetic heads arranged at an angle of 180° from each other, and such that the angle by which a magnetic tape in contact with the drum substends at the center of the drum is less than or equal to the smallest phase angle between said first and second pairs of magnetic heads.

---

### 5,018,037
### MAGNETORESISTIVE READ TRANSDUCER HAVING HARD MAGNETIC BIAS

**Mohamad T. Krounbi, 6238 Paso Los Cerritos, San Jose, Calif. 95120; Otto Voegeli, 13465 Sycamore Ave., Morgan Hill, Calif. 95037, and Po-Kang Wang, 1007 Shadow Brook Dr., San Jose, Calif. 95120**

**Filed Oct. 10, 1989, Ser. No. 419,246**

**Int. Cl.$^5$ G11B** *5/39*

U.S. Cl. 360—113 6 Claims

1. A magnetoresistive read transducer comprising:

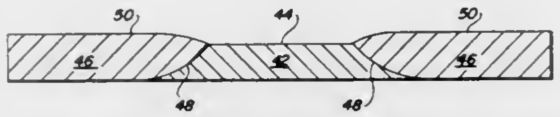
a magnetoresistive sensor having passive end regions separated by a central active region;

a thin film of magnetoresistive conductive layer formed of magnetic material, said magnetoresistive conductive layer extending over substantially only said central active

a first and a second thin film of hard magnetic material, each

VOL
1126
ISS
3
MY
21
1991
UMI

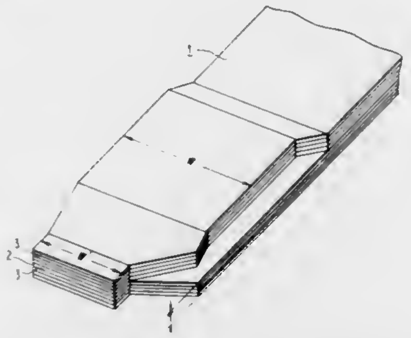
of said thin film of hard magnetic material forming an abutting junction having electrical and magnetic continuity with one end of said magnetoresistive conductive



layer, each of said thin film of hard magnetic material extending over substantially only one of said passive end regions to produce a longitudinal bias in said magnetoresistive sensor.

---

### 5,018,038
## THIN FILM MAGNETIC HEAD WITH LAMINATED METAL AND NON MAGNETIC FILM
**Kanji Nakanishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
**Filed Sep. 27, 1989, Ser. No. 413,504**
**Claims priority, application Japan, Oct. 4, 1988, 63-249059**
**Int. Cl.$^5$ G11B *5/147***
**U.S. Cl. 360—126 18 Claims**

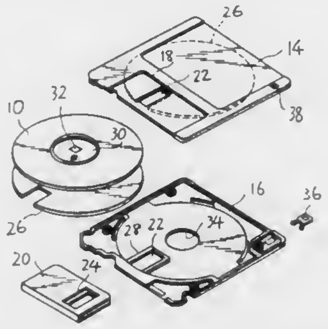


1. A thin film magnetic head adapted for recording and/or reproducing signals at a high frequency of 1 MHz or higher, in which a soft magnetic metal film having uniaxial magnetic anisotropy is used as a magnetic pole film material and the direction of the magnetic path of the magnetic circuit of the head is arranged to be substantially orthogonal to the axis of easy magnetization, wherein the improvement comprises:
- the magnetic pole film material constituting the magnetic path being formed as a lamination of two or more soft magnetic metal films, with an intervening nonmagnetic film between the adjacent soft magnetic metal films,
- the length W of the magnetic pole film material along the direction of the axis of easy magnetization being such that $30\ \mu m \leqq W \leqq 300\ \mu m$, and
- the uniaxial magnetic anisotropy constant Ku being such that $Ku \leqq 300\ J/m^3$.

---

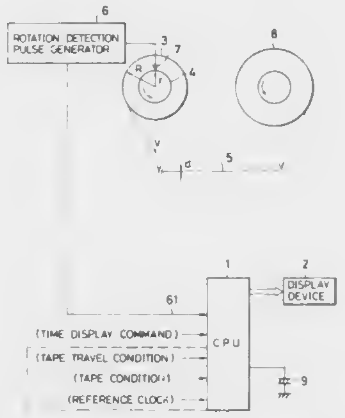
### 5,018,039
## DISC CARTRIDGE WITH THICK PORTION SURROUNDING HEAD INSERTION HOLE
**Haruo Shiba; Masaru Ikebe, both of Komoro, and Morimasa Sasaki, Saku, all of Japan, assignors to TDK Corporation, Tokyo, Japan**
**Filed Jun. 16, 1989, Ser. No. 367,308**
**Claims priority, application Japan, Jun. 17, 1988, 63-79489[U]**
**Int. Cl.$^5$ G11B *23/033***
**U.S. Cl. 360—133 5 Claims**

1. A disc cartridge comprising:
- a disc;
- a casing including a circumferential side wall in which said disc is rotatably received;
- a slide area defined on said casing by a slide area defining section of said casing including an upper and lower surface of said casing;
- at least one recording and/or reproducing head inserting hole formed in said slide area, a peripheral edge of said head inserting hole extending radially inward from said circumferential side wall;
- a shutter slidably fitted on said slide area defining section of said casing so as to be slidably over said slide area for covering and uncovering said head inserting hole;
- a liner arranged in said casing in a manner to be interposed between an inner surface of said casing and said disc, said liner having a peripheral edge that substantially conforms to said peripheral edge of said head inserting hole; and
- at least one thick-walled portion projecting inwardly from said inner surface and continuously surrounding said peripheral edge of said head inserting hole, said thick-walled portion having a continuous and substantially flat surface contacting said peripheral edge of said liner, said flat surface pressing said liner against said disc for cleaning and substantially blocking external contaminants from entering said casing between said thick-walled portion and said disc.



---

### 5,018,040
## TAPE TIME DISPLAY DEVICE FOR DISPLAYING A TAPE REMAINDER TIME
**Yoshihiro Nishida, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**PCT No. PCT/JP88/00274, § 371 Date Nov. 16, 1988, § 102(e) Date Nov. 16, 1988**
**PCT Filed Mar. 16, 1988, Ser. No. 275,535**
**Claims priority, application Japan, Mar. 20, 1987, 62-66243**
**Int. Cl.$^5$ G11B *15/18***
**U.S. Cl. 360—137 6 Claims**



1. A tape time display apparatus comprising:
- outputting means for outputting a predetermined number of pulse signals for each rotation of a reel on which tape is wound;
- detecting means for detecting a rotation period for said reel in response to the interval between said pulse signals when the tape travels at a constant speed;
- first calculating means for calculating an initial reel pulse number, which corresponds to a total length of the tape wound on said reel, according to said rotation period for said reel, said constant speed of the tape travel, the thickness of the tape and the radius of said reel, in accordance with an equation,

$$P=(mv/(2\pi d))\cdot fs-mr/d;$$

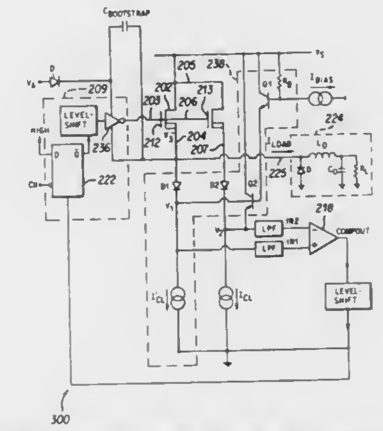
where P=said initial reel pulse number, m=said predetermined number of pulse signals, d=the thickness of the tape, fs=said rotation period for said reel, r=the radius of said reel and v=said constant speed of the tape travel,
- counting means for determining an updated reel pulse number by adding or subtracting the number of pulse signals from said outputting means to or from said initial reel pulse number respectively;
- second calculating means for calculating a tape time corresponding to the total length of the tape wound on said reel based on said updated reel pulse number when a tape time display command is input in accordance with an equation;

$$T=\left(\frac{2\pi r}{mv}+m\right)P+\frac{\pi d}{m^2 v}\cdot P^2,$$

and where P=said reel pulse number, m=said predetermined number of pulse signals, v=said constant speed of the tape travel r=the radius of said reel, d=the thickness of the tape and T=said tape time;
- displaying means for displaying said tape time calculated by said second calculating means.

---

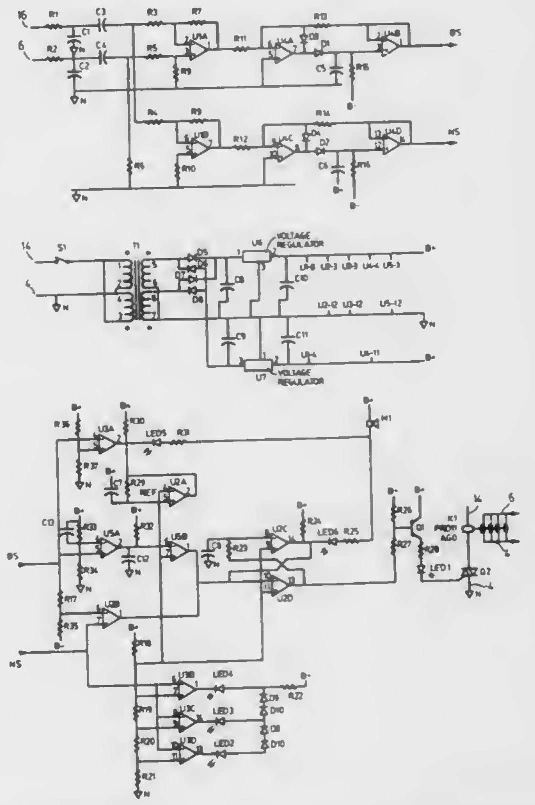
### 5,018,041
## CIRCUIT FOR INTERNAL CURRENT LIMITING IN A FAST HIGH SIDE POWER SWITCH
**Tamas S. Szepesi, San Jose, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.**
**Filed Jun. 16, 1989, Ser. No. 367,458**
**Int. Cl.$^5$ H02H *3/20***
**U.S. Cl. 361—18 20 Claims**



1. A current control circuit for use in switching regulator circuits including:
- a MOS device that is turned off and on to supply current to a load over a periodic, controllable duration of time, wherein the MOS device has an internal resistance which causes a voltage drop over the MOS device to increase substantially linearly for a linear increase in current flowing through the MOS device, and wherein there is a current limit voltage drop across the MOS device when the current flowing through the MOS device is at a level at which current limiting is desired; and
- means responsive to the voltage drop across the MOS device for switching off the MOS device when the current limit voltage is reached.

---

### 5,018,042
## TINGLE VOLTAGE FILTER
**Dale B. Williston, and David R. McGinn, both of Ontario Hydro, 700 University Ave., Toronto, Ontario, Canada M5G 1X6**
**Filed Dec. 13, 1989, Ser. No. 450,245**
**Int. Cl.$^5$ H02H *3/00***
**U.S. Cl. 361—42 8 Claims**



1. In apparatus for reducing differential potentials between different portions of a grounded structure due to current flow through a ground path in that structure, said apparatus comprising a saturating inductor in series with said ground path and with a local ground of an electrical supply utilized in association with the structure, the improvement wherein;
- the apparatus further includes means to establish a circuit bypassing said saturating inductor;
- means to establish a reference ground remote from said local ground;
- monitoring means responsive to conditions under which the retention of said saturating inductor in said ground path would be potentially hazardous, including means to sense the potential difference between the local ground with which the inductor is in series and the remote reference ground; and
- means, responsive to the sustained presence of an excessive potential difference between the local ground and the remote ground to actuate said bypass circuit establishing means.

VOL
1126
ISS
3
MY
21
1991
UMI

**5,018,043**

### REMOVABLE MODULAR CONTROL DEVICE FOR A CONTACTOR APPARATUS

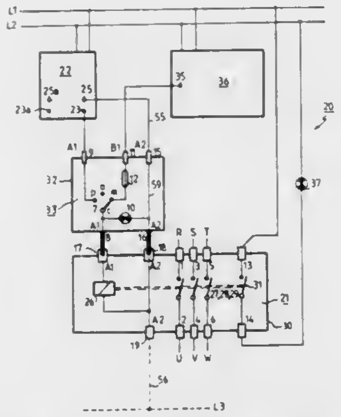
**Dominique Moreau, Saint Germain en Laye, France, assignor to Telemecanique, France**

**Filed May 22, 1989, Ser. No. 354,665**

**Claims priority, application France, May 20, 1988, 88 06765**

**Int. Cl.$^5$ H01H** *47/00*

**U.S. Cl. 361—187** **12 Claims**



1. A removable modular control device for a contactor apparatus comprising a housing having a upper wall and a front wall, and, in the said housing, power switching means actuated by an electromagnet having a first coil the two ends of which are respectively connected to two respective control terminals adapted to receive external electric conductors passing through a first pair of openings formed in the upper wall and to clamp said conductors by clamping screws accessible through a second pair of openings formed in the front wall, said removable modular control device comprising a selector lodged in an insulating case having an upper face, a front face and a lower face which is provided with first and second rigid projecting pins located so as to be engaged and clamped in the connecting terminals of the contactor thus providing both electrical and mechanical connection thereto, the first projecting pin being connected to a first input terminal which is permanently connected to a pole of a power supply source and the selector being connected between the second projecting pin and a second and third input terminals on which are applied transmitting signals which are provided by two distinct control means and which present a polarity opposite that of the said source, said input terminals each having an input orifice formed in the upper face of the case and a clamping screw accessible through an opening formed in the front face of the case.

---

**5,018,044**

### DUAL CONDUCTOR WRISTBAND

**John W. Weiss, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Aug. 23, 1989, Ser. No. 397,997**

**Int. Cl.$^5$ H05F** *3/02;* **H01R** *4/66*

**U.S. Cl. 361—220** **19 Claims**

5. A dual conductor wristband for draining electrostatic charge, comprising:

- a strap member having first and second conductive pathways, said pathways being electrically isolated from each other;
- a first conductive backplate attached to said strap member and in electrical contact with said first conductive pathway thereof;
- a second conductive backplate attached to said strap member and in electrical contact with said second conductive pathway thereof;
- an electrically insulative cover attached to said first and second backplates, said cover having a void therein; and
- a female jack located proximate said first and second backplates for receiving a dual connector plug, said female jack including:
  - a barrel contact located within said void, said barrel contact having a hole therethrough for passage of a dual connector plug and being electrically connected to said first backplate, and
  - a hairpin contact located proximate said barrel contact for receiving a tip of the dual connector plug, said hairpin contact being electrically connected to said second backplate.

---

**5,018,045**

### CORONA DISCHARGER FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE

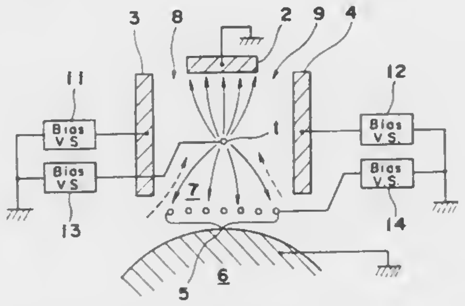
**Hisashi Myochin; Yoshinori Inoue; Hitoshi Saito, and Narutaka Yoshida, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 12, 1990, Ser. No. 507,748**

**Claims priority, application Japan, Apr. 14, 1989, 1-96088; Jul. 18, 1989, 1-84825[U]**

**Int. Cl.$^5$ G03G** *15/02;* **H01T** *19/00*

**U.S. Cl. 361—229** **23 Claims**



1. A corona discharger comprising:

- a discharge member for producing a corona discharge;
- means for applying a predetermined voltage to said discharge member;
- an electrically conductive back plate being provided on the opposite side of said discharge member to a member to be electrified;
- an electrically conductive side plate being provided close to said member to be electrified;
- an opening for discharging ozone produced by said corona discharge, said opening being formed between said side plate and said back plate; and
- means for setting respective electric potentials of said side plate and said back plate so that a difference between respective electric potentials of said side plate and said discharge member becomes lower than a difference between respective electric potentials of said back plate and said discharge member.

**5,018,046**

### FILM CAPACITOR CAPABLE OF UNDERGOING SEVERE ELECTRICAL TREATMENT AND METHODS FOR THE FABRICATION OF SUCH A CAPACITOR

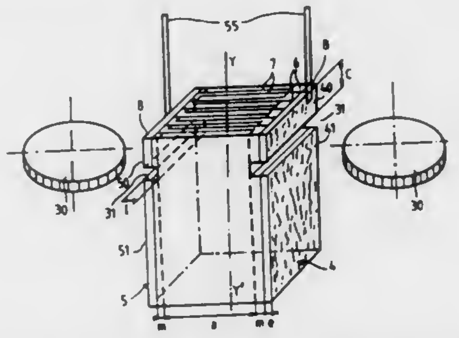
**Michel Pageaud, and Robert Gillet, both of Seurre, France, assignors to Compagnie Europeenne de Composants Electroniques LCC, Courbevoie, France**

**Filed Dec. 15, 1989, Ser. No. 451,522**

**Claims priority, application France, Dec. 20, 1988, 88 16815**

**Int. Cl.$^5$ H01G** *4/24, 1/13, 7/00*

**U.S. Cl. 361—273** **14 Claims**



1. A film capacitor of the stacked or coiled type having the shape of a block, with successive layers made with at least one film supporting at least one metallization and comprising two plates, with a thickness e electrically connecting the metallizations, wherein each plate is formed by at least two pads, one of the pads of each plate being used to apply a severe electrical treatment, with a view to the self-healing of the film.

---

**5,018,047**

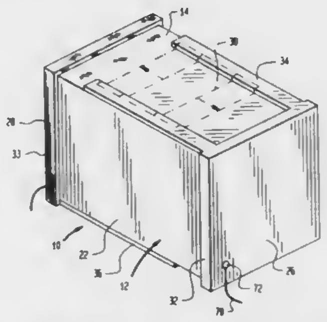
### ADJUSTABLE MULTILAYER CAPACITOR

**Victor Insetta; Richard V. Monsorno, both of Jacksonville, Fla.; Donald J. Davis, Jr., Rocky Point, and Stephen Beyel, Brentwood, both of N.Y., assignors to American Technical Ceramics Corporation, Huntington Station, N.Y.**

**Filed Jul. 20, 1990, Ser. No. 556,323**

**Int. Cl.$^5$ H01G** *5/24, 4/34*

**U.S. Cl. 361—277** **9 Claims**



1. A capacitor having an adjustable capacitance, comprising:

- a miniature monolithic dielectric block having rectangular end walls and four side walls each perpendicular to and terminating at said end walls;
- a first conductive terminal layer on one of said end walls extending over a marginal portion of at least one of said side walls;
- a second conductive terminal layer on said other end wall extending over a marginal portion of at least one of said side walls;
- laterally spaced internal electrodes embedded in said block parallel to said one side wall and alternately terminating at said first and second terminal layers to define said capacitance;
- an external electrode composed of an electrically conductive ink on one of said side walls; and
- marker means on one or more of said side walls to indicate to which of said marginal portions of said conductive terminal layers said external electrode is to be connected, said marker means comprising a pair of spaced conductive strips on said one side wall extending from said first terminal layer along said one side wall and terminating short of the other one of said end walls to define a rectangular external U-shaped terminal electrode on said one side wall leaving an uncovered area of said one side wall bounded by said U-shaped terminal electrode;
- whereby said external electrode can be drawn across said uncovered area of said one of said side walls and connected to said U-shaped terminal electrode to increase the capacitance of said capacitor.

---

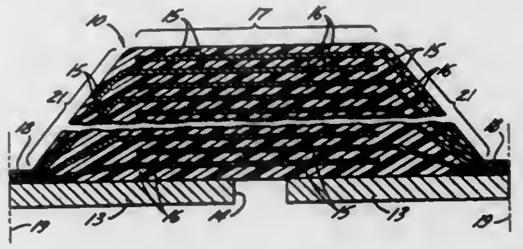
**5,018,048**

### MINIATURIZED MONOLITHIC MULTI-LAYER CAPACITOR AND APPARATUS AND METHOD FOR MAKING

**David G. Shaw, Glens Falls; Angelo Yializis, South Glens Falls; Donald S. Strycker, and Mooyoung Ham, both of Glens Falls, all of N.Y., assignors to Spectrum Control, Inc., Tucson, Ariz. Continuation of Ser. No. 139,073, Dec. 23, 1987, abandoned, which is a continuation of Ser. No. 878,849, Jun. 26, 1986, abandoned, which is a division of Ser. No. 620,647, Jun. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 562,779, Dec. 19, 1983, abandoned. This application Sep. 15, 1989, Ser. No. 408,471**

**Int. Cl.$^5$ H01G** *4/08, 7/00*

**U.S. Cl. 361—323** **16 Claims**



1. A capacitor comprising a plurality of vapor-deposited conductive layers with each layer being laterally offset in alternating directions relative to the preceding layer so as to define a central capacitance region, wherein a polymer dielectric layer, formed (a) by condensing a vaporized radiation-curable monomer onto such a conductive layer to form a liquid monomer coating on the layer, and (b) by thereafter subjecting the monomer coating to a radiation source to cure the monomer, is on each of the conductive layers to that, in the central capacitance region, the conductive layers are spaced and separated from each other by the polymer layers, wherein the polymer layers taper to zero thickness toward lines spaced substantially from two separated portions of the central capacitance region, and the conductive layers extend beyond the lines with successive conductive layers electrically contacting one another at spaced-apart terminal portions.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,018,049
## HOUSING FOR ELECTRONIC SWITCHGEAR

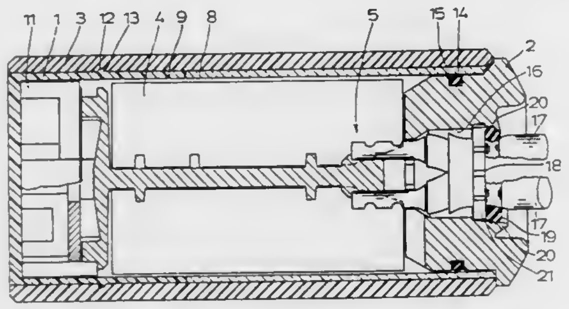
**Wolfgang Mehnert, Lindau-Reutin, Fed. Rep. of Germany, assignor to IFM Electronic GmbH, Essen, Fed. Rep. of Germany**

**Filed May 22, 1989, Ser. No. 355,019**

**Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818499**

**Int. Cl.$^5$ H05K** *7/20;* **H01F** *27/00*

**U.S. Cl. 361—380** **24 Claims**



1. A housing for electronic switchgear comprising:

an outer sleeve made of metal,

an inner sleeve positioned within said outer sleeve and being made of electrically insulating plastics that is impermeable to water, dust and other media in the ambient atmosphere,

a stopper of electrically insulating plastics that is impermeable to water, dust and other media in the ambient atmosphere,

wherein said inner sleeve is closed at one end and said stopper is inserted into said inner sleeve at its other end and is sealingly connected to said inner sleeve in order to close said inner sleeve,

wherein said inner sleeve consists of a first sleeve part open at both ends and a second sleeve part aligned with the first sleeve part and closed at one end, its other end abutting upon one end of said first sleeve part, said stopper being sealingly inserted into said first sleeve part at its other end,

wherein the plastics of said first sleeve part is transparent or translucent, whereas the plastics of said second sleeve part is not transparent or translucent but otherwise identical or of equal grade with the plastics of said first sleeve part,

wherein said first sleeve part and said second sleeve part are bonded together with their abutting ends in a hermetically sealed and puncture-proof manner, and

wherein said stopper is formed as a cable duct to sealingly pass through a cable.

---

### 5,018,050
## SOLID STATE RELAY

**Kozo Maenishi, Nagaokakyo, and Makoto Watanabe, Takatsuki, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Nov. 14, 1988, Ser. No. 271,220**

**Claims priority, application Japan, Nov. 17, 1987, 62-289847; Nov. 19, 1987, 62-176807[U]; Nov. 24, 1987, 62-179248[U]; Nov. 24, 1987, 62-179249[U]; Nov. 26, 1987, 62-180174[U]; Nov. 26, 1987, 62-180175[U]; Nov. 26, 1987, 62-180176[U]; Nov. 26, 1987, 62-180177[U]; Nov. 26, 1987, 62-298200; Nov. 30, 1987, 62-182540[U]; Nov. 30, 1987, 62-183576[U]; Nov. 30, 1987, 62-304366**

**Int. Cl.$^5$ H05K** *7/20*

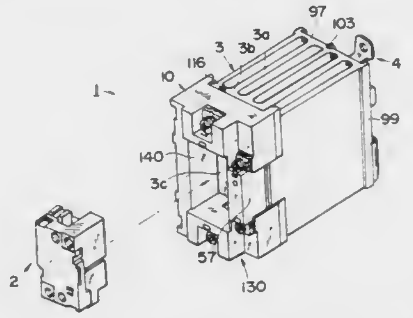
**U.S. Cl. 361—386** **23 Claims**

1. A solid state relay comprising:

a radiator having a base portion and a plurality of fins extending from this base portion;

a control circuit block which has a pair of input terminals and a pair of load terminals (6) and is attached to a front surface of the base portion of said radiator; and

a power circuit cartridge including therein a power semiconductor element which is turned on or off by a control circuit in said control circuit block, an absorber which is connected between said pair of load terminals, and a heat radiating plate to radiate heat of said power semiconductor element, said power circuit cartridge being detachably attached to the control circuit block so as to be electrically connected thereto,



wherein a through space is formed in the control circuit block so as to pierce from a front surface of the control circuit block to the front surface of the base portion of the radiator, the power circuit cartridge is inserted into said through space, and the heat radiating plate of the power circuit cartridge is joined to a portion of the base portion front surface of the radiator.

---

### 5,018,051
## IC CARD HAVING CIRCUIT MODULES FOR MOUNTING ELECTRONIC COMPONENTS

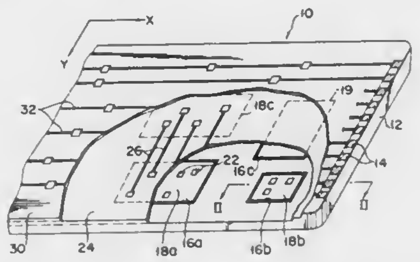
**Hiroshi Yamada, Yokohama; Masayuki Ohuchi, Tokyo; Masayuki Saito, Yokohama, and Akinori Hongu, Odawara, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 28, 1988, Ser. No. 291,252**

**Claims priority, application Japan, Mar. 31, 1988, 63-78716**

**Int. Cl.$^5$ H05K** *7/02*

**U.S. Cl. 361—393** **18 Claims**



1. A structure comprising:

(a) a card-shaped main base layer having a surface in which recess portions are formed and a connector layer having an external connection terminal pattern formed at an edge portion thereof;

(b) sub-base layers embedded in said recess portions of said main base layer and each having electronic components; and

(c) double-layered wiring means for providing electric connection between said electronic components and said connector terminal pattern, said wiring means comprising,

(d) a first wiring layer disposed on said main base layer so as to cover said sub-base layers and having a first wiring pattern which substantially consists of essentially parallel wiring lines extending in a first direction of said main base layer to be coupled to said electronic components, and

(e) a second wiring layer insulatively provided above said first wiring layer and having a second wiring pattern which substantially consists of essentially parallel wiring lines extending in a second direction of said main base layer to be coupled to said first wiring pattern and said connector terminal pattern.

---

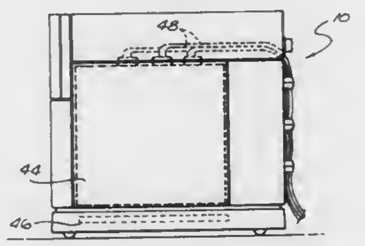
### 5,018,052
## CABLE MANAGEMENT APPARATUS FOR A COMPUTER WORKSTATION HOUSING

**James G. Ammon, San Jose; Philip G. Yurkonis, Campbell, and Alfred Lockwood, Palo Alto, all of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.**

**Filed Jan. 8, 1990, Ser. No. 461,992**

**Int. Cl.$^5$ H02B** *1/20;* **H05K** *5/00;* **G06F** *1/00*

**U.S. Cl. 361—428** **12 Claims**



1. A cable management apparatus for a computer workstation housing, comprising:

a cable trough disposed in an outer surface of said housing, said trough being formed by indenting a portion of said housing such that said trough is below said outer surface of said housing, said trough having at least one hinge element and an associated catch element coupled thereto; and

at least one rigid member having first and second ends, said first end removably coupled to said catch element, said second end removably coupled to said hinge element, said rigid member cooperating with said outer surface to form a space therebetween and secure cables exiting the computer station housing.

---

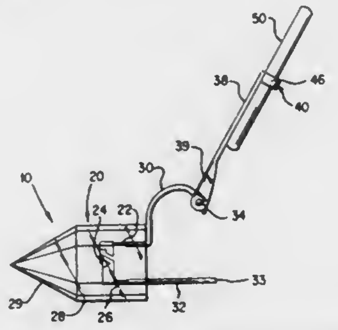
### 5,018,053
## ILLUMINATED JEWELRY

**James D. Belknap, Imperial, and Brian S. Ward, Ballwin, both of Mo., assignors to Lazerware, Inc., St. Louis, Mo.**

**Filed Oct. 18, 1990, Ser. No. 599,441**

**Int. Cl.$^5$ F21L** *15/08*

**U.S. Cl. 362—104** **20 Claims**



1. An apparatus having a power source for illuminating jewelry, which comprises:

(a) A retainer sized to receive and retain the power source;

(b) an electrically conductive lead finding pivotally secured to the retainer;

(c) a light source having first and second electrically conductive leads, the first lead secured to the lead finding;

(d) an electrically conductive lead post secured to the second lead on the light source,

(e) a light transmissive, non-conducting material formed about the light source to encapsulate the light source and a portion of the lead finding and the lead post; and

(f) a biasing member disposed between the retainer and the pivotally secured lead finding, the biasing member positioned to bias the retainer between a closed position wherein the lead post contacts the power source disposed within the retainer to energize the light source; and an open position which pivots the lead finding in relation to the retainer to break contact between the lead post and the power source, and for ease of insertion and removal of the illuminated jewelry.

---

### 5,018,054
## EXPOSURE DEVICE WITH FILTER

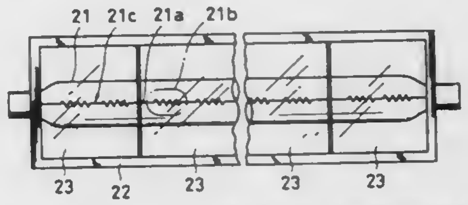
**Kunio Ohashi, and Mitsuru Ogura, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 20, 1990, Ser. No. 511,798**

**Claims priority, application Japan, Apr. 24, 1989, 1-48117**

**Int. Cl.$^5$ F21V** *9/00;* **F21S** *3/00*

**U.S. Cl. 362—211** **7 Claims**



1. An exposure device with a filter, comprising a bar-like lamp including a filament constructed of a plurality of luminescent members and non-luminescent members which are connected in series alternately, and a filter disposed in the vicinity of said lamp, said filter being composed of a plurality of filter plates arranged in a longitudinal direction of the filament, seams between said filter plates being set vis-a-vis with said non-luminescent members of said filament of said lamp.

---

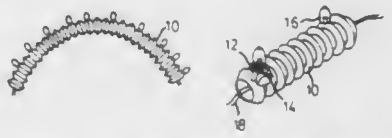
### 5,018,055
## BENDABLE AND DEFORMABLE LAMP STRING COMBINATION

**Jeng-Shyong Wu, No. 123, Tung Hsing Road, Tou Fen, Miao Li Hsien, Taiwan**

**Filed Dec. 28, 1988, Ser. No. 290,957**

**Int. Cl.$^5$ F21V** *21/00*

**U.S. Cl. 362—238** **8 Claims**



1. A bendable and deformable string lamp combination, comprising:

a tubular support member defined about a longitudinal axis and having a predetermined longitudinal extent, a predetermined lateral extent, and defining a hollow space therewithin, and including means for permitting said tubular support member to be bent along said longitudinal extent thereof so as to pre-selectively alter the direction in which said tubular support member extends;

a plurality of illumination lamps mounted upon said tubular support member so as to extend laterally beyond said lateral extent of said tubular support member; and

electrical power wiring means, for providing electrical power to said plurality of illumination lamps, disposed internally within said tubular support member so as to extend within said hollow space and along said longitudinal extent of said tubular support member.

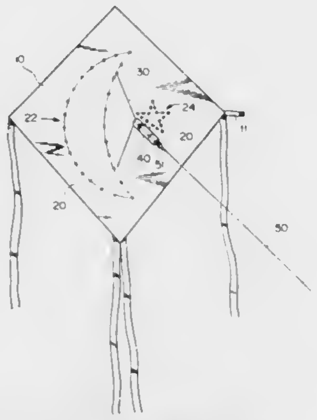
OL 126
SS 3
MY 21
1991
UMI

### 5,018,056
### KITE FOR USE AT NIGHT HAVING A SHINING AND GLITTERING EFFECT

**Chao-Kuo Hou, #8 Lane 67 Min Tzu St., Yung Ho City, Taipei County, Taiwan**

**Filed Mar. 1, 1990, Ser. No. 486,924**
**Int. Cl.$^5$ F21V** *33/00*

**U.S. Cl. 362—253** **6 Claims**



1. A kite for use at night comprising:

a kite body having a front face and a rear face;

a plurality of electrical lamps disposed on the front face of said kite body, said electrical lamps being arranged into a plurality of discrete groups;

control means including power supply means for energizing said electrical lamps, oscillating circuit means, and switching means, said switching means connected to said power supply means, said oscillating circuit means and said electrical lamps and including a switching member and a plurality of switching positions corresponding to said plurality of discrete groups, said switching member being movable relative to said switching means in response to the movement of said kite body caused by the wind for triggering the energization of a particular group of electrical lamps when in a particular switching position; and

lead means for connecting said control means to said kite and providing an electrical connection between said electrical lamps and said control means.

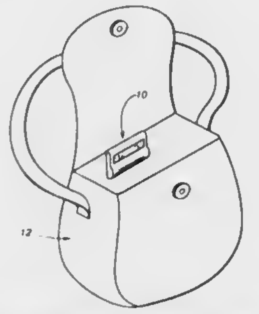
---

### 5,018,057
### TOUCH INITIATED LIGHT MODULE

**John D. Biggs, Danville, and Kenneth M. Twain, Oakland, both of Calif., assignors to Lamp Technologies, Inc., Danville, Calif.**

**Filed Jan. 17, 1990, Ser. No. 466,467**
**Int. Cl.$^5$ F21V** *23/00*

**U.S. Cl. 362—295** **7 Claims**



1. A light module adapted to provide light temporarily in a confined space comprising:

means for providing a source of light;

power means sufficient to activate said light source means;

electrical circuit means connected to said light source means and said power means;

touch sensitive switch means in said circuit means including proximity sensor means and means for requiring at least one touch of said sensor means by a user for closing a circuit between said light source means and said power means to turn on said light source means; and

timer means connected to said switch means for opening said circuit to automatically turn off said light source means a predetermined period of time after the circuit is first closed.

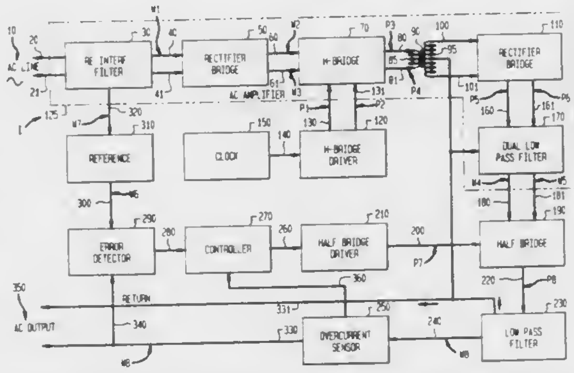
---

### 5,018,058
### HIGH FREQUENCY AC VOLTAGE CONTROL

**Adrian F. Ionescu, Patchogue, and Theodore Conant, New York, both of N.Y., assignors to Power Management International, Inc., Chappaqua, N.Y.**

**Filed Jul. 5, 1990, Ser. No. 548,686**
**Int. Cl.$^5$ H02M** *5/45*

**U.S. Cl. 363—34** **12 Claims**



1. Apparatus for producing a stabilized alternating voltage output for application to a load, from an alternating voltage input subject to distortion, comprising:

input lines for supplying alternating input voltage having ideally a sinusoidal wave form but subjected to distortion;

first conversion means connected in circuit with said input lines for generating an amplified voltage output having a sinusoidal envelope corresponding to that of said input voltage;

second conversion means connected in circuit with said first conversion means to convert said amplified voltage output to said stabilized alternating voltage output;

output lines for applying said alternating voltage output to said load;

a reference voltage generator connected in circuit with said input lines for producing a reference voltage which has an ideal sinosoidal form and synchronized in phase and frequency with said AC input voltage;

error detection means connected between said reference voltage generator and said output lines for producing error indicating signals corresponding to differences in amplitude frequency and phase between said reference voltage and said voltage output; and

control means connected to said error detection means for generating control pulses corresponding to said error indicating signals, and further connected to said second conversion means, so that said alternating voltage output is stabilized and corresponds to said ideal sinusoidal wave form of said input voltage free of said distortion in frequency, phase and amplitude.

### 5,018,059
### METHOD AND APPARATUS FOR TELECOMMUNICATIONS SIGNAL PROCESSING AND SWITCHING

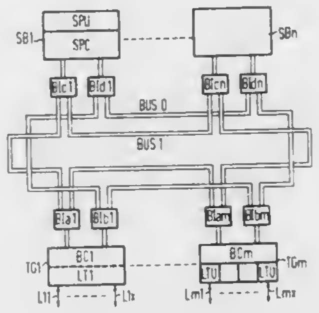
**Gunther Kerschner; Johann Wurzenberger, both of Munich; Herbert Hausmann, Olching; Giselher Eckel, Munich, and Peter Friedrich, Seefeld, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed May 1, 1985, Ser. No. 729,441**

**Claims priority, application Fed. Rep. of Germany, May 4, 1984, 3416542; May 4, 1984, 3416582**

**Int. Cl.$^5$ H04M** *3/00*

**U.S. Cl. 364—200** **6 Claims**



1. A method for establishing connections and transmitting communication signals between any of a plurality of subscriber locations of a communication switching system, including a data switching system wherein said subscriber locations are connected with a plurality of line terminating groups coupled to a ring-shaped bus arrangement, said communication switching system including computers through which, at least, the traffic related to establishing connections between any of the subscriber locations is developed, said method comprising the steps of:

coupling a plurality of computers to said ring-shaped bush arrangement and using respective ones of said plurality of said computers to control the establishment of connections to and from the subscriber locations associated with respective ones of the line terminating groups included in said communication switching system;

establishing a connection between a calling subscriber location and a called one of said subscriber locations through first and second ones of said computers, said first computer serving the line terminating group associated with the calling subscriber location and said second computer serving the line terminating group associated with the called subscriber location, by establishing upon a call request signal from the calling subscriber location a first communication path between said calling subscriber location, the line terminating group associated therewith and said first computer, and establishing a second communication path, in accordance with dialing information delivered by said calling subscriber location and designating said called subscriber location, between said first computer, said second computer, the line terminating group associated with said called subscriber location and said called subscriber location;

storing, upon establishment of said first and second communication paths, information concerning said calling and said called subscriber locations and the line terminating groups associated therewith in each of said first and second computers;

transmitting a call confirming signal from said called subscriber location to said calling subscriber location upon establishment of said first and second communication paths;

after transmission of said call confirming signal, releasing one of said first and second computers from control of said first and second communication paths and using the other one of said first and second computers to control the transmission of communication signals between said calling subscriber location and said called subscriber location; and

in the event of malfunction of said other one of said first and second computers, switching to and using said first-mentioned one of said first and second computers to control said first and second communication paths based upon the information concerning said calling and said called subscriber locations and the line terminating groups associated therewith stored therein.

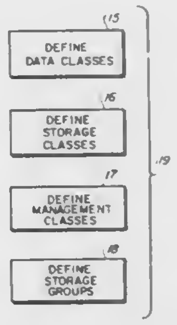
---

### 5,018,060
### ALLOCATING DATA STORAGE SPACE OF PERIPHERAL DATA STORAGE DEVICES USING IMPLIED ALLOCATION BASED ON USER PARAMETERS

**Jack P. Gelb, and John C. Tyrrell, both of San Jose, Calif., assignors to IBM Corporation, Armonk, N.Y.**

**Filed Jan. 26, 1989, Ser. No. 301,970**
**Int. Cl.$^5$ G06F** *13/00, 12/00*

**U.S. Cl. 364—200** **10 Claims**



1. In a machine-effected method for enabling the managing of data storage space for allocating such space for data to be stored in a data storage system and for enabling management of such data stored in said data storage system;

the machine-executed steps of:

storing in said data storage system storage machine-sensible indicia representing a plurality of storage class definitions, each of said storage class definitions including predetermined ones of the machine-sensible indicia representing data storage performance and availability parameters;

storing in said data storage system management machine-sensible indicia representing a plurality of management class definitions with ones of the management machine-sensible indicia representing each management class definition including ones of the management machine-sensible indicia respectively indicating management parameters for handling units of data stored in the data storage system such as life cycle processing which are independent of said performance and availability parameters;

storing in said data storage system group machine-sensible-indicia representing a storage group definition each of which includes group machine-sensible indicia representing lists a plurality of data storing volume including operations to be performed on data stored in volumes which are in the respective storage groups;

storing in said data storage system select machine-sensible indicia representing a plurality of automatic class selection routines for respectively selecting a one of said storage and management classes and one of the storage groups for each separate unit of data to be stored in the data storage system wherein each of the automatic class selection routines access the respective machine-sensible indicia represented definitions stored in the data storage system during each said class selection.

OL
126
SS
3
MY
21
1991
UMI

### 5,018,061

## MICROPROCESSOR WITH ON-CHIP CACHE MEMORY WITH LOWER POWER CONSUMPTION

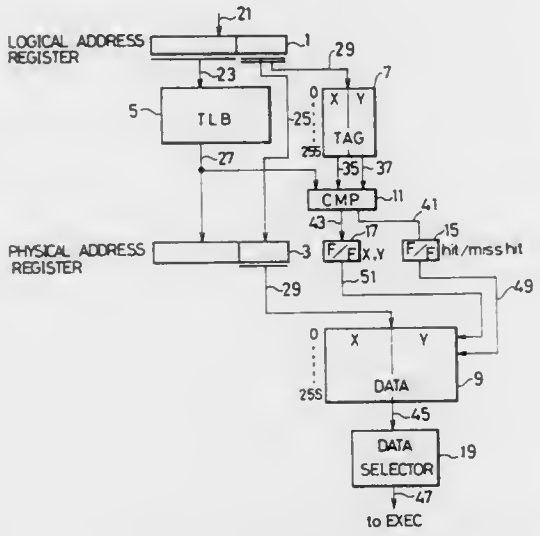
**Hidechica Kishigami, Yokohama; Tohru Sasaki, Kawasaki, and Kiyotaka Sasai, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jun. 27, 1988, Ser. No. 212,201**

**Claims priority, application Japan, Dec. 11, 1987, 62-312123**

**Int. Cl.$^5$ G06F** *12/00*

U.S. Cl. 364—200 5 Claims



1. A microprocessor for performing instruction execution by using pipelined processing, comprising:

a logical address register, which stores a logical address of a memory read or write operand;

a physical address register, which stores a physical address of a memory read or write operand;

a translation lookaside buffer (TLB), coupled to said logical address register and physical address register, to receive an upper value of the logical address, convert the upper value into a corresponding upper value of the physical address, and send it to said physical address register;

an on-chip cache memory comprising a tag memory having at least two (X and Y) sections and data memory also having at least two (X and Y) sections, said tag memory being coupled to said logical address register and containing a plurality of upper values of physical addresses for data in said data memory, said data memory being coupled to said physical address register and receiving a lower value of the physical address in said physical address register wherein access by the logical address to said tag memory is carried out prior to a corresponding access of the data memory by the physical address;

comparator means for comparing the upper value of physical address from said TLB and the upper value of physical addresses from sections (X and Y) of said tag memory and for outputting a result of comparison;

first storage means, coupled to said comparator means and said data memory, for storing the result of comparison indicating in which of the sections (X or Y) of said data memory a target data exists, and controlling said data memory so that only one of said sections (X and Y) is accessed; and

second storage means, coupled to said comparator means and said data memory, for storing the result of comparison which is a cache hit or a cache miss, and controlling said data memory to be accessed only when the result shows a cache hit.

---

### 5,018,062

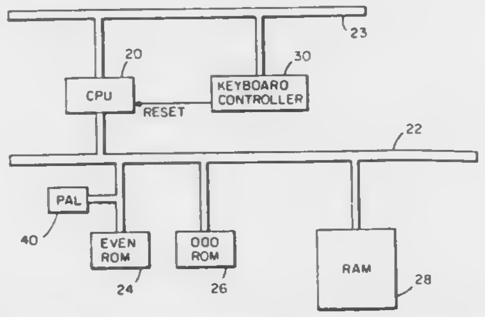
## METHOD AND APPARATUS FOR OVERRIDING A ROM ROUTINE IN RESPONSE TO A RESET

**David E. Culler, Boston; Gregory M. Papadopoulos, Arlington, and Richard P. Schneider, East Walpole, all of Mass., assignors to A.I. Architects, Inc., Cambridge, Mass.**

**Filed Oct. 23, 1987, Ser. No. 113,746**

**Int. Cl.$^5$ G06F** *9/36*

U.S. Cl. 364—200 15 Claims



1. A system comprising memory which includes read only memory (ROM) addressed by a microprocessor, the microprocessor responding to a reset signal to address an initialization routine in said ROM, the system further comprising:

an electronic device coupled between the ROM and the microprocessor to monitor addresses applied to the ROM, said electronic device being connected between the ROM and its socket, the device responding to an address applied to the ROM corresponding to the initialization routine by modifying a signal output from said ROM such that a jump from an address in ROM to another address in said ROM in the initialization routine is changed to a jump to another portion of memory other than said ROM which continues operation of the microprocessor without following the initialization routine; and

routines stored in memory other than said ROM for resetting the microprocessor and continuing operation of the microprocessor.

---

### 5,018,063

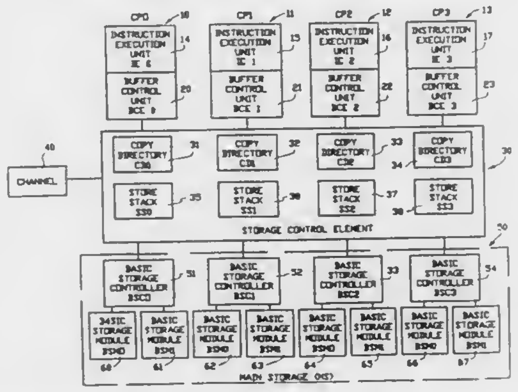
## METHOD FOR REDUCING CROSS-INTERROGATE DELAYS IN A MULTIPROCESSOR SYSTEM

**Lishing Liu, Pleasantville, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 5, 1988, Ser. No. 280,034**

**Int. Cl.$^5$ G06F** *12/00, 12/08, 12/14*

U.S. Cl. 364—200 7 Claims



1. In a multiprocessor computer system having:

a plurality of processors,

a local cache for each of said processors,

a main storage shared among said processors, and

a concurrency control scheme in which each line in said main storage may have one of at least two alternative states,

said first alternative state for a line permitting any processor to read from but not to write to said line, and

said second alternative state for a line being held by a particular processor and permitting only said particular processor to read from and to write to said line,

an improved method for fetching a line from said main storage into said local cache of one of said processors when another one of said processors holds said line in said second state,

said improved method comprising the steps performed by a multiprocessor computer system of:

requesting that the state of said line be changed to a state which allows said one processor to read from said line;

without waiting for said requested change in state to be made, provisionally fetching to the local cache of said one processor said line still held in said second state by said another processor;

confirming to said one processor upon making said requested change in state whether said line was modified after it was provisionally fetched; and

in the event said line was modified after it was provisionally fetched, refetching said modified line, whereby processing delays are reduced.

---

### 5,018,064

## VIRTUAL COMPUTER SYSTEM

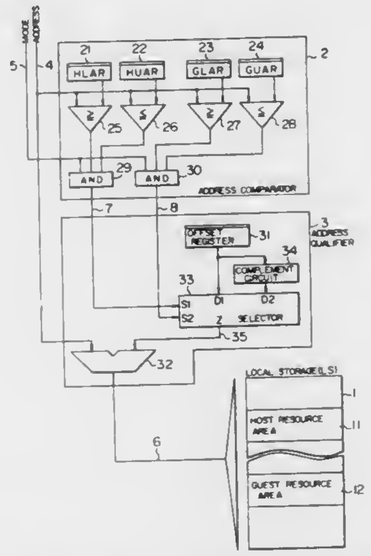
**Shinji Nakayama; Masaya Watanabe, and Shuichi Abe, all of Hadano, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 6, 1988, Ser. No. 215,789**

**Claims priority, application Japan, Jul. 8, 1987, 62-168636**

**Int. Cl.$^5$ G06F** *12/00, 12/08*

U.S. Cl. 364—200 4 Claims



1. A virtual computer system for initiating a guest computer by setting a state descriptor of the guest computer in a hardware resource area, the state descriptor being stored in a main storage and its address being indicated by a start interpretative execution (SIE) instruction, wherein the system comprises:

a local memory having a plurality of storage elements assigned to respective consecutively ordered addresses, wherein said plurality of storage elements include a plurality of first storage elements designated by a first continuous set of addresses, said first storage elements being defined as a hardware resource area for a host computer, and a plurality of second storage elements designated by a second continuous set of addresses, said second storage elements being defined as a hardware resource area for the guest computer, and wherein all or a part of the state descriptor of the guest computer is read out from the main storage and set in the hardware resource area for the guest computer when the SIE instruction is executed;

a mode latch for indicating whether said system is in a host computer mode or a guest computer mode;

means for detecting whether an address requested by the system is included in the first continuous set of addresses of the first storage elements;

means for generating an offset of addresses of the first storage elements and the second storage elements;

an access control unit for modifying the address requested by the system by applying the offset to address requested by the system when the mode latch indicates a guest computer mode and when said detecting means indicates the address requested by the system is included in the hardware resource area for the host computer, whereby the modified address represents an address of the hardware resource area for the guest; and

means for providing the local storage with the modified address.

---

### 5,018,065

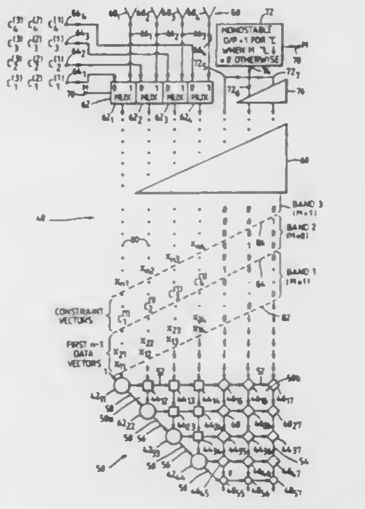
## PROCESSOR FOR CONSTRAINED LEAST SQUARES COMPUTATIONS

**John G. McWhirter, Malvern Wells, and Terence J. Shepherd, Malvern, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Filed Oct. 13, 1988, Ser. No. 256,999**

**Int. Cl.$^5$ G06F** *7/38*

U.S. Cl. 364—900 10 Claims



1. A processor for constrained least squares computations including a systolic array of boundary, internal and constraint cells connected to form rows and columns, and wherein:

(1) the rows include boundary cells connected to constraint cells via numbers of internal cells diminishing down the array by one per row to a row containing no internal cell,

(2) the columns comprise a first column having a boundary cell, intervening columns comprising individual boundary cells surmounted by respective numbers of internal cells increasing along the array by one per column, and at least one constraint cell column,

(3) the boundary cells have modes of operation in accordance with a QR decomposition rotation algorithm and comprising evaluating rotation parameters from respective stored elements and input data and updating stored elements,

(4) the internal and constraint cells have a mode of operation in accordance with the rotation algorithm and comprising

receiving evaluated rotation parameters and where necessary deriving their conjugates for application to respective stored elements and input data to provide rotated output data and updated stored elements,

(5) the array includes nearest neighbor cell interconnection lines providing for evaluated rotation parameters to pass along rows and rotated output data to pass down columns,

(6) the processor includes constraint column initializing means arranged to provide constraint cells with respective initial stored elements corresponding to constraint vector transformation by an R matrix of decomposed data,

(7) the array includes means for providing normalization factors corresponding to respective squared moduli of the results arising from constraint vector transformation by an R matrix of decomposed data and subsequent updating in accordance with the rotation algorithm,

(8) data input means are associated with the array for supplying first row boundary and internal cells with successive temporally skewed data vectors with each of such cells receiving one respective element per vector, and

(9) the array includes multiplying means arranged to generate cumulatively rotated constraint column outputs multiplied by cumulatively multiplied cosine or equivalent non-Givens rotation parameters and divided by respective normalization factors to produce residuals each derived from rotation parameters computed from a respective data vector and from stored elements prior to update with that data vector.

---

**5,018,066**

### SYSTEM FOR PROCESSING SALES DATA ON SLIPS USED IN RESTAURANTS

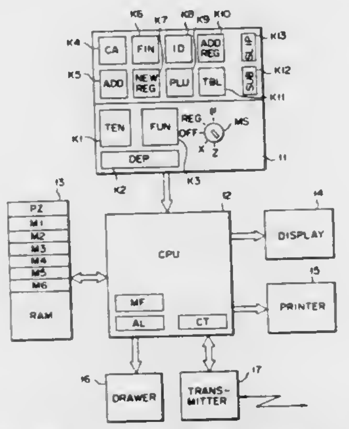
**Shinichi Yagi, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 868,636, May 29, 1988, abandoned. This application Dec. 9, 1988, Ser. No. 283,023**

**Claims priority, application Japan, Jun. 17, 1985, 60-131383**

**Int. Cl.$^5$ G06F *15/20***

U.S. Cl. 364—405 8 Claims



1. A system for processing data related to sale of items ordered from any one of a plurality of input terminals electrically coupled to a control apparatus, comprising:

a plurality of input terminals each of which includes:

(a) first means for ordering a new set of items for a given customer by inputting slip identification data uniquely assigned to said given customer, inputting sales data representing said new set of items ordered by said given customer, and associating such inputted slip identification data with such inputted sales data,

(b) arithmetic means for determining from the inputted sales data a new subtotal amount for the sales value of said new set of ordered items, and adding said new subtotal amount to a stored subtotal amount, if any, for a set of previously ordered items associated with such inputted slip identification data to obtain a current subtotal amount associated with said slip identification data; and

(c) second means for transmitting to a control apparatus said inputted slip identification data and said current subtotal amount associated therewith, if any, and for receiving from said control apparatus said stored subtotal amount associated with such inputted slip identification data; and

said control apparatus includes

(a) first means for receiving slip identification data and said current subtotal amount associated therewith, if any, from a selected one from among said plurality of input terminals, and for transmitting from said control apparatus to said selected input terminal a subtotal amount stored in said control apparatus and associated with a slip identification data received from said selected one input terminal,

(b) second means for storing a plurality of slip identification data with respective associated current subtotal amounts; and

(c) means to inhibit further transmission of the current subtotal amount associated with said received slip identification data to any input terminal after said associated current subtotal amount has been transmitted to said selected one input terminal and before a further associated subtotal has been received from said selected one input terminal.

---

**5,018,067**

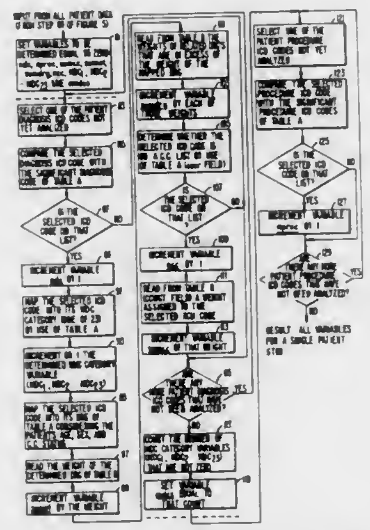
### APPARATUS AND METHOD FOR IMPROVED ESTIMATION OF HEALTH RESOURCE CONSUMPTION THROUGH USE OF DIAGNOSTIC AND/OR PROCEDURE GROUPING AND SEVERITY OF ILLNESS INDICATORS

**William C. Mohlenbrock, Del Mar; Peter J. Farley, Orinda; Lawrence J. Frye, Atherton; Donald E. Trummell, Jr., Daly City, and Alan G. Bostrom, San Francisco, all of Calif., assignors to Iameter Incorporated, San Mateo, Calif.**

**Continuation-in-part of Ser. No. 2,133, Jan. 12, 1987. This application Jul. 29, 1987, Ser. No. 79,654**

**Int. Cl.$^5$ G06F *15/21, 15/42***

U.S. Cl. 364—413.02 27 Claims



1. A method of monitoring the performance of a health provider in rendering medical services to a patient, comprising the steps of:

(1) predicting an outcome of treatment of the patient by the health provider by a method including the following steps executed on a computer:

converting into digital electronic signals input medical codes of at least a patient's principal diagnosis, any secondary diagnoses, any surgical procedures, sex and age,

identifying a few of an existing plurality of diagnostic and/or procedure groups of illnesses that are appropriate for either one of the surgical procedures signals or the principal diagnosis signals,

selecting from those few identified groups a single diagnostic or procedure group that is consistent with the signals of any secondary diagnoses and the patient's age and sex, and

calculating a sub-category within the single selected diagnostic or procedure group for predicting at least one outcome by a formula that mathematically combines various of the medical code input signals with constants unique to the single selected diagnostic or procedure group, the constants having been determined from a statistical analysis of a large amount of actual patient data within the single selected diagnostic or procedure group by use of the same formula;

(2) predicting from the calculated sub-category at least one outcome of patient treatment;

(3) comparing said predicted outcome with the actual outcome of patient treatment;

(4) monitoring the performance of health providers through use of said comparison; and

(5) providing counseling to said health provider if the performance level of the health provider falls below an established level.

---

**5,018,068**

### METHOD OF DETERMINING ENGINE RACING AND METHOD OF PREVENTING ENGINE RACING DURING SHIFT IN VEHICULAR AUTOMATIC TRANSMISSION

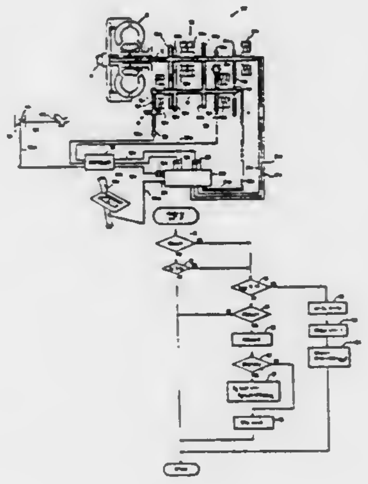
**Takashi Aoki, Saitama; Satoshi Terayama, Tokyo; Yoshihisa Iwaki, and Takamichi Shimada, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 2, 1989, Ser. No. 318,130**

**Claims priority, application Japan, Mar. 3, 1988, 63-50336; Mar. 30, 1988, 63-77487; Apr. 4, 1988, 63-103499**

**Int. Cl.$^5$ G05D *17/02;* B60K *41/08***

U.S. Cl. 364—424.1 19 Claims



12. A method of determining and preventing engine racing during an upshift in a power-on mode in an automatic transmission having clutches associated with respective gear positions, said method comprising the steps of:

detecting an input-output rotational speed ratio in a previous-gear-position clutch;

determining that engine racing has occurred when said input-output rotational speed ratio falls lower than a threshold which is slightly smaller than 1.0;

calculating a magnitude of the determined engine racing;

determining an amount of correction to prevent engine racing in subsequent power-on upshisfts based on the magnitude; and

correcting a control value of said previous-gear-position clutch based on said determined amount of correction to prevent engine racing in subsequent power-on upshifts.

---

**5,018,069**

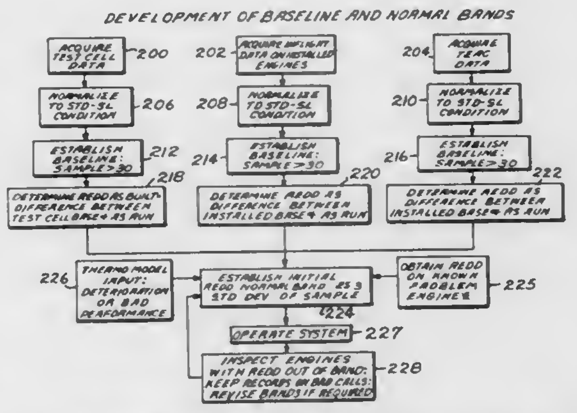
### REFERENCE SYSTEM AND METHOD FOR DIAGNOSING AIRCRAFT ENGINE CONDITIONS

**James L. Pettigrew, Fort Worth, Tex., assignor to Huwell Instruments, Inc., Fort Worth, Tex.**

**Filed Jul. 13, 1989, Ser. No. 379,220**

**Int. Cl.$^5$ G06F *15/20***

U.S. Cl. 364—424.04 29 Claims


DEVELOPMENT OF BASELINE AND NORMAL BANDS
ACQUIRE TEST CELL DATA
200
202
ACQUIRE INFLIGHT DATA ON INSTALLED ENGINES
204
ACQUIRE TEAC DATA
NORMALIZE TO STD-SL CONDITION
206
208
NORMALIZE TO STD-SL CONDITION
210
NORMALIZE TO STD-SL CONDITION
ESTABLISH BASELINE: SAMPLE>30
212
214
ESTABLISH BASELINE: SAMPLE>30
216
ESTABLISH BASELINE: SAMPLE>30
218
220
222
DETERMINE REDD AS BUILT-DIFFERENCE BETWEEN TEST CELL BASE & AS RUN
DETERMINE REDD AS DIFFERENCE BETWEEN INSTALLED BASE & AS RUN
DETERMINE REDD AS DIFFERENCE BETWEEN INSTALLED BASE & AS RUN
226
THERMO MODEL INPUT: DETERIORATION OR BAD PERFORMANCE
ESTABLISH INITIAL REDD NORMAL BAND AS 3 STD DEV OF SAMPLE
OBTAIN REDD ON KNOWN PROBLEM ENGINES
225
224
OPERATE SYSTEM
227
INSPECT ENGINES WITH REDD OUT OF BAND: KEEP RECORDS ON BAD CALLS: REVISE BANDS IF REQUIRED
228

1. A turbine engine diagnostic reference system for use with a turbine engine having performance related parameters and being subject to a plurality of causes of engine deterioration, comprising:

sensing means, located at operable positions of said turbine engine, for detecting the engine performance related parameters; and

processing means, electrically connected to said sensing means, for: (1) recording each sensed parameter as an actual function of another sensed parameter, (2) comparing the actual functions with predetermined standard baselines, (3) calculating deviations between the actual functions and the standard baselines, (4) comparing the deviations to predetermined normal deviations; and (5) outputting results of said comparisons;

indicating means for receiving from said processing means the performance related parameters and the results of said comparisons and for indicating the performance-related parameters and the results of said comparisons; and

diagnostic means for receiving from said processing means the results of said comparisons and for indicating particular causes of engine deterioration indicative of said comparisons.

---

**5,018,070**

### REAR WHEEL STEERING CONTROL SYSTEM FOR VEHICLE

**Takaaki Eguchi, Isehara City, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jul. 5, 1989, Ser. No. 375,630**

**Claims priority, application Japan, Jul. 5, 1988, 63-165934**

**Int. Cl.$^5$ B62D *5/04, 5/06***

U.S. Cl. 364—424.05 13 Claims

1. A steering control system for a vehicle, comprising;

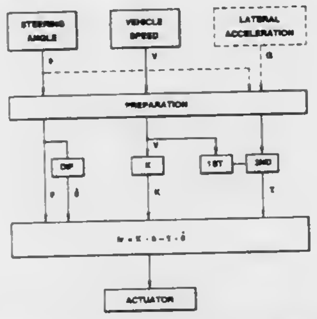
a rear steering actuator for varying an actual rear wheel steer angle of said vehicle in accordance with a control signal representing a desired rear wheel steer angle,

sensor means for sensing a steering angle of said vehicle,

controller means for determining a first product by multiplying a time rate of change of said steering angle by a deriva-

VOL
1126
ISS
3
MY
21
1991
UMI

tive coefficient, and producing said control signal in accordance with said first product, said controller means increasing said derivative coefficient with increase in a variable which is one of said steering angle and a lateral acceleration of said vehicle when said variable is greater than a predetermined threshold value.



---

5,018,071

### METHOD AND APPARATUS FOR CONTROLLING A GRINDER HAVING A SPINDLE WITH DEFLECTION SENSOR

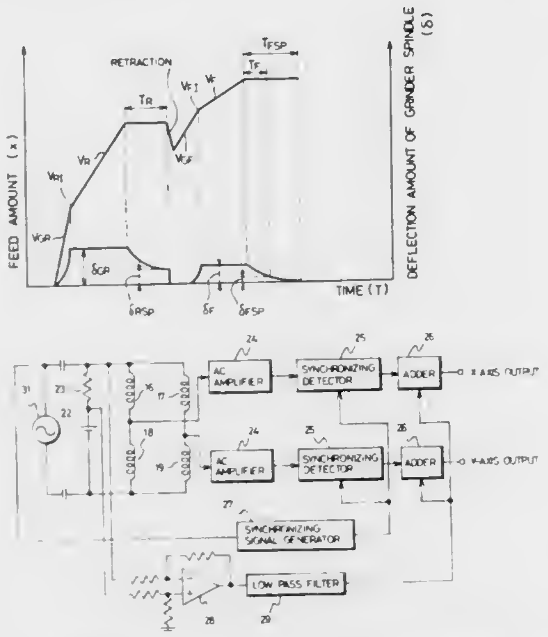
**Hiroyuki Kihara, and Hideki Omori, both of Narashino, Japan, assignors to Seiko Seiki Kabushiki Kaisha, Japan**

**Filed Nov. 23, 1988, Ser. No. 276,229**

**Claims priority, application Japan, Dec. 1, 1987, 62-183625[U]; Dec. 1, 1987, 62-304222; Aug. 23, 1988, 63-208796**

**Int. Cl.$^5$ G05B** *19/18*

**U.S. Cl. 364—474.17** **11 Claims**



1. An apparatus for controlling a grinder having a grinder having a spindle with deflection sensor means comprising:
- a motor;
- a grinding shaft driven by said motor;
- a grinding wheel mounted at an end portion of said grinding shaft for grinding a workpiece;
- feeding means for feeding the grinding wheel relative to the workpiece during a machining operation;
- deflection sensor means a part of which is disposed on the end portion of said grinding shaft for sensing a deflection of the end portion of said grinding shaft in terms of a change in inductance caused by the deflection during a machining operation and producing output signals representative of the amount of deflection; and
- control means for controlling a feeding amount of said grinding wheel toward the workpiece in response to the output signals of said deflection sensor means.

---

5,018,072

### OPTICALLY READABLE MAIL SYSTEM WITH GENERAL AND RECEIVER SPECIFIC INFORMATION

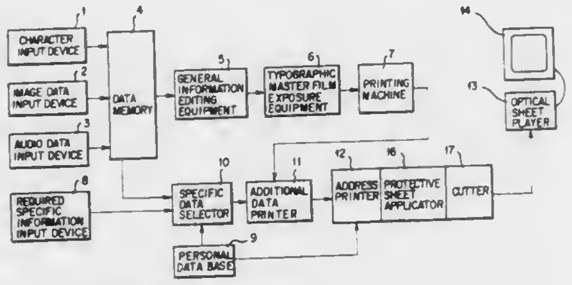
**Masahiko Ibamoto, Katsuta; Yasuo Morooka, Hitachi; Hiroaki Koyanagi, Katsuta; Manabu Sato, and Takeshi Mizumura, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 228,112, Aug. 4, 1990, abandoned. This application Mar. 13, 1990, Ser. No. 492,225**

**Claims priority, application Japan, Aug. 18, 1987, 62-204044**

**Int. Cl.$^5$ G06F** *15/20*

**U.S. Cl. 364—478** **31 Claims**



1. A mail system comprising:
- a composer selectively composing at least one of character information, image information and audio information;
- a printer printing the composite information as optically readable bit information on a plurality of recording elements;
- a first memory area storing specific information specifying at least one receiver of at least one of said recording elements;
- a second memory area storing information identifying items required by said receiver;
- a third memory area storing information related to the identified required items of said receiver;
- a selector selecting information corresponding to said identified required items of said receiver from said third memory area;
- a recorder recording said selected information corresponding to the required items of said receiver as optically readable bit information on said at least one of said recording elements; and
- a second recorder recording said specific information specifying said receiver on said at least one of said recording elements.

---

5,018,073

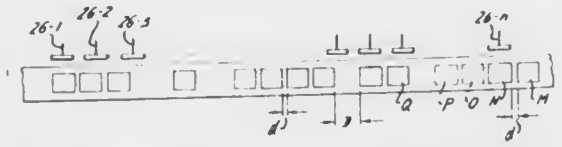
### HIGH DENSITY LOADED SORTING CONVEYORS

**Stanley Goldberg, Roseland, N.J., assignor to Goody Products, Inc., Kearny, N.J.**

**Filed Mar. 21, 1989, Ser. No. 326,675**

**Int. Cl.$^5$ G06F** *15/46*

**U.S. Cl. 364—478** **20 Claims**



1. A method operating a sorting conveyor that carries articles from a common location to diverters that are distributed along the conveyor at progressively greater distances from the common location, including the steps of preselecting which of the diverters is to remove each article from the conveyor, and establishing either a small separation or a substantially larger separation between each trailing article and its leading article on the conveyor in dependence on whether any trailing article or its leading article is first to be discharged from the conveyor by one of the diverters.

---

5,018,074

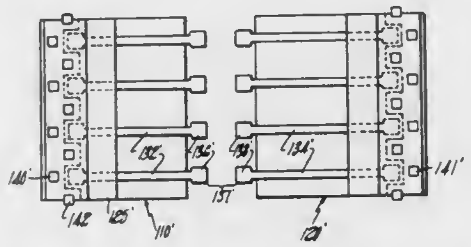
### METHOD OF MAKING GATE ARRAY MASKS

**J. Stephen Griffith, and Patricia L. Roberts, both of Colorado Springs, Colo., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Nov. 4, 1988, Ser. No. 267,198**

**Int. Cl.$^5$ G06F** *15/60*

**U.S. Cl. 364—490** **2 Claims**



1. A method of making a derivative set of masks for a set of integrated circuit gate array logic cells based on a column structure of gates, from a first set of masks containing a set of mask elements having predetermined characteristic dimensions and predetermined associated grid points, following a first set of design rules, comprising the steps of:
- specifying grid points and corresponding dimensions, in a first coordinate system, of a defining set of mask elements of said set of integrated circuit gate array logic cells, including said column structure, in accordance with said first set of design rules, whereby a digital representation of said defining set of mask elements is established that includes at least one grid point in said first grid system for each member of said defining set, said dimensions and location of all components of said defining set in said first coordinate system being stored in predetermined association with said at least one grid point;
- specifying corresponding reference points of all components in all cells of said set of integrated circuit gate array logic cells in terms of said first grid system, thereby establishing a first digital representation of said set of logic cells in which each component of said set of logic cells is represented by a reference grid position in said first grid system;
- storing said first digital representation of said symbolic representation in a storage medium;
- altering dimensions and grid positions in said coordinate system of said mask elements of said defining set in accordance with said second set of design rules, thereby defining a second grid system ranging over said defining set, whereby a nonlinear coordinate transformation is established between grid points of said defining set in said first grid system and corresponding grid points in said second grid system, and;
- in an automatic data processing system, stepping through said first digital representation of at least one other cell in said set of logic cells and transforming grid points of at least one component of said at least one other cell according to said defined transformation, whereby said at least one component of said at least one other logic cell is characterized by a second digital representation related to said second grid system and in accordance with said second set of design rules.

---

5,018,075

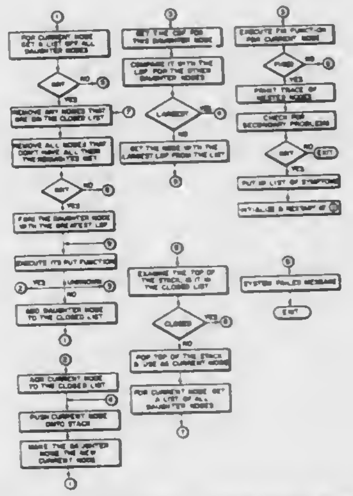
### UNKNOWN RESPONSE PROCESSING IN A DIAGNOSTIC EXPERT SYSTEM

**Charles P. Ryan, Phoenix; Thomas H. Howell, Scottsdale; Andrew Y. Pan, Phoenix, all of Ariz., and David W. Rolston, Santa Cruz, Calif., assignors to Bull Hn Information Systems Inc., Phoenix, Ariz.**

**Filed Mar. 24, 1989, Ser. No. 328,380**

**Int. Cl.$^5$ G06F** *15/18*

**U.S. Cl. 364—513** **4 Claims**



1. In a diagnostic expert system for solving a problem incorporating a cause-effect graph having a plurality of nodes and in which "yes", "no" and "unknown" are valid possible responsive inputs to a query, the method for processing in a computer which includes the following steps:
- (A) assign to each node in the cause-effect graph a local decision factor based on a given node's desirability for selection during a best-first search of the cause-effect graph;
- (B) assign to each node in the cause-effect graph a collapsed decision factor based on the values of the local decision factors for all daughter nodes of a current node; and
- (C) for the current node under examination having daughter nodes:
  - (1) obtain a first list of all of the current node's daughter nodes;
  - (2) examine the first list of daughter nodes and remove from the first list all daughter nodes on a closed list, a list of daughter nodes that have been visited before in examining a parent node of the current node which did not provide a solution to the problem, or whose prerequisites were not met;
  - (3) remove from the first list all daughter nodes which have prerequisites that are not met, and add them to the closed list;
  - (4) from the daughter nodes remaining on the first list, choose the daughter node with the largest local decision factor; and
  - (5) identify a test function to be executed for the chosen daughter node, and query the result of executing the identified test function;
    - (a) if the responsive input to a query produced in executing step (5) is a "yes", make the chosen daughter node the current node and return to step (C);
    - (b) if the responsive input to a query produced in executing step (5) is a "no", delete the chosen daughter node from the first list and add it to the closed list and return to step (C); and
    - (c) if the responsive input to a query produced in executing step (5) is an "unknown", compare the chosen daughter node's collapsed decision factor with the local decision factors for the other daughter nodes of

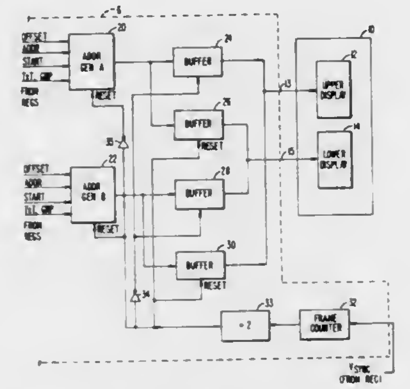
VOL
1126
ISS
3
MY
21
1991
UMI

the first list for the current node of the first list and which have their prerequisites met; and
- (i) if the collapsed decision factor of the chosen daughter node is larger than the local decision factors of the other daughter nodes of the list, make the chosen daughter node the current node and return to step (C); and
- (ii) if the collapsed decision factor of the chosen daughter node is not larger than the local decision factor of all of the daughter nodes of the first list, then choose the daughter node with the largest local decision factor and return to step (5).

---

### 5,018,076
### METHOD AND CIRCUITRY FOR DUAL PANEL DISPLAYS

**Aruo Johary, and Tetsuji Oguchi, botb of San Jose, Calif., assignors to Chips and Tecbnologies, Inc., San Jose, Calif.**
**Filed Sep. 16, 1988, Ser. No. 245,862**
**Int. Cl.⁵ G06F *15/62***
**U.S. Cl. 364—518** **24 Claims**



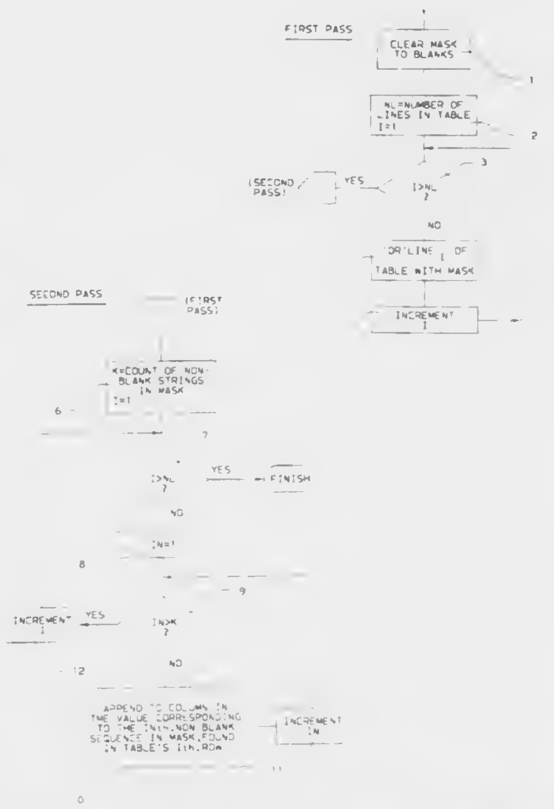
1. A data processing system comprising:
- a flat panel display system, including first and second flat panel displays adapted so as to appear to be essentially a single display; and
- a video controller including
- first and second address generators for generating first and second address information to drive said first and second displays,
- means for counting vertical sync position to identify first and second display frames,
- means for providing said first address information to drive said first display and said second address information to drive said second display during first display frames, and
- means for providing said second address information to drive said first display and said first address information to drive said second display during second display frames.

---

### 5,018,077
### DATA PROCESSING MACHINES

**Martin J. Healey, Winchester, England, assignor to International Business Machines Corporation, Armonk, N.Y.**
**Continuation of Ser. No. 208,306, Jun. 17, 1988, abandoned. This application Mar. 8, 1990, Ser. No. 492,242**
**Claims priority, application European Pat. Off., Jul. 8, 1987, 87306029.7**
**Int. Cl.⁵ G06F *15/626***
**U.S. Cl. 364—518** **5 Claims**

1. A data processing machine operable to automatically change the format of data to be printed or displayed and in which a set of stored data, nominally arranged in rows and columns, have items missing or stored in a non-uniform manner comprising:
- a) first means without predetermining the width of the columns for automatically recognizing and determining the column boundaries in each row of the set of data by determining the sequences of all blank areas and strips between all blank areas that contain sequences of non-blanks, and
- (b) second means for determining which rows of the set of data have missing items and for providing an indication in the row of the missing item whereby a control system of the machine is able to identify missing items and column boundaries before a new format of the set of data is produced.


FIRST PASS
CLEAR MASK TO BLANKS
NL=NUMBER OF LINES IN TABLE I=1
(SECOND PASS)
YES
I>NL ?
NO
'OR' LINE I OF TABLE WITH MASK
INCREMENT I
SECOND PASS
(FIRST PASS)
K=COUNT OF NON-BLANK STRINGS IN MASK I=1
I>NL ?
YES
FINISH
NO
IN=1
INCREMENT I
YES
IN>K ?
NO
APPEND TO COLUMN IN THE VALUE CORRESPONDING TO THE INth NON BLANK SEQUENCE IN MASK FOUND IN TABLE'S Ith ROW
INCREMENT IN
1
2
3
6
7
8
9
11
12

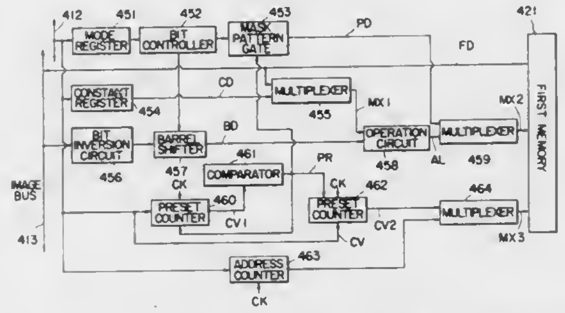
---

### 5,018,078
### APPARATUS AND METHOD FOR PROCESSING HUGE IMAGE INFORMATION AT HIGH SPEED

**Hitoshi Urabe; Hirosbi Korikawa; Kazuhiko Akimoto; Daisuke Nakaya, and Masahiko Mizuno, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
**Filed Dec. 8, 1988, Ser. No. 281,569**
**Claims priority, application Japan, Dec. 9, 1987, 62-311534; Jan. 20, 1988, 63-10509**
**Int. Cl.⁵ G06F *15/62***
**U.S. Cl. 364—518** **1 Claim**

1. An image processing apparatus comprising:
- an image bus operative to carrying bit map data;
- a CPU bus;
- a CPU having a main memory and being connected to said CPU bus;
- a sequencer connected between said CPU and said image data bus for transferring image data;
- a first memory for storing bit map data;
- a logical operational circuit, connected between said CPU bus and said image data bus as well as connecting to said first memory, memory and said image data bus;
- a common memory connected between said CPU bus and said image data bus;
- an expander and a third memory connected in series between said CPU bus and said image data bus;

- a raster image converter for generating a character bit map and a second memory connected in series between said CPU bus and said image data bus;
- a vector font memory which stores vector fonts necessary for generating said character bit map by said raster image converter and is connected to said CPU bus; and
- an output circuit which is connected between said CPU bus and said image data bus via a buffer and is connected to image recording devices via a buffer;
- wherein said logical operational circuit comprising a mode register and a constant register connected to said CPU bus, said mode register being operative to store selectable mode information from said CPU and said constant register being operative to store constant display data from said CPU, a bit inversion circuit connected to said image data bus, a barrel shifter for shifting bit data output of said bit inversion circuit controlled by a bit controller which is operated in accordance with output of said mode register, a mask pattern gate for outputting data in a predetermined pattern, a first multiplexer for inputting data read out from said first memory and an output of said constant register, an operation circuit which inputs an output of said barrel shifter and an output of said first multiplexer, a second multiplexer which inputs an output of said operation circuit and an output of said mask pattern gate and transfers a selected data to said first memory, a first preset counter and an address counter connected to said CPU bus, a comparator which compares value of clock in said first preset counter with a set value, a second preset counter which counts according to said clock as a preset value being output of said comparator, and a third multiplexer which inputs values of said address counter and said second preset counter and then transfer a selected data to said first memory.

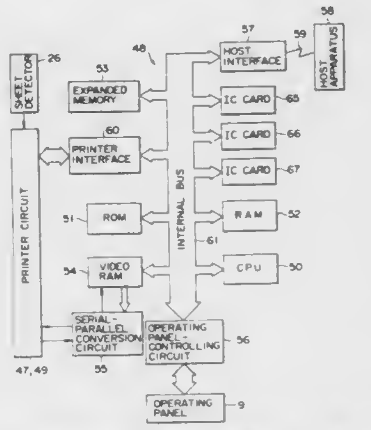


---

### 5,018,079
### IMAGE FORMING APPARATUS

**Hiroshi Shukunami, Yokohama; Yasufumi Tanimoto, Fujisawa, and Satoshi Onuma, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Tosbiba, Kawasaki, Japan**
**Filed Oct. 23, 1989, Ser. No. 426,073**
**Claims priority, application Japan, Oct. 24, 1988, 63-267506**
**Int. Cl.⁵ G06K *15/00***
**U.S. Cl. 364—519** **6 Claims**

1. An image forming apparatus for forming an image on an image formation medium from image data received from a plurality of host apparatuses, each image forming apparatus comprising:
- a plurality of means connected to the respective host apparatuses to receive image data from the host apparatuses;
- means for setting an order of priority for each of the plurality of connection means, the setting means including:
- first operating means for selecting the desired connection means, the first operating means including first key means for changing information incrementally or decrementally as to the connection means; second operating means for setting a priority order of the selected connection means, said second operating means including second key means for changing information incrementally or decrementally on the order of priority; and display means for indicating the selected connection means together with the priority order thereof, said display means including a message display region on which the information as to the connection means is displayed, and an order display region on which the information on the order of priority is displayed;
- means for storing the priority order set by the setting means;

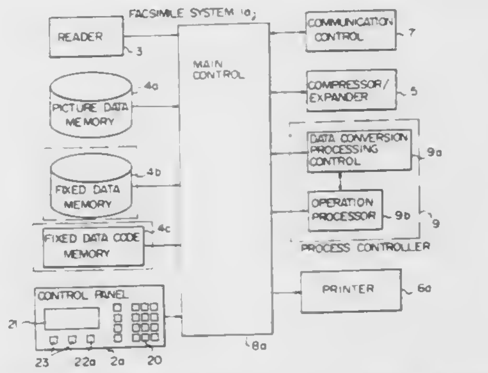


- means for sequentially selecting each of the plurality of connection means in accordance with the order of priority stored in the storing means if data is received simultaneously from two or more of the host apparatuses; and
- means for sequentially receiving image data in the order of priority from the connection means selected by the selecting means and forming images corresponding to the image data sequentially received from the connection means.

---

### 5,018,080
### PRINTER

**Yasubiro Inoue, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**
**Filed Jul. 3, 1990, Ser. No. 547,196**
**Claims priority, application Japan, Jul. 3, 1989, 1-172171**
**Int. Cl.⁵ G06K *15/00***
**U.S. Cl. 364—519** **11 Claims**



1. A printer capable of printing data upward from a last line of a page to a first line of the page on a printing medium, comprising: print specifying means for specifying a printing mode of the page, including an upright image printing mode for printing downward from the first line of the page and a reversed image printing mode for printing upward from the last line of the page;
- printing data storing means including a storage region which is connectable to receive data, for storing at least one page of data in dot line units;
- printing data reading means for reading the one dot line units from said printing data storing means and for providing the one dot line units as second data;

VOL
1126
ISS
3
MY
21
1991
UMI

reading direction specifying means for specifying an order to read the dot line units from said printing data storing means in accordance with the printing mode;
printing data processing means for providing printing data by reversing the second data from first to last to last to first when the reversed image printing mode is selected;
character storing means for storing fixed data;
fixed data forming means for selecting a portion of the fixed data;
fixed data storing means for storing the portion;
fixed data reading means for reading the portion from said fixed data storing means;
fixed data processing means for reversing the portion read by said fixed data reading means from said fixed data storing means, when the reversed image printing mode is selected; and
printing means for printing the printing data and the portion of the fixed data on the printing medium.

---

### 5,018,081
## PRINTER WITH AUTOMATIC RESTART

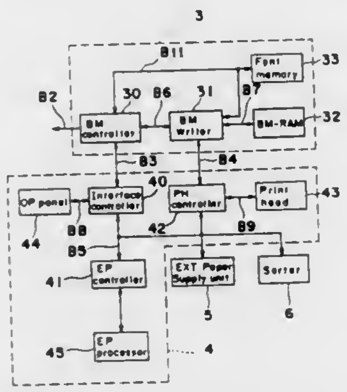
**Ikunori Yamaguchi, and Yoshikazu Ikenoue, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 294,783, Jan. 9, 1989, abandoned. This application Apr. 5, 1990, Ser. No. 506,566**

**Claims priority, application Japan, Jan. 7, 1988, 63-1697; Jan. 7, 1988, 63-1698**

**Int. Cl.$^5$ G03G *12/00***

**U.S. Cl. 364—519** **10 Claims**



1. A printer comprising:
interface means for receiving code data indicating printing information and control information sent from an external apparatus;
processing means for processing received code data to generate resultant data;
first memory means for storing said resultant data;
output means for outputting print data to a printing section of the printer in accordance with said resultant data stored in said first memory means;
signal generation means for generating a signal indicating when said printing section enters a predetermined state during operation of said printing section;
second memory means for storing format information regarding at least one page including the page being printed;
control means for stopping operation of said printing section when said signal is generated by said signal generation means and restarting said printing operation of the printing section in accordance with the format information stored in said second memory means when said predetermined state is terminated.

---

### 5,018,082
## GUIDANCE MESSAGE DISPLAY TIMING CONTROL USING TIME INTERVALS

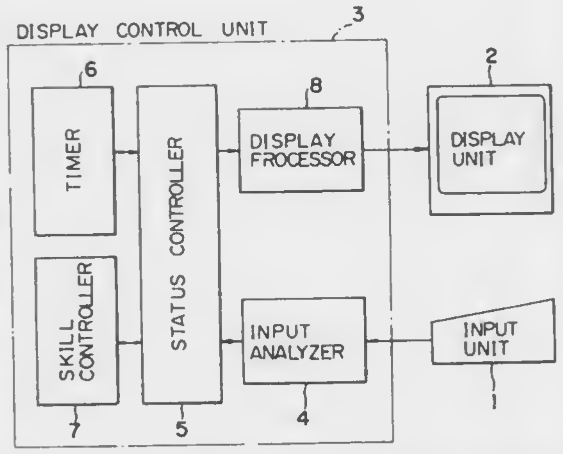
**Akihiko Obata, Mitaka, Japan; Motomitsu Adachi, Bedminister, N.J.; Hajime Kamata, Kawasaki, and Katsutoshi Yano, Tokyo, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 198,090, May 24, 1988, abandoned. This application May 7, 1990, Ser. No. 518,246**

**Claims priority, application Japan, May 25, 1987, 62-125763**

**Int. Cl.$^5$ G06F *15/18;* G09B *7/04***

U.S. Cl. 364—521 15 Claims



1. A display control unit of a guidance message display control system in terminal equipment for displaying a guidance message, the guidance message display control system also including an input unit, a display unit and a storage memory containing coordinate and status control tables, said display control unit comprising:
input data analyzing means, operatively connected to the input unit, for analyzing input data corresponding to an input operation based on the coordinate control table stored in the storage memory;
status control means, operatively connected to said input data analyzing means, for controlling display timing of the display unit based on the status control table stored in the storage memory;
timer means, operatively connected to said status control means, for counting an elapsed time and for setting a guidance display interval at every input operation, the guidance display interval corresponding to a skill level;
skill control means, operatively connected to said status control means, for controlling the skill level by increasing or decreasing the skill level at each input operation based on the elapsed time, the guidance display interval and correctness of the input operation, through a skill control table stored in the storage memory; and
display control means, operatively connected between said status control means and the display unit, for controlling a display status of the guidance message on the display unit,
wherein said status control means sends a request for the guidance display interval, prior to displaying the guidance message, to said skill control means, sends a command to set the guidance display interval given by said skill control means to said timer means, sends a request for an increment of the skill level to said skill control means when the input operation is correct, and sends a request for a decrement of the skill level to said skill control means when the input operation is incorrect.

---

### 5,018,083
## IMAGE PROCESSING SYSTEM

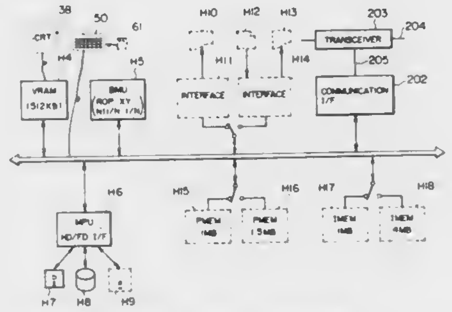
**Yasuhiro Watanabe, Yokohama; Takahiro Kato, Tokyo; Masayuki Utsumi, Tokyo; Masaki Hamada, Tokyo; Hiroshi Takakura, Yokohama; Taketo Hasegawa, Tokyo; Masaaki Shimizu, Sagamihara; Masaki Sagoh, Kawasaki; Fumio Furukawa, Tokyo; Yasuhisa Ishizawa, Yokohama; Takashi Minagawa, Yokohama; Kensaku Tanaka, Yokohama, and Kenzoh Ina, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 797,831, Nov. 13, 1985, abandoned. This application Jan. 31, 1989, Ser. No. 304,000**

**Claims priority, application Japan, Nov. 14, 1984, 59-239993; Nov. 14, 1984, 59-239994; Nov. 19, 1984, 59-243914; Nov. 19, 1984, 59-243915; Nov. 19, 1984, 59-243916; Nov. 19, 1984, 59-243917; Nov. 19, 1984, 59-243918; Nov. 19, 1984, 59-243919; Nov. 19, 1984, 59-243920; Nov. 19, 1984, 59-243921**

**Int. Cl.$^5$ G06F *15/20***

U.S. Cl. 364—523 55 Claims



1. An image processing system comprising:
display means for displaying image information including plural kinds of image information;
first memory means for storing the image information displayed by said display means;
instruction means for generating an instruction for extracting a desired area of the image information;
second memory means for storing the desired area of image information extracted in accordance with the instruction from said instruction means;
third memory means for storing information that indicates the kind of image information stored in said second memory means; and
control means for controlling said display means also to display a symbol selected in accordance with the information stored in said third memory means, whereby the kind of image information stored in said second memory means is indicated by the symbol.

---

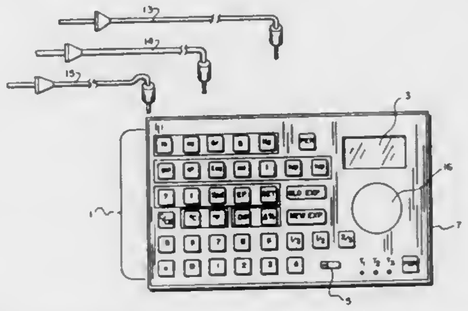
### 5,018,084
## DARKROOM CALCULATOR

**Steven J. Frank, 99 Pond Ave., Brookline, Mass. 02146**

**Filed Jan. 30, 1989, Ser. No. 303,639**

**Int. Cl.$^5$ G03B *7/00;* G06F *9/00***

U.S. Cl. 364—525 **19 Claims**



1. An apparatus for calculating and displaying adjusted values of at least one photographic parameter relating to darkroom photography, said apparatus comprising:
a. input means for entering values corresponding to at least two of the parameters exposure duration, lens aperture, paper speed and exposure factor, and a second set of values of at least one of the parameters exposure duration, lens aperture, paper speed and exposure factor, said second set of values comprising one fewer element than said first set;
b. processor means responsive to said input means adapted for receiving signals representative of said first and second sets of values and normalizing the differences to compute the adjusted value of the photographic parameter for which a value was entered in said first set of values but not in said second set, said adjusted value reflecting the value of said photographic parameter necessary to restore the exposure inherent in the values of said second set of parameters to that inherent in the values of said first set of parameters; and
c. display means for presenting the adjusted value.

---

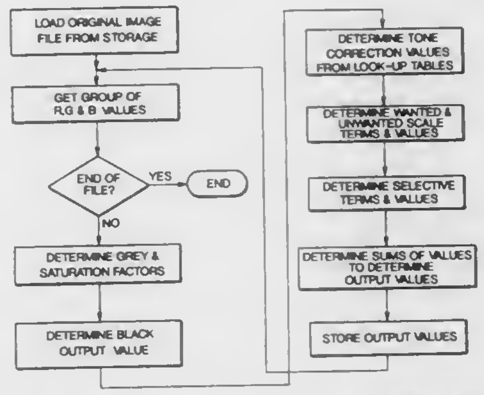
### 5,018,085
## COLOR PRINTING SYSTEM USABLE FOR REPRODUCTION OF COMPUTER-GENERATED IMAGES

**Jack E. Smith, Jr., Independence, Mo., assignor to Hallmark Cards, Inc., Kansas City, Mo.**

**Filed Jun. 16, 1988, Ser. No. 207,724**

**Int. Cl.$^5$ G06F *15/20, 15/62;* H04N *9/67***

U.S. Cl. 364—526 **8 Claims**


LOAD ORIGINAL IMAGE FILE FROM STORAGE
GET GROUP OF R,G & B VALUES
END OF FILE?
YES
END
NO
DETERMINE GREY & SATURATION FACTORS
DETERMINE BLACK OUTPUT VALUE
DETERMINE TONE CORRECTION VALUES FROM LOOK-UP TABLES
DETERMINE WANTED & UNWANTED SCALE TERMS & VALUES
DETERMINE SELECTIVE TERMS & VALUES
DETERMINE SUMS OF VALUES TO DETERMINE OUTPUT VALUES
STORE OUTPUT VALUES

1. A method for controlling production of black and cyan, magenta and yellow chromatic colors in reproduction of images, comprising the steps of supplying original image digital data in the form of groups of input data each of which defines R, G and B values variable within a certain range and respectively corresponding to intensity values of red, green and blue component colors of an individual pixel of an original image, and digitally processing said groups of input data to produce from each group of input data a corresponding group of output digital data for control of reproduction of an individual pixel of said original image in at least three output colors, said processing of said groups of input data including the steps of determining from said R, G and B values for each original image pixel a grey factor corresponding to whichever of said R, G and B values represents the least effective intensity, determining an output black value as a function of said grey factor, producing cyan, magneta and yellow color values which are such as to obtain a color reproduction of each original image pixel having a color other than grey, and producing cyan, magenta and yellow output chromatic values from said color values for use with said output black value in reproduction of each said original image pixel, said producing of said cyan, magenta and yellow color values including the steps of determining from said R, G and B values a saturation factor corresponding to whichever of said R, G and B values represents the greatest

VOL
1126
ISS
3
MY
21
1991
UMI

intensity, and thereafter determining each of said cyan, magenta and yellow output color values as a direct function of calibration values and said grey factor, said saturation factor and said R, G and B values for each original image pixel to produce a tone correction for each pixel.

---

### 5,018,086

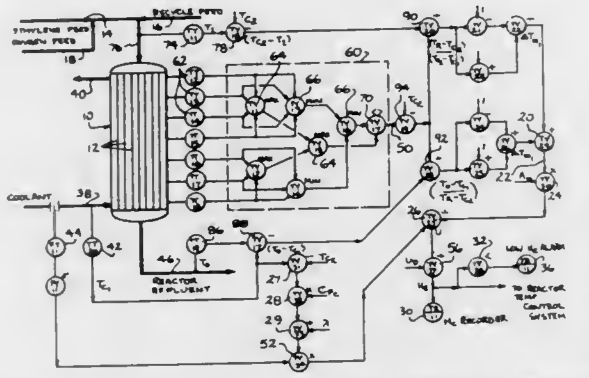
## FAULT DETECTION IN OLEFIN OXIDATION REACTOR

**Suresh C. Agarwal, Euclid, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.**

**Continuation-in-part of Ser. No. 370,703, Apr. 22, 1982, Pat. No. 4,488,239. This application Nov. 12, 1982, Ser. No. 440,930**

**Int. Cl.$^5$ G06F *15/46***

**U.S. Cl. 364—557** **3 Claims**



1. An alarm system for a reactor for containing a reaction and having coolant supply means for supplying coolant to the reactor, the reactant supply means for supplying reactant to the reactor in heat transfer relationship with the coolant over a heat transfer area (A) and effluent discharge means for discharging effluent from the reactor, comprising:

coolant flow rate means for measuring the flow rate of coolant ($F_c$) to the reactor;

means for providing values corresponding to the heat of vaporization (λ) the boiling temperature ($T_{c2}$) and the specific heat ($C_{pc}$) of the coolant;

inlet temperature measuring means for measuring the inlet temperature ($T_{c1}$) of the coolant to the reactor;

means for determining the log mean temperature difference ($\Delta T_m$) across the reactor; and

circuit means for calculating the actual heat transfer coefficient (U) of the heat transfer area according to the relationship:

$$U = \frac{F_c}{A\Delta T_m}\left[C_{pc}(T_{c2} - T_{c1}) + \lambda\right]$$

means for providing a value corresponding to a desired design heat transfer coefficient ($U_D$), said circuit including means for establishing a heat transfer effectiveness ($H_e$) of the reactor according to the relationship:

$H_e = U/U_D$;

comparison means connected to said circuit for comparing a calculated actual heat transfer effectiveness to a lower limit for heat transfer effectiveness of the reactor below which a fault exists; and

alarm means connected to said comparator means for activating an alarm when the actual heat transfer effectiveness falls below the lower limit therefor.

---

### 5,018,087

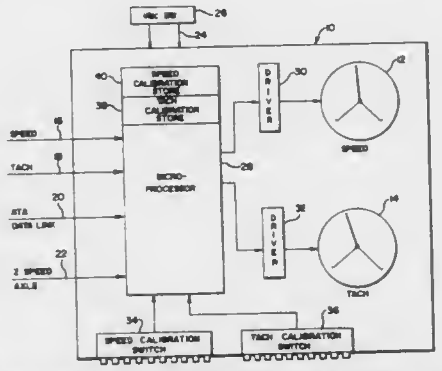
## PROGRAMMING SIGNAL SOURCE AND CALIBRATION DATA FOR A SPEEDOMETER/TACHOMETER WITH CALIBRATION SWITCHES

**Robert D. Dannenberg, Garrett, Ind., assignor to Navistar International Transportation Corp., Chicago, Ill.**

**Filed Nov. 3, 1989, Ser. No. 431,502**

**Int. Cl.$^5$ G01P *21/02, 21/00;* G06G *7/70***

**U.S. Cl. 364—571.01** **20 Claims**



1. In an automotive vehicle which has a multi-component powertrain that imparts motion to the vehicle and an instrumentation system, including a meter that is operated by an operating signal from a microprocessor to indicate the operational speed of a particular powertrain component, and wherein the meter operating signal must be calibrated to such particular powertrain component so that the meter accurately presents the operational speed of the particular powertrain component, an improved calibration means for calibrating the meter operating signal which comprises a fixed preset calibration that is stored in a non-volatile memory of the microprocessor, a first speed signal input for receiving from a sensor associated with said particular component an uncalibrated speed signal, a second speed signal input for receiving a pre-calibrated speed signal from a data link, and a combined calibration and selection means that is read by the microprocessor to calibrate the meter operating signal, said combined calibration and selection means comprising selection switch means operable to a first setting to cause the meter to be operated by the pre-calibrated speed signal received at said second speed signal input, to a second setting to cause the meter to be operated by the uncalibrated speed signal received at said first speed signal input, as calibrated by the fixed preset calibration that is stored in such non-volatile memory of the microprocessor, and to any selected setting of multiple additional settings to cause the meter to be operated by the uncalibrated speed signal input received at said second speed signal input, as calibrated by a particular calibration factor established by the particular selected setting of said multiple additional settings.

---

### 5,018,088

## ADAPTIVE LOCALLY-OPTIMUM DETECTION SIGNAL PROCESSOR AND PROCESSING METHODS

**James H. Higbie, Catonsville, Md., assignor to The Johns Hopkins University, Baltimore, Md.**

**Filed Oct. 2, 1989, Ser. No. 415,697**

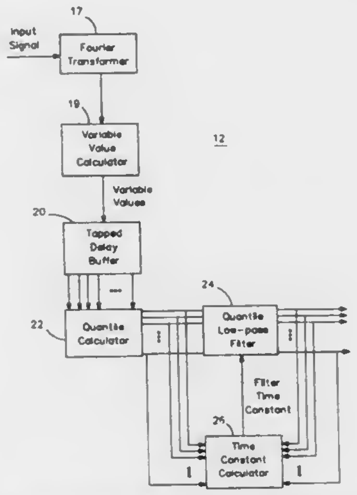
**Int. Cl.$^5$ G01T *1/16***

**U.S. Cl. 364—574** **30 Claims**

1. A signal processor for suppressing interference in an input signal comprising:

(a) means for estimating a set of quantiles of the probability distribution of a dynamic variable of said input signal;

(b) means for calculating a mapping from said set of quantiles; and



(c) means for applying said mapping to said input signal to suppress said interference; wherein said mapping provides locally-optimum detection of a signal of interest.

---

### 5,018,089

## LOGIC SIMULATION METHOD AND APPARATUS

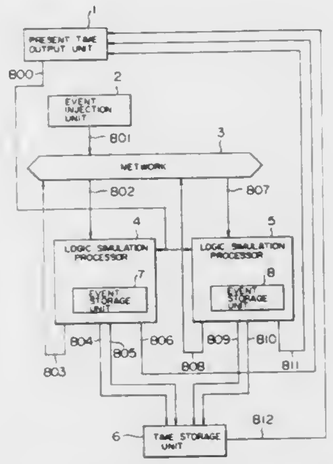
**Kiyoshi Kanazawa, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Mar. 6, 1989, Ser. No. 319,319**

**Claims priority, application Japan, Mar. 10, 1988, 63-56615**

**Int. Cl.$^5$ G06F *15/60, 15/22***

**U.S. Cl. 364—578** **4 Claims**



3. A logic simulation apparatus for simulating operations of a logic circuit comprising a plurality of logic elements by employing an event driven algorithm wherein (1) a set of events represent changes in status of signals at input and output terminals of said logic elements, (2) each event includes (i) element-terminal data indicating an input or output terminal of a logic element to which the event relates, (ii) event time data indicating a time when a status change occurs at the element-terminal and (iii) status data indicating a status to which the signal at the element-terminal changes, (3) an event is determined to be acceptable for current processing according to said algorithm based on coincidence of its said event time data with the current time which occurs when said event relates to a logic element having a changed signal status at its input terminal which causes a change in calculated signal status at its output to be calculated such that an event representing said change in calculated signal status at said output terminal is newly generated according to said algorithm, said apparatus comprising:

(a) a current time output unit for outputting a renewable current time indication;

(b) an event injection unit for producing a set of produced events to be applied to input terminals of said logic elements and for arranging said set of produced events in a particular order, each of said produced events representing a change in status of a signal applied to a said input terminal of said logic circuit and being provided with an identifier to distinguish it from newly generated events calculated according to said algorithm and auxiliary time data indicating a minimum event time of all produced events positioned subsequent thereto in said order;

(c) a logic simulation processor employing said algorithm to calculate changes in signal status in said logic circuit responsive to events received from said event injection unit, said processor including (i) an event storage unit for storing events received from said event injection unit as unprocessed events, (ii) means for taking out and deleting from among said unprocessed events stored in said event storage unit an event having an event time data coincident with the current time, (iii) means for processing said taken out event according to said algorithm to output a new event as an unprocessed event to be inputted to said event storage unit of the processor, and (iv) means for determining whether an unprocessed event is stored in said event storage unit which has event time data coincident with the current time; and

(d) a time storage unit for storing, when each of said produced events is stored in said event storage unit, its associated auxiliary time data; and

wherein said current time output unit includes means for comparing the current time indication with the auxiliary time stored in said time storage unit and means for renewing the current time, responsive to (i) a determination by said deciding means that no event is stored in said event storage unit which has event time data coincident with the current time and (ii) a determination by said comparing means that said current time is earlier than an item of said auxiliary time data stored in said time storage unit, up to a time not exceeding said auxiliary time data stored in said time storage unit, and

wherein each of said elements (a)–(d) are operable concurrently.

---

### 5,018,090

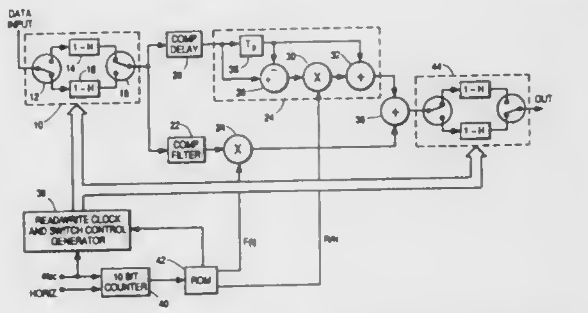
## DIGITAL INTERPOLATION CIRCUITRY

**Shinichi Shiratsuchi, Yokohama, Japan, assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Mar. 13, 1990, Ser. No. 493,020**

**Int. Cl.$^5$ G06F *15/31***

**U.S. Cl. 364—723** **6 Claims**



1. A sampled data interpolator comprising:

an input terminal for receiving a sampled data input signal;

a linear interpolator coupled to said input terminal for providing linearly interpolated samples at an output terminal thereof;

VOL
1126
ISS
3
MY
21
1991
UMI

a finite impulse response filter coupled to said input terminal, for providing filtered samples corresponding to a compensating signal;

weighting means, coupled to said filter, for scaling said compensating signal by a normalized sinc function to provide scaled samples at an output terminal thereof; and

means, coupled to the output terminals of said weighting means and said linear interpolator for additively combining said linearly interpolated samples and said scaled samples.

---

### 5,018,091

### DISCRETE FOURIER TRANSFORM CALCULATING PROCESSOR COMPRISING A REAL-TIME TESTING DEVICE

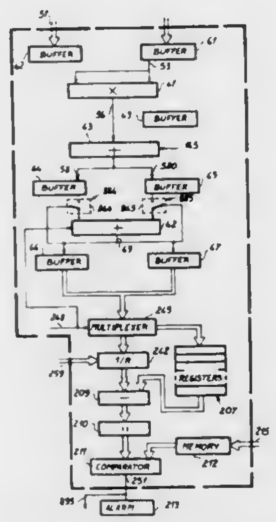
**Arnand du Chene; Bernard Dias, both of Paris, and Gérard Bergeon, Maisons Alfort, all of France, assignors to Thomson-CSF, Paris, France**

**Continuation of Ser. No. 45,881, May 4, 1987, abandoned. This application Jun. 23, 1989, Ser. No. 370,072**

**Claims priority, application France, May 6, 1986, 86 6544**

**Int. Cl.$^5$ G06F** *15/40*

**U.S. Cl. 364—726** **2 Claims**



1. A device for calculating a discrete Fourier transform and for conducting a comparison according to Parseval's equation comprising:

input buffer memory means for receiving input data;

multiplication means connected to said buffer memory means;

addition means and second buffer memory means interconnected with said multiplication means for performing the operations necessary to calculate the various terms of said discrete Fourier transform;

output buffer memory means for transmitting said calculated terms;

memory means for storing and delivering said input data and said calculated terms; and

controlling means for controlling the operation of said input buffer memory means, said multiplication means, said addition means and said second buffer memory means, said output buffer memory means, and said memory means;

first switching means connected between said input buffer memory means and said multiplication means and controlled by said controlling means for allowing said multiplication means to square said input data during a testing operation according to Parseval's equation;

second switching means connected to an output of said addition means and alternatively for connecting an input of said addition means to said output of said addition means to form an accumulator and connecting to said second buffer memory means;

subtracter means for subtracting a left side from a right side of Parseval's equation as calculated by said multiplication means and addition means when they are connected by said first and second switching means for the testing operation; and

comparison means for comparing an absolute value of the difference between the right side and the left side of Parseval's equation provided by said subtracting means and a tolerance value.

---

### 5,018,092

### STACK-TYPE ARITHMETIC CIRCUIT

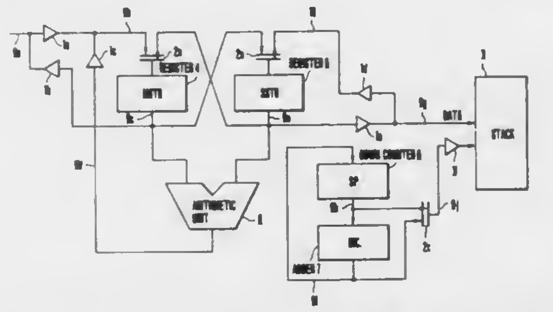
**Kuniharu Hashimoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Oct. 16, 1989, Ser. No. 421,983**

**Claims priority, application Japan, Oct. 18, 1988, 63-260611**

**Int. Cl.$^5$ G06F** *7/38*

**U.S. Cl. 364—736** **4 Claims**



1. A stack-type arithmetic circuit which has a stack structure for holding data to be operated, and which performs an operation by an arithmetic unit using the data to be operated on, comprising:

a first register having input and output terminals;

an external bus connected to the terminals of said first register;

buffers connected between said terminals and said bus for holding the latest value pushed by said arithmetic circuit;

a second register, having input and output terminals connected to the output and input terminals of said first register, respectively, for holding an immediately preceding value of the latest value;

wherein the outputs from said first and second registers are supplied to said arithmetic unit, and an output result from said arithmetic unit is returned to said first register;

a stack for holding remaining data to be operated; and

a stack pointer to access said stack, the stack pointer having a down counter and an adder, the adder adding one digit to the output of the down counter, wherein the output from said adder is used as the write address to said stack and the value in said down counter is updated by the output of said adder when a PUSH instruction is executed to said stack, and the output from said down counter is used as the read out address to said stack and the value in said down counter is decremented when a POP instruction is executed to said stack.

---

### 5,018,093

### HIGH PERFORMANCE SELF-CHECKING ADDER HAVING SMALL CIRCUIT AREA

**Feng-Hsien W. Shih, Yorktown Heights, N.Y., assignor to IBM Corporation, N.Y.**

**Filed Jan. 2, 1990, Ser. No. 459,872**

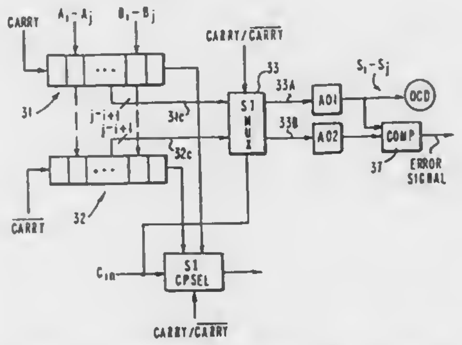
**Int. Cl.$^5$ G06F** *11/16, 7/50*

**U.S. Cl. 364—740** **17 Claims**

1. A circuit for checking for faults in an adder stage having a first ripple adder and a second ripple adder said first ripple

adder having a variable carry input and said second ripple adder having a carry input opposite that of said first adder, said checking circuit comprising:

means for selecting an output of one of said ripple adders in response to said variable carry input and to a carry output from a previous stage;



first means for storing said selected output when said variable carry input is equal to a first value;

second means for storing said selected output when said variable carry input is equal to a second value; and

means for providing an error signal in response to said stored outputs.

---

### 5,018,094

### DUAL INCREMENTER

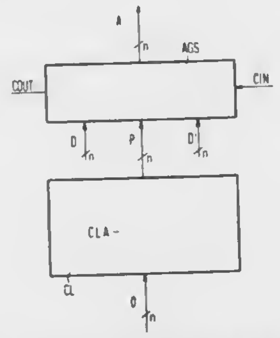
**Horst Fischer, Haar; Wolfgang Rohsaint, and Mohammed Hmimid, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jul. 13, 1989, Ser. No. 379,269**

**Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829413**

**Int. Cl.$^5$ G06F** *7/50*

**U.S. Cl. 364—770** **9 Claims**



1. A dual incrementer for modifying an n-digit input binary number (D) by one unit into an n-digit output binary number (A), said incrementer comprising, in combination,

a first circuit (CL), having n inputs to which the binary digits of the input binary number (D) are supplied and having n outputs, and in the case of an input binary number (D) consisting of n $(i=0,1 \ldots n-1)$ binary digits $(d(i))$, this first circuit (CL) supplies a switch signal $(p(i))$ at each of n outputs $(i=0,1 \ldots n-1)$ from said n outputs,

an output stage (AGS), having n inputs for receiving said switch signals and having n inputs for receiving the n binary digits of the input binary number (D) and n corresponding outputs for supplying the n binary digits of the output binary number (A), and as for the binary digit $i=0$, an inverted binary value of the received binary digit $(d(o))$ is applied at the output of said output stage for this binary digit, and as for each of the other remaining outputs i of said output stage $(i=1, \ldots n-1)$, the binary value of the received binary digits $(d(i))$ is applied at the corresponding output, where a switch signal $(p(i-1))$ is received from the first circuit (CL), which switch signal corresponds to the binary digit $i-1$.

---

### 5,018,095

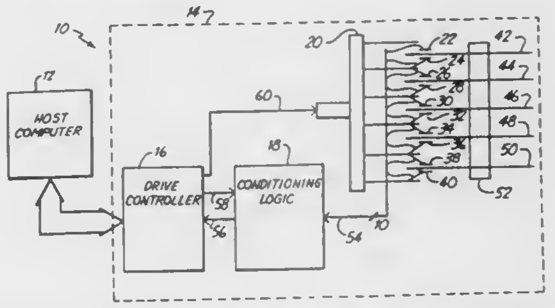
### UNIVERSAL DISK DRIVE TYPE EMULATION FOR IBM PC-AT COMPUTERS

**Haim N. Nissimov, West Hills, Calif., assignor to Seagate Technology, Inc., Scotts Valley, Calif.**

**Filed Feb. 15, 1990, Ser. No. 480,650**

**Int. Cl.$^5$ G06F** *9/00, 13/12*

**U.S. Cl. 364—900** **48 Claims**



1. A disk drive for use in a data storage system of the type having a computer coupled to the disk drive, the disk drive comprising:

storage media having a physical storage capacity, the storage media provided for storing data;

transducer means for reading the data from the storage media and for writing the data to the storage media;

configuring means for receiving a plurality of first signals representing first logical drive address parameters, for determining the physical storage capacity of the storage media, and for generating second signals representing second drive address parameters determined based on the first logical drive address parameters and the physical storage capacity of the storage media; and

controller means, coupled to the transducer means and the configuring means and provided for connection to the computer, for controlling the disk drive as a function of the first logical drive address parameters and second drive address parameters.

---

### 5,018,096

### SECURITY ADMINISTRATOR FOR AUTOMATICALLY UPDATING SECURITY LEVELS ASSOCIATED WITH OPERATOR PERSONAL IDENTIFICATION DATA

**Mitsunobu Aoyama, Oome, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 23, 1988, Ser. No. 289,159**

**Claims priority, application Japan, Dec. 28, 1987, 62-334755**

**Int. Cl.$^5$ G06F** *12/14, 1/00;* **H04L** *9/00*

**U.S. Cl. 364—900** **15 Claims**

1. A data processing system, having at least one input means, for authorizing access to a plurality of files stored in a memory means by a plurality of operators wherein each of said plurality of operators is authorized to access said files based on operator personal identification data stored in a first portion of said memory means and a plurality of security levels stored in a second portion of said memory means, the system comprising:

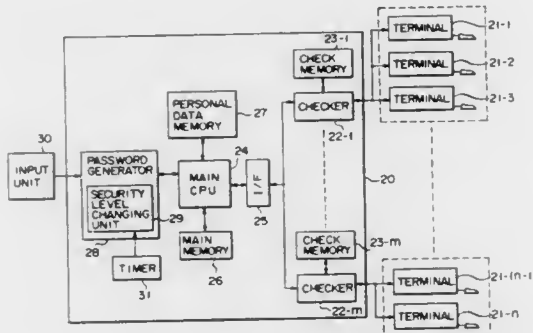
security administration means connected to said memory means for assigning a security level associated with operator personal identification data associated with one of said plurality of operators and for storing said security level in said second portion of said memory means;

security level changing means, coupled to said security adminstration means, for automatically detecting updating of said operator personal identification data and for reassigning the security level of said operator in accordance

VOL
126
ISS
3
MY
21
1991
UMI

with the updated operator personal identification data; and

checking means, coupled to said input means and said memory means, for comparing access information input by an operator with said stored operator personal identification data and for permitting access if said input access information corresponds to said stored operator personal identification data and for prohibiting access if said input access information does not correspond to said stored operator personal identification data.



---

### 5,018,097
### MODULARLY STRUCTURED DIGITAL COMMUNICATIONS SYSTEM FOR INTERCONNECTING TERMINAL EQUIPMENT AND PUBLIC NETWORKS, AND HAVING OPERATION AND RELIABILITY PROGRAMS

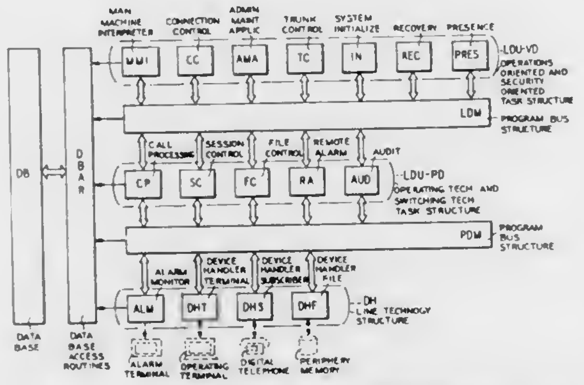
**Klaus Kuhlmann, Munich; Siegfried Elstner, Eichenau; Manfred Sonnemann, Alling, all of Fed. Rep. of Germany; Franz Schweiger, Vienna, Austria; Axel Verlohr, Munich, Fed. Rep. of Germany; John Muyssen, Evergem, Belgium, and Roger Lybeer, B Destelbergen, Fed. Rep. of Germany, assignors to Siemens Akitiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Aug. 19, 1988, Ser. No. 233,750**

**Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3727942; Aug. 21, 1987, 3727952; Aug. 21, 1987, 3727954; Jun. 13, 1988, 3820072**

**Int. Cl.$^5$ G06F** *3/00, 15/46, 15/20*

**U.S. Cl. 364—900** **29 Claims**



1. A modularly structured digital communications system for connecting terminal equipment to one another and to public networks comprising:

at least one operating technology terminal equipment;

at least one alarm indicting terminal equipment indicating alarm reports acquired from system-security-oriented test procedures; and

a central system computer having a system data base and at least one multi-tasking operating system, said central computer system further comprising

means for administration of a line technology task structure having apparatus program modules for interfacing with types of terminal equipment for generating logical messages and operating technology messages from inputs received from at least one of the terminal equipment and operating technology terminal equipment, and for outputting setting data corresponding to the type of terminal equipment and acquired from at least one of logical messages, operating technology messages, and alarm messages, the setting data being provided for at least one of terminal equipment and operating technology terminal equipment and alarm indicating terminal equipment,

means for administration of operating technology and switching technology coordination task structure having an operations-oriented coordination program module for the control of the operations-oriented information and data flow, having switching procedure program modules that, independent of the type of terminal equipment and independent of communications services, are structure for forming logical sub-processes of the overall switching process such that further performance feature program modules for the activation and de-activation of corresponding control procedures are formed in addition to at least one connection control program module for the control of set up and clear down of connections, and having at least one security-oriented check and evaluation program module for the implementation of non-time-critical, security-oriented check and evaluation events,

means for the administration of an operations-oriented and security-oriented application task structure having application program modules for the execution of application-oriented functions,

whereby at least one part of the program modules are respectively individually accessible to the data base via defined data base access routines, and

means for connecting the line technology task structure to the operating technology and switching technology coordination task structure and to the operations-oriented and security-oriented application task structure, having a program bus structure having at least one transmission protocol which operates independently of the communications service and the type of terminal equipment for the message communicated thereover formed and administered by the at least one multi-tasking operation system;

the apparatus program modules operatively connected to at least one of the program bus structure, the terminal equipment and the operating technology terminal equipment;

the coordination program module operatively connected to at least the program bus structure;

the application program modules operatively connected to at least the program bus structure.

---

### 5,018,098
### DATA TRANSFER CONTROLLING APPARATUS FOR DIRECT MEMORY ACCESS

**Takayoshi Taniai; Tadashi Saitoh, and Atsushi Fujihira, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki and Fujitsu Microcomputer Systems Limited, Kawashi, both of, Japan**

**Filed Apr. 27, 1988, Ser. No. 186,847**

**Claims priority, application Japan, May 7, 1987, 62-109753; May 12, 1987, 62-113604**

**Int. Cl.$^5$ G06F** *9/22, 12/02*

**U.S. Cl. 364—900** **8 Claims**

1. A data transfer controlling apparatus for direct memory access comprising:

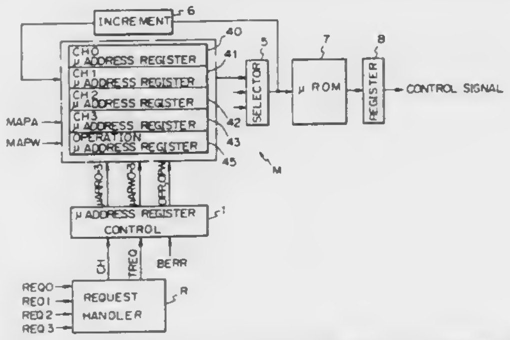
at least one first microaddress register, each register storing first microaddress information, said first microaddress information being for program processing of data transfer for a corresponding channel;

a second microaddress register which stores second microaddress information, said second microaddress information being for operational program processing other than said program processing of said data transfer;

a micro read only memory operatively connected to said first and second microaddress registers, for storing microinstructions and outputting a predetermined microinstruction in accordance with said first and second microaddress information respectively read out from a selected one of said first microaddress registers and said second microaddress register; and

an incremental element operatively connected to said first and second microaddress registers, for incrementing the value of said first and second microaddress information respectively read out from the selected one of said first microaddress registers and said second microaddress register, and for respectively writing said incremented first and second microaddress information to said selected one of said first microaddress registers and said second microaddress register,

said first microaddress information stored in one of said first microaddress registers for said corresponding channel being read out when said program processing of said data transfer for said corresponding channel is carried out, said second microaddress information stored in said second microaddress register being read out when operational program processing other than said program processing of said data transfer is carried out.



---

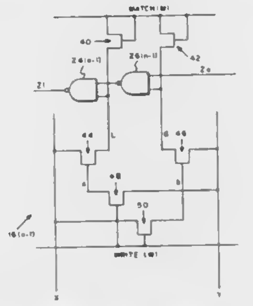
### 5,018,099
### COMPARISON CIRCUIT

**James L. Burrows, Merrimack, N.H., assignor to Lockheed Sanders, Inc., Nasbua, N.H.**

**Filed Jan. 8, 1990, Ser. No. 461,901**

**Int. Cl.$^5$ G11C** *15/00*

**U.S. Cl. 365—49** **11 Claims**



1. A comparison element comprising:

first and second inputs;

first and second pass transistors connected to the first and second inputs, respectively, and to provide first and second outputs, respectively;

first and second cross-over transistors connected to said first and second pass transistors, respectively, said first and second cross-over transistors being connected to said second and first inputs, respectively;

said pass transistors and said cross-over transistors being configured to store data at the junctions between said pass transistors and said cross-over transistors as received from the second and first inputs by the first and second cross-over transistors respectively,

said first and second pass transistors being configured to compare stored data and comparison data presented on the first and second inputs, respectively, after the stored data, and to indicate, on one output, whether the comparison data is not less than the stored data and, on the other output, whether the comparison data is not greater than the stored data; and

first and second diode means, connected to said first and second outputs respectively, said first and second diode means also being connected to a third output and being configured to indicate whether the comparison data matches the stored data,

said first and second diode means individually isolating said first and second outputs from said third output.

---

### 5,018,100
### SEMICONDUCTOR MEMORY DEVICE

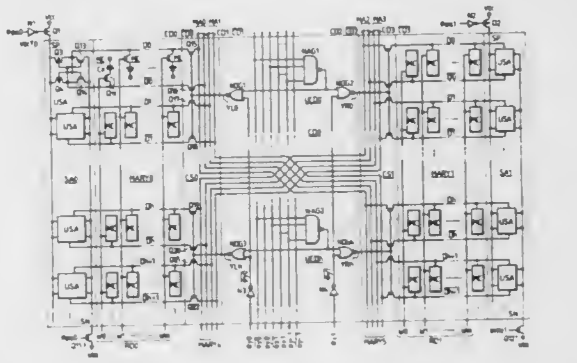
**Kazumasa Yanagisawa, Kokubunji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 11, 1989, Ser. No. 420,016**

**Claims priority, application Japan, Oct. 11, 1988, 63-255371**

**Int. Cl.$^5$ G11C** *8/02*

**U.S. Cl. 365—230.03** **25 Claims**



1. A semiconductor memory device comprising:

first and second memory arrays each having memory data lines and memory cells, and said memory arrays being disposed adjacent to each other in such a manner as to form a pair;

first and second common data lines disposed in such a manner as to cross one another at a predetermined position;

switch means for selectively connecting said first common data lines to said memory data lines of some of the memory cells of said first memory array on one side of said predetermined position and to said memory data lines of some of the memory cells of said second memory array on the other side of said predetermined position;

switch means for selectively connecting said second common data lines to said memory data lines of others of the memory cells of said first memory array on one side of said predetermined position and to memory said data lines of others of the memory cells of said second memory array on the other side of said predetermined position; and

all of said switch means connecting each of said memory cells to only one of said common data lines.

VOL 1126 ISS 3 MY 21 1991 UMI

### 5,018,101
## SEMICONDUCTOR MEMORY

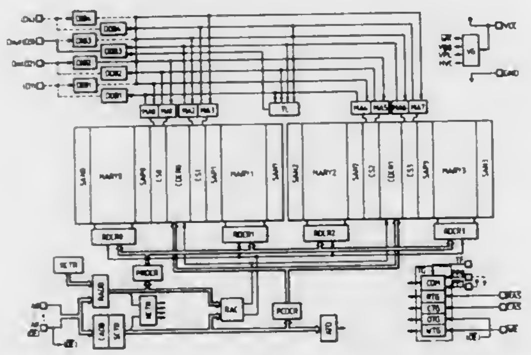
**Kazuhiko Kajigaya; Hiroaki Kotani; Kazuyoshi Oshima, all of Ohme; Yasuhiro Kasama, Tokyo, and Shinji Udo, Akishima, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan**

**Continuation of Ser. No. 228,228, Aug. 4, 1988, Pat. No. 4,956,811. This application Aug. 31, 1990, Ser. No. 575,658**

**Claims priority, application Japan, Sep. 16, 1987, 62-231640; Sep. 16, 1987, 62-231641**

**Int. Cl.$^5$ G11C** *13/00*

**U.S. Cl. 365—51** **6 Claims**



1. A semiconductor memory having a plurality of operating modes comprising:

a plurality of pads which correspond in a predetermined manner to a plurality of output circuits;

first connecting means for coupling said output circuits and corresponding pads selectively on the basis of an output bit pattern of said semiconductor memory;

a signal generator for delivering control signals for specifying said predetermined one of said operation modes; and

a first input pad which corresponds to said signal generator and which serves to couple a predetermined voltage to said signal generator for controlling said signal generator,

wherein said first connecting means is provided by a first conductive layer formed on a semiconductor substrate, and wherein said first input pad is connected to said predetermined voltage by effecting wire bonding.

---

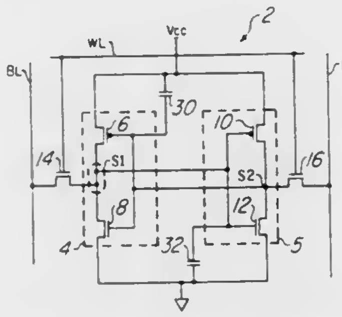
### 5,018,102
## MEMORY HAVING SELECTED STATE ON POWER-UP

**Theodore W. Houston, Richardson, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.**

**Filed Dec. 20, 1988, Ser. No. 287,338**

**Int. Cl.$^5$ G11C** *13/00*

**U.S. Cl. 365—95** **9 Claims**



1. An integrated circuit including a bistable circuit element comprising at least one coupling device operable to initiate asymmetrical current flow upon the application of a power supply voltage to a supply terminal in the element, operable in two stable states such that asymmetry in current flowing through separate portions of the element is necessary to switch the element from one stable state to another stable state, said separate portions comprising first and second inverters both coupled between said supply terminal and a ground terminal, said first control terminal including a first output node and a first control terminal, said second inverter including both a second output node coupled to said first control terminal and a second control terminal coupled to said first output node, said at least one coupling device being coupled between said supply terminal and said first control terminal to switch the circuit element to a predetermined state upon the application of the power supply voltage to said supply terminal.

---

### 5,018,103
## READ-ONLY MEMORY FOR A GATE ARRAY ARRANGEMENT

**Michael Pomper, Schliersee, and Martin Geiger, Furth, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

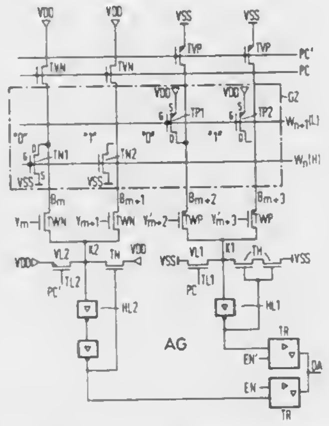
**PCT No. PCT/DE88/00035, § 371 Date Aug. 25, 1989, § 102(e) Date Aug. 25, 1989, PCT Pub. No. WO88/06795, PCT Pub. Date Sep. 7, 1988**

**PCT Filed Jan. 25, 1988, Ser. No. 423,407**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1987, 3706476**

**Int. Cl.$^5$ G11C** *13/00*

**U.S. Cl. 365—104** **12 Claims**



1. Read-only memory for a gate array arrangement having basic cells that contain at least one n-channel transistor and one p-channel transistor, comprising:

a) for each basic cell of the gate array arrangement,

a1) the p-channel transistors each have their gate electrode connectible to a first selection line that is connected to a first potential for the selection of the p-channel transistors, have their source electrode connected to a first supply potential and have their drain electrode connectible to a bit line,

a2) the n-channel transistors have their gate electrode connectible to a second selection line that is connected to a second potential for the selection of the n-channel transistors, have their source electrode connected to a second supply potential and have their drain electrode connectible respectively to a bit line of a plurality of bit lines for storing information;

b) an output circuit connecting the plurality of bit lines to a data line,

b1) said output circuit having, per bit line, a selection transistor of a plurality of selection transistors or respectively, that is driven by a bit line selection signal connected to the bit line and having the same conductivity type as the associated n-channel or p-channel transistors employed for information storing, said selection transistor being connected to selection transistors of the same conductivity type in groups in a node of the output circuit,

b2) said output circuit containing a pre-charging circuit and a holding circuit per group of selection transistors of one conductivity type, said output circuit being connected to the node and, before the drive of the selection transistors by a bit line selection signal, this node is charged to the supply potential, or respectively, used for the pre-charging of the bit line and holding the information potential at the node after the read-out of the information.

---

### 5,018,104
## REDUNDANT CIRCUIT INCORPORATED IN SEMICONDUCTOR MEMORY DEVICE

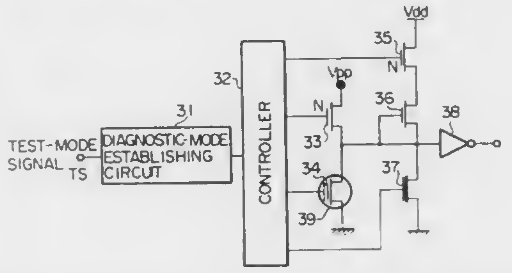
**Takahiko Urai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Apr. 12, 1989, Ser. No. 337,003**

**Claims priority, application Japan, Apr. 12, 1988, 63-90519**

**Int. Cl.$^5$ G11C** *7/00, 11/34*

**U.S. Cl. 365—200** **5 Claims**



5. A redundant circuit for a memory cell array provided with a plurality of memory cells each replaceable with a redundant memory cell after the memory cell is decided as a defective memory cell in a diagnostic mode of operation, comprising:

(a) a memorizing facility having a plurality of component parts and capable of storing an address associated with one of said memory cells decided as said defective memory cell for producing a memorized address signal representative of said address associated with said one of said memory cells; and

diagnostic mode establishing means responsive to a test mode signal and producing a first mode signal for said diagnostic mode of operation and a second mode signal for a replacement mode of operation carried out after the diagnostic mode of operation, in which each of said component parts comprises

(i) a non-volatile memory cell responsive to said second mode signal for memorizing a piece of said address associated with said one of said memory cells in a non-erasable manner,

(ii) a temporal memory cell shiftable between a memorizing state and a non-memorizing state and responsive to said first mode signal for establishing the memorizing state where said bit of said address associated with said one of said memory cells is stored, and

(iii) a memorized signal producing circuit operative to produce a bit of said memorized address signal on the basis of said bit of said address associated with said one of said memory cells stored in one of said non-volatile memory cell and said temporal memory cell.

---

### 5,018,105
## SEMICONDUCTOR MEMORY DEVICE

**Hideji Miyanishi, Toyonaka, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan**

**Filed May 22, 1990, Ser. No. 526,608**

**Claims priority, application Japan, May 26, 1989, 1-134367**

**Int. Cl.$^5$ G11C** *13/00, 11/40*

**U.S. Cl. 365—203** **8 Claims**

1. A semiconductor memory device comprising:

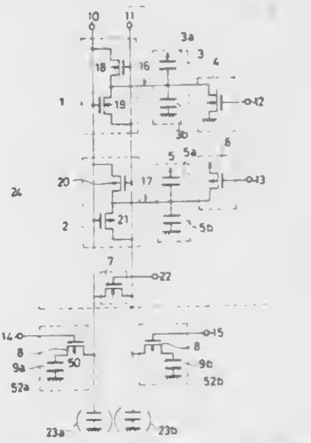
a pair of bit lines each having a parasitic capacitor and a memory cell connected thereto respectively, said memory cell having an electric capacitance; and

a sense amplifier device having a first sense amplifier, a second sense amplifier, a first transistor, a second transistor and a third transistor for amplifying a potential difference between said pair of bit lines, said potential difference being caused by a balance between the parasitic capacitor of one bit line and the electric capacitance of one memory cell connected to said one bit line after said pair of bit lines are short-circuited for a predeteremined time;

said first sense amplifier being connected to each of said pair of bit lines at an output thereof and to said first electric power source with a first capacitor at an input thereof;

said second sense amplifier being connected to each of said pair of bit lines at an output thereof and to a second electric power source with a second capacitor at an input thereof;

said third transistor being connected to said pair of bit lines to short-circuit the bit lines for said predetermined time;



said first transistor being connected to said first electric power source at one end thereof and grounded at another end thereof for supplying an electric power to said first sense amplifier from said first electric power source during a time a first potential at said input of said first sense amplifier to said one bit line is greater than a first threshold voltage defined by said first sense amplifier;

said second transistor being connected to a negative electric source of said second electric power source at one end thereof and to a positive electric source of said second electric power source at another end thereof for supplying another electric power to said second sense amplifier from said second electric power source during a time a second potential at said input of said second sense amplifier to said one bit line is less than a second threshold voltage defined by said second sense amplifier.

---

### 5,018,106
## STATIC RANDOM ACCESS MEMORY WITH MODULATED LOADS

**Mohammed E. Ul Haq, Sunnyvale, and Kenneth R. Smits, San Ramon, both of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.**

**Filed Apr. 27, 1989, Ser. No. 344,186**

**Iot. Cl.$^5$ G11C** *7/00*

**U.S. Cl. 365—203** **1 Claim**

1. A memory device comprising:

a memory cell array arranged in rows and columns, each of said rows including plural memory cells, each of said columns including plural memory cells, each of said memory cells having a true output and a complementary output;

bit-line means for communicating to said cells, said bit line means including a true-bit line and a complementary-bit line for each of said columns;

load means for providing load currents to said true-bit lines and said complementary-bit lines, said load means includ-

VOL
1126
ISS
3
MY
21
1991
UMI

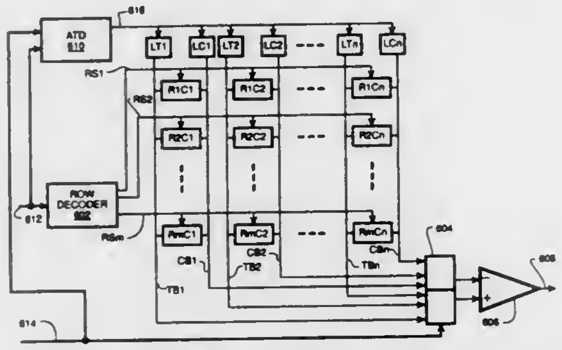
ing a load for each of said true-bit lines and each of said complementary-bit lines, each load including a load-varying transistor having a load control input for modulating the current provided by the load to the respective column, each load including a bypass transistor having a bypass control input tied to a constant voltage for limiting the extent to which the current through said load can be modulated, said bypass transistor being in parallel with said load-varying transistor;

a sense amplifier having a true-bit input and a complementary-bit input, said sense amplifier providing an output indicating which of the true-bit input and the complementary-bit input is at a higher voltage;

multiplexer means for selectively coupling said true-bit lines to said true-bit input and for selectively coupling said complementary-bit lines to said complementary-bit input, said multiplexer including select input means for receiving a column address code determining a column to have its true bit line coupled to said true-bit input and to have its complementary-bit line coupled to said complementary-bit input;

row address means for receiving a row address code;

row decoder means for selecting one of said rows for activation so that each cell in the selected row is coupled at its true output to the true-bit line belonging to the column containing that cell and at its complementary-bit output to the complementary-bit line belonging to the same column, said row decoder means being coupled to said row address means for receiving row address codes therefrom;



column decoder means for receiving column address codes, said column decoder means being coupled to said multiplexer for selecting which column is to have its true bit line and its complementary-bit line coupled to said sense amplifier; and

an address transition detector for providing a load-control pulse to the first load control input of the loads for the true-bit line and the complementary-bit line of a selected column in response to a transition in said row address code, said load-control pulse causing the load-varying transistors of the true-bit line and the complementary-bit line of the selected column to be turned off during said load pulse, said address transition detector being coupled to said row address means and said column address means, said address transistion detector being coupled to the control inputs of said load-varying transistors;

whereby, said load means provides a relatively large load current except as it is pulsed immediately after an address transition,

said load means, while providing a relatively large load current, promoting rapid pre-charging prior to a next address transition, and

said load means, while providing a relatively small load current during said load control pulse, permitting more rapid voltage differential development between said bit lines, in the case of a read operation, and within a selected memory cell, in the case of a write operation.

### 5,018,107
### SEMICONDUCTOR MEMORY DEVICE

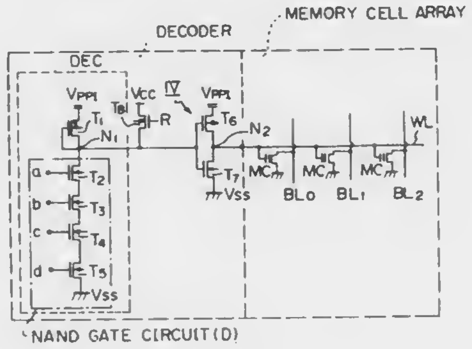
**Masanobu Yoshida, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

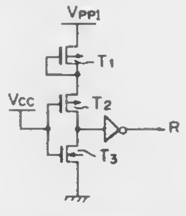
**Filed Oct. 19, 1989, Ser. No. 424,356**

**Claims priority, application Japan, Oct. 25, 1988, 63-267079**

**Int. Cl.$^5$ G11C** *11/409*

**U.S. Cl. 365—230.06** **12 Claims**





1. A semiconductor memory device comprising:

a first power source line for supplying a first power source voltage during a reading mode and a second power source voltage, which is higher than the first power source voltage, during a writing mode;

a second power source line for supplying a third power source voltage which is lower than the first power source voltage;

a decoder circuit including a load element connected between the first power source line and an output node, said decoder circuit having a first load current flowing therethrough when said semiconductor memory device is in said writing mode;

a plurality of transistors, connected in series between the output node and the second power source line, for decoding address information; and

load current increasing means, connected to said decoder circuit, for increasing the load current, flowing through said decoder circuit, over said first load current during reading mode.

### 5,018,108
### NONVOLATILE SEMICONDUCTOR MEMORY

**Tadashi Maruyama, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jun. 6, 1989, Ser. No. 362,180**

**Claims priority, application Japan, Jun. 9, 1988, 63-142051**

**Int. Cl.$^5$ G11C** *7/00, 16/06*

**U.S. Cl. 365—230.06** **8 Claims**

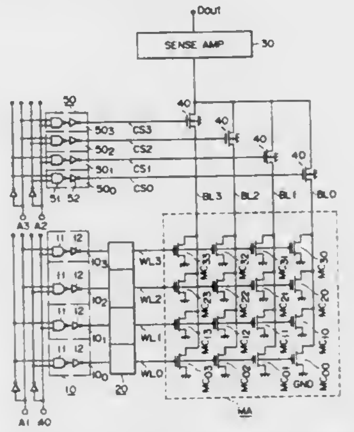
1. A nonvolatile semiconductor memory comprising:

a memory cell array in which a plurality of memory cells are arrayed in rows and columns in a matrix fashion, each said memory cell including a nonvolatile transistor having a source, gate, and drain, said nonvolatile transistor storing data as a high level or as a low level;

a plurality of word lines coupled with the gates of said nonvolatile transistors, said plurality of memory cells being arrayed in the rows of said memory array;

a row decoder including a plurality of partial decoders for selecting one of said plurality of word lines;

a constant voltage output circuit for receiving the outputs of said partial decoders of said row decoder, and for outputting a constant voltage to said selected one of said plurality of word lines, said constant voltage being a potential substantially halfway between a first and a second threshold voltage that respectively correspond to the high and low levels of the stored data and being used as a voltage for reading the stored data;



a plurality of bit lines coupled with the drains of said nonvolatile transistors, said plurality of memory cells being arrayed in the columns of said memory array;

a column decoder including a plurality of partial decoders for selecting one of said plurality of bit lines; and

a sense amplifier to be coupled with one of said plurality of bit lines selected by an output signal of said column decoder.

### 5,018,109
### MEMORY INCLUDING ADDRESS REGISTERS FOR INCREASING ACCESS SPEED TO THE MEMORY

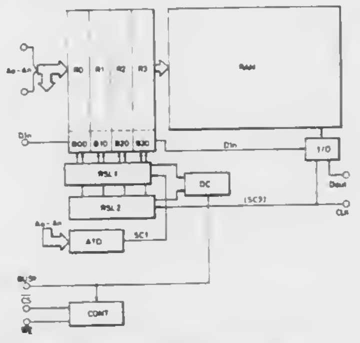
**Takashi Shinoda, and Masamichi Ishihara, both of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 144,066, Jan. 15, 1988, Pat. No. 4,912,679. This application Jan. 16, 1990, Ser. No. 465,890**

**Claims priority, application Japan, Jan. 16, 1987, 62-5981**

**Int. Cl.$^5$ G11C** *7/00, 8/00, 11/407*

**U.S. Cl. 365—230.08** **5 Claims**



1. A semiconductor memory comprising:

a memory cell array;

external address terminals to be supplied with first address signals for designating a first memory cell and second address signals for designating a second memory cell;

first memory means for storing said first address signals;

second memory means for storing said second address signals;

an external data terminal to be supplied with output data; and

means for supplying first data being stored in said first memory cell and second data being stored in said second memory cell to said external data terminal;

wherein said external address terminals are supplied with said first address signals before said second address signals, and wherein said second address signals supplied to said external address terminals are stored in said second memory means before said external data terminal is supplied with said first data.

### 5,018,110
### SERIAL INPUT/OUTPUT SEMICONDUCTOR MEMORY

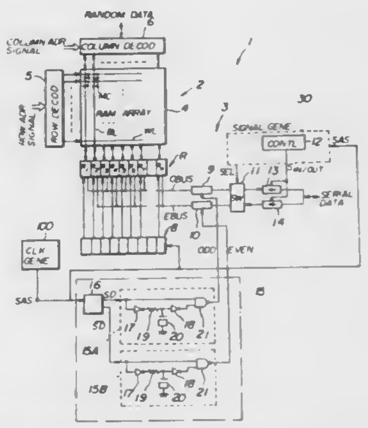
**Tsutomu Sugiyama, Kuwana, and Akihiko Watanabe, Minokamo, both of Japan, assignors to Fujitsu Limited, Kawasaki and Fujitsu VLSI Limited, Kasugai, both of, Japan**

**Filed Sep. 14, 1989, Ser. No. 407,091**

**Claims priority, application Japan, Sep. 20, 1988, 63-235695**

**Int. Cl.$^5$ G11C** *7/00*

**U.S. Cl. 365—230.09** **12 Claims**



1. A semiconductor memory comprising:

a memory cell array including a plurality of memory cells;

a data register, connected to said memory cell array, including a plurality of bit cells which store a plurality of bits of data read out from said memory cell array, said bit cells being assigned consecutive numbers;

a first data bus line which is connected to a selected one of odd numbered bit cells of said data register;

a second data bus line which is connected to a selected one of even numbered bit cells of said data register;

switching means for outputting serial data from said data register by alternately connecting said first and second data bus lines to an output bus line;

a first reset switch circuit for resetting said first data bus line when active;

a second reset circuit for resetting said second data bus line when active; and

control means for selectively making said first and second reset circuits active so that a data transfer period of one of said first and second data bus lines starts prior to an end of a data transfer period of the other of said first and second data bus lines.

### 5,018,111
### TIMING CIRCUIT FOR MEMORY EMPLOYING RESET FUNCTION

**Paul D. Madland, Beaverton, Oreg., assignor to Intel Corporation, Santa Clara, Calif.**

**Filed Dec. 27, 1988, Ser. No. 290,145**

**Int. Cl.$^5$ G11C** *8/00, 7/02*

**U.S. Cl. 365—233** **8 Claims**

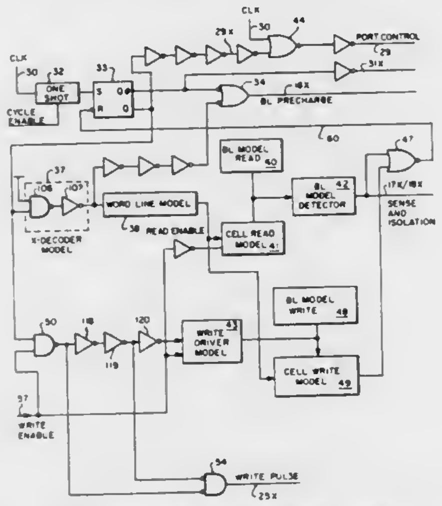
1. A timing circuit for providing a plurality of control signals to control accessing of data from or to a memory comprising:

a first circuit means for receiving a first input signal and for providing a first output response to said first input signal;

a plurality of second circuit means each representing scaled

VOL
1126
ISS
3
MY
21
1991
UMI

versions of actual memory components and each for providing a timed delay earlier in time to the actual delay in memory, said timed delay representing the time required for performing a function needed to access said memory, said plurality of second circuit means being coupled in series, the first one of said plurality of second circuit means being coupled to receive said first output signal, the last one of said plurality of second circuit means being coupled to provide a second input signal to said first circuit means;



said first circuit means providing a second output signal in response to said second input signal;

said first output signal and said second output signal each being delayed by at least one of said plurality of second circuit means, and after being so delayed, each being coupled to provide at least one of said control signals for a single memory cycle.

---

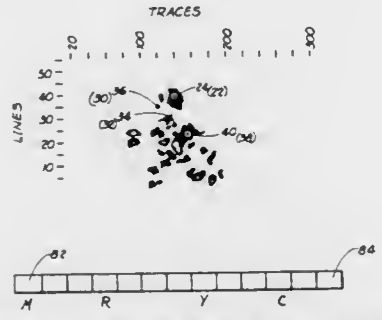
### 5,018,112

### METHOD FOR HYDROCARBON RESERVOIR IDENTIFICATION

**Roger P. Pinkerton, Katy, Tex., and Beverly Stebens, Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla. Continuation of Ser. No. 102,278, Sep. 28, 1987, abandoned, which is a continuation of Ser. No. 925,523, Oct. 28, 1986, abandoned, which is a continuation of Ser. No. 434,864, Oct. 18, 1982, abandoned. This application May 21, 1990, Ser. No. 527,682**

**Int. Cl.$^5$ G01V *1/34***

U.S. Cl. 367—72 **2 Claims**



1. A method for identifying areal boundaries of a subsurface hydrocarbon reservoir corresponding to a known hydrocarbon producing earth structure comprising:

(a) obtaining three-dimensional seismic trace data for an earth volume containing a known hydrocarbon producing earth structure and a known non-hydrocarbon producing earth structure;

(b) identifying a distinctive critical seismic data parameter in the seismic trace data which distinguishes the known hydrocarbon producing earth structure from the known non-hydrocarbon producing earth structure;

(c) measuring the values of the distinctive critical seismic data parameter appearing within a first selected time window on the individual traces of the seismic trace data;

(d) storing the values of the respective distinctive critical seismic parameter in a first coordinate grid;

(e) scaling the first coordinate grid to transform the values of the distinctive critical seismic parameter to respective color quality values in a range of color quality values on a plural color bar;

(f) measuring the values of the distinctive critical seismic data parameter appearing within a second selected time window on the individual traces of the seismic trace data;

(g) storing the values of the respective distinctive critical seismic parameter within said second selected time window in a second coordinate grid;

(h) scaling the second coordinate grid to transform the values of the distinctive critical seismic parameter to respective color quality values in a range of color quality values on a plural color bar; and

(i) superimposing the color quality values of the first coordinate grid and the second coordinate grid to a display indicator to form a plan view outline of the areal boundaries of the subsurface hydrocarbon reservoir corresponding to the known hydrocarbon producing earth structure.

---

### 5,018,113

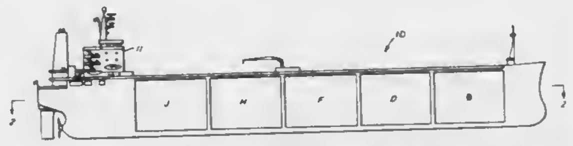
### DAMAGE LOCATION SYSTEM FOR A TANKER SHIP

**Booth B. Strange, 11106 Wickway, Houston, Tex. 77042, and Ben B. Thigpen, 13914 Kimberly, Houston, Tex. 77079**

**Filed Jun. 29, 1990, Ser. No. 545,571**

**Int. Cl.$^5$ G01S *3/808***

U.S. Cl. 367—127 **11 Claims**



9. In a ship having a plurality of liquid cargo tanks, a method for locating a point of impact due to collision with an object, comprising:

mounting a hydrophone array in each one of said plurality of cargo tanks;

detecting with said hydrophone arrays, average ambient noise transients and impulsive shock waves;

measuring the relative times of first arrival of said impulsive shock waves at each said hydrophone;

calculating the differences in the times of first arrival of the impulsive shock waves at the two hydrophones of any two selected pairs of hydrophones;

from the calculated shock wave arrival time differences, defining two lines of constant shock wave first arrival time difference with respect to the two hydrophones corresponding to each said selected pair of hydrophones; and

fixing the point of impact at the point of intersection of the two lines of constant shock wave arrival time difference.

---

### 5,018,114

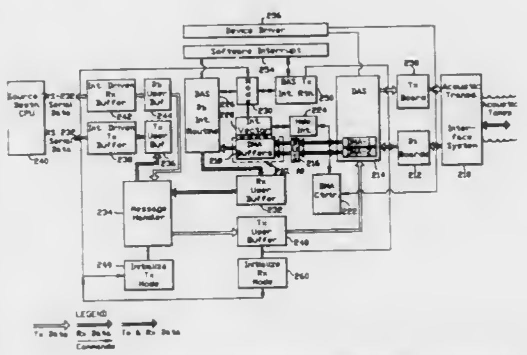
### ADJUSTABLE FREQUENCY DIVERSITY ACOUSTIC COMMUNICATIONS SYSTEM

**Gerald R. Mackelburg; Leon J. Bodzin; Howard B. McCracken, and Anthony E. Diamond, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 13, 1988, Ser. No. 284,004**

**Int. Cl.$^5$ H04B *11/00***

U.S. Cl. 367—134 **22 Claims**



1. A method for communicating comprising the steps of:

transmitting a string of individual signals simultaneously over a plurality of frequency diverse transmission channels with each of said individual signals being transmitted over at least one of said plurality of frequency diverse transmission channels;

receiving said string of individual signals including
- detecting the beginning of said string of individual signals;
- detecting the length of said individual signals;
- identifying the number of frequence of diverse transmission channels used per individual signal transmitted during said simultaneous transmission; and
- reading said individual signals.

---

### 5,018,115

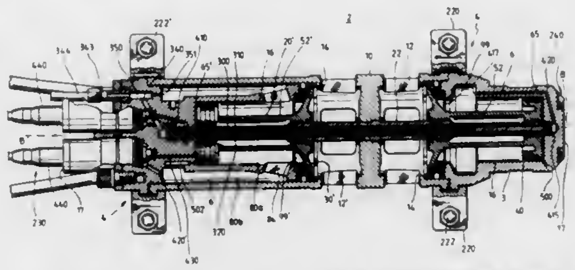
### MARINE ACOUSTIC SOURCE

**Adrien P. Pascouet, 8925 Lipan, Houston, Tex. 77063**

**Filed Jan. 23, 1989, Ser. No. 300,590**

**Int. Cl.$^5$ G01V *1/04***

U.S. Cl. 367—144 **53 Claims**



1. An acoustical source for generating within a liquid an acoustic signal where said signal is created by the explosive release within said liquid of a pressurized gas, said source comprising:

a housing comprising two reservoir chambers for confining therein two charges of pressurized gas, said reservoir chambers longitudinally opposed along a common axis and separated by a partition, each said reservoir chamber provided with a main port proximate the partition through which said reservoir chamber communicates with said liquid;

each reservoir chamber provided with a shuttle, said shuttle comprising a larger-diameter piston sealingly engaged to the exterior of said reservoir chamber and a smaller-diameter piston slidably and sealingly mounted inside said reservoir chamber; and

force-producing means operatively coupled with each said shuttle so as to cause said shuttles to move between a first and second position thereby directly releasing said charge through said main port and into said liquid, where said shuttles are capable of simultaneous relative movement and also capable of independent non-simultaneous relative movement responsive to said force producing means.

---

### 5,018,116

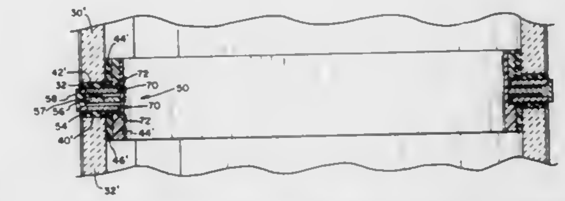
### INTER-ELEMENT MOUNTING FOR STACKED PIEZOELECTRIC TRANSDUCERS

**John C. Congdon, Fort Wayne, Ind., assignor to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.**

**Filed May 4, 1990, Ser. No. 532,714**

**Int. Cl.$^5$ H04R *17/00***

U.S. Cl. 367—165 **7 Claims**



1. An inter-element mounting for use between adjacent surfaces of two piezoelectric ceramic elements of a transducer stack, comprising: mechanical spring members disposed between said adjacent surfaces to vibrationally isolate said ceramic elements one from the other, said mechanical spring members comprising two plates disposed parallel to said surfaces, said plates being cantilevered such that at least a substantial portion of the areas of said plates between said surfaces are unsupported with respect to each other.

---

### 5,018,117

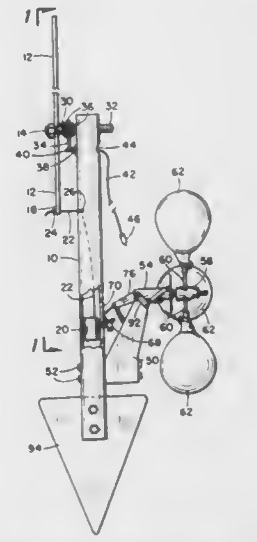
### COMBINED RACING KITE GATE AND QUICK DRAW DEVICE

**Arlen J. Lowrance, 7655 East 41st St., Tulsa, Okla. 74145**

**Filed Oct. 26, 1990, Ser. No. 603,443**

**Int. Cl.$^5$ G04B *47/00;* A63H *27/08***

U.S. Cl. 368—10 **7 Claims**



1. A racing gate for kites comprising a vertical pipe having an upper end and a lower end, the lower end supporting the pipe from the ground, an elongated wand having an upper end

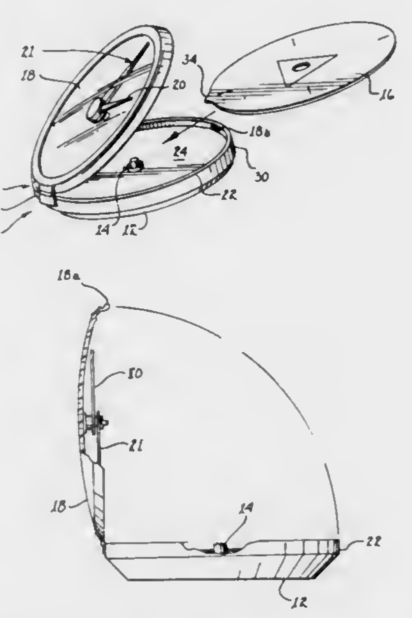
VOL
1126
ISS
3
MY
21
1991
UMI

and a lower end, means for pivotally attaching the wand above its lower end to the pipe adjacent its upper end, a weight slidably mounted within said pipe, and a cord connected from the lower end of said wand to said weight for maintaining said wand in a normally vertical condition.

---

### 5,018,118
### REPLACEABLE WATCH FACE IMPROVEMENT

**Jeanne Ross, 4618 N. 40th St., Phoenix, Ariz. 85018**
**Filed Apr. 16, 1990, Ser. No. 509,291**
**Int. Cl.⁵ G04B** *19/04*
**U.S. Cl. 368—228** **12 Claims**

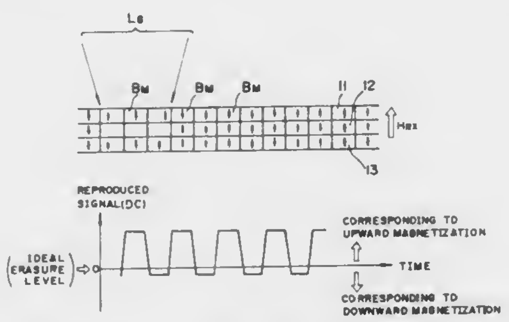


1. A watch body comprising
(a) a case;
(b) a watch mechanism carried in said case;
(c) means defining a watch face area on said case;
(d) removable face means adapted to fit said face area, said face means having an aperture therein;
(e) transparent, openable cover means carried by said case by hinge means securing the edge of said cover to said case and adapted to close said case to protect said face means and face area;
(f) analog time indicia means, carried by said cover means;
(g) connection means comprising a power take-off shaft and a time hand extension each having mating end means for engaging axially, adapted to closely fit said aperture, for operatively connecting said time indicia means to said watch mechanism through said aperture in said face means whereby said hand extension axially engages said power take-off shaft when said cover means is closed and said shaft and extension are disconnected when said cover means is opened.

---

### 5,018,119
### METHOD FOR REPRODUCING SIGNAL USING AN EXTERNAL MAGNETIC FIELD FROM MAGNETO-OPTICAL RECORDING MEDIUM HAVING THREE MAGNETIC LAYERS

**Katsuhisa Aratani, Chiba; Minoru Kohno, and Kenjiro Watanabe, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan**
**Filed Nov. 30, 1988, Ser. No. 278,011**
**Claims priority, application Japan, Nov. 30, 1987, 62-301922; Nov. 30, 1987, 62-301923**
**Int. Cl.⁵ G11B** *13/04, 11/14*
**U.S. Cl. 369—13** **4 Claims**


Ls
BM
BM
BM
11
12
HEX
13
REPRODUCED SIGNAL(DC)
IDEAL ERASURE LEVEL
0
CORRESPONDING TO UPWARD MAGNETIZATION
TIME
CORRESPONDING TO DOWNWARD MAGNETIZATION

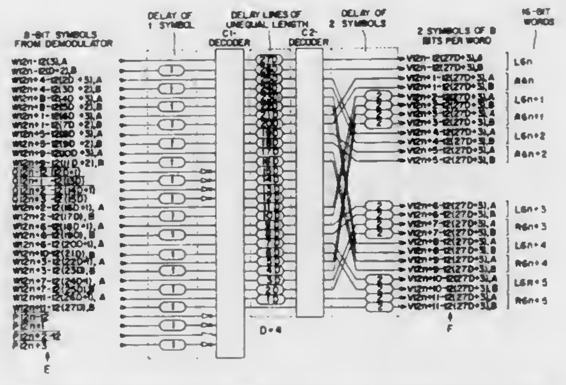
1. A method of reproducing a signal of a recorded magnetic domain from a magneto-optical recording medium having a first magnetic film, a second magnetic film and a third magnetic film magnetically coupled to one another at room temperature $T_{RT}$, wherein the Curie points Tc1, Tc2 and Tc3 of said first, second and third magnetic films respectively, are in the relationship of $Tc2>T_{RT}$, $Tc2<Tc1$, and $Tc2<Tc3$, and the coercive force Hc1 of said first magnetic film is small in the vicinity of the Curie point Tc2 of said second magnetic film, while the coercive force Hc3 of said third magnetic film is sufficiently greater than a required magnetic field intensity within a temperature range between said room temperature $T_{RT}$ and a predetermined temperature $T_{PB}$ higher than the Curie point Tc2 of said second magnetic film, and in reproducing said signal from said magneto-optical recording medium, said medium is heated to said predetermined temperature $T_{PB}$ to interrupt the magnetic coupling between said first and third magnetic film under an application of a magnetic field by magnetic field generating means comprising demagnetizing magnetic fields or stray magnetic fields from the recording medium and an external magnetic field applying means for providing said required magnetic intensity to change a domain size in said first magnetic film.

---

### 5,018,120
### OPTICAL RECORDING MEDIUM TRACK INDEXING SYSTEM

**Kentaroh Tsuji, Nara; Tsuneo Fujiwara, Tenri; Hiroshi Fuji, Nara; Shigeo Terashima, and Tomiyuki Numata, both of Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**
**Filed Dec. 15, 1988, Ser. No. 284,669**
**Claims priority, application Japan, Dec. 18, 1987, 62-322081**
**Int. Cl.⁵ G11B** *7/00*
**U.S. Cl. 369—32** **1 Claim**

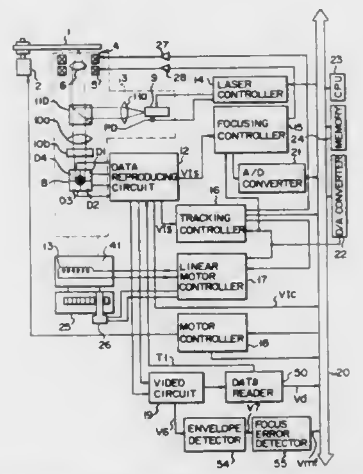
1. An optical disc recording medium for selectively storing or erasing information from an information bearing light, the medium comprising:
an information recording layer for recording information from said information bearing light in a multiplex format;
a substrate supporting said information recording layer having a first surface and a second surface, wherein said substrate is provided with a plurality of elongated substantially parallel tracks divided into frames, each of said tracks having an nonerasable index portion located in less than a single frame and formed by indentations in said second surface of said substrate representing the physical absolute address of each track in a multiplex format respectively.


8-BIT SYMBOLS FROM DEMODULATOR
DELAY OF 1 SYMBOL
DELAY LINES OF UNEQUAL LENGTH
DELAY OF 2 SYMBOLS
C1 DECODER
C2 DECODER
2 SYMBOLS OF 8 BITS PER WORD
16-BIT WORDS
D=4
E
F

---

### 5,018,121
### OPTICAL RECORDING/REPRODUCING FOCUSING APPARATUS

**Mikio Yamamuro, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Dec. 27, 1988, Ser. No. 290,339**
**Claims priority, application Japan, Dec. 28, 1987, 62-334738**
**Int. Cl.⁵ G11B** *7/00*
**U.S. Cl. 369—44.11** **15 Claims**

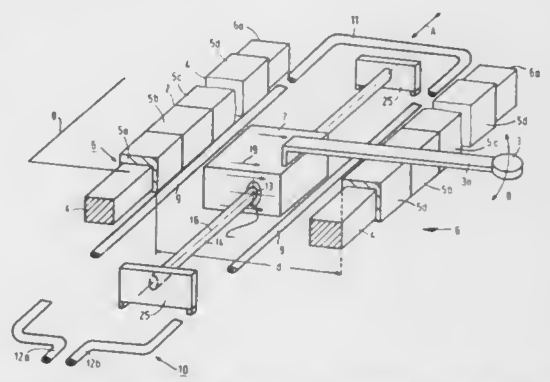


1. An apparatus for focusing a light beam onto an object to reproduce data recorded on the object, comprising:
means for directing the light beam onto the object;
first detecting means for detecting the light beam from the object so as to generate an electrical signal having a high-frequency component and a low-frequency component;
means for separating the high-frequency component and the low-frequency component of the signal generated by the first detecting means;
first amplifying means having a frequency band corresponding to the high-frequency component for amplifying the high-frequency component separated by the separating means;
second amplifying means having a frequency band corresponding to the low-frequency component for amplifying the low-frequency component separated by the separating means;
first generating means for generating a reproduced signal, with respect to the data recorded on the object, in accordance with the high-frequency component amplified by the first amplifying means, the reproduced signal having an envelope;
second detecting means for detecting a forced error by detecting the envelope including the reproduced signal supplied from the first generating means; and
second generating means for generating a focus control signal to adjust a location of the directing means with respect to the object, according to the low-frequency component amplified by the second amplifying means.

---

### 5,018,122
### LINEAR MOTOR ACTUATOR FOR MOVING AN OPTICAL READ/WRITE HEAD

**Karl-Hanns Meyer, Aachen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Mar. 9, 1989, Ser. No. 321,619**
**Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808510**
**Int. Cl.⁵ G11B** *7/00*
**U.S. Cl. 369—44.14** **13 Claims**



1. An electrodynamic actuator for optical storage systems comprising an electromechanical actuating device which is constructed to move an optical write and/or read unit into write and/or read operating positions relative to a storage medium, a radiation beam which is aimed at the operating positions by the optical unit being focussed at said positions by moving the optical system of the optical unit, the actuating device comprising a linear motor which comprises spaced apart parallel stator sections, which are constituted by rod-shaped stator iron elements carrying induction coils which are stationary relative to the stator, a permanent magnet being arranged between said stator sections and being guided to be longitudinally movable in a direction of translation between the axial ends of the stator sections, which permanent magnet carries the optical system of the optical unit and has a magnetic field which is oriented perpendicularly to the direction of translation and parallel to a central plane in which the stator iron elements, the induction coils and the permanent magnet itself are arranged, characterized in that
the permanent magnet is movable between the stator sections relative to the common central plane,
a plurality of induction coils are arranged after each other in the longitudinal direction on each rod-shaped stator element, and can be switched into and out of circuit separately, and
conductor bundles extend parallel to the stator sections between the permanent magnet and the two stator sections and are combined at the axial ends of the stator sections to form one or more focussing coils.

VOL
1126
ISS
3
MY
21
1991
UMI

## 5,018,123

## OPTICAL INFORMATION RECORDING MEDIUM AND METHOD FOR RECORDING INFORMATION ON SAID MEDIUM AND REPRODUCING INFORMATION THEREFROM

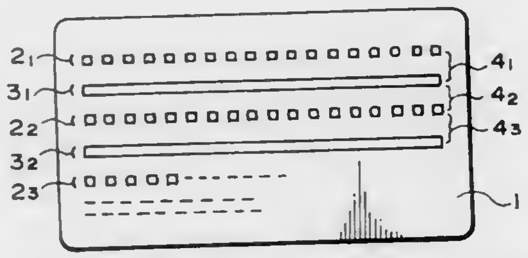
**Hideki Hosoya, Yokohama; Akio Aoki, Tokyo; Masahiko Enari; Masayuki Usui, both of Yokohama; Hiroshi Matsuoka, Kawasaki; Kazuhiko Matsuoka, Yokohama; Kazuo Minoura, Yokohama; Kenichi Suzuki, Yokohama; Satoshi Shikichi, and Fumiaki Kawaguchi, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 843,593, Mar. 25, 1986, abandoned. This application Apr. 13, 1989, Ser. No. 338,335**

**Claims priority, application Japan, Mar. 29, 1985, 60-65465; Apr. 22, 1985, 60-86671; Apr. 22, 1985, 60-86672; Apr. 22, 1985, 60-86673; Apr. 22, 1985, 60-86674**

**Int. Cl.$^5$ G11B** *7/00*

**U.S. Cl. 369—44.110** **23 Claims**



1. An optical information recording medium comprising:

a plurality of parallel tracking tracks preformed on a surface of the medium, wherein a tracking signal can be detected by scanning a light beam along at lest one of said tracking tracks;

an information recording region for storing information provided in an area between said tracking tracks; and

a kick region for instructing the light beam to move to one of said plurality of tracking tracks adjacent to said at least one tracking track provided at both endmost portions of said at least one tracking track.

---

## 5,018,124

## INFORMATION RECORDING METHOD AND APPARATUS FOR RECORDING INFORMATION ON TRACK POSITIONED AT LEAST TWO TRACKS AHEAD WHEN ABNORMALITY OF TRACKING SERVO IS DETECTED

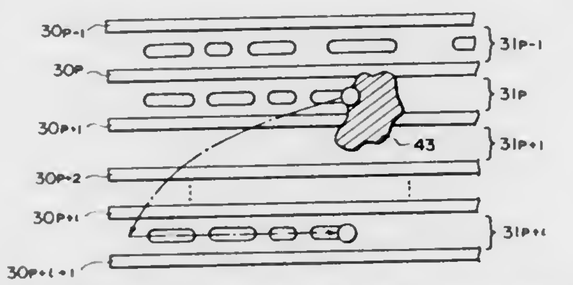
**Yutaka Ogasawara, and Wataru Sakagami, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 25, 1988, Ser. No. 173,469**

**Claims priority, application Japan, Mar. 31, 1987, 62-077961**

**Int. Cl.$^5$ G11B** *7/00. 7/09*

**U.S. Cl. 369—44.330** **14 Claims**



1. An information recording apparatus for recording information on an information recording medium on which a plurality of tracks are provided in parallel with each other, said apparatus comprising:

recording means for recording information on one of the tracks;

shifting means for shifting said recording means onto another track;

tracking servo means for performing a tracking servo operation of said recording means with respect to a track;

detecting means for detecting an abnormality of the tracking servo operation; and

control means for controlling said shifting means, causing said recording means to move to a new track positioned at least two tracks ahead of a track in which an abnormality is detected in a direction on the medium in which no information is recorded; when said detecting means detects the abnormality of the tracking servo operation, whereby, prior to recording any additional information, said recording means records again, on the new track, the same information to be recorded on the track at which the abnormality is detected.

---

## 5,018,125

## SIGNAL PROCESSING CIRCUIT FOR DETECTING A TRACKING ERROR FOR AN OPTICAL DISK APPARATUS

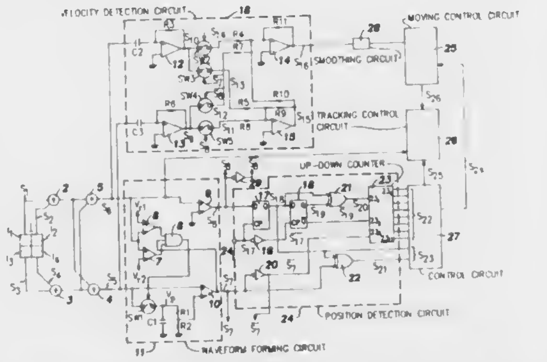
**Gohji Uchikoshi, Higashimurayama, and Toshiko Otomo, Tokyo, both of Japan, assignors to Nakamichi Corporation, Tokyo, Japan**

**Filed Jan. 31, 1989, Ser. No. 304,351**

**Claims priority, application Japan, Feb. 4, 1988, 63-24689**

**Int. Cl.$^5$ G11B** *7/095*

**U.S. Cl. 369—44.250** **3 Claims**



1. A signal processing circuit for an optical disk apparatus to detect a sine wave tracking error signal obtained when an optical spot on an optical disk moves in a direction of a radius of said optical disk and a sine wave whole reflection light quantity signal having a component of phase offset by 90 degrees relative to said tracking error signal and to deform said sine wave whole reflection light quantity signal so that a deformed signal is provided which has states of "H" and "L" selected on timing when said whole reflection light quantity signal traverses a center level of its amplitude, said signal processing circuit comprising:

signal detection means to detect said tracking error signal and said whole reflection light quantity signal;

sample hold means to provide a comparison signal sequentially having a sampling state changing its level in proportion to said whole reflection light quantity signal at a predetermined ratio and a holding state having a constant level in synchronization with a switching signal;

comparison means to provide a deformed signal having states of "H" and "L" by comparing said comparison signal with said whole reflection light quantity signal;

level determination means to provide a determination signal indicating whether a level of said tracking error signal is within an area of predetermined level near a center of its amplitude;

switch means to input said deformed signal and said determination signal to provide said switching signal synchronizing with said deformed signal and said determination signal at a predetermined timing for controlling said sample hold means;

and said comparison signal being at said sampling state only when said tracking error signal is within said predetermined area and said deformed signal is at one of states "H" and "L" while said comparison signal is at said holding state when said tracking error signal is not within said predetermined area or when said deformed signal is at the other of said states of "H" and "L".

---

## 5,018,126

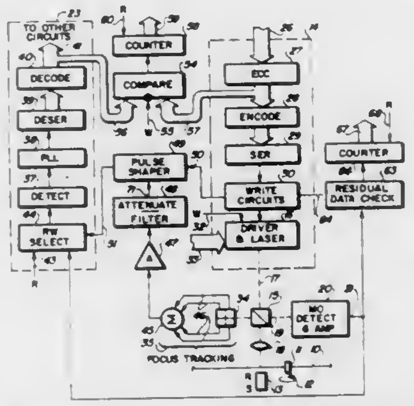
## CHECKING MEDIA OPERATIONS AND RECORDING DURING OPTICAL RECORDING

**John E. Kulakowski; Rodney J. Means; David M. Oldham, and Morovat Tayefeh, all of Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 239,863, Sep. 2, 1988, Pat. No. 4,941,139. This application Apr. 4, 1990, Ser. No. 504,449**

**Int. Cl.$^5$ G11B** *7/00*

**U.S. Cl. 369—58** **5 Claims**



1. In the method of operating an optical recorder having a record member responsive to a laser beam to thermally alter a recording layer to represent information-bearing signals when the laser beam exceeds a predetermined intensity level and such thermal alteration does not change the reflectivity of the medium;

while recording signals on the record member by said laser beam wherein new information-bearing signals to be recorded for modulating the intensity of said recording laser beam between intensities above and below said predetermined intensity level in a pattern representing said new information-bearing signals, performing the steps of:

sensing the intensity of the reflected light from the record medium of said recording laser beam for indicating recording laser beam intensity temporal pattern of changes which indicate the information-bearing signals to be recorded on the record member; and

comparing the sensed reflected light intensity pattern of changes with the information-bearing signals for indicting media asperities and counting the asperities for indicating media caused errors in the recording of the new information-bearing signals in the record member.

---

## 5,018,127

## LIGHT EMITTING APPARATUS HAVING A PLURALITY OF LIGHT EMITTING POINTS

**Hideo Andō, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 101,486, Sep. 28, 1987, abandoned. This application Oct. 30, 1989, Ser. No. 427,986**

**Claims priority, application Japan, Sep. 27, 1986, 61-229139**

**Int. Cl.$^5$ G11B** *7/00*

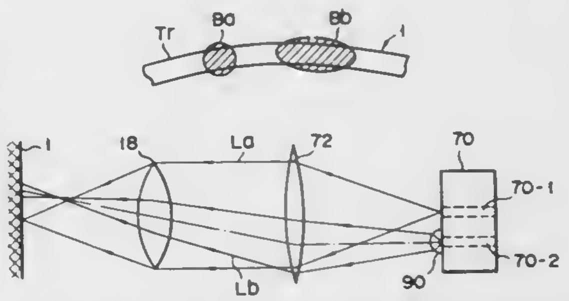
**U.S. Cl. 369—112** **32 Claims**

1. A system for retrieving and erasing information from an information recording medium having a track and for recording information onto the information recording medium, comprising:

a light emitting apparatus including:

light emitting means, having first and second light emitting points, for emitting first and second light beams from the first and second light emitting point, respectively, the light emitting points being closely arranged; and

optical means, arranged in front of the second light emitting point, for allowing only the second light beam to pass therethrough and modifying only the cross section of the second light beam emitted from the second light emitting point; and



means arranged thereafter for converging the first and second light beams onto the information recording medium, the first light beam forming a substantially circular beam spot and the second light beam forming a substantially elliptical erasing beam spot extending along the track on the information medium.

---

## 5,018,128

## APPARATUS AND MEDIUM FOR RECORDING ERASABLE INFORMATION

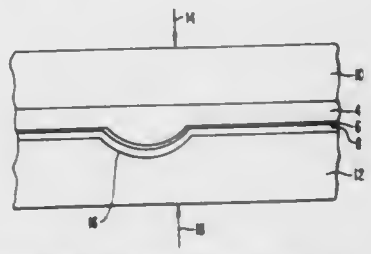
**Paul R. Goldberg, Palo Alto; Calif., assignors to Tandy Corporation, Ft. Worth, Tex.**

**Calif., assignors to Tandy Corporation, Ft. Worth, Tex.**

**Division of Ser. No. 294,723, Jan. 10, 1989, which is a continuation-in-part of Ser. No. 153,288, Feb. 5, 1988, abandoned. This application Oct. 2, 1989, Ser. No. 416,284**

**Int. Cl.$^5$ G11B** *5/84;* **G01D** *9/00*

**U.S. Cl. 369—284** **18 Claims**



1. A recording and erasing system comprising:

a recording medium having a first, expansion layer a second, retention layer juxtaposed to said first, expansion layer, said second, retention layer being adapted to hold material of said first, expansion layer in a substantially deformed condition upon cessation of a first write beam heating said first, expansion layer, and means for reflecting at least a second erase beam at an interface of said first, expansion layer and said second, retention layer; and

means for activating said first write beam and said second erase beam, said second erase beam being operative to heat said second, retention layer, said first write beam being activated at a first desired time and being deactivated thereafter, said second erase beam being activated

VOL 1126
ISS 3
MY 21
1991
UMI

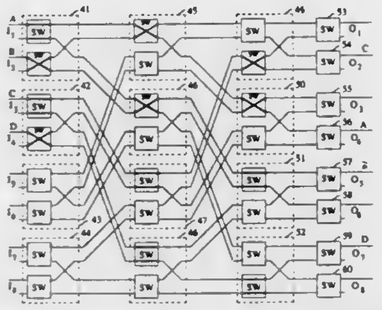
after activation of said first write beam and being deactivated before cessation of said first write beam.

---

### 5,018,129
## DUAL RAIL DILATED SWITCHING NETWORKS

**Arun N. Netravali, Westfield, and Krishnan Padmanabhan, New Providence, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Mar. 9, 1989, Ser. No. 321,048**
**Int. Cl.$^5$ H04J** *14/00*
**U.S. Cl. 370—1** **8 Claims**



1. A method for creating an altered version of a given network that employs single rail 2×2 switches and includes single rail input signals and single rail output signals, comprising the steps of:

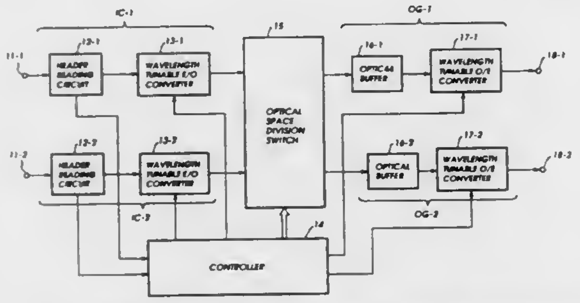
employing a dual rail switch in said altered version of a given network in place of a single rail switch in said given network, said dual rail switch comprising two input pairs of leads and two output pairs of leads;
employing a pair of links in said altered version of a given network in place of a single link in said given network; and
employing a combiner stage as the ultimate stage of said altered version of a given network to combine pairs of output signals in a penultimate stage of said altered version of a given network to form single rail output signals of said altered version of a given network that parallel said single rail output signals of said given network.

---

### 5,018,130
## HIGH-SPEED OPTICAL PACKET SWITCHING SYSTEM USING OPTICAL BUFFER BETWEEN INCOMING AND OUTGOING CHANNELS

**Syuji Suzuki, and Hiroshi Suzuki, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Jun. 22, 1989, Ser. No. 370,192**
**Claims priority, application Japan, Jun. 23, 1988, 63-156126**
**Int. Cl.$^5$ H04J** *14/00*
**U.S. Cl. 370—1** **12 Claims**



1. An optical packet switching system having incoming line terminals for receiving incoming packets, respectively, and outgoing line terminals, each of said incoming packets being destined to one of said outgoing line terminals, comprising:

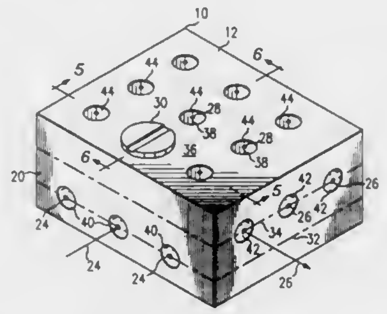
a wavelength selection stage connected to said incoming line terminals for selecting a wavelength parameter from a plurality of wavelength parameters according to the destination of each of said incoming packets, said wavelength selection stage including a wavelength tunable device for converting said incoming packet to an optical packet having a wavelength corresponding to said selected wavelength parameter, said wavelength selection stage multiplexing a plurality of such optical packets to generate a wavelength and time division multiplexed (WTDM) signal in response to receipt of a plurality of said incoming packets;
an optical buffer for storing said WTDM signal; and
a wavelength detection stage connected between said optical buffer and said outgoing line terminals for rearranging a plurality of said selected wavelength parameters according to the destinations of incoming packets, said wavelength detection stage including a wavelength tunable device for detecting optical packets from said stored WTDM signal in accordance with the rearranged wavelength parameters so that each of the optical packets detected by said wavelength tunable device appears at one of said outgoing line terminals according to the destination of the corresponding incoming packet.

---

### 5,018,131
## OPTICAL SWITCH

**Govind Shah, Princeton Junction; Peter A. Basile, West Windsor; Ralph H. Carmen, Lebanon, all of N.J., and Stephen A. Deschaine, Garland, Tex., assignors to DSC Communications Corporation, Plano, Tex.**

**Filed Feb. 28, 1989, Ser. No. 316,987**
**Int. Cl.$^5$ H04J** *14/00*
**U.S. Cl. 370—1** **13 Claims**



1. An optical switch comprising:

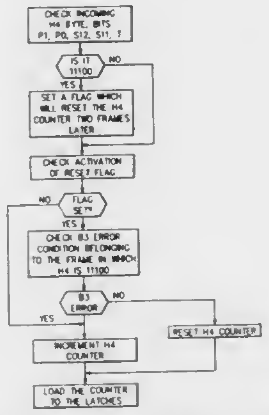
a housing having an interior;
a plurality of optical transmitters mounted on said housing so that light from said transmitters radiates into said interior of said housing substantially along lines of projection in a first plane, wherein each line of projection is associated with one of said transmitters;
a plurality of optical receivers mounted on said housing so that light received by said receivers approaches from said interior of said housing substantially along lines of incidence in a second plane, wherein each line of incidence is associated with one of said receivers and each of said lines of incidence crosses each of said lines of projection within said interior of said housing at a cross point, and said first and second planes do not intersect within said housing interior;
means, demountably coupled to said housing at one of said cross points, for reflecting light from one of said lines of projection to one of said lines of incidence; and
means for aligning said reflecting means so that light from said transmitters along said lines of projection is substantially reflected along said lines of incidence.

---

### 5,018,132
## SONET 4H BYTE RECEIVER AND FILTER

**Timothy J. Williams, and Ertugrul Baydar, both of Raleigh, N.C., assignors to Alcatel NA Network Systems Corp., Raleigh, N.C.**

**Filed May 12, 1989, Ser. No. 351,538**
**Int. Cl.$^5$ H04J** *1/16, 3/14, 3/12*
**U.S. Cl. 370—13** **11 Claims**


CHECK INCOMING H4 BYTE, BITS P1, P0, S12, S11, T
IS IT 11100
NO
YES
SET A FLAG WHICH WILL RESET THE H4 COUNTER TWO FRAMES LATER
CHECK ACTIVATION OF RESET FLAG
FLAG SET?
NO
YES
CHECK B3 ERROR CONDITION BELONGING TO THE FRAME IN WHICH H4 IS 11100
B3 ERROR
NO
YES
RESET H4 COUNTER
INCREMENT H4 COUNTER
LOAD THE COUNTER TO THE LATCHES

1. In an access apparatus for a SONET transmission system of the type that transmits information in frames, each frame having tributaries with channels, a plurality of frames forming a superframe, a device for processing H4 bytes, comprising:

means for receiving SONET-formatted bytes from the SONET transmission system;
means for extracting H4 bytes from the received SONET bytes;
means for sensing an alarm condition related to the received SONET bytes;
means for sequentially generating H4 bytes for each SONET frame; and
means for periodically locking said H4 byte generating means to the received H4 bytes, said locking means being responsive to said alarm sensing means to prevent said periodic locking when an alarm condition is sensed, whereby the H4 byte generating means is periodically locked to the received H4 bytes when no alarm condition is sensed and continues to sequentially generate H4 bytes in a free-running manner if an alarm condition is sensed.

---

### 5,018,133
## NETWORK SYSTEM COMPRISING A PLURALITY OF LANS USING HIERARCHICAL ROUTING

**Masato Tsukakoshi, Yokohama; Yasuhiro Takahashi, Fujisawa; Matsuaki Terada, Machida, and Nobuyuki Takagishi, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 270,844, Nov. 14, 1988, abandoned. This application Sep. 6, 1990, Ser. No. 582,781**
**Claims priority, application Japan, Nov. 18, 1987, 62-289319**
**Int. Cl.$^5$ H04J** *1/16, 3/02, 3/14, 3/24*
**U.S. Cl. 370—16** **6 Claims**

1. A hierarchical routing network system, comprising a plurality of local area networks (LANs) interconnected by a plurality of bridge means for transmitting communication messages between terminal devices connected to said LANs, in which a spanning tree structure, whose root is constructed by means including more than one bridge assigned a bridge ID of highest priority, is formed by controlling at least one of said plurality of bridge means to work in backup mode, where no communication message is relayed, in an operating state, characterized by:

said plurality of LANs including at least one main LAN having a relatively high data transmission speed and capacity and a plurality of sub-LANs having a relatively low data transmission speed and capacity;
each of said bridge means for connecting two adjacent LANs having:
(a) means for selectively relaying communication messages received from one of said adjacent LANs to the other according to an destination address included in each of said received messages;
(b) means for periodically sending out first control messages for constructing said spanning tree structure with respect to said adjacent LANs;
(c) means for determining whether the bridge means should operate so as to periodically send out said first control messages or operate so as to relay first control messages received from one of said adjacent LANs to the other in accordance with a result of comparison between a bridge ID assigned to the bridge means and that included in the received control message; and
(d) means for determining whether or not the bridge means should operate in the backup mode in accordance with a result of comparison between cost information included in a second control message for instructing reconstruction of said spanning tree received by one of said adjacent LANs and an estimated cost of a message to be relayed to said one adjacent LAN from the other;
a plurality of first ones of said bridge means for connecting said main LAN and said sub-LANs being assigned bridge IDs of priority higher than that given to second ones of said bridge means connecting sub-LANs with each other;
each of said second bridge means having means for monitoring the arrival of said first control messages from one of said adjacent LANs and for sending out a notification message to said adjacent LANs if abnormality in the transmission of the first control message has been detected by said monitoring; and
each of said first bridge means having means for sending out said second control message in response to reception of said notification message from one of said second bridge means and being operated so as to transmit no first and second control message to said main LAN, but to transmit them only to the side of the sub-LANs connected therewith, whereby the operation for reconstruction of the spanning tree is carried out locally within a partial tree area including one of said first bridge means as its root.

---

### 5,018,134
## METHOD FOR CANCELLING ECHO IN A TRANSMITTER AND AN APPARATUS THEREFOR

**Masaru Kokubo, Fochu, Japan; Tatsuko Shinotsuka, Stuffgart, Fed. Rep. of Germany; Tatsuya Kameyama, Hachioji, Japan; Motohiro Kokumai, Yokohama, Japan, and Hirotaka Hara, Kokubunji, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

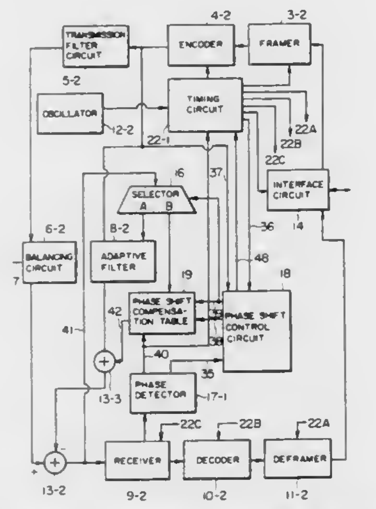
**Continuation of Ser. No. 271,673, Nov. 16, 1988, Pat. No. 4,896,318. This application Dec. 4, 1989, Ser. No. 444,851**
**Claims priority, application Japan, Nov. 18, 1987, 62-289320; Jun. 24, 1988, 63-154692**
**Int. Cl.$^5$ H04J** *3/00*
**U.S. Cl. 370—32.1** **14 Claims**

8. An apparatus for cancelling an echo in a transmitting apparatus comprising:

(a) means for detecting an incoming component which is derived from a transmitting signal transmitted from said transmitting apparatus and which enters into a receiving circuit in said transmitting apparatus via a transmitting medium;
(b) means for setting an output of an echo canceller in order to cancel said incoming component on the basis of a detecting result of said incoming component;
(c) means for detecting a phase difference between an operational clock for transmitting a signal transmitted from another transmitting apparatus communicating with si apparatus and an operational clock of said transmitting apparatus for receiving said transmitted signal from said other transmitting apparatus;

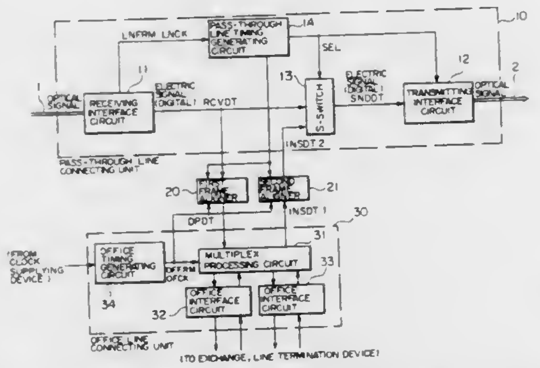
VOL 1126
ISS 3
MY 21 1991
UMI

(d) means for comparing said phase difference with a predetermined value;
(e) means for detecting the transmission of a particular, predetermined signal row from said transmitting apparatus;
(f) means for changing a phase of said operational clock of said transmitting apparatus after said detecting of said transmission of said particular signal row, when said phase difference becomes greater than said predetermined value; and
(g) means for correcting said output of said echo canceller when said operational clock phase of said transmitting apparatus is changed.



### 5,018,135
### ADD DROP MULTIPLEXER

**Yoshihiro Ashi, and Tadayuki Kanno, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Sep. 26, 1989, Ser. No. 412,475**
**Claims priority, application Japan, Sep. 28, 1988, 63-241042**
**Int. Cl.$^5$ H04J** *3/08*
**U.S. Cl. 370—55** **12 Claims**

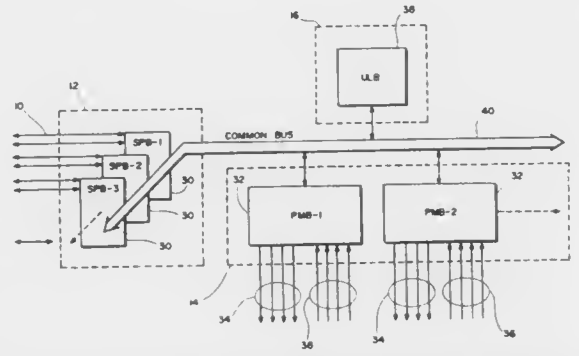

PASS-THROUGH LINE TIMING GENERATING CIRCUIT
LNFRM LNCK
SEL
OPTICAL SIGNAL
RECEIVING INTERFACE CIRCUIT
ELECTRIC SIGNAL (DIGITAL) RCVDT
SWITCH
ELECTRIC SIGNAL (DIGITAL) SNDDT
TRANSMITTING INTERFACE CIRCUIT
OPTICAL SIGNAL
PASS-THROUGH LINE CONNECTING UNIT
FRAME ALIGNER
(FROM CLOCK SUPPLYING DEVICE)
OFFICE TIMING GENERATING CIRCUIT
MULTIPLEX PROCESSING CIRCUIT
OFFICE INTERFACE CIRCUIT
OFFICE INTERFACE CIRCUIT
OFFICE LINE CONNECTING UNIT
(TO EXCHANGE, LINE TERMINATION DEVICE)
1A
10
11
12
13
2
20
21
30
31
32
33
34

1. An add drop multiplexer, in which digital transmission lines synchronized in a circuit network are installed, comprising:
a pass-through line connecting unit which is driven by a timing signal extracted from a transmission line signal that has passed through a transmission line and effects branching and insertion of the transmission line as well as connection of pass-through lines at multiplexed levels;
an office line connecting unit which performs an office interface function for each of a plurality of devices in a single office;
a first frame aligner connecting multiplex branched signals from said pass-through line connecting unit with said office line connecting unit; and
a second frame aligner connecting multiplex inserted signals from said office line connecting unit with said pass-through line connecting unit.

---

### 5,018,136
### MULTIPLEXED DIGITAL PACKET TELEPHONE SYSTEM

**Raphael Gollub, St. Louis Park, Minn., assignor to Republic Telcom Systems Corporation, Boulder, Colo.**
**Continuation of Ser. No. 212,044, Sep. 6, 1988, abandoned, which is a division of Ser. No. 119,273, Nov. 9, 1987, Pat. No. 4,782,485. This application Sep. 5, 1990, Ser. No. 579,189**
**Int. Cl.$^5$ H04J** *15/00, 3/24*
**U.S. Cl. 370—60.1** **6 Claims**



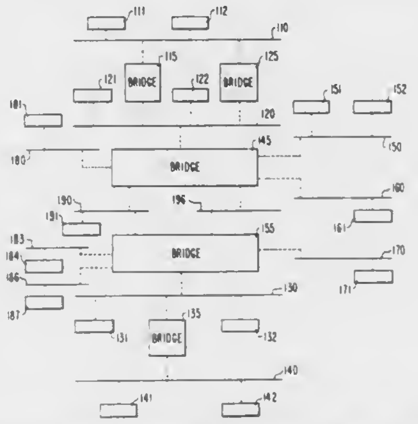
1. A communication system for communicating speech signals over a communication medium, said speech signals comprising alternating speech spurts and speech pauses, comprising:
means for formatting said speech signals into successive groups of digital bits, each of said groups of bits being derived from a speech interval comprising no more than one of said speech spurts;
means for transforming said groups of digital bits into variable length corresponding frames of digital compression variables comprised of digital bits whereby the ratio of the number of bits in a corresponding frame to the number of bits in the group to which the frame corresponds to is less than one;
means for appending an identifying header to said frames of digital compression variables to provide variety sized information packets adapted for asynchronous transmission along said communication medium; and
means for transmitting said information packets asychronously along said communication medium.

---

### 5,018,137
### TRANSPARENT LOAD SHARING FOR PARALLEL NETWORKS

**Floyd J. Backes, Temple, N.H.; George Varghese, Bradford, and Charles W. Kaufman, Northboro, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**
**Continuation of Ser. No. 212,359, Jun. 27, 1988. This application Oct. 16, 1990, Ser. No. 598,214**
**Int. Cl.$^5$ H04J** *3/02, 3/24*
**U.S. Cl. 370—85.13** **13 Claims**

1. In a collection of networks connected to a plurality of end nodes and to at least one of a plurality of bridges, said bridges being used for forwarding messages in a time sequence between end nodes connected to different ones of said networks, a method for improving communication among said end nodes comprising the steps of:
selecting one of said bridges connected to each of said networks as a designated bridge for that network to forward messages to and from that network, wherein the remaining ones of said bridges connected to that network and not selected as said designated bridge are deemed daughter bridges;
sensing, by each of said daughter bridges, whether a trunking condition exists in the ones of said networks connected to that daughter bridge, said trunking condition occurring when a plurality of said networks, termed trunked networks, are connected to both that daughter bridge and to a corresponding one of said designated bridges, wherein the ones of said daughter bridges sensing said trunking condition are termed trunked daughter bridges; and

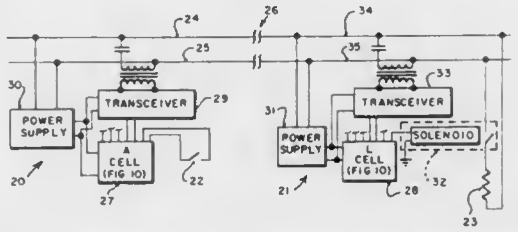


executing a binding scheme by a selected one of said trunked daughter bridges to cause said selected trunked daughter bridge to forward messages to and from said designated bridge in the same manner as would a plurality of daughter bridges each connected to a different one of the trunked networks corresponding to said selected trunked daughter bridge, thereby distributing the messages forwarded between said selected trunked daughter bridge and said corresponding designated bridge among said connected trunked networks in a manner which preserves the time sequence of said messages.

---

### 5,018,138
### PROTOCOL FOR NETWORK HAVING A PLURALITY OF INTELLIGENT CELLS

**William B. Twitty, Santa Cruz, and Wendell B. Sander, Los Gatos, both of Calif., assignors to Echelon Systems Corporation, Los Gatos, Calif.**
**Division of Ser. No. 119,382, Nov. 10, 1987, abandoned. This application Nov. 8, 1988, Ser. No. 268,944**
**Int. Cl.$^5$ H04J** *3/24, 3/02*
**U.S. Cl. 370—94.1** **3 Claims**

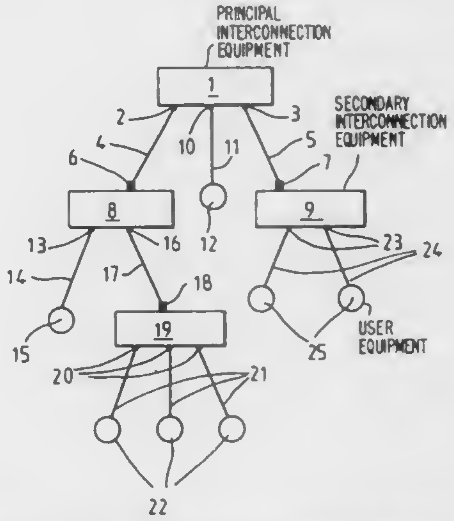


1. In a network for sensing, communicating and controlling where a plurality of cells communicate with one another through packets, an improvement comprising the steps of:
each cell determining the baud rate of a received packet;
each cell storing said baud rate within said cell;
any of said cells replying to said packet, using said stored baud rate in computing durations of slots, and using a backoff algorithm to determine how many of said slots to wait before replying.

---

### 5,018,139
### COMMUNICATION NETWORK BETWEEN USER EQUIPMENT

**Rémi Despres, Montesson, France, assignor to Societe Anonyme Rce, Cergy-Pontoise, France**
**Filed Jun. 21, 1990, Ser. No. 541,496**
**Claims priority, application France, Jul. 4, 1989, 89 08957**
**Int. Cl.$^5$ H04J** *3/24, 3/02*
**U.S. Cl. 370—94.3** **2 Claims**


PRINCIPAL INTERCONNECTION EQUIPMENT
SECONDARY INTERCONNECTION EQUIPMENT
USER EQUIPMENT
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1. Network for communication between user equipment for transferring messages emitted by each user equipment to all the other user equipment comprising a principal interconnection equipment (**1**) having at least two downstream terminals (**2, 3**) each connected via a connection (**4, 5**) to a single upstream terminal (**6, 7**) of a secondary interconnection equipment (**8, 9**) or to a user equipment (**12**), each secondary interconnection equipment (**8, 9, 19**) comprising at least two downstream terminals (**13, 16, 23, 20**) each connected to a user equipment (**15, 22, 25**) or to the upstream terminal (**18**) of another secondary interconnection equipment (**19**), any message emitted by a user equipment (**12, 15, 22, 25**) being transmitted to all the interconnection equipment (**1, 8, 9, 19**) and, thereafter, to each of the user equipment (**12, 15, 22, 25**) connected thereto, wherein:
each user equipment (**12, 15, 22, 25**) emits a message only if it has first received an emission authorization signal,
each user equipment (**12, 15, 22, 25**) emits, after having finished using the authorization signal, an end of emission signal,
the principal interconnection equipment (**1**) emits an emission authorization signal on one of its downstream terminals (**2, 3**) only if, for each emission authorization signal which it has emitted on one of its downstream terminals (**2, 3**), it has received an end of emission signal on the same downstream terminal (**2, 3**),
each secondary interconnection equipment (**8, 9, 19**) emits an emission authorization signal on one of its downstream terminals (**13, 16, 20, 23**) only if it has itself received an emission authorization signal on its upstream terminal (**6, 7, 18**) and if, for each emission authorization signal which it has emitted on one of its downstream terminals (**13, 16, 20, 23**), it has received an end of emission signal on the same downstream terminal (**13, 16, 20, 23**),
each secondary interconnection equipment (**8, 9, 19**) emits on its upstream terminal (**6, 7, 18**) an end of emission signal only if, for each emission authorization signal which it has emitted on one of its downstream terminals (**13, 16, 20, 23**), it has received an end of emission signal on the same terminal (**13, 16, 20, 23**).

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,018,140

### REFRAME CIRCUIT IN A SYNCHRONOUS MULTIPLEXING DEVICE

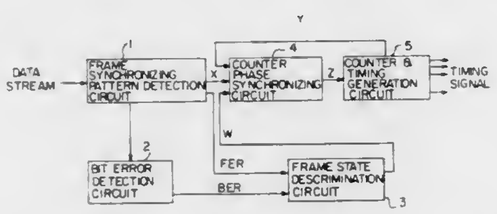
**Bhum C. Lee; Kwon C. Park, and Bong T. Kim, all of Daejeon, Rep. of Korea, assignors to Electronics and Telecommunications Research Institute, Daejon and Korea Telecommunications Authority, Seoul, both of, Rep. of Korea**

**Filed Dec. 11, 1989, Ser. No. 448,805**

**Claims priority, application Rep. of Korea, Dec. 14, 1988, 16773**

**Int. Cl.$^5$ H04J** *3/06*

**U.S. Cl. 370—105.1** **5 Claims**


Y
1
4
5
DATA STREAM
FRAME SYNCHRONIZING PATTERN DETECTION CIRCUIT
X
COUNTER PHASE SYNCHRONIZING CIRCUIT
Z
COUNTER & TIMING GENERATION CIRCUIT
TIMING SIGNAL
W
2
BIT ERROR DETECTION CIRCUIT
FER
BER
FRAME STATE DESCRIMINATION CIRCUIT
3

1. A reframe means in a synchronous multiplexing device comprising: a frame synchronizing pattern detection means for detecting whether a frame synchronizing pattern in a received data stream is the same as a predetermined synchronizing pattern, for providing the result thereof as a first output signal (X) and for providing a second output signal (FER) in an out-of-frame state;

a frame pattern bit error detection means responsive to a serial data stream from the frame synchronizing pattern detection means, for comparing the serial data stream with a predetermined serial frame pattern, for detecting bit error in the data stream, for guarding whether the detected bit error exceeds an error threshold value (Eth) and for providing the result thereof as an output signal (BER);

an in-frame/out-of-frame state discrimination means responsive to the output signal (BER) from the frame pattern bit error detection means and the second output signal (FER) in the out-of-frame state from the frame synchronizing pattern detection means, for discriminating in an in-frame state, as a normal in-frame state (I) if the error in a frame synchronizing signal train is less than or equal to the error threshold (Eth), for discriminating in an in-frame state, as a pre-alarm state (J) if the error exceeds the error threshold (Eth) and for discriminating in an in-frame state, as the out-of-frame state when the error exceeds the error threshold continuously more than a predetermined number of times, and for guarding in the out-of-frame state, whether a predetermined frame synchronizing signal train is detected at a position of the next frame signal expected from the detected frame synchronizing pattern, for being processed in a frame pattern search steps (B through H) determining whether the detected frame synchronizing pattern is produced accidentially, and then for providing the result as an output signal (W);

a counter phase synchronizing means responsive to the output signal (W) from the in-frame/out-of-frame state discrimination means, the first output signal (X) from the frame synchronizing pattern detection means and a reference phase signal (Y), for providing as an output signal (Z) a parallel loading mode for fixing phase while operation in the in-frame state and a count-up mode for counting until the state becomes the in-frame state while operation in the out-of-frame state and;

a counter and timing generation means responsive to an operating mode control signal (z) from the counter phase synchronizing means, for operating in the parallel loading mode or in the count-up mode, for generating a timing signal in accordance with each of the operating modes and then for supplying them to each means and a system classifying a received multiplexed data.

---

### 5,018,141

### CIRCUIT FOR SEPARATING VOICE, DATA AND SIGNALING INFORMATION

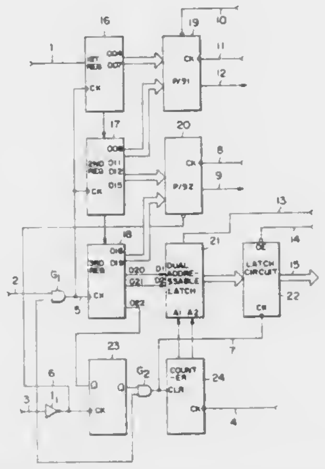
**Ki-Cheol Kim, Suwon, Rep. of Korea, assignor to SamSung Electronics, Co., Ltd., Suwon, Rep. of Korea**

**Filed Aug. 31, 1989, Ser. No. 400,945**

**Claims priority, application Rep. of Korea, Aug. 31, 1988, 1988-11204**

**Int. Cl.$^5$ H04J** *3/12*

**U.S. Cl. 370—110.1** **7 Claims**



1. In combination with a central processing unit providing a read signal, a combo-codec and a frequency divider providing a first transmission clock signal, a second transmission clock signal, a third transmission clock signal, a frame synchronous bar signal, FS, a reception-shift-enable signal, RxSHEN, and a transmission-enable signal, TxEN, a circuit for separating voice, data and signalling information of a digital basic access frame, said circuit comprising:

serial/parallel conversion means for receiving at a data input thereof serial digital data of a basic access frame and for outputting via a plurality of output ports thereof said digital data of said basic access frame as parallel digital data of said basic access frame in accordance with a serial-parallel conversion clock signal applied thereto;

first parallel/serial circuit means operably connected with said frequency divider and with said serial/parallel conversion means, for receiving parallel digital data corresponding to data information of said received digital basic access frame from a first output port of said serial/parallel conversion means in accordance with said frame synchronous bar signal FS from said frequency divider, and for outputting said digital data representing data information of said received digital basic access frame as serial digital data in accordance with said first transmission clock signal from said frequency divider;

second parallel/serial circuit means operably connected with said frequency divider and with said serial/parallel conversion means, for receiving parallel digital data corresponding to voice information of said received digital basic access frame from a second output port of said serial/parallel conversion means in accordance with an inverted reception-shift-enable signal $\overline{\text{RxSHEN}}$ applied to said second parallel/serial circuit means, and for outputting said digital data representing voice information of said received digital basic access frame as serial digital data to said combo-codec in accordance with said second transmission clock signal from said frequency divider;

data separation control circuit means operably connected with said frequency divider, said serial/parallel conversion means and said second parallel/serial circuit means, and receiving said reception-shift-enable signal RxSHEN, said transmission-enable signal TxEN and said third transmission clock signal from said frequency divider, for generating and outputting said inverted reception-shift-enable signal $\overline{\text{RxSHEN}}$ to said second parallel/serial circuit means, and for generating and outputting said serial-parallel conversion clock signal to said serial/parallel conversion means in accordance with said reception-shift-enable signal and said third transmission clock signal, and for receiving from a third output port of said serial/parallel conversion means digital data corresponding to synchronization information of said received digital basic access frame and for generating and outputting an address signal and a latch clock signal in accordance with said synchronization information, said reception-shift-enable signal RxSHEN, said inverted reception-shift-enable signal $\overline{\text{RxSHEN}}$ and said transmission enable signal TxEN; and

data collection means operably connected with said serial/-parallel conversion means, said data separation control circuit means, said frequency divider and said central processing unit, for receiving and collecting from a fourth output port of said serial/parallel conversion means digital data corresponding to signalling information of a predetermined number of received digital basic access frames in accordance with said transmission-enable signal TxEN from said frequency divider and said address signal from said data separation control circuit means, and for outputting to said central processing unit said digital data representing said collected signalling information of said predetermined number of basic access frames in accordance with said latch clock signal from said data separation control circuit means and said read signal from said central processing unit.

---

### 5,018,142

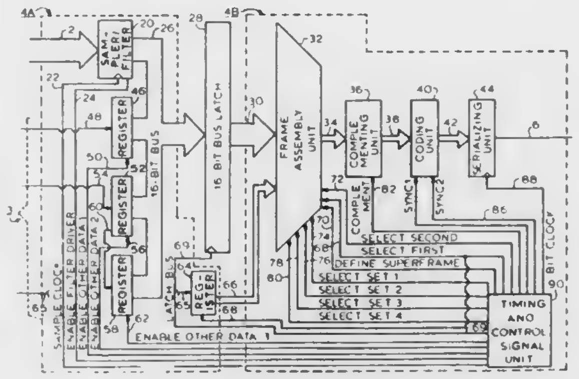
### TECHNIQUE FOR ORGANIZING AND CODING SERIAL BINARY DATA FROM A PLURALITY OF DATA LINES FOR TRANSMISSION OVER A SINGLE TRANSMISSION LINE

**Robert J. Simcoe, Westborough, and Gregory M. Waters, Boston, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation of Ser. No. 164,392, Mar. 4, 1988, abandoned. This application Jan. 26, 1990, Ser. No. 471,209**

**Int. Cl.$^5$ H04J** *3/00, 14/08*

**U.S. Cl. 370—112** **59 Claims**



9. A digital-data transmission apparatus for receiving at least one system input signal representing a sequence of data bits that occur at most at an expected maximum data rate and for generating in response thereto an optical transmitter output signal for transmission over a fiber-optic cable comprising:

a transmitter input circuit, connected to receive the system input signal and including:

a sampling circuit for taking samples of the system input signal at a sampling rate that exceeds the expected maximum data rate and for generating a sample signal representing a sequence of sample bits determined by corresponding successive samples;

a transmitter filter responsive to the sample signal for generating a transmitter-filter output that comprises, for each given sample bit, an associated transmitter-filter output bit whose value is that of the majority of the given sample bit, the sample bit that immediately succeeds the given sample bit, and the transmitter-filter output bit associated with the sample bit that immediately precedes the given sample bit; and

means for generating a transmitter-input-circuit signal whose contents are determined by the transmitter-filter output; and

a transmitter output circuit, connected to receive the transmitter-input-circuit signal, for generating as the transmitter output signal a signal representing contents determined by the transmitter-input-circuit bits, the transmitter output circuit comprising:

transmitter frame-assembly means for organizing the transmitter-input-circuit bits into intermediate data words, each of which comprises a predetermined number of the transmitter-input-circuit bits;

a transmitter complement unit for complementing alternate intermediate data words and generating a transmitter-complement-unit output comprising the alternate complemented and uncomplemented intermediate data words;

a coding unit responsive to the transmitter-complement-unit output for producing a coding-unit output signal representing transmitter code words that result from encoding the transmitter-complement-unit output in accordance with the following code:

| Code Word | Data Word |
|---|---|
| 01010 | 0000 |
| 10001 | 0001 |
| 10010 | 0010 |
| 11000 | 0011 |
| 01100 | 0100 |
| 10101 | 0101 |
| 00110 | 0110 |
| 01001 | 0111 |
| 01101 | 1000 |
| 10011 | 1001 |

a transmitter adapted for coupling to a fiber-optic cable for transmitting over the fiber-optic cable, as the transmitter-output signal, an optical signal representing the transmitter code words that the coding unit produces.

---

### 5,018,143

### FAULT DIAGNOSING AND IDENTIFICATION SYSTEM FOR REPRODUCTION MACHINES

**Dale T. Platteter, Fairport, and Robert S. Westfall, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 255,658, Oct. 13, 1988, abandoned. This application Jan. 26, 1990, Ser. No. 471,148**

**Int. Cl.$^5$ G06F** *11/00*

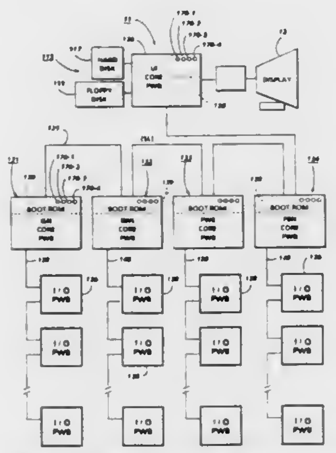
**U.S. Cl. 371—16.4** **5 Claims**

1. A process for diagnosing and identifying faults in a reproduction machine during operation of said machine, the machine having a plurality of image processing components, an operating system providing control data for operating said components; memory means for storing said operating system; and control means including plural printed wiring boards coupled by a shared line with said memory means for implementing operation of said machine in accordance with said operating system, each of said boards having plural fault indicating lamps thereon, comprising the steps of:

(a) repeatedly actuating a first of said lamps on each of said boards while said operating system is running:

(b) repeatedly actuating a second of said lamps on each of said boards at a predetermined rate each time a message is received on said shared line; and

(c) repeatedly actuating a third of said lamps on said boards at a predetermined rate each time a message is transmitted from said boards to said shared line;



(d) where a fault in one of said boards is detected,

(1) identifying said fault by code, and

(2) pulsing said second and third lamps on said board on and off a number of times equal to said code whereby to identify said code and the fault detected.

---

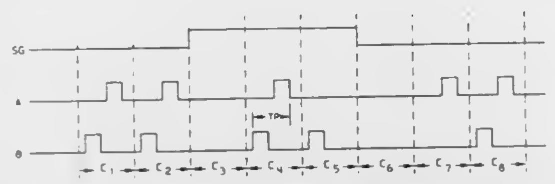
### 5,018,144
### LOGIC PERFORMANCE VERIFICATION AND TRANSITION FAULT DETECTION

**James L. Corr, Shelburne, and Brian J. Vincent, Essex Junction, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 28, 1989, Ser. No. 345,758**

**Int. Cl.$^5$ G06F *11/00***

**U.S. Cl. 371—22.3** **5 Claims**



1. In a scan test system operated in a plurality of machine cycles to test a logic network, the test system comprising a first means having a first portion for receiving test data and a second portion for sending the received test data to the logic network, a second means having a first portion for receiving data from the logic network and a second portion for sending such data to an analyzer, a first signal source for producing a first clock signal that enables the first portions of the first and second means, and a second signal source for producing a second clock signal that enables the second portions of the first and second means, an improved method for gauging the propagation delay of the logic network, comprising the steps of:

writing test data serially into the first means by iteratively strobing the second clock signal and then the first clock signal in sequence for a plurality of timing cycles until all test data is received by the first means;

sending test data in parallel from the second portion of first means to the logic network by strobing the second clock signal, and receiving corresponding logic data from the logic network by the first portion of the second means by subsequently strobing the first clock signal, during the course of a single machine cycle, so as to provide a test window commensurate with the expected propagation delay of the logic network; and

reading said logic data out of the second means, by iteratively strobing the second clock signal and then the first clock signal in sequence for a plurality of timing cycles until all logic data is read.

---

### 5,018,145
### IC TESTER

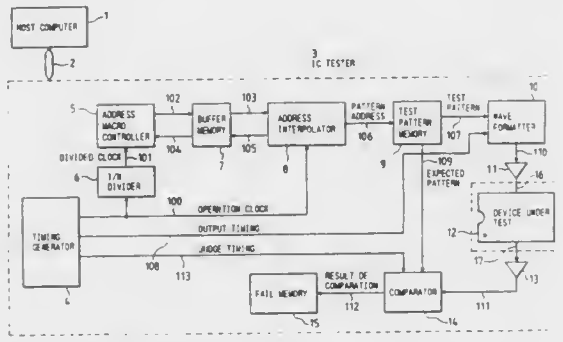
**Shuji Kikuchi, Kanagawa; Yoshio Ouchida, and Ryohei Kamiya, both of Honjo, all of Japan, assignors to Hitachi, Ltd. and Hitachi Electronics Engineering Co., Ltd., both of Tokyo, Japan**

**Filed Aug. 31, 1989, Ser. No. 401,228**

**Claims priority, application Japan, Sep. 6, 1988, 63-221290**

**Int. Cl.$^5$ G06F *11/22***

**U.S. Cl. 371—27** **6 Claims**



5. An IC tester comprising:

a first memory storing test pattern control instructions;

a first address generator specifying addresses top said first memory;

a second memory storing test patterns;

a second address generator specifying addresses to said second memory;

a first controller providing a first control signal to said first address generator by interpreting a test pattern control instruction read from said first memory, said first control signal being in accordance with the interpretation of said test pattern control instruction, and further providing a control information for said second address generator;

a third memory temporarily storing said control information for said second address generator;

a second controller providing a second control signal generated in accordance with an interpretation of the temporarily stored control information being read from said third memory; and

a clock generator providing clock signals to said first and second address generators, and providing an address renewal speed to each of said address generators.

---

### 5,018,146
### APPARATUS AND METHOD FOR DETERMINING IF A PARTICULAR PLUG-IN CARD IS APPROPRIATE FOR USE WITH AN ELECTRONIC PROCESSOR

**Daniel W. Sexton, Charlottesville, Va., assignor to GE Fanuc Automation North America, Inc., Charlottesville, Va.**

**Filed Jun. 22, 1989, Ser. No. 369,898**

**Int. Cl.$^5$ G06F *11/10***

**U.S. Cl. 371—37.1** **9 Claims**

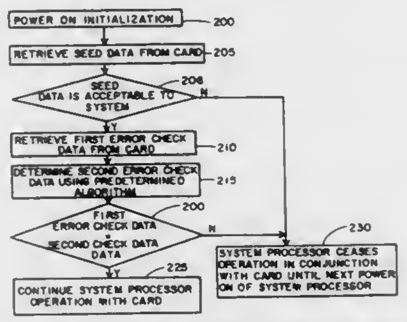
7. In an information processing system capable of accepting electronic circuit cards therein, a method of determining if a particular card is appropriate for use in said system, said method comprising the steps of:

storing a first error check code on said card, said first error check code being a function of seed data stored on said card, said first error check code being related to said seed data by a first predetermined algorithm;

retrieving said first error check code from said card and storing it in the system;

retrieving the seed data stored on said card and storing it in the system;

calculating a second error check code from said retrieved seed data using a second predetermined algorithm;


POWER ON INITIALIZATION
200
RETRIEVE SEED DATA FROM CARD
205
SEED DATA IS ACCEPTABLE TO SYSTEM
206
N
Y
RETRIEVE FIRST ERROR CHECK DATA FROM CARD
210
DETERMINE SECOND ERROR CHECK DATA USING PREDETERMINED ALGORITHM
215
200
FIRST ERROR CHECK DATA = SECOND CHECK DATA DATA
N
Y
230
SYSTEM PROCESSOR CEASES OPERATION IN CONJUNCTION WITH CARD UNTIL NEXT POWER ON OF SYSTEM PROCESSOR
225
CONTINUE SYSTEM PROCESSOR OPERATION WITH CARD

summing said second error check code with said retrieved first error check code; and

permitting said card to function with said system if said step of summing produces a predetermined value and otherwise not permitting said card to function with said system.

---

### 5,018,147
### BIT MASK GENERATOR

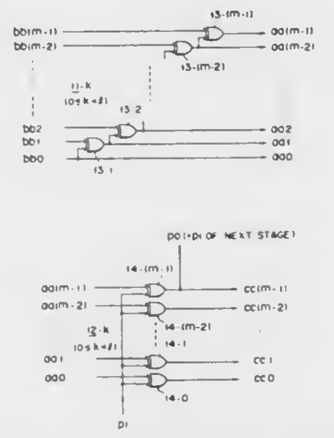
**Naoyuki Kai, Tokyo; Masahide Ohhashi, Yokohama, and Tsutomu Minagawa, Fujisawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jan. 26, 1989, Ser. No. 301,675**

**Claims priority, application Japan, Jan. 30, 1988, 63-20316**

**Int. Cl.$^5$ G06F *11/10***

**U.S. Cl. 371—49.1** **15 Claims**



1. A bit mask generator for generating mask data which detects as a boundary a bit position of logic "1" in input data consisting of a plurality of bits, comprising partial mask generators for dividing the input data into a plurality of blocks, and generating partial mask data corresponding to the divided blocks; and parity correction circuits for correcting or modifying the partial mask data in accordance with a given parity input, and generating parity outputs,

each of said partial mask generators being provided with a plurality of first exclusive OR gates each of which receives bit data of the corresponding block as one input, and either one of LSB input data and an output from a lower-bit side first exclusive OR gate as the other input,

each of said parity correction circuits being provided with a plurality of second exclusive OR gates each of which receives as one input the partial mask data generated by the partial mask generator of the corresponding block while receiving as the other input a parity generated by a lower-bit side parity correction circuit of the corresponding block, an output from each second exclusive OR gate being generated as mask data of the corresponding block, and an output from the MSB second exclusive OR gate being output as the parity.

---

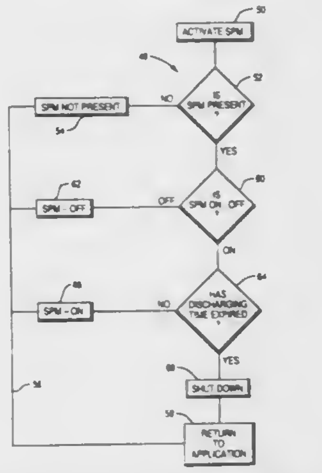
### 5,018,148
### METHOD AND APPARATUS FOR POWER FAILURE PROTECTION

**Ramesh U. Patel, and Sithy So, both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed Mar. 1, 1989, Ser. No. 317,384**

**Int. Cl.$^5$ G06F *11/00***

**U.S. Cl. 371—66** **16 Claims**



1. A method for protection of a system embodied in a data processing apparatus having a normal power supply and a standby power supply associated therewith, comprising the following steps:

setting a timer in the data processing apparatus to a value equal to a period of time during which the standby power supply is capable of supplying power to said data processing system when said standby power supply is fully charged;

repetitively checking the status of the standby power supply to determine whether or not said standby power supply is supplying power to said data processing apparatus in place of the normal power supply when said normal power supply is interrupted;

starting operation of said timer when said standby power supply is found, during said repetitive checking, to be supplying power to said data processing apparatus;

continuing to repetitively check the status of said standby power supply and stopping and starting operation of said timer to provide a cumulative elapsed time in accordance with the termination and any subsequent commencement and termination of the supplying of power to said data processing apparatus by said standby power supply until the time remaining on the timer is exhausted; and

shutting down the operation of said data processing apparatus if the standby power supply continues to supply power to said data processing apparatus after the time remaining on the timer is exhausted.

VOL 126
ISS 3
MY 21
1991
UMI

### 5,018,149

## FREE ELECTRON LASER OSCILLATOR

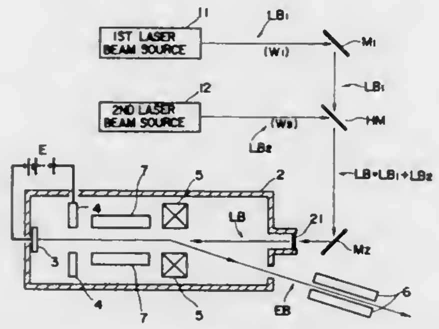
**Yutaro Yanagisawa, Hamamatsu, Japan, assignor to Hamamatsu Photonics K.K., Hamamatsu, Japan**

**Filed Feb. 13, 1990, Ser. No. 479,243**

**Claims priority, application Japan, Feb. 13, 1989, 1-33368**

**Int. Cl.⁵ H01S *3/00***

U.S. Cl. 372—2 5 Claims



1. A free electron laser oscillator comprising:
- a first laser beam generating means for emitting a first laser beam having a first wavelength;
- a second laser beam generating means for emitting a second laser beam having a second wavelength different from said first wavelength;
- an electron beam emission means for receiving a composition beam composed of said first and second laser beams and for converting said composition beam into an electron beam for emission;
- acceleration means for accelerating said electron beam to a predetermined speed at which said accelerated electron beam interacts with a light; and
- laser generating means for periodically biasing said accelerated electron beam with a predetermined cycle identical to a variation cycle in an electron density of said accelerated electron beam to generate a free-electron laser by the interaction between a synchrotron radiation light, obtained by the periodical biasing of said accelerated electron beam, and said accelerated electron beam.

---

### 5,018,150

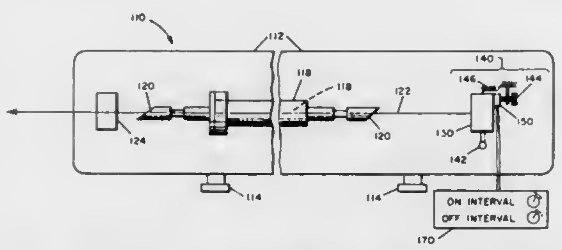
## REFLECTOR SWITCHED LASERS

**Robert J. Wojnarowski, Ballston Lake, and Charles W. Eichelberger, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 5, 1989, Ser. No. 403,236**

**Int. Cl.⁵ H01S *3/08***

U.S. Cl. 372—9 17 Claims



1. In a laser of the type including a continuous lasing medium, an adjustable mirror which, when properly aligned with the optical axis of the lasing medium, enables laser action and means for continuously exciting said lasing medium, the improvement comprising:
- means for switching said laser between on and off states including:
- electromagnetic means for changing the angle of said mirror between an aligned condition in which laser action takes place and a misaligned condition in which laser action is suppressed.

---

### 5,018,151

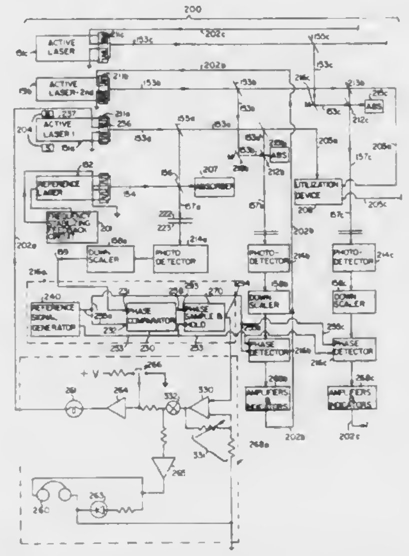
## LASER CONTROL APPARATUS AND METHOD FOR FREQUENCY OFFSET PHASE LOCKING AND THE MINIMIZING OF RETRO-REFLECTION EFFECTS

**Norman T. Seaton, 2821 9th St., Berkeley, Calif. 94710**

**Continuation-in-part of Ser. No. 268,399, May 29, 1981, Pat. No. 4,468,773. This application Aug. 28, 1984, Ser. No. 645,803**

**Int. Cl.⁵ H01S *3/098***

U.S. Cl. 372—18 8 Claims



1. A laser control apparatus including an active laser, a reference laser, means for phase locking the radiation output of said active laser to the radiation output of said reference laser with a relative frequency offset, wherein the improvement in said laser control apparatus comprises:
- said means for phase locking including means for heterodyning the radiation outputs of said lasers to produce a light beat frequency, means for generating an active frequency electric signal as a function of said light beat frequency, means for generating a reference offset frequency electric signal, and a phase comparator means having electric circuitry means for sensing changes in phase between two electric signals and coupled to said means for generating said active frequency electric signal and said means for generating said reference offset frequency electric signal, the phase comparator electric circuitry means providing an output electric signal as a result of changes in phase between said active frequency electric signal and said reference offset frequency electric signal, said phase comparator electric circuitry means including means for providing a substantially infinite capture to thereby prevent phase locking of said active frequency electric signal to said reference offset frequency electric signal at harmonic and mirror image frequencies of said reference offset frequency electric signal.

---

### 5,018,152

## APPARATUS FOR CONTROLLING PULSE ENERGY IN A Q-SWITCHED LASER SYSTEM

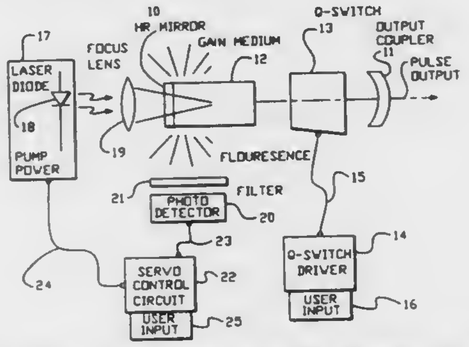
**Mark A. Linne, Mountain View; Robert W. Johnson, Los Altos, and Richard G. Thompson, Scotts Valley, all of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.**

**Filed Sep. 7, 1989, Ser. No. 404,316**

**Int. Cl.⁵ H01S *3/10***

U.S. Cl. 372—25 15 Claims

1. An apparatus for controlling pulse energy in a switched cavity laser system including a resonant cavity, a gain medium within the cavity, a cavity switch, means for generating pump energy and an output coupler, wherein the gain medium exhibits fluorescence in response to pump energy, comprising:
- controllable means, coupled with the means for generating pump energy and the gain medium, for controlling the pump energy delivered to the gain medium in response to an energy control signal;



- detector means, coupled with the gain medium, for generating a fluorescence signal in response to the fluorescence exhibited by the gain medium; and
- means, connected to the detector means and the controllable means, for generating the energy control signal in response to the fluorescence signal.

---

### 5,018,153

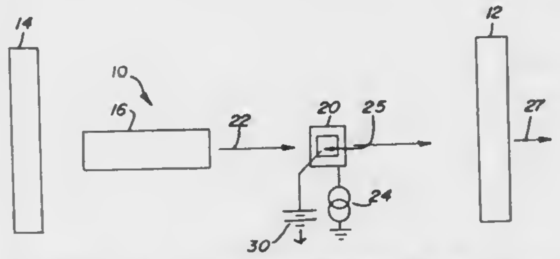
## METHOD AND APPARATUS FOR CORRECTING AMPLITUDE VARIATION IN ELECTRO-OPTIC LASER SYSTEMS

**Kuei-Ru Chien, Cerritos; Robin A. Reeder, Arleta, both of Calif., and H. Dean Stovall, Las Cruces, N. Mex., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Feb. 23, 1990, Ser. No. 483,732**

**Int. Cl.⁵ H01S *3/106***

U.S. Cl. 372—28 18 Claims



1. A method of correcting the amplitude variation induced by electro-optic crystal birefringence within a laser system, said method comprising the steps of:
- (a) actuating a laser gain medium to emit linearly polarized laser light, said gain medium being disposed within a resonant cavity defined by an end reflector and a partially reflective outcoupler;
- (b) frequency modulating the laser light by passing said light through an electro-optic crystal modulator disposed within the resonant cavity, said modulator being activated by a time varying electrical signal, wherein crystal birefringence in the electro-optic crystal modulator causes elliptical polarization in said linearly polarized light and amplitude variation in said frequency modulated laser light; and
- (c) correcting said amplitude variation by changing said elliptically polarized light to a linear polarization within said resonant cavity.

---

### 5,018,154

## SEMICONDUCTOR LASER DRIVE DEVICE

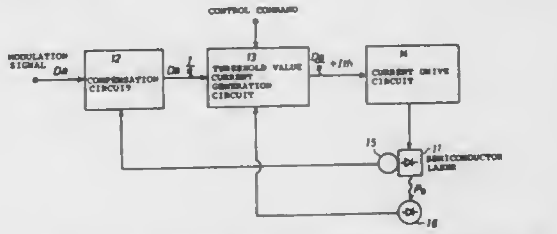
**Tsuyoshi Ohashi, Hashima, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Sep. 6, 1990, Ser. No. 578,270**

**Claims priority, application Japan, Sep. 12, 1989, 1-237585; Oct. 5, 1989, 1-261833**

**Int. Cl.⁵ H01S *3/131***

U.S. Cl. 372—29 21 Claims



1. A drive circuit for driving a semiconductor laser, comprising:
- control signal generating means electrically coupled to the semiconductor laser for generating a control signal for driving the semiconductor laser based on an externally provided modulation signal;
- detecting means for detecting a temperature of the semiconductor laser;
- compensating means electrically coupled to the control signal generating means for altering the control signal based on the temperature of the semiconductor laser to compensate for changes in slope efficiency η of the semiconductor laser.

---

### 5,018,155

## SEMICONDUCTOR LASER DRIVING APPARATUS TO BE USED FOR OPTICAL INFORMATION RECORDING AND REPRODUCING APPARATUS

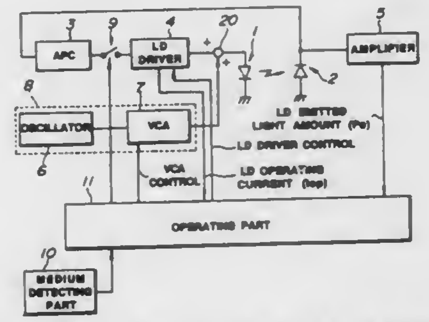
**Nobuo Miyairi, Fujino, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Sep. 20, 1990, Ser. No. 585,463**

**Claims priority, application Japan, Sep. 22, 1989, 1-247495**

**Int. Cl.⁵ H01S *3/131***

U.S. Cl. 372—31 12 Claims



1. A semiconductor laser driving apparatus for driving a semiconductor laser and to be used for an optical information recording and reproducing apparatus doing at least one of recording and reproducing information in an information recording medium by using a light from said semiconductor laser, comprising:
- an emitted light amount detecting means for detecting the emitted light amount of said semiconductor laser;
- an output controlling means for controlling the output of said semiconductor laser on the basis of the detected output of said emitted light amount detecting means so as to be kept constant;
- a driving means for feeding said semiconductor laser with an operating direct current;
- a high frequency superimposing means for superimposing a

VOL
1126
ISS
3
MY
21
1991
UMI

high frequency current on said operating direct current from said driving means;

a measuring means for measuring the variation of the emitted light amount of said semiconductor laser with the variation of the operating current of said semiconductor laser in the absence of said information recording medium in the focus position of said semiconductor laser; and

a superimposed amount controlling means for controlling the superimposed amount by said high frequency superimposing means in response to the measured result of said measuring means.

---

### 5,018,156
### SEMICONDUCTOR LASER APPARATUS

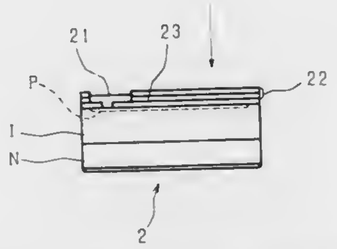
**Masayasu Hashimoto; Hirofumi Yoneyama, and Yasuhiro Watanabe, all of Tottori, Japan, assignors to Sanyo Electric Co., Ltd., Tottori, Japan**

**Filed Jun. 13, 1989, Ser. No. 365,498**

**Claims priority, application Japan, Jun. 20, 1988, 63-81226; Dec. 29, 1988, 63-331549**

**Int. Cl.⁵ H01S** *3/19*

**U.S. Cl. 372—44** **13 Claims**



1. A semiconductor laser apparatus comprising:

a semiconductor laser having a pair of opposed light emitting surfaces; and

a semiconductor photosensor separated by a predetermined distance from a light emitting surface of said semiconductor laser, said semiconductor photosensor having a layer with main inner and outer surfaces and a side and a semiconductor junction surface beneath and coextensive with a substantial part of said layer main inner surface a film formed over a substantial part of said layer main outer surface, said layer main outer surface positioned opposite one of the light emitting surfaces of said laser, said film reflecting a portion of the laser emitted light from the laser light emitting surface back to the laser while permitting some of the light to pass to said semiconductor junction surface for photodetection.

---

### 5,018,157
### VERTICAL CAVITY SEMICONDUCTOR LASERS

**Dennis G. Deppe; Russell D. Dupuis, both of Austin, Tex., and Erdmann F. Schubert, New Providence, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

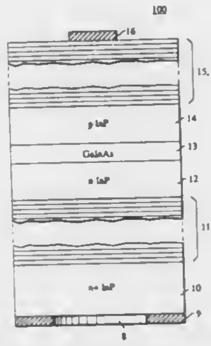
**Filed Jan. 30, 1990, Ser. No. 472,145**

**Int. Cl.⁵ H01S** *3/19*

**U.S. Cl. 372—45** **18 Claims**

1. In a vertical cavity semiconductor laser an active region which generates optical radiation and a mirror stack which reflects the radiation, the stack containing a plurality of spatial periods each of which consists of essentially a quarter-wavelength layer of first semiconductor material and a quarter-wavelength layer of second semiconductor material which is different from the first,

the layer of second material having energy a bandgap that is equal to or less than the energy per photon of the radiation, and



the layer of second material containing a concentration of impurities sufficient to render the second material degenerate and significantly less absorptive of the radiation.

---

### 5,018,158
### SEMICONDUCTOR LASER DEVICE

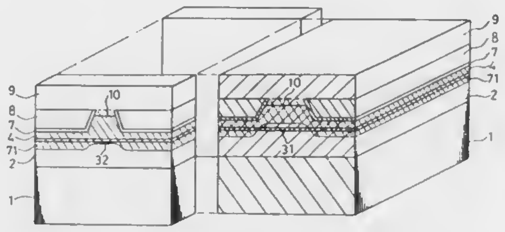
**Masato Okada; Masaki Kohno, and Tetsuya Yagi, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jan. 30, 1990, Ser. No. 472,290**

**Claims priority, application Japan, Feb. 1, 1989, 1-24452**

**Int. Cl.⁵ H01S** *3/19*

**U.S. Cl. 372—46** **3 Claims**



1. A semiconductor laser device comprising:

an n type substrate;

an n type first cladding layer and a multi quantum well active layer successively grown on said n type substrate;

a p type second cladding layer having a stripe ridge with a top surface opposite said substrate and a relatively narrow width in the neighborhood of a facet of the laser and a relatively wide width inside the laser disposed on said active layer;

a p type buffer layer containing a higher concentration of p type dopants than said second cladding layer and disposed on said second cladding layer except on the top surface of said stripe ridge;

a n type current blocking layer disposed on said buffer layer; and

a p type contact layer disposed on the top surface of said stripe ridge and said current blocking layer wherein said multi quantum well layer, except directly opposite the relatively wide width of said stripe ridge remote from the facet, is disordered by diffusion of p type dopants from said p type buffer layer.

---

### 5,018,159
### DIVIDED ELECTRODE TYPE SEMICONDUCTOR LASER DEVICE

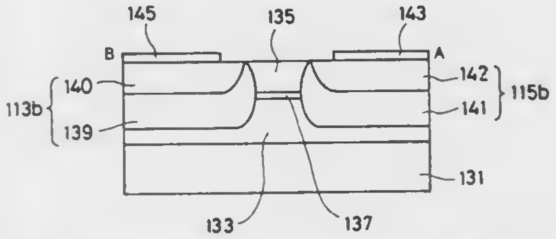
**Yoshihiro Suzuki; Hiroyoshi Yajima; Junichi Shimada, all of Tsukuba; Kenji Shimoyama, and Hideki Gotoh, both of Ushiku, all of Japan, assignors to Director-General, Agency of Industrial Science and Technology and Mitsubishi Kasei Corporation, both of Tokyo, Japan**

**Filed Nov. 22, 1989, Ser. No. 440,522**

**Claims priority, application Japan, Nov. 25, 1988, 63-299355**

**Int. Cl.⁵ H01S** *3/19*

**U.S. Cl. 372—46** **4 Claims**



1. A divided electrode type semiconductor laser device, comprising:

a substrate;

a pair of carrier injection clad layers;

cap layers disposed on each one of said pair of carrier injection layers respectively, each of said cap layers having an electrode thereon;

an active layer disposed between said carrier injection clad layers so as to form a lateral junction type buried semiconductor laser in which said carrier injection clad layers are buried, said active layer comprising a resonant cavity, and

a high-resistance layer separating said carrier injection clad layers from each other.

---

### 5,018,160
### DYE SYSTEM FOR DYE LASER APPLICATIONS

**Peter R. Hammond, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 8, 1990, Ser. No. 564,240**

**Int. Cl.⁵ H01S** *3/20*

**U.S. Cl. 372—53** **2 Claims**

1. In a method for producing energy by a dye laser, the improvement comprising the step of pumping a solution comprising the dye [2-methyl-6-[2-(1,2,3,4-tetrahydr-1-methyl-6-quinolinyl)ethenyl]-4H-pyran-4-ylidene -propanedinitrile dissolved in 2-phenoxyethanol with energy sufficient to cause said dye solution to lase.

---

### 5,018,161
### COMPACT EXCIMER LASER

**Robert P. Akins; Donald G. Larson, both of San Diego; Uday K. Sengupta, Del Mar, and Richard L. Sandstrom, Encinitas, all of Calif., assignors to Cymer Laser Technologies, San Diego, Calif.**

**Division of Ser. No. 144,799, Jan. 15, 1988. This application Jul. 10, 1990, Ser. No. 550,666**

**Int. Cl.⁵ H01S** *3/22*

**U.S. Cl. 372—57** **5 Claims**

1. A compact excimer laser, including

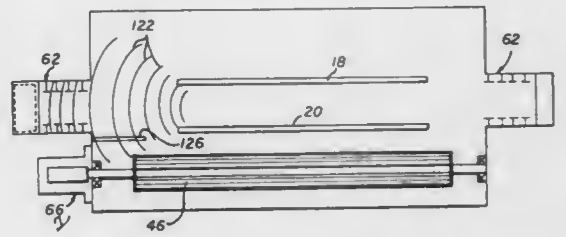
a housing structure having a plurality of walls forming an internal laser cavity,

a gas located within the laser cavity and with the gas capable of lasing action,

a pair of spaced electrodes located within the laser cavity and forming an electrical discharge area between the electrodes for stimulating gas within the discharge area to lasing action in accordance with an electrical discharge between the electrodes,

one of the pair of electrodes located along a central position within the cavity and grounded to the housing structure,

the other of the pair of electrodes located adjacent to one of the walls of the housing structure, and



window structures having windows located at the ends of the housing structure adjacent the discharge area and with each window structure including a plurality of parallel vane members located within the window structure to define a series of small chambers to diffuse the movement of gas from the interior of the laser cavity toward the window structures due to shockwaves produced by the electrical discharge.

---

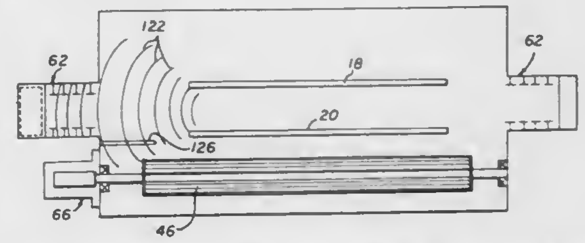
### 5,018,162
### COMPACT EXCIMER LASER

**Robert P. Akins; Donald G. Larson, both of San Digeo; Uday K. Sengupta, Del Mar, and Richard L. Sandstrom, Encinitras, all of Calif., assignors to Cymer Laser Technologies, San Diego, Calif.**

**Division of Ser. No. 144,799, Jan. 15, 1988. This application Jul. 10, 1990, Ser. No. 550,660**

**Int. Cl.⁵ H01S** *3/22*

**U.S. Cl. 372—57** **6 Claims**



1. In combination in an excimer laser for use with a gas capable of a lasing action,

a housing structure having a plurality of walls defining a laser cavity for receiving and holding the gas,

a pair of spaced electrodes disposed with in the laser cavity and forming an electrical discharge area between the electrodes for stimulating gas within the discharge area to lasing action in accordance with an electrical discharge between the electrodes,

means including a motor and a fan for circulating the gas within the laser cavity,

means for filtering at least a portion of the circulating gas to precipitate particulates from the gas,

a window for passing, from a position inside the laser cavity to a position outside the housing, energy produced by the energy discharge between the electrodes,

means for inhibiting the flow of unfiltered gas to the window to inhibit the deposit of the particulates on the window, and

means for passing clean air past the window to further inhibit the deposit of the paticulates on the window.

VOL
1126
ISS
3
MY
21
1991
UMI

**5,018,163**

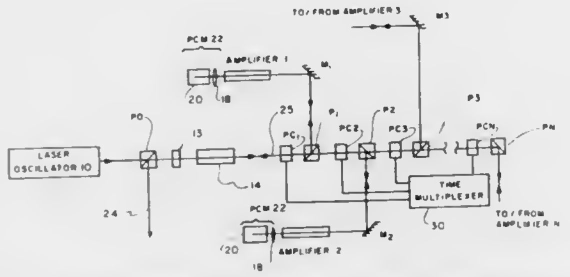
### GATLING GUN LASER PULSE AMPLIFIER USING AN OPTICAL DIODE

**Geraldine H. Daunt, Arlington, Va.; Richard A. Utano, Winterpark, Fla., and Suresh Chandra, Falls Church, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 26, 1990, Ser. No. 515,139**

**Int. Cl.$^5$ H01S** *3/07*

**U.S. Cl. 372—68** **4 Claims**



1. A laser system for providing high power pulse repetition frequency laser output beam pulses, said system comprised of:

- a laser oscillator which produces a high quality reference wavefront of low energy laser beam pulses which are fired at a pulse repetition frequency of said laser system;
- a plurality of phase conjugate amplifiers comprised of a plurality of laser amplifiers having phase conjugate mirrors at one end thereof;
- an optical diode positioned on the oscillator axis for initially receiving said laser beam pulses, said optical diode comprised of a polarizer for linearly polarizing said laser beam pulses a half-wave plate for rotating each of the laser input beam pulses in one direction, and a Faraday rotator which rotates each of the laser input beam pulses in the opposite direction from rotation by said half-wave plate;
- a plurality of Pockels cells and polarizers, each of said plurality of Pockels cells and polarizes associated with a phase conjugate amplifier of said plurality of phase conjugate amplifiers wherein said plurality of Pockels cells and polarizers are positioned along said oscillator axis between said Faraday rotator and each of the associated plurality of phase conjugate amplifiers which are positioned in separate offset folded optical paths from said oscillator axis: and
- a time-multiplexer means which sequentially applies a half-wave voltage to each of said plurality of Pockels cells in synchronism with each of said low energy laser beam pulses produced by said oscillator wherein each Pockels cell rotates each of said laser beam pulses through 90° an in input beam pulse to said amplifier at a pulse repetition frequency of said laser system wherein said polarizer routes the input laser beam pulse toward said phase conjugate amplifier associated therewith in which said input beam pulse is once amplified as it passes through the amplifier and is retroreflected by said phase conjugate mirror back through said amplifier to be amplified a second time to form an amplified output beam pulse which is reflected off said polarizer is passed through and is rotated by said Pockels cell back through 90° wherein said output beam pulse is rotated to be polarized in the same direction as the input laser beam pulse upon passing back through said Faraday rotator and said half-wave plate wherein said output beam pulse undergoes a net polarization rotation of 90° in which the amplified output beam pulse is reflected off said polarizer and out of said laser system.

---

**5,018,164**

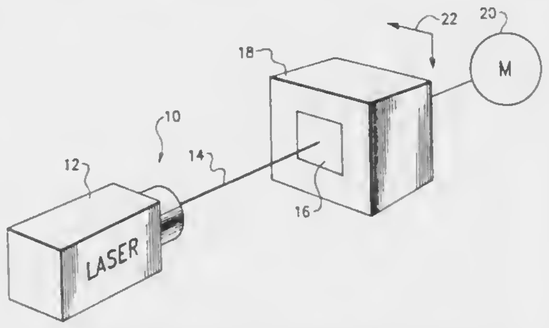
### EXCIMER LASER ABLATION METHOD AND APPARATUS FOR MICROCIRCUIT FABRICATION

**Peter D. Brewer, Newbury Park, and Jennifer J. Zinck, Calabasas, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Sep. 12, 1989, Ser. No. 405,940**

**Int. Cl.$^5$ H01S** *3/00*

**U.S. Cl. 372—109** **27 Claims**



1. A laser ablation method comprising the steps of:

(a) providing a solid material including at least two constituents which are ablated from the material in response to laser beam irradiation of a predetermined wavelength at respective rate which vary unequally as functions of irradiation fluence;

(b) predetermining said functions;

(c) selecting a desired proportion between the rates at which said constituents are to be ablated;

(d) irradiating the material with a laser beam of the predetermined wavelength;

(e) setting the fluence of said laser beam in accordance with said functions to a level which is greater than an ablation fluence threshold of the material and which causes the constituents to be ablated from the material at rates which are in said selected proportion to each other; and

(f) causing predetermined relative movement between the laser beam and the material such that a predetermined pattern corresponding to the predetermined relative movement is formed in a selected area of the material by ablation.

---

**5,018,165**

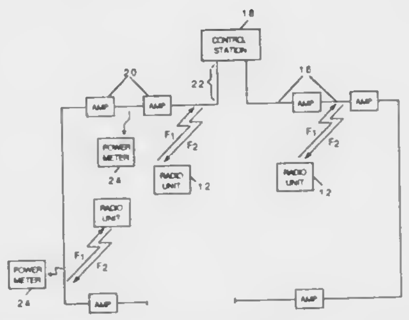
### COMMUNICATION SYSTEM USING SPREAD SPECTRUM AND LEAKY TRANSMISSION LINE

**Harold K. Sobner, Richardson; Joel N. Hoyloak, Lucas, and John T. Spradling, Van Alstyne, all of Tex., assignors to Andrew Corporation, Orland Park, Ill.**

**Filed Mar. 21, 1990, Ser. No. 496,774**

**Int. Cl.$^5$ H04K** *1/00*

**U.S. Cl. 375—1** **22 Claims**



22. A full-duplex communication system, comprising:

- a leaky coaxial cable for carrying, transmitting and receiving spread spectrum radio signals throughout a prescribed coverage area;

- a transceiver, coupled to the leaky coaxial cable, for transmitting spread spectrum signals in a first frequency band between about 902 MHz and 928 MHz and for simultaneously receiving spread spectrum radio signals in a second frequency band between about 2400 MHz and 2483.5 MHz, wherein the spread spectrum radio signals transmitted from the transceiver at least one point are carried by the leaky coaxial cable at a first power level which may be greater than 1 Watt; and
- a plurality of radio units for receiving the spread spectrum radio signals transmitted through the leaky coaxial cable within the prescribed coverage area and for transmitting the spread spectrum radio signals through the leaky coaxial cable to the transceiver in the second frequency band;
- wherein the leaky coaxial cable decreases the power level of the spread spectrum radio signals in the first frequency band to a level less than about 1 Watt, by the time the spread spectrum signals radiate from the leaky coaxial cable.

---

**5,018,166**

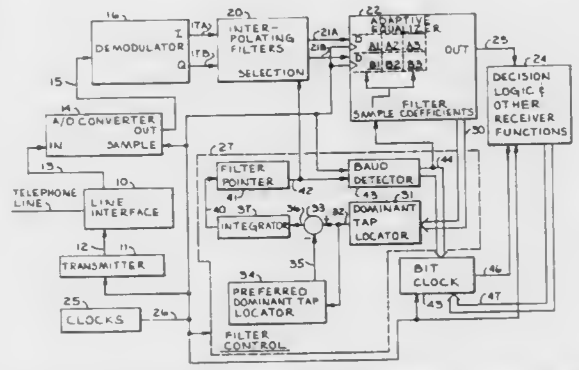
### METHOD AND APPARATUS FOR BAUD TIMING RECOVERY

**Taruna Tjahjadi, Duluth, and Cynthia J. Correa, Alpharetta, both of Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.**

**Filed Oct. 10, 1989, Ser. No. 419,077**

**Int. Cl.$^5$ H03G** *5/16*

**U.S. Cl. 375—12** **43 Claims**



26. A method for determining a preferred dominant tap location in an adaptive equalizer which provides a set of complex adaptive equalizer filter coefficients, comprising the steps of:

- calculating a squared magnitude for each pair of said complex adaptive equalizer filter coefficients;
- comparing said squared magnitude for each pair of said complex adaptive equalizer filter coefficients to said squared magnitude for every other pair of said complex adaptive equalizer filter coefficients;
- designating, as said dominant tap filter position, a filter tap position which provides a said pair of said complex adaptive equalizer filter coefficients having a said magnitude greater than a said magnitude of every other pair of said complex adaptive equalizer filter coefficients;
- providing initial values for a center tap reference and said preferred dominant tap location;
- determining a difference between said dominant filter tap position and said center tap reference to provide an error signal;
- storing said error signal and said preferred dominant tap location to provide a stored error and a stored preferred dominant tap location, respectively;
- calculating a magnitude for said error signal and a magnitude for said stored error signal;
- providing a stored magnitude of said error;
- when said magnitude of said error is greater than said stored magnitude of said error then determining said preferred dominant tap location by summing said error and said stored preferred dominant tap location, and updating said stored error by equating said stored error to said error; and
- when said magnitude of said error is less than said stored magnitude of said error then determining said preferred dominant tap location by summing said stored error and said stored preferred dominant tap location.

---

**5,018,167**

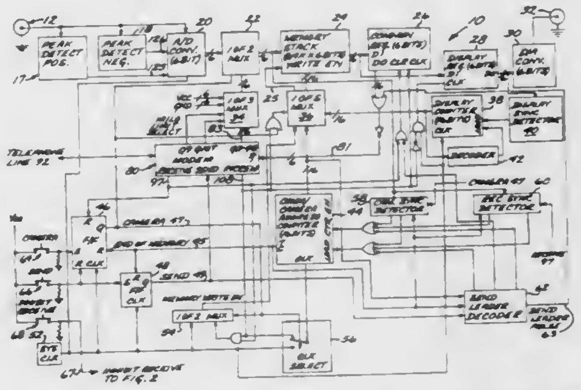
### MODEM EMPLOYING PULSE WIDTH MODULATION FOR DATA TRANSMISSION

**Frank M. Perelman, 4450 Alla Rd., Los Angeles, Calif. 90066**

**Division of Ser. No. 371,040, Jun. 26, 1989, abandoned, which is a continuation-in-part of Ser. No. 137,620, Dec. 24, 1987, abandoned. This application Apr. 20, 1990, Ser. No. 511,759**

**Int. Cl.$^5$ H03K** *7/08*

**U.S. Cl. 375—22** **12 Claims**



1. An apparatus for a modem employing pulse width modulation for sending and receiving digital data that comprises:

- a binary counter having a plurality of lesser significant bit positions and a selected more significant bit position;
- a means for clocking said binary counter coupled to said binary counter;
- a means for detecting the transition from one state to another of said selected more significant bit position of said binary counter coupled to said selected more significant bit position;
- a means for loading said plurality of lesser significant bit positions of said binary counter with the inverse of digital data to be sent responsive to said means for detecting the transition from one state to another of said selected more significant bit position;
- a means for loading said selected more significant bit position of said binary counter with said selected more significant bit position's state responsive to said means for detecting the transition from one state to another of said selected more significant bit position; and
- a means for sending signals coupled to said selected more significant bit position.

---

**5,018,168**

### CLOCK SIGNAL CONVERSION CIRCUIT

**Takeru Matsuoka, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Feb. 9, 1990, Ser. No. 477,540**

**Claims priority, application Japan, Feb. 9, 1989, 1-30433**

**Int. Cl.$^5$ H04L** *7/00*

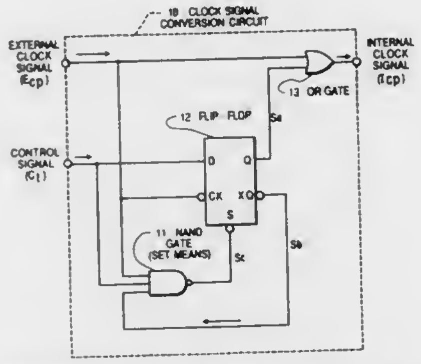
**U.S. Cl. 375—106** **7 Claims**

1. A clock signal conversion circuit which receives a clock signal and a control signal and generates a converted clock signal, said clock signal conversion circuit comprising:

- holding means for holding the control signal in response to the clock signal and outputting a held control signal;
- masking means for selectively masking the clock signal in

VOL
1126
ISS
3
MY
21
1991
UMI

response to the held control signal and outputting the converted clock signal; and

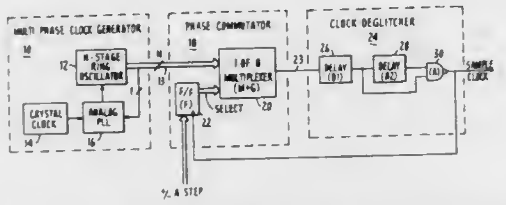

10 CLOCK SIGNAL CONVERSION CIRCUIT
EXTERNAL CLOCK SIGNAL (Ecp)
INTERNAL CLOCK SIGNAL (Icp)
13 OR GATE
12 FLIP-FLOP
CONTROL SIGNAL (Ct)
D
Q
CK
XQ
S
11 NAND GATE (SET MEANS)
Sa
Sc
Sb

generating means for generating a set signal in response to the clock signal, the control signal and the held control signal, said holding means being forced to a predetermined state in response to the set signal.

### 5,018,169
## HIGH RESOLUTION SAMPLE CLOCK GENERATOR WITH DEGLITCHER

**Hee Wong, San Jose, Calif., and Jesus Guinea, Verdellino, Italy, assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Jun. 21, 1989, Ser. No. 369,474**
**Int. Cl.$^5$ H03D** *3/24*
**U.S. Cl. 375—119** **15 Claims**

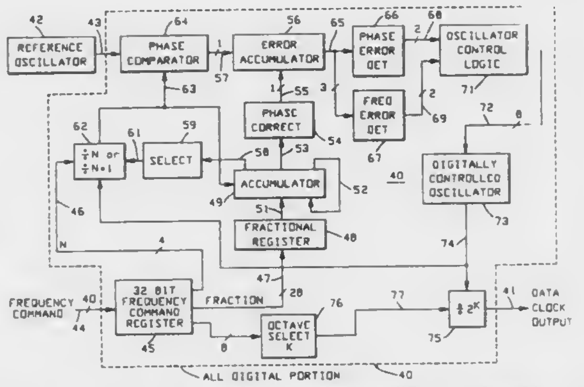


2. A digital controlled clock for generating a sample clocks signal for use in recovering data from a received signal, the digital controlled clock comprising:
- (a) a multi-phase clock generator comprising
  - (i) a crystal oscillator that provides a reference clock signal having a preselected frequency;
  - (ii) a multi-stage ring oscillator that provides a plurality of phase clock signals having the preselected frequency and an equally-spaced phase relationship; and
  - (iii) locking means connected to receive the reference clock signal and one of the phase clock signals for locking the frequency of the phase clock signals to the preselected frequency;
- (b) a phase commutator for selecting one of the phase clock signals, the phase commutator comprising
  - (i) a multiplexor that receives the plurality of phase clock signal as input signals and provides the selected phase clock signal as an output signal based on a select input signal to the multiplexor; and
- (c) clock deglitcher circuitry for removing spikes from the selected phase clock signal to provide the sample clock signal, the clock deglitcher circuitry comprising
  - (i) a first delay stage for delaying the selected phase clock signal by a first preselected amount to provide a first delay stage output signal;
  - (ii) a second delay stage for delaying the first delay stage output signal by a second preselected amount to provide a second delay stage output; and
  - (iii) a NAND gate which receives the first and second delay stage output signals as input signals and provides the sample clock signal as an output signal.

### 5,018,170
## VARIABLE DATA RATE CLOCK SYNTHESIZER

**Michael L. Wilson, Salt Lake City, Utah, assignor to Unisys Corporation, Blne Bell, Pa.**

**Filed Nov. 21, 1989, Ser. No. 440,006**
**Int. Cl.$^5$ H03D** *3/24*
**U.S. Cl. 375—120** **9 Claims**

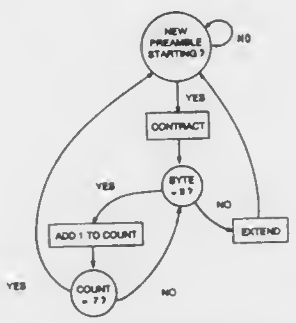


1. A digital variable rate clock synthesizer, comprising:
an all digital phase locked loop (PLL) having a phase comparator with one input coupled to a source of digital reference signals, and
a second phase comparator input coupled through a variable ratio divider circuit to a digital controlled oscillator,
said PLL having an error accumulator coupled to the output of said phase comparator to provide a digital output error signal,
said digital output error signal being coupled to the input of a frequency error detector and to a phase error detector,
digital oscillator control means coupled to the output of said error detectors for providing output digital control signals for controlling said digital controlled oscillator, and
a second variable ratio divider circuit coupled to the output of said digital controlled oscillator to provide a selectable frequency digital clock output signal.

### 5,018,171
## SMOOTHING FILTER

**Ronald S. Perloff, Poway, and Timothy L. Garverick, Cupertino, both of Calif., assignors to National Semiconductor Corp., Santa Clara, Calif.**

**Filed Aug. 9, 1989, Ser. No. 391,439**
**Int. Cl.$^5$ H04L** *23/00*
**U.S. Cl. 375—121** **22 Claims**



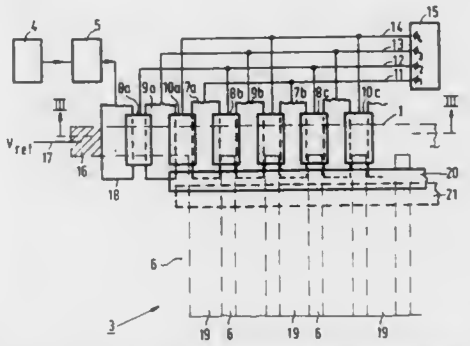
1. In a data transmission network wherein an information frame is transmitted from a transmit station in the network to a receive station in the network, the information frame comprising a series of information characters including a sequence of a plurality of preamble information characters, a method of controlling the number of preamble information characters included in the transmitted sequence, the method comprising the sequential steps of:

- (a) identifying an information character as an initial preamble information character;
- (b) in the event that the preamble of a previous frame has been extended, deleting the initial preamble information character;
- (c) in the event that the next information character is a preamble information character, incrementing a counter;
- (d) iteratively repeating step (c) to identify a sequence of preamble information characters until the counter reaches a preset threshold, indicating that a continuous sequence of a preselected number of preamble information characters has been transmitted.

### 5,018,172
## CHARGE-COUPLED SPS MEMORY DEVICE

**Frits A. Steenhof, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Mar. 5, 1990, Ser. No. 489,406**
**Claims priority, application Netherlands, Mar. 6, 1989, 8900540**
**Int. Cl.$^5$ G11C** *19/28, 11/34;* **H01L** *29/78*
**U.S. Cl. 377—60** **5 Claims**

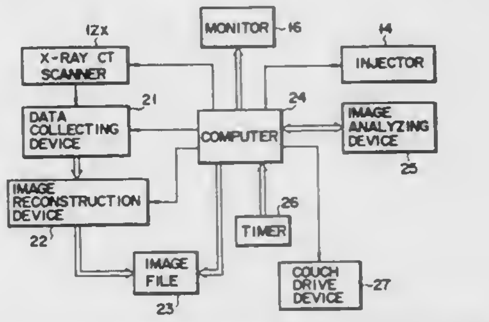


1. A semiconductor device having a charge-coupled memory device of the SPS type formed at a surface of a semiconductor body and comprising:
a series input register comprising a series of charge storage sites, in which data can be stored in the form of charge packets;
a parallel section coupled to the series input register and comprising a plurality of adjacent parallel registers, each of which corresponds to one of the storage sites of the series input register;
a system of clock electrodes, which are connected by clock lines to clock voltage sources for applying clock voltages having a first level at which the semiconductor body has induced in it a potential well, in which charge can be stored, and a second level through which charge is pushed to an adjacent storage site;
an input stage in series with the series input register comprising an input diode and a sampling electrode, which is located between the diode and the first storage site of the series input register and is connected by one of the clock lines to other clock electrodes of the series input register and by means of which a potential well can be induced in the semiconductor body, in which by means of the input diode charge packets can be formed, which are representative of the data supply; and
signal supply means for supplying data which are converted into charge packets by the input stage, characterized in that an interrupter stage is provided for interrupting the supply of the data in the potential well under the sampling electrode when the series input register is full at such an instant that during the transport of the charge packets from the series input register to the parallel section the part of the semiconductor body under the sampling electrode is free from information-representing charge packets.

### 5,018,173
## DIAGNOSIS APPARATUS USING X-RAY CT DEVICE

**Norihiko Komai; Takashi Nishiguchi; Junji Hirayama, and Tomoaki Terada, all of Wakayama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 13, 1989, Ser. No. 421,528**
**Claims priority, application Japan, Oct. 18, 1988, 63-261987**
**Int. Cl.$^5$ H04N** *5/32;* **G01N** *23/00;* **H05G** *1/64;* **G21K** *1/12*
**U.S. Cl. 378—4** **5 Claims**

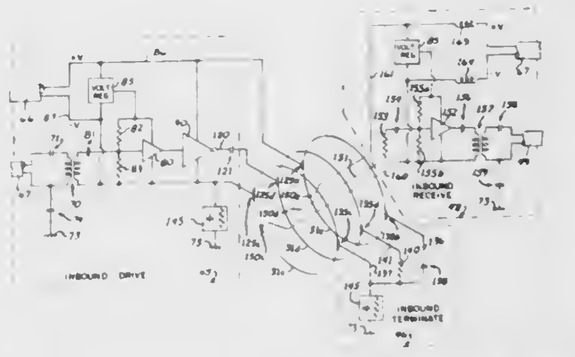


1. A diagnostic apparatus using an X-ray CT device, comprising:
X-ray scanning means for repeatedly scanning one or more portions of a subject using an X-ray a plurality of times for each portion to output X-ray projection data;
image processing means for processing the X-ray projection data output from said scanning means to generate image data corresponding to a plurality of tomograms with contrast; and
image analyzing means for analyzing the image data obtained by said image processing means to calculate a set of parameters which represents a state of permeability of blood vessels, by collecting CT value data of an identical location for a time t from the series of image data, and generating concentration data representing concentrations of contrast medium in the blood vessels, and calculating the parameters in accordance with the CT value data and the concentration data.

### 5,018,174
## HIGH SPEED COMMUNICATION APPARATUS FOR COMPUTERIZED AXIAL TOMOGRAPHY (CAT) SCANNERS

**Arthur K. Collins, Waukesha, Wis., assignor to General Electric Company, Milwaukee, Wis.**

**Filed Nov. 20, 1989, Ser. No. 439,904**
**Int. Cl.$^5$ A61B** *6/00;* **H05G** *1/10;* **H02K** *27/10, 1/10*
**U.S. Cl. 378—4** **8 Claims**



1. A communications apparatus for providing high speed communications between first and second electronics systems mounted on first and second mechanical mounting structures, respectively, where the first and second mechanical mounting

VOL
1126
ISS
3
MY
21
1991
UMI

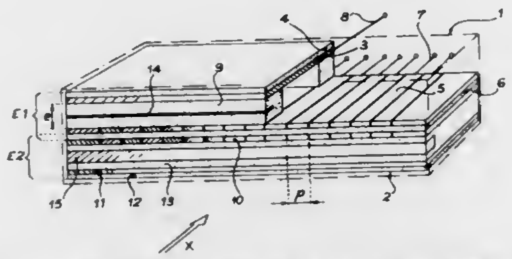
structures are adapted for rotary movement with respect to each other along an axis of rotation, the apparatus comprising:
a first slip ring arranged coaxially with the axis of rotation between the first and second mechanical mounting structures;
drive means mounted on the first mechanical mounting structure and connected to the first electronics system for transmitting an electrical signal voltage onto the first slip ring, the electrical signal voltage being referenced to a signal ground reference potential and being encoded with data to be communicated from the first electronics system to the second electronics system, the drive means including first connection means for making contact with the first slip ring at a first point in the frame of reference of the first mechanical mounting structure;
termination means mounted on the first mechanical mounting structure for providing termination of the electrical signal voltage on the first slip ring, the termination means including;
second connection means for making contact with the first slip ring at a second point in the frame of reference of the first mechanical mounting structure, the first and second points being located approximately diametrically opposite each other across the first slip ring; and
a resistive termination connected between the second connection means and the signal ground reference potential; and
receive means connected to the second electronic system on the second mechanical mounting structure for receiving the electrical signal voltage on the first slip ring, the receive means including third connection means for making contact with the first slip ring to receive the electrical signal voltage from the first slip ring.

---

### 5,018,175
## DETECTION ARRAY FOR IONIZING RADIATION TOMOGRAPHY

**Robert Allemand, Saint Ismier; Martine Drouet, Pierrefitte; Gaétan Pleyber, Domene, and Edmond Tournier, Grenoble, all of France, assignors to Commissariat A L'Energie Atomique, Paris, France**

**Filed Mar. 15, 1989, Ser. No. 323,885**
**Claims priority, application France, Mar. 23, 1988, 88 03796**
**Int. Cl.$^5$ H01J *47/02***
U.S. Cl. 378—19 3 Claims



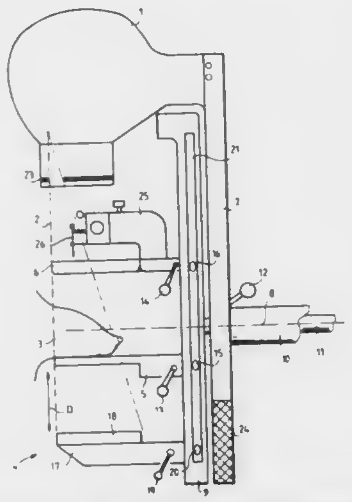
1. Detection array for ionizing radiation tomography, for obtaining an image of at least one section of an object or organ by detecting ionizing rays which have passed through the object or organ in at least one sectional plane comprising at least one detection stack (E1) having a planar conductive polarizing plate (3) parallel to the sectional plane, a series of conductive, planar identical electrodes (5), which are insulated from one another and parallel to the sectional plane, said electrodes extending in a longitudinal direction towards the object and an ionizable material between the plate (3) and the electrodes (5), each volume between each electrode (5) and a surface portion of the polarizing plate (3) facing said electrode defining a detection cell, said cell being defined by its pitch p essentially equal to the width of the electrode in a plane perpendicular to the longitudinal direction and by its height e equal to the distance separating the electrode and the polarizing plate, the object or organ having one or more inclusions with projections on the stack in a plane perpendicular to the longitudinal direction of the electrodes, said projections being linear or quasi-linear and inclined with respect to the plane of said electrodes, the smallest distance d separating two disturbing elements incorporating at least the polarizing plate and the electrodes is equal or smaller than $2p \cdot \tan\alpha$, $\alpha$ designating the smallest angle of inclination of these projections above which an artefact due to the disturbing elements of the stack must be eliminated, so to avoid the disturbing effects of said elements, wherein the ionizable material is a gas, so that the stack is located in a tight chamber provided with an entrance window or port transparent to the ionizing radiation from the organ or object, the polarizing plate (3) and electrodes (5) being located on separate insulating supports (4, 6), an insulating spacer (9) transparent to the ionizing radiation being positioned between the plate (3) and the electrodes (5), said spacer having at least one portion facing the window or port (2) and the portion of said spacer facing window (2) has at least one intermediate plate (14) opaque to the ionizing rays, parallel to the sectional plane, said plate belonging to said stack disturbing elements.

---

### 5,018,176
## MAMMOGRAPH EQUIPPED WITH AN INTEGRATED DEVICE FOR TAKING STEREOTAXIC PHOTOGRAPHS AND A METHOD OF UTILIZATION OF SAID MAMMOGRAPH

**René Romeas, Palaiseau; Didier Rouchy, Les Clayes Sour Bois, and Alain Gilleron, Paris, all of France, assignors to General Electric CGR S.A., Issy les Moulineaux, France**

**Filed Mar. 23, 1990, Ser. No. 497,970**
**Claims priority, application France, Mar. 29, 1989, 89 04086**
**Int. Cl.$^5$ A61B *6/04***
U.S. Cl. 378—37 6 Claims



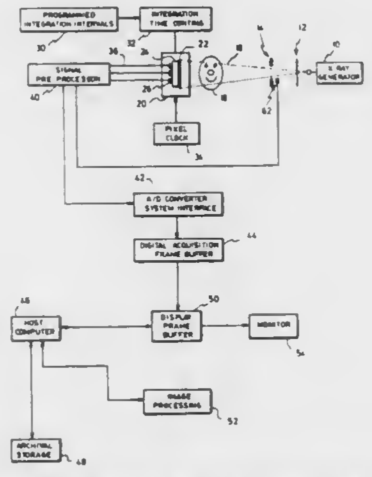
6. A method for taking stereotaxic photographs of a breast with a mammograph, wherein said method involves the following steps:
a breast to be radiographically examined is placed between an x-ray tube and a breast support plate,
an image receiver equipped with a radiation-sensitive film is placed downstream of said breast support plate,
said image receiver is moved away from said breast support plate and is subsequently fixed to said support plate,
the x-ray tube is inclined on one side of the normal to the breast support plate while maintaining said support plate and said image receiver in a stationary position,
a photograph is taken,
the x-ray tube is inclined on another side with respect to said normal without modifying either the position of the radiation-sensitive film or the image receiver,
and a second photograph is taken,
the general image thus obtained is developed, said image being projected in two juxtaposed images on a single radiation-sensitive film introduced in the image receiver.

---

### 5,018,177
## APPARATUS AND METHOD FOR PRODUCING DIGITAL PANORAMIC X-RAY IMAGES

**W. Doss McDavid; S. Brent Dove, both of San Antonio, Tex.; Ulf Welander, Umea, and Gunilla Tronje, Enskede, both of Sweden, assignors to Board of Regents, The University of Texas System, Austin, Tex.**

**Filed Jun. 1, 1989, Ser. No. 360,093**
**Int. Cl.$^5$ G01N *23/04***
U.S. Cl. 378—62 12 Claims



1. A method of producing an X-ray image of an object, said method comprising the steps of:
(a) impinging an X-ray beam on the object, the X-ray beam moving about the object along a predetermined path within a predetermined time period;
(b) detecting the X-rays which pass through the object with a single linear radiation detector extending substantially perpendicular to said predetermined path, said radiation detector producing a set of pixel electrical signals, each pixel electrical signal being proportional to X-rays received by an area of the radiation detector;
(c) dividing the predetermined time period into a series of time intervals, said time intervals being a function of an elapsed time of said predetermined time period;
(d) integrating said pixel electrical signals during each time interval; and
(e) electronically processing the integrated pixel electrical signals to produce the X-ray image of the object.

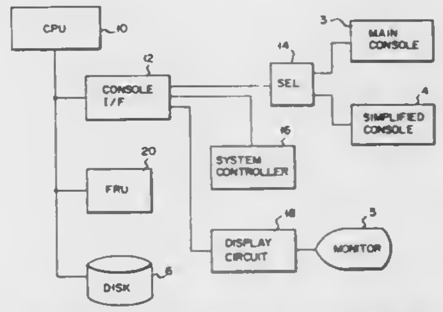
---

### 5,018,178
## MEDICAL APPARATUS WITH A CONTROL CONSOLE

**Kenichirou Katsumata, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 320,252, Mar. 7, 1989, abandoned. This application Oct. 5, 1990, Ser. No. 595,696**
**Claims priority, application Japan, Mar. 8, 1988, 63-54065**
**Int. Cl.$^5$ A61B *6/00;* H05G *1/08, 1/10;* G21K *1/12***
U.S. Cl. 378—91 15 Claims

1. A console assembly for a medical imaging apparatus which detects information about an object using a plurality of selected imaging parameters corresponding to a plurality of operational commands, said plurality of selected imaging parameters including at least a first set of imaging parameters corresponding to a first set of the operational commands and a second set of imaging parameters corresponding to a second set of the operational commands, and produces an image based on the detected information, said console assembly comprising:
first console means for inputting the entire plurality of selected imaging parameters and supplying a first output based on the entire plurality of selected imaging parameters;
second console means for inputting only the first set of imaging parameters, for disabling input of the second set of imaging parameters, and for supplying a second output based on the first set of parameters;
means for selecting between said first and second console means, said first console means supplying the first output to the medical imaging apparatus when said first console means is selected, and said second console means supplying the second output to the medical imaging apparatus when said second console means is selected; and
storage means for storing the second set of imaging parameters and for automatically supplying a third output based on the second set of imaging parameters to the medical imaging apparatus at times when said second console means is selected.

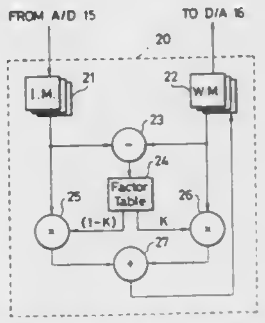


---

### 5,018,179
## RECURSIVE FILTER AND IMAGE DISPLAY APPARATUS INCLUDING THE SAME

**Makoto Kaneko, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 17, 1990, Ser. No. 509,737**
**Claims priority, application Japan, Apr. 18, 1989, 1-096229**
**Int. Cl.$^5$ H05G *1/64;* H04N *5/213, 5/32***
U.S. Cl. 378—99 19 Claims



1. A recursive filter for reducing image noise, comprising:
subtracter means for claculating a subtraction between first and second images to obtain a subtraction result;
a factor table for determining an addition ratio between the first and second images on the basis of the subtraction result; and
adder means for adding the first and second images at the addition reatio to obtain a third image

VOL 1126 ISS 3 MY 21 1991 UMI

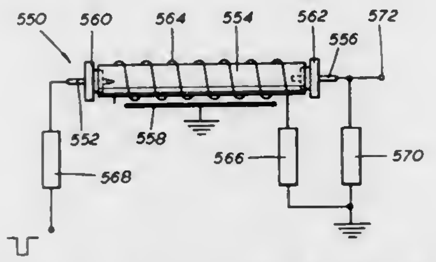
### 5,018,180
### ENERGY CONVERSION USING HIGH CHARGE DENSITY

**Kenneth R. Shoulders, Austin, Tex., assignor to Jupiter Toy Company, Austin, Tex.**

**Continuation-in-part of Ser. No. 183,506, May 3, 1988, abandoned, which is a continuation-in-part of Ser. No. 137,244, Jan. 6, 1988, abandoned. This application May 3, 1989, Ser. No. 347,262**

**Int. Cl.$^5$ H01J** *23/34*

**U.S. Cl. 378—119** **42 Claims**



1. An energy converter comprising a source of charged particles; a solid dielectric body having a channel positioned to be responsive to the charged particles; means for accelerating the charged particles in the channel; a slow wave electrical conductor capacitively coupled to the channel and the changed particles; a counter-electrode capacitively coupled to the slow wave electrical conductor, the channel and the electron bundle; means for biasing the slow wave conductor and counter-electrode so that the charged particles propagate along and are guided by the channel and coupled to (a) the solid dielectric body, (b) the slow wave electrical conductor and (c) the counter electrode so the charged particles charge the dielectric and cause a transfer of energy via the dielectric to the slow wave structure; the slow wave structure coupling energy transferred to it via the dielectric to a load.

---

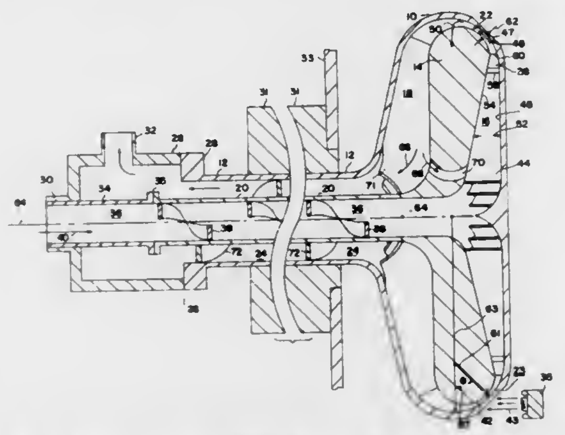
### 5,018,181
### LIQUID COOLED ROTATING ANODES

**Arthur H. Iversen, Saratoga, and Stephen Whitaker, Davis, both of Calif., assignors to Coriolis Corporation, Saratoga, Calif.**

**Continuation of Ser. No. 57,339, Jun. 2, 1987, abandoned. This application Oct. 31, 1989, Ser. No. 430,902**

**Int. Cl.$^5$ H01J** *35/10*

**U.S. Cl. 378—144** **14 Claims**



14. A liquid cooled rotating anode having a characteristic radius, the anode being adapted for irradiation by an energy beam comprising:

an arcuate heat exchange surface on the interior of said anode, said arcuate surface having curves in planes parallel to the axis of rotation of said anode; and

a septum, fixed within said anode for rotation with said anode, cooperating with said anode to define a conduit being configured to direct a flow of coolant liquid past said heat exchange surface to remove heat from said heat exchange surface by formation of nucleate vapor bubbles on said heat exchange surface;

said heat exchange surface interacting with said coolant to generate first and second centrifugal forces creating respective pressure gradients in said coolant, said first centrifugal force being inversely proportional to the local radius of curvature of said curves, said second centrifugal force being proportional to said characteristic radius.

---

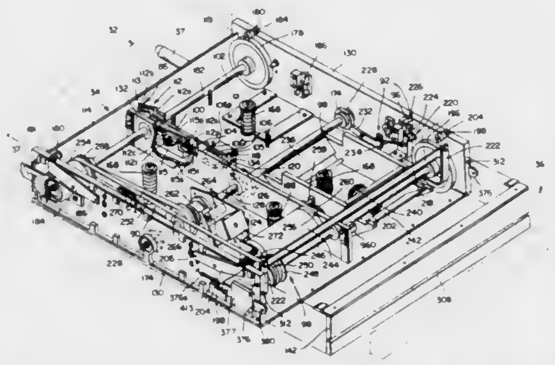
### 5,018,182
### FILM CHANGER HAVING FILM-RECEIVING, NONDRIVEN CASSETTE WITH SPIRAL-SHAPED GUIDE PLATE

**Kevin P. Cowan; Bruno Fazi, Jr., both of Allison Park; Joseph B. Havrilla, Pittsburgh; Stanley R. Lewandowski, Cheswick, and David M. Reilly, Glenshaw, all of Pa., assignors to Medrad, Inc., Pittsburgh, Pa.**

**Filed Nov. 15, 1988, Ser. No. 271,457**

**Int. Cl.$^5$ G03R** *42/02*

**U.S. Cl. 378—173** **55 Claims**



41. A medical x-ray film exposure device for an x-ray apparatus, which comprises:

clamping means for clamping a sheet of x-ray film in an exposure position for an x-ray film exposure operation;

feed means for feeding sheets of film sequentially into and out of the exposure position for respective exposure operations;

means for forming indicia, including sequential film numbers, on edge portions of the sheets of film during the exposure operations;

liquid crystal display means including a backlighted electroluminescent panel, forming part of the indicia forming means, for producing an image of the indicia to be formed on the sheets of film; and

means for controlling the image produced by the liquid crystal display means, including the sequential film numbers, to control the indicia formed on the sheets of film.

---

### 5,018,183
### X-RAY FILM MAGAZINE

**Erik Bjoerk, Stockholm, and Ola Wiklund, Jaerfaella, both of Sweden, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

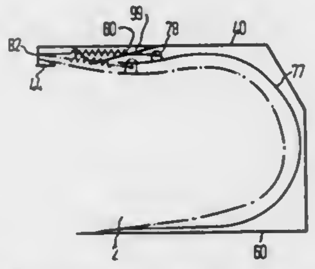
**Filed Jun. 7, 1990, Ser. No. 534,553**

**Claims priority, application European Pat. Off., Jun. 12, 1989, 89110600.7**

**Int. Cl.$^5$ G03B** *42/02, 42/04*

**U.S. Cl. 378—173** **3 Claims**

1. In an x-ray film magazine having a housing and a cover in combination forming an interior volume having a substantially C-shaped cross section adapted for accepting a plurality of sheets of x-ray film, the improvement comprising a flexible foil disposed in the interior of the magazine and following said C-shaped cross section, said foil having one end rigidly connected to a base of said housing and an opposite end resiliently connected to said cover such that, when said x-ray film magazine is loaded with x-ray film, said foil at least partially supports a bottommost sheet of x-ray film in a selected position and location.



---

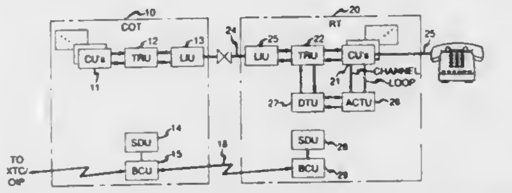
### 5,018,184
### AUTOMATED CHANNEL TEST UNIT

**Lane J. Abrams, Highland Park; Kevin Loughran; David W. Masukewicz, both of Randolph, and Robert L. Overstreet, Jr., Morristown, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jul. 3, 1990, Ser. No. 548,464**

**Int. Cl.$^5$ H04M** *1/24;* **H04J** *3/14*

**U.S. Cl. 379—29** **20 Claims**



1. A digital loop transmission system apparatus comprising:

a central office terminal;

a remote terminal having a plurality of channel units, the remote terminal further including a test unit comprising:

means for applying to the channel units appropriate terminations and detectors for testing the channel units;

means for controlling the application of the terminations and detectors; and

means for providing access to digital transmission signals.

---

### 5,018,185
### TAMPERPROOF PAY TELEPHONE

**Robert Riddle, 526 Rutland St., Westbury, N.Y. 11590**

**Filed Mar. 21, 1990, Ser. No. 496,653**

**Int. Cl.$^5$ H04M** *1/15, 17/00*

**U.S. Cl. 379—145** **13 Claims**

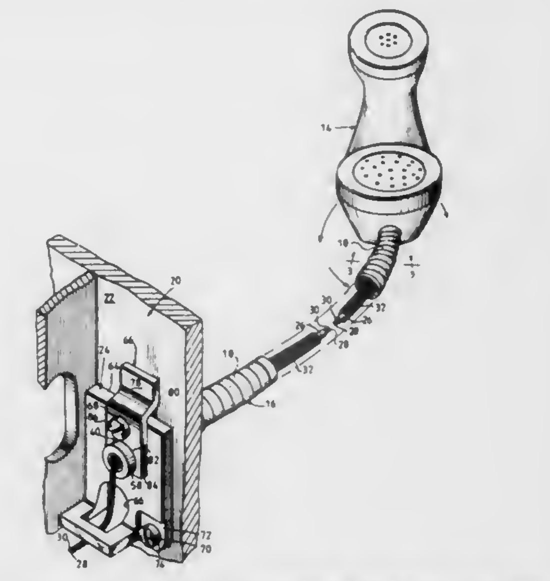
1. A tamperproof pay telephone comprising:

(a) a main portion having an upper coin housing portion with an upper coin housing wall;

(b) a handset;

(c) a cord connecting said handset to said upper coin housing wall of said upper coin housing portion of said main portion; and

(d) an attachment assembly for securing said cord to said upper coin housing wall, said cord including an inner tube liner, an inner tube of a stainless steel wire braided rope, four telephone wires of which one is a power wire, said four telephone wires passing through said inner tube liner, said inner tube of said stainless steel wire braided rope which is ultimately encased in a stainless steel armored hose so that said inner tube of said stainless steel wire braided rope adds flexibility while adding protection by rolling when a cut to said cord is attempted. said inner tube of said stainless steel wire braided rope prevents the cutting open of said stainless steel armored hose in order to prevent access to said four telephone wires, as well as, preventing the twisting of said handset that would cause said stainless steel armored hose to unwind.



---

### 5,018,186
### COMMUNICATING APPARATUS PROVIDING DISCRIMINATED VOICE AND/OR IMAGE COMMUNICATION

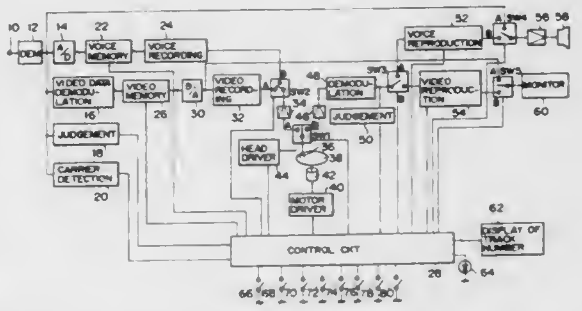
**Norio Kimura, and Masahiro Takei, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 19, 1989, Ser. No. 340,261**

**Claims priority, application Japan, Apr. 21, 1988, 63-96913; Apr. 22, 1988, 63-99637; Apr. 28, 1988, 63-103968**

**Int. Cl.$^5$ H04N** *7/12*

**U.S. Cl. 379—153** **23 Claims**



1. A communicating apparatus comprising:

a) recording and reproducing means for recording a received signal, including an image signal, onto a recording medium and for reproducing the recorded signal on the recording medium;

b) control means for allowing said recording and reproducing means to execute a recording operation in accordance with the signal reception;

c) position memory means for storing information with respect to a recording position of the recording medium; and

d) control means for allowing said recording and reproducing means to execute the recording and reproducing operation at a position next to a preceding recording position with reference to the stored information in the position memory means when an absence recording mode is set.

VOL
1126
ISS
3
MY
21
1991
UMI

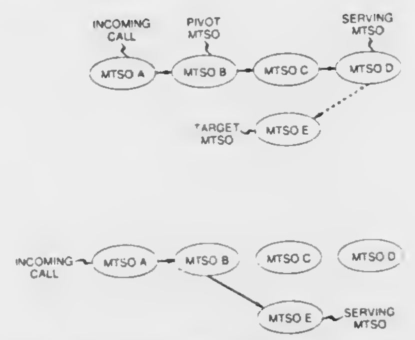
### 5,018,187
### MOBILE TELEPHONE INTRASYSTEM AND INTERSYSTEM ENHANCED HANDOFF METHOD AND APPARATUS FOR LIMITING TRUNK SWITCHING CONNECTIONS

**John A. Marinho, Chatham, N.J.; Steven J. Pilgrim, Darien, Ill., and I-Hsiang Yu, Cedar Knoll, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jun. 5, 1990, Ser. No. 533,658**

**Int. Cl.⁵ H04Q** *7/04*

**U.S. Cl. 379—60** **9 Claims**



6. A cellular telephone system, comprising:
a plurality of mobile telephone switching offices (MTSO), each controlling a plurality of cell sites with antennas for communicating with mobile radiotelephones,
communication trunks connected between ones of the mobile telephone switching offices,
apparatus for facilitating a handoff of a mobile radiotelephone from one cell site antenna to another cell site antenna and from one MTSO to another MTSO and operative for permitting extended handoffs in which the land connections include a plurality of MTSOs in tandem connection,
means for compiling a list of the tandem connections included in a call connection,
means for identifying available trunk connections between a target MTSO and MTSOs identified in the list of tandem connections, and
means for directly establishing a trunk connection between the target MTSO and a pivot MTSO to minimize the number of tandem connections and disconnecting a portion of the trunk connection of the MTSOs included in the list of the tandem connections.

---

### 5,018,188
### MICROPHONE-CONTROLLER WITH MULTIFUNCTION, SINGLE CONDUCTOR

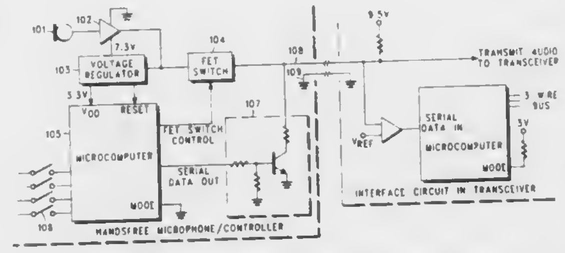
**Joseph L. Kowalski, Fox River Grove, and Daniel S. Rokusek, Hoffman Estates, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 20, 1989, Ser. No. 453,877**

**Int. Cl.⁵ H04M** *11/00*

**U.S. Cl. 379—63** **8 Claims**

1. A microphone-controller apparatus, for providing an audio signal and control signals, coupled by a multifunction, single conductor to transceiving means, the apparatus comprising:
(a) an electroacoustic transducer for generating the audio signal;
(b) amplifying means, for amplifying the audio signal, having an input coupled to the electroacoustic transducer and an output coupled to the multifunction, single conductor;
(c) controllable isolation means for isolating the amplifying means and the voltage regulation means from the multifunction, single conductor;
(d) voltage regulation means for regulating a first voltage provided by the transceiver means over the multifunction, single conductor, thereby providing a predetermined second voltage to the microphone-controller apparatus; and
(e) processing means for controlling the apparatus, the controllable isolation means, and generating the control signals to be transmitted over the multifunction, single conductor.



---

### 5,018,189
### COMMUNICATION APPARATUS WITH TELEPHONE AND DATA COMMUNICATION CAPABILITY

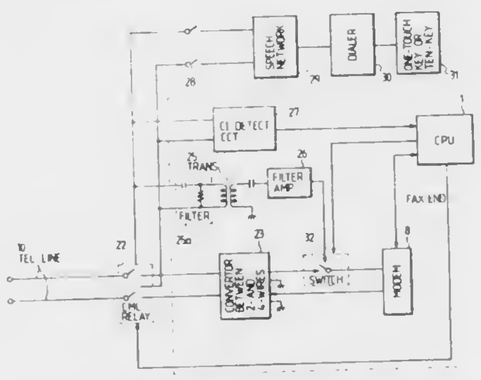
**Yuji Kurosawa, Kawasaki; Hisao Terajima, and Shingo Isozaki, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 19, 1989, Ser. No. 367,671**

**Claims priority, application Japan, Jun. 23, 1988, 63-153456; Jun. 23, 1988, 63-153457; Jun. 26, 1988, 63-153458**

**Int. Cl.⁵ H04M** *11/00*

**U.S. Cl. 379—93** **10 Claims**



1. A data communication apparatus in which a telephone set and a line are connectable, comprising:
data communication means for performing data communication;
switching means for selectively connecting the telephone set or said data communication means with the line;
detection means for detecting whether a signal associated with the data communication has been received by the detection means or not, when a dial signal from the telephone set is sent onto the line; and
control means for controlling said switching means to perform selective connection of the data communication means to the line, in response to a positive detection by said detection means during dialing through the telephone set, so as to start the data communication.

---

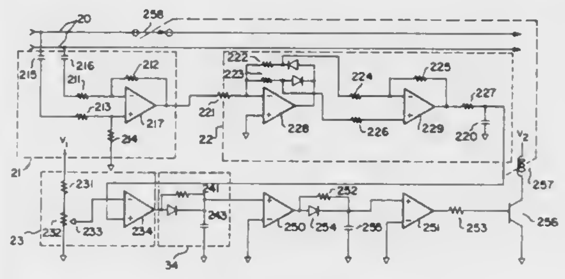
### 5,018,190
### DEVICE TO BLOCK UNAUTHORIZED MODEM ACCESS OVER A PBX LINE

**Richard C. Walker, Palo Alto, and Hans von Braun, San Francisco, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Sep. 21, 1989, Ser. No. 410,689**

**Int. Cl.⁵ H04M** *11/00*

**U.S. Cl. 379—95** **16 Claims**



1. A modem detector comprising:
sampling means for sampling each of a plurality of audio lines, each functioning as a channel for transmission of data;
an average power detector, having an input connected to the sampling means, for detecting the average power on each audio line that is sampled;
means for comparing the detected average power on each sampled audio line with a threshold power level P that would be exceeded if a modem were operating on said line;
means for determining whether said detected average power of a sampled line continuously exceeds said threshold power level P for a period longer than a reference period T, where T is selected to be longer than the time that this threshold power level is likely to be continuously exceeded by normal human speech; and
means for indicating whether such detected average power has continuously exceeded said threshold P for longer than T.

---

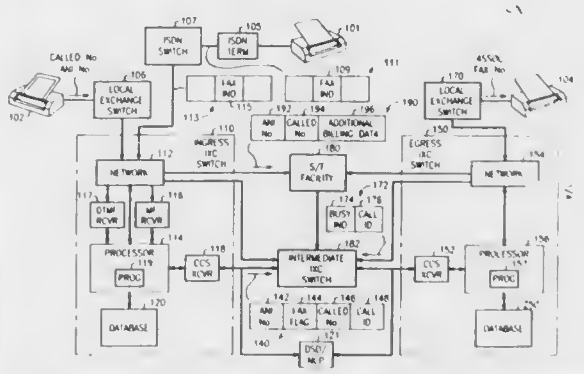
### 5,018,191
### SPECIAL SERVICE CALL ROUTING

**Nancy A. Catron, Long Valley; Richard J. Famulare, Belle Mead; Joseph V. Fodale, Lincroft; Karrie J. Hanson, Westfield; Robert A. Koch, Freehold; Ronald E. Large, Holmdel; Paramdeep S. Sahni, Marlboro; Alan I. Schwartz, Bedminster, and Susan M. Zoccolillo, Howell, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Oct. 23, 1989, Ser. No. 425,529**

**Int. Cl.⁵ H04N** *1/32*

**U.S. Cl. 379—100** **23 Claims**



1. A method of setting up a facsimile call comprising the steps of:
recognizing a special dialed prefix of the call indicating that the call is from a facsimile station;
responsive to said step of recognizing, setting a facsimile indicator in data of a common channel signaling (CCS) message being sent to a switching system for further routing said call; and
processing the call as a facsimile call in the switching system.

---

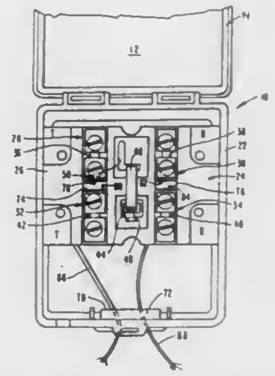
### 5,018,192
### UTILITY METER TO TELEPHONE LINE INTERFACE

**Thomas J. Smith, Bay Shore, N.Y., assignor to TII Industries, Inc., Copiague, N.Y.**

**Filed Oct. 23, 1989, Ser. No. 425,302**

**Int. Cl.⁵ H04M** *11/00*

**U.S. Cl. 379—107** **7 Claims**



1. A utility meter to telephone line interface comprising:
(a) a hollow housing having a closed end and a major open end;
(b) a cover adapted to cooperate with said housing major open end, said cover being hingedly connected to said housing along one edge of said housing major open end;
(c) a first opening in said housing adapted to receive at least one subscriber telephone line pair and one utility meter line pair;
(d) a removable terminal block disposed within said hollow housing, said terminal block having;
  (i) an integrally molded telephone receptacle housing provided with a through opening having a first open end and a second open end, said receptacle housing being adapted to receive and removably retain a mating telephone plug having conductive pins disposed on the distal end of a plug-in telephone line cord having at least two terminals in said first open end and a pin carrier block having a plurality of conductor pins disposed in said second open end, said receptacle housing being adapted to hold said conductor pins in electrically conductive contact with said telephone plug conductive pins when said pin carrier block and said telephone plug are mated,
  (ii) connection means for electrically connecting at least two of said receptacle conductor pins to at least a pair of telephone station line terminals disposed on the rear surface of said terminal block adapted to receive said at least one subscriber telephone line pair,
  (iii) at least two utility line terminals disposed in said terminal block, said utility line terminals being adapted to receive said at least one utility meter line pair.
  (iv) first cable connection means having a plurality of line pairs therein, each one of said line pairs being connected to a pair of utility meter terminals, the other distal ends of said line pairs being connected to a pair of utility line terminals disposed on said terminal block, and
  (v) second cable connection means having a plurality of line pairs therein, one end of each of said line pairs being connected to respective pairs of utility terminal pairs, the other end of said second cable connection means terminating in a telephone plug so that when said plug

VOL
1126
ISS
3
MY
21
1991
UMI

is placed in said receptacle said telephone line pairs are continued; and

(e) a lip having an opening therein extending from an edge of said housing major opening; and

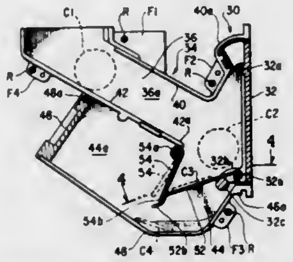
(f) a lip having an opening therein extending from said hinged cover that aligns with said lip opening when said hinged cover is in the closed position.

---

### 5,018,193
### COIN TELEPHONE BOX WITH ANTI-STUFFING COIN RETURN CHUTE

**James R. DeArkland, 8119 Buena Fortuna, Carpinteria, Calif. 93013**

**Filed Jul. 13, 1990, Ser. No. 552,105**
**Int. Cl.⁵ H04M** *17/00;* **B65G** *11/04*
**U.S. Cl. 379—145** **10 Claims**



1. In a coin operated telephone unit having coin box, a coin return chute within said box, a coin retrieval cavity below the coin discharge end of said chute, and a coin return door in the front wall of said box pivoted at its upper edge portion for swing movement inwardly toward the coin discharge end of said chute and providing finger access to the coin retrieval cavity for the removal of coins therein, the improvement for inhibiting the stuffing of the coin return chute with foreign materials comprising:

(a) a first gate plate affixed to and carried by the coin return door proximate its lower edge portion and partially spanning the open top portion of the coin retrieval cavity; and

(b) a second gate plate pivotally attached to the coin return chute at its coin discharge end and extending downwardly to the upper surface of the first gate plate proximate the rearward edge portion thereof, said first and second gate plates cooperating to close off access to the coin return chute from the coin retrieval cavity when the return door is pivoted inwardly to provide access to said cavity, and said second gate plate being pivotally movable away from said first gate plate by coins descending within said coin return chute to said first gate plate for sliding discharge along said first gate plate into said coin retrieval cavity.

---

### 5,018,194
### ELECTRONIC SWITCHING SYSTEM HAVING CALL-FORWARDING FUNCTION

**Takashi Suzuki, Tokyo, and Etsuji Nakagiri, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Jul. 13, 1989, Ser. No. 379,254**
**Claims priority, application Japan, Jul. 13, 1988, 63-174770**
**Int. Cl.⁵ H04M** *3/54, 7/06*
**U.S. Cl. 379—207** **13 Claims**

1. An electronic switching system having a call-forwarding function for effecting a call forwarding between subscribers, comprising:

a plurality of subscriber terminals;

a switching network accommodating said subscriber terminals;

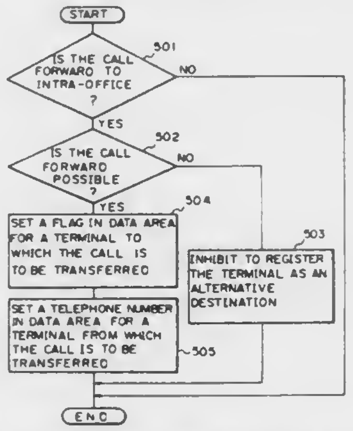
a storage unit, connected to said switching network, for storing data used to forward calls for said subscriber terminals;

discrimination information adding means, connected to said storage unit, for adding discrimination information to the data for respective ones of said subscriber terminals, said discrimination information indicating whether or not each of said subscriber terminals is already registered as an alternative destination from another one of said subscriber terminals accommodated by said switching network;

discrimination information reading means, connected to said discrimination information adding means, for reading, when a call forwarding from a first one of said subscriber terminals to a second one of said subscriber terminals is to be registered in said storage unit, said discrimination information of said second one of said subscriber terminals; and

determining means for determining whether the registration of a call forwarding is possible when a call requesting registration of a call forward is generated;

whereby, when the read discrimination information indicates that said second one of said subscriber terminals is not registered as an alternative destination, said second one of said subscriber terminals is allowed to be registered as an alternative destination, and when the read discrimination information indicates that said second one of said subscriber terminals is already registered as an alternative destination, said second one of said subscriber terminals is inhibited from being registered as an alternative destination.

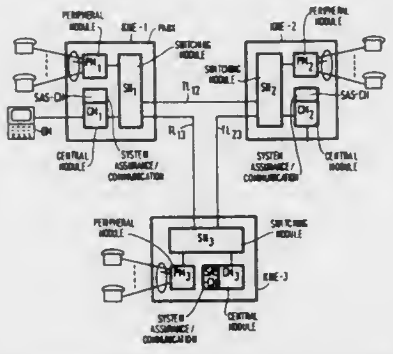

START
501
IS THE CALL FORWARD TO INTRA-OFFICE ?
NO
YES
502
IS THE CALL FORWARD POSSIBLE ?
NO
YES
504
SET A FLAG IN DATA AREA FOR A TERMINAL TO WHICH THE CALL IS TO BE TRANSFERRED
503
INHIBIT TO REGISTER THE TERMINAL AS AN ALTERNATIVE DESTINATION
SET A TELEPHONE NUMBER IN DATA AREA FOR A TERMINAL FROM WHICH THE CALL IS TO BE TRANSFERRED
505
END

---

### 5,018,195
### FULLY INTEGRATED TELECOMMUNICATION NETWORK

**Lawrence M. Hall, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 26, 1989, Ser. No. 412,966**
**Claims priority, application Netherlands, Sep. 30, 1988, 8802410**
**Int. Cl.⁵ H04M** *7/00*
**U.S. Cl. 379—225** **12 Claims**



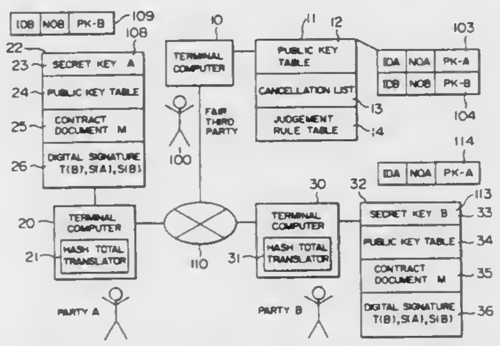
1. Telecommunication network, more specifically a telephone network, which comprises a number of units interconnected by means of transmission lines, each unit comprising a switching module, a central module and at least a single peripheral module to which user gates can be connected, characterised in that a number of progressively higher levels are assigned to the control communication between any pair of units, in that in each unit code numbers are stored for each level with the exception of the lowest level, and in that means are provided for allowing communication between a pair of units at a specific level only if the code numbers of these two units match for the relevant level and if communication between these units already takes place at all lower levels.

---

### 5,018,196
### METHOD FOR ELECTRONIC TRANSACTION WITH DIGITAL SIGNATURE

**Kazuo Takaragi, Ebina, and Ryoichi Sasaki, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 180,050, Apr. 11, 1988, Pat. No. 4,885,777, which is a continuation of Ser. No. 897,861, Aug. 19, 1986, abandoned. This application Jul. 5, 1989, Ser. No. 375,828**
**Claims priority, application Japan, Dec. 23, 1988, 63-323295**
**Int. Cl.⁵ H04K** *9/00*
**U.S. Cl. 380—30** **9 Claims**



1. A method for electronic transaction, by which a first transacting party A and a second transacting party B exchange their digital signatures concerning a contract document M through terminal devices connected through a communication line, the method including the steps of:

a step of transmitting said contract document M from one of a first terminal device operated by said first transacting party A to a second terminal device operated by the second transacting party B to the other; a step of transmitting to said first terminal device by said second transacting party B a preliminary digital signature obtained by coding first data including an identifier IDA of the first transacting party A, an identifier IDB of the second transacting party B, a data identifier indicating that the first data is the preliminary digital signature by the public key cryptosystem using the secret key of the second transacting party B from said second terminal device and a hash total h(M) obtained by transforming said contract document M by using said predetermined hash function;

a step of transmitting by said first transacting party A a formal digital signature obtained by coding second data including a hash total h(M) obtained by transforming said contract document M by using said predetermined hash function, transmitting an identifier IDA of the first transacting party A, an identifier IDB of the second transacting party B and a data identifier indicating that the second data is a formal digital signature by the public key cryptosystem using the secret key of the first transacting party A from said first terminal device to said second terminal device; and

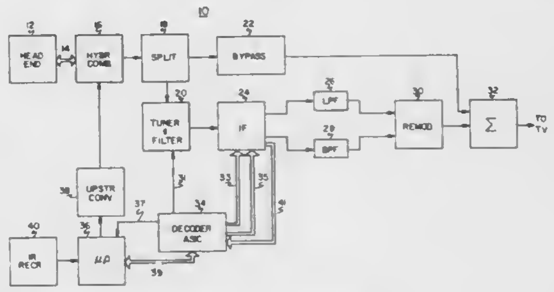
a step of transmitting by said second transacting party B a formal digital signature obtained by coding said second data by the public key cryptosystem using the secret key of the second transacting party B from said second terminal device to said first terminal device.

---

### 5,018,197
### SECURE VIDEO DECODER SYSTEM

**Gary A. Jones, Arlington Heights; Gopalan Krishnamurthy, Wheeling, and Paul A. Snopko, Chicago, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Jul. 30, 1990, Ser. No. 559,468**
**Int. Cl.⁵ H04N** *7/167*
**U.S. Cl. 380—20** **3 Claims**



1. A cable decoder system comprising;

means for receiving message encrypted with a secure decryption key and another decryption key and a scrambled video signal from a cable head end;

means for supplying said encrypted messages to an integrated circuit;

means in said integrated circuit for storing said secure decryption key and said another decryption key;

means in said integrated circuit for decrypting said messages with said secure decryption key for enabling descrambling of said scrambled video signal;

means in said integrated circuit for decrypting portions of said received messages that are encrypted with said another decryption key; and

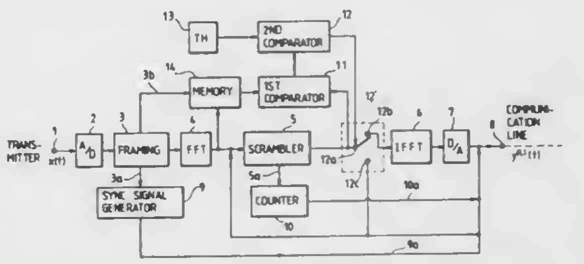
means for permitting signals exiting said integrated circuit to only reflect said another decryption key.

---

### 5,018,198
### SPEECH PRIVACY PROCESSING METHOD AND APPARATUS THEREFOR

**Fntoshi Takahashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 18, 1990, Ser. No. 466,953**
**Claims priority, application Japan, Jan. 20, 1989, 1-009819**
**Int. Cl.⁵ H04K** *1/06*
**U.S. Cl. 380—38** **8 Claims**



1. A speech privacy processing apparatus comprising:

scrambling means for scrambling an input original speech signal;

obtaining means for obtaining a number of elements included in common among high-frequency components of the original speech signal and high-frequency components of the scrambled signal;

control means for controlling said scrambling means to repeat its scrambling operation until said number of elements becomes smaller than a predetermined threshold; and

count means for counting the number of repetitions of the scrambling operation.

VOL
1126
ISS
3
MY
21
1991
UMI

### 5,018,199

### CODE-CONVERSION METHOD AND APPARATUS FOR ANALYZING AND SYNTHESIZING HUMAN SPEECH

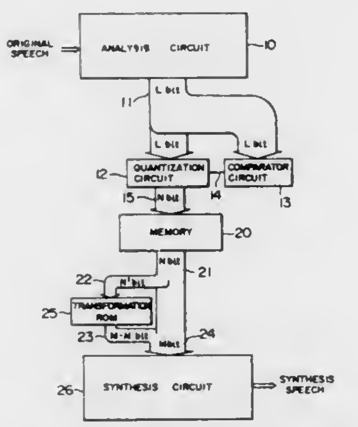
**Takao Nakajima, and Hiroshi Shigehara, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 751,512, Jul. 3, 1985, abandoned. This application Sep. 1, 1989, Ser. No. 423,571**

**Claims priority, application Japan, Jnl. 4, 1984, 59-138703; Jul. 4, 1984, 59-138704**

**Int. Cl.⁵ G10L** *3/00;* **G06F** *5/00*

**U.S. Cl. 381—36** **19 Claims**



1. A method of analyzing and synthesizing human speech comprising the steps of:

analyzing human speech to extract a pitch parameter from said human speech;

quantizing said pitch parameter to generate a quantization parameter having a plurality of bits, a part of said plurality of bits of said quantization parameter having a predetermined bit pattern when said pitch parameter is in a predetermined range which exceeds a range expressed by said plurality of bits, said predetermined range corresponding to a range of a human voice;

transforming said part of said plurality of bits of said quantization parameter into an additive parameter having at least one bit in accordance with said predetermined range;

combining said additive parameter with another part of said quantization parameter to obtain a synthesis parameter which has a shifted range including said predetermined range and excluding a redundant range not taken by said human voice; and

synthesizing said human speech on the basis of said synthesis parameter and other feature parameters.

---

### 5,018,200

### COMMUNICATION SYSTEM CAPABLE OF IMPROVING A SPEECH QUALITY BY CLASSIFYING SPEECH SIGNALS

**Kazunori Ozawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Sep. 21, 1989, Ser. No. 410,459**

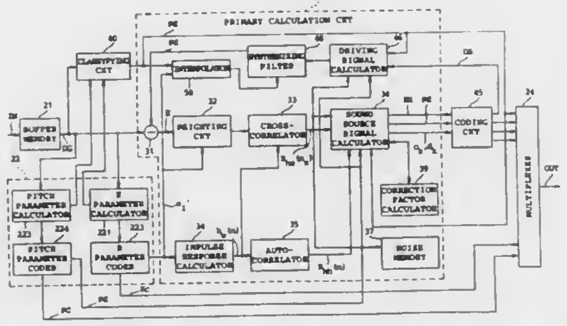
**Claims priority, application Japan, Sep. 21, 1988, 63-237727; Dec. 13, 1988, 63-316040**

**Int. Cl.⁵ G10L** *7/02*

**U.S. Cl. 381—36** **7 Claims**

1. In an encoder device supplied with a sequence of digital speech signals to produce a sequence of output signals, the sequence of said digital speech signals forming a frame, said encoder device comprising parameter calculation means responsive to said sequence of the digital speech signals for calculating first and second primary parameters which specify a spectrum envelope and a pitch of said sequence of the digital speech signals to produce first and second parameter signals representative of said spectrum envelope and said pitch, respectively, primary calculation means coupled to said parameter calculation means for calculating a set of calculation result signals representative of the sequence of said digital speech signals, and output signal producing means for successively rendering said set of the calculation result signals into the sequence of said output signals, the improvement wherein said encoder device comprises:

subsidiary parameter extracting means supplied with the sequence of said digital speech signals and said first and said second primary parameter signals for extracting, from the sequence of said digital speech signals, a subsidiary parameter which is different from said first and said second primary parameters and which specifies a selected one of at least three species of said sequence of the digital speech signals to classify the sequence of said digital speech signals into one of said at least three classes corresponding to said at least three species, respectively, and to produce a class identification signal representative of each of said sequence of said digital speech signals to produce a class identification signal representative of each of said at least three classes;



means for producing said class identification signal as a monitoring result signal representative of a result of monitoring said subsidiary parameter;

processing means supplied with said digital speech signals, said first and second primary parameter signals, and said monitoring result signal for processing said digital speech signals to selectively produce a first set of primary sound source signals and a second set of secondary sound source signals different from said first set of the primary sound source signals, said first set of the primary sound source signals being formed by a set of excitation pulses calculated with respect to a selected one of subframes which result from dividing every frame in dependency upon said second primary parameter signal and each of which is shorter than said frame and

means for supplying a combination of said primary and said secondary sound source signals to said output signal producing means as said calculation result signals.

---

### 5,018,201

### SPEECH RECOGNITION DIVIDING WORDS INTO TWO PORTIONS FOR PRELIMINARY SELECTION

**Kazuhide Sugawara, Tokyo, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 30, 1988, Ser. No. 278,055**

**Claims priority, application Japan, Dec. 4, 1987, 62-306091**

**Int. Cl.⁵ G10L** *9/00, 5/06*

**U.S. Cl. 381—43** **8 Claims**

1. A speech recognition apparatus which converts inputted speech into a label for each predetermined time interval and performs speech recognition using label strings, said apparatus comprising:

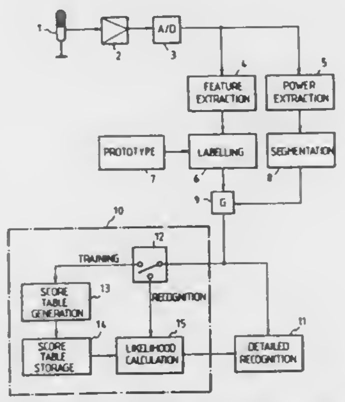
a first memory means for storing, for each word in a vocabulary, a probability of producing each label in a label set at an arbitrary time interval in a fixed length first portion of an utterance of said word;

a second memory means for storing, for each word in said

vocabulary, a probability of producing each label in said label set at an arbitrary time interval in a second portion following said first portion of the utterance of said word;

means for determining, upon the generation of a label for an inputted speech to be recognized, whether the label belongs to said first portion or said second portion;

means for outputting, when the generated label for said inputted speech belongs to said first portion, the probability of producing the label concerned at an arbitrary time interval in the first portion of the utterance of each word in said vocabulary wit reference to said first memory means;



means for outputting, when the generated label for said inputted speech belongs to said second portion, the probability of producing the label concerned at an arbitrary time interval in the second portion of the utterance of each word in said vocabulary with reference to said second memory means;

means for accumulating the probabilities outputted for each word;

means for specifying at least one candidate word in accordance with the magnitude of the accumulated value; and

means for performing detailed recognition for each of the specified candidate words.

---

### 5,018,202

### ELECTRONIC NOISE ATTENUATION SYSTEM

**Minoru Takahashi, Tokyo; Tanetoshi Miura, 1-11-20 Minami-cho, Kokubunji, Tokyo; Hareo Hamada, 4-8-1 Kajino-cho, Koganei, Tokyo; Hideki Hyondo, Yokohama; Ryusuke Gotoda, Tokyo; Yasushi Yoshimura, Tokyo; Takashi Kuribayashi, Tokyo, and Akio Akasaka, Tokyo, all of Japan, assignors to Hitachi Plant Engineering & Construction Co., Ltd.; Tanetoshi Miura and Hareo Hamada**

**Filed Feb. 22, 1989, Ser. No. 313,475**

**Claims priority, application Japan, Sep. 5, 1988, 63-223028**

**Int. Cl.⁵ G10K** *11/16*

**U.S. Cl. 381—71** **4 Claims**

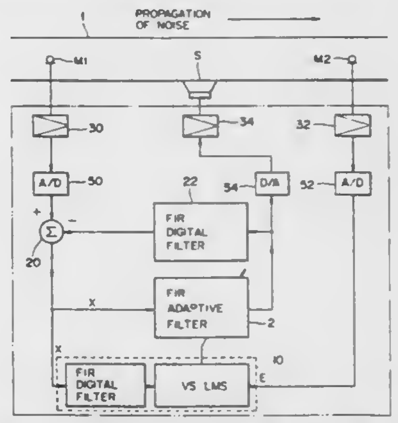
1. An electronic noise attenuation system for achieving attenuation of a sound wave propagated from a source of noise in a propagation passage of a sound wave by generating another sound wave 180° out of phase and having the same sound pressure with said propagated sound wave to produce interference between the two sound waves at a given position in said propagation passage, said system comprising:

first mechano-electric transducer means disposed at a position closer to said source of noise from said given position in said propagation passage to sense said propagated sound wave from said source of noise and convert it into an electric signal;

electro-mechanical transducer means interposed between the position of said first mechano-electric transducer means and said given position in said propagation passage to generate a sound wave for cancelling said propagated sound wave from said noise source at said given position;

second mechano-electric transducer means interposed between the position of said electro-mechanical transducer means and said given position or disposed at said given position to sense said propagated sound waves from said electro-mechanical transducer means and from said source of noise and convert them into electric signals;

an adaptive digital filter arranged to be given time varying filter coefficients so that an amount of noise attenuation can be the maximum, to perform the digital operation processing on output signals of said first mechano-electric transducer means in accordance with said time varying filter coefficients, and to create a drive signal to be applied to said electro-mechanical transducer means;



a digital filter arranged to be given filter coefficients indicating a transfer function between said electro-mechanical transducer means and said second mechano-electric transducer means, to perform the digital operation processing on output signals of said first mechano-electric transducer means in accordance with said filter coefficients; and

control means for inputting therein output signals of said second mechano-electric transducer means and output signals of said digital filter, for calculating said time varying filter coefficients sequentially in accordance with a VS-LMS algorithm, and for updating said time varying filter coefficients of said adaptive digital filter by the thus calculated time varying filter coefficients.

---

### 5,018,203

### NOISE ATTENUATION

**Craig G. Sawyers, St. Neots, and Gordon M. Edge, Nr. Saffron Walden, both of England, assignors to Scientific Generics Limited, Cambridge, England**

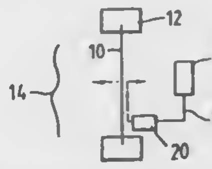
**PCT No. PCT/GB88/00115, § 371 Date Oct. 23, 1989, § 102(e) Date Oct. 23, 1989, PCT Pub. No. WO88/06779, PCT Pub. Date Sep. 7, 1988**

**PCT Filed Feb. 23, 1988, Ser. No. 399,451**

**Claims priority, application United Kingdom, Feb. 24, 1987, 8704314**

**Int. Cl.⁵ G10K** *11/16*

**U.S. Cl. 381—71** **24 Claims**



1. Apparatus for attenuating noise, the apparatus comprising a diaphragm one side of which is subjected to the noise, sensing means for sensing the actual displacement of the diaphragm in response to the noise, and deflecting means responsive to the sensing means for deflecting the diaphragm in order to cancel the displacement, to attenuate noise transmitted from one side

VOL
1126
ISS
3
MY
21
1991
UMI

of the diaphragm to the other side of the diaphragm, the diaphragm being divided up into separate areas, each area having a corresponding sensing means cooperating with a deflecting means, so that each area of the diaphragm is separately driven.

---

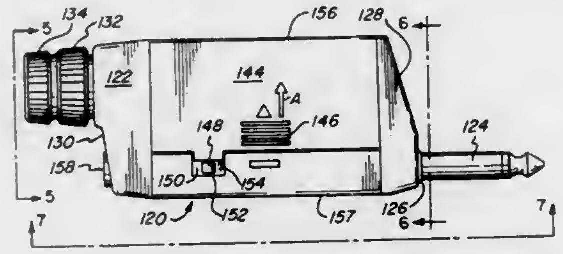
### 5,018,204
### PORTABLE MUSICAL INSTRUMENT AMPLIFIER

**David E. Christian, Danbury, Conn., assignor to C. B. Labs, Inc., Bridgeport, Conn.**

**Continuation of Ser. No. 273,415, Nov. 18, 1988, Pat. No. 4,944,016, which is a continuation-in-part of Ser. No. 121,166, Jan. 16, 1987, abandoned. This application Apr. 6, 1990, Ser. No. 505,459**

**Int. Cl.$^5$ H04R** *1/10*

U.S. Cl. 381—74 **13 Claims**



1. A portable musical instrument amplifier comprising:
- an electronic amplifying and signal processing system;
- a body containing said electronic amplifying and signal processing system;
- an input plug directly rigidly attached to and projecting from said body and electrically coupled to said electronic amplifying and signal processing system, wherein said body has essentially planar end, side, and bottom surfaces with a majority of the end surface forming an obtuse angle with said input plug; and
- headphone connection means in said body adapted to connect physically and electrically said electronic amplifying and signal processing system to headphones, whereby, when said input plug is inserted into a musical instrument output jack, said electronic amplifying and signal processing system produces an amplified signal from the instrument capable of being heard with headphones.

---

### 5,018,205
### AUTOMATIC SOUND LEVEL COMPENSATOR FOR A SOUND REPRODUCTION DEVICE MOUNTED IN A VEHICLE

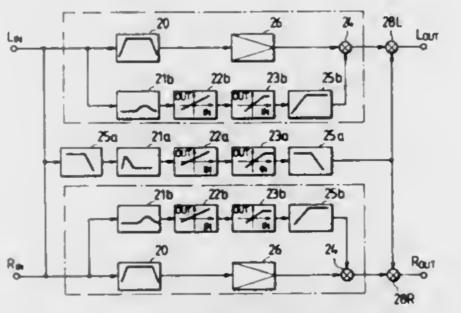
**Kazunori Takagi; Shinichi Sato; Masahiko Ito, and Hideo Yamamoto, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Continuation of Ser. No. 263,768, Oct. 28, 1988, abandoned. This application Jul. 11, 1990, Ser. No. 552,364**

**Claims priority, application Japan, Feb. 3, 1988, 63-23563; Feb. 5, 1988, 63-23959**

**Int. Cl.$^5$ H04B** *1/00*

U.S. Cl. 381—86 **7 Claims**



1. A sound reproduction device including an automatic loudness compensator for compensating a sound level of an audio signal, comprising;
- means for increasing a first level of sound pressure of said audio signal in a first range of sound frequency relative to a second level of sound pressure in a middle range of sound frequency when a sound level of said audio signal is lower than a reference sound level; and
- means for decreasing said first level of sound pressure relative to said second level of sound pressure in said middle range of sound frequency when said sound level of said audio signal is higher than said reference sound level;
- wherein said sound reproduction device is mounted in a vehicle; and
- further comprising: means for adjusting said first level of sound pressure relative to said second level of sound pressure based on a noise produced by movement of said vehicle.

---

### 5,018,206
### NETWORK MOUNTING DEVICE FOR COAXIAL TYPE SPEAKER

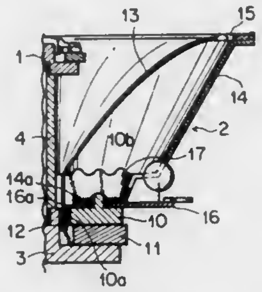
**Takashi Suzuki, Yamagata, Japan, assignor to Pioneer Electronic Corp., Tokyo, Japan**

**Filed Mar. 6, 1990, Ser. No. 489,156**

**Claims priority, application Japan, Sep. 14, 1989, 1-107229[U]**

**Int. Cl.$^5$ H04R** *1/02*

U.S. Ci. 381—188 **5 Claims**



1. In a coaxial type speaker including a woofer having a diaphragm, a center pole for forming a magnetic circuit of said woofer, and a tweeter mounted on a front end of said center pole; a network mounting device comprising frame for supporting an outer circumference of said diaphragm of said woofer, a plate for forming said magnetic circuit, a network for dividing a frequency and feeding divided frequencies to said woofer and said tweeter, and a substrate for mounting said network thereon, said subtrate being sandwiched between said frame and said plate.

---

### 5,018,207
### APPARATUS FOR OBJECTIVELY GRADING CENTERING CONDITION OF A STAMP

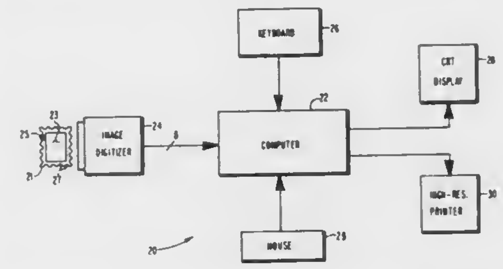
**Jack Purdum, 7650 Rutherglen Way, Indianapolis, Ind. 46254**

**Filed Sep. 18, 1989, Ser. No. 408,684**

**Int. Cl.$^5$ G06K** *9/32*

U.S. Cl. 382—1 **19 Claims**

1. A method for determining the centering condition of a vignette surrounded by a rectangular border having perforation markings at the outermost edges of said border, said method comprising the steps of:
- (a) digitizing an image of said vignette and said border to produce a pixel data file;
- (b) analyzing the pixel data file and determining four minimum pixel distances from the perforation markings to the vignette at the top, bottom, left side and right side of the vignette;



- (c) calculating a centering index for the image using the four minimum pixel distances; and
- (d) displaying said centering index.

---

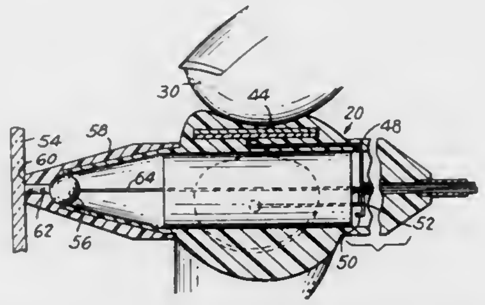
### 5,018,208
### INPUT DEVICE FOR DYNAMIC SIGNATURE VERIFICATION SYSTEMS

**Karen S. Gladstone, 721 Avenue O, Brooklyn, N.Y. 11230**

**Filed Apr. 2, 1990, Ser. No. 503,375**

**Int. Cl.$^5$ G06K** *9/00*

U.S. Cl. 382—3 **13 Claims**



1. An input device for use in a dynamic handwritten pattern verification system, particularly for a signature verification system, comprising:
- (a) a housing having a hand-held barrel extending along an axis and terminating in a writing tip;
- (b) positioning means on the barrel adjacent the tip for positioning a plurality of fingers of one hand of a writer forming a handwritten pattern in a one-handed writing configuration at a plurality of preselected locations on the barrel;
- (c) barrel pressure transducer means for sensing radially-inwardly-directed writing pressure by said fingers against the barrel during forming of the handwritten pattern, including at least one transducer located at one of the preselected locations in a force-transmitting relationship with the respective finger positioned thereat to convert radially-inwardly-directed writing pressure exerted by the respective finger on the barrel to an electrical output signal; and
- (d) means for conducting the electrical output signal to the verification system.

---

### 5,018,209
### ANALYSIS METHOD AND APPARATUS FOR BIOLOGICAL SPECIMENS

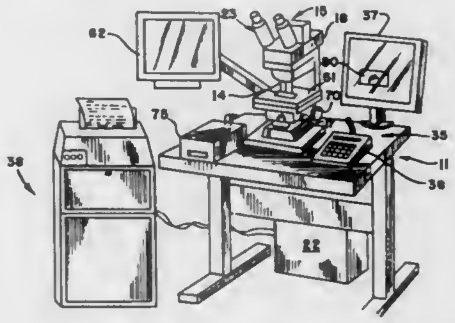
**James W. Bacus, Hinsdale, Ill., assignor to Cell Analysis Systems, Inc., Lombard, Ill.**

**Continuation-in-part of Ser. No. 794,937, Nov. 4, 1985, Pat. No. 4,741,043. This application Nov. 4, 1986, Ser. No. 927,285**

**Int. Cl.$^5$ G06K** *9/00*

U.S. Cl. 382—6 **4 Claims**

1. An interactive method for selecting a subpopulation of cell objects from a population of cell objects and for measuring a subpopulation of malignant cell objects for a given measured parameter with a digital image processing means, said method comprising the steps of:
- providing in real time an enlarged view of a field containing a plurality of malignant cell objects from the population of cell objects to a user-observer through the digital image processing means,
- visually selecting which of the plurality of cell objects have visual parameters identifying them for being placed into a selected subpopulation of malignant cell objects to be measured and rejecting from the subpopulation those cells objects being viewed and lacking the visual parameters,



- measuring only the selected malignant cell objects in the selected subpopulation for the measured parameter with a digital image processing means, and
- generating with a digital image processing means a quantitation based on the measured parameter for the selected malignant cell object subpopulation, including the generation of a parameter distribution of the measured parameter for the malignant cells showing a first peak and/or second peak for the selected subpopulation.

---

### 5,018,210
### PATTERN COMPARATOR WITH SUBSTAGE ILLUMINATION AND POLYGONAL DATA REPRESENTATION

**Jerry D. Merryman, Dallas; Thomas C. Penn, Richardson; William G. Manns, Dallas; Don J. Weeks, Southlake, and Anthony B. Wood, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 25, 1988, Ser. No. 173,778**

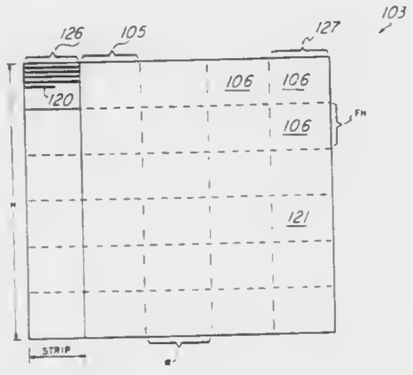
**Int. Cl.$^5$ G06K** *9/00, 9/50, 9/56*

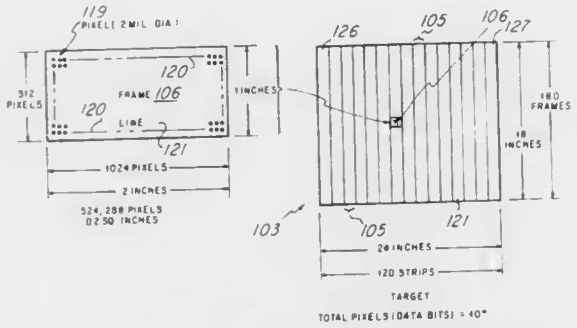
U.S. Cl. 382—8 **6 Claims**

1. A pattern inspection system for inspecting an opaque pattern on a transparent target, comprising:
- a database partitioned into frames of data describing an ideal pattern comprised of reference polygons, wherein each reference polygon is contained within one frame;
- a plurality of pipelines for expanding the frames of data into bit-mapped descriptions of the polygons;
- a light source below the target for illuminating the non-patterned areas of the target;
- a photo-detector for raster scanning the target;

VOL 1126
ISS 3
MY 21 1991
UMI

a clock for clocking in pixel data from the photo-detector; and





a comparator for comparing the pixel data with the bit-mapped descriptions of the polygons.

---

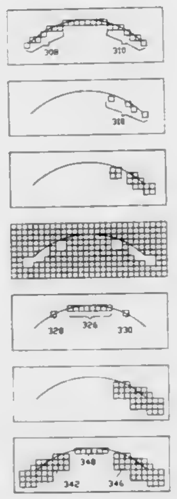
### 5,018,211
### SYSTEM FOR DETECTING AND ANALYZING ROUNDED OBJECTS

**Robert S. Jaffe, Shenorock, and Jon R. Mandeville, Yorktown Heights, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Oct. 31, 1988, Ser. No. 264,534**

**Int. Cl.$^5$ G06K** *9/00, 9/48, 9/46;* **G01B** *11/24*

**U.S. Cl. 382—8** **10 Claims**



7. A system for determining characteristics of a substantially rounded feature comprising:

means for forming a raster-scan image of pixels representing said rounded feature;

means for detecting and identifying groups of pixels from said raster-scan image of pixels, each said group including pixels clustered about an azimuth and lying adjacent a line which is substantially tangent to a boundary of said rounded feature and further including shoulder pixels lying about said boundary and adjacent said tangent line pixels;

means for isolating said shoulder pixels from said pixels on said tangent line;

means for trimming each said group of tangent line pixels to identify a pixel adjacent a chosen azimuth; and

means for analyzing said characteristics of said rounded feature by determining relationships between said identified pixels.

---

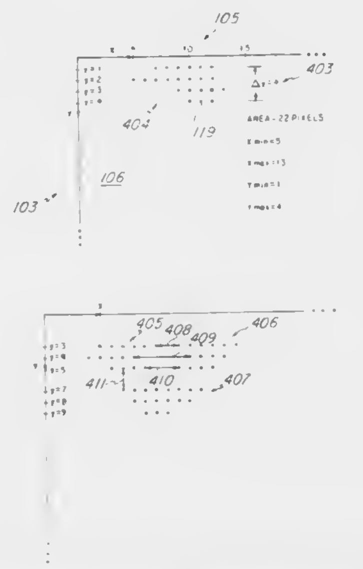
### 5,018,212
### DEFECT AREA CONSOLIDATION FOR PATTERN INSPECTOR

**William G. Manns; Anthony B. Wood, both of Dallas; David A. Norwood, Richardson; Don J. Weeks, Southlake, and Michael Gordon, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 25, 1988, Ser. No. 173,395**

**Int. Cl.$^5$ G06K** *9/00;* **H04N** *7/18;* **G01N** *21/00*

**U.S. Cl. 382—8** **5 Claims**



1. A computerized method of eliminating false defect areas and consolidating defect areas in a pattern inspection system, comprising the steps of:

comparing, one-by-one, the pixels of an ideal pattern with the corresponding pixels of a pattern on a target;

counting the number of adjacent rows having miscompared pixels;

comparing the number of rows of miscompared pixels with a first error criterion allowance; designating the miscompared pixels as a defect area if the first error criterion allowance comparisons produce a miscompare;

designating first and second designated defect areas as a single consolidated defect area if the first and second designated defect areas are separated by a number of pixels less than or equal to a second error criterion allowance.

---

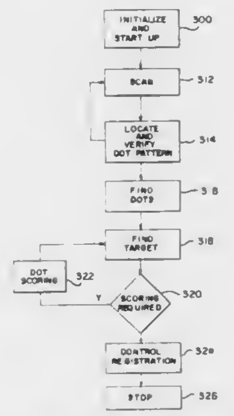
### 5,018,213
### METHOD AND APPARATUS FOR REGISTRATION MARK IDENTIFICATION

**Dale R. Sikes, Burlington, Mass., assignor to Web Printing Controls Co., Inc., Barrington, Ill.**

**Filed May 11, 1988, Ser. No. 193,314**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—8** **14 Claims**



1. Apparatus for identifying each multiple element color component of a color-to-color registration mark comprising a pattern of a plurality of multiple element color components in a multi-color automatic registration system, comprising:

means for locating each element of the registration mark and for determining position, color and size information for each element;

means for matching mark elements to identify each possible multiple element component based upon the position and color information to obtain possible multiple element components;

means for scoring the possible multiple element components by accumulating a score for each possible multiple element component based upon the position, color and size information; and,

means for selecting the multiple element color components to be utilized as identified multiple element color components of the registration mark based upon the scores.

---

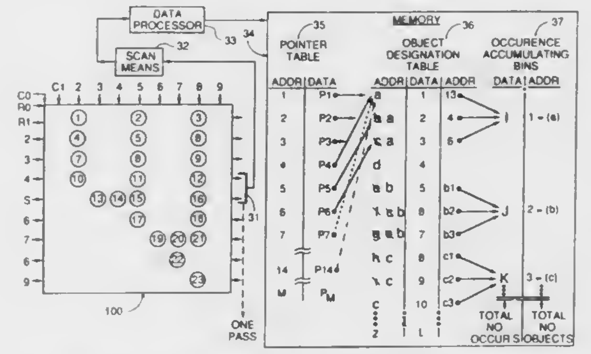
### 5,018,214
### METHOD AND APPARATUS FOR IDENTIFYING DISCRETE OBJECTS IN A VISUAL FIELD

**Nicholas E. Pasch, Redwood City, Calif., assignor to LSI Logic Corporation, Milpitas, Calif.**

**Filed Jun. 23, 1988, Ser. No. 210,596**

**Int. Cl.$^5$ G06K** *9/34*

**U.S. Cl. 382—9** **18 Claims**



1. A method for identifying discrete objects in a visual field composed of an array of pixels, comprising:

establishing a first table for recording a set of pointers, each of said pointers being associated with the occurrence of a prespecified condition in a corresponding one of said pixels;

establishing a second table for recording one or more object names;

setting the pointers of the pointer table to point to one or more object names in the second table; and

changing one of the object names in the second table when it is found that the pixels associated therewith through their respective pointers belong to an object of a different name;

counting the number of pointers pointing to one or more specific object names recorded in the second table.

---

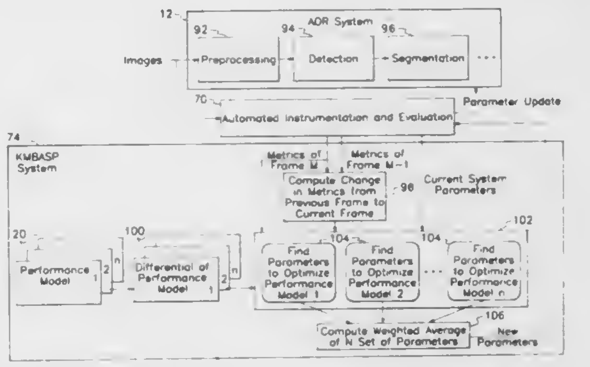
### 5,018,215
### KNOWLEDGE AND MODEL BASED ADAPTIVE SIGNAL PROCESSOR

**Hatem N. Nasr, Edina; Firooz A. Sadjadi, St. Anthony; Michael E. Bazakos, Bloomington, and Hossien Amehdi, Edina, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 23, 1990, Ser. No. 498,196**

**Int. Cl.$^5$ G06K** *9/62*

**U.S. Cl. 382—15** **12 Claims**


12
92
94
ADR System
96
Images
Preprocessing
Detection
Segmentation
70
Automated Instrumentation and Evaluation
Parameter Update
74
KMBASP System
Metrics of Frame M
Metrics of Frame M-1
Compute Change in Metrics from Previous Frame to Current Frame
98
Current System Parameters
20
100
102
104
104
Performance Model
Differential of Performance Model
Find Parameters to Optimize Performance Model 1
Find Parameters to Optimize Performance Model 2
Find Parameters to Optimize Performance Model n
106
Compute Weighted Average of N Set of Parameters
New Parameters

1. A knowledge and model based adaptive signal processor comprising:

model means for providing a plurality of performance models having parameters;

differential means, connected to said model means, for differentiating each of the performance models;

change determining means for computing changes in metrics from a previous imagery frame to a current imagery frame;

optimizing means, connected to said differential means and to said change determining means, for determining and/or adjusting parameters that optimize the performance models; and

averaging means, connected to said optimizing means, for computing a weighted average of the parameters.

---

### 5,018,216
### METHOD OF EXTRACTING A FEATURE OF A CHARACTER

**Keiji Kojima, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Japan**

**Filed Jul. 11, 1989, Ser. No. 378,161**

**Claims priority, application Japan, Jul. 20, 1988, 63-181368**

**Int. Cl.$^5$ G06K** *9/48*

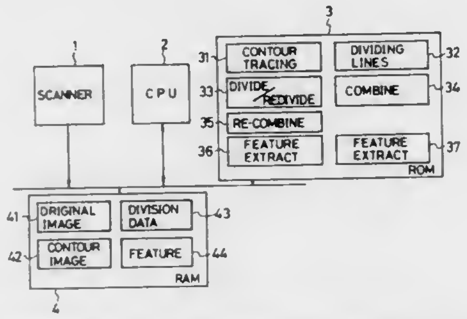
**U.S. Cl. 382—22** **17 Claims**

1. A method of extracting a feature of a character comprising the steps of:

(a) dividing a contour image of a character into a plurality of segments by referring to a pair of dividing lines provided for said contour image, said dividing lines crossing said contour image so that said dividing lines cross a width of a line forming said character, and said contour image being divided into the plurality of segments at dividing

VOL
1126
ISS
3
MY
21
1991
UMI

points selected from cross points where said dividing lines cross said contour image, said step of dividing said contour image including the steps of:
(1) tracing white or black pixels arranged along said contour image;
(2) assigning said white or black pixels direction codes indicative of respective directions of movement of said tracing; and
(3) defining said pair of dividing lines by calculating a distribution of each of said direction codes;



(b) dividing each of said segments into a plurality of sub-segments;
(c) combining said sub-segments together to thereby form a plurality of combined segments in accordance with a predetermined rule indicative of a combination of said sub-segments, said predetermined rule representing that sub-segments located on each of said dividing points being included in an identical one of said combined segments; and

extracting a feature of each of said combined segments.

---

### 5,018,217
### DATA CONVERTING APPARATUS HAVING MEANS FOR CHANGING ORNAMENTAL STROKE END DATA OF CHARACTER OUTLINE

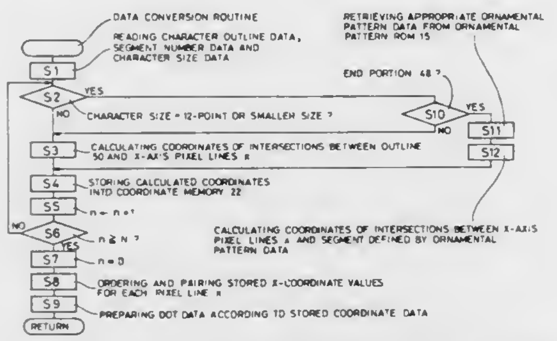
**Hitosbi Yoshida, Kohnan; Naoyuki Kawamoto, Toki, and Takahiro Kanegae, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Sep. 22, 1989, Ser. No. 410,872**

**Claims priority, application Japan, Sep. 26, 1988, 63-239940; Jan. 18, 1989, 1-9399**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—22** **23 Claims**


DATA CONVERSION ROUTINE
READING CHARACTER OUTLINE DATA, SEGMENT NUMBER DATA AND CHARACTER SIZE DATA
RETRIEVING APPROPRIATE ORNAMENTAL PATTERN DATA FROM ORNAMENTAL PATTERN ROM 15
S1
END PORTION 48 ?
S2
YES
NO
CHARACTER SIZE = 12-POINT OR SMALLER SIZE ?
S10
YES
NO
S11
S3
CALCULATING COORDINATES OF INTERSECTIONS BETWEEN OUTLINE 50 AND X-AXIS PIXEL LINES n
S12
S4
STORING CALCULATED COORDINATES INTO COORDINATE MEMORY 22
S5
n ← n+1
NO
S6
n ≧ N ?
YES
CALCULATING COORDINATES OF INTERSECTIONS BETWEEN X-AXIS PIXEL LINES n AND SEGMENT DEFINED BY ORNAMENTAL PATTERN DATA
S7
n = 0
S8
ORDERING AND PAIRING STORED X-COORDINATE VALUES FOR EACH PIXEL LINE n
S9
PREPARING DOT DATA ACCORDING TO STORED COORDINATE DATA
RETURN

1. A data converting apparatus for converting a batch of outline data comprising multiple sets of segment data representative of an outline of a character, into a batch of dot data representative of the character, each of said sets of segment data representing a corresponding segment of said outline of the character, said apparatus converting said outline data into said dot data according to a conversion rule that each stroke of said character is constituted by picture elements which lie in an outline of said stroke so as to satisfy a predetermined requirement, when said outline of said character is superimposed on a coordinated pixel screen wherein the picture elements are defined by a plurality of straight lines parallel to an X-axis and a plurality of straight lines parallel to a Y-axis perpendicular to said X-axis, wherein the improvement comprising:

ornamental end data converting means operable without following said conversion rule, for processing ornamental end data comprising at least one of said multiple sets of segment data of said outline data which defines a profile of an ornamental end portion of an ornamented stroke of said character, said batch outline data further comprising ornament indicator data which indicates that said ornamental end data defines said profile of said ornamental end portion, said ornamental end data converting means being responsive to said ornament indicator data to convert said ornamental end data into a predetermined block of dot data associated with said ornamental end portion of said ornamented stroke.

---

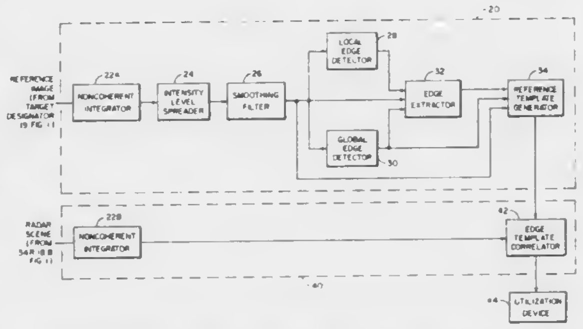
### 5,018,218
### CONFIRMED BOUNDARY PATTERN MATCHING

**Theodore J. Peregrim, Bedford; Stephen L. Richter, Harvard, and Richard E. Roy, Maynard, all of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed Aug. 29, 1988, Ser. No. 237,935**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—22** **5 Claims**



1. In an imaging system representing an image by an array of pixels, a method of selecting pixels in the image representing the edges of objects comprising the steps of:
(a) forming a first map from the image comprising an array of pixels, each of the pixels having a value computed according to a first technique and indicating whether the corresponding pixel in the image represents an edge;
(b) forming a second map from the image comprising an array of pixels, each of the pixels having a value computed according to a second technique and indicating whether the corresponding pixel in the image represents an edge;
(c) selecting as edges those pixels in the image corresponding to pixels in first map having values indicating an edge and corresponding to pixels in the second map having values indicating an edge; and
(d) additionally selecting as additional edges pixels from a set of pixels consisting of those pixels corresponding to pixels in the first map having values indicating an edge and corresponding to pixels in the second map having values not indicating an edge wherein each pixel in the set is adjacent to another pixel in the set or adjacent to a pixel selected as an edge.

---

### 5,018,219
### OBJECT RECOGNIZE APPARATUS

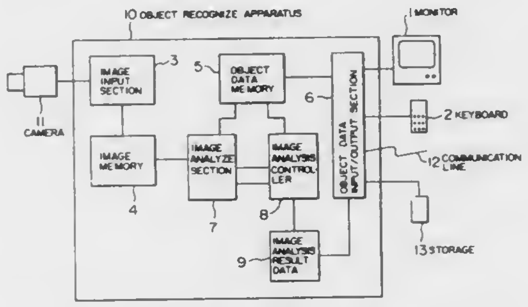
**Kichie Matsuzaki, Yokohama; Mitsunobu Isobe, Machida; Kenzo Takeichi, Tochigi; Ryouichi Hisatomi, Tochigi, and Masasi Kudou, Tochigi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 6, 1989, Ser. No. 306,397**

**Claims priority, application Japan, Feb. 29, 1988, 63-44412; Aug. 26, 1988, 63-210708**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—37** **4 Claims**



1. An object recognition apparatus comprising:
image input means for imaging an object an arbitrary position so as to input an image;
means for specifying a recognition object as a set including a plurality of lower-level recognition objects;
means for setting, for each of said lower-level recognition objects, at least a preprocessing operation of said each lower-level recognition object, features and contour shape of said each lower-level recognition object as attribute data corresponding to a judgment operation of said each lower-level recognition object and orientation base, position base, measurement items, collision check and coordinate conversion parameters as optional data of said each lower-level recognition object;
means for performing a processing for said each lower-level recognition object according to said preprocessing operation, said judgment operation and said measurement items of said each lower-level recognition object;
means for obtaining geometric features from said inputted image by performing a preprocessing according to said preprocessing operation of said each lower-level recognition object;
means for effecting a judgment and detection of said lower-level recognition objects by comparing said geometric features obtained from said inputted image to features and contour shape of said each lower-level recognition object corresponding to said judgment operation; and
means for detecting a recognition object including said lower-level recognition objects on the basis of results of said detection effected on said each lower-level recognition level object.

VOL
1126
ISS
3
MY
21
1991
UMI

# DESIGN PATENTS

## GRANTED MAY 21, 1991

### ERRATA

| For<br>CLASS | See<br>PATENT NO. |
|---|---|
| D8-071 | 316,943 |
| D14-253 | 316,999 |

VOL
1126
ISS
3
MY
21
1991
UMI

# DESIGNS

MAY 21, 1991

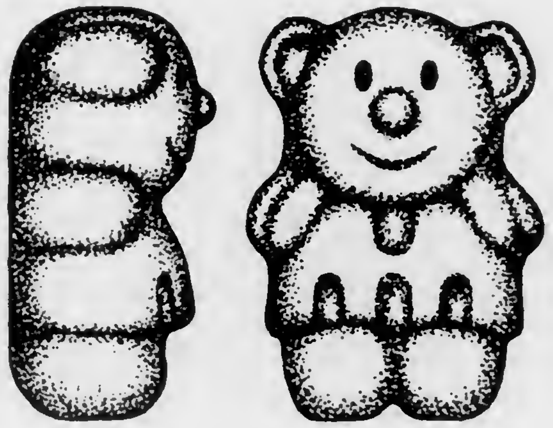
### 316,922
### SNACK FOOD

**Jane E. Alpers, Minneapolis; Joseph E. Greenwald, New Brighton; Christopher B. Foote, Minneapolis; James J. MacLachlan, Maple Grove, and Robert A. Will, Eagan, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.**

**Filed Nov. 2, 1988, Ser. No. 266,026**

**Term of patent 14 years**

U.S. Cl. D1—110



### 316,923
### LONG UNDERWEAR ENSEMBLE

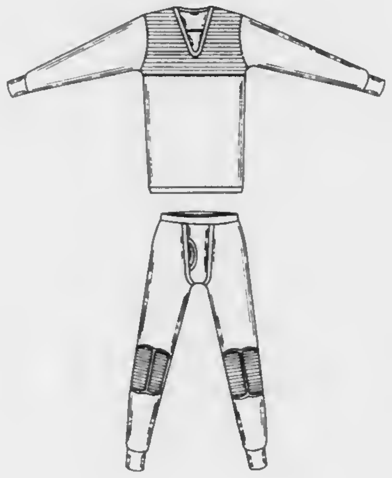
**Steen Jensen, Randers, and Robert Birch, Morke, both of Denmark, assignors to IM Randers A/S, Randers, Denmark**

**Filed Jun. 22, 1988, Ser. No. 210,309**

**Claims priority, application Denmark, Jan. 8, 1988, MA88.0030**

**Term of patent 14 years**

U.S. Cl. D2—8



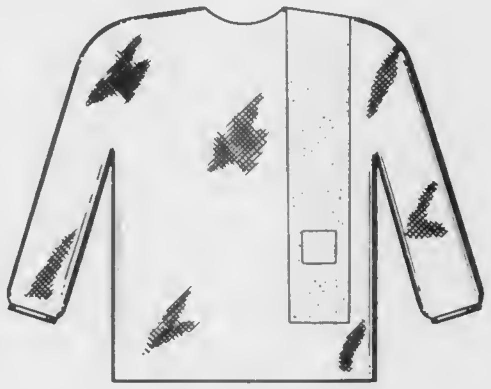
### 316,924
### BLOUSE OR SIMILAR ARTICLE

**Ara Berberian, 28415 Streamwood La., Southfield, Mich. 48034**

**Filed Mar. 4, 1988, Ser. No. 163,886**

**Term of patent 14 years**

U.S. Cl. D2—215



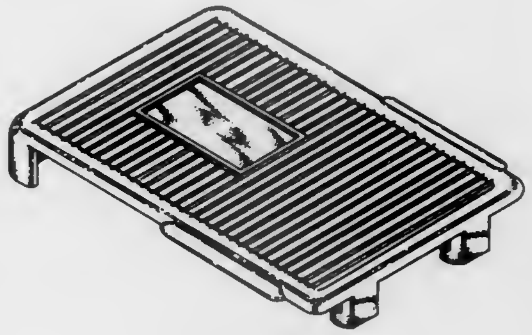
### 316,925
### BICYCLING SHOE CLEAT PROTECTOR

**Jim A. Kerbs, 16736 N. Alpine Rd., Lodi, Calif. 95240**

**Filed Aug. 15, 1988, Ser. No. 232,182**

**Term of patent 14 years**

U.S. Cl. D2—271



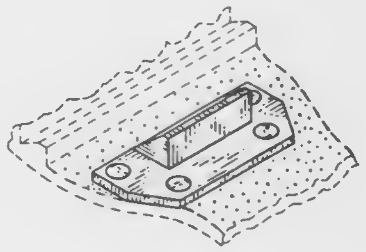
### 316,926
### BICYCLE SHOE CLEAT

**Michael B. St. John, 4143 Gaviota Ave., Long Beach, Calif. 90807**

**Filed Aug. 26, 1988, Ser. No. 237,003**

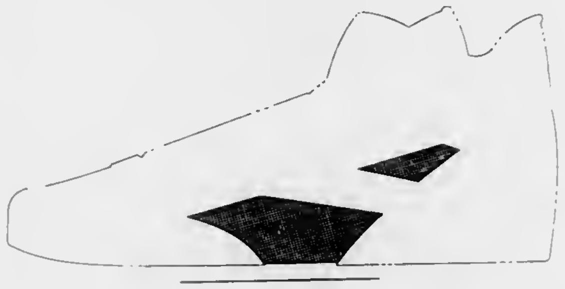
**Term of patent 14 years**

U.S. Cl. D2—314

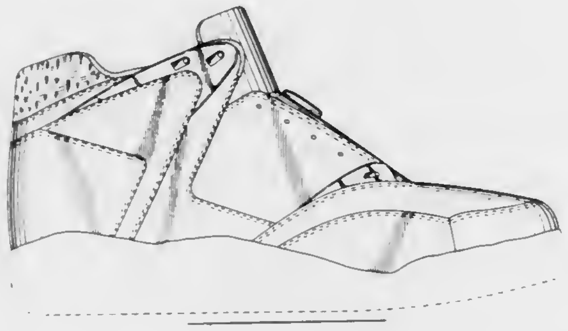


VOL
1126
ISS
3
MY
21
1991
UMI

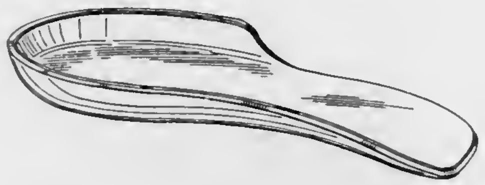
316,927
### PORTION OF A SHOE UPPER
Patricia D. Quan, Hermosa Beach; Angelo Maccano, Simi Valley, and Robert Y. Greenberg, Woodland Hills, all of Calif., assignors to L.A. Gear, Inc., Los Angeles, Calif.
Division of Ser. No. 122,003, Nov. 18, 1987, Pat. No. Des. 299,081. This application Dec. 16, 1988, Ser. No. 285,868
Term of patent 14 years
U.S. Cl. D2—314



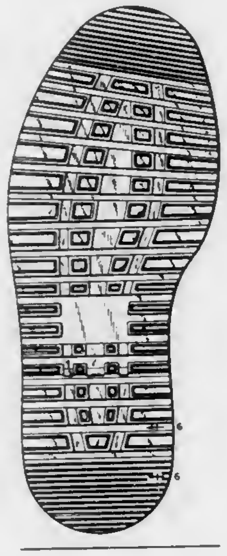
316,928
### SHOE UPPER
Bruce E. Rogers, Portland, Oreg., assignor to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.
Filed Jun. 15, 1990, Ser. No. 539,531
Term of patent 14 years
U.S. Cl. D2—314



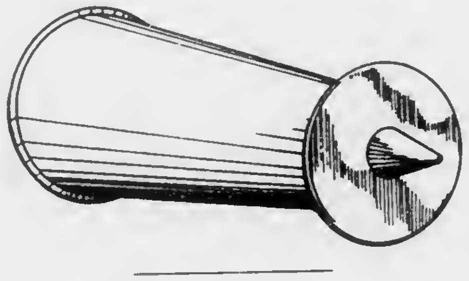
316,929
### ORTHOPEDIC HEEL-INSERT
Barry Ullman, 1526 Crowe Ave., Deerfield, Ill. 60015
Filed Dec. 16, 1988, Ser. No. 285,243
Term of patent 14 years
U.S. Cl. D2—318



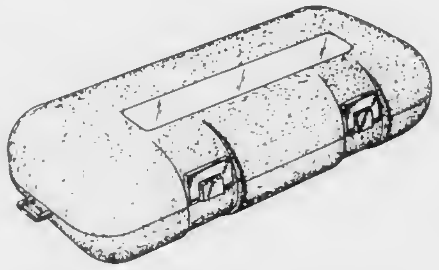
316,930
### TREAD SURFACE AND PERIPHERY OF A FOOTWEAR UNIT SOLE
Giorgio Bernasconi, Varese, Italy, assignor to Vibram S.p.A., Italy
Filed Jul. 25, 1988, Ser. No. 223,532
Term of patent 14 years
U.S. Cl. D2—320



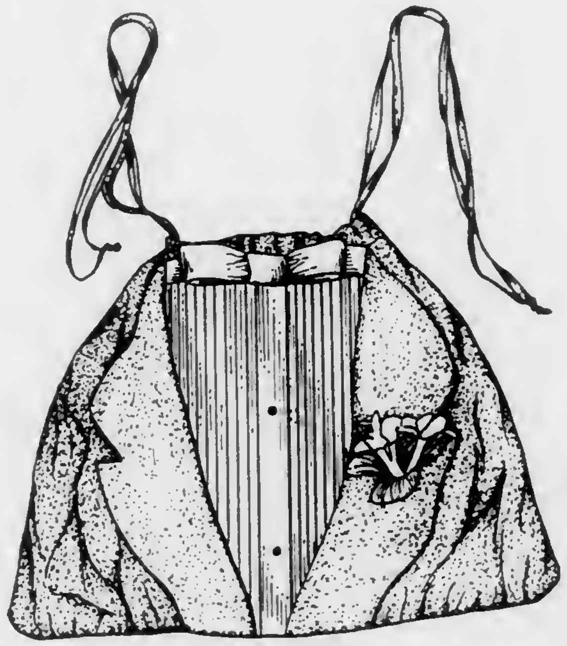
316,931
### MULTIPURPOSE THIMBLE
Marian I. Joy, 616 Skyway Box 126, Stirling City, Calif. 95978
Filed Jul. 11, 1988, Ser. No. 217,604
Term of patent 14 years
U.S. Cl. D3—29



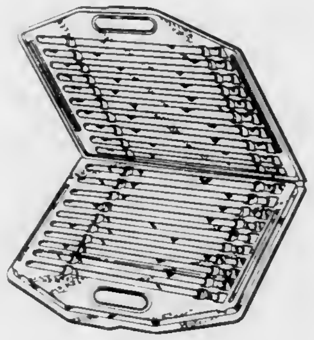
316,932
### FLOATABLE EYEGLASS CASE, OR SIMILAR ARTICLE
William F. Escher, Jr., 1949 Frederick St., Placentia, Calif. 92670
Filed Jan. 19, 1988, Ser. No. 145,210
Term of patent 14 years
U.S. Cl. D3—34



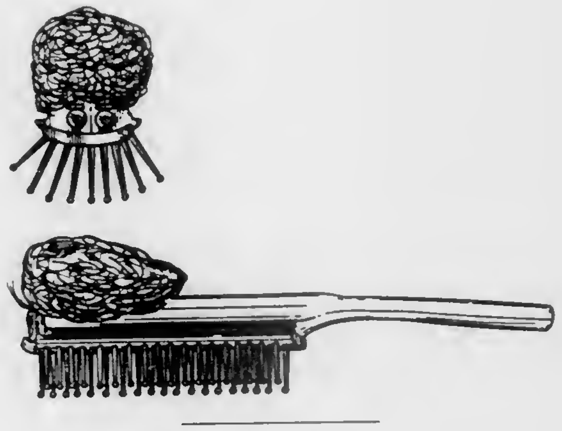
316,933
### MONEY BAG
Janet A. Costello, 19 Jarrett Ave., Rockledge, Pa. 19111
Filed Sep. 23, 1988, Ser. No. 249,471
Term of patent 14 years
U.S. Cl. D3—41



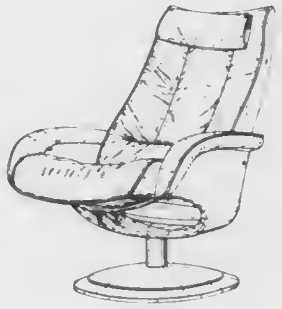
316,934
### CANDLE CARRIER
John Stanfield, 425 Riverhill Dr., Atlanta, Ga. 30328
Filed Jul. 29, 1988, Ser. No. 225,960
Term of patent 14 years
U.S. Cl. D3—73



316,935
### BRUSH
Ellen B. Gewen, 615 Lopax Rd., #U-12, Harrisburg, Pa. 17112
Filed Aug. 31, 1988, Ser. No. 238,434
Term of patent 14 years
U.S. Cl. D4—136

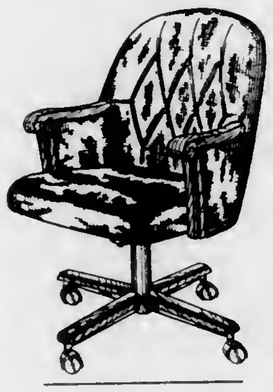


316,936
### CHAIR
Jostein Ekornes, 6222 Ikornnes, and Harald Relling, N-6030 Langevag, both of Norway
Filed Apr. 19, 1988, Ser. No. 185,767
Claims priority, application Norway, Oct. 19, 1987, 68720
Term of patent 14 years
U.S. Cl. D6—365

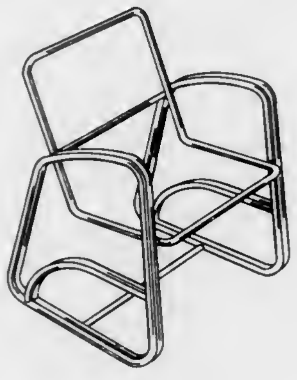


VOL
1126
ISS
3
MY
21
1991
UMI

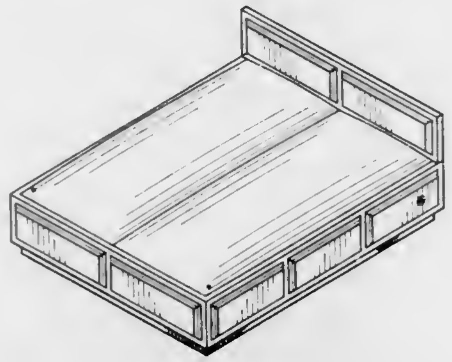
316,937
**CHAIR**
Edsel E. Murry, Coldwater, Miss., assignor to Chromcraft Furniture Corporation, Senatobia, Miss.
Filed May 29, 1990, Ser. No. 529,521
Term of patent 14 years
U.S. Cl. D6—366



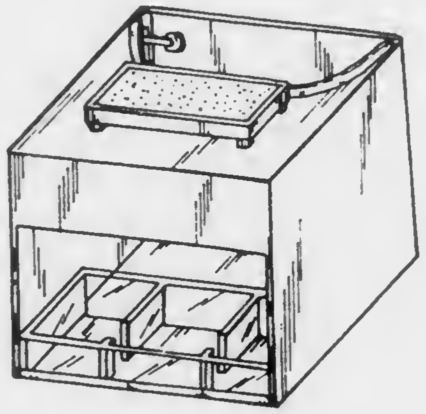
316,938
**CHAIR FRAME**
Stephen C. Hess, Birmingham, Ala., assignor to Winston Furniture Company of Alabama, Inc., Birmingham, Ala.
Filed Jun. 1, 1988, Ser. No. 201,105
Term of patent 14 years
U.S. Cl. D6—373



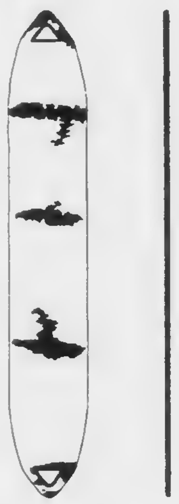
316,939
**WATERBED**
William E. Chambers, Jr., Rte. 3, Box 314B, Leland, N.C. 28451
Filed Feb. 25, 1988, Ser. No. 160,109
Term of patent 14 years
U.S. Cl. D6—382



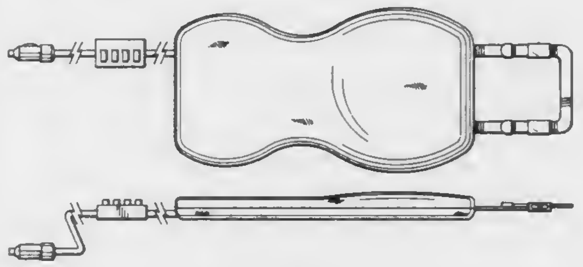
316,940
**STAND FOR A BEVERAGE SERVER AND CONDIMENTS**
David D. Boyd, Portland, Oreg., assignor to Boyd Coffee Company, Portland, Oreg.
Filed Aug. 31, 1987, Ser. No. 91,094
The portion of the term of this patent subsequent to Feb. 5, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—467



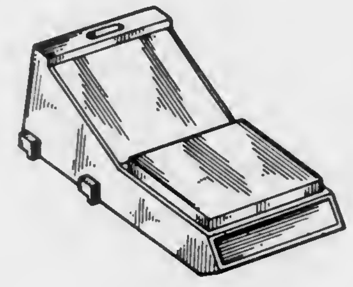
316,941
**WASHCLOTH**
J. Trinidad Ruiz, 1548 Ferran Ave., Sacramento, Calif. 95832
Filed Apr. 20, 1989, Ser. No. 340,597
Term of patent 14 years
U.S. Cl. D6—608



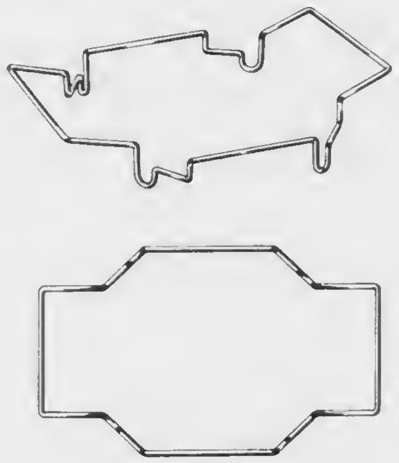
316,942
**VEHICLE SEAT HEATING PAD**
Leroy Johnson, 6420 St. Pius Ave., Baton Rouge, La. 70811
Filed Mar. 8, 1989, Ser. No. 320,380
Term of patent 14 years
U.S. Cl. D6—611



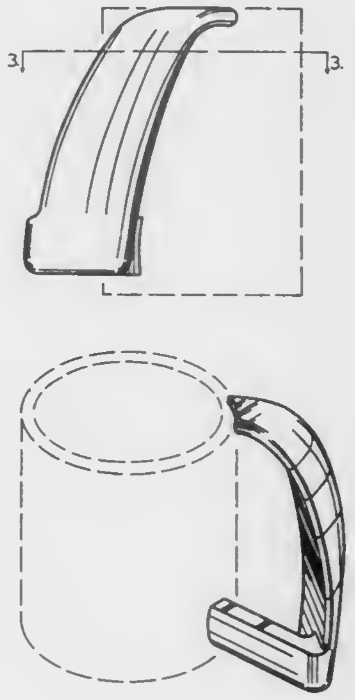
316,943
**SOLDERING PENCIL HOLDER BASE**
Paul L. Urban, Cheraw, S.C., assignor to Cooper Industries, Inc., Houston, Tex.
Filed Feb. 18, 1988, Ser. No. 157,342
Term of patent 14 years
U.S. Cl. D8—71



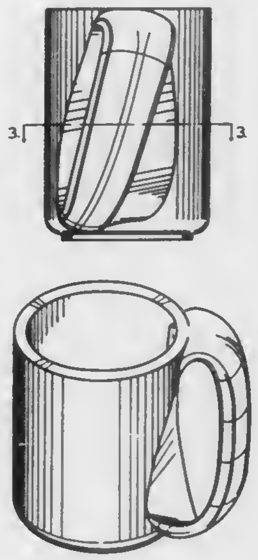
316,944
**COOKING STONE STAND**
Piergiorgio Manna, 3268 Chapel Creek Dr., #232, Dallas, Tex. 75220
Filed Dec. 20, 1988, Ser. No. 286,770
Term of patent 14 years
U.S. Cl. D7—388



316,945
**HANDLE FOR A CUP OR SIMILAR ARTICLE**
Jon S. Dewey, 875 Lodge, Reno, Nev. 89503
Filed Nov. 18, 1988, Ser. No. 277,045
Term of patent 14 years
U.S. Cl. D7—394



316,946
**CUP OR SIMILAR ARTICLE**
Jon S. Dewey, 875 Lodge St., Reno, Nev. 89503
Filed Nov. 28, 1988, Ser. No. 277,041
Term of patent 14 years
U.S. Cl. D7—535

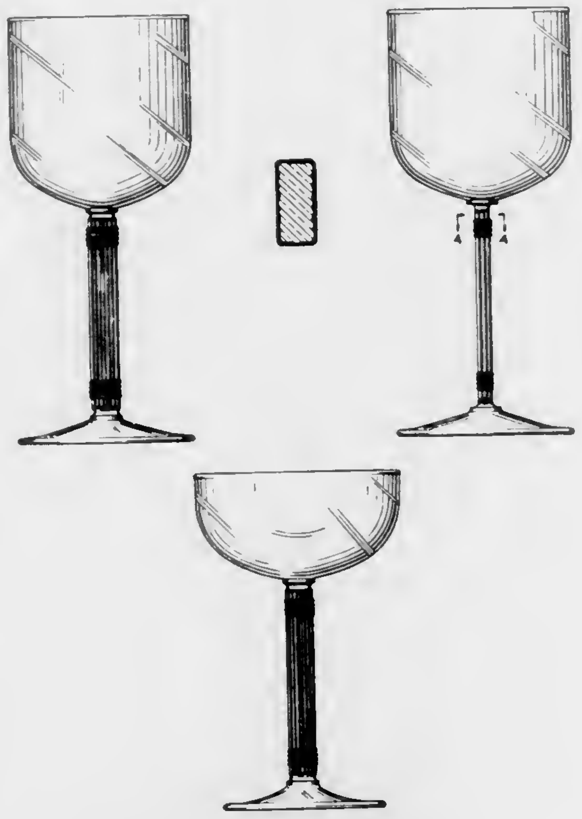


VOL 1126 ISS 3 MY 21 1991 UMI

### 316,947
### GOBLET

Walter Wenzl, Regen, Fed. Rep. of Germany, assignor to Christian Dior, S.A., Paris, France
Filed Nov. 7, 1988, Ser. No. 268,356
Term of patent 14 years

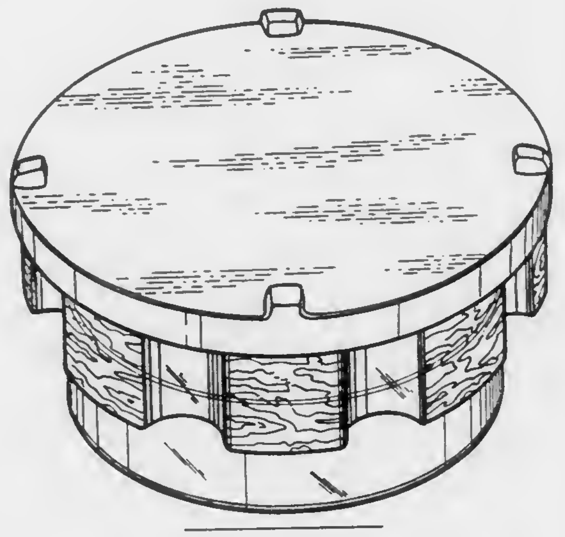
U.S. Cl. D7—537



### 316,948
### COVERED BOWL

Charles W. Mann, Burlington, N.C., assignor to Engineered Plastics, Inc., Gibsonville, N.C.
Filed Aug. 20, 1987, Ser. No. 87,446
Term of patent 14 years

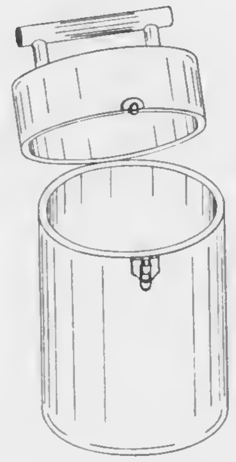
U.S. Cl. D7—540



### 316,949
### COOLER

Boyd D. Frizell, 9867 Scott Mill Rd., Jacksonville, Fla. 32257
Filed May 18, 1989, Ser. No. 353,779
Term of patent 14 years

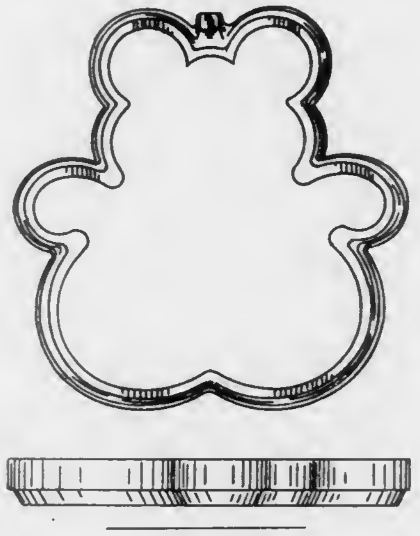
U.S. Cl. D7—605



### 316,950
### COMBINED TART AND PANCAKE MAKING TOOL

Ursula Kaiser, Riverside, Ill., assignor to Kitchen Connection, Lyons, Ill.
Filed Jun. 22, 1989, Ser. No. 369,919
Term of patent 14 years

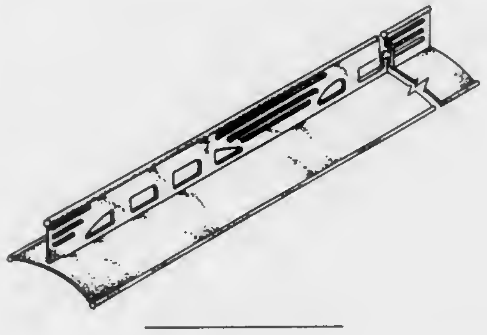
U.S. Cl. D7—676



### 316,951
### VEGETATION BARRIER

George D. Groves, Jefferson County, Mo., assignor to B & G Consultants, Inc., Arnold, Mo.
Continuation-in-part of Ser. No. 188,449, Apr. 29, 1988, Pat. No. 4,903,947. This application Oct. 10, 1989, Ser. No. 418,480
Term of patent 14 years

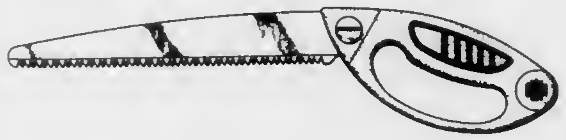
U.S. Cl. D8—1



### 316,952
### PRUNING SAW

Kimikazu Ishida, and Tsuneo Ishida, both of Miki, Japan, assignors to Saboten Co., Ltd., Hyogo, Japan
Filed May 26, 1989, Ser. No. 358,184
Claims priority, application Japan, Feb. 16, 1989, 1-5702
Term of patent 14 years

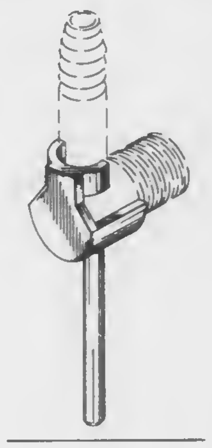
U.S. Cl. D8—9



### 316,953
### STREET ELBOW HOLDER TOOL

Ralph N. Weiss, 2681 13th St. N., Naples, Fla. 33940
Filed Feb. 22, 1988, Ser. No. 159,053
Term of patent 14 years

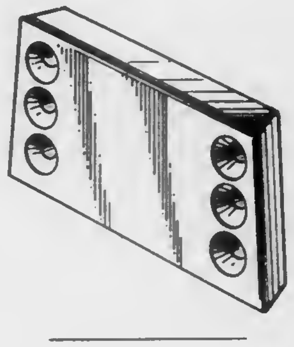
U.S. Cl. D8—70



### 316,954
### JEWELER'S TOOL MOUNTING PLATE

Donald J. Glaser, and Harold W. Gaston, both of Emporia, Kans., assignors to Glendo Corporation, Emporia, Kans.
Filed May 7, 1987, Ser. No. 46,728
Term of patent 14 years

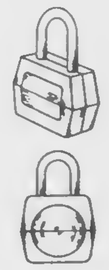
U.S. Cl. D8—71



### 316,955
### PADLOCK

Thomas M. Goida, Derry, N.H.; Domenic Martignetti, Wilmington, and L. James Newman, III, Somerville, both of Mass., assignors to Phadz, Wilmington, Mass.
Filed Nov. 30, 1988, Ser. No. 277,919
Term of patent 14 years

U.S. Cl. D8—334



VOL
1126
ISS
3
MY
21
1991
UMI

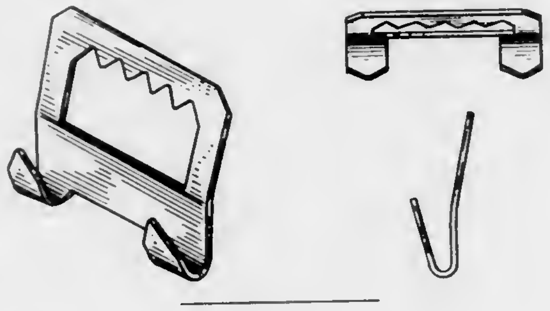
### 316,956
### HANGER FOR A FOAM BOARD

Marlin J. Hoskinson, Philadelphia, Pa.; Eugene M. Lorincz, Cinnaminson, N.J., and George W. Samson, Blue Bell, Pa., assignors to Moore Push-Pin Company, Wyndmoor, Pa.

Filed Apr. 3, 1989, Ser. No. 332,095

Term of patent 14 years

U.S. Cl. D8—371



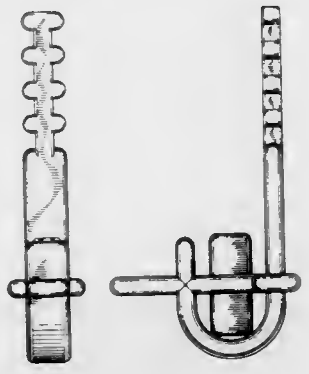
### 316,957
### FLEXIBLE HANGER FOR FOREIGN CAR MUFFLERS, OR SIMILAR ARTICLE

Kerry D. Kent, 7878 Reagan Rd., Riverside, Calif. 92509

Filed Sep. 25, 1989, Ser. No. 411,620

Term of patent 14 years

U.S. Cl. D8—373



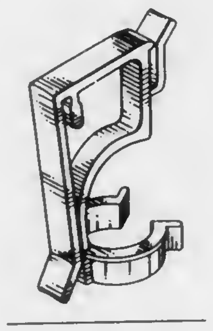
### 316,958
### CHRISTMAS LIGHT CLIP

Donald D. Rumpel, Kellogg, Id., assignor to Kellogg Plastics, Ltd., Smelterville, Id.

Continuation-in-part of Ser. No. 436,222, Nov. 13, 1989, which is a continuation-in-part of Ser. No. 161,671, Feb. 29, 1988, Pat. No. D. 306,533. This application Dec. 18, 1989, Ser. No. 453,455

Term of patent 14 years

U.S. Cl. D8—395



### 316,959
### TOOTHPASTE DISPENSER

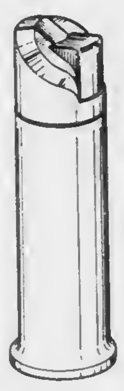
Piero Battegazzore, Via G. Galilei, 74 - 15100 Alessandria, Italy

Filed Dec. 2, 1987, Ser. No. 127,696

Claims priority, application Italy, Jun. 2, 1987, 21705/87[U]

Term of patent 14 years

U.S. Cl. D9—300



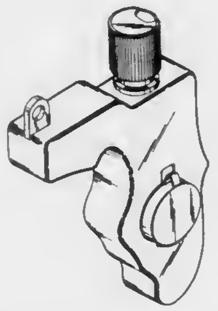
### 316,960
### BOTTLE

Eugene R. Wilkerson, Destin, Fla., assignor to Florida Isles Enterprises, Inc., Destin, Fla.

Filed May 12, 1989, Ser. No. 351,099

Term of patent 14 years

U.S. Cl. D9—307



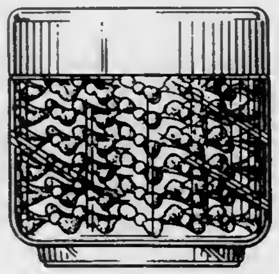
### 316,961
### COMBINED COSMETIC PRODUCT AND CONTAINER THEREFOR

David Hoenig, East Brunswick, N.J., assignor to Revlon, Inc., New York, N.Y.

Filed Jul. 11, 1988, Ser. No. 217,482

Term of patent 14 years

U.S. Cl. D9—337



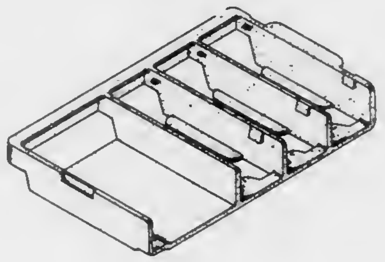
### 316,962
### SHAVING CARTRIDGE DISPENSER

Michael J. Gray, Duxbury, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Jan. 19, 1989, Ser. No. 298,735

Term of patent 14 years

U.S. Cl. D9—342



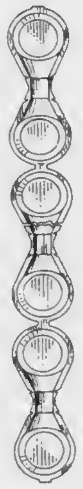
### 316,963
### CONTAINER STRIP

Derek V. Mancini, Uxbridge, Canada, assignor to Twinpack, Inc., Quebec, Canada

Division of Ser. No. 92,705, Sep. 3, 1987. This application Feb. 26, 1990, Ser. No. 484,649

Term of patent 14 years

U.S. Cl. D9—345



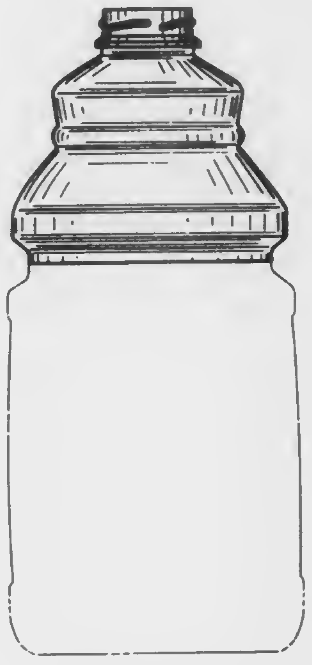
### 316,964
### UPPER PORTION OF A BOTTLE

Stuart A. York, Tariffville, Conn., assignor to Hoover Universal, Inc., Plymouth, Mich.

Filed Jun. 1, 1989, Ser. No. 359,936

Term of patent 14 years

U.S. Cl. D21—349



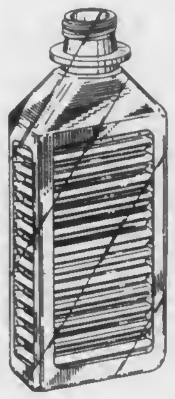
### 316,965
### BOTTLE

Russell A. Arvidson, Mundelein, Ill., and Thomas A. Vandewalle, Worthington, Ohio, assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Oct. 31, 1988, Ser. No. 265,430

Term of patent 14 years

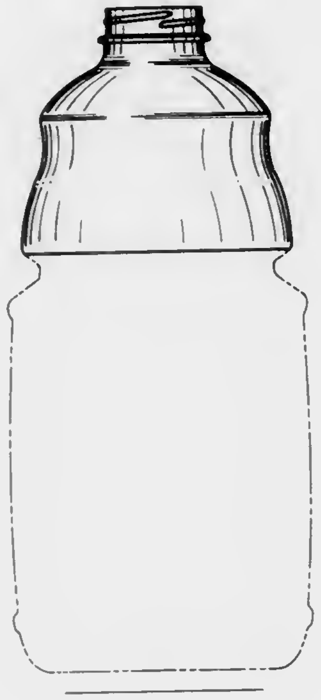
U.S. Cl. D9—370



VOL
1126
ISS
3
MY
21
1991
UMI

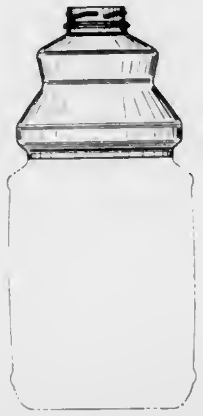
### 316,966
### UPPER PORTION OF A BOTTLE

Stuart A. York, Tariffville, Conn., assignor to Hoover Universal, Inc., Plymouth, Mich.
Filed Mar. 1, 1989, Ser. No. 317,783
Term of patent 14 years
U.S. Cl. D9—390



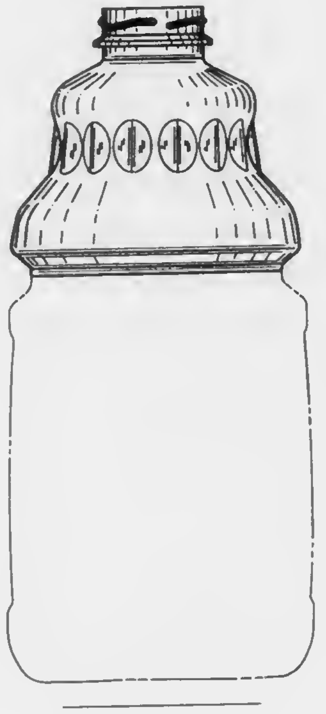
### 316,967
### UPPER PORTION OF A BOTTLE

Stuart A. York, Tariffville, Conn., assignor to Hoover Universal, Inc., Plymouth, Mich.
Filed Jun. 1, 1989, Ser. No. 359,945
Term of patent 14 years
U.S. Cl. D9—390



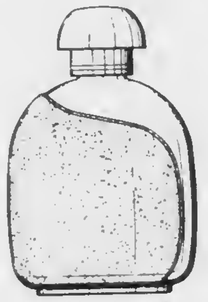
### 316,968
### UPPER PORTION OF A BOTTLE

Stuart A. York, Tariffville, Conn., assignor to Hoover Universal, Inc., Plymouth, Mich.
Filed Jun. 1, 1989, Ser. No. 360,234
Term of patent 14 years
U.S. Cl. D9—392



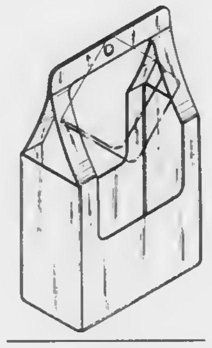
### 316,969
### COMBINED BOTTLE AND CAP

Kay E. Wiseman, Burnham, and Brian E. Kichenside, Bushey Heath, both of England, assignors to Chesebrough-Pond's USA Co., Greenwich, Conn.
Filed Dec. 19, 1988, Ser. No. 286,666
Claims priority, application United Kingdom, Jun. 20, 1988, 1051633
Term of patent 14 years
U.S. Cl. D9—409



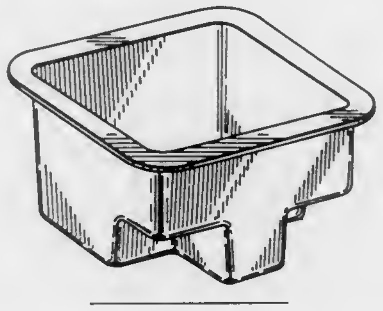
### 316,970
### GIFT BOX

Richard M. Dawson; Gerald G. Kotthoff; William A. Tipton, and David A. James, all of St. Louis County, Mo., assignors to Acme Premium Supply Corp., St. Louis, Mo.
Filed Apr. 5, 1989, Ser. No. 333,193
Term of patent 14 years
U.S. Cl. D9—415



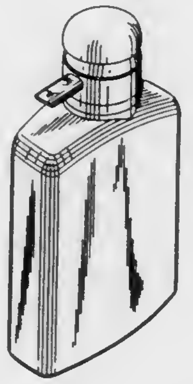
### 316,971
### CONTAINER

Thom Kearnes, Akron, and Joel Wennerstrom, Streetsboro, both of Ohio, assignors to The State Chemical Manufacturing Co., Cleveland, Ohio
Filed Aug. 8, 1988, Ser. No. 229,903
Term of patent 14 years
U.S. Cl. D9—424



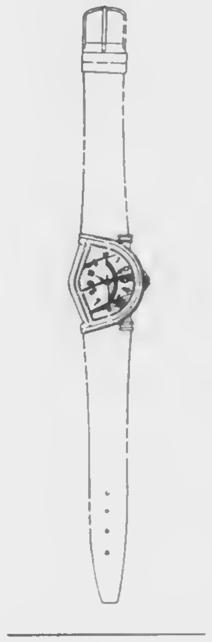
### 316,972
### DISPENSER FOR LIQUIDS

Brian Law, Leicester, and Anthony Wass, Stamford, both of England, assignors to The English Glass Company Limited, United Kingdom
Filed Jun. 21, 1988, Ser. No. 209,475
Claims priority, application United Kingdom, Dec. 23, 1987, 1047347
Term of patent 14 years
U.S. Cl. D9—448



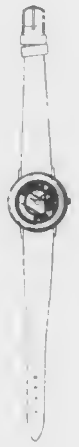
### 316,973
### WRISTWATCH

Tso C. Fong, Kowloon, Hong Kong, assignor to Pearl Industries Limited, Kowloon, Hong Kong
Filed Jun. 6, 1988, Ser. No. 202,449
Claims priority, application United Kingdom, Dec. 19, 1987, 1047254
Term of patent 14 years
U.S. Cl. D10—32



### 316,974
### WRISTWATCH

Tso C. Fong, Kowloon, Hong Kong, assignor to Pearl Industries Limited, Kowloon, Hong Kong
Filed Jun. 6, 1988, Ser. No. 202,998
Claims priority, application United Kingdom, Dec. 19, 1987, 1047253
Term of patent 14 years
U.S. Cl. D10—33



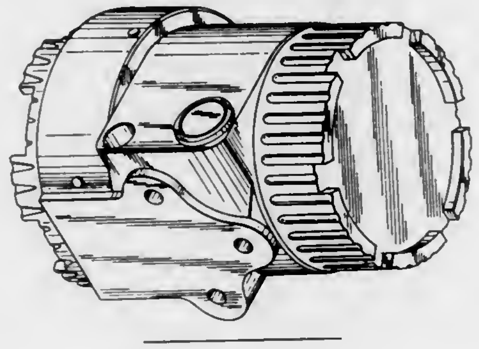
VOL 1126 ISS 3 MY 21 1991 UMI

316,975

### HOUSING FOR A CURRENT TO PRESSURE TRANSMITTER

Gregory C. Brown, and John H. Nash, both of Minnetonka, Minn., assignors to Rosemount Inc., Eden Prairie, Minn.
Filed Sep. 4, 1987, Ser. No. 93,471
Term of patent 14 years

U.S. Cl. D10—46

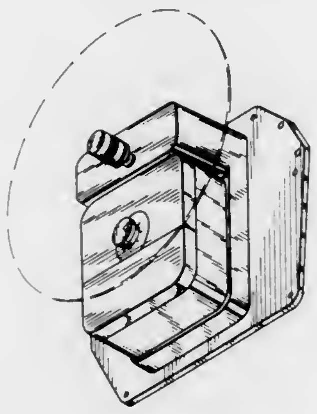


316,976

### CHART DRIVE

Thomas R. Comerford, Cincinnati, and Hubert F. Yeary, Newtown, both of Ohio, assignors to Mercury Instruments, Inc., Cincinnati, Ohio
Filed Oct. 5, 1988, Ser. No. 253,750
Term of patent 14 years

U.S. Cl. D10—46

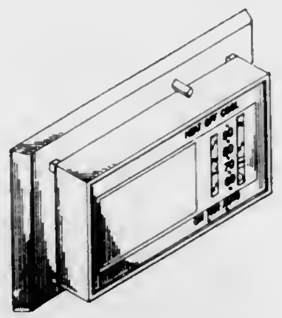


316,977

### THERMOSTAT

Donald P. Kolbow, and Richard B. Porter, both of Bloomington, Minn., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Apr. 10, 1989, Ser. No. 335,454
Term of patent 14 years

U.S. Cl. D10—51

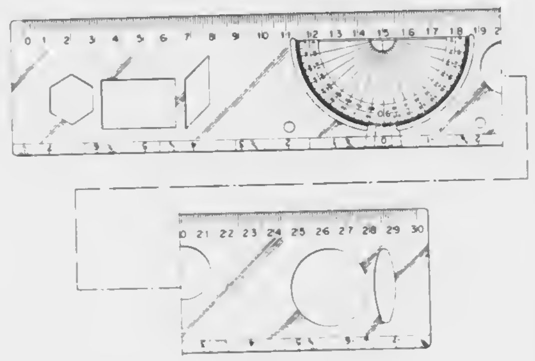


316,978

### RULER/MATHEMATICAL AID

Maureen T. Chesson, Winthrop, and Phillipa G. Banks, Mount Pleasant, both of Australia, assignors to Aesthetic Holdings Pty Ltd., Pinjarra, Australia
Filed Dec. 9, 1987, Ser. No. 130,671
Claims priority, application Australia, Jun. 12, 1987, 2036/87
Term of patent 14 years

U.S. Cl. D10—62

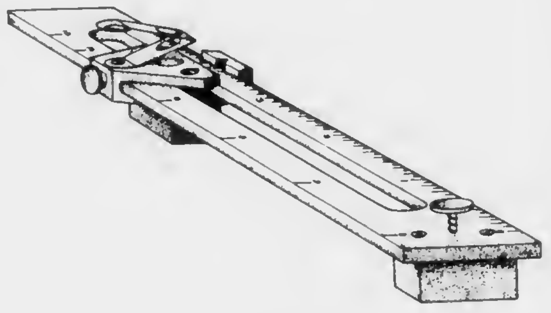


316,979

### COMBINED RULER AND COMPASS

Billy D. Reynolds, 1225 Maple Springs Church Rd., Shelby, N.C. 28150
Filed Jun. 8, 1988, Ser. No. 203,861
Term of patent 14 years

U.S. Cl. D10—70

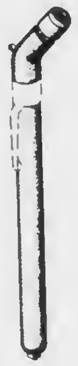


316,980

### TIRE GAUGE

Barry Brinker, and David E. Burbrink, both of Cincinnati, Ohio, assignors to 'totes', incorporated, Loveland, Ohio
Filed May 5, 1989, Ser. No. 348,672
Term of patent 14 years

U.S. Cl. D10—86

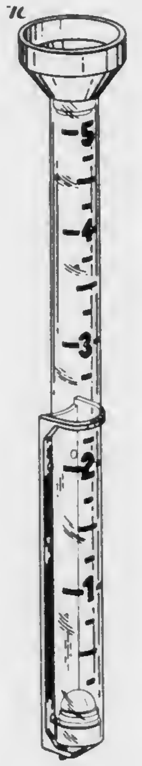


316,981

### RAIN GAUGE

Robert C. Geschwender, and George W. Peterson, both of Lincoln, Nebr., assignors to Concept Engineering, Inc., Lincoln, Nebr.
Filed Oct. 24, 1988, Ser. No. 261,469
Term of patent 14 years

U.S. Cl. D10—101

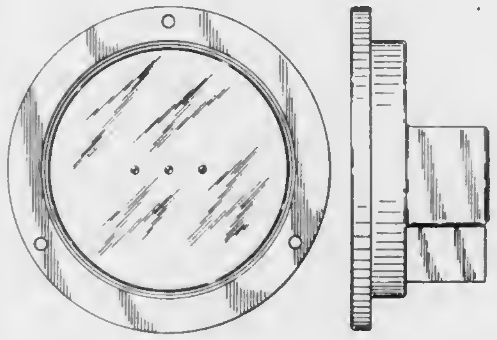


316,982

### PRESSURE GAUGE HOUSING

John Hestich, Glendora, Calif., assignor to Dwyer Instruments, Inc., Michigan City, Ind.
Filed Oct. 13, 1988, Ser. No. 257,296
Term of patent 14 years

U.S. Cl. D10—102

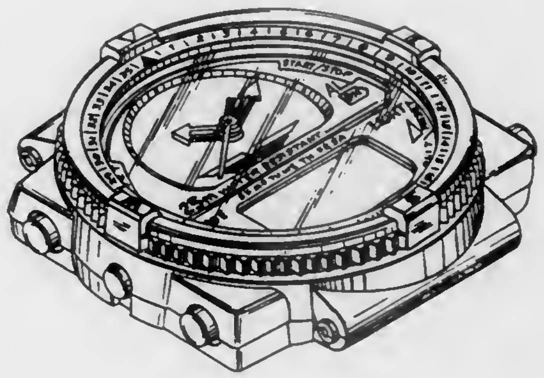


316,983

### COMBINED ANALOG AND DIGITAL WRISTWATCH

John T. Houlihan, Watertown, Conn., assignor to Timex Corporation, Middlebury, Conn.
Filed Aug. 5, 1988, Ser. No. 228,659
Term of patent 14 years

U.S. Cl. D10—39

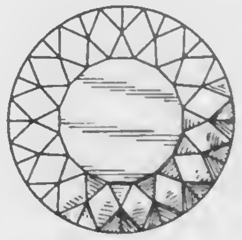


316,984

### PRECIOUS STONE

Shlomo Cohen, Netanya, Israel, assignor to Seiki Shinsha Co. Ltd., Tokyo, Japan
Filed Feb. 24, 1989, Ser. No. 315,036
Claims priority, application Israel, Sep. 5, 1988, 14119
Term of patent 14 years

U.S. Cl. D11—90



VOL
1126
ISS
3
MY
21
1991
UMI

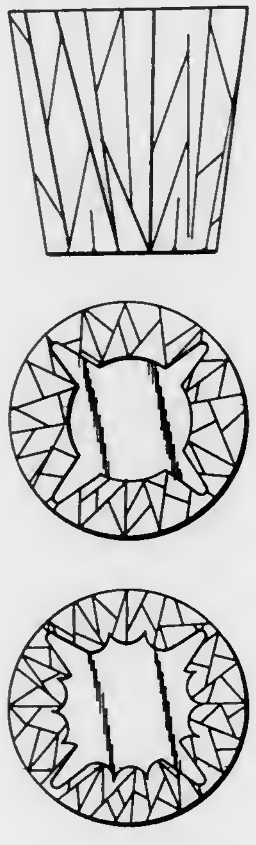
### 316,985
### FLOWER POT COVER

**Donald E. Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.**

**Filed Apr. 13, 1989, Ser. No. 337,448**

**Term of patent 14 years**

U.S. Cl. D11—164



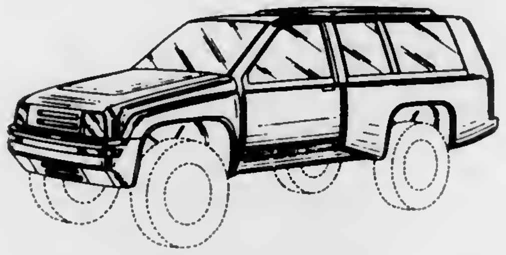
### 316,986
### BODY FOR UTILITY VEHICLE

**David E. Hackett, El Toro; Kevin K. Hunter, Laguna Niguel, both of Calif., and Kintaro Matsumoto, Hino, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Division of Ser. No. 139,693, Dec. 29, 1987, Pat. No. D. 311,160. This application Mar. 26, 1990, Ser. No. 498,929**

**Term of patent 14 years**

U.S. Cl. D12--96



### 316,987
### TRUCK

**Hiroshi Machida; Hiromu Wada, and Yukio Hirano, all of Fujisawa, Japan, assignors to Isuzu Motors Limited, Tokyo, Japan**

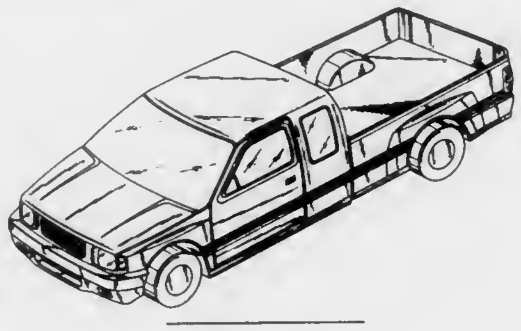
**Filed Mar. 26, 1987, Ser. No. 30,109**

**Claims priority, application Japan, Oct. 2, 1986, 61-38820**

**The portion of the term of this patent subsequent to Jan. 1, 2005, has been disclaimed.**

**Term of patent 14 years**

U.S. Cl. D12—98



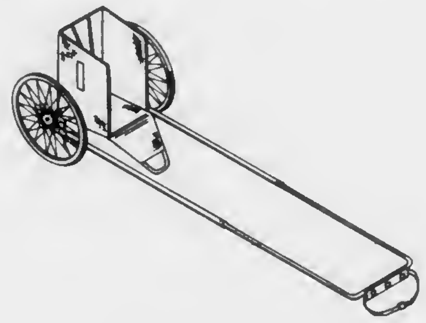
### 316,988
### CHILD TRANSPORTER

Carlton P. McCrary, 1401 S. Pulaski, Little Rock, Ark. 72202

Filed Mar. 30, 1987, Ser. No. 31,684

Term of patent 14 years

U.S. Cl. D12—129



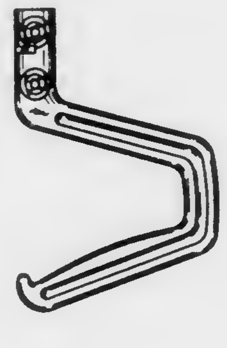
### 316,989
### STROLLER HANDLE

**Harry J. Giambrone, Kettering, Ohio, assignor to Spalding & Evenflo Companies, Inc., Tampa, Fla.**

**Filed Oct. 13, 1988, Ser. No. 257,236**

**Term of patent 14 years**

U.S. Cl. D12—133



### 316,990
### TIRE

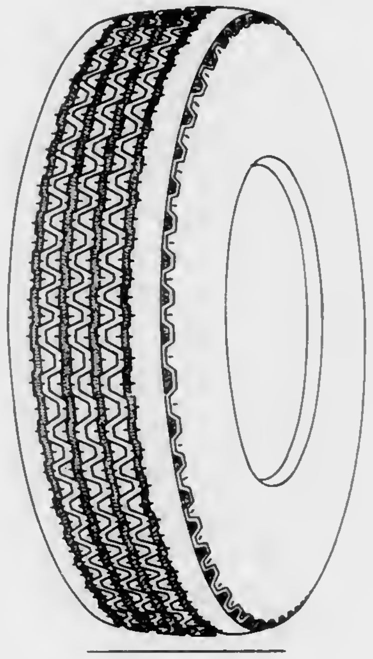
**Georges Adam, Bissen, and Claude Lardo, Luxembourg, both of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Jul. 11, 1988, Ser. No. 217,572**

**The portion of the term of this patent subsequent to Apr. 9, 2005, has been disclaimed.**

**Term of patent 14 years**

U.S. Cl. D12—142



### 316,991
### TIRE TREAD

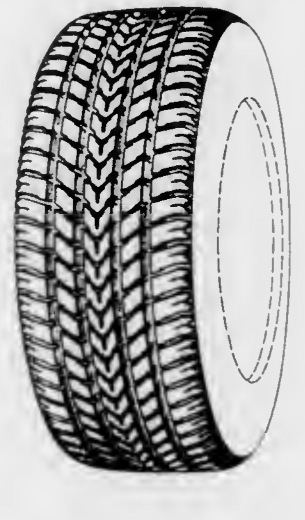
**Maurice Graas, Luxembourg, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed May 26, 1989, Ser. No. 357,433**

**Claims priority, application Benelux, Apr. 24, 1989, 64291-00**

**Term of patent 14 years**

U.S. Cl. D12—147



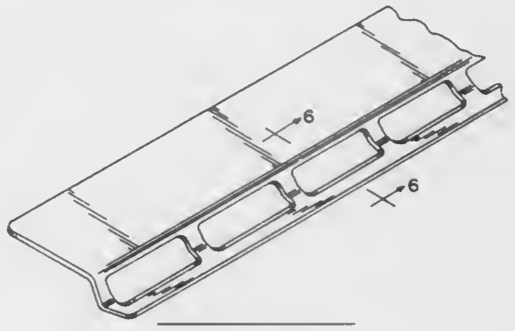
### 316,992
### TIE RAIL FOR PICK-UP TRUCKS, BOATS OR THE LIKE

**Joseph S. Geeck, III, 701 Roseland Pkwy., Harahan, La. 70123**

**Filed Sep. 6, 1988, Ser. No. 240,849**

**Term of patent 14 years**

U.S. Cl. D12—155



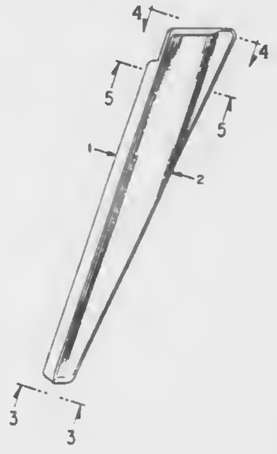
### 316,993
### AUTO WINDOW WIND DEFLECTOR

**Donald A. Swauger, 2105 Byron Rd., Sacramento, Calif. 95825**

**Filed Jul. 6, 1987, Ser. No. 69,937**

**Term of patent 14 years**

U.S. Cl. D12—181



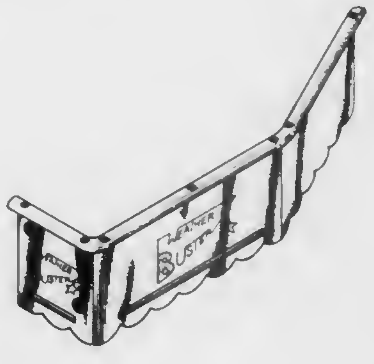
### 316,994
### VEHICLE MUD FLAP

**Eugene Anania, 1341 Blake St., St. Augustine, Fla. 32084**

**Filed Jul. 5, 1989, Ser. No. 375,720**

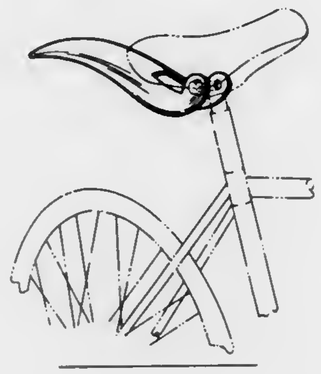
**Term of patent 14 years**

U.S. Cl. D12—185

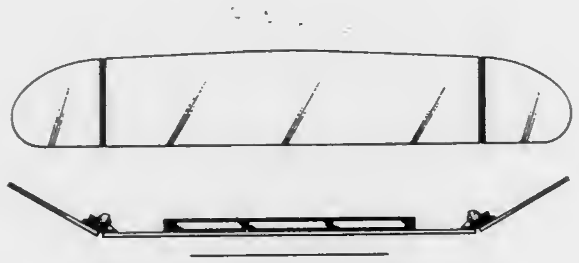


OL
126
SS
3
MY
21
991
UMI

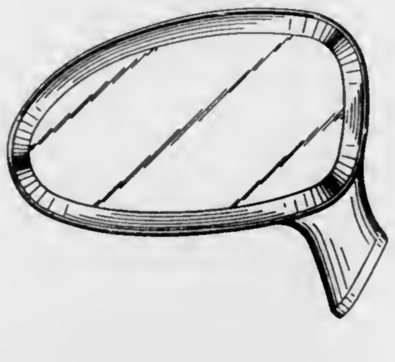
316,995
### BICYCLE SPLASH GUARD
Calvin M. Kowalski, 215 Gould Ave., Depew, N.Y. 14043
Filed Dec. 6, 1988, Ser. No. 280,660
Term of patent 14 years
U.S. Cl. D12—186



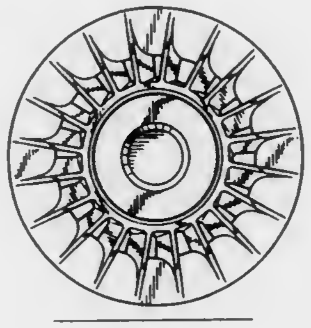
316,996
### AUTO REAR VIEW SAFETY MIRROR
Donald A. Swauger, 2105 Byron Rd., Sacramento, Calif. 95825
Filed Jan. 9, 1989, Ser. No. 292,729
Term of patent 14 years
U.S. Cl. D12—187



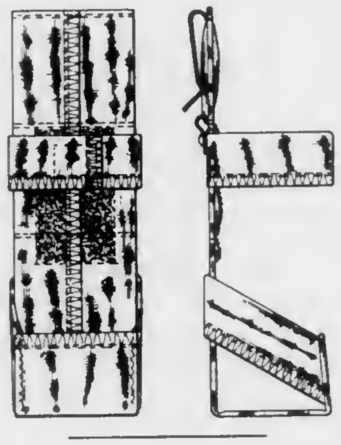
316,997
### OUTSIDE MIRROR FOR A MOTOR VEHICLE
Richard Soederberg, Muehlacker, Fed. Rep. of Germany, assignor to Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany
Filed Jun. 29, 1989, Ser. No. 380,221
Claims priority, application Fed. Rep. of Germany, Jan. 20, 1989, M8900376.4
Term of patent 14 years
U.S. Cl. D12—187



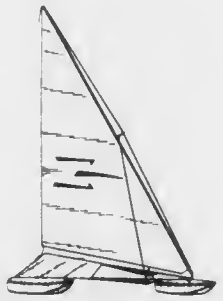
316,998
### WHEEL COVER
Jürgen Haussmann, Garching, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke AG, Fed. Rep. of Germany
Filed Feb. 9, 1989, Ser. No. 307,974
Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, M8801012
Term of patent 14 years
U.S. Cl. D12—206



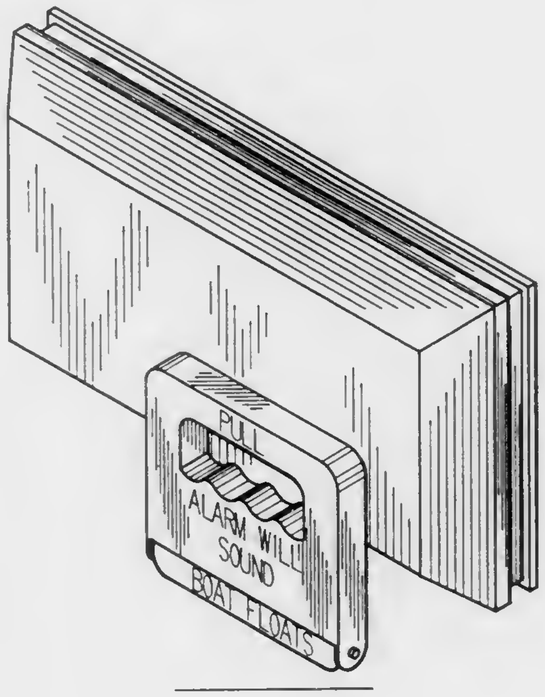
316,999
### HOLDER FOR A CELLULAR TELEPHONE
Janice R. Sarff, 627 N. Fourth Ave. East, Duluth, Minn. 55805
Filed Oct. 6, 1989, Ser. No. 417,849
Term of patent 14 years
U.S. Cl. D14—253



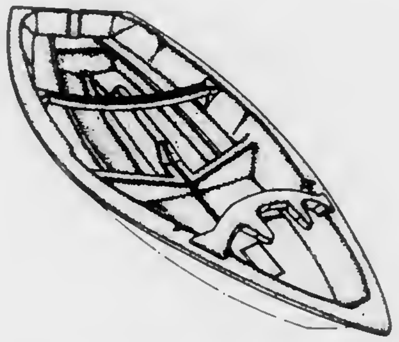
317,000
### TRIMARAN
Jelle F. Berghoef, Jr., Spanjaardstraat 52, 4331 ES Middelburg, Netherlands
Filed May 17, 1988, Ser. No. 195,548
Term of patent 14 years
U.S. Cl. D12—304



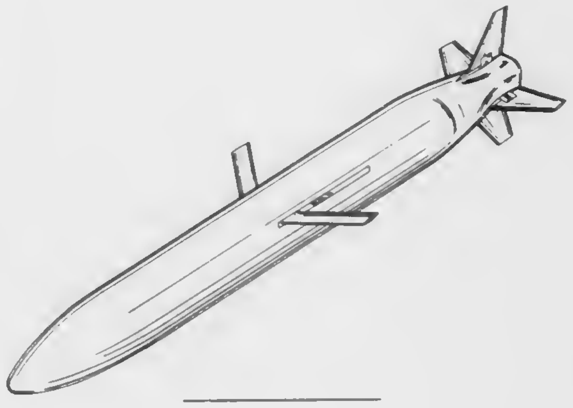
317,001
### COMBINED EMERGENCY FLOAT AND ALARM UNIT THEREFOR
Christopher F. Hoult, 1145 Granite Creek La., Chino Valley, Ariz. 86323
Filed Nov. 18, 1988, Ser. No. 272,879
Term of patent 14 years
U.S. Cl. D12—316



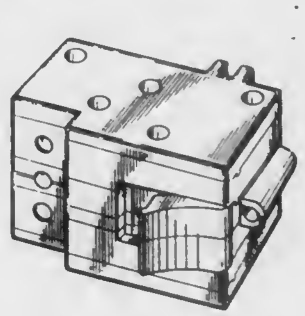
317,002
### DESIGN FOR A BOAT DECK
Gunter S. Müller, and Christiano R. M. Pontes, both of Rio de Janeiro, Brazil, assignors to Innovator Industria E Comercio Ltda., Rio de Janeiro, Brazil
Filed Jul. 6, 1989, Ser. No. 375,972
Claims priority, application Brazil, Jan. 10, 1989, MI4900039
Term of patent 14 years
U.S. Cl. D12—318



317,003
### AIRCRAFT
Alex E. Tribe, Thousand Oaks; Marion R. Bottorff, Ventura; Ronald G. Cottrell, Thousand Oaks; Richard L. Ranes, Simi Valley, and William B. Whistler, Thousand Oaks, all of Calif., assignors to Northrop Corporation, Hawthorne, Calif.
Filed Oct. 25, 1989, Ser. No. 428,071
Term of patent 14 years
U.S. Cl. D12—333



317,004
### MAIN CIRCUIT BREAKER
Jeffrey O. Sharp, Lexington, Ky.; Edward P. Dessert, Lincoln, Nebr., and Michael R. Harris, Winchester, Ky., assignors to Square D Company, Palatine, Ill.
Filed Jul. 19, 1989, Ser. No. 384,934
Term of patent 14 years
U.S. Cl. D13—160



VOL
1126
ISS
3
MY
21
1991
UMI

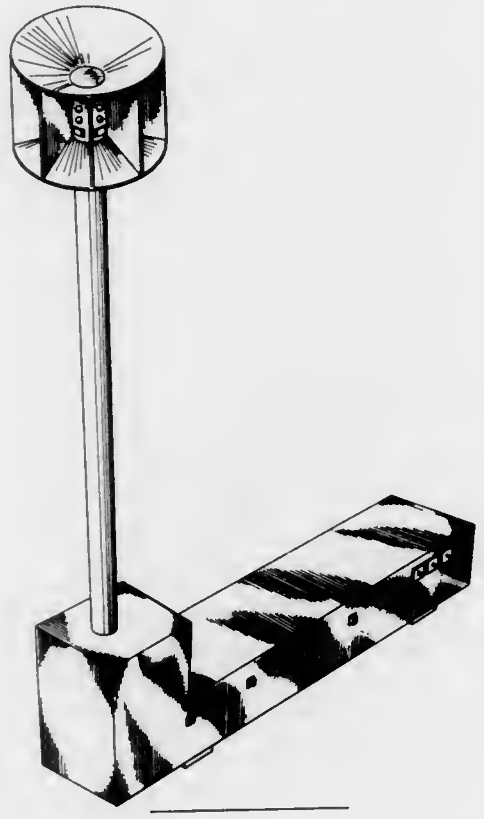
### 317,005
### INFRARED DATA TRANSMISSION UNIT FOR COMPUTER PERIPHERAL EQUIPMENT

**Gammini Wickrema, St. Laurent; Joseph Desouza, Coté St. Luc, both of Canada, and Samuel Battaglia, Lakeville, Ill., assignors to Smoke Signal Data Systems, Inc., Lakeville, Ill.**

**Filed Aug. 25, 1988, Ser. No. 236,125**

**Term of patent 14 years**

U.S. Cl. D14—107



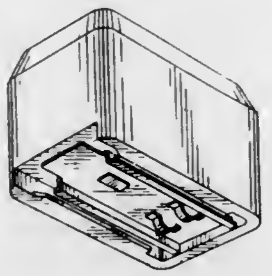
### 317,006
### INTERFACE UNIT FOR ELECTRONIC BAR CODE READER

**Jamshid Naderi, and Donna E. Goodner, both of Charlotte, N.C., assignors to Hand Held Products, Inc., Charlotte, N.C.**

**Filed Sep. 30, 1988, Ser. No. 252,356**

**Term of patent 14 years**

U.S. Cl. D14—116



### 317,007
### LOUDSPEAKER

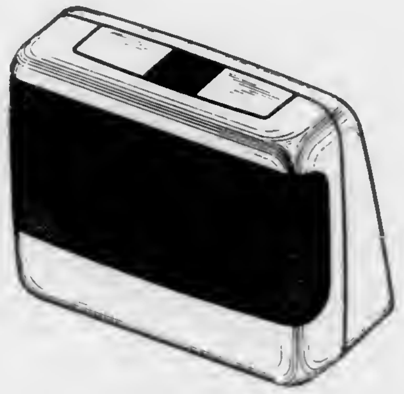
**Eiji Shintani, Tokyo, Japan, assignor to Pioneer Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 3, 1989, Ser. No. 305,664**

**Claims priority, application Japan, Sep. 6, 1988, 63-35218**

**Term of patent 14 years**

U.S. Cl. D14—214



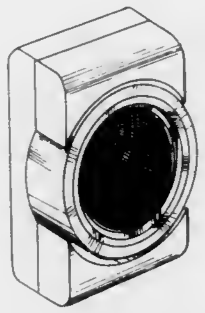
### 317,008
### SPEAKER

**Ronald Emmerling, Montclair, N.J., assignor to Gemini Industries, Inc., Clifton, N.J.**

**Filed Apr. 6, 1989, Ser. No. 334,227**

**Term of patent 14 years**

U.S. Cl. D14—215



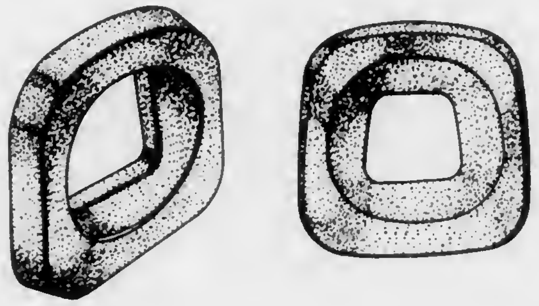
### 317,009
### EAR CUSHION FOR TELEPHONE RECEIVER OR SIMILAR ARTICLE

**John E. Stevenson, 677 Estelle Ave., Glendale, Calif. 91202**

**Filed May 10, 1989, Ser. No. 349,802**

**Term of patent 14 years**

U.S. Cl. D14—249



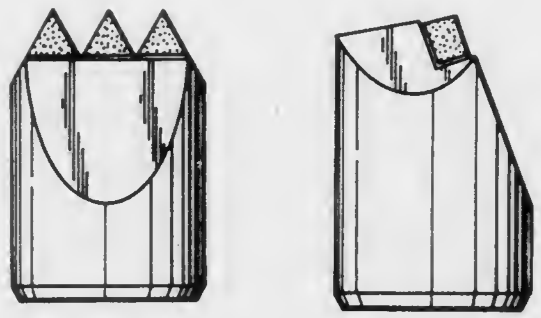
### 317,010
### STUD-MOUNTED POLYCRYSTALLINE TOOTHED DIAMOND CUTTING BLANK

**Friedel S. Knemeyer, Granville, Ohio, assignor to General Electric Company, Worthington, Ohio**

**Filed May 11, 1988, Ser. No. 192,872**

**Term of patent 14 years**

U.S. Cl. D15—21



### 317,011
### OPERATOR CAB FOR AN AGRICULTURAL MACHINE WITH MOUNTING WINGS THEREFOR

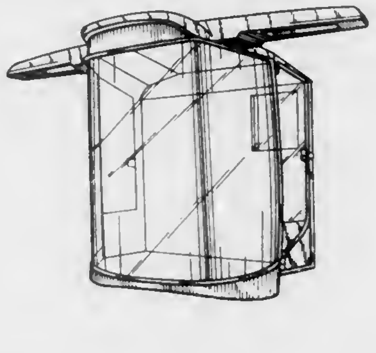
**Geert R. Boddin, Zedelgem; Jean-Pierre Vandendriessche, Denderleeuw, and Daniel C. Witdoek, Hooglede, all of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.**

**Filed Mar. 14, 1988, Ser. No. 168,346**

**Claims priority, application United Kingdom, Sep. 15, 1987, 1004894**

**Term of patent 14 years**

U.S. Cl. D15—30



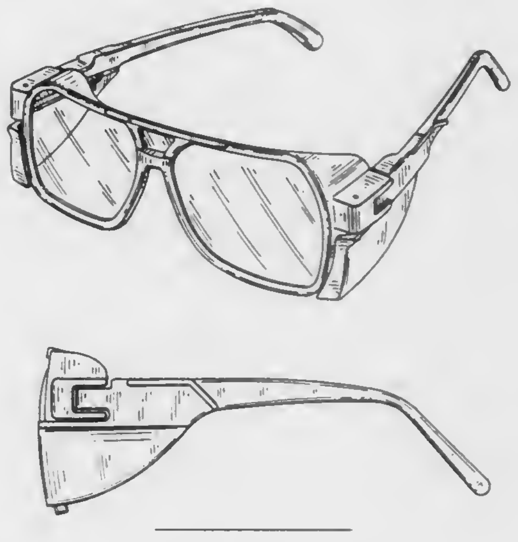
### 317,012
### SAFETY SPECTACLES

**Richard Hirschman, Albertson, N.Y., assignor to Hudson Optical Corporation, Bohemia, N.Y.**

**Filed May 9, 1988, Ser. No. 191,486**

**Term of patent 14 years**

U.S. Cl. D16—115



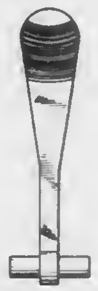
### 317,013
### FRENCH HORN SPATULA

**James H. Andersen, Kenosha, Wis., assignor to G. LeBlanc Corporation, Kenosha, Wis.**

**Filed Oct. 5, 1988, Ser. No. 254,113**

**Term of patent 14 years**

U.S. Cl. D17—13



### 317,014
### PRINTER FOR DISPLAY PAGERS

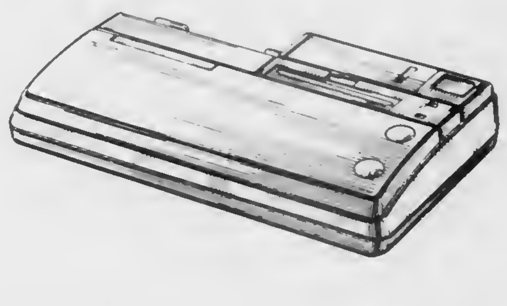
**Takashi Oyamada, and Mamoru Takahashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Nov. 30, 1988, Ser. No. 278,309**

**Claims priority, application Japan, May 30, 1988, 63-21470**

**Term of patent 14 years**

U.S. Cl. D18—13



OL
126
SS
3
MY
21
1991
UMI

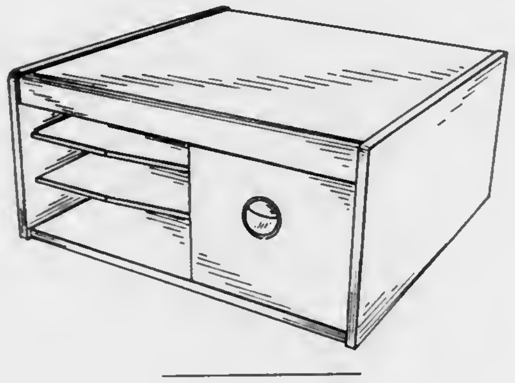
### 317,015
### ORGANIZING SUPPORT STAND FOR LASER PRINTERS OR THE LIKE

**Jack D. Bankier, Northbrook, Ill., assignor to Bankier Companies, Inc., Northbrook, Ill.**

**Filed Jan. 5, 1989, Ser. No. 293,655**

**Term of patent 14 years**

**U.S. Cl. D18—23**



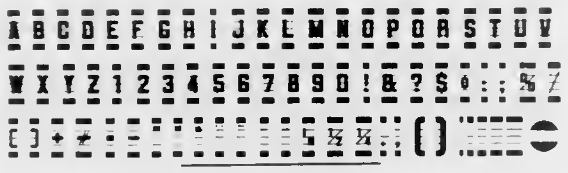
### 317,016
### TYPE FONT

**Glenn Bookman, 175 Serrill Rd., Elkins Park, Pa. 19117**

**Filed Nov. 6, 1986, Ser. No. 928,111**

**Term of patent 14 years**

**U.S. Cl. D18—27**



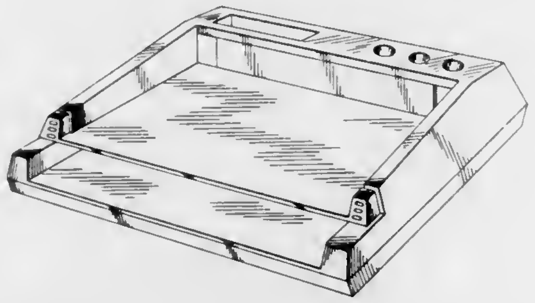
### 317,017
### COMBINED HOLDER FOR A NOTEPAD AND WRITING INSTRUMENTS

**Heng G. Kheng, Singapore, Singapore, assignor to Metro Plastic Industry Pte Ltd., Singapore, Singapore**

**Filed Jun. 2, 1988, Ser. No. 201,624**

**Term of patent 14 years**

**U.S. Cl. D19—78**



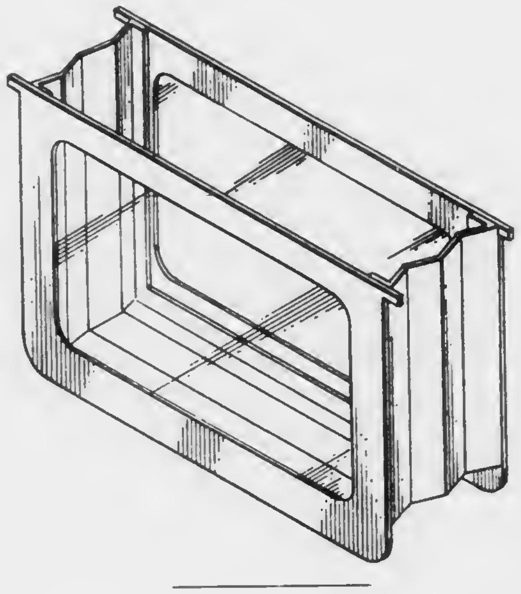
### 317,018
### HANGING FILE FOLDER

**Kenneth A. Tarlow, Playa del Rey, Calif., and Barbara D. Arner, 1901 Polaris Dr., Glendale, Calif. 91208, assignors to Barbara D. Arner, Oxnard, Calif.**

**Filed Sep. 18, 1987, Ser. No. 98,128**

**Term of patent 14 years**

**U.S. Cl. D19—90**



### 317,019
### CURRENCY DISCRIMINATING MACHINE

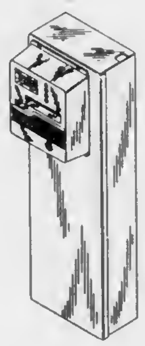
**Koji Yukimoto; Hiroshi Hayashi, both of Sakado, and Yukio Ito, Niiza, all of Japan, assignors to Kabushiki Kaisha Nippon Coinco, Japan**

**Filed Jul. 22, 1988, Ser. No. 223,071**

**Claims priority, application Japan, Feb. 3, 1988, 63-3755**

**Term of patent 14 years**

**U.S. Cl. D20—9**



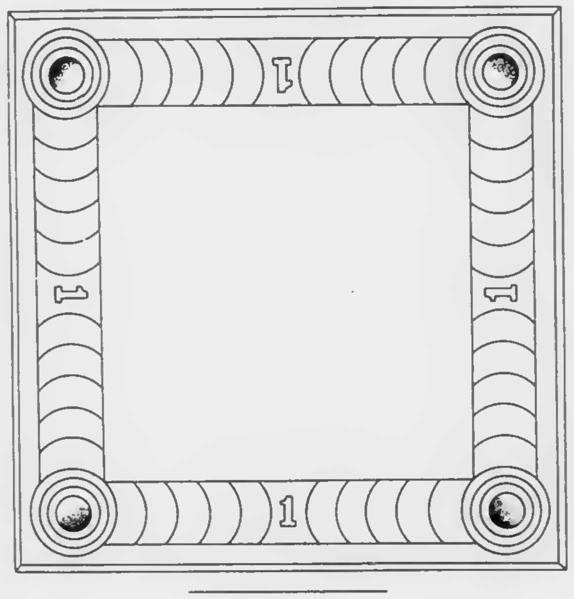
### 317,020
### BOARD GAME

**Jeffrey M. Johnson, 395 Redding Rd. #233, Lexington, Ky. 40502**

**Filed Jan. 29, 1988, Ser. No. 149,862**

**Term of patent 14 years**

**U.S. Cl. D21—34**



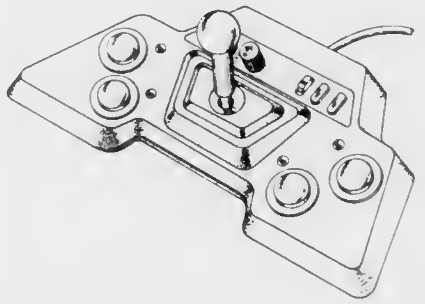
### 317,021
### JOYSTICK HOUSING

**Donald P. Shulman, and Betty A. Shulman, both of 440 Brentwood Dr., Piscataway, N.J. 08854**

**Filed Feb. 16, 1988, Ser. No. 156,196**

**Term of patent 14 years**

**U.S. Cl. D21—48**



### 317,022
### CONSTRUCTION TOY PANEL

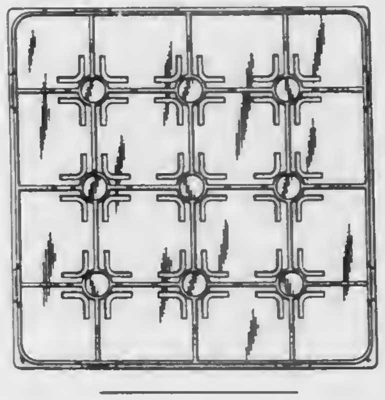
**Hermann E. Müller, Zugerstrasse 43, CH-6330 Cham, Switzerland**

**Filed Jul. 14, 1989, Ser. No. 380,159**

**Claims priority, application Hague, Jan. 17, 1989, DM 012 605**

**Term of patent 14 years**

**U.S. Cl. D21—108**



### 317,023
### TOY BLOCK VEHICLE

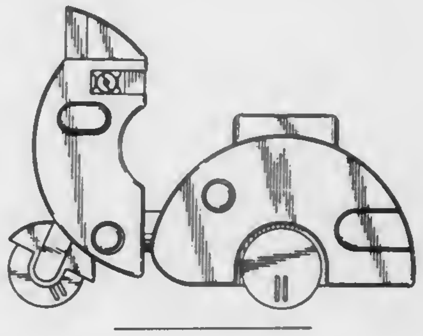
**Hideki Tachikawa, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan**

**Filed Jun. 2, 1989, Ser. No. 360,735**

**Claims priority, application Japan, Dec. 9, 1988, 63-48076**

**Term of patent 14 years**

**U.S. Cl. D21—124**



### 317,024
### TOY RACING CAR

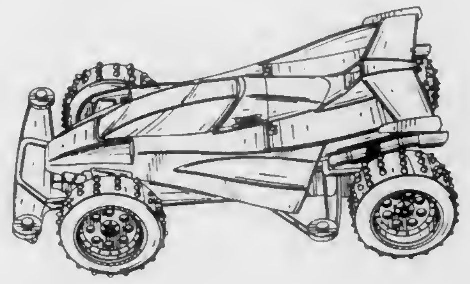
**Kiyoshi Yajima, Shizuoka, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan**

**Filed Jul. 5, 1989, Ser. No. 375,516**

**Claims priority, application Japan, Mar. 6, 1989, 1-7929**

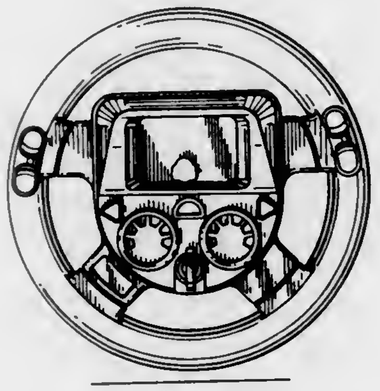
**Term of patent 14 years**

**U.S. Cl. D21—137**

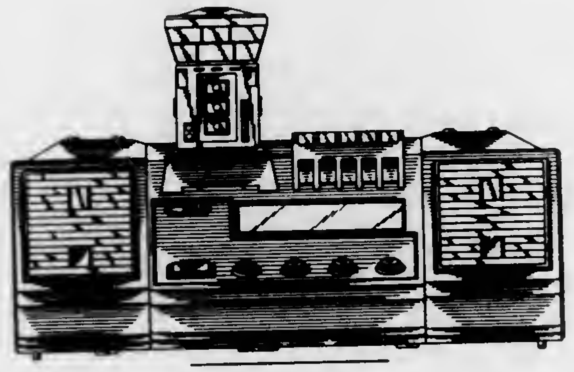


VOL 1126 ISS 3 MY 21 1991 UMI

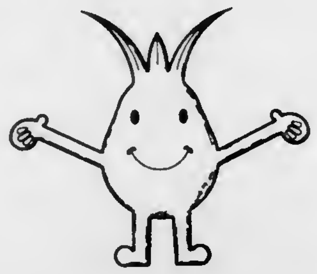
317,025
### SIMULATIVE DRIVING TOY
Thomas Ng Chuk-Sun, Hong Kong, Hong Kong, assignor to Blue Box Toy Factory Limited, Hong Kong
Filed Dec. 5, 1988, Ser. No. 280,625
Claims priority, application United Kingdom, Sep. 23, 1988, 1053714
Term of patent 14 years
U.S. Cl. D21—142



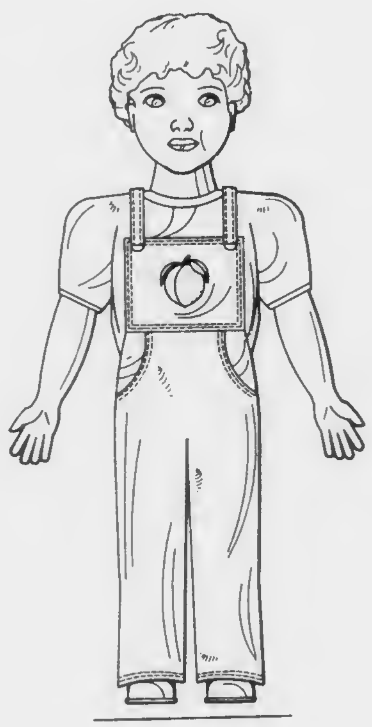
317,026
### CONTROL STATION FOR TOY VEHICLE RACING SET
Tsuyoshi Ueyama, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jul. 13, 1989, Ser. No. 379,146
Claims priority, application Japan, Jan. 18, 1989, 1-1351
Term of patent 14 years
U.S. Cl. D21—142



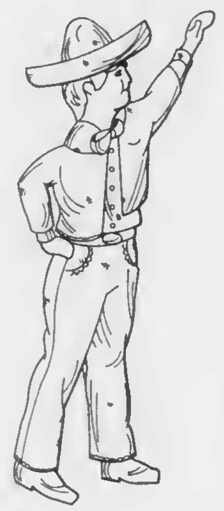
317,027
### TOY SPROUT FIGURE
Teresa A. Fegan, R.R. 1, St. Augustine, Ill. 61474
Filed Oct. 11, 1988, Ser. No. 256,378
Term of patent 14 years
U.S. Cl. D21—155



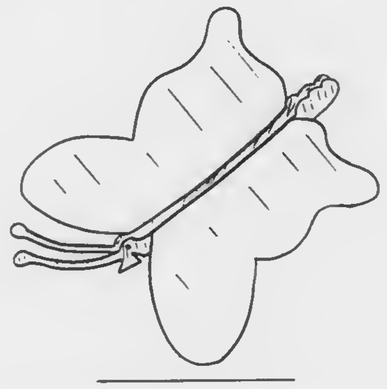
317,028
### DOLL
Tonya H. Long, Rte. 1, Box 283-1, Timmonsville, S.C. 29161
Filed Apr. 17, 1989, Ser. No. 338,771
Term of patent 14 years
U.S. Cl. D21—171



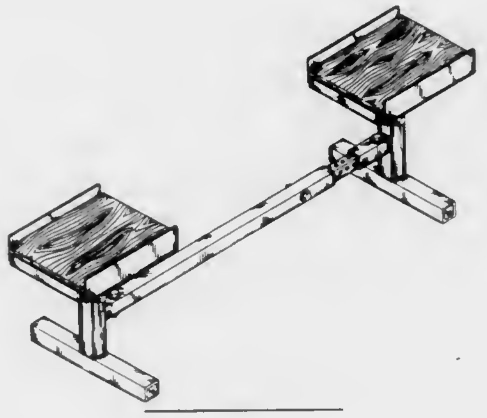
317,029
### DOLL
Javier J. Flores, 1109 Benjamin SE., and Charles E. Cannon, 950 Sigsbee SE., both of Grand Rapids, Mich. 49506
Filed May 26, 1989, Ser. No. 357,487
Term of patent 14 years
U.S. Cl. D21—180



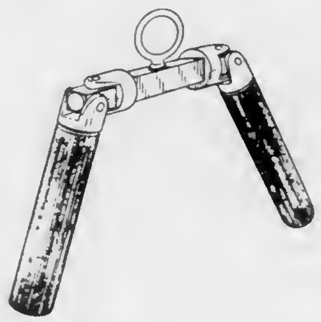
317,030
### TOY BUTTERFLY
Jeffrey L. Peyton, P.O. Box C-32000, Richmond, Va. 23261-2000
Filed Jun. 2, 1987, Ser. No. 57,246
Term of patent 14 years
U.S. Cl. D21—185



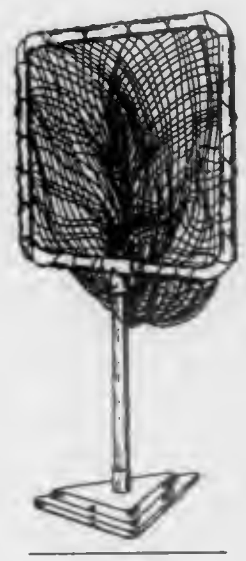
317,031
### SAFETY SPOTTER SUPPORT FOR BARBELLS
Louis Ceppo, 210 E. Tampa Ave., Cherry Hill, N.J. 08034
Filed Mar. 21, 1988, Ser. No. 171,513
Term of patent 14 years
U.S. Cl. D21—191



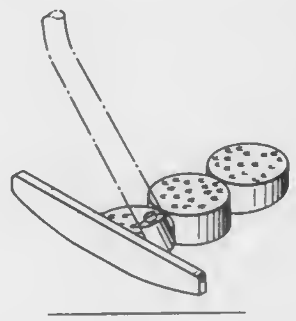
317,032
### WEIGHTLIFTING CABLE BAR
Christopher W. Eckler, P.O. Box 564, Nashua, N.H. 03061-0564
Filed Oct. 18, 1988, Ser. No. 259,100
Term of patent 14 years
U.S. Cl. D21—198



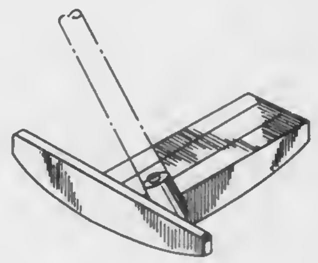
317,033
### TOSS GAME GOAL
Louis Rains, Rte. 4, Box 327, Van Buren, Ark. 72956
Filed Sep. 13, 1988, Ser. No. 243,770
Term of patent 14 years
U.S. Cl. D21—200



317,034
### GOLF CLUB HEAD
David T. Pelz, 436 Seawind, Austin, Tex. 78746
Filed Jul. 28, 1988, Ser. No. 225,154
Term of patent 14 years
U.S. Cl. D21—215

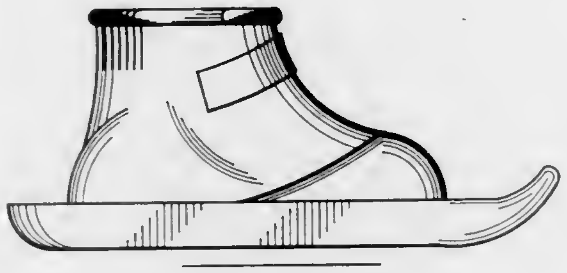


317,035
### GOLF CLUB HEAD
David T. Pelz, 436 Seawind, Austin, Tex. 78746
Filed Jul. 28, 1988, Ser. No. 225,155
Term of patent 14 years
U.S. Cl. D21—219

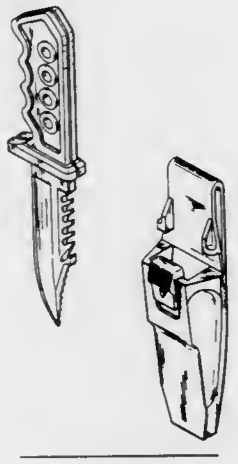


VOL
126
ISS
3
MY
21
1991
UMI

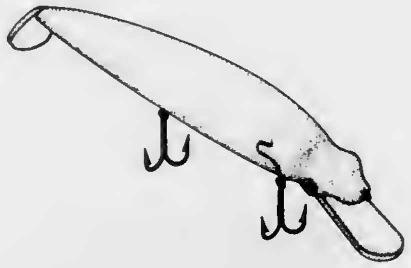
317,036
**SNOW SKATE**
Theresa L. Crivello, 9034 W. Orchard, West Allis, Wis. 53214
Filed Jun. 22, 1988, Ser. No. 210,761
Term of patent 14 years
U.S. Cl. D21—225



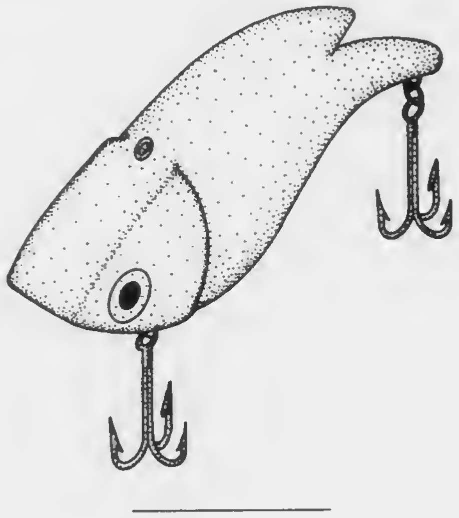
317,037
**COMBINED KNIFE AND SHEATH**
Eiichi Koshiishi, Tokyo, Japan, assignor to Kabushi kikaisha Harisan, Tokyo, Japan
Filed Apr. 22, 1988, Ser. No. 186,975
Claims priority, application Japan, Dec. 23, 1987, 62-52100
Term of patent 14 years
U.S. Cl. D22—118



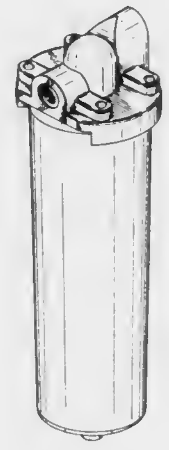
317,038
**FISHING LURE**
William T. Mann, Eufaula, Ala., assignor to FW Acquisition, Inc., Eufaula, Ala.
Filed Sep. 9, 1988, Ser. No. 242,074
Term of patent 14 years
U.S. Cl. D22—132



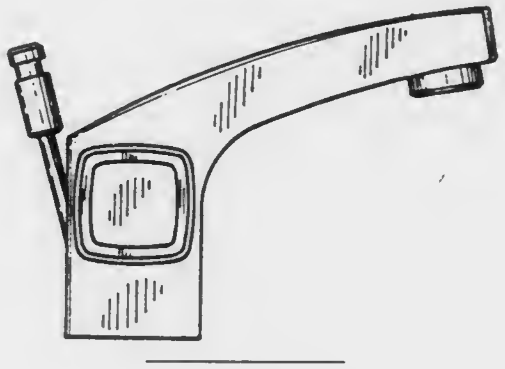
317,039
**FISHING LURE**
William T. Mann, Eufaula, Ala., assignor to FW Acquisition, Inc., Eufaula, Ala.
Filed Sep. 9, 1988, Ser. No. 242,073
Term of patent 14 years
U.S. Cl. D22—133



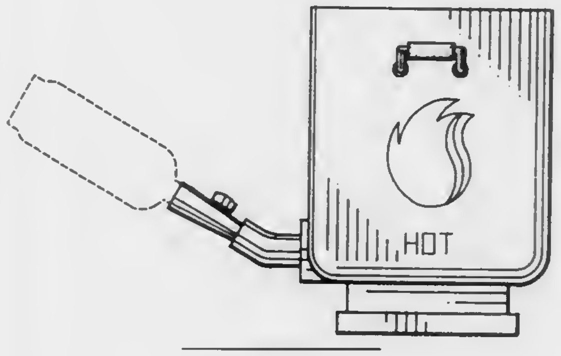
317,040
**COMBINED QUICK-CHANGE FILTER CARTRIDGE AND HEAD**
Raymond M. Petrucci, Middlebury; Bruce G. Taylor, Kensingtou; Edward C. Giordano, Manchester, all of Conn.; James M. Padilla, Covina Heights, and Carl Palmer, La Habra Heights, both of Calif., assignors to Cuno, Incorporated, Meriden, Conn.
Division of Ser. No. 128,504, Dec. 3, 1987, Pat. No. Des. 306,754, which is a continuation-in-part of Ser. No. 822,548, Jan. 27, 1986, abandoned. This application Sep. 27, 1989, Ser. No. 412,872
Term of patent 14 years
U.S. Cl. D23—209



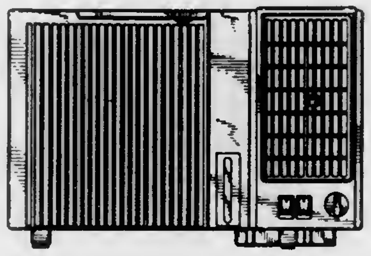
317,041
**FAUCET**
Alfons Knapp, Bleicherstrasse 3, Biberach/Riss, Fed. Rep. of Germany
Filed Jun. 2, 1987, Ser. No. 57,438
Claims priority, application Italy, Dec. 11, 1986, 54185-B86
Term of patent 14 years
U.S. Cl. D23—241



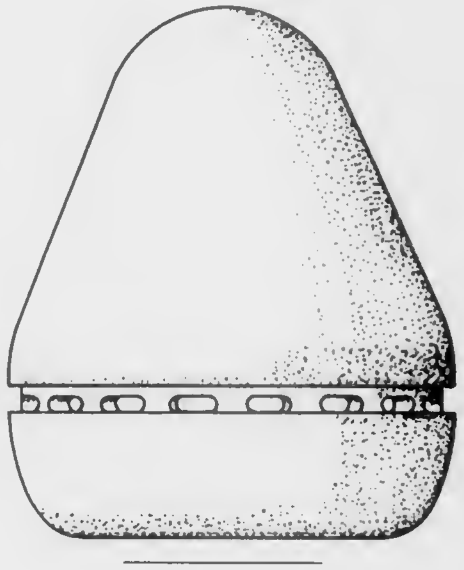
317,042
**PORTABLE HOT AIR HEATER**
George Hall, 224 Salem Rd., Tewksbury, Mass. 01876
Filed May 18, 1989, Ser. No. 353,508
Term of patent 14 years
U.S. Cl. D23—332



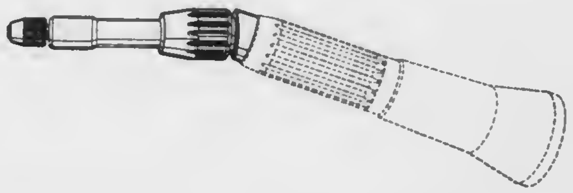
317,043
**AIR CLEANER**
Dov Z. Glucksman, Wenham, Mass., and David Lekhtman, Morin Heights, Canada, assignors to Bionaire Inc., Canada
Filed Sep. 26, 1989, Ser. No. 412,389
Term of patent 14 years
U.S. Cl. D23—364



317,044
**CONTAINER FOR AN AIR FRESHENER**
Graham A. Thomson, London, United Kingdom, assignor to Reckitt & Colman Products Limited, London, England
Filed Dec. 4, 1989, Ser. No. 445,342
Claims priority, application United Kingdom, Jun. 2, 1989, 1059921
Term of patent 14 years
U.S. Cl. D23—367



317,045
**MOTOR DRIVEN DENTAL INSTRUMENT FOR LAMINATING TEETH**
Svante R. Edwardson, Solna, Sweden, assignor to Dentatus International AB, Hagersten, Sweden
Filed Sep. 26, 1988, Ser. No. 251,956
Term of patent 14 years
U.S. Cl. D24—10



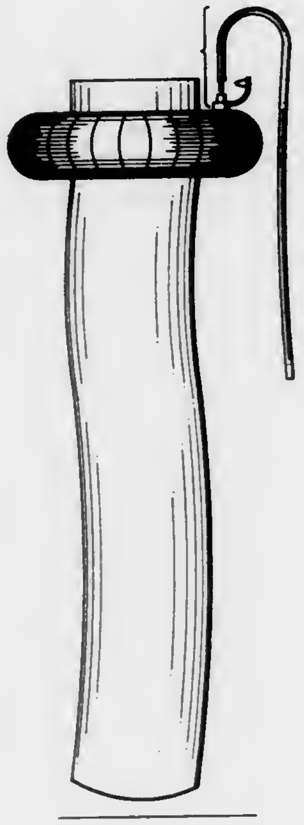
VOL
1126
ISS
3
MY
21
1991
UMI

**317,046**

### COMBINED CAST PROTECTOR AND STEM

Mary L. Anding, P.O. Box 133, Hwy. 14, Arena, Wis. 53503
Filed May 18, 1988, Ser. No. 195,526
Term of patent 14 years

U.S. Cl. D24—49

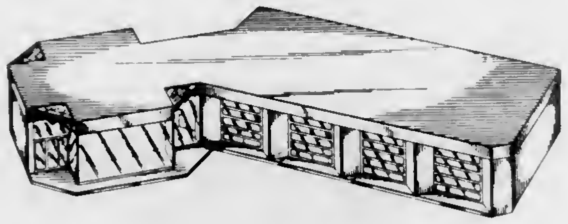


**317,047**

### BUILDING FOR AN AUTOMOTIVE SERVICE STATION OR THE LIKE

Raymond Poelvoorde, New York, N.Y., assignor to Sun Refining and Marketing Company, Philadelphia, Pa.
Filed Nov. 16, 1988, Ser. No. 272,266
The portion of the term of this patent subsequent to Aug. 14, 2004, has been disclaimed.
Term of patent 14 years

U.S. Cl. D25—34

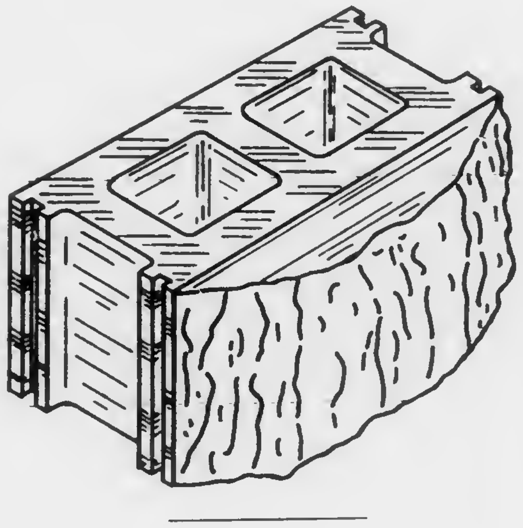


**317,048**

### WALL BLOCK

Paul J. Forsberg, Edina, Minn., assignor to Keystone Retaining Wall Systems, Inc., Edina, Minn.
Continuation-in-part of Ser. No. 863,399, May 14, 1986, Pat. No. Des. 301,064. This application Nov. 21, 1988, Ser. No. 273,873
The portion of the term of this patent subsequent to May 28, 2005, has been disclaimed.
Term of patent 14 years

U.S. Cl. D25—114

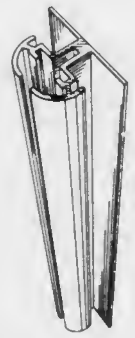


**317,049**

### EXTRUSION

Jerry D. Pavone; Paul D. Aubke, and Kevin P. Shatzer, all of Cincinnati, Ohio, assignors to Concept USA, Inc., Cincinnati, Ohio
Filed Mar. 7, 1990, Ser. No. 489,604
Term of patent 14 years

U.S. Cl. D25—119

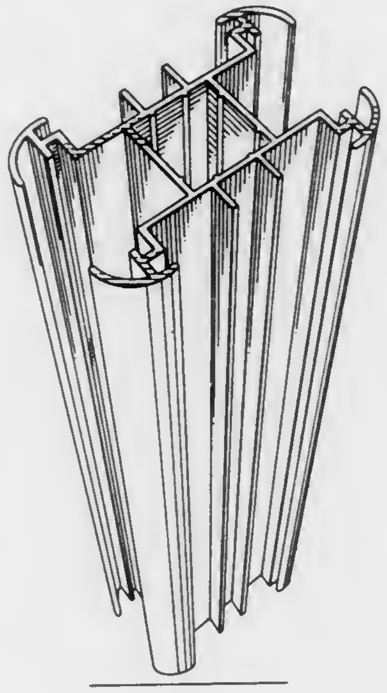


**317,050**

### EXTRUSION

Jerry D. Pavone; Paul D. Aubke, and Kevin P. Shatzer, all of Cincinnati, Ohio, assignors to Concept USA, Inc., Cincinnati, Ohio
Filed Mar. 7, 1990, Ser. No. 489,654
Term of patent 14 years

U.S. Cl. D25—122

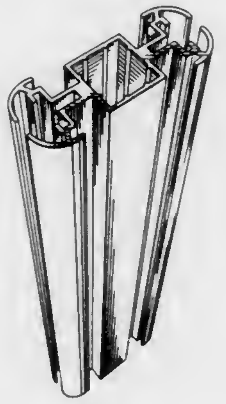


**317,051**

### EXTRUSION

Jerry D. Pavone; Paul D. Aubke, and Kevin P. Shatzer, all of Cincinnati, Ohio, assignors to Concept USA, Inc., Cincinnati, Ohio
Filed Mar. 2, 1990, Ser. No. 488,794
Term of patent 14 years

U.S. Cl. D25—122

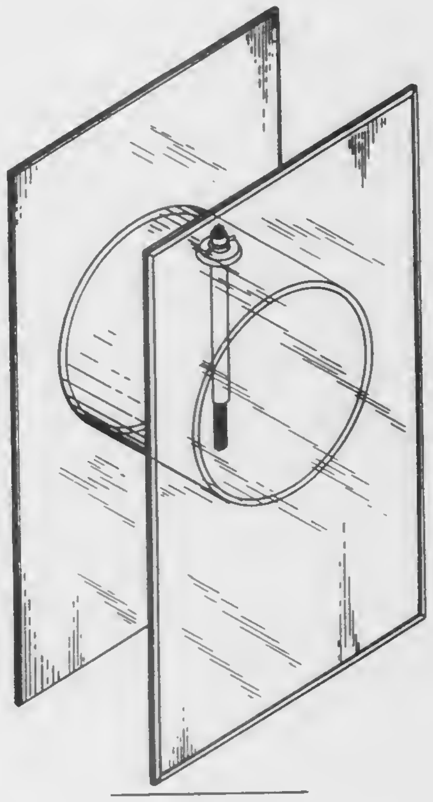


**317,052**

### OIL LAMP

David R. Perkins, Manchester, Mass., assignor to Glass Dimensions, Inc., Essex, Mass.
Filed Feb. 13, 1989, Ser. No. 310,845
Term of patent 14 years

U.S. Cl. D26—11

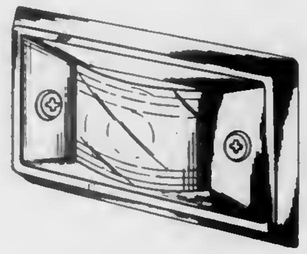


**317,053**

### TRANSOM LIGHT

Warrick M. Whitley, II, Lynn Haven, Fla., assignor to Attwood Corporation, Lowell, Mich.
Filed Jul. 27, 1987, Ser. No. 78,251
Term of patent 14 years

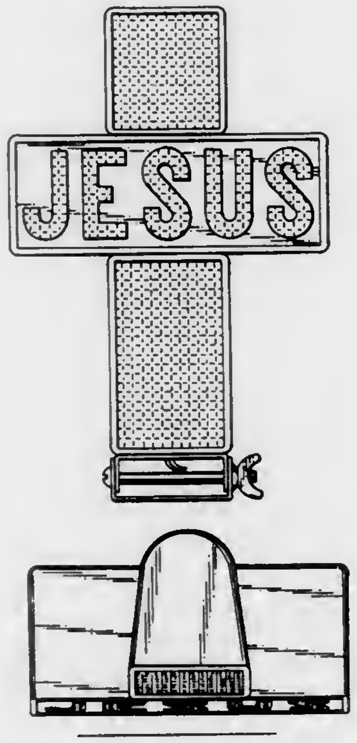
U.S. Cl. D26—28



/OL
126
ISS
3
MY
21
1991
UMI

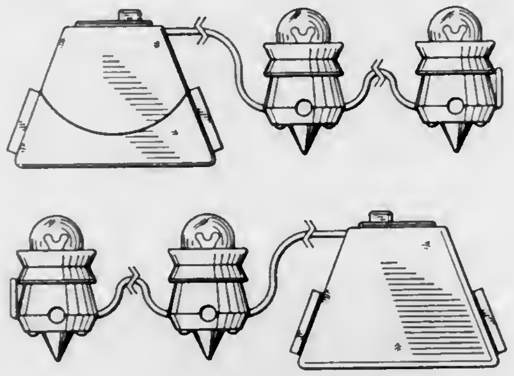
### 317,054
### AUXILIARY VEHICLE TAIL AND BRAKE LIGHT

Gregory L. Olmstead, 1525 Carter St., Auburndale, Fla. 33823
Filed May 30, 1989, Ser. No. 358,197
Term of patent 14 years
U.S. Cl. D26—32



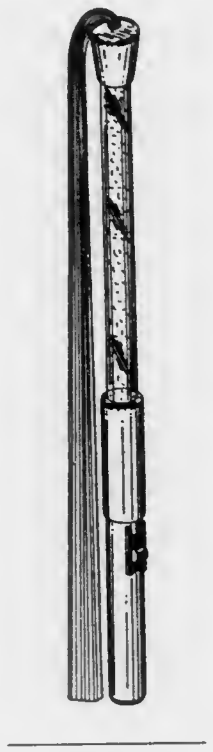
### 317,055
### COMBINED SPOKE-MOUNTED STRING OF BICYCLE LIGHTS AND SWITCH THEREFOR

Terrence J. Moore, 4 Parkside Way, Ormond Beach, Fla. 32074
Filed Mar. 27, 1989, Ser. No. 328,602
Term of patent 14 years
U.S. Cl. D26—35



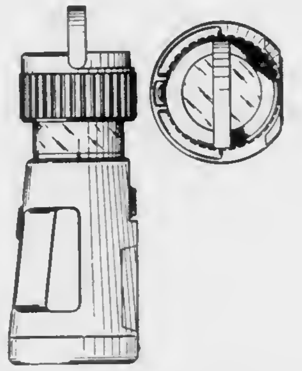
### 317,056
### FLASHLIGHT WAND

Benjamin J. Cimock, Altamonte Springs, Fla., assignor to I & K Trading Company, Washington, D.C.
Filed Nov. 14, 1988, Ser. No. 271,195
Term of patent 14 years
U.S. Cl. D26—37



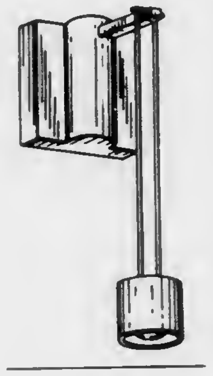
### 317,057
### FLASHLIGHT

Augusto Argandona, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Aug. 15, 1989, Ser. No. 394,170
Term of patent 14 years
U.S. Cl. D26—40



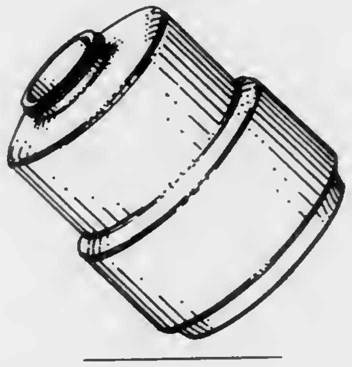
### 317,058
### WALL MOUNTED LAMP ASSEMBLY

Robert A. Sonneman, New York, N.Y., assignor to Sonneman Design Group, Inc., Long Island City, N.Y.
Filed Aug. 14, 1989, Ser. No. 393,455
Term of patent 14 years
U.S. Cl. D26—92



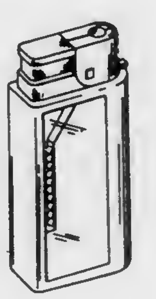
### 317,059
### FUEL CONTAINER FOR LIQUID CANDLE LAMP

J. Alan Menter, Manlius, N.Y., assignor to Hollowick, Inc., Manlius, N.Y.
Filed Apr. 11, 1988, Ser. No. 180,266
Term of patent 14 years
U.S. Cl. D26—117



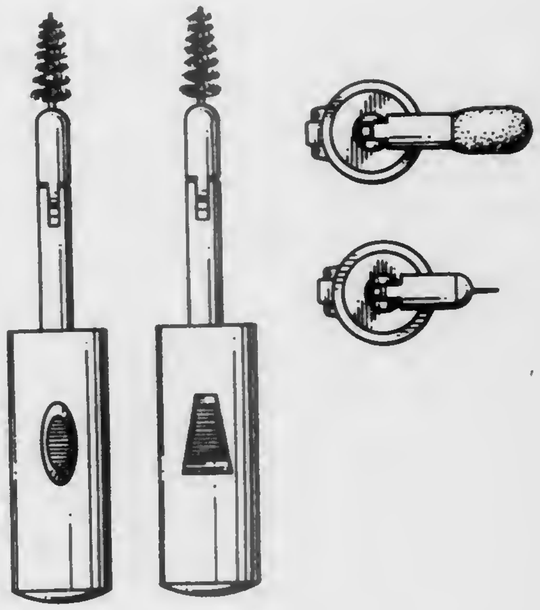
### 317,060
### CIGARETTE LIGHTER

Neil A. French, East Greenwich, and Alan French, Warwick, both of R.I., assignors to Park Lane Associates, Inc., Providence, R.I.
Filed Feb. 9, 1990, Ser. No. 478,765
Term of patent 14 years
U.S. Cl. D27—148



### 317,061
### ADJUSTABLE COSMETIC APPLICATOR

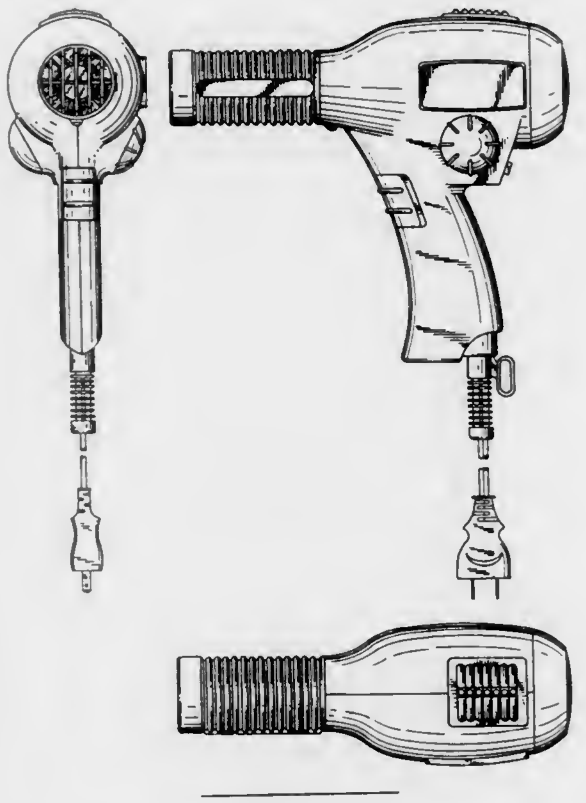
Henry J. Cassai, 163-47 85th St., Howard Beach, N.Y. 11414, and Gino H. Cassai, Kings, N.Y., assignors to Henry J. Cassai, Howard Beach, N.Y.
Filed Jan. 23, 1989, Ser. No. 299,958
Term of patent 14 years
U.S. Cl. D28—7



VOL
126
SS
3
MY
21
1991
UMI

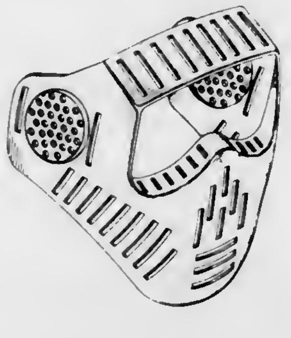
### 317,062
### HAIR DRYER

Yoshimoto Takahashi, Kodaira, Japan, assignor to Comet Electric Co., Ltd., Tokyo, Japan
Filed May 1, 1989, Ser. No. 345,713
Claims priority, application Japan, Oct. 31, 1988, 63-42859
Term of patent 14 years
U.S. Cl. D28—13



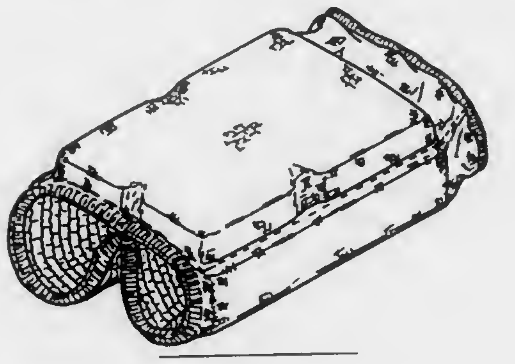
### 317,063
### MASK FOR PAINT BALL TAG GAMES

Larry R. Johnson, R.R. 1, Box 15, Zimmerman, Minn. 55398
Filed Dec. 22, 1986, Ser. No. 944,826
Term of patent 14 years
U.S. Cl. D29—17



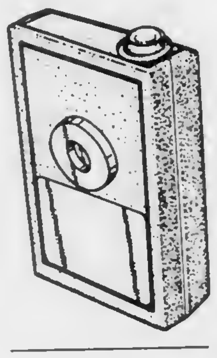
### 317,064
### LIMB PROTECTOR

Alfred R. Pierce, Jr., 25 Argyle Ave., Blackwood, N.J. 08012
Division of Ser. No. 70,232, Jul. 6, 1987, Pat. No. Des. 311,075.
This application Sep. 26, 1990, Ser. No. 588,414
Term of patent 14 years
U.S. Cl. D29—20



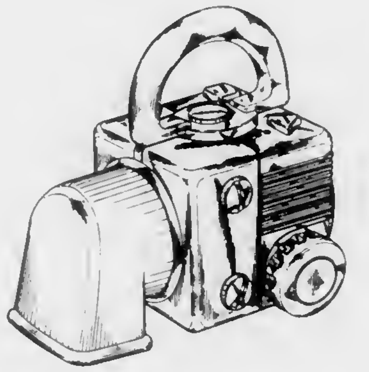
### 317,065
### ANIMAL BEHAVIOR MODIFICATION DEVICE

Ted R. Greene, 5098 Lynbrook Ct., Pleasanton, Calif. 94566
Filed Aug. 3, 1988, Ser. No. 228,160
Term of patent 14 years
U.S. Cl. D30—156



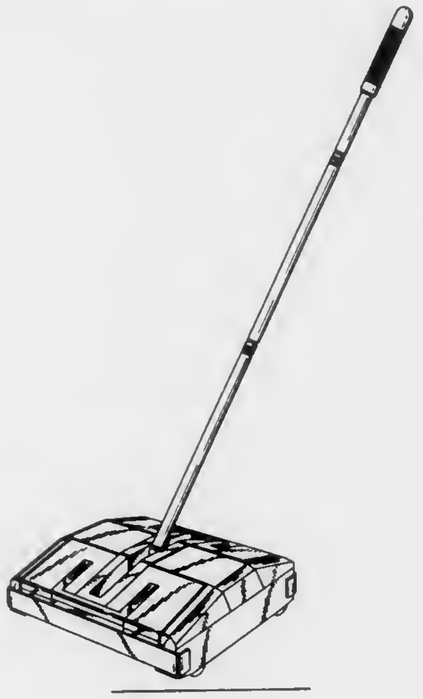
### 317,066
### VACUUM CLEANER

Haruo Miyazaki, Osaka, and Kazuo Takada, Nara, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan
Filed Feb. 5, 1990, Ser. No. 475,651
Claims priority, application Japan, Aug. 11, 1989, 1-29604
Term of patent 14 years
U.S. Cl. D32—18



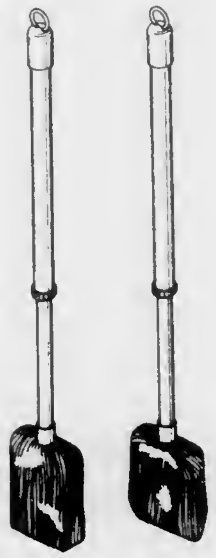
### 317,067
### FLOOR CLEANER

Yutaka Kuroda, Tokyo, Japan, assignor to Kabushiki Kaisha Hoky, Chiba, Japan
Filed Nov. 18, 1987, Ser. No. 124,959
Claims priority, application Japan, Jul. 1, 1987, 62-26880
Term of patent 14 years
U.S. Cl. D32—38



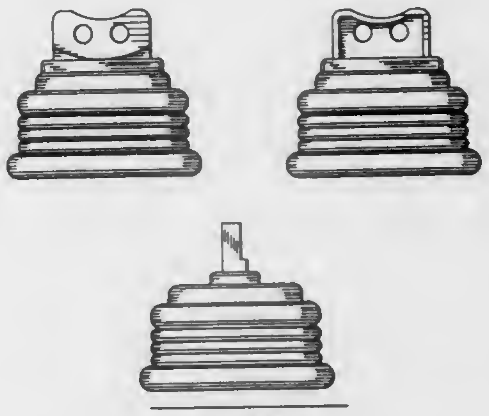
### 317,068
### CLEANING TOOL

Gloria F. Bosworth, 232 Central St., Milford, Mass. 01752
Filed Sep. 14, 1987, Ser. No. 96,330
Term of patent 14 years
U.S. Cl. D32—51



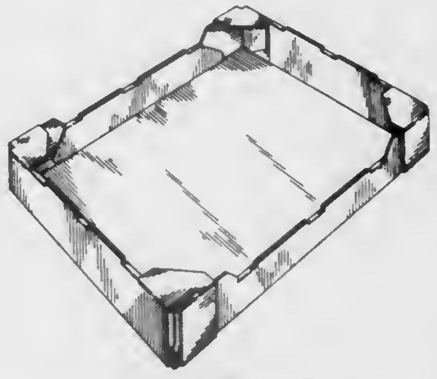
### 317,069
### STAND FOR SUPPORTING AUTOMOTIVE AXLES

Dale A. Earl, 517 W. Locust St., Payson, Ariz. 85541, and Dale A. Earl, 2310 N. 28th St., Phoenix, Ariz. 85008
Filed May 26, 1989, Ser. No. 357,486
Term of patent 14 years
U.S. Cl. D34—31



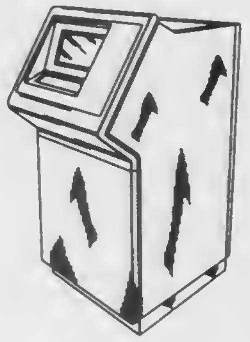
### 317,070
### FOOD CONTAINER

Edward L. Ott, Smyrna, Ga.; Paul F. Petriekis, Palos Park, and Michael E. Janis, Naperville, both of Ill., assignors to Restanrant Technology, Inc., Oak Brook, Ill.
Filed May 25, 1989, Ser. No. 357,432
Term of patent 13 years
U.S. Cl. D34—40



### 317,071
### SELF SERVICE TERMINAL OR SIMILAR ARTICLE

Francis J. A. McFadden, Miamisburg, Ohio; Donald W. Carr, Dundee, Wales; Steven W. Swaine, Newtyle, Wales, and Cahrles G. V. Rohan, Carnoustie, Wales, assignors to NCR Corporation, Dayton, Ohio
Filed May 11, 1988, Ser. No. 192,816
Term of patent 14 years
U.S. Cl. D99—28



OL
126
SS
3
MY
21
1991
UMI

# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 21ST DAY OF MAY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A. B. Dick Company: *See—*
  - Kulisz, Michael, 5,017,226, Cl. 106-21.000.
- A.I. Architects, Inc.: *See—*
  - Culler, David E.; Papadopoulos, Gregory M.; and Schneider, Richard P., 5,018,062, Cl. 364-200.000.
- A/S Selvaagbygg: *See—*
  - Thorsnes, Ola O., 5,016,411, Cl. 52-220.000.
- ABB Stal AB: *See—*
  - Brannstrom, Roine, 5,016,435, Cl. 60-39.050.
- Abbaschian, Gholamreza J.: *See—*
  - Clere, Thomas M.; Abbaschian, Gholamreza J.; Wheeler, Douglas J.; and Barnes, Albert L., 5,017,217, Cl. 75-244.000.
- Abbott Laboratories: *See—*
  - Wong, Martin, 5,017,501, Cl. 436-528.000.
- Abdikaliev, Nurlan: *See—*
  - Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.
- Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; and Sanada, Takashi, to Sumitomo Chemical Co., Ltd. Process for making a thermoplastic resin composition. 5,017,652, Cl. 525-68.000.
- Abe, Keiji: *See—*
  - Endo, Takeshi; Nambu, Yoko; and Abe, Keiji, 5,017,684, Cl. 528-409.000.
- Abe, Masahiro: *See—*
  - Mase, Yasukazu; Abe, Masahiro; and Hirata, Osamu, 5,016,663, Cl. 134-1.000.
- Abe, Naomichi, to Fujitsu Limited. Formation of a negative resist pattern utilize water-soluble polymeric material and photoacid generator. 5,017,461, Cl. 430-325.000.
- Abe, Shigeru: *See—*
  - Meguro, Kazunori; Itoh, Toshiaki; and Abe, Shigeru, 5,016,610, Cl. 126-91.00A.
- Abe, Shuichi: *See—*
  - Nakayama, Shinji; Watanabe, Masaya; and Abe, Shuichi, 5,018,064, Cl. 364-200.000.
- Abernethy, William J. Sea anchor or drogue. 5,016,556, Cl. 114-311.000.
- Abrams, Lane J.; Loughran, Kevin; Masukewicz, David W.; and Overstreet, Robert L., Jr., to AT&T Bell Laboratories. Automated channel test unit. 5,018,184, Cl. 379-29.000.
- Aburatani, Kenji; and Shozaki, Tamotsu, to Kabushiki Kaisha Kobe Seiko Sho. Wiredrawing apparatus including an ultrasonic flaw detector. 5,016,475, Cl. 73-644.000.
- ACF Industries, Incorporated: *See—*
  - Krug, John A.; Hammonds, James C.; Schmidt, Kenneth D.; and Paglusch, Dennis F., 5,017,065, Cl. 410-58.000.
- Ackermann, Ulrich: *See—*
  - Paquet, Volker; Ackermann, Ulrich; Etzkorn, Heniz-W.; Kersten, Ralf T.; and Rutze, Uwe, 5,017,404, Cl. 427-45.100.
- Ackerson, Robert C.; and Yuyama, Takeshi, to Du Pont de Nemours, E. I., and Company. Herbicides for weed control in rice. 5,017,215, Cl. 71-93.000.
- Ackley, William V. Counter-rotating boat propeller drive. 5,017,168, Cl. 440-82.000.
- Acree, Lee M.: *See—*
  - Macpherson, John W.; and Acree, Lee M., 5,017,394, Cl. 426-302.000.
- Acres, Robert W.: *See—*
  - Dower, Roger G.; Acres, Robert W.; Davis, Harold R.; Donham. Andrew N.; Riahi, Nader; Slamka, Richard W. A.; and Urbaniak, Lechoslaw K., 5,017,795, Cl. 250-560.000.
- Actel Corporation: *See—*
  - Galbraith, Douglas C.; and Greene, Jonathan W., 5,017,813, Cl. 307-475.000.
- Action Products Marketing Corporation: *See—*
  - Trimble, Carroll O., 5,017,313, Cl. 264-32.000.
- Adachi, Kazuyosi: *See—*
  - Matsuo, Yutaka; Isobe, Takeshi; and Adachi, Kazuyosi. 5,017,336, Cl. 420-422.000.
- Adachi, Kenro: *See—*
  - Ito, Kenichiro; Nojiri, Hiromi; and Adachi, Kenro, 5,016,740, Cl. 192-38.000.
- Adachi, Motomitsu: *See—*
  - Obata, Akihiko; Adachi, Motomitsu; Kamata, Hajime; and Yano, Katsutoshi, 5,018,082, Cl. 364-521.000.
- Adam, John D.; and Talisa, Salvador H., to Westinghouse Electric Corp. Mode trapped magnetostatic wave (MSW) filters and channelizer formed therefrom. 5,017,896, Cl. 333-134.000.
- Adamaitis, Karl. Erosion resistant elbow conduit. 5,016,923, Cl. 285-127.000.
- Adams, Frank H.: *See—*
  - Schmidt, Robert J.; Haizmann, Robert S.; Ford, Mark R.; Low, C. David; and Adams, Frank H., 5,017,541, Cl. 502-169.000.
- Adolph Coors Company: *See—*
  - Grims, Conrad M.; Moen, Bruce A.; and Pardubicky, Jaroslav F., 5,016,462, Cl. 72-349.000.
- Advanced Micro Devices, Inc.: *See—*
  - Turner, John E., 5,017,809, Cl. 307-465.000.
- Advanced Technology Laboratories, Inc.: *See—*
  - Schwartz, Gary, 5,016,641, Cl. 128-661.090.
- Aera Transportation Products, Inc.: *See—*
  - Walker, Del E.; and Early, Stephen R., 5,016,395, Cl. 49-501.000.
- Aero Marine Engineering, Inc.: *See—*
  - Havins, Felton H., 5,017,165, Cl. 440-6.000.
- Aerospatiale Societe Nationale Industrielle: *See—*
  - Rigollet, Jean-Paul, 5,017,940, Cl. 343-912.000.
- Affleck, Wayde H.: *See—*
  - Cohn, David B.; Affleck, Wayde H.; and Lawrence, George D., 5,017,769, Cl. 250-216.000.
- Agano, Toshitaka; and Fuseda, Yuichi, to Fuji Photo Film Co., Ltd. Radiation image read-out and reproducing method. 5,017,774, Cl. 250-327.200.
- Agarwal, Suresh C., to Babcock & Wilcox Company, The. Fault detection in olefin oxidation reactor. 5,018,086, Cl. 364-557.000.
- Ager, Scott P.: *See—*
  - Grassman, David L.; Ager, Scott P.; and Root, Tamis L., 5,017,620, Cl. 514-698.000.
- Agfa Gevaert AG: *See—*
  - Kuntz, Gunther; and Baarfusser, Johann, 5,017,287, Cl. 210-433.100.
- Agfa-Gevaert, N.V.: *See—*
  - De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 5,017,951, Cl. 355-27.000.
  - Joly, Ludovicus P.; and Rutges, Antonius A., 5,017,468, Cl. 430-569.000.
- Aghajanian, Michael K.; and Nagelberg, Alan S., to Lanxide Technology Company, LP. Method of forming a metal matrix composite body by a spontaneous infiltration technique. 5,016,703, Cl. 164-97.000.
- Agostinelli, John A.; Mir, Jose M.; Paz-Pujalt, Gustavo R.; Lelental, Mark; and Nicholas, Ralph A., III, to Eastman Kodak Company. Barrier layer containing conductive articles. 5,017,551, Cl. 505-1.000.
- Agrawal, Ashok K.; and Landry, Norman R., to General Electric Company. Monopulse phased array antenna with plural transmit-receive module phase shifters. 5,017,927, Cl. 342-371.000.
- Agro Elements: *See—*
  - Humphrey, Robert E., 5,017,374, Cl. 424-93.000.
- Ahlberg & Co. AB: *See—*
  - Engstrom, Carl-Otto, 5,016,374, Cl. 40-605.000.
- Ahlers, Olaf, to Eska Medical Lubeck Medizintechnik GmbH & Co. Method of producing open-celled metal structures. 5,016,702, Cl. 164-34.000.
- Aichi Steel Works, Limited: *See—*
  - Honkura, Yoshinobu; Fukui, Yasuji; Matsuo, Tooru; and Mishima, Chisato, 5,017,247, Cl. 148-302.000.
- Aiken, Robert B. Scrolling sign apparatus. 5,016,371, Cl. 40-518.000.
- Air Products and Chemicals, Inc.: *See—*
  - Gottier, Gerry N.; and Herron, Donn M., 5,017,204, Cl. 62-11.000.
- Aishita, Hideki: *See—*
  - Kawamura, Masanori; Arai, Yoshinobu; and Aishita, Hideki, 5,017,589, Cl. 514-352.000.
- Aisin Seiki Kabushiki Kaisha: *See—*
  - Terazawa, Tadashi, 5,016,589, Cl. 123-399.000.
- Ajimomoto Co., Inc.: *See—*
  - Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Ken-ich, 5,017,480, Cl. 435-106.000.
- Ajinomoto Co., Inc.: *See—*
  - Matsui, Kazuhiko; Miwa, Kiyoshi; and Sano, Konosuke, 5,017,481, Cl. 435-108.000.
  - Mitsutake, Hiromi; Saitoh, Hideomi; and Nagata, Koichiro, 5,017,364, Cl. 424-54.000.
- Akai, Mikio: *See—*
  - Yanagishita, Norio; Matsuura, Ichiro; Ishimaru, Kiichiro; and Akai, Mikio, 5,017,115, Cl. 425-125.000.
- Akamatsu, Kazuo: *See—*
  - Kondo, Kenji; Akamatsu, Kazuo; Yamauchi, Takeshi; Yamaoka, Tooru; and Komura, Atsushi, 5,018,001, Cl. 357-67.000.
- Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Packaging material for photosensitive materials. 5,017,429, Cl. 428-349.000.

OL
126
SS
3
MY
21
991
UMI

- Akasaka, Akio: *See—*
  - Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.
- Akatsu, Yohsuke; Fukushima, Naoto; Fujimura, Itaru; and Fukunaga, Yukio, to Nissan Motor Company, Limited. Anti-rolling control system for automotive active suspension system. 5,016,907, Cl. 280-707.000.
- Akers, Oliver C.; and Spurlock, Verlin C. Awning cover. 5,016,699, Cl. 160-22.000.
- Akimoto, Kazuhiko: *See—*
  - Urabe, Hitoshi; Korikawa, Hiroshi; Akimoto, Kazuhiko; Nakaya, Daisuke; and Mizuno, Masahiko, 5,018,078, Cl. 364-518.000.
- Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., to Cymer Laser Technologies. Compact excimer laser. 5,018,161, Cl. 372-57.000.
- Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., to Cymer Laser Technologies. Compact excimer laser. 5,018,162, Cl. 372-57.000.
- Akitake, Hiroshi, to Olympus Optical Company Ltd. Zoom mechanism for zoom lenses. 5,016,993, Cl. 350-429.000.
- Akiyama, Koichi, to Kowa Company Ltd. Particle measuring apparatus. 5,017,008, Cl. 356-336.000.
- Akiyoshi, Hitoshi: *See—*
  - Ogawa, Seiichi; Sukimoto, Minobu; and Akiyoshi, Hitoshi, 5,016,578, Cl. 123-52.0MC.
- Aktiebolaget Bofors: *See—*
  - Hallstrom, Stig, 5,016,535, Cl. 102-411.000.
- Aktiebolaget Electrolux: *See—*
  - Tolf, Anders K. H., 5,016,667, Cl. 137-143.000.
- Akzo America Inc.: *See—*
  - Simms, Barbara L.; and Chu, Chihang R., 5,017,354, Cl. 423-338.000.
- Akzo N.V.: *See—*
  - Schoonhoven, Johannes W. F. M.; Eijsbouts, Sonja; Heinerman, Jacobus J. L.; and Eisenhuth, Ludwig, 5,017,535, Cl. 502-30.000.
- Al-Sheikh, Edward G. Motor vehicle supplementary locking mechanism. 5,016,454, Cl. 70-185.000.
- Aladdin Synergetics, Inc.: *See—*
  - Wischhusen, Heiner; and Kehlbeck, Hans, 5,016,756, Cl. 206-545.000.
- Alasio, Victor. Elevator cab fire extinguishing system. 5,016,715, Cl. 169-61.000.
- Albert, Gregory P.; and Dubuque, Kenneth J., to Ingersoll-Rand Company. Cylinder and housing assembly for pneumatic tool. 5,017,109, Cl. 418-152.000.
- Albrecht, Thomas R.: *See—*
  - Zdeblick, Mark; and Albrecht, Thomas R., 5,017,266, Cl. 156-643.000.
- Alcatel NA Network Systems Corp.: *See—*
  - Williams, Timothy J.; and Baydar, Ertugrul, 5,018,132, Cl. 370-13.000.
- Aldrich, Darrell L.; and Jacobs, John R., to Interpane Coatings, Inc. Method for fabricating insulating glass assemblies. 5,017,252, Cl. 156-109.000.
- Aldrich, Donald C.; Buchanan, Robert C.; and Sollinger, John F., to Du Pont de Nemours, E. I., and Company. Fiber reinforced resin preform. 5,016,516, Cl. 87-8.000.
- Aldrich, William N., to Ampex Corporation. Optical apparatus for electrically inter-coupling rotating and stationary devices. 5,016,961, Cl. 350-96.150.
- Alexander, Ronald. Method of transferring photographs to leather. 5,016,452, Cl. 69-21.000.
- Alford, Raymond E.; and Warren, deceased; Ian H., to Chemetics International Company Ltd. Metal electrodes for electrochemical processes. 5,017,276, Cl. 204-290.00R.
- Ali, Mir Q.: *See—*
  - Kubsik, Robert H.; and Ali, Mir Q., 5,016,429, Cl. 53-381.100.
- Alig, Leo; and Muller, Marcel, to Hoffmann-La Roche Inc. Phenethanolamine derivatives. 5,017,619, Cl. 514-653.000.
- Aligue , Jordi C.; and Vazquez, Manuel A., to Mecanismos Auxiliares Industriales, S.A. Apparatus for assembling wire harnesses. 5,016,345, Cl. 29-742.000.
- Alioto, Kevin J. Combination seat post and air pump for bicycle. 5,016,894, Cl. 280-201.000.
- Allardin, Jean A. Multi-stage air pressure cylinder. 5,016,522, Cl. 92-62.000.
- Allegrezza, Anthony E., Jr.: *See—*
  - DiLeo, Anthony J.; Allegrezza, Anthony E., Jr.; and Burke, Edmund T., 5,017,292, Cl. 210-645.000.
- Allemand, Robert; Drouet, Martine; Pleyber, Gaetan; and Tournier, Edmond, to Commissariat A L'Energie Atomique. Detection array for ionizing radiation tomography. 5,018,175, Cl. 378-19.000.
- Allen, George S. Method and apparatus for imaging the anatomy. 5,016,639, Cl. 128-653.00R.
- Allen, Winthrop D., III: *See—*
  - Gilda, Patricia; Mann, William F.; and Allen, Winthrop D., III, 5,016,754, Cl. 206-496.000.
- Allied-Signal, Inc.: *See—*
  - Ruggles, John F.; and Boyd, Gary L., 5,017,022, Cl. 384-100.000.
  - Zander, Richard A.; Gaiser, Robert F.; and Crumb, Donald A., 5,016,442, Cl. 60-535.000.
- Alpine Electronics Inc.: *See—*
  - Otsuki, Akira, 5,018,032, Cl. 360-105.000.
- Alps Electric Co., Ltd.: *See—*
  - Takahashi, Atsuhiko, 5,017,848, Cl. 318-568.100.
  - Tominaga, Tomohisa; Sato, Kazuichi; Otsuka, Kouichi; Endo, Toshiya; and Oikawa, Susumu, 5,017,443, Cl. 429-99.000.
  - Yamashita, Tatsumaro, 5,018,036, Cl. 360-107.000.
- Altschuler, Lili W.: *See—*
  - Barsotti, Robert J.; Altschuler, Lili W.; and Harper, Lee R., 5,017,435, Cl. 428-502.000.
- Aluminum Company of America: *See—*
  - Chen-Tsai, Charlotte H.; Sanchez, Isaac C.; and Burton, William L., 5,017,411, Cl. 428-36.600.
- Alvord, Robert J.; Bambule, Raymond; Orr, Roy W., Jr.; and Sorensen, Thomas L., to Zenith Electronics Corporation. Monostable trigger circuit usable with horizontal sync pulses of either polarity. 5,018,011, Cl. 358-148.000.
- Alza Corporation: *See—*
  - Maruyama, Frederick; and Cortese, Richard, 5,017,381, Cl. 424-472.000.
- AM International, Inc.: *See—*
  - Sadwick, Paul V., 5,017,964, Cl. 355-219.000.
- Amachi, Nobumitsu: *See—*
  - Fukada, Takeshi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; Codama, Mitsufumi; and Takayama, Toru, 5,017,828, Cl. 313-367.000.
  - Sakama, Mitsunori; Fukada, Takeshi; Sakamoto, Naoya; Amachi, Nobumitsu; Hayashi, Shigenori; and Inushima, Takashi, 5,017,502, Cl. 437-2.000.
- Amarillo Cell Culture Company, Incorporated: *See—*
  - Cummins, Joseph M., 5,017,371, Cl. 424-85.600.
- Amaya, Shinji: *See—*
  - Iwanari, Yoshiyuki; Amaya, Shinji; Shimizu, Seiichi; and Kogawara, Toshiro, 5,017,450, Cl. 430-106.000.
- Ambrose, Larry R.: *See—*
  - Chiappe, Wayne T.; Ambrose, Larry R.; Dalmon, Donald P.; Juskie, Bernard R.; and Godwin, Raymond E., 5,016,420, Cl. 53-138.100.
- Amehdi, Hossien: *See—*
  - Nasr, Hatem N.; Sadjadi, Firooz A.; Bazakos, Michael E.; and Amehdi, Hossien, 5,018,215, Cl. 382-15.000.
- American Home Products Corporation: *See—*
  - Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., 5,017,601, Cl. 514-443.000.
- American Safety Razor Company: *See—*
  - Iten, Clemens A., 5,016,353, Cl. 30-124.000.
- American Standard Inc.: *See—*
  - Plzak, William J., 5,016,448, Cl. 62-476.000.
- American Technical Ceramics Corporation: *See—*
  - Insetta, Victor; Monsorno, Richard V.; Davis, Donald J., Jr.; and Beyel, Stephen, 5,018,047, Cl. 361-277.000.
- Amersham International plc: *See—*
  - Finlan, Martin F., 5,017,882, Cl. 328-234.000.
- Ames, William G.; Jacobs, Irwin M.; Weaver, Lindsay A., Jr.; and Gilhousen, Klein S., to Qualcomm, Inc. Dual satellite navigation system. 5,017,926, Cl. 342-353.000.
- Amgen Inc.: *See—*
  - Yen, Kwang-Mu; and Blatt, Lawrence M., 5,017,495, Cl. 435-320.100.
- Ammermann, Eberhard: *See—*
  - Seele, Rainer; Kober, Reiner; Goetz, Norbert; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,594, Cl. 514-383.000.
  - Seele, Rainer; Sauter, Hubert; Kober, Reiner; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,595, Cl. 514-383.000.
- Ammon, James G.; Yurkonis, Philip G.; and Lockwood, Alfred, to Sun Microsystems, Inc. Cable management apparatus for a computer workstation housing. 5,018,052, Cl. 361-428.000.
- Amoco Corporation: *See—*
  - Marcec, Jerome J.; Phillips, James O.; Grzybowski, Albert T.; and Grzybowski, Bohdan, 5,016,467, Cl. 73-56.000.
- AMP Incorporated: *See—*
  - Bowen, Terry P.; and Rowlette, John R., 5,016,966, Cl. 350-96.190.
  - Gerst, Michael; Schroder, Wolfgang; and Bauer, Lothar, 5,016,346, Cl. 29-754.000.
- Ampex Corporation: *See—*
  - Aldrich, William N., 5,016,961, Cl. 350-96.150.
  - Pisharody, Raghavan K.; and Gooch, Beverley R., 5,016,342, Cl. 29-603.000.
- Amrhein, Gerald T.; and Nolan, Paul S., to Babcock & Wilcox Company, The. Dusty environment wet bulb indicator. 5,016,472, Cl. 73-338.000.
- Amway Corporation: *See—*
  - Vanderbilt, Herbert J.; and Modert, Timothy D., 5,017,318, Cl. 264-113.000.
- Anchor Hocking Corporation: *See—*
  - Hayes, Thomas H.; and LoMaglio, Lewis C., 5,016,783, Cl. 222-321.000.
- Anchorlok Corp.: *See—*
  - Bowyer, John P., 5,016,523, Cl. 92-63.000.
- Anders, Robert J.; Cerveny, John G.; and Milkowski, Andrew L., to Oscar Mayer Foods Corporation. Packaged foodstuff containing a lactate salt. 5,017,391, Cl. 426-129.000.
- Andersen, Henrik D.; Dahl, Hans H. M.; and Christensen, Thorkild, to Nordisk Gentofte A/S. DNA sequence. 5,017,493, Cl. 435-252.300.
- Andersen, Roger: *See—*
  - Hildebrand, David F.; Kemp, Thomas R.; Andersen, Roger; and Loughrin, John H., 5,017,386, Cl. 426-18.000.
- Anderson, Duane A.: *See—*
  - Graf, Kevin J.; Hastreiter, James J.; and Anderson, Duane A., 5,017,094, Cl. 417-218.000.

---

- Anderson, Jon V. Can-conveyor system and rinser. 5,017,242, Cl. 134-22.180.
- Anderson, Robert W., to Anson Limited. Pipeline coupling. 5,016,920, Cl. 285-39.000.
- Andersson, Gunnar A.: *See—*
  - Lundstrom, Per-Åke; Andersson, Gunnar A.; West, Åke; and Magi, Juhan, 5,017,218, Cl. 75-388.000.
- Ando, Hideo, to Kabushiki Kaisha Toshiba. Light emitting apparatus having a plurality of light emitting points. 5,018,127, Cl. 369-112.000.
- Ando, Koichi: *See—*
  - Asada, Tomoyuki; Nishida, Kaoru; Shimono, Mamoru; Shinohara, Hideyuki; and Ando, Koichi, 5,016,560, Cl. 118-653.000.
- Ando, Ootaro: *See—*
  - Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.
- Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, to Asahi Kogaku Kogyo K.K. Table assembly for pattern drawing apparatus. 5,017,949, Cl. 354-4.000.
- Andou, Hirokazu; Kikuchi, Hiroshi; and Murakawa, Hiroki, to Oki Electric Industry Co., Ltd. Corrosion suppressing ink ribbon. 5,017,029, Cl. 400-237.000.
- Andrew Corporation: *See—*
  - Dienes, Geza, 5,017,938, Cl. 343-874.000.
  - Sohner, Harold K.; Hoyloak, Joel N.; and Spradling, John T., 5,018,165, Cl. 375-1.000.
- Andrews, Bernard J.: *See—*
  - Newham, Paul; and Andrews, Bernard J., 5,017,937, Cl. 343-785.000.
- Andrews, David R.: *See—*
  - Neustadt, Bernard R.; Andrews, David R.; McNamara, Paul E.; and Watkins, Robert W., 5,017,567, Cl. 514-171.000.
- Angelo Cremona & Figlio S.p.A.: *See—*
  - Cremona, Lorenzo, 5,016,692, Cl. 144-213.000.
- Ansell, Christopher W. G., to Smith & Nephew Associated Companies plc. Adhesive their preparation and use. 5,017,625, Cl. 521-159.000.
- Ansell, Peter J.: *See—*
  - Jenkins, Derek K.; and Ansell, Peter J., 5,017,539, Cl. 502-102.000.
- Anson Limited: *See—*
  - Anderson, Robert W., 5,016,920, Cl. 285-39.000.
- Antelman, Marvin S., to N. Jonas & Co., Inc. Divalent silver bactericide for water treatment. 5,017,295, Cl. 210-764.000.
- Antsena, Irene B.: *See—*
  - Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.
- Aoki, Akio: *See—*
  - Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.
- Aoki, Kazuo: *See—*
  - Suzuki, Akira; Matsuda, Shoichi; Muto, Yasutami; and Aoki, Kazuo, 5,016,688, Cl. 141-170.000.
- Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; and Shimada, Takamichi, to Honda Giken Kogyo Kabushiki Kaisha. Method of determining engine racing and method of preventing engine racing during shift in vehicular automatic transmission. 5,018,068, Cl. 364-424.100.
- Aoyagi, Takayoshi: *See—*
  - Murakami, Fumio; Okazaki, Sadaaki; Aoyagi, Takayoshi; Iwasaki, Tokuji; and Konno, Tetsuya, 5,016,677, Cl. 139-245.000.
- Aoyama, Mitsunobu, to Kabushiki Kaisha Toshiba. Security administrator for automatically updating security levels associated with operator personal identification data. 5,018,096, Cl. 364-900.000.
- Appel, Stanley H.; and Tomozawa, Yasuko, to Baylor College of Medicine. Method to prepare a neurotrophic composition. 5,017,375, Cl. 424-570.000.
- Applegate, Raymond A.; and Bradley, Arthur, to Board of Regents, The University of Texas System. Vascular entoptoscope. 5,016,643, Cl. 128-745.000.
- Applied Motion: *See—*
  - Dick, G. John; and Edwards, Eric A., 5,016,869, Cl. 272-70.000.
- APV Chemical Machinery Inc.: *See—*
  - Loomans, Bernard A.; Kowalczyk, James E.; Lange, Harold A.; and Jones, Jerry W., 5,017,269, Cl. 201-25.000.
- Aqua-Vac Locators, Inc.: *See—*
  - Simons, Billy R.; Turner, Ben K.; and Brell, James T., 5,016,717, Cl. 175-66.000.
- Aquanautics Corporation: *See—*
  - Kerr, John B.; De Castro, Emory S.; and Zenner, Bruce, 5,017,274, Cl. 204-129.000.
- Arahara, Kohzoh: *See—*
  - Kobayashi, Motokazu; Arahara, Kohzoh; Yuasa, Toshiya; Kai, Takashi; and Fukumoto, Hiroshi, 5,017,223, Cl. 106-20.000.
- Arai, Ken-ichi: *See—*
  - Lee, Frank; Yokota, Takashi; Arai, Ken-ichi; Mosmann, Timothy; and Rennick, Donna, 5,017,691, Cl. 535-351.000.
- Arai, Makoto: *See—*
  - Kijima, Takao; Taniguchi, Haruyuki; Arai, Makoto; and Sugitani, Nobuyuki, 5,016,903, Cl. 280-663.000.
- Arai, Naoto: *See—*
  - Kanda, Nobuo; Mandoh, Ritsuo; Nojima, Masaharu; and Arai, Naoto, 5,017,545, Cl. 503-208.000.
- Arai, Osamu: *See—*
  - Shimizu, Nobuo; Kuroda, Michio; Kirikami, Seiichi; Sato, Isao; and Arai, Osamu, 5,016,443, Cl. 60-737.000.
- Arai, Tatsuo: *See—*
  - Tsujimura, Osamu; Arai, Tatsuo; Nakayama, Masaaki; and Okawa, Masayuki, 5,017,055, Cl. 407-113.000.
- Arai, Yoshinobu: *See—*
  - Imaki, Katsuhiro; Arai, Yoshinobu; and Okegawa, Tadao, 5,017,610, Cl. 514-546.000.
  - Kawamura, Masanori; Arai, Yoshinobu; and Aishita, Hideki, 5,017,589, Cl. 514-352.000.
- Arakawa, Toshihiko; Mori, Toshiyuki; and Matsumoto, Yoshihiro, to Tosoh Corporation. Silicon nitride sintered body and process for preparation thereof. 5,017,530, Cl. 501-98.000.
- Araki, Toshihiko: *See—*
  - Harada, Hiroyuki; Matsuura, Yasumasa; Araki, Toshihiko; and Kajitani, Tetsuji, 5,017,850, Cl. 318-599.000.
- Aramaki, Minoru: *See—*
  - Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi; Kodama, Mitsuo; Nakano, Hisaji; and Nakagawa, Shinsuke, 5,017,499, Cl. 436-124.000.
- Aratani, Katsuhisa; Kohno, Minoru; and Watanabe, Kenjiro, to Sony Corporation. Method for reproducing signal using an external magnetic field from magneto-optical recording medium having three magnetic layers. 5,018,119, Cl. 369-13.000.
- ARBA Holding S.A.: *See—*
  - Mombers, Johannes M., 5,017,061, Cl. 409-139.000.
- Arcamone, Federico: *See—*
  - Lazzari, Ettore; Arcamone, Federico; Penco, Sergio; Verini, Maria A.; and Mongelli, Nicola, 5,017,599, Cl. 514-422.000.
- Archibald, Thomas G.: *See—*
  - Baum, Kurt; Archibald, Thomas G.; and Malik, Aslam A., 5,017,734, Cl. 585-21.000.
- Arco Chemical Technology, Inc.: *See—*
  - Usui, Masahiro; and Higashio, Yasuhiko, 5,017,712, Cl. 549-529.000.
- Arctco, Inc.: *See—*
  - Zulawski, Dennis P., 5,016,728, Cl. 181-229.000.
- Arifoglu, Mustafa; and Marmer, William N., to United States of America, Agriculture. Sequential oxidative and reductive bleaching of pigmented and unpigmented fibers. 5,017,194, Cl. 8-111.000.
- Aritech Corporation: *See—*
  - Pantus, Math M. J., 5,017,906, Cl. 340-517.000.
- Arizona Technology Development Corporation: *See—*
  - Hruby, Victor; and Kawasaki, Andrew, 5,017,689, Cl. 530-327.000.
- Arkans, Edward J. Integral pump and check valve apparatus. 5,017,100, Cl. 417-413.000.
- Arlt, Joachim; Dobrusskin, Alexander; Von Scheidt, Jurgen; and Heider, Jurgen, to Patent-Treuhand Gesellschaft fur Elektrische Gluhlampen m.b.H. Illumination system having a low-power high-pressure discharge lamp and power supply combination. 5,017,839, Cl. 315-219.000.
- Arndt, Peter J.: *See—*
  - Rauch, Hubert; Arndt, Peter J.; Klesse, Wolfgang; Krall, Wilhelm; and Frank, Klaus, 5,017,631, Cl. 523-340.000.
- Arnold, Dagmar: *See—*
  - Borel, Georg; and Arnold, Dagmar, 5,016,678, Cl. 139-383.00A.
- Arnold, Victor A. Device and method for maintaining sterility of multi-dose medicament vials. 5,017,186, Cl. 604-48.000.
- Aroonsakul, Chaovanee. Method of diagnosing alzheimer's disease and senile dementia. 5,017,470, Cl. 435-4.000.
- Arroyo, Candido J.; Meskell, David J., Jr.; and Mullin, Francis J., to AT&T Bell Laboratories. Cable closure including superabsorbent foam water blocking system and methods of using same. 5,016,952, Cl. 350-96.200.
- Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH: *See—*
  - Holss, Kurt, 5,017,106, Cl. 417-481.000.
- Artistic Desk Pad & Novelty Co., Inc.: *See—*
  - Mayo, Stephen I., 5,016,760, Cl. 211-55.000.
- Asada, Masahiro: *See—*
  - Tomita, Haruo; Yamashita, Kouichi; Kondo, Takeshi; Suzuki, Noriyuki; Matsumoto, Shigemi; and Asada, Masahiro, 5,017,651, Cl. 525-66.000.
- Asada, Shinji, to Dainippon Screen Mfg. Co. Ltd. Method of and appartus for setting color separation. 5,018,008, Cl. 358-78.000.
- Asada, Tomoyuki; Nishida, Kaoru; Shimono, Mamoru; Shinohara, Hideyuki; and Ando, Koichi, to Kabushiki Kaisha Toshiba. Device for image toner distribution on a developing device. 5,016,560, Cl. 118-653.000.
- Asahi Denka Kogyo K.K.: *See—*
  - Endo, Takeshi; Nambu, Yoko; and Abe, Keiji, 5,017,684, Cl. 528-409.000.
- Asahi Kasei Kogyo kabushiki Kaisha: *See—*
  - Hattori, Yasuo; and Kitagawa, Yuichi, 5,017,660, Cl. 525-338.000.
- Asahi Kogaku Kogyo K.K.: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
  - Hirayama, Yasuhiko; Ogawa, Tetsuro; and Ojima, Satoshi, 5,017,518, Cl. 501-1.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
  - Shindo, Osamu, 5,017,005, Cl. 356-125.000.
- Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; and Kanome, Yuji, to Canon Kabushiki Kaisha. Ink ribbon cassette and recording apparatus which can be loaded with the ink ribbon cassette. 5,017,942, Cl. 346-76.0PH.
- Asakura, Tsutou: *See*—
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,018,018, Cl. 358-213.110.
- Asami, Tadao: *See*—
  - Kume, Toyohiko; Goto, Toshio; Kamochi, Atsumi; Yanagi, Akihiko; Miyauchi, Hiroshi; and Asami, Tadao, 5,017,213, Cl. 71-95.000.
- Ascher, Jay. Removable and disposable extension for a light guide of a dental curing light and its method of use. 5,017,140, Cl. 433-215.000.
- Aschwanden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, to Hoffmann-La Roche Inc. Hydrocinnamic acid derivatives. 5,017,608, Cl. 514-538.000.
- Ascom Autelca AG: *See*—
  - Haueter, Ernst, 5,016,546, Cl. 109-45.000.
- Asea Brown Boveri Ltd.: *See*—
  - Roggwiller, Peter, 5,017,992, Cl. 357-38.000.
- ASGCO Manufacturing, Inc.: *See*—
  - Gibbs, A. Todd, 5,016,746, Cl. 198-499.000.
- Ashaway, Ltd.: *See*—
  - Gilda, Patricia; Mann, William F.; and Allen, Winthrop D., III, 5,016,754, Cl. 206-496.000.
- Asher, Paul M. L.: *See*—
  - Birchall, James D.; Mockford, Mary J.; Stanley, David R.; Asher, Paul M. L.; and McCarthy, William R., 5,017,525, Cl. 501-87.000.
- Ashi, Yoshihiro; and Kanno, Tadayuki, to Hitachi, Ltd. Add drop multiplexer. 5,018,135, Cl. 370-55.000.
- Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; Miyoshi, Jun; and Eri, Masatsugu, to Matsushita Electric Industrial Co., Ltd. Dry cell. 5,017,445, Cl. 429-224.000.
- Ashok, Sankaranarayanan, to Olin Corporation. Copper alloys having improved softening resistance and a method of manufacture thereof. 5,017,250, Cl. 148-411.000.
- Askanazi, Jeffrey. Method for improving ventilation during sleep and treating sleep related ventilation abnormalities. 5,017,616, Cl. 514-561.000.
- Askew, Robert J., to Mustang Industries, Inc. Closure system. 5,016,290, Cl. 2-270.000.
- Assaf, Gad; and Doron, Benjamin, to Geophysical Engineering Company. Method of an means for controlling precipitation in evaporation ponds. 5,017,043, Cl. 405-52.000.
- Assmus, Richard C.: *See*—
  - Brecher, Charles; Assmus, Richard C.; and Brecher, Jonathan S., 5,017,751, Cl. 219-121.520.
- Associated Universities, Inc.: *See*—
  - Palmer, Robert B., 5,017,881, Cl. 328-233.000.
- AT&T Bell Laboratories: *See*—
  - Abrams, Lane J.; Loughran, Kevin; Masukewicz, David W.; and Overstreet, Robert L., Jr., 5,018,184, Cl. 379-29.000.
  - Arroyo, Candido J.; Meskell, David J., Jr.; and Mullin, Francis J., 5,016,952, Cl. 350-96.200.
  - Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Parampdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.
  - Clark, Harold R., 5,017,263, Cl. 156-633.000.
  - Deppe, Dennis G.; Dupuis, Russell D.; and Schubert, Erdmann F., 5,018,157, Cl. 372-45.000.
  - Doyle, Clarence E., 5,017,155, Cl. 439-532.000.
  - Fisher, Thomas S.; and Losty, Martin R., 5,017,917, Cl. 340-825.790.
  - Fishman, David A., 5,017,799, Cl. 307-34.000.
  - Hammond, Rodney W.; Myers, Clyde J.; and Travieso, Ruben, 5,016,968, Cl. 350-96.200.
  - Kriz, John C.; and Tsay, Mean-sea, 5,017,807, Cl. 307-443.000.
  - Marinho, John A.; Pilgrim, Steven J.; and Yu, I-Hsiang, 5,018,187, Cl. 379-60.000.
  - Netravali, Arun N.; and Padmanabhan, Krishnan, 5,018,129, Cl. 370-1.000.
  - Rouse, David M., 5,017,986, Cl. 357-[illegible]000.
  - Saleh, Adel A. M., 5,017,885, Cl. 330-4.300.
  - Shah, Nimish K.; and Singh, Michael P., 5,017,815, Cl. 307-530.000.
  - Verbeek, Robert J. M., 5,017,889, Cl. 331-1.00A.
- Ata, Ali D.: *See*—
  - McKinney, John M.; Ata, Ali D.; Wierzba, Robert B.; and Flowers, William F., 5,016,666, Cl. 137-1.000.
- Atanassov, Atanas K.: *See*—
  - Mitkov, Atanas L.; Georgiev, Ivan N.; Atanassov, Atanas K.; Radulov, Peter T.; and Stoyanov, Iliya Y., 5,017,177, Cl. 460-46.000.
- Athanas, David S.; Groves, Gary W.; Hammoud, Fahrey M.; and Perry, David L., to Monroe Auto Equipment Company. Method and apparatus for controlling shock absorbers. 5,016,908, Cl. 280-707.000.
- Athey, Kevin D.: *See*—
  - Bemis, Suzanne V.; Winer, Ernst A.; Leeds, Jeffrey L.; and Athey, Kevin D., 5,017,142, Cl. 434-220.000.
- Atlantic Richfield Company: *See*—
  - Gerstenkorn, Ralph, 5,016,686, Cl. 141-96.000.
- Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, to Jouveinal S.A. Substituted ethylamines, their preparation process, their use as medicine and their synthesising agents. 5,017,723, Cl. 564-383.000.
- Aubert, Daniel; Blanc, Francis; Desmolin, Henri; Morre, Michel; and Sindely, Lucette, to Sanofi, S. A. Valproic acid preparations. 5,017,613, Cl. 514-557.000.
- Audi, Mauro: *See*—
  - Busso, Mario; and Audi, Mauro, 5,017,836, Cl. 315-111.910.
- Auergesellschaft GmbH: *See*—
  - Dahrendorf, Klaus D.; Kling, Peter; and Kriems, Ulrich, 5,016,627, Cl. 128-205.240.
- Augat, Inc.: *See*—
  - Brouillette, Peter; and Ciufetti, Salvatore D., 5,016,344, Cl. 29-622.000.
- Aumueller, Alexander; Neumann, Peter; and Trauth, Hubert, to BASF Aktiengesellschaft. 2,6-polyalkyl-4-piperidylamides, use thereof as stabilizers, in particular for plastics, and organic material containing same. 5,017,702, Cl. 546-99.000.
- Ausimont S.r.l.: *See*—
  - Chittofrati, Alba; and Lenti, Daria, 5,017,307, Cl. 252-500.000.
  - Navarrini, Walter; and Desmarteu, Darryl D., 5,017,709, Cl. 548-959.000.
- Aust, Hampton L., III: *See*—
  - Thompson, John E.; Gonzalez, Angelo; Bursel, Joseph S.; and Aust, Hampton L., III, 5,016,861, Cl. 267-44.000.
- Australian Wire Industries Pty. .Limited: *See*—
  - Robertson, Malcolm A., 5,017,407, Cl. 427-349.000.
- Autoflug GmbH & Co.: *See*—
  - Nohren, Hubert; Siebrand, Gerhard; and Moritzen, Werner, 5,016,534, Cl. 102-387.000.
- Automotion, Incorporated: *See*—
  - Garzelloni, Thomas L., 5,016,748, Cl. 198-781.000.
- Avanic, Branko: *See*—
  - Ooi, Leng H.; Yeh, Peter J.; and Avanic, Branko, 5,017,897, Cl. 333-204.000.
- AVL AG: *See*—
  - Marsoner, Hermann; Fischer, Fritz; and Kleinhappl, Erich, 5,017,339, Cl. 422-82.040.
- Baarfusser, Johann: *See*—
  - Kuntz, Gunther; and Baarfusser, Johann, 5,017,287, Cl. 210-433.100.
- Babcock Industries Inc.: *See*—
  - Jaksic, Miroslav, 5,016,490, Cl. 74-501.50R.
- Babcock & Wilcox Company, The: *See*—
  - Agarwal, Suresh C., 5,018,086, Cl. 364-557.000.
  - Amrhein, Gerald T.; and Nolan, Paul S., 5,016,472, Cl. 73-338.000.
- Bachmann, Marc R.: *See*—
  - Karmas, Endel; and Bachmann, Marc R., 5,017,387, Cl. 426-43.000.
- Backes, Floyd J.; Varghese, George; and Kaufman, Charles W., to Digital Equipment Corporation. Transparent load sharing for parallel networks. 5,018,137, Cl. 370-85.130.
- Backus, Alan; and Popeil, Ronald, to Popeil Industries, Inc. Method and apparatus for producing subliminal images. 5,017,143, Cl. 434-236.000.
- Bacus, James W., to Cell Analysis Systems, Inc. Analysis method and apparatus for biological specimens. 5,018,209, Cl. 382-6.000.
- Badgley, J. Scott: *See*—
  - Winterbottom, Walter L.; Badgley, J. Scott; and Baumgartner, Linda J., 5,016,809, Cl. 228-205.000.
- Baer, Robert L.; and Kimball, Ben H. Apparatus and method for producing and cleaning an oil well. 5,016,708, Cl. 166-75.100.
- Baermann, Horst, to Rheinmagnet, Horst Baermann, GmbH. Permanent magnetic arrangement for therapeutic purposes. 5,017,185, Cl. 600-15.000.
- Bahrle, Friedrich; Wulf, Helmut; and Kreeb, Helmut, to Daimler-Benz AG. Passenger compartment heating system, in particular bus heating system. 5,016,705, Cl. 165-41.000.
- Bailey, David L.: *See*—
  - Milne, Christopher G.; Shelby, Paulus P., Jr.; and Bailey, David L., 5,017,007, Cl. 356-301.000.
- Bailey, Randall E.: *See*—
  - Stoddard, David C. F.; Robertson, James D.; Spamer, William S.; Hanna, James; Bailey, Randall E.; and Parham, Dennis E., 5,016,761, Cl. 211-59.400.
- Bainbridge, Stephen: *See*—
  - Jerram, Paul A.; and Bainbridge, Stephen, 5,017,891, Cl. 331-88.000.
- Baine, James R. Circular cutting device. 5,016,354, Cl. 30-371.000.
- Bair, Kenneth W., to Burroughs Wellcome Co. Tricyclic derivatives. 5,017,600, Cl. 514-443.000.
- Baker Hughes Incorporated: *See*—
  - Donovan, Joseph F.; and Yates, Donald N., Jr., 5,016,716, Cl. 175-17.000.
- Baker, Marvin B.; and Kirkland, Edmund R. Stabilizer for vertically driven pumps. 5,017,104, Cl. 417-423.120.
- Baker, Roger D.: *See*—
  - Works, Joseph W.; and Baker, Roger D., 5,016,898, Cl. 280-433.000.
- Balatan, Sergio E., to BASF Corporation. Nonionically stabilized polyester urethane resin for water-borne coating compositions. 5,017,673, Cl. 528-59.000.
- Baldacci, Lapo, to Bimak S.p.A. Steam producing machine with improved delivery nozzle especially for heating beverages and rising foam therein. 5,017,759, Cl. 392-386.000.

- Baldwin, Chauncey D.; Shricker, Brian R.; and Ivy, Richard E., to Pitman-Moore, Inc. Poultry growth promotion. 5,017,560, Cl. 514-21.000.
- Balk, Hermann, to Reifenhauser GmbH & Co. Maschinenfabrik. Method and apparatus for stretching thermoplastic films. 5,017,323, Cl. 264-288.400.
- Ballheimer, Benny: *See*—
  - Krikke, Roger D.; Ballheimer, Benny; Jones, Nelson A.; and Stone, Dwight V., 5,017,178, Cl. 464-7.000.
- Balzers Aktiengesellschaft: *See*—
  - Strasser, Gregor; Zohrer, Gerald; Schertler, Roman; and Fischer, Heinrich, 5,017,073, Cl. 414-217.000.
- Bamber, David J., to Colemann Outdoor Products, Inc. Adjustable light. 5,017,327, Cl. 362-389.000.
- Bambule, Raymond: *See*—
  - Alvord, Robert J.; Bambule, Raymond; Orr, Roy W., Jr.; and Sorensen, Thomas L., 5,018,011, Cl. 358-148.000.
- Bankert, Richard B.; and Repasky, Elizabeth A. Microflotation devices used for immunoassays and cell/molecular fractionation. 5,017,472, Cl. 435-7.250.
- Banno, Shigeki: *See*—
  - Tomura, Yoshihiro; and Banno, Shigeki, 5,017,626, Cl. 522-9.000.
- Bansleben, Donald A.; Carter, Charles G.; and Kumar, Ranjit, to W. R. Grace & Co.-Conn. Corrosion inhibitor. 5,017,306, Cl. 252-389.230.
- Barber, Gerald L. Amusement ride. 5,016,540, Cl. 104-53.000.
- Bardford, Judson A., to Bradford Company. Anti-static coated paperboard or similar rigid material. 5,017,260, Cl. 156-308.200.
- Barkan, Edward D.: *See*—
  - Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, 5,017,765, Cl. 235-462.000.
- Barker, Nicholas E.: *See*—
  - Harris, Rano J., Jr.; and Barker, Nicholas E., 5,016,554, Cl. 114-219.000.
- Barkman, William F.: *See*—
  - Ngian, Jenna P. C.; and Barkman, William F., 5,016,375, Cl. 40-642.000.
- Barmag AG: *See*—
  - Muller, Manfred; Neumann, Bernd; and Stuttem, Manfred, 5,017,911, Cl. 340-677.000.
  - Schippers, Heinz; Lenk, Erich; Gerhartz, Siegmar; Schiminski, Herbert; and Turk, Herbert, 5,016,829, Cl. 242-18.00A.
- Barnes, Albert L.: *See*—
  - Clere, Thomas M.; Abbaschian, Gholamreza J.; Wheeler, Douglas J.; and Barnes, Albert L., 5,017,217, Cl. 75-244.000.
- Barnett, Barry R. M.; and Wiffin, Richard E., to TRW United-Carr Limited. Device for fixing bundle of elongate members having noncylindrical outer surface to a support. 5,016,336, Cl. 29-281.500.
- Barnette, Charles J., to Kent Adhesive Products Co. Book binding reinforcement. 5,017,070, Cl. 412-4.000.
- Barot-Ciorbaru, Rita: *See*—
  - Nicolau, Yves-Claude; LePape, Alain; and Barot-Ciorbaru, Rita, 5,017,359, Cl. 424-1.100.
- Barrow, William A.: *See*—
  - Phillips, Norman J.; Leksell, David; Wehrli, Henry A., III; Barrow, William A.; and Kruskopf, Mark S., 5,017,824, Cl. 313-13.000.
- Barsotti, Robert J.; Altschuler, Lili W.; and Harper, Lee R., to Du Pont de Nemours, E. I., and Company. Multi-component coating composition comprising an anhydride containing polymer, a glycidyl component and a monomeric or oligomeric anhydride component. 5,017,435, Cl. 428-502.000.
- Barten, Piet G. J., to U.S. Philips Corporation. Color display tube, deflection system and electron gun. 5,017,843, Cl. 315-368.000.
- Barth, Volker: *See*—
  - Friemel, Wolfgang; Barth, Volker; and Dierks, Hildegund, 5,017,376, Cl. 424-409.000.
- Bartholomew, Richard D.; Pitalo, Stephen K.; and Schaffer, James R., Jr., to Boeing Company, The. Position sensor using optical fibers and a variable filter. 5,017,771, Cl. 250-227.210.
- Bartylla, James G. Cup conveyor. 5,017,052, Cl. 406-88.000.
- Barwise, Robert D. Hydraulic coupling. 5,016,671, Cl. 137-614.040.
- BASF Aktiengesellschaft: *See*—
  - Aumueller, Alexander; Neumann, Peter; and Trauth, Hubert, 5,017,702, Cl. 546-99.000.
  - Grimmer, Johannes; and Kiefer, Hans, 5,017,700, Cl. 544-244.000.
  - Hohmann, Andreas; Reuther, Wolfgang; Fikentscher, Rolf; and Proll, Theo, 5,017,725, Cl. 564-487.000.
  - Kempter, Fritz E.; Matejcek, Franz; Neubach, Werner; and Flory, Klaus, 5,017,641, Cl. 524-598.000.
  - Martan, Hans; Mross, Wolf D.; and Engert, Gerd-Juergen, 5,017,542, Cl. 502-209.000.
  - Seele, Rainer; Kober, Reiner; Goetz, Norbert; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,594, Cl. 514-383.000.
  - Seele, Rainer; Sauter, Hubert; Kober, Reiner; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,595, Cl. 514-383.000.
- BASF Corporation: *See*—
  - Balatan, Sergio E., 5,017,673, Cl. 528-59.000.
- Basile, Peter A.: *See*—
  - Shah, Govind; Basile, Peter A.; Carmen, Ralph H.; and Deschaine, Stephen A., 5,018,131, Cl. 370-1.000.
- Bath Institute of Medical Engineering Limited: *See*—
  - Leyshon, David R., 5,016,862, Cl. 267-136.000.
- Bathelier, Andre : *See*—
  - Textoris, Andre ; Lyaudet, Georges; and Bathelier, Andre , 5,017,344, Cl. 423-10.000.
- Batson, Robert E., to Dexus Research Inc. Applicator for highly reactive materials. 5,016,784, Cl. 222-386.000.
- Baude, Dominique; Chavel, Pierre; Joyeux, Denis; and Taboury, Jean, to Essilor International-Compagnie Generale. Optical lens for correcting astigmatism. 5,016,977, Cl. 350-162.170.
- Bauer, Jamie D., to Scholl, Inc. Merchandise display unit. 5,016,764, Cl. 211-189.000.
- Bauer, Lothar: *See*—
  - Gerst, Michael; Schroder, Wolfgang; and Bauer, Lothar, 5,016,346, Cl. 29-754.000.
- Baugh, William J.: *See*—
  - Parker, J. J.; Tiedeman, Sandy; and Baugh, William J., 5,016,879, Cl. 273-126.00A.
- Baum, Kurt; Archibald, Thomas G.; and Malik, Aslam A. Ethynyl adamantane derivatives and methods of polymerization thereof. 5,017,734, Cl. 585-21.000.
- Baumann Ofstad, Elizabeth: *See*—
  - De Clippeleir, Georges E. M. J.; Baumann Ofstad, Elizabeth; and Kvisle, Steinar, 5,017,543, Cl. 502-328.000.
- Baumgartinger, Josef: *See*—
  - Wanek, Erich; Baumgartinger, Josef; Schobesberger, Manfred; Stadlbauer, Rupert; and Weinrotter, Klaus, 5,017,110, Cl. 425-7.000.
- Baumgartner, Linda J.: *See*—
  - Winterbottom, Walter L.; Badgley, J. Scott; and Baumgartner, Linda J., 5,016,809, Cl. 228-205.000.
- Baxter International Inc.: *See*—
  - Taiariol, Van; Oakley, Robert V.; and Ventura, Peter, 5,017,490, Cl. 435-240.200.
- Baydar, Ertugrul: *See*—
  - Williams, Timothy J.; and Baydar, Ertugrul, 5,018,132, Cl. 370-13.000.
- Bayer Aktiengesellschaft: *See*—
  - Berneth, Horst; Psaar, Hubert; and Jabs, Gert, 5,017,707, Cl. 548-455.000.
  - Haas, Peter; Hettel, Hans; and Ruckes, Andreas, 5,017,623, Cl. 521-128.000.
  - Kohler, Burkhard; Meyer, Rolf-Volker; Dorf, Ernst-Ulrich; Russeler, Wolfgang; and Schmidt, Manfred, 5,017,682, Cl. 528-388.000.
  - Onnenberg, Volker; and Mollmann, Gunter, 5,017,114, Cl. 425-112.000.
  - Schumann, Werner; and Tischer, Werner, 5,017,422, Cl. 428-216.000.
  - Stoltefuss, Jurgen; Bechem, Martin; Gross, Rainer; Hebisch, Siegbert; and Schramm, Matthias, 5,017,590, Cl. 514-356.000.
- Baylor College of Medicine: *See*—
  - Appel, Stanley H.; and Tomozawa, Yasuko, 5,017,375, Cl. 424-570.000.
- Bazakos, Michael E.: *See*—
  - Nasr, Hatem N.; Sadjadı, Firooz A.; Bazakos, Michael E.; and Amehdi, Hossien, 5,018,215, Cl. 382-15.000.
- Beagle, Donald L., Jr. Quick release skateboard backpack. 5,016,794, Cl. 224-211.000.
- Beakley, Westcoat: *See*—
  - Welch, Robert J.; Nattress, Robert H.; Nitkowski, Robert E.; and Beakley, Westcoat, 5,016,948, Cl. 312-250.000.
- Beall, Gary W.: *See*—
  - Powell, Thomas W., Jr.; Schulz, Anthony A.; and Beall, Gary W., 5,017,361, Cl. 424-46.000.
- Bean, Samuel L.; Dulik, Mark D.; and Monopoli, Peter A., to General Chemical Corporation. Method for permanganate bleaching of fabric and garments. 5,017,301, Cl. 252-105.000.
- Beatty, Robert F.: *See*—
  - Scharrer, Joseph K.; Beatty, Robert F.; and Csomor, Arpad, 5,017,023, Cl. 384-114.000.
- Beaumont, M. William. Auxiliary drain and filler device for plastic pools. 5,016,296, Cl. 4-507.000.
- Beaupre, Paul A. Fishing lure having a spinnable buoyant body equipped with reflective surfaced fins. 5,016,387, Cl. 43-42.330.
- Bechem, Martin: *See*—
  - Stoltefuss, Jurgen; Bechem, Martin; Gross, Rainer; Hebisch, Siegbert; and Schramm, Matthias, 5,017,590, Cl. 514-356.000.
- Beck, James M., to Creative Packaging Corp. Side orifice dispensing closure. 5,016,787, Cl. 222-522.000.
- Beck, Maurice: *See*—
  - Lucas, Gary; Beck, Maurice; and Hunt, Andrew, 5,017,879, Cl. 324-663.000.
- Becker, Eberhard; Sprung, Hartwig; and Staggl, Roland, to Mannesmann Aktiengesellschaft. Robot conveyor system. 5,016,407, Cl. 52-126.100.
- Becker, Mark H.; and Maynard, Scott D., to Robotics Automation Consulting Engineering Industries, Inc. Tapping attachment for a punch press. 5,016,335, Cl. 29-57.000.
- Becker, Yigal, to Luxembourg Industries (Pamol) Ltd. Production of 3,5,6-trichloropyridin-2 ol and novel intermediates thereof. 5,017,705, Cl. 546-250.000.
- Beco Engineering Company: *See*—
  - Lerner, Bernard J., 5,017,348, Cl. 423-235.000.
- Becton, Dickinson and Company: *See*—
  - Wagner, Daniel B., 5,017,473, Cl. 435-7.920.
- Beecham Group, p.l.c.: *See*—
  - Grinter, Trevor J.; and Kincey, Peter M., 5,017,701, Cl. 544-276.000.
- Beede Electrical Instrument Co., Inc.: *See*—
  - Brooks, Bradford L., 5,017,862, Cl. 324-146.000.

OL
126
SS
3
MY
21
991
UMI

Begley, Kathi: *See—*
Cashion, Linda; Begley, Kathi; Colby, Wendy; and Morser, Michael J., 5,017,478, Cl. 435-69.100.

BEI Electronics, Inc.: *See—*
Hafle, Ralph S., 5,017,772, Cl. 250-227.210.

Beier, Thomas: *See—*
Woike, Theo; Kerkmann, Detlef; Beier, Thomas; Krasser, Wolfgang; and Pescia, Danilo, 5,016,992, Cl. 350-376.000.

Bekker-Madsen, Per, to R. Ancker Jorgensen A/S. Method and device for dispensing of labels. 5,017,412, Cl. 428-43.000.

Belcher, Bryan L.; and Todman, Michael T., to Rolls-Royce plc. Interturbine duct. 5,016,436, Cl. 60-264.000.

Belknap, James D.; and Ward, Brian S., to Lazerware, Inc. Illuminated jewelry. 5,018,053, Cl. 362-104.000.

Bell Helicopter Textron Inc.: *See—*
Willis, John M., 5,017,912, Cl. 340-679.000.

Bell, Lon E.: *See—*
Gunning, Kevin J.; and Bell, Lon E., 5,017,743, Cl. 200-61.45R.

Belliotti, Thomas R.; and Kostlan, Catherine R., to Warner-Lambert Company. Novel fenamic acid methyl hydroxamate derivatives having cyclooxygenase and 5-lipoxygenase inhibition. 5,017,604, Cl. 514-482.000.

Bemis, Suzanne V.; Winer, Ernst A.; Leeds, Jeffrey L.; and Athey, Kevin D., to United States of America, Navy. Interactive method for testing working memory. 5,017,142, Cl. 434-220.000.

Bender, Kelly M., to Mikros U.S.A., Inc. Knee brace. 5,016,621, Cl. 128-80.00C.

Bendix Europe Services Techniques: *See—*
Gautier, Jean-Pierre, 5,016,520, Cl. 91-471.000.

Beninga, Kelly J.: *See—*
Butler, Barry L.; and Beninga, Kelly J., 5,016,998, Cl. 350-608.000.

Bennett, Allan I.: *See—*
Engel, Joseph C.; Mueller, Denis A.; and Bennett, Allan I., 5,017,859, Cl. 324-127.000.

Bennett, Eugene R.: *See—*
Peters, Thomas E.; Logan, James D.; Bennett, Eugene R.; Dieter, Clarence L.; and Henckel, David J., 5,017,312, Cl. 264-24.000.

Bently Nevada Corp.: *See—*
Schutts, Mark E., 5,016,343, Cl. 29-605.000.

Bentz, Helmut, to O & K Orenstein & Koppel Aktiengesellschaft. Arrangement for connecting and moving the plates of a caterpillar track of earth-moving machines. 5,016,945, Cl. 305-58.0PC.

Berardi, Giovanni. Filtering hood for kitchen cookers, fitted with ionic filtering unit. 5,016,612, Cl. 126-299.00D.

Berg, Kjell E.: *See—*
Minor, Robert N.; and Berg, Kjell E., 5,017,042, Cl. 405-50.000.

Berge, Harald. Coin or token-released gaming machine. 5,016,880, Cl. 273-138.00A.

Bergeon, Gerard: *See—*
du Chene, Arnaud; Dias, Bernard; and Bergeon, Gerard, 5,018,091, Cl. 364-726.000.

Berger, Joachim; and Gerstung, Ulrich, to Robert Bosch GmbH. Brake stop light circuit arrangement for a vehicle having electronic diesel control. 5,016,587, Cl. 123-359.000.

Berkeley, James E., to Shopsmith, Inc. Speed reduction device. 5,017,180, Cl. 474-84.000.

Berlex Laboratories, Inc.: *See—*
Cashion, Linda; Begley, Kathi; Colby, Wendy; and Morser, Michael J., 5,017,478, Cl. 435-69.100.

Berman, Arthur L.: *See—*
Kalmanash, Michael; and Berman, Arthur L., 5,016,985, Cl. 350-335.000.

Bernasek, Edward; Hildebolt, William M.; Shannon, Michael D.; Shelar, Gary R.; and White, Jackie L., to R. J. Reynolds Tobacco Company. Flavor substances for smoking articles. 5,016,654, Cl. 131-302.000.

Berneth, Horst; Psaar, Hubert; and Jabs, Gert, to Bayer Aktiengesellschaft. Tetraindolylheptamethine dyestuff32. 5,017,707, Cl. 548-455.000.

Bernier, Lucien. Apparatus for centering template guide on router. 5,016,691, Cl. 144-134.00D.

Berris, Richard E., Jr.: *See—*
Hazony, Dov; and Berris, Richard E., Jr., 5,016,474, Cl. 73-597.000.

Bertiger, Bary R.; Leopold, Raymond J.; and Peterson, Kenneth M., to Motorola, Inc. Multiple beam deployable space antenna system. 5,017,925, Cl. 342-352.000.

Bertrandie, Alain M.; Bird, Thomas G. C.; Jung, Frederic H.; and Lohmann, Jean-Jacques M., to ICI Pharma. Cephalosporin derivatives. 5,017,569, Cl. 514-206.000.

Besso, Michael M.: *See—*
Marikar, Y. M. Faruq; and Besso, Michael M., 5,017,420, Cl. 428-212.000.

Bethlehem Steel Co.: *See—*
Bramfitt, Bruce L.; and Hansen, Steven S., 5,017,335, Cl. 420-127.000.

Beyel, Stephen: *See—*
Insetta, Victor; Monsorno, Richard V.; Davis, Donald J., Jr.; and Beyel, Stephen, 5,018,047, Cl. 361-277.000.

Bezos, Angel P., to Pulse Electronics, Inc. Method to authorize a head of train unit to transmit emergency commands to its associated rear unit. 5,016,840, Cl. 246-187.00R.

BF Goodrich Company, The: *See—*
Wilson, Gary F.; and Eckstein, Yona, 5,017,629, Cl. 523-219.000.

Bhatnagar, Ranbir K.: *See—*
Cannon, Joseph G.; Bhatnagar, Ranbir K.; and Long, J. Paul, 5,017,602, Cl. 514-452.000.

Bieger, Walter I.: *See—*
Larson, Vada J.; Larson, Roger L.; and Bieger, Walter I., 5,016,559, Cl. 116-234.000.

Bielawski, Billy J., Sr.: *See—*
Riera, John F.; Bielawski, Billy J., Sr.; and Pavelec, John J., 5,016,507, Cl. 83-384.000.

Bietry, Joseph R.: *See—*
Merritt, Edward J., Jr.; Samuels, Joan E.; and Bietry, Joseph R., 5,017,012, Cl. 356-371.000.

Biggs, John D.; and Twain, Kenneth M., to Lamp Technologies, Inc. Touch initiated light module. 5,018,057, Cl. 362-295.000.

Bilgrien, Carl J.; and Lee, Chi-long, to Dow Corning Corporation. Polycyclosiloxanes containing silacyclobutane. 5,017,671, Cl. 528-21.000.

Billbury, Ronald R.: *See—*
Zimmer, Anita F.; and Billbury, Ronald R., 5,01o,859, Cl. 254-134.30R.

Biller, Scott A.: *See—*
Karanewsky, Donald S.; Biller, Scott A.; and Gordon, Eric M., 5,017,716, Cl. 556-405.000.

Billino, Susanne: *See—*
Herrmann, Heinz; and Billino, Susanne, 5,017,457, Cl. 430-272.000.

Bills, William D.; Christini, Theodore P.; Kellogg, Reid E.; Maynard, Richard B.; and Zegarski, William J., to E. I. de Pont de Nemours and Company. Adhesion between phosphor and topcoat layers of an X-ray intensifying screen. 5,017,440, Cl. 428-690.000.

Bimak S.p.A.: *See—*
Baldacci, Lapo, 5,017,759, Cl. 392-386.000.

Bingham, Curt G.: *See—*
Dalebout, William T.; and Bingham, Curt G., 5,016,871, Cl. 272-73.000.

Bioboat AB: *See—*
Svensson, Sigfrid, 5,017,237, Cl. 134-4.000.

Biogen, Inc.: *See—*
Gilbert, Walter; Fisher, Richard A.; Sato, Vicki L.; and Ramachandran, Kuzhalmannam L., 5,017,688, Cl. 530-326.000.

Biondo, John V., Jr., to PVI, Inc. Automatic photographic apparatus and automatic frame dispensing machine. 5,017,953, Cl. 354-83.000.

Bionetics Corporation, The: *See—*
Taback, Israel, 5,016,479, Cl. 73-862.450.

BioTechnica International, Inc.: *See—*
Sloma, Alan; Lee, Rosalind C.; and Pero, Janice, 5,017,477, Cl. 435-69.100.

Birchall, James D.; Mockford, Mary J.; Stanley, David R.; Asher, Paul M. L.; and McCarthy, William R., to Imperial Chemical Industries PLC. Production of ceramic materials and of precursor therefor. 5,017,525, Cl. 501-87.000.

Bird, Thomas G. C.: *See—*
Bertrandie, Alain M.; Bird, Thomas G. C.; Jung, Frederic H.; and Lohmann, Jean-Jacques M., 5,017,569, Cl. 514-206.000.

Birkmair, Hubert, to MAN Roland Druckmaschinen AG. Adjustable longitudinal folding former system. 5,016,863, Cl. 270-41.000.

Bissell Amfab, Inc.: *See—*
Solomon, Robert A., 5,016,846, Cl. 248-161.000.

Bissell Inc.: *See—*
Bledsoe, Susan G.; and Goodrich, Gordon W., 5,016,315, Cl. 15-410.000.

Bitritto, Michel: *See—*
Wadhwa, Lachman; Bitritto, Michel; and Powers, Edward J., 5,017,681, Cl. 528-342.000.

Bivens Winchester Corporation: *See—*
Crotts, Lonnie M.; and Rambo, William W., 5,016,662, Cl. 134-45.000.

Bjoerk, Erik; and Wiklund, Ola, to Siemens Aktiengesellschaft. X-ray film magazine. 5,018,183, Cl. 378-173.000.

Bladon, John J., to Shipley Company Inc. Printed circuit board. 5,017,742, Cl. 174-266.000.

Blaese, Herbert R. Portable antenna. 5,017,934, Cl. 343-713.000.

Blanc, Francis: *See—*
Aubert, Daniel; Blanc, Francis; Desmolin, Henri; Morre, Michel; and Sindely, Lucette, 5,017,613, Cl. 514-557.000.

Bland, David G.; and Conte, Joseph J., to Dow Chemical Company, The. Sulfone polymer foam produced with aqueous blowing agent. 5,017,622, Cl. 521-79.000.

Blank, Paul C.: *See—*
Steinhagen, Horst G.; and Blank, Paul C., 5,016,724, Cl. 180-197.000.

Blatt, Lawrence M.: *See—*
Yen, Kwang-Mu; and Blatt, Lawrence M., 5,017,495, Cl. 435-320.100.

Blease, Wilfred J., to Pioneer Plastics, Inc. Self-powered bait trolling mechanism. 5,016,385, Cl. 43-26.100.

Bledsoe, Susan G.; and Goodrich, Gordon W., to Bissell Inc. Floor cleaning device with improved handle grip. 5,016,315, Cl. 15-410.000.

Blish, Nelson A. Variable intake and exhaust engine. 5,016,583, Cl. 123-190.0BC.

Bliss, Erlan S.; Smith, James R.; Salmon, J. Thaddeus; and Monjes, Julio A., to United States of America, Energy. Partially segmented deformable mirror. 5,016,997, Cl. 350-607.000.

Blitshteyn, Mark: *See—*
Wright, William S.; and Blitshteyn, Mark, 5,017,876, Cl. 324-464.000.

Block, Karl-Heinz, to Zinser Textilmaschinen GmbH. Apparatus for automatically transporting textile laps to a comber. 5,017,075, Cl. 414-225.000.

Block Systems Inc.: *See—*
Sievert, Dick J., 5,017,049, Cl. 405-284.000.

Blue Arrown Enterprises, Inc.: *See—*
Thorndike, Charles E.; and Holopainen, Vaino J., 5,017,080, Cl. 414-454.000.

Blum, Yigal D.; and Laine, Richard M., to SRI International. Process for making ceramic materials. 5,017,529, Cl. 501-95.000.

Board of Regents, The Uni. of Texas System: *See—*
Marcus, Harris L., 5,017,317, Cl. 264-81.000.

Board of Regents, The University of Texas System: *See—*
Applegate, Raymond A.; and Bradley, Arthur, 5,016,643, Cl. 128-745.000.
Deckard, Carl R., 5,017,753, Cl. 219-121.630.
Frautschi, Jack; and Tingey, Kevin, 5,017,670, Cl. 527-313.000.
McDavid, W. Doss; Dove, S. Brent; Welander, Ulf; and Tronje, Gunilla, 5,018,177, Cl. 378-62.000.

Boardman, Perry K. Multi-directional exercise device. 5,016,874, Cl. 272-137.000.

Bodor, Nicholas S., to University of Florida. Redox systems for brain-targeted drug delivery. 5,017,566, Cl. 514-58.000.

Bodor, Nicholas S., to University of Florida. Labile derivatives of ketone analogs of 3-substituted-1-alkylamino-2-propanols and their use as beta-adrenergic blockers. 5,017,618, Cl. 514-640.000.

Bodzin, Leon J.: *See—*
Mackelburg, Gerald R.; Bodzin, Leon J.; McCracken, Howard B.; and Diamond, Anthony E., 5,018,114, Cl. 367-134.000.

Boeing Company, The: *See—*
Bartholomew, Richard D.; Pitalo, Stephen K.; and Schaffer, James R., Jr., 5,017,771, Cl. 250-227.210.
Pinson, George T., 5,016,537, Cl. 102-443.000.

Boggs, Michael S. Automatic flossing tool. 5,016,660, Cl. 132-322.000.

Boilot, Jean-Pierre: *See—*
Chaput, Frederic; and Boilot, Jean-Pierre, 5,017,534, Cl. 501-134.000.

Bok, Hendrik F., to Union Carbide Chemicals and Plastics Technology Corporation. Method of conformal coating. 5,017,409, Cl. 427-424.000.

Boler Company, The: *See—*
Cadden, Robert L., 5,016,906, Cl. 280-680.000.

Bollmann, Dieter, to Bollmann Hydraulik GmbH. Ball bearig gears. 5,016,487, Cl. 74-206.000.

Bollmann Hydraulik GmbH: *See—*
Bollmann, Dieter, 5,016,487, Cl. 74-206.000.

Bombardier, Wanda K.; Ferryman, Kim; and Khalil, Nessim, to Eskimo Pie Corporation. Sugar free chocolate coating. 5,017,392, Cl. 426-659.000.

Bonello, Philippe, to Sarcem Automation. Altimeter. 5,016,473, Cl. 73-387.000.

Bonfield, William; Bowman, Jeremy A.; and Grynpas, Marc D., to National Research Development Corporation. Composite material for use in orthopaedics. 5,017,627, Cl. 523-115.000.

Bonko, Mark L.; and Lopp, Loran C., Jr., to Goodyear Tire & Rubber Company, The. Self-cleaning tire tread. 5,016,696, Cl. 152-209.00B.

Bonnice, Richard; and Spector, George. Timed refrigerator lock. 5,016,453, Cl. 70-93.000.

Bonnichsen, Fritz F.: *See—*
Simon, Bernd; Holm, Niels E.; and Bonnichsen, Fritz F., 5,017,190, Cl. 604-207.000.

Boot, Phillip; Hurst, Dare; and Lasseter, Robert, to Panelbrick Industries Pty. Ltd. Brick placing machine. 5,016,419, Cl. 52-749.000.

Booth, Bruce L., to Du Pont de Nemours, E. I., and Company. Optical switch having a phase change region therein. 5,016,958, Cl. 350-96.130.

Bopp, Richard C., to General Electric Company. Polyphenylene ether resins and compositions having reduced odor and method of reducing odor in same. 5,017,656, Cl. 525-149.000.

Bordone, Christina: *See—*
Lebrun, Jean-Jacques; and Bordone, Christina, 5,017,640, Cl. 524-588.000.

Borel, Georg; and Arnold, Dagmar, to Hermann Wangner GmbH & Co. Double-layer papermaking fabric having a single system of non-symmetrically extending longitudinal threads. 5,016,678, Cl. 139-383.00A.

Borey, Robert E.: *See—*
Bustance, William G.; and Borey, Robert E., 5,016,657, Cl. 132-202.000.

Borg-Warner Automotive, GmbH: *See—*
Leitz, Hermann, 5,016,741, Cl. 192-45.100.

Borghi, Italo: *See—*
Fiore, Leonardo; Borghi, Italo; and Mattiussi, Andrea, 5,017,657, Cl. 525-173.000.

Bornemann, Gert; and Heibel, Hans-Jurgen, to Metallgesellschaft Aktiengesellschaft. Fluidizing combustion chamber. 5,016,576, Cl. 122-4.00D.

Borngen, Lutz, to Rheinmetall GmbH. Bomblet projectile including a stabilization band. 5,016,533, Cl. 102-386.000.

Borst, Gaylord M., to Outboard Marine Corporation. Crankshaft driven compressor for supplying air to a fuel injection mechanism. 5,016,597, Cl. 123-533.000.

Bossa, David W. Playswing assembly. 5,016,873, Cl. 272-85.000.

Bossmann, Adelgund; and Schollmeyer, Eckard, to German Textile Research Center North-West. Fiber, filament, yarn and/or flat articles and/or nonwoven material containing these, as well as a process for producing the former. 5,017,423, Cl. 428-224.000.

Bostrom, Alan G.: *See—*
Mohlenbrock, William C.; Farley, Peter J.; Frye, Lawrence J.; Trummell, Donald E., Jr.; and Bostrom, Alan G., 5,018,067, Cl. 364-413.020.

Botsch, Susan. Personalized pet animal memorial product. 5,016,330, Cl. 27-1.000.

Bouchard, Andre C.; and Waymouth, John F., to GTE Products Corporation. Glow discharge lamp with getter material or anode. 5,017,831, Cl. 313-558.000.

Boulanger, Claude. Emergency evacuation harness. 5,016,299, Cl. 5-81.00R.

Boumendil, Frank, to Gordon, Michel, a part interest. Protective cap for a hypodermic syringe. 5,017,189, Cl. 604-192.000.

Boussemart, Jean-Pierre: *See—*
Goud, Gilles R.; and Boussemart, Jean-Pierre, 5,016,902, Cl. 280-630.000.

Bovee, Loren L.; and Weber, Larry J., to Fisher Controls International, Inc. Control element for a ball valve. 5,016,857, Cl. 251-304.000.

Bowen, Terry P.; and Rowlette, John R., to AMP Incorporated. Asymmetic optical fiber tap. 5,016,966, Cl. 350-96.190.

Bowman, Jeremy A.: *See—*
Bonfield, William; Bowman, Jeremy A.; and Grynpas, Marc D., 5,017,627, Cl. 523-115.000.

Bowman, Timothy S., to Butler Manufacturing Company. Membrane for outlet fittings. 5,017,153, Cl. 439-426.000.

Bowsky, Benjamin: *See—*
Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, 5,017,740, Cl. 174-152.0GM.

Bowyer, John P., to Anchorlok Corp. Adjustable mounting apparatus for air-operated diaphragm brakes. 5,016,523, Cl. 92-63.000.

Boyd, Andrew J.; and Webster, Andrea M., to CMB Packaging (UK) Limited. Resistance welding apparatus. 5,017,749, Cl. 219-64.000.

Boyd, David B.: *See—*
Gilat, Ronen; and Boyd, David B., 5,016,801, Cl. 226-197.000.

Boyd, Gary L.: *See—*
Ruggles, John F.; and Boyd, Gary L., 5,017,022, Cl. 384-100.000.

BP Chemicals Limited: *See—*
O'Connor, Sean P., 5,017,298, Cl. 252-47.000.

Braat, Josephus J. M., to U.S. Philips Corporation. Projection-lens system. 5,016,994, Cl. 350-432.000.

Bradford Company: *See—*
Bardford, Judson A., 5,017,260, Cl. 156-308.200.

Bradley, Arthur: *See—*
Applegate, Raymond A.; and Bradley, Arthur, 5,016,643, Cl. 128-745.000.

Bradley, Ralph E. Wedging tree stand. 5,016,733, Cl. 182-187.000.

Bramfitt, Bruce L.; and Hansen, Steven S., to Bethlehem Steel Co. Microalloyed steel and process for preparing a railroad joint bar. 5,017,335, Cl. 420-127.000.

Brannstrom, Roine, to ABB Stal AB. Method of controlling a PFBC plant in the event of operational disturbance in the gas turbine unit. 5,016,435, Cl. 60-39.050.

Branson International Plasma Corporation: *See—*
Reichelderfer, Richard F., deceased; McOmber, Janice I.; Ryan, Andrew P.; and Davies, John T., 5,016,332, Cl. 29-25.010.

Braquet, Pierre: *See—*
Godfroid, Jean-Jacques; Braquet, Pierre; and Heymans, Francoise, 5,017,588, Cl. 514-336.000.

Brar, Amarjit S.; and Narayan, Prativadi B., to Seagate Technology, Inc. Micro-contamination-free coating for die-cast component in magnetic disk drive. 5,017,439, Cl. 428-629.000.

Brecher, Charles; Assmus, Richard C.; and Brecher, Jonathan S., to GTE Laboratories Incorporated. Inductively-coupled RF plasma torch. 5,017,751, Cl. 219-121.520.

Brecher, Jonathan S.: *See—*
Brecher, Charles; Assmus, Richard C.; and Brecher, Jonathan S., 5,017,751, Cl. 219-121.520.

Bredow, Charles W.; Schindler, Frederick J.; and Warburton, Charles E., Jr., to Rohm and Haas Company. Water-based composites with superior cure in thick films, and chemical and shock resistance. 5,017,632, Cl. 523-400.000.

Breen, Christine O.; and Breen, Joseph M. Ironing board having swingable extensions and a detachable suspended table, for ironing trousers, shirts, and large items. 5,016,367, Cl. 38-135.000.

Breen, Joseph M.: *See—*
Breen, Christine O.; and Breen, Joseph M., 5,016,367, Cl. 38-135.000.

Brell, James T.: *See—*
Simons, Billy R.; Turner, Ben K.; and Brell, James T., 5,016,717, Cl. 175-66.000.

Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z. Ethyl-3-(2-ethyl-2,2-dimethylhydrazinium)-propionate salts to treat arrhythmia. 5,017,611, Cl. 514-551.000.

Brendel, Thomas E.: *See—*
Lane, L. Thomas; Fraser, Bruce A.; and Brendel, Thomas E., 5,016,447, Cl. 62-470.000.

Breuil, Jean-Pierre: *See—*
Keromnes, Bernard; and Breuil, Jean-Pierre, 5,017,003, Cl. 356-53.000.

Breuil, S.A.: *See—*
Keromnes, Bernard; and Breuil, Jean-Pierre, 5,017,003, Cl. 356-53.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Breuleux, Gerald, legal representative: *See—*
  Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Paul A.; and Breuleux, Gerald, legal representative, 5,017,582, Cl. 514-305.000.
Breunig, Charles F.: *See—*
  Stiefel, Werner K.; and Breunig, Charles F., 5,017,366, Cl. 424-59.000.
Brewer, Peter D.; and Zinck, Jennifer J., to Hughes Aircraft Company. Excimer laser ablation method and apparatus for microcircuit fabrication. 5,018,164, Cl. 372-109.000.
Bridgestone Corporation: *See—*
  Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.
  Iwasaki, Shizuo; and Inada, Norio, 5,016,698, Cl. 152-527.000.
Bridle, Ronald J.: *See—*
  Myles, Bernard; and Bridle, Ronald J., 5,017,047, Cl. 405-259.000.
Briggs, Jeffrey M. Gutter and bracket assembly. 5,016,404, Cl. 52-12.000.
Brighton, Richard W., to Rainier International, Inc. Non-lethal practice round for automatic and semiautomatic firearms. 5,016,536, Cl. 102-430.000.
Brillinger, Martin; Hiller, Wolfgang; Klingelhoefer, Ulrich; and Radtke, Manfred, to Mero-Werke Dr. Ing. Max Mengeringhausen GmbH & Co. Sealed wall connection to raised floor for use in germ-free chambers or the like. 5,016,408, Cl. 52-126.600.
Bringer-Meyer, Stephanie; and Sahm, Hermann, to Forschungszentrum Juelich GmbH. Process for obtaining sorbitol and gluconic acid by fermentation, and cell material suitable for this purpose. 5,017,485, Cl. 435-158.000.
Brinkman, Karl M.; Sullivan, John L.; and Hanley, David R. Alkyl salicylate developer resin for carbonless copy paper and imaging use. 5,017,546, Cl. 503-211.000.
British Nuclear Fuels plc: *See—*
  Gilchrist, Paul; and Hodgson, Graham, 5,017,345, Cl. 423-18.000.
British Telecommunications public limited company: *See—*
  Marshall, Ian W.; and Constantine, Philip D., 5,016,965, Cl. 350-96.180.
Brooks, Bradford L., to Beede Electrical Instrument Co., Inc. Air-core meter having improved bobbin design. 5,017,862, Cl. 324-146.000.
Brooks, Lawrence W.; and Dwenger, Thomas A., to Goodyear Tire & Rubber Company, The. Aircraft tire having asymmetric tread. 5,016,838, Cl. 244-103.00R.
Brooks, Rodney R., to International Paint public limited company. Process for inhibiting fouling of an underwater surface. 5,017,322, Cl. 264-255.000.
Brophy, Thomas G.: *See—*
  Gregory, Jonathan M.; and Brophy, Thomas G., 5,017,208, Cl. 65-277.000.
Brother Kogyo Kabushiki Kaisha: *See—*
  Harada, Yuichi, 5,017,031, Cl. 400-636.100.
  Horie, Fujio; and Matsubara, Kenji, 5,016,550, Cl. 112-454.000.
  Katoh, Tokunori, 5,017,958, Cl. 355-27.000.
  Ohashi, Tsuyoshi, 5,018,154, Cl. 372-29.000.
  Yoshida, Hitoshi; Kawamoto, Naoyuki; and Kanegae, Takahiro, 5,018,217, Cl. 382-22.000.
Brouillette, Peter; and Ciufetti, Salvatore D., to Augat, Inc. Method for constructing a miniature dual in-line package electrical switch. 5,016,344, Cl. 29-622.000.
Brown, Earnest D. Vapor treatment facilities for petroleum storage tank cleaning. 5,017,240, Cl. 134-22.100.
Brown, Jack E. Lockable clothing. 5,016,284, Cl. 2-69.000.
Brown, Kenneth; and Riley, Richard E., to Hamilton Standard Controls, Inc. Rotary digital contact encoder substrate. 5,017,741, Cl. 174-260.000.
Brown, Ralph E.; Canahuati, Marlene; and Jackson, Roy J., to Shell Oil Company. Pipe rehabilitation using epoxy resin composition. 5,017,258, Cl. 156-294.000.
Brown, Robert S.: *See—*
  Martin, James W.; Brown, Robert S.; Buck, E. Lance; and Del Corso, Gregory J., 5,017,437, Cl. 428-558.000.
Brown, Ronald E.; and Grinwis, Jack M. Limb protective covering. 5,016,648, Cl. 128-846.000.
Brown, Scott H.: *See—*
  Kolts, John H.; Tooley, Patricia A.; and Brown, Scott H., 5,017,357, Cl. 423-437.000.
Brown & Williamson Tobacco Corporation: *See—*
  McMurtrie, Andrew, 5,016,656, Cl. 131-364.000.
Browne, Alan L.; and Chin, Yuen-Kwok, to General Motors Corporation. Braking indicator system. 5,017,904, Cl. 340-479.000.
Brugel, Edward G., to E.I. du Pont de Nemours and Company. Process for extracting metal residue from poly(ether ketone ketones). 5,017,685, Cl. 528-480.000.
Brunetto, Thomas; and Spector, George. Air vent opener. 5,016,504, Cl. 81-488.000.
Brunner, Michael G., to Westinghouse Electric Corp. Fiber-optic heater probe assembly for heat treating metallic conduits. 5,017,761, Cl. 219-502.000.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., to Eastman Kodak Company. X-ray intensifying screen including a titanium activated hafnium dioxide phosphor containing yttrium to reduce afterglow. 5,017,791, Cl. 250-483.100.
Buchanan, Robert C.: *See—*
  Aldrich, Donald C.; Buchanan, Robert C.; and Sollinger, John F., 5,016,516, Cl. 87-8.000.
Buchanan, Walter R.: *See—*
  Dodt, Darcy T.; and Buchanan, Walter R., 5,017,508, Cl. 437-173.000.
Buchholz, Rainer: *See—*
  Zodrow, Rudolf; and Buchholz, Rainer, 5,017,261, Cl. 156-568.000.
Buchtel, Dean H.: *See—*
  McAllise, Gregg A.; and Buchtel, Dean H., 5,016,316, Cl. 15-412.000.
Buck, Daniel C.; and Stitzer, Steven N., to Westinghouse Electric Corp. Magnetostatic wave (MSW) filter with sharp upper cut-off frequency and channelizer formed therefrom. 5,017,895, Cl. 333-134.000.
Buck, E. Lance: *See—*
  Martin, James W.; Brown, Robert S.; Buck, E. Lance; and Del Corso, Gregory J., 5,017,437, Cl. 428-558.000.
Buckshaw, Dennis J. Safety cap for electrical outlet. 5,017,148, Cl. 439-148.000.
Budenbender, Bernd. Bung-type container. 5,016,775, Cl. 220-288.000.
Budinger, William D. Method and apparatus for determination and display of critical gas supply information. 5,016,483, Cl. 73-865.100.
Bull Hn Information Systems Inc.: *See—*
  Ryan, Charles P.; Howell, Thomas H.; Pan, Andrew Y.; and Rolston, David W., 5,018,075, Cl. 364-513.000.
Bulloch, Russell G.; and Garrick, Craig K. Exercise device. 5,016,870, Cl. 272-73.000.
Bullock, James F.: *See—*
  Mowforth, Clive W.; Bullock, James F.; and Maternaghan, Trevor J., 5,017,469, Cl. 430-569.000.
Bulso, Joseph D., Jr.; and Lewers, William R., to Redicon Corporation. Method for multidirectional sheet feeding. 5,016,506, Cl. 83-35.000.
Bundgaard, Hans: *See—*
  Hansen, Kristian T.; Bundgaard, Hans; and Faarup, Peter, 5,017,571, Cl. 514-213.000.
Burenga, Thomas I., to Worksaver, Inc. Method for manufacturing reinforced tines. 5,016,350, Cl. 29-891.200.
Burgess, Roy T.; Campau, Gregory P.; Claar, Leslie M.; Hodges, Robert C.; Snow, Douglas G.; and Taylor, Roy, to Vickers, Incorporated. Power transmission. 5,017,095, Cl. 417-222.00R.
Burke, Edmund T.: *See—*
  DiLeo, Anthony J.; Allegrezza, Anthony E., Jr.; and Burke, Edmund T., 5,017,292, Cl. 210-645.000.
Burns, Douglas: *See—*
  Curtis, Joe E., Jr.; Burns, Douglas; and Cloyd, John E., 5,016,832, Cl. 242-58.600.
Burns, James W.; Cox, Steven; and Walts, Alan E., to Genzyme Corporation. Water insoluble derivatives of hyaluronic acid. 5,017,229, Cl. 106-162.000.
Burow, Charles F., to Cosca, Richard A. Painter's hip level pail carrier. 5,016,791, Cl. 224-148.000.
Burr-Brown Corporation: *See—*
  Matsusako, Kyoji, 5,017,918, Cl. 341-118.000.
Burress, Deborah S.: *See—*
  Burress, J. David; and Burress, Deborah S., 5,016,388, Cl. 47-23.000.
Burress, J. David; and Burress, Deborah S. Protective tree guard. 5,016,388, Cl. 47-23.000.
Burroughs Wellcome Co.: *See—*
  Bair, Kenneth W., 5,017,600, Cl. 514-443.000.
  Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., 5,017,577, Cl. 514-263.000.
Burrows, James L., to Lockheed Sanders, Inc. Comparison circuit. 5,018,099, Cl. 365-49.000.
Bursel, Joseph S.: *See—*
  Thompson, John E.; Gonzalez, Angelo; Bursel, Joseph S.; and Aust, Hampton L., III, 5,016,861, Cl. 267-44.000.
Burton, William L.: *See—*
  Chen-Tsai, Charlotte H.; Sanchez, Isaac C.; and Burton, William L., 5,017,411, Cl. 428-36.600.
Busso, Mario; and Audi, Mauro, to Varian, S.p.A. Electronic feeder for an ion pump. 5,017,836, Cl. 315-111.910.
Bustance, William G.; and Borey, Robert E., to Totally, Inc. Hair treatment process and end wrap laminate. 5,016,657, Cl. 132-202.000.
Butler, Barry L.; and Beninga, Kelly J., to Science Applications International Corporation. Focus control system for stretched-membrane mirror module. 5,016,998, Cl. 350-608.000.
Butler Manufacturing Company: *See—*
  Bowman, Timothy S., 5,017,153, Cl. 439-426.000.
Byers, David J.; and Penny, John R., to GEC (New Zealand) Limited. Current controlled inverter. 5,017,855, Cl. 318-811.000.
C.A. Blockers, Inc.: *See—*
  Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, 5,016,655, Cl. 131-310.000.
C. B. Labs, Inc.: *See—*
  Christian, David E., 5,018,204, Cl. 381-74.000.
C. Gerhardt Fabrik & Lager Chemischer Apparate GmbH & Co K.G.: *See—*
  Langer, Alfred, 5,017,500, Cl. 436-178.000.
C & K Systems, Inc.: *See—*
  Mousavi, Ali R., 5,017,783, Cl. 250-353.000.
Cadden, Robert L., to Boler Company, The. Suspension adjustment. 5,016,906, Cl. 280-680.000.
Cadwell, Gilbert C., to Rohr Industries, Inc. Method and apparatus for dual superplastic forming of metal sheets. 5,016,805, Cl. 228-118.000.
Calam, Bruce T.; and Karlowee, Rudy, to TNS Holdings Ltd.; and RHC Investments Ltd. Interlocking roofcurb joint. 5,016,406, Cl. 52-58.000.

Calaresu, Paolo: *See—*
  Messina, Giuseppe; Lorenzoni, Loreno; Calaresu, Paolo; and Sechi, Giovanni M., 5,017,721, Cl. 564-151.000.
Calhoun, Clyde D.; and Koskenmaki, David C., to Calhoun, Clyde D. Method of transferring an inorganic image. 5,017,255, Cl. 156-230.000.
Call, Dirk B.: *See—*
  Ness, Dale C.; and Call, Dirk B., 5,016,466, Cl. 73-4.00R.
Calvet, Alain P.: *See—*
  Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.
Campau, Gregory P.: *See—*
  Burgess, Roy T.; Campau, Gregory P.; Claar, Leslie M.; Hodges, Robert C.; Snow, Douglas G.; and Taylor, Roy, 5,017,095, Cl. 417-222.00R.
Canada, Her Majesty the Queen in right of, as represented by the Minister of Highways and Transportation: *See—*
  Woollam, Ronald F., 5,016,544, Cl. 105-215.200.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government: *See—*
  Farnworth, Brian; and Dix, James K., 5,017,424, Cl. 428-230.000.
Canahuati, Marlene: *See—*
  Brown, Ralph E.; Canahuati, Marlene; and Jackson, Roy J., 5,017,258, Cl. 156-294.000.
Cannon, Joseph G.; Bhatnagar, Ranbir K.; and Long, J. Paul, to University of Iowa Research Foundation. Antagonists of organophosphate-induced toxicity. 5,017,602, Cl. 514-452.000.
Canon Kabushiki Kaisha: *See—*
  Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; and Kanome, Yuji, 5,017,942, Cl. 346-76.0PH.
  Hashimoto, Seiji, 5,018,006, Cl. 358-44.000.
  Hashimoto, Yuichi; and Koyama, Takashi, 5,017,965, Cl. 355-219.000.
  Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.
  Ishizuka, Koh; Tsukiji, Masaaki; Kubota, Yoichi; Ishii, Satoshi; and Nishimura, Tetsuharu, 5,017,777, Cl. 250-231.160.
  Kaneko, Kiyoshi; and Tanaka, Atsushi, 5,017,913, Cl. 340-712.000.
  Kato, Masayoshi; and Kanda, Hitoshi, 5,016,823, Cl. 241-5.000.
  Kimura, Norio; and Takei, Masahiro, 5,018,186, Cl. 379-153.000.
  Kobayashi, Motokazu; Arahara, Kohzoh; Yuasa, Toshiya; Kai, Takashi; and Fukumoto, Hiroshi, 5,017,223, Cl. 106-20.000.
  Koike, Shoji; Eida, Tsuyoshi; and Yamamoto, Takao, 5,017,227, Cl. 106-22.000.
  Koizumi, Ryoichi; Kishida, Hideaki; and Katayama, Akira, 5,017,948, Cl. 346-140.00R.
  Komiyama, Katsumi; Fukaya, Masaki; Yokono, Kojiro; and Toma, Hitoshi, 5,017,988, Cl. 357-30.000.
  Kurosawa, Yuji; Terajima, Hisao; and Isozaki, Shingo, 5,018,189, Cl. 379-93.000.
  Masuda, Kazuaki; Saito, Akio; Kashino, Toshio; and Watanabe, Takashi, 5,017,946, Cl. 346-140.00R.
  Masuda, Kazuaki, 5,017,947, Cl. 346-140.00R.
  Mitomi, Tatsuo; and Hirose, Yoshihiko, 5,017,969, Cl. 355-271.000.
  Murakami, Eiichi; Kohno, Michio; and Suzuki, Akiyoshi, 5,017,798, Cl. 250-572.000.
  Murata, Yoshitaka, 5,017,956, Cl. 354-416.000.
  Ogasawara, Yutaka; and Sakagami, Wataru, 5,018,124, Cl. 369-44.330.
  Okada, Shinjiro, 5,016,989, Cl. 350-350.00S.
  Okumura, Ichiro, 5,017,823, Cl. 310-323.000.
  Saitoh, Keishi; Okamura, Ryuji; Otoshi, Hirokazu; and Matsuda, Koichi, 5,016,565, Cl. 118-723.000.
  Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, 5,018,028, Cl. 360-27.000.
  Sasai, Keizo; Sakuragi, Kenkichi; Nakamura, Mitsunori; Ohkubo, Akio; and Yoshino, Motoaki, 5,017,945, Cl. 346-136.000.
  Takahashi, Futoshi, 5,018,198, Cl. 380-38.000.
  Tanioka, Hiroshi, 5,018,024, Cl. 358-457.000.
  Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
  Yoshihara, Toshiyuki, 5,017,449, Cl. 430-59.000.
Canovas, Enrique A. Odorless toilet. 5,016,294, Cl. 4-217.000.
Canplas Industries Limited: *See—*
  Ward, John F., 5,016,843, Cl. 248-68.100.
Capper, Montague. Napped elastic waistband. 5,016,291, Cl. 2-312.000.
Cardiac Pacemakers, Inc.: *See—*
  Heil, Ronald W., Jr.; and Owens, Robert C., 5,016,808, Cl. 228-176.000.
Carlyon, William R., to Honeywell Inc. Interleaved center and edge-fed comb arrays. 5,017,931, Cl. 33-700.0MS.
Carmen, Ralph H.: *See—*
  Shah, Govind; Basile, Peter A.; Carmen, Ralph H.; and Deschaine, Stephen A., 5,018,131, Cl. 370-1.000.
Carobolante, Francesco; Pace, Ermanno; and McCormack, Mark, to SGS-Thomson Microelectronics, Inc. Brushless direct current motor starting and operating apparatus and method. 5,017,845, Cl. 318-138.000.
Carpenter, Roger E., to McNeil (Ohio) Corporation. Grinding impeller assembly for a grinder pump. 5,016,825, Cl. 241-46.060.
Carpenter Technology Corporation: *See—*
  Martin, James W.; Brown, Robert S.; Buck, E. Lance; and Del Corso, Gregory J., 5,017,437, Cl. 428-558.000.
Carrier Corporation: *See—*
  Dimarco, Ben P.; Tolone, Ralph J.; and Miller, Lester N., 5,016,706, Cl. 165-162.000.
  Fraser, Howard H., Jr.; and Etemad, Shahrokh, 5,017,107, Cl. 418-55.500.
  Lane, L. Thomas; Fraser, Bruce A.; and Brendel, Thomas E., 5,016,447, Cl. 62-470.000.
Carroll, Noel: *See—*
  Thew, Martin T.; Smyth, Ian C.; and Carroll, Noel, 5,017,288, Cl. 210-512.100.
Carter, Charles G.: *See—*
  Bansleben, Donald A.; Carter, Charles G.; and Kumar, Ranjit, 5,017,306, Cl. 252-389.230.
Carter, Don E.; McPeters, Arnold L.; and Skeen, Hobson L., to Monsanto Company. Spinning pack for wet spinning bicomponent filaments. 5,017,116, Cl. 425-131.500.
Carter, Robert E. Bumper with storage compartment. 5,016,932, Cl. 293-106.000.
Carter, William; Meadows, David A.; Hayes, Jay L.; and Voege, John S., to Puritan-Bennett Corporation. Flow selector device. 5,016,673, Cl. 138-45.000.
Cashion, Linda; Begley, Kathi; Colby, Wendy; and Morser, Michael J., to Berlex Laboratories, Inc. Transfected cells containing plasmids having genes oriented in opposing directions and methods of using. 5,017,478, Cl. 435-69.100.
Casio Computer Co., Ltd.: *See—*
  Yagi, Shinichi, 5,018,066, Cl. 364-405.000.
Cassata, Orrin J., to Mr. Tool Manufacturing, Inc. Clothing identifier. 5,016,368, Cl. 40-299.000.
Catalytica, Inc.: *See—*
  Fellmann, Jere; Wentrcek, Paul R.; and Kilner, Peter, 5,017,735, Cl. 585-820.000.
Caterpillar Inc.: *See—*
  Krikke, Roger D.; Ballheimer, Benny; Jones, Nelson A.; and Stone, Dwight V., 5,017,178, Cl. 464-7.000.
Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Paramdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., to AT&T Bell Laboratories. Special service call routing. 5,018,191, Cl. 379-100.000.
Cawse, John L.; and Harris, Philip J., to Ilford Limited. Preparation of latexes of color coupler polymers. 5,017,667, Cl. 526-264.000.
Cecere, Andrew P.: *See—*
  Milligan, William D.; and Cecere, Andrew P., 5,016,329, Cl. 26-18.500.
Cell Analysis Systems, Inc.: *See—*
  Bacus, James W., 5,018,209, Cl. 382-6.000.
Center for Blood Research, Inc., The: *See—*
  Surgenor, Douglas M., 5,017,338, Cl. 422-41.000.
Central Glass Company, Limited: *See—*
  Gotoh, Yoshihiko; Kawai, Toshikazu; and Negishi, Junji, 5,017,730, Cl. 568-812.000.
  Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi; Kodama, Mitsuo; Nakano, Hisaji; and Nakagawa, Shinsuke, 5,017,499, Cl. 436-124.000.
  Morimoto, Shigeki; and Sugiura, Kenji, 5,017,519, Cl. 501-7.000.
Centre National de la Recherche Scientifique: *See—*
  Nicolau, Yves-Claude; LePape, Alain; and Barot-Ciorbaru, Rita, 5,017,359, Cl. 424-1.100.
Cerami, Anthony: *See—*
  Farmar, James G.; Ulrich, Peter; and Cerami, Anthony, 5,017,696, Cl. 536-18.700.
Cero, Maurizio D.: *See—*
  Nicolino, Aldo; and Cero, Maurizio D., 5,016,668, Cl. 137-231.000.
Cerveny, John G.: *See—*
  Anders, Robert J.; Cerveny, John G.; and Milkowski, Andrew L., 5,017,391, Cl. 426-129.000.
Cetinkaya, Ismail B., to UOP. Low pressure mixing apparatus for atomizing fluids. 5,017,343, Cl. 422-140.000.
Chaffoteaux et Maury: *See—*
  Le Mer, Joseph; and Derrien, Jean-Luc, 5,016,922, Cl. 285-81.000.
Chandra, Suresh: *See—*
  Daunt, Geraldine H.; Utano, Richard A.; and Chandra, Suresh, 5,018,163, Cl. 372-68.000.
Chane-Ching, Jean-Yves; and Dumousseau, Jean-Yves, to Rhone-Poulenc Specialites Chimique. Novel cerium oxide particulates. 5,017,352, Cl. 423-263.000.
Chang, Main, to Exxon Chemical Patents Inc. Supported catalyst for 1-olefin and 1,4-diolefin copolymerization. 5,017,665, Cl. 526-129.000.
Chang, Pao-Yuan. Power-driven surfboard. 5,017,166, Cl. 440-7.000.
Chang-Sam, Kim: *See—*
  June-Gunn, Lee; Chang-Sam, Kim; Heon-Jin, Choi; and Seong-Hoon, Park, 5,017,527, Cl. 501-90.000.
Chang, Yeong-Ho; and Jones, Glenn C., to Eastman Kodak Company. Polyesters terminated with carboxycyclohexanecarboxylate groups. 5,017,679, Cl. 528-272.000.
Chapman Instruments, Inc.: *See—*
  Merritt, Edward J., Jr.; Samuels, Joan E.; and Bietry, Joseph R., 5,017,012, Cl. 356-371.000.
Chapman, Ward W. Spring return mechanism for flying shears. 5,016,505, Cl. 83-198.000.

OL
1126
ISS
3
MY
21
1991
UMI

- Chapoy, L. Lawrence: *See—*
  - Giannini, Umberto; Coassolo, Alfredo; Foa', Marco; Sabarino, Giampiero; and Chapoy, L. Lawrence, 5,017,678, Cl. 528-190.000.
- Chapron, Claude E. P.; and Parpaleix, Jean B., to U.S. Philips Corp. Integrated circuit with high output current $I^2L$ transistor. 5,017,997, Cl. 357-44.000.
- Chapuis, Christian; Margot, Christian; Schulte-Elte, Karl-Heinrich; and Pamingle, Herve , to Firmenich S.A. Tetramethyl-1-oxaspiro[2.5]octane. 5,017,711, Cl. 549-332.000.
- Chaput, Frederic; and Boilot, Jean-Pierre, to Compagnie Europeenne de Composants Electroniques -LCC. Method for the fabrication of a ceramic material by hybrid chemical process and material obtained thereby. 5,017,534, Cl. 501-134.000.
- Chatelain, Pierre: *See—*
  - Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.
- Chatourel, Daniel, to Societe Generele des Eaux Minerals de Vittel. Opening-closing device for a bag of flexible synthetic material with limited penetration. 5,016,757, Cl. 206-603.000.
- Chavel, Pierre: *See—*
  - Baude, Dominique; Chavel, Pierre; Joyeux, Denis; and Taboury, Jean, 5,016,977, Cl. 350-162.170.
- Chemetics International Company Ltd.: *See—*
  - Alford, Raymond E.; and Warren, deceased; Ian H., 5,017,276, Cl. 204-290.00R.
- Chen, Frank J.: *See—*
  - Oswald, Alexis A.; Chen, Frank J.; Espino, Ramon L.; and Peng, Kuo L., 5,017,279, Cl. 208-67.000.
- Chen, Tsai-An. Baking apparatus. 5,016,528, Cl. 99-353.000.
- Chen-Tsai, Charlotte H.; Sanchez, Isaac C.; and Burton, William L., to Aluminum Company of America. Polymer blend comprising polycarbonate, acrylonitrile-methylacrylate copolymer, and imide-acrylate copolymer. 5,017,411, Cl. 428-36.600.
- Chen, Tze-Chiang; Chuang, Ching-Te Kent; Li, Guann-Pyng; and Ning, Tak Hung, to International Business Machines Corporation. Raised base bipolar transistor structure and its method of fabrication. 5,017,990, Cl. 357-34 000.
- Chevreux, Christiane A. R.: *See—*
  - Chevreux, Pierre; and Chevreux, Christiane A. R., 5,017,433, Cl. 428-425.600.
- Chevreux, Pierre; and Chevreux, Christiane A. R., to Deltaglass S. A. Glass laminate and method of forming a glass laminate. 5,017,433, Cl. 428-425.600.
- Chevron Research & Technology Company: *See—*
  - Ely, Douglas L.; and Heffner, David A., 5,017,289, Cl. 210-610.000.
  - Mulaskey, Bernard; Miller, Stephen J.; Holtermann, Dennis L.; and Jacobson, Robert L., 5,017,278, Cl. 208-65.000.
- Chiappe, Wayne T.; Ambrose, Larry R.; Dalmon, Donald P.; Juskie, Bernard R.; and Godwin, Raymond E., to Sardee Industries, Inc. Apparatus and method for packaging groups of articles. 5,016,420, Cl. 53-138.100.
- Chien, Kuei-Ru; Reeder, Robin A.; and Stovall, H. Dean, to Hughes Aircraft Company. Method and apparatus for correcting amplitude variation in electro-optic laser systems. 5,018,153, Cl. 372-28.000.
- Chiesi Farmaceutici S.p.A.: *See—*
  - Chiesi, Paolo, 5,017,607, Cl. 514-534.000.
- Chiesi, Paolo, to Chiesi Farmaceutici S.p.A. Method to treat Parkinsons disease. 5,017,607, Cl. 514-534.000.
- Chin, Yuen-Kwok: *See—*
  - Browne, Alan L.; and Chin, Yuen-Kwok, 5,017,904, Cl. 340-479.000.
- Chips and Technologies, Inc.: *See—*
  - Johary, Arun; and Oguchi, Tetsuji, 5,018,076, Cl. 364-518.000.
- Chisso Corporation: *See—*
  - Nakashima, Masahiro; Urata, Yasuo; and Nagaie, Tetsuya, 5,017,720, Cl. 560-209.000.
  - Noma, Takeshi; Matsumoto, Tadao; and Sugihara, Taizo, 5,017,658, Cl. 525-195.000.
- Chittofrati, Alba; and Lenti, Daria, to Ausimont S.r.l. Electrically conductive microemulsions based on perfluoropolyethers. 5,017,307, Cl. 252-500.000.
- Chlebina, Larry E.: *See—*
  - Majerus, Norbert; Chlebina, Larry E.; and Rambacher, John S., 5,017,127, Cl. 425-549.000.
- Chmiel, Steven F., to Rexnord Corporation. Spikeless motor starting circuit. 5,017,853, Cl. 318-786.000.
- Chochinov, Allan: *See—*
  - Tanaka, Kazuna; Kapec, Jeffrey; and Chochinov, Allan, 5,016,303, Cl. 5-437.000.
- Choi, Charles Y. M.: *See—*
  - Hoffman, Mark R.; Choi, Charles Y. M.; Pedersen, Peder M.; and Pedersen, Niels C., Jr., 5,017,739, Cl. 174-138.00F.
- Choi, Hyun K.: *See—*
  - Drouet, Michel G.; and Choi, Hyun K., 5,017,754, Cl. 219-121.360.
- Chomerics, Inc.: *See—*
  - Smith, David C., 5,017,419, Cl. 428-209.000.
- Chow, Alan Y. Artificial retina device. 5,016,633, Cl. 128-419.00R.
- Chow, Che C.: *See—*
  - Eddy, Clifford O.; Henry, Arnold W.; Lorenzo, Lynn; Chow, Che C.; Ferguson, Robert M.; and Finsterwalder, Robert N., 5,017,432, Cl. 428-422.000.
- Christensen, Thorkild: *See—*
  - Andersen, Henrik D.; Dahl, Hans H. M.; and Christensen, Thorkild, 5,017,493, Cl. 435-252.300.
- Christian, David E., to C. B. Labs, Inc. Portable musical instrument amplifier. 5,018,204, Cl. 381-74.000.
- Christian Pfeiffer Maschinenfabrik GmbH & Co., KG *See—*
  - Michelsen, Ralph; Schulze-Brockhausen, Udo; Weit, Herbert; and Schmitz, Erwin, 5,016,826, Cl. 241-72.000.
- Christini, Theodore P.: *See—*
  - Bills, William D.; Christini, Theodore P.; Kellogg, Reid E.; Maynard, Richard B.; and Zegarski, William J., 5,017,440, Cl. 428-690.000.
- Chromecek, Richard C.; and Sojka, Milan F., to Dow Corning Corporation. Aqueous cleaning dispersions using adsorptive polymeric powder and method of using. 5,017,238, Cl. 134-7.000.
- Chu, Chihang R.: *See—*
  - Simms, Barbara L.; and Chu, Chihang R., 5,017,354, Cl. 423-338.000.
- Chu, Shaw-Chang; and Kirk, Kevin A., to Mobil Oil Corporation. Heat sealable packaging film with drawable primer. 5,017,430, Cl. 428-353.000.
- Chuang, Ching-Te Kent: *See—*
  - Chen, Tze-Chiang; Chuang, Ching-Te Kent; Li, Guann-Pyng; and Ning, Tak Hung, 5,017,990, Cl. 357-34.000.
- Chuang, Shien-Yu: *See—*
  - Hsu, Chi-Hsueh; Yang, Wen-Li; and Chuang, Shien-Yu, 5,016,625, Cl. 128-201.250.
- Chubu Electric Power Company, Incorporated: *See—*
  - Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.
- Chugai Seiyaku Kabushiki Kaisha: *See—*
  - Noda, Yukijumi; Sugawa, Makoto; and Kohda, Akira, 5,017.570, Cl. 514-211.000.
- Chung, Gishi: *See—*
  - Shen, Bing-Whey; McKee, Randy; and Chung, Gishi, 5,017,506, Cl. 437-52.000.
- Ciba-Geigy Corporation: *See—*
  - Rochat, Alain C.; Iqbal, Abul; and Wallquist, Olof, 5,017,706, Cl. 548-414.000.
  - Wenger, Jean; Winternitz, Paul; and Zeller, Martin, 5,017,211, Cl. 71-92.000.
- Ciccotelli, Stephen S. Swim fin. 5,017,169, Cl. 441-61.000.
- Cifuentes, Martin E.; and Greenleaf, Suzanne M., to Dow Corning Corporation. Polish containing micronized wax particles. 5,017,222, Cl. 106-10.000.
- Ciufetti, Salvatore D.: *See—*
  - Brouillette, Peter; and Ciufetti, Salvatore D., 5,016,344, Cl. 29-622.000.
- Claar, Leslie M.: *See—*
  - Burgess, Roy T.; Campau, Gregory P.; Claar, Leslie M.; Hodges, Robert C.; Snow, Douglas G.; and Taylor, Roy, 5,017,095, Cl. 417-222.00R.
- Claar, Terry D.; and Mason, Steven M., to Lanxide Technology Company, LP. Process for preparing self-supporting bodies and products produced thereby. 5,017,334, Cl. 419-12.000.
- Clarion Co., Ltd.: *See—*
  - Uehara, Yukiyasu; and Migita, Kazuhiko, 5,017,146, Cl. 439-65.000.
- Clark, Bryan K.: *See—*
  - Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,018,128, Cl. 369-284.000.
- Clark, Harold R., to AT&T Bell Laboratories. Optoelectronic device package method. 5,017,263, Cl. 156-633.000.
- Clark, Paul H.; Yager, Deborah A.; and Clark, Randal W., Jr. Seal assembly. 5,017,024, Cl. 384-482.000.
- Clark, Randal W., Jr.: *See—*
  - Clark, Paul H.; Yager, Deborah A.; and Clark, Randal W., Jr., 5,017,024, Cl. 384-482.000.
- Clarke, Geoffrey; and Harris, Geoffrey J., to Square D Company. Pilot light assembly. 5,017,833, Cl. 315-51.000.
- Clawson, Carl W.: *See—*
  - Stoltz, John R.; and Clawson, Carl W., 5,017,930, Cl. 342-465.000.
- Claycomb, Jack R. Durable blast joint with hydrostatic driver. 5,016,921, Cl. 285-39.000.
- Clearfield, Abraham, to Texas A&M University System, The. Pillaring of layered compounds. 5,017,537, Cl. 502-63.000.
- Clegg, Gary D.: *See—*
  - Yarger, Eric J.; Yarger, Rex D.; and Clegg, Gary D., 5,017,736, Cl. 174-35.0MS.
- Clegg, Jon Y.: *See—*
  - Semler, Loren H.; Palm, Joseph M.; Englram, Paul B.; and Clegg, Jon Y., 5,017,291, Cl. 210-641.000.
- Clemens, Robert J., to Eastman Kodak Company. Low temperature Michael addition reactions. 5,017,649, Cl. 525-59.000.
- Clere, Thomas M.; Abbaschian, Gholamreza J.; Wheeler, Douglas J.; and Barnes, Albert L., to Eltech Systems Corporation. Ceramic/-metal or ceramic/ceramic composite article. 5,017,217, Cl. 75-244.000.
- Clingman, William H., Jr.; and Kennedy, Lyn R. Method of taking a proportional sample of flowing gas in a line. 5,016,482, Cl. 73-863.610.
- Clitherow, Barbara M.; Dean, Trevor W. R.; Gascoigne, John A.; and Van Issum, Bernhard E., to Du Pont de Nemours, E. I., and Company. Filler compositions and their use in papermaking. 5,017,268, Cl. 162-146.000.
- Clorox Company, The: *See—*
  - Doolittle, Frederick G.; Ellgen, Jon L.; Heiskell, Ronald E.; Lipton, Thomas M.; and Parent, James R., 5,016,607, Cl. 126-25.00R.
  - Stanislowski, Anna G.; and England, J. Bruce, 5,016,568, Cl. 119-173.000.

- Clouser, Sidney J.: *See—*
  - Whewell, Christopher J.; Clouser, Sidney J.; and Lee, Chin-ho, 5,017,271, Cl. 204-15.000.
- Cloyd, John E.: *See—*
  - Curtis, Joe E., Jr.; Burns, Douglas; and Cloyd, John E., 5,016,832, Cl. 242-58.600.
- Clusserath, Ludwig, to Seitz Enzinger Noll Maschinenbau Aktiengesellschaft. Method and apparatus for dispensing carbonated liquids, especially beverages, into containers under counter pressure. 5,016,684, Cl. 141-6.000.
- CMB Packaging (UK) Limited: *See—*
  - Boyd, Andrew J.; and Webster, Andrea M., 5,017,749, Cl. 219-64.000.
- Coassolo, Alfredo: *See—*
  - Giannini, Umberto; Coassolo, Alfredo; Foa', Marco; Sabarino, Giampiero; and Chapoy, L. Lawrence, 5,017,678, Cl. 528-190.000.
- Cochrane, Russell D. Shoe dryer. 5,016,364, Cl. 34-202.000.
- Codama, Mitsufumi: *See—*
  - Fukada, Takeshi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; Codama, Mitsufumi; and Takayama, Toru, 5,017,828, Cl. 313-367.000.
- Coe Manufacturing Company, The: *See—*
  - Peters, Thomas E.; Logan, James D.; Bennett, Eugene R.; Dieter, Clarence L.; and Henckel, David J., 5,017,312, Cl. 264-24.000.
- Cogent Limited: *See—*
  - Payne, Peter A.; and Nicholls, Mark, 5,016,333, Cl. 29-25.350.
- Cognitronics Corp.: *See—*
  - Shepard, David H., 5,017,763, Cl. 235-432.000.
- Cohen, Allen L. Multifocals using phase shifting. 5,017,000, Cl. 351-161.000.
- Cohn, David B.; Affleck, Wayde H.; and Lawrence, George D., to Hughes Aircraft Company. Surface particulate laser power limiter which generates a plasma. 5,017,769, Cl. 250-216.000.
- Coker, Theodore R. Detachable electric drive unit for collapsible wheelchair. 5,016,720, Cl. 180-13.000.
- Colby, Mark J.: *See—*
  - Dix, Gary E.; Crowther, Russell L.; Colby, Mark J.; Matzner, Bruce; and Elkins, Robert B., 5,017,332, Cl. 376-370.000.
- Colby, Wendy: *See—*
  - Cashion, Linda; Begley, Kathi; Colby, Wendy; and Morser, Michael J., 5,017,478, Cl. 435-69.100.
- Cole, Mark F. Automatic switching valve. 5,016,664, Cl. 137-1.000.
- Colella, Nicholas J.: *See—*
  - Smith, Tommy E., Jr.; Struve, Kenneth W.; and Colella, Nicholas J., 5,017,779, Cl. 250-283.000.
- Colemann Outdoor Products, Inc.: *See—*
  - Bamber, David J., 5,017,327, Cl. 362-389.000.
- Colgate-Palmolive Company: *See—*
  - Colwell, Dennis J.; and Pflug, James J., 5,017,302, Cl. 252-134.000.
  - Gaffar, Abdul; and Polefka, Thomas G., 5,017,362, Cl. 424-52.000.
- Colleran, Stephen A.: *See—*
  - Krehbiel, Fred L.; Wilson, Bill B.; and Colleran, Stephen A., 5,017,162, Cl. 439-752.000.
- Collins, Arthur K., to General Electric Company. High speed communication apparatus for computerized axial tomography (CAT) scanners. 5,018,174, Cl. 378-4.000.
- Collins, Joel C.: *See—*
  - Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.
- Colombo, Augusto; Pares, Juan; and Frigol, Jordi, to Laboratorios del Dr. Esteve, S.A. Arylpyrazolylcarbinol compounds with analgesic activity. 5,017,596, Cl. 514-406.000.
- Colorado State University Research Foundation: *See—*
  - Stille, John K., 5,017,677, Cl. 528-125.000.
- Colwell, Dennis J.; and Pflug, James J., to Colgate-Palmolive Company. Bar soap having improved resistance to cracking. 5,017,302, Cl. 252-134.000.
- Combe, Jean; Renard, Gerard; and Valentin, Emmanuel, to Institut Francais du Petrole. Process for assisted recovery of heavy hydrocarbons from an underground formation using drilled wells having an essentially horizontal section. 5,016,709, Cl. 166-245.000.
- Combs, Mary A. Infant rocker/cradle. 5,016,301, Cl. 5-105.000.
- Combustion Engineering, Inc.: *See—*
  - Falzarano, Michael J.; and Wivagg, Adrian P., 5,016,776, Cl. 220-305.000.
- Comfort, Gordon A. Process for plastic tubing manufacture. 5,017,321, Cl. 264-167.000.
- Commissariat A L'Energie Atomique: *See—*
  - Allemand, Robert; Drouet, Martine; Pleyber, Gaetan; and Tournier, Edmond, 5,018,175, Cl. 378-19.000.
- Compagnie de Raffinage et de Distribution Total France: *See—*
  - Durrieu, Marc, 5,017,294, Cl. 210-708.000.
- Compagnie Europeenne de Composants Electroniques -LCC: *See—*
  - Chaput, Frederic; and Boilot, Jean-Pierre, 5,017,534, Cl. 501-134.000.
  - Pageaud, Michel; and Gillet, Robert, 5,018,046, Cl. 361-273.000.
- Compagnie Generale des Matieres Nucleaires (Cogema): *See—*
  - Textoris, Andre ; Lyaudet, Georges; and Bathelier, Andre . 5,017,344, Cl. 423-10.000.
- Compax Corp.: *See—*
  - Milligan, William D.; and Cecere, Andrew P., 5,016,329, Cl. 26-18.500.
- Compular Limited: *See—*
  - Harding, Paul R., 5,017,028, Cl. 400-120.000.
- Comsat: *See—*
  - Geller, Bernard D., 5,017,886, Cl. 330-277.000.
- Conant, Theodore: *See—*
  - Ionescu, Adrian F.; and Conant, Theodore, 5,018,058, Cl. 363-34.000.
- Condrey, Tommy. System for handling cotton modules. 5,017,076, Cl. 414-345.000.
- Congdon, John C., to Magnavox Government and Industrial Electronics Company. Inter-element mounting for stacked piezoelectric transducers. 5,018,116, Cl. 367-165.000.
- Conoco Inc.: *See—*
  - Pinkerton, Roger P.; and Stebens, Beverly, 5,018,112, Cl. 367-72.000.
- Conoco Specialty Products: *See—*
  - Thew, Martin T.; Smyth, Ian C.; and Carroll, Noel, 5,017,288, Cl. 210-512.100.
- Conopco, Inc.: *See—*
  - Sawant, Vijay A., 5,017,390, Cl. 426-100.000.
- Conrad, Alta; Mayer, George E.; and Utke, Donald A., to Teledyne Kinetics. Battery powered temperature-controlled wire stripper. 5,016,500, Cl. 81-9.400.
- Consolidated HGM Corp.: *See—*
  - Vandergriff, Arvel L., 5,016,320, Cl. 19-40.000.
- Constantine, Philip D.: *See—*
  - Marshall, Ian W.; and Constantine, Philip D., 5,016,965, Cl. 350-96.180.
- Conte, Joseph J.: *See—*
  - Bland, David G.; and Conte, Joseph J., 5,017,622, Cl. 521-79.000.
- Continental White Cap, Inc.: *See—*
  - Heilman, Robert J., 5,016,769, Cl. 215-230.000.
- Cooksey Corp., The: *See—*
  - Cooksey, James D., 5,017,068, Cl. 411-373.000.
- Cooksey, James D., to Cooksey Corp., The. Plastic screw accessory. 5,017,068, Cl. 411-373.000.
- Cooper, Herbert E.: *See—*
  - Smith, Earl D.; deFazekas, Josef P.; and Cooper, Herbert E., 5,016,912, Cl. 280-711.000.
- Cooper, Stuart L.: *See—*
  - Grasel, Timothy G.; and Cooper, Stuart L., 5,017,664, Cl. 525-454.000.
- Coors Brewing Company: *See—*
  - Johansson, Bert E.; and Grims, Conrad M., 5,016,463, Cl. 72-354.800.
- Copal Company Limited: *See—*
  - Takagi, Masaaki, 5,017,768, Cl. 250-201.500.
- Copolymer Rubber & Chemical Corporation: *See—*
  - Olivier, Errol J., 5,017,727, Cl. 568-719.000.
- Cordani, John L., to MacDermid, Incorporated. Composition and method for stripping tin or tin-lead alloy from copper surfaces. 5,017,267, Cl. 156-656.000.
- Cordery, Robert A.; Kilmartin, William L.; and Zeller, Claude, to Pitney Bowes Inc. Double pulse magnetic markers. 5,017,907, Cl. 340-551.000.
- Cordis Corporation: *See—*
  - Jackowski, Stefan; and Pinchuk, Leonard, 5,017,325, Cl. 264-521.000.
- Coriolis Corporation: *See—*
  - Iversen, Arthur H.; and Whitaker, Stephen, 5,018,181, Cl. 378-144.000.
- Cornell Research Foundation, Inc.: *See—*
  - Dalman, G. Conrad, 5,017,892, Cl. 331-96.000.
  - Edelstein, Daniel C.; Wachman, Elliot S.; and Tang, Chung L., 5,017,806, Cl. 307-428.000.
- Corning Incorporated: *See—*
  - Miller, William J.; Nolan, Daniel A.; and Williams, Gregory E., 5,017,206, Cl. 65-3.110.
- Corr, James L.; and Vincent, Brian J., to International Business Machines Corporation. Logic performance verification and transition fault detection. 5,018,144, Cl. 371-22.300.
- Correa, Cynthia J.: *See—*
  - Tjahjadi, Taruna; and Correa, Cynthia J., 5,018,166, Cl. 375-12.000.
- Cortese, Richard: *See—*
  - Maruyama, Frederick; and Cortese, Richard, 5,017,381, Cl. 424-472.000.
- Cosca, Richard A.: *See—*
  - Burow, Charles F., 5,016,791, Cl. 224-148.000.
- Cosman, Armond D.; Knippelmier, Gary H.; and Minarovic, Joe T., to Minnesota Mining and Manufacturing Company. Self-dispensing spaced electronic markers. 5,017,415, Cl. 428-77.000.
- Cosworth Deep Sea Systems Limited: *See—*
  - Jubb, Albert, 5,016,599, Cl. 123-570.000.
- Counihan, James. Resilient floor system. 5,016,413, Cl 52-391.000.
- Coutant, William R.: *See—*
  - Fodor, Lawrence M.; and Coutant, William R., 5,017,661, Cl. 525-344.000.
- Cowan, Kenneth M., to Shell Oil Company. Cement sealing. 5,016,711, Cl. 166-250.000.
- Cowan, Kevin P.; Fazi, Bruno, Jr.; Havrilla, Joseph B.; Lewandowski, Stanley R.; and Reilly, David M., to Medrad, Inc. Film changer having film-receiving, nondriven cassette with spiral-shaped guide plate. 5,018.182, Cl. 378-173.000.
- Cox, Geradus, to Sulzer Brothers Limited. Elastically mounted pneumatic thread feed device. 5,016,679, Cl. 139-450.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Cox, James P.; and Cox, Kelly K. Gas scrubbing apparatus and process. 5,017,203, Cl. 55-457.000.
Cox, Jarrell H. Collapsible support device. 5,016,853, Cl. 248-523.000.
Cox, Kelly K.: *See—*
  Cox, James P.; and Cox, Kelly K., 5,017,203, Cl. 55-457.000.
Cox, Steven: *See—*
  Burns, James W.; Cox, Steven; and Walts, Alan E., 5,017,229, Cl. 106-162.000.
Crandall, Raymond K.: *See—*
  Fuller, Timothy J.; Solodar, Warren E.; Kang, Henry R.; Kaplan, Samuel; and Crandall, Raymond K., 5,017,644, Cl. 524-612.000.
Crane, Jacob: *See—*
  Sankaranarayanan, Ashok; Crane, Jacob; and Fister, Julius C., 5,017,244, Cl. 148-3.000.
Crano, John C.; and Haynes, Ronald L., to PPG Industries, Inc. Polyol(allyl carbonate) compositions and polymerizates prepared therefrom. 5,017,666, Cl. 526-230.500.
Creaden, David E., to Lawrence Paper Company. Molded flourescent tube dunnage element. 5,016,751, Cl. 206-419.000.
Creative Packaging Corp.: *See—*
  Beck, James M., 5,016,787, Cl. 222-522.000.
Cremona, Lorenzo, to Angelo Cremona & Figlio S.p.A. Veneer cutting machine for tree trunks with improved antibending device. 5,016,692, Cl. 144-213.000.
Crespi, Giuseppe. Apparatus for measuring the flexural resistance of ribbed patterns. 5,016,477, Cl. 73-849.000.
Crews, Jay A. Ergonomically designed keyboard. 5,017,030, Cl. 400-485.000.
Criswell, David R. Two position float arm. 5,016,295, Cl. 4-324.000.
Critchley, Martin, to Delta Circuit Protection & Controls Ltd. Circuit breaker. 5,017,899, Cl. 335-172.000.
Cross, Michael A.; and Nichols, Edward W., to Westinghouse Electric Corp. Multifunction electro-optical system test tool. 5,017,004, Cl. 356-121.000.
Crotts, Lonnie M.; and Rambo, William W., to Bivens Winchester Corporation. Rollover vehicle washing apparatus with high and low pressure spray systems. 5,016,662, Cl. 134-45.000.
Crowther, Russell L.: *See—*
  Dix, Gary E.; Crowther, Russell L.; Colby, Mark J.; Matzner, Bruce; and Elkins, Robert B., 5,017,332, Cl. 376-370.000.
Crumb, Donald A.: *See—*
  Zander, Richard A.; Gaiser, Robert F.; and Crumb, Donald A., 5,016,442, Cl. 60-535.000.
Cruson, Bob: *See—*
  Schwarz, Dick; Warrer, Bob; Musgrave, Mike; Cruson, Bob; Gordon, Christa; and Weinert, Todd, 5,017,436, Cl. 428-519.000.
CSIR: *See—*
  Sonnenberg, Neville; Kingon, Angus I.; and Paterson, Adrian W., 5,017,532, Cl. 501-103.000.
Csomor, Arpad: *See—*
  Scharrer, Joseph K.; Beatty, Robert F.; and Csomor, Arpad, 5,017,023, Cl. 384-114.000.
Culler, David E.; Papadopoulos, Gregory M.; and Schneider, Richard P., to A.I. Architects, Inc. Method and apparatus for overriding a ROM routine in response to a reset. 5,018,062, Cl. 364-200.000.
Cullick, Alvin S.; and Roach, Robert E., to Mobil Oil Corporation. Method and apparatus for locating solvent injection apparatus within a natural gas wellbore. 5,016,712, Cl. 166-250.000.
Culp, Gordon W., to Rockwell International Corporation. Piezoelectric rotary union system. 5,017,820, Cl. 310-328.000.
Cummins, Joseph M., to Amarillo Cell Culture Company, Incorporated. Method for reducing side effects of cancer therapy. 5,017,371, Cl. 424-85.600.
Curtis, Joe E., Jr.; Burns, Douglas; and Cloyd, John E., to Kuhlman Corporation. Method and apparatus for winding an amorphous magnetic toroidal transformer core. 5,016,832, Cl. 242-58.600.
Cuscurida, Michael, to Texaco Chemical Company. Acetoacetoxyethyl methacrylate in the cure of epoxy resins. 5,017,676, Cl. 528-121.000.
Cycle Composites, Inc.: *See—*
  Hollingsworth, Ritch; and Mouritsen, John, 5,016,895, Cl. 280-280.000.
Cymer Laser Technologies: *See—*
  Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,161, Cl. 372-57.000.
  Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,162, Cl. 372-57.000.
D.C.P. AF 1988 A/S: *See—*
  Simon, Bernd; Holm, Niels E.; and Bonnichsen, Fritz F., 5,017,190, Cl. 604-207.000.
Dahl, Hans H. M.: *See—*
  Andersen, Henrik D.; Dahl, Hans H. M.; and Christensen, Thorkild, 5,017,493, Cl. 435-252.300.
Dahl, Terrance J., to St. Jude Medical, Inc. Centrifugal blood pump and magnetic coupling. 5,017,103, Cl. 417-420.000.
Dahrendorf, Klaus D.; Kling, Peter; and Kriems, Ulrich, to Auergesellschaft GmbH. Lung-governed valve. 5,016,627, Cl. 128-205.240.
Dai Ichi Kogyo Seiyaku Co., Ltd.: *See—*
  Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 5,017,697, Cl. 536-127.000.
Dai Nippon Insatsu Kabushiki Kaisha: *See—*
  Miyazawa, Kazushi; Terauchi, Takao; Hanamoto, Keiji; and Takagi, Fumio, 5,017,417, Cl. 428-195.000.
Daicel Chemical Industries, Ltd.: *See—*
  Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 5,017,290, Cl. 210-635.000.
Daiei Chemical Company, Ltd.: *See—*
  Kondo, Takanori; Yamachika, Hiroshi; Tanaka, Kunihiko; and Nishida, Yasuhiro, 5,017,713, Cl. 552-237.000.
Daimler-Benz AG: *See—*
  Bahrle, Friedrich; Wulf, Helmut; and Kreeb, Helmut, 5,016,705, Cl. 165-41.000.
Dainippon Ink & Chemicals, Inc.: *See—*
  Iwanari, Yoshiyuki; Amaya, Shinji; Shimizu, Seiichi; and Kogawara, Toshiro, 5,017,450, Cl. 430-106.000.
  Kase, Mitsuo; Okoshi, Noboru; and Tsuyuzaki, Kazue, 5,017,655, Cl. 525-127.000.
Dainippon Pharmaceutical Co., Ltd.: *See—*
  Kon, Tatsuya; Kato, Shiro; Morie, Toshiya; Karasawa, Tadahiko; and Yoshida, Naoyuki, 5,017,573, Cl. 514-218.000.
Dainippon Screen Mfg. Co. Ltd.: *See—*
  Asada, Shinji, 5,018,008, Cl. 358-78.000.
Dakin, Wayne R., to Discovision Associates. Record disc for storing separate video and audio information. 5,018,020, Cl. 358-310.000.
Dale, Ralph S.: *See—*
  Hager, Thomas P.; and Dale, Ralph S., 5,016,973, Cl. 350-96.230.
Dalebout, William T.; and Bingham, Curt G., to Proform Fitness Products, Inc. Exercise machine resistance controller. 5,016,871, Cl. 272-73.000.
Daleo, Carlo V.: *See—*
  Hsu, Sawyer C. Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 5,016,947, Cl. 312-108.000.
D'Alessio, James M.: *See—*
  Kotewicz, Michael L.; D'Alessio, James M.; and Gerard, Gary F., 5,017,492, Cl. 435-252.300.
Dallaire, Dominique: *See—*
  Dallaire, Raymond; and Dallaire, Dominique, 5,016,526, Cl. 98-98.000.
Dallaire Industries Ltd.: *See—*
  Dallaire, Raymond; and Dallaire, Dominique, 5,016,526, Cl. 98-98.000.
Dallaire, Raymond; and Dallaire, Dominique, to Dallaire Industries Ltd. Ventilated sliding closure assembly. 5,016,526, Cl. 98-98.000.
Dalman, G. Conrad, to Cornell Research Foundation, Inc. Waveguide adaptors and Gunn oscillators using the same. 5,017,892, Cl. 331-96.000.
Dalmon, Donald P.: *See—*
  Chiappe, Wayne T.; Ambrose, Larry R.; Dalmon, Donald P.; Juskie, Bernard R.; and Godwin, Raymond E., 5,016,420, Cl. 53-138.100.
Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., to Burroughs Wellcome Co. Methods for treating viral infection. 5,017,577, Cl. 514-263.000.
Danforth, Steven D.: *See—*
  McCaskill, Don R.; Orthoefer, Frank T.; and Danforth, Steven D., 5,017,395, Cl. 426-459.000.
Dang, Mieu-Hong; and Taborga, Jorge R. Method of enhancing communication setup between a communication station and a telecommunications network. 5,017,915, Cl. 340-825.060.
Daniel, John K.: *See—*
  Liu, Paul S.; Rhinehart, Barry L.; and Daniel, John K., 5,017,563, Cl. 514-27.000.
Dannatt, Hugh St. L., to Pitney Bowes Inc. Tape cutter. 5,016,511, Cl. 83-487.000.
Dannenberg, Robert D., to Navistar International Transportation Corp. Programming signal source and calibration data for a speedometer/-tachometer with calibration switches. 5,018,087, Cl. 364-571.010.
D'Arrigo, Sebastiano: *See—*
  Gill, Manzur; D'Arrigo, Sebastiano; and Lin, Sung-Wei, 5,017,980, Cl. 357-23.500.
Datatech Enterprises Co., Ltd.: *See—*
  Wu, Sunny, 5,016,849, Cl. 248-183.000.
Daughton, John W.; Jones, Jack E.; and Shaffer, Michael L., to Xerox Corporation. Elevator tray position control apparatus. 5,017,972, Cl. 355-321.000.
Daum, Wolfgang: *See—*
  Neugebauer, Constantine A.; and Daum, Wolfgang, 5,018,002, Cl. 357-68.000.
Daunt, Geraldine H.; Utano, Richard A.; and Chandra, Suresh, to United States of America, Army. Gatling gun laser pulse amplifier using an optical diode. 5,018,163, Cl. 372-68.000.
Davies, John T.: *See—*
  Reichelderfer, Richard F., deceased; McOmber, Janice I.; Ryan, Andrew P.; and Davies, John T., 5,016,332, Cl. 29-25.010.
Davis, David L., to Patient Solutions, Inc. Infusion device with disposable elements. 5,017,059, Cl. 409-131.000.
Davis, Donald J., Jr.: *See—*
  Insetta, Victor; Monsorno, Richard V.; Davis, Donald J., Jr.; and Beyel, Stephen, 5,018,047, Cl. 361-277.000.
Davis, Harold R.: *See—*
  Dower, Roger G.; Acres, Robert W.; Davis, Harold R.; Donham, Andrew N.; Riahi, Nader; Slamka, Richard W. A.; and Urbaniak, Lechoslaw K., 5,017,795, Cl. 250-560.000.
Davis, Larry: *See—*
  Effland, Richard C.; Klein, Joseph T.; Davis, Larry; and Olson, Gordon E., 5,017,578, Cl. 514-266.000.
Davis, Paul K. Pipe coupling and method of forming. 5,016,925, Cl. 285-363.000.
Davis, Steven D., to W. A. Lane, Inc. Biased cross seal for packaging machine. 5,016,426, Cl. 53-554.000.

Davis, Wayne T.; Reed, Gregory D.; and Keener, Timothy C., to University of Tennessee Research Corporation, The. Method for desulfurization of flue gases. 5,017,349, Cl. 423-242.000.
Dayco Products, Inc.: *See—*
  Henderson, Dewey D., 5,017,181, Cl. 474-133.000.
DBX Corporation: *See—*
  Smith, Earl D.; deFazekas, Josef P.; and Cooper, Herbert E., 5,016,912, Cl. 280-711.000.
Dean, Trevor W. R.: *See—*
  Clitherow, Barbara M.; Dean, Trevor W. R.; Gascoigne, John A.; and Van Issum, Bernhard E., 5,017,268, Cl. 162-146.000.
DeArkland, James R. Coin telephone box with anti-stuffing coin return chute. 5,018,193, Cl. 379-145.000.
Deason, Vance A.; and Ward, Michael B., to United States of America, Energy. Fiber optic diffraction grating maker. 5,016,951, Cl. 350-3.670.
DeBoer, Charles D., to Eastman Kodak Company. Use of vacuum for improved density in laser-induced thermal dye transfer. 5,017,547, Cl. 503-227.000.
De Castro, Emory S.: *See—*
  Kerr, John B.; De Castro, Emory S.; and Zenner, Bruce, 5,017,274, Cl. 204-129.000.
Deckard, Carl R., to Board of Regents, The University of Texas System. Method and apparatus for producing parts by selective sintering. 5,017,753, Cl. 219-121.630.
De Clippeleir, Georges E. M. J.; Baumann Ofstad, Elizabeth; and Kvisle, Steinar, to Labofina, S.A. Process for the preparation of a dehydrogenation catalyst. 5,017,543, Cl. 502-328.000.
Deere & Company: *See—*
  Farber, Arnold S.; Lang, Stephen P.; and Smart, David C., 5,017,910, Cl. 340-635.000.
deFazekas, Josef P.: *See—*
  Smith, Earl D.; deFazekas, Josef P.; and Cooper, Herbert E., 5,016,912, Cl. 280-711.000.
Degussa Aktiengesellschaft: *See—*
  Miethe, Peter; Voss, Harald; and Gruber, Ronald, 5,017,476, Cl. 435-61.000.
Del Mar Avionics: *See—*
  Gregg, David P., 5,017,414, Cl. 428-64.000.
Delalande S.A.: *See—*
  Ward, Mona; Ph.Settembre, Pierre-Andre ; Renaud, Alain; and Langlois, Michel, 5,017,572, Cl. 514-218.000.
Delbianco, Alberto; and Girardi, Ermanno, to Eniricerche, S.p.A. Single-step coal liquefaction process. 5,017,282, Cl. 208-414.000.
Del Corso, Gregory J.: *See—*
  Martin, James W.; Brown, Robert S.; Buck, E. Lance; and Del Corso, Gregory J., 5,017,437, Cl. 428-558.000.
Delrieu, Gilles L. E.: *See—*
  Miraucourt, Carmen; and Delrieu, Gilles L. E., 5,017,088, Cl. 415-173.200.
Delta Circuit Protection & Controls Ltd.: *See—*
  Critchley, Martin, 5,017,899, Cl. 335-172.000.
Delta International Machinery Corporation: *See—*
  Haffely, Jeff L.; Stahler, Mark G.; and Wixey, Barry D., 5,016,693, Cl. 144-253.00J.
Deltaglass S. A.: *See—*
  Chevreux, Pierre; and Chevreux, Christiane A. R., 5,017,433, Cl. 428-425.600.
Deppe, Dennis G.; Dupuis, Russell D.; and Schubert, Erdmann F., to AT&T Bell Laboratories. Vertical cavity semiconductor lasers. 5,018,157, Cl. 372-45.000.
De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., to Agfa-Gevaert, N.V. Photographic processing application with replaceable cassette. 5,017,951, Cl. 355-27.000.
Derkatz, Keith. Gun holster. 5,016,793, Cl. 224-209.000.
Derrien, Jean-Luc: *See—*
  Le Mer, Joseph; and Derrien, Jean-Luc, 5,016,922, Cl. 285-81.000.
De Rycke, Gino L.: *See—*
  De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 5,017,951, Cl. 355-27.000.
Descamps, Marcel: *See—*
  Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.
Deschaine, Stephen A.: *See—*
  Shah, Govind; Basile, Peter A.; Carmen, Ralph H.; and Deschaine, Stephen A., 5,018,131, Cl. 370-1.000.
Desmarteu, Darryl D.: *See—*
  Navarrini, Walter; and Desmarteu, Darryl D., 5,017,709, Cl. 548-959.000.
De Smet, Gabriel, to Isoform. Method and device for pressing sheet material with a deformable punch under a ram. 5,016,458, Cl. 72-57.000.
Desmolin, Henri: *See—*
  Aubert, Daniel; Blanc, Francis; Desmolin, Henri; Morre, Michel; and Sindely, Lucette, 5,017,613, Cl. 514-557.000.
Despres, Remi, to Societe Anonyme Rce. Communication network between user equipment. 5,018,139, Cl. 370-94.300.
Detia Freyberg GmbH: *See—*
  Friemel, Wolfgang; Barth, Volker; and Dierks, Hildegund, 5,017,376, Cl. 424-409.000.
Deutsche Gesellschaft fur Wiederaufarbeitung Von Kernbrennstoffen mbH: *See—*
  Popp, Franz-Wolfgang; Krammer, Erwin; Genannt, Wolfgang; and Flehr, Dietmar, 5,016,422, Cl. 53-330.000.
Dewitz, Thomas S., to Shell Oil Company. Method for enhancing energy recovery from a high temperature, high pressure synthesis gas stream. 5,017,196, Cl. 48-210.000.
Dexus Research Inc.: *See—*
  Batson, Robert E., 5,016,784, Cl. 222-386.000.
Diamond, Anthony E.: *See—*
  Mackelburg, Gerald R.; Bodzin, Leon J.; McCracken, Howard B.; and Diamond, Anthony E., 5,018,114, Cl. 367-134.000.
Diamond, Israel. Concentric rotating disc assembly. 5,017,762, Cl 235-78.00R.
Dias, Bernard: *See—*
  du Chene, Arnaud; Dias, Bernard; and Bergeon, Gerard, 5,018,091, Cl. 364-726.000.
Dick, G. John; and Edwards, Eric A., to Applied Motion. Human bipedal locomotion device. 5,016,869, Cl. 272-70.000.
Didion, Charles J., to Didion Manufacturing Company. Sand reclaiming drum. 5,016,827, Cl. 241-79.300.
Didion Manufacturing Company: *See—*
  Didion, Charles J., 5,016,827, Cl. 241-79.300.
Diemeer, Martinus B. J., to Koninklijke PTT Nederland N.V. Electro-optical component and method for making the same. 5,016,959, Cl. 350-96.140.
Dienes, Geza, to Andrew Corporation. UHF-TV broadcast system having circular, non-coaxial waveguide transmission line for operation in the $TE_{11}$ mode. 5,017,938, Cl. 343-874.000.
Dierks, Hildegund: *See—*
  Friemel, Wolfgang; Barth, Volker; and Dierks, Hildegund, 5,017,376, Cl. 424-409.000.
Diesel Kiki Co., Ltd.: *See—*
  Nakajima, Nobuyuki, 5,017,097, Cl. 417-295.000.
Diesel KikiCo., Ltd.: *See—*
  Sugiura, Hiroyuki; Nakajima, Nobuyuki; and Iijima, Takeo, 5,017,096, Cl. 417-222.00S.
Dieter, Clarence L.: *See—*
  Peters, Thomas E.; Logan, James D.; Bennett, Eugene R.; Dieter, Clarence L.; and Henckel, David J., 5,017,312, Cl. 264-24.000.
Dietlein, John E., to Dow Corning Corporation. Asphalt highway joint sealant. 5,017,628, Cl. 523-200.000.
Digital Equipment Corporation: *See—*
  Backes, Floyd J.; Varghese, George; and Kaufman, Charles W., 5,018,137, Cl. 370-85.130.
  Lin, Chong M., 5,017,985, Cl. 357-23.130.
  Mellitz, Richard I., 5,017,863, Cl. 324-158.00R.
  Simcoe, Robert J.; and Waters, Gregory M., 5,018,142, Cl. 370-112.000.
DiLeo, Anthony J.; Allegrezza, Anthony E., Jr.; and Burke, Edmund T., to Millipore Corporation. Membrane, process and system for isolating virus from solution. 5,017,292, Cl. 210-645.000.
Dilo, Johann P., to Oskar Dilo Maschinenfabrik K.G. Device on needling machines for the production of needle-bonded fabric webs or the like. 5,016,331, Cl. 28-115.000.
Dimarco, Ben P.; Tolone, Ralph J.; and Miller, Lester N., to Carrier Corporation. Heat exchanger tube support. 5,016,706, Cl. 165-162.000.
Di Nunzio, Vittorio; and D'Onofrio, Francesco, to Fiat Auto S.p.A. Method and apparatus for detecting and indicating anomalies in the operation of the ignition systems of internal combustion engines. 5,017,874, Cl. 324-378.000.
Dir. General, Agency of Industrial Science and Technology: *See—*
  Yamada, Yasuhiro; Fujii, Masaki; and Shimomura, Seiji, 5,017,358, Cl. 423-449.000.
Director-General, Agency of Industrial Science and Technology: *See—*
  Suzuki, Yoshihiro; Yajima, Hiroyoshi; Shimada, Junichi; Shimoyama, Kenji; and Gotoh, Hideki, 5,018,159, Cl. 372-46.000.
Discovision Associates: *See—*
  Dakin, Wayne R., 5,018,020, Cl. 358-310.000.
DiValentin, Eugenio: *See—*
  Schneider, Roy W.; and DiValentin, Eugenio, 5,017,089, Cl. 416-35.000.
Divan, Deepakraj M., to Wisconsin Alumni Research Foundation. AC to DC to AC power conversion apparatus with few active switches and input and output control. 5,017,800, Cl. 307-66.000.
Divsalar, Dariush; and Simon, Marvin K., to United States of America, National Aeronautics and Space Administration. Multiple symbol differential detection. 5,017,883, Cl. 329-304.000.
Dix, Gary E.; Crowther, Russell L.; Colby, Mark J.; Matzner, Bruce; and Elkins, Robert B., to General Electric Company. Two-phase pressure drop reduction BWR assembly design. 5,017,332, Cl. 376-370.000.
Dix, James K.: *See—*
  Farnworth, Brian; and Dix, James K., 5,017,424, Cl. 428-230.000.
Dixie Chemical Company: *See—*
  Zawalski, Robert C., 5,017,732, Cl. 570-151.000.
Dixiw-Narco, Inc.: *See—*
  Swierczek, Remi D., 5,017,176, Cl. 453-49.000.
DME Industries, Inc.: *See—*
  Greenberg, Jack, 5,016,289, Cl. 2-246.000.
Dobrusskin, Alexander: *See—*
  Arlt, Joachim; Dobrusskin, Alexander; Von Scheidt, Jurgen; and Heider, Jurgen, 5,017,839, Cl. 315-219.000.
Dobson, Peter J., to U.S. Philips Corp. Method of modulating an optical beam. 5,016,990, Cl. 350-353.000.
Dodge, Larry H.; and Stone, Stanford C., to Minnesota Mining and Manufacturing Company. Free flow prevention system for infusion pump. 5,017,192, Cl. 604-250.000.

VOL 1126
ISS 3
MY 21 1991
UMI

- Dodt, Darcy T.; and Buchanan, Walter R., to Ixys Corporation. Method of annealing fully-fabricated, radiation damaged semiconductor devices. 5,017,508, Cl. 437-173.000.
- Dohi, Hideyuki: *See—*
  - Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,017,733, Cl. 585-6.300.
- Dohogne, L. Ranney, to Emerson Electric Co. Voltage change and motor rotation reversal device. 5,017,818, Cl. 310-71.000.
- Doi, Koji: *See—*
  - Makino, Tadashi; Doi, Koji; Matsuoka, Masayoshi; and Tsuboi, Toshiharu, 5,017,564, Cl. 514-47.000.
- Doi, Shigetoshi; and Nagayama, Yoshiaki, to Mazda Motor Corporation. Air conditioner control system for vehicles. 5,016,815, Cl. 236-49.300.
- Domen, Albrecht F.: *See—*
  - De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 5,017,951, Cl. 355-27.000.
- Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Paul A.; and Breuleux, Gerald, legal representative, to Sandoz Ltd. Method of inducing a serotonin M receptor antagonist effect with N-quinuclidinyl-benzamides. 5,017,582, Cl. 514-305.000.
- Dondero, Richard S.: *See—*
  - Schutt, Ernest G.; Dondero, Richard S.; Hansen, William P.; Hovorka, George B.; and Meyer, Raymond E., 5,017,009, Cl. 358-338.000.
- Donham, Andrew N.: *See—*
  - Dower, Roger G.; Acres, Robert W.; Davis, Harold R.; Donham, Andrew N.; Riahi, Nader; Slamka, Richard W. A.; and Urbaniak, Lechoslaw K., 5,017,795, Cl. 250-560.000.
- Donnelly, Michael B., to Spectranetics Corporation. Optical fiber coupler with linear input. 5,016,964, Cl. 350-96.180.
- D'Onofrio, Francesco: *See—*
  - Di Nunzio, Vittorio; and D'Onofrio, Francesco, 5,017,874, Cl. 324-378.000.
- Donovan, Joseph F.; and Yates, Donald N., Jr., to Baker Hughes Incorporated. Tubing carried perforating gun with insulation jacket. 5,016,716, Cl. 175-17.000.
- Doolittle, Frederick G.; Ellgen, Jon L.; Heiskell, Ronald E.; Lipton, Thomas M.; and Parent, James R., to Clorox Company, The. Barbecue grill assembly. 5,016,607, Cl. 126-25.00R.
- Dorf, Ernst-Ulrich: *See—*
  - Kohler, Burkhard; Meyer, Rolf-Volker; Dorf, Ernst-Ulrich; Russeler, Wolfgang; and Schmidt, Manfred, 5,017,682, Cl. 528-388.000.
- Doron, Benjamin: *See—*
  - Assaf, Gad; and Doron, Benjamin, 5,017,043, Cl. 405-52.000.
- Dosako, Shunichi; and Shinmoto, Hiroshi, to Snow Brand Milk Products Co., Ltd. Agent for blocking nonspecific adsorption, process for preparing thereof and method of blocking nonspecific adsorption. 5,017,559, Cl. 514-21.000.
- Doskocil Manufacturing Company, Inc.: *See—*
  - Sharp, Douglas J.; and Smith, E. W., 5,016,926, Cl. 292-42.000.
- Dotta, Yoshihisa: *See—*
  - Kawashima, Akihiro; Yoshida, Hirokazu; Tagusa, Yasunobu; Inada, Kiyoshi; Makita, Hideshi; and Dotta, Yoshihisa, 5,016,986, Cl. 350-339.00R.
- Dougal, Alvin L., Jr.; and Hara, Shigeyoshi, to Hercules Incorporated. Black-pigmented polymeric compositions of matter. 5,017,647, Cl. 524-856.000.
- Dougherty, Lawrence W.; and Roberts, William N., to Zenith Electronics Corporation. Brazing method for mounting a tension shadow mask. 5,017,170, Cl. 445-30.000.
- Dove, S. Brent: *See—*
  - McDavid, W. Doss; Dove, S. Brent; Welander, Ulf; and Tronje, Gunilla, 5,018,177, Cl. 378-62.000.
- Dow Chemical Company, The: *See—*
  - Bland, David G.; and Conte, Joseph J., 5,017,622, Cl. 521-79.000.
- Dow Corning Corporation: *See—*
  - Bilgrien, Carl J.; and Lee, Chi-long, 5,017,671, Cl. 528-21.000.
  - Chromecek, Richard C.; and Sojka, Milan F., 5,017,238, Cl. 134-7.000.
  - Cifuentes, Martin E.; and Greenleaf, Suzanne M., 5,017,222, Cl. 106-10.000.
  - Dietlein, John E., 5,017,628, Cl. 523-200.000.
  - Katsoulis, Dimitris E., 5,017,360, Cl. 424-45.000.
  - Krahnke, Robert H.; and Saam, John C., 5,017,672, Cl. 528-23.000.
  - Legrow, Gary E.; and Liles, Donald T., 5,017,221, Cl. 106-2.000.
  - Lutz, Michael A., 5,017,406, Cl. 427-54.100.
  - Petroff, Lenin; Romenesko, David J.; and Ekeland, Robert A., 5,017,216, Cl. 71-116.000.
  - Wright, Antony P.; and Varaprath, Padmakumari J., 5,017,717, Cl. 556-413.000.
- Dow Corning Limited: *See—*
  - Spyropoulos, Konstantinos; and Yianni, Paul A., 5,017,297, Cl. 252-8.800.
- Dowd, Patrick F.; Wicklow, Donald T.; Gloer, James B.; and Rinderknecht, Brad L., to United States of America, Agriculture; and University of Iowa Research Foundation. Nominine, and insecticidal fungal metabolite. 5,017,598, Cl. 514-415.000.
- Dowden, Paul J., to Strachan & Henshaw Limited. Rail car dumpers. 5,017,077, Cl. 414-360.000.
- Dower, Roger G.; Acres, Robert W.; Davis, Harold R.; Donham, Andrew N.; Riahi, Nader; Slamka, Richard W. A.; and Urbaniak, Lechoslaw K. Apparatus for inspecting can seams and the like. 5,017,795, Cl. 250-560.000.
- Doyle, Clarence E., to AT&T Bell Laboratories. Terminal boards and frame therefor. 5,017,155, Cl. 439-532.000.
- Doyoshita, Toshi: *See—*
  - Itoh, Kiyochika; and Doyoshita, Toshi, 5,016,430, Cl. 53-370.200.
- Drahus, Denis P. Disposable safety razor system. 5,016,351, Cl. 30-41.000.
- Drake, Donald J., to Xerox Corporation. Thermal ink jet printhead with recirculating cooling system. 5,017,941, Cl. 346-1.100.
- Drejer, Jorgen: *See—*
  - Jakobsen, Palle; and Drejer, Jorgen, 5,017,585, Cl. 514-317.000.
- Dresser-Rand Company: *See—*
  - Jamieson, Richard A., 5,016,669, Cl. 137-512.000.
- Drewel, Gunter; Enoch, Horst; and Grotkasten, Klaus, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Apparatus for charging a tire heating press. 5,017,111, Cl. 425-28.100.
- Driller, Jack; Faulkenberry, William J.; and Lizzi, Frederic L., to Riverside Research Institute. Local application of medication with ultrasound. 5,016,615, Cl. 128-24.00A.
- Droho, Joseph S., to North American Philips Corporation. Ignitor circuit for discharge lamps with novel ballast. 5,017,840, Cl. 315-291.000.
- Drouet, Martine: *See—*
  - Allemand, Robert; Drouet, Martine; Pleyber, Gaetan; and Tournier, Edmond, 5,018,175, Cl. 378-19.000.
- Drouet, Michel G.; and Choi, Hyun K., to Hydro Quebec. Plasma reactor used to treat powder material at very high temperatures. 5,017,754, Cl. 219-121.360.
- DSC Communications Corporation: *See—*
  - Shah, Govind; Basile, Peter A.; Carmen, Ralph H.; and Deschaine, Stephen A., 5,018,131, Cl. 370-1.000.
- Dubner, Daniel W.; and Felch, D. Gregory. Regimen calendar. 5,016,917, Cl. 283-4.000.
- Dubroeucq, Marie-Christine; Paris, Jean-Marc; and Renault, Christian, to Rhone-Poulenc Sante. Quinolyloxyacetamides. 5,017,576, Cl. 514-228.200.
- Dubuque, Kenneth J.: *See—*
  - Albert, Gregory P.; and Dubuque, Kenneth J., 5,017,109, Cl. 418-152.000.
- du Chene, Arnaud; Dias, Bernard; and Bergeon, Gerard, to Thomson-CSF. Discrete fourier transform calculating processor comprising a real-time testing device. 5,018,091, Cl. 364-726.000.
- Dugan, John M.; and Ries, Gordon W., to Rockwell International Corporation; and Rockwell International Corporation. Varying operational frequency control circuit apparatus with noise minimizing feature. 5,017,880, Cl. 328-165.000.
- Dukes, John N.; Lum, Paul; and Larson, John D., to Hewlett-Packard Company. Slow motion cardiac imaging. 5,016,642, Cl. 128-696.000.
- Dulik, Mark D.: *See—*
  - Bean, Samuel L.; Dulik, Mark D.; and Monopoli, Peter A., 5,017,301, Cl. 252-105.000.
- Dumais, Arthur; and Koski, Richard D., to MagneTek Controls. Magnetostrictive linear position detector with reflection termination. 5,017,867, Cl. 324-207.130.
- Dumousseau, Jean-Yves: *See—*
  - Chane-Ching, Jean-Yves; and Dumousseau, Jean-Yves, 5,017,352, Cl. 423-263.000.
- Duncan, Alexander: *See—*
  - Hunter, Robert L.; and Duncan, Alexander, 5,017,370, Cl. 424-83.000.
- Duncan, Scott M.: *See—*
  - Santos, Alfred J.; Hilby, James A.; and Duncan, Scott M., 5,017,866, Cl. 324-174.000.
- Duncan, Wayne: *See—*
  - Linwood, Gary; and Duncan, Wayne, 5,017,794, Cl. 250-551.000.
- Dunn, Stewart A. Portable combination hunting and observation stand. 5,016,732, Cl. 182-116.000.
- Du Pont de Nemours, E. I., and Company: *See—*
  - Ackerson, Robert C.; and Yuyama, Takeshi, 5,017,215, Cl. 71-93.000.
  - Aldrich, Donald C.; Buchanan, Robert C.; and Sollinger, John F., 5,016,516, Cl. 87-8.000.
  - Barsotti, Robert J.; Altschuler, Lili W.; and Harper, Lee R., 5,017,435, Cl. 428-502.000.
  - Booth, Bruce L., 5,016,958, Cl. 350-96.130.
  - Clitherow, Barbara M.; Dean, Trevor W. R.; Gascoigne, John A.; and Van Issum, Bernhard E., 5,017,268, Cl. 162-146.000.
  - Escobar, Agustin; Wagenknecht, Dietmar; and Malick, Ahmad W., 5,017,609, Cl. 514-538.000.
  - Larson, James R.; and Leffew, Kenneth W., 5,017,451, Cl. 430-137.000.
  - Raynolds, Stuart, 5,017,300, Cl. 252-67.000.
  - Subramanian, Munirpallam A., 5,017,554, Cl. 505-1.000.
- Dupuis, Russell D.: *See—*
  - Deppe, Dennis G.; Dupuis, Russell D.; and Schubert, Erdmann F., 5,018,157, Cl. 372-45.000.
- Durr, Herbert, to Maschinenfabrik Gustav Eirich. Method of extracting liquid from wet material. 5,016,361, Cl. 34-10.000.
- Durrieu, Marc, to Compagnie de Raffinage et de Distribution Total France. Apparatus for the separation of two immiscible liquids and use of said apparatus in the desalting of a hydrocarbon feedstock. 5,017,294, Cl. 210-708.000.
- Durselen, Heinz: *See—*
  - Janicka, Johannes; Meyer, Gunter; and Durselen, Heinz, 5,017,270, Cl. 201-41.000.
- Dutschke, Reginald V. Particulate material loaders. 5,016,822, Cl. 239-651.000.

- Dwenger, Thomas A.: *See—*
  - Brooks, Lawrence W.; and Dwenger, Thomas A., 5,016,838, Cl. 244-103.00R.
- E. I. de Pont de Nemours and Company: *See—*
  - Bills, William D.; Christini, Theodore P.; Kellogg, Reid E.; Maynard, Richard B.; and Zegarski, William J., 5,017,440, Cl. 428-690.000.
- E.I. du Pont de Nemours and Company: *See—*
  - Brugel, Edward G., 5,017,685, Cl. 528-480.000.
- E. M. Matson, Jr., Company, Inc.: *See—*
  - Grassman, David L.; Ager, Scott P.; and Root, Tamis L., 5,017,620, Cl. 514-698.000.
- E.M.S. Technik GmbH: *See—*
  - Kellner, Helmut, 5,017,013, Cl. 356-373.000.
- E.R. Squibb & Sons, Inc.: *See—*
  - Karanewsky, Donald S.; Biller, Scott A.; and Gordon, Eric M., 5,017,716, Cl. 556-405.000.
- E-Tek Dynamics, Inc.: *See—*
  - Pan, Jing-Jong, 5,016,963, Cl. 350-96.180.
- Early, Stephen R.: *See—*
  - Walker, Del E.; and Early, Stephen R., 5,016,395, Cl. 49-501.000.
- Eastern Company, The: *See—*
  - Weinerman, Lee S., 5,016,393, Cl. 49-395.000.
- Eastman Kodak Company: *See—*
  - Agostinelli, John A.; Mir, Jose M.; Paz-Pujalt, Gustavo R.; Lelental, Mark; and Nicholas, Ralph A., III, 5,017,551, Cl. 505-1.000.
  - Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 5,017,791, Cl. 250-483.100.
  - Chang, Yeong-Ho; and Jones, Glenn C., 5,017,679, Cl. 528-272.000.
  - Clemens, Robert J., 5,017,649, Cl. 525-59.000.
  - DeBoer, Charles D., 5,017,547, Cl. 503-227.000.
  - Harvey, Donald M., 5,017,954, Cl. 354-234.100.
  - Kocher, Haribhajan S., 5,016,955, Cl. 350-3.710.
  - Kozak, Stephen J., 5,017,408, Cl. 427-420.000.
  - Lisson, Jerold B.; and Stark, Richard A., 5,017,011, Cl. 356-363.000.
  - McClune, Gregory J.; and Smith-Lewis, Margaret J., 5,017,474, Cl. 435-7.500.
  - McColgin, William C., 5,017,459, Cl. 430-299.000.
  - Moore, Leslie G., Jr., 5,018,019, Cl. 358-215.000.
  - Sublett, Bobby J., 5,017,680, Cl. 528-274.000.
  - Wash, Michael L.; Pearson, Douglas H.; and Kelbe, Richard R., 5,017,326, Cl. 354-207.000.
- Eaton Corporation: *See—*
  - Graf, Kevin J.; Hastreiter, James J.; and Anderson, Duane A., 5,017,094, Cl. 417-218.000.
  - Stephenson, Dwight B., 5,016,672, Cl. 137-625.240.
- Eberhardt, George J.: *See—*
  - Hermann, Thomas L.; and Eberhardt, George J., 5,017,033, Cl. 400-693.000.
- Echelon Systems Corporation: *See—*
  - Twitty, William B.; and 'Sander, Wendell B., 5,018,138, Cl. 370-94.100.
- Eckardt, Bernd, to Siemens Aktiengesellschaft. Nuclear power plant having a containment. 5,017,331, Cl. 376-313.000.
- Eckel, Giselher: *See—*
  - Kerschner, Gunther; Wurzenberger, Johann; Hausmann, Herbert; Eckel, Giselher; and Friedrich, Peter, 5,018,059, Cl. 364-200.000.
- Eckstein, Yona: *See—*
  - Wilson, Gary F.; and Eckstein, Yona, 5,017,629, Cl. 523-219.000.
- Ecolab Inc.: *See—*
  - Thomas, John E.; Sahy, Darrell; and Mehus, Richard, 5,016,790, Cl. 222-639.000.
- Ecolomics Inc.: *See—*
  - Spink, Donald R.; Robinson, Murry C.; and Nguyen, Kim D., 5,017,346, Cl. 423-101.000.
- Ecotechniek B.V.: *See—*
  - Klapwijk, Abraham; and Spanjers, Henricus L. F. M., 5,017,496, Cl. 436-62.000.
- Edahiro, Takeshi: *See—*
  - Takehara, Shin; Edahiro, Takeshi; Morita, Toshiki; and Kumada, Hiroyoshi, 5,016,911, Cl. 280-708.000.
- Edamoto, Toshiyuki: *See—*
  - Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, 5,017,442, Cl. 429-94.000.
- Eddy, Clifford O.; Henry, Arnold W.; Lorenzo, Lynn; Chow, Che C.; Ferguson, Robert M.; and Finsterwalder, Robert N., to Xerox Corporation. Fuser member. 5,017,432, Cl. 428-422.000.
- Edelstein, Daniel C.; Wachman, Elliot S.; and Tang, Chung L., to Cornell Research Foundation, Inc. Broadly tunable high repetition rate femtosecond optical parametric oscillator. 5,017,806, Cl. 307-428.000.
- Edelstein, William A.: *See—*
  - Mueller, Otward M.; Roemer, Peter B.; and Edelstein, William A., 5,017,871, Cl. 324-318.000.
- Edge, Gordon M.: *See—*
  - Sawyers, Craig G.; and Edge, Gordon M., 5,018,203, Cl. 381-71.000.
- Edminster, Robert E., to Motorola, Inc. Safe and arm device. 5,016,532, Cl. 102-254.000.
- Edwards, Eric A.: *See—*
  - Dick, G. John; and Edwards, Eric A., 5,016,869, Cl. 272-70.000.
- EEV Limited: *See—*
  - Jerram, Paul A.; and Bainbridge, Stephen, 5,017,891, Cl. 331-88.000.
- Effem GmbH: *See—*
  - Gideon, Jurgen; Krieger, Dieter; and Mengel, Erich, 5,017,054, Cl. 406-191.000.
- Effland, Richard C.; Klein, Joseph T.; Davis, Larry; and Olson, Gordon E., to Hoechst-Roussel Pharmaceuticals Inc. N-heteroaryl-purin-6-amines useful as analgesic and anticonvulsant agents. 5,017,578, Cl. 514-266.000.
- Egawa, Hideharu; and Suzuki, Yasoji, to Tokyo Shibaura Denki Kabushiki Kaisha. Semiconductor circuit. 5,017,994, Cl. 357-42.000.
- Egawa, Makoto: *See—*
  - Sugiyama, Keikichi; Takada, Koji; Fukushima, Akira; and Egawa, Makoto, 5,017,368, Cl. 424-70.000.
- Eguchi, Takaaki, to Nissan Motor Co., Ltd. Rear wheel steering control system for vehicle. 5,018,070, Cl. 364-424.050.
- Eichelberger, Charles W.: *See—*
  - Wojnarowski, Robert J.; and Eichelberger, Charles W., 5,018,150, Cl. 372-9.000.
- Eichen, Elliot; and Melman, Paul, to GTE Laboratories Incorporated. Hybrid optical Y-junction. 5,016,960, Cl. 350-96.150.
- Eida, Tsuyoshi: *See—*
  - Koike, Shoji; Eida, Tsuyoshi; and Yamamoto, Takao, 5,017,227, Cl. 106-22.000.
- Eijsbouts, Sonja: *See—*
  - Schoonhoven, Johannes W. F. M.; Eijsbouts, Sonja; Heinerman, Jacobus J. L.; and Eisenhuth, Ludwig, 5,017,535, Cl. 502-30.000.
- Eisen, Herman S.: *See—*
  - Pasternack, Mark S.; and Eisen, Herman S., 5,017,489, Cl. 435-196.000.
- Eisenhuth, Ludwig: *See—*
  - Schoonhoven, Johannes W. F. M.; Eijsbouts, Sonja; Heinerman, Jacobus J. L.; and Eisenhuth, Ludwig, 5,017,535, Cl. 502-30.000.
- Eisentraut, Rudolph A.: *See—*
  - Peterson, Stanley P. D.; and Eisentraut, Rudolph A., 5,016,476, Cl. 73-829.000.
- Ejima, Kimie. Production method for net structures. 5,016,337, Cl. 29-418.000.
- Ejiri, Joji: *See—*
  - Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.
- Ekeland, Robert A.: *See—*
  - Petroff, Lenin; Romenesko, David J.; and Ekeland, Robert A., 5,017,216, Cl. 71-116.000.
- Ekhoff, Donald L.; and Smith, Robert S. Shock start for memory disk motor drives. 5,018,029, Cl. 360-69.000.
- Ekwall, Christer: *See—*
  - Vock, Josef; Ljungstroem, Jan; and Ekwall, Christer, 5,016,634, Cl. 128-419.0PT.
- Electronics and Telecommunications Research Institute: *See—*
  - Lee, Bhum C.; Park, Kwon C.; and Kim, Bong T., 5,018,140, Cl. 370-105.100.
- Elgin Molded Plastics, Inc.: *See—*
  - Lindner, Henry, 5,017,441, Cl. 429-9.000.
- Elkind, Jerome L.; Smith, Patricia B.; Hutchins, Larry D.; Luttmer, Joseph D.; York, Rudy L.; and England, Julie S., to Texas Instruments Incorporated. Method for dry etching vias in integrated circuit layers. 5,017,511, Cl. 437-225.000.
- Elkins, Robert B.: *See—*
  - Dix, Gary E.; Crowther, Russell L.; Colby, Mark J.; Matzner, Bruce; and Elkins, Robert B., 5,017,332, Cl. 376-370.000.
- Ellgen, Jon L.: *See—*
  - Doolittle, Frederick G.; Ellgen, Jon L.; Heiskell, Ronald E.; Lipton, Thomas M.; and Parent, James R., 5,016,607, Cl. 126-25.00R.
- Elson, Todd E.: *See—*
  - Peck, Ralph E.; Elson, Todd E.; and Toofan, Masoud, 5,016,551, Cl. 114-045.000.
- Elstner, Siegfried: *See—*
  - Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred; Schweiger, Franz; Verlohr, Axel; Muyssen, John; and Lybeer, Roger, 5,018,097, Cl. 364-900.000.
- Eltech Systems Corporation: *See—*
  - Clere, Thomas M.; Abbaschian, Gholamreza J.; Wheeler, Douglas J.; and Barnes, Albert L., 5,017,217, Cl. 75-244.000.
  - Niksa, Andrew J.; and Pohto, Gerald R., 5,017,275, Cl. 204-206.000.
- Elvidge, John H.: *See—*
  - Watkinson, Charles J.; and Elvidge, John H., 5,017,207, Cl. 65-66.000.
- Ely, Douglas L.; and Heffner, David A., to Chevron Research & Technology Company. Process for in situ biodegradation of hydrocarbon contaminated soil. 5,017,289, Cl. 210-610.000.
- Emata, Takashi: *See—*
  - Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji; Koguma, Hiroshi; and Emata, Takashi, 5,018,004, Cl. 357-74.000.
- Embrey, Mostyn P.; and Graham, Neil B., to National Research Development Corporation. Controlled release compositions (II). 5,017,382, Cl. 424-486.000.
- Emerson Electric Co.: *See—*
  - Dohogne, L. Ranney, 5,017,818, Cl. 310-71.000.
  - Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, 5,017,740, Cl. 174-152.0GM.
- Emory University: *See—*
  - Hunter, Robert L.; and Duncan, Alexander, 5,017,370, Cl. 424-83.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Enari, Masahiko: *See—*

Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.

Endo, Keiji: *See—*

Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,017,733, Cl. 585-6.300.

Endo, Mikio: *See—*

Oikawa, Katsuyuki; Ishihara, Toshinobu; Endo, Mikio; and Kubota, Tohru, 5,017,715, Cl. 556-401.000.

Endo, Takeshi; Nambu, Yoko; and Abe, Keiji, to Asahi Denka Kogyo K.K. Method of polymerizing epoxy compound. 5,017,684, Cl. 528-409.000.

Endo, Toshiya: *See—*

Tominaga, Tomohisa; Sato, Kazuichi; Otsuka, Kouichi; Endo, Toshiya; and Oikawa, Susumu, 5,017,443, Cl. 429-99.000.

Endoh, Tamotsu: *See—*

Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.

Energy Concepts, Inc.: *See—*

Miller, Paul; and Thompson, Tommy L., 5,016,391, Cl. 49-70.000.

Engel, Gunter: *See—*

Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Paul A.; and Breuleux, Gerald, legal representative, 5,017,582, Cl. 514-305.000.

Engel, Joseph C.; Mueller, Denis A.; and Bennett, Allan I., to Westinghouse Electric Corp. Integral capacitive divider bus bar voltage measuring apparatus and combined current sensor. 5,017,859, Cl. 324-127.000.

Engert, Gerd-Juergen: *See—*

Martan, Hans; Mross, Wolf D.; and Engert, Gerd-Juergen, 5,017,542, Cl. 502-209.000.

England, J. Bruce: *See—*

Stanislowski, Anna G.; and England, J. Bruce, 5,016,568, Cl. 119-173.000.

England, Jimmy C.; Hensley, John R.; Moehling, Frederick E.; Roberts, Everett M.; and Ruble, Hugh-Hiram, Jr., to Inco Alloys International, Inc. Durable method for producing finned tubing. 5,016,460, Cl. 72-208.000.

England, Julie S.: *See—*

Elkind, Jerome L.; Smith, Patricia B.; Hutchins, Larry D.; Luttmer, Joseph D.; York, Rudy L.; and England, Julie S., 5,017,511, Cl. 437-225.000.

Engler, Gideon: *See—*

Kaplan, Zvi; Engler, Gideon; and Loeb, Avi, 5,016,518, Cl. 89-8.000.

Englram, Paul B.: *See—*

Semler, Loren H.; Palm, Joseph M.; Englram, Paul B.; and Clegg, Jon Y., 5,017,291, Cl. 210-641.000.

Engstrom, Carl-Otto, to Ahlberg & Co. AB. Buildable device including modular frame assembly. 5,016,374, Cl. 40-605.000.

Enichem Elastomers Ltd.: *See—*

Jenkins, Derek K.; and Ansell, Peter J., 5,017,539, Cl. 502-102.000.

Enichim ANIC S.p.A.: *See—*

Messina, Giuseppe; Lorenzoni, Loreno; Calaresu, Paolo; and Sechi, Giovanni M., 5,017,721, Cl. 564-151.000.

Eniricerche, S.p.A.: *See—*

Delbianco, Alberto; and Girardi, Ermanno, 5,017,282, Cl. 208-414.000.

Enloe, Jack H.; Lau, John W.; and Rice, Roy W. Electronic package comprising aluminum nitride and aluminum nitride-borosilicate glass composite. 5,017,434, Cl. 428-428.000.

Enoch, Horst: *See—*

Drewel, Gunter; Enoch, Horst; and Grotkasten, Klaus, 5,017,111, Cl. 425-28.100.

EnviRestore Technologies, Inc.: *See—*

Green, Dennis H.; and Johnson, Stephen C., 5,016,314, Cl. 15-320.000.

Environmental Support Systems, Inc.: *See—*

Lambert, Barnum B., 5,016,628, Cl. 128-205.280.

Environmental Water Technology, Inc.: *See—*

Miler, Steven L.; Wathen, Ronald L.; and Palazzo, Raymond E., Jr., 5,017,284, Cl. 210-97.000.

Epitope, Inc.: *See—*

Fellman, Jack H., 5,017,471, Cl. 435-5.000.

Epperly, William R.; Sullivan, James C.; Sprague, Barry N.; and O'Leary, John H., to Fuel Tech, Inc. Process for nitrogen oxides reduction and minimization of the production of other pollutants. 5,017,347, Cl. 423-235.000.

Eri, Masatsugu: *See—*

Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; Miyoshi, Jun; and Eri, Masatsugu, 5,017,445, Cl. 429-224.000.

Erickson, Donald C. One-and-a-half effect absorption cycle. 5,016,444, Cl. 62-79.000.

Erni, Daniel; and Staeheli, Paul, to Maschinenfabrik Rieter AG. Funnel arrangement at the outlet of a card machine. 5,016,322, Cl. 19-150.000.

Ernst Pelz-Vertriebs GmbH & Co.: *See—*

Pelz, Peter, 5,016,934, Cl. 296-214.000.

ESAB Welding Products, Inc.: *See—*

Severance, Wayne S., Jr.; and Turner, Tommie Z., 5,017,752, Cl. 219-121.590.

Esaka, Kazuyoshi: *See—*

Kawano, Osamu; Takahashi, Manabu; Wakita, Junichi; and Esaka, Kazuyoshi, 5,017,248, Cl. 148-320.000.

Escobar, Agustin; Wagenknecht, Dietmar; and Malick, Ahmad W., to Du Pont de Nemours, E. I., and Company. Pharmaceutical composition and method of treatment or prophylaxis of cardiac disorders. 5,017,609, Cl. 514-538.000.

Eska Medical Lubeck Medizintechnik GmbH & Co.: *See—*

Ahlers, Olaf, 5,016,702, Cl. 164-34.000.

Eskimo Pie Corporation: *See—*

Bombardier, Wanda K.; Ferryman, Kim; and Khalil, Nessim, 5,017,392, Cl. 426-659.000.

Espino, Ramon L.: *See—*

Oswald, Alexis A.; Chen, Frank J.; Espino, Ramon L.; and Peng, Kuo L., 5,017,279, Cl. 208-67.000.

Essilor International-Compagnie Generale: *See—*

Baude, Dominique; Chavel, Pierre; Joyeux, Denis; and Taboury, Jean, 5,016,977, Cl. 350-162.170.

Etchepare, Eduard E., to Rockwell International Corporation. Spent solvent recovery in circuit processing. 5,017,199, Cl. 55-57.000.

Etemad, Shahrokh: *See—*

Fraser, Howard H., Jr.; and Etemad, Shahrokh, 5,017,107, Cl. 418-55.500.

Ethyl Corporation: *See—*

McKinnie, Bonnie G.; and Wood, Daniel A., 5,017,728, Cl. 568-726.000.

ETI-TEC Maschinenbau GmbH: *See—*

Zodrow, Rudolf; and Buchholz, Rainer, 5,017,261, Cl. 156-568.000.

Etzkorn, Heniz-W.: *See—*

Paquet, Volker; Ackermann, Ulrich; Etzkorn, Heniz-W.; Kersten, Ralf T.; and Rutze, Uwe, 5,017,404, Cl. 427-45.100.

Eurodent Industriale S.p.A.: *See—*

Gatti, Armando, 5,017,136, Cl. 433-98.000.

Euteneier, Leonard. No-slack restricted-drum stabilizer for commercial multitrailer combinations. 5,016,899, Cl. 280-446.100.

Evans, Brenda C. Portable grill apparatus. 5,016,608, Cl. 126-41.00R.

Evans, David A.: *See—*

Nguyen, Uy; Frakman, Grigory; and Evans, David A., 5,017,397, Cl. 426-542.000.

Exergen Corporation: *See—*

Pompei, Francesco, 5,017,019, Cl. 374-133.000.

EXPORTech Company, Inc.: *See—*

Oder, Robin R., 5,017,283, Cl. 209-212.000.

Exxon Chemical Patents Inc: *See—*

Welborn, Howard C., Jr., 5,017,714, Cl. 556-12.000.

Exxon Chemical Patents Inc.: *See—*

Chang, Main, 5,017,665, Cl. 526-129.000.

Gutierrez, Antonio; Song, Won R.; Lundberg, Robert D.; and Kleist, Robert A., 5,017,299, Cl. 252-51.50R.

White, Donald A., 5,017,662, Cl. 525-351.000.

Exxon Research and Engineering Company: *See—*

Oswald, Alexis A.; Chen, Frank J.; Espino, Ramon L.; and Peng, Kuo L., 5,017,279, Cl. 208-67.000.

Verduijn, Johannes P., 5,017,353, Cl. 423-328.000.

Ey-Rang, An; and Jung-Whan, Cho. Driving control circuit for robot. 5,017,849, Cl. 318-568.100.

Eyssautier, Bruno, to Sanofi. Process for multiplication of polysaccharide-producing microorganisms and use thereof in a polysaccharide production process. 5,017,479, Cl. 435-101.000.

Ezaki, Shinobu: *See—*

Tokai, Masaie; Kuroiwa, Minoru; and Ezaki, Shinobu, 5,016,561, Cl. 118-718.000.

Faarup, Peter: *See—*

Hansen, Kristian T.; Bundgaard, Hans; and Faarup, Peter, 5,017,571, Cl. 514-213.000.

Fabbri, Andrea; Moretti, Costanzo; and Forni, Laura, to Industria Farmaceutica Serono S.p.A. Treatment of infertility with somatotrophin releasing factor. 5,017,557, Cl. 514-12.000.

Fabbri, Vladimiro, to I.E.M.C.A. Spa Industria Elettromeccanica Complessi Automatici. Bar loader for a multi-chuck machine. 5,017,074, Cl. 414-224.000.

Fadler, Kurt: *See—*

Fischer, Matthias; Wiedmann, Rainer; Fadler, Kurt; and Jeppe, Harald, 5,016,744, Cl. 192-106.200.

Faigle, Ernst M.; Semchena, John H.; and Thompson, Richard J., to TRW Vehicle Safety Systems Inc. Vehicle occupant restraint system. 5,016,914, Cl. 280-741.000.

Falline, Brian J.; and Weihrauch, Bruce W., to Moline Paint Manufacturing Co. Lacquer coatings for polyurethane-molded articles. 5,017,634, Cl. 524-267.000.

Falzarano, Michael J.; and Wivagg, Adrian P., to Combustion Engineering, Inc. Nuclear fuel container tamper-proof closure. 5,016,776, Cl. 220-305.000.

Famulare, Richard J.: *See—*

Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Parамdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.

Fanuc Ltd.: *See—*

Mizuno, Yutaka, 5,017,767, Cl. 235-492.000.

Farber, Arnold S.; Lang, Stephen P.; and Smart, David C., to Deere & Company. Intermittent fault detection system. 5,017,910, Cl. 340-635.000.

Fargette, Alain; Marland, Andre ; Thomas, Fabrice; and Souloumiac, Alain. Magnetically controlled optical switch. 5,016,978, Cl. 350-269.000.

Farley, Peter J.: *See—*

Mohlenbrock, William C.; Farley, Peter J.; Frye, Lawrence J.; Trummell, Donald E., Jr.; and Bostrom, Alan G., 5,018,067, Cl. 364-413.020.

Farmar, James G.; Ulrich, Peter; and Cerami, Anthony, to Rockefeller University, The. Advanced glycosylation end products and associated methods. 5,017,696, Cl. 536-18.700.

Farmitalia Carlo Erba, SPA: *See—*

Lazzari, Ettore; Arcamone, Federico; Penco, Sergio; Verini, Maria A.; and Mongelli, Nicola, 5,017,599, Cl. 514-422.000.

Farnsworth, Robert P., to Hughes Aircraft Company. Simplified gaseous discharge device simmering circuit. 5,017,834, Cl. 315-58.000.

Farnworth, Brian; and Dix, James K., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Skin tight chemical/biological protective suit. 5,017,424, Cl. 428-230.000.

Faulkenberry, William J.: *See—*

Driller, Jack; Faulkenberry, William J.; and Lizzi, Frederic L., 5,016,615, Cl. 128-24.00A.

Fazi, Bruno, Jr.: *See—*

Cowan, Kevin P.; Fazi, Bruno, Jr.; Havrilla, Joseph B.; Lewandowski, Stanley R.; and Reilly, David M., 5,018,182, Cl. 378-173.000.

Feaster, William L., Jr. Greenhouse transport system. 5,016,541, Cl. 104-129.000.

Feinauer, Roland: *See—*

Finke, Jurgen; and Feinauer, Roland, 5,017,686, Cl. 524-87.000.

Feintool International Holding: *See—*

Haack, Johannes, 5,016,807, Cl. 228-170.000.

Felch, D. Gregory: *See—*

Dubner, Daniel W.; and Felch, D. Gregory, 5,016,917, Cl. 283-4.000.

Feldman, Lyudmila, to Mead Corporation, The. Method for image developing on plain paper utilizing a developer-donor sheet. 5,017,452, Cl. 430-138.000.

Feldtkeller, Martin, to Siemens Aktiengesellschaft. Base current regulation circuit for a switching transistor, in particular a bipolar transistor. 5,017,802, Cl. 307-270.000.

Fellman, Jack H., to Epitope, Inc. Reagent for peroxidase detection. 5,017,471, Cl. 435-5.000.

Fellmann, Jere; Wentrcek, Paul R.; and Kilner, Peter, to Catalytica, Inc. Selective sorption of 2,6-diisopropylnaphthalene. 5,017,735, Cl. 585-820.000.

Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., to American Home Products Corporation. Anti-ulcer 5-(2-substituted ethenyl)-3(2H)-furanones. 5,017,601, Cl. 514-443.000.

Fender, Norman N. Device for sliding and floating a boat lift. 5,016,685, Cl. 114-45.000.

Fergason, James L.; and Mohebban, Manoochehr, to Raychem Corporation. Liquid crystal display having a capacitor for overvoltage protection. 5,016,982, Cl. 350-331.00R.

Fergason, James L., to Manchester R & D Partnership. Liquid crystal motion picture projector with memory. 5,016,984, Cl. 350-334.000.

Ferguson, James C.; Hanz, Marvin C.; and Moeller, Galen A. Slingshot with adjustable sight. 5,016,601, Cl. 124-20.100.

Ferguson, Robert M.: *See—*

Eddy, Clifford O.; Henry, Arnold W.; Lorenzo, Lynn; Chow, Che C.; Ferguson, Robert M.; and Finsterwalder, Robert N., 5,017,432, Cl. 428-422.000.

Ferraro, Robert J., to Smith & Wesson Corp. Removable front sight for handguns. 5,016,381, Cl. 42-100.000.

Ferrero, Pietro, to Ferrero S.p.A. Wrapping machine, particularly for sweets and similar food products. 5,016,421, Cl. 53-233.000.

Ferrero S.p.A.: *See—*

Ferrero, Pietro, 5,016,421, Cl. 53-233.000.

Ferryman, Kim: *See—*

Bombardier, Wanda K.; Ferryman, Kim; and Khalil, Nessim, 5,017,392, Cl. 426-659.000.

Feuz, Fritz; Hora, Ferdinand; and Linder, Fritz, to Von Roll Transportsysteme AG. Track installation for the vehicles of a transport installation, especially a revolving aerial cable transport installation. 5,016,539, Cl. 104-28.000.

Fiat Auto S.p.A.: *See—*

Di Nunzio, Vittorio; and D'Onofrio, Francesco, 5,017,874, Cl. 324-378.000.

Fichtel & Sachs AG: *See—*

Fischer, Matthias; Wiedmann, Rainer; Fadler, Kurt; and Jeppe, Harald, 5,016,744, Cl. 192-106.200.

Fiedler, Armin, to International Freezer Corporation. Recirculation system for soft serve ice cream apparatus. 5,016,446, Cl. 62-342.000.

Fielding, Kenneth H.: *See—*

Horner, Joseph L.; Fielding, Kenneth H.; and Makekau, Charles K., 5,016,976, Cl. 350-162.130.

Fields, Charlie B., to Tri-State Hospital Supply Corp. Infant feeding device. 5,017,193, Cl. 604-270.000.

Figard, Joseph E.: *See—*

Snelling, Ricky E.; Figard, Joseph E.; and Morton, Robert W., 5,017,643, Cl. 524-609.000.

Fikentscher, Rolf: *See—*

Hohmann, Andreas; Reuther, Wolfgang; Fikentscher, Rolf; and Proll, Theo, 5,017,725, Cl. 564-487.000.

Finegan, Joel D.: *See—*

Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,018,128, Cl. 369-284.000.

Finke, Jurgen; and Feinauer, Roland, to Huels Aktiengesellschaft. Production of aromatic polyamide using a fused ring stabilizer. 5,017,686, Cl. 524-87.000.

Finlan, Martin F., to Amersham International plc; and Oxford Instruments Ltd. Proton source. 5,017,882, Cl. 328-234.000.

Finnah, Josef, to GEA Finnah GmbH. Apparatus for feeding a label to a cavity of a molding device for thermoforming plastic containers. 5,017,125, Cl. 425-504.000.

Finneran, James G., to J. G. Finneran Associates. Cap closure and liner. 5,016,771, Cl. 215-341.000.

Finsterwalder, Robert N.: *See—*

Eddy, Clifford O.; Henry, Arnold W.; Lorenzo, Lynn; Chow, Che C.; Ferguson, Robert M.; and Finsterwalder, Robert N., 5,017,432, Cl. 428-422.000.

Fiore, Leonardo; Borghi, Italo; and Mattiussi, Andrea, to Montedipe S.r.l. Rapidly-crystallizing polyester compositions. 5,017,657, Cl. 525-173.000.

Firmenich S.A.: *See—*

Chapuis, Christian; Margot, Christian; Schulte-Elte, Karl-Heinrich; and Pamingle, Herve , 5,017,711, Cl. 549-332.000.

Fischer, Fritz: *See—*

Marsoner, Hermann; Fischer, Fritz; and Kleinhappl, Erich, 5,017,339, Cl. 422-82.040.

Fischer, Heinrich: *See—*

Strasser, Gregor; Zohrer, Gerald; Schertler, Roman; and Fischer, Heinrich, 5,017,073, Cl. 414-217.000.

Fischer, Horst; Rohsaint, Wolfgang; and Hmimid, Mohammed, to Siemens Aktiengesellschaft. Dual incrementer. 5,018,094, Cl. 364-770.000.

Fischer, Matthias; Wiedmann, Rainer; Fadler, Kurt; and Jeppe, Harald, to Fichtel & Sachs AG. Clutch disc for a friction clutch. 5,016,744, Cl. 192-106.200.

Fischer, Robert W., Jr.: *See—*

Hsu, Sawyer C. Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 5,016,947, Cl. 312-108.000.

Fisher Controls International, Inc.: *See—*

Bovee, Loren L.; and Weber, Larry J., 5,016,857, Cl. 251-304.000.

Fisher, Richard A.: *See—*

Gilbert, Walter; Fisher, Richard A.; Sato, Vicki L.; and Ramachandran, Kuzhalmannam L., 5,017,688, Cl. 530-326.000.

Fisher, Thomas S.; and Losty, Martin R., to AT&T Bell Laboratories. Restriction of communication service accessibility among subscriber communities. 5,017,917, Cl. 340-825.790.

Fishman, David A., to AT&T Bell Laboratories. Automatic power supply load shedding techniques. 5,017,799, Cl. 307-34.000.

Fister, Julius C.: *See—*

Sankaranarayanan, Ashok; Crane, Jacob; and Fister, Julius C., 5,017,244, Cl. 148-3.000.

Fitzner, Jeffrey N.: *See—*

Hylarides, Mark D.; Srinivasan, Ananthachari; Fitzner, Jeffrey N.; and Vrudhula, Vivekananda M., 5,017,693, Cl. 530-390.000.

Fitzpatrick, Margaret. Massaging device. 5,016,619, Cl. 128-67.000.

Fleet, George W. J.; and Namgoong, Sung K., to Monsanto Company. Fucosidase inhibitor. 5,017,704, Cl. 546-242.000.

Flehr, Dietmar: *See—*

Popp, Franz-Wolfgang; Krammer, Erwin; Genannt, Wolfgang; and Flehr, Dietmar, 5,016,422, Cl. 53-330.000.

Flory, Klaus: *See—*

Kempter, Fritz E.; Matejcek, Franz; Neubach, Werner; and Flory, Klaus, 5,017,641, Cl. 524-598.000.

Flowers, William F.: *See—*

McKinney, John M.; Ata, Ali D.; Wierzba, Robert B.; and Flowers, William F., 5,016,666, Cl. 137-1.000.

Flowers, Woodie: *See—*

Hanna, R. Scott; Flowers, Woodie; Luchaco, David G.; Yuhasz, Stephen J.; Spira, Joel S.; and Hall, Philip R., 5,017,837, Cl. 315-136.000.

Foa', Marco: *See—*

Giannini, Umberto; Coassolo, Alfredo; Foa', Marco; Sabarino, Giampiero; and Chapoy, L. Lawrence, 5,017,678, Cl. 528-190.000.

Fodale, Joseph V.: *See—*

Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Paramdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.

Fodor, Lawrence M.; and Coutant, William R., to Phillips Petroleum Company. Process for reducing the level of t-butyl alcohol (TBA) in visbroken polyolefins. 5,017,661, Cl. 525-344.000.

Fonderie & Ateliers des Sablons: *See—*

Godat, Jean; and Krzywdziak, Alain, 5,017,017, Cl. 366-251.000.

Foo, Thomas K.; Hayes, Cecil E.; and Kang, Yoon-Won, to General Electric Company. NMR radio frequency coil with dielectric loading for improved field homogeneity. 5,017,872, Cl. 324-322.000.

Ford, Mark R.: *See—*

Schmidt, Robert J.; Haizmann, Robert S.; Ford, Mark R.; Low, C. David; and Adams, Frank H., 5,017,541, Cl. 502-169.000.

Ford Motor Company: *See—*

Goates, Eldon L., 5,016,488, Cl. 74-475.000.

Mason, Claude F., 5,016,991, Cl. 350-357.000.

Winterbottom, Walter L.; Badgley, J. Scott; and Baumgartner, Linda J., 5,016,809, Cl. 228-205.000.

Forni, Laura: *See—*

Fabbri, Andrea; Moretti, Costanzo; and Forni, Laura, 5,017,557, Cl. 514-12.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Forschungszentrum Juelich GmbH: *See—*
Bringer-Meyer, Stephanie; and Sahm, Hermann, 5,017,485, Cl. 435-158.000.
Forschungszentrum Julich GmbH: *See—*
Woike, Theo; Kerkmann, Detlef; Beier, Thomas; Krasser, Wolfgang; and Pescia, Danilo, 5,016,992, Cl. 350-376.000.
Fossati, Piero; Heidenreich, Holger; Hugl, Herbert; and Wehling, Klaus, to Miles Inc. Indicator compounds, method of their preparation and use of those compounds in an iron assay system. 5,017,498, Cl. 436-84.000.
Four D, Incorporated: *See—*
Reiland, Kenneth H.; Reiland, Mary J.; and Herold, Ronald J., 5,016,778, Cl. 221-154.000.
Fourneaux, Roger; and Grandvallet, Gilles, to S. A. Saurer Diederichs. System for detecting and correcting weft misfeeds. 5,016,676, Cl. 139-116.200.
Fox, David A., to Westinghouse Electric Corp. Circuit and method for voltage regulation of electric power sources. 5,017,857, Cl. 322-25.000.
Fradin, Maurice. Process for preparing restructured meat. 5,017,393, Cl. 426-272.000.
Frakman, Grigory: *See—*
Nguyen, Uy; Frakman, Grigory; and Evans, David A., 5,017,397, Cl. 426-542.000.
Framatome: *See—*
Hurdiel, Alain, 5,017,330, Cl. 376-260.000.
Francis, Timothy L.: *See—*
Wahlquist, Randy W.; Reinarts, John M.; and Francis, Timothy L., 5,017,219, Cl. 75-415.000.
Frank, Klaus: *See—*
Rauch, Hubert; Arndt, Peter J.; Klesse, Wolfgang; Krall, Wilhelm; and Frank, Klaus, 5,017,631, Cl. 523-340.000.
Frank, Steven J. Darkroom calculator. 5,018,084, Cl. 364-525.000.
Fraser, Bruce A.: *See—*
Lane, L. Thomas; Fraser, Bruce A.; and Brendel, Thomas E., 5,016,447, Cl. 62-470.000.
Fraser, Howard H., Jr.; and Etemad, Shahrokh, to Carrier Corporation. Slider block radial compliance mechanism. 5,017,107, Cl. 418-55.500.
Fratis, James: *See—*
Hsu, Sawyer C. Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 5,016,947, Cl. 312-108.000.
Frautschi, Jack; and Tingey, Kevin, to Board of Regents, The University of Texas System. Methods and compositions for providing articles having improved biocompatibility characteristics. 5,017,670, Cl. 527-313.000.
Frehaut, Jean-Pierre; and Pineau, Jean-Pierre, to Thomson-Brandt Armements. Device for the locking and unlocking of two elements of a projectile, notably of a parachute container. 5,016,839, Cl. 244-147.000.
French, Barry T., to Rockwell International Corporation. High-speed modified successive approximation analog to digital converter. 5,017,920, Cl. 341-163.000.
Frenco Verzahnungslehren GmbH, Firma: *See—*
Och, Rudolf, 5,016,471, Cl. 73-162.000.
Freyssinet, Georges; and Freyssinet, Martine, to Rhone-Poulenc Agrochimie. Process for regenerating sunflowers by embryogenesis. 5,017,491, Cl. 435-240.500.
Freyssinet, Martine: *See—*
Freyssinet, Georges; and Freyssinet, Martine, 5,017,491, Cl. 435-240.500.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Drewel, Gunter; Enoch, Horst; and Grotkasten, Klaus, 5,017,111, Cl. 425-28.100.
Friedrich, Peter: *See—*
Kerschner, Gunther; Wurzenberger, Johann; Hausmann, Herbert; Eckel, Giselher; and Friedrich, Peter, 5,018,059, Cl. 364-200.000.
Friemel, Wolfgang; Barth, Volker; and Dierks, Hildegund, to Detia Freyberg GmbH. Delayed hydrolysis of metal phosphides. 5,017,376, Cl. 424-409.000.
Frigol, Jordi: *See—*
Colombo, Augusto; Pares, Juan; and Frigol, Jordi, 5,017,596, Cl. 514-406.000.
Frimley, Charles H., to Trico Products Corporation. Washer arrangement for a windscreen wiper. 5,016,312, Cl. 15-250.040.
Fritsche Mollmann GmbH & Co.: *See—*
Onnenberg, Volker; and Mollmann, Gunter, 5,017,114, Cl. 425-112.000.
Frolov, George, to Harrow Products, Inc. Electromagnetic shear lock. 5,016,929, Cl. 292-251.500.
Frye, Lawrence J.: *See—*
Mohlenbrock, William C.; Farley, Peter J.; Frye, Lawrence J.; Trummell, Donald E., Jr.; and Bostrom, Alan G., 5,018,067, Cl. 364-413.020.
FSI International, Inc.: *See—*
Moxness, Sherman U.; and Grant, Robert W., 5,017,236, Cl. 134-1.000.
Fuchikami, Takamasa: *See—*
Ojima, Iwao; and Fuchikami, Takamasa, 5,017,718, Cl. 556-466.000.
Fuel Tech, Inc.: *See—*
Epperly, William R.; Sullivan, James C.; Sprague, Barry N.; and O'Leary, John H., 5,017,347, Cl. 423-235.000.
Fuji Electric Co., Ltd.: *See—*
Hayashi, Takao; and Yamada, Masao, 5,017,333, Cl. 376-382.000.
Fuji, Hiroshi: *See—*
Tsuji, Kentaroh; Fujiwara, Tsuneo; Fuji, Hiroshi; Terashima, Shigeo; and Numata, Tomiyuki, 5,018,120, Cl. 369-32.000.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Ishitsuka, Keiichi; and Tsunoda, Shinji, 5,016,396, Cl. 49-502.000.
Ohkumo, Hiroya, 5,016,590, Cl. 123-412.000.
Fuji Kagakushi Kogyo Co., Ltd.: *See—*
Goda, Hitoshi, 5,017,228, Cl. 106-28.000.
Ohtomo, Yasuyuki; and Obata, Yoshiyuki, 5,017,256, Cl. 156-240.000.
Fuji Kiko Co., Ltd.: *See—*
Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.
Fuji Photo Film Co.: *See—*
Hayashi, Goichi; Fujimagari, Sajuro; Nakamura, Kensaku; and Ishida, Ryuichi, 5,017,455, Cl. 430-256.000.
Fuji Photo Film Co., Ltd.: *See—*
Agano, Toshitaka; and Fuseda, Yuichi, 5,017,774, Cl. 250-327.200.
Akao, Mutsuo, 5,017,429, Cl. 428-349.000.
Inoue, Nobuaki; and Hayashi, Katsumi, 5,017,463, Cl. 430-398.000.
Kato, Eiichi; and Ishii, Kazuo, 5,017,448, Cl. 430-49.000.
Kobayashi, Hidetoshi; Ohi, Reiichi; and Sakanoue, Kei, 5,017,466, Cl. 430-558.000.
Kotani, Takaaki, 5,017,955, Cl. 354-400.000.
Kubota, Kazufumi, 5,018,023, Cl. 358-450.000.
Nakamine, Takeshi; Kawata, Ken; and Taguchi, Toshiki, 5,017,454, Cl. 430-203.000.
Nakanishi, Kanji, 5,018,038, Cl. 360-126.000.
Okamura, Hisashi; and Katoh, Kazunobu, 5,017,456, Cl. 430-264.000.
Shioji, Mitsuaki; Morimoto, Kenichi; Kato, Shinji; Nakamura, Takeshi; and Nozaki, Nobuharu, 5,016,983, Cl. 350-332.000.
Terashita, Takaaki, 5,017,014, Cl. 356-404.000.
Urabe, Hitoshi; Korikawa, Hiroshi; Akimoto, Kazuhiko; Nakaya, Daisuke; and Mizuno, Masahiko, 5,018,078, Cl. 364-518.000.
Fujihira, Atsushi: *See—*
Taniai, Takayoshi; Saitoh, Tadashi; and Fujihira, Atsushi, 5,018,098, Cl. 364-900.000.
Fujii, Masaki: *See—*
Yamada, Yasuhiro; Fujii, Masaki; and Shimomura, Seiji, 5,017,358, Cl. 423-449.000.
Fujii, Tetsuo; Sakakibara, Toshio; and Sakakibara, Nobuyoshi, to Nippondenso Co., Ltd. Method of making a nonvolatile semiconductor memory apparatus with a floating gate. 5,017,505, Cl. 437-52.000.
Fujii, Tetsuo; Sakai, Minekazu; and Kuroyanagi, Akira, to Nippondenso Co., Ltd. EEPROM semiconductor memory device. 5,017,979, Cl. 357-23.500.
Fujimagari, Sajuro: *See—*
Hayashi, Goichi; Fujimagari, Sajuro; Nakamura, Kensaku; and Ishida, Ryuichi, 5,017,455, Cl. 430-256.000.
Fujimaki, Tatsuo: *See—*
Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.
Fujimori, Hiroyoshi: *See—*
Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.
Fujimoto, Sachito: *See—*
Fujimura, Akira; Fujimoto, Sachito; and Hosoda, Fumio, 5,016,596, Cl. 123-489.000.
Fujimoto, Shigeru: *See—*
Yahagi, Susumu; Ishida, Shuichi; and Fujimoto, Shigeru, 5,017,755, Cl. 219-121.680.
Fujimura, Akira; Fujimoto, Sachito; and Hosoda, Fumio, to Honda Giken Kogyo K.K. Air-fuel ratio control method for internal combustion engines. 5,016,596, Cl. 123-489.000.
Fujimura, Itaru: *See—*
Akatsu, Yohsuke; Fukushima, Naoto; Fujimura, Itaru; and Fukunaga, Yukio, 5,016,907, Cl. 280-707.000.
Fujimura, Masaki; and Tadokoro, Toyohiko, to Yamaha Corporation. Metallic golf club head. 5,016,882, Cl. 273-167.00H.
Fujino, Akihiko: *See—*
Nakai, Masaaki; Izumi, Shuji; Fujino, Akihiko; Taniguchi, Nobuyuki; Yamaki, Toshio; and Mukai, Hiromu, 5,017,957, Cl. 354-429.000.
Fujisawa Pharmaceutical Company, Ltd.: *See—*
Matsuo, Masaaki; Manabe, Takashi; Shigenaga, Shinji; and Matsuda, Hiroshi, 5,017,703, Cl. 546-201.000.
Fujita, Kazuo. Electrically-operated folding stage system. 5,016,403, Cl. 52-7.000.
Fujitsu Limited: *See—*
Abe, Naomichi, 5,017,461, Cl. 430-325.000.
Inoue, Yasuhiro, 5,018,080, Cl. 364-519.000.
Matsuoka, Takeru, 5,018,168, Cl. 375-106.000.
Miura, Takao; Imaoka, Kazunori; and Sugimoto, Fumitoshi, 5,017,998, Cl. 357-49.000.
Obata, Akihiko; Adachi, Motomitsu; Kamata, Hajime; and Yano, Katsutoshi, 5,018,082, Cl. 364-521.000.
Sugiyama, Tsutomu; and Watanabe, Akihiko, 5,018,110, Cl. 365-230.090.
Suzuki, Takashi; and Nakagiri, Etsuji, 5,018,194, Cl. 379-207.000.
Takagi, Masaaki, 5,017,768, Cl. 250-201.500.
Taniai, Takayoshi; Saitoh, Tadashi; and Fujihira, Atsushi, 5,018,098, Cl. 364-900.000.
Tsuji, Hiroki; Kawano, Kyoichiro; and Murase, Teruo, 5,017,738, Cl. 174-94.00R.

Yoshida, Masanobu, 5,017,803, Cl. 307-296.500.
Yoshida, Masanobu, 5,018,107, Cl. 365-230.060.
Fujitsu Microcomputer Systems Limited: *See—*
Taniai, Takayoshi; Saitoh, Tadashi; and Fujihira, Atsushi, 5,018,098, Cl. 364-900.000.
Fujitsu VLSI Limited: *See—*
Sugiyama, Tsutomu; and Watanabe, Akihiko, 5,018,110, Cl. 365-230.090.
Fujiwara, Tsuneo: *See—*
Tsuji, Kentaroh; Fujiwara, Tsuneo; Fuji, Hiroshi; Terashima, Shigeo; and Numata, Tomiyuki, 5,018,120, Cl. 369-32.000.
Fukada, Takeshi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; Codama, Mitsufumi; and Takayama, Toru, to Semiconductor Energy Laboratory Co., Ltd. Image sensor. 5,017,828, Cl. 313-367.000.
Fukada, Takeshi: *See—*
Sakama, Mitsunori; Fukada, Takeshi; Sakamoto, Naoya; Amachi, Nobumitsu, Hayashi, Shigenori; and Inushima, Takashi, 5,017,502, Cl. 437-2.000.
Fukaya, Masaki: *See—*
Komiyama, Katsumi; Fukaya, Masaki; Yokono, Kojiro; and Toma, Hitoshi, 5,017,988, Cl. 357-30.000.
Fukuhara, Hiroshi; and Matsunaga, Fujihisa, to Mitsui Petrochemical Indistries, Ltd. Phenol preparation process and propylene recovery therefrom. 5,017,729, Cl. 568-798.000.
Fukui, Yasuji: *See—*
Honkura, Yoshinobu; Fukui, Yasuji; Matsuo, Tooru; and Mishima, Chisato, 5,017,247, Cl. 148-302.000.
Fukumoto, Hiroshi: *See—*
Kobayashi, Motokazu; Arahara, Kohzoh; Yuasa, Toshiya; Kai, Takashi; and Fukumoto, Hiroshi, 5,017,223, Cl. 106-20.000.
Fukunaga, Akio. Wire stripping apparatus. 5,016,398, Cl. 51-80.00R.
Fukunaga, Keizo: *See—*
Tsuji, Masaru; Katoh, Atsuyuki; and Fukunaga, Keizo, 5,017,962, Cl. 355-210.000.
Fukunaga, Yukio: *See—*
Akatsu, Yohsuke; Fukushima, Naoto; Fujimura, Itaru; and Fukunaga, Yukio, 5,016,907, Cl. 280-707.000.
Fukushima, Akira: *See—*
Sugiyama, Keikichi; Takada, Koji; Fukushima, Akira; and Egawa, Makoto, 5,017,368, Cl. 424-70.000.
Fukushima, Naoto: *See—*
Akatsu, Yohsuke; Fukushima, Naoto; Fujimura, Itaru; and Fukunaga, Yukio, 5,016,907, Cl. 280-707.000.
Fuller, John R. C.: *See—*
Ong, Beng S.; Murti, Dasarao K.; and Fuller, John R. C., 5,017,645, Cl. 524-726.000.
Fuller, Timothy J.; Solodar, Warren E.; Kang, Henry R.; Kaplan, Samuel; and Crandall, Raymond K., to Xerox Corporation. Ink jet ink compositions. 5,017,644, Cl. 524-612.000.
Fullerton, James T. Collapsible box with improved corner locks. 5,016,814, Cl. 229-196.000.
Furrer, Hansjorg; Peltoniemi, Raimo; Richle, Norbert; and Ulrich, Dietrich, to Lonza Ltd. Process for making hollow billets into tubes. 5,016,456, Cl. 72-38.000.
Furukawa Aluminum Co., Ltd.: *See—*
Nabae, Motohiro; and Kishino, Kunihiko, 5,017,337, Cl. 420-532.000.
Furukawa, Fumio: *See—*
Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
Furukawa, Satoru; Ozaki, Akio; Nakanishi, Toshihide; Kotani, Yukinobu; and Sugimoto, Masahiro, to Kyowa Hakko Kogyo Co., Ltd. Process for producing L-threonine. 5,017,483, Cl. 435-115.000.
Furusawa, Toshihiro; Satoh, Atsushi; Nakajima, Takashi; and Matsugishi, Noriaki, to Idemitsu Kosan Co., Ltd.; and Seidensha Electronics Co., Ltd. Method for injection molding into a resonating mold. 5,017,311, Cl. 264-23.000.
Furuta, Taro: *See—*
Kihara, Koji; and Furuta, Taro, 5,017,617, Cl. 514-635.000.
Furuya, Masato: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,018,018, Cl. 358-213.110.
Fuseda, Yuichi: *See—*
Agano, Toshitaka; and Fuseda, Yuichi, 5,017,774, Cl. 250-327.200.
Fyles, Kenneth M.: *See—*
Yale, Brian; and Fyles, Kenneth M., 5,017,521, Cl. 501-64.000.
G-C Dental Industrial Corp.: *See—*
Kojima, Norio, 5,017,790, Cl. 250-455.100.
G.D. Societa Per Azioni: *See—*
Spatafora, Mario; Grandi, Bruno; and Gamberini, Antonio, 5,016,423, Cl. 53-476.000.
GAC International, Inc.: *See—*
Miura, Fujio, 5,017,133, Cl. 433-20.000.
Gaffar, Abdul; and Polefka, Thomas G., to Colgate-Palmolive Company. Anticalculus oral composition. 5,017,362, Cl. 424-52.000.
Gaidis, James M.: *See—*
Gartner, Ellis M.; Myers, David F.; and Gaidis, James M., 5,017,234, Cl. 106-781.000.
Gaiser, Robert F.: *See—*
Zander, Richard A.; Gaiser, Robert F.; and Crumb, Donald A., 5,016,442, Cl. 60-535.000.
Galbraith, Douglas C.; and Greene, Jonathan W., to Actel Corporation. Input/output module with latches. 5,017,813, Cl. 307-475.000.
Gallez, Francois: *See—*
Leroux, Jacques; and Gallez, Francois, 5,017,062, Cl. 409-179.000.
Galvanetto, Francois: *See—*
Spiess, Hansruedi; and Galvanetto, Francois, 5,017,039, Cl. 404-25.000.
Gamand, Patrice, to U.S. Philips Corporation. High frequency IC power amplifier. 5,017,887, Cl. 330-277.000.
Gamberini, Antonio: *See—*
Spatafora, Mario; Grandi, Bruno; and Gamberini, Antonio, 5,016,423, Cl. 53-476.000.
Ganesan, Pasupathy: *See—*
Smith, Gaylord D.; Tassen, Curtis S.; Ganesan, Pasupathy; and Wheeler, Jack M., 5,017,249, Cl. 148-410.000.
Garcia, Evaristo, Jr.: *See—*
Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Garcia, Evaristo, Jr., 5,017,510, Cl. 437-192.000.
Garcia, Rudy J., to W. L. Gore & Associates, Inc. Replaceable seal for electrical cables in a severe environment. 5,017,160, Cl. 439-750.000.
Garda Impranti: *See—*
Tomelleri, Raffaele, 5,016,464, Cl. 72-447.000.
Gardner, Frederick P. Power saw arrangement. 5,016,510, Cl. 83-471.002.
Garrett, R. Patrick; and Krivoshia, Miles S. Reformable support structure. 5,016,624, Cl. 128-82.100.
Garrick, Craig K.: *See—*
Bulloch, Russell G.; and Garrick, Craig K., 5,016,870, Cl. 272-73.000.
Garrison, Joe K.: *See—*
Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.
Gartner, Ellis M.; Myers, David F.; and Gaidis, James M., to W. R. Grace & Co.-Conn. Processing additives for blended cements. 5,017,234, Cl. 106-781.000.
Garverick, Timothy L.: *See—*
Perloff, Ronald S.; and Garverick, Timothy L., 5,018,171, Cl. 375-121.000.
Garvin, William D. Open top trash bag holder. 5,016,844, Cl. 248-97.000.
Garzelloni, Thomas L., to Automotion, Incorporated. Accumulating conveyor. 5,016,748, Cl. 198-781.000.
Gas Research Institute: *See—*
Himmel, Robert L.; and Parobechek, Frank E., 5,016,606, Cl. 126-21.00A.
Gascoigne, John A.: *See—*
Clitherow, Barbara M.; Dean, Trevor W. R.; Gascoigne, John A.; and Van Issum, Bernhard E., 5,017,268, Cl. 162-146.000.
Gaskell, David J., to Lucas Industries public limited company. Fuel injectors for internal combustion engines. 5,016,820, Cl. 239-533.120.
Gasparaitis, Bernard V.; and Knutson, William J., to Motorola, Inc. Lighting panel for liquid crystal display. 5,016,956, Cl. 350-96.100.
Gassen, James R.; and Suchdev, Lakhbir S., to Textron Inc. Vibration reducing chain saw handle. 5,016,355, Cl. 30-383.000.
Gassman, Walter J. Cam drive diesel engine utilizing double acting pistons. 5,016,580, Cl. 123-58.00A.
Gatti, Armando, to Eurodent Industriale S.p.A. Apparatus with modular operative blocks for dentistry. 5,017,136, Cl. 433-98.000.
Gautier, Jean-Pierre, to Bendix Europe Services Techniques. Process for adjusting the value of the jump of a brake booster. 5,016,520, Cl. 91-471.000.
Gaz de France: *See—*
LaForet, Jean; and Rigaud, Andre , 5,016,605, Cl. 126-20.000.
GB Electrical, Inc.: *See—*
Miller, Lee A., 5,017,760, Cl. 219-390.000.
GBD Inc. dba Gold Graphics: *See—*
Gold, Albert A., 5,016,372, Cl. 40-591.000.
GE Fanuc Automatinon North America, Inc.: *See—*
Sexton, Daniel W., 5,018,146, Cl. 371-37.100.
GEA Finnah GmbH: *See—*
Finnah, Josef, 5,017,125, Cl. 425-504.000.
Gebr. Hofmann GmbH & Co. KG Maschinenfabrik: *See—*
Himmler, Gunther, 5,016,470, Cl. 73-146.000.
GEC (New Zealand) Limited: *See—*
Byers, David J.; and Penny, John R., 5,017,855, Cl. 318-811.000.
Geiger, Martin: *See—*
Pomper, Michael; and Geiger, Martin, 5,018,103, Cl. 365-104.000.
Gelb, Jack P.; and Tyrrell, John C., to International Business Machines Corporation. Allocating data storage space of peripheral data storage devices using implied allocation based on user parameters. 5,018,060, Cl. 364-200.000.
Geller, Bernard D., to Comsat. RF power combiner using baluns. 5,017,886, Cl. 330-277.000.
Geltosky, Jack: *See—*
Haberzettl, Cecelia; Geltosky, Jack; and Perst, Renee, 5,017,342, Cl. 422-102.000.
Genannt, Wolfgang: *See—*
Popp, Franz-Wolfgang; Krammer, Erwin; Genannt, Wolfgang; and Flehr, Dietmar, 5,016,422, Cl. 53-330.000.
Genentech, Inc.: *See—*
O'Brien, Donogh P.; and Vehar, Gordon A., 5,017,556, Cl. 514-2.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- General Chemical Corporation: *See—*
  - Bean, Samuel L.; Dulik, Mark D.; and Monopoli, Peter A., 5,017,301, Cl. 252-105.000.
- General Electric CGR S.A.: *See—*
  - Romeas, Rene ; Rouchy, Didier; and Gilleron, Alain, 5,018,176, Cl. 378-37.000.
- General Electric Company: *See—*
  - Agrawal, Ashok K.; and Landry, Norman R., 5,017,927, Cl. 342-371.000.
  - Bopp, Richard C., 5,017,656, Cl. 525-149.000.
  - Collins, Arthur K., 5,018,174, Cl. 378-4.000.
  - Dix, Gary E.; Crowther, Russell L.; Colby, Mark J.; Matzner, Bruce; and Elkins, Robert B., 5,017,332, Cl. 376-370.000.
  - Foo, Thomas K.; Hayes, Cecil E.; and Kang, Yoon-Won, 5,017,872, Cl. 324-322.000.
  - Germer, Warren R.; Ouellette, Maurice J.; and Negahban-Hagh, Mehrdad, 5,017,860, Cl. 324-142.000.
  - Johnson, Donald S., 5,017,624, Cl. 521-154.000.
  - Mueller, Otward M.; Roemer, Peter B.; and Edelstein, William A., 5,017,871, Cl. 324-318.000.
  - Nash, Dudley O.; and Nold, David A., 5,016,818, Cl. 239-127.100.
  - Neugebauer, Constantine A.; and Daum, Wolfgang, 5,018,002, Cl. 357-68.000.
  - Oliver, David W., 5,017,869, Cl. 324-230.000.
  - Pate, Robert A.; and Pate, Alma J., 5,016,517, Cl. 89-7.000.
  - Siemers, Paul A.; and Ritter, Ann M., 5,017,438, Cl. 428-614.000.
  - Wojnarowski, Robert J.; and Eichelberger, Charles W., 5,018,150, Cl. 372-9.000.
  - Yerman, Alexander J.; and Ngo, Khai D. T., 5,017,902, Cl. 336-83.000.
  - Young, Glen C.; and Kiefer, James R., 5,017,846, Cl. 318-244.000.
- General Motors Corporation: *See—*
  - Browne, Alan L.; and Chin, Yuen-Kwok, 5,017,904, Cl. 340-479.000.
  - Haka, Raymond J., 5,016,521, Cl. 92-13.100.
- General Signal Corporation: *See—*
  - Latka, Henry C., 5,016,683, Cl. 141-1.000.
- Genevray, Henri, to N. Schlumberger Et Cie, S.A. Thread deflectors, particularly for a hollow spindle machine. 5,016,431, Cl. 57-19.000.
- Genzyme Corporation: *See—*
  - Burns, James W.; Cox, Steven; and Walts, Alan E., 5,017,229, Cl. 106-162.000.
- Geophysical Engineering Company: *See—*
  - Assaf, Gad; and Doron, Benjamin, 5,017,043, Cl. 405-52.000.
- George Banta Co., Inc.: *See—*
  - Huston, Donald B.; and Rackow, William L., 5,016,888, Cl. 273-239.000.
- Georgiev, Ivan N.: *See—*
  - Mitkov, Atanas L.; Georgiev, Ivan N.; Atanassov, Atanas K.; Radulov, Peter T.; and Stoyanov, Iliya Y., 5,017,177, Cl. 460-46.000.
- Gerard de Grooth, Bernard; Greve, Jan; and Terstappen, Leonardus W. M. M., to Sequoia-Turner Corporation. Particle discriminator and method. 5,017,497, Cl. 436-63.000.
- Gerard, Gary F.: *See—*
  - Kotewicz, Michael L.; D'Alessio, James M.; and Gerard, Gary F., 5,017,492, Cl. 435-252.300.
- Gerdt, David W.: *See—*
  - Halsey, James D.; Riggs, Robert F.; Gilligan, Lawrence H.; and Gerdt, David W., 5,017,793, Cl. 250-551.000.
- Gerhartz, Siegmar: *See—*
  - Schippers, Heinz; Lenk, Erich; Gerhartz, Siegmar; Schiminski, Herbert; and Turk, Herbert, 5,016,829, Cl. 242-18.00A.
- German Textile Research Center North-West: *See—*
  - Bossmann, Adelgund; and Schollmeyer, Eckard, 5,017,423, Cl. 428-224.000.
- Germer, Warren R.; Ouellette, Maurice J.; and Negahban-Hagh, Mehrdad, to General Electric Company. Electronic meter digital phase compensation. 5,017,860, Cl. 324-142.000.
- Gerot-Pharmazeutika Gesellschaft m.b.H.: *See—*
  - Schlager, Ludwig H., 5,017,586, Cl. 514-318.000.
- Gerst, Michael; Schroder, Wolfgang; and Bauer, Lothar, to AMP Incorporated. Apparatus for applying a bung seal to an electrical lead. 5,016,346, Cl. 29-754.000.
- Gerstenkorn, Ralph, to Atlantic Richfield Company. Method and apparatus for loading particulate materials. 5,016,686, Cl. 141-96.000.
- Gerstung, Ulrich: *See—*
  - Berger, Joachim; and Gerstung, Ulrich, 5,016,587, Cl. 123-359.000.
- Gesser, Hyman D.; Hunter, Norman R.; Yarlagadda, Prasd S.; and Morton, Lawrence A. Direct conversion of ethane to alcohols by high pressure controlled oxidation. 5,017,731, Cl. 568-910.000.
- Geyer, Robert A.; and Peterson, Terence A., to Tennant Company. Floor scrubber having laterally variable scrub brush position. 5,016,310, Cl. 15-49.100.
- GH Hensley Industries, Inc.: *See—*
  - Robinson, Howard W., 5,016,365, Cl. 37-141.00T.
- Ghate, Suhas R.; and Phatak, Sharad C., to University of Georgia Research Foundation, Inc. Pesticide spraying device and method. 5,016,817, Cl. 239-113.000.
- Ghiardo, Fiorenzo, to ROJ Electrotex S.p.A. Electromagnetic blocking unit for a weft storage drum. 5,016,681, Cl. 139-452.000.
- Ghysels, Marcel: *See—*
  - Suenens, Albert J.; and Ghysels, Marcel, 5,016,305, Cl. 5-477.000.
- Giannesini, Jean-Frarcois: *See—*
  - Renard, Gerard; and Giannesini, Jean-Francois, 5,016,710, Cl. 166-245.000.
- Giannini, Umberto; Coassolo, Alfredo; Foa', Marco; Sabarino, Giampiero; and Chapoy, L. Lawrence, to Montedison S.p.A. Thermotropic liquid crystalline polymers. 5,017,678, Cl. 528-190.000.
- Gibbs, A. Todd, to ASGCO Manufacturing, Inc. Conveyor belt scraping apparatus. 5,016,746, Cl. 198-499.000.
- Gibbs, Andrew H. Surface mount I.C. pin array system. 5,017,164, Cl. 439-885.000.
- Gideon, Jurgen; Krieger, Dieter; and Mengel, Erich, to Effem GmbH. Delivery line for the conveying of viscous or pasty material. 5,017,054, Cl. 406-191.000.
- Gilat, Ronen; and Boyd, David B., to Industrial Label Corporation. Multiple-ply web registration apparatus. 5,016,801, Cl. 226-197.000.
- Gilbert, Walter; Fisher, Richard A.; Sato, Vicki L.; and Ramachandran, Kuzhalmannam L., to Biogen, Inc. Peptides involved in the pathogenesis of HIV infection. 5,017,688, Cl. 530-326.000.
- Gilchrist, Paul; and Hodgson, Graham, to British Nuclear Fuels plc. Method of producing uranium (IV) fluoride. 5,017,345, Cl. 423-18.000.
- Gilda, Patricia; Mann, William F.; and Allen, Winthrop D., III, to Ashaway, Ltd. Collapsible ashtray. 5,016,754, Cl. 206-496.000.
- Gilhousen, Klein S.: *See—*
  - Ames, William G.; Jacobs, Irwin M.; Weaver, Lindsay A., Jr.; and Gilhousen, Klein S., 5,017,926, Cl. 342-353.000.
- Gill, Manzur, to Texas Instruments Incorporated. Process for minimizing lateral distance between elements in an integrated circuit by using sidewall spacers. 5,017,515, Cl. 437-229.000.
- Gill, Manzur; D'Arrigo, Sebastiano; and Lin, Sung-Wei, to Texas Instruments Incorporated. Electrically-erasable, electrically-programmable read-only memory cell. 5,017,980, Cl. 357-23.500.
- Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, to Merck Frosst, Canada, Inc. Cyclohept[-b]indolealkanoic acids, pharmaceutical compositions and use. 5,017,593, Cl. 514-381.000.
- Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, to Merck Frosst Canada, Inc. Cyclohept(-B)indolealkanoic acids, pharmaceutical compositions and use. 5,017,597, Cl. 514-411.000.
- Gilleron, Alain: *See—*
  - Romeas, Rene ; Rouchy, Didier; and Gilleron, Alain, 5,018,176, Cl. 378-37.000.
- Gillet, Robert: *See—*
  - Pageaud, Michel; and Gillet, Robert, 5,018,046, Cl. 361-273.000.
- Gillette Canada, Inc.: *See—*
  - Suhonen, Christopher H., 5,017,363, Cl. 424-52.000.
- Gillette Company, The: *See—*
  - Metcalf, Stephan C., 5,016,352, Cl. 30-85.000.
- Gilligan, Lawrence H.: *See—*
  - Halsey, James D.; Riggs, Robert F.; Gilligan, Lawrence H.; and Gerdt, David W., 5,017,793, Cl. 250-551.000.
- Gilliland, Malcolm T. Method and apparatus for preventing chain reaction transistor failure in paralleled transistors. 5,017,756, Cl. 219-130.320.
- Gilpatrick, Michael W., to Milliken Research Corporation. Carpet patterning machine and method. 5,016,328, Cl. 26-7.000.
- Girard, Yves: *See—*
  - Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,593, Cl. 514-381.000.
  - Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,597, Cl. 514-411.000.
- Girardi, Ermanno: *See—*
  - Delbianco, Alberto; and Girardi, Ermanno, 5,017,282, Cl. 208-414.000.
- Gladstone, Karen S. Input device for dynamic signature verification systems. 5,018,208, Cl. 382-3.000.
- Glasstech Solar, Inc.: *See—*
  - Madan, Arun; and Von Roedern, Bolko, 5,016,562, Cl. 118-719.000.
- Gleason Reel Corp.: *See—*
  - Schumann, P. Richard; and Schmidt, Paul R., 5,016,841, Cl. 248-51.000.
- Globe-Union Inc.: *See—*
  - Reichman, Benjamin; and Strebe, James I., 5,017,446, Cl. 421-225.000.
- Gloer, James B.: *See—*
  - Dowd, Patrick F.; Wicklow, Donald T.; Gloer, James B.; and Rinderknecht, Brad L., 5,017,598, Cl. 514-415.000.
- Goates, Eldon L., to Ford Motor Company. Shift mechanism for engaging sliding gear in manual transmission. 5,016,488, Cl. 74-475.000.
- Goda, Hitoshi, to Fuji Kagakushi Kogyo Co., Ltd. Liquid ink for selective printing. 5,017,228, Cl. 106-28.000.
- Godat, Jean; and Krzywdziak, Alain, to Fonderie & Ateliers des Sablons. Stirring apparatus forming an accessory for selective stirring of the base colors on paint stirring machines. 5,017,017, Cl. 366-251.000.
- Godau, Claus: *See—*
  - Marten, Manfred; Godau, Claus; and Schmelzer, Heinz, 5,017,675, Cl. 528-111.000.
- Godfroid, Jean-Jacques; Braquet, Pierre; and Heymans, Francoise, to Societe De Conseils De Recherches Et D'Applications Scientifiques. 5-(ω-ammonio acyloxy methylene) tetrahydrofurans and tetrahydrothiophenes and a therapeutic composition containing same. 5,017,588, Cl. 514-336.000.
- Godwin, Raymond E.: *See—*
  - Chiappe, Wayne T.; Ambrose, Larry R.; Dalmon, Donald P.; Juskie, Bernard R.; and Godwin, Raymond E., 5,016,420, Cl. 53-138.100.

- Goedecke, Wolf-Dieter; Schwenzer, Reinhard; and Huber, Ralf. Linear drive. 5,016,519, Cl. 91-361.000.
- Goekler, Lewis E., to Standex International Corporation. Capacitive liquid level sensor. 5,017,909, Cl. 340-620.000.
- Goetz, Norbert: *See—*
  - Seele, Rainer; Kober, Reiner; Goetz, Norbert; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,594, Cl. 514-383.000.
- Gold, Albert A., to GBD Inc. dba Gold Graphics. Road service sign. 5,016,372, Cl. 40-591.000.
- Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, to Tandy Corporation. Apparatus and medium for recording erasable information. 5,018,128, Cl. 369-284.000.
- Goldberg, Stanley, to Goody Products, Inc. High density loaded sorting conveyors. 5,018,073, Cl. 364-478.000.
- Goldenberg, Michael P. Belt clip. 5,016,326, Cl. 24-3.00J.
- Gollub, Raphael, to Republic Telcom Systems Corporation. Multiplexed digital packet telephone system. 5,018,136, Cl. 370-60.100.
- Golwyn, Daniel H. Treatment of immunologically based disorders, specifically Crohn's disease. 5,017,575, Cl. 514-220.000.
- Gonzalez, Angelo: *See—*
  - Thompson, John E.; Gonzalez, Angelo; Bursel, Joseph S.; and Aust, Hampton L., III, 5,016,861, Cl. 267-44.000.
- Gooch, Beverley R.: *See—*
  - Pisharody, Raghavan K.; and Gooch, Beverley R., 5,016,342, Cl. 29-603.000.
- Goodman, Charles A.: *See—*
  - Gully, Wilfred J.; and Goodman, Charles A., 5,017,854, Cl. 318-811.000.
- Goodrich, David. Composite liner for motor vehicles. 5,016,936, Cl. 296-39.300.
- Goodrich, Gordon W.: *See—*
  - Bledsoe, Susan G.; and Goodrich, Gordon W., 5,016,315, Cl. 15-410.000.
- Goodrich, Rollie M.: *See—*
  - Herdzina, Frank J.; and Goodrich, Rollie M., 5,017,072, Cl. 413-66.000.
- Goody Products, Inc.: *See—*
  - Goldberg, Stanley, 5,018,073, Cl. 364-478.000.
- Goodyear Tire & Rubber Company, The: *See—*
  - Bonko, Mark L.; and Lopp, Loran C., Jr., 5,016,696, Cl. 152-209.00B.
  - Brooks, Lawrence W.; and Dwenger, Thomas A., 5,016,838, Cl. 244-103.00R.
  - Looman, Ernest W.; and Wolbert, Harold A., 5,017,118, Cl. 425-133.500.
  - Majerus, Norbert; Chlebina, Larry E.; and Rambacher, John S., 5,017,127, Cl. 425-549.000.
- Gordon, Christa: *See—*
  - Schwarz, Dick; Warrer, Bob; Musgrave, Mike; Cruson, Bob; Gordon, Christa; and Weinert, Todd, 5,017,436, Cl. 428-519.000.
- Gordon, Eric M.: *See—*
  - Karanewsky, Donald S.; Biller, Scott A.; and Gordon, Eric M., 5,017,716, Cl. 556-405.000.
- Gordon, Joan E. Environmentally sound carrier package. 5,016,750, Cl. 206-150.000.
- Gordon, Michael: *See—*
  - Manns, William G.; Wood, Anthony B.; Norwood, David A.; Weeks, Don J.; and Gordon, Michael, 5,018,212, Cl. 382-8.000.
- Gordon, Michel: *See—*
  - Boumendil, Frank, 5,017,189, Cl. 604-192.000.
- Gordon, Richard A. Animal collar. 5,016,575, Cl. 119-106.000.
- Goto, Shoji: *See—*
  - Miyazaki, Benichi; Yamamoto, Hiroshi; and Goto, Shoji, 5,018,033, Cl. 360-106.000.
- Goto, Toshio: *See—*
  - Kume, Toyohiko; Goto, Toshio; Kamochi, Atsumi; Yanagi, Akihiko; Miyauchi, Hiroshi; and Asami, Tadao, 5,017,213, Cl. 71-95.000.
- Goto, Yozo: *See—*
  - Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.
- Gotoda, Ryusuke: *See—*
  - Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kurihayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.
- Gotoh, Hideki: *See—*
  - Suzuki, Yoshihiro; Yajima, Hiroyoshi; Shimada, Junichi; Shimoyama, Kenji; and Gotoh, Hideki, 5,018,159, Cl. 372-46.000.
- Gotoh, Yoshihiko; Kawai, Toshikazu; and Negishi, Junji, to Central Glass Company, Limited. Process of preparing bis (trifluoromethylphenyl) methanol. 5,017,730, Cl. 568-812.000.
- Gotou, Tetsuo: *See—*
  - Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.
- Gotthardt, Gerhard; Milijasevic, Zoran; Nakazawa, Akira; and Skalsky, Michael, to Telectronics, N.V. Thin electrode lead and connections. 5,016,646, Cl. 128-784.000.
- Gottier, Gerry N.; and Herron, Donn M., to Air Products and Chemicals, Inc. Dephlegmator process for the recovery of helium. 5,017,204, Cl. 62-11.000.
- Goud, Gilles R.; and Boussemart, Jean-Pierre, to Salomon S.A. Safety ski binding. 5,016,902, Cl. 280-630.000.
- Gould, Bobby J. Automatic golf ball tee apparatus. 5,016,886, Cl. 273-201.000.
- Gould Inc.: *See—*
  - Whewell, Christopher J.; Clouser, Sidney J.; and Lee, Chin-ho, 5,017,271, Cl. 204-15.000.
- Goulter, Victor H.: *See—*
  - Stary, Jeffrey D.; and Goulter, Victor H., 5,017,034, Cl. 401-35.000.
- Gouret, Claude J.: *See—*
  - Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.
- Gouvenot, Daniel, to Soltanche. Method of rendering soils impervious and products for carrying out the method. 5,017,233, Cl. 106-600.000.
- Govan, Donald T. Line and weed cutter. 5,017,167, Cl. 440-73.000.
- Gowrylow, Felicia B. Nursing pad. 5,017,174, Cl. 450-37.000.
- Gradeff, Peter S.; and Yunlu, Kenan, to Rhone-Poulenc, Inc. Process for the preparation of ceric hydrocarbyl silyloxides by transetherification of ceric alkoxides. 5,017,694, Cl. 534-15.000.
- Gradeff, Peter S.; and Yunlu, Kenan, to Rhone-Poulenc, Inc. Ceric hydrocarbyl silyloxides and process for their preparation. 5,017,695, Cl. 534-15.000.
- Graf, Kevin J.; Hastreiter, James J.; and Anderson, Duane A., to Eaton Corporation. Solenoid valve control system for hydrostatic transmission. 5,017,094, Cl. 417-218.000.
- Graham, Neil B.: *See—*
  - Embrey, Mostyn P.; and Graham, Neil B., 5,017,382, Cl. 424-486.000.
- Grandi, Bruno: *See—*
  - Spatafora, Mario; Grandi, Bruno; and Gamberini, Antonio, 5,016,423, Cl. 53-476.000.
- Grandvallet, Gilles: *See—*
  - Fourneaux, Roger; and Grandvallet, Gilles, 5,016,676, Cl. 139-116.200.
- Grant, Robert W.: *See—*
  - Moxness, Sherman U.; and Grant, Robert W., 5,017,236, Cl. 134-1.000.
- Granz, Bernd; Holzapfel, Ralf; and Niewisch, Joachim, to Siemens Aktiengesellschaft. Optical apparatus for detecting cavitation bubbles in liquids. 5,017,775, Cl. 250-227.250.
- Grasel, Timothy G.; and Cooper, Stuart L., to Wisconsin Alumni Research Foundation. Biocompatible polyurethane devices wherein polyurethane is modified with lower alkyl sulfonate and lower alkyl carboxylate. 5,017,664, Cl. 525-454.000.
- Grassman, David L.; Ager, Scott P.; and Root, Tamis L., to E. M. Matson, Jr., Company, Inc. Pesticide composition. 5,017,620, Cl. 514-698.000.
- Graupe, Daniel, to Sigmedics, Inc. of Delaware. Control of FNS via pattern variations of response EMG. 5,016,635, Cl. 128-421.000.
- Graver Company, The: *See—*
  - Ryan, Leo, 5,017,241, Cl. 134-22.120.
- Green, Dennis H.; and Johnson, Stephen C., to EnviRestore Technologies, Inc. Asbestos-containing materials removal assembly. 5,016,314, Cl. 15-320.000.
- Green, Dennis L. Printer enclosure. 5,017,032, Cl. 400-693.000.
- Green, Kathrine W. Makeup shield for left and right eyelashes. 5,016,658, Cl. 132-216.000.
- Green, Scott T. Nutritional drink compositions. 5,017,389, Cl. 426-72.000.
- Greenberg, Jack, to DME Industries, Inc. Epaulet stiffener. 5,016,289, Cl. 2-246.000.
- Greene, Jonathan W.: *See—*
  - Galbraith, Douglas C.; and Greene, Jonathan W., 5,017,813, Cl. 307-475.000.
- Greene, Peter D., to STC plc. Optical modulator with superlattice having asymmetric barriers. 5,017,974, Cl. 357-4.000.
- Greenebaum, James E., II, to Pittway Corp. Skirtless mounting cup. 5,016,785, Cl. 222-402.100.
- Greenleaf, Suzanne M.: *See—*
  - Cifuentes, Martin E.; and Greenleaf, Suzanne M., 5,017,222, Cl. 106-10.000.
- Greenman, Clifford H.: *See—*
  - Martin, Donald J.; Narciso, Ralph A.; Lowe, David T.; and Greenman, Clifford H., 5,016,962, Cl. 350-96.160.
- Greenway, Peter. Pole climbing device. 5,016,734, Cl. 182-221.000.
- Gregg, David P., to Del Mar Avionics. Method for manufacturing a second surface optical storage device. 5,017,414, Cl. 428-64.000.
- Gregory, Jonathan M.; and Brophy, Thomas G., to GTE Products Corporation. Apparatus for forming a groove in a glass tube. 5,017,208, Cl. 65-277.000.
- Greiser, Wolfgang; Plotz, Kurt; Wagner, Hans; and Zerfass, Karl-Christian, to Hoechst Aktiengesellschaft. Laminate. 5,017,426, Cl. 428-280.000.
- Greve, Jan: *See—*
  - Gerard de Grooth, Bernard; Greve, Jan; and Terstappen, Leonardus W. M. M., 5,017,497, Cl. 436-63.000.
- Gribshaw, Franklin C.: *See—*
  - Lang, Paul W.; and Gribshaw, Franklin C., 5,018,007, Cl. 358-60.000.
- Griffin, George A.: *See—*
  - Wehr, Don H., 5,016,445, Cl. 62-101.000.
- Griffith, J. Stephen; and Roberts, Patricia L., to United Technologies Corporation. Method of making gate array masks. 5,018,074, Cl. 364-490.000.
- Grimmer, Johannes; and Kiefer, Hans, to BASF Aktiengesellschaft. Preparation of riboflavin-5'-phosphate (5'-FMN) and its sodium salt.

VOL
1126
ISS
3
MY
21
1991
UMI

and of riboflavin-4',5'-cyclophosphoric acid ester chloride as an intermediate. 5,017,700, Cl. 544-244.000.

Grims, Conrad M.; Moen, Bruce A.; and Pardubicky, Jaroslav F., to Adolph Coors Company. Apparatus for aligning a tool member. 5,016,462, Cl. 72-349.000.

Grims, Conrad M.: *See—*
Johansson, Bert E.; and Grims, Conrad M., 5,016,463, Cl. 72-354.800.

Grinter, Trevor J.; and Kincey, Peter M., to Beecham Group, p.l.c. Process for the preparation of purine derivatives. 5,017,701, Cl. 544-276.000.

Grinwis, Jack M.: *See—*
Brown, Ronald E.; and Grinwis, Jack M., 5,016,648, Cl. 128-846.000.

Grivna, Gerald J.; and Thompson, Robert N. Gripper device. 5,016,306, Cl. 5-498.000.

Grix, Raimund: *See—*
Kutscher, Roland; Grix, Raimund; Li, Gangqiang; and Wollnik, Hermann, 5,017,780, Cl. 250-287.000.

Grochal, Peter, to Sto AG. Compound thermal insulating system. 5,016,412, Cl. 52-302.000.

Groshens, Pierre, to Lainiere de Picardie. Process for the production of a hot-sealable textile product for use in garments. 5,017,418, Cl. 428-196.000.

Gross, Rainer: *See—*
Stoltefuss, Jurgen; Bechem, Martin; Gross, Rainer; Hebisch, Siegbert; and Schramm, Matthias, 5,017,590, Cl. 514-356.000.

Grotkasten, Klaus: *See—*
Drewel, Gunter; Enoch, Horst; and Grotkasten, Klaus, 5,017,111, Cl. 425-28.100.

Grouhel, Agnes M.: *See—*
Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.

Groves, Gary W.: *See—*
Athanas, David S.; Groves, Gary W.; Hammoud, Fahrey M.; and Perry, David L., 5,016,908, Cl. 280-707.000.

Gruber, Ronald: *See—*
Miethe, Peter; Voss, Harald; and Gruber, Ronald, 5,017,476, Cl 435-61.000.

Grumman Aerospace Corporation: *See—*
McGill, John; and Zoubek, Stanley F., Jr., 5,017,921, Cl. 342-18.000.

Grunbeck Waseraufbereitung GmbH: *See—*
Rottel, Franz, 5,017,105, Cl. 417-439.000.

Grunwald, Peter H. Overhead projector. 5,017,002, Cl. 353-66.000.

Grynpas, Marc D.: *See—*
Bonfield, William; Bowman, Jeremy A.; and Grynpas, Marc D., 5,017,627, Cl. 523-115.000.

Grzybowski, Albert T.: *See—*
Marcec, Jerome J.; Phillips, James O.; Grzybowski, Albert T.; and Grzybowski, Bohdan, 5,016,467, Cl. 73-56.000.

Grzybowski, Bohdan: *See—*
Marcec, Jerome J.; Phillips, James O.; Grzybowski, Albert T.; and Grzybowski, Bohdan, 5,016,467, Cl. 73-56.000.

GSE, Inc.: *See—*
Roggendorf, Peter, 5,018,027, Cl. 360-14.200.

GTE Laboratories Incorporated: *See—*
Brecher, Charles; Assmus, Richard C.; and Brecher, Jonathan S., 5,017,751, Cl. 219-121.520.
Eichen, Elliot; and Melman, Paul, 5,016,960, Cl. 350-96.150.

GTE Products Corporation: *See—*
Bouchard, Andre C.; and Waymouth, John F., 5,017,831, Cl. 313-558.000.
Gregory, Jonathan M.; and Brophy, Thomas G., 5,017,208, Cl. 65-277.000.

GTE Valenite Corporation: *See—*
Robinson, Wayne; and Noggle, Kenneth, 5,017,058, Cl. 408-173.000.

Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, to Sanofi. Use of aminoalkoxyphenyl derivatives for reducing and/or controlling excessive intraocular pressure. 5,017,579, Cl. 514-299.000.

Guerra, Robert: *See—*
Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,018,128, Cl. 369-284.000.

Guiberteau, Christian; Le Paih, Michele; and Ruggeri, Stephane, to Thomson Composants Microondes. Sample-and-hold unit with high sampling frequency. 5,017,924, Cl. 342-195.000.

Guimarin, Henry L. Low cost light switch extension arm. 5,017,746, Cl. 200-331.000.

Guindon, Yvan: *See—*
Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,593, Cl. 514-381.000.
Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,597, Cl. 514-411.000.
Young, Robert N.; Rokach, Joshua; Williams, Haydn R.; Kakushima, Masatoshi; and Guindon, Yvan, 5,017,583, Cl. 514-312.000.

Guinea, Jesus: *See—*
Wong, Hee; and Guinea, Jesus, 5,018,169, Cl. 375-119.000.

Guirguis, Raouf A., to La Mina Ltd. Urine testing module and method of collecting urine antigen. 5,016,644, Cl. 128-771.000.

Gully, Wilfred J.; and Goodman, Charles A., to Hughes Aircraft Company. Variable duty cycle pulse width modulated motor control system. 5,017,854, Cl. 318-811.000.

Gunning, Dade. Firearm loading lockout device. 5,016,377, Cl. 42-70.110.

Gunning, Kevin J.; and Bell, Lon E., to TRW Technar Inc. Gas damped deceleration switch. 5,017,743, Cl. 200-61.45R.

Gutierrez, Antonio; Song, Won R.; Lundberg, Robert D.; and Kleist, Robert A., to Exxon Chemical Patents, Inc. Novel ethylene alpha-olefin copolymer substituted Mannich base lubricant dispersant additives. 5,017,299, Cl. 252-51.50R.

H. Krantz GmbH & Co.: *See—*
Weck, Franz, 5,016,525, Cl. 98-40.120.

Ha, Yeong L.: *See—*
Pariza, Michael W.; and Ha, Yeong L., 5,017,614, Cl. 514-558.000.

Haack, Johannes, to Feintool International Holding. Method for producing workpieces of metal. 5,016,807, Cl. 228-170.000.

Haag-Streit AG: *See—*
Papritz, Franz; and Widmer, Hansruedi, 5,016,854, Cl. 248-563.000.

Haarmann & Reimer GmbH: *See—*
Rabenhorst, Jurgen; and Hopp, Rudolf, 5,017,388, Cl. 426-44.000.

Haas, Peter; Hettel, Hans; and Ruckes, Andreas, to Bayer Aktiengesellschaft. Process for the preparation of polyurethane foams. 5,017,623, Cl. 521-128.000.

Haberzettl, Cecelia; Geltosky, Jack; and Perst, Renee, to Ortho Diagnostic Systems Inc. Device for immunoassay determinations. 5,017,342, Cl. 422-102.000.

Haffely, Jeff L.; Stahler, Mark G.; and Wixey, Barry D., to Delta International Machinery Corporation. Guide fence for power tools. 5,016,693, Cl. 144-253.00J.

Hafle, Ralph S., to BEI Electronics, Inc. Fiber optic probe sensor for measuring target displacement. 5,017,772, Cl. 250-227.210.

Hafner, Udo; and Krause, Heinz-Martin, to Robert Bosch GmbH. Fuel distributor for fuel injection systems of internal combustion engines. 5,016,594, Cl. 123-470.000.

Hager, Thomas P.; and Dale, Ralph S., to Owens-Corning Fiberglas Corporation. Cable reinforcement for an optical fiber cable. 5,016,973, Cl. 350-96.230.

Haizmann, Robert S.: *See—*
Schmidt, Robert J.; Haizmann, Robert S.; Ford, Mark R.; Low, C. David; and Adams, Frank H., 5,017,541, Cl. 502-169.000.

Hajzler, Christian, to Torrington Company, The. Bearing assembly with encoder ring in slidable contact with sensor. 5,017,868, Cl. 324-207.220.

Haka, Raymond J., to General Motors Corporation. Self-adjusting servo mechanism for actuating a friction band assembly in a planetary gear set. 5,016,521, Cl. 92-13.100.

Hakka, Leo E.; and Sarlis, John N., to Union Carbide Canada Limited. Gas scrubbing process. 5,017,350, Cl. 423-243.000.

Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi; Kodama, Mitsuo; Nakano, Hisaji; and Nakagawa, Shinsuke, to Central Glass Company, Limited. Method for analyzing fluorine containing gases. 5,017,499, Cl. 436-124.000.

Hall, Lawrence M., to U.S. Philips Corporation. Fully integrated telecommunication network. 5,018,195, Cl. 379-225.000.

Hall, Philip R.: *See—*
Hanna, R. Scott; Flowers, Woodie; Luchaco, David G.; Yuhasz, Stephen J.; Spira, Joel S.; and Hall, Philip R., 5,017,837, Cl. 315-136.000.

Hallenbeck, Edward S. Miter gauge for woodworking machine. 5,016,508, Cl. 83-435.001.

Halliburton Company: *See—*
McCabe, Michael A.; Wilson, J. Michael; Weaver, Jimmie D.; and Venditto, James J., 5,016,714, Cl. 166-308.000.

Hallmark Cards, Inc.: *See—*
Smith, Jack E., Jr., 5,018,085, Cl. 364-526.000.

Hallstrom, Stig, to Aktiebolaget Bofors. Arrangement for mine construction. 5,016,535, Cl. 102-411.000.

Halsey, James D.; Riggs, Robert F.; Gilligan, Lawrence H.; and Gerdt, David W., to Sperry Marine Inc. Optically driven RF generator. 5,017,793, Cl. 250-551.000.

Halstead, Whitfield G.: *See—*
Saiia, Louis S.; and Halstead, Whitfield G., 5,016,969, Cl. 350-96.200.

Ham, Mooyoung: *See—*
Shaw, David G.; Yializis, Angelo; Strycker, Donald S.; and Ham, Mooyoung, 5,018,048, Cl. 361-323.000.

Hamabe, Kenji: *See—*
Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.

Hamada, Hareo: *See—*
Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.

Hamada, Kiyoshi; Nonomura, Kinzo; Takahashi, Masayuki; Hashiguchi, Jumpei; and Kitao, Satoshi, to Matsushita Electric Industrial Co., Ltd. Image display apparatus. 5,017,842, Cl. 315-366.000.

Hamada, Masaki: *See—*
Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.

Hamada, Tatsuro: *See—*
Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.

Hamamatsu Photonics K.K.: *See—*
Yanagisawa, Yutaro, 5,018,149, Cl. 372-2.000.

Hamamatsu Photonics Kabushiki Kaisha: *See—*
Koishi, Musubu; and Watanabe, Motoyuki, 5,017,829, Cl. 313-382.000.

Hamamoto, Koji: *See—*
Kawai, Naoki; Hamamoto, Koji; and Minooka, Masahiro, 5,017,757, Cl. 219-130.510.

Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, to Shionogi & Co., Ltd. Gelatin hard capsule containing crystalline hydrate of oral cephalosporin. 5,017,380, Cl. 424-454.000.

Hamilton Standard Controls, Inc.: *See—*
Brown, Kenneth; and Riley, Richard E., 5,017,741, Cl. 174-260.000.

Hamilton, William J. Balanced latch bolt keeper support system. 5,016,930, Cl. 292-340.000.

Hamlin, Thomas J., to Xerox Corporation. Document roll-up system. 5,016,833, Cl. 242-66.000.

Hammond, Peter R., to United States of America, Energy. Dye system for dye laser applications. 5,018,160, Cl. 372-53.000.

Hammond, Rodney W.; Myers, Clyde J.; and Travieso, Ruben, to AT&T Bell Laboratories. Duplex optical fiber connector and cables terminated therewith. 5,016,968, Cl. 350-96.200.

Hammonds, James C.: *See—*
Krug, John A.; Hammonds, James C.; Schmidt, Kenneth D.; and Paglusch, Dennis F., 5,017,065, Cl. 410-58.000.

Hammoud, Fahrey M.: *See—*
Athanas, David S.; Groves, Gary W.; Hammoud, Fahrey M.; and Perry, David L., 5,016,908, Cl. 280-707.000.

Han, Kyung S. Variable speed gearing assembly. 5,016,493, Cl. 74-840.000.

Hanamoto, Keiji: *See—*
Miyazawa, Kazushi; Terauchi, Takao; Hanamoto, Keiji; and Takagi, Fumio, 5,017,417, Cl. 428-195.000.

Handa, Junichi; Ito, Hiroshi; Hattori, Hiroshi; and Suganuma, Akira, to Toyota Jidosha Kabushiki Kaisha. Metallic paint film. 5,017,638, Cl. 524-449.000.

Haney, Donald C.: *See—*
Velie, Wallace W.; Lewis, William T.; and Haney, Donald C., 5,017,129, Cl. 431-326.000.

Hanke, Wolfgang; and Kuhne, Viktor, to J.M. Voith GmbH. Flexible coupling with load variable damping. 5,017,179, Cl. 464-24.000.

Hanley, David R.: *See—*
Brinkman, Karl M.; Sullivan, John L.; and Hanley, David R., 5,017,546, Cl. 503-211.000.

Hanna, James: *See—*
Stoddard, David C. F.; Robertson, James D.; Spamer, William S.; Hanna, James; Bailey, Randall E.; and Parham, Dennis E., 5,016,761, Cl. 211-59.400.

Hanna, James L.: *See—*
Spamer, William S.; Robertson, J. David; Stoddard, David C. F.; and Hanna, James L., 5,016,527, Cl. 98-115.300.

Hanna, R. Scott; Flowers, Woodie; Luchaco, David G.; Yuhasz, Stephen J.; Spira, Joel S.; and Hall, Philip R., to Lutron Electronics Co., Inc. Indicator lamp system. 5,017,837, Cl. 315-136.000.

Hannya, Shuichi: *See—*
Iida, Nozomi; Hannya, Shuichi; and Omote, Kazuaki, 5,016,394, Cl. 49-441.000.

Hans, Waldemar; Kind, Wilhelm; Kirchner, Manfred; and Werner, Siegfried, to Robert Bosch GmbH. Fuel injection valve. 5,016,821, Cl. 239-585.000.

Hanse, Eric; and Rancoulle, Gilbert, to Vesuvius Crucible Company. Pouring spout for servo-assisted opening, device incorporating it and implementation process. 5,016,788, Cl. 222-590.000.

Hansen, Kristian T.; Bundgaard, Hans; and Faarup, Peter, to Novo Nordisk A/S. Carbamic acid ester of substituted 7-hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepines. 5,017,571, Cl. 514-213.000.

Hansen, Lowell D., to Vickers Incorporated. Hydraulic periphery pumps. 5,017,086, Cl. 415-55.500.

Hansen, Lowell D.; Hurley, J. Richard; Schweitzer, Jean J.; and Zoya, Walter J., to Vickers, Incorporated. Power transmission. 5,017,098, Cl. 417-302.000.

Hansen, Steven S.: *See—*
Bramfitt, Bruce L.; and Hansen, Steven S., 5,017,335, Cl. 420-127.000.

Hansen, William P.: *See—*
Schutt, Ernest G.; Dondero, Richard S.; Hansen, William P.; Hovorka, George B.; and Meyer, Raymond E., 5,017,009, Cl. 358-338.000.

Hanson, Karrie J.: *See—*
Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Parmdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.

Hanz, Marvin C.: *See—*
Ferguson, James C.; Hanz, Marvin C.; and Moeller, Galen A., 5,016,601, Cl. 124-20.100.

Hara, Hirotaka: *See—*
Kokubo, Masaru; Shinotsuka, Tatsuko; Kameyama, Tatsuya; Kokumai, Motohiro; and Hara, Hirotaka, 5,018,134, Cl. 370-32.100.

Hara, Shigeyoshi: *See—*
Dougal, Alvin L., Jr.; and Hara, Shigeyoshi, 5,017,647, Cl. 524-856.000.

Harada, Hiroyuki; Matsuura, Yasumasa; Araki, Toshihiko; and Kajitani, Tetsuji, to Mita Industrial Co., Ltd. Mobile member control apparatus. 5,017,850, Cl. 318-599.000.

Harada, Yuichi, to Brother Kogyo Kabushiki Kaisha. Printing apparatus having an automatic paper insertion function. 5,017,031, Cl. 400-636.100.

Harding, Paul R., to Compular Limited. Substrate clamping apparatus for a thermal printer. 5,017,028, Cl. 400-120.000.

Harle, Gerard-Jean: *See—*
Petitcollin, Jean-Marc; and Harle, Gerard-Jean, 5,017,210, Cl. 65-106.000.

Harms, Ronald J.: *See—*
Kryger, Tom F., 5,017,057, Cl. 408-68.000.

Harnden, James A.; and Hill, Lorimer K., to Siliconix Incorporated. Hall sensing of bond wire current. 5,017,804, Cl. 307-309.000.

Harper, Lee R.: *See—*
Barsotti, Robert J.; Altschuler, Lili W.; and Harper, Lee R., 5,017,435, Cl. 428-502.000.

Harris, Donald L., to Panelfold, Inc. Multi-directional radial wheel trolley and track for operable walls. 5,016,318, Cl. 16-95.00R.

Harris, Geoffrey J.: *See—*
Clarke, Geoffrey; and Harris, Geoffrey J., 5,017,833, Cl. 315-51.000.

Harris Graphics Corporation: *See—*
Palmatier, Roland T., 5,016,530, Cl. 101-349.000.

Harris, Harold L., to Harris International Sales Corporation. Emission control apparatus. 5,016,438, Cl. 60-299.000.

Harris International Sales Corporation: *See—*
Harris, Harold L., 5,016,438, Cl. 60-299.000.

Harris, John R. Evaporative cooled cloth hood. 5,016,287, Cl. 2-202.000.

Harris, Philip J.: *See—*
Cawse, John L.; and Harris, Philip J., 5,017,667, Cl. 526-264.000.

Harris, Rano J., Jr.; and Barker, Nicholas E., to Romar Technologies, Inc. Line storage reel for boat fenders, respectively, boat fenders equipped with line storage reels. 5,016,554, Cl. 114-219.000.

Harrow Products, Inc.: *See—*
Frolov, George, 5,016,929, Cl. 292-251.500.

Hart, Charles R., Jr. Collapsible support and transport stand for personal watercraft. 5,016,893, Cl. 280-35.000.

Harte, Richard A.; and Mastin, Stephen H., to Microbiological Associates, Inc. Fluorescent detection method based on enzyme activated conversion of a fluorophore precursor substrate. 5,017,475, Cl. 435-7.900.

Hartwell Corporation, The: *See—*
Jackson, Frank T., 5,016,931, Cl. 292-341.180.

Harvey, Donald M., to Eastman Kodak Company. Camera shutter with thermal actuator. 5,017,954, Cl. 354-234.100.

Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, to Minolta Camera Kabushiki Kaisha. Image forming apparatus with use of a laser beam. 5,017,961, Cl. 355-202.000.

Hasegawa, Taketo: *See—*
Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.

Hasegawa, Toshiyuki; Takagishi, Hisao; and Horiuchi, Hiroshi, to Sumitomo Chemical Company, Limited. Process for producing aqueous solution of cationic thermosetting resin. 5,017,642, Cl. 524-608.000.

Hashiguchi, Jumpei: *See—*
Hamada, Kiyoshi; Nonomura, Kinzo; Takahashi, Masayuki; Hashiguchi, Jumpei; and Kitao, Satoshi, 5,017,842, Cl. 315-366.000.

Hashimoto, Akihiko; Kitahara, Toshihiro; and Miyajima, Hiroshi, to Olympus Optical Co., Ltd. Apparatus for driving card-like record medium. 5,017,764, Cl. 235-454.000.

Hashimoto Corporation: *See—*
Hashimoto, Kazuo, 5,018,014, Cl. 358-183.000.

Hashimoto, Kazuo, to Hashimoto Corporation. TV receiver and method for concurrently displaying a reproduced stored program and a received program. 5,018,014, Cl. 358-183.000.

Hashimoto, Kuniharu, to NEC Corporation. Stack-type arithmetic circuit. 5,018,092, Cl. 364-736.000.

Hashimoto, Masayasu; Yoneyama, Hirofumi; and Watanabe, Yasuhiro, to Sanyo Electric Co., Ltd. Semiconductor laser apparatus. 5,018,156, Cl. 372-44.000.

Hashimoto, Seiji, to Canon Kabushiki Kaisha. Multi-plate type image pickup apparatus having picture elements for producing color and luminance signals. 5,018,006, Cl. 358-44.000.

Hashimoto, Yoshito: *See—*
Yokote, Yoshihiro; and Hashimoto, Yoshito, 5,016,916, Cl. 280-808.000.

Hashimoto, Yuichi; and Koyama, Takashi, to Canon Kabushiki Kaisha. Charging member and electrophotographic apparatus using the same. 5,017,965, Cl. 355-219.000.

Hastings, Donald H., to Medicis Corporation. Method of producing antibody-fortified dry whey. 5,017,372, Cl. 424-85.800.

Hastreiter, James J.: *See—*
Graf, Kevin J.; Hastreiter, James J.; and Anderson, Duane A., 5,017,094, Cl. 417-218.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Hata, Kunihiro: *See—*
Sikinami, Yasuo; Hata, Kunihiro; and Yasuhara, Masaki, 5,017,377, Cl. 424-409.000.
Hata, Toshinobu: *See—*
Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.
Hata, Yoshio: *See—*
Shimizu, Yuzuru; and Hata, Yoshio, 5,017,822, Cl. 310-207.000.
Hatakawa, Yoshio: *See—*
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 5,017,697, Cl. 536-127.000.
Hatanaka, Mutsuo, to Kel Corporation. Two-piece connector and method of press-connecting flat cables together. 5,017,149, Cl. 439-157.000.
Hatano, Tadao: *See—*
Nagaoka, Kazuo; Hatano, Tadao; Wakabayashi, Sadao; and Shimizu, Takamitsu, 5,016,359, Cl. 33-702.000.
Hattori, Hiroshi: *See—*
Handa, Junichi; Ito, Hiroshi; Hattori, Hiroshi; and Suganuma, Akira, 5,017,638, Cl. 524-449.000.
Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, to Japan Synthetic Rubber Co., Ltd.; and Bridgestone Corporation. Rubber compositions from modified trans-polybutadiene and rubber for tires. 5,017,636, Cl. 524-300.000.
Hattori, Yasuo; and Kitagawa, Yuichi, to Asahi Kasei Kogyo kabushiki Kaisha. Selectively, partially hydrogenated polymer and rubber composition and impact resistant styrenic resin containing the same. 5,017,660, Cl. 525-338.000.
Hauchard, Patrick; and Loisel, Francois, to Legrand. Electric terminal connector. 5,017,161, Cl. 439-750.000.
Haueter, Ernst, to Ascom Autelca AG. Device for the insertion, storage, and removal of objects to be stored in strongboxes and of sheet-like material. 5,016,546, Cl. 109-45.000.
Haugen, John M., Jr. Picture and negative storage container. 5,016,752, Cl. 206-455.000.
Haupt, Randy L.; and McCormack, Christopher J., to United States of America, Air Force. Low sidelobe array by amplitude edge tapering the edge elements. 5,017,928, Cl. 342-379.000.
Haus, Paul Z., Jr. Watthour meter open potential circuit detecting device. 5,017,877, Cl. 324-546.000.
Hausmann, Herbert: *See—*
Kerschner, Gunther; Wurzenberger, Johann; Hausmann, Herbert; Eckel, Giselher; and Friedrich, Peter, 5,018,059, Cl. 364-200.000.
Havins, Felton H., to Aero Marine Engineering, Inc. Apparatus for automatically raising and lowering boat motors. 5,017,165, Cl. 440-6.000.
Havrilla, Joseph B.: *See—*
Cowan, Kevin P.; Fazi, Bruno, Jr.; Havrilla, Joseph B.; Lewandowski, Stanley R.; and Reilly, David M., 5,018,182, Cl. 378-173.000.
Hay, Eric; and Nordstrom, Anders, to NH Produkter Handelsbolag. Game having magnetically operable pieces. 5,016,878, Cl. 273-85.00F.
Hayakawa, Issei: *See—*
Ukai, Noriyuki; Hayakawa, Issei; Miyamoto, Mithuru; and Matsuhisa, Tadaaki, 5,017,531, Cl. 501-98.000.
Hayakawa, Makoto: *See—*
Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.
Hayase, Shuji: *See—*
Onishi, Yasunobu; Hayase, Shuji; Horiguchi, Rumiko; and Hirao, Akiko, 5,017,453, Cl. 430-176.000.
Hayashi, Akihiko; Yamazaki, Toru; and Torii, Akira, to Nippondenso Co., Ltd. Multiband antenna system for use in motor vehicles. 5,017,935, Cl. 343-715.000.
Hayashi, Goichi; Fujimagari, Sajuro; Nakamura, Kensaku; and Ishida, Ryuichi, to Fuji Photo Film Co.; and Panac-Industries Inc. Process for recovering support from photographic film. 5,017,455, Cl. 430-256.000.
Hayashi, Hijiri: *See—*
Ohashi, Yuji; Terakado, Yoshimitsu; and Hayashi, Hijiri, 5,016,803, Cl. 228-4.500.
Hayashi, Katsumi: *See—*
Inoue, Nobuaki; and Hayashi, Katsumi, 5,017,463, Cl. 430-398.000.
Hayashi, Noriki: *See—*
Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.
Hayashi, Shigenori: *See—*
Sakama, Mitsunori; Fukada, Takeshi; Sakamoto, Naoya; Amachi, Nobumitsu; Hayashi, Shigenori; and Inushima, Takashi, 5,017,502, Cl. 437-2.000.
Hayashi, Shigeo, to Sumitomo Electric Industries, Ltd. Constant-current regulated power circuit. 5,017,858, Cl. 323-316.000.
Hayashi, Shigetsuga: *See—*
Tada, Hisashi; Shiraishi, Yoshinobu; and Hayashi, Shigetsuga, 5,017,674, Cl. 528-93.000.
Hayashi, Takao; and Yamada, Masao, to Japan Atomic Power Co., Ltd.; and Fuji Electric Co., Ltd., JPX. Multi-region reactor core pebble bed high temperature gas reactor. 5,017,333, Cl. 376-382.000.
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, to Honda Giken Kogyo Kabushiki Kaisha. Brake device for vehicles. 5,016,737, Cl. 188-181.00A.
Hayes, Cecil E.: *See—*
Foo, Thomas K.; Hayes, Cecil E.; and Kang, Yoon-Won, 5,017,872, Cl. 324-322.000.
Hayes, Jay L.: *See—*
Carter, William; Meadows, David A.; Hayes, Jay L.; and Voege, John S., 5,016,673, Cl. 138-45.000.
Hayes Microcomputer Products, Inc.: *See—*
Tjahjadi, Taruna; and Correa, Cynthia J., 5,018,166, Cl. 375-12.000.
Hayes, Thomas H.; and LoMaglio, Lewis C., to Anchor Hocking Corporation. Pump dispenser package. 5,016,783, Cl. 222-321.000.
Haynes, Ronald L.: *See—*
Crano, John C.; and Haynes, Ronald L., 5,017,666, Cl. 526-230.500.
Haytayan, Harry M. Explosive actuated extendable driving tool. 5,016,802, Cl. 227-11.000.
Hazony, Dov; and Berris, Richard E., Jr., to J. W. Harley Inc. Ultrasonic transducer. 5,016,474, Cl. 73-597.000.
HD Electric Company: *See—*
Hoffman, Mark R.; Choi, Charles Y. M.; Pedersen, Peder M.; and Pedersen, Niels C., Jr., 5,017,739, Cl. 174-138.00F.
Healey, Martin J., to International Business Machines Corporation. Data processing machines. 5,018,077, Cl. 364-518.000.
Heath, William D.: *See—*
Kirkman, Todd A.; and Heath, William D., 5,017,758, Cl. 219-205.000.
Heaton, Donald E.; and Roepke, John E. Filleting attachment for a caulking gun. 5,017,113, Cl. 425-87.000.
Hebisch, Siegbert: *See—*
Stoltefuss, Jurgen; Bechem, Martin; Gross, Rainer; Hebisch, Siegbert; and Schramm, Matthias, 5,017,590, Cl. 514-356.000.
Hedgecock, Charles J. R.; Jones, Stuart D.; and Kuo, Elizabeth A., to Roussel Uclaf. Novel imidazobenzodiazepines. 5,017,574, Cl. 514-220.000.
Hedgepeth, John M.: *See—*
Rhodes, Marvin D.; and Hedgepeth, John M., 5,016,418, Cl. 52-646.000.
Heffner, David A.: *See—*
Ely, Douglas L.; and Heffner, David A., 5,017,289, Cl. 210-610.000.
Hegedus, Andreas G., to Hexcel Corporation. Ceramic bodies of controlled porosity and process for making same. 5,017,522, Cl. 501-81.000.
Hehl, Karl. Injection molding machine comprising a protective covering. 5,017,121, Cl. 425-151.000.
Heibel, Hans-Jurgen: *See—*
Bornemann, Gert; and Heibel, Hans-Jurgen, 5,016,576, Cl. 122-4.00D.
Heidelberger Druckmaschinen AG: *See—*
Jahn, Hans-Georg, 5,016,529, Cl. 101-211.000.
Heidenreich, Holger: *See—*
Fossati, Piero; Heidenreich, Holger; Hugl, Herbert; and Wehling, Klaus, 5,017,498, Cl. 436-84.000.
Heider, Jurgen: *See—*
Arlt, Joachim; Dobrusskin, Alexander; Von Scheidt, Jurgen; and Heider, Jurgen, 5,017,839, Cl. 315-219.000.
Heijnen, Godefridus H. C.; Mulder, Cornelis A. M.; and Van Der Stelt, Ernest O. W., to U.S. Philips Corporation. Filter for colored electric lamp. 5,017,825, Cl. 313-112.000.
Heil, Ronald W., Jr.; and Owens, Robert C., to Cardiac Pacemakers, Inc. Implantable tapered spiral endocardial lead for use in internal defibrillation. 5,016,808, Cl. 228-176.000.
Heiligman, Randy B. Faucet-mounted water filter with wall inlet and annular chamber. 5,017,286, Cl. 210-266.000.
Heilman, Robert J., to Continental White Cap, Inc. Closure with high energy button. 5,016,769, Cl. 215-230.000.
Heinerman, Jacobus J. L.: *See—*
Schoonhoven, Johannes W. F. M.; Eijsbouts, Sonja; Heinerman, Jacobus J. L.; and Eisenhuth, Ludwig, 5,017,535, Cl. 502-30.000.
Heinzman, Fred C. Mechanical rotating combination lock opening device. 5,017,851, Cl. 318-685.000.
Heiskell, Ronald E.: *See—*
Doolittle, Frederick G.; Ellgen, Jon L.; Heiskell, Ronald E.; Lipton, Thomas M.; and Parent, James R., 5,016,607, Cl. 126-25.00R.
Helling, Daniel J.: *See—*
Helling, Robert W.; and Helling, Daniel J., 5,016,428, Cl. 53-403.000.
Helling, Robert W.; and Helling, Daniel J. Inflating apparatus and method. 5,016,428, Cl. 53-403.000.
Helton, Jesse D. Truss transportation trailer. 5,017,081, Cl. 414-470.000.
Hemink, Gerrit-Jan: *See—*
Middelhoek, Jan; Hemink, Gerrit-Jan; and Wijburg, Rutger C. M., 5,017,978, Cl. 357-23.500.
Henckel, David J.: *See—*
Peters, Thomas E.; Logan, James D.; Bennett, Eugene R.; Dieter, Clarence L.; and Henckel, David J., 5,017,312, Cl. 264-24.000.
Henderson, Dewey D., to Dayco Products, Inc. Belt tensioner, kit therefor and methods of making the same. 5,017,181, Cl. 474-133.000.
Henderson, Donald M. Telescoping packaging system. 5,016,753, Cl. 206-459.000.
Henderson, Jon H., to Sienco, Inc. Fluid viscoelastic test apparatus and method. 5,016,469, Cl. 73-64.100.
Henkel Kommanditgesellschaft auf Aktien: *See—*
Hoeffkes, Horst; and Kaczich, Anke, 5,017,305, Cl. 252-311.000.
Henley Manufacturing Holding Company, Inc.: *See—*
Mills, Jesse V., 5,016,582, Cl. 123-90.390.

Hennessy, Thomas F., to Lori Corporation. Key unlocking and retaining method and apparatus. 5,016,455, Cl. 70-493.000.
Henriksen, Henning R. Protective glove. 5,016,286, Cl. 2-161.00R.
Henry, Arnold W.: *See—*
Eddy, Clifford O.; Henry, Arnold W.; Lorenzo, Lynn; Chow, Che C.; Ferguson, Robert M.; and Finsterwalder, Robert N., 5,017,432, Cl. 428-422.000.
Hensley, John R.: *See—*
England, Jimmy C.; Hensley, John R.; Moehling, Frederick E.; Roberts, Everett M.; and Ruble, Hugh-Hiram, Jr., 5,016,460, Cl. 72-208.000.
Henson, J. Peter. Collapsible carrying container for animals. 5,016,570, Cl. 119-19.000.
Heon-Jin, Choi: *See—*
June-Gunn, Lee; Chang-Sam, Kim; Heon-Jin, Choi; and Seong-Hoon, Park, 5,017,527, Cl. 501-90.000.
Hercules Incorporated: *See—*
Dougal, Alvin L., Jr.; and Hara, Shigeyoshi, 5,017,647, Cl. 524-856.000.
Schroeder, Richard B., 5,016,531, Cl. 101-415.100.
Herdzina, Frank J.; and Goodrich, Rollie M., to Service Tool Die & Mfg. Co. Dual lane conversion system. 5,017,072, Cl. 413-66.000.
Herendeen, Bella E. Portable bookstand apparatus. 5,016,852, Cl. 248-461.000.
Herloski, Robert P., to Xerox Corporation. Input of control information to an electronic image scanner through the imaging apparatus. 5,018,025, Cl. 358-471.000.
Hermann Hemscheidt Maschinenfabrik GmbH & Co.: *See—*
Kowalik, Heinrich; Pletsch, Peter; and Kohl, Gerald, 5,017,051, Cl. 405-302.000.
Hermann, Thomas L.; and Eberhardt, George J., to NCR Corporation. Method of producing a printer which facilitates clearing a jammed document. 5,017,033, Cl. 400-693.000.
Hermann Wangner GmbH & Co.: *See—*
Borel, Georg; and Arnold, Dagmar, 5,016,678, Cl. 139-383.00A.
Herold, Ronald J.: *See—*
Reiland, Kenneth H.; Reiland, Mary J.; and Herold, Ronald J., 5,016,778, Cl. 221-154.000.
Herrmann, Heinz; and Billino, Susanne, to Hoechst Aktiengesellschaft. Presensitized printing plate for waterless lithographic printing and process for production thereof. 5,017,457, Cl. 430-272.000.
Herrnstadt, Corinna; and Wilcox, Edward, to Mycogen Corporation. Cloning and expression of bacillus thuringiensis gene toxic to beetles of the order coleoptera. 5,017,373, Cl. 424-93.000.
Herron, Donn M.: *See—*
Gottier, Gerry N.; and Herron, Donn M., 5,017,204, Cl. 62-11.000.
Herzig, Paul A. Object retaining apparatus for a vehicle. 5,016,847, Cl. 248-175.000.
Hettel, Hans: *See—*
Haas, Peter; Hettel, Hans; and Ruckes, Andreas, 5,017,623, Cl. 521-128.000.
Hewlett-Packard Company: *See—*
Dukes, John N.; Lum, Paul; and Larson, John D., 5,016,642, Cl. 128-696.000.
Loewen, Victor D., 5,017,776, Cl. 250-231.140.
Walker, Richard C.; and von Braun, Hans, 5,018,190, Cl. 379-95.000.
Hexcel Corporation: *See—*
Hegedus, Andreas G., 5,017,522, Cl. 501-81.000.
Heymans, Francoise: *See—*
Godfroid, Jean-Jacques; Braquet, Pierre; and Heymans, Francoise, 5,017,588, Cl. 514-336.000.
Hi-Ranger, Inc.: *See—*
Holmes, William K., 5,016,731, Cl. 182-2.000.
Higashio, Yasuhiko: *See—*
Usui, Masahiro; and Higashio, Yasuhiko, 5,017,712, Cl. 549-529.000.
Higbie, James H., to Johns Hopkins University, The. Adaptive locally-optimum detection signal processor and processing methods. 5,018,088, Cl. 364-574.000.
Higginbotham, Daryle. Method and apparatus for removing wrappers from coin rolls. 5,016,397, Cl. 51-80.00A.
Hijikata, Kenji, to Polyplastics Co., Ltd. Liquid-crystalline polymer. 5,017,304, Cl. 252-299.010.
Hilal, Mohamed A., to International Superconductor Corp. Methods of generating and controlling a magnetic field without using an external power supply specification. 5,016,600, Cl. 124-3.000.
Hilby, James A.: *See—*
Santos, Alfred J.; Hilby, James A.; and Duncan, Scott M., 5,017,866, Cl. 324-174.000.
Hildebolt, William M.: *See—*
Bernasek, Edward; Hildebolt, William M.; Shannon, Michael D.; Shelar, Gary R.; and White, Jackie L., 5,016,654, Cl. 131-302.000.
Hildebrand, David F.; Kemp, Thomas R.; Andersen, Roger; and Loughrin, John H., to University of Kentucky Research Foundation. Method of reducing odor associated with hexanal production in plant products. 5,017,386, Cl. 426-18.000.
Hill, Lorimer K.: *See—*
Harnden, James A.; and Hill, Lorimer K., 5,017,804, Cl. 307-309.000.
Hill, Peter R.: *See—*
Yapp, John R.; and Hill, Peter R., 5,016,806, Cl. 228-147.000.
Hiller, Wolfgang: *See—*
Brillinger, Martin; Hiller, Wolfgang; Klingelhoefer, Ulrich; and Radtke, Manfred, 5,016,408, Cl. 52-126.600.
Himmel, Robert L.; and Parobechek, Frank E., to Gas Research Institute. Gas-fired oven. 5,016,606, Cl. 126-21.00A.
Himmler, Gunther, to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik. Apparatus for testing motor vehicle tires. 5,016,470, Cl. 73-146.000.
Hinze, Lee R.: *See—*
Hsu, Hui-Pin; Jang, Soon; and Hinze, Lee R., 5,016,971, Cl. 350-96.210.
Hirahara, Hidehumi: *See—*
Takahori, Mutsuo; and Hirahara, Hidehumi, 5,017,184, Cl. 493-368.000.
Hirakawa, Kazuyoshi; Kuriyaki, Hisao; and Zheng, Xu-guang, to Kyushu University. Method of producing high-temperature superconducting ceramics material by mechanical orientation. 5,017,548, Cl. 505-1.000.
Hirao, Akiko: *See—*
Onishi, Yasunobu; Hayase, Shuji; Horiguchi, Rumiko; and Hirao, Akiko, 5,017,453, Cl. 430-176.000.
Hirata, Osamu: *See—*
Mase, Yasukazu; Abe, Masahiro; and Hirata, Osamu, 5,016,663, Cl. 134-1.000.
Hirayama, Junji: *See—*
Komai, Norihiko; Nishiguchi, Takashi; Hirayama, Junji; and Terada, Tomoaki, 5,018,173, Cl. 378-4.000.
Hirayama, Yasuhiko; Ogawa, Tetsuro; and Ojima, Satoshi, to Asahi Kogaku Kogyo K.K. Process for producing calcium phosphate ceramics having porous surface. 5,017,518, Cl. 501-1.000.
Hirose, Yoshihiko: *See—*
Mitomi, Tatsuo; and Hirose, Yoshihiko, 5,017,969, Cl. 355-271.000.
Hisaki, Hiroshi: *See—*
Mori, Osamu; Oyama, Motofumi; Hisaki, Hiroshi; Sekiguchi, Masato; Okamura, Akinobu; and Tanabe, Haruhiro, 5,017,639, Cl. 524-510.000.
Hisatomi, Kaoru: *See—*
Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, 5,017,442, Cl. 429-94.000.
Hisatomi, Ryouichi: *See—*
Matsuzaki, Kichie; Isobe, Mitsunobu; Takeichi, Kenzo; Hisatomi, Ryouichi; and Kudou, Masasi, 5,018,219, Cl. 382-37.000.
Hitachi Automotive Engineering Co., Ltd.: *See—*
Imamura, Kazunori; and Hoshi, Yoshikazu, 5,016,586, Cl. 123-336.000.
Hitachi Construction Machinery Co., Ltd.: *See—*
Yamamoto, Nobuyoshi; Murata, Yasuhiko; Saeki, Fumimasa; and Kurosaka, Hirosige, 5,016,721, Cl. 180-89.130.
Hitachi Electronics Engineering Co., Ltd.: *See—*
Kikuchi, Shuji; Ouchida, Yoshio; and Kamiya, Ryohei, 5,018,145, Cl. 371-27.000.
Hitachi Ferrite, Ltd.: *See—*
Naito, Norihiro, 5,017,894. Cl. 333-1.100.
Hitachi, Ltd.: *See—*
Ashi, Yoshihiro; and Kanno, Tadayuki, 5,018,135, Cl. 370-55.000.
Ibamoto, Masahiko; Morooka, Yasuo; Koyanagi, Hiroaki; Sato, Manabu; and Mizumura, Takeshi, 5,018,072, Cl. 364-478.000.
Imamura, Kazunori; and Hoshi, Yoshikazu, 5,016,586, Cl. 123-336.000.
Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 5,018,101, Cl. 365-51.000.
Kikuchi, Shuji; Ouchida, Yoshio; and Kamiya, Ryohei, 5,018,145, Cl. 371-27.000.
Koizumi, Hideaki; Takeda, Ryuzaburo; Sano, Koichi; and Yokoyama, Tetsuo, 5,016,637, Cl. 128-653.0AF.
Kokubo, Masaru; Shinotsuka, Tatsuko; Kameyama, Tatsuya; Kokumai, Motohiro; and Hara, Hirotaka, 5,018,134, Cl. 370-32.100.
Machida, Morihisa; Tajima, Yoshio; Nakatsumi, Hideo; Isahai, Tatsuo; and Shiroki, Daijiro, 5,017,427, Cl. 428-323.000.
Matsuzaki, Kichie; Isobe, Mitsunobu; Takeichi, Kenzo; Hisatomi, Ryouichi; and Kudou, Masasi, 5,018,219, Cl. 382-37.000.
Miyazawa, Hideyuki, 5,017,507, Cl. 437-162.000.
Mizuta, Hiroshi; Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, 5,017,973, Cl. 357-4.000.
Mochizuki, Kazuhiro; Tanoue, Tomonori; Kusano, Chushirou; Masuda, Hiroshi; and Mitani, Katsuhiko, 5,017,517, Cl. 437-90.000.
Murayama, Akira; Uchikawa, Naoshi; Tamura, Takahiro; Mizuno, Takao; and Sakurai, Kazuo, 5,017,108, Cl. 418-55.600.
Nakayama, Shinji; Watanabe, Masaya; and Abe, Shuichi, 5,018,064, Cl. 364-200.000.
Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji; Koguma, Hiroshi; and Emata, Takashi, 5,018,004, Cl. 357-74.000.
Shibata, Manabu, 5,017,993, Cl. 357-40.000.
Shimaguchi, Takashi; Yamada, Toshihiro; Natori, Tatsuo; Okada, Akihisa; and Misumi, Hiroshi, 5,017,102, Cl. 417-420.000.
Shimizu, Nobuo; Kuroda, Michio; Kirikami, Seiichi; Sato, Isao; and Arai, Osamu, 5,016,443, Cl. 60-737.000.
Shinoda, Takashi; and Ishihara, Masamichi, 5,018,109, Cl. 365-230.080.
Soda, Yasunari; Mochiji, Kozo; Oizumi, Hiroaki; and Kimura, Takeshi, 5,017,458, Cl. 430-296.000.
Sunami, Hideo; Kure, Tokuo; and Kawamoto, Yoshifumi, 5,017,981, Cl. 357-23.600.
Takaragi, Kazuo; and Sasaki, Ryoichi, 5,018,196, Cl. 380-30.000.

VOL
1126
ISS
3
MY
21
1991
UMI

  - Tokai, Masaie; Kuroiwa, Minoru; and Ezaki, Shinobu, 5,016,561, Cl. 118-718.000.
  - Tsukakoshi, Masato; Takahashi, Yasuhiro; Terada, Matsuaki; and Takagishi, Nobuyuki, 5,018,133, Cl. 370-16.000.
  - Yamada, Toshio; Kobayashi, Tohru; Nishizawa, Hirotaka; Itoh, Hiroyuki; and Saitoh, Tatsuya, 5,018,000, Cl. 357-51.000.
  - Yanagisawa, Kazumasa, 5,018,100, Cl. 365-230.030.
  - Yasuoka, Hideki, 5,017,996, Cl. 357-43.000.
- Hitachi Maxell, Ltd.: *See—*
  - Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, 5,017,442, Cl. 429-94.000.
- Hitachi Mizusawa Electronics Co., Ltd.: *See—*
  - Ura, Mitugu; Obara, Yoshihiro; and Takahashi, Kazushi, 5,017,900, Cl. 335-210.000.
- Hitachi Plant Engineering & Construction Co., Ltd.: *See—*
  - Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.
- Hitachi VLSI Engineering Corp.: *See—*
  - Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 5,018,101, Cl. 365-51.000.
  - Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji; Koguma, Hiroshi; and Emata, Takashi, 5,018,004, Cl. 357-74.000.
- Hlasta, Dennis J., to Sterling Drug Inc. Antidepressant 2-(4,5-dihydro-1H-imidazolyl)-dihydro-1H-indoles, -1,2,3,4-tetrahydroquinolines and -1H-indoles, and methods of use thereas. 5,017,584, Cl. 514-314.000.
- Hmimid, Mohammed: *See—*
  - Fischer, Horst; Rohsaint, Wolfgang, and Hmimid, Mohammed, 5,018,094, Cl. 364-770.000.
- Hochiki Corporation: *See—*
  - Yuchi, Sadataka, 5,017,905, Cl. 340-506.000.
- Hodge, Todd D. Scaffold planking stabilizer. 5,016,735, Cl. 182-223.000.
- Hodgens, Henry M., II, to United Technologies Corporation. Wear resistant electroless nickel-boron coating compositions. 5,017,410, Cl. 427-443.100.
- Hodges, Robert C.: *See—*
  - Burgess, Roy T.; Campau, Gregory P.; Claar, Leslie M.; Hodges, Robert C.; Snow, Douglas G.; and Taylor, Roy, 5,017,095, Cl. 417-222.00R.
- Hodgson, Graham: *See—*
  - Gilchrist, Paul; and Hodgson, Graham, 5,017,345, Cl. 423-18.000.
- Hoechst AG: *See—*
  - Marten, Manfred; Godau, Claus; and Schmelzer, Heinz, 5,017,675, Cl. 528-111.000.
- Hoechst Aktiengesellschaft: *See—*
  - Greiser, Wolfgang; Plotz, Kurt; Wagner, Hans; and Zerfass, Karl-Christian, 5,017,426, Cl. 428-280.000.
  - Herrmann, Heinz; and Billino, Susanne, 5,017,457, Cl. 430-272.000.
  - Kruse, Alfred; Siegemund, Gunter; and Ruppert, Ingo, deceased, 5,017,719, Cl. 560-106.000.
  - Stahlhofen, Paul, 5,017,462, Cl. 430-325.000.
- Hoechst Celanese Corp.: *See—*
  - Marikar, Y. M. Faruq; and Besso, Michael M., 5,017,420, Cl. 428-212.000.
  - Wadhwa, Lachman; Bitritto, Michel; and Powers, Edward J., 5,017,681, Cl. 528-342.000.
- Hoechst-Roussel Pharmaceuticals Inc.: *See—*
  - Effland, Richard C.; Klein, Joseph T.; Davis, Larry; and Olson, Gordon E., 5,017,578, Cl. 514-266.000.
- Hoeffkes, Horst; and Kaczich, Anke, to Henkel Kommanditgesellschaft auf Aktien. Free-flowing pearlescent concentrate. 5,017,305, Cl. 252-311.000.
- Hoegnelid, Kurt; and Ljungstroem, Jan, to Siemens Aktiengesellschaft. Medical device and method for stimulating a physiological event in a patient with a stimulation intensity automatically adapting to the physical activity of the patient. 5,016,632, Cl. 128-419.0PG.
- Hoffman, Mark R.; Choi, Charles Y. M.; Pedersen, Peder M.; and Pedersen, Niels C., Jr., to HD Electric Company. Jacket for cable connector. 5,017,739, Cl. 174-138.00F.
- Hoffmann-La Roche Inc.: *See—*
  - Alig, Leo; and Muller, Marcel, 5,017,619, Cl. 514-653.000.
  - Aschwanden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, 5,017,608, Cl. 514-538.000.
  - Stunnenberg, Hendrik G.; and Wittek, Riccardo, 5,017,487, Cl. 435-172.300.
- Hogrefe, Arthur F., to Johns Hopkins University, The. Minimum interface biomedical monitoring system. 5,016,631, Cl. 128-419.0PS.
- Hohmann, Andreas; Reuther, Wolfgang; Fikentscher, Rolf; and Proll, Theo, to BASF Aktiengesellschaft. Preparation of addition salts of cysteamine with acids. 5,017,725, Cl. 564-487.000.
- Holcroft Inc.: *See—*
  - Smith, John W., 5,016,860, Cl. 266-112.000.
- Holleman, Timothy: *See—*
  - Williams, Terrell; Keimel, John G.; Rugland, Roger; Sandstrom, Richard; and Holleman, Timothy, 5,016,645, Cl. 128-784.000.
- Holley, Carl A. Biomass briquetter. 5,017,124, Cl. 425-204.000.
- Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; by Weiskel, Lillith M., legal representative; by Warnock, Charles F., legal representative; by Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, to John D. Hollingsworth On Wheels, Inc., a part interest. Compact carding apparatus with silver thread-up and method. 5,016,321, Cl. 19-98.000.
- Hollingsworth, Ritch; and Mouritsen, John, to Cycle Composites, Inc. Cycle fork with fiber reinforced resin blades and crown and method of making same. 5,016,895, Cl. 280-280.000.
- Holloway, Ian, to I.H.W. Engineering Ltd. Seat reclining mechanism. 5,016,940, Cl. 297-362.000.
- Holm, Niels E.: *See—*
  - Simon, Bernd; Holm, Niels E.; and Bonnichsen, Fritz F., 5,017,190, Cl. 604-207.000.
- Holmes, Thomas J.; and Nygaard, Barbara G., to University of Minnesota, Regents of the. Crystalline saponin-containing complex. 5,017,562, Cl. 514-26.000.
- Holmes, William K., to Hi-Ranger, Inc. Articulated boom including tensioning apparatus. 5,016,731, Cl. 182-2.000.
- Holopainen, Vaino J.: *See—*
  - Thorndike, Charles E.; and Holopainen, Vaino J., 5,017,080, Cl. 414-454.000.
- Holroyd, Trevor J., to Stresswave Technology Limited. Stress wave load cell. 5,016,480, Cl. 73-862.590.
- Holss, Kurt, to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH. Pump for conveying gases and providing a differential pressure. 5,017,106, Cl. 417-481.000.
- Holt, Dennis A.; Kowalski, Conrad J.; Levy, Mark A.; Metcalf, Brian W.; and Tickner, Ann M., to SmithKline Beecham Corporation. Steriod 5-alpha-reductase inhibitors. 5,017,568, Cl. 514-173.000.
- Holtermann, Dennis L.: *See—*
  - Mulaskey, Bernard; Miller, Stephen J.; Holtermann, Dennis L.; and Jacobson, Robert L., 5,017,278, Cl. 208-65.000.
- Holtzer, Dominique: *See—*
  - Schoeb, Pascal; and Holtzer, Dominique, 5,016,745, Cl. 194-346.000.
- Holzapfel, Ralf: *See—*
  - Granz, Bernd; Holzapfel, Ralf; and Niewisch, Joachim, 5,017,775, Cl. 250-227.250.
- Holzer, Michael, Jr., to Skil Corporation. Automatic shaft lock. 5,016,501, Cl. 81-57.110.
- Holzinger, Reinhard; and Weiss, Gerhard, to Krauss Maffei Aktiengesellschaft. Tie-rod assembly for an injection molding press. 5,017,120, Cl. 425-150.000.
- Honda Giken Kogyo K.K.: *See—*
  - Fujimura, Akira; Fujimoto, Sachito; and Hosoda, Fumio, 5,016,596, Cl. 123-489.000.
- Honda Giken Kogyo Kabushiki Kaisha: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; and Shimada, Takamichi, 5,018,068, Cl. 364-424.100.
  - Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 5,016,737, Cl. 188-181.00A.
  - Iino, Takashi, 5,016,492, Cl. 74-733.100.
  - Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.
- Honeywell Inc.: *See—*
  - Carlyon, William R., 5,017,931, Cl. 33-700.0MS.
  - Jungkman, David L.; and White, Timothy E., 5,017,786, Cl. 250-352.000.
  - Nasr, Hatem N.; Sadjadi, Firooz A.; Bazakos, Michael E.; and Amehdi, Hossien, 5,018,215, Cl. 382-15.000.
  - Roisen, Roger L.; Rahn, Curtis H.; Straight, John B.; and Liu, Michael S., 5,017,999, Cl. 357-49.000.
- Hongu, Akinori: *See—*
  - Yamada, Hiroshi; Ohuchi, Masayuki; Saito, Masayuki; and Hongu, Akinori, 5,018,051, Cl. 361-393.000.
- Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, to Emerson Electric Co. Fused hermetic terminal assembly including a pin guard and lead wire end connection securing device associated therewith. 5,017,740, Cl. 174-152.0GM.
- Honkura, Yoshinobu; Fukui, Yasuji; Matsuo, Tooru; and Mishima, Chisato, to Aichi Steel Works, Limited. Rare earth magnet alloy. 5,017,247, Cl. 148-302.000.
- Hood Laboratories: *See—*
  - Marten, Lewis H.; and Lane, Charles, 5,017,188, Cl. 604-178.000.
- Hoover Company, The: *See—*
  - McAllise, Gregg A.; and Buchtel, Dean H., 5,016,316, Cl. 15-412.000.
- Hopkins, David L.; and Perz, John S., to Lubrizol Corporation, The. Asphalt additive compositions. 5,017,230, Cl. 106-284.300.
- Hopp, Rudolf: *See—*
  - Rabenhorst, Jurgen; and Hopp, Rudolf, 5,017,388, Cl. 426-44.000.
- Hora, Ferdinand: *See—*
  - Feuz, Fritz; Hora, Ferdinand; and Linder, Fritz, 5,016,539, Cl. 104-28.000.
- Horal, Peter: *See—*
  - Vahlne, Anders; Svennerholm, Bo; Rymo, Lars; Jeansson, Stig; and Horal, Peter, 5,017,687, Cl. 530-324.000.
- Hori, Tomoshige; and Itoh, Kensuke, to Snow Brand Milk Products Co., Ltd. Disposable sensor. 5,017,875, Cl. 324-446.000.
- Horie, Fujio; and Matsubara, Kenji, to Brother Kogyo Kabushiki Kaisha. Sewing machine for stitching selected patterns. 5,016,550, Cl. 112-454.000.
- Horiguchi, Rumiko: *See—*
  - Onishi, Yasunobu; Hayase, Shuji; Horiguchi, Rumiko; and Hirao, Akiko, 5,017,453, Cl. 430-176.000.

- Horino, Morikatsu; Kawabe, Manabu; and Yagi, Yoshiaki, to Kirin Beer Kabushiki Kaisha. Draught beer dispensing system. 5,016,786, Cl. 222-504.000.
- Horiuchi, Hiroshi: *See—*
  - Hasegawa, Toshiyuki; Takagishi, Hisao; and Horiuchi, Hiroshi, 5,017,642, Cl. 524-608.000.
- Horiuchi, Kenjiro: *See—*
  - Nakamura, Kiyokazu; Kometani, Kiichi; Koshino, Akihiko; and Horiuchi, Kenjiro, 5,017,650, Cl. 525-65.000.
- Horn, Mark W.: *See—*
  - Pang, Stella W.; and Horn, Mark W., 5,017,403, Cl. 427-39.000.
- Horner, Joseph L.; Fielding, Kenneth H.; and Makekau, Charles K., to United States of America, Air Force. Modified compact 2f optical correlator. 5,016,976, Cl. 350-162.130.
- Hoshi, Yoshikazu: *See—*
  - Imamura, Kazunori; and Hoshi, Yoshikazu, 5,016,586, Cl. 123-336.000.
- Hoshizaki Denki Kabushiki Kaisha: *See—*
  - Nagata, Osamu; Kuwahara, Tokihiro; Suzawa, Yukichi; Kamino, Hiroaki; Suyama, Tomio; and Konno, Tomoyoshi, 5,017,852, Cl. 318-727.000.
- Hosiden Electronics Co., Ltd.: *See—*
  - Sugiyama, Keishi, 5,017,156, Cl. 439-607.000.
- Hosoda, Fumio: *See—*
  - Fujimura, Akira; Fujimoto, Sachito; and Hosoda, Fumio, 5,016,596, Cl. 123-489.000.
- Hosokawa, Shigefumi: *See—*
  - Kanai, Tsuneo; Hosokawa, Shigefumi; Kumakura, Yasuo; Umemura, Shigeru; and Inagaki, Shuichiro, 5,017,145, Cl. 439-45.000.
- Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, to Canon Kabushiki Kaisha. Optical information recording medium and method for recording information on said medium and reproducing information therefrom. 5,018,123, Cl. 369-44.110.
- Hostetler, Eldon, to Ziggity Systems, Inc. Safety lock. 5,016,574, Cl. 119-72.500.
- Hotkowski, Peter: *See—*
  - Todaro, Frank A.; and Hotkowski, Peter, 5,017,071, Cl. 412-43.000.
- Hotta, Yoshihiko; and Kubo, Keishi, to Ricoh Company, Ltd. Reversible thermosensitive recording material. 5,017,421, Cl. 428-216.000.
- Hou, Chao-Kuo. Kite for use at night having a shining and glittering effect. 5,018,056, Cl. 362-253.000.
- Houston, Theodore W., to Texas Instruments, Incorporated. Memory having selected state on power-up. 5,018,102, Cl. 365-95.000.
- Hovorka, George B.: *See—*
  - Schutt, Ernest G.; Dondero, Richard S.; Hansen, William P.; Hovorka, George B.; and Meyer, Raymond E., 5,017,009, Cl. 358-338.000.
- Howards, Stuart S.: *See—*
  - Turner, Terry L.; and Howards, Stuart S., 5,017,378, Cl. 424-422.000.
- Howell Instruments, Inc.: *See—*
  - Pettigrew, James L., 5,018,069, Cl. 364-424.040.
- Howell, Thomas H.: *See—*
  - Ryan, Charles P.; Howell, Thomas H.; Pan, Andrew Y.; and Rolston, David W., 5,018,075, Cl. 364-513.000.
- Hoyloak, Joel N.: *See—*
  - Sohner, Harold K.; Hoyloak, Joel N.; and Spradling, John T., 5,018,165, Cl. 375-1.000.
- Hruby, Victor; and Kawasaki, Andrew, to Arizona Technology Development Corporation. Dynorphin analogs specific for kappa opioid receptors. 5,017,689, Cl. 530-327.000.
- Hsieh, Chi H. Vibration control in NMR magnet structures. 5,016,638, Cl. 128-653.00A.
- Hsu, Chi-Hsueh; Yang, Wen-Li; and Chuang, Shien-Yu. Full head respirator. 5,016,625, Cl. 128-201.250.
- Hsu, Hui-Pin; Jang, Soon; and Hinze, Lee R., to Hughes Aircraft Company. Automated laser fusion system for high strength optical fiber splicing. 5,016,971, Cl. 350-96.210.
- Hsu, Sawyer C. Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., to NCR Corporation. Cable carrying method and apparatus for modular computer cabinets and the like. 5,016,947, Cl. 312-108.000.
- Hu, Chen. Plastic health massage disk. 5,016,616, Cl. 128-32.000.
- Huang, Chun-Chi. Scroll saw blade holding system. 5,016,512, Cl. 83-783.000.
- Huber, Ralf: *See—*
  - Goedecke, Wolf-Dieter; Schwenzer, Reinhard; and Huber, Ralf, 5,016,519, Cl. 91-361.000.
- Hudspeth, James P.: *See—*
  - Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.
- Huebner, Mark A.: *See—*
  - Thomas; Gary R.; and Huebner, Mark A., 5,016,392, Cl. 49-352.000.
- Huels Aktiengesellschaft: *See—*
  - Finke, Jurgen; and Feinauer, Roland, 5,017,686, Cl. 524-87.000.
- Huether, Berta L., heir: *See—*
  - Huether, Werner M., deceased; Huether, Berta L., heir; and Rossmann, Axel, 5,016,437, Cl. 60-280.000.
- Huether, Werner M., deceased; by Huether, Berta L., heir; and Rossmann, Axel, to MTU Motoren- und Turbinen-Union Muenchen GmbH. Apparatus for cleaning diesel engine exhaust gas. 5,016,437, Cl. 60-280.000.
- Huggins, Morris. Beam clamp system. 5,016,855, Cl. 249-21.000.
- Hughes Aircraft Company: *See—*
  - Brewer, Peter D.; and Zinck, Jennifer J., 5,018,164, Cl. 372-109.000.
  - Chien, Kuei-Ru; Reeder, Robin A.; and Stovall, H. Dean, 5,018,153, Cl. 372-28.000.
  - Cohn, David B.; Affleck, Wayde H.; and Lawrence, George D., 5,017,769, Cl. 250-216.000.
  - Farnsworth, Robert P., 5,017,834, Cl. 315-58.000.
  - Gully, Wilfred J.; and Goodman, Charles A., 5,017,854, Cl. 318-811.000.
  - Hsu, Hui-Pin; Jang, Soon; and Hinze, Lee R., 5,016,971, Cl. 350-96.210.
  - Moss, Gaylord E.; and Wreede, John E., 5,016,953, Cl. 350-3.660.
  - Peterson, Stanley P. D.; and Eisentraut, Rudolph A., 5,016,476, Cl. 73-829.000.
  - Smith, Ronald T., 5,016,950, Cl. 350-3.700.
  - Smith, Willis H., Jr., 5,016,987, Cl. 350-344.000.
  - Tsuda, George I., 5,017,929, Cl. 342-427.000.
  - Wallner, Jane; and Yu, Kevin, 5,017,447, Cl. 430-2.000.
  - Wu, Te-Kao, 5,017,939, Cl. 343-911.00R.
- Hugi, Bruno: *See—*
  - Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Paul A.; and Breuleux, Gerald, legal representative, 5,017,582, Cl. 514-305.000.
- Hugl, Herbert: *See—*
  - Fossati, Piero; Heidenreich, Holger; Hugl, Herbert; and Wehling, Klaus, 5,017,498, Cl. 436-84.000.
- Hukuda, Kazuyuki, to Rohm Co., Ltd. Meter driving apparatus. 5,017,861, Cl. 324-143.000.
- Hull, Richard W.; and O'Shaughnessy, Timothy G., to Western Digital Corporation. Digital-to-analog converter with bit weight segmented arrays. 5,017,919, Cl. 341-136.000.
- Humphrey, Martin D.; and Johnson, Alfred N., to Westinghouse Electric Corp. Alpha-detecting conveyor apparatus. 5,017,788, Cl. 250-385.100.
- Humphrey, Robert E., to Agro Elements. Crop growth promotion. 5,017,374, Cl. 424-93.000.
- Hung, Sheng-Hu. Lightly-operating automatic door closer with double cylinders. 5,016,317, Cl. 16-54.000.
- Hunt, Andrew: *See—*
  - Lucas, Gary; Beck, Maurice; and Hunt, Andrew, 5,017,879, Cl. 324-663.000.
- Hunt, Thomas C. Heat exchanger. 5,016,577, Cl. 122-182.100.
- Hunter, Norman R.: *See—*
  - Gesser, Hyman D.; Hunter, Norman R.; Yarlagadda, Prasd S.; and Morton, Lawrence A., 5,017,731, Cl. 568-910.000.
- Hunter, Robert L.; and Duncan, Alexander, to Emory University. Improved method of performing angioplasty procedures. 5,017,370, Cl. 424-83.000.
- Hunter, Robert M. Child-resistant disposable lighter with spark wheel arrester. 5,017,128, Cl. 431-277.000.
- Hurdiel, Alain, to Framatome. Device for opening and closing a filter in a nuclear plant and process for replacing the filter packing. 5,017,330, Cl. 376-260.000.
- Hurley, J. Richard: *See—*
  - Hansen, Lowell D.; Hurley, J. Richard; Schweitzer, Jean J.; and Zoya, Walter J., 5,017,098, Cl. 417-302.000.
- Huron/St. Clair Incorporated: *See—*
  - Stapleton, Craig A.; and Zauner, Robert S., 5,016,798, Cl. 224-326.000.
  - Stapleton, Craig A., 5,016,799, Cl. 224-326.000.
- Hurst, Dare: *See—*
  - Boot, Phillip; Hurst, Dare; and Lasseter, Robert, 5,016,419, Cl. 52-749.000.
- Huston, Donald B.; and Rackow, William L., to George Banta Co., Inc. Magnetic game system. 5,016,888, Cl. 273-239.000.
- Hutchins, Larry D.: *See—*
  - Elkind, Jerome L.; Smith, Patricia B.; Hutchins, Larry D.; Luttmer, Joseph D.; York, Rudy L.; and England, Julie S., 5,017,511, Cl. 437-225.000.
- Hydro-Craft, Inc.: *See—*
  - Walker, William R.; and Lukowski, George W., 5,016,461, Cl. 72-336.000.
- Hydro Quebec: *See—*
  - Drouet, Michel G.; and Choi, Hyun K., 5,017,754, Cl. 219-121.360.
- Hylarides, Mark D.; Srinivasan, Ananthachari; Fitzner, Jeffrey N.; and Vrudhula, Vivekananda M., to NeoRx Corporation. Methods for introducing a sulfhydryl amino or hydroxyl groups to a compound. 5,017,693, Cl. 530-390.000.
- Hyoudo, Hideki: *See—*
  - Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.
- Hyundai Electronics Industries Co., Ltd.: *See—*
  - Park, Hae S.; Kim, Sang I.; Kim, Sea C.; Park, Kye S.; and Park, Jin G., 5,017,265, Cl. 156-643.000.
- I.E.M.C.A. Spa Industria Elettromeccanica Complessi Automatici: *See—*
  - Fabbri, Vladimiro, 5,017,074, Cl. 414-224.000.
- I.H.W. Engineering Ltd.: *See—*
  - Holloway, Ian, 5,016,940, Cl. 297-362.000.
- Iacconi, Marie. Extruder nozzle. 5,017,117, Cl. 425-133.100.

VOL
1126
ISS
3
MY
21
1991
UMI

- Iameter Incorporated: *See—*
  - Mohlenbrock, William C.; Farley, Peter J.; Frye, Lawrence J.; Trummell, Donald E., Jr.; and Bostrom, Alan G., 5,018,067, Cl. 364-413.020.
- Ibamoto, Masahiko; Morooka, Yasuo; Koyanagi, Hiroaki; Sato, Manabu; and Mizumura, Takeshi, to Hitachi, Ltd. Optically readable mail system with general and receiver specific information. 5,018,072, Cl. 364-478.000.
- Ibiden Company, Ltd.: *See—*
  - Otani, Sugio; and Kakegawa, Hiroya, 5,017,431, Cl. 428-420.000.
- Ibuchi, Yoshiaki, to Sharp Kabushiki Kaisha. Image forming apparatus and media cartridge for use in the same. 5,017,959, Cl. 355-27.000.
- Ichitou, Toshikatsu: *See—*
  - Kitamura, Hiroki; Takanashi, Itsuo; Yamamura, Takashi; Ichitou, Toshikatsu; and Tai, Hiromichi, 5,017,944, Cl. 346-108.000.
- ICI Pharma: *See—*
  - Bertrandie, Alain M.; Bird, Thomas G. C.; Jung, Frederic H.; and Lohmann, Jean-Jacques M., 5,017,569, Cl. 514-206.000.
- Idemitsu Kosan Co., Ltd.: *See—*
  - Furusawa, Toshihiro; Satoh, Atsushi; Nakajima, Takashi; and Matsugishi, Noriaki, 5,017,311, Cl. 264-23.000.
- IFM Electronic GmbH: *See—*
  - Mehnert, Wolfgang, 5,018,049, Cl. 361-380.000.
- Igaki, Tetsuo; Kaneko, Akio; Manaka, Sumio; and Kinoshita, Kimiaki, to Nippon Soda Co., Ltd. Fluoran compound and coloring recording material using it. 5,017,710, Cl. 549-226.000.
- Igarashi, Ichiro; and Ito, Hiroaki, to Tokai Rubber Industries, Ltd. Refrigerant transporting hose. 5,016,675, Cl. 138-125.000.
- Igarashi, Noboru, to Sharp Kabushiki Kaisha. Frame construction for microwave oven having an integrally formed open chassis and an inserting opening. 5,017,750, Cl. 219-10.55R.
- Iida, Akihiko: *See—*
  - Izumi, Tetsujirou; and Iida, Akihiko, 5,017,893, Cl. 332-103.000.
- Iida, Nozomi; Hannya, Shuichi; and Omote, Kazuaki, to Nissan Motor Co., Ltd. Glass runner structure of automotive door. 5,016,394, Cl. 49-441.000.
- Iijima, Hiroshi: *See—*
  - Sakurai, Kaoru; Maeda, Masaru; Murakami, Harunori; and Iijima, Hiroshi, 5,017,933, Cl. 343-704.000.
- Iijima, Shigeru; Tanaka, Kazunobu; Matsuda, Akihisa; Matsumura, Mitsuo; and Yamamoto, Hideo, to Toa Nenryo Kogyo K.K. Silicon thin film and method of producing the same. 5,017,308, Cl. 252-501.100.
- Iijima, Takeo: *See—*
  - Sugiura, Hiroyuki; Nakajima, Nobuyuki; and Iijima, Takeo, 5,017,096, Cl. 417-222.00S.
- Iimura, Haruo, to Ricoh Company, Ltd. Liquid crystal display device with a birefringent compensator. 5,016,988, Cl. 350-347.00R.
- Iino, Takashi, to Honda Giken Kogyo Kabushiki Kaisha. Continuously variable automatic transmission. 5,016,492, Cl. 74-733.100.
- Iinuma, Mitsuhisa: *See—*
  - Yamada, Hideo; Nakayama, Shozo; Iinuma, Mitsuhisa; and Tobiki, Hisao, 5,017,191, Cl. 604-243.000.
- Iitani, Kinzo: *See—*
  - Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Ken-ich, 5,017,480, Cl. 435-106.000.
- Iizuka, Kazuo: *See—*
  - Shiratori, Hidehisa; and Iizuka, Kazuo, 5,017,060, Cl. 409-137.000.
- Ikebe, Masaru: *See—*
  - Shiba, Haruo; Ikebe, Masaru; and Sasaki, Morimasa, 5,018,039, Cl. 360-133.000.
- Ikeda Bussan Co., Ltd.: *See—*
  - Yanagishita, Norio; Matsuura, Ichiro; Ishimaru, Kiichiro; and Akai, Mikio, 5,017,115, Cl. 425-125.000.
- Ikeda, Hayato: *See—*
  - Kawai, Katsunori; Ikeda, Hayato; Ishihara, Shinichi; and Kawai, Toshihiro, 5,016,524, Cl. 92-182.000.
- Ikeda, Yasushi: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
- Ikegami, Yuji; Sasayama, Shinichi; Tachino, Noboru; and Kamiya, Takeshi, to Nippon Yakin Kogyo Co., Ltd. Production process of ferrite stainless steel covered with oxide whisker. 5,017,544, Cl. 502-439.000.
- Ikenoue, Yoshikazu: *See—*
  - Yamaguchi, Ikunori; and Ikenoue, Yoshikazu, 5,018,081, Cl. 364-519.000.
- Ilford Limited: *See—*
  - Cawse, John L.; and Harris, Philip J., 5,017,667, Cl. 526-264.000.
  - Mowforth, Clive W.; Bullock, James F.; and Maternaghan, Trevor J., 5,017,469, Cl. 430-569.000.
- Im, Kwan-Soon. Friction clutch system. 5,016,739, Cl. 192-0.080.
- Imaizumi, Hideo, to Sanyo Electric Co., Ltd. Detecting circuit which reduces buzz in a sound signal. 5,018,016, Cl. 358-198.000.
- Imaki, Katsuhiro; Arai, Yoshinobu; and Okegawa, Tadao, to Ono Pharmaceutical Co., Ltd. Derivatives of p-substituted phenyl ester of pivalic acid. 5,017,610, Cl. 514-546.000.
- Imamura, Kazunori; and Hoshi, Yoshikazu, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Apparatus for controlling a throttle valve. 5,016,586, Cl. 123-336.000.
- Imaoka, Kazunori: *See—*
  - Miura, Takao; Imaoka, Kazunori; and Sugimoto, Fumitoshi, 5,017,998, Cl. 357-49.000.
- Imhof, Rene : *See—*
  - Aschwanden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, 5,017,608, Cl. 514-538.000.
- Imperial Chemical Industries PLC: *See—*
  - Birchall, James D.; Mockford, Mary J.; Stanley, David R.; Asher, Paul M. L.; and McCarthy, William R., 5,017,525, Cl. 501-87.000.
  - Robson, Michael J., 5,017,606, Cl. 514-531.000.
- Imperial, George R.; Kung, Hsiang-Ching; Makarewicz, Paul A.; McCormick, Bonnie J.; and Slovik, Lori S., to International Paper Company. Paper for use in ion deposition printing. 5,017,416, Cl. 428-195.000.
- Imtec Inc.: *See—*
  - Murphy, William J., 5,017,257, Cl. 156-268.000.
- Ina, Kenzoh: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Inada, Kiyoshi: *See—*
  - Kawashima, Akihiro; Yoshida, Hirokazu; Tagusa, Yasunobu; Inada, Kiyoshi; Makita, Hideshi; and Dotta, Yoshihisa, 5,016,986, Cl. 350-339.00R.
- Inada, Norio: *See—*
  - Iwasaki, Shizuo; and Inada, Norio, 5,016,698, Cl. 152-527.000.
- Inagaki, Shuichiro: *See—*
  - Kanai, Tsuneo; Hosokawa, Shigefumi; Kumakura, Yasuo; Umemura, Shigeru; and Inagaki, Shuichiro, 5,017,145, Cl. 439-45.000.
- Inco Alloys International, Inc.: *See—*
  - England, Jimmy C.; Hensley, John R.; Moehling, Frederick E.; Roberts, Everett M.; and Ruble, Hugh-Hiram. Jr., 5,016,460, Cl. 72-208.000.
  - Smith, Gaylord D.; Tassen, Curtis S.; Ganesan, Pasupathy; and Wheeler, Jack M., 5,017,249, Cl. 148-410.000.
- Inco Limited: *See—*
  - Price, Thomas L.; Walli, Richard A.; and Phipps, Peter G , 5,017,200, Cl. 55-96.000.
- Industria Farmaceutica Serono S.p.A.: *See—*
  - Fabbri, Andrea; Moretti, Costanzo; and Forni, Laura, 5,017,557, Cl. 514-12.000.
- Industrial Label Corporation: *See—*
  - Gilat, Ronen; and Boyd, David B., 5,016,801, Cl. 226-197.000
- Industrial Technology Research Institute: *See—*
  - Wu, Biing-Seng, 5,017,983, Cl. 357-23.700.
- Infiltrator Systems Inc.: *See—*
  - Nichols, James M., 5,017,041, Cl. 405-48.000.
- Ingersoll-Rand Company: *See—*
  - Albert, Gregory P.; and Dubuque, Kenneth J., 5,017,109, Cl. 418-152.000.
- Ingwersen, Peter; and West, Bernard M., to Molex Incorporated. Method and apparatus for unloading components from tape carrier packaging. 5,017,078, Cl. 414-417.000.
- Inion, Henri: *See—*
  - Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.
- Innoke Oy: *See—*
  - Poro, Antti M., 5,016,491, Cl. 74-640.000.
- Innovative Concepts, Inc.: *See—*
  - Reznikov, Naum; and Protiva, Marc T., 5,016,946, Cl. 312-108.000.
- Inoue, Atsushi: *See—*
  - Ogawa, Takahiro; Inoue, Atsushi; Ito, Kiyotaka; Ueta, Yutaka; and Koga, Kazuhiko, 5,016,341, Cl. 29-603.000.
- Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, to Honda Giken Kogyo Kabushiki Kaisha. Engine block construction with skeletal frame. 5,016,584, Cl. 123-195.00R.
- Inoue, Nobuaki; and Hayashi, Katsumi, to Fuji Photo Film Co., Ltd. Development processing method for silver halide photographic materials. 5,017,463, Cl. 430-398.000.
- Inoue, Takashi: *See—*
  - Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, 5,016,564, Cl. 118-723.000.
- Inoue, Yasuhiro, to Fujitsu Limited. Printer. 5,018,080, Cl. 364-519.000.
- Inoue, Yoshinori: *See—*
  - Myochin, Hisashi; Inoue, Yoshinori; Saito, Hitoshi; and Yoshida Narutaka, 5,018,045, Cl. 361-229.000.
- Insetta, Victor; Monsorno, Richard V.; Davis, Donald J., Jr.; and Beyel, Stephen, to American Technical Ceramics Corporation. Adjustable multilayer capacitor. 5,018,047, Cl. 361-277.000.
- Institut Francais du Petrole: *See—*
  - Combe, Jean; Renard, Gerard; and Valentin, Emmanuel, 5,016,709, Cl. 166-245.000.
  - Renard, Gerard; and Giannesini, Jean-Francois, 5,016,710, Cl. 166-245.000.
  - Wittrisch, Christian, 5,016,727, Cl. 181-102.000.
- Instruments and Movements Limited: *See—*
  - Jones, Norman S., 5,016,626, Cl. 128-204.260.
- Integrated Device Technology, Inc.: *See—*
  - Wu, Chau-Chin, 5,017,812, Cl. 307-475.000.

- Intel Corporation: *See—*
  - Madland, Paul D., 5,018,111, Cl. 365-233.000.
- InterMetro Industries Corporation: *See—*
  - Welch, Robert J.; Nattress, Robert H.; Nitkowski, Robert E.; and Beakley, Westcoat, 5,016,948, Cl. 312-250.000.
- International Business Machines Corporation: *See—*
  - Chen, Tze-Chiang; Chuang, Ching-Te Kent; Li, Guann-Pyng; and Ning, Tak Hung, 5,017,990, Cl. 357-34.000.
  - Corr, James L.; and Vincent, Brian J., 5,018,144, Cl. 371-22.300.
  - Gelb, Jack P.; and Tyrrell, John C., 5,018,060, Cl. 364-200.000.
  - Healey, Martin J., 5,018,077, Cl. 364-518.000.
  - Jaffe, Robert S.; and Mandeville, Jon R., 5,018,211, Cl. 382-8.000.
  - Kulakowski, John E.; Means, Rodney J.; Oldham, David M.; and Tayefeh, Morovat, 5,018,126, Cl. 369-58.000.
  - Liu, Lishing, 5,018,063, Cl. 364-200.000.
  - Mamin, Harry J.; and Rugar, Daniel, 5,017,010, Cl. 356-345.000.
  - Shih, Feng-Hsien W., 5,018,093, Cl. 364-740.000.
  - Sugawara, Kazuhide, 5,018,201, Cl. 381-43.000.
- International Freezer Corporation: *See—*
  - Fiedler, Armin, 5,016,446, Cl. 62-342.000.
- International Paint public limited company: *See—*
  - Brooks, Rodney R., 5,017,322, Cl. 264-255.000.
- International Paper Company: *See—*
  - Imperial, George R.; Kung, Hsiang-Ching; Makarewicz, Paul A.; McCormick, Bonnie J.; and Slovik, Lori S., 5,017,416, Cl. 428-195.000.
- International Superconductor: *See—*
  - Porcell, George, 5,017,552, Cl. 505-1.000.
- International Superconductor Corp.: *See—*
  - Hilal, Mohamed A., 5,016,600, Cl. 124-3.000.
- Interpane Coatings, Inc.: *See—*
  - Aldrich, Darrell L.; and Jacobs, John R., 5,017,252, Cl. 156-109.000.
- Inushima, Takashi: *See—*
  - Sakama, Mitsunori; Fukada, Takeshi; Sakamoto, Naoya; Amachi, Nobumitsu; Hayashi, Shigenori; and Inushima, Takashi, 5,017,502, Cl. 437-2.000.
- Ioka, Tsunejiro; Saigo, Tatsuji; and Tomita, Michio, to Seiko Instruments Inc. Sheet feeding device for image recording apparatus. 5,016,865, Cl. 271-103.000.
- Ionescu, Adrian F.; and Conant, Theodore, to Power Management International, Inc. High frequency AC voltage control. 5,018,058, Cl. 363-34.000.
- Iqbal, Abul: *See—*
  - Rochat, Alain C.; Iqbal, Abul; and Wallquist, Olof, 5,017,706, Cl. 548-414.000.
- IRECO Incorporated: *See—*
  - Lawrence, Lawrence D.; and Sudweeks, Walter B., 5,017,251, Cl. 149-2.000.
- Irie, Tadashi: *See—*
  - Nishitani, Yasuhiro; Nishino, Yutaka; and Irie, Tadashi, 5,017,581, Cl. 514-300.000.
- Isahai, Tatsuo: *See—*
  - Machida, Morihisa; Tajima, Yoshio; Nakatsumi, Hideo; Isahai, Tatsuo; and Shiroki, Daijiro, 5,017,427, Cl. 428-323.000.
- Iscar Ltd.: *See—*
  - Moskowitz, David; and Porat, Reuven, 5,017,524, Cl. 501-87.000.
- Ishida, Ryuichi: *See—*
  - Hayashi, Goichi; Fujimagari, Sajuro; Nakamura, Kensaku; and Ishida, Ryuichi, 5,017,455, Cl. 430-256.000.
- Ishida, Shuichi: *See—*
  - Yahagi, Susumu; Ishida, Shuichi; and Fujimoto, Shigeru, 5,017,755, Cl. 219-121.680.
- Ishida, Yasuo; Ohta, Kazunari; Nakahama, Tatsuo; and Yoshikawa, Harutoshi, to Takeda Chemical Industries, Ltd. Sulfonylurea compounds and herbicidal use. 5,017,212, Cl. 71-92.000.
- Ishihara, Masamichi: *See—*
  - Shinoda, Takashi; and Ishihara, Masamichi, 5,018,109, Cl. 365-230.080.
- Ishihara, Shinichi: *See—*
  - Kawai, Katsunori; Ikeda, Hayato; Ishihara, Shinichi; and Kawai, Toshihiro, 5,016,524, Cl. 92-182.000.
- Ishihara, Toshinobu: *See—*
  - Oikawa, Katsuyuki; Ishihara, Toshinobu; Endo, Mikio; and Kubota, Tohru, 5,017,715, Cl. 556-401.000.
- Ishii, Kazuo: *See—*
  - Kato, Eiichi; and Ishii, Kazuo, 5,017,448, Cl. 430-49.000.
- Ishii, Keizuo: *See—*
  - Muramoto, Hisaichi; Ishii, Keizuo; and Miyazono, Tadafumi, 5,017,646, Cl. 524-807.000.
- Ishii, Satoshi: *See—*
  - Ishizuka, Koh; Tsukiji, Masaaki; Kubota, Yoichi; Ishii, Satoshi; and Nishimura, Tetsuharu, 5,017,777, Cl. 250-231.160.
- Ishii, Tomoyuki: *See—*
  - Suzuki, Katsuya; Nakajima, Yoshihiro; and Ishii, Tomoyuki, 5,016,842, Cl. 248-68.100.
- Ishikawa, Makoto, to Maruishi Iron Works Co., Ltd. Method and apparatus for separating paper sheets into units and distributing them. 5,017,085, Cl. 414-796.000.
- Ishikawa Prefecture: *See—*
  - Tsukabayashi, Kazuo; Yamamoto, Takashi; and Sawanoi, Yasunari, 5,016,451, Cl. 68-2.000.
- Ishikawajima Harima Jukogyo Kabushiki Kaisha: *See—*
  - Kiritani, Yoshiharu; Onishi, Yutaka; Tagata, Shigeyoshi; and Umeno, Koichi, 5,017,045, Cl. 405-143.000.
- Ishimaru, Kiichiro: *See—*
  - Yanagishita, Norio; Matsuura, Ichiro; Ishimaru, Kiichiro; and Akai, Mikio, 5,017,115, Cl. 425-125.000.
- Ishimoto, Kazumi: *See—*
  - Sato, Syoji; Makino, Yutaka; Ishimoto, Kazumi; and Izumi, Yasuo, 5,017,131, Cl. 432-152.000.
- Ishitsuka, Keiichi; and Tsunoda, Shinji, to Fuji Jukogyo Kabushiki Kaisha. Fixing structure of sashes of motor vehicle door. 5,016,396, Cl. 49-502.000.
- Ishizawa, Yasuhisa: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Ishizuka, Koh; Tsukiji, Masaaki; Kubota, Yoichi; Ishii, Satoshi; and Nishimura, Tetsuharu, to Canon Kabushiki Kaisha. Diffracted beam encoder. 5,017,777, Cl. 250-231.160.
- Isobe, Mitsunobu: *See—*
  - Matsuzaki, Kichie; Isobe, Mitsunobu; Takeichi, Kenzo; Hisatomi, Ryouichi; and Kudou, Masasi, 5,018,219, Cl. 382-37.000.
- Isobe, Takeshi: *See—*
  - Matsuo, Yutaka; Isobe, Takeshi; and Adachi, Kazuyosi, 5,017,336, Cl. 420-422.000.
- Isoform: *See—*
  - De Smet, Gabriel, 5,016,458, Cl. 72-57.000.
- Isozaki, Shingo: *See—*
  - Kurosawa, Yuji; Terajima, Hisao; and Isozaki, Shingo, 5,018,189, Cl. 379-93.000.
- Israel, Gina; and LaRussa, Bonnie S. Apparatus for holding dental floss containers. 5,016,661, Cl. 132-324.000.
- Iten, Clemens A., to American Safety Razor Company. Suture cutter. 5,016,353, Cl. 30-124.000.
- Ito, Daisuke, to Tosa Plastic Zosen Corporation. Anticorrosive and rust free system for marine-using engine. 5,016,585, Cl. 123-198.00E.
- Ito, Hiroaki: *See—*
  - Igarashi, Ichiro; and Ito, Hiroaki, 5,016,675, Cl. 138-125.000.
- Ito, Hiroshi: *See—*
  - Handa, Junichi; Ito, Hiroshi; Hattori, Hiroshi; and Suganuma, Akira, 5,017,638, Cl. 524-449.000.
- Ito, Kenichiro; Nojiri, Hiromi; and Adachi, Kenro, to NTN Corporation. Torque responsive engaging clutch. 5,016,740, Cl. 192-38.000.
- Ito, Kiyotaka: *See—*
  - Ogawa, Takahiro; Inoue, Atsushi; Ito, Kiyotaka; Ueta, Yutaka; and Koga, Kazuhiko, 5,016,341, Cl. 29-603.000.
- Ito, Masahiko: *See—*
  - Takagi, Kazunori; Sato, Shinichi; Ito, Masahiko; and Yamamoto, Hideo, 5,018,205, Cl. 381-86.000.
- Ito, Takashi: *See—*
  - Nakamura, Akihiko; and Ito, Takashi, 5,016,362, Cl. 34-51.000.
- Ito, Yoshihide. Method of planting seedlings. 5,016,548, Cl. 111-114.000.
- Itoh, Hiroyuki: *See—*
  - Yamada, Toshio; Kobayashi, Tohru; Nishizawa, Hirotaka; Itoh, Hiroyuki; and Saitoh, Tatsuya, 5,018,000, Cl. 357-51.000.
- Itoh, Kenji: *See—*
  - Yamazaki, Shunpei; and Itoh, Kenji, 5,017,264, Cl. 156-643.000.
- Itoh, Kensuke: *See—*
  - Hori, Tomoshige; and Itoh, Kensuke, 5,017,875, Cl. 324-446.000.
- Itoh, Kiyochika; and Doyoshita, Toshi, to Tokyo Winder Co., Ltd. Crimping apparatus used in wrapping cylindrical objects. 5,016,430, Cl. 53-370.200.
- Itoh, Kiyohiko: *See—*
  - Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, 5,017,932, Cl. 343-702.000.
- Itoh, Tetsuya: *See—*
  - Utsumi, Tatsuya; Kawamura, Shinji; Itoh, Tetsuya; Moriyama, Hiroshi; and Okada, Naofumi, 5,016,828, Cl. 241-158.000.
- Itoh, Toshiaki: *See—*
  - Meguro, Kazunori; Itoh, Toshiaki; and Abe, Shigeru, 5,016,610, Cl. 126-91.00A.
- ITT Corporation: *See—*
  - Nemit, Jeffrey T., 5,017,923, Cl. 342-52.000.
- Iuchi, Tohru; Nakamori, Yukio; Kawasaki, Atsushi; Yashiro, Hirokatsu; and Nagatake, Yoh-ichi, to Nippon Steel Corporation. Clinical thermometer. 5,017,018, Cl. 374-130.000.
- Iversen, Arthur H.; and Whitaker, Stephen, to Coriolis Corporation. Liquid cooled rotating anodes. 5,018,181, Cl. 378-144.000.
- Ivy, Richard E.: *See—*
  - Baldwin, Chauncey D.; Shricker, Brian R.; and Ivy, Richard E., 5,017,560, Cl. 514-21.000.
- Iwabuchi, Katsuhiko; Yokokawa, Osamu; and Takanabe, Eiichiro, to Tel Sagami Limited. Apparatus for treatment using gas. 5,016,567, Cl. 118-733.000.
- Iwaki, Yoshihisa: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; and Shimada, Takamichi, 5,018,068, Cl. 364-424.100.
- Iwama, Masatoshi: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
- Iwanari, Yoshiyuki; Amaya, Shinji; Shimizu, Seiichi; and Kogawara, Toshiro, to Dainippon Ink & Chemicals, Inc. Color toner composition for electrostatic developer. 5,017,450, Cl. 430-106.000.

VOL 1126 ISS 3 MY 21 1991 UMI

- Iwasaki, Katsuhiro: *See—*
  - Tanabe, Haruyoshi; Iwasaki, Katsuhiro; Kawakami, Masahiro; Taki, Chihiro; and Takaoka, Toshio, 5,017,220, Cl. 75-629.000.
- Iwasaki, Shizuo; and Inada, Norio, to Bridgestone Corporation. Pneumatic radial tires with improved polyvinyl alcohol belt cords. 5,016,698, Cl. 152-527.000.
- Iwasaki, Takashi: *See—*
  - Nakanishi, Masayuki; Iwasaki, Takashi; and Maeda, Shuichi, 5,017,225, Cl. 106-21.000.
- Iwasaki, Tokuji: *See—*
  - Murakami, Fumio; Okazaki, Sadaaki; Aoyagi, Takayoshi; Iwasaki, Tokuji; and Konno, Tetsuya, 5,016,677, Cl. 139-245.000.
- Ixys Corporation: *See—*
  - Dodt, Darcy T.; and Buchanan, Walter R., 5,017,508, Cl. 437-173.000.
- Iyer, Natraj C.: *See—*
  - Whitlow, Graham A.; and Iyer, Natraj C., 5,017,553, Cl. 505-1.000.
- Izumi, Shuji: *See—*
  - Nakai, Masaaki; Izumi, Shuji; Fujino, Akihiko; Taniguchi, Nobuyuki; Yamaki, Toshio; and Mukai, Hiromu, 5,017,957, Cl. 354-429.000.
- Izumi, Tetsujirou; and Iida, Akihiko, to Robotech Laboratory Co., Ltd. Microwave modulator. 5,017,893, Cl. 332-103.000.
- Izumi, Yasuo: *See—*
  - Sato, Syoji; Makino, Yutaka; Ishimoto, Kazumi; and Izumi, Yasuo, 5,017,131, Cl. 432-152.000.
- J. G. Finneran Associates: *See—*
  - Finneran, James G., 5,016,771, Cl. 215-341.000.
- J.M. Voith GmbH: *See—*
  - Hanke, Wolfgang; and Kuhne, Viktor, 5,017,179, Cl. 464-24.000.
- J. W. Harley Inc.: *See—*
  - Hazony, Dov; and Berris, Richard E., Jr., 5,016,474, Cl. 73-597.000.
- Jabs, Gert: *See—*
  - Berneth, Horst; Psaar, Hubert; and Jabs, Gert, 5,017,707, Cl. 548-455.000.
- Jackowski, Stefan; and Pinchuk, Leonard, to Cordis Corporation. Stretch-blow molding method for manufacturing balloons for medical devices. 5,017,325, Cl. 264-521.000.
- Jackson, Frank T., to Hartwell Corporation, The. Latching mechanism having a pre-adjusted load. 5,016,931, Cl. 292-341.180.
- Jackson, Roy J.: *See—*
  - Brown, Ralph E.; Canahuati, Marlene; and Jackson, Roy J., 5,017,258, Cl. 156-294.000.
- Jacobelli, Henry L.: *See—*
  - Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.
- Jacobs, Irwin M.: *See—*
  - Ames, William G.; Jacobs, Irwin M.; Weaver, Lindsay A., Jr.; and Gilhousen, Klein S., 5,017,926, Cl. 342-353.000.
- Jacobs, John R.: *See—*
  - Aldrich, Darrell L.; and Jacobs, John R., 5,017,252, Cl. 156-109.000.
- Jacobsen, Stephen C.; and Wood, John E., to Sarcos Group. Field-based movement sensor. 5,016,481, Cl. 73-862.640.
- Jacobson, Robert L.: *See—*
  - Mulaskey, Bernard; Miller, Stephen J.; Holtermann, Dennis L.; and Jacobson, Robert L., 5,017,278, Cl. 208-65.000.
- Jaecklin, Felix P. Building element for supportive grid walls with a bulk material filling. 5,017,050, Cl. 405-284.000.
- Jaffe, Robert S.; and Mandeville, Jon R., to International Business Machines Corp. System for detecting and analyzing rounded objects. 5,018,211, Cl. 382-8.000.
- Jaguar Cars Limited: *See—*
  - Parsons, Bryan N. V., 5,016,581, Cl. 123-90.250.
- Jahn, Hans-Georg, to Heidelberger Druckmaschinen AG. Sheet-fed rotary printing press for multi-color printing. 5,016,529, Cl. 101-211.000.
- Jakob-Roetne, Roland: *See—*
  - Aschwanden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, 5,017,608, Cl. 514-538.000.
- Jakobsen, Palle; and Drejer, Jorgen, to Novo Nordisk A/S. Method of treating calcium overload. 5,017,585, Cl. 514-317.000.
- Jaksic, Miroslav, to Babcock Industries Inc. Cable control system for dual actuators. 5,016,490, Cl. 74-501.50R.
- James and Rosemarie Parker Family Trust: *See—*
  - Parker, J. J.; Tiedeman, Sandy; and Baugh, William J., 5,016,879, Cl. 273-126.00A.
- Jamieson, Richard A., to Dresser-Rand Company. Valve assembly. 5,016,669, Cl. 137-512.000.
- Jandacek, Ronald J.; and Letton, James C., to Procter & Gamble Company, The. Improved margarine compositions/containing solid sucrose polyesters. 5,017,398, Cl. 426-603.000.
- Jandrakovic, Joyce A. Patient standing assistance apparatus. 5,016,300, Cl. 5-85.000.
- Jang, Long-Kuan: *See—*
  - Sadeghi, Mohammad-Ali; Sadeghi, Kazem; Kuo, Jih-Fen; Jang, Long-Kuan; and Yen, Teh F., 5,017,281, Cl. 208-390.000.
- Jang, Soon: *See—*
  - Hsu, Hui-Pin; Jang, Soon; and Hinze, Lee R., 5,016,971, Cl. 350-96.210.
- Janicka, Johannes; Meyer, Gunter; and Durselen, Heinz, to Krupp Koppers GmbH. Method of reducing nox-content in flue gas during heating of coking oven. 5,017,270, Cl. 201-41.000.
- Janik, Leon P.; and Maxwell, M. Craig, to Stanadyne Automotive Corp. Fuel filter and cartridge assembly. 5,017,285, Cl. 210-232.000.
- Japan as represented by Director General of Agency of Industrial Science and Technology: *See—*
  - Kimura, Kunio; Jinnai, Kazuhiko; and Tateyama, Hiroshi, 5,017,523, Cl. 501-85.000.
- Japan Atomic Power Co., Ltd.: *See—*
  - Hayashi, Takao; and Yamada, Masao, 5,017,333, Cl. 376-382.000.
- Japan Capsular Products Inc.: *See—*
  - Nakanishi, Masayuki; Iwasaki, Takashi; and Maeda, Shuichi, 5,017,225, Cl. 106-21.000.
- Japan Synthetic Rubber Co., Ltd.: *See—*
  - Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.
- Japan Tobacco, Inc.: *See—*
  - Sato, Kiyomi; and Saito, Yasuo, 5,017,787, Cl. 250-360.100.
- Jarrold, Gregory S.: *See—*
  - Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 5,017,791, Cl. 250-483.100.
- Jarvik, Murray E.: *See—*
  - Rose, Jed E.; and Jarvik, Murray E., 5,016,652, Cl. 131-270.000.
- Jay, John C. Backpack convertible chair. 5,016,792, Cl. 224-155.000.
- Jeansson, Stig: *See—*
  - Vahlne, Anders; Svennerholm, Bo; Rymo, Lars; Jeansson, Stig; and Horal, Peter, 5,017,687, Cl. 530-324.000.
- Jenkins, Derek K.; and Ansell, Peter J., to Enichem Elastomers Ltd. Polymerization of butadiene. 5,017,539, Cl. 502-102.000.
- Jennings, Thomas A., to T. A. Jennings Associates, Inc. Method and apparatus for the determination of moisture in materials. 5,016,468, Cl. 73-73.000.
- Jeppe, Harald: *See—*
  - Fischer, Matthias; Wiedmann, Rainer; Fadler, Kurt; and Jeppe, Harald, 5,016,744, Cl. 192-106.200.
- Jerram, Paul A.; and Bainbridge, Stephen, to EEV Limited. Magnetrons with resonator element for stabilizing output radiation frequency. 5,017,891, Cl. 331-88.000.
- Jervis B. Webb Company: *See—*
  - Kubsik, Robert H.; and Ali, Mir Q., 5,016,429, Cl. 53-381.100.
- Jinnai, Kazuhiko: *See—*
  - Kimura, Kunio; Jinnai, Kazuhiko; and Tateyama, Hiroshi, 5,017,523, Cl. 501-85.000.
- Jirkovsky, Ivo L.: *See—*
  - Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., 5,017,601, Cl. 514-443.000.
- Johansson, Bert E.; and Grims, Conrad M., to Coors Brewing Company. Apparatus and method for forming can bottoms. 5,016,463, Cl. 72-354.800.
- Johary, Arun; and Oguchi, Tetsuji, to Chips and Technologies, Inc. Method and circuitry for dual panel displays. 5,018,076, Cl. 364-518.000.
- John D. Hollingsworth On Wheels, Inc.: *See—*
  - Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.
- Johns Hopkins University, The: *See—*
  - Higbie, James H., 5,018,088, Cl. 364-574.000.
  - Hogrefe, Arthur F., 5,016,631, Cl. 128-419.0PS.
- Johnson, Alfred N.: *See—*
  - Humphrey, Martin D.; and Johnson, Alfred N., 5,017,788, Cl. 250-385.100.
- Johnson, Daniel B. Shutter assembly. 5,016,390, Cl. 49-38.000.
- Johnson, Donald S., to General Electric Company. Reduction of silicone foam density using buffers. 5,017,624, Cl. 521-154.000.
- Johnson, Earnest E. Speed square holder. 5,016,796, Cl. 224-245.000.
- Johnson, James L., to Toshiba America Information Systems, Inc. Disc storage apparatus having an arcuate pivot assembly. 5,018,035, Cl. 360-106.000.
- Johnson, Joseph H. Pistol grip fishing pole stand. 5,016,384, Cl. 43-21.200.
- Johnson, Joseph T. Protective mask. 5,016,649, Cl. 128-859.000.
- Johnson, Robert M., Jr., to Motorola, Inc. Battery charging system. 5,017,856, Cl. 320-2.000.
- Johnson, Robert W.: *See—*
  - Linne, Mark A.; Johnson, Robert W.; and Thompson, Richard G., 5,018,152, Cl. 372-25.000.
- Johnson, Stephen C.: *See—*
  - Green, Dennis H.; and Johnson, Stephen C., 5,016,314, Cl. 15-320.000.
- Johnston, Thomas K., to United Technologies Automotive Inc. Low nerve, low temperature expandable, curable hot melt sealant. 5,017,653, Cl. 525-89.000.
- Johnstone, Bradford: *See—*
  - Tylisz, Eugene R.; and Johnstone, Bradford, 5,017,066, Cl. 410-121.000.
- Joly, Ludovicus P.; and Rutges, Antonius A., to Agfa-Gevaert, N.V. Process for the preparation of silver halide emulsions. 5,017,468, Cl. 430-569.000.
- Jones, Gary A.; Krishnamurthy, Gopalan; and Snopko, Paul A., to Zenith Electronics Corporation. Secure video decoder system. 5,018,197, Cl. 380-20.000.
- Jones, Glenn C.: *See—*
  - Chang, Yeong-Ho; and Jones, Glenn C., 5,017,679, Cl. 528-272.000.

- Jones, Jack E.: *See—*
  - Daughton, John W.; Jones, Jack E.; and Shaffer, Michael L., 5,017,972, Cl. 355-321.000.
- Jones, Jerry W.: *See—*
  - Loomans, Bernard A.; Kowalczyk, James E.; Lange, Harold A.; and Jones, Jerry W., 5,017,269, Cl. 201-25.000.
- Jones, Nelson A.: *See—*
  - Krikke, Roger D.; Ballheimer, Benny; Jones, Nelson A.; and Stone, Dwight V., 5,017,178, Cl. 464-7.000.
- Jones, Norman S., to Instruments and Movements Limited. Ventilators for promoting lung function. 5,016,626, Cl. 128-204.260.
- Jones, Robert B. Weapon apparatus. 5,016,380, Cl. 42-90.000.
- Jones, Stuart D.: *See—*
  - Hedgecock, Charles J. R.; Jones, Stuart D.; and Kuo, Elizabeth A., 5,017,574, Cl. 514-220.000.
- Jonkouski, Gail C., to Wilson Sporting Goods Co. Golf ball. 5,016,887, Cl. 273-232.000.
- Joseph, John. Portable basketball retrieval apparatus. 5,016,875, Cl. 273-1.50A.
- Jouveinal S.A.: *See—*
  - Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.
- Joyeux, Denis: *See—*
  - Baude, Dominique; Chavel, Pierre; Joyeux, Denis; and Taboury, Jean, 5,016,977, Cl. 350-162.170.
- Jubb, Albert, to Cosworth Deep Sea Systems Limited. Closed cycle internal combustion engine. 5,016,599, Cl. 123-570.000.
- Jun-Ichi Nishizawa: *See—*
  - Nishizawa, Jun-ichi; Tamamushi, Takashige; and Nonaka, Kenichi, 5,017,991, Cl. 357-38.000.
- June-Gunn, Lee; Chang-Sam, Kim; Heon-Jin, Choi; and Seong-Hoon, Park, to Korea Advanced Institute of Science & Technology. Mechanical seals of SiC-coated graphite hy rate-controlled generation of SiO and process therefor. 5,017,527, Cl. 501-90.000.
- Jung, Frederic H.: *See—*
  - Bertrandie, Alain M.; Bird, Thomas G. C.; Jung, Frederic H.; and Lohmann, Jean-Jacques M., 5,017,569, Cl. 514-206.000.
- Jung-Whan, Cho: *See—*
  - Ey-Rang, An; and Jung-Whan, Cho, 5,017,849, Cl. 318-568.100.
- Jungkman, David L.; and White, Timothy E., to Honeywell Inc. $V_2O_3$ protection for IR detector arrays against intense thermal radiation. 5,017,786, Cl. 250-352.000.
- Junien, Jean-Louis: *See—*
  - Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.
- Junkers, John K. Power wrench. 5,016,502, Cl. 81-57.390.
- Jupiter Toy Company: *See—*
  - Shoulders, Kenneth R., 5,018,180, Cl. 378-119.000.
- Juskie, Bernard R.: *See—*
  - Chiappe, Wayne T.; Ambrose, Larry R.; Dalmon, Donald P.; Juskie, Bernard R.; and Godwin, Raymond E., 5,016,420, Cl. 53-138.100.
- Just, William J. Necktie. 5,016,285, Cl. 2-144.000.
- Kabushiki Kaisha Kobe Seiko Sho: *See—*
  - Aburatani, Kenji; and Shozaki, Tamotsu, 5,016,475, Cl. 73-644.000.
- Kabushiki Kaisha Komatsu Seisakusho: *See—*
  - Nagai, Takao, 5,016,910, Cl. 280-707.000.
- Kabushiki Kaisha Matsuyama Seisakusho: *See—*
  - Yoshino, Kunio, 5,016,979, Cl. 350-281.000.
- Kabushiki Kaisha Pilot: *See—*
  - Tomita, Hajime; and Sonoda, Yasuo, 5,017,224, Cl. 106-22.000.
- Kabushiki Kaisha Shinkawa: *See—*
  - Ohashi, Yuji; Terakado, Yoshimitsu; and Hayashi, Hijiri, 5,016,803, Cl. 228-4.500.
- Kabushiki Kaisha Toka-Rika-Denki-Seisakusho: *See—*
  - Kato, Hiroyuki, 5,016,485, Cl. 74-18.100.
- Kabushiki Kaisha Toshiba: *See—*
  - Ando, Hideo, 5,018,127, Cl. 369-112.000.
  - Aoyama, Mitsunobu, 5,018,096, Cl. 364-900.000.
  - Asada, Tomoyuki; Nishida, Kaoru; Shimono, Mamoru; Shinohara, Hideyuki; and Ando, Koichi, 5,016,560, Cl. 118-653.000.
  - Kai, Naoyuki; Ohhashi, Masahide; and Minagawa, Tsutomu, 5,018,147, Cl. 371-49.100.
  - Kaneko, Makoto, 5,018,179, Cl. 378-99.000.
  - Kasugai, Takao; and Takeda, Tadahiro, 5,017,870, Cl. 324-318.000.
  - Katsumata, Kenichirou, 5,018,178, Cl. 378-91.000.
  - Kishigami, Hidechica; Sasaki, Tohru; and Sasai, Kiyotaka, 5,018,061, Cl. 364-200.000.
  - Koike, Norio, 5,017,830, Cl. 313-402.000.
  - Komai, Norihiko; Nishiguchi, Takashi; Hirayama, Junji; and Terada, Tomoaki, 5,018,173, Cl. 378-4.000.
  - Maruyama, Tadashi, 5,018,108, Cl. 365-230.060.
  - Mase, Yasukazu; Abe, Masahiro; and Hirata, Osamu, 5,016,663, Cl. 134-1.000.
  - Nakajima, Takao; and Shigehara, Hiroshi, 5,018,199, Cl. 381-36.000.
  - Nakano, Yuji; Saitoh, Koji; and Murakami, Hiroaki, 5,017,810, Cl. 307-465.000.
  - Nonami, Hidetaka, 5,016,864, Cl. 271-38.000.
  - Onishi, Yasunobu; Hayase, Shuji; Horiguchi, Rumiko; and Hirao, Akiko, 5,017,453, Cl. 430-176.000.
  - Sasaki, Minoru; Umeda, Masafumi; Tagami, Yoshitomo; and Sugikawa, Akihiko, 5,018,017, Cl. 358-209.000.
  - Sato, Masamichi, 5,017,773, Cl. 250-223.00R.
  - Shukunami, Hiroshi; Tanimoto, Yasufumi; and Onuma, Satoshi, 5,018,079, Cl. 364-519.000.
  - Suga, Takayuki, 5,017,966, Cl. 355-260.000.
  - Sugita, Naomasa, 5,017,976, Cl. 357-15.000.
  - Sumitani, Shigeto, 5,017,130, Cl. 431-352.000.
  - Takesako, Sumiyoshi; and Morito, Akira, 5,017,026, Cl. 400-24 000.
  - Takeuchi, Hiroshi, 5,017,513, Cl. 437-228.000.
  - Tamada, Masuo; Tanaka, Tsutomu; and Matsuoka, Hideo, 5,017,766, Cl. 235-492.000.
  - Ueno, Masaji; and Ofusa, Kumi, 5,017,808, Cl. 307-446.000.
  - Yahagi, Susumu; Ishida, Shuichi; and Fujimoto, Shigeru, 5,017,755, Cl. 219-121.680.
  - Yamada, Hiroshi; Ohuchi, Masayuki; Saito, Masayuki; and Hongu, Akinori, 5,018,051, Cl. 361-393.000.
  - Yamamuro, Mikio, 5,018,121, Cl. 369-44.110.
- Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
  - Kawai, Katsunori; Ikeda, Hayato; Ishihara, Shinichi; and Kawai, Toshihiro, 5,016,524, Cl. 92-182.000.
  - Mitsuya, Kinpei; and Murata, Masahiko, 5,016,680, Cl. 139-452.000.
- Kaczich, Anke: *See—*
  - Hoeffkes, Horst; and Kaczich, Anke, 5,017,305, Cl. 252-311.000.
- Kageyama, Kenji: *See—*
  - Otani, Sugio; Tsuyuguchi, Michio; Kano, Haruyuki; Sone, Yoshihisa; Kageyama, Kenji; and Mabuchi, Toshiaki, 5,017,683, Cl. 528-396.000.
- Kai, Naoyuki; Ohhashi, Masahide; and Minagawa, Tsutomu, to Kabushiki Kaisha Toshiba. Bit mask generator. 5,018,147, Cl. 371-49.100.
- Kai, Takashi: *See—*
  - Kobayashi, Motokazu; Arahara, Kohzoh; Yuasa, Toshiya; Kai, Takashi; and Fukumoto, Hiroshi, 5,017,223, Cl. 106-20.000.
- Kaida, Kenichi; Yamada, Osamu; and Okuda, Eiji, to Matsushita Electric Industrial Co., Ltd. Apparatus for the inspection of printed circuit boards on which components have been mounted. 5,017,864, Cl. 324-158.00F.
- Kaiser Aerospace & Electronics Corporation: *See—*
  - Kalmanash, Michael; and Berman, Arthur L., 5,016,985, Cl. 350-335.000.
- Kaiser, John E., Jr.; Lockshaw, James J.; Ruiz, Juan J.; and Stevens, William L., to Tolo, Inc. Acoustic filter having acoustic isolation of internal flow element. 5,016,730, Cl. 181-265.000.
- Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., to Nordson Corporation. Method for depositing particulate material into a pad of fibrous material in a forming chamber. 5,017,324, Cl. 264-510.000.
- Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semiconductor memory. 5,018,101, Cl. 365-51.000.
- Kajii, Osamu: *See—*
  - Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, 5,017,442, Cl. 429-94.000.
- Kajino, Masayor, to Kubota Ltd. Vehicle having a wet type main clutch. 5,016,743, Cl. 192-70.120.
- Kajitani, Tetsuji: *See—*
  - Harada, Hiroyuki; Matsuura, Yasumasa; Araki, Toshihiko; and Kajitani, Tetsuji, 5,017,850, Cl. 318-599.000.
- Kakegawa, Hiroya: *See—*
  - Otani, Sugio; and Kakegawa, Hiroya, 5,017,431, Cl. 428-420.000.
- Kaken Pharmaceutical Co., Ltd.: *See—*
  - Kusakabe, Yoko; Suzuki, Hiroshi; and Kudo, Hidehiko, 5,017,561. Cl. 514-25.000.
- Kaken Tech Co., Ltd.: *See—*
  - Komatsu, Keisaku; Yamada, Takashi; and Owatari, Toshimi, 5,017,303, Cl. 252-174.130.
- Kakimoto, Mitsuo: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
- Kakushima, Masatoshi: *See—*
  - Young, Robert N.; Rokach, Joshua; Williams, Haydn R.; Kakushima, Masatoshi; and Guindon, Yvan, 5,017,583, Cl. 514-312.000.
- Kalmanash, Michael; and Berman, Arthur L., to Kaiser Aerospace & Electronics Corporation. Infrared filter using cholesteric liquids. 5,016,985, Cl. 350-335.000.
- Kaltschmidt, Horst: *See—*
  - Klausing, Helmut; and Kaltschmidt, Horst, 5,017,922, Cl. 342-25.000.
- Kalvinsh, Ivars Y.: *See—*
  - Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.
- Kamata, Hajime: *See—*
  - Obata, Akihiko; Adachi, Motomitsu; Kamata, Hajime; and Yano, Katsutoshi, 5,018,082, Cl. 364-521.000.
- Kamath, Venkatesh H., to Xerox Corporation Sheet stacking apparatus. 5,016,867, Cl. 271-209.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Kameyama, Tatsuya: *See—*
  - Kokubo, Masaru; Shinotsuka, Tatsuko; Kameyama, Tatsuya; Kokumai, Motohiro; and Hara, Hirotaka, 5,018,134, Cl. 370-32.100.
- Kamigawa, Hidenori, to Sanyo Electric Co., Ltd.; and Saga Sanyo Industry Co., Ltd. Method for forming a conductive film on a surface of a conductive body coated with an insulating film. 5,017,272, Cl. 204-56.100.
- Kamino, Hiroaki: *See—*
  - Nagata, Osamu; Kuwahara, Tokihiro; Suzawa, Yukichi; Kamino, Hiroaki; Suyama, Tomio; and Konno, Tomoyoshi, 5,017,852, Cl. 318-727.000.
- Kamiya, Ryohei: *See—*
  - Kikuchi, Shuji; Ouchida, Yoshio; and Kamiya, Ryohei, 5,018,145, Cl. 371-27.000.
- Kamiya, Takeshi: *See—*
  - Ikegami, Yuji; Sasayama, Shinichi; Tachino, Noboru; and Kamiya, Takeshi, 5,017,544, Cl. 502-439.000.
- Kamochi, Atsumi: *See—*
  - Kume, Toyohiko; Goto, Toshio; Kamochi, Atsumi; Yanagi, Akihiko; Miyauchi, Hiroshi; and Asami, Tadao, 5,017,213, Cl. 71-95.000.
- Kamp, Heinz, to W. Schlafhorst AG & Co. Ring spinning and spooling frame. 5,016,434, Cl. 57-313.000.
- Kanai, Tsuneo; Hosokawa, Shigefumi; Kumakura, Yasuo; Umemura, Shigeru; and Inagaki, Shuichiro, to Nippon Telegraph & Telephone Corporation. Matrix switching device and method of manufacturing the same. 5,017,145, Cl. 439-45.000.
- Kanare, Donald. Hot and cold body pack. 5,016,629, Cl. 128-402.000.
- Kanazawa, Kiyoshi, to Matsushita Electric Industrial Co., Ltd. Logic simulation method and apparatus. 5,018,089, Cl. 364-578.000.
- Kanda, Hitoshi: *See—*
  - Kato, Masayoshi; and Kanda, Hitoshi, 5,016,823, Cl. 241-5.000.
- Kanda, Nobuo; Mandoh, Ritsuo; Nojima, Masaharu; and Arai, Naoto, to Kanzaki Paper Manufacturing Company, Limited. Heat sensitive recording material. 5,017,545, Cl. 503-208.000.
- Kanegae, Takahiro: *See—*
  - Yoshida, Hitoshi; Kawamoto, Naoyuki; and Kanegae, Takahiro, 5,018,217, Cl. 382-22.000.
- Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
  - Nakamura, Yoshio; Ogura, Masahiro; Shimada, Yoshio; Watanabe, Kiyoshi; and Takahashi, Hideyuki, 5,017,484, Cl. 435-158.000.
  - Shiiki, Hitoshi; Tada, Minoru; and Nakamura, Kyoichi, 5,017,621, Cl. 521-58.000.
  - Tomita, Haruo; Yamashita, Kouichi; Kondo, Takeshi; Suzuki. Noriyuki; Matsumoto, Shigemi; and Asada, Masahiro, 5,017,651, Cl. 525-66.000.
- Kaneko, Akio: *See—*
  - Igaki, Tetsuo; Kaneko, Akio; Manaka, Sumio; and Kinoshita, Kimiaki, 5,017,710, Cl. 549-226.000.
- Kaneko, Kiyoshi; and Tanaka, Atsushi, to Canon Kabushiki Kaisha. Coordinates input apparatus. 5,017,913, Cl. 340-712.000.
- Kaneko, Makoto, to Kabushiki Kaisha Toshiba. Recursive filter and image display apparatus including the same. 5,018,179, Cl. 378-99.000.
- Kaneko, Tetsuya: *See—*
  - Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Ken-ich, 5,017,480, Cl. 435-106.000.
- Kaneko, Toyokazu: *See—*
  - Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita. Ken-ich, 5,017,480, Cl. 435-106.000.
- Kang, Henry R.: *See—*
  - Fuller, Timothy J.; Solodar, Warren E.; Kang, Henry R.; Kaplan, Samuel; and Crandall, Raymond K., 5,017,644, Cl. 524-612.000.
- Kang, Yoon-Won: *See—*
  - Foo, Thomas K.; Hayes, Cecil E.; and Kang, Yoon-Won, 5,017,872, Cl. 324-322.000.
- Kanno, Tadayuki: *See—*
  - Ashi, Yoshihiro; and Kanno, Tadayuki, 5,018,135, Cl. 370-55.000.
- Kano, Haruyuki: *See—*
  - Otani, Sugio; Tsuyuguchi, Michio; Kano, Haruyuki; Sone, Yoshihisa; Kageyama, Kenji; and Mabuchi, Toshiaki, 5,017,683, Cl. 528-396.000.
- Kanoh, Yoshiaki: *See—*
  - Yamada, Akiyoshi; and Kanoh, Yoshiaki, 5,017,126, Cl. 425-526.000.
- Kanome, Yuji: *See—*
  - Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; and Kanome, Yuji, 5,017,942, Cl. 346-76.0PH.
- Kantner, Robert C.: *See—*
  - Newkirk, Marc S.; Kennedy, Christopher R.; and Kantner, Robert C., 5,017,533, Cl. 501-127.000.
- Kanzaki Paper Manufacturing Company, Limited: *See—*
  - Kanda, Nobuo; Mandoh, Ritsuo; Nojima, Masaharu; and Arai, Naoto, 5,017,545, Cl. 503-208.000.
- Kapare, Gunnar. End wall member for use with boxes. 5,016,811, Cl. 229-23.00R.
- Kapec, Jeffrey: *See—*
  - Tanaka, Kazuna; Kapec, Jeffrey; and Chochinov, Allan, 5,016,303, Cl. 5-437.000.
- Kaplan, Samuel: *See—*
  - Fuller, Timothy J.; Sclodar, Warren E.; Kang, Henry R.; Kaplan, Samuel; and Crandall, Raymond K., 5,017,644, Cl. 524-612.000.
- Kaplan, Zvi; Engler, Gideon; and Loeb, Avi, to State of Israel, Atomic Energy Commission, Soreq Nuclear Research/Center, The. Method and apparatus for accelerating projectiles. 5,016,518, Cl. 89-8.000.
- Karaki, Koichi: *See—*
  - Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.
- Karanewsky, Donald S.; Biller, Scott A.; and Gordon, Eric M., to E.R. Squibb & Sons, Inc. Phosphorous-containing HMG-CoA reductase inhibitors, new intermediates and method. 5,017,716, Cl. 556-405.000.
- Karasawa, Tadahiko: *See—*
  - Kon, Tatsuya; Kato, Shiro; Morie, Toshiya; Karasawa, Tadahiko; and Yoshida, Naoyuki, 5,017,573, Cl. 514-218.000.
- Karlowee, Rudy: *See—*
  - Calam, Bruce T.; and Karlowee, Rudy, 5,016,406, Cl. 52-58.000.
- Karmas, Endel; and Bachmann, Marc R., to Rutgers, The State University of New Jersey. Novel natural yoghurt compositions and method of preparation. 5,017,387, Cl. 426-43.000.
- Karube, Isao; and Muramatsu, Hiroshi, to Seiko Instruments & Electronics Ltd. Bio-thermo tip sensor. 5,017,494, Cl. 435-288.000.
- Kasahara, Takeshi, to Toko, Inc. Variable-capacitance diode element having wide capacitance variation range. 5,017,950, Cl. 357-14.000.
- Kasama, Yasuhiro: *See—*
  - Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 5,018,101, Cl. 365-51.000.
- Kase, Kiyoshi, to Motorola, Inc. Offset cancel latching comparator. 5,017,805, Cl. 307-362.000.
- Kase, Mitsuo; Okoshi, Noboru; and Tsuyuzaki, Kazue, to Dainippon Ink and Chemicals, Inc. Urethane coating resin composition. 5,017,655, Cl. 525-127.000.
- Kashino, Toshio: *See—*
  - Masuda, Kazuaki; Saito, Akio; Kashino, Toshio; and Watanabe, Takashi, 5,017,946, Cl. 346-140.00R.
- Kasugai, Takao; and Takeda, Tadahiro, to Kabushiki Kaisha Toshiba. Method and system for setting and displaying magnetic resonance image acquisition duration information. 5,017,870, Cl. 324-318.000.
- Katayama, Akira: *See—*
  - Koizumi, Ryoichi; Kishida, Hideaki; and Katayama, Akira, 5,017,948, Cl. 346-140.00R.
- Kato, Eiichi; and Ishii, Kazuo, to Fuji Photo Film Co., Ltd. Electrophotographic lithographic printing plate precursor. 5,017,448, Cl. 430-49.000.
- Kato, Hiroyuki, to Kabushiki Kaisha Toka-Rika-Denki-Seisakusho. Lever apparatus. 5,016,485, Cl. 74-18.100.
- Kato Iron Works, Ltd.: *See—*
  - Kato, Masa, 5,016,340, Cl. 29-598.000.
- Kato, Isao: *See—*
  - Nagahara, Toyohiro; Niwa, Takashi; Sano, Takezo; and Kato, Isao, 5,017,747, Cl. 200-453.000.
- Kato, Masa, to Kato Iron Works, Ltd. Method of manufacture of a rotor core member for a dynamoelectric machine. 5,016,340, Cl 29-598.000.
- Kato, Masayoshi; and Kanda, Hitoshi, to Canon Kabushiki Kaisha. Air current classifier, process for preparing toner, and apparatus for preparing toner. 5,016,823, Cl. 241-5.000.
- Kato, Shinji: *See—*
  - Shioji, Mitsuaki; Morimoto, Kenichi; Kato, Shinji; Nakamura, Takeshi; and Nozaki, Nobuharu, 5,016,983, Cl. 350-332.000.
- Kato, Shiro: *See—*
  - Kon, Tatsuya; Kato, Shiro; Morie, Toshiya; Karasawa, Tadahiko; and Yoshida, Naoyuki, 5,017,573, Cl. 514-218.000.
- Kato, Tadashi: *See—*
  - Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.
- Kato, Takahiro: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Kato, Yuichi: *See—*
  - Nishikawa, Hiromitsu; and Kato, Yuichi, 5,016,939, Cl. 296-219.000.
- Katoh, Atsuyuki: *See—*
  - Tsuji, Masaru; Katoh, Atsuyuki; and Fukunaga, Keizo, 5,017,962, Cl. 355-210.000.
- Katoh, Kazunobu: *See—*
  - Okamura, Hisashi; and Katoh, Kazunobu, 5,017,456, Cl. 430-264.000.
- Katoh, Tokunori, to Brother Kogyo Kabushiki Kaisha. Image forming apparatus having control unit for rewinding operation of photosensitive recording medium. 5,017,958, Cl. 355-27.000.
- Katsoulis, Dimitris E., to Dow Corning Corporation. Surface modified aluminum and aluminum-zirconium salts. 5,017,360, Cl. 424-45.000.
- Katsuki, Kazuo: *See—*
  - Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; Katsuki, Kazuo; and Yamashita, Ken, 5,016,981, Cl. 350-314.000.
- Katsumata, Kenichirou, to Kabushiki Kaisha Toshiba. Medical apparatus with a control console. 5,018,178, Cl. 378-91.000.
- Katsumata, Ryoichi; and Yokoi, Haruhiko, to Kyowa Hakko Kogyo Co., Ltd. Process for producing L-arginine. 5,017,482, Cl. 435-114.000.

- Katz, David H., to La Jolla Pharmaceutical Company. D-GL conjugate therapy. 5,017,648, Cl. 525-54.100.
- Kauffman, Frank. Multi-function towing trailer. 5,016,897, Cl. 280-402.000.
- Kaufman, Charles W.: *See—*
  - Backes, Floyd J.; Varghese, George; and Kaufman, Charles W., 5,018,137, Cl. 370-85.130.
- Kaufman, Jay S. Capo for stringed instruments. 5,016,514, Cl. 84-318.000.
- Kawabe, Manabu: *See—*
  - Horino, Morikatsu; Kawabe, Manabu; and Yagi, Yoshiaki, 5,016,786, Cl. 222-504.000.
- Kawaguchi, Fumiaki: *See—*
  - Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.
- Kawaguchi, Takeshi: *See—*
  - Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 5,016,737, Cl. 188-181.00A.
- Kawahara, Yoshihiro: *See—*
  - Morita, Shigeru; Takei, Terutaka; Kawahara, Yoshihiro; and Togoshi, Yoshikazu, 5,016,722, Cl. 180-89.140.
- Kawai, Katsunori; Ikeda, Hayato; Ishihara, Shinichi; and Kawai, Toshihiro, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Sealing arrangement for a piston in a compressor. 5,016,524, Cl. 92-182.000.
- Kawai, Naoki; Hamamoto, Koji; and Minooka, Masahiro, to Mitsushita Electric Industrial Co., Ltd. Pulsed arc welding machine. 5,017,757, Cl. 219-130.510.
- Kawai, Taiyo; and Nakagawa, Narihisa, to Toyota Jidosha Kabushiki Kaisha. Air-fuel ratio control device for internal combustion engine. 5,016,595, Cl. 123-478.000.
- Kawai, Toshihiro: *See—*
  - Kawai, Katsunori; Ikeda, Hayato; Ishihara, Shinichi; and Kawai, Toshihiro, 5,016,524, Cl. 92-182.000.
- Kawai, Toshikazu: *See—*
  - Gotoh, Yoshihiko; Kawai, Toshikazu; and Negishi, Junji, 5,017,730, Cl. 568-812.000.
- Kawakami, Masahiro: *See—*
  - Tanabe, Haruyoshi; Iwasaki, Katsuhiro; Kawakami, Masahiro; Taki, Chihiro; and Takaoka, Toshio, 5,017,220, Cl. 75-629.000.
- Kawakami, Shigenobu: *See—*
  - Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,017,733, Cl. 585-6.300.
- Kawamoto, Naoyuki: *See—*
  - Yoshida, Hitoshi; Kawamoto, Naoyuki; and Kanegae, Takahiro, 5,018,217, Cl. 382-22.000.
- Kawamoto, Yoshifumi: *See—*
  - Sunami, Hideo; Kure, Tokuo; and Kawamoto, Yoshifumi, 5,017,981, Cl. 357-23.600.
- Kawamura, Masanori; Arai, Yoshinobu; and Aishita, Hideki, to Ono Pharmaceutical Co., Ltd. Novel amino acid derivatives. 5,017,589, Cl. 514-352.000.
- Kawamura, Seizo, to Shikoku Kakoki Co., Ltd. Device for preventing liquid from dripping from filling nozzle of liquid filling machine. 5,016,687, Cl. 141-116.000.
- Kawamura, Shinji: *See—*
  - Utsumi, Tatsuya; Kawamura, Shinji; Itoh, Tetsuya; Moriyama, Hiroshi; and Okada, Naofumi, 5,016,828, Cl. 241-158.000.
- Kawano, Kyoichiro: *See—*
  - Tsuji, Hiroki; Kawano, Kyoichiro; and Murase, Teruo, 5,017,738, Cl. 174-94.00R.
- Kawano, Osamu; Takahashi, Manabu; Wakita, Junichi; and Esaka, Kazuyoshi, to Nippon Steel Corporation. Hot rolled steel sheet with high strength and distinguished formability. 5,017,248, Cl. 148-320.000.
- Kawasaki, Andrew: *See—*
  - Hruby, Victor; and Kawasaki, Andrew, 5,017,689, Cl. 530-327.000.
- Kawasaki, Atsushi: *See—*
  - Iuchi, Tohru; Nakamori, Yukio; Kawasaki, Atsushi; Yashiro, Hirokatsu; and Nagatake, Yoh-ichi, 5,017,018, Cl. 374 130.000.
- Kawasaki Jukogyo Kabushiki Kaisha: *See—*
  - Nitta, Shigemitsu, 5,016,439, Cl. 60-310.000.
- Kawashima, Akihiro; Yoshida, Hirokazu; Tagusa, Yasunobu; Inada, Kiyoshi; Makita, Hideshi; and Dotta, Yoshihisa, to Sharp Kabushiki Kaisha. Display device having an improvement in insulating between conductors connected to electronic components. 5,016,986, Cl. 350-339.00R.
- Kawashima, Hiroshi: *See—*
  - Ohara, Osamu; Kawashima, Hiroshi; and Takata, Hiroshi, 5,016,543, Cl. 105-150.000.
- Kawata, Ken: *See—*
  - Nakamine, Takeshi; Kawata, Ken; and Taguchi, Toshiki, 5,017,454, Cl. 430-203.000.
- Kawata, Kyozo: *See—*
  - Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, 5,017,380, Cl. 424-454.000.
- Kawazoe, Kenji: *See—*
  - Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; and Kanome, Yuji, 5,017,942, Cl. 346-76.0PH.
- Kaye, Barbara: *See—*
  - Kaye, Kenneth; and Kaye, Barbara, 5,016,749, Cl. 206-5.100.
- Kaye, Kenneth; and Kaye, Barbara. Eyeglass and contact lens holder. 5,016,749, Cl. 206-5.100.
- Kazan, Benjamin: *See—*
  - Street, Robert A.; and Kazan, Benjamin, 5,017,989, Cl. 357-30.000.
- Kazuhiko, Kozuka: *See—*
  - Oshima, Takafumi; and Kazuhiko, Kozuka, 5,017,826, Cl. 313-142.000.
- Keener, Richard A.: *See—*
  - Rice, Verle L.; and Keener, Richard A., 5,016,358, Cl. 33-569.000.
- Keener, Timothy C.: *See—*
  - Davis, Wayne T.; Reed, Gregory D.; and Keener, Timothy C., 5,017,349, Cl. 423-242.000.
- Keeney, L. Douglas: *See—*
  - Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, 5,016,655, Cl. 131-310.000.
- Kehlbeck, Hans: *See—*
  - Wischhusen, Heiner; and Kehlbeck, Hans, 5,016,756, Cl. 206-545.000.
- Keikichi Sugiyama: *See—*
  - Sugiyama, Keikichi; Takada, Koji; Fukushima, Akira; and Egawa, Makoto, 5,017,368, Cl. 424-70.000.
- Keimel, John G.: *See—*
  - Williams, Terrell; Keimel, John G.; Rugland, Roger; Sandstrom, Richard; and Holleman, Timothy, 5,016,645, Cl. 128-784.000.
- Kel Corporation: *See—*
  - Hatanaka, Mutsuo, 5,017,149, Cl. 439-157.000.
- Kelbe, Richard R.: *See—*
  - Wash, Michael L.; Pearson, Douglas H.; and Kelbe, Richard R., 5,017,326, Cl. 354-207.000.
- Kellis, Warren D. Insulated panel siding. 5,016,415, Cl. 52-522.000.
- Kellner, Helmut, to E.M.S. Technik GmbH. Method of determining the position of a reference point of a scanner relative to an incremental scale as well as a reference point communicator. 5,017,013, Cl. 356-373.000.
- Kellogg, Reid E.: *See—*
  - Bills, William D.; Christini, Theodore P.; Kellogg, Reid E.; Maynard, Richard B.; and Zegarski, William J., 5,017,440, Cl. 428-690.000.
- Kemp, Thomas R.: *See—*
  - Hildebrand, David F.; Kemp, Thomas R.; Andersen, Roger; and Loughrin, John H., 5,017,386, Cl. 426-18.000.
- Kempter, Fritz E.; Matejcek, Franz; Neubach, Werner; and Flory, Klaus, to BASF Aktiengesellschaft. Preparation of aqueous nonwoven binders of low formaldehyde emission on curing based on urea, formaldehyde and glyoxal. 5,017,641, Cl. 524-598.000.
- Kennard, David C., Jr.: *See—*
  - Kennard, Dwight C., Jr.; Kennard, James C.; and Wick, Carl J., 5,016,768, Cl. 212-262.000.
- Kennard, Dwight C., Jr.; Kennard, James C.; and Wick, Carl J., to Kennard, David C., Jr.; and Kennard, James C. Pickup truck derrick with traveling sheaves. 5,016,768, Cl. 212-262.000.
- Kennard, James C.: *See—*
  - Kennard, Dwight C., Jr.; Kennard, James C.; and Wick, Carl J., 5,016,768, Cl. 212-262.000.
- Kennedy, Christopher R.: *See—*
  - Newkirk, Marc S.; Kennedy, Christopher R.; and Kantner, Robert C., 5,017,533, Cl. 501-127.000.
- Kennedy, Lyn R.: *See—*
  - Clingman, William H., Jr.; and Kennedy, Lyn R., 5,016,482, Cl. 73-863.610.
- Kent Adhesive Products Co.: *See—*
  - Barnette, Charles J., 5,017,070, Cl. 412-4.000.
- Kerkmann, Detlef: *See—*
  - Woike, Theo; Kerkmann, Detlef; Beier, Thomas; Krasser, Wolfgang; and Pescia, Danilo, 5,016,992, Cl. 350-376.000.
- Keromnes, Bernard; and Breuil, Jean-Pierre, to Breuil, S.A. Automatic sorting ovoscope. 5,017,003, Cl. 356-53.000.
- Kerr, John B.; De Castro, Emory S.; and Zenner, Bruce, to Aquanautics Corporation. Method and systems for extracting oxygen employing electrocatalysts. 5,017,274, Cl. 204-129.000.
- Kerschner, Gunther; Wurzenberger, Johann; Hausmann, Herbert; Eckel, Giselher; and Friedrich, Peter, to Siemens Aktiengesellschaft. Method and apparatus for telecommunications signal processing and switching. 5,018,059, Cl. 364-200.000.
- Kersten, Ralf T.: *See—*
  - Paquet, Volker; Ackermann, Ulrich; Etzkorn, Heniz-W.; Kersten, Ralf T.; and Rutze, Uwe, 5,017,404, Cl. 427-45.100.
- Kesling, Christopher K., to TP Orthodontics, Inc. Individual root torquing auxiliary. 5,017,132, Cl. 433-18.000.
- Ketzer, Georg: *See—*
  - Schuster, Rudolf; and Ketzer, Georg, 5,016,804, Cl. 228-51.000.
- Key Machine Tool, Incorporated: *See—*
  - Kovalenko, Thomas R.; and Xin, Lu B., 5,016,334, Cl. 29-38.00B.
- Khalil, Nessim: *See—*
  - Bombardier, Wanda K.; Ferryman, Kim; and Khalil, Nessim, 5,017,392, Cl. 426-659.000.
- Kida, Shiro: *See—*
  - Ogata, Masaru; Matsumoto, Hiroshi; Shimizu, Sumio; and Kida, Shiro, 5,017,708, Cl. 548-515.000.
- Kiefer, Hans: *See—*
  - Grimmer, Johannes; and Kiefer, Hans, 5,017,700, Cl. 544-244.000.
- Kiefer, James R.: *See—*
  - Young, Glen C.; and Kiefer, James R., 5,017,846, Cl. 318-244.000.
- Kihara, Hiroyuki; and Omori, Hideki, to Seiko Seiki Kabushiki Kaisha. Method and apparatus for controlling a grinder having a spindle with deflection sensor. 5,018,071, Cl. 364-474.170.
- Kihara, Koji; and Furuta, Taro, to Saraya Kabushiki Kaisha. Disinfectant composition for medical use. 5,017,617, Cl. 514-635.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Kijima, Takao; Taniguchi, Haruyuki; Arai, Makoto; and Sugitani, Nobuyuki, to Mazda Motor Corporation. Vehicle suspension system. 5,016,903, Cl. 280-663.000.

Kikuchi, Hiroshi: *See—*
Andou, Hirokazu; Kikuchi, Hiroshi; and Murakawa, Hiroki, 5,017,029, Cl. 400-237.000.

Kikuchi, Shuji; Ouchida, Yoshio; and Kamiya, Ryohei, to Hitachi, Ltd.; and Hitachi Electronics Engineering Co., Ltd. IC tester. 5,018,145, Cl. 371-27.000.

Kilmartin, William L.: *See—*
Cordery, Robert A.; Kilmartin, William L.; and Zeller, Claude, 5,017,907, Cl. 340-551.000.

Kilner, Peter: *See—*
Fellmann, Jere; Wentrcek, Paul R.; and Kilner, Peter, 5,017,735, Cl. 585-820.000.

Kim, Bong T.: *See—*
Lee, Bhum C.; Park, Kwon C.; and Kim, Bong T., 5,018,140, Cl. 370-105.100.

Kim, Dae S. Heat sealed disposable paint bag and method. 5,016,755, Cl. 206-526.000.

Kim, Ki-Cheol, to SamSung Electronics, Co., Ltd. Circuit for separating voice, data and signaling information. 5,018,141, Cl. 370-110.100.

Kim, Sang I.: *See—*
Park, Hae S.; Kim, Sang I.; Kim, Sea C.; Park, Kye S.; and Park, Jin G., 5,017,265, Cl. 156-643.000.

Kim, Sea C.: *See—*
Park, Hae S.; Kim, Sang I.; Kim, Sea C.; Park, Kye S.; and Park, Jin G., 5,017,265, Cl. 156-643.000.

Kimball, Ben H.: *See—*
Baer, Robert L.; and Kimball, Ben H., 5,016,708, Cl. 166-75.100.

Kimura, Kunio; Jinnai, Kazuhiko; and Tateyama, Hiroshi, to Japan as represented by Director General of Agency of Industrial Science and Technology. Method for the preparation of ultra-fine hollow glass spheres. 5,017,523, Cl. 501-85.000.

Kimura, Norio; and Takei, Masahiro, to Canon Kabushiki Kaisha. Communicating apparatus providing discriminated voice and/or image communication. 5,018,186, Cl. 379-153.000.

Kimura, Norio: *See—*
Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, 5,018,028, Cl. 360-27.000.

Kimura, Takeshi: *See—*
Soda, Yasunari; Mochiji, Kozo; Oizumi, Hiroaki; and Kimura, Takeshi, 5,017,458, Cl. 430-296.000.

Kincey, Peter M.: *See—*
Grinter, Trevor J.; and Kincey, Peter M., 5,017,701, Cl. 544-276.000.

Kind, Wilhelm: *See—*
Hans, Waldemar; Kind, Wilhelm; Kirchner, Manfred; and Werner, Siegfried, 5,016,821, Cl. 239-585.000.

Kingon, Angus I.: *See—*
Sonnenberg, Neville; Kingon, Angus I.; and Paterson, Adrian W., 5,017,532, Cl. 501-103.000.

Kinoshita, Kimiaki: *See—*
Igaki, Tetsuo; Kaneko, Akio; Manaka, Sumio; and Kinoshita, Kimiaki, 5,017,710, Cl. 549-226.000.

Kirchner, Manfred: *See—*
Hans, Waldemar; Kind, Wilhelm; Kirchner, Manfred; and Werner, Siegfried, 5,016,821, Cl. 239-585.000.

Kirikami, Seiichi: *See—*
Shimizu, Nobuo; Kuroda, Michio; Kirikami, Seiichi; Sato, Isao; and Arai, Osamu, 5,016,443, Cl. 60-737.000.

Kirin Beer Kabushiki Kaisha: *See—*
Horino, Morikatsu; Kawabe, Manabu; and Yagi, Yoshiaki, 5,016,786, Cl. 222-504.000.
Suzuki, Akira; Matsuda, Shoichi; Muto, Yasutami; and Aoki, Kazuo, 5,016,688, Cl. 141-170.000.

Kiritani, Yoshiharu; Onishi, Yutaka; Tagata, Shigeyoshi; and Umeno, Koichi, to Sato Kogyo Co., Ltd.; Ishikawajima Harima Jukogyo Kabushiki Kaisha; and Tokyo Keiki Co., Ltd. Method and apparatus for controlling attitude of shield excavator. 5,017,045, Cl. 405-143.000.

Kirk, Kevin A.: *See—*
Chu, Shaw-Chang; and Kirk, Kevin A., 5,017,430, Cl. 428-353.000.

Kirkland, Edmund R.: *See—*
Baker, Marvin B.; and Kirkland, Edmund R., 5,017,104, Cl. 417-423.120.

Kirkman, Todd A.; and Heath, William D., to Toddco Research and Development Company, Inc. Non-thermostatically controlled high power oil pan-heater. 5,017,758, Cl. 219-205.000.

Kirwan, George B.; and Nelson, Victor A. Intermodal transport system. 5,017,064, Cl. 410-53.000.

Kishida, Hideaki: *See—*
Koizumi, Ryoichi; Kishida, Hideaki; and Katayama, Akira, 5,017,948, Cl. 346-140.00R.

Kishigami, Hidechica; Sasaki, Tohru; and Sasai, Kiyotaka, to Kabushiki Kaisha Toshiba. Microprocessor with on-chip cache memory with lower power consumption. 5,018,061, Cl. 364-200.000.

Kishino, Kunihiko: *See—*
Nabae, Motohiro; and Kishino, Kunihiko, 5,017,337, Cl. 420-532.000.

Kiss, Stephen J. Rod plug caps. 5,016,674, Cl. 138-91.000.

Kitagawa, Yuichi: *See—*
Hattori, Yasuo; and Kitagawa, Yuichi, 5,017,660, Cl. 525-338.000.

Kitahara, Toshihiro: *See—*
Hashimoto, Akihiko; Kitahara, Toshihiro; and Miyajima, Hiroshi, 5,017,764, Cl. 235-454.000.

Kitamura, Hiroki; Takanashi, Itsuo; Yamamura, Takashi; Ichitou, Toshikatsu; and Tai, Hiromichi, to Victor Company of Japan, Ltd. Control system for information recording laser beam. 5,017,944, Cl. 346-108.000.

Kitamura, Tomio: *See—*
Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, 5,017,442, Cl. 429-94.000.

Kitao, Satoshi: *See—*
Hamada, Kiyoshi; Nonomura, Kinzo; Takahashi, Masayuki; Hashiguchi, Jumpei; and Kitao, Satoshi, 5,017,842, Cl. 315-366.000.

Kivipelto, Pekka J., to Neles Oy. Method for manufacture or repair of a globe valve. 5,016,349, Cl. 29-890.121.

Kiyohiko Itoh: *See—*
Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, 5,017,932, Cl. 343-702.000.

Klapwijk, Abraham; and Spanjers, Henricus L. F. M., to Ecotechniek B.V. Method for determining the respiration rate of a respiring material in the form of a continuous process current, as well as a device suitable for such an application. 5,017,496, Cl. 436-62.000.

Klausing, Helmut; and Kaltschmidt, Horst, to Messerschmitt-Bolkow-Blohm GmbH. Radar system having a synthetic aperture on the basis of rotating antennae. 5,017,922, Cl. 342-25.000.

Klausner, Fred P. Footwear lacing system. 5,016,327, Cl. 24-713.300.

Klein, Joseph T.: *See—*
Effland, Richard C.; Klein, Joseph T.; Davis, Larry; and Olson, Gordon E., 5,017,578, Cl. 514-266.000.

Klein, Paul E. Anti-contamination orthodontic device dispenser. 5,016,766, Cl. 221-22.000.

Kleinhappl, Erich: *See—*
Marsoner, Hermann; Fischer, Fritz; and Kleinhappl, Erich, 5,017,339, Cl. 422-82.040.

Kleist, Robert A.: *See—*
Gutierrez, Antonio; Song, Won R.; Lundberg, Robert D.; and Kleist, Robert A., 5,017,299, Cl. 252-51.50R.

Klement, John F.: *See—*
McAllister, William T.; and Klement, John F., 5,017,488, Cl. 435-194.000.

Klesse, Wolfgang: *See—*
Rauch, Hubert; Arndt, Peter J.; Klesse, Wolfgang; Krall, Wilhelm; and Frank, Klaus, 5,017,631, Cl. 523-340.000.

Kling, Peter: *See—*
Dahrendorf, Klaus D.; Kling, Peter; and Kriems, Ulrich, 5,016,627, Cl. 128-205.240.

Klingelhoefer, Ulrich: *See—*
Brillinger, Martin; Hiller, Wolfgang; Klingelhoefer, Ulrich; and Radtke, Manfred, 5,016,408, Cl. 52-126.600.

Klusmire, Galen J., to Teepak, Inc. Brake-sizing devices for food stuffing apparatus and methods of use. 5,017,175, Cl. 452-38.000.

Knippelmier, Gary H.: *See—*
Cosman, Armond D.; Knippelmier, Gary H.; and Minarovic, Joe T., 5,017,415, Cl. 428-77.000.

Knoess, Walter, to Sinterstahl Gesellschaft m.b.H. Process for the manufacture of a tubular crankshaft. 5,016,348, Cl. 29-888.100.

Knurr, Hans, to Knurr-Mechanik Fur Die Elektronik Aktiengesellschaft. Swing door and door frame assembly. 5,016,949, Cl. 312-296.000.

Knurr-Mechanik Fur Die Elektronik Aktiengesellschaft: *See—*
Knurr, Hans, 5,016,949, Cl. 312-296.000.

Knutson, William J.: *See—*
Gasparaitis, Bernard V.; and Knutson, William J., 5,016,956, Cl. 350-96.100.

Koa Oil Company, Ltd.: *See—*
Yamada, Yasuhiro; Fujii, Masaki; and Shimomura, Seiji, 5,017,358, Cl. 423-449.000.

Kobayashi, Hidetoshi; Ohi, Reiichi; and Sakanoue, Kei, to Fuji Photo Film Co., Ltd. Color-forming aminopyrimidine couplers and silver halide color photographic light-sensitive materials containing the coupler. 5,017,466, Cl. 430-558.000.

Kobayashi, Hiroyuki: *See—*
Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshihiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, 5,016,890, Cl. 273-312.000.

Kobayashi, Isao, to Tokyo Electron Limited. Handling apparatus. 5,017,082, Cl. 414-729.000.

Kobayashi, Kiyoteru, to Mitsubishi Denki Kabushiki Kaisha. Capacitor in semiconductor device. 5,017,982, Cl. 357-23.600.

Kobayashi, Masashi, to Maruman Golf Kabushikikaisha. Golf club heads and fabrication process thereof. 5,016,883, Cl. 273-167.00R.

Kobayashi, Motokazu; Arahara, Kohzoh; Yuasa, Toshiya; Kai, Takashi; and Fukumoto, Hiroshi, to Canon Kabushiki Kaisha. Recording material. 5,017,223, Cl. 106-20.000.

Kobayashi, Satoshi: *See—*
Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.

Kobayashi, Tohru: *See—*
Yamada, Toshio; Kobayashi, Tohru; Nishizawa, Hirotaka; Itoh, Hiroyuki; and Saitoh, Tatsuya, 5,018,000, Cl. 357-51.000.

Kober, Reiner: *See—*
Seele, Rainer; Kober, Reiner; Goetz, Norbert; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,594, Cl. 514-383.000.
Seele, Rainer; Sauter, Hubert; Kober, Reiner; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,595, Cl. 514-383.000.

Koch, Robert A.: *See—*
Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Paramdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.

Kocher, Haribhajan S., to Eastman Kodak Company. Holographic laser scanner motor. 5,016,955, Cl. 350-3.710.

Kochs Alder Aktiengesellschaft: *See—*
Sadlack, Werner; Vogt, Siegfried; Upmeier, Egon; and Schulze, Wolfram, 5,016,549, Cl. 112-104.000.

Kodama, Mitsuo: *See—*
Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi; Kodama, Mitsuo; Nakano, Hisaji; and Nakagawa, Shinsuke, 5,017,499, Cl. 436-124.000.

Koerv, Peter, to Messerschmitt-Bolkow-Blohm GmbH. Arrangement for a remote-controlled track-guided picture transmission. 5,018,009, Cl. 358-100.000.

Koga, Kazuhiko: *See—*
Ogawa, Takahiro; Inoue, Atsushi; Ito, Kiyotaka; Ueta, Yutaka; and Koga, Kazuhiko, 5,016,341, Cl. 29-603.000.

Koga, Yoshiro, to Seiko Epson Corporation. Method and apparatus for forming images including a toner transporting member having an insulating layer. 5,017,967, Cl. 355-261.000.

Kogawara, Toshiro: *See—*
Iwanari, Yoshiyuki; Amaya, Shinji; Shimizu, Seiichi; and Kogawara, Toshiro, 5,017,450, Cl. 430-106.000.

Koguma, Hiroshi: *See—*
Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji; Koguma, Hiroshi; and Emata, Takashi, 5,018,004, Cl. 357-74.000.

Kohara, Masanobu: *See—*
Yasunaga, Masatoshi; and Kohara, Masanobu, 5,018,003, Cl. 357-72.000.

Kohda, Akira: *See—*
Noda, Yukijumi; Sugawa, Makoto; and Kohda, Akira, 5,017,570, Cl. 514-211.000.

Kohl, Gerald: *See—*
Kowalik, Heinrich; Pletsch, Peter; and Kohl, Gerald, 5,017,051, Cl. 405-302.000.

Kohler, Burkhard; Meyer, Rolf-Volker; Dorf, Ernst-Ulrich; Russeler, Wolfgang; and Schmidt, Manfred, to Bayer Aktiengesellschaft. Process for the production of unbranched polyarylene sulfides of improved color quality and improved color stability. 5,017,682, Cl. 528-388.000.

Kohler Co.: *See—*
Sauter, Bruce M.; Tempas, Jeffrey F.; and Sandman, Robert B., 5,016,297, Cl. 4-619.000.

Kohno, Masaki: *See—*
Okada, Masato; Kohno, Masaki; and Yagi, Tetsuya, 5,018,158, Cl. 372-46.000.

Kohno, Michio: *See—*
Murakami, Eiichi; Kohno, Michio; and Suzuki, Akiyoshi, 5,017,798, Cl. 250-572.000.

Kohno, Minoru: *See—*
Aratani, Katsuhisa; Kohno, Minoru; and Watanabe, Kenjiro, 5,018,119, Cl. 369-13.000.

Kohsai, Tadashi, to Terumo Kabushiki Kaisha. Preparation of catheter including bonding and then thermoforming. 5,017,259, Cl. 156-294.000.

Koide, Tadao: *See—*
Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.

Koike, Kiyofumi, to Seiko Epson Corporation. Impact printer. 5,017,027, Cl. 400-54.000.

Koike, Norio, to Kabushiki Kaisha Toshiba. Color cathode ray tube having a shadow mask covered with a porous layer. 5,017,830, Cl. 313-402.000.

Koike, Shoji; Eida, Tsuyoshi; and Yamamoto, Takao, to Canon Kabushiki Kaisha. Recording liquid and ink-jet recording process using same. 5,017,227, Cl. 106-22.000.

Koishi, Musubu; and Watanabe, Motoyuki, to Hamamatsu Photonics Kabushiki Kaisha. Framing camera. 5,017,829, Cl. 313-382.000.

Koizumi, Hideaki; Takeda, Ryuzaburo; Sano, Koichi; and Yokoyama, Tetsuo, to Hitachi, Ltd. MRI method. 5,016,637, Cl. 128-653.0AF.

Koizumi, Ryoichi; Kishida, Hideaki; and Katayama, Akira, to Canon Kabushiki Kaisha. Ink jet recording device with thermal energy adjustment. 5,017,948, Cl. 346-140.00R.

Kojima, Keiji, to Ricoh Company, Ltd. Method of extracting a feature of a character. 5,018,216, Cl. 382-22.000.

Kojima, Norio, to G-C Dental Industrial Corp. Temperature controller units for dental agar imporession materials. 5,017,790, Cl. 250-455.100.

Kokubo, Masaru; Shinotsuka, Tatsuko; Kameyama, Tatsuya; Kokumai, Motohiro; and Hara, Hirotaka, to Hitachi, Ltd. Method for cancelling echo in a transmitter and an apparatus therefor. 5,018,134, Cl. 370-32.100.

Kokumai, Motohiro: *See—*
Kokubo, Masaru; Shinotsuka, Tatsuko; Kameyama, Tatsuya; Kokumai, Motohiro; and Hara, Hirotaka, 5,018,134, Cl. 370-32.100.

Kokusai Electric Co., Ltd.: *See—*
Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, 5,017,932, Cl. 343-702.000.

Kolts, John H.; Tooley, Patricia A.; and Brown, Scott H., to Phillips Petroleum Company. Catalytic process for oxidation of carbon monoxide. 5,017,357, Cl. 423-437.000.

Komai, Norihiko; Nishiguchi, Takashi; Hirayama, Junji; and Terada, Tomoaki, to Kabushiki Kaisha Toshiba. Diagnosis apparatus using X-ray CT device. 5,018,173, Cl. 378-4.000.

Komatsu, Hiroshi: *See—*
Nanyoshi, Yasutoshi; and Komatsu, Hiroshi, 5,016,591, Cl. 123-419.000.

Komatsu, Keisaku; Yamada, Takashi; and Owatari, Toshimi, to Kaken Tech Co., Ltd. Paint peeling composition and paint peeling method. 5,017,303, Cl. 252-174.130.

Kometani, Kiichi: *See—*
Nakamura, Kiyokazu; Kometani, Kiichi; Koshino, Akihiko; and Horiuchi, Kenjiro, 5,017,650, Cl. 525-65.000.

Komiya, Masayuki: *See—*
Otsuka, Masaaki; Komiya, Masayuki; Sawanobori, Naruhito; and Nagahama, Shinobu, 5,017,520, Cl. 501-44.000.

Komiyama, Katsumi; Fukaya, Masaki; Yokono, Kojiro; and Toma, Hitoshi, to Canon Kabushiki Kaisha. Image reading device with protective layers. 5,017,988, Cl. 357-30.000.

Komura, Atsushi: *See—*
Kondo, Kenji; Akamatsu, Kazuo; Yamauchi, Takeshi; Yamaoka, Tooru; and Komura, Atsushi, 5,018,001, Cl. 357-67.000.

Kon, Tatsuya; Kato, Shiro; Morie, Toshiya; Karasawa, Tadahiko; and Yoshida, Naoyuki, to Dainippon Pharmaceutical Co., Ltd. Indazole-3-carboxylic acid derivatives. 5,017,573, Cl. 514-218.000.

Kondo, Kenji; Akamatsu, Kazuo; Yamauchi, Takeshi; Yamaoka, Tooru; and Komura, Atsushi, to Nippondenso Co., Ltd. Aluminum line with crystal grains. 5,018,001, Cl. 357-67.000.

Kondo, Takanori; Yamachika, Hiroshi; Tanaka, Kunihiko; and Nishida, Yasuhiro, to Sumitomo Chemical Company, Ltd.; and Daiei Chemical Company, Ltd. Process for preparing substituted aminoanthraquinones. 5,017,713, Cl. 552-237.000.

Kondo, Takeshi: *See—*
Tomita, Haruo; Yamashita, Kouichi; Kondo, Takeshi; Suzuki, Noriyuki; Matsumoto, Shigemi; and Asada, Masahiro, 5,017,651, Cl. 525-66.000.

Konica Corporation: *See—*
Masukawa, Toyoaki; and Nakayama, Noritaka, 5,017,467, Cl. 430-558.000.
Nishijima, Toyoki; and Onodera, Kaoru, 5,017,464, Cl. 430-551.000.
Nishijima, Toyoki, 5,017,465, Cl. 430-551.000.
Yamada, Yasushi, 5,017,971, Cl. 355-313.000.

Konieczynski, Ronald D., to Nordson Corporation. Method and apparatus of isolating pneumatic panels in liquid application systems. 5,016,665, Cl. 137-1.000.

Konig, Franz, to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft. Feeder for supplying fibers to an apparatus for forming a preliminary web. 5,016,324, Cl. 19-296.000.

Konig, Herbert: *See—*
Putz, Oliver; and Konig, Herbert, 5,016,433, Cl. 57-264.000.

Koninklijke PTT Nederland N.V.: *See—*
Diemeer, Martinus B. J., 5,016,959, Cl. 350-96.140.

Konno, Tetsuya: *See—*
Murakami, Fumio; Okazaki, Sadaaki; Aoyagi, Takayoshi; Iwasaki, Tokuji; and Konno, Tetsuya, 5,016,677, Cl. 139-245.000.

Konno, Tomoyoshi: *See—*
Nagata, Osamu; Kuwahara, Tokihiro; Suzawa, Yukichi; Kamino, Hiroaki; Suyama, Tomio; and Konno, Tomoyoshi, 5,017,852, Cl. 318-727.000.

Konno, Tsuneo: *See—*
Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.

Kooketsu, Norio. Front lens for sunglasses. 5,017,001, Cl. 351-86.000.

Korea Advanced Institute of Science & Technology: *See—*
June-Gunn, Lee; Chang-Sam, Kim; Heon-Jin, Choi; and Seong-Hoon, Park, 5,017,527, Cl. 501-90.000.

Korea Telecommunications Authority: *See—*
Lee, Bhum C.; Park, Kwon C.; and Kim, Bong T., 5,018,140, Cl. 370-105.100.

Korikawa, Hiroshi: *See—*
Urabe, Hitoshi; Korikawa, Hiroshi; Akimoto, Kazuhiko; Nakaya, Daisuke; and Mizuno, Masahiko, 5,018,078, Cl. 364-518.000.

Koshino, Akihiko: *See—*
Nakamura, Kiyokazu; Kometani, Kiichi; Koshino, Akihiko; and Horiuchi, Kenjiro, 5,017,650, Cl. 525-65.000.

Koskenmaki, David C.: *See—*
Calhoun, Clyde D.; and Koskenmaki, David C., 5,017,255, Cl. 156-230.000.

Koski, Richard D.: *See—*
Dumais, Arthur; and Koski, Richard D., 5,017,867, Cl. 324-207.130.

Koskinen, Pentti A.; and Timari, Antti S., to Nokia Mobile Phones. Attachment system for the holder of the operating device of a radiophone. 5,016,851, Cl. 248-278.000.

Kostlan, Catherine R.: *See—*
Belliotti, Thomas R.; and Kostlan, Catherine R., 5,017,604, Cl. 514-482.000.

Kotani, Hiroaki: *See—*
Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 5,018,101, Cl. 365-51.000.

Kotani, Takaaki, to Fuji Photo Film Co., Ltd. Autofocus camera with flash unit. 5,017,955, Cl. 354-400.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Kotani, Yukinobu: *See—*
  - Furukawa, Satoru; Ozaki, Akio; Nakanishi, Toshihide; Kotani, Yukinobu; and Sugimoto, Masahiro, 5,017,483, Cl. 435-115.000.
- Kotewicz, Michael L.; D'Alessio, James M.; and Gerard, Gary F., to Life Technologies, Inc. Reverse transcriptase and method for its production. 5,017,492, Cl. 435-252.300.
- Kovalenko, Thomas R.; and Xin, Lu B., to Shenyang No. 3 Machine Tool Works; and Key Machine Tool, Incorporated. Multiple spindle bar machine. 5,016,334, Cl. 29-38.00B.
- Kowa Company Ltd.: *See—*
  - Akiyama, Koichi, 5,017,008, Cl. 356-336.000.
- Kowalczyk, James E.: *See—*
  - Loomans, Bernard A.; Kowalczyk, James E.; Lange, Harold A.; and Jones, Jerry W., 5,017,269, Cl. 201-25.000.
- Kowalik, Heinrich; Pletsch, Peter; and Kohl, Gerald, to Hermann Hemscheidt Maschinenfabrik GmbH & Co. Electrohydraulic control means for hydraulic self-advancing support units. 5,017,051, Cl. 405-302.000.
- Kowalski, Conrad J.: *See—*
  - Holt, Dennis A.; Kowalski, Conrad J.; Levy, Mark A.; Metcalf, Brian W.; and Tickner, Ann M., 5,017,568, Cl. 514-173.000.
- Kowalski, Joseph L.; and Rokusek, Daniel S., to Motorola, Inc. Microphone-controller with multifunction, single conductor. 5,018,188, Cl. 379-63.000.
- Koyama, Ikuo: *See—*
  - Ozawa, Yasuo; Koyama, Ikuo; and Shimano, Kimihide, 5,017,383, Cl. 424-490.000.
- Koyama, Takashi: *See—*
  - Hashimoto, Yuichi; and Koyama, Takashi, 5,017,965, Cl. 355-219.000.
- Koyanagi, Hiroaki: *See—*
  - Ibamoto, Masahiko; Morooka, Yasuo; Koyanagi, Hiroaki; Sato, Manabu; and Mizumura, Takeshi, 5,018,072, Cl. 364-478.000.
- Koyo Seiko Co., Ltd.: *See—*
  - Sano, Osamu, 5,016,723, Cl. 180-143.000.
- Kozak, Stephen J., to Eastman Kodak Company. Curtain coating start/finish method and apparatus. 5,017,408, Cl. 427-420.000.
- Krahenbuhl, Doug W. Ankle support. 5,016,623, Cl. 128-80.00H.
- Krahnke, Robert H.; and Saam, John C., to Dow Corning Corporation. Polyalkoxysilylalkylenedisilazanes and silylamines. 5,017,672, Cl. 528-23.000.
- Krall, Wilhelm: *See—*
  - Rauch, Hubert; Arndt, Peter J.; Klesse, Wolfgang; Krall, Wilhelm; and Frank, Klaus, 5,017,631, Cl. 523-340.000.
- Krammer, Erwin: *See—*
  - Popp, Franz-Wolfgang; Krammer, Erwin; Genannt, Wolfgang; and Flehr, Dietmar, 5,016,422, Cl. 53-330.000.
- Kranz, Walter, to Messerschmitt-Bolkow-Blohm GmbH. Guided missile. 5,016,835, Cl. 244-3.220.
- Krasser, Wolfgang: *See—*
  - Woike, Theo; Kerkmann, Detlef; Beier, Thomas; Krasser, Wolfgang; and Pescia, Danilo, 5,016,992, Cl. 350-376.000.
- Krause, Heinz-Martin: *See—*
  - Hafner, Udo; and Krause, Heinz-Martin, 5,016,594, Cl. 123-470.000.
- Krauss Maffei Aktiengesellschaft: *See—*
  - Holzinger, Reinhard; and Weiss, Gerhard, 5,017,120, Cl. 425-150.000.
- Krauter, Heinrich: *See—*
  - Mecke, Norbert; and Krauter, Heinrich, 5,017,428, Cl. 428-336.000.
- Kreeb, Helmut: *See—*
  - Bahrle, Friedrich; Wulf, Helmut; and Kreeb, Helmut, 5,016,705, Cl. 165-41.000.
- Krehbiel, Fred L.; Wilson, Bill B.; and Colleran, Stephen A., to Molex Incorporated. Electrical connector with terminal alignment and position assurance component. 5,017,162, Cl. 439-752.000.
- Krieger, Dieter: *See—*
  - Gideon, Jurgen; Krieger, Dieter; and Mengel, Erich, 5,017,054, Cl. 406-191.000.
- Krieger, Kurt. Device for float-conveying of webs of material. 5,016,363, Cl. 34-156.000.
- Kriems, Ulrich: *See—*
  - Dahrendorf, Klaus D.; Kling, Peter; and Kriems, Ulrich, 5,016,627, Cl. 128-205.240.
- Krikke, Roger D.; Ballheimer, Benny; Jones, Nelson A.; and Stone, Dwight V., to Caterpillar Inc. Resilient coupling apparatus. 5,017,178, Cl. 464-7.000.
- Krippelz, Jacob, Sr. Emergency light. 5,017,903, Cl. 340-472.000.
- Krishnamurthy, Gopalan: *See—*
  - Jones, Gary A.; Krishnamurthy, Gopalan; and Snopko, Paul A., 5,018,197, Cl. 380-20.000.
- Krivoshia, Miles S.: *See—*
  - Garrett, R. Patrick; and Krivoshia, Miles S., 5,016,624, Cl. 128-82.100.
- Kriz, John C.; and Tsay, Mean-sea, to AT&T Bell Laboratories. Output buffer having capacitive drive shunt for reduced noise. 5,017,807, Cl. 307-443.000.
- Krounbi, Mohamad T.; Voegeli, Otto; and Wang, Po-Kang. Magnetoresistive read transducer having hard magnetic bias. 5,018,037, Cl. 360-113.000.
- Krug, John A.; Hammonds, James C.; Schmidt, Kenneth D.; and Paglusch, Dennis F., to ACF Industries, Incorporated. Retractable railcar hitch. 5,017,065, Cl. 410-58.000.
- Kruger, Christof: *See—*
  - Olinger, Philip M.; and Kruger, Christof, 5,017,400, Cl. 426-660.000.
- Krupp Koppers GmbH: *See—*
  - Janicka, Johannes; Meyer, Gunter; and Durselen, Heinz, 5,017,270, Cl. 201-41.000.
- Kruse, Alfred; Siegemund, Gunter; and Ruppert, Ingo, deceased (by Schroeder, Carl Horst, administrator), to Hoechst Aktiengesellschaft. Esters of arylbisperfluoroalkylcarbinols, and a process for the preparation of these compounds. 5,017,719, Cl. 560-106.000.
- Kruse, James W.: *See—*
  - Londt, Edward E.; and Kruse, James W., 5,017,916, Cl. 340-870.130.
- Kruskopf, Mark S.: *See—*
  - Phillips, Norman J.; Leksell, David; Wehrli, Henry A., III; Barrow, William A.; and Kruskopf, Mark S., 5,017,824, Cl. 313-13.000.
- Kryger, Tom F., to Harms, Ronald J., a part interest. Apparatus for drilling a circularly curved bore. 5,017,057, Cl. 408-68.000.
- Krzywdziak, Alain: *See—*
  - Godat, Jean; and Krzywdziak, Alain, 5,017,017, Cl. 366-251.000.
- Kubo, Keishi: *See—*
  - Hotta, Yoshihiko; and Kubo, Keishi, 5,017,421, Cl. 428-216.000.
- Kubota, Kazufumi, to Fuji Photo Film Co., Ltd. Image input method. 5,018,023, Cl. 358-450.000.
- Kubota Ltd.: *See—*
  - Kajino, Masayor, 5,016,743, Cl. 192-70.120.
  - Morita, Shigeru; Takei, Terutaka; Kawahara, Yoshihiro; and Togoshi, Yoshikazu, 5,016,722, Cl. 180-89.140.
- Kubota, Tohru: *See—*
  - Oikawa, Katsuyuki; Ishihara, Toshinobu; Endo, Mikio; and Kubota, Tohru, 5,017,715, Cl. 556-401.000.
- Kubota, Yoichi: *See—*
  - Ishizuka, Koh; Tsukiji, Masaaki; Kubota, Yoichi; Ishii, Satoshi; and Nishimura, Tetsuharu, 5,017,777, Cl. 250-231.160.
- Kubsik, Robert H.; and Ali, Mir Q., to Jervis B. Webb Company. Apparatus for deheading wrapped paper rolls. 5,016,429, Cl. 53-381.100.
- Kudo, Hidehiko: *See—*
  - Kusakabe, Yoko; Suzuki, Hiroshi; and Kudo, Hidehiko, 5,017,561, Cl. 514-25.000.
- Kudou, Masasi: *See—*
  - Matsuzaki, Kichie; Isobe, Mitsunobu; Takeichi, Kenzo; Hisatomi, Ryouichi; and Kudou, Masasi, 5,018,219, Cl. 382-37.000.
- Kuhlman Corporation: *See—*
  - Curtis, Joe E., Jr.; Burns, Douglas; and Cloyd, John E., 5,016,832, Cl. 242-58.600.
- Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred; Schweiger, Franz; Verlohr, Axel; Muyssen, John; and Lybeer, Roger, to Siemens Akitiengesellschaft. Modularly structured digital communications system for interconnecting terminal equipment and public networks, and having operation and reliability programs. 5,018,097, Cl. 364-900.000.
- Kuhne, Viktor: *See—*
  - Hanke, Wolfgang; and Kuhne, Viktor, 5,017,179, Cl. 464-24.000.
- Kulakowski, John E.; Means, Rodney J.; Oldham, David M.; and Tayefeh, Morovat, to International Business Machines Corporation. Checking media operations and recording during optical recording. 5,018,126, Cl. 369-58.000.
- Kulakowski, Phyllis. Belt for retaining sensing electrodes on the chest of an infant afflicted with Apnea. 5,016,636, Cl. 128-644.000
- Kulisz, Michael, to A. B. Dick Company. Ink and method for the development of concealed images. 5,017,226, Cl. 106-21.000.
- Kumada, Hiroyoshi: *See—*
  - Takehara, Shin; Edahiro, Takeshi; Morita, Toshiki; and Kumada, Hiroyoshi, 5,016,911, Cl. 280-708.000.
- Kumakura, Yasuo: *See—*
  - Kanai, Tsuneo; Hosokawa, Shigefumi; Kumakura, Yasuo; Umemura, Shigeru; and Inagaki, Shuichiro, 5,017,145, Cl. 439-45.000.
- Kumar, Ranjit: *See—*
  - Bansleben, Donald A.; Carter, Charles G.; and Kumar, Ranjit, 5,017,306, Cl. 252-389.230.
- Kumazaki, Hiroshi, to Toshiba Kikai Kabushiki Kaisha. Method and apparatus of judging quality of injection molded products. 5,017,315, Cl. 264-40.100.
- Kume, Toyohiko; Goto, Toshio; Kamochi, Atsumi; Yanagi, Akihiko; Miyauchi, Hiroshi; and Asami, Tadao, to Nihon Tokushu Noyaku Seizo K. K. 1-phenylpyrroles. 5,017,213, Cl. 71-95.000.
- Kung, Hsiang-Ching: *See—*
  - Imperial, George R.; Kung, Hsiang-Ching; Makarewicz, Paul A.; McCormick, Bonnie J.; and Slovik, Lori S., 5,017,416, Cl. 428-195.000.
- Kuntz, Gunther; and Baarfusser, Johann, to Agfa Gevaert AG. Dual cup-shaped supporting filter body. 5,017,287, Cl. 210-433.100.
- Kuo, Elizabeth A.: *See—*
  - Hedgecock, Charles J. R.; Jones, Stuart D.; and Kuo, Elizabeth A., 5,017,574, Cl. 514-220.000.
- Kuo, Jih-Fen: *See—*
  - Sadeghi, Mohammad-Ali; Sadeghi, Kazem; Kuo, Jih-Fen; Jang, Long-Kuan; and Yen, Teh F., 5,017,281, Cl. 208-390.000.
- Kuramoto, Ryosuke, to Nakata Manufacture Company Limited. Method and guide roll stand for guiding and shaping strip material in a pipe mill. 5,016,459, Cl. 72-178.000.
- Kure, Tokuo: *See—*
  - Sunami, Hideo; Kure, Tokuo; and Kawamoto, Yoshifumi, 5,017,981, Cl. 357-23.600.
- Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
  - Machida, Katsuichi; Saito, Akira; and Sakagami, Teruo, 5,017,698, Cl. 544-71.000.

- Kuribayashi, Takashi: *See—*
  - Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.
- Kuriyaki, Hisao: *See—*
  - Hirakawa, Kazuyoshi; Kuriyaki, Hisao; and Zheng, Xu-guang, 5,017,548, Cl. 505-1.000.
- Kuroda, Michio: *See—*
  - Shimizu, Nobuo; Kuroda, Michio; Kirikami, Seiichi; Sato, Isao; and Arai, Osamu, 5,016,443, Cl. 60-737.000.
- Kuroiwa, Minoru: *See—*
  - Tokai, Masaie; Kuroiwa, Minoru; and Ezaki, Shinobu, 5,016,561, Cl. 118-718.000.
- Kurono, Masayasu: *See—*
  - Sawai, Kiichi; Natori, Shunji; Takahashi, Haruo; Tanaka, Kenichi; Mitani, Takahiko; and Kurono, Masayasu, 5,017,486, Cl. 435-172.300.
- Kurosaka, Hirosige: *See—*
  - Yamamoto, Nobuyoshi; Murata, Yasuhiko; Saeki, Fumimasa; and Kurosaka, Hirosige, 5,016,721, Cl. 180-89.130.
- Kurosaki, Makoto, to Yamaha Corporation. Clamping apparatus. 5,017,038, Cl. 403-385.000.
- Kurosawa, Yuji; Terajima, Hisao; and Isozaki, Shingo, to Canon Kabushiki Kaisha. Communication apparatus with telephone and data communication capability. 5,018,189, Cl. 379-93.000.
- Kuroyanagi, Akira: *See—*
  - Fujii, Tetsuo; Sakai, Minekazu; and Kuroyanagi, Akira, 5,017,979, Cl. 357-23.500.
- Kusakabe, Yoko; Suzuki, Hiroshi; and Kudo, Hidehiko, to Kaken Pharmaceutical Co., Ltd. Antibotic 6270B and its use as an anticoccidiosis agent and a feed additive. 5,017,561, Cl. 514-25.000.
- Kusano, Chushirou: *See—*
  - Mizuta, Hiroshi; Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, 5,017,973, Cl. 357-4.000.
  - Mochizuki, Kazuhiro; Tanoue, Tomonori; Kusano, Chushirou; Masuda, Hiroshi; and Mitani, Katsuhiko, 5,017,517, Cl. 437-90.000.
- Kushibe, Takahiro; Takano, Yuuichi; and Sato, Takeshi, to Toyota Jidosha Kabushiki Kaisha. Fuel injection control apparatus of two-stroke engine. 5,016,598, Cl. 123-533.000.
- Kusunori, Shigeru: *See—*
  - Nishimura, Tadashi; Sugahara, Kazukyuki; Kusunori, Shigeru; and Ohsaki, Akihiko, 5,017,504, Cl. 437-40.000.
- Kutscher, Roland; Grix, Raimund; Li, Gangqiang; and Wollnik, Hermann. Ion reflector. 5,017,780, Cl. 250-287.000.
- Kuwahara, Tokihiro: *See—*
  - Nagata, Osamu; Kuwahara, Tokihiro; Suzawa, Yukichi; Kamino, Hiroaki; Suyama, Tomio; and Konno, Tomoyoshi, 5,017,852, Cl. 318-727.000.
- Kuze, Tetsuya; and Suzuki, Toshihiko, to Yokohama Rubber Co., Ltd., The. Pneumatic tire having the highest rigidity tread rib offset from the equatorial line. 5,016,695, Cl. 152-209.00A.
- Kuzukawa, Kiyoaki, to Omron Corporation. Electromagnetic relay. 5,017,898, Cl. 335-128.000.
- Kvisle, Steinar: *See—*
  - De Clippeleir, Georges E. M. J.; Baumann Ofstad, Elizabeth; and Kvisle, Steinar, 5,017,543, Cl. 502-328.000.
- Kyburz, Emilio: *See—*
  - Aschwanden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, 5,017,608, Cl. 514-538.000.
- Kyowa Hakko Kogyo Co., Ltd.: *See—*
  - Furukawa, Satoru; Ozaki, Akio; Nakanishi, Toshihide; Kotani, Yukinobu; and Sugimoto, Masahiro, 5,017,483, Cl. 435-115.000.
  - Katsumata, Ryoichi; and Yokoi, Haruhiko, 5,017,482, Cl. 435-114.000.
- Kyushu University: *See—*
  - Hirakawa, Kazuyoshi; Kuriyaki, Hisao; and Zheng, Xu-guang, 5,017,548, Cl. 505-1.000.
- L.M. & L. Corporation: *See—*
  - Mabie, Norman H., 5,017,182, Cl. 474-256.000.
- La Jolla Pharmaceutical Company: *See—*
  - Katz, David H., 5,017,648, Cl. 525-54.100.
- La Mina Ltd.: *See—*
  - Guirguis, Raouf A., 5,016,644, Cl. 128-771.000.
- Labofina, S.A.: *See—*
  - De Clippeleir, Georges E. M. J.; Baumann Ofstad, Elizabeth; and Kvisle, Steinar, 5,017,543, Cl. 502-328.000.
- Laboratorios del Dr. Esteve, S.A.: *See—*
  - Colombo, Augusto; Pares, Juan; and Frigol, Jordi, 5,017,596, Cl. 514-406.000.
- Laboratorios Paris, C.A.: *See—*
  - Paris-Marcano, Lucinda C., 5,017,280, Cl. 208-223.000.
- Lafforgue, Jean-Jacques; and Schwartz, Claude, to Societe de Prospection et D'Inventions Techniques (S.P.I.T.). Drill tool holder. 5,016,892, Cl. 279-82.000.
- LaForet, Jean; and Rigaud, Andre , to Gaz de France. Steam-operated and/or gas-operated furnace. 5,016,605, Cl. 126-20.000.
- Lai, Kou Y. Camping lantern and cooking stove set. 5,016,611, Cl. 126-258.000.
- Laine, Richard M.: *See—*
  - Blum, Yigal D.; and Laine, Richard M., 5,017,529, Cl. 501-95.000.
- Lainiere de Picardie: *See—*
  - Groshens, Pierre, 5,017,418, Cl. 428-196.000.
- Lambert, Barnum B., to Environmental Support Systems, Inc. Disposable carbon dioxide absorber. 5,016,628, Cl. 128-205.280.
- Lambert, Fred R., to Mountain State Muzzleloading Supplies, Inc. Black powder percussion nipple. 5,016,379, Cl. 42-83.000.
- Lambert, Patrick M.: *See—*
  - Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 5,017,791, Cl. 250-483.100.
- Lamonica, Daryle; and Tatti, Wayne V. Rotatable blade for fishing lure. 5,016,386, Cl. 43-42.140.
- Lamp Technologies, Inc.: *See—*
  - Biggs, John D.; and Twain, Kenneth M., 5,018,057, Cl. 362-295.000.
- Landry, Norman R.: *See—*
  - Agrawal, Ashok K.; and Landry, Norman R., 5,017,927, Cl. 342-371.000.
- Lane, Charles: *See—*
  - Marten, Lewis H.; and Lane, Charles, 5,017,188, Cl. 604-178.000.
- Lane, L. Thomas; Fraser, Bruce A.; and Brendel, Thomas E., to Carrier Corporation. Oil return for a two-stage compressor having interstage cooling. 5,016,447, Cl. 62-470.000.
- Lang, Hermann, to Siemens Aktiengesellschaft. Method and apparatus for converting a gap-infested read-in clock into a gap-free read-out clock. 5,017,801, Cl. 307-269.000.
- Lang, Paul W.; and Gribshaw, Franklin C., to Universal Applied Sciences Inc. Thin projection screen having a liquid crystal display screen overlaid a sheet of fiber optic cables. 5,018,007, Cl. 358-60.000.
- Lang, Stephen P.: *See—*
  - Farber, Arnold S.; Lang, Stephen P.; and Smart, David C., 5,017,910, Cl. 340-635.000.
- Lange, Gottfried; Reinfelder, Hans-Erich; and Tressl, Guenther, to Siemens Aktiengesellschaft. Read-out system for a luminescent storage screen in an X-ray diagnostics installation. 5,017,781, Cl. 250-327.200.
- Lange, Harold A.: *See—*
  - Loomans, Bernard A.; Kowalczyk, James E.; Lange, Harold A.; and Jones, Jerry W., 5,017,269, Cl. 201-25.000.
- Lange, Louis G., III; and Spilburg, Curtis A. Use of sulfated polysaccharides to inhibit pancreatic cholesterol esterase. 5,017,565, Cl. 514-54.000.
- Langer, Alfred, to C. Gerhardt Fabrik & Lager Chemischer Apparate GmbH & Co K.G. Fat extraction process and apparatus. 5,017,500, Cl. 436-178.000.
- Langlois, Michel: *See—*
  - Naylor, Robert J.; Naylor, Brenda; Renaud, Alain; and Langlois, Michel, 5,017,580, Cl. 514-299.000.
  - Ward, Mona; Ph.Settembre, Pierre-Andre ; Renaud, Alain; and Langlois, Michel, 5,017,572, Cl. 514-218.000.
- Lanham, Mark E., to Unit Rail Anchor Company. Resilient rail fastener. 5,016,816, Cl. 238-349.000.
- Lanxide Technology Company, LP: *See—*
  - Aghajanian, Michael K.; and Nagelberg, Alan S., 5,016,703, Cl. 164-97.000.
  - Claar, Terry D.; and Mason, Steven M., 5,017,334, Cl. 419-12.000.
  - Newkirk, Marc S.; and Zwicker, Shirley L., 5,017,526, Cl. 501-89.000.
  - Newkirk, Marc S.; Kennedy, Christopher R.; and Kantner, Robert C., 5,017,533, Cl. 501-127.000.
- Large, Ronald E.: *See—*
  - Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Paramdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.
- Larson, Donald G.: *See—*
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,161, Cl. 372-57.000.
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,162, Cl. 372-57.000.
- Larson, James R.; and Leffew, Kenneth W., to Du Pont de Nemours, E. I., and Company. Continuous process for preparing resin particles in a liquid. 5,017,451, Cl. 430-137.000.
- Larson, John D.: *See—*
  - Dukes, John N.; Lum, Paul; and Larson, John D., 5,016,642, Cl. 128-696.000.
- Larson, Roger L.: *See—*
  - Larson, Vada J.; Larson, Roger L.; and Bieger, Walter I., 5,016,559, Cl. 116-234.000.
- Larson, Vada J.; Larson, Roger L.; and Bieger, Walter I., to Larson, Vada J.; and Larson, Roger L. Bookmark having integral pencil holder. 5,016,559, Cl. 116-234.000.
- LaRussa, Bonnie S.: *See—*
  - Israel, Gina; and LaRussa, Bonnie S., 5,016,661, Cl. 132-324.000.
- Lasseter, Robert: *See—*
  - Boot, Phillip; Hurst, Dare; and Lasseter, Robert, 5,016,419, Cl. 52-749.000.
- Lassiter, Wallace R., to R. J. Reynolds Tobacco Company. Method and apparatus for manufacturing cigarette rods free of metal. 5,016,653, Cl. 131-286.000.
- Latka, Henry C., to General Signal Corporation. Apparatus for controllably feeding a particulate material. 5,016,683, Cl. 141-1.000.
- Latviiskaya Selskhokhozyaistvennaya Akademia: *See—*
  - Moskvin, Gennady A., 5,016,569, Cl. 119-14.080.
- Lau, John W.: *See—*
  - Enloe, Jack H.; Lau, John W.; and Rice, Roy W., 5,017,434, Cl. 428-428.000.
- Lawrence, George D.: *See—*
  - Cohn, David B.; Affleck, Wayde H.; and Lawrence, George D., 5,017,769, Cl. 250-216.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Lawrence, Lawrence D.; and Sudweeks, Walter B., to IRECO Incorporated. Shock-resistant, low density emulsion explosive. 5,017,251, Cl. 149-2.000.

Lawrence Paper Company: *See*—
  Creaden, David E., 5,016,751, Cl. 206-419.000.

Lazerware, Inc.: *See*—
  Belknap, James D.; and Ward, Brian S., 5,018,053, Cl. 362-104.000.

Lazzari, Ettore; Arcamone, Federico; Penco, Sergio; Verini, Maria A.; and Mongelli, Nicola, to Farmitalia Carlo Erba, SPA. Site specific alkylating agents. 5,017,599, Cl. 514-422.000.

Lebrun, Jean-Jacques; and Bordone, Christina, to Rhone-Poulenc Chimie. Controlled polymerization of silazane monomers. 5,017,640, Cl. 524-588.000.

Lee, Bhum C.; Park, Kwon C.; and Kim, Bong T., to Electronics and Telecommunications Research Institute; and Korea Telecommunications Authority. Reframe circuit in a synchronous multiplexing device. 5,018,140, Cl. 370-105.100.

Lee, Charles, to Photon Imaging Corp. Spin initialization procedure. 5,016,974, Cl. 350-96.240.

Lee, Chi-long: *See*—
  Bilgrien, Carl J.; and Lee, Chi-long, 5,017,671, Cl. 528-21.000.

Lee, Chin-ho: *See*—
  Whewell, Christopher J.; Clouser, Sidney J.; and Lee, Chin-ho, 5,017,271, Cl. 204-15.000.

Lee, Frank; Yokota, Takashi; Arai, Ken-ichi; Mosmann, Timothy; and Rennick, Donna, to Schering Corporation. Mammalian interleukin-4. 5,017,691, Cl. 535-351.000.

Lee, Michael E., to Rosemount Office Systems, Inc. Modular workstations. 5,016,405, Cl. 52-36.000.

Lee, Rosalind C.: *See*—
  Sloma, Alan; Lee, Rosalind C.; and Pero, Janice, 5,017,477, Cl. 435-69.100.

Lee, Sunny. Hydraulic type stationary cycle exercise. 5,016,872, Cl. 272-73.000.

Leeds, Jeffrey L.: *See*—
  Bemis, Suzanne V.; Winer, Ernst A.; Leeds, Jeffrey L.; and Athey, Kevin D., 5,017,142, Cl. 434-220.000.

Leffew, Kenneth W.: *See*—
  Larson, James R.; and Leffew, Kenneth W., 5,017,451, Cl. 430-137.000.

Le Fur, Gerard: *See*—
  Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.

Legrady, Janos, to Zierick Manufacturing Corporation. Solid single leg terminal. 5,017,159, Cl. 439-741.000.

Legrand: *See*—
  Hauchard, Patrick; and Loisel, Francois, 5,017,161, Cl. 439-750.000.

Legrow, Gary E.; and Liles, Donald T., to Dow Corning Corporation. Polymethylalkylsiloxane emulsions and methods. 5,017,221, Cl. 106-2.000.

Lehmann, Hanno; and Zettier, Karl-Heinz, to Westfalia Separator AG. Method of centrifuging cheese milk. 5,017,396, Cl. 426-491.000.

Lehrman, Sandra N.: *See*—
  Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., 5,017,577, Cl. 514-263.000.

Leighton, Harry J.: *See*—
  Daluge, Susan M.; Leighton, Harry J.; and Lehrman, Sandra N., 5,017,577, Cl. 514-263.000.

Leistenschneider, Raimund, to Mercedes-Benz AG. Method and apparatus for adapting the sensitivity of a sensor system for the detection of precipitations during the control of wiping intervals of a screen-wiper. 5,017,847, Cl. 318-443.000.

Leitz, Hermann, to Borg-Warner Automotive, GmbH. Double cage freewheel assembly. 5,016,741, Cl. 192-45.100.

Leksell, David: *See*—
  Phillips, Norman J.; Leksell, David; Wehrli, Henry A., III; Barrow, William A.; and Kruskopf, Mark S., 5,017,824, Cl. 313-13.000.

Lelental, Mark: *See*—
  Agostinelli, John A.; Mir, Jose M.; Paz-Pujalt, Gustavo R.; Lelental, Mark; and Nicholas, Ralph A., III, 5,017,551, Cl. 505-1.000.

Lemelson, Jerome H. Automatic manipulation system and method. 5,017,084, Cl. 414-744.300.

Lemelson, Jerome H. Drug units and methods for treating blood clots. 5,017,379, Cl. 424-450.000.

Le Mer, Joseph; and Derrien, Jean-Luc, to Chaffoteaux et Maury. Pipe couplings. 5,016,922, Cl. 285-81.000.

Lendaro, Jeffery B., to RCA Licensing Corporation. Disabling arrangement for a circuit operating at a deflection rate. 5,017,844, Cl. 315-408.000.

Lenk, Erich: *See*—
  Schippers, Heinz; Lenk, Erich; Gerhartz, Siegmar; Schiminski, Herbert; and Turk, Herbert, 5,016,829, Cl. 242-18.00A.

Lenti, Daria: *See*—
  Chittofrati, Alba; and Lenti, Daria, 5,017,307, Cl. 252-500.000.

Lenzing Aktiengesellschaft: *See*—
  Wanek, Erich; Baumgartinger, Josef; Schobesberger, Manfred; Stadlbauer, Rupert; and Weinrotter, Klaus, 5,017,110, Cl. 425-7.000.

Leonard, Paulina K. Artwork analysis device. 5,016,357, Cl. 33-277.000.

Leonardo, Stephen V. Modular frame assembly and method for making same. 5,016,765, Cl. 211-189.000.

Leopold, Raymond J.: *See*—
  Bertiger, Bary R.; Leopold, Raymond J.; and Peterson, Kenneth M., 5,017,925, Cl. 342-352.000.

Le Paih, Michele: *See*—
  Guiberteau, Christian; Le Paih, Michele; and Ruggeri, Stephane, 5,017,924, Cl. 342-195.000.

LePape, Alain: *See*—
  Nicolau, Yves-Claude; LePape, Alain; and Barot-Ciorbaru, Rita, 5,017,359, Cl. 424-1.100.

Lerner, Bernard J., to Beco Engineering Company. Treatment of nitrogen oxides. 5,017,348, Cl. 423-235.000.

Leroux, Jacques; and Gallez, Francois, to Serdi - Societe D'Etudes De Realisation Et De Diffusion Industrielles. Tool for precision machining. 5,017,062, Cl. 409-179.000.

Letourneur, Bernard. Medicinal composition for regularizing hormonal secretion and for treating sterility. 5,017,384, Cl. 424-601.000.

Letton, James C.: *See*—
  Jandacek, Ronald J.; and Letton, James C., 5,017,398, Cl. 426-603.000.

Levchenko, Georgy T.; and Radzikovsky, Alexandr. Apparatus for forming films by evaporation in vacuum. 5,016,566, Cl. 118-726.000.

Lever Brothers Company, Division of Conopco, Inc.: *See*—
  Nedonchelle, Yvon J., 5,017,296, Cl. 252-8.600.

Levitt, George. Herbicidal sulfonamides. 5,017,214, Cl. 71-92.000.

Levy, Mark A.: *See*—
  Holt, Dennis A.; Kowalski, Conrad J.; Levy, Mark A.; Metcalf, Brian W.; and Tickner, Ann M., 5,017,568, Cl. 514-173.000.

Lewandowski, Stanley R.: *See*—
  Cowan, Kevin P.; Fazi, Bruno, Jr.; Havrilla, Joseph B.; Lewandowski, Stanley R.; and Reilly, David M., 5,018,182, Cl. 378-173.000.

Lewers, William R.: *See*—
  Bulso, Joseph D., Jr.; and Lewers, William R., 5,016,506, Cl. 83-35.000.

Lewis, William T.: *See*—
  Velie, Wallace W.; Lewis, William T.; and Haney, Donald C., 5,017,129, Cl. 431-326.000.

Leyshon, David R., to Bath Institute of Medical Engineering Limited. Vibration isolation arrangement. 5,016,862, Cl. 267-136.000.

Li, Gangqiang: *See*—
  Kutscher, Roland; Grix, Raimund; Li, Gangqiang; and Wollnik, Hermann, 5,017,780, Cl. 250-287.000.

Li, Guann-Pyng: *See*—
  Chen, Tze-Chiang; Chuang, Ching-Te Kent; Li, Guann-Pyng; and Ning, Tak Hung, 5,017,990, Cl. 357-34.000.

Licari, Vincent. Tandem axle vehicle suspension system. 5,016,905, Cl. 280-677.000.

Lichtenberger, William J., to RobertShaw Controls Company. Burner control device and electrical switch unit assembly, parts therfor and methods of making the same. 5,017,745, Cl. 200-307.000.

Lickle, Brett. Air induction system for goggle. 5,016,293, Cl. 2-436.000.

Life Technologies, Inc.: *See*—
  Kotewicz, Michael L.; D'Alessio, James M.; and Gerard, Gary F., 5,017,492, Cl. 435-252.300.

Liles, Donald T.: *See*—
  Legrow, Gary E.; and Liles, Donald T., 5,017,221, Cl. 106-2.000.

Liljeqvist, Lance R.: *See*—
  Weber, Frank J.; Liljeqvist, Lance R.; and Prisco, Richard S., 5,016,572, Cl. 119-52.100.

Lin, Chien-Hung. Automobile suspension system. 5,016,909, Cl. 280-707.000.

Lin, Chong M., to Digital Equipment Corporation. Input protection arrangement for VLSI integrated circuit devices. 5,017,985, Cl. 357-23.130.

Lin, Lieh-Chao. Joint elbow assembly for wiring. 5,016,924, Cl. 285-127.000.

Lin, Paul T.; and McShane, Michael B., to Motorola Inc. Thin, molded, surface mount electronic device. 5,018,005, Cl. 357-80.000.

Lin, Sung-Wei: *See*—
  Gill, Manzur; D'Arrigo, Sebastiano; and Lin, Sung-Wei, 5,017,980, Cl. 357-23.500.

Lin, Yuan: *See*—
  Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.

Lindemer, Terrence B.: *See*—
  Tiegs, Terry N.; and Lindemer, Terrence B., 5,017,528, Cl. 501-95.000.

Linden, Claes. Exhaust system for combustion engine. 5,016,729, Cl. 181-240.000.

Linder, Fritz: *See*—
  Feuz, Fritz; Hora, Ferdinand; and Linder, Fritz, 5,016,539, Cl. 104-28.000.

Lindner, Henry, to Elgin Molded Plastics, Inc. Battery pack. 5,017,441, Cl. 429-9.000.

Lindsey, Kyle. Numeric generator apparatus. 5,016,881, Cl. 273-138.00A.

Linne, Mark A.; Johnson, Robert W.; and Thompson, Richard G., to Spectra-Physics, Inc. Apparatus for controlling pulse energy in a Q-switched laser system. 5,018,152, Cl. 372-25.000.

Linwood, Gary; and Duncan, Wayne, to United Manufacturing Co., Inc. Apparatus and method for varying the timing of a control signal. 5,017,794, Cl. 250-551.000.

Lipton, Thomas M.: *See*—
  Doolittle, Frederick G.; Ellgen, Jon L.; Heiskell, Ronald E.; Lipton, Thomas M.; and Parent, James R., 5,016,607, Cl. 126-25.00R.

Lisson, Jerold B.; and Stark, Richard A., to Eastman Kodak Company. Assembly and method for monitoring the alignment of a workpiece. 5,017,011, Cl. 356-363.000.

Liu, Lishing, to International Business Machines Corporation. Method for reducing cross-interrogate delays in a multiprocessor system. 5,018,063, Cl. 364-200.000.

Liu, Michael S.: *See*—
  Roisen, Roger L.; Rahn, Curtis H.; Straight, John B.; and Liu, Michael S., 5,017,999, Cl. 357-49.000.

Liu, Paul S.; Rhinehart, Barry L.; and Daniel, John K., to Merrell Dow Pharmaceuticals Inc. Castanospermine esters and glycosides. 5,017,563, Cl. 514-27.000.

Liu, Yun-Yu; and Shih, Hsiao-Lei, to Pan-International Industrial Corp. Receptacle for cable connector with locking mechanism and electric shielding property. 5,017,157, Cl. 439-609.000.

Liu, Yun-Yu; and Shih, Hsiao-Lei, to Pan-International Industrial Corp. Structure of receptacle for electric connector with self-locking and electric shield mechanism. 5,017,158, Cl. 439-609.000.

Lizzi, Frederic L.: *See*—
  Driller, Jack; Faulkenberry, William J.; and Lizzi, Frederic L., 5,016,615, Cl. 128-24.00A.

Ljung-crantz, Billy. Dosing device on a filling plant, in particular for liquid and pasty products, and process for its operation. 5,016,690, Cl. 141-242.000.

Ljungstroem, Jan: *See*—
  Hoegnelid, Kurt; and Ljungstroem, Jan, 5,016,632, Cl. 128-419.0PG.
  Vock, Josef; Ljungstroem, Jan; and Ekwall, Christer, 5,016,634, Cl. 128-419.0PT.

Lloyd, Randahl B., to Tektronix, Inc. Metastable sense circuit. 5,017,814, Cl. 307-480.000.

Lockheed Sanders, Inc.: *See*—
  Burrows, James L., 5,018,099, Cl. 365-49.000.

Lockshaw, James J.: *See*—
  Kaiser, John E., Jr.; Lockshaw, James J.; Ruiz, Juan J.; and Stevens, William L., 5,016,730, Cl. 181-265.000.

Lockwood, Alfred: *See*—
  Ammon, James G.; Yurkonis, Philip G.; and Lockwood, Alfred, 5,018,052, Cl. 361-428.000.

Lockwood, Larry E. Paint brush holder. 5,016,773, Cl. 220-90.000.

Loeb, Avi: *See*—
  Kaplan, Zvi; Engler, Gideon; and Loeb, Avi, 5,016,518, Cl. 89-8.000.

Loewen, Victor D., to Hewlett-Packard Company. Apparatus for and methods of optical encoding having spiral shaped light modulator. 5,017,776, Cl. 250-231.140.

Loffredo, Mark D., to Williams Electronics Games, Inc. Video display co-processor for use in a video game. 5,016,876, Cl. 273-437.000.

Logan, James D.: *See*—
  Peters, Thomas E.; Logan, James D.; Bennett, Eugene R.; Dieter, Clarence L.; and Henckel, David J., 5,017,312, Cl. 264-24.000.

Lohmann, Jean-Jacques M.: *See*—
  Bertrandie, Alain M.; Bird, Thomas G. C.; Jung, Frederic H.; and Lohmann, Jean-Jacques M., 5,017,569, Cl. 514-206.000.

Loisel, Francois: *See*—
  Hauchard, Patrick; and Loisel, Francois, 5,017,161, Cl. 439-750.000.

Lokken, Roger C.: *See*—
  Young, John B.; and Lokken, Roger C., 5,016,311, Cl. 15-88.300.

Loma Linda University Medical Center: *See*—
  Young, Phillip E.; and McColl, David B., 5,017,789, Cl. 250-396.0ML.

LoMaglio, Lewis C.: *See*—
  Hayes, Thomas H.; and LoMaglio, Lewis C., 5,016,783, Cl. 222-321.000.

Londt, Edward E.; and Kruse, James W., to Navistar International Transportation Corp. Shift prompter/driver information display. 5,017,916, Cl. 340-870.130.

Long, J. Paul: *See*—
  Cannon, Joseph G.; Bhatnagar, Ranbir K.; and Long, J. Paul, 5,017,602, Cl. 514-452.000.

Lonza Ltd.: *See*—
  Furrer, Hansjorg; Peltoniemi, Raimo; Richle, Norbert; and Ulrich, Dietrich, 5,016,456, Cl. 72-38.000.

Looman, Ernest W.; and Wolbert, Harold A., to Goodyear Tire & Rubber Company, The. Apparatus for forming a coextrusion from extruded strips. 5,017,118, Cl. 425-133.500.

Loomans, Bernard A.; Kowalczyk, James E.; Lange, Harold A.; and Jones, Jerry W., to APV Chemical Machinery Inc. Method of continuously carbonizing primarily organic waste material. 5,017,269, Cl. 201-25.000.

Lopp, Loran C., Jr.: *See*—
  Bonko, Mark L.; and Lopp, Loran C., Jr., 5,016,696, Cl. 152-209.00B.

Lorenz, Gisela: *See*—
  Seele, Rainer; Kober, Reiner; Goetz, Norbert; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,594, Cl. 514-383.000.
  Seele, Rainer; Sauter, Hubert; Kober, Reiner; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,595, Cl. 514-383.000.

Lorenzo, Lynn: *See*—
  Eddy, Clifford O.; Henry, Arnold W.; Lorenzo, Lynn; Chow, Che C.; Ferguson, Robert M.; and Finsterwalder, Robert N., 5,017,432, Cl. 428-422.000.

Lorenzoni, Loreno: *See*—
  Messina, Giuseppe; Lorenzoni, Loreno; Calaresu, Paolo; and Sechi, Giovanni M., 5,017,721, Cl. 564-151.000.

Lori Corporation: *See*—
  Hennessy, Thomas F., 5,016,455, Cl. 70-493.000.

Losty, Martin R.: *See*—
  Fisher, Thomas S.; and Losty, Martin R., 5,017,917, Cl. 340-825.790.

Loughran, Kevin: *See*—
  Abrams, Lane J.; Loughran, Kevin; Masukewicz, David W.; and Overstreet, Robert L., Jr., 5,018,184, Cl. 379-29.000.

Loughrin, John H.: *See*—
  Hildebrand, David F.; Kemp, Thomas R.; Andersen, Roger; and Loughrin, John H., 5,017,386, Cl. 426-18.[illegible]00.

Low, C. David: *See*—
  Schmidt, Robert J.; Haizmann, Robert S.; Ford, Mark R.; Low, C. David; and Adams, Frank H., 5,017,541, Cl. 502-169.000.

Lowe, David T.: *See*—
  Martin, Donald J.; Narciso, Ralph A.; Lowe, David T.; and Greenman, Clifford H., 5,016,962, Cl. 350-96.160.

Lowery, Jimmie L. Billiard cue tip. 5,016,877, Cl. 273-70.000.

Lowrance, Arlen J. Combined racing kite gate and quick draw device. 5,018,117, Cl. 368-10.000.

LRS, Inc.: *See*—
  McGarvey, David C.; and Whitman, David C., 5,016,689, Cl. 141-198.000.

LSI Logic Corporation: *See*—
  Pasch, Nicholas E., 5,018,214, Cl. 382-9.000.

Lubrizol Corporation, The: *See*—
  Hopkins, David L.; and Perz, John S., 5,017,230, Cl. 106-284.300.

Lucas, Gary; Beck, Maurice; and Hunt, Andrew, to Schlumberger Technology Corporation. Capacitive void fraction measurement apparatus. 5,017,879, Cl. 324-663.000.

Lucas Industries public limited company: *See*—
  Gaskell, David J., 5,016,820, Cl. 239-533.120.
  Pagdin, Brian C.; and McQueen, Alastair M., 5,016,588, Cl. 123-399.000.

Lucchesi, Mike: *See*—
  Psiol, Nick; and Lucchesi, Mike, 5,016,884, Cl. 273-176.0FA.

Lucchetti, Jean: *See*—
  Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.

Luchaco, David G.: *See*—
  Hanna, R. Scott; Flowers, Woodie; Luchaco, David G.; Yuhasz, Stephen J.; Spira, Joel S.; and Hall, Philip R., 5,017,837, Cl. 315-136.000.

Lucks Company, The: *See*—
  Macpherson, John W.; and Acree, Lee M., 5,017,394, Cl. 426-302.000.

Ludlow, Roy S. Boat hull. 5,016,552, Cl. 114-56.000.

Luke, John H.: *See*—
  Preston, Donald; and Luke, John H., 5,017,048, Cl. 405-262.000.

Lukevits, Edmund Y.: *See*—
  Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.

Lukowski, George W.: *See*—
  Walker, William R.; and Lukowski, George W., 5,016,461, Cl. 72-336.000.

Lum, Paul: *See*—
  Dukes, John N.; Lum, Paul; and Larson, John D., 5,016,642, Cl. 128-696.000.

Lumex, Inc.: *See*—
  Tanaka, Kazuna; Kapec, Jeffrey; and Chochinov, Allan, 5,016,303, Cl. 5-437.000.

Lumson S.r.l.: *See*—
  Moretti, Remo, 5,016,780, Cl. 222-153.000.

Lundberg, Robert D.: *See*—
  Gutierrez, Antonio; Song, Won R.; Lundberg, Robert D.; and Kleist, Robert A., 5,017,299, Cl. 252-51.50R.

Lundstrom, Per-Åke; Andersson, Gunnar A.; West, Åke; and Magi, Juhan, to Uddholm Tooling Aktiebolag. Method and apparatus for the production of metal granules. 5,017,218, Cl. 75-388.000.

Lutron Electronics Co., Inc.: *See*—
  Hanna, R. Scott; Flowers, Woodie; Luchaco, David G.; Yuhasz, Stephen J.; Spira, Joel S.; and Hall, Philip R., 5,017,837, Cl. 315-136.000.

Luttmer, Joseph D.: *See*—
  Elkind, Jerome L.; Smith, Patricia B.; Hutchins, Larry D.; Luttmer, Joseph D.; York, Rudy L.; and England, Julie S., 5,017,511, Cl. 437-225.000.

Lutz, Michael A., to Dow Corning Corporation. UV curable compositions cured with polysilane and peroxide initiators. 5,017,406, Cl. 427-54.100.

Luxembourg Industries (Pamol) Ltd.: *See*—
  Becker, Yigal, 5,017,705, Cl. 546-250.000.

Lyaudet, Georges: *See*—
  Textoris, Andre ; Lyaudet, Georges; and Bathelier, Andre 5,017,344, Cl. 423-10.000.

Lybeer, Roger: *See*—
  Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred; Schweiger, Franz; Verlohr, Axel; Muyssen, John; and Lybeer, Roger, 5,018,097, Cl. 364-900.000.

Mabie, Norman H., to L.M. & L. Corporation. Belt connector with improved flexible bite feature. 5,017,182, Cl. 474-256.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Mabuchi, Toshiaki: *See—*

Otani, Sugio; Tsuyuguchi, Michio; Kano, Haruyuki; Sone, Yoshihisa; Kageyama, Kenji; and Mabuchi, Toshiaki, 5,017,683, Cl. 528-396.000.

MacAllister, Niall P. Endotracheal intubation apparatus. 5,016,614, Cl. 128-4.000.

MacDermid, Incorporated: *See—*

Cordani, John L., 5,017,267, Cl. 156-656.000.

Machida, Katsuichi; Saito, Akira; and Sakagami, Teruo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Spirooxazine photochromic compounds. 5,017,698, Cl. 544-71.000.

Machida, Morihisa; Tajima, Yoshio; Nakatsumi, Hideo; Isahai, Tatsuo; and Shiroki, Daijiro, to Yokohama Rubber Co., Ltd., The; and Hitachi, Ltd. Laminate having indicator function. 5,017,427, Cl. 428-323.000.

Mackelburg, Gerald R.; Bodzin, Leon J.; McCracken, Howard B.; and Diamond, Anthony E., to United States of America, Navy. Adjustable frequency diversity acoustic communications system. 5,018,114, Cl. 367-134.000.

Macpherson, Hugh. Solvent responsive signal-carrying device. 5,017,908, Cl. 340-605.000.

Macpherson, John W.; and Acree, Lee M., to Lucks Company, The. Method for making edible base shapes having pictorial images for decorating foodstuffs. 5,017,394, Cl. 426-302.000.

Madan, Arun; and Von Roedern, Bolko, to Glasstech Solar, Inc. Modular continuous vapor deposition system. 5,016,562, Cl. 118-719.000.

Madland, Paul D., to Intel Corporation. Timing circuit for memory employing reset function. 5,018,111, Cl. 365-233.000.

Maeda, Masaru: *See—*

Sakurai, Kaoru; Maeda, Masaru; Murakami, Harunori; and Iijima, Hiroshi, 5,017,933, Cl. 343-704.000.

Maeda, Shuichi: *See—*

Nakanishi, Masayuki; Iwasaki, Takashi; and Maeda, Shuichi, 5,017,225, Cl. 106-21.000.

Maenishi, Kozo; and Watanabe, Makoto, to Omron Tateisi Electronics Co. Solid state relay. 5,018,050, Cl. 361-386.000.

Magi, Juhan: *See—*

Lundstrom, Per-Åke; Andersson, Gunnar A.; West, Åke; and Magi, Juhan, 5,017,218, Cl. 75-388.000.

Magnavox Government and Industrial Electronics Company: *See—*

Congdon, John C., 5,018,116, Cl. 367-165.000.

Magneshield Technologies, Inc.: *See—*

Yarger, Eric J.; Yarger, Rex D.; and Clegg, Gary D., 5,017,736, Cl. 174-35.0MS.

MagneTek Controls: *See—*

Dumais, Arthur; and Koski, Richard D., 5,017,867, Cl. 324-207.130.

Mahaux, Jean-Marie: *See—*

Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.

Maitland, Kenneth R., to Majco Building Specialties, L.P. Fireplace top wall assembly and cooling system. 5,016,613, Cl. 126-312.000.

Majco Building Specialties, L.P.: *See—*

Maitland, Kenneth R., 5,016,613, Cl. 126-312.000.

Majerus, Norbert; Chlebina, Larry E.; and Rambacher, John S., to Goodyear Tire & Rubber Company, The. Self aligning nozzle for injection molding. 5,017,127, Cl. 425-549.000.

Makarewicz, Paul A.: *See—*

Imperial, George R.; Kung, Hsiang-Ching; Makarewicz, Paul A.; McCormick, Bonnie J.; and Slovik, Lori S., 5,017,416, Cl. 428-195.000.

Makekau, Charles K.: *See—*

Horner, Joseph L.; Fielding, Kenneth H.; and Makekau, Charles K., 5,016,976, Cl. 350-162.130.

Makino, Tadashi; Doi, Koji; Matsuoka, Masayoshi; and Tsuboi, Toshiharu, to Senju Pharmaceutical Co., Ltd. Solid pharmaceutical preparation and method of producing same. 5,017,564, Cl. 514-47.000.

Makino, Yutaka: *See—*

Sato, Syoji; Makino, Yutaka; Ishimoto, Kazumi; and Izumi, Yasuo, 5,017,131, Cl. 432-152.000.

Makita, Haruomi, to Mitsubishi Jukogyo Kabushiki Kaisha. Moving blade tip clearance measurement apparatus and method with moveable lens. 5,017,796, Cl. 250-561.000.

Makita, Hideshi: *See—*

Kawashima, Akihiro; Yoshida, Hirokazu; Tagusa, Yasunobu; Inada, Kiyoshi; Makita, Hideshi; and Dotta, Yoshihisa, 5,016,986, Cl. 350-339.00R.

Malick, Ahmad W.: *See—*

Escobar, Agustin; Wagenknecht, Dietmar; and Malick, Ahmad W., 5,017,609, Cl. 514-538.000.

Malik, Aslam A.: *See—*

Baum, Kurt; Archibald, Thomas G.; and Malik, Aslam A., 5,017,734, Cl. 585-21.000.

Mamin, Harry J.; and Rugar, Daniel, to International Business Machines Corporation. High sensitivity position sensor and method. 5,017,010, Cl. 356-345.000.

MAN Roland Druckmaschinen AG: *See—*

Birkmair, Hubert, 5,016,863, Cl. 270-41.000.

Manabe, Naoki: *See—*

Sugiyama, Masaaki; and Manabe, Naoki, 5,017,147, Cl. 439-144.000.

Manabe, Takashi: *See—*

Matsuo, Masaaki; Manabe, Takashi; Shigenaga, Shinji; and Matsuda, Hiroshi, 5,017,703, Cl. 546-201.000.

Manaka, Sumio: *See—*

Igaki, Tetsuo; Kaneko, Akio; Manaka, Sumio; and Kinoshita, Kimiaki, 5,017,710, Cl. 549-226.000.

Manchester R & D Partnership: *See—*

Fergason, James L., 5,016,984, Cl. 350-334.000.

Mandeville, Jon R.: *See—*

Jaffe, Robert S.; and Mandeville, Jon R., 5,018,211, Cl. 382-8.000.

Mandoh, Ritsuo: *See—*

Kanda, Nobuo; Mandoh, Ritsuo; Nojima, Masaharu; and Arai, Naoto, 5,017,545, Cl. 503-208.000.

Mangus, Donald J. Cautery tip cleaner and holder. 5,016,401, Cl. 51-328.000.

Mann, William F.: *See—*

Gilda, Patricia; Mann, William F.; and Allen, Winthrop D., III, 5,016,754, Cl. 206-496.000.

Mannesmann Aktiengesellschaft: *See—*

Becker, Eberhard; Sprung, Hartwig; and Staggl, Roland, 5,016,407, Cl. 52-126.100.

Manns, William G.; Wood, Anthony B.; Norwood, David A.; Weeks, Don J.; and Gordon, Michael, to Texas Instruments Incorporated. Defect area consolidation for pattern inspector. 5,018,212, Cl. 382-8.000.

Manns, William G.: *See—*

Merryman, Jerry D.; Penn, Thomas C.; Manns, William G.; Weeks, Don J.; and Wood, Anthony B., 5,018,210, Cl. 382-8.000.

Marcec, Jerome J.; Phillips, James O.; Grzybowski, Albert T.; and Grzybowski, Bohdan, to Amoco Corporation. Automated flow rate machine. 5,016,467, Cl. 73-56.000.

Marconi Company Limited, The: *See—*

Newham, Paul; and Andrews, Bernard J., 5,017,937, Cl. 343-785.000.

Marcus, Harris L., to Board of Regents, The Uni. of Texas System. Gas phase selective beam deposition. 5,017,317, Cl. 264-81.000.

Margot, Christian: *See—*

Chapuis, Christian; Margot, Christian; Schulte-Elte, Karl-Heinrich; and Pamingle, Herve , 5,017,711, Cl. 549-332.000.

Marhevka, Virginia C. Film-forming teat sealer for prevention of mastitis and use thereof. 5,017,369, Cl. 424-78.000.

Marikar, Y. M. Faruq; and Besso, Michael M., to Hoechst Celanese Corp. Process for preparing electrically conductive shaped articles from polybenzimidazoles. 5,017,420, Cl. 428-212.000.

Marinho, John A.; Pilgrim, Steven J.; and Yu, I-Hsiang, to AT&T Bell Laboratories. Mobile telephone intrasystem and intersystem enhanced handoff method and apparatus for limiting trunk switching connections. 5,018,187, Cl. 379-60.000.

Marini, Lawrence G.: *See—*

Relf, Richard S.; Marini, Lawrence G.; and Parkinson, David, 5,017,141, Cl. 434-29.000.

Marland, Andre : *See—*

Fargette, Alain; Marland, Andre ; Thomas, Fabrice; and Souloumiac, Alain, 5,016,978, Cl. 350-269.000.

Marlar, Brian A. Arm restraint device for children afflicted with a compulsive biting disorder. 5,016,650, Cl. 128-878.000.

Marlowe, Carolyn: *See—*

Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, 5,016,655, Cl. 131-310.000.

Marmer, William N.: *See—*

Arifoglu, Mustafa; and Marmer, William N., 5,017,194, Cl. 8-111.000.

Marshall, Ian W.; and Constantine, Philip D., to British Telecommunications public limited company. Optical package. 5,016,965, Cl. 350-96.180.

Marsoner, Hermann; Fischer, Fritz; and Kleinhappl, Erich, to AVL AG. Apparatus for measuring the components of a sample. 5,017,339, Cl. 422-82.040.

Martan, Hans; Mross, Wolf D.; and Engert, Gerd-Juergen, to BASF Aktiengesellschaft. Catalyst for the oxidation and ammonoxidation of α-, β-unsaturated hydrocarbons. 5,017,542, Cl. 502-209.000.

Marten, Lewis H.; and Lane, Charles, to Hood Laboratories. Tracheal cannulas and stents. 5,017,188, Cl. 604-178.000.

Marten, Manfred; Godau, Claus; and Schmelzer, Heinz, to Hoechst AG. Use of polyamidoamines as curing agents fo. epoxy resins and curable mixtures containing these substances wherein the acid component has oxyalkylene(repeating)units. 5,017,675, Cl. 528-111.000.

Martin, Donald J.; Narciso, Ralph A.; Lowe, David T.; and Greenman, Clifford H., to Raynet Corporation. Method of repairing an optical fiber. 5,016,962, Cl. 350-96.160.

Martin, Donald L. Printed material organizer. 5,016,763, Cl. 211-184.000.

Martin Engineering Company: *See—*

Veenhof, Willem D., 5,016,747, Cl. 198-525.000.

Martin, James W.; Brown, Robert S.; Buck, E. Lance; and Del Corso, Gregory J., to Carpenter Technology Corporation. Process for making clad articles and article made thereby. 5,017,437, Cl. 428-558.000.

Martin Marietta Energy Systems, Inc.: *See—*

Tiegs, Terry N.; and Lindemer, Terrence B., 5,017,528, Cl. 501-95.000.

Maruishi Iron Works Co., Ltd.: *See—*

Ishikawa, Makoto, 5,017,085, Cl. 414-796.000.

Maruman Golf Kabushikikaisha: *See—*

Kobayashi, Masashi, 5,016,883, Cl. 273-167.00R.

Maruta, Takashi: *See—*

Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.

Maruyama, Frederick; and Cortese, Richard, to Alza Corporation. Multi-unit pulsatile delivery system. 5,017,381, Cl. 424-472.000.

Maruyama, Tadashi, to Kabushiki Kaisha Toshiba. Nonvolatile semiconductor memory. 5,018,108, Cl. 365-230.060.

Maruyama, Takashi: *See—*

Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, 5,017,663, Cl. 525-397.000.

Marvin, Morley. Expandable polystyrene container hinge and method of forming. 5,016,777, Cl. 220-339.000.

Mas, Eduardo M. Compact mouth and breath freshener apparatus. 5,016,659, Cl. 132-321.000.

Maschinenfabrik Andritz Actiengesellschaft: *See—*

Schieg, Rudolf; and Tesch, Johann, 5,017,198, Cl. 55-21.000.

Maschinenfabrik Gustav Eirich: *See—*

Durr, Herbert, 5,016,361, Cl. 34-10.000.

Maschinenfabrik Rieter AG: *See—*

Erni, Daniel; and Staeheli, Paul, 5,016,322, Cl. 19-150.000.

Mase, Yasukazu; Abe, Masahiro; and Hirata, Osamu, to Kabushiki Kaisha Toshiba. Method of determining end of cleaning of semiconductor manufacturing apparatus. 5,016,663, Cl. 134-1.000.

Mashey, Thomas: *See—*

Violette, John A.; and Mashey, Thomas, 5,017,092, Cl. 416-204.00A.

Mason, Claude F., to Ford Motor Company. Flexible, solid electrolyte useful in electrochromic devices. 5,016,991, Cl. 350-357.000.

Mason, Steven M.: *See—*

Claar, Terry D.; and Mason, Steven M., 5,017,334, Cl. 419-12.000.

Massachusetts Institute of Technology: *See—*

Pang, Stella W.; and Horn, Mark W., 5,017,403, Cl. 427-39.000.

Pasternack, Mark S.; and Eisen, Herman S., 5,017,489, Cl. 435-196.000.

Massey, Peter J., to U.S. Philips Corp. Microwave antenna. 5,017,936, Cl. 343-773.000.

Mastin, Stephen H.: *See—*

Harte, Richard A.; and Mastin, Stephen H., 5,017,475, Cl. 435-7.900.

Masuda, Hiroshi: *See—*

Mochizuki, Kazuhiro; Tanoue, Tomonori; Kusano, Chushirou; Masuda, Hiroshi; and Mitani, Katsuhiko, 5,017,517, Cl. 437-90.000.

Masuda, Kazuaki; Saito, Akio; Kashino, Toshio; and Watanabe, Takashi, to Canon Kabushiki Kaisha. Ink jet recording head having surface treatment layer and recording equipment having the head. 5,017,946, Cl. 346-140.00R.

Masuda, Kazuaki, to Canon Kabushiki Kaisha. Liquid ejection recording head having a substrate supporting a wall portion which includes support walls to form open channels that securely bond a lid member to the wall portion. 5,017,947, Cl. 346-140.00R.

Masukawa, Toyoaki; and Nakayama, Noritaka, to Konica Corporation. Photographic material with imidazole cyan coupler. 5,017,467, Cl. 430-558.000.

Masukewicz, David W.: *See—*

Abrams, Lane J.; Loughran, Kevin; Masukewicz, David W.; and Overstreet, Robert L., Jr., 5,018,184, Cl. 379-29.000.

Masumoto, Takahiko, to Sanyo Electric Co., Ltd. Decoder for subsampled video signal. 5,018,010, Cl. 358-136.000.

Matejcek, Franz: *See—*

Kempter, Fritz E.; Matejcek, Franz; Neubach, Werner; and Flory, Klaus, 5,017,641, Cl. 524-598.000.

Maternaghan, Trevor J.: *See—*

Mowforth, Clive W.; Bullock, James F.; and Maternaghan, Trevor J., 5,017,469, Cl. 430-569.000.

Matsubara, Kenji: *See—*

Horie Fujio; and Matsubara, Kenji, 5,016,550, Cl. 112-454.000.

Matsuda, Akihisa: *See—*

Iijima, Shigeru; Tanaka, Kazunobu; Matsuda, Akihisa; Matsumura, Mitsuo; and Yamamoto, Hideo, 5,017,308, Cl. 252-501.100.

Matsuda, Hiroshi: *See—*

Matsuo, Masaaki; Manabe, Takashi; Shigenaga, Shinji; and Matsuda, Hiroshi, 5,017,703, Cl. 546-201.000.

Matsuda, Koichi: *See—*

Saitoh, Keishi; Okamura, Ryuji; Otoshi, Hirokazu; and Matsuda, Koichi, 5,016,565, Cl. 118-723.000.

Matsuda, Shoichi: *See—*

Suzuki, Akira; Matsuda, Shoichi; Muto, Yasutami; and Aoki, Kazuo, 5,016,688, Cl. 141-170.000.

Matsuda, Yusaku, to Sanwa Diamond Industrial Co., Ltd. Method and apparatus for manufacturing super abrasive cutting saw. 5,016,498, Cl. 76-25.100.

Matsugami, Shouji: *See—*

Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji; Koguma, Hiroshi; and Emata, Takashi, 5,018,004, Cl. 357-74.000.

Matsugishi, Noriaki: *See—*

Furusawa, Toshihiro; Satoh, Atsushi; Nakajima, Takashi; and Matsugishi, Noriaki, 5,017,311, Cl. 264-23.000.

Matsuhisa, Tadaaki: *See—*

Ukai, Noriyuki; Hayakawa, Issei; Miyamoto, Mithuru; and Matsuhisa, Tadaaki, 5,017,531, Cl. 501-98.000.

Matsui, Kazuhiko; Miwa, Kiyoshi; and Sano, Konosuke, to Ajinomoto Co., Inc. Coryneform bacteria carrying recombinant DNA and process for producing an aromatic amino acid by using the same. 5,017,481, Cl. 435-108.000.

Matsui, Toshikazu: *See—*

Ohtsuka, Nobukazu; Nagai, Hiroyuki; Shibanaka, Mitsugu; and Matsui, Toshikazu, 5,016,868, Cl. 271-273.000.

Matsui, Yuji: *See—*

Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.

Matsumoto, Hiroshi: *See—*

Ogata, Masaru; Matsumoto, Hiroshi; Shimizu, Sumio; and Kida, Shiro, 5,017,708, Cl. 548-515.000.

Matsumoto, Shigemi: *See—*

Tomita, Haruo; Yamashita, Kouichi; Kondo, Takeshi; Suzuki, Noriyuki; Matsumoto, Shigemi; and Asada, Masahiro, 5,017,651, Cl. 525-66.000.

Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, to Dai Ichi Kogyo Seiyaku Co., Ltd. Process for purifying sucrose fatty acid esters having high HLB. 5,017,697, Cl. 536-127.000.

Matsumoto, Tadao: *See—*

Noma, Takeshi; Matsumoto, Tadao; and Sugihara, Taizo, 5,017,658, Cl. 525-195.000.

Matsumoto, Yoshihiro: *See—*

Arakawa, Toshihiko; Mori, Toshiyuki; and Matsumoto, Yoshihiro, 5,017,530, Cl. 501-98.000.

Matsumura, Mitsuo: *See—*

Iijima, Shigeru; Tanaka, Kazunobu; Matsuda, Akihisa; Matsumura, Mitsuo; and Yamamoto, Hideo, 5,017,308, Cl. 252-501.100.

Matsunaga, Fujihisa: *See—*

Fukuhara, Hiroshi; and Matsunaga, Fujihisa, 5,017,729, Cl. 568-798.000.

Matsuno, Tomoyoshi: *See—*

Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.

Matsuo, Masaaki; Manabe, Takashi; Shigenaga, Shinji; and Matsuda, Hiroshi, to Fujisawa Pharmaceutical Company, Ltd. Indolylpiperidine compounds, processes for the preparation thereof and pharmaceutical composition comprising the same. 5,017,703, Cl. 546-201.000.

Matsuo, Tooru: *See—*

Honkura, Yoshinobu; Fukui, Yasuji; Matsuo, Tooru; and Mishima, Chisato, 5,017,247, Cl. 148-302.000.

Matsuo, Yutaka; Isobe, Takeshi; and Adachi, Kazuyosi, to Mitsubishi Kinzoku Kabushiki Kaisha. Zironium alloy for use in pressurized nuclear reactor fuel components. 5,017,336, Cl. 420-422.000.

Matsuoka, Hideo: *See—*

Tamada, Masuo; Tanaka, Tsutomu; and Matsuoka, Hideo. 5,017,766, Cl. 235-492.000.

Matsuoka, Hiroshi: *See—*

Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.

Matsuoka, Kazuhiko: *See—*

Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.

Matsuoka, Masayoshi: *See—*

Makino, Tadashi; Doi, Koji; Matsuoka, Masayoshi; and Tsuboi, Toshiharu, 5,017,564, Cl. 514-47.000.

Matsuoka, Noriyuki, to Yamaichi Electric Mfg. Co., Ltd. Socket for an electric part. 5,017,152, Cl. 439-263.000.

Matsuoka, Noriyuki, to Yamaichi Electric Mfg. Co., Ltd. Connector for an electric part. 5,017,154, Cl. 439-492.000.

Matsuoka, Takeru, to Fujitsu Limited. Clock signal conversion circuit. 5,018,168, Cl. 375-106.000.

Matsusako, Kyoji, to Burr-Brown Corporation. Method and circuit for eliminating major bit transition error at the bipolar zero point in a digital-to-analog converter. 5,017,918, Cl. 341-118.000.

Matsushita Electric Industrial Co., Ltd.: *See—*

Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; Miyoshi, Jun; and Eri, Masatsugu, 5,017,445, Cl. 429-224.000.

Hamada, Kiyoshi; Nonomura, Kinzo; Takahashi, Masayuki; Hashiguchi, Jumpei; and Kitao, Satoshi, 5,017,842, Cl. 315-366.000.

Kaida, Kenichi; Yamada, Osamu; and Okuda, Eiji, 5,017,864, Cl. 324-158.00F.

Kanazawa, Kiyoshi, 5,018,089, Cl. 364-578.000.

Miyazaki, Benichi; Yamamoto, Hiroshi; and Goto, Shoji, 5,018,033, Cl. 360-106.000.

Ogawa, Kazufumi, 5,017,975, Cl. 357-8.000.

Sato, Syoji; Makino, Yutaka; Ishimoto, Kazumi; and Izumi, Yasuo, 5,017,131, Cl. 432-152.000.

Yoshida, Yoshikazu; Tanaka, Kunio; Nishikawa, Yukio; and Takada, Yusuke, 5,017,277, Cl. 204-298.020.

Matsuura, Ichiro: *See—*

Yanagishita, Norio; Matsuura, Ichiro; Ishimaru, Kiichiro; and Akai, Mikio, 5,017,115, Cl. 425-125.000.

Matsuura, Yasumasa: *See—*

Harada, Hiroyuki; Matsuura, Yasumasa; Araki, Toshihiko; and Kajitani, Tetsuji, 5,017,850, Cl. 318-599.000.

Matsuzaki, Kichie; Isobe, Mitsunobu; Takeichi, Kenzo; Hisatomi, Ryouichi; and Kudou, Masasi, to Hitachi, Ltd. Object recognize apparatus. 5,018,219, Cl. 382-37.000.

Mattel, Inc.: *See—*

Shapero, Wallace H.; and Sneddon, John, 5,017,173, Cl. 446-374.000.

Matthews, Donald P.; Whitten, Jeffrey P.; and McCarthy, James B., to Merrell Dow Pharmaceuticals. Thiazolyl methyl)-2-2'-Bi-1H-imidazoles and use as hypertensive agents. 5,017,591, Cl. 514-369.000.

VOL 1126
ISS 3
MY 21 1991
UMI

- Matthews, Max, to Medical Concepts, Inc. Spline and splinting board combination. 5,016,620, Cl. 128-78.000.
- Mattiussi, Andrea: *See—*
  - Fiore, Leonardo; Borghi, Italo; and Mattiussi, Andrea, 5,017,657, Cl. 525-173.000.
- Matzner, Bruce: *See—*
  - Dix, Gary E.; Crowther, Russell L.; Colby, Mark J.; Matzner, Bruce; and Elkins, Robert B., 5,017,332, Cl. 376-370.000.
- Maxwell, M. Craig: *See—*
  - Janik, Leon P.; and Maxwell, M. Craig, 5,017,285, Cl. 210-232.000.
- Mayer, George E.: *See—*
  - Conrad, Alta; Mayer, George E.; and Utke, Donald A., 5,016,500, Cl. 81-9.400.
- Maynard, Richard B.: *See—*
  - Bills, William D.; Christini, Theodore P.; Kellogg, Reid E.; Maynard, Richard B.; and Zegarski, William J., 5,017,440, Cl. 428-690.000.
- Maynard, Scott D.: *See—*
  - Becker, Mark H.; and Maynard, Scott D., 5,016,335, Cl. 29-57.000.
- Mayo, Stephen I., to Artistic Desk Pad & Novelty Co., Inc. Collapsible organizational rack. 5,016,760, Cl. 211-55.000.
- Mayr, Bernhard, to TMC Corporation. Ski. 5,016,901, Cl. 280-607.000.
- Mazda Motor Corporation: *See—*
  - Doi, Shigetoshi: and Nagayama, Yoshiaki, 5,016,815, Cl. 236-49.300.
  - Kijima, Takao; Taniguchi, Haruyuki; Arai, Makoto; and Sugitani, Nobuyuki, 5,016,903, Cl. 280-663.000.
  - Takehara, Shin; Edahiro, Takeshi; Morita, Toshiki; and Kumada, Hiroyoshi, 5,016,911, Cl. 280-708.000.
- Mazurek, John D. Vibration dampening motor mount. 5,017,328, Cl. 267-136.000.
- McAllise, Gregg A.; and Buchtel, Dean H., to Hoover Company, The. Motor fan cover and sealing arrangement. 5,016,316, Cl. 15-412.000.
- McAllister, William T.; and Klement, John F., to University of Medicine and Dentistry of New Jersey. Highly efficient dual T7/T3 promoter vector PJKF16 and dual SP6/T3 promoter vector PJFK15. 5,017,488, Cl. 435-194.000.
- McBride, Daniel T.; and Stewart, William H., Jr., to Milliken Research Corporation. Method and apparatus for patterning substrates using gas streams. 5,016,308, Cl. 8-149.000.
- McCabe, Michael A.; Wilson, J. Michael; Weaver, Jimmie D.; and Venditto, James J., to Halliburton Company. Biocidal well treatment method. 5,016,714, Cl. 166-308.000.
- McCall, Robert G.: *See—*
  - Stalcup, Robert W.; and McCall, Robert G., 5,016,651, Cl. 128-898.000.
- McCarthy, James B.: *See—*
  - Matthews, Donald P.; Whitten, Jeffrey P.; and McCarthy, James B., 5,017,591, Cl. 514-369.000.
- McCarthy, William R.: *See—*
  - Birchall, James D.; Mockford, Mary J.; Stanley, David R.; Asher, Paul M. L.; and McCarthy, William R., 5,017,525, Cl. 501-87.000.
- McCaskill, Don R.; Orthoefer, Frank T.; and Danforth, Steven D., to Riceland Foods, Inc. Method of making a steamtable quality parboiled rice product. 5,017,395, Cl. 426-459.000.
- McClune, Gregory J.; and Smith-Lewis, Margaret J., to Eastman Kodak Company. Wash solution, test kit and method for the determination of an immunological ligand. 5,017,474, Cl. 435-7.500.
- McColgin, William C., to Eastman Kodak Company. Lift-off process. 5,017,459, Cl. 430-299.000.
- McColl, David B.: *See—*
  - Young, Phillip E.; and McColl, David B., 5,017,789, Cl. 250-396.0ML.
- McComas, Charles C., to United Technologies Corporation. Method of coating abradable seal assembly. 5,017,402, Cl. 427-34.000.
- McCormack, Christopher J.: *See—*
  - Haupt, Randy L.; and McCormack, Christopher J., 5,017,928, Cl. 342-379.000.
- McCormack, Mark: *See—*
  - Carobolante, Francesco; Pace, Ermanno; and McCormack, Mark, 5,017,845, Cl. 318-138.000.
- McCormick, Bonnie J.: *See—*
  - Imperial, George R.; Kung, Hsiang-Ching; Makarewicz, Paul A.; McCormick, Bonnie J.; and Slovik, Lori S., 5,017,416, Cl. 428-195.000.
- McCracken, Howard B.: *See—*
  - Mackelburg, Gerald R.; Bodzin, Leon J.; McCracken, Howard B.; and Diamond, Anthony E., 5,018,114, Cl. 367-134.000.
- McCully, Clyde E. Device for accomplishing directional movement of a trailer. 5,016,900, Cl. 280-477.000.
- McDavid, W. Doss; Dove, S. Brent; Welander, Ulf; and Tronje, Gunilla, to Board of Regents, The University of Texas System. Apparatus and method for producing digital panoramic x-ray images. 5,018,177, Cl. 378-62.000.
- McGarvey, David C.; and Whitman, David C., to LRS, Inc. Safety tank apparatus for liquid storage. 5,016,689, Cl. 141-198.000.
- McGill, John; and Zoubek, Stanley F., Jr., to Grumman Aerospace Corporation. Radar system and a method for operating a radar system. 5,017,921, Cl. 342-18.000.
- McGinn, David R.: *See—*
  - Williston, Dale B.; and McGinn, David R., 5,018,042, Cl. 361-42.000.
- McGuire, Thomas F.; and Noyes, John, III. Glove bag and method of use. 5,017,197, Cl. 55-1.000.
- McKee, Randy: *See—*
  - Shen, Bing-Whey; McKee, Randy; and Chung, Gishi, 5,017,506, Cl. 437-52.000.
- McKinney, John M.; Ata, Ali D.; Wierzba, Robert B.; and Flowers, William F., to Nalco Chemical Company. Automated chemical storage and chemical feed system. 5,016,666, Cl. 137-1.000.
- McKinnie, Bonnie G.; and Wood, Daniel A., to Ethyl Corporation. Tetrabromobisphenol-A process. 5,017,728, Cl. 568-726.000.
- McMann, Ronald E.: *See—*
  - Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Garcia, Evaristo, Jr., 5,017,510, Cl. 437-192.000.
- McMurtrie, Andrew, to Brown & Williamson Tobacco Corporation. Cigarette and method of making same. 5,016,656, Cl. 131-364.000.
- McNamara, Paul E.: *See—*
  - Neustadt, Bernard R.; Andrews, David R.; McNamara, Paul E.; and Watkins, Robert W., 5,017,567, Cl. 514-171.000.
- McNay, Thomas O.: *See—*
  - Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, 5,017,740, Cl. 174-152.0GM.
- McNeil (Ohio) Corporation: *See—*
  - Carpenter, Roger E., 5,016,825, Cl. 241-46.060.
- McOmber, Janice I.: *See—*
  - Reichelderfer, Richard F., deceased; McOmber, Janice I.; Ryan, Andrew P.; and Davies, John T., 5,016,332, Cl. 29-25.010.
- McPeters, Arnold L.: *See—*
  - Carter, Don E.; McPeters, Arnold L.; and Skeen, Hobson L., 5,017,116, Cl. 425-131.500.
- McQueen, Alastair M.: *See—*
  - Pagdin, Brian C.; and McQueen, Alastair M., 5,016,588, Cl. 123-399.000.
- McShane, Michael B.: *See—*
  - Lin, Paul T.; and McShane, Michael B., 5,018,005, Cl. 357-80.000.
- McWhirter, John G.; and Shepherd, Terence J., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Processor for constrained least squares computations. 5,018,065, Cl. 364-900.000.
- Mead Corporation, The: *See—*
  - Feldman, Lyudmila, 5,017,452, Cl. 430-138.000.
  - Robertson, J. D.; and Orr, Ladd M., 5,016,545, Cl. 108-111.000.
  - Spamer, William S.; Robertson, J. David; Stoddard, David C. F.; and Hanna, James L., 5,016,527, Cl. 98-115.300.
  - Spamer, William S., 5,016,759, Cl. 211-13.000.
  - Stoddard, David C. F.; Robertson, James D.; Spamer, William S.; Hanna, James; Bailey, Randall E.; and Parham, Dennis E., 5,016,761, Cl. 211-59.400.
  - Zimmer, Anita F.; and Billbury, Ronald R., 5,016,859, Cl. 254-134.30R.
- Meadows, David A.: *See—*
  - Carter, William; Meadows, David A.; Hayes, Jay L.; and Voege, John S., 5,016,673, Cl. 138-45.000.
- Means, Rodney J.: *See—*
  - Kulakowski, John E.; Means, Rodney J.; Oldham, David M.; and Tayefeh, Morovat, 5,018,126, Cl. 369-58.000.
- Mecanismos Auxiliares Industriales, S.A.: *See—*
  - Aligue , Jordi C.; and Vazquez, Manuel A., 5,016,345, Cl. 29-742.000.
- Mecke, Norbert; and Krauter, Heinrich, to Pelikan Aktiengesellschaft. Multiple impression thermal transfer ribbon. 5,017,428, Cl. 428-336.000.
- Medical Concepts, Inc.: *See—*
  - Matthews, Max, 5,016,620, Cl. 128-78.000.
- Medicis Corporation: *See—*
  - Hastings, Donald H., 5,017,372, Cl. 424-85.800.
- Medrad, Inc.: *See—*
  - Cowan, Kevin P.; Fazi, Bruno, Jr.; Havrilla, Joseph B.; Lewandowski, Stanley R.; and Reilly, David M., 5,018,182, Cl. 378-173.000.
- Meerson, Felix Z.: *See—*
  - Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y ; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.
- Meguro, Kazunori; Itoh, Toshiaki; and Abe, Shigeru, to Toshiba Ceramics Co., Ltd. Radiant tube type heater. 5,016,610, Cl. 126-91.00A.
- Mehnert, Wolfgang, to IFM Electronic GmbH. Housing for electronic switchgear. 5,018,049, Cl. 361-380.000.
- Mehus, Richard: *See—*
  - Thomas, John E.; Saby, Darrell; and Mehus, Richard, 5,016,790, Cl. 222-639.000.
- Meinzer, Karl, to Messerschmitt-Boelkow-Blohm GmbH. Broadband nonlinear drive control network for linear amplifiers arranged in several amplifier channels. 5,017,888, Cl. 330-295.000.
- Mellitz, Richard I., to Digital Equipment Corporation. Electro-emissive laser stimulated test. 5,017,863, Cl. 324-158.00R.
- Melman, Paul: *See—*
  - Eichen, Elliot; and Melman, Paul, 5,016,960, Cl. 350-96.150.
- Meltz, Gerald; and Morey, William W., to United Technologies Corporation. Multi-core optical waveguide Bragg grating light redirecting arrangement. 5,016,967, Cl. 350-96.190.
- Memoli, Kevin A.: *See—*
  - Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., 5,017,601, Cl. 514-443.000.
- Mende, Takayuki; and Sakai, Takanobu, to Mitsui Petrochemical Industries, Ltd. Melt-blowing die. 5,017,112, Cl. 425-72.200.

- Mengel, Erich: *See—*
  - Gideon, Jurgen; Krieger, Dieter; and Mengel, Erich, 5,017,054, Cl. 406-191.000.
- Mentken, Robert. Modular universal construction units employing flexible web with interlockable heads. 5,016,417, Cl. 52-571.000.
- Mercat, Jean-Pierre, to Ste Look. Method for measuring the torque transmitted to the driving wheel of a cycle or like vehicle and a device for carrying out said method. 5,016,478, Cl. 73-862.190.
- Mercedes-Benz AG: *See—*
  - Leistenschneider, Raimund, 5,017,847, Cl. 318-443.000.
- Merck & Co., Inc.: *See—*
  - Ostlind, Dan A.; and Mochales, Sagrario, 5,017,603, Cl. 514-455.000.
- Merck Frosst, Canada, Inc.: *See—*
  - Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,593, Cl. 514-381.000.
  - Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,597, Cl. 514-411.000.
  - Young, Robert N.; Rokach, Joshua; Williams, Haydn R.; Kakushima, Masatoshi; and Guindon, Yvan, 5,017,583, Cl. 514-312.000.
- Mero-Werke Dr. Ing. Max Mengeringhausen GmbH & Co.: *See—*
  - Brillinger, Martin; Hiller, Wolfgang; Klingelhoefer, Ulrich; and Radtke, Manfred, 5,016,408, Cl. 52-126.600.
- Merrell Dow Pharmaceuticals: *See—*
  - Matthews, Donald P.; Whitten, Jeffrey P.; and McCarthy, James B., 5,017,591, Cl. 514-369.000.
- Merrell Dow Pharmaceuticals Inc.: *See—*
  - Liu, Paul S.; Rhinehart, Barry L.; and Daniel, John K., 5,017,563, Cl. 514-27.000.
- Merritt, Edward J., Jr.; Samuels, Joan E.; and Bietry, Joseph R., to Chapman Instruments, Inc. Viewing system for surface profiler. 5,017,012, Cl. 356-371.000.
- Merryman, Jerry D.; Penn, Thomas C.; Manns, William G.; Weeks, Don J.; and Wood, Anthony B., to Texas Instruments Incorporated. Pattern comparator with substage illumination and polygonal data representation. 5,018,210, Cl. 382-8.000.
- Meskell, David J., Jr.: *See—*
  - Arroyo, Candido J.; Meskell, David J., Jr.; and Mullin, Francis J., 5,016,952, Cl. 350-96.200.
- Messerschmitt-Boelkow-Blohm GmbH: *See—*
  - Meinzer, Karl, 5,017,888, Cl. 330-295.000.
  - Poisel, Hans; and Trommer, Gert, 5,017,006, Cl. 356-218.000.
- Messerschmitt-Bolkow-Blohm GmbH: *See—*
  - Klausing, Helmut; and Kaltschmidt, Horst, 5,017,922, Cl. 342-25.000.
  - Koerv, Peter, 5,018,009, Cl. 358-100.000.
  - Kranz, Walter, 5,016,835, Cl. 244-3.220.
- Messina, Giuseppe; Lorenzoni, Loreno; Calaresu, Paolo; and Sechi, Giovanni M., to Enichim ANIC S.p.A. Process for the preparation of oxalyl- and oxamyl-hydrazides. 5,017,721, Cl. 564-151.000.
- Metallgesellschaft Aktiengesellschaft: *See—*
  - Bornemann, Gert; and Heibel, Hans-Jurgen, 5,016,576, Cl. 122-4.00D.
- Metcalf, Brian W.: *See—*
  - Holt, Dennis A.; Kowalski, Conrad J.; Levy, Mark A.; Metcalf, Brian W.; and Tickner, Ann M., 5,017,568, Cl. 514-173.000.
- Metcalf, Stephan C., to Gillette Company, The. Single button razor. 5,016,352, Cl. 30-85.000.
- Metcalf, Walter W. Self-propulsion device for skateboards or the like. 5,016,726, Cl. 280-243.000.
- Metz, Kurt W. Pyramidal shaped balloon holder. 5,016,848, Cl. 248-176.000.
- Meyer, Gunter: *See—*
  - Janicka, Johannes; Meyer, Gunter; and Durselen, Heinz, 5,017,270, Cl. 201-41.000.
- Meyer. Karl-Hanns, to U.S. Philips Corporation. Linear motor actuator for moving an optical read/write head. 5,018,122, Cl. 369-44.140.
- Meyer, Raymond E.: *See—*
  - Schutt, Ernest G.; Dondero, Richard S.; Hansen, William P.; Hovorka, George B.; and Meyer, Raymond E., 5,017,009, Cl. 358-338.000.
- Meyer, Robert A., to Ramvac Corporation. Trap and separator for denial vacuum systems. 5,017,135, Cl. 433-92.000.
- Meyer, Rolf-Volker: *See—*
  - Kohler, Burkhard; Meyer, Rolf-Volker; Dorf, Ernst-Ulrich; Russeler, Wolfgang; and Schmidt, Manfred, 5,017,682, Cl. 528-388.000.
- Miceli, Joseph J. Pomice containing composition. 5,017,232, Cl. 106-711.000.
- Michelsen, Ralph; Schulze-Brockhausen, Udo; Weit, Herbert; and Schmitz, Erwin, to Christian Pfeiffer Maschinenfabrik GmbH & Co., KG. Tube mill partition. 5,016,826, Cl. 241-72.000.
- Microbiological Associates, Inc.: *See—*
  - Harte, Richard A.; and Mastin, Stephen H., 5,017,475, Cl. 435-7.900.
- Middelhoek, Jan; Hemink, Gerrit-Jan; and Wijburg, Rutger C. M., to U.S. Philips Corp. EPROM having a reduced number of contacts. 5,017,978, Cl. 357-23.500.
- Mieda, Yoshihiro: *See—*
  - Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshihiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, 5,016,890, Cl. 273-312.000.
- Miethe, Peter; Voss, Harald; and Gruber, Ronald, to Degussa Aktiengesellschaft. Method for the biocatalytic reaction of organic substances. 5,017,476, Cl. 435-61.000.
- Migita, Kazuhiko: *See—*
  - Uehara, Yukiyasu; and Migita, Kazuhiko, 5,017,146, Cl. 439-65.000.
- Mikros U.S.A., Inc.: *See—*
  - Bender, Kelly M., 5,016,621, Cl. 128-80.00C.
- Miler, Steven L.; Wathen, Ronald L.; and Palazzo, Raymond E., Jr., to Environmental Water Technology, Inc. Fluid purifying apparatus and method of purifying fluids. 5,017,284, Cl. 210-97.000.
- Miles Inc.: *See—*
  - Fossati, Piero; Heidenreich, Holger; Hugl, Herbert; and Wehling, Klaus, 5,017,498, Cl. 436-84.000.
- Milijasevic, Zoran: *See—*
  - Gotthardt, Gerhard; Milijasevic, Zoran; Nakazawa, Akira; and Skalsky, Michael, 5,016,646, Cl. 128-784.000.
- Milkowski, Andrew L.: *See—*
  - Anders, Robert J.; Cerveny, John G.; and Milkowski, Andrew L., 5,017,391, Cl. 426-129.000.
- Miller, Lee A., to GB Electrical, Inc. Plastic pipe heater. 5,017,760, Cl. 219-390.000.
- Miller, Lester N.: *See—*
  - Dimarco, Ben P.; Tolone, Ralph J.; and Miller, Lester N., 5,016,706, Cl. 165-162.000.
- Miller, Paul; and Thompson, Tommy L., to Energy Concepts, Inc. Door and dock cover. 5,016,391, Cl. 49-70.000.
- Miller, Stephen J.: *See—*
  - Mulaskey, Bernard; Miller, Stephen J.; Holtermann, Dennis L.; and Jacobson, Robert L., 5,017,278, Cl. 208-65.000.
- Miller, William J. Modular rowing shell. 5,016,557, Cl. 114-347.000.
- Miller, William J.; Nolan, Daniel A.; and Williams, Gregory E., to Corning Incorporated. Method of providing a 1xN fiber optic coupler. 5,017,206, Cl. 65-3.110.
- Milligan, William D.; and Cecere, Andrew P., to Compax Corp. Apparatus for compressive shrinkage of tubular knitted fabrics and the like. 5,016,329, Cl. 26-18.500.
- Milliken Research Corporation: *See—*
  - Gilpatrick, Michael W., 5,016,328, Cl. 26-7.000.
  - McBride, Daniel T.; and Stewart, William H., Jr., 5,016,308, Cl. 8-149.000.
  - Sanders, Kenneth H., 5,017,425, Cl. 428-253.000.
- Millipore Corporation: *See—*
  - DiLeo, Anthony J.; Allegrezza, Anthony E., Jr.; and Burke, Edmund T., 5,017,292, Cl. 210-645.000.
- Mills, Jesse V., to Henley Manufacturing Holding Company, Inc. Rocker arm. 5,016,582, Cl. 123-90.390.
- Milne, Christopher G.; Shelby, Paulus P., Jr.; and Bailey, David L. Apparatus and microbase for surface-enhanced raman spectroscopy system and method for producing same. 5,017,007, Cl. 356-301.000.
- Minagawa, Takashi: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Minagawa, Tsutomu: *See—*
  - Kai, Naoyuki; Ohhashi, Masahide; and Minagawa, Tsutomu, 5,018,147, Cl. 371-49.100.
- Minami, Kyoji: *See—*
  - Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, 5,017,380, Cl. 424-454.000.
- Minarovic, Joe T.: *See—*
  - Cosman, Armond D.; Knippelmier, Gary H.; and Minarovic, Joe T., 5,017,415, Cl. 428-77.000.
- Minnesota Mining and Manufacturing Company: *See—*
  - Cosman, Armond D.; Knippelmier, Gary H.; and Minarovic, Joe T., 5,017,415, Cl. 428-77.000.
  - Dodge, Larry H.; and Stone, Stanford C., 5,017,192, Cl. 604-250.000.
  - Sowman, Harold G., 5,017,316, Cl. 264-60.000.
  - Weiss, John W., 5,018,044, Cl. 361-220.000.
  - Young, John B.; and Lokken, Roger C., 5,016,311, Cl. 15-88.300.
- Minolta Camera Kabuahiki Kaisha: *See—*
  - Sakata, Toshio, 5,017,970, Cl. 355-290.000.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,017,961, Cl. 355-202.000.
  - Myochin, Hisashi; Inoue, Yoshinori; Saito, Hitoshi; and Yoshida, Narutaka, 5,018,045, Cl. 361-229.000.
  - Nakai, Masaaki; Izumi, Shuji; Fujino, Akihiko; Taniguchi, Nobuyuki; Yamaki, Toshio; and Mukai, Hiromu, 5,017,957, Cl. 354-429.000.
  - Yamaguchi, Ikunori; and Ikenoue, Yoshikazu, 5,018,081, Cl. 364-519.000.
- Minooka, Masahiro: *See—*
  - Kawai, Naoki; Hamamoto, Koji; and Minooka, Masahiro, 5,017,757, Cl. 219-130.510.
- Minor, Robert N.; and Berg, Kjell E. Fluid directing systems. 5,017,042, Cl. 405-50.000.
- Minoura, Kazuo: *See—*
  - Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.
- Mir, Jose M.: *See—*
  - Agostinelli, John A.; Mir, Jose M.; Paz-Pujalt, Gustavo R.; Lelental, Mark; and Nicholas, Ralph A., III, 5,017,551, Cl. 505-1.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Miraucourt, Carmen; and Delrieu, Gilles L. E., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A.". Gas turbine engine compressor casing with internal diameter control. 5,017,088, Cl. 415-173.200.
- Mishima, Chisato: *See—*
  - Honkura, Yoshinobu; Fukui, Yasuji; Matsuo, Tooru; and Mishima, Chisato, 5,017,247, Cl. 148-302.000.
- Mr. Tool Manufacturing, Inc.: *See—*
  - Cassata, Orrin J., 5,016,368, Cl. 40-299.000.
- Misumi, Hiroshi: *See—*
  - Shimaguchi, Takashi; Yamada, Toshihiko; Natori, Tatsuo; Okada, Akihisa; and Misumi, Hiroshi, 5,017,102, Cl. 417-420.000.
- Mita Industrial Co., Ltd.: *See—*
  - Harada, Hiroyuki; Matsuura, Yasumasa; Araki, Toshihiko; and Kajitani, Tetsuji, 5,017,850, Cl. 318-599.000.
  - Ohtsuka, Nobukazu; Nagai, Hiroyuki; Shibanaka, Mitsugu; and Matsui, Toshikazu, 5,016,868, Cl. 271-273.000.
- Mitani, Katsuhiko: *See—*
  - Mochizuki, Kazuhiro; Tanoue, Tomonori; Kusano, Chushirou; Masuda, Hiroshi; and Mitani, Katsuhiko, 5,017,517, Cl. 437-90.000.
- Mitani, Takahiko: *See—*
  - Sawai, Kiichi; Natori, Shunji; Takahashi, Haruo; Tanaka, Kenichi; Mitani, Takahiko; and Kurono, Masayasu, 5,017,486, Cl. 435-172.300.
- Mitchell, Bruce. Transit system. 5,016,542, Cl. 104-130.000.
- Mitchell, William D. Hydraulic lift mechanism for camper shells. 5,016,858, Cl. 254-45.000.
- Mitkov, Atanas L.; Georgiev, Ivan N.; Atanassov, Atanas K.; Radulov, Peter T.; and Stoyanov, Iliya Y., to VTU "Angel Kantchev". Maize sheller. 5,017,177, Cl. 460-46.000.
- Mitomi, Tatsuo; and Hirose, Yoshihiko, to Canon Kabushiki Kaisha. Device having movable belt. 5,017,969, Cl. 355-271.000.
- Mitsubishi Denki Kabushiki Kaisha: *See—*
  - Kobayashi, Kiyoteru, 5,017,982, Cl. 357-23.600.
  - Morikane, Hiroyuki, 5,016,484, Cl. 74-6.000.
  - Nishida, Yoshihiro, 5,018,040, Cl. 360-137.000.
  - Nishimura, Tadashi; Sugahara, Kazukyuki; Kusunori, Shigeru; and Ohsaki, Akihiko, 5,017,504, Cl. 437-40.000.
  - Okada, Masato; Kohno, Masaki; and Yagi, Tetsuya, 5,018,158, Cl. 372-46.000.
  - Otsubo, Mutsuyuki, 5,017,243, Cl. 136-244.000.
  - Shimizu, Yuzuru; and Hata, Yoshio, 5,017,822, Cl. 310-207.000.
  - Takagi, Hiroshi, 5,017,512, Cl. 437-227.000.
  - Yasunaga, Masatoshi; and Kohara, Masanobu, 5,018,003, Cl. 357-72.000.
  - Yoshida, Kazuo, 5,017,744, Cl. 200-277.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
  - Makita, Haruomi, 5,017,796, Cl. 250-561.000.
  - Takahori, Mutsuo; and Hirahara, Hidehumi, 5,017,184, Cl. 493-368.000.
- Mitsubishi Kaisha Kaisha: *See—*
  - Takita, Hidenori. 5,017,832, Cl. 315-8.000.
- Mitsubishi Kasei Corporation: *See—*
  - Nakajima, Tsuyoshi; and Yazami, Rachid, 5,017,444, Cl. 429-218.000.
  - Nakanishi, Masayuki; Iwasaki, Takashi; and Maeda, Shuichi, 5,017,225, Cl. 106-21.000.
  - Suzuki, Yoshihiro; Yajima, Hiroyoshi; Shimada, Junichi; Shimoyama, Kenji; and Gotoh, Hideki, 5,018,159, Cl. 372-46.000.
- Mitsubishi Kinzoku Kabushiki Kaisha: *See—*
  - Matsuo, Yutaka; Isobe, Takeshi; and Adachi, Kazuyosi, 5,017,336, Cl. 420-422.000.
  - Nishihara, Akira; and Tsunashima, Makoto, 5,017,231, Cl. 106-452.000.
  - Tsujimura, Osamu; Arai, Tatsuo; Nakayama, Masaaki; and Okawa, Masayuki, 5,017,055, Cl. 407-113.000.
- Mitsubishi Metal Corporation: *See—*
  - Shiratori, Hidehisa; and Iizuka, Kazuo, 5,017,060, Cl. 409-137.000.
- Mitsui Petrochemical Indistries, Ltd.: *See—*
  - Fukuhara, Hiroshi; and Matsunaga, Fujihisa, 5,017,729, Cl. 568-798.000.
- Mitsui Petrochemical Industries, Ltd.: *See—*
  - Mende, Takayuki; and Sakai, Takanobu, 5,017,112, Cl. 425-72.200.
- Mitsushita Electric Industrial Co., Ltd.: *See—*
  - Kawai, Naoki; Hamamoto, Koji; and Minooka, Masahiro, 5,017,757, Cl. 219-130.510.
- Mitsutake, Hiromi; Saitoh, Hideomi; and Nagata, Koichiro, to Ajinomoto Co., Inc. Paste-like dentifrice composition. 5,017,364, Cl. 424-54.000.
- Mitsuya, Kinpei; and Murata, Masahiko, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Weft processing and releasing apparatus in a jet loom. 5,016,680, Cl. 139-452.000.
- Miura, Fujio, to GAC International, Inc. Orthodontic archwire. 5,017,133, Cl. 433-20.000.
- Miura, Katsunori, to Sanyo Electric Co., Ltd. FM demodulator. 5,017,841, Cl. 329-325.000.
- Miura, Takao; Imaoka, Kazunori; and Sugimoto, Fumitoshi, to Fujitsu Limited. Semiconductor device using SOI substrate. 5,017,998, Cl. 357-49.000.
- Miura, Tanetoshi: *See—*
  - Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.
- Miwa, Kiyoshi: *See—*
  - Matsui, Kazuhiko; Miwa, Kiyoshi; and Sano, Konosuke, 5,017,481, Cl. 435-108.000.
- Miyairi, Nobuo, to Olympus Optical Co., Ltd. Semiconductor laser driving apparatus to be used for optical information recording and reproducing apparatus. 5,018,155, Cl. 372-31.000.
- Miyajima, Hiroshi: *See—*
  - Hashimoto, Akihiko; Kitahara, Toshihiro; and Miyajima, Hiroshi, 5,017,764, Cl. 235-454.000.
- Miyamoto, Mithuru: *See—*
  - Ukai, Noriyuki; Hayakawa, Issei; Miyamoto, Mithuru; and Matsuhisa, Tadaaki, 5,017,531, Cl. 501-98.000.
- Miyanishi, Hideji, to Ricoh Co., Ltd. Semiconductor memory device. 5,018,105, Cl. 365-203.000.
- Miyasaka, Akihiro; and Ogawa, Hiroyuki, to Nippon Steel Corporation. Martensitic stainless steels excellent in corrosion resistance and stress corrosion cracking resistance method of heat treatment of the steels. 5,017,246, Cl. 148-135.000.
- Miyauchi, Hiroshi: *See—*
  - Kume, Toyohiko; Goto, Toshio; Kamochi, Atsumi; Yanagi, Akihiko; Miyauchi, Hiroshi; and Asami, Tadao, 5,017,213, Cl. 71-95.000.
- Miyazaki, Benichi; Yamamoto, Hiroshi; and Goto, Shoji, to Matsushita Electric Industrial Co., Ltd. Guide mechanism for head transfer apparatus. 5,018,033, Cl. 360-106.000.
- Miyazaki, Kenji: *See—*
  - Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.
- Miyazawa, Hideyuki, to Hitachi, Ltd. Method of fabricating semiconductor integrated circuit devices including updiffusion to selectively dope a silicon layer. 5,017,507, Cl. 437-162.000.
- Miyazawa, Kazushi; Terauchi, Takao; Hanamoto, Keiji; and Takagi, Fumio, to Dai Nippon Insatsu Kabushiki Kaisha. Multilayer base film for three-dimensional conformability. 5,017,417, Cl. 428-195.000.
- Miyazawa, Masashi: *See—*
  - Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Ken-ich, 5,017,480, Cl. 435-106.000.
- Miyazono, Tadafumi: *See—*
  - Muramoto, Hisaichi; Ishii, Keizuo; and Miyazono, Tadafumi, 5,017,646, Cl. 524-807.000.
- Miyoshi, Jun: *See—*
  - Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; Miyoshi, Jun; and Eri, Masatsugu, 5,017,445, Cl. 429-224.000.
- Miyoshi, Tamihiro: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
- Mizek, Robert S. Noise and recoil reducing bow stabilizer for archery bows. 5,016,602, Cl. 124-89.000.
- Mizoguchi, Akira: *See—*
  - Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.
- Mizumura, Takeshi: *See—*
  - Ibamoto, Masahiko; Morooka, Yasuo; Koyanagi, Hiroaki; Sato, Manabu; and Mizumura, Takeshi, 5,018,072, Cl. 364-478.000
- Mizuno, Masahiko: *See—*
  - Urabe, Hitoshi; Korikawa, Hiroshi; Akimoto, Kazuhiko; Nakaya, Daisuke; and Mizuno, Masahiko, 5,018,078, Cl. 364-518.000.
- Mizuno, Takao: *See—*
  - Murayama, Akira; Uchikawa, Naoshi; Tamura, Takahiro; Mizuno, Takao; and Sakurai, Kazuo, 5,017,108, Cl. 418-55.600.
- Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, to Sumitomo Chemical Co., Ltd. Resin composition. 5,017,663, Cl. 525-397.000.
- Mizuno, Yutaka, to Fanuc Ltd. IC card with metal reinforcing plates and grounding lead wire. 5,017,767, Cl. 235-492.000.
- Mizuta, Hiroshi; Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, to Hitachi, Ltd. Resonant tunneling device. 5,017,973, Cl. 357-4.000.
- MMI Products, Inc.: *See—*
  - Preston, Donald; and Luke, John H., 5,017,048, Cl. 405-262.000.
- Moberg, Lennart, to Siemens Aktiengesellschaft. Heart pacemaker with hysteresis function. 5,016,630, Cl. 128-419.0PG.
- Mobil Oil Corporation: *See—*
  - Chu, Shaw-Chang; and Kirk, Kevin A., 5,017,430, Cl. 428-353.000.
  - Cullick, Alvin S.; and Roach, Robert E., 5,016,712, Cl. 166-250.000.
  - Sanchez, J. Michael; and Strom, E. Thomas, 5,016,713, Cl. 166-270.000.
- Moch, Uriel P. Device for the localized fastening of elements having an edge, especially of plates to a supporting structure. 5,016,410, Cl. 52-235.000.
- Mochales, Sagrario: *See—*
  - Ostlind, Dan A.; and Mochales, Sagrario, 5,017,603, Cl 514-455.000.
- Mochiji, Kozo: *See—*
  - Soda, Yasunari; Mochiji, Kozo; Oizumi, Hiroaki; and Kimura, Takeshi, 5,017,458, Cl. 430-296.000.
- Mochizuki, Kazuhiro; Tanoue, Tomonori; Kusano, Chushirou; Masuda, Hiroshi; and Mitani, Katsuhiko, to Hitachi, Ltd. Method of fabricating semiconductor device using An Sb protection layer. 5,017,517, Cl. 437-90.000.

- Mockford, Mary J.: *See—*
  - Birchall, James D.; Mockford, Mary J.; Stanley, David R.; Asher, Paul M. L.; and McCarthy, William R., 5,017,525, Cl. 501-87.000.
- Modert, Timothy D.: *See—*
  - Vanderbilt, Herbert J.; and Modert, Timothy D., 5,017,318, Cl. 264-113.000.
- Moehling, Frederick E.: *See—*
  - England, Jimmy C.; Hensley, John R.; Moehling, Frederick E.; Roberts, Everett M.; and Ruble, Hugh-Hiram, Jr., 5,016,460, Cl. 72-208.000.
- Moeller, Galen A.: *See—*
  - Ferguson, James C.; Hanz, Marvin C.; and Moeller, Galen A., 5,016,601, Cl. 124-20.100.
- Moen, Bruce A.: *See—*
  - Grims, Conrad M.; Moen, Bruce A.; and Pardubicky, Jaroslav F., 5,016,462, Cl. 72-349.000.
- Mohebban, Manoochehr: *See—*
  - Fergason, James L.; and Mohebban, Manoochehr, 5,016,982, Cl. 350-331.00R.
- Mohlenbrock, William C.; Farley, Peter J.; Frye, Lawrence J.; Trummell, Donald E., Jr.; and Bostrom, Alan G., to Iameter Incorporated. Apparatus and method for improved estimation of health resource consumption through use of diagnostic and/or procedure grouping and severity of illness indicators. 5,018,067, Cl. 364-413.020.
- Molex Incorporated: *See—*
  - Ingwersen, Peter; and West, Bernard M., 5,017,078, Cl. 414-417.000.
  - Krehbiel, Fred L.; Wilson, Bill B.; and Colleran, Stephen A., 5,017,162, Cl. 439-752.000.
  - Peterson, Bruce A., 5,017,151, Cl. 439-248.000.
- Moline Paint Manufacturing Co.: *See—*
  - Falline, Brian J.; and Weihrauch, Bruce W., 5,017,634, Cl. 524-267.000.
- Mollmann, Gunter: *See—*
  - Onnenberg, Volker; and Mollmann, Gunter, 5,017,114, Cl. 425-112.000.
- Mombers, Johannes M., to ARBA Holding S.A. Apparatus for the peeling of surfaces, including nonplanar surfaces. 5,017,061, Cl. 409-139.000.
- Monarch Knitting Machinery Corporation: *See—*
  - Pernick, Bruce M., 5,016,450, Cl. 66-93.000.
- Mongelli, Nicola: *See—*
  - Lazzari, Ettore; Arcamone, Federico; Penco, Sergio; Verini, Maria A.; and Mongelli, Nicola, 5,017,599, Cl. 514-422.000.
- Monjes, Julio A.: *See—*
  - Bliss, Erlan S.; Smith, James R.; Salmon, J. Thaddeus; and Monjes, Julio A., 5,016,997, Cl. 350-607.000.
- Monnard, Andre : *See—*
  - Ris, Max; and Monnard, Andre , 5,016,298, Cl. 4-654.000.
- Monopoli, Peter A.: *See—*
  - Bean, Samuel L.; Dulik, Mark D.; and Monopoli, Peter A., 5,017,301, Cl. 252-105.000.
- Monroe Auto Equipment Company: *See—*
  - Athanas, David S.; Groves, Gary W.; Hammoud, Fahrey M.; and Perry, David L., 5,016,908, Cl. 280-707.000.
- Monsanto Company: *See—*
  - Carter, Don E.; McPeters, Arnold L.; and Skeen, Hobson L., 5,017,116, Cl. 425-131.500.
  - Fleet, George W. J.; and Namgoong, Sung K., 5,017,704, Cl. 546-242.000.
- Monsorno, Richard V.: *See—*
  - Insetta, Victor; Monsorno, Richard V.; Davis, Donald J., Jr.; and Beyel, Stephen, 5,018,047, Cl. 361-277.000.
- Montano, Donald; and Montano, Ernest. Apparatus for sub-dividing hay bales. 5,017,399, Cl. 426-636.000.
- Montano, Ernest: *See—*
  - Montano, Donald; and Montano, Ernest, 5,017,399, Cl. 426-636.000.
- Montedipe S.r.l.: *See—*
  - Fiore, Leonardo; Borghi, Italo; and Mattiussi, Andrea, 5,017,657, Cl. 525-173.000.
- Montedison S.p.A.: *See—*
  - Giannini, Umberto; Coassolo, Alfredo; Foa', Marco; Sabarino, Giampiero; and Chapoy, L. Lawrence, 5,017,678, Cl. 528-190.000.
- Montes, Leopoldo F. Treatment of plantar warts using cycloheximide. 5,017,587, Cl. 514-328.000.
- Moody, Paul E., to United States of America, Navy. Submarine torpedo tube primary seal interlock. 5,016,555, Cl. 114-238.000.
- Moody, Paul E., to United States of America, Navy. Low force cable disconnect. 5,017,150, Cl. 439-197.000.
- Moore, Leslie G., Jr., to Eastman Kodak Company. Method and apparatus for improving signal to noise ratio in a telecine machine. 5,018,019, Cl. 358-215.000.
- Morantz, Jack: *See—*
  - Thimon, Jacques; and Morantz, Jack, 5,016,427, Cl. 53-44.000.
- Morash, Dean C., to Northrop Corporation. Positioner for accurately drilling a hole in a tool ball pad. 5,017,056, Cl. 408-1.00R.
- Moreau, Dominique, to Telemecanique. Removable modular control device for a contactor apparatus. 5,018,043, Cl. 361-187.000.
- Moretti, Costanzo: *See—*
  - Fabbri, Andrea; Moretti, Costanzo; and Forni, Laura, 5,017,557, Cl. 514-12.000.
- Moretti, Remo, to Lumson S.r.l. Hand pump for dispensing bottles with shutoff arrangement for preventing spillage therefrom. 5,016,780, Cl. 222-153.000.
- Morey, William W.: *See—*
  - Meltz, Gerald; and Morey, William W., 5,016,967, Cl. 350-96.190.
- Mori, Osamu; Oyama, Motofumi; Hisaki, Hiroshi; Sekiguchi, Masato; Okamura, Akinobu; and Tanabe, Haruhiro, to Nippon Zeon Co., Ltd. Adhesive for bonding rubber to fibers. 5,017,639, Cl. 524-510.000.
- Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Ken-ich, to Ajimomoto Co., Inc. Process for recovering L-amino acid from fermentation liquors. 5,017,480, Cl. 435-106.000.
- Mori, Toshiyuki: *See—*
  - Arakawa, Toshihiko; Mori, Toshiyuki; and Matsumoto, Yoshihiro, 5,017,530, Cl. 501-98.000.
- Morie, Toshiya: *See—*
  - Kon, Tatsuya; Kato, Shiro; Morie, Toshiya; Karasawa, Tadahiko; and Yoshida, Naoyuki, 5,017,573, Cl. 514-218.000.
- Morikane, Hiroyuki, to Mitsubishi Denki Kabushiki Kaisha. Starter motor. 5,016,484, Cl. 74-6.000.
- Morimoto, Akira: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
- Morimoto, Kenichi: *See—*
  - Shioji, Mitsuaki; Morimoto, Kenichi; Kato, Shinji; Nakamura, Takeshi; and Nozaki, Nobuharu, 5,016,983, Cl. 350-332.000.
- Morimoto, Shigeki; and Sugiura, Kenji, to Central Glass Company, Limited. Transparent and nonexpansive glass-ceramic. 5,017,519, Cl. 501-7.000.
- Morioka, Koji: *See—*
  - Ogata, Hiromasa; Morioka, Koji; and Ohmori, Susumu, 5,017,202, Cl. 55-390.000.
- Morita, Hideyuki: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
- Morita, Shigeru; Takei, Terutaka; Kawahara, Yoshihiro; and Togoshi, Yoshikazu, to Kubota Ltd. Cab structure for riding type working vehicle. 5,016,722, Cl. 180-89.140.
- Morita, Toshiki: *See—*
  - Takehara, Shin; Edahiro, Takeshi; Morita, Toshiki; and Kumada, Hiroyoshi, 5,016,911, Cl. 280-708.000.
- Morito, Akira: *See—*
  - Takesako, Sumiyoshi; and Morito, Akira, 5,017,026, Cl. 400-24.000.
- Moritzen, Werner: *See—*
  - Nohren, Hubert; Siebrand, Gerhard; and Moritzen, Werner, 5,016,534, Cl. 102-387.000.
- Moriwaki, Kazuyuki: *See—*
  - Murakami, Toshiaki; and Moriwaki, Kazuyuki, 5,016.563, Cl. 118-723.000.
- Moriya, Takashi: *See—*
  - Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.
- Moriyama, Hiroshi: *See—*
  - Utsumi, Tatsuya; Kawamura, Shinji; Itoh, Tetsuya; Moriyama, Hiroshi; and Okada, Naofumi, 5,016,828, Cl. 241-158.000.
- Morooka, Yasuo: *See—*
  - Ibamoto, Masahiko; Morooka, Yasuo; Koyanagi, Hiroaki; Sato, Manabu; and Mizumura, Takeshi, 5,018,072, Cl. 364-478.000
- Morre, Michel: *See—*
  - Aubert, Daniel; Blanc, Francis; Desmolin, Henri; Morre, Michel; and Sindely, Lucette, 5,017,613, Cl. 514-557.000.
- Morrison, Allan R. Cleaning vertical window blinds. 5,017,239, Cl. 134-15.000.
- Morrison, Douglas M. Variable pitch propeller blades and drive and adjusting mechanism therefor. 5,017,090, Cl. 416-168.00R.
- Morser, Michael J.: *See—*
  - Cashion, Linda; Begley, Kathi; Colby, Wendy; and Morser, Michael J., 5,017,478, Cl. 435-69.100.
- Mortimer, Jacques: *See—*
  - Smith, Philip J.; and Mortimer, Jacques, 5,017,637, Cl. 524-354.000.
- Morton, Carlyle D. Adjustable open end wrench. 5,016,503, Cl. 81-127.000.
- Morton, Howard E.: *See—*
  - Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,593, Cl. 514-381.000.
  - Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,597, Cl. 514-411.000.
- Morton, Lawrence A.: *See—*
  - Gesser, Hyman D.; Hunter, Norman R.; Yarlagadda, Prasd S.; and Morton, Lawrence A., 5,017,731, Cl. 568-910.000.
- Morton, Robert W.: *See—*
  - Snelling, Ricky E.; Figard, Joseph E.; and Morton, Robert W., 5,017,643, Cl. 524-609.000.
- Moschini, Franco, to Poltrona Frau S.p.A. Method of and devices for attaching covering layers to supporting structures. 5,017,413, Cl. 428-61.000.
- Moskowitz, David; and Porat, Reuven, to Iscar Ltd. Ceramic cutting tool. 5,017,524, Cl. 501-87.000.
- Moskvin, Gennady A., to Latviiskaya Selskhokhozyaistvennaya Akademia. Automatic milk counter of milking unit. 5,016,569, Cl. 119-14.080.

VOL
1126
ISS
3
MY
21
1991
UMI

Mosmann, Timothy: *See—*

Lee, Frank; Yokota, Takashi; Arai, Ken-ichi; Mosmann, Timothy; and Rennick, Donna, 5,017,691, Cl. 535-351.000.

Moss, Gaylord E.; and Wreede, John E., to Hughes Aircraft Company. Reduction of noise in computer generated holograms. 5,016,953, Cl. 350-3.660.

Moss, Oden K.; and Spector, George. Game tile structure. 5,016,889, Cl. 273-293.000.

Motorola, Inc.: *See—*

Bertiger, Bary R.; Leopold, Raymond J.; and Peterson, Kenneth M., 5,017,925, Cl. 342-352.000.

Edminster, Robert E., 5,016,532, Cl. 102-254.000.

Gasparaitis, Bernard V.; and Knutson, William J., 5,016,956, Cl. 350-96.100.

Johnson, Robert M., Jr., 5,017,856, Cl. 320-2.000.

Kase, Kiyoshi, 5,017,805, Cl. 307-362.000.

Kowalski, Joseph L.; and Rokusek, Daniel S., 5,018,188, Cl. 379-63.000.

Lin, Paul T.; and McShane, Michael B., 5,018,005, Cl. 357-80.000.

Ooi, Leng H.; Yeh, Peter J.; and Avanic, Branko, 5,017,897, Cl. 333-204.000.

Mott, Edward B. Sewage disposal system and method. 5,017,040, Cl. 405-32.000.

Mount Sinai School of Medicine of the City University of New York: *See—*

Sanders, Ira, 5,016,647, Cl. 128-787.000.

Mountain State Muzzleloading Supplies, Inc.: *See—*

Lambert, Fred R., 5,016,379, Cl. 42-83.000.

Mouri, Hiroshi: *See—*

Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.

Mouritsen, John: *See—*

Hollingsworth, Ritch; and Mouritsen, John, 5,016,695, Cl. 280-280.000.

Mousavi, Ali R., to C & K Systems, Inc. 360 degree field of view optical sensing device. 5,017,783, Cl. 250-353.000.

Mowforth, Clive W.; Bullock, James F.; and Maternaghan, Trevor J., to Ilford Limited. Twinned emulsions made from silver iodide seed crystals having an aspect ratio of at least 2:1. 5,017,469, Cl. 430-569.000.

Moxness, Sherman U.; and Grant, Robert W., to FSI International, Inc. High frequency sonic substrate processing module. 5,017,236, Cl. 134-1.000.

Mross, Wolf D.: *See—*

Martan, Hans; Mross, Wolf D.; and Engert, Gerd-Juergen, 5,017,542, Cl. 502-209.000.

MTU Motoren- und Turbinen-Union Muenchen GmbH: *See—*

Huether, Werner M., deceased; Huether, Berta L., heir; and Rossmann, Axel, 5,016,437, Cl. 60-280.000.

Mueller, Denis A.: *See—*

Engel, Joseph C.; Mueller, Denis A.; and Bennett, Allan I., 5,017,859, Cl. 324-127.000.

Mueller, Otward M.; Roemer, Peter B.; and Edelstein, William A., to General Electric Company. Gradient current speed-up circuit for high-speed NMR imaging system. 5,017,871, Cl. 324-318.000.

Mukai, Hiromu: *See—*

Nakai, Masaaki; Izumi, Shuji; Fujino, Akihiko; Taniguchi, Nobuyuki; Yamaki, Toshio; and Mukai, Hiromu, 5,017,957, Cl. 354-429.000.

Mulaskey, Bernard; Miller, Stephen J.; Holtermann, Dennis L.; and Jacobson, Robert L., to Chevron Research and Technology Company. Multi-stage reforming process. 5,017,278, Cl. 208-65.000.

Mulder, Cornelis A. M.: *See—*

Heijnen, Godefridus H. C.; Mulder, Cornelis A. M.; and Van Der Stelt, Ernest O. W., 5,017,825, Cl. 313-112.000.

Mulder, Douglas C.: *See—*

Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 5,017,324, Cl. 264-510.000.

Muller, Manfred; Neumann, Bernd; and Stuttem, Manfred, to Barmag AG. Method and apparatus for measuring the tension of an advancing yarn. 5,017,911, Cl. 340-677.000.

Muller, Marcel: *See—*

Alig, Leo; and Muller, Marcel, 5,017,619, Cl. 514-653.000.

Mullin, Francis J.: *See—*

Arroyo, Candido J.; Meskell, David J., Jr.; and Mullin, Francis J., 5,016,952, Cl. 350-96.200.

Munk, Edmund, to Werzalit AG & Cl. Elongate cover profile and apparatus for and method of manufacturing the same. 5,016,416, Cl. 52-539.000.

Murakami, Eiichi; Kohno, Michio; and Suzuki, Akiyoshi, to Canon Kabushiki Kaisha. Surface examining apparatus for detecting the presence of foreign particles on two or more surfaces. 5,017,798, Cl. 250-572.000.

Murakami, Fumio; Okazaki, Sadaaki; Aoyagi, Takayoshi; Iwasaki, Tokuji; and Konno, Tetsuya, to Nippon Felt Co., Ltd. Automatic cop changing device for a weaving machine. 5,016,677, Cl. 139-245.000.

Murakami, Harunori: *See—*

Sakurai, Kaoru; Maeda, Masaru; Murakami, Harunori; and Iijima, Hiroshi, 5,017,933, Cl. 343-704.000.

Murakami, Hiroaki: *See—*

Nakano, Yuji; Saitoh, Koji; and Murakami, Hiroaki, 5,017,810, Cl. 307-465.000.

Murakami, Toshiaki; and Moriwaki, Kazuyuki, to Nippon Telegraph and Telephone Corporation. Method of manufacturing thin compound oxide film and apparatus for manufacturing thin oxide film. 5,016,563, Cl. 118-723.000.

Murakawa, Hiroki: *See—*

Andou, Hirokazu; Kikuchi, Hiroshi; and Murakawa, Hiroki, 5,017,029, Cl. 400-237.000.

Muramatsu, Hiroshi: *See—*

Karube, Isao; and Muramatsu, Hiroshi, 5,017,494, Cl. 435-288.000.

Muramatsu, Takayoshi, to Yamaha Hatsudoki Kabushihiki Kaisha. Motorcycle having enclosed running components. 5,016,725, Cl. 180-225.000.

Muramoto, Hisaichi; Ishii, Keizuo; and Miyazono, Tadafumi. Aqueous vinyl resin emulsion. 5,017,646, Cl. 524-807.000.

Murase, Teruo: *See—*

Tsuji, Hiroki; Kawano, Kyoichiro; and Murase, Teruo, 5,017,738, Cl. 174-94.00R.

Murata Kikai Kabushiki Kaisha: *See—*

Uramoto, Makoto; and Sakata, Hideji, 5,017,797, Cl. 250-561.000.

Murata, Masahiko: *See—*

Mitsuya, Kinpei; and Murata, Masahiko, 5,016,680, Cl. 139-452.000.

Murata, Yasuhiko: *See—*

Yamamoto, Nobuyoshi; Murata, Yasuhiko; Saeki, Fumimasa; and Kurosaka, Hirosige, 5,016,721, Cl. 180-89.130.

Murata, Yoshitaka, to Canon Kabushiki Kaisha. Flash photography system. 5,017,956, Cl. 354-416.000.

Murayama, Akira; Uchikawa, Naoshi; Tamura, Takahiro; Mizuno, Takao; and Sakurai, Kazuo, to Hitachi, Ltd. Scroll compressor with first and second oil pumps in series. 5,017,108, Cl. 418-55.600.

Murphy, William J., to Imtec Inc. Variable length die cutter and method of cutting composite label. 5,017,257, Cl. 156-268.000.

Murray Envelope Corporation: *See—*

Rhian, Walter G.; and Niequist, Kent E., 5,016,370, Cl. 40-359.000.

Murti, Dasarao K.: *See—*

Ong, Beng S.; Murti, Dasarao K.; and Fuller, John R. C., 5,017,645, Cl. 524-726.000.

Musgrave, Mike: *See—*

Schwarz, Dick; Warrer, Bob; Musgrave, Mike; Cruson, Bob; Gordon, Christa; and Weinert, Todd, 5,017,436, Cl. 428-519.000.

Mushabac, David R. Mechanical support for hand-held dental/medical instrument. 5,017,139, Cl. 433-109.000.

Mustang Industries, Inc.: *See—*

Askew, Robert J., 5,016,290, Cl. 2-270.000.

Muto, Yasutami: *See—*

Suzuki, Akira; Matsuda, Shoichi; Muto, Yasutami; and Aoki, Kazuo, 5,016,688, Cl. 141-170.000.

Muyssen, John: *See—*

Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred; Schweiger, Franz; Verlohr, Axel; Muyssen, John; and Lybeer, Roger, 5,018,097, Cl. 364-900.000.

Mycogen Corporation: *See—*

Herrnstadt, Corinna; and Wilcox, Edward, 5,017,373, Cl. 424-93.000.

Myers, Clyde J.: *See—*

Hammond, Rodney W.; Myers, Clyde J.; and Travieso, Ruben, 5,016,968, Cl. 350-96.200.

Myers, David F.: *See—*

Gartner, Ellis M.; Myers, David F.; and Gaidis, James M., 5,017,234, Cl. 106-781.000.

Myles, Bernard; and Bridle, Ronald J., to University College Cardiff Consultants Limited. Soil nailing. 5,017,047, Cl. 405-259.000.

Myochin, Hisashi; Inoue, Yoshinori; Saito, Hitoshi; and Yoshida, Narutaka, to Minolta Camera Kabushiki Kaisha. Corona discharger for use in electrophotographic copying machine. 5,018,045, Cl. 361-229.000.

N. Jonas & Co., Inc.: *See—*

Antelman, Marvin S., 5,017,295, Cl. 210-764.000.

N. Schlumberger Et Cie, S.A.: *See—*

Genevray, Henri, 5,016,431, Cl. 57-19.000.

Nabae, Motohiro; and Kishino, Kunihiko, to Furukawa Aluminum Co., Ltd. Aluminum alloy for magnetic disc substrate execellent in platability. 5,017,337, Cl. 420-532.000.

Naes, Oscar L. Thermostatically controlled boat de-icer. 5,017,093, Cl. 417-14.000.

Nagahama, Shinobu: *See—*

Otsuka, Masaaki; Komiya, Masayuki; Sawanobori, Naruhito; and Nagahama, Shinobu, 5,017,520, Cl. 501-44.000.

Nagahara, Toyohiro; Niwa, Takashi; Sano, Takezo; and Kato, Isao, to Omron Tateisi Electronics Co. Microswitch. 5,017,747, Cl. 200-453.000.

Nagai, Hiroyuki: *See—*

Ohtsuka, Nobukazu; Nagai, Hiroyuki; Shibanaka, Mitsugu; and Matsui, Toshikazu, 5,016,868, Cl. 271-273.000.

Nagai, Takao, to Kabushiki Kaisha Komatsu Seisakusho. Suspension cylinder control system for motor vehicles. 5,016,910, Cl. 280-707.000.

Nagaie, Tetsuya: *See—*

Nakashima, Masahiro; Urata, Yasuo; and Nagaie, Tetsuya, 5,017,720, Cl. 560-209.000.

Nagaoka, Kazuo; Hatano, Tadao; Wakabayashi, Sadao; and Shimizu, Takamitsu, to Sony Magnescale Inc. Linear scale arrangement. 5,016,359, Cl. 33-702.000.

Nagasaki, Tatsuo: *See—*

Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.

Nagase, Ryo; Noda, Juichi; and Sugita, Etsuji, to Nippon Telegraph and Telephone Corp. Ferrule for optical fiber transmitting linearly polarized light and optical fiber connector using this ferrule. 5,016,970, Cl. 350-96.210.

Nagata, Koichiro: *See—*

Mitsutake, Hiromi; Saitoh, Hideomi; and Nagata, Koichiro, 5,017,364, Cl. 424-54.000.

Nagata, Morimasa: *See—*

Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.

Nagata, Osamu; Kuwahara, Tokihiro; Suzawa, Yukichi; Kamino, Hiroaki; Suyama, Tomio; and Konno, Tomoyoshi, to Hoshizaki Denki Kabushiki Kaisha. Electric control apparatus for dishwashing machine. 5,017,852, Cl. 318-727.000.

Nagatake, Yoh-ichi: *See—*

Iuchi, Tohru; Nakamori, Yukio; Kawasaki, Atsushi; Yashiro, Hirokatsu; and Nagatake, Yoh-ichi, 5,017,018, Cl. 374-130.000.

Nagayama, Yoshiaki: *See—*

Doi, Shigetoshi; and Nagayama, Yoshiaki, 5,016,815, Cl. 236-49.300.

Nagelberg, Alan S.: *See—*

Aghajanian, Michael K.; and Nagelberg, Alan S., 5,016,703, Cl. 164-97.000.

Naito, Norihiro, to Hitachi Ferrite, Ltd. Lumped constant non-reciprocal circuit element. 5,017,894, Cl. 333-1.100.

Nakagaki, Shintaro: *See—*

Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,018,018, Cl. 358-213.110.

Nakagawa, Narihisa: *See—*

Kawai, Taiyo; and Nakagawa, Narihisa, 5,016,595, Cl. 123-478.000.

Nakagawa, Shinsuke: *See—*

Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi; Kodama, Mitsuo; Nakano, Hisaji; and Nakagawa, Shinsuke, 5,017,499, Cl. 436-124.000.

Nakagiri, Etsuji: *See—*

Suzuki, Takashi; and Nakagiri, Etsuji, 5,018,194, Cl. 379-207.000.

Nakahama, Tatsuo: *See—*

Ishida, Yasuo; Ohta, Kazunari; Nakahama, Tatsuo; and Yoshikawa, Harutoshi, 5,017,212, Cl. 71-92.000.

Nakai, Masaaki; Izumi, Shuji; Fujino, Akihiko; Taniguchi, Nobuyuki; Yamaki, Toshio; and Mukai, Hiromu, to Minolta Camera Kabushiki Kaisha. Exposure control device for a camera. 5,017,957, Cl. 354-429.000.

Nakajima, Akihiko: *See—*

Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 5,017,697, Cl. 536-127.000.

Nakajima, Hideo; and Takamiya, Toshio, to Takata Kabushiki Kaisha. Air bag in air bag equipment. 5,016,913, Cl. 280-738.000.

Nakajima, Nobuyuki, to Diesel Kiki Co., Ltd. Control valve device for variable capacity compressors. 5,017,097, Cl. 417-295.000.

Nakajima, Nobuyuki: *See—*

Sugiura, Hiroyuki; Nakajima, Nobuyuki; and Iijima, Takeo, 5,017,096, Cl. 417-222.00S.

Nakajima, Takao; and Shigehara, Hiroshi, to Kabushiki Kaisha Toshiba. Code-conversion method and apparatus for analyzing and synthesizing human speech. 5,018,199, Cl. 381-36.000.

Nakajima, Takashi: *See—*

Furusawa, Toshihiro; Satoh, Atsushi; Nakajima, Takashi; and Matsugishi, Noriaki, 5,017,311, Cl. 264-23.000.

Nakajima, Tsuyoshi; and Yazami, Rachid, to Mitsubishi Kasei Corporation. Lithium cell. 5,017,444, Cl. 429-218.000.

Nakajima, Yoshihiro: *See—*

Suzuki, Katsuya; Nakajima, Yoshihiro; and Ishii, Tomoyuki, 5,016,842, Cl. 248-68.100.

Nakamichi Corporation: *See—*

Uchikoshi, Gohji; and Otomo, Toshiko, 5,018,125, Cl. 369-44.250.

Nakamine, Takeshi; Kawata, Ken; and Taguchi, Toshiki, to Fuji Photo Film Co., Ltd. Heat-developable color light-sensitive material. 5,017,454, Cl. 430-203.000.

Nakamori, Yukio: *See—*

Iuchi, Tohru; Nakamori, Yukio; Kawasaki, Atsushi; Yashiro, Hirokatsu; and Nagatake, Yoh-ichi, 5,017,018, Cl. 374-130.000.

Nakamura, Akihiko; and Ito, Takashi, to NGK Insulators, Ltd.; and Pokka Corporation. Coffee bean roasting device. 5,016,362, Cl. 34-51.000.

Nakamura, Kazuo: *See—*

Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.

Nakamura, Kensaku: *See—*

Hayashi, Goichi; Fujimagari, Sajuro; Nakamura, Kensaku; and Ishida, Ryuichi, 5,017,455, Cl. 430-256.000.

Nakamura, Kiyokazu; Kometani, Kiichi; Koshino, Akihiko; and Horiuchi, Kenjiro, to Toray Industries, Inc. Composition of polyester, polyphenylene ether, diglycidyl dicarboxylate and impact modifier. 5,017,650, Cl. 525-65.000.

Nakamura, Kyoichi: *See—*

Shiiki, Hitoshi; Tada, Minoru; and Nakamura, Kyoichi, 5,017,621, Cl. 521-58.000.

Nakamura, Mitsunori: *See—*

Sasai, Keizo; Sakuragi, Kenkichi; Nakamura, Mitsunori; Ohkubo, Akio; and Yoshino, Motoaki, 5,017,945, Cl. 346-136.000.

Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, to Sumitomo Metal Industries Ltd. Plasma apparatus. 5,016,564, Cl. 118-723.000.

Nakamura, Takeshi: *See—*

Shioji, Mitsuaki; Morimoto, Kenichi; Kato, Shinji; Nakamura, Takeshi; and Nozaki, Nobuharu, 5,016,983, Cl. 350-332.000.

Nakamura, Yoshio; Ogura, Masahiro; Shimada, Yoshio; Watanabe, Kiyoshi; and Takahashi, Hideyuki, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for preparing 3-chloro-1,2-propanediol. 5,017,484, Cl. 435-158.000.

Nakanishi, Kanji, to Fuji Photo Film Co., Ltd. Thin film magnetic head with laminated metal and non magnetic film. 5,018,038, Cl. 360-126.000.

Nakanishi, Masayuki; Iwasaki, Takashi; and Maeda, Shuichi, to Japan Capsular Products Inc.; and Mitsubishi Kasei Corporation. Microencapsulated photochromic material, process for its preparation and a water-base ink composition prepared therefrom. 5,017,225, Cl. 106-21.000.

Nakanishi, Toshihide: *See—*

Furukawa, Satoru; Ozaki, Akio; Nakanishi, Toshihide; Kotani, Yukinobu; and Sugimoto, Masahiro, 5,017,483, Cl. 435-115.000.

Nakano, Hisaji: *See—*

Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi; Kodama, Mitsuo; Nakano, Hisaji; and Nakagawa, Shinsuke, 5,017,499, Cl. 436-124.000.

Nakano, Yuji; Saitoh, Koji; and Murakami, Hiroaki, to Kabushiki Kaisha Toshiba. Input switching device used in a logic MOS integrated circuit. 5,017,810, Cl. 307-465.000.

Nakashima, Masahiro; Urata, Yasuo; and Nagaie, Tetsuya, to Chisso Corporation. Methods of producing and reserving alkylene glycol monesorbates. 5,017,720, Cl. 560-209.000.

Nakata Manufacture Company Limited: *See—*

Kuramoto, Ryosuke, 5,016,459, Cl 72-178.000.

Nakatsumi, Hideo: *See—*

Machida, Morihisa; Tajima, Yoshio; Nakatsumi, Hideo; Isahai, Tatsuo; and Shiroki, Daijiro, 5,017,427, Cl. 428-323.000.

Nakaya, Daisuke: *See—*

Urabe, Hitoshi: Korikawa, Hiroshi; Akimoto, Kazuhiko; Nakaya, Daisuke; and Mizuno, Masahiko, 5,018,078, Cl. 364-518.000.

Nakayama, Masaaki: *See—*

Tsujimura, Osamu; Arai, Tatsuo; Nakayama, Masaaki; and Okawa, Masayuki, 5,017,055, Cl. 407-113.000.

Nakayama, Noritaka: *See—*

Masukawa, Toyoaki; and Nakayama, Noritaka, 5,017,467, Cl 430-558.000.

Nakayama, Satoshi: *See—*

Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, 5,016,564, Cl. 118-723.000.

Nakayama, Shinji; Watanabe, Masaya; and Abe, Shuichi, to Hitachi, Ltd. Virtual computer system. 5,018,064, Cl. 364-200.000.

Nakayama, Shozo: *See—*

Yamada, Hideo; Nakayama, Shozo; Iinuma, Mitsuhisa; and Tobiki, Hisao, 5,017,191, Cl. 604-243.000.

Nakazawa, Akira: *See—*

Gotthardt, Gerhard; Milijasevic, Zoran; Nakazawa, Akira; and Skalsky, Michael, 5,016,646, Cl. 128-784.000.

Nalco Chemical Company: *See—*

McKinney, John M.; Ata, Ali D.; Wierzba, Robert B ; and Flowers. William F., 5,016,666, Cl. 137-1.000.

Nambu, Yoko: *See—*

Endo, Takeshi; Nambu, Yoko; and Abe, Keiji, 5,017,684, Cl. 528-409.000.

Namco Ltd.: *See—*

Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshihiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, 5,016,890, Cl. 273-312.000.

Namgoong, Sung K.: *See—*

Fleet, George W. J.; and Namgoong, Sung K., 5,017,704, Cl. 546-242.000.

Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, to Daicel Chemical Industries, Ltd. Separation agent comprising acyl- or carbamoyl-substituted polysaccharide. 5,017,290, Cl. 210-635.000.

Nanjoh, Takeshi; and Yamamoto, Kenji, to Ricoh Company, Ltd.; and Ricoh Research Institute of General Electronics Co., Ltd. Contact type image sensor. 5,017,987, Cl. 357-30.000.

Nanyoshi, Yasutoshi; and Komatsu, Hiroshi, to Nissan Motor Company, Limited. System and method for controlling a combustion state in a multi-cylinder engine for a vehicle. 5,016,591, Cl. 123-419.000.

Narayan, Prativadi B.: *See—*

Brar, Amarjit S.; and Narayan, Prativadi B., 5,017,439, Cl. 428-629.000.

Narciso, Ralph A.: *See—*

Martin, Donald J.; Narciso, Ralph A.; Lowe, David T.; and Greenman, Clifford H., 5,016,962, Cl. 350-96.160.

Nash, Dudley O.; and Nold, David A., to General Electric Company. Integral transition and convergent section exhaust nozzle. 5,016,818, Cl. 239-127.100.

Nasr, Hatem N.; Sadjadi, Firooz A.; Bazakos, Michael E.; and Amehdi, Hossien, to Honeywell Inc. Knowledge and model based adaptive signal processor. 5,018,215, Cl. 382-15.000.

Nasu, Kazuhito, to Takehito Nasu. Method of processing asbestos chips and apparatus. 5,017,016, Cl. 366-139.000.

National Hydrohoist Company: *See—*

Peck, Ralph E.; Elson, Todd E.; and Toofan, Masoud. 5,016,551. Cl. 114-045.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- National Research Development Corporation: *See—*
  - Bonfield, William; Bowman, Jeremy A.; and Grynpas, Marc D., 5,017,627, Cl. 523-115.000.
  - Embrey, Mostyn P.; and Graham, Neil B., 5,017,382, Cl. 424-486.000.
- National Semiconductor Corp.: *See—*
  - Perloff, Ronald S.; and Garverick, Timothy L., 5,018,171, Cl. 375-121.000.
  - Szepesi, Tamas S., 5,018,041, Cl. 361-18.000.
  - Wilcox, Milton E., 5,017,816, Cl. 307-570.000.
  - Wong, Hee; and Guinea, Jesus, 5,018,169, Cl. 375-119.000.
- Natori, Shunji: *See—*
  - Sawai, Kiichi; Natori, Shunji; Takahashi, Haruo; Tanaka, Kenichi; Mitani, Takahiko; and Kurono, Masayasu, 5,017,486, Cl. 435-172.300.
- Natori, Tatsuo: *See—*
  - Shimaguchi, Takashi; Yamada, Toshihiro; Natori, Tatsuo; Okada, Akihisa; and Misumi, Hiroshi, 5,017,102, Cl. 417-420.000.
- Nattress, Robert H.: *See—*
  - Welch, Robert J.; Nattress, Robert H.; Nitkowski, Robert E.; and Beakley, Westcoat, 5,016,948, Cl. 312-250.000.
- Navarrini, Walter; and Desmarteu, Darryl D., to Ausimont S.r.l. Process for the preparation of perfluoro-amino oxaziridines. 5,017,709, Cl. 548-959.000.
- Nave, Mark J. Measuring and limiting EMI with a differential mode rejection network. 5,017,878, Cl. 324-613.000.
- Navistar International Transportation Corp.: *See—*
  - Dannenberg, Robert D., 5,018,087, Cl. 364-571.010.
  - Londt, Edward E.; and Kruse, James W., 5,017,916, Cl. 340-870.130.
- Nayfa, James E. Preservative composition and method. 5,017,612, Cl. 514-557.000.
- Naylor, Brenda: *See—*
  - Naylor, Robert J.; Naylor, Brenda; Renaud, Alain; and Langlois, Michel, 5,017,580, Cl. 514-299.000.
- Naylor, Robert J.; Naylor, Brenda; Renaud, Alain; and Langlois, Michel. Memory enhancing-R-N-(1-azabicyclo[2.2.2.]oct-3-yl)benzamides and thiobenzamides. 5,017,580, Cl. 514-299.000.
- NCR Corporation: *See—*
  - Hermann, Thomas L.; and Eberhardt, George J., 5,017,033, Cl. 400-693.000.
  - Hsu, Sawyer C. Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 5,016,947, Cl. 312-108.000.
  - Patel, Ramesh U.; and So, Sithy, 5,018,148, Cl. 371-66.000.
- NEC Corporation: *See—*
  - Hashimoto, Kuniharu, 5,018,092, Cl. 364-736.000.
  - Nishimoto, Shozo, 5,017,514, Cl. 437-229.000.
  - Oikawa, Shinro, 5,017,968, Cl. 355-262.000.
  - Ozawa, Kazunori, 5,018,200, Cl. 381-36.000.
  - Shiba, Hiroshi, 5,017,503, Cl. 437-31.000.
  - Soejima, Katsumoto, 5,017,995, Cl. 357-43.000.
  - Suzuki, Syuji; and Suzuki, Hiroshi, 5,018,130, Cl. 370-1.000.
  - Urai, Takahiko, 5,018,104, Cl. 365-200.000.
  - Wada, Satoshi, 5,018,031, Cl. 360-96.500.
- NEC Home Electronics Ltd.: *See—*
  - Onayama, Shuichi; and Nosaka, Kazuhiko, 5,016,954, Cl. 350-3.710.
  - Sunada, Koichi; and Sato, Hiroshi, 5,018,015, Cl. 358-188.000.
- Nedonchelle, Yvon J., to Lever Brothers Company, Division of Conopco, Inc. Liquid detergent composition containing a smeltite clay softening agent. 5,017,296, Cl. 252-8.600.
- Negahban-Hagh, Mehrdad: *See—*
  - Germer, Warren R.; Ouellette, Maurice J.; and Negahban-Hagh, Mehrdad, 5,017,860, Cl. 324-142.000.
- Negishi, Junji: *See—*
  - Gotoh, Yoshihiko; Kawai, Toshikazu; and Negishi, Junji, 5,017,730, Cl. 568-812.000.
- Negri, Ettore, to Savio, S.p.A. Method of producing quality hosiery by changing stitch length in circular knitting machines and a device for its implementation. 5,016,449, Cl. 66-54.000.
- Neles Oy: *See—*
  - Kivipelto, Pekka J., 5,016,349, Cl. 29-890.121.
- Nelson, Donald E. Projectile-target game apparatus. 5,016,891, Cl. 273-407.000.
- Nelson, Robert S. X-ray detector for radiographic imaging. 5,017,782, Cl. 250-327.200.
- Nelson, Victor A.: *See—*
  - Kirwan, George B.; and Nelson, Victor A., 5,017,064, Cl. 410-53.000.
- Nemit, Jeffrey T., to ITT Corporation. Over the horizon communication system. 5,017,923, Cl. 342-52.000.
- NeoRx Corporation: *See—*
  - Hylarides, Mark D.; Srinivasan, Ananthachari; Fitzner, Jeffrey N.; and Vrudhula, Vivekananda M., 5,017,693, Cl. 530-390.000.
- Ness, Dale C.; and Call, Dirk B. Test apparatus and method for blood pressure measuring equipment. 5,016,466, Cl. 73-4.00R.
- Netravali, Arun N.; and Padmanabhan, Krishnan, to AT&T Bell Laboratories. Dual rail dilated switching networks. 5,018,129, Cl. 370-1.000.
- Neubach, Werner: *See—*
  - Kempter, Fritz E.; Matejcek, Franz; Neubach, Werner; and Flory, Klaus, 5,017,641, Cl. 524-598.000.
- Neugebauer, Constantine A.; and Daum, Wolfgang, to General Electric Company. High current hermetic package including an internal foil and having a lead extending through the package lid and a packaged semiconductor chip. 5,018,002, Cl. 357-68.000.
- Neumann, Bernd: *See—*
  - Muller, Manfred; Neumann, Bernd; and Stuttem, Manfred, 5,017,911, Cl. 340-677.000.
- Neumann, Peter: *See—*
  - Aumueller, Alexander; Neumann, Peter; and Trauth, Hubert, 5,017,702, Cl. 546-99.000.
- Neustadt, Bernard R.; Andrews, David R.; McNamara, Paul E.; and Watkins, Robert W., to Schering Corporation. Carboxyalkyl dipeptides as antiglaucoma agents. 5,017,567, Cl. 514-171.000.
- Newham, Paul; and Andrews, Bernard J., to Marconi Company Limited, The. Wideband horn antenna. 5,017,937, Cl. 343-785.000.
- Newkirk, Marc S.; and Zwicker, Shirley L., to Lanxide Technology Company, LP. Methods of making shaped ceramic composites. 5,017,526, Cl. 501-89.000.
- Newkirk, Marc S.; Kennedy, Christopher R.; and Kantner, Robert C., to Lanxide Technology Company, LP. Method for in situ tailoring the metallic component of ceramic articles. 5,017,533, Cl. 501-127.000.
- Newtec International (Societe Anonyme): *See—*
  - Thimon, Jacques; and Morantz, Jack, 5,016,427, Cl. 53-44.000.
- Ngian, Jenna P. C.; and Barkman, William F., to Otis Elevator Company. Label clip for electrical component housing. 5,016,375, Cl. 40-642.000.
- NGK Insulators, Ltd.: *See—*
  - Nakamura, Akihiko; and Ito, Takashi, 5,016,362, Cl. 34-51.000.
  - Ukai, Noriyuki; Hayakawa, Issei; Miyamoto, Mithuru; and Matsuhisa, Tadaaki, 5,017,531, Cl. 501-98.000.
- NGK Spark Plug Co., Ltd.: *See—*
  - Oshima, Takafumi; and Kazuhiko, Kozuka, 5,017,826, Cl. 313-142.000.
- Ngo, Khai D. T.: *See—*
  - Yerman, Alexander J.; and Ngo, Khai D. T., 5,017,902, Cl. 336-83.000.
- Nguyen, Dam C., to Sundstrand Corporation. Multi-pass crossflow jet impingement heat exchanger. 5,016,707, Cl. 165-167.000.
- Nguyen, Kim D.: *See—*
  - Spink, Donald R.; Robinson, Murry C.; and Nguyen, Kim D., 5,017,346, Cl. 423-101.000.
- Nguyen, Uy; Frakman, Grigory; and Evans, David A. Process for extracting antioxidants from Labiatae herbs. 5,017,397, Cl. 426-542.000.
- NH Produkter Handelsbolag: *See—*
  - Hay, Eric; and Nordstrom, Anders, 5,016,878, Cl. 273-85.00F.
- Nicholas, Ralph A., III: *See—*
  - Agostinelli, John A.; Mir, Jose M.; Paz-Pujalt, Gustavo R.; Lelental, Mark; and Nicholas, Ralph A., III, 5,017,551, Cl. 505-1.000.
- Nicholls, Mark: *See—*
  - Payne, Peter A.; and Nicholls, Mark, 5,016,333, Cl. 29-25.350.
- Nichols, Edward W.: *See—*
  - Cross, Michael A.; and Nichols, Edward W., 5,017,004, Cl. 356-121.000.
- Nichols, James M., to Infiltrator Systems Inc. Leaching system conduit with high rigidity joint. 5,017,041, Cl. 405-48.000.
- Nicolau, Yves-Claude; LePape, Alain; and Barot-Ciorbaru, Rita, to Centre National de la Recherche Scientifique. Aerosol compositions for in vivo imaging and therapy. 5,017,359, Cl. 424-1.100.
- Nicolino, Aldo; and Cero, Maurizio D. Connection for extensions of inflating valves of motor vehicle tires. 5,016,668, Cl. 137-231.000.
- Niedbala, Raymond S., to SolarCare Technologies Corporation. Sunscreen composition and applicator system. 5,017,365, Cl. 424-59.000.
- Niequist, Kent E.: *See—*
  - Rhian, Walter G.; and Niequist, Kent E., 5,016,370, Cl. 40-359.000.
- Niewisch, Joachim: *See—*
  - Granz, Bernd; Holzapfel, Ralf; and Niewisch, Joachim, 5,017,775, Cl. 250-227.250.
- Nihon Medi-Physics Co., Ltd.: *See—*
  - Yamada, Hideo; Nakayama, Shozo; Iinuma, Mitsuhisa; and Tobiki, Hisao, 5,017,191, Cl. 604-243.000.
- Nihon Tokushu Noyaku Seizo K. K.: *See—*
  - Kume, Toyohiko; Goto, Toshio; Kamochi, Atsumi; Yanagi, Akihiko; Miyauchi, Hiroshi; and Asami, Tadao, 5,017,213, Cl. 71-95.000.
- Nihonmatal Co., Ltd.: *See—*
  - Noguchi, Tatsuo, 5,017,254, Cl. 156-227.000.
- Niksa, Andrew J.; and Pohto, Gerald R., to Eltech Systems Corporation. Electroplating cell anode. 5,017,275, Cl. 204-206.000.
- Nilssen, Ole K. Electronic incandescent lighting product. 5,017,838, Cl. 315-200.00R.
- Ning, Tak Hung: *See—*
  - Chen, Tze-Chiang; Chuang, Ching-Te Kent; Li, Guann-Pyng; and Ning, Tak Hung, 5,017,990, Cl. 357-34.000.
- Nippon Acchakutanshi Seizo Kabushiki Kaisha: *See—*
  - Okazaki, Takashi; Suzuki, Eiji; and Shinohara, Takashi, 5,016,347, Cl. 29-825.000.
- Nippon Carbide Kogyo Kabushiki Kaisha: *See—*
  - Shibafuchi, Hiroshi; Sasaki, Masanori; Nitta, Hidenori; and Yoshida, Masahiko, 5,017,355, Cl. 423-369.000.
- Nippon Felt Co., Ltd.: *See—*
  - Murakami, Fumio; Okazaki, Sadaaki; Aoyagi, Takayoshi; Iwasaki, Tokuji; and Konno, Tetsuya, 5,016,677, Cl. 139-245.000.
- Nippon Kayaku Kabushiki Kaisha: *See—*
  - Satou, Fumitaka; and Ogawa, Fumio, 5,017,195, Cl. 8-526.000.
- Nippon Oil Co., Ltd.: *See—*
  - Tsukabayashi, Kazuo; Yamamoto, Takashi; and Sawanoi, Yasunari, 5,016,451, Cl. 68-2.000.

- Nippon Oil & Fats Co., Ltd.: *See—*
  - Tomura, Yoshihiro; and Banno, Shigeki, 5,017,626, Cl. 522-9.000.
- Nippon Petrochemicals Company, Limited: *See—*
  - Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 5,017,733, Cl. 585-6.300.
- Nippon Seiko Kabushiki Kaisha: *See—*
  - Yokote, Yoshihiro; and Hashimoto, Yoshito, 5,016,916, Cl. 280-808.000.
- Nippon Sheet Glass Co., Ltd.: *See—*
  - Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; Katsuki, Kazuo; and Yamashita, Ken, 5,016,981, Cl. 350-314.000.
  - Sakurai, Kaoru; Maeda, Masaru; Murakami, Harunori; and Iijima, Hiroshi, 5,017,933, Cl. 343-704.000.
- Nippon Soda Co., Ltd.: *See—*
  - Igaki, Tetsuo; Kaneko, Akio; Manaka, Sumio; and Kinoshita, Kimiaki, 5,017,710, Cl. 549-226.000.
- Nippon Steel Corporation: *See—*
  - Iuchi, Tohru; Nakamori, Yukio; Kawasaki, Atsushi; Yashiro, HIrokatsu; and Nagatake, Yoh-ichi, 5,017,018, Cl. 374-130.000.
  - Kawano, Osamu; Takahashi, Manabu; Wakita, Junichi; and Esaka, Kazuyoshi, 5,017,248, Cl. 148-320.000.
  - Miyasaka, Akihiro; and Ogawa, Hiroyuki, 5,017,246, Cl. 148-135.000.
- Nippon Telegraph & Telephone Corporation: *See—*
  - Kanai, Tsuneo; Hosokawa, Shigefumi; Kumakura, Yasuo; Umemura, Shigeru; and Inagaki, Shuichiro, 5,017,145, Cl. 439-45.000.
  - Murakami, Toshiaki; and Moriwaki, Kazuvuki, 5,016,563, Cl. 118-723.000.
  - Nagase, Ryo; Noda, Juichi; and Sugita, Etsuji, 5,016,970, Cl. 350-96.210.
- Nippon Yakin Kogyo Co., Ltd.: *See—*
  - Ikegami, Yuji; Sasayama, Shinichi; Tachino, Noboru; and Kamiya, Takeshi, 5,017,544, Cl. 502-439.000.
- Nippon Zeon Co., Ltd.: *See—*
  - Mori, Osamu; Oyama, Motofumi; Hisaki, Hiroshi; Sekiguchi, Masato; Okamura, Akinobu; and Tanabe, Haruhiro, 5,017,639, Cl. 524-510.000.
- Nippondenso Co., Ltd.: *See—*
  - Fujii, Tetsuo; Sakakibara, Toshio; and Sakakibara, Nobuyoshi, 5,017,505, Cl. 437-52.000.
  - Fujii, Tetsuo; Sakai, Minekazu; and Kuroyanagi, Akira, 5,017,979, Cl. 357-23.500.
  - Hayashi, Akihiko; Yamazaki, Toru; and Torii, Akira, 5,017,935, Cl. 343-715.000.
  - Kondo, Kenji; Akamatsu, Kazuo; Yamauchi, Takeshi; Yamaoka, Tooru; and Komura, Atsushi, 5,018,001, Cl. 357-67.000.
- Niro-Plan AG: *See—*
  - Ris, Max; and Monnard, Andre , 5,016,298, Cl. 4-654.000.
- Nisato, Dino: *See—*
  - Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.
- Nishida, Kaoru: *See—*
  - Asada, Tomoyuki; Nishida, Kaoru; Shimono, Mamoru; Shinohara, Hideyuki; and Ando, Koichi, 5,016,560, Cl. 118-653.000.
- Nishida, Yasuhiro: *See—*
  - Kondo, Takanori; Yamachika, Hiroshi; Tanaka, Kunihiko; and Nishida, Yasuhiro, 5,017,713, Cl. 552-237.000.
- Nishida, Yoshihiro, to Mitsubishi Denki Kabushiki Kaisha. Tape time display device for displaying a tape remainder time. 5,018,040, Cl. 360-137.000.
- Nishiguchi, Takashi: *See—*
  - Komai, Norihiko; Nishiguchi, Takashi; Hirayama, Junji; and Terada, Tomoaki, 5,018,173, Cl. 378-4.000.
- Nishihara, Akira; and Tsunashima, Makoto, to Mitsubishi Kinzoku Kabushiki Kaisha. Process for preparing coated pigments. 5,017,231, Cl. 106-452.000.
- Nishijima, Toyoki; and Onodera, Kaoru, to Konica Corporation. Silver halide light-sensitive photographic material having improved light fastness. 5,017,464, Cl. 430-551.000.
- Nishijima, Toyoki, to Konica Corporation. Light-sensitive silver halide photographic material. 5,017,465, Cl. 430-551.000.
- Nishikawa, Hiromitsu; and Kato, Yuichi, to Ohi Siesakusho Co., Ltd. Canvas top type sunroof structure for motor vehicle. 5,016,939, Cl. 296-219.000.
- Nishikawa, Yukio: *See—*
  - Yoshida, Yoshikazu; Tanaka, Kunio; Nishikawa, Yukio; and Takada, Yusuke, 5,017,277, Cl. 204-298.020.
- Nishikori, Toshiaki: *See—*
  - Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.
- Nishimoto, Shozo, to NEC Corporation. Method of manufacturing a semiconductor device using a main vernier pattern formed at a right angle to a subsidiary vernier pattern. 5,017,514, Cl. 437-229.000.
- Nishimura, Tadashi; Sugahara, Kazukyuki; Kusunori, Shigeru; and Ohsaki, Akihiko, to Mitsubishi Denki Kabushiki Kaisha. Vertical type MOS transistor and method of formation thereof. 5,017,504, Cl. 437-40.000.
- Nishimura, Tetsuharu: *See—*
  - Ishizuka, Koh; Tsukiji, Masaaki; Kubota, Yoichi; Ishii, Satoshi; and Nishimura, Tetsuharu, 5,017,777, Cl. 250-231.160.
- Nishino, Yutaka: *See—*
  - Nishitani, Yasuhiro; Nishino, Yutaka; and Irie, Tadashi, 5,017,581, Cl. 514-300.000.
- Nishio, Taichi: *See—*
  - Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; and Sanada, Takashi, 5,017,652, Cl. 525-68.000.
- Nishitani, Yasuhiro; Nishino, Yutaka; and Irie, Tadashi, to Shionogi & Co., Ltd. Pyridonecarboxylic acids and their anti-bacterial compositions. 5,017,581, Cl. 514-300.000.
- Nishizawa, Hirotaka: *See—*
  - Yamada, Toshio; Kobayashi, Tohru; Nishizawa, Hirotaka; Itoh, Hiroyuki; and Saitoh, Tatsuya, 5,018,000, Cl. 357-51.000.
- Nishizawa, Jun-ichi; Tamamushi, Takashige; and Nonaka, Ken-ichi, to Jun-Ichi Nishizawa. Light quenchable thyristor device. 5,017,991, Cl. 357-38.000.
- Nissan Motor Company, Limited: *See—*
  - Akatsu, Yohsuke; Fukushima, Naoto; Fujimura, Itaru; and Fukunaga, Yukio, 5,016,907, Cl. 280-707.000.
  - Eguchi, Takaaki, 5,018,070, Cl. 364-424.050.
  - Iida, Nozomi; Hannya, Shuichi; and Omote, Kazuaki, 5,016,394, Cl. 49-441.000.
  - Nanyoshi, Yasutoshi; and Komatsu, Hiroshi, 5,016,591, Cl. 123-419.000.
  - Ono, Hitoshi, 5,016,704, Cl. 165-1.000.
  - Sasaki, Michiaki; and Ozaki, Katsunori, 5,016,670, Cl. 137-574.000.
  - Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.
  - Sugano, Kazuhiko, 5,016,496, Cl. 74-868.000.
  - Suzuki, Katsuya; Nakajima, Yoshihiro; and Ishii, Tomoyuki, 5,016,842, Cl. 248-68.100.
  - Takizawa, Satoshi, 5,016,495, Cl. 74-866.000.
  - Yamaguchi, Hiroshi, 5,016,494, Cl. 74-858.000.
- Nissan Shatai Company, Limited: *See—*
  - Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.
- Nissimov, Haim N., to Seagate Technology, Inc. Universal disk drive type emulation for IBM PC-AT computers. 5,018,095, Cl. 364-900.000.
- Nitkowski, Robert E.: *See—*
  - Welch, Robert J.; Nattress, Robert H.; Nitkowski, Robert E.; and Beakley, Westcoat, 5,016,948, Cl. 312-250.000.
- Nitta, Hidenori: *See—*
  - Shibafuchi, Hiroshi; Sasaki, Masanori; Nitta, Hidenori; and Yoshida, Masahiko, 5,017,355, Cl. 423-369.000.
- Nitta, Shigemitsu, to Kawasaki Jukogyo Kabushiki Kaisha. Exhaust system for a small watercraft engine. 5,016,439, Cl. 60-310.000.
- Nitto Boseki Co., Ltd.: *See—*
  - Shioura, Kozo; and Taguchi, Hideo, 5,017,205, Cl. 65-1.000.
- Niwa, Takashi: *See—*
  - Nagahara, Toyohiro; Niwa, Takashi; Sano, Takezo; and Kato, Isao, 5,017,747, Cl. 200-453.000.
- NKK Corporation: *See—*
  - Tanabe, Haruyoshi; Iwasaki, Katsuhiro; Kawakami, Masahiro; Taki, Chihiro; and Takaoka, Toshio, 5,017,220, Cl. 75-629.000.
- Noboru, Oshima: *See—*
  - Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.
- Noda, Isao: *See—*
  - Senuma, Akitaka; Tsukada, Kiroku; and Noda, Isao, 5,017,635, Cl. 524-269.000.
- Noda, Juichi: *See—*
  - Nagase, Ryo; Noda, Juichi; and Sugita, Etsuji, 5,016,970, Cl. 350-96.210.
- Noda, Yukijumi; Sugawa, Makoto; and Kohda, Akira, to Chugai Seiyaku Kabushiki Kaisha. Dibenzoxazepine compounds useful in the treatment of cerebral vasospasm or its sequela. 5,017,570, Cl. 514-211.000.
- Noggle, Kenneth: *See—*
  - Robinson, Wayne; and Noggle, Kenneth, 5,017,058, Cl. 408-173.000.
- Noguchi, Tatsuo, to Nihonmatal Co., Ltd. Method of making inflatable bodies. 5,017,254, Cl. 156-227.000.
- Nohren, Hubert; Siebrand, Gerhard; and Moritzen, Werner, to Autoflug GmbH & Co. Missile for setting down a load. 5,016,534, Cl. 102-387.000.
- Nojima, Masaharu: *See—*
  - Kanda, Nobuo; Mandoh, Ritsuo; Nojima, Masaharu; and Arai, Naoto, 5,017,545, Cl. 503-208.000.
- Nojiri, Hiromi: *See—*
  - Ito, Kenichiro; Nojiri, Hiromi; and Adachi, Kenro, 5,016,740, Cl. 192-38.000.
- Nokia Mobile Phones: *See—*
  - Koskinen, Pentti A.; and Timari, Antti S., 5,016,851, Cl. 248-278.000.
- Nolan, Daniel A.: *See—*
  - Miller, William J.; Nolan, Daniel A.; and Williams, Gregory E., 5,017,206, Cl. 65-3.110.
- Nolan, Paul S.: *See—*
  - Amrhein, Gerald T.; and Nolan, Paul S., 5,016,472, Cl. 73-338.000.
- Nold, David A.: *See—*
  - Nash, Dudley O.; and Nold, David A., 5,016,818, Cl. 239-127.100.
- Noma, Hiroyuki; Saitou, Saneto; and Ono, Masaharu, to Sumitomo Rubber Industries, Ltd. Safety tire having defined carcass curvature

VOL 1126 ISS 3 MY 21 1991 UMI

from the point of maximum width to the bead. 5,016,697, Cl. 152-454.000.

Noma, Takeshi; Matsumoto, Tadao; and Sugihara, Taizo, to Chisso Corporation. Dyeable polypropylene fibers for clothes. 5,017,658, Cl. 525-195.000.

Nonaka, Jun: *See—*
Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.

Nonaka, Ken-ichi: *See—*
Nishizawa, Jun-ichi; Tamamushi, Takashige; and Nonaka, Ken-ichi, 5,017,991, Cl. 357-38.000.

Nonami, Hidetaka, to Kabushiki Kaisha Toshiba. Apparatus for feeding sheet material. 5,016,864, Cl. 271-38.000.

Nonomura, Kinzo: *See—*
Hamada, Kiyoshi; Nonomura, Kinzo; Takahashi, Masayuki; Hashiguchi, Jumpei; and Kitao, Satoshi, 5,017,842, Cl. 315-366.000.

Nordisk Gentofte A/S: *See—*
Andersen, Henrik D.; Dahl, Hans H. M.; and Christensen, Thorkild, 5,017,493, Cl. 435-252.300.

Nordson Corporation: *See—*
Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 5,017,324, Cl. 264-510.000.
Konieczynski, Ronald D., 5,016,665, Cl. 137-1.000.
Pedigrew, Colin, 5,016,812, Cl. 229-132.000.

Nordstrom, Anders: *See—*
Hay, Eric; and Nordstrom, Anders, 5,016,878, Cl. 273-85.00F.

North American Philips Corporation: *See—*
Droho, Joseph S., 5,017,840, Cl. 315-291.000.
Patt, Paul J.; and Stolfi, Fred R., 5,017,819, Cl. 310-90.500.

Northrop Corporation: *See—*
Morash, Dean C., 5,017,056, Cl. 408-1.00R.
Stencel, Edgar L., 5,017,069, Cl. 411-403.000.

Norvell, Jean. Water impermeable, water vapor permeable orthopedic cast. 5,016,622, Cl. 128-91.00R.

Norwood, David A.: *See—*
Manns, William G.; Wood, Anthony B.; Norwood, David A.; Weeks, Don J.; and Gordon, Michael, 5,018,212, Cl. 382-8.000.

Nosaka, Kazuhiko: *See—*
Onayama, Shuichi; and Nosaka, Kazuhiko, 5,016,954, Cl. 350-3.710.

Nosaka, Tsutomu: *See—*
Satoh, Kazuo; and Nosaka, Tsutomu, 5,017,253, Cl. 156-130.300.

Novo Nordisk A/S: *See—*
Hansen, Kristian T.; Bundgaard, Hans; and Faarup, Peter, 5,017,571, Cl. 514-213.000.
Jakobsen, Palle; and Drejer, Jorgen, 5,017,585, Cl. 514-317.000.

Noyes, John, III: *See—*
McGuire, Thomas F.; and Noyes, John, III, 5,017,197, Cl. 55-1.000.

Nozaki, Nobuharu: *See—*
Shioji, Mitsuaki; Morimoto, Kenichi; Kato, Shinji; Nakamura, Takeshi; and Nozaki, Nobuharu, 5,016,983, Cl. 350-332.000.

NTN Corporation: *See—*
Ito, Kenichiro; Nojiri, Hiromi; and Adachi, Kenro, 5,016,740, Cl. 192-38.000.

Numata, Tomiyuki: *See—*
Tsuji, Kentaroh; Fujiwara, Tsuneo; Fuji, Hiroshi; Terashima, Shigeo; and Numata, Tomiyuki, 5,018,120, Cl. 369-32.000.

NV B'Linea: *See—*
Suenens, Albert J.; and Ghysels, Marcel, 5,016,305, Cl. 5-477.000.

Nyberg, Muriel R., legal representative: *See—*
Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.

Nygaard, Barbara G.: *See—*
Holmes, Thomas J.; and Nygaard, Barbara G., 5,017,562, Cl. 514-26.000.

O & K Orenstein & Koppel Aktiengesellschaft: *See—*
Bentz, Helmut, 5,016,945, Cl. 305-58.0PC.

Oakley, Robert V.: *See—*
Taiariol, Van; Oakley, Robert V.; and Ventura, Peter, 5,017,490, Cl. 435-240.200.

Obara, Yoshihiro: *See—*
Ura, Mitugu; Obara, Yoshihiro; and Takahashi, Kazushi, 5,017,900, Cl. 335-210.000.

Obata, Akihiko; Adachi, Motomitsu; Kamata, Hajime; and Yano, Katsutoshi, to Fujitsu Limited. Guidance message display timing control using time intervals. 5,018,082, Cl. 364-521.000.

Obata, Yoshiyuki: *See—*
Ohtomo, Yasuyuki; and Obata, Yoshiyuki, 5,017,256, Cl. 156-240.000.

Oberg Industries: *See—*
Walters, Harry J., 5,017,792, Cl. 250-548.000.

O'Brien, Donogh P.; and Vehar, Gordon A., to Genentech, Inc. Treatment of bleeding disorders using lipid-free tissue factor protein. 5,017,556, Cl. 514-2.000.

Och, Rudolf, to Frenco Verzahnungslehren GmbH, Firma. Test method and testing device for detecting any faults, or inaccuracies, in splined wheels or objects with similar profiles. 5,016,471, Cl. 73-162.000.

O'Connor, Sean P., to BP Chemicals Limited. Lubricating composition containing anti-wear/extreme pressure additives. 5,017,298, Cl. 252-47.000.

Oder, Robin R., to EXPORTech Company, Inc. Method of magnetic separation and apparatus therefore. 5,017,283, Cl. 209-212.000.

Odom, Harold A., Jr. Method and apparatus for supply of water and nutrients to plants. 5,016,389, Cl. 47-48.500.

Oechsner, Hans. High-frequency ion source. 5,017,835, Cl. 315-111.810.

Oehler, William P. Boat with retractable roof. 5,016,558, Cl. 114-361.000.

Oesterrechisches Forschungszentrum Seibersdorf Ges. M.B.H.: *See—*
Riesing, Johann, 5,017,262, Cl. 156-630.000.

Ofusa, Kumi: *See—*
Ueno, Masaji; and Ofusa, Kumi, 5,017,808, Cl. 307-446.000.

Ogasawara, Yutaka; and Sakagami, Wataru, to Canon Kabushiki Kaisha. Information recording method and apparatus for recording information on track positioned at least two tracks ahead when abnormality of tracking servo is detected. 5,018,124, Cl. 369-44.330.

Ogata, Hiromasa; Morioka, Koji; and Ohmori, Susumu, to Taikisha Ltd.; and Toyo Boseki Kabushiki Kaisha. Gas treating apparatus. 5,017,202, Cl. 55-390.000.

Ogata, Masaru; Matsumoto, Hiroshi; Shimizu, Sumio; and Kida, Shiro, to Shionogi & Co., Ltd. Azabicycloalkanes. 5,017,708, Cl. 548-515.000.

Ogawa, Fumio: *See—*
Satou, Fumitaka; and Ogawa, Fumio, 5,017,195, Cl. 8-526.000.

Ogawa, Hiroyuki: *See—*
Miyasaka, Akihiro; and Ogawa, Hiroyuki, 5,017,246, Cl. 148-135.000.

Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Organic electronic device with a monomolecular layer or multi-monomolecular layer having electroconductive conjugated bonds. 5,017,975, Cl. 357-8.000.

Ogawa, Seiichi; Sukimoto, Minobu; and Akiyoshi, Hitoshi, to Showa Aluminum Corporation. Intake manifold. 5,016,578, Cl. 123-52.0MC.

Ogawa, Takahiro; Inoue, Atsushi; Ito, Kiyotaka; Ueta, Yutaka; and Koga, Kazuhiko, to Sanyo Electric Co., Ltd. A process for producing magnetic heads of the floating type. 5,016,341, Cl. 29-603.000.

Ogawa, Tetsuro: *See—*
Hirayama, Yasuhiko; Ogawa, Tetsuro; and Ojima, Satoshi, 5,017,518, Cl. 501-1.000.

Ogita, Hiromitsu; and Toida, Akikazu, to Shinko Electric Co., Ltd. Thermal transfer type color printer. 5,017,943, Cl. 346-76.0PH.

Oguchi, Tetsuji: *See—*
Johary, Arun; and Oguchi, Tetsuji, 5,018,076, Cl. 364-518.000.

Ogura, Masahiro: *See—*
Nakamura, Yoshio; Ogura, Masahiro; Shimada, Yoshio; Watanabe, Kiyoshi; and Takahashi, Hideyuki, 5,017,484, Cl. 435-158.000.

Ogura, Mitsuru: *See—*
Ohashi, Kunio; and Ogura, Mitsuru, 5,018,054, Cl. 362-211.000.

Oguri, Hideyo: *See—*
Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshihiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, 5,016,890, Cl. 273-312.000.

Ohara, Osamu; Kawashima, Hiroshi; and Takata, Hiroshi, to Yamaha Hatsudoki Kabushiki Kaisha. Freight system. 5,016,543, Cl. 105-150.000.

Ohashi, Keiichi, to Sharp Kabushiki Kaisha. Cassette loading mechanism of a magnetic recording and reproducing apparatus. 5,018,030, Cl. 360-94.000.

Ohashi, Kunio; and Ogura, Mitsuru, to Sharp Kabushiki Kaisha. Exposure device with filter. 5,018,054, Cl. 362-211.000.

Ohashi, Tsuyoshi, to Brother Kogyo Kabushiki Kaisha. Semiconductor laser drive device. 5,018,154, Cl. 372-29.000.

Ohashi, Yuji; Terakado, Yoshimitsu; and Hayashi, Hijiri, to Kabushiki Kaisha Shinkawa. Wire bonding apparatus. 5,016,803, Cl. 228-4.500.

Ohbayashi Corporation: *See—*
Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.

Ohhashi, Masahide: *See—*
Kai, Naoyuki; Ohhashi, Masahide; and Minagawa, Tsutomu, 5,018,147, Cl. 371-49.100.

Ohi, Reiichi: *See—*
Kobayashi, Hidetoshi; Ohi, Reiichi; and Sakanoue, Kei, 5,017,466, Cl. 430-558.000.

Ohi Seisakusho Co., Ltd.: *See—*
Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.

Ohi Siesakusho Co., Ltd.: *See—*
Nishikawa, Hiromitsu; and Kato, Yuichi, 5,016,939, Cl. 296-219.000.

Ohkubo, Akio: *See—*
Sasai, Keizo; Sakuragi, Kenkichi; Nakamura, Mitsunori; Ohkubo, Akio; and Yoshino, Motoaki, 5,017,945, Cl. 346-136.000.

Ohkumo, Hiroya, to Fuji Jukogyo Kabushiki Kaisha. System for controlling ignition timing of an internal combustion engine. 5,016,590, Cl. 123-412.000.

Ohlin, Stig D., to Scantool Handelsbolag. Anchoring bolt device. 5,017,067, Cl. 411-45.000.

Ohmori, Naoto: *See—*
Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,017,961, Cl. 355-202.000.

Ohmori, Susumu: *See—*
Ogata, Hiromasa; Morioka, Koji; and Ohmori, Susumu, 5,017,202, Cl. 55-390.000.

Ohsaki, Akihiko: *See—*
Nishimura, Tadashi; Sugahara, Kazukyuki; Kusunori, Shigeru; and Ohsaki, Akihiko, 5,017,504, Cl. 437-40.000.

Ohshima, Michio: *See—*
Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.

Ohsumi, Hideki, to Yazaki Corporation. Terminal engaging apparatus of connector. 5,017,163, Cl. 439-752.000.

Ohta, Kazunari: *See—*
Ishida, Yasuo; Ohta, Kazunari; Nakahama, Tatsuo; and Yoshikawa, Harutoshi, 5,017,212, Cl. 71-92.000.

Ohtomo, Yasuyuki; and Obata, Yoshiyuki, to Fuji Kagakushi Kogyo Co., Ltd. Method of using a heat-sensitive melt-transfer recording medium. 5,017,256, Cl. 156-240.000.

Ohtsuka, Nobukazu; Nagai, Hiroyuki; Shibanaka, Mitsugu; and Matsui, Toshikazu, to Mita Industrial Co., Ltd. Automatic document transfer device. 5,016,868, Cl. 271-273.000.

Ohuchi, Masayuki: *See—*
Yamada, Hiroshi; Ohuchi, Masayuki; Saito, Masayuki; and Hongu, Akinori, 5,018,051, Cl. 361-393.000.

Ohwaki, Akira: *See—*
Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.

Oikawa, Katsuyuki; Ishihara, Toshinobu; Endo, Mikio; and Kubota, Tohru, to Shin-Etsu Chemical Co., Ltd. Iodotrimethylsilane compositions. 5,017,715, Cl. 556-401.000.

Oikawa, Shinro, to NEC Corporation. Liquid development apparatus having comb-like electrode. 5,017,968, Cl. 355-262.000.

Oikawa, Susumu: *See—*
Tominaga, Tomohisa; Sato, Kazuichi; Otsuka, Kouichi; Endo, Toshiya; and Oikawa, Susumu, 5,017,443, Cl. 429-99.000.

Oizumi, Hiroaki: *See—*
Soda, Yasunari; Mochiji, Kozo; Oizumi, Hiroaki; and Kimura, Takeshi, 5,017,458, Cl. 430-296.000.

Ojima, Iwao; and Fuchikami, Takamasa, to Sagami Chemical Research Center. Process for preparing polyfluoroalkyl-substituted compounds. 5,017,718, Cl. 556-466.000.

Ojima, Satoshi: *See—*
Hirayama, Yasuhiko; Ogawa, Tetsuro; and Ojima, Satoshi, 5,017,518, Cl. 501-1.000.

Okada, Akihisa: *See—*
Shimaguchi, Takashi; Yamada, Toshihiro; Natori, Tatsuo; Okada, Akihisa; and Misumi, Hiroshi, 5,017,102, Cl. 417-420.000.

Okada, Masato; Kohno, Masaki; and Yagi, Tetsuya, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,018,158, Cl. 372-46.000.

Okada, Naofumi: *See—*
Utsumi, Tatsuya; Kawamura, Shinji; Itoh, Tetsuya; Moriyama, Hiroshi; and Okada, Naofumi, 5,016,828, Cl. 241-158.000.

Okada, Shinjiro, to Canon Kabushiki Kaisha. Liquid crystal element with improved contrast and brightness. 5,016,989, Cl. 350-350.00S.

Okamoto, Ichiro: *See—*
Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 5,017,290, Cl. 210-635.000.

Okamura, Akinobu: *See—*
Mori, Osamu; Oyama, Motofumi; Hisaki, Hiroshi; Sekiguchi, Masato; Okamura, Akinobu; and Tanabe, Haruhiro, 5,017,639, Cl. 524-510.000.

Okamura, Hisashi; and Katoh, Kazunobu, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 5,017,456, Cl. 430-264.000.

Okamura, Ryuji: *See—*
Saitoh, Keishi; Okamura, Ryuji; Otoshi, Hirokazu; and Matsuda, Koichi, 5,016,565, Cl. 118-723.000.

Okawa, Masayuki: *See—*
Tsujimura, Osamu; Arai, Tatsuo; Nakayama, Masaaki; and Okawa, Masayuki, 5,017,055, Cl. 407-113.000.

Okazaki, Sadaaki: *See—*
Murakami, Fumio; Okazaki, Sadaaki; Aoyagi, Takayoshi; Iwasaki, Tokuji; and Konno, Tetsuya, 5,016,677, Cl. 139-245.000.

Okazaki, Takashi; Suzuki, Eiji; and Shinohara, Takashi, to Nippon Acchakutanshi Seizo Kabushiki Kaisha. Method and apparatus of making terminals of cables. 5,016,347, Cl. 29-825.000.

Okegawa, Tadao: *See—*
Imaki, Katsuhiro; Arai, Yoshinobu; and Okegawa, Tadao, 5,017,610, Cl. 514-546.000.

Oki Electric Industry Co., Ltd.: *See—*
Andou, Hirokazu; Kikuchi, Hiroshi; and Murakawa, Hiroki, 5,017,029, Cl. 400-237.000.

Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji; Koguma, Hiroshi; and Emata, Takashi, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semi-conductor device. 5,018,004, Cl. 357-74.000.

Okoshi, Noboru: *See—*
Kase, Mitsuo; Okoshi, Noboru; and Tsuyuzaki, Kazue, 5,017,655, Cl. 525-127.000.

Okuda, Eiji: *See—*
Kaida, Kenichi; Yamada, Osamu; and Okuda, Eiji, 5,017,864, Cl. 324-158.00F.

Okuda, Michihiro: *See—*
Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.

Okumura, Ichiro, to Canon Kabushiki Kaisha. Vibration wave driven actuator. 5,017,823, Cl. 310-323.000.

Okuyama, Takashi: *See—*
Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.

Oldfield, William W., to Wiltron Company. Coaxial microwave device test fixture. 5,017,865, Cl. 324-158.00F.

Oldham, David M.: *See—*
Kulakowski, John E.; Means, Rodney J.; Oldham, David M.; and Tayefeh, Morovat, 5,018,126, Cl. 369-58.000.

O'Leary, John H.: *See—*
Epperly, William R.; Sullivan, James C.; Sprague, Barry N.; and O'Leary, John H., 5,017,347, Cl. 423-235.000.

Olin Corporation: *See—*
Ashok, Sankaranarayanan, 5,017,250, Cl. 148-411.000.
Sankaranarayanan, Ashok; Crane, Jacob; and Fister, Julius C., 5,017,244, Cl. 148-3.000.
Sowash, Robert P., 5,016,538, Cl. 102-520.000.

Olinger, Philip M.; and Kruger, Christof, to Suomen Xyrofin Oy. Non-cariogenic sweetener. 5,017,400, Cl. 426-660.000.

Oliver, David W., to General Electric Company. Swept frequency eddy current system for measuring coating thickness. 5,017,869, Cl. 324-230.000.

Olivier, Errol J., to Copolymer Rubber & Chemical Corporation. Polymerizable antioxidant composition. 5,017,727, Cl. 568-719.000.

Olson, Gordon E.: *See—*
Effland, Richard C.; Klein, Joseph T.; Davis, Larry; and Olson, Gordon E., 5,017,578, Cl. 514-266.000.

Olympus Optical Company Ltd.: *See—*
Akitake, Hiroshi, 5,016,993, Cl. 350-429.000.
Hashimoto, Akihiko; Kitahara, Toshihiro; and Miyajima, Hiroshi, 5,017,764, Cl. 235-454.000.
Miyairi, Nobuo, 5,018,155, Cl. 372-31.000.
Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.
Takekawa, Hiroshi, 5,017,341, Cl. 422-102.000.

Omori, Hideki: *See—*
Kihara, Hiroyuki; and Omori, Hideki, 5,018,071, Cl. 364-474.170.

Omote, Kazuaki: *See—*
Iida, Nozomi; Hannya, Shuichi; and Omote, Kazuaki, 5,016,394, Cl. 49-441.000.

Omron Corporation: *See—*
Kuzukawa, Kiyoaki, 5,017,898, Cl. 335-128.000.

Omron Tateisi Electronics Co.: *See—*
Maenishi, Kozo; and Watanabe, Makoto, 5,018,050, Cl. 361-386.000.
Nagahara, Toyohiro; Niwa, Takashi; Sano, Takezo; and Kato, Isao, 5,017,747, Cl. 200-453.000.
Yamakawa, Takeshi, 5,017,817, Cl. 307-571.000.

Onayama, Shuichi; and Nosaka, Kazuhiko, to NEC Home Electronics Ltd. Optical pickup and hologram therefor. 5,016,954, Cl. 350-3.710.

Ong, Beng S.; Murti, Dasarao K.; and Fuller, John R. C., to Xerox Corporation. Photoresponsive imaging members with protective copolyurethane overcoatings. 5,017,645, Cl. 524-726.000.

Onishi, Yasunobu; Hayase, Shuji; Horiguchi, Rumiko; and Hirao, Akiko, to Kabushiki Kaisha Toshiba. A silicone resist materials containing a polysiloxane and a photo-sensitive agent. 5,017,453, Cl. 430-176.000.

Onishi, Yutaka: *See—*
Kiritani, Yoshiharu; Onishi, Yutaka; Tagata, Shigeyoshi; and Umeno, Koichi, 5,017,045, Cl. 405-143.000.

Onnenberg, Volker; and Mollmann, Gunter, to Bayer Aktiengesellschaft; and Fritsche Mollmann GmbH & Co. Device for manufacturing foam cushions with a covering. 5,017,114, Cl. 425-112.000.

Ono, Hitoshi, to Nissan Motor Company, Limited. Air conditioner system for automotive vehicle. 5,016,704, Cl. 165-1.000.

Ono, Masaharu: *See—*
Noma, Hiroyuki; Saitou, Saneto; and Ono, Masaharu, 5,016,697, Cl. 152-454.000.

Ono Pharmaceutical Co., Ltd.: *See—*
Imaki, Katsuhiro; Arai, Yoshinobu; and Okegawa, Tadao, 5,017,610, Cl. 514-546.000.
Kawamura, Masanori; Arai, Yoshinobu; and Aishita, Hideki, 5,017,589, Cl. 514-352.000.

Onoda, Fumiyuki: *See—*
Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.

Onodera, Hiroki, to Yamaha Hatsudoki Kabushika Kaisha. Cylinder head and valve train arrangement for multiple valve engine. 5,016,592, Cl. 123-432.000.

Onodera, Kaoru: *See—*
Nishijima, Toyoki; and Onodera, Kaoru, 5,017,464, Cl. 430-551.000.

VOL 1126 ISS 3 MY 21 1991 UMI

Onuma, Satoshi: *See—*
Shukunami, Hiroshi; Tanimoto, Yasufumi; and Onuma, Satoshi, 5,018,079, Cl. 364-519.000.

Ooi, Leng H.; Yeh, Peter J.; and Avanic, Branko, to Motorola, Inc. Split ring resonator bandpass filter with differential output. 5,017,897, Cl. 333-204.000.

Orr, Ladd M.: *See—*
Robertson, J. D.; and Orr, Ladd M., 5,016,545, Cl. 108-111.000.

Orr, Roy W., Jr.: *See—*
Alvord, Robert J.; Bambule, Raymond; Orr, Roy W., Jr.; and Sorensen, Thomas L., 5,018,011, Cl. 358-148.000.

Ortho Diagnostic Systems Inc.: *See—*
Haberzettl, Cecelia; Geltosky, Jack; and Perst, Renee, 5,017,342, Cl. 422-102.000.
Schutt, Ernest G.; Dondero, Richard S.; Hansen, William P.; Hovorka, George B.; and Meyer, Raymond E., 5,017,009, Cl. 358-338.000.

Orthoefer, Frank T.: *See—*
McCaskill, Don R.; Orthoefer, Frank T.; and Danforth, Steven D., 5,017,395, Cl. 426-459.000.

O'Ryan, David E.: *See—*
Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 5,017,324, Cl. 264-510.000.

Oscar Mayer Foods Corporation: *See—*
Anders, Robert J.; Cerveny, John G.; and Milkowski, Andrew L., 5,017,391, Cl. 426-129.000.

O'Shaughnessy, Timothy G.: *See—*
Hull, Richard W.; and O'Shaughnessy, Timothy G., 5,017,919, Cl. 341-136.000.

Oshima, Kazuyoshi: *See—*
Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 5,018,101, Cl. 365-51.000.

Oshima, Takafumi; and Kazuhiko, Kozuka, to NGK Spark Plug Co., Ltd. Rapid heat-dissipating type spark plug for internal combustion engines. 5,017,826, Cl. 313-142.000.

Oshiro, Yasuo; Tanaka, Tatsuyoshi; Sakurai, Yoji; and Sato, Seiji, to Otsuka Pharmaceutical Co., Ltd. Hydrofluorene derivatives. 5,017,724, Cl. 564-427.000.

Oshsner, Edwin: *See—*
Schlumpf, Hans-Peter; Pfister, Hans J.; and Oshsner, Edwin, 5,017,015, Cl. 366-82.000.

Oskar Dilo Maschinenfabrik K.G: *See—*
Dilo, Johann P., 5,016,331, Cl. 28-115.000.

Osman, Bradley L.: *See—*
Rippingale, John B.; Upton, Charles R.; Schonstedt, Erick O.; and Osman, Bradley L., 5,017,873, Cl. 324-326.000.

Ostlind, Dan A.; and Mochales, Sagrario, to Merck & Co., Inc. Xanthomegnin, a known compound, is an antiparasitic agent. 5,017,603, Cl. 514-455.000.

Oswald, Alexis A.; Chen, Frank J.; Espino, Ramon L.; and Peng, Kuo L., to Exxon Research and Engineering Company. Multistep process for the manufacture of novel polyolefin lubricants from sulfur containing thermally cracked petroleum residua. 5,017,279, Cl. 208-67.000.

Otani, Sugio; and Kakegawa, Hiroya, to Ibiden Company, Ltd. Adhesion structures and method of producing the same. 5,017,431, Cl. 428-420.000.

Otani, Sugio; Tsuyuguchi, Michio; Kano, Haruyuki; Sone, Yoshihisa; Kageyama, Kenji; and Mabuchi, Toshiaki, to Sumikin Chemical Co., Ltd. Condensed polycyclic, polynuclear aromatic thermosetting resin having good moldability and heat resistance; and preparation thereof. 5,017,683, Cl. 528-396.000.

Otis Elevator Company: *See—*
Ngian, Jenna P. C.; and Barkman, William F., 5,016,375, Cl. 40-642.000.

Otomo, Toshiko: *See—*
Uchikoshi, Gohji; and Otomo, Toshiko, 5,018,125, Cl. 369-44.250.

Otoshi, Hirokazu: *See—*
Saitoh, Keishi; Okamura, Ryuji; Otoshi, Hirokazu; and Matsuda, Koichi, 5,016,565, Cl. 118-723.000.

Otsubo, Mutsuyuki, to Mitsubishi Denki Kabushiki Kaisha. Solar cell and a production method therefor. 5,017,243, Cl. 136-244.000.

Otsuka, Kanji: *See—*
Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji:; Koguma, Hiroshi; and Emata, Takashi, 5,018,004, Cl. 357-74.000.

Otsuka, Kouichi: *See—*
Tominaga, Tomohisa; Sato, Kazuichi; Otsuka, Kouichi; Endo, Toshiya; and Oikawa, Susumu, 5,017,443, Cl. 429-99.000.

Otsuka, Masaaki; Komiya, Masayuki; Sawanobori, Naruhito; and Nagahama, Shinobu, to Sumita Optical Glass, Inc. Fluorosphosphate optical glass. 5,017,520, Cl. 501-44.000.

Otsuka Pharmaceutical Co., Ltd.: *See—*
Oshiro, Yasuo; Tanaka, Tatsuyoshi; Sakurai, Yoji; and Sato, Seiji, 5,017,724, Cl. 564-427.000.

Otsuki, Akira, to Alpine Electronics Inc. Audio reproduction device with head base moving mechanism. 5,018,032, Cl. 360-105.000.

Ouchida, Yoshio: *See—*
Kikuchi, Shuji; Ouchida, Yoshio; and Kamiya, Ryohei, 5,018,145, Cl. 371-27.000.

Ouellette, Maurice J.: *See—*
Germer, Warren R.; Ouellette, Maurice J.; and Negahban-Hagh, Mehrdad, 5,017,860, Cl. 324-142.000.

Outboard Marine Corporation: *See—*
Borst, Gaylord M., 5,016,597, Cl. 123-533.000.

Overstreet, Robert L., Jr.: *See—*
Abrams, Lane J.; Loughran, Kevin; Masukewicz, David W.; and Overstreet, Robert L., Jr., 5,018,184, Cl. 379-29.000.

Owatari, Toshimi: *See—*
Komatsu, Keisaku; Yamada, Takashi; and Owatari, Toshimi, 5,017,303, Cl. 252-174.130.

Owens-Corning Fiberglas Corporation: *See—*
Hager, Thomas P.; and Dale, Ralph S., 5,016,973, Cl. 350-96.230.

Owens, Robert C.: *See—*
Heil, Ronald W., Jr.; and Owens, Robert C., 5,016,808, Cl. 228-176.000.

Oxford Instruments Ltd.: *See—*
Finlan, Martin F., 5,017,882, Cl. 328-234.000.

Oy Dailab Inc.: *See—*
Rasanen, Jaakko, 5,017,785, Cl. 250-345.000.

Oyama, Motofumi: *See—*
Mori, Osamu; Oyama, Motofumi; Hisaki, Hiroshi; Sekiguchi, Masato; Okamura, Akinobu; and Tanabe, Haruhiro, 5,017,639, Cl. 524-510.000.

Ozaki, Akio: *See—*
Furukawa, Satoru; Ozaki, Akio; Nakanishi, Toshihide; Kotani, Yukinobu; and Sugimoto, Masahiro, 5,017,483, Cl. 435-115.000.

Ozaki, Katsunori: *See—*
Sasaki, Michiaki; and Ozaki, Katsunori, 5,016,670, Cl. 137-574.000.

Ozawa, Kazunori, to NEC Corporation. Communication system capable of improving a speech quality by classifying speech signals. 5,018,200, Cl. 381-36.000.

Ozawa, Yasuo; Koyama, Ikuo; and Shimano, Kimihide, to Taisho Pharmaceutical Co., Ltd. Method of producing fine coated pharmaceutical preparation. 5,017,383, Cl. 424-490.000.

Pac-Fasteners: *See—*
Reynolds, Richard L., 5,017,079, Cl. 411-432.000.

Pace, Ermanno: *See—*
Carobolante, Francesco; Pace, Ermanno; and McCormack, Mark, 5,017,845, Cl. 318-138.000.

Padmanabhan, Krishnan: *See—*
Netravali, Arun N.; and Padmanabhan, Krishnan, 5,018,129, Cl. 370-1.000.

Pagdin, Brian C.; and McQueen, Alastair M., to Lucas Industries Public Limited Company. Throttle actuator and control system. 5,016,588, Cl. 123-399.000.

Pageaud, Michel; and Gillet, Robert, to Compagnie Europeenne de Composants Electroniques LCC. Film capacitor capable of undergoing severe electrical treatment and methods for the fabrication of such a capacitor. 5,018,046, Cl. 361-273.000.

Paglusch, Dennis F.: *See—*
Krug, John A.; Hammonds, James C.; Schmidt, Kenneth D.; and Paglusch, Dennis F., 5,017,065, Cl. 410-58.000.

Palazzo, Raymond E., Jr.: *See—*
Miler, Steven L.; Wathen, Ronald L.; and Palazzo, Raymond E., Jr., 5,017,284, Cl. 210-97.000.

Palm, Joseph M.: *See—*
Semler, Loren H.; Palm, Joseph M.; Englram, Paul B.; and Clegg, Jon Y., 5,017,291, Cl. 210-641.000.

Palmatier, Roland T., to Harris Graphics Corporation. Ink mover distributor roll. 5,016,530, Cl. 101-349.000.

Palmer, Robert B., to Associated Universities, Inc. Radio frequency accelerating cavity having slotted irises for damping certain electromagnetic modes. 5,017,881, Cl. 328-233.000.

Pamingle, Herve : *See—*
Chapuis, Christian; Margot, Christian; Schulte-Elte, Karl-Heinrich; and Pamingle, Herve , 5,017,711, Cl. 549-332.000.

Pan, Andrew Y.: *See—*
Ryan, Charles P.; Howell, Thomas H.; Pan, Andrew Y.; and Rolston, David W., 5,018,075, Cl. 364-513.000.

Pan-International Industrial Corp.: *See—*
Liu, Yun-Yu; and Shih, Hsiao-Lei, 5,017,157, Cl. 439-609.000.
Liu, Yun-Yu; and Shih, Hsiao-Lei, 5,017,158, Cl. 439-609.000.

Pan, Jing-Jong, to E-Tek Dynamics, Inc. Fiber optic coupler and method of making same. 5,016,963, Cl. 350-96.180.

Pan, Peter. Scarf. 5,016,288, Cl. 2-207.000.

Panac-Industries Inc.: *See—*
Hayashi, Goichi; Fujimagari, Sajuro; Nakamura, Kensaku; and Ishida, Ryuichi, 5,017,455, Cl. 430-256.000.

Panelbrick Industries Pty. Ltd.: *See—*
Boot, Phillip; Hurst, Dare; and Lasseter, Robert, 5,016,419, Cl. 52-749.000.

Panelfold, Inc.: *See—*
Harris, Donald L., 5,016,318, Cl. 16-95.00R.

Pang, Stella W.; and Horn, Mark W., to Massachusetts Institute of Technology. Process for forming planarized films. 5,017,403, Cl. 427-39.000.

Pantus, Math M. J., to Aritech Corporation. Apparatus and method for combining analog detection signals to provide enhanced alarm integrity. 5,017,906, Cl. 340-517.000.

Papadopoulos, Gregory M.: *See—*
Culler, David E.; Papadopoulos, Gregory M.; and Schneider, Richard P., 5,018,062, Cl. 364-200.000.

Papesh, Thomas S. Bench mount puller support. 5,016,465, Cl. 72-457.000.

Papritz, Franz; and Widmer, Hansruedi, to Haag-Streit AG. Height adjustable supporting device for an instrument. 5,016,854, Cl. 248-563.000.

Paquet, Volker; Ackermann, Ulrich; Etzkorn, Heniz-W.; Kersten, Ralf T.; and Rutze, Uwe, to Schott Glaswerke. Plasma CVD process using a plurality of overlapping plasma columns. 5,017,404, Cl. 427-45.100.

Pardubicky, Jaroslav F.: *See—*
Grims, Conrad M.; Moen, Bruce A.; and Pardubicky, Jaroslav F., 5,016,462, Cl. 72-349.000.

Parent, James R.: *See—*
Doolittle, Frederick G.; Ellgen, Jon L.; Heiskell, Ronald E.; Lipton, Thomas M.; and Parent, James R., 5,016,607, Cl. 126-25.00R.

Pares, Juan: *See—*
Colombo, Augusto; Pares, Juan; and Frigol, Jordi, 5,017,596, Cl. 514-406.000.

Parham, Dennis E.: *See—*
Stoddard, David C. F.; Robertson, James D.; Spamer, William S.; Hanna, James; Bailey, Randall E.; and Parham, Dennis E., 5,016,761, Cl. 211-59.400.

Paris, Jean-Marc: *See—*
Dubroeucq, Marie-Christine; Paris, Jean-Marc; and Renault, Christian, 5,017,576, Cl. 514-228.200.

Paris-Marcano, Lucinda C., to Laboratorios Paris, C.A. Process for recovering metals and for removing sulfur from materials containing them by means of an oxidative extraction. 5,017,280, Cl. 208-223.000.

Pariza, Michael W.; and Ha, Yeong L., to Wisconsin Alumni Research Foundation. Methods of preventing oxidation, quenching singlet oxygen and inhibiting mold growth and novel compositions therefor. 5,017,614, Cl. 514-558.000.

Park, Chul. Tank type liquid air cleaner. 5,017,201, Cl. 55-227.000.

Park, Dennis: *See—*
Willer, Rodney L.; Park, Dennis; and Stern, Alfred G., 5,017,356, Cl. 423-384.000.

Park, Hae S.; Kim, Sang I.; Kim, Sea C.; Park, Kye S.; and Park, Jin G., to Hyundai Electronics Industries Co., Ltd. Method for removing residual material from a cavity during the manufacture of a semiconductor device by utilizing plasma scattering. 5,017,265, Cl. 156-643.000.

Park, Jin G.: *See—*
Park, Hae S.; Kim, Sang I.; Kim, Sea C.; Park, Kye S.; and Park, Jin G., 5,017,265, Cl. 156-643.000.

Park, Kwon C.: *See—*
Lee, Bhum C.; Park, Kwon C.; and Kim, Bong T., 5,018,140, Cl. 370-105.100.

Park, Kye S.: *See—*
Park, Hae S.; Kim, Sang I.; Kim, Sea C.; Park, Kye S.; and Park, Jin G., 5,017,265, Cl. 156-643.000.

Parker, J. J.; Tiedeman, Sandy; and Baugh, William J., to James and Rosemarie Parker Family Trust. Pachinko game. 5,016,879, Cl. 273-126.00A.

Parkinson, David: *See—*
Relf, Richard S.; Marini, Lawrence G.; and Parkinson, David, 5,017,141, Cl. 434-29.000.

Parobechek, Frank E.: *See—*
Himmel, Robert L.; and Parobechek, Frank E., 5,016,606, Cl. 126-21.00A.

Parpaleix, Jean B.: *See—*
Chapron, Claude E. P.; and Parpaleix, Jean B., 5,017,997, Cl. 357-44.000.

Parry, John S., to Sterimatic Holdings Limited. Tag assemblies. 5,016,369, Cl. 40-301.000.

Parsons, Bryan N. V., to Jaguar Cars Limited. Valve mechanisms. 5,016,581, Cl. 123-90.250.

Pascaud, Xavier B.: *See—*
Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.

Pasch, Nicholas E., to LSI Logic Corporation. Method and apparatus for identifying discrete objects in a visual field. 5,018,214, Cl. 382-9.000.

Pascouet, Adrien P. Marine acoustic source. 5,018,115, Cl. 367-144.000.

Pasternack, Mark S.; and Eisen, Herman S., to Massachusetts Institute of Technology. Cytotoxic T lymphocte serine esterase and method for stimulation and inhibition. 5,017,489, Cl. 435-196.000.

Pate, Alma J.: *See—*
Pate, Robert A.; and Pate, Alma J., 5,016,517, Cl. 89-7.000.

Pate, Robert A.; and Pate, Alma J., to General Electric Company. Liquid propellant gun. 5,016,517, Cl. 89-7.000.

Patel, Ramesh U.; and So, Sithy, to NCR Corporation. Method and apparatus for power failure protection. 5,018,148, Cl. 371-66.000.

Patent-Treuhand Gesellschaft fur Elektrische Gluhlampen m.b.H: *See—*
Arlt, Joachim; Dobrusskin, Alexander; Von Scheidt, Jurgen; and Heider, Jurgen, 5,017,839, Cl. 315-219.000.

Paterson, Adrian W.: *See—*
Sonnenberg, Neville; Kingon, Angus I.; and Paterson, Adrian W., 5,017,532, Cl. 501-103.000.

Patient Solutions, Inc.: *See—*
Davis, David L., 5,017,059, Cl. 409-131.000.

Patt, Paul J.; and Stolfi, Fred R., to North American Philips Corporation. Linear magnetic spring and spring/motor combination. 5,017,819, Cl. 310-90.500.

Pavelec, John J.: *See—*
Riera, John F.; Bielawski, Billy J., Sr.; and Pavelec, John J., 5,016,507, Cl. 83-384.000.

Payne, Peter A.; and Nicholls, Mark, to Cogent Limited. Method for manufacturing piezoelectric polymer transducers. 5,016,333, Cl. 29-25.350.

Paz-Pujalt, Gustavo R.: *See—*
Agostinelli, John A.; Mir, Jose M.; Paz-Pujalt, Gustavo R.; Lelental, Mark; and Nicholas, Ralph A., III, 5,017,551, Cl. 505-1.000.

Pearson, Douglas H.: *See—*
Wash, Michael L.; Pearson, Douglas H.; and Kelbe, Richard R., 5,017,326, Cl. 354-207.000.

Peck, Ralph E.; Elson, Todd E.; and Toofan, Masoud, to National Hydrohoist Company. Lift for water vehicles. 5,016,551, Cl. 114-045.000.

Pedersen, Niels C., Jr.: *See—*
Hoffman, Mark R.; Choi, Charles Y. M.; Pedersen, Peder M.; and Pedersen, Niels C., Jr., 5,017,739, Cl. 174-138.00F.

Pedersen, Peder M.: *See—*
Hoffman, Mark R.; Choi, Charles Y. M.; Pedersen, Peder M.; and Pedersen, Niels C., Jr., 5,017,739, Cl. 174-138.00F.

Pedigrew, Colin, to Nordson Corporation. Sift-proof carton and method and adhesive dispensing means for producing same. 5,016,812, Cl. 229-132.000.

Peier, Othmar, to Steyr-Daimler-Puch AG. Liquid friction coupling. 5,016,742, Cl. 192-58.00C.

Pelikan Aktiengesellschaft: *See—*
Mecke, Norbert; and Krauter, Heinrich, 5,017,428, Cl. 428-336.000.

Pellegrino, Wendy M. Infant feeding assembly. 5,016,845, Cl. 248-104.000.

Peltoniemi, Raimo: *See—*
Furrer, Hansjorg; Peltoniemi, Raimo; Richle, Norbert; and Ulrich, Dietrich, 5,016,456, Cl. 72-38.000.

Pelz, Peter, to Ernst Pelz-Vertriebs GmbH & Co. Prefabricated inner roof lining for motor vehicles. 5,016,934, Cl. 296-214.000.

Penco, Sergio: *See—*
Lazzari, Ettore; Arcamone, Federico; Penco, Sergio; Verini, Maria A.; and Mongelli, Nicola, 5,017,599, Cl. 514-422.000.

Peng, Kuo L.: *See—*
Oswald, Alexis A.; Chen, Frank J.; Espino, Ramon L.; and Peng, Kuo L., 5,017,279, Cl. 208-67.000.

Penn, Thomas C.: *See—*
Merryman, Jerry D.; Penn, Thomas C.; Manns, William G.; Weeks, Don J.; and Wood, Anthony B., 5,018,210, Cl. 382-8.000.

Penny, John R.: *See—*
Byers, David J.; and Penny, John R., 5,017,855, Cl. 318-811.000.

Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; Katsuki, Kazuo; and Yamashita, Ken, to Nippon Sheet Glass Co., Ltd. Mask. 5,016,981, Cl. 350-314.000.

Perandi, Aado J. Vacuum tube and MOSFET transimpedance amplifier. 5,017,884, Cl. 330-3.000.

Peregrim, Theodore J.; Richter, Stephen L.; and Roy, Richard E., to Raytheon Company. Confirmed boundary pattern matching. 5,018,218, Cl. 382-22.000.

Perelman, Frank M. Modem employing pulse width modulation for data transmission. 5,018,167, Cl. 375-22.000.

Pergande, Lormine, legal representative: *See—*
Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.

Perloff, Ronald S.; and Garverick, Timothy L., to National Semiconductor Corp. Smoothing filter. 5,018,171, Cl. 375-121.000.

Pernick, Bruce M., to Monarch Knitting Machinery Corporation. Knit fabric with inlay pile yarn and method. 5,016,450, Cl. 66-93.000.

Pero, Janice: *See—*
Sloma, Alan; Lee, Rosalind C.; and Pero, Janice, 5,017,477, Cl. 435-69.100.

Perret, Joel: *See—*
Pribat, Didier; Perret, Joel; and Rouffy, Jean-Claude, 5,017,340, Cl. 422-98.000.

Perry, David L.: *See—*
Athanas, David S.; Groves, Gary W.; Hammoud, Fahrey M.; and Perry, David L., 5,016,908, Cl. 280-707.000.

Perry, Pauline R. Child restraint for use with a seat belt in an automobile. 5,016,915, Cl. 280-801.000.

Perst, Renee: *See—*
Haberzettl, Cecelia; Geltosky, Jack; and Perst, Renee, 5,017,342, Cl. 422-102.000.

Perz, John S.: *See—*
Hopkins, David L.; and Perz, John S., 5,017,230, Cl. 106-284.300.

Pescia, Danilo: *See—*
Woike, Theo; Kerkmann, Detlef; Beier, Thomas; Krasser, Wolfgang; and Pescia, Danilo, 5,016,992, Cl. 350-376.000.

Pesek, Joseph J.: *See—*
Sandoval, Junior E.; and Pesek, Joseph J., 5,017,540, Cl. 502-158.000.

Peters, Andrew C.; and Wass, Anthony C. L. Breach loading cartridge pen. 5,017,035, Cl. 401-132.000.

Peters, Thomas E.; Logan, James D.; Bennett, Eugene R.; Dieter, Clarence L.; and Henckel, David J., to Coe Manufacturing Company, The. Oriented chopped fiber mats and method and apparatus for making same. 5,017,312, Cl. 264-24.000.

Peterson, Bruce A., to Molex Incorporated. Floating panel mount for electrical connectors. 5,017,151, Cl. 439-248.000.

Peterson, Charles A. Liquid contact plate and support system for cooling towers. 5,017,309, Cl. 261-111.000.

Peterson, Charles A. Interconnecting liquid contact plate support system for cooling towers. 5,017,310, Cl. 261-111.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Peterson, Kenneth M.: *See—*
  - Bertiger, Bary R.; Leopold, Raymond J.; and Peterson, Kenneth M., 5,017,925, Cl. 342-352.000.
- Peterson, Stanley P. D.; and Eisentraut, Rudolph A., to Hughes Aircraft Company. Optical fiber bending stress proof tester. 5,016,476, Cl. 73-829.000.
- Peterson, Terence A.: *See—*
  - Geyer, Robert A.; and Peterson, Terence A., 5,016,310, Cl. 15-49.100.
- Petitcollin, Jean-Marc; and Harle, Gerard-Jean, to Saint-Gobain Vitrage International. Method and apparatus for positioning of a glass sheet relative to cambering and/or other heat treatment tools. 5,017,210, Cl. 65-106.000.
- Petroff, Lenin; Romenesko, David J.; and Ekeland, Robert A., to Dow Corning Corporation. Postemergent herbicide compositions containing silicone glycol adjuvants. 5,017,216, Cl. 71-116.000.
- Pettigrew, James L., to Howell Instruments, Inc. Reference system and method for diagnosing aircraft engine conditions. 5,018,069, Cl. 364-424.040.
- Pfanstiel, Erich. Dispenser for viscous materials. 5,016,782, Cl. 222-257.000.
- Pfister, Hans J.: *See—*
  - Schlumpf, Hans-Peter; Pfister, Hans J.; and Oshsner, Edwin, 5,017,015, Cl. 366-82.000.
- Pfizer Hospital Products Group, Inc.: *See—*
  - Radovich, John M.; and Schofield, Richard W., 5,017,293, Cl. 210-646.000.
- Pflug, James J.: *See—*
  - Colwell, Dennis J.; and Pflug, James J., 5,017,302, Cl. 252-134.000.
- Ph.Settembre, Pierre-Andre : *See—*
  - Ward, Mona; Ph.Settembre, Pierre-Andre ; Renaud, Alain; and Langlois, Michel, 5,017,572, Cl. 514-218.000.
- Phatak, Sharad C.: *See—*
  - Ghate, Suhas R.; and Phatak, Sharad C., 5,016,817, Cl. 239-113.000.
- Philip Morris Inc.: *See—*
  - Williams, David L.; and Southwick, Everett W., 5,017,235, Cl. 131-278.000.
- Phillips, James O.: *See—*
  - Marcec, Jerome J.; Phillips, James O.; Grzybowski, Albert T.; and Grzybowski, Bohdan, 5,016,467, Cl. 73-56.000.
- Phillips, Norman J.; Leksell, David; Wehrli, Henry A., III; Barrow, William A.; and Kruskopf, Mark S., to Westinghouse Electric Corp. TFEL edge emitter module and packaging assembly employing sealed cavity capacity varying mechanism. 5,017,824, Cl. 313-13.000.
- Phillips Petroleum Company: *See—*
  - Fodor, Lawrence M.; and Coutant, William R., 5,017,661, Cl. 525-344.000.
  - Kolts, John H.; Tooley, Patricia A.; and Brown, Scott H., 5,017,357, Cl. 423-437.000.
  - Skraba, Frank W., 5,017,536, Cl. 502-41.000.
  - Snelling, Ricky E.; Figard, Joseph E.; and Morton, Robert W., 5,017,643, Cl. 524-609.000.
- Phipps, Peter G.: *See—*
  - Price, Thomas L.; Walli, Richard A.; and Phipps, Peter G., 5,017,200, Cl. 55-96.000.
- Photon Imaging Corp.: *See—*
  - Lee, Charles, 5,016,974, Cl. 350-96.240.
- Pickle, Linwood A., to Smith & Wesson Corp. Removable front sight for handguns. 5,016,382, Cl. 42-100.000.
- Pierce, Gerald A.: *See—*
  - Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; Katsuki, Kazuo; and Yamashita, Ken, 5,016,981, Cl. 350-314.000.
- Pietinen, Pertti; and Savonjousi, Aslak. Method and apparatus for controlling the production of thermomechanical pulp. 5,016,824, Cl. 241-21.000.
- Pilgrim, Steven J.: *See—*
  - Marinho, John A.; Pilgrim, Steven J.; and Yu, I-Hsiang, 5,018,187, Cl. 379-60.000.
- Pilkington plc: *See—*
  - Yale, Brian; and Fyles, Kenneth M., 5,017,521, Cl. 501-64.000.
- Pinchuk, Leonard: *See—*
  - Jackowski, Stefan; and Pinchuk, Leonard, 5,017,325, Cl. 264-521.000.
- Pineau, Jean-Pierre: *See—*
  - Frehaut, Jean-Pierre; and Pineau, Jean-Pierre, 5,016,839, Cl. 244-147.000.
- Pinkerton, Roger P.; and Stebens, Beverly, to Conoco Inc. Method for hydrocarbon reservoir identification. 5,018,112, Cl. 367-72.000.
- Pinson, George T., to Boeing Company, The. Controlled explosive, hypervelocity self-contained round for a large caliber gun. 5,016,537, Cl. 102-443.000.
- Pinto, Adolf P. Heat regeneration in engines. 5,016,441, Cl. 60-516.000.
- Pioneer Electronic Corp.: *See—*
  - Suzuki, Takashi, 5,018,206, Cl. 381-188.000.
  - Takagi, Kazunori; Sato, Shinichi; Ito, Masahiko; and Yamamoto, Hideo, 5,018,205, Cl. 381-86.000.
  - Tsuji, Takehiro, 5,018,012, Cl. 358-171.000.
- Pioneer Plastics, Inc.: *See—*
  - Blease, Wilfred J., 5,016,385, Cl. 43-26.100.
- Pisharody, Raghavan K.; and Gooch, Beverley R., to Ampex Corporation. Method of manufacturing ultra small track width thin film transducers. 5,016,342, Cl. 29-603.000.
- Pitalo, Stephen K.: *See—*
  - Bartholomew, Richard D.; Pitalo, Stephen K.; and Schaffer, James R., Jr., 5,017,771, Cl. 250-227.210.
- Pitman-Moore, Inc.: *See—*
  - Baldwin, Chauncey D.; Shricker, Brian R.; and Ivy, Richard E., 5,017,560, Cl. 514-21.000.
- Pitney Bowes Inc.: *See—*
  - Cordery, Robert A.; Kilmartin, William L.; and Zeller, Claude, 5,017,907, Cl. 340-551.000.
  - Dannatt, Hugh St. L., 5,016,511, Cl. 83-487.000.
- Pittway Corp.: *See—*
  - Greenebaum, James E., II, 5,016,785, Cl. 222-402.100.
- Plahn, Katherine C. Article holding bracket. 5,016,850, Cl. 248-206.300.
- Platteter, Dale T.; and Westfall, Robert S., to Xerox Corporation. Fault diagnosing and identification system for reproduction machines. 5,018,143, Cl. 371-16.400.
- Pletsch, Peter: *See—*
  - Kowalik, Heinrich; Pletsch, Peter; and Kohl, Gerald, 5,017,051, Cl. 405-302.000.
- Pleyber, Gaetan: *See—*
  - Allemand, Robert; Drouet, Martine; Pleyber, Gaetan; and Tournier, Edmond, 5,018,175, Cl. 378-19.000.
- Plotz, Kurt: *See—*
  - Greiser, Wolfgang; Plotz, Kurt; Wagner, Hans; and Zerfass, Karl-Christian, 5,017,426, Cl. 428-280.000.
- Pluss-Staufer AG: *See—*
  - Schlumpf, Hans-Peter; Pfister, Hans J.; and Oshsner, Edwin, 5,017,015, Cl. 366-82.000.
- Plzak, William J., to American Standard Inc. Internal heat exchanger for an absorption apparatus. 5,016,448, Cl. 62-476.000.
- Pohto, Gerald R.: *See—*
  - Niksa, Andrew J.; and Pohto, Gerald R., 5,017,275, Cl. 204-206.000.
- Poisel, Hans; and Trommer, Gert, to Messerschmitt-Boelkow-Blohm GmbH. Laser warning sensor. 5,017,006, Cl. 356-218.000.
- Pokka Corporation: *See—*
  - Nakamura, Akihiko; and Ito, Takashi, 5,016,362, Cl. 34-51.000.
- Polefka, Thomas G.: *See—*
  - Gaffar, Abdul; and Polefka, Thomas G., 5,017,362, Cl. 424-52.000.
- Poltrona Frau S.p.A.: *See—*
  - Moschini, Franco, 5,017,413, Cl. 428-61.000.
- Polyplastics Co., Ltd.: *See—*
  - Hijikata, Kenji, 5,017,304, Cl. 252-299.010.
- Pompei, Francesco, to Exergen Corporation. Radiation detector for differential biological temperature readings. 5,017,019, Cl. 374-133.000.
- Pomper, Michael; and Geiger, Martin, to Siemens Aktiengesellschaft. Read-only memory for a gate array arrangement. 5,018,103, Cl. 365-104.000.
- Popeil Industries, Inc.: *See—*
  - Backus, Alan; and Popeil, Ronald, 5,017,143, Cl. 434-236.000.
- Popeil, Ronald: *See—*
  - Backus, Alan; and Popeil, Ronald, 5,017,143, Cl. 434-236.000.
- Popp, Franz-Wolfgang; Krammer, Erwin; Genannt, Wolfgang; and Flehr, Dietmar, to Deutsche Gesellschaft fur Wiederaufarbeitung Von Kernbrennstoffen mbH. Apparatus for screw-coupling two heavy weight components having a common vertical axis. 5,016,422, Cl. 53-330.000.
- Porat, Reuven: *See—*
  - Moskowitz, David; and Porat, Reuven, 5,017,524, Cl. 501-87.000.
- Porcell, George, to International Superconductor. Superconductor wire and method of making same. 5,017,552, Cl. 505-1.000.
- Poro, Antti M., to Innoke Oy. Gear assembly. 5,016,491, Cl. 74-640.000.
- Porteous, Paul D. Dental paste cup with multi-facet inner base. 5,016,795, Cl. 224-217.000.
- Posi-Plus Technologies Inc.: *See—*
  - Thibault, Francois, 5,016,767, Cl. 212-188.000.
- Powell, Thomas W., Jr.; Schulz, Anthony A.; and Beall, Gary W., to United Catalysts, Inc. Allergen absorbent and blocking aerosol composition. 5,017,361, Cl. 424-46.000.
- Power, Donald E. Bird observation enclosure, selectively limiting, squirrel resistant. 5,016,573, Cl. 119-57.900.
- Power Management International, Inc.: *See—*
  - Ionescu, Adrian F.; and Conant, Theodore. 5,018,058, Cl. 363-34.000.
- Powers, Edward J.: *See—*
  - Wadhwa, Lachman; Bitritto, Michel; and Powers, Edward J., 5,017,681, Cl. 528-342.000
- PPG Industries, Inc.: *See—*
  - Crano, John C.; and Haynes, Ronald L., 5,017,666, Cl. 526-230.500.
- Preston, Donald; and Luke, John H., to MMI Products, Inc. "U" anchor and "T" connector retaining wall anchor system. 5,017,048, Cl. 405-262.000.
- Pribat, Didier; Perret, Joel; and Rouffy, Jean-Claude, to Thomson-CSF. Temperature compensated resistive type sensor for the measurement of relative concentrations of fluid reactive species. 5,017,340, Cl. 422-98.000.
- Price, Thomas L.; Walli, Richard A.; and Phipps, Peter G., to Inco Limited. Baghouse. 5,017,200, Cl. 55-96.000.
- Prisco, Richard S.: *See—*
  - Weber, Frank J.; Liljeqvist, Lance R.; and Prisco, Richard S., 5,016,572, Cl. 119-52.100.
- Procter & Gamble Company, The: *See—*
  - Jandacek, Ronald J.; and Letton, James C., 5,017,398, Cl. 426-603.000.
  - Wienecke, Horst P., 5,017,385, Cl. 426-5.000.
- Proform Fitness Products, Inc.: *See—*
  - Dalebout, William T.; and Bingham, Curt G., 5,016,871, Cl 272-73.000.

- Proll, Theo: *See—*
  - Hohmann, Andreas; Reuther, Wolfgang; Fikentscher, Rolf; and Proll, Theo, 5,017,725, Cl. 564-487.000.
- Protiva, Marc T.: *See—*
  - Reznikov, Naum; and Protiva, Marc T., 5,016,946, Cl. 312-108.000.
- Psaar, Hubert: *See—*
  - Berneth, Horst; Psaar, Hubert; and Jabs, Gert, 5,017,707, Cl. 548-455.000.
- Pshennikova, Ma/Ya G.: *See—*
  - Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.
- Psiol, Nick; and Lucchesi, Mike. Golf putting game. 5,016,884, Cl. 273-176.0FA.
- Pugh, Kenneth J. Magnetic actuated firearms locking mechanism. 5,016,376, Cl. 42-70.110.
- Pullen, William J., V. Radiation gathering and focussing apparatus and devices. 5,016,995, Cl. 350-537.000.
- Pulse Electronics, Inc.: *See—*
  - Bezos, Angel P., 5,016,840, Cl. 246-187.00R.
- Purdum, Jack. Apparatus for objectively grading centering condition of a stamp. 5,018,207, Cl. 382-1.000.
- Puritan-Bennett Corporation: *See—*
  - Carter, William; Meadows, David A.; Hayes, Jay L.; and Voege, John S., 5,016,673, Cl. 138-45.000.
- Putz, Oliver; and Konig, Herbert, to Zinser Textilmaschinen GmbH. Method and apparatus for monitoring, grasping and release of yarn tubes by an automatic bobbin changer for a textile ring spinning or twisting machine. 5,016,433, Cl. 57-264.000.
- PVI, Inc.: *See—*
  - Biondo, John V., Jr., 5,017,953, Cl. 354-83.000.
- Qualcomm, Inc.: *See—*
  - Ames, William G.; Jacobs, Irwin M.; Weaver, Lindsay A., Jr.; and Gilhousen, Klein S., 5,017,926, Cl. 342-353.000.
- Quigley, Gary F. Golf trainer. 5,016,885, Cl. 273-188.00R.
- Quirk, Jennifer M., to W. R. Grace & Co.-Conn. Deblocking N-formyl aspartame compounds. 5,017,690, Cl. 530-335.000.
- R. Ancker Jorgensen A/S: *See—*
  - Bekker-Madsen, Per, 5,017,412, Cl. 428-43.000.
- R. J. Reynolds Tobacco Company: *See—*
  - Bernasek, Edward; Hildebolt, William M.; Shannon, Michael D.; Shelar, Gary R.; and White, Jackie L., 5,016,654, Cl. 131-302.000.
  - Lassiter, Wallace R., 5,016,653, Cl. 131-286.000.
- Rabenhorst, Jurgen; and Hopp, Rudolf, to Haarmann & Reimer GmbH. Process for the preparation of vanillin. 5,017,388, Cl. 426-44.000.
- Rabii, Khosro M., to Zenith Electronics Corporation. Programmable audio/video signal interface. 5,018,013, Cl. 358-181.000.
- Rackow, William L.: *See—*
  - Huston, Donald B.; and Rackow, William L., 5,016,888, Cl. 273-239.000.
- Rademacher, Mark. Combination gamma, ultraviolet and X-radiation goggles. 5,016,292, Cl. 2-431.000.
- Radovich, John M.; and Schofield, Richard W., to Pfizer Hospital Products Group, Inc. Multi-pass blood washing and plasma removal device and method. 5,017,293, Cl. 210-646.000.
- Radtke, Manfred: *See—*
  - Brillinger, Martin; Hiller, Wolfgang; Klingelhoefer, Ulrich; and Radtke, Manfred, 5,016,408, Cl. 52-126.600.
- Radulov, Peter T.: *See—*
  - Mitkov, Atanas L.; Georgiev, Ivan N.; Atanassov, Atanas K.; Radulov, Peter T.; and Stoyanov, Iliya Y., 5,017,177, Cl. 460-46.000.
- Radzikovsky, Alexandr: *See—*
  - Levchenko, Georgy T.; and Radzikovsky, Alexandr, 5,016,566, Cl. 118-726.000.
- Rafson, Harold J. Process for removing volatile organic compounds from air streams. 5,017,351, Cl. 423-245.200.
- Rahn, Curtis H.: *See—*
  - Roisen, Roger L.; Rahn, Curtis H.; Straight, John B.; and Liu, Michael S., 5,017,999, Cl. 357-49.000.
- Raines, Charles C.; and Starmer, Philip H., to Zeon Chemicals USA, Inc. Free flowing particles of an emulsion polymer having $SiO_2$ incorporated therein. 5,017,630, Cl. 523-334.000.
- Rainier International, Inc.: *See—*
  - Brighton, Richard W., 5,016,536, Cl. 102-430.000.
- Ralston Purina Company: *See—*
  - Weber, Frank J.; Liljeqvist, Lance R.; and Prisco, Richard S., 5,016,572, Cl. 119-52.100.
- Ramachandran, Kuzhalmannam L.: *See—*
  - Gilbert, Walter; Fisher, Richard A.; Sato, Vicki L.; and Ramachandran, Kuzhalmannam L., 5,017,688, Cl. 530-326.000.
- Rambacher, John S.: *See—*
  - Majerus, Norbert; Chlebina, Larry E.; and Rambacher, John S., 5,017,127, Cl. 425-549.000.
- Rambo, William W.: *See—*
  - Crotts, Lonnie M.; and Rambo, William W., 5,016,662, Cl. 134-45.000.
- Ramvac Corporation: *See—*
  - Meyer, Robert A., 5,017,135, Cl. 433-92.000.
- Rancoulle, Gilbert: *See—*
  - Hanse, Eric; and Rancoulle, Gilbert, 5,016,788, Cl. 222-590.000.
- Rasanen, Jaakko, to Oy Dailab Inc. IR-spectrometric analyzing procedure and means. 5,017,785, Cl. 250-345.000.
- Rasmussen, Donald D. Strap connector. 5,016,325, Cl. 24-68.00R.
- Rasmussen, Roy D.: *See—*
  - Shervington, Roger M.; Rasmussen, Roy D.; and Stadler, Jeff A., 5,017,821, Cl. 310-68.00D.
- Rauch, Hubert; Arndt, Peter J.; Klesse, Wolfgang; Krall, Wilhelm; and Frank, Klaus, to Rohm GmbH. Method for making a spray dried emulsion polymer. 5,017,631, Cl. 523-340.000.
- Raychem Corporation: *See—*
  - Fergason, James L.; and Mohebban, Manoochehr, 5,016,982, Cl. 350-331.00R.
- Raynet Corporation: *See—*
  - Martin, Donald J.; Narciso, Ralph A.; Lowe, David T.; and Greenman, Clifford H., 5,016,962, Cl. 350-96.160.
  - Saiia, Louis S.; and Halstead, Whitfield G., 5,016,969, Cl. 350-96.200.
- Raynolds, Stuart, to Du Pont de Nemours, E. I., and Company. Compositions and process for use in refrigeration. 5,017,300, Cl. 252-67.000.
- Raytheon Company: *See—*
  - Peregrim, Theodore J.; Richter, Stephen L.; and Roy, Richard E., 5,018,218, Cl. 382-22.000.
- RCA Licensing Corporation: *See—*
  - Lendaro, Jeffery B., 5,017,844, Cl. 315-408.000.
  - Shiratsuchi, Shinichi, 5,018,090, Cl. 364-723.000.
- Rebar, Linda. Integral stretcher and intravenous fluid carrier/gravity dependent drainage support. 5,016,307, Cl. 5-503.000.
- Redactron B.V.: *See—*
  - Ryhiner, Victor G., 5,016,304, Cl. 5-453.000.
- Redicon Corporation: *See—*
  - Bulso, Joseph D., Jr.; and Lewers, William R., 5,016,506, Cl. 83-35.000.
- Reed, Gregory D.: *See—*
  - Davis, Wayne T.; Reed, Gregory D.; and Keener, Timothy C., 5,017,349, Cl. 423-242.000.
- Reeder, Robin A.: *See—*
  - Chien, Kuei-Ru; Reeder, Robin A.; and Stovall, H. Dean, 5,018,153, Cl. 372-28.000.
- Reichelderfer, Desiree, legal representative: *See—*
  - Reichelderfer, Richard F., deceased; McOmber, Janice I.; Ryan, Andrew P.; and Davies, John T., 5,016,332, Cl. 29-25.010.
- Reichelderfer, Richard F., deceased (by Reichelderfer, Desiree, legal representative); McOmber, Janice I.; Ryan, Andrew P.; and Davies, John T., to Branson International Plasma Corporation. Plasma reactor and process with wafer temperature control. 5,016,332, Cl. 29-25.010.
- Reichman, Benjamin; and Strebe, James I., to Globe-Union Inc. Electrodes containing conductive metal oxides. 5,017,446, Cl. 421-225.000.
- Reifenhauser GmbH & Co. Maschinenfabrik: *See—*
  - Balk, Hermann, 5,017,323, Cl. 264-288.400.
- Reiland, Kenneth H.; Reiland, Mary J.; and Herold, Ronald J., to Four D, Incorporated. System for low cost dispensing of soft packaged articles. 5,016,778, Cl. 221-154.000.
- Reiland, Mary J.: *See—*
  - Reiland, Kenneth H.; Reiland, Mary J.; and Herold, Ronald J., 5,016,778, Cl. 221-154.000.
- Reilly, David M.: *See—*
  - Cowan, Kevin P.; Fazi, Bruno, Jr.; Havrilla, Joseph B.; Lewandowski, Stanley R.; and Reilly, David M., 5,018,182, Cl. 378-173.000.
- Reinarts, John M.: *See—*
  - Wahlquist, Randy W.; Reinarts, John M.; and Francis, Timothy L., 5,017,219, Cl. 75-415.000.
- Reinfelder, Hans-Erich: *See—*
  - Lange, Gottfried; Reinfelder, Hans-Erich; and Tressl, Guenther, 5,017,781, Cl. 250-327.200.
- Reiter, John P. Sanding apparatus with interchangeable bases and handles. 5,016,402, Cl. 51-393.000.
- Relf, Richard S.; Marini, Lawrence G.; and Parkinson, David. Computing system. 5,017,141, Cl. 434-29.000.
- Renard, Gerard; and Giannesini, Jean-Francois, to Institut Francais du Petrole; and Societe Nationale Elf Aquitaine (Production). Method of assisted production of an effluent to be produced contained in a geological formation. 5,016,710, Cl. 166-245.000.
- Renard, Gerard: *See—*
  - Combe, Jean; Renard, Gerard; and Valentin, Emmanuel, 5,016,709, Cl. 166-245.000.
- Renaud, Alain: *See—*
  - Naylor, Robert J.; Naylor, Brenda; Renaud, Alain; and Langlois, Michel, 5,017,580, Cl. 514-299.000.
  - Ward, Mona; Ph.Settembre, Pierre-Andre ; Renaud, Alain; and Langlois, Michel, 5,017,572, Cl. 514-218.000.
- Renault, Christian: *See—*
  - Dubroeucq, Marie-Christine; Paris, Jean-Marc; and Renault, Christian, 5,017,576, Cl. 514-228.200.
- Rennick, Donna: *See—*
  - Lee, Frank; Yokota, Takashi; Arai, Ken-ichi; Mosmann, Timothy; and Rennick, Donna, 5,017,691, Cl. 535-351.000.
- Repasky, Elizabeth A.: *See—*
  - Bankert, Richard B.; and Repasky, Elizabeth A., 5,017,472, Cl. 435-7.250.
- Republic Telcom Systems Corporation: *See—*
  - Gollub, Raphael, 5,018,136, Cl. 370-60.100.
- Research Foundation Institute Pty. Limited: *See—*
  - Richardson, Donald G., 5,016,457, Cl. 72-56.000.
- Reuther, Wolfgang: *See—*
  - Hohmann, Andreas; Reuther, Wolfgang; Fikentscher, Rolf; and Proll, Theo, 5,017,725, Cl. 564-487.000.

VOL 1126 ISS 3 MY 21 1991 UMI

- Rexnord Corporation: *See—*
  - Chmiel, Steven F., 5,017,853, Cl. 318-786.000.
- Reynolds Consumer Products, Inc.: *See—*
  - Simonsen, Steve H.; Tomic, Mladomir; and Wegner, Wayne M., 5,017,021, Cl. 383-63.000.
- Reynolds, Richard L., to Pac-Fasteners. Laminated nut with one way installation. 5,017,079, Cl. 411-432.000.
- Reznikov, Naum; and Protiva, Marc T., to Innovative Concepts, Inc. Modular storage container for diskettes. 5,016,946, Cl. 312-108.000.
- RHC Investments Ltd.: *See—*
  - Calam, Bruce T.; and Karlowee, Rudy, 5,016,406, Cl. 52-58.000.
- Rheinhold & Mahla GmbH: *See—*
  - Zemanek, Jiri; Timpert, Manfred; and Rudolph, Karl, 5,017,314, Cl. 264-35.000.
- Rheinmagnet, Horst Baermann, GmbH: *See—*
  - Baermann, Horst, 5,017,185, Cl. 600-15.000.
- Rheinmetall GmbH: *See—*
  - Borngen, Lutz, 5,016,533, Cl. 102-386.000.
- Rhian, Walter G.; and Niequist, Kent E., to Murray Envelope Corporation. One piece adhesive folder tab extension. 5,016,370, Cl. 40-359.000.
- Rhinehart, Barry L.: *See—*
  - Liu, Paul S.; Rhinehart, Barry L.; and Daniel, John K., 5,017,563, Cl. 514-27.000.
- Rhodes, Marvin D.; and Hedgepeth, John M., to United States of America, National Aeronautics and Space Administration. Synchronously deployable double fold beam and planar truss structure. 5,016,418, Cl. 52-646.000.
- Rhone-Poulenc Agrochimie: *See—*
  - Freyssinet, Georges; and Freyssinet, Martine, 5,017,491, Cl. 435-240.500.
- Rhone-Poulenc Chimie: *See—*
  - Lebrun, Jean-Jacques; and Bordone, Christina, 5,017,640, Cl. 524-588.000.
- Rhone-Poulenc, Inc.: *See—*
  - Gradeff, Peter S.; and Yunlu, Kenan, 5,017,694, Cl. 534-15.000.
  - Gradeff, Peter S.; and Yunlu, Kenan, 5,017,695, Cl. 534-15.000.
- Rhone-Poulenc Sante: *See—*
  - Dubroeucq, Marie-Christine; Paris, Jean-Marc; and Renault, Christian, 5,017,576, Cl. 514-228.200.
- Rhone-Pulenc Specialites Chimique: *See—*
  - Chane-Ching, Jean-Yves; and Dumousseau, Jean-Yves, 5,017,352, Cl. 423-263.000.
- Riahi, Nader: *See—*
  - Dower, Roger G.; Acres, Robert W.; Davis, Harold R.; Donham, Andrew N.; Riahi, Nader; Slamka, Richard W. A.; and Urbaniak, Lechoslaw K., 5,017,795, Cl. 250-560.000.
- Rice, Roy W.: *See—*
  - Enloe, Jack H.; Lau, John W.; and Rice, Roy W., 5,017,434, Cl. 428-428.000.
- Rice, Verle L.; and Keener, Richard A. Guide fence and mitre guide assembly for router mounting table. 5,016,358, Cl. 33-569.000.
- Riceland Foods, Inc.: *See—*
  - McCaskill, Don R.; Orthoefer, Frank T.; and Danforth, Steven D., 5,017,395, Cl. 426-459.000.
- Richardson, Brian P.: *See—*
  - Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Paul A.; and Breuleux, Gerald, legal representative, 5,017,582, Cl. 514-305.000.
- Richardson, Donald G., to Research Foundation Institute Pty. Limited. Method of forming metal. 5,016,457, Cl. 72-56.000.
- Richardson, William F., to Texas Instruments Incorporated. Dual EPROM cells on trench walls with virtual ground buried bit lines. 5,017,977, Cl. 357-23.500.
- Richle, Norbert: *See—*
  - Furrer, Hansjorg; Peltoniemi, Raimo; Richle, Norbert; and Ulrich, Dietrich, 5,016,456, Cl. 72-38.000.
- Richter, Stephen L.: *See—*
  - Peregrim, Theodore J.; Richter, Stephen L.; and Roy, Richard E., 5,018,218, Cl. 382-22.000.
- Ricoh Company, Ltd.: *See—*
  - Hotta, Yoshihiko; and Kubo, Keishi, 5,017,421, Cl. 428-216.000.
  - Iimura, Haruo, 5,016,988, Cl. 350-347.00R.
  - Kojima, Keiji, 5,018,216, Cl. 382-22.000.
  - Miyanishi, Hideji, 5,018,105, Cl. 365-203.000.
  - Nanjoh, Takeshi; and Yamamoto, Kenji, 5,017,987, Cl. 357-30.000.
  - Takahashi, Shuji, 5,016,866, Cl. 271-122.000.
- Ricoh Research Institute of General Electronics Co., Ltd.: *See—*
  - Nanjoh, Takeshi; and Yamamoto, Kenji, 5,017,987, Cl. 357-30.000.
- Riddle, Robert. Tamperproof pay telephone. 5,018,185, Cl. 379-145.000.
- Riera, John F.; Bielawski, Billy J., Sr.; and Pavelec, John J. Apparatus for severing a tubular workpiece. 5,016,507, Cl. 83-384.000.
- Ries, Gordon W.: *See—*
  - Dugan, John M.; and Ries, Gordon W., 5,017,880, Cl. 328-165.000.
- Riesing, Johann, to Oesterrechisches Forschungszentrum Seibersdorf Ges. M.B.H. Material-web marking by means of bar code. 5,017,262, Cl. 156-630.000.
- Rieter Machine Works, Ltd.: *See—*
  - Wehrli, Rudolf; and Stalder, Herbert, 5,016,323, Cl. 19-258.000.
- Rigaud, Andre : *See—*
  - LaForet, Jean; and Rigaud, Andre , 5,016,605, Cl. 126-20.000.
- Riggs, Robert F.: *See—*
  - Halsey, James D.; Riggs, Robert F.; Gilligan, Lawrence H.; and Gerdt, David W., 5,017,793, Cl. 250-551.000.
- Rigollet, Jean-Paul, to Aerospatiale Societe Nationale Industrielle. Electromagnetic wave reflector for an antenna and its production method. 5,017,940, Cl. 343-912.000.
- Riley, Richard E.: *See—*
  - Brown, Kenneth; and Riley, Richard E., 5,017,741, Cl. 174-260.000.
- Rinderknecht, Brad L.: *See—*
  - Dowd, Patrick F.; Wicklow, Donald T.; Gloer, James B.; and Rinderknecht, Brad L., 5,017,598, Cl. 514-415.000.
- Rippingale, John B.; Upton, Charles R.; Schonstedt, Erick O.; and Osman, Bradley L., to Schonstedt Instrument Company. Methods and apparatus employing permanent magnets for marking, locating, tracing and identifying hidden objects such as buried fiber optic cables. 5,017,873, Cl. 324-326.000.
- Ris, Max; and Monnard, Andre , to Niro-Plan AG. Accessory set for kitchen sinks. 5,016,298, Cl. 4-654.000.
- Ritter, Ann M.: *See—*
  - Siemers, Paul A.; and Ritter, Ann M., 5,017,438, Cl. 428-614.000.
- Riverside Research Institute: *See—*
  - Driller, Jack; Faulkenberry, William J.; and Lizzi, Frederic L., 5,016,615, Cl. 128-24.00A.
- Rizzardi, Napoleone. Sealing cap especially for antibiotic, infusion and transfusion bottles. 5,016,770, Cl. 215-232.000.
- Rizzetto, Randall. Fish bait applicator. 5,016,383, Cl. 43-4.000.
- Roach, Robert E.: *See—*
  - Cullick, Alvin S.; and Roach, Robert E., 5,016,712, Cl. 166-250.000.
- Robert Bosch GmbH: *See—*
  - Berger, Joachim; and Gerstung, Ulrich, 5,016,587, Cl. 123-359.000.
  - Hafner, Udo; and Krause, Heinz-Martin, 5,016,594, Cl. 123-470.000.
  - Hans, Waldemar; Kind, Wilhelm; Kirchner, Manfred; and Werner, Siegfried, 5,016,821, Cl. 239-585.000.
- Roberts, Everett M.: *See—*
  - England, Jimmy C.; Hensley, John R.; Moehling, Frederick E.; Roberts, Everett M.; and Ruble, Hugh-Hiram, Jr., 5,016,460, Cl. 72-208.000.
- Roberts, Patricia L.: *See—*
  - Griffith, J. Stephen; and Roberts, Patricia L., 5,018,074, Cl. 364-490.000.
- Roberts, William N.: *See—*
  - Dougherty, Lawrence W.; and Roberts, William N., 5,017,170, Cl. 445-30.000.
- RobertShaw Controls Company: *See—*
  - Lichtenberger, William J., 5,017,745, Cl. 200-307.000.
- Robertson, Glen A., to United States of America, National Aeronautics and Space Administration. Electromagnetic Meissner effect launcher. 5,017,549, Cl. 505-1.000.
- Robertson, J. D.; and Orr, Ladd M., to Mead Corporation, The. Adjustable display stand. 5,016,545, Cl. 108-111.000.
- Robertson, J. David: *See—*
  - Spamer, William S.; Robertson, J. David; Stoódard, David C. F.; and Hanna, James L., 5,016,527, Cl. 98-115.300.
- Robertson, James D.: *See—*
  - Stoddard, David C. F.; Robertson, James D.; Spamer, William S.; Hanna, James; Bailey, Randall E.; and Parham, Dennis E., 5,016,761, Cl. 211-59.400.
- Robertson, Malcolm A., to Australian Wire Industries Pty. .Limited. Stabilisation of jet wiped wire. 5,017,407, Cl. 427-349.000.
- Robinson, Howard W., to GH Hensley Industries, Inc. Wear parts for excavation apparatus. 5,016,365, Cl. 37-141.00T.
- Robinson, Murry C.: *See—*
  - Spink, Donald R.; Robinson, Murry C.; and Nguyen, Kim D., 5,017,346, Cl. 423-101.000.
- Robinson, Wayne; and Noggle, Kenneth, to GTE Valenite Corporation. Mechanical fine adjust boring head. 5,017,058, Cl. 408-173.000.
- Robotech Laboratory Co., Ltd.: *See—*
  - Izumi, Tetsujirou; and Iida, Akihiko, 5,017,893, Cl. 332-103.000.
- Robotics Automation Consulting Engineering Industries, Inc.: *See—*
  - Becker, Mark H.; and Maynard, Scott D., 5,016,335, Cl. 29-57.000.
- Robson, Michael J., to Imperial Chemical Industries PLC. Fluorobenzyl esters. 5,017,606, Cl. 514-531.000.
- Rochat, Alain C.; Iqbal, Abul; and Wallquist, Olof, to Ciba-Geigy Corporation. Monoketopyrrolopyrroles. 5,017,706, Cl. 548-414.000.
- Rockefeller University, The: *See—*
  - Farmar, James G.; Ulrich, Peter; and Cerami, Anthony, 5,017,696, Cl. 536-18.700.
- Rockwell International Corporation: *See—*
  - Culp, Gordon W., 5,017,820, Cl. 310-328.000.
  - Dugan, John M.; and Ries, Gordon W., 5,017,880, Cl. 328-165.000.
  - Dugan, John M.; and Ries, Gordon W., 5,017,880, Cl. 328-165.000.
  - Etchepare, Eduard E., 5,017,199, Cl. 55-57.000.
  - French, Barry T., 5,017,920, Cl. 341-163.000.
  - Scharrer, Joseph K.; Beatty, Robert F.; and Csomor, Arpad, 5,017,023, Cl. 384-114.000.
  - Worley, Eugene R., 5,017,811, Cl. 307-475.000.
- Rodland, Arild: *See—*
  - Tandberg, Geir, 5,016,718, Cl. 175-333.000.
- Rodriguez, Frank W. Paint container closure cap. 5,016,774, Cl. 220-254.000.
- Roemer, Peter B.: *See—*
  - Mueller, Otward M.; Roemer, Peter B.; and Edelstein, William A., 5,017,871, Cl. 324-318.000.
- Roepke, John E.: *See—*
  - Heaton, Donald E.; and Roepke, John E., 5,017,113, Cl. 425-87.000.
- Roggendorf, Peter, to GSE, Inc. Method of and means for providing information to edit a video tape. 5,018,027, Cl. 360-14.200.
- Roggwiller, Peter, to Asea Brown Boveri Ltd. High blocking-capacity semiconductor component. 5,017,992, Cl. 357-38.000.

- Rohm Co., Ltd.: *See—*
  - Hukuda, Kazuyuki, 5,017,861, Cl. 324-143.000.
- Rohm GmbH: *See—*
  - Rauch, Hubert; Arndt, Peter J.; Klesse, Wolfgang; Krall, Wilhelm; and Frank, Klaus, 5,017,631, Cl. 523-340.000.
- Rohm and Haas Company: *See—*
  - Bredow, Charles W.; Schindler, Frederick J.; and Warburton, Charles E., Jr., 5,017,632, Cl. 523-400.000.
- Rohr Industries, Inc.: *See—*
  - Cadwell, Gilbert C., 5,016,805, Cl. 228-118.000.
- Rohsaint, Wolfgang: *See—*
  - Fischer, Horst; Rohsaint, Wolfgang; and Hmimid, Mohammed, 5,018,094, Cl. 364-770.000.
- Roisen, Roger L.; Rahn, Curtis H.; Straight, John B.; and Liu, Michael S., to Honeywell Inc. Method for forming variable width isolation structures. 5,017,999, Cl. 357-49.000.
- ROJ Electrotex S.p.A.: *See—*
  - Ghiardo, Fiorenzo, 5,016,681, Cl. 139-452.000.
- Rokach, Joshua: *See—*
  - Young, Robert N.; Rokach, Joshua; Williams, Haydn R.; Kakushima, Masatoshi; and Guindon, Yvan, 5,017,583, Cl. 514-312.000.
- Rokusek, Daniel S.: *See—*
  - Kowalski, Joseph L.; and Rokusek, Daniel S., 5,018,188, Cl. 379-63.000.
- Rolls-Royce plc: *See—*
  - Belcher, Bryan L.; and Todman, Michael T., 5,016,436, Cl. 60-264.000.
- Rolston, David W.: *See—*
  - Ryan, Charles P.; Howell, Thomas H.; Pan, Andrew Y.; and Rolston, David W., 5,018,075, Cl. 364-513.000.
- Roman, Francois J.: *See—*
  - Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.
- Romar Technologies, Inc.: *See—*
  - Harris, Rano J., Jr.; and Barker, Nicholas E., 5,016,554, Cl. 114-219.000.
- Romeas, Rene ; Rouchy, Didier; and Gilleron, Alain, to General Electric CGR S.A. Mammograph equipped with an integrated device for taking stereotaxic photographs and a method of utilization of said mammograph. 5,018,176, Cl. 378-37.000.
- Romenesko, David J.: *See—*
  - Petroff, Lenin; Romenesko, David J.; and Ekeland, Robert A., 5,017,216, Cl. 71-116.000.
- Root, Tamis L.: *See—*
  - Grassman, David L.; Ager, Scott P.; and Root, Tamis L., 5,017,620, Cl. 514-698.000.
- Rose, Jed E.; and Jarvik, Murray E., to University of California, The Regents of the. Method and apparatus for aiding in the reduction of incidence of tobacco smoking. 5,016,652, Cl. 131-270.000.
- Rosemount Office Systems, Inc.: *See—*
  - Lee, Michael E., 5,016,405, Cl. 52-36.000.
- Ross, Jeanne. Replaceable watch face improvement. 5,018,118, Cl. 368-228.000.
- Rossini, Umberto; Simonin, Pierre; and Tremblay, Christine, to Thomson-CSF. Compactly built electron tube and fabrication method thereof. 5,017,827, Cl. 313-268.000.
- Rossmann, Axel: *See—*
  - Huether, Werner M., deceased; Huether, Berta L., heir; and Rossmann, Axel, 5,016,437, Cl. 60-280.000.
- Rotondo, Frank. Check and magnetic strip arrangement. 5,016,919, Cl. 283-82.000.
- Rottel, Franz, to Grunbeck Waseraufbereitung GmbH. Metering pump. 5,017,105, Cl. 417-439.000.
- Rouchy, Didier: *See—*
  - Romeas, Rene ; Rouchy, Didier; and Gilleron, Alain, 5,018,176, Cl. 378-37.000.
- Rouffy, Jean-Claude: *See—*
  - Pribat, Didier; Perret, Joel; and Rouffy, Jean-Claude, 5,017,340, Cl. 422-98.000.
- Rouse, David M., to AT&T Bell Laboratories. Optical device mounting apparatus. 5,017,986, Cl. 357-30.000.
- Roussel Uclaf: *See—*
  - Hedgecock, Charles J. R.; Jones, Stuart D.; and Kuo, Elizabeth A., 5,017,574, Cl. 514-220.000.
- Rowan, Robert L., Jr. Method for adjusting the vertical position of a frame on a foundation. 5,016,338, Cl. 29-423.000.
- Rowledge, Darrel. Article carrier. 5,016,797, Cl. 224-257.000.
- Rowlette, John R.: *See—*
  - Bowen, Terry P.; and Rowlette, John R., 5,016,966, Cl. 350-96.190.
- Roy, Richard E.: *See—*
  - Peregrim, Theodore J.; Richter, Stephen L.; and Roy, Richard E., 5,018,218, Cl. 382-22.000.
- Ruble, Hugh-Hiram, Jr.: *See—*
  - England, Jimmy C.; Hensley, John R.; Moehling, Frederick E.; Roberts, Everett M.; and Ruble, Hugh-Hiram, Jr., 5,016,460, Cl. 72-208.000.
- Ruckes, Andreas: *See—*
  - Haas, Peter; Hettel, Hans; and Ruckes, Andreas, 5,017,623, Cl. 521-128.000.
- Rudolph, Karl: *See—*
  - Zemanek, Jiri; Timpert, Manfred; and Rudolph, Karl, 5,017,314, Cl. 264-35.000.
- Rugar, Daniel: *See—*
  - Mamin, Harry J.; and Rugar, Daniel, 5,017,010, Cl. 356-345.000.
- Ruggeri, Stephane: *See—*
  - Guiberteau, Christian; Le Paih, Michele; and Ruggeri, Stephane, 5,017,924, Cl. 342-195.000.
- Ruggles, John F.; and Boyd, Gary L., to Allied-Signal, Inc. High temperature bearing. 5,017,022, Cl. 384-100.000.
- Rugland, Roger: *See—*
  - Williams, Terrell; Keimel, John G.; Rugland, Roger; Sandstrom, Richard; and Holleman, Timothy, 5,016,645, Cl. 128-784.000.
- Ruiz, Juan J.: *See—*
  - Kaiser, John E., Jr.; Lockshaw, James J.; Ruiz, Juan J.; and Stevens, William L., 5,016,730, Cl. 181-265.000.
- Ruiz, Oscar F., to Sherwood Medical Company. Angiographic catheter for use in the right coronary artery. 5,016,640, Cl. 128-658.000.
- Ruppert, Ingo, deceased: *See—*
  - Kruse, Alfred; Siegemund, Gunter; and Ruppert, Ingo, deceased, 5,017,719, Cl. 560-106.000.
- Russeler, Wolfgang: *See—*
  - Kohler, Burkhard; Meyer, Rolf-Volker; Dorf, Ernst-Ulrich; Russeler, Wolfgang; and Schmidt, Manfred, 5,017,682, Cl. 528-388.000.
- Rutgers, The State University of New Jersey: *See—*
  - Karmas, Endel; and Bachmann, Marc R., 5,017,387, Cl. 426-43.000.
- Rutges, Antonius A.: *See—*
  - Joly, Ludovicus P.; and Rutges, Antonius A., 5,017,468, Cl. 430-569.000.
- Ruttimann, Hans-Rudolf: *See—*
  - Spross, Erhard; and Ruttimann, Hans-Rudolf, 5,016,942, Cl. 299-33.000.
- Rutze, Uwe: *See—*
  - Paquet, Volker; Ackermann, Ulrich; Etzkorn, Heniz-W.; Kersten, Ralf T.; and Rutze, Uwe, 5,017,404, Cl. 427-45.100.
- Ryan, Andrew P.: *See—*
  - Reichelderfer, Richard F., deceased; McOmber, Janice I.; Ryan, Andrew P.; and Davies, John T., 5,016,332, Cl. 29-25.010.
- Ryan, Charles P.; Howell, Thomas H.; Pan, Andrew Y.; and Rolston, David W., to Bull Hn Information Systems Inc. Unknown response processing in a diagnostic expert system. 5,018,075, Cl. 364-513.000.
- Ryan, Leo, to Graver Company, The. Backwash method and apparatus. 5,017,241, Cl. 134-22.120.
- Ryhiner, Victor G., to Redactron B.V. Fluidized bed with moisture removing means. 5,016,304, Cl. 5-453.000.
- Rymo, Lars: *See—*
  - Vahlne, Anders; Svennerholm, Bo; Rymo, Lars; Jeansson, Stig; and Horal, Peter, 5,017,687, Cl. 530-324.000.
- S. A. Saurer Diederichs: *See—*
  - Fourneaux, Roger; and Grandvallet, Gilles, 5,016,676, Cl. 139-116.200.
- Saam, John C.: *See—*
  - Krahnke, Robert H.; and Saam, John C., 5,017,672, Cl. 528-23.000.
- Sabarino, Giampiero: *See—*
  - Giannini, Umberto; Coassolo, Alfredo; Foa', Marco; Sabarino, Giampiero; and Chapoy, L. Lawrence, 5,017,678, Cl. 528-190.000.
- Sabo, Karen: *See—*
  - Sher, Arden; and Sabo, Karen, 5,017,784, Cl. 250-338.100.
- Saby, Darrell: *See—*
  - Thomas, John E.; Saby, Darrell; and Mehus, Richard, 5,016,790, Cl. 222-639.000.
- Sadeghi, Kazem: *See—*
  - Sadeghi, Mohammad-Ali; Sadeghi, Kazem; Kuo, Jih-Fen; Jang, Long-Kuan; and Yen, Teh F., 5,017,281, Cl. 208-390.000.
- Sadeghi, Mohammad-Ali; Sadeghi, Kazem; Kuo, Jih-Fen; Jang, Long-Kuan; and Yen, Teh F., to Tar Sands Energy Ltd. Treatment of carbonaceous materials. 5,017,281, Cl. 208-390.000.
- Sadjadi, Firooz A.: *See—*
  - Nasr, Hatem N.; Sadjadi, Firooz A.; Bazakos, Michael E.; and Amehdi, Hossien, 5,018,215, Cl. 382-15.000.
- Sadlack, Werner; Vogt, Siegfried; Upmeier, Egon; and Schulze, Wolfram, to Kochs Alder Aktiengesellschaft. Attaching a strip of cloth with a zip-fastener component to a trouser forepart. 5,016,549, Cl. 112-104.000.
- Sadwick, Paul V., to AM International, Inc. Corona charge system and apparatus for electrophotographic printing press. 5,017,964, Cl. 355-219.000.
- Saeki, Fumimasa: *See—*
  - Yamamoto, Nobuyoshi; Murata, Yasuhiko; Saeki, Fumimasa; and Kurosaka, Hirosige, 5,016,721, Cl. 180-89.130.
- Saeki, Kunio: *See—*
  - Sato, Yasuo; and Saeki, Kunio, 5,016,800, Cl. 225-2.000.
- Saga Sanyo Industry Co., Ltd.: *See—*
  - Kamigawa, Hidenori, 5,017,272, Cl. 204-56.100.
- Sagami Chemical Research Center: *See—*
  - Ojima, Iwao; and Fuchikami, Takamasa, 5,017,718, Cl. 556-466.000.
- Sager, William F. Apparatus for delivering a controllable variable flow of pressurized fluid. 5,016,440, Cl. 60-429.000.
- Sagoh, Masaki: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Sahlin International, Inc.: *See—*
  - Sahlin, Richard T., 5,017,083, Cl. 414-744.300.

VOL
1126
ISS
3
MY
21
1991
UMI

Sahlin, Richard T., to Sahlin International, Inc. Apparatus for loading and/or unloading industrial presses. 5,017,083, Cl. 414-744.300.

Sahm, Hermann: *See—*
Bringer-Meyer, Stephanie; and Sahm, Hermann, 5,017,485, Cl. 435-158.000.

Sahni, Paramdeep S.: *See—*
Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Paramdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.

Saigo, Tatsuji: *See—*
Ioka, Tsunejiro; Saigo, Tatsuji; and Tomita, Michio, 5,016,865, Cl. 271-103.000.

Saiia, Louis S.; and Halstead, Whitfield G., to Raynet Corporation. Mechanism for nesting an optical fiber in an optical coupler and providing positive stop opening and closing positions for the coupler. 5,016,969, Cl. 350-96.200.

Sain, Kenneth D. Firearm safety apparatus. 5,016,378, Cl. 42-70.060.

Saint-Gobain Vitrage International: *See—*
Petitcollin, Jean-Marc; and Harle, Gerard-Jean, 5,017,210, Cl. 65-106.000.

St. Jude Medical, Inc.: *See—*
Dahl, Terrance J., 5,017,103, Cl. 417-420.000.

Saito, Akio: *See—*
Masuda, Kazuaki; Saito, Akio; Kashino, Toshio; and Watanabe, Takashi, 5,017,946, Cl. 346-140.00R.

Saito, Akira: *See—*
Machida, Katsuichi; Saito, Akira; and Sakagami, Teruo, 5,017,698, Cl. 544-71.000.

Saito, Hitoshi: *See—*
Myochin, Hisashi; Inoue, Yoshinori; Saito, Hitoshi; and Yoshida, Narutaka, 5,018,045, Cl. 361-229.000.

Saito, Masayuki: *See—*
Yamada, Hiroshi; Ohuchi, Masayuki; Saito, Masayuki; and Hongu, Akinori, 5,018,051, Cl. 361-393.000.

Saito, Motohiro: *See—*
Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.

Saito, Tsuyoshi; and Yamaoka, Masaru, to Saito, Tsuyoshi; Yamaska, Masaru; and Tanaka, Masaichi. Dental system for treating a root canal. 5,017,134, Cl. 433-72.000.

Saito, Yasuo: *See—*
Sato, Kiyomi; and Saito, Yasuo, 5,017,787, Cl. 250-360.100.

Saitoh, Hideomi: *See—*
Mitsutake, Hiromi; Saitoh, Hideomi; and Nagata, Koichiro, 5,017,364, Cl. 424-54.000.

Saitoh, Keishi; Okamura, Ryuji; Otoshi, Hirokazu; and Matsuda, Koichi, to Canon Kabushiki Kaisha. Microwave plasma chemical vapor deposition apparatus for forming functional deposited film with means for stabilizing plasma discharge. 5,016,565, Cl. 118-723.000.

Saitoh. Koji: *See—*
Nakano, Yuji; Saitoh, Koji; and Murakami, Hiroaki, 5,017,810, Cl. 307-465.000.

Saitoh, Tadashi: *See—*
Taniai, Takayoshi; Saitoh, Tadashi; and Fujihira, Atsushi, 5,018,098, Cl. 364-900.000.

Saitoh, Tatsuya: *See—*
Yamada, Toshio; Kobayashi, Tohru; Nishizawa, Hirotaka; Itoh, Hiroyuki; and Saitoh, Tatsuya, 5,018,000, Cl. 357-51.000.

Saitou, Saneto: *See—*
Noma, Hiroyuki; Saitou, Saneto; and Ono, Masaharu, 5,016,697, Cl. 152-454.000.

Sakagami, Teruo: *See—*
Machida, Katsuichi; Saito, Akira; and Sakagami, Teruo, 5,017,698, Cl. 544-71.000.

Sakagami, Wataru: *See—*
Ogasawara, Yutaka; and Sakagami, Wataru, 5,018,124, Cl. 369-44.330.

Sakai, Minekazu: *See—*
Fujii, Tetsuo; Sakai, Minekazu; and Kuroyanagi, Akira, 5,017,979, Cl. 357-23.500.

Sakai, Takanobu: *See—*
Mende, Takayuki; and Sakai, Takanobu, 5,017,112, Cl. 425-72.200.

Sakakibara, Mitsuhiko: *See—*
Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.

Sakakibara, Nobuyoshi: *See—*
Fujii, Tetsuo; Sakakibara, Toshio; and Sakakibara, Nobuyoshi, 5,017,505, Cl. 437-52.000.

Sakakibara, Toshio: *See—*
Fujii, Tetsuo; Sakakibara, Toshio; and Sakakibara, Nobuyoshi, 5,017,505, Cl. 437-52.000.

Sakama, Mitsunori; Fukada, Takeshi; Sakamoto, Naoya; Amachi, Nobumitsu; Hayashi, Shigenori; and Inushima, Takashi, to Semiconductor Energy Laboratory Co., Ltd. Image sensor and manufacturing method for the same. 5,017,502, Cl. 437-2.000.

Sakama, Mitsunori: *See—*
Fukada, Takeshi; Sakama, Mitsunori; Amachi, Nobumitsu, Sakamoto, Naoya; Codama, Mitsufumi; and Takayama, Toru, 5,017,828, Cl. 313-367.000.

Sakamoto, Naoya: *See—*
Fukada, Takeshi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; Codama, Mitsufumi; and Takayama, Toru, 5,017,828, Cl. 313-367.000.
Sakama, Mitsunori; Fukada, Takeshi; Sakamoto, Naoya; Amachi, Nobumitsu; Hayashi, Shigenori; and Inushima, Takashi, 5,017,502, Cl. 437-2.000.

Sakamoto, Sadafumi: *See—*
Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, 5,017,932, Cl. 343-702.000.

Sakamoto, Teruo: *See—*
Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, 5,017,380, Cl. 424-454.000.

Sakanoue, Kei: *See—*
Kobayashi, Hidetoshi; Ohi, Reiichi; and Sakanoue, Kei, 5,017,466, Cl. 430-558.000.

Sakata, Hideji: *See—*
Uramoto, Makoto; and Sakata, Hideji, 5,017,797, Cl. 250-561.000.

Sakata, Toshio, to Minolta Camera Kabuahiki Kaisha. Fixing device with movable nip region for use in copiers. 5,017,970, Cl. 355-290.000.

Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, to Canon Kabushiki Kaisha. Audio signal recording apparatus and reproducing apparatus. 5,018,028, Cl. 360-27.000.

Sakuragi, Kenkichi: *See—*
Sasai, Keizo; Sakuragi, Kenkichi; Nakamura, Mitsunori; Ohkubo, Akio; and Yoshino, Motoaki, 5,017,945, Cl. 346-136.000.

Sakurai, Kaoru; Maeda, Masaru; Murakami, Harunori; and Iijima, Hiroshi, to Nippon Sheet Glass Co., Ltd. Vehicle window antenna with antenna elements on two surfaces. 5,017,933, Cl. 343-704.000.

Sakurai, Kazuo: *See—*
Murayama, Akira; Uchikawa, Naoshi; Tamura, Takahiro; Mizuno, Takao; and Sakurai, Kazuo, 5,017,108, Cl. 418-55.600.

Sakurai, Yoji: *See—*
Oshiro, Yasuo; Tanaka, Tatsuyoshi; Sakurai, Yoji; and Sato, Seiji, 5,017,724, Cl. 564-427.000.

Saleh, Adel A. M., to AT&T Bell Laboratories. Optical amplifier with reduced nonlinearity. 5,017,885, Cl. 330-4.300.

Salem Industries, Inc.: *See—*
Thomason, Michael C., 5,016,547, Cl. 110-211.000.

Salmon, J. Thaddeus: *See—*
Bliss, Erlan S.; Smith, James R.; Salmon, J. Thaddeus; and Monjes, Julio A., 5,016,997, Cl. 350-607.000.

Salomon S.A.: *See—*
Goud, Gilles R.; and Boussemart, Jean-Pierre, 5,016,902, Cl. 280-630.000.

SamSung Electronics, Co., Ltd.: *See—*
Kim, Ki-Cheol, 5,018,141, Cl. 370-110.100.

Samuels, Joan E.: *See—*
Merritt, Edward J., Jr.; Samuels, Joan E.; and Bietry, Joseph R., 5,017,012, Cl. 356-371.000.

Sanada, Takashi: *See—*
Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; and Sanada, Takashi, 5,017,652, Cl. 525-68.000.

Sanchez, Isaac C.: *See—*
Chen-Tsai, Charlotte H.; Sanchez, Isaac C.; and Burton, William L., 5,017,411, Cl. 428-36.600.

Sanchez, J. Michael; and Strom, E. Thomas, to Mobil Oil Corporation. Method of preheating a heavy oil zone through existing bottom water and then diverting steam into the oil zone. 5,016,713, Cl. 166-270.000.

Sander, Wendell B.: *See—*
Twitty, William B.; and Sander, Wendell B., 5,018,138, Cl. 370-94.100.

Sanders, Ira, to Mount Sinai School of Medicine of the City University of New York. Method for controlling the glottic opening. 5,016,647, Cl. 128-787.000.

Sanders, Kenneth H., to Milliken Research Corporation. Tricot knitting machine improvement. 5,017,425, Cl. 428-253.000.

Sandman, Robert B.: *See—*
Sauter, Bruce M.; Tempas, Jeffrey F.; and Sandman, Robert B., 5,016,297, Cl. 4-619.000.

Sandoval, Junior E.; and Pesek, Joseph J. Silicon hydride surface intermediates for chemical separations apparatus. 5,017,540, Cl. 502-158.000.

Sandoz Ltd.: *See—*
Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Paul A.; and Breuleux, Gerald, legal representative. 5,017,582, Cl. 514-305.000.
Tscheulin, Guenther, 5,017,633, Cl. 524-117.000.

Sandstrom, Richard: *See—*
Williams, Terrell; Keimel, John G.; Rugland, Roger; Sandstrom, Richard; and Holleman, Timothy, 5,016,645, Cl. 128-784.000.

Sandstrom, Richard L.: *See—*
Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,161, Cl. 372-57.000.
Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,162, Cl. 372-57.000.

Sandvik AB: *See—*
Sundstrom, Erik, 5,016,497, Cl. 76-25.100.

Sankaranarayanan, Ashok; Crane, Jacob; and Fister, Julius C., to Olin Corporation. Process for improving the electrical conductivity of a copper-nickel-iron alloy. 5,017,244, Cl. 148-3.000.

Sano, Koichi: *See—*
Koizumi, Hideaki; Takeda, Ryuzaburo; Sano, Koichi; and Yokoyama, Tetsuo, 5,016,637, Cl. 128-653.0AF.

Sano, Konosuke: *See—*
Matsui, Kazuhiko; Miwa, Kiyoshi; and Sano, Konosuke, 5,017,481, Cl. 435-108.000.

Sano, Osamu, to Koyo Seiko Co., Ltd. Hydraulic power steering apparatus. 5,016,723, Cl. 180-143.000.

Sano, Takezo: *See—*
Nagahara, Toyohiro; Niwa, Takashi; Sano, Takezo; and Kato, Isao, 5,017,747, Cl. 200-453.000.

Sanofi: *See—*
Eyssautier, Bruno, 5,017,479, Cl. 435-101.000.
Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.

Sanofi, S. A.: *See—*
Aubert, Daniel; Blanc, Francis; Desmolin, Henri; Morre, Michel; and Sindely, Lucette, 5,017,613, Cl. 514-557.000.

Santos, Alfred J.; Hilby, James A.; and Duncan, Scott M., to Torrington Company, The. Magnetic field sensor mounting with sensor arm contacting rotating bearing member. 5,017,866, Cl. 324-174.000.

Sanwa Diamond Industrial Co., Ltd.: *See—*
Matsuda, Yusaku, 5,016,498, Cl. 76-25.100.

Sanwa Kagaku Kenkyusho Co., Ltd.: *See—*
Sawal, Kiichi; Natori, Shunji; Takahashi, Haruo; Tanaka, Kenichi; Mitani, Takahiko; and Kurono, Masayasu, 5,017,486, Cl. 435-172.300.

Sanyo Electric Co., Ltd.: *See—*
Hashimoto, Masayasu; Yoneyama, Hirofumi; and Watanabe, Yasuhiro, 5,018,156, Cl. 372-44.000.
Imaizumi, Hideo, 5,018,016, Cl. 358-198.000.
Kamigawa, Hidenori, 5,017,272, Cl. 204-56.100.
Masumoto, Takahiko, 5,018,010, Cl. 358-136.000.
Miura, Katsunori, 5,017,841, Cl. 329-325.000.
Ogawa, Takahiro; Inoue, Atsushi; Ito, Kiyotaka; Ueta, Yutaka; and Koga, Kazuhiko, 5,016,341, Cl. 29-603.000.

Sapiro, Andrew J. Float switch with buoyant housing and switch operating means within the housing. 5,017,748, Cl. 200-84.00C.

Saraya Kabushiki Kaisha: *See—*
Kihara, Koji; and Furuta, Taro, 5,017,617, Cl. 514-635.000.

Sarcem Automation: *See—*
Bonello, Philippe, 5,016,473, Cl. 73-387.000.

Sarcos Group: *See—*
Jacobsen, Stephen C.; and Wood, John E., 5,016,481, Cl. 73-862.640.

Sardee Industries, Inc.: *See—*
Chiappe, Wayne T.; Ambrose, Larry R.; Dalmon, Donald P.; Juskie, Bernard R.; and Godwin, Raymond E., 5,016,420, Cl. 53-138.100.

Sarlis, John N.: *See—*
Hakka, Leo E.; and Sarlis, John N., 5,017,350, Cl. 423-243.000.

Saruyama, Toshio: *See—*
Togashi, Atsushi; and Saruyama, Toshio, 5,017,654, Cl. 525-100.000.

Sasai, Keizo; Sakuragi, Kenkichi; Nakamura, Mitsunori; Ohkubo, Akio; and Yoshino, Motoaki, to Canon Kabushiki Kaisha. Method of an apparatus for recording images, while avoiding damage due to prolonged contact between platen and recording device. 5,017,945, Cl. 346-136.000.

Sasai, Kiyotaka: *See—*
Kishigami, Hidechica; Sasaki, Tohru; and Sasai, Kiyotaka, 5,018,061, Cl. 364-200.000.

Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, to Olympus Optical Co., Ltd. Electronic endoscope provided with a sample-hold circuit. 5,016,975, Cl. 350-96.260.

Sasaki, Masanori: *See—*
Shibafuchi, Hiroshi; Sasaki, Masanori; Nitta, Hidenori; and Yoshida, Masahiko, 5,017,355, Cl. 423-369.000.

Sasaki, Michiaki; and Ozaki, Katsunori, to Nissan Motor Company, Limited. Fuel tank structure for automotive vehicle. 5,016,670, Cl. 137-574.000.

Sasaki, Minoru; Umeda, Masafumi; Tagami, Yoshitomo; and Sugikawa, Akihiko, to Kabushiki Kaisha Toshiba. Electronic still camera and image recording method thereof. 5,018,017, Cl. 358-209.000.

Sasaki, Morimasa: *See—*
Shiba, Haruo; Ikebe, Masaru; and Sasaki, Morimasa, 5,018,039, Cl. 360-133.000.

Sasaki, Ryoichi: *See—*
Takaragi, Kazuo; and Sasaki, Ryoichi, 5,018,196, Cl. 380-30.000.

Sasaki, Tohru: *See—*
Kishigami, Hidechica; Sasaki, Tohru; and Sasai, Kiyotaka, 5,018,061, Cl. 364-200.000.

Sasayama, Shinichi: *See—*
Ikegami, Yuji; Sasayama, Shinichi; Tachino, Noboru; and Kamiya, Takeshi, 5,017,544, Cl. 502-439.000.

Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, to Nippon Petrochemicals Company, Limited. Electrical insulating oil composition. 5,017,733, Cl. 585-6.300.

Sato, Hiroshi: *See—*
Sunada, Koichi; and Sato, Hiroshi, 5,018,015, Cl. 358-188.000.

Sato, Isao: *See—*
Shimizu, Nobuo; Kuroda, Michio; Kirikami, Seiichi; Sato, Isao; and Arai, Osamu, 5,016,443, Cl. 60-737.000.

Sato, Kazuichi: *See—*
Tominaga, Tomohisa; Sato, Kazuichi; Otsuka, Kouichi; Endo, Toshiya; and Oikawa, Susumu, 5,017,443, Cl. 429-99.000.

Sato, Kiyomi; and Saito, Yasuo, to Japan Tobacco, Inc. Desk top type infrared radiation moisture measuring apparatus. 5,017,787, Cl. 250-360.100.

Sato Kogyo Co., Ltd.: *See—*
Kiritani, Yoshiharu; Onishi, Yutaka; Tagata, Shigeyoshi; and Umeno, Koichi, 5,017,045, Cl. 405-143.000.

Sato, Manabu: *See—*
Ibamoto, Masahiko; Morooka, Yasuo; Koyanagi, Hiroaki; Sato, Manabu; and Mizumura, Takeshi, 5,018,072, Cl. 364-478.000.

Sato, Masamichi, to Kabushiki Kaisha Toshiba. Apparatus for detecting number of packs included in bundle. 5,017,773, Cl. 250-223.00R.

Sato, Seiji: *See—*
Oshiro, Yasuo; Tanaka, Tatsuyoshi; Sakurai, Yoji; and Sato, Seiji, 5,017,724, Cl. 564-427.000.

Sato, Seizi; and Yano, Eiji, to Sony Corporation. Adaptor for a small-sized tape cassette. 5,016,834, Cl. 242-199.000.

Sato, Shinichi: *See—*
Takagi, Kazunori; Sato, Shinichi; Ito, Masahiko; and Yamamoto, Hideo, 5,018,205, Cl. 381-86.000.

Sato, Syoji; Makino, Yutaka; Ishimoto, Kazumi; and Izumi, Yasuo, to Matsushita Electric Industrial Co., Ltd. Atmosphere furnace. 5,017,131, Cl. 432-152.000.

Sato, Takanori, to Shimizu Construction Co., Ltd. Method for restraining response of a structure to outside disturbances and apparatus therefor. 5,016,409, Cl. 52-167.0DF.

Sato, Takeshi: *See—*
Kushibe, Takahiro; Takano, Yuuichi; and Sato, Takeshi, 5,016,598, Cl. 123-533.000.

Sato, Vicki L.: *See—*
Gilbert, Walter; Fisher, Richard A.; Sato, Vicki L.; and Ramachandran, Kuzhalmannam L., 5,017,688, Cl. 530-326.000.

Sato, Yasuo; and Saeki, Kunio. Method of cutting workpiece. 5,016,800, Cl. 225-2.000.

Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshihiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, to Namco Ltd. Shooting game machine. 5,016,890, Cl. 273-312.000.

Satoh, Atsushi: *See—*
Furusawa, Toshihiro; Satoh, Atsushi; Nakajima, Takashi; and Matsugishi, Noriaki, 5,017,311, Cl. 264-23.000.

Satoh, Kazuo; and Nosaka, Tsutomu, to Sumitomo Rubber Industries, Ltd. Method for applying tire material. 5,017,253, Cl. 156-130.300.

Satou, Fumitaka; and Ogawa, Fumio, to Nippon Kayaku Kabushiki Kaisha. Non-dustable granular dye: dye particles coated with hydroxylpropyl cellulose or carbohydrate. 5,017,195, Cl. 8-526.000.

Saukkonen, Seppo, to Valmet Paper Machinery Inc. Method and device for threading the end of a web. 5,016,831, Cl. 242-55.000.

Sauter, Bruce M.; Tempas, Jeffrey F.; and Sandman, Robert B., to Kohler Co. Sink assembly. 5,016,297, Cl. 4-619.000.

Sauter, Hubert: *See—*
Seele, Rainer; Sauter, Hubert; Kober, Reiner; Ammermann, Eberhard; and Lorenz, Gisela, 5,017,595, Cl. 514-383.000.

Saveland, Lee. Beverage bottle stopper remover. 5,016,499, Cl. 81-3.370.

Savin Corporation: *See—*
Sher, Arden; and Sabo, Karen, 5,017,784, Cl. 250-338.100.

Savio, S.p.A.: *See—*
Negri, Ettore, 5,016,449, Cl. 66-54.000.

Savonjousi, Aslak: *See—*
Pietinen, Pertti; and Savonjousi, Aslak, 5,016,824, Cl. 241-21.000.

Sawai, Kiichi; Natori, Shunji; Takahashi, Haruo; Tanaka, Kenichi; Mitani, Takahiko; and Kurono, Masayasu, to Sanwa Kagaku Kenkyusho Co., Ltd. Cloning of DNA encoding antibacterial polypeptide precursor. 5,017,486, Cl. 435-172.300.

Sawanobori, Naruhito: *See—*
Otsuka, Masaaki; Komiya, Masayuki; Sawanobori, Naruhito: and Nagahama, Shinobu, 5,017,520, Cl. 501-44.000.

Sawanoi, Yasunari: *See—*
Tsukabayashi, Kazuo; Yamamoto, Takashi; and Sawanoi, Yasunari, 5,016,451, Cl. 68-2.000.

Sawant, Vijay A., to Conopco, Inc. Confection and method and apparatus for manufacturing it. 5,017,390, Cl. 426-100.000.

Sawyers, Craig G.; and Edge, Gordon M., to Scientific Generics Limited. Noise attenuation. 5,018,203, Cl. 381-71.000.

Scantool Handelsbolag: *See—*
Ohlin, Stig D., 5,017,067, Cl. 411-45.000.

Schaffer, James R., Jr.: *See—*
Bartholomew, Richard D.; Pitalo, Stephen K.; and Schaffer, James R., Jr., 5,017,771, Cl. 250-227.210.

Scharrer, Joseph K.; Beatty, Robert F.; and Csomor, Arpad, to Rockwell International Corporation. Asymmetrically stepped hydrostatic bearing. 5,017,023, Cl. 384-114.000.

Schering Corporation: *See—*
Lee, Frank; Yokota, Takashi; Arai, Ken-ichi; Mosmann, Timothy; and Rennick, Donna, 5,017,691, Cl. 535-351.000.
Neustadt, Bernard R.; Andrews, David R.; McNamara, Paul E.; and Watkins, Robert W., 5,017,567, Cl. 514-171.000.
Zurawski, Gerard; and Zurawski, Sandra M., 5,017,692, Cl. 530-351.000.

Schering Wien Ges. m.b.H.: *See—*
Stindl, Wolfgang, 5,017,605, Cl. 514-529.000.

Schertler, Roman: *See—*
Strasser, Gregor; Zohrer, Gerald; Schertler, Roman; and Fischer, Heinrich, 5,017,073, Cl. 414-217.000.

Scheu Manufacturing Company: *See—*
Velie, Wallace W.; Lewis, William T.; and Haney, Donald C., 5,017,129, Cl. 431-326.000.

Schieg, Rudolf; and Tesch, Johann, to Maschinenfabrik Andritz Actiengesellschaft. Process for the treatment of material-gas mixtures. 5,017,198, Cl. 55-21.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Schilder, Herbert. Set of endodontic instruments. 5,017,138, Cl. 433-102.000.
- Schiminski, Herbert: *See—*
  - Schippers, Heinz; Lenk, Erich; Gerhartz, Siegmar; Schiminski, Herbert; and Turk, Herbert, 5,016,829, Cl. 242-18.00A.
- Schindler, Frederick J.: *See—*
  - Bredow, Charles W.; Schindler, Frederick J.; and Warburton, Charles E., Jr., 5,017,632, Cl. 523-400.000.
- Schippers, Heinz; Lenk, Erich; Gerhartz, Siegmar; Schiminski, Herbert; and Turk, Herbert, to Barmag AG. Takeup machine. 5,016,829, Cl. 242-18.00A.
- Schlaak, Helmut, to Siemens Aktiengesellschaft. Detachable multiple splicing connector for light waveguides. 5,016,972, Cl. 350-96.220.
- Schlager, Ludwig H., to Gerot-Pharmazeutika Gesellschaft m.b.H. 5-dialkylaminomethyl-2-furanomethanol derivatives having anti-hypertensive properties. 5,017,586, Cl. 514-318.000.
- Schlicht, Larry J.: *See—*
  - Wegner, David K.; and Schlicht, Larry J., 5,016,700, Cl. 160-232.000.
- Schlumberger Industries: *See—*
  - Schoeb, Pascal; and Holtzer, Dominique, 5,016,745, Cl 194-346.000.
- Schlumberger Technology Corporation: *See—*
  - Lucas, Gary; Beck, Maurice; and Hunt, Andrew, 5,017,879, Cl. 324-663.000.
  - Wraight, Peter D., 5,017,778, Cl. 250-254.000.
- Schlumpf, Hans-Peter; Pfister, Hans J.; and Oshsner, Edwin, to Pluss-Staufer AG. Direct processing of polymer with pulverulent additives in injection moulding machines. 5,017,015, Cl. 366-82.000.
- Schmelzer, Heinz: *See—*
  - Marten, Manfred; Godau, Claus; and Schmelzer, Heinz, 5,017,675, Cl. 528-111.000.
- Schmidt, Kenneth D.: *See—*
  - Krug, John A.; Hammonds, James C.; Schmidt, Kenneth D.; and Paglusch, Dennis F., 5,017,065, Cl. 410-58.000.
- Schmidt, Manfred: *See—*
  - Kohler, Burkhard; Meyer, Rolf-Volker; Dorf, Ernst-Ulrich; Russeler, Wolfgang; and Schmidt, Manfred, 5,017,682, Cl. 528-388.000.
- Schmidt, Paul R.: *See—*
  - Schumann, P. Richard; and Schmidt, Paul R., 5,016,841, Cl. 248-51.000.
- Schmidt, Robert J.; Haizmann, Robert S.; Ford, Mark R.; Low, C. David; and Adams, Frank H., to UOP. Catalyst for the isomerization of alkanes. 5,017,541, Cl. 502-169.000.
- Schmitz, Erwin: *See—*
  - Michelsen, Ralph; Schulze-Brockhausen, Udo; Weit, Herbert; and Schmitz, Erwin, 5,016,826, Cl. 241-72.000.
- Schneider, Douglas A.: *See—*
  - Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 5,017,324, Cl. 264-510.000.
- Schneider, Richard P.: *See—*
  - Culler, David E.; Papadopoulos, Gregory M.; and Schneider, Richard P., 5,018,062, Cl. 364-200.000.
- Schneider, Roy W.; and DiValentin, Eugenio, to United Technologies Corporation. Propeller speed governor having a derivative inhibit at high flight speeds. 5,017,089, Cl. 416-35.000.
- Schobesberger, Manfred: *See—*
  - Wanek, Erich; Baumgartinger, Josef; Schobesberger, Manfred; Stadlbauer, Rupert; and Weinrotter, Klaus, 5,017,110, Cl. 425-7.000.
- Schoeb, Pascal; and Holtzer, Dominique, to Schlumberger Industries. Detection device for detecting that a coin receptacle is full. 5,016,745, Cl. 194-346.000.
- Schofield, Richard W.: *See—*
  - Radovich, John M. and Schofield, Richard W., 5,017,293, Cl. 210-646.000.
- Scholl, Inc.: *See—*
  - Bauer, Jamie D., 5,016,764, Cl. 211-189.000.
- Schollmeyer, Eckard: *See—*
  - Bossmann, Adelgund, and Schollmeyer, Eckard, 5,017,423, Cl. 428-224.000.
- Schonstedt, Erick O.: *See—*
  - Rippingale, John B.; Upton, Charles R.; Schonstedt, Erick O.; and Osman, Bradley L., 5,017,873, Cl. 324-326.000.
- Schonstedt Instrument Company: *See—*
  - Rippingale, John B.; Upton, Charles R.; Schonstedt, Erick O.; and Osman, Bradley L., 5,017,873, Cl. 324-326.000.
- Schoonhoven, Johannes W. F. M.; Eijsbouts, Sonja; Heinerman, Jacobus J. L.; and Eisenhuth, Ludwig, to Akzo N.V. Process for the preparation of a presulfided and sulfided catalyst. 5,017,535, Cl. 502-30.000.
- Schott Glaswerke: *See—*
  - Paquet, Volker; Ackermann, Ulrich; Etzkorn, Heniz-W.; Kersten, Ralf T.; and Rutze, Uwe, 5,017,404, Cl. 427-45.100.
- Schramm, Matthias: *See—*
  - Stoltefuss, Jurgen; Bechem, Martin; Gross, Rainer; Hebisch, Siegbert; and Schramm, Matthias, 5,017,590, Cl. 514-356.000.
- Schroder, Wolfgang: *See—*
  - Gerst, Michael; Schroder, Wolfgang; and Bauer, Lothar, 5,016,346, Cl. 29-754.000.
- Schroeder, Carl Horst, administrator: *See—*
  - Kruse, Alfred; Siegemund, Gunter; and Ruppert, Ingo, deceased, 5,017,719, Cl. 560-106.000.
- Schroeder, Richard B., to Hercules, Incorporated. Double truck printing registration system for a rotary printing press. 5,016,531, Cl. 101-415.100.
- Schubert, Erdmann F.: *See—*
  - Deppe, Dennis G.; Dupuis, Russell D.; and Schubert, Erdmann F., 5,018,157, Cl. 372-45.000.
- Schulte-Elte, Karl-Heinrich: *See—*
  - Chapuis, Christian; Margot, Christian; Schulte-Elte, Karl-Heinrich; and Pamingle, Herve , 5,017,711, Cl. 549-332.000.
- Schultz, Francis J. Display hub cap apparatus. 5,016,944, Cl. 301-37.00N.
- Schulz, Anthony A.: *See—*
  - Powell, Thomas W., Jr.; Schulz, Anthony A.; and Beall, Gary W., 5,017,361, Cl. 424-46.000.
- Schulze-Brockhausen, Udo: *See—*
  - Michelsen, Ralph; Schulze-Brockhausen, Udo; Weit, Herbert; and Schmitz, Erwin, 5,016,826, Cl. 241-72.000.
- Schulze, Wolfram: *See—*
  - Sadlack, Werner; Vogt, Siegfried; Upmeier, Egon; and Schulze, Wolfram, 5,016,549, Cl. 112-104.000.
- Schumann, P. Richard; and Schmidt, Paul R., to Gleason Reel Corp. Rolling conductor support. 5,016,841, Cl. 248-51.000.
- Schumann, Werner; and Tischer, Werner, to Bayer Aktiengesellschaft. Cast films of ABS plastics. 5,017,422, Cl. 428-216.000.
- Schuster, Rudolf; and Ketzer, Georg, to Siemens Aktiengesellschaft. Soldering apparatus having at least one stirrup electrode. 5,016,804, Cl. 228-51.000.
- Schutt, Ernest G.; Dondero, Richard S.; Hansen, William P.; Hovorka, George B.; and Meyer, Raymond E., to Ortho Diagnostic Systems, Inc. Scattered total internal reflectance immunoassay system. 5,017,009, Cl. 358-338.000.
- Schutts, Mark E., to Bently Nevada Corp. Method of making a proximity sensor. 5,016,343, Cl. 29-605.000.
- Schuurman, Arend, to U.S. Philips Corp. Method of manufacturing a shear plate for a dry-shaver. 5,017,460, Cl. 430-320.000.
- Schwartz, Alan I.: *See—*
  - Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Paramdeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.
- Schwartz, Claude: *See—*
  - Lafforgue, Jean-Jacques; and Schwartz, Claude, 5,016,892, Cl. 279-82.000.
- Schwartz, Gary, to Advanced Technology Laboratories, Inc. Spectral interpolation of ultrasound Doppler signal. 5,016,641, Cl. 128-661.090.
- Schwarz, Dick; Warrer, Bob; Musgrave, Mike; Cruson, Bob; Gordon, Christa; and Weinert, Todd. Clear thermoplastic polymer composite material. 5,017,436, Cl. 428-519.000.
- Schweiger, Franz: *See—*
  - Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred; Schweiger, Franz; Verlohr, Axel; Muyssen John; and Lybeer, Roger, 5,018,097, Cl. 364-900.000.
- Schweitzer, Jean J.: *See—*
  - Hansen, Lowell D.; Hurley, J. Richard; Schweitzer, Jean J.; and Zoya, Walter J., 5,017,098, Cl. 417-302.000.
- Schwenzer, Reinhard: *See—*
  - Goedecke, Wolf-Dieter; Schwenzer, Reinhard; and Huber, Ralf, 5,016,519, Cl. 91-361.000.
- Science Applications International Corporation: *See—*
  - Butler, Barry L.; and Beninga, Kelly J., 5,016,998, Cl. 350-608.000.
- Scientific Generics Limited: *See—*
  - Sawyers, Craig G.; and Edge, Gordon M., 5,018,203, Cl. 381-71.000.
- Scott, Robert L., to Scott, Robert L. Precise electronic aid to musical instrument tuning. 5,016,515, Cl. 84-454.000.
- Seagate Technology, Inc.: *See—*
  - Brar, Amarjit S.; and Narayan, Prativadi B., 5,017,439, Cl. 428-629.000.
  - Nissimov, Haim N., 5,018,095, Cl. 364-900.000.
- Seaton, Norman T. Laser control apparatus and method for frequency offset phase locking and the minimizing of retro-reflection effects. 5,018,151, Cl. 372-18.000.
- Seaver, George. Photoelastic optical switch and optical systems employing the optical switch and a method of use thereof. 5,016,957, Cl. 350-96.130.
- Sechi, Giovanni M.: *See—*
  - Messina, Giuseppe; Lorenzoni, Loreno; Calaresu, Paolo; and Sechi, Giovanni M., 5,017,721, Cl. 564-151.000.
- Seele, Rainer; Kober, Reiner; Goetz, Norbert; Ammermann, Eberhard; and Lorenz, Gisela, to BASF Aktiengesellschaft. 1-halo-1-azolylpropenes and -methyloxiranes and fungicides containing these compounds. 5,017,594, Cl. 514-383.000.
- Seele, Rainer; Sauter, Hubert; Kober, Reiner; Ammermann, Eberhard; and Lorenz, Gisela, to BASF Aktiengesellschaft. Azolylmethylallyl alcohols and fungicides containing these compounds. 5,017,595, Cl. 514-383.000.
- Segovia, Jose F. Gate locking mechanism. 5,016,928, Cl. 292-213.000.
- Seidensha Electronics Co., Ltd.: *See—*
  - Furusawa, Toshihiro; Satoh, Atsushi; Nakajima, Takashi; and Matsugishi, Noriaki, 5,017,311, Cl. 264-23.000.
- Seifert, C. Vaughn. Convertible yo-yo and top. 5,017,172, Cl. 446-250.000.
- Seiko Epson Corporation: *See—*
  - Koga, Yoshiro, 5,017,967, Cl. 355-261.000.
  - Koike, Kiyofumi, 5,017,027, Cl. 400-54.000.

  - Uchida, Masahide; and Shida, Fumio, 5,017,914, Cl. 340-784.000.
- Seiko Instruments & Electronics Ltd.: *See—*
  - Karube, Isao; and Muramatsu, Hiroshi, 5,017,494, Cl. 435-288.000.
- Seiko Instruments Inc.: *See—*
  - Ioka, Tsunejiro; Saigo, Tatsuji; and Tomita, Michio, 5,016,865, Cl. 271-103.000.
- Seiko Seiki Kabushiki Kaisha: *See—*
  - Kihara, Hiroyuki; and Omori, Hideki, 5,018,071, Cl. 364-474.170.
- Seikosha Co., Ltd.: *See—*
  - Tanaka, Sakae; and Watanabe, Yoshiaki, 5,017,984, Cl. 357-23.700.
- Seitz Enzinger Noll Maschinenbau Aktiengesellschaft: *See—*
  - Clusserath, Ludwig, 5,016,684, Cl. 141-6.000.
- Sekiguchi, Masato: *See—*
  - Mori, Osamu; Oyama, Motofumi; Hisaki, Hiroshi; Sekiguchi, Masato; Okamura, Akinobu; and Tanabe, Haruhiro, 5,017,639, Cl. 524-510.000.
- Semchena, John H.: *See—*
  - Faigle, Ernst M.; Semchena, John H.; and Thompson, Richard J., 5,016,914, Cl. 280-741.000.
- Semiconductor Energy Laboratory Co., Ltd.: *See—*
  - Fukada, Takeshi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; Codama, Mitsufumi; and Takayama, Toru, 5,017,828, Cl. 313-367.000.
  - Sakama, Mitsunori; Fukada, Takeshi; Sakamoto, Naoya; Amachi, Nobumitsu; Hayashi, Shigenori; and Inushima, Takashi, 5,017,502, Cl. 437-2.000.
  - Yamazaki, Shunpei; and Itoh, Kenji, 5,017,264, Cl. 156-643.000.
- Semler Industries, Inc.: *See—*
  - Semler, Loren H.; Palm, Joseph M.; Englram, Paul B.; and Clegg, Jon Y., 5,017,291, Cl. 210-641.000.
- Semler, Loren H.; Palm, Joseph M.; Englram, Paul B.; and Clegg, Jon Y., to Semler Industries, Inc. Process for recycling and reconstituting flexographic inks. 5,017,291, Cl. 210-641.000.
- Sempel, Adrianus, to U.S. Philips Corporation. Phase-controllable oscillator. 5,017,890, Cl. 331-45.000.
- Semple, James S. Collapsible cap for a pickup truck box. 5,016,935, Cl. 296-26.000.
- Sengupta, Uday K.: *See—*
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,161, Cl. 372-57.000.
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,018,162, Cl. 372-57.000.
- Senju Pharmaceutical Co., Ltd.: *See—*
  - Makino, Tadashi; Doi, Koji; Matsuoka, Masayoshi; and Tsuboi, Toshiharu, 5,017,564, Cl. 514-47.000.
- Sente Creations Co., Ltd.: *See—*
  - Shiina, Akio, 5,017,171, Cl. 446-197.000.
- Senuma, Akitaka; Tsukada, Kiroku; and Noda, Isao, to Union Carbide Chemicals and Plastics Company Inc. Kneaded moldable resin composition. 5,017,635, Cl. 524-269.000.
- Seong-Hoon, Park: *See—*
  - June-Gunn, Lee; Chang-Sam, Kim; Heon-Jin, Choi; and Seong-Hoon, Park, 5,017,527, Cl. 501-90.000.
- Sequoia-Turner Corporation: *See—*
  - Gerard de Grooth, Bernard; Greve, Jan; and Terstappen, Leonardus W. M. M., 5,017,497, Cl. 436-63.000.
- Serdi - Societe D'Etudes De Realisation Et De Diffusion Industrielles: *See—*
  - Leroux, Jacques; and Gallez, Francois, 5,017,062, Cl. 409-179.000.
- Service Tool Die & Mfg. Co.: *See—*
  - Herdzina, Frank J.; and Goodrich, Rollie M., 5,017,072, Cl. 413-66.000.
- Severance, Wayne S., Jr.; and Turner, Tommie Z., to ESAB Welding Products, Inc. Plasma arc torch starting process having separated generated flows of non-oxidizing and oxidizing gas. 5,017,752, Cl. 219-121.590.
- Sexton, Daniel W., to GE Fanuc Automatinon North America, Inc. Apparatus and method for determining if a particular plug-in card is appropriate for use with an electronic processor. 5,018,146, Cl. 371-37.100.
- SGS-Thomson Microelectronics, Inc.: *See—*
  - Carobolante, Francesco; Pace, Ermanno; and McCormack, Mark, 5,017,845, Cl. 318-138.000.
- Shafer, Robert L. Double bed trailer. 5,016,896, Cl. 280-400.000.
- Shaffer, Michael L.: *See—*
  - Daughton, John W.; Jones, Jack E.; and Shaffer, Michael L., 5,017,972, Cl. 355-321.000.
- Shah, Govind; Basile, Peter A.; Carmen, Ralph H.; and Deschaine, Stephen A., to DSC Communications Corporation. Optical switch. 5,018,131, Cl. 370-1.000.
- Shah, Nimish K.; and Singh, Michael P., to AT&T Bell Laboratories. Sense amplifier with selective pull up. 5,017,815, Cl. 307-530.000.
- Shannon, Michael D.: *See—*
  - Bernasek, Edward; Hildebolt, William M.; Shannon, Michael D.; Shelar, Gary R.; and White, Jackie L., 5,016,654, Cl. 131-302.000.
- Shapero, Wallace H.; and Sneddon, John, to Mattel, Inc. Torsional joint skeleton for poseable figure. 5,017,173, Cl. 446-374.000.
- Sharp, Bruce R. Fibrous reinforced resinous storage tanks with strengthened walls. 5,017,044, Cl. 405-53.000.
- Sharp, Douglas J.; and Smith, E. W., to Doskocil Manufacturing Company, Inc. Latching mechanism. 5,016,926, Cl. 292-42.000.
- Sharp Kabushiki Kaisha: *See—*
  - Ibuchi, Yoshiaki, 5,017,959, Cl. 355-27.000.
  - Igarashi, Noboru, 5,017,750, Cl. 219-10.55R.
  - Kawashima, Akihiro; Yoshida, Hirokazu; Tagusa, Yasunobu; Inada, Kiyoshi; Makita, Hideshi; and Dotta, Yoshihisa, 5,016,986, Cl. 350-339.00R.
  - Ohashi, Keiichi, 5,018,030, Cl. 360-94.000.
  - Ohashi, Kunio; and Ogura, Mitsuru, 5,018,054, Cl. 362-211.000.
  - Shioji, Mitsuaki; Morimoto, Kenichi; Kato, Shinji; Nakamura, Takeshi; and Nozaki, Nobuharu, 5,016,983, Cl. 350-332.000.
  - Takada, Yuji, 5,018,026, Cl. 358-473.000.
  - Tatsumi, Takashi, 5,018,022, Cl. 358-431.000.
  - Tsuji, Kentaroh; Fujiwara, Tsuneo; Fuji, Hiroshi; Terashima, Shigeo; and Numata, Tomiyuki, 5,018,120, Cl. 369-32.000.
  - Tsuji, Masaru; Katoh, Atsuyuki; and Fukunaga, Keizo, 5,017,962, Cl. 355-210.000.
  - Utsumi, Tatsuya; Kawamura, Shinji; Itoh, Tetsuya; Moriyama, Hiroshi; and Okada, Naofumi, 5,016,828, Cl. 241-158.000.
- Shaw, David G.; Yializis, Angelo; Strycker, Donald S.; and Ham, Mooyoung, to Spectrum Control, Inc. Miniaturized monolithic multilayer capacitor and apparatus and method for making. 5,018,048, Cl. 361-323.000.
- Shelar, Gary R.: *See—*
  - Bernasek, Edward; Hildebolt, William M.; Shannon, Michael D.; Shelar, Gary R.; and White, Jackie L., 5,016,654, Cl. 131-302.000.
- Shelby, Paulus P., Jr.: *See—*
  - Milne, Christopher G.; Shelby, Paulus P., Jr.; and Bailey, David L., 5,017,007, Cl. 356-301.000.
- Shell Oil Company: *See—*
  - Brown, Ralph E.; Canahuati, Marlene; and Jackson, Roy J., 5,017,258, Cl. 156-294.000.
  - Cowan, Kenneth M., 5,016,711, Cl. 166-250.000.
  - Dewitz, Thomas S., 5,017,196, Cl. 48-210.000.
- Shen, Bing-Whey; McKee, Randy; and Chung, Gishi, to Texas Instruments Incorporated. Method for fabricating a trench DRAM. 5,017,506, Cl. 437-52.000.
- Shen, Kuo C. Method of making composite products from lignocellulosic materials. 5,017,319, Cl. 264-124.000.
- Shenyang No. 3 Machine Tool Works: *See—*
  - Kovalenko, Thomas R.; and Xin, Lu B., 5,016,334, Cl. 29-38.00B.
- Shepard, David H., to Cognitronics Corp. Scanning apparatus storing both processed and unprocessed scan data signals for separate readout and method of operating same. 5,017,763, Cl. 235-432.000.
- Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, to Symbol Technologies, Inc. Hand held bar code scanner with automatic scanner deenergization. 5,017,765, Cl. 235-462.000.
- Shepherd, Terence J.: *See—*
  - McWhirter, John G.; and Shepherd, Terence J., 5,018,065, Cl. 364-900.000.
- Sher, Arden; and Sabo, Karen, to Savin Corporation. Thermal detector. 5,017,784, Cl. 250-338.100.
- Shervington, Roger M.; Rasmussen, Roy D.; and Stadler, Jeff A., to Sundstrand Corporation. Brushless dynamo electric machine with access to rectifier assembly. 5,017,821, Cl. 310-68.00D.
- Sherwood Medical Company: *See—*
  - Ruiz, Oscar F., 5,016,640, Cl. 128-658.000.
- Shiba, Haruo; Ikebe, Masaru; and Sasaki, Morimasa, to TDK Corporation. Disc cartridge with thick portion surrounding head insertion hole. 5,018,039, Cl. 360-133.000.
- Shiba, Hiroshi, to NEC Corporation. Process for making a bipolar transistor including selective oxidation. 5,017,503, Cl. 437-31.000.
- Shibafuchi, Hiroshi; Sasaki, Masanori; Nitta, Hidenori; and Yoshida, Masahiko, to Nippon Carbide Kogyo Kabushiki Kaisha. Process for producing cyanamide. 5,017,355, Cl. 423-369.000.
- Shibanaka, Mitsugu: *See—*
  - Ohtsuka, Nobukazu; Nagai, Hiroyuki; Shibanaka, Mitsugu, and Matsui, Toshikazu, 5,016,868, Cl. 271-273.000.
- Shibata, Manabu, to Hitachi, Ltd. Semiconductor integrated circuit device with bus lines. 5,017,993, Cl. 357-40.000.
- Shibata, Tohru: *See—*
  - Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 5,017,290, Cl. 210-635.000.
- Shida, Fumio: *See—*
  - Uchida, Masahide; and Shida, Fumio, 5,017,914, Cl. 340-784.000.
- Shigehara, Hiroshi: *See—*
  - Nakajima, Takao; and Shigehara, Hiroshi, 5,018,199, Cl. 381-36.000.
- Shigenaga, Shinji: *See—*
  - Matsuo, Masaaki; Manabe, Takashi; Shigenaga, Shinji; and Matsuda, Hiroshi, 5,017,703, Cl. 546-201.000.
- Shih, Feng-Hsien W., to International Business Machines Corporation. High performance self-checking adder having small circuit area. 5,018,093, Cl. 364-740.000.
- Shih, Hsiao-Lei: *See—*
  - Liu, Yun-Yu; and Shih, Hsiao-Lei, 5,017,157, Cl. 439-609.000.
  - Liu, Yun-Yu; and Shih, Hsiao-Lei, 5,017,158, Cl. 439-609.000.
- Shiiki, Hitoshi; Tada, Minoru; and Nakamura, Kyoichi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Polypropylene resin pre-expanded beads, manufacturing method thereof and expansion-molding method using said beads. 5,017,621, Cl. 521-58.000.
- Shiina, Akio, to Sente Creations Co., Ltd. Toy utilizing bubbles in liquid. 5,017,171, Cl. 446-197.000.
- Shikichi, Satoshi: *See—*
  - Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.
- Shikoku Kakoki Co., Ltd.: *See—*
  - Kawamura, Seizo, 5,016,687, Cl. 141-116.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Shimada, Hiroo: *See—*
  - Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.
- Shimada, Junichi: *See—*
  - Suzuki, Yoshihiro; Yajima, Hiroyoshi; Shimada, Junichi; Shimoyama, Kenji; and Gotoh, Hideki, 5,018,159, Cl. 372-46.000.
- Shimada, Noboru: *See—*
  - Hattori, Iwakazu; Shimada, Noboru; Noboru, Oshima; Sakakibara, Mitsuhiko; Mouri, Hiroshi; Fujimaki, Tatsuo; and Hamada, Tatsuro, 5,017,636, Cl. 524-300.000.
- Shimada, Takamichi: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; and Shimada, Takamichi, 5,018,068, Cl. 364-424.100.
- Shimada, Yoshio: *See—*
  - Nakamura, Yoshio; Ogura, Masahiro; Shimada, Yoshio; Watanabe, Kiyoshi; and Takahashi, Hideyuki, 5,017,484, Cl. 435-158.000.
- Shimaguchi, Takashi; Yamada, Toshihiro; Natori, Tatsuo; Okada, Akihisa; and Misumi, Hiroshi, to Hitachi, Ltd. Magnetically coupled pump and nuclear reactor incorporating said pump. 5,017,102, Cl. 417-420.000.
- Shimano, Kimihide: *See—*
  - Ozawa, Yasuo; Koyama, Ikuo; and Shimano, Kimihide, 5,017,383, Cl. 424-490.000.
- Shimek, Daniel C.: *See—*
  - Shimek, Ronald J.; Shimek, Daniel C.; and Wolf, James F., 5,016,609, Cl. 126-85.00B.
- Shimek, Ronald J.; Shimek, Daniel C.; and Wolf, James F. Direct vented multi glass side fireplace. 5,016,609, Cl. 126-85.00B.
- Shimizu Construction Co., Ltd.: *See—*
  - Sato, Takanori, 5,016,409, Cl. 52-167.0DF.
- Shimizu, Masaaki: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Shimizu, Nobuo; Kuroda, Michio; Kirikami, Seiichi; Sato, Isao; and Arai, Osamu, to Hitachi, Ltd. Fuel-air premixing device for a gas turbine. 5,016,443, Cl. 60-737.000.
- Shimizu, Seiichi: *See—*
  - Iwanari, Yoshiyuki; Amaya, Shinji; Shimizu, Seiichi; and Kogawara, Toshiro, 5,017,450, Cl. 430-106.000.
- Shimizu, Sumio: *See—*
  - Ogata, Masaru; Matsumoto, Hiroshi; Shimizu, Sumio; and Kida, Shiro, 5,017,708, Cl. 548-515.000.
- Shimizu, Takamitsu: *See—*
  - Nagaoka, Kazuo; Hatano, Tadao; Wakabayashi, Sadao; and Shimizu, Takamitsu, 5,016,359, Cl. 33-702.000.
- Shimizu, Yuzuru; and Hata, Yoshio, to Mitsubishi Denki Kabushiki Kaisha. Three-phase magneto armature. 5,017,822, Cl. 310-207.000.
- Shimomura, Seiji: *See—*
  - Yamada, Yasuhiro; Fujii, Masaki; and Shimomura, Seiji, 5,017,358, Cl. 423-449.000.
- Shimono, Mamoru: *See—*
  - Asada, Tomoyuki; Nishida, Kaoru; Shimono, Mamoru; Shinohara, Hideyuki; and Ando, Koichi, 5,016,560, Cl. 118-653.000.
- Shimoyama, Kenji: *See—*
  - Suzuki, Yoshihiro; Yajima, Hiroyoshi; Shimada, Junichi; Shimoyama, Kenji; and Gotoh, Hideki, 5,018,159, Cl. 372-46.000.
- Shin-Etsu Chemical Co., Ltd.: *See—*
  - Oikawa, Katsuyuki; Ishihara, Toshinobu; Endo, Mikio; and Kubota, Tohru, 5,017,715, Cl. 556-401.000.
  - Yoshihoka, Hiroshi; Yamaya, Masaaki; and Yanagisawa, Hideyoshi, 5,017,668, Cl. 526-279.000.
- Shindo, Osamu, to Asahi Kogaku Kogyo Kabushiki Kaisha. Focal point detecting optical apparatus. 5,017,005, Cl. 356-125.000.
- Shinko Electric Co., Ltd.: *See—*
  - Ogita, Hiromitsu; and Toida, Akikazu, 5,017,943, Cl. 346-76.0PH.
- Shinmoto, Hiroshi: *See—*
  - Dosako, Shunichi; and Shinmoto, Hiroshi, 5,017,559, Cl. 514-21.000.
- Shinoda, Takashi; and Ishihara, Masamichi, to Hitachi, Ltd. Memory including address registers for increasing access speed to the memory. 5,018,109, Cl. 365-230.080.
- Shinohara, Hideyuki: *See—*
  - Asada, Tomoyuki; Nishida, Kaoru; Shimono, Mamoru; Shinohara, Hideyuki; and Ando, Koichi, 5,016,560, Cl. 118-653.000.
- Shinohara, Takashi: *See—*
  - Okazaki, Takashi; Suzuki, Eiji; and Shinohara, Takashi, 5,016,347, Cl. 29-825.000.
- Shinonaga, Hirohiko: *See—*
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,018,018, Cl. 358-213.110.
- Shinotsuka, Tatsuko: *See—*
  - Kokubo, Masaru; Shinotsuka, Tatsuko; Kameyama, Tatsuya; Kokumai, Motohiro; and Hara, Hirotaka, 5,018,134, Cl. 370-32.100.
- Shioji, Mitsuaki; Morimoto, Kenichi; Kato, Shinji; Nakamura, Takeshi; and Nozaki, Nobuharu, to Fuji Photo Film Co., Ltd.; and Sharp Kabushiki Kaisha. Drive method of liquid crystal device. 5,016,983, Cl. 350-332.000.
- Shionogi & Co., Ltd.: *See—*
  - Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, 5,017,380, Cl. 424-454.000.
  - Nishitani, Yasuhiro; Nishino, Yutaka; and Irie, Tadashi, 5,017,581, Cl. 514-300.000.
  - Ogata, Masaru; Matsumoto, Hiroshi; Shimizu, Sumio; and Kida, Shiro, 5,017,708, Cl. 548-515.000.
- Shioura, Kozo; and Taguchi, Hideo, to Nitto Boseki Co., Ltd. Nozzle plate for spinning glass fibres. 5,017,205, Cl. 65-1.000.
- Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, to Sumitomo Electric Industries, Ltd. Method for producing thin film of oxide superconductor. 5,017,550, Cl. 505-1.000.
- Shipley Company Inc.: *See—*
  - Bladon, John J., 5,017,742, Cl. 174-266.000.
- Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, to Nissan Motor Co., Ltd.; Nissan Shatai Company, Limited; Ohi Seisakusho Co., Ltd.; and Fuji Kiko Co., Ltd. Automatic transmission shift control device. 5,016,738, Cl. 192-4.00A.
- Shirai, Yuuji: *See—*
  - Okinaga, Takayuki; Matsugami, Shouji; Shirai, Yuuji; Otsuka, Kanji; Koguma, Hiroshi; and Emata, Takashi, 5,018,004, Cl. 357-74.000.
- Shiraishi, Yoshinobu: *See—*
  - Tada, Hisashi; Shiraishi, Yoshinobu; and Hayashi, Shigetsuga, 5,017,674, Cl. 528-93.000.
- Shiratori, Hidehisa; and Iizuka, Kazuo, to Mitsubishi Metal Corporation. Rotary cutting tool. 5,017,060, Cl. 409-137.000.
- Shiratsuchi, Shinichi, to RCA Licensing Corporation. Digital interpolation circuitry. 5,018,090, Cl. 364-723.000.
- Shiroki, Daijiro: *See—*
  - Machida, Morihisa; Tajima, Yoshio; Nakatsumi, Hideo; Isahai, Tatsuo; and Shiroki, Daijiro, 5,017,427, Cl. 428-323.000.
- Shopsmith, Inc.: *See—*
  - Berkeley, James E., 5,017,180, Cl. 474-84.000.
- Shoulders, Kenneth R., to Jupiter Toy Company. Energy conversion using high charge density. 5,018,180, Cl. 378-119.000.
- Showa Aluminum Corporation: *See—*
  - Ogawa, Seiichi; Sukimoto, Minobu; and Akiyoshi, Hitoshi, 5,016,578, Cl. 123-52.0MC.
- Shozaki, Tamotsu: *See—*
  - Aburatani, Kenji; and Shozaki, Tamotsu, 5,016,475, Cl. 73-644.000.
- Shricker, Brian R.: *See—*
  - Baldwin, Chauncey D.; Shricker, Brian R.; and Ivy, Richard E., 5,017,560, Cl. 514-21.000.
- Shukunami, Hiroshi; Tanimoto, Yasufumi; and Onuma, Satoshi, to Kabushiki Kaisha Toshiba. Image forming apparatus. 5,018,079, Cl. 364-519.000.
- Siebrand, Gerhard: *See—*
  - Nohren, Hubert; Siebrand, Gerhard; and Moritzen, Werner, 5,016,534, Cl. 102-387.000.
- Siegemund, Gunter: *See—*
  - Kruse, Alfred; Siegemund, Gunter; and Ruppert, Ingo, deceased, 5,017,719, Cl. 560-106.000.
- Siemens Akitiengesellschaft: *See—*
  - Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred, Schweiger, Franz; Verlohr, Axel; Muyssen, John; and Lybeer, Roger, 5,018,097, Cl. 364-900.000.
- Siemens Aktiengesellschaft: *See—*
  - Bjoerk, Erik; and Wiklund, Ola, 5,018,183, Cl. 378-173.000.
  - Eckardt, Bernd, 5,017,331, Cl. 376-313.000.
  - Feldtkeller, Martin, 5,017,802, Cl. 307-270.000.
  - Fischer, Horst; Rohsaint, Wolfgang; and Hmimid, Mohammed, 5,018,094, Cl. 364-770.000.
  - Granz, Bernd; Holzapfel, Ralf; and Niewisch, Joachim, 5,017,775, Cl. 250-227.250.
  - Hoegnelid, Kurt; and Ljungstroem, Jan, 5,016,632, Cl. 128-419.0PG.
  - Kerschner, Gunther; Wurzenberger, Johann; Hausmann, Herbert; Eckel, Giselher; and Friedrich, Peter, 5,018,059, Cl. 364-200.000.
  - Lang, Hermann, 5,017,801, Cl. 307-269.000.
  - Lange, Gottfried; Reinfelder, Hans-Erich; and Tressl, Guenther, 5,017,781, Cl. 250-327.200.
  - Moberg, Lennart, 5,016,630, Cl. 128-419.0PG.
  - Pomper, Michael; and Geiger, Martin, 5,018,103, Cl. 365-104.000.
  - Schlaak, Helmut, 5,016,972, Cl. 350-96.220.
  - Schuster, Rudolf; and Ketzer, Georg, 5,016,804, Cl. 228-51.000.
  - Vock, Josef; Ljungstroem, Jan; and Ekwall, Christer, 5,016,634, Cl. 128-419.0PT.
- Siemens-Bendix Automotive Electronics L.P.: *See—*
  - Wood, Ross W., 5,016,819, Cl. 239-522.000.
- Siemers, Paul A.; and Ritter, Ann M., to General Electric Company. Silicon carbide filament reinforced titanium aluminide matrix with reduced cracking tendency. 5,017,438, Cl. 428-614.000.
- Sienco, Inc.: *See—*
  - Henderson, Jon H., 5,016,469, Cl. 73-64.100.
- Sievert, Dick J., to Block Systems Inc. Composite masonry block 5,017,049, Cl. 405-284.000.
- Sigalov, Hagai. Transmissive and reflective optical control of sound, light and motion. 5,017,770, Cl. 250-221.000.
- Sigmedics, Inc. of Delaware: *See—*
  - Graupe, Daniel, 5,016,635, Cl. 128-421.000.
- Sikes, Dale R., to Web Printing Controls Co., Inc. Method and apparatus for registration mark identification. 5,018,213, Cl. 382-8.000.

- Sikinami, Yasuo; Hata, Kunihiro; and Yasuhara, Masaki, to Takiran Co., Ltd. Controlled release insect pest repellent. 5,017,377, Cl. 424-409.000.
- Sikka, Vinod K., to United States of America, Energy. Method for improving weldability of nickel aluminide alloys. 5,016,810, Cl. 228-206.000.
- Siliconix Incorporated: *See—*
  - Harnden, James A.; and Hill, Lorimer K., 5,017,804, Cl. 307-309.000.
- Simco Company, Inc., The: *See—*
  - Wright, William S.; and Blitshteyn, Mark, 5,017,876, Cl. 324-464.000.
- Simcoe, Robert J.; and Waters, Gregory M., to Digital Equipment Corporation. Technique for organizing and coding serial binary data from a plurality of data lines for transmission over a single transmission line. 5,018,142, Cl. 370-112.000.
- Simkhovich, Boris Z.: *See—*
  - Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.
- Simmons, Thomas R. Method and apparatus for massage. 5,016,618, Cl. 128-66.000.
- Simms, Barbara L.; and Chu, Chihang R., to Akzo America Inc. Process for production of high purity silica gel. 5,017,354, Cl. 423-338.000.
- Simon, Bernd; Holm, Niels E.; and Bonnichsen, Fritz F., to D.C.P. AF 1988 A/S. Dosage unit for dosing a number of measured quantities of a liquid, such as an insulin preparation, from a container, preferably a cartridge. 5,017,190, Cl. 604-207.000.
- Simon, Marvin K.: *See—*
  - Divsalar, Dariush; and Simon, Marvin K., 5,017,883, Cl. 329-304.000.
- Simonin, Pierre: *See—*
  - Rossini, Umberto; Simonin, Pierre; and Tremblay, Christine, 5,017,827, Cl. 313-268.000.
- Simons, Billy R.; Turner, Ben K.; and Brell, James T., to Aqua-Vac Locators, Inc. Vacuum excavator. 5,016,717, Cl. 175-66.000.
- Simons, Einar L. E. Fold-up container and construction method. 5,016,813, Cl. 229-189.000.
- Simonsen, Steve H.; Tomic, Mladomir; and Wegner, Wayne M., to Reynolds Consumer Products, Inc. Reclosable profile having improved closure members. 5,017,021, Cl. 383-63.000.
- Sindely, Lucette: *See—*
  - Aubert, Daniel; Blanc, Francis; Desmolin, Henri; Morre, Michel; and Sindely, Lucette, 5,017,613, Cl. 514-557.000.
- Singh, Michael P.: *See—*
  - Shah, Nimish K.; and Singh, Michael P., 5,017,815, Cl. 307-530.000.
- Singh, Ramnaraine. Dispenser for granular materials. 5,016,789, Cl. 222-608.000.
- Sinterstahl Gesellschaft m.b.H.: *See—*
  - Knoess, Walter, 5,016,348, Cl. 29-888.100.
- Sisk, David E. Aeration device for bulk material containers. 5,017,053, Cl. 406-138.000.
- Skalsky, Michael: *See—*
  - Gotthardt, Gerhard; Milijasevic, Zoran; Nakazawa, Akira; and Skalsky, Michael, 5,016,646, Cl. 128-784.000.
- Skeen, Hobson L.: *See—*
  - Carter, Don E.; McPeters, Arnold L.; and Skeen, Hobson L., 5,017,116, Cl. 425-131.500.
- Skil Corporation: *See—*
  - Holzer, Michael, Jr., 5,016,501, Cl. 81-57.110.
- Skraba, Frank W., to Phillips Petroleum Company. Catalyst regeneration including method of introducing oxygen into fluidized bed. 5,017,536, Cl. 502-41.000.
- Slamka, Richard W. A.: *See—*
  - Dower, Roger G.; Acres, Robert W.; Davis, Harold R.; Donham, Andrew N.; Riahi, Nader; Slamka, Richard W. A.; and Urbaniak, Lechoslaw K., 5,017,795, Cl. 250-560.000.
- Slater, Daniel, to Slater, Daniel. Individualized video center. 5,018,021, Cl. 358-349.000.
- Sloane, Paul G. Knockout bar mounting for injection molding machines. 5,017,123, Cl. 425-182.000.
- Sloma, Alan; Lee, Rosalind C.; and Pero, Janice, to BioTechnica International, Inc. Enhancing DNA sequencies derived from the sacQ gene. 5,017,477, Cl. 435-69.100.
- Slovik, Lori S.: *See—*
  - Imperial, George R.; Kung, Hsiang-Ching; Makarewicz, Paul A.; McCormick, Bonnie J.; and Slovik, Lori S., 5,017,416, Cl. 428-195.000.
- Smart, David C.: *See—*
  - Farber, Arnold S.; Lang, Stephen P.; and Smart, David C., 5,017,910, Cl. 340-635.000.
- Smit, Huug W. Automotive bumper and tailgate. 5,016,933, Cl. 293-117.000.
- Smith, David C., to Chomerics, Inc. Non-moire shielded window. 5,017,419, Cl. 428-209.000.
- Smith, E. W.: *See—*
  - Sharp, Douglas J.; and Smith, E. W., 5,016,926, Cl. 292-42.000.
- Smith, Earl D.; deFazekas, Josef P.; and Cooper, Herbert E., to DBX Corporation. Trailer suspension apparatus. 5,016,912, Cl. 280-711.000.
- Smith, Gaylord D.; Tassen, Curtis S.; Ganesan, Pasupathy; and Wheeler, Jack M., to Inco Alloys International, Inc. Nickel-base alloy. 5,017,249, Cl. 148-410.000.
- Smith, Jack E., Jr., to Hallmark Cards, Inc. Color printing system usable for reproduction of computer-generated images. 5,018,085, Cl. 364-526.000.
- Smith, James R.: *See—*
  - Bliss, Erlan S.; Smith, James R.; Salmon, J. Thaddeus; and Monjes, Julio A., 5,016,997, Cl. 350-607.000.
- Smith, John W., to Holcroft Inc. "No-nick" part-handling apparatus and method. 5,016,860, Cl. 266-112.000.
- Smith-Lewis, Margaret J.: *See—*
  - McClune, Gregory J.; and Smith-Lewis, Margaret J., 5,017,474, Cl. 435-7.500.
- Smith & Nephew Associated Companies plc: *See—*
  - Ansell, Christopher W. G., 5,017,625, Cl. 521-159.000.
- Smith, Patricia B.: *See—*
  - Elkind, Jerome L.; Smith, Patricia B.; Hutchins, Larry D.; Luttmer, Joseph D.; York, Rudy L.; and England, Julie S., 5,017,511, Cl. 437-225.000.
- Smith, Philip J.; and Mortimer, Jacques. Low toxicity fire retardant thermoplastic material. 5,017,637, Cl. 524-354.000.
- Smith, Robert S.: *See—*
  - Ekhoff, Donald L.; and Smith, Robert S., 5,018,029, Cl. 360-69.000.
- Smith, Ronald T., to Hughes Aircraft Company. Full-color zero-order suppressed diffraction optics diffusing screen/louver filter laminate. 5,016,950, Cl. 350-3.700.
- Smith, Thomas J., to TII Industries, Inc. Utility meter to telephone line interface. 5,018,192, Cl. 379-107.000.
- Smith, Tommy E., Jr.; Struve, Kenneth W.; and Colella, Nicholas J., to United States of America, Energy. Real time Faraday spectrometer. 5,017,779, Cl. 250-283.000.
- Smith & Wesson Corp.: *See—*
  - Ferraro, Robert J., 5,016,381, Cl. 42-100.000.
  - Pickle, Linwood A., 5,016,382, Cl. 42-100.000.
- Smith, Willis H., Jr., to Hughes Aircraft Company. Liquid crystal cell sealant assembly. 5,016,987, Cl. 350-344.000.
- SmithKline Beecham Corporation: *See—*
  - Holt, Dennis A.; Kowalski, Conrad J.; Levy, Mark A.; Metcalf, Brian W.; and Tickner, Ann M., 5,017,568, Cl. 514-173.000.
- Smits, Kenneth R.: *See—*
  - Ul Haq, Mohammed E.; and Smits, Kenneth R., 5,018,106, Cl. 365-203.000.
- Smyth, Ian C.: *See—*
  - Thew, Martin T.; Smyth, Ian C.; and Carroll, Noel, 5,017,288, Cl. 210-512.100.
- Sneddon, John: *See—*
  - Shapero, Wallace H.; and Sneddon, John, 5,017,173, Cl. 446-374.000.
- Sneddon, John L. Multi-functional rotary hydraulic machine systems. 5,017,087, Cl. 415-72.000.
- Snelling, Ricky E.; Figard, Joseph E.; and Morton, Robert W., to Phillips Petroleum Company. Composition and process for making poly (arylene sulfide) resins reinforced with glass fibers. 5,017,643, Cl. 524-609.000.
- Snopko, Paul A.: *See—*
  - Jones, Gary A.; Krishnamurthy, Gopalan; and Snopko, Paul A., 5,018,197, Cl. 380-20.000.
- Snow Brand Milk Products Co., Ltd.: *See—*
  - Dosako, Shunichi; and Shinmoto, Hiroshi, 5,017,559, Cl. 514-21.000.
  - Hori, Tomoshige; and Itoh, Kensuke, 5,017,875, Cl. 324-446.000.
- Snow, Douglas G.: *See—*
  - Burgess, Roy T.; Campau, Gregory P.; Claar, Leslie M.; Hodges, Robert C.; Snow, Douglas G.; and Taylor, Roy, 5,017,095, Cl. 417-222.00R.
- So, Sithy: *See—*
  - Patel, Ramesh U.; and So, Sithy, 5,018,148, Cl. 371-66.000.
- Societe Anonyme Rce: *See—*
  - Despres, Remi, 5,018,139, Cl. 370-94.300.
- Societe De Conseils De Recherches Et D'Applications Scientifiques: *See—*
  - Godfroid, Jean-Jacques; Braquet, Pierre; and Heymans, Francoise, 5,017,588, Cl. 514-336.000.
- Societe de Prospection et D'Inventions Techniques (S.P.I.T.): *See—*
  - Lafforgue, Jean-Jacques; and Schwartz, Claude, 5,016,892, Cl. 279-82.000.
- Societe Generele des Eaux Minerals de Vittel: *See—*
  - Chatourel, Daniel, 5,016,757, Cl. 206-603.000.
- Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A.": *See—*
  - Miraucourt, Carmen; and Delrieu, Gilles L. E., 5,017,088, Cl. 415-173.200.
- Societe Nationale Elf Aquitaine (Production): *See—*
  - Renard, Gerard; and Giannesini, Jean-Francois, 5,016,710, Cl. 166-245.000.
- Soda, Yasunari; Mochiji, Kozo; Oizumi, Hiroaki; and Kimura, Takeshi, to Hitachi, Ltd. Method for production of graft copolymer, pattern replication method, and base polymer and resist for graft copolymerization. 5,017,458, Cl. 430-296.000.
- Soejima, Katsumoto, to NEC Corporation. Self-aligned Bi-CMOS device having high operation speed and high integration density. 5,017,995, Cl. 357-43.000.
- Sohner, Harold K.; Hoyloak, Joel N.; and Spradling, John T., to Andrew Corporation. Communication system using spread spectrum and leaky transmission line. 5,018,165, Cl. 375-1.000.
- Sojka, Milan F.: *See—*
  - Chromecek, Richard C.; and Sojka, Milan F., 5,017,238, Cl. 134-7.000.

VOL 1126
ISS 3
MY 21 1991
UMI

SolarCare Technologies Corporation: *See—*
Niedbala, Raymond S., 5,017,365, Cl. 424-59.000.

Sollinger, John F.: *See—*
Aldrich, Donald C.; Buchanan, Robert C.; and Sollinger, John F., 5,016,516, Cl. 87-8.000.

Solodar, Warren E.: *See—*
Fuller, Timothy J.; Solodar, Warren E.; Kang, Henry R.; Kaplan, Samuel; and Crandall, Raymond K., 5,017,644, Cl. 524-612.000.

Solomon, Robert A., to Bissell Amfab, Inc. Spring and lock support for overbed table. 5,016,846, Cl. 248-161.000.

Soltanche: *See—*
Gouvenot, Daniel, 5,017,233, Cl. 106-600.000.

Somatomo, Yoshiki: *See—*
Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, 5,017,442, Cl. 429-94.000.

Sone, Yoshihisa: *See—*
Otani, Sugio; Tsuyuguchi, Michio; Kano, Haruyuki; Sone, Yoshihisa; Kageyama, Kenji; and Mabuchi, Toshiaki, 5,017,683, Cl. 528-396.000.

Song, Won R.: *See—*
Gutierrez, Antonio; Song, Won R.; Lundberg, Robert D.; and Kleist, Robert A., 5,017,299, Cl. 252-51.50R.

Sonnemann, Manfred: *See—*
Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred; Schweiger, Franz; Verlohr, Axel; Muyssen, John; and Lybeer, Roger, 5,018,097, Cl. 364-900.000.

Sonnenberg, Neville; Kingon, Angus I.; and Paterson, Adrian W., to CSIR. Sintered ceramic product. 5,017,532, Cl. 501-103.000.

Sonoda, Yasuo: *See—*
Tomita, Hajime; and Sonoda, Yasuo, 5,017,224, Cl. 106-22.000.

Sony Corporation: *See—*
Aratani, Katsuhisa; Kohno, Minoru; and Watanabe, Kenjiro, 5,018,119, Cl. 369-13.000.
Sato, Seizi; and Yano, Eiji, 5,016,834, Cl. 242-199.000.
Spross, Erhard; and Ruttimann, Hans-Rudolf, 5,016,942, Cl. 299-33.000.

Sony Magnescale Inc.: *See—*
Nagaoka, Kazuo; Hatano, Tadao; Wakabayashi, Sadao; and Shimizu, Takamitsu, 5,016,359, Cl. 33-702.000.

Sorensen, Thomas L.: *See—*
Alvord, Robert J.; Bambule, Raymond; Orr, Roy W., Jr.; and Sorensen, Thomas L., 5,018,011, Cl. 358-148.000.

Soulard, Claude D.: *See—*
Aubard, Gilbert G.; Calvet, Alain P.; Gouret, Claude J.; Grouhel, Agnes M.; Jacobelli, Henry L.; Junien, Jean-Louis; Pascaud, Xavier B.; Roman, Francois J.; Soulard, Claude D.; Hudspeth, James P.; and Lin, Yuan, 5,017,723, Cl. 564-383.000.

Souloumiac, Alain: *See—*
Fargette, Alain; Marland, Andre ; Thomas, Fabrice; and Souloumiac, Alain, 5,016,978, Cl. 350-269.000.

Southwick, Everett W.: *See—*
Williams, David L.; and Southwick, Everett W., 5,017,235, Cl. 131-278.000.

Sowash, Robert P., to Olin Corporation. Sabot bullet. 5,016,538, Cl. 102-520.000.

Sowman, Harold G., to Minnesota Mining and Manufacturing Company. Internally modified ceramic fiber. 5,017,316, Cl. 264-60.000.

Spamer, William S.; Robertson, J. David; Stoddard, David C. F.; and Hanna, James L., to Mead Corporation, The. Product display enclosure. 5,016,527, Cl. 98-115.300.

Spamer, William S., to Mead Corporation, The. Article display device. 5,016,759, Cl. 211-13.000.

Spamer, William S.: *See—*
Stoddard, David C. F.; Robertson, James D.; Spamer, William S.; Hanna, James; Bailey, Randall E.; and Parham, Dennis E., 5,016,761, Cl. 211-59.400.

Spanjers, Henricus L. F. M.: *See—*
Klapwijk, Abraham; and Spanjers, Henricus L. F. M., 5,017,496, Cl. 436-62.000.

Spatafora, Mario; Grandi, Bruno; and Gamberini, Antonio, to G.D. Societa Per Azioni. Method and a device for folding the ends of tubular wrappings. 5,016,423, Cl. 53-476.000.

Spector, George: *See—*
Bonnice, Richard; and Spector, George, 5,016,453, Cl. 70-93.000.
Brunetto, Thomas; and Spector, George, 5,016,504, Cl. 81-488.000.
Moss, Oden K.; and Spector, George, 5,016,889, Cl. 273-293.000.

Spectra-Physics, Inc.: *See—*
Linne, Mark A.; Johnson, Robert W.; and Thompson, Richard G., 5,018,152, Cl. 372-25.000.

Spectranetics Corporation: *See—*
Donnelly, Michael B., 5,016,964, Cl. 350-96.180.

Spectrum Control, Inc.: *See—*
Shaw, David G.; Yializis, Angelo; Strycker, Donald S.; and Ham, Mooyoung, 5,018,048, Cl. 361-323.000.

Spencer, William P Vector steering control system. 5,016,553, Cl 114-151.000.

Sperry Marine Inc.: *See—*
Halsey, James D.; Riggs, Robert F.; Gilligan, Lawrence H.; and Gerdt, David W., 5,017,793, Cl. 250-551.000.

Spiess, Hansruedi; and Galvanetto, Francois. Covering for a ground opening. 5,017,039, Cl. 404-25.000.

Spilburg, Curtis A.: *See—*
Lange, Louis G., III, and Spilburg, Curtis A., 5,017,565, Cl. 514-54.000.

Spink, Donald R.; Robinson, Murry C.; and Nguyen, Kim D., to Ecolomics Inc. Process for treating zinc oxide bearing materials. 5,017,346, Cl. 423-101.000.

Spira, Joel S.: *See—*
Hanna, R. Scott; Flowers, Woodie; Luchaco, David G.; Yuhasz, Stephen J.; Spira, Joel S.; and Hall, Philip R., 5,017,837, Cl. 315-136.000.

Sportsmen's Outdoor Products: *See—*
Tilby, V. John, 5,016,604, Cl. 124-92.000.

Spradling, John T.: *See—*
Sohner, Harold K.; Hoyloak, Joel N.; and Spradling, John T., 5,018,165, Cl. 375-1.000.

Sprague, Barry N.: *See—*
Epperly, William R.; Sullivan, James C.; Sprague, Barry N.; and O'Leary, John H., 5,017,347, Cl. 423-235.000.

Spross, Erhard; and Ruttimann, Hans-Rudolf, to Sony Corporation. Anchor boring unit. 5,016,942, Cl. 299-33.000.

Sprung, Hartwig: *See—*
Becker, Eberhard; Sprung, Hartwig; and Staggl, Roland, 5,016,407, Cl. 52-126.100.

Spurlock, Verlin C.: *See—*
Akers, Oliver C.; and Spurlock, Verlin C., 5,016,699, Cl. 160-22.000.

Spyropoulos, Konstantinos; and Yianni, Paul A., to Dow Corning Limited. Microemulsions for treating fibrous materials containing the reaction product of a silane and a siloxane. 5,017,297, Cl. 252-8.800.

Square D Company: *See—*
Clarke, Geoffrey; and Harris, Geoffrey J., 5,017,833, Cl. 315-51.000.

SRI International: *See—*
Blum, Yigal D.; and Laine, Richard M., 5,017,529, Cl. 501-95.000.

Srinivasan, Ananthachari: *See—*
Hylarides, Mark D.; Srinivasan, Ananthachari; Fitzner, Jeffrey N.; and Vrudhula, Vivekananda M., 5,017,693, Cl. 530-390.000.

Stadlbauer, Rupert: *See—*
Wanek, Erich; Baumgartinger, Josef; Schobesberger, Manfred; Stadlbauer, Rupert; and Weinrotter, Klaus, 5,017,110, Cl. 425-7.000.

Stadler, Jeff A.: *See—*
Shervington, Roger M.; Rasmussen, Roy D.; and Stadler, Jeff A., 5,017,821, Cl. 310-68.00D.

Stadler, Paul A.: *See—*
Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Paul A.; and Breuleux, Gerald, legal representative, 5,017,582, Cl. 514-305.000.

Staeheli, Paul: *See—*
Erni, Daniel; and Staeheli, Paul, 5,016,322, Cl. 19-150.000.

Staggl, Roland: *See—*
Becker, Eberhard; Sprung, Hartwig; and Staggl, Roland, 5,016,407, Cl. 52-126.100.

Stahlecker, Fritz, to Stahlecker, Hans, a part interest. Yarn piecing arrangement for two component prestrengthened yarn spinning machine. 5,016,432, Cl. 57-261.000.

Stahlecker, Hans: *See—*
Stahlecker, Fritz, 5,016,432, Cl. 57-261.000.

Stahler, Mark G.: *See—*
Haffely, Jeff L.; Stahler, Mark G.; and Wixey, Barry D., 5,016,693, Cl. 144-253.00J.

Stahlhofen, Paul, to Hoechst Aktiengesellschaft. Process of producing negative relief copies utilizing photosensitive copying material with thermal hardening triazine compound. 5,017,462, Cl. 430-325.000.

Stahnke, Wayne L. Method and apparatus for reproducing pedaling effects in a piano performance. 5,016,513, Cl. 84-19.000.

Stalcup, Robert W.; and McCall, Robert G. Method of providing topoical anesthetic in a sanitary and convenient manner. 5,016,651, Cl. 128-898.000.

Stalder, Herbert: *See—*
Wehrli, Rudolf; and Stalder, Herbert, 5,016,323, Cl. 19-258.000.

Stanadyne Automotive Corp.: *See—*
Janik, Leon P.; and Maxwell, M. Craig, 5,017,285, Cl. 210-232.000.

Standex International Corporation: *See—*
Goekler, Lewis E., 5,017,909, Cl. 340-620.000.

Stanford University: *See—*
Zdeblick, Mark; and Albrecht, Thomas R., 5,017,266, Cl. 156-643.000.

Staniforth, John N., to University of Bath. Lubricating rotary tablet press. 5,017,122, Cl. 425-100.000.

Stanislowski, Anna G.; and England, J. Bruce, to Clorox Company, The. Odor controlling animal litter with pine oil. 5,016,568, Cl. 119-173.000.

Stanley, David R.: *See—*
Birchall, James D.; Mockford, Mary J.; Stanley, David R.; Asher, Paul M. L.; and McCarthy, William R., 5,017,525, Cl. 501-87.000.

Stanley Works, The: *See—*
Wegner, David K.; and Schlicht, Larry J., 5,016,700, Cl. 160-232.000.

Stapleton, Craig A.; and Zauner, Robert S., to Huron/St. Clair Incorporated. Spacer insert for load-bearing slats. 5,016,798, Cl. 224-326.000.

Stapleton, Craig A., to Huron/St. Clair Incorporated. Support stanchion for luggage carrier. 5,016,799, Cl. 224-326.000.

Starcevich, Lee E. Tape measuring apparatus. 5,016,360, Cl. 33-758.000.

Stark, Richard A.: *See—*
Lisson, Jerold B.; and Stark, Richard A., 5,017,011, Cl. 356-363.000.

Starmer, Philip H.: *See—*
Raines, Charles C.; and Starmer, Philip H., 5,017,630, Cl. 523-334.000.

Stary, Jeffrey D.; and Goulter, Victor H. Marker and pen combination employing transverse and longitudinally spaced tips. 5,017,034, Cl. 401-35.000.

State of Israel, Atomic Energy Commission, Soreq Nuclear Research/Center, The: *See—*
Kaplan, Zvi; Engler, Gideon; and Loeb, Avi, 5,016,518, Cl. 89-8.000.

STC plc: *See—*
Greene, Peter D., 5,017,974, Cl. 357-4.000.

STD Engineering AB: *See—*
Tuulse, Tanel, 5,017,960, Cl. 355-91.000.

Ste Look: *See—*
Mercat, Jean-Pierre, 5,016,478, Cl. 73-862.190.

Stebens, Beverly: *See—*
Pinkerton, Roger P.; and Stebens, Beverly, 5,018,112, Cl. 367-72.000.

Steenhof, Frits A., to U.S. Philips Corp. Charge-coupled SPS memory device. 5,018,172, Cl. 377-60.000.

Steinhagen, Horst G.; and Blank, Paul C., to Twin Disc, Incorporated. Inter-axle differential having a friction-type biasing clutch and wheel slip sensing control means therefor. 5,016,724, Cl. 180-197.000.

Stencel, Edgar L., to Northrop Corporation. Sleeve bolt. 5,017,069, Cl. 411-403.000.

Stephenson, Dwight B., to Eaton Corporation. Steering controller with integral parallel control. 5,016,672, Cl. 137-625.240.

Sterimatic Holdings Limited: *See—*
Parry, John S., 5,016,369, Cl. 40-301.000.

Sterling Drug Inc.: *See—*
Hlasta, Dennis J., 5,017,584, Cl. 514-314.000.

Stern, Alfred G.: *See—*
Willer, Rodney L.; Park, Dennis; and Stern, Alfred G., 5,017,356, Cl. 423-384.000.

Stevens, William L.: *See—*
Kaiser, John E., Jr.; Lockshaw, James J.; Ruiz, Juan J.; and Stevens, William L., 5,016,730, Cl. 181-265.000.

Stewart, William H., Jr.: *See—*
McBride, Daniel T.; and Stewart, William H., Jr., 5,016,308, Cl. 8-149.000.

Steyr-Daimler-Puch AG: *See—*
Peier, Othmar, 5,016,742, Cl. 192-58.00C.
Weber, Georg, 5,016,904, Cl. 280-664.000.

Stiefel Laboratories, Inc.: *See—*
Stiefel, Werner K.; and Breunig, Charles F., 5,017,366, Cl. 424-59.000.

Stiefel, Werner K.; and Breunig, Charles F., to Stiefel Laboratories, Inc. Pharmaceutical compositions. 5,017,366, Cl. 424-59.000.

Stigen, Charles L. Handle assembly. 5,016,319, Cl. 16-114.00R.

Stille, John K., to Colorado State University Research Foundation. Polyquinoline copolymers. 5,017,677, Cl. 528-125.000.

Stindl, Wolfgang, to Schering Wien Ges. m.b.H. Cosmetic cream preparation containing water/oil and oil/water emulsions. 5,017,605, Cl. 514-529.000.

Stirling, William. Device for deploying tubular sheet material, and methods of utilization thereof. 5,016,424, Cl. 53 459.000.

Stitzer, Steven N.: *See—*
Buck, Daniel C.; and Stitzer, Steven N., 5,017,895, Cl. 333-134.000.

Sto AG: *See—*
Grochal, Peter, 5,016,412, Cl. 52-302.000.

Stoddard, David C. F.; Robertson, James D.; Spamer, William S.; Hanna, James; Bailey, Randall E.; and Parham, Dennis E., to Mead Corporation, The. Transportable display module. 5,016,761, Cl. 211-59.400.

Stoddard, David C. F.: *See—*
Spamer, William S.; Robertson, J. David; Stoddard, David C. F.; and Hanna, James L., 5,016,527, Cl. 98-115.300.

Stojkoski, Radmila G. Skin treatment preparation. 5,017,367, Cl. 424-63.000.

Stolfi, Fred R.: *See—*
Patt, Paul J.; and Stolfi, Fred R., 5,017,819, Cl. 310-90.500.

Stoltefuss, Jurgen; Bechem, Martin; Gross, Rainer; Hebisch, Siegbert; and Schramm, Matthias, to Bayer Aktiengesellschaft. 1,4-dihydropyridine-threonine compounds with cardiovascular activity. 5,017,590, Cl. 514-356.000.

Stoltz, John R.; and Clawson, Carl W., to Stoltz, John R. Precision landing system. 5,017,930, Cl. 342-465.000.

Stone, Dwight V.: *See—*
Krikke, Roger D.; Ballheimer, Benny; Jones, Nelson A.; and Stone, Dwight V., 5,017,178, Cl. 464-7.000.

Stone, Stanford C.: *See—*
Dodge, Larry H.; and Stone, Stanford C., 5,017,192, Cl. 604-250.000.

Stottman, Richard. Combination handguide and measuring tool for use with table mounted wood working equipment. 5,016,509, Cl. 83-437.000.

Stovall, H. Dean: *See—*
Chien, Kuei-Ru; Reeder, Robin A.; and Stovall, H. Dean, 5,018,153, Cl. 372-28.000.

Stoyanov, Iliya Y.: *See—*
Mitkov, Atanas L.; Georgiev, Ivan N.; Atanassov, Atanas K.; Radulov, Peter T.; and Stoyanov, Iliya Y., 5,017,177, Cl. 460-46.000.

Strachan & Henshaw Limited: *See—*
Dowden, Paul J., 5,017,077, Cl. 414-360.000.

Straight, Joh. B *See—*
Roisen, Roger L.; Rahn, Curtis H.; Straight, John B.; and Liu, Michael S., 5,017,999, Cl. 357-49.000.

Strange, Booth B.; and Thigpen, Ben B. Damage location system for a tanker ship. 5,018,113, Cl. 367-127.000.

Strasser, Gregor; Zohrer, Gerald; Schertler, Roman; and Fischer, Heinrich, to Balzers Aktiengesellschaft. Transport system for conveying workpiece between first and second media. 5,017,073, Cl. 414-217.000.

Strebe, James I.: *See—*
Reichm[illegible], Benjamin; and Strebe, James I., 5,017,446, Cl. 421-225.000.

Street, Robert A.; and Kazan, Benjamin, to Xerox Corporation. Solid state radiation sensor array panel. 5,017,989, Cl. 357-30.000.

Stresswave Technology Limited: *See—*
Holroyd, Trevor J., 5,016,480, Cl. 73-862.590.

Strom, E. Thomas: *See—*
Sanchez, J. Michael; and Strom, E. Thomas, 5,016,713, Cl. 166-270.000.

Struve, Kenneth W.: *See—*
Smith, Tommy E., Jr.; Struve, Kenneth W.; and Colella, Nicholas J., 5,017,779, Cl. 250-283.000.

Strycker, Donald S.: *See—*
Shaw, David G.; Yializis, Angelo; Strycker, Donald S.; and Ham, Mooyoung, 5,018,048, Cl. 361-323.000.

Stunnenberg, Hendrik G.; and Wittek, Riccardo, to Hoffmann-La Roche Inc. Vaccinia DNA. 5,017,487, Cl. 435-172.300.

Sturtevant, Emily B. Pocket display and protective enclosure. 5,017,037, Cl. 402-73.000.

Stuttem, Manfred: *See—*
Muller, Manfred; Neumann, Bernd; and Stuttem, Manfred, 5,017,911, Cl. 340-677.000.

Sublett, Bobby J., to Eastman Kodak Company. Process and catalyst-inhibitor systems for preparing poly(ethylene terephthalate). 5,017,680, Cl. 528-274.000.

Subramanian, Munirpallam A., to Du Pont de Nemours, E. I., and Company. Superconducting metal oxide Tl-Pb-Ca-Sr-Cu-O compositions and processes for manufacture and use. 5,017,554, Cl. 505-1.000.

Suchdev, Lakhbir S.: *See—*
Gassen, James R.; and Suchdev, Lakhbir S., 5,016,355, Cl. 30-383.000.

Sudweeks, Walter B.: *See—*
Lawrence, Lawrence D.; and Sudweeks, Walter B., 5,017,251, Cl. 149-2.000.

Suehiro, Kikumitsu: *See—*
Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; Miyoshi, Jun; and Eri, Masatsugu, 5,017,445, Cl. 429-224.000.

Suen, Tzeng J. Process for preparing polyalkoxymethylmelamines. 5,017,699, Cl. 544-196.000.

Suenaga, Takashi: *See—*
Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi; Kodama, Mitsuo; Nakano, Hisaji; and Nakagawa, Shinsuke, 5,017,499, Cl. 436-124.000.

Suenens, Albert J.; and Ghysels, Marcel, to NV B'Linea. Innerspring construction for mattresses, cushions, and the like and process for manufacturing said construction. 5,016,305, Cl. 5-477.000.

Suga, Takayuki, to Kabushiki Kaisha Toshiba. Toner cartridge and image forming apparatus having the toner cartridge. 5,017,966, Cl. 355-260.000.

Sugahara, Kazukyuki: *See—*
Nishimura, Tadashi; Sugahara, Kazukyuki; Kusunori, Shigeru; and Ohsaki, Akihiko, 5,017,504, Cl. 437-40.000.

Sugano, Kazuhiko, to Nissan Motor Co., Ltd. Shift control system for engine braking in an auxiliary transmission. 5,016,496, Cl. 74-868.000.

Suganuma, Akira: *See—*
Handa, Junichi; Ito, Hiroshi; Hattori, Hiroshi; and Suganuma, Akira, 5,017,638, Cl. 524-449.000.

Sugawa, Makoto: *See—*
Noda, Yukijumi; Sugawa, Makoto; and Kohda, Akira, 5,017,570, Cl. 514-211.000.

Sugawara, Kazuhide, to International Business Machines Corporation. Speech recognition dividing words into two portions for preliminary selection. 5,018,201, Cl. 381-43.000.

Sugawara, Kazutake: *See—*
Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.

Sugihara, Taizo: *See—*
Noma, Takeshi; Matsumoto, Tadao; and Sugihara, Taizo, 5,017,658, Cl. 525-195.000.

Sugikawa, Akihiko: *See—*
Sasaki, Minoru; Umeda, Masafumi; Tagami, Yoshitomo; and Sugikawa, Akihiko, 5,018,017, Cl. 358-209.000.

Sugimoto, Fumitoshi: *See—*
Miura, Takao; Imaoka, Kazunori; and Sugimoto, Fumitoshi, 5,017,998, Cl. 357-49.000.

Sugimoto, Masahiro: *See—*
Furukawa, Satoru; Ozaki, Akio; Nakanishi, Toshihide; Kotani, Yukinobu; and Sugimoto, Masahiro, 5,017,483, Cl. 435-115.000.

Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, to Ohbayashi Corporation; and Chubu Electric Power Company, Incorporated. Method of protecting a structure constructed on ground liable to be liquefied. 5,017,046, Cl. 405-229.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Sugino, Kazuo: *See—*
  - Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; Miyoshi, Jun; and Eri, Masatsugu, 5,017,445, Cl. 429-224.000.
- Sugita, Etsuji: *See—*
  - Nagase, Ryo; Noda, Juichi; and Sugita, Etsuji, 5,016,970, Cl. 350-96.210.
- Sugita, Naomasa, to Kabushiki Kaisha Toshiba. Semiconductor device having intermediate layer for pinching off conductive path during reverse bias application. 5,017,976, Cl. 357-15.000.
- Sugitani, Nobuyuki: *See—*
  - Kijima, Takao; Taniguchi, Haruyuki; Arai, Makoto; and Sugitani, Nobuyuki, 5,016,903, Cl. 280-663.000.
- Sugiura, Hiroyuki; Nakajima, Nobuyuki; and Iijima, Takeo, to Diesel KikiCo., Ltd. Variable capacity compressor. 5,017,096, Cl. 417-222.00S.
- Sugiura, Kenji: *See—*
  - Morimoto, Shigeki; and Sugiura, Kenji, 5,017,519, Cl. 501-7.000.
- Sugiyama, Keikichi; Takada, Koji; Fukushima, Akira; and Egawa, Makoto, to Keikichi Sugiyama. Composition for application to hair or scalp. 5,017,368, Cl. 424-70.000.
- Sugiyama, Keishi, to Hosiden Electronics Co., Ltd. Electrical connector. 5,017,156, Cl. 439-607.000.
- Sugiyama, Masaaki; and Manabe, Naoki, to Yazaki Corporation. Connectors with cover providing connection sequence control. 5,017,147, Cl. 439-144.000.
- Sugiyama, Tsutomu; and Watanabe, Akihiko, to Fujitsu Limited; and Fujitsu VLSI Limited. Serial input/output semiconductor memory. 5,018,110, Cl. 365-230.090.
- Suhonen, Christopher H., to Gillette Canada, Inc. Stabilized stannous fluoride toothpaste. 5,017,363, Cl. 424-52.000.
- Sukimoto, Minobu: *See—*
  - Ogawa, Seiichi; Sukimoto, Minobu; and Akiyoshi, Hitoshi, 5,016,578, Cl. 123-52.0MC.
- Sullivan, James C.: *See--*
  - Epperly, William R.; Sullivan, James C.; Sprague, Barry N.; and O'Leary, John H., 5,017,347, Cl. 423-235.000.
- Sullivan, John L.: *See—*
  - Brinkman, Karl M.; Sullivan, John L.; and Hanley, David R., 5,017,546, Cl. 503-211.000.
- Sullivan, Robert J. Self retracting hypodermic syringe. 5,017,187, Cl. 604-110.000.
- Sulzer Brothers Limited: *See—*
  - Cox, Geradus, 5,016,679, Cl. 139-450.000.
- Sumikin Chemical Co., Ltd.: *See—*
  - Otani, Sugio; Tsuyuguchi, Michio; Kano, Haruyuki; Sone, Yoshihisa; Kageyama, Kenji; and Mabuchi, Toshiaki, 5,017,683, Cl. 528-396.000.
- Sumita Optical Glass, Inc.: *See—*
  - Otsuka, Masaaki; Komiya, Masayuki; Sawanobori, Naruhito; and Nagahama, Shinobu, 5,017,520, Cl. 501-44.000.
- Sumitani, Shigeto, to Kabushiki Kaisha Toshiba. Burner for a combustion device. 5,017,130, Cl. 431-352.000.
- Sumitomo Chemical Co., Ltd.: *See—*
  - Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; and Sanada, Takashi, 5,017,652, Cl. 525-68.000.
  - Hasegawa, Toshiyuki; Takagishi, Hisao; and Horiuchi, Hiroshi, 5,017,642, Cl. 524-608.000.
  - Kondo, Takanori; Yamachika, Hiroshi; Tanaka, Kunihiko; and Nishida, Yasuhiro, 5,017,713, Cl. 552-237.000.
  - Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, 5,017,663, Cl. 525-397.000.
- Sumitomo Electric Industries, Ltd.: *See—*
  - Hayashi, Shigeo, 5,017,858, Cl. 323-316.000.
  - Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.
  - Yoshimura, Ichiro, 5,017,209, Cl. 65-13.000.
- Sumitomo Metal Industries Ltd.: *See—*
  - Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, 5,016,564, Cl. 118-723.000.
- Sumitomo Rubber Industries, Ltd.: *See—*
  - Noma, Hiroyuki; Saitou, Saneto; and Ono, Masaharu, 5,016,697, Cl. 152-454.000.
  - Satoh, Kazuo; and Nosaka, Tsutomu, 5,017,253, Cl. 156-130.300.
- Sun Microsystems, Inc.: *See—*
  - Ammon, James G.; Yurkonis, Philip G.; and Lockwood, Alfred, 5,018,052, Cl. 361-428.000.
- Sunada, Koichi; and Sato, Hiroshi, to NEC Home Electronics Ltd. Adaptive keyed synchronous detector. 5,018,015, Cl. 358-188.000.
- Sunami, Hideo; Kure, Tokuo; and Kawamoto, Yoshifumi, to Hitachi, Ltd. Semiconductor memory and method for fabricating the same. 5,017,981, Cl. 357-23.600.
- Sundstrand Corporation: *See—*
  - Nguyen, Dam C., 5,016,707, Cl. 165-167.000.
  - Shervington, Roger M.; Rasmussen, Roy D.; and Stadler, Jeff A., 5,017,821, Cl. 310-68.00D.
- Sundstrom, Erik, to Sandvik AB. Method and apparatus for grinding teeth in a steel strip to form saws. 5,016,497, Cl. 76-25.100.
- Suomen Xyrofin Oy: *See—*
  - Olinger, Philip M.; and Kruger, Christof, 5,017,400, Cl. 426-660.000.
- Surgenor, Douglas M., to Center for Blood Research, Inc.. The. Platelet concentrates. 5,017,338, Cl. 422-41.000.
- Suyama, Tomio: *See—*
  - Nagata, Osamu; Kuwahara, Tokihiro; Suzawa, Yukichi; Kamino, Hiroaki; Suyama, Tomio; and Konno, Tomoyoshi, 5,017,852, Cl. 318-727.000.
- Suzawa, Yukichi: *See—*
  - Nagata, Osamu; Kuwahara, Tokihiro; Suzawa, Yukichi; Kamino, Hiroaki; Suyama, Tomio; and Konno, Tomoyoshi, 5,017,852, Cl. 318-727.000.
- Suzuki, Akira; Matsuda, Shoichi; Muto, Yasutami; and Aoki, Kazuo, to Kirin Beer Kabushiki Kaisha. Roller bottle filling and harvesting system. 5,016,688, Cl. 141-170.000.
- Suzuki, Akiyoshi: *See—*
  - Murakami, Eiichi; Kohno, Michio; and Suzuki, Akiyoshi, 5,017,798, Cl. 250-572.000.
- Suzuki, Eiji: *See—*
  - Okazaki, Takashi; Suzuki, Eiji; and Shinohara, Takashi, 5,016,347, Cl. 29-825.000.
- Suzuki, Hiroshi: *See—*
  - Kusakabe, Yoko; Suzuki, Hiroshi; and Kudo, Hidehiko, 5,017,561, Cl. 514-25.000.
  - Suzuki, Syuji; and Suzuki, Hiroshi, 5,018,130, Cl. 370-1.000.
- Suzuki, Katsuya; Nakajima, Yoshihiro; and Ishii, Tomoyuki, to Yazaki Corporation; and Nissan Motor Co., Ltd. Protector for wire harness. 5,016,842, Cl. 248-68.100.
- Suzuki, Kenichi: *See—*
  - Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.
- Suzuki, Kunio; and Takeuchi, Kenji, to Yamaha Corporation. Process of fabricating beryllium plate member with large mechanical strength. 5,017,245, Cl. 148-11.50R.
- Suzuki, Noriyuki: *See—*
  - Tomita, Haruo; Yamashita, Kouichi; Kondo, Takeshi; Suzuki, Noriyuki; Matsumoto, Shigemi; and Asada, Masahiro, 5,017,651, Cl. 525-66.000.
- Suzuki, Syuji; and Suzuki, Hiroshi, to NEC Corporation. High-speed optical packet switching system using optical buffer between incoming and outgoing channels. 5,018,130, Cl. 370-1.000.
- Suzuki, Takamitsu; and Yonezawa, Minoru, to Yamaha Hatsudoki Kabushiki Kaisha. Intake system for V type engine. 5,016,579, Cl. 123-52.0MV.
- Suzuki, Takashi; and Nakagiri, Etsuji, to Fujitsu Limited. Electronic switching system having call-forwarding function. 5,018,194, Cl. 379-207.000.
- Suzuki, Takashi, to Pioneer Electronic Corp. Network mounting device for coaxial type speaker. 5,018,206, Cl. 381-188.000.
- Suzuki, Toshihiko: *See—*
  - Kuze, Tetsuya; and Suzuki, Toshihiko, 5,016,695, Cl. 152-209.00A.
- Suzuki, Yasoji: *See—*
  - Egawa, Hideharu; and Suzuki, Yasoji, 5,017,994, Cl. 357-42.000.
- Suzuki, Yasurou: *See—*
  - Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; and Sanada, Takashi, 5,017,652, Cl. 525-68.000.
- Suzuki, Yoshihiro; Yajima, Hiroyoshi; Shimada, Junichi; Shimoyama, Kenji; and Gotoh, Hideki, to Director-General, Agency of Industrial Science and Technology; and Mitsubishi Kasei Corporation. Divided electrode type semiconductor laser device. 5,018,159, Cl. 372-46.000.
- Suzuki, Yusuke: *See—*
  - Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, 5,017,380, Cl. 424-454.000.
- Svennerholm, Bo: *See—*
  - Vahlne, Anders; Svennerholm, Bo; Rymo, Lars; Jeansson, Stig; and Horal, Peter, 5,017,687, Cl. 530-324.000.
- Svensson, Sigfrid, to Bioboat AB. Contamination removal process. 5,017,237, Cl. 134-4.000.
- Swartz, Jerome: *See—*
  - Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, 5,017,765, Cl. 235-462.000.
- Swierczek, Remi D., to Dixiw-Narco, Inc. Coin hopper and dispenser. 5,017,176, Cl. 453-49.000.
- Symbol Technologies, Inc.: *See—*
  - Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, 5,017,765, Cl. 235-462.000.
- Szepesi, Tamas S., to National Semiconductor Corp. Circuit for internal current limiting in a fast high side power switch. 5,018,041, Cl. 361-18.000.
- T. A. Jennings Associates, Inc.: *See—*
  - Jennings, Thomas A., 5,016,468, Cl. 73-73.000.
- Taback, Israel, to Bionetics Corporation, The. Tension gauge for thin materials. 5,016,479, Cl. 73-862.450.
- Taborga, Jorge R.: *See—*
  - Dang, Mieu-Hong; and Taborga, Jorge R., 5,017,915, Cl. 340-825.060.
- Taboury, Jean: *See—*
  - Baude, Dominique; Chavel, Pierre; Joyeux, Denis; and Taboury, Jean, 5,016,977, Cl. 350-162.170.
- Tachi-S Co. Ltd.: *See—*
  - Yokota, Masaaki, 5,016,941, Cl. 297-452.000.
- Tachihara, Satoru: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.

- Tachino, Noboru: *See—*
  - Ikegami, Yuji; Sasayama, Shinichi; Tachino, Noboru; and Kamiya, Takeshi, 5,017,544, Cl. 502-439.000.
- Tada, Hisashi; Shiraishi, Yoshinobu; and Hayashi, Shigetsuga. Epoxy resin composition for composite material from m- or o-substituted triglycidylaminophenols, with fortifier and latent curing agents. 5,017,674, Cl. 528-93.000.
- Tada, Minoru: *See—*
  - Shiiki, Hitoshi; Tada, Minoru; and Nakamura, Kyoichi, 5,017,621, Cl. 521-58.000.
- Tadokoro, Toyohiko: *See—*
  - Fujimura, Masaki; and Tadokoro, Toyohiko, 5,016,882, Cl. 273-167.00H.
- Tagami, Yoshitomo: *See—*
  - Sasaki, Minoru; Umeda, Masafumi; Tagami, Yoshitomo; and Sugikawa, Akihiko, 5,018,017, Cl. 358-209.000.
- Tagata, Shigeyoshi: *See—*
  - Kiritani, Yoshiharu; Onishi, Yutaka; Tagata, Shigeyoshi; and Umeno, Koichi, 5,017,045, Cl. 405-143.000.
- Taguchi, Hideo: *See—*
  - Shioura, Kozo; and Taguchi, Hideo, 5,017,205, Cl. 65-1.000.
- Taguchi, Toshiki: *See—*
  - Nakamine, Takeshi; Kawata, Ken; and Taguchi, Toshiki, 5,017,454, Cl. 430-203.000.
- Tagusa, Yasunobu: *See—*
  - Kawashima, Akihiro; Yoshida, Hirokazu; Tagusa, Yasunobu; Inada, Kiyoshi; Makita, Hideshi; and Dotta, Yoshihisa, 5,016,986, Cl. 350-339.00R.
- Tai, Hiromichi: *See—*
  - Kitamura, Hiroki; Takanashi, Itsuo; Yamamura, Takashi; Ichitou, Toshikatsu; and Tai, Hiromichi, 5,017,944, Cl. 346-108.000.
- Taiariol, Van; Oakley, Robert V.; and Ventura, Peter, to Baxter International Inc. Method for in vitro reproduction and growth of cells in culture medium. 5,017,490, Cl. 435-240.200.
- Taikisha Ltd.: *See—*
  - Ogata, Hiromasa; Morioka, Koji; and Ohmori, Susumu, 5,017,202, Cl. 55-390.000.
- Taisho Pharmaceutical Co., Ltd.: *See—*
  - Ozawa, Yasuo; Koyama, Ikuo; and Shimano, Kimihide, 5,017,383, Cl. 424-490.000.
- Tajima, Yoshio: *See—*
  - Machida, Morihisa; Tajima, Yoshio; Nakatsumi, Hideo; Isahai, Tatsuo; and Shiroki, Daijiro, 5,017,427, Cl. 428-323.000.
- Takada, Koji: *See—*
  - Sugiyama, Keikichi; Takada, Koji; Fukushima, Akira; and Egawa, Makoto, 5,017,368, Cl. 424-70.000.
- Takada, Yuji, to Sharp Kabushiki Kaisha. Hand-held copying apparatus. 5,018,026, Cl. 358-473.000.
- Takada, Yusuke: *See—*
  - Yoshida, Yoshikazu; Tanaka, Kunio; Nishikawa, Yukio; and Takada, Yusuke, 5,017,277, Cl. 204-298.020.
- Takagi, Fumio: *See—*
  - Miyazawa, Kazushi; Terauchi, Takao; Hanamoto, Keiji; and Takagi, Fumio, 5,017,417, Cl. 428-195.000.
- Takagi, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Wafer having a dicing area having a step region covered with a conductive layer and method of manufacturing the same. 5,017,512, Cl. 437-227.000.
- Takagi, Kazunori; Sato, Shinichi; Ito, Masahiko; and Yamamoto, Hideo, to Pioneer Electronic Corporation. Automatic sound level compensator for a sound reproduction device mounted in a vehicle. 5,018,205, Cl. 381-86.000.
- Takagi, Masaaki, to Copal Company Limited; and Fujitsu Limited. Optical focusing control apparatus. 5,017,768. Cl. 250-201.500.
- Takagishi, Hisao: *See—*
  - Hasegawa, Toshiyuki; Takagishi, Hisao; and Horiuchi, Hiroshi, 5,017,642, Cl. 524-608.000.
- Takagishi, Nobuyuki: *See—*
  - Tsukakoshi, Masato; Takahashi, Yasuhiro; Terada, Matsuaki; and Takagishi, Nobuyuki, 5,018,133, Cl. 370-16.000.
- Takahashi, Atsuhiko, to Alps Electric Co., Ltd. Drive control circuit. 5,017,848, Cl. 318-568.100.
- Takahashi, Futoshi, to Canon Kabushiki Kaisha. Speech privacy processing method and apparatus therefor. 5,018,198, Cl. 380-38.000.
- Takahashi, Haruo: *See—*
  - Sawai, Kiichi; Natori, Shunji; Takahashi, Haruo; Tanaka, Kenichi; Mitani, Takahiko; and Kurono, Masayasu, 5,017,486, Cl. 435-172.300.
- Takahashi, Hideyuki: *See—*
  - Nakamura, Yoshio; Ogura, Masahiro; Shimada, Yoshio; Watanabe, Kiyoshi; and Takahashi, Hideyuki, 5,017,484, Cl. 435-158.000.
- Takahashi, Kazushi: *See—*
  - Ura, Mitugu; Obara, Yoshihiro; and Takahashi, Kazushi, 5,017,900, Cl. 335-210.000.
- Takahashi, Kenichi: *See—*
  - Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.
- Takahashi, Manabu: *See—*
  - Kawano, Osamu; Takahashi, Manabu; Wakita, Junichi; and Esaka, Kazuyoshi, 5,017,248, Cl. 148-320.000.
- Takahashi, Masayuki: *See—*
  - Hamada, Kiyoshi; Nonomura, Kinzo; Takahashi, Masayuki; Hashiguchi, Jumpei; and Kitao, Satoshi, 5,017,842, Cl. 315-366.000.
- Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, to Hitachi Plant Engineering & Construction Co., Ltd.; Miura, Tanetoshi; and Hamada, Hareo. Electronic noise attenuation system. 5,018,202, Cl. 381-71.000.
- Takahashi, Shuji, to Ricoh Company, Ltd. Sheet feed mechanism for an image recorder. 5,016,866, Cl. 271-122.000.
- Takahashi, Susumu: *See—*
  - Mizuta, Hiroshi; Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, 5,017,973, Cl. 357-4.000.
- Takahashi, Yasuhiro: *See—*
  - Tsukakoshi, Masato; Takahashi, Yasuhiro; Terada, Matsuaki; and Takagishi, Nobuyuki, 5,018,133, Cl. 370-16.000.
- Takahori, Mutsuo; and Hirahara, Hidehumi, to Mitsubishi Jukogyo Kabushiki Kaisha. Cut length adjusting apparatus. 5,017,184, Cl. 493-368.000.
- Takakura, Hiroshi: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Takamiya, Toshio: *See—*
  - Nakajima, Hideo; and Takamiya, Toshio, 5,016,913, Cl. 280-738.000.
- Takanabe, Eiichiro: *See—*
  - Iwabuchi, Katsuhiko; Yokokawa, Osamu; and Takanabe, Eiichiro, 5,016,567, Cl. 118-733.000.
- Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, to Victor Company of Japan, Ltd. Apparatus for detecting distribution of electric surface potential. 5,018,018, Cl. 358-213.110.
- Takanashi, Itsuo: *See—*
  - Kitamura, Hiroki; Takanashi, Itsuo; Yamamura, Takashi; Ichitou, Toshikatsu; and Tai, Hiromichi, 5,017,944, Cl. 346-108.000.
- Takano, Satoshi: *See—*
  - Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.
- Takano, Yuuichi: *See—*
  - Kushibe, Takahiro; Takano, Yuuichi; and Sato, Takeshi, 5,016,598, Cl. 123-533.000.
- Takaoka, Toshio, to Toyota Jidosha Kabushiki Kaisha. Method and apparatus for preventing surging of vehicle having internal combustion engine. 5,016,593, Cl. 123-436.000.
- Takaoka, Toshio: *See—*
  - Tanabe, Haruyoshi; Iwasaki, Katsuhiro; Kawakami, Masahiro; Taki, Chihiro; and Takaoka, Toshio, 5,017,220, Cl. 75-629.000.
- Takaragi, Kazuo; and Sasaki, Ryoichi, to Hitachi, Ltd. Method for electronic transaction with digital signature. 5,018,196, Cl. 380-30.000.
- Takata, Hiroshi: *See—*
  - Ohara, Osamu; Kawashima, Hiroshi; and Takata, Hiroshi, 5,016,543, Cl. 105-150.000.
- Takata Kabushiki Kaisha: *See—*
  - Nakajima, Hideo; and Takamiya, Toshio, 5,016,913, Cl. 280-738.000.
- Takayama, Toru: *See—*
  - Fukada, Takeshi; Sakama, Mitsunori; Amachi, Nobumitsu; Sakamoto, Naoya; Codama, Mitsufumi; and Takayama, Toru, 5,017,828, Cl. 313-367.000.
- Takeda Chemical Industries, Ltd.: *See—*
  - Ishida, Yasuo; Ohta, Kazunari; Nakahama, Tatsuo; and Yoshikawa, Harutoshi, 5,017,212, Cl. 71-92.000.
- Takeda, Ryuzaburo: *See—*
  - Koizumi, Hideaki; Takeda, Ryuzaburo; Sano, Koichi; and Yokoyama, Tetsuo, 5,016,637, Cl. 128-653.0AF.
- Takeda, Tadahiro: *See—*
  - Kasugai, Takao; and Takeda, Tadahiro, 5,017,870, Cl. 324-318.000.
- Takeda, Toyohiko: *See—*
  - Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, 5,017,380, Cl. 424-454.000.
- Takehara, Shin; Edahiro, Takeshi; Morita, Toshiki; and Kumada, Hiroyoshi, to Mazda Motor Corporation. Automotive suspension system. 5,016,911, Cl. 280-708.000.
- Takehito Nasu: *See—*
  - Nasu, Kazuhito, 5,017,016, Cl. 366-139.000.
- Takei, Masahiro: *See—*
  - Kimura, Norio; and Takei, Masahiro, 5,018,186, Cl. 379-153.000.
  - Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, 5,018,028, Cl. 360-27.000.
- Takei, Terutaka: *See—*
  - Morita, Shigeru; Takei, Terutaka; Kawahara, Yoshihiro; and Togoshi, Yoshikazu, 5,016,722, Cl. 180-89.140.
- Takeichi, Kenzo: *See—*
  - Matsuzaki, Kichie; Isobe, Mitsunobu; Takeichi, Kenzo; Hisatomi, Ryouichi; and Kudou, Masasi, 5,018,219, Cl. 382-37.000.
- Takekawa, Hiroshi, to Olympus Optical Co., LTD. Agglutination analyzing vessel. 5,017,341, Cl. 422-102.000.
- Takesako, Sumiyoshi; and Morito, Akira, to Kabushiki Kaisha Toshiba. Apparatus for automatically exchanging a passbook. 5,017,026, Cl. 400-24.000.
- Takeshima, Shinichi, to Toyota Jidosha Kabushiki Kaisha. Catalyst for purifying exhaust gas and a method of producing the same. 5,017,538, Cl. 502-64.000.
- Takeuchi, Hiroshi, to Kabushiki Kaisha Toshiba. Method for manufacturing a semiconductor device. 5,017,513, Cl. 437-228.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Takeuchi, Kenji: *See—*
  - Suzuki, Kunio; and Takeuchi, Kenji, 5,017,245, Cl. 148-11.50R.
- Taki, Chihiro: *See—*
  - Tanabe, Haruyoshi; Iwasaki, Katsuhiro; Kawakami, Masahiro; Taki, Chihiro; and Takaoka, Toshio, 5,017,220, Cl. 75-629.000.
- Takiran Co., Ltd.: *See—*
  - Sikinami, Yasuo; Hata, Kunihiro; and Yasuhara, Masaki, 5,017,377, Cl. 424-409.000.
- Takita, Hidenori, to Mitsubishi Kaisha Kaisha. Magnetic cancelling apparatus for color cathode-ray tube. 5,017,832, Cl. 315-8.000.
- Takizawa, Satoshi, to Nissan Motor Co., Ltd. Engine brake running control for automatic transmission in automatic drive range. 5,016,495, Cl. 74-866.000.
- Talisa, Salvador H.: *See—*
  - Adam, John D.; and Talisa, Salvador H., 5,017,896, Cl. 333-134.000.
- Tamada, Masuo; Tanaka, Tsutomu; and Matsuoka, Hideo, to Kabushiki Kaisha Toshiba. Portable electronic apparatus capable of confirming validity of transaction data. 5,017,766, Cl. 235-492.000.
- Tamamushi, Takashige: *See—*
  - Nishizawa, Jun-ichi; Tamamushi, Takashige; and Nonaka, Kenichi, 5,017,991, Cl. 357-38.000.
- Tamura, Takahiro: *See—*
  - Murayama, Akira; Uchikawa, Naoshi; Tamura, Takahiro; Mizuno, Takao; and Sakurai, Kazuo, 5,017,108, Cl. 418-55.600.
- Tan, Jinglu, to University of Minnesota, Regents of the. Fluid regulator valve. 5,017,099, Cl. 417-307.000.
- Tanabe, Haruhiro: *See—*
  - Mori, Osamu; Oyama, Motofumi; Hisaki, Hiroshi; Sekiguchi, Masato; Okamura, Akinobu; and Tanabe, Haruhiro, 5,017,639, Cl. 524-510.000.
- Tanabe, Haruyoshi; Iwasaki, Katsuhiro; Kawakami, Masahiro; Taki, Chihiro; and Takaoka, Toshio, to NKK Corporation. Method for smelting reduction of Ni ore. 5,017,220, Cl. 75-629.000.
- Tanabe, Yasufumi: *See—*
  - Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshibiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, 5,016,890, Cl. 273-312.000.
- Tanaka, Atsushi: *See—*
  - Kaneko, Kiyoshi; and Tanaka, Atsushi, 5,017,913, Cl. 340-712.000.
- Tanaka, Kazuna; Kapec, Jeffrey; and Chochinov, Allan, to Lumex, Inc. Cervical and head support pillow. 5,016,303, Cl. 5-437.000.
- Tanaka, Kazunobu: *See—*
  - Iijima, Shigeru; Tanaka, Kazunobu; Matsuda, Akihisa; Matsumura, Mitsuo; and Yamamoto, Hideo, 5,017,308, Cl. 252-501.100.
- Tanaka, Kenichi: *See—*
  - Sawai, Kiichi; Natori, Shunji; Takahashi, Haruo; Tanaka, Kenichi; Mitani, Takahiko; and Kurono, Masayasu, 5,017,486, Cl. 435-172.300.
- Tanaka, Kensaku: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Tanaka, Kunihiko: *See—*
  - Kondo, Takanori; Yamachika, Hiroshi; Tanaka, Kunihiko; and Nishida, Yasuhiro, 5,017,713, Cl. 552-237.000.
- Tanaka, Kunio: *See—*
  - Yoshida, Yoshikazu; Tanaka, Kunio; Nishikawa, Yukio; and Takada, Yusuke, 5,017,277, Cl. 204-298.020.
- Tanaka, Masaichi: *See—*
  - Saito, Tsuyoshi; and Yamaoka, Masaru, 5,017,134, Cl. 433-72.000.
- Tanaka, Sakae; and Watanabe, Yoshiaki, to Seikosha Co., Ltd. Amorphous silicon thin film transistor array. 5,017,984, Cl. 357-23.700.
- Tanaka, Shinsaku; and Yoshimura, Toshio, to Tanashin Denki Co., Ltd. Bi-directional tape recorder with pivoted magnetic head. 5,018,034, Cl. 360-106.000.
- Tanaka, Tatsuyoshi: *See—*
  - Oshiro, Yasuo; Tanaka, Tatsuyoshi; Sakurai, Yoji; and Sato, Seiji, 5,017,724, Cl. 564-427.000.
- Tanaka, Tsutomu: *See—*
  - Tamada, Masuo; Tanaka, Tsutomu; and Matsuoka, Hideo, 5,017,766, Cl. 235-492.000.
- Tanashin Denki Co., Ltd.: *See—*
  - Tanaka, Shinsaku; and Yoshimura, Toshio, 5,018,034, Cl. 360-106.000.
  - Yoshimura, Toshio, 5,017,901, Cl. 335-265.000.
- Tandberg, Geir, to Tandberg, Geir; and Rodland, Arild. Combination drill bit. 5,016,718, Cl. 175-333.000.
- Tandy Corporation: *See—*
  - Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,018,128, Cl. 369-284.000.
- Tang, Chung L.: *See—*
  - Edelstein, Daniel C.; Wachman, Elliot S.; and Tang, Chung L., 5,017,806, Cl. 307-428.000.
- Taniai, Takayoshi; Saitoh, Tadashi; and Fujihira, Atsushi, to Fujitsu Limited; and Fujitsu Microcomputer Systems Limited. Data transfer controlling apparatus for direct memory access. 5,018,098, Cl. 364-900.000.
- Taniguchi, Haruyuki: *See—*
  - Kijima, Takao; Taniguchi, Haruyuki; Arai, Makoto; and Sugitani, Nobuyuki, 5,016,903, Cl. 280-663.000.
- Taniguchi, Nobuyuki: *See—*
  - Nakai, Masaaki; Izumi, Shuji; Fujino, Akihiko; Taniguchi, Nobuyuki; Yamaki, Toshio; and Mukai, Hiromu, 5,017,957, Cl. 354-429.000.
- Tanimoto, Yasufumi: *See—*
  - Shukunami, Hiroshi; Tanimoto, Yasufumi; and Onuma, Satoshi, 5,018,079, Cl. 364-519.000.
- Tanioka, Hiroshi, to Canon Kabushiki Kaisha. Image processing apparatus using two-dimensional space frequency to discriminate image type. 5,018,024, Cl. 358-457.000.
- Tanoue, Tomonori: *See—*
  - Mizuta, Hiroshi; Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, 5,017,973, Cl. 357-4.000.
  - Mochizuki, Kazuhiro; Tanoue, Tomonori; Kusano, Chushirou; Masuda, Hiroshi; and Mitani, Katsuhiko, 5,017,517, Cl. 437-90.000.
- Tar Sands Energy Ltd.: *See—*
  - Sadeghi, Mohammad-Ali; Sadeghi, Kazem; Kuo, Jih-Fen; Jang, Long-Kuan; and Yen, Teh F., 5,017,281, Cl. 208-390.000.
- Tarlow, Kenneth A.; Wood, Russell P.; and Wood, Christi K., to Wood, Russell P.; and Wood, Christi K. Automatic body massaging apparatus. 5,016,617, Cl. 128-52.000.
- Tartaglino, Jerry J. Inflatable bladder for control of fluid flow. 5,016,856, Cl. 251-61.000.
- Tassen, Curtis S.: *See—*
  - Smith, Gaylord D.; Tassen, Curtis S.; Ganesan, Pasupathy; and Wheeler, Jack M., 5,017,249, Cl. 148-410.000.
- Tateyama, Hiroshi: *See—*
  - Kimura, Kunio; Jinnai, Kazuhiko; and Tateyama, Hiroshi, 5,017,523, Cl. 501-85.000.
- Tatsumi, Takashi, to Sharp Kabushiki Kaisha. Facsimile device for transmitting portions of documents and holding the transmission process. 5,018,022, Cl. 358-431.000.
- Tatti, Wayne V.: *See—*
  - Lamonica, Daryle; and Tatti, Wayne V., 5,016,386, Cl. 43-42.140.
- Tayefeh, Morovat: *See—*
  - Kulakowski, John E.; Means, Rodney J.; Oldham, David M.; and Tayefeh, Morovat, 5,018,126, Cl. 369-58.000.
- Taylor, Roy: *See—*
  - Burgess, Roy T.; Campau, Gregory P.; Claar, Leslie M.; Hodges, Robert C.; Snow, Douglas G.; and Taylor, Roy, 5,017,095, Cl. 417-222.00R.
- TDK Corporation: *See—*
  - Shiba, Haruo; Ikebe, Masaru; and Sasaki, Morimasa, 5,018,039, Cl. 360-133.000.
- Teepak, Inc.: *See—*
  - Klusmire, Galen J., 5,017,175, Cl. 452-38.000.
- Tektronix, Inc.: *See—*
  - Lloyd, Randahl B., 5,017,814, Cl. 307-480.000.
- Tel Sagami Limited: *See—*
  - Iwabuchi, Katsuhiko; Yokokawa, Osamu; and Takanabe, Eiichiro, 5,016,567, Cl. 118-733.000.
- Telectronics, N.V.: *See—*
  - Gotthardt, Gerhard; Milijasevic, Zoran; Nakazawa, Akira; and Skalsky, Michael, 5,016,646, Cl. 128-784.000.
- Teledyne Kinetics• *See—*
  - Conrad, Alta; Mayer, George E.; and Utke, Donald A., 5,016,500, Cl. 81-9.400.
- Telemecanique: *See—*
  - Moreau, Dominique, 5,018,043, Cl. 361-187.000.
- Tempas, Jeffrey F.: *See—*
  - Sauter, Bruce M.; Tempas, Jeffrey F.; and Sandman, Robert B., 5,016,297, Cl. 4-619.000.
- Tennant Company: *See—*
  - Geyer, Robert A.; and Peterson, Terence A., 5,016,310, Cl. 15-49.100.
- Tentler, Lynn A., to Tru-Fire Corporation. Cushioned nock. 5,016,603, Cl. 124-91.000.
- Ten Wolde, Anne W., to Williams Trading B.V. Device with replaceable container for atomizing liquid. 5,016,781, Cl. 222-162.000.
- Terada, Matsuaki: *See—*
  - Tsukakoshi, Masato; Takahashi, Yasuhiro; Terada, Matsuaki; and Takagishi, Nobuyuki, 5,018,133, Cl. 370-16.000.
- Terada, Tomoaki: *See—*
  - Komai, Norihiko; Nishiguchi, Takashi; Hirayama, Junji; and Terada, Tomoaki, 5,018,173, Cl. 378-4.000.
- Terajima, Hisao: *See—*
  - Kurosawa, Yuji; Terajima, Hisao; and Isozaki, Shingo, 5,018,189, Cl. 379-93.000.
- Terakado, Yoshimitsu: *See—*
  - Ohashi, Yuji; Terakado, Yoshimitsu; and Hayashi, Hijiri, 5,016,803, Cl. 228-4.500.
- Teraoka, Masao, to Tochigifujisangyo Kabushi Kaisha. Power transmission apparatus. 5,017,183, Cl. 475-150.000.
- Terashima, Shigeo: *See—*
  - Tsuji, Kentaroh; Fujiwara, Tsuneo; Fuji, Hiroshi; Terashima, Shigeo; and Numata, Tomiyuki, 5,018,120, Cl. 369-32.000.
- Terashita, Takaaki, to Fuji Photo Film Co., Ltd. Photographic printing exposure determining apparatus and film type data processing apparatus for photographic printer. 5,017,014, Cl. 356-404.000.
- Terauchi, Takao: *See—*
  - Miyazawa, Kazushi; Terauchi, Takao; Hanamoto, Keiji; and Takagi, Fumio, 5,017,417, Cl. 428-195.000.
- Terayama, Satoshi: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; and Shimada, Takamichi, 5,018,068, Cl. 364-424.100.
- Terazawa, Tadashi, to Aisin Seiki Kabushiki Kaisha. Throttle control device. 5,016,589, Cl. 123-399.000.

- Terstappen, Leonardus W. M. M.: *See—*
  - Gerard de Grooth, Bernard; Greve, Jan; and Terstappen, Leonardus W. M. M., 5,017,497, Cl. 436-63.000.
- Terumo Kabushiki Kaisha: *See—*
  - Kohsai, Tadashi, 5,017,259, Cl. 156-294.000.
- Tesch, Johann: *See—*
  - Schieg, Rudolf; and Tesch, Johann, 5,017,198, Cl. 55-21.000.
- Texaco Chemical Company: *See—*
  - Cuscurida, Michael, 5,017,676, Cl. 528-121.000.
- Texas A&M University System, The: *See—*
  - Clearfield, Abraham, 5,017,537, Cl. 502-63.000.
- Texas Instruments Incorporated: *See—*
  - Elkind, Jerome L.; Smith, Patricia B.; Hutchins, Larry D.; Luttmer, Joseph D.; York, Rudy L.; and England, Julie S., 5,017,511, Cl. 437-225.000.
  - Gill, Manzur, 5,017,515, Cl. 437-229.000.
  - Gill, Manzur; D'Arrigo, Sebastiano; and Lin, Sung-Wei, 5,017,980, Cl. 357-23.500.
  - Houston, Theodore W., 5,018,102, Cl. 365-95.000.
  - Manns, William G.; Wood, Anthony B.; Norwood, David A.; Weeks, Don J.; and Gordon, Michael, 5,018,212, Cl. 382-8.000.
  - Merryman, Jerry D.; Penn, Thomas C.; Manns, William G.; Weeks, Don J.; and Wood, Anthony B., 5,018,210, Cl. 382-8.000.
  - Richardson, William F., 5,017,977, Cl. 357-23.500.
  - Shen, Bing-Whey; McKee, Randy; and Chung, Gishi, 5,017,506, Cl. 437-52.000.
  - Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Garcia, Evaristo, Jr., 5,017,510, Cl. 437-192.000.
- Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft: *See—*
  - Konig, Franz, 5,016,324, Cl. 19-296.000.
- Textoris, Andre ; Lyaudet, Georges; and Bathelier, Andre , to Compagnie Generale des Matieres Nucleaires (Cogema). Process for the separation of iron from an organic solution containing uranium. 5,017,344, Cl. 423-10.000.
- Textron Inc.: *See—*
  - Gassen, James R.; and Suchdev, Lakhbir S., 5,016,355, Cl. 30-383.000.
- Theno, Mark H. Collage sheet having rollable releasable adhesive surface. 5,016,373, Cl. 40-594.000.
- Thew, Martin T.; Smyth, Ian C.; and Carroll, Noel, to Conoco Specialty Products. Cyclone separator. 5,017,288, Cl. 210-512.100.
- Thibault, Francois, to Posi-Plus Technologies Inc. Boom articulation mechanism with, simultaneously operable, cylinders. 5,016,767, Cl. 212-188.000.
- Thigpen, Ben B.: *See—*
  - Strange, Booth B.; and Thigpen, Ben B., 5,018,113, Cl. 367-127.000.
- Thimon, Jacques; and Morantz, Jack, to Newtec International (Societe Anonyme). Film unwinding carriage for a packaging machine. 5,016,427, Cl. 53-44.000.
- Thiokol Corporation: *See—*
  - Willer, Rodney L.; Park, Dennis; and Stern, Alfred G., 5,017,356, Cl. 423-384.000.
- Thomas, Fabrice: *See—*
  - Fargette, Alain; Marland, Andre ; Thomas, Fabrice; and Souloumiac, Alain, 5,016,978, Cl. 350-269.000.
- Thomas, Gary R.; and Huebner, Mark A., to Wickes Manufacturing Company. Regular for flush window. 5,016,392, Cl. 49-352.000.
- Thomas Industries Inc.: *See—*
  - Toledo, George, 5,016,927, Cl. 292-92.000.
- Thomas, John E.; Saby, Darrell; and Mehus, Richard, to Ecolab Inc. Apparatus and method for dispensing a detergent solution. 5,016,790, Cl. 222-639.000.
- Thomason, Michael C., to Salem Industries, Inc. Regenerative incinerator. 5,016,547, Cl. 110-211.000.
- Thompson, John E.; Gonzalez, Angelo; Bursel, Joseph S.; and Aust, Hampton L., III, to Vette Products, Inc. Mounting of a single transverse leaf spring for vehicles. 5,016,861, Cl. 267-44.000.
- Thompson, Richard G.: *See—*
  - Linne, Mark A.; Johnson, Robert W.; and Thompson, Richard G., 5,018,152, Cl. 372-25.000.
- Thompson, Richard J.: *See—*
  - Faigle, Ernst M.; Semchena, John H.; and Thompson, Richard J., 5,016,914, Cl. 280-741.000.
- Thompson, Robert N.: *See—*
  - Grivna, Gerald J.; and Thompson, Robert N., 5,016,306, Cl. 5-498.000.
- Thompson, Tommy L.: *See—*
  - Miller, Paul; and Thompson, Tommy L., 5,016,391, Cl. 49-70.000.
- Thomson-Brandt Armements: *See—*
  - Frehaut, Jean-Pierre; and Pineau, Jean-Pierre, 5,016,839, Cl. 244-147.000.
  - Thouron, Rene , 5,016,836, Cl. 244-3.220.
- Thomson Composants Microondes: *See—*
  - Guiberteau, Christian; Le Paih, Michele; and Ruggeri, Stephane, 5,017,924, Cl. 342-195.000.
- Thomson-CSF: *See—*
  - du Chene, Arnaud; Dias, Bernard; and Bergeon, Gerard, 5,018,091, Cl. 364-726.000.
  - Pribat, Didier; Perret, Joel; and Rouffy, Jean-Claude, 5,017,340, Cl. 422-98.000.
  - Rossini, Umberto; Simonin, Pierre; and Tremblay, Christine, 5,017,827, Cl. 313-268.000.
- Thorndike, Charles E.; and Holopainen, Vaino J., to Blue Arrown Enterprises, Inc. Hand truck. 5,017,080, Cl. 414-454.000.
- Thorsnes, Ola O., to A/S Selvaagbygg. Building structure and method and element for making same. 5,016,411, Cl. 52-220.000.
- Thouron, Rene , to Thomson-Brandt Armements. Guidance/control device for a carrier comprising a movable nozzle. 5,016,836, Cl. 244-3.220.
- Tickner, Ann M.: *See—*
  - Holt, Dennis A.; Kowalski, Conrad J.; Levy, Mark A.; Metcalf, Brian W.; and Tickner, Ann M., 5,017,568, Cl. 514-173.000.
- Tidwell, Doug E. Apparatus and method for transmitting a message. 5,016,918, Cl. 283-67.000.
- Tiedeman, Sandy: *See—*
  - Parker, J. J.; Tiedeman, Sandy; and Baugh, William J., 5,016,879, Cl. 273-126.00A.
- Tiegs, Terry N.; and Lindemer, Terrence B., to Martin Marietta Energy Systems, Inc. Modified silicon carbide whiskers. 5,017,528, Cl. 501-95.000.
- TII Industries, Inc.: *See—*
  - Smith, Thomas J., 5,018,192, Cl. 379-107.000.
- Tilby, V. John, to Sportsmen's Outdoor Products. String silencers for archery bows. 5,016,604, Cl. 124-92.000.
- Timari, Antti S.: *See—*
  - Koskinen, Pentti A.; and Timari, Antti S., 5,016,851, Cl. 248-278.000.
- Timken Company, The: *See—*
  - Williams, Samuel R., 5,017,025, Cl. 384-584.000.
- Timpert, Manfred: *See—*
  - Zemanek, Jiri; Timpert, Manfred; and Rudolph, Karl, 5,017,314, Cl. 264-35.000.
- Tingey, Kevin: *See—*
  - Frautschi, Jack; and Tingey, Kevin, 5,017,670, Cl. 527-313.000.
- Tingley, Eugene H.: *See—*
  - Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, 5,017,740, Cl. 174-152.0GM.
- Tischer, Werner: *See—*
  - Schumann, Werner; and Tischer, Werner, 5,017,422, Cl. 428-216.000.
- Tjahjadi, Taruna; and Correa, Cynthia J., to Hayes Microcomputer Products, Inc. Method and apparatus for baud timing recovery. 5,018,166, Cl. 375-12.000.
- TMC Corporation: *See—*
  - Mayr, Bernhard, 5,016,901, Cl. 280-607.000.
- TNS Holdings Ltd.: *See—*
  - Calam, Bruce T.; and Karlowee, Rudy, 5,016,406, Cl. 52-58.000.
- Toa Nenryo Kogyo K.K.: *See—*
  - Iijima, Shigeru; Tanaka, Kazunobu; Matsuda, Akihisa; Matsumura, Mitsuo; and Yamamoto, Hideo, 5,017,308, Cl. 252-501.100.
- Tobiki, Hisao: *See—*
  - Yamada, Hideo; Nakayama, Shozo; Iinuma, Mitsuhisa; and Tobiki, Hisao, 5,017,191, Cl. 604-243.000.
- Tochigifujisangyo Kabushi Kaisha: *See—*
  - Teraoka, Masao, 5,017,183, Cl. 475-150.000.
- Todaro, Frank A.; and Hotkowski, Peter, to VeloBind, Inc. Machine for automatically binding books with flexible stud binding strips. 5,017,071, Cl. 412-43.000.
- Toddco Research and Development Company, Inc.: *See—*
  - Kirkman, Todd A.; and Heath, William D., 5,017,758, Cl. 219-205.000.
- Todman, Michael T.: *See—*
  - Belcher, Bryan L.; and Todman, Michael T., 5,016,436, Cl. 60-264.000.
- Togashi, Atsushi; and Saruyama, Toshio, to Toray Silicone Company, Limited. Thermosetting organosiloxane composition. 5,017,654, Cl. 525-100.000.
- Togoshi, Yoshikazu: *See—*
  - Morita, Shigeru; Takei, Terutaka; Kawahara, Yoshihiro; and Togoshi, Yoshikazu, 5,016,722, Cl. 180-89.140.
- Toida, Akikazu: *See—*
  - Ogita, Hiromitsu; and Toida, Akikazu, 5,017,943, Cl. 346-76.0PH.
- Tokai, Masaie; Kuroiwa, Minoru; and Ezaki, Shinobu, to Hitachi, Ltd. Continuous vacuum processing apparatus. 5,016,561, Cl. 118-718.000.
- Tokai Rubber Industries, Ltd.: *See—*
  - Igarashi, Ichiro; and Ito, Hiroaki, 5,016,675, Cl. 138-125.000.
- Toko, Inc.: *See—*
  - Kasahara, Takeshi, 5,017,950, Cl. 357-14.000.
- Tokoi, Lauri. Cutting means for underwater pelletizer. 5,017,119, Cl. 425-142.000.
- Tokyo Copal Chemical Co., Ltd.: *See—*
  - Yonehara, Takashi, 5,016,313, Cl. 15-320.000.
- Tokyo Electron Limited: *See—*
  - Kobayashi, Isao, 5,017,082, Cl. 414-729.000.
- Tokyo Keiki Co., Ltd.: *See—*
  - Kiritani, Yoshiharu; Onishi, Yutaka; Tagata, Shigeyoshi; and Umeno, Koichi, 5,017,045, Cl. 405-143.000.
- Tokyo Sharyo Seizo Kabushiki Kaisha: *See—*
  - Yoda, Akira, 5,016,489, Cl. 74-479.000.
- Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
  - Egawa, Hideharu; and Suzuki, Yasoji, 5,017,994, Cl. 357-42.000.
- Tokyo Winder Co., Ltd.: *See—*
  - Itoh, Kiyochika; and Doyoshita, Toshi, 5,016,430, Cl. 53-370.200.
- Toledo, George, to Thomas Industries Inc. Dogging device for panic exit device. 5,016,927, Cl. 292-92.000.
- Tolf, Anders K. H., to Aktiebolaget Electrolux. Device for a dishwasher. 5,016,667, Cl. 137-143.000.
- Tolo, Inc.: *See—*
  - Kaiser, John E., Jr.; Lockshaw, James J.; Ruiz, Juan J.; and Stevens, William L., 5,016,730, Cl. 181-265.000.

VOL 1126
ISS 3
MY 21 1991
UMI

- Tolone, Ralph J.: *See—*
  - Dimarco, Ben P.; Tolone, Ralph J.; and Miller, Lester N., 5,016,706, Cl. 165-162.000.
- Toma, Hitoshi: *See—*
  - Komiyama, Katsumi; Fukaya, Masaki; Yokono, Kojiro; and Toma, Hitoshi, 5,017,988, Cl. 357-30.000.
- Tomabechi, Hideo: *See—*
  - Sasaki, Masahiko; Kato, Tadashi; Fujimori, Hiroyoshi; Nagasaki, Tatsuo; Onoda, Fumiyuki; Nishikori, Toshiaki; Tomabechi, Hideo; Sugawara, Kazutake; Nakamura, Kazuo; Ando, Ootaro; and Karaki, Koichi, 5,016,975, Cl. 350-96.260.
- Tomelleri, Raffaele, to Garda Impranti. Apparatus for repairing accident-damaged bodies in motor vehicles. 5,016,464, Cl. 72-447.000.
- Tomic, Mladomir: *See—*
  - Simonsen, Steve H.; Tomic, Mladomir; and Wegner, Wayne M., 5,017,021, Cl. 383-63.000.
- Tominaga, Tomohisa; Sato, Kazuichi; Otsuka, Kouichi; Endo, Toshiya; and Oikawa, Susumu, to Alps Electric Co., Ltd. Battery housing device. 5,017,443, Cl. 429-99.000.
- Tomita, Hajime; and Sonoda, Yasuo, to Kabushiki Kaisha Pilot. Water-resistant ink composition. 5,017,224, Cl. 106-22.000.
- Tomita, Haruo; Yamashita, Kouichi; Kondo, Takeshi; Suzuki, Noriyuki; Matsumoto, Shigemi; and Asada, Masahiro, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Thermoplastic resin composition. 5,017,651, Cl. 525-66.000.
- Tomita, Michio: *See—*
  - Ioka, Tsunejiro; Saigo, Tatsuji; and Tomita, Michio, 5,016,865, Cl. 271-103.000.
- Tomozawa, Yasuko: *See—*
  - Appel, Stanley H.; and Tomozawa, Yasuko, 5,017,375, Cl. 424-570.000.
- Tomura, Yoshihiro; and Banno, Shigeki, to Nippon Oil & Fats Co., Ltd. Visible light-curing polyester resin composition. 5,017,626, Cl. 522-9.000.
- Toofan, Masoud: *See—*
  - Peck, Ralph E.; Elson, Todd E.; and Toofan, Masoud, 5,016,551, Cl. 114-045.000.
- Tooley, Patricia A.: *See—*
  - Kolts, John H.; Tooley, Patricia A.; and Brown, Scott H., 5,017,357, Cl. 423-437.000.
- Toray Industries, Inc.: *See—*
  - Nakamura, Kiyokazu; Kometani, Kiichi; Koshino, Akihiko; and Horiuchi, Kenjiro, 5,017,650, Cl. 525-65.000.
- Toray Silicone Company, Limited: *See—*
  - Togashi, Atsushi; and Saruyama, Toshio, 5,017,654, Cl. 525-100.000.
- Torii, Akira: *See—*
  - Hayashi, Akihiko; Yamazaki, Toru; and Torii, Akira, 5,017,935, Cl. 343-715.000.
- Toriihara, Makoto: *See—*
  - Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.
- Torreno, Manuel L., Jr.: *See—*
  - Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Garcia, Evaristo, Jr., 5,017,510, Cl. 437-192.000.
- Torrington Company, The: *See—*
  - Hajzler, Christian, 5,017,868, Cl. 324-207.220.
  - Santos, Alfred J.; Hilby, James A.; and Duncan, Scott M., 5,017,866, Cl. 324-174.000.
- Tosa Plastic Zosen Corporation: *See—*
  - Ito, Daisuke, 5,016,585, Cl. 123-198.00E.
- Toshiba America Information Systems, Inc.: *See—*
  - Johnson, James L., 5,018,035, Cl. 360-106.000.
- Toshiba Ceramics Co., Ltd.: *See—*
  - Meguro, Kazunori; Itoh, Toshiaki; and Abe, Shigeru, 5,016,610, Cl. 126-91.00A.
- Toshiba Kikai Kabushiki Kaisha: *See—*
  - Kumazaki, Hiroshi, 5,017,315, Cl. 264-40.100.
- Tosoh Corporation: *See—*
  - Arakawa, Toshihiko; Mori, Toshiyuki; and Matsumoto, Yoshihiro, 5,017,530, Cl. 501-98.000.
- Totally, Inc.: *See—*
  - Bustance, William G.; and Borey, Robert E., 5,016,657, Cl. 132-202.000.
- Totaro, Charles C. Bird observatory. 5,016,571, Cl. 119-23.000.
- Tournier, Edmond: *See—*
  - Allemand, Robert; Drouet, Martine; Pleyber, Gaetan; and Tournier, Edmond, 5,018,175, Cl. 378-19.000.
- Towers, Christine M.: *See—*
  - Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 5,017,791, Cl. 250-483.100.
- Toyo Boseki Kabushiki Kaisha: *See—*
  - Ogata, Hiromasa; Morioka, Koji; and Ohmori, Susumu, 5,017,202, Cl. 55-390.000.
- Toyota Jidosha Kabushiki Kaisha: *See—*
  - Handa, Junichi; Ito, Hiroshi; Hattori, Hiroshi; and Suganuma, Akira, 5,017,638, Cl. 524-449.000.
  - Kawai, Taiyo; and Nakagawa, Narihisa, 5,016,595, Cl. 123-478.000.
  - Kushibe, Takahiro; Takano, Yuuichi; and Sato, Takeshi, 5,016,598, Cl. 123-533.000.
  - Takaoka, Toshio, 5,016,593, Cl. 123-436.000.
  - Takeshima, Shinichi, 5,017,538, Cl. 502-64.000.
- TP Orthodontics, Inc.: *See—*
  - Kesling, Christopher K., 5,017,132, Cl. 433-18.000.
- Tran, Mank H., to Westinghouse Electric Corp. Free standing blade for use in low pressure steam turbine. 5,017,091, Cl. 416-193.00A.
- Trapentsier, Petr T.: *See—*
  - Bremanis, Gunar A.; Meerson, Felix Z.; Kalvinsh, Ivars Y.; Abdikaliev, Nurlan; Trapentsier, Petr T.; Pshennikova, Ma/Ya G.; Antsena, Irene B.; Lukevits, Edmund Y.; and Simkhovich, Boris Z., 5,017,611, Cl. 514-551.000.
- Trauth, Hubert: *See—*
  - Aumueller, Alexander; Neumann, Peter; and Trauth, Hubert, 5,017,702, Cl. 546-99.000.
- Travieso, Ruben: *See—*
  - Hammond, Rodney W.; Myers, Clyde J.; and Travieso, Ruben, 5,016,968, Cl. 350-96.200.
- Tremblay, Christine: *See—*
  - Rossini, Umberto; Simonin, Pierre; and Tremblay, Christine, 5,017,827, Cl. 313-268.000.
- Trench, Anthony B. Saw and saw blade for use therein. 5,016,356, Cl. 30-393.000.
- Tressl, Guenther: *See—*
  - Lange, Gottfried; Reinfelder, Hans-Erich; and Tressl, Guenther, 5,017,781, Cl. 250-327.200.
- Tri-State Hospital Supply Corp.: *See—*
  - Fields, Charlie B., 5,017,193, Cl. 604-270.000.
- Trico Products Corporation: *See—*
  - Frimley, Charles H., 5,016,312, Cl. 15-250.040.
- Trimble, Carroll O., to Action Products Marketing Corporation. Method and means for repairing existing manhole. 5,017,313, Cl. 264-32.000.
- Trinity Industries, Inc.: *See—*
  - Tylisz, Eugene R.; and Johnstone, Bradford, 5,017,066, Cl. 410-121.000.
- Trommer, Gert: *See—*
  - Poisel, Hans; and Trommer, Gert, 5,017,006, Cl. 356-218.000.
- Tronje, Gunilla: *See—*
  - McDavid, W. Doss; Dove, S. Brent; Welander, Ulf; and Tronje, Gunilla, 5,018,177, Cl. 378-62.000.
- Tru-Fire Corporation: *See—*
  - Tentler, Lynn A., 5,016,603, Cl. 124-91.000.
- Trummell, Donald E., Jr.: *See—*
  - Mohlenbrock, William C.; Farley, Peter J.; Frye, Lawrence J.; Trummell, Donald E., Jr.; and Bostrom, Alan G., 5,018,067, Cl. 364-413.020.
- TRW Technar Inc.: *See—*
  - Gunning, Kevin J.; and Bell, Lon E., 5,017,743, Cl. 200-61.45R.
- TRW United-Carr Limited: *See—*
  - Barnett, Barry R. M.; and Wiffin, Richard E., 5,016,336, Cl. 29-281.500.
- TRW Vehicle Safety Systems Inc.: *See—*
  - Faigle, Ernst M.; Semchena, John H.; and Thompson, Richard J., 5,016,914, Cl. 280-741.000.
- Tsabar, Rafi. Multiple-feed clothesline drying apparatus. 5,016,762, Cl. 211-119.100.
- Tsay, Han-Tsun. Universal tool rest for a milling planer. 5,017,063, Cl. 409-215.000.
- Tsay, Mean-sea: *See—*
  - Kriz, John C.; and Tsay, Mean-sea, 5,017,807, Cl. 307-443.000.
- Tschan, Grace J. Sun visor with extensible panel. 5,016,938, Cl. 296-97.800.
- Tscheulin, Guenther, to Sandoz Ltd. Filled polyolefins stabilized with a combination of a hindered phenol and a phenylphosphonite. 5,017,633, Cl. 524-117.000.
- Tsuboi, Toshiharu: *See—*
  - Makino, Tadashi; Doi, Koji; Matsuoka, Masayoshi; and Tsuboi, Toshiharu, 5,017,564, Cl. 514-47.000.
- Tsuchida, Tetsuo: *See—*
  - Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 5,016,737, Cl. 188-181.00A.
- Tsuchiyama, Shigeki: *See—*
  - Sugimoto, Tadao; Tsuchiyama, Shigeki; Hayakawa, Makoto; Goto, Yozo; Koide, Tadao; Endoh, Tamotsu; Toriihara, Makoto; and Ejiri, Joji, 5,017,046, Cl. 405-229.000.
- Tsuda, George I., to Hughes Aircraft Company. Angle of arrival measuring technique. 5,017,929, Cl. 342-427.000.
- Tsuji, Hiroki; Kawano, Kyoichiro; and Murase, Teruo, to Fujitsu Limited. Connecting apparatus. 5,017,738, Cl. 174-94.00R.
- Tsuji, Kentaroh; Fujiwara, Tsuneo; Fuji, Hiroshi; Terashima, Shigeo; and Numata, Tomiyuki, to Sharp Kabushiki Kaisha. Optical recording medium track indexing system. 5,018,120, Cl. 369-32.000.
- Tsuji, Masaru; Katoh, Atsuyuki; and Fukunaga, Keizo, to Sharp Kabushiki Kaisha. Image forming apparatus with process-cartridges. 5,017,962, Cl. 355-210.000.
- Tsuji, Takehiro, to Pioneer Electronic Corporation. Video signal stretcher. 5,018,012, Cl. 358-171.000.
- Tsujimura, Osamu; Arai, Tatsuo; Nakayama, Masaaki; and Okawa, Masayuki, to Mitsubishi Kinzoku Kabushiki Kaisha. Indexable cutter insert. 5,017,055, Cl. 407-113.000.
- Tsukabayashi, Kazuo; Yamamoto, Takashi; and Sawanoi, Yasunari, to Ishikawa Prefecture; and Nippon Oil Co., Ltd. Apparatus for treating carbon fiber fabrics. 5,016,451, Cl. 68-2.000.
- Tsukada, Kiroku: *See—*
  - Senuma, Akitaka; Tsukada, Kiroku; and Noda, Isao, 5,017,635, Cl. 524-269.000.
- Tsukakoshi, Masato; Takahashi, Yasuhiro; Terada, Matsuaki; and Takagishi, Nobuyuki, to Hitachi, Ltd. Network system comprising a plurality of LANs using hierarchical routing. 5,018,133, Cl. 370-16.000.

- Tsukiji, Masaaki: *See—*
  - Ishizuka, Koh; Tsukiji, Masaaki; Kubota, Yoichi; Ishii, Satoshi; and Nishimura, Tetsuharu, 5,017,777, Cl. 250-231.160.
- Tsunashima, Makoto: *See—*
  - Nishihara, Akira; and Tsunashima, Makoto, 5,017,231, Cl. 106-452.000.
- Tsunoda, Shinji: *See—*
  - Ishitsuka, Keiichi; and Tsunoda, Shinji, 5,016,396, Cl. 49-502.000.
- Tsuyuguchi, Michio: *See—*
  - Otani, Sugio; Tsuyuguchi, Michio; Kano, Haruyuki; Sone, Yoshihisa; Kageyama, Kenji; and Mabuchi, Toshiaki, 5,017,683, Cl. 528-396.000.
- Tsuyuzaki, Kazue: *See—*
  - Kase, Mitsuo; Okoshi, Noboru; and Tsuyuzaki, Kazue, 5,017,655, Cl. 525-127.000.
- Tuckerman, David B., to University of California, Regents of the. Stand-off transmission lines and method for making same. 5,017,509, Cl. 437-182.000.
- Tuhro, Richard W., to Xerox Corporation. Image input device providing background detection arrangement. 5,017,963, Cl. 355-218.000.
- Tujikawa, Masanori: *See—*
  - Hamashima, Yoshio; Minami, Kyoji; Kawata, Kyozo; Sakamoto, Teruo; Takeda, Toyohiko; Suzuki, Yusuke; and Tujikawa, Masanori, 5,017,380, Cl. 424-454.000.
- Turk, Herbert: *See—*
  - Schippers, Heinz; Lenk, Erich; Gerhartz, Siegmar; Schiminski, Herbert; and Turk, Herbert, 5,016,829, Cl. 242-18.00A.
- Turner, Ben K.: *See—*
  - Simons, Billy R.; Turner, Ben K.; and Brell, James T., 5,016,717, Cl. 175-66.000.
- Turner, John E., to Advanced Micro Devices, Inc. Method and apparatus for program verification of a field programmable logic device. 5,017,809, Cl. 307-465.000.
- Turner, Terry L.; and Howards, Stuart S., to University of Virginia Alumni Patents Foundation, The. Intraorgan injection of biologically active compounds contained in slow-release microcapsules or microspheres. 5,017,378, Cl. 424-422.000.
- Turner, Tommie Z.: *See—*
  - Severance, Wayne S., Jr.; and Turner, Tommie Z., 5,017,752, Cl. 219-121.590.
- Tuulse, Tanel, to STD Engineering AB. Exposure of radiation sensitive materials. 5,017,960, Cl. 355-91.000.
- Twain, Kenneth M.: *See—*
  - Biggs, John D.; and Twain, Kenneth M., 5,018,057, Cl. 362-295.000.
- Twin Disc, Incorporated: *See—*
  - Steinhagen, Horst G.; and Blank, Paul C., 5,016,724, Cl. 180-197.000.
- Twitty, William B.; and Sander, Wendell B., to Echelon Systems Corporation. Protocol for network having a plurality of intelligent cells. 5,018,138, Cl. 370-94.100.
- Tylisz, Eugene R.; and Johnstone, Bradford, to Trinity Industries, Inc. Well car adjustable guide apparatus. 5,017,066, Cl. 410-121.000.
- Tyrrell, John C.: *See—*
  - Gelb, Jack P.; and Tyrrell, John C., 5,018,060, Cl. 364-200.000.
- Ube Industries, Ltd.: *See—*
  - Yamada, Akiyoshi; and Kanoh, Yoshiaki, 5,017,126, Cl. 425-526.000.
- Uchida, Masahide; and Shida, Fumio, to Seiko Epson Corporation. Circuit for driving a liquid crystal display panel. 5,017,914, Cl. 340-784.000.
- Uchikata, Yoshio: *See—*
  - Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; and Kanome, Yuji, 5,017,942, Cl. 346-76.0PH.
- Uchikawa, Naoshi: *See—*
  - Murayama, Akira; Uchikawa, Naoshi; Tamura, Takahiro; Mizuno, Takao; and Sakurai, Kazuo, 5,017,108, Cl. 418-55.600.
- Uchikoshi, Gohji; and Otomo, Toshiko, to Nakamichi Corporation. Signal processing circuit for detecting a tracking error for an optical disk apparatus. 5,018,125, Cl. 369-44.250.
- Uddholm Tooling Aktiebolag: *See—*
  - Lundstrom, Per-Åke; Andersson, Gunnar A.; West, Åke; and Magi, Juhan, 5,017,218, Cl. 75-388.000.
- Udo, Shinji: *See—*
  - Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 5,018,101, Cl. 365-51.000.
- Uehara, Yukiyasu; and Migita, Kazuhiko, to Clarion Co., Ltd. Structure for coupling plural substrates. 5,017,146, Cl. 439-65.000.
- Ueno, Masaji; and Ofusa, Kumi, to Kabushiki Kaisha Toshiba. BI-MOS logic circuit having a switch circuit for discharging electrical charge accumulated in a parasitic capacitor. 5,017,808, Cl. 307-446.000.
- Ueno, Yasushi. Rearview mirror with operating condition display. 5,016,996, Cl. 350-600.000.
- Ueta, Yutaka: *See—*
  - Ogawa, Takahiro; Inoue, Atsushi; Ito, Kiyotaka; Ueta, Yutaka; and Koga, Kazuhiko, 5,016,341, Cl. 29-603.000.
- Ueyama, Masaki: *See—*
  - Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.
- Ukai, Noriyuki; Hayakawa, Issei; Miyamoto, Mithuru; and Matsuhisa, Tadaaki, to NGK Insulators, Ltd. Silicon nitride ceramic sintered bodies. 5,017,531, Cl. 501-98.000.
- Ul Haq, Mohammed E.; and Smits, Kenneth R., to VLSI Technology, Inc. Static random access memory with modulated loads. 5,018,106, Cl. 365-203.000.
- Ulrich, Dietrich: *See—*
  - Furrer, Hansjorg; Peltoniemi, Raimo; Richle, Norbert; and Ulrich, Dietrich, 5,016,456, Cl. 72-38.000.
- Ulrich, Peter: *See—*
  - Farmar, James G.; Ulrich, Peter; and Cerami, Anthony, 5,017,696, Cl. 536-18.700.
- Umeda, Masafumi: *See—*
  - Sasaki, Minoru; Umeda, Masafumi; Tagami, Yoshitomo; and Sugikawa, Akihiko, 5,018,017, Cl. 358-209.000.
- Umekawa, Osamu. Stable biocide composition for industrial use. 5,017,592, Cl. 514-372.000.
- Umemura, Shigeru: *See—*
  - Kanai, Tsuneo; Hosokawa, Shigefumi; Kumakura, Yasuo; Umemura, Shigeru; and Inagaki, Shuichiro, 5,017,145, Cl. 439-45.000.
- Umeno, Koichi: *See—*
  - Kiritani, Yoshiharu; Onishi, Yutaka; Tagata, Shigeyoshi; and Umeno, Koichi, 5,017,045, Cl. 405-143.000.
- Union Camp Corporation: *See—*
  - Woell, James B., 5,017,726, Cl. 568-448.000.
- Union Carbide Canada Limited: *See—*
  - Hakka, Leo E.; and Sarlis, John N., 5,017,350, Cl. 423-243.000.
- Union Carbide Chemicals and Plastics Company Inc.: *See—*
  - Senuma, Akitaka; Tsukada, Kiroku; and Noda, Isao, 5,017,635, Cl. 524-269.000.
- Union Carbide Chemicals and Plastics Technology Corporation: *See—*
  - Bok, Hendrik F., 5,017,409, Cl. 427-424.000.
- Unisys Corporation: *See—*
  - Wilson, Michael L., 5,018,170, Cl. 375-120.000.
- Unit Rail Anchor Company: *See—*
  - Lanham, Mark E., 5,016,816, Cl. 238-349.000.
- United Catalysts, Inc.: *See—*
  - Powell, Thomas W., Jr.; Schulz, Anthony A.; and Beall, Gary W., 5,017,361, Cl. 424-46.000.
- United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
  - McWhirter, John G.; and Shepherd, Terence J., 5,018,065, Cl. 364-900.000.
- United Manufacturing Co., Inc.: *See—*
  - Linwood, Gary; and Duncan, Wayne, 5,017,794, Cl. 250-551.000.
- United States of America
  - Agriculture: *See—*
    - Arifoglu, Mustafa; and Marmer, William N., 5,017,194, Cl. 8-111.000.
    - Dowd, Patrick F.; Wicklow, Donald T.; Gloer, James B.; and Rinderknecht, Brad L., 5,017,598, Cl. 514-415.000.
  - Air Force: *See—*
    - Haupt, Randy L.; and McCormack, Christopher J., 5,017,928, Cl. 342-379.000.
    - Horner, Joseph L.; Fielding, Kenneth H.; and Makekau, Charles K., 5,016,976, Cl. 350-162.130.
  - Army: *See—*
    - Daunt, Geraldine H.; Utano, Richard A.; and Chandra, Suresh, 5,018,163, Cl. 372-68.000.
  - Energy: *See—*
    - Bliss, Erlan S.; Smith, James R.; Salmon, J. Thaddeus; and Monjes, Julio A., 5,016,997, Cl. 350-607.000.
    - Deason, Vance A.; and Ward, Michael B., 5,016,951, Cl. 350-3.670.
    - Hammond, Peter R., 5,018,160, Cl. 372-53.000.
    - Sikka, Vinod K., 5,016,810, Cl. 228-206.000.
    - Smith, Tommy E., Jr.; Struve, Kenneth W.; and Colella, Nicholas J., 5,017,779, Cl. 250-283.000.
  - National Aeronautics and Space Administration: *See—*
    - Divsalar, Dariush; and Simon, Marvin K., 5,017,883, Cl. 329-304.000.
    - Rhodes, Marvin D.; and Hedgepeth, John M., 5,016,418, Cl. 52-646.000.
    - Robertson, Glen A., 5,017,549, Cl. 505-1.000.
  - Navy: *See—*
    - Bemis, Suzanne V.; Winer, Ernst A.; Leeds, Jeffrey L.; and Athey, Kevin D., 5,017,142, Cl. 434-220.000.
    - Mackelburg, Gerald R.; Bodzin, Leon J.; McCracken, Howard B.; and Diamond, Anthony E., 5,018,114, Cl. 367-134.000.
    - Moody, Paul E., 5,016,555, Cl. 114-238.000.
    - Moody, Paul E., 5,017,150, Cl. 439-197.000.
- U.S. Philips Corporation: *See—*
  - Barten, Piet G. J., 5,017,843, Cl. 315-368.000.
  - Braat, Josephus J. M., 5,016,994, Cl. 350-432.000.
  - Chapron, Claude E. P.; and Parpaleix, Jean B., 5,017,997, Cl. 357-44.000.
  - Dobson, Peter J., 5,016,990, Cl. 350-353.000.
  - Gamand, Patrice, 5,017,887, Cl. 330-277.000.
  - Hall, Lawrence M., 5,018,195, Cl. 379-225.000.
  - Heijnen, Godefridus H. C.; Mulder, Cornelis A. M.; and Van Der Stelt, Ernest O. W., 5,017,825, Cl. 313-112.000.
  - Massey, Peter J., 5,017,936, Cl. 343-773.000.
  - Meyer, Karl-Hanns, 5,018,122, Cl. 369-44.140.
  - Middelhoek, Jan; Hemink, Gerrit-Jan; and Wijburg, Rutger C. M., 5,017,978, Cl. 357-23.500.
  - Schuurman, Arend, 5,017,460, Cl. 430-320.000.
  - Sempel, Adrianus, 5,017,890, Cl. 331-45.000.
  - Steenhof, Frits A., 5,018,172, Cl. 377-60.000.
  - van der Putten, Andreas M. T. P., 5,017,516, Cl. 437-230.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- United Technologies Automotive Inc.: *See—*
  - Johnston, Thomas K., 5,017,653, Cl. 525-89.000.
- United Technologies Corporation: *See—*
  - Griffith, J. Stephen; and Roberts, Patricia L., 5,018,074, Cl. 364-490.000.
  - Hodgens, Henry M., II, 5,017,410, Cl. 427-443.100.
  - McComas, Charles C., 5,017,402, Cl. 427-34.000.
  - Meltz, Gerald; and Morey, William W., 5,016,967, Cl. 350-96.190.
  - Schneider, Roy W.; and DiValentin, Eugenio, 5,017,089, Cl. 416-35.000.
  - Violette, John A.; and Mashey, Thomas, 5,017,092, Cl. 416-204.00A.
- Universal Applied Sciences Inc.: *See—*
  - Lang, Paul W.; and Gribshaw, Franklin C., 5,018,007, Cl. 358-60.000.
- University College Cardiff Consultants Limited: *See—*
  - Myles, Bernard; and Bridle, Ronald J., 5,017,047, Cl. 405-259.000.
- University of Bath: *See—*
  - Staniforth, John N., 5,017,122, Cl. 425-100.000.
- University of California, The Regents of the: *See—*
  - Rose, Jed E.; and Jarvik, Murray E., 5,016,652, Cl. 131-270.000.
  - Tuckerman, David B., 5,017,509, Cl. 437-182.000.
  - Vyas, Girish N., 5,017,558, Cl. 514-14.000.
- University of Florida: *See—*
  - Bodor, Nicholas S., 5,017,566, Cl. 514-58.000.
  - Bodor, Nicholas S., 5,017,618, Cl. 514-640.000.
- University of Georgia Research Foundation, Inc.: *See—*
  - Ghate, Suhas R.; and Phatak, Sharad C., 5,016,817, Cl. 239-113.000.
- University of Iowa Research Foundation: *See—*
  - Cannon, Joseph G.; Bhatnagar, Ranbir K.; and Long, J. Paul, 5,017,602, Cl. 514-452.000.
  - Dowd, Patrick F.; Wicklow, Donald T.; Gloer, James B.; and Rinderknecht, Brad L., 5,017,598, Cl. 514-415.000.
- University of Kentucky Research Foundation: *See—*
  - Hildebrand, David F.; Kemp, Thomas R.; Andersen, Roger; and Loughrin, John H., 5,017,386, Cl. 426-18.000.
- University of Medicine and Dentistry of New Jersey: *See—*
  - McAllister, William T.; and Klement, John F., 5,017,488, Cl. 435-194.000.
- University of Minnesota, Regents of the: *See—*
  - Holmes, Thomas J.; and Nygaard, Barbara G., 5,017,562, Cl. 514-26.000.
  - Tan, Jinglu, 5,017,099, Cl. 417-307.000.
- University of Tennessee Research Corporation, The: *See—*
  - Davis, Wayne T.; Reed, Gregory D.; and Keener, Timothy C., 5,017,349, Cl. 423-242.000.
- University of Virginia Alumni Patents Foundation, The: *See—*
  - Turner, Terry L.; and Howards, Stuart S., 5,017,378, Cl. 424-422.000.
- UOP: *See—*
  - Cetinkaya, Ismail B., 5,017,343, Cl. 422-140.000.
  - Schmidt, Robert J.; Haizmann, Robert S.; Ford, Mark R.; Low, C. David; and Adams, Frank H., 5,017,541, Cl. 502-169.000.
- Upmeier, Egon: *See—*
  - Sadlack, Werner; Vogt, Siegfried; Upmeier, Egon; and Schulze, Wolfram, 5,016,549, Cl. 112-104.000.
- Upton, Charles R.: *See—*
  - Rippingale, John B.; Upton, Charles R.; Schonstedt, Erick O.; and Osman, Bradley L., 5,017,873, Cl. 324-326.000.
- Ura, Mitugu; Obara, Yoshihiro; and Takahashi, Kazushi, to Hitachi Mizusawa Electronics Co., Ltd. Deflection yoke. 5,017,900, Cl. 335-210.000.
- Urabe, Hitoshi; Korikawa, Hiroshi; Akimoto, Kazuhiko; Nakaya, Daisuke; and Mizuno, Masahiko, to Fuji Photo Film Co., Ltd. Apparatus and method for processing huge image information at high speed. 5,018,078, Cl. 364-518.000.
- Urai, Takahiko, to NEC Corporation. Redundant circuit incorporated in semiconductor memory device. 5,018,104, Cl. 365-200.000.
- Uralita, S.A.: *See—*
  - Velazquez Garcia, Rafael, 5,017,320, Cl. 264-148.000.
- Uramoto, Makoto; and Sakata, Hideji, to Murata Kikai Kabushiki Kaisha. Device for detecting yarn. 5,017,797, Cl. 250-561.000.
- Urata, Yasuo: *See—*
  - Nakashima, Masahiro; Urata, Yasuo; and Nagaie, Tetsuya, 5,017,720, Cl. 560-209.000.
- Urbaniak, Lechoslaw K.: *See—*
  - Dower, Roger G.; Acres, Robert W.; Davis, Harold R.; Donham, Andrew N.; Riahi, Nader; Slamka, Richard W. A.; and Urbaniak, Lechoslaw K., 5,017,795, Cl. 250-560.000.
- Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, to Kokusai Electric Co., Ltd.; and Kiyohiko Itoh. Miniature antenna. 5,017,932, Cl. 343-702.000.
- Usui, Masahiro; and Higashio, Yasuhiko, to Arco Chemical Technology, Inc. Production of hydrocarbon-soluble salts of molybdenum for epoxidation of olefins. 5,017,712, Cl. 549-529.000.
- Usui, Masayuki: *See—*
  - Hosoya, Hideki; Aoki, Akio; Enari, Masahiko; Usui, Masayuki; Matsuoka, Hiroshi; Matsuoka, Kazuhiko; Minoura, Kazuo; Suzuki, Kenichi; Shikichi, Satoshi; and Kawaguchi, Fumiaki, 5,018,123, Cl. 369-44.110.
- Utano, Richard A.: *See—*
  - Daunt, Geraldine H.; Utano, Richard A.; and Chandra, Suresh, 5,018,163, Cl. 372-68.000.
- Utke, Donald A.: *See—*
  - Conrad, Alta; Mayer, George E.; and Utke, Donald A., 5,016,500, Cl. 81-9.400.
- Utsumi, Masayuki: *See—*
  - Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, 5,018,083, Cl. 364-523.000.
- Utsumi, Tatsuya; Kawamura, Shinji; Itoh, Tetsuya; Moriyama, Hiroshi; and Okada, Naofumi, to Sharp Kabushiki Kaisha. Shredding machine. 5,016,828, Cl. 241-158.000.
- Vahlne, Anders; Svennerholm, Bo; Rymo, Lars; Jeansson, Stig; and Horal, Peter, to Virovahl, S.A. Peptides for the detection of HTLV-1 infection. 5,017,687, Cl. 530-324.000.
- Valentin, Emmanuel: *See—*
  - Combe, Jean; Renard, Gerard; and Valentin, Emmanuel, 5,016,709, Cl. 166-245.000.
- Valentine, Sidney L.: *See—*
  - Hsu, Sawyer C. Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 5,016,947, Cl. 312-108.000.
- Vallat, Jean-Noel: *See—*
  - Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; Vallat, Jean-Noel; and Le Fur, Gerard, 5,017,579, Cl. 514-299.000.
- Valmet Paper Machinery Inc.: *See—*
  - Saukkonen, Seppo, 5,016,831, Cl. 242-55.000.
- Vanderbilt, Herbert J.; and Modert, Timothy D., to Amway Corporation. Method of making a water filter. 5,017,318, Cl. 264-113.000.
- Vandergriff, Arvel L., to Consolidated HGM Corp. Cotton gin feeder and preginner. 5,016,320, Cl. 19-40.000.
- van der Groep, L. A. Polymer composition, a process for its manufacture, and a thermoplastic moulding composition. 5,017,659, Cl. 525-222.000.
- van der Putten, Andreas M. T. P., to U.S. Philips Corporation. Method of manufacturing a semiconductor device. 5,017,516, Cl. 437-230.000.
- Van Der Stelt, Ernest O. W.: *See—*
  - Heijnen, Godefridus H. C.; Mulder, Cornelis A. M.; and Van Der Stelt, Ernest O. W., 5,017,825, Cl. 313-112.000.
- van Drunen, Johannes R. Method and arrangement and method for the manufacturing of coated mouldings, in particular of capsules containing pharmaceutical materials and are meant to be used as medicine. 5,017,401, Cl. 427-3.000.
- Van Issum, Bernhard E.: *See—*
  - Clitherow, Barbara M.; Dean, Trevor W. R.; Gascoigne, John A.; and Van Issum, Bernhard E., 5,017,268, Cl. 162-146.000.
- Varaprath, Padmakumari J.: *See—*
  - Wright, Antony P.; and Varaprath, Padmakumari J., 5,017,717, Cl. 556-413.000.
- Varghese, George: *See—*
  - Backes, Floyd J.; Varghese, George; and Kaufman, Charles W., 5,018,137, Cl. 370-85.130.
- Varian, S.p.A.: *See—*
  - Busso, Mario; and Audi, Mauro, 5,017,836, Cl. 315-111.910.
- Vayda, Mark. Timed cycle single stop shopping facility. 5,016,736, Cl. 186-53.000.
- Vazquez, Manuel A.: *See—*
  - Aligue , Jordi C.; and Vazquez, Manuel A., 5,016,345, Cl. 29-742.000.
- Veenhof, Willem D., to Martin Engineering Company. Barrier seal for conveyor skirtboard. 5,016,747, Cl. 198-525.000.
- Vehar, Gordon A.: *See—*
  - O'Brien, Donogh P.; and Vehar, Gordon A., 5,017,556, Cl. 514-2.000.
- Velazquez Garcia, Rafael, to Uralita, S.A. Process for the manufacuture of stratified pieces such as roof tiles and wall tiles. 5,017,320, Cl. 264-148.000.
- Velie, Wallace W.; Lewis, William T.; and Haney, Donald C., to Scheu Manufacturing Company. Porous ceramic gas burner. 5,017,129, Cl. 431-326.000.
- VeloBind, Inc.: *See—*
  - Todaro, Frank A.; and Hotkowski, Peter, 5,017,071, Cl. 412-43.000.
- Venditto, James J.: *See—*
  - McCabe, Michael A.; Wilson, J. Michael; Weaver, Jimmie D.; and Venditto, James J., 5,016,714, Cl. 166-308.000.
- Ventura, Peter: *See—*
  - Taiariol, Van; Oakley, Robert V.; and Ventura, Peter, 5,017,490, Cl. 435-240.200.
- Venturi Applications, Inc.: *See—*
  - Willis, Mark T., 5,016,837, Cl. 244-12.100.
- Verbeek, Robert J. M., to AT&T Bell Laboratories. Digital phase-locked loop using a tapped delay line in a phase meter. 5,017,889, Cl. 331-1.00A.
- Verduijn, Johannes P., to Exxon Research and Engineering Co. Recycled zeolite L preparation. 5,017,353, Cl. 423-328.000.
- Verini, Maria A.: *See—*
  - Lazzari, Ettore; Arcamone, Federico; Penco, Sergio; Verini, Maria A.; and Mongelli, Nicola, 5,017,599, Cl. 514-422.000.
- Verlohr, Axel: *See—*
  - Kuhlmann, Klaus; Elstner, Siegfried; Sonnemann, Manfred; Schweiger, Franz; Verlohr, Axel; Muyssen, John; and Lybeer, Roger, 5,018,097, Cl. 364-900.000.
- Vermaat, Huibrecht P., to Vermaat Technics B.V. Apparatus for inspecting and repairing the tubes of a nuclear power plant. 5,017,329, Cl. 576-249.000.
- Vermaat Technics B.V.: *See—*
  - Vermaat, Huibrecht P., 5,017,329, Cl. 576-249.000.
- Vesuvius Crucible Company: *See—*
  - Hanse, Eric; and Rancoulle, Gilbert, 5,016,788, Cl. 222-590.000.

- Vette Products, Inc.: *See—*
  - Thompson, John E.; Gonzalez, Angelo; Bursel, Joseph S.; and Aust, Hampton L., III, 5,016,861, Cl. 267-44.000.
- Vickers, Incorporated: *See—*
  - Burgess, Roy T.; Campau, Gregory P.; Claar, Leslie M.; Hodges, Robert C.; Snow, Douglas G.; and Taylor, Roy, 5,017,095, Cl. 417-222.00R.
  - Hansen, Lowell D., 5,017,086, Cl. 415-55.500.
  - Hansen, Lowell D.; Hurley, J. Richard; Schweitzer, Jean J.; and Zoya, Walter J., 5,017,098, Cl. 417-302.000.
- Victor Company of Japan, Ltd.: *See—*
  - Kitamura, Hiroki; Takanashi, Itsuo; Yamamura, Takashi; Ichitou, Toshikatsu; and Tai, Hiromichi, 5,017,944, Cl. 346-108.000.
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,018,018, Cl. 358-213.110.
- Vidovic, Gerda. Toothbrush with absorbent pad. 5,017,036, Cl. 401-283.000.
- Vincent, Brian J.: *See—*
  - Corr, James L.; and Vincent, Brian J., 5,018,144, Cl. 371-22.300.
- Vinson, Paul. Planetary lap. 5,016,399, Cl. 51-118.000.
- Violette, John A.; and Mashey, Thomas, to United Technologies Corporation. Rotor blade retention. 5,017,092, Cl. 416-204.00A.
- Virovahl, S.A.: *See—*
  - Vahlne, Anders; Svennerholm, Bo; Rymo, Lars; Jeansson, Stig; and Horal, Peter, 5,017,687, Cl. 530-324.000.
- VLSI Technology, Inc.: *See—*
  - Ul Haq, Mohammed E.; and Smits, Kenneth R., 5,018,106, Cl. 365-203.000.
- Vock, Josef; Ljungstroem, Jan; and Ekwall, Christer, to Siemens Aktiengesellschaft. Implantable medical device with means for telemetric transmission of data. 5,016,634, Cl. 128-419.0PT.
- Voege, John S.: *See—*
  - Carter, William; Meadows, David A.; Hayes, Jay L.; and Voege, John S., 5,016,673, Cl. 138-45.000.
- Voegeli, Otto: *See—*
  - Krounbi, Mohamad T.; Voegeli, Otto; and Wang, Po-Kang, 5,018,037, Cl. 360-113.000.
- Vogt, Siegfried: *See—*
  - Sadlack, Werner; Vogt, Siegfried; Upmeier, Egon; and Schulze, Wolfram, 5,016,549, Cl. 112-104.000.
- Vollmerhausen, Robert H. Lateral access river transit system. 5,016,309, Cl. 14-71.700.
- Von Roll Transportsysteme AG: *See—*
  - Feuz, Fritz; Hora, Ferdinand; and Linder, Fritz, 5,016,539, Cl. 104-28.000.
- von Braun, Hans: *See—*
  - Walker, Richard C.; and von Braun, Hans, 5,018,190, Cl. 379-95.000.
- Von Roedern, Bolko: *See—*
  - Madan, Arun; and Von Roedern, Bolko, 5,016,562, Cl. 118-719.000.
- Von Scheidt, Jurgen: *See—*
  - Arlt, Joachim; Dobrusskin, Alexander; Von Scheidt, Jurgen; and Heider, Jurgen, 5,017,839, Cl. 315-219.000.
- Vore, Danny D. Window shade conveyor system. 5,016,701, Cl. 160-241.000.
- Voss, Harald: *See—*
  - Miethe, Peter; Voss, Harald; and Gruber, Ronald, 5,017,476, Cl. 435-61.000.
- Vrudhula, Vivekananda M.: *See—*
  - Hylarides, Mark D.; Srinivasan, Ananthachari; Fitzner, Jeffrey N.; and Vrudhula, Vivekananda M., 5,017,693, Cl. 530-390.000.
- VTU "Angel Kantchev": *See—*
  - Mitkov, Atanas L.; Georgiev, Ivan N.; Atanassov, Atanas K.; Radulov, Peter T.; and Stoyanov, Iliya Y., 5,017,177, Cl. 460-46.000.
- Vyas, Girish N., to University of California, The Regents of the. Synthetic vaccine peptide epitomes of hepatitis B surface antigen. 5,017,558, Cl. 514-14.000.
- W. A. Lane, Inc.: *See—*
  - Davis, Steven D., 5,016,426, Cl. 53-554.000.
- W. L. Gore & Associates, Inc.: *See—*
  - Garcia, Rudy J., 5,017,160, Cl. 439-750.000.
- W. R. Grace & Co.-Conn.: *See—*
  - Bansleben, Donald A.; Carter, Charles G.; and Kumar, Ranjit, 5,017,306, Cl. 252-389.230.
  - Gartner, Ellis M.; Myers, David F.; and Gaidis, James M., 5,017,234, Cl. 106-781.000.
  - Quirk, Jennifer M., 5,017,690, Cl. 530-335.000.
- W. Schlafhorst AG & Co.: *See—*
  - Kamp, Heinz, 5,016,434, Cl. 57-313.000.
  - Wey, Edmund, 5,016,830, Cl. 242-35.50A
- Wachman, Elliot S.: *See—*
  - Edelstein, Daniel C.; Wachman, Elliot S.; and Tang, Chung I., 5,017,806, Cl. 307-428.000.
- Wada, Satoshi, to NEC Corporation. Magnetic tape apparatus with loading mechanism. 5,018,031, Cl. 360-96.500.
- Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, to C.A. Blockers, Inc. Cigarette manufacturing process. 5,016,655, Cl. 131-310.000.
- Wadhwa, Lachman; Bitritto, Michel; and Powers, Edward J., to Hoechst Celanese Corp. High performance thermally stable polybenzimidazole film. 5,017,681, Cl. 528-342.000.
- Wagenknecht, Dietmar: *See—*
  - Escobar, Agustin; Wagenknecht, Dietmar; and Malick, Ahmad W., 5,017,609, Cl. 514-538.000.
- Wagner, Daniel B., to Becton, Dickinson and Company. Homogeneous chemiluminescence immunoassay using a light absorbing material. 5,017,473, Cl. 435-7.920.
- Wagner, Hans: *See—*
  - Greiser, Wolfgang; Plotz, Kurt; Wagner, Hans; and Zerfass, Karl-Christian, 5,017,426, Cl. 428-280.000.
- Wagner, Richard L.; and Weber, William C. Clamping assembly. 5,016,694, Cl. 144-144.50R.
- Wahlquist, Randy W.; Reinarts, John M.; and Francis, Timothy L., to Westinghouse Electric Company. Utilization of sponge metal fines. 5,017,219, Cl. 75-415.000.
- Waidhofer, Michael. Radar detector adaptor. 5,017,144, Cl. 439-34.000.
- Wakabayashi, Sadao: *See—*
  - Nagaoka, Kazuo; Hatano, Tadao; Wakabayashi, Sadao; and Shimizu, Takamitsu, 5,016,359, Cl. 33-702.000.
- Wakita, Junichi: *See—*
  - Kawano, Osamu; Takahashi, Manabu; Wakita, Junichi; and Esaka, Kazuyoshi, 5,017,248, Cl. 148-320.000.
- Waldron, Robert D. Systems for deviating and (optionally) converging radiation. 5,016,980, Cl. 350-286.000.
- Walker, Del E.; and Early, Stephen R., to Aera Transportation Products, Inc. Boxcar door having balsa core sandwich construction. 5,016,395, Cl. 49-501.000.
- Walker, Richard C.; and von Braun, Hans, to Hewlett-Packard Company. Device to block unauthorized modem access over a PBX line. 5,018,190, Cl. 379-95.000.
- Walker, William R.; and Lukowski, George W., to Hydro-Craft, Inc. Method and apparatus for stamping weld adapters. 5,016,461, Cl. 72-336.000.
- Walli, Richard A.: *See—*
  - Price, Thomas L.; Walli, Richard A.; and Phipps, Peter G., 5,017,200, Cl. 55-96.000.
- Wallner, Jane; and Yu, Kevin, to Hughes Aircraft Company. Photosensitive emulsion for holographic plates and method. 5,017,447, Cl. 430-2.000.
- Wallquist, Olof: *See—*
  - Rochat, Alain C.; Iqbal, Abul; and Wallquist, Olof, 5,017,706, Cl. 548-414.000.
- Walters, Harry J., to Oberg Industries. Method and apparatus for detecting a sheet strip material misfeed condition. 5,017,792, Cl. 250-548.000.
- Walts, Alan E.: *See—*
  - Burns, James W.; Cox, Steven; and Walts, Alan E., 5,017,229, Cl. 106-162.000.
- Wanek, Erich; Baumgartinger, Josef; Schobesberger, Manfred; Stadlbauer, Rupert; and Weinrotter, Klaus, to Lenzing Aktiengesellschaft. Apparatus for producing high-temperature resistant polymers in powder form. 5,017,110, Cl. 425-7.000.
- Wang, Guo-Chi. Imitated carved wooden door having three-dimensional panel structure. 5,016,414, Cl. 52-456.000.
- Wang, Po-Kang: *See—*
  - Krounbi, Mohamad T.; Voegeli, Otto; and Wang, Po-Kang, 5,018,037, Cl. 360-113.000.
- Warashina, Naomi: *See—*
  - Inoue, Kazuo; Konno, Tsuneo; Moriya, Takashi; Warashina, Naomi; Ueyama, Masaki; Hata, Toshinobu; Hamabe, Kenji; Matsuno, Tomoyoshi; Shimada, Hiroo; Gotou, Tetsuo; and Nagata, Morimasa, 5,016,584, Cl. 123-195.00R.
- Warburton, Charles E., Jr.: *See—*
  - Bredow, Charles W.; Schindler, Frederick J., and Warburton, Charles E., Jr., 5,017,632, Cl. 523-400.000.
- Ward, Brian S.: *See—*
  - Belknap, James D.; and Ward, Brian S., 5,018,053, Cl. 362-104.000.
- Ward, John F., to Canplas Industries Limited. Pipe clamp. 5,016,843, Cl. 248-68.100.
- Ward, Michael B.: *See—*
  - Deason, Vance A.; and Ward, Michael B., 5,016,951, Cl. 350-3.670.
- Ward, Mona; Ph.Settembre, Pierre-Andre ; Renaud, Alain; and Langlois, Michel, to Delalande S.A. Derivatives of 1-[3-(4-hydroxyphenyl) 1-hydroxy 1-propyl] benzene substituted in position 2 by an aminoalkyleneoxy chain, the method of preparing same and the application thereof to therapeutics. 5,017,572, Cl. 514-218.000.
- Ward, Richard. Security device for clothing. 5,016,758, Cl. 211-4.000.
- Ward, Rodney L.: *See—*
  - Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 5,017,324, Cl. 264-510.000.
- Warner-Lambert Company: *See—*
  - Belliotti, Thomas R.; and Kostlan, Catherine R., 5,017,604, Cl. 514-482.000.
- Warnock, Charles F., legal representative: *See—*
  - Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.
- Warnock, William A., deceased: *See—*
  - Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.
- Warren, deceased, Ian H.: *See—*
  - Alford, Raymond E.; and Warren, deceased; Ian H., 5,017,276, Cl. 204-290.00R.

VOL
1126
ISS
3
MY
21
1991
UMI

- Warrer, Bob: *See—*
  - Schwarz, Dick; Warrer, Bob; Musgrave, Mike; Cruson, Bob; Gordon, Christa; and Weinert, Todd, 5,017,436, Cl. 428-519.000.
- Wash, Michael L.; Pearson, Douglas H.; and Kelbe, Richard R., to Eastman Kodak Company. Film mid roll interrupt protection for a camera using magnetic azimuth recording on film. 5,017,326, Cl. 354-207.000.
- Wass, Anthony C. L.: *See—*
  - Peters, Andrew C.; and Wass, Anthony C. L., 5,017,035, Cl. 401-132.000.
- Watanabe, Akihiko: *See—*
  - Sugiyama, Tsutomu; and Watanabe, Akihiko, 5,018,110, Cl. 365-230.090.
- Watanabe, Kenjiro: *See—*
  - Aratani, Katsuhisa; Kohno, Minoru; and Watanabe, Kenjiro, 5,018,119, Cl. 369-13.000.
- Watanabe, Kiyoshi: *See—*
  - Nakamura, Yoshio; Ogura, Masahiro; Shimada, Yoshio; Watanabe, Kiyoshi; and Takahashi, Hideyuki, 5,017,484, Cl. 435-158.000.
- Watanabe, Makoto: *See—*
  - Maenishi, Kozo; and Watanabe, Makoto, 5,018,050, Cl. 361-386.000.
- Watanabe, Masaya: *See—*
  - Nakayama, Shinji; Watanabe, Masaya; and Abe, Shuichi, 5,018,064, Cl. 364-200.000.
- Watanabe, Motoyuki: *See—*
  - Koishi, Musubu; and Watanabe, Motoyuki, 5,017,829, Cl. 313-382.000.
- Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, to Hitachi Maxell, Ltd. Coiled lithium battery. 5,017,442, Cl. 429-94.000.
- Watanabe, Satoshi: *See—*
  - Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshihiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, 5,016,890, Cl. 273-312.000.
- Watanabe, Takashi: *See—*
  - Masuda, Kazuaki; Saito, Akio; Kashino, Toshio; and Watanabe, Takashi, 5,017,946, Cl. 346-140.00R.
- Watanabe, Yasuhiro; Kato, Takahiro; Utsumi, Masayuki; Hamada, Masaki; Takakura, Hiroshi; Hasegawa, Taketo; Shimizu, Masaaki; Sagoh, Masaki; Furukawa, Fumio; Ishizawa, Yasuhisa; Minagawa, Takashi; Tanaka, Kensaku; and Ina, Kenzoh, to Canon Kabushiki Kaisha. Image processing system. 5,018,083, Cl. 364-523.000.
- Watanabe, Yasuhiro: *See—*
  - Hashimoto, Masayasu; Yoneyama, Hirofumi; and Watanabe, Yasuhiro, 5,018,156, Cl. 372-44.000.
- Watanabe, Yoshiaki: *See—*
  - Tanaka, Sakae; and Watanabe, Yoshiaki, 5,017,984, Cl. 357-23.700.
- Waters, Gregory M.: *See—*
  - Simcoe, Robert J.; and Waters, Gregory M., 5,018,142, Cl. 370-112.000.
- Wathen, Ronald L.: *See—*
  - Miler, Steven L.; Wathen, Ronald L.; and Palazzo, Raymond E., Jr., 5,017,284, Cl. 210-97.000.
- Watkins, Robert W.: *See—*
  - Neustadt, Bernard R.; Andrews, David R.; McNamara, Paul E.; and Watkins, Robert W., 5,017,567, Cl. 514-171.000.
- Watkinson, Charles J.; and Elvidge, John H. Method and apparatus for forming glass flakes. 5,017,207, Cl. 65-66.000.
- Watson, David E. Snow ridger. 5,016,366, Cl. 37-220.000.
- Watson, Kenneth E.: *See—*
  - Watson, William L.; and Watson, Kenneth E., 5,016,486, Cl. 74-205.000.
- Watson Welding & Mfg. Inc.: *See—*
  - Watson, William L.; and Watson, Kenneth E., 5,016,486, Cl. 74-205.000.
- Watson, William L.; and Watson, Kenneth E., to Watson Welding & Mfg. Inc. Reversing drive mechanism. 5,016,486, Cl. 74-205.000.
- Waymouth, John F.: *See—*
  - Bouchard, Andre C.; and Waymouth, John F., 5,017,831, Cl. 313-558.000.
- Weaver, Jimmie D.: *See—*
  - McCabe, Michael A.; Wilson, J. Michael; Weaver, Jimmie D.; and Venditto, James J., 5,016,714, Cl. 166-308.000.
- Weaver, Lindsay A., Jr.: *See—*
  - Ames, William G.; Jacobs, Irwin M.; Weaver, Lindsay A., Jr.; and Gilhousen, Klein S., 5,017,926, Cl. 342-353.000.
- Web Printing Controls Co., Inc.: *See—*
  - Sikes, Dale R., 5,018,213, Cl. 382-8.000.
- Weber, Frank J.; Liljeqvist, Lance R.; and Prisco, Richard S., to Ralston Purina Company. Pet food package and dispenser. 5,016,572, Cl. 119-52.100.
- Weber, Georg. Pressure bar for a belt grinding machine. 5,016,400, Cl. 51-141.000.
- Weber, Georg, to Steyr-Daimler-Puch AG. Wheel suspension for vehicles. 5,016,904, Cl. 280-664.000.
- Weber, Larry J.: *See—*
  - Bovee, Loren L.; and Weber, Larry J., 5,016,857, Cl. 251-304.000.
- Weber, William C.: *See—*
  - Wagner, Richard L.; and Weber, William C., 5,016,694, Cl. 144-144.50R.
- Webster, Andrea M.: *See—*
  - Boyd, Andrew J.; and Webster, Andrea M., 5,017,749, Cl. 219-64.000.
- Weck, Franz, to H. Krantz GmbH & Co. Air outlet for imparting a spin flow to air passing therethrough. 5,016,525, Cl. 98-40.120.
- Weeks, Don J.: *See—*
  - Manns, William G.; Wood, Anthony B.; Norwood, David A.; Weeks, Don J.; and Gordon, Michael, 5,018,212, Cl. 382-8.000.
  - Merryman, Jerry D.; Penn, Thomas C.; Manns, William G.; Weeks, Don J.; and Wood, Anthony B., 5,018,210, Cl. 382-8.000.
- Wegner, David K.; and Schlicht, Larry J., to Stanley Works, The. Insulated metal panel garage door. 5,016,700, Cl. 160-232.000.
- Wegner, Wayne M.: *See—*
  - Simonsen, Steve H.; Tomic, Mladomir; and Wegner, Wayne M., 5,017,021, Cl. 383-63.000.
- Wehling, Klaus: *See—*
  - Fossati, Piero; Heidenreich, Holger; Hugl, Herbert; and Wehling, Klaus, 5,017,498, Cl. 436-84.000.
- Wehr, Don H., to Williams, Darrell H.; and Griffin, George A. Absorption apparatus, method for producing a refrigerant effect, and an absorbent-refrigerant solution. 5,016,445, Cl. 62-101.000.
- Wehrli, Henry A., III: *See—*
  - Phillips, Norman J.; Leksell, David; Wehrli, Henry A., III; Barrow, William A.; and Kruskopf, Mark S., 5,017,824, Cl. 313-13.000.
- Wehrli, Rudolf; and Stalder, Herbert, to Rieter Machine Works, Ltd. High-draft drafting device for a flyerless spinning process. 5,016,323, Cl. 19-258.000.
- Weick, Heinz H. Dispenser for the vaporization of active substances to be inhaled. 5,016,425, Cl. 53-453.000.
- Weihrauch, Bruce W.: *See—*
  - Falline, Brian J.; and Weihrauch, Bruce W., 5,017,634, Cl. 524-267.000.
- Weinerman, Lee S., to Eastern Company, The. Door construction. 5,016,393, Cl. 49-395.000.
- Weinert, Todd: *See—*
  - Schwarz, Dick; Warrer, Bob; Musgrave, Mike; Cruson, Bob; Gordon, Christa; and Weinert, Todd, 5,017,436, Cl. 428-519.000.
- Weinrotter, Klaus: *See—*
  - Wanek, Erich; Baumgartinger, Josef; Schobesberger, Manfred; Stadlbauer, Rupert; and Weinrotter, Klaus, 5,017,110, Cl. 425-7.000.
- Weiskel, Lillith M., legal representative: *See—*
  - Hollingsworth, John D.; Garrison, Joe K.; Collins, Joel C.; Warnock, William A., deceased; Weiskel, Lillith M., legal representative; Warnock, Charles F., legal representative; Pergande, Lormine, legal representative; and Nyberg, Muriel R., legal representative, 5,016,321, Cl. 19-98.000.
- Weiss, Gerhard: *See—*
  - Holzinger, Reinhard; and Weiss, Gerhard, 5,017,120, Cl. 425-150.000.
- Weiss, John W., to Minnesota Mining and Manufacturing Company. Dual conductor wristband. 5,018,044, Cl. 361-220.000.
- Weissman, Bernard. Dental tool reamer capable of following natural curvature of tooth canal. 5,017,137, Cl. 433-102.000.
- Weit, Herbert: *See—*
  - Michelsen, Ralph; Schulze-Brockhausen, Udo; Weit, Herbert; and Schmitz, Erwin, 5,016,826, Cl. 241-72.000.
- Welander, Ulf: *See—*
  - McDavid, W. Doss; Dove, S. Brent; Welander, Ulf; and Tronje, Gunilla, 5,018,177, Cl. 378-62.000.
- Welborn, Howard C., Jr., to Exxon Chemical Patents Inc. Silicon-bridged transition metal compounds. 5,017,714, Cl. 556-12.000.
- Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Garcia, Evaristo, Jr., to Texas Instruments Incorporated. Method of making a scalable fuse link element. 5,017,510, Cl. 437-192.000.
- Welch, Robert J.; Nattress, Robert H.; Nitkowski, Robert E.; and Beakley, Westcoat, to InterMetro Industries Corporation. Modular utility cart. 5,016,948, Cl. 312-250.000.
- Wenger, Jean; Winternitz, Paul; and Zeller, Martin, to Ciba-Geigy Corporation. Heterocyclic compounds. 5,017,211, Cl. 71-92.000.
- Wentrcek, Paul R.: *See—*
  - Fellmann, Jere; Wentrcek, Paul R.; and Kilner, Peter, 5,017,735, Cl. 585-820.000.
- Werner, Siegfried: *See—*
  - Hans, Waldemar; Kind, Wilhelm; Kirchner, Manfred; and Werner, Siegfried, 5,016,821, Cl. 239-585.000.
- Werzalit AG & Cl.: *See—*
  - Munk, Edmund, 5,016,416, Cl. 52-539.000.
- West, Bernard M.: *See—*
  - Ingwersen, Peter; and West, Bernard M., 5,017,078, Cl. 414-417.000.
- West, Åke: *See—*
  - Lundstrom, Per-Åke; Andersson, Gunnar A.; West, Åke; and Magi, Juhan, 5,017,218, Cl. 75-388.000.
- Western Digital Corporation: *See—*
  - Hull, Richard W.; and O'Shaughnessy, Timothy G., 5,017,919, Cl. 341-136.000.
- Western Rock Bit Company Limited: *See—*
  - White, Kenneth M., 5,016,719, Cl. 175-353.000.
- Westfalia Separator AG: *See—*
  - Lehmann, Hanno; and Zettier, Karl-Heinz, 5,017,396, Cl. 426-491.000.
- Westfall, Robert S.: *See—*
  - Platteter, Dale T.; and Westfall, Robert S., 5,018,143, Cl. 371-16.400.
- Westinghouse Electric Company: *See—*
  - Wahlquist, Randy V.; Reinarts, John M.; and Francis, Timothy L., 5,017,219, Cl. 75-415.000.

- Westinghouse Electric Corp.: *See—*
  - Adam, John D.; and Talisa, Salvador H., 5,017,896, Cl. 333-134.000.
  - Brunner, Michael G., 5,017,761, Cl. 219-502.000.
  - Buck, Daniel C.; and Stitzer, Steven N., 5,017,895, Cl. 333-134.000.
  - Cross, Michael A.; and Nichols, Edward W., 5,017,004, Cl. 356-121.000.
  - Engel, Joseph C.; Mueller, Denis A.; and Bennett, Allan I., 5,017,859, Cl. 324-127.000.
  - Fox, David A., 5,017,857, Cl. 322-25.000.
  - Humphrey, Martin D.; and Johnson, Alfred N., 5,017,788, Cl. 250-385.100.
  - Phillips, Norman J.; Leksell, David; Wehrli, Henry A., III; Barrow, William A.; and Kruskopf, Mark S., 5,017,824, Cl. 313-13.000.
  - Tran, Mank H., 5,017,091, Cl. 416-193.00A.
  - Whitlow, Graham A.; and Iyer, Natraj C., 5,017,553, Cl. 505-1.000.
- Wey, Edmund, to W. Schlafhorst AG & Co. Method and device for combining pairs of cheeses. 5,016,830, Cl. 242-35.50A.
- Wheeler, Douglas E. Combination camera to produce multiple prints, and print viewing device. 5,017,952, Cl. 354-76.000.
- Wheeler, Douglas J.: *See—*
  - Clere, Thomas M.; Abbaschian, Gholamreza J.; Wheeler, Douglas J.; and Barnes, Albert L., 5,017,217, Cl. 75-244.000.
- Wheeler, Jack M.: *See—*
  - Smith, Gaylord D.; Tassen, Curtis S.; Ganesan, Pasupathy; and Wheeler, Jack M., 5,017,249, Cl. 148-410.000.
- Whewell, Christopher J.; Clouser, Sidney J.; and Lee, Chin-ho, to Gould Inc. Method for printed circuit board pattern making using selectively etchable metal layers. 5,017,271, Cl. 204-15.000.
- Whitaker, Stephen: *See—*
  - Iversen, Arthur H.; and Whitaker, Stephen, 5,018,181, Cl. 378-144.000.
- White, Donald A., to Exxon Chemical Patents, Inc. Selective catalytic process for preparing N-halothiosulfonamide modified EPDM terpolymers. 5,017,662, Cl. 525-351.000.
- White, Edward B. Shield for a vehicle windshield. 5,016,937, Cl. 296-97.700.
- White, Jackie L.: *See—*
  - Bernasek, Edward; Hildebolt, William M.; Shannon, Michael D.; Shelar, Gary R.; and White, Jackie L., 5,016,654, Cl. 131-302.000.
- White, Jeffrey. Selectively operated gerotor device. 5,017,101, Cl. 417-310.000.
- White, Kenneth M., to Western Rock Bit Company Limited. Rotary cone type rock bits. 5,016,719, Cl. 175-353.000.
- White, Timothy E.: *See—*
  - Jungkman, David L.; and White, Timothy E., 5,017,786, Cl. 250-352.000.
- Whitlow, Graham A.; and Iyer, Natraj C., to Westinghouse Electric Corp. High temperature superconductor having a high strength thermally matched high temperature sheath. 5,017,553, Cl. 505-1.000.
- Whitman, David C.: *See—*
  - McGarvey, David C.; and Whitman, David C., 5,016,689, Cl. 141-198.000.
- Whitten, Jeffrey P.: *See—*
  - Matthews, Donald P.; Whitten, Jeffrey P.; and McCarthy, James B., 5,017,591, Cl. 514-369.000.
- Wick, Carl J.: *See—*
  - Kennard, Dwight C., Jr.; Kennard, James C.; and Wick, Carl J., 5,016,768, Cl. 212-262.000.
- Wickes Manufacturing Company: *See—*
  - Thomas, Gary R.; and Huebner, Mark A., 5,016,392, Cl. 49-352.000.
- Wicklow, Donald T.: *See—*
  - Dowd, Patrick F.; Wicklow, Donald T.; Gloer, James B.; and Rinderknecht, Brad L., 5,017,598, Cl. 514-415.000.
- Widmer, Hansruedi: *See—*
  - Papritz, Franz; and Widmer, Hansruedi, 5,016,854, Cl. 248-563.000.
- Wiedmann, Rainer: *See—*
  - Fischer, Matthias; Wiedmann, Rainer; Fadler, Kurt; and Jeppe, Harald, 5,016,744, Cl. 192-106.200.
- Wienecke, Horst P., to Procter & Gamble Company, The. Chewing gum. 5,017,385, Cl. 426-5.000.
- Wierzba, Robert B.: *See—*
  - McKinney, John M.; Ata, Ali D.; Wierzba, Robert B.; and Flowers, William F., 5,016,666, Cl. 137-1.000.
- Wiffin, Richard E.: *See—*
  - Barnett, Barry R. M.; and Wiffin, Richard E., 5,016,336, Cl. 29-281.500.
- Wijburg, Rutger C. M.: *See—*
  - Middelhoek, Jan; Hemink, Gerrit-Jan; and Wijburg, Rutger C. M., 5,017,978, Cl. 357-23.500.
- Wiklund, Ola: *See—*
  - Bjoerk, Erik; and Wiklund, Ola, 5,018,183, Cl. 378-173.000.
- Wilcox, Edward: *See—*
  - Herrnstadt, Corinna; and Wilcox, Edward, 5,017,373, Cl. 424-93.000.
- Wilcox, Milton E., to National Semiconductor Corp. Adaptive gate discharge circuit for power FETS. 5,017,816, Cl. 307-570.000.
- Wilk, Peter J. Collapsible receptacle assembly and related method. 5,016,772, Cl. 220-8.000.
- Willer, Rodney L.; Park, Dennis; and Stern, Alfred G., to Thiokol Corporation. Preparation of cyanogen from glyoxime. 5,017,356, Cl. 423-384.000.
- Williams, Darrell H.: *See—*
  - Wehr, Don H., 5,016,445, Cl. 62-101.000.
- Williams, David L.; and Southwick, Everett W., to Philip Morris Inc. Smoking compositions containing a 2,5-diacylpyrazine flavorant additive. 5,017,235, Cl. 131-278.000.
- Williams Electronics Games, Inc.: *See—*
  - Loffredo, Mark D., 5,016,876, Cl. 273-437.000.
- Williams, Gregory E.: *See—*
  - Miller, William J.; Nolan, Daniel A.; and Williams, Gregory E., 5,017,206, Cl. 65-3.110.
- Williams, Haydn R.: *See—*
  - Young, Robert N.; Rokach, Joshua; Williams, Haydn R.; Kakushima, Masatoshi; and Guindon, Yvan, 5,017,583, Cl. 514-312.000.
- Williams, Ronnie E. Discrete lens eyeglasses. 5,016,999, Cl. 351-41.000.
- Williams, Samuel R., to Timken Company, The. Bearing assembly for a shaft journal. 5,017,025, Cl. 384-584.000.
- Williams, Terrell; Keimel, John G.; Rugland, Roger; Sandstrom, Richard; and Holleman, Timothy. Medical electrode lead. 5,016,645, Cl. 128-784.000.
- Williams, Timothy J.; and Baydar, Ertugrul, to Alcatel NA Network Systems Corp. SONET 4h byte receiver and filter. 5,018,132, Cl. 370-13.000.
- Williams Trading B.V.: *See—*
  - Ten Wolde, Anne W., 5,016,781, Cl. 222-162.000.
- Williamson, Nic. Apparatus for dispensing measured amounts of fluid from an open-ended pouch. 5,016,779, Cl. 222-95.000.
- Willis, John M., to Bell Helicopter Textron Inc. Electrical detection of shear pin operation. 5,017,912, Cl. 340-679.000.
- Willis, Mark T., to Venturi Applications, Inc. Venturi enhanced airfoil. 5,016,837, Cl. 244-12.100.
- Williston, Dale B.; and McGinn, David R. Tingle voltage filter. 5,018,042, Cl. 361-42.000.
- Wilson, Bill B.: *See—*
  - Krehbiel, Fred L.; Wilson, Bill B.; and Colleran, Stephen A., 5,017,162, Cl. 439-752.000.
- Wilson, Gary F.; and Eckstein, Yona, to BF Goodrich Company, The. Moldable low density thermoplastic composite with hollow glass spheres and the method for compounding. 5,017,629, Cl. 523-219.000.
- Wilson, J. Michael: *See—*
  - McCabe, Michael A.; Wilson, J. Michael; Weaver, Jimmie D.; and Venditto, James J., 5,016,714, Cl. 166-308.000.
- Wilson, Michael L., to Unisys Corporation. Variable data rate clock synthesizer. 5,018,170, Cl. 375-120.000.
- Wilson Sporting Goods Co.: *See—*
  - Jonkouski, Gail C., 5,016,887, Cl. 273-232.000.
- Wiltron Company: *See—*
  - Oldfield, William W., 5,017,865, Cl. 324-158.00F.
- Winer, Ernst A.: *See—*
  - Bemis, Suzanne V.; Winer, Ernst A.; Leeds, Jeffrey L.; and Athey, Kevin D., 5,017,142, Cl. 434-220.000.
- Winterbottom, Walter L.; Badgley, J. Scott; and Baumgartner, Linda J., to Ford Motor Company. Thermal degreasing in reactive atmospheres and subsequent brazing of aluminum-based sheets or parts. 5,016,809, Cl. 228-205.000.
- Winternitz, Paul: *See—*
  - Wenger, Jean; Winternitz, Paul; and Zeller, Martin, 5,017,211, Cl. 71-92.000.
- Wirtgen, Reinhard. Milling device for cutting up road surfaces. 5,016,943, Cl. 299-87.000.
- Wischhusen, Heiner; and Kehlbeck, Hans, to Aladdin Synergetics, Inc. Multi-partition food storage and multiple serving apparatus. 5,016,756, Cl. 206-545.000.
- Wisconsin Alumni Research Foundation: *See—*
  - Divan, Deepakraj M., 5,017,800, Cl. 307-66.000.
  - Grasel, Timothy G.; and Cooper, Stuart L., 5,017,664, Cl. 525-454.000.
  - Pariza, Michael W.; and Ha, Yeong L., 5,017,614, Cl. 514-558.000.
- Wittek, Riccardo: *See—*
  - Stunnenberg, Hendrik G.; and Wittek, Riccardo, 5,017,487, Cl. 435-172.300.
- Wittrisch, Christian, to Institut Francais du Petrole. Method and device of seismic prospection in wells and particularly deviated wells. 5,016,727, Cl. 181-102.000.
- Wivagg, Adrian P.: *See—*
  - Falzarano, Michael J.; and Wivagg, Adrian P., 5,016,776, Cl. 220-305.000.
- Wixey, Barry D.: *See—*
  - Haffely, Jeff L.; Stahler, Mark G.; and Wixey, Barry D., 5,016,693, Cl. 144-253.00J.
- Woell, James B., to Union Camp Corporation. Processes for the conversion of myrcene to nerol and citral. 5,017,726, Cl. 568-448.000.
- Woike, Theo; Kerkmann, Detlef; Beier, Thomas; Krasser, Wolfgang; and Pescia, Danilo, to Forschungszentrum Julich GmbH. Method of and apparatus for the reading of magnetically stored information. 5,016,992, Cl. 350-376.000.
- Wojnarowski, Robert J.; and Eichelberger, Charles W., to General Electric Company. Reflector switched lasers. 5,018,150, Cl. 372-9.000.
- Wolbert, Harold A.: *See—*
  - Looman, Ernest W.; and Wolbert, Harold A., 5,017,118, Cl. 425-133.500.
- Wolf, James F.: *See—*
  - Shimek, Ronald J.; Shimek, Daniel C.; and Wolf, James F., 5,016,609, Cl. 126-85.00B.
- Wollnik, Hermann: *See—*
  - Kutscher, Roland; Grix, Raimund; Li, Gangqiang; and Wollnik, Hermann, 5,017,780, Cl. 250-287.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Wong, Hee; and Guinea, Jesus, to National Semiconductor Corporation. High resolution sample clock generator with deglitcher. 5,018,169, Cl. 375-119.000.

Wong, Martin, to Abbott Laboratories. Preparation of uniformly sized liposomes encapsulating an aqueous liquid. 5,017,501, Cl. 436-528.000.

Wood, Anthony B.: *See—*

Manns, William G.; Wood, Anthony B.; Norwood, David A.; Weeks, Don J.; and Gordon, Michael, 5,018,212, Cl. 382-8.000.

Merryman, Jerry D.; Penn, Thomas C.; Manns, William G.; Weeks, Don J.; and Wood, Anthony B., 5,018,210, Cl. 382-8.000.

Wood, Christi K.: *See—*

Tarlow, Kenneth A.; Wood, Russell P.; and Wood, Christi K., 5,016,617, Cl. 128-52.000.

Wood, Daniel A.: *See—*

McKinnie, Bonnie G.; and Wood, Daniel A., 5,017,728, Cl. 568-726.000.

Wood, John E.: *See—*

Jacobsen, Stephen C.; and Wood, John E., 5,016,481, Cl. 73-862.640.

Wood, Ross W., to Siemens-Bendix Automotive Electronics L.P. Electromagnetic fuel injector having split stream flow director. 5,016,819, Cl. 239-522.000.

Wood, Russell P.: *See—*

Tarlow, Kenneth A.; Wood, Russell P.; and Wood, Christi K., 5,016,617, Cl. 128-52.000.

Woog, Gunter. Disposable cell for recovering conductive metal and method of using. 5,017,273, Cl. 204-105.00R.

Woollam, Ronald F., to Canada, Her Majesty the Queen in right of, as represented by the Minister of Highways and Transportation. Road/-rail power unit. 5,016,544, Cl. 105-215.200.

Workman, Lester J. Flea killer compositions. 5,017,615, Cl. 514-560.000.

Works, Joseph W.; and Baker, Roger D. Fifth wheel trailer hitch assembly for pickup trucks and flat bed vehicles. 5,016,898, Cl. 280-433.000.

Worksaver, Inc.: *See—*

Burenga, Thomas I., 5,016,350, Cl. 29-891.200.

Worley, Eugene R., to Rockwell International Corporation. CMOS TTL input buffer using a ratioed inverter with a threshold voltage adjusted N channel field effect transistor. 5,017,811, Cl. 307-475.000.

Wraight, Peter D., to Schlumberger Technology Corporation. Methods and apparatus for evaluating formation characteristics while drilling a borehole through earth formations. 5,017,778, Cl. 250-254.000.

Wreede, John E.: *See—*

Moss, Gaylord E.; and Wreede, John E., 5,016,953, Cl. 350-3.660.

Wright, Antony P.; and Varaprath, Padmakumari J., to Dow Corning Corporation. Novel synthesis of difunctional halo organo noncarbon group IV main group element amides. 5,017,717, Cl. 556-413.000.

Wright, William S.; and Blitshteyn, Mark, to Simco Company, Inc., The. Corona current monitoring apparatus and circuitry for A.C. air ionizers including capacitive current elimination. 5,017,876, Cl. 324-464.000.

Wu, Biing-Seng, to Industrial Technology Research Institute. Amorphous silicon thin film transistor with a depletion gate. 5,017,983, Cl. 357-23.700.

Wu, Chau-Chin, to Integrated Device Technology, Inc. Combined ECL-to-TTL translator and decoder. 5,017,812, Cl. 307-475.000.

Wu, Jeng-Shyong. Bendable and deformable lamp string combination. 5,018,055, Cl. 362-238.000.

Wu, Sunny, to Datatech Enterprises Co., Ltd. Swivel mechanism for a monitor of a laptop computer. 5,016,849, Cl. 248-183.000.

Wu, Te-Kao, to Hughes Aircraft Company. Two layer matching dielectrics for radomes and lenses for wide angles of incidence. 5,017,939, Cl. 343-911.00R.

Wulf, Helmut: *See—*

Bahrle, Friedrich; Wulf, Helmut; and Kreeb, Helmut, 5,016,705, Cl. 165-41.000.

Wurzenberger, Johann: *See—*

Kerschner, Gunther; Wurzenberger, Johann; Hausmann, Herbert; Eckel, Giselher; and Friedrich, Peter, 5,018,059, Cl. 364-200.000.

Xerox Corporation: *See—*

Daughton, John W.; Jones, Jack E.; and Shaffer, Michael L., 5,017,972, Cl. 355-321.000.

Drake, Donald J., 5,017,941, Cl. 346-1.100.

Eddy, Clifford O.; Henry, Arnold W.; Lorenzo, Lynn; Chow, Che C.; Ferguson, Robert M.; and Finsterwalder, Robert N., 5,017,432, Cl. 428-422.000.

Fuller, Timothy J.; Solodar, Warren E.; Kang, Henry R.; Kaplan, Samuel; and Crandall, Raymond K., 5,017,644, Cl. 524-612.000.

Hamlin, Thomas J., 5,016,833, Cl. 242-66.000.

Herloski, Robert P., 5,018,025, Cl. 358-471.000.

Kamath, Venkatesh H., 5,016,867, Cl. 271-209.000.

Ong, Beng S.; Murti, Dasarao K.; and Fuller, John R. C., 5,017,645, Cl. 524-726.000.

Platteter, Dale T.; and Westfall, Robert S., 5,018,143, Cl. 371-16.400.

Street, Robert A.; and Kazan, Benjamin, 5,017,989, Cl. 357-30.000.

Tuhro, Richard W., 5,017,963, Cl. 355-218.000.

Xin, Lu B.: *See—*

Kovalenko, Thomas R.; and Xin, Lu B., 5,016,334, Cl. 29-38.00B.

Yabushita, Tatsuhisa: *See—*

Sato, Yoshinori; Yabushita, Tatsuhisa; Mieda, Yoshihiro; Kobayashi, Hiroyuki; Tanabe, Yasufumi; Watanabe, Satoshi; and Oguri, Hideyo, 5,016,890, Cl. 273-312.000.

Yachigo, Shinichi: *See—*

Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, 5,017,663, Cl. 525-397.000.

Yager, Deborah A.: *See—*

Clark, Paul H.; Yager, Deborah A.; and Clark, Randal W., Jr., 5,017,024, Cl. 384-482.000.

Yagi, Shinichi, to Casio Computer Co., Ltd. System for processing sales data on slips used in restaurants. 5,018,066, Cl. 364-405.000.

Yagi, Tetsuya: *See—*

Okada, Masato; Kohno, Masaki; and Yagi, Tetsuya, 5,018,158, Cl. 372-46.000.

Yagi, Yoshiaki: *See—*

Horino, Morikatsu; Kawabe, Manabu; and Yagi, Yoshiaki, 5,016,786, Cl. 222-504.000.

Yahagi, Susumu; Ishida, Shuichi; and Fujimoto, Shigeru, to Kabushiki Kaisha Toshiba. Method of repairing liquid crystal display and apparatus using the method. 5,017,755, Cl. 219-121.680.

Yajima, Hiroyoshi: *See—*

Suzuki, Yoshihiro; Yajima, Hiroyoshi; Shimada, Junichi; Shimoyama, Kenji; and Gotoh, Hideki, 5,018,159, Cl. 372-46.000.

Yale, Brian; and Fyles, Kenneth M., to Pilkington plc. Borosilicate glass compositions in corporating cerium oxide. 5,017,521, Cl. 501-64.000.

Yamachika, Hiroshi: *See—*

Kondo, Takanori; Yamachika, Hiroshi; Tanaka, Kunihiko; and Nishida, Yasuhiro, 5,017,713, Cl. 552-237.000.

Yamada, Akiyoshi; and Kanoh, Yoshiaki, to Ube Industries, Ltd. Blow molding apparatus. 5,017,126, Cl. 425-526.000.

Yamada, Hideo; Nakayama, Shozo; Iinuma, Mitsuhisa; and Tobiki, Hisao, to Nihon Medi-Physics Co., Ltd. Injector. 5,017,191, Cl. 604-243.000.

Yamada, Hiroshi; Ohuchi, Masayuki; Saito, Masayuki; and Hongu, Akinori, to Kabushiki Kaisha Toshiba. IC card having circuit modules for mounting electronic components. 5,018,051, Cl. 361-393.000.

Yamada, Masao: *See—*

Hayashi, Takao; and Yamada, Masao, 5,017,333, Cl. 376-382.000.

Yamada, Osamu: *See—*

Kaida, Kenichi; Yamada, Osamu; and Okuda, Eiji, 5,017,864, Cl. 324-158.00F.

Yamada, Takashi: *See—*

Komatsu, Keisaku; Yamada, Takashi; and Owatari, Toshimi, 5,017,303, Cl. 252-174.130.

Yamada, Toshihiro: *See—*

Shimaguchi, Takashi; Yamada, Toshihiro; Natori, Tatsuo; Okada, Akihisa; and Misumi, Hiroshi, 5,017,102, Cl. 417-420.000.

Yamada, Toshio; Kobayashi, Tohru; Nishizawa, Hirotaka, Itoh, Hiroyuki; and Saitoh, Tatsuya, to Hitachi, Ltd. Semiconductor device using MIS capacitor. 5,018,000, Cl. 357-51.000.

Yamada, Yasuhiro; Fujii, Masaki; and Shimomura, Seiji, to Dir. General, Agency of Industrial Science and Technology; and Koa Oil Company, Ltd. Preparation of elastic graphite materials. 5,017,358, Cl. 423-449.000.

Yamada, Yasushi, to Konica Corporation. Exposure device for copying apparatus. 5,017,971, Cl. 355-313.000.

Yamada, Yukio: *See—*

Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,017,961, Cl. 355-202.000.

Yamaguchi, Hidetaka: *See—*

Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.

Yamaguchi, Hiroshi, to Nissan Motor Co., Ltd. Jolt control for drive system. 5,016,494, Cl. 74-858.000.

Yamaguchi, Ikunori; and Ikenoue, Yoshikazu, to Minolta Camera Kabushiki Kaisha. Printer with automatic restart. 5,018,081, Cl. 364-519.000.

Yamaguchi, Yoichi: *See—*

Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.

Yamaha Corporation: *See—*

Fujimura, Masaki; and Tadokoro, Toyohiko, 5,016,882, Cl. 273-167.00H.

Kurosaki, Makoto, 5,017,038, Cl. 403-385.000.

Suzuki, Kunio; and Takeuchi, Kenji, 5,017,245, Cl. 148-11.50R.

Yamaha Hatsudoki Kabushihiki Kaisha: *See—*

Muramatsu, Takayoshi, 5,016,725, Cl. 180-225.000.

Yamaha Hatsudoki Kabushika Kaisha: *See—*

Onodera, Hiroki, 5,016,592, Cl. 123-432.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See—*

Ohara, Osamu; Kawashima, Hiroshi; and Takata, Hiroshi, 5,016,543, Cl. 105-150.000.

Suzuki, Takamitsu; and Yonezawa, Minoru, 5,016,579, Cl. 123-52.0MV.

Yamaichi Electric Mfg. Co., Ltd.: *See—*

Matsuoka, Noriyuki, 5,017,152, Cl. 439-263.000.

Matsuoka, Noriyuki, 5,017,154, Cl. 439-492.000.

Yamakawa, Takeshi, to Omron Tateisi Electronics Co. Basic circuitry particularly for construction of multivalued logic systems. 5,017,817, Cl. 307-571.000.

Yamaki, Toshio: *See—*

Nakai, Masaaki; Izumi, Shuji; Fujino, Akihiko; Taniguchi, Nobuyuki; Yamaki, Toshio; and Mukai, Hiromu, 5,017,957, Cl. 354-429.000.

Yamamoto, Hideo: *See—*

Iijima, Shigeru; Tanaka, Kazunobu; Matsuda, Akihisa; Matsumura, Mitsuo; and Yamamoto, Hideo, 5,017,308, Cl. 252-501.100.

Takagi, Kazunori; Sato, Shinichi; Ito, Masahiko; and Yamamoto, Hideo, 5,018,205, Cl. 381-86.000.

Yamamoto, Hiroshi: *See—*

Miyazaki, Benichi; Yamamoto, Hiroshi; and Goto, Shoji, 5,018,033, Cl. 360-106.000.

Yamamoto, Kenji: *See—*

Nanjoh, Takeshi; and Yamamoto, Kenji, 5,017,987, Cl. 357-30.000.

Yamamoto, Masaki: *See—*

Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Ken-ich, 5,017,480, Cl. 435-106.000.

Yamamoto, Nobuyoshi; Murata, Yasuhiko; Saeki, Fumimasa; and Kurosaka, Hirosige, to Hitachi Construction Machinery Co., Ltd. Full-turn type working machine. 5,016,721, Cl. 180-89.130.

Yamamoto, Takao: *See—*

Koike, Shoji; Eida, Tsuyoshi; and Yamamoto, Takao, 5,017,227, Cl. 106-22.000.

Yamamoto, Takashi: *See—*

Tsukabayashi, Kazuo; Yamamoto, Takashi; and Sawanoi, Yasunari, 5,016,451, Cl. 68-2.000.

Yamamura, Takashi: *See—*

Kitamura, Hiroki; Takanashi, Itsuo; Yamamura, Takashi; Ichitou, Toshikatsu; and Tai, Hiromichi, 5,017,944, Cl. 346-108.000.

Yamamuro, Mikio, to Kabushiki Kaisha Toshiba. Optical recording/reproducing focusing apparatus. 5,018,121. Cl. 369-44.110.

Yamaoka, Masaru: *See—*

Saito, Tsuyoshi; and Yamaoka, Masaru, 5,017,134, Cl. 433-72.000.

Yamaoka, Tooru: *See—*

Kondo, Kenji; Akamatsu, Kazuo; Yamauchi, Takeshi; Yamaoka, Tooru; and Komura, Atsushi, 5,018,001, Cl. 357-67.000.

Yamashita, Ken: *See—*

Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; Katsuki, Kazuo; and Yamashita, Ken, 5,016,981, Cl. 350-314.000.

Yamashita, Kouichi: *See—*

Tomita, Haruo; Yamashita, Kouichi; Kondo, Takeshi; Suzuki, Noriyuki; Matsumoto, Shigemi; and Asada, Masahiro, 5,017,651, Cl. 525-66.000.

Yamashita, Tatsumaro, to Alps Electric Co., Ltd. Rotary head type magnetic recording and reproducing apparatus with dedicated recording and reproducing magnetic heads. 5,018,036, Cl. 360-107.000.

Yamaska, Masaru: *See—*

Saito, Tsuyoshi; and Yamaoka, Masaru. 5,017,134, Cl. 433-72.000.

Yamauchi, Takeshi: *See—*

Kondo, Kenji; Akamatsu, Kazuo; Yamauchi, Takeshi; Yamaoka, Tooru; and Komura, Atsushi, 5,018,001, Cl. 357-67.000.

Yamaya, Masaaki: *See—*

Yoshihoka, Hiroshi; Yamaya, Masaaki; and Yanagisawa, Hideyoshi, 5,017,668, Cl. 526-279.000.

Yamazaki, Hiroshi: *See—*

Shirahama, Katsunori; Kobayashi, Satoshi; Okuda, Michihiro; Maruta, Takashi; Saito, Motohiro; and Yamazaki, Hiroshi, 5,016,738, Cl. 192-4.00A.

Yamazaki, Shunpei; and Itoh, Kenji, to Semiconductor Energy Laboratory Co., Ltd. Method of eliminating carbon material by chemical vapor reaction. 5,017,264, Cl. 156-643.000.

Yamazaki, Toru: *See—*

Hayashi, Akihiko; Yamazaki, Toru; and Torii, Akira, 5,017,935, Cl. 343-715.000.

Yanagi, Akihiko: *See—*

Kume, Toyohiko; Goto, Toshio; Kamochi, Atsumi; Yanagi, Akihiko; Miyauchi, Hiroshi; and Asami, Tadao, 5,017,213, Cl. 71-95.000.

Yanagisawa, Hideyoshi: *See—*

Yoshihoka, Hiroshi; Yamaya, Masaaki; and Yanagisawa, Hideyoshi, 5,017,668, Cl. 526-279.000.

Yanagisawa, Kazumasa, to Hitachi, Ltd. Semiconductor memory device. 5,018,100, Cl. 365-230.030.

Yanagisawa, Yutaro, to Hamamatsu Photonics K.K. Free electron laser oscillator. 5,018,149, Cl. 372-2.000.

Yanagishita, Norio; Matsuura, Ichiro; Ishimaru, Kiichiro; and Akai, Mikio, to Ikeda Bussan Co., Ltd. Mold assembly for molding frame-installed and skin-covered seat cushion structure. 5,017,115. Cl. 425-125.000.

Yang, Wen-Li: *See—*

Hsu, Chi-Hsueh; Yang, Wen-Li; and Chuang, Shien-Yu, 5,016,625, Cl. 128-201.250.

Yano, Eiji: *See—*

Sato, Seizi; and Yano, Eiji, 5,016,834, Cl. 242-199.000.

Yano, Katsutoshi: *See—*

Obata, Akihiko; Adachi, Motomitsu; Kamata, Hajime; and Yano, Katsutoshi, 5,018,082, Cl. 364-521.000.

Yapp, John R.; and Hill, Peter R., to 501 Senior Bigwood Limited. Tube weld mill. 5,016,806, Cl. 228-147.000.

Yarger, Eric J.; Yarger, Rex D.; and Clegg, Gary D., to Magneshield Technologies, Inc. Magnetically shielded door for use with shielded enclosures. 5,017,736, Cl. 174-35.0MS.

Yarger, Rex D.: *See—*

Yarger, Eric J.; Yarger, Rex D.; and Clegg, Gary D., 5,017,736, Cl. 174-35.0MS.

Yarita, Ken-ich: *See—*

Mori, Shigenori; Iitani, Kinzo; Yamamoto, Masaki; Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita. Ken-ich, 5,017,480, Cl. 435-106.000.

Yarlagadda, Prasd S.: *See—*

Gesser, Hyman D.; Hunter, Norman R.; Yarlagadda, Prasd S.; and Morton, Lawrence A., 5,017,731, Cl. 568-910.000.

Yashiro, HIrokatsu: *See—*

Iuchi, Tohru; Nakamori, Yukio; Kawasaki, Atsushi; Yashiro, HIrokatsu; and Nagatake, Yoh-ichi, 5,017,018, Cl. 374-130.000.

Yasuhara, Masaki: *See—*

Sikinami, Yasuo; Hata, Kunihiro; and Yasuhara, Masaki, 5,017,377, Cl. 424-409.000.

Yasunaga, Masatoshi; and Kohara, Masanobu, to Mitsubishi Denki Kabushiki Kaisha. Lead frame and semiconductor device. 5,018,003, Cl. 357-72.000.

Yasuoka, Hideki, to Hitachi, Ltd. Semiconductor device and production method thereof. 5,017,996, Cl. 357-43.000.

Yates, Donald N., Jr.: *See—*

Donovan, Joseph F.; and Yates, Donald N., Jr., 5,016,716, Cl. 175-17.000.

Yazaki Corporation: *See—*

Ohsumi, Hideki, 5,017,163, Cl. 439-752.000.

Sugiyama, Masaaki; and Manabe, Naoki, 5,017,147, Cl. 439-144.000.

Suzuki, Katsuya; Nakajima, Yoshihiro; and Ishii, Tomoyuki, 5,016,842, Cl. 248-68.100.

Yazami, Rachid: *See—*

Nakajima, Tsuyoshi; and Yazami, Rachid, 5,017,444, Cl. 429-218.000.

Yeh, Peter J.: *See—*

Ooi, Leng H.; Yeh, Peter J.; and Avanic, Branko, 5,017,897, Cl. 333-204.000.

Yen, Kwang-Mu; and Blatt, Lawrence M., to Amgen Inc. Plasmid encoding the *Pseudomonas mendocina* toluene monooxygenase gene. 5,017,495, Cl. 435-320.100.

Yen, Teh F.: *See—*

Sadeghi, Mohammad-Ali; Sadeghi, Kazem; Kuo, Jih-Fen; Jang, Long-Kuan; and Yen, Teh F., 5,017,281, Cl. 208-390.000.

Yerman, Alexander J.; and Ngo, Khai D. T., to General Electric Company. Conductive film magnetic components. 5,017,902, Cl. 336-83.000.

Yializis, Angelo: *See—*

Shaw, David G.; Yializis, Angelo; Strycker, Donald S.; and Ham, Mooyoung, 5,018,048, Cl. 361-323.000.

Yianni, Paul A.: *See—*

Spyropoulos, Konstantinos; and Yianni, Paul A., 5,017,297, Cl. 252-8.800.

Yoakim, Christiane: *See—*

Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,593, Cl. 514-381.000.

Gillard, John W.; Guindon, Yvan; Morton, Howard E.; Girard, Yves; and Yoakim, Christiane, 5,017,597, Cl. 514-411.000.

Yoda, Akira, to Tokyo Sharyo Seizo Kabushiki Kaisha. Multiarticulation robot. 5,016,489, Cl. 74-479.000.

Yokohama Rubber Co., Ltd., The: *See—*

Kuze, Tetsuya; and Suzuki, Toshihiko, 5,016,695, Cl. 152-209.00A.

Machida, Morihisa; Tajima, Yoshio; Nakatsumi, Hideo; Isahai, Tatsuo; and Shiroki, Daijiro, 5,017,427, Cl. 428-323.000.

Yokoi, Haruhiko: *See—*

Katsumata, Ryoichi; and Yokoi, Haruhiko, 5,017,482, Cl. 435-114.000.

Yokokawa, Osamu: *See—*

Iwabuchi, Katsuhiko; Yokokawa, Osamu; and Takanabe, Eiichiro, 5,016,567, Cl. 118-733.000.

Yokono, Kojiro: *See—*

Komiyama, Katsumi; Fukaya, Masaki; Yokono, Kojiro; and Toma, Hitoshi, 5,017,988, Cl. 357-30.000.

Yokota, Masaaki, to Tachi-S Co. Ltd. Structure of vehicle seat. 5,016,941, Cl. 297-452.000.

Yokota, Takashi: *See—*

Lee, Frank; Yokota, Takashi; Arai, Ken-ichi; Mosmann, Timothy; and Rennick, Donna, 5,017,691, Cl. 535-351.000.

Yokote, Yoshihiro; and Hashimoto, Yoshito, to Nippon Seiko Kabushiki Kaisha. Mechanism for adjusting the position of shoulder anchor. 5,016,916, Cl. 280-808.000.

Yokoyama, Tetsuo: *See—*

Koizumi, Hideaki; Takeda, Ryuzaburo; Sano, Koichi; and Yokoyama, Tetsuo, 5,016,637, Cl. 128-653.0AF.

Yonehara, Takashi, to Tokyo Copal Chemical Co., Ltd. Surface finishing device. 5,016,313, Cl. 15-320.000.

Yoneyama, Hirofumi: *See—*

Hashimoto, Masayasu; Yoneyama, Hirofumi; and Watanabe, Yasuhiro, 5,018,156, Cl. 372-44.000.

Yonezawa, Minoru: *See—*

Suzuki, Takamitsu; and Yonezawa, Minoru, 5,016,579, Cl. 123-52.0MV.

York, Rudy L.: *See—*

Elkind, Jerome L.; Smith, Patricia B.; Hutchins, Larry D.; Luttmer, Joseph D.; York, Rudy L.; and England, Julie S., 5,017,511, Cl. 437-225.000.

Yoshida, Hirokazu: *See—*

Kawashima, Akihiro; Yoshida, Hirokazu; Tagusa, Yasunobu; Inada, Kiyoshi; Makita, Hideshi; and Dotta, Yoshihisa, 5,016,986, Cl. 350-339.00R.

Yoshida, Hiroshi: *See—*

Watanabe, Osamu; Kajii, Osamu; Edamoto, Toshiyuki; Kitamura, Tomio; Hisatomi, Kaoru; Yoshida, Hiroshi; and Somatomo, Yoshiki, 5,017,442, Cl. 429-94.000.

Yoshida, Hitoshi; Kawamoto, Naoyuki; and Kanegae, Takahiro, to Brother Kogyo Kabushiki Kaisha. Data converting apparatus having

VOL
1126
ISS
3
MY
21
1991
UMI

- means for changing ornamental stroke end data of character outline. 5,018,217, Cl. 382-22.000.
- Yoshida, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Roller contact device. 5,017,744, Cl. 200-277.000.
- Yoshida, Masahiko: *See—*
  - Shibafuchi, Hiroshi; Sasaki, Masanori; Nitta, Hidenori; and Yoshida, Masahiko, 5,017,355, Cl. 423-369.000.
- Yoshida, Masanobu, to Fujitsu Limited. Power supply potential rising detection circuit. 5,017,803, Cl. 307-296.500.
- Yoshida, Masanobu, to Fujitsu Limited. Semiconductor memory device. 5,018,107, Cl. 365-230.060.
- Yoshida, Naoyuki: *See—*
  - Kon, Tatsuya; Kato, Shiro; Morie, Toshiya; Karasawa, Tadahiko; and Yoshida, Naoyuki, 5,017,573, Cl. 514-218.000.
- Yoshida, Narutaka: *See—*
  - Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,017,961, Cl. 355-202.000.
  - Myochin, Hisashi; Inoue, Yoshinori; Saito, Hitoshi; and Yoshida, Narutaka, 5,018,045, Cl. 361-229.000.
- Yoshida, Noriyuki: *See—*
  - Shioya, Jun; Yamaguchi, Yoichi; Mizoguchi, Akira; Yoshida, Noriyuki; Takahashi, Kenichi; Miyazaki, Kenji; Takano, Satoshi; and Hayashi, Noriki, 5,017,550, Cl. 505-1.000.
- Yoshida, Yoshikazu; Tanaka, Kunio; Nishikawa, Yukio; and Takada, Yusuke, to Matsushita Electric Industrial Co., Ltd. Laser sputtering apparatus. 5,017,277, Cl. 204-298.020.
- Yoshihara, Toshiyuki, to Canon Kabushiki Kaisha. Electrophotographic photosensitive member with substituted nylon interlayer. 5,017,449, Cl. 430-59.000.
- Yoshihoka, Hiroshi; Yamaya, Masaaki; and Yanagisawa, Hideyoshi, to Shin-Etsu Chemical Co., Ltd. Room temperature curable resin composition. 5,017,668, Cl. 526-279.000.
- Yoshikawa, Harutoshi: *See—*
  - Ishida, Yasuo; Ohta, Kazunari; Nakahama, Tatsuo; and Yoshikawa, Harutoshi, 5,017,212, Cl. 71-92.000.
- Yoshimura, Ichiro, to Sumitomo Electric Industries, Ltd. High temperature furnace with thermal insulation. 5,017,209, Cl. 65-13.000.
- Yoshimura, Toshio, to Tanashin Denki Co., Ltd. Controller for a movable member. 5,017,901, Cl. 335-265.000.
- Yoshimura, Toshio: *See—*
  - Tanaka, Shinsaku; and Yoshimura, Toshio, 5,018,034, Cl. 360-106.000.
- Yoshimura, Toshitaka: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,017,949, Cl. 354-4.000.
- Yoshimura, Yasushi: *See—*
  - Takahashi, Minoru; Miura, Tanetoshi; Hamada, Hareo; Hyoudo, Hideki; Gotoda, Ryusuke; Yoshimura, Yasushi; Kuribayashi, Takashi; and Akasaka, Akio, 5,018,202, Cl. 381-71.000.
- Yoshino, Kunio, to Kabushiki Kaisha Matsuyama Seisakusho. Antiglare inside rearview mirror assembly for motor vehicle. 5,016,979, Cl. 350-281.000.
- Yoshino, Motoaki: *See—*
  - Sasai, Keizo; Sakuragi, Kenkichi; Nakamura, Mitsunori; Ohkubo, Akio; and Yoshino, Motoaki, 5,017,945, Cl. 346-136.000.
- Young, Chuang P. Electric wire twisting machine. 5,016,682, Cl. 140-149.000.
- Young, Glen C.; and Kiefer, James R., to General Electric Company. Stall protection circuit for an electronically commutated motor. 5,017,846, Cl. 318-244.000.
- Young, James R.: *See—*
  - Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; Katsuki, Kazuo; and Yamashita, Ken, 5,016,981, Cl. 350-314.000.
- Young, John B.; and Lokken, Roger C., to Minnesota Mining and Manufacturing Company. Apparatus and brush segment arrangement for finishing wheel brushes; and method. 5,016,311, Cl. 15-88.300.
- Young, Peter D. Impregnant compositions for porous articles. 5,017,669, Cl. 526-320.000.
- Young, Phillip E.; and McColl, David B., to Loma Linda University Medical Center. Raster scan control system for a charged-particle beam. 5,017,789, Cl. 250-396.0ML.
- Young, Robert N.; Rokach, Joshua; Williams, Haydn R.; Kakushima, Masatoshi; and Guindon, Yvan, to Merck Frosst Canada, Inc. Leukotriene antagonists. 5,017,583, Cl. 514-312.000.
- Yu, I-Hsiang: *See—*
  - Marinho, John A.; Pilgrim, Steven J.; and Yu, I-Hsiang, 5,018,187, Cl. 379-60.000.
- Yu, Kaung M. Motive air seat cushion. 5,016,302, Cl. 5-423.000.
- Yu, Kevin: *See—*
  - Wallner, Jane; and Yu, Kevin, 5,017,447, Cl. 430-2.000.
- Yuasa, Toshiya: *See—*
  - Kobayashi, Motokazu; Arahara, Kohzoh; Yuasa, Toshiya; Kai, Takashi; and Fukumoto, Hiroshi, 5,017,223, Cl. 106-20.000.
- Yuchi, Sadataka, to Hochiki Corporation. Fire alarm system. 5,017,905, Cl. 340-506.000.
- Yuhasz, Stephen J.: *See—*
  - Hanna, R. Scott; Flowers, Woodie; Luchaco, David G.; Yuhasz, Stephen J.; Spira, Joel S.; and Hall, Philip R., 5,017,837, Cl. 315-136.000.
- Yunlu, Kenan: *See—*
  - Gradeff, Peter S.; and Yunlu, Kenan, 5,017,694, Cl. 534-15.000.
  - Gradeff, Peter S.; and Yunlu, Kenan, 5,017,695, Cl. 534-15.000.
- Yurkonis, Philip G.: *See—*
  - Ammon, James G.; Yurkonis, Philip G.; and Lockwood, Alfred, 5,018,052, Cl. 361-428.000.
- Yuyama, Takeshi: *See—*
  - Ackerson, Robert C.; and Yuyama, Takeshi, 5,017,215, Cl. 71-93.000.
- Zander, Richard A.; Gaiser, Robert F.; and Crumb, Donald A., to Allied-Signal Inc. Master cylinder with fluid level and pressure failure detector. 5,016,442, Cl. 60-535.000.
- Zauner, Robert S.: *See—*
  - Stapleton, Craig A.; and Zauner, Robert S., 5,016,798, Cl. 224-326.000.
- Zawalski, Robert C., to Dixie Chemical Company. Process for preparing chlorofluorocarbons via an in situ generated activated aluminum trihalide catalyst and products resulting therefrom. 5,017,732, Cl. 570-151.000.
- Zdeblick, Mark; and Albrecht, Thomas R., to Stanford University. Method of making an integrated scanning tunneling microscope. 5,017,266, Cl. 156-643.000.
- Zegarski, William J.: *See—*
  - Bills, William D.; Christini, Theodore P.; Kellogg, Reid E.; Maynard, Richard B.; and Zegarski, William J., 5,017,440, Cl. 428-690.000.
- Zeller, Claude: *See—*
  - Cordery, Robert A.; Kilmartin, William L.; and Zeller, Claude, 5,017,907, Cl. 340-551.000.
- Zeller, Martin: *See—*
  - Wenger, Jean; Winternitz, Paul; and Zeller, Martin, 5,017,211, Cl. 71-92.000.
- Zemanek, Jiri; Timpert, Manfred; and Rudolph, Karl, to Rheinhold & Mahla GmbH. Process for producing shells, moldings and a detachable insulation. 5,017,314, Cl. 264-35.000.
- Zenith Electronics Corporation: *See—*
  - Alvord, Robert J.; Bambule, Raymond; Orr, Roy W., Jr.; and Sorensen, Thomas L., 5,018,011, Cl. 358-148.000.
  - Dougherty, Lawrence W.; and Roberts, William N., 5,017,170, Cl. 445-30.000.
  - Jones, Gary A.; Krishnamurthy, Gopalan; and Snopko, Paul A., 5,018,197, Cl. 380-20.000.
  - Rabii, Khosro M., 5,018,013, Cl. 358-181.000.
- Zenner, Bruce: *See—*
  - Kerr, John B.; De Castro, Emory S.; and Zenner, Bruce, 5,017,274, Cl. 204-129.000.
- Zeon Chemicals USA, Inc.: *See—*
  - Raines, Charles C.; and Starmer, Philip H., 5,017,630, Cl. 523-334.000.
- Zerfass, Karl-Christian: *See—*
  - Greiser, Wolfgang; Plotz, Kurt; Wagner, Hans; and Zerfass, Karl-Christian, 5,017,426, Cl. 428-280.000.
- Zettier, Karl-Heinz: *See—*
  - Lehmann, Hanno; and Zettier, Karl-Heinz, 5,017,396, Cl. 426-491.000.
- Zheng, Xu-guang: *See—*
  - Hirakawa, Kazuyoshi; Kuriyaki, Hisao; and Zheng, Xu-guang, 5,017,548, Cl. 505-1.000.
- Zierick Manufacturing Corporation: *See—*
  - Legrady, Janos, 5,017,159, Cl. 439-741.000.
- Ziggity Systems, Inc.: *See—*
  - Hostetler, Eldon, 5,016,574, Cl. 119-72.500.
- Zimmer, Anita F.; and Billbury, Ronald R., to Mead Corporation, The. Wiring harness installation accessory. 5,016,859, Cl. 254-134.30R.
- Zinck, Jennifer J.: *See—*
  - Brewer, Peter D.; and Zinck, Jennifer J., 5,018,164, Cl. 372-109.000.
- Zinser Textilmaschinen GmbH: *See—*
  - Block, Karl-Heinz, 5,017,075, Cl. 414-225.000.
  - Putz, Oliver; and Konig, Herbert, 5,016,433, Cl. 57-264.000.
- Zoccolillo, Susan M.: *See—*
  - Catron, Nancy A.; Famulare, Richard J.; Fodale, Joseph V.; Hanson, Karrie J.; Koch, Robert A.; Large, Ronald E.; Sahni, Parandeep S.; Schwartz, Alan I.; and Zoccolillo, Susan M., 5,018,191, Cl. 379-100.000.
- Zodrow, Rudolf; and Buchholz, Rainer, to ETI-TEC Maschinenbau GmbH. Labelling machine for objects such as bottles or the like. 5,017,261, Cl. 156-568.000.
- Zohrer, Gerald: *See—*
  - Strasser, Gregor; Zohrer, Gerald; Schertler, Roman; and Fischer, Heinrich, 5,017,073, Cl. 414-217.000.
- Zoubek, Stanley F., Jr.: *See—*
  - McGill, John; and Zoubek, Stanley F., Jr., 5,017,921, Cl. 342-18.000.
- Zoya, Walter J.: *See—*
  - Hansen, Lowell D.; Hurley, J. Richard; Schweitzer, Jean J.; and Zoya, Walter J., 5,017,098, Cl. 417-302.000.
- Zulawski, Dennis P., to Arctco, Inc. Air intake noise suppressor. 5,016,728, Cl. 181-229.000.
- Zurawski, Gerard; and Zurawski, Sandra M., to Schering Corporation. Truncated human interleukin-a alpha. 5,017,692, Cl. 530-351.000.
- Zurawski, Sandra M.: *See—*
  - Zurawski, Gerard; and Zurawski, Sandra M., 5,017,692, Cl. 530-351.000.
- Zwicker, Shirley L.: *See—*
  - Newkirk, Marc S.; and Zwicker, Shirley L., 5,017,526, Cl. 501-89.000.
- Zwijsen, Jan A.: *See—*
  - De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 5,017,951, Cl. 355-27.000.
- 501 Senior Bigwood Limited: *See—*
  - Yapp, John R.; and Hill, Peter R., 5,016,806, Cl. 228-147.000.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF MAY, 1991

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Aerts, Johannes C. J.: *See—*
  - Gerritsen, Jan; and Aerts, Johannes C. J., Re. 33,592, Cl. 315-382.000.
- Dory, Jacques, to EDAP International, S.A. Method for examining, localizing and treating with ultrasound. Re. 33,590, Cl. 128-660.030.
- EDAP International, S.A.: *See—*
  - Dory, Jacques, Re. 33,590, Cl. 128-660.030.
- Feeny, Richard J.; Zilligen, James A.; and Klaeui, Hans J., to FTZ Industries, Inc. Method of prefabricating an electrical connector. Re. 33,591, Cl. 156-85.000.
- FTZ Industries, Inc.: *See—*
  - Feeny, Richard J.; Zilligen, James A.; and Klaeui, Hans J., Re. 33,591, Cl. 156-85.000.
- Gerritsen, Jan; and Aerts, Johannes C. J., to U.S. Philips Corporation. Color display tube with reduced deflection defocussing. Re. 33,592, Cl. 315-382.000.
- Herst, Douglas J.; and Ngai, Peter Y. Y., to Peerless Lighting Corporation. Luminaire for indirect lighting. Re. 33,593, Cl. 362-223.000.
- Klaeui, Hans J.: *See—*
  - Feeny, Richard J.; Zilligen, James A.; and Klaeui, Hans J., Re. 33,591, Cl. 156-85.000.
- Ngai, Peter Y. Y.: *See—*
  - Herst, Douglas J.; and Ngai, Peter Y. Y., Re. 33,593, Cl. 362-223.000.
- Peerless Lighting Corporation: *See—*
  - Herst, Douglas J.; and Ngai, Peter Y. Y., Re. 33,593, Cl. 362-223.000.
- U.S. Philips Corporation: *See—*
  - Gerritsen, Jan; and Aerts, Johannes C. J., Re. 33,592, Cl. 315-382.000.
- Zilligen, James A.: *See—*
  - Feeny, Richard J.; Zilligen, James A.; and Klaeui, Hans J., Re. 33,591, Cl. 156-85.000.

---

# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

- Applied Telematics, Inc.: *See—*
  - Riskin, Bernard N., B1 4,757,267, Cl. 379-113.000.
- Bouillon, Claude; and Rosenbaum, Georges, to Societe Anonyme dite: L'Oreal. Aluminum tris-(N-oxypyridine-2-thiolate); cosmetic or pharmaceutical compositions containing the same and the use of said compositions. B1 4,209,506, 5-21-91, Cl. 424-68.000.
- CVI/Beta Ventures, Inc.: *See—*
  - Zider, Robert B.; and Krumme, John F., B1 4,896,955, Cl. 351-41.000.
- Duggan, J. E., to Siemens-Allis, Inc. Electrical panel having molded base pan. B1 4,118,754, 5-21-91, Cl. 361-355.000.
- GWN Inc.: *See—*
  - Mertes, Paul M., B1 4,125,297, Cl. 312-348.000.
- Hoopengardner, Merle R., to JacTac Inc. System for holding carpet in place without stretching. B1 4,797,170, 5-21-91, Cl. 156-71.000.
- JacTac Inc: *See—*
  - Hoopengardner, Merle R., B1 4,797,170, Cl. 156-71.000.
- Krumme, John F.: *See—*
  - Zider, Robert B.; and Krumme, John F., B1 4,896,955, Cl. 351-41.000.
- Mertes, Paul M., to GWN Inc. Universal drawer slider. B1 4,125,297, 5-21-91, Cl. 312-348.000.
- Recker, Bradley J.: *See—*
  - Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., B1 4,882,120, Cl. 363-98.000.
- Riskin, Bernard N., to Applied Telematics, Inc. Telephone system for connecting a customer to a supplier of goods. B1 4,757,267, 5-21-91, Cl. 379-113.000.
- Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., to Sunstrand Corporation. DC content control for an inverter. B1 4,882,120, 5-21-91, Cl. 363-98.000.
- Rosenbaum, Georges: *See—*
  - Bouillon, Claude; and Rosenbaum, Georges, B1 4,209,506, Cl. 424-68.000.
- Rozman, Christopher J.: *See—*
  - Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., B1 4,882,120, Cl. 363-98.000.
- Siemens-Allis, Inc.: *See—*
  - Duggan, J. E., B1 4,118,754, Cl. 361-355.000.
- Societe Anonyme dite: L'Oreal: *See—*
  - Bouillon, Claude; and Rosenbaum, Georges, B1 4,209,506, Cl. 424-68.000.
- Stevens, Myron T. Outboard motor with elevated horizontal pivot axis. B1 4,355,986, 5-21-91, Cl. 440-53.000.
- Sunstrand Corporation: *See—*
  - Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., B1 4,882,120, Cl. 363-98.000.
- Zider, Robert B.; and Krumme, John F., to CVI/Beta Ventures, Inc. Eyeglass frame including shape-memory elements. B1 4,896,955, 5-21-91, Cl. 351-41.000.

---

# LIST OF DESIGN PATENTEES

- Abbott Laboratories: *See—*
  - Arvidson, Russell A.; and Vandewalle, Thomas A., 316,965, Cl. D9-370.000.
- Acme Premium Supply Corp.: *See—*
  - Dawson, Richard M.; Kotthoff, Gerald G.; Tipton, William A.; and James, David A., 316,970, Cl. D9-415.000.
- Adam, Georges; and Lardo, Claude, to Goodyear Tire & Rubber Company, The. Tire. 316,990, 5-21-91, Cl. D12-142.000.
- Aesthetic Holdings Pty Ltd.: *See—*
  - Chesson, Maureen T.; and Banks, Phillipa G., 316,978, Cl. D10-62.000.
- Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., to General Mills, Inc. Snack food. 316,922, 5-21-91, Cl. D1-110.000.
- Anania, Eugene. Vehicle mud flap. 316,994, 5-21-91, Cl. D12-185.000.
- Andersen, James H., to G. LeBlanc Corporation. French horn spatula. 317,013, 5-21-91, Cl. D17-13.000.
- Anding, Mary L. Combined cast protector and stem. 317,046, 5-21-91, Cl. D24-49.000.
- Argandona, Augusto, to Quaker Oats Company, The. Flashlight. 317,057, 5-21-91, Cl. D26-40.000.
- Arner, Barbara D.: *See—*
  - Tarlow, Kenneth A.; and Arner, Barbara D., 317,018, Cl. D19-90.000.
- Arvidson, Russell A.; and Vandewalle, Thomas A., to Abbott Laboratories. Bottle. 316,965, 5-21-91, Cl. D9-370.000.
- Attwood Corporation: *See—*
  - Whitley, Warrick M., II, 317,053, Cl. D26-28.000.

VOL
1126
ISS
3
MY
21
1991
UMI

Aubke, Paul D.: *See—*
Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,049, Cl. D25-119.000.
Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,050, Cl. D25-122.000.
Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,051, Cl. D25-122.000.
B & G Consultants, Inc.: *See—*
Groves, George D., 316,951, Cl. D8-1.000.
Bankier Companies, Inc.: *See—*
Bankier, Jack D., 317,015, Cl. D18-23.000.
Bankier, Jack D., to Bankier Companies, Inc. Organizing support stand for laser printers or the like. 317,015, 5-21-91, Cl. D18-23.000.
Banks, Phillipa G.: *See—*
Chesson, Maureen T.; and Banks, Phillipa G., 316,978, Cl. D10-62.000.
Battaglia, Samuel: *See—*
Wickrema, Gammini; Desouza, Joseph; and Battaglia, Samuel, 317,005, Cl. D14-107.000.
Battegazzore, Piero. Toothpaste dispenser. 316,959, 5-21-91, Cl. D9-300.000.
Bayerische Motoren Werke AG: *See—*
Haussmann, Jurgen. 316,998, Cl. D12-206.000.
Berberian, Ara. Blouse or similar article. 316,924, 5-21-91, Cl. D2-215.000.
Berghoef, Jelle F., Jr. Trimaran. 317,000, 5-21-91, Cl. D12-304.000.
Bernasconi, Giorgio, to Vibram S.p.A. Tread surface and periphery of a footwear unit sole. 316,930, 5-21-91, Cl. D2-320.000.
Bionaire Inc.: *See—*
Glucksman, Dov Z., and Lekhtman, David, 317,043, Cl. D23-364.000.
Birch, Robert: *See—*
Jensen, Steen; and Birch, Robert, 316,923, Cl. D2-8.000.
Blue Box Toy Factory Limited: *See—*
Ng Chuk-Sun, Thomas, 317,025, Cl. D21-142.000.
Boddin, Geert R.; Vandendriessche, Jean-Pierre; and Witdoek, Daniel C., to Ford New Holland, Inc. Operator cab for an agricultural machine with mounting wings therefor. 317,011, 5-21-91, Cl. D15-30.000.
Bookman, Glenn. Type font. 317,016, 5-21-91, Cl. D18-27.000.
Bosworth, Gloria F. Cleaning tool. 317,068, 5-21-91, Cl. D32-51.000.
Bottorff, Marion R.: *See—*
Tribe, Alex E.; Bottorff, Marion R.; Cottrell, Ronald G.; Ranes, Richard L.; and Whistler, William B., 317,003, Cl. D12-333.000.
Boyd Coffee Company: *See—*
Boyd, David D., 316,940, Cl. D6-467.000.
Boyd, David D., to Boyd Coffee Company. Stand for a beverage server and condiments. 316,940, 5-21-91, Cl. D6-467.000.
Brinker, Barry; and Burbrink, David E., to 'totes', incorporated. Tire gauge. 316,980, 5-21-91, Cl. D10-86.000.
Brown, Gregory C.; and Nash, John H., to Rosemount Inc. Housing for a current to pressure transmitter. 316,975, 5-21-91, Cl. D10-46.000.
Burbrink, David E.: *See—*
Brinker, Barry; and Burbrink, David E., 316,980, Cl. D10-86.000.
Cannon, Charles E.: *See—*
Flores, Javier J.; and Cannon, Charles E., 317,029, Cl. D21-180.000.
Carr, Donald W.: *See—*
McFadden, Francis J. A.; Carr, Donald W.; Swaine, Steven W.; and Rohan, Cahrles G. V., 317,071, Cl. D99-28.000.
Cassai, Gino H.: *See—*
Cassai, Henry J.; and Cassai, Gino H., 317,061, Cl. D28-7.000.
Cassai, Henry J.; and Cassai, Gino H., to Cassai, Henry J. Adjustable cosmetic applicator. 317,061, 5-21-91, Cl. D28-7.000.
Ceppo, Louis. Safety spotter support for barbells. 317,031, 5-21-91, Cl. D21-191.000.
Chambers, William E., Jr. Waterbed. 316,939, 5-21-91, Cl. D6-382.000.
Chesebrough-Pond's USA Co.: *See—*
Wiseman, Kay E.; and Kichenside, Brian E., 316,969, Cl. D9-409.000.
Chesson, Maureen T.; and Banks, Phillipa G., to Aesthetic Holdings Pty Ltd. Ruler/mathematical aid. 316,978, 5-21-91, Cl. D10-62.000.
Christian Dior, S.A.: *See—*
Wenzl, Walter, 316,947, Cl. D7-537.000.
Chromcraft Furniture Corporation: *See—*
Murry, Edsel E., 316,937, Cl. D6-366.000.
Cimock, Benjamin J., to I & K Trading Company. Flashlight wand. 317,056, 5-21-91, Cl. D26-37.000.
Cohen, Shlomo, to Seiki Shinsha Co. Ltd. Precious stone. 316,984, 5-21-91, Cl. D11-90.000.
Comerford, Thomas R.; and Yeary, Hubert F., to Mercury Instruments, Inc. Chart drive. 316,976, 5-21-91, Cl. D10-46.000.
Comet Electric Co., Ltd.: *See—*
Takahashi, Yoshimoto, 317,062, Cl. D28-13.000.
Concept Engineering, Inc.: *See—*
Geschwender, Robert C.; and Peterson, George W., 316,981, Cl. D10-101.000.
Concept USA, Inc.: *See—*
Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,049, Cl. D25-119.000.
Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,050, Cl. D25-122.000.
Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,051, Cl. D25-122.000.
Cooper Industries, Inc.: *See—*
Urban, Paul L., 316,943, Cl. D8-71.000.
Costello, Janet A. Money bag. 316,933, 5-21-91, Cl. D3-41.000.
Cottrell, Ronald G.: *See—*
Tribe, Alex E.; Bottorff, Marion R.; Cottrell, Ronald G.; Ranes, Richard L.; and Whistler, William B., 317,003, Cl. D12-333.000.
Crivello, Theresa L. Snow skate. 317,036, 5-21-91, Cl. D21-225.000.
Cuno, Incorporated: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 317,040, Cl. D23-209.000.
Dawson, Richard M.; Kotthoff, Gerald G.; Tipton, William A.; and James, David A., to Acme Premium Supply Corp. Gift box. 316,970, 5-21-91, Cl. D9-415.000.
Dentatus International AB: *See—*
Edwardson, Svante R., 317,045, Cl. D24-10.000.
Desouza, Joseph: *See—*
Wickrema, Gammini; Desouza, Joseph; and Battaglia, Samuel, 317,005, Cl. D14-107.000.
Dessert, Edward P.: *See—*
Sharp, Jeffrey O.; Dessert, Edward P.; and Harris, Michael R., 317,004, Cl. D13-160.000.
Dewey, Jon S. Handle for a cup or similar article. 316,945, 5-21-91, Cl. D7-394.000.
Dewey, Jon S. Cup or similar article. 316,946, 5-21-91, Cl. D7-535.000.
Dwyer Instruments, Inc.: *See—*
Hestich, John, 316,982, Cl. D10-102.000.
Earl, Dale A.; and Earl, Dale A. Stand for supporting automotive axles. 317,069, 5-21-91, Cl. D34-31.000.
Earl, Dale A.: *See—*
Earl, Dale A.; and Earl, Dale A., 317,069, Cl. D34-31.000.
Eckler, Christopher W. Weightlifting cable bar. 317,032, 5-21-91, Cl. D21-198.000.
Edwardson, Svante R., to Dentatus International AB. Motor driven dental instrument for laminating teeth. 317,045, 5-21-91, Cl. D24-10.000.
Ekornes, Jostein; and Relling, Harald. Chair. 316,936, 5-21-91, Cl. D6-365.000.
Emmerling, Ronald, to Gemini Industries, Inc. Speaker. 317,008, 5-21-91, Cl. D14-215.000.
Engineered Plastics, Inc.: *See—*
Mann, Charles W., 316,948, Cl. D7-540.000.
English Glass Company Limited, The: *See—*
Law, Brian; and Wass, Anthony, 316,972, Cl. D9-448.000.
Escher, William F., Jr. Floatable eyeglass case, or similar article. 316,932, 5-21-91, Cl. D3-34.000.
Fegan, Teresa A. Toy sprout figure. 317,027, 5-21-91, Cl. D21-155.000.
Flores, Javier J.; and Cannon, Charles E. Doll. 317,029, 5-21-91, Cl. D21-180.000.
Florida Isles Enterprises, Inc.: *See—*
Wilkerson, Eugene R., 316,960, Cl. D9-307.000.
Fong, Tso C., to Pearl Industries Limited. Wristwatch. 316,973, 5-21-91, Cl. D10-32.000.
Fong, Tso C., to Pearl Industries Limited. Wristwatch. 316,974, 5-21-91, Cl. D10-33.000.
Foote, Christopher B.: *See—*
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 316,922, Cl. D1-110.000.
Ford New Holland, Inc.: *See—*
Boddin, Geert R.; Vandendriessche, Jean-Pierre; and Witdoek, Daniel C., 317,011, Cl. D15-30.000.
Forsberg, Paul J., to Keystone Retaining Wall Systems, Inc. Wall block. 317,048, 5-21-91, Cl. D25-114.000.
French, Alan: *See—*
French, Neil A.; and French, Alan, 317,060, Cl. D27-148.000.
French, Neil A.; and French, Alan, to Park Lane Associates, Inc. Cigarette lighter. 317,060, 5-21-91, Cl. D27-148.000.
Frizell, Boyd D. Cooler. 316,949, 5-21-91, Cl. D7-605.000.
FW Acquisition, Inc.: *See—*
Mann, William T., 317,038, Cl. D22-132.000.
Mann, William T., 317,039, Cl. D22-133.000.
G. LeBlanc Corporation: *See—*
Andersen, James H., 317,013, Cl. D17-13.000.
Gaston, Harold W.: *See—*
Glaser, Donald J.; and Gaston, Harold W., 316,954, Cl. D8-71.000.
Geeck, Joseph S., III. Tie rail for pick-up trucks, boats or the like. 316,992, 5-21-91, Cl. D12-155.000.
Gemini Industries, Inc.: *See—*
Emmerling, Ronald, 317,008, Cl. D14-215.000.
General Electric Company: *See—*
Knemeyer, Friedel S., 317,010, Cl. D15-21.000.
General Mills, Inc.: *See—*
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 316,922, Cl. D1-110.000.
Geschwender, Robert C.; and Peterson, George W., to Concept Engineering, Inc. Rain gauge. 316,981, 5-21-91, Cl. D10-101.000.
Gewen, Ellen B. Brush. 316,935, 5-21-91, Cl. D4-136.000.
Giambrone, Harry J., to Spalding & Evenflo Companies, Inc. Stroller handle. 316,989, 5-21-91, Cl. D12-133.000.
Gillette Company, The: *See—*
Gray, Michael J., 316,962, Cl. D9-342.000.
Giordano, Edward C.: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 317,040, Cl. D23-209.000.
Glaser, Donald J.; and Gaston, Harold W., to Glendo Corporation. Jeweler's tool mounting plate. 316,954, 5-21-91, Cl. D8-71.000.
Glass Dimensions, Inc.: *See—*
Perkins, David R., 317,052, Cl. D26-11.000.

Glendo Corporation: *See—*
Glaser, Donald J.; and Gaston, Harold W., 316,954, Cl. D8-71.000.
Glucksman, Dov Z.; and Lekhtman, David, to Bionaire Inc. Air cleaner. 317,043, 5-21-91, Cl. D23-364.000.
Goida, Thomas M.; Martignetti, Domenic; and Newman, L. James, III, to Phadz. Padlock. 316,955, 5-21-91, Cl. D8-334.000.
Goodner, Donna E.: *See—*
Naderi, Jamshid; and Goodner, Donna E., 317,006, Cl. D14-116.000.
Goodyear Tire & Rubber Company, The: *See—*
Adam, Georges; and Lardo, Claude, 316,990, Cl. D12-142.000.
Graas, Maurice, 316,991, Cl. D12-147.000.
Graas, Maurice, to Goodyear Tire & Rubber Company, The. Tire tread. 316,991, 5-21-91, Cl. D12-147.000.
Gray, Michael J., to Gillette Company, The. Shaving cartridge dispenser. 316,962, 5-21-91, Cl. D9-342.000.
Greenberg, Robert Y.: *See—*
Quan, Patricia D.; Maccano, Angelo; and Greenberg, Robert Y., 316,927, Cl. D2-314.000.
Greene, Ted R. Animal behavior modification device. 317,065, 5-21-91, Cl. D30-156.000.
Greenwald, Joseph E.: *See—*
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 316,922, Cl. D1-110.000.
Groves, George D., to B & G Consultants, Inc. Vegetation barrier. 316,951, 5-21-91, Cl. D8-1.000.
Hackett, David E.; Hunter, Kevin K.; and Matsumoto, Kintaro, to Toyota Jidosha Kabushiki Kaisha. Body for utility vehicle. 316,986, 5-21-91, Cl. D12-96.000.
Hall, George. Portable hot air heater. 317,042, 5-21-91, Cl. D23-332.000.
Hand Held Products, Inc.: *See—*
Naderi, Jamshid; and Goodner, Donna E., 317,006, Cl. D14-116.000.
Harris, Michael R.: *See—*
Sharp, Jeffrey O.; Dessert, Edward P.; and Harris, Michael R., 317,004, Cl D13-160.000.
Haussmann, Jurgen, to Bayerische Motoren Werke AG. Wheel cover. 316,998, 5-21-91, Cl. D12-206.000.
Hayashi, Hiroshi: *See—*
Yukimoto, Koji; Hayashi, Hiroshi; and Ito, Yukio, 317,019, Cl. D20-9.000.
Hess, Stephen C., to Winston Furniture Company of Alabama, Inc. Chair frame. 316,938, 5-21-91, Cl. D6-373.000.
Hestich, John, to Dwyer Instruments, Inc. Pressure gauge housing. 316,982, 5-21-91, Cl. D10-102.000.
Highland Supply Corporation: *See—*
Weder, Donald E., 316,985, Cl. D11-164.000.
Hirano, Yukio: *See—*
Machida, Hiroshi; Wada, Hiromu; and Hirano, Yukio, 316,987, Cl. D12-98.000.
Hirschman, Richard, to Hudson Optical Corporation. Safety spectacles. 317,012, 5-21-91, Cl. D16-115.000.
Hoenig, David, to Revlon, Inc. Combined cosmetic product and container therefor. 316,961, 5-21-91, Cl. D9-337.000.
Hollowick, Inc.: *See—*
Menter, J. Alan, 317,059, Cl. D26-117.000.
Honeywell Inc.: *See—*
Kolbow, Donald P.; and Porter, Richard B., 316,977, Cl. D10-51.000.
Hoover Universal, Inc.: *See—*
York, Stuart A., 316,964, Cl. D21-349.000.
York, Stuart A., 316,966, Cl. D9-390.000.
York, Stuart A., 316,967, Cl. D9-390.000.
York, Stuart A., 316,968, Cl. D9-392.000.
Hoskinson, Marlin J.; Lorincz, Eugene M.; and Samson, George W., to Moore Push-Pin Company. Hanger for a foam board. 316,956, 5-21-91, Cl. D8-371.000.
Houlihan, John T., to Timex Corporation. Combined analog and digital wristwatch. 316,983, 5-21-91, Cl. D10-39.000.
Hoult, Christopher F. Combined emergency float and alarm unit therefor. 317,001, 5-21-91, Cl. D12-316.000.
Hudson Optical Corporation: *See—*
Hirschman, Richard, 317,012, Cl. D16-115.000.
Hunter, Kevin K.: *See—*
Hackett, David E.; Hunter, Kevin K.; and Matsumoto, Kintaro, 316,986, Cl. D12-96.000.
I & K Trading Company: *See—*
Cimock, Benjamin J., 317,056, Cl. D26-37.000.
IM Randers A/S: *See—*
Jensen, Steen; and Birch, Robert, 316,923, Cl. D2-8.000.
Innovator Industria E Comercio Ltda.: *See—*
Muller, Gunter S.; and Pontes, Christiano R. M., 317,002, Cl. D12-318.000.
Ishida, Kimikazu; and Ishida, Tsuneo, to Saboten Co., Ltd. Pruning saw. 316,952, 5-21-91, Cl. D8-9.000.
Ishida, Tsuneo: *See—*
Ishida, Kimikazu; and Ishida, Tsuneo, 316,952, Cl. D8-9.000.
Isuzu Motors Limited: *See—*
Machida, Hiroshi; Wada, Hiromu; and Hirano, Yukio, 316,987, Cl. D12-98.000.
Ito, Yukio: *See—*
Yukimoto, Koji; Hayashi, Hiroshi; and Ito, Yukio, 317,019, Cl. D20-9.000.
James, David A.: *See—*
Dawson, Richard M.; Kotthoff, Gerald G.; Tipton, William A.; and James, David A., 316,970, Cl. D9-415.000.
Janis, Michael E.: *See—*
Ott, Edward L.; Petriekis, Paul F.; and Janis, Michael E., 317,070, Cl. D34-40.000.
Jensen, Steen; and Birch, Robert, to IM Randers A/S. Long underwear ensemble. 316,923, 5-21-91, Cl. D2-8.000.
Johnson, Jeffrey M. Board game. 317,020, 5-21-91, Cl. D21-34.000.
Johnson, Larry R. Mask for paint ball tag games. 317,063, 5-21-91, Cl. D29-17.000.
Johnson, Leroy. Vehicle seat heating pad. 316,942, 5-21-91, Cl. D6-611.000.
Joy, Marian I. Multipurpose thimble. 316,931, 5-21-91, Cl. D3-29.000.
Kabushi kikaisha Harisan: *See—*
Koshiishi, Eiichi, 317,037, Cl. D22-118.000.
Kabushiki Kaisha Hoky: *See—*
Kuroda, Yutaka, 317,067, Cl. D32-38.000.
Kabushiki Kaisha Nippon Coinco: *See—*
Yukimoto, Koji; Hayashi, Hiroshi; and Ito, Yukio, 317,019, Cl. D20-9.000.
Kabushiki Kaisha Tamiya Mokei: *See—*
Yajima, Kiyoshi, 317,024, Cl. D21-137.000.
Kaiser, Ursula, to Kitchen Connection. Combined tart and pancake making tool. 316,950, 5-21-91, Cl. D7-676.000.
Kearnes, Thom; and Wennerstrom, Joel, to State Chemical Manufacturing Co., The. Container. 316,971, 5-21-91, Cl. D9-424.000.
Kellogg Plastics, Ltd.: *See—*
Rumpel, Donald D., 316,958, Cl. D8-395.000.
Kent, Kerry D. Flexible hanger for foreign car mufflers, or similar article. 316,957, 5-21-91, Cl. D8-373.000.
Kerbs, Jim A. Bicycling shoe cleat protector. 316,925, 5-21-91, Cl. D2-271.000.
Keystone Retaining Wall Systems, Inc.: *See—*
Forsberg, Paul J., 317,048, Cl. D25-114.000.
Kheng, Heng G., to Metro Plastic Industry Pte Ltd. Combined holder for a notepad and writing instruments. 317,017, 5-21-91, Cl. D19-78.000.
Kichenside, Brian E.: *See—*
Wiseman, Kay E.; and Kichenside, Brian E., 316,969, Cl D9-409.000.
Kitchen Connection: *See—*
Kaiser, Ursula, 316,950, Cl. D7-676.000.
Knapp, Alfons. Faucet. 317,041, 5-21-91, Cl. D23-241.000.
Knemeyer, Friedel S., to General Electric Company. Stud-mounted polycrystalline toothed diamond cutting blank. 317,010, 5-21-91, Cl. D15-21.000.
Kolbow, Donald P.; and Porter, Richard B., to Honeywell Inc. Thermostat. 316,977, 5-21-91, Cl. D10-51.000.
Koshiishi, Eiichi, to Kabushi kikaisha Harisan. Combined knife and sheath. 317,037, 5-21-91, Cl. D22-118.000.
Kotthoff, Gerald G.: *See—*
Dawson, Richard M.; Kotthoff, Gerald G.; Tipton, William A.; and James, David A., 316,970, Cl. D9-415.000.
Kowalski, Calvin M. Bicycle splash guard. 316,995, 5-21-91, Cl. D12-186.000.
Kuroda, Yutaka, to Kabushiki Kaisha Hoky. Floor cleaner. 317,067, 5-21-91, Cl. D32-38.000.
L.A. Gear, Inc.: *See—*
Quan, Patricia D.; Maccano, Angelo; and Greenberg, Robert Y., 316,927, Cl. D2-314.000.
Lardo, Claude: *See—*
Adam, Georges; and Lardo, Claude, 316,990, Cl. D12-142.000.
Law, Brian; and Wass, Anthony, to English Glass Company Limited, The. Dispenser for liquids. 316,972, 5-21-91, Cl. D9-448.000.
Lekhtman, David: *See—*
Glucksman, Dov Z.; and Lekhtman, David, 317,043, Cl. D23-364.000.
Long, Tonya H. Doll. 317,028, 5-21-91, Cl. D21-171.000.
Lorincz, Eugene M.: *See—*
Hoskinson, Marlin J.; Lorincz, Eugene M.; and Samson, George W., 316,956, Cl. D8-371.000.
Maccano, Angelo: *See—*
Quan, Patricia D.; Maccano, Angelo; and Greenberg, Robert Y., 316,927, Cl. D2-314.000.
Machida, Hiroshi; Wada, Hiromu; and Hirano, Yukio, to Isuzu Motors Limited. Truck. 316,987, 5-21-91, Cl. D12-98.000.
MacLachlan, James J.: *See—*
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 316,922, Cl. D1-110.000.
Mancini, Derek V., to Twinpack, Inc. Container strip. 316,963, 5-21-91, Cl. D9-345.000.
Mann, Charles W., to Engineered Plastics, Inc. Covered bowl. 316,948, 5-21-91, Cl. D7-540.000.
Mann, William T., to FW Acquisition, Inc. Fishing lure. 317,038, 5-21-91, Cl. D22-132.000.
Mann, William T., to FW Acquisition, Inc. Fishing lure. 317,039, 5-21-91, Cl. D22-133.000.
Manna, Piergiorgio. Cooking stone stand. 316,944, 5-21-91, Cl. D7-388.000.
Martignetti, Domenic: *See—*
Goida, Thomas M.; Martignetti, Domenic; and Newman, L. James, III, 316,955, Cl. D8-334.000.

VOL
1126
ISS
3
MY
21
1991
UMI

- Matsumoto, Kintaro: *See—*
  - Hackett, David E.; Hunter, Kevin K.; and Matsumoto, Kintaro, 316,986, Cl. D12-96.000.
- McCrary, Carlton P. Child transporter. 316,988, 5-21-91, Cl. D12-129.000.
- McFadden, Francis J. A.; Carr, Donald W.; Swaine, Steven W.; and Rohan, Cahrles G. V., to NCR Corporation. Self service terminal or similar article. 317,071, 5-21-91, Cl. D99-28.000.
- Menter, J. Alan, to Hollowick, Inc. Fuel container for liquid candle lamp. 317,059, 5-21-91, Cl. D26-117.000.
- Mercury Instruments, Inc.: *See—*
  - Comerford, Thomas R.; and Yeary, Hubert F., 316,976, Cl. D10-46.000.
- Metro Plastic Industry Pte Ltd.: *See—*
  - Kheng, Heng G., 317,017, Cl. D19-78.000.
- Miyazaki, Haruo; and Takada, Kazuo, to Sanyo Electric Co., Ltd. Vacuum cleaner. 317,066, 5-21-91, Cl. D32-18.000.
- Moore Push-Pin Company: *See—*
  - Hoskinson, Marlin J.; Lorincz, Eugene M.; and Samson, George W., 316,956, Cl. D8-371.000.
- Moore, Terrence J. Combined spoke-mounted string of bicycle lights and switch therefor. 317,055, 5-21-91, Cl. D26-35.000.
- Muller, Gunter S.; and Pontes, Christiano R. M., to Innovator Industria E Comercio Ltda. Design for a boat deck. 317,002, 5-21-91, Cl. D12-318.000.
- Muller, Hermann E. Construction toy panel. 317,022, 5-21-91, Cl. D21-108.000.
- Murry, Edsel E., to Chromcraft Furniture Corporation. Chair. 316,937, 5-21-91, Cl. D6-366.000.
- Naderi, Jamshid; and Goodner, Donna E., to Hand Held Products, Inc. Interface unit for electronic bar code reader. 317,006, 5-21-91, Cl. D14-116.000.
- Nash, John H.: *See—*
  - Brown, Gregory C.; and Nash, John H., 316,975, Cl. D10-46.000.
- NCR Corporation: *See—*
  - McFadden, Francis J. A.; Carr, Donald W.; Swaine, Steven W.; and Rohan, Cahrles G. V., 317,071, Cl. D99-28.000.
- NEC Corporation: *See—*
  - Oyamada, Takashi; and Takahashi, Mamoru, 317,014, Cl. D18-13.000.
- Newman, L. James, III: *See—*
  - Goida, Thomas M.; Martignetti, Domenic; and Newman, L. James, III, 316,955, Cl. D8-334.000.
- Ng Chuk-Sun, Thomas, to Blue Box Toy Factory Limited. Simulative driving toy. 317,025, 5-21-91, Cl. D21-142.000.
- Nike, Inc.: *See—*
  - Rogers, Bruce E., 316,928, Cl. D2-314.000.
- Nike International Ltd.: *See—*
  - Rogers, Bruce E., 316,928, Cl. D2-314.000.
- Northrop Corporation: *See—*
  - Tribe, Alex E.; Bottorff, Marion R.; Cottrell, Ronald G.; Ranes, Richard L.; and Whistler, William B., 317,003, Cl. D12-333.000.
- Olmstead, Gregory L. Auxiliary vehicle tail and brake light. 317,054, 5-21-91, Cl. D26-32.000.
- Ott, Edward L.; Petriekis, Paul F.; and Janis, Michael E., to Restaurant Technology, Inc. Food container. 317,070, 5-21-91, Cl. D34-40.000.
- Oyamada, Takashi; and Takahashi, Mamoru, to NEC Corporation. Printer for display pagers. 317,014, 5-21-91, Cl. D18-13.000.
- Padilla, James M.: *See—*
  - Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 317,040, Cl. D23-209.000.
- Palmer, Carl: *See—*
  - Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 317,040, Cl. D23-209.000.
- Park Lane Associates, Inc.: *See—*
  - French, Neil A.; and French, Alan, 317,060, Cl. D27-148.000.
- Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., to Concept USA, Inc. Extrusion. 317,049, 5-21-91, Cl. D25-119.000.
- Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., to Concept USA, Inc. Extrusion. 317,050, 5-21-91, Cl. D25-122.000.
- Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., to Concept USA, Inc. Extrusion. 317,051, 5-21-91, Cl. D25-122.000.
- Pearl Industries Limited: *See—*
  - Fong, Tso C., 316,973, Cl. D10-32.000.
  - Fong, Tso C., 316,974, Cl. D10-33.000.
- Pelz, David T. Golf club head. 317,034, 5-21-91, Cl. D21-215.000.
- Pelz, David T. Golf club head. 317,035, 5-21-91, Cl. D21-219.000.
- Perkins, David R., to Glass Dimensions, Inc. Oil lamp. 317,052, 5-21-91. Cl. D26-11.000.
- Peterson, George W.: *See—*
  - Geschwender, Robert C.; and Peterson, George W., 316,981, Cl. D10-101.000.
- Petriekis, Paul F.: *See—*
  - Ott, Edward L.; Petriekis, Paul F.; and Janis, Michael E., 317,070, Cl. D34-40.000.
- Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, to Cuno, Incorporated. Combined quick-change filter cartridge and head. 317,040, 5-21-91, Cl. D23-209.000.
- Peyton, Jeffrey L. Toy butterfly. 317,030, 5-21-91, Cl. D21-185.000.
- Phadz: *See—*
  - Goida, Thomas M.; Martignetti, Domenic; and Newman, L. James, III, 316,955, Cl. D8-334.000.
- Pierce, Alfred R., Jr Limb protector. 317,064, 5-21-91, Cl. D29-20.000.
- Pioneer Kabushiki Kaisha: *See—*
  - Shintani, Eiji, 317,007, Cl. D14-214.000.
- Poelvoorde, Raymond, to Sun Refining and Marketing Company. Building for an automotive service station or the like. 317,047, 5-21-91, Cl. D25-34.000.
- Pontes, Christiano R. M.: *See—*
  - Muller, Gunter S.; and Pontes, Christiano R. M., 317,002, Cl. D12-318.000.
- Porsche Aktiengesellschaft: *See—*
  - Soederberg, Richard, 316,997, Cl. D12-187.000.
- Porter, Richard B.: *See—*
  - Kolbow, Donald P.; and Porter, Richard B., 316,977, Cl. D10-51.000.
- Quaker Oats Company, The: *See—*
  - Argandona, Augusto, 317,057, Cl D26-40.000.
- Quan, Patricia D.; Maccano, Angelo; and Greenberg, Robert Y., to L.A. Gear, Inc. Portion of a shoe upper. 316,927, 5-21-91, Cl. D2-314.000.
- Rains, Louis. Toss game goal. 317,033, 5-21-91, Cl. D21-200.000.
- Ranes, Richard L.: *See—*
  - Tribe, Alex E.; Bottorff, Marion R.; Cottrell, Ronald G.; Ranes, Richard L.; and Whistler, William B., 317,003, Cl D12-333.000
- Reckitt & Colman Products Limited: *See—*
  - Thomson, Graham A., 317,044, Cl. D23-367.000.
- Relling, Harald: *See—*
  - Ekornes, Jostein; and Relling, Harald, 316,936, Cl. D6-365.000.
- Restaurant Technology, Inc.: *See—*
  - Ott, Edward L.; Petriekis, Paul F.; and Janis, Michael E., 317,070, Cl. D34-40.000.
- Revlon, Inc.: *See—*
  - Hoenig, David, 316,961, Cl. D9-337.000.
- Reynolds, Billy D. Combined ruler and compass. 316,979, 5-21-91, Cl. D10-70.000.
- Rogers, Bruce E., to Nike, Inc.; and Nike International Ltd. Shoe upper. 316,928, 5-21-91, Cl. D2-314.000.
- Rohan, Cahrles G. V.: *See—*
  - McFadden, Francis J. A.; Carr, Donald W.; Swaine, Steven W.; and Rohan, Cahrles G. V., 317,071, Cl. D99-28.000.
- Rosemount Inc.: *See—*
  - Brown, Gregory C.; and Nash, John H., 316,975, Cl. D10-46.000.
- Ruiz, J. Trinidad. Washcloth. 316,941, 5-21-91, Cl. D6-608.000.
- Rumpel, Donald D., to Kellogg Plastics, Ltd. Christmas light clip. 316,958, 5-21-91, Cl. D8-395.000.
- Saboten Co., Ltd.: *See—*
  - Ishida, Kimikazu; and Ishida, Tsuneo, 316,952, Cl. D8-9.000.
- St. John, Michael B. Bicycle shoe cleat. 316,926, 5-21-91, Cl. D2-314.000.
- Samson, George W.: *See—*
  - Hoskinson, Marlin J.; Lorincz, Eugene M.; and Samson, George W., 316,956, Cl. D8-371.000.
- Sanyo Electric Co., Ltd.: *See—*
  - Miyazaki, Haruo; and Takada, Kazuo, 317,066, Cl. D32-18.000.
- Sarff, Janice R. Holder for a cellular telephone. 316,999, 5-21-91, Cl. D14-253.000.
- Seiki Shinsha Co. Ltd.: *See—*
  - Cohen, Shlomo, 316,984, Cl. D11-90.000.
- Sharp, Jeffrey O.; Dessert, Edward P.; and Harris, Michael R., to Square D Company. Main circuit breaker. 317,004, 5-21-91, Cl. D13-160.000.
- Shatzer, Kevin P.: *See—*
  - Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,049, Cl. D25-119.000.
  - Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,050, Cl. D25-122.000.
  - Pavone, Jerry D.; Aubke, Paul D.; and Shatzer, Kevin P., 317,051, Cl. D25-122.000.
- Shintani, Eiji, to Pioneer Kabushiki Kaisha. Loudspeaker. 317,007, 5-21-91, Cl. D14-214.000.
- Shulman, Betty A.: *See—*
  - Shulman, Donald P.; and Shulman, Betty A., 317,021, Cl. D21-48.000.
- Shulman, Donald P.; and Shulman, Betty A. Joystick housing. 317,021, 5-21-91, Cl. D21-48.000.
- Smoke Signal Data Systems, Inc.: *See—*
  - Wickrema, Gammini; Desouza, Joseph; and Battaglia, Samuel, 317,005, Cl. D14-107.000.
- Soederberg, Richard, to Porsche Aktiengesellschaft. Outside mirror for a motor vehicle. 316,997, 5-21-91, Cl. D12-187.000.
- Sonneman Design Group, Inc.: *See—*
  - Sonneman, Robert A., 317,058, Cl. D26-92.000.
- Sonneman, Robert A., to Sonneman Design Group, Inc. Wall mounted lamp assembly. 317,058, 5-21-91, Cl. D26-92.000.
- Spalding & Evenflo Companies, Inc.: *See—*
  - Giambrone, Harry J., 316,989, Cl. D12-133.000.
- Square D Company: *See—*
  - Sharp, Jeffrey O.; Dessert, Edward P.; and Harris, Michael R., 317,004, Cl. D13-160.000.
- Stanfield, John. Candle carrier. 316,934, 5-21-91, Cl. D3-73.000.
- State Chemical Manufacturing Co., The: *See—*
  - Kearnes, Thom; and Wennerstrom, Joel, 316,971, Cl. D9-424.000.
- Stevenson, John E. Ear cushion for telephone receiver or similar article. 317,009, 5-21-91, Cl. D14-249.000.
- Sun Refining and Marketing Company: *See—*
  - Poelvoorde, Raymond, 317,047, Cl. D25-34.000.
- Swaine, Steven W.: *See—*
  - McFadden, Francis J. A.; Carr, Donald W.; Swaine, Steven W.; and Rohan, Cahrles G. V., 317,071, Cl. D99-28.000.

- Swauger, Donald A. Auto window wind deflector. 316,993, 5-21-91, Cl. D12-181.000.
- Swauger, Donald A. Auto rear view safety mirror. 316,996, 5-21-91, Cl. D12-187.000.
- Tachikawa, Hideki, to Tomy Company, Ltd. Toy block vehicle. 317,023, 5-21-91, Cl. D21-124.000.
- Takada, Kazuo: *See—*
  - Miyazaki, Haruo; and Takada, Kazuo, 317,066, Cl. D32-18.000.
- Takahashi, Mamoru: *See—*
  - Oyamada, Takashi; and Takahashi, Mamoru, 317,014, Cl. D18-13.000.
- Takahashi, Yoshimoto, to Comet Electric Co., Ltd. Hair dryer. 317,062, 5-21-91, Cl. D28-13.000.
- Tarlow, Kenneth A.; and Arner, Barbara D., to Arner, Barbara D. Hanging file folder. 317,018, 5-21-91, Cl. D19-90.000.
- Taylor, Bruce G.: *See—*
  - Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 317,040, Cl. D23-209.000.
- Thomson, Graham A., to Reckitt & Colman Products Limited. Container for an air freshener. 317,044, 5-21-91, Cl. D23-367.000.
- Timex Corporation: *See—*
  - Houlihan, John T., 316,983, Cl. D10-39.000.
- Tipton, William A.: *See—*
  - Dawson, Richard M.; Kotthoff, Gerald G.; Tipton, William A.; and James, David A., 316,970, Cl. D9-415.000.
- Tomy Company, Ltd.: *See—*
  - Tachikawa, Hideki, 317,023, Cl. D21-124.000.
  - Ueyama, Tsuyoshi, 317,026, Cl. D21-142.000.
- 'totes', incorporated: *See—*
  - Brinker, Barry; and Burbrink, David E., 316,980, Cl. D10-86.000.
- Toyota Jidosha Kabushiki Kaisha: *See—*
  - Hackett, David E.; Hunter, Kevin K.; and Matsumoto, Kintaro, 316,986, Cl. D12-96.000.
- Tribe, Alex E.; Bottorff, Marion R.; Cottrell, Ronald G.; Ranes, Richard L.; and Whistler, William B., to Northrop Corporation. Aircraft. 317,003, 5-21-91, Cl. D12-333.000.
- Twinpack, Inc.: *See—*
  - Mancini, Derek V., 316,963, Cl. D9-345.000.
- Ueyama, Tsuyoshi, to Tomy Company, Ltd. Control station for toy vehicle racing set. 317,026, 5-21-91, Cl. D21-142.000.
- Ullman, Barry. Orthopedic heel-insert. 316,929, 5-21-91, Cl. D2-318.000.
- Urban, Paul L., to Cooper Industries, Inc. Soldering pencil holder base. 316,943, 5-21-91, Cl. D8-71.000.
- Vandendriessche, Jean-Pierre: *See—*
  - Boddin, Geert R.; Vandendriessche, Jean-Pierre; and Witdoek, Daniel C., 317,011, Cl. D15-30.000.
- Vandewalle, Thomas A.: *See—*
  - Arvidson, Russell A.; and Vandewalle, Thomas A., 316,965, Cl. D9-370.000.
- Vibram S.p.A.: *See—*
  - Bernasconi, Giorgio, 316,930, Cl. D2-320.000.
- Wada, Hiromu: *See—*
  - Machida, Hiroshi; Wada, Hiromu; and Hirano, Yukio, 316,987, Cl. D12-98.000.
- Wass, Anthony: *See—*
  - Law, Brian; and Wass, Anthony, 316,972, Cl. D9-448.000.
- Weder, Donald E., to Highland Supply Corporation. Flower pot cover. 316,985, 5-21-91, Cl. D11-164.000.
- Weiss, Ralph N. Street elbow holder tool. 316,953, 5-21-91, Cl. D8-70.000.
- Wennerstrom, Joel: *See—*
  - Kearnes, Thom; and Wennerstrom, Joel. 316,971, Cl. D9-424.000.
- Wenzl, Walter, to Christian Dior, S.A. Goblet. 316,947, 5-21-91, Cl. D7-537.000.
- Whistler, William B.: *See—*
  - Tribe, Alex E.; Bottorff, Marion R.; Cottrell, Ronald G.; Ranes, Richard L.; and Whistler, William B., 317,003, Cl. D12-333.000.
- Whitley, Warrick M., II, to Attwood Corporation. Transom light. 317,053, 5-21-91, Cl. D26-28.000.
- Wickrema, Gammini; Desouza, Joseph; and Battaglia, Samuel, to Smoke Signal Data Systems, Inc. Infrared data transmission unit for computer peripheral equipment. 317,005, 5-21-91, Cl. D14-107.000.
- Wilkerson, Eugene R., to Florida Isles Enterprises, Inc. Bottle. 316,960, 5-21-91, Cl. D9-307.000.
- Will, Robert A.: *See—*
  - Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 316,922, Cl. D1-110.000.
- Winston Furniture Company of Alabama, Inc.: *See—*
  - Hess, Stephen C., 316,938, Cl. D6-373.000.
- Wiseman, Kay E.; and Kichenside, Brian E., to Chesebrough-Pond's USA Co. Combined bottle and cap. 316,969, 5-21-91, Cl. D9-409.000.
- Witdoek, Daniel C.: *See—*
  - Boddin, Geert R.; Vandendriessche, Jean-Pierre; and Witdoek, Daniel C., 317,011, Cl. D15-30.000.
- Yajima, Kiyoshi, to Kabushiki Kaisha Tamiya Mokei. Toy racing car. 317,024, 5-21-91, Cl. D21-137.000
- Yeary, Hubert F.: *See—*
  - Comerford, Thomas R.; and Yeary, Hubert F., 316,976, Cl. D10-46.000.
- York, Stuart A., to Hoover Universal, Inc. Upper portion of a bottle. 316,964, 5-21-91, Cl. D21-349.000.
- York, Stuart A., to Hoover Universal, Inc. Upper portion of a bottle. 316,966, 5-21-91, Cl. D9-390.000.
- York, Stuart A., to Hoover Universal, Inc. Upper portion of a bottle. 316,967, 5-21-91, Cl. D9-390.000.
- York, Stuart A., to Hoover Universal, Inc. Upper portion of a bottle 316,968, 5-21-91, Cl. D9-392.000.
- Yukimoto, Koji; Hayashi, Hiroshi; and Ito, Yukio, to Kabushiki Kaisha Nippon Coinco. Currency discriminating machine. 317,019, 5-21-91, Cl. D20-9.000.

# LIST OF PLANT PATENTEES

- Ackerman, Stephen M., to Plant Sciences, Inc. Raspberry plant name PSI 168. 7,528, 5-21-91, Cl. 46.000.
- Carlson, H. David. Nectarine tree Carlson variety. 7,527, 5-21-91, Cl. 41.000.
- Hill, John; and Hill, Sue. Apple tree Hidala. 7,526, 5-21-91, Cl. 34.000.
- Hill, Sue: *See—*
  - Hill, John; and Hill, Sue, 7,526, Cl. 34.000.
- Hines Nurseries Inc.: *See—*
  - Mossholder, Rose M., 7,530, Cl. 57.000.
- J. Frank Schmidt & Son Co.: *See—*
  - Warren, Keith S., 7,529, Cl 51.000.
- Mossholder, Rose M., to Hines Nurseries Inc. Azalea hybrid 'Billie Dee'. 7,530, 5-21-91, Cl. 57.000.
- Plant Sciences, Inc.: *See—*
  - Ackerman, Stephen M., 7,528, Cl. 46.000
- VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Sandy 7,531, 5-21-91, Cl. 74.000.
- Warren, Keith S., to J. Frank Schmidt & Son Co. Maple tree named 'Keithsform'. 7,529, 5-21-91, Cl 51.000.
- Yoder Brothers, Inc.: *See—*
  - VandenBerg, Cornelis P., 7,531, Cl 74.000

VOL
1126
ISS
3
MY
21
1991
UMI

# CLASSIFICATION OF PATENTS

## ISSUED MAY 21, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

| | |
|---|---|
| **CLASS 2** | |
| 69 | 5,016,284 |
| 144 | 5,016,285 |
| 161 R | 5,016,286 |
| 202 | 5,016,287 |
| 207 | 5,016,288 |
| 246 | 5,016,289 |
| 270 | 5,016,290 |
| 312 | 5,016,291 |
| 431 | 5,016,292 |
| 436 | 5,016,293 |
| **CLASS 4** | |
| 217 | 5,016,294 |
| 324 | 5,016,295 |
| 507 | 5,016,296 |
| 619 | 5,016,297 |
| 654 | 5,016,298 |
| **CLASS 5** | |
| 81 R | 5,016,299 |
| 85 | 5,016,300 |
| 105 | 5,016,301 |
| 423 | 5,016,302 |
| 437 | 5,016,303 |
| 453 | 5,016,304 |
| 477 | 5,016,305 |
| 498 | 5,016,306 |
| 503 | 5,016,307 |
| **CLASS 8** | |
| 111 | 5,017,194 |
| 149 | 5,016,308 |
| 526 | 5,017,195 |
| **CLASS 14** | |
| 71.7 | 5,016,309 |
| **CLASS 15** | |
| 49.1 | 5,016,310 |
| 88.3 | 5,016,311 |
| 250.04 | 5,016,312 |
| 320 | 5,016,313 |
| | 5,016,314 |
| 410 | 5,016,315 |
| 412 | 5,016,316 |
| **CLASS 16** | |
| 54 | 5,016,317 |
| 95 R | 5,016,318 |
| 114 R | 5,016,319 |
| **CLASS 19** | |
| 40 | 5,016,320 |
| 98 | 5,016,321 |
| 150 | 5,016,322 |
| 258 | 5,016,323 |
| 296 | 5,016,324 |
| **CLASS 24** | |
| 3.3 | 5,016,326 |
| 68 R | 5,016,325 |
| 713.3 | 5,016,327 |
| **CLASS 26** | |
| 7 | 5,016,328 |
| 18.5 | 5,016,329 |
| **CLASS 27** | |
| 1 | 5,016,330 |
| **CLASS 28** | |
| 115 | 5,016,331 |
| **CLASS 29** | |
| 25.01 | 5,016,332 |
| 25.35 | 5,016,333 |
| 38 B | 5,016,334 |
| 57 | 5,016,335 |
| 281.5 | 5,016,336 |
| 418 | 5,016,337 |
| 423 | 5,016,338 |
| 598 | 5,016,340 |
| 603 | 5,016,341 |
| | 5,016,342 |
| 605 | 5,016,343 |
| 622 | 5,016,344 |
| 742 | 5,016,345 |
| 754 | 5,016,346 |
| 825 | 5,016,347 |
| 888.1 | 5,016,348 |
| 890.121 | 5,016,349 |
| 891.2 | 5,016,350 |
| **CLASS 30** | |
| 41 | 5,016,351 |
| 85 | 5,016,352 |
| 124 | 5,016,353 |
| 371 | 5,016,354 |
| 383 | 5,016,355 |
| 393 | 5,016,356 |
| **CLASS 33** | |
| 277 | 5,016,357 |
| 569 | 5,016,358 |
| 700 MS | 5,017,931 |
| 702 | 5,016,359 |
| 758 | 5,016,360 |
| **CLASS 34** | |
| 10 | 5,016,361 |
| 51 | 5,016,362 |
| 156 | 5,016,363 |
| 202 | 5,016,364 |
| **CLASS 37** | |
| 141 T | 5,016,365 |
| 220 | 5,016,366 |
| **CLASS 38** | |
| 135 | 5,016,367 |
| **CLASS 40** | |
| 299 | 5,016,368 |
| 301 | 5,016,369 |
| 359 | 5,016,370 |
| 518 | 5,016,371 |
| 591 | 5,016,372 |
| 594 | 5,016,373 |
| 605 | 5,016,374 |
| 642 | 5,016,375 |
| **CLASS 42** | |
| 70.06 | 5,016,378 |
| 70.11 | 5,016,376 |
| | 5,016,377 |
| 83 | 5,016,379 |
| 90 | 5,016,380 |
| 100 | 5,016,381 |
| | 5,016,382 |
| **CLASS 43** | |
| 4 | 5,016,383 |
| 21.2 | 5,016,384 |
| 26.1 | 5,016,385 |
| 42.14 | 5,016,386 |
| 42.33 | 5,016,387 |
| **CLASS 47** | |
| 23 | 5,016,388 |
| 48.5 | 5,016,389 |
| **CLASS 48** | |
| 210 | 5,017,196 |
| **CLASS 49** | |
| 38 | 5,016,390 |
| 70 | 5,016,391 |
| 352 | 5,016,392 |
| 395 | 5,016,393 |
| 441 | 5,016,394 |
| 501 | 5,016,395 |
| 502 | 5,016,396 |
| **CLASS 51** | |
| 80 A | 5,016,397 |
| 80 R | 5,016,398 |
| 118 | 5,016,399 |
| 141 | 5,016,400 |
| 328 | 5,016,401 |
| 393 | 5,016,402 |
| **CLASS 52** | |
| 7 | 5,016,403 |
| 12 | 5,016,404 |
| 36 | 5,016,405 |
| 58 | 5,016,406 |
| 126.1 | 5,016,407 |
| 126.6 | 5,016,408 |
| 167 DF | 5,016,409 |
| 220 | 5,016,411 |
| 235 | 5,016,410 |
| 302 | 5,016,412 |
| 391 | 5,016,413 |
| 456 | 5,016,414 |
| 522 | 5,016,415 |
| 539 | 5,016,416 |
| 571 | 5,016,417 |
| 646 | 5,016,418 |
| 749 | 5,016,419 |
| **CLASS 53** | |
| 44 | 5,016,427 |
| 138.1 | 5,016,420 |
| 233 | 5,016,421 |
| 330 | 5,016,422 |
| 370.2 | 5,016,430 |
| 381.1 | 5,016,429 |
| 403 | 5,016,428 |
| 453 | 5,016,425 |
| 459 | 5,016,424 |
| 476 | 5,016,423 |
| 554 | 5,016,426 |
| **CLASS 55** | |
| 1 | 5,017,197 |
| 21 | 5,017,198 |
| 57 | 5,017,199 |
| 96 | 5,017,200 |
| 227 | 5,017,201 |
| 390 | 5,017,202 |
| 457 | 5,017,203 |
| **CLASS 57** | |
| 19 | 5,016,431 |
| 261 | 5,016,432 |
| 264 | 5,016,433 |
| 313 | 5,016,434 |
| **CLASS 60** | |
| 39.05 | 5,016,435 |
| 264 | 5,016,436 |
| 280 | 5,016,437 |
| 299 | 5,016,438 |
| 310 | 5,016,439 |
| 429 | 5,016,440 |
| 516 | 5,016,441 |
| 535 | 5,016,442 |
| 737 | 5,016,443 |
| **CLASS 62** | |
| 11 | 5,017,204 |
| 79 | 5,016,444 |
| 101 | 5,016,445 |
| 342 | 5,016,446 |
| 470 | 5,016,447 |
| 476 | 5,016,448 |
| **CLASS 65** | |
| 1 | 5,017,205 |
| 3.11 | 5,017,206 |
| 13 | 5,017,209 |
| 66 | 5,017,207 |
| 106 | 5,017,210 |
| 277 | 5,017,208 |
| **CLASS 66** | |
| 54 | 5,016,449 |
| 93 | 5,016,450 |
| **CLASS 68** | |
| 2 | 5,016,451 |
| **CLASS 69** | |
| 21 | 5,016,452 |
| **CLASS 70** | |
| 93 | 5,016,453 |
| 185 | 5,016,454 |
| 493 | 5,016,455 |
| **CLASS 71** | |
| 92 | 5,017,211 |
| | 5,017,212 |
| | 5,017,214 |
| 93 | 5,017,215 |
| 95 | 5,017,213 |
| 116 | 5,017,216 |
| **CLASS 72** | |
| 38 | 5,016,456 |
| 56 | 5,016,457 |
| 57 | 5,016,458 |
| 178 | 5,016,459 |
| 208 | 5,016,460 |
| 336 | 5,016,461 |
| 349 | 5,016,462 |
| 354.8 | 5,016,463 |
| 447 | 5,016,464 |
| 457 | 5,016,465 |
| **CLASS 73** | |
| 4 R | 5,016,466 |
| 56 | 5,016,467 |
| 64.1 | 5,016,469 |
| 73 | 5,016,468 |
| 146 | 5,016,470 |
| 162 | 5,016,471 |
| 338 | 5,016,472 |
| 387 | 5,016,473 |
| 597 | 5,016,474 |
| 644 | 5,016,475 |
| 829 | 5,016,476 |
| 849 | 5,016,477 |
| 862.19 | 5,016,478 |
| 862.45 | 5,016,479 |
| 862.59 | 5,016,480 |
| 862.64 | 5,016,481 |
| 863.61 | 5,016,482 |
| 865.1 | 5,016,483 |
| **CLASS 74** | |
| 6 | 5,016,484 |
| 18.1 | 5,016,485 |
| 205 | 5,016,486 |
| 206 | 5,016,487 |
| 475 | 5,016,488 |
| 479 | 5,016,489 |
| 501.5 R | 5,016,490 |
| 640 | 5,016,491 |
| 733.1 | 5,016,492 |
| 840 | 5,016,493 |
| 858 | 5,016,494 |
| 866 | 5,016,495 |
| 868 | 5,016,496 |
| **CLASS 75** | |
| 244 | 5,017,217 |
| 388 | 5,017,218 |
| 415 | 5,017,219 |
| 629 | 5,017,220 |
| **CLASS 76** | |
| 25.1 | 5,016,497 |
| | 5,016,498 |
| **CLASS 81** | |
| 3.37 | 5,016,499 |
| 9.4 | 5,016,300 |
| 57.11 | 5,016,501 |
| 57.39 | 5,016,502 |
| 127 | 5,016,503 |
| 488 | 5,016,504 |
| **CLASS 83** | |
| 35 | 5,016,306 |
| 198 | 5,016,505 |
| 384 | 5,016,507 |
| 435.001 | 5,016,508 |
| 437 | 5,016,509 |
| 471.002 | 5,016,510 |
| 487 | 5,016,511 |
| 783 | 5,016,512 |
| **CLASS 84** | |
| 19 | 5,016,513 |
| 318 | 5,016,514 |
| 454 | 5,016,515 |
| **CLASS 87** | |
| 8 | 5,016,516 |
| **CLASS 89** | |
| 7 | 5,016,517 |
| 8 | 5,016,518 |
| **CLASS 91** | |
| 361 | 5,016,519 |
| 471 | 5,016,520 |
| **CLASS 92** | |
| 13.1 | 5,016,521 |
| 62 | 5,016,522 |
| 63 | 5,016,523 |
| 182 | 5,016,524 |
| **CLASS 98** | |
| 40.12 | 5,016,525 |
| 98 | 5,016,526 |
| 115.3 | 5,016,527 |
| **CLASS 99** | |
| 353 | 5,016,528 |
| **CLASS 101** | |
| 211 | 5,016,529 |
| 349 | 5,016,530 |
| 415.1 | 5,016,531 |
| **CLASS 102** | |
| 254 | 5,016,532 |
| 386 | 5,016,533 |
| 387 | 5,016,534 |
| 411 | 5,016,535 |
| 430 | 5,016,536 |
| 443 | 5,016,537 |
| 520 | 5,016,538 |
| **CLASS 104** | |
| 28 | 5,016,539 |
| 53 | 5,016,540 |
| 129 | 5,016,541 |
| 130 | 5,016,542 |
| **CLASS 105** | |
| 150 | 5,016,543 |
| 215.2 | 5,016,544 |
| **CLASS 106** | |
| 2 | 5,017,221 |
| 10 | 5,017,222 |
| 20 | 5,017,223 |
| 21 | 5,017,225 |
| | 5,017,226 |
| 22 | 5,017,224 |
| | 5,017,227 |
| 28 | 5,017,228 |
| 162 | 5,017,229 |
| 284.3 | 5,017,230 |
| 452 | 5,017,231 |
| 600 | 5,017,233 |
| 711 | 5,017,232 |
| 781 | 5,017,234 |
| **CLASS 108** | |
| 111 | 5,016,545 |
| **CLASS 109** | |
| 45 | 5,016,546 |
| **CLASS 110** | |
| 211 | 5,016,547 |
| **CLASS 111** | |
| 114 | 5,016,548 |
| **CLASS 112** | |
| 104 | 5,016,549 |
| 454 | 5,016,550 |
| **CLASS 114** | |
| 45 | 5,016,685 |
| 56 | 5,016,552 |
| 045 | 5,016,551 |
| 151 | 5,016,553 |
| 219 | 5,016,554 |
| 238 | 5,016,555 |
| 311 | 5,016,556 |
| 347 | 5,016,557 |
| 361 | 5,016,558 |
| **CLASS 116** | |
| 234 | 5,016,559 |
| **CLASS 118** | |
| 653 | 5,016,560 |
| 718 | 5,016,561 |
| 719 | 5,016,562 |
| 723 | 5,016,563 |
| | 5,016,564 |
| | 5,016,565 |
| 726 | 5,016,566 |
| 733 | 5,016,567 |
| **CLASS 119** | |
| 14.08 | 5,016,569 |
| 19 | 5,016,570 |
| 23 | 5,016,571 |
| 52.1 | 5,016,572 |
| 57.9 | 5,016,573 |
| 72.5 | 5,016,574 |
| 106 | 5,016,575 |
| 173 | 5,016,568 |
| **CLASS 122** | |
| 4 D | 5,016,576 |
| 182.1 | 5,016,577 |
| **CLASS 123** | |
| 52 MC | 5,016,578 |
| 52 MV | 5,016,579 |
| 58 A | 5,016,580 |
| 90.25 | 5,016,581 |
| 90.39 | 5,016,582 |
| 190 BC | 5,016,583 |
| 195 R | 5,016,584 |
| 198 E | 5,016,585 |
| 336 | 5,016,586 |
| 359 | 5,016,587 |
| 399 | 5,016,588 |
| | 5,016,589 |
| 412 | 5,016,590 |
| 419 | 5,016,591 |
| 432 | 5,016,592 |
| 436 | 5,016,593 |
| 470 | 5,016,594 |
| 478 | 5,016,595 |
| 489 | 5,016,596 |
| 533 | 5,016,597 |
| | 5,016,598 |
| 570 | 5,016,599 |
| **CLASS 124** | |
| 3 | 5,016,600 |
| 20.1 | 5,016,601 |
| 89 | 5,016,602 |
| 91 | 5,016,603 |
| 92 | 5,016,604 |
| **CLASS 126** | |
| 20 | 5,016,605 |
| 21 A | 5,016,606 |
| 25 R | 5,016,607 |
| 41 R | 5,016,608 |
| 85 B | 5,016,609 |
| 91 A | 5,016,610 |
| 258 | 5,016,611 |
| 299 D | 5,016,612 |
| 312 | 5,016,613 |
| **CLASS 128** | |
| 4 | 5,016,614 |
| 24 A | 5,016,615 |
| 32 | 5,016,616 |
| 52 | 5,016,617 |
| 66 | 5,016,618 |
| 67 | 5,016,619 |
| 78 | 5,016,620 |
| 80 C | 5,016,621 |
| 80 H | 5,016,623 |
| 82.1 | 5,016,624 |
| 91 R | 5,016,622 |
| 201.25 | 5,016,625 |
| 204.26 | 5,016,626 |
| 205.24 | 5,016,627 |
| 205.28 | 5,016,628 |
| 402 | 5,016,629 |
| 419 PG | 5,016,630 |
| | 5,016,632 |
| 419 PS | 5,016,631 |
| 419 PT | 5,016,634 |
| 419 R | 5,016,633 |
| 421 | 5,016,635 |
| 644 | 5,016,636 |
| 653 A | 5,016,638 |
| 653 OAF | 5,016,637 |
| 653 R | 5,016,639 |
| 658 | 5,016,640 |
| 660.03 | Re.33,590 |
| 661.09 | 5,016,641 |
| 696 | 5,016,642 |
| 745 | 5,016,643 |
| 771 | 5,016,644 |
| 784 | 5,016,645 |
| | 5,016,646 |
| 787 | 5,016,647 |
| 846 | 5,016,648 |
| 859 | 5,016,649 |
| 878 | 5,016,650 |
| 898 | 5,016,651 |
| **CLASS 131** | |
| 270 | 5,016,652 |
| 278 | 5,017,235 |
| 286 | 5,016,653 |
| 302 | 5,016,654 |
| 310 | 5,016,655 |
| 364 | 5,016,656 |
| **CLASS 132** | |
| 202 | 5,016,657 |
| 216 | 5,016,658 |
| 321 | 5,016,659 |
| 322 | 5,016,660 |
| 324 | 5,016,661 |

VOL
1126
ISS
3
MY
21
1991
UMI

| | |
|---|---|
| **CLASS 134** | |
| 1 | 5,016,663 |
| | 5,017,236 |
| 4 | 5,017,237 |
| 7 | 5,017,238 |
| 15 | 5,017,239 |
| 22.1 | 5,017,240 |
| 22.12 | 5,017,241 |
| 22.18 | 5,017,242 |
| 45 | 5,016,662 |
| **CLASS 136** | |
| 244 | 5,017,243 |
| **CLASS 137** | |
| 1 | 5,016,664 |
| | 5,016,665 |
| | 5,016,666 |
| 143 | 5,016,667 |
| 231 | 5,016,668 |
| 512 | 5,016,669 |
| 574 | 5,016,670 |
| 614.04 | 5,016,671 |
| 625.24 | 5,016,672 |
| **CLASS 138** | |
| 45 | 5,016,673 |
| 91 | 5,016,674 |
| 125 | 5,016,675 |
| **CLASS 139** | |
| 116.2 | 5,016,676 |
| 245 | 5,016,677 |
| 383 A | 5,016,678 |
| 450 | 5,016,679 |
| 452 | 5,016,680 |
| | 5,016,681 |
| **CLASS 140** | |
| 149 | 5,016,682 |
| **CLASS 141** | |
| 1 | 5,016,683 |
| 6 | 5,016,684 |
| 96 | 5,016,686 |
| 116 | 5,016,687 |
| 170 | 5,016,688 |
| 198 | 5,016,689 |
| 242 | 5,016,690 |
| **CLASS 144** | |
| 134 D | 5,016,691 |
| 144.5 R | 5,016,694 |
| 213 | 5,016,692 |
| 253 J | 5,016,693 |
| **CLASS 148** | |
| 3 | 5,017,244 |
| 11.5 R | 5,017,245 |
| 135 | 5,017,246 |
| 302 | 5,017,247 |
| 320 | 5,017,248 |
| 410 | 5,017,249 |
| 411 | 5,017,250 |
| **CLASS 149** | |
| 2 | 5,017,251 |
| **CLASS 152** | |
| 209 A | 5,016,695 |
| 209 B | 5,016,696 |
| 454 | 5,016,697 |
| 527 | 5,016,698 |
| **CLASS 156** | |
| 71 | B1 4,797,170 |
| 85 | Re.33,591 |
| 109 | 5,017,252 |
| 130.3 | 5,017,253 |
| 227 | 5,017,254 |
| 230 | 5,017,255 |
| 240 | 5,017,256 |
| 268 | 5,017,257 |
| 294 | 5,017,258 |
| | 5,017,259 |
| 308.2 | 5,017,260 |
| 568 | 5,017,261 |
| 630 | 5,017,262 |
| 633 | 5,017,263 |
| 643 | 5,017,264 |
| | 5,017,265 |
| | 5,017,266 |
| 656 | 5,017,267 |
| **CLASS 160** | |
| 22 | 5,016,699 |
| 232 | 5,016,700 |
| 241 | 5,016,701 |
| **CLASS 162** | |
| 146 | 5,017,268 |
| **CLASS 164** | |
| 34 | 5,016,702 |
| 97 | 5,016,703 |
| **CLASS 165** | |
| 1 | 5,016,704 |
| 41 | 5,016,705 |
| 162 | 5,016,706 |
| 167 | 5,016,707 |
| **CLASS 166** | |
| 75.1 | 5,016,708 |
| 245 | 5,016,709 |
| | 5,016,710 |
| 250 | 5,016,711 |
| | 5,016,712 |
| 270 | 5,016,713 |
| 308 | 5,016,714 |
| **CLASS 169** | |
| 61 | 5,016,715 |
| **CLASS 174** | |
| 35 MS | 5,017,736 |
| 94 R | 5,017,738 |
| 138 F | 5,017,739 |
| 152 GM | 5,017,740 |
| 260 | 5,017,741 |
| 266 | 5,017,742 |
| **CLASS 175** | |
| 17 | 5,016,716 |
| 66 | 5,016,717 |
| 333 | 5,016,718 |
| 353 | 5,016,719 |
| **CLASS 180** | |
| 13 | 5,016,720 |
| 89.13 | 5,016,721 |
| 89.14 | 5,016,722 |
| 143 | 5,016,723 |
| 197 | 5,016,724 |
| 225 | 5,016,725 |
| **CLASS 181** | |
| 102 | 5,016,727 |
| 229 | 5,016,728 |
| 240 | 5,016,729 |
| 265 | 5,016,730 |
| **CLASS 182** | |
| 2 | 5,016,731 |
| 116 | 5,016,732 |
| 187 | 5,016,733 |
| 221 | 5,016,734 |
| 223 | 5,016,735 |
| **CLASS 186** | |
| 53 | 5,016,736 |
| **CLASS 188** | |
| 181 A | 5,016,737 |
| **CLASS 192** | |
| 0.08 | 5,016,739 |
| 4 A | 5,016,738 |
| 38 | 5,016,740 |
| 45.1 | 5,016,741 |
| 58 C | 5,016,742 |
| 70.12 | 5,016,743 |
| 106.2 | 5,016,744 |
| **CLASS 194** | |
| 346 | 5,016,745 |
| **CLASS 198** | |
| 499 | 5,016,746 |
| 525 | 5,016,747 |
| 781 | 5,016,748 |
| **CLASS 200** | |
| 61.45 R | 5,017,743 |
| 84 C | 5,017,748 |
| 277 | 5,017,744 |
| 307 | 5,017,745 |
| 331 | 5,017,746 |
| 453 | 5,017,747 |
| **CLASS 201** | |
| 25 | 5,017,269 |
| 41 | 5,017,270 |
| **CLASS 204** | |
| 15 | 5,017,271 |
| 56.1 | 5,017,272 |
| 105 R | 5,017,273 |
| 129 | 5,017,274 |
| 206 | 5,017,275 |
| 290 R | 5,017,276 |
| 298.02 | 5,017,277 |
| **CLASS 206** | |
| 5.1 | 5,016,749 |
| 130 | 5,016,750 |
| 419 | 5,016,751 |
| 455 | 5,016,752 |
| 459 | 5,016,753 |
| 496 | 5,016,754 |
| 526 | 5,016,755 |
| 545 | 5,016,756 |
| 603 | 5,016,757 |
| **CLASS 208** | |
| 65 | 5,017,278 |
| 67 | 5,017,279 |
| 223 | 5,017,280 |
| 390 | 5,017,281 |
| 414 | 5,017,282 |
| **CLASS 209** | |
| 212 | 5,017,283 |
| **CLASS 210** | |
| 97 | 5,017,284 |
| 232 | 5,017,285 |
| 266 | 5,017,286 |
| 433.1 | 5,017,287 |
| 512.1 | 5,017,288 |
| 610 | 5,017,289 |
| 635 | 5,017,290 |
| 641 | 5,017,291 |
| 645 | 5,017,292 |
| 646 | 5,017,293 |
| 708 | 5,017,294 |
| 764 | 5,017,295 |
| **CLASS 211** | |
| 4 | 5,016,758 |
| 13 | 5,016,759 |
| 55 | 5,016,760 |
| 59.4 | 5,016,761 |
| 119.1 | 5,016,762 |
| 184 | 5,016,763 |
| 189 | 5,016,764 |
| | 5,016,765 |
| **CLASS 212** | |
| 188 | 5,016,767 |
| 262 | 5,016,768 |
| **CLASS 215** | |
| 230 | 5,016,769 |
| 232 | 5,016,770 |
| 341 | 5,016,771 |
| **CLASS 219** | |
| 10.55 R | 5,017,750 |
| 64 | 5,017,749 |
| 121.36 | 5,017,754 |
| 121.52 | 5,017,751 |
| 121.59 | 5,017,752 |
| 121.63 | 5,017,753 |
| 121.68 | 5,017,755 |
| 130.32 | 5,017,756 |
| 130.51 | 5,017,757 |
| 205 | 5,017,758 |
| 390 | 5,017,760 |
| 502 | 5,017,761 |
| **CLASS 220** | |
| 8 | 5,016,772 |
| 90 | 5,016,773 |
| 254 | 5,016,774 |
| 288 | 5,016,775 |
| 305 | 5,016,776 |
| 339 | 5,016,777 |
| **CLASS 221** | |
| 22 | 5,016,766 |
| 154 | 5,016,778 |
| **CLASS 222** | |
| 95 | 5,016,779 |
| 153 | 5,016,780 |
| 162 | 5,016,781 |
| 257 | 5,016,782 |
| 321 | 5,016,783 |
| 386 | 5,016,784 |
| 402.1 | 5,016,785 |
| 504 | 5,016,786 |
| 522 | 5,016,787 |
| 590 | 5,016,788 |
| 608 | 5,016,789 |
| 639 | 5,016,790 |
| **CLASS 224** | |
| 148 | 5,016,791 |
| 155 | 5,016,792 |
| 209 | 5,016,793 |
| 211 | 5,016,794 |
| 217 | 5,016,795 |
| 245 | 5,016,796 |
| 257 | 5,016,797 |
| 326 | 5,016,798 |
| | 5,016,799 |
| **CLASS 225** | |
| 2 | 5,016,800 |
| **CLASS 226** | |
| 197 | 5,016,801 |
| **CLASS 227** | |
| 11 | 5,016,802 |
| **CLASS 228** | |
| 4.5 | 5,016,803 |
| 51 | 5,016,804 |
| 118 | 5,016,805 |
| 147 | 5,016,806 |
| 170 | 5,016,807 |
| 176 | 5,016,808 |
| 205 | 5,016,809 |
| 206 | 5,016,810 |
| **CLASS 229** | |
| 23 R | 5,016,811 |
| 132 | 5,016,812 |
| 189 | 5,016,813 |
| 196 | 5,016,814 |
| **CLASS 235** | |
| 78 R | 5,017,762 |
| 432 | 5,017,763 |
| 454 | 5,017,764 |
| 462 | 5,017,765 |
| 492 | 5,017,766 |
| | 5,017,767 |
| **CLASS 236** | |
| 49.3 | 5,016,815 |
| **CLASS 238** | |
| 349 | 5,016,816 |
| **CLASS 239** | |
| 113 | 5,016,817 |
| 127.1 | 5,016,818 |
| 522 | 5,016,819 |
| 533.12 | 5,016,820 |
| 585 | 5,016,821 |
| 651 | 5,016,822 |
| **CLASS 241** | |
| 5 | 5,016,823 |
| 21 | 5,016,324 |
| 46.06 | 5,016,825 |
| 72 | 5,016,826 |
| 79.3 | 5,016,827 |
| 158 | 5,016,828 |
| **CLASS 242** | |
| 18 A | 5,016,829 |
| 35.50 A | 5,016,830 |
| 55 | 5,016,831 |
| 58.6 | 5,016,832 |
| 66 | 5,016,833 |
| 199 | 5,016,834 |
| **CLASS 244** | |
| 3.22 | 5,016,835 |
| | 5,016,836 |
| 12.1 | 5,016,837 |
| 103 R | 5,016,838 |
| 147 | 5,016,839 |
| **CLASS 246** | |
| 187 R | 5,016,840 |
| **CLASS 248** | |
| 51 | 5,016,841 |
| 68.1 | 5,016,842 |
| | 5,016,843 |
| 97 | 5,016,844 |
| 104 | 5,016,845 |
| 161 | 5,016,846 |
| 175 | 5,016,847 |
| 176 | 5,016,848 |
| 183 | 5,016,849 |
| 206.3 | 5,016,850 |
| 278 | 5,016,851 |
| 461 | 5,016,852 |
| 523 | 5,016,853 |
| 563 | 5,016,854 |
| **CLASS 249** | |
| 21 | 5,016,855 |
| **CLASS 250** | |
| 201 5 | 5,017,768 |
| 216 | 5,017,769 |
| 221 | 5,017,770 |
| 223 R | 5,017,773 |
| 227.21 | 5,017,771 |
| | 5,017,772 |
| 227.25 | 5,017,775 |
| 231.14 | 5,017,776 |
| 231.16 | 5,017,777 |
| 254 | 5,017,778 |
| 283 | 5,017,779 |
| 287 | 5,017,780 |
| 327.2 | 5,017,774 |
| | 5,017,781 |
| | 5,017,782 |
| 338.1 | 5,017,784 |
| 345 | 5,017,785 |
| 352 | 5,017,786 |
| 353 | 5,017,783 |
| 360.1 | 5,017,787 |
| 385.1 | 5,017,788 |
| 396 ML | 5,017,789 |
| 455.1 | 5,017,790 |
| 483.1 | 5,017,791 |
| 548 | 5,017,792 |
| 551 | 5,017,793 |
| | 5,017,794 |
| 560 | 5,017,795 |
| 561 | 5,017,796 |
| | 5,017,797 |
| 572 | 5,017,798 |
| **CLASS 251** | |
| 61 | 5,016,856 |
| 304 | 5,016,857 |
| **CLASS 252** | |
| 8.6 | 5,017,296 |
| 8.8 | 5,017,297 |
| 47 | 5,017,298 |
| 51.5 R | 5,017,299 |
| 67 | 5,017,300 |
| 105 | 5,017,301 |
| 134 | 5,017,302 |
| 174 13 | 5,017,303 |
| 299.01 | 5,017,304 |
| 311 | 5,017,305 |
| 389.23 | 5,017,306 |
| 500 | 5,017,307 |
| 501 1 | 5,017,308 |
| **CLASS 254** | |
| 45 | 5,016,858 |
| 134.3 R | 5,016,859 |
| **CLASS 261** | |
| 111 | 5,017,309 |
| | 5,017,310 |
| **CLASS 264** | |
| 23 | 5,017,311 |
| 24 | 5,017,312 |
| 32 | 5,017,313 |
| 35 | 5,017,314 |
| 40 1 | 5,017,315 |
| 60 | 5,017,316 |
| 81 | 5,017,317 |
| 113 | 5,017,318 |
| 124 | 5,017,319 |
| 148 | 5,017,320 |
| 167 | 5,017,321 |
| 255 | 5,017,322 |
| 288.4 | 5,017,323 |
| 510 | 5,017,324 |
| 521 | 5,017,325 |
| **CLASS 266** | |
| 112 | 5,016,860 |
| **CLASS 267** | |
| 44 | 5,016,861 |
| 136 | 5,016,862 |
| | 5,017,328 |
| **CLASS 270** | |
| 41 | 5,016,863 |
| **CLASS 271** | |
| 38 | 5,016,864 |
| 103 | 5,016,865 |
| 122 | 5,016,866 |
| 209 | 5,016,867 |
| 273 | 5,016,868 |
| **CLASS 272** | |
| 70 | 5,016,869 |
| 73 | 5,016,870 |
| | 5,016,871 |
| | 5,016,872 |
| 85 | 5,016,873 |
| 137 | 5,016,874 |
| **CLASS 273** | |
| 1.5 A | 5,016,875 |
| 70 | 5,016,877 |
| 85 F | 5,016,878 |
| 126 A | 5,016,879 |
| 138 A | 5,016,880 |
| | 5,016,881 |
| 167 H | 5,016,882 |
| 167 R | 5,016,883 |
| 176 FA | 5,016,884 |
| 188 R | 5,016,885 |
| 201 | 5,016,886 |
| 232 | 5,016,887 |
| 239 | 5,016,888 |
| 293 | 5,016,889 |
| 312 | 5,016,890 |
| 407 | 5,016,891 |
| 437 | 5,016,876 |
| **CLASS 279** | |
| 82 | 5,016,892 |
| **CLASS 280** | |
| 35 | 5,016,893 |
| 201 | 5,016,894 |
| 243 | 5,016,726 |
| 280 | 5,016,895 |
| 400 | 5,016,896 |
| 402 | 5,016,897 |
| 433 | 5,016,898 |
| 446.1 | 5,016,899 |
| 477 | 5,016,900 |
| 607 | 5,016,901 |
| 630 | 5,016,902 |
| 663 | 5,016,903 |
| 664 | 5,016,904 |
| 677 | 5,016,905 |
| 680 | 5,016,906 |
| 707 | 5,016,907 |
| | 5,016,908 |
| | 5,016,909 |
| | 5,016,910 |
| 708 | 5,016,911 |
| 711 | 5,016,912 |
| 738 | 5,016,913 |
| 741 | 5,016,914 |
| 801 | 5,016,915 |
| 808 | 5,016,916 |
| **CLASS 283** | |
| 4 | 5,016,917 |
| 67 | 5,016,918 |
| 82 | 5,016,919 |
| **CLASS 285** | |
| 39 | 5,016,920 |
| | 5,016,921 |
| 81 | 5,016,922 |
| 127 | 5,016,923 |
| | 5,016,924 |
| 363 | 5,016,925 |
| **CLASS 292** | |
| 42 | 5,016,926 |
| 92 | 5,016,927 |
| 213 | 5,016,928 |
| 251.5 | 5,016,929 |
| 340 | 5,016,930 |
| 341.18 | 5,016,931 |
| **CLASS 293** | |
| 106 | 5,016,932 |
| 117 | 5,016,933 |
| **CLASS 296** | |
| 26 | 5,016,935 |
| 39.3 | 5,016,936 |
| 97.7 | 5,016,937 |
| 97.8 | 5,016,938 |
| 214 | 5,016,934 |
| 219 | 5,016,939 |
| **CLASS 297** | |
| 362 | 5,016,940 |
| 452 | 5,016,941 |
| **CLASS 299** | |
| 33 | 5,016,942 |
| 87 | 5,016,943 |
| **CLASS 301** | |
| 37 N | 5,016,944 |
| **CLASS 305** | |
| 58 PC | 5,016,945 |
| **CLASS 307** | |
| 34 | 5,017,799 |
| 66 | 5,017,800 |
| 269 | 5,017,801 |
| 270 | 5,017,802 |
| 296.5 | 5,017,803 |
| 309 | 5,017,804 |
| 362 | 5,017,805 |
| 428 | 5,017,806 |
| 443 | 5,017,807 |
| 446 | 5,017,808 |
| 465 | 5,017,809 |
| | 5,017,810 |
| 475 | 5,017,811 |
| | 5,017,812 |
| | 5,017,813 |
| 480 | 5,017,814 |
| 530 | 5,017,815 |
| 570 | 5,017,816 |
| 571 | 5,017,817 |
| **CLASS 310** | |
| 68 D | 5,017,821 |
| 71 | 5,017,818 |
| 90.5 | 5,017,819 |
| 207 | 5,017,822 |
| 323 | 5,017,823 |
| 328 | 5,017,820 |
| **CLASS 312** | |
| 108 | 5,016,946 |
| | 5,016,947 |
| 250 | 5,016,948 |
| 296 | 5,016,949 |
| 348 | B1 4,125,297 |
| **CLASS 313** | |
| 13 | 5,017,824 |
| 112 | 5,017,825 |
| 142 | 5,017,826 |
| 268 | 5,017,827 |
| 367 | 5,017,828 |
| 382 | 5,017,829 |
| 402 | 5,017,830 |
| 558 | 5,017,831 |
| **CLASS 315** | |
| 8 | 5,017,832 |
| 51 | 5,017,833 |

---

| | |
|---|---|
| 58 | 5,017,834 |
| 111.81 | 5,017,835 |
| 111.91 | 5,017,836 |
| 136 | 5,017,837 |
| 200 R | 5,017,838 |
| 219 | 5,017,839 |
| 291 | 5,017,840 |
| 366 | 5,017,842 |
| 368 | 5,017,843 |
| 382 | Re.33,592 |
| 408 | 5,017,844 |
| **CLASS 318** | |
| 138 | 5,017,845 |
| 244 | 5,017,846 |
| 443 | 5,017,847 |
| 568.1 | 5,017,848 |
| | 5,017,849 |
| 599 | 5,017,850 |
| 685 | 5,017,851 |
| 727 | 5,017,852 |
| 786 | 5,017,853 |
| 811 | 5,017,854 |
| | 5,017,855 |
| **CLASS 320** | |
| 2 | 5,017,856 |
| **CLASS 322** | |
| 25 | 5,017,857 |
| **CLASS 323** | |
| 316 | 5,017,858 |
| **CLASS 324** | |
| 127 | 5,017,859 |
| 142 | 5,017,860 |
| 143 | 5,017,861 |
| 146 | 5,017,862 |
| 158 F | 5,017,864 |
| | 5,017,865 |
| 158 R | 5,017,863 |
| 174 | 5,017,866 |
| 207.13 | 5,017,867 |
| 207.22 | 5,017,868 |
| 230 | 5,017,869 |
| 318 | 5,017,870 |
| | 5,017,871 |
| 322 | 5,017,872 |
| 326 | 5,017,873 |
| 378 | 5,017,874 |
| 446 | 5,017,875 |
| 464 | 5,017,876 |
| 546 | 5,017,877 |
| 613 | 5,017,878 |
| 663 | 5,017,879 |
| **CLASS 328** | |
| 165 | 5,017,880 |
| 233 | 5,017,881 |
| 234 | 5,017,882 |
| **CLASS 329** | |
| 304 | 5,017,883 |
| 325 | 5,017,841 |
| **CLASS 330** | |
| 3 | 5,017,884 |
| 4.3 | 5,017,885 |
| 277 | 5,017,886 |
| | 5,017,887 |
| 295 | 5,017,888 |
| **CLASS 331** | |
| 1 A | 5,017,889 |
| 45 | 5,017,890 |
| 88 | 5,017,891 |
| 96 | 5,017,892 |
| **CLASS 332** | |
| 103 | 5,017,893 |
| **CLASS 333** | |
| 1.1 | 5,017,894 |
| 134 | 5,017,895 |
| | 5,017,896 |
| 204 | 5,017,897 |
| **CLASS 335** | |
| 128 | 5,017,898 |
| 172 | 5,017,899 |
| 210 | 5,017,900 |
| 265 | 5,017,901 |
| **CLASS 336** | |
| 83 | 5,017,902 |
| **CLASS 340** | |
| 472 | 5,017,903 |
| 479 | 5,017,904 |
| 506 | 5,017,905 |
| 517 | 5,017,906 |
| 551 | 5,017,907 |
| 605 | 5,017,908 |
| 620 | 5,017,909 |
| 635 | 5,017,910 |
| 677 | 5,017,911 |
| 679 | 5,017,912 |
| 712 | 5,017,913 |
| 784 | 5,017,914 |
| 825.06 | 5,017,915 |
| 825.79 | 5,017,917 |
| 870.130 | 5,017,916 |
| **CLASS 341** | |
| 118 | 5,017,918 |
| 136 | 5,017,919 |
| 163 | 5,017,920 |
| **CLASS 342** | |
| 18 | 5,017,921 |
| 25 | 5,017,922 |
| 52 | 5,017,923 |
| 195 | 5,017,924 |
| 352 | 5,017,925 |
| 353 | 5,017,926 |
| 371 | 5,017,927 |
| 379 | 5,017,928 |
| 427 | 5,017,929 |
| 465 | 5,017,930 |
| **CLASS 343** | |
| 702 | 5,017,932 |
| 704 | 5,017,933 |
| 713 | 5,017,934 |
| 715 | 5,017,935 |
| 773 | 5,017,936 |
| 785 | 5,017,937 |
| 874 | 5,017,938 |
| 911 R | 5,017,939 |
| 912 | 5,017,940 |
| **CLASS 346** | |
| 1.1 | 5,017,941 |
| 76 PH | 5,017,942 |
| | 5,017,943 |
| 108 | 5,017,944 |
| 136 | 5,017,945 |
| 140 R | 5,017,946 |
| | 5,017,947 |
| | 5,017,948 |
| **CLASS 350** | |
| 3.66 | 5,016,953 |
| 3.67 | 5,016,951 |
| 3.7 | 5,016,950 |
| 3.71 | 5,016,954 |
| | 5,016,955 |
| 96.10 | 5,016,956 |
| 96.13 | 5,016,957 |
| | 5,016,958 |
| 96.14 | 5,016,959 |
| 96.15 | 5,016,960 |
| | 5,016,961 |
| 96.16 | 5,016,962 |
| 96.18 | 5,016,963 |
| | 5,016,964 |
| | 5,016,965 |
| 96.19 | 5,016,966 |
| | 5,016,967 |
| 96.20 | 5,016,952 |
| | 5,016,968 |
| | 5,016,969 |
| 96.21 | 5,016,970 |
| | 5,016,971 |
| 96.22 | 5,016,972 |
| 96.23 | 5,016,973 |
| 96.24 | 5,016,974 |
| 96.26 | 5,016,975 |
| 162.13 | 5,016,976 |
| 162.17 | 5,016,977 |
| 269 | 5,016,978 |
| 281 | 5,016,979 |
| 286 | 5,016,980 |
| 314 | 5,016,981 |
| 331 R | 5,016,982 |
| 332 | 5,016,983 |
| 334 | 5,016,984 |
| 335 | 5,016,985 |
| 339 R | 5,016,986 |
| 344 | 5,016,987 |
| 347 R | 5,016,988 |
| 350 S | 5,016,989 |
| 353 | 5,016,990 |
| 357 | 5,016,991 |
| 376 | 5,016,992 |
| 429 | 5,016,993 |
| 432 | 5,016,994 |
| 537 | 5,016,995 |
| 600 | 5,016,996 |
| 607 | 5,016,997 |
| 608 | 5,016,998 |
| **CLASS 351** | |
| 41 | 5,016,999 |
| | B1 4,896,955 |
| 86 | 5,017,001 |
| 161 | 5,017,000 |
| **CLASS 353** | |
| 66 | 5,017,002 |
| **CLASS 354** | |
| 4 | 5,017,949 |
| 76 | 5,017,952 |
| 83 | 5,017,953 |
| 207 | 5,017,326 |
| 234.1 | 5,017,954 |
| 400 | 5,017,955 |
| 416 | 5,017,956 |
| 429 | 5,017,957 |
| **CLASS 355** | |
| 27 | 5,017,951 |
| | 5,017,958 |
| | 5,017,959 |
| 91 | 5,017,960 |
| 202 | 5,017,961 |
| 210 | 5,017,962 |
| 218 | 5,017,963 |
| 219 | 5,017,964 |
| | 5,017,965 |
| 260 | 5,017,966 |
| 261 | 5,017,967 |
| 262 | 5,017,968 |
| 271 | 5,017,969 |
| 290 | 5,017,970 |
| 313 | 5,017,971 |
| 321 | 5,017,972 |
| **CLASS 356** | |
| 53 | 5,017,003 |
| 121 | 5,017,004 |
| 125 | 5,017,005 |
| 218 | 5,017,006 |
| 301 | 5,017,007 |
| 336 | 5,017,008 |
| 345 | 5,017,010 |
| 363 | 5,017,011 |
| 371 | 5,017,012 |
| 373 | 5,017,013 |
| 404 | 5,017,014 |
| **CLASS 357** | |
| 4 | 5,017,973 |
| | 5,017,974 |
| 8 | 5,017,975 |
| 14 | 5,017,950 |
| 15 | 5,017,976 |
| 23.13 | 5,017,985 |
| 23.5 | 5,017,977 |
| | 5,017,978 |
| | 5,017,979 |
| | 5,017,980 |
| 23.6 | 5,017,981 |
| | 5,017,982 |
| 23.7 | 5,017,983 |
| | 5,017,984 |
| 30 | 5,017,986 |
| | 5,017,987 |
| | 5,017,988 |
| | 5,017,989 |
| 34 | 5,017,990 |
| 38 | 5,017,991 |
| | 5,017,992 |
| 40 | 5,017,993 |
| 42 | 5,017,994 |
| 43 | 5,017,995 |
| | 5,017,996 |
| 44 | 5,017,997 |
| 49 | 5,017,998 |
| | 5,017,999 |
| 51 | 5,018,000 |
| 67 | 5,018,001 |
| 68 | 5,018,002 |
| 72 | 5,018,003 |
| 74 | 5,018,004 |
| 80 | 5,018,005 |
| **CLASS 358** | |
| 44 | 5,018,006 |
| 60 | 5,018,007 |
| 78 | 5,018,008 |
| 100 | 5,018,009 |
| 136 | 5,018,010 |
| 148 | 5,018,011 |
| 171 | 5,018,012 |
| 181 | 5,018,013 |
| 183 | 5,018,014 |
| 188 | 5,018,015 |
| 198 | 5,018,016 |
| 209 | 5,018,017 |
| 213 11 | 5,018,018 |
| 215 | 5,018,019 |
| 310 | 5,018,020 |
| 338 | 5,017,009 |
| 349 | 5,018,021 |
| 431 | 5,018,022 |
| 450 | 5,018,023 |
| 457 | 5,018,024 |
| 471 | 5,018,025 |
| 473 | 5,018,026 |
| **CLASS 360** | |
| 14.2 | 5,018,027 |
| 27 | 5,018,028 |
| 69 | 5,018,029 |
| 94 | 5,018,030 |
| 96.5 | 5,018,031 |
| 105 | 5,018,032 |
| 106 | 5,018,033 |
| | 5,018,034 |
| | 5,018,035 |
| 107 | 5,018,036 |
| 113 | 5,018,037 |
| 126 | 5,018,038 |
| 133 | 5,018,039 |
| 137 | 5,018,040 |
| **CLASS 361** | |
| 18 | 5,018,041 |
| 42 | 5,018,042 |
| 187 | 5,018,043 |
| 220 | 5,018,044 |
| 229 | 5,018,045 |
| 273 | 5,018,046 |
| 277 | 5,018,047 |
| 323 | 5,018,048 |
| 355 | B1 4,118,754 |
| 380 | 5,018,049 |
| 386 | 5,018,050 |
| 393 | 5,018,051 |
| 428 | 5,018,052 |
| **CLASS 362** | |
| 104 | 5,018,053 |
| 211 | 5,018,054 |
| 223 | Re.33,593 |
| 238 | 5,018,055 |
| 253 | 5,018,056 |
| 295 | 5,018,057 |
| 389 | 5,017,327 |
| **CLASS 363** | |
| 34 | 5,018,058 |
| 98 | B1 4,882,120 |
| **CLASS 364** | |
| 200 | 5,018,059 |
| | 5,018,060 |
| | 5,018,061 |
| | 5,018,062 |
| | 5,018,063 |
| | 5,018,064 |
| 405 | 5,018,066 |
| 413.02 | 5,018,067 |
| 424.04 | 5,018,069 |
| 424.05 | 5,018,070 |
| 424.1 | 5,018,068 |
| 474.17 | 5,018,071 |
| 478 | 5,018,072 |
| | 5,018,073 |
| 490 | 5,018,074 |
| 513 | 5,018,075 |
| 518 | 5,018,076 |
| | 5,018,077 |
| | 5,018,078 |
| 519 | 5,018,079 |
| | 5,018,080 |
| | 5,018,081 |
| 521 | 5,018,082 |
| 523 | 5,018,083 |
| 525 | 5,018,084 |
| 526 | 5,018,085 |
| 557 | 5,018,086 |
| 571.01 | 5,018,087 |
| 574 | 5,018,088 |
| 578 | 5,018,089 |
| 723 | 5,018,090 |
| 726 | 5,018,091 |
| 736 | 5,018,092 |
| 740 | 5,018,093 |
| 770 | 5,018,094 |
| 900 | 5,018,065 |
| | 5,018,095 |
| | 5,018,096 |
| | 5,018,097 |
| | 5,018,098 |
| **CLASS 365** | |
| 49 | 5,018,099 |
| 51 | 5,018,101 |
| 95 | 5,018,102 |
| 104 | 5,018,103 |
| 200 | 5,018,104 |
| 203 | 5,018,105 |
| | 5,018,106 |
| 230.03 | 5,018,100 |
| 230.06 | 5,018,107 |
| | 5,018,108 |
| 230.08 | 5,018,109 |
| 230.09 | 5,018,110 |
| 233 | 5,018,111 |
| **CLASS 366** | |
| 82 | 5,017,015 |
| 139 | 5,017,016 |
| 251 | 5,017,017 |
| **CLASS 367** | |
| 72 | 5,018,112 |
| 127 | 5,018,113 |
| 134 | 5,018,114 |
| 144 | 5,018,115 |
| 165 | 5,018,116 |
| **CLASS 368** | |
| 10 | 5,018,117 |
| 228 | 5,018,118 |
| **CLASS 369** | |
| 13 | 5,018,119 |
| 32 | 5,018,120 |
| 44.11 | 5,018,121 |
| 44.110 | 5,018,123 |
| 44 14 | 5,018,122 |
| 44.250 | 5,018,125 |
| 44.330 | 5,018,124 |
| 58 | 5,018,126 |
| 112 | 5,018,127 |
| 284 | 5,018,128 |
| **CLASS 370** | |
| 1 | 5,018,129 |
| | 5,018,130 |
| | 5,018,131 |
| 13 | 5,018,132 |
| 16 | 5,018,133 |
| 32.1 | 5,018,134 |
| 55 | 5,018,135 |
| 60.1 | 5,018,136 |
| 85.13 | 5,018,137 |
| 94.1 | 5,018,138 |
| 94.3 | 5,018,139 |
| 105.1 | 5,018,140 |
| 110 1 | 5,018,141 |
| 112 | 5,018,142 |
| **CLASS 371** | |
| 16.4 | 5,018,143 |
| 22.3 | 5,018,144 |
| 27 | 5,018,145 |
| 37.1 | 5,018,146 |
| 49.1 | 5,018,147 |
| 66 | 5,018,148 |
| **CLASS 372** | |
| 2 | 5,018,149 |
| 9 | 5,018,150 |
| 18 | 5,018,151 |
| 25 | 5,018,152 |
| 28 | 5,018,153 |
| 29 | 5,018,154 |
| 31 | 5,018,155 |
| 44 | 5,018,156 |
| 45 | 5,018,157 |
| 46 | 5,018,158 |
| | 5,018,159 |
| 53 | 5,018,160 |
| 57 | 5,018,161 |
| | 5,018,162 |
| 68 | 5,018,163 |
| 109 | 5,018,164 |
| **CLASS 374** | |
| 130 | 5,017,018 |
| 133 | 5,017,019 |
| **CLASS 375** | |
| 1 | 5,018,165 |
| 12 | 5,018,166 |
| 22 | 5,018,167 |
| 106 | 5,018,168 |
| 119 | 5,018,169 |
| 120 | 5,018,170 |
| 121 | 5,018,171 |
| **CLASS 376** | |
| 260 | 5,017,330 |
| 313 | 5,017,331 |
| 370 | 5,017,332 |
| 382 | 5,017,333 |
| **CLASS 377** | |
| 60 | 5,018,172 |
| **CLASS 378** | |
| 4 | 5,018,173 |
| | 5,018,174 |
| 19 | 5,018,175 |
| 37 | 5,018,176 |
| 62 | 5,018,177 |
| 91 | 5,018,178 |
| 99 | 5,018,179 |
| 119 | 5,018,180 |
| 144 | 5,018,181 |
| 173 | 5,018,182 |
| | 5,018,183 |
| **CLASS 379** | |
| 29 | 5,018,184 |
| 60 | 5,018,187 |
| 63 | 5,018,188 |
| 93 | 5,018,189 |
| 95 | 5,018,190 |
| 100 | 5,018,191 |
| 107 | 5,018,192 |
| 113 | B1 4,757,267 |
| 145 | 5,018,185 |
| | 5,018,193 |
| 153 | 5,018,186 |
| 207 | 5,018,194 |
| 225 | 5,018,195 |
| **CLASS 380** | |
| 20 | 5,018,197 |
| 30 | 5,018,196 |
| 38 | 5,018,198 |
| **CLASS 381** | |
| 36 | 5,018,199 |
| | 5,018,200 |
| 43 | 5,018,201 |
| 71 | 5,018,202 |
| | 5,018,203 |
| 74 | 5,018,204 |
| 86 | 5,018,205 |
| 188 | 5,018,206 |
| **CLASS 382** | |
| 1 | 5,018,207 |
| 3 | 5,018,208 |
| 6 | 5,018,209 |
| 8 | 5,018,210 |
| | 5,018,211 |
| | 5,018,212 |
| | 5,018,213 |
| 9 | 5,018,214 |
| 15 | 5,018,215 |
| 22 | 5,018,216 |
| | 5,018,217 |
| | 5,018,218 |
| 37 | 5,018,219 |
| **CLASS 383** | |
| 63 | 5,017,021 |
| **CLASS 384** | |
| 100 | 5,017,022 |
| 114 | 5,017,023 |
| 482 | 5,017,024 |
| 584 | 5,017,025 |
| **CLASS 392** | |
| 386 | 5,017,759 |
| **CLASS 400** | |
| 24 | 5,017,026 |
| 54 | 5,017,027 |
| 120 | 5,017,028 |
| 237 | 5,017,029 |
| 485 | 5,017,030 |
| 636.1 | 5,017,031 |
| 693 | 5,017,032 |
| | 5,017,033 |
| **CLASS 401** | |
| 35 | 5,017,034 |
| 132 | 5,017,035 |
| 283 | 5,017,036 |
| **CLASS 402** | |
| 73 | 5,017,037 |
| **CLASS 403** | |
| 385 | 5,017,038 |
| **CLASS 404** | |
| 25 | 5,017,039 |
| **CLASS 405** | |
| 32 | 5,017,040 |
| 48 | 5,017,041 |
| 50 | 5,017,042 |
| 52 | 5,017,043 |
| 53 | 5,017,044 |
| 143 | 5,017,045 |
| 229 | 5,017,046 |
| 259 | 5,017,047 |
| 262 | 5,017,048 |
| 284 | 5,017,049 |
| | 5,017,050 |
| 302 | 5,017,051 |
| **CLASS 406** | |
| 88 | 5,017,052 |
| 138 | 5,017,053 |
| 191 | 5,017,054 |
| **CLASS 407** | |
| 113 | 5,017,055 |
| **CLASS 408** | |
| 1 R | 5,017,056 |
| 68 | 5,017,057 |
| 173 | 5,017,058 |
| **CLASS 409** | |
| 131 | 5,017,059 |
| 137 | 5,017,060 |
| 139 | 5,017,061 |
| 179 | 5,017,062 |
| 215 | 5,017,063 |
| **CLASS 410** | |
| 53 | 5,017,064 |
| 58 | 5,017,065 |
| 121 | 5,017,066 |
| **CLASS 411** | |
| 45 | 5,017,067 |
| 373 | 5,017,068 |
| 403 | 5,017,069 |
| 432 | 5,017,079 |

VOL
1126
ISS
3
MY
21
1991
UMI

## CLASSIFICATION OF PATENTS

### CLASS 412

| | |
|---|---|
| 4 | 5,017,070 |
| 43 | 5,017,071 |

### CLASS 413

| | |
|---|---|
| 66 | 5,017,072 |

### CLASS 414

| | |
|---|---|
| 217 | 5,017,073 |
| 224 | 5,017,074 |
| 225 | 5,017,075 |
| 345 | 5,017,076 |
| 360 | 5,017,077 |
| 417 | 5,017,078 |
| 454 | 5,017,080 |
| 470 | 5,017,081 |
| 729 | 5,017,082 |
| 744.3 | 5,017,083 |
| | 5,017,084 |
| 796 | 5,017,085 |

### CLASS 415

| | |
|---|---|
| 55.5 | 5,017,086 |
| 72 | 5,017,087 |
| 173.2 | 5,017,088 |

### CLASS 416

| | |
|---|---|
| 35 | 5,017,089 |
| 168 R | 5,017,090 |
| 193 A | 5,017,091 |
| 204 A | 5,017,092 |

### CLASS 417

| | |
|---|---|
| 14 | 5,017,093 |
| 218 | 5,017,094 |
| 222 R | 5,017,095 |
| 222 S | 5,017,096 |
| 295 | 5,017,097 |
| 302 | 5,017,098 |
| 307 | 5,017,099 |
| 310 | 5,017,101 |
| 413 | 5,017,100 |
| 420 | 5,017,102 |
| | 5,017,103 |
| 423 12 | 5,017,104 |
| 439 | 5,017,105 |
| 481 | 5,017,106 |

### CLASS 418

| | |
|---|---|
| 55.5 | 5,017,107 |
| 55.6 | 5,017,108 |
| 152 | 5,017,109 |

### CLASS 419

| | |
|---|---|
| 12 | 5,017,334 |

### CLASS 420

| | |
|---|---|
| 127 | 5,017,335 |
| 422 | 5,017,336 |
| 532 | 5,017,337 |

### CLASS 421

| | |
|---|---|
| 225 | 5,017,446 |

### CLASS 422

| | |
|---|---|
| 41 | 5,017,338 |
| 82.04 | 5,017,339 |
| 98 | 5,017,340 |
| 102 | 5,017,341 |
| | 5,017,342 |
| 140 | 5,017,343 |

### CLASS 423

| | |
|---|---|
| 10 | 5,017,344 |
| 18 | 5,017,345 |
| 101 | 5,017,346 |
| 235 | 5,017,347 |
| | 5,017,348 |
| 242 | 5,017,349 |
| 243 | 5,017,350 |
| 245.2 | 5,017,351 |
| 263 | 5,017,352 |
| 328 | 5,017,353 |
| 338 | 5,017,354 |
| 369 | 5,017,355 |
| 384 | 5,017,356 |
| 437 | 5,017,357 |
| 449 | 5,017,358 |

### CLASS 424

| | |
|---|---|
| 1.1 | 5,017,359 |
| 45 | 5,017,360 |
| 46 | 5,017,361 |
| 52 | 5,017,362 |
| | 5,017,363 |
| 54 | 5,017,364 |
| 59 | 5,017,365 |
| | 5,017,366 |
| 63 | 5,017,367 |
| 68 | B1 4,209,506 |
| 70 | 5,017,368 |
| 78 | 5,017,369 |
| 83 | 5,017,370 |
| 85.6 | 5,017,371 |
| 85.8 | 5,017,372 |
| 93 | 5,017,373 |
| | 5,017,374 |
| 409 | 5,017,376 |
| | 5,017,377 |
| 422 | 5,017,378 |
| 450 | 5,017,379 |
| 454 | 5,017,380 |
| 472 | 5,017,381 |
| 486 | 5,017,382 |
| 490 | 5,017,383 |
| 570 | 5,017,375 |
| 601 | 5,017,384 |

### CLASS 425

| | |
|---|---|
| 7 | 5,017,110 |
| 28.1 | 5,017,111 |
| 72.200 | 5,017,112 |
| 87 | 5,017,113 |
| 100 | 5,017,122 |
| 112 | 5,017,114 |
| 125 | 5,017,115 |
| 131.5 | 5,017,116 |
| 133.1 | 5,017,117 |
| 133.5 | 5,017,118 |
| 142 | 5,017,119 |
| 150 | 5,017,120 |
| 151 | 5,017,121 |
| 182 | 5,017,123 |
| 204 | 5,017,124 |
| 504 | 5,017,125 |
| 526 | 5,017,126 |
| 549 | 5,017,127 |

### CLASS 426

| | |
|---|---|
| 5 | 5,017,385 |
| 18 | 5,017,386 |
| 43 | 5,017,387 |
| 44 | 5,017,388 |
| 72 | 5,017,389 |
| 100 | 5,017,390 |
| 129 | 5,017,391 |
| 272 | 5,017,393 |
| 302 | 5,017,394 |
| 459 | 5,017,395 |
| 491 | 5,017,396 |
| 542 | 5,017,397 |
| 603 | 5,017,398 |
| 636 | 5,017,399 |
| 659 | 5,017,392 |
| 660 | 5,017,400 |

### CLASS 427

| | |
|---|---|
| 3 | 5,017,401 |
| 34 | 5,017,402 |
| 39 | 5,017,403 |
| 45.1 | 5,017,404 |
| 54.1 | 5,017,406 |
| 349 | 5,017,407 |
| 420 | 5,017,408 |
| 424 | 5,017,409 |
| 443.1 | 5,017,410 |

### CLASS 428

| | |
|---|---|
| 36.6 | 5,017,411 |
| 43 | 5,017,412 |
| 61 | 5,017,413 |
| 64 | 5,017,414 |
| 77 | 5,017,415 |
| 195 | 5,017,416 |
| | 5,017,417 |
| 196 | 5,017,418 |
| 209 | 5,017,419 |
| 212 | 5,017,420 |
| 216 | 5,017,421 |
| | 5,017,422 |
| 224 | 5,017,423 |
| 230 | 5,017,424 |
| 253 | 5,017,425 |
| 280 | 5,017,426 |
| 323 | 5,017,427 |
| 336 | 5,017,428 |
| 349 | 5,017,429 |
| 353 | 5,017,430 |
| 420 | 5,017,431 |
| 422 | 5,017,432 |
| 425.6 | 5,017,433 |
| 428 | 5,017,434 |
| 502 | 5,017,435 |
| 519 | 5,017,436 |
| 558 | 5,017,437 |
| 614 | 5,017,438 |
| 629 | 5,017,439 |
| 690 | 5,017,440 |

### CLASS 429

| | |
|---|---|
| 9 | 5,017,441 |
| 94 | 5,017,442 |
| 99 | 5,017,443 |
| 218 | 5,017,444 |
| 224 | 5,017,445 |

### CLASS 430

| | |
|---|---|
| 2 | 5,017,447 |
| 49 | 5,017,448 |
| 59 | 5,017,449 |
| 106 | 5,017,450 |
| 137 | 5,017,451 |
| 138 | 5,017,452 |
| 176 | 5,017,453 |
| 203 | 5,017,454 |
| 256 | 5,017,455 |
| 264 | 5,017,456 |
| 272 | 5,017,457 |
| 296 | 5,017,458 |
| 299 | 5,017,459 |
| 320 | 5,017,460 |
| 325 | 5,017,461 |
| | 5,017,462 |
| 398 | 5,017,463 |
| 551 | 5,017,464 |
| | 5,017,465 |
| 558 | 5,017,466 |
| | 5,017,467 |
| 569 | 5,017,468 |
| | 5,017,469 |

### CLASS 431

| | |
|---|---|
| 277 | 5,017,128 |
| 326 | 5,017,129 |
| 352 | 5,017,130 |

### CLASS 432

| | |
|---|---|
| 152 | 5,017,131 |

### CLASS 433

| | |
|---|---|
| 18 | 5,017,132 |
| 20 | 5,017,133 |
| 72 | 5,017,134 |
| 92 | 5,017,135 |
| 98 | 5,017,136 |
| 102 | 5,017,137 |
| | 5,017,138 |
| 109 | 5,017,139 |
| 215 | 5,017,140 |

### CLASS 434

| | |
|---|---|
| 29 | 5,017,141 |
| 220 | 5,017,142 |
| 236 | 5,017,143 |

### CLASS 435

| | |
|---|---|
| 4 | 5,017,470 |
| 5 | 5,017,471 |
| 7.25 | 5,017,472 |
| 7.5 | 5,017,474 |
| 7.9 | 5,017,475 |
| 7.92 | 5,017,473 |
| 61 | 5,017,476 |
| 69.1 | 5,017,477 |
| | 5,017,478 |
| 101 | 5,017,479 |
| 106 | 5,017,480 |
| 108 | 5,017,481 |
| 114 | 5,017,482 |
| 115 | 5,017,483 |
| 158 | 5,017,484 |
| | 5,017,485 |
| 172.3 | 5,017,486 |
| | 5,017,487 |
| 194 | 5,017,488 |
| 196 | 5,017,489 |
| 240.2 | 5,017,490 |
| 240.5 | 5,017,491 |
| 252.3 | 5,017,492 |
| | 5,017,493 |
| 288 | 5,017,494 |
| 320.1 | 5,017,495 |

### CLASS 436

| | |
|---|---|
| 62 | 5,017,496 |
| 63 | 5,017,497 |
| 84 | 5,017,498 |
| 124 | 5,017,499 |
| 178 | 5,017,500 |
| 528 | 5,017,501 |

### CLASS 437

| | |
|---|---|
| 2 | 5,017,502 |
| 31 | 5,017,503 |
| 40 | 5,017,504 |
| 52 | 5,017,505 |
| | 5,017,506 |
| 90 | 5,017,517 |
| 162 | 5,017,507 |
| 173 | 5,017,508 |
| 182 | 5,017,509 |
| 192 | 5,017,510 |
| 225 | 5,017,511 |
| 227 | 5,017,512 |
| 228 | 5,017,513 |
| 229 | 5,017,514 |
| | 5,017,515 |
| 230 | 5,017,516 |

### CLASS 439

| | |
|---|---|
| 34 | 5,017,144 |
| 45 | 5,017,145 |
| 65 | 5,017,146 |
| 144 | 5,017,147 |
| 148 | 5,017,148 |
| 157 | 5,017,149 |
| 197 | 5,017,150 |
| 248 | 5,017,151 |
| 263 | 5,017,152 |
| 426 | 5,017,153 |
| 492 | 5,017,154 |
| 532 | 5,017,155 |
| 607 | 5,017,156 |
| 609 | 5,017,157 |
| | 5,017,158 |
| 741 | 5,017,159 |
| 730 | 5,017,160 |
| | 5,017,161 |
| 752 | 5,017,162 |
| | 5,017,163 |
| 885 | 5,017,164 |

### CLASS 440

| | |
|---|---|
| 6 | 5,017,165 |
| 7 | 5,017,166 |
| 53 | B1 4,355,986 |
| 73 | 5,017,167 |
| 82 | 5,017,168 |

### CLASS 441

| | |
|---|---|
| 61 | 5,017,169 |

### CLASS 445

| | |
|---|---|
| 30 | 5,017,170 |

### CLASS 446

| | |
|---|---|
| 197 | 5,017,171 |
| 250 | 5,017,172 |
| 374 | 5,017,173 |

### CLASS 450

| | |
|---|---|
| 37 | 5,017,174 |

### CLASS 452

| | |
|---|---|
| 38 | 5,017,175 |

### CLASS 453

| | |
|---|---|
| 49 | 5,017,176 |

### CLASS 460

| | |
|---|---|
| 46 | 5,017,177 |

### CLASS 464

| | |
|---|---|
| 7 | 5,017,178 |
| 24 | 5,017,179 |

### CLASS 474

| | |
|---|---|
| 84 | 5,017,180 |
| 133 | 5,017,181 |
| 256 | 5,017,182 |

### CLASS 475

| | |
|---|---|
| 150 | 5,017,183 |

### CLASS 493

| | |
|---|---|
| 368 | 5,017,184 |

### CLASS 501

| | |
|---|---|
| 1 | 5,017,518 |
| 7 | 5,017,519 |
| 44 | 5,017,520 |
| 64 | 5,017,521 |
| 81 | 5,017,522 |
| 85 | 5,017,523 |
| 87 | 5,017,524 |
| | 5,017,525 |
| 89 | 5,017,526 |
| 90 | 5,017,527 |
| 95 | 5,017,528 |
| | 5,017,529 |
| 98 | 5,017,530 |
| | 5,017,531 |
| 103 | 5,017,532 |
| 127 | 5,017,533 |
| 134 | 5,017,534 |

### CLASS 502

| | |
|---|---|
| 30 | 5,017,535 |
| 41 | 5,017,536 |
| 63 | 5,017,537 |
| 64 | 5,017,538 |
| 102 | 5,017,539 |
| 158 | 5,017,540 |
| 169 | 5,017,541 |
| 209 | 5,017,542 |
| 328 | 5,017,543 |
| 439 | 5,017,544 |

### CLASS 503

| | |
|---|---|
| 208 | 5,017,545 |
| 211 | 5,017,546 |
| 227 | 5,017,547 |

### CLASS 505

| | |
|---|---|
| 1 | 5,017,548 |
| | 5,017,549 |
| | 5,017,550 |
| | 5,017,551 |
| | 5,017,552 |
| | 5,017,553 |
| | 5,017,554 |

### CLASS 514

| | |
|---|---|
| 2 | 5,017,556 |
| 12 | 5,017,557 |
| 14 | 5,017,558 |
| 21 | 5,017,559 |
| | 5,017,560 |
| 25 | 5,017,561 |
| 26 | 5,017,562 |
| 27 | 5,017,563 |
| 47 | 5,017,564 |
| 54 | 5,017,565 |
| 58 | 5,017,566 |
| 171 | 5,017,567 |
| 173 | 5,017,568 |
| 206 | 5,017,569 |
| 211 | 5,017,570 |
| 213 | 5,017,571 |
| 218 | 5,017,572 |
| | 5,017,573 |
| 220 | 5,017,574 |
| | 5,017,575 |
| 228.2 | 5,017,576 |
| 263 | 5,017,577 |
| 266 | 5,017,578 |
| 299 | 5,017,579 |
| | 5,017,580 |
| 300 | 5,017,581 |
| 305 | 5,017,582 |
| 312 | 5,017,583 |
| 314 | 5,017,584 |
| 317 | 5,017,585 |
| 318 | 5,017,586 |
| 328 | 5,017,587 |
| 336 | 5,017,588 |
| 352 | 5,017,589 |
| 356 | 5,017,590 |
| 369 | 5,017,591 |
| 372 | 5,017,592 |
| 381 | 5,017,593 |
| 383 | 5,017,594 |
| | 5,017,595 |
| 406 | 5,017,596 |
| 411 | 5,017,597 |
| 415 | 5,017,598 |
| 422 | 5,017,599 |
| 443 | 5,017,600 |
| | 5,017,601 |
| 452 | 5,017,602 |
| 455 | 5,017,603 |
| 482 | 5,017,604 |
| 529 | 5,017,605 |
| 531 | 5,017,606 |
| 534 | 5,017,607 |
| 538 | 5,017,608 |
| | 5,017,609 |
| 546 | 5,017,610 |
| 551 | 5,017,611 |
| 557 | 5,017,612 |
| | 5,017,613 |
| 558 | 5,017,614 |
| 560 | 5,017,615 |
| 561 | 5,017,616 |
| 635 | 5,017,617 |
| 640 | 5,017,618 |
| 653 | 5,017,619 |
| 698 | 5,017,620 |

### CLASS 521

| | |
|---|---|
| 58 | 5,017,621 |
| 79 | 5,017,622 |
| 128 | 5,017,623 |
| 154 | 5,017,624 |
| 159 | 5,017,625 |

### CLASS 522

| | |
|---|---|
| 9 | 5,017,626 |

### CLASS 523

| | |
|---|---|
| 115 | 5,017,627 |
| 200 | 5,017,628 |
| 219 | 5,017,629 |
| 334 | 5,017,630 |
| 340 | 5,017,631 |
| 400 | 5,017,632 |

### CLASS 524

| | |
|---|---|
| 87 | 5,017,686 |
| 117 | 5,017,633 |
| 267 | 5,017,634 |
| 269 | 5,017,635 |
| 300 | 5,017,636 |
| 354 | 5,017,637 |
| 449 | 5,017,638 |
| 510 | 5,017,639 |
| 588 | 5,017,640 |
| 598 | 5,017,641 |
| 608 | 5,017,642 |
| 609 | 5,017,643 |
| 612 | 5,017,644 |
| 726 | 5,017,645 |
| 807 | 5,017,646 |
| 856 | 5,017,647 |

### CLASS 525

| | |
|---|---|
| 54.1 | 5,017,648 |
| 59 | 5,017,649 |
| 65 | 5,017,650 |
| 66 | 5,017,651 |
| 68 | 5,017,652 |
| 89 | 5,017,653 |
| 100 | 5,017,654 |
| 127 | 5,017,655 |
| 149 | 5,017,656 |
| 173 | 5,017,657 |
| 195 | 5,017,658 |
| 222 | 5,017,659 |
| 338 | 5,017,660 |
| 344 | 5,017,661 |
| 351 | 5,017,662 |
| 397 | 5,017,663 |
| 454 | 5,017,664 |

### CLASS 526

| | |
|---|---|
| 129 | 5,017,665 |
| 230.5 | 5,017,666 |
| 264 | 5,017,667 |
| 279 | 5,017,668 |
| 320 | 5,017,669 |

### CLASS 527

| | |
|---|---|
| 313 | 5,017,670 |

### CLASS 528

| | |
|---|---|
| 21 | 5,017,671 |
| 23 | 5,017,672 |
| 59 | 5,017,673 |
| 93 | 5,017,674 |
| 111 | 5,017,675 |
| 121 | 5,017,676 |
| 125 | 5,017,677 |
| 190 | 5,017,678 |
| 272 | 5,017,679 |
| 274 | 5,017,680 |
| 342 | 5,017,681 |
| 388 | 5,017,682 |
| 396 | 5,017,683 |
| 409 | 5,017,684 |
| 480 | 5,017,685 |

### CLASS 530

| | |
|---|---|
| 324 | 5,017,687 |
| 326 | 5,017,688 |
| 327 | 5,017,689 |
| 335 | 5,017,690 |
| 351 | 5,017,692 |
| 390 | 5,017,693 |

### CLASS 534

| | |
|---|---|
| 15 | 5,017,694 |
| | 5,017,695 |

### CLASS 535

| | |
|---|---|
| 351 | 5,017,691 |

### CLASS 536

| | |
|---|---|
| 18.7 | 5,017,696 |
| 127 | 5,017,697 |

### CLASS 544

| | |
|---|---|
| 71 | 5,017,698 |
| 196 | 5,017,699 |
| 244 | 5,017,700 |
| 276 | 5,017,701 |

### CLASS 546

| | |
|---|---|
| 99 | 5,017,702 |
| 201 | 5,017,703 |
| 242 | 5,017,704 |
| 250 | 5,017,705 |

### CLASS 548

| | |
|---|---|
| 414 | 5,017,706 |
| 455 | 5,017,707 |
| 515 | 5,017,708 |
| 959 | 5,017,709 |

### CLASS 549

| | |
|---|---|
| 226 | 5,017,710 |
| 332 | 5,017,711 |
| 529 | 5,017,712 |

### CLASS 552

| | |
|---|---|
| 237 | 5,017,713 |

### CLASS 556

| | |
|---|---|
| 12 | 5,017,714 |
| 401 | 5,017,715 |
| 405 | 5,017,716 |
| 413 | 5,017,717 |
| 466 | 5,017,718 |

### CLASS 560

| | |
|---|---|
| 106 | 5,017,719 |
| 209 | 5,017,720 |

### CLASS 564

| | |
|---|---|
| 151 | 5,017,721 |
| 383 | 5,017,723 |
| 427 | 5,017,724 |
| 487 | 5,017,725 |

### CLASS 568

| | |
|---|---|
| 448 | 5,017,726 |
| 719 | 5,017,727 |
| 726 | 5,017,728 |
| 798 | 5,017,729 |
| 812 | 5,017,730 |
| 910 | 5,017,731 |

### CLASS 570

| | |
|---|---|
| 151 | 5,017,732 |

### CLASS 576

| | |
|---|---|
| 249 | 5,017,329 |

### CLASS 585

| | |
|---|---|
| 6.3 | 5,017,733 |
| 21 | 5,017,734 |
| 820 | 5,017,735 |

### CLASS 600

| | |
|---|---|
| 15 | 5,017,185 |

### CLASS 604

| | |
|---|---|
| 48 | 5,017,186 |
| 110 | 5,017,187 |
| 178 | 5,017,188 |
| 192 | 5,017,189 |
| 207 | 5,017,190 |
| 243 | 5,017,191 |
| 250 | 5,017,192 |
| 270 | 5,017,193 |

---

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D1— | 110 | 316,922 | | 540 | 316,948 | D10— | 32 | 316,973 | | 206 | 316,998 | | 124 | 317,023 | D25— | 34 | 317,047 |
| D2— | 8 | 316,923 | | 605 | 316,949 | | 33 | 316,974 | | 304 | 317,000 | | 137 | 317,024 | | 114 | 317,048 |
| | 215 | 316,924 | | 676 | 316,950 | | 39 | 316,983 | | 316 | 317,001 | | 142 | 317,025 | | 119 | 317,049 |
| | 271 | 316,925 | D8— | 1 | 316,951 | | 46 | 316,975 | | 318 | 317,002 | | | 317,026 | | 122 | 317,050 |
| | 314 | 316,926 | | 9 | 316,952 | | | 316,976 | | 333 | 317,003 | | 155 | 317,027 | | | 317,051 |
| | | 316,927 | | 70 | 316,953 | | 51 | 316,977 | D13— | 160 | 317,004 | | 171 | 317,028 | D26— | 11 | 317,052 |
| | | 316,928 | | 71 | 316,943 | | 62 | 316,978 | D14— | 107 | 317,005 | | 180 | 317,029 | | 28 | 317,053 |
| | 318 | 316,929 | | | 316,954 | | 70 | 316,979 | | 116 | 317,006 | | 185 | 317,030 | | 32 | 317,054 |
| | 320 | 316,930 | | 334 | 316,955 | | 86 | 316,980 | | 214 | 317,007 | | 191 | 317,031 | | 35 | 317,055 |
| D3— | 29 | 316,931 | | 371 | 316,956 | | 101 | 316,981 | | 215 | 317,008 | | 198 | 317,032 | | 37 | 317,056 |
| | 34 | 316,932 | | 373 | 316,957 | | 102 | 316,982 | | 249 | 317,009 | | 200 | 317,033 | | 40 | 317,057 |
| | 41 | 316,933 | | 395 | 316,958 | D11— | 90 | 316,984 | | 253 | 316,999 | | 215 | 317,034 | | 92 | 317,058 |
| | 73 | 316,934 | D9— | 300 | 316,959 | | 164 | 316,985 | D15— | 21 | 317,010 | | 219 | 317,035 | | 117 | 317,059 |
| D4— | 136 | 316,935 | | 307 | 316,960 | D12— | 96 | 316,986 | | 30 | 317,011 | | 225 | 317,036 | D27— | 148 | 317,060 |
| D6— | 365 | 316,936 | | 337 | 316,961 | | 98 | 316,987 | D16— | 115 | 317,012 | | 349 | 316,964 | D28— | 7 | 317,061 |
| | 366 | 316,937 | | 342 | 316,962 | | 129 | 316,988 | D17— | 13 | 317,013 | D22— | 118 | 317,037 | | 13 | 317,062 |
| | 373 | 316,938 | | 345 | 316,963 | | 133 | 316,989 | D18— | | 317,014 | | 132 | 317,038 | D29— | 17 | 317,063 |
| | 382 | 316,939 | | 370 | 316,965 | | 142 | 316,990 | | 23 | 317,015 | | 133 | 317,039 | | 20 | 317,064 |
| | 467 | 316,940 | | 390 | 316,966 | | 147 | 316,991 | | 27 | 317,016 | D23— | 209 | 317,040 | D30— | 156 | 317,065 |
| | 608 | 316,941 | | | 316,967 | | 155 | 316,992 | D19— | 78 | 317,017 | | 241 | 317,041 | D32— | 18 | 317,066 |
| | 611 | 316,942 | | 392 | 316,968 | | 181 | 316,993 | | 90 | 317,018 | | 332 | 317,042 | | 38 | 317,067 |
| D7— | 388 | 316,944 | | 409 | 316,969 | | 185 | 316,994 | D20— | 9 | 317,019 | | 364 | 317,043 | | 51 | 317,068 |
| | 394 | 316,945 | | 415 | 316,970 | | 186 | 316,995 | D21— | 34 | 317,020 | | 367 | 317,044 | D34— | 31 | 317,069 |
| | 535 | 316,946 | | 424 | 316,971 | | 187 | 316,996 | | 48 | 317,021 | D24— | 10 | 317,045 | | 40 | 317,070 |
| | 537 | 316,947 | | 448 | 316,972 | | | 316,997 | | 108 | 317,022 | | 49 | 317,046 | D99— | 28 | 317,071 |

## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 34 | 7,526 | | 41 | 7,527 | | 46 | 7,528 | | 51 | 7,529 | | 57 | 7,530 | | 74 | 7,531 |

VOL
1126
ISS
3
MY
21
1991
UMI

# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

| | | | | | |
|---|---|---|---|---|---|
| Alabama | 1 | Kentucky | 21 | Oregon | 41 |
| Alaska | 2 | Louisiana | 22 | Pennsylvania | 42 |
| American Samoa | 3 | Maine | 23 | Puerto Rico | 43 |
| Arizona | 4 | Maryland | 24 | Rhode Island | 44 |
| Arkansas | 5 | Massachusetts | 25 | South Carolina | 45 |
| California | 6 | Michigan | 26 | South Dakota | 46 |
| Canal Zone | 7 | Minnesota | 27 | Tennessee | 47 |
| Colorado | 8 | Mississippi | 28 | Texas | 48 |
| Connecticut | 9 | Missouri | 29 | Utah | 49 |
| Delaware | 10 | Montana | 30 | Vermont | 50 |
| District of Columbia | 11 | Nebraska | 31 | Virginia | 51 |
| Florida | 12 | Nevada | 32 | Virgin Islands | 52 |
| Georgia | 13 | New Hampshire | 33 | Washington | 53 |
| Guam | 14 | New Jersey | 34 | West Virginia | 54 |
| Hawaii | 15 | New Mexico | 35 | Wisconsin | 55 |
| Idaho | 16 | New York | 36 | Wyoming | 56 |
| Illinois | 17 | North Carolina | 37 | U.S. Air Force | 57 |
| Indiana | 18 | North Dakota | 38 | U.S. Army | 58 |
| Iowa | 19 | Ohio | 39 | U.S. Navy | 59 |
| Kansas | 20 | Oklahoma | 40 | | |

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

| | |
|---|---|
| 01 | 5,016,537 |
| | 5,016,814 |
| | 5,016,933 |
| | 5,017,549 |
| | 5,017,771 |
| 04 | 5,016,287 |
| | 5,016,466 |
| | 5,016,476 |
| | 5,016,532 |
| | 5,016,664 |
| | 5,016,874 |
| | 5,016,912 |
| | 5,016,918 |
| | 5,016,937 |
| | 5,017,022 |
| | 5,017,186 |
| | 5,017,689 |
| | 5,017,845 |
| | 5,017,925 |
| | 5,018,075 |
| | 5,018,118 |
| | 5,018,126 |
| 05 | 5,016,732 |
| | 5,016,796 |
| | 5,017,313 |
| | 5,017,395 |
| | 5,017,728 |
| | 5,017,772 |
| 06 | Re.33,593 |
| | 5,016,291 |
| | 5,016,292 |
| | 5,016,296 |
| | 5,016,320 |
| | 5,016,332 |
| | 5,016,335 |
| | 5,016,342 |
| | 5,016,354 |
| | 5,016,372 |
| | 5,016,383 |
| | 5,016,386 |
| | 5,016,390 |
| | 5,016,398 |
| | 5,016,401 |
| | 5,016,426 |
| | 5,016,499 |
| | 5,016,500 |
| | 5,016,513 |
| | 5,016,514 |
| | 5,016,538 |
| | 5,016,568 |
| | 5,016,607 |
| | 5,016,608 |
| | 5,016,617 |
| | 5,016,619 |
| | 5,016,628 |
| | 5,016,629 |
| | 5,016,642 |
| | 5,016,651 |
| | 5,016,652 |
| | 5,016,659 |
| | 5,016,686 |
| | 5,016,689 |
| | 5,016,691 |
| | 5,016,708 |
| | 5,016,730 |
| | 5,016,747 |
| | 5,016,754 |
| | 5,016,774 |
| | 5,016,791 |
| | 5,016,795 |
| | 5,016,805 |
| | 5,016,837 |
| | 5,016,858 |
| | 5,016,869 |
| | 5,016,881 |
| | 5,016,884 |
| | 5,016,893 |
| | 5,016,894 |
| | 5,016,895 |
| | 5,016,925 |
| | 5,016,927 |
| | 5,016,931 |
| | 5,016,946 |
| | 5,016,947 |
| | 5,016,950 |
| | 5,016,953 |
| | 5,016,961 |
| | 5,016,962 |
| | 5,016,963 |
| | 5,016,969 |
| | 5,016,971 |
| | 5,016,980 |
| | 5,016,981 |
| | 5,016,982 |
| | 5,016,984 |
| | 5,016,985 |
| | 5,016,987 |
| | 5,016,997 |
| | 5,016,998 |
| | 5,017,010 |
| | 5,017,023 |
| | 5,017,030 |
| | 5,017,034 |
| | 5,017,052 |
| | 5,017,056 |
| | 5,017,059 |
| | 5,017,068 |
| | 5,017,069 |
| | 5,017,100 |
| | 5,017,123 |
| | 5,017,129 |
| | 5,017,142 |
| | 5,017,143 |
| | 5,017,164 |
| | 5,017,173 |
| | 5,017,175 |
| | 5,017,187 |
| | 5,017,199 |
| | 5,017,240 |
| | 5,017,266 |
| | 5,017,274 |
| | 5,017,278 |
| | 5,017,281 |
| | 5,017,289 |
| | 5,017,328 |
| | 5,017,332 |
| | 5,017,363 |
| | 5,017,373 |
| | 5,017,381 |
| | 5,017,399 |
| | 5,017,414 |
| | 5,017,447 |
| | 5,017,475 |
| | 5,017,478 |
| | 5,017,490 |
| | 5,017,495 |
| | 5,017,508 |
| | 5,017,509 |
| | 5,017,522 |
| | 5,017,529 |
| | 5,017,540 |
| | 5,017,558 |
| | 5,017,648 |
| | 5,017,691 |
| | 5,017,692 |
| | 5,017,734 |
| | 5,017,735 |
| | 5,017,769 |
| | 5,017,776 |
| | 5,017,779 |
| | 5,017,782 |
| | 5,017,783 |
| | 5,017,784 |
| | 5,017,804 |
| | 5,017,809 |
| | 5,017,811 |
| | 5,017,812 |
| | 5,017,813 |
| | 5,017,816 |
| | 5,017,820 |
| | 5,017,834 |
| | 5,017,851 |
| | 5,017,854 |
| | 5,017,865 |
| | 5,017,883 |
| | 5,017,919 |
| | 5,017,920 |
| | 5,017,923 |
| | 5,017,926 |
| | 5,017,929 |
| | 5,017,938 |
| | 5,017,939 |
| | 5,017,953 |
| | 5,017,989 |
| | 5,018,007 |
| | 5,018,020 |
| | 5,018,029 |
| | 5,018,035 |
| | 5,018,037 |
| | 5,018,041 |
| | 5,018,052 |
| | 5,018,057 |
| | 5,018,060 |
| | 5,018,067 |
| | 5,018,076 |
| | 5,018,095 |
| | 5,018,106 |
| | 5,018,114 |
| | 5,018,128 |
| | 5,018,138 |
| | 5,018,151 |
| | 5,018,152 |
| | 5,018,153 |
| | 5,018,160 |
| | 5,018,161 |
| | 5,018,162 |
| | 5,018,164 |
| | 5,018,167 |
| | 5,018,169 |
| | 5,018,171 |
| | 5,018,181 |
| | 5,018,190 |
| | 5,018,193 |
| | 5,018,214 |
| | 4,125,297 |
| | 4,797,170 |
| | 4,896,955 |
| 08 | 5,016,301 |
| | 5,016,306 |
| | 5,016,314 |
| | 5,016,428 |
| | 5,016,445 |
| | 5,016,462 |
| | 5,016,463 |
| | 5,016,469 |
| | 5,016,562 |
| | 5,016,964 |
| | 5,017,677 |
| | 5,017,917 |
| | 5,017,928 |
| | 5,018,074 |
| 09 | 5,016,289 |
| | 5,016,303 |
| | 5,016,375 |
| | 5,016,377 |
| | 5,016,455 |
| | 5,016,511 |
| | 5,016,776 |
| | 5,016,784 |
| | 5,016,929 |
| | 5,016,967 |
| | 5,017,041 |
| | 5,017,042 |
| | 5,017,071 |
| | 5,017,089 |
| | 5,017,092 |
| | 5,017,238 |
| | 5,017,244 |
| | 5,017,258 |
| | 5,017,267 |
| | 5,017,285 |
| | 5,017,347 |
| | 5,017,699 |
| | 5,017,763 |
| | 5,017,866 |
| | 5,017,907 |
| | 5,018,204 |
| 10 | 5,016,531 |
| | 5,016,622 |
| | 5,017,214 |
| | 5,017,215 |
| | 5,017,300 |
| | 5,017,301 |
| | 5,017,334 |
| | 5,017,356 |
| | 5,017,526 |
| | 5,017,533 |
| | 5,017,554 |
| | 5,017,685 |
| | 5,017,794 |
| 11 | 5,017,037 |
| 12 | 5,016,300 |
| | 5,016,318 |
| | 5,016,326 |
| | 5,016,367 |
| | 5,016,440 |
| | 5,016,505 |
| | 5,016,541 |
| | 5,016,558 |
| | 5,016,640 |
| | 5,016,658 |
| | 5,016,694 |
| | 5,016,855 |
| | 5,016,861 |
| | 5,016,956 |
| | 5,017,048 |
| | 5,017,091 |
| | 5,017,167 |
| | 5,017,232 |
| | 5,017,242 |
| | 5,017,325 |
| | 5,017,366 |
| | 5,017,402 |
| | 5,017,410 |
| | 5,017,566 |
| | 5,017,575 |
| | 5,017,615 |
| | 5,017,618 |
| | 5,017,746 |
| | 5,017,878 |
| | 5,017,897 |
| | 5,018,047 |
| 13 | 5,016,284 |
| | 5,016,285 |
| | 5,016,351 |
| | 5,016,397 |
| | 5,016,399 |
| | 5,016,527 |
| | 5,016,545 |
| | 5,016,759 |
| | 5,016,761 |
| | 5,016,817 |
| | 5,016,915 |
| | 5,016,952 |
| | 5,016,968 |
| | 5,017,370 |
| | 5,017,756 |
| | 5,018,166 |
| | 4,118,754 |
| 14 | 5,016,294 |
| 15 | 5,016,293 |
| 16 | 5,016,441 |
| | 5,016,542 |
| | 5,016,951 |
| | 5,017,312 |
| | 5,017,736 |
| 17 | 5,016,297 |
| | 5,016,307 |

VOL
1126
ISS
3
MY
21
1991
UMI

5,016,315
5,016,350
5,016,360
5,016,368
5,016,420
5,016,446
5,016,465
5,016,467
5,016,501
5,016,597
5,016,602
5,016,633
5,016,635
5,016,661
5,016,666
5,016,707
5,016,724
5,016,748
5,016,750
5,016,753
5,016,765
5,016,769
5,016,785
5,016,787
5,016,848
5,016,876
5,016,877
5,016,887
5,016,935
5,017,072
5,017,078
5,017,151
5,017,162
5,017,170
5,017,178
5,017,226
5,017,291
5,017,343
5,017,351
5,017,400
5,017,441
5,017,470
5,017,501
5,017,541
5,017,598
5,017,634
5,017,739
5,017,815
5,017,821
5,017,838
5,017,840
5,017,856
5,017,903
5,017,934
5,018,011
5,018,013
5,018,021
5,018,188
5,018,197
5,018,209
4,882,120
18 5,016,334
5,016,574
5,016,577
5,016,673
5,016,701
5,016,897
5,017,066
5,017,132
5,017,560
5,017,741
5,017,844
5,017,846
5,017,916
5,018,087
5,018,116
5,018,207
19 5,016,391
5,016,857
5,017,602
5,017,910
20 5,016,395
5,016,717
5,016,751
5,016,898
5,017,327
21 5,016,460
5,016,509
5,016,655
5,016,656
5,016,832
5,017,101
5,017,284
5,017,386
5,017,389
22 5,016,554
5,016,794
5,016,900
5,017,076
5,017,090
5,017,727
23 5,017,208
24 5,016,444
5,016,614
5,016,631
5,016,644

5,016,703
5,016,840
5,017,004
5,017,197
5,017,201
5,017,234
5,017,306
5,017,434
5,017,492
5,017,690
5,017,886
5,017,895
5,018,088
25 : 5,016,352
5,016,381
5,016,382
5,016,517
5,016,557
5,016,636
5,016,755
5,016,792
5,016,873
5,016,917
5,016,936
5,016,944
5,016,957
5,016,960
5,016,976
5,017,019
5,017,138
5,017,172
5,017,188
5,017,229
5,017,292
5,017,338
5,017,403
5,017,409
5,017,419
5,017,477
5,017,489
5,017,688
5,017,742
5,017,751
5,017,831
5,017,863
5,017,985
5,018,062
5,018,084
5,018,142
5,018,213
5,018,218
26 : 5,016,392
5,016,415
5,016,429
5,016,442
5,016,454
5,016,461
5,016,488
5,016,490
5,016,507
5,016,515
5,016,521
5,016,523
5,016,547
5,016,620
5,016,650
5,016,657
5,016,685
5,016,700
5,016,768
5,016,798
5,016,799
5,016,809
5,016,846
5,016,859
5,016,860
5,016,885
5,016,914
5,016,991
5,017,058
5,017,079
5,017,083
5,017,095
5,017,124
5,017,148
5,017,193
5,017,216
5,017,221
5,017,222
5,017,260
5,017,269
5,017,318
5,017,321
5,017,360
5,017,367
5,017,406
5,017,474
5,017,524
5,017,604
5,017,628
5,017,671
5,017,672
5,017,673
5,017,717
5,017,867
5,017,904

27 : 5,016,310
5,016,311
5,016,319
5,016,373
5,016,402
5,016,405
5,016,448
5,016,553
5,016,559
5,016,609
5,016,645
5,016,671
5,016,672
5,016,728
5,016,778
5,016,808
5,016,850
5,016,896
5,017,094
5,017,099
5,017,192
5,017,236
5,017,255
5,017,286
5,017,316
5,017,369
5,017,439
5,017,562
5,017,884
5,017,931
5,017,999
5,018,044
5,018,136
5,018,215
28 : 5,016,370
5,016,733
5,017,086
5,017,098
29 : 5,016,330
5,016,357
5,016,358
5,016,384
5,016,427
5,016,572
5,016,816
5,016,827
5,016,905
5,017,053
5,017,065
5,017,081
5,017,093
5,017,116
5,017,181
5,017,565
5,017,653
5,017,818
5,018,053
5,018,085
30 : 5,017,128
31 : 5,016,486
5,016,801
32 : 5,016,343
5,016,388
5,016,852
5,016,879
5,017,084
5,017,361
33 5,016,344
5,016,385
5,016,530
5,016,802
5,017,080
5,017,182
5,017,257
5,017,786
5,017,860
5,017,862
5,018,099
5,018,137
34 : 5,016,404
5,016,502
5,016,504
5,016,571
5,016,580
5,016,615
5,016,715
5,016,749
5,016,764
5,016,771
5,016,845
5,016,919
5,016,974
5,017,009
5,017,040
5,017,057
5,017,155
5,017,241
5,017,263
5,017,279
5,017,299
5,017,302
5,017,342
5,017,362
5,017,379
5,017,387
5,017,420

5,017,430
5,017,435
5,017,488
5,017,567
5,017,578
5,017,603
5,017,616
5,017,637
5,017,662
5,017,681
5,017,694
5,017,695
5,017,716
5,017,726
5,017,788
5,017,799
5,017,877
5,017,885
5,017,927
5,018,073
5,018,129
5,018,131
5,018,184
5,018,187
5,018,191
4,757,267
35 : 5,017,169
5,017,789
36 : 5,016,417
5,016,447
5,016,450
5,016,452
5,016,453
5,016,508
5,016,575
5,016,638
5,016,647
5,016,669
5,016,674
5,016,683
5,016,706
5,016,760
5,016,772
5,016,777
5,016,833
5,016,867
5,016,955
5,017,011
5,017,012
5,017,107
5,017,109
5,017,137
5,017,139
5,017,140
5,017,159
5,017,168
5,017,206
5,017,326
5,017,354
5,017,408
5,017,416
5,017,432
5,017,438
5,017,459
5,017,472
5,017,546
5,017,547
5,017,551
5,017,552
5,017,584
5,017,624
5,017,644
5,017,656
5,017,696
5,017,718
5,017,762
5,017,765
5,017,791
5,017,806
5,017,819
5,017,869
5,017,871
5,017,881
5,017,892
5,017,902
5,017,921
5,017,941
5,017,954
5,017,963
5,017,972
5,017,990
5,018,002
5,018,019
5,018,025
5,018,048
5,018,058
5,018,063
5,018,093
5,018,143
5,018,150
5,018,185
5,018,192
5,018,208
5,018,211
37 5,016,329
5,016,355

5,016,364
5,016,649
5,016,653
5,016,654
5,016,662
5,016,735
5,016,999
5,017,104
5,017,309
5,017,310
5,017,473
5,017,480
5,017,577
5,017,600
5,018,132
38 5,017,372
39 : 5,016,316
5,016,393
5,016,472
5,016,474
5,016,493
5,016,506
5,016,573
5,016,582
5,016,606
5,016,660
5,016,665
5,016,696
5,016,726
5,016,783
5,016,818
5,016,825
5,016,838
5,016,847
5,016,875
5,016,891
5,016,908
5,016,973
5,017,025
5,017,033
5,017,044
5,017,070
5,017,118
5,017,127
5,017,176
5,017,180
5,017,217
5,017,230
5,017,271
5,017,275
5,017,324
5,017,398
5,017,452
5,017,563
5,017,591
5,017,629
5,017,666
5,017,740
5,017,760
5,017,857
5,017,909
5,017,964
5,017,986
5,018,086
5,018,148
40 5,016,551
5,016,714
5,016,844
5,016,853
5,016,886
5,017,024
5,017,357
5,017,643
5,017,661
5,018,117
41 5,016,295
5,016,325
5,016,766
5,016,938
5,017,032
5,017,293
5,017,471
5,017,814
5,017,930
5,018,111
42 5,016,380
5,016,468
5,016,483
5,016,503
5,016,516
5,016,624
5,016,693
5,016,746
5,016,758
5,016,948
5,016,958
5,016,966
5,017,194
5,017,204
5,017,252
5,017,283
5,017,335
5,017,348
5,017,365
5,017,411
5,017,437

5,017,440
5,017,451
5,017,553
5,017,568
5,017,601
5,017,632
5,017,745
5,017,761
5,017,792
5,017,807
5,017,824
5,017,837
5,017,859
5,017,876
5,017,896
5,018,182
43 : 5,017,609
44 : 5,016,555
5,017,150
45 : Re.33,591
5,016,308
5,016,321
5,016,328
5,016,413
5,016,540
5,017,425
5,017,752
46 : 5,017,135
47 : 5,016,613
5,016,639
5,016,648
5,016,810
5,017,007
5,017,349
5,017,528
5,017,622
5,017,649
5,017,679
5,017,680
48 5,016,302
5,016,338
5,016,365
5,016,376
5,016,378
5,016,389
5,016,438
5,016,482
5,016,570
5,016,583
5,016,601
5,016,618
5,016,643
5,016,711
5,016,712
5,016,713
5,016,716
5,016,856
5,016,921
5,016,926
5,016,928
5,017,119
5,017,144
5,017,160
5,017,165
5,017,196
5,017,258
5,017,317
5,017,371
5,017,375
5,017,415
5,017,436
5,017,506
5,017,510
5,017,511
5,017,515
5,017,536
5,017,537
5,017,612
5,017,630
5,017,665
5,017,670
5,017,676
5,017,714
5,017,732
5,017,753
5,017,778
5,017,880
5,017,912
5,017,915
5,017,952
5,017,977
5,017,980
5,018,005
5,018,069
5,018,102
5,018,112
5,018,113
5,018,115
5,018,157
5,018,165
5,018,177
5,018,180
5,018,210
5,018,212
49 5,016,481
5,016,552

5,016,604
5,016,623
5,016,870
5,016,871
5,016,932
5,017,103
5,017,219
5,017,251
5,018,170
50 : 5,018,144
51 : 5,016,309

5,016,353
5,016,418
5,016,479
5,016,736
5,016,763
5,016,819
5,017,000
5,017,235
5,017,378
5,017,392
5,017,793

5,017,873
5,018,146
5,018,163
53 : 5,016,387
5,016,641
5,016,752
5,016,899
5,016,923
5,017,174
5,017,203
5,017,394

5,017,620
5,017,693
54 : 5,016,379
5,016,699
5,017,064
5,017,153
5,017,249
55 5,016,371
5,016,510
5,016,600
5,016,603

5,016,621
5,016,720
5,016,731
5,016,790
5,016,841
5,016,888
5,017,021
5,017,049
5,017,273
5,017,391

5,017,446
5,017,614
5,017,647
5,017,664
5,017,758
5,017,800
5,017,853
5,017,872
5,018,174
4,355,986

## DESIGN PATENTS

01 : 316,938
317,038
317,039
04 : 317,001
317,069
05 : 316,988
317,033
06 : 316,925
316,926
316,927
316,931
316,932
316,941
316,957
316,982
316,986
316,993
316,996
317,003

317,009
317,018
317,065
09 : 316,964
316,966
316,967
316,968
316,983
317,040
12 : 316,949
316,953
316,960
316,994
317,053
317,054
317,055
317,056
317,070
13 : 316,934

16 : 316,958
17 : 316,929
316,950
316,965
316,985
317,015
317,027
20 : 316,954
21 : 317,004
317,020
22 : 316,942
316,992
25 : 316,962
317,042
317,043
317,052
317,068
26 : 316,924
317,029

27 : 316,922
316,975
316,977
316,999
317,048
317,063
28 : 316,937
29 : 316,951
316,970
31 : 316,981
32 : 316,945
316,946
33 : 316,955
317,032
34 : 316,961
317,008
317,021
317,031
317,064

36 316,995
317,012
317,047
317,057
317,058
317,059
317,061
37 316,939
316,948
316,979
317,006
39 316,971
316,976
316,980
316,989
317,010
317,049
317,050

317,051
317,071
41 : 316,928
316,940
42 : 316,933
316,935
316,956
317,016
44 : 317,060
45 : 316,943
317,028
48 : 316,944
317,034
317,035
51 : 317,030
55 : 317,013
317,036
317,046

## PLANT PATENTS

06 : 7,528
7,530
7,531
41 7,529
53 : 7,527

U.S. GOVERNMENT PRINTING OFFICE : O–1991

VOL
1126

ISS
3

MY
21

1991

UMI

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY STATE ZIP CODE

**PLEASE PRINT OR TYPE** (or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

**SUBSCRIPTION ORDER FORM**

**ENTER MY SUBSCRIPTION TO:**

**@ $ Domestic; @ $ Foreign.**

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY STATE ZIP CODE

**PLEASE PRINT OR TYPE** (or) COUNTRY

☐ Remittence Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ...............

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

VOL
1126

ISS
3

MY
21

1991

UMI

VOL
1126

ISS
3

MY
21

1991

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Harry F. Manbeck, Jr., *Commissioner*

UMI

VOL
1126

ISS
4

MY
28

1991

UMI

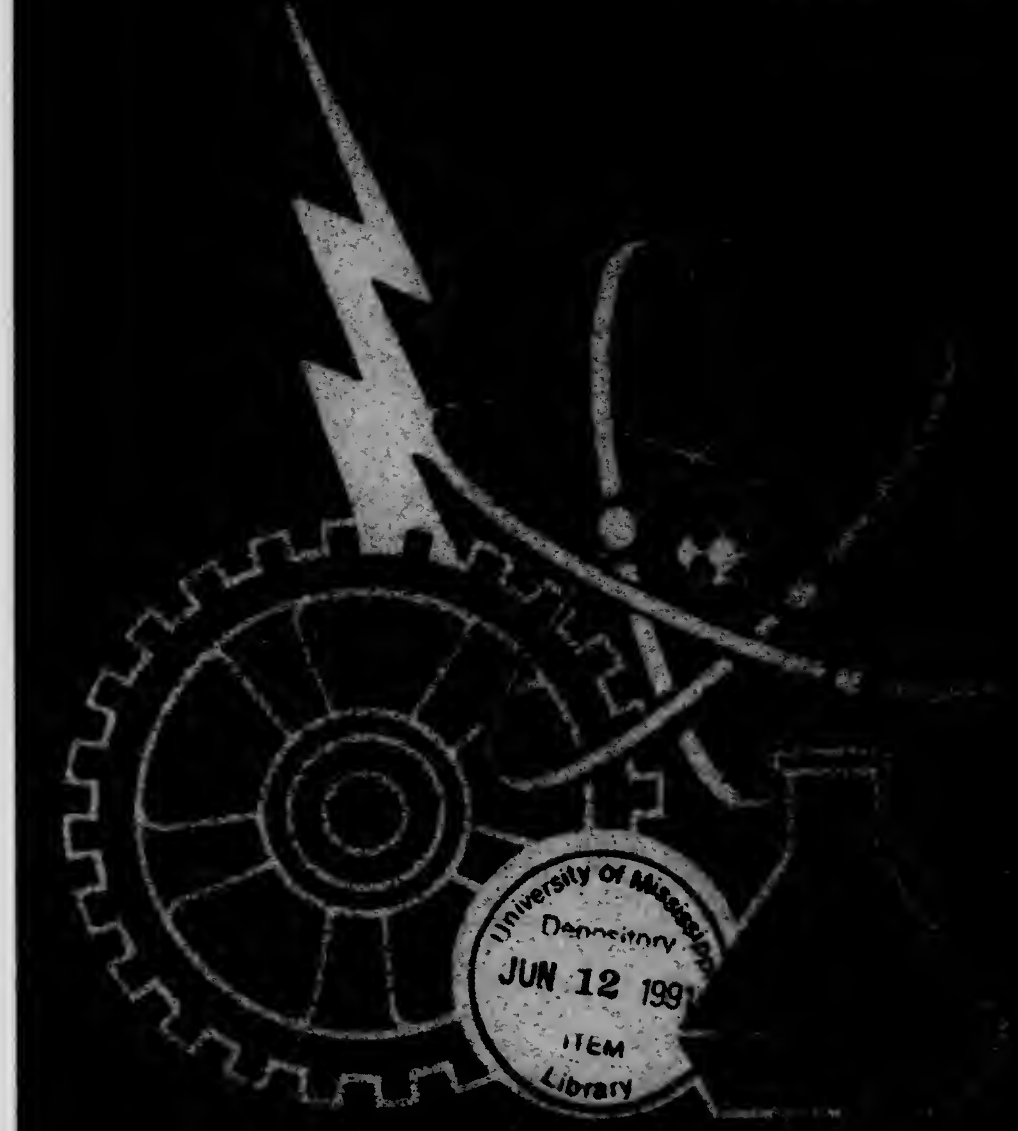
C 21.5:1126/4
Official Gazette, Patents, ...

Vol. 1126 Number 4

# OFFICIAL GAZETTE
## of the
## UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS
May 28, 1991



University of Mississippi
Depository
JUN 12 1991
ITEM
Library

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

VOL
1126

ISS
4

MY
28

1991

UMI

OL
126

SS
4

MY
28

1991

UMI

U·M·I

PAGES OG73 AND OG74 ARE MISSING IN NUMBER ONLY.

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE
May 28, 1991 Volume 1126 Number 4

## CONTENTS

Page

Patent and Trademark Office Notices

- Patent Cooperation Treaty (PCT) Information .......... 1126 OG 76
- Patent Cooperation Treaty (PCT) Update .......... 1126 OG 76
- Notice of Maintenance Fees Payable .......... 1126 OG 76
- Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees .......... 1126 OG 77
- Reissue Applications Filed .......... 1126 OG 79
- Requests for Reexaminations Filed .......... 1126 OG 80
- Availability of PatentIn Computer Program Training .......... 1126 OG 80
- Erratum .......... 1126 OG 81
- Trademark Trial and Appeal Board "Brown Bag Lunch" Seminars .......... 1126 OG 81
- Status of PTO Services .......... 1126 OG 82
- Patent Certificates of Correction .......... 1126 OG 83
- Special Boxes for Mail .......... 1126 OG 84

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries .......... 1126 OG 85
Patent Examining Corps .......... 1126 OG 87
**Reexaminations** .......... 2005
Reissue Patents Granted ( 33,594 ) .......... 2007
Plant Patents Granted ( 7.532 ) .......... 2009

Patents Granted

- General and Mechanical ( 5,018,220 ) .......... 2011
- Chemical ( 5,019,130 ) .......... 2319
- Electrical ( 5,019,672 ) .......... 2469

Design Patents Granted ( 317,072 ) .......... 2645
Index of Patentees .......... PI 1
Indices of Reissue, Reexamination, Design and Plant Patents .......... PI 79

Classification of

- Patents (Including Reissues and Reexaminations) .......... PI 85
- Designs, and Plants Applications .......... PI 89

Geographical Index of Residence of Inventors

- Patents (Including Reissues and Reexaminations) .......... PI 91
- Designs and Plant Applications .......... PI 93

Change of Address Form and Subscription Order Form .......... PI 95

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.
THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

---

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

---

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

VOL
1126
ISS
4
MY
28
1991
UMI

# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German marks and the exchange rate of the U.S. dollar in relation to the German mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees ( in U.S. dollars) is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed | 550.00 |
| —Corresponding prior U.S. national application filed | 380.00 |
| —Supplemental search fee, per additional invention | 150.00 |
| European Patent Office as ISA | 1492.00 |
| Preliminary examination fee | |
| USPTO as International Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as ISA | 400.00 |
| —Additional examination fee, per additional invention | 130.00 |
| —ISA not the USPTO | 600.00 |
| —Additional examination fee, per additional invention | 200.00 |
| International fees | |
| Basic fee | 559.00 |
| Basic Supplemental fee (for each page over 30) | 11.00 |
| Designation fee per country or region for the first 10 national or regional offices | 135.00 |
| Designation fee for 11th and subsequent designations | No Charge |
| Handling fee | 171.00 |

U.S. National Stage fees

| | Small Entity | Regular |
|---|---|---|
| USPTO was IPEA | 165.00 | 330.00 |
| USPTO was ISA but not IPEA | 185.00 | 370.00 |
| USPTO was neither ISA nor IPEA | 250.00 | 500.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 18.00 | 36.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 60.00 | 120.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) | 60.00 | 120.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) | 30.00 | 30.00 |

April 11, 1991 HARRY F. MANBECK, Jr.  
*Assistant Secretary and Commissioner*  
*of Patents and Trademarks.*

---

## Patent Cooperation Treaty (PCT) Update

### Change in International Search Fee Charged by the European Patent Office Effective July 1, 1991

The International Bureau of the World Intellectual Property Organization has informed the U. S. Patent and Trademark Office that, due to changes in the exchange rate of the U. S. dollar in relation to the German mark, the dollar amount of the international search fee charged by the European Patent Office for international applications filed in the United States Receiving Office will be $1,320.00, effective July 1, 1991.

May 2, 1991 HARRY F. MANBECK, Jr.  
*Assistant Secretary and Commissioner*  
*of Patents and Trademarks*

---

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on May 24, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,745,634 through 4,747,161  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 22, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,449,251 through 4,450,590  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant........$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant........$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))........$415.00  
By other than a small entity........$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))........$835.00  
By other than a small cnttity........$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982........$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))........$60.00  
By other than a small entity........$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable........$550.00"

---

## Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MARCH 17, 1991*  
*DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| Re. 32,193 | 06/712,578 | 6/24/86 |
| (4,376,963) | (06/218,339) | (3/15/83) |
| 4,376,312 | 06/265,199 | 3/15/83 |
| 4,376,320 | 06/320,843 | 3/15/83 |
| 4,376,327 | 06/229,344 | 3/15/83 |
| 4,376,328 | 06/259,912 | 3/15/83 |
| 4,376,334 | 06/258,115 | 3/15/83 |
| 4,376,337 | 06/304,672 | 3/15/83 |
| 4,376,345 | 06/330,658 | 3/15/83 |
| 4,376,346 | 06/313,980 | 3/15/83 |
| 4,376,354 | 06/237,826 | 3/15/83 |
| 4,376,355 | 06/256,382 | 3/15/83 |
| 4,376,360 | 06/228,134 | 3/15/83 |
| 4,376,362 | 06/225,147 | 3/15/83 |
| 4,376,363 | 06/266,075 | 3/15/83 |
| 4,376,377 | 06/250,582 | 3/15/83 |
| 4,376,391 | 06/238,280 | 3/15/83 |
| 4,376,392 | 06/291,898 | 3/15/83 |
| 4,376,394 | 06/234,427 | 3/15/83 |
| 4,376,395 | 06/236,209 | 3/15/83 |
| 4,376,397 | 06/234,363 | 3/15/83 |
| 4,376,403 | 06/259,755 | 3/15/83 |
| 4,376,417 | 06/239,546 | 3/15/83 |
| 4,376,425 | 06/264,292 | 3/15/83 |
| 4,376,427 | 06/321,191 | 3/15/83 |
| 4,376,432 | 06/253,208 | 3/15/83 |
| 4,376,434 | 06/239,584 | 3/15/83 |
| 4,376,462 | 06/235,775 | 3/15/83 |
| 4,376,489 | 06/237,029 | 3/15/83 |
| 4,376,502 | 06/303,195 | 3/15/83 |
| 4,376,503 | 06/240,374 | 3/15/83 |
| 4,376,517 | 06/253,804 | 3/15/83 |
| 4,376,535 | 06/217,891 | 3/15/83 |
| 4,376,544 | 06/245,470 | 3/15/83 |
| 4,376,554 | 06/228,042 | 3/15/83 |
| 4,376,558 | 06/247,371 | 3/15/83 |
| 4,376,580 | 06/239,547 | 3/15/83 |
| 4,376,581 | 06/220,451 | 3/15/83 |
| 4,376,586 | 06/227,536 | 3/15/83 |
| 4,376,611 | 06/270,347 | 3/15/83 |
| 4,376,625 | 06/278,429 | 3/15/83 |
| 4,376,629 | 06/307,193 | 3/15/83 |
| 4,376,633 | 06/272,842 | 3/15/83 |
| 4,376,647 | 06/235,177 | 3/15/83 |
| 4,376,648 | 06/259,058 | 3/15/83 |
| 4,376,651 | 06/347,917 | 3/15/83 |
| 4,376,658 | 06/250,538 | 3/15/83 |
| 4,376,669 | 06/292,210 | 3/15/83 |
| 4,376,673 | 06/235,809 | 3/15/83 |
| 4,376,686 | 06/321,973 | 3/15/83 |
| 4,376,690 | 06/262,049 | 3/15/83 |
| 4,376,697 | 06/308,076 | 3/15/83 |
| 4,376,703 | 06/320,082 | 3/15/83 |
| 4,376,706 | 06/216,271 | 3/15/83 |
| 4,376,719 | 06/283,589 | 3/15/83 |
| 4,376,721 | 06/286,204 | 3/15/83 |
| 4,376,722 | 06/315,827 | 3/15/83 |
| 4,376,735 | 06/329,961 | 3/15/83 |
| 4,376,736 | 06/305,874 | 3/15/83 |
| 4,376,742 | 06/237,227 | 3/15/83 |
| 4,376,755 | 06/344,085 | 3/15/83 |
| 4,376,758 | 06/222,988 | 3/15/83 |
| 4,376,760 | 06/315,212 | 3/15/83 |
| 4,376,772 | 06/328,894 | 3/15/83 |
| 4,376,775 | 06/285,379 | 3/15/83 |
| 4,376,777 | 06/222,881 | 3/15/83 |
| 4,376,779 | 06/228,482 | 3/15/83 |
| 4,376,780 | 06/312,341 | 3/15/83 |

VOL 1126 ISS 4 MY 28 1991 UMI

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,376,783 | 06/240,512 | 3/15/83 |
| 4,376,786 | 06/352,688 | 3/15/83 |
| 4,376,791 | 06/338,820 | 3/15/83 |
| 4,376,792 | 06/298,969 | 3/15/83 |
| 4,376,793 | 06/297,339 | 3/15/83 |
| 4,376,813 | 06/341,148 | 3/15/83 |
| 4,376,823 | 06/274,728 | 3/15/83 |
| 4,376,838 | 06/244,846 | 3/15/83 |
| 4,376,846 | 06/250,038 | 3/15/83 |
| 4,376,848 | 06/250,639 | 3/15/83 |
| 4,376,852 | 06/259,389 | 3/15/83 |
| 4,376,860 | 06/325,517 | 3/15/83 |
| 4,376,865 | 06/243,483 | 3/15/83 |
| 4,376,902 | 06/354,335 | 3/15/83 |
| 4,376,908 | 06/220,485 | 3/15/83 |
| 4,376,911 | 06/217,901 | 3/15/83 |
| 4,376,943 | 06/274,964 | 3/15/83 |
| 4,376,960 | 06/221,951 | 3/15/83 |
| 4,376,964 | 06/237,707 | 3/15/83 |
| 4,376,988 | 06/238,138 | 3/15/83 |
| 4,376,996 | 06/258,061 | 3/15/83 |
| 4,376,997 | 06/246,678 | 3/15/83 |
| 4,377,005 | 06/297,043 | 3/15/83 |
| 4,649,575 | 06/859,917 | 3/17/87 |
| 4,649,577 | 06/821,007 | 3/17/87 |
| 4,649,578 | 06/837,775 | 3/17/87 |
| 4,649,581 | 06/682,191 | 3/17/87 |
| 4,649,585 | 06/843,980 | 3/17/87 |
| 4,649,588 | 06/827,217 | 3/17/87 |
| 4,649,589 | 06/713,388 | 3/17/87 |
| 4,649,593 | 06/765,543 | 3/17/87 |
| 4,649,596 | 06/630,218 | 3/17/87 |
| 4,649,603 | 06/733,042 | 3/17/87 |
| 4,649,613 | 06/773,587 | 3/17/87 |
| 4,649,628 | 06/675,872 | 3/17/87 |
| 4,649,631 | 06/829,076 | 3/17/87 |
| 4,649,645 | 06/646,742 | 3/17/87 |
| 4,649,649 | 06/794,679 | 3/17/87 |
| 4,649,653 | 06/811,275 | 3/17/87 |
| 4,649,656 | 06/731,496 | 3/17/87 |
| 4,649,660 | 06/859,395 | 3/17/87 |
| 4,649,662 | 06/833,374 | 3/17/87 |
| 4,649,664 | 06/781,056 | 3/17/87 |
| 4,649,674 | 06/840,143 | 3/17/87 |
| 4,649,677 | 06/668,935 | 3/17/87 |
| 4,649,679 | 06/776,735 | 3/17/87 |
| 4,649,680 | 06/700,106 | 3/17/87 |
| 4,649,681 | 06/859,321 | 3/17/87 |
| 4,649,682 | 06/633,402 | 3/17/87 |
| 4,649,690 | 06/876,779 | 3/17/87 |
| 4,649,693 | 06/853,628 | 3/17/87 |
| 4,649,697 | 06/712,972 | 3/17/87 |
| 4,649,700 | 06/728,037 | 3/17/87 |
| 4,649,702 | 06/765,098 | 3/17/87 |
| 4,649,709 | 06/723,156 | 3/17/87 |
| 4,649,714 | 06/846,885 | 3/17/87 |
| 4,649,715 | 06/853,643 | 3/17/87 |
| 4,649,721 | 06/873,342 | 3/17/87 |
| 4,649,724 | 06/772,340 | 3/17/87 |
| 4,649,725 | 06/764,875 | 3/17/87 |
| 4,649,727 | 06/671,527 | 3/17/87 |
| 4,649,738 | 06/818,564 | 3/17/87 |
| 4,649,739 | 06/806,628 | 3/17/87 |
| 4,649,744 | 06/610,710 | 3/17/87 |
| 4,649,746 | 06/723,556 | 3/17/87 |
| 4,649,755 | 06/685,869 | 3/17/87 |
| 4,649,762 | 06/680,697 | 3/17/87 |
| 4,649,772 | 06/751,929 | 3/17/87 |
| 4,649,778 | 06/308,389 | 3/17/87 |
| 4,649,784 | 06/696,693 | 3/17/87 |
| 4,649,795 | 06/610,753 | 3/17/87 |
| 4,649,796 | 06/875,843 | 3/17/87 |
| 4,649,797 | 06/657,795 | 3/17/87 |
| 4,649,799 | 06/660,574 | 3/17/87 |
| 4,649,804 | 06/708,467 | 3/17/87 |
| 4,649,829 | 06/667,718 | 3/17/87 |
| 4,649,833 | 06/713,908 | 3/17/87 |
| 4,649,834 | 06/822,022 | 3/17/87 |
| 4,649,843 | 06/551,017 | 3/17/87 |
| 4,649,846 | 06/740,915 | 3/17/87 |
| 4,649,849 | 06/716,204 | 3/17/87 |
| 4,649,851 | 06/775,365 | 3/17/87 |
| 4,649,852 | 06/882,191 | 3/17/87 |
| 4,649,856 | 06/817,955 | 3/17/87 |
| 4,649,861 | 06/764,323 | 3/17/87 |
| 4,649,864 | 06/656,242 | 3/17/87 |
| 4,649,865 | 06/835,175 | 3/17/87 |
| 4,649,885 | 06/815,679 | 3/17/87 |
| 4,649,887 | 06/689,374 | 3/17/87 |
| 4,649,897 | 06/796,783 | 3/17/87 |
| 4,649,898 | 06/586,251 | 3/17/87 |
| 4,649,900 | 06/698,893 | 3/17/87 |
| 4,649,902 | 06/813,202 | 3/17/87 |
| 4,649,905 | 06/667,340 | 3/17/87 |
| 4,649,912 | 06/731,714 | 3/17/87 |
| 4,649,914 | 06/796,692 | 3/17/87 |
| 4,649,915 | 06/667,098 | 3/17/87 |
| 4,649,916 | 06/629,673 | 3/17/87 |
| 4,649,922 | 06/821,800 | 3/17/87 |
| 4,649,946 | 06/716,267 | 3/17/87 |
| 4,649,951 | 06/751,189 | 3/17/87 |
| 4,649,954 | 06/768,104 | 3/17/87 |
| 4,649,955 | 06/789,859 | 3/17/87 |
| 4,649,959 | 06/786,471 | 3/17/87 |
| 4,649,973 | 06/816,474 | 3/17/87 |
| 4,649,974 | 06/752,508 | 3/17/87 |
| 4,649,981 | 06/709,071 | 3/17/87 |
| 4,650,002 | 06/633,511 | 3/17/87 |
| 4,650,004 | 06/666,011 | 3/17/87 |
| 4,650,005 | 06/677,385 | 3/17/87 |
| 4,650,011 | 06/541,152 | 3/17/87 |
| 4,650,027 | 06/742,579 | 3/17/87 |
| 4,650,034 | 06/816,412 | 3/17/87 |
| 4,650,035 | 06/831,570 | 3/17/87 |
| 4,650,036 | 06/726,052 | 3/17/87 |
| 4,650,038 | 06/729,263 | 3/17/87 |
| 4,650,043 | 06/745,659 | 3/17/87 |
| 4,650,046 | 06/690,505 | 3/17/87 |
| 4,650,048 | 06/779,555 | 3/17/87 |
| 4,650,049 | 06/755,061 | 3/17/87 |
| 4,650,052 | 06/754,841 | 3/17/87 |
| 4,650,065 | 06/812,245 | 3/17/87 |
| 4,650,067 | 06/809,524 | 3/17/87 |
| 4,650,069 | 06/734,342 | 3/17/87 |
| 4,650,073 | 06/764,104 | 3/17/87 |
| 4,650,074 | 06/813,388 | 3/17/87 |
| 4,650,075 | 06/706,075 | 3/17/87 |
| 4,650,077 | 06/808,770 | 3/17/87 |
| 4,650,078 | 06/866,319 | 3/17/87 |
| 4,650,080 | 06/726,042 | 3/17/87 |
| 4,650,083 | 06/741,848 | 3/17/87 |
| 4,650,089 | 06/819,718 | 3/17/87 |
| 4,650,093 | 06/736,676 | 3/17/87 |
| 4,650,100 | 06/723,378 | 3/17/87 |
| 4,650,102 | 06/819,055 | 3/17/87 |
| 4,650,103 | 06/802,534 | 3/17/87 |
| 4,650,105 | 06/699,065 | 3/17/87 |
| 4,650,115 | 06/763,395 | 3/17/87 |
| 4,650,117 | 06/841,890 | 3/17/87 |
| 4,650,132 | 06/832,222 | 3/17/87 |
| 4,650,135 | 06/752,777 | 3/17/87 |
| 4,650,137 | 06/797,118 | 3/17/87 |
| 4,650,138 | 06/782,044 | 3/17/87 |
| 4,650,144 | 06/707,927 | 3/17/87 |
| 4,650,145 | 06/785,131 | 3/17/87 |
| 4,650,146 | 06/657,669 | 3/17/87 |
| 4,650,150 | 06/769,669 | 3/17/87 |
| 4,650,153 | 06/738,062 | 3/17/87 |
| 4,650,154 | 06/773,503 | 3/17/87 |
| 4,650,160 | 06/663,968 | 3/17/87 |
| 4,650,174 | 06/586,392 | 3/17/87 |
| 4,650,181 | 06/820,682 | 3/17/87 |
| 4,650,185 | 06/574,174 | 3/17/87 |
| 4,650,191 | 06/674,408 | 3/17/87 |
| 4,650,196 | 06/883,617 | 3/17/87 |
| 4,650,199 | 06/607,129 | 3/17/87 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,650,222 | 06/870,533 | 3/17/87 |
| 4,650,235 | 06/842,143 | 3/17/87 |
| 4,650,248 | 06/687,600 | 3/17/87 |
| 4,650,254 | 06/676,363 | 3/17/87 |
| 4,650,268 | 06/750,958 | 3/17/87 |
| 4,650,275 | 06/713,905 | 3/17/87 |
| 4,650,284 | 06/661,509 | 3/17/87 |
| 4,650,297 | 06/860,301 | 3/17/87 |
| 4,650,300 | 06/880,632 | 3/17/87 |
| 4,650,306 | 06/726,017 | 3/17/87 |
| 4,650,311 | 06/663,358 | 3/17/87 |
| 4,650,314 | 06/539,917 | 3/17/87 |
| 4,650,323 | 06/814,721 | 3/17/87 |
| 4,650,328 | 06/617,657 | 3/17/87 |
| 4,650,331 | 06/724,087 | 3/17/87 |
| 4,650,345 | 06/787,652 | 3/17/87 |
| 4,650,354 | 06/782,326 | 3/17/87 |
| 4,650,369 | 06/802,281 | 3/17/87 |
| 4,650,371 | 06/660,463 | 3/17/87 |
| 4,650,397 | 06/773,530 | 3/17/87 |
| 4,650,419 | 06/698,430 | 3/17/87 |
| 4,650,432 | 06/831,716 | 3/17/87 |
| 4,650,448 | 06/791,630 | 3/17/87 |
| 4,650,453 | 06/772,641 | 3/17/87 |
| 4,650,461 | 06/830,238 | 3/17/87 |
| 4,650,464 | 06/747,720 | 3/17/87 |
| 4,650,480 | 06/712,846 | 3/17/87 |
| 4,650,490 | 06/693,131 | 3/17/87 |
| 4,650,492 | 06/769,638 | 3/17/87 |
| 4,650,502 | 06/466,263 | 3/17/87 |
| 4,650,518 | 06/681,579 | 3/17/87 |
| 4,650,527 | 06/848,350 | 3/17/87 |
| 4,650,540 | 06/564,773 | 3/17/87 |
| 4,650,541 | 06/649,627 | 3/17/87 |
| 4,650,545 | 06/703,066 | 3/17/87 |
| 4,650,546 | 06/355,558 | 3/17/87 |
| 4,650,549 | 06/795,575 | 3/17/87 |
| 4,650,554 | 06/791,063 | 3/17/87 |
| 4,650,556 | 06/710,131 | 3/17/87 |
| 4,650,559 | 06/671,234 | 3/17/87 |
| 4,650,579 | 06/727,440 | 3/17/87 |
| 4,650,580 | 06/754,190 | 3/17/87 |
| 4,650,588 | 06/745,571 | 3/17/87 |
| 4,650,602 | 06/733,563 | 3/17/87 |
| 4,650,613 | 06/687,313 | 3/17/87 |
| 4,650,617 | 06/748,889 | 3/17/87 |
| 4,650,618 | 06/550,493 | 3/17/87 |
| 4,650,625 | 06/730,914 | 3/17/87 |
| 4,650,631 | 06/609,990 | 3/17/87 |
| 4,650,632 | 06/600,664 | 3/17/87 |
| 4,650,655 | 06/634,859 | 3/17/87 |
| 4,650,661 | 06/462,928 | 3/17/87 |
| 4,650,668 | 06/685,080 | 3/17/87 |
| 4,650,671 | 06/605,762 | 3/17/87 |
| 4,650,682 | 06/469,134 | 3/17/87 |
| 4,650,689 | 06/715,932 | 3/17/87 |
| 4,650,695 | 06/733,710 | 3/17/87 |
| 4,650,704 | 06/793,949 | 3/17/87 |
| 4,650,707 | 06/738,457 | 3/17/87 |
| 4,650,709 | 06/793,547 | 3/17/87 |
| 4,650,712 | 06/655,924 | 3/17/87 |
| 4,650,715 | 06/488,532 | 3/17/87 |
| 4,650,719 | 06/791,615 | 3/17/87 |
| 4,650,741 | 06/788,882 | 3/17/87 |
| 4,650,780 | 06/797,547 | 3/17/87 |
| 4,650,782 | 06/842,509 | 3/17/87 |
| 4,650,800 | 06/496,093 | 3/17/87 |
| 4,650,806 | 06/691,238 | 3/17/87 |
| 4,650,835 | 06/829,881 | 3/17/87 |
| 4,650,845 | 06/629,353 | 3/17/87 |
| 4,650,846 | 06/835,290 | 3/17/87 |
| 4,650,854 | 06/741,936 | 3/17/87 |
| 4,650,857 | 06/810,862 | 3/17/87 |
| 4,650,876 | 06/804,216 | 3/17/87 |
| 4,650,881 | 06/718,649 | 3/17/87 |
| 4,650,883 | 06/773,914 | 3/17/87 |
| 4,650,890 | 06/759,536 | 3/17/87 |
| 4,650,893 | 06/753,890 | 3/17/87 |
| 4,650,902 | 06/624,937 | 3/17/87 |
| 4,650,905 | 06/774,866 | 3/17/87 |
| 4,650,909 | 06/792,647 | 3/17/87 |
| 4,650,910 | 06/836,037 | 3/17/87 |
| 4,650,918 | 06/801,271 | 3/17/87 |
| 4,650,943 | 06/396,413 | 3/17/87 |
| 4,650,958 | 06/781,420 | 3/17/87 |
| 4,650,962 | 06/817,066 | 3/17/87 |
| 4,650,968 | 06/657,484 | 3/17/87 |
| 4,650,979 | 06/308,500 | 3/17/87 |
| 4,650,995 | 06/692,288 | 3/17/87 |
| 4,651,003 | 06/697,047 | 3/17/87 |
| 4,651,010 | 06/617,165 | 3/17/87 |
| 4,651,019 | 06/672,477 | 3/17/87 |
| 4,651,021 | 06/762,434 | 3/17/87 |
| 4,651,023 | 06/739,601 | 3/17/87 |
| 4,651,025 | 06/605,959 | 3/17/87 |
| 4,651,026 | 06/619,666 | 3/17/87 |
| 4,651,052 | 06/754,188 | 3/17/87 |
| 4,651,061 | 06/654,442 | 3/17/87 |
| 4,651,065 | 06/762,880 | 3/17/87 |
| 4,651,076 | 06/741,553 | 3/17/87 |
| 4,651,077 | 06/745,850 | 3/17/87 |
| 4,651,083 | 06/754,863 | 3/17/87 |
| 4,651,093 | 06/577,149 | 3/17/87 |
| 4,651,111 | 06/711,443 | 3/17/87 |
| 4,651,115 | 06/696,735 | 3/17/87 |
| 4,651,123 | 06/638,226 | 3/17/87 |
| 4,651,126 | 06/729,830 | 3/17/87 |
| 4,651,129 | 06/730,354 | 3/17/87 |
| 4,651,135 | 06/585,220 | 3/17/87 |
| 4,651,138 | 06/468,552 | 3/17/87 |
| 4,651,159 | 06/699,309 | 3/17/87 |
| 4,651,185 | 06/723,509 | 3/17/87 |
| 4,651,194 | 06/684,295 | 3/17/87 |
| 4,651,205 | 06/622,600 | 3/17/87 |
| 4,651,219 | 06/729,533 | 3/17/87 |
| 4,651,231 | 06/650,873 | 3/17/87 |
| 4,651,243 | 06/604,872 | 3/17/87 |
| 4,651,246 | 06/742,659 | 3/17/87 |
| 4,651,251 | 06/730,723 | 3/17/87 |
| 4,651,263 | 06/724,094 | 3/17/87 |
| 4,651,301 | 06/620,130 | 3/17/87 |
| 4,651,307 | 06/667,039 | 3/17/87 |
| 4,651,319 | 06/786,491 | 3/17/87 |
| 4,651,326 | 06/873,511 | 3/17/87 |
| 4,651,331 | 06/738,153 | 3/17/87 |
| 4,651,339 | 06/747,268 | 3/17/87 |

---

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

**Re. 33,449**, Re. S. N. 07/680,655, Filed Apr. 2, 1991, Cl. 273/65.ee, HELICALLY GROVED FOAM FOOTBALL, Rod G. Martin, Owner of Record: *Inventor*, Attorney or Agent: Brian D. Ogonowsky, Ex. Gp.: 334

**4,179,532**, Re. S. N. 07/683,569, Filed Apr. 10, 1991, Cl. 360, SYNCHRONIZING SIGNAL DETECTING CIRCUIT, Ken Kutaragi, Owner of Record: *Sony Corp., Tokyo, Japan*, Attorney or Agent: Jay H. Maioli, Ex. Gp.: 233

**4,188,556**, Re. S. N. 07/610,927, Filed May 15, 1984, Cl. 310/268, ELECTRO-MECHANICAL MACHINE WITH PIE-SHAPED COILS ON DISC ROTOR, James H. Hahn, Owner of Record: *Inventor*, Attorney or Agent: Joseph B. Lerch, Ex. Gp.: 212

VOL 1126 ISS 4 MY 28 1991 UMI

**4,664,791**, Re. S. N. 07/549,165, Filed Aug. 13, 1990, Cl. 209/421, PADDING MACHINES, Ray McClain, et al., Owner of Record: *Ray McClain, Inc., Tulsa, Okla.*, Attorney or Agent: Frank J. Catalano, Ex. Gp.: 318

**4,777,984**, Re. S. N. 07/683,494, Filed Apr. 13, 1991, Cl. 138, METHOD FOR LINING A PIPE OR MAIN, Brian W. Storah, Owner of Record: *British Gas Plc., London, England*, Attorney or Agent: Charles L. Gholz, Ex. Gp.: 242

**4,807,527**, Re. S. N. 07/660,535, Filed Feb. 25, 1991, Cl. 101/216, PRINTING MACHINE CYCLINDER HOLDER ARRANGEMENT, Peter Knauer, Owner of Record: *Man Roland Druckmaschinen AG, Offenbach Am Main, Fed. Rep. of Germany*, Attorney or Agent: Stephen H. Frishauf, Ex. Gp.: 337

**4,817,233** Re. S. N. 07/679,588, Filed Apr. 3, 1991, Cl. 15/320, SCRUBBER SQUEEGEES FOR SCRUBBING FORWARD AND BACKWARD, Steven J. A. Waldhauser, Owner of Record: *Tennant Co., Minneapolis, Minn.*, Attorney or Agent: Daniel C. McEachran, Ex. Gp.: 242

**4,883,936** Re. S. N. 07/673,405, Filed Feb. 28, 1991, Cl. 219/10.055, CONTROL OF MICROWAVE INTERACTIVE HEATING BY PATTERNED DEACTIVATION, Patrick L. Maynard, et al., Owner of Record: *James River Corp. of Va., Richmond, Va.*, Attorney or Agent: Charles M. Leedom. Ex. Gp.: 214

**4,912,781**, Re. S. N. 07/685,448, Filed Apr. 15, 1991, Cl. 2/167, CUT RESISTANT YARN CONSTRUCTION AND BODY PROTECTIVE APPAREL, Steven D. Robins, et al., Owner of Record: *Inventor*, Attorney or Agent: W. Thad Adams, Ex. Gp.: 247

**4,958,972** Re. S. N. 07/685,260, Filed Apr. 11, 1991, Cl. 411/387, BREAKABLE COMPOSITE DRILL SCREW, Katsumi Shinjo, Owner of Record: *Yugen Kaisha Shinjoseisakusho, Osaka, Japan*, Attorney or Agent: C. Bruce Hamburg, Ex. Gp.: 358

**4,966,291**, Re. S. N. 07/685,300, Filed Apr. 12, 1991, Cl. 213/071, SLACKLESS ROTARY DRAWBAR ASSEMBLY, Mary A. Glover, Owner of Record: *McConway & Torley Corp., Pittsburg, Pa.*, Attorney or Agent: James O. Ray, Ex. Gp.: 313

---

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

**D. 309,129**, Reexam. No. 90/002,325, Requested Apr. 22, 1991, Cl. D13/149, L-SHAPED ELECTRICAL CONNECTOR, David M. Ottmann, Owner of Record: *Connector Manufacturing Corp., Hamilton, Ohio*, Attorney or Agent: Biebel, French & Nauman, Dayton, Ohio, Ex. Gp.: 293, Requester: Donald F. Frei, Wood, Herron & Evans, Cincinnati, Ohio

**4,300,090**, Reexam. No. 90/002,319, Requested Apr. 12, 1991, Cl. 323/311, DIRECT CURRENT POWER SUPPLY. Harold J. Weber, Owner of Record: *Inventor, Holliston, Mass.*, Attorney or Agent: None, Ex. Gp.: 212, Requester: Russell E. Hattis, Wallenstein, Wagner & Hattis, Chicago, Ill

**4,465,074**, Reexam. No. 90/002,324, Requested Apr. 19, 1991, Cl. 128/639, METHOD OF APPLYING AN ELECTRODE TO THE SKIN OF A PATIENT, Gilbert Buchalter, Owner of Record: *Millburn Marketing Assoc., Millburn, N.J.*, Attorney or Agent: Lawrence I. Lerner, Lerner, David, Littenberg, et al., Westfield, N.J., Ex. Gp.: 335, Requester: Patricia M. Drost, Fitzpatrick, Cella, Harper, et al., New York, N.Y.

**4,477,575**, Reexam. No. 90/002,321, Requested Apr. 18, 1991, Cl. 422/055, PROCESS AND COMPOSITION FOR SEPARATING PLASMA OR SERUM FROM WHOLE BLOOD, Peter Vogel, et al., Owner of Record: *Boehringer Mannheim GmbH, Mannheim-Waldhof, West Germany*, Attorney or Agent: Felfe & Lynch, New York. N. Y., Ex. Gp.: 181, Requester: Home Diagnostics, Inc., Clifton, N. J.

**4,756,101**, Reexam. No. 90/002,326, Requested Apr. 22, 1991, Cl. 037/244, SWING WHEEL SNOWTHROWER, Nathan J. Friberg, et al., Owner of Record: *The Toro Co., Minneapolis, Minn.*, Attorney or Agent: James W. Miller, Minneapolis, Minn, Ex. Gp.: 351, Requester: Owner

**4,816,224**, Reexam. No. 90/002,322, Requested Apr. 18, 1991, Cl. 422/055, DEVICE FOR SEPARATING PLASMA OR SERUM FROM WHOLE BLOOD AND ANALYSIS OF THE SAME, Peter Vogel, et al., Owner of Record: *Boehringer Mannheim GmbH, Mannheim-Waldhof, West Germany*, Attorney or Agent: Felfe & Lynch, New York. N. Y., Ex. Gp.: 181, Requester: Home Diagnostics, Inc., Clifton, N. J.

**4,887,476**, Reexam. No. 90/002,320, Requested Apr. 17, 1991, Cl. 074/7E, SMALL ENGINE PROVIDED WITH SELF STARTING MOTOR, Yukio Yokoyama, Owner of Record: *Tanaka Kogyo Co., Ltd., Chiba, Japan*, Attorney or Agent: Frishaue, Holt, Goodman & Woodward, New York, N. Y., Ex. Gp.: 352, Requester: Birch, Stewart, Kolasch & Birch, Falls Church, Va.

**4,914,372**, Reexam. No. 90/002,323, Requested Apr. 18, 1991, Cl. 320/061, SMALL ENGINE FOR HAND-HELD WORK MACHINES, Shigetoshi Ishida, Owner of Record: *Tanaka Kogyo Co., Ltd., Chiba, Japan*, Attorney or Agent: Frishaue, Holt, Goodman & Woodward, New York, N. Y., Ex. Gp.: 212, Requester: Birch, Stewart, Kolasch & Birch, Falls Church, Va.

**4,974,160**, Reexam. No. 90/002,318, Requested Apr. 12, 1991, Cl. 364/300, MENU SELECTED APPLICATION PROGRAMS CREATED FROM DEFINED MODULES OF CODE, William K. Bane, Owner of Record: *Computer Associates International, Inc., Garden City, N. Y.*, Attorney or Agent: Stephen D. Kahn, New York, N. Y., Ex. Gp.: 236, Requester: Owner

---

## Availability of PatentIn Computer Program Training for Portable Computer Owners

The Patent and Trademark Office (PTO) has developed a computer program, called PatentIn, that will facilitate compliance with the Requirements for Patent Applications containing Nucleotide Sequence and/or Amino Acid Sequence Disclosures (sequence rules: 37 CFR 1.821 through 1.825). (Final rules were published in the Federal Register, 55 Fed. Reg. 18230 (May 1, 1990), and in the Official Gazette, 1114 O.G. (May 15, 1990).)

If there is sufficient demand, one or more one-day training sessions will be held on the use of the PatentIn computer program during the week of June 24-28, 1991. The training would be directed at practitioners who have portable computers capable of running PatentIn. (In order to run PatentIn, the computer must have an MS-DOS operating system, a hard disk with 2 megabytes of available storage, and 550K of available RAM). Electricial power hookups will be provided for portables requiring 120 volt AC power.

The training would be conducted at the PTO in Arlington, Virginia. It would include (1) the use of PatentIn to prepare the sequence listing file of information, and (2) the use of word proccessing software to prepare the PatentIn sequence listing file for inclusion as part of the application papers. Also included would be training on the basic file editing and manipulation skills that may be neccessary for preparing sequence information for importing into PatentIn.

Each session would be limited to 20 participants. Particiapants would be required to have PatentIn installed on their computers prior to the start of the session. Copies of PatentIn may be obtained from the address shown below at a cost of $480 payable

by check to the "Commissioner of Patents and Trademarks" or by charge authorization against an established PTO deposit account.

The charge for the training would be $50. Expressions of interest to attend should be made in writing, addressed to the Commissioner of Patents and Trademarks; Washington, D. C. 20231; Attention: Arthur F. Purcell, Office of the Administrator for Documentation-Crystal Mall 2, Suite 300. Expressions of interest may also be sent via facsimile to 703-557-0668. Respondents should indicate their preferences as to the day of the week on which the training should be held. If sufficient interest is evidenced, one or more sessions will be scheduled and respondents notified. No payment for the training should be made prior to such notification.

Any questions about the sequence rules or this notice should be directed to Arthur F. Purcell, by telephone at (703) 557-0400.

WILLIAM S. LAWSON
*Administrator for Documentation*

---

## Erratum

"All reference to Patent No. 5,009,945 to Tatsuo Takeuchi of Kawasaki, Japan, et al., for 'TRANSPARENT FILM AND COLOR IMAGE FORMING METHOD' appearing in the Official Gazette of Apr. 23, 1991 should be deleted since no patent was granted."

---

## Trademark Trial and Appeal Board "Brown Bag Lunch" Seminars

The Trademark Trial and Appeal Board is inaugurating a series of "brown bag lunch" seminars. The seminars will be informal lunch-time discussions with Trademark Trial and Appeal Board members and interlocutory motions attorneys. In each seminar, Board professionals will provide information on particular areas of Board practice and procedure and will respond to any questions posed by seminar participants.

The first seminar will be held on Tuesday, June 4, 1991, from 12:00-1:30 p.m., in the conference froom (lobby level) of the South Tower Building, 2900 Crystal Drive, Arlington, Va. The Board will discuss Trademark Trial and Appeal Board discovery practice and the prospects for adapting alternative dispute resolution techniques to Board proceedings. Seating is limited to approximately fifty (50). Please call Beth Chapman or Helen Wendel, after May 14, at (703) 308-9300, to reserve a place; and bring a brown bag lunch.

April 26, 1991

J. DAVID SAMS
*Chairman, Trademark Trial and Appeal Board*

## Trademark Automation

The U. S. Patent and Trademark Office (PTO) recognizes that effective and efficient automated trademark systems are of vital importance to successfully conducting the Agency's mission of examining applications for the registration of trademarks. To that end, the PTO is undertaking two programs designed to improve trademark data base quality and the trademark search and retrieval system.

Three separate activities are being planned to improve the trademark automated search and retrieval function. The PTO will implement improvements in the existing T-Search system to the degree that they are technically feasible and cost effective. One major step has already been taken, moving the search software to the PTO's Amdahl 5990 computer, which has resulted in reductions in search times of 20-30% and increased the number of simultaneous users that may be on the system. The PTO is also initiating an internal development project for an interim mark search system which will make maximum use of commercial off-the-shelf software and hardware components. This interim system will be developed based on selected features specififed in the Functional Requirements Document for a replacement search system. If the imterim mark search system provides improved service to users and is cost beneficial, it will be deployed in the trademark operation until a replacement for the existing T-Search system can be procured and installed in the PTO. Finally, the PTO is initiating a formal source selection process to replace the current T-Search system. This will be a contractor developed, government maintained search system meeting all search requirements specified in the Functional Requirements Document. Contractor resources will also be acquired to perform research on advanced search techniques that will be implemented if a technique shows an acceptable return on investment.

The general focus of the data base quality improvement program will be to clean up data that is presently available in trademark data bases, improve data base administration techiques to ensure that data being entered in trademark systems is of high quality, and develop an image file in an industry standard format.

Six specific activities will be undertaken over the next two to three years to accomplish this goal. The PTO will: (1) capture trademark images in CCITT Group IV format for use in the new search system; (2) improve documentation and training related to data entry and text editing work; (3) provide additional edit checks in existing systems to prevent entry of errors; (4) clean up approximately 61,000 potential spelling errors that have been identified in the six million words in the data base; (5) develop automated procedures for the entry of some "pseudomark" information used in T-Search to ensure consistency; and (6) clean up a number of potential errors that have been discovered in the data base using automated data checking techniques.

May 1, 1991

JEFFREY M. SAMUELS
*Assistant Commissioner for Trademarks*

VOL
1126
ISS
4
MY
28
1991
UMI

### Status of PTO Services

The following is an update of the status of PTO services for Apr. 1991:

| Service Item | FY 1990 Goal (Calendar Days )* | Monthly Average (Calendar Days )* |
|---|---|---|
| Filing Receipts: | | |
| Patents | 22 | 18 |
| Trademarks | 30 | 25 |
| Patent/Trademark Copies: | | |
| Special Window Coupons | 24 Hours | 16 Hours |
| Window Coupons | 5 | 2 |
| Mail Coupons | 12 | 6 |
| Letter Orders | 16 | 12 |
| Electronic Ordering Service (EOS) | 11 | 5 |
| Certified Copies: | | |
| Trademark Registrations | 21 | 24 |
| Applications-As-Filed | 17 | 11 |
| File-Wrapper/Contents | N/A | 26 |
| Walk-up Certification | 1 | 1 |
| Patent Application Expedited | 5 | 7 |
| Trademark Search Library: | | |
| Filing Pending Marks | 23 | 23 |
| Filing Reg. Certificates | Issue Date+2 days | On Goal |
| Filing Temp. Drawings | 8 | 14 |
| Assignments: | | |
| Recording Patent-New Applications | 20** | 16 |
| Recording Patent-Mail Room Recpts. | 20 | 15 |
| Return Patents-New Applications | 34** | 36 |
| Return Patents-Mail Room Recpts. | 34 | 35 |
| Recording Trademarks | 20 | 17 |
| Returning Trademark Documents | 34 | 33 |
| Avg. Days from Issue Fee Payment to Issue Date | 90-100 | 111 |
| Issue Fee Receipts Mailed | 4 weeks prior to Issue Date | On Time |
| Patent Copies Available | 95% on Issue Date | 70% on Issue Date + 5 |
| Trademark Copies Available | 95% on Issue Date | 99% on Issue Date |

* Unless otherwise noted.
** Goal reflects the number of days from the date the filing receipt is mailed.

*Service Statistics*•Patent copies available on issue day was less than goal due to start-up problems at the Government Printing Office's new patent printer's plant.

May 3, 1991

THERESA A. BRELSFORD
*Assistant Commissioner for*
*Administration*

---

# PATENT NOTICES

### Certificates of Correction For Week of May 28, 1991

D. 304,075
D. 304,115
D. 308,167
D. 308,585
D 309,026
PP. 4.038
4,542,331
4,738,986
4,740,031
4,743,604
4,759,874
4,774,071
4,775,778
4,778,115
4,786,493
4,808,729
4,818,711
4,825,873
4,827,945
4,832,898
4,833,715
4,838,486
4,841,555
4,843,090
4,845,503
4,846,162
4,847,293
4,848,480
4,850,514
4,851,707
4,852,075
4,853,765
4,853,928
4,855,216
4,857,363
4,857,535
4,858,642
4,859,297
4,860,594
4,861,774
4,861,939
4,863,662
4,864,525
4,864,537
4,865,156
4,866,063
4,868,114
4,868,415
4,868,728
4,869,518
4,870,095
4,871,225
4,872,075
4,872,772
4,872,881
4,873,660
4,874,487
4,877,373
4,878,486
4,878,620
4,879,045
4,879,071
4,879,332
4,879,535
4,879,723
4,880,069
4,880,688
4,880,693
4,883,776
4,884,266
4,885,223
4,887,197
4,887,844
4,887,983
4,888,314
4,889,126
4,889,558
4,889,861
4,890,708
4,891,221
4,891,831
4,893,521
4,893,866
4,895,433
4,895,605
4,895,973
4,897,212
4,897,760
4,898,270
4,898,500
4,898,867
4,899,539
4,899,961
4,900,504
4,901,152
4,901,281
4,901,956
4,902,231
4,902,668
4,903,193
4,903,515
4,903,767
4,903,793
4,903,852
4,903,900
4,903,951
4,904,033
4,904,181
4,904,441
4,904,590
4,906,219
4,906,508
4,906,630
4,906,768
4,906,981
4,908,035
4,908,384
4,909,257
4,909,302
4,909,768
4,910,157
4,910,173
4,910,389
4,910,399
4,910,404
4,911,653
4,911,793
4,911,977
4,912,025
4,912,207
4,912,326
4,912,726
4,912,915
4,913,025
4,913,044
4,913,144
4,913,362
4,913,381
4,914,185
4,914,229
4,915,600
4,916,032
4,916,205
4,916,283
4,917,113
4,917,462
4,917,626
4,917,987
4,918,040
4,918,174
4,918,363
4,919,481
4,919,589
4,920,105
4,920,119
4,920,347
4,921,319
4,922,353
4,923,589
4,925,071
4,925,132
4,926,593
4,926,596
4,926,865
4,927,441
4,928,024
4,929,920
4,951,248
4,955,092
4,957,191

VOL
1126
ISS
4
MY
28
1991
UMI

## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box ____________
Commissioner of Patents and Trademarks
Washington, D.C. 20231

| | |
|---|---|
| Box 3 | Mail for the Office of personel for NFC |
| Box 4 | Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs. |
| Box 5 | "No Fee" mail related to trademarks. |
| Box 6 | Mail for the Office of Procurement |
| Box 7 | Reissue applications for patents involved in litigation and subsequently filed related papers. |
| Box 8 | All papers for the Office of the Solicitor *except* communications relating to *pending litigation*; papers relating to pending litigation shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215 |
| Box 9 | Coupon orders for U.S. patent and trademark copies. |
| Box 10 | Orders for certified copies of patent and trademark applications. |
| Box 11 | Electronic Ordering Service (EOS). |
| Box 12 | Contributions to the Examiner Education Program. |
| Box 13 | Mail for the Employee and Labor Relations Division. |
| Box 14 | Invoices directed to the Office of Finance. |
| Box 15 | Mail for the Advisory Commission on Patent Law Reform. |
| Box 16 | Deposit Account Replenishment Checks |
| Box 171 | Vacancy Announcement Applications. |
| Box AF | Expedited procedure for processing amendments and other responses after final rejection. |
| Box Assignment | All assignment documents except those filed with new applications. |
| Box DD | Mail related to Disclosure Documents. |
| Box EEO | Mail for the Office of Equal Employment Programs. |
| Box FWC | Requests for File Wrapper Continuation Applications (under 37 CFR 1.62) |
| Box Interference | Communications relating to interferences and applications and patents involved in interference. |
| Box Issue Fee | All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee. |
| Box ITU | All intent to use documents, excluding the initial application and amendments to allege use. |
| Box M. Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box Non-Fee-Amendment | Non-fee amendments to patent applications. (Use Box AF for responses after final rejection). |
| Box OED | Mail for the Office of Enrollment and Discipline |
| Box PATENT APPLICATION | New patent application and associated papers and fees. |
| Box TRADEMARK | New trademark application and associated papers and APPLICATION fees. |
| Box Pat. Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Reexam | Requests for Reexamination for *original* request papers *only*. |
| Box Sequence | Submission of diskette for biotechnical application. |
| Box SN | For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application"). |

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Alabama | Auburn University Libraries | (205) 844-1747 |
| | Birmingham Public Library | (205) 226-3680 |
| Alaska | Anchorage: Z. J. Loussac Public Library | (907) 261-2916 |
| Arizona | Tempe: Noble Library, Arizona State University | (602) 965-7607 |
| Arkansas | Little Rock: Arkansas State Library | (501) 682-2053 |
| California | Los Angeles Public Library | (213) 612-3273 |
| | Sacramento: California State Library | (916) 322-4572 |
| | San Diego Public Library | (619) 236-5813 |
| | Sunnyvale Patent Clearinghouse | (408) 730-7290 |
| Colorado | Denver Public Library | (303) 640-8847 |
| Connecticut | New Haven: Science Park Library | (203) 786-5447 |
| Delaware | Newark: University of Delaware Library | (302) 451-2965 |
| Dist. of Columbia | Washington: Howard University Libraries | (202) 806-7252 |
| Florida | Fort Lauderdale: Broward County Main Library | (305) 357-7444 |
| | Miami-Dade Public Library | (305) 375-2665 |
| | Orlando: University of Central Florida Libraries | (407) 823-2562 |
| | Tampa: Tampa Campus Library, University of South Florida | (813) 974-2726 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4508 |
| Hawaii | Honolulu: Hawaii State Public Library System | (808) 586-3477 |
| Idaho | Moscow: University of Idaho Library | (208) 885-6235 |
| Illinois | Chicago Public Library | (312) 269-2865 |
| | Springfield: Illinois State Library | (217) 782-5659 |
| Indiana | Indianapolis-Marion County Public Library | (317) 269-1741 |
| Iowa | Des Moines: State Library of Iowa | (515) 281-4118 |
| Kansas | Wichita: Ablah Library, Wichita State University | (316) 689-3155 |
| Kentucky | Louisville Free Public Library | (502) 561-8617 |
| Louisiana | Baton Rouge: Troy H. Middleton Library, Louisiana State University | (504) 388-2570 |
| Maryland | College Park: Engineering and Physical Sciences Library, University of Maryland | (301) 405-9157 |
| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
| Michigan | Ann Arbor: Engineering Transportation Library, University of Michigan | (313) 764-7494 |
| | Detroit Public Library | (313) 833-1450 |
| Minnesota | Minneapolis Public Library and Information Center | (612) 372-6570 |
| Misssissippi | Jackson: Mississippi Library Commission | Not Yet Operational |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 390 |
| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4281 |
| Nebraska | Lincoln: Engineering Library, University of Nebraska-Lincoln | (402) 472-3411 |
| Nevada | Reno: University of Nevada-Reno Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
| New Jersey | Newark Public Library | (201) 733-7782 |
| | Piscataway: Library of Science and Medicine, Rutgers University | (201) 932-2895 |
| New Mexico | Albuquerque: University of New Mexico General Library | (505) 277-4412 |
| New York | Albany: New York State Library | (518) 473-4636 |
| | Buffalo and Erie County Public Library | (716) 858-7101 |
| | New York Public Library (The Research Libraries) | (212) 714-8529 |
| North Carolina | Raleigh: D.H. Hill Library, North Carolina State University | (919) 737-3280 |
| North Dakota | Grand Forks: Chester Fritz Library, University of North Dakota | (701) 777-4888 |
| Ohio | Cincinnati and Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 292-6175 |
| | Toledo/Lucas County Public Library | (419) 259-5212 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 744-7086 |
| Oregon | Salem: Oregon State Library | (503) 378-4239 |
| Pennsylvania | Philadelphia, The Free Library of | (215) 686-5331 |
| | Pittsburgh, Carnegie Library of | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |

VOL 1126 ISS 4 MY 28 1991 UMI

Reference Collections of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Rhode Island | Providence Public Library | (401) 455-8027 |
| South Carolina | Charleston: Medical University of South Carolina Library | (803) 792-2372 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8876 |
|  | Nashville: Stevenson Science Library, Vanderbilt University | (615) 322-2775 |
| Texas | Austin: McKinney Engineering Library, University of Texas at Austin | (512) 471-1610 |
|  | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-2551 |
|  | Dallas Public Library | (214) 670-1468 |
|  | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext.2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
| Virginia | Richmond: James Branch Cabell Library, Virginia Commonwealth University | (804) 367-1104 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Library, University of Wisconsin Madison | (608) 262-6845 |
|  | Milwaukee Public Library | (414) 278-3247 |

## PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

| PATENT EXAMINING GROUPS | Phone Number Area Code 703 |
|---|---|
| **CHEMICAL EXAMINING GROUPS** |  |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, | 308-0661 |
| AND ENGINEERING, GROUP 110—D. E. TALBERT, Director. | 308-1235 |
| ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director |  |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 | 308-0651 |
| BARRY S. RICHMAN, Director |  |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND | 308-2351 |
| COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 308-0196 |
| BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director |  |
| **ELECTRICAL EXAMINING GROUPS** |  |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. KELLY, | 308-1782 |
| Director | 308-0511 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director |  |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—GERALD GOLDBERG, Director | 308-0754 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—CARLTON CROYLE | 308-0771 |
| Director |  |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, | 308-0956 |
| Director. |  |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 | 308-0962 |
| STEWART LEVY, Acting Director | 308-0511 |
| DESIGN, GROUP 290—ROBERT E. GARRETT, Director |  |
| **MECHANICAL EXAMINING GROUPS** |  |
|  | 308-1113 |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 308-1148 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director |  |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, | 308-0858 |
| GROUP 330—J. J. LOVE, Director | 308-0861 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—JOHN KITTLE, Director |  |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— | 308-0651 |
| A. L. SMITH, Director |  |

---

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

| | |
|---|---|
|  | Numbers 3,800,329 to 3,808,603 inclusive |
| Patents | 3,535 to 3,540 inclusive |
| Plant Patents |  |

VOL
1126
ISS
4
MY
28
1991
UMI

# REEXAMINATIONS

MAY 28, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

### B1 3,892,042 (1474th)
### ELECTRONIC RUN-OUT COMPENSATOR AND METHOD OF ELECTRONICALLY COMPENSATING FOR WOBBLE RUN-OUT IN A ROTATING BODY

**David A. Senften, Florissant, Mo., assignor to Hunter Engineering Co., Bridgeton, Mo.**

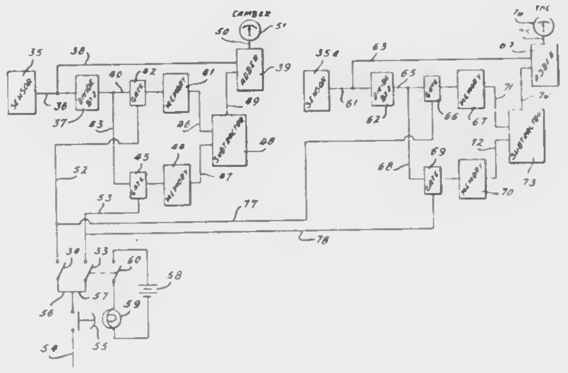
**Reexamination Request No. 90/002,135, Sep. 13, 1990.**

**Reexamination Certificate for Patent No. 3,892,042, issued Jul. 1, 1975, Ser. No. 433,212, Jan. 14, 1974.**

**Claims priority, application United Kingdom, Jan. 31, 1973, 4972/73**

**Int. Cl.⁵ G01B** *11/26*

U.S. Cl. 33—301



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-8** is confirmed.

1. A method for finding the wobble run-out of a rotary body relative to its true axis of rotation, said method consisting in providing a pair of signal generating sensor means sensitive to orientation of the rotary body at 90° to each other, rotating the body into two predetermined positions 180° apart to generate corresponding sensor signals at each said position of the body, said signals being separate and independent and indicative of the body orientation at said predetermined positions, and electronically subtracting the sensor signals corresponding to the positions 180° apart to find the wobble run-out relative to the true axis of rotation, and displaying the sensor signals, corrected by half the difference obtained from said signal subtraction, as an angular relation between the true axis of rotation and the desired axis.

---

### B1 4,453,294 (1475th)
### ENGAGEABLE ARTICLE USING PERMANENT MAGNET

**Tamao Morita, 47-1, 6-chome, Arakawa, Arakawa-ku, Tokyo, Japan 116 , assignor to Tamao Morita, Tokyo, Japan**

**Reexamination Request No. 90/001,475, Mar. 23, 1988.**

**Reexamination Certificate for Patent No. 4,453,294, issued Jun. 12, 1984, Ser. No. 477,838, Mar. 25, 1983.**

**Continuation of Ser. No. 309,762, Oct. 8, 1981, abandoned, which is a continuation of Ser. No. 89,134, Oct. 29, 1979, abandoned**

**Int. Cl.⁵ A44B** *17/00*

U.S. Cl. 24—303

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-4** and **5** is confirmed.

Claim **6** is determined to be patentable as amended.

New claim **7** is added and determined to be patentable.

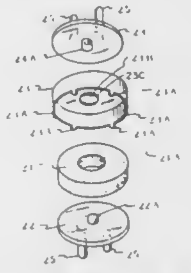
6. A magnetic fastener comprising:

a *circular permanent* magnetic member having a first side and a second side of opposite polarities, a substantially central hole extending between said sides, and a peripheral edge;

a cover member of non-magnetic material configurationally conforming and adjacent to said second side and said peripheral edge of said magnetic member so that it encloses said magnetic member except said first side; a substantially central hole in said cover member coaxial with said hole in said magnetic member, a cylindrical flange on said cover member at said hole therein extending axially into said hole in said magnetic member and in engagement therewith to retain said magnetic member in radially fixed relationship with respect to said cover member;

a first ferromagnetic material member positioned against said first side of said magnetic member, and having at least two prongs rigidly secured thereto and extending outwardly therefrom for attaching said first ferromagnetic member to a first surface;

means for securing edge portions of said first ferromagnetic material member to regions of said cover member of non-magnetic material in the vicinity of said peripheral edge; [and] *said securing means comprising locking tabs on the peripheral edge of said cover member of non-magnetic material, said locking tabs being bent around edge portions of said first ferromagnetic material member to secure said member to said cover member and thereby substantially enclose said magnetic member;*



a second ferromagnetic material member removably positionable against said non-magnetic cover member adjacent said second side comprising:

a base plate adapted to engage said non-magnetic cover, and [an] *a solid* elongated projection extending substantially centrally from said base plate through said [holes in spaced relation to said hole in said magnetic member] *hole in said non-magnetic cover member and said hole in said magnetic member* toward and contacting said first ferromagnetic material member, and a plurality of prongs rigidly secured to said base plate and extending outwardly therefrom for attaching said second ferromagnetic member to a second surface[, said securing means comprising locking tabs on the peripheral edge of said cover member on non-magnetic material, said locking tabs being bent around edge portions of said first ferromagnetic material member to secure said member to said cover member and thereby substantially enclose said magnetic member]*; and*

*said solid elongated projection being sized in width in spaced relation to said hole in said magnetic member and said flange in said non-magnetic cover member so that said projection will not contact the sides of said magnetic member when said second ferromagnetic material member is positioned against said non-magnetic cover member and said projection extends into said hole in said magnetic member, the distance between*

VOL
1126
ISS
4
MY
28
1991
UMI

*the sides of said projection and said magnetic member being such that the magnetic flux from said magnetic member is guided through said solid projection to increase the magnetic attraction between said first and second ferromagnetic material members.*

---

B1 4,657,696 (1476th)

### SCINTILLATION COUNTING MEDIUM AND COUNTING METHOD

**James Thomson, Coalville, England, assignor to Fisons plc**

**Reexamination Request No. 90/001,981, Apr. 2, 1990.**

**Reexamination Certificate for Patent No. 4,657,696, issued Apr. 14, 1987, Ser. No. 776,615, Sep. 16, 1985.**

**Claims priority, application United Kingdom, Sep. 19, 1984, 8423636**

**Int. Cl.$^5$ C09K** *11/06;* **G01T** *1/20*

**U.S. Cl. 252—301.17**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-8** is confirmed.

1. A scintillation medium comprising at least one diisopropylnaphthalene and an additional fluor, wherein said at least one diisopropylnaphthalene is liquid at a temperature of 5° C.

---

B1 4,836,222 (1478th)

### PROCESS FOR TREATING TOBACCO

**Larry J. Livingston, 4768 Hermitage Rd., Virginia Beach, Va. 23455**

**Reexamination Request No. 90/001,968, Mar. 21, 1990.**

**Reexamination Certificate for Patent No. 4,836,222, issued Jun. 6, 1989, Ser. No. 215,522, Jul. 6, 1988.**

**Int. Cl.$^5$ A24B** *15/30*

**U.S. Cl. 131—310**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETEMRINED THAT:

Claim **1** is determined to be patentable as amended.

Claims **2-44**, dependent on an amended claim, are determined to be patentable.

New claim **45** is added and determined to be patentable.

1. A process for coloring tobacco, comprising the steps of:
(a) placing the tobacco within an enclosure containing air;
(b) [exposing the tobacco to ethylene gas in the concentration range of approximately 25-75 parts per million;] *emitting substantially pure ethylene from a cylinder and exposing the tobacco to the substantially pure ethylene in the concentration range of approximately 25-75 ppm;* and
(c) continuously exchanging the air within said enclosure approximately 10-110 times per 24-hour period for a time sufficient to produce the desirable color.

---

# REISSUES

## MAY 28, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Patent Not Issued For This Number**

**Re. 33,594**

---

**Re. 33,595**

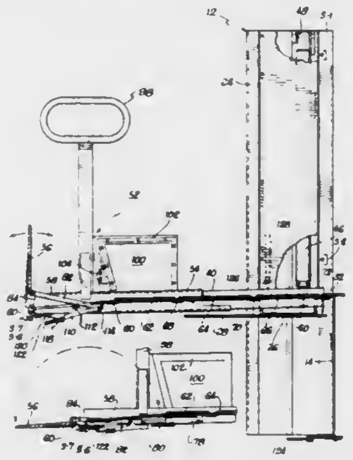
### WHEELCHAIR LIFT

**Donald B. Sullivan, LaJolla, and Graham R. Thorley, Vista, both of Calif., assignors to Hogan Mfg., Inc., Escalon, Calif.**

**Original No. 4,556,128, dated Dec. 3, 1985, Ser. No. 423,930, Sep. 27, 1982. Division of Ser. No. 268,466, May 29, 1981, Pat. No. 4,466,771, which is a continuation-in-part of Ser. No. 41,943, May 24, 1979, Pat. No. 4,251,179, which is a continuation-in-part of Ser. No. 885,714, Mar. 13, 1978, Pat. No. 4,176,999, which is a continuation-in-part of Ser. No. 769,636, Feb. 17, 1977, Pat. No. 4,081,091, which is a continuation-in-part of Ser. No. 606,137, Aug. 20, 1975, Pat. No. 4,027,807. Application for reissue Dec. 2, 1987, Ser. No. 127,777**

**Int. Cl.$^5$ B66B** *9/20*

**U.S. Cl. 187—9 R** **8 Claims**



1. A lift assembly commuting between an upper level and a lower level alternately as a stair or as a vertically adjustable platform, said lift assembly comprising:
(a) an elevator assembly;
(b) a [horizontal extension] *platform* frame for supporting a horizontal extension assembly, said *platform* frame being mounted on said elevator assembly for vertical movements;
(c) a plurality of articulate panels defining said stair and extensible as part of [a] *said* platform;
(d) the panel which is outermost when *said articulate panels are* extended having a safety barrier pivoted substantially at the outer edge thereof [and], *said safety barrier* being pivotal from an inwardly directed mode folded against said outermost panel acting as a [part] *tread* of said [stairs] *stair*, through an upright position effectively deployed as a safety barrier, to an outwardly extended position defining a ramp continuation of said outermost panel; and
wherein said outermost panel is hinged on the edge opposite the edge mounting said safety barrier to a panel acting as [the] *a* riser panel of a step of said stair, and said riser [has a projecting] *panel having an extending* rod [extending] *projecting* down beneath said outermost panel when in said stair mode, and including an actuator rod and a pivotal linkage on said safety barrier such that upon deployment of said panels as a platform, said extending rod forces said actuator rod to pivot said safety barrier into the upright position.

**Re. 33,596**

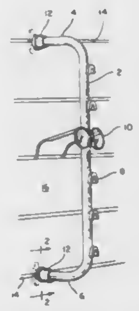
### SUPPORT FOR DISPLAY ITEMS OR THE LIKE

**Jan S. Ennis, Redmond, Wash., assignor to Ennco Display Systems, Inc., Redmond, Wash.**

**Original No. 4,830,203, dated May 16, 1989, Ser. No. 109,059, Oct. 15, 1987. Application for reissue Aug. 29, 1989, Ser. No. 399,903**

**Int. Cl.$^5$ A47H** *1/02*

**U.S. Cl. 211—105.2** **5 Claims**



*4. A display system for spectacle frames or the like, wherein the frames are displayed in arrays, each of said frames resting upon a nose piece secured to a display member, said display member removably secured by a securing device to a slot wall wherein the securing device includes an outwardly open cup member having a bottom for contact with the wall and with a securing element, said securing element having a base which extends through the slot of the slot wall, the securing element being of a T-shape in cross-section having a stem and opposing arm members extending rearwardly from the bottom of the cup member wherein the stem of the securing element is removably fastened to the bottom of the cup and said stem of the securing element is of a length to assure the arm members abut the back of the slot wall when in position and the base member being of a thickness that enables passage through the slot, the arm members being of a first thickness adjacent the stem and of a second lesser thickness at the ends to accommodate variance in wall thickness, said arms of a dimension to enable them to pass through the slot of the slot wall when parallel thereto and to bridge the slot when perpendicular thereto whereby the cup and attached T-shaped securing member can be placed adjacent the wall with the T-shaped securing member extending through the slot, the securing member rotated through 90° and the cup and the subsequently secured display members are thus secured to the slot wall.*

---

**Re. 33,597**

### HIDDEN MARKOV MODEL SPEECH RECOGNITION ARRANGEMENT

**Stephen E. Levinson, 320 N. Chestnut St., Westfield, N.J. 07090; Lawrence R. Rabiner, 58 Sherbrook Dr., and Man M. Sondhi, 75 Appletree Rd., both of Berkeley Heights, N.J. 07922**

**Original No. 4,587,670, dated May 6, 1986, Ser. No. 434,516, Oct. 15, 1982. Application for reissue May 5, 1988, Ser. No. 190,606**

**Int. Cl.$^5$ G10L** *5/00*

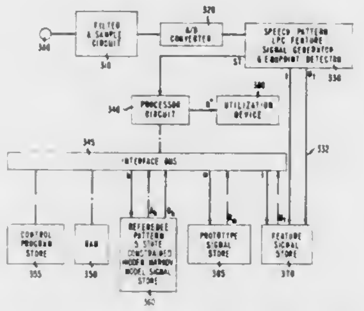
**U.S. Cl. 381—43** **18 Claims**

*16. A speech analyzer for recognizing an utterance as one of a plurality of reference patterns each having a frame sequence of acoustic feature signals comprising:*
*means for storing signals representative of acoustic features of said plurality of reference patterns;*
*means for storing a plurality of templates each representative of an identified spoken reference pattern, the template of each spoken reference pattern comprising signals representative of*

VOL 1126
ISS 4
MY 28 1991
UMI

*a first state, a last state and preselected number N—2 intermediate states between said first and last states of a constrained hidden Markov model of said spoken reference pattern, N being independent of the number of acoustic feature frames in the acoustic feature frame sequence of the identified spoken reference pattern, a plurality of first type signals each representative of the likelihood of an acoustic feature signal of a reference pattern frame being in a predetermined one of said states, and a plurality of second type signals each representative of the likelihood of a transition from an acoustic feature signal in one of said states to another of said states of said template;*

*means responsive to the utterance for forming a time frame sequence of acoustic feature signals representative of the speech pattern of the utterance;*



*means responsive to said utterance feature signal sequence and said stored acoustic feature signals for selecting a sequence of said feature signals representative of the utterance speech pattern;*

*means jointly responsive to said sequence of feature signals representative of the utterance and the reference pattern template N state constrained hidden Markov model signals for combining said utterance representative sequence of feature signal sequence with said reference pattern N state Markov model template signals to form a third type signal representative of the likelihood of the unknown utterance being the spoken reference pattern; and*

*means responsive to the third type signals for the plurality of reference patterns for generating a signal to identify the utterance as one of the plurality of reference patterns.*

---

Re. 33,598

### FACING CUTTER

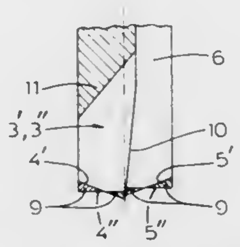
**Roy Bijl, Waalre, Netherlands, assignor to Walker-Hagou B.V., Bladel, Netherlands**

**Original No. 4,758,120, dated Jul. 19, 1988, Ser. No. 3,576, Jan. 15, 1987. Application for reissue Mar. 23, 1990, Ser. No. 501,605**

**Claims priority, application European Pat. Off., Jan. 16, 1986, 86200073.4**

**Int. Cl.⁵ B23B** *41/02, 51/00*

**U.S. Cl. 408—204** **6 Claims**



1. A facing cutter for making annular holes, comprising:

a substantially cylindrical jacket having inner and outer peripheries and a lower end;

a plurality of axial cutting teeth spaced circumferentially at the lower end of said jacket;

each of said cutting teeth having two cutting edges, a radially inner cutting edge and a radially outer cutting edge;

said inner cutting edge extending radially outward from the inner periphery of the jacket;

said outer cutting edge extending radially inward from the outer periphery of the jacket;

the radially outer end of said inner cutting edge being offset circumferentially with respect to the radially inner end of said outer cutting edge;

every other tooth around the circumference of the periphery being of alternately different clearance face configuration, wherein one tooth has a roof-shaped clearance face configuration, the roof-shaped tooth having a crest at the joint between the the inner and outer cutting edges, the next tooth having a flat clearance face configuration;

the axial length for every other tooth being also of alternately different configuration such that the cutting teeth having the roof-shaped clearance face are adapted to cut the central portion of the groove to be formed by the cutting teeth, while the cutting teeth having the flat clearance face are adapted to cut the side portions of the groove to be formed.

---

Re. 33,599

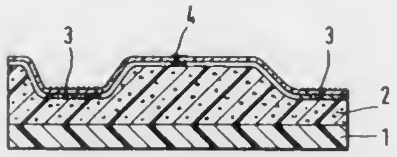
### PROCESS FOR OBTAINING AREAS OF DISTINCTIVE APPEARANCE ON SYNTHETIC COVERINGS AND THE PRODUCT DERIVED THEREFROM

**Jean-Francois Courtoy, Wiltz, and Daniel Marchal, Esch sur Alzette, both of Luxembourg, assignors tn Eurofloor S.A., Luxembourg**

**Original No. 4,608,294, dated Aug. 26, 1986, Ser. No. 603,843, Apr. 25, 1984. Application for reissue Sep. 11, 1987, Ser. No. 96,642**

**Int. Cl.⁵ B05D** *3/06*

**U.S. Cl. 428—141** **40 Claims**



1. A process of obtaining areas of distinctive appearance on a synthetic covering, the covering including a support layer, including the steps of:

depositing at least a first polymeric coating having at least one first polymerization initiator [thereon] *therein* onto a first selected [area] *zone* of said support layer;

depositing at least a second [polymeric] coating having at least one second polymerization initiator therein onto a second selected [area] *zone* of said support layer, said first and second polymerization initiators each being comprised of one of a combination of two initiators which decompose under different spectral conditions, said two initiators comprising two of the three initiators selected from the group consisting of thermal initiators, ultraviolet radiation initiators and ionic initiators, at least a portion of said second [polymeric] coating comprising *a polymeric material including* a crosslinkable monomer, *the deposited coatings defining a synthetic covering;*

pre-gelling said [deposited coatings] *synthetic covering;*

graining *at least* selected areas of said [deposited coatings] *synthetic covering* to form a matted surface;

polymerizing said [first polymeric coating] *synthetic covering in said first zone* via said first initiator wherein said [first polymeric coating] *synthetic covering in said first zone* is fixed to said support layer, and wherein said matted surface on said [first polymeric coating] *synthetic covering in said first zone* is fixed thereon; [and]

gelling [said second polymeric coating] to cause fluidization of said [second polymeric coating] *synthetic covering which has not been fixed by initiation in said first zone* thereby smoothing said matted surface thereon*; and*

*polymerizing said synthetic covering in said second zone via said second initiator wherein said synthetic covering in said second zone is fixed to said support layer.*

---

# PLANT PATENTS

## GRANTED MAY 28, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,532

### PEACH TREE ("SUGAR LADY")

**Chris F. Zaiger, 537 Rosemore Ave.; Gary N. Zaiger, 1907 Elm Ave.; Leith M. Gardner, 1207 Grimes Ave., and Grant G. Zaiger, 2121 Elm Ave., all of Modesto, Calif. 95351**

**Filed Jul. 10, 1989, Ser. No. 377,905**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—42** **1 Claim**

1. A new and distinct variety of peach tree as illustrated and described, characterized by its large size, vigorous, upright growth and a regular and productive bearer of large, firm, white flesh, freestone fruit that have a sub-acid, mild, sweet delicate flavor with very good eating quality; the fruit is further characterized in comparison to the white flesh Giant Babcock Peach (U.S. Plant Pat. No. 1,353) by having a higher degree of red skin color, firmer flesh with greater shipping and storage quality and maturing approximately 21 days earlier.

---

7,533

### FORSYTHIA PLANT NAMED 'FAIRY-LAND'

**Hendrik van de Werken, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.**

**Filed Nov. 16, 1988, Ser. No. 271,665**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinct cultivar of Forsythia named 'Fairy-Land', substantially as shown and described herein.

---

7,534

### 'MINIKIN'

**Hendrik van de Werken, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.**

**Filed Nov. 16, 1988, Ser. No. 271,919**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinct cultivar of Forsythia named 'Minikin', substantially as shown and described herein.

---

7,535

### FORSYTHIA CV. 'LEMON-SCREEN'

**Hendrik van de Werken, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.**

**Filed Nov. 16, 1988, Ser. No. 272,063**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinct cultivar of *Forsythia intermedia* named 'Lemon-Screen' substantially as shown and described herein.

---

7,536

### HEATH PLANT NAMED ROSEMARIE

**Bruno L. Imazio, Watsonville, Calif., assignor to Bay City Flower Co., Half Moon Bay, Calif.**

**Filed Dec. 7, 1989, Ser. No. 447,261**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinct hybrid plant variety of the Ericaceae family substantially as herein show and described.

---

7,537

### *SPIREA JAPONICA* — LISP VARIETY

**Peter Catt, Greatham, Great Britain, assignor to The Conard-Pyle Company, West Grove, Pa.**

**Filed Feb. 12, 1990, Ser. No. 478,528**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinct variety of *Spirea japonica* substantially as illustrated and described and characterized by:

(a) a more compact growth habit than *Spirea japonica* 'Gold Flame'.

(b) the formation of foliage which during the spring exhibits a golden/yellow coloration which persists longer and is more stable than that of *Spirea japonica* 'Gold Flame'.

(c) the exhibition of a profuse flowering habit from approximately May until October when grown at West Grove, Pa., and

(d) the capability of undergoing asexual propagation on a stable and homogenous basis.

---

7,538

### REGAL PELARGONIUM NAMED 'FANTASY'

**Richard Craig, and Leon Glicenstein, both of State College, Pa., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.**

**Filed Jun. 22, 1989, Ser. No. 370,502**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct cultivar of regal Pelargonium substantially as illustrated and described herein, particularly characterized as being compact and self-branching, early flowering and floriferous, and having a maroon blotch fading to a blush pink background on the upper petals and lighter blush pink to near white lower petals.

---

7,539

### PRAIRIE BUFFALOGRASS

**Milton C. Engelke, Richardson, and Virginia G. Lehman, Plano, both of Tex., assignors to Texas A & M University System, College Station, Tex.**

**Filed Dec. 22, 1989, Ser. No. 456,851**

**Int. Cl.⁵ A01H** *5/00*

**U.S. Cl. Plt.—88** **1 Claim**

1. A new and distinct perennial buffalograss cultivar having $2n=40$ chromosomes, substantially as herein shown and described, distinguished by rapidly spreading stolons, competitive growth, short height, durability, frost and drought tolerance, low maintenance requirements, uniform height, color and density, and improved turf performance.

VOL
1126
ISS
4
MY
28
1991
UMI

# PATENTS

## GRANTED MAY 28, 1991

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 51-259 | 5,018,228 |
| 221-222 | 5,018,249 |
| 24-555 | 5,018,260 |
| 29-465 | 5,018,285 |
| 63-012 | 5,018,365 |
| 475-347 | 5,018,402 |
| 106-185 | 5,018,574 |
| 248-311 | 5,018,633 |
| 221-065 | 5,018,644 |
| 299-125 | 5,018,660 |
| 254-266 | 5,018,708 |
| 462-018 | 5,018,766 |
| 415-173 | 5,018,942 |
| 432-116 | 5,018,968 |
| 416-035 | 5,018,006 |
| 475-285 | 5,019,025 |
| 19-128 | 5,019,110 |
| 52-474 | 5,019,111 |
| 53-474 | 5,019,112 |
| 56-295 | 5,019,113 |
| 72-467 | 5,019,114 |
| 82-001 | 5,019,115 |
| 112-121 | 5,019,116 |
| 118-723 | 5,019,117 |
| 123-196 | 5,019,118 |
| 123-500 | 5,019,119 |
| 123-557 | 5,019,120 |
| 128-004 | 5,019,121 |
| 131-194 | 5,019,122 |
| 144-208 | 5,019,123 |
| 206-045 | 5,019,124 |
| 206-532 | 5,019,125 |
| 211-104 | 5,019,126 |
| 222-001 | 5,019,127 |
| 239-661 | 5,019,128 |
| 269-071 | 5,019,129 |
| 210-094 | 5,019,243 |
| 427-096 | 5,019,409 |

VOL
1126
ISS
4
MY
28
1991
UMI

### ERRATA—Continued

| | |
|---|---|
| 436-500 | 5,019,521 |
| 428-220 | 5,019,536 |
| 523-122 | 5,019,601 |
| 428-447 | 5,019,644 |
| 346-140 | 5,019,675 |
| 200-050 | 5,019,676 |
| 307-465 | 5,019,736 |
| 372-031 | 5,019,769 |
| 335-210 | 5,019,863 |

# PATENTS

## GRANTED MAY 28, 1991

## GENERAL AND MECHANICAL

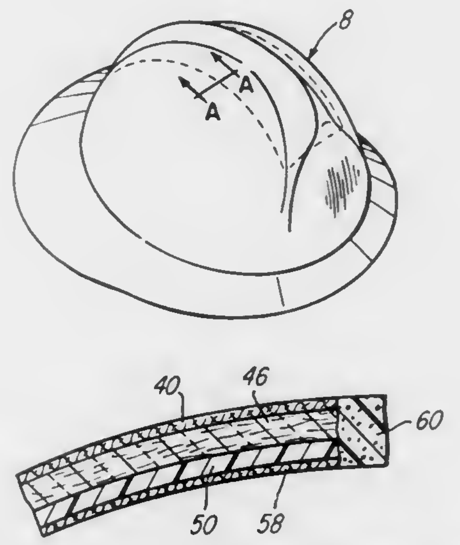
**5,018,220**

### FIREFIGHTER'S HELMET

**Abbott A. Lane, Dayton, and John M. Hetzel, Jr., Kettering, both of Ohio, assignors to Firequip Helmets, Inc., Dayton, Ohio**

**Filed Feb. 23, 1990, Ser. No. 483,645**
**Int. Cl.$^5$ A42B** *3/00*

**U.S. Cl. 2—5** **13 Claims**



1. A method of producing a shell of a firefighter's helmet comprising providing a layer of fine fiber glass type material, covering the layer of fine fiber glass material with a layer of knit cloth material, covering the layer of knit cloth material with a layer of coarse fiber glass type material, covering the layer of coarse fiber glass type material with a layer of fine fiber glass type material, impregnating the layers in a body of polyester resin material, and molding all of the materials into a desired shape of a shell of a firefighter's helmet.

---

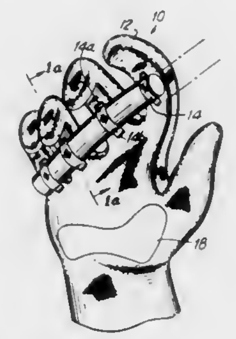
**5,018,221**

### JOINT GUARD

**Joseph G. Romandetto, 1534 Waring Ave., Bronx, N.Y. 10469**

**Filed Apr. 5, 1989, Ser. No. 333,313**
**Int. Cl.$^5$ A41D** *13/08*

**U.S. Cl. 2—16** **10 Claims**



1. A hand guard comprising:

a glove having a front surface, back surface, finger portions, and a thumb portion;

a segment of shock absorbing material having a cylindrical cross section and a length sufficient to span across all of said finger portions;

means for attaching said shock absorbing material to said front surface across said finger portions, such that when said glove is in use, said shock absorbing material covers the middle joint of each of the user's fingers.

---

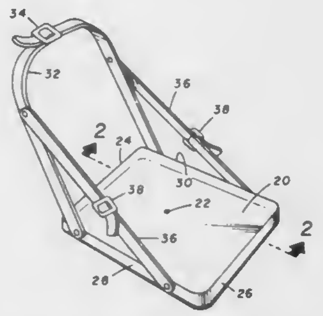
**5,018,222**

### PROTECTIVE SHIELD

**Loren A. Hazelbaker, 104 Tunnel Rd., Milton, Fla. 32571**

**Continuation-in-part of Ser. No. 500,959, Mar. 29, 1990. This application Sep. 24, 1990, Ser. No. 587,772**
**Int. Cl.$^5$ A41B** *13/10*

**U.S. Cl. 2—49 A** **7 Claims**



1. A protective device for use by a person changing diapers of a male infant, said person having a body comprising a head, a face, a trapezius region, and a torso, said device comprising:

a. a substantially transparent shield having a major central region, a proximal end edge region, a distal end edge region, and first and second lateral edge regions, said shield having a center of gravity intermediate said proximal and distal end edge regions; and

b. suspension means for suspending said shield from said trapezius region whereby said shield is supported between said infant and said face.

---

**5,018,223**

### NON-FOGGING GOGGLES

**Chris R. Dawson; Gerald R. Parks, and John Dondero, all of Chula Vista, Calif., assignors to John R. Gregory, Chula Vista, Calif.**

**Continuation-in-part of Ser. No. 410,041, Sep. 20, 1989, abandoned. This application May 7, 1990, Ser. No. 519,911**
**Int. Cl.$^5$ A61F** *9/02*

**U.S. Cl. 2—436** **3 Claims**

1. Goggles adapted for use in cold weather which comprise:

a lens assembly;

an elastomeric pliable frame having ventilating apertures therethrough, said frame peripherally mounting said lens assembly, wherein said lens assembly comprises:

a first lens having an outer face exposed to ambient air and an opposite inner face;

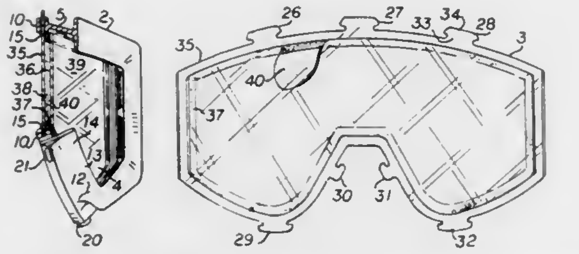
a heat-reflective, semi-transparent coating applied to said inner face;

a heat-conductive second lens inwardly parallel and spaced-apart from said first lens, said second lens being devoid of any reflective coating;

a peripheral spacing seal hermetically closing an interstice between said first and second lenses, and

VOL 1126
ISS 4
MY 28 1991
UMI

wherein said first lens has a peripheral margin extending beyond the edges of the second lens; and



said frame having a peripheral groove shaped and dimensioned to engage said margin.

---

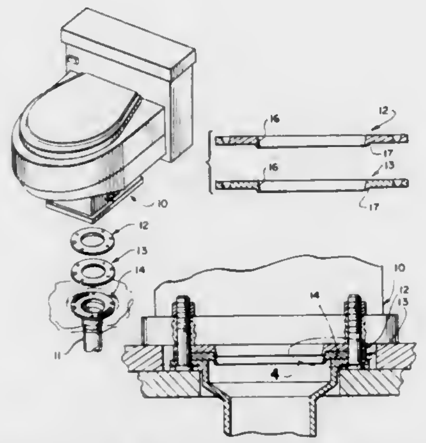
### 5,018,224
### STACKABLE SOIL PIPE SPACER FLANGE

**B. Eugene Hodges, 761 Palmer Dr., Greenville, Mich. 48838**

**Filed Dec. 18, 1989, Ser. No. 451,638**

**Int. Cl.⁵ E03D** *11/00*

U.S. Cl. 4—252 R 5 Claims



1. A stackable self-aligning and self-sealing spacer for extending a soil pipe flange to floor level to meet a toilet fixture, said spacer being characterized by:

a ring-shaped body sized to cover a soil pipe flange and having spaced fastener openings circumferentially disposed for receiving threaded fastening means to interconnect said soil pipe flange, spacer and toilet fixture,

said body being defined by parallel surfaces intersected by a conical opening corresponding to the inner diameter of the smallest soil pipe flange to be accommodated, said opening having a wide end and a narrow end,

said body including an axially protruding elastically deformable annular collar defining an axial extension of the narrow end of said conical opening, and

said collar having an outer conical surface adapted to be received in wedging self-centering sealing relationship with the conical opening of a second spacer of like construction when the spacers are assembled in stacked relationship about a common axis.

---

### 5,018,225
### APPPARATUS FOR PREVENTING AND HEALING BEDSORES IN LONG-TERM INPATIENTS

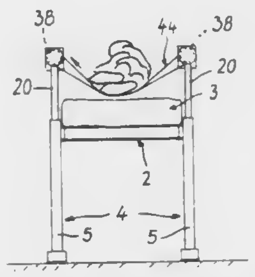
**Bruno Fergni, Pianoro; Giancarlo Venturi, Monzuno, and Carlo Bedogni, Rimini, all of Italy, assignors to Italpres S.n.c. di Frengni Bruno & C., Pianoro, Italy**

**Filed Dec. 18, 1989, Ser. No. 452,550**

**Claims priority, application Italy, Dec. 23, 1988, 3711 A/88**

**Int. Cl.⁵ B61G** *7/00, 7/012*

U.S. Cl. 5—61 1 Claim



1. An apparatus for preventing and curing bedsores, comprising a bed including a bed frame and two pairs of supporting elements, each pair being disposed at a respective side of said frame, and each supporting element comprising a vertical tubular upright fixed to said frame and having a box-like base, a tubular column telescopingly guided inside said tubular upright and provided with an internal female thread, a pair of parallel fabric traction rollers, each roller having coaxial opposite pivots supported for rotation on the top portion of the columns of a respective pair of supporting elements, a piece of fabric closed in a loop around said pair of rollers, means for axially actuating said column and thereby lifting or lowering said pair of rollers with respect to the bed frame, and means for rotating said pair of rollers and moving said piece of fabric wound thereon, said roller lifting and lowering means comprising for each column a threaded rod coaxially extending inside each columns engaging said female thread and rotatably supported in said base, a toothed pulley keyed onto said rod inside said base, an electric motor flanged on said base and having a toothed pinion inside said base, and a toothed belt wound in a loop about said toothed pulley and pinion, and said means for rotating each roller comprising a box-like body articulated to the top portion of a column of each pair, a tang rotatably supported inside said box-like body and coaxially to said roller and an electric motor flanged onto said box-like body and driving said tang, said tang comprising a cup-like portion having a recess for prismatic engagement with a pivot of said roller, said prismatic engagement being defined by a dowel extending transversely through said pivot and engaging slots formed in the edge of said cup-portion.

---

### 5,018,226
### APPARATUS AND METHOD FOR TRANSPORTING AN INJURED PERSON

**Eric Davies, deceased, late of Surrey, Canada by William P. Williams, executor , and Ian R. McAllister, Vancouver, Canada, assignors to William Price Williams, Surrey, Canada**

**Filed Aug. 19, 1988, Ser. No. 234,422**

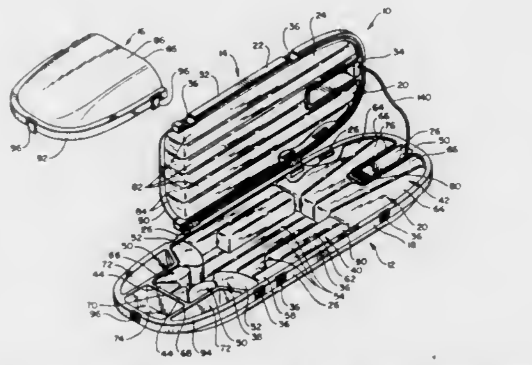
**Int. Cl.⁵ A61G** *1/00*

U.S. Cl. 5—82 R 26 Claims

1. A transport unit particularly adapted to contain an injured person in a manner that the person can be transported with relative comfort and safety, said unit comprising:

a. a substantially rigid containing structure having at least front, back and side walls defining a containing chamber for the person and substantially surrounding the containing chamber;

b. an inflatable locating and cushioning means positioned within said structure and having a first preliminary receiving configuration where the locating and cushioning means defines a containing region which corresponds to a configuration of the person's body, and into which said person is able to be placed, said locating and cushioning means also having a second inflated engaging and locating configuration where the locating and cushioning means is more inflated to engage the person, with the locating and cushioning means having supporting surface means arranged to engage, and to conform to, substantial surface areas of the person's body to provide in the second configuration locating support for the person's body within the structure, said locating and cushioning means comprising a plurality of separately inflatable cushion portions;



c. said unit being characterized in that the locating and cushioning means is located within the containing structure so that vertical and lateral force loads exerted by the person'body are reacted essentially as compressive forces int he locating and cushioning means, with these forces in turn being transmitted to adjacent portions of the containing structure,

d. selectively operable inflating means operatively connected to said locating and cushioning means in said containing structure and operable to cause selected inflation of at least some of said cushion portions separately so that said locating and cushioning means can be moved from the first configuration to the second inflated engaging configuration while the person is in the containing region, and degree of inflation and pressure of said cushion portions can be controlled

whereby the person's body remains contained, positioned and supported within said unit, without imposing excessive localized force loads on the person's body.

---

### 5,018,227
### PORTABLE INSULATED TENT—COT

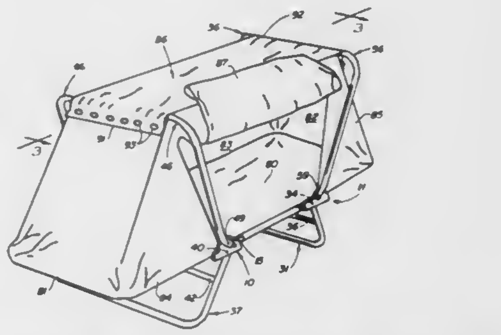
**Michael A. Canfield, 10418 N. 48th Pl., Phoenix, Ariz. 85028**

**Filed Nov. 21, 1989, Ser. No. 439,875**

**Int. Cl.⁵ A47C** *17/64*

U.S. Cl. 5—113 10 Claims

1. A bed including
(a) bedding means defining a surface for an individual to recline on;
(b) pliable tent means at least partially covering said bedding means;
(c) frame means for supporting said bedding means and tent means above the ground and including
  (i) first and second spaced apart legs, each of said legs having an upper end and a lower ground contacting end,
  (ii) a U-shaped upright tent support having a first and second lower ends and supporting a portion of said tent means above and spaced apart from said bedding means,
  (iii) a U-shaped outrigger member having first and second bottom ends,
  (iv) a first unitary hinge member connected to one of said upper ends and having
    a first vertically oriented slot extending through said hinge member,
    a first pin slidably carried in said slot for vertical displacement along said slot between first and second operative positions, said pin extending through and outwardly from said hinge member and connected to
      one of said lower ends, and
      one of said bottom ends,
    such that
      said tent support and said outrigger member are interconnected by said pin,
      said outrigger member can be pivoted with respect to said first hinge member simultaneously with or independently of said tent support, and
      when said pin is moved from said first to said second operative position, said one of said lower ends and said one of said bottom ends are simultaneously vertically displaced with said pin,



  (v) a second unitary hinge member spaced apart from said first unitary hinge member and connected to the other of said upper ends and including
    a second vertically oriented slot extending through said hinge member,
    a second pin slidably carried in said slot for vertical displacement along said slot between first and second operative positions, said pin extending through and outwardly from said hinge member and connected to
      the other of said lower ends, and
      the other of said bottom ends,
    such that
      said tent support and said outrigger member are interconnected by said second pin,
      said outrigger member can be pivoted with respect to said second hinge member simultaneously with or independently of said tent support, and
      when said pin is moved from said first to said second operative position, said other of said lower ends and said other of said bottom ends are simultaneously vertically displaced with said pin.

---

### 5,018,228
### BRAKE LATHE WITH HAND-HELD GRINDER AND METHOD OF GRINDING

**Leo C. Bogaerts, Antioch, and David Cattapan, Mount Prospect, both of Ill., assignors to Ammco Tools, Inc., North Chicago, Ill.**

**Filed Feb. 2, 1987, Ser. No. 9,915**

**Int. Cl.⁵ B24B** *23/00*

U.S. Cl. 51—259 3 Claims

1. Apparatus for grinding for the planar braking surfaces of a brake disc mounted for rotation on the spindle of a lathe, comprising in combination
  a hand-held grinder attachment having
    a housing,

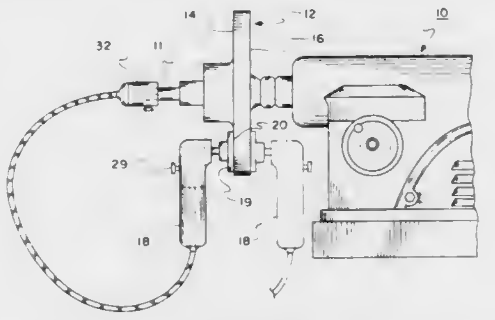
VOL
1126
ISS
4
MY
28
1991
UMI

a transmission mounted in said housing,

said transmission having a rotatable input and a rotatable output, and

an abrasive grinding disc mounted to said output,

a flexible drive cable connected at one end to said rotatable input of said transmission, and

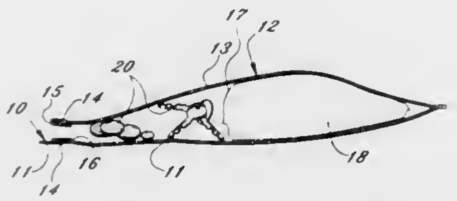


cooperable means provided respectively at the other end of said flexible drive cable and at the distal end of said spindle coupling said drive cable t said spindle for rotation of said cable in unison with said spindle.

---

### 5,018,229
### POCKETED BEACH TOWEL

Douglas E. Eberhart, P.O. Box 2331, N. Canton, Ohio 44720
Continuation-in-part of Ser. No. 103,379, Oct. 1, 1987, abandoned. This application Apr. 3, 1990, Ser. No. 504,614
Int. Cl.$^5$ A47G *9/06*
U.S. Cl. 5—417 4 Claims

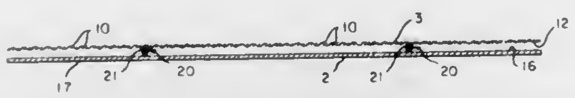


1. In a pocketed towel having a towel fabric of rectangular configuration and a pocket fabric of triangular configuration attached in overlying relation along two of its edges to underlying corner edges of the rectangular towel fabric to define a pocket at a corner of the rectangular towel fabric; the improvement comprising a removable packaged weight shaped and sized to fit in the pocket and cause the pocket fabric to bulge outwardly from the towel fabric to form camouflaged space within the pocket for personal effects, and camouflaged separable fastener means releasably attaching the remaining edge of the triangularly shaped pocket fabric to the towel fabric in simulation of a permanent closure, whereby the camouflaged space is available for personal effects to be hidden in the pocket when the towel is in use.

---

### 5,018,230
### SANDLESS BEACH BLANKETS

Paul Steberger, 961 Treetops, Wharton, N.J. 07885
Filed Apr. 12, 1990, Ser. No. 508,165
Int. Cl.$^5$ A47G *9/06*
U.S. Cl. 5—420 25 Claims



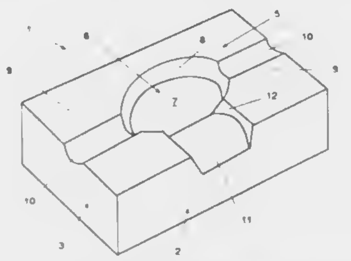
1. A blanket or towel of a size adapted to support a substantial portion of a seated or laying user, primarily intended for use on sandy surfaces comprised of:

a lower layer, and an upper separate and unattached fabric layer which is placed on top of said lower layer and which said upper layer contains a plurality of openings of a size substantially larger than grains of sand, which penetrate from the upper surface through said upper layer through to the upper surface of said lower layer whereby sand which is brought on to the top surface of the blanket or towel passes through the openings in the upper layer and accumulates between the upper and lower layers to prevent sand from coming into contact with the user.

---

### 5,018,231
### NECK GUARD PILLOW

Jason Wang, 2245 Watt St., Reno, Nev. 89509
Filed Aug. 27, 1990, Ser. No. 572,772
Int. Cl.$^5$ A47G *9/00*
U.S. Cl. 5—436 4 Claims



1. A pillow for resting one's head and neck in a plurality of resting positions, comprising:

a body, said body comprising six relatively planar sides along three orthogonal directions, said body having a length, width and depth corresponding to said three orthogonal directions;

a first planar side comprising a top panel of said body, said top panel having a central depression and a pair of elevated portions on either side of said depression;

a second planar side comprising a front panel of said body, said front panel having a ridge along an intermediate portion of the length of said front panel, said ridge having a depth less than the depth of said body;

wherein, said depression supports one's head and said ridge supports one's neck when lying on one's back and one of said elevated portions supports one's head when lying on one's side;

side central depression having an elliptically shaped base and a continuous upwardly sloping side wall, said base having a depth less than the depth of said ridge support;

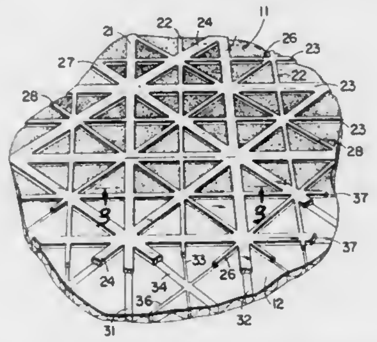
the long dimension of said elliptical base lies in a line with the length of said body and the short dimension of said elliptical base lies in a line with the width of said body.

---

### 5,018,232
### COVER

Terrance W. Sachetti, 5930 W. Broadway #9, Crystal, Minn. 55428
Continuation-in-part of Ser. No. 223,424, Jul. 25, 1988, Pat. No. 4,894,101, which is a division of Ser. No. 934,462, Nov. 24, 1986, Pat. No. 4,759,090. This application Nov. 17, 1989, Ser. No. 437,625
Int. Cl.$^5$ A47G *9/02*
U.S. Cl. 5—482 59 Claims

53. A cover comprising: a member having a surface, first means of phosphorescent material anchored to said surface whereby when the member is subjected to a light environment and subsequently to a darkened environment the phosphorescent material emits light, and second means of fluorescent material spaced from the first means attached to said surface

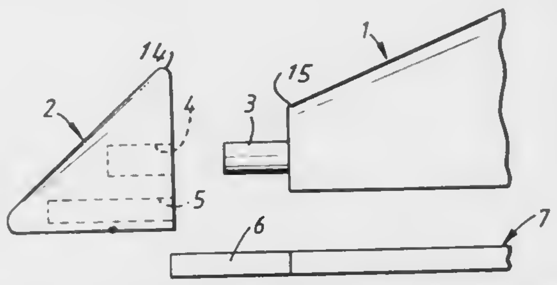


operable to reflect visible light when subjected to light in the ultra violet wavelength range.

---

### 5,018,233
### LAST

Adam P. M. Waterfield, Kettering; Norman R. Waterfield, Wellingborough; David A. Chapman, Rushden; Thomas K. Andrews, Little Billing, and Brian Humphrey, Kettering, all of England, assignors to Geo. J. Cox Ltd., Wellingborough, United Kingdom
Filed Jun. 29, 1989, Ser. No. 372,842
Claims priority, application United Kingdom, Jun. 30, 1988, 8815560
Int. Cl.$^5$ A43D *3/00*
U.S. Cl. 12—133 B 6 Claims



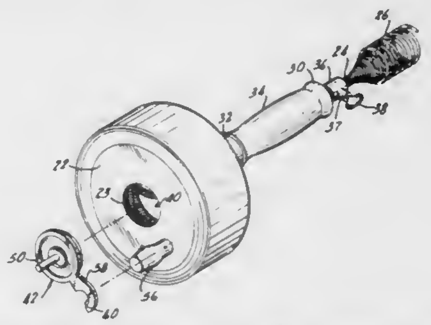
1. A last comprising a main body portion and a toe portion, means for releasably connecting together said portions prior to and during lasting, said releasable connecting means being constructed and arranged to enable said main body portion to be separated from said toe portion while still within lasted footwear following lasting thereof on said last, and the main portion to be withdrawn from said lasted footwear while said toe portion remains in its lasting position within said footwear, said toe portion having an upper surface, at least at an area of connection of said portions, extending above an upper surface of an adjacent part of the main body portion.

---

### 5,018,234
### DRAIN AUGER

Fred J. Meyer, 19711 NE. 21 Ct., North Miami Beach, Fla. 33179, and Samuel L. Jacks, 15811 Collins Ave. #226, North Miami Beach, Fla. 33160
Filed May 29, 1990, Ser. No. 530,196
Int. Cl.$^5$ B08B *9/02*
U.S. Cl. 15—104.33 8 Claims

1. A container for a drain cleaning plumbing tool having an essentially cylindrical storage chamber of relatively large cross-section for storing a flexible coiled plumber's snake therewithin; an elongated, essentially cylindrical passage of less cross-section than said storage chamber integral with and extending axially forward of said storage chamber for positioning a selected length of said snake extending from said storage chamber therethrough; locking means associated with a wall of said passage to fix a selected length of said snake that extends beyond a forward end of said passage, said storage chamber having a rear wall with a central aperture and a handle extending axially rearwardly of said rear wall in radially spaced relation to said central aperture, characterized by a unitary closure member constructed and arranged to close said central aperture and to make bearing contact with a portion of said rear wall surrounding said central aperture, a drive rod integral with and extending axially rearward from said unitary closure member for connection to a chuck for a drill to form an axis of rotation, said drive rod having an axially forward portion constructed and arranged to form a rigid integral structure with said unitary closure member, a radial arm integral with

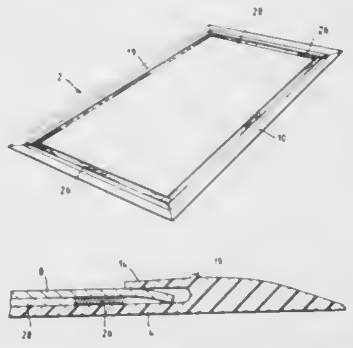


said closure member extending radially outward from said closure member axially rearward of said rear wall to form a lever arm terminating in a hook member constructed and arranged to engage said handle remote from an axis of rotation when said drive rod engages said chuck of said drill that is rotated, whereby said storage chamber, said passage and said snake are rotated in unison from a drive connection that includes a moment of force through said lever arm, said hook member and said handle remote from said drive rod about said axis of rotation, thereby reducing the likelihood of breakage between said drive rod and said closure member compared to breakage experienced when the entire mass of said storage chamber, said passage and said snake is caused to rotate from driving engagement means adjacent said rotation axis.

---

### 5,018,235
### MAT HOLDER

Paul O. Stamatiou, Walderslade, and Christopher R. Stevens, Maidstone, both of Great Britain, assignors to Kimberly-Clark Corporation, Neenab, Wis.
Filed Sep. 12, 1989, Ser. No. 406,337
Claims priority, application United Kingdom, Sep. 13, 1988, 8821407
Int. Cl.$^5$ B32B *3/00*
U.S. Cl. 15—215 8 Claims



1. A holder for a flexible mat, said holder comprising a base upon which the mat rests, said base having corners and an integral upwardly extending wall about its periphery, said wall having an integral lip with a tapered edge forming a recess

VOL 1126
ISS 4
MY 28 1991
UMI

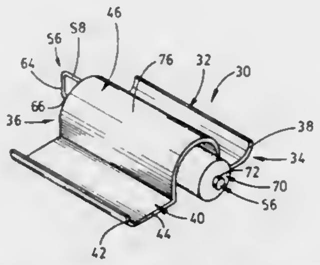
channel dimensioned so as to receive edge portions of a correspondingly shaped mat, said wall having raised ridge means provided on the upper surface of the wall extending around the holder and in vertical alignment with the edge of said recess to act as a guide for correct placement of said mat in the holder, means to hold the edge portion of the mat in place, and slits provided within the lip from the free edge of the lip to said upwardly extended wall to facilitate placement of the mat material within said channel.

---

**5,018,236**

## ROLLER-TYPE PAINT APPLICATOR

**Martin Feldman, 88 Barnes St., Long Beach, N.Y. 11561**
**Filed Apr. 19, 1990, Ser. No. 511,258**
**Int. Cl.$^5$ B05C** *17/02*
**U.S. Cl. 15—230.11** **1 Claim**



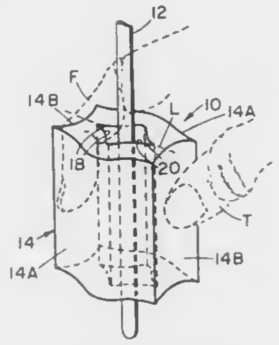
1. A roller-type paint applicator comprising:
- (A) a monolithic housing which includes
  - (1) two L-shaped wing sections each having a short leg and a long leg, first and second ends, with said wing section long legs being coplanar with each other and which extend toward each other and are both interposed between said short legs, and
  - (2) a semicylindrical central section having a longituidinal centerline located intermediate to said short legs and said long legs and having two side edges each of which is connected to one of said long legs and first and second ends which are coplanar with said wing section first and second ends;
- (B) a plurality of arcuate support bands embedded in said central section and being spaced apart from each other along said central section longitudinal centerline; and
- (C) a monolithic J-shaped roller support element which includes
  - (1) a short leg attached to said central housing by being interposed between said support bands and said central housing and having one leg that extends beyond one of said central ends, said short leg extending along said longitudinal centerline,
  - (2) a bight section having one end attached to said short leg and extending from said short leg toward the plane containing said wing section long legs, and
  - (3) a long leg extending along said central section longitudinal centerline and having one end connected to said bight section and having another end spaced outwardly of said central section beyond the other end of said central section, said long leg being spaced above the plane containing said wing section long legs; and
- (D) a paint roller applicator mounted on said roller support long leg, said roller applicator being sized to extend outwardly of said central section below the plane containing the wing section long legs and to be spaced from said central section.

---

**5,018,237**

## DIPSTICK WIPE-OFF TOOL

**Charles R. Valley, 1309 Redbud Dr., Fairborn, Ohio 45324**
**Filed Mar. 1, 1990, Ser. No. 487,405**
**Int. Cl.$^5$ F01M** *11/12*
**U.S. Cl. 15—244.1** **16 Claims**



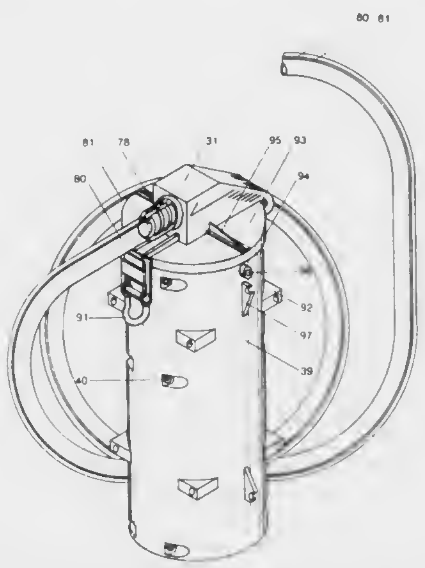
1. A dipstick wipe-off tool, comprising:
- (a) a body composed of an absorbent material;
- (b) said body having an elongated open hole formed by and within said material of said body providing a starting opening extending axially through said body; and
- (c) said body also having at least one slit formed by and within said material of said body, said slit having a normally closed orientation and being narrower than said open hole, said slit extending through said material of said body along one side of said hole and connected with said starting opening provided by said hole such that when said body is squeezed from opposite directions along the line of said slit the starting opening will accurately guide the application of the squeezing force in a way that the slot opens up and the size of said starting opening through said body becomes enlarged as said slit opens up.

---

**5,018,238**

## HAND HELD WAND WITH ON/OFF SWITCH REMOTELY CONNECTED TO MOTOR/FAN

**Joseph A. Nelle, P.O. Box 1183, Del Mar, Calif. 92014-1183**
**Filed May 17, 1989, Ser. No. 353,812**
**Int. Cl.$^5$ A47L** *5/38*
**U.S. Cl. 15—314** **8 Claims**



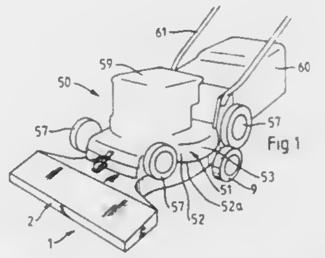
1. An apparatus for clearing a work surface from dust and small debris which comprises:
- an air-sucking assembly having an air inlet;
- a wand substantially commensurate with a pen and other articles which can be held between thumb and index finger of one hand;
- said wand comprising a hollow tubular body having an intake opening at a working tip and an outlet at a proximal end opposite said tip;
- a control switch mounted on the outer surface of said body;
- a flexible conduit connecting said outlet to said air inlet; and
- a suspending ring rotatively attached to said body.

---

**5,018,239**

## MOWER ATTACHMENT

**Milan Dobric, 92 Chandler Road, Noble Park, 3174, Victoria, Australia**
**Filed May 22, 1990, Ser. No. 526,760**
**Claims priority, application Australia, May 26, 1989, PJ4373; Oct. 20, 1989, PJ6940**
**Int. Cl.$^5$ A47L** *9/00*
**U.S. Cl. 15—328** **8 Claims**



1. Apparatus suitable for use with a mower, the mower comprising a housing, a motor driven blade assembly mounted to the housing so as to be disposed adjacent the ground or surface over which the mower travels when in use, the blade assembly being adapted for rotation relative to the housing about a generally upright axis with respect to the ground or surface, the apparatus comprising a main body which includes a side wall which includes a support surface or platform section for receiving a portion of the mower housing when in the mounted position and an upstanding peripheral rim arranged to inhibit lateral movement of the mower when in the mounted position, a cover section which when the attachment is in a mounted position, is arranged so that the cover section and the housing of the mower at least partially encase the blade assembly in a compartment and a head section which is secured to or integral with the cover section, the head section having an intake opening which in use is disposed adjacent and facing the ground or surface, with a transfer passage providing communication between said intake opening and said compartment, the apparatus further including ground engaging wheels operatively connected to said main body so that when the apparatus is in the mounted position the mower is carried on said main body and supported by said ground engaging wheels, said ground engaging wheels are mounted for rotation about a single axis thereby permitting the apparatus to pivot about said axis, the arrangement being such that rotation of the blade assembly causes loose debris on the ground to be drawn through the intake opening and into the compartment via the transfer passage.

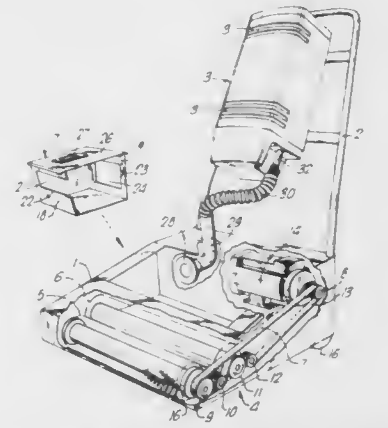
---

**5,018,240**

## CARPET CLEANER

**Andrew P. Holman, Poole, England, assignor to Cimex Limited, Dorset, England**
**Filed Apr. 27, 1990, Ser. No. 515,455**
**Int. Cl.$^5$ A47L** *5/30*
**U.S. Cl. 15—349** **16 Claims**

1. A carpet cleaner comprising:
- a hollow housing capable of being moved across the carpet surface;
- intake means through which dust, dirt, debris, litter and other particulate matter may be ingested;
- air exhaust means;
- brush means in the vicinity of the intake means for brushing up said dust, dirt, debris, litter and other particulate matter from the carpet surface, said brush means comprises a pair of contra-rotating brush rollers wherein one of the rollers rotates at a speed lower than the speed of the other roller, said roller positioned side by side with axes parallel to one another and to the carpet surface and at right angles to the direction of movement of the cleaner, the arrangement being such that when the rollers rotate in use the dust, dirt, debris, litter and other particulate matter passes between the rollers generally upwardly from the carpet surface;



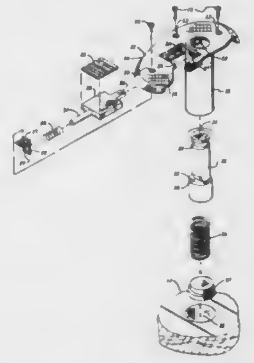
- air flow creation means to induce air to enter through the intake means and exit through the exhaust means;
- accumulation means for accumulating the larger items of debris, litter and other particulate matter entrained in the air flow; and,
- collection means for collecting dust, dirt and other smaller items of particulate matter not accumulated in the accumulation means.

---

**5,018,241**

## FOOT-OPERATED DOOR STOP ASSEMBLY

**Richard M. Baines, 51 Sentry Dr., SE., Cartersville, Ga. 30120**
**Filed Oct. 20, 1989, Ser. No. 424,865**
**Int. Cl.$^5$ E05F** *05/06*
**U.S. Cl. 16—82** **8 Claims**



1. A foot-operated door stop assembly for installation in a vertically disposed hole in a floor on the side to which the door opens, said assembly comprising a cylindrical housing disposed in the hole and having an open upper end, an elevated face plate projecting radially from said cylindrical housing and being adapted to engage the floor surface, a door stopping member disposed in said housing and having upper and lower slot means formed in the outer surface thereof, a latch assembly means spaced outwardly from said stopping member and being horizontally movable for selectively engaging one of said slot

VOL
1126
ISS
4
MY
28
1991
UMI

means for maintaining said door stopping member in a selected position, said latch assembly means being disposed above the level of the floor and below said elevated face plate, said door stopping member being rotatably mounted in said housing for selectively aligning said lower slot means with said latch assembly means and a spring means disposed below said stopping member for urging said member upwardly upon disengagement of said latch assembly means from said upper slot means.

---

### 5,018,242

### SPRING-ACTION HINGE FOR SPECTACLE FRAME

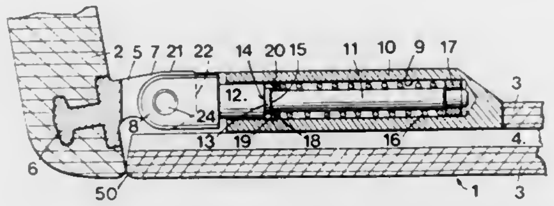
**Gabriel Guy, Vegy-Foncenex, France, and Conrad Zellweger, Chene-Bougeries, Switzerland, assignors to LN Industries S.A.**

**Filed Mar. 28, 1989, Ser. No. 329,643**

**Claims priority, application Switzerland, Apr. 29, 1988, 1608/88**

**Int. Cl.⁵ G02C** *5/22*

**U.S. Cl. 16—228** **5 Claims**



1. In a spring-action hinge for spectacle frame, comprising two hinge elements, one of which is designed to be fixed to the front part of the frame, the other hinge element being connected to a temple by means of an elastic element, comprising a housing extending longitudinally to the temple, a rod-shaped part integral with the hinge element at one end and slidingly mounted in said housing, a compression spring surrounding said rod inside the housing and on the one hand, pressing on a surface integral with the rod, and, on the other hand, pressing on a surface integral with the housing; the improvement wherein the end of the rod, opposite to the end which is integral with the hinge element, has a portion with an engaged straight section to form one of the pressure surfaces, the other pressure surface comprising a part engaged in the housing and made integral with the inner wall of the latter, by deformation of at least one of the part and housing, wherein the inner wall of the housing has a notch in which a portion of said part is engaged, and wherein the inner wall of the housing is circularly cylindrical, the notch being formed by a groove in this inner wall, whereby said part comprises a split elastic ring engaged in said groove and surrounding the rod.

---

### 5,018,243

### VEHICLE DOOR HINGE WITH COMPOUND ROLLER STRUCTURE

**Dennis J. Anspaugh, Osseo, Mich., and John D. Sterbank, Kersey, Pa., assignors to ITT Corporation, New York, N.Y.**

**Filed Oct. 12, 1990, Ser. No. 596,460**

**Int. Cl.⁵ E05D** *11/10*

**U.S. Cl. 16—335** **19 Claims**

1. A hinge assembly for a vehicle having a body and a door comprising;

a first plate adapted to be secured to the body of the vehicle;

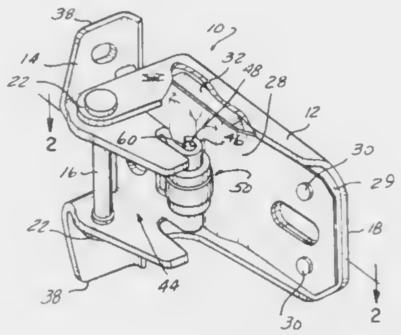
a second plate adapted to be secured to the door of the vehicle;

pin means for pivotally connecting the first plate to the second plate about a first axis;

third plate means secured to one of said first and second plates at one end and having a free end positioned intermediate between said one of said first and second plates and the other of said first and second plates proximate the pin means;

spring means positioned between said third plate means and said one of said first and second plates for biasing said third plate means outwardly from said one of said first and second plates;

a roller member mounted for rotation about a second axis and movable with said other of said first and second plates between a door-closed position and a door-opened position, wherein said roller member is spaced from said third plate means when in said door-closed position, said roller member engageable with said third plate means when moving between said door-opened position and said door-closed position causing deflection of said third plate means against said spring means, said roller member having a hard, rigid spool portion and a flexible, resilient silencer portion, said silencer portion adapted to engage said spool portion such that the spool portion and the silencer portion engage said third plate means when moving between said door-opened and door-closed positions.



---

### 5,018,244

### HINGE DEVICE FOR COUPLING A MEMBER ROTATABLE TO ANOTHER

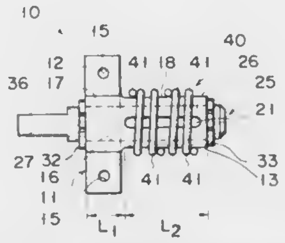
**Isao Hino, Komagane, Japan, assignor to NHK Spring Co., Ltd., Yokohama, Japan**

**Filed Jun. 12, 1990, Ser. No. 536,445**

**Claims priority, application Japan, Jun. 14, 1989, 1-150856**

**Int. Cl.⁵ E05D** *11/08*

**U.S. Cl. 16—342** **15 Claims**



1. A hinge device for coupling a first member rotatably to a second member, said hinge device comprising:

(a) a bearing member to be fastened to said first member, said bearing member comprising:

a base portion; and

a hollow cylindrical portion having an axial through hole having a circular cross section;

said hollow cylindrical portion comprising:

a thick-wall section formed integrally with said base portion; and

a sleeve section having an axis, said sleeve section being coaxial with said thick-wall section, and having an inside diameter substantially the same as that of said thick-wall section and an outside diameter smaller than that of said thick-wall section;

(b) a shaft passing through said axial through hole of said hollow cylindrical portion, said shaft contacting an inner circumferential surface of said hollow cylindrical portion and adapted to be connected at one end to said second member; and

(c) tightening means mounted on said sleeve section of said hollow cylindrical portion for tightening said sleeve section onto a circumferential surface of said shaft.

---

### 5,018,245

### APPARATUS FOR OPENING AND MIXING STAPLE COTTON

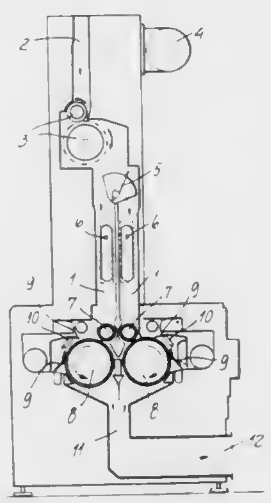
**Pietro B. Marzoli, and Emilio Vezzoli, both of via Durante, 1, Palazzolo Sull'Oglio (BS), Italy**

**Filed Oct. 23, 1989, Ser. No. 425,414**

**Claims priority, application Italy, Jun. 1, 1989, 20723 A/89**

**Int. Cl.⁵ D01G** *13/00*

**U.S. Cl. 19—145.5** **2 Claims**



1. An apparatus for opening and mixing staple cotton comprising two vertical axis staple cotton adjoining chambers, each said chamber having an open top and an open bottom and being supplied with staple cotton to be processed through the top thereof, a staple cotton gripping rotary cylinder arranged at said bottom of each said chamber and a staple cotton entraining and opening rotary cylinder arranged near said gripping rotary cylinder, each said cotton opening cylinder communicating with a vertical manifold in turn communicating with a vacuum duct for discharging processed staple cotton from said apparatus, near each said cotton opening cylinders there being moreover provided a carding plate for carding said staple cotton entrained by each said opening rotary cylinder and downstream of said carding plate, a cleaning blade adapted to remove not spinnable material included in said staple cotton.

---

### 5,018,246

### PASSAGE WIDTH ADJUSTING DEVICE FOR A SLIVER TRUMPET

**Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany**

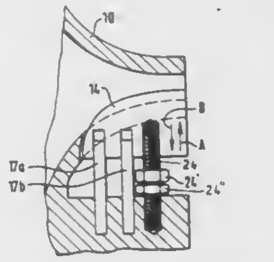
**Filed Apr. 24, 1990, Ser. No. 513,671**

**Claims priority, application Fed. Rep. of Germany, Apr. 25, 1989, 3913548**

**Int. Cl.⁵ D01G** *15/46*

**U.S. Cl. 19—150** **10 Claims**

1. In a sliver producing textile machine including a sliver trumpet having wall means defining a constriction through which the sliver passes; said constriction having a cross-sectional area; and a sensor arranged at said constriction for determining the thickness and irregularities in the sliver passing through said constriction; the improvement wherein said wall means includes a stationary wall portion and a movable wall portion displaceable relative to the stationary wall portion for varying the size of said cross-sectional area; the improvement further comprising support means for linearly movably supporting said movable wall portion in a direction perpendicular to a direction of travel of the sliver.



---

### 5,018,247

### CLEANING MACHINE FOR TEXTILE FIBRES WITH DRUM HAVING REDUCED DIAMETER OVER THE LENGTH

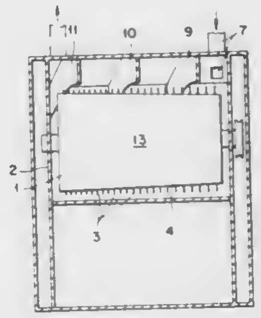
**Ulf Schneider, Winterthur, and René Schmid, Niederneunforn, both of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland**

**Filed Jan. 31, 1990, Ser. No. 472,796**

**Claims priority, application Switzerland, Jan. 31, 1989, 320/89**

**Int. Cl.⁵ D01G** *9/20*

**U.S. Cl. 19—205** **30 Claims**



1. A cleaning machine for textile fibres transported in a delivery air stream, the machine comprising a casing, a horizontal opening roller rotatably supported in the casing, the roller including a roller body and beater rods protruding from a peripheral area of the roller body, grate bars arranged below an underside of the opening roller and an inlet and an outlet for conveying a delivery air stream to and from the opening roller, the inlet and the outlet being arranged at first and second ends, respectively, of the opening roller, the machine further including at least one deflector inclined to an axis of rotation of the opening roller such that the delivery air stream flows around and along the opening roller, the roller body having a diameter which increases from the first end to the second end of the opening roller, the peripheral area of the roller body comprising a continuous surface extending circumferentially around a rotation axis of the roller body.

OL
126
SS
4
MY
28
1991
UMI

**5,018,248**

### DRAFTING APPARATUS WITH AUTOLEVELLING

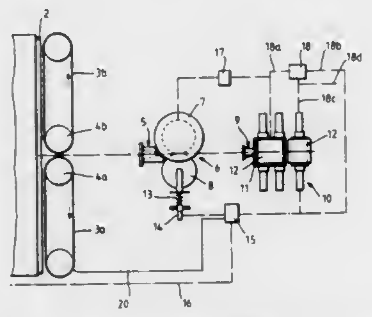
**Walter Haworth, Rossendale, and Alfred Wood, Oldham, both of England, assignors to Hollingsworth (U.K.) Limited, Accrington, United Kingdom**

**Filed Jul. 19, 1989, Ser. No. 382,812**

**Claims priority, application United Kingdom, Aug. 9, 1988, 8818869; Feb. 7, 1989, 8902708**

**Int. Cl.$^5$ D01H** *5/32, 5/42*

**U.S. Cl. 19—240** **11 Claims**



1. Carding apparatus including means converting a carded web into a sliver, and drafting apparatus drafting the converted sliver, said drafting apparatus comprising:
  (a) driven drafting means comprising drafting rollers defining a series of drafting nips;
  (b) an autoleveller for controlling the draft ratio of said driven drafting means, said autoleveller including:
    (ba) a sliver sensing system for encountering the sliver before the drafting nips;
    (bb) means for adjusting the sliver speed at at least one of said drafting nips, for controlling the draft ratio of said drafting nips in response to a signal from said sliver sensing system;
    (bc) adjusting means for adjusting the operating speed of said drafting apparatus;
    (bd) time delay means for ensuring that an appropriate correction drafting adjustment is effected by said draft ratio controlling means when the sensed part of the sliver is passing said at least one drafting nip; and
    (be) means responsive to said adjusting means for varying the time delay effected by said time delay means; wherein:
    (bf) said time delay varying means are responsive to said adjusting means and effective to define a variable time delay as the arithmetic difference of a first component inversely proportional to the operating speed selected and a second component which is a constant.

**5,018,249**

### DEVICE FOR THE EJECTION OF BOXES THROUGH THE EXIT OF A CONTAINER AND A BOX ADAPTED FOR USE IN SUCH A DEVICE

**Nils A. T. Andersson, Järfälla, and Bo S. Lindgren, Spanga, both of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 904,089, Sep. 4, 1986, abandoned, which is a division of Ser. No. 604,279, Apr. 26, 1984, Pat. No. 4,650,092. This application Sep. 3, 1987, Ser. No. 94,048**

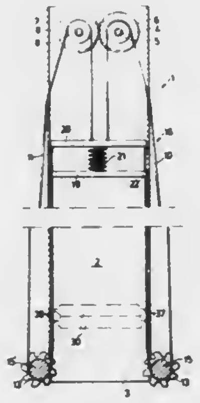
**Claims priority, application Sweden, May 3, 1983, 8302508**

**The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.**

**Int. Cl.$^5$ B65H** *3/32*

**U.S. Cl. 221—222** **11 Claims**

1. An improved apparatus for dispensing packages from a moving container having an opening through which the packages are to be ejected, wherein the improvement comprises a transport mechanism for controllably ejecting the packages indepedently of the orientation of the container with respect to the force of gravity, said transport mechanism including:
  (a) engagement means, for performing an interlocking function, attached to each package;
  (b) indexing means located adjacent to the opening of the container, said indexing means comprising:
    1. engaging means for interlocking with the engagement means of the package closest to the opening, thereby securing the package in place; and
    2. means for controllably moving the engaging means through a predefined cycle causing said engaging means to eject the closest package through the opening with sufficient force to overcome the force of gravity, after interlocking with the engagement means of the next closest package; and
  (c) advancing means coupled to the indexing means for cooperating with said indexing means to positively advance the packages toward the engaging means synchronously with said movement of said engaging means.



**5,018,250**

### FASTENING DEVICE FOR NECKLACES

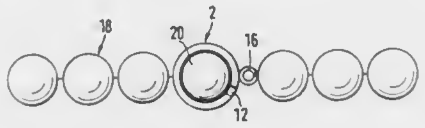
**Hubert E. Schröder, In den Blumentriften 1, D-3320 Salzgitter 1, Fed. Rep. of Germany**

**Filed Feb. 7, 1990, Ser. No. 476,744**

**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1989, 8901609[U]**

**Int. Cl.$^5$ A44C** *5/00*

**U.S. Cl. 24—116 A** **10 Claims**



1. In combination, a fastening device and a jewelry chain, said jewelry chain comprising a main portion and a bead-shaped terminal end member which is attached to said main portion with an intermediate member, said intermediate member having a substantially reduced transverse cross sectional dimension relative to said end member, said fastening device comprising a pair of ring elements and a spacing element, said ring elements each defining a central opening of at least slightly larger diameter than the outer diameter of said end member, said spacing element being received and secured to said ring elements so that said spacing element is operative for rigidly maintaining said ring elements in spaced, substantially parallel, aligned relation and so that said spacing element is interposed between said ring elements without significantly obstructing the central openings defined by said ring elements, one of said ring elements having a slit formed therein adjacent said spacing element for receiving said intermediate member therethrough in order to position the latter between said ring elements so that said end member is received in the openings thereby defined, and connecting means for connecting said ring elements and said spacing element to said jewelry chain at a location remote from said end element.

**5,018,251**

### CABLE ANCHORAGE

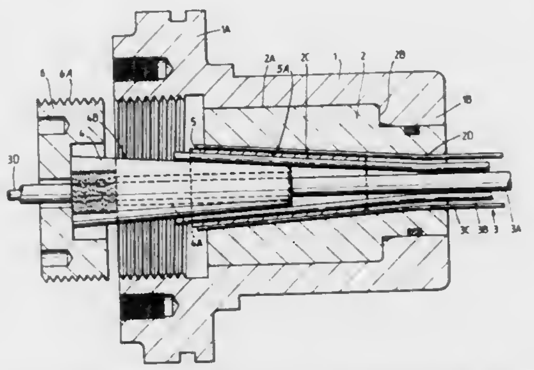
**Charles J. Brown, Harlow, England, assignor to STC PLC, London, England**

**Filed Nov. 9, 1989, Ser. No. 434,796**

**Claims priority, application United Kingdom, Nov. 10, 1988, 8826313**

**Int. Cl.$^5$ H02G** *15/02*

**U.S. Cl. 24—122.6** **11 Claims**



1. A clamp assembly for a wire tensile strength member comprising first and second clamping parts for clamping between them the wire member, means for holding the parts clamped together, at least one of the parts having a clamping surface roughened by grit firmly honed to said surface and harder than the material of the wire member.

**5,018,252**

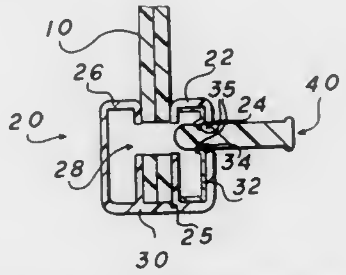
### LOCKING FASTENER

**David O. Butler, 1306 Vermont Ave., Tarpon Springs, Fla. 34689**

**Filed Dec. 4, 1989, Ser. No. 445,270**

**Int. Cl.$^5$ A44B** *21/00*

**U.S. Cl. 24—453** **6 Claims**



1. A locking fastener for fastening fastenable materials or objects comprising, in combination:
  a base portion;
  a first and second projecting portion in spaced relationship from said base portion; and
  a retained locking pin;
  said first projecting portion having an aperture disposed through which said locking pin is retained, a metal insert therein having an aperture with opposed straight, barbs along its upper and lower edges oriented for interlocking engagement with upper and lower surfaces of said locking pin retained in said aperture of said first projecting portion;
  said second projecting portion having an aperture disposed for receiving said interlocking pin retained in said aperture of said first projecting portion;
  said spaced relationship of said first projecting portion and said second projecting portion from said base portion provides an access slot from said fastenable materials or objects;
whereby said locking pin retained in said aperture of said first projecting portion can be inserted into said aperture of said second projecting portion.

**5,018,253**

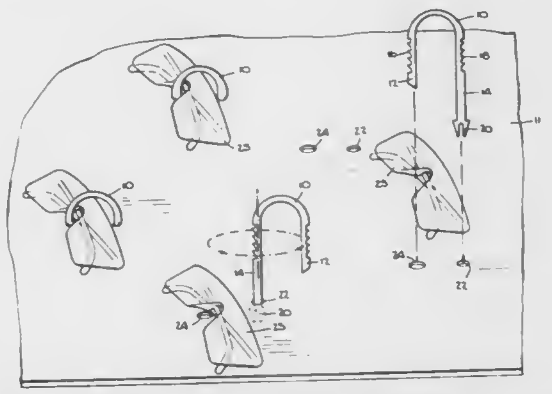
### PILFER-RESISTANT DISPLAY DEVICE

**Henry W. Oppenheimer, Southampton, N.Y., assignor to Ultimate Plastics, Inc., Jamaica, N.Y.**

**Filed Feb. 7, 1989, Ser. No. 307,416**

**Int. Cl.$^5$ A44B** *21/00*

**U.S. Cl. 24—458** **11 Claims**



1. A device for displaying an article comprising:
a support having first and second apertures, said first aperture being smaller than said second aperture;
a U-shaped member having first and second legs received in respective ones of said first and second apertures, said legs each having unidirectional gripping means disposed thereon for engaging sides of said first and second apertures such that said legs can be translated in said apertures in a first direction to secure said article between said legs by a first force applied in the first direction but cannot be moved in a second direction opposite said first direction by an oppositely applied force unless a second force perpendicular to said first force is applied to said legs to bend said legs while applying the force opposite the first force, the first leg being longer than the second leg, said first leg having a deformable head end receivable through the first of said apertures whereby said first leg can be pivoted in the first aperture when said second leg is not received in the second aperture, thereby facilitating placement and removal of the article to be displayed, said deformable head of said first leg being sized such that in its undeformed state, said head has a width greater than the first aperture.

**5,018,254**

### TUG RELEASE CONNECTOR

**Christer Brodin, 104 N. Davis, Belgrade, Mont. 59714**

**Filed Aug. 3, 1990, Ser. No. 562,324**

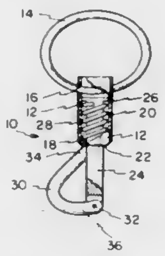
**Int. Cl.$^5$ A44B** *13/00*

**U.S. Cl. 24—601.5** **4 Claims**

1. A tug release connector for holding an item, comprising:
an elongated hollow body member having a longitudinal bore therethrough;
the hollow body member having a concave lip at one end thereof;
a shaft received by the hollow body member and extending outwardly through and beyond the lip;
a resilient means located within the bore and connected between the body member and the shaft to bias the shaft to a partially retracted position within the hollow body member;
a clip having a first and second end, the first end hingedly

VOL
126
SS
4
MY
28
1991
UMI

mounted with a pin to the shaft outside the body member, and the second end sized to be received between the lip and the shaft, whereby when the second end is received between the lip and the shaft, and the resilient means draws the shaft to the retracted position, the clip is closed to hold an item carried by the clip.



---

### 5,018,255

## METHOD AND APPARATUS FOR NEEDLING OF GLASS MAT AND COMPOSITE PRODUCT MADE FROM SAID MAT

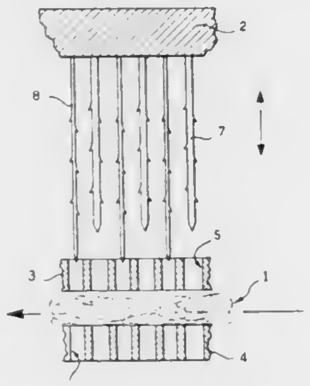
**Robert Bolliand, Ecully, France, assignor to Vetrotex Saint-Gobain S.A., Chambery and Institut Textile de France, Boulogne Billancourt, both of, France**

**Filed Jun. 24, 1988, Ser. No. 211,195**

**Claims priority, application France, Jun. 26, 1987, 87 09064**

**Int. Cl.⁵ D04H** *11/08, 18/00, 5/02, 1/46*

U.S. Cl. 28—107 4 Claims



1. A process for needling a continuous glass filament mat comprising the step of subjecting a same portion of the mat to the simultaneous penetrating action of two sets of barbed needles with different diameters.

---

### 5,018,256

## ARCHITECTURE AND PROCESS FOR INTEGRATING DMD WITH CONTROL CIRCUIT SUBSTRATES

**Larry J. Hornbeck, Van Alstyne, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Jun. 29, 1990, Ser. No. 546,331**

**Int. Cl.⁵ B44C** *1/22;* **H01L** *29/68;* **G02B** *26/08*

U.S. Cl. 29—25.01 4 Claims

1. A method of planarizing an integrated semiconductor substrate for the purpose of constructing thereon an electromechanical device, said method comprising the steps of:

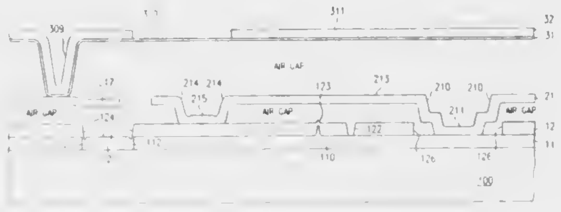
spinning on a first spacer consisting of a planarizing liquid organic material covering said substrate;

patterning and curing said first spacer to form first support posts electrodes of said electromechanical device;

forming said electrodes over said first spacer;

spinning on a second spacer consisting of a planarizing liquid organic material covering said electrodes;

patterning and curing said second spacer to form second support posts for the mechanical portion of said electromechanical device;



establishing on a said second spacer a plurality of mechanical elements supported by said second support posts; and

removing said first and second spacers.

---

### 5,018,257

## MAGNETIC SHEET POLISHING DEVICE

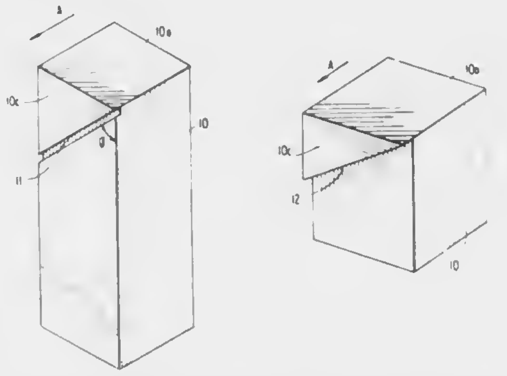
**Yasuo Nagashima; Haruo Soeda; Masamichi Sato, all of Tokyo, and Takashi Kubo, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Division of Ser. No. 398,303, Aug. 24, 1989, Pat. No. 4,976,020, which is a continuation of Ser. No. 110,821, Oct. 21, 1987, abandoned. This application Apr. 5, 1990, Ser. No. 505,087**

**Claims priority, application Japan, Oct. 21, 1986, 61-248280; Oct. 24, 1986, 61-251942**

**Int. Cl.⁵ B24B** *39/06;* **B23B** *27/00*

U.S. Cl. 29—90.01 5 Claims



1. A magnetic sheet polishing device for smoothing the surface of a magnetic sheet, said device comprising:

a rotational drive unit for rotating said magnetic sheet;

a head carriage having a base plate disposed at an end thereof; and

a scraper attached to said base plate for sliding against a surface of magnetic material of a rotating magnetic sheet such that magnetic lumps projecting from said surface of the magnetic material are scraped off, said scraper including a substantially flat sliding surface, a downstream side surface disposed nearly perpendicular with respect to said sliding surface as measured with said scraper, and an upstream side surface, wherein said scraper further includes means for indicating the amount of wear of said sliding surface,

wherein said means for indicating the amount of wear of said sliding surface is a single diagonal groove formed in said downstream side surface and having an opening adjacent to said sliding surface, such that when said sliding surface is worn, said opening of said single diagonal groove is shifted along said sliding surface.

4. A magnetic sheet polishing device for smoothing the surface of a magnetic sheet, said device comprising:

a rotational drive unit for rotating said magnetic sheet;

a heat carriage having a base plate disposed at an end thereof; and

a scraper attached to said base plate for sliding against a surface of magnetic material of a rotating magnetic sheet such that magnetic lumps projecting from said surface of the magnetic material are scraped off, said scraper including a substantially flat sliding surface, a downstream side surface disposed nearly perpendicular with respect to said sliding surface as measured within said scraper, and an upstream side surface, wherein said scraper further includes means for indicating the amount of wear of said sliding surface,

wherein said means for indicating the amount of wear of said sliding surface is a single diagonal step formed on said downstream side surface and having an edge adjacent to said sliding surface, such that when said sliding surface is worn, said edge of said single diagonal step shifts along said sliding surface.

---

### 5,018,258

## SUPPORT SYSTEM FOR A VARIABLE-CROWN ROLL

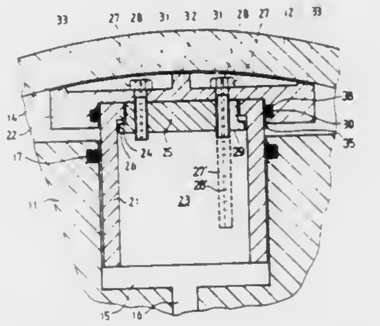
**Juhani Niskanen, Oulansalo, Finland, assignor to Valmet Paper Machinery Inc., Finland**

**Filed Dec. 1, 1989, Ser. No. 444,726**

**Claims priority, application Finland, Dec. 15, 1988, 885801**

**Int. Cl.⁵ B21B** *13/02*

U.S. Cl. 29—116.2 6 Claims



1. A variable crown roll system comprising:

a non-rotating roll axle;

a cylindrical roll mantle enclosing said axle and being rotatable about said axle;

a plurality of hydraulic loading elements enclosed by said mantle and connecting with said axle for positioning said mantle relative to a further roll to define therewith a nip, an axis of rotation of said mantle and an axis of rotation of said further roll defining a plane of the nip; and

wherein each of said hydraulic loading element comprises:

a cylinder bore formed within said axle and having an axis lying in said nip plane;

a piston formed as a cylindrical bushing with an internal cavity and mounted for translation within said cylinder bore;

a guide shoe supported on an outer end of said piston and being free to pivot relative to said piston and to undergo displacement relative to said piston in a radial direction of said mantle;

a seal disposed between said piston and said shoe to provide a hydraulic seal between said piston and said shoe;

lubrication pockets disposed in a surface of said shoe facing an interior surface of said mantle;

capillary bores interconnecting said lubrication pockets with said piston bushing cavity;

a fastening piece secured to said glide shoe and extending into the outer end of said piston bushing for securing said glide shoe to said piston; and

wherein said fastening piece has a radially outwardly extending shoulder;

the outer end of said piston bushing has a radially inwardly extending shoulder of said fastening piece for securing said glide shoe to said piston bushing; and

a gap is disposed between said inwardly and said outwardly extending shoulders to permit relative motion between said piston and said glide shoe; and

wherein said hydraulic loading elements are activated by a hydraulic pressure medium applied to the cavities of respective pistons to urge the respective glide shoes against the interior surface of said mantle, the hydraulic medium passing through the capillary bores into the lubrication pockets to act as hydrostatic lubrication between said shoes and said mantle.

---

### 5,018,259

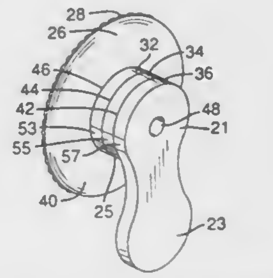
## METHOD OF DESIGN AND MANUFACTURE OF LAMINATED ORTHODONTIC BRACKETS

**Alexander J. Wildman, 2662 Donner Pl., Eugene, Oreg. 97401**

**Filed Sep. 21, 1988, Ser. No. 247,178**

**Int. Cl.⁵ B21F** *43/00;* **A61C** *3/00*

U.S. Cl. 29—160.6 16 Claims



1. A method of designing and fabricating orthodontic brackets, comprising:

defining a three dimensional shape of an orthodontic bracket having a base, a body and an attachment member formed in said body;

segmenting the shape of the bracket along a plurality of spaced-apart surfaces defining at least two laminae, each lamina having a thickness defining one dimension of the bracket body in accordance with the spacing of the surfaces and a peripheral edge face defining a second dimension of the bracket body;

providing at least two layers of metal, each having two opposite major surfaces and a thickness proportional to the spacing of a corresponding one of the laminae;

patterning a boundary onto each layer of metal in accordance with the peripheral edge face of the corresponding lamina;

sectioning each of the layers of metal along the patterned boundary to form layer components, each layer component having a thickness and a peripheral edge face matching the thickness and peripheral edge face of the corresponding lamina;

assembling the layer components in accordance with the segmented shape of the bracket, with their major surfaces in contacting relationship and with their peripheral edge faces in the same relative alignment as the edge faces of the laminae in the segmented shape of the bracket;

fusing the assembled layer components together along said major surfaces; and

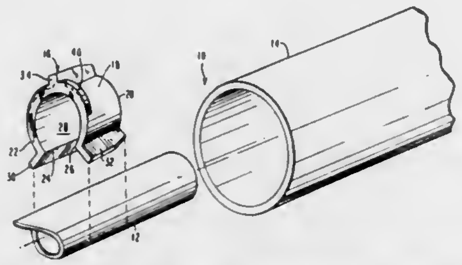
patterning and sectioning steps including masking an area of at least one major surface of each layer of metal within said boundary and selectively chemical etching away metal from the layer in areas exposed around the masked areas.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,260

### SUPPORTS FOR DOUBLE-CONTAINMENT THERMOPLASTIC PIPE ASSEMBLIES

**Christopher G. Ziu, Charlestown, Mass., assignor to Asahi/America, Inc., Medford, Mass.**
**Filed May 26, 1989, Ser. No. 356,700**
**Int. Cl.⁵ F16L** *3/08, 3/13*
**U.S. Cl. 24—555** **1 Claim**



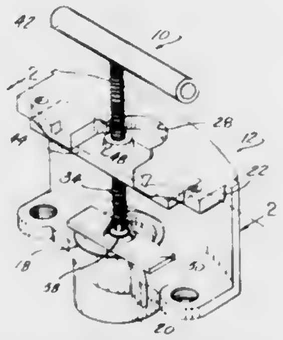
1. A unitarily molded resilient thermoplastic support clip for maintaining an inner carrier pipe in concentric relationship to an outer containment pipe, said support clip comprising a resilient mounting portion defining a section of a cylinder with an inner surface dimensioned for mounting on the carrier pipe, said mounting portion having opposed first and second axial ends and opposed first and second spaced apart longitudinally extending edges, said mounting portion having a reinforcing flange extending outwardly from said second axial end thereof and through an arc of approximately 180° around said mounting portion for preventing overstress of said mounting portion, said reinforcing flange being generally symmetrically disposed on areas of said mounting portion equally spaced from the first and second edges thereof, and a plurality of radially aligned support legs extending unitarily outwardly from the mounting portion to define a major radius for said support clip substantially equal to an inner radius for the outer containment pipe, said plurality of support legs defining at least a first, second and third support legs, said first and second support legs being respectively aligned with the first and second edges of said mounting portion, said resilient mounting portion extending through an arc of approximately 270° such that movement of the first and second support legs against the inner carrier pipe in a direction orthogonal to the longitudinal axis of the inner carrier pipe generates outward deflection of the mounting portion for mounting the support clip to the inner carrier pipe, portions of said support legs in proximity to the first axial end of said mounting portion being tapered to define a minor radius less than the inner radius of the outer containment pipe.

---

### 5,018,261

### PISTON PUSHING TOOL

**Ezaria Y. Markous, 119 S. Laurel, Royal Oak, Mich. 48067**
**Filed Apr. 10, 1990, Ser. No. 507,603**
**Int. Cl.⁵ B23P** *19/04*
**U.S. Cl. 29—239** **4 Claims**



1. A piston pushing tool for use in disc brake assemblies having a caliper housing providing a piston receiving bore in which a piston is reciprocably disposed, the bore being open at one end and closed at its opposite end, and an outboard shoe support bracket spaced axially apart from the open end and having axially outer and inner surfaces and an opening therethrough generally aligned with the bore, the piston being a hollow cylindrical piston with a first and adjacent the closed end of the bore, and a second end adjacent the open end of the bore, the second end being closed and having an axially inner surface and an axially outer surface, the axially outer surface having two peg receiving bores therein, the tool comprising:

a threaded shaft having a distal end, a proximal end, and an intermediate portion, the shaft being porportioned and designed to extend axially through the opening in the support bracket;

means, attached to the proximal end of the shaft, for rotating the shaft,

means, engaged on the intermediate portion of the shaft, for abutting the axially inner surface of the support bracket; and

a second plate for abutting the second end of the piston, the second plate having a first surface and a second surface, the first surface having two pegs attached thereto, the pegs being removably receivable within the peg receiving bores, the second surface being attached to the distal end of the shaft;

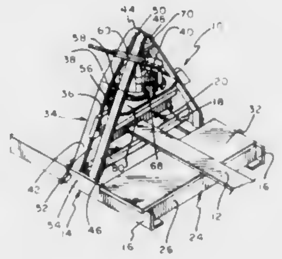
wherein upon rotation of the rotating means, the second plate will be driven away from the axially inner surface abutting means, thereby pushing the piston fully into the piston receiving bore.

---

### 5,018,262

### BELT SPLICING APPARATUS

**Royce Wheatcroft, 333 E. Vine, Dighton, Kans. 67839**
**Filed Oct. 2, 1989, Ser. No. 415,865**
**Int. Cl.⁵ B23P** *11/00*
**U.S. Cl. 29—243.51** **11 Claims**



1. An apparatus for lacing ends of a belt and the like comprising:

(a) a base means for supporting the apparatus for lacing in an upright position;

(b) a first frame structure and a second frame structure, said first and second frame structure each having a top whereat the first and second frame structure connect together to slope down and away from each other such as to provide a generally upright opening and to attach to the base means at a lower extremity of both the first and second frame structure;

(c) a lever means slidably disposed in said upright opening for moving up and down therein;

(d) at least one spring means for biasing the lever means upwardly;

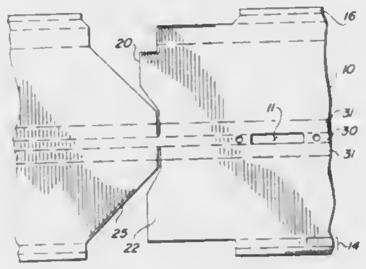
(e) at least one lever support means secured to said first and second frame structure for providing a barrier whereagainst the lever means is lodged by the spring means; and

(f) a means for driving the lever means downwardly towards the base means to contact and close a clipper vise lacer means containing a plurality of clipper hooks such that the clipper hooks are driven and embedded into an end of a belt that has been previously disposed in the clipper vise lacer means.

### 5,018,263

### METHOD FOR MAKING A METAL SCREEN DOOR FRAME

**Melvin J. Stern, 2126 Harbor Way, Ft. Lauderdale, Fla. 33326**
**Filed Oct. 2, 1989, Ser. No. 415,906**
**Int. Cl.⁵ B21D** *35/00*
**U.S. Cl. 29—469.5** **7 Claims**



1. A method of forming a hollow metal door frame comprising the steps of:

a) cutting an elongated continuous flat sheet metal strip;

b) cutting angled miter corners and opposing flaps in longitudinal edges of the strip;

c) rolling the strip to form an essentially rectangular frame stock including crimping and bonding free longitudinal edges of the strip;

d) coating a surface of the miter and flaps with an adhesive; and

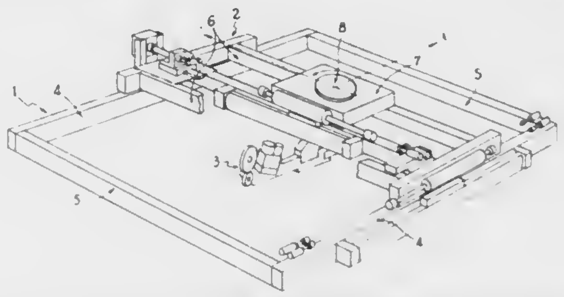
e) bending the frame stock to a right angle at each miter corner including tucking the flaps under the angled miter cuts to therefor form a rectangular door frame.

---

### 5,018,264

### MACHINE FOR FITTING SEALS INTO A GROOVE

**Jean-Jacques Kautt, Strasbourg, France, assignor to Ferco Internatioinal Usine De Ferrures De Batiment, Sarrebourg, France**
**Filed Feb. 21, 1990, Ser. No. 482,718**
**Claims priority, application France, Mar. 9, 1989, 89 03090; Apr. 11, 1989, 89 04735; Nov. 28, 1989, 89 15650**
**Int. Cl.⁵ B23P** *21/00;* **B23Q** *15/00*
**U.S. Cl. 29—564.8** **24 Claims**



1. A machine for automatically fitting a seal into a groove in a window opening frame comprising:

a framework;

frame feed means for feeding frames to be fitted with said seal to support means for supporting said frames in the vicinity of the framework;

means for determining characteristics and dimensions of a frame fed by the frame feed means;

a gantry movable along said framework;

a carriage movable along said gantry; and

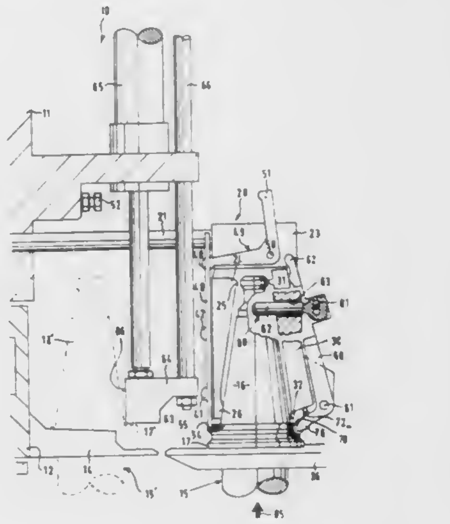
a manipulator head rotatably mounted on the carriage, said manipulator head comprising cutting means for cutting the seal, seal fitting means for fitting the seal into the groove and means for guiding and feeding the seal to said cutting means.

---

### 5,018,265

### MACHINE TOOL

**Hans-Henning Winkler, Tuttlingen, and Eugen Rütschle, Mühlheim, both of Fed. Rep. of Germany, assignors to Chiron-Werke GmbH & Co. KG, Tuttlingen, Fed. Rep. of Germany**
**Continuation of Ser. No. 247,252, Sep. 21, 1988, abandoned. This application Sep. 14, 1990, Ser. No. 584,450**
**Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 3732055**
**Int. Cl.⁵ B23Q** *3/157*
**U.S. Cl. 29—568** **6 Claims**



1. A machine tool, comprising:

(a) a plurality of toolholders, wherein each toolholder has an upper tapered section, a lower tool section and flange means therebetween, said flange means being provided with recesses;

(b) a toolholder magazine having a plurality of receiving means for receiving said flange means, a predetermined one of said toolholders being received in an upright position within one of said receiving means located at a predetermined first transfer position within said toolholder magazine;

(c) toolholder exchange means for exchanging toolholders between said toolholder magazine and a machine tool spindle, said toolholder exchange means having a pivotable arm carrying a hand, said hand being positioned at a second transfer position adjacent said first transfer position;

(d) transfer means connected to said toolholder magazine for transferring said predetermined one toolholder from said first transfer position to said second transfer position along a first horizontal axis, said transfer means having,

a bar extending along said first horizontal axis above said toolholders and having a free end;

a base member connected to said free end;

a first and a second holding member extending from said base member in a downward direction, said holding members being spaced from each other along said first horizontal axis and defining between them a gap having a clearance that is wider than said upper tapered section of said toolholder to allow passage of said toolholders therethrough in a direction perpendicular to said first horizontal axis;

locking means having a first locking member connected to said first holding member and a second locking member connected to said second holding member, said first and second locking members each having a locking end mating with one of said recesses in said flange means of said toolholder; and

actuating means for displacing said first and said second locking members to insert their respective locking ends into said

VOL
126
ISS
4
MY
28
1991
UMI

recesses in a locking position when said predetermined one toolholder is transferred out of said first transfer position.

---

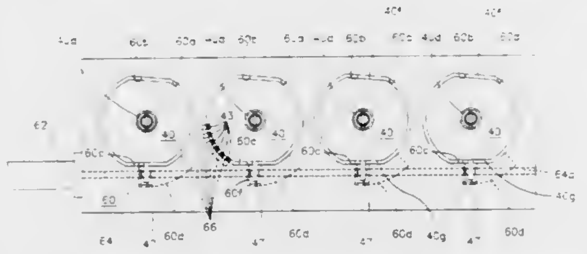
### 5,018,266
### NOVEL MEANS FOR MOUNTING A TOOL TO A ROBOT ARM

**James Hutchinson, Doylestown, Pa.; Brian Hoffman, Somerville, N.J., and Steven Pollack, Washington Crossing, Pa., assignors to Megamation Incorporated, Lawrenceville, N.J.**

**Continuation-in-part of Ser. No. 129,454, Dec. 7, 1987, Pat. No. 4,875,275. This application Oct. 23, 1989, Ser. No. 425,565**

**Int. Cl.$^5$ B23Q *3/155***

**U.S. Cl. 29—568** **33 Claims**



1. A tool holder assembly for holding a plurality of tools including a connector assembly fixedly secured to each tool and having a connector means movable between a locked and an unlocked position for connection with apparatus for operating the tool;

said tool holder assembly including a plurality of openings, each adapted to hold a tool and its cooperating connector assembly;

each connector assembly having a predetermined peripheral shape;

each of said openings having a shape generally conforming to the shape of said connector assembly and including means for substantially simultaneously moving the connector means provided in each of said connectors between a locked and an unlocked position.

30. A method for uncoupling a tool from a robot arm through the use of a tool holder having a tool receiving opening, said tool including a mounting flange having a tapered projection and locking means arranged for movement within said tapered projection, said locking means having an operating arm extending outwardly from the periphery of said flange, said robot arm having a female flange with a tapered opening receiving said tapered projection, said method comprising the steps of:

moving said robot arm to place said robot arm above said tool holder opening;

moving said robot arm downwardly when the tool coupled to said robot arm is aligned with said tool holder opening whereby said tool and tool mounting flange enter into said tool holder opening;

moving said operating arm from the locked position to the unlocked position to unlock said tool flange from said robot arm flange;

moving said robot arm to displace said robot arm flange from said tool holder, said robot arm thereafter being free to be moved to another location in a workspace for performing a subsequent operation.

---

### 5,018,267
### METHOD OF FORMING A LAMINATE

**Jerry W. Schoen, Middletown, Ohio, assignor to Armco Inc., Middletown, Ohio**

**Filed Sep. 5, 1989, Ser. No. 402,310**

**Int. Cl.$^5$ H01F *3/04***

**U.S. Cl. 29—609** **15 Claims**

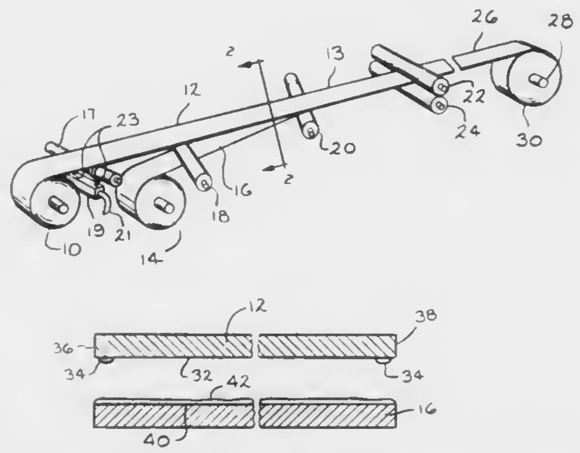
1. A method of forming a laminate, comprising the steps of: providing at least two sheets each having a facing surface,

applying a liquid bonding agent to one of said surfaces,

applying a sealing agent along the longitudinal edges to one of said surfaces,

applying pressure to said sheets to remove excess liquid bonding agent from between said surfaces and forming a continuous barrier along said edges as said surfaces are brought into contact with each other,

whereby air between said surfaces is displaced by said liquid bonding agent and said sealing agent prevents reentry of said air and minimizes seepage of said liquid bonding agent along said edges.



---

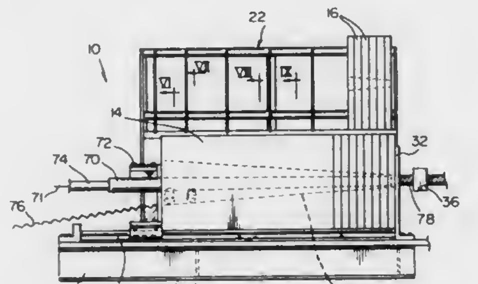
### 5,018,268
### APPARATUS FOR FORMING METAL SHIELD FROM TAPE

**Mohamed Chabane, Ste. Julie; J. Raymond Boucher, Chateauguay, and Ali Pan, Kingston, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Jan. 10, 1990, Ser. No. 463,054**

**Int. Cl.$^5$ B23P *19/04***

**U.S. Cl. 29—728** **7 Claims**



1. A former for forming a metal shield from tape as it is moved along a passline comprising a concave forming surface which extends along and faces inwardly onto the passline with at least a downstream end of the forming surface being frustoconical while increasing in diameter in an upstream direction of the passline, the former having a plurality of former sections each of which defines an axially extending part of the forming surface, the former sections being locatable together in operational positions in specific order, side-by-side around the passline and axially of the forming surface in the downstream direction, and removable from their operational positions from the downstream end of the former in succession in the upstream direction, so as to alter the downstream end diameter of the forming surface and to locate the former sections in succession in stowed positions spaced from one side of the passline, and tape engaging means locatable upstream of some at least of the former sections for engaging along a longitudinal extending median region of the tape and for urging said longitudinally extending region against the forming surface as the tape is fed along the passline.

---

### 5,018,269
### METHOD FOR PRESS-INSTALLING WIRES

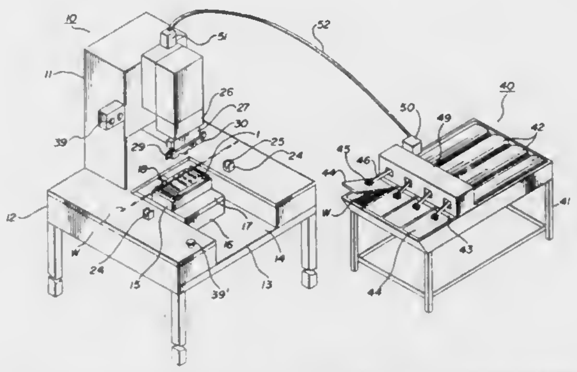
**Masahiko Ishida, Kosai; Nobuaki Yamakawa, and Masahiro Shiida, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan**

**Division of Ser. No. 378,673, Jul. 12, 1989. This application May 31, 1990, Ser. No. 531,370**

**Claims priority, application Japan, Jul. 14, 1988, 63-173693**

**Int. Cl.$^5$ H01R *43/04***

**U.S. Cl. 29—861** **1 Claim**



1. A wire press-installing method for successively seating predetermined rated wires into respective rows of receiver terminals, starting with a row at one end of a joint block and ending with a row at the other end, the rows of receiver terminals being erected at a predetermined pitch on a base of a joint block, comprising the steps of:

selecting one wire container among a plurality of wire containers according to a predetermined order of press-installing the predetermined rated wires, the containers containing the same or different kinds of rated wires to be seated in respective rows of receiver terminals, each of the containers having a cover attached to one end thereof, the cover being able to be opened and closed;

opening the cover attached to one end of the selected wire container so that a wire contained therein can be picked up;

picking up the selected wire from the selected wire container;

successively seating predetermined rated wires into respective rows of receiver terminals, starting with said row at one end of a joint block and ending with another row at another end of the joint block; and

moving a wire press-installing blade with a ram means toward and away from the joint block, wherein the step of opening the cover is in response to the ram means having moved the distance equal to the pitch of the receiver terminals on the joint block.

---

### 5,018,270
### PROCESS AND APPARATUS FOR ASSEMBLING AN ELECTRICAL CONNECTOR ONTO TWO ELECTRIC WIRES

**Fritz Caumanns, Radevormwald, Fed. Rep. of Germany, assignor to Grote & Hartmann GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany**

**Filed Feb. 5, 1989, Ser. No. 417,515**

**Claims priority, application Fed. Rep. of Germany, Oct. 10, 1988, 3834455; Mar. 17, 1989, 3908867**

**Int. Cl.$^5$ H01R *43/04;* B23P *19/00***

**U.S. Cl. 29—863** **34 Claims**

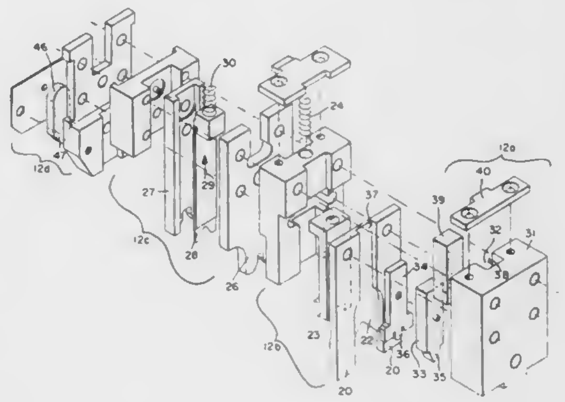
1. A process for assembling an electrical connector onto two electric wires, said electrical connector being formed from a sheet metal stamping part, said electrical connector having a contact portion and a claw portion, said claw portion including an insulation claw and a strand claw, said two electric wires each being insulated in an end portion, the end portions of said two electric wires being arranged adjacent to each other and being crimped in said insulation and strand claws, said process comprising:

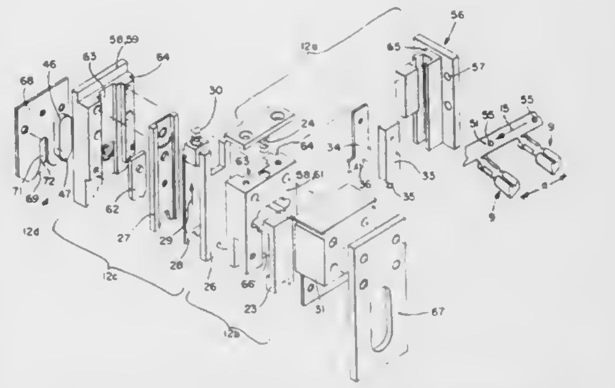
said electrical connector being a first electrical connector connected to a second electrical connector, and said second electrical connector being connected to other following electrical connectors, all said electrical connectors being connected together by stamping strips, said second and following electrical connectors having same construction as said first electrical connector;

forming said first, second and following electrical connectors into a band;

arranging said two electric wires adjacent to each other and feeding said two electric wires to a crimping tool;

feeding said first electrical connector from said band to said crimping tool;





positioning said first electrical connector and said end portions of said two electric wires under said crimping tool;

crimping said end portions of said two electric wires in said insulation and strand claws of said first electrical connector; and

during said crimping, simultaneously separating said first electrical connector from said band and opening up the insulation and strand claws of said second electrical connector.

10. An apparatus for assembling an electrical connector onto two electric wires, said electrical connector being formed from a sheet metal stamping part, said electrical connector having a contact portion and a claw portion, said claw portion including an insulation claw and a strand claw, said two electric wires each being insulated in an end portion, the end portions of said two electric wires being arranged adjacent to each other and

VOL 1126
ISS 4
MY 28
1991
UMI

being crimped in said insulation and strand claws, said apparatus comprising:

a tool including an upper part and a lower part to provide a crimping station for crimping said end portions of said two electric wires in said insulation and strand claws of said electrical connector; and

an opening-up station disposed in front of said crimping station to open up insulation and strand claws of a following second electrical connector during said crimping at said crimping station.

---

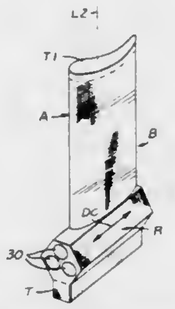
### 5,018,271
### METHOD OF MAKING A COMPOSITE BLADE WITH DIVERGENT ROOT

**Carlos Bailey, Farmington, and Raymond G. Spain, Farmington Hills, both of Mich., assignors to Airfoil Textron Inc., Lima, Ohio**

**Filed Sep. 9, 1988, Ser. No. 243,074**

**Int. Cl.$^5$ B21K** *3/04*

**U.S. Cl. 29—889.71** **36 Claims**



1. A method for making a composite gas turbine engine blade having an airfoil and an integral root, comprising the steps of:

(a) braiding a plurality of fibers to form a preform having an airfoil precursor portion and an integral root precursor portion,

(b) inserting a plurality of fiber shaping inserts into the root precursor portion to extend in a chordwise direction of the blade and in a pattern to impart an enlarged, divergent shape to the root precursor portion in a direction transverse to said chordwise direction, and

(c) disposing the preform having the root precursor portion enlarged and divergently shaped by said inserts in a matrix material to form a composite gas turbine engine blade.

---

### 5,018,272
### METHOD OF MAKING AN EXHAUST CATALYST BY SECURING WIRE MESH ONTO AN ARBOR

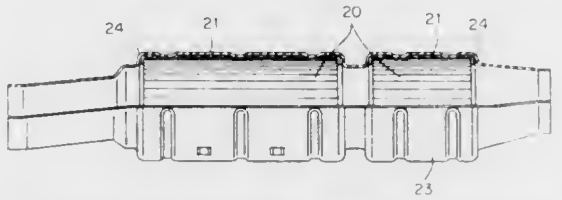
**Walter Seeger, Gaggenau; Rüdiger Mussler, Rastatt, and Reinhard Häfelein, Kuppenheim, all of Fed. Rep. of Germany, assignors to Roth Technik GmbH, Gaggenau, Fed. Rep. of Germany**

**Filed Mar. 29, 1989, Ser. No. 330,607**

**Claims priority, application Italy, Apr. 5, 1988, 3811411**

**Int. Cl.$^5$ B23P** *15/26*

**U.S. Cl. 29—890.08** **15 Claims**



1. A method for producing a tubular shaped wire mesh serving as cladding for a catalytically coated cylindrical one-piece ceramic unit used to decontaminate exhausts of internal combustion engines, said unit functioning as catalysts and having an intake for exhaust at one end and having an exhaust outlet at another end, said unit having two end faces located at the intake and outlet ends of said unit said end faces defining a length of said unit,

wrapping the wire mesh around a circumferential surface of an arbor, said wire mesh being axially longer than the length of the unit, said wire mesh having two projecting sections each extending axially beyond each end face of the unit;

securing said wire mesh to said surface of said arbor in an area between the projecting sections and thereby radially conforming said wire mesh into said circumferential surface of said arbor;

compressing each of said projecting section of said wire mesh into a bead and thereby axially securing said wire mesh to said arbor.

---

### 5,018,273
### PROCESS FOR PRODUCING AN ORIFICE PLATE FOR PELLETIZING OF PLASTICS

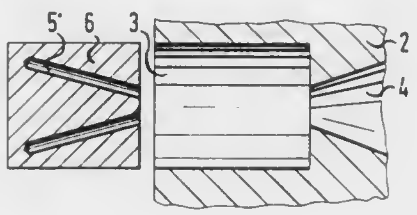
**Friedrich Lambertus, Stuttgart, Fed. Rep. of Germany, assignor to Werner & Pfleiderer GmbH, Fed. Rep. of Germany**

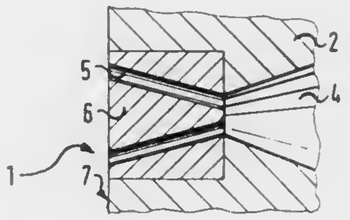
**Filed Sep. 13, 1990, Ser. No. 582,240**

**Claims priority, application Fed. Rep. of Germany, Oct. 17, 1989, 3934596**

**Int. Cl.$^5$ B21D** *53/00*

**U.S. Cl. 29—890.142** **13 Claims**





1. In a process for producing an orifice plate for pelletizing a plastic melt in which an insert is fixed in a recess in a base plate and melt flows through a melt channel in the base plate and then through a bore in the insert for discharge at an outer surface of the insert, the improvement comprising

forming a blind bore in the insert prior to insertion of the insert into a recess in a base plate,

inserting the insert into the recess of the base plate so that the blind bore communicates with a melt channel in the base plate and a solid, outer face of the insert is exposed at said recess, said blind bore terminating in proximity to said outer face,

fixing the insert in said recess and hardening the insert, and

removing material from the insert at said outer face to expose the blind bore at said outer face.

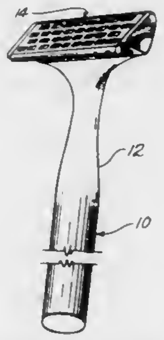
### 5,018,274
### SAFETY RAZOR BLADE

**Robert A. Trotta, Pembroke, Mass., assignor to The Gillette Company, Boston, Mass.**

**Filed Apr. 5, 1990, Ser. No. 505,853**

**Int. Cl.$^5$ B26B** *21/00, 21/54*

**U.S. Cl. 30—50** **20 Claims**



1. A method of manufacturing a razor blade which includes the steps of:

providing a unitary block of ceramic material in the form of a honeycomb structure having a plurality of substantially parallel cells formed therein;

forming at least one surface on the structure intersecting each of the parallel cells at an acute angle; and

grinding and polishing the one surface to form a plurality of sharpened edges at the intersection of the one surface with the periphery of each of the cells to thereby provide a plurality of cutting edges to be employed in the shaving process.

---

### 5,018,275
### CUTTING DEVICE

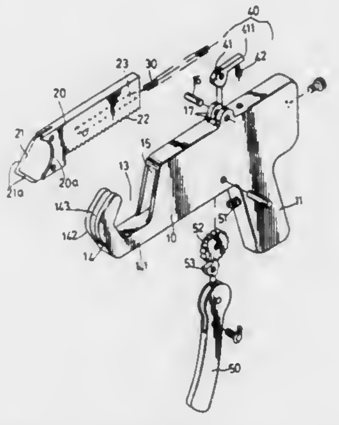
**Chi-Chieh Huang, No. 9, Feng-She Rd., Ta-She Tsun, Shen-Kang Hsiang, Taichung Hsien, Taiwan**

**Filed Nov. 21, 1989, Ser. No. 440,130**

**Claims priority, application Taiwan, Sep. 30, 1989, 78209573**

**Int. Cl.$^5$ B25F** *3/00;* **B23D** *21/06*

**U.S. Cl. 30—124** **1 Claim**



1. A cutting device comprising:

a gun-like body having a front end, a rear end, a grip member extending downward adjacent said rear end, a longitudinal bore extending from said rear end toward said front end, a fixed jaw member disposed at said front end, and a mouth formed between said fixed jaw member and said longitudinal bore to receive a workpiece;

a movable member slidably provided in said bore and having a front end with a cutting element to extend into said mouth to effect cutting and a bottom end provided with rack teeth;

said fixed jaw member being forked and defining an aperture to permit said cutting element to move in therebetween;

a ratchet wheel mounted on said gun-like body adjacent said grip member and engaging said rack teeth;

a lever handle mounted to said gun-like body to turn cooperatively with said ratchet wheel, and incorporating a pawl member to engage said ratchet wheel, said ratchet wheel moving said movable member in a direction towards said front end when said lever handle is operated;

a first spring connected to said grip member and biasing said lever handle;

a second spring to return said movable member in a direction towards said rear end, and a dog member mounted on said gun-like body above said movable member and urged in a first position to depress said movable member against said ratchet wheel and in a second position to allow said second spring to return said movable member towards said rear end.

---

### 5,018,276
### TOOTH STRUCTURE OF ROTARY SAW BLADE AND METHOD OF FORMING THE SAME

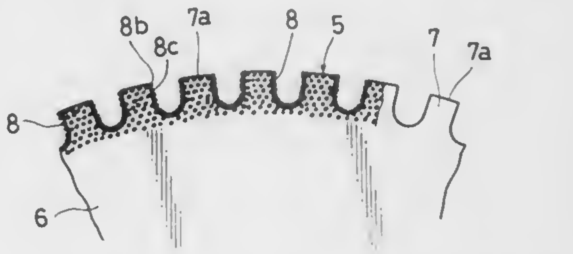
**Tanehiko Asada, Shizuoka, Japan, assignor to Kaken Corporation Limited, Iwata, Japan**

**Filed Apr. 25, 1990, Ser. No. 514,157**

**Claims priority, application Japan, May 9, 1989, 1-116820**

**Int. Cl.$^5$ B26B** *9/00;* **B24D** *7/00*

**U.S. Cl. 30—347** **6 Claims**



1. A rotary saw blade comprising a disc-like base plate and a plurality of circumferentially arranged teeth at the periphery of said base plate, each of said teeth having a top surface directed radially outwardly from said base plate and extending in a substantially circumferential direction with respect to said base plate, each of said teeth being coated with ultra-hard abrasive grains except for each said top surface which is not coated with said grains.

---

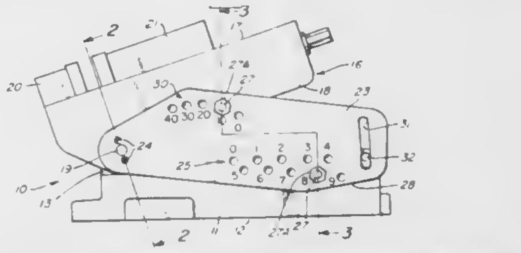
### 5,018,277
### ANGLE SETTING DEVICE

**Blair A. Frost, P.O. Box 213, Clinton, Me. 04927**

**Filed Mar. 2, 1990, Ser. No. 487,136**

**Int. Cl.$^5$ G01B** *3/50*

**U.S. Cl. 33—538** **13 Claims**



1. A device for establishing predetermined angular relationships between two opposite flat surfaces, said device comprising first, second and third components each of which has first and second ends, a pivot interconnecting the first ends of said

VOL
1126
ISS
4
MY
28
1991
UMI

components, the first component having the first flat surface and the second component having the second flat surface, first manually adjustable means detachably connecting the first and third components in a plurality of different positions ranging from a zero position by uniform increments to a maximum number thereof and second manually adjustable means detachably connecting the second and third components in a plurality of different positions ranging from a zero position by uniform increments to a maximum number thereof, when both adjustable detachable means are in zero positions, said two surfaces are in a predetermined, polar starting position and in any other position of either position of said means, a particular, predetermined angular relationship between said surfaces is established, the increments established by the second adjustable means equal to the first next whole number which represents the total of the first increments plus one additional such increment.

---

## 5,018,278
## PROBE HEAD OF THE SWITCHING TYPE

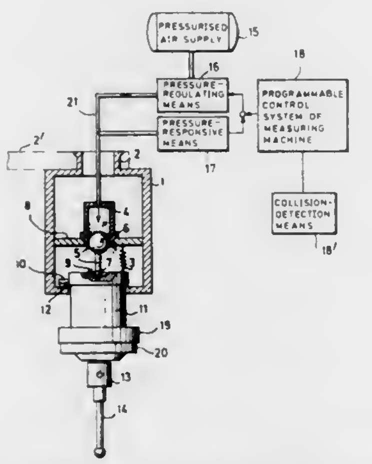
**Hans-Peter Aehnelt, Oberkochen; Eckhard Enderle, Aalen/Dewangen, and Michael Wirth, Aalen, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany**

**Filed Nov. 29, 1989, Ser. No. 442,605**

**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1988, 3842151**

Int. Cl.$^5$ G01B *5/03*

U.S. Cl. 33—559 9 Claims


PRESSURISED AIR SUPPLY
15
16
18
PRESSURE-REGULATING MEANS
PRESSURE-RESPONSIVE MEANS
PROGRAMMABLE CONTROL SYSTEM OF MEASURING MACHINE
COLLISION-DETECTION MEANS
18'
21
2'
2
17
1
8
4
10
9
3
12
11
19
20
13
14

1. In a coordinate-measuring machine having a movable measurement arm and a probe head mounted to said arm and programmable control means for moving said arm and its probe head in an automated program of probe-pin contact with and removal from a workpiece to be measured, said probe head comprising a probe-head housing and a movable member for deflectably mounting a probe pin with respect to the housing, wherein loading means normally and yieldably retains the movable member in precisely seated relation to the housing and in readiness to generate an electric signal upon probe-pin contact with a workpiece, the improvement wherein said loading means comprises a cylinder, a pneumatically operated piston in said cylinder, and wherein pneumatic-supply means for operating said piston includes and adjustably resettable regulating valve with means for varying the pressure operating on the piston, and means connecting said programmable control means to said regulating valve for automatically varying the setting of the regulating valve in the course of a given program of workpiece-contacting measurements.

---

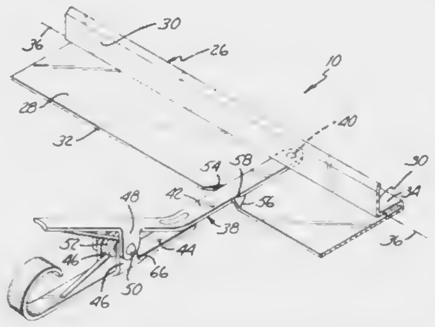
## 5,018,279
## STRIP SHINGLE ALIGNMENT TOOL

**Clarence F. Williams, 1601 E. Iowa Ave., St. Paul, Minn. 55106**

**Continuation-in-part of Ser. No. 309,482, Feb. 13, 1989, abandoned. This application Apr. 20, 1990, Ser. No. 512,652**

Int. Cl.$^5$ G01D *21/00*

U.S. Cl. 33—649 5 Claims



1. A strip shingle alignment tool for positioning strip shingles on a roof with respect to strip shingles of an already fastened shingle strip, preparatory to fastening them to the roof, said fastened and unfastened shingles each being partially defined by a straight bottom edge; said tool including:

a. an elongate straight-edge unfastened shingle positioning plate having a substantially flat, longitudinally extending base flange and a longitudinally extending unfastened shingle strip positioning flange extending up from the base flange in normal relation thereto and defining at its connection with the base flange, a straight unfastened shingle bottom edge positioning line;

b. at least two spaced-apart clamps, each clamp having an upper jaw mounted to the shingle positioning plate and extending rearwardly in the plane of the base flange in normal relation to the bottom edge positioning line, each clamp having a lower jaw pivoted to the upper jaw and adapted to extend under a bottom edge portion of a shingle in the strip of fastened shingles, and each clamp being manually operable to move the jaws between open and closed positions;

c. resilient means tending to maintain the jaws in closed position;

d. a fastened-shingle bottom edge locating stop between the jaws, each stop being positioned to come into interfering relation with said bottom edge of said shingle in the fastened shingle strip when its clamp is not in closed position and said lower jaw is extended to the limit of its movement up under said shingle of the fastened strip;

e. wherein the distance between the locating stop and the bottom edge positioning line in direction normal to the positioning line is equal to a predetermined desired distance between the bottom edge of the fastened shingle strip and the bottom edge of the shingles to be fastened;

f. the mounting of the upper jaw to the shingle positioning plate is a pivotal mounting of that jaw to the base flange on an axis lying in a vertical plane, this mounting permitting the clamp to be movable between an operating position normal to the bottom edge positioning line and a storage and handling position at an acute angle with respect to said bottom edge positioning line;

g. releasable means provided to positively fix each of the clamps in its operating position;

h. wherein the base flange of the shingle positioning plate is made of sheet metal and extends rearwardly away from the bottom edge positioning line in a substantially flat plane partially defined by a base flange rear edge lying in spaced, parallel relation to the bottom edge positioning line;

i. wherein a forward end portion of each upper clamp jaw is pivoted to the base flange in forwardly spaced relation to the base flange rear edge; and

j. wherein the releasable means to fix each clamp in its operating position is constituted as a pair of upper jaw movement limiting stops on a portion of said base flange rear edge, one in contact with each side of the upper clamp jaw.

---

## 5,018,280
## METHOD AND DEVICE FOR THE OPERATION OF A WORKPIECE-CONTACTING PROBE HEAD OF THE SWITCHING TYPE

**Eckhard Enderle, Aalen-Dewangen; Hans-Peter Aehnelt, Oberkochen; Karl-Eugen Aubele, Gussenstadt, and Michael Wirth, Aalen, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany**

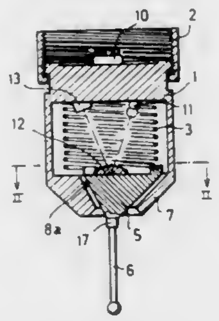
**Continuation of Ser. No. 277,699, Nov. 30, 1988, abandoned, which is a continuation-in-part of Ser. No. 72,163, Jul. 10, 1987, Pat. No. 4,815,214. This application Jul. 20, 1990, Ser. No. 555,909**

**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824548**

**The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.**

Int. Cl.$^5$ G01B *7/28*

U.S. Cl. 33—832 15 Claims



1. A device for operating a probe head having a displaceable probe which is so biased toward seating engagement with a fixed mount in the probe head as to define a zero position of the probe in the mount, said probe having piezoelectric means connected thereto for sensing initial probe contact with a workpiece, circuit means including an oscillator and an interval timer, said circuit means being connected to initiate a predetermined timing interval and upon lapse of said interval to excite said oscillator in transient driving relation with said piezoelectric means, said timing interval being sufficient to permit probe removal from workpiece contact prior to excitation of said oscillator.

9. The improved method of operating a coordinate-measuring machine wherein (a) a probe head of the machine has a mount which deflectably mounts a work-contacting probe and the probe is continuously biased for seating in the mount to define a zero position of the probe and wherein the probe is piezoelectrically responsive to mechanical stress to sense initial probe contact with a workpiece, and (b) the machine performs a cycle of probe-head displacement to move the probe into and then away from workpiece contact, for each point to be measured on a workpiece, said improvement comprising the steps of generating an electrical signal, and using the generated signal to piezoelectrically excite the probe into oscillation which is sustained for a predetermined period of time in each cycle after the probe has moved away from contact with the workpiece.

---

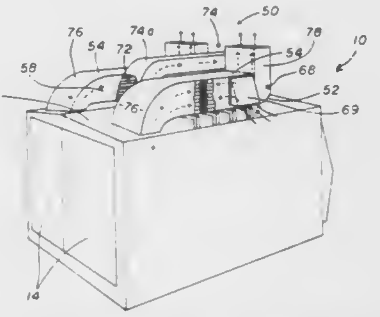
## 5,018,281
## TOBACCO BARN WITH HEAT EXCHANGER SYSTEM

**S. Thomas Bulluck, Jr., Rt. 1, Box 106, Pinetops, N.C. 27864**

**Filed Nov. 15, 1990, Ser. No. 613,995**

Int. Cl.$^5$ F26B *19/00*

U.S. Cl. 34—35 10 Claims



6. A method of curing and drying tobacco and transferring heat associated with exhaust air to fresh incoming air during the curing and drying process comprising the steps of:

(a) exhausting air from a tobacco curing and drying structure and splitting the exhaust air into two streams and directing each stream of exhaust air into a first end of a separate heat exchange module;

(b) moving the exhaust air through separated channels within the heat exchange modules and exhausting the exhaust air from the heat exchange modules about a second end portion thereof that is disposed opposite the first end portion;

(c) inducing fresh inlet air into the second end portion of each heat exchange module and moving the fresh air through a series of separated channels such that the fresh air and exhaust air are alternately spaced and flow in counter directions with respect to each other through the two heat exchange modules such that heat associated with the exhaust air is continuously being transferred to the counter flowing fresh air;

(d) directing the fresh air out each heat exchange module about the first end portion thereof and combining the fresh air from each heat exchange module and transferring the combined fresh air to a main fresh air transfer duct; and

(e) transferring the combined fresh air in the main fresh air transfer duct back to the curing and drying structure where the fresh air is combined with a system of circulating air passing through the curing and drying structure.

---

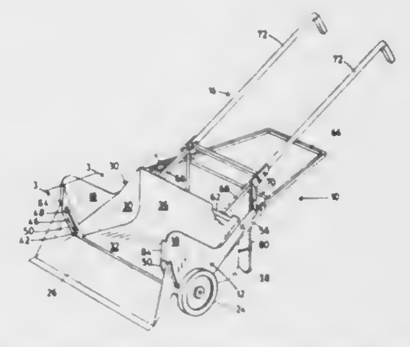
## 5,018,282
## MECHANICAL SHOVEL

**Kwang Y. Hong, 87 Wayne Avenue, Scarborough, Ontario, Canada M1R 1Y4**

**Filed Oct. 1, 1990, Ser. No. 592,004**

Int. Cl.$^5$ E01H *5/02*

U.S. Cl. 37—130 17 Claims



1. A manually powered mechanical shovel comprising a

VOL
1126
ISS
4
MY
28
1991
UMI

frame including a chassis and a handle means extending rearwardly from said chassis to define a longitudinal axial direction;

means for supporting said chassis from a ground surface for movement thereover;

a scoop for collecting material therein, said scoop having a forward portion and a rearward portion;

means mounting said forward portion of said scoop to said frame for rotation about an axis;

means for emptying material from said scoop comprising a lever means having a first end and a second end interconnected by a mid portion; and

fulcrum means mounting said mid portion to said frame for rotation thereabout;

said first end of said lever being operatively connected to said scoop whereby a downward movement of said second end of said lever causes said scoop to rotate about said axis to empty any load contained therein.

---

### 5,018,283

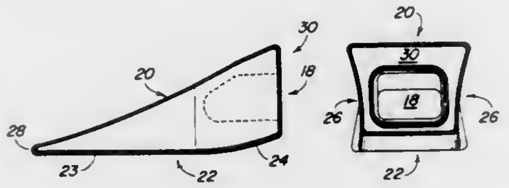
### LOADER BUCKET TOOTH

**Ronald W. Fellner, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.**

**Continuation-in-part of Ser. No. 389,655, Aug. 4, 1989, Pat. No. 4,949,481. This application Aug. 21, 1990, Ser. No. 570,485**

**Int. Cl.$^5$ D06F *79/00***

**U.S. Cl. 37—141 T** 1 Claim



1. A digging tooth for a loader bucket, comprising

a top surface having a concave configuration;

a bottom surface having a flat forward portion and a convex rear portion , the flat forward portion intersecting the top surface to form a forward cutting edge;

two plowshare sidewalls extending between the top surface and the bottom surface; and

a rear portion extending between the concave top surface, the convex bottom surface and the two sidewalls, the rear portion being provided with mounting means for mounting said digging tooth on a digging bucket, wherein the top surface proceeding from the forward cutting edge to the rear portion first converges then diverges, and the bottom surface proceeding from the forward cutting edge to the rear portion continuously converges.

---

### 5,018,284

### SNOW PLOW FOR VEHICLES

**Shiro Mikami, Sapporo; Seiju Ooshima, Asahikawa, and Yoshio Nagahara, Kushiro, all of Japan, assignors to Japan as represented by Director of Construction Machinery Works of Hokkaido Development Bureau, Hokkaido, Japan**

**PCT No. PCT/JP87/00198, § 371 Date Dec. 19, 1988, § 102(e) Date Dec. 19, 1988, PCT Pub. No. WO88/07607, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 31, 1987, Ser. No. 269,185**

**Int. Cl.$^5$ E01H *5/04***

**U.S. Cl. 37—233** 6 Claims

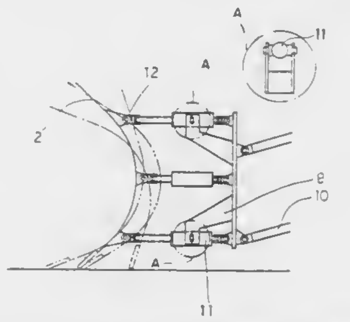
1. A snow plow for a vehicle comprising:

a fixing member attached to the front of the vehicle;

an elastic member having a vertical axis and a horizontal axis therethrough;

means for mounting the elastic member to the fixing member; and

telescopic means for deforming said elastic member to vary the configuration thereof, said elastic member being deformable about said vertical and horizontal axes by said telescopic means, said telescopic means comprise a plurality of cylinders arranged in a plurality of generally horizontal rows and generally vertical columns with each row and each column having more than one cylinder therein.



---

### 5,018,285

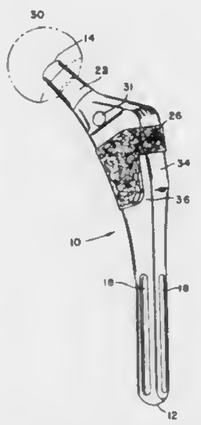
### METHOD OF CONSTRUCTING PROSTHETIC IMPLANT WITH WRAPPED POROUS SURFACE

**Arden R. Zolman, Warsaw; Phillip J. Andersen, Silver Lake, and Steven T. Bayne, Warsaw, all of Ind., assignors to Zimmer, Inc., Warsaw, Ind.**

**Continuation of Ser. No. 277,525, Nov. 28, 1988, abandoned, which is a division of Ser. No. 88,363, Aug. 24, 1987, abandoned. This application Jan. 16, 1990, Ser. No. 463,829**

**Int. Cl.$^5$ B23Q *9/02;* B23P *19/04***

**U.S. Cl. 29—465** 21 Claims



1. A method of constructing a prosthetic implant comprising the following steps:

(a) providing a base implant including a stem portion having a plurality of sides;

(b) precontouring a separate porous pad having a first desired configuration which is substantially flat;

(c) wrapping the pad around the stem portion for attachment thereto in a second non-flat configuration conforming to the shape of the stem portion about which the pad is wrapped; and

(d) applying a plurality of sequentially applied forming jaws to said pad, thereby converting said substantially flat first configuration to the non-flat second configuration, said plurality of jaws applying such force to the pad in a desired sequence, with one of said plurality of jaws initially contacting with and applying force to the pad first, and with at least one other of the plurality of jaws subsequently contacting with and applying force to the pad thereafter.

### 5,018,286

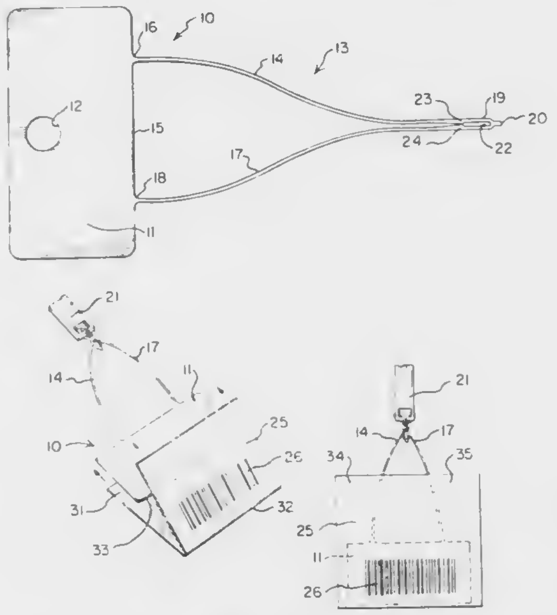
### TAMPER RESISTANT SKI TICKET

**Daniel B. Zahner, 3060 29th St., #12, Boulder, Colo. 80301**

**Filed Apr. 18, 1990, Ser. No. 511,480**

**Int. Cl.$^5$ G09F *3/10***

**U.S. Cl. 40—299** 27 Claims



1. A tag/ticket combination for attachment to a clothing opening, said tag/ticket combination providing a tamper resistant ticket, comprising:

an integral tag unit including a flat panel having a closed loop attached thereto,

said loop comprising a thin, flexible, thread-like member having two ends attached to an edge portion of said panel and having a mid portion intermediate said two ends

said loop having a length that enables the mid portion of said loop to be folded against itself, to thus allow said loop to be threaded through a clothing opening,

said panel being of a relatively small size so as to enable said panel to thereafter be inserted through said loop. to thereby attach said loop to the clothing opening, and

a relatively large size ticket having an adhesive on one side thereof, and having access indicia on the opposite side thereof,

said ticket being folded to place said one adhesive side in abutting relation to said panel so as to overlap said two ends of said loop and thereby prevent removal of said tag/ticket by reinsertion of said panel through said loop.

---

### 5,018,287

### LABEL HOLDER FOR PARTS BIN

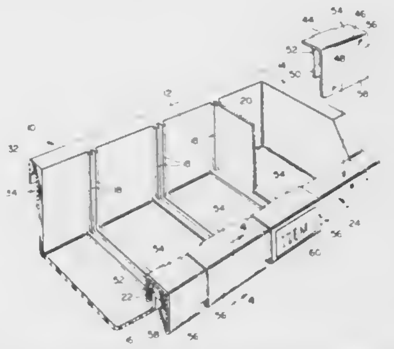
**Jacob Fast, 7561 N.W. 9th St., Plantation, Fla. 33317**

**Filed Oct. 12, 1989, Ser. No. 420,594**

**Int. Cl.$^5$ G09F *3/18***

**U.S. Cl. 40—312** 3 Claims

1. In combination with a parts bin of the type having a front wall with a channel-shaped rim and a channel-shaped cover element attached over the rim to provide a front outer wall extending below an outer wall of the rim, a back inner wall spaced from an inner wall of the rim, and an upper wall engaging an upper wall of the rim, a label holder of plastic sheet material fitted over the cover element, the holder being divided by transverse fold lines into five contiguous rectangular panels including a central panel on the upper wall of the cover element, a second panel extending downwardly from a front end of the central panel over the front outer wall of the cover element, a third panel extending upwardly from a lower end of the second panel and engaging an outer part of said rim, a fourth panel extending downwardly from a back end of the central panel over the back inner wall of the cover element, and a fifth panel extending upwardly from a lower end of the fourth panel into a space between the back inner wall of the cover element and the inner wall of the rim, the fifth panel releasably locking the holder in place.



---

### 5,018,288

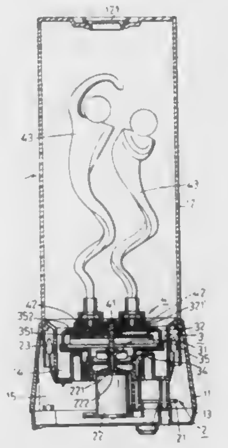
### SOUND ACTIVATED WATER SPOUTING TOY

**Tsai-Ten Yang, No. 23, Sec. 1, Chung-Hwa W. Rd., Tainan City, Taiwan**

**Filed Aug. 28, 1990, Ser. No. 574,302**

**Int. Cl.$^5$ G09F *19/02***

**U.S. Cl. 40—406** 5 Claims



1. A sound activated toy, comprising:

a casing having a hollow seat with a closed top end and an open bottom end, a base attached to said open bottom end of said hollow seat to confine a lower receiving space, and a hollow transparent enclosing wall attached to said closed top end of said hollow seat to confine an upper receiving space, said hollow transparent enclosing wall including an access means for water to be received in said upper receiving space;

a sound activated control circuit means disposed inside said lower receiving space;

a motor similarly disposed inside said lower receiving space and actuated by said control circuit means, said motor having an axle projecting through said closed top end of said hollow seat into said upper receiving space;

a spout enclosure provided in and communicated with said upper receiving space, said spout enclosure being disposed adjacent to said lower receiving space and having a top wall with at least one spout hole;

a propeller means confined inside said spout enclosure and moved by said motor; and

a toy figure mechanism disposed above said spout enclosure

VOL
1126
ISS
4
MY
28
1991
UMI

inside said upper receiving space and similarly moved by said motor;

whereby, a predetermined amount of water is to be received in said upper receiving space through said access means, said control circuit means actuating said motor to move said propeller means in order to force water from said upper receiving space into said spout enclosure so as to generate a water spout at each said spout hole.

---

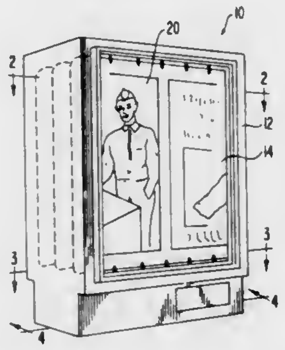
### 5,018,289
### CHANGEABLE SIGN DISPLAY DEVICE WITH IMPROVED PANEL SUSPENSION

**Gideon Gelman, Petah, Israel, assignor to Product Innovations, Skokie, Ill.**

**Filed May 10, 1988, Ser. No. 192,145**

**Int. Cl.$^5$ G09F *11/12***

**U.S. Cl. 40—472** **9 Claims**



1. A display device comprising:

an enclosure having first and second opposing planar sections, each of the planar sections having at least one opening formed therein;

a plurality of elongated spools mounted inside the enclosure, a first pair of spools being disposed at opposing ends of the first planar section and aligned along a plane parallel to the plane of the first planar section, a second pair of spools being disposed at opposing ends of the second planar section and aligned along a plane parallel to the plane of the second planar section, the spools having upper and lower belt engaging means;

driving means operatively connected to at least one of the spools;

upper and lower endless belts positively and operatively respectively engaging the upper and lower belt engaging means and sequentially connecting the plurality of spools for effecting simultaneous rotation thereof;

a plurality of panels of visual display material;

means for yieldably connecting the plurality of panels of visual display material to the endless belts, the panels being yieldably connected to the endless belts along a pair of opposed edge portions of each of the panels and disposed to permit the viewing of at least one of the panels through the openings in the planar sections;

means for keeping the endless belts operatively engaged with said belt engaging means of said spools, said keeping means comprising elongated keeper members secured to said enclosures, said keeper members being positioned between the endless belts and the panels of visual display material.

---

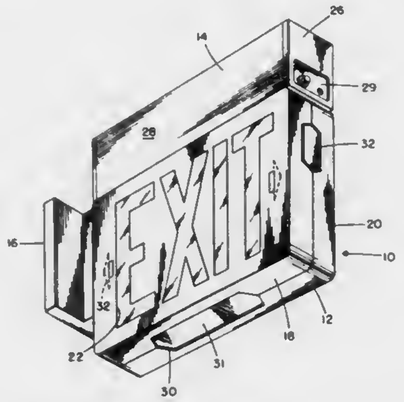
### 5,018,290
### EXIT SIGN

**Edward P. Kozek, Woodbury; Charles R. Ruskouski, Danbury, both of Conn., and Steven J. Altamura, Scarsdale, N.Y., assignors to Dual-Lite, Inc., Newtown, Conn.**

**Filed Feb. 23, 1989, Ser. No. 315,949**

**Int. Cl.$^5$ G09F *13/04***

**U.S. Cl. 40—570** **19 Claims**



1. An exit sign assembly comprising:

A. a housing defining an enclosure therein and including means defining indicia thereon;

B. a printed circuit board mounted within said enclosure in a generally parallel arrangement with and spaced from said indicia defining means;

C. a plurality of low voltage incandescent lamps mounted in a desired pattern on said printed circuit board to fully illuminate said indicia of said indicia defining means in a uniform manner, said indicia defining means includes a visible area through which light can pass from said low voltage incandescent lamps so as to make the visible area visible outside said enclosure and a masked area which blocks light from said incandescent lamps from passing outside said enclosure, said low voltage incandescent lamps are arranged in said desired pattern whereby said lamps are located directly behind said masked area so that an imaginary line passing through any one of said low voltage incandescent lamps normal to said indicia defining means intersects said indicia defining means only in said masked area; and

D. an electric power supply operationally connected to said printed circuit board for supplying power to said low voltage incandescent lamps.

---

### 5,018,291
### DISPLAY HOLDER

**Frank Pasquale, Towaco, and John G. Dewees, Morristown, both of N.J., assignors to Trans World Marketing Corporation, East Rutherford, N.J.**

**Filed Mar. 13, 1989, Ser. No. 322,540**

**Int. Cl.$^5$ G09F *3/18***

**U.S. Cl. 40—642** **4 Claims**

1. A holder for displaying a printed sheet on a support wall, comprising:

(A) a back plate having a planar support surface and a channel formed around substantially the entire perimeter of said support surface to rigidify said back plate and to space said support surface from a support wall when said channel is placed against said support wall;

(B) a cover plate comprising a front face and a flange which extends around substantially the entire perimeter of said front face, said flange fitting into said channel and cooperating with said channel to position said support surface and a rear surface of said front face parallel to and spaced from one another; and

(C) means for snap fitting said back plate to said cover plate; wherein said snap-fitting means includes:

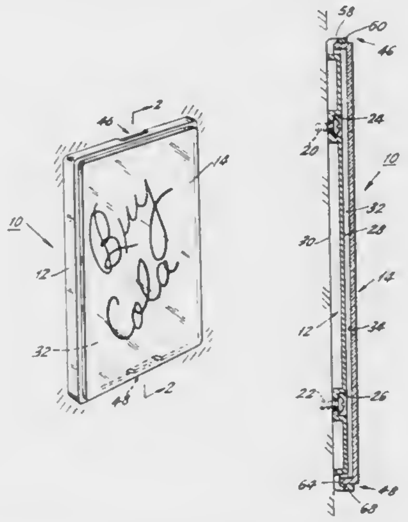
(1) a first notch formed in said back wall and said outer wall, said notch being located at a first end of said back plate, said notch defining a first, resilient transverse beam in said outer wall;

(2) a first boss formed on a resilient tongue formed in said flange of said cover plate, the relative resiliency of said first transverse beam and said tongue permitting said first boss to be snap-fit past said first transverse beam and inserted and retained behind said resilient transverse beam when said resilient tongue is inserted into said first notch;

(3) a second notch formed in said back wall and said outer wall, said second notch being located at a second end of said back plate which is opposite from said first end, said second notch defining a second transverse beam in said outer wall;

(4) a second boss on said flange of said cover plate, said second boss being insertable into said second notch and, when so inserted, being retained behind said second transverse beam;

wherein said channel has a generally U-shaped cross-section designed to receive said flange; said channel including an inner wall which extends from said support surface in a first direction, a back wall which extends from said inner wall and generally parallel to said support surface, and an outer wall which extends from said back wall in a direction which is generally parallel to and opposite to said first direction.



---

### 5,018,292
### LINKAGE ASSEMBLY FOR TRIGGER/SEAR ASSEMBLIES

**Dennis E. West, 1612 Weatherstone Ct., Blue Springs, Mo. 64015**

**Filed Jan. 2, 1990, Ser. No. 459,431**

**Int. Cl.$^5$ F41A *19/10, 19/12, 19/16***

**U.S. Cl. 42—69.02** **21 Claims**

1. In a firearm having a trigger assembly and sear assembly, linkage apparatus between said assemblies for transmitting motion of said trigger assembly to said sear assembly to fire said firearm, said linkage apparatus comprising:

a trigger bracket having a pair of spaced apart mounting blocks with a central track therebetween;

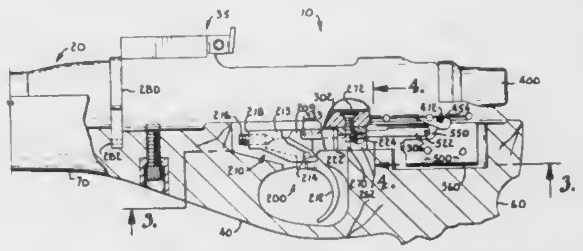
means for mounting said bracket to said firearm;

means for mounting said bracket to said trigger assembly;

a linkage bar having first and second ends;

means on said linkage bar for receiving said track therein;

means for mounting said first end of said bar to said trigger assembly; and



means for mounting said second end of said bar to said sear assembly, said linkage bar transmitting motion of said trigger assembly to said sear assembly for operation of said firearm.

---

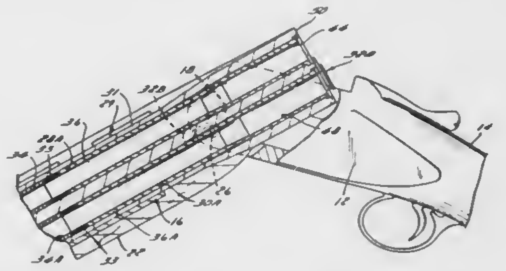
### 5,018,293
### SHOTGUN SHELL EJECTOR/EXTRACTOR MEANS FOR SKEET GUN CARRIER BARREL HAVING SMALLER GAUGE TUBE THEREIN

**Donald R. Mainland, Racine, Wis., assignor to Kolars Arms, Racine, Wis.**

**Filed Sep. 27, 1989, Ser. No. 413,461**

**Int. Cl.$^5$ F41A *21/10***

**U.S. Cl. 42—77** **13 Claims**



1. In a shotgun:

a detachable regular barrel with a bore of predetermined guage and having a shell ejector/extractor operable by an operating mechanism on said shotgun, said regular barrel with said ejector/extractor thereon having a predetermined weight and balance;

and means for replacing said detachable regular barrel to enable firing of a shotgun shell smaller than said predetermined guage, said means having the same weight and balance as that of said regular barrel with said shell ejector/extractor thereon, said means comprising:

a carrier barrel having an ejector/extractor thereon detachably mountable on said shotgun in place of said regular barrel and being of lighter weight and less strong than said regular barrel;

a tube insertable in said carrier barrel and adapted to have said smaller gauge shotgun shell fired therethrough;

and an adapter insertable in said carrier barrel for association with said tube and having a firing chamber therein for receiving said smaller gauge shotgun shell, said adapter comprising movable means operable by said ejector/extractor on said carrier barrel to effect ejection or extraction of said smaller guage shotgun shell.

---

### 5,018,294
### STEADY HAND

**Dennis McGuffee, 623 Teagarden, Gulfport, Miss. 39507**

**Filed May 31, 1988, Ser. No. 200,539**

**Int. Cl.$^5$ F41A *35/00***

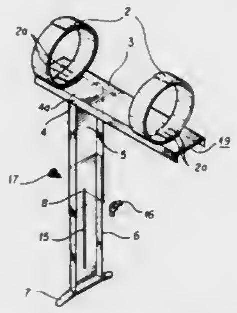
**U.S. Cl. 42—94** **5 Claims**

1. In a rifle or gun support:

a forearm brace;

VOL 1126
ISS 4
MY 28
1991
UMI

a knee support, having a means for attachment movably mounted to the forearm brace and knee support and



where the means for attachment is a pivot means to allow the knee support and forearm brace to fold together.

---

**5,018,295**

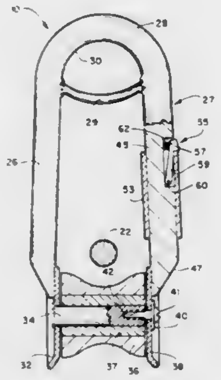
### ROLLER PURSE RING

**Harry W. Taylor, IV, 1248 Walnut Tree La., El Cajon, Calif. 92021, and Andrew Castagnola, 3851 Bandini, San Diego, Calif. 92110**

**Filed Sep. 22, 1989, Ser. No. 410,849**

**Int. Cl.$^5$ A01K** *73/12*

**U.S. Cl. 43—14** — **6 Claims**



1. A roller purse ring comprising:
a pair of laterally spaced longitudinally extending arms that extend substantially in the same direction, said arms each having a top end and bottom end;
a curved loop member having its opposite ends connected to the respective top ends of said arms to form a closed loop configuration to which a rope sling may attached;
a laterally extending pin having a first end and an second end;
a roller journaled on said pin;
a first cheek plate rigidly mounted on the bottom end of one of said longitudinally extending arms, the first end of said pin being rigidly connected to said first cheek plate;
said other longitudinal extending arm having a stationary arm portion at its top end and a swivel arm portion at its bottom end, said arm portions having interlocking fingers formed adjacent one of their respective ends;
the bottom end of said swivel arm portion being rigidly connected to a second cheek plate;
means pivotally connecting said second cheek plate to the second end of said pin so that said swivel arm portion may be pivoted about said pin thereby disengaging said respective interlocking fingers so that a cable can be laterally passed through the open space that has been provided for; and
a tubular locking sleeve that reciprocally slides over said interlocking fingers.

---

**5,018,296**

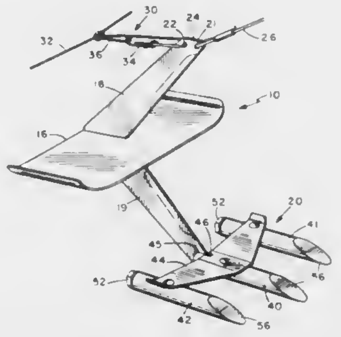
### TROLLING DEVICE FOR FISHING

**Carl F. Putz, II, 1880 Harbor Island Dr., San Diego, Calif. 92101**

**Filed Dec. 12, 1989, Ser. No. 448,932**

**Int. Cl.$^5$ A01K** *83/00*

**U.S. Cl. 43—43.12** — **18 Claims**



1. A trolling device for attachment to a downrigger line, comprising:
a plate-like hydrofoil member having a leading end and a trailing end;
a first strut projecting upwardly from the hydrofoil member and having first securing means at its upper end for securing it to the end of a first downrigger line and second, releasable securing means spaced from said first securing means for securing said first strut to an intermediate point in the length of a second, fishing line, the releasable securing means including release means for releasing the fishing line if a predetermined force is applied to the free end of the fishing line, and
a weighted keel assembly depending downwardly from the hydrofoil member for directing it downwardly at its leading edge when suspended from a boat downrigger line.

---

**5,018,297**

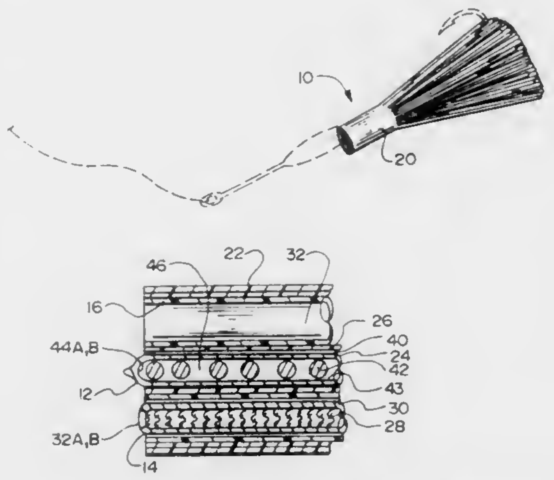
### AUDIBLE FISHING LURE

**Michael B. Kennedy, Jr., Lakeland, Fla., assignor to Wild Tails, Inc., Lakeland, Fla.**

**Filed Mar. 8, 1990, Ser. No. 490,470**

**Int. Cl.$^5$ A01K** *85/00*

**U.S. Cl. 43—42.28** — **32 Claims**



1. A fish attracting rattling scented skirted assembly for incorporation in a fishing lure comprising in combination:
a noise making subassembly comprising:

a hollow housing,
an object enclosed within said hollow housing generating fish attracting audible noises,
a first hollow resilient tube having an outer wall and an inner diameter allowing insertion and retention of said hollow housing into said first hollow resilient tube for promoting an essentially aligned, colinear, longitudinal occupation of an open ended inner space enclosed by an inner wall of said first hollow resilient tube;
a second hollow resilient tube having an outer wall and open ends and an open ended space within its inner wall unoccupied and reserved for allowing adaption to the fishing lure;
a fish attracting scent receiving and releasing subassembly comprising,
a material for receiving a fish attracting scented liquid and releasing the fish attracting scented liquid,
an open ended cylinder having an outer wall and adapted to receive and retain said material and further adapted to release the fish attracting scented liquid through a trailing end of said open ended cylinder; and
a fish attracting undulation skirt having a waistband allowing evelopment of said fish attracting noise making subassembly, said fish attracting scent receiving and releasing subassembly, and said second hollow resilient tube.

---

**5,018,298**

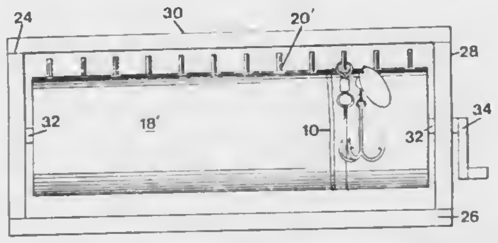
### HOLDER FOR PRE-RIGGED FISHING LEADERS

**Susan T. Spears, 885 Lake Forest Dr., Lake Oswego, Oreg. 97034**

**Continuation-in-part of Ser. No. 394,921, Aug. 7, 1989, abandoned. This application Jan. 22, 1990, Ser. No. 467,957**

**Int. Cl.$^5$ A01K** *97/00*

**U.S. Cl. 43—57.2** — **1 Claim**



1. A holder for elongated pre-rigged fishing leaders of the type having a fish hook at one end and a pole line connecting eye at its other end, said holder comprising:
a box-like frame having bottom and end walls and an elongated top longitudinal bar between said end walls serving as a handle,
a drum mounted for rotation between said end walls,
and a plurality of pegs projecting integrally from said drum in spaced relation,
said pegs forming individual hooking pegs for the pole line connecting eye of a fishing leader and also forming wrapping areas therebetween for fishing leaders wrapped around said drum in a direction parallel with the projecting direction of said pegs,
said drum having a puncturable surface whereby a fish hook end of a leader can be anchored on said drum by sticking the point of the fish hook into said surface.

---

**5,018,299**

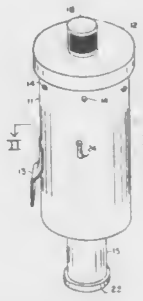
### PESTICIDE DELIVERY DEVICE

**Thomas W. Peek, and John B. Floyd, both of Ocala, Fla., assignors to BioAgriTech, Inc., a Florida corporation, Jacksonville, Fla.**

**Filed Oct. 19, 1989, Ser. No. 423,931**

**Int. Cl.$^5$ A01M** *1/20*

**U.S. Cl. 43—107** — **11 Claims**



1. A device for attracting and killing flies consisting essentially of:
(A) pesticide means for killing the flies and attractant means for attracting the flies;
(B) an elongated string-like, absorbent member impregnated with said pesticide means;
(C) attachment means affixed to said elongated member, for attaching said elongated member to a structural member of a building, where said elongated member hangs vertically from said attachment means such that said elongated member is completely exposed;
(D) one or more artificial decoys attached to said elongated member, where said decoys are impregnated with said attractant.

---

**5,018,300**

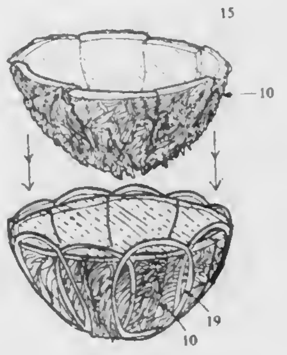
### HANGING BASKET LINER

**Martin T. Chiu, 3155 Arlotte Ave., and Derek A. Firth, 3461, Val Verde Ave., both of Long Beach, Calif. 90808**

**Filed Oct. 23, 1989, Ser. No. 425,124**

**Int. Cl.$^5$ A01G** *9/02;* **A47G** *7/00*

**U.S. Cl. 47—67** — **9 Claims**



1. A hanging basket liner comprising:
an inner lining which is of a generally circular configuration having top, inner and outer surfaces, said lining having a diameter within the range of from about 17 inches to 48 inches and being flexible in construction and with vanes emanating from a smaller inner circle, said inner circle having a diameter within the range of from about 10 inches to 24 inches, and said inner lining having a thickness within the range of from $\frac{1}{4}$ to $\frac{1}{2}$ inch and having on said outer surface a covering of sphagnum moss or similar material, the liner, complete with its outer covering being so constructed as to form a dish shape when adapted to the

VOL
1126
ISS
4
MY
28
1991
UMI

shape of the interior of a wire hanging basket designed to hold live or artificial plants and flowers.

---

### 5,018,301
### METHOD OF CULTIVATING MUSHROOMS

**Katsuhiko Kusakabe, Otsu; Hitoshi Maruyama, Shiga; Yukita Kawano, Otsu; Susumu Matsui, Otsu; Tsutomu Taniguchi, Kyoto, and Akira Obayashi, Uji, all of Japan, assignors to Takara Shuzo Co., Ltd., Kyoto, Japan**

**Filed Apr. 21, 1989, Ser. No. 343,547**

**Claims priority, application Japan, Jun. 14, 1988, 63-144693; Oct. 25, 1988, 63-267237**

**Int. Cl.$^5$ A01G** *1/04*

**U.S. Cl. 47—1.1** 1 Claim

1. A method of cultivating mushrooms which comprises conducting the cultivation in a culture medium containing at least one member selected from the group consisting of magnesium aluminometasilicate, magnesium aluminate, sodium aluminosilicate, sodium aluminate, calcium aluminosilicate, barium aluminosilicate, and synthetic hydrotalcites.

---

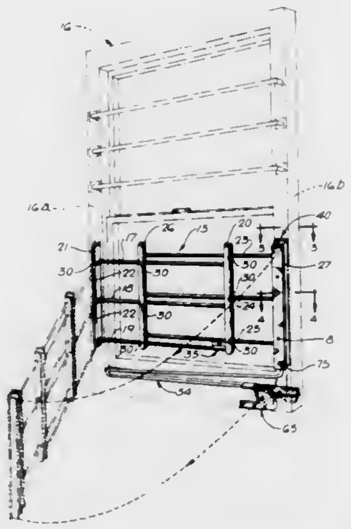
### 5,018,302
### BURGLAR BAR SAFETY LATCH ASSEMBLY

**Richard G. Kluge, Pell Lake, Wis., assignor to John Sterling Corporation, Richmond, Ill.**

**Filed Aug. 8, 1990, Ser. No. 564,199**

**Int. Cl.$^5$ E06B** *3/68*

**U.S. Cl. 49—56** 7 Claims



1. A burglar bar assembly operable to form a security barrier over the opening of a window or door frame, comprising:

plural, rigid, horizontally oriented rod members held in spaced parallelism by plural intervening rigid, laterally spaced, vertical spacer members; one of said spacer members being attachable to a first vertical member of said frame and having hinged connection with the said rod members at one end of said assembly; a second of said spacer members being fixed to said rod members at the non-hinged end of said assembly; a locking channel mountable to a second vertical member of said frame in opposing parallelism to said one spacer member; said locking channel having two right angularly related planar legs, one of which is attachable to said second vertical member and the second of which projects outwardly from the latter at a location to interferingly engage said rod members adjacent said second of said spacer members when the bar assembly is swung toward a closed condition across said frame; said second of said legs having multiple slotted openings extending inwardly of one outer edge thereof and inclined upwardly to the horizontal for receiving said rod members therein; and latch means mounted adjacent at least one of said slotted openings and comprising a pivotally mounted locking cam operable to move beneath a said rod member in said one of said openings whereby to capture the same and prevent its escape from said one of said openings.

---

### 5,018,303
### AUTOMATIC DOOR OPERATING SYSTEM

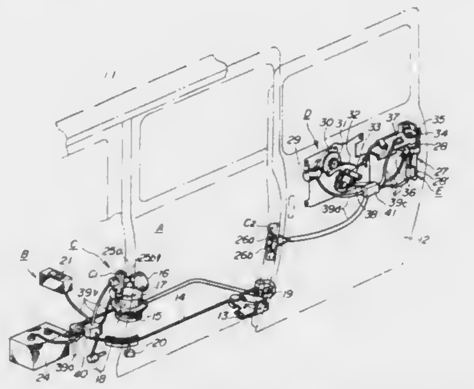
**Soushichi Koura, and Jun Yamagishi, both of Yokohama, Japan, assignors to Ohi Seisakusho Co., Ltd., Yokohama, Japan**

**Filed May 22, 1990, Ser. No. 526,653**

**Claims priority, application Japan, May 22, 1989, 1-58087; May 24, 1989, 1-59120**

**Int. Cl.$^5$ E05F** *15/00*

**U.S. Cl. 49—280** 16 Claims



1. An automatic door operating system for use in a motor vehicle having a vehicle body and a movable door, comprising:

first means for allowing said door to assume an open position, a half-latch position and a full-close latched position, said open position being a position wherein said door opens a door opening defined by said vehicle body, said half-latch position being a position wherein said door is halfly latched to the vehicle body while almost closing said door opening and said full-close latched position being a position wherein said door is fully latched to the vehicle body while fully closing the door opening;

an electric door moving device for moving said door between said open position and said full-close latched position when energized;

an electric door closing device for shifting said door from said half-latch position to said full-close latched position when energized; and

second means for controlling the door closing operation of said electric door moving device;

third means for feeding said electric door closing device with electric power; and

fourth means for allowing said second and third means to cooperate with each other to eliminate a possible trouble which may occur when said door comes to a position adjacent to said half-latch position.

---

### 5,018,304
### DOOR OPERATOR

**Ritchie L. Longoria, Germantown, Tenn., assignor to F. L. Saino Manufacturing Co., Memphis, Tenn.**

**Filed May 10, 1990, Ser. No. 521,437**

**Int. Cl.$^5$ E05F** *15/10*

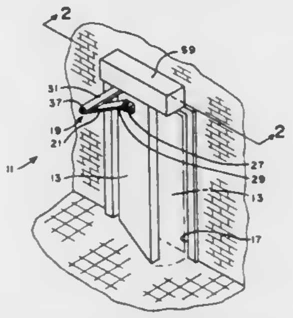
**U.S. Cl. 49—340** 14 Claims

1. An operator for use in combination with a source of electrical energy and for moving a door between an open position and a closed position in difficult situations caused by heavy doors, windy conditions, stack pressure, negative plant pressures, tight seals, etc., said operator comprising:

(a) linkage means for being attached to said door;

(b) a motor assembly for being coupled to said source of electrical energy, said motor assembly having a drive shaft; and

(c) drive train means for coupling said drive shaft of said motor assembly to said linkage means and for allowing said motor assembly to move said door to said open position and to said closed position under power, said drive train means including an electrical mechanical clutch means for being coupled to said source of electrical energy for being activated when electrical energy passes from said source of electrical energy to said clutch means and for selectively disconnecting said linkage means from said drive shaft of said motor assembly if the torque required to move said door between said open and closed positions increases above a certain amount for completely disconnecting said linkage means from aid drive shft of said motor assembly in the event not electrical energy passes from said source of electrical energy to said clutch means, said drive train means including variable torque control means for varying said certain amount of torque required before said clutch means disconnects said linkage means from said drive shaft of said motor assembly.



---

### 5,018,305
### WINDOW REGULATOR APPARATUS

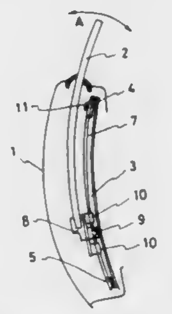
**Nobuyuki Kuki, Toyohashi; Yukio Isomura, Chiryu; Hirokazu Suzumura, Toyota, and Yoshikazu Sakakibara, Anjo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan**

**Filed Mar. 28, 1990, Ser. No. 500,291**

**Claims priority, application Japan, Mar. 29, 1989, 1-35804**

**Int. Cl.$^5$ E05F** *11/38*

**U.S. Cl. 49—348** 9 Claims



1. A window regulator apparatus, comprising:

a guide rail;

a window glass;

a bracket movably supported on said guide rail, said window glass attached to said bracket in a position normally spaced from said guide rail;

driving means for moving said bracket along said rail in an upward and downward direction, said window glass being moved with said bracket normally in a path generally spaced from said rail; and

a resilient member mounted on said guide rail for preventing contact between said guide rail and window glass in the event of a transverse force applied to said window glass in a direction moving said glass out of said path toward said guide rail.

---

### 5,018,306
### BEARING DEVICE FOR SLIDING LEAF OF DOORS, WINDOWS OR THE LIKE

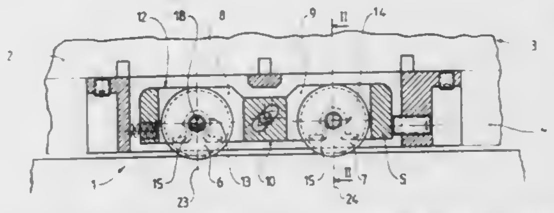
**M. Gérard Prevot, Willerwald, France, assignor to Ferco International, Sarrebourg, France**

**Filed May 2, 1990, Ser. No. 517,720**

**Claims priority, application France, May 22, 1989, 89 06834**

**Int. Cl.$^5$ E05D** *13/02*

**U.S. Cl. 49—425** 10 Claims



1. A bearing device adapted to be mounted at a lower portion of a sliding closure, said bearing device comprising a slide including at least one recess, an elastically distortable element mounted in each respective recess, said element comprising means for guiding and bearing a horizontal spindle for retaining a bearing element freely and rotatingly mounted on said horizontal spindle.

---

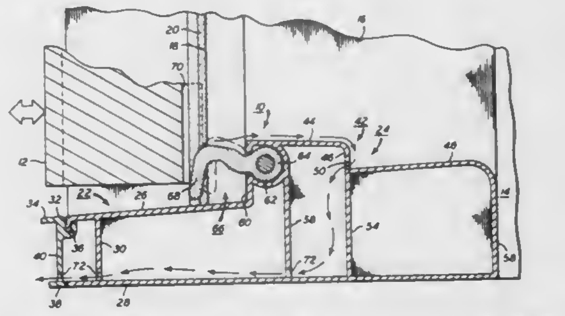
### 5,018,307
### SELF-DRAINING THRESHOLD FOR AN OUT-SWINGING DOOR

**Allen J. Burrous, Macedon; Silvio Colaprete, Rochester, and David W. Kehrli, Lima, all of N.Y., assignors to Schlegel Corporation, Rochester, N.Y.**

**Filed Apr. 25, 1990, Ser. No. 514,183**

**Int. Cl.$^5$ E06B** *1/70*

**U.S. Cl. 49—471** 5 Claims



1. A self-draining threshold for an out-swinging door leading into an enclosure comprising:

a hollow exterior threshold portion extending toward the exterior of the enclosure such that upon the opening and closing of the door, a portion of the door passes over the exterior threshold portion;

a hollow interior threshold portion extending away from the door into the interior of the enclosure and having an upper wall; and

drainage means in the threshold comprising a slot in the upper wall of the interior threshold portion for draining water from the interior of the enclosure to the exterior of the enclosure, such that water which penetrates the plane of the door to the interior of the enclosure flows over the upper wall, into and through the slot and hollow threshold to the exterior thereof.

OL
126
SS
4
MY
28
1991
UMI

**5,018,308**

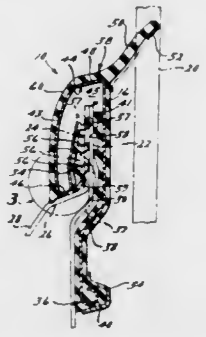
### BELT WEATHERSTRIP FOR AUTOMOTIVE VEHICLE

**Robert A. Vaughan, Dearborn, Mich., assignor to The Standard Products Company, Cleveland, Ohio**

**Filed Sep. 6, 1989, Ser. No. 403,380**

**Int. Cl.$^5$ E06B** *7/16*

**U.S. Cl. 49—491** **11 Claims**



1. A generally channel-shaped strip structure for clamping retention on an edge flange, said strip structure comprising:

a reinforcement core member having in cross-section, a channel shape defined by a first and a second leg of said core member joined by a web;

said first leg being joined to a reentrant free end of said core member extending inwardly into said channel by a radius portion of said core member having reduced thickness relative to said free end and said first leg adjacent thereto; and

an elastomeric cover layer bonded to said reinforcement core member, said elastomeric cover layer including means for retaining the strip structure onto an associated edge flange, said retaining means positioned on said member extending inwardly from at least one of said legs of said reinforcement core member.

---

**5,018,309**

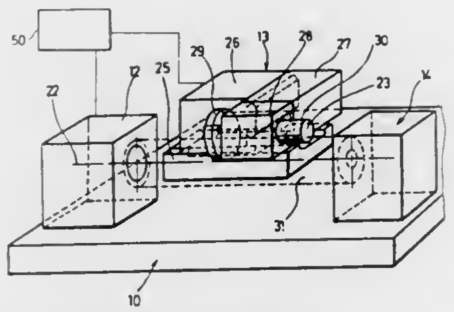
### UNIVERSAL GRINDER

**Peter Wyss, Steffisburg, Switzerland, assignor to Fritz Studer AG, Switzerland**

**Filed Oct. 5, 1989, Ser. No. 417,454**

**Int. Cl.$^5$ B24B** *25/00*

**U.S. Cl. 51—72 R** **15 Claims**



1. A universal grinder, comprising:

a common machine bed having a planar top surface on which a workpiece spindle head, a grinding spindle head and a footstock are selectively arranged, wherein said workpiece spindle head, the grinding spindle head and the footstock are each constructed as independently operable separate constructional units freely movable to an infinite number of reusable working positions on said planar top surface to allow different operating ranges for the universal grinder to machine both small and large workpieces;

means for fixing said separate constructional units to said planar top surface in any of the reusable working positions to permit detaching and a changing of said constructional units between reusable working positions;

a precision alignment means for aligning said constructional units at selected working positions;

means mounted at predetermined locations on each of said separate constructional units for interacting with said precision alignment means for locating said separate constructional units in the reusable working positions on said planar top surface for different operating ranges.

---

**5,018,310**

### KNIFE SHARPENER

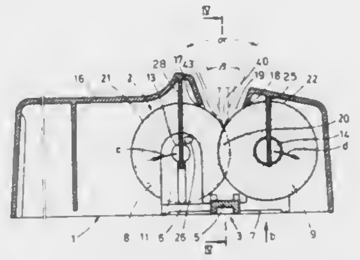
**Udo Fierus, and Gerd Fierus, both of Am Gierlichshof 10, D-5090 Leverkusen 3, Fed. Rep. of Germany**

**Filed Sep. 18, 1989, Ser. No. 440,761**

**Claims priority, application Fed. Rep. of Germany, Sep. 29, 1988, 3833065**

**Int. Cl.$^5$ B24B** *3/36, 3/54*

**U.S. Cl. 51—80 BS** **3 Claims**



1. A non-powered knife sharpener having two round grinding elements which are rotatably supported in a synthetic resin housing underneath a passage opening in the housing wall, the grinding elements having parallel axes of rotation and are offset with respect to each other, these grinding elements forming, by a partial overlapping, a passage with an acute honing angle for a knife blade,

a one piece bracket of a synthetic resin insertable in the housing from the bottom, the central axis of the bracket is in alignment with the central axis of the housing in the installed condition,

said bracket comprising a base plate arranged in the direction of a transverse axis of the housing which is perpendicular to the central axis of the housing, said bracket having two oppositely directed supporting arms of a flat bar profile, which arms have limited resiliency about the transverse axis and extend on both sides of the central bracket axis in parallel relation thereto and at a spacing therefrom,

two bearing blocks supported on the support arms offset from the transverse axis, said bearing blocks having transversely orientated bearing pins for the attachment of said two grinding elements offset with respect to the central axis at equal distances on either side, said grinding elements overlapping in the direction of the transverse axis and having a mutual space therebetween,

said grinding elements extending through slots in the housing wall into a trough-like indentation of the housing accessible from above, and the peripheral surfaces of these grinding elements forming a passage in the region of the indentation with a grinding angle that is infinitely variable within a certain range by deformation of said arms upon exertion of force upon the grinding elements by a knife blade.

---

**5,018,311**

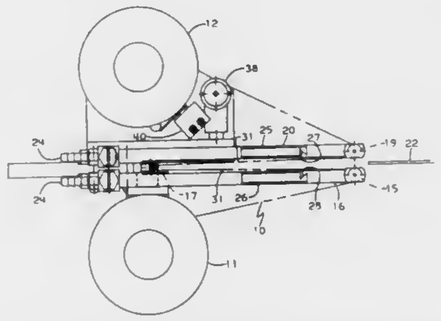
### MAGNETIC DISK BURNISHING METHOD AND APPARATUS

**Gerald D. Malagrino, Jr., Rochester, and Dale A. Nelson, Oronoco, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 28, 1989, Ser. No. 372,971**

**Int. Cl.$^5$ B24B** *21/06, 5/00*

**U.S. Cl. 51—140** **9 Claims**



1. A burnishing apparatus for burnishing the surfaces of a rotating disk comprising a burnishing tape;

means for positioning unsupported stretches of said burnishing tape intermediate locations of support, above and below said rotating disk;

air delivery means for directing a deflected air stream toward each of said stretches of said burnishing tape to urge said tape into contact with the respected confronting surfaces of said rotating disk; and

means for moving said burnishing apparatus relative to said rotating disk to advance the locations of tape contact across the surfaces of said disk.

---

**5,018,312**

### DEFLASHING APPARATUS

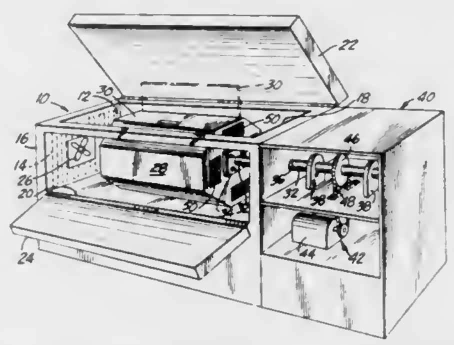
**Al Steckis, 19 N. Ridge Dr., Coram, N.Y. 11727**

**Continuation of Ser. No. 71,365, Jul. 9, 1987, Pat. No. 4,796,388. This application Oct. 17, 1988, Ser. No. 258,575**

**The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.**

**Int. Cl.$^5$ B24B** *31/02*

**U.S. Cl. 51—164.1** **24 Claims**



1. An apparatus for deflashing of elastomeric elements comprising

a) a tumbling barrel having a closable opening for introducing and withdrawal of elastomeric elements and deflashing media to the interior of the barrel;

b) a stationary refrigeration chamber sized for receiving the barrel therein, having an access opening for providing access to a barrel located therein, having means for mounting the barrel therein, and having means for cooling of the barrel and contents thereof, comprising means for lowering the temperature of air in the interior of the chamber, said cooling means consisting of air; and

c) means for imparting motion to the barrel mounted within the stationary chamber to achieve impacting movement to the barrel contents.

---

**5,018,313**

### ROUNDNESS PROCESSING DEVICE OF A SLIPPER SURFACE OF A ROCKER ARM

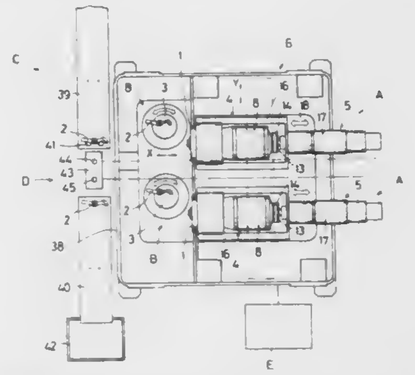
**Shuji Yamane, and Seiji Tou, both of Kyoto, Japan, assignors to Kabushiki Kaisha Nisshin Seisa Kusho, Kyoto, Japan**

**Continuation-in-part of Ser. No. 156,000, Feb. 16, 1988, abandoned. This application Sep. 12, 1989, Ser. No. 406,353**

**Claims priority, application Japan, Jul. 3, 1987, 62-167355**

**Int. Cl.$^5$ B24B** *19/26*

**U.S. Cl. 51—165.71** **22 Claims**



1. A roundness processing device for a slipper surface of a rocker arm, the device comprising:

a wheel side unit containing a disc-shaped grinding wheel which is rotated and driven,

a jig side unit comprising an oscillatable jig for holding the rocker arm,

means for conveying rocker arms,

means for delivering and discharging the rocker arm conveyed by the conveying means into and out of the jig in the jig side unit, wherein the delivering and discharging means is a delivering and discharging robot comprising a moving table movable in the direction of the rotary shaft of the grinding wheel and a delivery loader and a discharge loader mounted on the moving table, and

means for automatically driving and controlling the wheel side unit, jig side unit, and delivering and discharging means in mutual relationship, wherein

the grinding wheel comprises a polishing surface, which is a plane perpendicular to an axial line of the grinding wheel rotary shaft, at one side,

the jig in the jig side unit comprises rocker arm holding means for holding the slipper surface of the rocker arm opposite the polishing surface,

the jig comprises an oscillation shaft parallel to the polishing surface, the oscillation shaft being arranged within a plane perpendicular to the polishing surface containing a contact line between the polishing surface and slipper surface,

the oscillation shaft is coupled with means for oscillating the jig within a preset angular range,

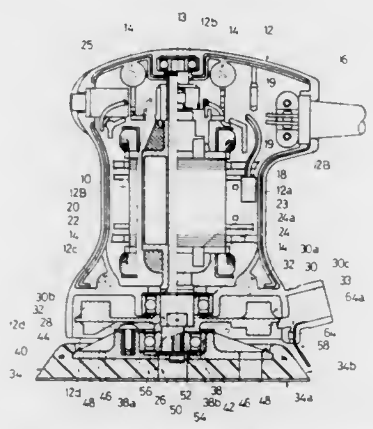
either one of the wheel side unit and the jig side unit contains interval adjusting means for variably adjusting the interval between the polishing surface of the grinding wheel and the oscillation shaft line of the jig, and

the device is capable of processing the slipper surface of the rocker arm to a high degree of dimensional precision.

OL
126
SS
4
MY
28
991
JMI

### 5,018,314
### SANDER

**Fusao Fushiya, and Shinobu Yamaguchi, both of Anjo, Japan, assignors to Makita Electric Works, Ltd., Anjo, Japan**
**Filed Jun. 6, 1990, Ser. No. 533,812**
**Claims priority, application Japan, Jun. 8, 1989, 1-67093[U]; Apr. 27, 1990, 2-46027[U]**
**Int. Cl.$^5$ B24B** *23/03*
**U.S. Cl. 51—170 MT** **5 Claims**



1. A sander comprising a body, a motor mounted on said body and having a rotary shaft, a pad for mounting an abrasive sheet for abrading a work, said pad being drivingly connected to said rotary shaft of said motor, a mechanism interposed between said motor and said pad for transmitting the rotation of said motor to said pad in such a manner that said pad can perform a dual motion including an orbital motion and a rotational motion so as to permit rotation of said pad to reach substantially the same speed as the rotational speed of said rotary shaft when said pad is unloaded, and a resilient member mounted on said body and adapted to contact said pad so as to produce frictional resistance against the rotation of said pad so that the rotational speed of said pad is lowered to prevent the abrasive sheet from being scattered or to prevent the work from being abruptly abraded when said pad is pressed on the work.

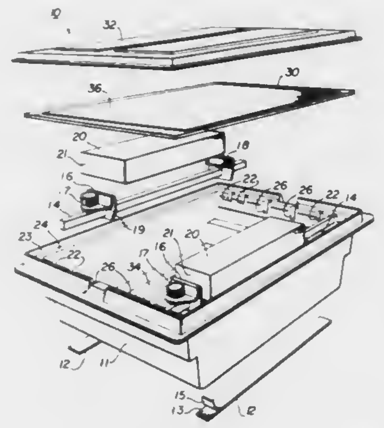
---

### 5,018,315
### APPARATUS FOR HOLDING AND STORING SHARPENING STONES

**Leonard G. Lee, Ottawa; Francis A. McLean, Kemptville, and Jean H. Gagnon, Aylmer, all of Canada, assignors to Lee Valley Tools Ltd., Ottawa, Canada**
**Filed Sep. 5, 1990, Ser. No. 577,864**
**Int. Cl.$^5$ B24B** *3/00, 53/02;* **B28D** *1/00*
**U.S. Cl. 51—213** **7 Claims**

1. An apparatus for holding and storing sharpening stones comprising:

(A) a plurality of sharpening stone holding fixtures, each fixture comprising a bar and two spring clips positionable on the bar so as to clasp a stone therebetween;
(B) a fluid reservoir having
  (1) a bottom containing raised ridges and
  (2) sides attached to the bottom to form a container for fluid, the upper margins of the sides forming an upper peripheral edge that includes
    (i) an upstanding lip defining a recess and
    (ii) a means for receiving the fixtures in a first position comprising a plurality of pairs of notches substantially equal in depth to the thickness of the bar so that the top of the bar is substantially coplanar with the upper peripheral edge of the reservoir and
    (iii) a means for receiving the fixture in a second position comprising a plurality of pair of notches greater in depth than the thickness of the bar so that the top of the bar is lower than the upper peripheral edge of the reservoir; and

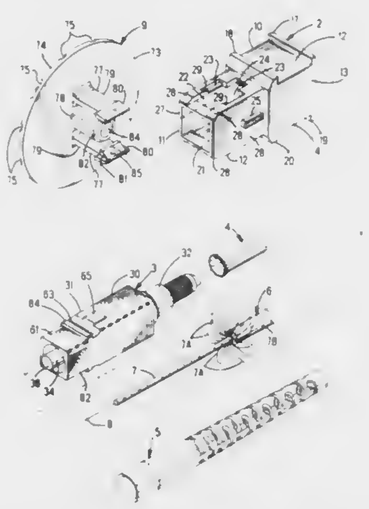


(C) a sheet of glass to be received in the recess to cover the container and provide a surface for lapping stones.

---

### 5,018,316
### POLISHING FIXTURE FOR OPTICAL FIBER OF PUSH-PULL CONNECTOR

**Denis G. Mulholland, Lancaster; Ronald R. Schaffer, and Gary N. Warner, both of Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**
**Filed Jun. 21, 1990, Ser. No. 541,556**
**Int. Cl.$^5$ B24B** *41/06*
**U.S. Cl. 51—216 R** **7 Claims**

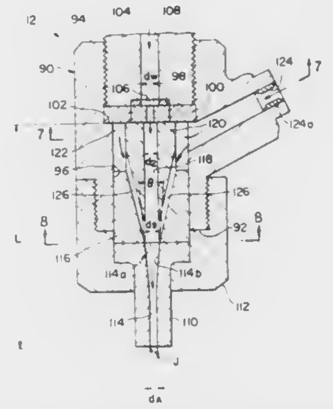


1. A one-piece molded polishing fixture for polishing a front end of a fiber optic member extending from the bore of a ferrule member of an optical fiber connector, comprising; a body member having front disc-shaped flat surface with web of gutters and a bore extending therethrough in which a front end of the fiber optical member is to be disposed with a front surface of the fiber optical member extending outwardly beyond the said front flat surface; and means for securing the body member to the optical fiber connector, wherein said means for securing the body member and connector comprises;

an alignment sleeve and at least two resilient catch pieces of cantilever form terminating in extending protrusions and lip structures.

### 5,018,317
### ABRASIVE WATER JET CUTTING APPARATUS

**Masanori Kiyoshige; Tomonobu Okada; Takashi Kawashima, and Takeshi Hirokawa, all of Hyogo, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan**
**Continuation-in-part of Ser. No. 17,345, Feb. 20, 1987, Pat. No. 4,872,293. This application Jun. 19, 1989, Ser. No. 367,714**
**Claims priority, application Japan, Feb. 20, 1986, 61-36072; Apr. 18, 1986, 61-90398; Jul. 8, 1986, 61-161268; Jul. 8, 1986, 61-161269; Sep. 18, 1986, 61-143415; Sep. 18, 1986, 61-143416; Nov. 5, 1986, 61-264778**
**Int. Cl.$^5$ B24C** *5/00, 5/04*
**U.S. Cl. 51—410** **11 Claims**



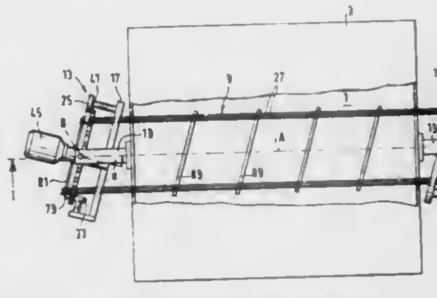
1. An apparatus for cutting a work by means of an abrasive water jet containing abrasive particles, comprising:

(a) a source of water under pressure;
(b) abrasive suspension supply means for supplying an abrasive suspension such that abrasive particles with an average size of up to about 100 microns are held in suspension in water; and
(c) an abrasive water jet nozzle assembly to be held opposite the work to be cut and communicating with both the pressurized water source and the abrasive suspension supply means, the nozzle assembly mixing he pressurized water and the abrasive suspension for directing the resulting mixture against the work as an abrasive water jet, said jet nozzle assembly including a nozzle body having a rectilinear through path made up of a water passageway, a water ejecting orifice disposed downstream of said water passageway, an ejected water passageway disposed downstream of said orifice, and an abrasive water orifice disposed downstream of said ejected water passageway, said abrasive water orifice having an upstream opening of a diameter equal to, or slightly smaller than, a diameter of said ejected waver passageway, said upstream opening being joined with a downstream portion of said ejected water passageway in such a manner that said abrasive water orifice includes an upstream tapered portion having a diameter that increases gradually toward said upstream opening and forms a smooth continuation of said ejected water passageway to produce a streamlined flow of the ejected water, said nozzle body further having an abrasive suspension inlet port connected to the abrasive suspension supply means, an annular abrasive suspension chamber disposed around said through path and connected to said inlet port, and a plurality of abrasive suspension passageways communicatively connecting said abrasive suspension chamber to said downstream portion of said ejected water passageway where said ejected water passageway is joined with said upstream opening of said abrasive water orifice, said abrasive suspension passageways being directed toward said upstream opening and having walls which merge with said upstream tapered portion of said abrasive water orifice to supply the abrasive suspension into said upstream opening in the form of an outer layer of streamlined flow of the abrasive suspension, surrounding the streamlined flow of the ejected water, whereby a dual-layer flow of the water and the abrasive suspension is produced through said abrasive water orifice.

---

### 5,018,318
### APPARATUS FOR SURFACE TREATMENT OF WORKPIECES

**Werner Hunziker, Im Kopfli 262, CH-5054 Kirchleerau, Switzerland**
**Filed Dec. 5, 1989, Ser. No. 446,210**
**Claims priority, application Switzerland, Dec. 6, 1988, 4514/88**
**The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.**
**Int. Cl.$^5$ B24C** *3/10, 3/18, 9/00*
**U.S. Cl. 51—417** **15 Claims**



1. Apparatus for advancing and changing the orientation of workpieces, comprising a rotary receptacle having an axis of rotation and including a tubular shell having an internal space for workpieces, a plurality of elongated first components extending in substantial parallelism with said axis and having first and second end portions, and additional elongated components having first and second end portions, said additional components being disposed at a first distance from said axis and said first components being located at a greater second distance from said axis, said receptacle further having first and second end walls and means for connecting said end walls to the respective end portions of said first components, said end walls having apertures which receive with play the respective end portions of said additional components, said connecting means including universal joints at least between said first end wall and the first end portions of said first components, said joints including resilient means for subjecting said first components to longitudinal tensional stresses; and means for rotating said shell about said axis to thereby reciprocate said first components at least in a predetermined portion of said shell, including means for maintaining said end walls at an oblique angle to said axis while said shell rotates.

---

### 5,018,319
### PNEUMATIC TUBE SELECTOR MECHANISM

**James J. Allard, Vacaville, Calif., assignor to Pauli & Griffin, Vacaville, Calif.**
**Filed Mar. 13, 1989, Ser. No. 322,575**
**Int. Cl.$^5$ B24C** *9/00*
**U.S. Cl. 51—424** **16 Claims**

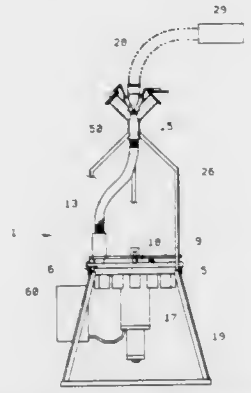
1. A pneumatic tube selector mechanism for use in conjunction with vacuum generating means for collecting abrasive materials from a plurality of discrete sources, the tube selector comprising:

an intake manifold having a multiplicity of intake ducts arranged in a circle about a manifold centerpoint, each said intake duct being in fluid communication with a particular one of said discrete sources;
a vacuum duct having a first end coupled to the vacuum generating means;
a selector plate rotationally coupled to the intake manifold for rotation about a selector plate axis that extends through said manifold centerpoint, the selector plate hav-

OL
126
SS
4
MY
28
991
UMI

ing an opening therein that is coupled to a second end of the vacuum duct;

drive means for rotating the selector plate about the selector plate axis to selectively couple the selector plate opening to any particular one of the circularly arranged manifold intake ducts;



positioning means for precisely positioning the selector plate relative to a selected intake duct to insure good fluid communication between said vacuum duct and the selected intake duct; and

a roller for rotationally supporting the selector plate upon the intake manifold.

---

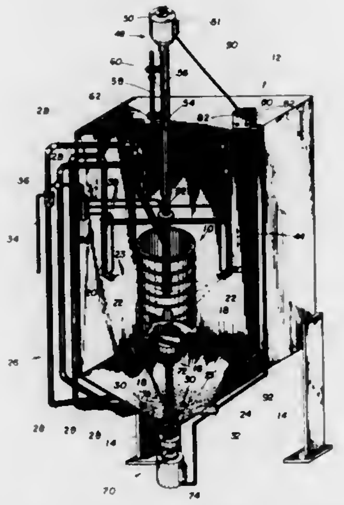
### 5,018,320
### STRIPPER ASSEMBLY FOR COMBUSTION CHAMBERS OF TURBINE OR JET ENGINES

**Michael Anguelo, and George Angulo, both of 2358 W. Eighth La., Hialeah, Fla. 33010**

**Filed Feb. 9, 1989, Ser. No. 308,298**

**Int. Cl.$^5$ B24C** *3/00*

**U.S. Cl. 51—426** **13 Claims**



11. A cleaning assembly for combustion chambers of gas turbine and jet engines designed to direct blast media under high pressure air onto surfaces of the combustion chamber being cleaned, said assembly comprising:

a. a housing including a hollow interior dimensioned to enclose the combustion chamber and including a mounting structure disposed and structured to support the chamber within said hollow interior,

b. a spray nozzle assembly mounted within said housing and including a plurality of nozzle members disposed in spaced relation to one another and collectively in surrounding relation to exterior and interior surface portions of the chamber, whereby blast media is directed onto the exterior and interior surface portions,

c. transfer means comprising flexible conduit means mounted on said housing and including flexible conduit means extending into the housing and being connected to said spray nozzle assembly for directing the blast media under pressurized fluid flow to said spray nozzle members,

d. a first drive means including a drive motor connected to said spray nozzle assembly and structured for reciprocating linear movement of said plurality of spray nozzles within said housing and along a length of the chamber being cleaned,

e. a second drive means including a drive motor connected to said mounting structure and structured for rotation of said mounting structure and the combustion chamber mounted thereon within said housing and relative to said spray nozzle assembly, and

f. said flexible conduit means extending into the housing and to each nozzle member accommodating said reciprocating linear movement.

---

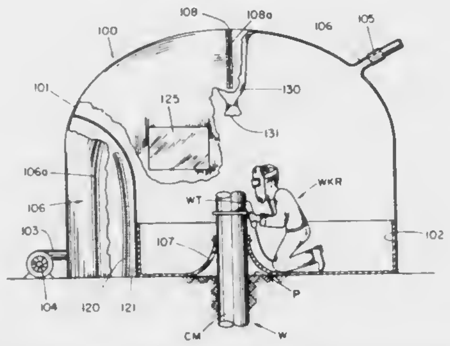
### 5,018,321
### SUBTERRANEAN WELL WELDING HABITAT

**Louis J. Wardlaw, III, Cypress, Tex., assignor to Hot-Hed, Inc., Houston, Tex.**

**Filed May 2, 1990, Ser. No. 517,926**

**Int. Cl.$^5$ E04G** *11/04*

**U.S. Cl. 52—2.17** **7 Claims**



1. A flexible subterranean well transmission welding habitat for entrapment of welding slag, sparks and the like, comprising:

an outer air-suspendable arcuate dome mountable over a subterranean well entry point, said entry point receiving a conduit member extendable into the dome and upon which a welding procedure is to be effected;

a fire-resistant shield element disposable around at least part of the interior of said dome;

means for introducing a supply of air for selectively suspending said dome over said entry point; and

means extending through an upper portion of said dome and away from said entry point and communicating with interior of said dome to permit smoke including particulate matter resulting from the weldint procedure to be effectively discharged from the interior of said dome.

---

### 5,018,322
### ELECTRICALLY-OPERATED FOLDING STAGE SYSTEM

**Kazuo Fujita, No. 1, Hagiyamadai 1-Chome, Seto-shi, Aichi-ken, Japan**

**Filed Feb. 6, 1990, Ser. No. 475,867**

**Claims priority, application Japan, Apr. 15, 1989, 1-96187**

**The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.**

**Int. Cl.$^5$ E04H** *3/26*

**U.S. Cl. 52—7** **8 Claims**

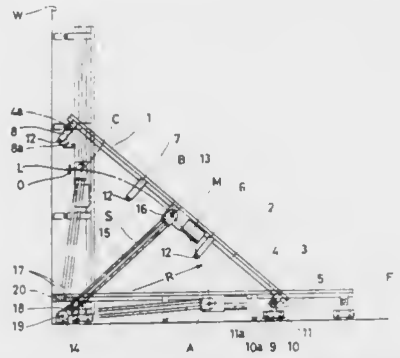
1. An electrically-operated folding stage system comprising

(a) a stage body with (i) a platform and (ii) plural rows of legs with upper ends connected to a bottom of the platform,

(b) plural wheel means each associated with one of the rows of the legs and provided in conjunction with a front end portion of the platform to facilitate movements of the stage body on a floor,

(c) geared motors fixed to the bottom of the platform and each capable of being rotated in either of opposed directions to move the stage body between a horizontal position on the floor and a vertical position immediately adjacent to a wall,

each of the geared motors having an output shaft,



(d) swing arms each having one end fixed to the output shaft of one of the geared motors, and

(e) support means each provided in conjunction with one of the swing arms and located on a given position predetermined in relation to a lower portion of the wall for pivotally supporting an opposed end of the swing arm,

said given position being selected from among a corner at which the floor and the wall meet, a position on the floor which is in close proximity to the wall, and a position on the wall which is on a lower level than the platform when the platform is in a horizontal position on the floor.

---

### 5,018,323
### WALL PANEL SYSTEM

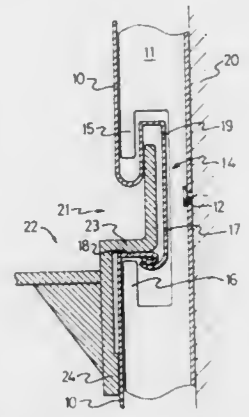
**Knud Clausen, 6/24 Savannah Street, Epsom, Auckland, New Zealand, assignor to Knud Clausen and Murray R. Fitzsimmons, both of Epsom, New Zealand**

**Filed May 8, 1990, Ser. No. 520,451**

**Claims priority, application New Zealand, May 12, 1989, 229095**

**Int. Cl.$^5$ A47B** *47/00;* **G09F** *7/18*

**U.S. Cl. 52—36** **6 Claims**



1. A shelf support system including:

a plurality of elongate support elements,

a plurality of elongate generally planar wall panels arranged in normal use transversely across said elongate support elements; and

a plurality of shelf supports each including a hook or flange;

wherein each said elongated support element includes a plurality of recesses therein, each said recess being undercut in said support element, to provide at least one overhanging lip at the mouth of said recess;

each said wall panel is comprised of sheet material and includes a first part of a channel along a first edge of said panel, a complementary second part of a channel parallel to said first part along a second edge opposite said first edge, and a raised face between said parts of a channel;

at least one said part including to substantially rigid oppositely recurving portions, providing the general form of an S-bend in cross-section, a first portion providing an overhanging flange and the second portion recurving behind the first to provide an undercut channel behind said first portion;

whereby a channel can be formed by the association of said first edge of one said panel with said second edge of a second said panel, said channel having at least one overhanging flange;

wherein the dimensions of said parts of a channel and recesses provide that a said first part of a channel can be fitted into a said recess, extending transversely relative to said elongate support element. and is movable longitudinally relative to said support element within said recess to an engaged position at which said first substantially rigid recurving portion passes around said overhanging lip, and said second substantially rigid recurving portion underlies said overhanging lip, the longitudinal overlap between said lip and said second recurving portion acting to engage said channel in said recess;

further including means engageable to retain said first part of a channel in said engaged position by stopping movement of said panel longitudinally relative to said support element, said means including a transversely projecting flange on said panel, and a coacting detent on said support element;

and wherein said hook or flange of said shelf supports can be engaged in said undercut channel to support a shelf.

---

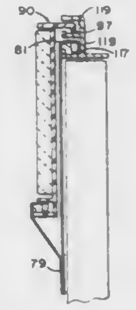
### 5,018,324
### SWIMMING POOL WALL

**Jay A. Lankheet, Holland, Mich., assignor to Americana Pools, Holland, Mich.**

**Filed Dec. 28, 1989, Ser. No. 458,090**

**Int. Cl.$^5$ E04H** *3/16. 3/18*

**U.S. Cl. 52—169.7** **32 Claims**



1. A swimming pool wall panel assembly comprising:

a wall panel.

a deck support pivotally mounted on said wall panel. said deck support being adapted to pivot between a position against said wall panel and an open deck supporting position projecting away from said wall panel;

a brace pivotally mounted on said wall panel and adapted to be connected to said deck support when said deck support is moved into position to support a deck. said brace pivoting on both a vertical axis and a horizontal axis when said

OL
126
SS
4
MY
28
1991
UMI

wall panel is positioned to provide a vertical pool wall; and

said deck support including means for receiving a ground stake for holding said deck support when in position to support a deck.

---

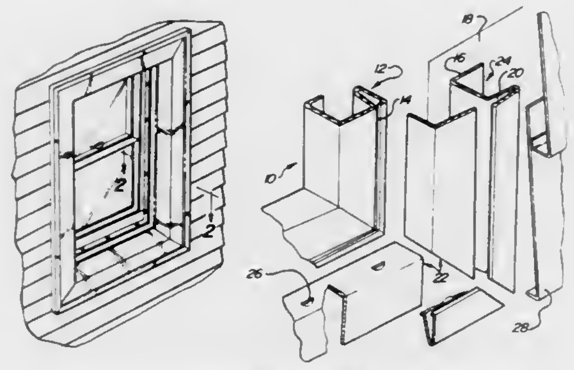
### 5,018,325
## SYSTEM AND METHOD FOR SHIELDING THE PERIPHERY OF A FRAMEWORK OF A BUILDING OPENING ADJACENT A BUILDING SURFACE

**Oliver Geen, 1068 Briarhurst, Manchester, Mo. 63021, and Cornelis G. Arens, 4247 White Birch Dr., W. Bloomfield, Mich. 48033**

**Filed Sep. 24, 1990, Ser. No. 587,774**

**Int. Cl.$^5$ E06B *1/04***

**U.S. Cl. 52—211** **15 Claims**



1. A system for shielding an opening left between portions of a system covering the external surfaces of a building comprising:

a first member which defines an elongated linearly extending first channel, said first member having a closed interior portion defining part of said first channel and an elongated slotted opening which communicates with said first channel, said first member further having a flange means for maintaining said first channel in fixed relation to said framework in which said first channel is oriented in a predetermined manner with respect to said building surface;

a second member which defines an elongated linearly extending second channel, said second member having a closed interior portion defining part of said second channel and an elongated slotted opening which communicates with said second channel, said second member further having a flange means for attaching to said building surface thereby maintaining said second channel in fixed relation to said framework in which said second channel is oriented in a predetermined manner with respect to said building surface;

a facia member having first and second planar portions, said first portion having an edge for slidable insertion into said slotted opening of said first member and said second portion having an edge for slidable insertion into said slotted opening of said second member, said facia member thereby spanning the periphery of said framework between said first and second members to provide a weather resistant cover.

---

### 5,018,326
## BUILDING SYSTEM

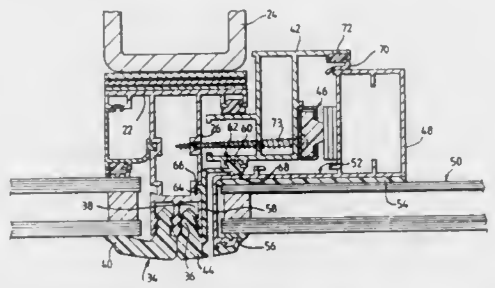
**Donald A. Reynolds, Baildon, United Kingdom, assignor to Don Reynolds International Limited, Bradford, United Kingdom**

**Filed Nov. 9, 1989, Ser. No. 435,004**

**Claims priority, application United Kingdom, Nov. 11, 1988, 8826426**

**Int. Cl.$^5$ E06B *3/62***

**U.S. Cl. 52—235** **5 Claims**



1. An opening window for use with curtain wall systems comprising an outer frame having an external side and being adapted to fit to the framework members of the curtain wall system, and an inner frame having an external side and forming the movable opening portion of the window and bearing the glazed portion of the window, the inner frame being positioned within the outer frame and being hingedly attached thereto, and the outer edge of the glazed portion extending outwardly beyond the boundaries of the inner frame at the external side thereof so as to be substantially coextensive with the external side of the outer frame, the outer frame carrying a first gasket and the outer edge of the glazed portion carrying a second gasket, both gaskets being arranged so tat they together give the appearance of an infill retaining unitary gasket at the external side of the outer frame.

---

### 5,018,327
## PREFABRICATED PLATE ELEMENTS FOR THE CONSTRUCTION OF INSULATING CHAMBERS

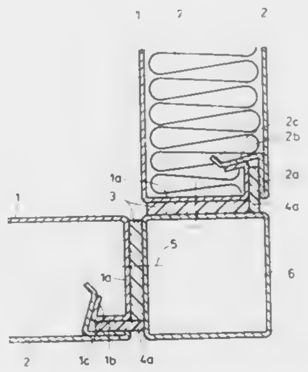
**Rudolf A. Goebel, Brunisried, Switzerland, and Konrad Stolzlechner, Brunico, Italy, assignors to Aelos Holding AG, Heerbrugg, Switzerland**

**Filed May 31, 1988, Ser. No. 203,344**

**Claims priority, application Italy, Jul. 31, 1986, 4837 A/86**

**Int. Cl.$^5$ F16S *1/00***

**U.S. Cl. 52—282** **8 Claims**



1. Prefabricated plate element for the construction of insulating chambers, insulating walls, as well as coverings, which comprises

a cover providing a substantially planar outer surface for the plate element;

a box-shaped sheet metal part (1) having an insulating filling (7), characterized in that between said box shaped sheet metal part (1) and said cover (2) there is provided a snap connection which can be repeatedly released without causing any damage to the snap connection, which snap connection exhibits

two oppositely disposed and parallel running support faces and

two extension sections adjoining to the respective parallel running support faces and bent relative to respective one of the two support faces in a direction away from said planar outer surface of the cover and wherein the extension sections are in direct contact for forming a form-stable connection between the cover and the box-shaped sheet metal part;

a first seal disposed between said support faces, said first seal disposed substantially in parallel to the planar outer surface.

---

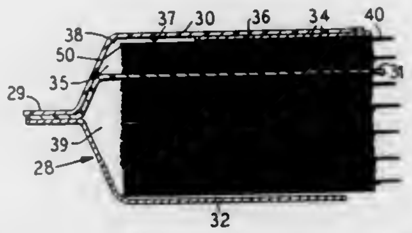
### 5,018,328
## MULTI-COMPARTMENT VACUUM INSULATION PANELS

**Nihat O. Cur, and David B. Kirby, both of St. Joseph Township, Berrien County, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Dec. 18, 1989, Ser. No. 451,830**

**Int. Cl.$^5$ B32B *3/28, 1/06***

**U.S. Cl. 50—406** **18 Claims**



1. A vacuum thermal insulation panel comprising:

a first outer wall;

a second outer wall coextensive and parallel with said first outer wall;

at least one internal wall coextensive and parallel with said outer walls, interposed between said first outer wall and said second outer wall and hermetically sealed together with said first outer wall and said second outer wall about their perimeters;

a first compartment being evacuated and containing a predetermined amount of a microporous insulating material, said compartment being defined by an internal wall and one of said outer walls, with the pressure differential across said internal wall being very small; and

a second compartment being evacuated and containing a predetermined amount of a microporous insulating material, said second compartment being defined by an internal wall and the other of said outer walls, with the pressure differential across said outer wall being approximately equal to atmospheric pressure.

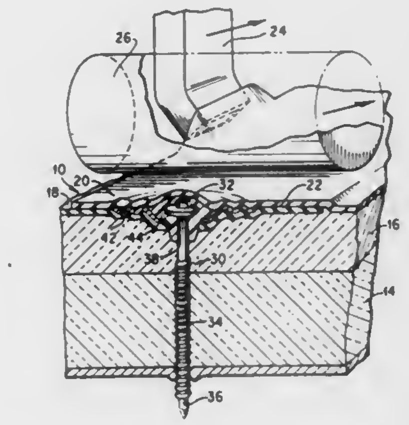
---

### 5,018,329
## ATTACHMENT OF ROOFING WASHER WITH HEAT-SEALED SCREW-WASHER ASSEMBLAGE

**S. Riaz Hasan, Palatine, and Louis Thomas, Maywood, both of Ill., assignors to Illinois Tool Works Inc., Glenview, Ill. Continuation of Ser. No. 417,368, Oct. 5, 1989, abandoned. This application May 25, 1990, Ser. No. 528,914**

**Int. Cl.$^5$ E04B *5/00***

**U.S. Cl. 52—410** **13 Claims**



1. A method of attaching a sheet of roofing material, such as a roofing membrane, to an underlayment, such as a metal or wooden deck, possibly with one or more layers of roofing material, such as a blanket of roofing insulation, between the sheet of roofing material and the underlayment, the method comprising:

(a) providing a screw having a head and having a threaded shank,

(b) providing a composite roofing washer being an assemblage of

  (1) a metal roofing washer having a central aperture and having a countersunk cavity, which includes the central aperture,

  (2) a thermoplastic insert, which is made of a material that flows when heated sufficiently and that resolidifies when cooled to ambient temperatures prevailing where the method is practiced, the thermoplastic insert being inserted into the countersunk cavity of the metal roofing washer and having a central hub, the central hub extending through the central aperture of the metal roofing washer and being shaped so as to interlock the thermoplastic insert and the metal roofing washer, the thermoplastic insert having a central aperture and having a central socket, the central socket being adapted to receive the head of the screw,

(c) driving the screw so as to drive the threaded shank of the screw through the central aperture of the thermoplastic insert, through the sheet of roofing material and any layer or layers of roofing material between the sheet of roofing material and the underlayment, and into the underlayment until the head of the screw is received by the central socket and bears against the thermoplastic insert,

(d) heating the thermoplastic insert so as to cause some of the material of the thermoplastic insert to flow into the central socket and over at least part of the head of the screw, while the thermoplastic insert and the metal roofing washer remain interlocked at the central hub, thereby to heat-seal the screw to the thermoplastic insert when the material caused to flow resolidifies, and

(e) terminating step (d) so that the thermoplastic insert can cool and pressing on the thermoplastic insert after the thermoplastic insert has been heated but before the material caused to flow has resolidified.

VOL 126
SS 4
MY 28
1991
UMI

**5,018,330**

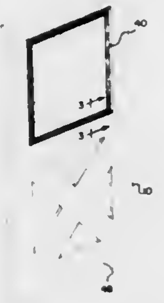
### DOOR LIGHT

Bernd Lewkowitz, English Creek and West Jersey Ave., McKee City, N.J. 08232

Filed Jan. 31, 1990, Ser. No. 472,726

Int. Cl.$^5$ E06B *3/58*

U.S. Cl. 52—455 — 17 Claims



1. A door light for installation in a door of the type having an interior surface, an exterior surface, a shaped opening provided in the door and defining a periphery, and glass within the opening, the door light comprising:

a plurality of clips securing the glass to the door within the opening, each said clip being a discrete fastening element and comprising:

a first member and a second member, the first and second members contacting opposite sides of the glass,

each clip member comprising a first leg overfitting the periphery of the door opening and a second leg in contact with one of said glass surfaces,

the first leg of the first clip member being provided with a first hole,

the first leg of the second clip member being provided with a second hole;

a fastener connecting the first clip member to the second clip member;

first and second door light frames peripherally overfitting the shaped opening on opposite sides of the door, each of the door light frames comprising an integral one piece molding of plastic fitted around the periphery defined by the shaped opening in the door, and each of the door light frames being respectively secured to one of said first clip member and said second clip member, the door light frames and the respective first and second clip members defining protrusions having abutments, and complementary recesses which interfit with the protrusions, to lock the door light frames to the first and second clip members inwardly toward the door and the glass, the protrusions being directed in opposite directions along surfaces of the door and the glass, thereby fixing the door light frames to the door while permitting expansion and contraction of the door light frames relative to the door.

---

**5,018,331**

### WALL REPAIR METHOD AND DEVICE

Richard Forzano, Cedar Grove, N.J., assignor to RJF Industries, Inc., Cedar Grove, N.J.

Filed Jun. 7, 1990, Ser. No. 536,411

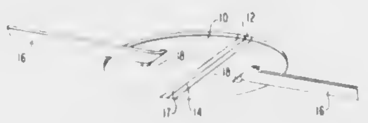
Int. Cl.$^5$ E04G *23/00*

U.S. Cl. 52—514 — 10 Claims

1. A backing device for use in repairing hollow walls and ceilings, comprising:

a foldable support plate member, said plate member including at least two segments joined by hinging means; and

pulling means for transmitting a pulling force to said foldable support plate member on opposite sides of said hinging means through a hole in a wall which is to be repaired whereby said support plate member can be folded and inserted through said hole in said wall, and unfolded inside said hole, and said pulling means pulled through said hole and secured to the exterior of said wall.



---

**5,018,332**

### GRATING

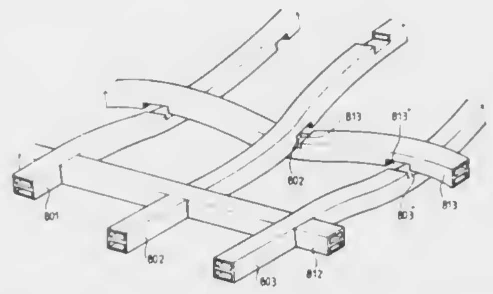
Choi Ying-Kit, 7F1-6, No. 303, Tun Hwa North Road, Taipei, Taiwan

Filed Apr. 11, 1990, Ser. No. 507,531

Claims priority, application Taiwan, May 11, 1989, 78103598

Int. Cl.$^5$ E04C *5/04*

U.S. Cl. 52—666 — 2 Claims



1. A grating comprising at least a longitudinal tubular element and at least a tranverse tubular element, each of said longitudinal and transverse tubular elements has at least a hollow upper portion and a hollow lower portion, and is intermittently staggeringly provided with a plurality of indentations respectively positioned in an upper portion and a lower portions of each said tubular element in a manner such that an indentation in said upper portion of one of said longitudinal and tranverse elements is capable of matching with an indentation in said lower portion of the other one of said longitudinal and transverse element, and an indentation in said lower portion of said one element is capable of matching with an indentation in said upper portion of said other one element.

---

**5,018,333**

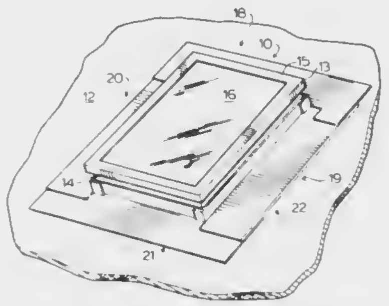
### ELASTOMERIC WEATHER SEAL FLASHING AND METHOD OF MANUFACTURE

Ronald Bruhni, 707 Arrow Rd., Weston Ontario, Canada M9M 2L4

Filed Aug. 9, 1990, Ser. No. 564,759

Int. Cl.$^5$ E04B *7/18*

U.S. Cl. 52—741 — 1 Claim



1. The method of fabricating a flashing assembly of elastomeric sheet material in the form of a frame for surrounding objects, such as skylights, projecting from roofs said assembly comprising a plurality of sealedly lapping panels each embodying a relatively wide apron and an upstanding flange extending along one elongated edge thereof the ends of said flanges having overlapping sealedly connected wings on the ends thereof whereby to provide collectively a continuous fastener surrounding the inner edges of said assembly capable of co-planar sealing engagement with a projecting curb secured around an opening hole in a roof; and wherein said flanges are integral with said panels and project substantially at right angles to the overall plane of the panels, around the inner edge of said assembly, the ends of said panels projecting in their plane to provide double-thickness overlapping, double-thickness skirting at the junction of each pair of adjacent flanges and hence extra snug packing abutments at the corners of said assembly; comprising the steps of;

making first incisions in said sheet material inwardly at right angles to the inner edge at two spaced location in the vicinity of the opposite ends thereof; making short second incisions parallel with the edge of said material and at right angles to the first incisions of a length such as to terminate at the inner ends of said first incisions; and

(a) folding the sheet material such that the material between the inner ends of said first incisions at right angles to the plane of said material thereby forming said flange; and (b) folding the ends of said flanges at right angles at the junctions of said second incisions and the line-of-fold between said flange and said sheet material and also folding the incised ends of said flanges at right angles to form said wings and sealably securing adjacent wings in overlapping relationship to form a continuous collar upstanding at right angles to the plane of said sheet along the inner edge of said frame.

---

**5,018,334**

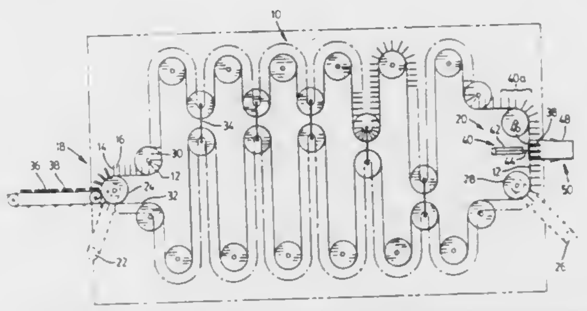
### CARTON LOADING MACHINE HAVING LOAD ACCUMULATOR

Peter Guttinger, Rexdale; H. J. Paul Langen, and Ronald J. Langen, both of Brampton, all of Canada, assignors to H. J. Langen & Sons Limited, Mississauga, Canada

Filed Apr. 11, 1990, Ser. No. 507,502

Int. Cl.$^5$ B65B *35/30, 35/44*

U.S. Cl. 53—152 — 1 Claim



1. A carton loading machine which receives load items from an infeed conveyor that conveys the items one at a time in at least one row of items, said carton loading machine comprising:

(a) a carton loading station in which a plurality of load items are loaded simultaneously into a carton,

(b) a variable capacity load accumulator comprising;

i) a load transfer conveyor having load transporting compartments at spaced internals along the length thereof,

ii) an input station in which a single load transporting compartment is located,

iii) a discharge station in which a group of at least two longitudinally spaced load transporting compartments are located,

iv) a forward run which has a substantial length extending from the input station to the discharge station and a return run extending from the discharge station to the input station,

v) first and second conveyor drive means located proximate the input station and the discharge station respectively and operable to independently drive or arrest the movement of the forward run through the load transfer station and through the input station to vary the load storage capacity of the forward run to provide a range of load storage capacity which is substantially greater than the load capacity of the carton loading station to accommodate substantial interruption in the supply of load items to the input station or the transfer of load items in the carton loading station,

(c) said variable capacity load accumulator being located between the infeed conveyor and said carton loading station with said input station arranged to admit load items into each of said single load transporting compartments in turn as successive compartments are located in said input station, and with said discharge station located with one said group of load transporting compartments opening into said carton loading station, and

(d) transfer means mounted for movement between the discharge station and carton loading station and operable to transfer load items from the group of load transporting compartments located in said discharge station into said loading station to load a carton located therein in use.

---

**5,018,335**

### CAPSULE CHARGING APPARATUS

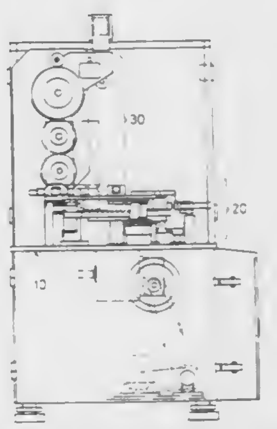
Taizo Yamamoto, Osaka, and Hirokazu Konishi, Sakurai, both of Japan, assignors to Nippon Elanco Kabushiki Kaisha, Osaka, Japan

Filed Dec. 22, 1989, Ser. No. 455,096

Claims priority, application Japan, Dec. 28, 1988, 63-334002

Int. Cl.$^5$ A61J *5/00;* B65B *43/40*

U.S. Cl. 53—281 — 3 Claims



1. In a capsule charging apparatus for charging a hard gelatin capsule with a filling of powder, granule, or liquid continuously in constant amounts, wherein said capsule having a cap and a body coupled together is received and held in an upright posture at one of the positions in which a turntable intermittently rotatable through every predetermined rotation angle around a vertical shaft pauses, and operation processes such as separation of said filling into said body of said capsule. charging of said filling into said body, coupling of said cap with said body, and ejection of said charged capsule are performed in order during one rotation of said turntable at plural positions including said position which are defined by said rotation angle of said turntable,

said capsule charging apparatus is characterized in that said turntable comprises a cap rotary member and a body rotary member disposed opposite to each other with a predetermined space therebetween in the vertical direction of said vertical shaft of said turntable and on the disc surface of said cap rotary member, cap containing pockets for holding the caps separated from the bodies are provided, and on the disc surface of the body rotary member, body containing pockets are provided corresponding to said cap containing pockets of said cap rotary member,

between said cap rotary member and said body rotary member a capsule guide member is interposed for separating said capsule which connects the cap containing pockets with corresponding body containing pockets so as to allow said capsule body to pass from said cap containing pockets to said body containing pockets only when said capsule is separated into cap and body, and

between said cap rotary member and said body rotary member a capsule guide member is interposed for coupling said capsule which connects the cap containing pockets with corresponding body containing pockets so as to allow said capsule body to pass from said body containing pockets to said cap containing pockets only when said cap is coupled with said body charged with a filling,

wherein, said capsule guide member for separating said capsule comprises pocket bores bored at a capsule guide base and tubular members inserted one end thereof movably in the vertical direction into said pocket bores with large diameter allowing said capsule body to pass therethrough, and said capsule guide member for coupling said capsule comprises tubular members provided movably in the vertical direction allowing said capsule to pass therethrough.

---

### 5,018,336
### SYSTEM AND PROCESS FOR PRODUCING OR TREATING CYLINDRICAL ARTICLES AND APPARATUS EMPLOYABLE THEREIN

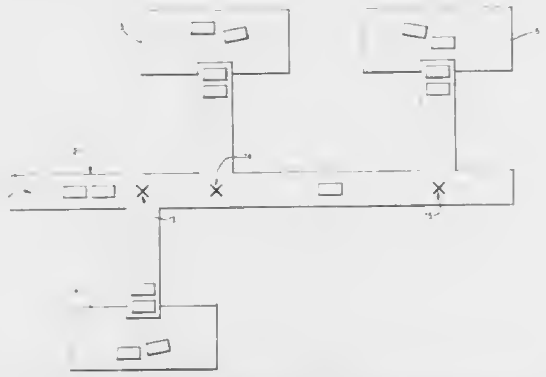
**Giovanni Mengotti, and Italo Pacchioni, both of Vicenza, Italy, assignors to Umberto Bastianello, Vicenza, Italy**

**Filed Nov. 28, 1989, Ser. No. 442,982**

**Claims priority, application Italy, Nov. 28, 1988, 3676 A/88; Jun. 16, 1989, 45742 A/89; Jun. 23, 1989, 45746 A/89; Jun. 28, 1989, 45749 A/89**

**Int. Cl.$^5$ B65B** *35/10, 57/14*

**U.S. Cl. 53—435** **73 Claims**



1. In a system for the production or treatment of articles wherein the articles are transported between an upstream station and a downstream station and wherein the speed of the articles from the upstream station is greater than the speed of operation of the downstream station, said system comprising means for the production of cylindrical cops by a winding step to form a tube-like shape, a cutting step to cut the tube-like shape to form tubes, a drying step to dry the thus cut tubes, a cutting-to-length step to cut the tubes to selected lengths, and a final trimming step to result in the cops, the improvement comprising:

- a plurality of said downstream stations; and
- articles distributing means, located between said upstream station and said plurality of downstream stations, and operable to distribute the articles to any of said plurality of downstream stations, for selectively distributing the articles to said plurality of downstream stations as a function of operating conditions thereof.

---

### 5,018,337
### USE OF REACTIVE HOT MELT ADHESIVE FOR PACKAGING APPLICATIONS

**David G. Carter, Chorleywood; Derek J. Green, Langley, and Michael C. Collins, High Wycombe, all of United Kingdom, assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.**

**Filed Apr. 10, 1989, Ser. No. 335,309**

**Int. Cl.$^5$ B65B** *3/02*

**U.S. Cl. 53—458** **7 Claims**

1. In a process for sealing cases and cartons comprising the steps of: (1) erecting the case or carton blank; (2) filling the case or carton with a material containing aromatic oils, solvents or petrochemicals; (3) apply adhesive to one or more of the carton flaps; (4) compressing the flap(s); and (5) allowing the adhesive to set or cure, the improvement which comprises using as the adhesive a solvent-free hot melt polyurethane adhesive composition which is solid at room temperature and resistant when cured to attack by such aromatic oils, solvents or petrochemicals and/or vapors therefrom, said adhesive composition consisting essentially of:

- (a) 5 to 90% by weight of a urethane prepolymer having an isocyanate content of 0.25 to 15% and an isocyanate index greater than 1 and no more than about 2;
- (b) 10 to 95% by weight of a low molecular weight polymer of ethylenically unsaturated monomers containing no active hydrogen; said hot melt adhesive formulation being characterized, in the absence of tackifiers and/or plasticizers, by a viscosity of 3000 to 50,000 cps. at 120° C.

---

### 5,018,338
### SLICED FOOD HANDLING DEVICE

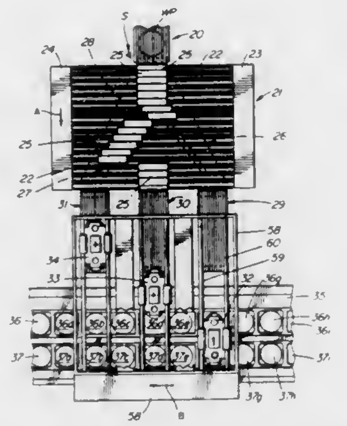
**Paul Jurchuk, Kitchener; David Hooper, Waterloo; Alan Staff, Kitchener, and Hans Sitt, Waterloo, all of Canada, assignors to Thurne Engineering Co., Limited, Norwich, England**

**Filed Oct. 27, 1989, Ser. No. 427,425**

**Claims priority, application Canada, Nov. 28, 1988, 584266**

**Int. Cl.$^5$ B65B** *35/50, 39/12*

**U.S. Cl. 53—532** **22 Claims**



1. Apparatus for transfer of a workpiece having a predetermined shape and size, from conveyor means having a generally horizontal conveying path defined by an upper run of a number of parallel, spaced-apart endless bands trained about guide roller means, to an unloading station remote from the conveyor means, said apparatus comprising, in combination:

- a) workpiece retainer means including at least two stop members spaced apart transversely of the conveying path, said stop members being associated with the conveyor means for selectively assuming a retracted position, wherein the stop members clear said conveying path, and an extended position in which the stop members protrude, between the respective bands, above the conveying path, to retain the workpiece on the conveying path while the conveyor continues to run;
- b) workpiece raising means including a set of at least three normally generally vertical support pins spaced apart and adapted to selectively assume a lowered position in which position the tops of the pins clear the conveying path, and a raised position, in which position the support pins extend upwardly between the bands, with the tops disposed above the conveying path, the tops being arranged in a pattern for supporting a respective workpiece previously retained by said retainer means;
- c) carriage means for engaging a respective raised workpiece supported on the tops and for carrying the workpiece away from said conveyor means to said unloading station, said carriage means including
  - i) a pair of opposed finger systems defining a plurality of normally generally horizontal, parallel and coplanar fingers, one system including at least one first finger, the other system including at least one second finger, said first and second fingers pointing in opposite directions, each toward the opposed finger system
  - ii) first actuation means for selectively moving the finger systems from an open position wherein free end portions of the fingers are remote from each other and from a respective raised workpiece, to a closed position wherein the free end portions are adapted to be disposed immediately underneath a respective raised workpiece, whereby, upon lowering of the raising means, the workpiece rests upon the horizontal fingers;
  - iii) second actuation means for moving the closed finger systems from a first position wherein the fingers are disposed above the conveyor means, to a second position in which the fingers are disposed at the unloading station;
  - iv) discharge means for discharging the workpiece from the carriage means to said unloading station.

---

### 5,018,339
### APPARATUS FOR SHRINK-WRAPPING PALLETIZED GOODS

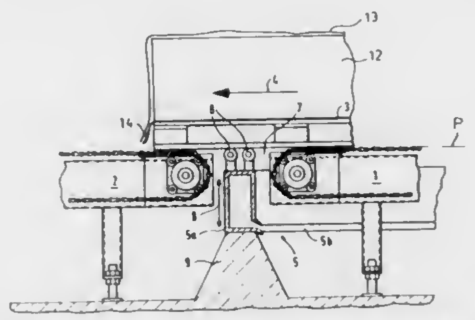
**Reiner W. Hannen, Pfalzdorf; Norbert P. Vermeulen, Kleve-Warbeyen, and Hans-Theo Pieters, Kleve, all of Fed. Rep. of Germany, assignors to MSK - Verpackungs-Systeme Gesellschaft Mit Beschrankter, Kleve, Fed. Rep. of Germany**

**Filed Jun. 18, 1990, Ser. No. 540,014**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1989, 8907610[U]**

**Int. Cl.$^5$ B65B** *53/02, 53/06*

**U.S. Cl. 53—557** **5 Claims**



1. An apparatus for shrinking a wrapping about goods carried on a pallet, the apparatus comprising:

- transport means defining a support surface for displacing the palletized goods in a transport direction and including an upstream conveyor, a station conveyor spaced downstream by an upstream gap from the upstream conveyor, and a downstream conveyor spaced downstream by a downstream gap from the station conveyor;
- a heat ring having upstream and downstream portions and side portions extending in the direction therebetween, the ring being displaceable between a lower position with the upstream and downstream portions in the gaps below the surface and the side portions flanking the station conveyor and an upper position above the surface;
- respective upstream and downstream rollers on the upstream and downstream portions and level with the support surface in the lower position of the ring; and
- actuator means for displacing the ring between its upper and lower positions.

---

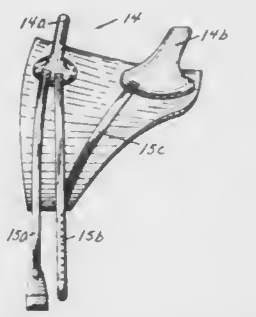
### 5,018,340
### SPORTS SADDLE

**Robert L. Marshall, Rt 2 Box 306B, Salem Hampton, Ky. 42078**

**Filed Apr. 12, 1989, Ser. No. 336,920**

**Int. Cl.$^5$ B68C** *1/02*

**U.S. Cl. 54—44** **6 Claims**



1. A horse saddle comprising an underlayment adapted to engage the body of a horse, independent saddle trees overlaying said underlayment, and stirrup and girth straps each having a portion secured to said underlayment and a free end directly secured to a saddle tree, whereby said saddle trees freely and independently slide in limited areas on said underlayment.

---

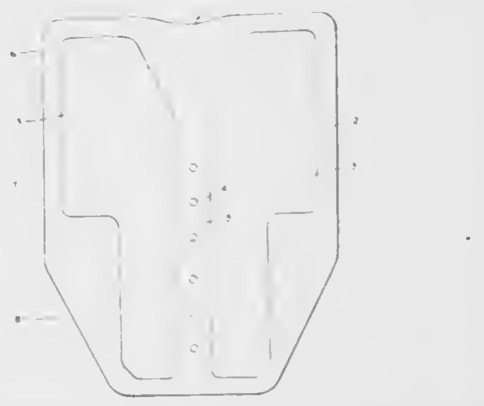
### 5,018,341
### MOLDED SADDLE PAD WITH ENCAPSULATED LAYERS

**Sarah K. Evertson, Ipswich, Mass., assignor to Equine Innovations, Inc., Newbury, Mass.**

**Continuation-in-part of Ser. No. 297,411, Jan. 13, 1989. This application Oct. 2, 1989, Ser. No. 415,901**

**Int. Cl.$^5$ B68C** *1/12*

**U.S. Cl. 54—66** **15 Claims**



1. A back pad for use under saddles comprising a unitary, single-layer molded pad which is formed of a flexible, shock-absorbant polymeric material further comprising:

- a centrally located raised forward portion which rises over the withers area of the horse;

OL
126
SS
4
MY
28
991
JMI

a centrally located channel area which runs the length of the pad from the withers area to the rear of the pad;
a plurality of openings perforating said channel area; and
symmetrical raised cushioning portions located laterally on both sides of the pad in the areas which correspond to the areas where the saddle rests against the back and shoulders of the horse, said cushioning portions having encapsulated therein at least one layer of shock-absorbing material.

---

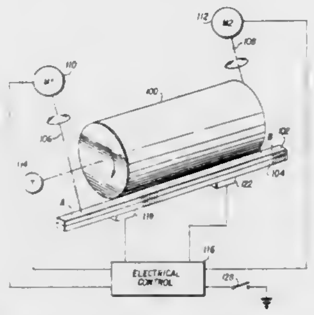
### 5,018,342
### METHOD FOR SHEAR BAR ADJUSTMENT IN A FORAGE HARVESTER

**John R. McClure, New Holland; Marvin G. Weaver, Jr., Lititz, and Richard P. Strosser, Akron, all of Pa., assignors to Ford New Holland, Inc., New Holland, Pa.**

**Filed Apr. 13, 1990, Ser. No. 508,573**

**Int. Cl.$^5$ A01D** *55/00;* **B02C** *25/00*

**U.S. Cl. 56—10.5** **7 Claims**



1. In a forage harvester wherein first and second bidirectional motors are selectively energized one at a time to move respective first and second ends of a shear bar relative to the knives of a rotating cutterhead to adjust the clearance between the shear bar and the knives, and a vibration sensor is provided for sensing vibrations of the shear bar, a method for improving the accuracy of adjustment of the shear bar, said method comprising the following steps:

(a) while one of said motors is energized to move its respective end of the shear bar toward the rotating cutterhead, sensing the output of said vibration sensor and comparing the output of the vibration sensor with a threshold value to determine if said vibrations indicate a hit has occurred;
(b) stopping said one motor and initiating a timer to time an interval when it is determined that a hit has occurred;
(c) repeatedly sensing the output of said vibration sensor and comparing its output with said threshold value to determine if a second hit occurs during said timing interval; and,
(d) energizing said one motor to move its respective end of the shear bar away from the cutterhead only if it is determined that a second hit occurred in said timing interval.

---

### 5,018,343
### COTTON PICKER SPINDLE LUBRICATION APPARATUS, METHOD AND LUBRICATION CARTRIDGE THEREFORE

**Donald R. Finke, Lake Arrowhead, Calif., assignor to Lubricating Specialties Company, Pico Rivera, Calif.**

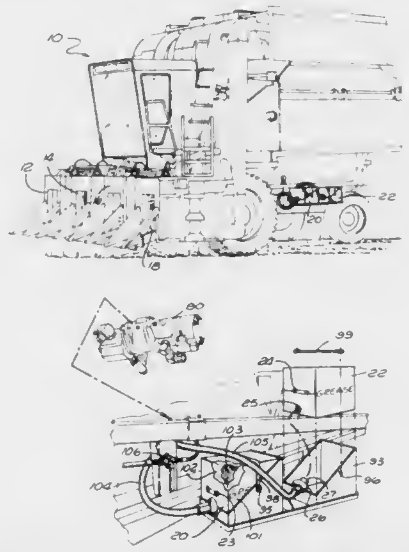
**Continuation-in-part of Ser. No. 349,112, May 5, 1984, abandoned. This application Feb. 9, 1990, Ser. No. 477,645**

**Int. Cl.$^5$ A01D** *46/16*

**U.S. Cl. 56—12.1** **9 Claims**

5. In a mobile cotton harvester having a plurality of picker drums comprising a plurality of rows of spindles, each drum having a lubrication-receiving means, a spindle lubrication system comprising:

a lubricant reservoir located on said harvester, said lubricant reservoir comprising a cardboard box, a plastic liner in said cardboard box, and 20 to 40 pounds of grease disposed in said liner;
a lubricant pump having an input connected to said lubricant reservoir and an output for providing said lubricant under pressure, said pump comprising a hydraulic motor adapted to be powered from a hydraulic system of said harvester;
a connecting means for connecting said pump input to said reservoir, said connecting means comprising a sharpened end for penetrating said liner when said reservoir is empty;
a lubricant distributing means for distributing equal amounts of lubricant to said each of said picker drums, said lubricant distributing means comprising a supply conduit connected to said output of said pump, at least one manifold means, conduit means connected at one end to said manifold means and at the other end to picker drum fitting associated with each picker drum, said conduit means having a unitary internal diameter and being of different lengths to attach to different picker drum fittings;
said picker drum fittings connected to said lubrication-receiving means and having an internal diameter selected to provide predetermined resistance to the flow of said lubricant into each of said picker drums such that each picker drum receives an equal amount of lubricant notwithstanding the different lengths of conduit means attached thereto.



---

### 5,018,344
### LAWN MOWER WITH BLOWER UNIT

**Kazuo Samejima; Shinichiro Inoue; Takao Sakatsuji; Hideo Kida; Kiyoto Kasamatsu; Hironori Tsuchihashi; Akiyoshi Takemoto; Tsuyoshi Sato; Toshihiko Hamada, and Masatami Fukuda, all of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan**

**Continuation of Ser. No. 359,067, May 26, 1989, abandoned. This application Sep. 10, 1990, Ser. No. 581,438**

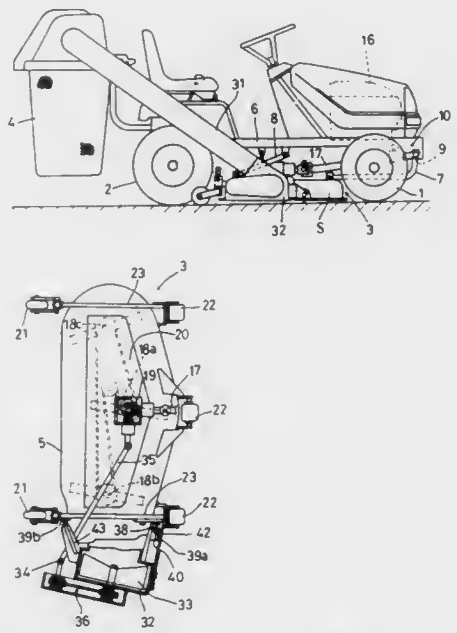
**Claims priority, application Japan, Aug. 24, 1988, 63-110950[U]; Sep. 20, 1988, 63-122883[U]**

**Int. Cl.$^5$ A01D** *34/70*

**U.S. Cl. 56—13.3** **23 Claims**

1. A lawn mower comprising:

a blower case removably connected to one lateral side of said blade housing for blowing grass clippings toward a grass catcher disposed rearwardly of a vehicle body, and a blower mounted in the blower case,
a wheel support frame in the form of at least one elongated rigid member, said wheel support frame being secured only to said blade housing and said elongated rigid member extending beyond said blade housing in at least one of a fore and aft direction relative to the vehicle body, said at least one wheel being fixed to said wheel support frame, and



coupling means fixed to said wheel support frame for connecting said blower case to said blade housing.

---

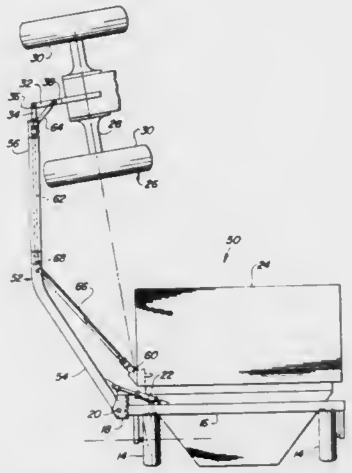
### 5,018,345
### CROP HARVESTER HAVING ANGULAR DRAFT TONGUE FOR ACCOMMODATING SHARP TURNS

**James C. Walters, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed May 29, 1990, Ser. No. 529,796**

**Int. Cl.$^5$ A01D** *34/00*

**U.S. Cl. 56—14.9** **2 Claims**



1. In a crop harvester including a main wheel-supported frame supporting a crop header, including a crop severing cutterbar, forwardly thereof and a draft tongue pivotally coupled to the left-hand end of the frame for movement between a working position, wherein a rear portion thereof extends outwardly and forwardly relative to the header and a forward portion thereof extends substantially in a straight ahead direction, and a transport position wherein the rear portion extends along side the header and the forward portion is angled rightwardly relative to the straight ahead direction, and a driveline being coupled for driving the header cutterbar and including a pedestal shaft supported by said forward portion of the draft tongue and being adapted for connection to a tractor PTO, the improvement comprising: said driveline pedestal shaft being supported by and extending substantially the length of the forward portion of the draft tongue and being located in substantial vertical alignment with the forward portion of the draft tongue; and said forward portion of the draft tongue being of constant cross section along its length and being exclusive of any structure which extends rightwardly thereof, whereby no structure is present which would interfere with a tractor hitched to the draft tongue and making a sharp right turn.

---

### 5,018,346
### MOWED GRASS CONTAINER FOR MOWING MACHINE

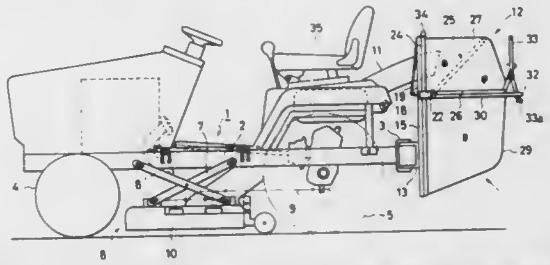
**Takeshi Ishimaru, and Satoshi Matsuke, both of Ehime, Japan, assignors to Iseki & Co., Ltd., Matsuyama, Japan**

**Filed May 14, 1990, Ser. No. 523,350**

**Claims priority, application Japan, Jun. 30, 1989, 1-170455; Nov. 22, 1989, 1-304072**

**Int. Cl.$^5$ A01D** *34/70, 34/12, 34/64*

**U.S. Cl. 56—202** **8 Claims**



8. A mowed grass container for a mowing machine having a mower attached to a machine body associated with a conveying means for conveying the mowed grass comprising a mounting shield adapted to be attached to the machine body, a foldable cover hingedly connected to said mounting shield, a grass containing unit pivotally supported on said mounting shield, said grass containing unit having an open front and an open upper end, said cover forming a closure for said upper end, said open front of said grass containing unit being normally biased toward said mounting shield, whereby said grass containing unit receives the mowed grass from the conveying means, and whereby pivoting of said grass containing unit relative to said mounting shield causes the mowed grass collected therein to be discharged through said front opening.

---

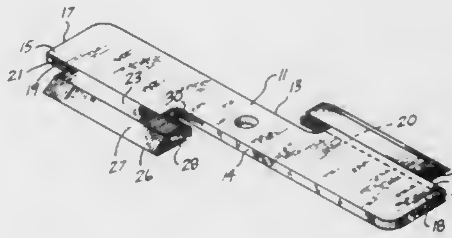
### 5,018,347
### LAWN MOWER BLADE REPLACEMENT CUTTING EDGE APPARATUS

**Michael A. Feilen, 39 W 365 Hogan Hill, Elgin, Ill. 60123**

**Filed May 7, 1990, Ser. No. 519,805**

**Int. Cl.$^5$ A01D** *34/73*

**U.S. Cl. 56—295** **2 Claims**



1. A rotary lawn mower blade arranged for rotative mounting to a lawn mower, comprising:

OL
126
SS
4
MY
28
991
UMI

an elongate generally "S" shaped body, including a forward edge spaced from a rear edge, and

a first end edge surface spaced from and parallel to a second end edge surface defining opposed ends of the body, and

a top surface spaced from and parallel to a bottom surface, and

a forward blade support head flange extending forwardly and beyond the forward edge including a forward blade body end surface, and

a rear blade support head flange extending rearwardly and beyond the rear edge, including a rear blade body end surface, the forward blade body end surface aligned with the first end edge surface, and

the rear blade body end surface aligned with the second end edge surface, and

a first slot formed in the forward blade support head flange, and a second slot formed in the rear blade support head flange, wherein the first and second slots are arranged parallel relative to one another, and

a replaceable blade member slidably mounted in each of the first and second slots, and

wherein the first slot in the forward blade support head flange extends to a first shoulder, the first shoulder spaced from the first end edge surface a predetermined distance, the second slot extending in the rear blade support head flange to a second shoulder, the second shoulder spaced from the second end edge surface the predetermined distance, and

wherein the blade member includes a blade member top surface aligned with the body top surface, and a blade member bottom surface aligned with the body bottom surface, and a blade member rear surface arranged orthogonally relative to the blade member top surface and the blade member bottom surface, and a rearwardly extending "T" shaped flange extending rearwardly of the blade member rear surface, and the blade member including an inner end surface spaced from and parallel to an outer end surface, the outer end surface aligned with the first end edge surface when the blade member is positioned within the first slot, and the outer end surface of the blade member positioned within the second slot aligned with the second end edge surface, and the "T" shaped flange extending along the blade member rear surface to a terminal position, the terminal position spaced from the outer end surface of each blade member a distance equal to the predetermined distance, and

wherein the blade member is formed of a polymeric material, and

wherein the blade member includes metallic reinforcement formed within the blade member, and

wherein the metallic reinforcement includes a reinforcing wire mesh, the reinforcing wire mesh extending from the blade member top surface a distance substantially equal to one-half to two-thirds of a predetermined height defined between the blade member top surface and blade bottom surface to effect reinforcement of the blade member and subsequently permitting flexure of the blade member during use.

---

## 5,018,348
## METHOD FOR DETECTING THE CONDITION OF CATALYTIC CONVERTERS

**Ferry Durschimidt, Friolzheim; Harmut Kolb, Ludwigsburg; Wolfgang Strauss, Denkendorf, and Hartmut Weckenmann, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Nov. 28, 1989, Ser. No. 442,316**

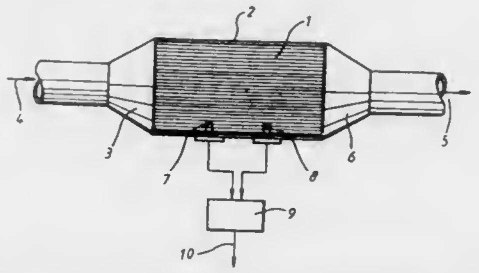
**Claims priority, application Fed. Rep. of Germany, Dec. 10, 1988, 3841685**

**Int. Cl.$^5$ F01N** *3/18*

**U.S. Cl. 60—274** **5 Claims**

1. A method for detecting the operational condition of a catalytic converter having a volume in an exhaust gas path of an internal combustion engine comprising the steps of:

arranging an upstream gas emission probe and a downstream exhaust gas emission probe in the exhaust gas path on either side of an intermediately located portion of the volume of the catalytic converter;



detecting a phase shift between output signals of the upstream and downstream gas emission probes; and

evaluating the phase shift between the output signals as a measure of a state of aging of the catalytic converter.

---

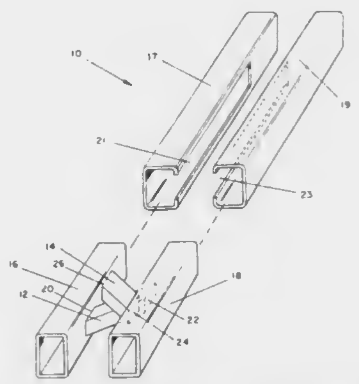
## 5,018,349
## EXHAUST EFFICIENCY INCREASING APPARATUS

**Joseph H. Pemberton, 801 E. Main, Artesia, N. Mex. 88210**

**Continuation-in-part of Ser. No. 388,240, Jul. 31, 1989, Pat. No. 4,947,645. This application Jun. 12, 1990, Ser. No. 536,971**

**Int. Cl.$^5$ F02B** *27/02*

**U.S. Cl. 60—313** **34 Claims**



1. An apparatus for increasing exhaust efficiency for an internal combustion engine having two banks of cylinders, a left bank and a right bank, there being a separate exhaust conduit from each bank of cylinders, a left exhaust conduit and a right exhaust conduit, respectively, the apparatus comprising:

first means for communicating from the left exhaust conduit to the right exhaust conduit, said first communicating means extending from a position on the left conduit a selected distance from the left cylinder bank to a preselected position on the right exhaust conduit, said preselected position on the right exhaust conduit being further from the right cylinder bank than the selected position on the left exhaust conduit is from the left cylinder bank;

second means for communicating from the right exhaust conduit to the left exhaust conduit, said second communicating means extending from a position on the right conduit a selected distance from the right cylinder bank to a preselected position on the left exhaust conduit, said preselected position on the left exhaust conduit being further from the left cylinder bank than the selected position on the right exhaust conduit is from the right cylinder bank; and

means for adjustably positioning said first and second means on the exhaust conduits at two or more selected positions at different positions from the cylinder banks without disconnecting said apparatus from the exhaust conduits.

---

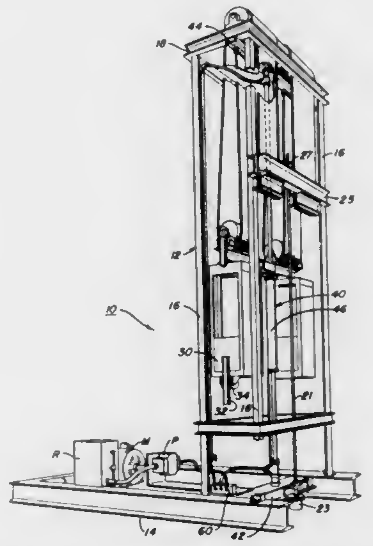
## 5,018,350
## LONG STROKE DEEP WELL PUMPING UNIT

**E. A. Bender, 6625 Kane Way, Bakersfield, Calif. 93309**

**Filed May 9, 1990, Ser. No. 521,332**

**Int. Cl.$^5$ F16D** *31/02*

**U.S. Cl. 60—369** **7 Claims**



1. In a long stroke pumping unit for deep wells, of the type having a tower disposed adjacent to, and immediately above, a well, and having a polish rod extending from the tower into the well, and the tower having a base from which spaced, vertically disposed frame members extend, the frame members being tied together in rigid connection by space cross members, the improvement comprising:

means defining a vertically disposed, reciprocating fluid motor, said motor being mounted at one end thereof to said base of said tower, and the opposite end thereof to the top of the tower,

means defining counterweight apparatus disposed within said frame, and affixed directly to said fluid motor for reciprocation therein,

drum means mounted to the top of said tower, for rotation about a horizontal axis,

belt means said belt means being disposed about said drum and interconnecting said counterbalance apparatus and said polish rod,

pump means for developing and sequentially delivering fluid to opposite ends of said motor, so as to cause said motor, and counterweight apparatus to reciprocate, and control valve means, responsive to the position of said counterweight apparatus, disposed between said pump and said motor, for selectively directing fluid from said pump to said motor so as to pull said counterweight apparatus upwardly, and then downwardly in a reciprocating movement, which movement is transmitted through said belts to reciprocate said polish rod.

---

## 5,018,351
## HYDROMECHANICAL DRIVE

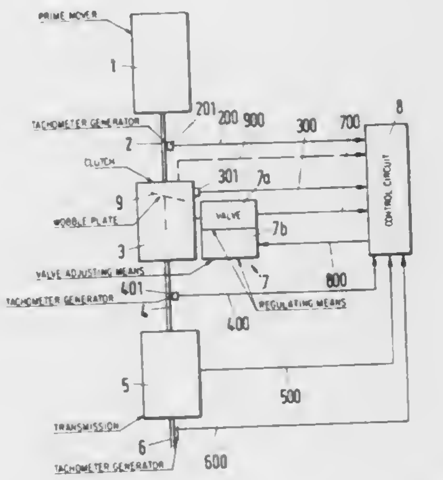
**Erhard Otte, Bünde, Fed. Rep. of Germany, assignor to Gerhard Klemm Maschinenfabrik GmbH & Co., Bielefeld, Fed. Rep. of Germany**

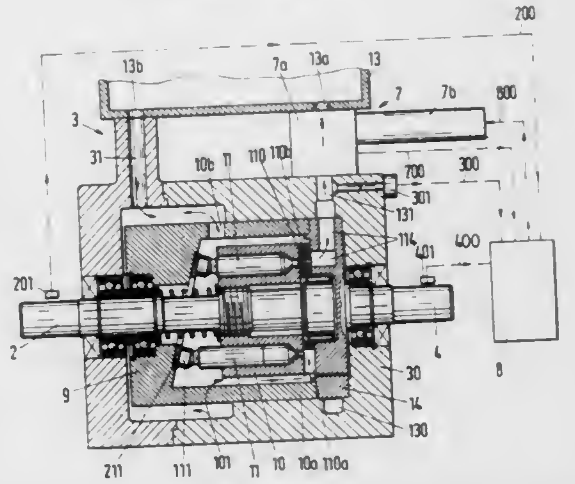
**Filed Dec. 16, 1988, Ser. No. 286,404**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742569**

**Int. Cl.$^5$ F16D** *31/02*

**U.S. Cl. 60—448** **30 Claims**





1. A hydromechanical drive, particularly a clutch or a transmission, comprising a rotary input element connectable with a prime mover; a rotary output element; at least one signal generating means for monitoring the RPM of at least one of said input and output elements; control means having at least one first input connected with said monitoring means; torque transmitting means including at least one adjustable hydraulic motor interposed between said input and output elements; and means for regulating the pressure and/or flow of hydraulic fluid in said motor, said control means having at least one signal transmitting output connected with said regulating means and at least one second input arranged to receive from said regulating means signals denoting the condition of said regulating means.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,352
### MODULAR PREFILLED HYDRAULIC CONTROL APPARATUS

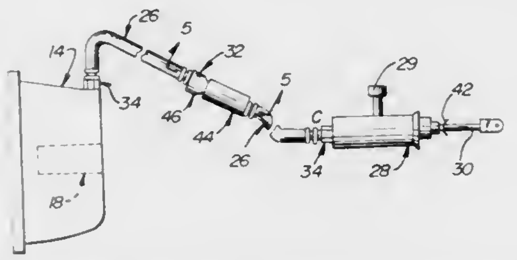
**David J. Compton, Troy; Richard A. Nix, Utica, and Keith V. Leigh-Monstevens, Troy, all of Mich., assignors to Automotive Products plc, Warwickshire, England**

**Continuation of Ser. No. 797,405, Nov. 12, 1985, abandoned, which is a division of Ser. No. 607,020, Apr. 30, 1984, Pat. No. 4,607,670, which is a continuation-in-part of Ser. No. 555,667, Nov. 28, 1983, Pat. No. 4,624,290. This application Sep. 9, 1988, Ser. No. 243,148**

**The portion of the term of this patent subsequent to Aug. 26, 2003, has been disclaimed.**

**Int. Cl.$^5$ F16D** *25/08;* **B60T** *11/16*

U.S. Cl. 60—533 50 Claims



30. A hydraulic apparatus for installation on a machine, said apparatus being formed by providing a hydraulic cylinder having a bore and piston means disposed in said bore, providing a conduit communicating at one end thereof with said bore, filling said bore and said conduit with hydraulic fluid prior to installation on the machine, and providing a coupling member on the other end of said conduit operative to normally close said other end of said conduit to prevent the passage of hydraulic fluid out of said other end of said conduit and operative in response to engagement with a complementary coupling member to open the other end of said conduit to allow the passage of hydraulic fluid through the other end of said conduit.

---

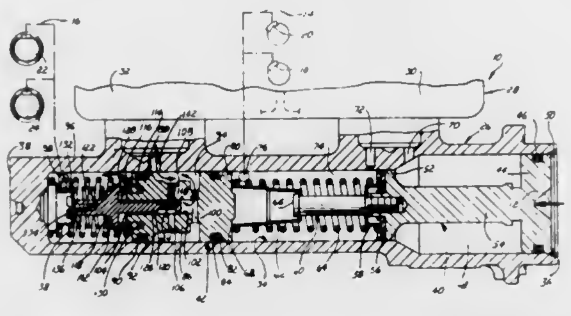
### 5,018,353
### CENTER COMPENSATING MASTER CYLINDER

**Cecil C. Pugh, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 3, 1989, Ser. No. 331,930**

**Int. Cl.$^5$ B60T** *11/20*

U.S. Cl. 60—562 3 Claims



2. For use in an actuatable and releasable master cylinder, a master cylinder pressurizing piston assembly including a piston main body having compensating passage means therein adapted to selectively conduct brake fluid between a brake fluid reservoir and a pressurizing chamber in which brake fluid is selectively pressurizable and releasable by axial master cylinder actuating and releasing movements of said piston assembly, a selectively open and closed compensating valve controlling said passage means and including a first valve element on said piston main body and a second valve element mounted on said piston main body for axial movements at selected times relative thereto and at selected times therewith, said piston main body having a bore forming a portion of said passage means and said second valve element having a pin part inserted within said piston main body bore, and said piston having a groove with an inserted O-ring and said second valve element having a lip member insertable within said piston groove and wherein fluid communication is governed by contact of said lip with said O-ring, means acting on said piston main body and said second valve element resiliently holding said second valve element axially spaced from said first valve element during a master cylinder released position of said piston assembly, said last named means being overcome by master cylinder actuating movement of said piston main body to first permit said first valve element to be moved into sealing engagement with said second valve element to close said valve and thus close said passage means during master cylinder actuating movement of said piston assembly and thereafter permit concurrent further axial actuating movements of said piston main body and said second valve element with further actuating movements of said piston assembly, said means acting on said piston main body and said second valve element further acting as said master cylinder piston assembly is moved to the master cylinder released position to move said first valve element axially away from said second valve element and reopen said compensating passage means.

---

### 5,018,354
### AUXILIARY COMBUSTION CHAMBERS FOR SUPERCHARGED INTERNAL COMBUSTION ENGINES AND INTERNAL COMBUSTION ENGINES EQUIPPED WITH SUCH A CHAMBER

**Jean Melchior, and Thierry Andre, both of Paris, France, assignors to Etat Francais, Represente Par Le Delegue General Pour L'Armament, Paris Armees, France**

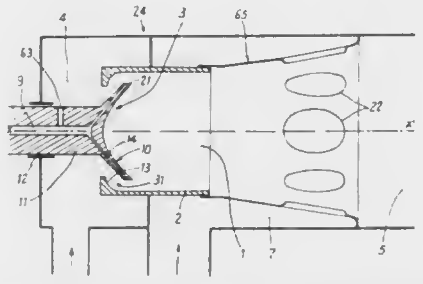
**PCT No. PCT/FR88/00385, § 371 Date Mar. 16, 1989, § 102(e) Date Mar. 16, 1989, PCT Pub. No. WO89/01090, PCT Pub. Date Feb. 9, 1989**

**PCT Filed Jul. 25, 1988, Ser. No. 348,490**

**Claims priority, application France, Jul. 23, 1987, 87 10446**

**Int. Cl.$^5$ F02B** *37/00*

U.S. Cl. 60—606 20 Claims



1. Auxiliary combustion chamber (**24**) for an internal combustion engine (**35**) supercharged by a turbocompressor (**36**), the air outlet (**37**) of the compressor (**38**) communicating with the air inlet (**39**) of the working chambers (**25**) of the engine (**35**) and with a bypass pipe (**30**) provided with throttling means (**31**) having a variable passage section, and the gas inlet (**40**) of the turbine (**41**) communicating with the gas outlet (**42**) of said working chambers (**25**) and with the bypass pipe (**30**) on the downstream side of said throttling means (**31**), which combustion chamber (**24**) comprises:

a primary combustion zone (**1**) which is defined by a flame tube (**2**) and a chamber inner end (**3**) and communicates with a first cavity (**4**) connected to the bypass pipe (**30**),

a secondary dilution zone (**5**) located on the downstream side of said primary zone (**1**) and communicating with a second cavity (**7**) connected to the gas outlet (**42**) of the working chambers (**25**), the gas outlet (**8**) of which communicates with the gas inlet (**40**) of the turbine (**41**),

an inlet (**9**) for fuel under pressure which is provided in the chamber inner end (**3**) and opens onto the primary combustion zone (**1**) and

ignition means (**52**) for the fuel coming from said fuel inlet (**9**),

characterized in that

the primary zone (**1**) has a shape of revolution about an axis (X—X') and is defined by

the flame tube (**2**) which is of circular crosssectional shape, coaxial with said axis (X—X'), smooth and devoid of air supply orifices of notable section which may put the primary zone (**1**) in communication with said first cavity (**4**),

the chamber inner end (**3**), which is movable in a direction parallel to said axis (X—X') and cooperates with a fixed seat (**13**) rigidly connected to the flame tube (**2**) and separating the primary zone (**1**) from the first cavity (**4**) so as to constitute, with the chamber inner end (**3**), the throttling means (**31**) with a variable passage section, and which is constituted by a sleeve (**10**) rigidly connected to a balancing piston (**11**), coaxial with said axis (X—X'), the balancing piston (**11**) being slidable in a cylindrical bearing surface (**12**) rigidly connected to the walls of the first cavity (**4**), and in that

the inlet (**9**) of the fuel under pressure is constituted by at least one nozzle (**14**) which is arranged in said sleeve (**10**) in such manner as to open out toward the primary combustion zone (**1**).

---

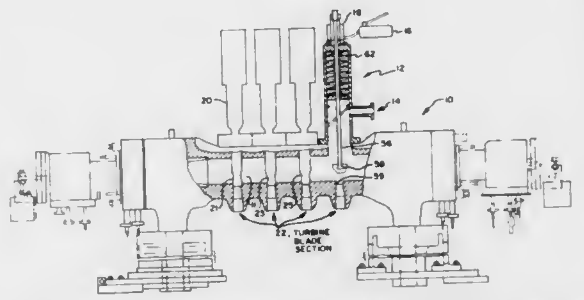
### 5,018,355
### METHOD AND APPARATUS FOR PERIODIC CHEMICAL CLEANINGS OF TURBINES

**Charles D. Foster, Rte. 4, Box 70G, Keyser, W. Va. 26726**

**Filed Aug. 28, 1989, Ser. No. 398,910**

**Int. Cl.$^5$ F01K** *21/00*

U.S. Cl. 60—646 7 Claims



1. Cleaning material injection apparatus for use with the steam chest of a turbine and in particular in place of a governor valve of the steam chest for an aperture in the steam chest leading to the turbine, said injection apparatus comprising:

a housing assembly having an upper and lower portion, said lower portion including a hollow interior defined by side walls, said hollow interior terminating at means defining an open end wall;

a flange for attaching the apparatus to the turbine, said flange extending radially from said means defining said open end wall;

a piston assembly reciprocally mounted within said housing , said piston assembly including a valve stem having a plug member at one end thereof for closing the steam chest aperture leading to the turbine;

drive means for reciprocating said piston assembly between a first raised position where the steam chest aperture is open and a second lowered position where the steam chest aperture is closed; sliding seal means operatively connected with said piston assembly to seal the piston assembly to prevent release of cleaning materials to the atmosphere; and

inlet means for providing an open passageway leading into said lower portion to permit the inlet of cleaning material into the injection apparatus, said inlet means including a baffle member to direct the flow of inlet material into the lower portion of the housing.

---

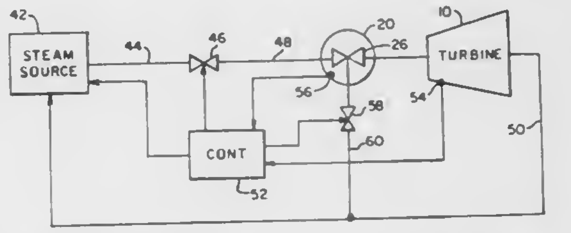
### 5,018,356
### TEMPERATURE CONTROL OF A STEAM TURBINE STEAM TO MINIMIZE THERMAL STRESSES

**George J. Silvestri, Jr., Winter Park; James A. Martin, Winter Springs, and Douglas R. Ulrich, Chuluota, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 10, 1990, Ser. No. 597,942**

**Int. Cl.$^5$ F01K** *13/02*

U.S. Cl. 60—646 4 Claims



1. A method in a steam turbine system for reducing thermal stresses in a steam chest coupled in operating association with a steam turbine subjected to cyclic operation, the system including a source of controllable temperature steam, a throttle valve connected between the steam source and the steam chest and including means for regulating the flow of steam to the steam chest over at least a predetermined range of flow rates, at least one temperature sensor coupled to the steam chest for providing signals indicative of temperature of walls of the steam chest, a steam leak-off line connected to the steam chest and including a flow control valve for regulating the flow of steam through the leak-off line, and control means connected to the throttle valve and the flow control valve and further connected to the temperature sensor, the method comprising the steps of:

selecting a desirable temperature for the walls of the steam chest predeterminately related to the temperature of the steam to be admitted into the steam turbine;

comparing in the control means the desirable temperature of the steam chest walls to the temperature indicated by the at least one temperature sensor; and

controlling the throttle valve and flow control valve to establish a steam flow through the steam chest sufficient to effect a warming of the steam chest walls at a preselected low rate to minimize thermal stress on the steam chest from heating until the steam chest wall temperature is within a preselected range of the desirable temperature.

---

### 5,018,357
### TEMPERATURE CONTROL SYSTEM FOR A CRYOGENIC REFRIGERATION

**James Livingstone, Framingham; Graham J. Higham, Ashland, both of Mass., and Gerald R. Pruitt, Pancho Palos Verdes, Calif., assignors to Helix Technology Corporation, Waltham, Mass.**

**Continuation of Ser. No. 256,042, Oct. 11, 1988, abandoned. This application Mar. 1, 1990, Ser. No. 488,418**

**Int. Cl.$^5$ F25B** *9/00*

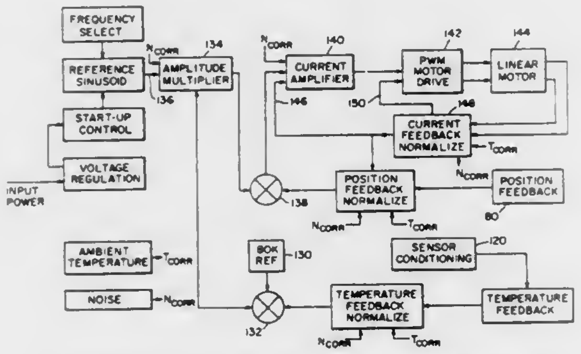
U.S. Cl. 62—6 10 Claims

1. A cryogenic refrigerator having a displacer within a refrigeration cylinder and a compressor comprising a reciprocating armature within an hermetically sealed housing which alternately compresses and expands to cool a portion of a working fluid flowing through the cylinder to cryogenic temperatures, a linear drive motor with a coil assembly for driving the armature, and a temperature control system comprising:

a sensor to detect the temperature of the working fluid and,

VOL 126
SS 4
MY 28
1991
UMI

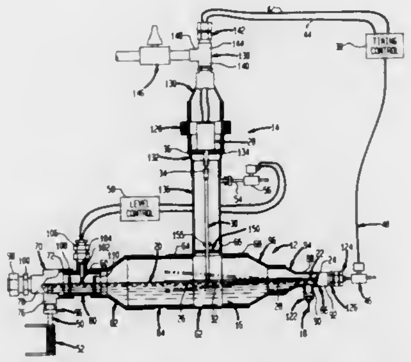
an analog control circuit that adjusts an amplitude of a reference signal in response to a signal generated by the temperature sensor to vary the displacement of the armature reciprocating at a predetermined frequency such that the temperature of the working fluid is adjustable, the control circuit having a pulse width modulation circuit to convert an input signal to a pulse width modulated drive signal that is applied to the coil.



---

### 5,018,358
### CRYOGEN DELIVERY APPARATUS

**Ron C. Lee, Bridgewater, and Mark J. Kirschner, Morristown, both of N.J., assignors to The BOC Group, Inc., Murray Hill, N.J.**
**Filed Mar. 20, 1990, Ser. No. 496,397**
**Int. Cl.⁵ F17C** *7/04*
**U.S. Cl. 62—48.1** **7 Claims**

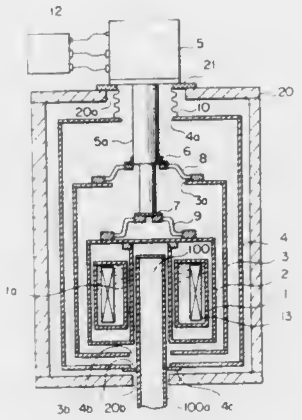


1. An apparatus for selectively delivering a cryogen in pure liquid and gaseous forms, said apparatus comprising:
a pressure vessel having an inlet for receiving the cryogen within the pressure vessel;
means for maintaining the cryogen within the pressure vessel so that a liquid-vapor interface is produced within the pressure vessel;
conduit means extending into the pressure vessel and having a moveable section adapted for movement above and below the liquid-vapor interface for delivering the pure gaseous and liquid forms of the cryogen from the pressure vessel; and
actuation means connected to the moveable section of the conduit means for selectively moving the moveable section of the conduit means above and below the liquid-vapor interface for the duration of preset time intervals so that the pure gaseous and liquid forms of the cryogen are selectively delivered from the pressure vessel in quantities proportional to the preset time intervals.

---

### 5,018,359
### CRYOGENIC REFRIGERATION APPARATUS

**Mituo Horikawa, and Kazuki Moritsu, both of Ako, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Jun. 26, 1990, Ser. No. 543,487**
**Claims priority, application Japan, Jun. 30, 1989, 1-166896**
**Int. Cl.⁵ F25B** *19/00*
**U.S. Cl. 62—51.1** **5 Claims**



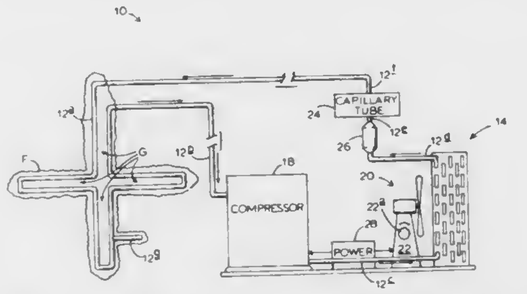
1. A cryogenic refrigeration apparatus, comprising:
a cryogenic vessel which accommodates a superconducting coil immersed in a cryogenic cooling medium and which is disposed in surrounding relationship to an electromagnetic cavity in which a magnetic field is produced by said superconducting coil;
a vacuum vessel disposed outwardly of said cryogenic vessel with a vacuum area interposed therebetween and provided with means defining an opening;
thermal shield means which includes at least one layer disposed between said vacuum vessel and said cryogenic vessel;
a magnetic shield disposed outwardly of said vacuum vessel for preventing a magnetic flux produced by said superconducting coil from leaking to the exterior, said magnetic shield having a wall thickness greater than said vacuum vessel;
cooling means securely supported on said magnetic shield for cooling said thermal shield means;
heat conducting means connected between said cooling means and said thermal shield means through said opening of said vacuum vessel for conducting to said thermal shield means a cooling effect provided by said cooling means;
vibration absorbing means connected between said magnetic shield and said vacuum vessel so as to define said vacuum area which accommodates said cryogenic vessel and said thermal shield means, said vibration absorbing means having elasticity which substantially prevents vibration produced by said cooling means from being transmitted from said magnetic shield to said vacuum vessel; and
access means for providing external access to a magnetic field which is produced in said electromagnetic cavity by said superconducting coil.

---

### 5,018,360
### FROSTED SCULPTURE METHOD AND APPARATUS

**Jeffrey K. Jones, 1861 SE. 148th, Portland, Oreg. 97233**
**Filed Jun. 14, 1990, Ser. No. 538,226**
**Int. Cl.⁵ F25C** *1/12*
**U.S. Cl. 62—66** **10 Claims**

5. Apparatus for creating a frosted sculpture comprising:
a length of conduit configured to form an armature for a sculpture, with the armature having gaps between adjacent formed conduit segments, and
reverse-sublimation means operatively coupled with said length, of conduit for continuously circulating a freezing agent through said length of conduit, said reverse-sublimation means maintaining the outer surface of said length of conduit at a temperature substantially below the freezing point of water and removing from water vapor-containing ambient air surrounding said length of conduit the heat of fusion of water, thereby to cause the passage of water vapor exposed to the outer surface of said length of conduit from a vapor phase to a solid phase substantially without passing through a liquid phase,

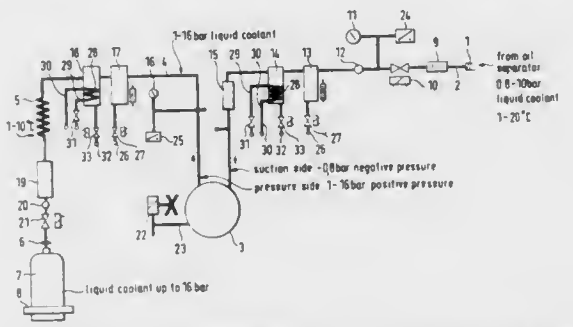


said length of conduit and said reverse-sublimation means cooperating to promote the progressive buildup on the outer surface of said length of conduit and within said gaps a blanket of frost to flesh out said armature.

---

### 5,018,361
### METHOD AND APPARATUS FOR DISPOSAL AND REPROCESSING OF ENVIRONMENTALLY HAZARDOUS SUBSTANCES FROM REFRIGERATION SYSTEMS

**Willi Kroll, Herne, and Klaus Augstein, Mulheim/Ruhr, both of Fed. Rep. of Germany, assignors to KSR Kuhlsysteme und Recycling GmbH & Co. KG, Fed. Rep. of Germany**
**Filed Feb. 23, 1989, Ser. No. 314,656**
**Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3829923; Feb. 26, 1988, 3806011**
**Int. Cl.⁵ F25B** *47/00*
**U.S. Cl. 62—85** **12 Claims**

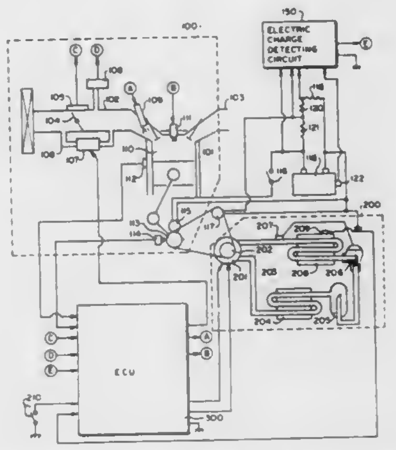

1-16bar liquid coolant
from oil separator
0.8-10bar liquid coolant
1-20°C
suction side -0.8bar negative pressure
pressure side 1-16bar positive pressure
liquid coolant up to 16 bar
1-10°C

1. A method for disposal and recovery of gaseous refrigerant from refrigeration systems comprising the steps of:
aspirating the refrigerant by use of a compressor, from the refrigeration system at an elevated temperature such that the refrigerant remains in the gaseous phase;
passing the refrigerant in sequence through an oil filter, a water filter and an activated carbon filter in order to remove the contaminants of oil, water and particulate matter respectively;
collecting each separated said contaminant in a separate container;
passing the refrigerant through said compressor in order to compress the refrigerant and cause it to enter a liquid phase;
passing the refrigerant in sequence through a second oil filter, a second water filter and a second activated carbon filter in order to remove the contaminants of oil, water and particulate matter respectively;
collecting each separated said contaminant in a separate container; and
collecting the refrigerant in said liquid phase in a disposal container.

---

### 5,018,362
### APPARATUS FOR CONTROLLING AUTOMOTIVE AIR CONDITIONER

**Kenichi Nagase, Nagoya; Hiroshi Haraguchi, Kariya; Toshiaki Mizuno, Nagoya, and Takayuki Kamada, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**
**Filed Nov. 28, 1989, Ser. No. 442,554**
**Claims priority, application Japan, Nov. 28, 1988, 63-300375**
**Int. Cl.⁵ B60H** *1/32;* **F25B** *27/00*
**U.S. Cl. 62—133** **12 Claims**



1. An apparatus for controlling an automotive air conditioner comprising:
(a) an air conditioner having a variable displacement compressor driven by an automotive internal combustion engine for keeping an automotive passenger compartment at a proper temperature;
(b) first detecting means for detecting an idling state of said automotive internal combustion engine;
(c) second detecting means for detecting an air conditioning operation state of said air conditioner, when said automotive air conditioner is operating;
(d) first displacement means for adjusting and maintaining a displacement of said variable displacement compressor to or near to a maximum displacement thereof responsive to first detecting means detecting the idling state and said second detecting means detecting that said automotive air conditioner is operating;
(e) determining means for determining whether a cooling ability of said air conditioner must be increased;
(f) idling speed setting means for setting a desired idling speed of said automotive internal combustion engine to a lower speed than a current idling speed when said determining means determines that cooling ability does not need to increase; and
(g) engine speed control means for controlling an actual idling speed of said automotive internal combustion engine to substantially said desired idling speed.

OL 126 SS 4 MY 28 1991 UMI

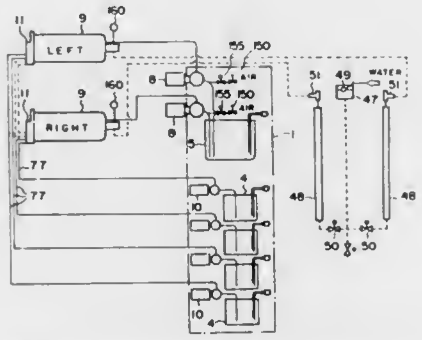
### 5,018,363
### APPARATUS FOR PREPARING ICE CREAMS

**Ken Aoki, Ashikaga; Katsuhiko Hoshi, Ohta; Shigeo Satoh; Mitsuru Kakinuma, both of Gumma; Shigeru Togashi, Ashikaga, and Hiromi Saitoh, Gumma, all of Japan, assignors to Sanyo Electric Co., Ltd., Oska, Japan**

**Division of Ser. No. 229,601, Aug. 8, 1988, Pat. No. 4,860,550. This application Jun. 19, 1989, Ser. No. 367,987**

**Int. Cl.$^5$ B67D** *5/62*

**U.S. Cl. 62—135** **8 Claims**



1. An apparatus for preparing an ice cream product, comprising:

a plurality of respective cylinders;

means for preparing ice cream within said cylinders, said preparing means including means for supplying a mix to an inside of each of said respective cylinders, means for refrigerating and agitating the mix inside said cylinders and for maintaining a temperature inside said cylinders within a predetermined temperature range to produce the ice cream, and means for dispensing the ice cream after preparation is complete;

means for holding a plurality of different flavors; and

selection means for selectively supplying any of said flavors from said holding means to each of said cylinders so that the ice cream dispensed is flavored and for selectively operating said preparing means to prepare the ice cream within each of said cylinders, selectively.

---

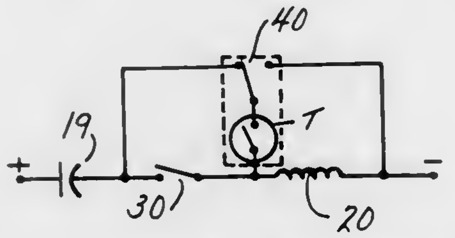
### 5,018,364
### INTERNAL AIR DAMPER FOR A COMBINATION REFRIGERATOR-FREEZER

**Paul B. Chesnut, Daviess County, Ky.; Michael W. Moore, and Ivan D. Sarrell, both of Dade County, Ga., assignors to Tenelex Industries, Inc., Chattanooga, Tenn.**

**Filed Jan. 22, 1990, Ser. No. 468,356**

**Int. Cl.$^5$ F16K** *31/02;* **F25D** *17/04*

**U.S. Cl. 62—187** **7 Claims**



1. An arrangement for introducing air from the freezer section to the refrigerator section of a refrigeration unit comprising a housing disposed within a wall separating said freezer section and said refrigerator section, said housing having an opening permitting air passage from said freezer section to said refrigerator section, a rotatable baffle mounted on said housing and selectively blocking said air passage from said freezer section to said refrigerator section, and electromechanical circuitry, including a temperature sensor, cam means, switching means, capacitor means and a baffle drive motor, where said switching means is responsive to rotation of said cam means, where rotation of said cam means and said baffle is simultaneous, and where said capacitor means is in series with said baffle drive motor and at a value preventing baffle drive motor burn-up because of shorting, whereby said electromechanical circuitry selectively actuates partial movement of said baffle from a fully closed air blocking position to a stopped open position, and whereby said baffle moves again to said fully closed air blocking position when said temperature sensor reaches a preselected condition.

---

### 5,018,365
### EARRING DEVICE

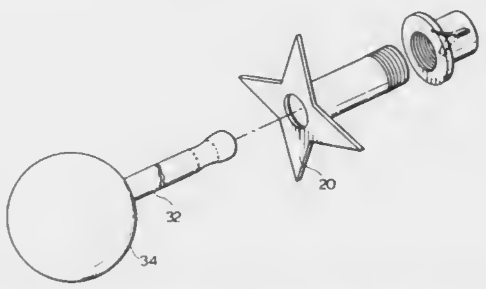
**Elizabeth Luceno, 1646 Corkstone Glade, Mississauga, Ontario, L4W 2A1, Canada**

**Filed Oct. 30, 1989, Ser. No. 429,295**

**Claims priority, application Canada, Nov. 14, 1988, 583043**

**Int. Cl.$^5$ A44C** *7/00*

**U.S. Cl. 63—12** **5 Claims**



1. A device for securement of an earring having a depending stem to an opening in an earlobe for abutment against the front and rear of the earlobe comprising an outer cylindrical sleeve having a threaded axial opening and a flange for abutment against the rear of the earlobe in alignment with the earlobe opening, an inner elongated cylindrical sleeve having a front flange and a threaded rear end adapted to be inserted through the earlobe opening to thread into the outer cylindrical sleeve whereby the front flange abuts the front of the earlobe, and gripping means positioned within the outer sleeve for detachably gripping the earring stem therein whereby the earring is secured against the front flange of the inner sleeve.

---

### 5,018,366
### CONTROL CIRCUIT UNIT FOR A VARIABLE CAPACITY COMPRESSOR INCORPORATING A SOLENOID-OPERATED CAPACITY CONTROL VALVE

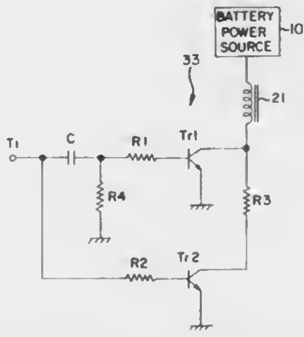
**Hiroshi Tanaka; Chuichi Kawamura, and Junichi Ohno, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan**

**Filed Feb. 3, 1989, Ser. No. 306,342**

**Claims priority, application Japan, Feb. 5, 1988, 63-26375**

**Int. Cl.$^5$ F25B** *1/00*

**U.S. Cl. 62—228.5** **5 Claims**



1. A control circuit for controlling an operation of a solenoid-operated capacity control unit of a variable capacity refrigerant compressor accommodated in an air-conditioning system of an automobile and provided with a compressor framework having therein a suction chamber for a refrigerant to be compressed and a discharge chamber for a compressed refrigerant to be discharged to the air-conditioning system, a rotatable drive shaft connectable to a rotation drive source, a variable capacity compressing unit for sucking, compressing and discharging the refrigerant in response to the rotation of the drive shaft, and a capacity control refrigerant passageway means for controlling a pressure acting on the variable capacity compressing unit, said capacity control refrigerant passageway means being opened and closed by an operation of a valve element of the solenoid-operated capacity control unit, said control circuit comprising:

a single DC electric power source for supplying electric voltage to a solenoid of said solenoid-operated capacity control unit, said electric switching circuit means comprising two parallel transistor switching circuits arranged in an electric energizing circuit of said solenoid of said solenoid-operated capacity control unit for permitting an application of a high DC voltage to the electric circuit of the solenoid when both of the parallel transistor switching circuits are turned ON, and permitting an application of a low DC voltage to the electric energizing circuit of the solenoid when only one of the parallel transistor switching circuits is turned ON; and

electric energizing voltage control circuit means for controlling the level of said electric voltage applied to said electric energizing circuit of said solenoid from said single electric power source in such a manner that a high level electric starting voltage needed to initiate a movement of the valve element of said solenoid-operated capacity control unit is applied to said electric energizing circuit of said solenoid for a predetermined time, through said two parallel transistor switching circuits, and that after said predetermined time has elapsed, a low level electric retaining voltage needed to retain said solenoid of said solenoid-operated capacity control unit at an energized position is applied through said only one of said two parallel transistor switching circuits.

---

### 5,018,367
### COOLING ENERGY GENERATOR WITH COOLING ENERGY ACCUMULATOR

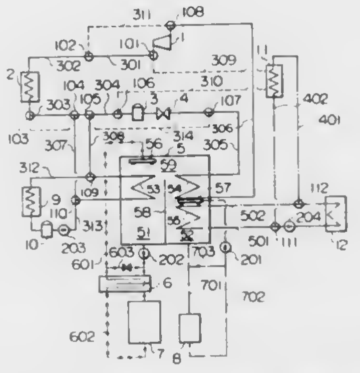
**Akira Yamada; Isao Ohkouchi, both of Hitachi, Japan; Yasuo Koseki, Hitachiota; Hideaki Kurokawa, Hitachi; Katsuya Ebara, Mito; Sankichi Takahashi, Hitachi; Risuke Onoda, Ibaraki, and Shigeo Sugimoto, Ushiku, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 31, 1989, Ser. No. 386,693**

**Claims priority, application Japan, Aug. 4, 1988, 63-195198**

**Int. Cl.$^5$ F25B** *15/00*

**U.S. Cl. 62—476** **4 Claims**



1. A cooling energy generator with a cooling energy accumulator, comprising:

refrigerant which absorbs a latent heat when the refrigerant evaporates,

absorbent liquid which includes and absorbs the refrigerant therein,

a container having a first chamber receiving the absorbent liquid, a second chamber receiving the liquid refrigerant and a vapor passage communicating with the space over the absorbent liquid in the first chamber and with a space over the liquid refrigerant in the second chamber so that the refrigerant vapor passes through the vapor passage but the absorbent liquid and the liquid refrigerant can not pass through the vapor passage,

absorbent spraying means for spraying the absorbent liquid in the first chamber,

means for cooling the absorbent liquid during the accelerated cooling operation and for heating the absorbent liquid during a cooling energy accumulating operation,

refrigerant spraying means for spraying the liquid refrigerant in the second chamber during the accelerated cooling operation and during a normal cooling operation,

air-conditioning heat exchanger arranged under the refrigerant spraying means, the air-conditioning heat exchanger supplying cooling energy to a cooling device for air conditioning, and

heat pump means having a compressor for compressing heat-pump refrigerant, a heat-pump radiator for cooling the compressed high-temperature heat-pump refrigerant, an orifice for adiabatic expansion of the compressed and cooled heat-pump refrigerant and a heat-pump heat exchanger in which the low-temperature heat-pump refrigerant passes, the heat-pump heat exchanger arranged between the vapor passage and the refrigerant spraying means in the second chamber.

---

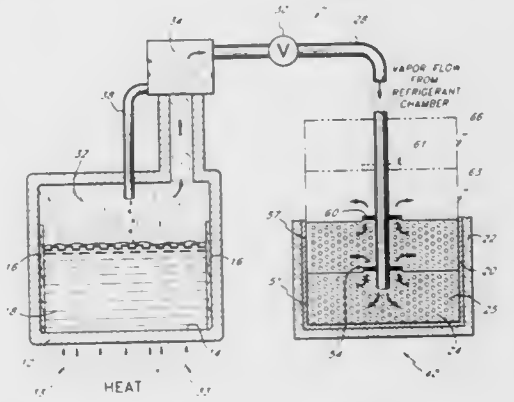
### 5,018,368
### MULTI-STAGED DESICCANT REFRIGERATION DEVICE

**Gary V. Steidl, Olivenhain; Cullen M. Sabin, San Diego, and Dennis A. Thomas, Malibu, all of Calif., assignors to International Thermal Packaging, Inc., Westlake Village, Calif.**

**Filed Oct. 12, 1989, Ser. No. 420,282**

**Int. Cl.$^5$ F25B** *17/08*

**U.S. Cl. 62—480** **8 Claims**



1. A refrigeration apparatus, comprising:

a refrigerant chamber containing an evaporatable refrigerant liquid;

a plurality of desiccant chambers, each containing a sorbent material for said liquid;

at least one conduit for conducting vaporized refrigerant liquid to said chambers; and

one or more valving means for directing said vapor to each said chamber in sequence, so that sorbent in a first such chamber contacts said vapor first, until at least a portion of the sorptive capacity of the sorbent in the first chamber is exhausted, and then a first said valving means directs said vapor into a second such chamber in response to a temperature of the first chamber.

**5,018,369**

### DEVICE FOR ACTIVATING KNITTING CAMS IN CIRCULAR KNITTING MACHINES

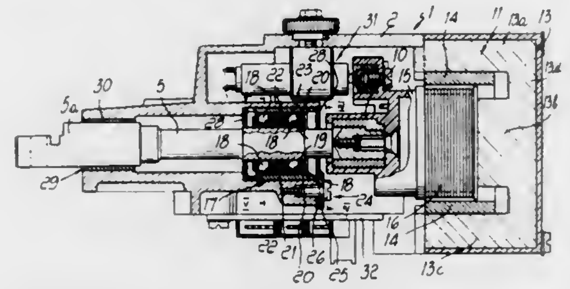
**Francesco Lonati, Brescia, Italy, assignor to Lonati S.p.A., Brescia, Italy**

**Filed Dec. 14, 1989, Ser. No. 450,501**

**Claims priority, application Italy, Dec. 30, 1988, 23170 A/88**

**Int. Cl.$^5$ D04B** *15/32*

**U.S. Cl. 66—40** 7 Claims



1. Device for activating knitting cams in circular knitting machines and the like, comprising a box like supporting structure which slidably accommodates at least one slider, arranged laterally facing the needle cylinder of the machine and being movable along a direction which is substantially radial to the needle cylinder, said slider being rigidly associated, with its end which protrudes out of said box-like structure, with a knitting cam which is selectively engageable, by moving said slider, with needle actuation elements, a controllably actuatable linear motor being provided, said motor having its output shaft connected to said slider and having a direction of actuation which is substantially parallel to the direction of motion of said slider, wherein said slider is constituted by a shaft which is slidably supported, along its axis, by said box-like structure by means of a first bearing which is arranged inside said box-like structure and has a plurality of balls partially accommodated in seats defined longitudinally on the outer surface of said shaft and in seats correspondingly defined on the inner surface of a bust which extends around said shaft, means being provided for locking the rotation of said bush about its axis.

**5,018,370**

### CENTRAL STITCH CONTROLLING APPARATUS FOR CIRCULAR KNITTING MACHINE

**Koji Tsuchiya, Nishinomiya, Japan, assignor to Precision Fukuhara Works, Ltd., Hyogo, Japan**

**Filed May 31, 1990, Ser. No. 531,129**

**Claims priority, application Japan, Jun. 9, 1989, 1-67447[U]**

**Int. Cl.$^5$ D04B** *15/32*

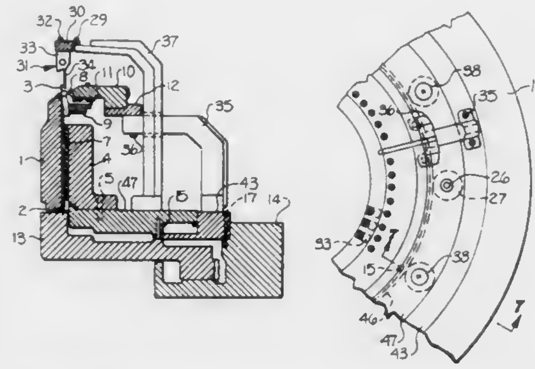
**U.S. Cl. 66—55** 7 Claims

1. A central stitch length controlling apparatus for a multi-feed circular knitting machine of the type including knitting cams (**7**) supported on knitting cam blocks (**4**) at each feed thereof, an inner knitting cam block supporting ring (**6**, **47**), an outer ring (**16**, **43**) surrounding and supporting said inner ring (**6**, **47**), and means for raising and lowering said inner knitting cam block support ring (**6**, **47**) relative to and independently from said outer ring (**16**, **43**), said central stitch controlling apparatus being characterized in that said inner knitting cam block support ring raising and lowering means comprises

a plurality of wheel elements (**18**, **38**) disposed between said inner knitting cam block support ring (**6**, **47**) and said outer ring (**16**, **43**),

thread means (**20***a*. **23***a* and **39***a*. **40***a*) operatively associated with said wheel elements (**18**, **38**) for raising and lowering said inner knitting cam block support ring (**6**, **47**) with corresponding rotation of said wheel elements (**18**, **38**),

transmission means (**19**, **46**) drivingly interconnecting said wheel elements to each other, and



wheel element driving means (**26**) for imparting movement to said transmission means (**19**, **46**) for simultaneously imparting like rotational movement to each of said wheel elements (**18**, **38**) and to selectively raise or lower said inner knitting cam block support ring (**6**, **47**).

**5,018,371**

### TUNNEL FINISHER

**Günther Riba, Mühlental 78, D-5400 Koblenz 1, Fed. Rep. of Germany**

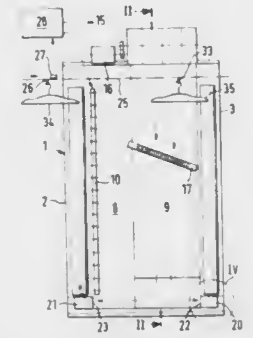
**PCT No. PCT/EP89/00603, § 371 Date Jan. 29, 1990, § 102(e) Date Jan. 29, 1990, PCT Pub. No. WO89/12134, PCT Pub. Date Dec. 14, 1989**

**PCT Filed May 30, 1989, Ser. No. 458,680**

**Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818387[U]; Mar. 22, 1989, 8903655**

**Int. Cl.$^5$ D06F** *61/06*

**U.S. Cl. 68—5 C** 12 Claims



1. A tunnel finisher comprising an entrance and an exit, a pair of air drums within the tunnel finisher and associated with the entrance and a further pair of air drums within the tunnel finisher and associated with the exit, a steam chamber and a circulation chamber within the tunnel finisher, conveyor means having grippers for passing garments into the tunnel finisher between the entrance pair of air drums, through the steam and circulation chambers, and out of the tunnel finisher between the exit pair of air drums, a steam supply means within the steam chamber and adjacent the entrance pair of air drums, a recirculation means associated with the circulation chamber for recirculating an atmosphere within the tunnel finisher, a detector for indicating that a garment to be treated passes the steam supply means, the recirculation means having an air outlet with variable cross-section, a control connecting the detector and the air outlet for adjusting the cross-section of the air outlet and for activating the steam supply whereby the control is designed such that during steam supply the cross-section is adjusted such that part of the steam is passed to the outside of the tunnel finisher through the recirculation means.

**5,018,372**

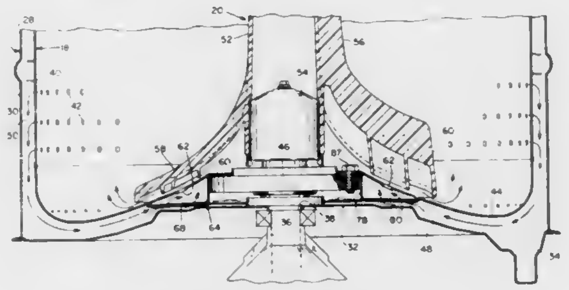
### FILTER FOR AUTOMATIC WASHING MACHINE

**Ronald L. Altnau, Sr., Ripon, Wis., assignor to Speed Queen Company, Ripon, Wis.**

**Filed Sep. 24, 1990, Ser. No. 587,827**

**Int. Cl.$^5$ D06F** *13/02. 39/10*

**U.S. Cl. 68—18 F** 18 Claims



1. A washing machine comprising:

a vertical tub adapted for holding a washing fluid;

a clothes basket positioned in said tub, said basket having a cylindrical sidewall with a plurality of perforations and a bottom with at least one opening, said sidewall and said bottom being spaced from said tub thereby providing a vertical passageway in said tub outside said basket and a region in said tub underneath said basket, said bottom being upwardly inclined toward the center;

an agitator comprising means for circulating said washing fluid out of said basket through said perforations in said sidewall, down said vertical passageway to said region underneath said basket, and up into said basket through said at least one opening; and

a lint filter positioned in said region underneath said basket for filtering lint from said circulating washing fluid, said filter comprising a substantially horizontal disc having an outer periphery seated against the underside of said basket bottom wherein a chamber is formed between said disc and said upwardly inclined bottom, said disc having an underside face with a plurality of holes communicating with said chamber for passing said circulating washing fluid, said holes being of such a size as to filter from said circulating washing fluid lint which collects on the underside face of said disc, said holes having downward draft wherein the bottom openings to said holes are larger than the respective top openings.

**5,018,373**

### SLIDING DOOR LOCK

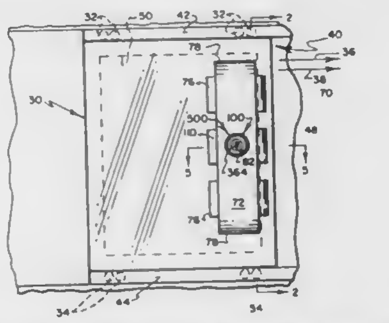
**Lee S. Weinerman, Medina, and Joel T. Vargus, Parma, both of Ohio, assignors to The Eastern Company, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 304,957, Feb. 1, 1989, Pat. No. 4,912,951, and a continuation-in-part of Ser. No. 305,011, Feb. 1, 1989, and a continuation-in-part of Ser. No. 305,010, Feb. 1, 1989. This application Apr. 2, 1990, Ser. No. 502,829**

**The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.**

**Int. Cl.$^5$ E05B** *65/08*

**U.S. Cl. 70—99** 42 Claims



1. A latch for mounting on front and rear faces of a closure that is movable from side-to-side with respect to structure located behind the closure, and with the latch having a latch bolt formation that is projectable behind the closure to releasably engage structure located behind the closure to releasably retain the closure in a closed position, comprising:

a) front housing means including a front housing member for mounting on a front face of a closure adjacent an opening that is formed through the closure;

b) rear housing means including a rear housing member for mounting on a rear face of the closure adjacent the opening;

c) compartment formation means defined by rearwardly facing portions of the front housing member and by forwardly facing portions of the rear housing member, for cooperating with the opening that is formed through the closure to provide a compartment for housing a latch bolt member;

d) aligned opening means including a front opening formed substantially centrally through the front housing member and communicating with the compartment, and a rear opening formed substantially centrally through the rear housing member and communicating with the compartment, with the front and rear openings being aligned along an imaginary axis that extends forwardly and rearwardly with respect to the closure, and with the rear opening being of elongate configuration;

e) a latch bolt opening formed through the rear housing member and communicating with the compartment at a location spaced from the axis of the aligned front and rear openings;

f) latch bolt means including a latch bolt member having an elongate body for being positioned within the compartment, and having rearwardly projecting means including a latch bolt formation for extending through the latch bolt opening to project rearwardly from the rear housing member, with the body of the latch bolt member being movable forwardly and rearwardly within the compartment to selectively position the latch bolt member in a "latched" position wherein the latch bolt formation is relatively "projected" with respect to the rear housing member, and an "unlatched" position wherein the latch bolt formation is relatively "retracted" with respect to the rear housing member;

g) push button means connected to the latch bolt member for moving forwardly and rearwardly therewith relative to the front and rear housing members, including a button member having a stem that projects forwardly from the

OL
126
SS
4
MY
28
1991
UMI

latch bolt member and through the front opening to provide structure that is accessible from the front of the latch for moving the latch bolt member relatively forwardly and rearwardly with respect to the front and rear housing members;

h) biasing means for biasing the latch bolt member and the button member forwardly with respect to the front and rear housing members;

i) latching member means connected to the latch bolt member for forward and rearward movements therewith, including a latching member having elongate latching formation means configured 1) to be movable through the rear opening when the latching formation means is in an unlatching position wherein the latching formation means is aligned with the elongate rear opening, and 2) to block forward movement of the latching member means when the elongate latching formation is in a latching position wherein the latching formation means extends behind and overlies portions of the rear housing member that reside adjacent the rear opening so as to be out of alignment with the rear opening;

j) rotary positioning means connected to the button member and being accessible from the front of the latch for rotating the latching member means between its unlatching position of alignment with the rear opening and its latching position of non-alignment with the rear opening;

k) whereby the latch can be operated:

  i) to "latch" the closure on which it is mounted in a closed position by causing the latch bolt formation to engage structure located behind the closure to prevent movement of the closure out of its closed position, as by moving the button member together with the latch bolt member and the latching member rearwardly in opposition to the action of the biasing means to a position wherein the latching formation means can be rotated from its unlatching position of alignment with the rear opening to its latching position of non-alignment with the rear opening; and,

  ii) to "unlatch" the closure by counterrotating the latching member to align the latching formation means with the rear opening, and by moving the button member together with the latch bolt and the latching member forwardly to a position wherein the latch bolt formation disengages said structure and thereby permits the closure to be moved out of its closed position; and,

l) the front housing member includes a forwardly projecting sleeve-like formation means for closely surrounding portions of the button member to support, guide and protectively shroud said portions of the button member for forward and rearward movement along said axis.

---

**5,018,374**

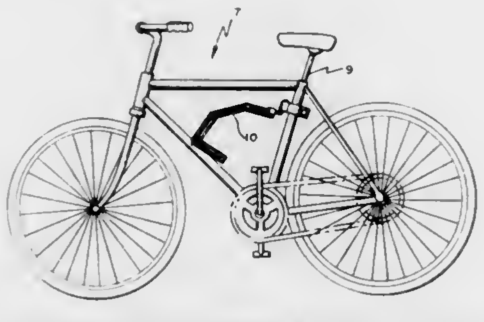
### BICYCLE LOCK

**Venses J. Montano, 1110 San Felipe, Santa Fe, N. Mex. 87501**

**Filed Sep. 6, 1989, Ser. No. 403,493**

**Int. Cl.$^5$ E05B *71/00***

**U.S. Cl. 70—233 1 Claim**



1. A locking device for securing a bicycle or the like to a stationary support comprising a chain, said chain being formed from a plurality of elongated links, each of said links having a slot formed therein, a fastener slidably and rotatably disposed in each of said slots serially connecting one link to the other, a coupling means, hinge means connecting said coupling means to one of said links permitting universal movement of the same relative to said link, whereby when the coupling means is secured to said bicycle or the like the links are adapted to be slidably and rotatably disposed relative to one another when wrapped about said stationary support to snugly engage the same, and lock means adapted to be inserted through overlapped slots for locking the chain and thereby the bicycly or the like in place.

---

**5,018,375**

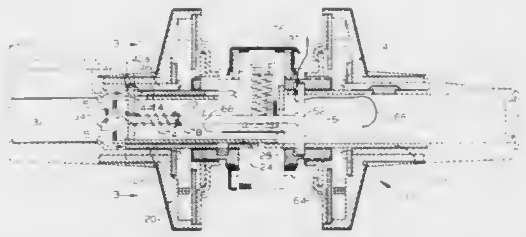
### LOCKSET HAVING ELECTRIC MEANS FOR DISABLING AND ENABLING THE OUTER HANDLE

**Clay E. Tully, Charlotte, N.C., assignor to Yale Security Inc., Monroe, N.C.**

**Filed Sep. 18, 1990, Ser. No. 584,298**

**Int. Cl.$^5$ E05B *55/08***

**U.S. Cl. 70—472 6 Claims**



1. A door lock comprising an inner handle, an outer handle, a latch housing between the handles and containing a latch retractor, first spring means biasing the latch retractor outwardly, coaxial inner and outer tubular spindles receiving the respective handles and both terminating respectively inside the lock in arcuate pull-back scoops, the two scoops being aligned end-to-end and disposed against the side of the retractor opposite the first spring means and each being adapted when turned to activate the latch retractor, the inner handle being keyed to the inner spindle, the outer spindle being notched out at its outer end, the notch comprising a longitudinal slot and an adjoining partial circumferential space, the outer spindle having thereinside a transversely disposed disc having a central opening and a radial dog, the outer handle having a shank with a longitudinal interior spline, the disc and dog normally disposed with the dog extending through the longitudinal slot and into the spline to key the outer handle and the outer tubular spindle into unitary rotation with each other, and an electrical motor fixedly mounted in the inner tubular spindle, the motor having a central rotary shaft coaxial with the spindles and extending through the retractor and into the central opening in the disc, the shaft having an outward radial pin intermediate the retractor and the disc, an axial spring closely surrounding the shaft and having one end fixed in the disc and the other end embracing the shaft on the far side of the pin from the disc, the pin being disposed between adjacent turns of the spring, whereby, depending on rotary direction, rotation of the motor will drive the disc and dog either into the longitudinal slot to key the outer spindle and shank together or outward into the circumferential space so that the outer handle is disconnected from the outer spindle.

---

**5,018,376**

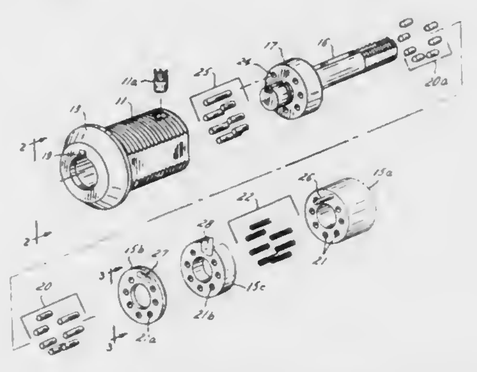
### HIGH SECURITY AXIAL PIN TUMBLER LOCK

**David G. Lee, 2200 E. Mettler Rd., Lodi, Calif. 94240**

**Continuation-in-part of Ser. No. 328,889, Mar. 27, 1989, abandoned. This application Mar. 19, 1990, Ser. No. 495,328**

**Int. Cl.$^5$ E05B *27/00***

**U.S. Cl. 70—491 20 Claims**



1. In a tubular lock construction comprising an outer barrel having fore and rear ends, a tumbler sleeve including a stationary portion telescoped into the rear end portion of the barrel, a locking spindle extending through and rotatably mounted in the stationary tumbler sleeve portion, a rotatable driver sleeve fixed to the spindle and disposed within the barrel adjacent to the fore end of the tumbler sleeve, sets of driver and tumbler pins slidably mounted in axially extending and annularly spaced bores defined in the stationary tumbler sleeve portion and the driver sleeve, the improvement comprising:

a plurality of tumbler plates disposed between the driver sleeve and the stationary sleeve portion, each of the plates having annularly spaced bores corresponding to the bores of the driver sleeve and stationary tumbler portion sleeve,

at least one of the sets of driver and tumbler pins further comprising at least one intermediate pin segment slidably mounted between the driver pin and the tumbler pin in an aligned set of axial bores, the combined length of the intermediate pin segments within each bore being less than the combined thickness of the plurality of tumbler plates,

at least one of the tumbler plates having a projection and the remaining tumbler plates and the stationary tumbler sleeve having cooperating openings through which the projection extends, said openings being wider than the projection,

each of said tumbler plates being mounted for individual limited rotational movement with respect to one another and the stationary tumbler sleeve portion when pin segment interfaces in each set of the bores coincide with respective sleeve and/or plate interfaces, said individual rotational movement limited by the projection and the cooperating openings,

whereby a false shear plane at the coinciding interfaces is provided with sufficient rotational movement to be essentially the same in feel as a true shear plane.

---

**5,018,377**

### HOT ROLLING OF METAL STRIP

**Kenneth T. Lawson, Yorkshire, England, assignor to Dave McKee (Sheffield) Limited, Yorkshire, England**

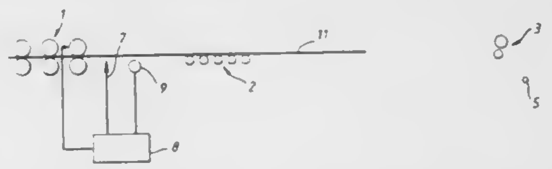
**Filed Nov. 2, 1989, Ser. No. 430,667**

**Claims priority, application United Kingdom, Nov. 3, 1988, 8825714**

**Int. Cl.$^5$ B21B *37/04***

**U.S. Cl. 72—12 5 Claims**

1. A method of rolling hot metal strip in which the leading end of the strip issuing from between the work rolls of the last stand of a multi-stand hot rolling mill is passed along a run-out table; comprising the steps of first employing a non-contact-type of strip shape detector adjacent to, and downstream of, the last stand to detect variations in shape across the width of the metal strip and to produce first signals representative of said variations across the width of the strip; employing said first signals to adjust the gap between the work rolls of at least one of the stands of the rolling mill in the sense to reduce shape variation across the width of the strip substantially to zero; bringing said leading end of the strip into engagement with means located remote from the rolling mill to apply longitudinal tension to the portion of the strip between said means and the last stand of the rolling mill; then discontinuing employment of said non-contact-type of strip shape detector and employing a contact-type strip tension detector adjacent to, and downstream of, the last stand to detect variations in shape across the width of the actual strip and to produce second signals representative of said variations across the width of the strip; and employing said second signals instead of said first signals to adjust the gap between the work rolls of at least one of the stands of the rolling mill in the sense to reduce shape variations across the width of the strip substantially to zero.



---

**5,018,378**

### MOLD MAKING

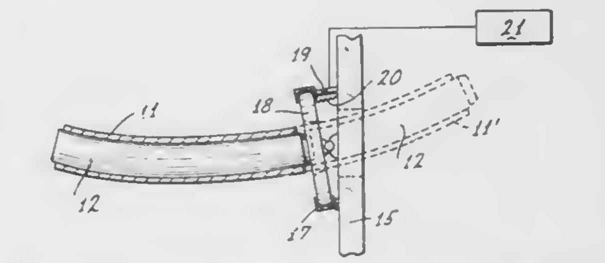
**Ulrich Maier, Wallenhorst, and Horst Fischer, Osnabrueck, both of Fed. Rep of Germany, assignors to KM-kabelmetal AG, Osnabrueck, Fed. Rep. of Germany**

**Filed May 4, 1987, Ser. No. 46,128**

**Claims priority, application Fed. Rep. of Germany, May 2, 1986, 3615004; May 3, 1986, 3615079**

**Int. Cl.$^5$ B21C *37/15***

**U.S. Cl. 72—283 5 Claims**



1. Method of making molds for continuous casting machines comprising the steps of:

providing a plurality of different tubular blanks of copper or copper based alloys;

selecting a particular one from among said tubular blanks as stored and feeding same to a first working station;

providing in the first station one end of said selected tubular blank with a thrust mount against which a mandrel to be inserted can abut during subsequent working;

selecting a particular mandrel from among a plurality of stored mandrels, the selected mandrel having an outer contour corresponding to the inner contour of the mold to be made;

placing, in a second work station, the selected mandrel into said selected tubular blank;

pivotally mounting a die in a third station, and forcing by means of the die, the tubular blank onto the mandrel in all around tight surface to surface contact;

acting on the die for positioning the die in relation to the mandrel and the tubular blank as passing through thereby maintaining an orientation of the die to the mandrel and the tubular blank thereon as passing through the die such

VOL
1126
ISS
4
MY
28
1991
UMI

that a die plane runs at right angles to a center axis of the mandrel, where intersecting said plane;
removing the mandrel in a fourth station from the sized tubular blank;
returning the mandrel either to the second station or to the mandrel store; and
removing the sized tubular blank from the equipment.

---

### 5,018,379
### APPARATUS AND METHOD FOR CRIMPING END OF CAN BODY

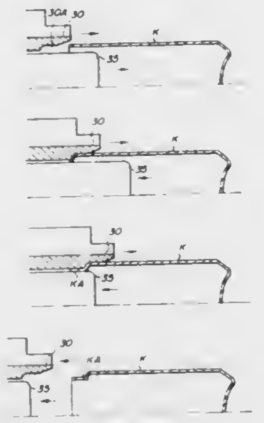
**Keiichi Shirai; Akira Kawaguchi, and Sunao Kitazima, all of Hyogo, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan**

**Filed Feb. 20, 1990, Ser. No. 481,201**

**Claims priority, application Japan, Feb. 22, 1989, 1-42088; Feb. 23, 1989, 1-20581[U]**

**Int. Cl.$^5$ B21D** *51/26, 41/04*

**U.S. Cl. 72—354.6** **16 Claims**



1. A method for crimping an open end of a can body by using a male die having a diameter smaller than the diameter of the can body and a female die having a processing surface of crimping the open end, which comprises:
inserting said male die into the can body through the open end in such a manner as to be coaxial therewith;
causing said female die to fit on said open end, and keeping said female die moving along the outer peripheral surface of the male die toward said can while moving said male die, inserted into said can body, in a releasing direction from the can body at a speed of 10-20% of the speed of movement of said female die toward said can, such that the opening end is crimped by the relative movement of said male and female dies so as to have a reduced diameter; and
(c) releasing said male and female dies out of engagement with said can body.

---

### 5,018,380
### DIELECTRIC SENSORS

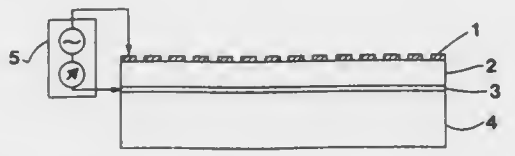
**Joseph J. Zupancic, Bensenville; Sandra L. Petty-Weeks, West Chicago, and Anthony J. Polak, Lake Zurich, all of Ill., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Feb. 6, 1989, Ser. No. 307,121**

**Int. Cl.$^5$ G01N** *27/00*

**U.S. Cl. 73—23.2** **15 Claims**

1. A method of measuring the amount of carbon monoxide or oxygen in a gas comprising:
(a) contacting said gas with a film consisting essentially of an organometallic gas carrier dispersed within an interpenetrating polymer network in contact with electrodes having a means for measuring the dielectric properties of said polymer film;
(b) measuring the dielectric properties of said polymer film; and,



(c) correlating the measured dielectric properties with the amount of carbon monoxide or oxygen present in said gas.

---

### 5,018,381
### APPARATUS FOR CHECKING AIR LEAKS IN VEHICLE TIRE RIMS

**Trineu Campos, Anhanguera Highway, KM 147, Limeira, Sao Paulo, Brazil**

**Filed Sep. 12, 1989, Ser. No. 406,893**

**Claims priority, application Brazil, Sep. 12, 1988, PI 8804683**

**Int. Cl.$^5$ G01M** *3/06*

**U.S. Cl. 73—45.5** **1 Claim**

1. An apparatus for factory checking of air leaks in a vehicle rim (3) in a manner similar to such checking when a tire is on the rim comprising a tank (12) receiving a volume of liquid (13) in its bottom portion and having plurality of bearings (11) thereon, a body mount (5) carried by said bearings 11 so as to rotate about a symmetrical axis whereby a section of the rim (3) is immersed in the liquid (13), said body mount (5) having a wall member facing the rim (3) to define a main pressure chamber (2), a pair of sealing rings (4) in the body mount (5) and engaging an annular bead on the rim (3) to seal the main pressure chamber (2), a minor pressure chamber (1) in said body mount (5) defined by rear surfaces of said sealing rings (4) and respectively communicating with a pair of ducts (7 and 8), a third duct (9) communicating with said main pressure chamber (2), a manometer communicating with said three ducts (7, 8 and 9) and being pressurized and depressurized thereby, a valve (10) communicating with said manometer (6) for charging and discharging said main and minor pressure chambers (2 and 1), and a feeder-extractor (14) carried by said body mount (5) for manipulation of the rim (3) into and out of the liquid (13) so as to be checked for air leaks.

---

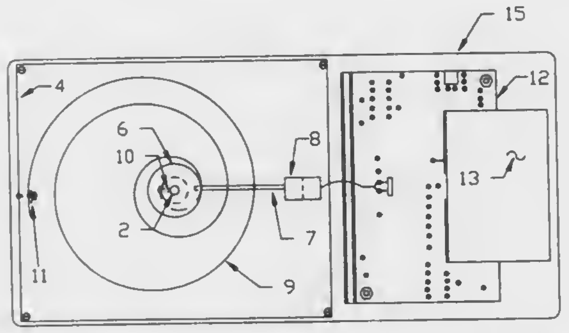
### 5,018,382
### APPARATUS FOR MEASUREMENT AND CALCULATION OF MOMENT OF INERTIA

**James W. Kelley, 4469 Sunburst Dr., Oceanside, Calif. 92056, and Roger D. McWilliams, 3 Dickens Ct., Irvine, Calif. 92715**

**Filed Mar. 5, 1990, Ser. No. 488,220**

**Int. Cl.$^5$ G01M** *1/12;* **G01H** *1/00*

**U.S. Cl. 73—65** **1 Claim**



1. An apparatus for making a direct measurement of the moment of inertia of an object about an axis of rotation, comprising;
a rotational pendulum consisting of a circular platform of low moment of inertia, a means of vertical support extending from the central axis of said circular platform through the central aperture of a means of lateral support, said lateral support allowing rotational freedom to said circular platform and vertical support means about said central axis and being secured to a rigid structure, and a spiral coil spring member conjoined with said vertical support via threaded fastener to one end of said spiral coil spring member at its central axis, the body of said spiral coil spring member lying in a horizontal plane, perpendicular to the axis of rotation of said circular platform, and secured at its other end to the aforementioned rigid structure, said rotational pendulum exhibiting rotational oscillation in response to the torque impressed upon the circular platform through its cooperative members by the resilience of the spiral coil spring member as the consequence of an initial angular displacement, the period of said oscillation being proportional to the square root of the moment of inertia of said rotational pendulum and any load resting thereon,
means of quantifying the period of oscillation by generating a pulse of a duration equal to said period comprising a photogate that senses the passage of said rotational pendulum through the equilibrium position, and a divide by three circuit which is driven by the output of said photogate and endeavors to define the rotational period of said rotational pendulum to be three pulses from said photogate. means for generating a voltage that increases with time a constant rate, said rate being adjustable,
means to generate squarewave pulses at a frequency related by a constant to the voltage at the input of said squarewave pulse generating means, said constant being adjustable, and said frequency being equal at any time during the rotational period to the product of the voltage rate of change and frequency to voltage ratio,
means of counting squarewave pulses produced by said squarewave pulse generating means for a period of time determined by the duration of the pulse generated by the period quantifying means, said counting means thereby integrating the product of the voltage rate of change, the frequency to voltage ratio, and the period of oscillation with respect to time, the result of said integration being equal to the product of the voltage rate of change, the frequency to voltage ratio, and the square of the period of oscillation,
and means for displaying then number registered by said counting means.

---

### 5,018,383
### FAILURE DIAGNOSTIC APPARATUS IN AN ENGINE AIR INTAKE SYSTEM

**Kazuhide Togai, Takatsuki; Yoshiaki Danno, Kyoto; Masato Yoshida, Kyoto; Makoto Shimada, Kyoto, and Katsunori Ueda, Kyoto, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

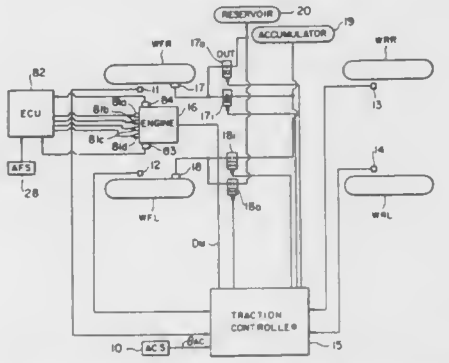
**Filed Apr. 9, 1990, Ser. No. 505,445**

**Claims priority, application Japan, Apr. 7, 1989, 1-88740**

**Int. Cl.$^5$ G01M** *15/00*

**U.S. Cl. 73—118.1** **6 Claims**

1. A failure diagnostic apparatus in an engine intake system, which comprises:
a throttle valve arranged in an intake path of an intake pipe of an engine for controlling an intake air amount by opening and closing a valve thereof;
throttle opening detecting means for detecting an opening of the throttle valve;
intake air amount detecting means for detecting a first intake air amount passing through the intake pipe;
engine torque detecting means for detecting an output torque of the engine;
first air amount estimating means for estimating a second intake air amount passing through the intake pipe on the basis of the opening of the throttle valve detected by the throttle opening detecting means;
second air amount estimating means for estimating a third intake air amount passing through the intake pipe on the basis of the output torque of the engine detected by the engine torque detecting means;
correction means for adding a correction of time delay occurring upon detection of the output torque of the engine to the first intake air amount detected by the intake air amount detecting means and the second intake air amount estimated by the first air amount estimating means, respectively; and
failure judging means for comparing the first intake air amount added the correction by the correction means, the second intake air amount added the correction by the correction means, and the third intake air amount estimated by the second amount estimating means, thereby judging a failure in any one of the intake air amount detecting means, the throttle opening detecting means and the engine torque detecting means.



---

### 5,018,384
### ROTATIONAL SPEED DETECTOR

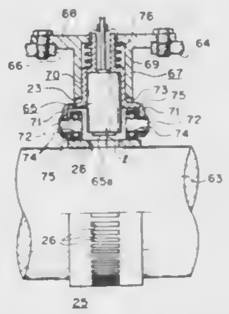
**Yoshitaka Hayashi, and Hayato Ohmi, both of Kanagawa, Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 19, 1990, Ser. No. 555,205**

**Claims priority, application Japan, Jul. 21, 1989, 1-187555; Mar. 1, 1990, 2-47243; Apr. 19, 1990, 2-101692**

**Int. Cl.$^5$ G01M** *19/00*

**U.S. Cl. 73—118.1** **9 Claims**



1. A rotational speed detector which is provided on a first member and a second member, which rotate relative to each other, to detect said relative rotation, said detector comprising:
a sensor rotor which is secured to said first member;
a rotational speed sensor assembly which is slidable relative to said first member but unable to rotate relative to said second member; and
a biasing means which biases said rotational speed sensor assembly toward said sensor rotor so that said rotational speed sensor assembly is in contact with either said sensor

rotor or said first member, thereby maintaining the distance between said rotational speed sensor assembly and said sensor rotor at a constant level.

---

### 5,018,385

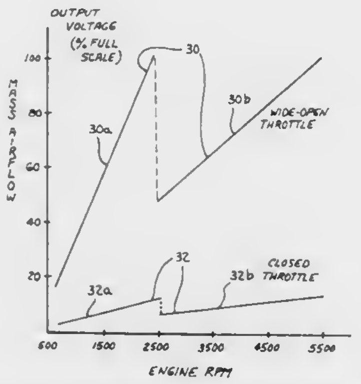
## I.C. ENGINE AIRFLOW METER HAVING SPEED-BASED AUTOMATIC GAIN CONTROL

**Michael J. Frick, Toano, Va., assignor to Siemens Automotive L.P., Auburn Hills, Mich.**

**Filed Mar. 26, 1990, Ser. No. 499,130**

**Int. Cl.⁵ G01M** *15/00*

**U.S. Cl. 73—118.2** **13 Claims**



1. In an internal combustion engine having an airflow meter, including an electric circuit, delivering an electric signal measurement of induction airflow past a throttle into the engine, the improvement comprising means to modify the gain of said electric circuit as a function of engine speed such that at any given throttle opening the gain over one portion of the engine speed range is different from what it is over another portion of the engine speed range.

---

### 5,018,386

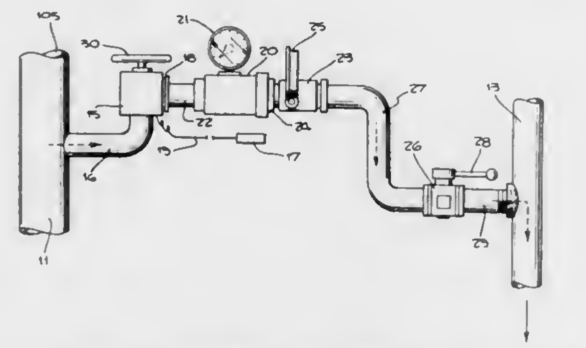
## METHOD FOR TESTING PRESSURIZED WATER SYSTEMS

**Paul Zeoli, 6245 Gentry Ave., North Hollywood, Calif. 91606**

**Continuation of Ser. No. 266,283, Oct. 26, 1988, abandoned, which is a continuation of Ser. No. 926,007, Oct. 31, 1986, abandoned. This application Mar. 27, 1990, Ser. No. 500,732**

**Int. Cl.⁵ G01M** *19/00*

**U.S. Cl. 73—168** **8 Claims**



1. A method for testing the pressure and flow of water from a preexisting supply of water (**11**) associated with a building through a preexisting normally closed pressure reducing valve (**15**) having a normally capped discharge outlet (**18**), said building having a downpipe (**13**) for removing water from the building, said downpipe being normally plugged off by a removable cap(**13'**), said method comprising the steps of:

opening said outlet (**18**) and coupling to said outlet (**18**) a first conduit (**22**) and a water pressure measuring device (**20**) having a gauge (**21**) operatively coupled thereto;

coupling said device (**20**) to a water flow meter (**23**) having a manometer (**25**) operatively coupled thereto;

coupling said meter (**23**) via a second conduit (**27**) to a normally open shut-off valve (**26**) having a control handle (**28**);

removing said cap (**13'**) from said downpipe (**13**) and coupling said shut-off valve (**26, 28**) via a third conduit (**29**) to said downpipe (**13**);

opening said reducing valve (**15**) thereby flowing fluid out of said outlet (**18**) and through said first conduit (**22**), through said water pressure measuring device (**20**), through said water flow meter (**23**), through said second conduit (**27**) to said shut-off valve (**26**) and into said downpipe (**13**) via said third conduit (**29**);

closing said shut-off valve (**26**) thereby stopping said water flow into said downpipe (**13**)

thereby creating a static pressure reading at said gauge (**21**) operatively coupled to said water pressure measuring device (**20**);

determining the static pressure reading on said gauge (**21**) and, if said reading is below a predetermined desired psi reading, adjusting said pressure reducing valve (**15**) until the static pressure, as measured at gauge (**21**), increased to at least said aforementioned predetermined desired psi reading;

opening said shut-off valve (**26**) via said handle (**28**) thereon thereby flowing water through said third conduit (**29**) and into said downpipe (**13**) while visually observing both the residual gallons per minute flowing from said first conduit (**22**) to said second conduit (**27**) as read at said manometer (**25**) and the residual pressure reading at said gauge (**21**) for a predetermined period of time and flow rate; and

shutting off said reducing valve (**15**).

---

### 5,018,387

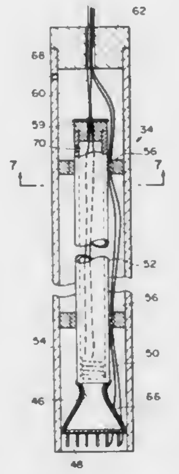
## CRYOGENIC LIQUID LEVEL MEASURING APPARATUS

**Ganapati R. Myneni, Grafton, Va., assignor to Southeastern Universities Research Association, Newport News, Va.**

**Filed Jul. 27, 1989, Ser. No. 385,372**

**Int. Cl.⁵ G01F** *23/00*

**U.S. Cl. 73—295** **8 Claims**



1. An apparatus for measuring a level of a cryogenic fluid in a cryostat having a bottom, comprising:

a pressure sensor having an electrical output which varies in accordance with a head of the cryogenic fluid;

a support for supporting the sensor near the bottom of the cryostat; and

indicator means, coupled to the sensor, for indicating the level of cryogenic fluid in the cryostat based on the electrical output of the sensor,

wherein the support means comprises a first inner tube, and a second outer tube mounted coaxially with the first inner tube, wherein the first inner tube has a lower end to which the sensor is mounted, and an upper end portion which has at least one hole formed radially therein, wherein the sensor is a semiconductor sensor having a housing, a semiconductor element having one side exposed to the interior of the first inner tube and an opposite side exposed to the cryogenic fluid, the electrical output corresponding to a differential pressure between the pressure within the inner tube and the pressure at the bottom of the cryostat attributable to the head of the cryogenic fluid.

---

### 5,018,388

## PRESSURE SENSOR FOR INFUSION CONDUITS

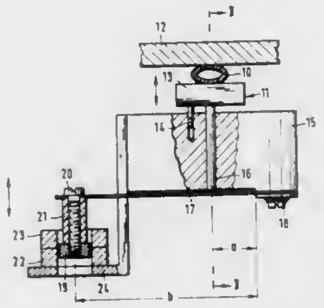
**Wolfgang Mosebach, Dagobertshausen; Rolf Heitmeier, Baunatal; Hans Gerlach, Marsberg, and Dieter Rath, Melsungen, all of Fed. Rep. of Germany, assignors to B. Braun Melsungen AG, Melsungen, Fed. Rep. of Germany**

**Filed Jun. 1, 1990, Ser. No. 532,023**

**Claims priority, application Fed. Rep. of Germany, Jun. 7, 1989, 3918534**

**Int. Cl.⁵ G01L** *7/04, 9/10*

**U.S. Cl. 73—730** **7 Claims**



1. A pressure sensor for determining the pressure of a medium in a hose, comprising:

a resilient bar having a free end and a fixed end,

a pressure member for pressing the hose, the pressure member contacting the resilient bar at a point of contact nearer to the fixed end of the bar than the free end of the bar,

an influencing member mounted adjacent the free end of the bar and defining a path, and

means for determining the position of the influencing member, including at least two oscillator coils for maintaining an electric oscillation having a parameter which changes in response to changes in position of the influencing member, each of the oscillator coils maintaining an electric oscillation having a parameter which changes in response to changes in position of the influencing member, the two oscillator coils being successively arranged in the path of the influencing member.

---

### 5,018,389

## ROCK-STRESS MEASURING METHOD

**Dennis Mraz, Saskatoon, Canada, assignor to Engineered Instruments, Inc., Saskatoon, Canada**

**Filed Jan. 9, 1990, Ser. No. 462,595**

**Int. Cl.⁵ G01N** *33/24*

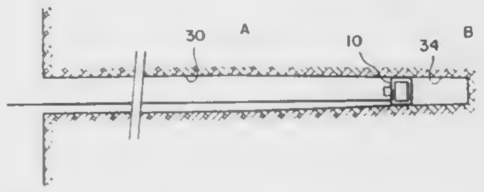
**U.S. Cl. 73—784** **4 Claims**

1. A method of measuring rock-stress comprising drilling a cylindrical borehole into earth material at a length short of a desired depth of placement;

drilling beyond the first length with a tapered bit to form a conically shaped, inward end portion of the cylindrical borehole;

inserting a tapered sensing plug into the conically shaped inward end portion of the cylindrical borehole;

seating the sensing plug at a predetermined orientation firmly in the conically shaped inward end portion of the cylindrical borehole; and



processing signals output by the sensing plug to determine rock-stress data.

---

### 5,018,390

## METHOD AND APPARATUS FOR MONITORING THE TENSION AND QUALITY OF AN ADVANCING YARN

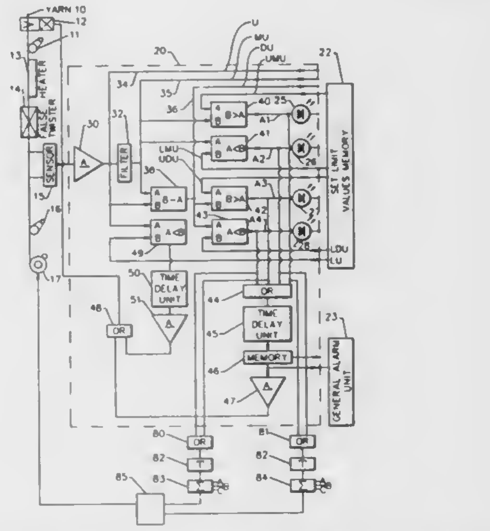
**Manfred Muller, Wuppertal, Fed. Rep. of Germany, assignor to Barmag AG, Fed. Rep. of Germany**

**Filed Jun. 1, 1990, Ser. No. 532,217**

**Claims priority, application Fed. Rep. of Germany, Jul. 6, 1989, 3922244**

**Int. Cl.⁵ G01N** *3/08*

**U.S. Cl. 73—828** **8 Claims**



1. A method of monitoring the tension of an advancing yarn, and comprising the steps of

continuously monitoring the value (U) of the tension of the advancing yarn, while continuously determining the mean value (MU) of the monitored tension, and while also continuously determining the differential (DU) between the monitored value and the mean value,

generating a first alarm signal whenever the mean value (MU) leaves a predetermined tolerance range (UMU;LMU) for a predetermined time, and generating a second alarm signal whenever the differential value (DU) leaves a second predetermined tolerance range (UDU;LDU) for a predetermined time, and

logging of the first and second alarm signals occurring during a predetermined time (SR) so as to provide an indication of the quality of the yarn.

### 5,018,391
## INDUCTIVE FLOW METER

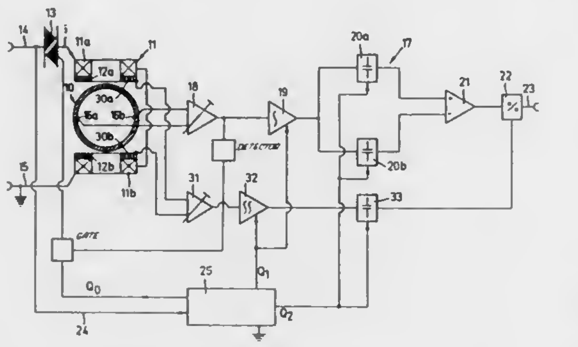
**Friedhelm Doll, Wermelskirchen, Fed. Rep. of Germany, assignor to Turbo-Werk Messtechnik GmbH, Cologne, Fed. Rep. of Germany**

**Filed Jan. 31, 1990, Ser. No. 472,755**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1989, 3903068**

**Int. Cl.⁵ G01F** *1/60*

**U.S. Cl. 73—861.17** **17 Claims**



8. An inductive flow meter, comprising:
a magnetic field generator,
a pair of electrodes,
a switch for connecting the magnetic field generator to a source of alternating current voltage, whereby the alternating current voltage is supplied to the magnetic field generator and an exciting current is supplied to the magnetic field generator,
a control circuit, the control circuit including a zero crossing detector for detecting a zero amplitude of the alternating current voltage, means for bringing the switch to a conductive state at a zero amplitude of the alternating current voltage, and means for bringing the switch to a non-conductive state at a zero amplitude of the exciting current,
means for controlling the switch to supply the alternating current voltage to the magnetic field generator for a duration less than a period of the alternating current voltage, and
an evaluating circuit connected to the pair of electrodes, the evaluating circuit including an integrator for integrating a voltage at the electrodes over a period of time beginning when the switch is brought to the conductive state and corresponding to at least a period of the alternating current voltage.

---

### 5,018,392
## METHOD AND SYSTEM FOR ZERO-RESETTING OF A TORQUE-MEASURING DEVICE, ESPECIALLY ON A CYCLE OR LIKE VEHICLE

**Jean-Pierre Mercat, Chateau Renault, France, assignor to STE Look, Nevers, France**

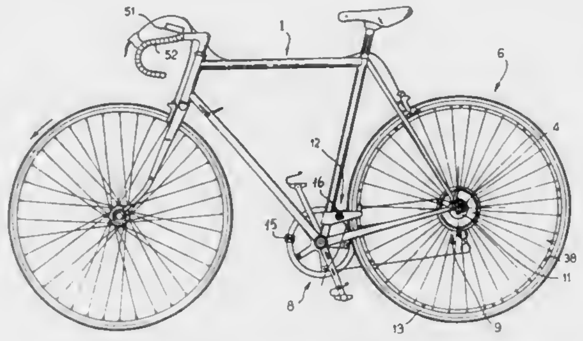
**Filed Mar. 16, 1990, Ser. No. 494,320**

**Claims priority, application France, Mar. 29, 1989, 89 04058**

**Int. Cl.⁵ G01L** *3/02;* **B67D** *5/26;* **A63B** *49/00*

U.S. Cl. 73—862.19 6 Claims

1. A method for zero-resetting of a device for measuring transmitted torque during use of a cycle equipped with said device and having a driving wheel fitted with a free-wheel mechanism, wherein:
a monitoring operation is applied to a phenomenon or a parameter which is normally variable during normal use of the cycle and which disappears or becomes constant when the driving wheel rotates in free-wheel motion, and when the disappearance or the constant character of the phenomenon or of the parameter thus monitored is observed during a predetermined period of time, initiating zero-resetting of the torque-measuring device.



---

### 5,018,393
## DEVICE FOR DETERMINING TORQUE TRANSMITTED IN A SHAFT

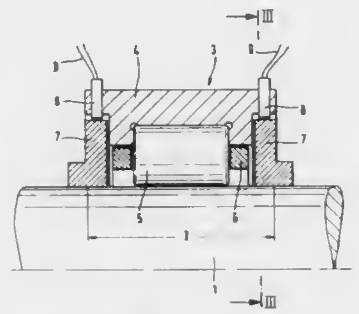
**Hanns Seegers, Herzogenaurach, Fed. Rep. of Germany, assignor to INA Walzlageer Schaeffler KG, Fed. Rep. of Germany**

**Filed Dec. 27, 1989, Ser. No. 457,239**

**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1989, 3905251**

Int. Cl.⁵ G01L *3/10*

U.S. Cl. 73—862.34 9 Claims



1. A device for determining the torque transmitted in a shaft, which device comprises two pick-ups arranged at an axial distance from each other on the shaft, with which sensors are contactlessly associated, characterized in that each pick-up is arranged at the two end faces of a radial shaft bearing.

---

### 5,018,394
## CONTINUOUSLY ADJUSTABLE DILUTING DEVICE FOR MIXING PREDETERMINED VOLUMES OF LIQUID

**Warren E. Gilson, 601 N. Segoe Rd., Unit #104, Madison, Wis. 53705**

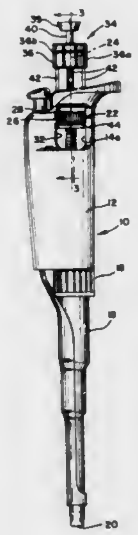
Filed Jan. 10, 1990, Ser. No. 463,283

Int. Cl.⁵ G01N *1/14;* B01L *3/02*

U.S. Cl. 73—864.18 18 Claims

1. An adjustable diluting device for mixing a predetermined volume of a liquid sample with a predetermined volume of a liquid diluent, at least one of said volumes being variable, comprising:
a body having an elongate chamber open at an upper end of said body and extending downwardly along a central axis thereof;
a volume adjustment mechanism for one of said volumes rotatably mounted in said chamber and including a rotating adjustment element frictionally engaging an adjacent

wall surface of said chamber for retaining an adjusted position in said chamber;
means for rotating said adjustment element supported for longitudinal movement relative thereto along said axis between a retracted position relative to said body and an outwardly extended externally exposed, operative position readily accessible adjacent said open upper end of said body for rotating said adjustment element to vary said one volume;



the rotating means including knob means secured adjacent an outer end portion of an elongate support element slidably supported from said adjustment element for movement longitudinally of said axis between said retracted and said operative positions; and
the elongate support element comprising at least one member slidably mounted in said adjustment element spaced radially outward and parallel of said axis.

---

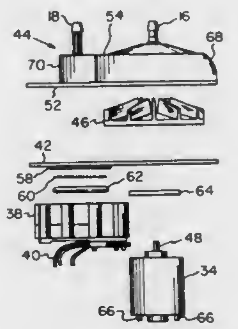
### 5,018,395
## GAS SAMPLING DEVICE WITH IMPROVED MIXED FLOW FAN

**Richard M. Hickox, Ross Township, Allegheny County; William P. Spohn, Swissvale, and David J. D'Amico, Oakmont, all of Pa., assignors to Bacharach, Inc., Pittsburgh, Pa.**

**Filed Feb. 8, 1990, Ser. No. 477,233**

**Int. Cl.⁵ G01N** *1/24*

**U.S. Cl. 73—864.34** **26 Claims**



1. A gas sampling device comprising:
(a) a chamber including a chamber top mounted to a chamber base, with the chamber base having a gas flow passage extending therethrough and into the chamber;
(b) a circular fan positioned within the chamber and spaced from and directing gas flows toward the gas flow passage, with the fan rotatable in a plane substantially parallel to an upper surface of the chamber base;
(c) a motor mounted to a lower surface of the chamber base and having a shaft extending perpendicularly through the chamber base and attached to the fan;
(d) a gas sensor mounted to the lower surface of the chamber base and in fluid communication with the gas flow passage;
(e) an inlet flow passage extending through the chamber top above the fan and oriented substantially perpendicular thereto; and
(f) an outlet flow passage extending through the chamber top above the gas flow passage, with the chamber top including a fan housing surrounding but spaced from an outer perimeter of the fan and a gas tunnel housing extending tangentially from the fan housing to the gas flow passage, with the fan housing having an inner wall which has a linearly increasing, outward spiral shape in which the spacing between the outer perimeter of the fan and the inner wall gradually increases, in the direction of rotation of the fan, from a minimum in an area following the gas tunnel housing, to a maximum in a transition area between the fan housing and the gas tunnel housing.

---

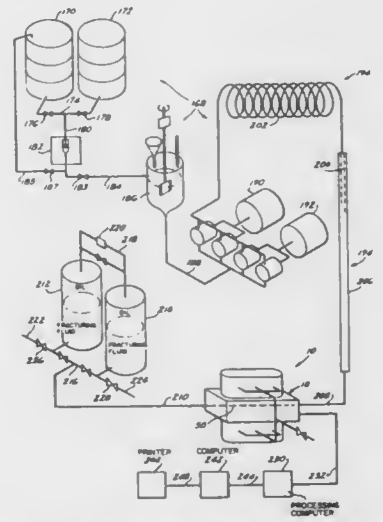
### 5,018,396
## CELL ASSEMBLY FOR DETERMINING CONDUCTIVITY AND PERMEABILITY

**Glenn S. Penny, Duncan, Okla., assignor to Stim Lab, Inc., Duncan, Okla.**

**Division of Ser. No. 233,158, Aug. 17, 1988, Pat. No. 4,922,758. This application Nov. 13, 1989, Ser. No. 434,459**

**Int. Cl.⁵ E21B** *43/267*

**U.S. Cl. 73—865.6** **8 Claims**



1. An apparatus for conditioning a fracturing fluid to simulate downhole injection conditions to which the fracturing fluid would be subjected in a subterranean formation at a predetermined depth and distance from a bore hole prior to passage of the fracturing fluid into a cell assembly, the apparatus comprising:
pump means for pressurizing the fracturing fluid to a preselected pressure;
first conduit means having a predetermined length and internal diameter for producing a first shear rate on the pressurized fracturing fluid representative of the shear rate to which the pressurized fracturing fluid would be subjected at a predetermined depth in the subterranean formation; and
second conduit means having a predetermined length and internal diameter for producing a second shear rate on the pressurized fracturing fluid representative of the shear

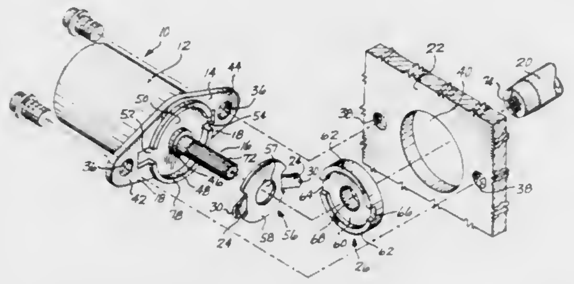
OL
126
SS
4
MY
28
991
UMI

rate to which the pressurized fracturing fluid would be subjected at a predetermined distance from the bore hole, the first shear rate being greater than the second shear rate on the pressurized fracturing fluid.

---

### 5,018,397
### TRANSDUCER INPUT SHAFT LOCK MECHANISM

**Charles B. Matich, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.**
**Filed Jan. 26, 1990, Ser. No. 470,928**
**Int. Cl.$^5$ G01D** *5/00*
U.S. Cl. 73—866.5 12 Claims

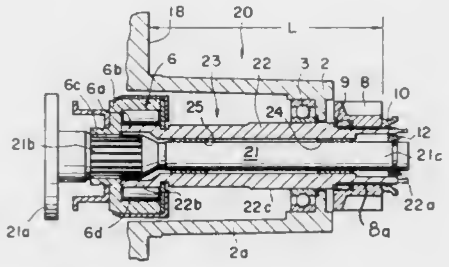


1. A transducer connectable to a rotatable member for generating an electrical signal indicative of the angular position of such member, said transducer comprising:
- a housing including a mounting base having a base surface within a substantially radial plane;
- a rotary input shaft projecting from said mounting base and in use being connectable to a rotatable member when said transducer is mounted with said base surface against a mounting member; and
- means within said housing for producing an electrical output signal related to the angular position of the input shaft; and
- an improvement in the nature of a mechanism for locking the input shaft into an indexing position when the transducer is not installed to insure that, at installation time, the transducer output will be synchronized to the position of the rotatable member, said mechanism comprising:
- a leaf spring detent carried by said housing and having a fixed inner end positioned radially between said input shaft and said base surface, and a free outer end positioned radially inwardly adjacent the base surface, said leaf spring detent having an at-rest position in which it deflects axially outwardly from the mounting base of the housing as it extends radially outwardly from its fixed inner end to its free outer end, and in said at-rest position the free outer end of the leaf spring detent is spaced axially outwardly from the radial plane of the base surface; and
- a detent capture secured to the input shaft, said detent capture being rotatable with the input shaft and having a lock component constructed and positioned to interfit with an intermediate portion of the leaf spring detent when said leaf spring detent is in its at-rest position, for locking the detent capture and the input shaft against rotation relative to the leaf spring detent and the housing; and
- wherein said free outer end of said leaf spring detent projects radially outwardly from the lock component of the detent capture and axially outwardly from the plane of the base surface, into a position for contact with the mounting member, such contact being made as the mounting base is placed on the mounting member, and such contact bending the leaf spring detent towards the mounting base of the transducer housing and disengaging the leaf spring detent from the lock component of the detent capture, to in that manner free the detent capture and the input shaft for rotation.

---

### 5,018,398
### ENGINE STARTER WITH A PINION SHIFTER UNIT

**Taiichi Nakagawa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Jan. 17, 1990, Ser. No. 466,566**
**Claims priority, application Japan, Jan. 18, 1989, 1-9012**
**Int. Cl.$^5$ F02N** *11/00*
U.S. Cl. 74—7 R 7 Claims

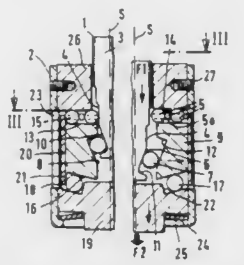


1. An engine starter comprising:
- an electric motor connected to an output rotary shaft (**21**);
- an elongated pinion shifter unit (**23**) axially slidably mounted on said output rotary shaft for rotation therewith and including a pinion (**8**) mounted at a first end and a unidirectional clutch (**6**) disposed at a second, opposite end;
- a solenoid switch for operating said electric motor and shifting said pinion shifter unit;
- a first sleeve bearing (**24**) disposed between said first end of said pinion shifter unit and said output rotary shaft; and
- a second sleeve bearing (**25**) disposed between said second end of said pinion shifter unit and said output rotary shaft;
- said first and said second sleeve bearings being axially spaced apart from each other, said first sleeve bearing being made of a first material exhibiting superior wear resistance under heavy load conditions, and said second sleeve bearing being made of a second material exhibiting superior wear resistance under high speed rotation conditions.

---

### 5,018,399
### MECHANICAL SERVOMOTOR

**Harry L. Sawatzki, Vaduz, Liechtenstein, and Harald Feistenauer, Lindenberg, Fed. Rep. of Germany, assignors to Firma Saurer-Allma GmbH, Kempten, Fed. Rep. of Germany**
**Filed Aug. 17, 1989, Ser. No. 395,083**
**Claims priority, application Switzerland, Aug. 18, 1988, 03085/88**
**Int. Cl.$^5$ F16H** *21/44*
U.S. Cl. 74—110 9 Claims



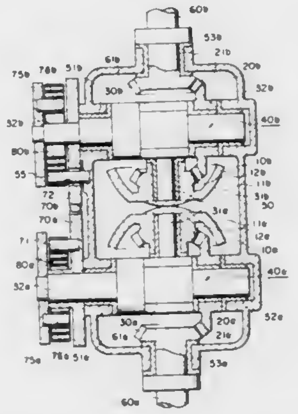
1. A mechanical servomotor comprising a housing enclosing
- a) a primary input member,
- b) a moveable abutment member,
- c) a secondary output member, and
- d) a plurality of roll bodies,

wherein said primary input member has wedge faces defined thereon and is moveably positioned between a symmetrical pair of mirror-image roll bodies arranged one on either side of said primary member so as to engage said wedge faces; each of said pair of roll bodies also engaging a respective abutment face along a plane of symmetry on said movable abutment member and at least one further pair of roll bodies being provided adjacent said abutment member; said abutment member being moveably mounted in the housing so as to allow a pure rolling movement of said roll bodies between said wedge faces and said abutment faces; and faces on said secondary member and/or corresponding faces on said abutment member are provided as further wedge faces engaged by said further roll bodies.

---

### 5,018,400
### CONTINUOUSLY VARIABLE TRACTION DRIVE SPEED CHANGER

**Akira Takami, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed May 30, 1990, Ser. No. 530,530**
**Claims priority, application Japan, Jun. 2, 1989, 1-141806**
**Int. Cl.$^5$ F16H** *15/00*
U.S. Cl. 74—198 1 Claim

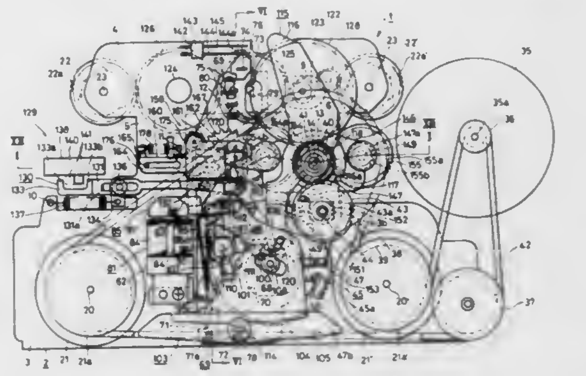


1. A continuously variable traction drive speed changer comprising:
- a main frame;
- a pair of rolling wheel assemblies each including a coupling wheel which is a bevel gear, a rolling wheel having a bevel gear meshing with said coupling wheel and a pivot shaft member rotatably supporting said coupling wheel and said rolling wheel, said rolling wheel having an outer circumferential surface defined by a rotated involute curve, and said pivot shaft member being rotatably supported from said main frame with respect to the circumferential direction of said coupling wheel;
- said pair of rolling wheel assemblies being mounted in parallel to each other to said main frame in such an arrangement that axes of said coupling wheels are parallel to each other, and axes of said rolling wheels are in a plane containing said axes of said coupling wheels and perpendicular to said axes of said coupling wheels, and that said rolling wheels are in contact with each other at outer circumferences thereof;
- an input shaft connected to said coupling wheel of one of said rolling wheel assemblies;
- an output shaft connected to said coupling wheel of the other of said rolling wheel assemblies; and
- a contact pressure applying member biasing said axes of said rolling wheels for rotating said pivot shaft members in the circumferential direction of said coupling wheel toward respective contact portions.

---

### 5,018,401
### TRANSLATION CAM MEANS

**Mitsuru Ida, Saitama, and Yasuhiro Yamaguchi, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan**
**Filed Nov. 14, 1989, Ser. No. 436,350**
**Claims priority, application Japan, Nov. 18, 1988, 63-293354**
**Int. Cl.$^5$ F16H** *3/34;* **B65H** *16/10;* **G11B** *5/008*
U.S. Cl. 74—354 9 Claims

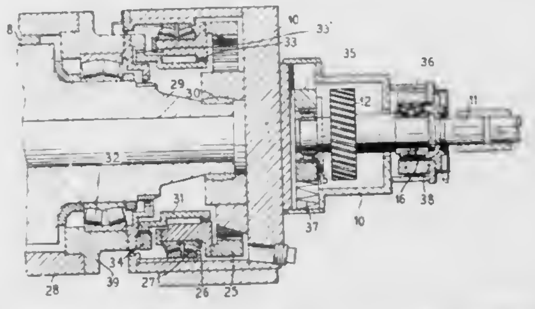


1. Translation cam means comprising:
- a translation cam being supported by support members, and reciprocating in relative relation to the support members;
- biasing means for urging the translation cam in a predetermined direction; and
- eccentric gear means being mounted for rotation on a pivot which is disposed on the translation cam and meshed for a predetermined duration with a driving gear, the eccentric gear means having teeth being arranged in a circular arc with the distance of each of the teeth from a pivot being different from one another;
- wherein the translation cam is moved against the force of the biasing means due to rotation of the eccentric gear means which is driven by the driving gear.

---

### 5,018,402
### PLANETARY GEAR DRIVE FOR CONTROLLED DEFECTION ROLLS

**Arnold J. Roerig, Beloit, and Steven C. Shockley, Clinton, both of Wis., assignors to Beloit Corporation, Beloit, Wis.**
**Filed Apr. 17, 1989, Ser. No. 338,685**
**Int. Cl.$^5$ F16H** *57/00*
U.S. Cl. 475—347 2 Claims



1. A drive mechanism for a paper machine controlled deflection roll comprising in combination:
- a power input shaft rotatably mounted;
- a sun gear driven by said shaft;
- planetary driven gears in driven mesh with the sun gear located on opposite lateral sides of the sun gear whereby driving forces are transmitted from the sun gear to the planetary gears at the location of mesh;
- an output drive mechanism driven by the planetary gears;
- and a movable supporting mount for the power input shaft yieldable parallel to the direction of the driving forces

between the sun and planetary gears whereby the sun gear is allowed to seek its own position in the plane of the gears to equalize the driving forces between the sun gear and each of the planetary gears;

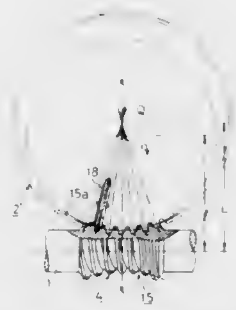
wherein the sun gear is mounted on the power input shaft with bearings and the movable supporting mount is in the form of slidable slide supports supporting the shaft and guiding the shaft and sun gear in said mount substantially normal to the plane of the axes of revolution of the sun and planetary gears.

---

### 5,018,403

### GLOBOID WORM GEAR SPEED REDUCTION APPARATUS

**Shiro Umezono, and Minoru Maki, both of Yokohama, Japan, assignors to Nippon Gear Co., Ltd., Japan**
**Continuation of Ser. No. 431,679, Nov. 3, 1989, abandoned, which is a continuation of Ser. No. 140,089, Dec. 31, 1987, abandoned. This application Jun. 20, 1990, Ser. No. 541,155**
**Claims priority, application Japan, Aug. 5, 1987, 62-119259**
**Int. Cl.$^5$ F16H** *55/08;* **B23F** *13/06*
**U.S. Cl. 74—425** **2 Claims**



1. A globoid worm gear speed reduction apparatus comprising:
  (a) a worm wheel having a plurality of equally spaced teeth disposed about an axis in a circle;
  (b) a globoid worm gear of the double envelope type having a worm thread disposed about its axis in engagement with the teeth of said worm wheel, the axis of said globoid worm gear being transverse to the axis of said worm wheel, said worm thread being defined by a conical cutting tool surface moved through an arc in a plane which includes the axis of said globoid worm gear, the radius of the arc being greater than the distance between the axes of said worm wheel and said globoid worm gear when said worm thread is engaged with the teeth of said worm wheel.

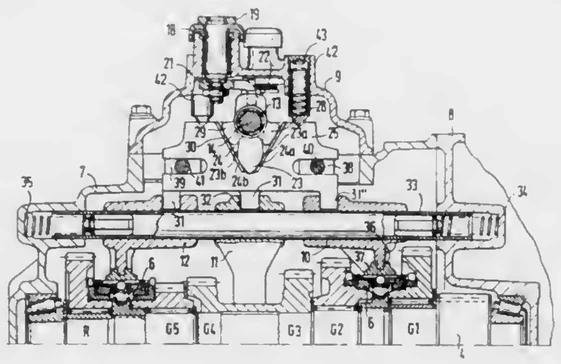
---

### 5,018,404

### CONTROL ARRANGEMENT FOR A GEAR SHIFT TRANSMISSION

**Robert Müller, Mönsheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany**
**Filed Dec. 6, 1989, Ser. No. 446,856**
**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1988, 3841780**
**Int. Cl.$^5$ F16H** *63/36, 59/04, 3/38*
**U.S. Cl. 74—477** **12 Claims**

1. An arrangement for controlling a synchronized gear shift transmission of a motor vehicle, comprising:
  a shift piece means that is longitudinally slidable on a shifting shaft by a selector lever fastened to a preselector shaft;
  said shift piece means is non-rotatably connected with the shifting shaft;
  the shift piece means controls shifting forks that engage synchronizing clutches of individual transmission gears by a shifting finger interacting with several shift rails disposed next to one another;
  stop means for restraining remaining shift rails when one shift rail is moved; and



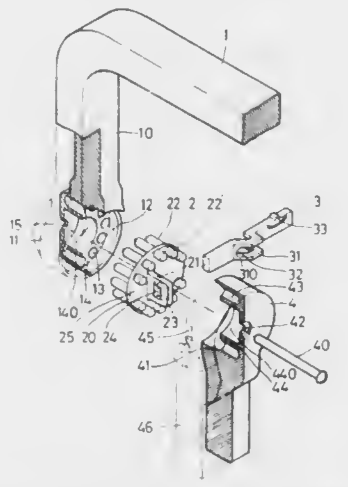
  wherein the shift finger is equipped with an involute flank which is applied to a plane contact surface of the shift rail to be moved.

---

### 5,018,405

### ANGLE ADJUSTMENT DEVICE FOR HANDLE OF STROLLER

**Hsiu-Hui Chiu, Tainan Hsien, Taiwan, assignor to Sunshon Molding Co., Ltd., Tainan Hsien, Taiwan**
**Filed Aug. 2, 1990, Ser. No. 562,556**
**Int. Cl.$^5$ G05G** *5/06;* **B62K** *21/16;* **E05B** *35/04*
**U.S. Cl. 74—529** **1 Claim**



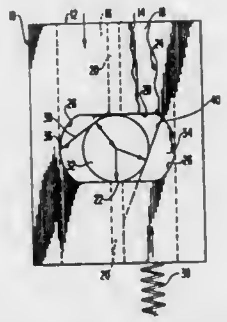
1. An angle adjustment device for adjustably and fixedly positioning a first bar to a second bar at one of a plurality of angular positions comprising:
  a first casing half member having a first recess and a first inner circular plate body having a first central passage extending axially therethrough, said inner circular plate body formed with a plurality of first cavities extending axially and in open communication with the recess;
  means integrally attached to the first casing half member for receiving an end portion of the first bar;
  a second casing half member having a second recess, said second casing half mating with the first casing half member having formed therein a pair of spaced grooves which define a passage across a chamber formed by unifying said first and second recesses, said second casing half member having a second circular plate body defining a second central passage adapted to be in alignment with the first central passage in the first casing half member and said inner circular plate body formed with a plurality of second cavities extending axially and communicating the second recess of the second casing half member;
  means integrally attached to the second casing half member for receiving an end portion of the second bar;
  a latch member including a disc member formed with a central opening adapted to be in alignment with the first central passage in the first casing half member, a plurality of first leg members projecting axially from a first side of the disc member and adapted to be movably received in the first cavities in the first circular plate body of the first casing half member, a plurality of second leg members projecting axially from a second side opposite to the first side of the disc member and adapted to be movably received in the second cavities in the second circular plate body of the second casing half member and a guide plate projecting from the second disc member and formed with an opening which defines a passage corresponding to the passage defined by the spaced grooves and sloping radially inwardly with respect to the disc member, said latch member being adapted to be housed in the mating first and second casing half members with the disc member thereof being disposed in the chamber which is dimensioned to allow the disc member therein to move axially between (1) a locking position with the first leg members of the disc member being correspondingly engaged in the first cavities of the first circular plate body of the first casing half member and the second leg members thereof being engaged in the cavities of the second circular plate body of the second casing half member and (2) an unlocking position where the first leg members the disc member are engaged in the first cavities of the circular member of the first casing half member and the second leg members thereof being disengaged from the second cavities of the circular plate body of the second casing half member;
  an actuating bar having two end portions protruding from the grooves of the mating first and second casing half members and an intermediate fold between the end portions having a slot corresponding to the central opening of the disc member and a sloping section being slidably inserted through the opening in the guide plate of the disc member to position the disc member in either a locking or unlocking position displacing the actuating bar in the spaced groooves; and
  a rivet member extending through the first and second central passages of the mating first and second casing half members, the central hole of the disc member and the slot of the actuating bar for fastening the mating first and second casing half members and securing the latch member and the actuating bar in position.

---

### 5,018,406

### MECHANICAL LOCKING DEVICE

**Peter Kerr, Columbus, Ohio, assignor to Schuler Incorporated, Columbus, Ohio**
**Filed Nov. 14, 1989, Ser. No. 437,126**
**Int. Cl.$^5$ F16H** *53/06*
**U.S. Cl. 74—569** **7 Claims**



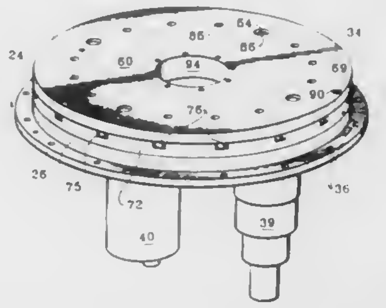
1. A mechanical locking apparatus comprising:
  housing means for defining first and second generally parallel paths of movement therein and a third path of movement generally normal to and between said first and second paths of movement;
  first means mounted in said housing means for movement along said first path for reciprocable movement in first and second directions along said first path and having a first inclined surface at a preselected angle relative to an axis of movement of said first path;
  second means mounted in said housing means for movement along the second path for reciprocable movement in first and second directions along said second path and having a second inclined surface at a preselected angle relative to an axis of movement of said second path;
  third means mounted in said housing means for free bidirectional movement in said housing means along said third path, said third means having line contact with and being simultaneously engageable by said inclined surfaces; and,
  said first and second inclined surfaces having their respective preselected angles established in a predetermined locking ratio with one another so that said second means is movable in a first direction along said second path in response to movement of said first means in said first direction which movement effects an axial force on said third means along said third path and causes movement of said second means in said first direction; movement of said second means in said second direction in response to a locking force is restricted by automatic locking such that said locking is effected by the locking force being generally equally angularly distributed by said third means between said housing means and said first means.

---

### 5,018,407

### PEDESTAL ASSEMBLY HAVING A REDUCED VOLUME IN A LUBRICANT FILLED HOUSING

**Dietrich H. Hoecht, Loganville, Ga., assignor to Scientific-Atlanta, Inc., Atlanta, Ga.**
**Filed Oct. 27, 1989, Ser. No. 429,283**
**Int. Cl.$^5$ F16H** *57/04, 57/02*
**U.S. Cl. 74—606 R** **11 Claims**



1. An insert shaped to occupy space in a lubricant-filled container so as to reduce the volume of lubricant comprising:
  a preshaped isocyanate polyurethane foam structure; and
  a coating of lubricant impregnable urethane over the surface of said structure.

---

### 5,018,408

### CONTROL SYSTEMS FOR POWER TRAINS PROVIDED IN VEHICLES

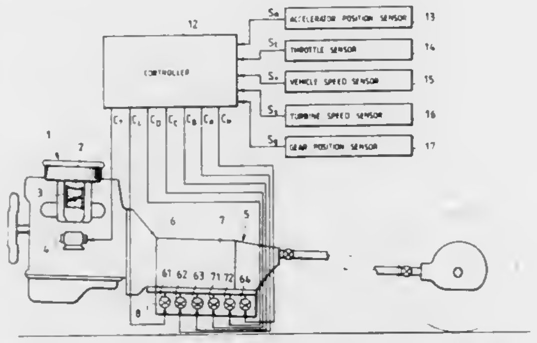
**Keiji Bota, and Kenji Sawa, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**
**Filed Sep. 20, 1988, Ser. No. 246,784**
**Claims priority, application Japan, Sep. 26, 1987, 62-241562**
**Int. Cl.$^5$ B60K** *41/06*
**U.S. Cl. 74—866** **17 Claims**

1. A control system for a power train provided in a vehicle to include a engine which has an engine output adjusting device controlled through an electric actuator in accordance with a first controlled variable on an accelerator accompanying with the engine and an automatic transmission which is

OL
126
SS
4
MY
28
991
UMI

coupled with the engine and in which a speed change operation is automatically performed by means of operating oil pressure produced in an oil hydraulic control circuit arrangement for actuating a speed change mechanism contained in the automatic transmission to have engaging friction elements and controlled to vary in accordance with an operating condition of the engine, said control system comprising:

first detecting means for detecting the first controlled variable on the accelerator,
second detecting means for detecting a second controlled variable on the engine output adjusting device,
third detecting means for detecting a traveling speed of the vehicle,



speed change control means for controlling the speed change mechanism to cause the same to carry out the speed change operation based on detection outputs of said first and third detecting means, and
operating oil pressure control means for controlling the operating oil pressure applied to the engaging friction elements in the speed change mechanism from the oil hydraulic control circuit arrangement based on a detection output of said second detecting means;
wherein said engine output adjusting device is controlled by the electric actuator according to the second controlled variable, and wherein said second controlled variable is determined by the electric actuator according to a predetermined relation to vary in response to variations in the first controlled variable on the accelerator.

---

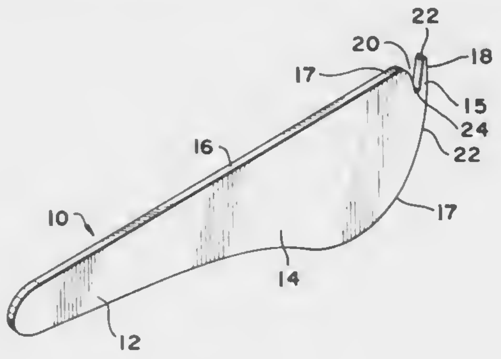
### 5,018,409
### TEAR TOP CAN OPENER

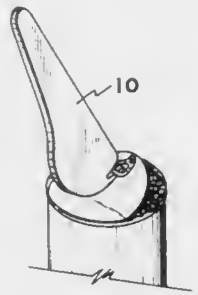
John A. Bittel, 85 Park Dr. North, Staten Island, N.Y. 10314
Filed Oct. 4, 1990, Ser. No. 592,666
Int. Cl.⁵ B67B *7/40*

U.S. Cl. 81—3.55 4 Claims

1. A tear top can opener for opening a closure lid of a container, the closure lid having a pull ring operably connected to a weakened score line, the pull ring being located adjacent the peripheral edge of the container, the opener comprising:

a handle for grasping the opener;
an intermediate bulbous shaped body portion adjacent said handle having a longitudinal axis and a parabolic shaped, pivoting edge for pivoting the opener on the container during the opening of the closure lid; and,
an opener end adjacent said intermediate portion having an end edge and a slot located adjacent said end edge defining a finger integrally formed with said end edge and located perpendicular to said longitudinal axis and on the opposite side of said pivoting edge; said finger being sized for insertion into said pull ring whereby said pull ring is held in said slot during the opening operation permitting the pull ring to be lifted in a perpendicular direction to remove the closure lid when said opener is pivoted on said pivoting edge.



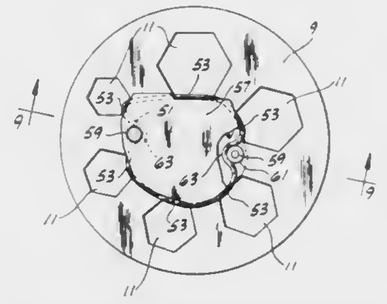


---

### 5,018,410
### WRENCH

Dennis G. Farnsworth, Manchester, Mo., assignor to Newington Corp., Manchester, Mo.
Continuation-in-part of Ser. No. 377,552, Jul. 10, 1989. This application Nov. 21, 1989, Ser. No. 439,475
The portion of the term of this patent subsequent to Jan. 15, 2008, has been disclaimed.
Int. Cl.⁵ B25B *9/00*

U.S. Cl. 81—13 10 Claims



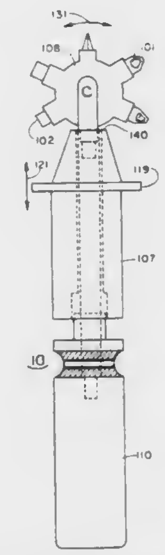
1. A wrench for holding a first fastener element of a nut-and-bolt fastener against rotation on an axis of the first fastener element while a second fastener element of the nut-and-bolt fastener is turned to tighten or loosen the fastener, said wrench comprising a generally circular wrench plate having a center and a plurality of different size polygonal openings therein spaced generally radially outwardly from said center for fitting fastener elements of different sizes, and holding means affixed to one face of the wrench plate and projecting generally radially outwardly with respect to the center of the wrench plate a relatively small distance beyond an inner edge of each opening for resilient engagement with the first fastener element when the latter is fitted in said opening, said resilient engagement holding the wrench plate in a fixed, self-retaining position in which the wrench plate is disposed in a plane generally perpendicular to said axis of rotation of the first fastener element, said wrench plate, when in said self-retaining position, being adapted to engage a part adjacent to the nut-and-bolt fastener when the second fastener element is turned, thereby holding the first fastener element against rotation on said axis and allowing both hands to be used to turn the second fastener element for tightening or loosening the nut-and-bolt fastener.

---

### 5,018,411
### MULTIPLE-HEAD TOOL

Nathan P. La Padura, 508 Brinley Ave. #5, Bradley Beach, N.J. 07735
Continuation-in-part of Ser. No. 216,511, Jul. 3, 1988, abandoned. This application May 22, 1989, Ser. No. 355,298
Int. Cl.⁵ B25B *17/00*

U.S. Cl. 81—57.5 14 Claims



1. A multiple-head tool which comprises:

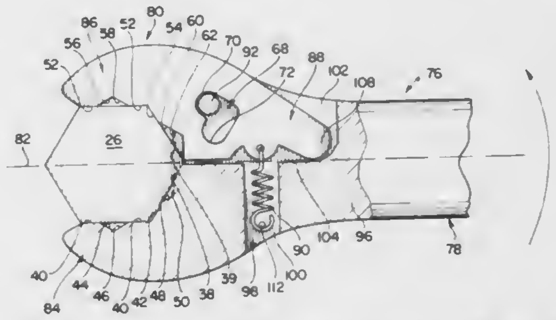
shaft means having a slot disposed therein which extends from one end thereof longitudinally along a portion of the shaft;
pivot means affixed to the shaft substantially traverse to the longitudinal extent of the slot;
multiple-head bit means having a pivot point, which multiple-head bit means is mounted at the pivot point on the pivot means so that the multiple-head bit means may be rotated within the slot, which multiple-head bit means comprises:
at least one tool which extends substantially radially from the pivot point and at least one further means which extends substantially radially from the pivot point in substantially the opposite direction from the at least one tool; and
sleeve means mounted on the shaft means and disposed to be longitudinally translatable along the shaft means, wherein:
at least the outer surface of the sleeve means is rotatable about the shaft by 360° so that the outer surface may be held continuously while the shaft is rotated; and at least the outer surface of the sleeve means is comprised of an electrically insulating material.

---

### 5,018,412
### OPEN-END RATCHET WRENCH

Albert A. Wylie, III, 39 North St., Warwick, R.I. 02886
Continuation-in-part of Ser. No. 185,412, Apr. 25, 1988, Pat. No. 4,848,193. This application Jul. 10, 1989, Ser. No. 377,888
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Int. Cl.⁵ B25B *13/28*

U.S. Cl. 81—111 11 Claims



1. A wrench comprising a handle element having first and second ends and a jaw assembly on the second end of said handle element, said jaw assembly including a first jaw portion on the second end of said handle element, a slide portion and a second jaw portion attached to said slide portion, said slide portion being movably attached to said handle element, said second jaw portion having a predetermined normal position wherein said first and second jaw portions cooperate to define the perimeter of an open mouth cavity for receiving the head of a hex-headed threaded fastening element having a rotational axis and wherein the head of said fastening element is receivable in said open mouth for rotating said fastening element about said rotational axis, the perimeter of said mouth cavity having an innermost extremity which is closest to the handle element, said jaw assembly having a central axis which is substantially perpendicular to said rotational axis and substantially equidistant from said first and second jaw portions when said second jaw portion is in the normal position thereof, means movably attaching said slide portion to said handle element such that when said second jaw portion is in said normal position and said jaw assembly is rotated to rotate the head of said fastening element in a first direction, a force applied by said fastening element head to said second jaw portion extends in the direction of the second end of said handle element and when said jaw assembly is rotated in an opposite second direction to overrun the head of said fastening element, a force applied by said fastening element head to said second jaw portion extends in a direction away from both said first jaw portion and the second end of said handle element, said slide portion having a stop member thereon, said attaching means movably and pivotally coupling said slide portion to said handle element, said attaching means preventing movement of said second jaw portion beyond said normal position in a direction toward said handle element, said wrench further comprising stop means engageable with said stop member for preventing pivoting of said slide portion about said attaching means when said jaw assembly is rotated to rotate said fastening element in said first direction, said attaching means permitting said second jaw portion to be moved in a direction away from both said first jaw portion and the second end of said handle element when said jaw assembly is rotated to rotate said fastening element in said second direction, at least one of said attaching means or said stop means being disposed inwardly of the innermost extremity of the perimeter of said mouth cavity in a direction toward the first end of said handle element, and biasing means having major and minor force components, the major force component of said biasing means being operative in a direction substantially perpendicular to said central axis for resiliently biasing said slide portion to a position wherein said second jaw portion is in the normal position thereof.

**5,018,413**

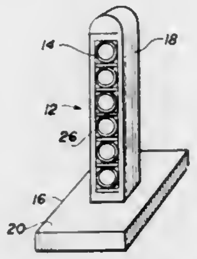
### TOOL SUPPORT

**Francisco S. Vazquez, 800 NW. 13th Ave., Apt. 1411, Miami, Fla. 33125**

**Filed Feb. 6, 1990, Ser. No. 475,948**

**Int. Cl.$^5$ B25B** *23/00*

**U.S. Cl. 87—462** **1 Claim**



1. For use in removing and replacing a vehicle wheel normally secured to the vehicle by a plurality of spaced lug nuts, using a cruciform lug removal tool including four radially extending arms each carrying a distal socket,

a tool supporting comprising:

a base having a support surface and an upper surface and a centrally arranged cylindrical recess in the upper surface of a first predetermined size and configuration,

a standard having a peg shaped lower end and a main upstanding extending portion with a working vertical surface, said standard being sized and configured for receipt of the peg shaped lower end in the recess with the upstanding extending portion in rigid vertical orientation, said standard having a substantially elongate receiving slot structured and configured for adaptive receipt of a plurality of cylindrical receiving chambers in a vertically stacked orientation,

a plurality of cylindrical receiving chambers in the working vertical surface along the upstanding extending portion in closely spaced relation, each of said receiving chambers being sized to receive any one of the sockets when the tool support is placed in confronting relation to the wheel and assembled, with two of the arms of the cruciform lug removal tool extending in aligned relation with one of the receiving chambers so that on rotation of the cruciform lug removal took, the receiving chamber serves as a bearing means.

---

**5,018,414**

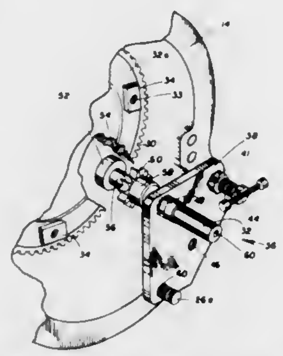
### TRANSMISSION SERVICING TOOL

**Richard C. Naumann, 2061 Pepperwood Ct., Redwood Valley, Calif. 95470**

**Filed Jun. 4, 1990, Ser. No. 532,799**

**Int. Cl.$^5$ B25B** *25/00*

**U.S. Cl. 81—484** **7 Claims**



1. A tool to facilitate removal and servicing an automotive automatic transmission, which includes a housing operatively mounted on a engine, a wheel rotatably mounted in said housing for driving engagement with said engine and a ring gear on said wheel, said ring gear in normal use being engaged by the pinion of a starter motor positioned on said housing by a locator stud thereon and secured thereto by a cap screw threadedly engaging a tapped hole therein, said wheel being only partially exposed for servicing but said starter motor being accessible for removal when said transmission is in operative position on said engine;

said tool comprising:

a plate;

a first hole through said plate receivable over the starter motor locator stud when said starter motor is removed;

a second hole through said plate for slideably receiving a screw to be threadedly engaged in said tapped hole;

a shaft rotatably mounted in said plate and extending therethrough on both sides thereof;

a pinion on said shaft on the inboard portion thereof positioned to mesh with said ring gear; and

means on the outboard portion of the shaft enabling said shaft to be gripped for manual rotation thereof.

---

**5,018,415**

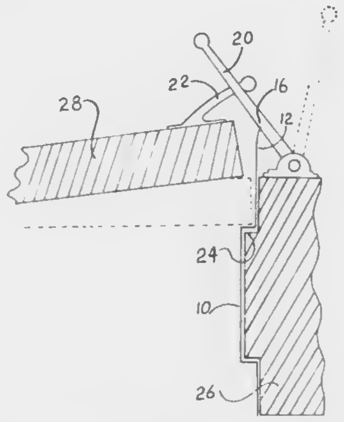
### DOOR SECURITY LATCH OPENER AND METHOD OF USING SAME

**Steven E. Hawley, Denver, Colo., assignor to Donita A. Hawley, Denver, Colo.**

**Filed Mar. 15, 1990, Ser. No. 494,132**

**Int. Cl.$^5$ E05G** *19/20*

**U.S. Cl. 81—15.9** **1 Claim**



1. A tool for unlatching door security latches, said latches comprising a stationary arm attached to the door and a swing arm attached to a door jam comprising:

a thin piece of rectangular metal; two finger like prongs formed at one end of the piece of metal; a series of four bends creating an offset area approximately at the center of the piece of metal; and prongs having notches at an outer end for engaging said swing arm of said security latch whereby said piece of metal is placed against the door jam with the offset area resting against the door jam and the notches engaging the swing arm; when the door is closed, the notches will apply pressure to the swing arm and cause it to disengage from the stationary arm.

**5,018,416**

### METHOD OF AND APPARATUS FOR CUTTING PIECES FROM AN ELONGATED TEXTILE WEB

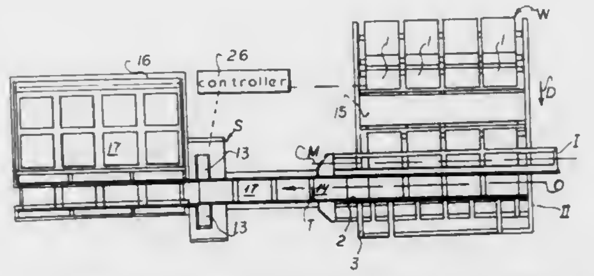
**Johannes Freermann, Ochtrup, Fed. Rep. of Germany, assignor to Carl Schmale GmbH & Co. KG, Ochtrup, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 174,074, Mar. 28, 1988, abandoned. This application Aug. 10, 1989, Ser. No. 392,053**

**Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710025**

**Int. Cl.$^5$ D05B** *1/00, 27/00*

**U.S. Cl. 83—14** **9 Claims**



1. A method of cutting pieces from an elongated flexible web and delivering the pieces to a treatment machine, the method comprising the steps of generally sequentially:

(a) feeding a leading edge of the web downstream in an upstream-to-downstream direction to an upstream cutting station with the edge extending transversely of the direction and gripping the leading edge at the cutting station with an upstream clamp;

(b) advancing the upstream clamp and the leading edge gripped thereby downstream away from the cutting station to a middle station spaced downstream from the cutting station and stopping advance of the upstream clamp and the leading edge gripped thereby in the middle station;

(c) at the middle station gripping the leading edge of the web with a downstream clamp;

(d) releasing the leading edge from the upstream clamp;

(e) displacing the downstream clamp and the leading edge held thereby downstream to a downstream holding station and generally simultaneously displacing the upstream clamp along the web upstream to a position slightly upstream of the upstream cutting station, whereby a piece constituting a leading end of the web is left extending between the upstream cutting station and the downstream clamp in the downstream holding station;

(f) gripping the web immediately downstream of the upstream cutting station with a transversely effective upstream clamping conveyor and also gripping it immediately upstream of the downstream holding station with a transversely effective downstream clamping conveyor;

(g) gripping the web immediately upstream of the upstream cutting station with the upstream clamp while continuing to hold the web immediately downstream of the cutting station with the upstream clamping conveyor and cutting the web longitudinally between the upstream clamp and the upstream clamping conveyor so as to cut the leading-end piece off the web, whereby the cut-off piece is left spanned between a trailing edge at the upstream clamping conveyor and a leading edge at the downstream clamping conveyor and a new leading edge of the web is formed at the cutting station; and

(h) conveying the cut-off piece transversely to the direction and generally parallel to its leading and trailing edges away from the stations with the clamping conveyors.

---

**5,018,417**

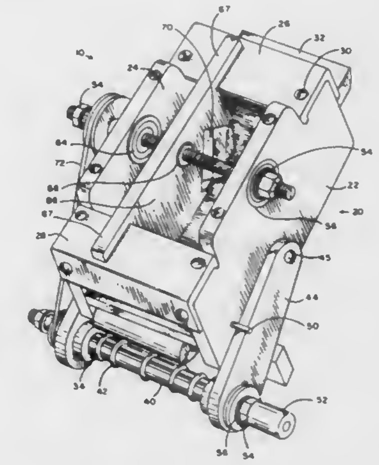
### GRAPHIC TAPE SLICER

**Larry V. Keister, 3175 Rocky Point Rd., Springfield, Ohio 45502**

**Filed Sep. 19, 1989, Ser. No. 409,141**

**Int. Cl.$^5$ B26D** *5/22*

**U.S. Cl. 83—156** **47 Claims**



1. A graphic tape slicer comprising:

(a) a generally rectangular frame having a front, a left side wall and a right side wall,

(b) a back cross support and a front cross support disposed between the side walls,

(c) a cutting blade holder disposed between the side walls and supported by the front and back cross supports,

(d) a cutting blade mounted on the cutting blade holder operatively positioned to engage a length of graphic tape to be sliced,

(e) a tape extraction roller disposed at the front of the frame,

(f) a bottom pulley mounted on the tape extraction roller,

(g) a top pulley mounted on a side wall and having a threaded rod attached thereto, said threaded rod engaging the cutting blade holder, and

(h) a drive belt connecting the bottom pulley and the top pulley

whereby as the graphic tape is extracted through the graphic tape slicer, the extraction roller causes the bottom pulley to rotate which causes the top pulley to rotate through the action of the drive belt which causes the threaded rod to rotate which effects a lateral movement of the cutting blade across the width of the graphic tape effecting an oblique slice in the graphic tape.

---

**5,018,418**

### APPARATUS FOR CUTTING LAMINATED SHEET MATERIAL

**Nobuo Nasu, Fukuyama, Japan, assignor to Kabushiki Kaisha Kawakami Seisakusho, Hiroshima, Japan**

**Continuation of Ser. No. 446,641, Dec. 6, 1989, abandoned, which is a division of Ser. No. 354,510, May 19, 1988, Pat. No. 4,916,992. This application Aug. 28, 1990, Ser. No. 574,508**

**Claims priority, application Japan, May 31, 1988, 63-131389**

**Int. Cl.$^5$ B26D** *1/06*

**U.S. Cl. 83—177** **6 Claims**

1. An apparatus for cutting sheet material, said apparatus comprising:

a frame;

a movable planar support member having a planar support surface for supporting the sheet material to be cut;

means for moving said support member relative to said frame;

a body disposed above said support surface;

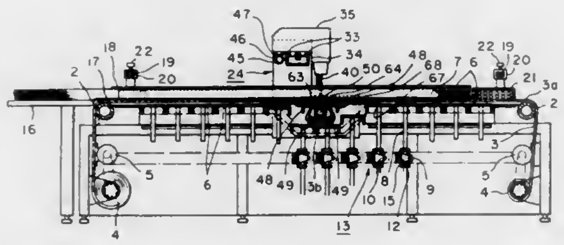
a cutting element disposed on said body;

OL
126
SS
4
MY
28
991
UMI

means defining a moveable recess in said planar support surface, said movable recess being moveable in said moveable planar support surface and with respect to said frame and further being sized to receive a portion of said cutting element, said body including means to reciprocate said cutting element in said recess;

a plurality of support plates, individually movable reciprocally on said frame normal to said movable support surface, said support plates being moveable into a support relationship with said moveable planar support surface and out of said support relationship to permit said means defining a moveable recess to move relative to said frame; and

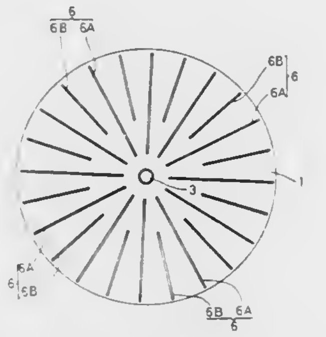
means for synchronously moving said cutting element and said recess in multiple directions in the plane of said planar surface.



---

### 5,018,419
### USED INK RIBBON CUTTING APPARATUS

**Motoko Omura, Osaka, Japan, assignor to Fuji Kagakushi, Kogyo Co., Ltd., Osaka, Japan**
**Filed Aug. 22, 1989, Ser. No. 397,173**
**Claims priority, application Japan, Aug. 24, 1988, 63-110952**
**Int. Cl.⁵ B26D** *5/08, 7/01*
**U.S. Cl. 83—451** **6 Claims**



1. An apparatus for cutting a used ink ribbon wound in a pancake form, comprising:

a first base member for supporting the ink ribbon in the pancake form,

a positioning member for setting a position of the ink ribbon relative to said first base member,

a first plurality of cutting blades arranged on a second base member in a predetermined radially extending position relative to said positioning member, and

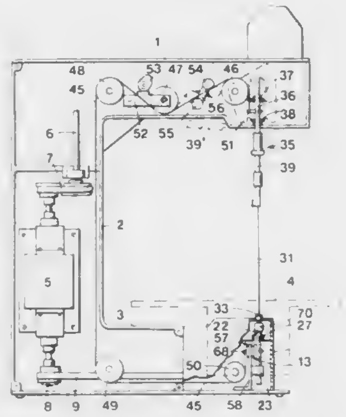
a second plurality of cutting blades, each of said second plurality of cutting blades being equally spaced between each of said first plurality of cutting blades, of a shorter length than each of said first plurality of cutting blades, and extending inwardly in a radial direction from an outer periphery of said second base member toward said positioning member,

wherein said first plurality of cutting blades cut said ink ribbon through a plurality of cutting planes extending radially from an axis of said ink ribbon and said second plurality of blades cut said ink ribbon from an outer perimeter radially inwardly toward said axis of said ink ribbon.

---

### 5,018,420
### MACHINE TOOL

**Francis Plomb, Le Lignon, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland**
**PCT No. PCT/CH88/00096, § 371 Date Nov. 3, 1988, § 102(e) Date Nov. 3, 1988, PCT Pub. No. WO88/09249, PCT Pub. Date Dec. 1, 1988**
**PCT Filed May 20, 1988, Ser. No. 283,473**
**Claims priority, application Switzerland, May 22, 1987, 01971/87; Aug. 20, 1987, 03203/87**
**Int. Cl.⁵ B27B** *3/12*
**U.S. Cl. 83—748** **9 Claims**



1. Machine tool comprising a hollow frame having a lateral upright, said upright linking a horizontal upper arm to a horizontal lower arm, one of said arms having a free end provided with a fixing element for fastening one end of a scroll saw blade and imparting to said blade a longitudinal reciprocating movement, said element being driven in reciprocating movement by a motor housed in said frame, said fixing element being linked to another fixing element in the other of said arms by flexible tie means, said means passing on feed pulleys and imparting the movements of said fixing element driven by the motor to said another fixing element, in order to provide said another fixing element with a force for return of said saw blade, wherein said flexible tie means passes on a stretcher displaceable by an elastic return device effective to bring into a retracted position, whenever said saw blade is removed, said another of said fixing elements which is not driven by said motor, wherein said another fixing element is pivotable about an axis transverse to the axis of the blade to a storage position on said machine.

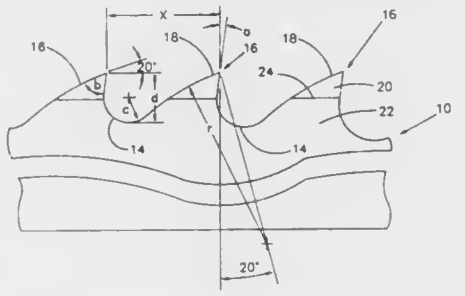
---

### 5,018,421
### SAW BLADE TOOTH GEOMETRY

**Walter J. Lucki, Agawam, and Gerald H. Tober, Longmeadow, both of Mass., assignors to Armstrong-Blum Manufacturing Company, Ltd., Agawam, Mass.**
**Filed Apr. 7, 1988, Ser. No. 178,498**
**Int. Cl.⁵ B23D** *61/00*
**U.S. Cl. 83—835** **4 Claims**

1. A welded edge saw blade, said blade extending longitudinally along an axis and having a plurality of teeth wherein each tooth has a positive rake angle from about 7° to about 12 $\frac{1}{2}$°, a depth equal to about .5 times the reciprocal of the pitch of said teeth, a gullet radius equal to about ..23 to .24 times the reciprocal of the pitch of said teeth, a tip included angle of from about 61° to about 64° and a radial relief back wherein the center of

the radius of said radial relief back is on a first line which intersects the tip of a tooth and is disposed from about 15° to

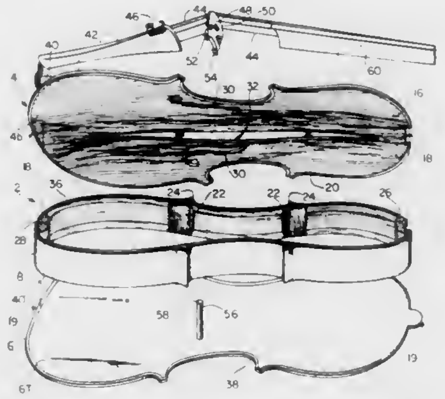


about 20° forward of a second line which also intersects said tooth tip and which is perpendicular to the axis.

---

### 5,018,422
### PROCESS FOR IMPROVEMENT OF TONE IN VIOLINS AND RELATED INSTRUMENTS

**Mayne R. Coe, Jr., 1211 Choctaw Street, Jupiter, Fla. 33458**
**Filed May 17, 1990, Ser. No. 524,465**
**Int. Cl.⁵ G10D** *1/02*
**U.S. Cl. 84—275** **20 Claims**



1. A method for treating wood to be used in producing violin type instruments having improved tone, comprising the steps of:

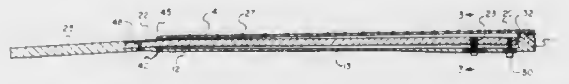
(a) immersing wood pieces in varnish; and

(b) subjecting said immersed pieces to elevated temperature and pressure for time periods ranging from 1 day to 14 days to enable said varnish to penetrate said immersed pieces.

---

### 5,018,423
### NECK ADJUSTMENT MECHANISM FOR STRINGED INSTRUMENTS

**David D. Bunker, 11909 8th Ave. S.W., Seattle, Wash. 98146, and David L. Bunker, 12334 S. Poney Express Rd., Draper, Utah 84020**
**Filed Jun. 12, 1989, Ser. No. 365,215**
**Int. Cl.⁵ G10D** *3/00*
**U.S. Cl. 84—293** **12 Claims**



1. A stringed instrument having a body portion and a neck extending from the body portion, said neck including:

a mounting end attachable to the body portion, a distal end and an intermediate section including means for attachment of a fingerboard;

an enclosed channel extending from the mounting end along a central axis of the neck to an opening at the distal end and having a channel cross-section defined by predetermined height and width dimensions relative to the fingerboard;

a rigid bar disposed within the channel and having (i) an adjustment end positioned near the instrument body and within the neck, (ii) a distal end extending toward the distal end of the neck, and (iii) a transverse pivot support coupled at an intermediate section of said bar and journaled within the neck;

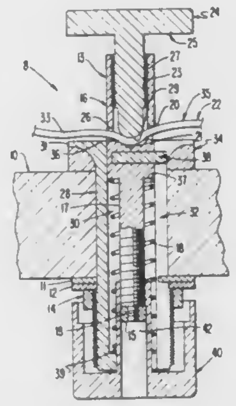
said bar having corresponding height and width dimensions which provide a close fit for the distal end of the bar within the neck such that displacement of the distal end of the bar along a vertical axis normal to the fingerboard in either upward or downward direction results in a corresponding upward or downward displacement of the distal end of the neck;

threaded adjustment means coupled at a first end to the neck near the mounting end and at a second end to the adjustment end of the bar in approximate vertical relationship with respect to the fingerboard to provide bi-directional adjustment in a controlled manner to the rigid bar in both upward and downward direction about the pivot support upon rotation of the threaded adjustment means.

---

### 5,018,424
### TUNING PEG

**Ned Steinberger, Cornwall, N.Y., assignor to Steinberger Sound Corporation, Newburgh, N.Y.**
**Filed Nov. 1, 1988, Ser. No. 265,693**
**Int. Cl.⁵ G10D** *3/14*
**U.S. Cl. 84—304** **7 Claims**



1. A tuning machine for mounting on a guitar headstock, comprising:

elongated housing means for extending substantially through the headstock of the guitar substantially perpendicular thereto, including a shearing surface, a bearing surface, and a slot aligned with a string of the guitar and extending in an axial direction from the bearing surface into the housing means for allowing the string to slidably move therein;

holding means slidably positioned in the housing means for moving longitudinally in the housing means, including an aperture substantially aligned with the direction of the string on the guitar for receiving the string therein, means for securing the string in the aperture substantially in alignment throughout its length with the direction of the string on the guitar, the string having an end portion which exits the aperture, and the holding means also including another shearing surface; and

tuning means for moving the holding means longitudinally

VOL
126
ISS
4
MY
28
1991
UMI

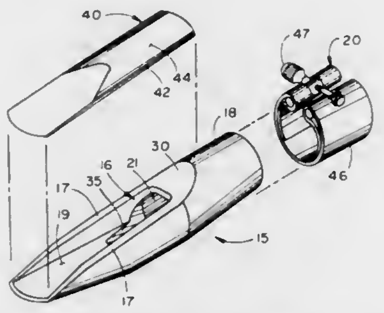
relative to the housing means and simultaneously drawing the string into the slot over the bearing surface and shearing the end portion of the string between the shearing surfaces without rotating the holding means in the housing means.

---

### 5,018,425
### MOUTHPIECE SYSTEM FOR WOODWIND INSTRUMENTS

**Philip L. Rovner, 10705 Cardington Way, Cockeysville, Md. 21030**

**Filed Aug. 11, 1989, Ser. No. 392,403**
**Int. Cl.$^5$ G10D** *9/02*
**U.S. Cl. 84—383 R** **22 Claims**



1. A mouthpiece having improved tonal qualities capable of receiving a reed thereon to cause air to vibrate in a woodwind musical instrument, comprising, in combination:

a tapered front portion having a substantially flat one side thereon, the one side having a table and an adjacent window having a given length, the table having a length which is relatively short with respect to the length of the window, the window having two sides;

the front portion having a tone chamber, the tone chamber in communication with the window, the tone chamber extending the full length of the window;

a pair of facing rails, one rail on each side of the window, each rail extending the length of the window;

the reed having a length greater than the length of the window, the reed engaging the facing rails such that the window extends to at least approximately 70% of the length of the reed, said length of the reed interfacing with the tone chamber; and

means for holding the reed on the mouthpiece.

---

### 5,018,426
### HI-HAT STAND APPARATUS FOR SUPPORTING A PAIR OF CYMBALS

**Seiji Suzuki, Kawaguchi, Japan, assignor to Pearl Musical Instrument Co., Tokyo, Japan**

**Filed Jun. 28, 1990, Ser. No. 545,470**
**Claims priority, application Japan, Dec. 28, 1989, 1-152969**
**Int. Cl.$^5$ G10D** *13/00*
**U.S. Cl. 84—422.3** **8 Claims**

1. A hi-hat stand apparatus for supporting upper and lower cymbals facing each other, comprising:

a hollow post having an open upper end portion, an open lower end portion, and a through hole extending between the two end portions, the lower cymbal being mounted on the upper end portion of the post;

an elevator rod passed through the through hole of the hollow post, said rod having upper and lower end portions, said upper end portion of the rod projecting upward from the upper end portion of the hollow post and being fitted with the upper cymbal;

return means for urging the elevator rod to ascend;

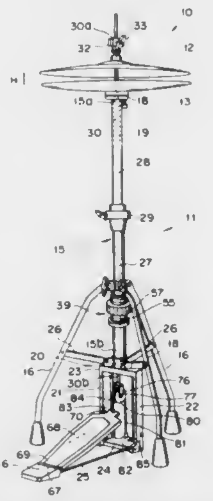
stopper means for restraining the upper limit position of the elevator rod to prevent the rod ascend from ascending above a predetermined height;

a frame having a pair of vertically extending side wall portions and a horizontally extending portion;

a foot board having first and second end portions, said first end portion being supported by the horizontally extending portion of the frame, said second end portion being situated higher than the first end portion;

a horizontal support shaft situated between the pair of side wall portions of the frame and adapted to move in the vertical direction in association with the elevator rod;

a running guide member rotatably supported by means of the support shaft, said guide member being adapted to ascend and descend together with the elevator rod and situated higher than the second end portion of the foot board;



a flexible member having a fixed end, a free end, and an intermediate portion situated between the two ends, said free end being connected to the second end portion of the foot board, said intermediate portion being curved in the form of an inverted U and wound around the upper half of the running guide member; and

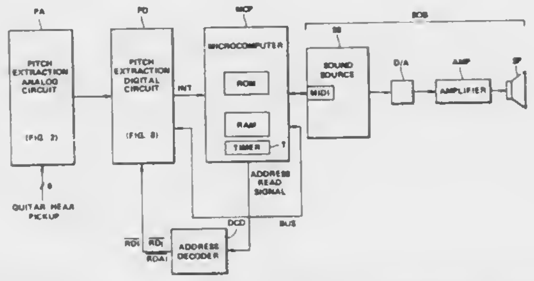
supporting means for supporting the fixed end of the flexible member, said supporting means being situated lower than the running guide member and immovable with respect to the frame.

---

### 5,018,427
### INPUT APPARATUS OF ELECTRONIC SYSTEM FOR EXTRACTING PITCH DATA FROM COMPRESSED INPUT WAVEFORM SIGNAL

**Shigeru Uchiyama, Sayama, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 252,914, Oct. 3, 1988, Pat. No. 4,841,827. This application Apr. 10, 1989, Ser. No. 336,005**
**Claims priority, application Japan, Oct. 8, 1987, 62-254169**
**Int. Cl.$^5$ G10H** *1/18, 1/46*
**U.S. Cl. 84—603** **27 Claims**



18. An electronic apparatus capable of controlling a musical tone to be generated in accordance with an input waveform signal, comprising:

compression conversion means for converting a level of an input waveform signal into a compressed level signal, said compression conversion means including means for performing a predetermined compression conversion on the input waveform signal and generating as an output said compressed level signal, such that the amplification factor of the predetermined compression conversion increases as the level of said input waveform signal is decreased; and

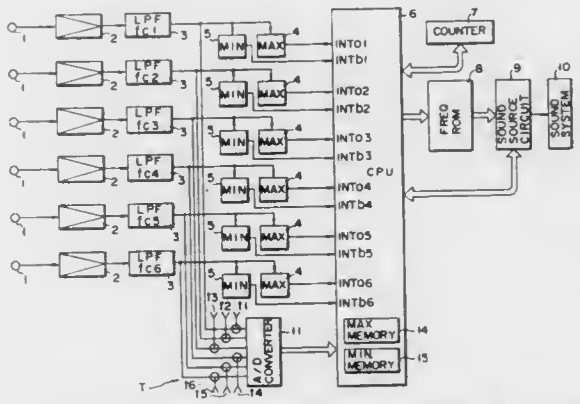
sound control means coupled to the output of said compression conversion means for controlling a musical sound to be generated in accordance with said compressed level signal.

---

### 5,018,428
### ELECTRONIC MUSICAL INSTRUMENT IN WHICH MUSICAL TONES ARE GENERATED ON THE BASIS OF PITCHES EXTRACTED FROM AN INPUT WAVEFORM SIGNAL

**Shigeru Uchiyama, Sayama, and Katsuhiko Obata, Tachikawa, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 112,780, Oct. 22, 1987, abandoned. This application Feb. 12, 1990, Ser. No. 478,759**
**Claims priority, application Japan, Oct. 24, 1986, 61-253487; Nov. 28, 1986, 61-282140; Nov. 28, 1986, 61-282142; Nov. 28, 1986, 61-283292; Dec. 1, 1986, 61-286228; Dec. 2, 1986, 61-285985; Dec. 3, 1986, 61-286745; Dec. 29, 1986, 61-314157; Jan. 12, 1987, 62-4714; Mar. 6, 1987, 62-50381; Mar. 6, 1987, 62-50382; Mar. 31, 1987, 62-76453**
**Int. Cl.$^5$ G10H** *7/00*
**U.S. Cl. 84—616** **39 Claims**



1. An electronic string musical instrument of a type in which musical tones are generated on the basis of pitches extracted from an input waveform signal produced by the vibration of a string, comprising:

pitch extracting means for extracting pitches from the input waveform signal;

input signal check means for checking whether said input waveform signal is present; and

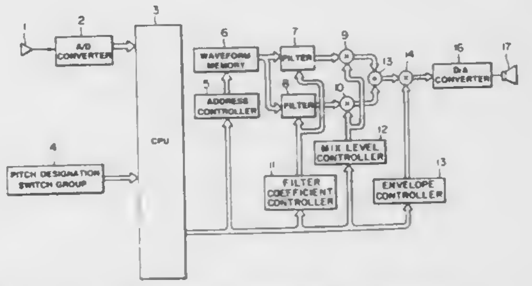
commanding means (a) for, when said input signal check means detects a start of the presence of said input waveform signal, providing a sounding start command to first generate a musical tone with a predetermined pitch corresponding to maximum string length in which no pitch designation operation is manipulated on an open string by a performer and (b) for, when the pitch of said input waveform signal is extracted by said pitch extracting means, providing a command to change the pitch of said generated musical tone to the extracted pitch.

---

### 5,018,429
### WAVEFORM GENERATING APPARATUS FOR AN ELECTRONIC MUSICAL INSTRUMENT USING FILTERED COMPONENTS OF A WAVEFORM

**Hideo Yamaya, Akishima, and Akio Iba, Tokorozawa, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Apr. 3, 1989, Ser. No. 332,803**
**Claims priority, application Japan, Apr. 7, 1988, 63-84138; Apr. 7, 1988, 63-84139**
**Int. Cl.$^5$ G10H** *1/12, 3/14, 7/00*
**U.S. Cl. 84—622** **17 Claims**



16. An electronic musical instrument comprising:

memory means for storing a plurality of waveform data obtained by filtering a single sound signal in a plurality of divided frequency bands;

synthesizing means for synthesizing at a synthesis ratio the plurality of waveform data read out from said memory means; and

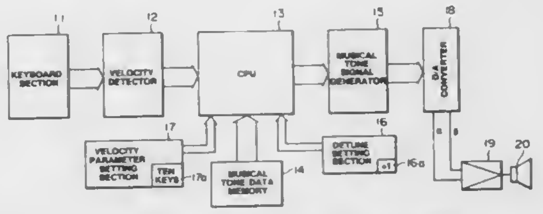
controlling means for variably controlling a harmonic overtone spectrum of a synthesized waveform data received from said synthesizing means and obtained by changing said synthesis ratio of said synthesizing means in response to an external control signal generated by manual performance of a musical piece.

---

### 5,018,430
### ELECTRONIC MUSICAL INSTRUMENT WITH A TOUCH RESPONSE FUNCTION

**Tatsuya Iijima, Fussa, and Hiroshi Morokuma, Akishima, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Jun. 15, 1989, Ser. No. 366,733**
**Claims priority, application Japan, Jun. 22, 1988, 63-81718[U]; Jun. 22, 1988, 63-81719[U]**
**Int. Cl.$^5$ G10H** *1/057, 1/08, 1/46, 7/02*
**U.S. Cl. 84—625** **15 Claims**



9. An electronic musical instrument, comprising:

waveform generating means having a plurality of lines, each generating one of a plurality of tone waveforms in response to a single input performance data;

touch response curve setting means for setting, for each of said lines, a touch response curve representing a relationship between a degree of touch data and a waveform level;

touch split point setting means for setting, for each of said lines, a point to divide the touch response curve into touch response curves having respective ranges;

waveform assigning means coupled to said touch split point setting means, for assigning a selected one of said plurality of tone waveforms to each range set by said touch split point setting means, and for determining a tone waveform

VOL
1126
ISS
4
MY
28
1991
UMI

to be generated by each of said lines in accordance with an input touch data; and

waveform level control means coupled to said waveform generating means and to said waveform assigning means, for controlling a waveform level of the tone waveform to be generated by each line according to the touch response curve set for each line, in response to an input performance data.

---

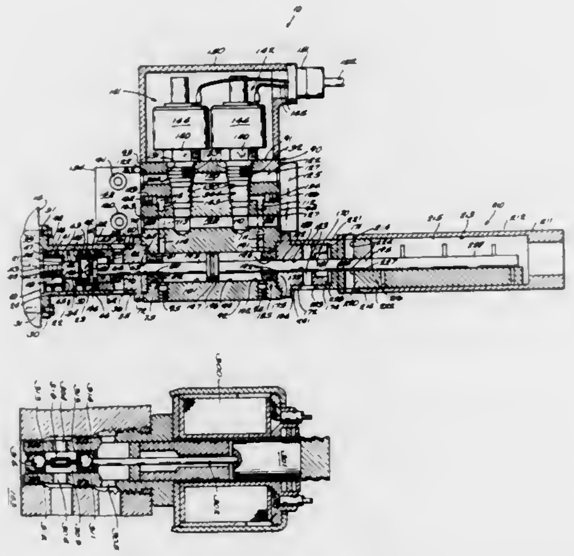
### 5,018,431
### APPARATUS FOR POSITIONING A WORK IMPLEMENT

**Thomas J. Gray, Waukesha, and Edwin O. Martinson, Milwaukee, both of Wis., assignors to Quadrastat Corporation, City of Industry, Calif.**

**Filed Dec. 9, 1988, Ser. No. 282,482**

**Int. Cl.⁵ F15B** *9/03, 9/09*

**U.S. Cl. 91—363 R** 29 Claims



1. An actuator comprising:

an actuator body including a cylinder having opposite ends, a first fluid channel adapted to be connected to a source of hydraulic fluid pressure, and a second fluid channel individually connected in fluid communication to the cylinder;

a piston slideably housed in the cylinder and moveable through a range of selected operative positions;

a first pulse valve disposed in fluid communication between the first and second fluid channels for selectively controlling the supply of hydraulic fluid from the first fluid channel, through the second fluid channel and into the cylinder;

the actuator body having a fluid exhaust channel connected in fluid communication with the pulse valve, and the pulse valve being operable selectively to connect the second fluid channel and the fluid exhaust channel in fluid communication,

a second pulse valve disposed in fluid communication with the actuator body, and the actuator body having a third channel connecting the second pulse valve and the cylinder in fluid communication, the second pulse valve selectively connecting the first and third fluid channels in fluid communication, and the third fluid channel and the fluid exhaust channel in fluid communication, and

means for selectively actuating the first pulse valve and the second pulse valve for positioning the piston in a selected one of said operative positions, said means for selectively actuating the first and second pulse valves including control means connected in controlling relation with said pulse valves for reciprocating said pulse valves in N cycle per second modes, and for varying N to thereby control fluid pressure application to the piston.

---

### 5,018,432
### HYDROSTATIC STEERING DEVICE WITH A RADIALLY FREE FLOATING VALVE MEMBER

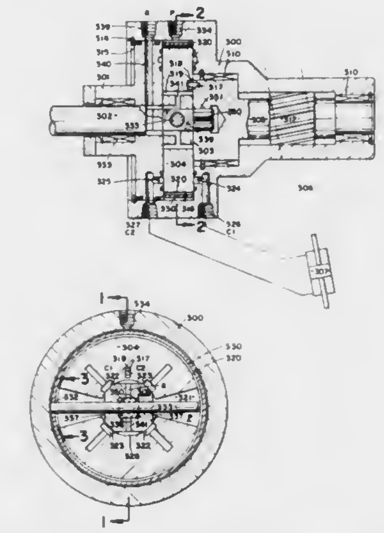
**Hollis N. White, Jr., 243 Pyle La., Hopkinsville, Ky. 42240**

**Division of Ser. No. 170,675, Mar. 17, 1988, Pat. No. 4,858,714.**

**This application Jun. 15, 1989, Ser. No. 346,990**

**Int. Cl.⁵ B62D** *5/06;* **F15B** *9/10*

**U.S. Cl. 91—375 R** 25 Claims



1. In a hydrostatic steering device having a valve member closely circumferentially surrounding an accompanying rotatable valve seat to form a valve for the device, and the valve member having an outer surface surrounded by a housing, the improvement of the valve member being radially free floating within the housing having no radial contact between the outer surface of the valve member and the housing so as to allow the valve member to adjust itself to the positioning of the rotatable valve seat.

---

### 5,018,433
### MECHANISM EMPLOYING FLUID UNDER PRESSURE PROVIDED WITH A ROTOR, A STATOR AND A DEVICE FOR ASSEMBLING THESE TWO ELEMENTS

**Louis B. Bigo, Compiegne, France, assignor to Poclain Hydraulics, Societe Anonyme, Verberie, France**

**Filed Oct. 13, 1988, Ser. No. 257,457**

**Claims priority, application France, Oct. 16, 1987, 87 14334**

**Int. Cl.⁵ F01B** *13/06;* **F04B** *19/02*

**U.S. Cl. 91—498** 2 Claims

1. In a mechanism employing fluid under pressure, such as a hydraulic pump or motor, comprising:

a stator,

a rotor,

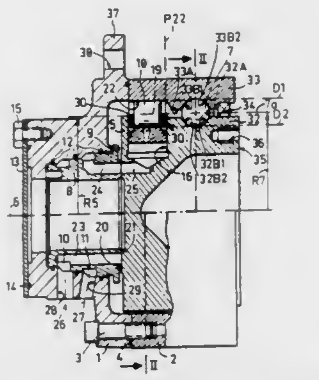
a device for assembling the rotor with respect to the stator, effecting relative rotational assembly of these two elements about a geometrical axis, and ensuring axial holding of said two elements in position, in the two opposite directions, parallel to said geometrical axis;

a reaction cam fast with one of said stator and rotor;

cylinders made in the other of said stator and rotor and disposed substantially radially with respect to said geometrical axis of rotation; and

pistons mounted to slide in said cylinders, each of said pistons including a rolling element abutting on said cam;

the assembly device in constituted by a single bearing which comprises:



two rolling tracks made directly on an extension of the reaction cam itself, and on an extension of the element itself in which the cylinders are made, respectively;

rolling members disposed between said tracks, capable of abutting on these two tracks so as to ensure axial holding, in the two opposite axial directions parallel to the geometrical axis, of the rotor with respect to the stator, and wherein the axes of the assembly device rolling members are disposed on a circle whose radius from said geometrical axis is substantially equal to the radius of a circle enveloping the outer periphery of the element in which the cylinders are made.

---

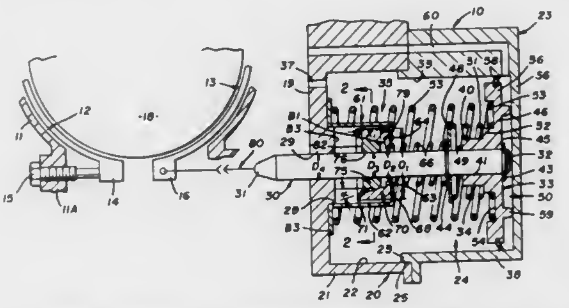
### 5,018,434
### SELF-ADJUSTING SERVO MECHANISM FOR ACTUATING A FRICTION BAND ASSEMBLY IN A PLANETARY GEAR SET

**Raymond J. Haka, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 20, 1990, Ser. No. 481,540**

**Int. Cl.⁵ F01B** *9/00*

**U.S. Cl. 92—29** 8 Claims



1. A self-adjusting servo mechanism comprising: a housing; said housing presenting a socket cavity; an actuating piston received within said socket cavity for axial reciprocation; a servo pin slidably disposed in said housing for axial retraction and protraction; means operatively connecting said servo pin to said actuating piston; and, a range locating means operative between said servo pin and said housing automatically to provide for retraction through a predetermined range and for protraction through at least said predetermined range, said range locating means comprising: a locking ring encircling said servo pin and being freely movable with respect thereto; an annularly discontinuous wedging ring encircling, and contiguously engaging, said servo pin; a first, radially inwardly directed, conical surface presented from said locking ring; a second, radially outwardly directed, conical surface presented from said wedging ring; said first and second conical surfaces effecting a frictionally locking interface during retraction of said servo pin.

---

### 5,018,435
### FLUID CELL ARRANGEMENT FOR COMPRESSED AIR MOTORS

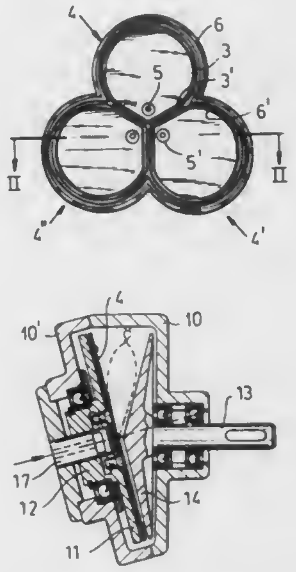
**René Kägi, Stäfa, Switzerland, assignor to Riwisa AG Kunststoffwerke, Hagglingen; Bruno P. Wernli, Habsburg; Gerold Richner, Wohlen and Peter Richner, Hagglingen, all of, Switzerland**

**Filed Oct. 6, 1989, Ser. No. 418,166**

**Claims priority, application Switzerland, Jul. 5, 1989, 02491/89**

**Int. Cl.⁵ F01B** *19/00, 3/00, 13/04*

**U.S. Cl. 92—48** 4 Claims



3. A fluid cell arrangement for a compressed air radial motor, said arrangement having a center and comprising:

a plurality of fluid cells arranged in a rosette-shape pattern, said fluid cells being planar in a pressureless state thereof, said cells being defined by a pair of leaves of a synthetic resin film welded to one another along peripheries of the cells and defining a respective freely distortable chamber within the periphery of each cell;

means for conducting an inflating medium into each of said chambers; and

an endless elastic rubber cord extending along peripheries of said cells and received between the pair of leaves, said rubber cord being disposed radially with respect to a center of the cell arrangement proximal to said center and being completed enclosed by said pairs of leaves sealing said rubber cord therebetween.

---

### 5,018,436
### FOLDED BLADDER FOR FLUID DYNAMIC MUSCLE

**Michael L. Evangelista, and Raymond A. Lia, both of Auburn, N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.**

**Filed Jul. 31, 1990, Ser. No. 563,359**

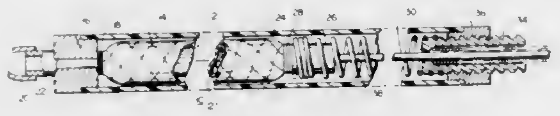
**Int. Cl.⁵ F01B** *19/00;* **F16J** *3/00*

**U.S. Cl. 92—92** 3 Claims

1. A fluid dynamic muscle for applying a tensile force onto an object, which comprises an elongated elastomeric bladder;

OL
126
SS
4
MY
28
991
UMI

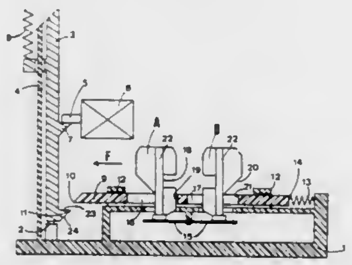
fluid conduit means coupled to a proximal end of the bladder for communicating fluid pressure to an interior of the bladder; a tubular braid formed of a plurality of substantially inextensible filaments and covering said bladder therewithin to expand laterally when fluid pressure is applied to it, but restraining the bladder such that as the braid increases in diameter it contracts axially; and distal terminator means attached to a distal end of the bladder and braid for sealing the distal end of the bladder and providing a mechanical attachment to said object for transmitting tensile force between said braid and said object; wherein said bladder is in the form of an elastomeric tube having a longitudinal fold extending along it so that said bladder has a generally U-shaped cross section when fluid pressure is not applied to the interior of the bladder so that the interior of the bladder has its cross-sectional area reduced to a minimum when evacuated of fluid.



---

### 5,018,437
### TOASTER

Antonio B. San Juan, Diagonal 622, E - Barcelona 21, Spain
Filed Apr. 9, 1990, Ser. No. 506,337
Claims priority, application France, Apr. 7, 1989, 89 04625
Int. Cl.$^5$ A47J *37/08*
U.S. Cl. 99—327 5 Claims

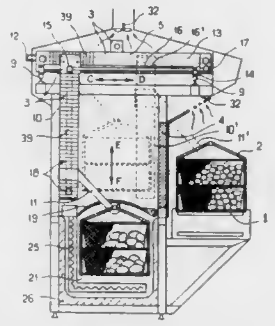


1. Toaster comprising a housing (1), a switch (2) for controlling electric power supply to the toaster, a bread carriage (3) guided within the housing and adapted to occupy either a toasting position in which the carriage (3) closes the switch (2), and in which the carriage (3) is moved by the user and maintained during the toasting cycle by a catch (5) operated by an electromagnet (6) which comes into engagement with an abutment (7) of the carriage (3), or a rest position into which the carriage (3) is moved by means of a return spring (8), at the end of the toasting cycle, when the catch (5) frees the abutment (7), a hot-keeping device for the toast comprising a latch (9) movably mounted between a hot-keeping position in which at the end of the toasting cycle the carriage (3) being displaced slightly toward its rest position so as to open the switch (2), the movable latch (9) is in engagement with a hook (11) carried by the carriage (3) to prevent further displacement of the carriage thereby to retain the toast in the toaster, and an automatic ejection position in which the latch (9) is withdrawn and does not prevent the displacement of the carriage (3) to eject the toast from the toaster, wherein the movable latch (9) is slidably mounted in the toaster, and manipulating means (A-B) for sliding the movable latch (9) in a direction (F) transverse to the movement of the carriage (3).

---

### 5,018,438
### COOKING AND COOLING TRANSFER APPARATUS AT WILL FOR AUTOMATIC INTRODUCTION AND EVACUATION OF CONTAINERS WHICH CONTAIN FOODS OR PRODUCTS HAVING A VARIABLE DURATION OF COOKING AND COOLING

René Grandi, "Loudon Ruy" , 38300 Bourgoin Jalieu, France
PCT No. PCT/FR88/00112, § 371 Date Jan. 3, 1989, § 102(e) Date Jan. 3, 1989, PCT Pub. No. WO88/06408, PCT Pub. Date Sep. 7, 1988
PCT Filed Feb. 29, 1988, Ser. No. 278,921
Claims priority, application France, Mar. 2, 1987, 87 02905
Int. Cl.$^5$ A47J *37/12*
U.S. Cl. 99—335 27 Claims



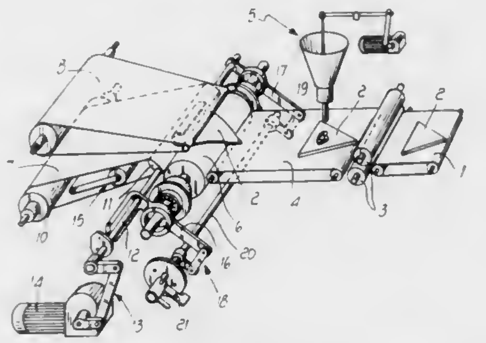
1. An apparatus for cooking and refrigerating a product, said apparatus comprising:
- (a) a cooking unit for cooking a product for a first predeterminable period of time, said cooking unit comprising a first treatment container in which treatment comprising said cooking is conducted;
- (b) a refrigeration unit for refrigerating said product for a second predeterminable period of time, said refrigeration unit comprising a second treatment container in which treatment comprising said refrigeration is conducted; and
- (c) transportation means for
  - (i) delivering said product toward said cooking unit;
  - (ii) receiving said product from said cooking unit;
  - (iii) delivering said product, received from said cooking unit, toward said refrigeration unit; and
  - (iv) receiving said product from said refrigeration unit;
  - each of said cooking unit and said refrigeration unit further comprising insertion and extraction means for
    - removing said product from said transportation means;
    - inserting said removed product into its corresponding treatment container for treatment;
    - extracting said inserted product from its corresponding treatment container after treatment; and
    - returning said extracted product to said transportation means;
  - said insertion and extraction means being programmable to extract and return said product after treatment for a predeterminable amount of time.

---

### 5,018,439
### ROLLING MACHINE PARTICULARLY FOR PRODUCING CROISSANTS

Italo Bordin, Cadoneghe, Italy, assignor to C.I.M. S.r.l., Mestrino, Italy
Filed Jan. 24, 1989, Ser. No. 300,864
Claims priority, application Italy, Feb. 10, 1988, 41526 A/88
Int. Cl.$^5$ A21C *3/06*
U.S. Cl. 99—450.2 22 Claims

1. A rolling machine particularly for producing croissants comprising:
- transport means for moving dough material and defining a transport plane,
- first endless belt means defining an unloading plane,
- at least one cylinder interposed between said transport means and said endless belt means and having a cylinder axis,
- second endless belt means overlying said first endless belt means and partially overlying said cylinder,
- at least one seat defined by said first endless belt means, said second endless belt means and said cylinder, said transport means being adapted for moving dough material onto said cylinder, said seat being adapted for rolling dough delivered to said cylinder,
- wherein said first endless belt means comprise;
  - at least one motorized roller,
  - at least one oscillatable blade spaced from said motorized roller,
  - at least one endless belt entrained around said at least one motorized roller and said oscillatable blade, and
  - actuation means for moving said oscillatable blade,
- wherein said actuation means comprise;
  - motor means,
  - lever means connected to said motor means,
  - at least one rod-like member connected to said lever means and to said oscillatable blade, and
  - connecting rod means associated with said rod-like member and being pivotally connected to said cylinder at said cylinder axis.

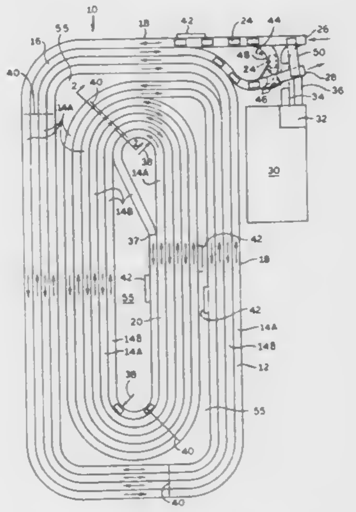


---

### 5,018,440
### TANK FOR TREATING UNITS OF A PRODUCT

Norman L. Johnson, 2456 Morning Star Trail, Green Bay, Wis. 54302
Filed Feb. 14, 1989, Ser. No. 310,093
Int. Cl.$^5$ A23C *19/00;* A01J *25/00*
U.S. Cl. 99—535 41 Claims

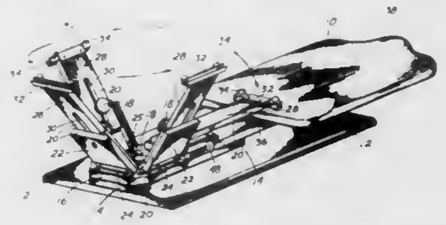
1. A tank for treating units of product with a liquid, the units of product having length dimensions, said tank comprising a conveying channel, said conveying channel being configured a series of loops, and having inner wall surfaces of said conveying channel disposed toward the inside of said loops, said conveying channel converging from an outer perimeter defined by an outermost one of said loops to an innermost one of said loops, said innermost loop defining a minimum turning radius in said conveying channel at said inner wall surface of said innermost loop, the numerical dimension of said minimum turning radius being at least 0.4 times said length dimension through the longest one of said units of product to be treated.



---

### 5,018,441
### PORTABLE SCREEN PRINTER

Humbert G. Miraglia, Jr., 1409 North St., Corning, Calif. 96021
Filed Dec. 27, 1988, Ser. No. 290,562
Int. Cl.$^5$ B41L *13/18*
U.S. Cl. 101—123 1 Claim



1. A screen printing apparatus with multiple positionable screen holder assemblies for use with variously sized print screens to print colors on an article, comprising:
- (a) a support base;
- (b) an elevational plate affixed to and extending upwardly from said support base;
- (c) a pivotable plate supporting said positionable screen holder assemblies, said pivotable plate being attached rotatably to said elevation plate;
- (d) releasable attachment and holding means attached to said pivotable plate for attaching said pivotable plate rotatably to said elevation plate and for temporarily maintaining said pivotable plate in different fixed positions;
- (e) hinging means attaching said positionable screen holder assemblies to said pivotable plate;
- (f) releasable clasp means for temporarily maintaining said positionable screen holder assemblies in fixed printing positions;
- (g) releasable clasp means for temporarily maintaining said positionable screen holder assemblies in an upwardly angled stored position;
- (h) releasable attachment means for holding differently sized print screens for printing in said positionable screen holder assemblies;
- (i) at least one article support platform;
- (j) attachment means for attaching said article support platform to said elevation platform.

OL
126
SS
4
MY
28
991
UMI

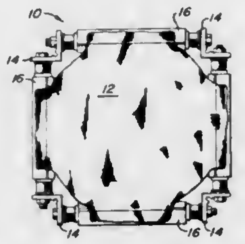
### 5,018,442
### PRINTING SCREEN STRETCH FRAME

**Kaino J. Hamu, 16061 Dominica Cir., Huntington Beach, Calif. 92649**

**Continuation of Ser. No. 216,967, Jul. 11, 1988, abandoned. This application Dec. 19, 1989, Ser. No. 455,933**

**Int. Cl.⁵ B05C** *17/08*

**U.S. Cl. 101—127.1** **20 Claims**



6. A stretch frame structure for stressing printing screen edgewise, comprising:
- rollers disposed along the four sides of a rectangle,
- bracket means including a pair of bracket arms at the ends, respectively, of each roller,
- each roller including a roller body, threaded shafts extending coaxially from the ends of said body and rotatably through the adjacent bracket arms to rotatably support the respective roller on the adjacent bracket arms, and means on said body for gripping an edge of a printing screen,
- each roller being rotatable in one direction to wind the screen on the respective roller and thereby tension the screen edgewise,
- nuts threaded on said shafts of each roller between the ends of the respective roller body and the adjacent bracket arms,
- the shafts of each roller being oppositely threaded such that rotation of the two nuts associated with each roller relative to their respective roller shafts in said one direction in which the roller turns to tension a screen urges the nuts against their adjacent ends of the respective roller body, and
- means for releasably securing each roller against rotation relative to its respective bracket arms.

---

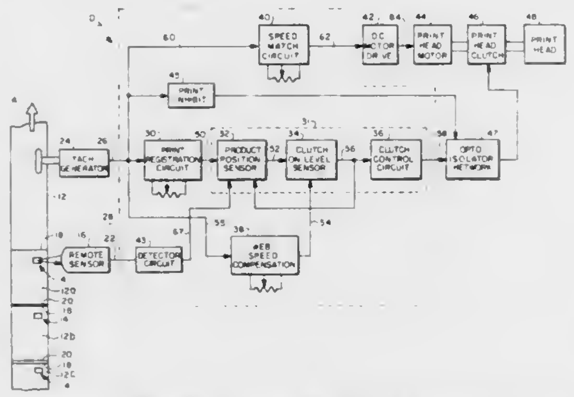
### 5,018,443
### POSITION SENSOR SYSTEMS FOR A PRINT HEAD

**Richard P. Bolger, Schaumburg, Ill., assignor to Illinois Tool Works Inc., Glenview, Ill.**

**Filed Sep. 15, 1989, Ser. No. 407,631**

**Int. Cl.⁵ B41F** *33/00*

**U.S. Cl. 101—228** **20 Claims**



1. In a position sensor system used with a printing apparatus for controlling accurately the movement of a print head so that printing occurs on a series of products at the same location independent of product speed, changes in speed and mechanical delays, the improvement comprising:
- sensing means for detecting the presence of a product or product mark on each product to be printed upon to generate input signals;
- speed sensing means for detecting the speed of the product to be printed upon to generate a speed signal;
- integrator means responsive to said speed signal and said input signals for generating a ramp signal indicative of the actual position of the product to be printed upon; and
- comparator means for comparing said ramp signal with a reference signal compensating for mechanical delays and for generating a clutch-on signal to activate a printing head clutch to cause movement of the print head into a printing position.

---

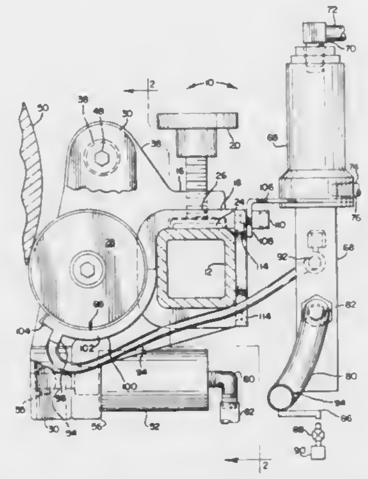
### 5,018,444
### INK APPLYING SYSTEM FOR A PRINTING APPARATUS

**Thomas H. Schumacher, Downers Grove, and Ronald L. Nelson, Hanover Park, both of Ill., assignors to WPC Machinery Corporation, Downers Grove, Ill.**

**Filed Feb. 28, 1990, Ser. No. 486,015**

**Int. Cl.⁵ B41F** *31/00*

U.S. Cl. 101—366 22 Claims



1. A system for providing ink from an external source of ink to a printing unit of the type which has a printing cylinder adapted to print on at least a portion of the width of a web that is carried through the unit, the unit also being of the type which has at least one transfer cylinder for transferring ink to the printing cylinder, the system comprising:
- an ink applying means having a rotatable cylindrically shaped ductor wheel and bracket means including a main bracket means having a side bracket means attached thereto, said ductor wheel being carried by said side bracket means, said side bracket means being pivotable relative to said main bracket means, said side bracket means being selectively moveable to move said doctor wheel into and out of contact with the transfer cylinder, said ink applying means having a reservoir located in close proximity to the ductor wheel and adapted to receive ink and apply the same to the outer surface of the ductor wheel;
- means for selectively moving said ductor wheel into and out of contact with the transfer cylinder in response to signals received thereby;
- means for positively pumping a metered amount of ink to said reservoir of said ductor wheel in response to signals received thereby;
- means for sensing the operating speed of the printing unit and for providing signals that are indicative of the operating speed; and,
- controller means operatively connected to said moving means, said pumping means and to said press speed sensing means, said controller means being adapted to receive said signals from said press speed sensing means and to provide signals to said moving means to selectively move said ductor wheel into and out of contact with said transfer cylinder and to said pumping means to pump ink to said reservoir in accordance with preselected sequences that are a function of said press speed sensing means and time.

---

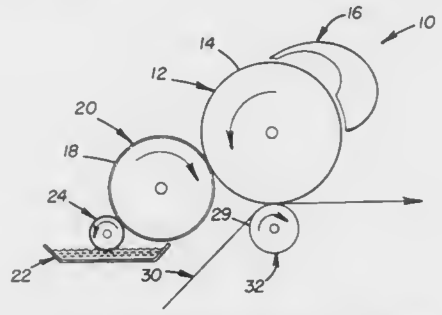
### 5,018,445
### MAGNETICALLY DELIVERED INK

**Albert J. Six, 22425 Santa Paula Ave., Cupertino, Calif. 95014**

**Filed Apr. 19, 1988, Ser. No. 183,660**

**Int. Cl.⁵ B41M** *5/00*

U.S. Cl. 101—489 12 Claims



1. A magnetographic printing method, comprising:
- selectively magnetizing portions of the cylindrical surface of a drum to thereby provide an image thereon;
- contacting the magnetized portions of the drum with a printing composition comprising a plurality of magnetic particles in suspension in a liquid medium having dissolved or suspended therein a coloring agent, the printing composition being on an anilox roller during the contacting, the relative amounts of the particles and the coloring agent being controlled whereby the color of the printing composition is substantially that of the coloring agent, whereby the magnetized portions of the drum are selectively coated by the printing composition; and
- contacting the cylindrical surface of the drum with a sheet which abstracts substantially all of the printing composition from the selectively coated portions of the cylindrical surface of the drum.

---

### 5,018,446
### INITIATING SENSOR

**Richard Benedikter, Putzbrunn; Gunther Sepp, Ottobrunn, and Wolfgang Knauer, Kienberg, all of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany**

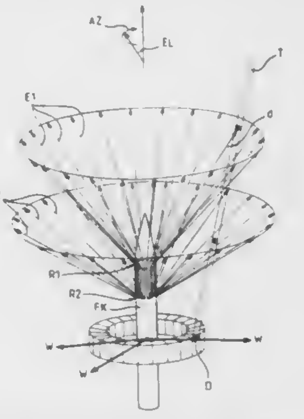
**Filed Feb. 9, 1990, Ser. No. 477,590**

**Claims priority, application Fed. Rep. of Germany, Mar. 21, 1989, 3909188**

**Int. Cl.⁵ F42C** *13/02*

**U.S. Cl. 102—213** **6 Claims**

1. An initiating sensor for the warhead of a missile, the missile having a circumference having at least two ring-shaped configurations of several optical sensing elements disposed thereon, the sensing elements having sensing regions opening out conically in the flight direction, wherein:
- the missile has two rings disposed on the circumference, each with a plurality of laser rangefinders having sharply focused sensing regions opening out and diverging conically in the flight direction;
- the laser rangefinders providing output signals, the output signals being coupled to a computer for calculating from a respective measured position and distance of a point of interception of the flight path of a target flying past and of a beam of a laser rangefinder, a vector of the relative speed between the missile and the target and further for determining a tripping time from the position of the calculated point of intersection of the vector through an effective axis of the warhead, said axis being directed at the target flight path.



---

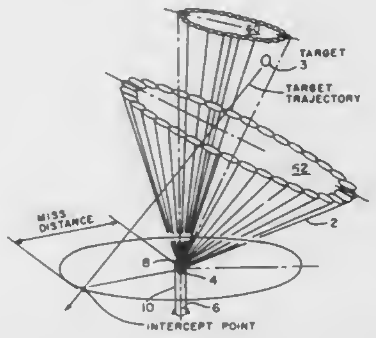
### 5,018,447
### DEVICE AND METHOD FOR MONITORING THE PRESENCE OF AN OBJECT IN SPACE

**Walter E. Miller, Jr.; Robert R. Mitchell, and Donald E. Lovelace, all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed May 3, 1990, Ser. No. 518,620**

**Int. Cl.⁵ F42C** *13/02*

**U.S. Cl. 102—213** **15 Claims**



1. A device for detecting the presence of an object in space, comprising: a solid, optically transparent cylinder having a top and a base, said cylinder further having a cavity at said base, a disk positioned inside said cavity, said disk having a first surface and a second surface, a means to support said disk inside said cavity, a means to control the insertion depth of said disk within said cavity, a means to tilt said disk in any plane that intersects the vertical axis of said cylinder, light emitting apparatus to emit laser light outwardly toward space, detecting apparatus to receive light impinging thereon, said light being reflected from an object in space, said emitting apparatus and detecting apparatus being mounted on said first surface of said disk.

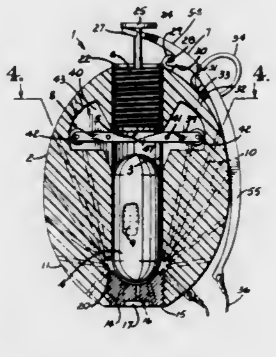
### 5,018,449
### PAINT DISPERSING TRAINING GRENADE

**Edward W. Eidson, II, 375 Caspian Way, #4, Imperial Beach, Calif. 92032**

**Filed Sep. 20, 1988, Ser. No. 246,775**

**Int. Cl.$^5$ F42B** *8/12*

**U.S. Cl. 102—498** **11 Claims**



1. A training weapon comprising:

(a) a weapon body having a cavity therein and a plurality of dispersion passages communicating between said cavity and an external surface of said body;

(b) a rupturable colorant container positioned in said cavity, being filled with a colorant, and releasing said colorant upon being ruptured;

(c) colorant container crusher means positioned within said weapon body and being urged toward said colorant container;

(d) crusher release means engaged between said crusher means and said weapon body; said release means normally maintaining said crusher means out of engagement with said colorant container and, upon being released, freezing said crusher means to rupture said colorant container to release said colorant and force said colorant out of said weapon body through said dispersion passages;

(e) crusher delay means engaged between said crusher means and said weapon body, said delay means preventing movement of said crusher means after release of said release means for a delay period and after said delay period allowing said crusher means to rupture said colorant container to release said colorant and force said colorant out of said weapon body through said dispersion passages;

(f) said crusher delay means including inertia delay means engaged between said crusher means and said weapon body, said inertia-delay means having a startup inertia which initially resists movement of said crusher means and which is overcome by said crusher means during said delay period; and

(g) said inertia delay means including:

(1) a delay lever pivotally connected to said weapon body and engaged with said crusher means;

(2) a delay wheel rotatably connected to said delay lever and rollingly engaging said weapon body; and

(3) said crusher means, when released, causing said delay lever to pivot and thereby causing said delay wheel to roll along said weapon body, rolling of said delay wheel being slowed initially by angular inertia of said delay wheel.

---

### 5,018,450
### LUMINESCENT PAINTBALL FOR MARKING NIGHTTIME IMPACTS

**Henry J. Smith, RR3 P.O. Box 234, Elverson, Pa. 19520**

**Filed Apr. 25, 1990, Ser. No. 514,302**

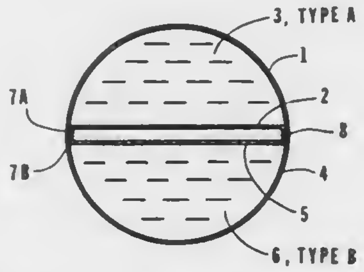
**Int. Cl.$^5$ F42B** *12/40*

**U.S. Cl. 102—513** **2 Claims**

1. A spherical and easily crushable projectile with two separate chambers which contain two separate reactive chemicals that become a chemiluminescent light source when mixed on impact; comprising:

two separate individually sealed hemispheres which are fused together to form an accurate sphere which has two fused capping membranes to isolate said two separate reactive chemicals;

said two fused capping membranes each having a raised fusion rim which forms said separate individually sealed hemispheres into a perfectly round cross section and increases the fusion area of said fused capping membranes; and



said raised fusion rim including a small extended lip which contacts an increases the fusion rim to trimmed edges of said separate individually sealed hemispheres and extends all possible leakage points of said raised fusion rims to the outside of said spherical and easily crushable projectile.

---

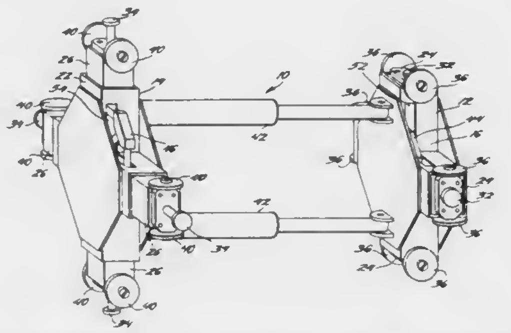
### 5,018,451
### EXTENDABLE PIPE CRAWLER

**Mark Hapstack, North Augusta, S.C., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Jan. 5, 1990, Ser. No. 461,591**

**Int. Cl.$^5$ B61B** *13/10*

**U.S. Cl. 104—138.2** **8 Claims**



1. An apparatus for moving through a passage defined by a closed wall, said apparatus comprising:

a housing having a plurality of channels radially disposed;

a plurality of first actuators, each of said first actuators slideably mounted within one of said channels;

a plurality of foot pad means for engaging and disengaging said wall, each of said foot pad means in operative connection with and deployable radially outward by each of said plurality of first actuators; and

extension mechanism means for sliding said first actuators radially in said channels to change the range of said plurality of foot pad means.

### 5,018,452
### DRIVE SYSTEM FOR TRACK MOUNTED UNDERCARRIAGES AND METHOD FOR USE THEREOF

**Henri Chauvet, 32 rue de la Fontaine, 92260 Fontenay Aux Roses, France**

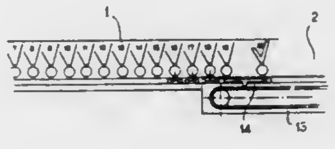
**PCT No. PCT/FR88/00616, § 371 Date Aug. 22, 1989, § 102(e) Date Aug. 22, 1989, PCT Pub. No. WO89/06300, PCT Pub. Date Jul. 13, 1989**

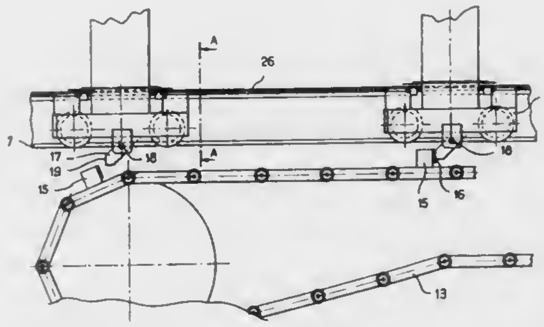
**PCT Filed Dec. 15, 1988, Ser. No. 415,206**

**Claims priority, application France, Dec. 30, 1987, 87 18414**

**Int. Cl.$^5$ A47C** *1/00;* **E04H** *3/00*

**U.S. Cl. 104—172.003** **17 Claims**





6. Automatic seat installation apparatus for storage in a first area and arrangement in a second area of seats on an auditorium, comprising a floor containing at least two longitudinal rails, wherein said seat installation apparatus comprises in combination:

a plurality of rows of seats each row comprising a plurality of seats mounted on support beams (5);

at least two undercarriages (6, 6′) each being in operative contact with a respective one of the rails and having attached in a supporting relationship, a portion of at least one support beam;

a system on each rail for driving said undercarriages forward comprising:

at least two undercarriages each comprising a frame having rail engaging means, said frame having an upstream and a downstream portion in the direction of movement along said rail structure to said second area;

a foldable connection element (26), said connection element being connected to a rearward portion of a first undercarriage and a frontward portion of a second undercarriage one of said undercarriages and said connection element including means for connecting said connection element to said undercarriages in a manner that permits said connection element to move between said first and second undercarriage in the direction of the rail (7) and in a predetermined range of motion D;

engagement means (17) attached to said frame of said undercarriage which is retractable when the seats are stored and extendable when the seats are displayed;

motorized drive chain means (13) aligned with said rail structure and extending over the entire second area and over part of the first area;

stop blocks (15) mounted on said chain means at predetermined intervals having a length between L and L-D, L being the maximum length of the spacing between two consecutive undercarriages;

wherein said drive chain means is attached to at least one of said two undercarriages and extends parallel to the rail over the entire length of the second area (2) and over part of the first area (1), said stop blocks being engageable with said engagement means for imparting a force to extend said undercarriages along said rail and said connection element being capable of covering said rails.

---

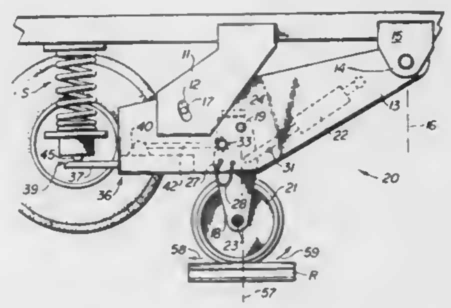
### 5,018,453
### AUXILIARY RAILROAD WHEEL LIFT ASSEMBLY FOR ROAD VEHICLE

**Daniel P. Kinard, Snellville, Ga., assignor to Bankhead Enterprises, Inc., Atlanta, Ga.**

**Filed Dec. 4, 1989, Ser. No. 444,848**

**Int. Cl.$^5$ B61D** *15/00*

**U.S. Cl. 105—72.2** **25 Claims**



1. An apparatus for converting a vehicle for travel on a railway, the vehicle having a frame and a suspension means for suspending road wheels from the frame, said apparatus comprising:

a first support member rigidly mounted to the vehicle frame;

a second support member pivotally mounted at a first portion to the vehicle frame and coupled to said first support member for limited pivotal movement of said second support member relative to the vehicle frame;

a railway wheel support member pivotally mounted at a first portion thereof to said second support member for movement between raised and lowered positions;

a railway wheel rotatably mounted to said railway wheel support member distal from said first portion of said railway wheel support member;

means for moving said railway wheel support member between said raised and lowered positions and for securing said railway wheel support member in said raised and lowered positions; and

means mounted to said second support member and movable into supporting engagement with the vehicle suspension means in response to said railway wheel support member being moved to its lowered position for temporarily supporting the suspension means of the vehicle and movable out of supporting engagement with the vehicle suspension means in response to said railway wheel support member being moved to its raised position.

---

### 5,018,454
### KNOCK-DOWN SEMI-RIGID TABLE ASSEMBLY

**Fred W. Negus, 710 Oak St., P.O. Box 128, Fort Atkinson, Wis. 53538**

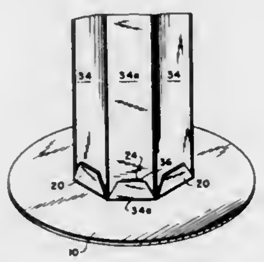
**Filed Sep. 4, 1990, Ser. No. 577,025**

**Int. Cl.$^5$ A47B** *3/06*

**U.S. Cl. 108—150** **8 Claims**

6. A knock-down table assembly having a hollow tubular base member and a table top for attachment to said base member, said table being fabricated of a semi-rigid foldable material, said base member having oppositely disposed first locking tabs and a plurality of flaps therebetween, said flaps being

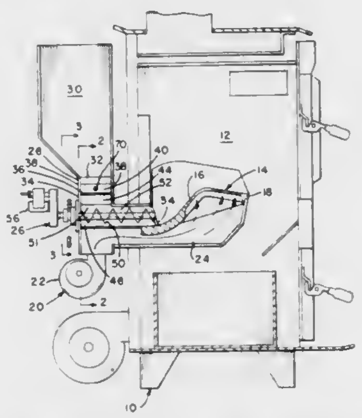
folded inwardly to form a slot therebetween, said locking tabs being inserted in said slot to thereby close the bottom end of said base member and to form a hollow tubular base member, the bottom of said table top being provided with flaps that can be bent away from the plane of the table wherein selected oppositely disposed flaps are provided with second locking tabs, said tubular base member being provided with correspondingly positioned side slots adjacent to the top thereof whereby said second locking tabs are inserted in said side slots in order to securely lock the table top to said base member.



---

### 5,018,455
## FEED SYSTEM FOR PELLET BURNING STOVE

**Dane P. Harman, Halifax, Pa., assignor to Harman Stove and Welding, Inc., Halifax, Pa.**
**Filed Jun. 15, 1990, Ser. No. 538,882**
**Int. Cl.⁵ F23K** *3/14, 3/16*
**U.S. Cl. 110—110** **10 Claims**

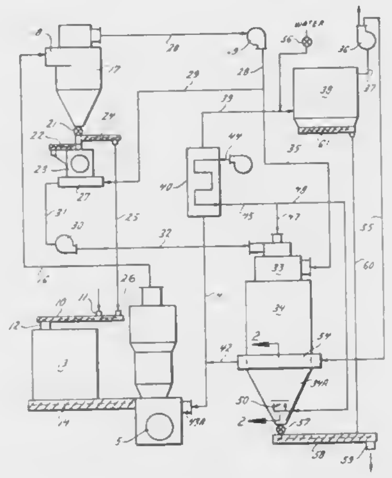


1. A fuel feed system for conveying particulate fuel such as wood pellets, crushed coal, wood chips and the like from a hopper to a firebox, the system including a hopper having a discharge mouth, a fuel collection plate located below the mouth of the hopper, a pusher block on the fuel collection plate, a fuel delivery passage located below the plate, said passage including a fuel delivery end located in a firebox and a fuel infeed end below the plate, fuel delivery means for moving fuel through the passage from the infeed end to the delivery end, said plate including a fuel discharge edge located on one side of the fuel passage, a fuel collection trough having an upper end surrounding said edge of the plate and a lower end adjacent the infeed end of the fuel feed passage, and drive means for actuating said fuel delivery means and for reciprocating said pusher block, said plate being located a sufficient distance above the trough to prevent burnback of fuel into the hopper.

---

### 5,018,456
## SYSTEM FOR DISPOSING OF SLUDGE

**Robert M. Williams, Ladue, Mo., assignor to Williams Patent Crusher and Pulverizer Company, St. Louis, Mo.**
**Filed Feb. 24, 1989, Ser. No. 314,895**
**Int. Cl.⁵ F23G** *5/33*
**U.S. Cl. 110—342** **12 Claims**



1. In a system for disposing of sludge by using the sludge as a primary source of fuel for its disposition by combustion thereof, the system comprising the steps of:

(a) processing a mass of liquified sludge to reduce the solids to a predetermined size for use as the fuel and concurrently separating a substantial portion of the contained liquid as a water vapor;

(b) delivering the processed solids and liquid to the combustor such that the combustor contains the solids and the liquids in the processed mass for conversion of the solids to ash and the conversion of the liquids to vapor;

(c) admitting a portion of the ambient air to the burner to support combustion of the solids, and another portion of ambient air to the combustor for removing the vapor at a temperature below the temperature at which the solids are reduced to ash;

(d) utilizing a part of the removed vapor to initiate evaporization of the liquid in the processed mass, and a part of the removed vapor to elevate the temperature of the ambient air admitted to the burner and to the combustor;

(e) releasing the part of the removed vapor used to elevate the temperature of the admitted ambient air to the ambient atmosphere; and

(f) removing the ash substantially free of vapor.

---

### 5,018,457
## WASTE TREATMENT SYSTEM

**Jack D. Brady, Fayetteville; Kenny M. Graves; Larry F. Paschke, both of Jonesboro, and John M. Golumbeski, Riverdale, all of Ga., assignors to Crown Andersen, Inc., Peachtree City, Ga.**
**Filed Jun. 16, 1989, Ser. No. 367,302**
**Int. Cl.⁵ F23J** *15/00*
**U.S. Cl. 110—346** **24 Claims**

1. A method of processing hazardous waste comprising the steps of:

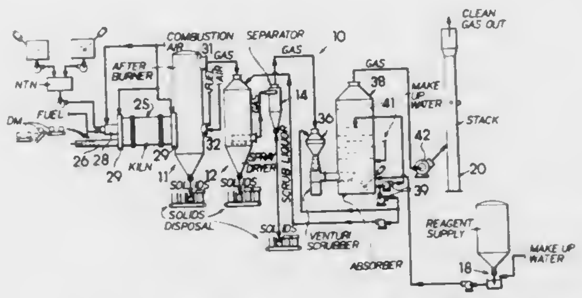
a) incinerating the hazardous waste to a temperature sufficient to break down the hazardous waste;

b) collecting the solids produced by the incineration step;

c) directing at least a portion of the exhaust gas stream produced by the incineration step through a spray dryer;

d) passing all of the gas stream from the incineration step including that portion exiting the spray dryer through a scrubbing and absorbing device to remove particulates and acid gas from the gas stream by contacting the gas stream with a scrubbing and acid gas absorbing slurry or solution;

e) separating a portion of the scrubbing and acid gas slurry or solution liquid after contact with the gas stream as a waste liquor;



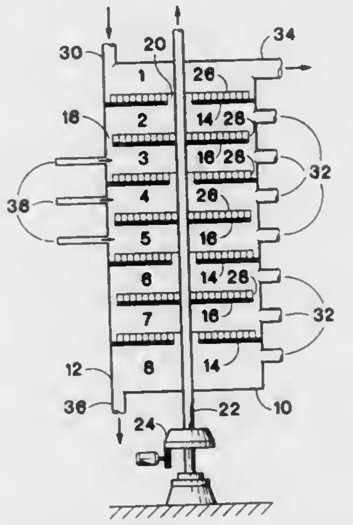
f) spraying the waste liquor into the exhaust gas stream passing through the spray dryer to evaporate the water in said waste liquor and produce a dry residue; and

g) collecting the dry residue so that there is no liquid waste output from the system.

---

### 5,018,458
## FURNACE COMBUSTION ZONE TEMPERATURE CONTROL METHOD

**Glover C. McIntyre, Pickering; Robert J. Lacombe, Saint John, both of Canada, and Russell G. Forbess, Weston, Wis., assignors to Zimpro Passavant Environmental Systems, Inc., Rothschild, Wis.**
**Filed Sep. 12, 1990, Ser. No. 581,338**
**Int. Cl.⁵ F23G** *5/00*
**U.S. Cl. 110—346** **17 Claims**



1. A method for controlling temperature in a combustion zone in a furnace, independent of flue gas oxygen content, comprising the steps:

(a) supplying combustion air to said furnace for combustion of a fuel therein;

(b) providing a plurality of low volume gas flow entry ports to said combustion zone in said furnace with carrier gas continuously flowing through said ports into said combustion zone;

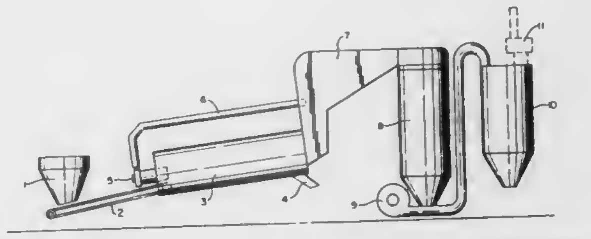
(c) selecting a set point value for said combustion zone temperature which, upon said temperature exceeding said set point value, commences generation of a fine water mist external said combustion zone by mist generating means within said carrier gas, said mist flowing into said combustion zone with said carrier gas and reducing temperature within said combustion zone by vaporization therein; and

(d) adding a proportionately greater amount of water mist to said carrier gas as the temperature of said combustion zone deviates above said set point value, said amount of water mist added limited by the capacity of said mist generating means, and ceasing said water mist generation upon said combustion zone temperature falling to or below said set point value.

---

### 5,018,459
## METHOD AND APPARATUS FOR RECYCLING PAPER PULP SLUDGE

**Wendell Judd, Fairfield, Ohio, assignor to Technology Development Corporation, Columbus, Ohio**
**Continuation-in-part of Ser. No. 317,511, May 18, 1989, abandoned. This application Oct. 27, 1989, Ser. No. 471,971**
**Int. Cl.⁵ F23G** *7/04*
**U.S. Cl. 110—346** **4 Claims**



1. A method for recycling paper pulp sludge comprising the steps of;

(a) introducing paper pulp sludge into a heater wherein said heater maintains a temperature of at least 800° Fahrenheit,

(b) rotating said heater containing said paper pulp sludge while maintaining said temperature of at least 800° Fahrenheit until essentially all water contained in said paper pulp sludge is removed by evaporation and further, until essentially all wood fibers and mixing catalysts contained in said paper pulp sludge are incinerated, resulting in a substantially dry incineration product,

(c) extracting said incineration product from said heater.

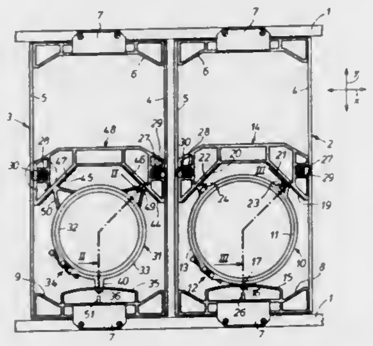
---

### 5,018,460
## EMBROIDERING MACHINE WITH A MOUNTING DEVICE FOR INDIVIDUAL EMBROIDERY HOOPS

**Lothar Schilling, Kaiserslautern, and Gottfried Schmidt, Stebach, both of Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Kaiserslautern, Fed. Rep. of Germany**
**Filed Mar. 2, 1990, Ser. No. 488,288**
**Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3919861**
**Int. Cl.⁵ D05C** *9/04*
**U.S. Cl. 112—103** **23 Claims**

1. An embroidering machine with a mounting unit for individual embroidery hoops, the embroidery hoops being detachably connected to the mounting unit and consisting of an inner hoop with an outer hoop surrounding said inner hoop and fabric to be embroidered located between said inner hoop and said outer hoop, comprising: three-point mounting means for the fixation of an outer embroidery hoop, comprising two opposite holders including a first holder with two contact surfaces, said two contact surfaces enclosing an angle, said two contact surfaces receiving fitted support surfaces of said outer

hoop, a second holder having a bow spring with a depression for receiving a projection arranged on the outer hoop at a

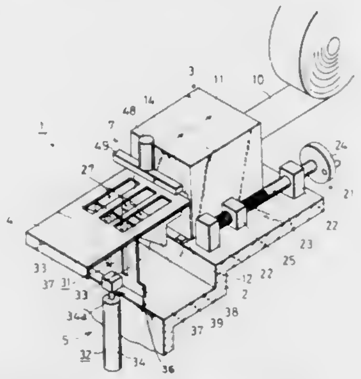


location bisecting the angle enclosed between the two contact surfaces of the first holder.

---

### 5,018,461
## LABEL SUPPLY APPARATUS AND LABEL SUPPLY METHOD

**Katsuyuki Kato, Nagoya, and Zinichi Yaguchi, Kani, both of Japan, assignors to Kabushikikaisha Barudan, Aichi, Japan**
**Filed Feb. 15, 1990, Ser. No. 480,716**
**Claims priority, application Japan, Apr. 18, 1989, 1-98474; May 15, 1989, 1-121761; Dec. 21, 1989, 1-331684**
**Int. Cl.⁵ D05B** *3/12, 3/22*
U.S. Cl. 112—104 7 Claims

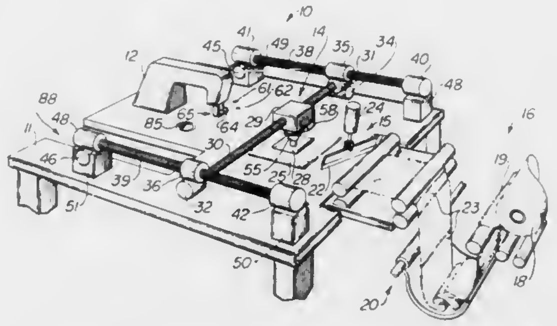


1. A label supply apparatus comprising:
a label rest position for supporting a label;
a retainer located opposite a label supported on said label rest position;
a push-in element provided at one side of said label rest position, opposite a side supporting said label, said push-in element being supported to advance towards and away from said one side, extending through an opening in said label rest position so that said push-in element pushes a portion of a said label supported on said label rest position into said retainer, whereby said retainer clips said portion of said label; and,
means for moving said retainer towards a sewing position over a locus of movement so that an end portion of said label protruding from said retainer hits an object situated near said sewing position, folding said label in a direction opposite the direction of movement of said retainer.

---

### 5,018,462
## EDGE FINISHING SYSTEM

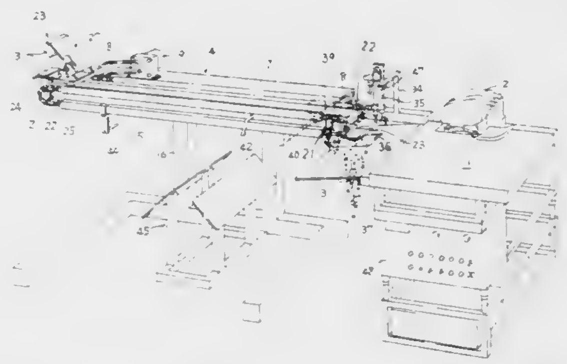
**Charles E. Brocklehurst, Fountain Inn, S.C., assignor to Sew Simple Systems, Inc., Fountain Inn, S.C.**
**Filed Oct. 16, 1989, Ser. No. 421,981**
**Int. Cl.⁵ D05B** *21/00, 1/20*
U.S. Cl. 112—121.12 19 Claims



1. A method of finishing a segment of sheet material having a plurality of approximately rectilinear edges arranged in series adjacent one another about the perimeter of the segment comprising:
moving the segment toward a sewing path with a first one of the edges of the segment approaching approximately normal to its length toward the sewing path,
detecting the first edge of the segment in the sewing path with a first detector as the first edge moves into the sewing path,
in response to detecting the first edge moved into the sewing path advancing the segment approximately parallel to its first edge along the sewing path through a sewing station in the sewing path,
finishing the first edge of the segment as the first edge advances along the sewing path through the sewing station,
detecting an adjacent edge of the segment following the first edge with a second detector positioned out of the sewing path of the first edge of the segment and closer to the sewing station than the first detector as the adjacent edge reaches a predetermined distance from the sewing station,
in response to detecting the adjacent edge reaching the predetermined distance from the sewing station turning the segment until the adjacent edge is positioned in and oriented approximately parallel to the sewing path,
detecting the adjacent edge of the segment as the adjacent edge becomes positioned in and oriented approximately parallel to the sewing path,
in response to detecting the adjacent edge of the segment becoming positioned in and oriented approximately parallel to the sewing path terminating the turning of the segment and advancing the segment with the adjacent edge moving approximately parallel to and along the sewing path and through the sewing station,
finishing the adjacent edge of the segment as the adjacent edge advances along the sewing path through the sewing station, and
repeating the steps of detecting, turning advancing and finishing of the other adjacent edges of the segment until all of the edges about the perimeter of the segment desired to be finished have been finished.

### 5,018,463
## STACKING DEVICE HAVING CLAMPS ALONG A CIRCULATING CONVEYOR FOR CLAMPING, CONVEYING, AND STACKING SEWN ARTICLES FROM A SEWING MACHINE TO A CLOTH HOLDING STAND

**Nobuo Nakajima, Tokyo, Japan, assignor to Pegasus Sewing Machine Mfg., Co., Ltd., Osaka and Grace Sewing Machine Co., Ltd., Tokyo, both of, Japan**
**Filed Jul. 14, 1989, Ser. No. 380,810**
**Claims priority, application Japan, Jul. 16, 1988, 63-177864**
**Int. Cl.⁵ D05B** *33/02;* **B65H** *29/00, 29/02, 29/04*
U.S. Cl. 112—121.29 16 Claims

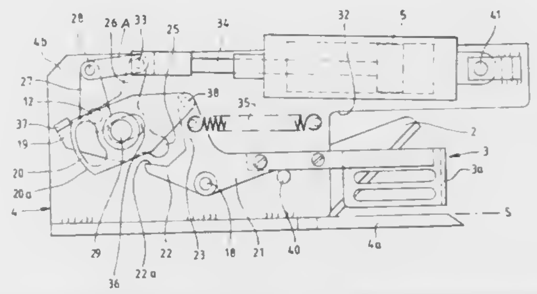


1. A stacking device for a sewing machine comprising a conveyor driven along a circulation route; means for clamping a work article, said clamping means being attached to the conveyor and spring-biased to an open position; means for closing the clamping means positioned along the circulation route, said closing means being independent from said clamping means; means for locking the clamping means in a closed state; and releasing means for unlocking said clamping means, said releasing means being positioned along the circulation route.

---

### 5,018,464
## CUTTING DEVICE

**Klaus Hampel, Bielefeld, and Reinhold Schrudde, Oerlinghausen, both of Fed. Rep. of Germany, assignors to Kochs Adler Aktiengesellschaft, Fed. Rep. of Germany**
**Filed Nov. 20, 1989, Ser. No. 439,709**
**Claims priority, application Fed. Rep. of Germany, Nov. 22, 1988, 3839367**
**Int. Cl.⁵ D05B** *37/04*
U.S. Cl. 112—130 11 Claims

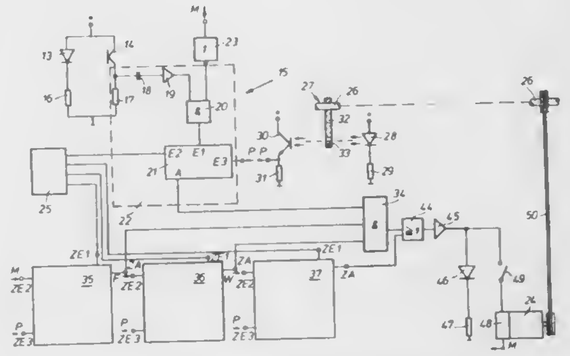


1. A cutting device for a sewing machine, having a cutting area in the vicinity of its sewing area;
the cutting device including a knife and a knife guard which is movable into a protective position surrounding the cutting area; common drive means for driving the knife and the knife guard;
mechanical stop means for stopping the knife, and for releasing the knife only when the knife guard is substantially in its protective position surrounding the cutting area;
wherein the stop means operates automatically during the movement of the knife and the knife guard toward the cutting area, to stop the movement of the knife, if the knife guard is not substantially in its protective position.

---

### 5,018,465
## SEWING MACHINE WITH THREAD MONITOR

**Walter Hager; Edgar Butzen; Günther Denuell, and Kurt Arnold, all of Kaiserslautern, Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Kaiserslautern, Fed. Rep. of Germany**
**PCT No. PCT/EP88/00800, § 371 Date Apr. 9, 1990, § 102(e) Date Apr. 9, 1990, PCT Pub. No. WO89/03908, PCT Pub. Date May 5, 1989**
**PCT Filed Sep. 3, 1988, Ser. No. 469,566**
**Claims priority, application Fed. Rep. of Germany, Nov. 21, 1987, 3735578; Jan. 13, 1988, 3800717**
**Int. Cl.⁵ D05B** *69/36*
U.S. Cl. 112—273 13 Claims



1. A sewing machine and thread monitor arrangement, comprising a bobbin held in a shuttle body, said bobbin having signal reflecting elements for reflecting a sensor signal; sensor means for responding to the bobbin thread running out including means for emitting sensor signals and means for detecting changes in signals reflected by said elements of said bobbin in dependence upon the different reflection characteristics of said elements, said sensor means generating pulse signals; a pulse generator providing one pulse per stick forming cycle; counter means for receiving said pulse signals from said sensor; and, setting means for inputting a presetting input to said counter means defining a maximum count, generating a signal indicating a disturbance in the shuttle thread when said counter means reaches said maximum count at least one additional counting device, for interrupting said signal indicating a disturbance for a number of stitch cycles for using up a slack thread section after a sewing machine function that causes slack thread.

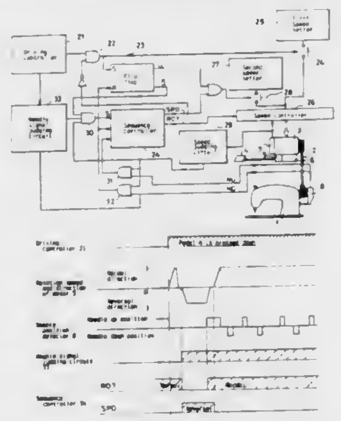
---

### 5,018,466
## SEWING MACHINE

**Hiroshi Hasegawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**
**Filed Oct. 27, 1989, Ser. No. 427,348**
**Claims priority, application Japan, Oct. 28, 1988, 63-273520**
**Int. Cl.⁵ D05B** *69/18*
U.S. Cl. 112—275 3 Claims

1. A sewing machine comprising:
a motor for driving said sewing machine;
needle position detecting means for detecting a position of a needle of said sewing machine and outputting a needle position signal in response thereto;
speed control means for controlling a rotation speed of said motor; and
sequence control means for controlling driving and stopping of said motor responding to a depth of a pedal, and for outputting a rotation direction signal to said speed control

means to drive said motor in a reverse direction for a predetermined angle when a needle-down signal of a first stitch is within a predetermined time period from a start of said driving.



---

5,018,467

### ADJUSTMENT DEVICE FOR FEEDING CLOTH IN A CLOTH TRANSPORT MECHANISM FOR A SEWING MACHINE

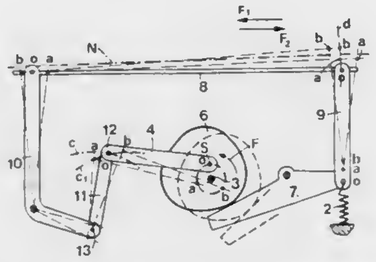
**Antonio Jimenez, Meyrin, and Pierre-Maurice Rochat, L'Orient, both of Switzerland, assignors to Mefina S.A., Switzerland**

**Filed Nov. 30, 1989, Ser. No. 443,360**

**Claims priority, application Switzerland, Nov. 30, 1988, 4444/88**

**Int. Cl.⁵ D05B** *27/22*

**U.S. Cl. 112—315** **4 Claims**



1. A sewing machine comprising a cloth transport mechanism and an adjusting device for adjusting cloth transport of said mechanism in amplitude and direction, the cloth transport mechanism comprising a drive shaft and a cloth transport member, the cloth transport member having two opposite ends, each of which is connected kinematically to the drive shaft by a respective connecting rod and lever mechanism, one of the connecting rod and lever mechanisms defining a first displacement trajectory in a direction substantially parallel to a support plane for the cloth while the other of the connecting rod and lever mechanisms defines a second displacement trajectory in a direction substantially perpendicular to said support plane, the adjusting device comprising a slideway having two tracks in the form of arcs of concentric circles centered on a trajectory described by a pivoting axis of a pivotal connection between two connecting rods of one of said connecting rod and lever mechanisms, and said slideway being mounted pivotingly about an axis parallel to said pivotal axis and passing through the center of said trajectory described by said pivotal connection, wherein said pivotal connection carries two rollers associated with resilient means for putting these rollers each in contact with a respective one of said tracks.

---

5,018,468

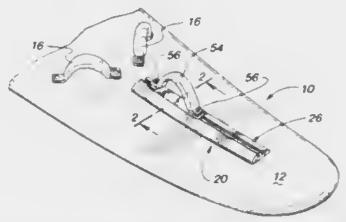
### MULTIPLE POSITION FOOTSTRAP TRACK FOR SAILBOARDS

**Steven R. Peterson, 7269 Vassar Ave., La Mesa, Calif. 92041**

**Filed Apr. 28, 1989, Ser. No. 344,747**

**Int. Cl.⁵ A63C** *15/06*

**U.S. Cl. 114—39.2** **9 Claims**



1. A hands-free sliding footstrap track for sailboards which is adjustable with foot pressure comprising:

a) a track member;
b) a slide member captively held to said track;
c) a footstrap attached to an upper portion of said slide member; and
d) positioning means for releasably securing said slide member from longitudinal movement to said track, said positioning means including a mechanism which urges said slide member upwardly into a locked position, said means allowing movement of said slide member relative to said track only on the application of downward pressure on said slide member to allow a user to preposition the footstrap while sailing by using foot pressure.

---

5,018,469

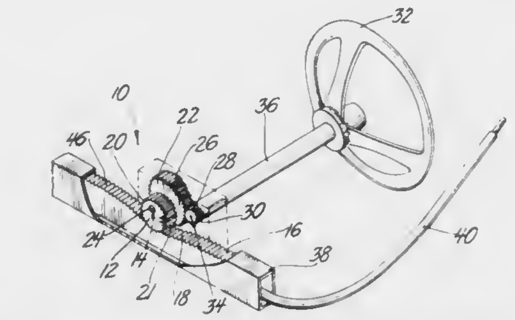
### VARIABLE RATIO STEERING HELM

**John Carlson, Wayne, Pa., assignor to Teleflex Incorporated, Limerick, Pa.**

**Continuation-in-part of Ser. No. 386,503, Jul. 27, 1989, abandoned. This application Dec. 18, 1989, Ser. No. 451,564**

**Int. Cl.⁵ B63H** *25/00*

**U.S. Cl. 114—144 R** **16 Claims**



1. A boat steering assembly of the type for actuating a steering element (**42**) in response to rotary inputs at a steering wheel (**32**) comprising;

a first axis (**14**);

rotary gear means including a rotary gear (**12**) supporting for rotation about said first axis (**14**), said gear (**12**) including a driving periphery (**21**) spaced radially form said first axis (**14**);

input means associated with said rotary gear means for rotating said gear (**12**) of said rotary gear means about said first axis (**14**), said input means including an intermediate idler gear (**22**) fixed relative to said gear (**12**) and disposed concentrically about said first axis (**14**) and a shaft gear (**28**) disposed in operative engagement with said idler gear (**22**) to rotate said gear (**12**) about said first axis (**14**) in response to rotation of said shaft gear (**28**);

output gear means (**16**, **16'**) including an engagement periphery (**18**, **18'**) for engaging said driving periphery (**21**) at a point of contact (**52**, **52'**);

said assembly characterized by said driving periphery (**21**) and said engagement periphery (**18**, **18'**) having profiles for automatically varying the distance between said first axis (**14**) and said point of contact (**52**, **52'**) as said rotary gear means rotates to increase the leverage between said input means and said output gear means (**16**, **16'**) when the distance between said first axis (**14**) and said point of contact (**52**, **52'**) decreases.

---

5,018,470

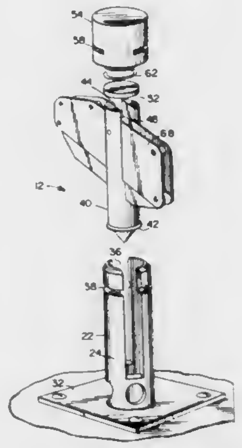
### LINEAR ACTUATED VALVE WITH REMOTE ACTUATION

**William J. Mitchell, Clermont, Fla., and Albert L. Grumelot, St. Mary's, Ohio, assignors to Master Concepts Inc., Orlando, Fla.**

**Filed Jun. 12, 1990, Ser. No. 536,789**

**Int. Cl.⁵ B63B** *13/00*

**U.S. Cl. 114—183 R** **21 Claims**



1. A linear actuated fluid valve, comprising

a valve body including an elongated sleeve having an axis, generally opposed slots through opposite side walls thereof, a first valve opening through a side wall, a second valve opening through an end of said sleeve, and a valve seat about said sleeve between said openings;

a valve member in said sleeve and movable axially between a valve closed position engageable with said seat and a valve open position spaced from said seat to enable fluid communication between said first and second openings, said member having a laterally opening slot therethrough in registry with said opposed slots of said sleeve;

means carried by said sleeve for biasing said valve member toward one of said valve open or valve closed positions;

a cam follower carried by said member in said slot thereof;

a cam carried by said body for movement in the slots of said sleeve and the slot of said member in a direction generally normal to the axis of said body, said cam having a surface engageable with said cam follower enabling movement of said member toward said valve open or valve closed position in response to movement of said cam in said normal direction and the bias of said biasing means; and

means for linearly moving said cam along said slots.

---

5,018,471

### MARINE FENDER FOR PILINGS OF MARINE STRUCTURES

**William E. Stevens, Rte. 6, Box 90, Elizabeth City, N.C. 27909**

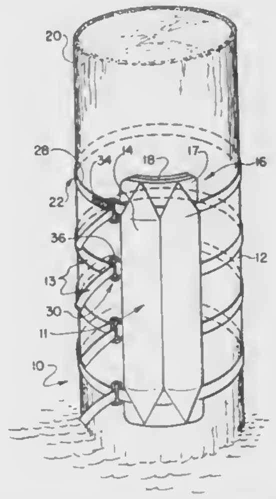
**Filed Jan. 10, 1989, Ser. No. 295,299**

**Int. Cl.⁵ E02B** *3/22*

**U.S. Cl. 114—219** **10 Claims**

1. A portable marine fender adapted to repeatedly be selectively affixed to and removed from an elongate piling of a marine structure for protecting marine vessels and the piling from damaging contact with one another, said fender comprising:

an elongate fender body having a greater longitudinal than lateral extent, said fender body including an elongate bumper portion extending in the longitudinal extent of said body at one side of said body, said bumper portion being of sufficient resiliency to cushion normal impact of a marine vessel with a piling as a result of marine wave action, and said fender body including a mounting surface at the opposite side of said body of sufficiently frictional character with respect to a piling for generally non-slipping engagement therewith, said body being sufficiently manipulable in its lateral extent transversely of its longitudinal extent to be generally conformable to the cross-sectional shape of a piling; and selectively engageable and disengageable strap means extending laterally from said fender body for encircling a piling for selectively securing said body to a piling with the elongate extents of said body and the piling generally parallel and with said mounting surface held in frictional facing contact against the piling.



---

5,018,472

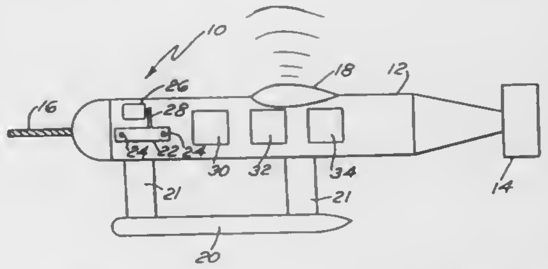
### HORIZONTALLY MOVEABLE WEIGHT STABILIZING DEVICE

**Michael J. Sullivan; Douglas G. Dussault, both of Oakdale, and Daniel Dinsmore, Jr., East Lyme, all of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jun. 22, 1989, Ser. No. 373,538**

**Int. Cl.⁵ B63B** *21/56*

**U.S. Cl. 114—244** **9 Claims**



1. A stabilizing device for a towed body towed by a tow cable against the rolling motion caused by an imbalanced torque in the tow cable, said stabilizing device includes:

means for sensing displacement due to rolling motion of said towed body;

a keel attached to said body at the bottom surface thereof for

VOL
1126
ISS
4
MY
28
1991
UMI

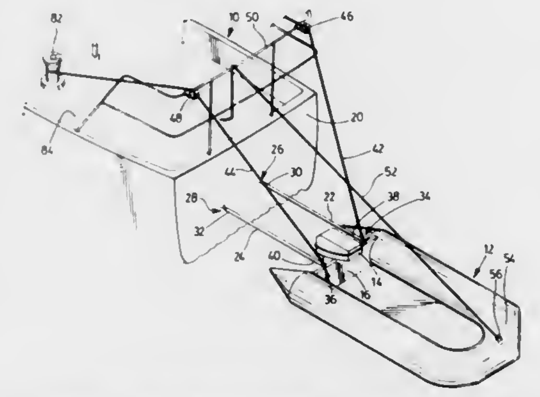
providing a coarse correction against the rolling motion of said towed body;

said towed body including a trim weight moveable along guide bars and controlled by an electric motor which is connected to the trim weight by a drive cam mechanism; and

means for providing finer correction against the rolling motion to stabilize said towed body.

---

### 5,018,473
## DINGHY TOWING MECHANISM AND METHOD
**Ronald Foster, 23 Red Oak Drive, Richmond Hill, Ontario, Canada L4B 1V5**
**Filed Oct. 24, 1989, Ser. No. 426,295**
**Int. Cl.$^5$ B63B *21/58***
**U.S. Cl. 114—249 10 Claims**



1. A dinghy towing mechanism in combination with a boat and a dinghy having a motor attached to its stern, the towing mechanism comprising:

a pair of elongate rigid members in horizontally spaced-apart relationship, each of the pair of rigid members having first and second ends;

a first pair of pivot connections coupling the first ends of the pair of rigid members to the stern of the boat;

a second pair of pivot connections coupling the second ends of the rigid members to the stern of the dinghy, the second pair of pivot connections being located one to either side of the dinghy motor, the second pair of pivot connections being releasable to permit disengagement of the dinghy from the rigid members;

the first and second pairs of pivot connections and the pair of rigid members being oriented to permit displacement of the dinghy between a fully-floating orientation in which both the stern and bow of the dinghy float in water behind the boat with the bow of the dinghy facing rearwardly away from the stern of the boat and a towing orientation in which the stern of the dingy and the motor are clear of the water and the bow of the dinghy floats in the water facing rearwardly away from the stern of the boat;

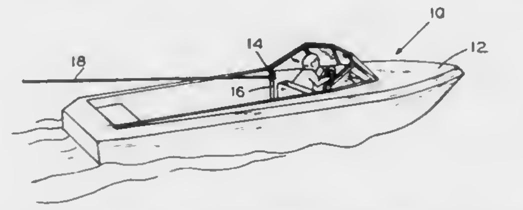
the elongate rigid members being moveable independently of one another and the towing mechanism defining a clearance space between the rigid members which receives the motor of the dinghy;

a pair of lines connected to the second ends of the rigid members and causing the dinghy to displace between at least the fully-floating and towing orientations in response to hauling in and paying out the pair of lines; and,

line holding means secured to the boat for releasably holding the pair of lines against paying out.

---

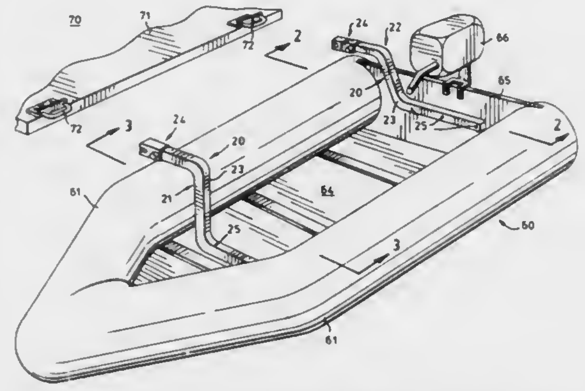
### 5,018,474
## SKI ROPE ATTACHMENT DEVICE
**David L. Jellen, Dos Palos, Calif., assignor to Malibu Boats, Inc., Merced, Calif.**
**Filed Mar. 22, 1990, Ser. No. 498,043**
**Int. Cl.$^5$ B63B *21/04***
**U.S. Cl. 114—253 5 Claims**



1. A device for attaching the front end of a water ski rope to the pylon on a towing boat in which the pylon is fixedly mounted in an upright position, said device comprising the combination of a vertically extending support pin having a proximal end mounted on the upper end of the pylon and a distal end extending upwardly from the pylon, a cylindrical swivel head formed about its outer periphery with an annular groove which is sized for carrying a loop on the end of said ski rope, the swivel head being formed at its lower end with a vertically axised lower bore, bearing means comprising an annular anti-friction bearing mounted within the lower bore and about the proximal end of the support pin for rotation of the swivel head about a vertical axis whereby during angular movement of the rope relative to the boat the loop of the rope freely rotates with the swivel head about said vertical axis to obviate chattering and wear of the rope, said swivel head being formed at its upper end with a vertically axised upper bore which extends downwardly about an upper portion of the distal end of the support pin, a peripheral groove formed about said upper portion of the distal end of the support pin, snap ring means releasably seated in the peripheral groove for preventing unintended relative axial movement of the swivel head from the support pin, an elastomeric filler cap having a cross-sectional shape sized to releasably fit within said upper bore, and means providing a water-tight seal between the filler cap and upper bore to prevent penetration of water into the upper bore and bearing.

---

### 5,018,475
## INFLATABLE DINGHY BRACKET
**Roy D. Burke, R.R. #1, Enniskillen, Ont., Canada L0B 1H0**
**Filed Sep. 14, 1988, Ser. No. 244,213**
**Int. Cl.$^5$ B63B *23/00***
**U.S. Cl. 114—365 20 Claims**



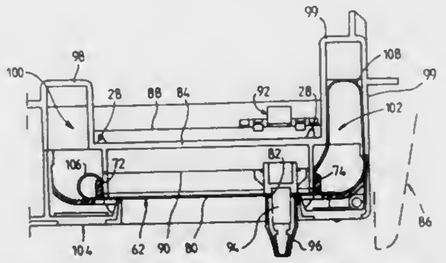
1. A bracket for securing an inflatable dinghy having opposing pontoon portions to a yacht, said bracket comprising:

a member adapted to fit over one of said pontoon portions, and having at one end thereof means for removably securing said member to said yacht; and

mounting means for mounting said member to said dinghy such that said member is directly or indirectly held by and between the under parts of the inner sides of said opposing pontoon portions.

---

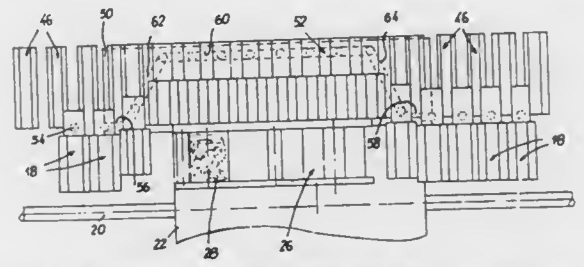
### 5,018,476
## SLIDING CURSOR CONTROL DEVICE, ESPECIALLY FOR A HEATING AND/OR AIR CONDITIONING INSTALLATION OF AN AUTOMOTIVE VEHICLE
**Fabrice Chrisologue, Elancourt, France, assignor to Valeo, Paris, France**
**Filed Jul. 26, 1989, Ser. No. 385,081**
**Claims priority, application France, Aug. 2, 1988, 88 10428**
**Int. Cl.$^5$ G09F *11/21***
**U.S. Cl. 116—322 11 Claims**



1. A slider arrangement to prevent light leakage from a control panel comprising: a panel defining a linear opening therethrough; a slidable control member; means mounting the slidable member with said slidable member extending through said linear opening; an elongated resilient tape; means slidably mounting the tape adjacent the linear opening so as to obturate said linear opening in any position of the slidable member along the linear opening, the tape comprising a central portion and two end portions extending respectively on either side of the central portion, with the central portion having a through opening and the slidable member extending through said through opening; and means mounting the two said end portions of the tape so as to define two terminal loops of the tape, whereby on displacement of the slidable member along the linear opening, the tape moves along the opening while extending one of said terminal loops and contracting the other one.

---

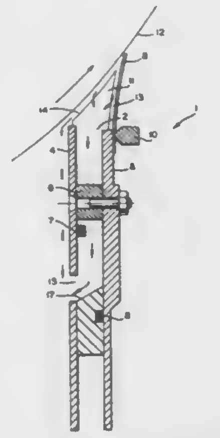
### 5,018,477
## SKI WAXING MACHINE
**Peter M. Amann, Magnusstr. 25, 8960 Kempton, Fed. Rep. of Germany**
**Filed Nov. 27, 1989, Ser. No. 441,825**
**Claims priority, application European Pat. Off., Dec. 21, 1988, 88121366**
**Int. Cl.$^5$ B05C *1/02;* A63C *11/08***
**U.S. Cl. 118—242 15 Claims**



1. A ski waxing machine comprising an oblong housing provided with at least one oblong deck recess, a plurality of supporting elements arranged below said recess within said housing supporting at least one ski, a slide guided along rails in longitudinal direction of the housing, a driving motor and a driving arrangement arranged within the housing for a reciprocating motion of the slide, waxing means provided at the slide for applying a coating of wax onto the running surfaces of the skis, said plurality of supporting elements arranged in the moving path of the slide, extending substantially crosswise to the longitudinal direction of the housing and being movably arranged between a supporting position respectively inside of the moving path of the slide and a rest position outside thereof, driving means provided at the slide for moving the plurality of supporting elements one after another into their rest positions upon approach of the waxing means respectively, and reset means for returning the plurality of supporting elements into their supporting positions after having been passed by the waxing means respectively wherein the plurality of supporting elements are mounted for a sliding movement substantially in crosswise direction to the longitudinal direction of the housing, and are arranged tightly adjacent one another and in their supporting positions form at least one cover arrangement substantially completely covering the deck recess of the housing from below, wherein further the driving means and the reset means are formed by a pair of transfer tracks respectively provided at leading and trailing areas of the slide respectively, wherein each one of the plurality of supporting elements has a bottom surface at which a follower is arranged to engage with each one of the pair of transfer tracks one after another, the transfer tracks arranged in one and the same plane mirror-invertedly with respect to a vertical cross plane and extending from inward ends to laterally and longitudinally offset outward ends respectively, wherein the inward ends of the pair of transfer tracks are longitudinally aligned and are laterally spaced from the longitudinally aligned outward ends by an amount substantially equal with the displacement of each one of the supporting elements between the supporting position and the rest position thereof.

---

### 5,018,478
## METHOD AND APPARATUS FOR COATING A PAPER WEB
**Paul O. Meinander, Grankulla, Finland, assignor to A. Ahlstrom Corporation, Karhula, Finland**
**PCT No. PCT/FI88/00092, § 371 Date Nov. 8, 1988, § 102(e) Date Nov. 8, 1988, PCT Pub. No. WO88/09700, PCT Pub. Date Dec. 15, 1988**
**PCT Filed Jun. 12, 1988, Ser. No. 269,531**
**Claims priority, application Finland, Jun. 12, 1987, 872616**
**Int. Cl.$^5$ B05C *3/132***
**U.S. Cl. 118—410 15 Claims**



1. A coating apparatus for coating a paper web comprising:

a pressurized coating chamber having substantially the same width as said web, said chamber being fillable with a coating paste and disposed to communicate said paste to said web;

said chamber defined by said web, a rear wall aligned with the inlet side of said web, a front wall aligned with the

OL
126
SS
4
MY
28
1991
UMI

discharge side of said web and opposite to said rear wall, and a wiping blade on the upper portion of said front wall;

an edge seal of substantially the same thickness as the space between said front and rear walls, an upper portion of said seal forming a wedge between said wiping blade and said web; and

a first gap between said upper seal portion and said web and a second gap between said upper seal portion and said wiping blade, each of said gaps being continuously open to outflow of said paste from said chamber to create a continuous flushing effect at said edge seal and prevent the drying of coating paste in said coating chamber, said first and second gaps being each at least 1 mm.

---

### 5,018,479

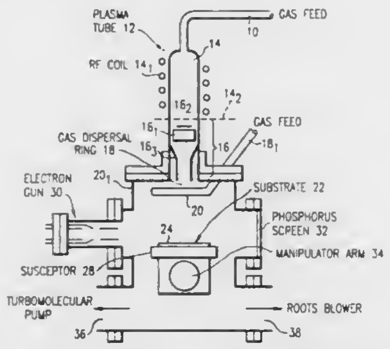
### REMOTE PLASMA ENHANCED CVD METHOD AND APPARATUS FOR GROWING AN EPITAXIAL SEMCONDUCTOR LAYER

**Robert J. Markunas, Chapel Hill; Robert Hendry, Hillsborough, and Ronald A. Rudder, Cary, all of N.C., assignors to Rescrach Triangle Institute, Inc., Research Triangle Park, N.C.**

**Division of Ser. No. 100,477, Sep. 24, 1987, Pat. No. 4,870,030. This application Aug. 10, 1989, Ser. No. 375,949**

**Int. Cl.$^5$ C23C** *16/00*

U.S. Cl. 118—723 14 Claims



1. A chemical vapor deposition apparatus for growing an epitaxial semiconductor layer on a substrate, comprising:

activation means for activating a feed gas by increasing the chemical reactivity of said feed gas, including

means for introducing said feed gas to an inlet of said activation means at a predetermined flow velocity,

means for imparting energy to said feed gas in an activation region thereby producing an activated feed gas composed of plural reactive species, and

an exit plane from which the activated feed gas exits the activation region;

spatial filtering means in communication with said exit plane for passing only selected of said reactive species of activated feed gas based on the lifetime of said selected of said reactive species;

a deposition chamber located downstream of and in communication with said spatial filtering means, comprising,

carrier gas introduction means for introducing a carrier gas including a constituent element of the semiconductor layer to be deposited at a predetermined flow velocity into a carrier gas mixing region where said carrier gas is mixed with said selected reactive species of said activated feed gas to transfer energy from said selected activated species and partially dissociated and activate said carrier gas into plural reactive species of said carrier gas,

a deposition region in which said substrate is positioned located downstream from said carrier gas mixing region;

wherein the flow rates of said feed and carrier gases are selected so that no back-diffusion of carrier gas and reactive species of said feed and carrier gases upstream of said exit plane occurs;

wherein selected reactive species of the activated feed gas activate the carrier gas and form activated species of the carrier gas. the activated carrier gas species being ordered and further dissociated through subsequent reactions with said selected reactive species of the activated feed gas on said substrate.

---

### 5,018,480

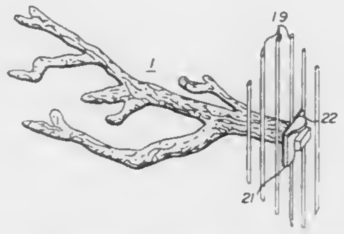
### SIMULATED TREE BRANCH FOR SMALL ANIMAL ENCLOSURES

**Marvin Goldman, Great Neck; Jerome Goldman; Terry Goldman, both of New York; Gerald Phillips, Wantagh, and Joseph Pesin, Brooklyn, all of N.Y., assignors to Penn Plax, Inc., Garden City, N.Y.**

**Filed Jun. 17, 1988, Ser. No. 207,794**

**Int. Cl.$^5$ A01K** *31/12*

U.S. Cl. 119—26 14 Claims



1. A simulated tree branch comprising a base portion, and a plurality of progressively smaller tributary segments which divide in a branching manner therefrom, both the base portion and tributary segments having a shape which is approximately cylindrical, variable within the limits of representing real tree material, and the base portion and tributary segments having a plurality of natural tree features molded therein which simulate real tree material, wherein the natural tree features are selected from at least one member of the following group consisting of, subtributary segments, bends, twists, knot markings, bark texture, points, lumps, holes, bud and leaf scars, bud tips at the end of a twig, broken nubs, areas of surface decomposition, erosion lines, broken ends, and a taper as the tributary segments extend toward the outer ends, said branch being made from non-toxic, non-leaching, waterproof, mite and contamination proof, washable thermoplastic material, and

a means formed on one end of the branch, for removably attaching the simulated tree branch to bars of a bird cage, so that the attaching means can support the weight of at least one bird,

wherein the means formed on one end of the branch, for removably attaching the simulated tree branch to the bars of a bird cage, comprises a "T" shaped projection extending from a back end of the base portion of the simulated branch, the "T" shaped projection having a post which is attached at one end thereof to the back end of the base portion of the simulated branch and a "T" top attached to an opposite end of the post perpendicular thereto, and two removably engagable flattened clip pieces, the flattened clip pieces having a cutout channel of sufficient size to fit over the post of the "T" and having a sufficient depth so that they may be securely wedged between the top of the "T", and the back end of the base portion of the simulated branch, with bars of a bird cage sandwiched therebetween.

### 5,018,481

### INSECT CONTROL DEVICE FOR LIVESTOCK CONTAINING COUMAPHOS

**Wayne B. Rose, Merriam, and Robert G. Arther, Prairie Village, both of Kans., assignors to Mobay Corporation, Pittsburgh, Pa.**

**Filed Jun. 2, 1989, Ser. No. 360,495**

**Int. Cl.$^5$ A01K** *29/00*

U.S. Cl. 119—156 12 Claims

1. An insect control device for attachment to livestock which effectively releases insect controlling agent for a period of up to four months comprising a molded article formed from a mixture of coumaphos, polyvinyl chloride and a plasticizer.

---

### 5,018,482

### COMBINED ODOR CONTROLLING ANIMAL LITTER

**Anna G. Stanislowski, Walnut Creek; J. Bruce England, Pleasanton, and Steven D. Ratcliff, Antioch, all of Calif., assignors to The Clorox Company, Oakland, Calif.**

**Continuation-in-part of Ser. No. 208,953, Jun. 17, 1988, Pat. No. 4,949,672. This application Jun. 23, 1989, Ser. No. 370,476**

**Int. Cl.$^5$ A01K** *1/015*

U.S. Cl. 119—173 18 Claims

1. An odor controlling animal litter comprising:

(a) adsorbent or absorbent particles; and

(b) an ammonia-controlling-effective amount of (i) pine oil and (ii) boric acid applied to said particles.

---

### 5,018,483

### FUEL INJECTION QUANTITY CONTROL DEVICE FOR ALCOHOL ENGINE

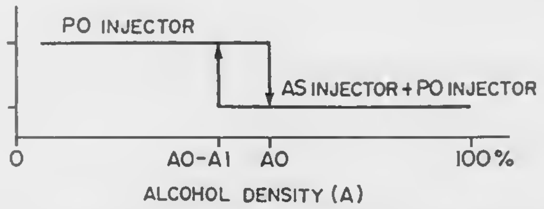
**Takamitau Kashima, Musashino, and Hitoshi Monden, Mitaka, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 16, 1990, Ser. No. 598,559**

**Claims priority, application Japan, Oct. 24, 1989, 1-278187**

**Int. Cl.$^5$ F02D** *19/08, 41/04*

U.S. Cl. 123—1 A 3 Claims



1. A fuel injection quantity control device for an alcohol engine enabled to be driven by a mixed fuel of gasoline and alcohol, including a plurality of cylinders, port injectors facing to the intake ports provided in said cylinders, and an intake pipe assembly portion injector provided in an intake pipe assembly portion, and being designed to control a fuel injection quantity with said injector,

said fuel injection quantity control device comprising;

a rotation quantity sensor mounted to said engine,

an engine revolution number calculator means for obtaining a speed of said engine based on the output of said rotation quantity sensor,

a port injector maximum fuel injection pulse width control means for defining the maximum fuel injection pulse width of said port injector based on the speed of said engine,

a density sensor for sensing an alcohol density in said fuel,

a parameter sensing means for sensing a parameter indicating the state of said engine,

a fuel injection pulse width control means for defining a fuel injection pulse width in dependency on the outputs of said density sensor and parameter sensing means,

a port injector injection ability determining means for comparing said fuel injection pulse width with said maximum fuel injection pulse width and determining whether or not said fuel injection pulse width is shorter than said maximum fuel injection pulse width,

an intake pipe assembly portion injector fuel injection pulse width control means for defining an intake pipe assembly portion injector fuel injection pulse width for an intake pipe assembly portion injector in dependency on the difference between said fuel injection pulse width and said maximum fuel injection pulse width if said determining means determines that said fuel injection pulse width is longer than said maximum fuel injection pulse width, and

an injector selector means for supplying the fuel injection pulse width defined by said fuel injection pulse width control means if said determining means determines that said fuel injection pulse width is shorter than said maximum fuel injection pulse width and supplying said maximum fuel injection pulse width to said port injector and said intake pipe assembly portion injector fuel injection pulse width to said intake pipe assembly portion injector if said determining means determines that said fuel injection pulse width is longer than said maximum fuel injection pulse width.

---

### 5,018,484

### COOLING FAN CONTROLLING APPARATUS

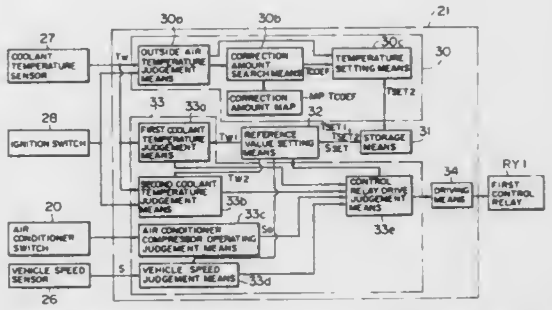
**Takao Naitoh, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 17, 1990, Ser. No. 524,440**

**Claims priority, application Japan, May 18, 1989, 1-125189**

**Int. Cl.$^5$ F01P** *7/02*

U.S. Cl. 123—41.12 7 Claims


21
30a
30b
30c
30
27
COOLANT TEMPERATURE SENSOR
Tw
OUTSIDE AIR TEMPERATURE JUDGEMENT MEANS
CORRECTION AMOUNT SEARCH MEANS
TCOEF
TEMPERATURE SETTING MEANS
CORRECTION AMOUNT MAP
MP TCOEF
TSET2
33
33a
32
28
IGNITION SWITCH
FIRST COOLANT TEMPERATURE JUDGEMENT MEANS
Tw1
REFERENCE VALUE SETTING MEANS
TSET1
TSET2
SSET
STORAGE MEANS
31
Tw2
SECOND COOLANT TEMPERATURE JUDGEMENT MEANS
33b
CONTROL RELAY DRIVE JUDGEMENT MEANS
34
DRIVING MEANS
RY1
FIRST CONTROL RELAY
20
AIR CONDITIONER SWITCH
33c
AIR CONDITIONER COMPRESSOR OPERATING JUDGEMENT MEANS
Sa
33e
VEHICLE SPEED SENSOR
S
VEHICLE SPEED JUDGEMENT MEANS
33d
26

1. An apparatus for controlling an electric cooling fan of an automotive vehicle with an engine, having a radiator facing the electric cooling fan for cooling a coolant of the engine, comprising:

generating means for generating an engine start signal;

sensing means for sensing a first coolant temperature at the engine start and a second coolant temperature after the engine start;

judgment means responsive to said engine start signal for comparing said first coolant temperature with a preset temperature, and generating a first judgment signal when said first coolant temperature is lower than said preset temperature;

setting means responsive to said first judgment signal for setting a cooling fan control temperature, said cooling fan control temperature being set higher as said first coolant temperature becomes lower;

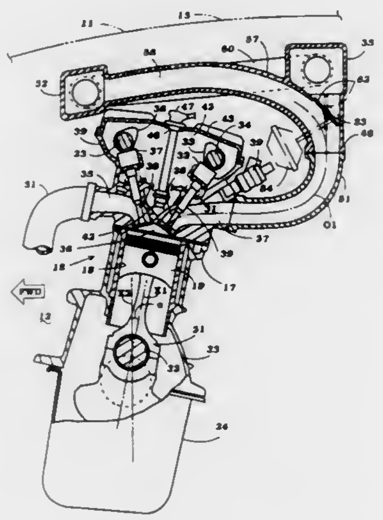
temperature judging means for comparing said cooling fan control temperature with said second coolant temperature and for outputting a second judgment signal; and

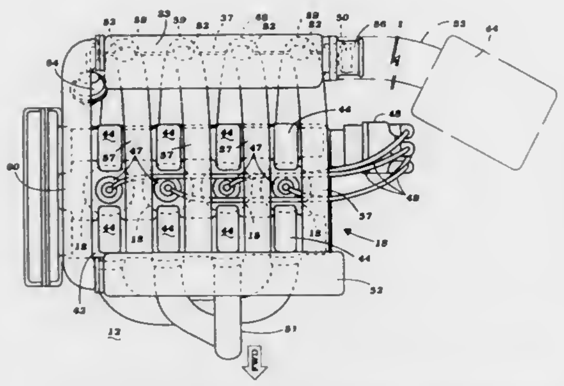
driving means responsive to said second judgment signal for driving said cooling fan.

OL
126
SS
4
MY
28
991
UMI

### 5,018,485
### INTAKE SYSTEM FOR AUTOMATIVE ENGINE

**Takehiro Washizu, and Tsutomu Nagamatsu, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**
**Filed Feb. 27, 1990, Ser. No. 485,466**
**Claims priority, application Japan, Mar. 3, 1989, 1-51612**
**Int. Cl.⁵ F02M** *35/10*
**U.S. Cl. 123—52 MB** **12 Claims**



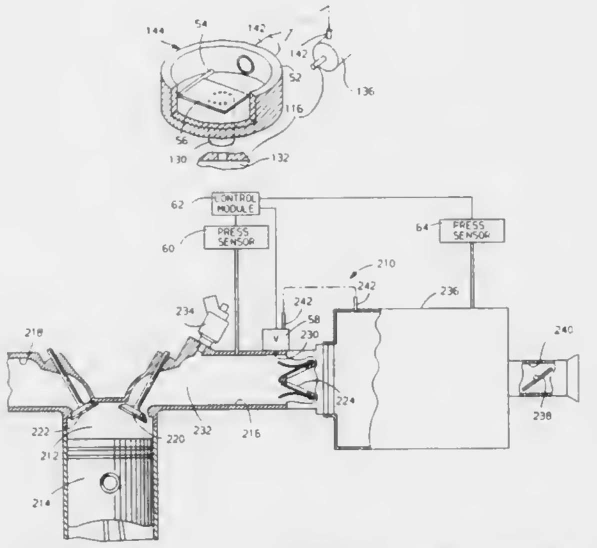


1. An induction system for an internal combustion engine having a combustion chamber, a first plenum chamber, first intake passage means communicating said first plenum chamber with said combustion chamber, a second plenum chamber spaced from said first plenum chamber, second intake passage means communicating said second plenum chamber with said combustion chamber, said first intake passage means and said first plenum chamber being tuned to improve low and mid-range performance of the engine, said second plenum chamber and said second intake passage means being tuned to improve the high speed running conditions of said engine, an atmospheric air inlet only to said second plenum chamber, throttle valve means for controlling the communication of said second plenum chamber with said combustion chamber, and conduit means communicating said second plenum chamber with said first plenum chamber for providing the sole source of atmospheric air from said atmospheric air inlet for said first plenum chamber.

---

### 5,018,486
### PRESSURE RELIEF SYSTEM FOR A CHECK VALVE

**Richard S. Davis, Romeo; Jordan R. Lee, Sterling Heights, and Glen R. MacFarlane, Clarkston, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Jun. 8, 1990, Ser. No. 534,985**
**Int. Cl.⁵ F02M** *35/10*
**U.S. Cl. 123—52 MF** **6 Claims**



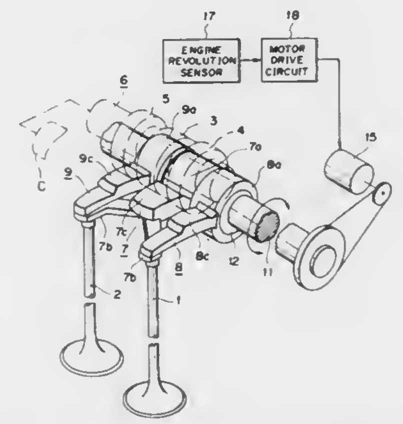
1. A pressure relief system for an engine having an intake passage leading to a cylinder, a check valve in the intake passage to allow fluid flow toward the cylinder and obstruct fluid back-flow in the reverse direction, and a bypass port located on the intake passage so that the bypass port communicates with a downstream portion defined by the portion of the intake passage between the cylinder and check valve, the pressure relief system comprising

- a pressure relief passage connected between the bypass port and a reservoir enabling communication between the reservoir and downstream portion, and
- a preloaded check valve connected to said pressure relief passage so that any pressure difference across said preloaded check valve is approximately equal to the difference between the pressure in the downstream portion and reservoir, the pressure difference across said preloaded check valve constituting the check valve pressure difference, said preloaded check valve comprising a flap and a torsion member, said torsion member being connected to said flap to allow said flap to pivot between a closed position wherein said flap obstructs flow through said pressure relief passage and an open position wherein said flap pivots away from said closed position to allow flow through said pressure relief passage, said torsion member being adapted to twist if said check valve pressure difference exceeds a predetermined amount to allow said flap to pivot to said open positions, said torsion member being further adapted to urge said flap to said closed position if said check valve pressure difference does not exceed said predetermined amount.

---

### 5,018,487
### VALVE TIMING MECHANISM WITH ECCENTRIC BUSHING ON ROCKER SHAFT

**Tatsuya Shinkai, Shizuoka, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan**
**Filed Jun. 29, 1990, Ser. No. 545,741**
**Claims priority, application Japan, Jun. 30, 1989, 1-168791**
**Int. Cl.⁵ F01L** *1/34*
**U.S. Cl. 123—90.16** **22 Claims**



1. A valve moving mechanism, for a four-cycle engine of a vehicle, operatively connected to a crank shaft of said engine and adapted to move one of a respective pair of intake and exhaust valves, comprising:

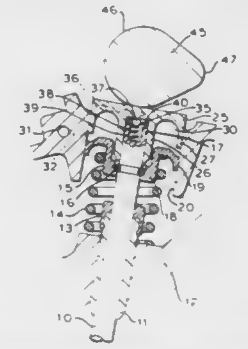
- a cam shaft operatively connected to said crank shaft;
- cam means, including first, second, and third cams, mounted upon said cam shaft, said second and third cams having outer profiles different from that of said first cam which is disposed between said second and third cams;
- a rocker shaft rotatable about an axis thereof;
- rocker arm means rotatably mounted upon said rocker shaft and including first, second, and third rocker arms driven by engagement with said first, second, and third cams, respectively, said rocker arm means being operatively connected to said one respective pair of intake and exhaust valves, said first, second, and third rocker arms having supporting bases mounted upon said rocker shaft; and
- bush means mounted upon said rocker shaft so as to be in engagement with at least one of said first, second, and third rocker arms, said bush means including an axis eccentric with respect to said axis of said rocker shaft.

---

### 5,018,488
### HYDRAULIC TAPPETS

**Steven J. Randle, Baginton, United Kingdom, assignor to Jaguar Cars Limited, United Kingdom**
**Filed Apr. 25, 1990, Ser. No. 514,090**
**Claims priority, application United Kingdom, May 3, 1989, 8910102**
**Int. Cl.⁵ F01L** *1/24*
**U.S. Cl. 123—90.55** **8 Claims**

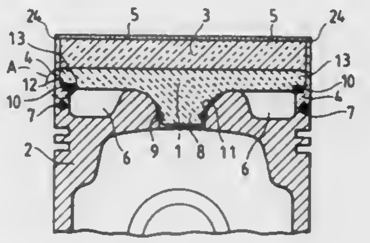
1. A hydraulic tappet for an internal combustion engine comprising a collar located axially on a valve stem, the outer periphery of the collar slidably engaging a cylindrical bore which is coaxial with the valve stem, a cap having a central tubular formation which slidingly engages over the end of the valve stem, the outer periphery of the cap slidably engaging the cylindrical bore, the cap being axially separated from the collar, a first chamber being defined between the cap and collar and a second chamber being defined between the cap and the end of the valve stem, an inlet for hydraulic fluid being provided to the first chamber and the first chamber being interconnected to the second chamber via a non-return valve which prevents flow of hydraulic fluid from the second chamber, a controlled leakage path being provided from the second chamber and means being provided to bias the cap into engagement with a cam formation.



---

### 5,018,489
### HEAT-INSULATING PISTON

**Katsunori Hirai, Yamato, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan**
**Filed Aug. 23, 1990, Ser. No. 571,359**
**Claims priority, application Japan, Sep. 13, 1989, 1-235639**
**Int. Cl.⁵ F02F** *3/00*
**U.S. Cl. 123—193 P** **14 Claims**



1. A heat-insulating piston comprising:

- a piston skirt member having a peripheral upper end surface;
- a ceramic cylindrical member having lower end surface thereof placed on said peripheral upper end surface of said piston skirt member to face the same;
- said cylindrical member having a step portion extending inwardly in a radial direction, on the inner peripheral surface thereof;
- a head base member fitted to said piston skirt member;
- said head base member having the peripheral portion thereof kept in contact with said step portion of said cylindrical member;
- a heat-insulating member disposed on the upper surface of said head base member; and
- a flat, ceramic thin film member disposed on the upper surface of said heat-insulating member and having the peripheral portion thereof bonded to the upper end portion of said cylindrical member;
- wherein metallic heat-resistant members are inserted into voids defined between said inner peripheral step portion of said cylindrical member and said peripheral portion of said head base member in order to prevent the occurrence of any gap between the lower surface of said thin film member and the upper surface of said heat-insulating member.

### 5,018,490
### HEATING SYSTEM, IN PARTICULAR FOR MOTOR VEHICLES, WITH AN INTERNAL COMBUSTION ENGINE AND A HEATER

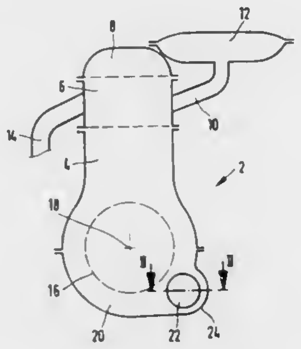
**Martin Kröner, Lorch, Fed. Rep. of Germany, assignor to J. Eberspächer, Esslingen, Fed. Rep. of Germany**

**Filed Apr. 26, 1990, Ser. No. 515,161**

**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1989, 3914154**

**Int. Cl.$^5$ F01M** *1/00;* **B60H** *1/22*

U.S. Cl. 123—196 AB 3 Claims



1. A heating system for use with internal combustion engines and a heater operated with liquid fuel for generating heat independently of the operation of the internal combustion engine and in addition to the waste heat of the internal combustion engine, the internal combustion engine having an oil storage space and defining a crank shaft axis, comprising a heater body extending substantially in one direction positioned in parallel to said crank shaft axis and disposed essentrically with respect to said crank shaft axis substantially in said storage space of the internal combustion engine.

---

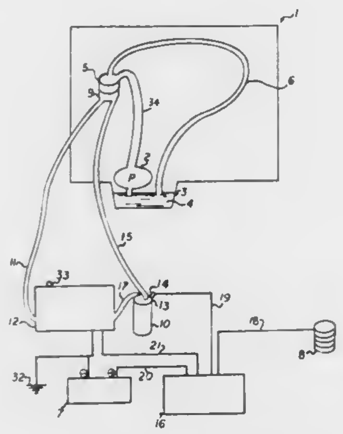
### 5,018,491
### AUXILIARY OIL PUMPING AND DRAINING SYSTEM

**Robert D. Fish, 12682 Senda Acantilada, San Diego, Calif. 92128**

**Filed May 8, 1989, Ser. No. 348,950**

**Int. Cl.$^5$ F01M** *1/00*

U.S. Cl. 123—196 S 6 Claims



1. In combination with an internal combustion engine having a standard oil filter fitting and an electrical power source, an auxiliary oil pumping and draining system comprising:

an adapter which is sized and dimensioned to attach to the standard oil filter fitting in place of a standard oil filter;

an electrical oil pump in liquid communication with said adapter;

a first means for coupling said adapter with said electrical oil pump;

a second oil filter fitting which is sized and dimensioned to attach to the standard oil filter;

a second means for coupling said electrical oil pump with said remote oil filter fitting;

a third means for coupling said remote oil filter fitting with said adapter;

an electrical control means for energizing said electrical pump with electricity from said electrical power source.

---

### 5,018,492
### WORK APPARATUS HAVING ONE HANDLE FOR ONE-HANDED OPERATION

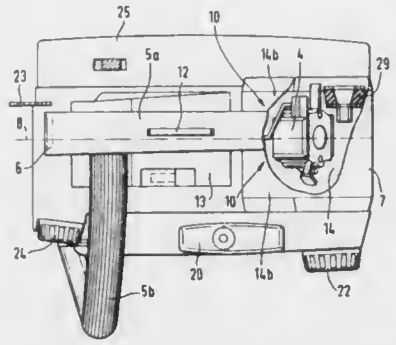
**Günter Wolf, Oppenweiler, and Reinhold Fink, Fellbach, both of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany**

**Filed Oct. 22, 1990, Ser. No. 601,234**

**Claims priority, application Fed. Rep. of Germany, Oct. 24, 1989, 3935361**

**Int. Cl.$^5$ F02F** *7/00*

U.S. Cl. 123—198 E 7 Claims



1. A work apparatus such as a chain saw or the like, the work apparatus being adapted to drive a work tool and to be manipulated by an operator holding the work apparatus with one hand, the work apparatus comprising:

a housing defining a longitudinal axis;

an engine for driving the work tool and being mounted in said housing;

a carburetor for metering an air/fuel-mixture to said engine;

a handle unit for carrying and guiding the work apparatus, said handle unit including: a hold portion having a forward end disposed above said housing so as to extend approximately in the direction of said axis; and, a bail-type side portion extending at an angle from said forward end;

a throttle lever movably journalled in said hold portion;

said hold portion having a rearward end expanded transversely to said axis to form a wall defining a receiving chamber for accommodating said carburetor therein; and,

said wall having a first wall portion facing toward said hold portion and said first wall portion being configured to define a bracing support for receiving the heel of the hand of the operator.

---

### 5,018,493
### ENGINE SPARK CONTROL APPARATUS

**Floyd M. Minks, 2700 Partin Settlement Rd., Kissimmee, Fla. 32743**

**Continuation of Ser. No. 337,014, Apr. 12, 1989, Pat. No. 5,003,946, which is a division of Ser. No. 226,298, Jul. 29, 1988, Pat. No. 4,821,703, which is a continuation of Ser. No. 112,100, Oct. 22, 1987, Pat. No. 4,774,924. This application Jul. 3, 1990, Ser. No. 548,141**

**Int. Cl.$^5$ F02P** *5/155*

U.S. Cl. 123—335 16 Claims

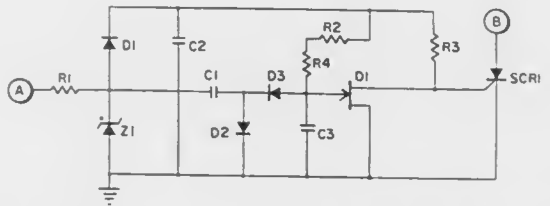
1. A system comprising:

an internal combustion engine having a spark ignition system, said system including a connection point adapted to selectively disable said ignition;

an alternator driven by said engine producing an AC voltage with a frequency proportional to engine speed,

a limiter circuit responsive to said frequency to control power flow from said connection point above a desired value of said frequency, said limiter circuit including;

electronic switch means connected to said connection point and having a gate terminal, a DC power point operating at a DC voltage, an integrating capacitor charged and discharged at a frequency fixed with said frequency of said alternator, the amplitude of said charge and discharge bearing a known relation to said DC voltage;



means for rectifying the current from said integrating capacitor to produce a control current converted to a summation point;

means connecting said summation point to said DC power point to produce a current at the summation point of a polarity to oppose said control current; and

amplifying means sensitive to a selected voltage difference between said summation point and a reference point, said amplifying means connected to control power flow to said gate terminal to disable said ignition above a selected engine speed.

---

### 5,018,494
### IDLING SPEED CONTROL DEVICE OF AN ENGINE

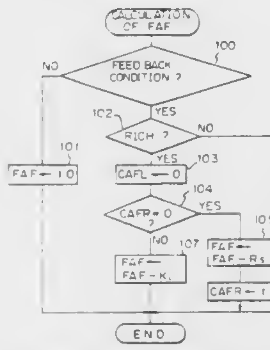
**Yukihiro Sonoda; Kouichi Osawa; Hiroshi Kanai; Kouichi Hoshi; Hiroki Matsuoka, all of Susono; Michihiro Ohashi, Mishima, and Hiroshi Sawada, Gotenba, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Feb. 14, 1990, Ser. No. 480,058**

**Claims priority, application Japan, Feb. 23, 1989, 1-41599**

**Int. Cl.$^5$ F02M** *3/06, 51/00*

U.S. Cl. 123—339 30 Claims



1. An idling speed control device of an engine having an intake passage and an exhaust passage, said device comprising:

an oxygen concentration detector arranged in the exhaust passage and producing an output signal indicating whether an air-fuel mixture fed into the engine is lean or rich;

feedback control means for controlling an amount of fuel fed into the engine in response to the output signal of said oxygen concentration detector, to bring an air-fuel ratio of the mixture to a desired air-fuel ratio;

acceleration detecting means for detecting an accelerating operation of the engine;

time calculating means for calculating a lean time and a rich time of the air-fuel mixture on the basis of the output signal of said oxygen concentration detector during a predetermined lean-rich discriminating time when the accelerating operation of the engine is carried out;

difference calculating means for calculating a difference between said lean time and said rich time;

start detecting means for detecting a starting operation of the engine; and

idling speed control means for controlling an idling speed of the engine when the engine is started to increase said idling speed when said lean time is longer than said rich time and when said difference is larger than a predetermined value, and to reduce said idling speed when said rich time is longer than said lean time and when said difference is larger than a predetermined value.

---

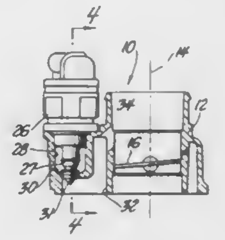
### 5,018,495
### AUTOMATIC IDLE SPEED CIRCUITRY

**Michael Dougherty, Detroit, Mich., assignor to Colt Industries, Inc., New York, N.Y.**

**Filed Aug. 17, 1988, Ser. No. 233,025**

**Int. Cl.$^5$ F02M** *3/00*

U.S. Cl. 123—339 2 Claims



1. Automatic idle speed fluid circuitry for controlling fluid flow to an intake manifold of an engine, said circuitry comprising:

a throttle body having a longitudinal axis and including means forming a central passageway along said axis;

throttle plate means disposed within said central passageway transversely to said axis for rotation between an open and closed position to allow fluid flow through said central passageway to the intake manifold on the engine;

said throttle body including means forming a secondary passageway having an inlet communicating with said central passageway upstream of said throttle plate;

said throttle body further including means forming an outlet communicating with the intake manifold downstream of said throttle plate means;

means integral with said throttle body forming a pocket in said throttle body and a seat at the bottom of said pocket communicating with said secondary passageway;

motor means disposed within said pocket and secured to said throttle body and cooperating with said seat for metering predetermined amounts of fluid flow past said seat;

means forming an opening intersecting with said pocket and said outlet to form an internal fluid flow path within said throttle body to allow fluid flow past said seat to flow through said outlet and to bypass said throttle plate means when in said closed position;

said inlet and said secondary passageway and said pocket and said opening and said outlet together form a continuous fluid flow path; and

said motor means comprises a stepper motor having a drive shaft and a pintel valve at one end of said drive shaft which moves axially to open and close said seat.

OL
126
SS
4
MY
28
1991
UMI

### 5,018,496

### METHOD AND APPARATUS FOR THROTTLE VALVE CONTROL IN INTERNAL COMBUSTION ENGINES

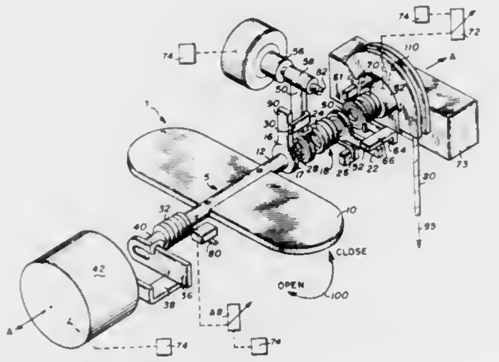
**Josef Buchl, Lenting, Fed. Rep. of Germany, assignor to Audi AG, Ingolstadt, Fed. Rep. of Germany**

**Filed Mar. 23, 1990, Ser. No. 498,341**

**Claims priority, application European Pat. Off., Mar. 25, 1989, 89105378.7**

**Int. Cl.$^5$ F02D** *9/02, 9/08*

U.S. Cl. 123—399 **20 Claims**



1. Throttle valve assembly for an internal combustion engine having a throttle open and throttle closed positions, comprising in operative combination:

(a) a throttle valve unit having means for biasing a throttle valve toward said throttle open position;
(b) a setting unit having:
  (i) first stop means for limiting the motion of the throttle valve toward said open position;
  (ii) second stop means for limiting the motion of the first stop means toward said throttle closed position and determining a first partially open position;
(c) a pivot unit having:
  (i) means for moving said first stop means toward said open position responsive to actuation of a gas pedal;
(d) means for controlling the degree of opening and closing of the throttle valve between said closed position and said partially open position determined by said second stop means limiting the motion of said first stop means; and
(e) said degree of throttle opening means operating between said closed position and said partially open position independent of said gas pedal upon release of said gas pedal.

---

### 5,018,497

### MULTIPLE VALVE INTERNAL COMBUSTION ENGINE

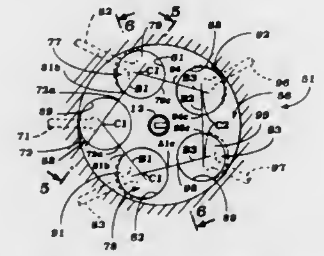
**Naoki Tsuchida, Iwata, Japan, assignor to Yamaha Hatsudoki Kabusbika Kaisha, Iwata, Japan**

**Filed May 23, 1990, Ser. No. 527,564**

**Claims priority, application Japan, May 29, 1989, 1-137053; May 29, 1989, 1-137054**

**Int. Cl.$^5$ F02M** *35/10*

U.S. Cl. 123—432 **18 Claims**



1. A combustion chamber and valve arrangement for an internal combustion engine having a cylinder bore closed at one end by a cylinder head having a surface facing said cylinder bore, a pair of valve seats formed in said cylinder head surface defining flow ports communicating with said combustion chamber, a pair of poppet valves supported for reciprocation about respective axes by said cylinder head and each having a head portion for cooperating with said valve seats for controlling the flow through said flow ports, said axes of reciprocation of said valves being angularly disposed relative to each other and not lying in parallel planes, said valves being disposed so that the adjacent edges of their heads lie in substantially a common plane extending perpendicular to the axis of the cylinder bore.

---

### 5,018,498

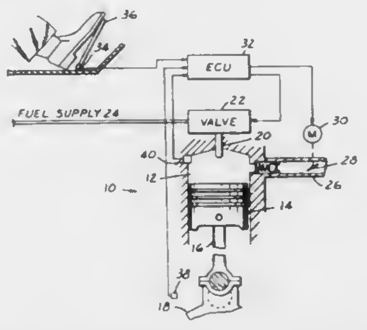
### AIR/FUEL RATIO CONTROL IN AN INTERNAL COMBUSTION ENGINE

**Thomas M. Hoover, Reese, Mich., assignor to Orbital Walbro Corporation, Cass City, Mich.**

**Filed Dec. 4, 1989, Ser. No. 445,408**

**Int. Cl.$^5$ F02M** *7/00*

U.S. Cl. 123—435 **6 Claims**



1. A method of controlling air/fuel ratio in an internal combustion engine having at least one cylinder with a piston coupled to a crankshaft, means for injecting combustion fuel directly into said cylinder, means including a throttle valve for controlling quantity of combustion air fed to said cylinder, and means responsive to an operator for setting engine demand, said method comprising the steps of:

(a) sensing engine demand established by the operator,
(b) operating said fuel injecting means as a direct function of sensed demand to inject into said cylinder a quantity of fuel to satisfy said demand,
(c) monitoring combustion in said cylinder, and
(d) adjusting said throttle valve to admit sufficient air into said cylinder to operate at a lean limit of said air/fuel ratio beyond which said engine misfires.

---

### 5,018,499

### FUEL DELIVERY RAIL ASSEMBLY

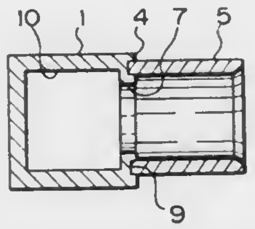
**Masayoshi Usui, Numazu, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Shizuoka, Japan**

**Filed Apr. 9, 1990, Ser. No. 506,184**

**Claims priority, application Japan, Apr. 15, 1989, 1-43628[U]**

**Int. Cl.$^5$ F02M** *41/00*

U.S. Cl. 123—456 **2 Claims**



1. A fuel delivery rail assembly for an internal combustion engine comprising;

an elongated conduit having a fuel passage of a generally rectangular hollow section, and
a plurality of sockets perpendicularly attached to one wall of said conduit, one end of each socket communicating with said fuel passage, and the other end of each socket being so formed as to receive a fuel injector,
said one wall of said conduit being provided with corresponding number of openings for receiving said one end of each socket,
a counter bore being disposed on each periphery of said openings, said counter bore being formed as a stepped cut out portion within the wall thickness of said one wall,
said other end of each socket being tightly fixed within said counter bore.

---

### 5,018,500

### PRESSURE REGULATOR DEVICE FOR THE FUEL CIRCUIT OF AN INTERNAL COMBUSTION ENGINE SUPPLY SYSTEM

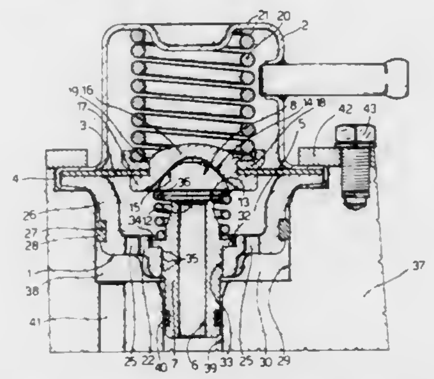
**Innocenzo Triolo, Casalecchio di Reno, and Rino Stagni, S. Pietro in Casale, both of Italy, assignors to Weber s.r.l., Turin, Italy**

**Filed Nov. 27, 1989, Ser. No. 441,881**

**Claims priority, application Italy, Nov. 25, 1988, 68054 A/88**

**Int. Cl.$^5$ F02M** *41/00*

U.S. Cl. 123—463 **8 Claims**



1. A pressure regulating device for a fuel circuit of an internal combustion engine supply system, said device comprising:

a valve housing formed by a cup-shaped body having a base wall including an axial hole and a lateral wall, and a bell-shaped cover secured to said body;
a circular plate disposed within said valve housing;
an annular deformable membrane having a peripheral edge locked between said body and said cover, and an inner edge secured to a peripheral edge of said circular plate;
a fuel chamber defined by said body, said membrane and said plate;
outlet means for external communication of fuel, said outlet means including an annular valve seat, said outlet means including a single tubular member tightly inserted into said axial hole of said base wall;
a shutter member having a planar working surface adapted for engaging and closing said valve seat, said shutter member further having a second oppositely disposed surface; and
spring means for urging said plate against said opposite surface of said shutter member, said spring means including a support defining a mounting housing having a substantially cylindrical seat for locating said body, said spring means further including a sealing ring interposed between said cylindrical seat and an annular seat of said lateral wall for sealing an inlet chamber defined by said mounting housing and said base wall, said support having a fuel discharge hole receiving said tubular member and being coaxial with said plate and said axial hole of said base wall, at least one fuel inlet hole communicating with said inlet chamber, at least one communication hole on said base wall for allowing fuel in said inlet chamber to enter into said fuel chamber;
said opposite surface of said shutter member being substantially spherical and cooperating with an associated curved surface of said plate, said curved surface being shaped as a surface of revolution of a curved line having two curved portions with opposite curvatures separated by a flexure, whereby pressure applied by said spring means to said shutter member through said curved surface and said opposed surface is on the axis of said tubular member.

---

### 5,018,501

### ELECTROMAGNETIC FUEL INJECTION VALVE APPARATUS

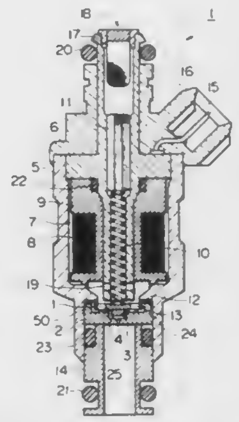
**Haruo Watanabe, Ibaraki; Ichiro Nakamura, Katsuta; Yoshio Okamoto, Ibaraki, and Hitoshi Konno, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 28, 1989, Ser. No. 458,293**

**Claims priority, application Japan, Dec. 28, 1988, 63-334036**

**Int. Cl.$^5$ F02M** *15/00*

U.S. Cl. 123—472 **17 Claims**



1. An electromagnetic fuel injection valve for an internal combustion engine, comprising a valve seat disposed in a fuel passage and having an injection hole through which fuel is injected; a plate valve member constituted by a disk-like cylindrically-shaped movable member operating as a valve body and provided in said fuel passage upstream of said injection hole for controlling the amount of fuel injected through said injection hole; and a fuel rotating element provided upstream of said injection hole and downstream of said plate valve member for causing said fuel to flow in a circle as it enters said injection hole.

---

### 5,018,502

### APPARATUS FOR THE DEGASSING OF FUEL

**Josef Humpl, Hiendorf; Johann Konrad, Ingolstadt; Reinhold Sturm, Lenting, and Johann Attenni, Wettstetten, all of Fed. Rep. of Germany, assignors to Audi AG, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 227,831, Aug. 3, 1988, abandoned. This application Oct. 4, 1989, Ser. No. 417,080**

**Int. Cl.$^5$ F02M** *37/04*

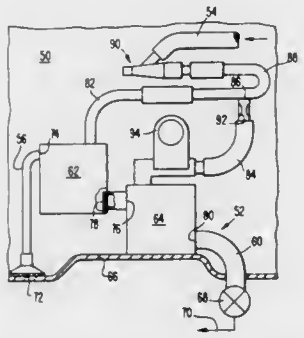
U.S. Cl. 123—514 **7 Claims**

1. An apparatus for the degassing of fuel in a fuel tank for motor vehicles comprising:

a fuel pump, an intake line extending from the bottom of said fuel tank, said pump connected to said intake line for pumping said fuel via said intake line and delivering said fuel to an internal-combustion engine of said motor vehicle;
a gas removal line including a vent valve on the intake line at a geodetically highest point;
an intake screen in the intake line, characterized in that said vent valve is located downstream of said intake screen and on a closed section of said intake line, said closed section ascending from said pump to said vent valve and

OL
126
SS
4
MY
28
1991
UMI

at least a first reservoir connected into the intake line;
the intake line having a first section connected between the pump and said first reservoir and a second section connected between said tank and said first reservoir, said first section being connected to said first reservoir at a geodetically lower point than said second section;



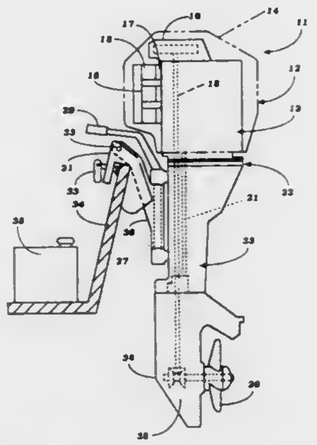
a suction removal line connected to said first reservoir at a geodetically high point relative to said first section;
a jet pump;
said suction removal line being connected to said jet pump;
a fuel return line for returning unused fuel to said tank; and
said jet pump being operated by said fuel return line.

---

### 5,018,503

## FUEL INCREASING SYSTEM FOR ENGINE

**Akihiko Hoshiba, and Kyoji Hakamata, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**
**Filed Dec. 13, 1989, Ser. No. 450,584**
**Claims priority, application Japan, Dec. 14, 1988, 63-313674**
**Int. Cl.$^5$ F02B** *13/00*
U.S. Cl. 123—580 **9 Claims**



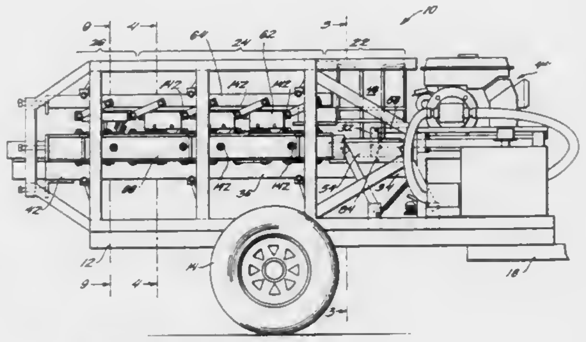
1. A fuel supply system for an internal combustion engine having a main fuel system comprising a fuel tank, a charge forming device for supplying fuel to said engine for its operation and a main fuel pump for supplying fuel from said fuel tank to said charge forming device and a supplemental fuel system for supplying supplemental fuel to said engine for certain phases of its operation comprising a supplemental fuel pump for drawing fuel from said main fuel system, a supplemental fuel discharge for discharging supplemental fuel from said supplemental fuel pump to said engine and a pressure regulator in said supplemental fuel discharge for bypassing fuel to a return for maintaining a predetermined pressure in said supplemental fuel discharge, the improvement comprising said return communicating with the inlet of said supplemental fuel pump.

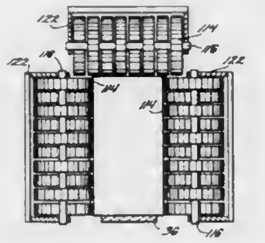
---

### 5,018,504

## METHOD AND APPARATUS FOR CLEANING USED BRICKS

**Neville C. Terbrugge; Gary Terbrugge, and Raymond W. Sifly, all of P.O. Box 1864, Orangeburg, S.C. 29116**
**PCT No. PCT/US89/03775, § 371 Date Aug. 31, 1989, § 102(e) Date Aug. 31, 1989**
**PCT Filed Aug. 31, 1989, Ser. No. 411,490**
**Int. Cl.$^5$ B28D** *1/20*
U.S. Cl. 125—26 **24 Claims**





1. A machine for removing mortar from used bricks and the like comprising:
a frame;
a channel attached to said frame, said channel having a first end and a second end;
a means for pushing bricks onto said first end of said channel, said pushing means in spaced relation to said first end of said channel, each brick pushing a preceding brick along said channel toward said second end;
means for crumbling mortar on bricks moving on said channel, said crumbling means adjacent said channel and in contact with bricks on said channel, said crumbling means further comprises gangs of interleaved spur gear assemblies in spaced relation to said channel so that said spur gear assemblies press against said bricks to penetrate and crumble said mortar on said bricks as said bricks move on said channel from said first end to said second end; and
means for scraping crumbled mortar from said bricks as said bricks approach said second end of said channel.

---

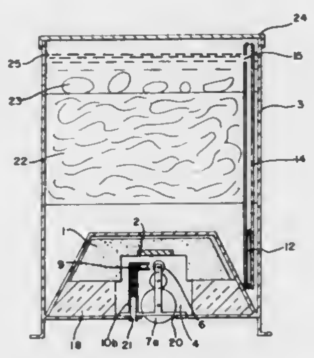
### 5,018,505

## SELF-HEATING CONTAINER

**Ryoichi Suzuki, Yokohama; Kunio Yamauchi, Hikone; Choji Kawabata, Tatebayashi; Akira Takeuchi, Fukaya, and Koki Ando, Tokyo, all of Japan, assignors to Nissin Shokuhin Kabushiki Kaisha, Osaka, Japan**
**Division of Ser. No. 395,768, Aug. 18, 1989. This application Nov. 5, 1990, Ser. No. 608,817**
**Claims priority, application Japan, Aug. 18, 1988, 63-108529; Nov. 30, 1988, 63-156177; Jun. 28, 1989, 1-74838[U]**
**Int. Cl.$^5$ F24H** *1/00*
U.S. Cl. 126—262 **6 Claims**

1. A self-heating container comprising a container, a heater

fixed within said container, said heater including a solid fuel, a firing agent adjacent with and easier to fire than said solid fuel, and an igniter mounted adjacent said firing agent, said igniter including a rotatably supported striker wheel and a flint for compressive engagement with said wheel, means extending from outside said container to rotate said wheel, said solid fuel and said firing agent each comprising a mixture of an oxidation agent and an inflammable material.

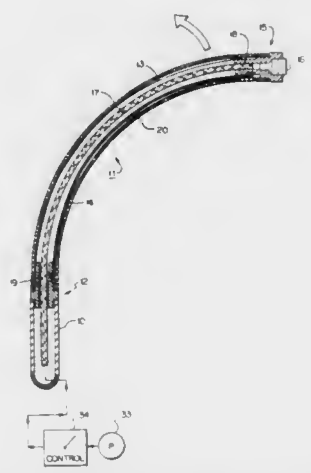


---

### 5,018,506

## FLUID CONTROLLED BIASED BENDING NECK

**Dominick Danna; Allan I. Krauter, both of Syracuse, and Raymond A. Lia, Auburn, all of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.**
**Filed Jun. 18, 1990, Ser. No. 539,232**
**Int. Cl.$^5$ A61B** *1/00*
U.S. Cl. 128—4 **10 Claims**



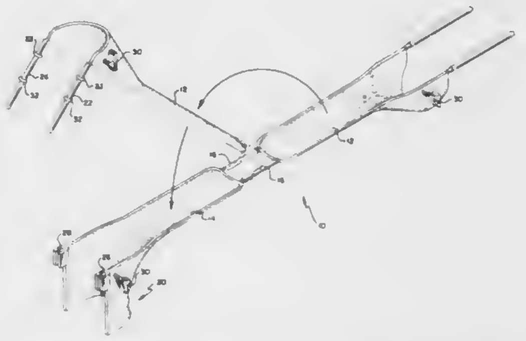
7. A borescope or endoscope which comprises a flexible elongated insertion tube, a viewing head at a distal tip of the insertion tube including illumination fibers and means for collecting a visual image of a target, a flexible signal and illumination conduit within said insertion tube through which light is transmitted to said viewing head and through which image information is transmitted from said viewing head; and a tubular, fluid-controlled bending neck assembly supported on a distal end of said insertion tube and having a distal end supporting said viewing head, comprising an elongated tubular elastomeric bladder; a tubular braid disposed over said bladder and confining same; a distal fitting supporting said viewing head and sealing the distal end of the bladder while mechanically attaching to the distal end of said braid; a proximal connector that connects to the distal end of said insertion tube, to which the proximal end of said bladder is sealably fitted and to which the proximal end of said braid is anchored, said connector including means for communicating fluid pressure from a controlled fluid pressure source to an interior of the bladder for inflating same, and an elastically bendable but axially substantially incompressible spine disposed between said bladder and said braid and extending axially at one side of the longitudinal axis of said bending neck, said spine including means at its proximal and distal ends mechanically affixing the spine to said connector and said fitting, respectively; such that when fluid pressure is applied to the interior of the bladder, the braid expands laterally and shortens axially on the side away from the spine, thereby bending the neck a controlled amount that depends on the fluid pressure applied.

---

### 5,018,507

## ONE-PIECE DISPOSABLE SPECULUM

**David H. Montaldi, 2358 Howell Mill Rd., NW., Atlanta, Ga. 30318**
**Continuation-in-part of Ser. No. 470,574, Jan. 26, 1990, Pat. No. 4,966,130. This application Jul. 13, 1990, Ser. No. 552,185**
**Int. Cl.$^5$ A61B** *1/30*
U.S. Cl. 128—17 **5 Claims**



1. A disposable speculum comprising:
a first blade member having a proximal end and a distal end;
a second blade member having a proximal end and a distal end, the distal ends of the first and second blade members being interconnected by first and second substantially parallel, spaced apart bar members, each of said bar members being formed integrally with said first and second blade members so as to be interconnected at each end thereof with a respective blade member, the interconnection between each end of each bar member and each said blade member being defined by a thinned portion of the material forming the bar member and the blade member so as to provide a living hinge connection;
a handle defined at said proximal end of said first blade member;
one of said blade members having an elongate support bar pivotally coupled to each longitudinal rear edge thereof;
the other blade member including means for slidably receiving said support bars,
whereby when said first blade member is disposed in parallel facing opposed relation to said second blade member so that the distal ends of said blade members are substantially adjacent to one another and the proximal ends of the blade members are disposed substantially adjacent to one another, the blades can be moved longitudinally relative to one another so as to selectively dispose the blades in immediately adjacent disposition or spaced apart from one another a distance defined at the distal end by the bar members and at the proximal end by a position of the support bars relative to said receiving means.

OL
126
SS
4
MY
28
1991
UMI

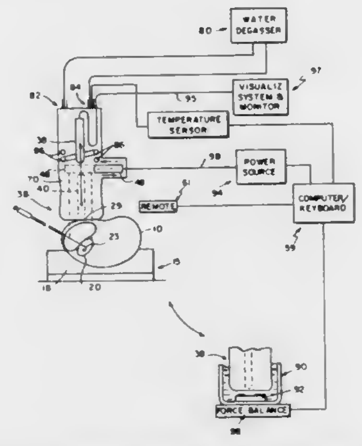
### 5,018,508
### SYSTEM AND METHOD USING CHEMICALS AND ULTRASOUND OR ULTRASOUND ALONE TO REPLACE MORE CONVENTIONAL SURGERY

**Francis J. Fry, General Delivery, St. James, Beaver Island, Mich. 49782, and Steven L. Griffin, 7461 N. Dorothy Dr., Indianapolis, Ind. 46220**

**Continuation-in-part of Ser. No. 202,015, Jun. 3, 1988, abandoned. This application Mar. 14, 1990, Ser. No. 493,442**

**Int. Cl.$^5$ A61B** *17/00*

**U.S. Cl. 128—24 AA** **4 Claims**



1. A method for rendering a gallbladder dysfunctional without surgical removal comprising the steps of infusing the gallbladder with methyl-tert-butyl ether (MTBE), then, while the gallbladder is so infused, irradiating the gallbladder with an ultrasound beam in such an ultrasound delivery format as not to elevate the average temperature of the gallbladder more than five degrees Centigrade over the period of treatment, and then removing the MTBE from the gallbladder, and then repeating these steps a sufficient number of times to render the gallbladder dysfunctional.

---

### 5,018,509
### ENDOSCOPE INSERTION CONTROLLING APPARATUS

**Akira Suzuki; Hiroki Hibino; Hiroyuki Fukuda; Yutaka Takahashi, and Akibumi Ishikawa, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,620**

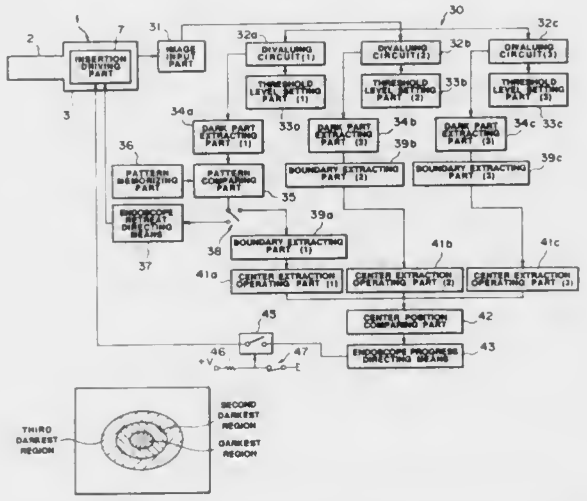
**Claims priority, application Japan, Feb. 21, 1989, 1-40929; Feb. 21, 1989, 1-40932; Jun. 27, 1989, 1-166369; Oct. 16, 1989, 1-270119**

**Int. Cl.$^5$ A61B** *1/04, 1/06*

**U.S. Cl. 128—6** **24 Claims**

1. An endoscope insertion controlling apparatus comprising:

a region extracting means for extracting a plurality of regions corresponding to brightness from an endoscope image by a plurality of brightness threshold levels; and


INSERTION DRIVING PART
IMAGE INPUT PART
DIVALUING CIRCUIT(1)
DIVALUING CIRCUIT(2)
DIVALUING CIRCUIT(3)
THRESHOLD LEVEL SETTING PART (1)
THRESHOLD LEVEL SETTING PART (2)
THRESHOLD LEVEL SETTING PART (3)
DARK PART EXTRACTING PART (1)
DARK PART EXTRACTING PART (2)
DARK PART EXTRACTING PART (3)
PATTERN MEMORIZING PART
PATTERN COMPARING PART
BOUNDARY EXTRACTING PART (2)
BOUNDARY EXTRACTING PART (3)
ENDOSCOPE RETREAT DIRECTING MEANS
BOUNDARY EXTRACTING PART (1)
CENTER EXTRACTION OPERATING PART (1)
CENTER EXTRACTION OPERATING PART (2)
CENTER EXTRACTION OPERATING PART (3)
CENTER POSITION COMPARING PART
ENDOSCOPE PROGRESS DIRECTING MEANS
+V
E
THIRD DARKEST REGION
SECOND DARKEST REGION
DARKEST REGION
1
2
3
7
30
31
32a
32b
32c
33a
33b
33c
34a
34b
34c
35
36
37
38
39a
39b
39c
41a
41b
41c
42
43
45
46
47

a determining means for determining endoscope inserting conditions based on an arrangement of respective regions extracted by said region extracting means.

---

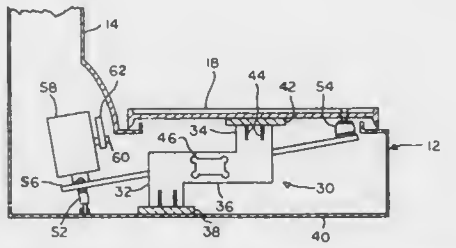
### 5,018,510
### PLATFORM FOR WEIGHING AND SIMULTANEOUSLY MASSAGING USER

**Daniel Slater, 2320 Westwood La., Palatine, Ill. 60067**

**Filed Feb. 24, 1989, Ser. No. 315,329**

**Int. Cl.$^5$ A61H** *1/00*

**U.S. Cl. 128—33** **12 Claims**



1. A scale-platform massager apparatus, comprising the combination of:

a frame;

a foot platform, and means supporting the foot platform movably relative to the frame operable to bear the weight of a person standing on the foot platform and being calibrated to determine the weight of the person;

means to massage the person standing on the foot platform comprising a driving vibrator, means in the form of deformable snubber means for mounting the driving vibrator movably relative to the frame operable to allow slight movements, horizontally and vertically, of the driving vibrator relative to the frame, means connecting the driving vibrator relative to the foot platform operable when the driving vibrator is activated to vibrate the foot platform relative to the frame; and

said means mounting the driving vibrator movably relative to the frame being in the form of cross braces connected between the snubber means at locations rearwardly of said foot platform supporting means; and said driving vibrator being mounted on and carried by the cross braces.

---

### 5,018,511
### MASSAGER UNIT

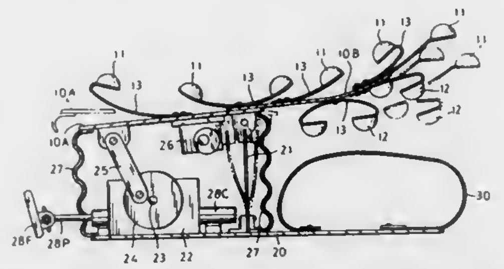
**Yasuna Yokoi, Aichi, Japan, assignor to K. K. Anretto, Aichi, Japan**

**Filed Mar. 28, 1989, Ser. No. 329,702**

**Claims priority, application Japan, Mar. 31, 1988, 63-78358; Mar. 31, 1988, 63-78359; May 28, 1988, 63-130594; Aug. 23, 1988, 63-208943**

**Int. Cl.$^5$ A61H** *1/00*

**U.S. Cl. 128—33** **7 Claims**



1. A portable massager unit attachable to a chair, sofa, vehicle seat and the like, said massager unit comprising:

an upper elongated plate member assembly having an upper elongated plate with a top side, a bottom side, an end and a central portion; and a plurality of elastic massage protrusions disposed on said top side and said bottom side of said upper elongated plate;

a base plate member having a central portion, a first end and a second end, said base plate being spaced apart from said upper elongated plate member assembly, the length of said base plate member substantially corresponding to the length of said upper elongated plate;

a support member having an upper end and a lower end, said upper end being attached to said central portion of said upper elongated plate, said lower end being coupled to said central portion of said base plate member;

an electric motor having an output shaft, said electric motor being mounted on said base plate member between said first end of said base plate member and said support member coupled to said central portion of said base plate member;

a crank mechanism, coupled to said output shaft of said electric motor, for swinging, as a fulcrum, the upper plate member assembly relative to said base plate member along said upper end of said support member;

said upper plate member assembly further including a plurality of secondary plate members, each of said secondary plate members being of a lesser thickness than said upper elongated plate and having a connecting end, said secondary plate members being attached at respective connecting ends to said end of said upper elongated plate;

whereby a user's body can be disposed relative to said massager unit so that said protrusions disposed on said top side of said upper elongated plate contact the user's back between the waist and the head, and whereby a user's extremity can be inserted between said end of said upper elongated plate member assembly and said base plate member between said second end of said base plate member and said support member coupled to said central portion of said base plate member, such that said massage protrusions disposed on said bottom side of said upper elongated plate contact the user's extremity.

---

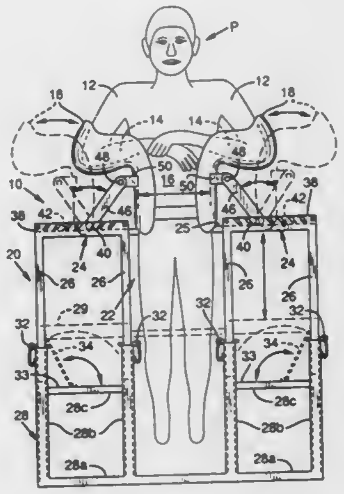
### 5,018,512
### LUMBAR TRACTION DEVICE

**Henry J. Dolan, 8221 SE. Groce Rd., Corbett, Oreg. 97019**

**Filed Aug. 23, 1989, Ser. No. 397,576**

**Int. Cl.$^5$ A61H** *1/02*

**U.S. Cl. 128—75** **15 Claims**



11. A traction device for supporting the weight of a person in an upright traction position wherein the right and left upper arms lay along the torso with the right and left forearms bent naturally forward at an acute angle relative to the right and left upper arms, respectively, said traction device comprising:

right support means conforming in shape to the right arm and torso of the person when the person is in the upright traction position, said right support means being adapted to support at least a substantial portion of the weight of the person by contacting the right forearm, said right support means being adapted to restrict outward lateral movement of the right arm relative to the torso;

left support means conforming in shape to the left arm and torso of the person when the person is in the upright traction position, said left support means being adapted to support at least a substantial portion of the weight of the person by contacting the left forearm, said left support means being adapted to restrict outward lateral movement of the left arm relative to the torso; and

frame means for positioning the right support means adjacent the right arm of the person and for positioning the left support means adjacent the left arm of the person when the person is in the upright traction position, said frame means including means for pivotal mounting of said right and left support means, said pivotal mounting means comprising:

a first right pivot shaft pivotally coupled to said frame means;

right mounting bar means affixed to said first right pivot shaft and extending generally upwardly therefrom;

a second right pivot shaft pivotally coupled a distal portion of said right mounting bar means;

right bracket means connecting said second right pivot shaft to said right support means whereby said right support means is pivotable about said first and second right pivot shafts;

a first left pivot shaft pivotally coupled to said frame means;

left mounting bar means affixed to said first left pivot shaft and extending generally upwardly therefrom;

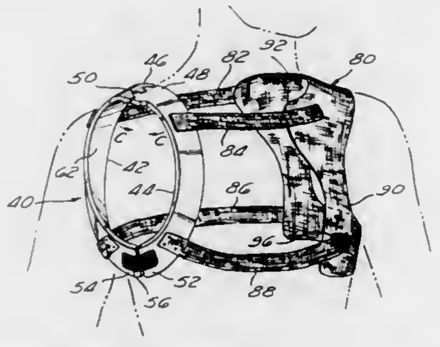
a second left pivot shaft pivotally coupled a distal portion of said left mounting bar means; and

left bracket means connecting said second left pivot shaft to said left support means whereby said left support means is pivotable about said first and second left pivot shafts.

OL
126
SS
4
MY
28
991
UMI

### 5,018,513
### SHOULDER BRACE

**Gene Charles, 8 Banyan Tree La., Irvine, Calif. 92715**
**Filed Jan. 8, 1990, Ser. No. 461,984**
**Int. Cl.$^5$ A61F** *5/01*
U.S. Cl. 128—78 11 Claims



1. A shoulder brace comprising:

a pressure exerting element positionable on the human shoulder to exert at least anteroposterior pressure on the superior aspect of the shoulder said pressure exerting element comprising:

a first curved member having a top end and a bottom end;

a second curved member having a top end and a bottom end;

a hinge pivotally connecting the top end of the first curved member such that said hinge may be positioned on top of the shoulder with the first curved member extending over the anterior shoulder and the second curved member extending over the posterior shoulder;

said first and second curved members being pivotal toward one another, about said hinge, so as to exert said anteroposterior pressure on said superior aspect of said shoulder;

a connector for connecting the first curved member to the second curved member to prevent said first and second curved members from pivoting away from one another and maintain said anteroposterior pressure on the superior aspect to the shoulder; and

a positioning element positionable on a portion of the body and attachable to said pressure exerting element in a substantially fixed position to hold said pressure exerting element on said shoulder.

---

### 5,018,514
### KNEE BRACE

**Edward S. Grood, Cincinnati; David L. Butler, Fairfield, both of Ohio; D. Michael Ledyard, Grosse Pointe Park, Mich., and Steven D. Hoffman, Cold Springs, Ky., assignors to Brace Technologies, Inc., Cincinnati, Ohio**
**Continuation-in-part of Ser. No. 61,915, Jun. 11, 1987, abandoned. This application Aug. 22, 1988, Ser. No. 234,887**
**Int. Cl.$^5$ A61F** *5/00*
U.S. Cl. 128—80 C 23 Claims

1. A knee brace, comprising:

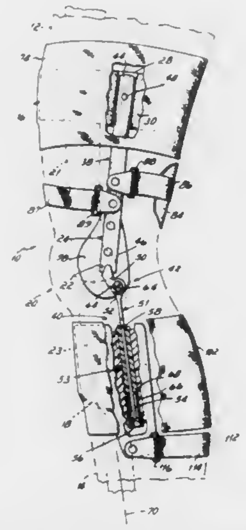
a femoral cuff having opposed sides and being adapted to mount onto the thigh of a patient;

a tibial cuff having opposed sides and being adapted to mount onto the calf of a patient;

a pair of linkage means for interconnecting said femoral cuff and said tibial cuff, each of said linkage means having a first link element mounted to one side of said femoral cuff and a second link element mounted to one side of said tibial cuff;

a pair of hinge means for pivotally connecting said first and second link elements of each of said linkage means, each of said hinge means having a hinge axis which is not aligned with the flexion-extension axis of the knee during at least some portion of the range of motion of the knee with the knee brace mounted to the leg of a patient;

mounting means, cooperating with said femoral cuff and said tibial cuff, for causing a brace force to be applied to the lower leg of the patient having a force component which resists anterior or posterior movement of the lower leg relative to the upper leg of the patient;

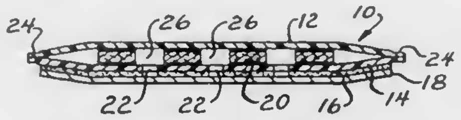


slider means associated with said second link element of each said linkage means for permitting axial movement of at least a portion of said second link element relative to the tibia along an axis substantially parallel to the longitudinal axis of the tibia with the knee brace mounted to the leg of the patient, said slider means substantially preventing a force component of said brace force from acting along said longitudinal axis of said tibia.

---

### 5,018,515
### SEE THROUGH ABSORBENT DRESSING

**Thomas Gilman, Lake Zurich, Ill., assignor to The Kendall Company, Mansfield, Mass.**
**Filed Dec. 14, 1987, Ser. No. 132,435**
**Int. Cl.$^5$ A61L** *15/00*
U.S. Cl. 128—155 11 Claims



1. An absorbent dressing comprising:

a transparent backing sheet having a relatively high water vapor permeability;

a front sheet having a pressure sensitive adhesive on a front surface thereof for facing a wound, said front sheet and adhesive having a plurality of apertures in register extending therethrough; and

an absorbent layer intermediate the front sheet and backing sheet having a plurality of openings in register with the apertures of the front sheet, with the openings of the layer being at least as large as the apertures of the front sheet.

### 5,018,516
### DELIVERY SYSTEM FOR A WOUND DRESSING

**Thomas H. Gilman, Mansfield, Mass., assignor to The Kendall Company, Mansfield, Mass.**
**Filed Dec. 22, 1989, Ser. No. 455,535**
**Int. Cl.$^5$ A61F** *13/00, 15/00;* **A61L** *15/00*
U.S. Cl. 128—155 4 Claims

1. A delivery system for applying a wound dressing comprising:

an elastomeric film wound dressing characterized by not being self-supporting and as having a tendency towards inadvertent wrinkling when attempting to apply the dressing to the wound, the film having a front surface, a back surface, a first end margin defining a first end edge and a second end margin defining a second end edge;

a pressure-sensitive adhesive layer on the front surface of the film;

a release sheet releasably attached to and covering the adhesive layer on the film;

a tab member secured to the second end margin of the film on the back surface of the film, the tab member having an end edge generally aligned with the second end edge of the film;

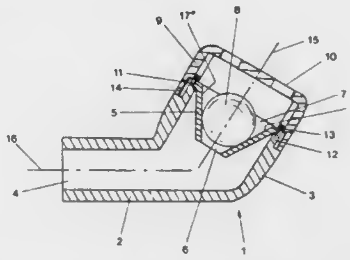
a support sheet having a front surface, a back surface, a first end margin defining a first end edge, a second end margin defining a second end edge, the support sheet having its front surface releasably secured to the back surface of the film, the second end edge of the support sheet being located over the tab member with the support sheet being free of attachment from the tab member;

and first and second indicating strips secured to the back surface of the support sheet in the first and second margins of the support sheet with the first indicating strip including a first means indicating a first manipulation for separating the film from the release sheet for applying the dressing to the wound without wrinkling and the second indicating strip including a second means signifying a second manipulation to peel the support sheet from the back of the film after the dressing has been applied to the wound.

---

### 5,018,517
### EXPIRATION-RESISTING APPARATUS DESIGNED FOR IMPROVING PULMONARY VENTILATION

**Claude Liardet, 30, rue Trévelin, CH-1170 Aubonne, Switzerland**
**PCT No. PCT/CH87/00146, § 371 Date Jun. 21, 1989, § 102(e) Date Jun. 21, 1989, PCT Pub. No. WO89/03707, PCT Pub. Date May 5, 1989**
**PCT Filed Oct. 22, 1987, Ser. No. 381,636**
**Int. Cl.$^5$ A63B** *23/00*
U.S. Cl. 128—200.24 9 Claims

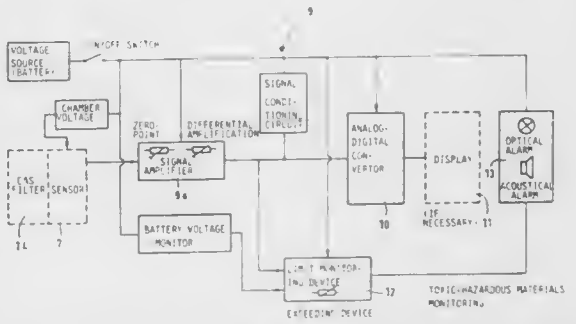


1. Expiration-resisting apparatus designed for improving pulmonary ventilation, characterized in that it comprises a first tubular part comprising an air inlet orifice into which the patient is able to expirate, and a second part comprising an exhaust passage of circular conical form, the axis of the said passage being inclined upwardly with respect to the axis of the part of tubular form at an angle of inclination comprised between 30° and 80°, the angle formed by a generatrix of the wall of the passage and the axis of the passage being smaller than the angle of inclination of the passage axis, a spherical ball o a diameter larger than the smallest diameter of the conical passage of the conical passage being disposed in the said passage so as to obstruct the said passage prior to expiration, the ball being able to be displaced freely in the said passage and offering a resistance to the expiration of the air exhaled by the patient by the effect of its own weight, the apparatus being so shaped as to permit the expired air to escape through at least one hole disposed in a zone opposite to the entry orifice of the conical passage, the dimensions of the hole being chosen so as to prevent the escape of the ball.

---

### 5,018,518
### GAS WORK WITH SENSING AND ALARM MEANS

**Hans-Jörg Hübner, Dortmund, Fed. Rep. of Germany, assignor to Gesellschaft für Gerätebau mbH, Dortmund, Fed. Rep. of Germany**
**Filed May 26, 1989, Ser. No. 358,304**
**Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3818052**
**Int. Cl.$^5$ A62B** *7/10, 9/00, 27/00*
U.S. Cl. 128—202.22 3 Claims



1. A gas mask having air aspiration means, said gas mask comprising:

battery means for providing electrical power to various components of the gas mask;

filter means, said filter means having an upsteam side in communication with the ambient air and a downstream side in communication with a user of the gas mask;

electrically operated means for producing a flow of ambient air into and through said filter means for supply to the user of the gas mask;

electric sensing means disposed on said downstream side of said filter means for sensing at least one gas in the flow of ambient air that affects the breathing of the user of the gas mask;

said electric sensing means comprising means for providing a variable electrical signal corresponding to the amount of said at least one gas present in the ambient air downstream of said filter means;

processing means for processing said variable electrical signal to produce a processed signal corresponding to said amount of said at least one gas;

alarm means responsive to said processed signal for providing an alarm when said amount of said at least one gas is outside of a range;

said alarm means being for indicating an inadequacy of said filter means for protection of the user of the gas mask;

wherein said at least one gas consists essentially of oxygen and wherein said electric sensing means comprises oxygen decomposing means.

VOL
1126
ISS
4
MY
28
1991
UMI

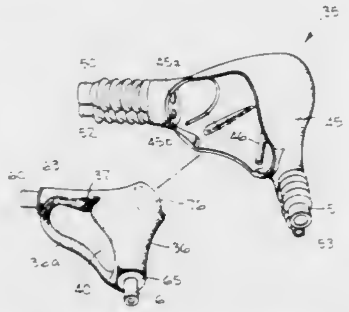
## 5,018,519
## MASK FOR ADMINSTERING AN ANESTHETIC GAS TO A PATIENT

**Glenn E. Brown, 2831 Research Park Dr., Soquel, Calif. 95037**

**Filed Aug. 3, 1990, Ser. No. 562,242**

**Int. Cl.$^5$ A61M** *16/06*

**U.S. Cl. 128—203.29** **25 Claims**



1. A mask for administering gas to a patient comprising:
(a) an inner cup-shaped wall having an inner surface and a peripheral edge, said inner wall being constructed and configured to fit over the nose or mouth of the patient and to engage the face of the patient along the peripheral edge thereof to form a gas chamber confronting the face of the patient, said inner wall being formed with a valve seat having at least one opening therein communicating with said gas chamber;
(b) an outer wall detachably secured to said inner wall by a releasable securing means for facilitating the removal of said outer wall from said inner wall to enable said outer wall to be reused while discarding said inner wall, said outer wall being spaced from said inner wall to define an exhaust passage therebetween;
(c) gas inlet means supported by said outer wall and including a conduit communicating with said gas chamber for introducing gas into said gas chamber to be administered to the patient, said conduit being detachably secured to said inner wall;
(d) exhaust outlet means supported by said outer wall and communicating with said exhaust passage for the removal of exhaust gas from said exhaust passage; and
(e) a flexible floating valve disc attached to said valve seat and arranged to form a sealing closure with said valve seat overlying said opening in said valve seat, said flexible floating valve disc being interposed between said valve seat and said outer wall, said floating valve disc forming a sealing closure with said valve seat over said opening in said valve seat in response to the patient inhaling to inhibit communication between said gas chamber and said exhaust passage, said floating valve disc being radially displaced from said opening in said valve seat for exhaust gas in said gas chamber to enter said exhaust passage in response to the patient exhaling.

---

## 5,018,520
## AERATION OR BREATHING APPARATUS

**Hans-Jörg Hübner, and Heribert Rische, both of Dortmund, Fed. Rep. of Germany, assignors to Gesellschaft für Gerätebau mbH, Dortmund, Fed. Rep. of Germany**

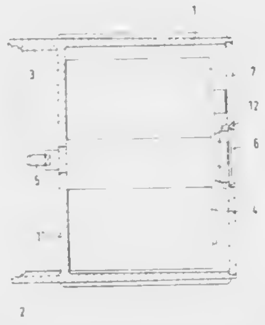
**Filed Mar. 21, 1989, Ser. No. 326,691**

**Claims priority, application Fed. Rep. of Germany, Mar. 21, 1988, 3809406**

**Int. Cl.$^5$ A61M** *15/00;* **H01M** *2/12*

**U.S. Cl. 128—205.12** **19 Claims**

1. Personal gas mask apparatus comprising:
means for inducing a flow of breathable air into a gas mask;
a battery pack for powering said means for inducing a flow of air;
circuit means for electrically connecting said battery pack to said means for inducing a flow of air;
a housing surrounding said battery pack, said housing including an opening for venting a build-up of pressure produced by said battery pack in said housing; and
plug means for closing said housing opening
means positioned in said opening between said housing and said plug means for forming a force fit of said plug means with said housing in said opening;



said means for forming a force fit being displaced from said opening when the pressure in said housing overcomes the force fit to forcibly expel said plug means from said housing to protect against overpressurization of said housing due to pressure produced by said battery pack.

---

## 5,018,521
## METHOD OF AND APPARATUS FOR INCREASED TRANSFER OF HEAT INTO OR OUT OF THE BODY

**William P. Campbell, 3310 Rowland Pl., Washington, D.C. 20008**

**Continuation-in-part of Ser. No. 922,713, Oct. 24, 1986, abandoned. This application Nov. 8, 1988, Ser. No. 268,858**

**Int. Cl.$^5$ A61F** *7/00;* **A61N** *1/00;* **A61H** *1/00*

**U.S. Cl. 128—363** **34 Claims**

1. A method of increasing transfer of heat into or out of a body having blood circulating therethrough, comprising the steps of:
(a) applying electrical stimulation to the body to increase amount of flow of the circulating blood to a surface region of the body; and
(b) simultaneously with the application of electrical stimulation to increase amount of the flow of blood to the surface region, applying a heating medium or a cooling medium to said surface region of the body respectively to heat or cool the body, whereby, due to the increased amount of blood flow to the surface region caused by application of electrical stimulation, heat flow into or out of the body is increased, as compared to heat flow without application of electrical stimulation.

---

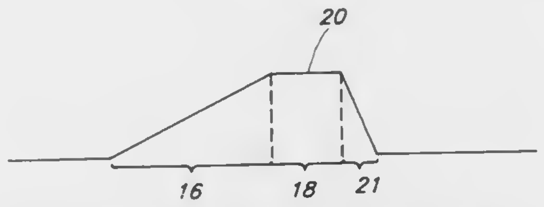
## 5,018,522
## RAMPED WAVEFORM NON-INVASIVE PACEMAKER

**Rahul Mehra, Stillwater, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.**

**Filed Oct. 26, 1987, Ser. No. 112,861**

**Int. Cl.$^5$ A61N** *1/36*

**U.S. Cl. 128—419 PG** **9 Claims**



1. A non-invasive cardiac pacemaker, comprising:
first and second skin contacting electrode means for electrically coupling to a patient;
first timing means for repetitively timing an escape interval; and
pulse generator means, coupled to and responsive to said first timing means and coupled to said first and second skin contacting electrode means, said pulse generator means generating pacing pulses for application to said patient via said first and second electrode means, said pacing pulses extending for a duration of at least about 20ms, said pacing pulses having a current amplitude which rises gradually from 0 to a maximum current amplitude over a predetermined rise time of at least about 20ms.

---

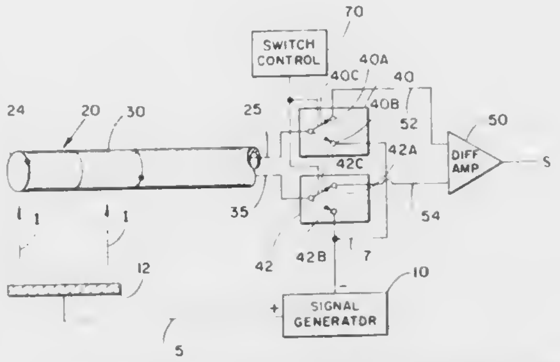
## 5,018,523
## APPARATUS FOR COMMON MODE STIMULATION WITH BIPOLAR SENSING

**Stanley M. Bach, Jr., Shoreview; Douglas J. Lang, Arden Hills; David K. Swanson, Roseville, and Roger W. Dahl, Andover, all of Minn., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.**

**Filed Apr. 23, 1990, Ser. No. 512,363**

**Int. Cl.$^5$ A61N** *1/362*

**U.S. Cl. 128—419 PG** **30 Claims**



1. Apparatus for stimulating and sensing evoked cardiac response to stimulus to a heart with a control signal that indicates a sensing mode or stimulus mode comprising:
(a) a pulse generator for delivering stimulus signals to the heart;
(b) a first electrode for electrical contact with the heart which provides a first response signal;
(c) a second electrode for electrical contact with the heart which provides a second response signal;
(d) a third indifferent electrode for electrical contact with body tissues that transmits stimulus signals from the pulse generator;
(e) means for switching connected to the first and second electrodes wherein the switching means switches the first and second electrodes alternately between a sensing mode and a stimulating mode in response to the control signal, wherein in the stimulating mode the first and second electrodes transmit the stimulus signals from the pulse generator through the heart, and in the sensing mode the switching means operates between the first and second electrodes so as to cause the first and second electrodes to act as bipolar sensing electrodes; and
(f) means for providing a differential signal having a first input for receiving the first response signal from the first electrode and a second input for receiving the second response signal from the second electrode.

---

## 5,018,524
## APPARATUS AND METHOD FOR GENERATING VITAL INFORMATION SIGNALS

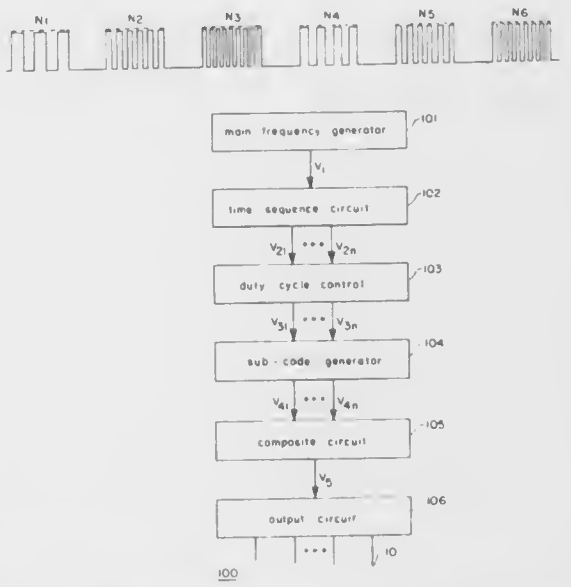
**Hansen Gu, and Dumin Wu, both of Bldg. 18, Hongxu Rd. 100, Shanghai, China**

**Continuation of Ser. No. 863,201, May 14, 1986, abandoned. This application Aug. 15, 1988, Ser. No. 232,536**

**Claims priority, application China, May 15, 1985, 85103600; Aug. 3, 1985, 85106040; Apr. 24, 1986, 86102850**

**Int. Cl.$^5$ A61N** *1/32*

**U.S. Cl. 128—421** **2 Claims**



1. An apparatus for generating vital information signals and applying them to the body of a patient, comprising:

OL 126
SS 4
MY 28
1991
UMI

means for generating an electrical signal comprising a pulse train consisting of a series of bursts of pulses, wherein the bursts are regularly spaced in time, and wherein each burst is made up of a plurality of pulses, the number of pulses in each burst varying from one burst to the next in a predetermined manner, and the frequency of the pulses in each burst varying from one burst to the next in a manner corresponding to the variation in the number of pulses in each burst such that all of the bursts are of equal time duration, the range of frequencies of the pulses in the bursts making up the pulse train being between about 230 and about 280 KHz, and the duty cycle of said bursts in said pulse train being in the range of 0.33–5.0; and

at least one pair of electrodes connected to said means for generating an electrical signal for applying said pulse train to the body of the patient.

---

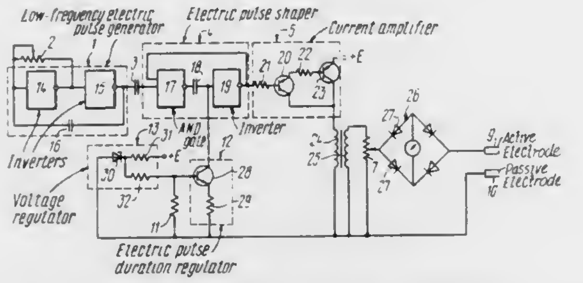
### 5,018,525
## DEVICE FOR DENTAL ELECTROANALGESIA

**Oleg F. Konobevtsev, deceased, late of Moscow by Irina V. Kazanskaya, administrator ; Mikhail A. Napadov; Gennady G. Grishanin, both of Kharkov; Georgy S. Kuklin, Moscow; Gennady F. Krivulya; Sergei V. Guschin, both of Kharkov; Vladimir N. Kondaurov, Moskovskaya; Oleg A. Chelyapin; Ljudmila S. Slobodyanik, both of Kharkov; Jury P. Gusev, Moscow; Oleg J. Kondratenko, Kharkov; Vladimir I. Salo, Kharkov, and Anatoly G. Shepenko, Kharkov, all of U.S.S.R., assignors to Kharkovski Medicinsky Institute and Kharkovski Institut Radioelectroniki, both of Kharkov, U.S.S.R.**

**Filed Nov. 1, 1989, Ser. No. 430,613**

**Int. Cl.$^5$ A61N** ***1/34, 1/00***

**U.S. Cl. 128—421** **2 Claims**



1. A device for dental electroanalgesia, comprising:

at least two electrodes; a first electrode placed on a corresponding reflexogenic zone of the auricular concha; a second electrode placed on the mucosa of the alveolar process of one of the jaws within the area of the projection of the root apices of the patient's teeth being prepared;

a low-frequency electric pulse generator having a first adjustment input and an output;

an electric pulse repetition frequency setter having an output connected to the first adjustment input of said low-frequency electric pulse generator;

an electric pulse front discriminator having an input and an output and connected with its input to the output of said low-frequency electric pulse generator;

an electric pulse shaper having a first input, a second input, and an output and connected with its first input to the output of said electric pulse front discriminator;

a current amplifier having an input and an output and connected with its input to the output of said electric pulse shaper;

a transformer having an input and an output and connected with its input to the output of said current amplifier;

an electric pulse amplitude regulator having an input and an output and connected with its input to the output of said transformer, while its output is electrically connected to said electrodes;

a temperature sensor having an output and placed on the patient's face skin in the area of segmental innervation of the patient's dental tissue being prepared;

an electric pulse duration regulator having an input and an output and connected with its input to the output of said temperature sensor and with its output to a second input of said electric pulse shaper.

---

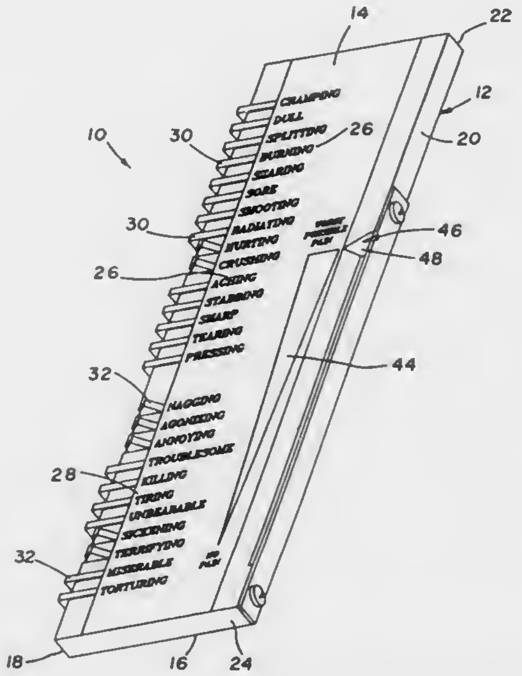
### 5,018,526
## APPARATUS AND METHOD FOR PROVIDING A MULTIDIMENSIONAL INDICATION OF PAIN

**Fannie Gaston-Johansson, 1318 N. 127th Ave., Omaha, Nebr. 68154**

**Filed Feb. 28, 1989, Ser. No. 316,497**

**Int. Cl.$^5$ A61B** ***5/00***

**U.S. Cl. 128—630** **20 Claims**



1. An apparatus for providing a multidimensional indication of the pain being experienced by a person, comprising,

an elongated base having a plurality of sensory pain descriptors displayed thereon and a plurality of emotional pain descriptors displayed thereon,

a selection indicator operatively associated with each descriptor, each selection indicator being on said base and selectively adjustable by a person between a first state indicating that the associated descriptor describes the person's pain and a second state indicating that the associated descriptor does not describe the person's pain.

---

### 5,018,527
## SENSOR FOR THE MEASUREMENT OF ION ACTIVITY

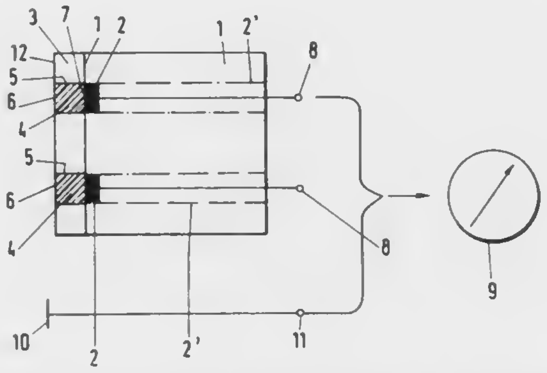
**Werner Pfab, Zirndorf; Michael Bergmann; Paul-Gerhard Fenzlein, both of Nuremberg, and Wolfgang Anderer, Aurachtal, all of Fed. Rep. of Germany, assignors to Siegert GmbH**

**Filed Jul. 28, 1988, Ser. No. 226,066**

**Claims priority, application Fed. Rep. of Germany, Aug. 1, 1987, 3725597; Mar. 25, 1988, 3810186**

**Int. Cl.$^5$ A61B** ***5/00***

**U.S. Cl. 128—635** **34 Claims**



1. A sensor for measuring the activity of ions at the surface of organic tissues or fluids, comprising an electrical insulating carrier, a plurality of ion-selective membranes supported in the insulating carrier and secured to the insulating carrier hermetically against the penetration of moisture between said membranes and said carrier, an electrical shunt connected to each membrane and forming with each membrane an electrode, a reference electrode operatively connected to said carrier for acting with at least one measuring electrode formed by at least one of said plurality of membranes and connected shunts, and a sensor body connected to said carrier holding at least all of said measuring electrodes to simultaneously measure a plurality of ionic activities with said plurality of membranes.

---

### 5,018,528
## PULSE DOPPLER ULTRASONIC DIAGNOSTIC SYSTEM

**Dai Morita; Yuichi Hirota, and Takao Higashiizumi, all of Tokyo, Japan, assignors to Yokogawa Medical Systems, Limited, Tokyo, Japan**

**PCT No. PCT/JP88/00441, § 371 Date Oct. 23, 1989, § 102(e) Date Oct. 23, 1989, PCT Pub. No. WO88/08278, PCT Pub. Date Nov. 3, 1988**

**PCT Filed Apr. 30, 1988, Ser. No. 432,730**

**Claims priority, application Japan, Apr. 30, 1987, 62-107064**

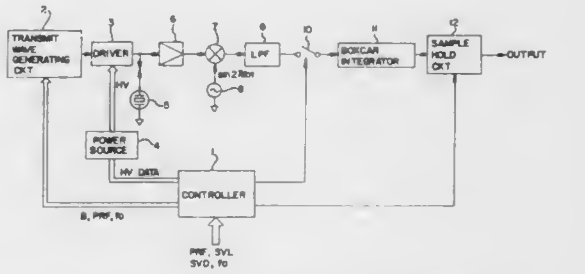
**Int. Cl.$^5$ A61B** ***8/06***

**U.S. Cl. 128—661.09** **1 Claim**

1. In a pulse Doppler ultrasonic diagnostic system comprising generating means, vibrator means, range gate means, and integrator means, the improvement comprising control means for receiving information representative of a volume to be sampled and for generating a first control signal representing a selected optimum burst wave number and a second control signal representing a selected integration interval in response to said received information

said generating means, under the control of said first control signal, for generating ultrasonic waves of a substantially constant mean power and of said selected wave burst number, for application to said vibration means; and

said range gate means, under the control of said second control signal, for applying to said integrator means during said selected integration interval signals received from said vibrator means;



whereby optimal Doppler signals are obtained for a selected sample volume.

---

### 5,018,529
## MINIATURIZED SENSOR FOR PHYSIOLOGICAL PRESSURE MEASUREMENTS

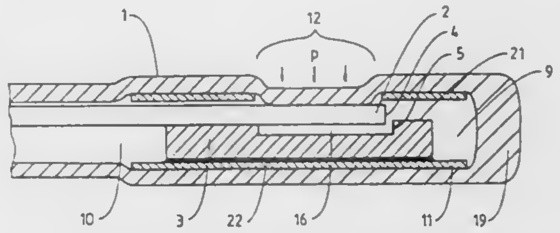
**Lars Tenerz, Uppsala, and Bertil Höök, Västeras, both of Sweden, assignors to Radisensor AB, Uppsala, Sweden**

**Continuation of Ser. No. 285,966, Dec. 14, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 473,054**

**Claims priority, application Sweden, Jun. 25, 1986, 8602836**

**Int. Cl.$^5$ A61B** ***5/02***

**U.S. Cl. 128—667** **13 Claims**



1. A miniaturized pressure sensor for physiological pressure measurements in situ, comprising:

a sleeve of elastic material having a proximate end and a distal end;

a diaphragm formed at the distal end of said sleeve;

a light conductor extending through said sleeve and having a corresponding proximal end and a corresponding distal

VOL
126
ISS
4
MY
28
1991
UMI

end for transmitting light from said corresponding proximal end to said corresponding distal end, said corresponding distal end having an end surface;

a light reflecting surface located opposite said corresponding distal end of the light conductor in a fixed position relative to the sleeve for receiving light from said corresponding distal end of the light conductor and to reflect a portion thereof back into the light conductor;

a portion of said corresponding distal end of said light conductor being in contact with the diaphragm to deflect the end surface of the light conductor in response to pressure forces acting on the diaphragm so as to modulate the intensity of the reflected light; and

support means arranged in the distal end of said sleeve to support said corresponding distal end of said light conductor in a cantilever fashion, said light reflecting surface being formed on a surface of said support means.

---

**5,018,530**

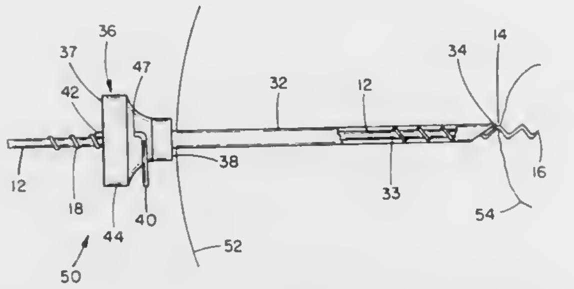
## HELICAL-TIPPED LESION LOCALIZATION NEEDLE DEVICE AND METHOD OF USING THE SAME

**William R. Rank, Gretna; Ronald L. Nichols, New Orleans, and Stephanie G. Schoenberger, New Orleans, all of La., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.**

**Filed Jun. 15, 1989, Ser. No. 367,405**

**Int. Cl.$^5$ A61B** *10/00*

U.S. Cl. 128—749 22 Claims



1. A needle assembly for localization of lesions within the body, comprising:

a needle cannula having a lumen, a cutting edge at a first end of said cannula and at least one notch in said cannula forming a cutout communicating with said lumen, said cutout being located proximate a second end of said cannula a predetermined distance from said first end; a marking device positioned within said lumen, said marking device including a shaft and a helical wire including a first portion helically wound at said first end about said shaft and extending a predetermined distance from said shaft in a helical coil, said helical wire having a sharpened tip, said marking wire being axially slidable and rotatable within said cannula;

wherein said helical wire of said marking device includes a second portion which engages into said at least one cutout formed by said notch, whereby rotation of said marking device effects advancement of said marking device through said lumen, the advancement of said marking device being responsive to said helical wire rotatingly engaging into and contacting said at least one cutout.

---

**5,018,531**

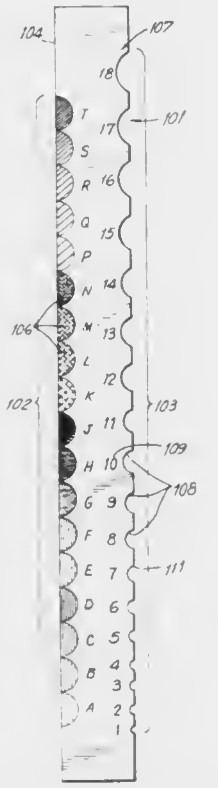
## SKIN BLEMISH MEASURING AND RECORDING SYSTEM AND METHOD

**William B. Hartman, 8 Sheffield Rd., North Caldwell, N.J. 07006**

**Filed Sep. 7, 1989, Ser. No. 403,962**

**Int. Cl.$^5$ A61B** *5/10*

U.S. Cl. 128—774 20 Claims



1. A skin blemish measuring and recording system, comprising:

a body map depicting the human body with reference points for identifying locations on the body; and

a measuring device including a blemish-color reference scale for determining color of a skin blemish and a distance measure for measuring blemish-size and location from skin folds and joints corresponding to reference points denoted on the body map.

---

**5,018,532**

## NOVEL PHOSPHORESCENT CONDOMS

**Robert W. Etheredge, III, 5 Oakhill Rd., Natick, Mass. 01760**

**Filed Jun. 27, 1988, Ser. No. 214,308**

**Int. Cl.$^5$ A61F** *6/04*

U.S. Cl. 128—844 11 Claims

1. In a condom comprising an elongated, generally tubular prophylactic device of thin flexible material having an inner and an outer surface, a closed end and an open end;

the improvement wherein said condom contains an effective amount of a material which, when activated by actinic radiation, will exhibit luminosity, said material exhibiting luminosity being incorporated within said thin flexible condom material, said inner and outer surfaces of said condom containing none of said material exhibiting luminosity.

---

**5,018,533**

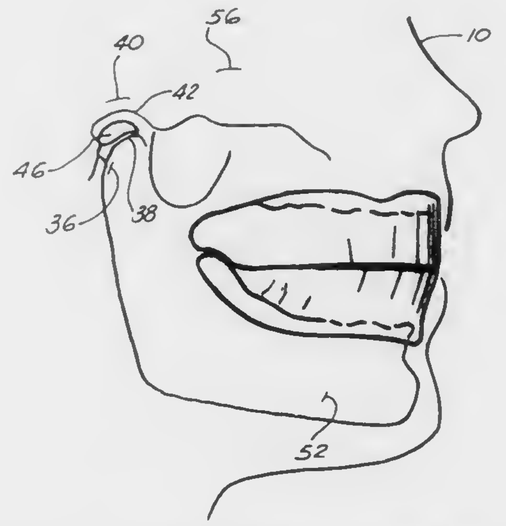
## APPARATUS FOR THE REDUCTION OF APNAA IN THE EDENTULOUS

**Richard H. Hawkins, 1245 Broad Ave., Gulfport, Miss. 39501**

**Filed May 25, 1989, Ser. No. 357,553**

**Int. Cl.$^5$ A61C** *7/08*

U.S. Cl. 128—848 1 Claim



1. A process for reducing the occurrence of apneic episodes in an edentulous person comprising:

determining a neuromuscularly balanced position of the temporal mandibular joint of the edentulous person;

determining a jaw position and angle of the edentulous person corresponding to said neuromuscularly balanced position, said jaw position and angle being determined relative to the closed mouth position;

shaping an internal two piece oral appliance means to maintain said determined jaw position and angle relative to said closed mouth position; and

said person wearing said oral appliance during sleep,

the step of shaping said internal appliance further comprising:

shaping an upper and a lower oral plate appliance, said upper appliance and said lower appliance corresponding to said closed mouth position;

facing said upper and said lower appliances with opposing planar rest surfaces;

shaping said opposing planar rest surfaces to maintain, in an opposed juxtaposition, said jaw position and angle relative to said closed mouth position.

---

**5,018,534**

## INTRAVENOUS CATHETER SHIELD AND RETAINER

**Michael L. Grant, P.O. Box 95744, Oklahoma City, Okla. 73143**

**Continuation-in-part of Ser. No. 378,359, Jun. 26, 1989, Pat. No. 4,919,150. This application Mar. 9, 1990, Ser. No. 490,904**

**Int. Cl.$^5$ A61F** *5/37, 13/00*

U.S. Cl. 128—877 4 Claims

1. A shield for protecting the position of an intravenous needle having one end of intravenous tubing connected thereto when the needle is inserted into a body part of a patient, comprising:

an elongated generally planar base having opposing side edges for flatly underlying a portion of a patient's limb,

said base having pairs of longitudinally spaced longitudinally elongated apertures adjacent its respective longitudinal marginal edges;

a plurality of flexible strap means respectively extending through said plurality of base apertures for securing said base to the patient's limb;

means for securing the respective strap of said strap means to the base for selectively positioning said respective strap intermediate the end limits of the respective elongated aperture,

said strap securing means including an elongated rigid member underlying the base and longitudinally spanning the respective base aperture and secured at its respective end portions to the depending surface of said base;

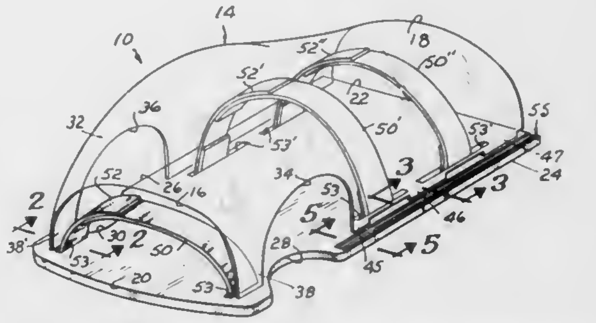
an elongated rigid transparent housing substantially inverted U-shape in transverse cross section having depending leg portions and an arcuate bight portion longitudinally overlying the base in laterally and vertically spaced relation with respect to the surface of the patient's limb and an intravenous needle location; and,

hinge means pivotally securing housing leg hinge members to a side edge portion of said base for pivoting movement of the housing toward and away from said base,

said hinge means including an upstanding projection on one end portion of said base adjacent its respective longitudinal side edge and adjacent the respective outer surface of said leg hinge members,

each said leg hinge member having a depending edge surface and having a generally vertically disposed downwardly open slot in its depending edge; and,

hinge pin means horizontally secured to said projection and projecting through the leg hinge member slots for vertical pivoting movement of the other end portion of said housing about a horizontal axis.



---

**5,018,535**

## METHOD AND APPARATUS FOR JOINING AND FEEDING STRIPS OF PAPER

**Domingos Da Silva, Cortaillod, and Roland Guinnard, Bevaix, both of Switzerland, assignors to Fabriques de Tabac Reunies, S.A., Neuchatel, Switzerland**

**Filed Nov. 9, 1988, Ser. No. 268,975**

**Claims priority, application Switzerland, Nov. 12, 1987, 04413/87**

**Int. Cl.$^5$ A24C** *5/47*

U.S. Cl. 131—60 18 Claims

1. A method of joining the ends of strips of paper of finite length for continuously feeding a machine, of the type wherein a trailing end of a first strip and a leading end of a second strip are brought into overlapping positions, and predetermined joining areas of the trailing and leading ends are pressed

VOL
1126
ISS
4
MY
28
1991
UMI

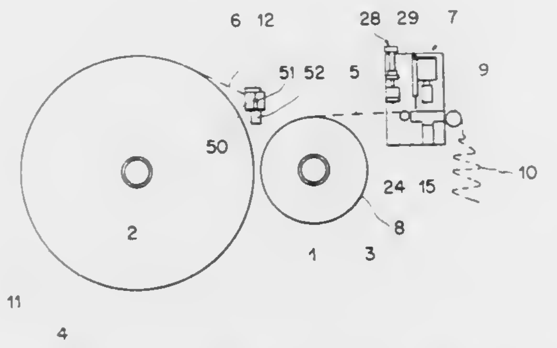
against one another, wherein the improvement comprises the successive steps of:

immobilizing and securing the trailing end relative to a counterplate,

cutting the trailing end along a line situated upstream from the predetermined joining area thereof,

discarding the cut-off portion of the trailing end,

placing the leading end which is secured on a conveyor in a position overlappingly facing the trailing end, by displacing the conveyor to a position facing the counterplate,



immobilizing and securing relative to the counterplate surface an immobilization portion of the leading end situated upstream from the line of severance of the second strip,

releasing the leading end from the conveyor and returning the conveyor to its initial position, and

pressing the overlapping leading and trailing ends between a punch surface and the counterplate to join the leading and trailing ends to one another.

---

### 5,018,536

### METHOD AND TOBACCO PRODUCT FOR USE BY THE CONSUMER FOR MAKING CIGARETTES

**Max Liebich, Bürgerholzring 9, D-8370 Regen, Fed. Rep. of Germany**

**Continuation of Ser. No. 591,869, Mar. 21, 1984, abandoned. This application Jul. 24, 1987, Ser. No. 80,257**

**Claims priority, application Fed. Rep. of Germany, Mar. 28, 1983, 3311248; Oct. 17, 1983, 3337688**

**Int. Cl.$^5$ A24C** *5/00*

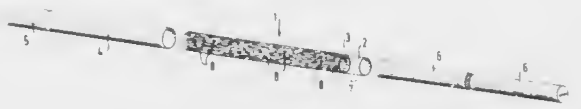
**U.S. Cl. 131—70** **22 Claims**

1. Ready-to-use set for making of cigarettes by hand by the consumer, the set comprising:

a shell of cigarette paper for receiving tobacco therein;

a prefabricated tobacco product having the form of a tobacco cartridge which is itself not smokable, and which comprises a sheath for containing a skein of tobacco, and a skein of smokable tobacco disposed in the sheath, the tobacco cartridge having an outer diameter and the shell of paper having an inner diameter, the outer diameter of the tobacco cartridge being slightly less than the inner diameter of the shell for enabling the sheath to be moved into the shell;

a free hand holdable and, hand manipulatable, loose plunger rod for being pushed into the sheath of the tobacco cartridge as the cartridge is being held free-handedly for moving the tobacco skein in the sheath out of the sheath and into the paper shell in which the tobacco cartridge is disposed, the planger rod having an outer diameter which is slightly less than the inner diameter of the sheath of the tobacco cartridge, whereby force can be applied to the tobacco skein by moving the plunger rod into the sheath for forcing the tobacco out of the sheath and into the shell.



---

### 5,018,538

### CIGARETTE MAKING MACHINE

**David B. Stewart, Dundee, Scotland, and Godfrey A. Wood, Aylesbury, England, assignors to Molins PLC, London, England**

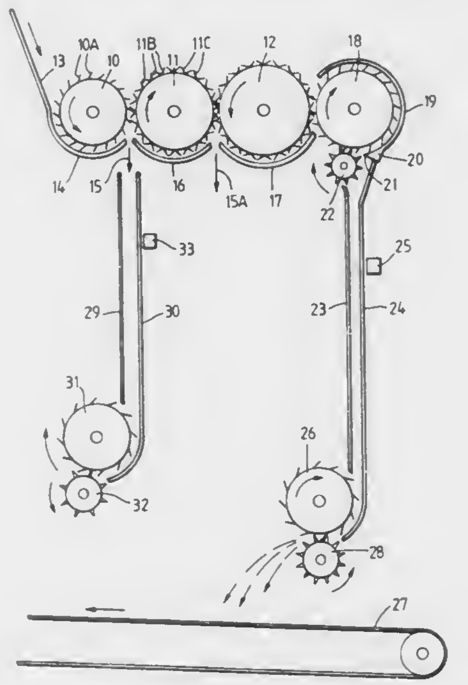
**Filed Feb. 10, 1989, Ser. No. 308,513**

**Claims priority, application United Kingdom, Feb. 10, 1988, 8802976**

**Int. Cl.$^5$ A24C** *5/14, 5/18, 5/39*

**U.S. Cl. 131—109.1** **12 Claims**

1. Apparatus for feeding tobacco in or to a cigarette making machine, comprising: a plurality of carded rollers which transfer a metered stream of tobacco from one carded roller to an adjacent carded roller while allowing tobacco shorts in the form of relatively short strands or particles of tobacco to drop out from the transfer point or points between carded rollers; means for collecting and metering the tobacco shorts; means for collecting and metering longer particles of tobacco which travel beyond the transfer point or points between carded rollers from which tobacco shorts drop out; and means for combining the metered streams of tobacco shorts and longer particles to form a cigarette filler stream which is to be enclosed in a continuous wrapper to form a continuous cigarette rod.



---

### 5,018,539

### CIGARETTE EJECTION DEVICE

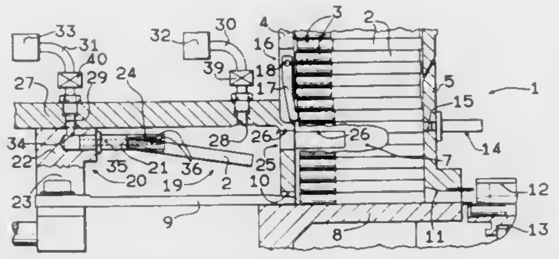
**Antonio Gamberini, Bologna, and Marco Ghini, San Lazzaro Di Savena, both of Italy, assignors to G.D. Societá per Azioni, Bologna, Italy**

**Filed Nov. 2, 1989, Ser. No. 431,556**

**Claims priority, application Italy, Nov. 14, 1988, 3661 A/88**

**Int. Cl.$^5$ A24C** *5/345*

**U.S. Cl. 131—280** **6 Claims**



1. A device for feeding cigarettes to the wrapping line of a packeting machine, comprising:

a hopper for supplying cigarettes to said machine, the lower part of said hopper being divided by dividing walls into outgoing channels each having a width substantially equal to the diameter of one cigarette and through which the cigarettes, placed in stacks, descend stepwise;

sensor means associated with each said channel for checking cigarettes in succession; and

a faulty cigarette pneumatic ejecting device, controlled by said sensor means for removing the faulty cigarettes from said hopper, comprising a withdrawal element, said pneumatic ejecting device comprising, for each said channel, a suction source connected with said withdrawal element, said withdrawal element being arranged to engage and retain one cigarette and being mobile, parallel to the cigarette axes, between a withdrawal position, defined by an access communicating with the interior of the respective said channel, and a disengagement position, in which said withdrawal element is spaced from said hopper by a distance at least equal to the length of one cigarette, said withdrawal element having an end in the form of an elongated curved plate with its longitudinal axis parallel to the axes of the cigarettes, the concave surface of said curved plate being arranged to cooperate with the lateral surface of a cigarette and being provided with apertures communicating with said suction source.

---

### 5,018,540

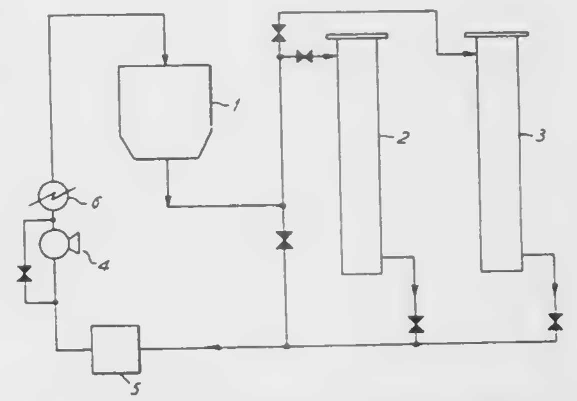
### PROCESS FOR REMOVAL OF BASIC MATERIALS

**Harvey J. Grubbs, Mechanicsville; Ravi Prasad, and Tony M. Howell, both of Midlothian, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.**

**Continuation-in-part of Ser. No. 947,102, Dec. 29, 1986, abandoned. This application Nov. 19, 1987, Ser. No. 122,761**

**Int. Cl.$^5$ A24B** *15/24, 15/26*

**U.S. Cl. 131—297** **60 Claims**



**18**. In a method for the selective extraction of nicotine from tobacco, preserving aroma-producing components, using normally gaseous solvents at high pressure, said method characterized in that basic components are among a plurality of substances extracted from tobacco by a solvent during one or more cycles of an extraction process, said method further characterized in that the tobacco is extracted with the solvent at high pressure in the presence of at least 10% by weight of moisture, based on the weight of the tobacco, the solvent at high pressure being in a physical state which is either a liquid at a pressure of from 50 to 300 atmospheres or a supercritical fluid at a temperature from the critical temperature of the solvent to about 120° C. at a pressure of from about 70 to 1500 atmospheres,

the improvement which comprises contacting the solvent with a non-volatile acid which is not soluble in the extrac-

OL 126
SS 4
MY 28
1991
UMI

tion solvent, while maintaining the solvent in the same physical state it was in prior to contact with the acid as the single means of removing substances from the solvent, which single means selectively removes nicotine from the solvent.

---

### 5,018,541

### TOBACCO SUBSTITUTE

**Etsuko Hukamachi, 6-1-1109, Ohjima, Koto-ku, Tokyo, Japan**
**Filed Jul. 25, 1989, Ser. No. 385,002**
**Int. Cl.$^5$ A24B** *15/16;* **A24D** *1/18*

**U.S. Cl. 131—359** **1 Claim**

1. A tobacco substitute consisting of:

a finely cut and dried non-tobacco plant material consisting of aloe; and

a powder containing at least tobacco sprinkled on and adhered to a surface of said finely cut and dried non-tobacco plant material.

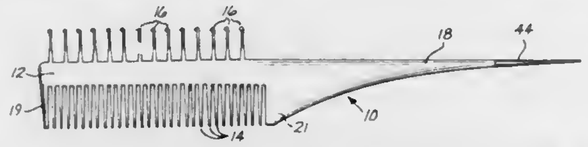
---

### 5,018,542

### INSTRUMENT FOR SELECTIVITY SEPARATING STRANDS OF HAIR

**Peter M. Lee, 11219 84th South, Seattle, Wash. 98178**
**Filed Apr. 26, 1990, Ser. No. 514,861**
**Int. Cl.$^5$ A45D** *24/04*

**U.S. Cl. 132—139** **5 Claims**



1. A comb for selectively separating strands of hair for individual treatment, said comb comprising:

a base having a length;

a plurality of teeth positioned at pre-selected spaced-apart locations along the length of said base, each tooth including a shaft which extends outwardly from said base to a free end and a hair-engaging *hook* portion at said free end, said hair-engaging *hook* portion including a tine member which extends outwardly from said shaft, each said tine *member* being positioned on a common side of each of said teeth substantially toward a direction of the base's *length* [longitudinal extension], said shaft being substantially linearly straight and smooth from said base to said hair-engaging *hook* portion, and a hook throat being defined by said tine member between said tine *member* and said shaft such that said hook throat is substantially open and substantially perpendicular to said shaft;

said hair-engaging *hook* portion being positioned to engage only selected strands of hair while allowing non-selected strands to fall freely from between said teeth as the comb is lifted, moving said teeth in a direction toward said base through a lock of hair, and such that [longitudinal] movement of said base *substantially only in a direction of said base's length opposite the position of said tine members* will substantially release said selected strands of hair from said hair-engaging *hook* portion of each tooth.

---

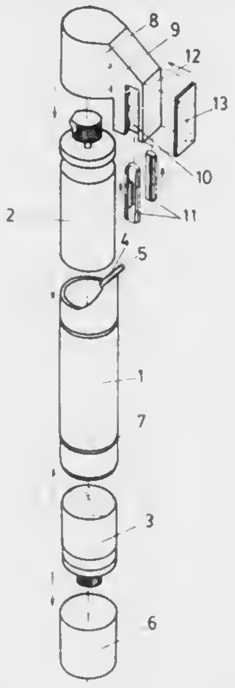
### 5,018,543

### PORTABLE SHAVING KIT

**Federico Trillo Martinez, and Jose M. Gargallo Jimeno, both of Madrid, Spain, assignors to Creatividad Y Desarrollo, S.A. (Creatyde, S.A.), Barajas, Spain**
**Filed Jan. 19, 1990, Ser. No. 467,840**
**Claims priority, application Spain, Jan. 19, 1989, 8900190**
**Int. Cl.$^5$ A45D** *27/22*

**U.S. Cl. 132—291** **6 Claims**

1. Shaving unit and shaving tools, all incorporated in the same element of small dimensions, comprising: an elongated hollow main body having opposite open ends in whose interior, and introduced through each of its opposite ends, are located separate lather spray and aftershave or lotion spray containers, both covered at the respective opposite ends thereof by closure caps, wherein the closure cap for said lather spray container includes an elongated side extension which projects parallel to said main body with a spaced elongated area between said main body and said side extension for attachment to clothing, whereas said lather spray closure cap possesses elongated grooves on both sides of said side extension parallel to the main body with the function for the accommodation of shaving heads, and a concave mirror is arranged in its anterior plane zone for observation of areas to be shaved, said elongated main body having an attachment element for shaving heads disposed toward an end above that which is connected to the lather spray container, wherein connection between said main body and a shaving head is achieved by means of a male-female connection with said attachment element comprising a hollow cylindrical element having a cross opening secured as an extension of the end of the main body for introduction therethrough of a mating body which is a connection member between said attachment element and a shaving head, said connection member having a body of trapeziform cross section with a cylindrical upper end which centrally incorporates a small circumferential offset in which a similar boss of the attachment element is connected, extended ribs being located at a lower base of said connection member for connection over said shaving head, whereas said connection member has a recessed portion extending over the entire length of said connection member which facilitates penetration into said shaving head.



---

### 5,018,544

### APPARATUS FOR CLEANING HEAT EXCHANGER TUBE BUNDLES

**Thomas B. Boisture, Baytown; Larry D. McGrew, Cleveland; James D. Jeffrey, Baytown; Robert G. Wetzel, Humble, all of Tex.; Gene P. Livingston, Pleasant Hill, Calif., and Robert A. Baten, Houston, Tex., assignors to Ohmstede Mechanical Services, Inc., Baytown, Tex.**
**Filed Mar. 6, 1990, Ser. No. 489,001**
**Int. Cl.$^5$ B08B** *3/02*

**U.S. Cl. 134—111** **14 Claims**

1. An apparatus for cleaning a heat exchanger tube bundle using fluids comprising:

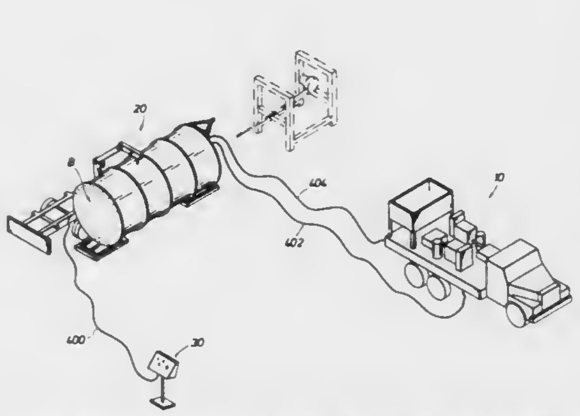
a first mobile base having a water reservoir to store the fluids from an external fluids source;

means for pressurizing the fluids mounted on said first mobile base;

a second mobile base proximate said first mobile base, said second mobile base having a longitudinal axis and longitudinal edges;

an articulated crane supported on said second mobile base and adapted for movement along said longitudinal axis of said second mobile base and capable of discharging the fluids toward the tube bundle;

means for delivering the fluids from said pressurizing means to said crane;



means for discharging the fluids having conduit means extending from said delivery means, said discharge means being mounted on said crane and capable of discharging the fluids toward the tube bundle; and

means for stabilizing said second mobile base and for supporting and rotating the tube bundle, the tube bundle being aligned substantially parallel to said longitudinal axis of said second mobile base.

---

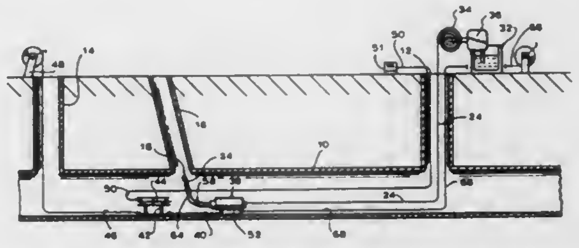
### 5,018,545

### APPARATUS FOR CLEANING INTERIOR OF A LATERAL PIPELINE

**Jeff P. Wells, Memphis, Tenn., assignor to Insituform of North America, Inc., Memphis, Tenn.**
**Filed Jan. 19, 1990, Ser. No. 467,376**
**Int. Cl.$^5$ B08B** *9/04*

**U.S. Cl. 134—113** **6 Claims**

1. Apparatus for cleaning a side pipe diverging in a given direction from a main pipe, said apparatus comprising a support movable along said main pipe and carrying a tube extending therefrom and having a leading portion oriented relative to said main pipe substantially similarly to said given direction, an elongated hose longitudinally mounted in and slidable through said tube, having a trailing end extending from said support through said main pipe to a remote operating station, and having a leading end, a cleaning element secured to said leading end and positioned substantially externally of said tube, said cleaning element being of a size to fit loosely within said side pipe and having fluid passages therein communicating between said hose and exit orifices oriented substantially rearwardly with respect to the leading end of said element, and means for supplying fluid under pressure through said hose and said passages inside said cleaning element, whereby the exiting of said fluid through said exit orifices of said cleaning element propels said cleaning element along said side pipe, pulling said hose along with it, in which said support comprises a hollow body to which said tube is detachably connected.



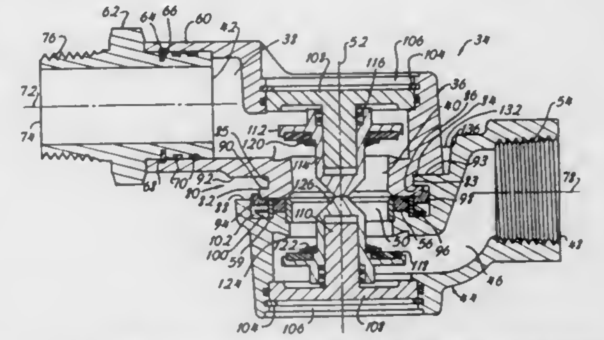
---

### 5,018,546

### FUEL SUPPLY DETACHABLE COUPLING

**Paul D. Carmack, Tipp City; James A. Asbury, Covington, both of Ohio, and Leonard R. Nitzberg, Knoxville, Tenn., assignors to Helix Enterprises, Inc., Knoxville, Tenn.**
**Filed Oct. 15, 1990, Ser. No. 597,886**
**Int. Cl.$^5$ F16L** *37/28*

**U.S. Cl. 137—68.1** **39 Claims**



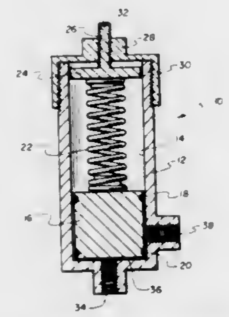
1. In a fuel dispensing system including a liquid dispensing station for receiving fuel from a remote location and supplying fuel to a rigid conduit, a flexible fuel line, and a rigid nozzle including operator actuated means operatively connected to said fuel line, a detachable safety device connected in said fuel line intermediate said nozzle and said conduit for coupling portions of said line together and for uncoupling when an excessive tensile force is exerted on said fuel line, said device comprising a first body member having a first portal, a second portal and a fluid passageway therebetween; a connecting conduit having first and second portals; means for rotatably connecting said connecting conduit to said body member with said first portals in flow communication; means for connecting said second portal of said connecting conduit to one of said rigid conduit and said nozzle; a second body member having a first portal, a second portal and a fluid passageway therebetween; interconnectable means for coupling said first and second body members together with the second portal of said first body member in flow communication with the second portal of said second body member to permit fuel to flow therebetween when said body members are coupled; means for connecting said first portal of said second body member to one end of said

OL
126
SS
4
MY
28
991
UMI

flexible fuel line; said first end of said fuel line having a longitudinal axis passing through said first portal of said second body member when connected thereto; means for connecting a second end of said fuel line to the other of said rigid conduit and said nozzle so that fuel may flow from said rigid conduit through said body members to said nozzle when said body members are coupled together; said interconnectable means comprising elements on said first and second body members permitting said body members to couple and uncouple in a direction disposed substantially parallel to said axis; first abutment means fixed to said first body member; second abutment means fixed to one of said second body member and said connecting conduit for abutting said first abutment means when an external tensile force above a threshold amount is applied in a direction inclined relatively to said axis, said first and second abutment means being disposed for producing a force vector in a direction substantially parallel to said axis; locking means for locking said body members together when coupled and for unlocking said body members when an external tensile force above a predetermined limit is applied to said fuel line in a direction substantially parallel to said axis or when said force vector is above said limit to permit uncoupling of said body members; and valve means in the fluid passageway of each body member for shutting flow communication between said body members when uncoupled.

---

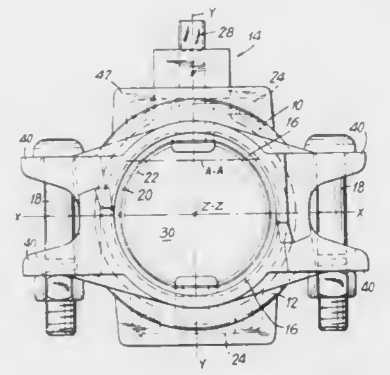
### 5,018,547
## PRESSURE ACTUATED VALVE
**Arlo S. Alcorn, 2681 S. Kamas Dr., Salt Lake City, Utah 84118**
**Filed Apr. 30, 1990, Ser. No. 516,163**
**Int. Cl.⁵ F16K** *17/04*
**U.S. Cl. 137—111** **4 Claims**



1. A fluid delivery system, comprising:
(a) a pressure actuated valve, comprising:
  (i) a valve body having a bore therethrough defining an interior of said valve body;
  (ii) a valve element positioned within said bore for movement therein;
  (iii) a spring positioned within said bore to urge said valve element toward a valve closed position;
  (iv) adjustment means mounted with said spring for permitting adjustment of spring force acting on said valve element;
  (v) means defining a first port in said valve body for introducing a first pressurized fluid into said valve body interior to act against said valve element to open said valve element against the action of said spring; and
  (vi) means defining a second port in said valve body located such that (A) said spring causes said valve element to close communication between said second port and said valve body interior when the force of said spring is greater than the force of pressurized fluid at said first port, and (B) sufficient fluid pressure force at said first port to overcome the spring force will shift said valve element to open said second port to communication with said valve body interior;
(b) a primary fluid supply line in communication with said valve first port; and
(c) a pressurized fluid supply line in communication with said valve second port, the fluid pressure within said pressurized fluid supply line being greater than the pressure within said primary fluid supply line, wherein a predetermined increase in pressure within said primary fluid supply line will overcome the spring force to cause said valve element to shift from its closed position to its open position, thereby establishing communication between said second port and said first port via said valve body interior, to permit the greater pressure pressurized fluid supply to flow through said second port, said valve interior, and said first port into said primary fluid supply line.

---

### 5,018,548
## SEGMENTED COUPLING FOR PIPES
**William R. McLennan, Easton, Pa., assignor to Victaulic Company of America, Easton, Pa.**
**Filed Jan. 12, 1990, Ser. No. 465,800**
**Int. Cl.⁵ F16K** *1/226, 51/00;* **F16L** *17/00*
**U.S. Cl. 137—315** **7 Claims**

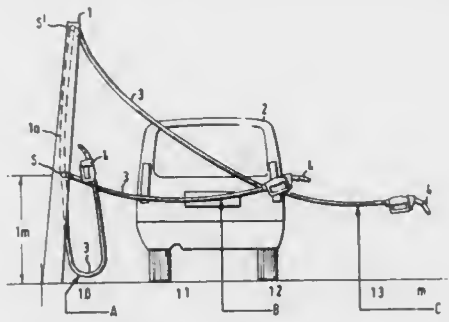


1. A coupling segment for assembly into a segmented coupling for pipes, said coupling segments having an end face at the respective opposite ends thereof which extends in the direction of the axis Z of the coupling and transverse to an X,Y plane thereof, said end faces being inclined in opposite directions with respect to an X,Z plane of the coupling segment and being operative to produce rotation of the associate coupling segment about the Y—Y axis thereof upon tightening down of said segmented coupling, each said end face being comprised of end face portions (**44**A, **44**B or **46**A, **46**B) arranged in parallelism with each other, and, an intermediate end face portion (**44**C or **46**C) extending between the adjacent ends of said end face portions and extending at an angle thereto in a direction extending transverse to and spaced to one side of said X,Y plane to permit said rotational movement of said segment coupling about said Y—Y axis, whereby said respective end faces emerge on opposite axial ends of a coupling assembled from such coupling segments at a position closely adjacent to an X,Z plane of said coupling.

---

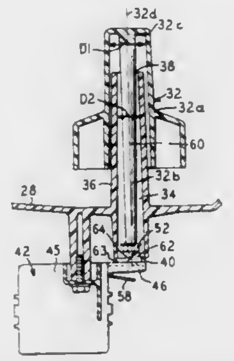
### 5,018,549
## PUMP COLUMN
**Jan H. Lucas, Delft, Netherlands, assignor to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands**
**Filed Jul. 9, 1987, Ser. No. 71,455**
**Claims priority, application Netherlands, Aug. 5, 1986, 8601994**
**Int. Cl.⁵ B67D** *5/00*
**U.S. Cl. 137—355.23** **13 Claims**

1. A pump column for a fuel filling station, comprising: at least one filling nozzle and one filling hose; at least one filling hose storage space, in which the hose is loosely suspended virtually vertically from the pump column and from which it can be pulled out in such a manner that a pivot point of the hose, at which the hose leaves the column virtually vertically moves up the pump column as more of the hose length is released; and a hose retaining mechanism which, refueling after in actuated at the top of the pump column, pushes the released part of the filling hose back into the hose storage space as it virtually vertically moves downwards until the original pivot point of the hose is reached and which then virtually vertically moves up again.



---

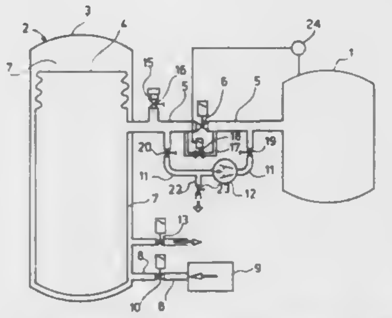
### 5,018,550
## DISHWASHER OVERFILL PROTECTION DEVICE
**Mark A. Burdorff, Pine Grove Township, Van Buren County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.**
**Filed Oct. 19, 1990, Ser. No. 599,990**
**Int. Cl.⁵ H01H** *35/18;* **F16K** *21/18, 31/18, 33/00*
**U.S. Cl. 137—387** **17 Claims**



**11**. In a dishwasher having a tub means for introducing water into said tub and switch means for controlling said means for introducing water into said tub, an improved apparatus for protecting said tub from being overfilled by water, said improvement comprising:
- a standpipe extending into said tub from a lower wall thereof, said standpipe having a wall defining a passageway having open ends, one end being secured to said lower tub wall,
- a float, said float including a float body for responding to water height within said tub, and a float stem extending from said float body through said standpipe, said float stem having an upper end and a lower end, said upper end being secured to said float body and said lower end terminating at a point beyond said tub wall and said standpipe,
- said float stem lower end including a radially extending retainer,
- securing means located beneath said lower tub wall for securing said float stem to said dishwasher, said securing means including a keyway through which said float stem extends, said keyway including a widened portion permitting passage of said retainer therethrough and a narrowed portion restricting passage of said retainer therethrough, said narrowed portion of said keyway being aligned coaxially with said standpipe,
- a wall surface about said narrowed portion of said keyway angled toward said widened portion of said keyway for deflecting said float stem and directing said retainer through said widened portion when said float stem is inserted into said standpipe, whereby upward movement of said float stem is limited by said retainer engaging said securing means during normal operation of said float in relationship to said switch means.

---

### 5,018,551
## DEVICE FOR INJECTING GAS UNDER HIGH PRESSURE AND HIGH FLOW RATE INTO AN AIRTIGHT TREATMENT CHAMBER AND FOR RECOVERY OF THE SAME
**Laurent Pelissier, Grenoble, France, assignor to Etudes Et Constructions Mecaniques, Seyssinet, France**
**Filed Mar. 16, 1990, Ser. No. 494,362**
**Claims priority, application France, Mar. 17, 1989, 89 03795**
**Int. Cl.⁵ B65B** *3/14, 3/16*
**U.S. Cl. 137—571** **4 Claims**



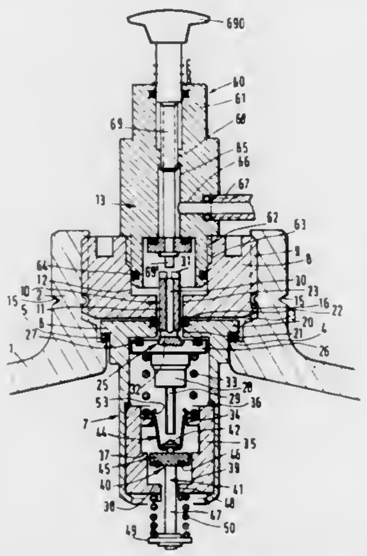
1. A device for filling a treatment chamber with a compressed gas, for evacuating gas present in the treatment chamber and for storing the evacuated gas, comprising:
- a gas storage tank comprising a rigid tank and an elastic tank arranged inside the rigid tank;
- a first pipe coupling said elastic tank to said treatment chamber, said first pipe comprising a first valve;
- a second pipe coupling said elastic tank to said treatment chamber, said second pipe comprising a pumping means for pumping gas from the treatment chamber to the elastic tank;
- a compressed air inlet for filling with compressed air a space arranged between the elastic tank and the rigid tank; and
- a second valve allowing said space to be vented,
- said treatment chamber being filled by introducing compressed ait into said space, and then opening the first valve, and said treatment chamber being evacuated by opening the first and second valves and then closing the first valve and evacuating with the pumping means towards the elastic tank residual gas present in said treatment chamber.

---

### 5,018,552
## VALVE ASSEMBLY FOR PACKING FLUID UNDER PRESSURE AND PACKING PROVIDED WITH SUCH ASSEMBLY
**Jean-Marie Politi, Pontault Combault, France, and Lennart Franz, Malmo, Sweden, assignors to L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procedes Georges Claude, Paris, France**
**Filed May 29, 1990, Ser. No. 530,289**
**Claims priority, application France, May 29, 1989, 89 06983; Dec. 20, 1989, 89 16870**
**Int. Cl.⁵ F16K** *51/00*
**U.S. Cl. 137—614.11** **10 Claims**

1. Valve assembly for fluid container (**1**) under pressure of the type comprising a valve housing (**7**) including a main valve (**26**) urged into closing position by means of a first return spring (**33**;**87**) and capable of cooperating with means (**690**;**600**) for operating the main valve against the action of the first

spring, which comprises an auxiliary valve (**45**) disposed in said housing (**7**), in series with the main valve (**26**), said auxiliary valve being drawn into closing position by means of a second low calibration spring (**50**;**50'**) and initially maintained in opening position by a locking means (**44**;**99**) initially loaded in locked position and displaceable towards a final unlocked position by the main valve (**26**), during a pronounced opening action exerted by the activating means (**690**;**600**) on the main valve beyond its normal opening travel.



---

### 5,018,553
### SINGLE-HANDLE MIXER VALVE WITH A BALL-TYPE VALVING MEMBER

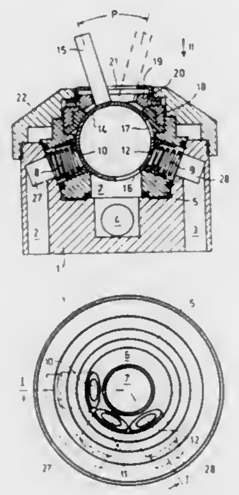
**Roland Grassberger, Brussels, Belgium, and Alfons Knapp, Biberach an der Riss, Fed. Rep. of Germany, assignors to Masco GmbH, Sandhausen, Fed. Rep. of Germany**

**Filed Sep. 11, 1990, Ser. No. 580,873**

**Claims priority, application Italy, Sep. 22, 1989, 67785 A/89**

**Int. Cl.⁵ F16K** *11/087*

**U.S. Cl. 137—625.41** 10 Claims



1. In a mixer valve comprising: a fixed part having a partially spherical seat; inlet openings for incoming flows of hot and cold water and at least one outlet opening for mixed water, said openings being disposed at a certain mutual distance and communicating with said partially spherical seat; a ball-type valving mounted in said partially spherical seat of the fixed part, said valving member having a control member for being displaced in rotation around two different axes, and having openings intended for cooperating with said inlet openings and outlet opening in order to regulate the mixing ratio between hot and cold water and the flow of delivered mixed water; and tubular gaskets of elastomeric material inserted in said inlet openings, the improvements; that said inlet openings with tubular gaskets include two inlet openings for a first flow of said two incoming flows of cold and hot water, and one inlet opening with tubular gasket for the second flow of said two incoming water flows, said three inlet openings wherein tubular gaskets are inserted being at least approximately aligned along a circle within said partially spherical seat of the fixed part of the valve; and that said opening of the ball valving member, intended for cooperating with said inlet openings, is elongated on the whole, and has an extension such as to at least approximately correspond to the total extension of two subsequent inlet openings, including the distance which separates the same.

---

### 5,018,554
### DEVICE FOR THE DAMPING OF PUMPS WITH INTERMITTENT DELIVERY

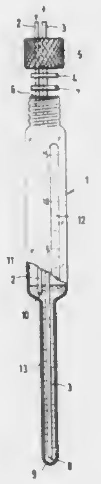
**Berndt Kulitzscher, Steinmark, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Aug. 16, 1989, Ser. No. 394,533**

**Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 8810455[U]**

**Int. Cl.⁵ F16L** *55/04*

U.S. Cl. 138—26 7 Claims



1 A device for the damping of a pump having intermittent liquid delivery, the device, comprising:

a tube defining an air chamber and having a first closed end and a second closed end, the first end having a cross-sectional area that is less than a second cross-sectional area at the second end of the tube;

means enclosed in said chamber for damping pressure surges;

a feed line extending into said tube through an opening in said second end, said feed line including an inflow opening disposed at a distal end thereof; and

a discharge line extending into said tube through an opening in said second end, said discharge line having an outflow opening disposed proximate said first closed end of said tube, said outflow opening of said discharge line being spaced a distance from the inflow opening of the feed line so that the inflow opening no longer dips into the liquid once the pump has been switched off in order to avoid air volume in said tube from being entrained in liquid exiting through said discharge line.

---

### 5,018,555
### PRE-PRESS TUBE

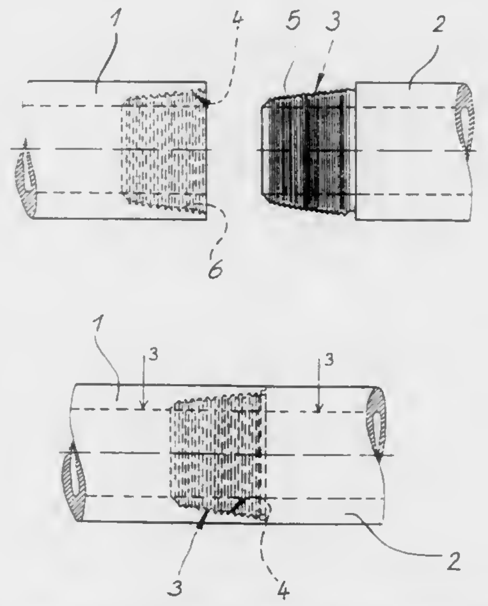
**Manfred Hawerkamp, Altenrather Strasse 5, 5210 Troisdorf, Fed. Rep. of Germany**

**Filed Jul. 19, 1988, Ser. No. 221,296**

**Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724767**

**Int. Cl.⁵ F16L** *47/00*

U.S. Cl. 138—155 **1 Claim**



1. A tube structure, comprising: at least two lengths of tube formed of thermoplastic synthetic material, each tube having one end with a plug-in portion, said plug-in portion being conically and inwardly tapered to from an outer cone and each tube having an opposite other end with a plug-in interior socket, said plug-in interior socket being conically outwardly tapered on an interior portion to form an inner cone for receiving a plug-in portion of a length of tube to be connected, said outer cone of said plug-in-end and said inner cone of said plug-in interior socket each including annular informings and annular outformings, said informings and said outformings of each of said outer cone and said inner cone are formed as wave troughs and wave crests respectively, a top line passing through wave crests of said outer cone defining an outer cone size, a top line passing through wave crests of said inner cone defining an inner cone size, said outer cone size being larger than said inner cone size, said top line of each of said inner cone and said outer cone each forming an angle of inclination with respect to a central axis of the tube, said angle of inclination being chosen to be substantially equal to a sliding friction angle, said informings and outformings of each of said outer cone and said inner cone engaging each other alternatingly in a force-locking connection to form a positive locking connection wherein the annular informing and annular outforming are substantially welded together.

---

### 5,018,556
### DOBBY LOOM WITH A MAGNETICALLY OPERATED HOOK SELECTOR

**Kaichiro Yoshida; Hiroshi Takada, both of Kyoto, and Toshio Nakajima, Ohsaka, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan**

**Filed Mar. 24, 1989, Ser. No. 328,497**

**Claims priority, application Japan, Apr. 1, 1988, 63-78152; May 13, 1988, 63-116741; May 16, 1988, 63-118735**

**Int. Cl.⁵ D03C** *1/00*

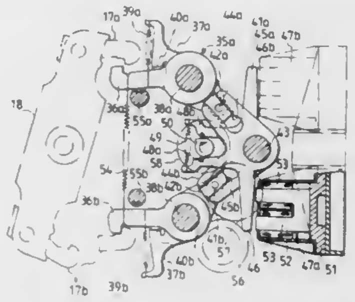
U.S. Cl. 139—68 **8 Claims**

1. A dobby loom in which up-and-down movement selection means for a held frame is operated by controlling a magnetically-driven device, characterized in that displacement of said up-and-down movement selection means is carried out by the combined-use of mechanical auxiliary means and said magnetically-driven means;

wherein said up-and-down movement selection means comprises a pair of holding hooks including means for engaging with a balk plate, and a pair of action levers engaged with one of the holding hooks, respectively;

wherein said holding hook comprises a hook portion and movable portion for rotating the hook portion to an operating position and an nonoperating position at which the hook portion is engaged with an disengaged from a movable hook of the balk plate, said hook portion and movable portion being rotatably provided on fixed shafts, respectively, and being connected by a spring for integral rotation;

wherein said action lever is movable between an operating position and a nonoperating position and includes an operating portion formed of a magnetic material for rotating the action lever between the operating and nonoperating positions, and solenoids comprising magnetically driven means for attracting the operating portion are arranged opposedly of the operating portion;



wherein a pair of said action levers which are arranged face to face with each other have cam lever portions, between which are provided a spring and an auxiliary cam, said auxiliary cam constituting the mechanical auxiliary means; and

wherein said auxiliary cam comprises a first cam surface for displacing the holding hook to the engaging position and a circular second cam surface for maintaining the holding hook at the nonengaging position, said auxiliary cam being in contact with a cam follower rotatably supported on the cam lever portion of the action lever so that the cam lever portion is pushed down by rotation of the auxiliary cam to mechanically urge the operating portion toward the solenoid.

---

### 5,018,557
### WEFT-SWITCHING SYSTEM WITH TELESCOPING NOZZLES

**Roger Fourneaux, La Tour du Pin, France, assignor to S. A. Saurer Diederichs (Societe Anonyme), Bourgoin Jallieu, France**

**Filed Mar. 16, 1990, Ser. No. 495,022**

**Claims priority, application France, Mar. 22, 1989, 89 04032**

**Int. Cl.⁵ D03D** *47/30*

**U.S. Cl. 139—450** **8 Claims**

1. A shuttleless loom wherein a weft filament is inserted crosswise in a weft direction into a warp moving in a warp direction transverse to the weft direction, the loom comprising:

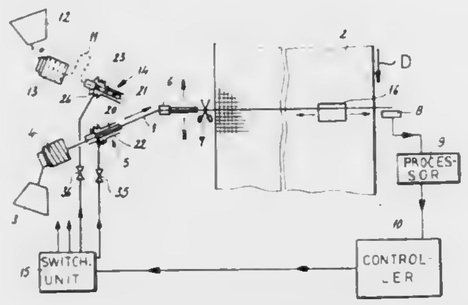
means including an injection nozzle that is movable limitedly in the warp direction to one side of the warp and that has a filament-receiving upstream end and a filament-ejecting downstream end from which a weft filament is projected in the weft direction through the warp;

OL 126 SS 4 MY 28 1991 UMI

separate generally stationary first and second yarn supplies to one side of the warp;

respective first and second telescoping feed nozzles to the one side of the warp and each having a generally stationary upstream end and a downstream end displaceable between an advanced position relatively close to the injection nozzle and a retracted position relatively far from the injection nozzle;

respective actuators for displacing the first and second nozzles between their positions;



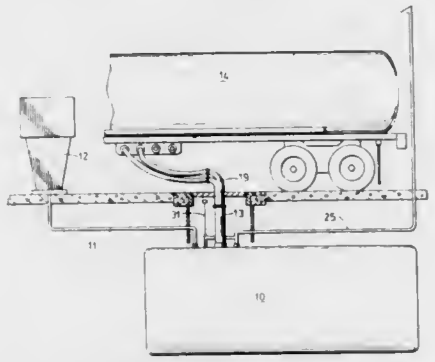
respective first and second feed means between the nozzles and the respective supplies for feeding filaments from the respective supplies to the upstream ends of the respective nozzles so that the respective filaments are ejected from the respective downstream ends thereof; and

control means connected to the actuators for switching from the filament of one of the supplies to the filament of the other supply by displacing the downstream end of the telescoping nozzle of the other supply to the advanced position and then pneumatically blowing the respective filament from the downstream end of the nozzle of the other supply into the upstream end of the injection nozzle.

---

### 5,018,558
## STORAGE TANK SYSTEM WITH INTERNAL OVERFILL MEANS

**Bruce R. Sharp, 4090 Rose Hill Ave., Cincinnati, Ohio 45229**
**Continuation of Ser. No. 279,836, Dec. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 66,691, Jun. 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 820,027, Aug. 11, 1987, Pat. No. 4,685,327, which is a continuation-in-part of Ser. No. 740,869, Jun. 3, 1985, Pat. No. 4,607,522, which is a continuation-in-part of Ser. No. 544,013, Oct. 21, 1983, Pat. No. 4,523,454, and Ser. No. 580,800, Feb. 16, 1984, Pat. No. 4,524,609, which is a continuation-in-part of Ser. No. 544,012, Oct. 21, 1983, abandoned, and a continuation-in-part of Ser. No. 745,540, Jun. 17, 1985, abandoned. This application Jul. 3, 1990, Ser. No. 547,914**
**Int. Cl.$^5$ F16K** *24/00;* **B65B** *31/00*
**U.S. Cl. 141—198** 6 Claims



1. A underground storage tank system having an internal retained capacity area for receiving overflow of liquid resulting from a filling operation through a delivery hose, comprising:

(a) a rigid storage tank having a storage area of at least about 1,000 gallons of liquid;

(b) a coaxial fill line extending from near ground surface into the storage tank, said coaxial fill line comprised of a fill pipe extending into the storage tank for delivering liquid therethrough and an outer vapor recovery tube concentric with the fill pipe which is attached to the storage tank and a vapor recovery extension tube extending therefrom with a lower end terminating from about two inches to about eighteen inches from a top inside surface of the storage tank, whereby said vapor recovery tube and vapor recovery extension tube receive vapors formed within the storage tank during the filling operation;

(c) a vent line attached to the storage tank and a vent extension line extending therefrom with a lower end terminating from about two inches to about eighteen inches from a top inside surface of the storage tank, wherein the area within the storage tank which is above the vapor recovery extension tube termination and vent extension line termination which is uppermost represents the internal retained capacity area;

(d) a dispensing line leading from within the storage tank to a dispenser at ground surface;

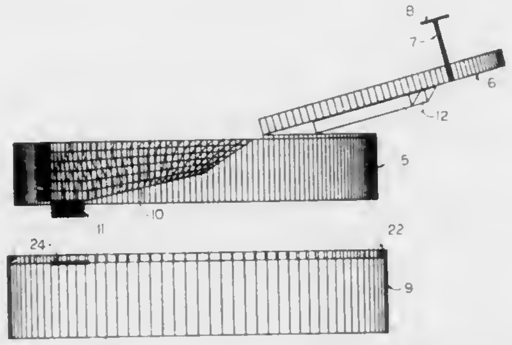
(e) a trapped vapor release valve in operable association with the retained capacity area so that when closed during a filling operation trapped vapors within the storage tank causes a build up of pressure to prevent liquid from completely occupying the retained capacity area and when opened permits excess liquid in the fill pipe to freely flow into the retained capacity area; and

(f) a by-pass vent line which extends from the trapped vapor release valve to the vent line such that opening of the trapped vapor release valve allows the trapped vapors in the internal retained capacity area to pass therefrom through the by-pass vent line and then the vent line.

---

### 5,018,559
## INDUSTRIAL FUNNEL APPARATUS WITH OPERABLE LID FOR USE WITH 55 GALLON DRUMS

**Larry J. Branan, 180A Gilles Rd., Edwards, Ill. 61528, assignor to Larry J. Branan, Edwards, Ill.**
**Filed Nov. 6, 1989, Ser. No. 432,381**
**Int. Cl.$^5$ B65B** *39/00*
U.S. Cl. 141—339 1 Claim

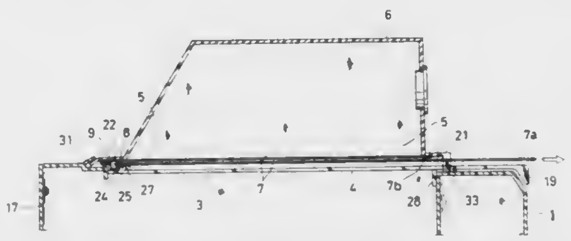


1. A funnel type apparatus adapted to capture paint-related liquids, said apparatus adapted to be placed on top of 55 gallon drums, said apparatus comprising: a funnel body having an open top and a bottom having a drain; a lid hinged on the open top being operable for opening and closing the open top; a rod attached at one end to the lid and having a disk at the other end, whereby when said lid is closing said open top said disk acts to plug the drain of said funnel body.

---

### 5,018,560
## DEVELOPER SUPPLYING STRUCTURE FOR A DEVELOPING DEVICE

**Kimihide Tsukamoto, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**
**Filed Feb. 1, 1990, Ser. No. 473,839**
**Claims priority, application Japan, Feb. 7, 1989, 1-13789[U]**
**Int. Cl.$^5$ B65B** *1/04;* **G03G** *15/06*
**U.S. Cl. 141—364** **17 Claims**



1. A developer supplying structure of a developing device, comprising:

a developer body formed with an aperture through which a developer is supplied;

a lid slidably attached to said developer body for selectively opening and closing said aperture;

a developer cartridge formed with an outlet corresponding to said aperture formed in said developer body, said developer cartridge being detachably mounted on said developer body;

a seal member folded in two portions wherein one portion seals said outlet of said developer cartridge and the other portion is left free as a flap, said seal member being separated from said outlet of said developer cartridge by pulling said flap thereby breaking the seal formed by said one portion;

a sliding member provided between and at a fold of said two portions of said seal member and slidable with said lid, and

means for connecting said sliding member to said lid and moving said lid with movement of said sliding member in a direction for opening said developer body, wherein said lid is simultaneously removed upon removal of said seal and said seal is simultaneously replaced upon replacement of said lid.

---

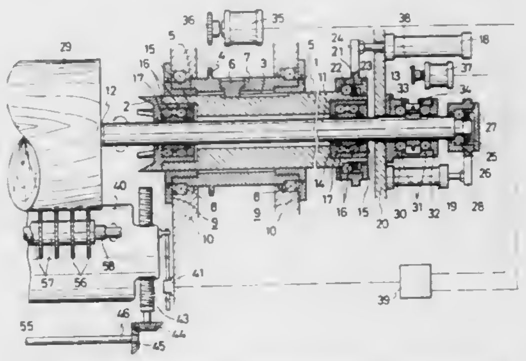
### 5,018,561
## VENEER LATHE

**Satoru Shimosaka, Obu; Yukinobu Kuno, Nagoya; Yukio Takagi, Obu, and Masuo Mizuno, Nagoya, all of Japan, assignors to Meinan Machinery Works, Inc., Obu, Japan**
**Filed May 30, 1990, Ser. No. 530,370**
**Claims priority, application Japan, May 31, 1989, 1-140160**
**Int. Cl.$^5$ B27L** *5/00*
**U.S. Cl. 144—209 R** **18 Claims**

9. Apparatus for supporting and rotating a log in a veneer lathe, comprising:

first and second pairs of spindles, each pair comprising an inner spindle and an outer spindle, each spindle being independently axially and rotatably movable; and

means for independently and axially moving the inner and outer spindles of at least the first pair of spindles to selectively engage a log and support said log between at least

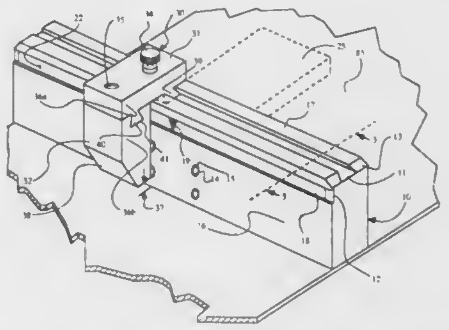


one spindle of said first pair and at least one spindle of said second pair.

---

### 5,018,562
## POWER TOOL FENCE SYSTEM

**Phillip A. Adams, 2542 Tartan Dr., Santa Clara, Calif. 95051**
**Filed Dec. 21, 1989, Ser. No. 455,207**
**Int. Cl.$^5$ B27B** *31/60*
**U.S. Cl. 144—253 R** **14 Claims**



1. A power tool fence system for orienting a workpiece in a predetermined position relative to a cutting tool protruding through a work surface comprising:

a rigid fence having a dovetail longitudinal slot having divergent side edges defined therein and having a first side facing said cutting tool against which the workpiece can be placed;

an adjustable stop block having an integral longitudinal dovetail protrusion, said protrusion being operatively coupled with said fence by engagement with said dovetail slot in said fence; and

means extending through said block to a bottom of said dovetail slot for raising said dovetail integral protrusion against said side edges of said dovetail slot and for locating said protrusion with respect to said dovetail slot of said fence thereby preventing the travel of the workpiece along said fence beyond said stop block.

---

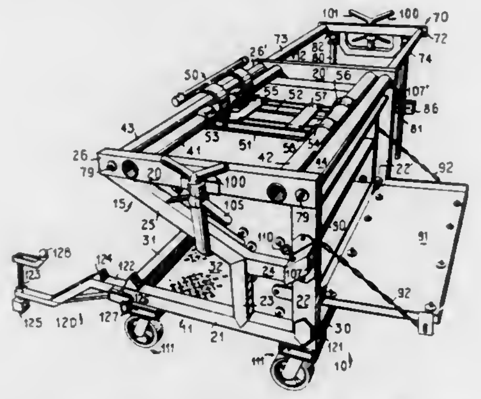
### 5,018,563
## MOBILE, EXTENDIBLE TABLE WITH TOOL MOUNT AND CARRIER

**Thomas P. Yoder, 3855 Water Oakway, Doravalle, Ga. 30340**
**Filed Oct. 17, 1989, Ser. No. 422,525**
**Int. Cl.$^5$ B25H** *1/00*
**U.S. Cl. 144—286 R** **15 Claims**

1. A mobile table comprising a frame having end pieces disposed generally vertically at opposite ends thereof; and at least two telescoping members, each telescoping member including a movable tubular member and a fixed tubular member

OL
126
SS
4
MY
28
1991
UMI

within which the movable tubular member is slideable, the fixed tubular members being rigidly attached to the end pieces and disposed approximately parallel to each other and generally horizontally; at least two movable tubular members remaining approximately parallel to the fixed tubular members when the telescoping members are fully extended.



---

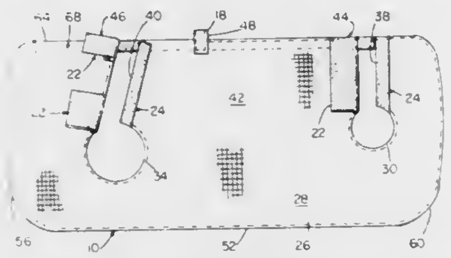
### 5,018,564
### FABRIC PROTECTIVE COVER FOR A DRIVE MECHANISM OF A BICYCLE

**Gregory V. Anglin, 10210 East F, Tacoma, Wash. 98445, and Robert W. Richmond, 2916 S. 200th St. Space 42, Sea-Tac, Wash. 98198**

**Filed Mar. 26, 1990, Ser. No. 499,190**

**Int. Cl.$^5$ B62J** *13/04;* **B65D** *65/08*

**U.S. Cl. 150—167** **3 Claims**



1. A full fabric material cover for the drive mechanism of a bicycle to protect the drive mechanism from dirt during storage of a bicycle or during transport of a bicycle, such as when a bicycle is carried on a bicycle rack in turn mounted on a vehicle, having the integral arrangement of such cover, comprising:

- a) a back elevational side of this cover having a lower edge, an essentially fully openable top edge, a front edge, and a back edge; a rear opening to fit about a rear axle of a bicycle, inside of rear gears and a drive chain; a front opening to fit about a pedal axle, inside of a right side pedal, sprocket, and drive chain; a vertical cut extending through and from the top edge of this back elevational side down to this rear opening; an essentially vertical cut extending through and from the top edge of this back elevational side down to this front opening; a flap thereby formed by these respective vertical cuts, which commences in the fabric material that extends between the rear opening and front opening and extends up to the essentially fully openable top edge of this back elevational side;
- b) a front elevational side of this cover, having a lower edge, an essentially fully openable top edge, a front edge, and a back edge, and arranged to be continuous throughout, extending longitudinally from a rear axle location of a bicycle to the sprocket end location, and extending vertically from the lower edge to the essentially fully openable top edge; and having both the back edge and the front edge and the lower edge respectively commonly formed with the back edge and front edge and the lower edge of the back elevational side of this cover;
- c) respective joinable hook and loop fastener portions secured to respective sides of the vertical cut of the back elevational side, which provides access to reach a rear axle of a bicycle:
- d) respective joinable hook and loop fastener portions secured to respective sides of the essentially vertical cut, which provides access to reach a pedal axle of a bicycle; and
- e) respective joinable hook and loop fastener portions secured to a respective side of the essentially fully openable top edge portions of both the front elevational side, and the back elevational side, the latter including open top edge portions, which are on the flap formed in the back elevational side.

---

### 5,018,565
### FILLER RING FOR A VEHICLE WHEEL AND TIRE ASSEMBLY

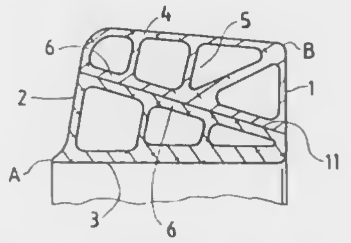
**Udo Frerichs, Langenhagen; Eckhard Kuhlmann, Hanover; Heinrich Köbler, Harsum, and Axel Metge, Hanover, all of Fed. Rep. of Germany, assignors to Continental Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 347,420, May 4, 1989, abandoned. This application Aug. 24, 1990, Ser. No. 573,284**

**Claims priority, application Fed. Rep. of Germany, May 10, 1988, 3815926**

**Int. Cl.$^5$ B60C** *15/02*

**U.S. Cl. 152—379.3** **10 Claims**



1. In a filler ring of rubber or plastic for a vehicle wheel and pneumatic tire assembly where the beads of the tire are mounted on the radially inner periphery of a drop-center wheel rim adjacent essentially radially inwardly extending rim flanges, with said filler ring filling a space located between a tire bead and a wall of said drop-center wheel rim adjacent to said essentially radially inwardly extending rim flanges, said filler ring being provided with a plurality of circumferentially extending hollow chambers that are disposed in two planes which are superimposed over one another in a radial direction and are separated from one another via a diagonal rib, with each of said planes of hollow chambers being provided with at least two hollow chambers that are successively arranged in an axial direction, with said filler ring having an axis of rotation, a side wall that rests against a tire bead and extends perpendicular to said axis or rotation, and an oppositely disposed inclined wall that extends at approximately 80° to said axis of rotation, and with said diagonal rib extending between a radially inner half of said side wall and a radially out half of said inclined wall, comprising the improvement wherein:

said diagonal rib specifically has a steep inclination at an angle of 75 to 80 with a radially inner half of said inclined wall, and including transverse ribs offset in different planes and extending essentially perpendicular to said diagonal rib so that effective lengths of said diagonal rib are reduced to such a small length and further as a result of the steep inclination of said diagonal rib directly a radial force component is produced when the tire bead exerts forces upon the filler ring, said radial force component being directed radially outwardly, and thus counteracting migratory shifting of the filler ring in a radially inward direction.

---

### 5,018,566
### MULTI-PART BOLTED STEEL RIM

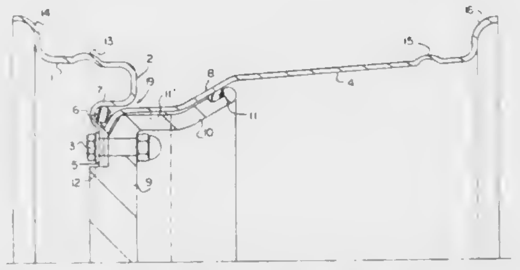
**Ludwig Thoni, 21 Hermann-Loens-Strasse, D-6701 Maxdorf-Birkenheide, Fed. Rep. of Germany**

**Filed Dec. 22, 1989, Ser. No. 454,916**

**Claims priority, application Fed. Rep. of Germany, Dec. 30, 1988, 3844329; Dec. 30, 1988, 3844330; Dec. 30, 1988, 3844331**

**Int. Cl.$^5$ B60B** *25/04*

**U.S. Cl. 152—396** **8 Claims**



1. A multi-part motor vehicle wheel rim of lightweight construction, comprising a central part, a front part, and a rear part forming a rim well and having a seal, said front and rear parts having inwardly pointing, mutually touching, contact faces for the formation of a radial joint and being bolted to the central part forming a bolt connection, all three parts being constructed of steel and the front part having a bulge pointing towards the inside of the rim, wherein in the portion of the rim adjoining the joint, in cross-section, the front part and the rear part widen in a V shape so that there is formed an open pocket between the rear part and the inwardly pointing bulge of the front part, which pocket contains an O-ring, and a bent-down portion of the rear part rests against a bevel of the central part.

---

### 5,018,567
### METHOD FOR FORMING TIE-BACK POUFS

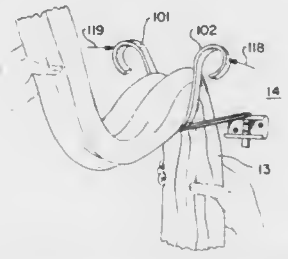
**Christer Hannerstig, Hollviksnan, Sweden, assignor to AB A. Svensson & Co., Malmö , Sweden**

**Continuation of Ser. No. 370,340, Jun. 22, 1989, Pat. No. 4,958,646, and a continuation-in-part of Ser. No. 114,655, Oct. 28, 1987, abandoned. This application Dec. 15, 1989, Ser. No. 451,097**

**Claims priority, application Fed. Rep. of Germany, Oct. 29, 1986, 3636845; European Pat. Off., Oct. 12, 1987, 87114878.9**

**Int. Cl.$^5$ A47H** *13/14*

**U.S. Cl. 160—348** **6 Claims**



1. A method for draping a curtain forming material comprising the steps of:

- a) attaching two holders to opposing sides of an opening in a wall, each holder having a C-shaped member positioned between and joining two prongs terminating in a curved surface portion at an upper end thereof, the C-shape member being affixed to a bar member at an end of the C-shaped member opposite its opening, said bar member having means to attach the holder to a wall;
- b) supporting a curtain material above the holder such that the curtain material extends along opposing sides of the opening in the wall;
- c) plaiting the portion of the curtain material that extends along the sides of the opening in the wall to form a bar-like bundle;
- d) pulling a portion of the bar-like bundle forwardly from the wall through the prongs of each holder; and
- e) pulling a portion of the forwardly pulled material around the prongs of the holders to form a tie-back pouf.

---

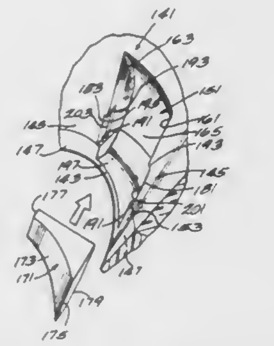
### 5,018,568
### LOST FOAM ENGINE BLOCK PATTERN

**Russell J. VanRens, Milwaukee, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Continuation of Ser. No. 202,212, Jun. 3, 1988, abandoned. This application Feb. 2, 1989, Ser. No. 306,245**

**Int. Cl.$^5$ B22C** *7/02, 9/04*

**U.S. Cl. 164—34** **12 Claims**



5. A foam pattern for forming a cylinder block of a two cycle engine, said pattern comprising a foam engine block component having an internal generally cylindrical wall defining a cylinder, a recess disposed in said wall and extending longitudinally of said cylinder, said recess having a base portion spaced radially from said wall and having a discharge end, a separate foam insert disposed circumferentially across said recess, said insert being spaced from said base portion to provide a longitudinal transfer passage therebetween, a first end of said insert being spaced longitudinally from said discharge end of said recess to provide a transfer port providing communication between said cylinder and the transfer passage, and means for joining said insert to said block component.

---

### 5,018,569
### METHOD FOR CONTINUOUS CASTING OF THIN SLAB INGOTS

**Armin Burau, Muelheim; Hans-Georg Eberhardt, Duisburg; Hans J. Ehrenberg, Duesseldorf; Hans U. Franzen; Rainer Lenk, both Duisburg; Lothar Parschat, Ratingen; Manfred Pfluger; Fritz-Peter Pleschiutschnigg, both of Duisburg, and Werner Rahmfeld, Muelheim, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany**

**Filed Jun. 30, 1989, Ser. No. 374,444**

**Claims priority, application Fed. Rep. of Germany, Jul. 4, 1988, 3822939; Mar. 8, 1989, 3907905**

**Int. Cl.$^5$ B22D** *11/20, 11/16*

**U.S. Cl. 164—454** **3 Claims**

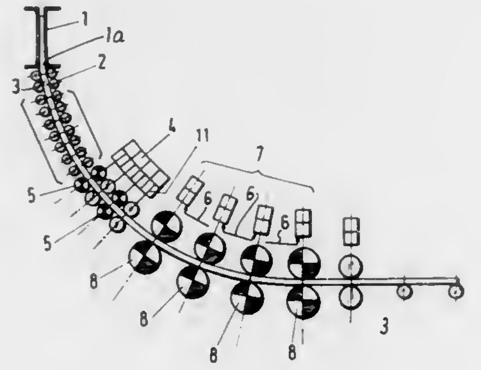
1. Method for continuous casting of thin slab ingots with reduced thickness following immediately the casting particularly of steel under utilization of a mold which is open at its bottom and under further utilization of roller pairs arranged along the withdrawal path, at least some of them are driven and at least some of the rollers are hydraulically adjustable perpendicular to the longitudinal direction of the casting so as to act as ingot deforming rolls, the improvement comprising:

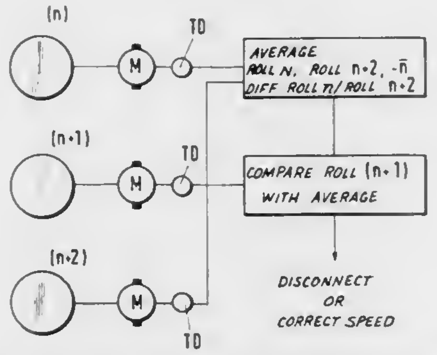
determining the instantaneous speed of each separately

OL
126
SS
4
MY
28
1991
UMI

driven rollers pair; determining the compressive force of each perpendicularly adjustable roller acting against the ingot, and providing a feedback control for adjusting the instantaneous speed and the compressive force of each roller, also separately;

ascertaining the location of a point of complete solidification by detecting the electric current inputted into each individual drive, by detecting the reaction forces produced by the ingot upon the perpendicularly adjustable rollers, and by detecting the spacing of each roller with respect to the oppositely positioned roller, and generating control signals accordingly;





providing a master control action by utilizing each of the control signals, controlling for the speed of each driven roller such that the point of complete solidification is dynamically maintained in a particular geometric position as far as the passing ingot is concerned; and

additionally limiting the adjustment of rollers by means of stops as far as the gap between pairs of such rollers is concerned downstream from said point.

---

5,018,570

## METHOD AND APPARATUS FOR MANUFACTURING COMPOSITE SUPERCONDUCTING STRIP

**Arthur H. Iversen, Saratoga, Calif., assignor to Coriolis Corporation, Saratoga, Calif.**

**Filed Aug. 23, 1989, Ser. No. 399,432**
**Division of Ser. No. 119,338, Nov. 10 1987.**
**Int. Cl.$^5$ B22D** *11/06, 19/16*
**U.S. Cl. 164—461** **5 Claims**

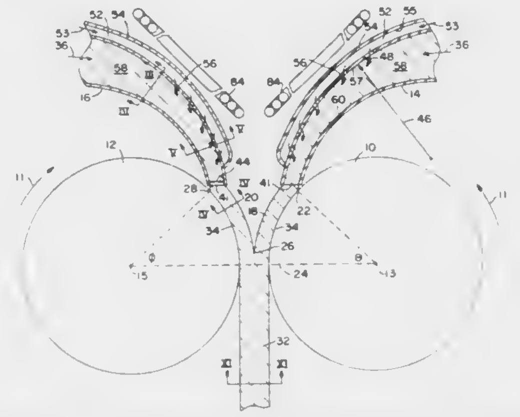
1. A method for producing a composite strip having a metal component and a continuous metal compound component, comprising the steps of:

forming a stream of molten metal in an enclosed casting conduit within a casting apparatus;

feeding a reactive fluid into a fluid conduit within said casting apparatus and through an inlet of said casting conduit;

contacting a surface region of said molten metal, while said molten metal is within said casting conduit, with said reactive fluid in such a manner that said reactive fluid is trapped against an inner surface of said casting conduit by the flow of molten metal therethrough to thereby form said continuous metal compound at said surface region of said molten metal;

thereafter discharging said stream of molten metal from said casting apparatus; and



chilling said stream of molten metal to form a composite metal strip.

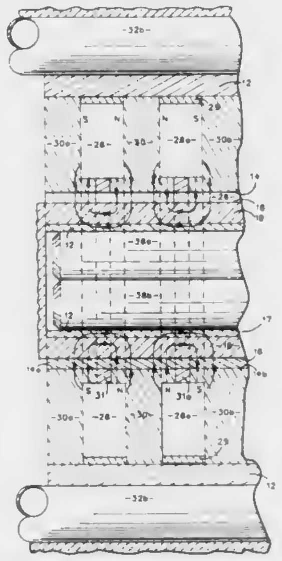
---

5,018,571

## MAGNETIC ROTARY THERMAL JOINT

**Arthur Holmberg, Jr., Cypress, and David E. Wilson, Huntington Beach, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jun. 2, 1989, Ser. No. 360,676**
**Int. Cl.$^5$ B64G** *1/50;* **F28F** *5/00*
**U.S. Cl. 165—41** **14 Claims**



13. A magnetic rotary thermal joint for use in deep space environments having a temperature of less than 100K., comprising:

a first rotor having a first thermal surface;

a second rotor, coaxially aligned with said first rotor and rotatable with respect to said first rotor, said second rotor having a second thermal surface facing said first thermal surface and separated from said first thermal surface by a gap;

a magnet for impressing a magnetic field across said gap; and

a ferromagnetic powder filling said gap.

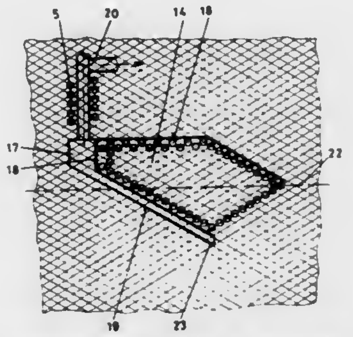
---

5,018,572

## STEAM CONDENSER

**Francisco Blangetti, and Vaclan Svoboda, both of Baden, Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland**

**Filed Feb. 20, 1990, Ser. No. 481,205**
**Claims priority, application Switzerland, Feb. 23, 1989, 670/89**
**Int. Cl.$^5$ F28B** *9/10*
**U.S. Cl. 165—113** **3 Claims**



1. Steam condenser for on-floor arrangement with a side inlet connected to a steam turbine, the steam being precipitated on pipes through which cooling water flows and which are combined into separate component clusters, and the pipes of a cluster, which are arranged in rows, enclosing a cavity in which a cooler for the non-condensable gases in arranged, wherein

the component clusters are oriented horizontally in their longitudinal extent,

a plurality of component clusters are vertically arranged above one another,

and each cooler is constructed asymmetrically inside one of the component clusters, wherein an intake cross section of the cooler has a geometrical center below the longitudinal center line of the respective component cluster.

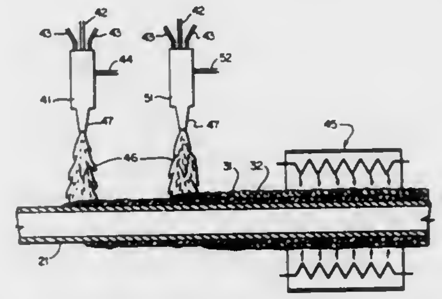
---

5,018,573

## METHOD FOR MANUFACTURING A HIGH EFFICIENCY HEAT TRANSFER SURFACE AND THE SURFACE SO MANUFACTURED

**Steven R. Zohler, Manlius, N.Y., and Richard C. Lewis, Merrimack, N.H., assignors to Carrier Corporation, Syracuse, N.Y.**

**Filed Dec. 18, 1989, Ser. No. 451,683**
**Int. Cl.$^5$ F28F** *13/18;* **B05D** *3/02*
**U.S. Cl. 165—133** **2 Claims**



1. A heat transfer surface comprising:

a metallic substrate;

a first coating of metallic powder particles deposited on said metallic substrate so that parts of said metallic powder particles are fused to said metallic substrate and to each other with interstitial voids among said metallic powder particles; and

a second coating of metallic powder particles deposited on said first coating of metallic powder particles so that parts of said metallic powder particles of said second coating are fused to said metallic powder particles of said first coating and to each other with interstitial voids among said metallic powder particles of said second coating, said interstitial voids of said second coating having a finer or smaller pore or cavity structure relative to said interstitial voids of said first coating.

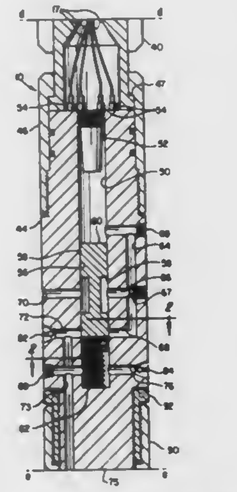
---

5,018,574

## TUBING CONVEYED WELLBORE FLUID FLOW MEASUREMENT APPARATUS

**Lonnie J. Smith, Allen, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Nov. 15, 1989, Ser. No. 436,850**
**Int. Cl.$^5$ E21B** *23/06, 33/127*
**U.S. Cl. 166—185** **16 Claims**



1. A tool for insertion into a wellbore for determining one of a selected property and condition of fluid being produced in the wellbore, said tool being adapted to be inserted in the wellbore at the end of an elongated tubing string, said tubing string being adapted to conduct pressure fluid to said tool, said tool being characterized by:

connector means for connecting said tool to said tubing string;

housing means connected to said connector means and including passage means therein for receiving pressure fluid from said tubing string;

fluid pressure actuated seal means on said tool responsive to receiving pressure fluid from said tubing string for forming a substantially fluid-tight seal in said wellbore;

means associated with said seal means including a wellbore fluid flow passage for conducting wellbore fluid through said packer;

valve means normally closing said wellbore fluid flow passage and responsive to communication of pressure fluid to said seal means to move to open said wellbore fluid flow passage to said wellbore; and

valve means in said tool for controlling the flow of pressure fluid to said seal means from said tubing string for causing said seal means to form said seal, said valve means including a closure member operable by pressure fluid from said tubing string to move from a first position to a second position for communicating pressure fluid to said seal means.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,575

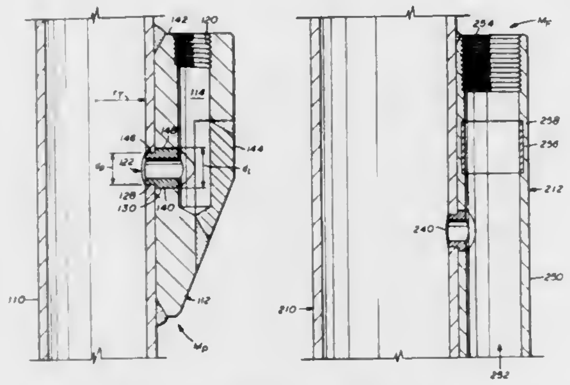
## APPARATUS FOR REDUCING ABRASION AND CORROSION IN MANDRELS

**Ronald C. Parsons, Houston, Tex., assignor to Mandrels, Inc., Houston, Tex.**

**Continuation of Ser. No. 262,426, Oct. 25, 1988, abandoned. This application Jan. 22, 1990, Ser. No. 471,056**

**Int. Cl.⁵ E21B** *17/10, 17/18*

U.S. Cl. 166—242 **2 Claims**



1. An apparatus for insertion into a production string for facilitating a gas lift operation in a producing well, the well having a tubular casing, a tubular production string inside the casing, a means for providing gas to the space between the casing and producing string and at least one valve which opens at a desired pressure differential to aid in controlling flow of the gas between the space and the producing string, the valve having radial gas ports, the apparatus comprising:

a tubing unit for connection with the production string, said tubing unit being tubular in form and having interior and exterior cylindrical surfaces defining a wall, the interior and exterior radial dimensions of said wall being similar to the equivalent radial dimensions of the production string to which said tubing unit is connected, so as to form a smooth connection between said tubing unit and the production string, said wall having a transverse through bore;

a valve lug, mounted to said exterior surface of said tubing unit, being generally tubular in form, having interior and exterior cylindrical surfaces defining a wall, having a first end adapted to receive the valve, and having a transverse through bore formed in said wall adjacent to said bore in said tubing unit to provide fluid communication between the interior of said tubing unit and the interior of said valve lug;

a tubular insert formed of material having an abrasion resistance appreciably greater than the material of said tubing unit and said valve lug, said insert having interior and exterior surfaces defining a wall positioned in said communicating bores of said tubing unit and said valve lug and attached to said tubing unit and said valve lug; and

a generally cylindrical tubular sleeve formed of material having an abrasion resistance appreciably greater than the material of said tubing unit and said valve lug, said sleeve having interior and exterior surfaces defining a wall, the diameter of said inner surface being approximately equal to the diameter of said inner surface of said valve lug; and

wherein said inner surface of said valve lug includes a groove, said groove depth being approximately the thickness of said sleeve wall, said groove being located adjacent the location of the radial ports of the valve when the valve is installed in the apparatus, said tubular sleeve being located in said groove.

---

### 5,018,576

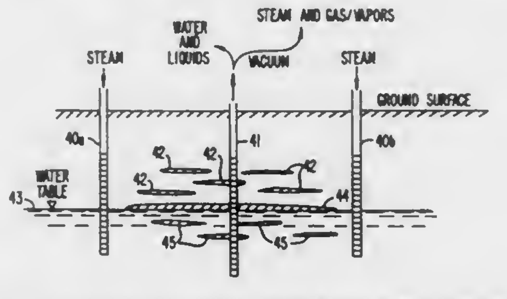
## PROCESS FOR IN SITU DECONTAMINATION OF SUBSURFACE SOIL AND GROUNDWATER

**Kent S. Udell, Berkeley; Nicholas Sitar, Kensington; James R. Hunt, Walnut Creek, and Lloyd D. Stewart, Jr., Berkeley, all of Calif., assignors to The Regents of the University of California, Oakland, Calif.**

**Filed Aug. 16, 1989, Ser. No. 394,739**

**Int. Cl.⁵ E02D** *3/11;* **E21B** *43/00, 43/24*

U.S. Cl. 166—272 **8 Claims**



1. A process for in situ decontamination of a contaminated subsurface area containing volatile contaminants, nonvolatile aqueous soluble contaminants and nonvolatile nonaqueous volatile contaminants, comprising the steps of:

(a) constructing an injection well system comprising a plurality of injection wells proximate to the periphery of and/or located within said contaminated area;

(b) constructing at least one extraction well disposed within said contaminated area and spaced apart from said injection wells;

(c) concurrently injecting steam into said injection well system and applying subatmospheric pressure to said extraction well whereby steam is drawn in a substantially horizontal direction through said contaminated subsurface area to thereby heat said area, volatilize, and extract a substantial amount of said volatile contaminants from said area; whereby water, nonvolatile and volatile contaminants are withdrawn through said extraction well;

(d) ceasing injection of said steam into said injection well system and continuing the application of subatmospheric pressure at said extraction well to withdraw residual steam and gases, and residual liquids from said subsurface area, which gases and steam are volatilized by the residual heat in said subsurface area.

---

### 5,018,577

## PHOSPHINATE INHIBITOR FOR SCALE SQUEEZE APPLICATIONS

**Jerry E. Pardue, Sugarland, Tex., and James F. Kneller, LaGrange Park, Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

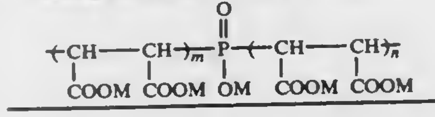
**Filed Aug. 2, 1990, Ser. No. 561,854**

**Int. Cl.⁵ C02F** *5/14;* **E21B** *37/00, 43/22*

U.S. Cl. 166—279 **8 Claims**

7. An improved squeeze treatment for preventing and removing scale from the surfaces of oil wells and the formations adjacent to the casing of these wells, said squeeze treatment being of the type wherein the injection of the flood water is stopped, a solution containing scale inhibitor is introduced under increased pressure into the wellbore penetrating the formation adjacent to the wellbore, the improvement which comprises using as the scale inhibitor a predominantly phosphinate containing composition comprising:

| Ingredients | Mole Percent - Less Than |
|---|---|
| A. Monosodium phosphinicobis - (succinic acid) | 22 |
| B. Monosodium phosphinico-succinic acid | 26 |
| C. Sodium phosphonosuccinic acid | 12 |
| D. Sodium phosphate | 5 |
| E. Sodium phosphite | 6 |
| F. Sodium hypophosphite, and | 6 |
| G. A phosphinicosuccinic acid oligomer having the probable structural formula: | |



$$-\!\left(\underset{\mathrm{COOM}}{\underset{|}{\mathrm{CH}}}-\underset{\mathrm{COOM}}{\underset{|}{\mathrm{CH}}}\right)_{m}-\overset{\mathrm{O}}{\overset{\|}{\underset{\mathrm{OM}}{\underset{|}{\mathrm{P}}}}}-\left(\underset{\mathrm{COOM}}{\underset{|}{\mathrm{CH}}}-\underset{\mathrm{COOM}}{\underset{|}{\mathrm{CH}}}\right)_{n}-$$

wherein G exceeds 25 mole percent, M is H, Na, K, $NH_4$, amine salts mixtures thereof and m and n are either 0 or a small whole number with the proviso that either m or n is a small whole number and the sum of m plus n is greater than 2, said improved squeeze treatment further comprising the steps of:

a) introducing a low brine pad solution into the formation following the introduction of the inhibitor into the formation and then;

b) introducing a high calcium brine flush into the formation.

---

### 5,018,578

## METHOD OF ARRESTING HYDRAULIC FRACTURE PROPAGATION

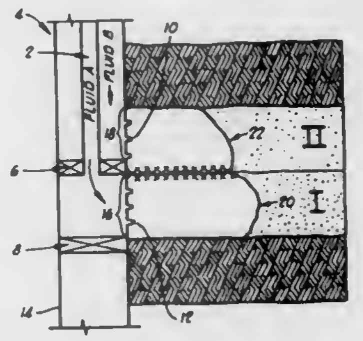
**Wadood El Rabaa, Plano, Tex.; R. Clay Cole, Duncan, Okla., and David L. Meadows, Rush Springs, Okla., assignors to Halliburton Company, Duncan, Okla.**

**Filed Aug. 6, 1990, Ser. No. 563,765**

**Int. Cl.⁵ E21B** *33/138, 43/26*

U.S. Cl. 166—281 **17 Claims**

1. A method of hydraulically fracturing a subterranean formation, comprising injecting a first fluid through a well bore into a first formation zone and injecting a second fluid through the well bore into a second formation zone which is adjacent to the first zone, said first and second fluids being injected at pressures sufficient to induce fracturing in both formation zones, contacting said first and second fluids in the subterranean formation proximate the interface between the first and second formation zones whereby a barrier product is formed which substantially arrests propagation of fractures from one zone into the other formation zone.



---

### 5,018,579

## ARRANGEMENT AND METHOD FOR CONDUCTING SUBSTANCE AND SEAL THEREFOR

**Britt O. Braddick, Houston, Tex., and Michael Langer, Nienhagen, Fed. Rep. of Germany, assignors to Texas Iron Works, Inc., Houston, Tex.**

**Filed Feb. 1, 1990, Ser. No. 471,291**

**Int. Cl.⁵ E21B** *33/16*

U.S. Cl. 166—291 **91 Claims**

1. Apparatus for forming a closed system with the bore of an operating string for first releasing sealably engaged lower plug and wiper means and then releasing sealably engaged upper plug and wiper means from the operating string to position a substance in a well bore comprising:

lower and upper spaced plug means for wiping the operating string bore ahead of and behind, respectively, the substance;

lower and upper spaced wiper means for wiping the liner ahead of and behind, respectively, the substance upon sealing engagement, respectively, with said lower and upper plug means for movement through the liner;

shear means connecting said lower and upper wiper means to the operating string; and

seals to close off communication between the operating string bore and the well bore when said lower plug means is sealingly engaged in said lower wiper means whereby pressure in the operating string is effective to actuate said shear means and release said engaged lower plug and wiper means from the operating string and to close off communication between the operating string bore and the well bore when said upper plug means is sealingly engaged in said upper wiper means whereby pressure in the operating string is effective to actuate said shear means and release said engaged upper plug and wiper means from the operating string.

12. Apparatus for conducting a substance through the bore of an operating string into a well bore wherein lower and upper wiper means are connected by shear means to the operating string for sealably receiving lower and upper plug means, respectively, for wiping ahead of and behind, respectively, the substance, said apparatus comprising:

a seal between the upper wiper means and the bore of the operating string;

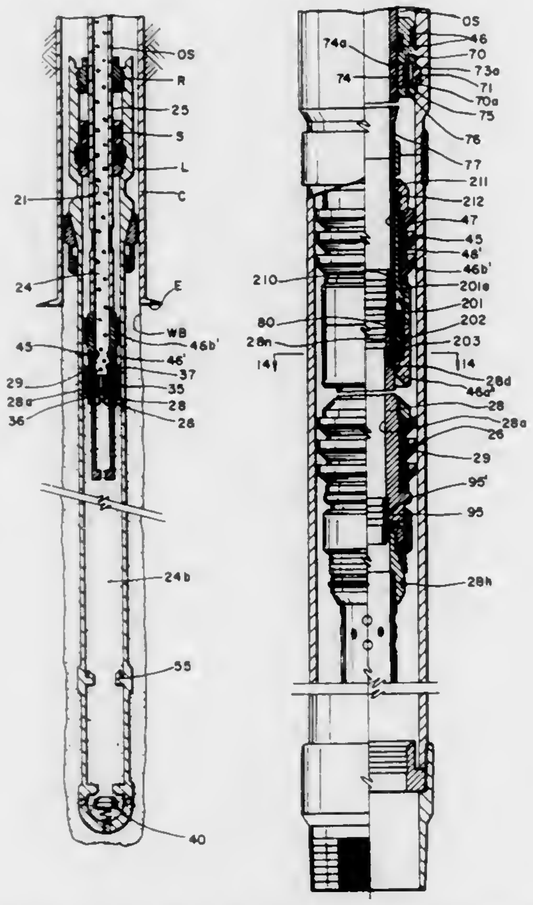
a seal arrangement to close off communication between the operating string adjacent the lower and upper wiper means and the well bore; and

shear means on the operating string for releasably securing each the lower and upper wiper means on the operating string.

60. A method of cementing a liner in a well bore casing

VOL
126
SS
4
MY
28
1991
UMI

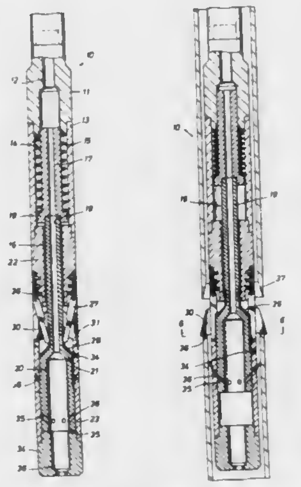
wherein the liner is sealably and releasably supported on an operating string having a bore for conducting cement into the well bore comprising the steps of:
- positioning upper wiper means to sealably engage the bore of the operating string and to seal off communication between the operating string bore adjacent the upper wiper means and the well bore;
- positioning lower wiper means to close off communication between the operating string bore adjacent the lower wiper means and the well bore;
- connecting shear means on the operating string with each the upper and lower wiper means;
- lowering the operating string with the wiper means thereon in the well bore;
- releasing the liner from the operating string and suspending the liner on the casing in the well bore;
- discharging lower plug means and cement into the operating string to wipe the operating string with cement therebehind;
- sealably seating and locking the lower plug means in the lower wiper means and shearing the shear means by fluid pressure to release the lower wiper means with the lower plug means therein from the operating string by fluid pressure in the operating string for wiping the liner ahead of the cement;
- discharging upper plug means into the operating string to wipe the operating string behind the cement;
- sealably seating the upper plug means within the upper wiper means and shearing the shear means by fluid pressure to release the upper wiper means with the plug means therein from the operating string by fluid pressure in the operating string for wiping behind the cement; and
- discharging the cement from the liner into the well bore.



88. A method of releasably assembling lower and upper wiper and plug means on an operating string having a bore for isolating a substance as it is conducted and discharged to a selected region in a well bore comprising the steps of:
- releasably positioning each the lower and upper wiper means on the operating string to receive the lower and upper plug means for wiping ahead of and behind the substance; and
- providing seals on the assembly to close off communication between the operating string bore adjacent the lower and upper wiper means and the well bore.

---

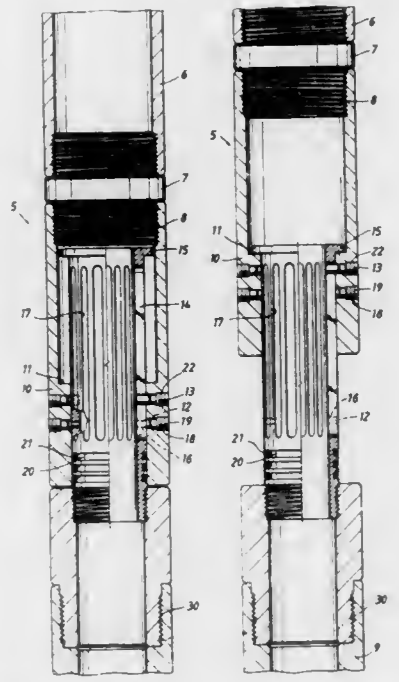
### 5,018,580
## SECTION MILLING TOOL
**Uvon Skipper, 7409 S. Rile Ave., Bellaire, Tex. 77401**
**Division of Ser. No. 273,906, Nov. 21, 1988, Pat. No. 4,893,675.**
**This application Jan. 16, 1990, Ser. No. 465,053**
**Int. Cl.$^5$ E21B** ***29/00***
**U.S. Cl. 166—298** **9 Claims**



1. A miller for lowering into a cased well for milling a casing from the well, the miller comprising:
- (a) an elongate outer tubular body having an inner axial passage therealong and adapted to be connected at the upper end thereof to a pipe string positioned in the casing for lowering to a selected depth and to be rotated by the pipe string;
- (b) a movable inner mandrel within said outer body, said inner mandrel movable between an initial position in said outer body and an operative position relative to the initial position therein;
- (c) a set of cutters movably rotatably mounted on and supported by said outer body and having outwardly extending cutting edges for contact against any surrounding casing wherein said cutters are constructed with cutting surfaces for cutting the casing on rotation of said outer body;
- (d) shoulder means movable with said inner mandrel for operatively moving said cutters radially outwardly into a cutting position; and
- (e) guide slot means at said shoulder means for engaging and restricting said cutters during milling wherein said cutters have an edge engaged by said guide slot to thereby enable restriction of said cutters after rotation, and said slot means comprises a first slot portion along a face of said shoulder means, and a second slot portion beyond said shoulder means on said mandrel.

---

### 5,018,581
## SAND RELEASE APPARATUS AND METHOD
**L. D. Hall, 2647 Cos, Liberty, Tex. 77575**
**Filed Jun. 11, 1990, Ser. No. 536,317**
**Int. Cl.$^5$ E21B** ***23/00, 34/14, 43/00***
**U.S. Cl. 166—373** **19 Claims**

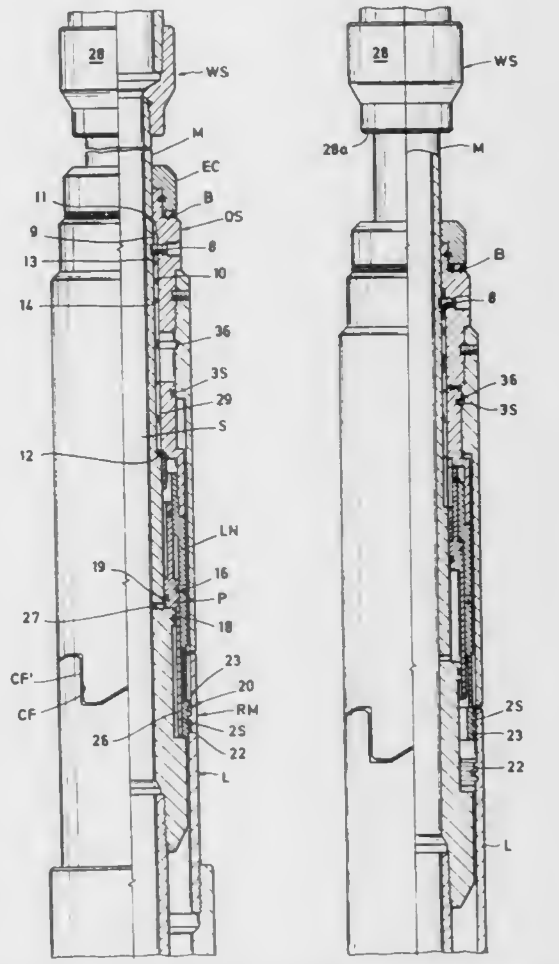


11. A sand release apparatus for enabling the release of a pump comprising:
- (a) first and second telescoped tubular sleeves adapted to be joined to a pump to form an elongate tubular extension thereof, wherein said first sleeve is affixed to the lower portion of the pump and said second sleeve is affixed to a pump hold down below the pump, said sleeves being initially closed and wherein said telescoped sleeves axially extend to an elongated arrangement;
- (b) a first restricting means for restricting relative axial extension of said tubular sleeves, said means restricting axial extension until an axial pull thereon exceeds a specified level;
- (c) sleeve located drain opening means said opening means being exposed upon axial extending telescoping movement to thereby drain sand around the exterior of the pump and apparatus through said opening means into the interior of the apparatus and downwardly through the lower portions thereof and wherein said sleeves close said drain opening means when said sleeves are telescoped together; and
- (d) means for enabling controlled separation of the pump from the apparatus at a specified joint, and while said apparatus is downhole and locked in place.

18. A method for releasing a pump determined to be sand locked comprising the sequential steps of:
- (a) applying an upward force on the sucker rod string to break a shear pin restricting relative axial extension of telescoped sleeve members connected in the well below the pump;
- (b) extending said telescoped sleeve members to expose drain openings to permit sand to flow away from the annular space; and
- (c) disconnecting from the tubing string below the pump to pull the pump free of the sand locked condition.

---

### 5,018,582
## HYDRAULIC RUNNING AND RELEASE TOOL WITH MECHANICAL EMERGENCY RELEASE
**Samuel F. Baker, Conroe, Tex., assignor to Texas Iron Works, Inc., Houston, Tex.**
**Filed Jun. 4, 1990, Ser. No. 533,029**
**Int. Cl.$^5$ E21B** ***43/10***
**U.S. Cl. 166—382** **12 Claims**



9. A setting tool for connection in a well string to position a tubular member in a well bore comprising:
- a mandrel adapted to be connected to the well string;
- an outer sleeve surrounding said mandrel and releasabaly secured thereto;
- a latch nut releasably connected to said outer sleeve;
- piston means sealingly engaging said mandrel;
- shear means releasably securing said piston to said latch nut to maintain said latch nut releasably connected to the tubular member;
- said mandrel having port means for conducting fluid pressure from the well string to release said piston means from and said latch nut;
- cooperating engageable surfaces on said piston and latch nut to reengage them together after said piston moves a predetermined longitudinal distance relative to said latch nut; and

/OL
126
SS
4
MY
28
1991
UMI

additional cooperating engageable surfaces on said latch nut and said outer sleeve which are engageable when said piston and engaged latch nut are moved a predetermined additional longitudinal distance by fluid pressure to secure said engaged piston and latch nut with said outer sleeve for retrieval along with said mandrel from the well bore.

---

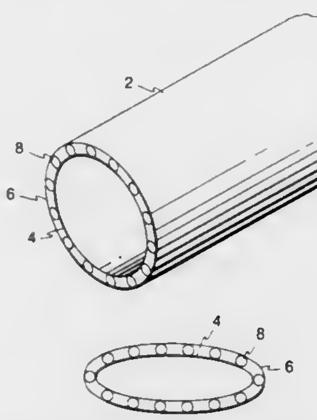
### 5,018,583
### WELL PROCFSS USING A COMPOSITE ROD-STIFFENED PRESSURIZED CABLE

**Jerry G. Williams, Ponca City, Okla., assignor to Conoco Inc., Houston, Tex.**

**Filed Mar. 15, 1990, Ser. No. 495,004**

**Int. Cl.⁵ E21B** *19/22;* **F16L** *11/12;* **H01B** *7/18;* **H02G** *1/08*

**U.S. Cl. 166—385** **10 Claims**



1. In a process in which a wireline actuated well tool is run into a wellbore by a spooled cable, the improvement which comprises utilizing as the cable an internally fluid-pressurized flexible membrane member stiffened with a plurality of parallel uni-directional composite rods spaced from each other and disposed axially on the outside of and in contact with said membrane, said pressurized membrane member being covered with an outer cylindrical flexible protective sheath separate from said membrane member, the combination forming a stiffened cylindrical cable having high resistance to buckling.

---

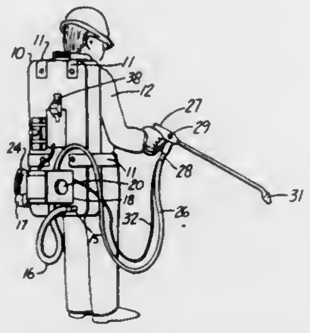
### 5,018,584
### FIRE SUPPRESSOR

**John C. Tomlinson, 4096 N. Victoria St., Shoreview, Minn. 55126**

**Filed Oct. 20, 1989, Ser. No. 424,595**

**Int. Cl.⁵ A62C** *11/00*

**U.S. Cl. 169—30** **5 Claims**



1. A pressurized fire suppressor which can be mounted on a user's back for selectively discharging a fire suppressant toward a fire approached by said user, and which has a reservoir which can be refilled with a fire suppressant available relatively nearby such a fire, said fire suppressor comprising:

a suppressant tank having a user's back mounting means affixed thereto, said suppressant tank having a fill opening at one end thereof and a first flexible conduit connector at an opposite end thereof;

a motor means coupled to a pump means both mounted on said suppressant tank, said pump means having an inlet and an outlet;

a first flexible conduit means which is connected to said pump means inlet, and which is also rapidly connectable to, and disconnectable from, said first flexible conduit connector and capable of passing a fire suppressant from said suppressant tank to said pump means when connected between each; and

a second flexible conduit means which is connected to said pump means outlet, and which is also rapidly connectable to, and disconnectable from, a suppressant discharge head and capable of passing thereto a fire suppressant from said pump means when so connected.

---

### 5,018,585
### SAFETY DEVICE TO RELIEVE EXPLOSIVE PRESSURES

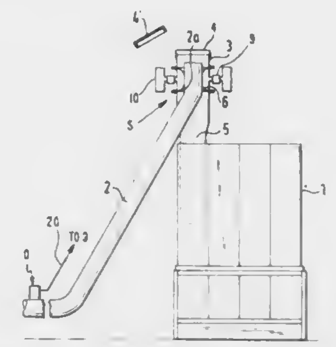
**Hermann Brennecke, Darmstadt, and Horst Liere, Eppertshausen, both of Fed. Rep. of Germany, assignors to Alfo AG, Muntelier, Switzerland**

**Filed Aug. 2, 1989, Ser. No. 388,231**

**Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831828**

**Int. Cl.⁵ A62C** *3/04, 2/06, 3/00, 2/00*

**U.S. Cl. 169—48** **15 Claims**



4. Safety device to relieve explosive pressures due to unintended explosion of explosive fluid media passing through a conveying duct (2, 5) having

a chamber (3) formed with a releasable closure (4) which, under influence of explosive pressure, can release and thus open the chamber;

an inlet duct (2*a*) terminating in said chamber,

said inlet duct being spaced from the walls of the chamber, said inlet duct having outer walls defining a fluid passage space in said chamber;

an outlet duct (5*a*) leading from said fluid passage space in the chamber; and

detector means (D) for detecting a flame or explosion,

and comprising, in accordance with the invention,

a rapid-acting separating means (S, 6; S', 15) positioned between said walls and in said fluid passage space leading to said outlet duct (5*a*), said flame or explosion detector means (D) being coupled to said separating means for activating said separating means upon sensing a flame or explosion and thereby separating the inlet and outlet ducts;

and wherein the rapid-acting separating means (S, 6) comprises an approximately ring-shaped elastic membrane (6) projectable from one of said walls to the other of said walls, and operating means (8, 9, 10) acting on said membrane for projecting said membrane across said chamber and between said walls for separating said inlet and outlet ducts.

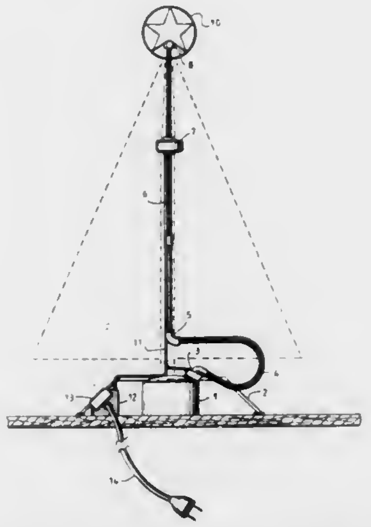
### 5,018,586
### FIRE SUPPRESSION SYSTEM FOR A DECORATIVE TREE

**Dennis Cawley, and Richard Cawley, both of 101 Access Rd., Norwood, Mass. 02062**

**Filed Jan. 26, 1990, Ser. No. 471,215**

**Int. Cl.⁵ A62C** *37/08*

U.S. Cl. 169—56 **2 Claims**



1. Apparatus for the suppression of a tree fire, upon a substantially conical shaped decorative tree comprising:

a canister capable of containing a fire suppression material;

a conduit leading from said canister for transporting therethrough the fire suppression material, said conduit having a plurality of stationary openings for permitting the exiting of the fire suppression material;

means for sensing the presence of heat or smoke; and,

means for forcing the fire suppression material contained within said canister through said conduit to and through the plurality of openings of said conduit in order to combat a tree fire, said means for forcing being activated in response to said sensing means sensing the presence of heat or smoke;

means for directing said fire suppression material outward and downward over the substantially conical shaped decorative tree, said means being said plurality of openings being oval shaped and said openings having a horizontal diameter which is greater than a vertical diameter;

said means for sensing the presence of heater smoke includes a plurality of heat/smoke detectors which encircle a tree;

said means for forcing the fire suppression material contained within said canister through said conduit includes a solenoid valve;

an electrical control relay connected within said conduit, said electrical control relay being capable of deactivating electrical power for a tree.

---

### 5,018,587
### BRUSH ATTACHMENT

**Dale E. Gandrud, and Randall C. Nelson, both of Owatonna, Minn., assignors to Gandy Company, Owatonna, Minn.**

**Filed Feb. 8, 1990, Ser. No. 477,584**

**Int. Cl.⁵ A01B** *45/00*

U.S. Cl. 172—612 **15 Claims**

1. A brush attachment for connection to a tow vehicle, comprising:

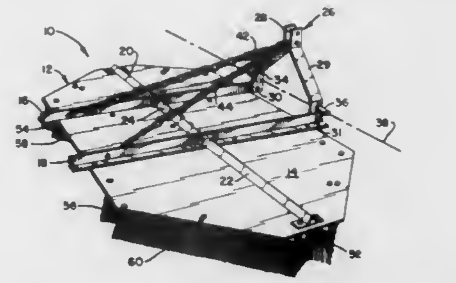
a semirigid plate having top and bottom sides;

a rigid frame;

means for adjustably interconnecting said frame and said plate in order to adjust the overall stiffness thereof;

hitch means mounted on said frame for selective attachment to the tow vehicle; and

a plurality of elongate brushes secured in end-to-end relationship to the bottom side of said plate, said brushes being arranged in at least one row extending substantially across said plate, with each brush oriented at an angle opposite to that of the next adjacent brush.



---

### 5,018,588
### ANCHOR DRILLING IMPLEMENT

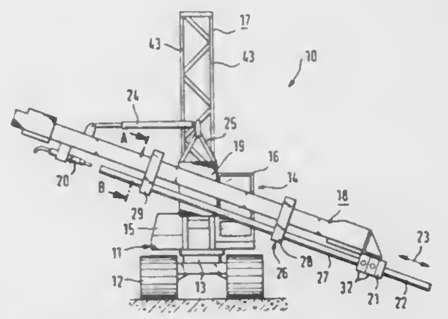
**Johann Haberer, Schrobenhausen, Fed. Rep. of Germany, assignor to Bauer Spezialtiefbau GmbH, Fed. Rep. of Germany**

**Continuation of Ser. No. 361,384, Jun. 5, 1989, abandoned. This application Sep. 25, 1990, Ser. No. 587,575**

**Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819537**

**Int. Cl.⁵ E21B** *7/02*

U.S. Cl. 173—22 **2 Claims**



1. An anchor drilling implement comprising:

caterpillar gear means for moving said implement;

a drill carriage comprising an upper part and a support positioned on said upper part, said drill carriage and said upper part each having a front end in the direction of forward travel, a back end in the direction of backward travel, a first side in the direction of drilling, and a second side opposite the direction of drilling, said support being positioned at said front end of said upper part and projecting over said caterpillar gear means, and said upper part being mounted on said caterpillar gear means for rotation 180° about a vertical axis;

a sliding carriage vertically displaceably guided on said support;

a vertically adjustable arm positioned on said sliding carriage;

a drilling mount pivotable in a vertical plane and vertically adjustable on said support, said drilling mount having a drilling end;

mounting means for pivotably mounting said drilling mount to said arm and thereby to said support, whereby said drilling mount can pivot unhindered in a vertical plane;

hydraulically-operated tool magazine means carried on said drilling mount for receiving a plurality of tool pipes and inserting a selected one of the tool pipes in and removing the selected tool pipe from said drilling mount; and

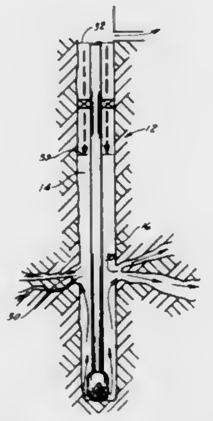
OL
126
SS
4
MY
28
1991
UMI

a driving cab positioned on said upper part laterally alongside said support, at said front end and said first side of said upper part, said tool magazine means being arranged on said drilling mount within sight of an operator located in said driving cab, and said tool magazine being hydraulically operated under the control of said driving cab in all rotation positions of said upper part.

---

### 5,018,589
### PROCESS FOR FINDING THE DEPTH OF A LOST RETURN ZONE

**James M. Williams, 404 Academy St., Houma, La. 70360**
**Continuation-in-part of Ser. No. 301,624, Jan. 25, 1989, Pat. No. 4,919,218. This application Jul. 31, 1989, Ser. No. 387,138**
**Int. Cl.$^5$ E21B** *47/10*
**U.S. Cl. 175—72** **6 Claims**



1. A process for finding the depth of a lost return zone in an open bore hole, where the surrounding strata of the bore hole has collapsed, the process comprising the following steps:

(a) detecting a drop in the mud level within the annulus of the drill casing to a certain depth for establishing a lost return zone;
(b) introducing a quantity of a lighter fluid into the annulus of the bore hole so that the annulus becomes filled with the lighter fluid;
(c) closing off any flow of fluid out of the annulus substantially at the level of the earth's surface;
(d) pushing a quantity of the mud in the annulus into the eroded strata by the weight of the lighter fluid flowing into the annulus;
(e) determining the depth of the hole;
(f) determining the amount of lighter fluid introduced into the annulus;
(g) calculating the hydrostatic head loss; and
(h) calculating the height that the mud in the annulus did not drop in order to establish the same hydrostatic head of the lost return zone depth, and calculating from that depth the depth of the lost return zone.

---

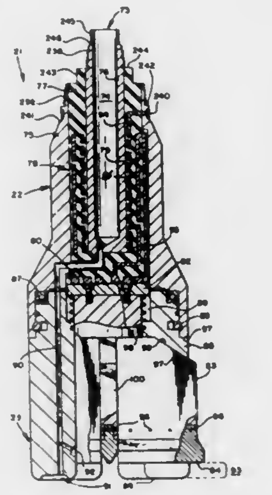
### 5,018,590
### ELECTROMAGNETIC DRILLING APPARATUS

**James M. Weldon, Austin, Tex., assignor to Parker Kinetic Designs, Inc., Austin, Tex.**
**Division of Ser. No. 138,891, Dec. 28, 1987, Pat. No. 4,899,834, which is a division of Ser. No. 822,773, Jan. 24, 1986, Pat. No. 4,722,402. This application Feb. 8, 1990, Ser. No. 477,706**
**Int. Cl.$^5$ F21B** *4/12*
**U.S. Cl. 175—105** **10 Claims**

9. A motor and drill bit for use downhole in a borehole, said motor has an annular housing attachment means located on the lower end of said housing by which said drill bit can be attached thereto; attachment means located on the upper end of said housing by which said motor can be connected at the lower end of a drill string;

said bit has a plurality of cutting members mounted for movement therein, a support member for moving said cutting members, and means connecting said support member to be moved by said motor;

means forming a primary and secondary electrical winding within the motor housing, means forming a fluid flow passageway through said housing and bit, electrical conductor means by which a source of current can be connected to said primary winding; means arranging said primary and secondary windings within said motor housing whereby current flow through the primary winding induces current flow through the secondary winding;

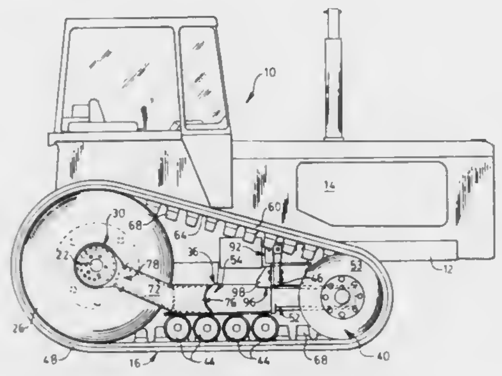


and means including a repulsion coil associated with said secondary winding for moving said support member and thereby vibrating said cutting members of said bit.

---

### 5,018,591
### TRACK LAYING WORK VEHICLE

**Robert J. Price, Dunlap, Ill., assignor to Caterpillar Inc., Peoria, Ill.**
**Filed Apr. 24, 1990, Ser. No. 513,746**
**Int. Cl.$^5$ B62D** *55/00, 55/08*
**U.S. Cl. 180—9.5** **22 Claims**



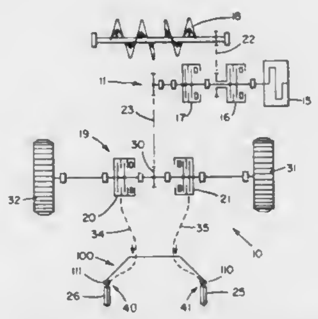
1. A track laying work vehicle, comprising:
a main frame assembly having first and second opposed sides and a longitudinal centerline;
an engine;
first and second roller frame assemblies, each having first and second end portions, and each positioned substantially parallel to the longitudinal centerline of the vehicle;
first and second drive axles, each rotatably connected to said engine;
first and second drive wheels, each rotatably connected to a respective drive axle;

first and second idler assemblies, each rotatably connected to a respective roller frame assembly;
first and second endless elastomeric track belts, each belt having an inner friction drive surface having a plurality of guide blocks, each belt encircling a respective roller frame assembly, idler assembly, and drive wheel;
a roller frame support beam having first and second end portions and a middle portion, said middle portion extending transverse to and beneath said main frame assembly and being connected to said main frame assembly;
first and second roller frame extensions, each having first and second end portions, each first end portions being connected to a respective second end portion of said first and second roller frame assemblies, and each second end portions being connected to a respective first and second drive axle;
first and second clamp assemblies, each releasably connected to a respective drive axle; and
each of said first and second roller frame assemblies being releasably connectable to and moveable along a respective first and second end portion of the roller frame support beam.

---

### 5,018,592
### STEERING CONTROL FOR SNOWBLOWERS

**Ewald Buchdrucker, Columbia Station, Ohio, assignor to MTD Products Inc., Cleveland, Ohio**
**Continuation-in-part of Ser. No. 180,204, Apr. 11, 1988, abandoned. This application Apr. 17, 1989, Ser. No. 339,169**
**Int. Cl.$^5$ B62D** *51/04*
**U.S. Cl. 180—19.3** **23 Claims**

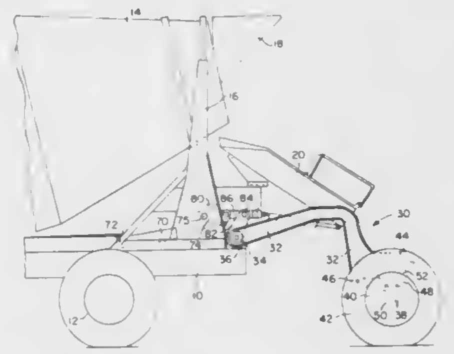


1. A snowblower having two laterally opposed drive members operationally rotated by an engine, a frame and handle bars having two arms; an improved power assisted steering comprising a power input sun gear assembly, said sun gear assembly having an input drive intermediate to two sun gears, means to selectively connect said input drive to the engine, a first set of planetary gears, said first set of planetary gears surrounding one of said sun gears, a first planet carrier, means to rotatively drivingly connect said first set of planetary gears to said first planet carrier, means to connect said first planet carrier to one of the two drive members, a first ring gear, said first ring gear surrounding said first set of planetary gears, said first ring gear being disconnectably connected to the frame preventing the rotation thereof, first operation means to disconnect said first ring gear from said frame so as to allow the rotation thereof, said first operation means including a pawl engaging a tooth, said pawl of said first operation means being interconnected between said first ring gear and the frame for selectively preventing the rotation of said first ring gear in respect to the frame, a second set of planetary gears, said second set of planetary gears surrounding the other of said sun gears, a second planet carrier, means to rotatively drivingly connect said second set of planetary gears to said second planet carrier, means to connect said second planet carrier to the other of the two drive members, a second ring gear, said second ring gear surrounding said second set of planetary gears, said second ring gear being disconnectably connected to the frame preventing the rotation thereof, second operations means to disconnect said second ring gear from said frame so as to allow the rotation thereof, said second operation means including a pawl engaging a tooth, said pawl of said second operation means being interconnected between said second ring gear and the frame for selectively preventing the rotation of said second ring gear in respect to the frame, one trigger control, means to pivotally mount said one trigger control to one arm of the handle bars for a degree of rotation in respect thereto from a neutral position, means to bias said one trigger control in said neutral position, a second trigger control, means to pivotally mount and second trigger control to the other arm of the handle bars for a degree of rotation in respect thereto from a neutral position, mean to bias said second trigger control in said neutral position, means to operatively connect said one trigger control to said first operation means such that rotation of said one trigger control from its neutral position allows rotation of said first ring gear and means to operatively connect said second trigger control to said second operation means such that rotation of said second trigger control from its neutral position allows rotation of said second ring gear to steer the snowblower.

---

### 5,018,593
### HIGH LIFT TAG AXLE FOR TRUCKS

**Lorin E. Hermann, Springville, N.Y., assignor to Ashford Concrete, Inc., Springville, N.Y.**
**Filed Jan. 26, 1990, Ser. No. 470,896**
**Int. Cl.$^5$ B62D** *61/12*
**U.S. Cl. 180—24.02** **18 Claims**



1. A tag axle for attachment to the rear of a truck comprising, a pair of tag arms having forward and rearward ends adapted to have their forward ends pivotally secured to a rear portion of said truck, a wheel rotatably secured to the rearward end of each tag arm, a lever arm secured to the forward end of each tag arm, at least two link members interconnecting each of said lever arms to said truck whereby one end of one said link member is pivotally connected to said lever arm at a pivotal junction, and another link member is pivotally connected to said truck at a pivotal junction, and said link members are pivotally connected to each other at a pivotal junction, means for pivoting said link members sufficient to align said link members and pivotal junctions in a plane whereby said link members will lock said tag arms in a position sufficient to maintain said wheels in contact with a road surface on which said truck is positioned, and means for pivoting said link members so they are not in a plane and will cause said tag arms to be pivoted upward raising said wheels from the road surface.

OL
126
SS
4
MY
28
1991
UMI

### 5,018,594
## REAR-WHEEL STEERING SYSTEM FOR FOUR-WHEEL STEERING VEHICLE

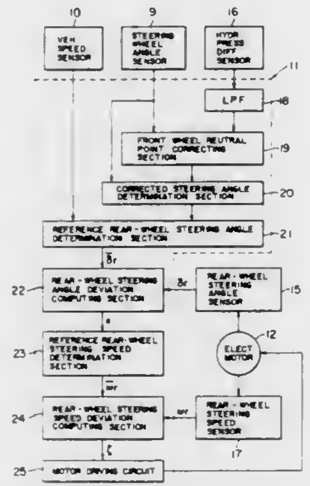
**Akira Takahashi, and Yuji Soejima, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 18, 1989, Ser. No. 451,804**

**Claims priority, application Japan, Dec. 22, 1988, 63-166005[U]; Dec. 22, 1988, 63-166006[U]**

**Int. Cl.$^5$ B62D *5/06, 7/15***

U.S. Cl. 180—140 6 Claims


10
9
16
VEH SPEED SENSOR
STEERING WHEEL ANGLE SENSOR
HYDR PRESS DIFF SENSOR
11
LPF
18
FRONT WHEEL NEUTRAL POINT CORRECTING SECTION
19
CORRECTED STEERING ANGLE DETERMINATION SECTION
20
REFERENCE REAR-WHEEL STEERING ANGLE DETERMINATION SECTION
21
δr
22
REAR-WHEEL STEERING ANGLE DEVIATION COMPUTING SECTION
δr
REAR-WHEEL STEERING ANGLE SENSOR
15
23
REFERENCE REAR-WHEEL STEERING SPEED DETERMINATION SECTION
ELECT MOTOR
12
24
REAR-WHEEL STEERING SPEED DEVIATION COMPUTING SECTION
REAR-WHEEL STEERING SPEED SENSOR
17
25
MOTOR DRIVING CIRCUIT

1. In a rear-wheel steering system for four-wheel steering vehicle having a front-wheel steering angle sensor for detecting a front-wheel steering angle, a vehicle speed sensor for detecting a vehicle speed, a control unit for carrying out rear-wheel steering control in accordance with an actual front-wheel steering angle represented by a deviation of the front-wheel steering angle from a neutral point of the steering and the vehicle speed, and an actuator controlled by the control unit to steer the rear wheels, the improvement of the rear-wheel steering system comprising:

detecting means for detecting front-wheel steering force, front-wheel lateral force or acceleration in the lateral direction of the vehicle and for producing a detection signal; and

front-wheel neutral point correcting means provided in said control unit for resetting said neutral point of the steering to a reference value of said front-wheel steering angle at a time when said detection signal indicates a straight-ahead driving state of the vehicle.

---

### 5,018,595
## TRACTION CONTROL SYSTEM

**Mitsuo Hara, Bisai; Shigeru Kamio, Nagoya; Mitsunori Takao, Kariya; Katsuya Sakita, Obu, all of Japan, and Tomoaki Abe, Brussels, Belgium, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jun. 2, 1990, Ser. No. 545,946**

**Claims priority, application Japan, Jul. 11, 1989, 1-178442; May 24, 1990, 2-134749**

**Int. Cl.$^5$ B60K *28/16***

U.S. Cl. 180—197 17 Claims

1. A traction control system comprising:

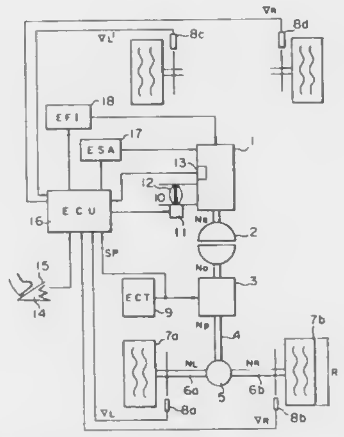
slip state detecting means for detecting the state of a wheel of a motor vehicle;

limit drive torque updating means for successively changing the limit drive torque in accordance with the state of the slip;

limit throttle operation amount setting means for setting a limit of amount of operation of the throttle valve in accordance with the updated limit drive torque;

accelerator operation amount detecting means for detecting the amount of operation of the accelerator by the driver;

inhibiting means for inhibiting updating of said limit drive torque when the amount of operation of the accelerator is smaller than said limit throttle operation amount; and



engine control means for controlling the engine such that the actual driving torque is maintained below said limit drive torque.

---

### 5,018,596
## POWER TRANSMITTING SYSTEM FOR A FOUR-WHEEL DRIVE VEHICLE

**Yukio Kodama, Ohta, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

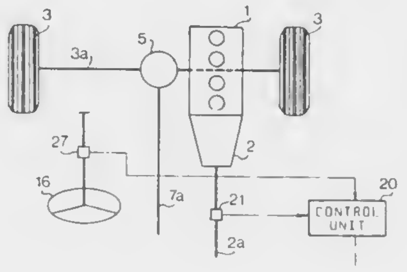
**Division of Ser. No. 63,173, Jun. 15, 1987. This application Apr. 14, 1989, Ser. No. 338,714**

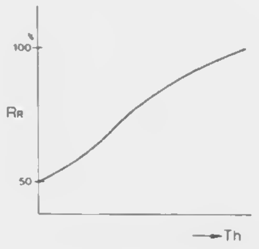
**Claims priority, application Japan, Jun. 20, 1986, 61-144475; Jun. 20, 1986, 61-144476; Jun. 20, 1986, 61-144477; Jun. 20, 1986, 61-144478; Jun. 20, 1986, 61-144479**

**The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.**

**Int. Cl.$^5$ B60K *17/34, 23/08***

U.S. Cl. 180—233 13 Claims





1. A power transmitting system for a four-wheel drive vehicle in which power of an engine is transmitted to front and rear wheels of the vehicle through a central differential, the system comprising

a torque distribution device including clutch means connected to outputs of said central differential operatively bypassing said central differential for changing torque transmitted to the front and rear wheels with a continuously changeable torque distribution ratio for the rear wheels,

detecting means for detecting driving conditions of the vehicle including steering torque for producing an output signal, and

control means responsive to the output signal for rendering the clutch means operative so as to change said torque distribution ratio for the rear wheels.

---

### 5,018,597
## FREE WHEEL HUB CONTROL SYSTEM

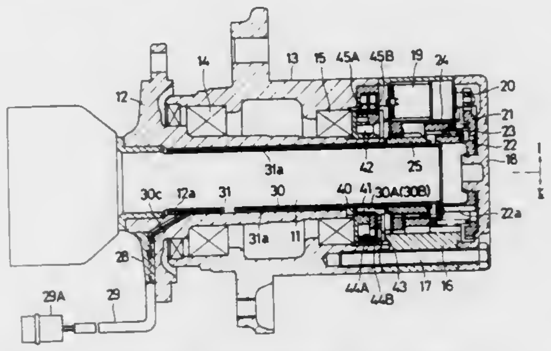
**Hideaki Wakabayashi, Nagoya; Tooru Kagata, Toyota, and Hiroyuki Amano, Kariyo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Dec. 27, 1989, Ser. No. 457,385**

**Claims priority, application Japan, Dec. 28, 1988, 63-328990**

**Int. Cl.$^5$ B60K *23/08***

U.S. Cl. 180—247 6 Claims



1. A free wheel hub control system comprising:

a free wheel hub mechanism disposed between a drive shaft and an axle hub, the axle hub being rotatably supported by a spindle, a flexible printed circuit disposed between a radial inner face of said spindle and a radial outer face of said drive shaft to transmit a control signal to an electric element of said free wheel hub mechanism, and a cylindrical collar on which is disposed said printed circuits, said cylindrical collar including means for frictionally engaging the cylindrical collar against said inner face of said spindle to connect the cylindrical collar to the spindle.

---

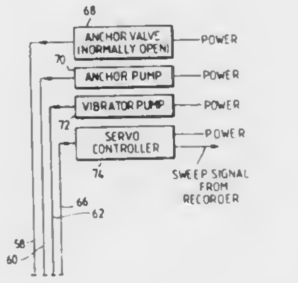
### 5,018,598
## APPARATUS FOR GENERATING SEISMIC WAVES

**Ernest O. Sodich, Caldwell, Tex., assignor to Emil A. Nakfoor and Mahesh Vyas, Houston, Tex., a part interest**

**Filed Jun. 18, 1990, Ser. No. 539,736**

**Int. Cl.$^5$ D01V *1/40***

U.S. Cl. 181—106 10 Claims



1. Apparatus for generating seismic waves in a well bore comprising,

an elongated body including a tubular expandable and a contractible outer anchor wall,

a self-contained anchor setting hydraulic system in the body including an anchor hydraulic reservoir, an anchor setting pump operable to pump hydraulic fluid from the anchor hydraulic reservoir into the anchor wall's interior and expand the anchor wall into anchored position in the well bore, a normally open anchor valve equalizing pressure in the anchor hydraulic reservoir with pressure in the well bore when open and operable to prevent flow of the hydraulic fluid therefrom when closed, and electric means for actuating the anchor setting pump for closing and opening the valve,

a self-contained vibrator hydraulic system in the body including a vibrator operable when activated to cycle pressure impulses to the interior of the tubular and contractible outer anchor wall effective to produce and radiate seismic waves, a vibrator hydraulic reservoir, a vibrator pump, and a vibrator valve operable to cycle hydraulic pressure to the vibrator actuating the vibrator,

a cable connected to the apparatus for locating the apparatus in the well bore, and

electrical means including surface switch means and electric lines in the cable operable to actuate the anchor pump, the anchor valve, the vibrator pump and the vibrator valve.

---

### 5,018,599
## HEADPHONE DEVICE

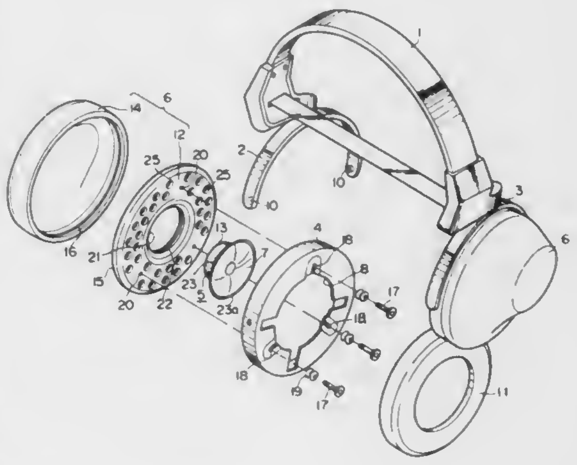
**Masahiro Dohi, and Koji Nageno, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan**

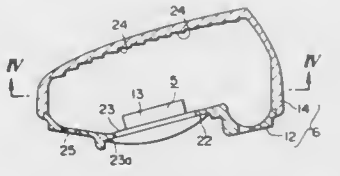
**Filed Sep. 18, 1989, Ser. No. 408,569**

**Claims priority, application Japan, Oct. 3, 1988, 63-249407**

**Int. Cl.$^5$ H04R *25/00***

U.S. Cl. 181—129 14 Claims





1. A headphone device comprising:

a loudspeaker unit including a diaphragm having a front surface, a back surface, and a periphery, and a magnetic circuit at the back surface of said diaphragm; and

a housing having a front plate supporting said loudspeaker unit at the periphery of said diaphragm, said housing enclosing said loudspeaker unit except for the front surface of the diaphragm thereof, said housing including

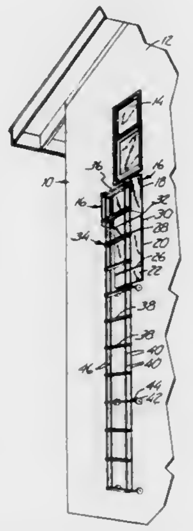
VOL
126
ISS
4
MY
28
1991
UMI

means for preventing the generation of standing sound waves within said housing comprising an inner surface of said housing provided with irregularities thereon.

---

### 5,018,600
### EXTENDIBLE LADDER

**Michael L. Sobczak, 251 Freeman Rd., Cloquet, Minn. 55720**
**Filed Feb. 20, 1990, Ser. No. 482,235**
**Int. Cl.$^5$ E06C** *9/14*
**U.S. Cl. 182—70** **18 Claims**



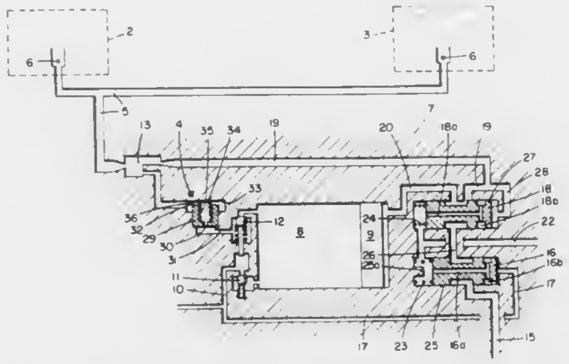
1. An extendible ladder assembly comprising:
- a plurality of parallel rungs each rung having sides which define a plane;
- a plurality of supports connected to the sides of adjacent parallel rungs, the supports being foldable between a first collapsed position wherein the supports fold along the sides of the rungs and are generally coplanar with the planes of the rungs and a second extended position for supporting the plurality of rungs;
- a mount operable coupled to the rungs for mounting the rungs; and
- a housing for supporting the mount and for enclosing the plurality of parallel rungs and the plurality of supports when the plurality of supports are in the first, collapsed position.

---

### 5,018,601
### INTEGRATED EMERGENCY LUBRICATION SYSTEM HAVING SINGLE FEED LINE TO BEARINGS

**Clive Waddington, Stratford, and George T. Milo, Huntington, both of Conn., assignors to Avco Corporation, Providence, R.I.**
**Filed Jun. 27, 1990, Ser. No. 545,359**
**Int. Cl.$^5$ F01M** *1/18*
**U.S. Cl. 184—6.4** **7 Claims**

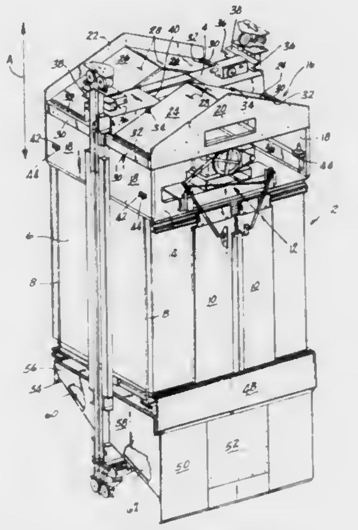
1. An integrated emergency lubricating system for supplying an oil/air mist to a lubrication conduit associated with bearings in the event that the supply of lubricating oil to said bearings through a main oil supply line fails, said system comprising:
- (a) an oil accumulator for containing a fixed amount of emergency supply oil, said accumulator containing an oil inlet conduit section having a pressure-sensitive inlet valve communicating with a pressurized main oil supply line adapted to supply said fixed amount of emergency supply oil to said accumulator, an oil outlet conduit having a pressure-sensitive outlet valve for retaining said oil within the accumulator under non-pressurized conditions, and an air inlet conduit for admitting pressurized air under emergency conditions to pressurize the oil within the accumulator sufficiently to force it through said oil outlet valve and said outlet conduit;
- (b) a misting chamber having an upstream oil inlet conduit section for supplying oil thereto from said accumulator under emergency conditions and an upstream air inlet conduit for supplying air to said misting chamber under emergency conditions to produce therein an oil/air mist with said oil, and having a downstream lubrication conduit for supplying said mist to one or more bearings requiring emergency lubrication;
- (c) an air supply conduit having an outlet for admitting compressed air from a source to said system under emergency conditions;
- (d) an air shut-off valve communicating with said air outlet and with an oil conduit section which communicates with the main oil supply line, said air shut off valve being biased to open said air outlet during emergency operation but being movable to close said air outlet during normal operating conditions by oil pressure within said oil conduit section;
- (e) an air conduit section communicating with said air shut-off valve and with said air inlet conduit to the accumulator for conveying high pressure air directly to the accumulator when said air shut-off valve is in open position, and also communicating with a pressure-regulating means which is open to the air inlet conduit to said misting chamber, for supplying air under regulated pressure to said misting chamber when said air shut-off valve is in open position; and
- (f) an oil flow-control valve communicating with said oil outlet conduit from said accumulator and with said oil inlet conduit section to said misting chamber, for uniformly metering the flow of oil from the accumulator to the misting chamber independently of differences between the oil pressure from said accumulator to said oil outlet conduit and the oil pressure in said oil inlet conduit section and independently of the temperature and viscosity of said oil, whereby a uniform volume of emergency oil is automatically metered through said flow control valve, to said misting chamber under the effects of full pressurized air, and a regulated supply of air is supplied to said misting chamber whenever the pressure of the oil to said air shut-off valve fails.



---

### 5,018,602
### REDUCTION OF NOISE AND VIBRATION IN AN ELEVATOR CAR BY SELECTIVELY REDUCING AIR TURBULENCE

**John K. Salmon, South Windsor, and Young S. Yoo, Avon, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.**
**Filed Mar. 21, 1990, Ser. No. 497,054**
**Int. Cl.$^5$ B66B** *11/02*
**U.S. Cl. 187—1 R** **7 Claims**



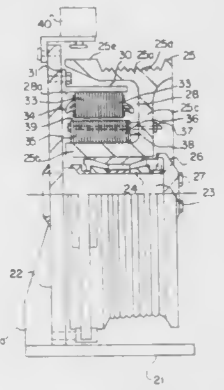
1. An elevator car assembly comprising:
- a. a frame;
- b. a car disposed in said frame;
- c. suspension means mounting said car in said frame;
- d. upper air deflector means mounted on said frame above said car and operable to shield said car from air impingement during upward travel of said car and frame, said upper air deflector means comprising pairs of pitched air deflector panels which meet at a vertical midplane of said car and slope downwardly away from each other toward side walls of said car, said air deflector panels being operable to deflect air flow away from a counterweight path of travel adjacent to said assembly; and
- e. lower air deflector means mounted on said frame below said car and operable to shield said car from air impingement during downward travel of said car and frame.

---

### 5,018,603
### ELEVATOR HOIST APPARATUS

**Hiroyasu Ito, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Aug. 24, 1989, Ser. No. 397,845**
**Claims priority, application Japan, Aug. 26, 1988, 63-212213**
**Int. Cl.$^5$ B66B** *11/08*
**U.S. Cl. 187—17** **17 Claims**

13. An elevator hoist apparatus comprising:
- a shaft;
- a support member for supporting said shaft;
- a sheave detachably and rotatably mounted on said shaft for use with an elevator hoist rope, said sheave having therein an inner space with a side opening;
- said sheave having walls including one disc side wall defining an inner space of said sheave, said sheave having a side opening opposite said one side wall and facing said support member;
- a motor stator mounted to said support member via a support structure which extends into the inner space of said sheave through the side opening, said stator assembly being disposed inside said sheave;
- a motor rotor core disposed within the inner space in an electromagnetically inductive relationship with said motor stator; and

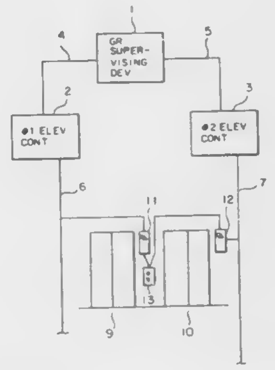


- mounting means for detachably mounting said motor rotor core to said sheave disc side wall and inside said sheave spaced by an air gap from said motor stator.

---

### 5,018,604
### APPARATUS FOR TRANSMITTING SIGNAL FOR GROUP SUPERVISION OF ELEVATORS

**Junichi Tanino, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Aug. 2, 1989, Ser. No. 388,518**
**Claims priority, application Japan, Aug. 5, 1988, 63-195650**
**Int. Cl.$^5$ B66B** *3/00*
**U.S. Cl. 187—121** **3 Claims**



1. An apparatus for transmitting signals for group supervision of elevators comprising:
- (a) a group supervising device;
- (b) a plurality of elevator controllers which generate and transmit control signals;
- (c) floor display panels on each floor which display elevator location represented by display signals;
- (d) hall buttons on each floor which transmit hall calling signals; and
- (e) control signal discriminating and calling signal transmitting means associated with a floor display panel and hall button on each floor for discriminating display signals from control and transmitting hall calling signals to said group supervising device;
- (f) said elevator controller, said floor display panels, said hall buttons, said signal transmitting and discriminating means being connected in a series connection with said group supervising device, and the control signals and hall calling signals being serially transmitted through the series connection.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,605

### MAGNETIC RAIL BRAKE DEVICE

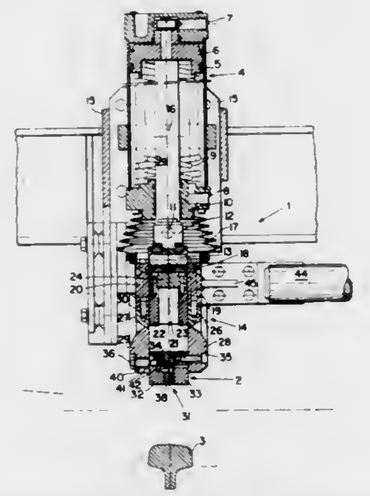
**Jelle Hooghiem, Siegerswoude; Bart van der Sloot, Weidum, and Sytse Epema, Gytsierk, all of Netherlands, assignors to Tebel Pneumatiek B.V., Leeuwarden, Netherlands**

**Filed Sep. 13, 1989, Ser. No. 406,462**

**Claims priority, application Netherlands, Sep. 15, 1988, 8802279; Sep. 15, 1988, 8802279**

**Int. Cl.$^5$ F16D** *65/34*

U.S. Cl. 188—165 20 Claims



1. A magnetic rail brake device for rail vehicles, comprising:

(a) at least one pair of brake blocks adapted to be engaged magnetically against the rail;

(b) at least one permanent magnet, the permanent magnet generating magnetic field lines;

(c) a magnet housing, the magnet housing being formed so as to have a substantially inverted u-shaped upper portion created by a top plate and an adjoining first side plate and an adjoining second side plate;

(d) a double acting cylinder, further comprising:

  (i) a cylinder block;

  (ii) a piston, the piston traveling within the cylinder block;

  (iii) at least one port, the port permitting adjustment of piston position within the cylinder by a pressure medium;

  (iv) a piston rod;

  (v) at least one spring, the spring permitting biasing of the piston position within the cylinder block;

(e) a universal joint, the universal joint being operatively interconnected between the piston rod and the magnet housing, such that the magnetic field lines close through an upper portion of the magnet housing when the permanent magnet is in a first position, and in a second position of the permanent magnet in the magnet housing the field lines can extend through pole pieces within brake block members of magnetizable material adapted to be brought into contact with the rail the second position being reached by unidirectional movement of the permanent magnet and the pole pieces; and

(f) a dust hood, the dust hood being formed as a bellows surrounding the universal joint, thereby protecting the universal joint against dust-and dirt.

---

### 5,018,606

### ELECTROPHORETIC FLUID DAMPER

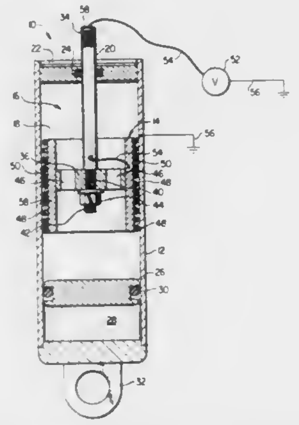
**J. David Carlson, Cary, N.C., assignor to Lord Corporation, Erie, Pa.**

**Filed Jan. 10, 1990, Ser. No. 463,138**

**Int. Cl.$^5$ F16F** *9/53, 15/03*

U.S. Cl. 188—267 17 Claims

1. An apparatus for controlling the transmission of force between relatively movable members, said apparatus comprising at least two electrodes slidably disposed relative to each other and respectively connected to said members, an electrophoretic fluid in surface contact with said electrodes for transmitting force between said members and capable of separating into a particle-rich phase and a particle-deficient phase in the presence of an electric field, means for applying an electric field between said electrodes and to said fluid to separate said fluid into said particle-rich phase and said particle-deficient phase, said particle-rich phase migrating to one.or the other of said electrodes depending on the direction of application of said electric field, means for forming a plurality of spaced and electrically insulating raised surfaces on one of said electrodes so that during application of said electric field in one direction said particle-rich phase collects on the other of said electrodes and extends between said other electrode and said raised surfaces to transmit a predetermined force between said members, and during application of said electric field in the other direction, said particle-rich phase of said fluid migrates to said one electrode and collects in the spaces between said raised surfaces to substantially reduce said force transmission.



---

### 5,018,607

### HYDRAULIC DASHPOT FOR PIPELINE SYSTEMS

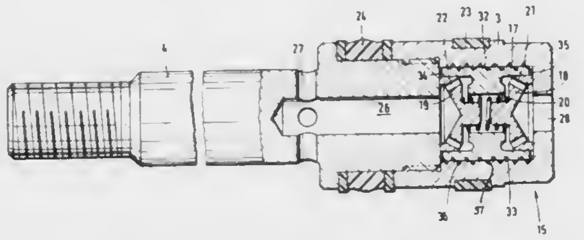
**Hans-Herlof Hardtke, Zeven, and Jörg Bernert, D-Zeven-Hofkoh, both of Fed. Rep. of Germany, assignors to Lisega GmbH, Fed. Rep. of Germany**

**Filed May 15, 1989, Ser. No. 351,631**

**Claims priority, application Fed. Rep. of Germany, May 19, 1988, 3817058**

**Int. Cl.$^5$ F16F** *9/34*

U.S. Cl. 188—282 19 Claims



1. A hydraulic dashpot for supporting loads comprising a cylinder having a piston mounted for displacement therein, said piston setting-off cylinder chambers of said cylinder, means for placing said cylinder chambers in fluid communication with a fluid storage chamber, said piston including an inner chamber housing a valve seat body of a main control valve, said main control valve further including a pair of piston-type valve members reciprocally carried generally within said inner chamber of said piston, each of said piston-type valve members including at least one through bore, means for biasing said piston-type valve members in a predetermined

direction away from each other, said inner chamber and valve seat body having opposing peripheral surfaces, groove means in at least one of said peripheral surfaces for placing axially opposite ends of said inner chamber in fluid communication with each other, first and second ports opening into generally axially opposite ends of said piston inner chamber in generally opposing relationship to respective first and second of said vale members, and said first and second valve members normally closing generally radial fluid communication between said respective first and second ports and said groove means at respective first and second of said piston inner chamber opposite ends when said first and second valve members have been biased a predetermined maximum distance from each other in said predetermined direction and normally opening generally radial fluid communication between said respective first and second ports and said groove means at said first and second piston inner chamber opposite ends when said first and second valve members are spaced closer to each other than said predetermined maximum distance in said predetermined direction to allow fluid flow between said first and second ports.

---

### 5,018,608

### HYDRAULIC SHOCK ABSORBER

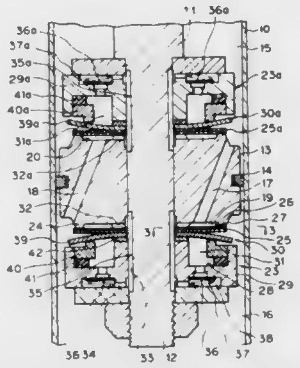
**Tomio Imaizumi, Kanagawa, Japan, assignor to Tokico Ltd., Kawasaki, Japan**

**Filed May 16, 1990, Ser. No. 524,054**

**Claims priority, application Japan, May 19, 1989, 1-126140**

**Int. Cl.$^5$ F16F** *9/34*

U.S. Cl. 188—322.15 7 Claims



1. A hydraulic shock absorber comprising a cylinder, a partition member for partitioning the interior of the cylinder into two chambers and a damping force generating mechanism for regulating the oil flow through a communication passageway formed through said partition member and connecting said two chambers with each other, said damping force generating mechanism comprising:

a disk valve seated on a seat formed on said partition member and adapted to open in response to the oil pressure in said communication passageway:

a damping force regulating chamber arranged on the side of said disk valve remote from said partition member:

an oil passageway for connecting said damping force regulating chamber to said communication passageway:

an orifice disposed in said oil passageway to restrict the area of said oil passageway for oil flow therethrough: and

fulcrum means arranged in said damping force regulating chamber and in contact with said disk valve for providing a fulcrum for said disk valve to deflect, said fulcrum means being designed such that the contact position in which said fulcrum means contacts with said disk valve is shifted in radially outward directions of said disk valve in response to increase in the pressure of oil which flows into said damping force regulating chamber through said orifice.

---

### 5,018,609

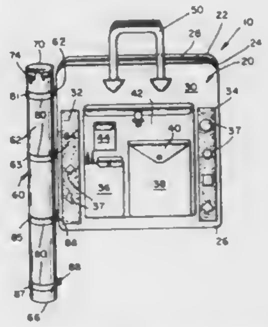
### SPECIALIZED CASE AND ATTACHMENT FOR CARRYING POSTERS AND OTHER DOCUMENTS IN THE ROLLED UP CONDITION

**Barry H. Brenner, 5900 Nora Lynn Rd., Woodland Hills, Calif. 91364**

**Filed Mar. 19, 1990, Ser. No. 495,113**

**Int. Cl.$^5$ A45C** *3/02, 11/26, 11/36*

U.S. Cl. 190—108 13 Claims



1. A specialized portable case for trade show visitors to carry large sheet objects in a rolled up condition as well as other assorted objects, comprising:

a. a first container of a generally slim, elongated cylindrical configuration having an openable end, and a circumferential side which has an exterior surface;

b. a second container of a generally rectangular configuration having a straight outer edge, an interior, and a multiplicity of exposed external pockets;

c. attaching means for attaching the exterior surface of the circumferential side of said first container to the straight outer edge of said second container;

d. whereby large flexible sheet objects may be retained in said first container in a rolled up condition, small variously configured objects may be retained in the respective multiplicity of exposed external pockets of said second container for direct access, and other valuable objects may be safely retained inside said second container.

---

### 5,018,610

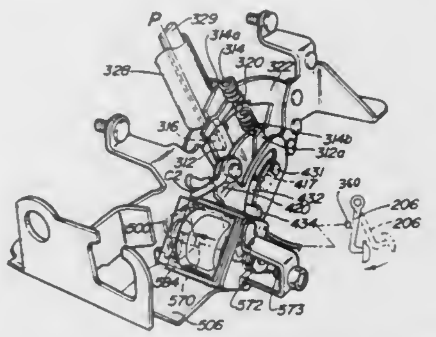
### SERVICE BRAKE AND SHIFT LEVER INTERLOCK SYSTEM

**Adam E. Rolinski, Grand Haven, and Greg R. Pattok, Spring Lake, both of Mich., assignors to Sparton Corporation, Jackson, Mich.**

**Filed Feb. 23, 1989, Ser. No. 314,717**

**Int. Cl.$^5$ B60K** *41/26*

U.S. Cl. 192—4 A 18 Claims



6. An interlock system for a vehicle having a transmission, an engine and a service brake system operable in a brake applied mode and a brake release mode, comprising:

(a) shift lever means movable between a "Park" position and a drive position,

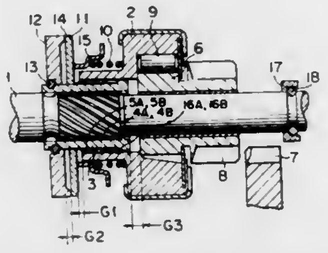
VOL
1126
ISS
4
MY
28
1991
UMI

(b) detent means for releasably retaining the shift lever means in a selected position,
(c) an ignition switch mechanism having a "Lock" position, a "Start" position to start the engine and a "Run" position to operate the engine,
(d) a locking lever operably connected to the ignition switch mechanism,
(e) coupling means for coupling the locking lever and the detent means and moving said locking lever to a locking position when the shift lever is releasably retained in said "Park" position such that said locking lever in said locking position prevents actuation of the detent means to release the shift lever when the ignition switch mechanism is in the "Lock" position, said locking lever and detent means being uncoupled when the shift lever is in the drive position,
(f) switch means responsive to the mode of the service brake system, and
(g) lever locking means responsive to said switch means for retaining the locking lever in said locking position when the shift lever is in the "Park" position with the ignition switch mechanism in the "Start" position or the "Run" position and with the service brake system in the brake release mode and for releasing the locking lever for movement from said locking position by actuation of said detent means when the shift lever is in the "Park" position with the ignition switch mechanism in the "Start" position or the "Run" position and with the service brake system in the brake applied mode such that said shift lever can be moved to the drive position.

---

### 5,018,611
## PINION CLUTCH FOR STARTER

**Nobutoshi Hasebe, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Ibaraki, both of, Japan**
**Filed Oct. 24, 1989, Ser. No. 426,049**
**Claims priority, application Japan, Oct. 27, 1988, 63-271425**
**Int. Cl.$^5$ F02N *11/00;* F16D *41/06***
U.S. Cl. 192—42 5 Claims

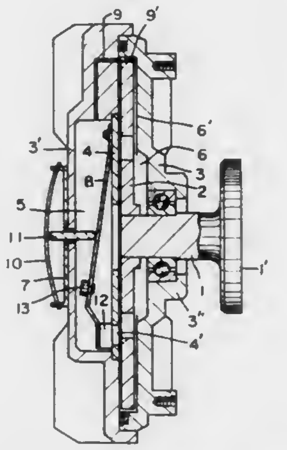


1. A pinion clutch for a starter comprising a spline tube having first and second helical splines on respective inner and outer surfaces thereof disposed on a drive shaft, said inner surface of said spline tube is engaged to said drive shaft by said first helical spline, while said outer surface of said spline tube is engaged to a clutch-outer by said second helical spline, and rollers disposed between a clutch-inner which is integrally formed with a pinion and said clutch-outer so that a one-way clutch function is realized, characterized in that:
a meshing spring and an impact torque absorbing spring urge said spline tube and said clutch-outer in opposite directions, said meshing spring and said impact torque absorbing spring are arranged in series and are disposed between said spline tube and said clutch-outer, and wherein said meshing spring has a spring constant less than a spring constant of said impact torque absorbing spring.

---

### 5,018,612
## TEMPERATURE-CONTROLLED FAN FLUID COUPLING

**Kazunori Takikawa, and Yuichi Ono, both of Numazu, Japan, assignors to Usui Kokusai Sangyo Kaisha Limited, Japan**
**Filed Nov. 17, 1989, Ser. No. 438,772**
**Claims priority, application Japan, Nov. 21, 1988, 63-151542**
**Int. Cl.$^5$ F16D *31/00***
U.S. Cl. 192—58 B 5 Claims

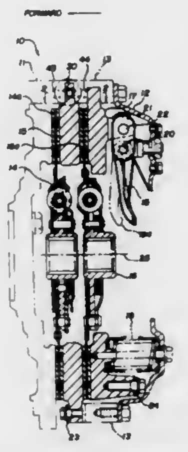


1. A temperature-controlled fan fluid coupling comprising:
a rotating shaft having opposed front and rear ends;
a drive disk rigidly fixed to the front end of the shaft and having a outer circumferential surface;
a sealed housing comprising a cover and a casing defining an inside therebetween, said housing being supported on the shaft via a bearing such that the drive disk is on the inside of the housing;
a generally circular partition plate which partitions the inside of the housing into an oil reservoir chamber and a torque transmission chamber containing the drive disk, the partition plate having an outer circumference and having an outflow-adjusting hole that adjusts the outflow of oil between the oil reservoir chamber and the torque transmission chamber, the hole being located close to the outer circumference of the partition plate, the hole taking the form of a slot having an elongated direction extending circumferentially of the partition plate:
a dam formed in a part of the inner wall surface of the housing which is opposite to the outer wall surface of the drive disk and on which oil collects during rotation;
a circulating passage communicating with the dam and extending from the torque transmission chamber to the oil reservoir chamber;
a temperature-sensing member that is mounted on the housing and deforms with temperature;
an elongated tonguelike resilient valve member having an elongated direction extending circumferentially of the partition plate and interlocking with the deforming temperature-sensing member for opening the outflow-adjusting hole when ambient temperature exceeds a preset value and for closing the outflow-adjusting hole when ambient temperature is below the preset value, the valve member being curved upward away from the partition plate, the valve member being located close to the outflow-adjusting hole and extending over the hole, one end of the valve member being rigidly fixed in the oil reservoir chamber;
a gap formed between opposite surfaces of the drive disk, the casing, and the cover near the outer circumferential surface of the drive disk to transmit torque;
and wherein the effective contact area of oil in the gap is increased and decreased to control the torque transmitted from the rotating shaft to the sealed housing.

---

### 5,018,613
## INTERMEDIATE PLATE POSITIONING MECHANISM FOR TWIN CLUTCH

**Tamio Nagano, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**
**Filed Jul. 12, 1989, Ser. No. 378,676**
**Claims priority, application Japan, Aug. 10, 1988, 63-106233[U]**
**Int. Cl.$^5$ F16D *13/75***
U.S. Cl. 192—70.25 8 Claims



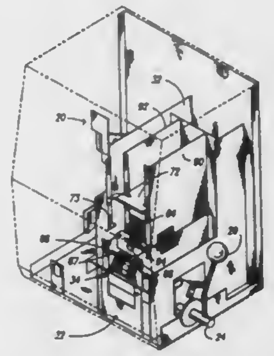
1. In a twin clutch equipped with a first clutch disc pressed on a flywheel, an annular intermediate plate pressing the first clutch disc on the flywheel, a second clutch disc pressed on a back face of the intermediate plate, and an annular pressure plate pressing the second clutch disc on the back face of the intermediate plate, respectively concentrically inside a clutch cover secured to an outer peripheral part of a flywheel; an intermediate plate positioning mechanism for the clutch, in which a hole extends in an axial direction of said clutch through an outer peripheral part of said intermediate plate, a slide member is disposed in said hole, a first coil spring is installed with a first coil spring compressive load between said slide member and said flywheel, a second coil spring is installed with a second coil spring compressive ember between said slide member and said pressure plate, a friction member between said slide member and an inner peripheral surface of said hole for providing a friction load between said slide member and said inner surface of said hole along a length of said inner peripheral surface of said hole where said slide member slides when a difference between said first coil spring compressive load and said second coil spring compressive load becomes larger than a prescribed value at a time of clutch engagement, said friction load stopping at a position along said length at which said first coil spring and said second coil spring com pressive loads become substantially equal, said slide member moving integrally with said intermediate plate while said clutch is being disengaged.

---

### 5,018,614
## TICKET VENDING MACHINE

**Wolf-Dietrich K. Ruckert, Vienna, Austria, assignor to Theodor Braun, Ges, m.b.H, Vienna, Austria**
**Filed Jan. 8, 1990, Ser. No. 461,612**
**Int. Cl.$^5$ G07F *5/04, 11/26***
U.S. Cl. 194—236 15 Claims

9. A ticket vending machine having an outer housing enclosing a money accepting and ticket dispensing apparatus comprising;
a hand operated lever exterior to the outer housing, the lever connected to an outer shaft penetrating the outer housing,
the outer shaft connected to an inner shaft, the inner shaft turning a first and second toothed plate inside the outer housing,
the first toothed plate engaging an intermediate gear, the intermediate gear engaging a drive gear axially connected to a cam wheel within the ticket dispensing apparatus,
the cam wheel actuating a leaf spring, the leaf spring connected to a gate lever for raising and lowering a gate each time the leaf spring passes a high point on the cam to permit exit of a ticket from a stack mounted in the ticket dispensing apparatus under a weight,
a pair of rotating drums mounted below the ticket stack with a band connecting the drums,

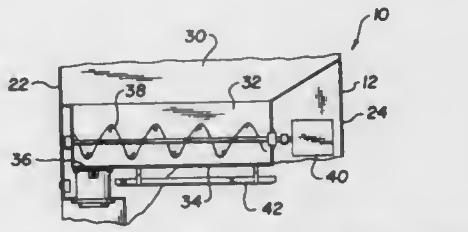


one drum being driven by a shaft connected axially to the drive gear so that rotation of the drive gear rotates the drum and moves a ticket outward over the band,
the second toothed plate engaged to a stop lever in the money accepting apparatus, the stop lever pivoting away from engagement with the second toothed plate upon insertion of a prescribed amount of money into the money accepting apparatus and
the inner shaft only being capable of turning when the stop lever is disengaged from the second toothed plate.

---

### 5,018,615
## VENDING MACHINE FOR PARTICULATE COMESTIBLES

**Frank D. Byrley, 12112 Madeleine Cir., Dallas, Tex. 75230**
**Filed Jun. 13, 1989, Ser. No. 365,528**
**Int. Cl.$^5$ A23L *1/18;* G07F *13/00***
U.S. Cl. 194—241 7 Claims



1. A machine for vending particulate comestibles comprising:
a housing having a top, two sides, a front, a rear, and a sloping bottom holding said particulate comestibles for permitting said comestibles to gravitate toward the lowest part of said bottom, wherein said bottom includes a plurality of perforations smaller than an acceptable particulate size whereby undersized particulates pass through said perforations;
a blower for forcing air upwardly through the perforations in said bottom;
a generally horizontally disposed screw conveyor located proximate the lowest part of said sloping bottom and journaled in said housing;
a discharge opening in said housing adjacent to one end of said screw conveyor;
motor means for rotating said screw conveyor;

/OL
126
SS
4
MY
28
1991
UMI

- coin slot means in said housing for receiving coins to actuate said motor means; and
- control means interposed between said motor means and coin slot means for controlling the rotation of said conveyor by said motor means thereby controlling the quantity of particulate comestible delivered through said opening by said conveyor.

---

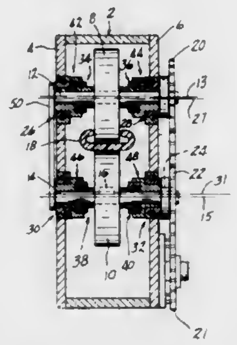
### 5,018,616
### BALANCED SELF ADJUSTABLE ESCALATOR HANDRAIL DRIVE

**Gerald E. Johnson, Farmington, and James A. Rivera, Bristol, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.**

**Filed Nov. 5, 1990, Ser. No. 609,285**

**Int. Cl.$^5$ B66B** *23/04*

**U.S. Cl. 198—335** **4 Claims**



1 A handrail drive assembly for a moving handrail, said assembly comprising:

- a) a pair of drive rollers mounted on rotatable drive roller shafts, said drive rollers forming a nip through which the handrail passes;
- b) rotatable end bearings supporting opposite ends of said drive roller shafts, said end bearings being mounted eccentrically of said drive roller shafts;
- c) drive means for rotating said drive rollers and drive roller shafts on said end bearings whereby the axes of said drive rollers move toward each other due to the eccentricity of said shafts and bearings, to increase nip pressure on the handrail responsive to resistance to movement of the handrail; and
- d) means interconnecting the end bearings at one end of said drive roller shafts, said means being operable to ensure that said drive roller axes move through substantially equal included angles when increasing the nip pressure.

---

### 5,018,617
### WORKPIECE PALLET CHANGER FOR MACHINE TOOLS

**Ichiro Miyata; Ichiro Kitaura, and Keitaro Yonezawa, all-of Itamishi, Japan, assignors to Aioi Seiki Kabushiki Kaisha, Hyogoken, Japan**

**Continuation of Ser. No. 634,406, Jul. 25, 1984, abandoned. This application Mar. 23, 1990, Ser. No. 501,404**

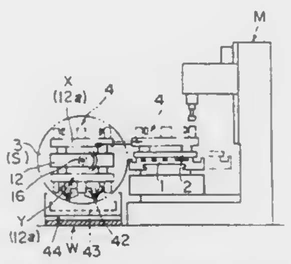
**Claims priority, application Japan, Jul. 25, 1983, 58-136363**

**Int. Cl.$^5$ B65G** *37/00*

**U.S. Cl. 198—346.1** **13 Claims**

1. A work pallet changer for a machine tool comprising a pallet fixing device on a work table receiving a work pallet on said pallet fixing device, a pallet shift system disposed adjacent said machine tool, a plurality of pallet mounting parts disposed in said pallet shift system and means for changing the position of each pallet mounting part between a pallet changing position located adjacent said pallet fixing device and a pallet retracted position spaced from said pallet changing position so as to enable transfer of a work pallet between one of said pallet mounting parts located at said pallet changing position and said pallet fixing device, and wherein: said pallet shift system further comprises at least one pallet rotating system including:

- a rotary frame having a plurality of non-radially extending peripheral surfaces for receiving respectively said pallet mounting parts disposed on said peripheral surfaces of said rotary frame at spaced locations from each other,
- a supporting frame which supports said rotary frame rotatable around an axis of rotation, driving means for rotating said rotary frame around said axis,



- a plurality of pallet engaging means respectively disposed on said pallet mounting parts, so as to engage each work pallet on each pallet mounting part thereby, wherein said pallet engaging means defines a path of entrance to and exit from the pallet mounting part to the pallet fixing device wherein the travel axis of the path is generally perpendicular to the axis of rotation.

---

### 5,018,618
### DEVICE FOR TEMPORARILY STORING A SUCCESSION OF NEWSPAPERS

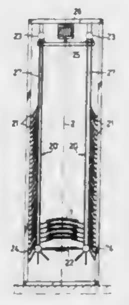
**Rolf Sjögren, Eksjö , Sweden, assignor to Wamac AB, Sweden**

**Filed Aug. 30, 1989, Ser. No. 400,497**

**Claims priority, application Sweden, Sep. 15, 1988, 8803254**

**Int. Cl.$^5$ B65G** *37/00*

**U.S. Cl. 198—347.3** **7 Claims**



1. Apparatus for temporarily storing a succession of flexible flat objects which have been arranged in overlapping formation, the apparatus comprising means for dividing a succession of the objects into separate sections of the succession; a temporary store for the separate sections; a conveyor for transporting the separate sections from the dividing means through the temporary store, the conveyor having lateral sides;

- transfer means for transferring the separated sections into a series of vertical layers in the store, the transfer means comprising a first set of shelves arrayed vertically above one another at one of the lateral sides of the conveyor and second set of shelves arranged one above the other at the opposite lateral side of the conveyor, the shelves in each of the first and second sets being arranged so that a respective pair of shelves, one from each of the first and second sets, is adapted for supporting opposite lateral edge regions of a section of the flexible objects;
- the transfer means further including apparatus for moving each of the sets of shelves up past the conveyor and transversely to the direction of motion of the conveyor, for causing a respective pair of the shelves to raise a respective section that is then on the conveyor and is then between the shelves of the conveyor off the conveyor and onto the shelves of the pair and into the store;
- the conveyor includes a support surface for a section of flexible objects and the support surface moves through the store; the transfer means for moving the shelves is so connected with the shelves as to increase the lateral distance, as measured across the conveyor, between the respective shelves of each pair of shelves for increasing the space between those shelves in the region just below and also in the region just above the support surface of the conveyor.

---

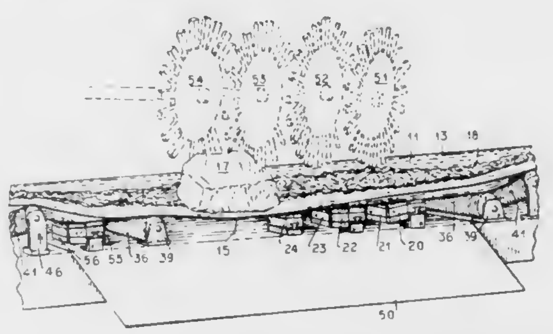
### 5,018,619
### CONVEYOR BELT DUMPING MECHANISM USING HORIZONTAL IDLERS AND IMPACT SLIDES

**William A. Wilson, 83 Pheasant Dr., Marietta, Ga. 30067**

**Continuation-in-part of Ser. No. 375,938, Jul. 6, 1989, Pat. No. 4,930,625. This application Jun. 4, 1990, Ser. No. 532,559**

**Int. Cl.$^5$ B65G** *15/60*

**U.S. Cl. 198—839** **1 Claim**



1. An apparatus for use with a conveyor belt supported in part by sets of paired idlers, the outer ends of the paired idlers being disposed upwardly of the inner ends thereof, so that the belt, when moving across the paired idlers, forms a trough, wherein the improvement comprises:

- (a) a plurality of idlers, each of which is rotatably mounted in a horizontal position; at least two of the idlers being approximately equal in length to the width of the belt; the idlers being disposed approximately parallel to each other; idlers which are substantially shorter than said two idlers being disposed between them, each of the shorter idlers being offset with respect to the centerline of the belt and to the same side of the belt, the end of each of the shorter idlers which is closest to the centerline lying along an imaginary arc which opens towards one edge of the belt, thereby forming a crescent-shaped section in a portion of the belt passing to one side of the shorter idlers; and
- (b) means including a plurality of low friction impact slides mounted beneath the crescent-shaped section for supporting the crescent-shaped section, the angle at which the upper surface of each of the slides is inclined relative to the horizontal depending upon the proximity of the slide to the centerline of the belt; when weighted down by a heavy, oversized object, said portion of the belt passing over the slides forming a generally flat-bottomed channel.

---

### 5,018,620
### CARRIER STOCK WITH BAND SEGMENTS EXTENDING BETWEEN OPPOSITE EDGES

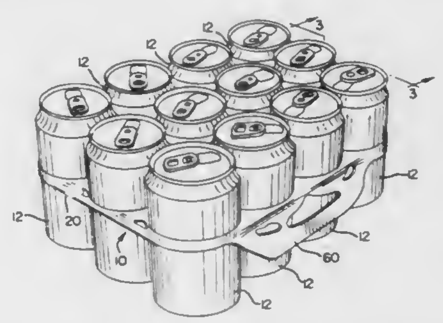
**Leslie S. Marco, Bloomingdale; Mindaugas J. Klygis, Barrington, and William N. Weaver, Northbrook, all of Ill., assignors to Illinois Tool Works Inc., Glenview, Ill.**

**Filed May 7, 1990, Ser. No. 519,859**

**Int. Cl.$^5$ B65D** *75/00, 71/00*

**U.S. Cl. 206—150** **19 Claims**

1. Carrier stock for machine application to substantially identical containers, said stock being formed from a single sheet of resilient polymeric material, said stock having opposite edges and being severable to form individual carriers with opposite ends, with separate container-receiving apertures to receive the individual containers, and with at least one additional aperture, which facilitates reconfiguration of said stock from an as-formed configuration to an application configuration, said stock being formed with band segments defining the container-receiving and additional apertures, each container-receiving or additional aperture having a margin comprising certain of said segments, the container-receiving apertures for each individual carrier being in longitudinal rows including edge rows at the opposite edges of said stock and in transverse ranks including end ranks at the opposite ends of each such individual carrier, the container-receiving aperture at each end rank of each edge row being defined by certain of said segments including



- (a) an outer cross segment, along which said stock is severable, the outer cross segment extending completely across said stock in the form of a continuous panel, between the opposite edges of said stock, and extending in a generally transverse direction when said stock is unstressed,
- (b) an outer edge segment extending along one of the opposite edges of said stock and extending in a generally longitudinal direction when said stock is unstressed,
- (c) an inner cross segment extending from the outer edge segment to the margin of one of the additional apertures and extending in a generally transverse direction when said stock is unstressed, and
- (d) an inner oblique segment extending from the outer cross segment to the margin of the same one of the additional apertures and extending in a generally oblique direction tending away from the outer edge segment when said stock is unstressed.

---

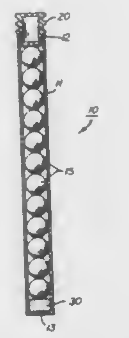
### 5,018,621
### CYLINDRICAL CONTAINER AND DISPENSER FOR SPHERICAL OBJECTS

**John J. O'Connell, Jr., 97 E. Waters Rd., Red Creek, N.Y. 13143**

**Filed Apr. 16, 1990, Ser. No. 509,355**

**Int. Cl.$^5$ B65D** *81/04, 81/26, 85/58*

**U.S. Cl. 206—204** **2 Claims**



1. A dispensing container for spherical objects, including:

OL
126
SS
4
MY
28
1991
UMI

a transparent resilient cylindrical tube having an open top and a closed bottom;

a stopper for removable insertion in the top of said container and including a plurality of resilient fingers extending downward and radially inward for contact with the topmost of said objects to thereby prevent axial movement of said objects when said tube is full thereof; and

a foam cushion disposed in the bottom of said container and cooperating with said stopper to prevent object breakage within said container, said cushion impregnated with a hygroscopic material to attract moisture and to keep the same from said objects.

2. A dispensing container for pills, including:

a transparent resilient cylindrical tube having an open top and a closed bottom;

a stopper for removable insertion in the top of said container and including a plurality of resilient fingers extending downward and radially inward for contact with the topmost of said pills to thereby prevent axial movement of said pills when said tube is full thereof; and

a foam cushion disposed in the bottom of said container and cooperating with said stopper to prevent pill breakage within said container, said cushion impregnated with a hygroscopic material to attract moisture and to keep the same from said pills.

---

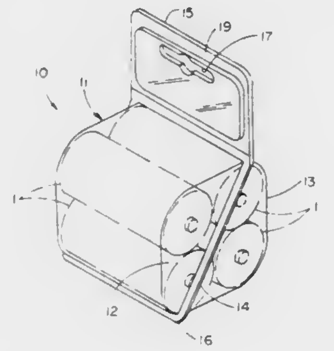
### 5,018,622
### BATTERY DISPLAY PACKAGE

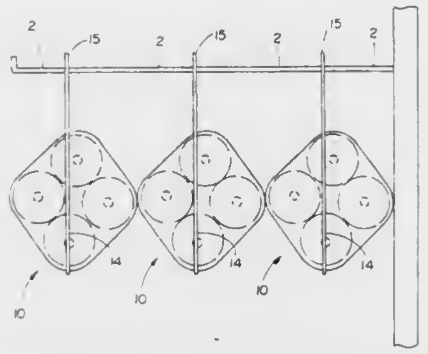
**William L. Hartley, Annapolis, Md., assignor to P.T.P. Industries, Baltimore, Md.**

**Filed Jun. 27, 1990, Ser. No. 544,402**

**Int. Cl.⁵ B65D** *85/62*

**U.S. Cl. 206—333** **24 Claims**





20. A blister package for the display of batteries comprising a substantially quadrilateral housing formed by a first blister and a second blister, each blister having a substantially triangular cross-section, each blister having flanges extending outwardly therefrom, the flanges on the front blister being bonded to the flanges on the rear blister, forming a substantially diagonal seam therebetween for removably joining the first and second blisters to one another, the housing being sized to receive therein at least two lower batteries disposed substantially horizontally therein in a side-by-side arrangement, and at least two upper batteries disposed substantially horizontally therein in a side-by-side arrangement on top of the lower batteries, and the diagonal seam extending outwardly from the package forming a header joined to the housing and being offset rearwardly on the housing, such that when supported by the header, the front blister of the housing hangs downwardly, thereby displaying the batteries when the package is viewed from the front, and further such that the package is self-supporting for display on a surface.

---

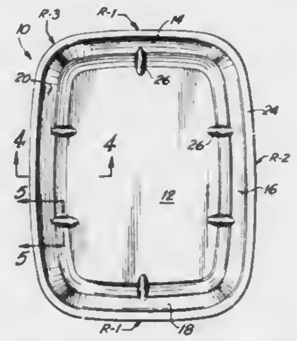
### 5,018,623
### MOLDED PLASTIC OVERWRAP TRAY

**John Hrenyo, Washington, N.J., assignor to Tekni-Plex Inc., Brooklyn, N.Y.**

**Filed Mar. 12, 1990, Ser. No. 492,889**

**Int. Cl.⁵ B65D** *1/34, 6/04, 71/08*

**U.S. Cl. 206—557** **11 Claims**



1. A molded plastic overwrap tray comprising:

a base and four sidewalls, each of said sidewalls having an upper edge;

adjacent sidewalls being connected to one another through an integrally formed large radius corner;

said sidewalls having an integrally formed thick, wide bead located adjacent to the open end of the tray to form a lip for said tray; and

said sidewalls being outwardly bowed by an amount which responds to the compressive forces imposed by a tightly stretched overwrap film to provide the tray with sidewalls having relatively straight or slightly bowed upper edges.

---

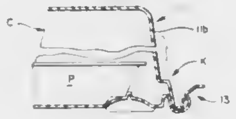
### 5,018,624
### TRAYLIKE MEMBER AND COVER THEREFOR

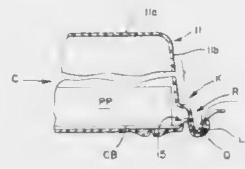
**Theodore R. Arneson, Mount Prospect; Robert F. Hitchcock, Glendale Heights, and Julie D. N. Williams, Round Lake Beach, all of Ill., assignors to Packaging Corporation of America, Evanston, Ill.**

**Filed Apr. 24, 1990, Ser. No. 513,752**

**Int. Cl.⁵ B65D** *1/34*

**U.S. Cl. 206—560** **20 Claims**





1. A traylike member comprising a surface for subtending and supporting a product; a marginal section extending from the periphery of said surface and adapted to be spaced outwardly from the product when supported by said surface; and a plurality of relatively spaced locating means provided on said surface and being adjustable relative thereto between operative and inoperative modes; when in said operative mode, said locating means projecting upwardly from said surface and coacting with one another to substantially restrain relative lateral movement of the supported product with respect to said surface, and when in an inoperative mode, said locating means assuming substantially non-upwardly projecting positions relative to said surface.

---

### 5,018,625
### FOIL PACK FOR PAPER TISSUES

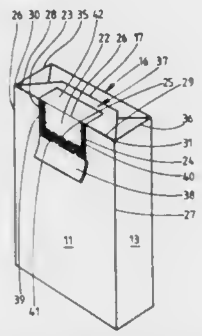
**Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co., Fed. Rep. of Germany**

**Filed Mar. 28, 1990, Ser. No. 501,918**

**Claims priority, application Fed. Rep. of Germany, Apr. 11, 1989, 3911779**

**Int. Cl.⁵ B43M** *7/00*

U.S. Cl. 206—621 **10 Claims**



1. A cuboidal foil pack for stacks of folded paper tissues, having a tear-open flap limited by perforation lines in the region of a (large-surfaced) front wall and an adhesive flap with adhesive-free grip end, said adhesive flap covering the (lower) end of said tear-open flap, said tear-open flap being laterally limited by perforation lines (side perforations) extending in the direction of an edge (front edge) formed between said front wall and a (small-surfaced) end wall, comprising the following features:

a) the perforation lines (side perforations **23, 24**) laterally limiting said tear-open flap (**22**) terminate at the edge (front edge **26**) formed between said front wall (**11**) and said end wall (**16**) at a (significant) distance to pack corners (**30, 31**) formed between said front wall (**11**) and said end wall (**12**),

b) from the ends of said side perforations (**23, 24**), there extend transversely oriented perforation lines (transverse perforations **28, 29**) along said front edge (**26**) up to said pack corners (**30, 31**).

---

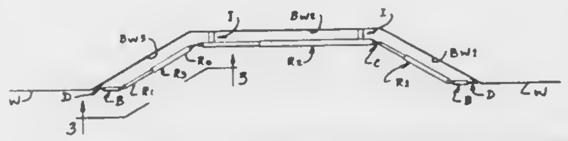
### 5,018,626
### CURTAIN ROD AND END BRACKET ASSEMBLY

**Daniel C. Johnson, Madison, Wis., assignor to Graber Industries, Inc., Middleton, Wis.**

**Filed Feb. 20, 1990, Ser. No. 482,343**

**Int. Cl.⁵ A47H** *1/10*

U.S. Cl. 211—105.1 **14 Claims**



2. A curtain rod and bracket assembly comprising, at least one elongated rod section having a front wall and upper and lower U-shaped flanges extending lengthwise along a rear side of the front wall, rod end bracket means including a generally upright rod support panel member and a generally upright mounting panel, hinge means connecting one end of the rod support panel to one end of the mounting panel for pivotal movement relative thereto about a generally upright pivot axis between a position in which the support panel extends generally lengthwise of the mounting panel and a position in which the support panel extends at an angel to the mounting panel, the rod support panel having first and second sides and an upper rod support edge, said upper rod support edge being constructed and arranged to extend into the upper flange on the rod section adjacent one end thereof and support the rod section for pivotal movement about the upper edge toward and away from the rod support panel, latch means on the rod support panel spaced below the upper rod support edge and engageable with the rod section when the latter is pivoted above the upper rod support edge into engagement with the rod support panel for releasably retaining the rod section against pivotal movement away from the rod support panel, wall bracket means for attaching the mounting panel to a support, said mounting panel having first and second side edges and said wall bracket means being adapted to attach the mounting panel to a support with either said first or said second side edge of the mounting panel uppermost, said hinge means being constructed and arranged for connecting the support panel to the mounting panel with the upper rod support edge of the support panel uppermost, when either said first or said second side edge of the mounting panel is uppermost, said rod section having a latch opening in the front wall spaced below the upper flange and inwardly of one end of the rod section, said latch means including first and second latch members integral with the support panel respectively at the first and second sides thereof and spaced below the upper edge of the support panel a distance to extend through. the latch opening when the rod section is respectively contiguous to the first or the second side of the support panel.

---

### 5,018,627
### RELATING TO SUPPORT RAILS

**John A. Moore, Carrickfergus, Northern Ireland, assignor to Silver Systems Limited, Carrickfergus, Ireland**

**Filed Oct. 18, 1990, Ser. No. 599,453**

**Claims priority, application United Kingdom, Oct. 18, 1989, 8923480**

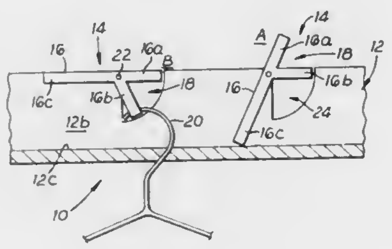
**Int. Cl.⁵ A47F** *5/00*

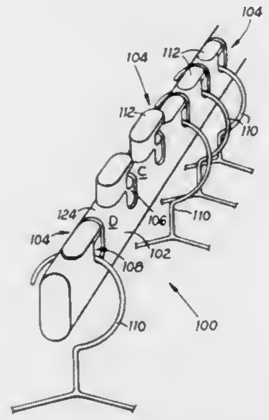
**U.S. Cl. 211—123** **11 Claims**

1. A support means comprising a support member and at least one receiving means; wherein the receiving means is movable, relative to the support member, between a first open position and a second closed position; the receiving means is adapted to receive, in use, a hanger stem whereby when a

VOL
126
ISS
4
MY
28
1991
UMI

hanger stem is placed in said receiving means, when in said first open position, the receiving means is caused to move to said second closed position, and when in said second position, further hanger stems are prevented from being placed therein.





---

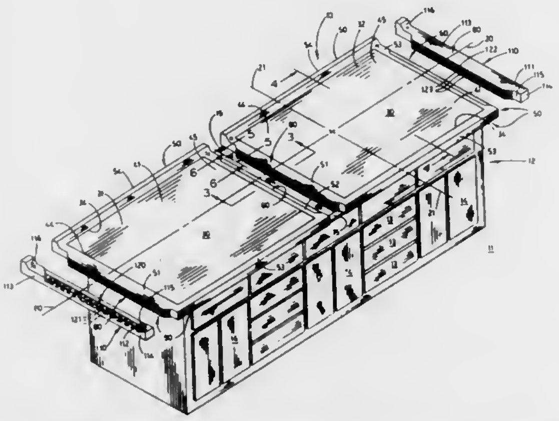
### 5,018,628
### WORKING SURFACE

**Robert Schenck, Manitowoc; Jeffrey H. Hoffman, Two Rivers; Michael N. Klein, Sheboygan, and Gene R. Kouba, Two Rivers, all of Wis., assignors to Classic Modular Systems, Inc., Two Rivers, Wis.**

**Filed Apr. 16, 1990, Ser. No. 509,878**

**Int. Cl.$^5$ A47F** *5/00*

**U.S. Cl. 211—153** **15 Claims**



1. A working surface comprising:

a substantially planar main body having a peripheral edge and first and second ends, and wherein the first and second ends have predetermined dimension and the working surface has a longitudinal line and reference, and wherein the first end has a male portion, and the second end has a female receiving station, and wherein the male portion and the female receiving station have length dimensions which are less than the length dimensions of the first and second ends respectively, and have individual substantially complementary shapes, and wherein the male portion extends substantially longitudinally outwardly relative to the main body and the female receiving station extends substantially longitudinally inwardly relative to the main body, and wherein a plurality of ribs are made integral with the female receiving station and male portion respectively, and wherein the respective ribs are disposed in predetermined spaced, substantially parallel relation relative to each other, and wherein the respective ribs define channels therebetween which have predetermined cross-sectional shapes, and wherein the respective ribs are received in a selected one of the channels formed by the ribs which are made integral with the other portion whereby the individual working surfaces may be releasably and coaxially joined together in juxtaposed relation to form a substantially continuous supporting surface.

---

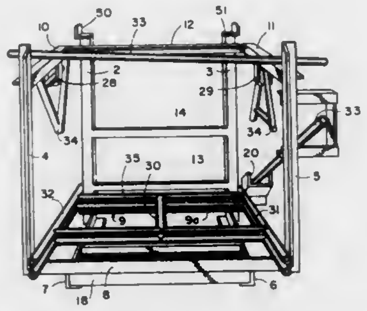
### 5,018,629
### SCAFFOLDING RACK

**Robert Lamar, A-4350 - 64th St., Holland, Mich. 49423**

**Filed Nov. 8, 1989, Ser. No. 433,290**

**Int. Cl.$^5$ A47B** *47/00*

**U.S. Cl. 211—194** **15 Claims**



1. A scaffold rack for supporting a plurality of scaffolding components including scaffolding frames constructed of parallel spaced legs wherein the scaffold rack comprises:

four upright corner posts including two front and posts and two rear end posts;

first side rails extending between one front end post and one rear end post;

second side rails extending between the other of said front and rear end posts;

front end rails extending between the two front end posts;

at least one rear end rail extending only between the lower ends of said two rear end posts;

said posts and rails forming a rigid upstanding frame assembly with an open end for receiving and stacking said scaffolding frames;

said front end posts being spaced a distance front each other less than the spaced distance between said rear end posts whereby when the scaffold frames each having parallel legs are stacked on their sides with the legs of one frame resting above the legs of another frame, the legs at one end thereof are located outside the front end posts and at the other end thereof are located inside the rear end posts;

a basket-like member mounted at one lower corner of one of the sides of said frame at one of the front or rear posts, and a ring-like member mounted on said one side of said frame at an upper corner of said frame at the other of said front or rear posts whereby a plurality of elongated braces can be supported along the said one side of said frame with the lower ends of said braces extending along the one side into said basket-like member and the upper ends of said braces extending through said ring-like member.

---

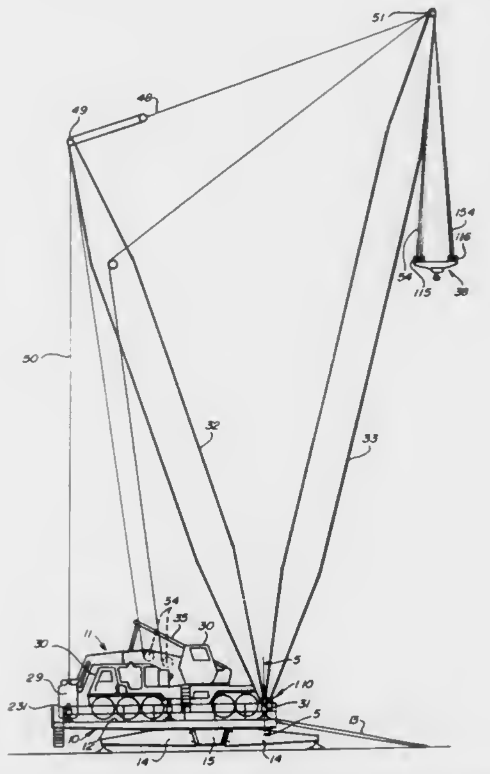
### 5,018,630
### HIGH-CAPACITY LIFT CRANE ASSEMBLY

**James R. McGhie, 4632 Metcalf Dr., Eagan, Minn. 55122**

**Filed Nov. 21, 1988, Ser. No. 274,351**

**Int. Cl.$^5$ B66C** *23/04, 23/78, 23/72;* **E01D** *15/12*

**U.S. Cl. 212—233** **6 Claims**



1. In the combination of a pair of independently operated cranes, each crane including a mast, boom with lift lines, hoist and counterweight thereon, with an assembly for increasing the lifting capacity of said pair of cranes, said assembly comprising:

platform adapted to directly support said pair of cranes and counterweights thereof in a side-by-side arrangement thereon; said platform including a central area and platform sides operatively connected to said central area for movement between a general planar operational position and a transporting position; a ramp surface with central ramp area and ramp sides operatively connected to said central ramp area for movement between a generally planar operational position and a transporting position; means mounting said ramp surface to said central area of said platform; said platform sides and ramp sides when in said operational position being adapted to, respectively, support said cranes and counterweights and to facilitate the movement of said cranes on and off of said platform;

means for rotatably supporting said platform;

a plurality of outriggers, means for releasably attaching said outriggers to said means for rotatably supporting said platform;

means mounted on said platform for rotating said platform in a horizontal plane above said outriggers;

means operatively interconnecting said mast and boom with said hoist and counterweight of said cranes;

a single lift means connected to the lift lines of the respective booms for lifting an object, and

means operatively interconnecting the respective hoists of said cranes so that said hoists are operated simultaneously to raise and lower said single lift means.

---

### 5,018,631
### HOIST DEVICE FOR A LOAD HANGING ON HOIST ROPES, IN PARTICULAR A CONTAINER-CRANE

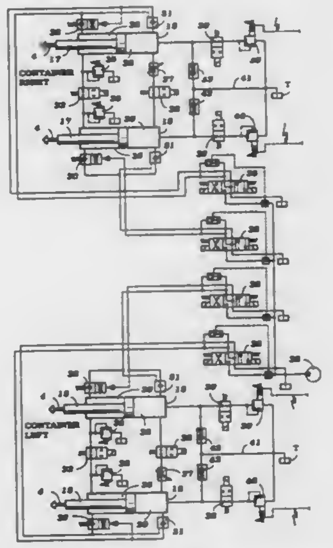
**Hans-Jürgen Reimer, Partenstein, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany**

**Filed Sep. 5, 1989, Ser. No. 402,873**

**Claims priority, application Fed. Rep. of Germany, Sep. 7, 1988, 3830429**

**Int. Cl.$^5$ B66C** *23/00*

**U.S. Cl. 212—250** **9 Claims**



1. A hoist device for a load suspended from four hoist ropes, in particular a container-crane, each rope having a first end and a second end, comprising drums, driving means and a plurality of crane-sided and load-sided pulleys, the first end of each rope being wound up and off a driven drum, characterized in that four hydraulic cylinders arrayed in pairs are provided one between the second end of each rope and a crane-sided fixed point, each cylinder including a pair of cylinder chambers and that a valve system is provided to selectively connect said cylinder chambers to a pressure source through individual directional valves or to a reservoir through a hydraulic resistance and to selectively connect said cylinders of each pair to each other for compensating different rope lengths and rope tension forces for positioning the load.

---

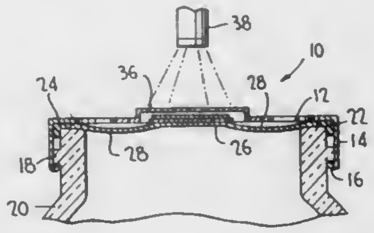
### 5,018,632
### TAMPER EVIDENT CLOSURE

**Frank J. Schmidt, Lilse, Ill., assignor to Continental White Cap Inc., Northbrook, Ill.**

**Filed Jun. 29, 1990, Ser. No. 545,718**

**Int. Cl.$^5$ B65D** *43/00*

**U.S. Cl. 215—230** **15 Claims**



1. A tamper indicating closure comprising a cap having a deflectable button which assumes a first shape when said cap is in a container closing position and a . second shape when said cap is released relative to a container, a first layer applied to an

VOL 1126 ISS 4 MY 28 1991 UMI

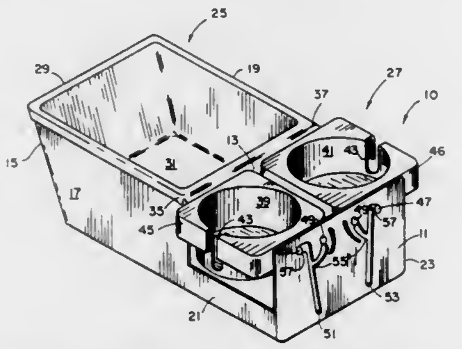
exterior of said button, said first layer being sensitive to external conditions, a second layer overlying said first layer, said second layer being in the form of a blocking material protecting said first layer from external conditions when said cap button has said first shape, said second layer being formed of a friable material and so bonded to said cap whereby when said button moves to said second shape said second layer ceases to protect said first layer.

---

**5,018,633**

### CONTAINER HOLDER

**Eric S. Toth; Gary T. DeBoer, and Linh H. Pham, all of Holland, Mich., assignors to Prince Corporation, Holland, Mich.**
**Filed Feb. 12, 1990, Ser. No. 478,452**
**Int. Cl.$^5$ B60N** *3/10*
**U.S. Cl. 248—311.2** **16 Claims**



1. A combined storage compartment and container holder comprising:

a substantially rectangular box-like housing, said housing having a first vertically upstanding end wall and a second vertically upstanding wall spaced from said first vertically upstanding wall and dividing said housing into a first section and a second section, each of said vertically upstanding walls having at least one vertically inclined guide slot formed therein, said first section of said housing defining a storage compartment;

at least one container holder slidably mounted in the second section of said housing;

a pair of spaced guide pins positioned on opposite outer sides of said container holder, said guide pins being fitted in the guide slots in each vertically upstanding wall and serving to control the movement of said at least one container holder form a vertical storage position to a horizontal use position in the second section of said housing; wherein two vertically inclined guide slots are provided in each vertically upstanding wall to control the movement of two container holders.

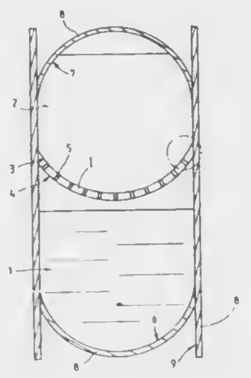
---

**5,018,634**

### SUSPENDED SKIN FOR THERMAL INSULATION OF CRYOGENIC PROPELLANTS

**Roger Le Touche, Ecquevilly, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France**
**Filed Sep. 12, 1990, Ser. No. 581,614**
**Claims priority, application France, Sep. 12, 1989, 89 11917**
**Int. Cl.$^5$ B65D** *25/00*
**U.S. Cl. 220—4.12** **7 Claims**

1. Double storage tank with an upper storage tank disposed above a lower storage tank, the storage tanks being separated by a thermally insulative wall, characterised in that said thermally insulative wall is a double-skin wall comprising a rigid bulkhead (3) towards the top storage tank and a skin (4) towards the bottom storage tank said skin being permeable to gases but impermeable to the liquid in the bottom storage tank, said rigid bulkhead (3) and said skin (4) being held apart.

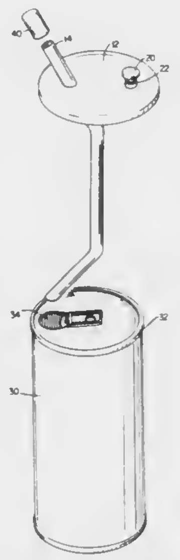


---

**5,018,635**

### FLUID CONTAINMENT AND ACCESS DEVICE FOR A BEVERAGE CONTAINER

**Michael T. Whittaker, 29 Carrier Ct., Auburn, Me. 04210**
**Filed Jul. 24, 1990, Ser. No. 557,584**
**Int. Cl.$^5$ B65D** *25/38*
**U.S. Cl. 220—90.2** **5 Claims**



1. A fluid containment and access device for use with a beverage container having an upper, beaded rim and an opening for flow of the fluid contents from within the volume of the container, said device comprising:

a flexible lid sized and constructed for secure fit upon the top of the beverage container in a manner to form a fluid-tight seal thereupon;

a straw integral with an fixedly joined to said lid, said straw having a first end extending generally above said lid and a second end adapted to extend through the opening into the volume of the container, said straw being sized to extend substantially to the bottom of the beverage container, said first end of said straw being angled approximately 45° to a vertical axis of the container, and said second end of said straw comprising a middle portion disposed generally vertical to the container axis, and a lower portion angled at approximately 45° to the container axis and extending substantially to the bottom rim of said container; and

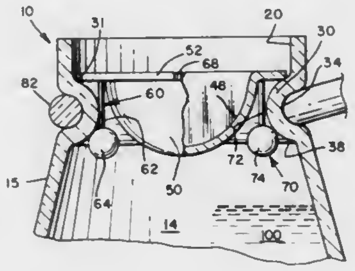
a vent assembly mounted in said lid, said vent assembly comprising a closure element adapted to be moved between a first position to permit the flow of air into the beverage container and a second position to prevent the flow of air into the beverage container.

---

**5,018,636**

### SAFETY MUG FOR LIQUIDS WITH IMPROVED TOP WHICH PERMITS THE LIQUID TO RETAIN ITS TEMPERATURE WHILE IT IS IN THE MUG AND FURTHER RETAIN THE LIQUID IF THE MUG IS BUMPED

**Gary Ross, 140 Oxnard Ave., Oxnard, Calif. 93003**
**Filed Jul. 23, 1990, Ser. No. 556,627**
**Int. Cl.$^5$ B65D** *41/26, 41/30*
**U.S. Cl. 220—90.4** **10 Claims**



1. A mug comprising:

a. a body member having a circumferential sidewall and a base, where the sidewall has an interior surface, and the base has a top surface and a flat bottom surface;

b. said interior surface of said sidewall and said top surface of said base forming an internal chamber with a top opening;

c. said interior surface of said sidewall being configured to have a protruding annular shelf with an upper portion and a lower portion, where the shelf is located adjacent to and spaced from said top opening of said body member;

d. a lid member having a central hemisphere and a circumferential disk with a gap, where the hemisphere has a top concave surface forming a depression and a bottom convex surface, and the disk has a top surface and bottom surface;

e. said lid member also having a bar mounted to said upper surface of said disk across said depression formed by said upper concave surface of said hemisphere; and

f. said lid member further having two retaining means, where each retaining means has a flexible rod with an upper end mounted to said bottom surface of said disk and a lower end, and a sphere attached to the lower end of the rod of each respective retaining means;

g. whereby said lid member can be retained in said body member by inserting said lid member into said body member from said top opening, such that said bottom surface of said disk rests onto said upper portion of said shelf, and each sphere of said retaining means is pressed against said lower portion of said shelf by the retention force of a respective one of said flexible rods of said retaining means, to thereby seal said internal chamber of said body member.

---

**5,018,637**

### BAG SUPPORT

**Don Miller, 500 SW. 64 Ave., Miami, Fla. 33144**
**Filed Feb. 6, 1990, Ser. No. 474,986**
**Int. Cl.$^5$ B65D** *90/04*
**U.S. Cl. 220—404** **10 Claims**

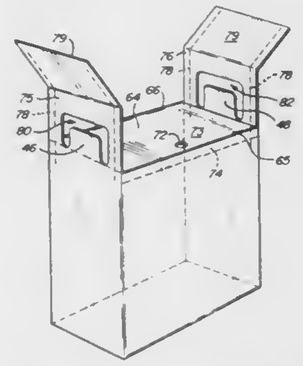
1. A container adapted to support a bag formed of flexible sheet material, the bag having a body formed with a base, side walls integral with the base, an open top, and a pair of generally inverted U-shaped bag handles having legs formed integrally with the side walls of the bag and extending from opposed sides of the free edges of the side walls, said container comprising:

A) a rigid rectangular planar base;

B) four rigid sheet side walls integrally formed with the base and extending upward from the periphery of the base generally normal to the base and terminating in a free edge lying in a plane generally parallel to the base;

C) a pair of handle elements integrally formed on the free edges of two opposing side walls and extending away from the base and beyond said free edge of the side walls, the handle elements each having an inverted U-shaped slot exposing a pair of tabs integrally formed within said handle elements, said tabs being adapted to fit within said handles of said bag, each said tab having the free edge of the side wall as a base;

whereby, the opposed handles of a bag may be arrayed over said tabs so that the bag is draped within and supported by the interior side walls of the container in an open attitude.

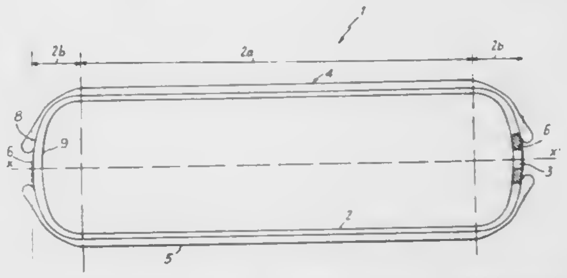


---

**5,018,638**

### RECEPTACLE FOR THE STORAGE OF FLUID UNDER PRESSURE

**Marcel Auberon, Le Haillan, and Albert Phan, St-Aubin, both of France, assignors to Societe Anonyme Dite: Aerospatiale Societe Nationale Industrielle, Paris**
**Filed Apr. 11, 1989, Ser. No. 336,129**
**Claims priority, application France, Apr. 27, 1988, 88 05618**
**Int. Cl.$^5$ B65D** *1/16*
**U.S. Cl. 220—414** **10 Claims**



1. Receptacle for the storage of fluid under pressure and of the type comprising an internal casing with a form of revolution around a longitudinal axis X, X' and having one central cylindrical section and two extremity sections, at least one of said extremity sections being bulged outwards so as to be a convex extremity, an armoring of resistant fibers coated with hardenable bonding material and encompassing said casing and having at least one planetary winding leaving open to said convex extremity section a cap centered on said axis X, X', wherein the outer contour of said convex extremity section of the casing has, as a longitudinal section, a shape which is at least approximately elliptical so that the ratio G of the small half axis to the major axis is such that:

VOL
126
ISS
4
MY
28
1991
UMI

$$0.32 \leqq G \leqq 0.4 \qquad (I)$$

where the major axis corresponds to the external diameter of the central cylindrical section of the casing and wherein the thickness $e_i$ of said convex extremity section of the casing, said cap being excluded, varies according to the formula:

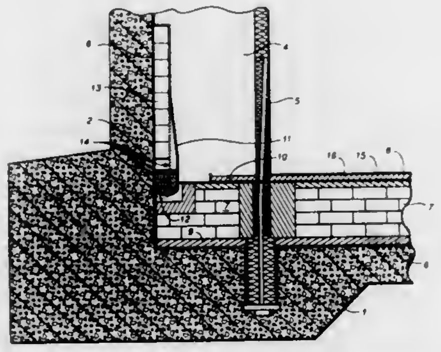
$$e_i = \frac{e_1 - e}{R - R_1}(R - R_i) + e \qquad (II)$$

in which:
  $R_i$ = distance to the axis X, X′ of the point of the outer contour of said convex extremity section at which the thickness $e_i$ is measured,
  e = thickness of the casing at its central cylindrical section,
  R = external radium of the central cylindrical section of the casing,
  $R_1$ = radius of the base of said cap, and
  $e_1$ = thickness of the casing for $R_i = R_1$, the thickness of said cap being at least equal to $e_1$.

---

### 5,018,639
## STORAGE CONTAINER FOR LOW-TEMPERATURE LIQUIDS

Han Schäfer, Frankfurt, Fed. Rep. of Germany, assignor to Philipp Holzmann AG, Fed. Rep. of Germany
Filed Apr. 20, 1990, Ser. No. 511,415
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1989, 3913253
Int. Cl.⁵ E03B *11/00*
U.S. Cl. 220—426 3 Claims

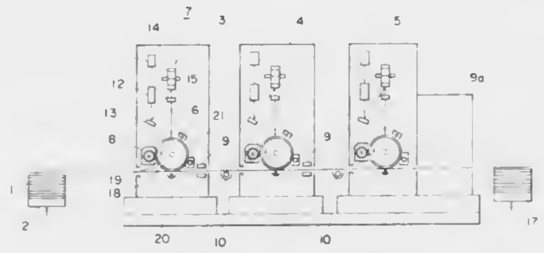


1. In a container for storage, of a low-temperature liquid, said container having an outer container closed on all sides and an inner, steel container to hold said liquid, said inner container spaced from said outer container by an annular space filled with granular insulating material, said inner container supported on insulation, and a spacer element at the bottom of said annular space, the improvement comprising:
  an annular container (**11**) positioned at the bottom of and within said annular space between said outer container (**1**) and said spacer element (**10, 15**), said annular container containing a material (**12**), liquefiable by heat, and a heating element (**14**), said spacer element being in contact with said inner container and with said annular container.

---

### 5,018,640
## MULTIPLE COLOR PRINTING METHOD FOR METALLIC CONTAINER AND THIN PLATE METAL AND PRINTED MATTER

Akihiko Morofuji, and Masaki Morotomi, both of Kanagawa, Japan, assignors to Toyo Seikan Kaisha Ltd., Tokyo, Japan
PCT No. PCT/JP88/00333, § 371 Date Nov. 29, 1988, § 102(e) Date Nov. 29, 1988, PCT Pub. No. WO88/07706, PCT Pub. Date Oct. 6, 1988
PCT Filed Mar. 31, 1988, Ser. No. 295,946
Claims priority, application Japan, Apr. 3, 1987, 62-82711; Aug. 31, 1987, 62-215279; Sep. 10, 1987, 62-225326; Nov. 26, 1987, 62-296056
Int. Cl.⁵ G06K *15/00*
U.S. Cl. 220—456 3 Claims

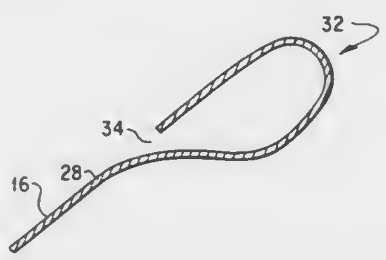


1. A laminated metallic container, comprising:
  a photoconductive material layer disposed upon the surface of said metallic container;
  at least one toner picture image layer disposed upon said photoconductive material layer; and
  a varnish finish layer disposed upon said at least one toner picture image layer.

---

### 5,018,641
## END CONSTRUCTION WITH HOLLOW BEAM CONSTRUCTION FOR A DRUM

Herbert L. Carpenter, Jr., Cullman, Ala., and James A. Hale, Red Bank, N.J., assignors to Greif Bros. Corp., Delaware, Ohio
Continuation-in-part of Ser. No. 321,965, Mar. 10, 1989. This application Apr. 6, 1990, Ser. No. 505,984
The portion of the term of this patent subsequent to Aug. 28, 2006, has been disclaimed.
Int. Cl.⁵ B65D *3/30*
U.S. Cl. 220—634 11 Claims



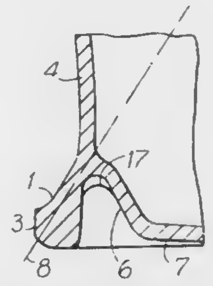
1. A drum comprising: a vertical sidewall with a circular cross section; a bottom circular end panel; and a lower circular chime including;
  an inwardly directed C-shaped portion with a first and a second leg at a lower circumferential end of said sidewall and forming a lower concave portion inwardly adjacent to said C-shaped portion on said sidewall;
  said first leg extending horizontally along the lower circumferential end of said sidewall and terminating with an internal lip pointing to an interior of said C-shaped portion;
  said lower concave portion formed by said second leg and a first diagonal flange inwardly adjacent to said second leg; and

  wherein said lower circular chime engages said lower circumferential end of said sidewall so as to engage a peripheral circumference of said bottom circular end panel and wherein the internal lip of said lower circular chime is placed between said bottom circular end panel and a lower peripheral edge of said sidewall; an upper circular chime including;
  an upper lip engaging an upper circumferential end of said sidewall;
  an upper concave portion formed by a horizontal portion inwardly adjacent to said upper lip and a second diagonal flange inwardly adjacent to said horizontal portion;
    wherein said upper circular chime engages an upper peripheral edge of said sidewall, said upper lip providing a lid seating means;
  wherein said first and second flanges terminate with portions of increased cross section; and
  wherein longitudinal forces on said sidewall urge said first and second flanges from a diagonal toward a horizontal position thereby increasing a circumference of said portions of increased cross section as measured about a longitudinal axis of the drum;
  wherein said chimes are constructed of a metal of substantially constant thickness and wherein said portion of increased cross section is formed by bending said metal;
  wherein said portion of increased cross section is formed by bending said metal into a substantially tear-drop shape at ends of said first and second flanges.

---

### 5,018,642
## VESSEL

Dietmar R. Pyzytulla, Kerpen, Fed. Rep. of Germany, assignor to Mauser-Werke GmbH, Bruehl, Fed. Rep. of Germany
Continuation of Ser. No. 324,289, Mar. 15, 1989, abandoned. This application Apr. 19, 1990, Ser. No. 511,490
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824176
Int. Cl.⁵ B65D *88/12, 88/08*
U.S. Cl. 220—675 5 Claims

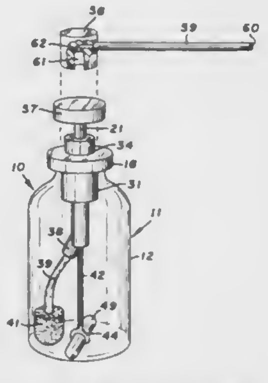


1. A thermoplastic vessel with a rolling ring protruding from the shell of the vessel near the bottom thereof in axial extension of the cylindrical shell and in which the shell area adjoining the base of a groove between the rolling ring and shell conically merges into the bottom head of the vessel, characterized in that the inside wall surface of rolling ring, starting from base of the groove, merges into an axial end face which, in turn, merges with a convex arc-shaped corner surface into a radial end surface of the ring with the cross section of the rolling ring thickening, as measured further from the base of said groove and the radial end surface merges from its upper outer edge into the outside surface of drum shell by a conical outside surface facing away from the bottom head of the vessel and the prolongation of the center axis drawn through the cross-section of the ring and generally parallel to the conical outside surface thereof, intersects the vertical center axis of the vessel, when empty, centrally of its axial length.

---

### 5,018,643
## AEROSOL DISPENSER WITH SEALED ACTUATOR AND AEROSOL DISPENSING METHOD

Lee R. Bolduc, 6416 Gainsborough Dr., Raleigh, N.C. 27612
Continuation-in-part of Ser. No. 261,320, Oct. 24, 1988, Pat. No. 4,979,638, which is a continuation-in-part of Ser. No. 49,361, May 14, 1987, which is a continuation-in-part of Ser. No. 812,237, Dec. 23, 1985, abandoned. This application Sep. 14, 1989, Ser. No. 407,330
The portion of the term of this patent subsequent to Dec. 25, 2007, has been disclaimed.
Int. Cl.⁵ B67B *7/00*
U.S. Cl. 222—1 19 Claims



1. A method of storing and subsequently dispensing a two component material comprising: storing one component of the material in an enclosed chamber of a container, said container having an open end closed with a valve having a valving member normally located in a closed position, and a nozzle mounted on the valving member, said valving member being movable from a closed position to an open position to open the valve to allow material to be dispensed from the container, continuously subjecting said one component of the material to pressure of a propellant, storing the other component of the material in a frangible ampule located in said enclosed chamber of the container, moving the valving member from the closed position to the open position to break the ampule, closing the nozzle during movement of the valving member to the open position to break the ampule to prevent the materials and propellant from being dispensed from the container, mixing the two components of the materials within said enclosed chamber, and moving the valving member from the closed position to the open position after the mixing of the two components of the material to dispense the mixed components of the material and the propellant from the container.

3. An aerosol dispenser comprising: a container having an internal chamber for storing a propellant and at least one first material under pressure, normally closed valve means mounted on said container to retain the propellant and one first material in said chamber, said valve means being movable to an open position to dispense aerosol to a desired location, frangible ampule means located with said chamber containing at least one second material that is separated from the first material within the chamber until said ampule means is broken, said valve means having a tubular stem, nozzle means mounted on the stem for directing aerosol to a selected location, means for holding the ampule means in said chamber means connected to said valve means and said means for holding the ampule means, said means connected to said valve means comprising a rigid rod extended between the valve means and means for holding the ampule means whereby when the valve means is first moved to the open position force is transmitted through the rigid rod to break the ampule means thereby releasing the second material into said chamber whereby the first and second materials are mixed within said chamber, and cap means mounted on the nozzle means for preventing discharge of materials from the nozzle means during the breaking of the ampule means, said cap means being removable from the noz-

VOL
126
SS
4
MY
28
1991
UMI

zle means whereby on subsequent movement of the valve means to the open position materials are dispensed from the nozzle means.

---

### 5,018,644
### DISPENSER FOR THE DISPENSING OF INDIVIDUAL TABLETS

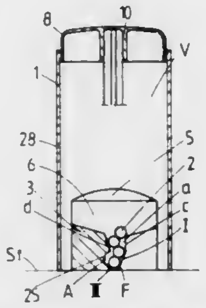
**Ludger Hackmann, and Josef Wilken, both of Lohne/Oldenburg, Fed. Rep. of Germany, assignors to Bramlage Gesellschaft mit beschränkter Haftung, Lohne/Oldenburg, Fed. Rep. of Germany**

**Filed Jun. 2, 1989, Ser. No. 361,025**

**Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 8807522[U]; Dec. 22, 1988, 8815878[U]**

**Int. Cl.$^5$ B65D** *83/00*

**U.S. Cl. 221—65** **28 Claims**



1. A dispenser for dispensing individual tablets, the dispenser comprising

a housing, and a displaceable slide operable with limited stroke in the housing;

a tablet storage chamber with adjoining delivery chute located in the housing, there being front end closure surfaces and profiled flanks formed, in part, fixed on the housing as a fixed flank and, in part, fixed on the slide as a movable flank,

a separation chamber developed in the moveable flank;

a separation finger operable with the separation chamber and formed extending from the fixed flank which is fixed on the housing;

wherein the separation finger comprises a vertex on the bottom side of a first oblique surface which commences on top opposite an upper closure of the separation chamber; and

a second oblique surface is developed on the moveable flank fixed to the slide, the second oblique surface commencing at the upper closure of the separation chamber and extending in upward direction and continuously increasing the cross-section of the delivery chute, said oblique surfaces arranging the tablets in a common plane with each tablet being supported by a lower tablet, and said second oblique surface has a nose-like corner which engages a next tablet to be dispensed below a horizontal diameter of said next tablet only when the second oblique surface has moved under said next tablet.

---

### 5,018,645
### AUTOMOTIVE FLUIDS DISPENSING AND BLENDING SYSTEM

**Herbert G. Zinsmeyer, 5911 Bullard Dr., Austin, Tex. 78731**

**Filed Jan. 30, 1990, Ser. No. 472,236**

**Int. Cl.$^5$ B67D** *5/30*

**U.S. Cl. 222—14** **36 Claims**

1. An automotive fluids dispensing system comprising:

a) storage means for a multiplicity of different fuel additives, pressuring and flow measuring means in lines from said storage means of each of said multiplicity of different fuel additives, leading through a routing and distribution means to a plurality of first fuel dispensing nozzle means;

b) a fuel flowmeter means in each fuel line leading to said plurality of first fuel nozzle means; and a first switching means to allow choice of each of said multiplicity of different fuel additives to be added into one of said plurality of first fuel nozzle means and to choose a mix ratio of said additives to be added to said fuel nozzle means in terms of a percent of an established normal mix ratio;

c) a controller means, receiving electronic input data from said fuel flowmeter means, said pressuring and flow measuring means, said routing and distribution means, and said first switching means; said controller means reacting from said electronic input data to:

1) direct additive flow of a minimum of one of said multiplicity of different fuel additives to one of said plurality of first fuel nozzle means that is in use;

2) control amount of each of said multiplicity of fuel additives dispensed,

3) calculate, store and display cost and amount of each of said multiplicity of fuel additives dispensed.

---

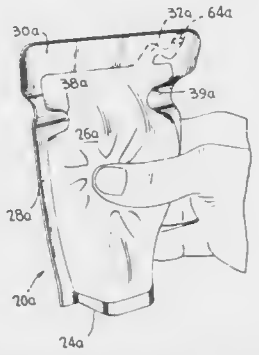
### 5,018,646
### SQUEEZABLE FLUID CONTAINER

**Fred L. Billman, Racine, Wis.; Mark D. Jamison, Zion, Ill., and Russell B. Wortley, Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.**

**Continuation of Ser. No. 275,457, Nov. 23, 1988, abandoned. This application Nov. 13, 1990, Ser. No. 614,057**

**Int. Cl.$^5$ B65D** *35/08*

**U.S. Cl. 222—107** **2 Claims**



1. In a squeezable plastic pouch-like article of manufacture defining a cavity for containing a dispensable fluid and having flexible sidewalls, a bottom, a pair of spaced-apart outwardly-extending deformable side-edge margins, and a deformable upper-edge margin which is unitary with the side-edge margins and which defines a fluid passageway means that is able to communicate with the fluid cavity, wherein deformation of the upper-edge margin in the vicinity of the inlet of the fluid passageway means tends to block fluid communication between the fluid passageway means and the fluid cavity, wherein the improvement comprises:

the fluid passageway means being defined by a minor portion of the surface area of the deformable upper-edge margin, wherein the fluid discharge means is of generally serpentine configuration and has a fluid discharge end;

deformation-causing means defined by at least one of the outwardly-extending side-edge margins and spaced from the upper-edge margin by a distance that is effective for causing deformation to occur in the side-edge margin that is in the vicinity of the deformation-causing means, rather than in the vicinity of the generally serpentine fluid passageway means, upon application of a predetermined squeezing pressure to the cavity-contained fluid via the article sidewalls, for purposes of enabling fluid to be discharged from the fluid-discharge end of the fluid passageway means;

whereby fluid communication between the generally serpentine fluid passageway means and the fluid cavity is maintained upon application of the predetermined squeezing pressure to the cavity-contained fluid via the article sidewalls.

---

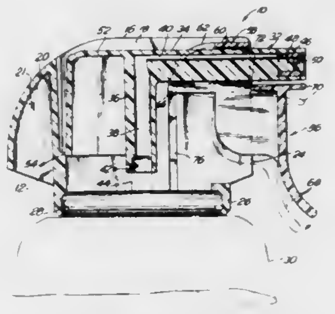
### 5,018,647
### DISPENSING CAP FOR USE WITH PRESSURIZED CONTAINER

**Robert H. Abplanalf, 10 Hewitt Ave., Bronxville, N.Y. 10708**

**Continuation of Ser. No. 388,729, Aug. 1, 1989, abandoned, which is a continuation of Ser. No. 277,540, Jan. 28, 1988, abandoned, which is a continuation of Ser. No. 861,114, May 6, 1986, abandoned, which is a continuation of Ser. No. 385,764, Jun. 8, 1982, abandoned. This application Jul. 3, 1990, Ser. No. 547,399**

**Int. Cl.$^5$ B65D** *83/00*

**U.S. Cl. 222—108** **13 Claims**



1. A multi-levered trigger-actuated dispensing cap adapted for use with a pressurized container having a valved closure, said cap comprising:

(a) a slotted housing having rear and side walls and a base adapted to be mounted on the perimeter of the valve closure,

(b) an actuator disposed within the slotted housing having a valve-connecting portion and a laterally directed discharge portion together defining a product duct, which actuator at the terminus of the valve-connecting portion sealingly connects with the valved closure and at the terminus of the discharge portion has a discharge orifice, said actuator further having a hinged arm hingedly connecting the actuator and housing to provide a lever, and

(c) a manually-operated trigger member engaging the discharge portion of the actuator at a point between the discharge orifice and the valve connecting portion and being hinged to the slotted housing, said trigger member having its gripping area disposed outside of the housing but within the perimeter of the container that the dispensing cap is adapted to fit, said trigger member being hinged to the housing at a position such that the distance from the trigger gripping surface to the trigger hinge is greater than the distance from the trigger engagement of the discharge portion of the actuator to the trigger hinge, thereby providing a second lever.

---

### 5,018,648
### CYLINDER DISCHARGE

**Bruno Gmur, Boppartstr, Switzerland, assignor to Gebruder Buhler AG, Uzwil, Switzerland**

**Continuation of Ser. No. 272,746, Oct. 7, 1988, abandoned. This application May 29, 1990, Ser. No. 530,475**

**Claims priority, application Switzerland, Dec. 11, 1986, 4930/86**

**Int. Cl.$^5$ G01F** *11/00*

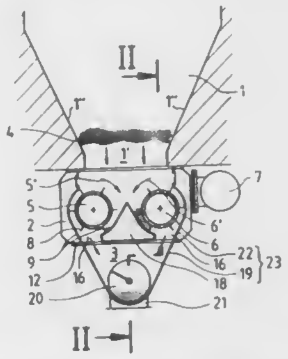
**U.S. Cl. 222—272** **10 Claims**

1. A cylinder discharger for farinaceous bulk goods, comprising:

a discharger having a top and a bottom which are open, said top being at a higher elevation than said bottom, said discharger having wall portions which are between said top and said bottom;

two discharge cylinders rotatably supported within said discharger, said discharge cylinders each having an outer circumference, said two discharge cylinders being between said wall portions of said discharger, said wall portions being spaced radially outside of said discharge cylinders;

a plurality of discharge chambers arranged about the outer circumference of each of said discharge cylinders, said discharge chambers being defined during a portion of rotation of said discharge cylinders by said outer circumference, said wall portions of said discharger, and a plurality of elongated webs which extend along said outer circumference in a direction of elongation of said discharge cylinders and which are spaced apart from each other in a circumferential direction of said cylinders, said discharge chambers being defined during another portion of rotation of said discharge cylinders by said outer circumference, said webs, and respective guide walls between said discharge cylinders; and



a trough converging and extending from said bottom of said discharger, said trough having means for conveying the product to an outlet after the product passes through the bottom.

---

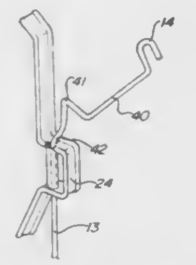
### 5,018,649
### PORTABLE MANNEQUIN WITH IMPROVED DISPLAY FEATURES

**Peter G. Ventimiglia, 19000 Lister, East Detroit, Mich. 48021**

**Continuation-in-part of Ser. No. 238,331, Aug. 29, 1988, Pat. No. 4,917,278. This application Feb. 8, 1990, Ser. No. 476,866**

**Int. Cl.$^5$ A47F** *8/00, 8/02;* **A47H** *5/00;* **A47G** *25/20*

**U.S. Cl. 223—68** **13 Claims**



1. A portable mannequin including, in combination:

(a) a separate clothes hanger;

(b) a frame member having hook means cooperating with said clothes hanger for removeably attaching said frame member to said clothes hanger, said frame member having said hook means on an upper portion thereof which is bent in a forward direction;

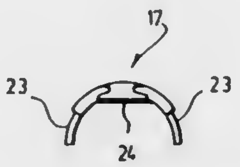
(c) a hoop pivotally mounted to said frame member; and

(d) a hoop extension member connected at one end to said hoop and slideably connected at its other end to said frame member to open and close said hoop.

OL
1126
ISS
4
MY
28
1991
UMI

### 5,018,650
### TAMPER PROOF HANGER WITH INTERCHANGEABLE SHOULDER CUPS

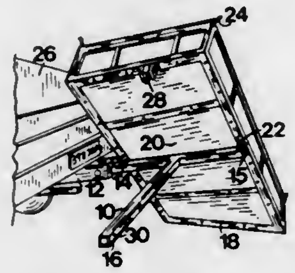
**Claude Mauffette, Montreal, Canada, assignor to Quada Internationale Ltd., Montreal, Canada**
**Filed Feb. 27, 1990, Ser. No. 485,521**
**Int. Cl.$^5$ A47G** *25/30, 25/28, 25/14*
**U.S. Cl. 223—93** **11 Claims**



5. The tamper-proof hanger defined in claim 1, wherein said tongue and groove connection is provided with a stop to prevent said cups from further sliding along said axis.

### 5,018,651
### SIDE OR END DUMP ARTICLE CARRIER

**Harold L. Hull, 401 Canyon Way, Sp. 43, Sparks, Nev. 89434, and Albert B. Currey, Rte. 1, Box 185, Eucha, Okla. 74342**
**Filed Dec. 27, 1988, Ser. No. 290,747**
**Int. Cl.$^5$ B60R** *9/06*
**U.S. Cl. 224—42.44** **4 Claims**



1. An article carrier adapted to be detachably interconnected with a standard tubular trailer hitch affixed to a frame of a towing vehicle comprising;

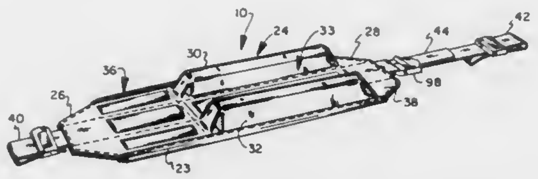
(a) a connection member adapted to be removably interconnected with the trailer hitch, said connection member being in the form of a "T" so that any one of its three ends may be used as a point of connection with the vehicle tubular hitch;
(b) a carrier member adapted to be removably interconnected with the connection member and
(c) means to pivotably attach said carrier member to said connection member.

### 5,018,652
### RIFLE SLING WITH RIFLE REST

**James O. Holtzclaw, Jr., Broomfield, Colo., assignor to The Hunter Company, Westminster, Colo.**
**Filed Aug. 31, 1989, Ser. No. 402,077**
**Int. Cl.$^5$ F41C** *27/22*
**U.S. Cl. 224—150** **10 Claims**

1. A rifle sling for a rifle having an elongated barrel, comprising:

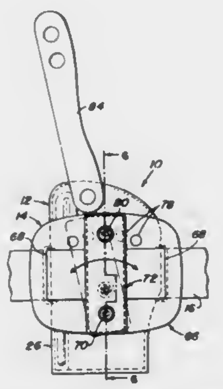
a body portion with first and second ends and a pair of opposed protrusions, defining therebetween a recess for receiving at least a portion of said rifle barrel so as to steady said barrel to aid in aiming said rifle;
first and second coupling means for coupling the first and second ends of said body portion to said rifle barrel;
said first and said second coupling means being spaced apart for connection to spaced apart portions of said rifle so that said body portion provides suspension for said rifle sling; and



stiffening means associated with said body portion to prevent flexing of the body portion along the length of the barrel of the rifle when rested in said recess.

### 5,018,653
### FRONT DRAW HANDGUN HOLSTER

**Randy R. Shoemaker, 4819 St. Andres, LaVerne, Calif. 91750**
**Filed Jun. 5, 1989, Ser. No. 361,256**
**Int. Cl.$^5$ F41C** *33/02*
**U.S. Cl. 224—198** **4 Claims**



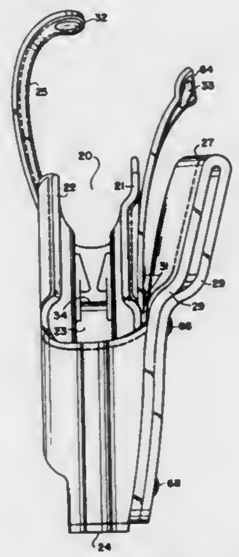
1. A holster to be worn by a person wearing a belt, comprising:

a holster body having inner and outer sides and inner and outer side walls at said inner and outer sides, respectively,
belt engaging means on said inner side wall of said holster body for mounting said holster body on the wearer's belt in various angular positions relative to the belt and securing said holster body against movement along the belt, and wherein
said belt engaging means comprises a member at the inner side of said holster body having spaced openings for receiving the wearer's belt in such a way that said member is restrained against movement relative to the belt in all directions except lengthwise of the belt, means pivotally mounting said member on said inner holster body side wall for angular adjustment of said member relative to said holster body on an axis transverse to said holster side walls, means for securing said member against pivoting movement relative to said holster body in any one of several different angular positions relative to said body, and means for releasably securing said member against endwise movement along said belt.

### 5,018,654
### HANDGUN HOLSTER WITH TRIGGER GUARD RESTRAINT

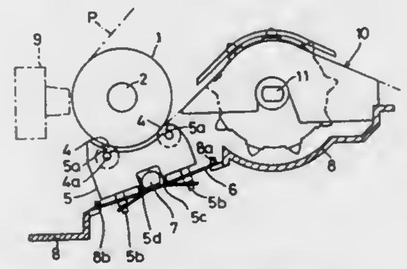
**William H. Rogers, and Norman E. Clifton, Jr., both of Jacksonville, Fla., assignors to Safariland Ltd., Inc.**
**Filed Jun. 12, 1989, Ser. No. 364,323**
**Int. Cl.$^5$ F41C** *33/02*
**U.S. Cl. 224—244** **22 Claims**

1. In a handgun holster adapted to permit withdrawal of a handgun from a cavity of a holster by a forward movement followed by a vertical upward movement of a handgun, said holster having with respect to a wearer an uninterrupted inner wall, an uninterrupted outer wall at least a partially closed an unopening front, a back, a top, a bottom, and a loop for suspending said holster from a belt worn by a wearer, the improvement which comprises a handgun restraining device entirely within said holster cavity and attached to the inside of said back of said holster and extending from adjacent said top to adjacent said bottom, said device including an elongated member having a body generally prismatic in shape and having two parallel flexible fins extending from said body to adjacent said top within said cavity along respective said walls, each said fin adjacent said top having a pyramidal boss projecting outwardly toward the other said fin and boss and terminating with a space between the respective apexes spaced apart from each other less than the width of a trigger guard of a handgun; each said boss having gently sloping sides from said top to said apex and from said back to said apex and having sides facing said front and said bottom that are substantially perpendicular to said fins; said boss being adapted to fit inside a trigger guard and to prevent removal of a handgun by a vertical upward movement until a handgun has been move toward said front to push said bosses apart sufficiently to clear a trigger guard.



### 5,018,655
### PAPER FEED DEVICE FOR PRINTER

**Yasushl Koike, and Akio Tajima, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan**
**Filed Nov. 14, 1989, Ser. No. 436,288**
**Claims priority, application Japan, Nov. 15, 1988, 63-148874[U]**
**Int. Cl.$^5$ B41J** *11/50, 13/054*
**U.S. Cl. 226—101** **11 Claims**

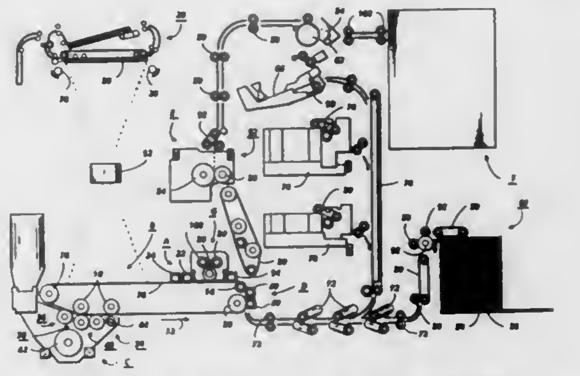


1. A paper feed for a printer comprising:

a frame means;
a platen rotatably mounted on said frame means;
friction roller support means juxtaposed to said platen;
biasing means mounted on said frame means and having a first operable condition biasing said friction roller support means toward said platen with a first biasing force and having a second operable condition biasing said friction roller support means toward said platen with a second biasing force less than said first biasing force;
cam means rotatably mounted on said frame means and operable between first and second operable positions to effect disposition of said biasing means in said first and second operating conditions;
said biasing means comprising a leaf spring having ends mounted on said frame means, said leaf spring having a main portion extending between said ends, said main portion engaging said friction roller support means when said cam means is in said first operable position such that said main portion of said spring biases said friction roller support means toward said platen;
said leaf spring having generally U-shaped tongue portions joined to said main portion, said tongue portions engaging said friction roller support means and being operable to bias said friction roller support means towards said platen;
said cam means being rotatably from said first to said second operable position to engage said main portion of said spring to space said main portion from said friction roller support means such that said main portion of said leaf spring no longer biases said friction roller support means towards said platen, said tongue portions biasing said friction roller support means toward said platen when said cam means is in said second operable position.

### 5,018,656
### STAPLING APPARATUS

**Russell L. Phelps, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**
**Filed Jul. 20, 1987, Ser. No. 75,706**
**Int. Cl.$^5$ B27F** *7/21*
**U.S. Cl. 227—84** **32 Claims**



1. An apparatus for stapling a set of sheets, including:

means for holding a fixed, predetermined length of wire with the length of the wire being held by said holding means being independent of the thickness of the set of sheets;
a wire cutter;
means for clamping the set of sheets;
means for moving said clamping means into engagement with the set of sheets;
means, responsive to the movement of said clamping means, for positioning said wire cutter along the predetermined length of wire in said holding means to a cutting position, said moving means applying a force on said wire cutter causing said wire cutter to shear the wire at the cutting position;
means for forming the cut piece of wire into a staple; and
means for driving the staple through the set of sheets to staple the sheets together.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,657

### PNEUMATICALLY ACTUATED SURGICAL STAPLER HEAD

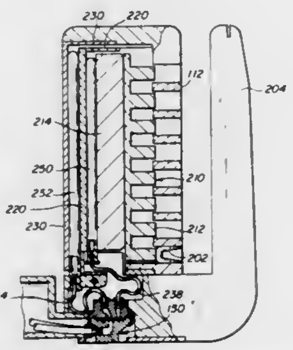
**Jack Pedlick, Butler; Bela Vincze, and Jess Deniega, both of Flemington, all of N.J., assignors to Ethicon, Inc., Somerville, N.J.**

**Filed Jan. 9, 1989, Ser. No. 294,523**

**Claims priority, application United Kingdom, Jan. 15, 1988, 8800909**

**Int. Cl.$^5$ A41H** *17/00*

**U.S. Cl. 227—178** **22 Claims**



1. A surgical stapling instrument comprising:
a source of pressurized gas;
pneumatic means for clamping tissue;
pneumatic means for implanting staples in said clamped tissue; and
manual means for actuating said pneumatic clamping means and said pneumatic staple implanting means by pressurized gas from said source.

---

### 5,018,658

### BONDING WEDGE

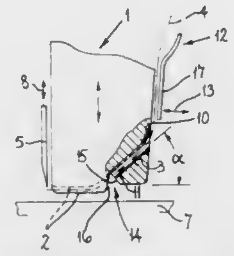
**Farhad Farassat, Muenchen, Fed. Rep. of Germany, assignor to Dynapert Inc., Wilmington, Del.**

**Filed Apr. 12, 1990, Ser. No. 509,555**

**Claims priority, application Fed. Rep. of Germany, Apr. 17, 1989, 3912580**

**Int. Cl.$^5$ B23K** *3/00;* **H01L** *21/60*

**U.S. Cl. 228—4.5** **4 Claims**



1. A bonding wedge for an ultrasonic bonder comprising
a wire guide in the form of a through-passage extending obliquely downwardly in the wire direction,
a plastic sleeve slidably located within said through-passage and extending substantially the entire length thereof, and
means for preventing the downward displacement of said plastic sleeve.

---

### 5,018,659

### METHOD OF BONDING A METAL OXIDE TO A METAL

**Johannes T. Klomp, Geldrop; Adrianus J. C. Van De Ven, and Johan F. J. M. Caers, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Jun. 2, 1989, Ser. No. 360,648**

**Claims priority, application Netherlands, Jun. 6, 1988, 8801439**

**Int. Cl.$^5$ B23K** *31/00, 101/36;* **C04B** *41/51;* **C23C** *26/00*

**U.S. Cl. 228—121** **5 Claims**

1. A method of bonding a surface of a metal oxide or a metal oxidic compound to a contact metal, the contact metal being brought into contact with the surface of the metal oxide or the metal oxidic compound, characterized in that the metallic element of the metal oxide or at least one metallic element of the metal oxidic compound is subsequently reduced at the surface to the corresponding metal by means of a reducing gas mixture including hydrogen and water vapor at a temperature between 800° and 1100° K. and the partial pressure ratio between hydrogen and water vapor is smaller than $10^{-2}$, said metallic element and the contact metal mixing, and the contact metal being inert relative to oxygen under the process conditions.

---

### 5,018,660

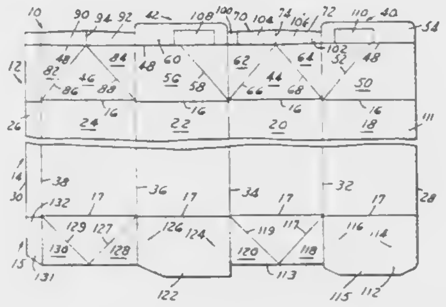
### CONTAINER AND BLANK FOR CONSTRUCTING SAME

**Leo J. Esper, Troy; David C. Jorgensen, Walled Lake; Howard E. Murrah, Fenton; Michael G. Schneider, Wixom; Raymond M. Phillips, Redford, all of Mich., and Bruce C. Dauzy, Lima, Ohio, assignors to Elopak Systems, A.G., Glattbrugg, Switzerland**

**Filed May 22, 1990, Ser. No. 527,115**

**Int. Cl.$^5$ B65D** *5/74*

**U.S. Cl. 229—125.42** **5 Claims**



1. A container including four interconnected body panels and a bottom closure therefor, a triangular fold-in spout panel formed on the upper end of one of said body panels, a triangular fold-in closure panel formed on one end of a second of said body panels, first and second oppositely disposed lower closure panels, first and second sets of triangular fold-back panels interconnecting said spout panel and said closure panel, respectively, with said respective lower closure panels, and being folded against the latter, first and second upper closure panels extending vertically from said respective first and second lower closure panels, and first and second infold lips extending vertically from each of said respective first and second sets of fold-back panels and being folded toward one another and sealed between said first and second upper closure panels, characterized by a food grade adhesive applied to the exterior surfaces of at least one infold lip of each of said first and second sets of infold lips, to the interior surfaces of at least one of said second set of infold lips, to at least one of the extreme left and right edge portions of the interior surfaces of said first set of infold lips, and to the interior surfaces of one of said first and second upper closure panels except for portions thereof directly opposite the portions of said first set of infold lips not covered with adhesive.

---

### 5,018,661

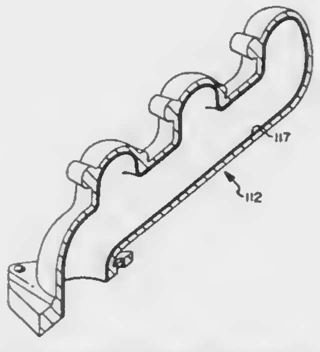
### HEAT-RESISTANT EXHAUST MANIFOLD AND METHOD OF PREPARING SAME

**Frederick F. Cyb, 23351 Filmore, Taylor, Mich. 48180**

**Continuation-in-part of Ser. No. 275,949, Nov. 25, 1988, Pat. No. 4,930,678, and a continuation-in-part of Ser. No. 350,336, May 11, 1989, abandoned. This application Mar. 19, 1990, Ser. No. 495,154**

**Int. Cl.$^5$ F01N** *7/10;* **B23K** *31/00*

**U.S. Cl. 228—176** **15 Claims**



1. A method of lining an exhaust manifold, comprising the steps of:
(a) applying a heat-resistant compound to form a first liner on the inside of a first metal shell, the first shell comprising a first section of an exhaust manifold;
(b) bonding the first liner to the first shell;
(c) applying a heat-resistant compound to form a second liner on the inside of a second metal shell, the second shell comprising a second section of the exhaust manifold and being alignable with the first section;
(d) bonding the second liner to the second shell; and then
(e) joining the first and second shells together in an aligned configuration to form an exhaust manifold or a portion of an exhaust manifold.

10. A heat-resistant exhaust manifold which is a product of a method which comprises the steps of:
(a) applying a heat-resistant compound to form a first liner on the inside of a first metal shell, the first shell comprising a first section of an exhaust manifold;
(b) adhesively bonding the first liner to the first shell;
(c) applying a heat-resistant compound to form a second liner on the inside of a second metal shell, the second shell comprising a second section of the exhaust manifold and being alignable with the first section;
(d) adhesively bonding the second liner to the second shell; and
(e) joining the first and second shells together in an aligned configuration to form the manifold or a portion thereof.

---

### 5,018,662

### COATING AND BRAZING TECHNIQUE

**Glenn A. Metts, Maumee, Ohio, assignor to P & J Industries, Inc., Toledo, Ohio**

**Filed Feb. 26, 1990, Ser. No. 485,046**

**Int. Cl.$^5$ B23K** *1/20*

**U.S. Cl. 228—208** **5 Claims**

1. In a method of manufacturing an assembly of metallic a components for use in the fuel system of an internal combustion engine, the steps comprising:
(a) applying a coating comprising a nickel alloy having a phosphorus content to the interior portions of the components of the assembly;
(b) placing the components in the desired configuration;
(c) applying a brazing compound comprising a nickel alloy having a phosphorus content comparatively higher than that of the nickel alloy of the coating and having a lower melting point of that of coating to the junctures of the components; and
(d) applying heat to the junctures of the components sufficient to melt the brazing compound without melting the coating, and therefore to effectively join the components together to form said assembly.

---

### 5,018,663

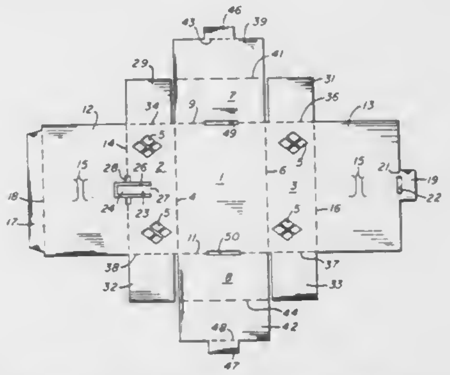
### HAND CARRYABLE RESH PRODUCE CONTAINER

**Thomas I. Corso, Pittsburgh, Pa., assignor to Corso Bros., Inc.**

**Filed Dec. 18, 1989, Ser. No. 452,992**

**Int. Cl.$^5$ B65D** *5/46, 5/48*

**U.S. Cl. 229—117.13** **29 Claims**



1. A container for packaging, transporting and enhancing quality maintenance of fresh produce of a predetermined weight corresponding to a predetermined number of individual produce items of preselected size, the container being assembled from a flat sheet of corrugated paperboard material comprising a bottom panel, a plurality of side panels forming the front, back and end walls of the container and having top edges defining a mouth of the assembled container, the side panels comprising longer primary front and back panels and a pair of shorter primary end panels, each primary side panel having a pair of lateral edges extending along a vertical corner of the assembled container and two pairs of secondary side panels each connected along one edge thereof to a vertically-extending lateral edge of a primary side panel and juxtaposed and secured to the interior surface of an adjoining primary side panel thereby reinforcing the vertical compressive strength of the adjoining primary side panel and a corresponding vertical corner of the container, a first top panel connected along one edge thereof to an upper edge of a first longer side panel and having on an opposed edge thereof a closure flap insertable, in closed position of the first top panel, into the container mouth in frictional engagement with the interior surface of a second longer side panel, a second top panel adapted in closed position of the assembled container to overlie the first top panel and having a primary closure tab insertable in a primary closure slot in the first top panel in a closed position of the second top panel, a secondary closure tab comprising an inner portion formed from the material of the first longer side panel and having one end thereof hingedly connected thereto and the other end thereof hingedly connected to an outer portion formed from the material of the first top panel and, in a closed position of the second top panel, extending above the exterior surface thereof and insertable in a secondary closure slot formed in the primary closure tab, each of the top panels being provided with a pair of parallel, elongated and spaced-apart hand carrying slots located substantially in the inertial center of the container and registrable with such slots in the other top panel in a closed position of the container, at least one of the side walls of the container having opening patterns spaced apart in the depth and length directions of the assembled container and providing means for visual inspection of the container contents and facilitating convective air circulation within the closed container and through such openings resulting from thermal differences inside and outside the container.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,664

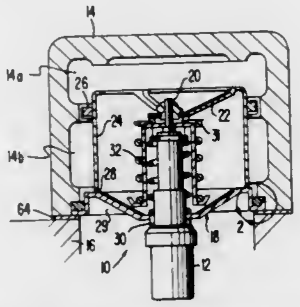
### THERMOSTAT HAVING SOFT MOUNTING STRUCTURE

**Gordon Butler, Crothersville, Ind., assignor to Caltherm Corporation, Columbus, Ind.**

**Filed May 8, 1990, Ser. No. 520,186**

**Int. Cl.$^5$ F01P** *7/02*

**U.S. Cl. 236—34.5** **23 Claims**



1. A thermostat for mounting between clamping surfaces in the cooling system of an engine, wherein there is a predetermined distance between the clamping surfaces when they are in clamping positions, comprising:

a valve element movable to control the flow of coolant through the cooling system, said valve element comprising a sleeve defining a central axis and an axial fluid passage;

a seat member, said seat member having a hard seat engageable by said movable valve element to stop flow of coolant between said movable valve element and said hard seat, said hard seat defining a periphery, and said seat member having a clamping portion extending beyond the periphery of said hard seat for clamping between the clamping surfaces in the cooling system of the engine; and

an elastomeric sealing member lying between at least part of said clamping portion and at least one of the clamping surfaces, said elastomeric sealing member engaging said clamping portion and, in at least an uncompressed condition, projecting beyond the clamping portion of the seat member in a direction perpendicular to the clamping surfaces, the clamping portion of the seat member and the elastomeric sealing ring in its uncompressed condition together having a maximum dimension in the direction perpendicular to the clamping surfaces greater than the predetermined distance between the clamping surfaces, and said clamping portion of the seat member having a maximum dimension in a direction perpendicular to the clamping surfaces at least as small as the predetermined distance between the clamping surfaces;

whereby distortion of said clamping portion and said hard seat is avoided when said thermostat is clamped between said clamping surfaces.

---

### 5,018,665

### THERMAL RELIEF VALVE

**Michael Sulmone, Trooper, Pa., assignor to Hale Fire Pump Company, Conshohocken, Pa.**

**Filed Feb. 13, 1990, Ser. No. 479,765**

**Int. Cl.$^5$ G05D** *23/12*

**U.S. Cl. 236—93 A** **8 Claims**

7. A thermal relief valve adapted to sense the fluid temperature of a pump or the like and to open to discharge pump fluid when the fluid temperature becomes too high, comprising:

a valve body adapted to be mounted in an opening in the body of the pump or the like,

said valve body having a cylinder chamber constructed and arranged to communicate at its inner end with the interior of the pump,

a piston slidably mounted for movement within said cylinder chamber between a valve closed position and a valve open position, said piston having an upstream end wall facing the inner end of said cylinder chamber and the fluid of the pump or the like,

means biasing said piston toward said valve closed position,

a temperature responsive means for actuating said piston between said valve closed and valve open positions thereof,

said temperature responsive means including

an actuator body,

a temperature sensing means contained within said actuator body, and

an actuating member mounted in said actuator body for movement through an actuating movement relative to said actuator body in response to the sensing of a temperature increase by said temperature sensing means,

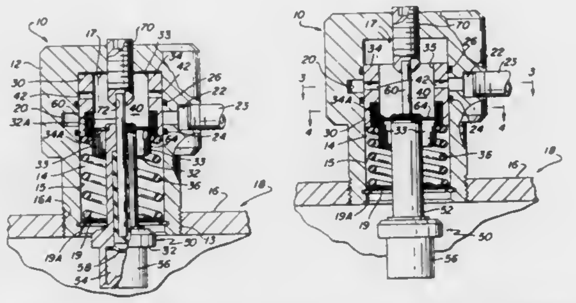
a stop means arranged in said valve body to be in alignment with said actuating member,

means mounting said actuator body of said temperature responsive means for conjoint movement with said piston and to position said temperature sensing means in contact with the fluid of the pump or the like for sensing the temperature thereof and said actuating member to extend from said actuator body toward said stop means for contact therewith,

and means providing a relief passage in said valve body for the flow of water from said cylinder chamber to atmosphere,

said piston having an internal chamber and relief ports therein providing flow communication between said internal piston chamber and the surface of said cylinder chamber, said piston having passage means therein extending between the upstream end wall of said piston and said internal piston chamber to provide flow communication between the inner end of said cylinder chamber and said internal piston chamber,

said relief passage and said relief ports being constructed and arranged so that when said piston is in the valve closed position, the flow through said relief ports is blocked and when said piston is in the valve open position, said relief ports provide flow communication between the internal piston chamber and said relief passage.



### 5,018,666

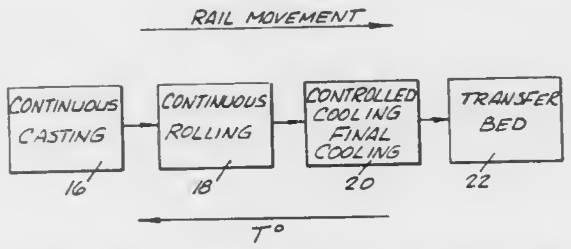
### UNITARY ONE QUARTER MILE LONG RAILROAD RAIL FREE OF WELD SEAMS

**Robert L. Cryderman, and John C. Winkley, both of Pueblo, Colo., assignors to CF&I Steel Corporation, Pueblo, Colo.**

**Filed Dec. 1, 1989, Ser. No. 444,789**

**Int. Cl.$^5$ E01B** *5/02*

**U.S. Cl. 238—122** **4 Claims**



1. A unitary, horizontally asymmetrical, steel railroad rail comprised of head, base and web sections, said rail being at least about 500 feet in length and substantially free of any weld seams.

---

### 5,018,667

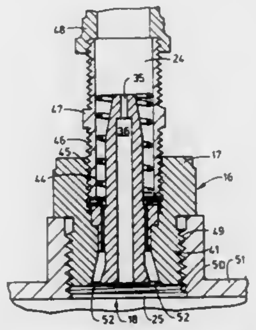
### PHASE CHANGE INJECTION NOZZLE

**Daniel L. Lloyd, Mason, Ohio, assignor to Cold Jet, Inc., Loveland, Ohio**

**Continuation of Ser. No. 308,169, Feb. 8, 1989, abandoned. This application Apr. 13, 1990, Ser. No. 515,763**

**Int. Cl.$^5$ B08B** *7/00;* **B05B** *7/14*

**U.S. Cl. 239—132.5** **30 Claims**



1. A nozzle for converting liquid flowing from an upstream cavity into solid particles which flow into a downstream cavity, comprising:

(a) a body having an inlet surface and an outlet surface;

(b) at least one primary orifice formed through said body, each of said primary orifices communicating with said inlet surface, and communicating with said outlet surface, each respective primary orifice being adapted to effect the phase change of the liquid flowing into said respective primary orifice from the liquid phase to the solid phase, said phase change cooling said body; and

(c) precooling means connected to said body for cooling the liquid prior to the liquid flowing into said primary orifices.

---

### 5,018,668

### METHOD AND APPARATUS FOR INITIATING ROTATION OF VERTICAL AUGER DEVICES

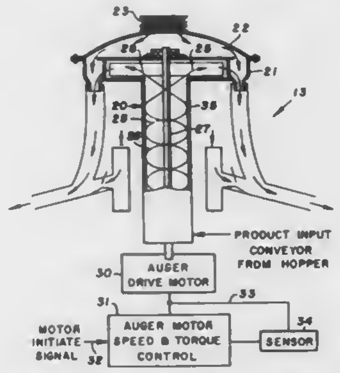
**Norman A. Bauer, Watertown, Minn., assignor to Ag-Chem Equipment Co., Inc., Minnetonka, Minn.**

**Filed Mar. 30, 1990, Ser. No. 502,767**

**Int. Cl.$^5$ B05B** *17/00;* **A01C** *15/14*

**U.S. Cl. 239—655** **2 Claims**

1. In combination with a pressurized pneumatic system for substantially uniform distribution of particulate solids upon the soil from a system mounted upon a self—propelled vehicle and including a reservoir with a source of supply of particulate solids to be distributed, a distribution head means including a lift-auger for metering and apportioning particulate solids from said reservoir into a plurality of generally aliquot portions, a plurality of elongated hollow delivery booms extending laterally outwardly of said vehicle from a proximal end to a distal discharge end, the improvement comprising:



(a) said drive motor comprising an hydraulic motor with a first low-speed/high-torque running mode and a second high-speed low-torque running mode, and means for initially operating said drive motor in said first mode and for converting said first mode to said second mode following a finite period of time, the arrangement being such that operation in such first mode continues until auger breakaway on initial rotation and wherein operation in said second mode is the normal operational mode.

---

### 5,018,669

### SPREADER FOR SPREADING GRANULAR AND/OR POWDERY MATERIAL

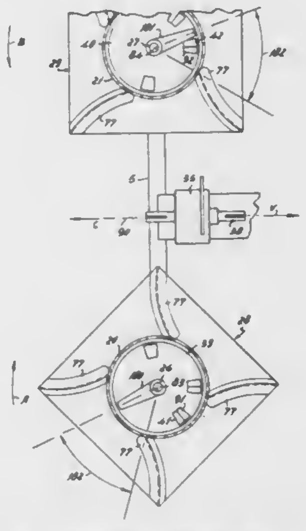
**Ary van der Lely, Maasland, and Cornelis J. G. Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N.V., Maasland, Netherlands**

**Filed May 1, 1979, Ser. No. 35,075**

**Claims priority, application Netherlands, May 5, 1978, 7804824; Mar. 1, 1979, 7901632**

**Int. Cl.$^5$ A01C** *17/00*

**U.S. Cl. 239—665** **11 Claims**



1. A spreader for spreading granular and/or powdery material comprising a frame, a hopper, feeding means from said hopper and at least two distribution members rotatably supported below said hopper, each said member being rotatably

OL
126
SS
4
MY
28
1991
UMI

about an upwardly extending shaft, each said distribution member comprising a plate with ejection blades, a displacer connected to each said distribution member and said displacer being positioned to lead at least one of said blades therein with respect to the direction of operative rotation of said plate and adapted to enhance temporarily the flow of material from said feeding means, whereby the flow of material from said feeding means during operation is temporarily enhanced by each said displacer and the temporarily increased flow passes to its respective said distribution member to be ejected by said one blade, each displacer being positioned relative to its respective said distribution member to temporarily enhance the flow of material thereto alternatively with the other said displacer, speed adjusting means carried by the spreader associated with each distribution member for simultaenously controlling the relative velocity of material ejected from each said distribution member causing it to fall substantially within a predetermined area, said feeding means, said distribution members and said adjusting means so constructed and arranged that said areas coincide with one another throughout.

---

**5,018,670**

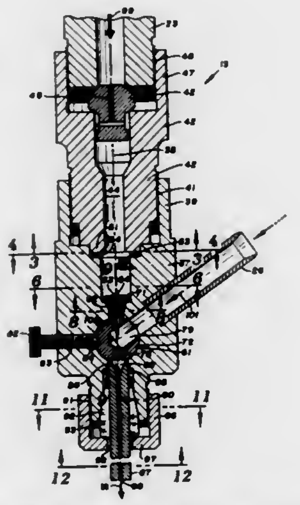
### CUTTING HEAD FOR WATER JET CUTTING MACHINE

**Eric J. Chalmers, Minneapolis, Minn., assignor to Possis Corporation, Minneapolis, Minn.**

**Filed Jan. 10, 1990, Ser. No. 463,251**

**Int. Cl.⁵ B24C** *5/04*

U.S. Cl. 239—433 **29 Claims**



1. A cutting head for a water jet cutting machine comprising:

a body having a longitudinal axis and a water inlet chamber for receiving water under pressure, an orifice element having an orifice aligned with said axis open to the chamber for discharging a high velocity stream of water, a holder supporting the orifice element, said holder having an outlet passage axially aligned with said axis, said body having a converging cone shaped recess open to the chamber with an axis aligned with the longitudinal axis of the body, said holder having a cone shaped surface adapted to fit into the cone shaped recess to align the orifice with said longitudinal axis, an annular member surrounding said holder and engageable with an inside wall of the body forming the water inlet chamber retaining the holder on the body, means having a chamber with an axis aligned with said longitudinal axis, an elongated nozzle having a passage open to the orifice and aligned with said longitudinal axis for receiving the high velocity stream of water and discharging the same as a water jet, collet means for holding the nozzle on said body with the passage aligned with said longitudinal axis, said body having a cone shaped diverging wall with an axis aligned with the longitudinal axis of the body, said collet means having surface means adapted to engage the cone shaped diverging surface of the body to align the passage with the longitudinal axis, and means holding the collet means on said body.

---

**5,018,671**

### PROCESS FOR THE CONTINUOUS GRANULATION OF HIGH DENSITY DETERGENT GRANULES

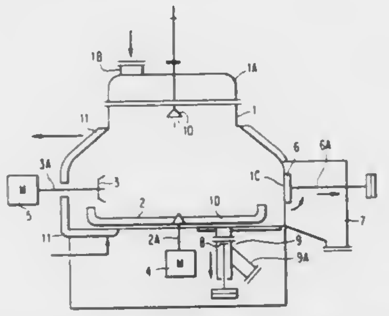
**Hitoshi Tanimoto; Koichiro Motono, and Takuo Goto, all of Wakayama, Japan, assignors to Kao Corporation, Tokyo, Japan**

**Filed Mar. 6, 1990, Ser. No. 488,835**

**Claims priority, application Japan, Mar. 6, 1989, 1-53540**

**Int. Cl.⁵ B02C** *23/18*

U.S. Cl. 241—16 **8 Claims**



1. A process for the continuous granulation of high-density detergent granules of a predetermined size from a detergent powder in a granulation apparatus comprising a granulation chamber, a feeding port located at the top of the granulation chamber, a first discharging port located at the bottom of the granulation chamber including valve means for opening and closing the port, a second discharging port located at the side wall of the granulation chamber, one or more horizontally rotating stirring blades attached to a rotational shaft positioned at the bottom of the granulation chamber which stir and mix the detergent powder, and one or more vertically rotating grinding blades located above the one or more stirring blades and attached to a rotational shaft positioned at the side wall of the granulation chamber which grind and classify coarse detergent particles, comprising the steps of continuously feeding a detergent powder into the granulation chamber; granulating the detergent powder by stirring and mixing the powder with the one or more horizontally rotating stirring blades; and continuously discharging the high-density detergent granules thus formed through the second discharging port.

---

**5,018,672**

### ORGANIC MATERIAL REDUCTION APPARATUS

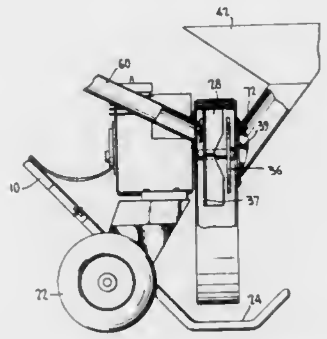
**R. Michael Peck, Lancaster; Thomas R. Hecht, Manheim, and Howard F. Livingston, Lancaster, all of Pa., assignors to Kathcon, Inc., Lancaster, Pa.**

**Filed Nov. 27, 1989, Ser. No. 441,470**

**Int. Cl.⁵ B02C** *18/14*

U.S. Cl. 241—37.5 **19 Claims**

1. Apparatus for the size reduction of vegetable and cellulosic material comprising a housing, said housing including an inlet opening for introducing material into said housing and a discharge opening for discharging material from said housing, a drive shaft extending into said housing, impeller means connected to said drive shaft, shredding means connected to said drive shaft and being disposed between said impeller means and said inlet opening for shredding material passing into the housing through said inlet opening and reducing the size of the material, and screen means disposed radially outwardly of said impeller means so that material passing radially outwardly from the impeller means impinge upon said screen means, said screen means being supported by said housing for movement toward and away from said impeller means during operation of the apparatus to prevent clogging of material between said impeller means and said screen means.



---

**5,018,673**

### CONTINUOUSLY WORKING MIXER

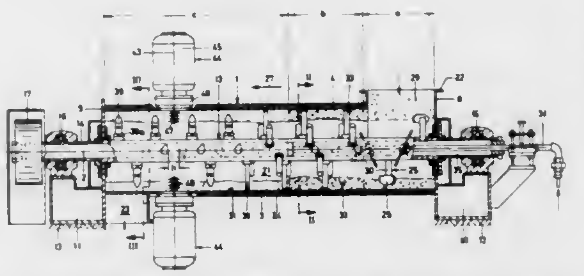
**Paul Eirich, Hardheim, and Werner Christen, Mannheim, both of Fed. Rep. of Germany, assignors to Draiswerke GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Nov. 20, 1989, Ser. No. 438,271**

**Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839671**

**Int. Cl.⁵ B02C** *18/14*

U.S. Cl. 241—62 **7 Claims**



1. Continuously working mixer for the wetting of, fibrous material with a liquid binding agent, in a ring of material, comprising:

an essentially horizontally arranged cylindrical housing (**1**), which is provided at a first end with a material supply pipe (**22**) for a continuous supply of material (**29**) and, at a second end, with a material discharge pipe (**23**) for a continuous removal of wetted material and which has an inner wall (**31**);

a mixing apparatus (**13**) which is arranged coaxially in the housing and which is driveable at high speed and which mixing apparatus comprises mixing tools (**25, 33, 38, 39**) which project essentially radially therefrom and into the vicinity of the inner wall (**31**) of the housing (**1**);

a draw-in zone (a) which is associated with a material supply pipe (**22**);

a wetting zone (b) which is provided downstream in an axial conveying direction (**27**) of the draw-in zone (a);

means for the admission of liquid into a ring (**32**) of material (**29**) which are provided in the wetting zone (b), and which ring (**32**) of the material (**29**) is helically conveyed and moved on the inner wall (**31**) of the housing (**1**) through its interior (**21**); and

means for the separation of clusters, wherein, the conveying direction (**27**), immediately upstream of the material discharge pipe (**23**), a plurality of cutting devices (**44**) are provided in a radial plane (**43**) relative to the shaft (**14**) said cutting devices (**44**) being arranged at equal angular spacings relative to one another around the full circumference of said housing (**1**), wherein said cutting devices (**44**) each comprise one cutter shaft (**47**) with an extension (e) projecting from the inner wall (**31**) of the housing (**1**) into the interior (**21**) and which is provided with a plurality of spacingly arranged cutters (**49, 50**), wherein said extension (e) of said cutter shaft in the direction of its axis (**48**) substantially corresponds to the thickness (f) of the ring (**32**) of material.

---

**5,018,674**

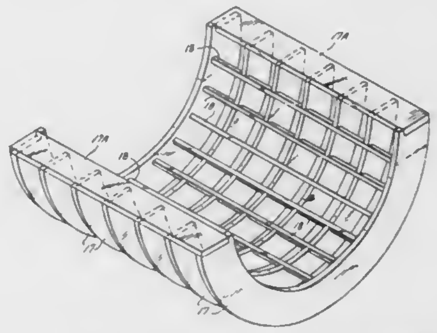
### GRATE ASSEMBLY IN A DOWN DRAFT IMPACT MILL

**Robert M. Williams, 16 La Hacienda, Ladue, Mo. 63124**

**Continuation of Ser. No. 419,256, Oct. 10, 1989, abandoned. This application Jul. 20, 1990, Ser. No. 555,798**

**Int. Cl.⁵ B02C** *13/284*

U.S. Cl. 241—88.4 **1 Claim**



1. In a rotary impact grinding mill having a housing formed with an inlet for material to be ground, a shaft mounted material grinding rotor carrying hammers operably mounted thereon to move in a circular path to intercept incoming material to be ground, and an outlet of the ground material, the improvement comprising a grate assembly mounted in the housing outlet to form a grid of grate openings defining a curved face presented to the hammers and including:

(a) a series of side-by-side ribs arranged in spaced apart positions, said ribs having edges and flat sides, the dimension of said flat sides determining the thickness of the grate assembly and the flat sides forming passages having low resistance to the flow of air and ground material, said ribs edges being curved to conform to the path of the material grinding rotor hammers for grinding material;

(b) stabilizing bars engaged with said series of side-by-side ribs to stabilize said ribs in said spaced apart positions, said bars being positioned in the curved face of the grid and having a dimension less than the thickness of said grate assembly and cooperative with said ribs in forming the size of openings for the passages of ground material; and

(c) said side-by-side ribs being directed substantially perpendicular to said stabilizing bars, and said stabilizing bars being parallel to said rotor shaft.

---

**5,018,675**

### AUXILIARY WORKING BOWL FOR A FOOD PROCESSOR

**André Gateaud, Perrecy les Forges, France, assignor to Robot Coupe S.A., France**

**Filed Mar. 28, 1989, Ser. No. 329,529**

**Claims priority, application France, Jul. 29, 1987, 87 10725**

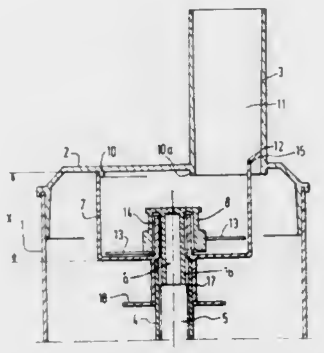
**Int. Cl.⁵ B02C** *18/12*

U.S. Cl. 241—282.2 **9 Claims**

1. A food processor assembly comprising a base having a motor housed therein said motor driving a shaft which projects vertically from the base and which has a top surface, a main cylindrical bowl removably connected to the base, said main bowl being provided with a sleeve surrounding the drive shaft, and a lid having a top and bottom surface and being removably connected to said main bowl, said lid having an insertion

VOL
126
SS
4
MY
28
1991
UMI

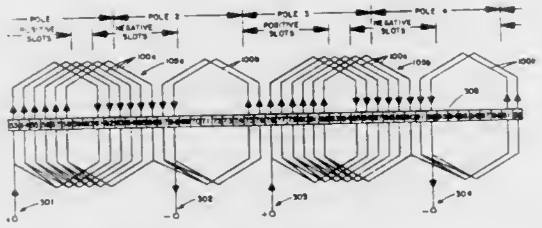
hopper, and further comprising an auxiliary working bowl having a diameter less than the diameter of the main working bowl, said auxiliary working bowl being removably mounted on the sleeve of said main bowl, said auxiliary working bowl bearing against the bottom surface of said lid and said sleeve such that said auxiliary working bowl is stationary during operation of said assembly, said drive shaft being capable of driving a tool in said auxiliary working bowl.



---

### 5,018,676
### ARMATURE WINDING ARRANGEMENT AND METHOD FOR ELECTRICAL MACHINE

**William E. Gulbrandson, Clear Lake, Minn., assignor to Onan Corporation, Minneapolis, Minn.**
**Continuation of Ser. No. 103,422, Sep. 30, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 406,841**
**Int. Cl.$^5$ H02K** *15/09*
**U.S. Cl. 242—7.03** **5 Claims**



1. A method for winding electrical conductor material to form a group of coils, each coil having a mechanical span, the group of coils being formed for an armature of a 120 degree phase belt electrical machine, wherein the group of coils is defined by a first and second subgroup of coils, and the armature comprises a plurality of slots arranged in a circular pattern and aligned with each other, the method comprising the steps of:

(a) winding said first subgroup of coils in the slots of the armature in a first direction, to provide for the flow of electrical current therethrough, the mechanical span of each coil of said first subgroup of coils being equal to a first mechanical span;

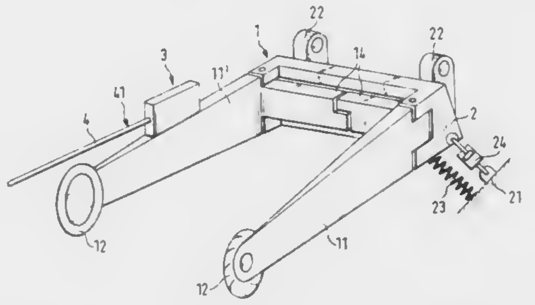
(b) winding said second subgroup of coils in the slots of the armature in a second direction, to provide for the flow of electrical current therethrough, the mechanical span of each coil of said second subgroup of coils being equal to said first mechanical span, the group of coils being formed by the first subgroup of coils and the second subgroup of coils being electrically equivalent to an alternative group of coils having the same number of coils all wound in the same direction with the coils having equal mechanical spans, and the first mechanical span of each coil of the group formed by the first subgroup of coils and the second subgroup of coils further being less than the mechanical span of each coil of the alternative group of coils, whereby less electrical conductor material is required to form the group of coils than is required to form the alternative groups of coils; and

(c) winding the group of coils such that each slot has electrical current flowing in a single direction therethrough.

---

### 5,018,677
### WINDING DEVICE TO WIND UP YARN IN SPINNING OR WINDING MACHINES

**Maximilian Fahmuller, Kelheim, Fed. Rep. of Germany, assignor to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany**
**Filed Jan. 18, 1990, Ser. No. 467,051**
**Claims priority, application Fed. Rep. of Germany, Jan. 20, 1989, 3901631**
**Int. Cl.$^5$ B65H** *54/42, 54/52*
**U.S. Cl. 242—18 DD** **15 Claims**



1. A winding device for winding yarn onto bobbins, comprising:

a) a bobbin for receiving yarn;

b) a bobbin for support arm for supporting said bobbin for rotation;

c) contact drive means for rotating said bobbin for winding said yarn thereon;

d) a hinge for connecting said bobbin support arm to a frame member for permitting said bobbin arm and said bobbin to move towards and away from said contact drive means;

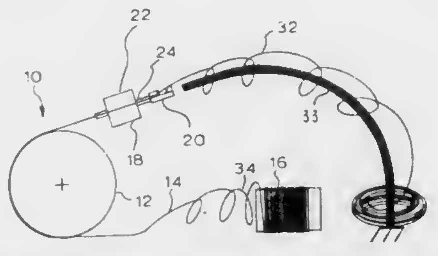
e) resilient means for urging said bobbin into contact with said contact drive means; and

f) dampening means disposed on said bobbin support arm for counteracting and damping oscillating movements of said bobbin support arm and said bobbins in a plane transverse to the longitudinal axis of said bobbin.

---

### 5,018,678
### FIBER PAYOUT MACHINE

**Stanley P. D. Peterson, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.**
**Filed Oct. 30, 1989, Ser. No. 429,300**
**Int. Cl.$^5$ B65H** *54/00, 54/76*
**U.S. Cl. 242—47** **12 Claims**



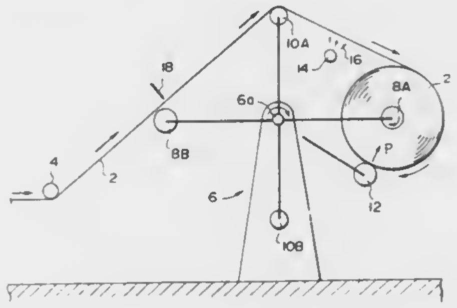
1. In a payout machine having a payout wheel for pulling optical fiber axially from a bobbin to rotate said fiber in a first direction and for dispensing said fiber into the air, an improvement wherein said improvement comprises:

means for deflecting said fiber into a helical pattern as said fiber is paid out from said payout wheel, said means including a deflector mounted in the path of the fiber and means for rotating said deflector in a second direction opposite said first direction.

---

### 5,018,679
### MAGNETIC RECORDING MEDIUM WIND-UP METHOD

**Yoshiharu Saiga; Makoto Yoshimura, and Susumu Hara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
**Filed Jan. 17, 1990, Ser. No. 466,567**
**Claims priority, application Japan, Jan. 19, 1989, 1-10440**
**Int. Cl.$^5$ B65H** *18/26*
**U.S. Cl. 242—67.1 R** **5 Claims**



1. A magnetic recording medium wind-up method for winding up a long strip-like magnetic recording medium into a coil around a core,

wherein the improvement comprises the steps of:

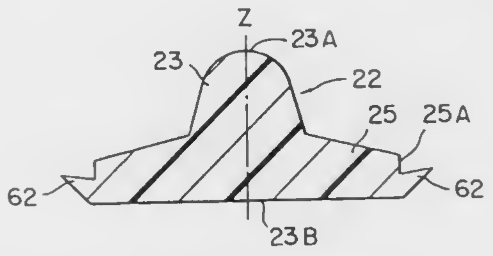
(i) pressing a wound-up portion of said magnetic recording medium toward said core with a predetermined pressure while said magnetic recording medium is being would up around said core, controlling said predetermined pressure so that no deformation occurs in the wound-up portion of said magnetic recording medium and said wound-up portion of said magnetic recording medium does not deviate along an axial direction of said core, and

(ii) wetting a predetermined length of said magnetic recording medium, which length will be wound up around said core immediately before said core is fully loaded with said magnetic recording medium, and controlling said predetermined length so that a plurality of outer loops of said magnetic recording medium superposed one upon another in the said coil to be kept in close contact with one another are prevented from deviating along said axial direction of said core.

---

### 5,018,680
### TAPE REEL OF A CASSETTE TAPE

**Akira Kato, Mito, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan**
**Filed Aug. 18, 1989, Ser. No. 395,458**
**Claims priority, application Japan, Aug. 19, 1988, 63-109365[U]**
**Int. Cl.$^5$ B65H** *75/14*
**U.S. Cl. 242—71.8** **4 Claims**



1. A tape reel for a cassette tape, comprising:

(a) a hub, made of a synthetic resin, having a top face;

(b) a pivot placed concentrically on the top face of the hub and having a head portion, a circumferential flange projecting radially outward from the head portion and nail means integrally formed with an edge of the circumferential flange to project radially outward and diagonally upward, the head portion adapted to be urged toward the top face of the hub by a leaf spring mounted to a casing of the cassette tape;

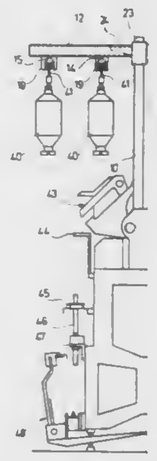
(c) pivot holding means having an inner circumferential wall integrally formed with the top face of the hub, the pivot holding means for resiliently holding the circumferential flange of the pivot so that the pivot is placed concentrically on the top face of the hub; and

(d) an upper flange having a center hole formed to allow the head portion of the pivot to pass therethrough, the upper flange being joined at the top face of the hub, and wherein the nail means of the pivot is brought into resilient contact with the inner circumferential wall of the pivot holding means by resiliently deforming the nail means for temporarily fastening of the pivot with the hub.

---

### 5,018,681
### ROVING BOBBIN CREEL FOR A TEXTILE RING SPINNING MACHINE OR THE LIKE

**Michael Weimar, Ebersbach/Fils, and Norbert Städele, Göppingen, both of Fed. Rep. of Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach/Fils, Fed. Rep. of Germany**
**Filed Dec. 11, 1989, Ser. No. 448,690**
**Claims priority, application Fed. Rep. of Germany, Dec. 10, 1988, 3841652**
**Int. Cl.$^5$ B65H** *49/14*
**U.S. Cl. 242—131** **10 Claims**

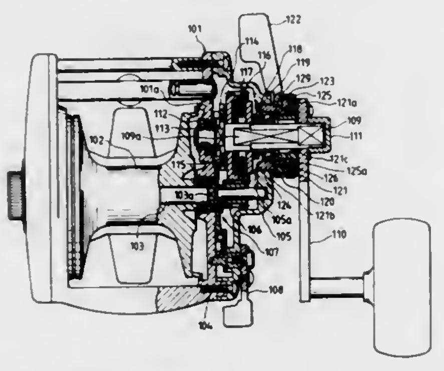


1. In a textile ring spinning machine or the like, a roving bobbin creel comprising a plurality of upright stanchions arranged in spaced relation along the length of the spinning machine at the transverse center of the spinning machine, mounting elements affixed to the upright stanchions, support elements affixed to the mounting elements to extend therefrom transversely outwardly with respect to the spinning machine, and an elongate carrier element affixed to said support elements to extend longitudinally with respect to said spinning machine for supporting a plurality of roving bobbins, each mounting element including a tongue portion projecting transversely outwardly with respect to the spinning machine and each support element defining an interior receiving area for insertion of one tongue portion to affix the support elements on the mounting elements.

VOL 126
ISS 4
MY 28
1991
UMI

### 5,018,682
## FISHING REEL HAVING A SPOOL SHAFT SUPPORTED AT BOTH ENDS THEREOF

**Atsuhito Aoki, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan**
**Division of Ser. No. 274,563, Nov. 23, 1988, Pat. No. 4,901,944.**
**This application Nov. 8, 1989, Ser. No. 433,196**
**Claims priority, application Japan, Nov. 24, 1987, 62-179516[U]; Nov. 26, 1987, 62-180870[U]**
**Int. Cl.$^5$ A01K** *89/015*
**U.S. Cl. 242—268** **5 Claims**



1. A fishing reel comprising:

a body having a side wall and a cover member secured to said side wall;

a spool shaft mounted on said body for rotation about a first axis;

a spool fixedly mounted on said spool shaft for joint rotation to wind a fishing line around said spool;

a master gear shaft having first and second ends;

a master gear rotatably mounted on said master gear shaft and disposed adjacent to said side wall;

a handle secured to said second end of said master gear shaft to rotate said master gear about said master gear shaft;

a pinion mounted on said spool shaft and meshingly engaging said master gear wherein said first end is attached to said side wall to rotate said pinion;

a plurality of drag washers including friction plates being mounted on said master gear shaft and urged into contact with said master gear;

a drag spring washer mounted adjacent to a central portion of said master gear shaft;

a first ball bearing mounted on said master gear shaft for movement therealong;

a drag adjustment member including a generally hollow cylindrically shaped member mounted around said master gear shaft and engaged with said cover member, said drag adjustment member being rotatable with respect to said cover member to move along said master gear shaft to urge said drag washers toward said master gear by pushing said first ball bearing and said drag spring washer;

a drag adjustment lever fixedly secured to said drag adjustment member to rotate said drag adjustment member about said master gear shaft with respect to said cover member;

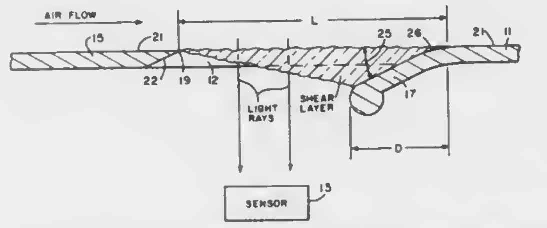
a drag preset member engaged with said drag adjustment member, said drag preset member being rotatable with respect to said drag adjustment member, said drag preset member and said drag adjustment member having means for moving said drag preset member and said drag adjustment member axially along said master gear shaft to urge said drag washers toward said master gear by pushing said first ball bearing and said drag spring washer; and

wherein said first bal bearing and said drag spring washer being contained within said drag adjustment member, and said first ball bearing and said drag spring washer being disposed between said drag washers and said drag preset member.

---

### 5,018,683
## SYSTEM FOR CONTROLLING TURBULENCE INSIDE AND JUST OUTSIDE A CAVITY

**Mansop M. Hahn; Jerry L. Lundry, both of Bellevue, and Larry W. Mohn, Edmonds, all of Wash., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**
**Filed Sep. 27, 1990, Ser. No. 589,822**
**Int. Cl.$^5$ B64C** *1/14*
**U.S. Cl. 244—1 R** **4 Claims**



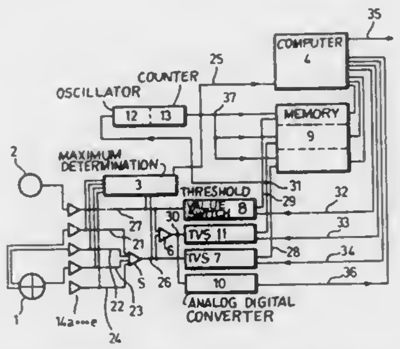
1. A system for controlling turbulence in a fluid shear layer flowing past an opening in a wall, comprising

a. a wall having therein an opening over which the fluid flows, said opening being defined by a forward lip of the wall, said forward lip defining the leading edge of the opening, said wall also having an aft lip with a leading edge, said aft lip defining the trailing edge of the opening, said aft lip extending into the opening at an angle of 30 to 60 degrees and having a length of 10 to 50% of the latch of said opening, said leading edge of said aft lip having an arcuate cross section.

---

### 5,018,684
## OPTICAL GUIDE BEAM STEERING FOR PROJECTILES

**Karl-Heinz Allgaier, Ottobrunn; Christian Diehl, and Horst Kirsche, both of Munich, all of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany**
**Filed Feb. 27, 1985, Ser. No. 732,186**
**Claims priority, application Fed. Rep. of Germany, Feb. 29, 1984, 3407398**
**Int. Cl.$^5$ F41G** *7/24*
**U.S. Cl. 244—3.13** **3 Claims**



1. Optical beam riding guidance for a missile which is guided from the launching to the target along a line of sight of a sighting device, wherein a launching device comprises one first light source whose sharply focused light beam is deflected with reference to said line of sight so that said light beam impinges on a receiver at said missile and a location assignment and tracking of said missile on a line of sight is carried out in an evaluating circuit, wherein one of said location assignment to an expiring time is produced by means of a time base which follows in said evaluating circuit and is synchronized with said launching device until the moment of launching, and a time base can be triggered by means of using a pulse-modulated reference second light source arranged parallel to said line of sight, characterized through the following characteristic features:

polarized light signals, which are generated by said first light source comprising a deflected coherent roll reference light source and said second light source comprising a pulse-modulated coherent time reference light source which are mounted in a launching installation with parallel light beam axes, are received by a first detector (**1**) and a second detector (**2**) with polarization filters which are perpendicular with respect to one another, at least one of which is constructed as a first detector with a plurality of sectors (**1**);

the output signals (**21, 22, 23, 24**) of said first detector with a plurality of said sectors (**1**) are fed on the one hand to a maximum determination unit (**3**) whose output signal (**25**) is fed to a computer (**4**) as an input value;

said output signals (**21, 22, 23, 24**) of said first detector with a plurality of said sectors (**1**) are combined, on the other hand, in a first mixer amplifier (**5**) whose output signal (**26**) is supplied to a first threshold value switch (**7**), as well as to a second mixer amplifier (**6**) to which an output signal (**27**) of said second detector (**2**) is fed in turn as a second input value, and said output signal (**27**) of said second detector is simultaneously also fed to a second threshold value switch (**8**) as an input signal;

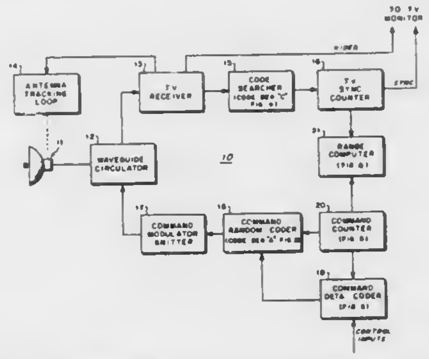
output signals (**28, 29**) of said first and second threshold value switches (**7, 8**) are read into a memory (**9**) of said computer (**4**);

an output signal (**30**) of said second mixer amplifier (**6**) is fed to said computer (**4**) as a time reference signal firstly via an analog-digital converter (**10**) and secondly via a third threshold value switch (**11**) as a time signal (**31**) to said memory (**9**) of said computer (**4**), as well as to an oscillator (**12**) of a counter (**13**) as a trigger signal, the counter state (**37**) of said counter (**13**) being fed to said memory (**9**).

---

### 5,018,685
## DATA LINK AND RETURN LINK

**Bruce R. Meuron, Willow Grove, and Joseph B. Lyons, Jr., Philadelphia, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed May 27, 1964, Ser. No. 370,741**
**Int. Cl.$^5$ F41G** *7/00*
**U.S. Cl. 244—3.14** **14 Claims**



1. A random code searcher for synchronizing a random code generator with an incoming sequence of code bits comprising:

an oscillator clock;

a code generator preset to issue a particular sequence of code bits and driven by pulses from said oscillator clock;

means to compare an incoming sequence of code bits with said sequence of code bits from said code generator and express an output as a function of correlation or noncorrelation of said two sequences;

means to interrupt the pulses driving said code generator periodically in response to a noncorrelation signal from said means to compare said code sequences;

a counter driven by the pulses driving said code generator for periodically providing a reset signal to said code generator;

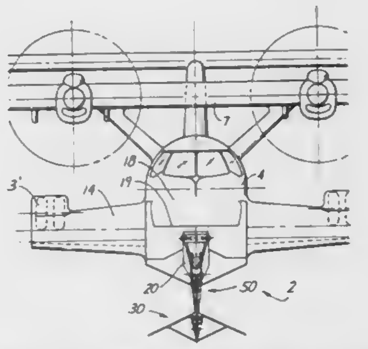
means for periodically sampling the output from said means to compare said code sequences and issuing a correlation or noncorrelation signal in response thereto; and

logic means for passing or interrupting pulses from said oscillator clock to said code generator and said counter means in response to the correlation or noncorrelation signal from said means for periodically sampling.

---

### 5,018,686
## HYDRODYNAMIC LIFT FOR FLYING BOATS OR SEA PLANES

**Herbert Zimmer, Friedrichshafen, Fed. Rep. of Germany, assignor to Dornier Luftfahrt GmbH, Friedrichshafen, Fed. Rep. of Germany**
**Filed Aug. 25, 1989, Ser. No. 398,790**
**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828965; Dec. 13, 1988, 3841878**
**Int. Cl.$^5$ B64C** *35/00, 35/02;* **B63B** *1/30, 1/26*
**U.S. Cl. 244—106** **16 Claims**



1. A vehicle of the flying boat or sea plane variety having a fuselage with a longitudinal axis and being constructed for and provided with means for obtaining a hydrodynamic lift, the improvement comprising:

a wing system linked to the boat or plane in order to obtain hydrodynamic lift when in a protracted position and including two wings arranged one above the other but establishing, in front view, a closed frame including an upper wing of the wing system having in said protracted position a negative, downward facing V position and a lower wing of the wing system having, in said protracted position from the fuselage, a positive, upwardly facing V position, both wings of the wing system being provided in an arrow configuration a point of which faces forward; and

means for completely retracting said wing system into the fuselage of the vehicle, including a lever system for pivoting both wings to turn them over by 180 degrees about an axis extending transversely to said longitudinal axis, to store them in the fuselage in an upside down or reverse order.

---

### 5,018,687
## DOOR/HATCH ACTUATION

**Artur Kupfernagel, Stuhr, and Dieter Nitsch, Delmenhorst, both of Fed. Rep. of Germany, assignors to MBB GmbH, Bremen 1, Fed. Rep. of Germany**
**Filed Mar. 1, 1989, Ser. No. 317,659**
**Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806688**
**Int. Cl.$^5$ B64C** *1/14*
**U.S. Cl. 244—129.5** **6 Claims**

1. Mechanically operable actuating device for opening towards the outside and closing a cargo hatch or freight door in the fuselage of an aircraft, comprising:

VOL
1126
ISS
4
MY
28
1991
UMI

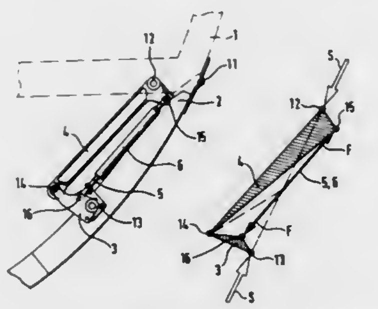
at least two hinges for connecting an upper side of the door or hatch to the fuselage;

a coupling member having an upper end and a lower end;

a first swivel joint for floatingly mounting the upper end of the coupling member to a re-enforcing part in the upper portion of the hatch or door;

a rocking arm;

a second swivel joint for floatingly connecting the rocking arm to a hatch or door frame of the fuselage;



a third swivel joint for connecting the rocking arm to the lower end of the coupling member;

a compression spring means;

a fourth swivel joint connecting one end of the spring means to the rocking arm so that the spring means extends substantially parallel to the coupling member; and

a fifth swivel joint connecting an opposite end of the spring means to the upper end of the coupling member.

---

### 5,018,688

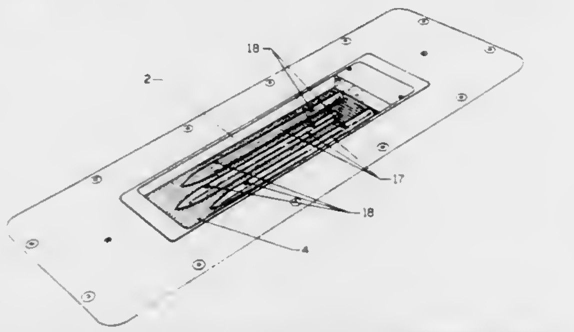
### PASSIVE VENTING TECHNIQUE FOR SHALLOW CAVITIES

**Robert L. Stallings, Jr., Yorktown, and Floyd J. Wilcox, Jr., Hampton, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics, Washington, D.C.**

**Filed Sep. 28, 1988, Ser. No. 250,468**

**Int. Cl.$^5$ B64C** *7/00;* **B64D** *1/02*

**U.S. Cl. 244—137.4** **2 Claims**



1. A device for reducing drag and store separation difficulties caused by shallow cavities recessed below the surface of aircraft in supersonic flight which comprises:

a. a shallow cavity, which is defined as one having a length to height ratio greater than about 9 and has four walls recessed below the aircraft surface,

b. a slab of porous material with porosity between 4 and 25% cut to fit precisely inside the cavity where the slab is thick enough to withstand a pressure difference on either major side of the slab and thin enough not to obstruct free flow of air through the slab,

c. a means to mount the slab in the cavity creating a plenum chamber between the slab and the floor of the cavity such that:

(1) airflow through the plenum chamber is not blocked,

(2) the plenum chamber formed is deep enough to allow air to flow freely therethrough, and

(3) the plenum chamber formed is shallow enough that storage space is maximized,

d. a means to mount stores within the cavity such that when the stores are released, they will separate from the cavity.

---

### 5,018,689

### METHOD AND DEVICE FOR STOPPING VEHICLE AT PREDETERMINED POSITION

**Seiji Yasunobu, Yokohama; Shoji Miyamoto, Kawasaki, and Hirokazu Ihara, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

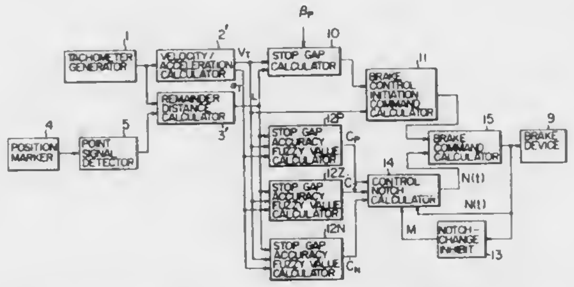
**Continuation of Ser. No. 127,549, Dec. 2, 1987, Pat. No. 4,852,007, which is a continuation of Ser. No. 488,455, Apr. 25, 1983. This application Mar. 14, 1989, Ser. No. 322,991**

**Claims priority, application Japan, Apr. 27, 1982, 57-70931; May 7, 1982, 57-75256**

**The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.**

**Int. Cl.$^5$ B61L** *3/08*

**U.S. Cl. 246—182 B** **7 Claims**


1
TACHOMETER GENERATOR
2'
VELOCITY / ACCELERATION CALCULATOR
Vт
βP
10
STOP GAP CALCULATOR
11
BRAKE CONTROL INITIATION COMMAND CALCULATOR
REMAINDER DISTANCE CALCULATOR
3'
4
POSITION MARKER
5
POINT SIGNAL DETECTOR
12P
STOP GAP ACCURACY FUZZY VALUE CALCULATOR
CP
12Z
STOP GAP ACCURACY FUZZY VALUE CALCULATOR
CZ
12N
STOP GAP ACCURACY FUZZY VALUE CALCULATOR
CN
14
CONTROL NOTCH CALCULATOR
15
BRAKE COMMAND CALCULATOR
9
BRAKE DEVICE
N(t)
N(t)
M
NOTCH-CHANGE INHIBIT
13

1. A method for controlling a controllable subject to adapt the behavior of the subject to an optimum condition as to a predetermined control purpose, comprising:

a first step of specifying a value of at least a first signal representing a current status of said subject;

a second step of predicting, by using said specified value of said first signal, values of a parameter for evaluating a condition of said control purpose according to a predetermined formula, said values being those values which would be obtained, respectively, as a result of control operations under a plurality of different control instructions, if applied to said subject, respectively;

a third step of converting each of said values of the parameter to at least one fuzzy value determined according to at least one of membership functions with respect to preselected performance indices relating to said control purpose, each of said membership functions defining a relationship between the fuzzy value and the value of the parameter; and

fourth step of determining one control instruction to be applied to said subject among said different control instructions based on the fuzzy values of said parameter.

---

### 5,018,690

### LATCH MECHANISM FOR A RAILBOARD TRACK SWITCH COVER

**Stanley W. Widmer, R.R. 2, Staples, Minn. 56479**

**Filed Apr. 23, 1990, Ser. No. 513,071**

**Int. Cl.$^5$ E01B** *7/20;* **E01F** *7/00*

**U.S. Cl. 246—428** **19 Claims**

1. A latch mechanism to hold down a railroad track switch cover housing positionable over a section of railroad track bed, comprising:

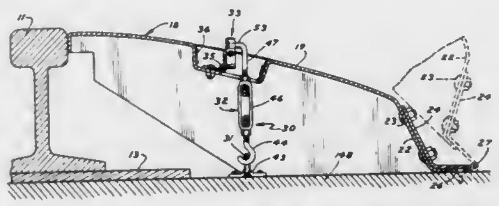
an anchor member securable to the track bed;

an elongate linkage rotatable about a first axis and having a cam end and a latch end;

said latch end of the linkage having hook means engageable with the anchor member when secured to the track bed;

a cam mechanism mounted on the housing having a cam member rotatably mounted for rotation about a second axis perpendicular to the first axis of the linkage;

said cam end of the linkage being eccentrically connected to the cam member for longitudinal movement of the linkage between a latch position with the hook means in engagement with the anchor member and a release position with the hook means clear of the anchor member; and



means for back and forth rotation of the cam member between the latch position of the linkage and the release position of the linkage.

---

### 5,018,691

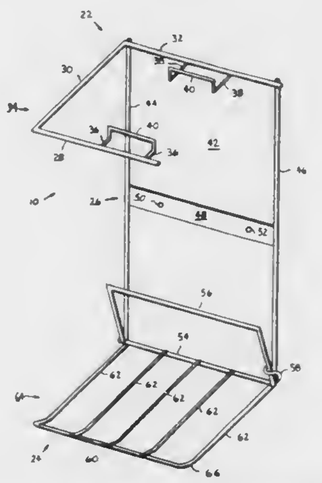
### SUPPORT RACK

**Bradley W. King, 145-215 Mississauga Valley Blvd., Mississauga, Ontario L5A 1Y7, Canada**

**Filed Mar. 26, 1990, Ser. No. 498,913**

**Int. Cl.$^5$ B65B** *67/04*

**U.S. Cl. 248—99** **11 Claims**



1. A support rack for dual handled plastic bags for use in storing refuse, comprising:

a frame having a first horizontal portion in the upper region of said rack, a second horizontal portion in the lower region of said rack, and a vertical portion in the rear region of said rack;

said first horizontal portion comprising a front frame member, a side frame member, and a rear frame member, which together co-operate to form a bag support member;

said vertical portion comprising at least one generally vertical member and attachment means for permitting said frame to be attached to a vertical receiving surface, and with said vertical portion extending generally downwardly beneath said rear frame member of said first horizontal portion;

a first arm means and a second arm means, said first arm means attached to said front frame member of said first horizontal portion and said second arm means attached to said rear frame member of said first horizontal portion, said first and second arm means being adapted to receive and retain handles of a plastic bag, with said first arm means and said second arm means being displaced from each other such that a plastic bag having one handle on said first arm means and one handle on said second arm means would be held open and thereby be adapted to receive and retain refuse;

with each of said first and second arm means having a stop means connected thereto to preclude the handles of a bag in place on said arm means from being displaced strictly horizontally off said arm means;

said second arm means adapted to receive both handles of one or more bags and retain an inventory of bags thereon, with said bags draping downwardly therefrom;

said second horizontal portion extending outwardly from the lower area of said vertical portion of said rack, thus providing a support means for supporting the bottom area of a plastic bag when in place on said first and second arm means;

clip arm means for retaining the bottom portion of said inventory of bags when in place on said second arm means.

---

### 5,018,692

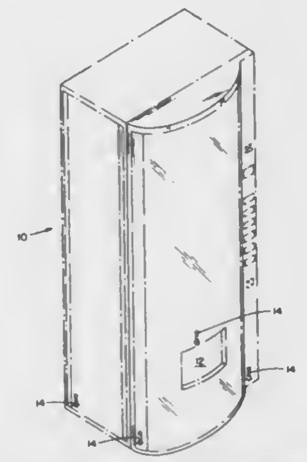
### VENDING MACHINE ANTIROCK MECHANISM

**Robert G. McGarrah, and Christopher M. McGarrah, both of Brookfield, Conn., assignors to PepsiCo Inc., Purchase, N.Y.**

**Filed Jul. 26, 1989, Ser. No. 385,693**

**Int. Cl.$^5$ F16M** *11/24*

**U.S. Cl. 248—188.3** **10 Claims**



1. An antirock mechanism for a vending machine, to prevent rocking of the vending machine, which is heavy when filled with vended products and might lead to tipping over of the vending machine and injury to persons in immediate proximity to the vending machine, comprising:

a. a vending machine for vending consumer products and having a base;

b. at least one antirock mechanism attached to the base of said vending machine, said antirock mechanism comprising at least one vertically movable antirock member, vertically movable relative to a locking member secured to the vending machine, with the movable antirock member moving vertically downwardly relative to the locking member when the vending machine is tilted or rocked and locking relative to the locking member in the vertical downward position to hold or support the vending machine in a subsequent tilted position to prevent oscillatory rocking of the vending machine.

VOL
1126
ISS
4
MY
28
1991
UMI

**5,018,693**

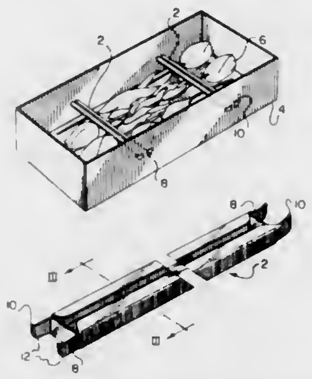
### SHIPPING BRACE FOR CARDBOARD CONTAINERS

**Lorne B. Dowling, Mississauga, Canada, assignor to International Brace Ltd., Canada**

**Filed Apr. 4, 1990, Ser. No. 504,627**

**Int. Cl.$^5$ E04B** *1/38*

**U.S. Cl. 248—217.2** **9 Claims**



1. A shipping brace for cardboard containers for long stemmed flowers and the like, comprising a bar of integral construction of length sufficient to extend transversely, from side to side within the container, a lower surface of the bar to rest on and secure in proper position the stems of such flowers, the bar having at each end a pair of spaced, sharpened, outwardly projecting planar protrusions terminating in points for piercing the container sides at separate spaced locations and projecting therethrough to hold the bar in fixed position relative thereto, the ends of the protrusions being bendable sideways for gripping the container sides, the bar being rounded along its lower edges to minimize the damage to stems when the bar is in position.

---

**5,018,694**

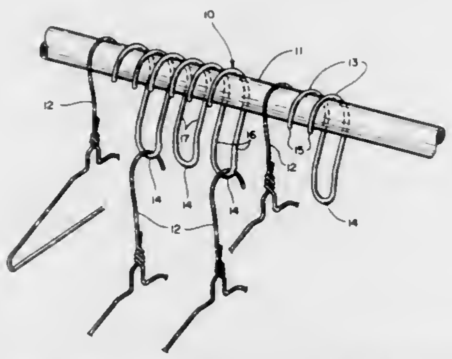
### CLOTHES HANGER SPACER

**Heidi S. Olson, Barrington, Ill., assignor to HICO Products, Inc., Barrington, Ill.**

**Continuation-in-part of Ser. No. 451,045, Dec. 15, 1989, abandoned. This application Jul. 17, 1990, Ser. No. 554,084**

**Int. Cl.$^5$ B42F** *13/00*

**U.S. Cl. 248—340** **13 Claims**



1. A clothes hanger spacer device for spacing garment hangers when suspended from a garment-supporting rod, comprising a one piece length of material having axially spaced apart hook-shaped opposite end portions having a radius between ($\frac{3}{4}$") to ($1\frac{1}{2}$") for hooked over engagement with a garment-supporting rod;

bent rod junctures positioned in the same plane and projecting beneath said axially spaced apart hook-shaped opposite end portions; and

a U-shaped closed loop beneath said bent rod junctures for disposition beneath a garment-supporting rod for carrying a clothes hanger in hooked assembly with the U-shaped closed loop, said axially spaced apart hook-shaped opposite end portions having identical profiles for disposition on the same side of a garment-supporting rod when assembled thereon.

---

**5,018,695**

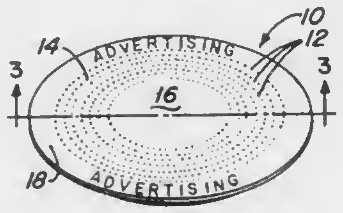
### DISPOSABLE COASTERS

**Willis E. Bishop, 21639 Lost River Dr., Diamond Bar, Calif. 91765**

**Filed Jun. 8, 1989, Ser. No. 363,485**

**Int. Cl.$^5$ A47B** *91/00*

**U.S. Cl. 248—346.1** **20 Claims**



1. A coaster comprising:

a first flat imperforate pad formed of a moisture-absorbent material that has the ability to absorb and retain liquid therewithin, said first pad having a flat upper face and a lower face,

a large number of small size contact adhesive patches extending across the upper face of said first pad inwardly from the peripheral edge of the first pad, the spaces between the adhesive patches being such that when the upper face of the first pad is adhesively secured to the lower face of a liquid container condensate will readily flow from the container surface into the first pad via the adhesive-free areas of the pad upper face, said first pad having liquid-reception pores spread across its entire upper face to facilitate downflow of liquid into the pad,

a liquid-impervious bonding film covering the lower face of the first pad, whereby liquid absorbed into the first pad is prevented from escaping through its lower face, and

a second imperforate pad having an upper face thereof adhered to the lower face of the first pad via said bonding film, said second pad being formed of a thermal insulation material and having sufficient thickness to act as a thermal barrier, whereby when said first pad is adhered to the lower face of a container containing a cold liquid the lower face of said second pad will have a higher temperature than the first pad.

---

**5,018,696**

### POWER SEAT ADJUSTER WITH FLOATING DRIVE MECHANISM

**Ronald R. Siegrist, Grass Lake, Mich., assignor to Hoover Universal, Inc., Plymouth, Mich.**

**Filed Apr. 26, 1990, Ser. No. 514,739**

**Int. Cl.$^5$ F16M** *13/00*

**U.S. Cl. 248—429** **19 Claims**

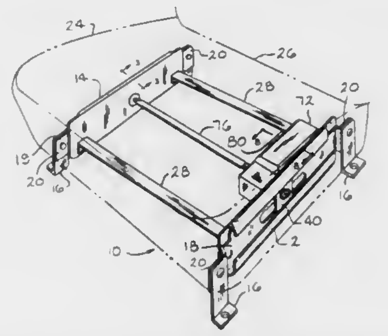
1. An adjustable vehicle seat assembly comprising:

a stationary track structure having means for mounting said seat assembly in a vehicle;

a seat frame structure having a driven member carried by said stationary track structure for movement in the direction of adjustment of said seat assembly;

means mounted to said seat frame structure for driving said frame structure including a drive member rotatably carried by said driven member and engaging said stationary track structure whereby rotation of said drive member causes movement of said driven member and said seat frame structure relative to said track structure in the direction of said seat assembly adjustment;

means associated with said drive member and said stationary track structure for holding said drive member and track structure engaged with one another and in a fixed vertical position relative to one another.



---

**5,018,697**

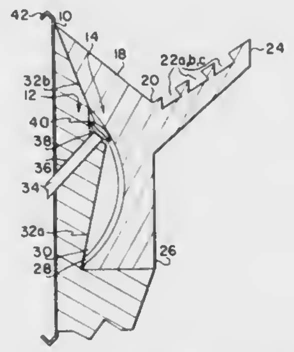
### OBJECT HANGER FOR DRYWALL

**David H. Treanor, and Tracy B. Treanor, both of 1508 E. 21st, Cheyenne, Wyo. 82001**

**Filed Jan. 11, 1990, Ser. No. 463,510**

**Int. Cl.$^5$ A47G** *1/16*

**U.S. Cl. 248—547** **7 Claims**



1. A device for mounting an object on a semi-permeable material, said device comprising in combination:

(a) a straight pin comprising a shank member having a first end which is pointed and a second end which includes a head member;

(b) a body member including front and rear surfaces; wherein said rear surface comprises a planar surface for abutment against said semi-permeable material, wherein said body member includes side surfaces and a set of gripping ridges formed in each said side surface; wherein said front surface comprises a recessed area; wherein said body member further includes an aperture extending through said body for receiving said straight pin and enabling said pin to access said semi-permeable material; wherein said aperture has a diameter slightly greater than said shank member of said pin; wherein said aperture extends generally at a forty-five degree angle with respect to said planar surface; said body member further including a landing located at the top of, and inclined in a plane perpendicular to, the centerline of said aperture for stopping the travel of said pin through said aperture by engaging said head member; and

(c) an inserter member which is hingedly attached to said body member at a connection and is movable against said head member of said pin to cause said pin to penetrate said semi-permeable material; wherein said inserter member is received in said recessed area in said body member.

---

**5,018,698**

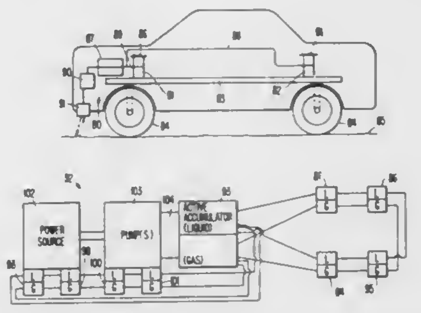
### MOTOR VEHICLE VIBRATION ISOLATION SUPPORT MOUNTING SYSTEM

**Jaromir Tobias, 322 E. 57th St., New York, N.Y. 10022**

**Continuation-in-part of Ser. No. 474,329, Feb. 2, 1990, which is a continuation-in-part of Ser. No. 381,197, Jul. 18, 1989, which is a continuation-in-part of Ser. No. 414,254, Sep. 29, 1989, which is a continuation-in-part of Ser. No. 463,259, Jan. 9, 1990. This application Apr. 9, 1990, Ser. No. 506,065**

**Int. Cl.$^5$ F16M** *13/00*

**U.S. Cl. 248—550** **10 Claims**



1. A motor vehicle vibration isolation support mounting system for isolating a vehicle from road induced vibration as the vehicle travels on a road, comprising:

at least one load support vibration isolation mount including a first mount part securable to a vehicle component subject to road induced vibration as the vehicle travels on the road, a second mount part securable to a relatively fixed support of the vehicle to be isolated from the road induced vibration, guide means for guiding relative movement of the first and second mount parts, first spring cushion means and high pressure hydraulic fluid medium means disposed in series between the first and second mount parts to attenuate vibration induced force transfer between said first and second mount parts,

hydraulic fluid accumulator means,

means for maintaining a first predetermined pressure of hydraulic fluid in the accumulator means,

high pressure fluid line means communicating the accumulator pressure with the high pressure fluid medium means of the at least one load support mount, and

means for detecting the contour of the road surface on which the vehicle is traveling, said means for maintaining being responsive to the contour of the road surface detected by said means for detecting for adjusting said predetermined pressure of hydraulic fluid in the accumulator means and thereby in the at one load support vibration isolation mount.

---

**5,018,699**

### HYDRAULIC ANTIVIBRATORY DEVICES

**Jean-Pierre Bretaudeau, Chateaudun, and Jean-Luc Salaud, Conflans, both of France, assignors to Hutchinson, France**

**Filed Jan. 10, 1990, Ser. No. 462,490**

**Claims priority, application France, Jan. 10, 1989, 89 00211**

**Int. Cl.$^5$ F16M** *5/00*

**U.S. Cl. 248—562** **5 Claims**

1. Hydraulic antivibratory device intended to be inserted for damping and connecting purposes between first and second rigid structures, said device comprising:

first and second rigid frames which can be fixed respectively to said first and second rigid structures,

an annular impervious elastomer partition inserted between said first and second frames for providing axial compression resistance, said partition forming a first tight deformable chamber with said first and second frames,

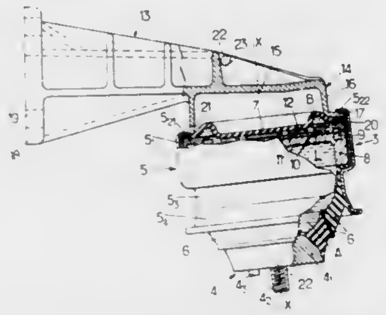
a flexible and impervious membrane carried by said first

VOL 126 SS 4 MY 28 1991 UMI

frame and forming therewith a second tight deformable chamber,

a restricted passage providing permanent communication between said first and second chambers,

a liquid mass filling said first and second chambers and said restricted passage, and

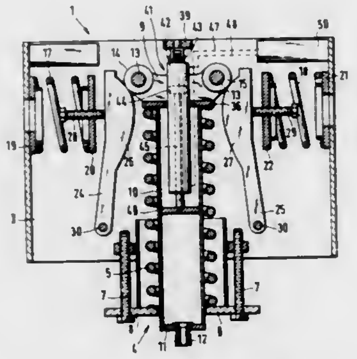


a rigid protective cover covering said membrane and fixed to said first frame, wherein said cover is formed by an integral one piece portion of a rigid intermediate arm adapted for connecting said first frame to said first rigid structure.

---

### 5,018,700
### SUSPENSION DEVICE FOR CONVEYING LOADS, PARTICULARLY PIPES

**Hans-Herlof Hardtke, Zeven, Fed. Rep. of Germany, assignor to Lisega GmbH, Fed. Rep. of Germany**
**Filed May 15, 1989, Ser. No. 351,621**
**Claims priority, application Fed. Rep. of Germany, May 17, 1988, 3816673**
**Int. Cl.$^5$ F16L** *3/00*
U.S. Cl. 248—571 20 Claims

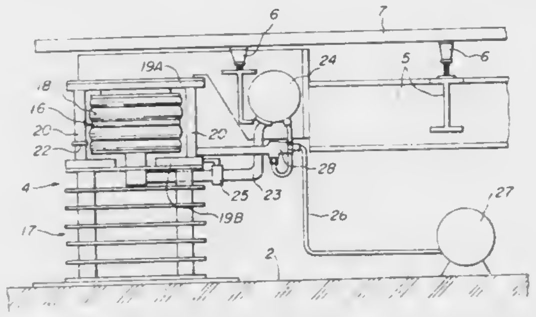


1. A suspension system for supporting loads, such as pipes, under generally constant tension comprising a main spring system including a main spring constructed and arranged between a suspension portion and a load-bearing portion for applying spring-biasing forces to the suspension portion in a predetermined direction, an additional spring system including an additional spring constructed and arranged to compensate for variations in the spring-biasing forces of the main spring, cam and cam follower means between said main and additional springs and responsive to main spring-loading to selectively increase or decrease the biasing forces of the additional spring, and hydraulically operated auxiliary means for applying a supplementary predetermined biasing force to selectively increase or decrease the biasing forces of said main spring in said predetermined direction and a direction opposite thereto.

---

### 5,018,701
### VIBRATION ISOLATING SUPPORT APPARATUS

**Nobuo 012aki, Tokorozawa, and Shoichi Morikawa, Kodaira, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**
**Filed Jan. 19, 1990, Ser. No. 467,464**
**Claims priority, application Japan, Jan. 25, 1989, 1-15575**
**Int. Cl.$^5$ F16M** *13/00*
U.S. Cl. 248—631 4 Claims

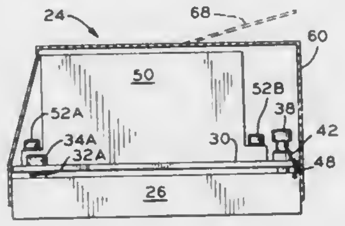


1. A vibration isolating support apparatus comprising; an air spring including a bellows, and a multiple laminated rubber assembly, the air spring and the multiple laminated rubber assembly being vertically stacked, the multiple laminated rubber assembly composed of a plurality of stacks each of a plurality of laminated rubbers and a plurality of stabilizing plates inserted between and connected to the upper and lower ends of the adjacent laminated rubbers in each stage of the stacks, wherein said air spring includes a bellows formed of an air bag filled with air under pressure and end plates fixed to the upper and lower ends thereof.

---

### 5,018,702
### ADJUSTABLE INCLINOMETER MOUNTING ASSEMBLY

**Daniel J. Roser, Benton Harbor, and Teruyoshi Hirose, St. Joseph, both of Mich., assignors to Sumitec Inc., Benton Harbor, Mich.**
**Continuation of Ser. No. 316,976, Feb. 28, 1989, abandoned. This application Mar. 7, 1990, Ser. No. 492,302**
**Int. Cl.$^5$ G10C** *25/00*
U.S. Cl. 248—904 18 Claims



1. A continuous casting apparatus comprising:

a mold including a face plate;

a base secured to said face plate;

an inclinometer mounted on said base;

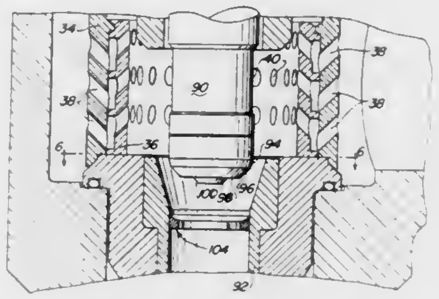
a supporting plate fixedly secured at a first end to said base for supporting said inclinometer; and

adjustable securing means for adjustably securing a second end of said supporting plate to said base whereby said second end may be raised or lowered with respect to said base and whereby the angle of inclination of said supporting plate with respect to said base may be adjusted.

---

### 5,018,703
### VALVE DESIGN TO REDUCE CAVITATION AND NOISE

**William B. Goode, Dallas, Tex., assignor to Teledyne Industries, Inc., Dallas, Tex.**
**Division of Ser. No. 143,980, Jan. 14, 1988, Pat. No. 4,860,993. This application Jun. 26, 1989, Ser. No. 371,201**
**Int. Cl.$^5$ F16K** *47/08*
U.S. Cl. 251—127 12 Claims

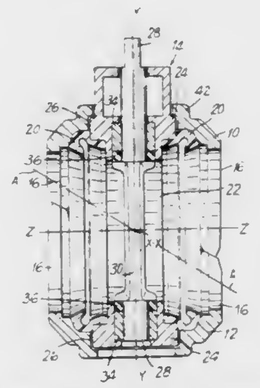


1. A valve comprising: a valve body having inlet and outlet passages communicating with a valve chamber; flow control means in said valve chamber, said flow control means being adapted to form an entrance section and an outlet section in said valve chamber, said flow control means having an annular plenum formed therein with an array of inlet bores communicating with said entrance section of said valve chamber and said plenum and an array of exit bores communicating with said plenum said outlet section of said valve chamber, said inlet bores and said outlet bores being arranged and configured to form a tortuous flow path from said inlet section to said outlet section of said valve chamber; a valve element in said valve chamber adapted to control flow of fluid from said outlet section of said valve chamber to said outlet passage in said valve body; a valve seat adjacent said outlet passage; a seating surface on said valve seat; a flow deflector ring having a central opening in said outlet passage, said ring having discontinuous deflector surfaces around said central opening separated by spaced grooves, said deflector surfaces and said grooves being arranged to disrupt flow of a stream of fluid flowing between said valve element and said valve seat to prevent the formation of a vena contracta downstream from said valve seat.

---

### 5,018,704
### PIPE COUPLING WITH IN-COUPLING FLOW CONTROLLER

**William R. McLennan, Easton, Pa., assignor to Victaulic Company of America, Easton, Pa.**
**Filed Jan. 12, 1990, Ser. No. 465,908**
**Int. Cl.$^5$ F16K** *51/00, 1/22*
U.S. Cl. 251—148 11 Claims



1. A flow-controller in the form of a segmented pipe coupling, comprising:

a complete flow-controller sub-assembly having a valve body, a vale seat provided within said valve body for cooperation with a rotatable valve member, a rotatable valve member supported within said body for rotation relative to said valve seat and into seating relation therewith, and means for rotating said valve member relative to said valve seat;

at least two arcuate coupling segments arranged in encircling relation with said valve body, said coupling segments having keys at axially opposite ends of said respective coupling segment for reception in grooves in the ends of pipes;

a gasket member providing a seal between one side of said valve body and for sealing engagement with a pipe end, and, a gasket member providing a seal between an opposite side of said valve body and for sealing engagement with another pipe end; and,

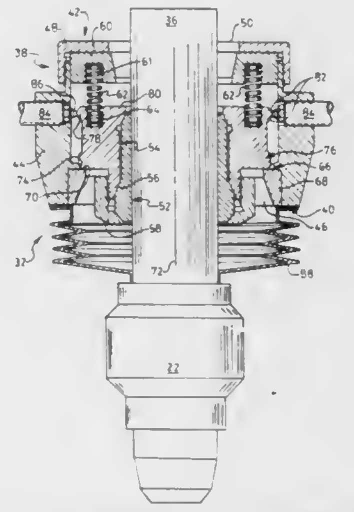
traction means for moving said coupling segments towards each other in radial directions and into encircling relation with said valve body and said pipe ends;

at least one of said couplings segments providing access to said valve member rotating means from a position exterior of that coupling segment.

---

### 5,018,705
### BREAK AWAY TORCH HOLDER FOR CUTTING MACHINES

**John B. Baldwin, Warrenville, and David R. Draper, Montgomery, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.**
**Filed May 29, 1990, Ser. No. 529,407**
**Int. Cl.$^5$ B23K** *7/10*
U.S. Cl. 266—77 12 Claims



1. A break away torch holder for a machine having a transverse track on which one or more torch carrying carriages are mounted so as to be transversely moveable on the transverse track by a first power means, said transverse track mounted on rails above a work piece supporting table and a second power means to move the transverse track along the rails above the work piece, a controller to cause the first and second power means to cause a torch to follow a prescribed pattern over the work piece, said break away torch holder comprising:

a housing attached to the carriage by a support, said housing having an internal pilot seat adjacent to a first opening at a first end of the housing;

a torch tube supporting the torch and having a longitudinal centerline;

a collet clamping the torch tube, said tube extending through the first opening and a second opening of said housing;

an adaptor secured to the collet, said adaptor having a pilot engaging the pilot seat;

resilient means extending between a support of the housing

VOL
126
SS
4
MY
28
1991
UMI

and an end of the adaptor, said resilient means urging the pilot of the adaptor against the pilot seat and allowing the pilot to move away from the pilot seat when the torch strikes an immovable object; and

the pilot seat in the housing and the pilot on the adaptor having matching flat surfaces perpendicular to the centerline of the torch tube, said flat surfaces when engaged being operative to center the torch in the holder.

---

**5,018,706**

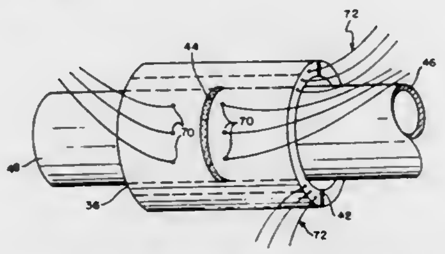
### APPARATUS FOR INHIBITING STRESS CORROSION CRACKING

**Thomas M. Butler, 7564 Clarence Ave., Pulaski, N.Y. 13142, and David Sancic, 236 E. 6 St., New York, N.Y. 10003**

**Division of Ser. No. 140,547, Jan. 4, 1988, Pat. No. 4,948,435. This application Feb. 23, 1990, Ser. No. 483,803**

**Int. Cl.$^5$ C21D *1/09***

**U.S. Cl. 266—80** **6 Claims**



1. Apparatus for inhibiting stress corrosion adjacent a welded joint in a steel workpiece, comprising

means for subjecting one surface of said welded joint and the workpiece areas adjacent thereto normally subject to compressive stress to radiant heat from an external heat source disposed in closely spaced proximity thereto,

means for maintaining a flow of coolant fluid past a second surface of said welded joint and the workpiece areas adjacent thereto normally subject to localized tensile stress, and

means for enclosing said radiant heat source and said one surface of said welded joint and workpiece areas adjacent thereto to concentrate the application of heat thereto.

---

**5,018,707**

### HEATING FURNACE

**Klaus H. Hemsath, Toledo, Ohio; H. Kenneth Staffin, Colonia, and Michael Owsiany, Edison, both of N.J., assignors to Gas Research Institute, Chicago, Ill.**

**Filed Mar. 14, 1989, Ser. No. 323,290**

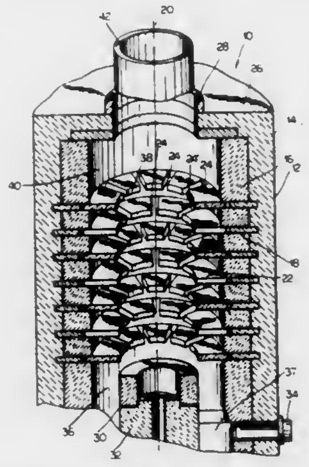
**Int. Cl.$^5$ F27B *5/08***

**U.S. Cl. 266—254** **10 Claims**

1. A heating mantle for heating a retort having an elongated tubular body comprising:

a source of hot gases;

cylindrical wall means; and a plurality of baffles supported by and extending radially inwardly from said cylindrical wall means to form a space for said retort, said baffles and said cylindrical wall means cooperating to form a plurality of heating chambers in communication with said source and open to said space, said chambers defining a tortuous path for said gases for transferring heat to said retort; said cylindrical wall means being disposed substantially vertically, and said baffles extending in planes perpendicular to said cylindrical wall means, said heating chambers being interconnected by slots in said baffles, said slots being radially offset from one baffle to another.



---

**5,018,708**

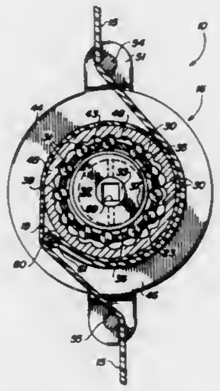
### WINCH APPARATUS

**James E. Shaffer, Maitland, Fla., assignor to Consulier Engineering, Inc., Riviera Beach, Fla.**

**Continuation-in-part of Ser. No. 458,149, Feb. 28, 1989. This application Feb. 23, 1990, Ser. No. 484,115**

**Int. Cl.$^5$ B66D *1/00***

**U.S. Cl. 254—266** **19 Claims**



1. A winch or the like, comprising:

a housing having oppositely disposed portions and a tubular connecting portion having inside and outside surfaces and joining said oppositely disposed portions;

a drive member rotatably mounted on said housing and having a first cyclically undulated surface disposed within said connecting portion to face said inside surface;

a driven member rotatably mounted on said housing and having a second cyclically undulated surface disposed annularly of said connecting portion to face said outside surface;

a flexible linear member adapted for carrying a load at a point along its length;

means fixing another point along the length of said linear member to said driven member for rotation therewith; and

oscillator means positioned to traverse said first undulated surface to be driven thereby in reciprocation through said connecting portion when said drive member is rotated, and positioned to traverse said second undulated surface to drive said second member in rotation in response to said reciprocation; whereby said another point of said linear member will be driven in rotation with said driven member to move said load.

---

**5,018,709**

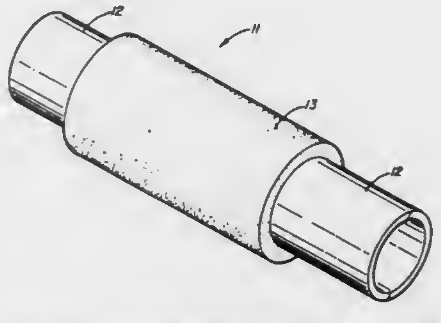
### MAKING A TAPHOLE

**Nicholas Cassens, Jr., 4082 Suffolk Way, Pleasanton, Calif. 94566, and Robert Rodrigues, 1261 Jefferson Ave., Salem, Ohio 44460**

**Division of Ser. No. 232,005, Aug. 15, 1988, abandoned. This application Aug. 16, 1989, Ser. No. 394,723**

**Int. Cl.$^5$ B22D *41/52***

**U.S. Cl. 266—271** **9 Claims**



1. A preformed taphole comprising (1) a hollow metal pipe and (2) a refractory mass formed about the exterior circumference of said pipe over at least a portion of its length, said refractory mass consisting essentially of (a) from 1% to 8% of a water soluble binder, (b) from 0.1% to 2% metal fibers, and (c) 0.5 to 5% flake graphite at least 90% of which is larger than 0.05 mm, with (d) basic refractory grain making up the balance of the admixture, all percentages being by weight and based on the total weight of the admixture.

---

**5,018,710**

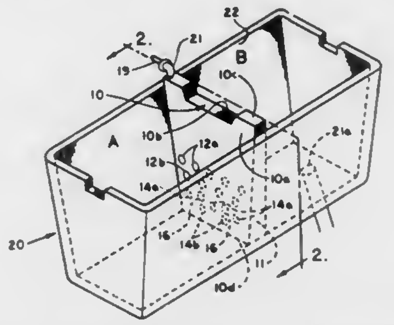
### METHOD AND DEVICES FOR REMOVING ALUMINA AND OTHER INCLUSIONS FROM STEEL CONTAINED IN TUNDISHES

**Madjid Soofi, St. Charles, Ill., assignor to Magneco/Metrel, Inc., Addison, Ill.**

**Filed Oct. 15, 1990, Ser. No. 597,628**

**Int. Cl.$^5$ C21B *7/04***

**U.S. Cl. 266—280** **4 Claims**



1. A baffle for tundishes which contains a plurality of holes for controlling the flow of molten steel within the tundish used to pour steel said baffle having a front face which contains depressions or embossments or a combination thereof of sufficient size and number to increase the surface area upon which they have been imposed at least 5%.

---

**5,018,711**

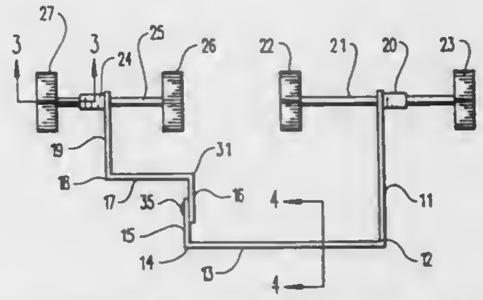
### CLAMP FOR INSTALLING DRAWER FRONTS

**Douglas L. Johnson, 1523 Gannon Dr., Sacramento, Calif. 95825**

**Filed Jan. 16, 1990, Ser. No. 465,406**

**Int. Cl.$^5$ B25B *1/10***

**U.S. Cl. 269—43** **7 Claims**



1. A clamp for use in installing a drawer front on a front face of a drawer and maintaining alignment of the front face and drawer front when the drawer is in a closed condition within a cabinet, comprising:

a first clamp body member formed from a thin, flat material and having first (11) and second (13) perpendicular leg portions;

a thin, flat first connecting flange (15) perpendicularly formed on an end of said second leg portion (11), said first connecting flange (15) extending in spaced parallel relation with said first leg portion (11);

a second clamp body member formed from a thin, flat material and having third (19) and fourth (17) perpendicular leg portions;

a thin, flat, second connecting flange (16) perpendicularly formed on an end of said fourth leg portion (17), said second connecting flange (16) at least partially overlying said first connecting flange (15) in abutting parallel relation therewith;

said first (11) and third (19) leg portions extending in spaced parallel relation;

a first clamping jaw (22) mounted on a first threaded shaft (21) extending transversely through said first leg portion (11) for threaded adjustment in a direction perpendicular to said first leg portion (11);

a second clamping jaw (26) mounted on a second threaded shaft (25) extending transversely through said third leg portion (19) or threaded adjustment in a direction perpendicular to said third leg portion (19), said first (22) and second (26) clamping jaws disposed between said first (11) and third (19) leg portions; and

fastening means (35) for adjustably securing said first (15) and second (16) connecting flanges to adjust offset of said first (22) and second (28) clamping jaws in a direction perpendicular to longitudinal axes of said first (21) and second (25) threaded shafts, and simultaneously adjust offset of said second (13) and fourth (17) leg portions.

---

**5,018,712**

### PATIENT SUPPORTING MEANS HAVING A PIVOTABLE PATIENT SUPPORTING PLATE

**Willi Schaefer, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jun. 18, 1990, Ser. No. 539,899**

**Claims priority, application European Pat. Off., Jun. 30, 1989, 89111990.1**

**Int. Cl.$^5$ A61G *13/00***

**U.S. Cl. 269—323** **15 Claims**

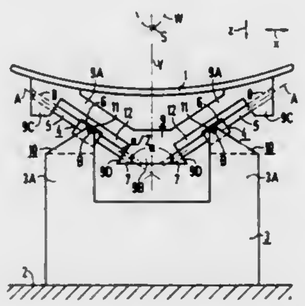
1. A patient supporting means comprising:

(a) a surface member on which a patient can be supported, said surface member being pivotable about a swiveling axis;

(b) a base on which the surface member is mounted;

VOL 126
ISS 4
MY 28 1991
UMI

(c) a guide arrangement mounting the surface member on the base, the guide arrangement including at least two longitudinal guides the longitudinal guides each comprising a straight guide member and a guide support member that cooperates with the guide member such that the guide member and the guide support member are displaceable relative to one another along a central axis of the longitudinal guide associated therewith, the central/axis of each longitudinal guide pair being aligned in a plane that extends at a right angle relative to the swiveling axis of the surface member, the central axes of/the longitudinal guides forming an angle α of less than 180°.

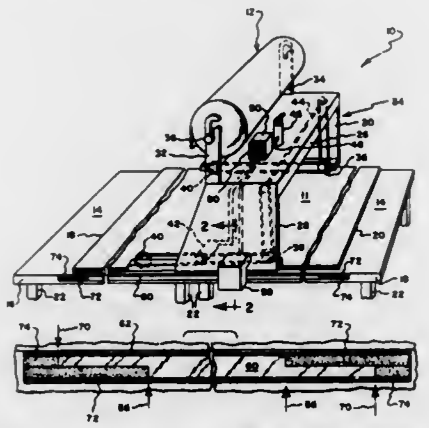


---

### 5,018,713
### CLOTH-SPREADING APPARATUS HAVING IMPROVED CONTROL MEANS

**Roif Jung, Waiblingen, Fed. Rep. of Germany, and Andrew A. Nalecz, Williamsville, N.Y., assignors to Eastman Machine Company, Buffalo, N.Y.**

**Filed Sep. 15, 1989, Ser. No. 407,820**
**Int. Cl.⁵ B65H** *29/46*
U.S. Cl. 270—31 **6 Claims**



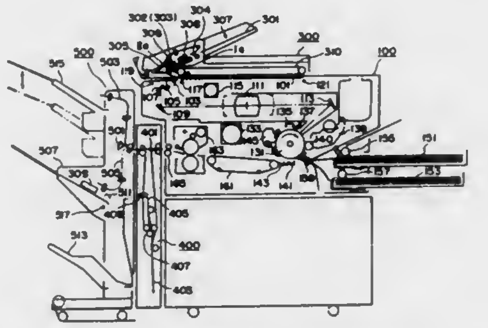
1. A cloth-spreading apparatus having an elongated worktable assembly, a movable carriage assembly at least partially supported on the worktable assembly, the carriage assembly carrying a roll of cloth which is to be spread upon the worktable as the carriage assembly moves between the first and second spaced-apart locations on the worktable assembly, drive means for driving the movable carriage assembly in either direction, and control means for controling the drive means as the carriage assembly is being driven towards either of the first or second spaced-apart locations, the control means causing the drive means to be shifted from a high speed to a slow speed as the carriage assembly approaches the first or second location, and further causing the carriage assembly to stop or reverse direction when it attains the first or second position, the control means including sensing means to sense the slow-down and stop positions; characterized in that the sensing means includes photocell means carried by the carriage and a light-reflective medium supported by the worktable, wherein the light-reflective medium is provided with equally spaced-apart nonreflective bars, and wherein the control means is provided with digital means capable of counting the bars to determine slow-down and stop positions.

---

### 5,018,714
### ORIGINAL HANDLING APPARATUS

**Takeshi Honjo, Kawasaki; Kenji Kobayashi, Tokyo; Akimaro Yoshida, Tokyo, and Takami Saeki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 143,050, Jan. 12, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 516,946**
**Claims priority, application Japan, Jan. 14, 1987, 62-6358**
**Int. Cl.⁵ B65H** *5/22*
U.S. Cl. 271—3.1 **5 Claims**



5. An original handling apparatus comprising:
storing means for storing a bundle of originals;
circulating means for feeding each original in the bundle of originals stored in said storing means to an exposure position, and for discharging the exposed original from the exposure position to said storing means;
setting means for setting a desired number of circulation cycles of the bundle of originals stored in said storing means; and
control means for controlling said circulating means so as to circulate the bundle of originals for the number of circulation times set by said setting means,
wherein said control means controls said circulating means so as to start feeding of a first original of the next circulation cycle prior to discharging a last original from the exposure position in the current circulation cycle, and said circulating means is adapted to perform feeding and discharging of the originals at the same side as to said exposure position.

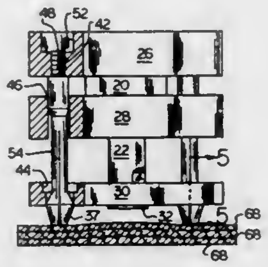
---

### 5,018,715
### FABRIC PICKUP DEVICE

**Allen Reeves; Michael O. Harbor; Patrick V. Reina, and Richard T. Sandgren, all of Nashville, Tenn., assignors to Red Kap Industries, Nashville, Tenn.**

**Filed Sep. 19, 1989, Ser. No. 409,103**
**Int. Cl.⁵ B65H** *3/02*
U.S. Cl. 271—19 **16 Claims**

1. A pickup device for use with a fabric piece handling system, said device comprising:
(a) actuating means having a portion adapted for movement between first and second positions;
(b) a plurality of clutches attached to said actuating means, each of said clutches having a head portion having a plurality of pickup fingers, said fingers being spaced apart from one another;
(c) an actuator attached to said portion of said actuating means for simultaneously engaging said head portion of each of said plurality of clutches, thereby moving said plurality of pickup fingers between an open position and a closed position when said portion of said actuating means is moved from said first to said second position; and
(d) a locating means for locating the actuating means and fabric to be picked up such that said clutches are in contact with a piece of fabric to be picked up,



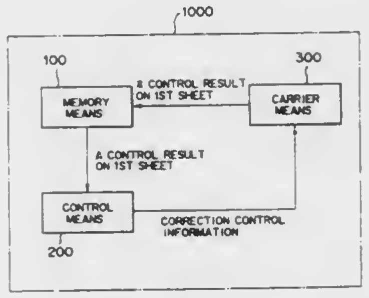
whereby said actuating means may be located with said clutches in contact with a piece of fabric to be handled, at which time said actuator is operable so said plurality of pickup fingers are moved to said closed position to grip and hold the surface of a fabric piece.

---

### 5,018,716
### SHEET TRANSPORTING APPARATUS WITH CONTROL MEANS

**Akimaro Yoshida, Tokyo, and Takeshi Honjo, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 9, 1989, Ser. No. 321,635**
**Claims priority, application Japan, Mar. 11, 1988, 63-057756; Mar. 14, 1988, 63-060106**
**Int. Cl.⁵ B65H** *7/02*
U.S. Cl. 271—227 **16 Claims**


1000
100
300
MEMORY MEANS
B CONTROL RESULT ON 1ST SHEET
CARRIER MEANS
A CONTROL RESULT ON 1ST SHEET
CONTROL MEANS
CORRECTION CONTROL INFORMATION
200

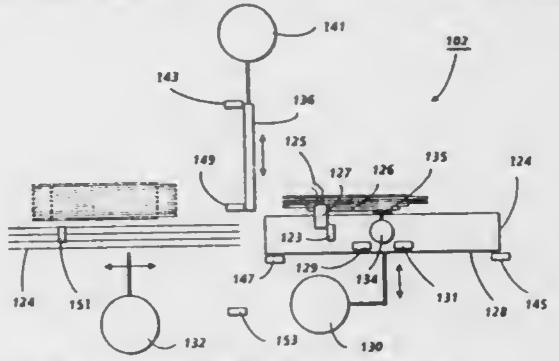
1. A sheet handling apparatus comprising:
transport means for transporting an original to a predetermined position;
control means for controlling said transport means so as to perform a deceleration control before the original arrives at said predetermined position after the original is transported at a predetermined speed;
monitor means for monitoring an operational state of said transport means at the time of execution of said deceleration control; and
memory means for storing information representing the operational state of said transport means monitored by said monitor means;
wherein said control means starts the deceleration control for a first original in a predetermined timing, and corrects a start timing of the deceleration control for a second original in accordance with the information representing the operational state of said transport means monitored by said monitor means and stored in said memory means in course of the deceleration control for the first original.

---

### 5,018,717
### SHEET STACKING APPARATUS

**Paul V. Sadwick, Palm Bay, Fla., and Michael K. Sabocheck, Marion, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jul. 23, 1987, Ser. No. 76,979**
**Int. Cl.⁵ B65H** *31/00*
U.S. Cl. 271—207 **28 Claims**



1. An apparatus for stacking sheets, including:
means for supporting sheets, said supporting means receiving sheets at a loading station;
means for advancing the sheets from a discharge station to an unloading station;
first means for moving said supporting means and said advancing means from the loading station to the discharge station;
second means for moving said supporting means relative to said advancing means, at the discharge station, to transfer the sheets from said supporting means to said advancing means;
an enclosure having an aperture therein with the discharge station being located interiorly of said enclosure and the unloading station being located exteriorly of said enclosure; and
means for opening and closing the aperture in said enclosure, said opening and closing means opening the aperture in said enclosure in synchronism with said advancing means moving the sheets from the discharge station to the unloading station to enable the sheets to pass therethrough.

---

### 5,018,718
### SHEET REGISTRATION METHOD AND APPARATUS FOR CALCULATION OF DELAY TIME AND SHEET FEED CONTROL THEREBY

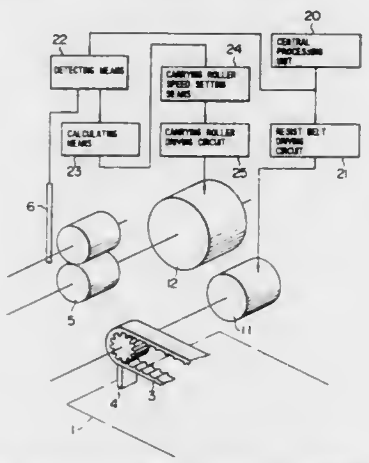
**Junichi Matsuno, Toride; Tsuyoshi Ogasawara, Ibaraki; Masataka Kawauchi, Ishioka, and Yasuyuki Tsuji, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan**

**Filed Dec. 27, 1989, Ser. No. 457,854**
**Claims priority, application Japan, Dec. 28, 1988, 63-334786**
**Int. Cl.⁵ B65H** *9/04;* **G03G** *21/00*
U.S. Cl. 271—245 **15 Claims**

1. A method of controlling print positioning to prevent misregistration between a toner image and paper in a printer including transfer means for transferring said toner image to paper, a paper end positioning member for temporarily stopping movement of said paper, and carrying means for carrying said paper to an image transfer position after said paper end positioning member is released, said method comprising the steps of: (a) detecting the time which elapses until said paper reaches a given position; (b) predicting the time which would elapse until said paper reaches said image transfer position on the basis of the time detected in detecting step (a); (c) calculating a time difference between the time from said predicting time step (b) and a time determined on the basis of a carrying speed pattern which is previously stored and has at least two

OL
126
SS
4
MY
28
1991
UMI

speeds; and, (d) controlling the carrying speed of said carrying means so that said time difference becomes zero to have said paper reach said image transfer position for image positioning on said paper without misregistration.

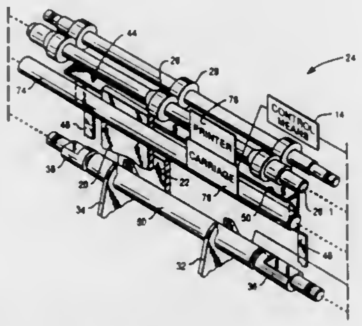

20
CENTRAL PROCESSING UNIT
22
DETECTING MEANS
24
CARRYING ROLLER SPEED SETTING MEANS
CALCULATING MEANS
CARRYING ROLLER DRIVING CIRCUIT
RESIST BELT DRIVING CIRCUIT
23
25
21
6
12
5
11
4
3
1

---

### 5,018,719
### ALIGNER MECHANISM FOR ALIGNING A DOCUMENT IN A BUSINESS MACHINE

**Hillis L. Wilson, Groton; Barry E. Passer, Newfield, and Peter W. Yaichuk, Groton, all of N.Y., assignors to NCR Corporation, Dayton, Ohio**

**Filed Mar. 16, 1990, Ser. No. 495,813**
**Int. Cl.$^5$ B65H** *9/04*
U.S. Cl. 271—246 10 Claims



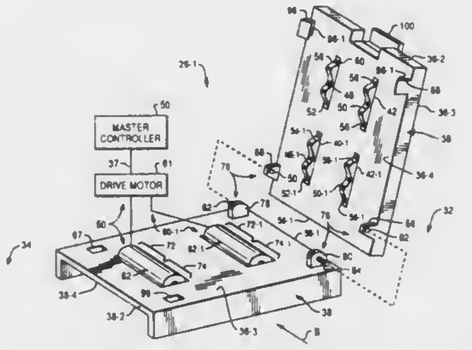
1. An aligner mechanism comprising:
a shaft for rotatably mounting in a housing having first and second spaced walls therein which form a slot to receive a document to be aligned in said slot, said shaft having first and second end portions;
first and second control sleeves keyed to said first and second end portions, respectively;
first and second levers pivotally mounted on said shaft adjacent to said first and second control sleeves, respectively, for pivotal movement between first and second positions;
an aligner bar having a first leg portion, a second leg portion, and an engaging portion joining said first and second leg portions, said first and second leg portions being bendable and also being secured to said first and second control sleeves, respectively;
actuating means for causing said shaft to rotate from said first position to said second position; and
resilient means for biasing said shaft to said first position;
said first and second control sleeves each having a control member thereon;
said first lever having a projection thereon which cooperates with said control member on said first control sleeve to provide a lost motion coupling therebetween and said second lever having a projection thereon which cooperates with said control member on said second control sleeve to provide a lost motion coupling therebetween to pivotally move said first and second levers to the second position when said shaft is rotated to said second position;
said first and second leg portions being secured to said first and second control sleeves, respectively, so that said aligner bar engages said first wall before said first and second levers pivotally move to said second position so as to introduce a bend in each of said first and second legs, thereby causing said engaging portion to be resiliently biased against said first wall before said first and second levers pivot to said second position;
said projections cooperating with said control members when said resilient means biases said shaft to said first position to enable said first and second levers to move to said first position before said engaging portion disengages said first wall.

---

### 5,018,720
### DOCUMENT TRANSPORT MODULE

**Sean E. Whittaker, Brooktondale, and Bruce F. Harris, Willseyville, both of N.Y., assignors to NCR Corporation, Dayton, Ohio**

Filed Mar. 22, 1990, Ser. No. 498,187
Int. Cl.$^5$ B65H *5/06*
U.S. Cl. 271—272 13 Claims



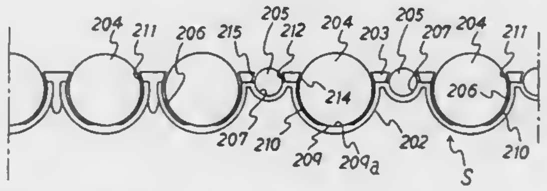
1. A document transport module for moving a document from an upstream area to a downstream area, said document transport module comprising:
first and second supports;
a cooperating member located on said first support, said cooperating member having an arcuately shaped recessed portion therein which faces said second support;
drive means located on said second support for moving the document into engagement with said arcuately shaped recessed portion and also for moving the document in the document transport module to said downstream area;
said first and second supports being generally planar;
each of said first and second supports having first and second ends;
pivot means for pivotally securing said first ends of said first and second supports together; said pivot means enabling said first and second supports to pivot between an open position and a closed position such that, when said first and second supports are in said closed position, said drive means can move the document into engagement with said arcuately shaped recessed portion; and
securing means associated with said second ends for securing the first and second supports in said closed position.

---

### 5,018,721
### SLIDING DEVICE

**Kouichi Nagahisa, 2-37, Ekinan 4-chome, Takaoka-shi, Toyama-ken 933, Japan**

**Filed Feb. 20, 1990, Ser. No. 481,170**
**Claims priority, application Japan, Feb. 20, 1989, 64-39719; May 15, 1989, 64-120838; Jun. 19, 1989, 64-156138; Aug. 23, 1989, 64-216270; Aug. 25, 1989, 64-219598; Oct. 23, 1989, 64-275362**
**Int. Cl.$^5$ A63G** *21/00*
**U.S. Cl. 272—56.5 SS 9 Claims**

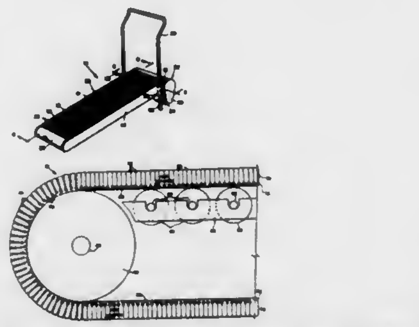


1. A sliding device, comprising:
a sheet-like substrate;
means defining a plurality of uniformly arranged first recesses in a surface of said substrate;
means defining a plurality of second recesses in said substrate surface, said second recesses being arranged peripherally around said first recesses, said second recesses being smaller than said first recesses;
a plurality of first balls each having a first diameter, each said first ball being received and engaged in one of said first recesses and rotatable in all directions;
a plurality of second balls each having a second diameter, each said second ball being received and engaged in one of said second recesses and rotatable in all directions; and
said second diameter of said second balls being smaller than said first diameter of said first balls, said first and second balls projecting from said recesses beyond said substrate surface, and said first balls projecting further beyond said substrate surface than said second balls.

---

### 5,018,722
### EXERCISE TREADMILL BELT

**Henry B. Whitmore, Rte. 5, Box 369, San Antonio, Tex. 78221**
**Continuation-in-part of Ser. No. 61,331, Jun. 11, 1987, abandoned. This application Nov. 18, 1988, Ser. No. 272,816**
**Int. Cl.$^5$ A63B** *22/02*
U.S. Cl. 272—69 **9 Claims**

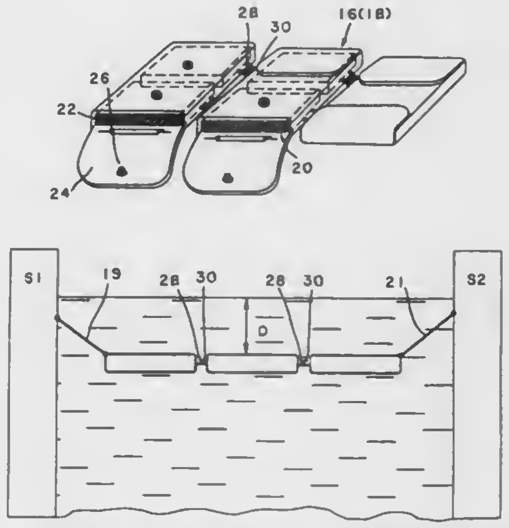


1. An exercise treadmill belt constructed to flex or bend in one direction only, comprising a continuous loop having a segmented outer portion and a substantially inextensible inner portion attached to one another, said outer portion comprising a plurality of abutting rigid rectangular shaped tread segments extendingparallel to one another across the full width of the belt, said tread segments being adapted to press together when in a flat plane and to be laterally compacted so as to provide a substantially smooth flat outer surface at the outer ends thereof and to cooperate with said substantially inextensible inner portion to prevent the belt from sagging or bending in the other direction.

---

### 5,018,723
### SWIMMING POOL APPARATUS COMPRISING SUBMERGED TRACK FOR DEEP WATER WALKING AND RUNNING

**Igor Burdenko, 79 Pine St., Sudbury, Mass. 01776**
**Division of Ser. No. 315,819, Feb. 27, 1989, Pat. No. 4,934,689. This application Mar. 5, 1990, Ser. No. 488,125**
**Int. Cl.$^5$ A63B** *1/00*
**U.S. Cl. 272—70 11 Claims**



1. An underwater track system for walking or running in water comprising: a plurality of floating pads connected in series in a closed loop circularly shaped configuration to form a first track and a second track and having sufficient buoyancy to maintain said pads under water at a depth of about 0.5 m to 1.5 m, and means for preventing said first track from submerging deeper than about 1.8 m, said second track being similar to said first track is positioned at a depth different from said first track, said means for preventing said first track from submerging comprising a stationary support and flexible links connecting said stationary support with said track; whereby a user may run or walk in water while being supported by the underwater tracks.

---

### 5,018,724
### ARRANGEMENT FOR MEASURING PHYSIOLOGICALLY GENERATED WEAK BIOMAGNETIC SIGNALS WHILE THE EXAMINATION SUBJECT IS AT REST AND EXERCISING

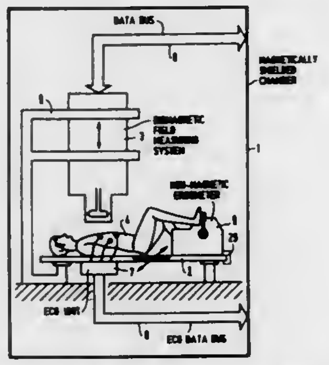
**Georg Naser, Zirndorf, and Siegfried Schneider, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Oct. 26, 1989, Ser. No. 426,978**
**Claims priority, application European Pat. Off., Nov. 28, 1988, 88119825**
**Int. Cl.$^5$ A63B** *21/00;* **A61B** *6/00*
**U.S. Cl. 272—73 3 Claims**

1. An apparatus for measuring weak biomagnetic fields comprising:
magnetic field measuring means for measuring, within a measuring volume, weak biomagnetic fields and for identifying the topical distribution and chronological course of bioelectric current sources which generate said biomagnetic fields;
support means adapted to support a patient in a fixed posi-

tion within said measuring volume of said magnetic field measuring means; and

bicycle ergometer means mounted on said support means and adapted to be operated by a patient for exercising said patient in said fixed position on said support means so that a measurement can be made by said magnetic field measuring means with said patient at rest in said fixed position and after operation of said ergometer means in said fixed position, said ergometer means consisting exclusively of components which are non-magnetic and which do not generate a magnetic field, said bicycle ergometer means having a fly wheel adapted to be rotated by said patient, a strap brake surrounding said fly wheel, means mechanically interacting with said fly wheel for measuring and displaying the mechanical power exerted by a patient in rotating said fly wheel, and opto-electronic speedometer means optically interacting with said fly wheel for measuring and displaying the speed of said fly wheel.


DATA BUS
8
MAGNETICALLY SHIELDED CHAMBER
BIOMAGNETIC FIELD MEASURING SYSTEM
3
1
NON-MAGNETIC ERGOMETER
4
7
2
ECG UNIT
ECG DATA BUS

---

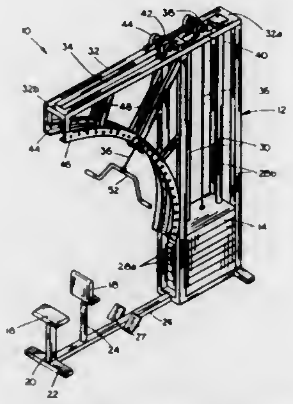
### 5,018,725
### ADJUSTABLE EXERCISE EQUIPMENT

**Roger D. Cook, 10528 Decatur St., Omaha, Nebr. 68114**

**Filed Jul. 25, 1990, Ser. No. 558,081**

**Int. Cl.⁵ A63B** *21/062*

U.S. Cl. 272—118 **8 Claims**



1. An adjustable exercise apparatus, comprising:

a frame having a forward end and a rearward end;

a cable operably threaded through said frame to connect a pull bar to a resistance-producing means;

a pull bar connected to said cable, adapted for selective gripping by a person;

a resistance-producing means connected to said cable for resisting the movement of said cable caused by pulling on the pull bar;

guide rail means having a forward and rearward end, mounted on said frame and extending upwardly and forwardly from the forward end of said frame;

said guide rail means including first and second horizontally, spaced-apart guide rails; and

a carriage operably connected to said guide rail means for selective movement therealong, said carriage having means for operably guiding cable therethrough from said resistance-producing means to said pull bar; and

said carriage being operably mounted between said guide rails with said cable passing between said guide rails.

---

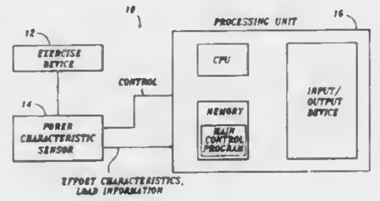
### 5,018,726
### METHOD AND APPARATUS FOR DETERMINING ANAEROBIC CAPACITY

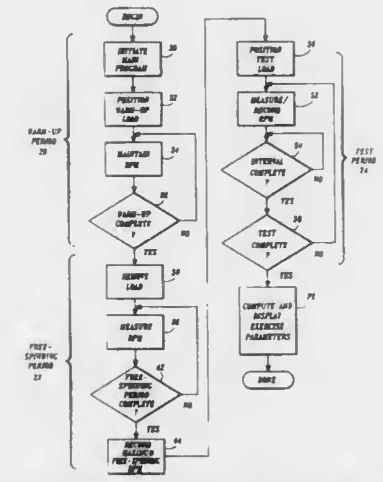
**Gerald N. Yorioka, 15109 - 30th Drive S.E., Mill Creek, Wash. 98012**

**Filed Aug. 9, 1989, Ser. No. 391,124**

**Int. Cl.⁵ A63B** *21/005*

U.S. Cl. 272—129 **12 Claims**





1. In an apparatus for measuring exercise parameters comprising: an exercise device including a movable component that creates a load on a user of the exercise device; sensor means connected to the exercise device for sensing the movement of the movable component, for quantitating the load created by the movable component, and for producing related power characteristic data; and a processing unit connected to the sensor means for receiving the power characteristic data, the improvement comprising:

main control means coupled to the processing unit for:

(a) continuously receiving the power characteristic data over a test period;

(b) continuously deriving a set of power values over said test period based on the received power characteristic data, said power values being indicative of the power required to move the movable component during said test period; and

(c) determining an anaerobic capacity value from said set of derived power values which represents to the time required to completely deplete a user's anaerobic capacity when the user exerts maximum mechanical effort, by analyzing the logarithmic power depletion of said derived power values over said test period.

12. A method for measuring exercise parameters carried out

in conjunction with the operation of an exercise apparatus, said apparatus comprising: an exercise device including a movable component that creates a load on a user of the exercise device; sensor means connected to the exercise device for sensing the movement of the movable component and the load created by the movable component and for producing related power characteristic data; and a processing unit connected to the sensor means for receiving the power characteristic data, the method comprising:

(a) continuously receiving the power characteristic data over a test period;

(b) continuously deriving a set of power values over said test period based on the received power characteristic data, said power values being indicative of the power required to move the movable component during said test period; and

(c) determing an anaerobic capacity value from said set of derived power values which, represents to the time required to completely deplete a user's anaerobic capacity when the user exerts maximum mechanical effort, by analyzing the logarithmic power depletion of said derived power values over said test period.

---

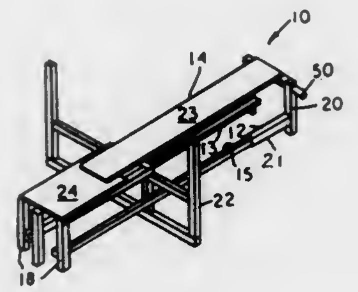
### 5,018,727
### THREE IN ONE EXERCISE BENCH

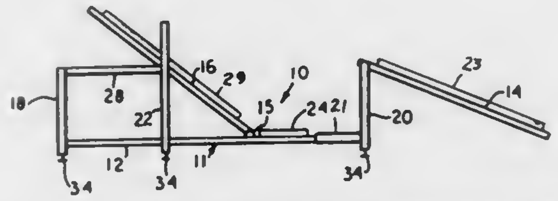
**Daniel M. Cornell, 538 Turner Rd., Meadville, Pa. 16335**

**Filed May 25, 1990, Ser. No. 528,372**

**Int. Cl.⁵ A63B** *21/00*

U.S. Cl. 272—144 **9 Claims**





1. An exercise bench comprising a longitudinal frame, a first side, a second side, first legs, second legs and intermediate legs, said first legs, said second legs and said intermediate legs being attached to said first side and to said second side and extending upwardly therefrom,

a first seat frame swingably attached to said second legs at a position spaced from said intermediate legs and swingable from a position extending downwardly and away from said intermediate legs to a position extending downwardly and toward said intermediate legs,

a second seat frame swingably attached to said first side and to said second side between said second legs and said intermediate legs and swingable from a position extending horizontally and toward said first legs to a position upward and toward said intermediate legs,

a fixed seat frame attached to said first legs and to said intermediate legs.

---

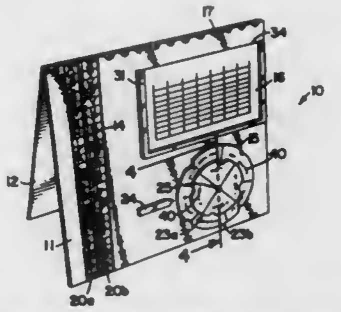
### 5,018,728
### NAME FORMING GAME APPARATUS AND METHOD

**Jonathan H. Liss, 235 Nevada Ave. S., Golden Valley, Minn. 55426**

**Filed Sep. 28, 1989, Ser. No. 414,194**

**Int. Cl.⁵ H63F** *3/00*

U.S. Cl. 273—459 **12 Claims**



1. A word game apparatus utilizing a letter couplet, wherein players associated corresponding initials formed by names of individuals with the letter couplet, the apparatus comprising:

(a) a game board;

(b) letter indicia means, cooperatively attached to said game board, for forming a letter couplet; and

(c) subset means, cooperatively connected to said board game, for distinguishing subsets of individuals having names, wherein only the initials of the names of those individuals which are properly included in the subset and which properly correspond with said letter couplet may be associated by the players.

---

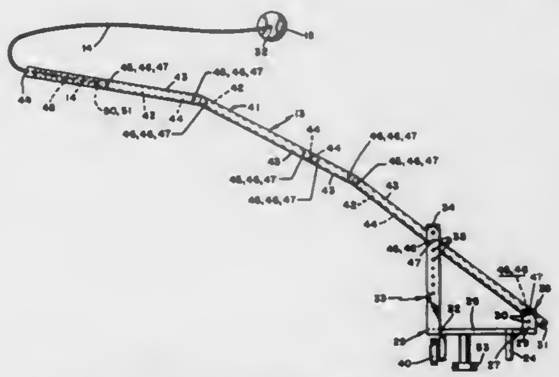
### 5,018,729
### BATTING PRACTICE MACHINE

**Cecil L. Wilkerson, 15 Alabama Ave., Phenix City, Ala. 36867**

**Filed Sep. 5, 1989, Ser. No. 403,160**

**Int. Cl.⁵ A63B** *69/40*

U.S. Cl. 273—26 E **4 Claims**



1. A batting practice machine comprising:

a) a generally flat, horizontal base further comprising a flat bottom and a peripheral wall, defining a reservoir therein;

b) a vertical frame secured to said base, and extending upward therefrom;

c) an adjustable, rotatable, outward extending arm attached to said frame; said arm being semi-rigid with an overall length of about 48 inches and a diameter of about 0.50 inch, said arm further comprising a hard outer tubular layer having three separate linear sections each about 16 inches in length, and an elongated flexible core having two linear sections each about 18 inches in length, with at least two apertures inscribed through the diameter of said arm perpendicular to the longitudinal axis of said arm;

d) a flexible line secured at a first end thereof to said arm;

e) a ball secured to a second end of said line; and

OL
126
SS
4
MY
28
1991
UMI

f) drive means secured to said frame and secured to said arm for rotating said arm in a generally horizontal circle.

---

5,018,730

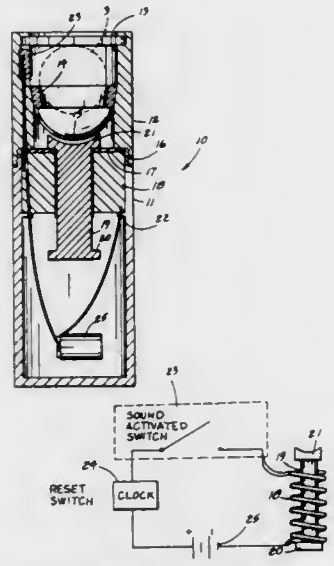
### GOLF BALL CUP EJECTING APPARATUS

**Radu Iliuta, Tenstavagen 94BV, 163 65 Spanga, Sweden**

**Filed Jul. 23, 1990, Ser. No. 559,672**

**Int. Cl.$^5$ A63B** *57/00*

U.S. Cl. 273—34 A 4 Claims



1. A golf ball cup ejecting apparatus for use in ejecting a golf ball received within the apparatus, wherein the golf ball is defined by a golf ball diameter and wherein the apparatus comprises,

a lower housing, and an upper housing coaxially aligned with and selectively securable to said lower housing, the upper housing including an entrance opening defined by a first diameter greater than the golf ball diameter, and wherein the entrance opening includes an upper terminal end and further includes an abutment ring formed within the entrance opening spaced below the upper terminal end, wherein the abutment ring is defined by an internal conical surface, wherein the abutment ring is defined by an opening less than that defined by the golf ball diameter to support the golf ball within the entrance opening, and

the lower housing having associated therewith means including an audibly actuated switch means for selectively actuating an electromagnetic means, including a ram in said lower housing to effect vertical and upper displacement of the ram to effect selective displacement of the golf ball from within the abutment ring.

---

5,018,731

### GOLF BALL DRIVING PRACTICE APPARATUS

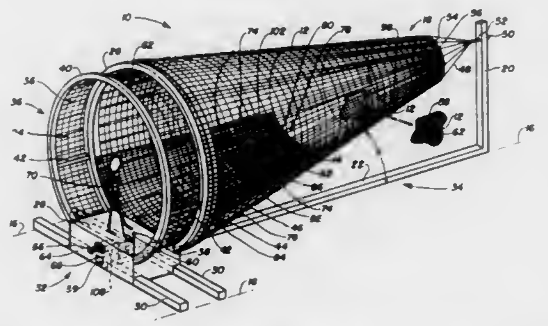
**Keith A. Doyle, 21 Woodshed Ter., Wrightsville, Pa. 17368**

**Filed Nov. 26, 1990, Ser. No. 617,663**

**Int. Cl.$^5$ A63B** *69/36, 67/02*

**U.S. Cl. 273—35 B** **20 Claims**

16. A golf ball driving practice apparatus comprising in combination, a stretched, flexible, truncated, conical mesh net and a frame assembly adapted to suspend and stretch said truncated conical shaped golf ball receiving and return net, with said net extending from a net divergent end thereof to a net opening end, and a connecting frame connected to said net opening end, said net divergent end including a solid, circular impact disc for holding the net material divergent and providing a wear resistant impact target at which the players aim, a player positioning and support platform at the open end of said net, and a golf ball receiving and dispensing means provided within the enclosure of said platform and adapted to receive spent golf balls after being practice driven by a player.



---

5,018,732

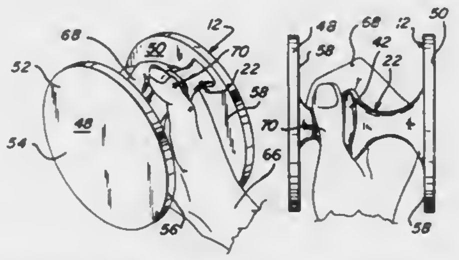
### HAND HELD PADDLE STRUCTURE

**Sandy F. Kraemer, and Tyler D. Kraemer, both of 2402 Ceresa La., Colorado Springs, Colo. 80909**

**Filed May 15, 1989, Ser. No. 351,666**

**Int. Cl.$^5$ A63B** *59/00*

U.S. Cl. 273—67 B 15 Claims



8. A paddle structure adapted to be held in a person's hand and to strike a ball in a method of game play, comprising:
(a) a main support and grasp assembly having an impact paddle assembly secured thereto;
(b) said main support and grasp assembly including a pair of spaced main support posts interconnected by an intermediate grasp bar;
(c) said impact paddle assembly, including first and second parallel paddle plates interconnected by said main support posts;
(d) one of said main support posts including a support section having a thumb support section integral therewith and positioned adjacent said intermediate grasp bar; and
(e) said thumb support section including an arcuate depressed thumb portion curved downwardly and inwardly at a position adjacent to and toward a longitudinal axis of said intermediate grasp bar as seen from a side elevational view to receive the thumb member of the person's hand and utilizing the same therein in cooperation with grasping said intermediate grasp bar for controlled movement of said paddle structure;

whereby finger members of a person's hand may encircle said intermediate grasp bar and the thumb member of the person's hand may engage said thumb support section to achieve controlled movement of said first and second paddle plates to strike a ball.

5,018,733

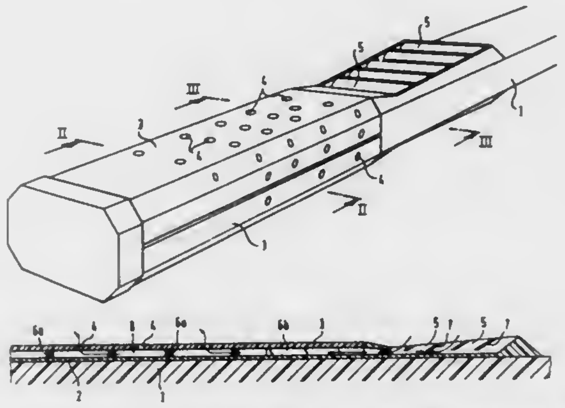
### HANDGRIP FOR A RACKET FOR BALL GAMES

**Thierry M. M. Buand, Nantes, France, assignor to S.A. Donnay International, Couvin, Belgium**

**Filed Apr. 10, 1989, Ser. No. 335,920**

**Int. Cl.$^5$ A63F** *49/08*

U.S. Cl. 273—75 **10 Claims**



1. Handgrip for a racket for ball games, in particular for tennis, squash and badminton rackets, the handgrip comprising a grip sleeve having a radial elasticity, said grip sleeve at least substantially surrounding the grip body, said grip sleeve supported on said grip body via a plurality of spacer elements, at least one ventilation chamber provided between the grip body and the grip sleeve and openings formed in the grip sleeve, wherein that volume of the ventilation chamber is variable by the pressure forces exerted during the game by the hand of the respective player; and in that at least a part of the openings provided in the grip sleeve form an induction and expulsion opening for an airflow which is also brought about by the volume changes, said variability of the volume of said ventilation chamber is presettable by said elasticity of the grip sleeve and of the spacer elements wherein the elasticity of the spacer elements is greater than the elasticity of the grip sleeve.

---

5,018,734

### GRIP LOCATING APPARATUS FOR SPORTING ARTICLE HANDLE

**John R. Allsop, 14 Marlborough St., Mont Albert, Victoria, 3127, Australia**

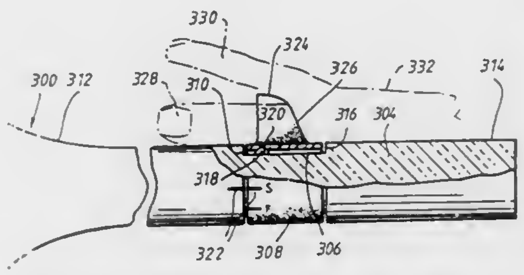
**PCT No. PCT/AU88/00142, § 371 Date Feb. 28, 1989, § 102(e) Date Feb. 28, 1989, PCT Pub. No. WO88/08733, PCT Pub. Date Nov. 17, 1988**

**PCT Filed May 13, 1988, Ser. No. 299,918**

**Claims priority, application Australia, May 13, 1987, Pl 1926; Jun. 12, 1987, Pl 2487; Aug. 31, 1987, Pl 4087; Oct. 16, 1987, Pl 4966**

**Int. Cl.$^5$ A63B** *49/08*

U.S. Cl. 273—75 **4 Claims**



1. Apparatus suitable for use with a tennis racket having a striking portion and a handle of generally conventional construction, a handle being connected to a striking portion and having an exterior surface that is gripped by a hand of a player during play, a handle having a forward end lying toward the striking portion, a rear end lying toward a butt of the racket and a central axis extending between the ends; said apparatus serving to position a hand of a player on a handle exterior surface so that a player may grip a handle in a plurality of different positions, and comprising:

a projection mountable on a handle to extend from a handle exterior surface generally normal to a handle axis, said projection being formed for comfortable engagement with a portion of a player's hand located between a thumb and index finger, said projection being generally arcuately movable about a handle axis when mounted on a handle for movement relative to a handle exterior surface to a plurality of discrete circumferential locations, a hand of a player, when engaging the projection, being movable on a handle exterior surface to a desired orientation responsive to the rotation of said projection so that a player may grip a handle in a desired one of a plurality of positions; and

locating means interposable between said projection and a handle for establishing said discrete circumferential locations of said projection, for releasably retaining said projection at a desired one of said locations, and for releasing said projection from restraint at one of said locations for arcuate movement about a handle axis solely in response to a torque applied to the apparatus about a central axis of a handle.

---

5,018,735

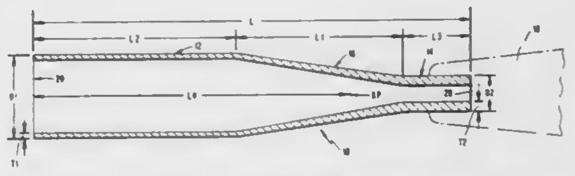
### LOW KICK POINT GOLF CLUB SHAFT

**Steven E. Meredith, and James F. Benjamin, both of Kennewick, Wash., assignors to Sandvik Special Metals Corporation, Kennewick, Wash.**

**Filed Nov. 9, 1989, Ser. No. 433,855**

**Int. Cl.$^5$ A63B** *53/12*

U.S. Cl. 273—80 B **12 Claims**



1. A low kick point wood golf club shaft adapted to receive a wood club head, said shaft being about 44 to 45 in. in total length from a butt end to a tip end thereof and comprising a generally cylindrical butt section, a generally cylindrical tip section, and a tapered section interconnecting said butt and tip sections, said butt section having an outer diameter of about 0.6 in. at the junction with said tapered section, said tip section having an outer diameter of about 0.335 in. at the junction with said tapered section, said tapered section having a smoothly tapering outer diameter tapering down from said butt section to said tip section at a rate in a range of about 0.018 to 0.025 in./in., said tapered section having a length shorter than a length of said butt section, longer than a length of said tip section, and no longer than about 13 in., said shaft having a kick point disposed at a distance of at least about 29 in. from said butt end.

VOL
126
SS
4
MY
28
1991
UMI

### 5,018,736
### INTERACTIVE GAME SYSTEM AND METHOD

**Timothy R. Pearson, and William W. Junkin, both of Laguna Beach, Calif., assignors to Wakeman & deForrest Corporation, Irvine, Calif.**

**Filed Oct. 27, 1989, Ser. No. 428,866**

**Int. Cl.$^5$ A63F** *9/00;* **H04M** *11/00*

**U.S. Cl. 273—439** **19 Claims**

1. An apparatus for providing an interactive game competition among an unlimited number of participants, comprising:

(a) a central controller;

(b) a plurality of data entry terminals remote from the central controller;

(c) a data link linking the data entry terminals to the central controller;

(d) a data register having stored therein a predefined data base comprising a finite set of data values corresponding to specific elements wherein the data register is accessible to the central controller;

(e) a statistical database which includes a set of statistics corresponding to elements of the data register;

(f) an unlimited number of subset databases, each subset database selected by a participant and including a non-exclusive subset of elements of the data register, wherein any of said elements may be simultaneously included in an unlimited number of said subset databases, and

(g) means for evaluating said subset databases on the basis of the statistical data base to provide a ranking of game participants.

---

### 5,018,737
### SLOT MACHINE

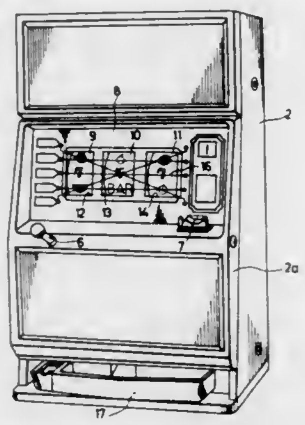
**Kazuo Okada, Tokyo, Japan, assignor to Kabushiki Kaisha Universal, Tochigi, Japan**

**Filed Aug. 22, 1990, Ser. No. 570,874**

**Claims priority, application Japan, Aug. 23, 1989, 1-216585**

**Int. Cl.$^5$ A63F** *5/04*

**U.S. Cl. 273—143 R** **5 Claims**



1. A slot machine having a plurality of series of symbols movable during the play of a game past a viewing window, said window having at least one winning line, comprising:

hit determining means for determining whether said game can result in a hit;

time changing means for changing the time required for said series of symbols to decelerate and stop in accordance with the result determined by said hit determining means, thereby to suggest to a player the possibility that said game can result in a hit; and

stop control means for controlling the stopping of each of said series of symbols by said required stop time set by said changing means, when a said hit can occur, said stop control means controlling the stopped position of each of said series of symbols thereby to establish a symbol combination that can be a hit on a said winning line.

---

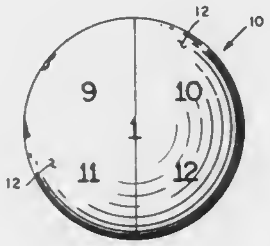
### 5,018,738
### SPHERICAL DICE WITH INTERCHANGEABLE ORIENTATION INSERT MEMBERS

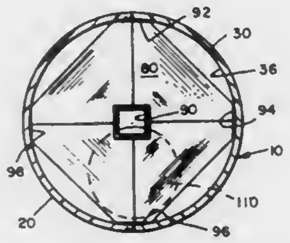
**Gyula Padi, 664 E. Woodington, Lancaster, Calif. 93535**

**Filed Sep. 18, 1989, Ser. No. 408,550**

**Int. Cl.$^5$ A63F** *9/04*

**U.S. Cl. 273—146** **18 Claims**





1. A spherical die comprising:

a. a first hemisphere member having an exterior surface, an interior surface and a hollow interior;

b. a second hemisphere member having an exterior surface, an interior surface, and a hollow interior;

c. means for joining said first hemisphere member and said second hemisphere member to form a sphere comprising the first and second hemisphere members, an outer surface comprising the exterior surfaces of the first and second hemisphere members, an interior surface comprising the interior surfaces of the first and second hemisphere members, and a hollow interior;

d. an interchangeable insert orientation member removably inserted within the hollow sphere such that selected locations of the interchangeable insert orientation member abut the interior surface of the sphere;

e. said interchangeable insert orientation member including a multiplicity of apertures at various spaced apart locations;

f. a selection member movably retained within the interchangeable insert orientation member and capable of landing in any one of the apertures when the sphere is rolled;

g. the surface of said sphere including a multiplicity of indicia on its surface, with a given indicia located diametrically opposite to the location of an aperture of said interchangeable insert orientation member; and

h. said interchangeable insert orientation member being removable and a substitute insert orientation member capable of insertion within the hollow interior of the sphere such that selected locations of the interchangeable insert orientation member abut the interior surface of the sphere, with the substitute insert orientation member having a multiplicity of apertures at various spaced apart locations, a selection member movably retained within the substitute interchangeable insert orientation member, and selected indicia on the surface of the sphere corresponding to the apertures in the substitute interchangeable insert orientation member such that a given indicia is diametrically opposite to the location of an aperture of the substitute interchangeable insert orientation member;

i. whereby a user can roll the die and the selection member will land in a given aperture and cause the sphere to come to rest in a position where the selected indicia on the surface of the sphere is diametrically opposite to the aperture of the interchangeable insert orientation member into which the selection member has landed and the random selection of indicia which can come up can be varied by substituting the substitute interchangeable insert orientation member in the sphere.

---

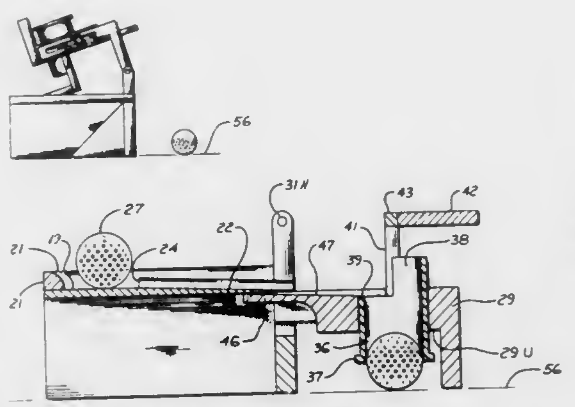
### 5,018,739
### GOLF PUTTING PRACTICE DEVICE

**Robert B. Hale, 6302 W. Loretta Dr., Indianapolis, Ind. 46241**

**Filed Apr. 10, 1990, Ser. No. 507,024**

**Int. Cl.$^5$ A63B** *57/00*

**U.S. Cl. 273—201** **5 Claims**



1. A putting practice apparatus comprising:

a putter guide member having a planar wall and having base means for resting on a supporting surface so as to position the wall in a vertical plane; and

a ball placing device associated with the wall and movable from a rest position behind the plane containing the wall surface to an active position in front of the wall surface, the placing device including a ball guide to receive a golf ball from storage and guide the ball into position on a supporting surface in front of the wall surface;

the placing device further including a bracket slidably receiving the ball guide therein and pivotally mounted on the guide member whereby the ball guide is vertically slidable when the placing device is in active position for raising the ball guide vertically from a ball placed on the supporting surface.

---

### 5,018,740
### GOLF BALL CORE

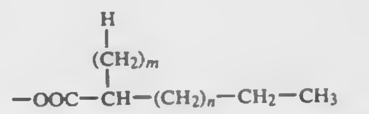
**Michael J. Sullivan, Chicopee, Mass., assignor to Spalding & Evenflo Companies, Inc., Tampa, Fla.**

**Filed Jun. 13, 1990, Ser. No. 537,836**

**Int. Cl.$^5$ A63B** *37/06*

**U.S. Cl. 273—220** **30 Claims**

1. In a golf ball core having the following: a diene elastomer having a weight average molecular weight from about 100,000 to about 500,000, at least one zinc or lead salt of an unsaturated carboxylic acid, a filler having a size of less than about 20 mesh, a low molecular weight fatty acid, and a free radical initiator; the improvement comprising solid core further containing from about 0.1 to about 5.0 phr of the zinc salt of a short branched chain saturated carboxylic acid according to Formula I:



$$-OOC-\underset{}{\overset{\overset{\displaystyle H}{|}}{\underset{|}{(CH_2)_m}}}\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!CH-(CH_2)_n-CH_2-CH_3 \qquad I$$

wherein n is an integer from 1–3, and m is an integer from 1–2.

---

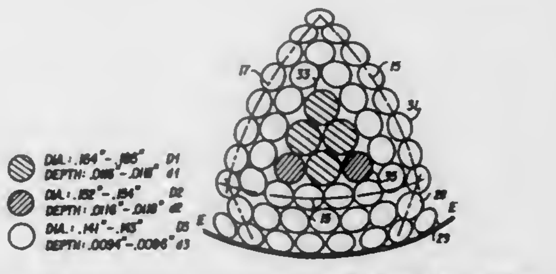
### 5,018,741
### GOLF BALL

**Joseph F. Stiefel, Shrewsbury; R. D. Nesbitt, Westfield, both of Mass., and Terence Melvin, Somers, Conn., assignors to Spalding & Evenflo Companies, Inc., Tampa, Fla.**

**Filed Jul. 24, 1989, Ser. No. 384,205**

**Int. Cl.$^5$ A63B** *37/14*

**U.S. Cl. 273—232** **6 Claims**



1. A golf ball having two poles and an equator, and having a preselected number of dimples arranged in a geometrical lattice configuration based upon a modified icosahedral lattice, said lattice comprising

a first plurality of adjacent triangles on either side of the equator of the ball, with the vertices of each of the adjacent triangles being located at each pole of said ball and the legs of said adjacent triangles opposite the vertices of said triangle being equidistantly spaced a predetermined distance from the equator of said ball;

two adjacent rows of dimples on either side of the equator of said ball extending about said ball between said equator and said legs of said triangles opposite said vertices, said dimples in said two adjacent rows having a diameter D3;

a first plurality of dimples lying along the lattice lines of said triangles, said first plurality of said dimples having a diameter D3;

a second plurality of dimples lying within each of said triangles, said second plurality of dimples comprising

four dimples having a diameter D1 greater than diameter D3;

two dimples having a diameter D2 greater than diameter D3, but less than the diameter D1; and

the remaining dimples lying in said triangles having a diameter D3.

---

### 5,018,742
### GOLF BALL CLEAR COATING WITH OPTICAL BRIGHTENERS

**Sharon R. Isaac, Acushnet, and Kevin M. Harris, New Bedford, both of Mass., assignors to Acushnet Company, New Bedford, Mass.**

**Continuation of Ser. No. 100,771, Sep. 24, 1987, Pat. No. 4,865,326. This application Apr. 28, 1989, Ser. No. 346,395**

**The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.**

**Int. Cl.$^5$ A63B** *37/12*

**U.S. Cl. 273—235 A** **9 Claims**

1. In a golf ball having a clear coating of paint applied as the outermost coating on said golf ball, the improvement comprising the inclusion in said clear coating of paint about 0.3% to about 1% by weight of the solids content of the clear coating of paint of one or more optical brighteners selected from the

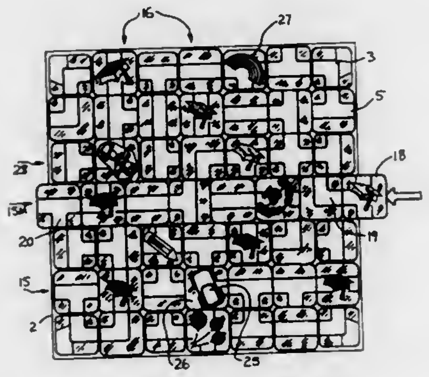
group consisting of stilbene derivatives, styrl derivatives of benzene and biphenyl, bis(benzazol-2-yl) derivatives, coumarins, carbostyrils, naphthalimides, derivatives of dibenzothiophene-5,5-dioxide, pyrene derivatives, and pyridotriazoles, said clear coating of paint having a solids content of 35–60%.

---

**5,018,743**

## BOARD GAME

**Steven E. Maier, and Helmut W. Maier, both of Waterloo, Canada, assignors to Brainy Toys Inc., Kitchener, Canada**
**Filed Apr. 11, 1990, Ser. No. 509,587**
**Claims priority, application Canada, Apr. 19, 1989, 597219**
**Int. Cl.⁵ A63F** *3/00*
**U.S. Cl. 273—242** **13 Claims**



1. Apparatus for a board game, wherein:

the apparatus includes a baseboard, respective movable game counters for each of at least two players, and a series of tablets which are laid out, on the baseboard, adjacent to one another;

the tablets are provided with means defining a pathway pattern, the means being so arranged on the tablets that in respect of some pairs of adjacent tablets a continuous path for the said game counters is defined therebetween, and in respect of other pairs of adjacent tablets, no pathway for the game counters exists therebetween;

some of the tablets are movable, a movable tablet being a tablet that is movable relative to an adjacent tablet and to the baseboard;

some of the tablets are provided with markings designating those tablets as target tablets;

the pathway pattern is such that a player may move his game counter from tablet to tablet along the pattern of pathways towards a selected one of the target tablets;

the apparatus includes a means, operable by a player, for moving the movable tablets;

the arrangement of the apparatus is such that the said movement of the movable tablets gives rise to a fresh pathway pattern;

the apparatus includes fixed tablets, which are fixed to the baseboard;

the fixed tablets are spaced apart in regular rows, with such spacing that corridors are created between the rows of fixed tablets, along which the movable tablets may be moved;

and all the tablets are square.

---

**5,018,744**

## METHOD FOR PLAYING A BOARD GAME

**Paul A. Patracuolia, 130 Main Street, Orange, N.J. 07050**
**Division of Ser. No. 120,207, Nov. 5, 1987, abandoned, which is a continuation of Ser. No. 898,755, Aug. 13, 1986, abandoned, which is a continuation of Ser. No. 772,152, Sep. 3, 1985, abandoned. This application Apr. 27, 1989, Ser. No. 344,467**
**Int. Cl.⁵ A63F** *3/00, 3/02*
**U.S. Cl. 273—248** **5 Claims**

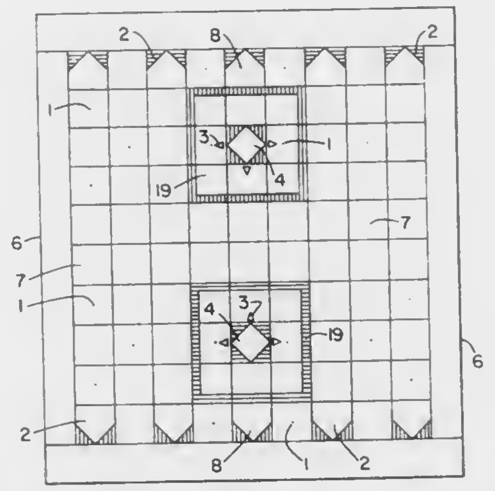
1. A method for playing a game, said game having a game apparatus comprising two distinguishable sets of playing pieces with each player of the game receiving one of said sets, the pieces within each set being of potentially three disparate playing ranks, a game board having four sides and a playing surface upon which said pieces are positioned and moved, said playing surface being divided into a grid of longitudinally and laterally contiguous playing spaces, a plurality of distinguishable starting spaces to accommodate the playing pieces of each player at the beginning of the game, distinguishable holding zones to which the pieces of each player may be sent during the game by the opposing player so as to impede the movement of said pieces, a plurality of distinguishable destination spaces for the pieces of each player, and a pair of dice used to indicate the number of playing spaces through which said pieces may be moved, the method comprising the steps of:

assigning a set of playing pieces to each player;

determining which player takes the first turn according to who obtains the higher number on a roll of a single die;

starting play by the first player rolling his two dice and moving one or two of his playing pieces through a number of playing spaces corresponding to the numbers showing on the dice;

continuing play by the second player rolling his two dice and moving one or two of his playing pieces in a like fashion;



alternating turns between the two players, each moving his pieces so as to gradually reach destination spaces from starting spaces;

jumping playing pieces over other pieces of either lower or equal rank in order to more directly advance the former across the board.

using a player's piece of highest rank to jump over the opposing player's pieces of lowest rank, causing said opposing pieces to be sent to the appropriate holding zone;

using a player's piece of highest rank to jump over his own pieces of lowest rank, causing said lowest ranking pieces to assume an intermediate playing rank;

using two of a player's pieces of intermediate rank in a single move to jump over the opposing player's piece of highest rank, causing said opposing piece of highest rank to be sent to the appropriate holding zone;

being unable to move a player's pieces through the holding zones assigned to either player;

preparing to move a player's pieces off the playing surface by initially occupying all of the destination spaces assigned to that player with his playing pieces;

being unable to move a player's pieces through the destination spaces assigned to the opposing player; and

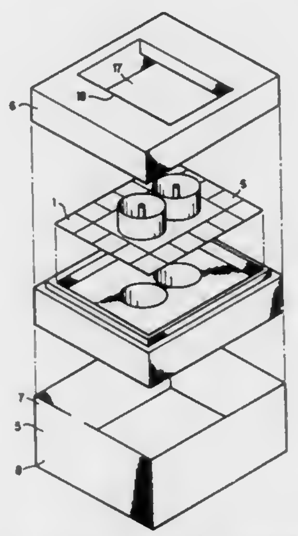
winning the game by being the first player to move all of his pieces off the playing surface from the destination spaces.

---

**5,018,745**

## BLIND RINGER TOSSING GAME

**Walter D. Dunse, 410 S. Washington, Jerseyville, Ill. 62052**
**Filed Oct. 1, 1990, Ser. No. 591,254**
**Int. Cl.⁵ A63B** *67/06*
**U.S. Cl. 273—338** **6 Claims**



1. A portable tossing game for one or more players, comprising:

(a) an essentially cubicle target box having upper and lower halves which are detachably connected to each other;

(b) a horizontal top board located midway between the upper part and the bottom base of said lower half, said top board being divided into a plurality of scoring areas;

(c) said top board having two adjacent cylindrical bull's-eyes located near the center of said board and protruding above it;

(d) an exact bull's eye peg, located in the center of each cylindrical bull's eye; and

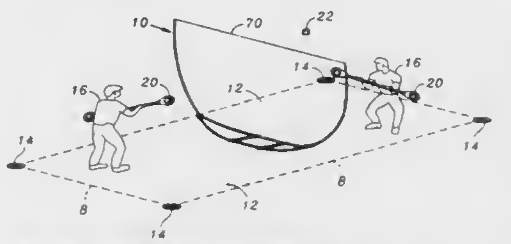
(e) a plurality of discs having central holes large enough so that they can be thrown around said exact bull's-eye pegs.

---

**5,018,746**

## FIELD GAME APPARATUS AND METHOD

**Joseph W. Cardoza, Jr., Acton, Calif., and Randolph P. Glass, 516 Calle Baranda, San Clemente, Calif. 92672, assignors to Randolph P. Glass, San Clemente, Calif.**
**Filed Feb. 6, 1990, Ser. No. 475,781**
**Int. Cl.⁵ A63B** *7/02, 59/02, 43/00*
**U.S. Cl. 273—411** **10 Claims**



1. A field game apparatus comprising:

a soft, non-resilient ball not retaining a definite shape, said ball comprising an outer covering and a plurality of pellets contained within said outer covering which pellets are free to move within said outer covering;

a scoring obstacle comprising a support structure and a cord, said cord being supported by said supporting structure in an elevated location relative to a playing surface; and

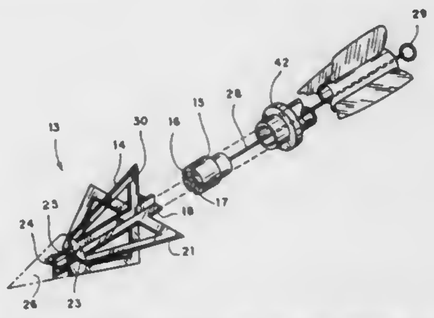
a plurality of racquets each racquet comprising a supple staff and two substantially identical annular structures each at an opposite end of said staff each said annular structure comprising a flange, an annular portion, and a containing network, whereby players may each manipulate a racquet to catch said ball in the first of said containing networks and further manipulate said staff and ball by flinging said ball from the first of said containing networks to the second of said containing networks or over said scoring obstacle as desired.

---

**5,018,747**

## BLADED DART PROJECTILE

**Jim W. Brown, Rte. 1, Box 182, Kinston, Ala. 36453**
**Filed Mar. 6, 1990, Ser. No. 489,031**
**Int. Cl.⁵ F42B** *6/08*
**U.S. Cl. 273—422** **6 Claims**



1. A bladed dart projectile for use with a manually energized launching device, comprising;

an elongated hollow shaft having a forward end and an aft end,

said hollow shaft aft end having a plurality of flight feathers disposed axially thereon,

said hollow shaft forward end containing a closely fitting hub,

said hub having an aft end providing attachment for a pull line extending through said hollow shaft, and

the aft end of said pull line extending from said hollow shaft aft end and providing means adaptable to a mechanical release device for the drawing of said shaft for the launching of said projectile.

---

**5,018,748**

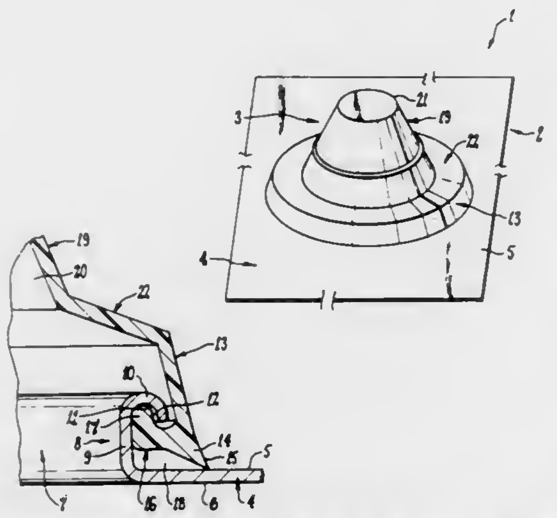
## SEAL DEVICE

**Werner E. Schalle, Upper Beconsfield, Australia, assignor to Aquarius Rubber (AUST.) Pty. Ltd., Victoria, Australia**
**Filed May 26, 1989, Ser. No. 357,558**
**Claims priority, application Australia, May 27, 1988, PI8477**
**Int. Cl.⁵ F16J** *15/02*
**U.S. Cl. 277—012** **10 Claims**

1. A seal device for sealing between a surface and an elongate member projecting through that surface, comprising: a one-piece mounting plate having a generally planar base portion with opposed inner and outer faces and an access aperture therethrough, the mounting plate being composed of metallic, non-resilient, manually deformable material, and in use being located with the inner face in a face-to-face relation with a mounting surface so that an elongate member projects through the access aperture, the base portion being deformable to conform to the contour of the surface and at least substantially retain the deformed contour, the mounting plate also having a rim portion integral with the base portion and extending about the periphery of the access aperture. the rim portion upstanding from the outer face of the body portion and having a retaining lip spaced outwardly of the base portion and shaped to provide an underlying shoulder; and, a sealing member which, in use of the device, overlies the access aperture and outstands from the outer face of the body portion, the sealing member having an access passage for receiving the elongate member therein with the sealing member sealingly engaging

VOL
126
SS
4
MY
28
1991
UMI

the elongate member, and the sealing member having a resiliently flexible skirt portion for overlying the rim portion with at least one retaining projection extending beneath the retaining lip for sealingly engaging against the rim portion and thereby releasably connecting the sealing member to the mounting plate, the skirt portion being shaped and sized relative to the rim portion and the spacing of the retaining projection from the base portion so that, by resiliently distorting the skirt portion, the retaining projection can be fitted beneath and released from beneath the retaining lip to respectively, achieve connection and disconnection between the sealing member and the one-piece mounting plate.



### 5,018,749
### SLIDE RING SEAL

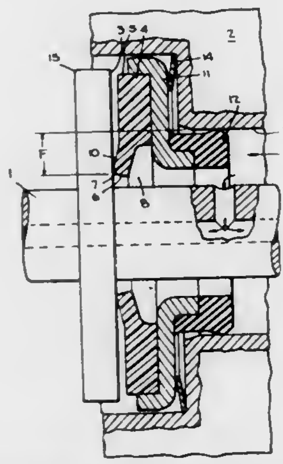
**Hans Forch, Birkenau, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany**

**Filed Jul. 6, 1989, Ser. No. 376,355**

**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 3829702**

**Int. Cl.⁵ F16J** *15/34*

U.S. Cl. 277—27 **6 Claims**



1. A slide ring seal to seal about a shaft with respect to a housing, comprising: a slide ring made of polytetrafluorethylene pressed against a counter surface, which is relatively rotatable, by means of pressure of a medium to be sealed and basically extending in a radial direction; said slide ring having an axis and having a cross-sectional profile having a radially external peripheral surface basically extending parallel to the axis of the slide ring, the slide ring having a sealing edge axially extending beyond the profile of a cross section of a major portion of said slide ring towards the counter surface and formed during manufacture, said counter surface including a circumferential surface portion having an outer diameter and said circumferential surface portion being exposed to pressure of the medium to be sealed and the sealing edge having a diameter which is basically identical with the outer diameter of the circumferential surface portion and the sealing edge being resiliently pressable to be basically surface planar with the profile of the cross section of the major portion of said slide ring by means of pressure, the slide ring seal including a cylinder surface of a housing and a support ring having a support surface extending in a radial direction, the slide ring being attached to the support surface of the support ring, the slide ring seal including a sealing lip made of rubber elastic material attached to the support ring, and the sealing lip pressing against the cylinder surface of the housing under elastic prestress, the difference between the diameter of the cylinder surface and the diameter of the sealing edge being so small that the effective, specific surface pressure contact at the sealing edge is very low.

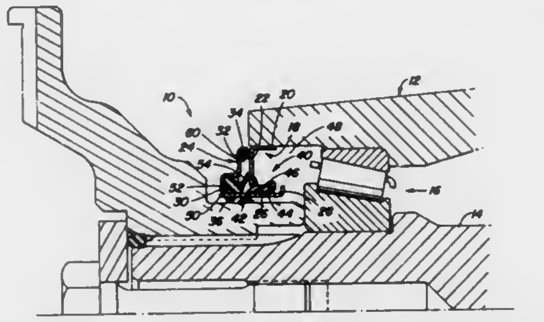
### 5,018,750
### SHAFT SEAL ASSEMBLY

**Richard M. Sparks, Cedar Falls, and Kendall D. Tjepkes, Dike, both of Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Jun. 2, 1989, Ser. No. 360,953**

**Int. Cl.⁵ F16J** *15/32*

U.S. Cl. 277—38 3 Claims



1. A lubricated seal arrangement for parts rotating relative to one another, the seal arrangement having a metal oil ring with a cylindrical outer member fixed relative to and engaging one of the parts and an annular flange member extending radially inwardly from the outer member, a metal guide ring fixed relative to the other part, a flexible annular oil seal fixed to a first portion of the oil ring and sealingly and slidably engaging the guide ring, an annular lip seal fixed to the guide ring and slidably and sealingly engaging the oil ring and a spacer member mounted between the oil and guide rings to maintain a clearance therebetween so as to prevent destruction of the lip seal, the spacer member being mounted for rotation with the guide ring and for sliding engagement with the oil ring, the spacer member and the lip seal engaging portions of the oil ring which are spaced apart from the first portion and which are exposed to lubricating oil retained by the oil seal so that heat generated in the oil ring by its sliding engagement with the spacer member is absorbed and dissipated by the lubricating oil retained by the oil ring and oil seal, characterized by:

- the spacer member slidably engaging a radially outer part of the flange member immediately adjacent to the cylindrical outer member, whereby heat generated by friction between the spacer member and the flange member is efficiently conducted to the one part via the cylindrical outer member.

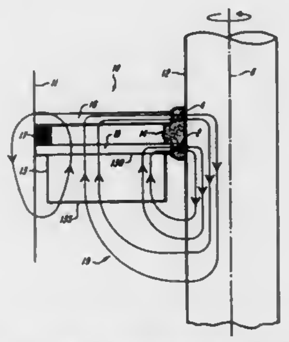
### 5,018,751
### STACKED POLE-PIECE FERROFLUID SEAL APPARATUS

**Kuldip Raj, Merrimack; Ronald Moskowitz, Hollis, both of N.H.; Joseph Moses, Tyngsboro, Mass.; James Bonvouloir, Nashua, and Frank Bloom, Windham, both of N.H., assignors to Ferrofluidics Corporation, N.H.**

**Filed Jun. 28, 1989, Ser. No. 373,328**

**Int. Cl.⁵ F16J** *15/40*

U.S. Cl. 277—80 **17 Claims**



1. In a magnetic fluid seal for sealing between a housing and a magnetically permeable shaft, said seal having:

- an annular magnet having poles of opposite polarity at first and second surfaces thereof, said magnet having a closely-spaced, non-contacting relationship with said shaft;
- an annular, magnetically permeable primary pole-piece axially abutting the first surface of said magnet, said pole-piece having a closely-spaced, non-contacting relationship with said shaft to define a primary gap; and
- a magnetic fluid disposed and retained in said primary gap, said magnetic fluid forming a magnetic O-ring seal about said shaft, the improvement comprising:
  - at least one annular, magnetically permeable secondary pole-piece disposed axially adjacent said primary pole-piece and separated from said primary pole-piece by a non-magnetic spacer to define an intermediate space therebetween, said secondary pole-piece having a closely-spaced, non-contacting relationship with said shaft to define a secondary gap;
  - said primary and secondary gaps and said space therebetween collectively defining an annular ring in which said magnetic fluid is disposed and retained.

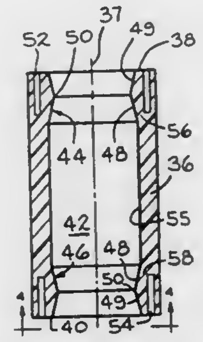
### 5,018,752
### SHAFT SEAL

**Larry D. Thomas, Beatrice, Nebr., assignor to Hoover Group, Inc., Alpharetta, Ga.**

**Filed Apr. 19, 1990, Ser. No. 511,297**

**Int. Cl.⁵ F16J** *15/32, 9/06*

U.S. Cl. 277—152 **5 Claims**



1. A shaft seal comprising a generally tubular plastic body having a pair of ends and longitudinal axis extending through said ends, said body having an axial cavity extending therethrough and a seal portion formed adjacent each of said ends of said body and projecting into and further defining said cavity, each said seal portion being integral with said body and being connected thereto by a narrow support portion which enables said seal portion to flex relative to the remainder of said body in a direction toward and away from said axis, and each said seal portion including annular radially inwardly converging surfaces which terminate in an edge engageable with a shaft extending axially through said body, each said seal portion being flexed away from said axis by each said edge engaging the shaft when the shaft is so extended, each said edge being biased in sealing engagement with the shaft when each said seal portion is flexed away from said axis, said seal portions being generally aligned in the direction of said axis upon being flexed.

### 5,018,753
### COMPOSITIONS FOR HYDRAULIC JOINT

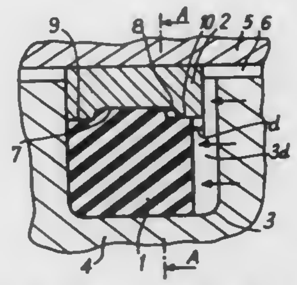
**Louis C. Porel, Rambervillers, France, assignor to Hydro Rene Luc, Baccarat, France**

**Filed Jun. 14, 1989, Ser. No. 365,941**

**Claims priority, application France, Jun. 14, 1988, 88 07939**

**Int. Cl.⁵ F16J** *9/06, 15/16*

U.S. Cl. 277—165 **3 Claims**



1. A sealing joint for first and second parts of hydraulic equipment said parts being for rotative relative motion about an axis, said joint for attachment on said first part comprising a combination of a friction ring of hard material having good friction resistance characteristics for making sliding contact with said second part, and a ring of more flexible material, the two rings being concentric with said axis and connected to one another by means of grooves made in a surface of said ring of hard material, said surface being in contact with the ring of more flexible material, said grooves being blind and formed parallel in length to said axis of rotation, the ring of more flexible material having integrally formed ribs parallel to said axis, said ribs having a circumferential width and radial height relative to said axis substantially the same as the circumferential width and radial depth of said grooves, said ribs having a length shorter than the length of said grooves, said ribs fitting into said grooves to interlock the two rings, said shorter rib length enabling longitudinal motion of said ribs in said grooves.

### 5,018,754
### FRONT SEAT REVERSING STRUCTURE FOR DUAL-SEAT BABY STROLLER

**Kenny Cheng, Tao Yuan Hsien, Taiwan, assignor to Joanna A. Nichols, Hemet, Calif.**

**Filed Mar. 7, 1990, Ser. No. 490,142**

**Int. Cl.⁵ B62B** *7/08*

U.S. Cl. 280—47.4 **2 Claims**

1. A front seat reversing structure for a dual-seal baby stroller comprising:

- a seat-back frame having a pair of opposed ends, each of the ends having a guide slot and a hole;
- a pair of switching elements, each of said pair of elements being a substantially sector-shaped plate with a guide groove provided along an arched portion thereof, a plurality of grooved holes being provided along a lower edge

/OL
126
SS
4
MY
28
1991
UMI

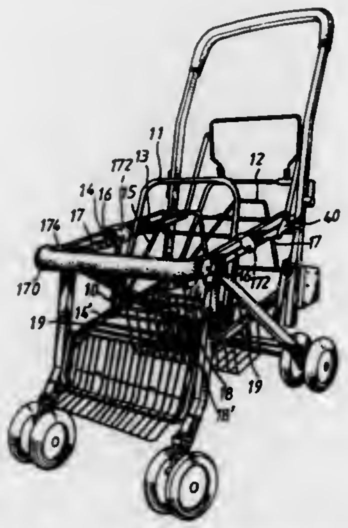
of said guide groove, a horizontal projection provided in the center of said guide groove for separating said grooved holes into two portions, and a pair of holes being further provided in each of said pair of elements at a location below said guide groove;

a locating bar with opposed ends, each end passing through the guide slot of a respective end slot of said seat-back frame and the guide groove on a respective one of said switching elements such that when the ends of said locating bar is in the grooved holes, the bar can only slide toward said horizontal projection on the lower edge of the guide groove;

a reversing lever bent into a trapezoidal shape with a pair of lower ends, each of said ends being secured to the locating bar;

a pair of links, one end of each of the links having a guide slot and the other end thereof being provided with a pair of holes, a rivet passing through one of said holes, through one of said holes in said switching element, and then the hole in a respective end of said seat-back frame to connect them in such a way that said seat-back frame can be rotated relative to said element;

a support bar having opposite ends secured to the lower end of respective ones of said pair of links;



two pairs of arms, one arm of each of said pairs of arms being rotatably pinned at one end to a respective one of a pair of upper side-bars by a rivet and the other end thereof being rotatably pinned to the guide slot on a respective of one said pair of links by a rivet; the other arm of each of said pair of arms being rotatably pinned at one end to a respective lower side-bar by a rivet and the other end thereof being connected by a rivet passing through the other of said pair of holes in a respective one of said links and the other of said pair of holes in the respective one of said switching elements, respectively, such that the connected ends of the links are rotatable relative tot he arms;

a pair of springs, one end of each of said springs being hooked to the locating bar and the other end thereof being hooked to the rivet which passes through a respective one of said switching elements and said other arm; and

a pair of retaining bars secured to the sides of each of said iower side bars adjacent respective ones of said other arms;

whereby the position of the locating bar in the grooved hole on the switching elements can be shifted by pulling the reversing lever in conjunction with pulling the seat-back frame, thus causing the arms to swing, the swinging range being limited by said retaining bars.

---

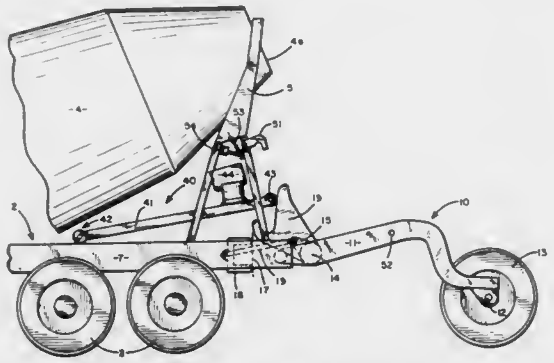
## 5,018,755
## TAG AXLE FOR WORK VEHICLES

**Garwin McNeilus, Dodge Center, and Ronald E. Christenson, Kasson, both of Minn., assignors to McNeilus Truck and Manufacturing, Inc., Dodge Center, Minn.**

**Filed Jan. 24, 1990, Ser. No. 469,175**

**Int. Cl.$^5$ B60P** *1/00;* **B62D** *61/12*

**U.S. Cl. 280—81.1** **24 Claims**



1. For a work vehicle having a main frame:

(a) a tag axle assembly which includes a pair of arms pivotally mounted to the vehicle, at least one tag axle, at least one tag wheel and a cross member,

(b) means for moving the tag axle assembly between a first position in which the tag wheels are elevated and a second position in which the tag wheels engage the ground, said means for moving the tag axle assembly including a pneumatic actuator fixed to the vehicle, a pivot member secured to the cross member of the tag axle assembly, and an elongated member secured at one end to the pneumatic actuator and at its other end to said pivot member for transferring force from the pneumatic actuator to the pivot member so that the pivot member, elongated member and pneumatic actuator cause the tag axle assembly to move to said first position when said pneumatic actuator is inflated with air; and

(c) pneumatic means for applying a variable downward force on the tag wheels when the tag wheels engage the ground.

---

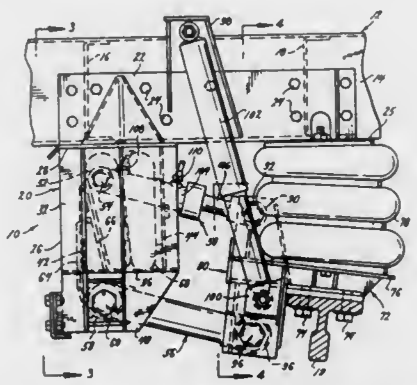
## 5,018,756
## CONTROL FOR SELF STEERING SUSPENSION ASSEMBLY

**James L. Mitchell, Springfield, Mo., assignor to Ridewell Corporation, Springfield, Mo.**

**Filed Oct. 23, 1989, Ser. No. 424,908**

**Int. Cl.$^5$ B62D** *61/12*

**U.S. Cl. 280—81.6** **19 Claims**



1. In a vehicle having a transmission with forward and reverse drive ratios, a chassis, and at least one axle with a variable pitch, a means to vary the axle pitch between a positive pitch and a negative pitch comprising:

axially extendable and retractable piston/cylinder means supported between the vehicle chassis and the axle and arranged to vary the pitch of the axle in response to extension and retraction of the piston/cylinder means;

control means in operative communication with the vehicle transmission and the piston/cylinder means, the control means being adapted to control the piston/cylinder means to vary the pitch of the axle to a positive pitch relative to a vertical plane when the transmission is in a forward drive ratio, to vary the pitch of the axle to a negative pitch relative to the vertical plane when the transmission is in a reverse drive ratio, and to maintain the axle in a positive pitch when operative communication with the vehicle transmission is interrupted.

---

## 5,018,757
## STEERING ANGLE CONTROL APPARATUS FOR VEHICLE

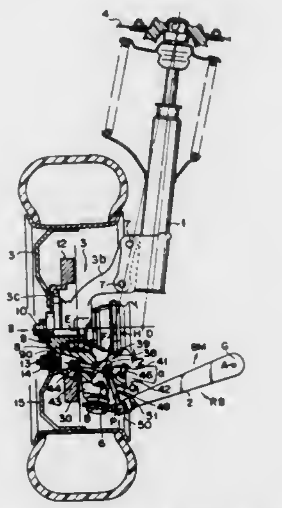
**Hajime Kozuka, Okazaki, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 30, 1990, Ser. No. 530,616**

**Claims priority, application Japan, Jun. 5, 1989, 1-142727; Dec. 4, 1989, 1-315098**

**Int. Cl.$^5$ B60G** *7/00*

**U.S. Cl. 280—96.1** **18 Claims**



1. A steering angle control apparatus for use in a vehicle including a knuckle having a knuckle arm, for rotatably supporting a wheel, suspension means for supporting said knuckle on a vehicle body so as to be movable substantially in the vertical direction and rotatable together with the wheel about a predetermined steering axis, and steering means including a tie rod having an outer end connected to the knuckle arm, for turning the knuckle and wheel through the tie rod, said apparatus comprising:

a changing mechanism for connecting said knuckle arm and said outer end of said tie rod to each other so that the relative position therebetween is variable; and

control means for actuating the changing mechanism in accordance with changes in a suspension stroke of the suspension means substantially in the vertical direction.

---

## 5,018,758
## HIGH EFFICIENCY BICYCLE FRAME

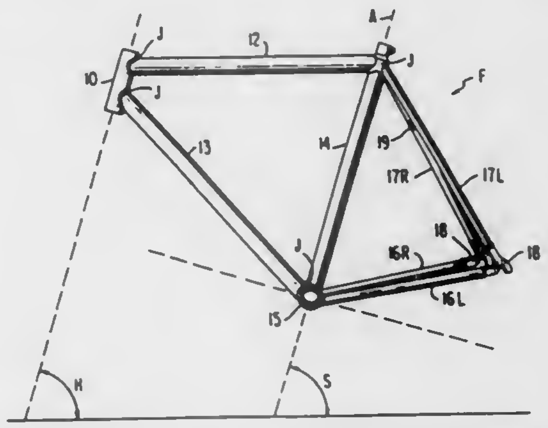
**Gary G. Klein, 207-B S. Prairie Rd., Chehalis, Wash. 98532**

**Continuation of Ser. No. 576,437, Feb. 2, 1984, Pat. No. 4,621,827, which is a continuation-in-part of Ser. No. 849,141, Nov. 7, 1977, Pat. No. 4,500,103, which is a continuation of Ser. No. 658,620, Feb. 17, 1976, abandoned. This application Oct. 23, 1986, Ser. No. 922,284**

**The portion of the term of this patent subsequent to Feb. 19, 2002, has been disclaimed.**

**Int. Cl.$^5$ B62K** *3/02*

**U.S. Cl. 280—281.1** **12 Claims**



1. In a bicycle having one wheel of greater than 25 inches in diameter and a frame of the type including a tubular top tube having front and rear ends, a tubular seat tube having top and bottom ends, a tubular head tube, a tubular down tube having top and bottom ends, a pair of chainstay tubes having front and rear ends, two seatstay tubes having top and bottom ends, a bottom bracket and two rear fork ends, wherein said top end of said down tube, said head tube and said front end of said top tube are interconnected, said top ends of both said seatstay tubes, said top end of said seat tube and said rear end of said top tube are interconnected, said bottom bracket, said bottom end of said down tube and said bottom end of said seat tube and said front ends of both said chainstay tubes are interconnected, said two rear fork ends, said rear ends of both said chainstay tubes and said bottom ends of both said seatstay tubes are interconnected, wherein said head tube is at a ground angle of between 60° to 80°, and said seat tube is at a ground angle of between 58° and 85° when the appropriate front fork and wheels are attached and rest on the ground, and wherein the mass of the frame without fork or other equipment is less than 5 pounds, the improvement wherein each of said top tube, down tube, seat tube, chainstay tubes and seatstay tubes is of a diameter and wall thickness such that said frame has a torsional rigidity between said head tube and said bottom bracket of at least 67 pounds$_{force}$ feet per degree of deflection with a torque being applied to said bottom bracket along an axis normal to the axis of said seat tube and normal to the axis of said bottom bracket with said head tube being clamped immovably, and a lateral bending rigidity of at least 120 pounds$_{force}$ per inch of deflection measured at said rear fork ends of said bicycle frame with an axle installed, with said head tube clamped immovably in a horizontal position and with said bottom bracket supported but not otherwise restrained, a force being applied and deflection measured in a direction normal to the plane of the bicycle frame and along the axis of the rear axle, and wherein said chainstay tubes each have a relative bending rigidity represented as the outer diameter to the fourth power minus the inner diameter to the fourth power all times the modulus of elasticity of the tube material of at least about 3,481,921.3 pounds$_{force}$ inches squared.

VOL
1126
ISS
4
MY
28
1991
UMI

5,018,759

### TAMPER RESISTANT TRAILER HITCH

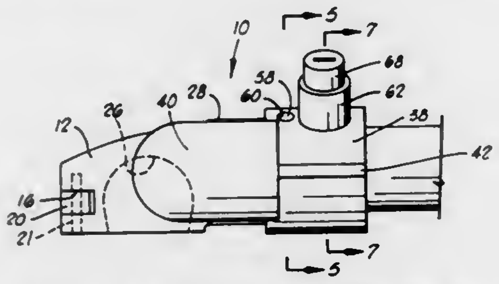
**S. Leonard Villalon; James D. Olds, and William H. Shoffner, all of Duncan, Okla., assignors to Guardian Hitch, Inc., Duncan, Okla.**

**Division of Ser. No. 116,459, Nov. 3, 1987, Pat. No. 4,925,205. This application Oct. 23, 1989, Ser. No. 425,705**

**The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.**

**Int. Cl.⁵ B60D** *1/06*

U.S. Cl. 280—507 23 Claims



1. A trailer hitch for connection to a hitch ball, said trailer hitch comprising:

a housing at least partially defining an open sided ball receiving cavity therein;

coupling means on said housing for coupling engagement with said hitch ball when said hitch ball is positioned in said cavity; and

a one-piece member adjacent said housing and having a position for preventing undesired removal of said hitch ball from said cavity and another position for substantially completely covering the open side of said cavity and thereby preventing substantially any access to said cavity when said hitch ball is removed from said cavity.

---

5,018,760

### SNOW SURFBOARD

**Jean-Pierre Remondet, Chalet "Le Tournavel", Le Cret, 73150 Val D'Isere, France**

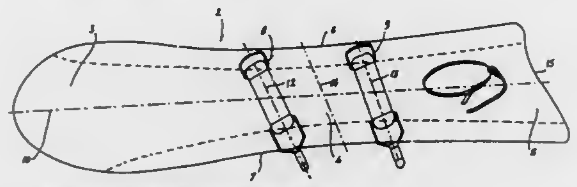
**PCT No. PCT/FR89/00011, § 371 Date Aug. 31, 1989, § 102(e) Date Aug. 31, 1989, PCT Pub. No. WO89/06560, PCT Pub. Date Jul. 27, 1989**

**PCT Filed Jan. 18, 1989, Ser. No. 415,218**

**Claims priority, application France, Jan. 18, 1988, 88 00820**

**Int. Cl.⁵ A63C** *5/04*

U.S. Cl. 280—609 6 Claims



1. A snow surfboard comprising:

a planar upper surface, a lower surface, a front portion, a tail portion, and a runner zone between said front portion and said tail portion, said snow surfboard having an hourglass profile with a central longitudinal axis and longitudinally extending sidewalls forming dimension lines which are curved inwardly into the runner zone, the bottom of each of said sidewalls forming an outside edge with said lower surface;

a pair of bindings attached to said upper surface and being longitudinally spaced along said central longitudinal axis, each of said bindings having a longitudinal axis which extends at an angle from a point of intersection of said longitudinal axis with said central longitudinal axis such that a forward potion of each binding is located forwardly of a line extending perpendicular to said central longitudinal axis at said point of intersection;

wherein said dimension lines of said sidewalls are offset longitudinally with respect to each other and are positioned such that an innermost curved point of each said dimension line is located on an axis which extends between the longitudinal axes of said bindings and is parallel thereto.

---

5,018,761

### SAFETY DEVICE IN THE FORM OF AN AIRBAG FOR MOTOR VEHICLES

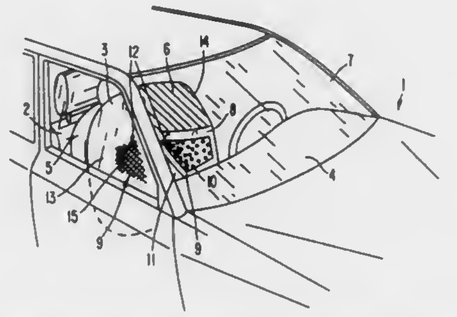
**Wolfgang Henseler, Tübingen, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed May 17, 1990, Ser. No. 524,572**

**Claims priority, application Fed. Rep. of Germany, May 17, 1989, 3916011**

**Int. Cl.⁵ B60R** *21/22*

U.S. Cl. 280—730 10 Claims



1. Safety device for motor vehicle occupants comprising an airbag which is located inflated in front of a vehicle occupant in response to a specified vehicle deceleration, and said airbag having outlet openings in its cover which permit the gas volume to be partially forced out, the airbag resting with a support surface against a vehicle curved windshield surface and having on an opposite side an impact surface for the vehicle occupant when inflated, said impact surface being approximately aligned in the vehicle transverse direction, wherein the airbag region has the greatest overall cross-section of gas outlets per surface unit near to a region with the greatest curvature of the windshield with respect to motor vehicle transverse axis.

---

5,018,762

### AIR-BAG DEVICE

**Motoharu Suzuki; Munemasa Shimamura, both of Yokohama; Hideo Omura, and Makoto Hikone, both of Yokosuka, all of Japan, assignors to Nissan Motor Company, Ltd., Japan**

**Filed Dec. 20, 1988, Ser. No. 286,794**

**Claims priority, application Japan, Dec. 24, 1987, 62-196295[U]**

**Int. Cl.⁵ B60G** *21/22, 21/24, 21/26*

U.S. Cl. 280—731 21 Claims

1. In a motor vehicle having a steering wheel installed therein, an air-bag device comprising:

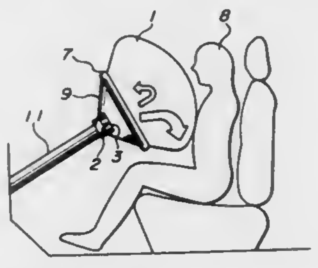
an air-bag mounted to a center pad of said steering wheel, said air-bag having therein upper and lower portions with respect to a condition wherein said air-bag is expanded;

inflator means, for generating gases to be blown into said air-bag;

means for covering said air-bag in a folded up condition;

means for actuating said inflator to generate the gases; and

flow-restricting means having a plurality of gas flow openings exposed to the interior of said air-bag, for restricting a flow of the gases from the inflator means through the gas flow openings toward said upper portion of said air-bag,



to thereby increase a flow of the gases toward said lower portion of said air-bag.

---

5,018,763

### SYSTEM FOR VEHICLE SAFETY DEVICES

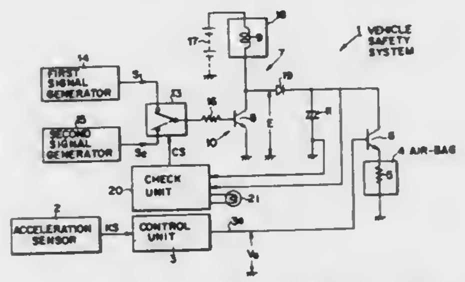
**Masami Okano, and Kunihiro Takeuchi, both of Higashimatsuyama, Japan, assignors to Zexel Corporation, Japan**

**Filed Jul. 16, 1990, Ser. No. 552,706**

**Claims priority, application Japan, Jul. 21, 1989, 1-189879**

**Int. Cl.⁵ B60R** *21/16*

U.S. Cl. 280—735 9 Claims



1. A vehicle safety system having a safety device for protecting a vehicle occupant from a vehicle collision, said safety device being rendered operative when a vehicle collision has occurred, said system comprising:

a warning buzzer for producing a warning sound;

an energy supply circuit means for supplying electric energy for actuating an electrically fired element of the safety device, said energy supply circuit means having a voltage step-up circuit means in which an inductance element of said warning buzzer is incorporated so as to act as a coil element for generating a back electromotive force for a voltage step-up in response to an ON/OFF voltage signal;

a checking means for checking whether or not there is an abnormal condition in said system; and

an applying means responsive to said checking means for applying a signal with at least an audible frequency component to said voltage step-up circuit means when an abnormal condition has occurred in said system, whereby said warning buzzer produces a warning sound in accordance with the audible frequency component.

---

5,018,764

### FOLDABLE BOOK AND BUILDING STRUCTURE

**Paula Beardell, 56 S. 11 St., Brooklyn, N.Y. 11211**

**Filed Jan. 31, 1990, Ser. No. 472,871**

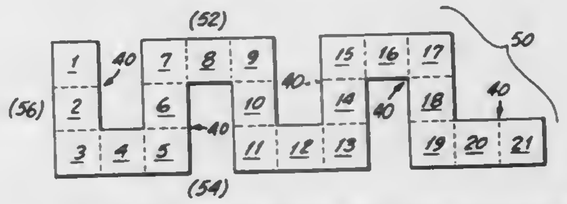
**Int. Cl.⁵ B42D** *1/00, 15/00*

U.S. Cl. 281—2 3 Claims

1. A foldable structure for forming a book like arrangement comprising:

a flat planar element in the form of a square wave about a horizontal axis, said planar element having a plurality of vertical segments and a plurality of horizontal segments, said planar element having a predetermined vertical dimension, each of said vertical segments extending across said vertical dimension,

each of said segments having N square panel portions, adjacent panel portions being separated by a fold line,



accordion folding of successive panel portions providing a square book like structure.

---

5,018,765

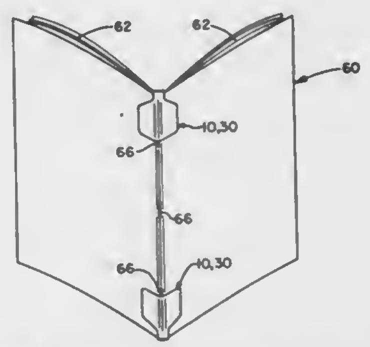
### AUXILIARY BINDER

**Charles J. Barnette, Akron, Ohio, assignor to Kent Adhesive Products Co., Kent, Ohio**

**Filed Dec. 8, 1989, Ser. No. 447,590**

**Int. Cl.⁵ B42D** *1/02*

U.S. Cl. 281—15.001 16 Claims



1. An auxiliary binder for booklets comprising;

a first sheet of material having an adhesive applied to one surface thereof; and

a second sheet of material releasably secured to said adhesive and forming a laminate, said second sheet of material being split through a thickness thereof between first and second ends thereof, said laminate comprising a pair of enlarged sections interconnected by a narrow strip, said split in said second sheet being congruent with said narrow strip, said material of said second sheet being removed at said split and an elongated strip of material being secured to said adhesive of said first sheet of material at said split, said elongated strip of material being adhesively coated on a surface opposite a surface received by said adhesive of said first sheet of material.

---

5,018,766

### METHOD OF IMPLEMENTING TRAVEL PLANNING AND PRODUCT THEREFOR

**Vicki J. Templet, Buffalo Grove, Ill., assignor to Wallace Computer Services, Inc., Hillside, Ill.**

**Continuation-in-part of Ser. No. 466,075, Jan. 16, 1990, Pat. No. 4,971,363. This application Jul. 11, 1990, Ser. No. 551,080**

**Int. Cl.⁵ B41L** *1/20*

U.S. Cl. 462—18 3 Claims

1. A form assembly implementing travel planning comprising

three superposed sheets bonded together along one side margin and selectively separable therefrom along a line of perforations,

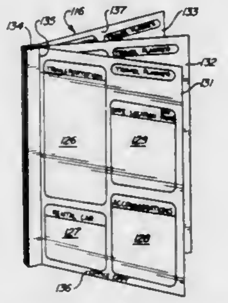
each of said sheets having front and back faces, the front face of each of said sheets having printed indicia thereon providing spaces on the left side for information on transpor-

VOL
1126
ISS
4
MY
28
1991
UMI

tation and car rental and printed indicia providing spaces on the right side for information on visit locations and dates and accommodations,

the front face of the top of said three sheets having printed indicia connoting an office copy and the back face of said top sheet being provided with a CB coating,

the front face of the middle of said three sheets having printed indicia connoting a family copy and the front and back faces of said middle sheet being provided with CF and CB coatings, respectively,



the front face of the bottom of said three sheets having printed indicia connoting a traveler copy and the front face of said bottom sheet being provided with a CF coating, and

the back face of said bottom sheet having printed indicia providing spaces thereon for reminders of things to do and expense accounting.

---

### 5,018,767

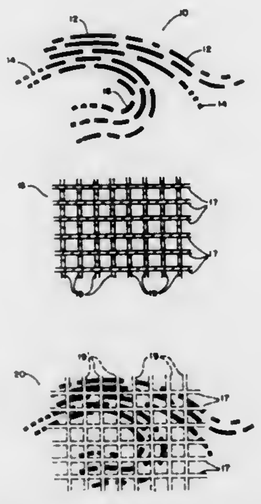
### COUNTERFEIT PROTECTED DOCUMENT

**Ralph C. Wicker, Rochester, N.Y., assignor to Schmeiser, Morelle & Watts, Albany, N.Y.**

**Filed Jan. 18, 1989, Ser. No. 298,020**

**Int. Cl.$^5$ B42D** *15/00*

**U.S. Cl. 283—67** **13 Claims**



1. Replicating, by printing, a first photocopier counterfeit of a face-value document, said printing containing substantially all counterfeit-mapped characteristics relating to images thereof that comprise, upon further photocopying, moire-and omission-producing lineation factors including size, shape and spacing, or tuning, of image-forming lines.

---

### 5,018,768

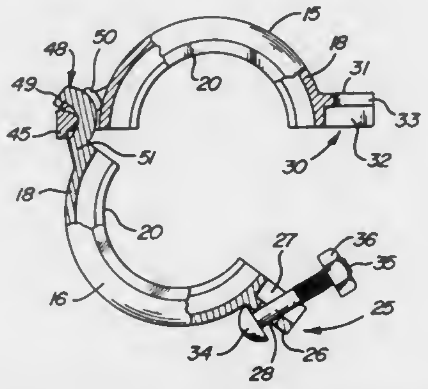
### PIPE COUPLING HINGE

**Josef Palatchy, Tiberias, Israel, assignor to Quikcoup, Incorporated, Pontaic, Mich.**

**Filed Jul. 19, 1990, Ser. No. 554,675**

**Int. Cl.$^5$ F16L** *35/00*

**U.S. Cl. 285—24** **9 Claims**



1. A pipe coupling hinge for hingedly connecting adjacent ends of arcuate pipe coupling segments having relatively narrow, band-like, arcuate walls, which segments are aligned and connected together at adjacent ends to form a generally circular casing for surrounding and coupling adjacent ends of a pair of pipes, with an end of one segment having a hinge loop and the corresponding end of the adjacent segment having a hinge hook engaged with said loop for providing a hinge connection between the segments and fastening means at the ends of said segments opposite said adjacent ends, the improvement comprising:

said hinge loop being generally U-shaped and formed of a pair of spaced apart side legs which are integral with, and extend radially outwardly from an adjacent segment wall, and an integral base forming a substantially straight hinge axle spaced outwardly of the segment wall and substantially parallel to the casing axis to provide an elongated, generally rectangular slot-like opening defined by said legs and base and the segment wall;

said hook being generally U-shaped with a fixed leg integral with said corresponding end and a free leg and a base for fitting through the loop opening and overlapping the axle, with the hook being generally rectangular in cross-section and substantially filling, but being slightly smaller in dimensions than the loop opening, so that the hinge is loose relative to the loop opening;

an outwardly extending bump formed on the exterior of the hook base at one side thereof, so that the bump is located near one of the legs forming the loop;

a depression formed in the axle adjacent said one leg and opening towards the segment wall portion which is overlapped by the axle;

and said hook being sufficiently loose relative to the loop opening, so that one of the segments may be manually moved relative to the other and relative to the casing axis, to fit a corner portion of the hook within the depression in the axle for clearing the bump through the loop opening to permit disengaging the hook from the loop, and with the bump being of sufficient height to normally engage the adjacent segment wall portion defining the loop when the hook is moved relative to the loop, and to otherwise prevent separation of the hook from the loop, when the segments are in axial alignment;

whereby said segments may be stored and handled separately and may be assembled together by inter-engaging the hook and loop thereof;

---

### 5,018,769

### ADAPTER FITTING

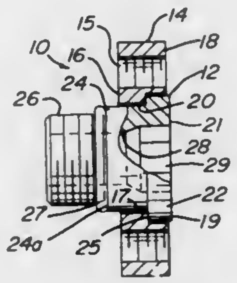
**David E. Albrecht, 1383 Granary Rd., Blue Bell, Pa. 19422**

**Filed Nov. 20, 1989, Ser. No. 439,885**

**The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.**

**Int. Cl.$^5$ F16L** *35/00*

**U.S. Cl. 285—39** **9 Claims**



1. An adapter fitting for connecting a threaded flow connector and a face sealing flange flow connector comprising:

a flange member having only two bolt holes arranged in a spaced apart pattern and a bore located centrally within said bolt hole pattern and extending through said flange member, said bolt holes being centered on an axis extending through the center of said bore,

and a mounting member mounted in said bore of said flange member and including:

a first body portion adapted to be held in arresting contact with said flange member and providing a face for mating with a flanged flow connection,

a second body portion extending beyond said flange member to a location spaced therefrom, the extended end of said second body portion having threads formed thereon for engagement with the threaded terminal port of one of said flow components,

a fluid flow passage extending through said body portions, and

a wrenching surface formed internally of said first body portion of said mounting member and adapted to be engaged by a wrenching mechanism for causing rotation of said mounting member.

---

### 5,018,770

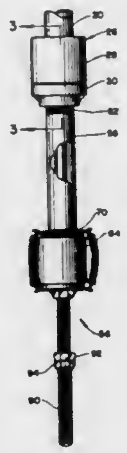
### FIRE SPRINKLER APPARATUS

**Ronald L. Beasley, Rte. 2, Box 202A - Hooper Rd., Ringgold, Ga. 30736**

**Filed Feb. 9, 1990, Ser. No. 477,643**

**Int. Cl.$^5$ F16L** *55/00*

**U.S. Cl. 285—39** **19 Claims**



1. The combination of a coupling for connecting a drop pipe in a fire sprinkler system to a sprinkler head, and a tool for cooperating with the coupling after the system has been tested but prior to connecting said sprinkler head, said coupling comprising a first body member adapted for connection to said pipe, said body member having a first passageway for communicating with said pipe when said body member is connected thereto, a second body member adapted for connection to said head, said second body member having a second passageway including an inlet adapted to communicate with said first passageway when said body members are connected together and an outlet so that fluid entering said first passageway may exit said outlet, a frangible disk, means for connecting said first and second body members together with said disk disposed intermediate said first passageway and said inlet of said second passageway to close communication therebetween until said disk is fractured, first connecting means disposed within said outlet for connecting said sprinkler head to said second body member after said disk is fractured, said tool comprising a hollow elongated housing having first and second ends, second connecting means associated with said first end receivable within said outlet for selective attachment to said first connecting means to connect said housing to said second body member after testing of said sprinkler system, an elongated ram disposed within said housing, said ram having an impact head at one end and a handle at another end, said impact head being disposed for extending out said first end of said housing and into said second passageway and said handle extending out said second end of said housing, means including a plurality of springs for resiliently connecting said housing to said ram, said springs disposed radially outwardly and externally of said second end of said housing, and means for adjustably positioning said ram such that said impact head is in juxtaposition with said frangible disk when said housing is connected to said second body member, whereby said handle may be pulled relatively to said housing away from said coupling manually to energize said springs and upon release of said handle said springs propel said ram toward said coupling to forcibly drive said impact head into fracturing engagement with said disk.

---

### 5,018,771

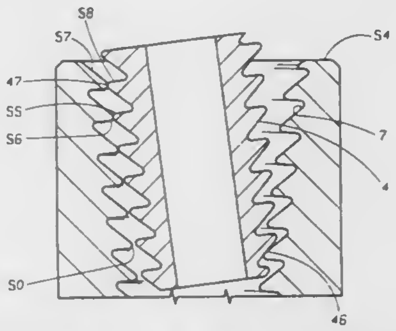
### THREADED TUBULAR CONNECTION

**John D. Watts, P.O. Box 79466, Houston, Tex. 77279**

**Continuation-in-part of Ser. No. 897,069, Jul. 18, 1986, Pat. No. 4,813,717. This application Feb. 24, 1989, Ser. No. 315,271**

**Int. Cl.$^5$ F16L** *25/00*

**U.S. Cl. 285—333** **12 Claims**

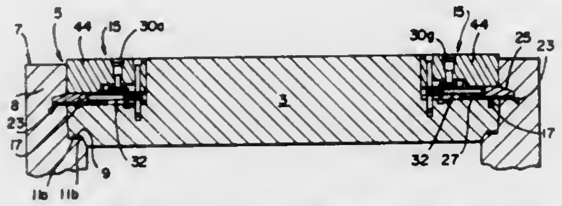


1. A threaded connection having a first member formed with tapered internal threads and a second member having tapered external threads dimensioned and formed for cooperation with the internal threads such that the external threads may be positioned axially within the internal threads to a stab depth that is established when the external thread of smallest diameter contacts an internal thread around the circumference of the external thread of smallest diameter, the stab depth exceeds the quantity: the thread form height plus the thread gap, multiplied by the outer diameter of said external thread and then divided by the difference of, the axial pitch of the threads minus twice the average width of the thread crests.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,772
### LATCHING DEVICE FOR SECURING A CLOSURE TO A CASK FOR TRANSPORTING RADIOACTIVE WASTE

**Franklin D. Obermeyer; Richard R. Cruz, and George Bieberbach, all of Pensacola, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed May 16, 1989, Ser. No. 352,426**
**Int. Cl.$^5$ E05C** *9/06*
U.S. Cl. 292—39 **40 Claims**



1. A latching device for removably securing and sealingly engaging a closure around an opening in a cask defined by an edge of said cask, comprising:

at least three shear key assemblies uniformly spaced around the outer portion of the closure, each of which includes a shear key means having a bolt portion movably mounted in said closure, and a latch portion that is insertable into and retractable out of a slot means in said cask edge in response to the application of a closing and an opening force applied to said bolt portion, said latch portion being beveled so as to wedgingly engage said slot means when inserted therein and to depress and engage the outer portion of said closure against said cask edge, and

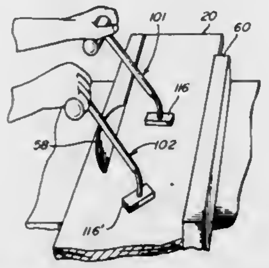
at least one drive mechanism located within a cavity in said closure and connected to the bolt portion of said shear key assemblies for applying said closing and opening forces to said bolt portions,

wherein the width of said latch portion is substantially larger than the width of said bolt portion to moore widely distribute the pressure that the latch portion applies around the perimeter of the closure when a closing force is applied to said bolt portion, and to minimize the pressure between said latch portion and said slot means to reduce binding forces therebetween.

---

### 5,018,773
### MANUAL PUSH FEEDER DEVICE FOR WOODWORKING MACHINES

**Norman M. Stavin, Cozzens La., Amagansett, N.Y. 11930, and Gary D. Johnson, New York, N.Y., assignors to Norman M. Stavin, Amagansett, N.Y.**
**Filed Jul. 14, 1989, Ser. No. 381,137**
**Int. Cl.$^5$ B66C** *1/00;* **B26D** *7/06*
U.S. Cl. 294—1.1 **13 Claims**



1. A manual push feeder device for moving a workpiece along a workpiece working machine, comprising:

base means for non-slipping engaging a workpiece to be moved along the machine, said base means including a lower pushing and engaging surface means for non-slipping engaging the workpiece such that the workpiece moves with movement of said lower surface means;

a handle having an upper end portion and a lower end portion;

flexible connecting means for flexibility coupling said lower end portion of said handle to said base means and to transmit movement forces applied to said handle to said base means;

said base means including a stud extending upwardly therefrom;

said lower end portion of said handle including a stud thereat;

said flexible connecting means having an upper hole for receiving said stud of said handle and a lower hole for receiving said stub of said base means, and having a flexible portion between ends of the studs received in said upper and lower holes;

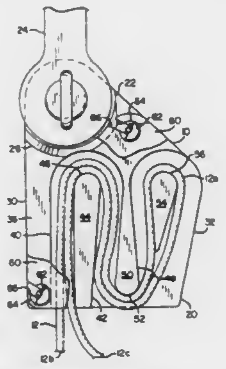
at least one of said studs and inner surface portions of said respective holes of said flexible connecting means having indentations and projections thereon for frictionally engaging the other of said studs and said inner surface portions of respective holes of said flexible connecting mans; and

grip means coupled to said upper end portion of said handle for permitting an operator to grasp said grip means and move said manual push feeder device and to correspondingly move the workpiece, when said lower surface means is engaged with a workpiece.

---

### 5,018,774
### STRAP CONNECTOR

**Donald D. Rasmussen, P.O. Box 250, Tualatin, Oreg. 97062**
**Filed Dec. 11, 1989, Ser. No. 448,310**
**Int. Cl.$^5$ F16G** *11/00*
U.S. Cl. 294—74 **4 Claims**



1. A strap connector comprising:

a body portion having upper and lower ends and also having front and rear surfaces and side edges,

attaching means on the upper end of said body portion for attachment to power lifting means,

a plurality of recess means in said front surface leading upwardly from said bottom end to a point short of the upper end and having a depth sufficient to fully receive a strap edgewise therein from said front surface,

a first and second of said recess means having a width between defining walls thereof to receive load and free portions of the strap in doubled relation,

the first and second of said recess means communicating with each other adjacent the upper end of said body portion to form a first abutment for a doubled portion of a strap reeved therefore,

the second and a third of said recess means communicating at the lower end of said body portion to form a second abutment for load and free portions of the strap reeved thereunder,

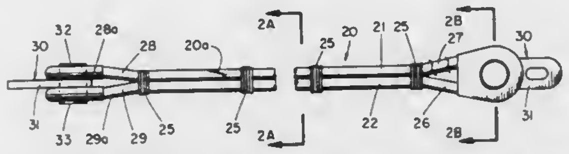
and an anchor projection in said third recess means arranged to be engaged by a doubled back end loop in the strap,

the load end of the strap being arranged to pinch the free end of the strap against one of said abutment means by a lifting force on the load end whereby to secure the strap nonslidably in the connector.

---

### 5,018,775
### ROPE ASSEMBLY

**Henry A. McKenna, 35 Hubbard Rd., Weston, Mass. 02193, and David A. Richards, 11922 Cedar Form, Stafford, Tex. 77477**
**Filed Dec. 11, 1989, Ser. No. 448,558**
**Int. Cl.$^5$ B66C** *1/12*
U.S. Cl. 294—74 **20 Claims**

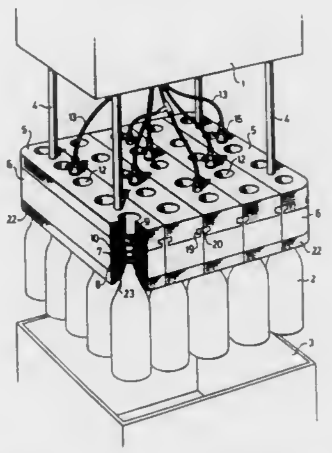


1. A rope assembly comprising a single rope which is doubled into two equal length legs restrained side-by-side and forming a looped eye at one end of said assembly, the ends of said rope at the other end of said assembly being formed into a pair of adjacent eyes which together create a clevis for connecting said rope assembly to other rope assemblies or fixtures, and a rope fitting comprising an elongated plate member from opposite sides of which project coaxially aligned cylindrical members each one of which is mutually engageable with corresponding ones of said adjacent eyes of said clevis, said plate member being provided with means spaced from said cylindrical members for attaching said rope fitting to a load carrying member, the outer ends of said cylindrical members being provided with separate and removably attached hemispherical caps so that if one of said caps is pulled onto a curved surface it will cause said fitting to roll to one side so the axis of said cylindrical members will be more nearly parallel to said curved surface.

---

### 5,018,776
### BOTTLE GRIPPING DEVICE

**Lars E. Trygg, Box 243, S-292 00 Karlshamn, Sweden**
**PCT No. PCT/SE88/00630, § 371 Date Apr. 18, 1990, § 102(e) Date Apr. 18, 1990, PCT Pub. No. WO89/04794, PCT Pub. Date Jun. 1, 1989**
**PCT Filed Nov. 18, 1988, Ser. No. 473,967**
**Claims priority, application Sweden, Nov. 19, 1987, 8704558**
**Int. Cl.$^5$ B66C** *1/46*
U.S. Cl. 294—119.3 **11 Claims**



1. A gripping device, particularly intended for bottles or like objects, comprising:

(a) a holding device (1),

(b) a mounting block (5) carried by the holding device,

(c) at least one gripping block (6) defining a plurality of through-passing cylindrical channels (7),

(d) a plurality of gripping elements individually disposed in the channels, each gripping element comprising a support sleeve (8), and a substantially cylindrical muff (9) of elastic material mounted on the sleeve, the gripping elements being inserted in the channels from an upwardly facing surface of the gripping block,

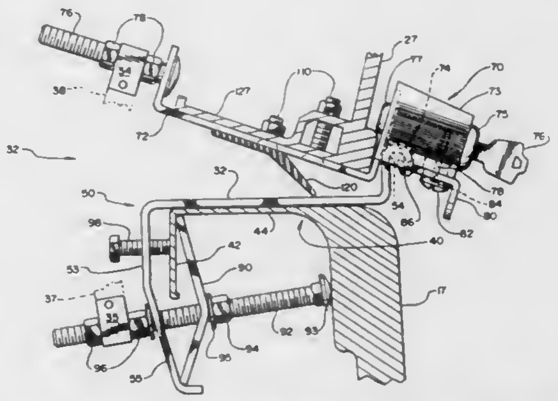
(e) air passage means (18) defined in the gripping block for supplying pressurized air to a space located between each muff and an associated support sleeve to deform each muff, and

(f) non-threaded means for readily detachably mounting the gripping block to the mounting block with said upwardly facing surface of the gripping block disposed closely proximate a downwardly facing surface of the mounting block such that the mounting block securely retains the gripping elements in their respective channels in the gripping block, and such that the gripping block is readily and easily removable from the mounting block to enable access to and replacement of worn or damaged gripping elements.

---

### 5,018,777
### HINGE AND CONNECTION ASSEMBLY FOR REMOVABLE TRUCK TOPPER

**Gleo S. Swenson, P.O. Box 22, Glenwood, Minn. 56334; Robert D. Grove, 317 Seventh Ave. SE., and Clinton E. Grove, R.R. 2, both of ELbow Lake, Minn. 56531**
**Filed Mar. 27, 1990, Ser. No. 500,089**
**Int. Cl.$^5$ B60J** *7/10*
U.S. Cl. 296—100 **11 Claims**



1. A hinge and connection assembly kit for use in combination with an open vehicle box, said box having a pair of opposed, parallel sidewalls, each with a channel rail along the interior of the upper edges of said sidewall, and a vehicle cap for covering the open vehicle box, said cap having a pair of opposed, parallel sidewalls, each with a cap base rail along its lower margin for resting on said channel rails, said bracket kit comprising:

a plurality of hinge/connection assemblies connected between the channel rails of at least one box sidewall and the adjacent base rails of the corresponding cap sidewall, each hinge/connection assembly comprising:

means for grasping the channel rail of a box sidewall;

a lower hinge plate connected to said means for grasping and having a first, downwardly concave hinge channel at its outer edge;

a corresponding upper hinge plate connected to a cap base rail above said lower hinge plate, said upper hinge plate having releasable capture means for releasably capturing said first hinge channel to form a hinge axis within the first hinge channel whereby the upper hinge plate

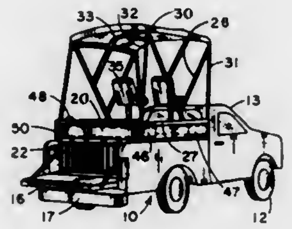
VOL
1126
ISS
4
MY
28
1991
UMI

and the cap base rail to which it is connected can rotate in an abbreviated arc about said hinge axis when said capture means is not released and the upper hinge plate can be vertically separated from the lower hinge plate when said capture means is released.

---

### 5,018,778
### PICKUP TRUCK ATTACHMENT APPARATUS

**Rowland H. Goble, P.O. Box 423, Lake Mary, Fla. 32746**
**Filed Apr. 6, 1990, Ser. No. 505,903**
**Int. Cl.$^5$ B60P *3/345***
**U.S. Cl. 296—159** **11 Claims**

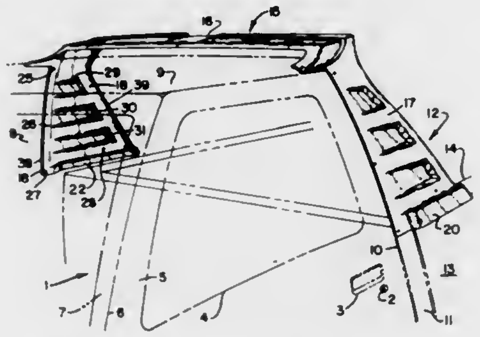


1. A pickup truck attachment comprising:
a storage compartment shaped to fit into the cargo compartment of a pickup truck, said storage compartment having a pair of sidewalls, each sidewall having a top edge and an entrance through a rear side thereof;
a platform attached over said storage compartment to provide a support surface thereover, said platform having a liquid storage tank thereon;
a pair of slide tracks attached to said platform;
a foldable tend structure having a plurality of frame members and a flexible covering, at least two of said frame members being slidably attached to said pair of slide tracks at one end of said frame members and adapted to slide therein for opening and collapsing said tent structure on top of said platform; and
at least one seat removably attached to said platform.

---

### 5,018,779
### CAB FAIRING

**David M Lund, Coon Rapids, Minn., assignor to Lund Industries, Incorporated, Minneapolis, Minn.**
**Filed Oct. 17, 1989, Ser. No. 420,655**
**Int. Cl.$^5$ B62D *35/00***
**U.S. Cl. 296—180.1** **21 Claims**

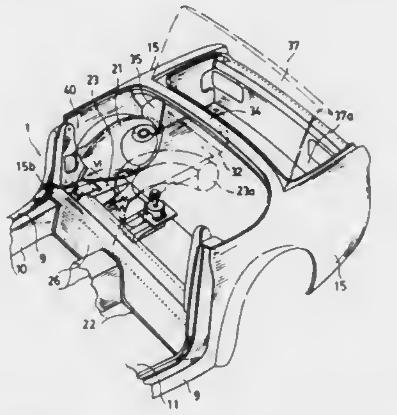


1. A fairing for use on a motor vehicle, comprising:
a) A left panel;
b) a right panel;
c) a central bar, the central bar being rigidly affixed to the left panel and the right panel, thereby forming a structure surrounding a portion of the motor vehicle; and
d) mounting means, tne mounting means being located in a forward region of the fairing, thereby preserving a relatively unobstructed region behind and beneath the fairing.

---

### 5,018,780
### VEHICLE LOWER BODY STRUCTURE

**Noboru Yoshii, and Takashi Umeda, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**
**Continuation of Ser. No. 227,462, Aug. 2, 1988, abandoned, which is a continuation of Ser. No. 913,370, Sep. 30, 1986, abandoned. This application Dec. 27, 1989, Ser. No. 456,607**
**Claims priority, application Japan, Oct. 1, 1985, 60-150453[U]; Oct. 4, 1985. 60-153057[U]; Oct. 7, 1985, 60-153572[U]; Oct. 14, 1985, 60-228499**
**Int. Cl.$^5$ B62D *23/00***
**U.S. Cl. 296—203** **18 Claims**

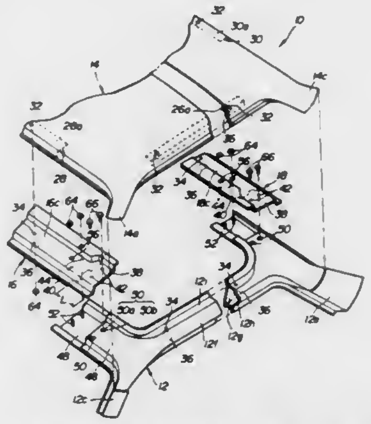


1. An elongated open-top vehicle body structure comprising a front body section having a forward end and a rear end, a rear body section having a forward end, a rear end and two opposed sides in each of which a side door opening is defined, the forward end of said rear body section being connected to the rear end of the front body section and a side door mounted on each opposed side of said rear body section to open and close the side door openings, said rear body section comprising:
(a) a floor panel horizontally extending forwardly and rearwardly between the forward end and the rear end of said rear body section and transversely between the opposed sides thereof;
(b) each said opposed side of said rear body section extending along and connected to one side of the floor panel and being composed of a vertically extending first portion constituting a side sill defining the bottom of the respective side door opening and a second portion constituting a rear body panel defining the rear edge of the side door opening and extending rearwardly of the side door opening; and
(c) a transversely extending reinforcing means of inverted U-shaped configuration extending transversely across said rear body section for reinforcing the vehicle body structure, said transversely extending reinforcing means having a lower inverted U-shaped member connected to said floor panel at its bottom and connected at its opposite ends to said vertically extending first portions of the opposed sides of said rear body section substantially flush with the tops of said side sills and rearwardly of the rear edges of the side door openings, and an upper inverted U-shaped member mounted on and extending vertically above the lower inverted U-shaped member and the side sills, the upper inverted U-shaped member overlapping and connected to the lower inverted U-shaped member and the vertically extending first portions of the opposed sides of the rear body section, and secured to the rear body panels above said side sills so that the vehicle body structure is thereby characterized by substantial torsional and sideways rigidity.

---

### 5,018,781
### ROOF STRUCTURE FOR MODULAR VEHICLE BODY AND METHOD OF BUILDING SAME

**Hideyuki Kumasaka, Yokohama; Kouji Takao, Atsugi; Hiroshi Kuriyama, Yokohama; Tarou Hagiwara, and Kenichi Miyazaki, both of Sagamihara, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**
**Continuation of Ser. No. 173,938, Mar. 28, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 438,950**
**Claims priority, application Japan, Mar. 26, 1987, 62-71997; Mar. 31, 1987, 62-78045**
**Int. Cl.$^5$ B62D *25/06***
**U.S. Cl. 296—210** **2 Claims**

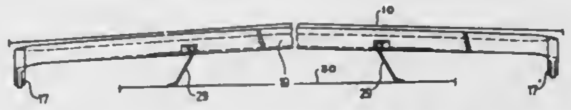


1. A roof structure for a modular vehicle body comprising:
a pair or roof side rails, each constituting part of one of two body side assemblies, respectively, and each of said rails having first bracket means at a front end and a rear end thereof and second bracket means between said front and rear ends thereof;
a roof having on the inner side thereof roof bracket means which extend inwardly from an outer periphery of said roof in such a way as to constitute a dual-wall structure together with said roof and rear bracket means extending outwardly from said periphery;
said second bracket means of said roof side rails being matched with said roof bracket means of said roof;
a front roof rail having at the laterally opposed ends thereof flange means matched with said first bracket means at the front ends of said roof side rails, said front roof rail having bracket means between said flange means thereof matched with said roof bracket means of said roof;
a rear roof rail having at the laterally opposite ends thereof flange means matched with said first bracket means at the rear ends of said roof side rails, said rear roof rail having bracket means between said flange means thereof matched with said rear bracket means of said roof;
a plurality of mechanical fasteners independent from said roof side rails, said roof and said front and rear roof rails for mechanically fastening said flange means of said front roof rail and said rear roof rail to said first bracket means of said roof side rails and for fastening said roof bracket means of said roof to said bracket means of said front roof rail and said second bracket means of said roof side rails and said rear bracket means to said bracket means of said rear roof rail;
wherein said roof bracket means comprises a front end bracket and a pair of lateral end brackets each having horizontal portions, said rear bracket means comprises a rear end bracket having a horizontal portion, and said bracket means of said front and rear roof rails and said second bracket means of said roof side rails having horizontal portions on which said horizontal portions of said front end bracket, said rear end bracket and said lateral end brackets are placed;
wherein each of said roof side rails has inner and outer panels, said first bracket means of said roof side rails comprising an outer bracket extending continuously from said outer panel of said roof side rail and an inner bracket extending continuously from said inner panel of said roof side rail, each of said front and rear roof rails having inner and outer panels, each of said flange means of said front roof rail and said rear roof rail having an outer flange and an inner flange integral with said outer and inner panels respectively of said front roof and rear roof panels and joined with said outer bracket and said inner bracket of each of said first bracket means of said roof side rails; and
wherein said outer and inner flanges of said front and rear roof rails and said outer and inner brackets of said roof side rails are designed so as to satisfy the relation of L1 and greater than L3 greater than L2 greater than L4 where L1 is the length of said outer panel of each of said front and rear rails, L2 is the length of said inner panel of each of said front and rear roof rails, L3 is the distance between said outer brackets at each of the front ends and the rear ends of said roof side rails, and L4 is the distance between said inner brackets at each of the front ends and the rear ends of said roof side rails.

---

### 5,018,782
### WIND DEFLECTOR FOR MOTOR VEHICLE ROOFS WITH A SLIDABLE COVER

**Gunnar Fiegel, and Stefan Schreiter, both of Wie Postanschrift, Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany**
**Filed Mar. 2, 1990, Ser. No. 487,282**
**Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906903**
**Int. Cl.$^5$ B60J *7/22***
**U.S. Cl. 296—217** **20 Claims**



1. Wind deflector for motor vehicle roofs of the type having a slidable cover for selectively closing and at least partially opening a roof opening in a stationary roof surface, the wind deflector comprising an elongated air conducting profile member that is disposed at a front edge of the roof opening running across the roof opening, spring means for pushing the air conducting profile member out into an operating position and actuating arms at each end of the profile member, said actuating arms being hinged to a part which is integral with the stationary roof surface, and means for swinging said actuating arms in response to movement of the cover into a closed cover position as a means for lowering the air conducting profile member into a nonoperating position; wherein the air conducting profile member, in an edge area spaced from the actuating arms, carries a stopping strip which extends over more than half of the width of the air conducting profile member and which lies against a stop on the front edge of the roof opening in the operating position of the wind deflector as a means for limiting the outward movement of the wind deflector; and wherein the spring force of said spring means is coordinated to the bending strength of an assembly consisting of the air conducting profile member and stopping strip as a means for automatically forming a lengthwise curvature in the air conducting profile member that at least approximately corresponds to a transverse curvature of the stationary roof surface by pressing the stopping strip on the stop.

VOL
1126
ISS
4
MY
28
1991
UMI

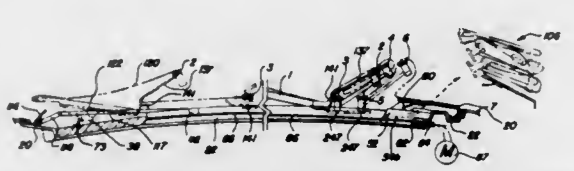
### 5,018,783
## SLIDABLE, FOLDABLE, AND REMOVABLE VEHICLE SUNROOF

**Antony W. Chamings, Mt. Clemens; Dennis W. Staley, Birmingham, and Gary Mannke, Woodhaven, all of Mich., assignors to ASC Incorporated, Southgate, Mich.**

**Filed Sep. 19, 1989, Ser. No. 409,152**

**Int. Cl.⁵ B60J** *7/06*

**U.S. Cl. 296—219** **28 Claims**



1. A slidable, foldable, removable fabric cover device for a vehicle comprising:
- (a) a fixed structure assembly including:
  1. a frame attached to the vehicle and having an aperture therein;
  2. means for driving a retractable panel assembly to aperture open and aperture closed positions, the driving means affixed to the frame;
- (b) a retractable panel assembly attachable to the fixed structure assembly and having aperture open and aperture closed positions, including:
  1. a foldable fabric sized to cover the aperture when the panel assembly is in the closed position;
  2. a front header attached to the fabric;
  3. means for gathering the fabric when the panel assembly is in the aperture open position;
  4. a rear header for releasably anchoring the fabric to the fixed roof structure assembly rearward of the front header, at least one of the front header and rear header having means for releasable attachment to the drive means; and
  5. means for removal of the retractable panel assembly from the vehicle.

---

### 5,018,784
## FLEXIBLE TOP APPARATUS OF A VEHICLE

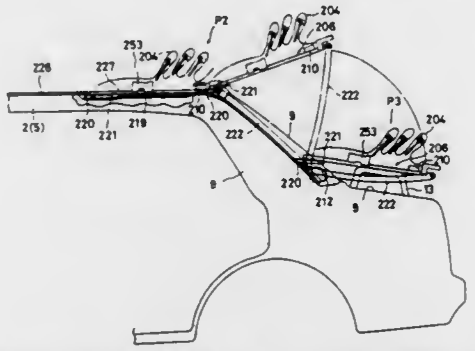
**Takahito Yokouchi; Kenji Matsumoto, and Kozo Odoi, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Shinchi, Japan**

**Filed Jul. 31, 1989, Ser. No. 386,734**

**Claims priority, application Japan, Jul. 30, 1988, 63-191605; Aug. 31, 1988, 63-115562[U]; Aug. 31, 1988, 63-218969**

**Int. Cl.⁵ B60J** *7/06*

**U.S. Cl. 296—219** **20 Claims**



1. A flexible top apparatus of a vehicle, comprising:
- a roof panel connected to a vehicle body through at least a pair of left-hand and right-hand front pillars and a pair of left-hand and right-hand rear pillars;
- a roof opening provided in the roof panel leaving a front header, a pair of left-hand and right-hand roof side rails, and a rear header and surrounded by said front header, said left-hand and right-hand roof side rails, and said rear header;
- a rear window glass panel fixed to said left-hand and right-hand rear pillars and said rear header;
- a flexible top having a size as substantially large as the roof opening in a state in which said flexible top is unfolded and expanded in a longitudinal direction of the vehicle body and being disposed to selectively take a first posture in which the roof opening is closed and a second posture in which said flexible top is contracted or folded in a longitudinal direction of the body and placed at a position in a vicinity of said rear header to open the roof opening; and
- a board member disposed underneath said flexible top located in the second posture for supporting said flexible top located in the second posture; and
- a guide means disposed between said board member and the body for movably guiding said board member and said flexible top supported by said board member between said second posture and a third posture located rearward of said second posture.

---

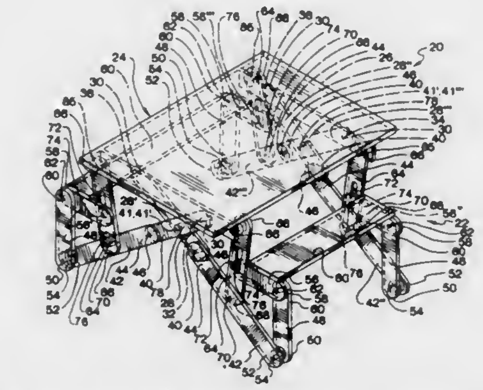
### 5,018,785
## FOLDING TABLE

**Robert J. Monson, 3432 Lyndale Ave. South, Minneapolis, Minn. 55408, and Alan L. Dzubak, 3501 Tyler St. NE., Minneapolis, Minn. 55418**

**Filed Nov. 28, 1989, Ser. No. 441,990**

**Int. Cl.⁵ A47B** *3/14*

**U.S. Cl. 297—159** **16 Claims**



1. A table and attached bench support structure foldable between an open erected position and a closed storable position comprising:
- a generally planar table top;
- a top brace pivotally attached by a first end of said top brace at each of four rectangularly positioned points of a planar surface of the top to form two pairs of top braces pivotable towards each other, each top brace having a key pin retention means intermediate first and second ends of said top brace;
- a leg brace pivotally attached by a first end of said leg brace to a second end of each top brace to form a knee pivot;
- a bench leg pivotally attached by a first end of said bench leg to a second end of each leg brace to form a base pivot;
- a bench support member pivotally attached by a first end of said bench support to a second end of each bench leg to form a bench pivot; a table leg pivotally attached by a first end of said table leg at each of four rectangularly positioned points of said planar surface of the top to form a table pivot, each table leg pivotally attached at a second end of said table leg to a leg brace at a point between the first and second end of the leg brace to form an intermediate pivot, each table leg having a slidable pivotal attachment means intermediate first and second ends of said table leg for slidable pivotal attachment of a second end of each bench support member to form a slidable pivot for longitudinal translation of the second end of the bench support member with respect to a length of the table leg intermediate the first and second ends of the table leg and for pivoting of the second end of the bench support member about a point of attachment of the second end; and
- a point of attachment of each top brace to the table top being directly opposite a second point of attachment to the table top of the corresponding table leg to which the top brace is attached through its corresponding bench support member, bench leg and leg brace.

---

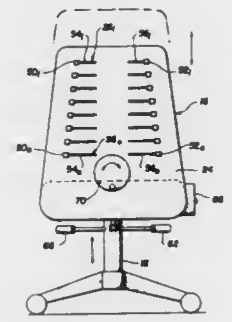
### 5,018,786
## ERGONOMIC ADJUSTABLE CHAIR AND METHOD

**Glenn A. Goldstein, 1400 E. 46th St., Brooklyn, N.Y. 11234, and Clifford M. Gross, 732 Gerald Ct., Brooklyn, N.Y. 11235**

**Continuation of Ser. No. 550,162, Nov. 9, 1983, abandoned. This application Feb. 10, 1987, Ser. No. 13,171**

**Int. Cl.⁵ A47C** *7/46*

**U.S. Cl. 297—284** **10 Claims**



1. An adjustable chair comprising:
- a base structure;
- a seat structure mounted to the base structure;
- a frame structure connected to the seat structure;
- a contour adjustment mechanism having a longitudinal and tranverse extent relative to said frame structure, said contour adjustment mechanism comprising a plurality of longitudinally spaced adjustment linkages mounted to the frame structure, the number and transverse extent of the adjustment linkages defining said longitudinal and transverse extent of said contour adjustment mechanism; and
- a flexible cover mounted to the plurality of adjustment linkages, said flexible cover providing an occupant engaging surface having a longitudinal and transverse extent substantially coextensive with the longitudinal and transverse extent of the contour adjustment mechanism, and said frame structure, plurality of adjustment linkages and flexible cover comprising a back rest, each adjustment linkage comprising:
- (i) a flexible cover engaging member which is substantially transverse coextensive with the occupant engaging surface of said flexible cover; and
- (ii) means mounted to the frame structure for adjusting the relative position of the flexible cover engaging member with respect to said frame structure, and thereby the relative position of the occupant engaging surface of said flexible cover associated therewith,

whereby the differential adjustment of the plurality of adjustment linkages adjusts the contour of the occupant engaging surface to conform to at least the spinal curvature of an occupant.

---

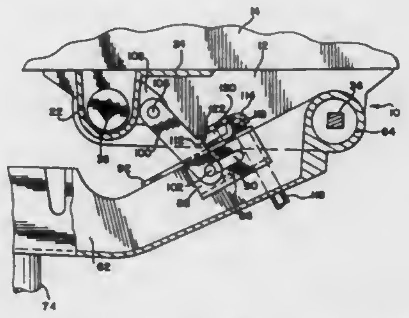
### 5,018,787
## CHAIR SEAT TILT CONTROL

**Michael H. Estkowski, St. Joseph, and Don E. Minor, Coloma, both of Mich., assignors to Shepherd Products U.S. Inc., St. Joseph, Mich.**

**Filed Jun. 20, 1990, Ser. No. 540,767**

**Int. Cl.⁵ A47C** *3/00*

**U.S. Cl. 297—302** **6 Claims**



1. A support mechanism for a tiltable chair including a seat support assembly adapted to be mounted to the underside of a chair seat, said support assembly having a front end and a rear end and including a pair of side plates; a tube having a central axis supported between and towards the front ends of said side plates such that said tube is relatively rotatable within said side plates; a base member having a rear end which is adapted to be supported by a chair post and a front end which is rigidly secured about said tube; a rear tilt torque mechanism associated with said seat support assembly operative to resist rear tilt of said seat support assembly about said tube; a rear tilt torque adjustment means connected to said rear tilt torque mechanism to selectively vary the resistance to rear tilt; at least one compression spring disposed between said seat support assembly and said base member operative to provide added resistance to rear tilt of said seat support assembly about said tube; a connecting link having one end pivotally connected to said support assembly and another end slidably connected to said base member, said connecting link adapted to limit rotation of said support assembly about said tube within predetermined limits; a release mechanism associated with said connecting link operative to lock said link in a first position such that rear tilt of said support assembly is prohibited and to selectively release said link to assume a second position such that rear tilt of said support assembly about said tube is permitted within predetermined limits.

---

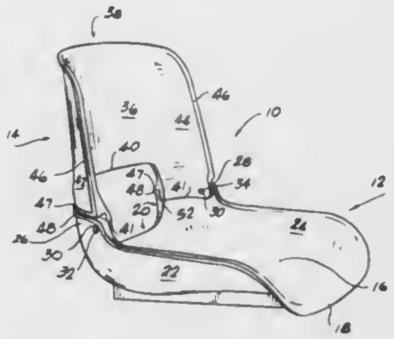
### 5,018,788
## FOLDABLE SEAT

**Steven D. Cedergreen, Seattle, Wash., assignor to Tempress Incorporated, Seattle, Wash.**

**Filed Dec. 8, 1989, Ser. No. 448,000**

**Int. Cl.⁵ B60N** *2/02*

**U.S. Cl. 297—378** **6 Claims**



1. A seat comprising a seat member having a front edge, an

VOL
1126
ISS
4
MY
28
1991
UMI

uppermost rear edge, a lower rear edge, and a back member, said back member hingedly attached to said seat member and displaceable between a horizontal folded and a vertical unfolded position, said seat member including a vertical back having a forward facing surface including a frontward extending shoulder positioned intermediate the uppermost rear edge and said lower rear edge, said shoulder having an upper, substantially horizontal surface bearing against the bottom of said back member when said back member is in said vertical position.

---

**5,018,789**

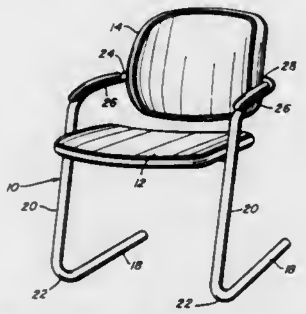
### MOUNTING ASSEMBLY FOR BACK OF TUBULAR FRAME SEATING

**Amuel E. Sheckells, Senatobia, Miss., assignor to Chromcraft Furniture Corporation, Senatobia, Miss.**

**Filed Jun. 12, 1990, Ser. No. 538,215**

**Int. Cl.$^5$ A47C *7/42***

**U.S. Cl. 297—444** **12 Claims**



1. In seating having a tubular frame and a back secured to the frame, an improved mounting assembly for securing the back to the frame comprising
   a back having a non metallic core made of wood, plastic, pressed paper or the like, said back having front and rear surfaces,
   a pair of similarly shaped metal straps in substantial alignment with one another and attached to opposite surfaces of the core to form a sandwich of the core,
   a plurality of fasteners each extending through both the metal straps and the core to bind the straps in place on the core,
   a metal back bracket secured to the strap on the rear surface of the back,
   and means permanently securing the back bracket to the tubular frame of the chair to hold the back in place on the frame.

---

**5,018,790**

### CUSTOMIZED SEAT CUSHION

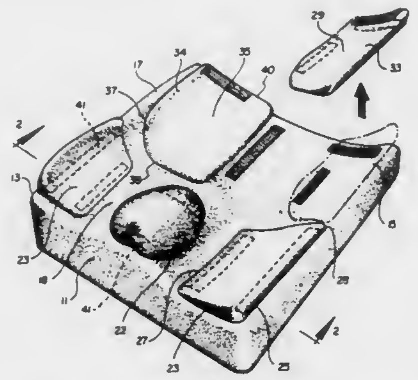
**Eric C. Jay, Boulder, Colo., assignor to Jay Medical, Ltd., Boulder, Colo.**

**Continuation of Ser. No. 221,639, Jul. 20, 1988, abandoned. This application Mar. 12, 1990, Ser. No. 491,554**

**Int. Cl.$^5$ A47C *7/14***

**U.S. Cl. 297—458** **28 Claims**

1. A seat cushion for supporting a human body and customizable assisting in the correction of posture and the prevention of development of posture deformities over time, while reducing the buildup of pressure over the bony prominences of the body, said seat cushion comprising:
   a tray having a depressed area situated beneath a user's ischial tuberosities, said tray having a plurality of rims, each of said plurality of rims sloping downwardly from an outer edge of the cushion toward said depressed area, said plurality of rims including a front rim having a central rise;
   a discrete anatomically shaped support, removably secured to said front rim, said support being of a generally rigid material and wherein attachment of said support to said front rim presents a substantially concave posture correcting surface toward the center of said front rim, said substantially concave surface being a part of said posture correcting surface; and



   a pad juxtaposed over said tray and said supports, said pad comprising a flexible envelope containing a fluid material.

---

**5,018,791**

### SEATING FURNITURE

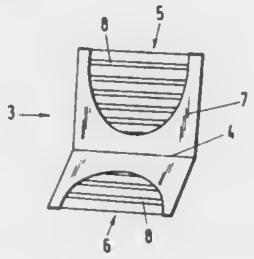
**Otto Zapf, Herzog-Adolph-Str. 5, D-6240 Konigstein, Fed. Rep. of Germany**

**Filed Aug. 3, 1989, Ser. No. 389,225**

**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1988, 3826290**

**Int. Cl.$^5$ A47C *7/02***

**U.S. Cl. 297—460** **5 Claims**



1. Seating furniture having a back rest which is pivotable approximately at the height of an armrest around a substantially horizontal axis, comprising a back rest which is bent in the area of the pivoting axis forming an upper part and in said back rest above and below said pivoting axis respectively, the upper and lower part of the back rest being inclined to each other, and that the middle upper area of said upper part of the back rest and the middle lower area of said lower part of the back rest have a greater flexibility than the other areas of the back rest.

---

**5,018,792**

### IMPACT RIPPER APPARATUS WITH LINEAR RECIPROCATING RAM

**Michael A. Roussin, Peoria, and Charles M. Crowell, Jr., Trivoli, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

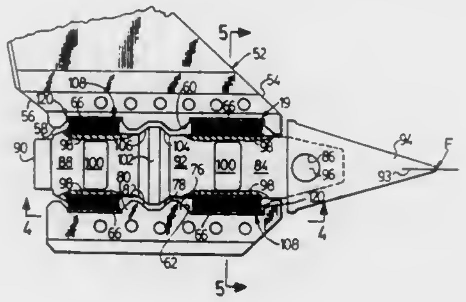
**Filed May 25, 1990, Ser. No. 528,401**

**Int. Cl.$^5$ B25D *17/00;* E02F *3/32***

**U.S. Cl. 299—37** **11 Claims**

1. An impact ripper apparatus, comprising:
   a mounting frame;
   a tool holder having a first end portion attached to the mounting frame and a second end portion projecting downwardly from the mounting frame, the second end portion having a cavity therethrough;

   a linear ram movably supported within the cavity and having a longitudinal axis;
   a plurality of resilient laminated pads having alternating layers of elastomeric sheets and noncompressable plates resiliently positioning the linear ram within the cavity relative to the tool holder, the plurality of pads being spaced around the linear ram; and



   an impact hammer attached to the mounting frame and being arranged to deliver impact blows to the linear ram moving the linear ram which deforms the alternating layers of elastomeric sheets to allow delivery of impact blows to the material to be fractured.

---

**5,018,793**

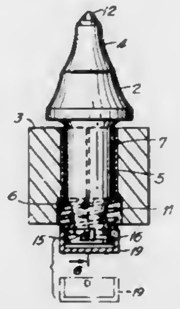
### ROTATIONALLY AND AXIALLY MOVABLE BIT

**Leroy E. Den Besten, Rd. #2, Castleton, N.Y. 12033-9648**

**Continuation of Ser. No. 273,049, Nov. 18, 1988, abandoned. This application Feb. 13, 1990, Ser. No. 480,365**

**Int. Cl.$^5$ E21C *25/46, 35/18***

**U.S. Cl. 299—86** **14 Claims**



4. A cutting bit for mounting a block comprising a generally conically shaped nose portion and a shank, a coil spring engaging said shank, a sleeve surrounding said shank for retaining the bit in the block wherein said coil spring dampens axial forces to which said cutting bit is subjected during cutting operations and which cause said bit to be expelled from the block.

---

**5,018,794**

### RALLYE WHEEL HUBCAP RETAINING DEVICE

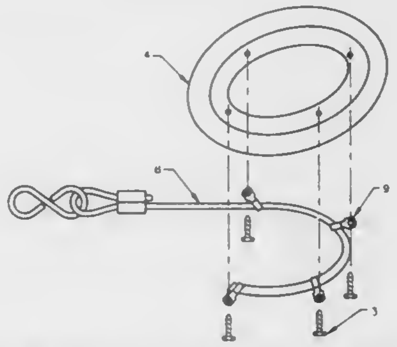
**Glenn W. Oliver, 1 Summit Hill Ct. C-4, Catonsville, Md. 21228, assignor to Glenn W. Oliver, Catonsville, Md.**

**Continuation-in-part of Ser. No. 312,928, Mar. 14, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 512,521**

**Int. Cl.$^5$ B60B *7/16***

**U.S. Cl. 301—37 AT** **6 Claims**

1. A wheel cover retaining device comprising:
   an elongated tether means having two ends;
   a first fastening means at a first end of said tether means for fastening said device to a vehicle wheel; a plurality of second fastening means adjacent a second end of said tether means and arranged in a spaced relationship along said tether means to coincide with existing fastening means on said wheel cover;



   whereby said tether means is adapted to be secured to said wheel cover by said existing fastening means.

---

**5,018,795**

### VEHICLE WHEEL MADE OF COMPOSITE MATERIAL

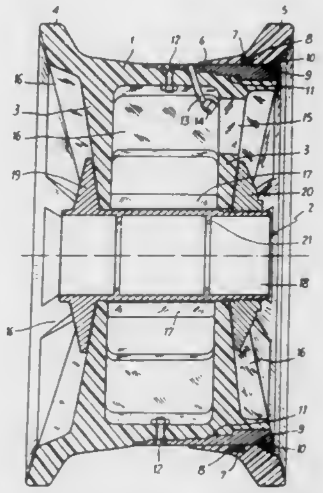
**Jean-Luc Engerand, Sceaux, and Jean-Pierre Mattei, La Varenne, both of France, assignors to Messier-Hispano-Bugatti, Montrouge and R. Alkan & Cie, Valenton, both of, France**

**Filed Jan. 24, 1990, Ser. No. 469,247**

**Claims priority, application France, Jan. 30, 1989, 89 01112**

**Int. Cl.$^5$ B60B *5/02, 25/04***

**U.S. Cl. 301—63 PW** **5 Claims**



1. A vehicle wheel comprising a rim associated with a hub by at least one side wall and on which removable beading is mounted in sealed manner and fixed to the rim on a side thereof by means of a keeper, wherein the rim and the side wall are made of composite material, and the rim comprises, on its periphery on the side where the removable beading is mounted, a metal mounting belt which is fixed to the rim, said metal mounting belt being provided with a positioning groove for said keeper.

---

**5,018,796**

### HYDRAULIC PRESSURE CONTROL VALVE

**Takashi Ishimaki, West Bloomfield, Mich., and Toshio Simura, Yamanashi, Japan, assignors to Tokico Ltd., Kanagawa, Japan**

**Filed May 11, 1990, Ser. No. 522,123**

**Claims priority, application Japan, May 16, 1989, 1-55940[U]**

**Int. Cl.$^5$ B60T *8/26***

**U.S. Cl. 303—9.75** **6 Claims**

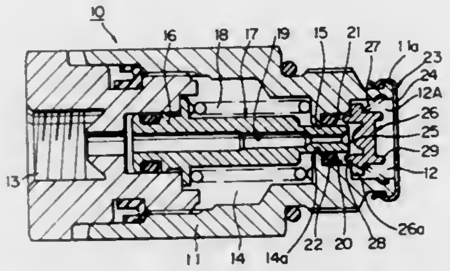
1. A hydraulic pressure control valve comprising:
   a body that having a bore extending therethrough defining

VOL
1126
ISS
4
MY
28
1991
UMI

an inlet port and an outlet portion at opposite ends of said body, respectively, and a valve chamber adjacent said inlet port, said inlet port communicating with a master cylinder, said outlet port communicating with a brake cylinder, said body being connected to said master cylinder via a connecting portion that is provided on the outer periphery of said body at a location radially outward from said inlet port;

a piston axially slidably disposed within said bore, said piston having a small-diameter portion which is disposed at the side of said body on which said inlet port is defined and having a distal end facing toward said inlet port, said small-diameter portion being spaced from an internal surface of said body defining said bore such that an annular groove is defined between said small-diameter portion and said internal surface, a large-diameter portion which is disposed at the side of said body on which said outlet portion is defined, and a communicating bore open at said distal end and which communicating bore places said inlet and outlet ports in communication;

biasing means for constantly biasing said piston toward said outlet port;



a sealing member disposed in said annular groove defined between said small-diameter portion and the internal surface of said body defining said bore;

a valve member disposed within said valve chamber defined adjacent said inlet port;

biasing means for biasing said valve member to a predetermined position, said valve member coming into and out of contact with the distal end of said small-diameter portion of said piston in response to axial sliding movement of said piston to close and open said communicating bore; and

a cap secured to the outer periphery of said body at said inlet port, said cap having a through-bore extending therethrough;

said valve member having a first projection which extends into said annular groove when said valve member is at said predetermined position, and at least one of said valve member and said cap having a second projection through which said valve member can abut said cap when said valve member moves toward said cap, the dimensions of said first and second projections being such that a distal end of said first projection is positioned so as to prevent said sealing member from coming out of said annular groove even when said valve member abuts said cap.

---

## 5,018,797
## FLUID PRESSURE CONTROLLER

**Koji Takata, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

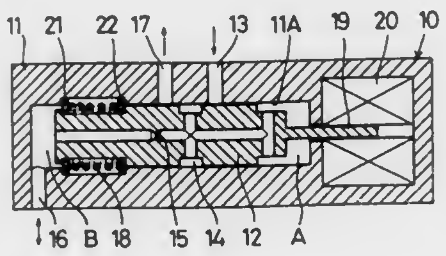
**Filed Nov. 14, 1989, Ser. No. 435,836**

**Claims priority, application Japan, Nov. 14, 1988, 63-288085; May 19, 1989, 1-127545; Jun. 16, 1989, 1-154869**

**Int. Cl.⁵ B60T** *8/36*

U.S. Cl. 303—117 **12 Claims**

1. A fluid pressure controller comprising a housing formed with a bore and an input port, a discharge port and an output port, a spool axially slidably mounted in said bore of the housing, a first chamber and a second chamber defined by the inner peripheral surface of said bore and both end faces of said spool, said spool being formed with an internal passage connecting said first and second chambers together and having its intermediate portion throttled to form a fixed-size orifice and with a peripheral channel disposed on the surface of said spool and communicating with said internal passage at a point between said first chamber and said fixed-size orifice, a spring for holding said spool in its initial position, and an electricity/power converter for imparting to said spool an axial driving force corresponding to the amplitude of an electric signal, said output port communicating with said second chamber, said spool being movable among a first position where said peripheral channel communicates with said input port, a second position where said peripheral channel communicates with neither said input port nor said discharge port and a third position where said peripheral channel communicates with said discharge port, so that when said output port is brought into communication with either said input port or said discharge port through said peripheral channel, hydraulic fluid will flow through said fixed-size orifice, thereby creating a pressure difference at both ends of said fixed-size orifice, a force acting on said spool by said pressure difference being equal to the driving force of said converter minus the biasing force of said spring.



---

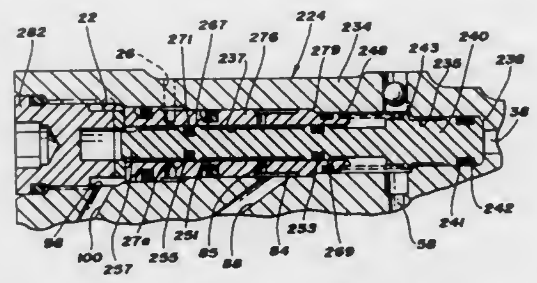
## 5,018,798
## ISOLATION VALVE

**Donald L. Parker, Middletown, and Donald M. Flory, Arcanum, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 1, 1989, Ser. No. 360,844**

**Int. Cl.⁵ B60T** *8/46*

U.S. Cl. 303—117 **4 Claims**



1. A closed center isolation valve for an anti-lock braking system (ABS) system modulator, said system including a master cylinder, a wheel cylinder, a solenoid valve controlled pressure releasable to a sump, a pump pressure, and a modulator pressure, said valve in combination comprising:

a frame with a central bore with fluid connections with said master cylinder, wheel cylinder, solenoid valve controlled pressure, pump pressure and said modulated pressure, said frame central bore having a first stop;

a spool slidably mounted in said central bore spring biased to first position against said stop;

a first seal means cooperating with said spool separating said pump pressure connection from said solenoid controlled pressure connection;

a second seal means cooperating with said spool separating said solenoid pressure connection from said modulated pressure connection;

a third seal means cooperating with said spool separating said modulated pressure connection whereby in a first spool position said third seal means seals said modulated pressure connection from said wheel cylinder connection allowing free flow from said master cylinder connection to said wheel cylinder connection and said third seal means when said spool is in an ABS mode seals and said modulated pressure connection from said master cylinder connection allowing free flow from said modulated pressure connection to said wheel cylinder connection and whereby said wheel cylinder connection is always separated from said modulated pressure connection by said third seal means.

---

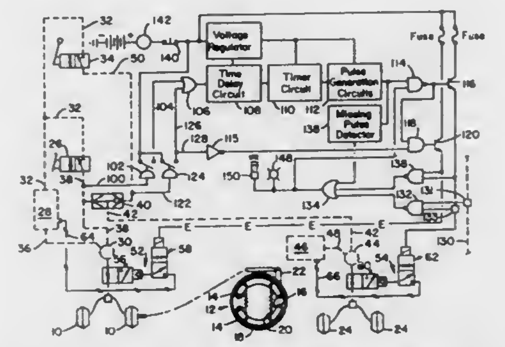
## 5,018,799
## ANTI-LOCK AIR BRAKE SYSTEM FOR WHEELED VEHICLES

**Jack Rutledge, Jr., Jonesborough, Tenn., assignor to John P. Squibb; W. B. Spratlin and James Widener, all of Johnson City, Tenn.**

**Filed Mar. 19, 1990, Ser. No. 495,650**

**Int. Cl.⁵ B60T** *8/36, 8/38, 13/68*

U.S. Cl. 303—118 **17 Claims**



1. An anti-lock system for air brakes connected to each wheel of a wheeled vehicle and being movable into frictional engagement with said wheels to retard their rotation, said air brakes being connected to operable means for moving said air brakes into said frictional engagement and having retracting means for moving said air brakes away from said frictional engagement, said operable means including: (a) air supply means for supplying an air flow; (b) air-actuated diaphragm means operably connected to said air brakes to move said air brakes into said frictional engagement when actuated by said air flow; (c) relay valve means movable between open and closed conditions, and when in said open condition being fluidically connected to said air supply means for receiving therefrom for distribution of said air flow thereof to and for actuation of said air-actuated diaphragm means; and (d) operator-actuated valve means fluidically connected to and between said air supply means and said relay valve means and actuatable by an opertor for fluidically connecting said air supply means to said relay valve means and thereby move said relay valve means from said closed condition to said open condition; said anti-lock system comprising:

means interposed between said relay valve means and said air-actuated diaphragm means and being actuatable alternately in a pulsing sequence:

(a) for blocking said air flow from said relay valve means to said air-actuated diaphragm means and for venting the release of air from said air-actuated diaphragm means, thereby enabling said retracting means to move said air brakes away from said frictional engagement, and

(b) for re-establishing air flow from said relay valve means to said air-actuated diaphragm means and for blocking said release of air from said air-actuated diaphragm means, thereby enabling said air-actuated diaphragm means again to move said air brakes into said frictional engagement;

said interposed means including pulse-generating circuit means for providing said pulsing sequence and electrical timed delay means actuatable by said operator-actuated valve means being actuated by said operator to delay the beginning of said pulsing sequence for a length of time sufficient to enable said air brakes to be fully moved into said frictional engagement and thereafter to actuate said pulse-generating circuit means.

---

## 5,018,800
## ASHTRAY FOR VEHICLES

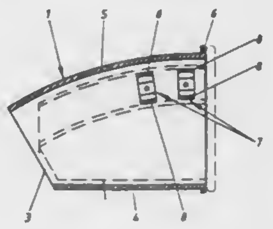
**Kurt Cziptschirsch; Volker Dabringhaus, and Peter Wegel, all of Wuppertal, Fed. Rep. of Germany, assignors to Gebr. Happich GmbH, Fed. Rep. of Germany**

**Filed May 25, 1989, Ser. No. 357,425**

**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1988, 3826180**

**Int. Cl.⁵ A47B** *88/04*

U.S. Cl. 312—344.1 **17 Claims**



1. A container, comprising:

a housing having an open side and inwardly facing sidewalls;

a drawer-like insert which is slidably movable along a path of movement into and out of the housing, the insert having outwardly facing sidewalls, each of the sidewalls of the insert having an elongated guide groove formed therein, each of the guide grooves extending along the path of movement; and

guide members for guiding the drawer-like insert along the path of movement, the guide members being fastened to the sidewalls of the housing;

each guide member being formed of a resilient plate and opposite arms, the plate being parallel to a corresponding one of the sidewalls of the housing and having opposite sides which are spaced apart from each other in a direction which is transverse to the path of movement, each of the arms comprising a resilient spring arm portion and a guide projection, each of the spring arm portions adjoining one of the sides of the plate, each of the guide projections projecting inwardly toward the drawer-like insert and being received within a corresponding one of the grooves;

wherein the plate is centrally located between the spring arm portions;

wherein the plate includes an outwardly projecting resting surface which is spaced outwardly from the spring arm portions and which rests against the corresponding sidewall of the housing;

wherein the spring arm portions face laterally away from each other, are thinner than the central plate, are spaced inwardly from the corresponding sidewall of the housing, and are parallel to the outwardly projecting resting surface of the plate;

wherein the guide projections extend inwardly from the spring arm portions, the projections and the spring arm portions forming bends;

wherein the spring arm portions are bent at the sides of the central plate so as to form outwardly directed fillets be-

VOL
1126
ISS
4
MY
28
1991
UMI

tween the spring arm portions and the sides of the central plate; and

wherein the guide projections and the spring arm portions are integrally formed with the central plate, the arms being resiliently connected to the plate, whereby the guide projections are resiliently movable relative to each other in directions generally paralleling the direction of extension of the plate and perpendicular thereto, such that the guide projections engage the corresponding guide groove with initial tension both in the direction of the path of movement of the insert and transverse thereto.

---

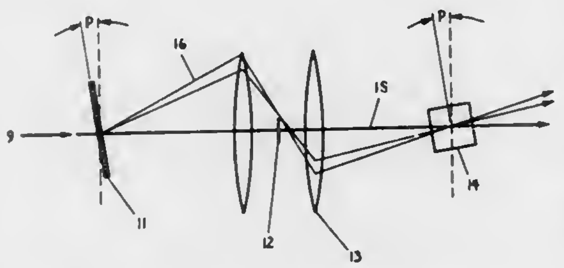
### 5,018,801
### ACHROMATIC VOLUME HOLOGRAPHY APPARATUS

**Mark Cronin-Golomb, Reading, and Robert A. Gonsalves, Woburn, both of Mass., assignors to Tufts University, Medford, Mass.**

**Filed Jun. 1, 1990, Ser. No. 531,623**

**Int. Cl.$^5$ G03H** *1/04;* **G02F** *1/03;* **G02B** *5/18*

**U.S. Cl. 350—3.61** **10 Claims**



1. Apparatus for providing an achromatic volume hologram comprising:

a diffraction grating inclined at a predetermined angle from a horizontal plane and arranged for receiving an optical image;

filter means optically coupled with said diffraction grating, said optical image transferring through said filter means;

holograph recording means inclined at said predetermined angle receiving said optical image and providing a holographic representation thereof; and

telescope means intermediate said filter means and said holograph recording means transmitting said optical image to said holograph recording means.

---

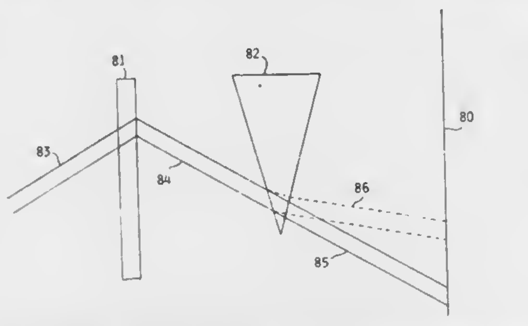
### 5,018,803
### THREE-DIMENSIONAL VOLUMETRIC SENSOR

**Joel Hecker, Port Jefferson Station; Howard Stern, Greenlawn, both of N.Y., and Tom Heydenburg, Upper Saddle River, N.J., assignors to Robotic Vision Systems, Inc., Hauppauge, N.Y.**

**Division of Ser. No. 697,796, Feb. 4, 1985, Pat. No. 4,830,443. This application Nov. 22, 1988, Ser. No. 274,860**

**Int. Cl.$^5$ G02B** *26/10, 5/04;* **G01B** *11/24*

**U.S. Cl. 350—3.71** **6 Claims**



1. An arrangement for use in developing information for three-dimensional measurement and inspection of an object surface comprising:

means for projecting a spot of narrow spectral band of light onto an object surface and having a projection axis along which said spot of light is projected;

means for sensing an image formed by incidence of said spot of projected light on said object surface, said sensing means including: an array of sensing elements, and optical imaging means for conveying said image to said array of sensing elements;

and deflector means in the path of said projection axis for deflecting part of said projection axis between said deflector means and said object to cause said spot to move to a number of positions on said object surface, said deflecting means comprising: movable means having segments of two-dimensional holographic gratings for deflecting said part of said projection axis by a predetermined first angle in one direction and by a predetermined second angle substantially orthogonal to said first angle and proportional to the amount of movement of said movable means, each said segments deflecting said part of said projection axis by a different first angle; and means for moving said movable means.

---

### 5,018,804
### LASER PICK-UP

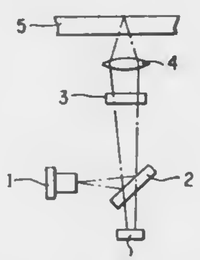
**Seung T. Jung, Kwachun; Soo H. Park, Suwon, and Chun K. Kim, Yongin-Gun, all of Rep. of Korea, assignors to Samsung Electronic Co., Ltd., Suwon, Rep. of Korea**

**Filed Dec. 29, 1989, Ser. No. 459,296**

**Claims priority, application Rep. of Korea, Dec. 31, 1988, 88-22370**

**Int. Cl.$^5$ G02B** *26/10*

**U.S. Cl. 350—3.71** **4 Claims**



1. A laser pick-up device, for an optical disk comprising:

a laser diode for generating a beam of laser light;

a reflection-type diffraction grating that divides and reflects the light from the laser diode;

a lens for focusing the light and collecting light from the optical disk;

a holographic optical element that functions as a toric lens and as a diffracting device for the reflected light; and

a six-division optical detector positioned behind the holographic optical element to receive the reflected light.

---

### 5,018,805
### LASER PRINTER

**David Kessler, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 16, 1989, Ser. No. 422,382**

**Int. Cl.$^5$ G02B** *26/08, 27/14;* **G01D** *15/14*

**U.S. Cl. 350—6.5** **14 Claims**

1. A laser printer comprising:

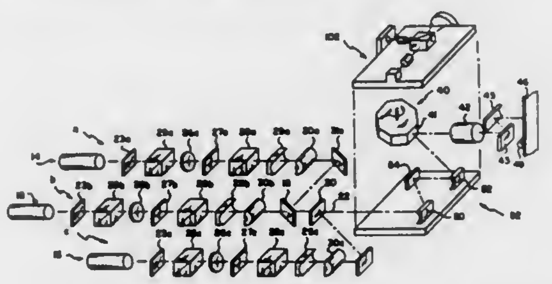
a plurality of optical heads, each of said optical heads including a laser which is adapted to emit a light beam at a wavelength different from the other lasers, at least some of said lasers being diode lasers;

means for modulating the light beam from each of said lasers in accordance with an information signal;

means for focussing said beams in a cross-scan direction at a registration plane;

means for receiving said beams from said focussing means and for combining said beams to form a combined beam of light which passes through said registration plane;

means for relaying said combined beam from said registration plane to a scanning means, said relaying means including means for focussing said combined beam in a cross-scan direction on said scanning means;



means for scanning said combined beam onto a receiving medium;

means for effecting relative movement between said receiving medium and said scanning means in a cross-scan direction; and

means for controlling said modulating means, said scanning means, and said means for effecting relative movement in timed relation to each other.

---

### 5,018,806
### IMAGE FORMING APPARATUS

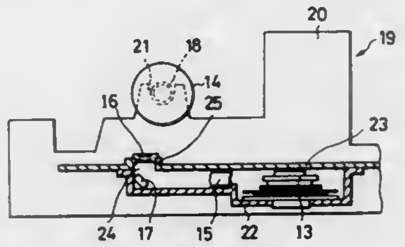
**Tomohiro Nakajima, Matsudo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Jan. 25, 1990, Ser. No. 470,233**

**Claims priority, application Japan, Feb. 9, 1989, 1-30523**

**Int. Cl.$^5$ G02B** *26/10;* **G03G** *5/00*

**U.S. Cl. 350—6.7** **5 Claims**



1. An image forming apparatus comprising:

an optical scanner including a deflector having mirror faces for deflecting a light from a light source, and an elongated cylindrical lens for correcting a shift in optical path caused by the inclination of each of the mirror faces of the deflector;

a photosensitive drum for performing a scanning operation thereon with respect to the light transmitted from the deflector through the cylindrical lens; and

a supporting means for supporting integrally all of the deflector, the cylindrical lens and the photosensitive drum, and for positioning all of the deflectors, the cylindrical lens and the photosensitive drum relative to each other.

---

### 5,018,807
### LENS SYSTEM FOR OPTICAL BEAM SCANNER

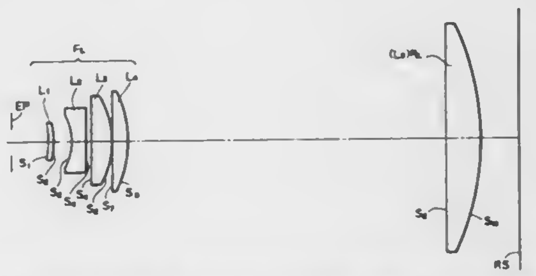
**Hiroyuki Shirota, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan**

**Filed Dec. 18, 1989, Ser. No. 452,236**

**Claims priority, application Japan, Dec. 16, 1988, 63-319124**

**Int. Cl.$^5$ G02B** *26/08, 9/60, 9/34*

**U.S. Cl. 350—6.8** **3 Claims**



1. A lens system for an optical beam scanner which scans a plurality of optical beams on a recording surface, said lens system comprising:

(a) a first lens group having an entrance pupil, said first lens group including:

(a−1) a first lens in the form of a meniscus having a positive power, said first lens having a concave surface which is directed to said entrance pupil;

(a−2) a second lens having a negative power;

(a−3) a third lens in the form of a meniscus having a positive power; and

(a−4) a fourth lens having a positive power; and

(b) a second lens group including a fifth lens having a positive power;

wherein said first through fifth lenses are successively disposed in order from said entrance pupil side; and

wherein said lens system satisfies the following relationships:

$$0.6<(r_2/r_3)\leqq 2.1$$

$$-0.43<(f_2/f)<-0.21$$

$$1.3<(f_5/f)\leqq 2.6$$

where $r_2$ is a radius of curvature of a surface of said first lens, which is directed to said recording surface; $r_3$ is a radius of curvature of a surface of said second lens, which is directed to said entrance pupil; $f_2$ is a focal length of said second lens; $f_5$ is a focal length of said fifth lens; and f is a focal length of the lens system.

---

### 5,018,808
### METHOD AND APPARATUS FOR BEAM DISPLACEMENT IN A LIGHT BEAM SCANNER

**Mark M. Meyers, Hamlin; James K. Lee, Brighton; Badhri Narayan, Rochester, and James E. Roddy, Greece, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 26, 1969, Ser. No. 457,128**

**Int. Cl.$^5$ G02B** *26.08;* **H01J** *5/16*

**U.S. Cl. 350—6.91** **25 Claims**

1. A method for beam scanning of a scan receiving member, comprising the steps of:

directing a light beam upon means operable by selective orientation for displacing the beam;

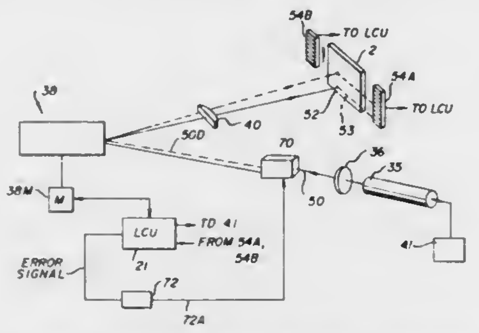
deflecting the light beam so as to effect repeated line scanning of the scan receiving member;

providing spacing between sequential scan lines, the spacing being subject to error;

determining the scan line spacing error; and

VOL
1126
ISS
4
MY
28
1991
UMI

selectably orienting the beam displacement means in accordance with the determination of the scan line spacing

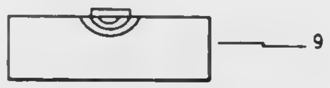


error so as to displace the light beam to compensate for such error.

---

### 5,018,809
### FABRICATION METHOD AND STRUCTURE OF OPTICAL WAVEGUIDES

**Sang Y. Shin, and Yung S. Son, both of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea**
**Filed Jul. 24, 1990, Ser. No. 557,619**
**Claims priority, application Rep. of Korea, Aug. 10, 1989, 1989-11376**
**Int. Cl.$^5$ G02B *6/10***
**U.S. Cl. 350—96.12** **16 Claims**



1. An optical waveguide of proton diffusion type comprising a substrate having an optical waveguide pattern thereon; and
a self-aligned dielectric cladding formed on said waveguide pattern;
wherein said dielectric cladding serves as a mask for inhibiting the outdiffusion of protons and promoting the indiffusion of said protons when said waveguide pattern is proton-diffused.

---

### 5,018,810
### METHOD FOR PRODUCING A SECOND HARMONIC WAVE GENERATING DEVICE

**Ryo Enomoto, and Masaya Yamada, both of Gifu, Japan, assignors to Ibiden Co., Ltd., Ogaki, Japan**
**Division of Ser. No. 452,410, Dec. 19, 1989, Pat. No. 4,973,118. This application Aug. 9, 1990, Ser. No. 564,562**
**Int. Cl.$^5$ G02F *1/37***
**U.S. Cl. 350—96.12** **1 Claim**

1. A method for producing a second harmonic wave generating device comprising forming a thin film on a substrate and ion beam etching said thin film to form a thin film waveguide layer, characterized in that a fundamental wavelength (λμm), a thickness (Tμm) of said thin film waveguide layer, an ordinary refractive index ($n_{OS1}$) of said substrate at said fundamental wavelength (λμm), an ordinary refractive index ($n_{OF1}$) of said thin film waveguide layer at said fundamental wavelength (λμm), an extraordinary refractive index ($n_{eS2}$) of said substrate at a second harmonic wavelength (λμm/2), and an extraordinary refractive index ($n_{eF2}$) of said thin film waveguide layer at said second harmonic wavelength (λμm/2) are represented by an equation,

$$\text{when } \frac{(n_{0F1} - n_{0S1})}{(n_{eF2} - n_{eS2})} > 2 \tag{A}$$

-continued

$$0.02 \leqq \frac{(\lambda + 0.1)\, N_1}{\lambda^3 T} \leqq 6.0$$

or,

$$\text{when } \frac{(n_{0F1} - n_{0S1})}{(n_{eF2} - n_{eS2})} \leqq 2 \tag{B}$$

$$0.05 \leqq \frac{(\lambda + 0.1)\, N_2}{\lambda^3 T} \leqq 5.0$$

wherein, $N_1$ in Equation (A) is

$$N_1 = \frac{(n_{eF2} - n_{eS2})}{(n_{0F1} - n_{eS2})}$$

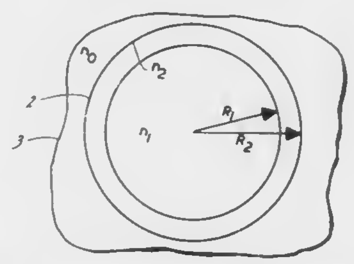
and $N_2$ in Equation (B) is

$$N_2 = \frac{(n_{eF2} - n_{eS2})}{(n_{0F1} - n_{eS1})}.$$

---

### 5,018,811
### ASYMMETRIC OPTICAL WAVEGUIDES FOR MINIMIZING BENDING LOSSES AND TECHNIQUES FOR FABRICATING SAME

**John R. Haavisto, Scituate, and Edward P. Ayers, Hingham, both of Mass., assignors to Northrop Corporation, Hawthorne, Calif.**
**Filed Jul. 18, 1990, Ser. No. 555,202**
**Int. Cl.$^5$ G02B *6/10;* H01L *21/70***
**U.S. Cl. 350—96.12** **16 Claims**

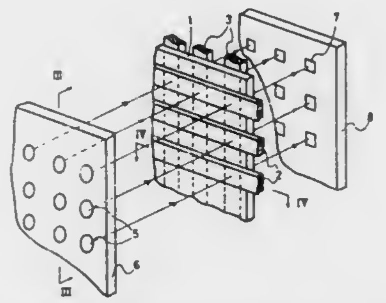


1. A curved optical waveguide formed within a substrate and exhibiting a minimal bending energy loss for a guided mode, the waveguide being characterized as having a varying index of refraction profile across a width of the waveguide and having a greatest index of refraction along a first curved edge that bounds a first region of the substrate, the index of refraction along the first curved edge exceeding an index of refraction of the first region of the substrate bounded thereby, further having a least index of refraction along a second curved edge that bounds the waveguide and the first substrate region, the index of refraction along the second curved edge exceeding an index of refraction of a second region of the substrate adjacent to the waveguide and extending away from the second curved edge, the index of refraction of the first substrate region exceeding the index of refraction of the second substrate region, the difference between the index of refraction of the waveguide at the second curved edge and the index of refraction of the adjacent second substrate region exceeding the difference between the index of refraction of the waveguide at the first curved edge and the index of refraction of the bounded first substrate region.

---

### 5,018,812
### OPTICAL SWITCHING DEVICE

**Yoshimasa Fukuda, Saitama, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.**
**Continuation of Ser. No. 196,915, May 20, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 430,099**
**Claims priority, application Japan, May 20, 1987, 62-122736**
**Int. Cl.$^5$ G02B *6/10***
**U.S. Cl. 350—96.14** **17 Claims**

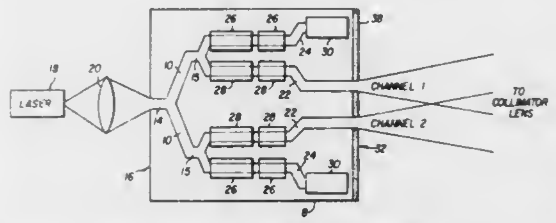


1. An optical switching device comprising:
a thin solid membrane film of organic material having a functional organic chemical group incorporated therein to impart electro-negativity to the thin film of a degree sufficient to vary the optical transmission and cut-off of infrared light of a predetermined wavelength incident on said thin film in dependence upon the application of an electrical potential to the thin film;
said thin film optically transmitting said infrared light of said predetermined wavelength in response to the application of an electrical potential at a first magnitude thereto and absorbing said infrared light of said predetermined wavelength in response to the application of an electrical potential at a second magnitude thereto.

---

### 5,018,813
### MULTICHANNEL INTEGRATED OPTIC MODULATOR FOR LASER PRINTER

**James E. Roddy, and Badhri Narayan, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Filed May 1, 1990, Ser. No. 517,134**
**Int. Cl.$^5$ G02B *6/10***
**U.S. Cl. 350—96.14** **16 Claims**

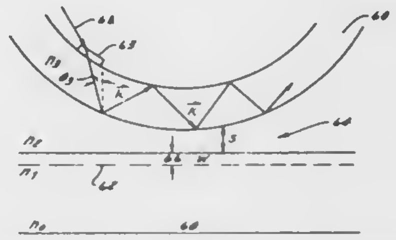


1. An integrated optics modulator comprising:
at least one input waveguide channel provided on an electro-optic substrate, wherein said input waveguide channel is divided into a write waveguide channel that extends to an output side of said substrate and a dead-end waveguide channel that terminates before reaching said output side of said substrate;
at least one dead-end channel electrode and at least one write electrode respectively positioned above said dead-end waveguide channel and said write waveguide channel; and
input means for coupling light into said input waveguide channel at an input side of said substrate.

---

### 5,018,814
### BROADBAND SINGLE-MODE OPTICAL COUPLER

**Tomasz P. Jannson, and Joanna L. Jannson, both of Torrance, Calif., assignors to Physical Optics Corporation, Torrance, Calif.**
**Filed Feb. 13, 1990, Ser. No. 479,451**
**Int. Cl.$^5$ G02B *6/26***
**U.S. Cl. 350—96.15** **15 Claims**

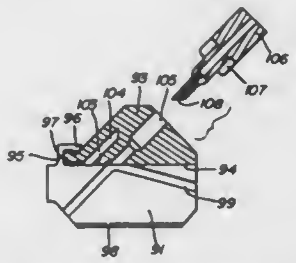


15. An apparatus for coupling light waves into a single-mode planar optical path comprising a curved continuous mode waveguide which is spaced apart from the planar optical path by a gap, the curvature of the waveguide and the distance across the gap being such that the phase-matching condition and the amplitude condition for coupling are optimized.

---

### 5,018,815
### FIBRE OPTIC DATA NETWORK

**Eric R. Cox, Chester, and Philippe J. C. Leliaert, Runcorn, both of England, assignors to Imperial Chemical Industries PLC, London, England**
**Continuation of Ser. No. 824,864, Jan. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 744,270, Jun. 13, 1985, abandoned. This application Dec. 5, 1989, Ser. No. 449,344**
**Claims priority, application United Kingdom, Jan. 31, 1985, 8502451; European Pat. Off., Jun. 10, 1985, 85304096.2**
**Int. Cl.$^5$ G02B *6/26, 6/42***
**U.S. Cl. 350—96.15** **9 Claims**



1. A fibre optic data network comprising a plurality of optical fibres, each comprising a core surrounded by cladding of lower refractive index and having a protective layer surrounding the cladding and a plurality of coupling devices associated with the fibres to couple them optically into the network configuration, each coupling device comprising means to hold an intermediate portion of a first optical fibre with its cladding intact and to conform it to a predetermined path which executes a bend having a radius of curvature sufficiently small to cause some of any light flowing through the first fibre to leak from the cladding around the outer edge of the bend, and means to hold at least one further optical fibre with a light receptive portion positioned to receive at least a portion of the light leaking from the cladding around the outer edge to the bend being arranged to hold said further fibre with the light-receptive portion thereof substantially aligned with the longitudinal axis of the portion of the first fibre preceding the bend, the extent of any displacement from alignment being no greater than the diameter of the first fibre, said means to hold the intermediate portion comprising a first assembly having a mating surface positioned with respect to said predetermined

VOL
1126
ISS
4
MY
28
1991
UMI

path such that the cladding on the outer surface of the bend in the first fibre lies flush with the mating surface, and the means for holding at least one further fibre comprising a second assembly lockable against the mating surface in a predetermined position wherein the light receptive portion of the at least one further fibre is positioned to receive at least a portion of the light leaking from the cladding around the outer surface of the bend in the first fibre, and including a stripping means fixed to the second assembly, which stripping means can be slid along the mating surface for stripping a portion of the protective layer from the outer surface of the bend which extends above the mating surface to expose the cladding as the second assembly is moved to its lockable position.

---

## 5,018,816

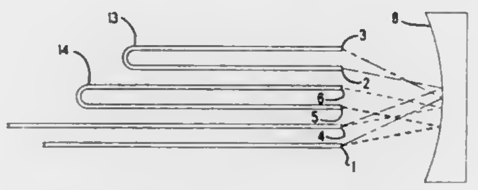
## OPTICAL DELAY SWITCH AND VARIABLE DELAY SYSTEM

**Dale D. Murray, Mount Joy, and Paul R. Reitz, Palmyra, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Jun. 11, 1990, Ser. No. 536,147**

**Int. Cl.⁵ G02B *6/36***

**U.S. Cl. 350—96.2** **20 Claims**



1. An optical fiber switch comprising:

an imaging system having a symmetry;

a group of optical fiber end faces, including a first optical fiber end face via which light is transmitted as an input signal to said imaging system and at least second and third optical fiber end faces being the end faces of an optical fiber loop, a fourth fiber end face via which light is transmitted away from said imaging system as an output signal, and fifth and sixth fiber end faces being the end faces of an optical fiber loop, the length of said fiber loop with fifth and sixth fiber end faces differing from the length of the fiber loop with second and third fiber end faces; and

means for changing the direction of light transmitted as an input signal from said first optical fiber end face between a first position and a second position, said means for changing the direction of light comprising means for displacing said group of fiber end faces and said imaging system relative to one another between a first position and a second position;

in said first position, light from said first fiber end face is imaged into said second fiber end face, said light imaged into said second fiber face being propagated through said fiber loop to said third fiber end face and imaged into said second fiber face being propagated through said fiber loop to said third fiber end face and imaged into said fourth fiber end face; and

in said second position, light from said first fiber end face is imaged into said fifth fiber end face, said light imaged into said fifth fiber end face being propagated through said fiber loop to said sixth fiber end face and imaged into said second fiber end face.

---

## 5,018,817

## METHOD OF OPTICALLY COUPLING OPTICAL FIBER TO WAVEGUIDE ON SUBSTRATE, AND OPTICAL DEVICE PRODUCED BY THE METHOD

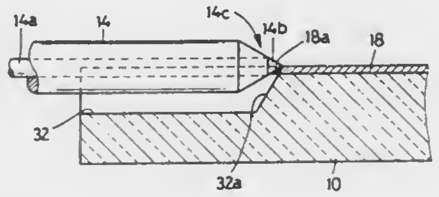
**Makoto Suzuki; Satoshi Watanabe; Takashi Tsukamoto, all of Nagoya; Hikoharu Aoki, Aichi; Hitomi Ohri, and Yukihiro Sako, both of Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Division of Ser. No. 222,427, Jul. 21, 1988, abandoned. This application Dec. 7, 1989, Ser. No. 447,421**

**Claims priority, application Japan, Jul. 24, 1987, 62-186038; Jul. 24, 1987, 62-186039; Jul. 24, 1987, 62-186040; Jul. 24, 1987, 62-186041; Jul. 24, 1987, 62-186042**

**Int. Cl.⁵ G02B *6/30***

**U.S. Cl. 350—96.17** **8 Claims**



1. An optical device comprising:

a substrate having a waveguide formed on a surface thereof for guiding a light beam therethrough;

a buffer layer formed on an area of a surface of said waveguide;

a mask having a cutout and formed on a surface of said buffer layer such that said cutout is aligned with a first part of the surface of said substrate, said mask being formed of a material capable of protecting a second part of the surface of the substrate, which is covered by said mask, from exposure to a high energy beam;

an optical fiber which is optically coupled at one end thereof to said waveguide, said one end of the optical fiber having a flat end face;

said substrate having a groove formed therein by exposure to said high-energy beam through said mask, such that said groove has a substantially flat end face substantially perpendicular to said surface of the substrate; and

fixing means for fixing an end portion of said optical fiber including said substantially flat end face, in said groove, such that said substantially flat end face of said optical fiber is positioned for optical coupling with an exposed portion of said waveguide exposed to said groove, so that said light beam travels from said optical fiber into said waveguide;

said buffer layer functioning to prevent said mask from absorbing an energy of said light beam while said light beam is traveling through said waveguide.

---

## 5,018,818

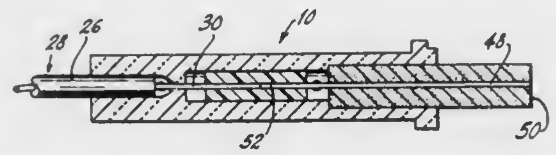
## FIELD INSTALLABLE FIBER OPTIC CONNECTOR

**Robert W. Barlow, Canton, Pa.; Robert W. Boucher, Valrico, Fla., and Thomas M. Lynch, Williamsport, Pa., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Jun. 11, 1990, Ser. No. 535,635**

**Int. Cl.⁵ G02B *6/38***

**U.S. Cl. 350—96.2** **2 Claims**



1. A field installable fiber optic connector comprising: an elongated tubular splice sleeve having a longitudinal axis and a first end formed to receive and align an optical fiber, said first end including a first diametered bore extending a given distance inwardly of said sleeve and tapering to a narrower, second diametered bore, said first diametered bore being of a size to receive a coated fiber and said second diametered bore being of a size to receive a stripped fiber; said sleeve having a middle portion and a contiguous second end, said middle portion having a third diametered bore, larger than said first diametered bore and containing a mated pair of elastomeric halves, which when mated form a fiber receiving bore there through, therein; said second end having a fourth diametered bore; a ceramic ferrule mounted in said fourth diametered bore, said ceramic ferrule comprised of a cylindrical member having an outside diameter equal to said fourth diametered bore and containing a longitudinal bore to receive an optical fiber, and an optical fiber therein, said optical fiber having one end terminating at the outside surface of said ferrule and having its other end projecting inwardly of said sleeve and terminating at the halfway point of said elastomeric halves.

---

## 5,018,819

## METHOD FOR CENTERING AND MOUNTING A LIGHT WAVEGUIDE IN A SLEEVE, AND APPARATUS FOR USE IN THE METHOD

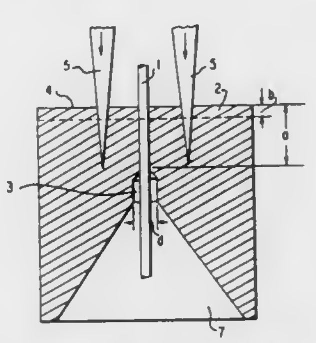
**Bernhard Schmidt, Neunkirchen, Fed. Rep. of Germany, assignor to Ant Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany**

**Filed Jun. 7, 1990, Ser. No. 534,264**

**Claims priority, application Fed. Rep. of Germany, Jun. 15, 1989, 3919532**

**Int. Cl.⁵ G02B *6/36***

**U.S. Cl. 350—96.20** **7 Claims**



1. A method of centering and fixing a light waveguide in a sleeve having an axis and an end face, the sleeve being composed in part, at least at the end face, of a body of ductile material having a bore which is coaxial to the sleeve axis, said method comprising the steps of:

(a) pushing the light waveguide into the bore; and

(b) exerting pressure on the end face of the body with a deformation tool having needles capable of penetration into the body to a substantial depth, the needles being movable independently of one another so as to fix and center the light waveguide into the body.

---

## 5,018,820

## METHOD OF OPTICALLY COUPLING AN UPTAPERED SINGLE-MODE OPTICAL FIBER TO OPTOELECTRONIC COMPONENTS

**Robert A. Boudreau, Hampton, N.H., and William C. Rideout, Townsend, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Division of Ser. No. 487,497, Mar. 2, 1990. This application May 21, 1990, Ser. No. 526,367**

**Int. Cl.⁵ G02B *6/42***

**U.S. Cl. 350—96.2** **21 Claims**

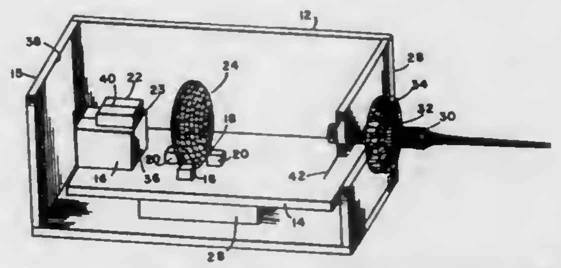
15. A method of optically coupling an uptapered single-mode optical fiber to a spaced-apart photoactive element, said element integrated with a substrate carrier and a lens within a housing and said fiber having its uptapered end within said housing and its opposite end outside said housing, comprising the steps of:

determining a desired positional arrangement of said element, lens, and fiber relative to one another;

determining a location for each of a plural set of reference marks within said housing in accordance with the desired positioning of said element, lens, and fiber;

placing said reference marks within said housing at said respective locations;

spatially positioning said element with respect to a first set of said reference marks and then securing said positioned element to said carrier;



positioning said lens with respect to a second set of said reference marks and then securing said positioned lens to said substrate, said lens having a numerical aperture sufficient to optically access said photoactive element and yield an appropriate magnification of a light beam emanating from said photoactive element;

positioning the uptapered end of said fiber with respect to a third set of said reference marks and then actively aligning said fiber with said magnified light beam such that the uptapered end is optically coupled through said lens to said photoactive element; and

securing said actively aligned fiber to said housing.

---

## 5,018,821

## OPTICAL CONNECTOR FERRULE AND METHOD FOR ASSEMBLING THE SAME

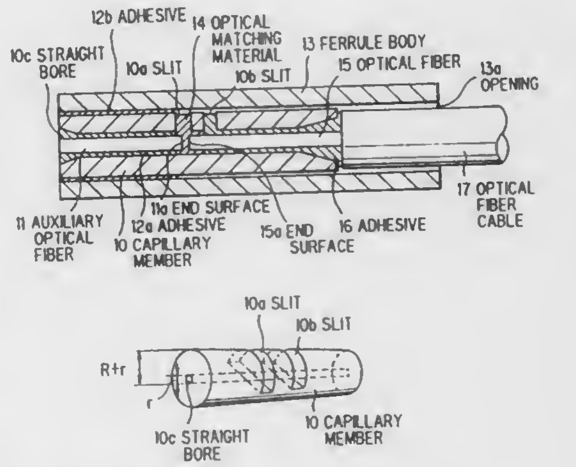
**Kazuhiko Kurata, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Dec. 22, 1989, Ser. No. 454,828**

**Claims priority, application Japan, Dec. 23, 1988, 63-323248**

**Int. Cl.⁵ G02B *6/36***

**U.S. Cl. 350—96.20** **5 Claims**



1. An optical connector ferrule, comprising:

VOL 1126
ISS 4
MY 28
1991
UMI

a capillary member provided with a straight bore having an inner diameter slightly larger than an outer diameter of an optical fiber;

an auxiliary optical fiber fixed in said straight bore of said capillary member, a first end of said auxiliary optical fiber being aligned with a corresponding first end of said capillary member, and a second end of said auxiliary optical fiber being positioned at an approximately intermediate portion in said straight bore of said capillary member; and

a ferrule body provided around an outer surface of said capillary member, a first end of said ferrule body being aligned with said corresponding first end of said capillary member, and a second end of said ferrule body extending over a second end of said capillary member;

wherein said auxiliary optical fiber, said capillary member, and said ferrule body are coaxially arranged, and said capillary member is provided with at least two slits for communicating said straight bore to an external of said capillary member, a first slit of said at least two slits which is positioned on a side of said first end relative to a remaining slit of said at least two slits, an end surface of said auxiliary optical fiber being positioned in registration with said first slit.

---

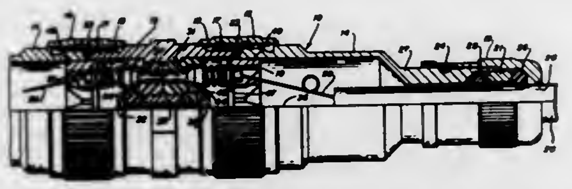
### 5,018,822
### ENVIRONMENTALLY SEALED MULTICHANNEL FIBER OPTIC CONNECTOR

**John S. Freismuth, Cheshire, and Robert G. Knowles, Northfield, both of Conn., assignors to Litton Systems, Inc., Watertown, Conn.**

**Filed Dec. 11, 1989, Ser. No. 448,794**

**Int. Cl.⁵ G02B** *6/36, 7/26*

**U.S. Cl. 350—96.20** **6 Claims**



1. A multichannel separable fiber optic connector comprising:

an elongated cylindrical housing comprising a center body and a pair of backshells removably attached to either side of the center body, the cylindrical housing having an axis which extends from one end of the housing to the other;

a retainer mounted in the center body having at least one splice aperture formed therein extending from one side of the retainer to the other in a direction which is generally parallel to the axis of the housing;

a keyway formed in both ends of each splice aperture;

a two-part rotary splice comprising two splice parts, each splice part having a fiber bore for receiving an optic fiber, an end face on one end, and an external key on the other end which mates with said keyways; and

means for bolding each splice part in engagement with a splice aperture with the two end faces of the splice parts in an abutting relationship with one another, whereby the keyways in the ends of each mounting aperture allows insertion of the splice part in only one angular orientation.

---

### 5,018,823
### SINGLE CHANNEL HIGH POWER FIBER OPTIC CONNECTOR

**Gary S. Himmelwright, Goleta, Calif., assignor to Santa Barbara Research Center, Goleta, Calif.**

**Filed Aug. 28, 1989, Ser. No. 398,878**

**Int. Cl.⁵ G02B** *6/38*

**U.S. Cl. 350—96.21** **12 Claims**

12. An apparatus for coupling optical fibers comprising:

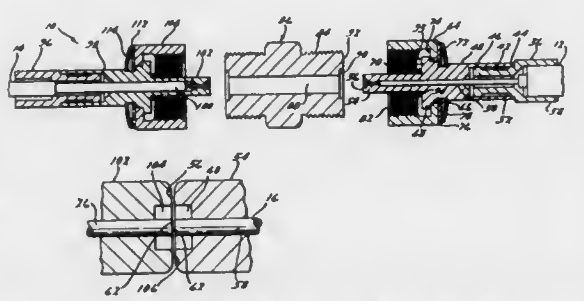
a pair of connectors each having an axial opening extending therethrough for receiving one of said optical fibers;

said connectors each including a protruding portion having a substantially flat face at its distal end, the plane of said face being perpendicular to said axial opening;

a recessed portion in said flat face surrounding said axial opening;

said optical fiber being inserted into said opening in each of said connectors so that the end of each optical fiber extends into said recessed portion, substantially into the plane of said face;

interconnect means for removably joining said pair of connectors so that said flat faces are oppositely disposed to one another and said optical fiber ends are placed in close proximity to each other but do not touch, whereby said recessed portions in both connectors create an air space around said optical fiber ends;



said optical fibers having at least one casing and said opening in said protruding portion having a reduced diameter portion near the recess, wherein only the optical fiber and not the casing may enter said reduced diameter portion;

means for permanently securing the optical fiber casing to said connector;

said connectors having a flat face adjacent to the base of said protruding portion; and

said interconnector means includes a substantially cylindrical connecting member having an opening therethrough for receiving said protruding portion, and further including a flat face at both ends for engaging with said flat face in the connector, wherein the relative distance between the faces of the protruding portions is determined by the axial length of said interconnect means said relative distance being about 0.005 inches.

---

### 5,018,824
### PROCESS FOR FUSION-SPLICING HERMETICALLY COATED OPTICAL FIBERS

**Masaharu Ooe; Yoichi Ishiguro, and Gotaro Tanaka, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Sep. 20, 1989, Ser. No. 409,714**

**Claims priority, application Japan, Sep. 24, 1988, 63-239531**

**Int. Cl.⁵ G02B** *6/38;* **C03B** *25/00;* **H05B** *7/18*

**U.S. Cl. 350—96.21** **6 Claims**

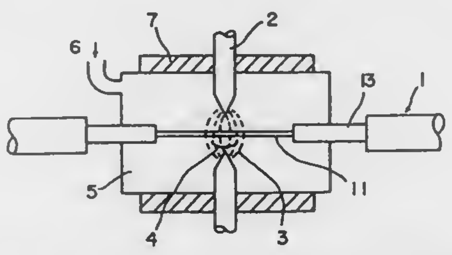
1. A process for fusion-splicing hermetically coated optical fibers each of which comprises an inorganic coating around an optical fiber glass, which process comprises:

(a) removing the inorganic coating by arcing;

(b) fusion splicing the fibers; and

(c) re-coating a portion of said fused fibers where the inorganic coating is removed with an inorganic material;

wherein said re-coating step is accomplished with a heating means selected from the group consisting of a chamber heated with a heater, a flame of a gas containing a hydrocarbon, a chamber heated with an infrared concentrating heater and remaining heat during the fusion splicing step.



---

### 5,018,825
### OVERHEAD OPTICAL TRANSMISSION SYSTEM

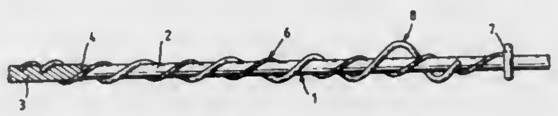
**Simon M. Rowland, Tarporley, United Kingdom, assignor to BICC Public Limited Company, England**

**Filed Jun. 4, 1990, Ser. No. 532,551**

**Claims priority, application United Kingdom, Jan. 14, 1989, 8913710; Dec. 6, 1989, 8927554; Dec. 6, 1989, 8927555**

**Int. Cl.⁵ G02B** *6/44*

**U.S. Cl. 350—96.23** **14 Claims**



10. An overhead optical transmission system in which at least one optical cable having a sheath of electrically insulating material is freely supported in long lengths between upstanding supports employed to support overhead electric power transmission lines and spaced along the route of the system and in which each end of the suspended length of optical cable is secured to an upstanding support by means of a termination fitting of metal or metal alloy which surrounds and is secured on a part of the length of the optical cable at said end, each metal termination fitting of the optical cable over a part of the length of the fitting extending to the end of the fitting remote from said upstanding support and an immediately adjacent part of the length of the optical cable are surrounded by a circumferentially shield of a material sufficiently electrically conductive at least to substantially reduce arcing and joule heating and a performed helix constituting a damper extends lengthwise of the shield, the overall outer diameter of the preformed helix over a part of its length remote from the fitting increasing smoothly in a direction away from the fitting.

---

### 5,018,826
### ROLL MANUFACTURED WITH A LIGHT WAVEGUIDE CONDUCTOR

**Dagmar Schütten, Erfstadt; Hans-Joachim Schmitz, Kerpen; Hans-Peter Caspar, Troisdorf; Veit M. Kolschbach, Cologne; Gerald Znoyek, Leverkusen, and Norbert Wenzel, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed May 19, 1989, Ser. No. 354,009**

**Claims priority, application Fed. Rep. of Germany, May 19, 1988, 3817030; Dec. 14, 1988, 3842036**

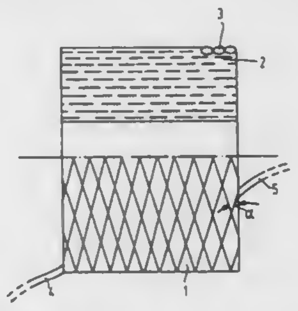
**Int. Cl.⁵ G02B** *6/16*

**U.S. Cl. 350—96.29** **14 Claims**

1. A roll arrangement for a light waveguide conductor (LWG-conductor) for the transmission of optical signals to and from a moving body, comprising:

said LWG-conductor being wound in the form of a self-supporting roll having crossed turns without a winding core; and

a sheath surrounding said LWG-conductor, said sheath having a flattened cross-sectional contour at at least the crossing points of said turns with the wider portion of said contour disposed in the direction of plane of winding.



---

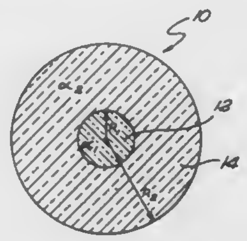
### 5,018,827
### METHOD FOR ELIMINATING THE TEMPERATURE SENSITIVITY OF AN OPTICAL FIBER AND A TEMPERATURE INSENSITIVE OPTICAL FIBER

**Patrick Brownrigg, 6481 Atlantic #N242, Long Beach, Calif. 90805; Victor Vali, 26035 Moulton Pkwy., Laguna Hills, Calif. 92653, and Bruce Youmans, 9532 E. Live Oak Ave., Temple City, Calif. 91780**

**Filed Oct. 3, 1989, Ser. No. 426,125**

**Int. Cl.⁵ G02B** *6/16*

**U.S. Cl. 350—96.30** **8 Claims**



8. A temperature insensitive optical fiber comprising:

a core of a first material, said first material having a predetermined coefficient of expansion, $\alpha_1$, a temperature dependent rate of change, dn/dT, of an index of refraction, n, and a radius, $R_1$, about an axis of said fiber; and

a cladding of a second material coaxial with and surrounding said core, said second material having a predetermined coefficient of thermal expansion, $\alpha_2$, and a radius, $R_2$, about said axis, said radius, $R_2$, of said second material being determined such that a condition

$$dn/dT = -\alpha n$$

is satisfied wherein

$$\alpha = (R_1/R_2)^2(\alpha_1 - \alpha_2) + \alpha_2.$$

---

### 5,018,828
### OPTICAL FIBER

**Akio Ohdaira, Iwakuni; Shunji Abe, Tokyo; Noboru Wakatsuki, and Akira Tanaka, both of Kawasaki, all of Japan, assignors to Mitsui Petrochemcial Industries, Ltd., Tokyo and Fujitsu Limited, Kawasaki, both of, Japan**

**Division of Ser. No. 3,321, Jan. 14, 1987, abandoned. This application Mar. 1, 1989, Ser. No. 318,425**

**Claims priority, application Japan, Feb. 24, 1986, 61-37245**

**Int. Cl.⁵ B32B** *9/00;* **G02B** *6/00*

**U.S. Cl. 350—96.34** **12 Claims**

1. An optical fiber comprising:

VOL 1126
ISS 4
MY 28
1991
UMI

(a) a core component comprising a polycarbonate or a silica type glass; and

(b) a clad component comprising at least 0.1% by weight of a composition composed of a graft-modified poly (4-methyl-1-pentene) (A) which is partially or entirely graft-modified with an unsaturated carboxylic acid or its derivative at a grafted amount within the range of from 0.1 to 10% by weight and 1 to 15% by weight, based on 100 parts by weight of said composition, of a low molecular weight compound having a number-average molecular weight of 300 to 5,000.

---

### 5,018,829
### OPTICAL FIBER AND METHOD OF PRODUCING THE SAME

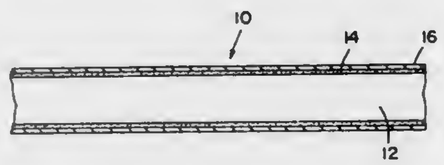
**Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

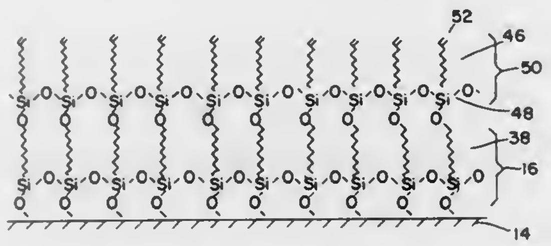
**Continuation of Ser. No. 158,111, Feb. 16, 1988, Pat. No. 4,875,759, which is a division of Ser. No. 799,452, Nov. 18, 1985, abandoned. This application Aug. 9, 1989, Ser. No. 391,115**

**Claims priority, application Japan, Nov. 19, 1984, 59-243676**

**Int. Cl.$^5$ G02B** *6/00*

**U.S. Cl. 350—96.34** **6 Claims**





1. An optical fiber comprising:

a core; and

a clad formed on said core, said clad being a monomolecular or multi-monomolecular film in which molecules are polymerized to one another by chemical bonding through Si—O groups and are arranged along the surface of the clad.

---

### 5,018,830
### AUTHENTICITY MARK, DOCUMENT CARRYING SUCH MARK, AND PROCESS AND DEVICE FOR READING AND VALIDATING SUCH MARK

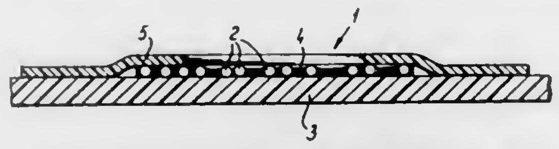
**Hugo K. Krop, Loosdrecht, Netherlands, assignor to Homer, Hollandse Meet- En Regelsystemen B.V., Amsterdam, Netherlands**

**Filed Oct. 10, 1989, Ser. No. 418,031**

**Claims priority, application Netherlands, Oct. 10, 1988, 8802472**

**Int. Cl.$^5$ G02B** *5/128*

**U.S. Cl. 350—105** **10 Claims**



1. Authenticity mark consisting of pattern of randomly divided granules attached to a delimited surface area of a substrate, wherein the granules consist of retroreflective microspheres with a diameter smaller than 500 microns and that the number of microspheres is selected such that between 20% and 80% of the available surface of said delimited area is covered by said microspheres.

---

### 5,018,831
### OPTICAL RESONANT DEVICE

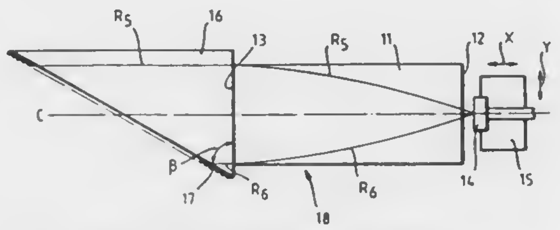
**Richard Wyatt, Felixstowe, and Keith H. Cameron, Woodbridge, both of England, assignors to British Telecommunications public limited company, London, England**

**PCT No. PCT/GB87/00788, § 371 Date Jul. 6, 1988, § 102(e) Date Jul. 6, 1988, PCT Pub. No. WO88/03723, PCT Pub. Date May 19, 1988**

**PCT Filed Nov. 6, 1987, Ser. No. 216,717**

**Int. Cl.$^5$ G02B** *5/18;* **H01S** *3/08*

**U.S. Cl. 350—162.17** **16 Claims**



1. A tunable optical resonant device including:

an external resonant cavity including an optical source,

a collimator having a central optical axis,

a grating fixed in a position with respect to said central optical axis such that it forms a substantially non-perpendicular, fixed angle with the central optical axis and such that collimated light from the optical source is incident on the grating at an angle which results in resonance at a predetermined wavelength when the optical source is substantially on the central optical axis, and

support means for supporting the optical source substantially on the central optical axis and for tuning said device by laterally offsetting the optical source about the central optical axis.

---

### 5,018,832
### DEVICE FOR PREVENTING GENERATION OF HARMFUL LIGHT IN OBJECTIVE LENS ASSEMBLY

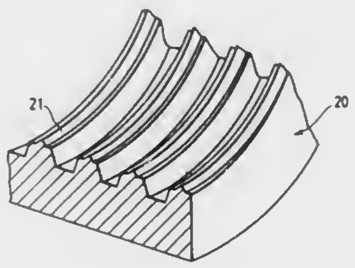
**Hiroshi Terunuma, Ichikawa; Daiki Tsukahara, Kawasaki, and Akira Katayama, Koganei, all of Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Filed Oct. 31, 1989, Ser. No. 429,637**

**Claims priority, application Japan, Nov. 10, 1988, 63-146880[U]**

**Int. Cl.$^5$ G02B** *7/04, 27/00*

**U.S. Cl. 350—276 SL** **14 Claims**



1. An objective lines assembly for an optical instrument, comprising:

an inner tube member surrounding an optical axis;

an outer tube member surrounding said inner tube member;

a helicoidal screw formed on the outside circumferential surface of said inner tube member;

a helicoidal screw formed on the inside circumferential surface of said outer tube member and engaged with the helicoidal screw on the inner tube member;

said helicoidal screws of said inner tube member and said outer tube member having each a main ridge of a trapezoidal form in section, respectively; and

means for forming a wall surface facing an object side of said objective lens assembly, said wall surface being formed at the top of the trapezoidal-section main ridge of the outer tube member and along the spiral of said screw, said wall surface being angulated relative to said optical axis so as substantially to prevent light incident on said wall surface from said object side of said objective lens assembly from reaching an image side of said objective lens assembly.

---

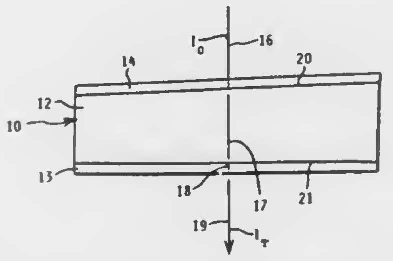
### 5,018,833
### NEUTRAL DENSITY FILTERS

**Keith E. Bennett, Huntington Beach, and John R. Staley, III, Corona, both of Calif., assignors to Newport Corporation, Fountain Valley, Calif.**

**Filed Jan. 17, 1990, Ser. No. 466,505**

**Int. Cl.$^5$ G02B** *5/28;* **B32B** *15/04*

**U.S. Cl. 350—314** **20 Claims**



1. A method of making a neutral density filter, comprising in combination the steps of:

providing a substrate including a volume absorber having a first density and having an uneven first attenuation characteristic, and having a front side for receiving light to be filtered and a backside opposite said front side; and

providing for a substantially constant attenuation of said light by depositing on said backside a thin-film attenuator for light having traversed the volume absorber and having light reflective properties attenuated by said volume attenuator, and having a second density and a second attenuation characteristic substantially complementing said first attenuation characteristic to provide said neutral density filter with a substantially constant attenuation at a density substantially equal to said first and second densities.

---

### 5,018,834
### ADDRESSING SCHEME FOR MULTIPLEXED FERRO-ELECTRIC LIQUID CRYSTAL

**Martin J. Birch, Teddington, Great Britain, assignor to STC PLC, London, England**

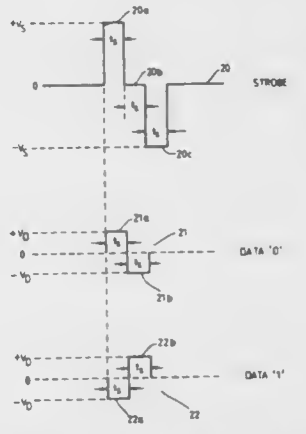
**Filed Nov. 6, 1989, Ser. No. 432,577**

**Claims priority, application United Kingdom, Nov. 23, 1988, 8827384**

**Int. Cl.$^5$ G02F** *1/13*

**U.S. Cl. 350—333** **2 Claims**

1. A method of addressing a matrix-array type liquid crystal cell with a ferroelectric liquid crystal layer whose pixels are defined by the areas of overlap between the members of a first set of electrodes on one side of the liquid crystal layer and the members of a second set on the other side of the layer, which pixels are selectively addressed on a line-by-line basis by applying strobe pulses sequentially to the members of the first set of electrodes while data pulses are applied in parallel to the members of the second set of electrodes wherein a data pulse of one data significance is a charge balanced bipolar pulse of duration 2 t which makes a first voltage excursion to a voltage $+V_D$ for a duration t followed by a second voltage excursion to a voltage $-V_D$ for a further duration t, wherein a data pulse of the opposite data significance is a charge balanced bipolar pulse also of duration 2 t which makes a first voltage excursion to a voltage $-V_D$ for a duration t followed by a second voltage excursion to a voltage $+V_D$ for a further duration t, wherein a strobe pulse is a charge balanced bipolar pulse of duration 3 t which makes a first voltage excursion to a voltage of modulus $|V_S|$ for a duration t followed by a zero volts dwell time of duration t, followed by a second voltage excursion oppositely directed to the first and also to a voltage of modulus $|V_S|$ for a duration t, and wherein the first and second voltage excursions of the strobe pulses and synchronised with the first voltage excursions of the data pulses.



---

### 5,018,835
### DEFLECTOR FOR AN OPTICAL BEAM INCLUDING REFRACTIVE MEANS

**Terry A. Dorschner, Newton Centre, Mass., assignor to Raytheon Company, Lexington, Mass.**

**Filed Jan. 3, 1989, Ser. No. 292,787**

**Int. Cl.$^5$ G02F** *1/133*

**U.S. Cl. 350—336** **22 Claims**

13. Apparatus for deflecting an incident optical beam, said apparatus comprising:

a liquid crystal cell including a first window having an optically-transparent common electrode, an electrically-insulating second window having a multiplicity of electrodes in the form of electrically isolated, optically-reflective, parallel stripes, and a layer of liquid crystal molecules intermediate said first and second windows;

said optical element positioned so that said incident optical beam is incident on said first window, said beam being reflected from said stripe electrodes;

means for coupling a multiplicity of control signals individually between said multiplicity of stripe electrodes and said common electrode, thereby creating local variations of refractive index in said liquid crystal layer; and

means for increasing the distance traveled by said optical beam within said layer of liquid crystal molecules, comprising refractive means interposed between said incident optical beam and said first window, said refractive means increasing the angle of incidence of said beam entering said liquid crystal cell.

18. Apparatus for deflecting an incident optical beam, said apparatus comprising:

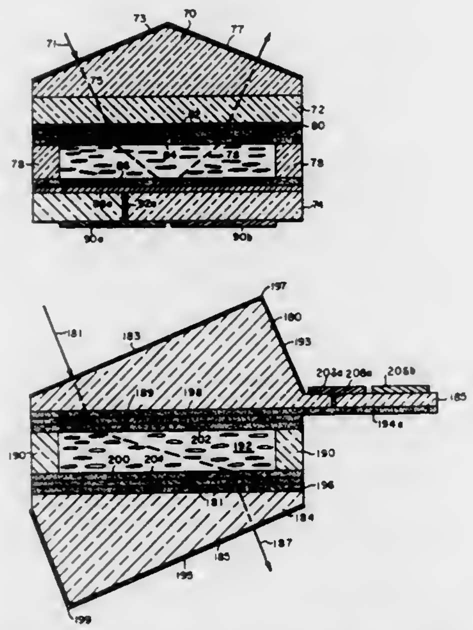
a liquid crystal cell including a first window having an optically-transparent common electrode, an electrically-insulating second window having a multiplicity of electrodes in the form of electrically isolated, optically-trans-

VOL
1126
ISS
4
MY
28
1991
UMI

parent, parallel stripes, and a layer of liquid crystal molecules intermediate said first and second windows;

means for coupling a multiplicity of control signals individually between said multiplicity of stripe electrodes and said common electrode, thereby creating local variations of refractive index in said liquid crystal layer; and

means for increasing the distance traveled by said optical beam within said layer of liquid crystal molecules, comprising first and second refractive means, said first refractive means being interposed between said incident optical beam and said first window for increasing the angle of incidence of said beam entering said liquid crystal cell, said second refractive means being adjacent said second window for decreasing the angle of incidence of said beam exiting said liquid crystal cell.



---

**5,018,836**

## OPTICAL DISC APPARATUS LENS DRIVE APPARATUS AND METHOD FOR THE MANUFACTURE OF SUCH

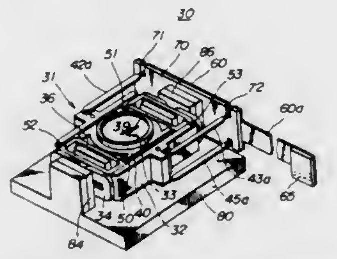
**Yasushi Noda, Tokyo; Kenji Shimozawa, Musashino, and Takashi Kamisaka, Kodaira, all of Japan, assignors to Teac Corporation, Tokyo, Japan**

**Filed Jan. 31, 1990, Ser. No. 472,745**

**Claims priority, application Japan, Feb. 2, 1989, 1-24406**

**Int. Cl.$^5$ G02B *7/02***

**U.S. Cl. 350—247** **10 Claims**



1. An objective lens drive apparatus comprising:

an objective lens holder supporting an objective lens and provided with drive coils,

a base fixing permanent magnets,

printed circuit boards fixing said base at a monolithic portion thereof, and

a plurality of flexible support members, having electroconductivity by themselves, electrically and mechanically connected at their base ends to said printed circuit board, and with their distal ends supporting said objective lens holder so as to be flexibly displaced to a position where said drive coils oppose said permanent magnets, and wherein

terminals of said drive coils are electrically connected to the flexible support members which are different from one another, and

a drive current is supplied to said drive coils from said printed circuit board to pass through said flexible support members.

---

**5,018,837**

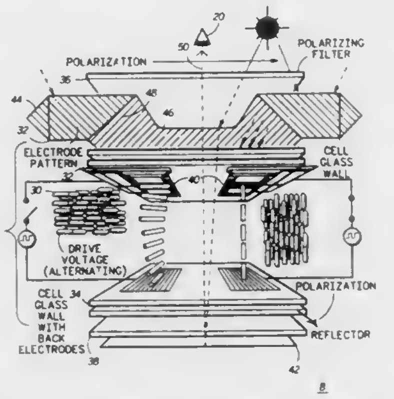
## ENHANCED CONTRAST LIQUID CRYSTAL DISPLAY DEVICE

**John M. McKee, Hillsboro Beach, and Joseph T. Downey, Coral Springs, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 3, 1989, Ser. No. 375,075**

**Int. Cl.$^5$ G02F *1/13***

**U.S. Cl. 350—345** **15 Claims**



1. A liquid crystal display (LCD) device comprising:

an LCD cell formed of a layer of optically nematic liquid crystal material disposed between two transparent substrates, the substrates having at least one pair of display electrodes disposed on opposite interior surfaces thereof;

first polarizing means situated on one side of said LCD cell;

second polarizing means situated on an opposite side of said LCD cell to said first polarizing means and having its axis of polarization orthogonal to that of said first polarizing means;

reflector means situated on an opposite side of said second polarizing means to said LCD cell for reflecting light back through said second polarizing means; and

light providing means situated between one of said polarizing means and said LCD cell for providing light directed towards said reflector means, said light providing means comprising a layer of light concentrating plastics material having an aperture therein surrounding at least said display electrodes and whose inner sides direct light emitted thereby towards said reflector means.

---

**5,018,838**

## METHOD AND DEVICE FOR ACHIEVING OPTICAL SPATIAL PHASE MODULATION

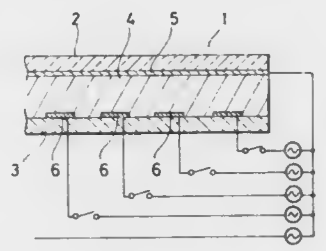
**Thomas H. Barnes; Kiyofumi Matsuda, and Naotake Ooyama, all of Tsukuba, Japan, assignors to Agency of Industrial Science & Technology and Minstry of International Trade and Industry, both of Tokyo, Japan**

**Filed Jul. 6, 1989, Ser. No. 375,950**

**Claims priority, application Japan, Jul. 8, 1988, 63-171428**

**Int. Cl.$^5$ G02F *1/133***

**U.S. Cl. 350—347 V** **5 Claims**



3. An optical correlator comprising:

a light source;

a transparency plate receiving a light beam from said light source and having an input image written thereon;

first means for Fourier transforming said light beam including said input image from said transparency plate;

an optical spatial phase modulating element including a liquid crystal layer having first and second surfaces opposed to each other, a plate electrode formed on said first surface of said liquid crystal layer, a plurality of sub-electrodes formed on said second surface of said liquid crystal layer and means for applying a potential of a specific intensity to each of said plurality of sub-electrodes to produce local changes in an alignment of molecules of said liquid crystal layer between said plate electrode and each of said plurality of sub-electrodes and form a prescribed refractive index distribution in said liquid crystal layer;

wherein said optical spatial phase modulating element receives the Fourier transformed light beam from said first means to pass the received light beam through said liquid crystal layer and modulate an optical spatial phase of the passed light beam in accordance with said prescribed refractive index distribution;

second means for fourier transforming the light beam modulated in the optical spatial phase from said optical spatial phase modulating element; and

image displaying means for displaying thereon the light beam Fourier transformed by said second means.

---

**5,018,839**

## LIQUID CRYSTAL DISPLAY DEVICE

**Tomiaki Yamamoto, Chigasaki; Akio Murayama, Kamakura; Susumu Kondo, Yokosuka; Hitoshi Hato, Yokohama; Shinichi Kamagami, Yokohama, and Shoichi Matsumoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 26, 1989, Ser. No. 385,535**

**Claims priority, application Japan, Jul. 27, 1988, 63-185503**

**Int. Cl.$^5$ G02F *1/135***

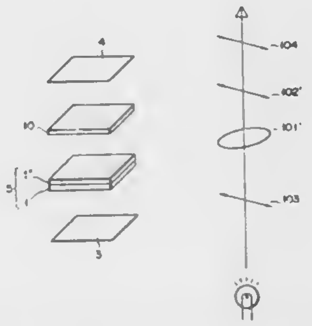
**U.S. Cl. 350—347 R** **2 Claims**

1. A liquid crystal display device comprising:

(A) a liquid crystal cell including:
  (a) first and second substrate spatially arranged to oppose each other,
  (b) first and second electrodes arranged on opposing surfaces of said first and second substrates, respectively, and
  (c) a liquid crystal composition filled between said first and second substrates and arranged in a twisted mode, an angle of twisting being in the range from 180° to 270°;

(B) first and second polarizers arranged on both sides of said liquid crystal cell; and

(C) an optical retardation film arranged between said second substrate and said second polarizer;



wherein said optical retardation film has a retardation value falling within a range of RO×0.55 to RO×0.80 (where RO is a retardation of the liquid crystal cell "and falls within a range of 0.5 to 1.0 μm"), and an optical axis of said optical retardation film is angled 100° to 130° with respect to the alignment direction of the liquid crystal molecules on said second substrate.

---

**5,018,840**

## IMAGE DISPLAY DEVICE HAVING A PHOTOSETTING BINDER

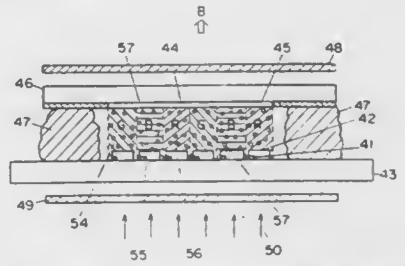
**Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 281,890, Dec. 8, 1988, abandoned, which is a continuation of Ser. No. 83,827, Aug. 11, 1987, abandoned, which is a division of Ser. No. 890,654, Jul. 30, 1986, abandoned. This application Dec. 6, 1989, Ser. No. 445,097**

**Claims priority, application Japan, Jul. 31, 1985, 60-169056; Jul. 31, 1985, 60-169057**

**Int. Cl.$^5$ G02F *1/13***

**U.S. Cl. 350—349** **2 Claims**



1. An image display device which comprises liquid crystal elements which elements are composed of

(a) a plurality of microcapsules in which an electric field responsive nematic, twist nematic, smectic or ferro-inductive liquid crystal is enclosed and the outer surface of which is colored said microcapsules being dispersed in a photosetting binder, or p1 (b) a plurality of microcapsules in which an electric field responsive nematic, twist nematic, smectic or ferro-inductive liquid crystal is enclosed said microcapsules being dispersed in a colored photosetting binder,

said liquid crystal elements being held between two confronting electrodes after being photoset in a pattern.

VOL 1126
ISS 4
MY 28
1991
UMI

### 5,018,841
## DRIVING METHOD FOR OPTICAL MODULATION DEVICE

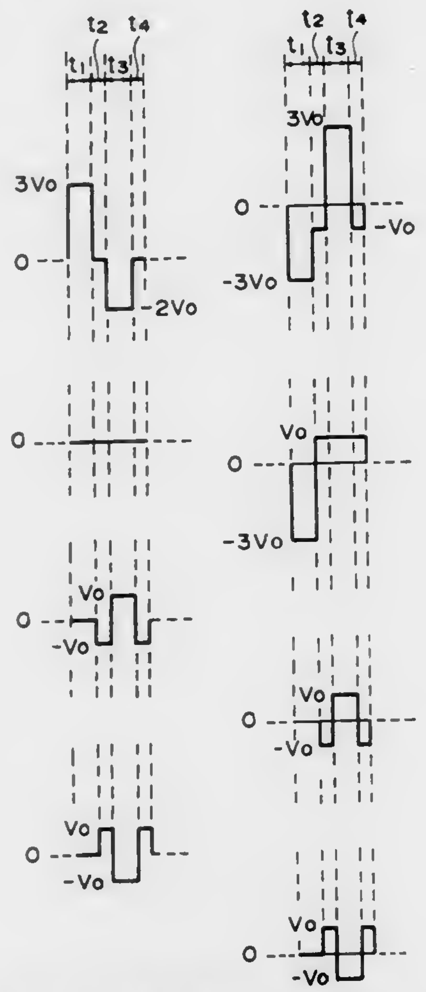
**Akihiro Mouri, Kokubunji; Tsutomu Toyono, Yokohama; Shuzo Kaneko, Tokyo; Yutaka Inaba, Kawaguchi, and Junichiro Kanbe, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 266,169, Nov. 2, 1988, which is a division of Ser. No. 942,716, Dec. 17, 1986, Pat. No. 4,836,656. This application Dec. 22, 1989, Ser. No. 455,299**

**Claims priority, application Japan, Dec. 25, 1985, 60-295304; Dec. 25, 1985, 60-295305; Dec. 25, 1985, 60-295308; Jan. 7, 1986, 61-001186**

**Int. Cl.$^5$ G02F** *1/137;* **G09G** *3/36*

**U.S. Cl. 350—350 S** **6 Claims**



1. An optical modulation apparatus, comprising:

a liquid crystal device comprising an electrode matrix comprising scanning electrodes and signal electrodes, and a ferroelectric liquid crystal having a first threshold voltage and a second threshold voltage in one and another directions, respectively; and

voltage application means for:

applying to a selected scanning electrode a scanning selection signal comprising a pulse of one polarity, a pulse of the other polarity, and a pulse having a voltage of zero, the polarities and the zero voltage being defined with respect to the potential level of a nonselected scanning electrode, and applying a voltage exceeding the first threshold voltage at the intersections of the selected scanning electrode and the signal electrodes when the former one of the pulses of one and the other polarities is applied to the scanning selection signal; and

selectively applying, to the signal electrodes, information signals each having a pulse of one polarity and a pulse of the other polarity having mutually different durations, the polarities being defined with respect to the potential level of a nonselected scanning electrode, the maximum duration pulse of the pulses of one and the other polarities of said information signals being synchronized with the latter one of the pulses of one and the other polarities of the scanning selection signal, wherein when maximum duration pulse is applied to a selected signal electrode, the maximum duration pulse has a voltage exceeding the second threshold voltage of the ferroelectric liquid crystal in combination with said latter pulse at the intersection of the selected scanning electrode and a selected signal electrode, wherein when the maximum duration pulse is applied to a nonselected signal electrode, the maximum duration pulse has a voltage not exceeding the second threshold voltage of the ferroelectric liquid crystal in combination with said latter pulse at the intersection of the selected scanning electrode and a nonselected signal electrode, wherein said maximum duration pulses applied to a selected and a nonselected signal electrode comprise, respectively, a selection information pulse and a nonselection information pulse.

---

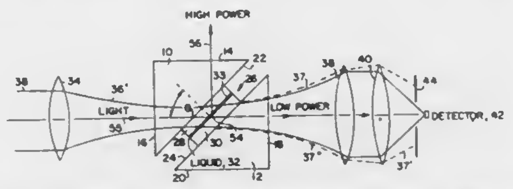
### 5,018,842
## OPTICAL SWITCH DEVICE

**Wenpeng Chen, Bethesda, Md., assignor to Martin Marietta Corporation, Bethesda, Md.**

**Filed Apr. 7, 1988, Ser. No. 178,669**

**Int. Cl.$^5$ G02B** *5/23;* **G02F** *1/01*

**U.S. Cl. 350—354** **9 Claims**



1. An optical power limiter and switch device, comprising:

a pair of optically transparent prisms having mutually opposing inclined faces relative to an incident beam of optical energy; and

a self-defocusing and optically non-linear liquid mixture including a host liquid and an optical energy absorbing liquid, said liquid mixture mounted between said inclined faces, said liquid mixture being self-activated so as to defocus an incident beam of optical energy of increasing intensity and to change the critical angle so that an incident beam exceeding a certain energy threshold will be totally reflected.

---

### 5,018,843
## ZOOM LENS APPARATUS WITH LENS UNITS FOR ZOOMING AND FOCUSING

**Kiyotaka Inadome; Hitoshi Imanari, both of Kawasaki; Kunihiro Fukino, Fujisawa, and Toru Takayama, Yokohama, all of Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Filed Dec. 7, 1989, Ser. No. 447,576**

**Claims priority, application Japan, Dec. 8, 1988, 63-311494; Jun. 6, 1989, 1-143819**

**Int. Cl.$^5$ G02B** *15/00*

**U.S. Cl. 350—429** **10 Claims**

1. A zoom lens barrel comprising:

a zoom lens optical system including at least one lens unit capable of being displaced along an optical axis for zooming and also for focusing;

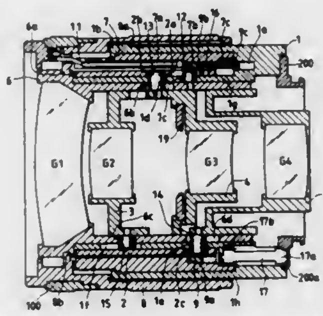
a cylindrical focusing member having at least one focus cam groove;

a cylindrical zooming member having at least one zoom cam groove;

engaging means for engaging said at least one lens unit in said focus and zoom cam grooves;

zooming means for causing relative rotation about the optical axis between said cylindrical focusing and zooming members for zooming of said zoom lens optical system, said at least one lens unit being displaced along the optical axis with relative rotation between said cylindrical focusing and zooming members; and

focusing means for causing relative displacement along the optical axis between said cylindrical focusing and zooming members for focusing of said zoom lens optical system, said at least one lens unit being displaced along the optical axis with relative displacement between said cylindrical focusing and zooming members;



said focus cam groove being formed non-linear so that said cylindrical focusing and zooming members may be relatively displaced to a substantially constant extent irrespective of the focal distance of said zoom lens optical system and that said at least one lens unit may be displaced in the optical axis direction by said focusing means to a variable extent according to the focal distance of said zoom lens optical system.

---

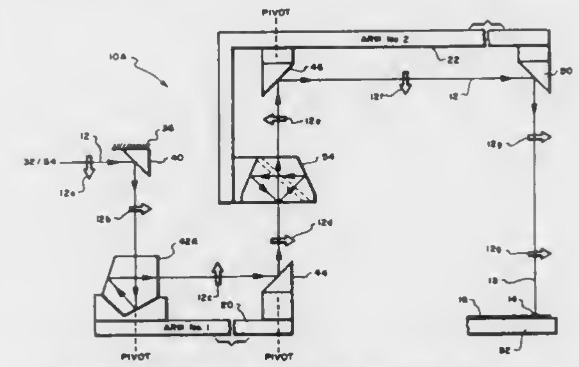
### 5,018,844
## PASSIVE BEAM DEROTATOR

**James Horton, Arcadia, Calif., assignor to OCA Applied Optics, Inc., Garden Grove, Calif.**

**Filed Dec. 27, 1989, Ser. No. 457,469**

**Int. Cl.$^5$ G02B** *23/02, 26/08;* **G01B** *11/26*

**U.S. Cl. 350—486** **7 Claims**



1. In a beam positioning device having two articulated arms to direct a beam of light having a preferred orientation from a light source to a selected position with the same preferred orientation, the improvement comprising;

beam rotating means fixed with respect to one of said arms to rotate said beam,

right angle prism means mounted on the other of said arms,

said beam rotating means and said right angle prism means being located to direct said beam along the length of said arms and along the axis of rotation of said arms,

means to rotate the beam at twice the amount that one arm is rotated with respect to the other arm to maintain the original orientation of said beam at said selected position, and

means to invert the beam entering the means to rotate the beam.

---

### 5,018,845
## PHOTOGRAPHIC SYSTEM FOR STABILIZING AN IMAGE INCLUDING TWO POSITIVE LENS GROUPS, EACH GROUP INCLUDING A POSITIVE LENS AND A NEGATIVE LENS

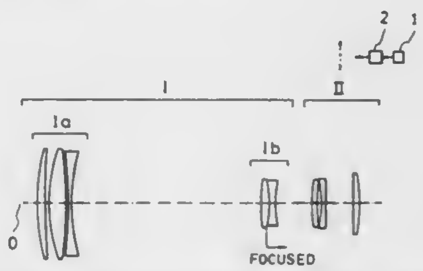
**Shoichi Yamazaki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 1, 1990, Ser. No. 487,193**

**Claims priority, application Japan, Mar. 2, 1989, 1-50363**

**Int. Cl.$^5$ G02B** *27/64*

**U.S. Cl. 350—500** **5 Claims**



1. A photographic system for stabilizing an image, comprising:

a first lens group having a positive refractive power, said first lens group containing at least one positive lens and at least one negative lens;

a second lens group disposed on an image side of said first lens group, said second lens group having a positive refractive power and containing at least one positive lens and one negative lens, said first and second lens group determining a reference optical axis;

a sensor; and

means to decenter said second lens group in a direction having a component perpendicular to said reference optical axis on the basis of an output of said sensor,

wherein said image stabilizing apparatus satisfies the following condition:

$$1 < f1/F < 3.5$$

where f1 is a focal length of said first lens group, and F is a focal length of the overall system.

---

### 5,018,846
## MICROSCOPE

**John Gutridge, 79, Wensleydale Road, Hampton Middlesex, United Kingdom TW12 2LT**

**Filed Oct. 31, 1989, Ser. No. 429,684**

**Claims priority, application United Kingdom, Jun. 15, 1989, 8913788; Aug. 2, 1989, 8917656**

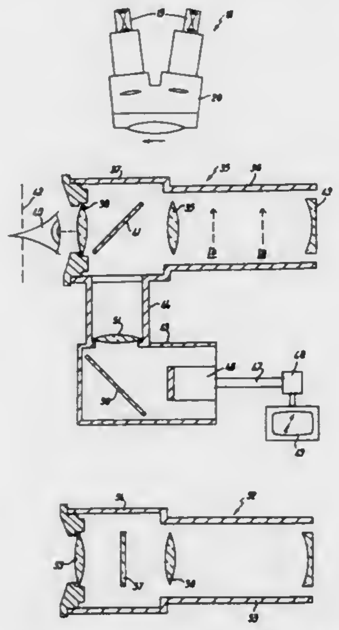
**Int. Cl.$^5$ G02B** *21/18, 21/00*

**U.S. Cl. 350—513** **22 Claims**

1. A pair of eyepieces for a divergent optic microscope, a first one of the eyepieces including a beam splitter, a second

VOL
1126
ISS
4
MY
28
1991
UMI

one of eyepieces of the pair including a neutral density filter arranged and adapted to reduce the intensity of light passing



directly through the second eyepiece issuing from the ocular lens of the first eyepiece.

---

5,018,847

### OBSERVATION AND/OR CULTIVATION INSTRUMENT FOR CELLS

**Satoshi Ojima, and Tsuneo Hiraide, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyn, Japan**

**Filed Sep. 12, 1989, Ser. No. 406,320**

**Claims priority, application Japan, Sep. 13, 1988, 63-229257**

**Int. Cl.$^5$ G02B** *1/00, 21/34*

**U.S. Cl. 350—534** **15 Claims**

1. An instrument for cultivation and observation of cells comprising a transparent substrate including a biocompatible ceramic coating, said biocompatible ceramic coating including a surface to be contacted with the cells, and said biocompatible ceramic coating being sufficiently thin and of a sufficiently even thickness to permit observation of the cells on the biocompatible ceramic coating in an optical microscope.

---

5,018,848

### LASER BEAM TRANSMITTING APPARATUS

**Saburo Kamiya, and Akikazu Tanimoto, both of Yokohama, Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Filed Aug. 26, 1988, Ser. No. 236,935**

**Claims priority, application Japan, Sep. 4, 1987, 62-220402**

**Int. Cl.$^5$ G02B** *23/02*

**U.S. Cl. 350—572** **9 Claims**

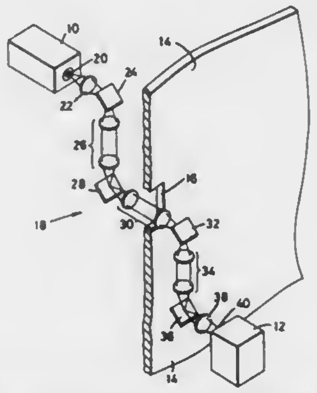
1. An apparatus for transmitting a laser beam supplied from a laser source to a working apparatus, comprising:

a plurality of reflecting mirrors disposed in series between said laser source and said working apparatus to change the direction of said laser beam;

a condensing optical system provided to condense said laser beam on the reflecting surface of the first one of said reflecting mirrors; and

a relay optical system including first and second imaging means disposed between said first reflecting mirror and the second reflecting mirror subsequent thereto in the direction of travel of said laser beam, said first imaging means being disposed between said first reflecting mirror and said second imaging means and having a forward focus substantially coincident with the reflecting surface of said first reflecting mirrors, said second imaging means being disposed between said first imaging means and said second reflecting mirror and having a rearward focus substantially coincident with the reflecting surface of said second reflecting mirror;

wherein said laser source has an exit opening for emitting said laser beam therethrough, said working apparatus has an entrance opening for introducing said laser beam thereinto, and said relay optical system further includes means for causing said laser beam reflected by said second reflecting mirror to be condensed on the entrance opening of said working apparatus, and wherein said relay optical system forms the image of the exit opening of said laser source on the entrance opening of said working apparatus.



---

5,018,849

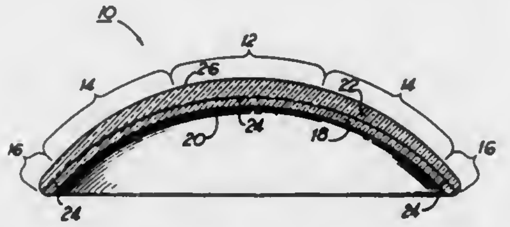
### COLORED CONTACT LENS AND METHODS OF MAKING THE SAME

**Kai C. Su, Alpharetta, and Jeanne S. Stevens-Crowe, Duluth, both of Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Nov. 16, 1988, Ser. No. 272,113**

**Int. Cl.$^5$ G02C** *7/04*

**U.S. Cl. 351—162** **10 Claims**



1. A contact lens capable of at least partially obscuring the natural color of the iris of the eye of a wearer, comprising:

a) a first lens portion having a rear base curve for contacting the eye of a wearer and an opposite top face;

b) a second lens portion having an upper surface that is tinted with a tinting composition for providing the appearance of a desired color to the iris of the eye of the wearer and a curved rear surface which is complementary in shape to said top face of the first lens portion, said first and second lens portions being joined together along said top face of the first lens portion and said curved rear surface of the second lens portion; and

c) means for obscuring at least partially the natural color of the iris of the eye of the wearer located between said first lens portion and said second lens portion said means being substantially translucent and substantially white and being in registry with the iris of the eye of the wearer when the contact lens is worn by the wearer said means aiding in obscuring the natural color of the iris of the eye of the wearer, the portion of said contact lens which is in registry with the pupil of the eye of the wearer when the contact lens is worn being transparent.

---

5,018,850

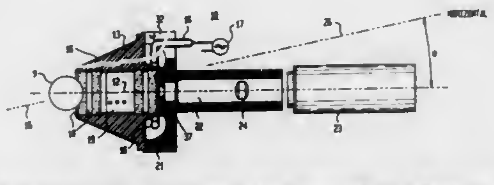
### ILLUMINATED RING DEVICE

**Martin Gersten; Roy Maus, both of Brooklyn, and Lars Tibbling, New York, all of N.Y., assignors to Computed Anatomy Incorporated, New York, N.Y.**

**Filed Mar. 13, 1990, Ser. No. 492,939**

**Int. Cl.$^5$ A61B** *3/10*

**U.S. Cl. 351—212** **5 Claims**



1. Apparatus for providing an illuminated pattern on an object comprising:

a conically shaped body of light previous material having a cylindrical bore defining a series of successive opaque and light transmitting rings and a substantially circular base portion for receiving the light to be transmitted through said rings, said opaque rings being incised in said bore and filled with an opaque coating,

a toroidal, light-emitting device, and

a light box of structurally rigid material for mounting said base portion of said conically shaped body, said light box having a semi-toroidal concavity for accommodating said light emitting device and maintaining said device substantially at the focus of said concavity, thereby to cause substantially all of the light from said device to be transmitted toward said base portion of said conically shaped body.

---

5,018,851

### SLIT ILLUMINATING APPARATUS

**Isao Matsumura, Yokosuka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

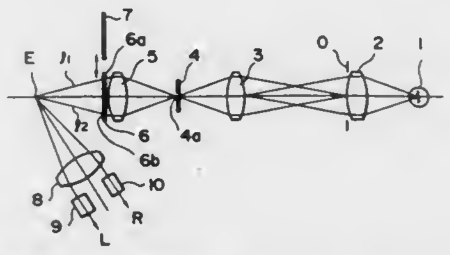
**Continuation of Ser. No. 158,657, Feb. 22, 1988, abandoned.**

**This application Oct. 31, 1989, Ser. No. 430,896**

**Claims priority, application Japan, Feb. 28, 1987, 62-46349**

**Int. Cl.$^5$ A61B** *3/10*

**U.S. Cl. 351—214** **15 Claims**



1. A slit lamp comprising:

an illuminating optical system comprising imaging means for imaging a slit-like light beam on a portion of an eye to be examined; and

an observation optical system for observing therethrough the portion of the eye to be examined illuminated by the slit-like light beam;

said illuminating optical system including aperture means for regulating the direction of application of the slit-like light imaged by said imaging means so as to direct slit-like light beams in different directions at different times on the same portion of the eye to be examined, said aperture means being movable in a direction substantially crossing an optic axis of said imaging means.

---

5,018,852

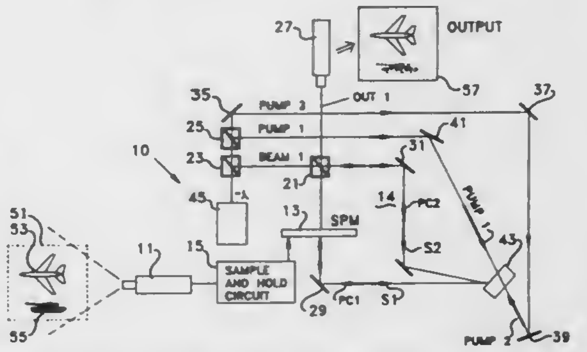
### MOTION DETECTION, NOVELTY FILTERING, AND TARGET TRACKING USING AN INTERFEROMETRIC TECHNIQUE WITH GAAS PHASE CONJUGATE MIRROR

**Li-Jen Cheng, LaCrescenta, and Tsuen-Hsi Lin, Northridge, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Aug. 16, 1990, Ser. No. 568,129**

**Int. Cl.$^5$ G01P** *3/36;* **G01B** *9/02, 9/21*

**U.S. Cl. 356—28.5** **17 Claims**



17. A method of image detection utilizing a phase conjugate interferometer having an output comprising the combination of first and second phase conjugate beams, said method comprising the steps of:

spatially modulating a light beam in one arm of said phase conjugate interferometer in accordance with the image in an object scene;

generating said first and second phase conjugate beams in said interferometer by passing a coherent pump beam through gratings formed in a fast photorefractive crystal; and

supplying said output to a means for converting said output into a visual display, whereby said visual display displays an object in said object scene which is moving at a speed above a speed selected at least in part by the grating formation time of said crystal.

---

5,018,853

### ANGLE SENSOR WITH CCD

**Dennis L. Hechel, New Berlin; Raymond H. Nlemetschek, Brookfield; Tobin Slocum, Waukesha; Gary R. Kercheck, Colgate, and Michael C. Crawford, Milwaukee, all of Wis., assignors to Bear Automotive Service Equipment Company, New Berlin, Wis.**

**Filed Jun. 4, 1990, Ser. No. 533,133**

**Int. Cl.$^5$ G01B** *11/275*

**U.S. Cl. 356—155** **28 Claims**

1. A system for measuring an angular relationship of wheels of a vehicle, the system comprising:

a first head unit for attachment to a first wheel;

a second head unit for attachment to a second wheel;

a radiation source mounted on the first head unit for providing an image, the radiation source having a radiation emitting surface;

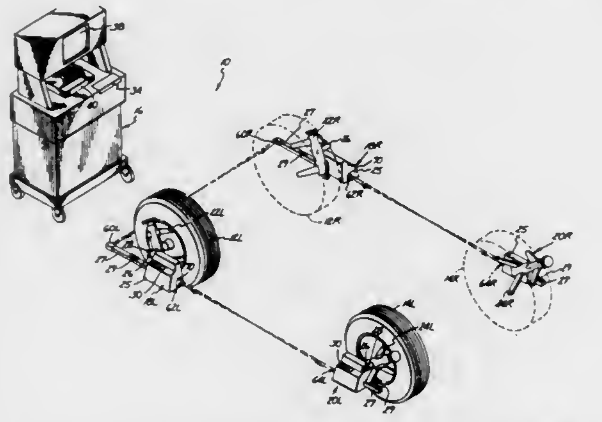
a linear CCD mounted on the second head unit having a plurality of linearly spaced pixel elements for receiving the image from the radiation source and providing a CCD output representative of the image;

means mounted on the second head unit and interposed in a

VOL
1126
ISS
4
MY
28
1991
UMI

plane between the radiation source and the linear CCD for defining an image of the radiation source upon the CCD;

a controller connected to the radiation source and the linear CCD for receiving CCD output and providing an output representative of an angle of a wheel of the vehicle; and



wherein at least one pixel element of the plurality of linearly spaced pixel elements receives radiation from the entire radiation emitting surface of the radiation source.

---

5,018,854

## THREE DIMENSIONAL IMAGING DEVICE

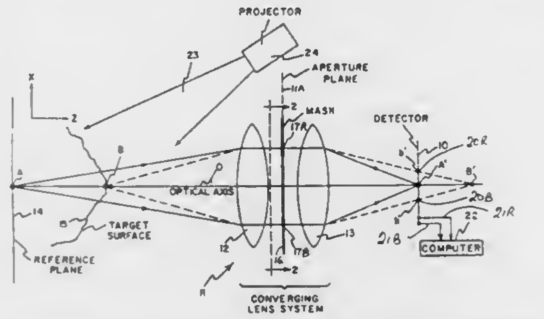
**Marc Rioux, Ottawa, Canada, assignor to National Research Council of Canada, Ottawa, Canada**

**Filed Apr. 10, 1990, Ser. No. 506,792**

**Claims priority, application Canada, Apr. 17, 1989, 596910**

**Int. Cl.⁵ G01B** *11/24*

U.S. Cl. 356—376 6 Claims



1. An imaging device having a converging lens system defining an optical axis extending in a direction Z, and a color sensitive position sensitive detector having a series of pixels extending in at least one of two mutually perpendicular directions X and Y both perpendicular to said direction Z, said lens system serving to simultaneously image a plurality of distributed points on a target surface onto the detector to generate first data on the coordinate of each said point in at least a selected one of the directions X and Y; a mask having a pair of differently colored filters spaced apart from each other in said selected direction for forming discrete images on the detector of each said point in a respective color, whereby to generate, by means of the spacing between said images, second data on the coordinate of each said point in the depiction Z; and means for scanning said pixels to extract said first and second data for all said points.

---

5,018,855

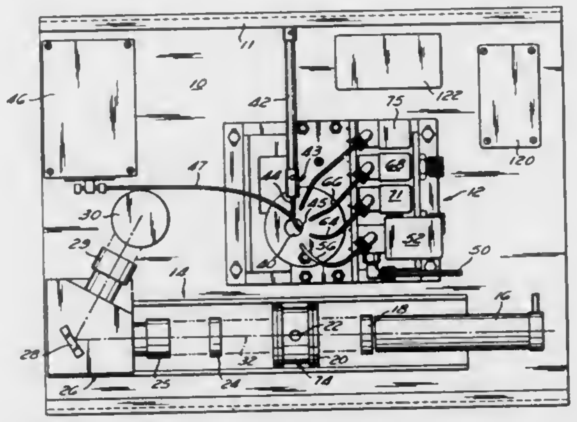
## ATOMIC ABSORPTION PROCESS MONITORING

**John Davison, Mission Viejo, and Chung Hsu, Laguna Hills, both of Calif., assignors to Athens Corp., Oceanside, Calif.**

**Filed Oct. 26, 1988, Ser. No. 262,969**

**Int. Cl.⁵ G01N** *21/74*

U.S. Cl. 356—312 23 Claims



1. An automated analytical instrument for providing continuous on-line monitoring of samples at detection levels below about one part per billion while minimizing exposure of the samples to the environment, having a fluid supply apparatus for delivering a fluid to be analyzed from a source thereof to a sample atomizer having a sample aperture for receiving said sample, said instrument, further, having a heating element with relatively small power requirements which can be rapidly interchanged for heating said fluid in said sample atomizer, comprising:

a sample cup for containing fluid to be analyzed;

a sample probe having a first end movable between a first position in fluid communication with the fluid contents of the sample cup and a second position in communication with the aperture;

a source of a first fluid in valved communication with the sample cup by way of a first vale, so that by opening the first valve, the sample cup is filled with the first fluid;

a source of a second fluid in valved communication with the sample cup by way of a second valve, so that by opening the second valve, the sample cup is filled with the second fluid;

a drain in valved communication with the sample cup by way of a third valve, which, when opened, permits emptying the contents from the sample cup;

a furnace having a wall with the sample aperture for receiving said sample being located thereon;

an elongated substantially electrically non-conductive body at least partially disposed within said furnace;

a heating coil of an electrically conductive material at least partially disposed within said furnace, having a first end and a second end said first end and said second end disposed on or near said non-conductive body, wherein at least one of the fluids is conveyed by the sample probe through the aperture directly onto the coil;

a first conductor in electrical connection with the first end of the heating coil;

a second conductor in electrical connection with the second end of the heating coil,

wherein the sample cup can be selectively filled with a quantity of either of the first and second fluids, and drained and refilled with the other of the first and second fluids.

---

5,018,856

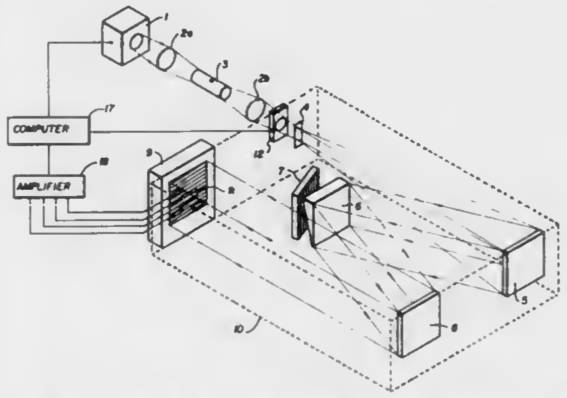
## CONTINUUM SOURCE ATOMIC ABSORPTION SPECTROMETRY

**James M. Harnly, Bethesda; Gary P. Moulton, Germantown, and Thomas C. O'Haver, Silver Spring, all of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C. and The University of Maryland, College Park, Md.**

**Filed Oct. 30, 1989, Ser. No. 428,529**

**Int. Cl.⁵ G01J** *3/30, 3/40, 3/28*

U.S. Cl. 356—312 16 Claims



1. A method for atomic absorption analysis, comprising the steps of:

atomizing a sample to be analyzed;

illuminating the atomized sample with a continuum light source means for emitting intensities from about 180 to about 800 nm, to produce a resultant light;

directing said resultant light through a light dispersing means onto a focal plane of said light dispersing means, thereby providing images each having an image width;

detecting light simultaneously at more than one wavelength at said focal plane of said light dispersing means using an integrating array detector means for integrating with respect to time the amount of light incident on said integrating array detector means and for converting the incident light into amplified electrical signals proportional to the integrated intensities of the incident light, said integrating array detector means spanning a small wavelength region of about 4 to about 10 times a said image width;

blocking said incident light from striking said detector means,

during said step of blocking utilizing said detector means to convert integrated intensities of incident light into amplified electrical signals which are proportional to said integrated intensities;

deriving from said amplified electrical signals a value, proportional to concentration, and independent of intensity, and;

repeating said steps of blocking and converting at a rate of at least 40 times per second.

---

5,018,857

## PASSIVE RING RESONATOR GYRO WITH POLARIZATION ROTATING RING PATH

**Glen A. Sanders, Plymouth; Robert B. Smith, St. Anthony, and Gordon F. Rouse, Arden Hills, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Sep. 15, 1988, Ser. No. 244,983**

**Int. Cl.⁵ G01B** *9/02;* **G01C** *19/64*

U.S. Cl. 356—350 21 Claims

1. A ring resonator gyro comprising:

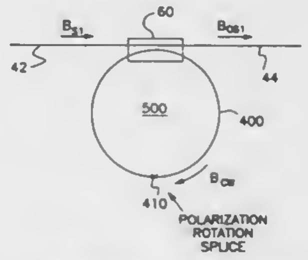
a ring resonator including, at least in part, a birefringent waveguide portion having principal axes of birefringence, and in which at some selected point along said birefringent waveguide, said principal axes of birefringence are rotated by a selected angle about the axis of propagation direction of said waveguide;

first means for producing first and second electromagnetic waves outside said ring resonator; and

coupling means for

coupling a first portion of said first electromagnetic wave into said ring resonator to propagate in a first direction along said axis of propagation direction of said waveguide, and

coupling a first portion of said second electromagnetic wave into said ring resonator to propagate in a second direction along said axis of propagation direction of said waveguide opposite said first direction.



---

5,018,858

## RING RESONATOR GYROSCOPE CONTROL SYSTEM WITH GAIN DIFFERENCE EQUALIZATION

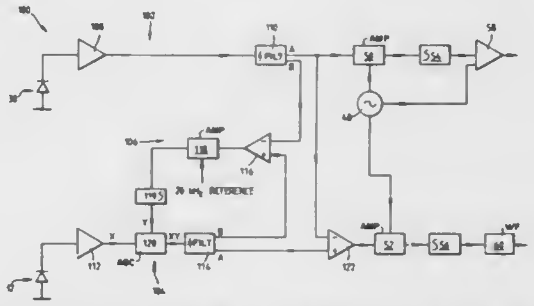
**Allan R. Malvern, Bracknell, England, assignor to British Aerospace Public Limited Company, London, England**

Filed Sep. 27, 1989, Ser. No. 412,805

Claims priority, application United Kingdom, Oct. 4, 1988, 8823250

Int. Cl.⁵ G01B *9/02*

U.S. Cl. 356—350 16 Claims



1. A system for controlling characteristics of a ring resonator gyroscope in which, in use, there are two beams, one travelling in a first direction and the other travelling in a second direction different than the first direction comprising:

a first channel comprising first detector means for receiving a portion of the first direction beam and first amplifier means for amplifying a signal from the first detector means to form a first signal;

a second channel comprising second detector means for receiving a portion of the second direction beam and second amplifier means for amplifying a signal from the second detector means to form a second signal;

means for obtaining samples of the first and second signals and for comparing the samples; and

gain control means for nulling gain differences between the first and second channels based on an amount of difference between said samples.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,859

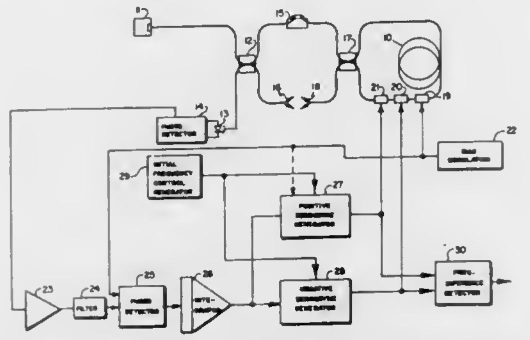
### FIBER OPTIC GYROSCOPE BALANCED PLURAL SERRODYNE MODULATORS PHASE DIFFERENCE CONTROL

Chin L. Chang, and Rudolf C. Dankwort, both of Phoenix, Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 26, 1989, Ser. No. 302,484

Int. Cl.⁵ G01B *9/02*

U.S. Cl. 356—350 23 Claims



1. A phase difference controller for a rotation sensor capable of sensing rotation about an axis of a coiled optical fiber based on having a pair of electromagnetic waves propagating through said optical fiber in opposing directions to both impinge on a photodetector with a phase difference relationship therebetween, said phase difference controller comprising:

a phase detector means having an input electrically connected to said photodetector to receive an output signal therefrom representative of phase differences occurring in pairs of electromagnetic waves impinging thereon, said phase detector means being capable of providing an output signal on an output thereof representative of both magnitude and direction of said phase differences indicated by said photodetector output signal;

a dual generator means having an input electrically connected to said phase detector means output to receive said phase detector means output signal, said dual output generator means having first and second outputs and being capable of providing a pair of output signals including a first output signal at said first output thereof and a second output signal at said second output thereof, said first output signal having a basic waveform portion repeated at selected frequencies consisting of a relatively long duration of substantially monotonically changing magnitude in one magnitude direction followed by a much shorter duration of substantially monotonically changing magnitude in an opposite magnitude direction, said second output signal having a basic waveform portion repeated at selected frequencies consisting of a relatively long duration of substantially monotonically changing magnitude in one magnitude direction followed by a much shorter duration of substantially monotonically changing magnitude in an opposite magnitude direction, said frequencies of said first and second output signals being determined by said phase detector means output signal with each being of a selected initial value absent any substantial rotation of said coiled optical fiber about said axis thereof, said dual output generator means first output signal having a change in frequency value in one magnitude direction for said coiled optical fiber rotating in one direction about said axis thereof and said dual output generator means second output signal having a change in frequency value in that same magnitude direction for said coiled optical fiber rotating in an opposite direction about said axis thereof so as to tend toward reducing differences in harmonics therebetween to thereby tend toward maintaining substantially constant that ratio occurring between values of an output of said rotation sensor and corresponding rates of rotation of said coiled optical fiber over both directions of rotation about said axis thereof; and

a pair of frequency translation means including a first frequency translation means electrically connected to said dual output generator means first output and a second frequency translation means electrically connected to said dual output generator means second output, said first and second frequency translation means each being positioned in a corresponding optical path portion selected from among those optical path portions taken by electromagnetic waves to reach or leave said coiled optical fiber enroute on an optical path to said photodetector in said rotation sensor to be capable of providing a frequency translation of any such electromagnetic waves passing therethrough in propagating along said optical path.

---

### 5,018,860

### FIBER OPTIC GYROSCOPE BALANCED PLURAL SERRODYNE GENERATORS COMBINED SIGNAL PHASE DIFFERENCE CONTROL

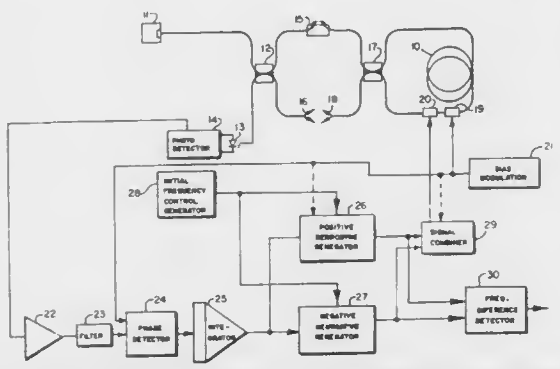
Michael S. Bielas, Phoenix, and Tamim F. El-Wailly, Peoria, both of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 26, 1989, Ser. No. 302,157

The portion of the term of this patent subsequent to May 28, 2008, has been disclaimed.

Int. Cl.⁵ G01B *9/02*

U.S. Cl. 356—350 21 Claims



1. A phase difference controller for a rotation sensor capable of sensing rotation about an axis of a coiled optical fiber based on having a pair of electromagnetic waves propagating through said optical fiber in opposing directions to both impinge on a photodetector with a phase difference relationship therebetween, said phase difference controller comprising:

a phase detector means having an input electrically connected to said photodetector to receive an output signal therefrom representative of phase differences occurring in pairs of electromagnetic waves impinging thereon, said phase detector means being capable of providing an output signal on an output thereof representative of both magnitude and direction of said phase differences indicated by said photodetector output signal;

a dual output generator means having an input electrically connected to said phase detector means output to receive said phase detector means output signal, said dual output generator means having first and second outputs and being capable of providing a pair of output signals including a first output signal at said first output thereof and a second output signal at said second output thereof, said first output signal having a basic waveform portion repeated at selected frequencies consisting of a relatively long duration of substantially increasing amplitude followed by a much shorter duration of substantially decreasing amplitude, said second output signal having a basic waveform portion repeated at selected frequencies consisting of a relatively long duration of substantially decreasing amplitude followed by a much shorter duration of substantially increasing amplitude, said frequencies of said first and second output signals being determined by said phase detector means output signal with each being of a selected initial value absent any substantial rotation of said coiled optical fiber about said axis thereof, said dual output generator means first output signal having an increased frequency value for said coiled optical fiber rotating in one direction about said axis thereof and said dual output generator means second output signal having an increased frequency value for said coiled optical fiber rotating in an opposite direction about said axis thereof so as to tend toward reducing differences in harmonics therebetween to thereby tend toward maintaining substantially constant that ratio occurring between values of an output of said rotation sensor and corresponding rates of rotation of said coiled optical fiber over both directions of rotation about said axis thereof;

a first combining means having an output and a pair of inputs with each of said pair of inputs being connected to one of said dual generator means first and second outputs, said first combining means being able to receive on each of its pair of inputs a signal and provide an output signal on its output representing a combination of those signals received on its inputs; and

a frequency translation means electrically connected to said first combining means output, said frequency translation means being positioned in a corresponding optical path portion selected from among those optical path portions taken by electromagnetic waves to reach or leave said coiled optical fiber enroute on an optical path to said photodetector in said rotation sensor to be capable of providing a frequency translation of any such electromagnetic wave passing therethrough in propagating along said optical path.

---

### 5,018,861

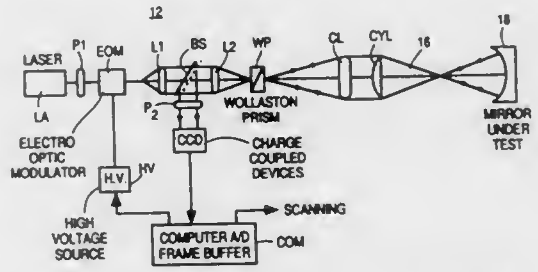
### METHODS AND MEANS FOR FULL-SURFACE INTERFEROMETRIC TESTING OF GRAZING INCIDENCE MIRRORS

John L. Remo, St. James, N.Y., assignor to Quantametrics Inc., St. James, N.Y.

Filed Jun. 22, 1989, Ser. No. 370,306

Int. Cl.⁵ G01B *9/02*

U.S. Cl. 356—353 2 Claims



1. An apparatus for measuring the characteristics of an optical device, comprising:

normal incidence, sub-aperture interferometry means for obtaining sequential data from sequential overlapping sub-aperture areas of the optical device;

said interferometry means including polarization shearing means for shear polarizing light in said sub-aperture interferometry means;

synthesizing means coupled to said interferometry means for analyzing the characteristics obtained from said interferometry means; and

said synthesizing means including means for combining the sequential data from the sequential overlapping sub-aperture areas of the optical device.

---

### 5,018,862

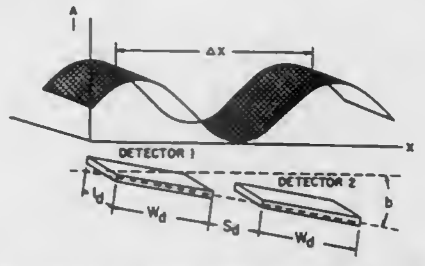
### SUCCESSIVE FRINGE DETECTION POSITION INTERFEROMETRY

Marc F. Aiello, Pittsburgh, Pa., assignor to Aerotech, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 430,568, Nov. 2, 1989, abandoned. This application Aug. 8, 1990, Ser. No. 564,394

Int. Cl.⁵ G01B *9/02*

U.S. Cl. 356—358 16 Claims



1. A stable single-frequency laser interferometer for measuring a distance comprising:

a) power stabilized lasing means for providing a stable coherent single-frequency first light beam,

b) means for splitting the first light beam to form a reference beam and a measurement beam and for directing the reference beam along a reference path having a fixed optical distance, there being a reference retro prism in said reference path, and for directing the measurement beam along a measurement path the optical distance of which varies with the distance being measured, there being a measurement retro prism in said measurement path,

c) a dual light sensor comprising two closely spaced very small sensor surfaces mounted in substantially the same plane,

d) means including said splitting means for recombining the measurement and reference beams to form a single fringe pattern where they overlap over the dual sensor, and

e) means to adjust the effective convergent angle of the recombining beams to have a sufficiently large effective convergent angle to promote stability and whereby the output signals of the two sensors are brought into phase quadrature.

---

### 5,018,863

### APPARATUS FOR ANALYSIS BY ELLIPSOMETRY, PROCEDURE FOR ELLIPSOMETRIC ANALYSIS OF A SAMPLE AND APPLICATION TO THE MEASUREMENT OF VARIATIONS IN THE THICKNESS OF THIN FILMS

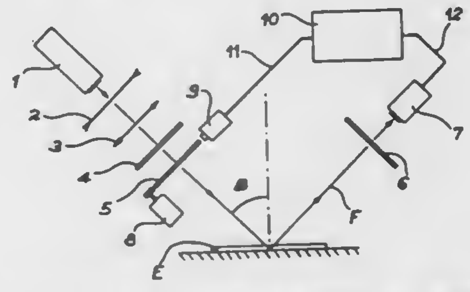
Aimé Vareille, 3 rue Gabriel Didier, 38130 Echirolles; Yves Vuillod, Cidex 237B 5 Lotissement du Coteau, 38790 Crolles, and Louis Thevenot, 3, Allee de la Piat, 38240 Meylan (F), all of France

Filed Mar. 6, 1989, Ser. No. 319,001

Claims priority, application France, Mar. 4, 1988, 88 02784

Int. Cl.⁵ G01N *21/21*

U.S. Cl. 356—369 14 Claims



1. An apparatus for analysis of a sample by ellipsometry, comprising:

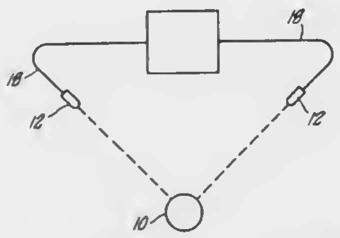
VOL
1126
ISS
4
MY
28
1991
UMI

a source of a light beam having a beam path toward said sample;
a plane-polarizing plate on said beam path between said source and said sample;
a measuring setup located along said beam path after said light beam has encountered said sample;
an analyzer located along said beam path between said sample and said measuring setup;
at least one element, located between said source and said sample, for splitting the beam into two waves of different phase; means for rotating said at least one element for splitting the beam around an axis that is substantially coaxial with the light beam at a frequency ω, said measuring setup including means responsive to components of said light beam at 2ω and 4ω.

---

### 5,018,864
## PRODUCT DISCRIMINATION SYSTEM AND METHOD THEREFOR

**Gerald R. Richert, Three Rivers, Calif., assignor to OMS-Optical Measuring Systems, Three Rivers, Calif.**
**Continuation-in-part of Ser. No. 204,685, Jun. 9, 1988, abandoned. This application Jun. 30, 1989, Ser. No. 375,319**
**Int. Cl.$^5$ G01B *11/02***
**U.S. Cl. 356—372** **16 Claims**



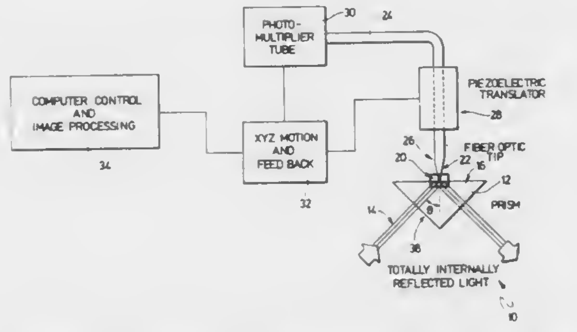
1. A method for distinguishing between adjacent product units conveyed substantially in single file, comprising the steps of
conveying product units along a conveying path;
repeatedly measuring in a thin scan area extending across the conveying path a representation of the local width of product conveyed along the conveying path past the scan area, said repeated measuring covering substantially contiguous areas of product;
comparing sequential width representations, noting increases and decreases in product widths and effectively ignoring width representations having no change greater than a threshold change over immediately prior said width representations;
distinguishing between product units when a selected plurality of decreases in width representations is followed by a selected plurality of increases in width representations.

---

### 5,018,865
## PHOTON SCANNING TUNNELING MICROSCOPY

**Thomas L. Ferrell, 1100 Hickory Trail Dr.; Robert J. Warmack, 12024 Ridgeland Dr., both of Knoxville, and Robin C. Reddick, Rte. 3, Box 315, Louisville, all of Tenn. 37932**
**Filed Oct. 21, 1988, Ser. No. 260,926**
**Int. Cl.$^5$ G01B *11/24***
**U.S. Cl. 356—376** **41 Claims**

1. A method for detecting properties of a near-field of light adjacent to a sample area on a surface comprising:
generating a near-field of light adjacent to the surface, the near-field having an increasing intensity in a direction perpendicular to and towards the surface and having substantially constant intensity at a substantially constant distance from the surface;
positioning a physical probe within the near-field and adjacent to the sample area to couple with and receive light from the near-field; and

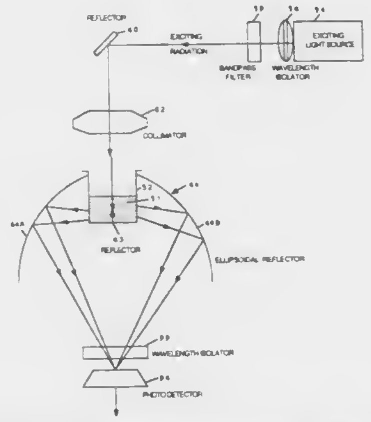


monitoring the amount of light received by the probe and producing an output signal corresponding to properties of the near-field adjacent to the sample area.

---

### 5,018,866
## METHOD AND APPARATUS FOR PERFORMING HIGH SENSITIVITY FLUORESCENCE MEASUREMENTS

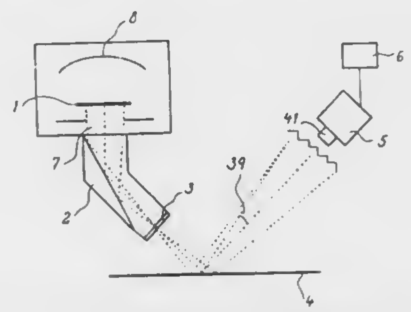
**Donald E. Osten, Bolingbrook, Ill., assignor to Packard Instrument Company, Downers Grove, Ill.**
**Filed Sep. 12, 1989, Ser. No. 405,963**
**Int. Cl.$^5$ G01N *21/64***
**U.S. Cl. 356—417** **15 Claims**



1. A method of performing fluorescence measurements on a sample capable of being activated by exciting radiation, said method comprising the steps of:
enclosing the sample within a container having
surrounding walls and an open side facing a bottom surface, said bottom surface having reflector means for reflecting any radiation incident thereupon;
introducing a beam of exciting radiation through said open side of container directly onto the sample contained therein in a direction normal to said reflector surface in such a way that said beam does not reach said container walls, thereby avoiding any secondary fluorescence therefrom, any portion of said beam which is unabsorbed by the sample and traverses through the sample to strike said reflector means on;
said bottom surface being reflected therefrom back through the sample without reaching said container walls, thereby avoiding any secondary fluorescence therefrom;
collecting fluorescent radiation from the sample through collector means surrounding said container walls, said collector means being adapted to focus said fluorescent radiation incident thereupon onto a predefined area; and
detecting and measuring said fluorescent radiation focused onto said predefined area.

### 5,018,867
## METHOD AND APPARATUS FOR THE INSPECTION OF SPECULARLY REFLECTIVE SURFACES

**Timo H. Piironen, Raahe, Finland, assignor to Rautaruukki Oy, Oulu, Finland**
**Filed Apr. 20, 1989, Ser. No. 341,135**
**Claims priority, application Finland, Apr. 21, 1988, 881857**
**Int. Cl.$^5$ G01N *21/86***
**U.S. Cl. 356—445** **9 Claims**

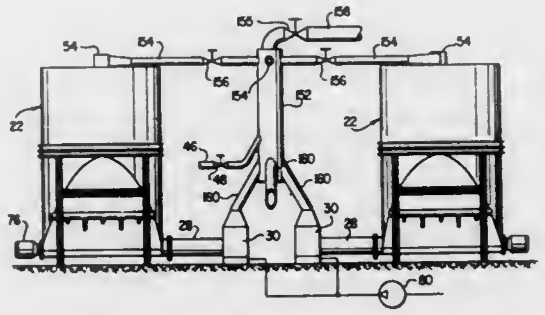


1. A device for inspecting a reflective surface, comprising:
a light source,
a lens for directing light from the light source to the surface,
light receiving means for receiving light reflected from the surface, the light receiving means comprising a receiver apparatus, an input pupil having a diameter and optics for forming an image of the surface on the receiver apparatus,
the light source and the light receiving means being disposed so that light directed from the light source to the surface and light reflected from the surface to the light receiving means define substantially equal angles,
the lens being disposed to form an image of the light source at the input pupil,
the optics being disposed to form an image of the surface on the receiver apparatus,
the size of the image of the light source at the input pupil being greater than the diameter of the input pupil.

---

### 5,018,868
## CEMENT STORAGE AND MIXING SYSTEM

**Lloyd A. Baillie, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.**
**Division of Ser. No. 244,588, Sep. 13, 1988, Pat. No. 4,896,968, which is a continuation of Ser. No. 38,693, Apr. 15, 1987, abandoned. This application Nov. 8, 1989, Ser. No. 433,314**
**Int. Cl.$^5$ B28C *5/06;* B01F *13/02***
**U.S. Cl. 366—10** **7 Claims**

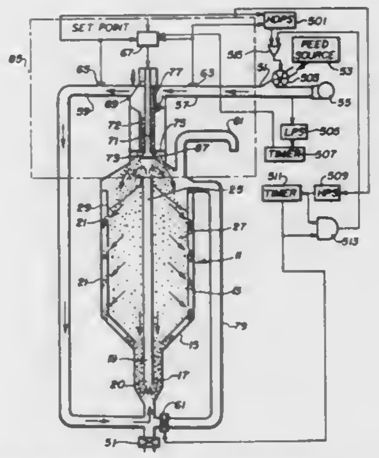


1. A system for storing, mixing and discharging dry cement material and operable to minimize separation of said dry cement material by at least one of elutriation and percolation, said system comprising:
a plurality of cement storage bins, each having a material receiving chamber and means forming a bottom discharge opening for discharging dry cement material therefrom, respectively;
plural mechanical screw conveyors including at least one mechanical screw conveyor connected to each of said bins, respectively, and in communication with said bottom discharge opening for mechanically conveying dry cement material away from said bins, respectively;
plural pneumatic conveying means including at least one pneumatic conveying means connected to each of said mechanical conveyors for receiving dry cement material therefrom, respectively, and including a material fluidizing plenum and means for introducing pressure air into said plenum for conveying dry cement material from said mechanical conveyor to a common material discharge conduit;
a generally vertically extending dry cement material common discharge conduit disposed adjacent to and in communication with each of said pneumatic conveying means, respectively, for receiving fluidized dry cement material;
material loading conduits connected to said common discharge conduit and to each of said bins, respectively, for circulating fluidized dry cement material to selected ones of said bins to selectively load dry cement material and said selected ones of said bins and to re-mix said dry cement material to minimize the effects of said one of elutriation and percolation during loading and storage of said dry cement material in said selected ones of said bins; and
a final discharge conduit connected to said common discharge conduit for conducting dry cement material from said system.

---

### 5,018,869
## METHOD AND APPARATUS USING FEED CONVEYING FLUID FOR BLENDING THE FEED AND/OR SEPARATING DEBRIS FROM THE FEED

**Kermit D. Paul, Bethlehem, Pa., assignor to Fuller Company, Bethlehem, Pa.**
**Filed Sep. 5, 1989, Ser. No. 402,552**
**Int. Cl.$^5$ B01F *13/02***
**U.S. Cl. 366—101** **49 Claims**



1. A material blending system comprising:
a blending vessel for blending a material contained therein, said blending vessel having a feed input for introducing a material to be blended into said vessel, a separate fluid input for receiving a fluid used for blending a material within said vessel, and means for blending a material introduced into said vessel using a fluid supplied to said fluid input;
means for supplying a material to be blended in a conveying fluid stream;
means for separating said material to be blended from said conveying fluid stream and guiding separated material to said blending vessel feed input; and
means for applying said conveying fluid stream having said material separated therefrom to said fluid input of said blending vessel.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,870

### DUAL-PUMP MIXING AND FEEDING APPARATUS

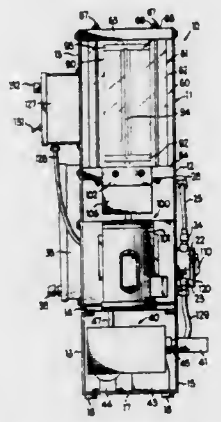
**Carl L. Brazelton, Austin, Tex.; Troy C. Litherland, Bradley, and James G. Johnston, Yorkville, both of Ill., assignors to Stranco, Inc., Bradley, Ill.**

**Continuation of Ser. No. 783,854, Oct. 3, 1985, Pat. No. 4,920,519. This application Feb. 23, 1990, Ser. No. 483,821**

**The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.**

**Int. Cl.⁵ B01F** *5/04, 7/20*

U.S. Cl. 366—161 **3 Claims**



1. Mixing and feeding apparatus for receiving polymer and water and for activating and diluting the polymer, comprising a frame, a vessel mounted on said frame defining a chamber therein, said vessel having a water inlet and a first polymer inlet and a second polymer inlet and an outlet, means for carrying water to said water inlet, first pump means for pumping an emulsion polymer to said first polymer inlet, second pump means for pumping a solution polymer to said second polymer inlet, means in said chamber for mixing the polymer and the water, means for energizing said first pump means, means for energizing said second pump means, and control means for selectively controlling the operation of both of said means for energizing.

---

### 5,018,871

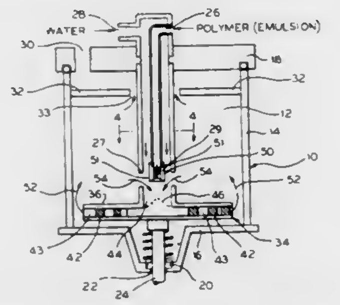
### POLYMER DILUTION AND ACTIVATION APPARATUS

**Carl L. Brazelton, Kankakee, and Troy C. Litherland, Bradley, both of Ill., assignors to Stranco, Inc., Bradley, Ill.**

**Filed Jul. 19, 1989, Ser. No. 382,613**

**Int. Cl.⁵ B01F** *15/02*

U.S. Cl. 366—168 **1 Claim**



1. Apparatus for mixing a polymer emulsion in dilution water to form a solution comprising

a chamber having a first inlet for the polymer emulsion, a second inlet for the water and an outlet for removing the solution of polymer and water from said chamber;

an impeller having a flat top surface, a flat bottom surface, and a circular outer edge, said impeller being rotatable about a central axis;

means for rotating said impeller at a selected rate of rotation;

said impeller having an eye in said top surface and a plurality of spaced internal tongues which form internal channels extending from said eye to said outer edge, said impeller creating a vacuum in a space in and adjacent to said eye and centrifugal force at said edge when said impeller rotates, so that polymer and water entering said inlets passes through said eye and said channels under pressure;

said inlets extending adjacent to said eye to place the polymer and water in said eye and said vacuum space within a distance of about 1 inch of said eye, said inlets being spaced away from said eye to permit a portion of the solution to re-enter said eye; and

check valve means secured to said polymer inlet for controlling the entry of the polymer into said eye, said channels and said chamber;

whereby the polymer is mixed with the water without substantial agglomeration of polymer molecules into gel aggregates.

---

### 5,018,872

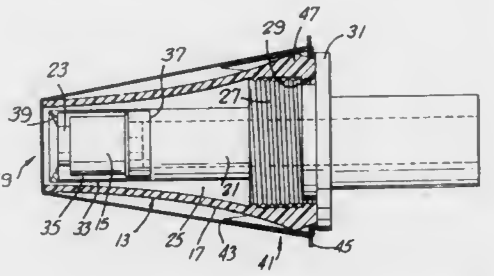
### PROBE ASSEMBLY FOR INFRARED THERMOMETER

**Edward D. Suszynski, Vista; Kerry Banke, La Mesa, and Thomas K. Gregory, Carlsbad, all of Calif., assignors to Diatek, Inc., San Diego, Calif.**

**Continuation-in-part of Ser. No. 265,881, Nov. 1, 1988, abandoned. This application Oct. 5, 1989, Ser. No. 417,267**

**Int. Cl.⁵ G01J** *5/06, 5/12;* **G01K** *1/08, 7/02*

U.S. Ci. 374—133 **19 Claims**



1. An infrared medical thermometer for measuring a patient's body temperature by sensing infrared radiation transmitted along the patient's ear canal, the thermometer comprising:

an elongated, thin-walled outer tube having an open forward end sized to fit snugly in the opening of a patient's ear canal;

an elongated heat sink located within the tube and having a forward end;

a sensor container secured to the forward end of the heat sink and positioned within the tube, adjacent to the tube's forward end;

an infrared sensor located within the sensor container and including a hot junction facing the tube's forward end and a cold junction facing the heat sink; and

heat-conductive shield means secured to the forward end of the heat sink, the shield means including a cylindrical shield encircling the infrared sensor container;

wherein the tube, heat sink, and cylindrical shield are sized to define an outer annular cavity between the tube and the cylindrical shield, and wherein the cylindrical shield, heat sink, and sensor container are sized to define an inner annular cavity between the cylindrical shield and the sensor container, the outer and inner annular cavities being concentric with each other and cooperating to prevent heat received from the patient's ear canal from reaching the cold junction of the infrared sensor for sufficient time to enable the patient's body temperature to be accurately measured.

### 5,018,873

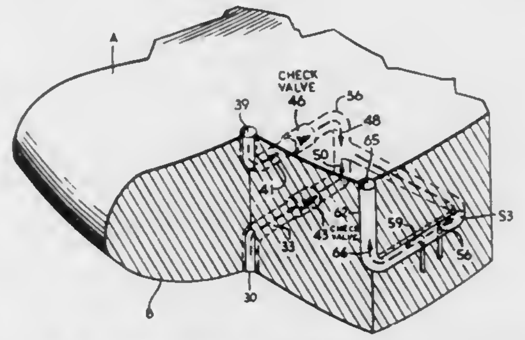
### AIR TEMPERATURE MEASUREMENT

**Melvin Bobo, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio**

**Filed Apr. 22, 1985, Ser. No. 725,964**

**Int. Cl.⁵ G01K** *13/02;* **F02B** *39/04*

U.S. Cl. 374—144 **10 Claims**



1. In an aircraft engine nacelle, the improvement comprising:

(a) a temperature sensor;

(b) means for maintaining a first airlow across the temperature sensor during takeoff; and

(c) means for maintaining a second airflow across the temperature sensor during cruise which is less than the first airflow.

---

### 5,018,874

### TEMPERATURE MONITORING DEVICE CONTAINING AT LEAST ONE ELEMENT OF AN ALLOY WHICH MEMORIZES ITS SHAPE

**Renée P. Weynant née Girones, Cadenet, France, assignor to G.I.R., Cadenet, France**

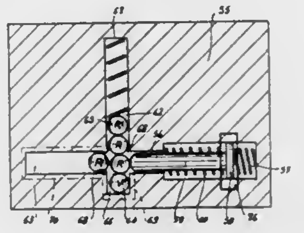
**PCT No. PCT/FR89/00510, § 371 Date Jun. 1, 1990, § 102(e) Date Jun. 1, 1990, PCT Pub. No. WO90/04156, PCT Pub. Date Apr. 19, 1990**

**PCT Filed Oct. 3, 1989, Ser. No. 499,333**

**Claims priority, application France, Oct. 4, 1988, 88 13245**

**Int. Cl.⁵ G01K** *3/00, 1/02*

U.S. Cl. 374—205 **11 Claims**



1. A temperature monitoring device, comprising:

a casing of a generally rectangular shape provided with two elongate chambers at right angels to one another and leading one into the other;

a motor element in said casing and comprising a spring received in a first of said chambers and composed of a shape-memorizing alloy, an end of said spring bearing against a bottom of said first chamber;

a movement transmission element operatively coupled with said motor element and including a piston against which another end of said spring bears, and a rod projecting from said piston and having an end closing an end of a second of said chambers when said spring is in a relaxed position; and

indicator means acted upon by said transmission element for irreversibly recording each overstepping of a predetermined temperature, said indicator means including balls received in said second chamber under a pressure urging said balls resiliently toward an opening of said second chamber communicating with said first chamber, said balls being adapted to be transferred to a part of said first chamber not containing said spring upon movement of said rod, said casing being formed with a transparent window over a portion thereof corresponding to said part of said first chamber to enable the presence of balls in said part to be ascertained.

---

### 5,018,875

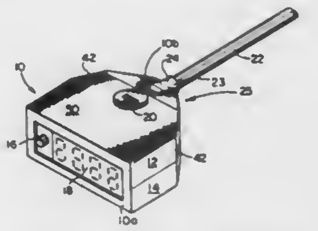
### DIGITAL THERMOMETER WITH PIVOTABLE PROBE

**Tur[illegible] A. Cook, Perkasie, Pa., assignor to PSG Industries, Inc., Perkasie, Pa.**

**Filed May 17, 1990, Ser. No. 525,366**

**Int. Cl.⁵ G01K** *7/04*

U.S. Cl. 374—208 **3 Claims**



1. A digital temperature indicating apparatus comprising:

a probe having a sensing end and a casing end, the casing end including a pivot boss extending generally transversely with respect to said probe, said pivot boss having a first end and a second end, the first and second ends being generally aligned along a common axis;

sensor means within the probe proximate the sensing end for sensing the temperature proximate the sensing end of the probe and generating an electrical signal proportionate to the sensed temperature;

casing means have a display end and a probe end for supporting the casing end of the probe, said casing means including support means positioned on the probe end for receiving the first and second ends of the pivot boss, such that the pivot boss and probe can pivot with respect to the casing means;

electronic means within said casing means and electrically connected to the sensor means for receiving the electrical signal and converting the electrical signal to a digital temperature signal; and

digital display means on the casing means for receiving the digital temperature signal and displaying the sensed temperature, whereby the casing means can pivot with respect to the probe for allowing the digital display means to be viewed from a plurality of perspectives.

---

### 5,018,876

### DIVIDED SEPARABLE TRASH BAG

**Robert M. Meanella, Kensington Station 419 McDonald Ave., Brooklyn, N.Y. 11218**

**Filed Jan. 2, 1990, Ser. No. 459,659**

**Int. Cl.⁵ B65D** *30/02, 30/22*

U.S. Cl. 383—1 **12 Claims**

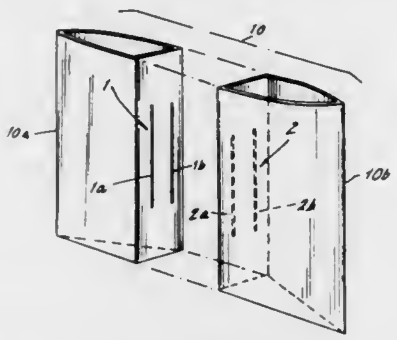
1. A divided trash bag comprising:

first and second bag halves, having at least first and second respective side surfaces;

first connecting means on the first side surface and second connecting means on the second side surface, said first and second connecting means being readily connected to and

VOL
1126
ISS
4
MY
28
1991
UMI

disconnected from each other for attaching and separating said two bag halves;

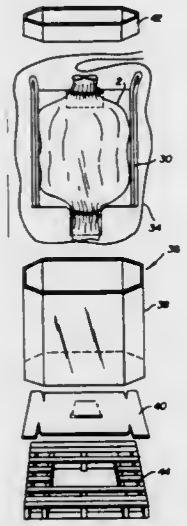


said first bag half and first connecting means being made of a biodegradable plastic.

---

### 5,018,877
## PACKAGING ASSEMBLY FOR CONTAMINABLE MATERIALS

**John F. Kantz, Oxford, N.J., assignor to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.**
**Filed Feb. 26, 1990, Ser. No. 484,781**
**Int. Cl.⁵ B65D** *30/04, 33/36*
U.S. Cl. 383—67 2 Claims

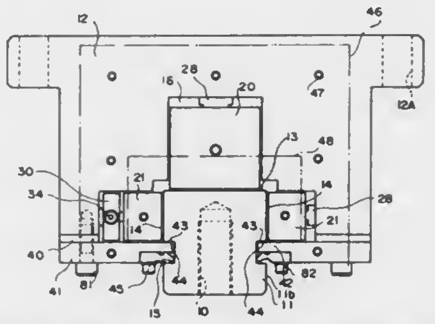


1. A package assembly for providing ultra-clean storage and gravity discharge of contaminatable powder or granular materials which comprises an outer container, a sterile vapor impermeable bag within said container, a woven outer liner completely surrounding and enclosing said bag and a vapor impermeable outer sheet covering enclosing said bag and said woven outer liner said bag having a bag body an inlet and an outlet, said inlet and outlet being closed when said bag accommodates said material to prevent contamination of said material, said outlet defining an opening, a flexible vapor impermeable tubular inner sheet extending from said opening and having a discharge end, a vapor impermeable tubular outer sheet enveloping said inner sheet terminating in a closed end, said inner sheet being secured by releasable securing means proximate said opening to prevent discharge of materials from said opening whereby when said inner sheet is positioned in a receiving means and said terminal end of said outer sheet is open and positioned around said receiving means and secured thereto, release of said securing means permits discharge of said material into said receiving means without contamination of said material.

---

### 5,018,878
## LINEAR GUIDE APPARATUS USING ROLLER TYPE LINEAR BEARING

**Toru Tsukada, Maebashi, and Hitoshi Yamada, Takasaki, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**
**Filed Aug. 2, 1990, Ser. No. 561,904**
**Claims priority, application Japan, Ang. 4, 1989, 1-92064**[U]
**Int. Cl.⁵ F16C** *29/06*
U.S. Cl. 384—44 3 Claims



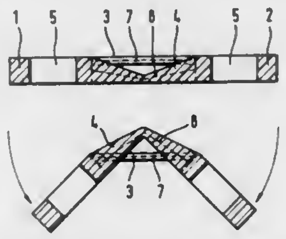
1. In a linear guide apparatus using roller type linear bearings comprising an axially extending guide rail and having axial track surfaces on outer surfaces thereof, a slider straddlingly mounted on said guide rail and movable in an axial direction along the track surfaces, and roller type linear bearings attached to inner surfaces of said slider facing the outer surfaces of said guide rail, said roller type linear bearings having roller trains respectively rolling on the track surfaces of said guide rail, the improvement comprising:
- said guide rail has on an upper surface thereof a main track surface for one of said roller type translation bearings which receives a main load of said slider, has on both lateral side surfaces thereof respectively sub-track surfaces for two of said roller type translation bearings which receive lateral loads of said slider, and has grooves respectively formed in the lateral side surface extending axially along the sub-tracks;
- said slider includes said roller type linear bearings having infinitely circulating roller trains respectively attached to positions respectively opposing the main track and the sub-track surfaces of said guide rail; and
- said slider further includes protruding portions formed at positions respectively opposing the sub-tracks of said guide rail, the protruding portions respectively having sliding surfaces which slide on the grooves in the lateral side surfaces of said guide rail and have seal members mounted thereon.

---

### 5,018,879
## CAGE FOR ROLLING BEARINGS WITH LONGITUDINAL MOVEMENTS

**Jürgen Rabe, Aurachtal, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany**
**Filed Sep. 4, 1990, Ser. No. 577,266**
**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1989, 3931446**
Int. Cl.⁵ F16C *29/04, 33/46*
U.S. Cl. 384—51 3 Claims

1. A cage made of polymeric material for a rolling bearing for longitudinal movements comprising two longish, parallel cage plates disposed at a distance from each other and containing pockets arranged crosswise to their longitudinal extension for the reception of cylindrical rolling elements, the cage plates being joined to each other by at least one first crossbar made in one piece with the cage plates and extending over a part of the length of the cage plates, the thickness of the crossbar being less than the thickness of the cage plates and the crossbar acts as a film hinge to permit the cage plates to be brought into different inclined positions relative to each other, characterized in that at least one other crossbar is arranged along another partial length of the cage plates and has a roof-like shape

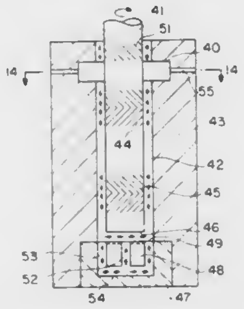


so that its neutral axis between the two cage plates is longer than the neutral axis of the first-mentioned crossbar.

---

### 5,018,880
## DYNAMIC PRESSURE BEARING DEVICE

**Mikio Nakasugi, Chofu, and Yoshiaki Watanabe, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Filed Jun. 28, 1989, Ser. No. 372,613**
**Claims priority, application Japan, Jun. 28, 1988, 63-158119; Jul. 1, 1988, 63-162614; Feb. 15, 1989, 1-035564**
**Int. Cl.⁵ F16C** *17/10*
U.S. Cl. 384—112 14 Claims



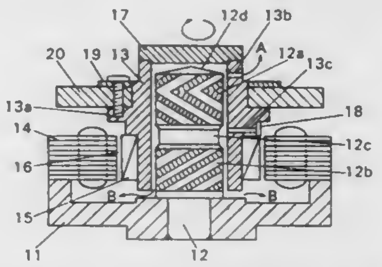
1. A dynamic pressure bearing device, comprising:
- a shaft member;
- a sleeve member rotatable relative to said shaft member and for accommodating said shaft member therein;
- first dynamic pressure producing means for producing a dynamic pressure for relatively supporting said shaft member and said sleeve member in a radial direction;
- second dynamic pressure producing means for producing a dynamic pressure for relatively supporting said shaft member and said sleeve member in a thrust direction, said second dynamic pressure producing means being defined between a free end face of said shaft member and said sleeve member and including a thrust surface opposed to said free end face of said shaft member; and
- a circulation passageway for circulating a fluid along at least a part of said thrust surface, said circulation passageway including a path for flowing the fluid from a middle portion of said thrust surface toward an outer periphery of said thrust surface substantially without flowing through said first dynamic pressure producing means.

---

### 5,018,881
## SELF ACTING GAS BEARING APPARATUS

**Takafumi Asada, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Oct. 20, 1989, Ser. No. 424,493**
**Claims priority, application Japan, Oct. 20, 1988, 63-264504**
**Int. Cl.⁵ F16C** *32/00*
U.S. Cl. 384—113 5 Claims

1. A self acting gas bearing apparatus comprising a cantilevered shaft, a sleeve member that is fitted to said shaft so as to be freely rotatable around said shaft, and a lid member that is fixed onto one end of said sleeve, wherein one or more intake holes having filters thereon are provided on one of said members in the vicinity of the free end side of said shaft, and dy-

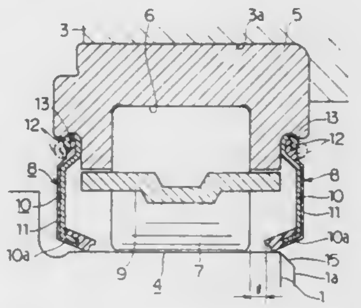


namic pressure generating grooves that force gas from said intake holes toward the fixed end side of said shaft are provided on the outer surface of said shaft.

---

### 5,018,882
## APPARATUS FOR SUPPORTING ROTARY SHAFT IN VEHICLE TRANSMISSION

**Takaaki Shiratani, Hiratsuka, and Seiji Namba, Isehara, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**
**Filed Aug. 1, 1990, Ser. No. 561,441**
**Claims priority, application Japan, Aug. 10, 1989, 1-93428**[U]
**Int. Cl.⁵ F16C** *33/78*
U.S. Cl. 384—484 4 Claims



1. An apparatus for supporting a rotating shaft of a vehicle transmission, said vehicle transmission having a casing and a rotating shaft, said rotating shaft having an outer peripheral surface with an outer track provided on said outer peripheral surface, and an axially middle section with a gear secured on said outer peripheral surface at said axially middle section, said casing having a support section to which said rotating shaft is rotatably mounted near said gear, said apparatus comprising;
- an outer race with an inner peripheral surface having axially middle and side sections and an inner track formed on said inner peripheral surface at said axially middle section, and outer race fixedly fitted into said support section of said casing;
- a plurality of rollers with opposed end surfaces provided between said inner track of said outer race and said outer track provided on said outer peripheral surface of said rotating shaft;
- a pair of seals comprised of a circular metallic core member with inner and outer peripheral edges and a circular elastic member with outer and inner peripheral edges, said outer peripheral edge of said elastic member supported by said outer peripheral edge of said metallic core member, and said outer peripheral edge of said metallic core member supported by said outer race along said inner peripheral surface thereof at said side sections; and
- each said seal having an inner peripheral edge which is bent toward said rollers, such that said inner peripheral edge of said elastic member comes close to said end surface of said rollers.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,883
## VECTOR FONT PROCESSING IN A PRINTING DEVICE

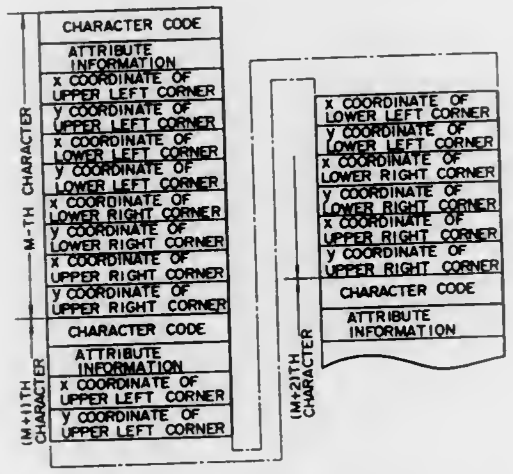
**Yntaka Fujita, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan**

**Filed Apr. 20, 1989, Ser. No. 340,852**

**Claims priority, application Japan, Apr. 27, 1988, 63-104871**

**Int. Cl.⁵ B41J** *5/30*

**U.S. Cl. 400—121** **7 Claims**


CHARACTER CODE
ATTRIBUTE INFORMATION
x COORDINATE OF UPPER LEFT CORNER
y COORDINATE OF UPPER LEFT CORNER
x COORDINATE OF LOWER LEFT CORNER
y COORDINATE OF LOWER LEFT CORNER
x COORDINATE OF LOWER RIGHT CORNER
y COORDINATE OF LOWER RIGHT CORNER
x COORDINATE OF UPPER RIGHT CORNER
y COORDINATE OF UPPER RIGHT CORNER
CHARACTER CODE
ATTRIBUTE INFORMATION
x COORDINATE OF UPPER LEFT CORNER
y COORDINATE OF UPPER LEFT CORNER
M-TH CHARACTER
(M+1)TH CHARACTER
x COORDINATE OF LOWER LEFT CORNER
y COORDINATE OF LOWER LEFT CORNER
x COORDINATE OF LOWER RIGHT CORNER
y COORDINATE OF LOWER RIGHT CORNER
x COORDINATE OF UPPER RIGHT CORNER
y COORDINATE OF UPPER RIGHT CORNER
CHARACTER CODE
ATTRIBUTE INFORMATION
(M+2)TH CHARACTER

1. A printing device, comprising:

input means for inputting character codes and attribute information items allotted to the character codes;

printing memory means for storing bit map fonts, each determined by a combination of a character code and an attribute information item input from said input means;

font stack memory means for storing combinations of character codes and attribute information items, corresponding to the bit map fonts stored in said printing memory means, with coordinate information items attached to the respective combinations of character codes and attribute information items and indicating the areas of said printing memory means at which said bit map fonts are located;

printing means for printing a printing pattern constituted by the bit map fonts stored in said printing memory means;

font memory means for storing a plurality of vector fonts; and

processing means for checking whether or not a combination of a character code and an attribute information item, identical to a combination of a character code and attribute information item input from said input means, is registered in said font stack memory means;

said processing means including means for selecting one of the vector fonts stored in said font memory means in accordance with an input character code, converting the selected vector font into a bit map font corresponding to the input attribute information item, storing the converted bit map font in an area of said printing memory means, and for registering a combination of character code and attribute information item in said font stack memory means with the coordinate information corresponding to the stored bit map font, when it is detected that an identical combination of character code and attribute information item has not been registered; and

said processing means including means for reading a bit map font from that area of said printing memory means which is specified by the coordinate information item attached to the identical combination of character code and attribute information item, and for storing the readout bit map font into another area of said printing memory means when it is detected that the identical combination has been registered.

---

### 5,018,884
## RECORDING APPARATUS IN WHICH A PLURALITY OF CARRIAGES CAN BE CONNECTED AND SEPARATED

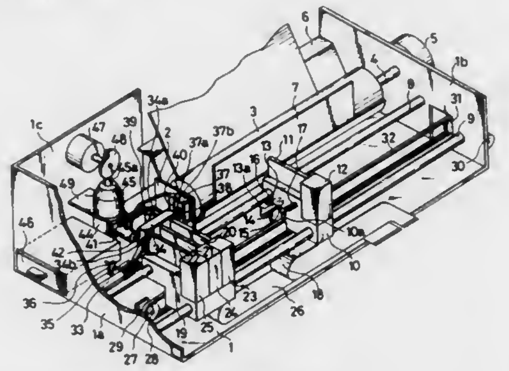
**Hirofumi Hirano; Shinichi Omo, both of Yokohama, and Hiroshi Fukui, Yokosuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 2, 1989, Ser. No. 317,928**

**Claims priority, application Japan, Mar. 2, 1988, 63-049194; Mar. 2, 1988, 63-049197**

**Int. Cl.⁵ B41J** *2/07, 2/01*

**U.S. Cl. 400—126** **20 Claims**



1. A recording apparatus comprising:

a first movable carrier carrying a first ink jet recording head thereon;

a second movable carrier carrying a second ink jet recording head thereon;

capping means for capping said second ink jet recording head; and

means for switching between a first recording mode and a second recording mode, wherein in the first recording mode, said first carrier moves to effect recording by said first ink jet recording head and said second ink jet recording head is capped by said capping means and in the second recording mode, said first carrier and said second carrier are integrally connected and are capable of moving together to effect recording by said first and second ink jet recording heads in a full recording range.

---

### 5,018,885
## CASSETTE FOR A PRINTING RIBBON FOR TYPEWRITERS

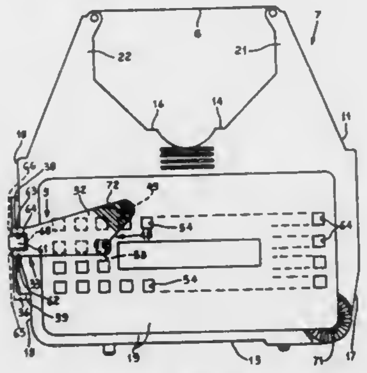
**Sergio Uggetti, Ivrea, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy**

**Filed May 2, 1990, Ser. No. 517,845**

**Claims priority, application Italy, May 18, 1989, 67363 A/89**

**Int. Cl.⁵ B41J** *32/00*

**U.S. Cl. 400—196** **20 Claims**



1. A cassette for a printing ribbon for typewriters, comprising:

a casing, having a slot and an opening;

a supply spool accommodated in said casing and having a tube on to which a printing ribbon is wound;

an anti-unrolling element to prevent unrolling movements of said ribbon when said cassette is not fitted to a typewriter and having a first portion which can be inserted into said slot in said casing and a second portion;

said anti-unrolling element comprising a hinge element connecting said second portion to said first portion;

said second portion being movable on the outside of said casing by means of said hinge element from an inoperative position to an operative position; and

said second portion comprising a hook element which can be inserted through said opening in said casing to engage said tube and positively block said supply spool when said second portion is in said operative position.

---

### 5,018,886
## RECORDING APPARATUS

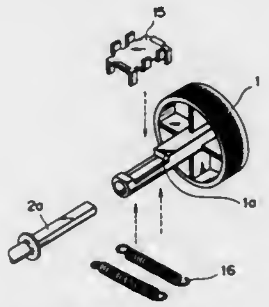
**Soichi Hiramatsu, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 22, 1989, Ser. No. 313,515**

**Claims priority, application Japan, Feb. 29, 1988, 63-046892**

**Int. Cl.⁵ B41J** *19/76*

**U.S. Cl. 400—545** **3 Claims**



1. A recording apparatus comprising:

a recording sheet feed roller for conveying a recording sheet, said recording sheet feed roller including a roller shaft;

a feed gear fixed to said roller shaft, said feed gear driving said feed roller when rotated;

driving means for rotating said feed gear, said driving means including a feed motor for generating a driving force for rotating said feed gear;

a feed knob for manually driving said roller shaft, said feed knob having a torque limiter for limiting torque more than a predetermined value from being transmitted from said feed knob to said roller shaft, wherein

said feed knob has a knob shaft which is rotatable relatively to said feed knob and fixed to said roller shaft, and said torque limiter comprises a spring member for applying a pressure between said knob shaft and said feed knob, wherein torque more than a predetermined value is not transmitted through said knob shaft to said roller shaft by the pressure of said spring member.

---

### 5,018,887
## FORMS FEED TRACTOR HAVING MODIFIED PIN SPACING

**Charles M. McCray; Brandon S. Nadler; David M. Sedgwick, and David M. Traxler, all of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 31, 1982, Ser. No. 239,159**

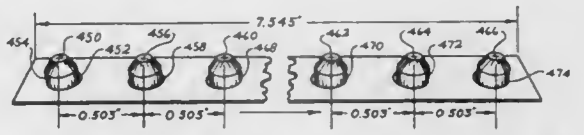
**Int. Cl.⁵ B41J** *11/30*

**U.S. Cl. 400—616.1** **12 Claims**

1. A belt for a forms feed tractor for feeding a record medium having equidistant spaced drive holes, said drive holes having leading and trailing edges, along at least one edge thereof, along a path said belt comprising:

a thin flexible band; and

a plurality of pins, leading edges on said pins, said pins affixed to said band and arranged for engaging and disengaging said drive holes of said record medium for advancing said record medium along a path means to prevent excessive deformation of said holes by said pins, said means including the leading edges of, said pins being spaced from one another by distance greater than the distance between the leading edges of said drive holes said pins having a crossectional shape, in a plane parallel to and in engagement with said record medium which is substantially the same shape as the shape of said holes but smaller in size so that one of said pins first engages one of said record medium's drive holes at said drive hole's trailing edge, said pin spacing relative to the spacing of said drive holes resulting in said pin migrating forward in said drive hole along a record medium's path so that said pin is in engagement with the leading edge of said drive hole prior to said pin disengaging said drive hole.



---

### 5,018,888
## PAPER TENSION ADJUSTING DEVICE AND METHOD FOR A PRINTER

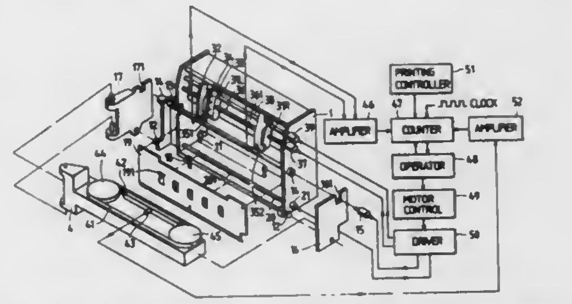
**Hiroshi Nishimura; Masao Miyasaka; Nobuhiko Itoh; Toshio Hiki, and Akira Igarashi, all of Ibaraki, Japan, assignors to Hitachi Koki Co., Ltd., Ibaraki, Japan**

**Filed Sep. 11, 1989, Ser. No. 405,290**

**Claims priority, application Japan, Sep. 20, 1988, 63-235261**

**Int. Cl.⁵ B41J** *11/30, 11/32*

**U.S. Cl. 400—616.1** **19 Claims**



1. A paper tension adjusting device for a continuous paper printing printer in which paper having thickness and rigidity and which is under tension in at least the widthwise direction is fed by at least one pair of tractors having feeding pins engagable with feeding apertures formed at the predetermined pitch in the paper along both longitudinal sides thereof and printed thereon comprising:

means for moving at least one of said tractors along the widthwise direction of said paper;

means for determining the desired widthwise tension of said, said determining means further including means for detecting the thickness of said paper; and

control means for causing said moving means to move said one tractor in response to said determining means so as to adjust the tension of said paper in the widthwise direction of said paper.

VOL
1126
ISS
4
MY
28
1991
UMI

**5,018,889**

### SHEET CONVEYING APPARATUS FOR A PRINTER

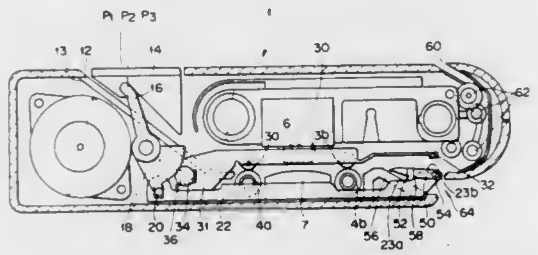
**Shinichi Oyaide, Shizuoka; Masayoshi Kawahira, and Toshio Miyazawa, both of Mishima, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan**

**Filed Feb. 8, 1990, Ser. No. 477,236**

**Claims priority, application Japan, Feb. 15, 1989, 1-35887; Apr. 4, 1989, 1-39919[U]; Jul. 25, 1989, 1-87123[U]**

**Int. Cl.$^5$ B41J** *13/32*

**U.S. Cl. 400—642** **10 Claims**



1. A sheet conveying apparatus for a printer, comprising:
an apparatus body having first and second sheet exhaust ports;
a printing unit provided in the apparatus body, the printing unit having an upstream side and a downstream side;
a pair of feeding rollers provided on the upstream side of the printing unit and comprising a driving roller and a driven roller for feeding a sheet to the printing unit;
a pair of exhaust rollers provided on the downstream side of the printing unit and comprising a driving roller and a driven roller for conveying the sheet from the printing unit toward the first and second sheet exhaust ports, the pair of exhaust rollers having a downstream side;
a convey unit for rotatably carrying one of the pair of feeding rollers and one of the pair of exhaust rollers;
driving means for driving the convey unit to simulteneously adjust a contact force of the feeding rollers and a contact force of the exhaust roller; and
an exhaust direction changing mechanism including: a sheet exhaust guide provided on the downstream side of the exhaust roller; and a coupling member for causing the sheet exhaust guide to select one of the first and second sheet exhaust ports, responsive to a movement of the convey unit driven by the driving means.

---

**5,018,890**

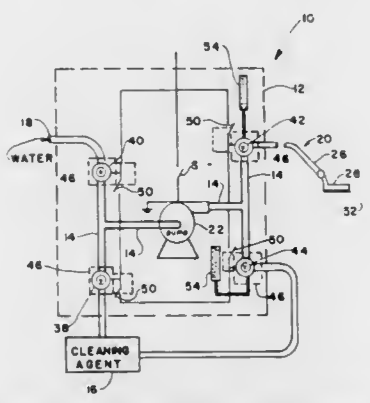
### POOL CLEANING SYSTEM

**Brian E. May, Amsterdam, N.Y., assignor to North Broadway Corp., Saratoga Springs, N.Y.**

**Continuation-in-part of Ser. No. 179,405, Apr. 8, 1988, abandoned. This application May 8, 1989, Ser. No. 348,391**

**Int. Cl.$^5$ E04H** *3/20;* **B08B** *5/04*

**U.S. Cl. 401—46** **25 Claims**



1. A portable pool cleaning system for cleaning swimming pool surfaces and surrounding decks including the removal of stains therefrom without draining the water from the pool, comprising:
a cart, said cart having conduit means mounted thereon for the flow of liquid therethrough, said conduit means being connectable in fluid communication with an external source of liquid cleaning agent and with a separate, external source of water;
a cleaning wand of adjustable length removably attachable to said conduit means for fluid communication therewith, said cleaning wand having a cleaning head pivotally mounted on one end thereof adapted for conformable engagement with the pool and deck surfaces, said cleaning head including scrubbing means for applying the liquid cleaning agent to the pool and deck surfaces and further defining a passageway therein for directing liquid flow against the surfaces to be cleaned;
a pump mounted on said cart and in fluid communication with said conduit means for selectively delivering liquid cleaning agent and water to said cleaning wand;
valve means for controlling the delivery of liquid cleaning agent and water to said cleaning wand, said valving means including means for recirculating liquid cleaning agent through said pool cleaning system;
safety shield means for preventing leakage of cleaning agent from said pool cleaning system; and
means for detecting whether said safety shield means is activated.

---

**5,018,891**

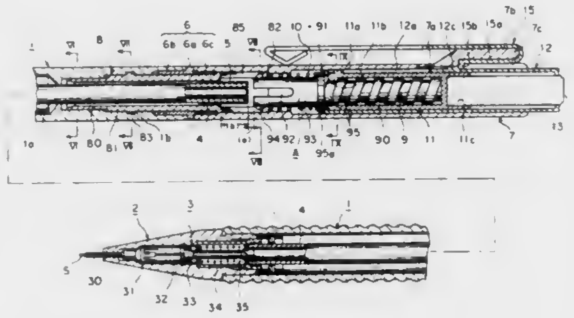
### WRITING INSTRUMENT WITH ERASER DISPENSER

**Hidehei Kageyama; Yoshihide Mitsuya, and Youichi Nakazato, all of Saitama, Japan, assignors to Kotobuko & Co., Ltd., Kyoto, Japan**

**Filed Jul. 10, 1989, Ser. No. 377,271**

**Int. Cl.$^5$ B43K** *29/02*

**U.S. Cl. 401—52** **3 Claims**



1. A writing instrument comprising:
an outer tube into which a lead pipe is axially slidably inserted;
a rear cap detachably and rotatably connected through a connector to a rear end of the outer tube;
an eraser guide member axially slidably receivable within said rear cap, said eraser guide member having an axial guide groove formed therein;
an eraser receiving member axially slidably receivable within said eraser guide member for supporting an eraser, said eraser receiving member having a deformable portion having an outward diametric projection formed thereon, said outward diametric projection being axially slidably receivable within said axial guide groove of said eraser guide member; and
a spiral member receivable within said eraser receiving member and threadingly engageable of an inward diametric projection of said eraser receiving member, said spiral member being detachably connected to said outer tube through said connector for rotation with said outer tube relative to said rear cap.

---

**5,018,892**

### APPLICATOR DEVICE FOR A STICK OF SPREADABLE MATERIAL

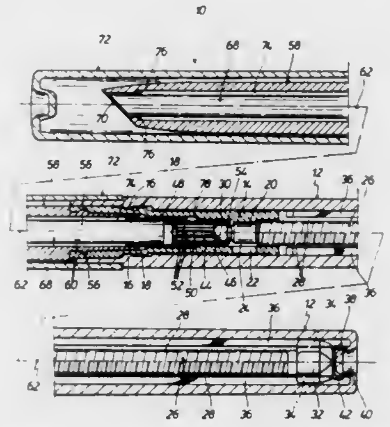
**Peter Krueckel, Heroldsberg; Gerhard Moeck, Kirchehrenbach, and Robert Finkenauer, Neremberg, all of Fed. Rep. of Germany, assignors to Schwan-Stabilo Schwanhaeusser GmbH & Co., Nuremberg, Fed. Rep. of Germany**

**Continuation of Ser. No. 226,676, Aug. 1, 1988, abandoned. This application Feb. 14, 1990, Ser. No. 481,658**

**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1987, 37282427**

**Int. Cl.$^5$ B43K** *21/10, 21/08;* **A45D** *40/06*

**U.S. Cl. 401—68** **8 Claims**



1. An applicator device for a stick of a spreadable material comprising: a shaft-like gripping portion; a screw portion connected to the gripping portion in axial alignment therewith and adapted to be rotated relative to the gripping portion, said screw portion being in the form of a stick-containing means which has a cavity therein for receiving said stick and which can be removed from and fitted to said gripping portion; a screwthreaded sleeve fixed to said screw portion; a screwthreaded spindle disposed in said gripping portion non-rotatably but axially movable therein and arranged in screwthreaded engagement with said screw threaded sleeve, said screwthreaded spindle having a first end towards said cavity in said screw portion and a second end; wherein the first end is provided with a ball head; and a pushing means for displacement of said stick in said cavity in said screw portion, the pushing means being disposed at the first end of said screwthreaded spindle and comprising a piston connected to said first end of said spindle and a sleeve disposed around said piston, wherein said piston nd said sleeve disposed around said piston initially comprise a one-piece, injection molded assembly with a plurality of rupture locations, said rupture locations connecting the piston and the sleeve for allowing subsequent separation of the piston and the sleeve and the sleeve and said piston has a space for fixing said ball head to said piston such that the piston and spindle may rotate relative to each other while preventing relative axial movement therebetween, and wherein said screwthreaded sleeve includes a rearward abutment means defining an abutment with the sleeve of the pushing means.

---

**5,018,893**

### COSMETIC STICK DISPENSER

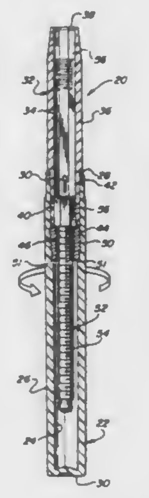
**Thomas F. Holloway, 866 Peter Rd., Southbury, Conn. 06488**

**Filed Mar. 29, 1990, Ser. No. 501,024**

**Int. Cl.$^5$ A45D** *40/06*

**U.S. Cl. 401—75** **3 Claims**

1. A stick dispenser comprising:
a hollow base member having an inner wall and an outer wall and an open upper end and a closed lower end, said upper end having an annular channel formed therein and a radially inward extending shoulder below said channel;
a hollow nose member having an inner wall and an outer wall and open upper and lower ends, the inner wall of said nose member being polygonal in cross-sectional shape, said lower end of said nose member being sized to be received inside said base member, said lower end of said nose member having a radially extending rib for snap fit in said annular channel in said base member to secure said nose and base members together;
a metal base insert, said base insert being fixedly retained in said base member between said shoulder and said lower end of said nose member when said nose member and base member are secured together, and having an outer wall with a plurality of rib segments thereon for engaging said inner wall of said base member, and being internally left hand screw threaded;



an elevator, said elevator having
  a platform adapted to slidingly fit inside said nose member, said platform having a cross-sectional shape which conforms to the cross-sectional shape of said nose member inner wall, and
  a screw threaded stem adapted to screw together with said base insert, said stem having a length sufficient to allow said elevator platform to be axially moved from a retracted position wherein said platform is adjacent said base insert to an extended position wherein said platform adjacent the upper open end of said nose member;
said dispenser being operable to dispense a stick product from said nose member by clockwise rotation of said base member relative to said nose member.

---

**5,018,894**

### APPLICATOR DEVICE FOR A LIQUID COMPRISING A DOME MADE OF A POROUS MATERIAL

**Antonin Goncalves, Montmorency, France, assignor to L'Oreal, Paris, France**

**Filed May 16, 1990, Ser. No. 524,022**

**Claims priority, application France, May 18, 1989, 89 06490**

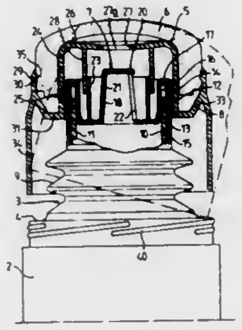
**Int. Cl.$^5$ B05C** *1/06*

**U.S. Cl. 401—202** **15 Claims**

1. An applicator device for a liquid, comprising: a bottle having a neck comprising at least one flexible zone and on which is fixed a dispensing head carrying a dispensing dome of rigid porous material; wherein the dispensing head comprises on the one hand, an obturator fixed on the neck of the bottle and provided with at least one opening and, on the other hand, a cap comprising means for supporting the dispensing dome; and wherein the cap is mechanically joined to the obturator and is manually actuable in translation parallel to the longitudinal axis of the applicator device between a closed position in

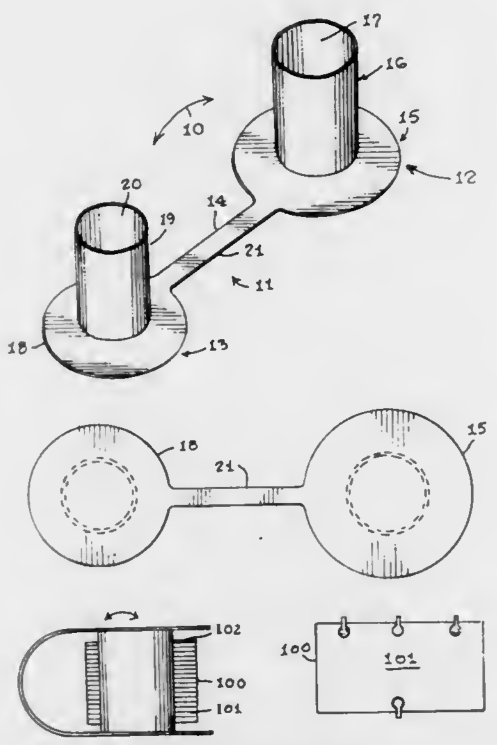
VOL
1126
ISS
4
MY
28
1991
UMI

which a closing element of the cap cooperates with a stopper element of the obturator to prevent any communication between the inside of the bottle and the dispensing dome, and an open position wherein said communication is obtained, said obturator comprising a circular cylindrical fixing skirt carrying a screw thread which cooperates with a corresponding screw thread on the neck, and said fixing skirt being joined to a stopper element centered on the axis of the neck, said obturator further comprising a cylindrical sealing skirt, which is coaxial with said fixing skirt and annularly joined thereto, and being disposed inside said neck, and being annularly joined to a central duct coaxial with said fixing skirt and said sealing skirt, said duct being open to the inside of the bottle and closed at its other end by said stopper element and said opening being arranged in the lateral wall of said duct.



---

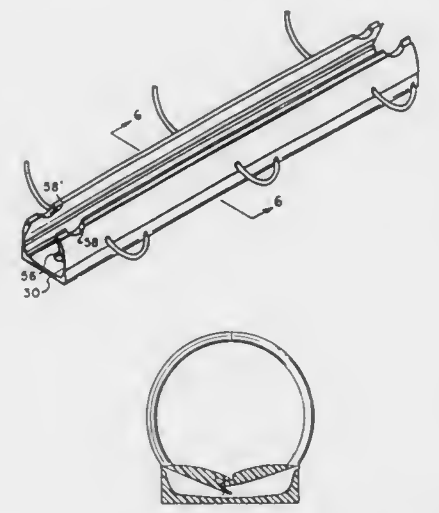
### 5,018,895
### FILM STACKER CLIP
**Joseph A. Meier, Jr., 9440 Hoffman Way, #D302, Thornton, Colo. 80229**
**Filed Oct. 12, 1989, Ser. No. 420,403**
**Int. Cl.$^5$ B42F** *3/02, 13/30*
U.S. Cl. 402—4 **3 Claims**



1. A film stacker clip arrangement in combination with a stack of individual sheets of film having a plurality of aligned apertures of predetermined diameter formed along at least one side of the sheets of film; wherein, the clip arrangement consists of:
- a plurality of clip units wherein each of the clip units comprises a male cylindrical member and female cylindrical member operatively connected by an intermediate connector member;
- wherein, the female member is dimensioned to be received in one of the said plurality of aligned apertures in the stack of film in a snugly fitting manner such that the individual sheets of film will be restrained from relative lateral movement with respect top one another;
- wherein, the female cylindrical member comprises: a generally enlarged flat circular female base element; and an enlarged diameter elongated hollow female cylindrical element dimensioned to provide for a snug fit within said aligned apertures; and the male cylindrical member comprises: a generally enlarged flat circular male base element; and a reduced diameter elongated cylindrical male element;
- and, wherein the intermediate connector member comprises an elongated generally flat flexible strap element connected on opposite ends to and having a width substantially smaller than the generally enlarged flat circular male and female base elements.

---

### 5,018,896
### SNAP RING ASSEMBLY
**Robert R. Vanni, 701 Tuxedo Ave., Brooklyn Heights, Ohio 44131**
**Filed Jun. 19, 1989, Ser. No. 368,420**
**Int. Cl.$^5$ B42F** *3/00*
U.S. Cl. 402—38 **12 Claims**

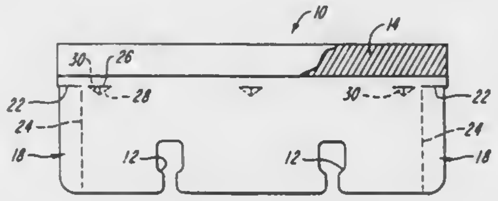


1. A one-piece molded snap ring assembly, said assembly comprising; an elongated base portion extending between a pair of spaced-apart sidewalls, each of said sidewalls having a proximate section extending transversely from the base portion, a distal section, and a hinge section extending integrally therebetween having a tapered cross-section that becomes progressively thinner in a direction from the base portion toward the hinge section, said hinge sections having a reduced thickness predetermined to enable the distal section to pivot thereat relative the proximate sections, said distal sections ending in respective free-ends respectively configured to matingly engage each other, said distal sections having respective arcuate ring sections that are in substantial registration with each other and that extend substantially transversely from respective sides thereof facing away from the base portion to respective free-ends thereof at a predetermined distance from

the hinge sections, and said assembly adapted such that pivotal movement of the distal sections toward each other to a first predetermined position causes the distal sections free-ends to matingly engage while causing the ring sections to pivot toward each other simultaneously therewith and further pivotal movement of the distal sections in the same direction to a second predetermined position is operative to create a force against the hinge sections effective to cause the hinge sections to snap the ring section free-ends into contacting engagement with each other to provide a closed condition thereof while maintaining mated engagement between the distal section free-ends.

---

### 5,018,897
### CARD FILE ADAPTOR
**Gary A. Horgan, 214 Newton St., Waltham, Mass. 02154**
**Filed Mar. 13, 1990, Ser. No. 492,942**
**Int. Cl.$^5$ B42D** *15/00;* **B42F** *19/04*
U.S. Cl. 402—79 **5 Claims**

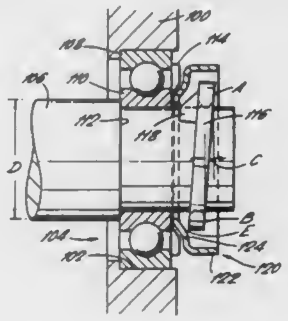


1. A card file adaptor for non-destructive mounting of a card in a conventional card file, comprising:
- a strip of material sized to fit in the conventional card file, said material strip having at least one predetermined opening formed in a first edge thereof for mounting said material strip in the conventional card file;
- an adhesive layer formed on the face of said material strip along a second edge thereof;
- a removable protective strip covering said adhesive layer; and
- means formed in said material strip and extending outwardly from the face of said strip containing the adhesive layer for physically engaging a bottom edge of the card to support the card in alignment superjacent said adhesive layer wherein the card may be adhered to said card file adaptor by pressing the card into engagement with said adhesive layer while the bottom edge is supported by the physical engaging means.

---

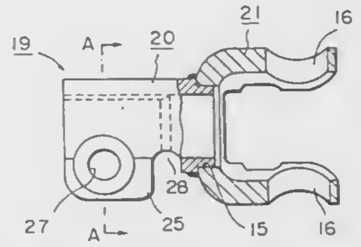
### 5,018,898
### PREVENTING MOVEMENT OF AN ARTICLE ALONG A SHAFT
**Keith W. Woodbridge, Luton; Daniel J. Doncaster, London, and Ronald F. Hamblin, Luton, all of United Kingdom, assignors to SKF (UK) Limited, Luton, United Kingdom**
**Filed Dec. 4, 1989, Ser. No. 445,427**
**Claims priority, application United Kingdom, Dec. 5, 1988, 8828581**
**Int. Cl.$^5$ F16B** *2/02*
U.S. Cl. 403—11 **14 Claims**

1. An assembly comprising a shaft, an article mounted on the shaft and a device which is also mounted on the shaft and prevents movement of the article along the shaft in the direction of the article to the device, the device comprising an element extending at least part way around the shaft and which, during assembly, can be moved along the shaft and then caused to adopt a position in which the element lies in a first plane extending perpendicular to a second plane in which lies the longitudinal axis of the shaft, the first plane forming an angle with a third plane extending perpendicular to the longitudinal axis of the shaft which is no greater than $\tan^{-1}\mu$, where $\mu$ is the coefficient of friction between the shaft and the element, characterized in that one or more members extend from the element to the article, the or each member having been produced separately from the element and article, the or each member being provided by an annular component interposed between the element and the article.



---

### 5,018,899
### YOKE FOR UNIVERSAL JOINT AND MANUFACTURING METHOD THEREFOR
**Ritsuo Kuribara; Kiyoshi Okubo; Koichi Yokoi, all of Maebashi, and Kiyoshi Sadakata, Gunma, all of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**
**Filed Jul. 2, 1990, Ser. No. 546,945**
**Claims priority, application Japan, Jul. 7, 1989, 1-174066**
**Int. Cl.$^5$ F16D** *3/00*
U.S. Cl. 403—57 **4 Claims**

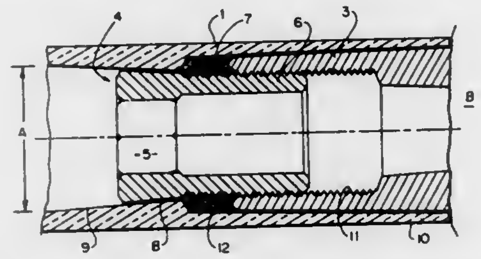


1. A yoke for universal joint comprising:
- a cylindrical coupling tube formed by pressing a metal plate and having a slit in a radial direction, serrate grooves on the tube internal periphery, and an intermediate reentrant cut-out on each side of said slit;
- a pair of flanges integrally formed at an end of said coupling tube and on both sides of said slit adjacent to said cut-outs; and
- a coupling arm formed by pressing a metal plate into U-shape;
- wherein a screw hole is formed in one of said flanges and a hole coaxial with said screw hole is formed in the other of said flanges for passing a bolt to be screwed into said screw hole, and said coupling arm is provided with a hole in a base portion thereof and coaxially aligned circular holes in opposite end portions thereof; and
- wherein the other end of said coupling tube is fitted into said hole in said base portion and is connected thereto.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,900
### PROCESS FOR CONNECTING AND ASSEMBLING TUBULAR ELEMENTS, IN PARTICULAR FOR CONSTRUCTING A BICYCLE FRAME

**Alain Darrin, Saint Germain an Mont d'Or, France, assignor to Technique du Verre Tisse S.a., France**
**Filed Nov. 14, 1989, Ser. No. 436,445**
**Claims priority, application France, Nov. 17, 1988, 88 15200**
**Int. Cl.⁵ F16B** *11/00*
**U.S. Cl. 403—267** **11 Claims**

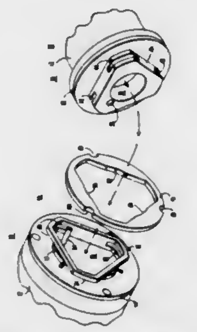


1. A bicycle frame assembly comprising a plurality of tubular elements and at least a bottom bracket which joins the respective tubular elements, wherein each of the tubular elements has one respective tube end adhesively joined to a respective one of a plurality of connector receptacles formed on said bottom bracket, such that one of each said tube end and its associated connector receptacle fit together one into the other to be bonded together by a suitable adhesive; and for each said tubular element, a fastener which is introduced through the tubular element into the associated tube end, said fastener having a proximal portion that presses against a mating interior surface of the tube end and a threaded distal portion that screws into a mating threaded portion of the associated receptacle.

---

### 5,018,901
### RING LATCHED COUPLER

**Herbert E. Ferree, Greensburg; Harry N. Andrews, Export; Frank W. Cooper, Jr., and Joseph R. Herberg, both of Monroeville Borough, all of Pa., assignors to Space Industries Partnership, L. P., Webster, Tex.**
**Filed Jul. 21, 1988, Ser. No. 222,583**
**Int. Cl.⁵ F16B** *7/20*
**U.S. Cl. 403—349** **3 Claims**

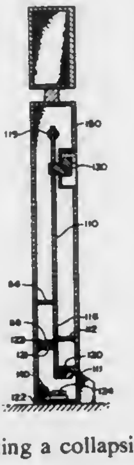


1. A ring latched coupler, comprising:
a male assembly having a plurality of grooves formed therein;
a complementary female assembly adapted to receive said male assembly, said female assembly having a plurality of slots formed therein; and
a latching ring rotatably carried by said female assembly, a fixed working surface of said latching ring being configured such that upon relative rotation of said male and female assemblies and said ring, said fixed working surface extends through said slots of said female assembly to engage said grooves of said male assembly so as to effect engagement with said male assembly;
said coupler additionally comprising a plurality of stop pins carried by said female assembly for limiting the rotation of said latching ring, and said latching ring including a plurality of notches for enabling said latching ring to be held stationary during rotation of said male and female assemblies.

---

### 5,018,902
### COLLAPSIBLE BOLLARDS

**James M. Miller, Philadelphia, Pa., and James A. Wargo, Cherry Hill, N.J., assignors to Trustees of University of Pennsylvania, Philadelphia, Pa.**
**Continuation of Ser. No. 312,872, Feb. 17, 1989, abandoned. This application Sep. 26, 1990, Ser. No. 590,504**
**Int. Cl.⁵ E01F** *13/00*
**U.S. Cl. 404—6** **12 Claims**



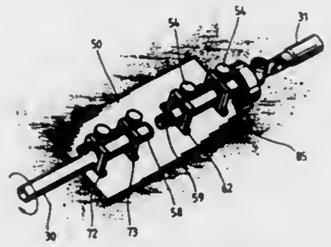
1. Apparatus for creating a collapsible barrier in a transitway, comprising:
(a) substantially hollow post means;
(b) post hinge means for hingable attaching said post means to the transitway between an obstructing position and a collapsed position, the axis of said post hinge means disposed substantially at the surface of the transitway;
(c) latch means for locking said post in an obstructing position, said latch means disposed entirely within said post means;
(d) mating latch means for cooperating with said latch means to lock said post in an obstructing position and;
(e) latch actuation means for releasing said latch means from said mating latch means when said post means is in an obstructing position to permit said post to be placed in a collapsed position and;
(f) re-locking means for locking said post in an obstructing position when said post is moved to said obstructing position, said re-locking means comprising a latch hinge means connected to said latch means, a resilient means located below said latch hinge means for urging said latch means against said mating latch means, and a return means for aligning said latch means and said mating latch means,
whereby said latch means and said mating latch means automatically cooperate when said post is moved to the obstructing position, providing a self-locking barrier.

---

### 5,018,903
### PIPE CONNECTION DEVICE

**Hugh W. O'Donnell, 9607 Oregano, Houston, Tex. 77036, and Ahmed Ben Salah, 10823 Candlewood Dr., Houston, Tex. 77042**
**Filed Feb. 16, 1990, Ser. No. 480,805**
**Int. Cl.⁵ F16L** *1/04*
**U.S. Cl. 405—170** **6 Claims**

1. An apparatus for the underwater threading together of the threaded ends of first and second interconnectable tubular products for directional drilling and production applications, the joint having a horizontal axis on the sea bottom, comprising:
(a) a rigid supporting member positionable on and retrievable from the sea bottom, the supporting member dimensioned to resist rotation about the joint axis during threading together of the threaded ends;

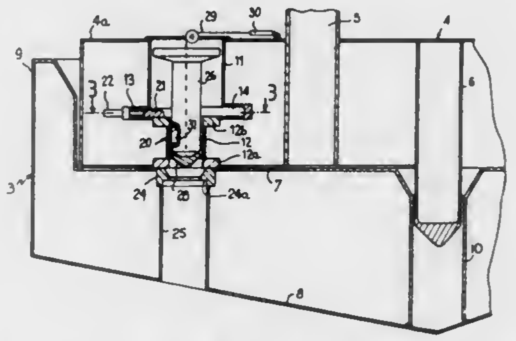


(b) first securing means mounted to the supporting member for securing the first tubular product, the first securing means adapted to allow rotation of the first tubular product about the joint axis; and
(c) second securing means mounted to the supporting member for securing the second tubular product in substantial axial alignment with the first tubular product, the second securing means adapted to resist rotation of the second tubular product about the joint axis.

---

### 5,018,904
### SEA-BED SUPPORT DEVICE FOR THE LEGS OF A SELF-ELEVATING OIL-RIG PLATFORM

**Pierre A. Thomas, Puteaux, and Guy R. Delamare, Herblay, both of France, assignors to Technic Geoproduction, Paris, France**
**Filed Jul. 17, 1989, Ser. No. 380,600**
**Claims priority, application France, Jul. 28, 1988, 88 10216**
**Int. Cl.⁵ E02B** *17/08*
**U.S. Cl. 405—196** **15 Claims**

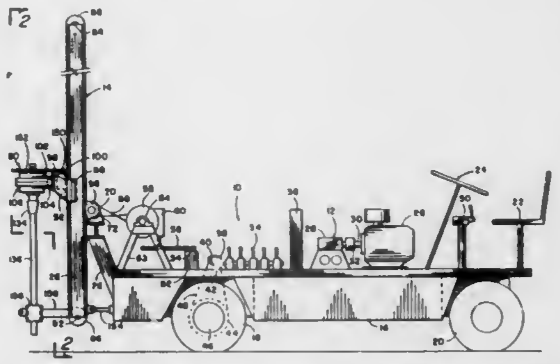


1. A device for supporting the legs of a self-elevating oil-rig platform on the sea-bed, comprising:
a shoe body, said shoe body including an upper plate for connection to the lower end of the leg of the oil-rig platform and a lower plate for resting on the sea-bed; and
locking means operable between the leg of the oil-rig and said shoe body for detachably and adjustably rigidly fixing said shoe body to the lower end of the leg of the oil-rig platform;
wherein said upper plate of said shoe body has a central housing defining a central opening in said upper plate and a plurality of peripheral housings angularly spaced about said central housing defining further openings;
the leg of the oil-rig platform has a foot portion having a centering stud thereon for receipt in said central opening in said upper plate of said shoe body; and
said locking means comprises a lock rod on the leg of the oil-rig platform for each said peripheral housing for receipt in respective said peripheral housings to immobilize said shoe body relative to the foot of the oil-rig platform.

---

### 5,018,905
### FOUNDATION SHORING METHOD AND MEANS

**William D. Kinder, 3555 Middlefield Rd., #1, Dallas, Tex. 75253**
**Continuation-in-part of Ser. No. 807,840, Nov. 11, 1985, and a continuation-in-part of Ser. No. 762,800, Aug. 2, 1985, which is a continuation of Ser. No. 464,973, Feb. 8, 1983. This application Feb. 27, 1989, Ser. No. 316,090**
**Int. Cl.⁵ E02D** *17/02*
**U.S. Cl. 405—230** **12 Claims**



1. A method for shoring a building foundation comprising the steps of: forming a plurality of spaced holes in the ground adjacent an edge of the foundation such that each hole has a diameter which is sufficiently greater than the outside diameter of a pier to substantially eliminate frictional force between adjacent surfaces of the pier and side of the hole; examining soil from the bottom of each hole to assure that the bottom of each hole extends into a formation which appears capable of supporting the weight of the foundation; positioning a pier in each hole such that the weight of each pier is supported almost entirely on the lower end of the pier in the hole in the formation; movably securing a fitting to each pier to engage the foundation; applying force to urge each fitting upwardly relative to each pier wherein the magnitude of the force exceeds the portion of the weight of the foundation which the pier is to support to assure that the formation into which the lower end of each hole extends has sufficient load bearing capacity to support the portion of the weight of the foundation the pier is to support; distributing the total weight of the foundation over a plurality of piers; and securing each fitting to the pier on which it is supported such that each of the plurality of piers supports a portion of the weight of the foundation.

---

### 5,018,906
### PULVERULENT PRODUCT STABILIZING SOILS IN PLACE AND METHOD OF APPLICATION

**Monique F. Bonier-Sahuc, 5 rue Jobbé Duval, 75015 Paris, France**
**Filed Nov. 10, 1988, Ser. No. 269,310**
**Claims priority, application France, Nov. 13, 1987, 87 15722**
**Int. Cl.⁵ E02D** *3/12*
**U.S. Cl. 405—263** **10 Claims**

1. Pulverulent product for stabilizing soils in place comprising a pulverulent fatty amine and at least one pulverulent product chosen from cements, slaked limes, fly ash, water repellents and mixtures thereof.

VOL
1126
ISS
4
MY
28
1991
UMI

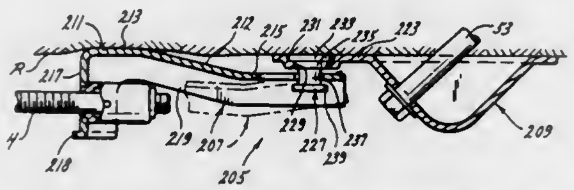
### 5,018,907
### MINE ROOF SYSTEM

**Yoginder P. Chugh, 1618 Tina Dr., Muphysboro, Ill. 62966; John R. Alongi, 350 E. Main, DuQuoin, Ill. 62832, and Joey Linton, R.R. #4, Box 162, W. Frankfort, Ill. 62896**

**Continuation-in-part of Ser. No. 283,601, Dec. 13, 1988, Pat. No. 4,946,315. This application Sep. 15, 1989, Ser. No. 407,915**

**Int. Cl.$^5$ E21D** *21/00*

**U.S. Cl. 405—288** **7 Claims**



1. In a mine having a roof and opposing side pillars, apparatus for supporting the roof and for exerting a compressive load on the roof comprising:
   (a) first and second connection means positionable against the roof at opposite sides thereof adjacent the opposing pillars, each connection means including a truss plate, a connector plate and pin means detachably interconnecting said truss plate and said connector plate said pin means permitting relative pivotal movement between said plates;
   (b) means for anchoring the truss plates to the roof; and
   (c) tie rod means interconnecting the first and second connector plates independently of said pin means.

---

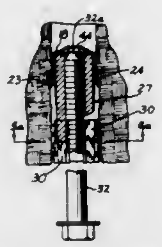
### 5,018,908
### ANCHOR ASSEMBLY FOR A MINE ROOF BOLT

**Gary Laphon, Vermillion, Ohio, assignor to American Mining Supply, Inc., North Ridgeville, Ohio**

**Filed Oct. 31, 1989, Ser. No. 429,472**

**Int. Cl.$^5$ E21D** *21/00*

**U.S. Cl. 405—259** **31 Claims**



1. An anchor assembly for anchoring a mine roof bolt, or the like, in a bore hole, the assembly comprising an anchor shell having anchor leaves arranged about a shell axis for engaging the side wall of a bore hole for anchoring the assembly, and a bolt having its threaded lead end disposed coaxially therein and a bail interconnecting the leaves, said bail comprising a middle portion extending crosswise of the axis above the leaves of the anchor shell and having spring fingers extending downwardly and outwardly from the bail above the leaves with each terminating in an end portion to be resiliently deformed by the sidewall of a borehole into which the anchor shell is inserted to bias the terminating end portions of the fingers against the sidewall of the hole, the terminating end portion of each finger being angularly disposed with respect to the axis and having an edge portion extending outwardly of the axis to be biased against the side wall of a borehole when the anchor shell is inserted therein for holding the anchor assembly against retraction by snagging the sidewall of the hole.

---

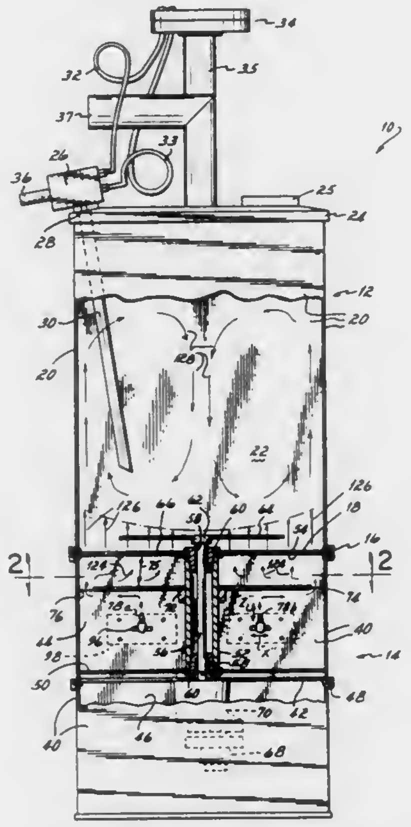
### 5,018,909
### POWDER FEED HOPPER

**Gerald W. Crum, Elyria; Richard D. Burke, Amherst; Robert J. Holland, Avon; Allen Newman, Lorain; David L. Moses, Amherst; William S. Miller, Grafton; Thomas E. Hollstein, Amherst, and Jeffrey R. Shutic, Wakeman, all of Ohio, assignors to Nordson Corporation, Westlake, Ohio**

**Filed Apr. 13, 1990, Ser. No. 508,968**

**Int. Cl.$^5$ B65G** *53/38, 53/18*

**U.S. Cl. 406—138** **29 Claims**



1. A powder feed hopper, comprising:
a housing having an outer wall which defines a hollow interior;
a fluidizing plate mounted to said wall within said hollow interior of said housing, said fluidizing plate having a top surface adapted to support particulate powder material and a bottom surface, said fluidizing plate defining a fluidized bed within said housing above said top surface thereof and a plenum within said housing beneath said bottom surface thereof;
means for introducing pressurized air into said plenum at a location beneath said bottom surface of said fluidizing plate, the pressurized air flowing upwardly toward said fluidizing plate;
a baffle plate having an outer periphery, said baffle plate being mounted within said plenum in the path of said pressurized air flowing toward said fluidizing plate so that said baffle plate is spaced a predetermined distance from said bottom surface of said fluidizing plate and so that said outer periphery of said baffle plate is spaced a predetermined distance from said outer wall of said housing forming a space therebetween, said baffle plate being effective to direct said pressurized air introduced into said plenum through said space between said outer wall of said housing and said outer periphery of said baffle plate prior to passage of said pressurized air through said fluidizing plate.

---

### 5,018,910
### PROCESS FOR INCREASING THE QUANTITY OF POWDER DISPENSED IN A POWDER COATING SYSTEM, AS WELL AS POWDER COATING SYSTEM

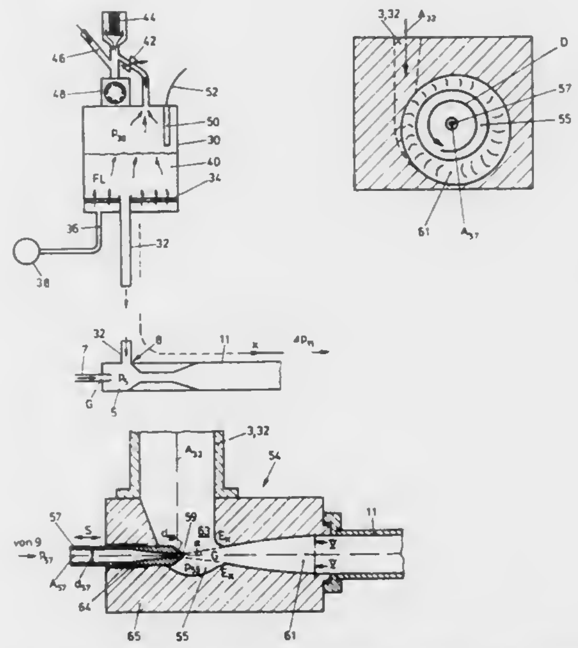
**Hardy P. Weiss, Hutten, Switzerland, assignor to Prazisions-Werkzeuge AG, Hutten, Switzerland**

**Continuation of Ser. No. 118,988, Nov. 10, 1987, abandoned. This application Feb. 26, 1990, Ser. No. 484,489**

**Claims priority, application Fed. Rep. of Germany, Nov. 15, 1986, 3639139**

**Int. Cl.$^5$ B65G** *53/50*

**U.S. Cl. 406—144** **17 Claims**



1. A process for selectively setting the quantity of powder continuously dispensed per unit of time out of an outlet of a powder coating system, comprising:
feeding the powder out of a powder container to a mixing chamber by generating a pressure drop from said powder container to said mixing chamber by means of a gas jet injected into said mixing chamber;
propelling said powder fed to said mixing chamber out of said chamber into a conveying line to said outlet by said jet of gas;
enlarging a diameter of said conveying line downstream and adjacent said mixing chamber to recover static pressure by retarding said powder and said gas;
propelling said powder and said gas along said conveying line and out of said outlet predominately by a pressure difference of said static pressure recovered and a static pressure of a surrounding of said outlet; and
settling the quantity of powder dispensed per unit of time out of said outlet of the powder coating system by setting the static pressure within said powder container independently from generation of said gas jet injected into said mixing chamber so as to settle said pressure difference by said pressure recovery and said static pressure selectively settled.

---

### 5,018,911
### DRILLING APPARATUS FOR STRUCTURAL STEEL SHAPES

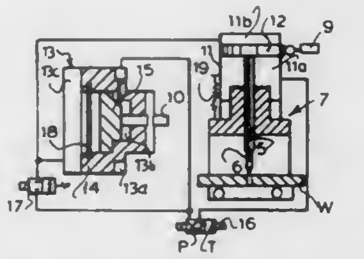
**Bernd Stursberg, Ennepetal, Fed. Rep. of Germany, assignor to Carl Ullrich Peddinghaus, Wuppertal-Barmen, Fed. Rep. of Germany**

**Filed Jul. 5, 1989, Ser. No. 375,769**

**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1988, 3823122**

**Int. Cl.$^5$ B23B** *47/22*

**U.S. Cl. 408—13** **7 Claims**



1. An apparatus for drilling holes in a steel structural-shape workpiece, comprising:
a support for said workpiece;
a drill head on said support, said drill head comprising:
a drill-bit carrier receiving a drill bit and rotatable to drill said workpiece,
a drill-feed cylinder displaceable on said support in a drilling direction parallel to said drill bit,
oppositely acting resilient means for biasing said drill-feed cylinder along said drilling direction toward a predetermined rest position, and
a drill-feed piston received in said drill-feed cylinder and operatively connected to said carrier, said drill-feed piston defining in said drill-feed cylinder a first pressurizable compartment effective to displace said drill-feed piston toward said workpiece and a second pressurizable compartment effective to retract said drill-feed piston from said workpiece; and
control means on said drill head for establishing a predetermined retracted position of said drill bit from said workpiece, said control means including:
a first control cylinder,
  a first control piston in said first control cylinder defining therein a first control chamber hydraulically coupled with said first pressurizable compartment, and a second control chamber hydraulically effective on said first control piston in a direction opposite an effective direction of said first control chamber, said first control piston defining therein a second control cylinder,
  a second control piston in said second control cylinder and defining therein a third control chamber hydraulically connected to said first control chamber and a fourth control chamber hydraulically connected to said second control chamber and effective on said second control piston opposite pressure in said third control chamber, said control pistons having displacements corresponding to an advance of said drill bit plus a length of a tip thereof, said second control piston having a fluid displacement corresponding to fluid displacement of said drill-feed piston for a retraction of said drill bit to said predetermined position of said tip from said workpiece,
  a first control valve selectively connecting said second and fourth control chambers with a hydraulic pressure source and said second compartment with a hydraulic

VOL 1126 ISS 4 MY 28 1991 UMI

drain in one position of said first control valve and connecting said second and fourth control chamber with said hydraulic drain and said second compartment with said hydraulic pressure source in another position of said first control valve,

a second control valve selectively connecting said first and third chambers and said first compartment with said pressure source in one position of said second control valve and said drain in another position of said second control valve, and

respective sensor means responsive to positions of said second piston and said drill-feed cylinder for controlling said control valves.

---

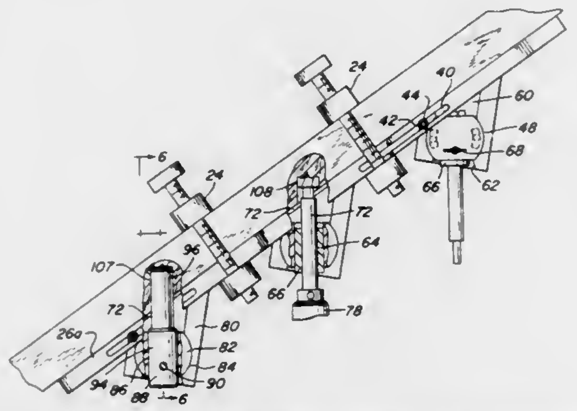
### 5,018,912
## DRILLING JIG FOR STAIR RAILS

**George J. Reitz, Feasterville, Pa., assignor to By George Enterprises, Inc., Pleasant Valley, Pa.**

**Filed May 18, 1990, Ser. No. 526,518**

**Int. Cl.⁵ B23B** *45/14*

**U.S. Cl. 408—115 R** 7 Claims



6. A kit of tools for drilling stair rail spindle holes of different diameters, said kit comprising;

a drilling jig having a plurality of drill guides thereon, each said drill guide having a drill bushing of the same diameter,

and a plurality of drill bits of different diameters, each said drill bit having an extended shank portion of the same diameter, said drill shank diameter slideably fitting in said jig drill bushings.

---

### 5,018,913
## DEVICE FOR CONTROLLING THE TOOL POSITION DEPENDING ON THE STROKE POSITION

**Walter Seiberlich, Ettlingen, Fed. Rep. of Germany, assignor to Maag-Gear-Wheel & Machine Co. Ltd., Zurich, Switzerland**

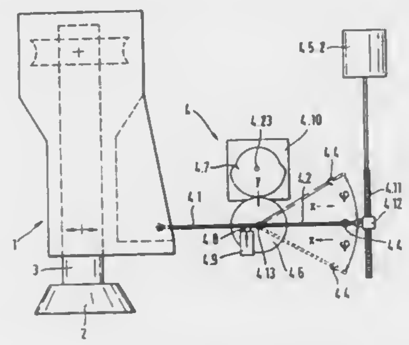
**Filed Feb. 21, 1989, Ser. No. 313,076**

**Claims priority, application Switzerland, Mar. 8, 1988, 00857/88-1**

**Int. Cl.⁵ B23F** *5/16;* **B23D** *1/00*

**U.S. Cl. 409—34** 36 Claims

1. A device for controlling the tool position including the extent of lift of the tool relative to a work table and also at least one of a lifting direction of the tool relative to a work table and a course of the machining line of the tool along the length of the stroke of the tool, depending on the stroke position on machine tools with a reciprocating tool movement, such as shaping or slotting machines or planers, wherein a workpiece is received by a work table and a tool (2) is received by a tool head (1) and one of the work table and the tool head is connected to a tool positioning device for controlling the relative position between tool (2) and workpiece in the sense of a tool positioning relative to the stroke position, characterised in that the tool positioning device (4) comprises a control mechanism, connected to at least one drive device, to adjust the extent of lift and also at least one of the lifting direction, and the course of the machining line.



---

### 5,018,914
## CHAMFERING TOOL

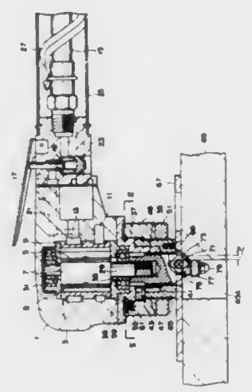
**Katsunobu Kishi, Tokyo, Japan, assignor to Nitto Kohki Co., Ltd., Tokyo, Japan**

**Filed May 30, 1990, Ser. No. 530,416**

**Claims priority, application Japan, Jun. 5, 1989, 1-65509[U]**

**Int. Cl.⁵ B23C** *1/20*

**U.S. Cl. 409—178** 7 Claims



1. A portable chamfering tool comprising:

a casing;

a rotating shaft projected from one end of the casing;

a ring-shaped connector arranged on the outer circumference of the rotating shaft, and having a ring-shaped groove formed on the outer circumference of the ring-shaped connector;

a ring-shaped boss attached to the outer circumference of the ring-shaped connector so as to freely move in the axial direction of the connector;

a guide plate attached to the ring-shaped boss;

adjusting and fixing rings screwed onto the ring-shaped boss, the adjusting ring having a recess formed at the upper portion thereof;

a connecting plate movably arranged in the recess of the adjusting ring and urged to the center of the ring-shaped connector to engage the ring-shaped groove on the outer circumference of the ring-shaped connector;

a cutter chip fixed to the rotating shaft, which passes through the ring-shaped boss, with a part of it projected downward from the underside of the guide plate; and

a guide attached to the rotating shaft and contactable with a side of a matter to be processed.

### 5,018,915
## SPINDLES OF MACHINE TOOLS

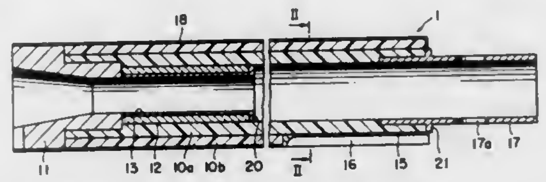
**Takahiko Inokuma, Yokohama; Sadamu Baba, Numazu; Shoji Imao, Tajimi; Hitoshi Kodama, Nagoya, and Takeo Gomi, Toyohashi, all of Japan, assignors to Toshiba Kikai Kabushiki Kaisha and Mitsubishi Rayon Company, Ltd., both of Tokyo, Japan**

**Filed Mar. 23, 1990, Ser. No. 497,621**

**Claims priority, application Japan, Sep. 8, 1989, 1-234218**

**Int. Cl.⁵ B23C** *9/00;* **B23B** *47/00*

**U.S. Cl. 409—231** **11 Claims**



1. A spindle of a machine tool comprising:

an adapter made of metal and provided with a portion of a shank of a tool;

a hollow cylindrical member made of fiber reinforced composite material and connected to the other end of said adapter to extend coaxially therewith for accommodating said shank, and

a hard protective coating layer covering substantially the outer surface of said spindle including said member and said adapter.

---

### 5,018,916
## ACTUATING ARRANGEMENT FOR A TOOL OR WORKPIECE CLAMPING DEVICE IN A MACHINE TOOL SPINDLE

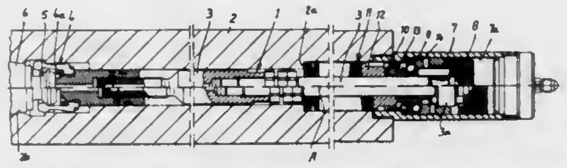
**Karl Bauch, Kempten; Alfred Raff, Marktoberdorf; Helmut Heel, Lengenwang, and Norbert Leege, Betzigau, all of Fed. Rep. of Germany, assignors to Ott Maschinentechnik GmbH, Kempten, Fed. Rep. of Germany**

**Filed Aug. 22, 1990, Ser. No. 571,320**

**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1989, 3936121**

**Int. Cl.⁵ B23B** *31/10;* **B23C** *5/26*

**U.S. Cl. 409—233** 6 Claims



1. An actuating arrangement for a tool or workpiece clamping device in a machine tool spindle, comprising a clamping bar which is axially displaceable in the clamping direction of the spindle under the force of a spring arrangement, and a first wedge transmission assembly which is operative between the spindle and the clamping bar, with freely movable balls which respectively bear against three cone surfaces of which one cone surface is provided on a clamping sleeve which is axially displaceable on the clamping bar, the other cone surface is provided on a clamping ring connected to the clamping bar and the third cone surface is provided on a support ring arranged stationarily with respect to the spindle, further comprising a pressure sleeve which is axially displaceable on the clamping bar between the spring arrangement and the clamping sleeve and which acts on the clamping sleeve in the clamping direction, and a piston-cylinder unit whose piston firstly acts on the clamping sleeve in a first phase of its release stroke movement which is directed oppositely to the clamping direction and also acts on an annular shoulder on the clamping bar in a second phase, characterised in that provided between the pressure sleeve (12) and the clamping sleeve (13) is a second wedge transmission assembly (10) with freely movable balls (21) which respectively bear against two cone surfaces (22, 23) which are inclined in mutually opposite relationship at the mutually facing ends (12*a*, 13*a*) of the two sleeves (12, 13) and successively against two further cone surfaces (24, 25) which are inclined in mutually opposite relationship on a ring (15) arranged concentrically with respect to the sleeves (12, 13) stationarily relative to the spindle (2), wherein the first cone surface (24) which faces towards the spring arrangement (11) expands in a conical configuration towards the spring arrangement (11) and the second cone surface (25) which is towards the clamping sleeve (13) expands in a conical configuration towards the clamping ring (14), in such a way that at the beginning of the clamping stroke movement of the pressure sleeve (12), which is produced by the spring arrangement (11), the balls (21) of the second wedge transmission assembly (10) bear against the first cone surface (24) and act on the clamping sleeve (13) to produce a travel step-up effect, and in second phase of the clamping stroke movement they bear against the second cone surface (25) and thereby in the second phase of the clamping stroke movement act on the clamping sleeve (13) to produce a force-increasing effect and in the last phase of the release stroke movement which is produced by the piston-cylinder unit (7*a*, 8) and which is directed in opposite relationship they again bear against the first cone surface (24) and thereby act on the pressure sleeve (12) towards the spring arrangement (11), to produce a force-increasing effect.

---

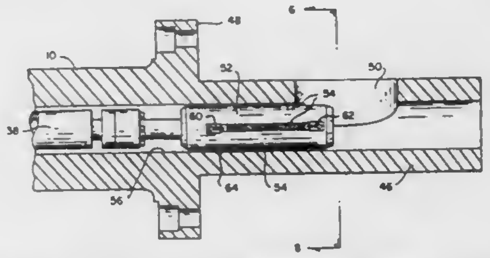
### 5,018,917
## APPARATUS FOR GROOVING THE BARREL OF A PLASTICATING MACHINE

**Paul N. Colby, New Castle, Pa., assignor to Spirex Corporation, Youngstown, Ohio**

**Division of Ser. No. 418,238, Oct. 6, 1989, Pat. No. 4,953,279. This application May 14, 1990, Ser. No. 522,690**

**Int. Cl.⁵ B23P** *6/00;* **B23D** *1/08*

**U.S. Cl. 409—296** **5 Claims**



1. An apparatus for grooving the interior surface of a plasticating machine having a plasticating extruder barrel and having support moorings with said plasticating barrel supported by said support moorings during the plasticating operation, said apparatus comprising

a. said plasticating extruder barrel supported by said support moorings,

b. a grooving device within said barrel while said extruder barrel is supported by said moorings, said grooving device having cutting elements which are disposed near one end of said barrel for grooving the interior surface of said barrel,

c. the end of said grooving device opposite from said cutting elements protruding from the other end of said barrel,

d. reciprocating means mounted on the protruding end of said grooving device to impart reciprocating movement to said cutting elements,

e. a support brace attached to said other end of said barrel for providing support for said protruding end of said grooving device,

f. said support brace providing access to allow manual adjustment of said grooving device, and

g. a bushing at said other end of said barrel for supporting said grooving device, said bushing having circumferen-

VOL
1126
ISS
4
MY
28
1991
UMI

tially spaced slots, and a key disposed on said grooving device for sequentially keying said grooving device into each of said slots.

---

5,018,918

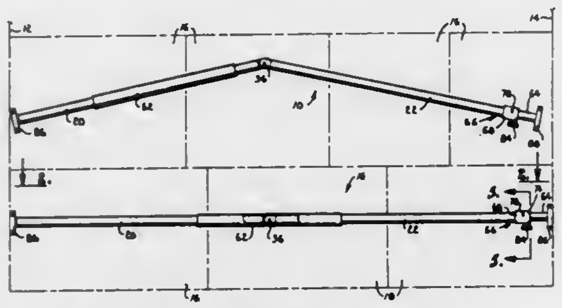
### LOAD RESTRAINT BAR FOR CARGO VEHICLES

**H. Montgomery Jacobs, 32075 W. 95th St., Desoto, Kans. 55018, and William D. Forrester, 1529 W. Cedar, Olathe, Kans. 66061**

**Filed Jul. 17, 1989, Ser. No. 380,606**

**Int. Cl.$^5$ B61D *45/00***

**U.S. Cl. 410—145** **16 Claims**



1. A cargo restraint bar comprising:
first and second elongate tubes each having an inner end and an outer end;
means for establishing a toggle joint connecting the inner ends of the tubes for pivotal movement between a rigid position wherein the tubes are axially aligned and a collapsed position wherein the tube axes are misaligned, said toggle joint establishing means comprising a pair of substantially cylindrical plugs connected with one another by said toggle joint, said plugs being received in the inner ends of the first and second tubes and being removable therefrom;
adjustable cam means on each said plug for applying a frictional force against the corresponding tube to hold the plug therein;
an elongate extension member having inner and outer ends and a sliding connection with said first tube in a manner permitting the extension member to extend and retract relative to the outer end of said first tube, thereby varying the length between the inner end of said first tube and the outer end of said extension member;
releasable clamp means for clamping said first tube and said extension member together; and
wall engaging means on the outer end of said second tube and on the outer end of said extension member for engaging opposed walls of a cargo compartment in the rigid position of the tubes.

---

5,018,919

### COMBINED RIGID PROFILE AND STRETCHING ROOF BOLT WITH EXPANSION ELEMENT

**Peter Stephan, Essen, Fed. Rep. of Germany, assignor to Bergwerksverband GmbH, Fed. Rep. of Germany**

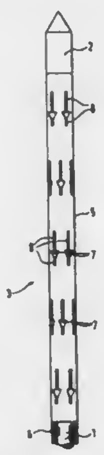
**Filed Mar. 12, 1990, Ser. No. 491,742**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1989, 3912499**

**Int. Cl.$^5$ F16B *13/04***

**U.S. Cl. 411—33** **7 Claims**

1. A roof bolt adapted to be inserted in a bolt bore for securing drifts and rooms in mining and tunnel construction characterized by a bolt bar having a bolt tip rigidly affixed to one end thereof and a force element at the opposite end of said bolt bar; walls defining a hollow, collapsible sheathing tube mounted on said bolt bar intermediate said bolt tip and said force element and adapted to collapse when said force element is moved toward said bolt tip, and wherein said sheathing tube has a plurality of spaced circumferential rows of cutouts which open into slots formed in the walls of said sheathing tube to cause said tube to have a plurality of rows of radially extending elements adapted to engage the walls of said bolt bore when said sheathing tube is collapsed.



---

5,018,920

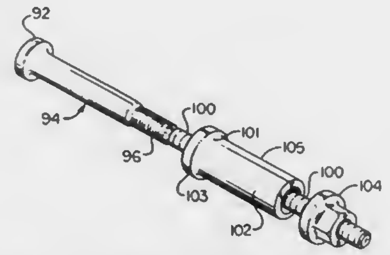
### INTERFERENCE FIT BOLT AND SLEEVE

**Eugene R. Speakman, Fullerton, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.**

**Division of Ser. No. 298,936, Jan. 23, 1989, abandoned. This application Jan. 16, 1990, Ser. No. 466,125**

**Int. Cl.$^5$ F16B *13/04, 21/00***

**U.S. Cl. 411—43** **1 Claim**



1. A interference fit threaded pull bolt fastener system for use with a pull tool securing a plurality of layers having an aligned hole together, comprising:
a bolt means comprising a straight walled shank portion having an enlarged head at one end and a threaded portion of a first reduced diameter at its other end with a serrated shaft means of diameter no greater than the first reduced diameter extending beyond the threaded portion, the serrated shaft being adapted to be broken off after pulling the bolt means into the hole;
a hollow sleeve means having a first portion adapted to receive the bolt means head, a straight walled portion of a smaller interior diameter than the exterior diameter of the shank of the bolt means adapted to receive the shank portion in an interference fit and a transition region of the outside surface of the sleeve at the intersection between the first portion and the straight walled portion wherein the transition region is a radiused intersection having a radius of about 0.030 to about 0.040 inches; and
nut means adapted to be torqued onto the threaded portion of the bolt means.

---

5,018,921

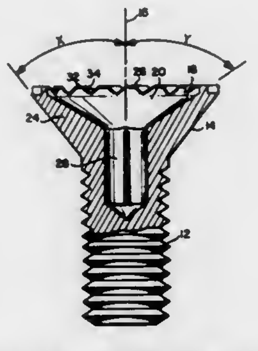
### LOCKING SCREW FOR MODULAR FRAMEWORK

**Richard C. Pinney, 2100 Deodar St., Santa Ana, Calif. 92701**

**Filed Aug. 6, 1990, Ser. No. 563,086**

**Int. Cl.$^5$ F16B *35/00, 7/00, 12/36***

**U.S. Cl. 411—393** **16 Claims**



1. A locking screw for modular framework, comprising:
a threaded shaft having a longitudinal axis and having two ends, and
a head portion having a frustoconical outer surface disposed along said longitudinal axis at one end of said shaft, said head portion having an end with a recessed cavity therein with a frustoconical inner surface, said outer and inner surfaces forming a wall therebetween which tapers in thickness in the direction away from the shaft into an annular surface portion encircling the recessed cavity, said annular surface portion having a roughened texture.

---

5,018,922

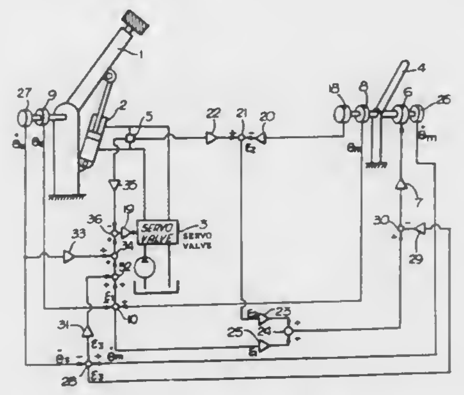
### MASTER/SLAVE TYPE MANIPULATOR

**Hiroshi Yoshinada, Machida, and Shu Takeda, Hiratsuka, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Division of Ser. No. 30,887, Mar. 26, 1987, Pat. No. 4,893,981. This application Sep. 12, 1989, Ser. No. 406,073**

**Int. Cl.$^5$ B25J *3/04***

**U.S. Cl. 414—5** **4 Claims**



1. A master/slave type manipulator comprising:
slaver means in the form of a working machine operated by a first actuator;
master means in the form of a control lever similar to said working machine and having a second actuator providing a torque to said control lever in a direction opposite to an operating direction of the control lever;
a first position sensor for detecting an actuated position of the working machine;
a first speed sensor for detecting a shifting speed of the working machine;
a second position sensor for detecting an operating position of the control lever;
a second speed sensor for detecting an operating speed of the control lever;
means for detecting a load acting on the working machine;
means for detecting a torque applied to the control lever;
first means for calculating a difference between an output of said first position sensor and an output of said second position sensor;
second means for calculating a difference between an output of said load detecting means and an output of said torque detecting means;
third means for calculating a difference between an output of said first speed sensor and an output of said second speed sensor;
fourth calculating means for weighting respectively and adding together an output of said first calculating means and an output of said second calculating means and for subtracting a weighted value of an output of said third calculating means from said weighted and added values;
first driving means for driving said second actuator in accordance with said subtracted value of said fourth calculating means;
fifth calculating means for summing the output of said first calculating means, and a weighted output of said first speed sensor, and for subtracting the output of said load detecting means from said sum; and
second driving means for driving said first actuator in accordance with an output of said fifth calculating means.

---

5,018,923

### AUTOMATED BRICKLAYING APPARATUS

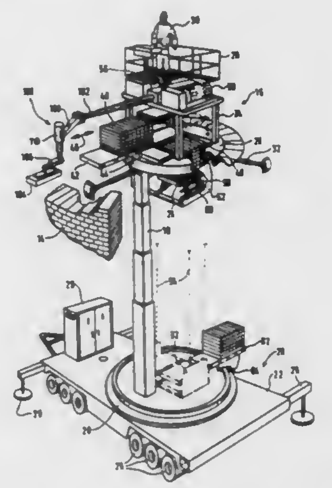
**Corneille Melan, Luxembourg; Jeannot Konsbruck, Berbourg, and Andre Kremer, Leudelange, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg, Luxembourg**

**Filed Oct. 12, 1989, Ser. No. 421,170**

**Claims priority, application Luxembourg, Nov. 9, 1988, 87381**

**Int. Cl.$^5$ E04G *21/16***

**U.S. Cl. 414—10** **9 Claims**



1. An apparatus for lining the inner wall of a vessel with bricks, comprising:
a mobile, substantially horizontal base;
a turntable rotatably mounted on the base;
a telescopic mast extending perpendicularly upwardly from a first end to a second end, said first end being secured to the turntable;
a work platform mounted on the second end of the mast, said platform being vertically movable by extension to the mast and being rotationally movable by rotation of the turntable;
retractable means for stabilizing the platform;
storage means for storing two pallets of bricks on the platform;

VOL
1126
ISS
4
MY
28
1991
UMI

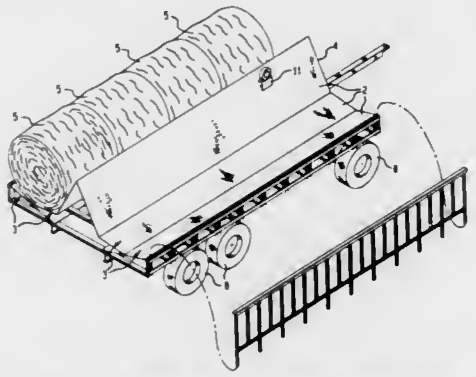
robot means for handling and laying the bricks;
control means for monitoring and controlling operation of the apparatus; and transport means for raising nd lowering pallets of bricks, said transport means comprising:
a pallet carrier cage, said cage having a lower compartment for receiving full pallets and an upper compartment for receiving empty pallets;
elevator means for receiving at least one pallet carrier cage; and
winch means for moving the elevator means between the turntable and the platform; and
means for loading and unloading the elevator means, said means for loading and unloading comprising:
guide means circumscribing the turntable; and
table means, slidably mounted on the guide means for movement around the turntable.

---

5,018,924

### ROUND BALE CARRIER AND REAR UNLOADER

**Karl Palmer, RD #2, Box 50, Earlville, N.Y. 13332**
**Continuation-in-part of Ser. No. 307,678, Feb. 8, 1989, Pat. No. 4,930,958. This application Apr. 23, 1990, Ser. No. 512,847**
**Int. Cl.$^5$ B60P *1/00***
**U.S. Cl. 414—245** **1 Claim**



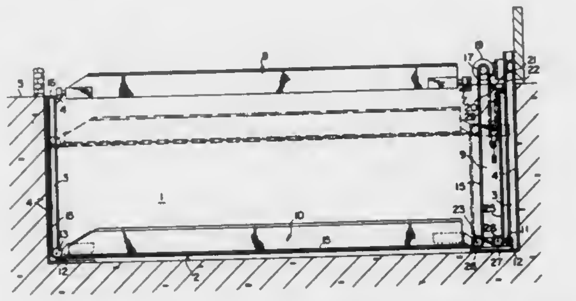
1. A round bale hauler and unloader comprising:
a wagon frame with a central longitudinal axis; one or more axles secured to the frame; wheels rotatably attached to said one or more axles for support and movement; a single piece superstructure aligned and parallel to the central longitudinal axis of the wagon frame and extending from the front to the rear of the wagon frame, the superstructure having a center A-frame and adjacent wedge shaped structures which are fixedly attached to the A-frame and which together with the A-frame form two parallel side by side channels; pivot means at the rear of the superstructure for attaching the superstructure to the rear of the wagon frame; and a hydraulic cylinder attached to the front bottom of the superstructure and the front top of the wagon frame to raise the front of the superstructure above the wagon frame and lower it onto the wagon frame pivoting the superstructure on its rear pivot means, such that when the hydraulic cylinder is fully retracted, the superstructure is in a lowered position and the two parallel channels can be filled with round bales whose axes are aligned parallel to the central longitudinal axis, and such that when the hydraulic cylinder is fully extended, the front of the superstructure is pivoted up about the rear pivot means, thereby causing the two parallel rows of round bales to slide off the rear of the wagon.

---

5,018,925

### LIFTING DEVICE FOR A PLATFORM FOR STORAGE OF MOTOR VEHICLES

**Anton Ganser, Friolzheim, Fed. Rep. of Germany, assignor to Otto Wobr GmbH, Fed. Rep. of Germany**
**PCT No. PCT/EP88/00390, § 371 Date Nov. 28, 1989, § 102(e) Date Nov. 28, 1989, PCT Pub. No. WO88/09764, PCT Pub. Date Dec. 15, 1988**
**PCT Filed May 6, 1988, Ser. No. 444,157**
**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718738**
**Int. Cl.$^5$ B66F *7/02***
**U.S. Cl. 414—240** **17 Claims**



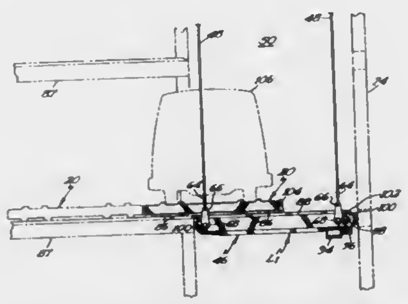
1. Lifting device for a platform (10) for storage of motor vehicles wherein there is arranged on each of two opposite sides of the platform (10) a carrying chain (15), the one end of which is stationarily held in the region above a corner of the platform (10), from which it hangs downwards and passes over a first deflection pulley (13) mounted for free rotation on a side of the platform (10) and then runs over a second deflection pulley (14) spaced from the first deflection pulley (13), each carrying chain (15) forming in the region of the platform a loop in which the platform (10) with the two deflection pulleys (13, 14) is suspended, and after the second deflection pulley (14) is led upwards again where it passes over a stationarily mounted drive wheel (17), characterized in that a gear (23) connected to the second deflection pulley (14) for common rotation with the latter is provided to mesh with a stationarily held guiding chain (25) which rests against the gear (23) on the side thereof which faces away from the carrying chain (15).

---

5,018,926

### AUTOMATIC STORAGE AND RETRIEVAL APPARATUS

**William A. Sternad, 18415 N. 30th Pl., Plymouth, Minn. 55447**
**Filed May 8, 1989, Ser. No. 348,552**
**Int. Cl.$^5$ E04H *6/06***
**U.S. Cl. 414—253** **20 Claims**



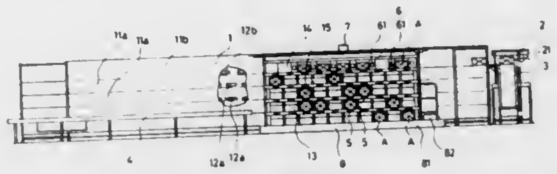
1. A structure incorporating automatic storage and retrieval apparatus comprising:
(a) a number of identical pallet means, each pallet means having translation means thereunder, arranged such that the pallet means can be translated along a path which is planar to the upper surface of the pallet means;
(b) a structure comprising a number of identical sized, horizontal levels which are aligned in a vertical array extending between a pair of vertical lift shafts which reach from ground level to all the other levels at opposite ends of the levels; each level having four sides oriented with a first pair of sides perpendicular to the shafts, and a second pair of sides parallel and open to the shafts; the levels being dimensioned such that, when filled with pallet means with their direction of motion oriented perpendicular to the shafts, each level will exactly hold an integral number of pallet means in the dimension between the shafts; and with the upper surface of each level having unobstructed, stationary upper surface means dimensioned, located and adapted to cooperate with and receive the pallet translation means of each pallet in pallet moving contact therewith, such that the pallet means can be transferred from either lift onto the surface means and thence, in free movement across the level in a direction perpendicular to the shafts;
(c) a lift mounted within each shaft, each lift having lift mechanism means arranged such that the respective lift can be moved from ground level to any other level; with the lifts sized to accommodate a pallet means oriented with the direction of motion perpendicular to the levels;
(d) transfer means on each lift operatively associated therewith and dimensioned, located and arranged such that pallet means located on a respective lift can be translated from either lift to the adjacent surface means with the pallet translation means cooperating with the surface means in moving contact therewith when the lift is positioned at any one of the levels; and
(e) control means arranged to operatively control the lift mechanism means and the transfer means so as to position both lifts at the same level whenever a pallet means is to be transferred from a lift to that level, whereby the pallet means being transferred from the one lift onto the stationary upper surface causes the pallet means adjacent the other lift to be transferred thereto by a pushing motion of any intermediate pallet means and the pallet means thereagainst.

---

5,018,927

### METHOD FOR ASSEMBLING AND STORING GOODS, APPARATUS THEREOF, AND METHOD FOR CONTROLLING THE APPARATUS

**Nobuhiro Tanaka, Saitama, Japan, assignor to Kao Corporation, Tokyo and Seibu Electric & Machinery Co., Ltd., Fukuoka, both of, Japan**
**Continuation of Ser. No. 167,312, Mar. 11, 1988, abandoned. This application Nov. 13, 1989, Ser. No. 434,500**
**Claims priority, application Japan, Mar. 11, 1987, 62-55531; Mar. 23, 1987, 62-42422[U]; Jun. 30, 1987, 62-162983; Aug. 5, 1987, 62-196015**
**Int. Cl.$^5$ B65G *1/00***
**U.S. Cl. 414—331** **2 Claims**



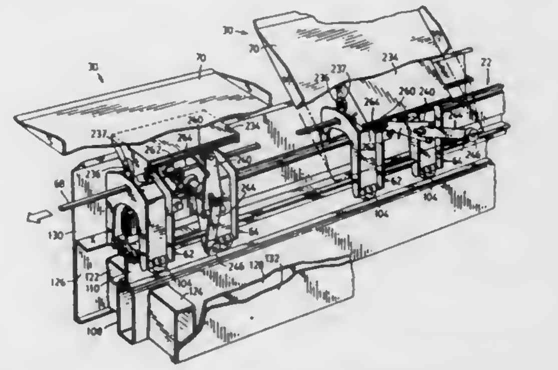
1. A goods assembling and storing apparatus for assembling and storing a plurality of goods comprising
a carousel having a plurality of goods storing portions for storing goods which are to be assembled and stored;
a plurality of frontages each having an opening therein;
said plurality of goods storing portions being selectively positionable behind said openings;
each of said frontage openings being provided with a frontage gate;
means for opening said frontage gate only when goods must be taken out of the goods storing portion located in the opening or when goods must be supplied into the goods storing portion in the opening;
supplying means having a goods carrying portion for supplying goods, which are to be transferred to said goods storing portions from which goods have been taken out, to a position adjacent said goods storing portions;
plural goods of the same kind are stored in each of the portions for storing goods and in each goods carrying portion;
said supplying means including a supplying stage of said carousel, said stage being movable along a horizontal circulating passageway;
supplement request indicating means disposed at a position corresponding to some portions or all of said goods storing portions; said supplement request indicating means has a take-out request indicating function to indicate the number of goods which are to be taken out; and
transfer indicating means disposed at a position corresponding to a part or all of said goods carrying portion.

---

5,018,928

### SORTATION EQUIPMENT

**Karl Hartlepp, 487 Highway 53 West, R.R. #1, Ancaster, Ontario, Canada L9G 3K9**
**Filed Oct. 31, 1989, Ser. No. 429,589**
**Claims priority, application Canada, Oct. 31, 1988, 581736**
**Int. Cl.$^5$ B65G *47/46***
**U.S. Cl. 414—339** **11 Claims**



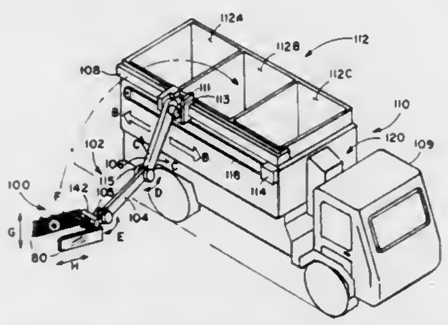
1. Sortation equipment for use in continuous track sortation systems, the equipment comprising: a train adapted to run on a continuous track for moving loads from a master station to one or more slave stations, the train having a locomotive and one or more cars coupled to be driven along the track by the locomotive, each of the cars including a tray tiltable from a load supporting generally horizontal position to a tilted position where the tray is inclined downwardly towards a slave station which is to receive the load off the tray, a discharge mechanism movable from a neutral to an intermediate position and then to an engagement position and including tray support means holding the tray horizontal with the discharge mechanism in the neutral and intermediate positions, and means on the train operable to move the discharge mechanism between the neutral and intermediate positions and the discharge mechanism being movable between the intermediate and engagement positions by contact with fixed means on the track at the slave station to drive the discharge mechanism as the train passes said fixed means whereby, as the discharge mechanism moves towards the engagement position, the tray is tilted to unload and then moved back to horizontal as the discharge mechanism returns to the intermediate position to again support the tray in the horizontal position; whereby when the discharge mechanism is in said neutral position, the discharge mechanism is prevented from engaging said fixed means.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,929
### TRUCK BODY AND APPARATUS FOR AUTOMATED COLLECTION OF RECYCLABLE MATERIALS

**William S. Carson, 3524 Twisted Oak Ct., Lake Wales, Fla. 33853**

**Filed Dec. 26, 1989, Ser. No. 457,298**
**Int. Cl.$^5$ B60P** *1/30;* **B65B** *21/02*
**U.S. Cl. 414—408** **12 Claims**



1. A truck body, for mounting to a truck or trailer, in combination with apparatus for picking up a curbside container having a plurality of lidded compartments containing separated materials therein, and selectively collecting such material:

- a) a plurality of bins formed in said truck body, each for collecting one of such materials;
- b) a track mounted adjacent an upper edge of a longitudinal side of said body;
- c) a carriage attached to said track;
- d) means for moving said carriage along said body;
- e) an articulated arm assembly attached at a proximal end thereof to said carriage, and having means for moving said, articulated arm assembly in a vertical plane;
- f) means attached to a distal end of said articulated arm assembly for engaging said container of separated materials so that the arm assembly is movable from a lower position adjacent the ground where the container engaging means engages said container to an upper position where the arm assembly lifts and inverts said container and said container engaging means over said longitudinal side of the truck body; and
- g) control means for controlling said articulated arm assembly to cause said container engaging means to engage said container, said control means thereafter controlling said articulated arm assembly to lift and invert such container over each successive one of said truck body bins, to selectively release materials from said lidded container bins into respective truck body bins, and to replace said container at curbside.

---

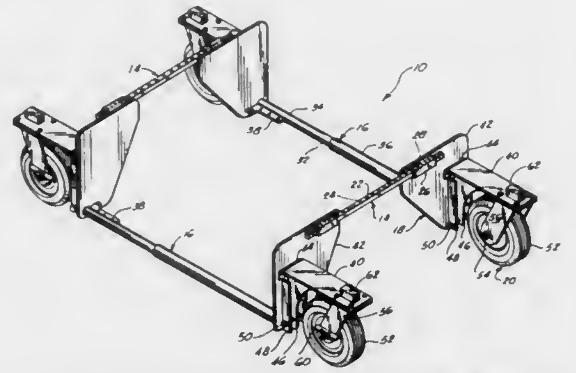
### 5,018,930
### LIFTING AND TRANSPORTING DEVICE

**Gary P. Hardin, Metairie, and Ronald Leonard, Slidell, both of La., assignors to SID Corp., Inc., Metairie, La.**

**Filed Mar. 12, 1990, Ser. No. 492,479**
**Int. Cl.$^5$ B60S** *13/02;* **B62B** *3/04;* **B60P** *3/40*
**U.S. Cl. 414—458** **12 Claims**

1. An apparatus for lifting and transporting heavy loads having an indented toe region therein comprising:

- (a) a pair of extendable tube assemblies each configured to fit within the indented toe region of a load to enable lifting and for supporting said load in a transport position;
- (b) a wheel assembly secured to the opposite ends of both said extendable tube assemblies, each said wheel assembly comprising an abutment plate pivotally secured to a support plate connected to a wheel;
- (c) a stop plate fixedly secured to said support plate;
- (d) at least one brace plate fixedly secured to said abutment plate;
- (e) removable fastening means for securing said stop and said brace plates together to prevent continued rotation of the one with respect to the other in a transport position;
- (f) width adjusting means securing adjacent wheel assemblies together for adjusting the width dimension between said extendable tube assemblies; and,



- (g) lever means secured to each said wheel assembly for pivoting said support plate with respect to said abutment plate; and

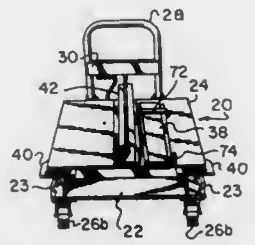
whereby said tube assemblies are inserted in said toe region of said load with the load on a support surface, and upon pivoting of said wheel assemblies the load is lifted and supported on said extendable tube assemblies.

---

### 5,018,931
### METHOD AND APPARATUS FOR HANDLING INFANT TRANSPORT INCUBATORS

**Derek Uttley, Nepean, Canada, assignor to Children's Hospital of Eastern Ontario, Ontario, Canada**

**Filed Sep. 19, 1989, Ser. No. 409,395**
**Claims priority, application Canada, Jul. 26, 1989, 606723**
**Int. Cl.$^5$ B65G** *67/02*
**U.S. Cl. 414—495** **4 Claims**



1. A carrier for handling hospital patient conveyances provided with wheeled bases, said carrier comprising:

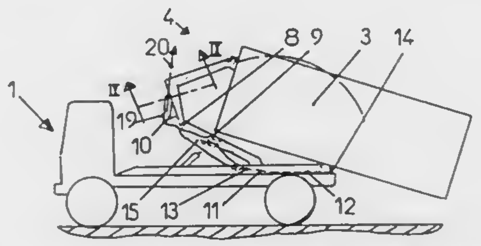
- a wheeled undercarriage;
- a platform hoistably mounted to said undercarriage for supporting the wheeled base of said patient conveyance, said platform being vertically displaceable above said undercarriage while remaining substantially parallel therewith;
- means for hoisting said platform;
- means for releasably locking said patient conveyance to said platform;
- ramp means for embarking and disembarking said patient conveyance from said platform; and
- brake means for selectively inhibiting movement of said wheeled undercarriage relative to a support surface;
- said means for releasably locking a wheeled patient conveyance to said platform including an elongated box structure open on one end and provided with a top surface of predetermined length and a narrow elongated longitudinal slot centered along said length of said top surface, said to surface having an inside;
- a latch mechanism transversely located within said box structure near said open end, said latch mechanism including a strike plate having a top edge and two ends and being affixed to a rotatable barrel having two ends and provided on one of said ends with a lever located along an outer side of said box structure, said lever being biased by a spring which urges said lever to a locked position wherein said top edge of said strike plate rests against said inside of said top surface of said box structure; and
- guide members comprising short sections of I-beam shaped stock each having a central web and being attached to the longitudinal centerline of the underside of said patient conveyance so that said web of each of said guide members enters said slot in said box structure when said patient conveyance is embarked on said platform, and said guide members are lockingly retained within said box structure by said latch mechanism.

---

### 5,018,932
### APPARATUS FOR HANDLING A LOAD BY ARM, NOTABLY FOR A TRUCK OR TRAILER

**Jean-Paul Croisier, Geneva, Switzerland, assignor to Interpatent Anstalt, Grande Rue Vadez, Liechtenstein**

**Continuation of Ser. No. 250,380, Sep. 28, 1988, abandoned. This application Jul. 23, 1990, Ser. No. 544,695**
**Claims priority, application European Pat. Off., Sep. 30, 1987, 87114298**
**Int. Cl.$^5$ B60P** *1/64*
**U.S. Cl. 414—498** **11 Claims**



1. A handling apparatus for moving and lifting, with minimal force, a load carried on a truck chassis, to a horizontal, vertical or tipped position, said apparatus comprising:

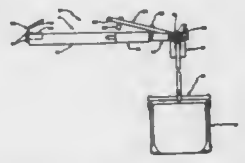
- (a) a plurality of serially disposed arms comprising:
  - (1) a rigid jib having a first arm and a second inferior arm, the first arm comprising a front section and a back section; the front section having an attached handling hook, and the back section attaching to the second inferior arm at approximately a right angle, and the second inferior arm comprising a front section and a back section; the front section of said inferior arm having an axis and the back section of said inferior arm having an axis;
  - (2) a rigid arm comprising a front section and a back section, the front section having a first front section axis and the back section having a first back section axis, the first front section axis connecting pivotally to the second inferior arm of the rigid jib at its back section axis;
  - (3) a crank arm, comprising a front section and a back section, the front section and back section of the crank arm each having an axis, and the front section of the crank arm comprising a locking lip which extends beyond the front section axis, and the front section of the crank arm connecting pivotally at its front section axis to the first back section axis of the rigid arm;
- (b) a disengaged frame member which is an elongated lever arm having a front section, a middle section and a back section, and having a first lever arm axis, a second lever arm axis and a third lever arm axis, where the first lever arm axis is located on the back section of the lever arm, the lever arm having an aperture formed therein for receipt of a fastening means for mounting the frame member on the truck chassis, the second lever arm axis being located at the middle section of the lever arm and the third lever arm axis being located at the front section of the lever arm; and
- (c) power means for moving the serially disposed arms and disengaged frame member comprising a first, a second, and a third hydraulic jack connected to the arms and frame member.

---

### 5,018,933
### DEVICE FOR TRANSFERRING AN INVALID TO AND FROM AN AUTOMOBILE

**Dale C. Kramer, Port Colborne, Canada, assignor to KHP, Inc., Snyder, N.Y.**

**Filed Apr. 3, 1990, Ser. No. 504,325**
**Claims priority, application United Kingdom, Apr. 25, 1989, 8907456; Apr. 3, 1989, 8907456**
**Int. Cl.$^5$ B60P** *1/00;* **B66C** *23/06*
**U.S. Cl. 414—542** **11 Claims**



1. A device for transferring an invalid from an automobile to a location distant thereof and vice versa, comprising:

- a support beam having a first tube and a second tube, said first tube being adapted to telescopically receive said second tube, said support beam extending transversely of the roof of an automobile, said roof having a widths, an inside surface and an outside surface; said support beam extending the width of said roof along said inside surface;
- a track of a fixed length connected to said support beam, said track being adapted to be selectively moved toward and away from said support beam;
- a first clamp mounted on said support beam for securing it to said roof;
- said first clamp being mounted to said first tube and includes means to adjustably engage said outside surface of said roof;
- a second clamp mounted on said track for securing it to said roof;
- said second clamp includes means to adjustably engage said outside surface of said roof;
- trolley means mounted on said track and adapted to traverse the length thereof;
- lifting means operatively connected to said trolley means for providing a substantially vertical lifting force;
- seat means, adapted to support a person or other load, operatively connected to said lifting means and adapted to be lifted in a vertical direction;
- said second tube includes a ratchet rack having a saw-toothed top surface mounted along the longitudinal length thereof;
- ratchet means including a ratchet release handle mounted on said track for selectively extending and retracting said track from said second tube and for locking said track at a selected position along said second tube; and
- wherein said ratchet means comprises a spring loaded ratchet head adapted to be activated by said ratchet release handle, said ratchet head being operative to selectively engage said teeth of said ratchet rack.

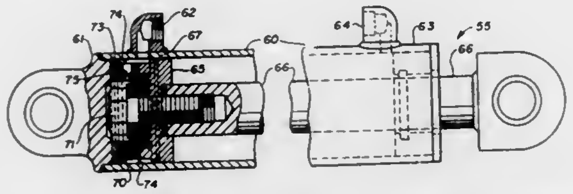
VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,934
### BACKHOE HYDRAULIC CYLINDER DECELERATOR

**John O. Steinkamp, Milford, and William S. Morrison, Rochester Hills, both of Mich., assignors to Ford New Holland, Inc., New Holland, Pa.**

**Filed Nov. 22, 1989, Ser. No. 440,921**
**Int. Cl.$^5$ E02F** *3/42*

**U.S. Cl. 414—695.5** **10 Claims**



1. In a backhoe having a prime mover including a wheeled frame; and an articulated boom assembly pivotally connected to said frame for movement about a generally vertical axis, said boom assembly having a working tool connected to a distal end thereof and being operable with articulated movement to move said working tool toward and away from said generally vertical axis, said boom assembly including a hydraulic cylinder interconnecting said boom assembly and said frame and being selectively operable to move said boom assembly about a generally horizontal axis to effect a raising and lowering of said working tool relative to said frame, said hydraulic cylinder having a barrel defining a chamber therewithin to retain hydraulic fluid under pressure and a piston translatable within said barrel in response to differences in hydraulic pressure on opposing sides of said piston, said piston having a rod extending outwardly therefrom beyond said barrel and a seal engageable with said barrel to divide said chamber into a retraction end and an extension end, said piston seal dividing said piston into a retraction side associated with said retraction end and an extension side associated with said extension end, each said end of said hydraulic cylinder having a port associated therewith for the introduction of hydraulic fluid under pressure to opposing sides of said piston seal, the improvement comprising:

a piston extension detachably affixed to said retraction side of said piston and having a fixed second seal mounted thereon for engagement with said barrel at a distance spaced from said piston seal to define an annular gap therebetween, said piston extension further having an orifice extending radially through said piston extension to bypass said fixed second seal to permit the passage of hydraulic fluid between said retraction end and said annular gap, the diameter of said orifice being significantly smaller than the port associated with said retraction end.

---

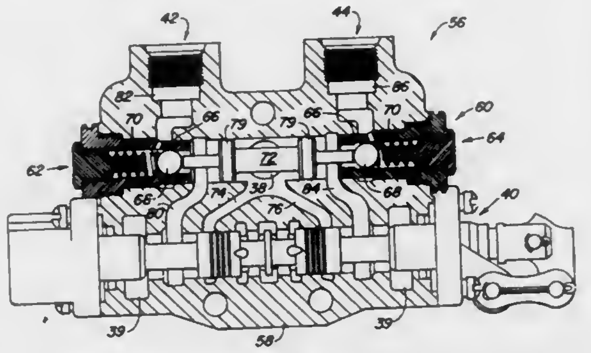
### 5,018,935
### AUTOMATIC PRESSURE RELIEF SYSTEM FOR A HYDRAULIC MOTOR

**Douglas M. Gage, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Nov. 9, 1989, Ser. No. 434,941**
**Int. Cl.$^5$ B66C** *1/42*

**U.S. Cl. 414—729** **33 Claims**

23. A grapple skidder for skidding logs comprising:
a support structure;
ground engaging means coupled to the support structure for supporting and propelling the support structure; .
a grapple linkage extending from the support structure;
a grapple coupled to the grapple linkage;
a rotary hydraulic motor coupled to the grapple linkage for rotating the grapple;
a reservoir for holding hydraulic fluid;
a source of pressurized hydraulic fluid is hydraulically coupled to the reservoir, the source of pressurized hydraulic fluid takes fluid from the reservoir and pressurizes the fluid;
a control valve is hydraulically coupled to the source of pressurized hydraulic fluid, the control valve controls the flow of hydraulic fluid from the source of pressurized hydraulic fluid, the control valve having a neutral position wherein flow from the source of pressurized fluid is checked;
first and second supply/return lines are hydraulically coupled to the control valve for directing pressurized hydraulic fluid from the control valve to the rotary hydraulic motor and exhausted hydraulic fluid from the rotary hydraulic motor to the control valve, and
means for automatically hydraulically coupling the supply/-return line having a lower hydraulic pressure than the other supply/return line to reservoir when the control valve is in the neutral position.



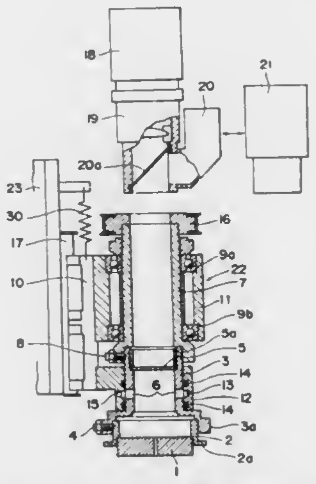
---

### 5,018,936
### ELECTRONIC PARTS ENGAGING APPARATUS

**Yasuo Izumi, Ikoma; Kazumi Ishimoto, Katano, and Yutaka Makino, Kobe, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 27, 1989, Ser. No. 371,973**
**Claims priority, application Japan, Jun. 29, 1988, 63-161605; Jul. 25, 1988, 63-184963; Jul. 25, 1988, 63-184966**
**Int. Cl.$^5$ B25J** *15/06*

**U.S. Cl. 414—752** **8 Claims**



1. An electronic parts engaging apparatus, comprising:
a suction nozzle made of a light transmitting material;
a recognition means for recognizing, through said suction nozzle, the shape of the electronic parts suctioned by said suction nozzle; and
a light ray applying means for applying light rays through said suction nozzle;
wherein said suction nozzle has an axial center and said recognition means and said light ray applying means are selectively positioned on said axial center of said suction nozzle.

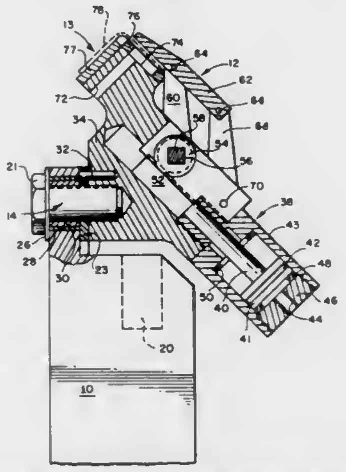
---

### 5,018,937
### SHEARCLIP-HANDLING TOOL

**Hans M. Kolstee, Glen Cove, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Continuation of Ser. No. 253,648, Oct. 5, 1988, abandoned. This application May 29, 1990, Ser. No. 528,904**
**Int. Cl.$^5$ B25J** *15/06*

**U.S. Cl. 414—783** **6 Claims**



1. A bracket-handling device for mounting on a robotic arm for handling angle brackets which have separate legs disposed at right angles relative to each other, the device comprising:
a body;
a solid pad mounted to the body and having surfaces disposed at right angles relative to each other which contact the respective legs of said angle bracket;
vacuum passage means formed in the body and passing through the pad for exerting vacuum pressure on a first surface of one leg of the bracket to maintain contact between the pad and the bracket;
a single unilateral jaw movably mounted in opposed relationship to the body for contacting a second surface of said one leg which is opposite said first surface and clamping the bracket against the pad during a portion of a bracket-handling interval;
linkage means pivotally connected to the jaw;
gear means for moving the linkage means; and actuator means for powering movement of the gear means.

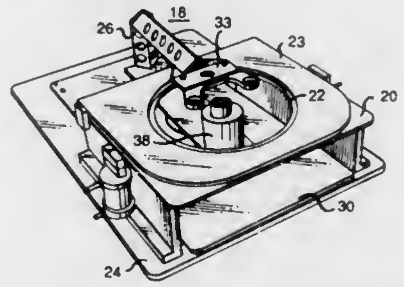
---

### 5,018,938
### METHOD AND APPARATUS FOR SEPARATING CHIPS

**Theodore J. Sikorski, Hamilton Square, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 18, 1990, Ser. No. 524,957**
**Int. Cl.$^5$ B66C** *23/00*

**U.S. Cl. 414—786** **4 Claims**



1. A method of handling a selected article within an array of articles adhered to the upper surfaces of a diaphram comprising the steps of:
supporting the diaphram on a first supporting surface with an opening therein;
securing said diaphram to overlie said opening;
supporting said first supporting surface in a vertically spaced relationship to a second supporting surface;
engaging and supporting a die ejector apparatus on said second surface;
engaging a portion of said die ejector with an engaging means mounted on a pick-up tool;
simultaneously displacing said pick-up tool and die ejector substantially as a single unit to a position wherein said pick-up tool and die ejector are aligned with a selected article on said diaphram wherein selected article is located between said pick-up tool and die ejector;
engaging a surface of the diaphram with a moveable member of the die ejector to separate the selected article from said diaphram and to move said selected article toward said pick-up tool;
engaging said selected article with said pick-up tool;
disengaging said engaging means from said die ejector; and moving said selected article to a desired location.

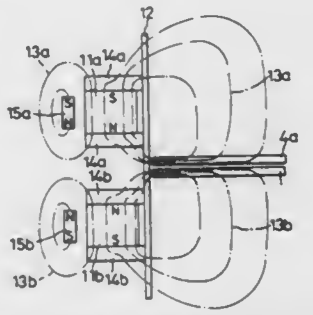
---

### 5,018,939
### APPARATUS FOR SEPARATING IRON SHEETS

**Tomomi Kishi; Kanshi Nonami; Masahiko Takeuchi; Naoyuki Yoshitani, all of Toyota, and Hideo Niwa, Toyoake, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Sanmei Electric Co., Ltd., both of Aichi, Japan**

**Continuation of Ser. No. 120,483, Nov. 13, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,344**
**Int. Cl.$^5$ B65G** *59/04*

**U.S. Cl. 414—795.4** **10 Claims**



1. An apparatus for separating adjacent stacked iron sheets, comprising:
at least a pair of main magnets, each having a first and second polarity portion with corresponding first and second opposite magnetic polarities;
at least one pair of auxiliary magnets, each having a first and second polarity portion with respective first and second magnetic polarities corresponding to the first and second magnetic polarities of the pair of main magnets;
each of said pair of main magnets being spaced a first distance from the stacked sheets and relative to each other for positioning in magnetic coupling adjacent opposite surfaces of the adjacent stacked sheets, and oriented in a predetermined direction with the first polarity portion of one of the pair of main magnets opposing the first polarity portion of the other of the pair of main magnets for generating in respective ones of the adjacent stacked sheets repelling magnetic flux patterns for separating one of the sheets from an adjacent sheet;
each of said pair of auxiliary magnets being disposed a second distance greater than the first distance from the stacked sheets adjacent and magnetically coupled to one of the main magnets, with the first and second polarity portions of the auxiliary magnets being oriented in the

VOL
1126
ISS
4
MY
28
1991
UMI

same predetermined direction as the first and second polarity portions of the corresponding magnetically coupled main magnets for generating a flux pattern for biasing the flux pattern of the corresponding main magnets, the biased flux pattern of the main magnets increasing the effectiveness of the generated repelling flux patterns of the main magnets.

---

### 5,018,940

## APPARATUS FOR SEPARATING A NUMBER OF PERIODICALS FROM A STACK OF PERIODICALS

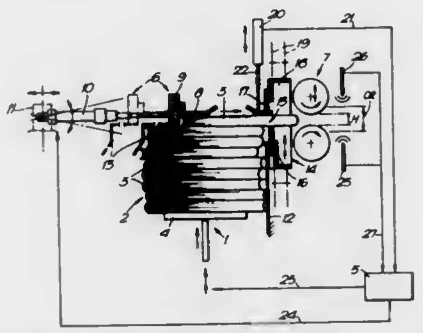
**Jon Hognestad, and Einar K. Selvig, both of Kongsberg, Norway, assignors to Media Craft a.s., Kongsberg, Norway**

**Filed Jan. 19, 1990, Ser. No. 467,183**

**Claims priority, application Norway, Jan. 20, 1989, 890268**

**Int. Cl.⁵ B65G** *59/02*

**U.S. Cl. 414—796.8** **7 Claims**



1. An apparatus for separating one or more essentially thin and planar products from a stack of such products; comprising
a stack-supporting means,
a means for gripping at least one product at the top of the stack and for lateral movement of the product to engagement with a further-feeding transport means,
said gripping means being vertically movable to automatically position itself in the correct functional position in relation to the top level of the stack, and
a gate means having a threshold member forming an abutment against the products below said at least one product which is to be separated at a time, and having a slot opening having a height which is adaptable to the product thickness in question, to allow the passing of only said at least one product at a time,
said gate means comprising a top member arranged to be kept bearing against the upper side of the stack, said top member and said threshold member being interconnected and vertically movable as a unit,
said top member being connected to a means for sensing the top level of the stack and for delivering a signal to a regulator when said level is within a chosen operational region of said sensing means,
said regualtor being arranged to ensure that the top level of the stack is within said operational region.

---

### 5,018,941

## BLADE FIXING ARRANGEMENT FOR A TURBOMACHINE ROTOR

**Bertrand J. J. M. Heurtel, Vert Saint Denis; Pierre-Louis Mondoloni, Boissy St Leger, and Jacques R. Serre, Vaux le Penil, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A., Paris, France**

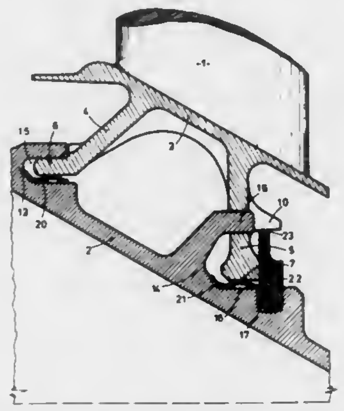
**Filed Jan. 4, 1990, Ser. No. 460,814**

**Claims priority, application France, Jan. 11, 1989, 89 00245**

**Int. Cl.⁵ F01D** *5/30*

**U.S. Cl. 416—220 R** **2 Claims**

1. A turbomachine rotor comprising a drum and at least one stage of blades secured to the outer periphery of said drum,
said drum having upstream and downstream annular beads on said outer periphery thereof, an annular groove in said upstream bead, an annular collar on said downstream bead, said collar being provided with peripherally spaced tongues projecting in the downstream direction, a cylindrical bearing surface on said drum adjacent said downstream bead, and an annular groove in said drum on the downstream side of said cylindrical bearing surface,
said blades each having a platform provided with upstream and downstream legs on the radially inner face thereof, said upstream leg having an end edge received in said annular groove of said upstream bead on said drum, and said downstream leg having a cylindrical bearing surface at its radially inner end acting on said cylindrical bearing surface of said drum, a central aperture receiving at least one of said tongues of said collar on said downstream bead, and a pair of hooks on the downstream face of said downstream leg, each of said hooks defining a recess in its radially inner face,
said rotor including a plurality of arcuate locking plates received in said annular groove of said drum and securing said blades in position, each of said locking plates having first tongues received in said recesses of said hooks on said downstream leg of a blade platform, and second locking tongues at the ends of said locking plate.



---

### 5,018,942

## MECHANICAL BLADE TIP CLEARANCE CONTROL APPARATUS FOR A GAS TURBINE ENGINE

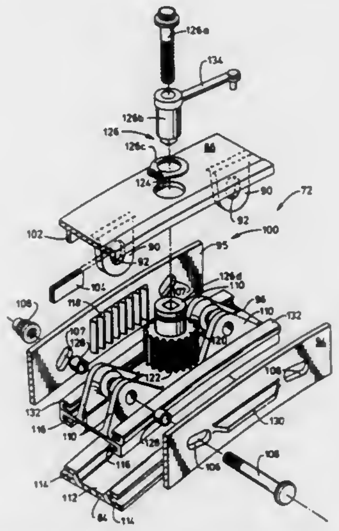
**John J. Ciokajlo, and Ambrose A. Hauser, both of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio**

**Filed Sep. 8, 1989, Ser. No. 404,923**

**Int. Cl.⁵ F01D** *5/20*

**U.S. Cl. 415—173.2** **16 Claims**

1. In a gas turbine engine including a rotatable rotor having a central axis and a row of blades with outer tips and a stationary casing with a shroud and being disposed in concentric relation with said rotor, an apparatus for controlling the clearance between said rotor blade tips and casing shroud, said apparatus comprising:
(a) a structure on said stationary casing spaced radially outwardly from an opening defined in said stationary casing and defining a plurality of mounting elements extending in a substantially radial direction relative to said central rotor axis;
(b) a pair of arcuate members extending circumferentially about said casing shroud and movable relative thereto, said arcuate members being spaced from opposite sides of said mounting elements of said stationary casing structure, said arcuate members having supporting elements which extend in inclined directions relative to a circumferential line about said casing shroud;
(c) means disposed between said stationary casing structure and said opening in said stationary casing and between said arcuate members, said means including a shroud segment and being mounted to said supporting elements of said arcuate members for movement relative to said arcuate members and radially toward and away from said stationary casing opening, said shroud segment defining a circumferential portion of said casing shroud, being separate from said stationary casing and disposed in said stationary casing opening; and
(d) actuating means disposed between said arcuate members and between a said shroud hanger and said stationary casing structure, said actuating means being mounted to said stationary casing structure and operable for moving said arcuate members circumferentially to cause radial movement of said shroud hanger and therewith radial movement of said shroud segment to establish a desired clearance between said shroud segment and rotor blade outer tips.



---

### 5,018,943

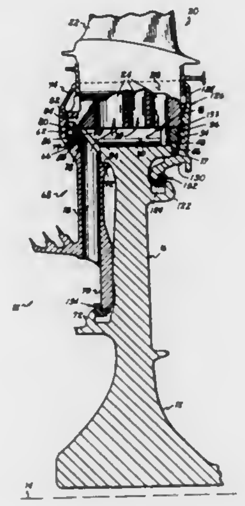
## BOLTLESS BALANCE WEIGHT FOR TURBINE ROTORS

**Robert J. Corsmeier, Cincinnati, and Richard W. Albrecht, Jr., Fairfield, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio**

**Filed Apr. 17, 1989, Ser. No. 338,671**

**Int. Cl.⁵ F01D** *25/06*

**U.S. Cl. 416—144** **10 Claims**



1. A balanced rotor of a gas turbine engine, comprising:
a rotor disk formed with circumferentially spaced slots each having a radially innermost surface;
a row of turbine rotor blades extending radially outwardly from the circumference of said rotor disk, each of said rotor blades being formed with a blade root having a bottom surface, said rotor blades being insertable within said dovetail slots of said rotor disk so that a cavity is formed between said bottom surface of said blade root and said radially innermost surface of said slots;
balance means insertable within said cavity for balancing said rotor; and
wherein said rotor disk has an aft surface and a forward surface, said balance means comprising a balance weight having a bottom surface engageable with said radially innermost surface of said slots in said turbine disk and a lip engageable with said aft surface of said rotor disk.

---

### 5,018,944

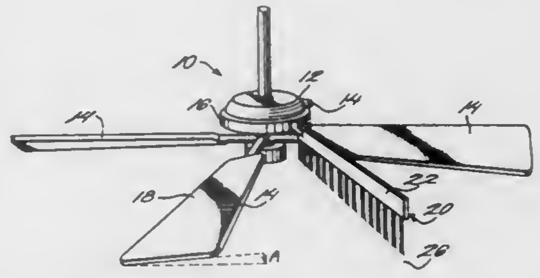
## CEILING FAN CLEANER APPARATUS

**John R. Bielecki, 3604 Spanish Ct., Hephzibah, Ga. 30815, and Thomas J. France, 1188 Norman St., North Augusta, S.C. 29841**

**Filed Dec. 26, 1989, Ser. No. 456,333**

**Int. Cl.⁵ F04D** *29/70*

**U.S. Cl. 416—146 R** **20 Claims**



1. A ceiling fan comprising:
a housing;
a motor within the housing;
a shaft rotated by said motor;
plurality of fan blades attached to said shaft and rotating therewith, said blades having a surface; and
means for brushing said blades as said blades rotate, said brushing means in spaced relation to said blades.

---

### 5,018,945

## ACCURATE PERISTALTIC PUMP

**Edmund D. D'Silva, Highland Park, Ill., assignor to Baxter International Inc., Deerfield, Ill.**

**Filed Dec. 14, 1989, Ser. No. 451,269**

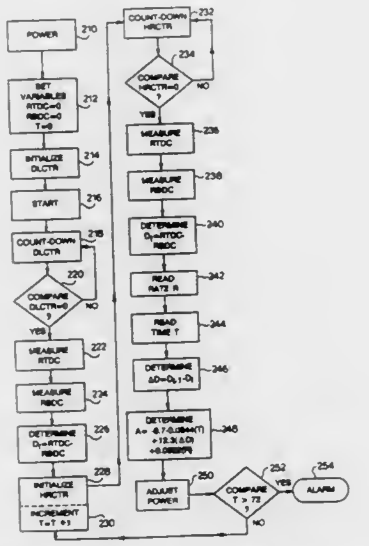
**Int. Cl.⁵ F04B** *43/12, 49/00*

**U.S. Cl. 417—12** **16 Claims**

1. A method for infusing a fluid from a source of fluid to a patient through tubing comprising:
(1) applying external pumping action to the tubing;
(2) measuring a diameter of the tubing subject to the pumping action after passage of a period of time;
(3) comparing the diameter of the tubing after the passage of

VOL 1126
ISS 4
MY 28 1991
UMI

a period of time with a previous diameter of the tubing; and



(4) adjusting the rate of the pumping action to compensate for any change in diameter of the tubing to maintain an approximately constant flow rate of infusion.

---

### 5,018,946
### FLUID PUMP APPARATUS

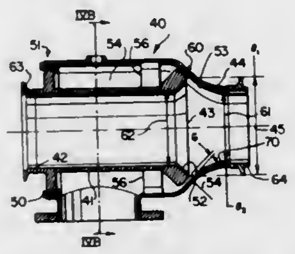
**Raymond A. Breckner, Richmond; Kurt K. Henriksson, Vancouver; Leslie C. Sharratt, Richmond, and Leslie M. Sharratt, Ganges, all of Canada, assignors to Innovac Technology Inc., Richmond, Canada**

**Filed Mar. 14, 1990, Ser. No. 494,114**

**Claims priority, application Canada, Mar. 14, 1989, 593611**

**Int. Cl.$^5$ F04F** *5/46*

**U.S. Cl. 417—197** **16 Claims**



1. A liquid pump for conveying sensitive material from a first to second location, said pump comprising a main duct extending along a longitudinal axis, said main duct including a first segment having an inlet end and an outlet end, said first segment being operable to be coupled to a source of liquid to be moved from a first location to a second location, means coupled with said first segment for forming an annular orifice for directing a primary liquid into said main duct at a location downstream of said inlet, said second segment having an annular convey curved surface located downstream of said orifice, said annular convex curved surface being positioned to intercept said liquid issuing from said orifice substantially tangential to said annular convex curved surface whereby said annular convex curbed surface may generate a Coanda effect in said primary fluid as it passes thereover, said annular curved surface converging smoothly to an inside diameter having a dimension substantially identical to the inside diameter of said outlet end of said first segment, a frusta-conical control surface extending peripheral around said first segment at said outlet end of said first segment and expanding outward at an angle to said longitudinal axis toward said annular curved surface, and wherein said inside diameter of said outlet end is measured on the inlet end side of and immediately adjacent to said control surface.

---

### 5,018,947
### SCREW TYPE VACUUM PUMP

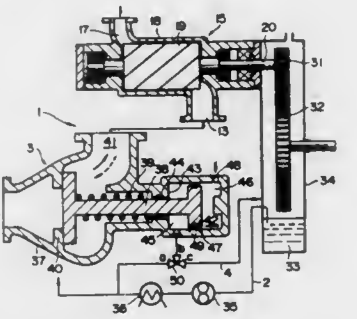
**Noboru Tsuboi, Kakogawa, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan**

**Filed Mar. 30, 1989, Ser. No. 330,696**

**Claims priority, application Japan, Aug. 19, 1988, 63-206904**

**Int. Cl.$^5$ F04B** *49/02;* **F04C** *18/16*

**U.S. Cl. 417—295** **3 Claims**



1. A screw type vacuum pump comprising:

a pump casing having a suction port and a discharge port on opposite sides thereof;

intermeshed male and female rotors comprising means for pumping a gas from said suction port to said discharge port when said rotors are rotated;

power transmission means for rotating said rotors, including a transmission casing having an oil reservoir;

oil circulating means including an oil pump and an oil cooler, for circulating lubricating oil to said pump casing for lubricating said rotors; and

a check valve fluidically connected to said suction port and comprising:

(a) a valve casing defining a gas flow space and a cylinder space, said gas flow space being fluidically isolated from said cylinder space and having a valve seat,

(b) a valve body for closing said valve seat and sealing said suction port, said valve body including a piston fitted in said cylinder space to divide said cylinder space into an oil chamber and an air chamber at atmospheric pressure,

(c) spring means for normally biasing said valve body in a closed position; and

(d) a three way change over valve selectively communicating said oil chamber with said oil reservoir when the vacuum pump is stopped and with said oil circulating means at a position downstream of said oil pump when said vacuum pump is operating,

whereby oil pressure is applied to said oil chamber from said oil circulating means via said change over valve when said vacuum pump is operated, so that said valve body moves from said closed position to an open position in opposition to the force of the spring means to open fluid communication to said suction port, and whereby the oil pressure is not applied to said oil chamber so that said check valve is closed to prevent reverse rotation of said rotors when said oil pump is stopped and lubricating oil is not circulated to said pump casing.

### 5,018,948
### ROTARY DISPLACEMENT COMPRESSOR WITH ADJUSTABLE OUTLET PORT EDGE

**Lars Sjte,uml/o/ holm, Sollentuna, and Stig Ludin, Värmdö, both of Sweden, assignors to Svenska Rotor Maskiner AB, Stockholm, Sweden**

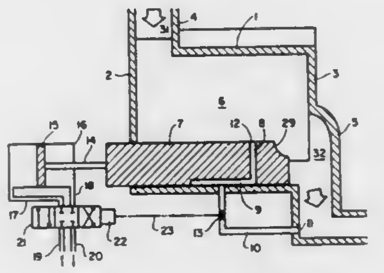
**PCT No. PCT/SE88/00533, § 371 Date Apr. 9, 1990, § 102(e) Date Apr. 9, 1990, PCT Pub. No. WO89/03482, PCT Pub. Date Apr. 20, 1989**

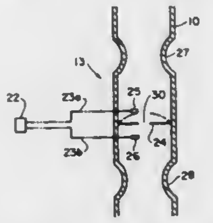
**PCT Filed Oct. 13, 1988, Ser. No. 469,457**

**Claims priority, application Sweden, Oct. 15, 1987, 8704017**

**Int. Cl.$^5$ F04B** *49/04, 49/08;* **F04C** *29/08*

**U.S. Cl. 417—302** **9 Claims**





1. A rotary displacement compressor having at least one rotor (6) mounted in a working space formed by a casing (1, 2, 3, 7) surrounding the rotor(s) (6), in which working space a gaseous working fluid is transported and compressed in compression chambers from an inlet port (31) connected to a suction channel (4) to an outlet port (32) connected to a pressure channel (5), said outlet port having an edge (29) determining the moment of opening for a compression chamber towards the outlet port (32), the position of said edge (29) being adjustable by actuating means (15, 16) governed by sensing means (13), characterized in that the compressor is provided with a connection channel (8, 9, 10) having one end (11) in communication with the pressure channel (5) and a second end (12) in communication with the working space in an area adjacent the outlet port (32) of the compressor, said sensing means (13) including a flow direction indicating means (13) in the connection channel (8, 9, 10) for indicating the direction of flow in the connection channel (8, 9, 10), said actuating means (15, 16) being arranged to displace said edge (29) in a direction towards a later occurrence of said moment of opening when sensing a direction of flow in the connection channel (8, 9, 10) from said one end (11) to said second end (12) and to displace said edge (29) in a direction towards an earlier occurrence of said moment of opening when sensing a flow in the opposite direction.

---

### 5,018,949
### DIAPHRAGM PUMP

**Hans Götz, Bad Urach, Fed. Rep. of Germany, assignor to Uraca Pumpenfabrik GmbH & Co. KG, Bad Urach, Fed. Rep. of Germany**

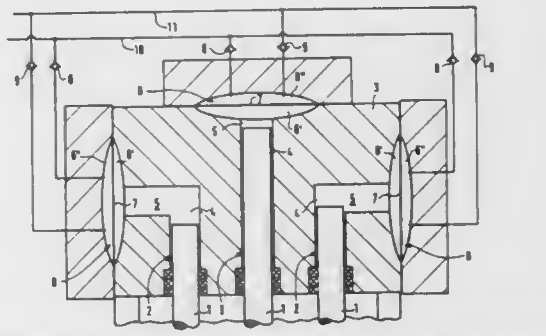
**Filed Jan. 31, 1990, Ser. No. 473,162**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1989, 39030490**

**Int. Cl.$^5$ F04B** *27/08, 43/06*

**U.S. Cl. 417—339** **11 Claims**

1. A diaphragm pump having several cylinders which are arranged in a row and which each form a stroke working space of a piston as well as having pump working spaces arranged in the same number which each may be closed off on the suction side by an inlet valve arrangement and, on the pressure side, by an outlet valve arrangement and are separated by a diaphragm from the stroke working space of the assigned piston or plunger, the work of the piston or plunger being transmissible to the diaphragm by a transmission fluid received in the stroke working space, wherein the cylinders are arranged at distances which are narrow in comparison to the cross-section of the pump working spaces, and the pump working spaces assigned to adjacent stroke working spaces are arranged on different sides of the row of cylinders or of a cylinder block receiving the cylinders.



---

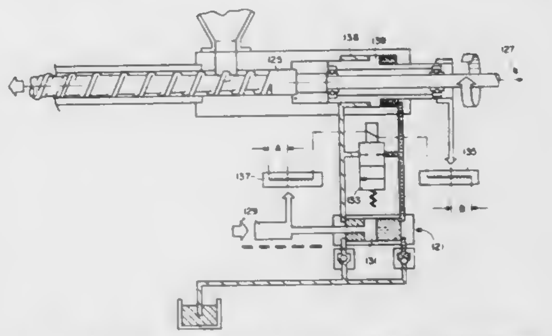
### 5,018,950
### ELECTROHYDRAULIC METHOD AND APPARATUS

**Lawrence W. Reinhart, 103 Raven Rd., Greenville, S.C. 29615**

**Division of Ser. No. 166,887, Mar. 11, 1988, abandoned. This application Jan. 4, 1990, Ser. No. 461,022**

**Int. Cl.$^5$ F04B** *35/02*

**U.S. Cl. 417—383** **2 Claims**



1. An apparatus for use in injection molding comprising:

rotatable auger means for forcing molten thermoplastic material into a mold structure for the molding thereof, said auger means being linearly moveable;

hydraulic means in communication with said rotatable auger for imparting linear movement thereto;

an electric linear motor for causing movement of said hydraulic means and thereby linear movement of said auger means;

said electric linear motor communicating with said hydraulic means on the exterior thereof;

said hydraulic means including;

a first hydraulic piston and cylinder in communication with said electric linear motor;

a second hydraulic piston and cylinder in hydraulic communication with said first hydraulic cylinder;

said second hydraulic cylinder being in communication with said auger means;

said first and second hydraulic pistons and cylinders being in sympathetic association with one another whereby the location of one piston along its stroke fixes the location of the other said piston along its stroke and thus the location of said auger along its stroke whereby the position of the

VOL
1126
ISS
4
MY
28
1991
UMI

auger along its stroke can be accurately determined by the position of said electrical linear motor along its stroke.

---

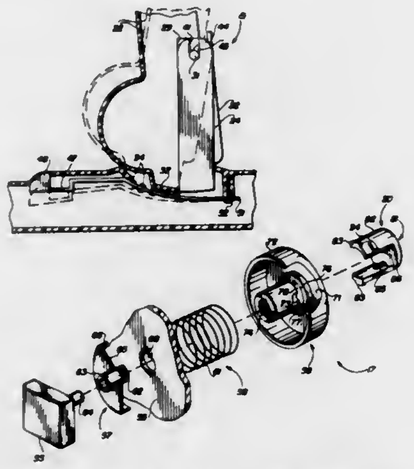
### 5,018,951
### PORTABLE ELECTRICAL FAN

**Jni-Shang Wang, Taipei, Taiwan, assignor to Duracraft Corporation, Sudbury, Mass.**

**Filed Aug. 9, 1989, Ser. No. 391,265**

**Int. Cl.⁵ F04B** *17/00;* **F01D** *15/12;* **E05D** *7/10;* **H01H** *3/20*

**U.S. Cl. 417—423.15** **38 Claims**



1. A portable electric appliance comprising:

fan means comprising a rotatable blade assembly, and an electrical motor operatively coupled to said blade assembly;

standard means having an upper end fixed to said fan means;

pedestal means;

coupling means comprising an upper member joined to a lower end of said standard means and a lower member pivotally coupled with said upper member and joined to said pedestal means, said upper member being freely demountable from said lower member;

manually operable latch means for preventing demounting of said upper member from said lower member; and

positioning means for selectively fixing the relative angular positions of said upper and lower members, said positioning means comprising a first surface means defined by said pedestal, a second surface means defined on a lower end of said upper member and engageable with said first surface means in any of a plurality of relative angular positions between said upper and lower members so as to prevent pivotal movement therebetween.

---

### 5,018,952
### SINGLE SCREW MECHANISM WITH GATEROTOR HOUSING AT INTERMEDIATE PRESSURE

**David C. Winyard, Annapolis, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 31, 1989, Ser. No. 359,462**

**Int. Cl.⁵ F04C** *18/12, 23/00*

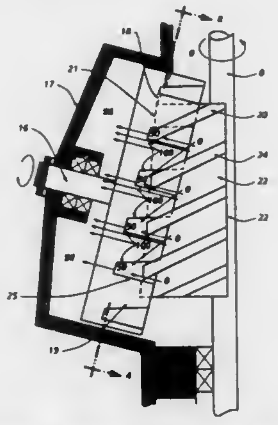
**U.S. Cl. 418—195** **4 Claims**

1. A single screw mechanism for varying the pressure of a fluid, comprising:

a mainrotor formed with a plurality of threads;

a casing cooperating with said mainrotor threads forming at last one chamber, said casing having a fluid inlet, a fluid outlet and first and second arcoid shaped window opening paths, said first and second window openings in mutual fluid communication, said second window opening extending beyond the end of said mainrotor threads, said second window in fluid communication with said fluid inlet;

a gaterotor formed with a plurality of teeth, said teeth sequentially extending through said first window opening into said at least one chamber and cooperating with said mainrotor teeth to vary the pressure of a fluid from an inlet pressure to an outlet pressure, said gaterotor teeth further sequentially extending into said second window opening, said teeth operating at close clearances with both sides of said second window; and,



a gaterotor housing sealedly cooperating with said casing and at least one surface of said gaterotor forming a gaterotor housing cavity, said cavity in operation receiving leakage fluid from said at least one chamber through said first window opening path and discharging said fluid through said second window into said inlet at a rate such that fluid pressure within said cavity achieves a steady state value intermediate between said inlet pressure and said outlet pressure.

---

### 5,018,953
### ROTOR WITH ECCENTRICALLY POSITIONED RETAINER PIN

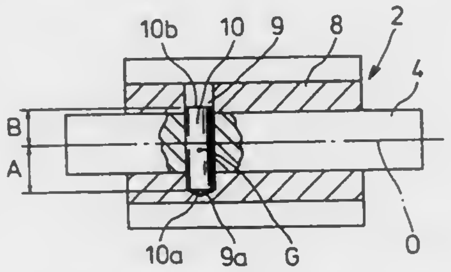
**Hidetsugu Matsubara, Matsudo; Yuichi Iguchi, Tokyo; Shinya Tanaka, Koganei, and Kazuya Miyashita, Chiba, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 11, 1990, Ser. No. 507,862**

**Claims priority, application Japan, May 18, 1989, 1-56470[U]**

**Int. Cl.⁵ F04C** *18/16, 29/00*

U.S. Cl. 418—201.1 4 Claims



1. A rotor comprising a barrel, a shaft extending through said barrel along an axis thereof, a blind retaining-pin receiving hole opened on said barrel and diametrically extending through said shaft to an opposed portion of the barrel and a retaining pin which is struck into said hole so as to join the barrel with the shaft, said pin being constructed such that a center gravity of the pin is eccentrically positioned toward a leading end of the pin beyond the axis of the shaft, thereby preventing the pin from pulling out of the hole during rotation of the rotor without the need of any additional pull-out preventive means.

---

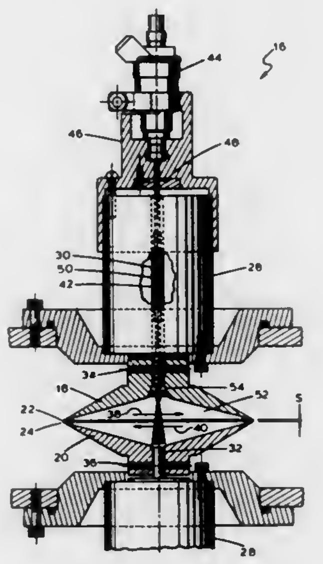
### 5,018,954
### SHIELDED COUNTER-ROTATING SPINNER ASSEMBLY FOR MICROPARTICALIZATION OF LIQUID

**Jerg B. Jergenson, Santa Barbara, Calif., assignor to Microparticle Technology, Inc., Santa Barbara, Calif.**

**Filed Apr. 16, 1990, Ser. No. 509,213**

**Int. Cl.⁵ B29B** *9/00*

**U.S. Cl. 425—8** **13 Claims**



1. An apparatus for the microparticalization of liquids comprising:

first and second conical spinners each having the same axis;

means for counter-rotating said first and second conical spinners about said axis, each said first and second conical spinner having a concave face concentric about said axis and each said conical spinner having a convex face concentric about said axis, said faces meeting in a sharp spinner edge which is concentric about said axis, said sharp spinner edges of said first and second conical spinners being sufficiently close to form a gas bearing therebetween;

means for delivering liquid to at least one of said concave faces so that upon rotation of said conical spinners, liquid moves radially outward on said concave faces to said edges of said first and second conical spinners where it is thrown from said conical spinners in microparticles; and

first and second non-rotating shields respectively positioned closely adjacent said convex surfaces of said first and second conical spinners for minimizing generation of gas flow in the gas around said conical spinner.

---

### 5,018,955
### DECORATIVE CURBING MACHINE

**Robert W. Parrish, 320 W. 200 North, Suite X, Layton, Utah 84041, and Walter F. Parrish, Layton, Utah, assignors to Robert W. Parrish, Layton, Utah**

**Filed Jul. 13, 1989, Ser. No. 379,071**

**Int. Cl.⁵ B28B** *1/29, 13/06*

**U.S. Cl. 425—64** **13 Claims**

1. An improvement in a manually maneuverable extruder-propelled apparatus for forming and extruding continuous elongated decorative curbing, edging and borders from cementitious materials, said apparatus including:

an auger mounted on an auger shaft supported and rotatively driven at a first end to compress and extrude said cementitious materials axially toward an unsupported second end thereof;

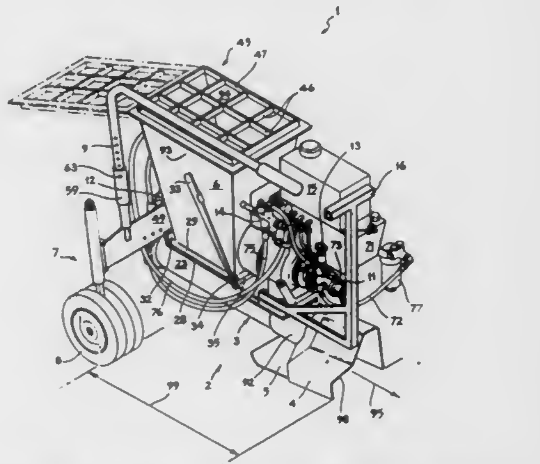
an auger housing surrounding said auger, having an inner surface proximate the outer diameter of said auger by which said material is directed to said second end thereof by said auger, and having said second end adapted for attachment to a mold for extrusion therefrom of said cementitious materials, said auger housing having the opposite, first end thereof closed, and having a feed aperture in said auger tube between said first and second ends for introducing said cementitious materials into said auger tube;

a hopper having an open upper inlet end and an open lower outlet end communicating with said feed aperture;

a mold attachable to said first end of said auger tube, and having a cross section to form and extrude said cementitious materials in a desired curbing shape;

a hydraulic power mechanism for driving said auger within said auger tube at a desired controllable speed, said hydraulic power mechanism including;

a. a hydraulic pump to pressurize hydraulic fluid,



b. a hydraulic motor to accept said pressurized fluid to drive said auger shaft,

c. speed control means to control the pressure of fluid to said hydraulic motor,

d. means to completely open or close the flow of said fluid to said hydraulic motor, and

e. conduit means for carrying said fluid from said hydraulic pump to said hydraulic motor, and returning said fluid from said hydraulic motor to said hydraulic pump;

motive means to drive said hydraulic pump to pressurize said hydraulic fluid for driving said auger;

a wheeled carriage having a cross-bar transversely slidable relative said auger housing for supporting the forward end of said curb forming apparatus, and having steerable, vertically adjustable wheels attached to each end of said cross-bar;

wherein the improvement comprises means for controlling said flow of said pressurized hydraulic fluid to either side of said hydraulic motor for controllably operating said motor in either the forward or backward direction.

---

### 5,018,956
### CAULK AND GLAZING TOOL

**Guy N. Lemaster, 9090 Cooley Lake Rd., Union Lake, Mich. 48386**

**Filed Jul. 26, 1990, Ser. No. 558,310**

**Int. Cl.⁵ B32B** *15/08*

**U.S. Cl. 425—87** **2 Claims**

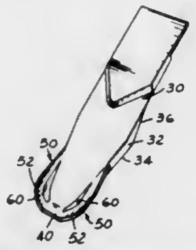
1. A tool for smoothing and shaping glazing material in a trowelling operation on windows which comprises:

VOL
1126
ISS
4
MY
28
1991
UMI

(a) a flat handle plate for manual gripping lying in a first plane and having a distal and a proximal end,

(b) spaced shoe plates depending from each side of said handle plate having spaced, elongate bottom runner edges extending rearwardly from the distal end of said handle plate and disposed at a 30° to 45° angle to the plane of said handle plate to trim glazing material at the runner edges,

(c) a smoothing blade transverse of said handle plate at the distal end of said handle plate essentially at the apex of the angle between the plane of the handle plate and the runner edges of the shoe plates, and

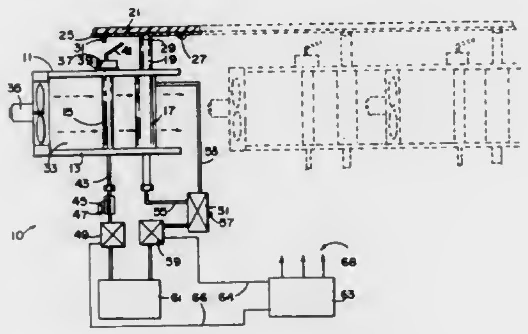


(d) spaced side wings flaring upwardly and outwardly from each side of said smoothing blade above the runner edges of said shoe plates and extending rearwardly toward the proximal end of the handle plate, said side wings having elongate perforations above said runner edges within the confines of said wings to feed excess trimmed glazing material away from the smoothing blade.

---

### 5,018,957
### HOT STAKING MACHINE

**Kenneth Assink, Holland; Mark J. Feenstra, Zeeland, and Gerald L. Boyer, Jr., Grand Rapids, all of Mich., assignors to J R Automation Technologies, Inc., Holland, Mich.**
**Filed May 25, 1990, Ser. No. 529,213**
**Int. Cl.⁵ B29C** *43/18*
**U.S. Cl. 425—112** **10 Claims**

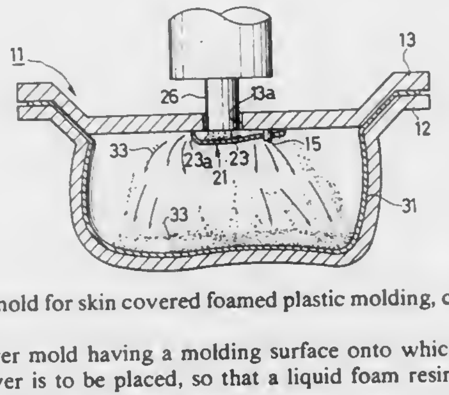


1. A hot staking assembly comprising:
a first support plate;
a second support plate aligned with and spaced apart from said first support plate;
a plurality of extensible cylinders supported by said first and second support plates;
a staking tool mounted for reciprocating motion in each of said extensible cylinders with the end of each staking tool when extended defining a work location for said hot staking assembly;
a plurality of air heaters supported by said first and second support plates;
each air heater of said plurality of air heaters being cooperatively associated with an extensible cylinder and staking tool;
an inclined vent tube extending from each of said air heaters for directing a stream of heated air to the work location defined by each of said staking tools.

---

### 5,018,958
### MOLD FOR SKIN COVERED FOAMED PLASTIC MOLDING

**Hisayoshi Mizuno, and Masami Mori, both of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Kanagawa, Japan**
**Filed Mar. 28, 1989, Ser. No. 329,577**
**Claims priority, application Japan, Sep. 30, 1987, 62-149757[U]**
**Int. Cl.⁵ B29C** *39/10, 39/24*
**U.S. Cl. 425—117** **4 Claims**

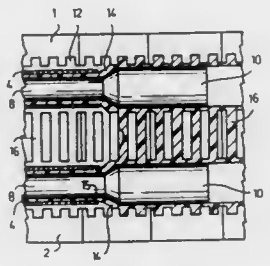


1. A mold for skin covered foamed plastic molding, comprising:
a lower mold having a molding surface onto which a skin cover is to be placed, so that a liquid foam resin can be poured onto the skin cover;
an upper mold to be closed over the lower mold and having an injection hole through which the liquid foam resin is to be poured; and
means, attached on the upper mold below the injection hole, for reducing pressure exerted on the skin cover due to fall of the liquid foam resin by receiving and temporarily detaining the liquid foam resin before the liquid foam resin falls onto the skin cover.

---

### 5,018,959
### DEVICE FOR PRODUCING A GRATE CONSTRUCTION AND A GRATE CONSTRUCTION

**Jyri Järvenkylä, Hollola, Finland, assignor to Uponor N.V., Sint Maarten, Netherlands Antilles**
**PCT No. PCT/FI89/00128, § 371 Date Feb. 15, 1990, § 102(e) Date Feb. 15, 1990, PCT Pub. No. WO90/00469, PCT Pub. Date Jan. 25, 1990**
**PCT Filed Jul. 3, 1989, Ser. No. 465,119**
**Claims priority, application Finland, Jul. 5, 1988, 883204**
**Int. Cl.⁵ B29C** *47/26, 97/34, 93/22*
**U.S. Cl. 425—325** **5 Claims**

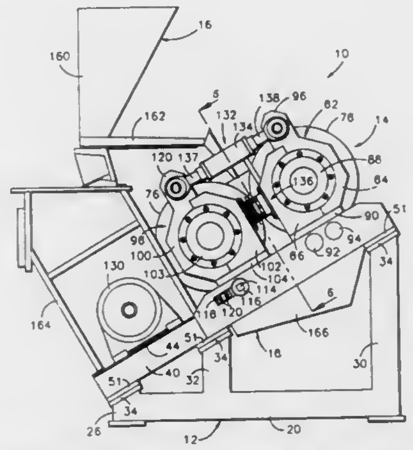


1. A device for producing grate constructions, comprising nozzle means for extruding plasticized material, and chill moulds moving one after another so as to define therebetween a moulding space after said nozzle means, the chill moulds travelling in the production direction within the area of the moulding space and comprising grooves on the mould surfaces facing the moulding space for forming ribs the nozzle means including at least two adjacent nozzles, that the chill moulds form a moulding space at each nozzle, and that the moulding spaces communicate with each other by means of conduits formed in the chill moulds and connecting chill mould grooves surrounding adjacent moulding spaces with each other, for forming ribs extending from one elongated supporting means to be formed in the moulding space to another.

---

### 5,018,960
### FLAKING ROLL APPARATUS

**Roy E. Singer, Crystal, Minn., assignor to Wenger Manufacturing, Inc., Sabetha, Kans.**
**Filed Jan. 12, 1990, Ser. No. 464,166**
**Int. Cl.⁵ B29C** *43/46*
**U.S. Cl. 425—367** **7 Claims**

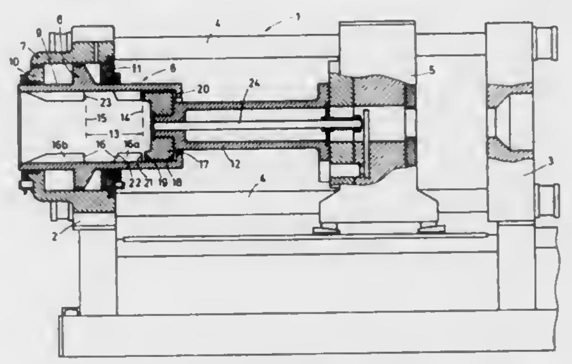


6. In a processing unit including a pair of elongated, axially rotatable, juxtaposed processing rollers presenting a processing nip there between, the improvement of apparatus for selective, side-to-side pivoting adjustment of one of said rollers relative to the adjacent roller, said apparatus comprising:
a pair of laterally spaced apart frame members;
a pair of roller supports operatively coupled with said one roller adjacent the opposed ends thereof and each presenting a portion adjacent a corresponding frame member; and
a rotatable eccentric operatively interconnecting each frame member with the adjacent support portion for selective eccentric movement of the corresponding roller support upon rotation of the associated eccentric.

---

### 5,018,961
### HYDRAULIC CLOSING UNIT

**Manfred Miese, Ettlingen, and Ernst Mai, Riesweiler, both of Fed. Rep. of Germany, assignors to Battenfeld GmbH, Fed. Rep. of Germany**
**Filed May 17, 1990, Ser. No. 525,102**
**Claims priority, application Fed. Rep. of Germany, May 18, 1989, 3916193**
**Int. Cl.⁵ B29C** *45/67*
**U.S. Cl. 425—450.1** **5 Claims**

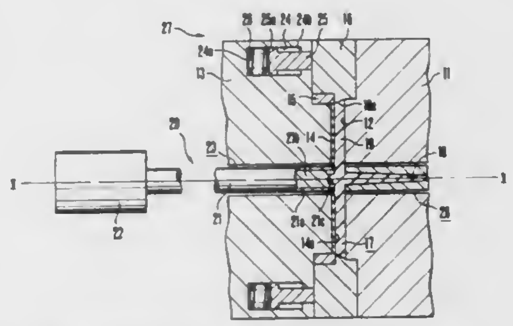


1. In a hydraulic mold closing unit, for an injection molding machines, the closing unit including a stationary support plate and a stationary mold clamping plate and guide columns extending between the stationary support plate and the stationary mold clamping plate, and a slidable mold clamping plate slidably guided on the guide columns between the stationary support plate and the stationary mold clamping plate, an annular main piston being axially slidably guided in the stationary support plate, means for applying load to both sides of the main piston, the main piston being capable of acting on the slidable mold clamping plate with a high mold closing force in mold closing direction, a mechanical support means and a mechanical pressure connection, the mechanical support means being capable of acting on the main piston between the main piston and the mechanical pressure connection, the mechanical pressure connection acting on the mechanical support means through a central pressure column, the improvement comprising at least two coupling planes provided between the main piston and the central pressure column, the coupling planes being mounted spaced apart and one behind the other in sliding direction of the slidable mold clamping plate, the main piston and the pressure column being slidable relative to each other over a distance range existing between the coupling planes, and coupling elements of the piston and said central pressure column being movable in and out of supporting engagement in a region of the coupling plane by means of the main piston and the pressure column.

---

### 5,018,962
### INJECTION MOLDING DIE APPARATUS FOR USE IN THE PRODUCTION OF SUBSTRATE OF OPTICAL DISK

**Takehiko Kitamura, Chiba; Hirosato Amano, Numazu, and Masaharu Kaita, Kamagaya, all of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan**
**Filed Sep. 20, 1989, Ser. No. 409,898**
**Claims priority, application Japan, Sep. 30, 1988, 63-248616**
**Int. Cl.⁵ B29C** *45/40*
**U.S. Cl. 425—556** **2 Claims**



1. An injection molding die apparatus comprising:
a stationary die part having a mirror-finished surface;
a movable die part movable in an axial direction towards and away from said stationary die part and provided with a stamper fixed thereto;
an outer peripheral ring having one end axially slidably fitting around the outer periphery of said movable die part, said outer peripheral ring being capable of making contact at its other end with said stationary die part when said movable die part has been moved close to said stationary die part, so as to form a die cavity in cooperation with said mirror-finished surface of said stationary die plate and said stamper on said movable die part, said die cavity being capable of receiving a molten plastic material injected thereto so that an optical disk substrate is formed by injection molding;
a first ejection mechanism including a rod member extending through the center of said movable die part and through the center of said stamper such that the end of said rod serves as a portion of said stamper defining said cavity, said first ejection mechanism further including an actuat-

VOL
1126
ISS
4
MY
28
1991
UMI

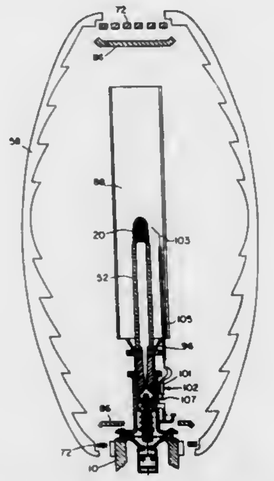
ing means for causing said rod member to project from said stamper in the axial direction; and

a second ejection mechanism including pins fixed to said outer peripheral ring and projected towards said movable die part and elastic members supported by said movable die part and positioned to press said pins against said outer peripheral ring to urge the ring towards said stationary die part in the axial direction through said pins;

wherein, when said movable die part is moved away from said stationary die part after the injection molding, the end of said rod member of said movable die part is projected from said stamper so as to separate the central portion of said optical disk substrate which is held in close contact with said mirror-finished surface of said stationary die part and, at the same time, said outer peripheral ring is caused to move relative to said movable die part so as to be kept in contact with said stationary die part thereby to separate the outer peripheral portion of said optical disk substrate from said stamper.

---

### 5,018,963
## PULSATING GAS POWERED LIGHT SOURCE
**Walter J. Diederich, West Newbury, Mass., assignor to TPV Energy System, Inc., Waltham, Mass.**
**Filed Aug. 7, 1989, Ser. No. 390,641**
**Int. Cl.⁵ F23C** *11/00*
**U.S. Cl. 431—1** **36 Claims**



1. A pulsating gas fuel light source comprising:

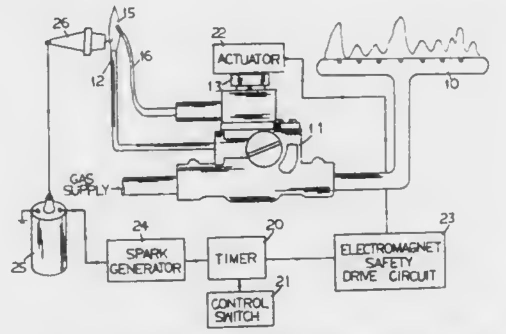
a housing supporting a lamp to which a fuel is continuously delivered for combustion;

a flexible diaphragm secured within the housing and formed to reciprocate between a first position and a second position in response to variations in pressure of a gas within the housing such that the diaphragm has reduced stress in the first and second positions relative to the diaphragm stress between the first and second positions; and

a regulator valve that is opened by movement of the diaphragm into the first position resulting in the delivery of fuel at an increased rate to the lamp and such that when the diaphragm is in the second position the valve closes resulting in the reduction of the rate of fuel delivery to the lamp.

---

### 5,018,964
## REMOTE-CONTROLLED GAS BARBEQUE IGNITING SYSTEM
**Reza H. Shah, 1176 Rutherford Road, Maple, Ontario, Canada L6A 1S2**
**Filed Jul. 6, 1990, Ser. No. 548,821**
**Int. Cl.⁵ F23Q** *9/08*
**U.S. Cl. 431—45** **12 Claims**



1. An electromechanical ignition system for a gas burner comprising,

a safety valve means having a main valve therein operative to admit a combustible gas to flow there-through from a supply source to said burner, said safety valve means having a pilot lighter nozzle means and a control means operative to admit said combustible gas to flow through said safety valve means to said pilot lighter nozzle means for ignition to form a pilot flame,

heat sensing means adapted at said safety valve means and operative for sensing existence of said pilot flame for a predetermined period of time and in cooperation with said control means for maintaining said main valve in an open condition,

electromagnetic means coupled to said control means and operative to actuate said control means.

timer means coupled to said electromagnetic means through a driver means, and operative to actuate said electromagnetic means for said period of. time,

spark generation means coupled to said timer means and operative to generate a series of sparks over said perdetermined period of time at said pilot lighter nozzle means for forming said pilot flame whereby igniting the combustible gas emitting from said burner,

said timer comprising a pulse generating means operative to generate a series of pulse signals and a holding signal simultaneously in said predetermined period of time, said series of pulse signal being converted by said spark generation means into said series of sparks, and said holding signal being fed to said driver means for operating said electromagnetic means for said predetermined period of time,

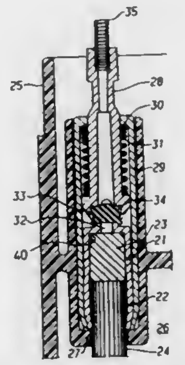
said driver means including a safety driver circuit means coupled between said timer means and said control means, said driver circuit means having a regulating means being operative in cooperation with said control means in an event of accidental extinction of said pilot flame to maintain said electromagnetic means inoperative for a longer period than said predetermined period of time.

---

### 5,018,965
## LIQUID FUEL GASIFYING DEVICE AND METHOD FOR PRODUCING THE DEVICE, AND BURNING DEVICE
**Masaharu Ichikawa, Tokyo, Japan, assignor to Yaka Feudor K.K., Himeji, Japan**
**Filed Nov. 14, 1989, Ser. No. 436,252**
**Claims priority, application Japan, Nov. 18, 1988, 63-291530; Oct. 19, 1989, 1-272187**
**Int. Cl.⁵ F23D** *14/28*
**U.S. Cl. 431—344** **4 Claims**

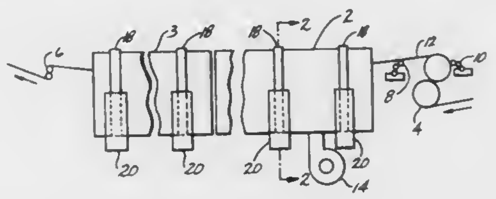
1. A liquid fuel gasifying device including a cylindrical gas

permeable ceramics filter, and a cylindrical thermally conductive gasifying casing which has inside said gas permeable ceramics filter, opening at the end on the gas upstream side toward a gas storage reservoir, and has a gas passage formed at the end on the gas downstream side which is opened and closed by a gas shut-off plug, characterized in that said gasifying casing comprises a press fitted portion having an inside diameter equal to the outside diamcter of said gas permeable ceramics filter which receives the front part of said gas permeable ceramics filter in a press-fitted state; and a non-press-fitted portion continuing to the gas upstream side of said press-fitted portion, and having an inside diameter slightly larger than the outside diameter of said gas permeable ceramics filter for receiving, in a non-press-fitted state, the rear part of said gas permeable ceramics filter, with said gas permeable ceramics filter fitted in said gasifying casing, the front peripheral surface of said gas permeable ceramics filter being shielded with the inner surface section of said gasifying casing, and the rear peripheral surface of said gas permeable ceramics filter being not shielded with the inner surface section of said gasifying casing.



---

### 5,018,966
## STRIP DRYING OR CURING OVEN
**Curt Braun, Riverside, Calif., assignor to Hunter Engineering Company, Inc., Riverside, Calif.**
**Filed Mar. 20, 1989, Ser. No. 326,165**
**Int. Cl.⁵ F27B** *9/28*
**U.S. Cl. 432—59** **17 Claims**



1. A curing or drying oven for a continuous strip comprising:

an elongated oven chamber having walls curved in transverse cross section;

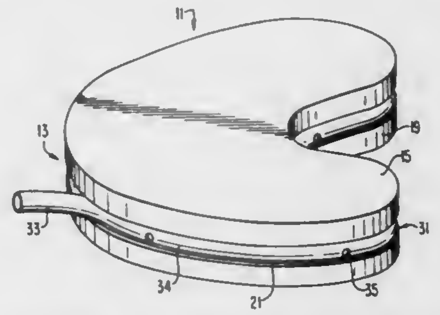
means for passing a coated strip through the oven from the entrance end to the exit end;

means for circulating heated air within the oven for heating the coated strip; and

means for spraying cleaning solution inside the oven for cleaning the oven.

---

### 5,018,967
## DENTAL FLUORIDE APPLICATOR AND METHOD FOR USING SAME
**Stephen Schwalbach, 1966 Golf View Dr., River Falls, Wis. 54022**
**Filed Aug. 15, 1990, Ser. No. 567,611**
**Int. Cl.⁵ A61C** *9/00*
**U.S. Cl. 433—37** **13 Claims**



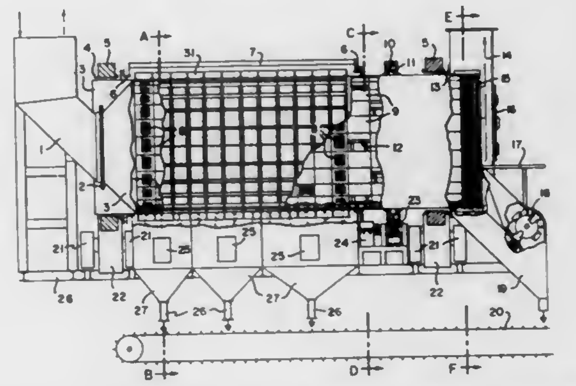
1. An apparatus for use in applying fluoride to the teeth of a patient, comprising:

a) a dental tray, said dental tray having a top surface being made of deformable material suitable for the making of a dental impression therein; and

b) an evacuation tube, said evacuation tube having a first end adapted for communication with a source of suction, the remainder of said evacuation tube having a plurality of apertures spaced along the length thereof for aspirating materials therethrough, said remainder of said evacuation tube being mounted along the periphery of said dental tray.

---

### 5,018,968
## REVOLVING GRATE COOLER FOR COOLING OF CLINKER OR SIMILAR PRODUCTS
**Jose D. Barreto, Rua Barao de Granito, 95 Casa Amarela, Recife - PE, Brazil**
**Filed May 19, 1989, Ser. No. 354,470**
**Claims priority, application Brazil, Jun. 15, 1988, PI8802994**
**Int. Cl.⁵ F27B** *7/38*
**U.S. Cl. 432—116** **17 Claims**



1. A revolving grate cooler for cooling of clinker or similar products, comprising a tubular shaped body having inner and outer surfaces and a plurality of holes formed therein, a plurality of metal cooling plates secured to said inner surface each having a plurality of openings cooperating with said plurality of holes, a pressurized chamber communicating with said body to provide air flow through said plurality of holes and openings for cooling the products within said body, and a plurality of curved guiding plates fastened to an internal upper portion of said pressurized chamber.

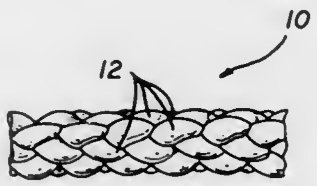
VOL
1126
ISS
4
MY
28
1991
UMI

### 5,018,969
### BRAIDED ELASTIC WIRE, WITH MEMORY, FOR BRACES

**Craig Andreiko, Alta Loma, and Terry L. Sterrett, Long Beach, both of Calif., assignors to Ormco Corporation, Glendora, Calif.**

**Filed Sep. 25, 1989, Ser. No. 411,646**
**Int. Cl.$^5$ A61C** *3/00*

**U.S. Cl. 433—20** **17 Claims**



1. In combination for resetting the position of teeth in a patient's mouth to a particular configuration,

a plurality of strands made from a material having a composition of substantially fifty five percent (55%) titanium and forty five percent (45%) nickel,

the plurality of strands being disposed in a braided relationship to define a filament,

the multi-strand filament having properties of being formed to the particular configuration at a particular elevated temperature for disposition in a patient's mouth, of being bent easily to any other configuration than the particular configuration at a critical temperature below the particular elevated temperature in accordance with the disposition of the teeth in the patient's mouth, of being coupled to the patient's teeth in such other configuration and of returning to the particular configuration at a temperature above the critical temperature.

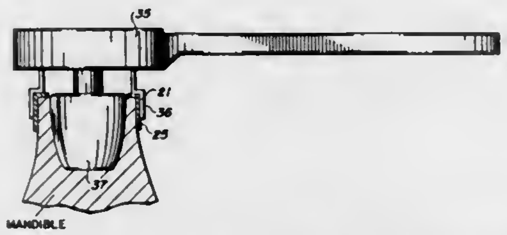
---

### 5,018,970
### IMPLANT TEETH—PERMANENT BASES WITH REPLACEABLE CAPS

**Finn R. Stordahl, 8914 N. Sun Lakes Blvd., Sun Lakes, Ariz. 85248**

**Continuation-in-part of Ser. No. 134,255, Dec. 17, 1987. This application May 5, 1989, Ser. No. 508,681**
**Int. Cl.$^5$ A61C** *3/00*

**U.S. Cl. 433—75** **6 Claims**



1. A dental jig for precisely holding and guiding a dental cutting tool for cutting the gum and bone for implanting a dental implant, said jig comprising a central portion and two skirt portions extending from said central portion, said central portion having at least one opening through which a cutting element of said cutting tool passes, said jig further comprising a tool guide, said tool guide having means for connecting said guide to a dental cutting tool and further having two wing portions, said two skirt portions and said two wing portions being removably engaged to provide guiding surfaces, whereby in use the jig is placed over the alveolar ridge with the two skirts covering the gum and a dental cutting tool having the tool guide attached thereto is inserted through said opening with the wing portions engaging the skirt portion to guide said tool while cutting.

---

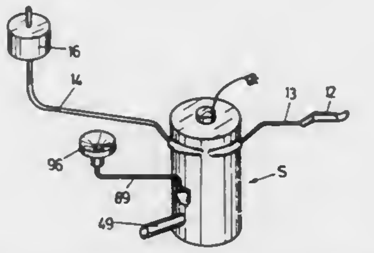
### 5,018,971
### SEPARATOR

**Werner Trawöger, Höttinger An 60, A-6020 Innsbruck, and Bruno Pregenzer, Huebe 30, A-6173 Oberperfurss, both of Austria**

**Continuation of Ser. No. 170,443, Mar. 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 905,564, Aug. 11, 1986, abandoned. This application Jun. 22, 1989, Ser. No. 370,152**

**Claims priority, application Austria, Dec. 17, 1984, 3986/84**
**Int. Cl.$^5$ A61C** *17/06*

**U.S. Cl. 433—92** **124 Claims**



1. A separator for separating a mixture of solids, liquids and suction air, to be inserted into a suction line of a dental system, so that the suction line is divided into two sections, the first section being provided with a suction nozzle discharging the mixture out of the mouth of a patient, and the second section leading to a suction pump, said separator comprising:

i) a separator housing comprising

an upper air separating chamber having deflectors, an inlet for the mixture to be connected to the first section of the suction line, and an outlet for the separated clean air to be connected to the second section of the suction line,

an intermediate liquid collecting chamber having a drain opening,

a lower sedimentation chamber for settling the solids up to a predetermined maximum settling level, and

a detachable collector bowl embodying the sedimentation chamber, the upper edge of the collector bowl being above the drain opening;

ii) a drain line between the liquid collecting chamber and a liquid outlet at the end of the drain line, said drain line comprising

several sections, a first section extending upwardly in the liquid collecting chamber, being provided with the drain opening above the predetermined settling level of the solids, and being submersible by accumulated liquid up to a predetermined maximum flood level, and

a non-return valve means being arranged in a further section of the drain line and securing against an ingress of unwanted air into the separator housing; and

iii) a drain system integrated within the drain line, said system discharging liquid that is accumulated up to the predetermined flood level out of the liquid collecting chamber and transferring said liquid to the liquid outlet.

---

### 5,018,972
### CORRECTING ARTICULATION DEFECT IN DENTATE HUMAN JAW

**Josephus Schreinemakers, Oranje Nassaulaann 12, 6026 Maarheeze, Netherlands**

**Filed Jan. 26, 1990, Ser. No. 471,211**
**Int. Cl.$^5$ A61C** *5/00, 11/00*

**U.S. Cl. 433—215** **8 Claims**

1. A preparation method for correcting a bite-articulation defect in a human patient, the method comprising the steps of sequentially:

a) making a positive model of a dentate human maxilla including the tuberosity thereof and of the respective mandible, whereby the maxilla model is formed with portions

corresponding to the patient's incisors, molars, and tuberosities;

b) marking on the front of the maxilla model the location of the patient's lip line and on the back of the maxilla model the location of the patient's ear-nose plane;

c) shaping the incisor portion of the maxilla model to have a lower edge lying on the location of the lip line;

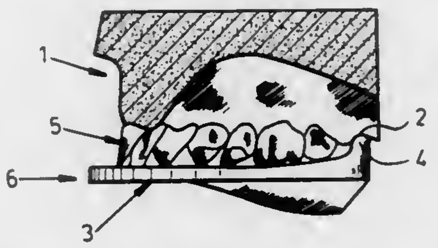
d) positioning on the maxilla model a calibration plate having

a posterior ridge engaging the tuberosity portion of the maxilla model,

an anterior part engaging the shaped incisor portion of the maxilla model, and

sides formed with slots aligned with the molar portions of the maxilla model,

the plate being selected from a set of plates of different ridge heights such that the slotted plate extends substantially parallel to the ear-nose plane from shaped front of the maxilla model;



e) filling the side slots around the molar portions of the maxilla model with mold-making compound;

f) fitting a mold fork flat to the underside of the calibration plate underneath the slots with the compound adhering to the mold fork;

g) separating the fork and the compound from the plate and maxilla model and fitting the fork and compound to the patient;

h) ascertaining the relative angular orientation between the fork and the patient's ear-nose plane and

h') if the fork and plane are not substantially parallel repeating steps e), f), and g) with more compound and a different calibration plate,

h'') if the fork and plane are substantially parallel selecting from the set of calibration plates another plate having the same dimensions and ridge height as the plate used with the parallel-lying fork but not formed with slots; and

i) grinding down the maxilla model using the plate unslotted plate of step h'') as a template.

---

### 5,018,973
### MOTION SIMULATOR FOR VEHICLE DRIVER

**Robert Alet, Cergy, and Roland Jezequel, Orgeval, both of France, assignors to Thomson-CSF, Puteaux, France**

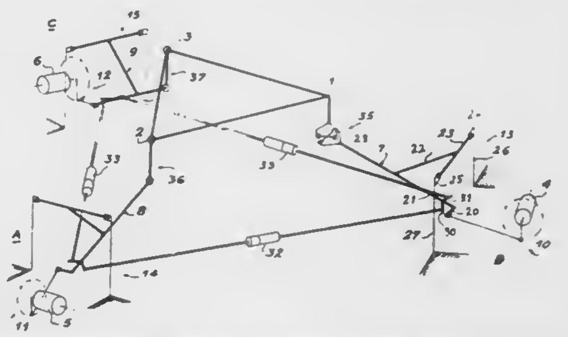
**Filed Nov. 27, 1989, Ser. No. 441,268**

**Claims priority, application France, Nov. 30, 1988, 88 15665**
**Int. Cl.$^5$ G09B** *9/04*

**U.S. Cl. 434—62** **7 Claims**

1. A motion simulator for vehicle driver training, which comprises:

at least three actuators placed at the vertices of a triangle, connected to at least three corresponding points, arranged in a triangle, for the fastening of a platform of a cabin by lever arms, one end of each of these arms being connected to a corresponding actuator by a joint with two degrees of freedom, the other end of one of the lever arms being connected to a point for fastening the platform by the joint with two degrees of freedom, and the other end of the other lever arms being connected, at all time, to one of the other platform fastening points by a joint with at least four degrees of freedom.



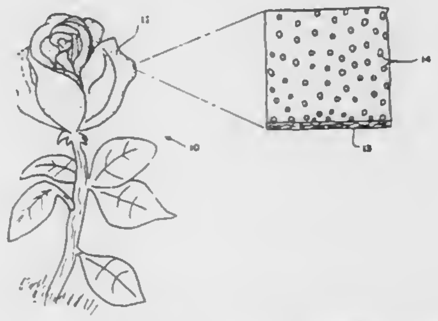
---

### 5,018,974
### COLORING BOOK OR THE LIKE WITH INK-REACTIVE, FRAGRANCE-RELEASING AREAS

**David W. Carnahan, East Ridge; Paul J. A. French, Signal Mountain; Richard K. Maury, Hixson; Gary L. Akins, Chattanooga, all of Tenn., and Philip J. Oaten, Yardley, Pa., assignors to Arcade, Inc., Chattanooga, Tenn. and Perfume International, Inc., Yardley, Pa., part interest to each**

**Filed May 22, 1990, Ser. No. 527,137**
**Int. Cl.$^5$ A63F** *9/10;* **G09B** *19/00*

**U.S. Cl. 434—98** **12 Claims**



1. A coloring or painting kit providing release of a fragrance associated with an image area comprising:

a substrate having depicted thereon at least one image area associated with a fragrance;

microcapsules deposited on said image area, said microcapsules having a rupturable inert wall and a central core of a fragrance oil;

a dispenser for applying a colorant in flowable form for application to said image area; and

an agent included in said colorant for reaction with said microcapsules so as to release said fragrance.

---

### 5,018,975
### EDUCATIONAL AMUSEMENT DEVICE WHICH INCLUDES A GAME CARD, AND METHOD FOR USING THE GAME CARD

**Alan B. Todd, 2500 N. Vernon St., Arlington, Va. 22207**

**Filed Sep. 14, 1990, Ser. No. 582,427**
**Int. Cl.$^5$ G09B** *19/00*

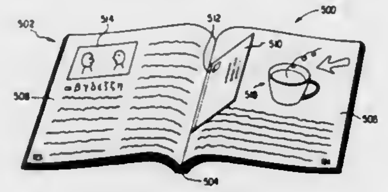
**U.S. Cl. 434—128** **20 Claims**

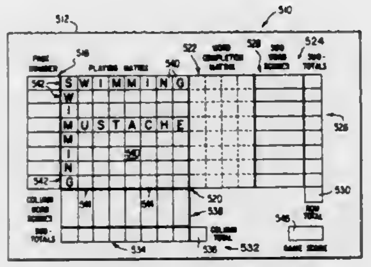
1. A method for using a game card by a player who is exposed to advertisements, the game card including a matrix of playing positions which are disposed in rows and columns, said method comprising the steps of:

(a) marking words derived from the advertisements in the playing positions of the rows or columns of the matrix;

VOL
1126
ISS
4
MY
28
1991
UMI

(b) identifying row words formed by contiguous letters in the rows of the matrix;
(c) recording row word subtotals based on values given to the row words identified in step (b);
(d) identifying column words formed by contiguous letters in the columns of the matrix;

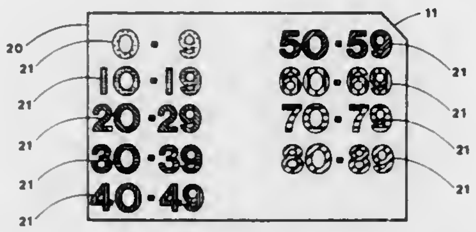




(e) recording column word subtotals based on values given to the column words identified in step (d);
(f) determining a game score based on at least some of the row word subtotals and the column word subtotals; and
(g) specifying the sources of said advertisements from which said words were derived on said game card.

---

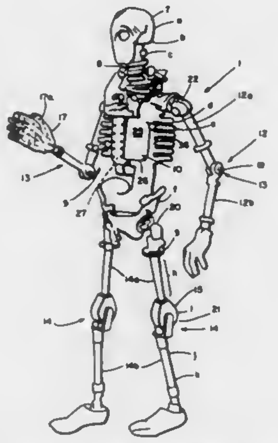
### 5,018,976
## TEACHING SYSTEM FOR ENHANCING THE LEARNING OF SETS OF FACTS
**Dorothy P. Kuyath, 6608 Portsmouth La., Raleigh, N.C. 27615**
**Filed Jan. 11, 1990, Ser. No. 463,538**
**Int. Cl.$^5$ G09B *1/00***
U.S. Cl. 434—207 **4 Claims**



1. A teaching system for enhancing the learning of sets of mathematical facts, said teaching system comprising:
a plurality of problem cards each of which has a mathematical problem on one face thereof, said problem cards being grouped into a plurality of sets corresponding to numeric ranges into which their respective answers fall, the cards of each set having a unique visually discernible characteristic; and
a key card for providing answer information independent of the problems, said key card including a plurality of ranges of answers with each range being defined as a numeric range with a lowermost value and an uppermost value, each range being displayed with the unique visually discernible characteristic associated with the respective set of problem cards whose answers fall therein.

---

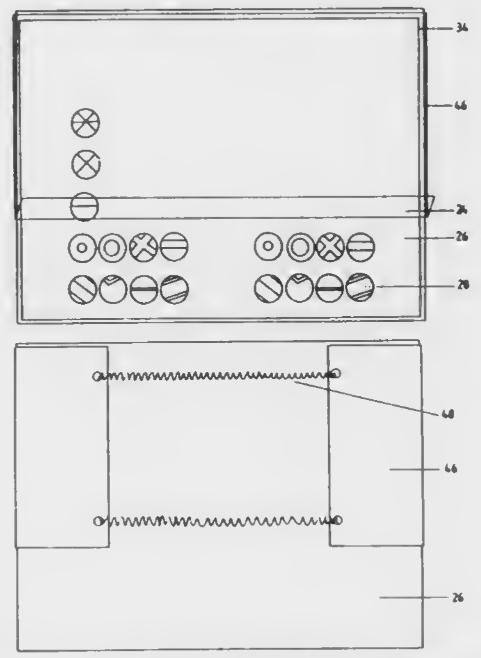
### 5,018,977
## MOTORCYCLE ACCIDENT SIMULATING TEST DUMMY
**Kenneth D. Wiley, Torrance; John W. Zellner, Rancho Palos Verdes, both of Calif.; Andre St. Laurent; James A. Newman, both of Gloucester, Canada; Thomas J. Szabo, Nepean, Canada, and Nicholas Shewchenko, Hull, Canada, assignors to Dynamic Research, Inc., Torrance, Calif.**
**Filed Apr. 21, 1989, Ser. No. 341,729**
**Int. Cl.$^5$ G09B *23/28***
U.S. Cl. 434—274 **20 Claims**



1. A motorcycle accident simulating test dummy, said dummy having
body means;
limb means including at least one of
arm means, and
leg means;
hand means; and
joint means providing articulated connecting means between at least a portion of said limb means and at least one of another portion of said limb means or said body means,
said dummy comprising:
motorcycle handle bar gripping means
included in said hand means, and
operable to releasably connect said dummy and motorcycle handle bar means;
said motorcycle handle bar gripping means being operable to release said dummy from said motorcycle handle bar means after gripping force, imposed by said motorcycle handle bar gripping means on said handle bar means is overcome by the inertial forces imposed on said dummy during accident simulation;
sensor means operable to sense an accident simulating condition imposed on said limb means,
said sensor means being operable to generate data signal means in response to said sensing by said sensor means;
data receiving and storage means operable to receive said data signal means from said sensor means and store said data within said body means;
housing and shock protecting means housing said data receiving means wholly contained within said body means and operable to shield said data receiving means from forces imposed on said dummy during accident simulation;
signal transmitting means operable to transmit said data signal means from said sensor means to said data receiving and storage means,
said signal transmitting means being contained entirely within said dummy and being free of externally extending transmitting means physically attached to any means apart from said dummy; and
said limb means including frangible fracture simulating means operable to fracture in response to inertial stress or external forces imposed on said dummy during accident simulation, said frangible, fracture simulating means including
visual indicating means operable to provide a visual simulation of limb fracturing, and
means operable to permit relative movement between fractured limb means segments simulating relative freedom of movement of fractured limbs during simulated accidents.

---

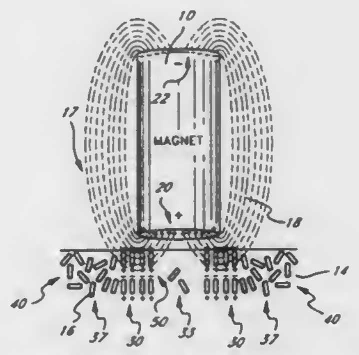
### 5,018,978
## DEVICE FOR THE PRESENTATION OF OBJECTS
**Rudiger Pech, Schwanhildenstrasse 1, D-8052 Wang, Fed. Rep. of Germany**
**PCT No. PCT/DE88/00381, § 371 Date Apr. 24, 1989, § 102(e) Date Apr. 24, 1989, PCT Pub. No. WO88/10485, PCT Pub. Date Dec. 29, 1988**
**PCT Filed Jun. 27, 1988, Ser. No. 331,658**
**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 8708837[U]**
**Int. Cl.$^5$ G09B *25/00***
U.S. Cl. 434—376 **5 Claims**



1. A device for the visual presentation of visually combinable objects, said objects being a main object and associated objects, shown on separated boards capable of relative movement in planes parallel to each other; said boards being a main picture board presenting the visual image of said main object and an auxiliary board presenting the visual image of said associated objects, said main picture board having an aperture at the position on the main object where an associated object is to be located; and a guide movably mounted on one of said boards and engageable with the other of said boards, for permitting concomitant movement of said other board with said guide in a given direction relative to said one board, said guide permitting the other of said boards to move in another direction relative to said guide whereby to permit such movement relative to said one board, whereby to selectively display an associated object with said main object by selectively registering said aperture in said main object board with an associated object on said auxiliary board.

---

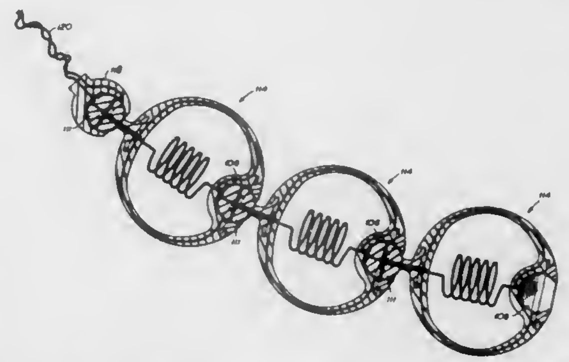
### 5,018,979
## MAGNETIC VISUAL DISPLAY
**Michael Gilano, Irvine, Calif.; Gordon B. Langford, Sandy, Utah, and Michael A. Gilano, Irvine, Calif., assignors to The Ohio Art Company, Bryan, Ohio**
**Filed Nov. 16, 1989, Ser. No. 437,744**
**Int. Cl.$^5$ B43L *1/00***
U.S. Cl. 434—409 **25 Claims**



1. A magnetic marking apparatus, comprising:
an enclosure having a plurality of transparent or translucent surfaces;
a dispersion medium having a plurality of randomly oriented, magnetically active flakes contained within said enclosure; and
a magnet outside said enclosure having a magnetic field, said magnetic field having a plurality of flux lines, said flakes aligning along said flux lines when said magnetic field is displayed to said flakes, said dispersion medium containing aligned flakes having light transmission characteristics different from said dispersion medium containing said randomly oriented magnetically active flakes.

---

### 5,018,980
## SNAP-APART UNIVERSAL JOINTED ELECTRICAL DEVICE
**John R. Robb, 7520 Hornwood, Suite 608, Houston, Tex. 77036**
**Continuation-in-part of Ser. No. 421,251, Oct. 13, 1989, Pat. No. 4,978,306. This application Sep. 12, 1990, Ser. No. 581,021**
**Int. Cl.$^5$ H01R *35/00***
U.S. Cl. 439—8 **5 Claims**



1. A snap-together universal-jointed electrical device, comprising:
a spherical plug having first and second conducting portions on its external surface, the plug being connected by an extension portion to a bulb with filament;
first and second electrical conductors disposed internally of the plug and electrically connected to the first and second conducting portions, the conductors extending from the plug through the extension portion to the bulb, one of the conductors being in electrical contact with the filament;
an essentially spherical socket having first and second con-

VOL
1126
ISS
4
MY
28
1991
UMI

ducting portions on its interior surface, the socket dimensioned to closely receive and hold the plug while permitting the plug to rotate and swivel within the socket, the socket holding the plug such that a portion of the plug's first and second conducting portions are in contact with a portion of the socket's first and second conducting portions;

the socket having an opening of lesser area than a great circle area of the plug, portions of the socket around the opening being comprised of elastic material that resiliently deforms to permit the plug to be pushed into and pulled out of the socket, said resiliency assuring that the portions of the socket reassume the original shape wherein the socket closely receives and holds the plug when the plug is within the socket, and the plug extension portion extending out of the opening when the plug is in the socket.

---

### 5,018,981
### CONTACT EQUIPPED WITH A BYPASS ELEMENT

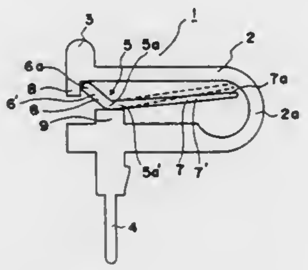
**Noriyuki Matsuoka, Tokyo, Japan, assignor to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan**

**Filed Jun. 13, 1990, Ser. No. 537,625**

**Claims priority, application Japan, Jun. 13, 1989, 1-150298**

**Int. Cl.⁵ H01R** *9/09, 31/08*

**U.S. Cl. 439—71** **4 Claims**



1. A contact, comprising:
- a warped element having a warped side thereof and an inner surface;
- a contact portion at one end of said warped element;
- a male terminal at the other end of said warped element; and
- a bypass element disposed within said warped element, said bypass element having a rigid portion at one end thereof, an elastic portion at the other end thereof, and a connecting portion between said rigid portion and said elastic portion;
- wherein a free end of said rigid portion and a point on said bypass element at said connecting portion are contacted with said inner surface of said warped element between the ends of said warped element to shorten a circuit between said contact portion and said male terminal; and
- wherein a free end of said elastic portion abuts against the inner surface of said warped element at said warped side of said warped element in order to elastically support said rigid portion.

---

### 5,018,982
### ADAPTER FOR STACKING PRINTED CIRCUIT BOARDS

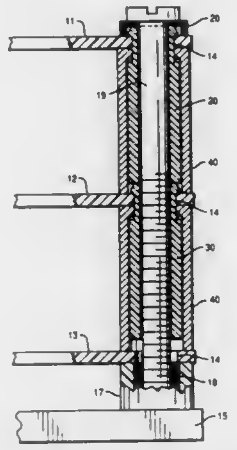
**Floyd G. Speraw, DeBary, and Jay A. Meyer, Oviedo, both of Fla., assignors to NCR Corporation, Dayton, Ohio**

**Filed Jul. 25, 1990, Ser. No. 558,038**

**Int. Cl.⁵ H01R** *9/09*

**U.S. Cl. 439—74** **3 Claims**

1. Apparatus for mechanically connecting a plurality of printed circuit boards in a parallel arrangement, each of said printed circuit boards having an equivalent distribution of mounting holes, the apparatus comprising:
- a standoff for placement between corresponding mounting holes of adjacent printed circuit boards, said standoff having a hole formed through its length, said hole being coaxial with a line drawn between the centers of said corresponding mounting holes, said standoff comprising a first cylindrical sleeve having an internal diameter greater than the diameter of said mounting holes and an end wall having a hole with a diameter equal to the diameter of said mounting holes; and
- a retainer for detachably connecting said standoff to one of said adjacent printed circuit boards, said retainer comprising a second cylindrical sleeve for insertion within said first sleeve, said second sleeve having a length less than the length of said first sleeve and having an external diameter less than the internal diameter of said first sleeve and greater than the diameter of said mounting holes, said retainer including a male connector formed at one end of said second sleeve for engagement with the hole in said end wall and one of said mounting holes, said retainer including a shoulder where said male connector is joined with said second sleeve, said retainer further including a hole formed through its length;



said male connector including:
- an enlarged end portion; and
- two cuts extending along the length of the connector and dividing the connector into two identical halves;
- whereby said cuts permit inward deflection of said connector halves during insertion or removal off said connector from said mounting holes or said standoff; and
- whereby said shoulder and said enlarged portion connect said standoff with a printed circuit board;
- whereby said printed circuit boards are connected together by fastening means placed through said corresponding mounting holes and the lengthwise hole in said retainer.

---

### 5,018,983
### ELECTRICAL ADAPTER FOR INTERCONNECTION WITH A SWITCH

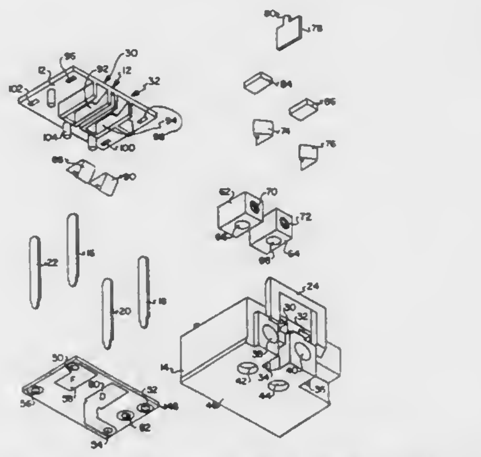
**Robert W. Bittel, Parma Hts., and Jules W. Rhine, Jr., Lyndhurst, both of Ohio, assignors to Lucerne Products, Inc., Hudson, Ohio**

**Filed Sep. 25, 1989, Ser. No. 411,725**

**Int. Cl.⁵ H01R** *23/02;* **H05K** *1/18*

**U.S. Cl. 439—76** **14 Claims**

1. An electrical adapter for interconnection with a switch having connectors for interconnection with a line voltage source and a motor, comprising:
- a housing;
- a first pair of connectors carried by said housing and adapted for mating interconnection with connections of the switch intended for interconnection with the motor;
- a second pair of connectors carried by said housing and adapted for mating interconnection with connections of the switch intended for interconnection with the motor;
- a third pair of connectors carried by said housing for mating interconnection with wires connected to the line voltage, each of said third pair of connectors comprising a connector block having intersecting passages therein, a first such passage adapted for receiving a wire, and a second such passage being threaded to receive a screw for locking said wire, said connector blocks being in engagement with circuit means;
- a fourth pair of connectors carried by said housing for mating interconnection with wires connected to the motor, said fourth pair of connectors comprising first and second spring clips in wire-receiving communication with said circuit means; and



said circuit means being carried by said housing for electrically interconnecting respective ones of said first and third pairs of connectors and respective ones of said second and fourth pairs of connectors, said circuit means comprising a printed circuit board, said connector blocks being attached to said printed circuit board and adapted for engaging and urging wires received thereby against said printed circuit board.

---

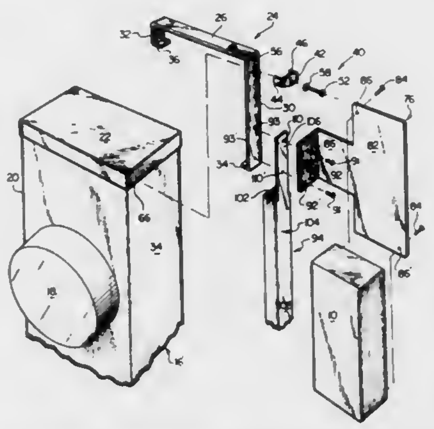
### 5,018,984
### TELEPHONE INTERFACE MOUNTING CLAMP

**George J. Franks, Jr., 664 Thompson Cir., Inverness, Ill. 60067**

**Continuation-in-part of Ser. No. 204,397, Jun. 9, 1988, Pat. No. 4,993,960, which is a continuation-in-part of Ser. No. 116,899, Nov. 5, 1987, Pat. No. 4,828,504. This application Nov. 7, 1989, Ser. No. 432,636**

**Int. Cl.⁵ H01R** *4/66*

**U.S. Cl. 439—92** **28 Claims**



1. A clamping for mounting a telephone interface box to a utility box comprising:
- an elongated base which spans one side of the utility box, said base having a pair of arms extending from the base for positioning the arms adjacent opposite sides of the utility box, with each of the arms being engageable with its adjacent side of the utility box;
- means for securing the clamp to the utility box; and
- a mounting plate attached to one of the arms, with the telephone interface utility box being secured to the mounting plate.

---

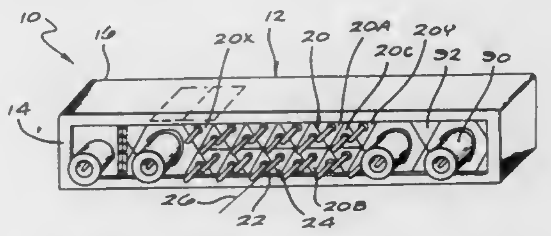
### 5,018,985
### CONNECTOR WITH MODULAR TERMINAL DEVICES

**John R. Moore, Tustin, Calif., assignor to ITT Corporation, New York, N.Y.**

**Filed Aug. 21, 1989, Ser. No. 396,252**

**Int. Cl.⁵ H01R** *29/00*

**U.S. Cl. 439—174** **5 Claims**



1. A connector comprising:
- a plurality of terminal devices, each including an elongated contact having an axis, and each including a quantity of insulative material forming a positioner, each of said positioners molded to and surrounding a portion of the corresponding contact and having a periphery formed of a plurality of flat sides and with said periphery being of substantially constant size and shape along the axis of the contact, each of said plurality of positioners being separate from the other ones of said positioners;
- a housing, said positioners of said terminal devices lying in said housing, with their peripheries substantially abutting each other and with said contact axes extending parallel to each other.

---

### 5,018,986
### ELECTRICAL CONNECTOR

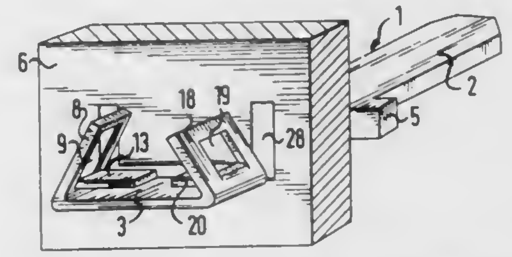
**Wolfgang Freitag, Arndtstrasse 9-11, 2351 Trappenkamp, Fed. Rep. of Germany**

**Filed Sep. 28, 1990, Ser. No. 590,657**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1989, 3932346**

**Int. Cl.⁵ H01R** *4/24*

**U.S. Cl. 439—421** **18 Claims**



1. An electrical connector comprising an insulating holder and at least one elongate electrical contact pin for insertion thereinto, said contact pin having a rear portion from which projects a first clamping part in the form of a clamping member having an initial position in which the clamping member projects normally of said contact pin for bending over into a clamping position against an insulated cable to penetrate the insulation thereof to make electrical contact with a conductor of the cable; wherein the clamping member is in the form of an

VOL
1126
ISS
4
MY
28
1991
UMI

apertured lug having an inner perimeter, said rear portion of the contact pin having at least one second clamping part in the form of a projection located so as to be at least partially surrounded by said lug in said clamping position thereof, said projection having an upper perimeter, said clamping parts having at least one perimetral insulation cutting edge and said lug having an intermediate bent position for locking said contact pin in the holder when said contact pin has been inserted thereinto.

---

### 5,018,987
### END HOUSING FOR MULTIPOLE ELECTRICAL PLUG AND SOCKET CONNECTORS

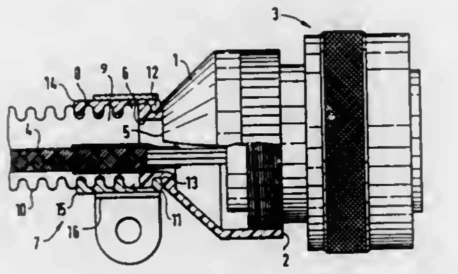
**Safa Kirma, Wedel, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH**

**Filed Apr. 30, 1990, Ser. No. 516,263**

**Claims priority, application Fed. Rep. of Germany, May 6, 1989, 3914936**

**Int. Cl.$^5$ H01R** *13/56*

**U.S. Cl. 439—445** **8 Claims**



1. A cable harness comprising a protective tube having a corrugated surface, electrical lines within the tube, a multipole electrical plug-in socket connector connected to the electrical lines, and a transition part having a first end adjacent the connector and a second end adjacent the protective tube for joining the connector to the protective tube, said transition part being a hollow member having at its first end a cylindrical receiving region for mounting to the plug-in connector and having at its second end a receptacle, a fastening element embracing with a first end thereof an end region of the protective tube in a frictionally locking manner and having a second end rotatably retained at the transition part receptacle, said fastening element comprising two separate half shells.

---

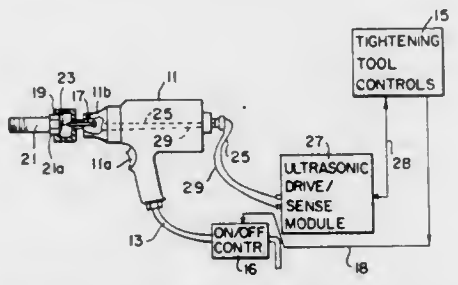
### 5,018,988
### ELECTRICAL CONTACT MECHANISM FOR ULTRASONIC TRANSDUCERS ON FASTENERS

**Ian E. Kibblewhite, Ambler, and Robert H. Strunk, Philadelphia, both of Pa., assignors to SPS Technologies, Inc., Newtown, Pa.**

**Filed Oct. 10, 1989, Ser. No. 419,053**

**Int. Cl.$^5$ H01R** *3/00, 17/04*

**U.S. Cl. 439—577** **17 Claims**



1. An electrical contact mechanism for electrically connecting electronic circuitry cabling to an ultrasonic transducer which can be alternatively embedded in, permanently attached to, or temporarily attached to a fastener, said transducer providing a contact surface on said fastener, said electrical contact mechanism being positioned within a fastener tightening tool and making said electrical connection when said tightening tool is positioned on said fastener, comprising:

a first electrically isolated conduction path through said tightening tool;

a first electrical connector on a first end of said first conduction path, said first electrical connector having a protruding movable pin spring biased outwardly and being fixed so as not to rotate relative to the tool; and

a second electrical conduction path through said tightening tool.

---

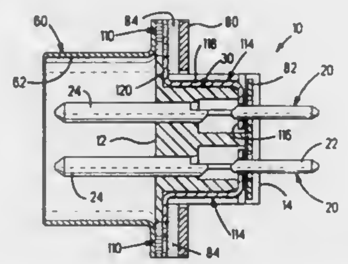
### 5,018,989
### ELECTRICAL CONNECTOR CONTAINING COMPONENTS AND METHOD OF MAKING SAME

**Teresa K. Black, Etters; James M. English, Harrisburg, and Michael S. Shank, Camp Hill, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Sep. 21, 1990, Ser. No. 586,362**

**Int. Cl.$^5$ H01R** *13/66*

**U.S. Cl. 439—620** **14 Claims**



1. An electrical connector of the type for transmitting signals and having a dielectric housing means a plurality of contacts secured in passageways thereof and extending from a mounting face to a mating face of the connector, and further having a conductive shell secured to the housing, said connector further comprising:

said dielectric housing means having a body extending between said mounting face and said mating face and having side surfaces and lateral flange portions extending outwardly from said side surfaces remote from said mounting face;

a conductive shell mountable to said housing means along said mating face thereof and including a transverse flange portion extending outwardly along and adjacent each said lateral flange portion of said housing means upon assembly thereto;

a plurality of electrical contacts secured in said housing means and including first sections extending from said mounting face for being connected to corresponding contact means of a corresponding first electrical article, and further including second sections at least exposed along said mating face for electrical connection with mating contacts of a corresponding second electrical article;

a like plurality of small electrical components mounted to said transverse flange portions of said shell, each component using at a location associated with a respective one of said electrical contacts and having a first electrode electrically connected to said conductive shell for grounding, each component having a second electrode facing in a direction toward said mounting face; and

a like plurality of discrete straps having respective first strap sections each first strap section electrically connected to a respective said contact first section along said mounting face, each said strap including an intermediate strap silicon extending along a said side surface of said housing to a respective second strap section extending transversely outwardly along a said lateral flange portion of said housing means to be adjacent and electrically connected to a said second electrode of an associated said component at least exposed by said lateral flange portion for such connection, each said strap defining a circuit from a said contact to an associated said component with said conductive shell defining a ground means of said component.

---

### 5,018,990
### FILTER CONNECTOR

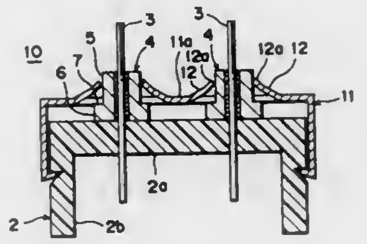
**Yukio Sakamoto; Iwao Fukutani, and Toshio Hori, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan**

**Filed Dec. 27, 1989, Ser. No. 457,564**

**Claims priority, application Japan, Dec. 28, 1988, 63-331898**

**Int. Cl.$^5$ H01R** *13/66*

**U.S. Cl. 439—620** **4 Claims**



1. A filter connector comprising:

a housing;

a connector terminal mounted on said housing;

a filter element mounted around said connector terminal; and,

a support plate for supporting said filter element as being mounted on said housing, wherein said support plate is extended in a lengthwise direction of said housing and has an elastic flap which is formed at the position corresponding to said filter element, and a free end of said flap holds an external surface of said filter element in a direction perpendicular to the lengthwise direction of said support plate and wherein said filter element is movable relative to the support plate in a lengthwise direction of the housing.

---

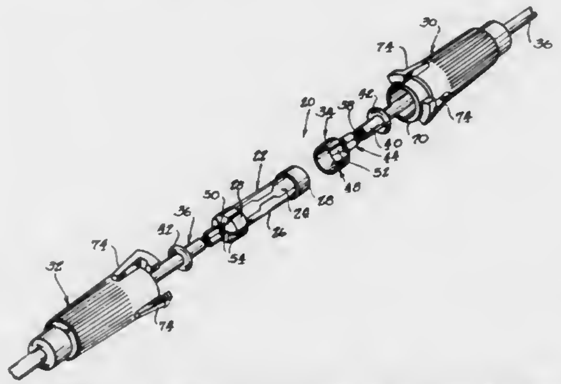
### 5,018,991
### FUSE HOLDER ASSEMBLY

**Paul C. Katz, Chicago; Patrick A. Pisciotto, Wood Dale, and Gary I. Robin, Niles, all of Ill., assignors to Triplex Manufacturing Co., Chicago, Ill.**

**Filed May 11, 1990, Ser. No. 522,326**

**Int. Cl.$^5$ H01R** *13/68*

**U.S. Cl. 439—621** **9 Claims**



1. A fuse holder assembly for a fuse of the type including a fusible link retained in an insulative sleeve, made of a material such as glass or a ceramic, with a terminal cup, connected to an end of the link, at each end of the sleeve, said fuse holder assembly comprising:

first and second insulated conductors each having a conductive core and an insulative jacket positioned about said core;

a first metallic terminal element including a larger end for slidably receiving one of said terminal cups and a smaller end attached to the core of said first insulated conductor;

a second metallic terminal element including a larger end for slidably receiving the other terminal cup and a small end attached to the core of said second insulated conductor;

a first sleeve of resilient insulative material receiving in an interference fit said first conductor, said sleeve being slidable on the outside surface of the jacket of said first conductor;

a second sleeve of resilient insulative material receiving in an interference fit said second conductor, said sleeve being slidable on the outside surface of the jacket of said second conductor;

a first cap of relatively rigid insulative material including a barrel defining a cavity for receiving said first terminal element, said first cap having a facing end portion and a remote end portion, said first cap further including an intermediate internal ledge disposed between said end portions for abutting said larger end of said first terminal element and a remote internal ledge disposed at said remote end portion for abutting said first sleeve, said remote ledge defining an opening for passage of said first conductor; and

a second cap of relatively rigid insulative material including a barrel defining a cavity for receiving said second terminal element, said second cap having a facing end portion and a remote end portion, said second cap further including an intermediate internal ledge disposed between the last-mentioned end portions for abutting said larger end of said second terminal element and a remote internal ledge disposed at said second cap remote end for abutting said second sleeve, said second cap remote ledge defining an opening for passage of said second conductor.

---

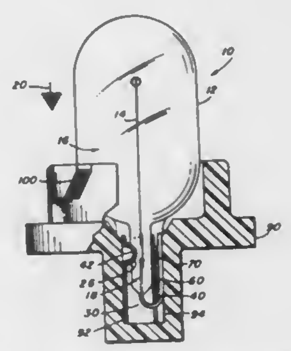
### 5,018,992
### WEDGE LAMP AND CLIP

**John A. Bergin, Hancock, and Roger A. Racette, Hillsboro, both of N.H., assignors to GTE Products Corporation, Danvers, Mass.**

**Filed May 20, 1988, Ser. No. 197,014**

**Int. Cl.$^5$ H01R** *33/09*

**U.S. Cl. 439—699** **18 Claims**



1. An electrically conductive clip electrically connecting an electrical lead extending from a lamp envelope to an electric source comprising: an electrically conductive clip body having

a) interior and exterior portions,

b) coupling means along the interior portion coacting with the envelope to fixedly position the clip with respect to the envelope,

c) means for mechanically coupling a portion of the electrical lead to the exterior portion of the clip, comprising a spring contact for making a lateral tensioning compression contact between the lead and the clip,

d) means for electrically connecting the lead to the clip, and

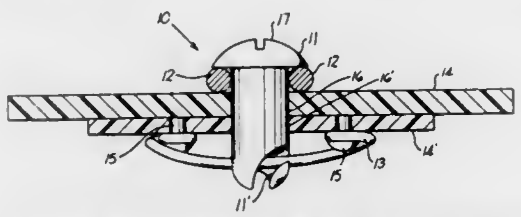
VOL
1126
ISS
4
MY
28
1991
UMI

e) means for electrically connecting the clip to the electric source.

---

### 5,018,993
### WIRING DEVICE TERMINAL

**Dwight H. Durham, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.**
**Filed Jun. 4, 1990, Ser. No. 532,550**
**Int. Cl.$^5$ H01R** *4/30*
**U.S. Cl. 439—801** **7 Claims**

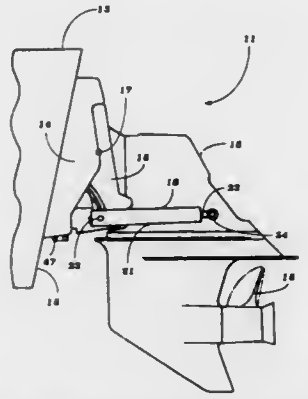


1. A wiring device adapted to respond to thermally induced variations in the dimensions of an electrical conductor terminated thereon, comprising:
  a retaining stud, said stud having a first, headed end and a second, slotted end, wherein said slotted end of said retaining stud comprises a spiral cam slot for engaging a means for imparting force on said electrical conductor and making electrical contact therewith; and
  a means for imparting holding force on said spiral cam slot of said retaining stud, said retaining stud being adapted to react to dimensional changes in said conductor and thereby prevent plastic deformation of said conductor.

---

### 5,018,994
### TILTING/TRIMMING SYSTEM FOR MARINE PROPULSION UNIT

**Ryozo Okita, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**
**Filed Aug. 3, 1989, Ser. No. 389,060**
**Int. Cl.$^5$ B63H** *5/12*
**U.S. Cl. 440—61** **17 Claims**

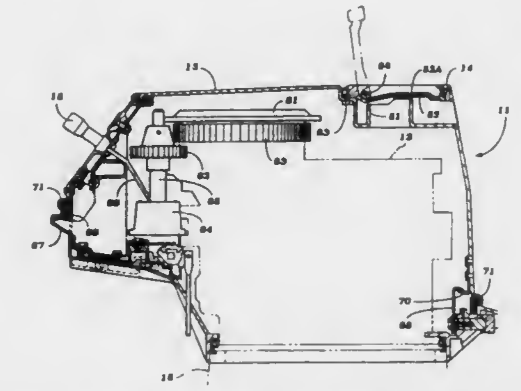


1. A hydraulic tilt and trim system for an outboard drive unit mounted on the transom of a marine vessel for tilting movement of the drive unit and movement between a plurality of trim positions, comprising at least one fluid motor extendably connecting the drive unit and transom or stationary part of the drive unit, said fluid motor having a cylinder housing and a moveable member defining a pair of fluid chambers, a pump for delivering hydraulic fluid to said fluid motor, a first conduit fluidly communicating said pump with one of said chambers, a second conduit fluidly communicating said pump with the other of said chambers, a manually operated selector valve adapted to be adjustably positioned for effecting quick tilting-up movement of the drive unit or slow trimming movement of the drive unit between a plurality of trim positions, and a bypass valve assembly positioned between and in communication with said first and second conduits so as to relieve hydraulic pressure in the system in the event an impact is received on the drive unit regardless of the position of said selector valve.

---

### 5,018,995
### TILT HANDLE

**Yukio Sumigawa, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**
**Filed Jun. 8, 1989, Ser. No. 363,475**
**Claims priority, application Japan, Jun. 10, 1988, 63-141811**
**Int. Cl.$^5$ B63H** *5/12*
**U.S. Cl. 440—63** **17 Claims**



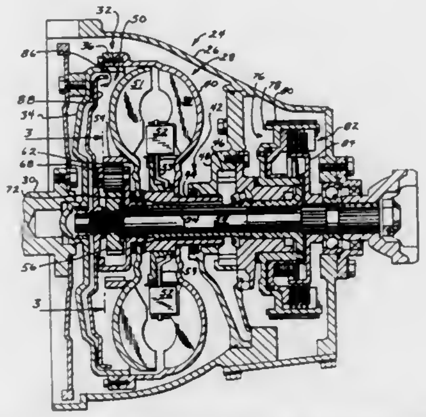
1. An outboard drive unit comprising a power head and propelling means for propelling a marine vessel having a hull through the water, said outboard drive unit further comprising a clamp bracket attached to the hull of said vessel, a tilt shaft positioned outside of the hull, a swivel bracket rotatably secured to said clamp bracket by said tilt shaft for movement about a generally horizontally extending tilt axis through a small tilt angle between a tilted-down position wherein the propelling means is positioned beneath the water and a tilted-up position wherein the propelling means is out of the water but the power head of said outboard drive unit does not intrude into said vessel beyond the hull, said swivel bracket extending rearwardly and generally horizontally when in the tilted-down position, said outboard drive unit further comprising a tilt handle secured to the power head of said outboard drive unit for movement from a recessed position on the power head to an operative position accessible to an operator for imparting movement of said outboard drive unit about the generally horizontally extending tilt axis.

---

### 5,018,996
### FLOW CONTROL FLUID COUPLING MARINE TRANSMISSION

**Neil A. Newman, Omro, Wis., and Thomas C. Bowen, Thousand Oaks, Calif., assignors to Brunswick Corporation, Skokie, Ill.**
**Continuation-in-part of Ser. No. 218,831, Jul. 13, 1988, abandoned. This application Jan. 10, 1990, Ser. No. 463,083**
**Int. Cl.$^5$ B63H** *23/08, 23/26, 23/30*
**U.S. Cl. 440—75** **14 Claims**

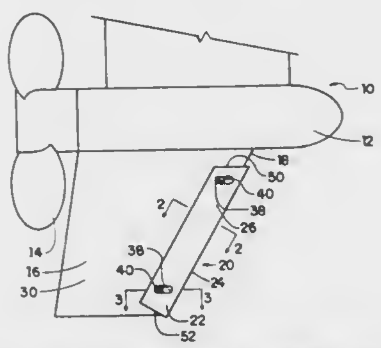
1. In a marine drive for a boat, said marine drive including an engine and a propulsion unit, the improvement comprising a fluid coupling interposed int he marine drive between the engine and the propulsion unit, said fluid coupling comprising:
  a rotatable fluid pump connected to the engine;
  a rotatable turbine adapted to be driven by said fluid pump; and
  flow control means disposed between said fluid pump and said turbine for governing the amount of power transferred to said turbine from said fluid pump, wherein said flow control means comprises a series of vanes disposed between said fluid pump and said turbine adjacent the entrance of said fluid into said fluid pump, wherein said vanes are mounted to and rotatable with said fluid pump, said vanes being movable between an open position for allowing full flow of fluid into said fluid pump, and a closed position for substantially cutting off the flow of fluid into said fluid pump from said turbine, said vanes being movable to varying positions between said open and closed positions for varying the amount of fluid flow into said fluid pump, and thereby the amount of power transferred to said turbine from said fluid pump.



---

### 5,018,997
### SKEG PROTECTOR

**Brian N. Guptill, Falcon Lake, Canada, assignor to M & J MacIver Holdings Ltd. and Marr's Leisure Products (1977) Inc., both of Winnipeg, Canada, a part interest**
**Filed Jun. 11, 1990, Ser. No. 536,356**
**Int. Cl.$^5$ B63H** *21/24*
**U.S. Cl. 440—76** **12 Claims**



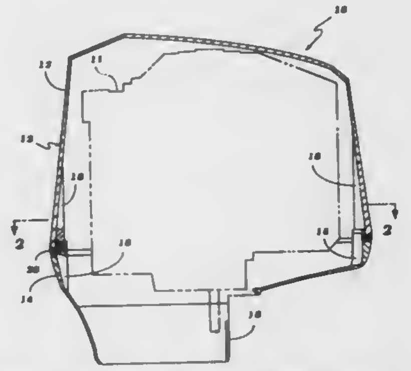
1. A skeg protector comprising a v-shaped channel with a leading edge and two flanges diverging therefrom, securing means for securing the channel over a leading edge of a skeg, said securing means comprising pairs of aligned, elongate, parallel slots, oriented at an acute angle to the leading edge, the slots of each pair being in respective ones of the flanges and fasteners extending through the pairs of slots, and a resilient strip extending along the inside of the channel, between the flanges for resiliently biassing the channel away from the leading edge of the skeg on which the protector is mounted.

---

### 5,018,998
### COWLING ARRANGEMENT FOR OUTBOARD MOTOR

**Nao[illegible] Kato, Hamamatsu, Japan, assignor to Sanshin Kogyo K[illegible]ushiki Kaisha, Hamamatsu, Japan**
**Filed Mar. 13, 1990, Ser. No. 492,714**
**Claims priority, application Japan, Mar. 13, 1989, 1-60258**
**Int. Cl.$^5$ B63H** *21/24*
**U.S. Cl. 440—77** **9 Claims**

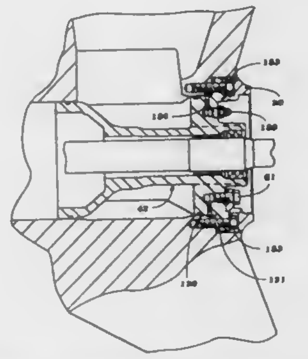
1. A cowling for enclosing the engine of an outboard motor comprising a top cover having an inner wall and a sealing surface, a tray member having an inner wall and a sealing surface adapted to engage said top cover sealing surface when said top cover and said tray member are attached, at least one positioning boss integrally formed on the inner wall of said tray member and at least one column shaped boss integrally formed on the inner wall of said top cover and having a lower portion for engagement with said positioning boss, said positioning boss being located adjacent said tray member sealing surface and said column shaped boss being located adjacent said top cover sealing surface so as to accurately align said sealing surfaces against each other when said top cover and said tray member are attached.



---

### 5,018,999
### PROPELLER DRIVING DEVICE OF MARINE PROPULSION UNIT

**Akihiro Onoue, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**
**Continuation-in-part of Ser. No. 145,965, Jan. 20, 1988, abandoned. This application Apr. 10, 1989, Ser. No. 335,805**
**Claims priority, application Japan, Jan. 23, 1987, 62-13867; Apr. 11, 1988, 63-87187**
**Int. Cl.$^5$ B63H** *21/24*
**U.S. Cl. 440—78** **7 Claims**



1. In a lower unit construction for a marine outboard drive comprised of a lower unit casing defining a generally rearwardly extending opening defined by a rear face of said drive unit casings and through which a driven propeller shaft passes, a bearing carrier extending into said opening for journaling said propeller shaft and closing said opening, fastening means for affixing said bearing carrier to said lower unit casing entirely within said opening and contiguous to and forwardly of said rear face thereof, and means extending at least in part into said opening for covering said fastening means to prevent said fastening means from causing turbulence upon the passage of said lower unit through the water.

VOL
1126
ISS
4
MY
28
1991
UMI

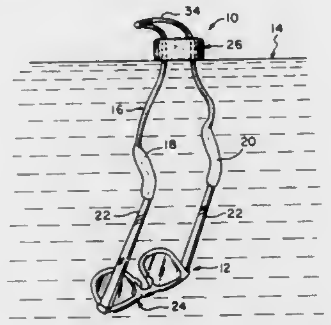
### 5,019,000
### METHOD AND APPARATUS FOR PREVENTING EYEGLASSES FROM SINKING IN WATER

**William H. Stephens, 11841 Kensington Road, Los Alamitos, Calif. 90720**

**Filed Aug. 18, 1989, Ser. No. 395,893**

**Int. Cl.$^5$ B63B** *22/16*

**U.S. Cl. 441—006** **13 Claims**



1. A floating eyeglass retainer for holding eyeglasses afloat comprising: an elongated, water impervious, resilient hollow flexible tube of annular cross-sectional configuration and having a first nominal outer diameter and having open ends adapted to be resiliently deformed for insertion over the bows of a frame for said eyeglasses, and a float colored to contrast markedly with a body of water and defining a pair of circular openings having a second nominal diameter which is less than said first nominal diameter through which said tube extends to thereby capture said tube and frictionally engage said tube so that said open ends of said tube reside on one side of said float for releasable attachment to bows of a frame for eyeglasses and so that an intermediate portion of said tube forms a loop between said openings on a side of said float opposite said one side and wherein said float has a buoyancy in water sufficient to overcome the weight of said eyeglasses and to remain afloat.

---

### 5,019,001
### METHOD FOR MANUFACTURING LIQUID CRYSTAL DISPLAY DEVICE

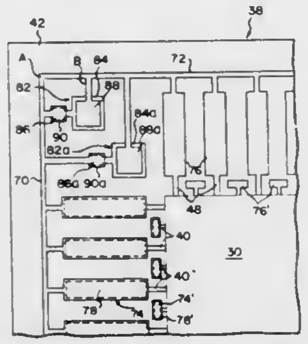
**Masanori Abe; Yoshiaki Komatsubara, and Tsuyoshi Iyama, all of Hyogo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 20, 1989, Ser. No. 453,802**

**Claims priority, application Japan, Dec. 21, 1988, 63-322565**

**Int. Cl.$^5$ G09G** *3/22*

**U.S. Cl. 445—3** **7 Claims**



1. A method for manufacturing a liquid crystal display device, comprising the steps of:
- (a) forming a plurality of address lines and a plurality of data lines, in an intersecting fashion, over a first substrate;
- (b) forming at least on short-circuit line for short-circuiting the address and data lines;
- (c) forming at least one area to be made short-circuit having two short-circuit electrodes connected to the short-circuit lines of the address and data lines, the two short-circuit electrodes being located opposite to each other with an insulating film formed therebetween;
- (d) exposing, subsequent to forming the short-circuit line, a spot between the short-circuit lines of the address and data lines to a laser beam and cutting the short-circuit line;
- (e) examining, subsequent to the exposing and cutting step (d), the presence or absence of a connection breakage and that of short-circuiting;
- (f) subsequent to the step (e), exposing the area to be made short-circuit to a laser beam to make short-circuiting between the two short-circuit electrodes;
- (g) forming a electrode on a second substrate;
- (h) sealing a liquid crystal composition between the first and second substrate; and
- (i) subsequent to making a short-circuit between the two short-circuit electrodes but prior to completing the liquid crystal display element, cutting off the short-circuit electrodes.

---

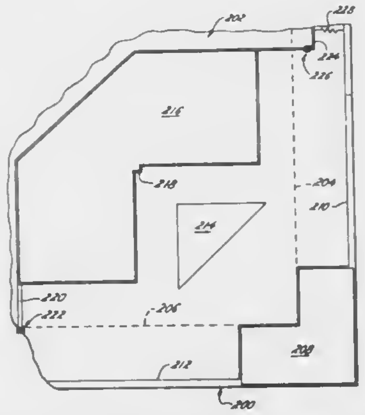
### 5,019,002
### METHOD OF MANUFACTURING FLAT PANEL BACKPLANES INCLUDING ELECTROSTATIC DISCHARGE PREVENTION AND DISPLAYS MADE THEREBY

**Scott H. Holmberg, San Ramon, Calif., assignor to Honeywell, Inc., Minneapolis, Minn.**

**Filed Jul. 12, 1989, Ser. No, 218,312**

**Int. Cl.$^5$ H01L** *45/00*

**U.S. Cl. 445—24** **36 Claims**



1. A method of manufacturing active matrix display backplanes and displays therefrom, comprising:
providing a substrate;
forming a pattern of pixels on said substrate;
forming a plurality of row and column intersecting pixel activation lines, interconnecting substantially all of said row lines to one another and substantially all of said column lines to one another;
forming an outer electrostatic discharge guard ring on said substrate coupled to said interconnected row and column lines via a resistance to provide protection from electrostatic discharges between said row and column activation lines during manufacture of the displays; and
removing said outer guard ring and row and column interconnections prior to completion of the display.

---

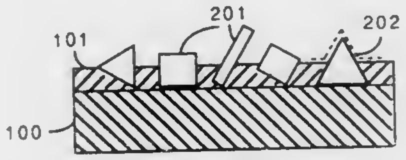
### 5,019,003
### FIELD EMISSION DEVICE HAVING PREFORMED EMITTERS

**Marc K. Chason, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Sep. 29, 1989, Ser. No. 414,505**

**Int. Cl.$^5$ H01J** *9/02*

**U.S. Cl. 445—24** **13 Claims**



1. A method of forming a field emission device, comprising the steps of:
- (A) providing a substrate;
- (B) providing a plurality of preformed objects, on the substrate, wherein:
  - (i) at least some of the preformed objects comprise emitters: and
  - (ii) at least some of the preformed objects are comprised of non-conductive material.

---

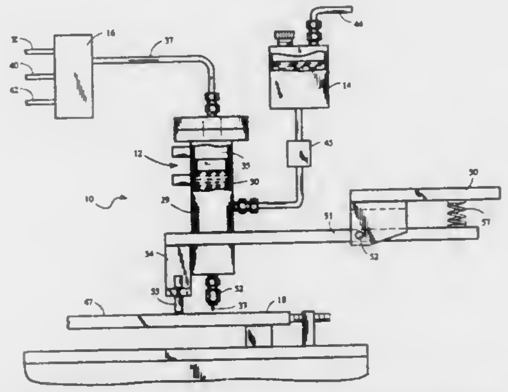
### 5,019,004
### METHOD OF MANUFACTURING CATHODE RAY TUBES WITH BINARY CODED FACEPLATES

**Johann Steiner, Des Plaines, and John M. Jarosz, Skokie, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Dec. 28, 1989, Ser. No. 458,103**

**Int. Cl.$^5$ H01J** *1/00*

**U.S. Cl. 445—30** **13 Claims**



1. A method of manufacturing cathode ray tubes that have a glass faceplate with a screen applied to its rear surface, a mask with apertures corresponding to a pattern of phosphor deposits on the screen and a funnel that encloses the screen and supports an electron gun, the steps including: applying a frit to the faceplate in the form of a digital code, devitrifying the frit to permanently bond the digital code frit to the faceplate as a devitrified code, applying a screen to the faceplate, attaching a mask in a fixed position relative to the screen, and attaching the funnel to the faceplate by devitrification, said method including dispensing the entire code frit from a single dispensing nozzle, and controlling movement of the dispensing nozzle in an x-y direction relative to the faceplate to form the code frit in a continuous undulating pattern on the faceplate.

---

### 5,019,005
### METHOD FOR THE FABRICATION OF A DIRECT-HEATED CATHODE STRUCTURE AND AN APPARATUS THEREFOR

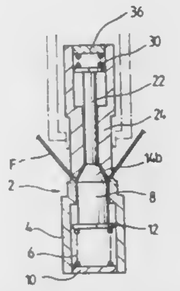
**Kyungseok Choi, Seoul, Rep. of Korea, assignor to Samsung Electron Devices Co., Ltd., Rep. of Korea**

**Filed Nov. 15, 1989, Ser. No. 436,895**

**Claims priority, application Rep. of Korea, Jul. 10, 1989, 89-10090**

**Int. Cl.$^5$ H01J** *9/06*

**U.S. Cl. 445—36** **8 Claims**



1. A method for the fabrication of a direct-heated cathode structure comprising the subsequent steps of:
- (a) bending step of filament materials including the stages wherein: filament materials are pressed by a center shaft on a dic pin; both ends of said filament materials are bent into a reversed V-shape by a first punch; said die pin is retreated inside a cylinder thus making said filament materials bent into a W-shape; and both ends of said filaments are bent into a corrugate shape by a second punch together with an upper fringe of said cylinder
- (b) welding step of ends of said filament material on to welding seats wherein lead bars fixed to a conventional base are adjusted and disposed at a required position, and said welding seats are supported so as not to be deformed by a pressure applied from an electric resistance welding electrode.

---

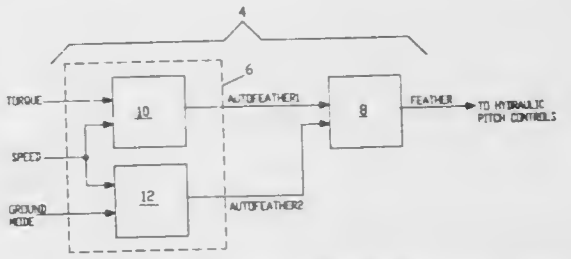
### 5,019,006
### AIRCRAFT ENGINE PROPELLER OVERSPEED PROTECTION TECHNICAL FIELD

**Roy W. Schneider, 29 Gail Dr., and Christopher D. Sierra, 60 Pinney St., Both of Ellington, Conn. 06029**

**Filed Feb. 26, 1990, Ser. No. 484,744**

**Int. Cl.$^5$ B64C** *11/40*

**U.S. Cl. 416—35** **5 Claims**

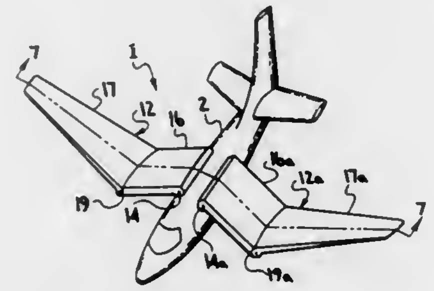


1. An aircraft engine propeller autofeather system, comprising:
signal means, for providing a torque signal indicative of engine torque, for providing a speed signal indicative of engine rotational speed, and for providing a ground mode signal indicative of aircraft flight status; and
processing means, for providing a first autofeather signal in response to said speed and torque signals indicating engine power loss, and for providing a second autofeather signal in response to said speed and ground mode signals indicating a propeller overspeed condition.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,007
### TOY GLIDER WITH VARIABLE DIHEDRAL WINGS

**Jack V. Miller, 700 N. Anburn Ave., Sierra Madre, Calif. 91024**
**Filed Jul. 9, 1990, Ser. No. 551,243**
**Int. Cl.⁵ A63H *27/00***
U.S. Cl. 446—62 **8 Claims**



1. A toy glider comprising:

an elongated fuselage including a nose section and a tail empennage section, said fuselage having a longitudinal flight axis at the intersection of a vertical plane and a horizontal plane when said toy glider is in a normal horizontal flight attitude, the fuselage having an elongated, recessed wing mounting channel on each side of the flight axis including a female, V-shaped bottom;

a pair of generally planar wings transverse to the longitudinal axis and generally in the horizontal plane, each wing having an outboard wing section and an inboard wing section;

an inboard wing section of each wing having a wing root at the inboard end in the form of an elongated polygon having at least one male corner generally matching the angle, width and length of a respective V-bottom channel of the fuselage, and having an outboard end including an elongated, recessed channel with a female, V-shaped bottom;

an outboard wing section of each wing having a wing root at the inboard end in the form of a polygonal form having at least one male corner generally matching the angle, width and length of the respective V-bottom channel of the outboard end of the inboard wing section, and each outboard wing section including a wing tip at an outboard end;

a tension means urging the wing root of each inboard wing section into a mating engagement with the respective wing root channel of the fuselage, whereby the tension means may be manually overcome to disengage the male polygonal corner from its mating engagement into the V-shaped channel of the fuselage and permit movement of the inboard wing section in the vertical direction; and

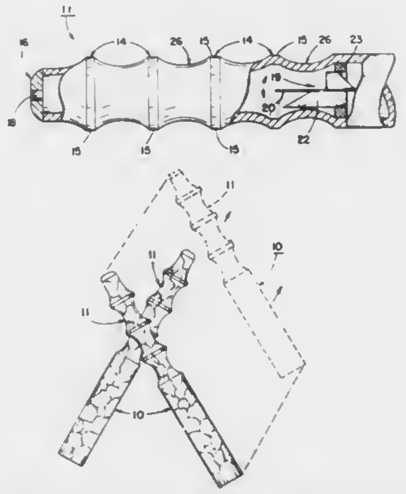
a tension means urging its wing root of each outboard wing section into a mating engagement with a respective wing root channel of the respective inboard wing section, whereby the tension means may be manually overcome to disengage the male polygonal corner from its mating engagement into the V-shaped channel of the inboard wing section and permit movement of the outboard wing section in the vertical direction.

---

### 5,019,008
### GAME CALL

**Jeffrey T. Hughes, Rte. 12, Box 270-C, Winston Salem, N.C. 27107**
**Filed Mar. 28, 1990, Ser. No. 500,075**
**Int. Cl.⁵ A63H *5/00***
U.S. Cl. 446—207 **6 Claims**

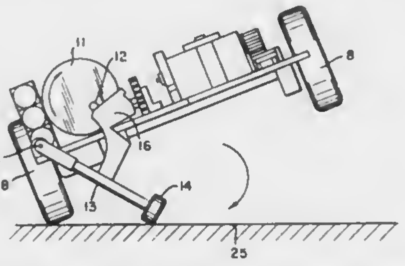
1. A game call comprising in combination: a pair of substantially hollow elongated members, said members comprising a section having a smooth outer surface and a section having a corrugated outer surface, a vibrator, said vibrator positioned within one of said elongated members to provide a desired sound when air is directed therethrough and whereby stropping one corrugated surface against the other will call game.



---

### 5,019,009
### TOY CAR CHASSIS INTERMITTENT TILT AND STEERING STRUCTURE

**Lin Chao-Chin, and Tseng Kuo-Heng, both of Taippei, Taiwan, assignors to Regency, Inc., New York, N.Y.**
**Filed Mar. 12, 1990, Ser. No. 491,480**
**Int. Cl.⁵ A63H *17/00***
U.S. Cl. 446—437 **11 Claims**



1. A vehicle adapted for movement on a travel surface comprising

a chassis;

a propulsion system mounted on said chassis;

at least one driven wheel rotatably mounted on said chassis and operatively connected to said propulsion system for propelling said vehicle while in engagement with said travel surface;

at least two other wheels, in addition to said one driven wheel, rotatably mounted on said chassis for normally supporting said vehicle in parallel disposition with respect to said travel surface when said vehicle is in motion, the lowermost surfaces of said driven and other wheels defining a plane;

a lifting member movably mounted on said vehicle for movement relative to said chassis between a first position on the side of said plane proximate said vehicle chassis and a second position on the side of said plane distal from said chassis;

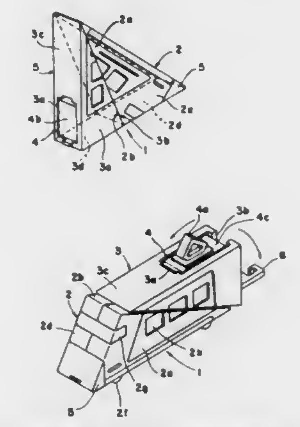
a lifting wheel mounted adjacent one end of said lifting member in a plane of rotation parallel to the longitudinal axis of said vehicle for engaging said travel surface and at a point in approximate longitudinal axial alignment with the center of gravity of said vehicle at least when said lifting member is in said second position; and

an actuating device mounted on said chassis and operatively connected to said lifting member for effecting movement thereof between said first and second positions.

---

### 5,019,010
### TRANSFORMABLE BLOCK TOYS

**Teruo Nikaido, and Ichiro Ohi, both of Tokyo, Japan, assignors to Tomy Company, Ltd., Tokyo, Japan**
**Filed Apr. 17, 1989, Ser. No. 338,851**
**Claims priority, application Japan, Apr. 15, 1988, 63-50559[U]; Jan. 23, 1989, 1-6146[U]**
**Int. Cl.⁵ A63H *33/00, 3/46, 17/00***
U.S. Cl. 446—487 **7 Claims**



1. A transformable block toy comprising:

a first body segment; and

a second body segment movably connected to the first body segment and being movable between a first, transformed position and second, untransformed position;

the first body segment and the second body segment collectively having a first geometric shape when the second body segment is in the first, transformed position and second geometric shape when the second body segment is in the second, untransformed position;

wherein the second body segment is a wedge having two substantially planar, parallel, triangularly-shaped outer surfaces spaced apart by three contiguous side surfaces,

wherein one of the side surfaces has a recess in which a rotatable member is mounted, and an adjacent one of the side surfaces has a recess in which a pivotal member is mounted adjacent the rotatable member; and

wherein the rotatable member has two opposite side surfaces, one of which has a projection extending outwardly therefrom which is receivable in the corresponding recess of the side surface.

---

### 5,019,011
### CLOSURE FOR BROOD CHAMBER

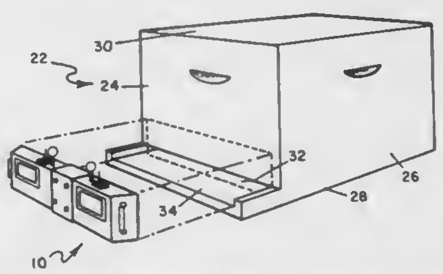
**John R. Williams, Rte. #1, Box 234, Hardeeville, S.C. 29927, and Marion L. McLatchy, 610 Hwy. 278 HHI, Hilton Head Island, S.C. 29928**
**Filed Aug. 16, 1989, Ser. No. 394,521**
**Int. Cl.⁵ A01K *47/06***
U.S. Cl. 449—27 **14 Claims**

1. A closure for a brood chamber, the brood chamber being of the type having a front opening between a front wall and a bottom wall, to prevent ingress and egress of bees through the front opening, comprising:

a housing having a length approximately the same as that of the front opening of the brood chamber and a width at least equal to that of the front opening of the brood chamber;

adjusting means on the housing for varying the length of the housing to match the length of the front opening of the brood chamber;

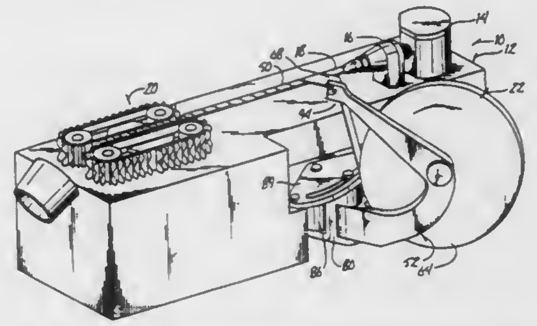
ventilating means within the housing to permit passage of air through the housing and through the front opening of the brood chamber; and clamping means on the housing for holding the housing securely over the front opening of the brood chamber, wherein the clamping means comprises at least one arm that is movable upward to a position behind the front wall of the brood chamber to prevent removal of the housing and movable downward to allow removal of the housing.



---

### 5,019,012
### ENCASED PRODUCT AND METHOD AND APPARATUS FOR ENCASING SAME

**Ray T. Townsend, Des Moines; David W. Smith, West Des Moines, and Robert M. Dykes, Urbandale, all of Iowa, assignors to Townsend Engineering Company, Des Moines, Iowa**
**Division of Ser. No. 187,351, Apr. 28, 1988, Pat. No. 4,944,069. This application Apr. 23, 1990, Ser. No. 512,329**
**Int. Cl.⁵ A22C *21/00***
U.S. Cl. 452—46 **3 Claims**



1. A cartridge for containing the ribbon for the casing of a meat encasing machine, comprising:

an enclosed housing;

a reel of ribbon material in said housing, said ribbon containing sufficient water-based moisture on the side edges thereof so that said side edges will adhere to each other to create a self-contained tubular casing when placed in overlapping condition.

---

### 5,019,013
### ON LINE BREAST HALVER AND PROCESSOR

**Jacobus E. Hazenbroek, Burg de Zeeuwstraat 52, Numansdorp, Netherlands**
**Filed Jan. 31, 1990, Ser. No. 472,891**
**Int. Cl.⁵ A22C *21/00***
U.S. Cl. 452—151 **19 Claims**

1. A method for the on-line processing of the breast and back portions of a poultry carcass or the like, comprising the steps of:

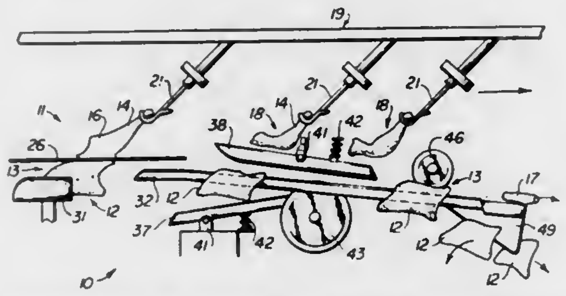
suspending a plurality of previously eviscerated poultry carcasses with the legs of each carcass hanging from an overhead conveyor and with the visceral opening of the carcass facing upwardly and the neck opening of the carcass facing downwardly;

moving the carcass with the conveyor in series along a processing path;

as each carcass moves along the processing path separating

VOL
1126
ISS
4
MY
28
1991
UMI

the upper carcass portion from the lower carcass portion of the poultry carcass by engaging the carcass with the narrowing side cutting edges of a V-shaped blade between the thighs and back of the carcass, pulling the carcass between the cutting edges of the blade with thigh portions of the lower carcass lying flat upon the top surface of the blade and the upper carcass trailing the lower carcass positioned below the blade, and severing the lower carcass from the upper carcass as the whole poultry carcass is moved between the progressively narrowing cutting edges;



continuing the movement of the lower carcass portion on the overhead conveyor;

continuing the movement of the upper carcass along a path approximately parallel to the path of the overhead conveyor, after the separation of the upper and lower carcasses; and

cutting through the upper carcass as the upper carcass moves along its path with cuts extending approximately parallel to the backbone of the carcass.

---

## 5,019,014
## FOREIGN OBJECT PROTECTION DEVICE FOR A HARVESTING MACHINE

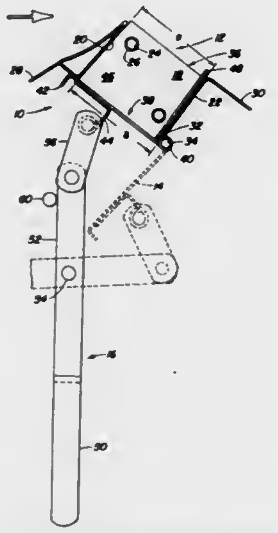
**Walter Hirsch, Bettendorf, Iowa, and Herbert Becker, Zweibrucken, Fed. Rep. of Germany, assignors to Deere & Company, Moline, Ill.**

**Filed Feb. 22, 1990, Ser. No. 484,721**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905968**

**Int. Cl.⁵ A01F** *12/16*

**U.S. Cl. 460—106** **14 Claims**



1. A foreign object protection device for a harvesting machine comprising:

a housing for accepting foreign objects, the housing having two opposed planar longitudinal walls which are interconnected by two opposed sidewalls that define an inlet opening through which foreign objects enter the housing and an outlet opening through which foreign objects exit the housing;

a door having a closed position for closing the outlet opening of the housing and an open position for opening the outlet opening of the housing, whereby the planar longitudinal walls of the housing diverge outwardly from the inlet opening to the outlet opening.

---

## 5,019,015
## FLEXIBLE SHAFT COUPLING

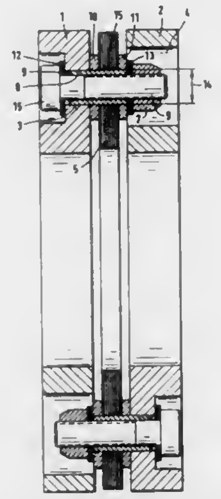
**Wilhelm Wasserfuhr, Castrop-Rauxel, Fed. Rep. of Germany, assignor to Rexnord Antriebstechnik Zweigniederlassung der Rexnord Gesellschaft mbH, Dortmund, Fed. Rep. of Germany**

**Filed Jun. 19, 1989, Ser. No. 367,972**

**Claims priority, application Fed. Rep. of Germany, Jul. 1, 1988, 3822207**

**Int. Cl.⁵ F16D** *3/78*

**U.S. Cl. 464—99** **6 Claims**



1. A flexible shaft coupling, comprising first and second coupling flanges and a stack of spring-elastic membranes mounted at an axial distance from the two coupling flanges, the coupling flanges having bores arranged alternatingly on a circle on the first coupling flange and on the second coupling flange, tightening bolts being mounted in the bores, each tightening bolt provided with a sleeve, the stack of membranes having bores in alignment with the bores of the stack of membranes, the stack of membranes being held together by means of the tightening bolts, a spacer washer each being arranged next to each side of the stack of membranes, each sleeve being a hardened cutting sleeve provided with a cutting edge, each cutting sleeve being forced into the respective bore of the stack of membranes and at least a portion of the cutting sleeve being forced into the corresponding bore of the coupling flange, wherein each cutting sleeve has an outer diameter which is greater than the maximum diameter of the respective bore of the stack of membranes and of the corresponding bore in the coupling flange.

---

## 5,019,016
## ANTI-SHUDDER TRIPOD CONSTANT VELOCITY UNIVERSAL JOINT

**Frederick J. Uchman, Clarkston, Mich., assignor to GKN Automotive Inc., Auburn Hills, Mich.**

**Filed Apr. 10, 1990, Ser. No. 507,022**

**Int. Cl.⁵ F16D** *3/20*

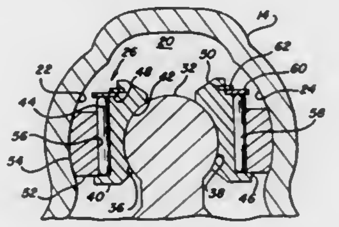
**U.S. Cl. 464—111** **15 Claims**

1. An anti-shudder constant velocity universal joint comprising:

an outer member having an internal cavity, said internal cavity having three longitudinal lobes equally spaced about an axis of rotation, each longitudinal lobe of said three longitudinal lobes having a pair of opposing side walls and each of said opposing side walls defining a longitudinal guideway parallel to said axis of rotation;

an inner member disposed in said outer member, said inner member having a spider member supporting three radially extending trunnions in a plane normal to an axis of rotation of said spider member, each trunnion of said three trunnions being disposed in a respective one of said longitudinal lobes between said longitudinal guideways; and

a multiple component roller attached to each trunnion of said three radially extending trunnions, each multiple component roller having an annular inner race member pivotably attached to said trunnion and an annular roller member circumscribing said inner race member engaging said longitudinal guideways, and a plurality of roller bearings disposed between said inner race member and said annular roller member to rotatably support said annular roller member about said inner race member, and each of said multiple component roller bearings further having means for providing limited axial displacement of said annular roller member relative to said inner race member to maintain the position of said annular roller member relative to said longitudinal guideways when said inner member is angularly disposed to said outer member.



---

## 5,019,017
## MONITORING ARRANGEMENT FOR A DRIVE BELT

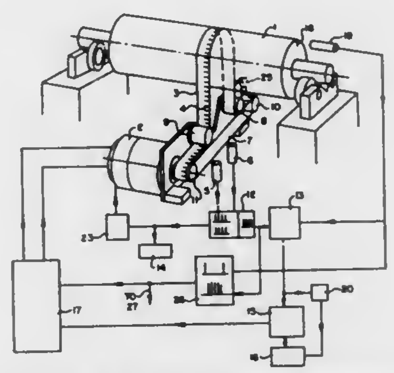
**Uwe Mönch, Bensheim, Fed. Rep. of Germany, assignor to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik, Pfungstadt, Fed. Rep. of Germany**

**Filed Feb. 5, 1990, Ser. No. 474,390**

**Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3904017**

**Int. Cl.⁵ F16H** *7/00;* **G01L** *5/10*

**U.S. Cl. 474—102** **44 Claims**



1. A monitoring arrangement for a belt drive including an endless drive belt for transmitting torque produced by a drive motor to a rotary member, comprising:

a plurality of markings on the drive belt at at least substantially equal spacings from each other in the longitudinal direction of the belt, the marking being adapted to be sensed;

first and second sensing means adapted to sense the markings on the drive belt and in response, output corresponding sensing signals in pulse form, the sensing means being arranged in succession and at a spacing from each other in a direction of travel of the drive belt;

a signal evaluation means connected to the first and second sensing means receiving the sensing signals and for relating the sensing signals to each other in respect of time in dependence on the spacing between the first and second sensing means and a speed of travel of the drive belt and for outputting a signal evaluation means output signal;

a zero reference marking on said rotary member;

a pulse counter connected to the signal evaluation means for receiving said signal evaluation means output signal and for counting said sensing signal pulses; and

a zero reference sensing means operatively coupled to said pulse counter for sensing said zero reference marking on said rotary member and for producing a zero reference signal and outputting said zero reference signal to said pulse counter, wherein said pulse counter produces and outputs an angular value signal corresponding to the respective positions of the rotary member in respect of an angle of rotation, wherein said rotary member is adapted to be stopped under the control of a count value of said counter, which corresponds to a desired position in respect of the angle of rotation and which is derived from the markings on the drive belt.

---

## 5,019,018
## DEVICE FOR TENSIONING A POWER TRANSMISSION BELT

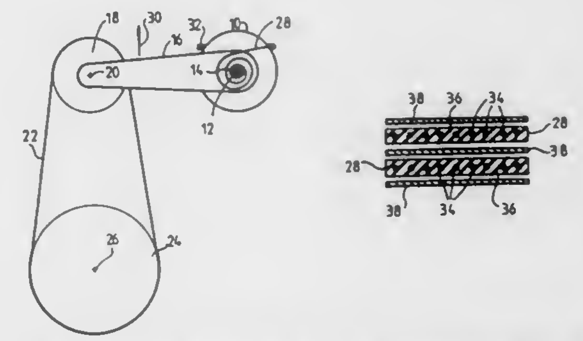
**Pierre Georget, Chambray les Tours, France, assignor to Hutchinson, Paris, France**

**Filed Feb. 22, 1990, Ser. No. 483,409**

**Claims priority, application France, Mar. 6, 1989, 89 02888**

**Int. Cl.⁵ F16H** *7/10*

**U.S. Cl. 474—117** **10 Claims**

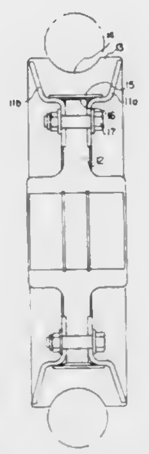


1. A device for tensioning a power transmission belt, the device comprising an elastically-deformable element which is mounted between a fixed point and the shaft of a pulley over which the belt passes, and which is arranged to put the belt under tension when it is itself under tension, wherein the elastically-deformable element comprises a layer of cords having a low modulus of extension and embedded in a strip of elastomer type material.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,019
### PULLEY TIRE RIM CONFIGURATION

**Harry A. T. Jones, 85 Dunstan Street, Bunbury, Western Australia, Australia 6230**
**PCT No. PCT/AU88/00314, § 371 Date Feb. 28, 1989, § 102(e) Date Feb. 28, 1989, PCT Pub. No. WO89/02046, PCT Pub. Date Mar. 9, 1989**
**PCT Filed Aug. 19, 1988, Ser. No. 466,254**
**Claims priority, application Australia, Aug. 28, 1987, PI4043**
**Int. Cl.⁵ F16G** *1/08;* **F16H** *55/36*
U.S. Cl. 474—166 61 Claims

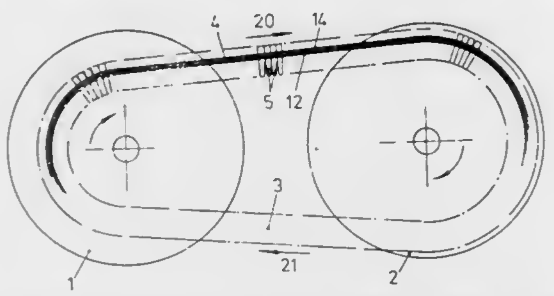


1. A pulley comprising:
a hub having a substantially cylindrical outer face and a pair of rim halves adapted to be mounted to the hub and having opposed inner axial faces which are divergent with respect to each other, a separatable pulley tyre having a cross-sectional configuration corresponding substantially to the space defined between the hub and the inner axial faces of the rim halves and having an inner circumference whereby the tyre is snugly received on the hub and is clampingly received between the rim halves, said tyre having a reinforcing ring located at or adjacent the inner circumference of the tyre, the outer circumference of the tyre being formed with a peripheral groove for accommodation of a pulley or cable.

---

### 5,019,020
### TRANSVERSE ELEMENT FOR A DRIVING BELT

**Johannes H. van Lith, Berlicum, Netherlands, assignor to Van Doorne's Transmissie B.V., Tilburg, Netherlands**
**Filed Jan. 5, 1990, Ser. No. 461,213**
**Claims priority, application Netherlands, Jan. 12, 1989, 8900072**
**Int. Cl.⁵ F16G** *1/22*
U.S. Cl. 474—240 12 Claims

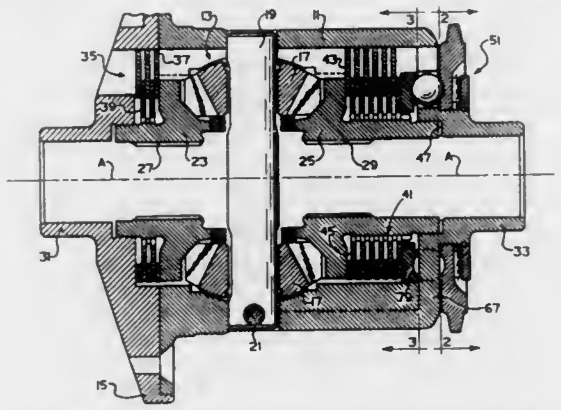


1. Transverse element for a driving belt, wherein a number of said transverse elements are movably provided, one behind the other, in longitudinal direction on at least one endless carrier, whereby the transverse elements butt against one another with their principal faces, said transverse element being provided with at least two sides faces converging relative to each other for co-operation with V-shaped pulleys and being bevelled radially inwardly in order to make bending of the driving belt possible, wherein the bevelled portion and one principal face joint at a tilting zone, and the center of gravity of the transverse element is located in a region beginning near the tilting zone and extending radially outwardly therefrom.

---

### 5,019,021
### MODULATING LIMITED SLIP DIFFERENTIAL

**David A. Janson, Plymouth, Mich., assignor to Eaton Corporation, Cleveland, Ohio**
**Filed Jul. 2, 1990, Ser. No. 548,317**
**Int. Cl.⁵ F16H** *1/44*
U.S. Cl. 475—150 12 Claims



1. A differential gear mechanism of the type including a gear case defining an axis of rotation and a gear chamber; differential gear means disposed in said gear chamber including at least one input gear and first and second output gears; means for limiting differentiating action of said differential gear means in response to an input signal, said limiting means including clutch means operable between a disengaged condition and an engaged condition, effective to retard relative rotation between said output gear and said gear case; actuating means comprising first and second actuating plates defining a ball and ramp actuator, wherein relative rotation of said actuating plates from an unactuated condition to an actuated condition is effective to bias said clutch means toward said engaged condition, characterized by:

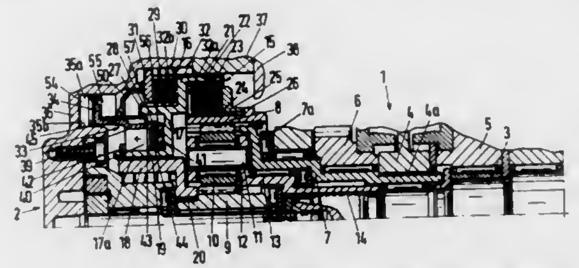
(a) said second actuating plate being disposed, in said unactuated condition, to rotate with said gear case; and
(b) an actuator disposed adjacent said gear case and including friction means operable in response to said input signal to move from an unactuated position, in which said second actuating plate is in said unactuated condition, to an actuated position in which said friction means is in frictional engagement with said second actuating plate, effective to cause relative rotation between said second actuating plate and said gear case, to move said actuating plates to said actuated condition.

---

### 5,019,022
### SPEED CHANGE ARRANGEMENT

**Günter Uhlig, Gifhorn; Fritz Blumenstein, and Gerhard Witte, both of Wolfsburg, all of Fed. Rep. of Germany, assignors to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany**
**Filed Aug. 7, 1989, Ser. No. 391,110**
**Claims priority, application Fed. Rep. of Germany, Aug. 31, 1988, 3829453**
**Int. Cl.⁵ F16H** *37/00*
U.S. Cl. 475—209 11 Claims

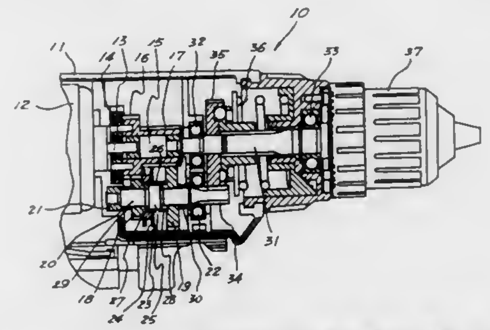
1. A speed change arrangement for vehicles comprising a plurality of gear pairs that can be switched as desired, planetary gear means connectable with the gear pairs having an input element, an output element, and at least one additional element, the planetary gear means including multi-disc brake means providing a first shift position and multi-disc clutch means providing a second shift position, disc support means connected with discs in the multi-disc brake means and the multi-disc clutch means and double-acting piston means for selectively moving the disc support means to actuate the multi-disc brake means or the multi-disc clutch means.



---

### 5,019,023
### SPEED CHANGER MECHANISM FOR ELECTRICALLY POWERED TOOL

**Hideki Kurosawa, Katsuta, Japan, assignor to Hitachi Koki Company, Limited, Tokyo, Japan**
**Filed Oct. 16, 1989, Ser. No. 422,405**
**Claims priority, application Japan, Oct. 14, 1988, 63-134674[U]; Oct. 14, 1988, 63-134675[U]**
**Int. Cl.⁵ F16H** *3/08, 3/083*
U.S. Cl. 475—269 5 Claims

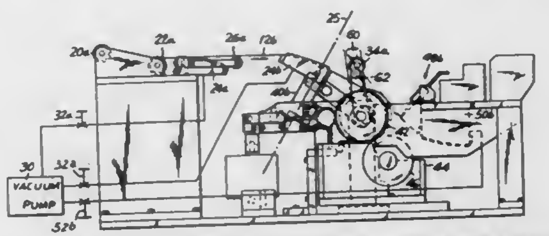


1. A speed changer mechanism for an electrically powered tool having a motor shaft and an output shaft, comprising:
a gear holder drivable by the motor shaft and having a larger-diameter gear and a smaller-diameter gear;
a transmission shaft rotatable by said gear holder for rotating the output shaft, said transmission shaft having a splined disc mounted thereon, said splined disc having first splines:
a high-speed gear rotably mounted on said transmission shaft and held in mesh with said larger-diameter gear, at all times, said high-speed gear having second splines;
a low-speed gear rotatably mounted on said transmission shaft and held in mesh with said smaller-diameter gear at all times, said low-speed gear having third splines;
a pair of springs for normally urging said high- and low-speed gears to be axially held against opposite surfaces of said splined disc; and
a clutch plate having internal axial teeth and axially slidably mounted on said splined disc, said clutch plate being axially movable in a position in which said internal axial teeth mesh with said first and second splines and a position in which said internal axial teeth mesh with said first and third splines.

---

### 5,019,024
### TENSIONING AND GLUING METHODS AND APPARATUS FOR TUBE WINDING MACHINES

**Edwin L. Cutright, Powhatan; Billy J. Keen, Jr., Chesterfield; G. Robert Scott, Midlothian, and Peter C. Van Davelaar, Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.**
**Filed Mar. 15, 1990, Ser. No. 493,755**
**Int. Cl.⁵ B31C** *3/00, 11/04*
U.S. Cl. 493—280 28 Claims

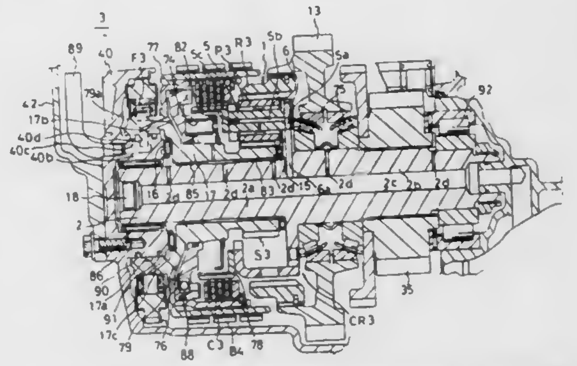


5. Apparatus for handling a tape being pulled along a predetermined path toward the mandrel of a tube winding machine comprising:
means for causing said tape to be pulled toward said mandrel;
means for applying glue to at least one side of said tape, said means for applying being upstream along said path from said means for causing;
first means for imparting frictional drag to said tape in order to resist but not prevent the motion of said tape toward said mandrel produced by said means for causing, said first means acting on said tape in advance of said means for applying glue; and
second means for imparting frictional drag to said tape in order to further resist but not prevent the motion of said tape toward said mandrel produced by said means for causing, said second means acting on said tape after said means for applying glue.

---

### 5,019,025
### CARRIER DEVICE IN AN AUTOMATIC TRANSMISSION

**Youichi Hayakawa, Toyoake; Chihiro Hosono, and Masaaki Nishida, both of Anjo, all of Japan, assignors to Aisin AW Co., Ltd., Anjo, Japan**
**Filed Jan. 4, 1989, Ser. No. 293,251**
**Claims priority, application Japan, Aug. 11, 1988, 63-201399**
**Int. Cl.⁵ F16H** *1/28*
U.S. Cl. 475—285 3 Claims



1. A carrier device in an automatic transmission comprising,
a planetary gear unit having a carrier with a carrier cover in the form of a flange, said carrier cover having a first lubricating oil hole extending in the radial direction thereof, a pinion shaft secured to the carrier cover and having a second lubricating oil hole extending in the longitudinal direction of the pinion shaft and communicat-

VOL
1126
ISS
4
MY
28
1991
UMI

ing with the first lubricating oil hole, and a pinion rotationally situated on the pinion shaft, and

a shaft integrally formed with the carrier cover so that the carrier cover extends radially outwardly from the shaft, said shaft being divided by the carrier cover into a small diameter section and a large diameter section larger than the small diameter section and having a third lubricating oil hole therein extending in the longitudinal direction thereof and communicating with the first lubricating oil hole, said shaft being adapted to support power transmission means at the large diameter section and the planetary gear unit having a rotatably mounted sun gear at the small diameter section, oil being forcibly supplied under pressure to the pinion through the first, second and third lubricating oil holes.

---

### 5,019,026

## DEVICE FOR ALIGNING BOX BLANKS WITHIN A MACHINE USED FOR PROCESSING THEM

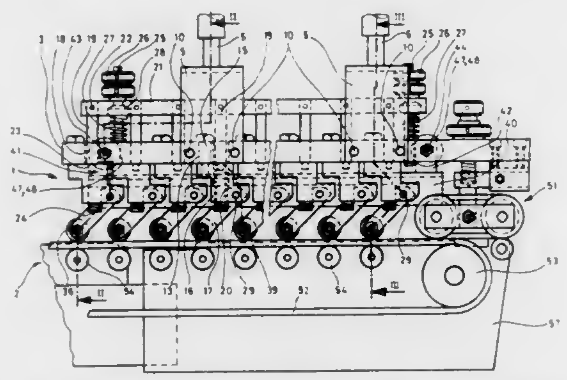
**Jean-Philippe Jaton, Val D'Illiez, Switzerland, assignor to Bobst SA, Switzerland**

**Filed Feb. 7, 1990, Ser. No. 476,614**

**Claims priority, application Switzerland, Feb. 9, 1989, 00453/89**

**Int. Cl.⁵ B31B** *3/04, 5/62, 1/64*

**U.S. Cl. 493—147** **6 Claims**



1. In a device for aligning box blanks within a folder-gluer processing the blanks, said device comprising upper straightening means, lower straightening means, said upper and lower straightening means acting jointly with lengthwise aligning means, and said upper straightening means being provided with means for adjusting a pressure of the upper straightening means on the box blanks, the improvements comprising said upper straightening means comprising a lengthwise beam being mounted on a frame of said machine, a plurality of roller assemblies being spaced along said beam, each assembly including a roller mounted for rotation on one end of a lever said lever being mounted on a base for pivotal movement around a horizontally extending axis, and means for pivotably mounting said base on the lengthwise beam for pivoting around a vertical axis, a flexible member being connected to each of said bases and extending to a corner piece, means for shifting said corner piece in a horizontal plane relative o said lengthwise beam, said lower straightening means consisting of a driven endless belt supported by lower rollers, said lower rollers having axles which are aligned to be vertical beneath the axles of the rollers of the upper straightening means, said lengthwise aligning means consisting of a lengthwise guiding rail and means for shifting said rail in a horizontal plane with regard to the upper and lower straightening means, and said means for adjusting the pressure on the upper straightening means comprising a ramp member having spaced guiding rods with one guiding rod for each of said roller assemblies, a spring extending between each guiding rod and its associated lever, and means for adjustably mounting said ramp member on the lengthwise beam including threaded adjusting rods and springs.

---

### 5,019,027

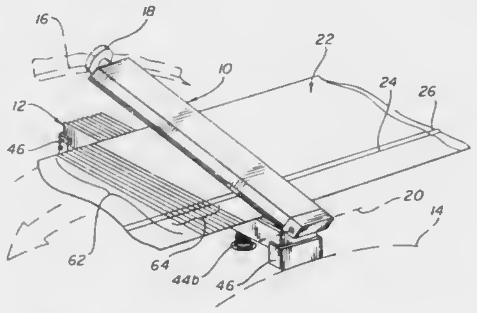
## METHOD AND APPARATUS FOR SEALING RECLOSABLE FLEXIBLE CONTAINERS WITHOUT SPOT SEALING

**Hugo Boeckmann, Arlington Heights; Donald L. Van Erden, Wildwood, and Mark D. Bauer, Mount Prospect, all of Ill., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 9, 1990, Ser. No. 491,330**

**Int. Cl.⁵ B31B** *1/66*

**U.S. Cl. 493—209** **28 Claims**



17. An apparatus for sealing plies of thermoplastic film having zipper closures thereon to form a reclosable container comprising:

opposing first and second seal jaws for engaging said thermoplastic film in an area to be sealed, said area including said zipper closures; said first seal jaw having first and second working surfaces, said first working surface comprising resilient means for engaging said area to be sealed, excluding said zipper closures; said second working surface comprising a patterned, non-resilient, heat-conductive surface positioned to engage said zipper closures in said area to be sealed; and said first seal jaw further comprising at least one heating element for adjustably heating said second working surface for sealing said zipper closures in said areas to be sealed; said second seal jaw having a third working surface, and means for heating said third working surfaces for sealing said areas to be sealed, including said zipper closures; said third working surface having a patterned surface for preventing slippage of said thermoplastic film, and means for engaging said zipper closures in said areas to be sealed;

means for cyclically reciprocating said first seal jaw into sealing cooperation with said second seal jaw; and

compressible means for supporting said second seal jaw comprising two or more springs which when compressed impose an asymmetric sealing pressure profile upon said second seal jaw for increasing pressure on said zipper closures in said area to be sealed.

---

### 5,019,028

## METHOD AND APPARATUS FOR PERFORATING AND/OR SEVERING TUBULAR BODIES

**Adalbert Engel, Drosselweg 4, D-7850 Lörrach; Christoph Engel, and Uta-Marie Engel, both of Lörrach, all of Fed. Rep. of Germany, assignors to Adalbert (Lörrach) Engel, Lörrach, Fed. Rep. of Germany**

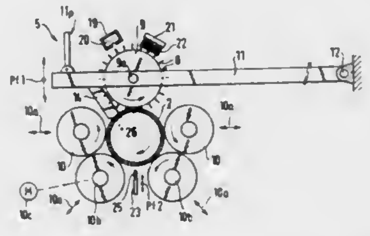
**Continuation of Ser. No. 37,095, Apr. 19, 1987, abandoned, which is a continuation of Ser. No. 478,912, Mar. 25, 1983, abandoned. This application Jul. 22, 1988, Ser. No. 224,213**

**Claims priority, application Fed. Rep. of Germany, Apr. 1, 1982, 3212153**

**Int. Cl.⁵ B26D** *3/16, 9/00;* **B26F** *1/24*

**U.S. Cl. 493—290** **44 Claims**

1. A method of making perforations in the walls of tubular workpieces such as synthetic plastic bobbins for textile yarns or the like, comprising the steps of effecting an initial penetration of selected portions of the wall of at least one tubular workpiece using at least one piercing tool; repeating said penetration effecting step for each of said selected portions; regulating the penetration frequency and total number of penetrations of the tool so that said frequency and number are sufficiently high to measurably raise the temperature of the tool due to friction generated during penetration and extraction of the latter, and so that a perforation is progressively formed at each of said selected portions; and confining the workpiece against movement in at least one of the directions including axially and radially of the workpiece so as to ensure that the at least one piercing tool repeatedly penetrates into the selected portions of the workpiece.



---

### 5,019,029

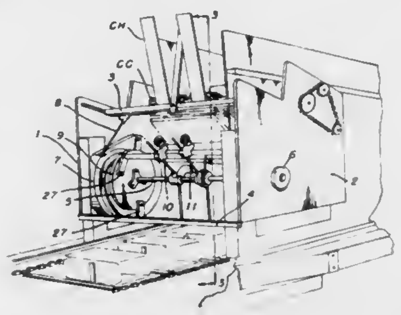
## MACHINE FOR ERECTING SLEEVE TYPE CARTONS

**Rodney K. Calvert, Dunwoody, Ga., assignor to The Mead Corporation, Dayton, Ohio**

**Filed Nov. 13, 1989, Ser. No. 434,190**

**Int. Cl.⁵ B31B** *1/78, 5/80*

**U.S. Cl. 493—315** **9 Claims**



1. A machine for sequentially manipulating out of a hopper collapsed sleeve type end loading cartons having face contacting panels in one of which an aperture is formed and for initiating set up thereof into open ended condition, said machine comprising a rotatable shaft, carton pick up means for sequentially engaging and withdrawing collapsed cartons from the hopper, a rotatable elongated support rod having one end thereof secured to said shaft and on which said carton pick up means is mounted for sliding reciprocal movement thereon, means for moving said elongated support rod and carton pick up means so that the other end of said elongated support extends through the aperture in said one face contacting panel and into engagement with the other of said face contacting panels so as to initiate a set up condition of the carton in coordination with sliding movement of said carton pick up means relative to said elongated support rod in a direction away from said hopper.

---

### 5,019,030

## ENVELOPE BLANK FORMING MACHINE

**Herbert W. Helm, Hollidaysburg; John R. Anderson, Duncansville, and Michael P. Lambert, Altoona, all of Pa., assignors to F. L. Smithe Machine Company, Inc., Duncansville, Pa.**

**Filed Apr. 26, 1990, Ser. No. 515,173**

**Int. Cl.⁵ B31B** *23/14, 41/14*

**U.S. Cl. 493—342** **2 Claims**

1. An envelope blank forming machine to form either generally rectangular booklet envelope blanks or generally diagonal envelope blanks from a web comprising,

pull rolls including means to pull the strip of paper from the web and feed the strip into the blank forming machine, said pull rolls positioned in a perpendicular position relative to the axis of the machine to feed the strip axially into the machine when forming booklet envelope blanks, means to move said pull rolls to an angular position relative to the axis of the machine to feed the strip at an angle to the axis of the machine for forming diagonal blanks,

a rotatable cutoff knife positioned in a perpendicular position relative to the axis of the machine and perpendicular to the strip to cut booklet envelope blanks from the strip having a generally rectangular configuration, means to move said rotatable cutoff knife to an angular position relative to the axis of the machine and the strip to cut the strip diagonally to the strip axis to form a blank having a diagonal configuration,

a first removable turnbar positioned upstream of said pull rolls, said first turnbar arranged at an angle to the axis of the blank forming machine, said turnbar including means to angularly change the direction of the strip from a direction aligned with the axis of the machine to an angular direction, said first turnbar being removed from the machine during the forming of booklet envelope blanks.

a second removable turnbar positioned in spaced relation to said first turnbar and arranged at an angle to the axis of the blank forming machine, said second turnbar including means to control the direction of movement of the strip to said pull rolls so that said strip moves at an angle to the axis of the machine, said second turnbar being removed from the machine during the forming of booklet envelope blanks,

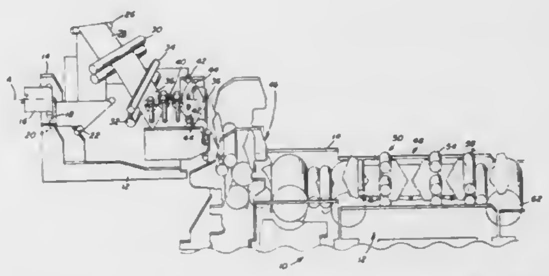
separating rolls rotating at a peripheral speed greater than the linear speed of said strip positioned downstream of said cutoff knife to separate and space said blanks from each other,

retractable, rotatable trimmer knives positioned downstream from said separating rolls to trim the pointed ends from a diagonal blank, retracting said rotatable trimmer knives into an inoperative position when forming rectangular envelope blanks,

seal flap cutters positioned downstream of said trimmer knives, said seal flap cutters including means to remove portions of said envelope blank and form seal flaps on booklet envelope blanks and seal flap corners on diagonal blanks,

first bottom flap cutters positioned downstream of said seal flap cutters, said first bottom flap cutters including means to remove portions of said envelope blank and form a portion of the bottom flap on both the booklet envelope blank and the diagonal envelope blank, and

rotatable second bottom flap cutters positioned downstream of said first bottom flap cutters, said second bottom flap cutters including means to remove other portions of said booklet envelope blank and form a bottom flap on said booklet envelope blank, said rotatable second bottom flap cutters also including means to remove portions of the diagonal envelope blanks and trim the bottom seal flap edge of the diagonal envelope blank.



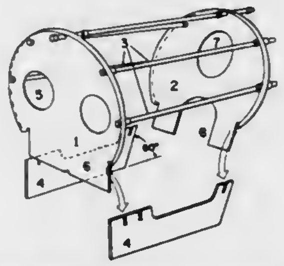
VOL 1126
ISS 4
MY 28
1991
UMI

### 5,019,031
## PROTECTIVE DEVICE FOR PERFORMING CRANIAL AUTOPSIES

**Javad Towfighi, Hershey; Allan F. Roberts, Mechanicsburg; Norman E. Foster, Camp Hill, and Arthur B. Abt, Hershey, all of Pa., assignors to The Pennsylvania Research Corporation, University Park, Pa.**

**Filed Mar. 9, 1990, Ser. No. 491,365**
**Int. Cl.$^5$ A61G** *10/00, 13/00*

**U.S. Cl. 600—21** **3 Claims**



1. A protective autopsy apparatus for providing
a contained environment separate from the ambient environment to maintain enclosed, infectious agents emanating from an opened cranium, comprising:
a pair of rigid end members, one of which is vertical and the other of which is tilted, wherein the vertical member has at least two circular windows and the tilted member at least one circular window, each said window provided with a disposable, flexible sleeve, said tilted member having an opening for slidably engaging the neck or chest of an autopsy subject;
multiple connecting elements for connecting and supporting the rigid end members and forming a frame; and
a flexible, stretchable, disposable, clear film over the frame of the connecting elements, whereby an autopsy subject's head is completely enclosed within said contained environment.

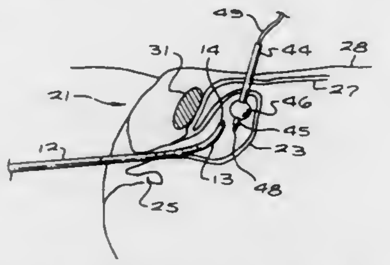
---

### 5,019,032
## REFINED SUSPENSION PROCEDURE WITH IMPLEMENT FOR TREATING FEMALE STRESS INCONTINENCE

**Jack R. Robertson, 1430 E. Main St., Suite 202, Santa Maria, Calif. 93454**

**Filed Apr. 3, 1990, Ser. No. 503,788**
**Int. Cl.$^5$ A61B** *17/00*

**U.S. Cl. 600—29** **19 Claims**



1. A procedure for treating incontinence in a woman, comprising the steps of:
inserting a urethral trocar into the woman's bladder and therethrough to press outward firmly against the woman's abdominal wall, so as to be perceptible from the exterior of the woman's body;
then, with the exteriorly perceptible trocar as a guide, making a suprapubic incision in the woman's abdominal wall and bladder to gain access to a tip of the trocar;
then using the tip of the trocar directly or indirectly to guide a tip of a viewing device through the suprapubic incision and into the woman's bladder; and
then installing sutures between the woman's rectus fascia and vagina, by means of a needle inserted through the woman's abdomen and into the woman's vagina;
substantially during the suture-installing step, monitoring the interior of the bladder through the viewing device to avoid placement of sutures in the bladder wall;
whereby the viewing device is remote from the neck of the bladder, where inadvertent placement of sutures is particularly likely; and
substantially during the suture-installing and monitoring steps, maneuvering the trocar or the viewing device, or both, to manipulate tissues of the woman's bladder, urethra, or abdominal wall, or combinations of any of these tissues, to facilitate accurate placement of the sutures, particularly avoiding the bladder and urethra.

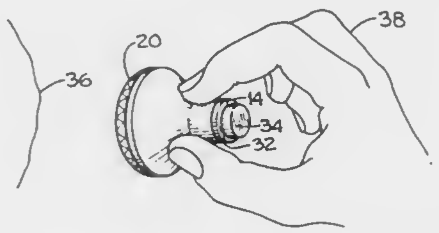
---

### 5,019,033
## OINTMENT APPLICATOR AND METHOD OF USING

**Navin M. Geria, Warren, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Dec. 18, 1989, Ser. No. 452,916**
**Int. Cl.$^5$ A61H** *15/00*

**U.S. Cl. 604—2** **12 Claims**



1. A disposable hollow ointment applicator which comprises:
a first periphery forming a first opening;
a second periphery forming a second opening, said second opening having a diameter smaller than said first opening;
a continuous elastic wall attached to and circumscribing said peripheries and disposed therebetween to form a substantially cone shaped hollow chamber for holding ointment therein; and
an ointment permeable membrane disposed around said first periphery to cover said first opening and hold ointment in said chamber until said ointment is forced through said membrane in response to closing said second opening squeezing said wall.

---

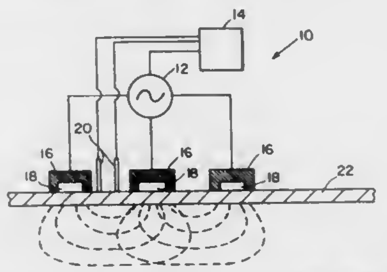
### 5,019,034
## CONTROL OF TRANSPORT OF MOLECULES ACROSS TISSUE USING ELECTROPORATION

**James C. Weaver, Sudbury; Kevin T. Powell, Boston, and Robert S. Langer, Jr., Newton, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 146,343, Jan. 21, 1988, abandoned. This application Mar. 30, 1989, Ser. No. 331,263**
**Int. Cl.$^5$ A61M** *37/00*

**U.S. Cl. 604—20** **23 Claims**

1. A method for transporting molecules across tissue comprising the steps of:
a. Applying at least one electrical pulse of sufficient voltage and duration to a region of tissue, wherein the tissue comprises at least a single layer of cells, in order to cause electroporation in the region; and



b. utilizing a driving force to move molecules across the regions of the tissue undergoing electroporation.

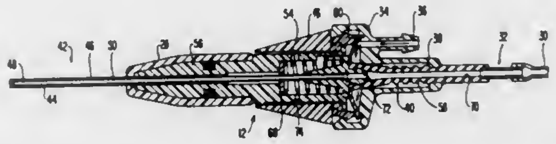
---

### 5,019,035
## CUTTING ASSEMBLY FOR SURGICAL CUTTING INSTRUMENT

**Berge Missirlian, Pasadena; Tamer Akkas, Mission Viejo, and Wayne A. Cook, Igo, all of Calif., assignors to Alcon Surgical, Inc., Fort Worth, Tex.**

**Filed Jun. 7, 1989, Ser. No. 362,806**
**Int. Cl.$^5$ A61B** *17/32*

**U.S. Cl. 604—22** **18 Claims**



14. A cutting probe assembly for use with a surgical cutting instrument of the type having a handpiece assembly, the handpiece assembly including means for effecting reciprocation of said probe assembly; said cutting probe assembly allowing aspiration of body tissue therethrough and being adapted to be attached to said handpiece assembly; said probe assembly comprising outer and inner cutting assemblies;
said outer cutting assembly including an outer tubular cutting member fixedly attached at a proximal end to said handpiece assembly and having a distal end portion defining a cutting port through which body tissue is aspirated, said outer tubular member having a cutting edge;
said inner cutting assembly including an inner tubular cutting member disposed inside of and continuously spaced along its entire length from said outer tubular cutting member;
said inner cutting member connected to the reciprocating means for reciprocating movement relative to and within said outer cutting member;
said inner cutting member having a distal end portion with a cutting edge formed thereon, said end portion of said inner member is angularly inclined relative to a longitudinal axis of said inner cutting member and is sized, shaped and inclined so as to maintain a preselected relationship with said cutting edge of said outer cutting member, said cutting edge of said inner member being resiliently maintained in the preselected relationship to cooperate with said cutting edge of said outer member to effect cutting of tissue aspirated through said port as said inner and outer cutting members are reciprocated with respect to each other;
said port has a radius which is generally equal to an outer radius of said outer cutting member so as to improve the cutting action;
the preselected relationship between said inner and outer cutting members defines a clearance therebetween; and
said inner cutting member has a relief surface formed which extends along the entire length of said distal end portion from a junction of said end portion and an adjacent portion of said inner cutting member, said relief surface being on a surface remote from said port.

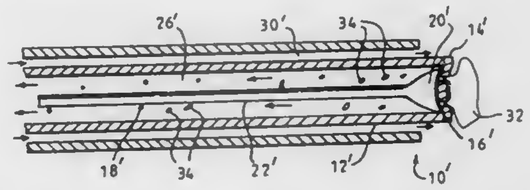
---

### 5,019,036
## METHOD AND APPARATUS FOR REMOVING GELATINOUS TISSUE

**Norman O. Stahl, 3199 Monterey Dr., Merrick, N.Y. 11566**

**Filed Nov. 28, 1989, Ser. No. 441,971**
**Int. Cl.$^5$ A61B** *17/32*

**U.S. Cl. 604—22** **17 Claims**



1. An instrument for removing gelatinous tissue and the like from a body, comprising:
a hollow, cylindrical body of small diameter having an open end;
a thin, perforated end piece mounted to said open end of said hollow, cylindrical body, said end piece including a concave portion extending within said hollow cylindrical body and having a plurality of small apertures extending therethrough, said end piece being sufficiently small in width that gelatinous tissue is able to extend through said apertures when pushed against said end piece;
a cutting tool movably mounted within said hollow cylindrical body, said cutting tool including a cutting edge abutting said thin, perforated end piece and substantially conforming to the inner surface of said perforated end piece;
means for aspirating materials through said perforated end piece and said hollow, cylindrical body, and
means for providing irrigation fluid adjacent to said perforated end piece,
said cutting edge being positioned with respect to said end piece such that it will shear off gelatinous tissue or the like upon the penetration of said tissue through said apertures and movement of said cutting tool.

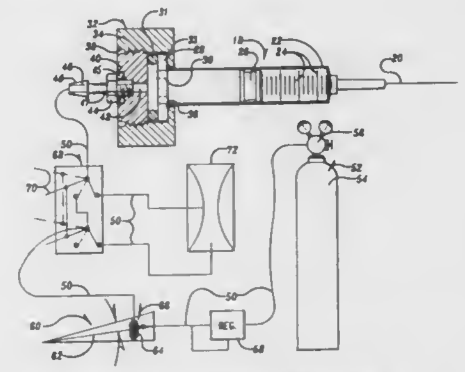
---

### 5,019,037
## PNEUMATIC RETINOPEXY INJECTOR

**Carl C. T. Wang, Oakland, and Leif J. Sundblom, Auburn, both of Calif., assignors to Alcon Laboratories, Inc., Forth Worth, Tex.**

**Filed Jul. 6, 1989, Ser. No. 376,013**
**Int. Cl.$^5$ A61M** *37/00*

**U.S. Cl. 604—23** **22 Claims**



1. A retinopexy injector means comprising:
syringe hand tool means for manipulation and placement by the hands of a surgeon to inject a gaseous substance into a

VOL
1126
ISS
4
MY
28
1991
UMI

specific location in a patient's eye to produce a gas bubble to assist in holding a partially detached or damaged retina in position for treatment, the syringe hand tool means including an injection needle connected in fluid communication directly to one end of a syringe case having an interior wall within which a piston means is movable between a first position and a second position nearer the injection needle, the piston means including a piston head in sealing contact with the interior wall of the syringe case, but being movable within the syringe case between the first and second positions according to a controllable pressure on the piston means;

communication means for operative attachment of and in fluid communication between the syringe hand tool means operatively attaching and a gaseous pressure means for providing the controllable pressure to move the piston means from the first position to the second position; and

a control means connected in fluid communication between the syringe hand tool means and the gaseous pressure means for allowing selective control of delivery of the controllable pressure to the piston means.

---

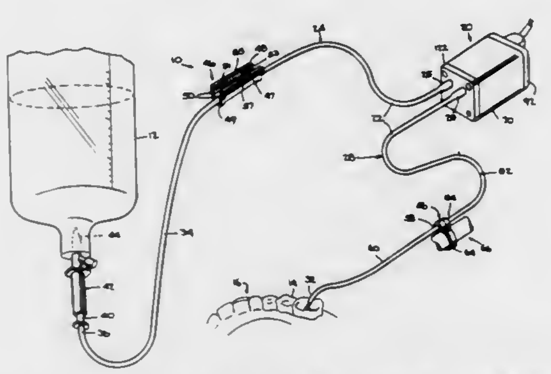
### 5,019,038
### IRRIGATION SYSTEM FOR SURGICAL PROCEDURES

**Harry A. Linden, Santa Barbara, Calif., assignor to Hall Surgical Division of Zimmer Inc., Carpinteria, Calif.**

**Filed Oct. 25, 1989, Ser. No. 426,817**

**Int. Cl.⁵ A61M *31/00***

**U.S. Cl. 604—49** **8 Claims**



5. A method of irrigating a surgical cutting site with a sterile irrigation fluid during a surgical operation which comprises the steps of

providing a kit having components which include a lightweight disposable pump assembly and disposable inlet and outlet tubing,

sterilizing said kit components,

packaging said kit components in a container which maintains said kit components in a sterile condition,

opening said container,

providing a sterile irrigation fluid source,

operably connecting said kit components with the sterile irrigation fluid source,

pumping the sterile irrigating fluid through said operably connected kit components to the surgical cutting site, and

disposing of the kit components.

---

### 5,019,039
### FLUID DRAINAGE NEEDLE METHOD OF USE

**Ronald W. Anderson, 407 S. 19th St., Blair, Nebr. 68008**

**Filed Nov. 15, 1989, Ser. No. 437,025**

**Int. Cl.⁵ A61M *31/00***

**U.S. Cl. 604—51** **1 Claim**

1. A method for draining fluid from between inner and outer body wall linings, comprising the steps of: providing a fluid drainage needle, including:

a cannula portion selectively, slidably associated with a needle portion;

said needle portion including:

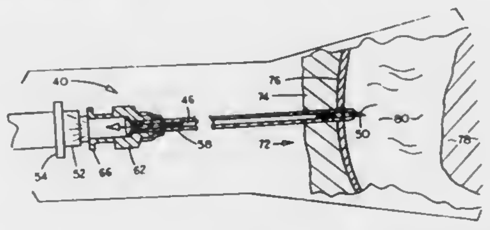
a rigid hollow needle mounted on a hollow base, said needle having a sharp distal end; and

a translucent hollow hub portion mounted to said base, for viewing fluid passing therethrough;

said cannula portion including a flexible, hollow sheath connected to a hollow hub, said sheath having a blunt distal end;

said sheath having at least one aperture formed in its side approximately ¼ inch from the distal end, and in communication with the interior hollow portion of the sheath, the aperture of a diameter sufficient to permit fluid aspiration therethrough;

said cannula hub being adapted for a selectively removable fit on said needle base with the needle projecting within said sheath;



said sheath of a length slightly less than said needle, such that the sharp end of said needle projects from said sheath when said cannula portion is carried on said needle portion;

inserting said needle, with said cannula portion removably fit on said needle portion, into a body and through said outer body wall;

stopping the insertion step when a flash of fluid from the between the inner and outer body wall linings is viewed in the needle portion hub;

sliding the cannula portion along the needle portion and into the space between the inner and outer wall linings until the sheath aperture is within the fluid;

removing the needle portion from said cannula portion;

draining the desired amount of fluid from between said inner and outer linings; and

removing said cannula portion.

---

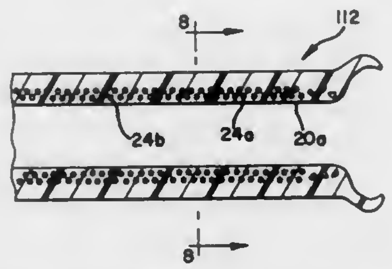
### 5,019,040
### CATHETER

**Toshinari Itaoka, Tokyo, and Shinichi Hirata, Takarazuka, both of Japan, assignors to Koshin Sangyo Kabushiki Kaisha, Kobe, Japan**

**Filed Aug. 31, 1989, Ser. No. 402,905**

**Int. Cl.⁵ A61M *25/00, 25/08***

**U.S. Cl. 604—95** **7 Claims**



1. A catheter comprising a tubular structure having a channel extending through it, a connector attached to one end of the structure and adapted to be connected to an energy source, the connector having at least one inlet port connected to the channel, energy guide fibers extending through the connector and along the tubular structure and adapted to be connected to the energy source, and a plurality of strings woven with said energy guide fibers and embedded in said tubular structure, said strings having portions on one side of said tubular structure which are formed of a shape memory alloy.

---

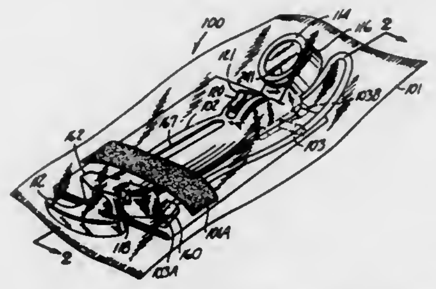
### 5,019,041
### BALLOON CATHETER INFLATION DEVICE

**David B. Robinson, Chanhassen; Daniel O. Adams, Blaine; William H. Penny, St. Anthony, and Gerald G. Voegele, St. Bonifacius, all of Minn., assignors to SciMed Life Systems, Inc., Maple Grove, Minn.**

**Filed Mar. 8, 1988, Ser. No. 165,600**

**Int. Cl.⁵ A61M *79/00***

**U.S. Cl. 604—97** **26 Claims**



1. A pressure device for use with a balloon type angioplasty catheter, comprising:

a housing having a proximal end and a distal end;

a syringe fitted within the housing;

means attached to the syringe for connecting an angioplasty catheter to the syringe;

means extending proximally from the syringe for pressurizing the syringe;

a thumb button pivotally carried by the housing adjacent the distal end of the housing for controlling the means for pressurizing;

means slidably mounted in the housing for locking the means for pressurizing, wherein the thumb button controls the means for locking;

means connected to the thumb button and the means for locking for linking the means for locking to the thumb button, wherein the thumb button controls the means for linking;

means fluidly connected to the syringe for measuring pressure;

means connected to the means for measuring pressure for illuminating the means for measuring pressure; and

wherein the means for illuminating are operably connected to the means for locking such that an initial actuation of the means for locking actuates the means for illuminating.

---

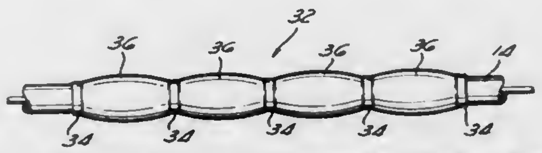
### 5,019,042
### BALLOON CATHETERS

**Harvinder Sahota, 3861 Wisteria, Seal Beach, Calif. 90740**

**Division of Ser. No. 276,375, Nov. 23, 1988, Pat. No. 4,983,167. This application Apr. 18, 1990, Ser. No. 510,470**

**Int. Cl.⁵ A61M *29/00***

**U.S. Cl. 604—101** **1 Claim**



1. A dilation catheter for negotiating and dilating tortuous vessels within the body, comprising:

an axially elongate catheter shaft, suitable for insertion into a body lumen; and

a multi-lobed dilatation balloon, secured to said catheter shaft, said multi-lobed dilatation balloon being comprised of alternating regions of thick and thin balloon material, wherein said thin portions readily expandable when connected to a source of pressurized fluid so as to radially expand said body lumen, and wherein said thick portions are resistant to expansion, so as to more readily conform to the contours of the body lumen.

---

### 5,019,043
### SYRINGE WITH NEEDLE RETRACTION CAPABILITY

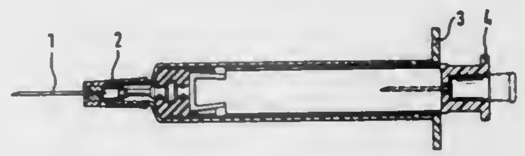
**Vicente M. Segui Pastor, Cuenca, 85, E-46008 Valencia; Amando Galiana Sabater, and Enrique Segui Pastor, both of Valencia, all of Spain, assignors to Vincent Miguel Segui Pastor, Valencia, Spain**

**Filed Jul. 27, 1989, Ser. No. 385,373**

**Claims priority, application Spain, Aug. 5, 1988, 8802473**

**Int. Cl.⁵ A61M *5/00***

**U.S. Cl. 604—110** **20 Claims**



1. A syringe, comprising:

a casing having a forward and rearward end and openings formed in the rearward end;

a plunger slidable within said casing and having a forward and rearward end, the rearward end of said plunger extending outside of the rearward end of said casing, said plunger including a main body and a piston formed at the forward end of said main body;

attachment means for attaching said plunger with a needle, said attachment means being connected to said piston and including a first member extending forwardly and out away from said piston and a second member extending rearwardly of said piston, said second member including outwardly biased locking lugs adapted to extend through apertures formed in the main body of said plunger; and

said outwardly biased lugs being dimensioned and arranged such that, when said plunger is retracted to the rearward end of said casing, said outwardly biased lugs are received in locking fashion within said openings formed in said casing.

---

### 5,019,044
### SAFETY HYPODERMIC SYRINGE

**Chien-Hua Tsao, No. 326, Pa Te Road, Sec. 2, Taipei, Taiwan**

**Filed Aug. 14, 1989, Ser. No. 393,390**

**Int. Cl.⁵ A61M *5/00***

**U.S. Cl. 604—110** **4 Claims**

1. A safety hypodermic syringe, including:

a barrel for containing liquid medicine, having a rear opening and a front neck portion in reduced diameter;

a clamping means fixed set in said neck portion comprising resilient clamping portion constantly clamping inward;

a holder plate integrally incorporated with a hypodermic needle, said holder plate being firmly retained by said clamping portion of said clamping means to let said hypodermic needle protrude beyond said barrel to become in a ready position for injection;

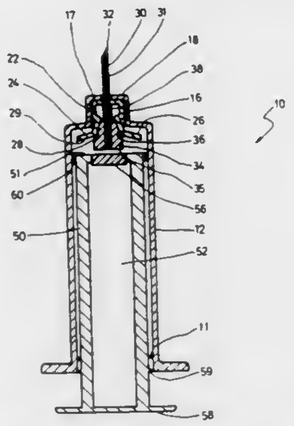
a spring means being to give a spring force to said hypodermic needle connected holder plate so as to let said hypodermic needle connected holder plate slide along axial way; and

a hollow plunger having at lest a part inserted through said rear opening and received in said barrel to slide therein by

VOL 1126 ISS 4 MY 28 1991 UMI

means of pressure force, said plunger comprising a front end surface having thereon an axial hole communicating with its inner chamber, said axial hole being blocked up by a rubber plug;

characterized in that when said plunger is pushed toward the front end of said barrel, said rubber plug is squeezed out of said axial hole by said holder plate, and said plunger having its front end press on said clamping means to let said clamping portion be squeezed to open so as to let said holder plate be released from the constraint of said clamping means.



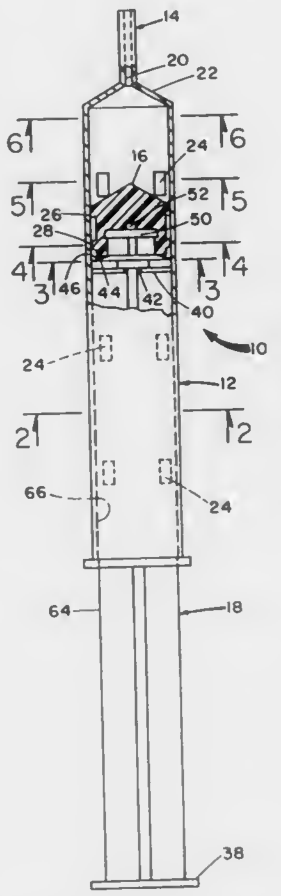
---

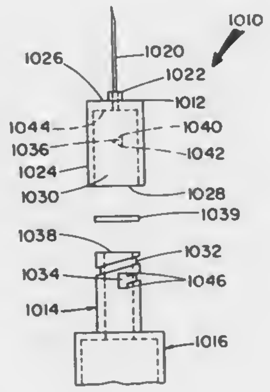
## 5,019,045

## HYPODERMIC SYRINGE WITH A LOCKING NEEDLE ASSEMBLY AND SYRINGE COMBINATION

**Sang D. Lee, 394 Lawton St., Cliffside Park, N.J. 07010**
**Filed Mar. 24, 1989, Ser. No. 328,165**
**Int. Cl.$^{5}$ A61M** *5/00*
**U.S. Cl. 604—110** **19 Claims**

1. A syringe comprising:
- a) a body portion with an inner surface defining a volume for holding a fluid;
- b) a plunger conforming to the inner surface of said body portion so as to fit tightly and to form a seal separating the volume on either side of said plunger within said body portion;
- c) a driver onto which said plunger is secured, said plunger being positioned within said body portion and said driver extending out of said body portion through an opening in said boy portion at one end;
- d) a needle support means positioned at the end of said body portion opposite the end through which said driver extends, said needle support means defining a channel allowing the transfer of fluid within said boy portion to a needle or needle assembly mounted on said needle support;
- e) syringe locking means located on the inner surface of said body portion; and
- f) syringe engagement means adapted to matingly engage said syringe locking means, said engagement means being associated with said driver, separate from said plunger and advanceable towards said needle support, and over said locking means, and being retained at the needle support end of said body portion upon the engagement of said locking means, said engagement coinciding with fluid, initially present in the volume defined by said body portion, being substantially discharged, wherein said engagement means comprises adjacent first and second members, said first and second members being positioned such that said first member prevents said second member from flexing sufficiently to return over said syringe locking means after





---

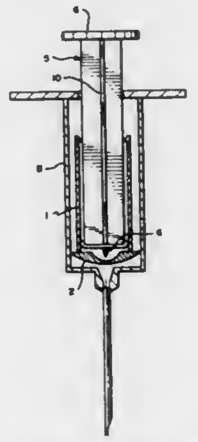
## 5,019,046

## SINGLE USE SYRINGE

**Reinhard Kobler, Munich, Fed. Rep. of Germany, assignor to Inter System Verfabrenstechnik GmbH, Fed. Rep. of Germany**
**Filed Mar. 29, 1990, Ser. No. 465,781**
**Claims priority, application Fed. Rep. of Germany, Jan. 19, 1989, 3901484**
**Int. Cl.$^{5}$ A61M** *5/00*
**U.S. Cl. 604—110** **7 Claims**

1. Single use syringe having a barrel, at which there is provided a needle, and in which a piston is arranged, which is sealingly slideable, relative thereto, wherein the piston comprises a cylindrical hollow body which is open at one end and is closed at on opposite end by a front wall which is weaker in its mid-section that at its peripheral area and a plunger which is arranged in the cylindrical hollow body in a slideable manner relative thereto, said piston having a punch on a front plate at a center part thereof that faces the weaker midsection of the front wall of the cylindrical hollow body, wherein a locking device is provided for holding the plunger within the cylindrical hollow body when the plunger is at a distance from the front wall of the cylindrical hollow body; wherein a space is formed between the front wall of the cylindrical hollow body and the front plate of the plunger; and wherein the front plate of the plunger essentially spans the cross sectional area of the cylindrical hollow body and has at least one opening through which said space between the front wall of cylindrical hollow

body and front plate is connected to outside air; whereby said front plate is punctured by said punch during injection and the ability for fluids to be aspirated by said syringe thereby destroyed.

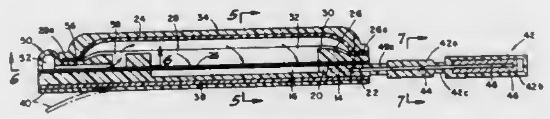


---

## 5,019,047

## FLUID DELIVERY APPARATUS

**Marshall S. Kriesel, St. Paul, Minn., assignor to Science Incorporated, Bloomington, Minn.**
**Filed Jun. 16, 1989, Ser. No. 367,304**
**Int. Cl.$^{5}$ A61M** *37/00*
**U.S. Cl. 604—132** **32 Claims**



18. A device for use in infusing medicinal fluids into a patient at a controlled rate comprising:
- (a) a thin, generally planar base having a fluid conduit formed therein, said fluid conduit terminating in a fluid outlet;
- (b) means for forming a fluid chamber comprising a thin, generally planar distendable film member superimposed over said base, said member being distendable out of plane by liquid introduced into said fluid chamber under pressure to establish internal stresses in said member said stresses tending to return said member to a less distended configuration;
- (c) a thin, generally planar, permeable member of a size substantially corresponding to the size of said base disposed internally of said chamber for controlling the flow of fluid toward said fluid conduit in said base;
- (d) a distendable film member engaging element disposed within said chamber intermediate said permeable member and said distendable film member, said distendable film member engaging element comprising an upstanding protuberance provided with a fluid flow chamber in communication with said fluid conduit in said base; and
- (e) a hollow needle integrally formed with said base in operable communication with said fluid outlet.

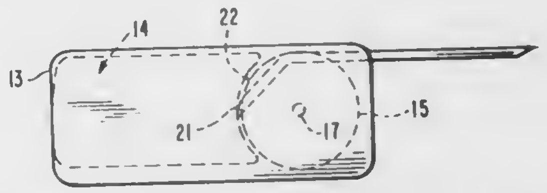
---

## 5,019,048

## UNIT DOSE SYRINGE WITH ROTATABLE NEEDLE

**George D. Margolin, 308 Vista Baya, Costa Mesa, Calif. 92627**
**Filed Jan. 10, 1990, Ser. No. 463,235**
**Int. Cl.$^{5}$ A61M** *5/32*
**U.S. Cl. 604—153** **15 Claims**

1. A syringe for administering fluids, said syringe comprising a sealed, hand-squeezable receptacle including the fluid to be administered and a needle permanently attached to the outside of said receptacle, said syringe also including a compartment for maintaining said needle in a protected position, said syringe including means for rotating said needle, said means for rotating being of a geometry to permit movement of said needle controllably between said protected position and an exposed position for administering said fluid independently.

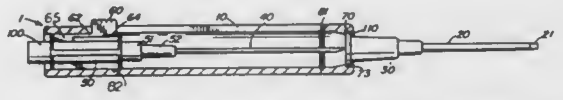


---

## 5,019,049

## INTRAVENOUS CATHETER AND INSERTION DEVICE

**Michael L. Haining, 6731 Ashmore, Houston, Tex. 77069**
**Filed Feb. 20, 1990, Ser. No. 482,014**
**Int. Cl.$^{5}$ A61M** *5/178*
**U.S. Cl. 604—165** **3 Claims**



1. An intravenous catheter insertion device comprising:
- (a) a hollow cylindrical barrel of semi-rigid plastic material having an insertion end and a distal end;
- (b) a catheter insertion needle carrier slidably mounted within said barrel;
- (c) a catheter insertion needle fixedly attached to said needle carrier and oriented toward said insertion end;
- (d) an intravenous catheter removably secured about said needle, said intravenous catheter comprising a rigid hollow conical base and a flexible hollow tube extending from the narrow end of said base, said base having a circumferential flange extending about the wide end;
- (e) sliding means mounted on said needle carrier extending exterior of said barrel for sliding said needle carrier with said needle and said catheter within said barrel to expose or retract said needle with said catheter; and
- (f) a locking surface at said insertion end having an inner diameter slightly smaller than the outer diameter of said circumferential flange to prevent retraction of said catheter after exposure.

---

## 5,019,050

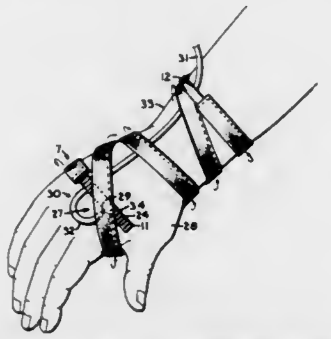
## SECURING DEVICE AND METHOD

**Karen K. Lynn, 10617 E. 26th Terrace, Independence, Mo. 64052, and Susan L. Higgins, 5193 SW. Raintree Pkwy., Lee's Summit, Mo. 64082**
**Filed May 30, 1989, Ser. No. 358,415**
**Int. Cl.$^{5}$ A61M** *5/32*
**U.S. Cl. 604—179** **21 Claims**

1. A securing device which includes:
- (a) a strap body with first and second edges, an outer material layer, an intermediate, resilient material layer, and a backing material layer;
- (b) first fastening means associated with one of said ends and including adhesive fastening means;
- (c) second fastening means associated with the other of said ends and including mechanical fastening means;
- (d) said body being folded longitudinally on itself with said backing material layer positioned in opposed relation to

VOL
1126
ISS
4
MY
28
1991
UMI

itself and substantially surrounded by said intermediate material layer; and



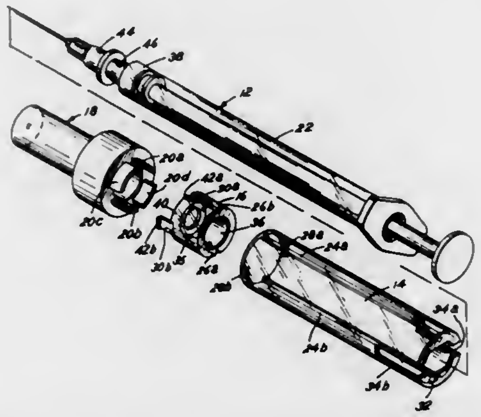
(e) said outer material layer substantially surrounding said intermediate material layer; and

(f) means for maintaining said body in its folded position.

---

### 5,019,051
### HYPODERMIC NEEDLE GUARD

**Lawrence W. Hake, Grand Island, Nebr., assignor to Needlepoint Guard, Inc., Grand Island, Nebr.**
**Filed Mar. 2, 1989, Ser. No. 317,733**
**Int. Cl.5 A61M** *5/32*
**U.S. Cl. 604—198** **8 Claims**



1. A needle guard for a hypodermic syringe assembly of the type including a hypodermic needle and a syringe barrel having a lead portion adjacent the hypodermic needle, the needle guard comprising a separate assembly which is attachable to the syringe assembly and which in combination therewith maintains either a non-protective or an irreversible protective configuration for the needle, said needle guard comprising in combination:

a separate, attachable fitting having an exterior portion and an interior portion, the interior portion being adapted to cooperatively mount in a fixed position on the lead portion of the barrel by frictionally, removably engaging the lead portion of the barrel;

a hollow protective sleeve on the fitting, said sleeve having an interior surface adapted to coact with the fitting, an exterior surface, a distal end and a proximal end;

guide means for slidably connecting the interior surface of said sleeve and the exterior portion of said fitting, said sleeve thereby being movable on the fitting axially in the direction of the length of the needle between a non-protective retracted position exposing the needle and a protective, extended position covering the needle; and

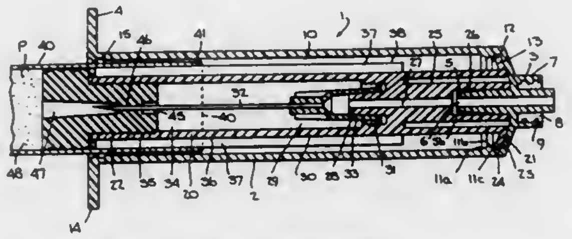
means for irreversibly locking said sleeve only in the protective, extended position relative to said fitting, whereby axial and rotational movement of the sleeve relative to the fitting is prevented, and the sleeve in the protective, extended position protrudes beyond the tip of the needle such that the sleeve defines a guard which irreversibly prevents further access to the needle once the sleeve has been moved to the extended position;

wherein the means for irreversibly locking the sleeve in the extended position is comprised of at least one elastic axial rib located on the exterior surface of the fitting and terminating with an outwardly extending tang, the tang being biased radially outward by the rib to engage the sleeve, and the sleeve adapted to irreversibly engage the tang when the sleeve is axially positioned in the extended position.

---

### 5,019,052
### BIPARTITE INJECTOR DEVICE

**John Rohrbough, Walnut, Calif., assignor to David Bull Laboratories Pty. Ltd., Mulgrave, Australia**
**Continuation-in-part of Ser. No. 405,989, Sep. 12, 1989. This application Nov. 20, 1989, Ser. No. 439,333**
**Int. Cl.5 A61M** *5/24*
**U.S. Cl. 604—203** **13 Claims**



1. Bipartite injector device comprising

a longitudinal hollow outer shell having a central axis and including a front closed end formed by a generally radial front wall, a rear open end, a cylindrical inner wall forming an interior adapted to receive coaxially through the open end and guide for movement relative thereto a cylindrical medicament vial closed by a penetrable stopper, a central hub extending through the closed end from an external hub spout to an internal hub circular seat in the shell interior and having a bore extending therethrough from the spout to the seat, a radially inwardly directed circular constriction ring on the inner wall adjacent the closed end and a radially inwardly facing circular locking groove defined axially on the inner wall between the ring and the radial front wall forming the closed end, the inner wall, ring, groove and seat being coaxial relative to the shell central axis,

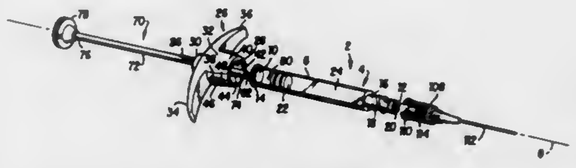
a cylindrical inner sleeve having a central axis and including a front cantilever mounting end having a radially outwardly directed flange terminating peripherally in a circular compression rim, a central needle mounting portion and a rear free end having a cylindrical connection socket adapted to connect stationarily such stopper thereat, and a hollow needle having a front circular collar flange and a rear pointed end, the sleeve, rim, needle mounting portion and socket being coaxial relative to the sleeve central axis,

the sleeve being sized for location in the shell sufficiently radially inwardly of the inner wall to permit insertion of the vial therebetween, the rim being sized for compression displacement through the ring and snap fit locking in the groove to mount the sleeve coaxially in the shell with the sleeve front end in cantilever stationary connection with the shell closed end, the sleeve flange being sized and arranged to abut stationarily against the radial front wall forming the shell closed end when the rim is in snap fit locking engagement with the groove, and the needle mounting portion being arranged to mount the needle coaxially and in fluid tight condition relative to the bore and sleeve to flow communicate the collar flange with the bore and to dispose the needle pointed end coaxially in the socket to penetrate such stopper for protected fluid tight flow between the vial and spout through the needle and bore.

---

### 5,019,053
### HYPODERMIC SYRINGE

**J. Kenneth Hoffman, Warren, Pa., and Joseph W. Blake, III, New Canaan, Conn., assignors to GTE Products Corporation, Stamford, Conn.**
**Filed Oct. 23, 1989, Ser. No. 425,138**
**Int. Cl.5 A61M** *5/315*
**U.S. Cl. 604—220** **1 Claim**



1. A hypodermic syringe, comprising;

a cartridge including an elongated tubular body extending along a longitudinal axis from a first open ind to a second open end, said first open end including an external flange and said second open end including external threads and an internal septum, said cartridge further including a piston therein slidable along said longitudinal axis;

a finger grasp extending along said longitudinal axis from one open end which communicates with an opposite open end, said first open end of said cartridge extending into said one open end of said finger grasp;

holding means associated with said finger grasp and said external flange for holding said cartridge in place relative to said finger grasp, said holding means further including at least one locking member which extends into said one open end of said finger grasp and engages said external flange of said cartridge;

a plunger comprising an elongated rod having one portion for extension through said opposite open end of said finger grasp for coupling to said piston, and an opposite portion which includes a head;

a hub extending along said longitudinal axis and including internal threads for fastening said hub to said cartridge by means of external cartridge threads; and

a needle attached to said hub and extending through said hub along said longitudinal axis and having a proximal end extending from said hub in one direction of said longitudinal axis for penetrating said internal septum when said internal hub threads are threaded upon said external cartridge threads, and an opposite distal end extending from said hub in an opposite direction of said longitudinal axis;

said finger grasp including (1) a central hub which extends in the direction of said longitudinal axis from said one open end to said opposite open end, and (2) opposing wings extending from said central hub in a generally radial direction relative to said longitudinal axis, said at least one locking member extending through said central hub into said one open end;

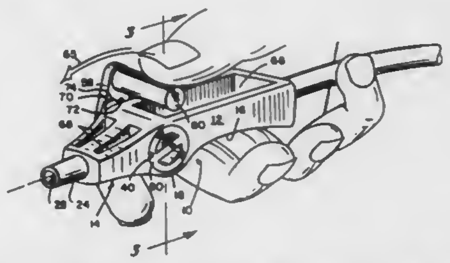
said central hub including at least one aperture extending therethrough, and wherein each locking member of said at least one locking member extends through a corresponding aperture of said at least one aperture into a cavity of said central hub;

said central hub and each locking member being formed by a unitary structure, and wherein each locking member extends into said cavity and is resiliently biased toward said longitudinal axis.

---

### 5,019,054
### MEDICAL DEVICE VALVING MECHANISM

**Thomas P. Clement, and David P. Weber, both of Bloomington, Ind., assignors to Mectra Labs, Inc., Bloomington, Ind.**
**Filed Nov. 6, 1989, Ser. No. 432,084**
**Int. Cl.5 A61M** *5/00*
**U.S. Cl. 604—248** **20 Claims**

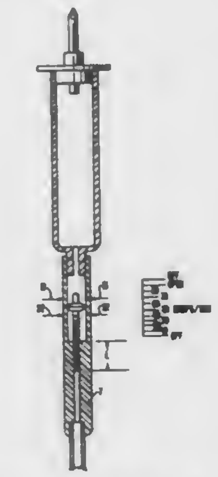


1. A medical device valving mechanism comprising a molded plastic, one-piece, elongated valve body molded to have a longitudinally extending body shaped to be gripped and securely held in a user's hand leaving the hand's thumb free for valve operational movement, said body providing at least one fluid passageway extending longitudinally therethrough, said body also providing a cylindrical opening extending transversely therethrough and intercepting said at least one passageway, a cylindrical molded plastic, one-piece rotor for snug slidable and rotational insertion into said cylindrical opening to block said at least one passageway, said rotor being rotatable between valve opening and valve closing positions, said rotor having at least one transaxial passageway therethrough which opens said at least one fluid passageway through said valve body when said rotor is in said valve opening position and which closes said at least one fluid passageway when said rotor is in said valve closing position, thumb-actuated means connected to said rotor for rotating said rotor, said actuated means being disposed above said valve body and said rotor for convenient thumb movement of said rotor, and wherein the shaped body is to be gripped and held by fingers of the user's hand at points located on the shaped body below an upstream and a downstream side of the rotor with the fingers of the user's hand being located below the thumb-actuated means so as to provide the free thumb for valve operational movement.

---

### 5,019,055
### FLOW REGULATOR AND METHOD

**Matthew O'Boyle, 310 Hall Hill Rd., Sommers, Conn. 06071**
**Filed Dec. 22, 1989, Ser. No. 454,983**
**Int. Cl.5 A61M** *5/00*
**U.S. Cl. 604—249** **24 Claims**



1. A flow regulator for regulating the flow of liquids to be

VOL
1126
ISS
4
MY
28
1991
UMI

administered parenterally to a patient comprising a first member having a flow passage therein with an inlet and an outlet for a liquid to be administered parenterally to a patient, a second member arranged to be adjustably telescoped in the passage of the first member, said first and second members being constructed such that the second member can be arranged in the passage of the first member to partially obstruct the flow passage to form a flow rate controlling channel which restricts the flow rate as a function of the length of said channel, the length of the flow rate controlling channel being adjustable, by changing the relative position of the first and second members, and means for changing the relative position of the first and second members to adjust the length of the flow rate controlling channel and thereby the flow rate of liquid flowing through said flow regulator, wherein said means for changing comprises a flexible wall of said first member which defines at least a portion of the flow passage and which transmits pressure applied to the outside of the first member to the second member for adjusting its position in the passage to adjust the flow rate of liquid flowing through the regulator.

---

### 5,019,056

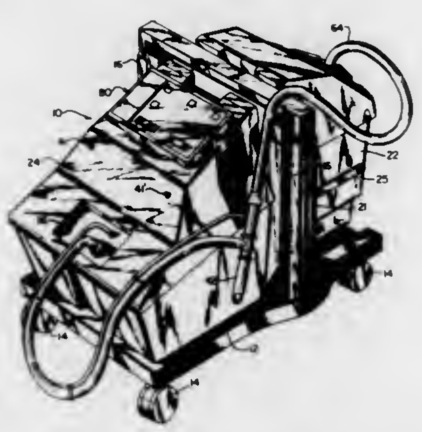
## BOWEL CARE APPARATUS

**Alan R. Lee, Littleton; David P. Mead, Castle Rock; Robert A. Null, Littleton; Thomas Shilling, Aurora, and Ray Atchley, Golden, all of Colo., assignors to Aegis Medical, Inc., Littleton, Colo.**

**Filed Sep. 22, 1988, Ser. No. 247,734**

**Int. Cl.$^5$ A61M *5/00***

**U.S. Cl. 604—257** **13 Claims**



1. Colonic lavage apparatus comprising: a spectrum insertable into the rectum of a patient for lavaging the patient's colon and extracting waste matter therefrom;

a source of liquid under pressure including fill line means communicating with said speculum for delivering liquid under pressure through said speculum into the colon;

drain line means communicating with said speculum for drawing said liquid and extracted waste matter from the colon; and

valve means interposed between said speculum and said drain line means including means communicating with said liquid pressure source whereby said valve means is directly responsive to the pressure of said liquid in said fill line means exceeding the pressure of said liquid in said speculum to move to a closed position in order to prevent the flow of said liquid therethrough and is directly responsive to the pressure of said liquid in said speculum exceeding the pressure of said liquid in said fill line means to move to an open position for draining said liquid and extracted waste matter from the colon of the patient.

---

### 5,019,057

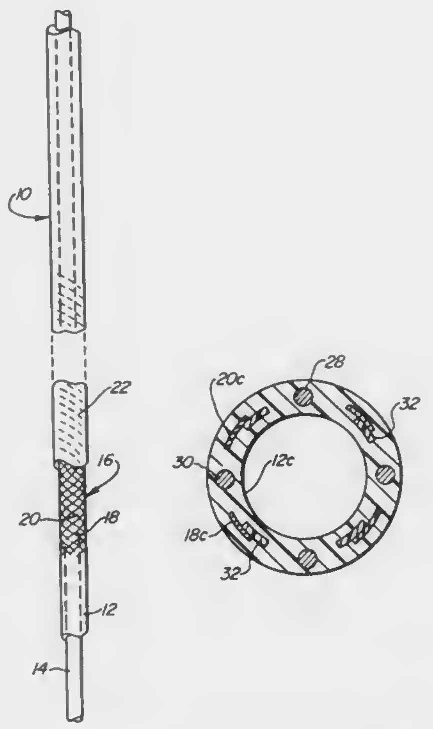
## CATHETER HAVING REINFORCING STRANDS

**Csaba Truckai, Miami, Fla., assignor to Cordis Corporation, Miami Lakes, Fla.**

**Filed Oct. 23, 1989, Ser. No. 424,927**

**Int. Cl.$^5$ A61M *25/00***

**U.S. Cl. 604—282** **11 Claims**



1. A flexible catheter which comprises at least one resilient, tubular layer in telescoping relation with a tubular sheath made of essentially helically disposed crossing strands in braided relation, at least one of said strands having a width that substantially exceeds its height and at least one of said strands being of substantially circular cross section.

---

### 5,019,058

## APPLICATOR MITT

**Duane L. Storandt, P.O. Box 6813, St. Louis, Mo. 63144**

**Continuation-in-part of Ser. No. 9,053, Jan. 27, 1987, abandoned. This application Jun. 28, 1988, Ser. No. 212,503**

**Int. Cl.$^5$ A61M *35/00***

**U.S. Cl. 604—290** **6 Claims**

1. A packaged applicator mitt formed from two laminated elongated sheets, the first laminated sheet including a first ply of a non-woven fabric layer, and, as a second ply bonded thereto, a thermoplastic film, the second laminated sheet being wider than the first sheet and including, as a first ply, a support layer capable of being printed on, and, as a second ply bonded thereto, a thermoplastic film, the first laminated sheet being folded with the fabric layer out and a portion of the sides thereof weld sealed to form an inner pouch, the wider second sheet being folded around the pouch so formed with the backing printable layer out, and the sides thereof peel sealed to form an outer pouch, the nonfolded open end of the outer pouch peel sealed forming an inner pouch sealed-in within the outer pouch.

---

### 5,019,059

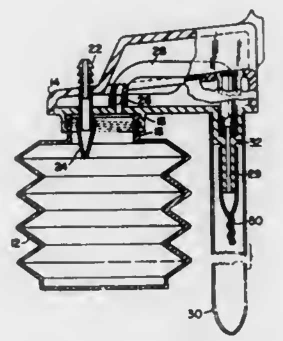
## APPARATUS AND METHOD FOR COLLECTING BODY FLUIDS

**Edward M. Goldberg, Glencoe, and Lev Melinyshyn, Mt. Prospect, both of Ill., assignors to Uresil Corporation, Skokie, Ill.**

**Continuation-in-part of Ser. No. 941,769, Dec. 15, 1986, abandoned. This application Aug. 2, 1988, Ser. No. 228,935**

**Int. Cl.$^5$ A61M *1/00***

**U.S. Cl. 604—317** **10 Claims**



1. A closed drainage apparatus for collecting and administering to a patient liquids suctioned from body and tissue cavities comprising:

suctioning means, in communication with the body and tissue cavities, for suctioning and receiving liquids and gases from the cavities, said suctioning means comprising a resilient container which is compressible to create a suctioning force as it returns to its normal expanded condition;

reservoir means, for receiving and storing excess liquids from said suctioning means;

a conduit, in communication with said reservoir, for transporting liquids from said reservoir to the patient; and

means, circumscribing said reservoir means, for applying pressure to said reservoir means to drive the collected fluids from said reservoir means through said conduit, said pressure applying means comprising an impervious flexible bag which circumscribes said reservoir means to establish an airtight pressure interface in the space between the outside wall of said reservoir means and the inside wall of said container, and means for inflating said airtight pressure interface.

---

### 5,019,060

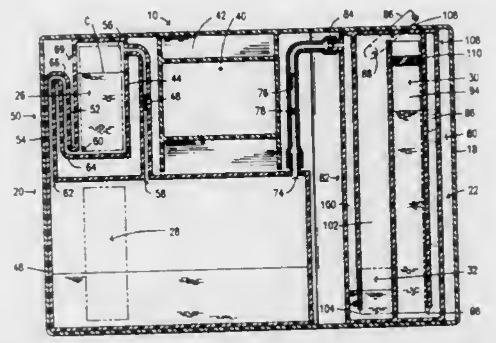
## DRAINAGE BLOOD COLLECTION APPARATUS

**Carl C. Goosen, 2415 Shoreham Rd., Orlando, Fla. 32803**

**Filed Feb. 10, 1989, Ser. No. 308,540**

**Int. Cl.$^5$ A61F *5/44***

**U.S. Cl. 604—319** **20 Claims**



1. A liquid collection device for use with various surgical procedures to control and monitor the rate of flow of liquid from body cavity such as the pleural cavity comprising a liquid collection section including an upper liquid flow rate monitoring chamber to be coupled to the body cavity by an inlet fluid conduit and a lower liquid accumulation reservoir in fluid communication therewith, a fluid outlet feed apparatus coupled between said upper liquid flow rate monitoring chamber and said lower liquid accumulation reservoir to dynamically feed a predetermined volume of liquid to said lower liquid accumulation reservoir when said predetermined volume of liquid is received in said upper liquid flow rate monitoring chamber, said fluid outlet feed apparatus comprising an air vent tube coupled between said upper liquid flow rate monitoring chamber and said lower liquid accumulation reservoir through a first and second air vent port respectively and a liquid feed tube coupled to said upper liquid flow rate monitoring chamber and said lower liquid accumulation reservoir through a first and second liquid port respectively.

---

### 5,019,061

## TAMPON AND A METHOD FOR ITS MANUFACTURE

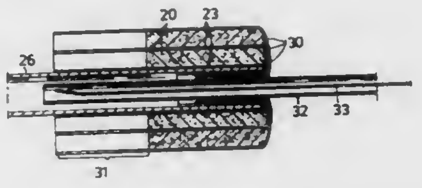
**Ebbe Hodén, Mariefred, Sweden, and Maja Mokvist, Snellville, Ga., assignors to AB Bergasa Industrier, Mariefred, Sweden**

**Filed Jan. 30, 1990, Ser. No. 472,176**

**Claims priority, application Sweden, May 30, 1989, 8901936**

**Int. Cl.$^5$ A61F *13/15, 13/20***

**U.S. Cl. 604—358** **15 Claims**



1. A tampon, comprising a body of substantially cylindrical external shape and obtained by winding an elongated starting-blank formed from a strip of thin, liquid-permeable layer material having a largest width greater than the length of the tampon and a string of absorbent material placed on the strip substantially symmetrically in relation to the longitudinal axis of said strip and having a width which corresponds substantially to the length of the tampon, several turns around a mandrel which extends transversely to the longitudinal direction of the blank, therewith to form a roll, and compressing the roll predominantly in its radial direction, wherein said turns comprise single layers of said strip with a filling formed from the string of absorbent material located between said layers and wherein such edge parts of the layer-material strip which in the wound state of the blank extend externally to both sides of the string are twisted inwardly and accommodated in a space located inwardly of the innermost turn.

---

### 5,019,062

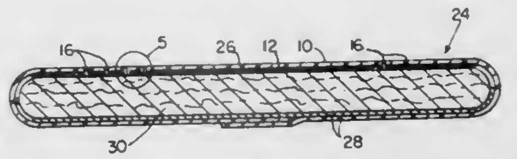
## BICOMPONENT MATERIAL

**Leslie D. Ryan, Millville; Mark J. Steinhardt, Loveland; Milton D. Spahni, Okeana, and James C. Baird, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jun. 23, 1988, Ser. No. 210,672**

**Int. Cl.$^5$ A61F *13/15***

**U.S. Cl. 604—359** **38 Claims**



20. A disposable absorbent article for collecting liquids discharged from a source and substantially containing mal-

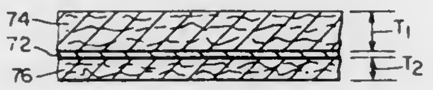
VOL
1126
ISS
4
MY
28
1991
UMI

odors generated by the collected liquids, said article comprising:
- (a) an absorbent core means for absorbing liquids, said core means having a first face and a second face opposed thereto;
- (b) a liquid impermeable backsheet overlaying said first opposed face of said core means;
- (c) a liquid permeable topsheet overlaying said second opposed face of said core means; and
- (d) a bicomponent film laminate disposed between said topsheet and said backsheet, said laminate comprising a first polymeric lamina exhibiting a pattern of discrete apertures therein, said first lamina having an exterior face and an interior face opposed thereto; said laminate further comprising a second active lamina comprising an odor control means, said second lamina having a first face adjacent said interior face of said first lamina and a second face opposed thereto, said second face of said second lamina being directionally oriented toward said core means, said second lamina also exhibiting a pattern of discrete apertures substantially coinciding with said discrete apertures of said first lamina, whereby said laminate includes means for permitting liquids deposited on said exterior face of said first lamina to pass through said discrete apertures in said laminate to said core means without substantially wetting said second lamina, said laminate also including means substantially preventing gaseous malodors generated by the absorbed liquids from passing through said laminate in a direction opposite to the direction of transmission of deposited liquids without substantial exposure of the gaseous malodors to said second face of said second lamina.

---

### 5,019,063
### ABSORBENT ARTICLES CONTAINING MECHANICAL PULP AND POLYMERIC GELLING MATERIAL

**Mario S. Marsan, Cincinnati, and Leonard R. Thompson, Fairfield, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**
**Filed Oct. 30, 1989, Ser. No. 428,524**
**Int. Cl.$^5$ A61F** *13/15*
**U.S. Cl. 604—368** **12 Claims**

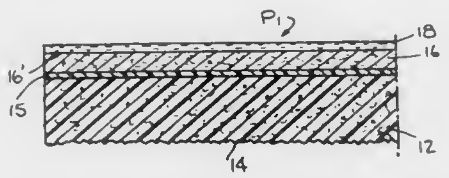


1. A disposable, absorbent diaper comprising:
- (a) a topsheet;
- (b) a liquid impervious backsheet associated with said topsheet; and
- (c) an absorbent core disposed between said topsheet and said backsheet, said absorbent core having:
  - (i) a dusting layer of mechanical pulp fibers;
  - (ii) a continuous primary layer of mechanical pulp fibers containing from about 8% to about 60%, on a total primary layer dry weight basis, of discrete particles of polymeric gelling material; and
  - (iii) a water-permeable core reinforcing layer disposed between said dusting layer and said primary layer; wherein: said mechanical pulp fibers have an average fiber length of at least about 1.9 mm and are characterized by a Distintegration State of at least about 85%; said dusting layer has a basis weight of between about 0.01 $g/cm^2$ and about 0.20 $g/cm^2$ and density of between about 0.06 $g/cm^3$ and about 0.30 $g/cm^3$ and said primary layer has a basis weight of between about 0.01 $g/cm^2$ and about 0.20 $g/cm^2$ and a density of between about 0.06 $g/cm^3$ and about 0.30 $g/cm^3$ and said absorbent core is oriented such that said primary layer is disposed toward said topsheet and said dusting layer is disposed toward said backsheet.

---

### 5,019,064
### LOW FRICTION MULTILAYER PAD WITH FOAM BACKING

**Kasriel Eilender, 305 E. 86th St., New York, N.Y. 10028**
**Continuation-in-part of Ser. No. 297,977, Jan. 17, 1989, Pat. No. 4,959,059. This application May 29, 1990, Ser. No. 530,189**
**Int. Cl.$^5$ A61F** *13/00, 13/15*
**U.S. Cl. 604—378** **19 Claims**

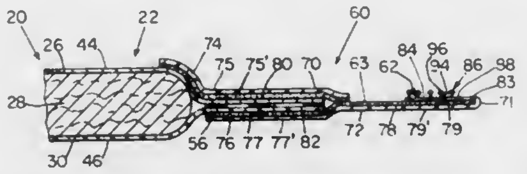


1. A multilayer low friction pad for reducing shear and friction forces on a person's body, and for preventing and treating sores on a person's body caused by shear forces, friction, pressure, chafing and moisture, comprising:
- a flexible first layer formed of a bulky foam material which is thick enough to serve as a shock absorber for an affected part of said person's body, and to prevent said pad from crumpling and wrinkling, and to facilitate handling the pad;
- a second layer bonded to one side of said first layer, said second layer being formed of thin, tough, flexible,, nonporous material to serve as a moisture barrier for preventing moisture from reaching said first layer;
- a third layer bonded at one side thereof to said second layer, said third layer being formed of a flexible material and having a very smooth and slippery other side; and
- a fourth layer composed of a slippery lubricant applied to and covering said other side of said third layer, said other side of said third layer being sufficient slippery to cooperate with said fourth layer to reduce shear forces thereon, and provide a working surface having a coefficient of friction of negligibly low magnitude.

---

### 5,019,065
### DISPOSABLE ABSORBENT ARTICLE WITH COMBINATION MECHANICAL AND ADHESIVE TAPE FASTENER SYSTEM

**Charles L. Scripps, Brookfield, Wis., assignor to The Procter & Gamble Company, Cincinnati, Ohio**
**Continuation of Ser. No. 134,278, Dec. 17, 1987, abandoned. This application Feb. 12, 1990, Ser. No. 479,232**
**Int. Cl.$^5$ A61F** *13/15*
**U.S. Cl. 604—385.1** **31 Claims**

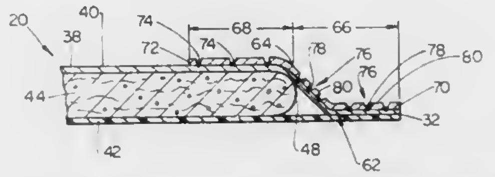


1. A disposable absorbent article comprising:
- a body portion having an inside surface, an outside surface opposite of said inside surface, longitudinal edges, a first end region, and a second end region opposite of said first end region, and comprising a liquid pervious topsheet, a liquid impervious backsheet joined to said topsheet, and an absorbent core disposed between said topsheet and said backsheet; and
- a tape fastener system positioned on said body portion and comprising
  - (a) a tape tab disposed adjacent each longitudinal edge in said first end region, each of said tape tabs comprising
    - (i) a fixed portion attached to said body portion,
    - (ii) a connective portion joined to said fixed portion adjacent said longitudinal edge, said connective portion having a fastening surface, a backing surface opposite of said fastening surface, and a distal edge spaced from said longitudinal edge of said body portion,
    - (iii) a first mechanical fastening means for mechanically engaging complementary elements to form a closure for the absorbent article, said first mechanical fastening means comprising a first fastening element joined to and disposed on a first area of said fastening surface, said first fastening element having elements capable of mechanically engaging complementary elements, and
    - (iv) adhesive securement means associated with and disposed on at least a second area of said fastening surface of said connective portion of said tape tab for adhesively securing at least said second area of said tape tab to another portion of the absorbent article to at least form a closure for the absorbent article so that each of said tape tabs has a combination mechanical and adhesive closure mechanism; and
  - (b) at least one landing member disposed on said outside surface in said second end region, said landing member comprising a second mechanical fastening means for mechanically engaging complementary elements to form a closure with said first mechanical fastening means for the absorbent article, said second mechanical fastening means comprising a second fastening element having elements mechanically engageable with said elements of said first fastening element.

---

### 5,019,066
### ABSORBENT ARTICLE HAVING A WAISTPANEL

**Mary E. Freeland, Norwood, and Ted L. Blaney, West Chester, both of Ohio, assignors to The Proctor & Gamble Company, Cincinnati, Ohio**
**Filed May 18, 1989, Ser. No. 353,923**
**Int. Cl.$^5$ A61F** *13/15*
**U.S. Cl. 604—385.2** **20 Claims**

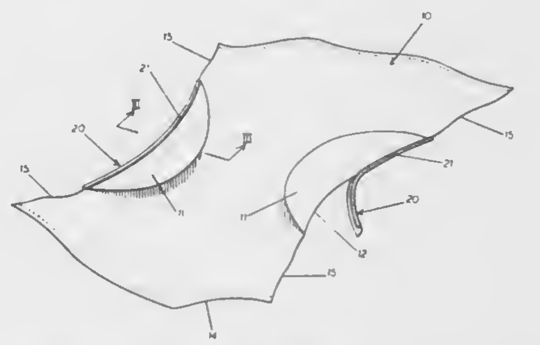


1. A unitary disposable absorbent article having longitudinal edges and end edges, the absorbent article comprising:
- a liquid pervious topsheet;
- a liquid impervious backsheet secured to said topsheet;
- an absorbent core disposed between said topsheet and said backsheet, said absorbent core having side edges and waist edges;
- a waist flap extending from and along each of said waist edges of said absorbent core to form said end edges; and
- an integral waistpanel disposed adjacent at least one of the end edges of the absorbent article, said waistpanel being positioned over and joined to said topsheet and said waist flap so that the waistpanel is positioned against the skin of the wearer during use, said waistpanel having an outward portion extending from said waist edge of said absorbent core toward said end edge, an inward portion contiguous with said outward portion and extending from said waist edge toward the center of said absorbent core, a first lateral edge joined to said waist flap, and a second lateral edge joined to said topsheet, said waistpanel having a compressed caliper under a load of about 35 $g/cm^2$ of at least about 0.075 mm.

---

### 5,019,067
### GARMENT WITH PROTECTIVE ELASTIC LEG DAMS

**Frances B. Simmons, Westminster, S.C., assignor to Gerber Childrenswear, Inc., Boston, Mass.**
**Filed Apr. 13, 1989, Ser. No. 337,574**
**Int. Cl.$^5$ A61F** *13/15*
**U.S. Cl. 604—385.2** **8 Claims**

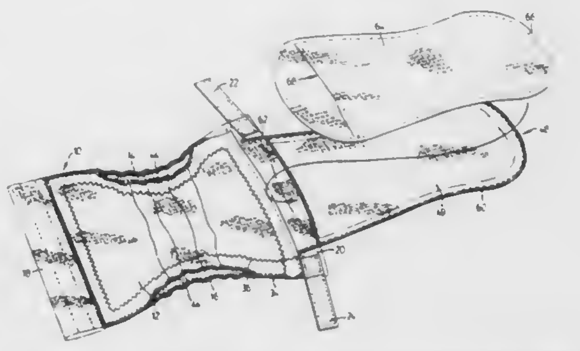


1. A protective garment comprising:
- a body having opposed side portions which have been folded inwardly towards one another, each along an arcuate fold line, said side portions being secured to the remainder of said body generally along said fold lines, whereby each fold line defines an arcuate, leg conforming side edge, and whereby each said inwardly folded side portion defines a protective dam along each side of said garment;
- an elastic strip secured generally along each said arcuate fold line in a partially stretched condition, whereby when said elastic strip is relaxed, it gathers said side edges defined by said fold lines and helps to contour said protective garment, said elastic strip on one of said side portions of said body being secured along its respective fold line by the same securing means which secures its respective inwardly folded side portion to the remainder of said body, and wherein each said elastic strip is folded over said arcuate fold line.

---

### 5,019,068
### WASHABLE DIAPER WITH ABSORBENT LINER

**Sam S. Perez, and Susan Malinowski, both of Grimsby, Canada, assignors to Diana Dolls Fashions, Inc., Stoney Creek, Canada**
**Filed Feb. 5, 1990, Ser. No. 474,946**
**Int. Cl.$^5$ A61F** *13/00*
**U.S. Cl. 604—386** **10 Claims**



1. In a washable cloth diaper of the type which has front and back waist band portions between which a multiplicity of layers of cloth extend in an intimate overlying relationship to form a highly absorbent main body portion, the improvement of, an absorbent primary liner which has a first edge secured to one of said waistband portions, said primary liner having a

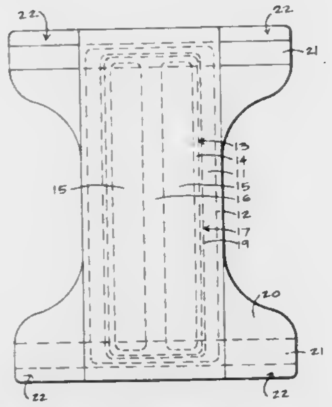
VOL
1126
ISS
4
MY
28
1991
UMI

body portion extending from said first edge which has a sufficient length to extend from the waistband portion to which it is attached to overlap a portion of said main body to cooperate therewith to increase the absorption capacity of the diaper in use, said body portion being free of attachment to the main body portion of the diaper whereby the body of the liner may be spaced from the main body of the diaper to facilitate drying of the diaper.

---

### 5,019,069
### TAPELESS SUPER-ABSORBENT DISPOSABLE DIAPER

**Walter V. Klemp, 1973 W. Clay, Houston, Tex. 77019**
**Filed Jun. 30, 1989, Ser. No. 374,506**
**Int. Cl.$^5$ A61F** *13/15*
**U.S. Cl. 604—387** **4 Claims**



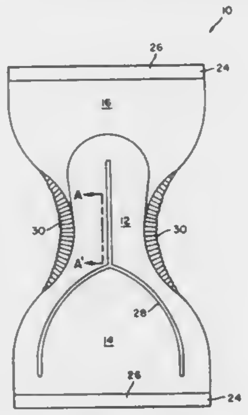
1. A disposable diaper, comprising:
a fluid permeable topsheet, a backsheet and an absorbent body interposed between said topsheet and said backsheet;
said topsheet includes longitudinal edges and a center wherein said topsheet is folded back over itself along each said longitudinal edge and bonded thereto thereby forming casings, said topsheet is again folded back over itself intermediate between said center and each of said longitudinal edge and bonded thereto thereby forming flaps which acts as fluid dams, and an elastic band positioned in each said casing;
a biodegradable means for allowing said diaper to be secured about its wearer.

---

### 5,019,070
### UNDERGARMENT SHIELD

**Margaret Ruben, 12 Longwood Dr., Saratoga, N.Y. 12866**
**Filed Mar. 1, 1988, Ser. No. 162,070**
**Int. Cl.$^5$ A61F** *13/15*
**U.S. Cl. 604—387** **2 Claims**

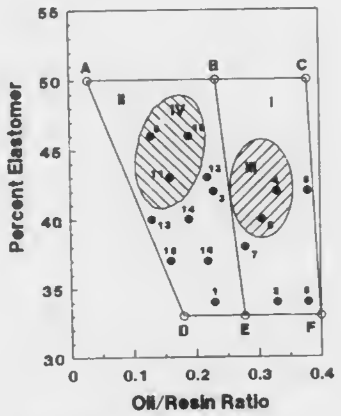
1. A disposable, removably flexible, variably orientable and absorbent undergarment shield comprising:
an essentially planar, hour glass shaped pad having one ply of liquid impermeable fabric overlaid by at least one ply of liquid absorbent composition, said liquid impermeable ply and said liquid absorbent ply being marginally bound together, said hour glass shape being defined by a first wide region, a transitional narrow crotch region, the margins of said crotch region comprising gathers, and a second wide region having absorbency enhancing means therein, said second wide region being more absorbent that said first wide region said region wide region being thicker than said first wide region;
borders at opposite edges of the wider regions, said borders being liquid impermeable and secured to said one ply of liquid impermeable fabric and said at least one ply of liquid absorbent composition, said borders being identical such that said shield may be secured to the inside of an undergarment with said second wide region placed in registry with the body front or body rear of the wearer; and
at least two adhesive strips located substantially equidistant from the edges of the shield, said strips being elongate and following said hour glass contour, said strips being of the type which are secured along one side and have a removable protective backing on the other side for revealing a pressure sensitive adhesive surface.



---

### 5,019,071
### ADHESIVE FASTENING TAB

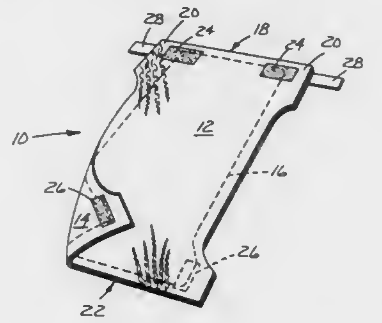
**Stephen W. Bany, St. Paul; John A. Miller, Woodbury, and Brad W. Eaton, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Dec. 12, 1989, Ser. No. 449,592**
**Int. Cl.$^5$ A61F** *13/15;* **C08J** *53/00;* **C08K** *53/00;* **C08L** *53/00*
**U.S. Cl. 604—389** **22 Claims**



1. A diaper fastening tab comprising a substrate and an adhesive layer, the adhesive composition of said adhesive layer comprising;
(a) 33 to 50 weight percent of an elastomer component comprised of a block copolymer of A blocks derived from styrene and B blocks derived from isoprene,
(b) a solid tackifying resin comprised predominantly of $C_5$ hydrocarbons, and
(c) an aliphatic oil having from about 5 to 45 percent aromatic hydrocarbon content, wherein the ratio of aliphatic oil to solid tackifying resin is from about 0.01 to 0.45 and wherein said block copolymer, tackifying resin and aliphatic oil composition ratios are defined by the cartesian space enclosed by those compositions having CMTg values of 254 to 265 Kelvin at 33 percent by weight elastomer content and CMTg values of 245 to 261Kelvin at 50 weight percent elastomer, defined by points A-F in FIG. 2.

### 5,019,072
### DISPOSABLE DIAPER THAT IS FASTENED BY CONTACT BETWEEN OVERLAPPING ADHESIVE PATCHES

**Stephen P. Polski, Shoreview, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Feb. 27, 1990, Ser. No. 485,589**
**Int. Cl.$^5$ A61F** *13/15;* **C08L** *9/00, 51/00, 23/00*
**U.S. Cl. 604—389** **16 Claims**

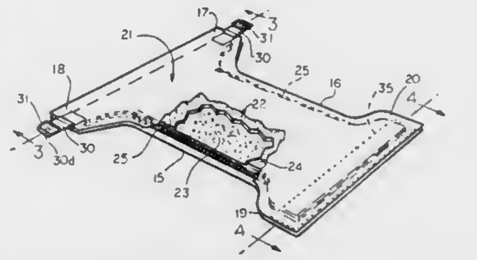


1. A refastenable disposable diaper comprising a composite including an absorbent core encased between a liquid-permeable user-contacting topsheet and an outer shell of thin thermoplastic film, the back of the composite having a pair of ears that overlap ears on the front of the diaper when the diaper is wrapped around a person, wherein said diaper has outer fastening means for holding the diaper in its wrapped position, further comprising an inner fastening means comprising peelable adhesive patches on faces of the back and front ears of the diaper that overlap when the diaper is in its wrapped position, and which places the patches in contact with each other, which patches will form bonds to each other that have resistance to shear forces and can be peeled apart by hand after 2 hours at room temperature.

---

### 5,019,073
### DISPOSABLE DIAPER WITH IMPROVED MECHANICAL FASTENING SYSTEM

**Thomas H. Roessler, Menasha, and Bruce M. Siebers, Appleton, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**
**Filed Dec. 20, 1988, Ser. No. 287,416**
**Int. Cl.$^5$ A61F** *13/15*
**U.S. Cl. 604—391** **38 Claims**

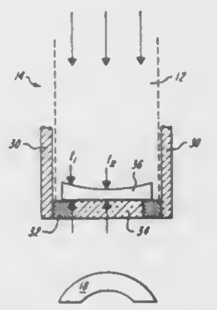


1. An absorbent article comprising:
superposed backsheet, absorbent body and topsheet elements formed into a composite having a selected shape,
opposite, longitudinal end portions of said composite providing front and rear waistband portions, respectively, adapted to encircle the body of a wearer,
means attached to said composite for fastening the front and rear waistband portions to each other comprising:
a hook and loop fastener comprising two interlocking materials, one being a hook material and the other being a loop material,
one of said two materials being attached to each of the lateral end portions of one of said waistband portions, and the other of said two materials being attached to said other of the waistband portions, the said materials being engageable to attach the front and rear waistband portions to each other upon encircling the body of the user,
said hook material comprising a polymeric base material of about 0.008–0.01 inch thickness having a flexural modulus of about 70,000 to 120,000 psi, a Shore hardness of about D-40–D-80, and the hook configurations thereof being tapered base to tip, and having a caliper in the range of about 0.035 to 0.050 inch, and
said loop material comprising a knit fabric having a raised and stabilized loop construction and a basis weight in the range of about 1.0-14 3.0 oz per square yard, said fabric including fabric yarns in which about 15%–35% of the fabric yarns are yarns having 1–15 filaments per yarn and having a yarn denier within the range of about 15–30 *d*, and in which about 65%–85% of the fabric yarns are yarns having about 10–30 filaments per yarn and a yarn denier within the range of about 30–50 *d;*
said hook and loop fastener having properties of shear of about 6.6 to 20 psi and peel of about 200–1200 grams per inch of width.

---

### 5,019,074
### LASER REPROFILING SYSTEM EMPLOYING AN ERODABLE MASK

**David F. Muller, Boston, Mass., assignor to Summit Technology, Inc., Waltham, Mass.**
**Continuation-in-part of Ser. No. 19,200, Mar. 9, 1987, Pat. No. 4,856,513, which is a continuation-in-part of Ser. No. 124,101, Jan. 15, 1988. This application Aug. 11, 1989, Ser. No. 392,782**
**The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.**
**Int. Cl.$^5$ A61N** *5/06*
**U.S. Cl. 606—5** **19 Claims**



1. A masking apparatus for use in laser reprofiling of a target surface, the apparatus comprising a support structure and an erodable mask connected to the support structure, the mask being erodable by radiation from a reprofiling laser and having a predefined profile of resistance to erosion by laser radiation, whereby upon irradiation of the mask, a portion of the laser radiation is selectively absorbed by the mask and another portion is transmitted to the target surface in accordance with the mask profile to selectively erode the target surface.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,075
### METHOD AND APPARATUS FOR ANGIOPLASTY

**J. Richard Spears, Winchester, and Donna Bourgelais, Malden, both of Mass., assignors to The Beth Israel Hospital, Boston, Mass.**

**Continuation of Ser. No. 225,969, Jul. 29, 1988, abandoned, which is a continuation of Ser. No. 4,780, Jan. 8, 1987, Pat. No. 4,799,479, which is a continuation of Ser. No. 664,156, Oct. 24, 1984, abandoned. This application Jul. 31, 1990, Ser. No. 561,360**

**Int. Cl.⁵ A61M** *29/02*

**U.S. Cl. 606—7** **42 Claims**

27. Apparatus for treatment of a body passage comprising:

an elongated flexible tube having a proximal end and a distal end which can be advanced through the body passage;

an inflatable balloon secured to said tube at or near the distal end thereof and having a balloon wall;

means for inflating and deflating the balloon from the proximal end of said tube to cause the balloon to form an enlarged channel in a selected region of the body passage; and

heating means for supplying energy through the wall of said balloon to cause the selected region of the body passage to be heated sufficiently to substantially maintain said enlarged channel after deflation of said balloon, said energy being supplied to substantially the entire circumference of the selected region of the body passage simultaneously.

---

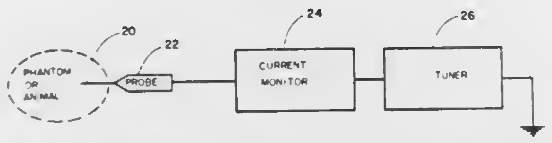
### 5,019,076
### RADIO FREQUENCY SURGICAL TOOL AND METHOD

**William S. Yamanashi, 107 E. G St., Jenks, Okla. 74137, and Arun-Angelo Patil, 3709 E. 69th Pl., Tulsa, Okla. 74136**

**Continuation of Ser. No. 906,791, Sep. 12, 1986, abandoned. This application Dec. 7, 1989, Ser. No. 449,110**

**Int. Cl.⁵ A61B** *17/39*

**U.S. Cl. 606—45** **24 Claims**



1. A method of surgical treatment comprising the steps of:

(a) creating an electromagnetic field in the vicinity of tissue to be surgically treated; and

(b) touching the tissue to be surgically treated with the exposed metal tip of a grounded electric current tunable electromagnetic field focusing probe such as to instantaneously vaporize the tissue being contacted by the metal tip and producing simultaneously a cutting and cauterizing effect.

---

### 5,019,077
### EXTERNAL SPLINT

**Giovanni De Bastiani, Verona; Giovanni Faccioli, Monzambano; Roberto Aldegheri, and Lodovico R. Brivio, both of Verona, all of Italy, assignors to ORTHOFIX S.r.l., Bussolengo, Italy**

**Filed Oct. 2, 1989, Ser. No. 415,992**

**Claims priority, application Italy, Mar. 17, 1989, 84919 A/89**

**Int. Cl.⁵ A61F** *5/04*

**U.S. Cl. 606—54** **15 Claims**

1. An external splint, particularly suitable for application to the pelvis, comprising:

first and second screw-holding clamps; and

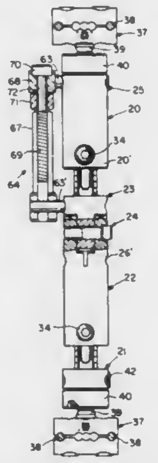
a central body connected between said screw-holding clamps, said central body comprising first, second, third and fourth elongated members and first and second ball joints coupling said central body to said first and second clamps, respectively; and wherein:

said first elongated member has one end portion coupled to said first ball joint and a second end portion telescopically engaging a corresponding first end portion of said second elongated member;

said second elongated member has a second end portion which forms a first part of a pivot joint;

said third elongated member has one end portion forming a second part of the pivot joint, said two parts of the pivot joint being pivotally journalled to allow movement of said second and third elongated members in a single plane;

said third elongated member has a second end portion adapted to telescopically engage with a first end portion of a fourth elongated member;



said fourth elongated member has a second end portion coupled to said second ball joint;

each of said telescopically engaging end portions have axial guide and locking means for preventing rotation and to selectively immobilize said telescopically engaging members;

said ball joints include means for immobilizing the ball joints of the screw-holding clamps relative to said central body; and said first and second parts of said pivot joint includes means for immobilizing said first and second parts of said pivot joint.

---

### 5,019,078
### BONE SCREW

**Stephen M. Perren; Robert Frigg, both of Davos-Dorf; Paul Gisin, Waldenburg, and Robert Mathys, Jr., Bettlach, all of Switzerland, assignors to Synthes (U.S.A.), Paoli, Pa.**

**Filed Nov. 17, 1989, Ser. No. 437,581**

**Claims priority, application Switzerland, Nov. 17, 1988, 04263/88**

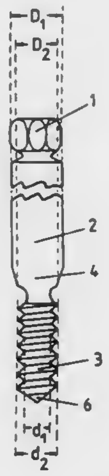
**Int. Cl.⁵ A61B** *17/58*

**U.S. Cl. 606—61** **13 Claims**

1. A bone screw having a head, a smooth shaft segment having a diameter $D_1$ adjacent said head, a threaded segment and a transition segment between the smooth shaft segment and the threaded segment, said transition segment tapering from a diameter $D_1$ adjacent said smooth shaft segment to a lesser diameter $D_2$ adjacent said threaded segment, the ratio

$$\frac{D_1 - D_2}{D_2}$$

being between 0.001 and 0.040.



---

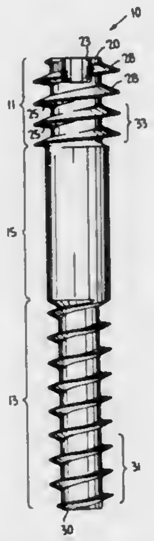
### 5,019,079
### BONE SCREW

**Randall D. Ross, Largo, Fla., assignor to Zimmer, Inc., Warsaw, Ind.**

**Filed Nov. 20, 1989, Ser. No. 438,879**

**Int. Cl.⁵ A61F** *5/04;* **F16B** *35/00*

**U.S. Cl. 606—72** **18 Claims**



1. A bone screw connecting two pieces of bone comprising:

a distal end;

a proximal end;

a generally cylindrical unthreaded intermediate section having a predetermined diameter;

a threaded proximal section extending from said proximal end to said intermediate section and having a first uniformly-pitched thread;

a threaded distal section extending from said distal end to said intermediate section and having a second uniformly-pitched thread that is threaded in the same direction as said first threads;

wherein the pitch of said second thread is greater than the pitch of said first thread; and

wherein said second thread has a major diameter substantially equal to said predetermined diameter.

---

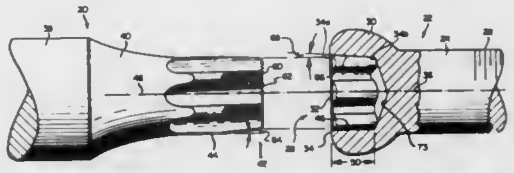
### 5,019,080
### DRIVE SYSTEM FOR PROSTHETIC FASTENERS

**H. Michael Hemer, Rockford, Ill., assignor to Trextron Inc., Providence, R.I.**

**Filed Feb. 13, 1990, Ser. No. 479,514**

**Int. Cl.⁵ A61F** *5/04;* **F16B** *23/00*

**U.S. Cl. 606—73** **12 Claims**



1. A threaded fastener with tool engaging means on a threaded shank adapted for use with a drive tool, said tool engaging means comprising: a recessed socket formed in an end of said shank for receiving a drive tool, said recessed socket having a top edge and a bottom edge; a central axis extending longitudinally through the fastener; alternating concave and convex partially-cylindrical surfaces formed inside said recessed socket, the axes of curvature of said partially-cylindrical surfaces being generally parallel to each other and to said central axis, said recessed socket formed with at least three concave partially-cylindrical surfaces; beveled surface portions formed on three of said concave surfaces sloping towards the central axis from the top edge of the recess to the bottom edge thereof, and said three concave surfaces being disposed generally at the apices of an equilateral triangle, said beveled portions formed for releasably engaging mating beveled surfaces formed on complementarily formed convex surfaces on said drive tool.

---

### 5,019,081
### LAMINECTOMY SURGICAL PROCESS

**Robert S. Watanabe, 11645 Wilshire Blvd., Suite 701, Los Angeles, Calif. 90025**

**Filed Dec. 10, 1986, Ser. No. 940,281**

**Int. Cl.⁵ A61B** *1/32*

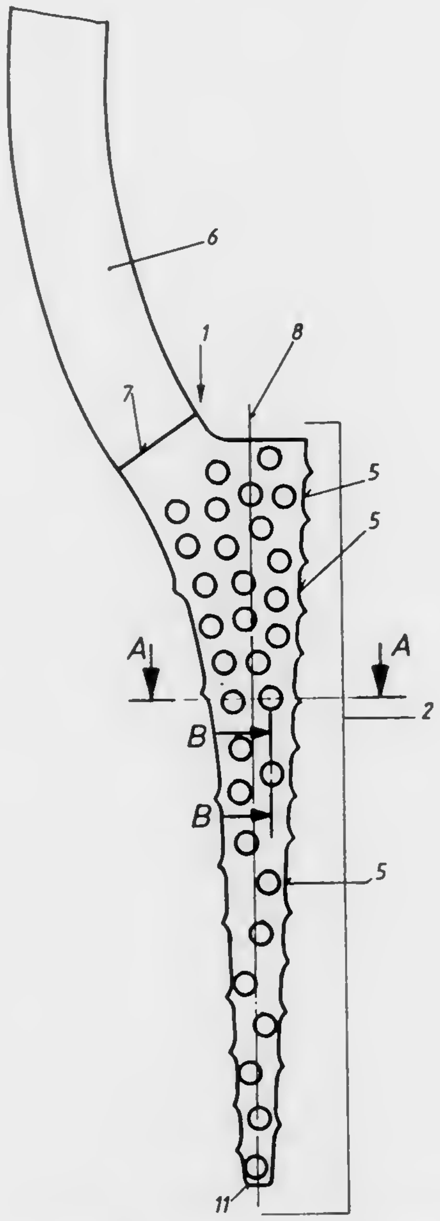
**U.S. Cl. 606—79** **2 Claims**

1. A laminectomy surgical process which involves the entrance into the interlaminal area of the spine, and which comprises the following steps: (a) punching a hole in the ligament covering the lamina of the spine; and (b) inserting a lamina spreader instrument through the hole in the ligament to engage and spread the lamina so as to open up the space there-between with the ligament in place, and with the ligament preventing any tendency for the instrument to slip out of the wound.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,082
### RASP-LIKE REAMING INSTRUMENT

**Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland**
**Filed Dec. 1, 1987, Ser. No. 127,208**
**Claims priority, application Switzerland, Jan. 8, 1987, 39/87**
**Int. Cl.$^5$ A61F *5/04***
**U.S. Cl. 606—85** **9 Claims**

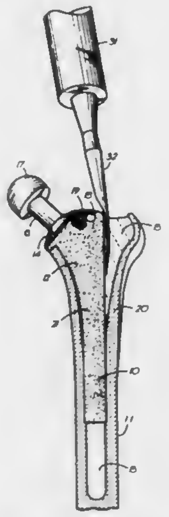


1. A rasp-like reaming instrument for bones comprising
an elongated hollow body of slender shape adapted to the shape of a prosthesis to be implanted in a bone;
a plurality of circumferentially disposed openings in said body; and
a plurality of circumferentially disposed teeth on said body for peeling bone material from within a bone, each said tooth having one of said openings adjacent thereto to permit passage of peeled bone material into said hollow body.

---

### 5,019,083
### IMPLANTING AND REMOVAL OF ORTHOPEDIC PROSTHESES

**Robert C. Klapper, Los Angeles, and James T. Caillouette, Newport Beach, both of Calif., assignors to Advanced Osseous Technologies, Inc., Aliso Viejo, Calif.**
**Filed Jan. 31, 1989, Ser. No. 304,820**
**Int. Cl.$^5$ A61B *17/56***
**U.S. Cl. 606—99** **7 Claims**

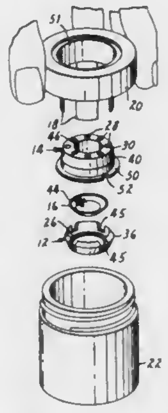


1. A method for removing a prosthesis having a porous surface ingrown with cancellous bone comprising the steps of:
ultrasonically disrupting cancellous bone adjacent to at least the porous surface of the prosthesis; and
withdrawing the prosthesis from the bone.

---

### 5,019,084
### CORNEAL HOLDER

**James E. Aysta, Stillwater; Richard L. Lindstrom, Wayzata, and Debra L. Skelnik, Cambridge, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Aug. 6, 1986, Ser. No. 893,785**
**Int. Cl.$^5$ A61B *17/32;* A45C *11/04***
**U.S. Cl. 606—107** **9 Claims**

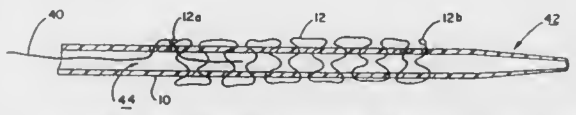


1. A corneal holder adapted to hold a corneal tissue while cutting a predetermined portion of said tissue, said holder comprising:
a base member having a first aperture of a size at least as large as said predetermined portion of said tissue,
a cap member having a second aperture of a size at least as large as said predetermined portion of said tissue,
attachment means associated with said base member and said cap member for attaching said base member to said cap member, said base member and said cap member thereby cooperatively defining a compartment adapted to hold the predetermined portion in substantially its original shape and in a retained relationship in alignment with said first and second apertures and defining a passageway through said first and second apertures configured to allow a cutting device to be passed through said passageway and into cutting contact with the circumference of said predetermined portion, and
engagement means for releasably engaging said holder to a jar cover wherein said engagement means comprises a cap sidewall tapered radially inward as it approaches the top of said cap in order to provide a lead-in for jaws of a jar cover.

---

### 5,019,085
### APPARATUS AND METHOD FOR PLACEMENT OF A STENT WITHIN A SUBJECT VESSEL

**Richard A. Hillstead, Hollywood, Fla., assignor to Cordis Corporation, Miami Lakes, Fla.**
**Continuation of Ser. No. 262,831, Oct. 25, 1988, Pat. No. 4,913,141. This application Feb. 23, 1990, Ser. No. 484,693**
**The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.**
**Int. Cl.$^5$ A61B *17/00***
**U.S. Cl. 606—108** **7 Claims**



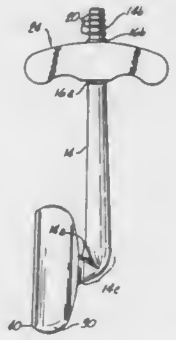
2. Apparatus for placing a flexible, generally cylindrical, expandable stent within a blood vessel comprising:
an elongated catheter having a catheter throughpassageway which extends from a proximal end to a distal end of said elongated catheter; said elongated catheter having a stent delivery portion proximal of said distal end defined by spaced apart openings which extend from the catheter throughpassage through a catheter wall; and
only a single flexible elongated stent retainer for insertion into the catheter passageway to extend from the proximal end of the catheter to the openings in the delivery portion of the catheter where said single stent retainer passes through the catheter wall via said openings to engage said stent and couple the stent to the catheter as the stent is maneuvered within the blood vessel;
said single flexible elongated stent retainer being retractable to release only one end of said stent once the stent is positioned within the blood vessel and allow the stent to contact inner walls of the blood vessel.

---

### 5,019,086
### MANIPULABLE VACUUM EXTRACTOR FOR CHILDBIRTH AND METHOD OF USING THE SAME

**Theodore C. Neward, 521 Scripps Dr., Claremont, Calif. 91711**
**Continuation of Ser. No. 405,958, Sep. 12, 1989, abandoned. This application Aug. 13, 1990, Ser. No. 566,484**
**Int. Cl.$^5$ A61B *17/42***
**U.S. Cl. 606—123** **8 Claims**

1. A vacuum extractor for childbirth comprising:
a copy with an open front portion and a rear portion;
a stem with a hollow interior and a front end and a rear end, the front end being attached to the rear portion of the cup with the interior of the cup communicating with the hollow interior of the stem,
wherein a first portion of the front end of the stem adjacent the cup has greater flexibility than the rest of the stem, the first portion being sufficiently flexible to permit temporary bending of the stem to position the cup parallel to the stem for facilitating insertion into the birth canal and wherein the stem has sufficient stiffness (a) to return to an original unbent position when released and (b) to allow a physician to manipulate the extractor and apply a torque to and guide the child's head.



---

### 5,019,087
### NERVE REGENERATION CONDUIT

**Joseph Nichols, Princeton, N.J., assignor to American Biomaterials Corporation, Plainsboro, N.J.**
**Filed Oct. 6, 1986, Ser. No. 915,512**
**Int. Cl.$^5$ A61F *2/06;* A61B *17/04***
**U.S. Cl. 606—152** **10 Claims**

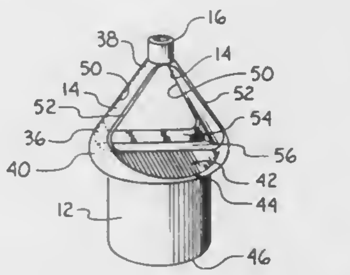
1. A hollow conduit for promoting the in vivo regeneration of a severed mammalian nerve so as to bridge a gap between its severed ends having walls comprised of a matrix of Type I collagen and laminin-containing material.

9. A method of promoting in vivo regeneration of a mammalian severed nerve so as to bridge a gap between its severed ends comprising bringing the respective ends of the severed nerve into contact with each end of a hollow conduit whose walls are comprised of a matrix of Type I collagen and laminin-containing material.

---

### 5,019,088
### OVOID ATHERECTOMY CUTTER

**Andrew F. Farr, Spring Valley, Calif., assignor to Interventional Technologies Inc., San Diego, Calif.**
**Filed Nov. 7, 1989, Ser. No. 432,512**
**Int. Cl.$^5$ A61B *17/32***
**U.S. Cl. 606—159** **16 Claims**



13. A rotatable atherectomy cutter for removing obstructive tissue from a body vessel, comprising:
a hollow cylindrical-shaped base having an outer wall;
guide means coaxially distanced from said base for slidably receiving a guide wire;
cutting means connecting said base to said guide means for alternately cutting said tissue with a first cutting edge and with a second cutting edge longer than said first cutting edge; and
ovoid means coupled to said cutting means for allowing said second cutting edge to extend beyond said outer wall of

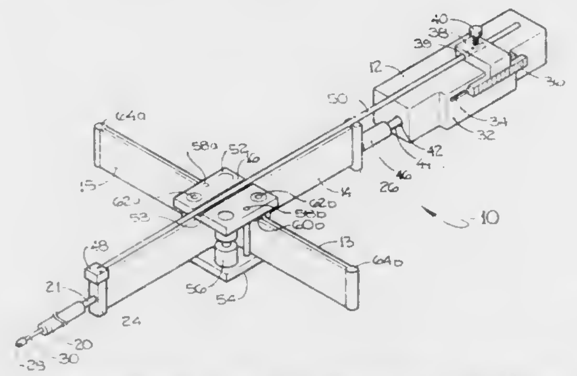
VOL
1126
ISS
4
MY
28
1991
UMI

said base to cut a diameter of tissue larger than the diameter of said base means.

---

### 5,019,089
### ATHERECTOMY ADVANCING PROBE AND METHOD OF USE

**Andrew F. Farr, Spring Valley, Calif., assignor to Interventional Technologies Inc., San Diego, Calif.**
**Filed Dec. 7, 1989, Ser. No. 447,368**
**Int. Cl.$^5$ A61B** *17/32*
**U.S. Cl. 606—172** **21 Claims**



1. An atherectomy probe for incrementally advancing a rotatable cutter to remove obstructive tissue from an artery comprising:

a distal support;

a proximal support;

a torque tube slidably held by said distal support and said proximal support, said torque tube having a distal end operatively engageable with the cutter;

a motor operatively connected to the proximal end of said torque tube for rotating said torque tube;

a connector for selectively holding said motor stationary with respect to said distal support;

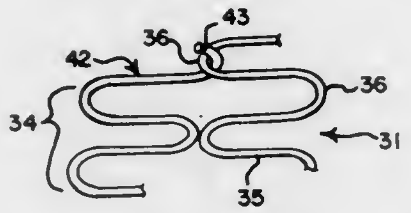
means for selectively advancing said proximal support toward said distal support while said connector holds said motor stationary; and

means for incrementally moving said motor toward said distal support to the extent allowed by said proximal support to advance the cutter from said distal support when said connector is released.

---

### 5,019,090
### RADIALLY EXPANDABLE ENDOPROSTHESIS AND THE LIKE

**Leonard Pinchuk, Miami, Fla., assignor to Corvita Corporation, Miami, Fla.**
**Filed Sep. 1, 1988, Ser. No. 240,000**
**Int. Cl.$^5$ A61N** *29/02;* **A61F** *2/06*
**U.S. Cl. 606—194** **20 Claims**



1. A radially expandable endoprosthesis, comprising:

a plurality of generally circumferential sections, including end and intermediate generally circumferential sections, said end and intermediate generally circumferential sections being substantially adjacent to one another and generally parallel to each other in order to thereby generally defined an endoprosthesis having a longitudinal axis along which each of said generally circumferential sections are axially spaced;

each of said generally circumferential sections includes an expandable segment that imparts radial expandability to said generally circumferential section whereby said section has an unexpanded insertion circumference and an expanded implantation circumference which is greater than said unexpanded insertion circumference;

said expandable segment of each generally circumferential section is a generally foldable member that is bendable between a generally closed orientation and a generally opened orientation so as to impart radial expandability to the generally circumferential section;

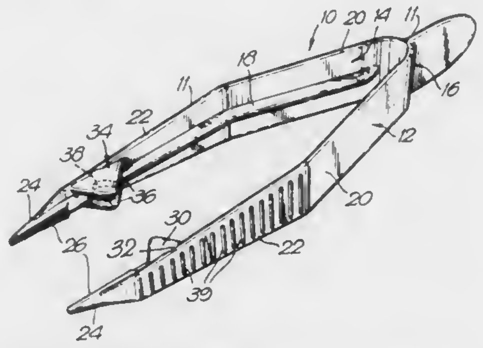
said generally circumferential sections form a continuous helix that defines an axially extending endoprosthesis; wherein said end sections each include a free end; and

means for engaging the free end of each of said end sections with an adjacent one of said intermediate generally circumferential sections, thereby avoiding the presentation of loose ends on the endoprosthesis.

---

### 5,019,091
### FORCEPS

**Michael Porat, P.O. Box 50355, Tel Aviv, Israel, and Amir Porat, 18 Highland Dr., North Caldwell, N.J.**
**Filed Feb. 25, 1988, Ser. No. 160,340**
**Claims priority, application Israel, Mar. 23, 1987, 81961**
**Int. Cl.$^5$ A61B** *17/28*
**U.S. Cl. 606—205** **8 Claims**



1. Plastic forceps comprising:

two opposing elongate arms of molded plastics having first ends joined together by an integral hinge, having second ends with jaws defining gripping surfaces at said second ends, and having inner opposing surfaces;

said hinge maintaining said arms in spaced overlying relation to each other for limiting outward movement of said arms relative to each other and for selective movement of said arms and gripping surfaces toward each other;

longitudinal ribs extending centrally along said inner opposing surfaces of said arms;

means for preventing lateral movement of said arms during gripping including a male engagement element defined on one of said arms and a complementary female engagement element defined on the other of said arms and disposed in registration with said male element;

said female engagement element includes a closed inner end and comprises a pair of laterally aligned protrusions extending perpendicular to the inner surface of said other of said arms on either side of the rib thereon;

said male engagement element comprises a complementary protrusion extending from the rib on said one of said arms perpendicular to the inner surface of the arm and disposed in registration between the protrusions on the female engagement element;

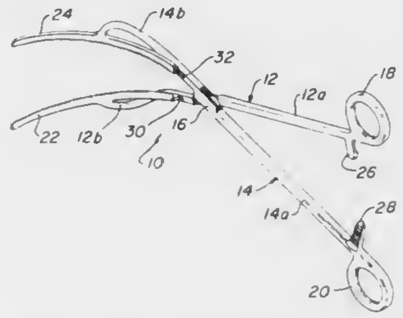
said protrusions extending substantially beyond the ribs and the gripping surfaces of the forceps; and

said closed inner end of said female engagement element comprises a recess in said rib between said pair of protrusions of the female engagement element for selective reception of the protrusion of the male engagement element upon movement of the arms toward each other.

---

### 5,019,092
### LIVER TRANSPLANT CLAMP

**Goran B. Klintmalm, Dallas, Tex., assignor to Pilling Company, Fort Washington, Pa.**
**Filed Oct. 4, 1989, Ser. No. 416,841**
**Int. Cl.$^5$ A61B** *17/28*
**U.S. Cl. 606—207** **11 Claims**



1. A clamp comprising:

a pair of elongate handles each having opposed ends, said handles being pivotally connected on an axis intermediate opposed ends thereof and movable between open and closed positions in a generally longitudinal plane; and

a pair of elongate curved jaws each having opposed ends, said jaws being fixed to adjacent ones of said handle ends, said jaws having curved faces lying in lateral planes generally aligned with respective ones of said handles and normal to the longitudinal plane, the jaw ends being proximal to the pivot axis smoothly merging with said handles near the pivot axis on arcs in the lateral planes.

---

### 5,019,093
### BRAIDED SUTURE

**Donald S. Kaplan, Weston, and Matthew E. Hermes, Easton, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.**
**Continuation of Ser. No. 344,745, Apr. 28, 1989, which is a continuation-in-part of Ser. No. 227,699, Aug. 3, 1988, abandoned, which is a continuation-in-part of Ser. No. 89,732, Aug. 26, 1987, abandoned. This application Mar. 9, 1990, Ser. No. 491,215**
**Int. Cl.$^5$ A61B** *17/06*
**U.S. Cl. 606—228** **48 Claims**

1. A braided suture of improved construction wherein for a given range of overall suture denier, the range of pick count, number of sheath yarns and denier of individual filaments comprising a sheath yarn are related to each other as follows:

| Overall Suture Denier | Pick Count | Number of Sheath Yarns | Denier of Individual Filaments |
|---|---|---|---|
| from about 50 to about 125 | from about 50 to about 100 | from about 4 to about 16 | from about 0.2 to about 1.8 |
| greater than about 125 to about 200 | from about 50 to about 100 | from about 4 to about 16 | from about 0.2 to about 1.8 |
| greater than about 200 to about 300 | from about 50 to about 100 | from about 4 to about 16 | from about 0.2 to about 1.8 |
| greater than about 300 to about 500 | from about 50 to about 100 | from about 10 to about 20 | from about 0.2 to about 1.8 |
| greater than about 500 to about 800 | from about 50 to about 100 | from about 14 to about 20 | from about 0.2 to about 1.8 |
| greater than about 800 to about 1200 | from about 50 to about 100 | from about 16 to about 32 | from about 0.2 to about 1.8 |
| greater than about 1200 to about 2000 | from about 50 to about 100 | from about 20 to about 36 | from about 0.2 to about 1.8 |
| greater than about 2000 to about 4000. | from about 50 to about 100 | from about 20 to about 36 | from about 0.2 to about 1.8 |

---

### 5,019,094
### CRYSTALLINE COPOLYMERS OF P-DIOXANONE AND POLY(ALKYLENE OXIDES)

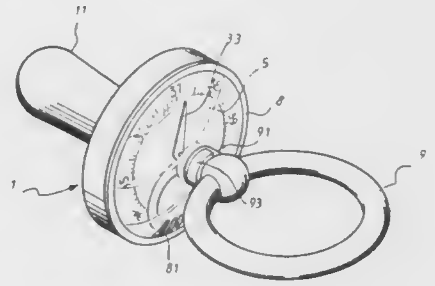
**Rao S. Bezwada, Whitehouse Station, and Shalaby W. Shalaby, Lebanon, both of N.J., assignors to Ethicon, Inc., Somerville, N.J.**
**Filed May 9, 1990, Ser. No. 521,212**
**Int. Cl.$^5$ C08G** *63/08*
**U.S. Cl. 606—230** **16 Claims**

1. A crystalline copolymer of p-dioxanone and an amount of a poly(alkylene oxide) effective to lower the modulus of the copolymer relative to the modulus of a p-dioxanone homopolymer.

---

### 5,019,095
### NIPPLE ASSEMBLY WITH ALARM BUZZER AND BODY TEMPERATURE INDICATOR

**Jieb-Shan Lu, 56, Alley 115, Shing Her Lane, Jang Her Li, Nan Tour City, Taiwan**
**Filed Aug. 29, 1990, Ser. No. 574,104**
**Int. Cl.$^5$ G01K** *13/00*
**U.S. Cl. 606—234** **1 Claim**



1. A nipple assembly comprising:

(a) a hollow base provided with a nipple and including an opening on one side of the base;

(b) a thin shell pot-shaped case having an open end and an inwardly extending circular flange, the case including a central tube, a plurality of glue pits formed on an outer circumference of the flange for receiving waterproof glue to attach the case to the base, upper shell portion provided

VOL
1126
ISS
4
MY
28
1991
UMI

with a plurality of liquid openings and a plurality of projecting sheets to permit liquid flow through the liquid openings;

(c) a body temperature indicator including a heat sensing winding formed by two metal sheets of different materials, one end of the winding being secured to the central tube, an axle inserted through the central tube, another end of the winding being secured to one end of the axle, a scale plate having temperature scale readings thereon and provided with a central hole therethrough, the axle being disposed through the central hole, a pointer secured to another end of the axle extending beyond the scale plate for providing scale readings and the scale plate being engaged with the circular flange at the open end of the case,

(e) a heat sensitive resistor;

(f) a circular waterproof plate of substantially the same size as the base and secured thereto by waterproof glue around the circumference of the plate to define a space between the plate and the base, the IC board, heat sensitive resistor, scale plate, heat sensing winding, axle and pointer being sealingly enclosed within the space, and the space being filled with a heat conductive liquid;

(g) an alarm buzzer, an energy source for powering the alarm buzzer, whereby when the temperature of the heat conductive liquid reaches a predetermined level, a signal from the heat sensitive resistor is sent through the IC board to activate the alarm buzzer and provide a warning to a person caring for a baby using the nipple assembly.

---

### 5,019,096

## INFECTION-RESISTANT COMPOSITIONS, MEDICAL DEVICES AND SURFACES AND METHODS FOR PREPARING AND USING SAME

**Charles L. Fox, Jr., New York, N.Y.; Shanta M. Modak, River Edge, N.J., and Lester A. Sampath, Nyack, N.Y., assignors to Trustees of Columbia University in the City of New York, New York, N.Y.**

**Continuation-in-part of Ser. No. 154,920, Feb. 11, 1988, abandoned. This application Oct. 14, 1988, Ser. No. 258,189**

**Int. Cl.$^5$ A61F *2/06***

**U.S. Cl. 623—1** **67 Claims**

63. An expanded PTFE vascular graft, a substantial proportion of the interstices of which contains a coating composition comprising, by weight, one part biomedical polyurethane, one part poly(lactic acid), one part chlorhexidine acetate, and three parts pipracil.

---

### 5,019,097

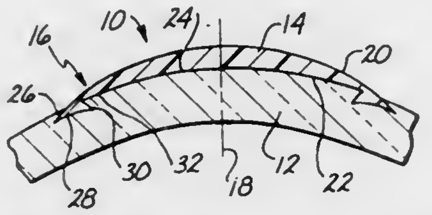
## CORNEAL ONLAY LENSES AND METHODS FOR ATTACHING SAME

**Patricia M. Knight, Laguna Niguel, and Robert C. Bishop, San Marino, both of Calif., assignors to Allergan, Inc., Irvine, Calif.**

**Filed Nov. 22, 1989, Ser. No. 440,975**

**Int. Cl.$^5$ A61F *2/14***

**U.S. Cl. 623—5** **39 Claims**



9. A lens device for attachment to a cornea, said lens device comprising:

an optic having an optical axis;

a flange coupled to the optic and extending radially outwardly of the optic;

said flange including a radially inwardly extending projection adapted for use in attaching the lens device to the cornea; and

the flange having a posterior surface and the radiallly inwardly projection and the posterior surface defining a V-shaped flute which opens radially inwardly.

---

### 5,019,098

## SIGHT-CORRECTING OPTICAL COMPONENT SUCH AS AN INTRA-OCULAR IMPLANT OR CONTACT LENS

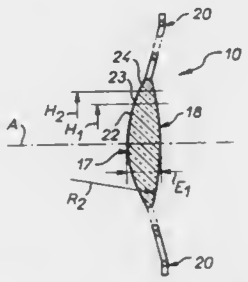
**Jean-Louis Mercier, Fontenay les Briis, France, assignor to Essilor International Cie Generale d'Optique, Creteil Cedex, France**

**Filed May 7, 1990, Ser. No. 519,870**

**Claims priority, application France, May 19, 1989, 89 06594**

**Int. Cl.$^5$ A61F *2/16;* G02C *7/04***

**U.S. Cl. 623—6** **12 Claims**



1. Sight-correcting optical component having front and rear surfaces at least one of which has a central part in the form of an aspherical surface of revolution with a meridian section satisfying the equation

$$X = \frac{1}{R}\left[\frac{Y^2}{1 + \sqrt{1 - (1 + K)\,Y^2/R^2}}\right] + A2\,Y^4 + A3\,Y^6 + A4\,Y^8 + A5\,Y^{10}$$

in which R1, K, A2, A3, A4 and A5 are numerical parameters chosen so that for the optical system comprising said optical component and a specified eye model, minus the crystalline lens if said optical component is an intra-ocular implant, they yield for an object proximity P defined by the equation

$$P = N' \cdot \frac{dx'}{f2}$$

in which N' is the refractive index of the image medium, dx' is the longitudinal spherical aberration in the image space and f' is the focal length of said eye model, a representative curve which:

for high values of the distance from the axis comprises a substantially straight first section with a slope less than or equal to zero and entirely located between a vertical line passing through a defined reference origin and an oblique line passing through points with coordinates (−1, 1.5) and (−1.5, 2.75) relative to said reference origin;

for low values of the distance from the axis comprises a second section intersecting the diopter axis vertically between points with horizontal coordinates (−2.5) and (−4) relative to said reference origin, and

for intermediate values of the distance from the axis comprising a median section merging monotonically and continuously with said first and second sections.

---

### 5,019,099

## INTRAOCULAR MULTIFOCAL LENS METHOD FOR CORRECTING THE APHAKIC EYE

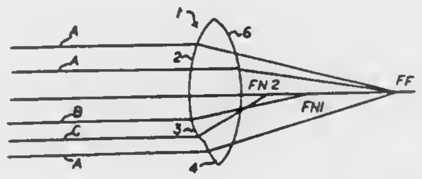
**Lee T. Nordan, 9834 Genesee Ave., Ste. 209, La Jolla, Calif. 92037**

**Continuation of Ser. No. 232,140, Aug. 15, 1988, Pat. No. 4,917,681, and a continuation of Ser. No. 88,227, Aug. 24, 1987, Pat. No. 4,769,033, and a continuation-in-part of Ser. No. 69,197, Jul. 2, 1987, abandoned. This application Apr. 16, 1990, Ser. No. 509,871**

**The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.**

**Int. Cl.$^5$ A61F *2/16***

**U.S. Cl. 623—6** **3 Claims**



1. A method for the correction of the aphakic eye following extracapsular cataract extraction, comprising:

implanting a universally configured prosthetic lens against the vitreous humor the eye;

a face of one side of said lens comprising a substantially aspherical, convex surface whereof the radius of curvature decreases from a value at points of said surface nearest to the center of the lens, to a lower value at points of said surface farther away from the center of the lens;

said decreases occurring along both the vertical axis and the horizontal axis of the plane of said lens; and

said values being sufficiently apart to extend the refractive power of said lens to substantially accommodate any aphakic condition,

wherein said surface is constituted of a series of successive spherical sectors, whereof the radii of curvature decreases discretely from the value of the radius of a first spherical sector nearest to the center of the lens to a lower value of the radius of the spherical sector further away from the center of the lens.

---

### 5,019,100

## USE OF A POLYMER NETWORK, METHOD FOR PREPARING A PREPOLYMER AND ALSO PREPARATION WHICH YIELDS A POLYMER NETWORK AFTER CURING

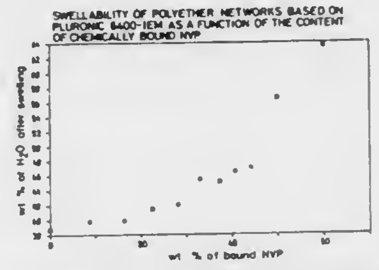
**Wilhelmus E. Hennink, Waddinxveen, and Leendert Huizer, Zoetermeer, both of Netherlands, assignors to Nederlandse Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek TNO, The Hague, Netherlands**

**Filed Jul. 1, 1988, Ser. No. 214,207**

**Claims priority, application Netherlands, Jul. 1, 1987, 8701548**

**Int. Cl.$^5$ A61F *2/16***

**U.S. Cl. 623—6** **16 Claims**



1. An intra-ocular lens comprising a poly(meth)-acrylate linked by oligomer chains into a polymeric network, said oligomer chains containing chemically bound alkylene oxide units as hydratable groups.

---

### 5,019,101

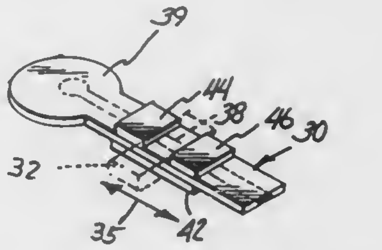
## SELF-SEALING VALVE FOR IMPLANTABLE DEVICE

**Bobby K. Purkait, 649A Verd Mar Dr., Santa Barbara, Calif. 93103, and Hilton Becker, 4417 Woodfield Blvd., Boca Raton, Fla. 33434**

**Filed May 31, 1989, Ser. No. 359,481**

**Int. Cl.$^5$ A61F *2/12***

**U.S. Cl. 623—8** **8 Claims**



1. A valve for use in a fluid fillable implantable device with a fill tube, the valve comprising:

a main body portion having a channel for receiving the fill tube wherein the channel is defined by first and second elastomeric layers and wherein the first elastomeric layer is restrained in a stretched state along a selected distance and the second elastomeric layer is restrained in first and second spaced apart areas with a third area there-inbetween in an unrestrained state, the first, second and third areas being in opposing relationship from the restrained area of the first layer such that when the fill tube is withdrawn from the channel, the first and second elastomeric layers fold in the third area occluding the fill tube channel.

---

### 5,019,102

## ANTI-REFLUXIVE INTERNAL URETERAL STENT WITH A DYNAMIC HOOD-VALVE AT THE VESICAL END FOR PREVENTION OF URINARY REFLUX INTO THE UPPER URINARY TRACT UPON INCREASE OF VESICAL PRESSURE

**Eberhard Hoene, Warburghof 16, D-3000, Hannover 61, Fed. Rep. of Germany**

**PCT No. PCT/EP88/01113, § 371 Date Aug. 10, 1989, § 102(e) Date Aug. 10, 1989, PCT Pub. No. WO89/05127, PCT Pub. Date Jun. 15, 1989**

**PCT Filed Dec. 7, 1988, Ser. No. 382,651**

**Claims priority, application Fed. Rep. of Germany, Dec. 10, 1987, 3741832**

**Int. Cl.$^5$ A61F *2/04***

**U.S. Cl. 623—12** **17 Claims**

1. An anti-refluxive internal ureteral stent, comprising:

a) a catheter having an open end;

b) hood valve means secured to said catheter adjacent said one end and having open and closed positions for opening and closing the opening thereof;

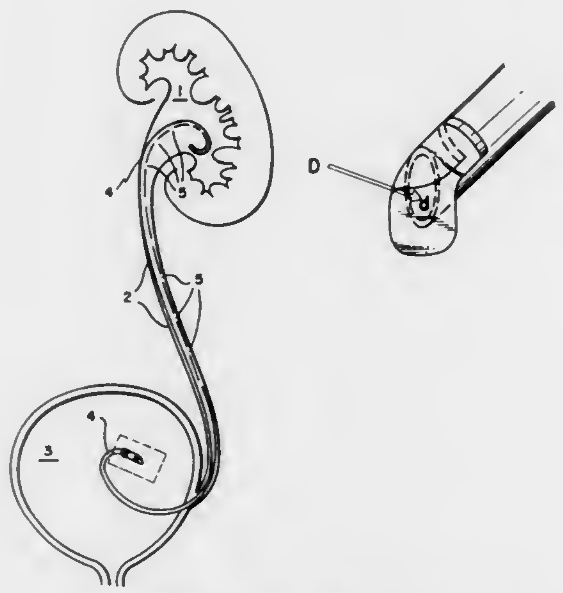
c) said hood valve means being actuated by a reflux pressure to assume said closed position;

d) said hood valve means including a flap member having a first free end portion; and

e) said flap member extending a distance beyond the open

VOL
1126
ISS
4
MY
28
1991
UMI

end so that when said hood valve means assumes said closed position, said flap member folds over thereby completely covering the open end and said first free end portion thereof extends beyond the perimeter of the open end.

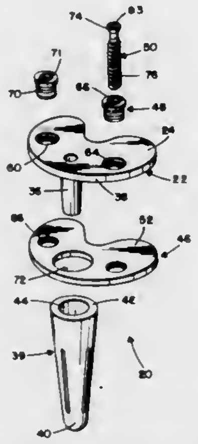


---

### 5,019,103
### TIBIAL WEDGE SYSTEM

**Richard R. Van Zile, and Donald E. McNulty, both of Warsaw, Ind., assignors to Boehringer Mannheim Corporation, Indianapolis, Ind.**

**Filed Feb. 5, 1990, Ser. No. 475,176**
**Int. Cl.⁵ A61F *2/38***
U.S. Cl. 623—20 12 Claims



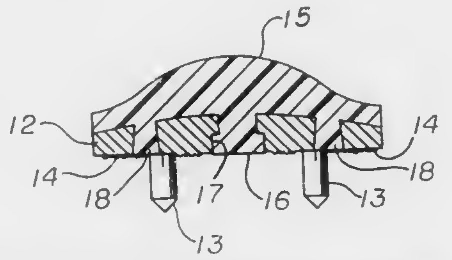
1. A prosthetic system for implantation on the proximal end of a tibia comprising:
tibial tray means including a distal surface and a proximal surface opposite said distal surface and a pair of laterally spaced clearance bores therethrough, each clearance bore having a coaxial counterbore communicating with said proximal surface;
wedge means including:
a proximal surface intimately received on said distal surface of said tibial tray; and
a distal mounting surface engageable with the proximal end of the tibia and having a pair of laterally spaced threaded bores therethrough generally aligned with the clearance bores, respectively, in said tibial tray means; and
joinder means for fixedly mounting said wedge means to said tibial tray means prior to implanting said tibial tray means on the proximal end of the tibia, said joinder means including:
a pair of cannulated fasteners, each having a head member, a threaded shank extending away from said head member, and a longitudinal bore extending through said head member and through said threaded shank, each of said head members being receivable in an associated one of the counterbore, each of said threaded shanks being threadedly engaged with an associated one of the threaded bores to thereby fixedly attach said wedge means to said tibial tray means; and
bone screw means extending through the longitudinal bore of each of said cannulated fasteners for fixedly attaching said tibial tray means and said wedge means to the tibia.

---

### 5,019,104
### PATELLAR PROSTHESIS AND METHOD OF MAKING THE SAME

**Leo A. Whiteside, St. Louis, Mo., and Bradley J. Coates, Cordova, Tenn., assignors to Dow Corning Wright Corporation, Arlington, Tenn.**

**Filed Jan. 16, 1990, Ser. No. 466,093**
**Int. Cl.⁵ A61F *2/38***
U.S. Cl. 623—20 4 Claims

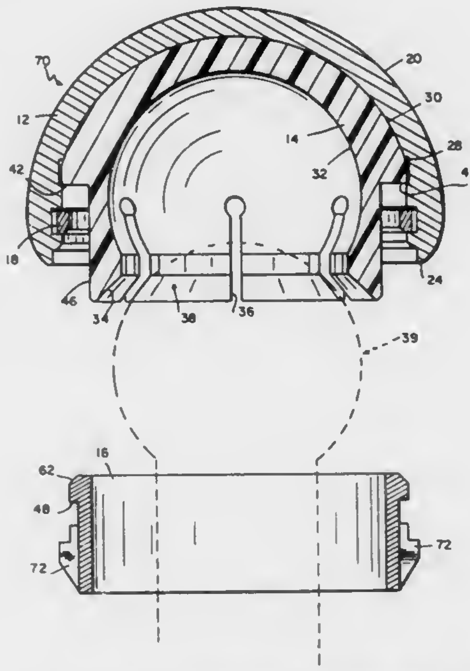


1. A patellar prosthesis for implantation in the human body to replace the articulating surface of the patella comprising:
a polymeric articulating surface portion, and,
a metal backing having an anterior surface adapted to be attached to the posterior surface of a resected patella, and a posterior surface adapted to engage the polymeric articulating surface portion, said metal backing portion having a central portion that is thicker than the outer edges thereof, said central portion being elevated on the posterior surface of said backing and having at least one aperture extending therethrough which has a greater cross-sectional area on the anterior side than on the posterior side thereof, adapted to fixedly receive an anchoring peg integral with the anterior surface of the polymeric articulating surface portion, said anterior surface of said articulating surface portion being coextensive in size and shape with said metal backing portion and being molded to conform to the contour thereof, said articulating surface portion have a generally convex posterior articulating surface, said anchoring peg being molded into said aperture and filling substantially the entire volume thereof.

### 5,019,105
### ACETABULAR CUP PROSTHESIS ASSEMBLY

**Roy C. Wiley, North Webster, Ind., assignor to Biomet, Inc., Warsaw, Ind.**

**Filed Aug. 3, 1989, Ser. No. 388,932**
**Int. Cl.⁵ A61F *2/30***
U.S. Cl. 623—22 31 Claims



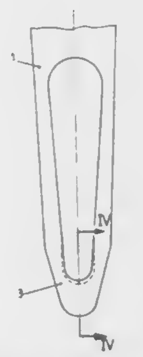
1. An acetabular cup prosthesis for receiving and releasably retaining a femoral head component of a hip prosthesis, comprising:
an outer shell having a generally smooth hemispherical outer surface, an inner surface, an opening defined by a peripheral edge surface joining said outer and inner surfaces, and a first circumferential groove formed in said inner surface;
a bearing insert, adapted to be received within the opening in the outer shell, having an outer surface, an inner surface, and an opening defined by a peripheral edge surface joining said outer and inner surfaces, wherein said inner surface and said opening are adapted to receive the femoral head of the hip prosthesis, and wherein said opening has a first diameter which is smaller than a diameter of the femoral head, and wherein said opening is elastically expandable to a second diameter to allow for passage of the femoral head through said opening;
retaining means for retaining said bearing insert within the opening in the outer shell;
collar means, movable from a disengaged position to an engaged position adjacent the outer surface of the bearing insert, for preventing said opening from expanding to said second diameter so as to allow the femoral head to be locked into place within the insert; and
locking means separable from said collar means, disposed in said first circumferential groove in the inner surface of said outer shell, at least a portion of said locking means protruding outwardly from said groove beyond the inner surface of said shell so as to interact with a portion of said collar means to secure said collar means in the engaged position adjacent the outer surface of the bearing insert, said portion of said locking means being elastically deformable inwardly into said groove so as to allow said collar means to be selectively moved to the disengaged and engaged positions.

---

### 5,019,106
### FIXING STEM FOR A PROSTHESIS

**Hans-Georg Willert, Göttingen, Fed. Rep. of Germany, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Aug. 11, 1989, Ser. No. 392,771**
**Claims priority, application Switzerland, Aug. 15, 1988, 3061/88**
**Int. Cl.⁵ A61F *2/32***
U.S. Cl. 623—22 7 Claims



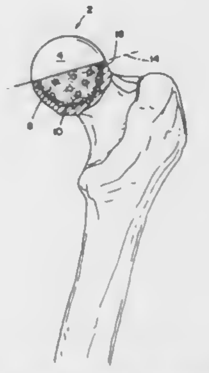
1. A fixing stem for a femoral head prosthesis having a main body portion, a hollowed distal region having a pair of resilient walls extending distally from said body portion and defining a continuous outer surface with said body portion, an elongated slot between said walls extending in an anterior/posterior direction and a cutting edge on each wall about a distal end of said slot for severing invading tissue upon withdrawal of said stem from a femur, and a closure element bridging said walls at a distal end thereof to close said slot and the distal end of said distal region.

---

### 5,019,107
### PROSTHESIS FOR PARTIALLY REPLACING THE JOINT HEAD OF A HUMAN BONE

**Klaus-Deiter Schelhas, Bremen, Fed. Rep. of Germany, assignor to Bristol-Meyers Squibb Company, New York, N.Y.**

**Filed Apr. 10, 1990, Ser. No. 507,154**
**Claims priority, application Italy, Apr. 18, 1989, 3912653**
**Int. Cl.⁵ A61F *2/36, 2/30***
U.S. Cl. 623—23 12 Claims



1. Endoprosthesis for the partial replacement of the joint head of a human bone, in particular of the thigh bone, with a first spherical segment whose diameter corresponds to that of the natural joint head, and with an anchoring part on the spherical segment, characterized by the fact that the anchoring part is constructed as a second spherical segment (6) whose surface displays an adhesive structure (8).

VOL 1126
ISS 4
MY 28
1991
UMI

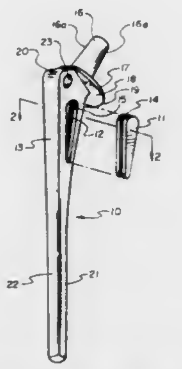
### 5,019,108
### MODULAR IMPLANT

**Kim C. Bertin, 324 Tenth Ave., Suite 111, Salt Lake City, Utah 84103, and Harry E. Rubash, 3601 Fifth Ave., Pittsburgh, Pa. 15213**

**Filed Feb. 2, 1990, Ser. No. 474,161**

**Int. Cl.$^5$ A61F** *2/32*

U.S. Cl. 623—23 20 Claims



1. A modular hip implant comprising, a femoral implant that includes a stem for fitting in a prepared femoral canal, which said stem extends from a proximal portion, wherethrough is formed a lateral opening; a fenestration plug is arranged for fitting across said lateral opening and includes means for releasably locking said fenestration plug in said lateral opening consisting of a ridge means that is formed within said lateral opening and is for fitting in a groove means that is formed around the edge of said fenestration plug; and a neck means that extends outwardly from said proximal portion for receiving a head thereon.

---

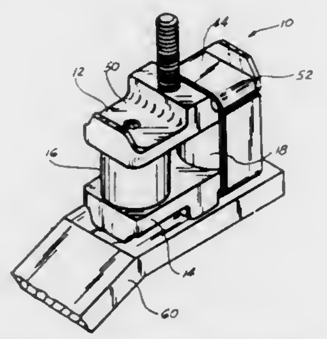
### 5,019,109
### MULTI-AXIAL ROTATION SYSTEM FOR ARTIFICIAL ANKLE

**Jerome P. Voisin, 143 "B" Isle of Cuba Road, Schriever, La. 70395**

**Filed Mar. 9, 1990, Ser. No. 492,885**

**Int. Cl.$^5$ A61F** *2/66, 2/68*

U.S. Cl. 623—49 15 Claims



1. A multi-axial rotation apparatus for an ankle prosthesis positionable in an artificial foot, the system comprising:

a) a first platform member secured to the artificial foot;

b) a second platform member spaced apart from the first platform member and positioned in a common plane therewith;

c) a first anterior solid compressible member bonded between and positioned intermediate first lower platform and upper platform members;

d) a second posterior solid compression member likewise bonded between and positioned intermediate the upper and lower platform members;

e) means interconnecting the first and second platform members and pre-compressing at least the posterior solid compression member; and

f) means for attaching the prosthesis to an upper leg portion of a wearer of the apparatus.

---

### 5,019,110
### NEEDLE RING WITH NEEDLES FOR THE COMBING CYLINDER OF AN OPEN-END SPINNING MACHINE

**Jörg Stauffer, Ettingen, Switzerland, and Pierre Müller, Le Bois d'Oingt, France, assignors to Ringtex-Kolifrath S.a.r.l., Buhl, France**

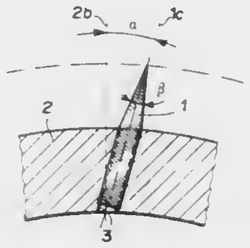
**PCT No. PCT/CH88/00129, § 371 Date Mar. 30, 1989, § 102(e) Date Mar. 30, 1989, PCT Pub. No. WO89/01064, PCT Pub. Date Feb. 9, 1989**

**PCT Filed Jul. 21, 1988, Ser. No. 353,638**

**Claims priority, application Switzerland, Aug. 3, 1987, 2967/87; Mar. 3, 1988, 807/88**

**Int. Cl.$^5$ D01B** *1/24*

U.S. Cl. 19—128 6 Claims



1. A needle ring for a combing cylinder of an open-end spinning machine, comprising:

a ring having a central ring axis and a wall; and

a plurality of needles secured to said wall; each said needle having a substantially oblong cross section; each said cross-section having a longer dimension and a shorter dimension substantially perpendicular to said longer dimension, said shorter dimension being oriented substantially parallel to said central ring axis.

---

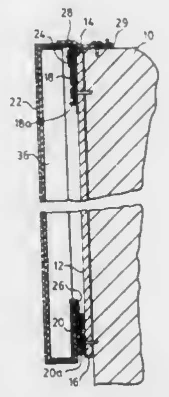
### 5,019,111
### FASCIA PANEL STRUCTURES

**William F. Dempsey, Acton; Steve Casar, Etobicoke, and Charles P. Reed, Scarborough, all of Canada, assignors to Alcan International Limited, Montreal, Canada**

**Filed Jun. 14, 1988, Ser. No. 206,570**

**Int. Cl.$^5$ B04B** *1/38*

U.S. Cl. 52—506 10 Claims



1. A fascia panel structure including a plurality of panels in side-by-side butting relationship, comprising:

a) two vertically-spaceable, horizontally-extendible panel edge support means fastenable to the structure against which the fascia is to be supported and providing respective horizontal, parallel elongated upwardly-opening panel edge receiving channels;

b) a plurality of said panels each having a front face and respective rearwardly-extending portions along their upper and lower edges, the rearwardly extending portions each terminating in a respective downwardly-extending horizontal edge engageable in the respective support means channel to support the respective panel edge against vertical downward movement while permitting the panel to move freely sideways on the support means;

c) a vertically-extending channel-forming member attached to the rear face of each panel adjacent one vertical edge to provide a vertical tongue-receiving channel between itself and the said panel rear face;

d) a tongue-forming member attached to the rear face of each panel adjacent to the other vertical edge and forming a tongue protruding from the panel edge along its entire length to be engageable in the adjacent vertical tongue receiving channel and bridge any gap between the adjacent panels; and

e) a hold down member fastenable to the said structure and engageable with the top edge of each panel to hold it against vertical movement and so that the said panel rearwardly-extending portions remain engaged in said support means channels.

---

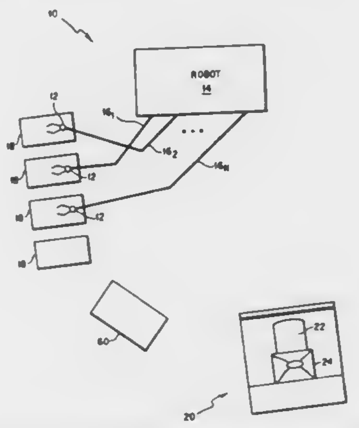
### 5,019,112
### ROBOTIC FOOD SERVICE PACKAGING SYSTEM

**K. G. Engelhardt; Roger A. Edwards, both of Carnegie; Whitney S. Sample, and Michael F. Sandrof, both of Pittsburgh, all of Pa., assignors to Carnegie-Mellon University, Pittsburgh, Pa.**

**Filed Jul. 12, 1989, Ser. No. 378,849**

**Int. Cl.$^5$ B65B** *5/10, 25/00;* **B25J** *11/00*

U.S. Cl. 53—474 9 Claims



1. A method for utensil handling and packaging comprising the steps of:

moving an end-effector in proximity to the utensil disposed in a bin;

seizing the utensil by the end-effector; and

packaging the utensil with a bagger.

---

### 5,019,113
### ROTARY LAWN MOWER BLADE ASSEMBLY

**John F. Burnell, 423 Cedar Dr., Lanoka Harbor, N.J. 08734**

**Filed May 7, 1990, Ser. No. 520,266**

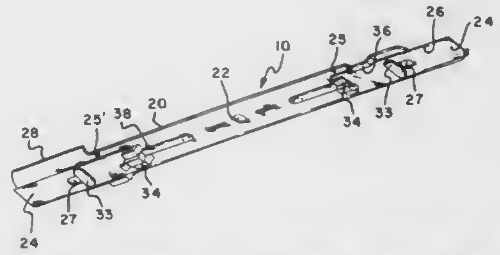
**Int. Cl.$^5$ A01D** *34/73, 34/82*

U.S. Cl. 56—295 5 Claims

4. A rotatable blade assembly for a rotary power lawn mower which comprises:

(a) an elongated bar member adapted to rotate in a substantially horizontal plane about an aperture formed centrally therethrough having means for detachably securing cutting element means to one surface of diametrically opposed end portions of said bar member which includes spaced pocket forming tab means, pin means and blade locking means in associated relationship extending from said surface of the bar member; and

(b) cutting element means adapted for being readily detachably secured in a substantially overlying relationship to said diametrically opposed end portions of said bar member with oppositely directed grass cutting edges being operatively disposed for cutting grass during operation of a rotary power mower, wherein said cutting element means are detachably secured to said bar member without the need for special tools or removing said bar member from the shaft of a rotary mower motor.



---

### 5,019,114
### MOULDING TOOL AND METHOD OF MAKING SAME

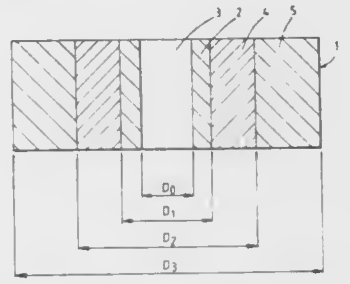
**Jens Gronbaek, Åbenrå, Denmark, assignor to Danfoss A/S, Nordborg, Denmark**

**Continuation of Ser. No. 415,579, Oct. 2, 1989, abandoned. This application Oct. 29, 1990, Ser. No. 605,174**

**Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3834996**

**Int. Cl.$^5$ B21C** *3/02*

U.S. Cl. 72—467 11 Claims



1. A moulding tool comprising an annular die having a moulding cavity and an outer peripheral surface, an inner ring abutting against the die outer peripheral surface under a radial bias and having an outer peripheral surface and an outer ring abutting against the inner ring outer peripheral surface under a radial bias, said outer ring surrounds said inner ring and said inner ring surrounds said annular die, the inner ring being made of a material having a higher modulus of elasticity than the material of each of the die and the outer ring.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,115
### METHOD AND APPARATUS FOR PRODUCING FRACTURED CHIPS WHEN PERFORMING A TURNING OPERATION

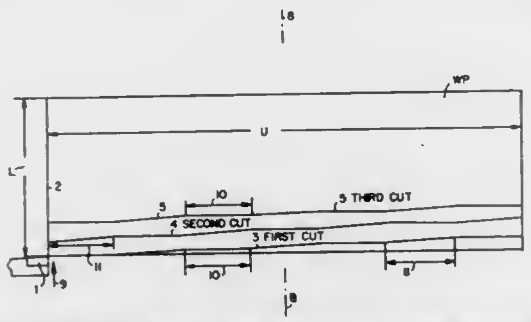
**Friedhelm Schneider, Wegberg; Klaus Koepnick, Solingen, and Henrik Wowra, Gangelt, all of Fed. Rep. of Germany, assignors to Firma Wilhelm Hegenscheidt Gesellschaft mbH, Erkelenz, Fed. Rep. of Germany**

**Filed Jun. 8, 1989, Ser. No. 364,692**

**Claims priority, application European Pat. Off., Jun. 14, 1988, 88109436.1**

**Int. Cl.$^5$ B23B** *1/00, 5/32, 25/02*

**U.S. Cl. 82—1.11** **13 Claims**



1. A method for fracturing chips during a turning operation on a revolving work piece in a lathe having a turning took, comprising the following steps:

(a) advancing said turning tool during first long time intervals along a contour to be machined on said work piece, at a first feed advance speed that is constant for forming substantially spiral portions of feed advance lines (3, 4, 5, 6) around said work piece contour,

(b) advancing said turning tool during second short time intervals with at least one second feed advance speed that differs from said first constant feed advance speed sufficiently to cause neighboring feed advance lines to approach each other during said second short time intervals for sufficiently reducing a cross-sectional dimension of said chips to assure a chip fracture, and

(c) controlling a succession of said first long time intervals and said second short time intervals in such a manner that said second short time intervals are short relative to the time duration of one work piece revolution and so that said first long time intervals are substantially longer than said second short time intervals, whereby said first and second time intervals alternate with each other as the work piece rotates.

---

### 5,019,116
### SEWING MACHINE APPARATUS FOR THE SUCCESIVE PRODUCTION OF A NUMBER OF STITCH GROUPS IN A WORKPIECE

**Gerhard Riss, Bielefeld, Fed. Rep. of Germany, assignor to Durkoppwerke GmbH, Fed. Rep. of Germany**

**Filed Jun. 5, 1989, Ser. No. 361,375**

**Claims priority, application Fed. Rep. of Germany, Jun. 7, 1988, 3819277**

**Int. Cl.$^5$ D05B** *21/00*

**U.S. Cl. 112—121.14** **10 Claims**

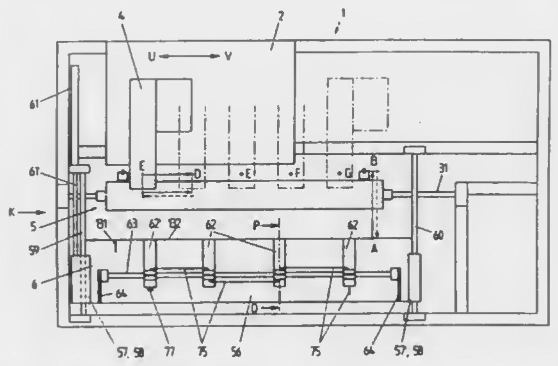
10. In a sewing machine, a carrier for positioning a workpiece on which repetitive sewing tasks are to be performed;

said carrier being adapted for linear movement in selected opposite directions;

a sewing device mounted on said carrier and movable therewith;

a clamp mounted for linear movement parallel to said carrier and engageable with said workpiece; said clamp being movable with said carrier and engaged with a workpiece for movement of said carrier and said clamp in one direction;

sewing material holding means which maintains said workpiece under tension continuously during said repetitive sewing tasks;



said clamp being separable from said workpiece immediately , before movement of said clamp in the opposite direction.

---

### 5,019,117
### PLASMA APPARATUS

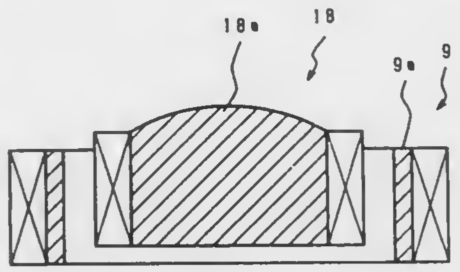
**Seiichi Nakamura; Satoshi Nakayama, and Takashi Inoue, all of Amagasaki, Japan, assignors to Sumitomo Metal Industries Ltd., Osaka, Japan**

**Continuation of Ser. No. 137,052, Dec. 23, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 364,585**

**Claims priority, application Japan, Dec. 29, 1986, 61-309560; Jun. 30, 1987, 62-164981; Jun. 30, 1987, 62-164982; Jul. 31, 1987, 62-193542; Sep. 16, 1987, 62-231343**

**Int. Cl.$^5$ C23C** *16/48*

**U.S. Cl. 118—723** **8 Claims**



1. A plasma apparatus, in which a plasma is generated within a plasma chamber by the use of an electron cyclotron resonance and the generated plasma is introduced into a sample chamber provided with a sample stage for placing a sample thereon through a plasma outlet window by the use of a magnetic field formed by an exciting coil disposed around said plasma chamber, comprising two electromagnets each having a cylindrical or columnar core with diameters different from each other and a coil wound around each core, said electromagnets being disposed concentrically with said exciting coil on a side opposite to the plasma outlet window relative to the sample on said sample stage for forming magnetic fields, the direction of the magnetic field generated by one of said electromagnets being the same as that of said exciting coil and the direction of the magnetic field generated by the other of said electromagnets being opposite to that of said exciting coil.

### 5,019,118
### BEARING STRUCTURE FOR TWO-CYCLE INTERNAL COMBUSTION ENGINE

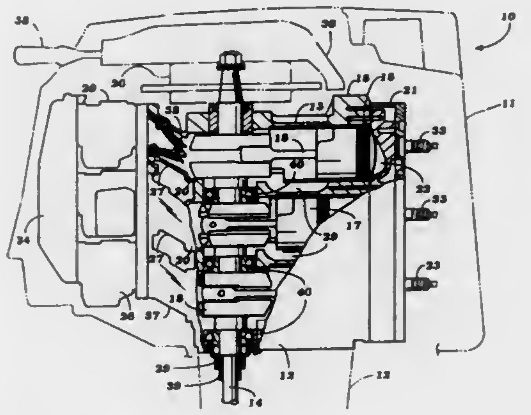
**Osamu Sakamoto, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

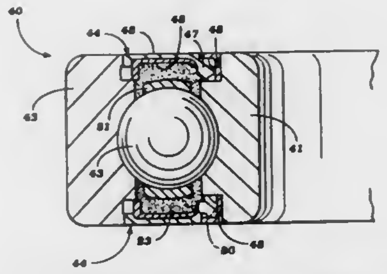
**Filed Jun. 28, 1989, Ser. No. 372,675**

**Claims priority, application Japan, Jun. 29, 1988, 63-162158**

**Int. Cl.$^5$ F16C** *33/76, 33/80*

**U.S. Cl. 123—196 W** **19 Claims**





1. In an internal combustion engine comprising a crankcase having at least one crank chamber, at least one bearing, and a crankshaft rotatably journaled within said crankcase and rotatably received by said bearing, the improvement comprising at least one seal member positioned outside of said crank chamber for sealing the inside of said bearing so as to prevent corrosion of said bearing and for preventing the fuel/air mixture within said crank chamber from passing through said bearing to the outside of said crank chamber.

---

### 5,019,119
### ELECTRO-RHEOLOGICAL FUEL INJECTOR

**Nicholas S. Hare, Sr., 252 Pineville Rd., Monroeville, Ala. 36460**

**Continuation-in-part of Ser. No. 405,769, Sep. 11, 1989, abandoned, which is a continuation-in-part of Ser. No. 399,178, Aug. 28, 1989, Pat. No. 4,930,463, which is a continuation-in-part of Ser. No. 339,748, Apr. 18, 1989, abandoned. This application Feb. 16, 1990, Ser. No. 481,308**

**Int. Cl.$^5$ F02M** *37/04*

**U.S. Cl. 123—500** **25 Claims**

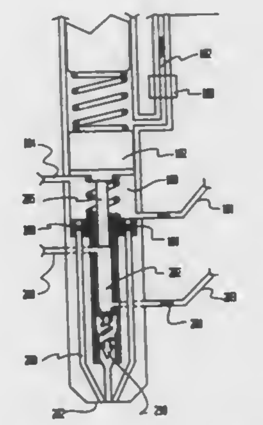
3. A fuel injector controlled by an electro-rheological valve comprising;

a generally cylindrical casing having a compression chamber for holding a quantity of fuel and a nozzle for injecting said fuel into an engine;

a fuel inlet for supplying a metered quantity of fuel to said compression chamber;

reciprocating telescoping plunger means housed within said chamber for driving said metered quantity of fuel into said nozzle, said telescoping plunger containing a fluid, the respective compression and decompression of said telescoping plunger being controlled by the movement of said fluid into and out of said plunger;

air compression means within said generally cylindrical casing for increasing the intensity of said fuel injection; and



electro-rheological valve means in series with said plunger for controlling the movement of said fluid into and out of said plunger, whereby the length of said plunger is varied and amount of fuel injected through said nozzle is adjusted.

---

### 5,019,120
### VAPOR-ACCELERATED COMBUSTION FUEL SYSTEM

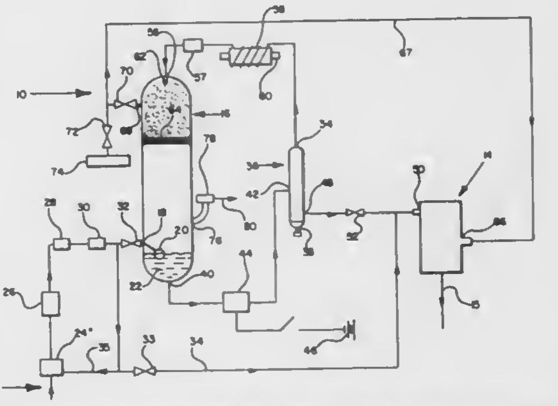
**Alfred M. Lewis, 3541 Delgany Dr., Charlotte, N.C. 28215, and James W. Cox, 309 Copper St., Asheboro, N.C. 27204**

**Continuation-in-part of Ser. No. 305,956, Feb. 2, 1989, Pat. No. 4,955,351. This application Sep. 14, 1989, Ser. No. 407,239**

**The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.**

**Int. Cl.$^5$ F02M** *31/00*

**U.S. Cl. 123—557** **9 Claims**



1. Apparatus for delivering vaporized and unvaporized fuel from a fuel source into a carburetor-based fuel delivery mechanism, said fuel delivery mechanism having an air filter, a choke, and a throttle, comprising:

(a) a container for holding vaporized and unvaporized fuel positioned between said fuel source and said fuel delivery mechanism;

(b) means for furnishing said container with a reservoir of unvaporized fuel from said fuel source;

(c) means for supplying said container with heated unvaporized fuel from said fuel source;

(d) means for supplying said fuel delivery mechanism with heated unvaporized fuel drawn from said reservoir;

VOL
1126
ISS
4
MY
28
1991
UMI

(e) means for vaporizing heated unvaporized fuel within said container;

(f) means associated with said container for removing excess fuel from said container; and

(g) means for providing said fuel delivery mechanism with vaporized fuel from said container,

whereby said container serves as a fuel bowl for said carburetor-based fuel delivery system.

---

### 5,019,121

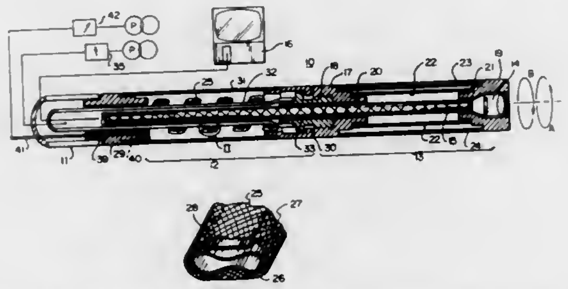
### HELICAL FLUID-ACTUATED TORSIONAL MOTOR

**Allan I. Krauter, Syracuse, N.Y., assignor to Welch Allyn, Inc., Skaneateles Falls, N.Y.**

**Filed May 25, 1990, Ser. No. 528,432**

**Int. Cl.⁵ A61B** *1/00;* **F01B** *19/00;* **F16J** *3/00*

**U.S. Cl. 128—4** **12 Claims**



1. A helical biased torsional fluid dynamic motor which comprises

an elongated elastomeric bladder in the form of a helix;

a tubular braid disposed over said bladder in said helix;

a helical spine that is resiliently flexible but is substantially inextensible and incompressible along the helix direction and disposed outside said bladder and adjacent said braid on the inner side of the helix;

means sealing said bladder at its ends;

means to communicate fluid pressure between a controlled fluid pressure source and the inside of said bladder to permit controlled inflation and deflation of said bladder;

anchor means at one of distal and proximal ends of said braid to which said one end is affixed,

swivel means at the other end of said braid to which said other end is affixed;

said fluid dynamic motor being operative such that when pressure is applied to said bladder the fluid expands the bladder radially but shortens the braid helically on the outside of the helix causing said swivel means to rotate in one direction, and when said pressure is relieved said spine acts to deflate said bladder and lengthen said braid on the outside of the helix causing said swivel means to rotate in the opposite direction.

6. An elongated flexible probe which comprises an elongated flexible insertion tube having a distal end, a helical biased torsional fluid dynamic motor disposed at the distal end of said insertion tube said motor including

an anchor attached onto said distal end of said insertion tube,

an elongated tubular elastomeric bladder in the form of a helix and having means sealing the ends thereof to define an interior thereof;

a tubular braid disposed over said bladder and in the form of said helix, with a proximal end of the braid secured to said anchor;

a helical spine that is resiliently flexible but is substantially incompressible along its helical direction, and disposed outside said bladder and adjacent said braid on a radially inward side of the helix;

swivel means disposed at a distal end of the braid and onto a portion of which said distal end of the braid is affixed;

said anchor including fluid conduit means extending through said insertion tube end communicating between a controlled fluid pressure source and the interior of said bladder, to permit controlled inflation and deflation of said bladder, such that when fluid pressure is applied to inflate said bladder, the fluid expands the bladder radially but shortens the braid helically on the outside of the helix thus causing said swivel to rotate in one direction, and such that when said pressure is relieved to deflate said bladder said spine acts to deflate said bladder and lengthens said braid on the outside of the helix thus causing said swivel means to rotate in the opposite direction; and

a tubular fluid-controlled biased bending neck supported on said swivel means and including means communicating with a second controlled fluid pressure source such that when pressure is applied from said second source to said bending neck the latter bends in one direction in a bending plane and when such pressure is relieved the bending neck bends in an opposite direction in said bending plane.

---

### 5,019,122

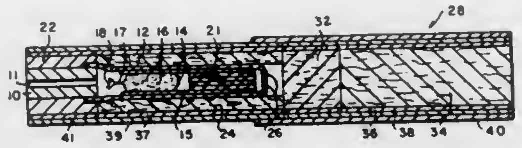
### SMOKING ARTICLE WITH AN ENCLOSED HEAT CONDUCTIVE CAPSULE CONTAINING AN AEROSOL FORMING SUBSTANCE

**Jack F. Clearman, Blakely, Ga.; William J. Casey; Olivia P. Furin, both of Clemmons, N.C., and Grant M. Stewart, Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Filed Aug. 21, 1987, Ser. No. 88,170**

**Int. Cl.⁵ A24D** *1/00, 1/18*

**U.S. Cl. 131—194** **15 Claims**



1. A smoking article comprising:

(a) a fuel element; and

(b) a heat conductive capsule located behind the fuel element which encloses an aerosol forming material and which, upon heating, undergoes a change in structure to release at least a portion of the aerosol forming material.

---

### 5,019,123

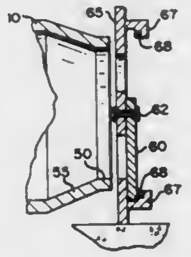
### PULP LOG DISCHARGE SYSTEM FOR A DEBARKING DRUM

**Ian J. H. Clarke-Pounder, and Edward L. Farrar, both of Nashua, N.H., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Jul. 3, 1990, Ser. No. 548,498**

**Int. Cl.⁵ B27L** *1/00*

**U.S. Cl. 144—208 B** **7 Claims**



1. A discharge control system for a pulp log debarking drum comprising:

means located at the discharge end of said drum for limiting axial discharge of bark and grit;

a fixed solid barrier having a substantially semi-circular discharge opening; and

a rotatable substantially semi-circular closure element proximate said solid barrier which by covering a portion of the opening in the fixed barrier, regulates the size of the discharge opening.

---

### 5,019,124

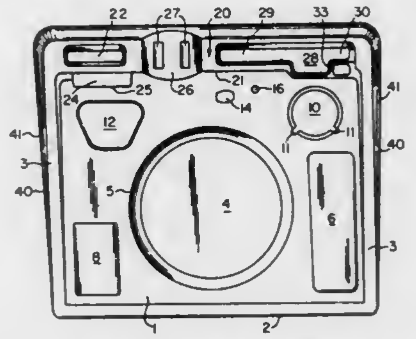
### TRAY

**Frederick F. Flugger, 1219 Muriel St., Pittsburgh, Pa. 15203**

**Filed May 29, 1990, Ser. No. 530,115**

**Int. Cl.⁵ B65D** *1/36*

**U.S. Cl. 206—45** **16 Claims**



1. A tray having a base, said base defined by two substantially parallel upper portions of sidewalls a forward edge extending between first ends of said upper portions and a raised back wall extending between second opposite ends of said side upper portions, an upstanding triangular sidewall below each of said upper portions, the apexes of said triangular sidewalls located at said forward edge of said base, said base including a continuously inclined base wall which extends at an upward angle from said forward edge to the base of said raised back wall and spaced below said upper sidewall portions, a plurality of individual depressions having different shapes and sizes formed in said base wall and a plurality of individual recess having different shapes and sizes formed in said raised back wall whereby each of said depressions and each of said recesses is adapted to hold an item, the exterior of each of said triangular sidewalls having recessed handle means formed therein for receiving the fingers of a hand whereby said tray can be easily lifted.

---

### 5,019,125

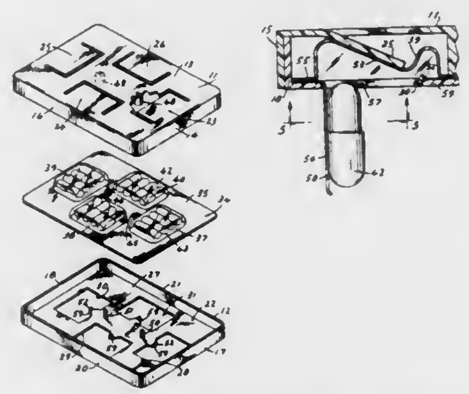
### DISPENSING CONTAINER

**Thomas M. Rebne, Lenexa, and David Esslinger, El Dorado, both of Kans., assignors to Marion Merrell Dow Inc., Kansas City, Mo.**

**Filed Jun. 26, 1990, Ser. No. 545,312**

**Int. Cl.⁵ B65D** *73/02*

**U.S. Cl. 206—532** **4 Claims**



1. A solid medicament dispensing device comprising:

a first member and a second member constructed and arranged to provide a container cavity;

at least one opening in one of said first and second members and at least one hinged contacting member in the other of said first and second members, said opening and said contacting member oppositely positioned and being in alignment;

a cartridge having a compartment for said solid medicament, said cartridge adapted to be positioned in said container cavity in a manner to align said compartment between said opening and said contacting member, said compartment composed in part of a severable material; and

piercing means positioned in said one member opposite said hinged contacting member;

so that with said compartment aligned in said container as previously defined and with said contacting member moved toward said opening, said contacting member will force said severable material against said piercing means and said medicament will be released from said severable material and out through said opening.

---

### 5,019,126

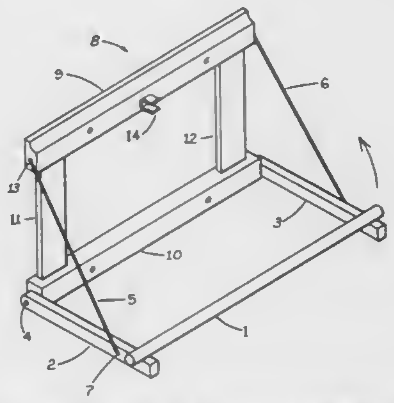
### FOLDABLE CLOTHES HANGER RAIL SYSTEM

**Steven W. Post, 3310 Redwood Cove, Jonesboro, Ark. 72401**

**Filed Mar. 1, 1990, Ser. No. 486,727**

**Int. Cl.⁵ A47F** *5/00*

**U.S. Cl. 211—104** **2 Claims**



1. A rail system suitable for holding a plurality of conventional clothes hangers comprising:

a rectangular frame capable of being securely mounted on a wall;

a pair of pivot members pivotally secured to said frame and moveable between a stored position adjacent said frame and an operable position extending outward therefrom;

a single rail fixedly mounted on and extending between said members, said rail and members defining an open space therebetween to permit hangers to engage said rail from a wide range of angles;

a pair of flexible cords secured to each of the members and the frame to hold said members in said operable position; and

means for releaseably holding said rail and said members in said stored position.

---

### 5,019,127

### DOSING A LIQUID

**Jürgen Böhm, Kaarst, and Georg Fischer, Velbert, both of Fed. Rep. of Germany, assignors to Benz & Hilgers GmbH, Dusseldorf, Fed. Rep. of Germany**

**Filed May 23, 1990, Ser. No. 528,127**

**Claims priority, application Fed. Rep. of Germany, Jun. 19, 1989, 3919913**

**Int. Cl.⁵ G01F** *11/00*

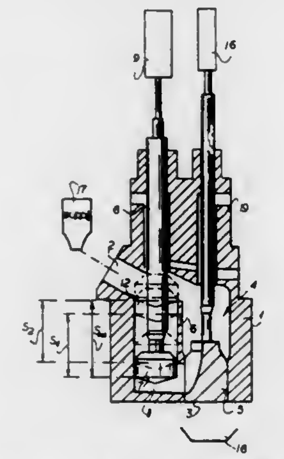
**U.S. Cl. 222—1** **6 Claims**

1. A method of operating an apparatus for dosing a liquid, the apparatus comprising:

a housing having

VOL
1126
ISS
4
MY
28
1991
UMI

an inlet connected to a supply of the liquid,
an outlet,
a filling chamber, and
a bypass chamber having an outlet side from which the outlet opens and an inlet side connected to the inlet;
a pumping piston subdividing the filling chamber into an inlet compartment into which the inlet opens and an outlet compartment;
a valve element in the housing movable between a filling position blocking the outlet and connecting the inlet through the bypass chamber with the outlet compartment and a feed position exposing the outlet and blocking flow between the inlet and the outlet compartment through the bypass chamber, the method comprising the steps of:

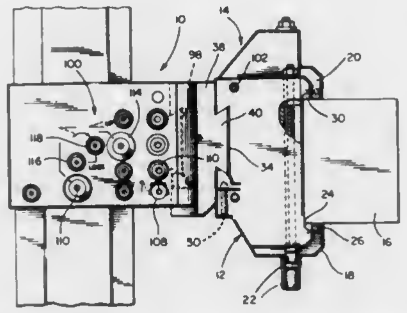


alternately retracting the piston through a back stroke while the element is in the filling position to draw liquid into the outlet compartment from the inlet through the bypass chamber and
advancing the piston through a predetermined advance stroke while the element is in the feed position to eject the drawn-in liquid from the outlet; and
at least periodically changing the length of the back stroke while maintaining the advance stroke always of the same length.

---

### 5,019,129
### WORKPIECE HOLDING SYSTEM

**Lars Johanson, 72 Hillsdale Rd., Cedar Grove, N.J. 07009**
**Filed Jul. 18, 1990, Ser. No. 553,751**
**Int. Cl.$^5$ B23Q** *3/02*
U.S. Cl. 269—71 **9 Claims**

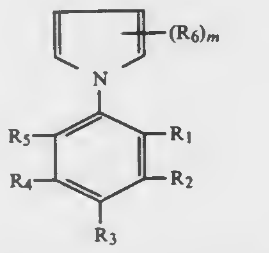


1. A workpiece holding system comprising a vise including a stationary jaw and a movable jaw with screw threaded means interconnecting the jaws to move them together, each of said jaws having a step adjacent its inner edge to provide a workpiece support surface, each of said jaws including a bendable workpiece engaging portion having a workpiece engaging surface thereon and being bendable about a point adjacent an outer edge portion whereby the workpiece gripping surfaces will move toward the steps on the jaws when clamping force is exerted by the jaws to bend the workpiece engaging portions, said workpiece engaging surfaces diverging outwardly and being bent to a position with the workpiece engaging surfaces parallel to the workpiece with the workpiece engaging surfaces not moving beyond a parallel relationship with the workpiece to provide a positive gripping action to the workpiece.

### 5,019,130
### SUBSTITUTED N-ARYL PYRROLES IN OXIDATIVE HAIR DYE COMPOSITIONS

**Lawrence A. Flood, Norwalk, Conn., assignor to Clairol Incorporated, New York City, N.Y.**
**Filed Nov. 3, 1989, Ser. No. 431,962**
**Int. Cl.$^5$ A61K** *7/13;* **C07D** *209/04*
U.S. Cl. 8—423 **17 Claims**

1. An oxidative hair dye composition for coloring keratinaceous substrates containing, as a reactive hair dye precusor, at least one compound of formula (I):



(I)

wherein at least two of $R_1$, $R_2$, $R_3$, $R_4$, and $R_5$ are not hydrogen and wherein they are otherwise independently selected from the group: H, OH, $NH_2$, halogen, $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, $C_{1-4}$ hydroxyalkyl, $NR_7R_8$ (in which $R_7$ is H, $C_{1-4}$ alkyl or $C_{1-4}$ hydroxyalkyl and $R_8$ is $C_{1-4}$ alkyl or $C_{1-4}$ hydroxyalkyl), or $—O(CH_2)_n—OR$ in which R is H or $C_{1-4}$ alkyl, and $n = 1-3$; $R_6$ is H, OH, $C_{1-6}$ alkyl, phenyl, halogen, carboxy, carboxaldehyde, nitro, amino, $C_{1-6}$ alkoxy, dialkylaminoalkyl (in which the alkyl groups contain 1–6 carbon atoms), $C_{1-6}$ hydroxyalkyl or $C_{1-6}$ alkenyl groups; and $m = 1-4$.

---

### 5,019,131
### REDYEING SUPPRESSED BLEACHED FABRIC

**James L. Nitsch, Jr., St. Louis, Mo., assignor to MMOQ, Ltd., St. Louis, Mo.**
**Filed Jul. 9, 1990, Ser. No. 549,617**
**Int. Cl.$^5$ D06P** *5/15;* **D06L** *3/00*
U.S. Cl. 8—457 **15 Claims**

1. A process for the redyeing of partially bleaching agent fabric to yield multicolored designs comprising the steps of:
(a) dyeing the fabric with a background first color;
(b) gathering selected areas of the dyed fabric to restrict access of further reagents;
(c) bleaching the gathered dyed fabric to remove the first color from the area outside the gathered areas; and
(d) redyeing the bleached areas with a second color.

---

### 5,019,132
### PROCESS FOR THE PREPARATION OF CONCENTRATED 1:2 METAL COMPLEX DYE PREPARATIONS

**Herb Davis, Forked River, N.J., and Charles R. Wetzel, High Point, N.C., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Filed Nov. 28, 1989, Ser. No. 442,101**
**Int. Cl.$^5$ C09B** *67/54, 45/01*
U.S. Cl. 8—527 **20 Claims**

1. A process for the preparation of a concentrated, aqueous, liquid dye formulation containing from 10 to 35 percent by weight of a 1:2 metal-complex dye or a mixture of 1:2 metal-complex dyes comprising the steps of:
(a) forming a moist filter cake comprising a metal-free azo or azomethine intermediate which is capable of metal complex formation and which contains at most one sulfonic acid group, the filter cake having a maximum sodium chloride less than about based on the dry weight;
(b) metallizing the metal-free intermediate by combining said filter cake with a complex-forming metal salt to form an aqueous slurry of 1:2 metal-complex dye; and
(c) diluting the aqueous slurry of 1:2 metal-complex dye to form the liquid dye formulation;
with the provisos that the liquid dye formulation is substantially free of organic solvents and lithium salts and that the process does not comprise a membrane separation step.

---

### 5,019,133
### METHOD FOR DYEING POLYESTER-CONTAINING FIBERS IN AN ALKALINE DYEING BATH AND DYEING ASSISTANT, AN AMINO-ACID COMPOUND

**Kiyoshi Himeno, Munakata, and Kazuhisa Konishi, Kitakyushu, both of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan**
**Filed Nov. 17, 1989, Ser. No. 437,622**
**Claims priority, application Japan, Nov. 25, 1988, 63-297420**
**Int. Cl.$^5$ D06P** *1/64, 3/54*
U.S. Cl. 8—531 **29 Claims**

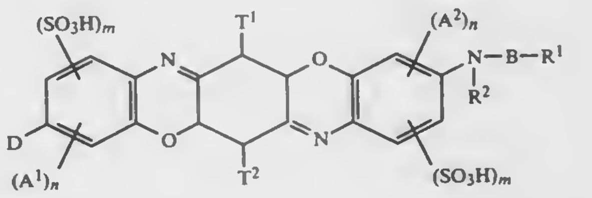
1. A method for dyeing polyester-containing fibers by using at least one disperse dye selected from the group consisting of axo type, anthraquinone type, phthalocyanine type, copper formazan type and quinophthalone type disperse dyes, wherein said dyeing is exhaustion dyeing conducted at 120° to 140° C. under an alkaline condition of pH 8 to 11 adjusted by an alkali metal hydroxide in an aqueous medium dyeing bath in the presence of at least one amino acid member selected from the group consisting of (a) neutral amino acids, (b) acidic amino acids, (c) basic amino acids, (d) alkali metal salts of said neutral amino acids, said acidic amino acids and said basic amino acids, and (e) amino acid derivatives, having at lest one hydrogen of the amino group of said neutral amino acids, said acidic amino acids, said basic amino acids and said alkali metal salts replaced with a $C_{1-4}$-alkyl, $C_{1-4}$-hydroxyalkyl or $C_{1-4}$-alkoxy-$C_{1-4}$-alkoxy-$C_{1-4}$-alkyl group, said amino acid member being present in an amount of from 0.02 to 0.8 g/l of the dyeing bath, provided that when a mixture of polyester fibers and cellulose fibers or natural or synthetic polyamide fibers is dyed in the same bath using a disperse dye and a reactive dye separately or a mixture of disperse and reactive dyes, the amino acid member is one selected from group (e) wherein both hydrogen atoms of the amino group are replaced with a $C_{1-4}$-alykl, $C_{1-4}$-hydroxyalkyl or $C_{1-4}$-alkoxy-$C_{1-4}$-alkyl group.

---

### 5,019,134
### REACTIVE DYES

**Denis R. A. Ridyard, Stockport, and Peter Smith, Bury, both of England, assignors to Imperial Chemical Industries PLC, London, England**
**Filed Aug. 8, 1989, Ser. No. 391,291**
**Claims priority, application United Kingdom, Aug. 17, 1988, 8819534; Oct. 18, 1988, 8824344**
**Int. Cl.$^5$ C09B** *62/44, 19/02;* **C07D** *265/38*
U.S. Cl. 8—549 **10 Claims**

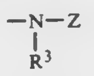
1. A triphenodioxazine reactive dye containing at least one fiber-reactive group, the dye, in the free acid form, having the formula:



wherein
each of $T^1$ and $T^2$, independently, represents H, Cl, Br, F, $SO_3H$ or an optionally substituted alkyl or aryl radical;
each of $A^1$ and $A^2$ represents alkyl, alkoxy, Cl, Br, COOH, $SO_3H$ or optionally substituted sulphamoyl;
n has a value of 0, 1 or 2;
m has a value of 1 or 2;

VOL
1126
ISS
4
MY
28
1991
UMI

$R^1$ represents H or a group of the formula:



$$-\underset{\displaystyle R^3}{\underset{|}{N}}-Z$$

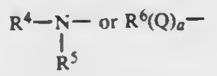
wherein

Z represents a fiber-reactive group;

each of $R^2$ and $R^3$, independently, represents H or an optionally substituted hydrocarbon radical;

B represents an optionally substituted divalent hydrocarbon radical; and

D represents a group of the formula



$$R^4-\underset{\displaystyle R^5}{\underset{|}{N}}- \text{ or } R^6(Q)_a-$$

wherein

$R^4$ represents an optionally substituted hydrocarbon radical free from fiber-reactive residues or an acyl radical;

$R^5$ represents H or an optionally substituted hydrocarbon radical;

$R^6$ represents H or an optionally substituted hydrocarbon radical free from fiber-reactive residues;

Q represents O or S; and

a has a value of 0 or 1.

---

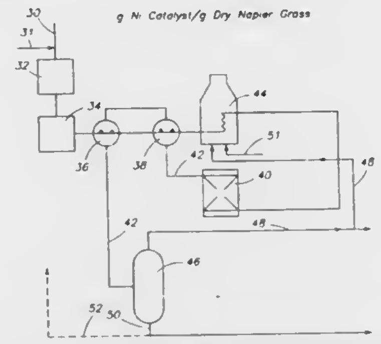
### 5,019,135
### METHOD FOR THE CATALYTIC CONVERSION OF LIGNOCELLULOSIC MATERIALS

**L. John Sealock, Jr., and Douglas C. Elliott, both of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.**

**Continuation-in-part of Ser. No. 107,175, Oct. 13, 1987, abandoned, which is a continuation of Ser. No. 773,338, Sep. 6, 1985, abandoned, which is a continuation of Ser. No. 380,027, May 20, 1982, abandoned. This application May 17, 1988, Ser. No. 194,804**

**Int. Cl.⁵ C10J** *3/00*

**U.S. Cl. 48—197 R** **18 Claims**



1. A method for converting lignocellulosic materials into a fuel gas, the method comprising:

maintaining, in a pressure reactor, at a temperature of 300° C. to 450° C. and a pressure of at least 100 atmospheres, lignocellulosic material and water in the presence of amounts of an alkali and of reduced nickel sufficient to catalyze a reaction of the lignocellulosic materials to produce a product gas composed primarily of methane, carbon dioxide and hydrogen.

---

### 5,019,136
### METHOD AND APPARATUS FOR SEPARATING GAS WITH A PUMP FROM A MEDIUM BEING PUMPED

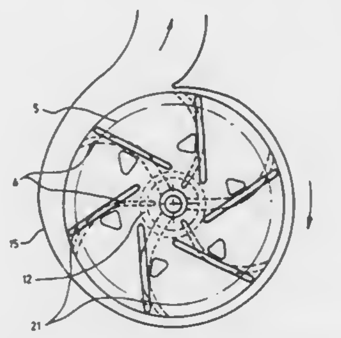
**Jorma Elonen, Jämsänkoski; Jukka Timperi; Reijo Vesala, both of Kotka, and Vesa Wikman, Kymi, all of Finland, assignors to A. Ahlstrom Corporation, Noormarkku, Finland**

**Filed Apr. 11, 1989, Ser. No. 336,208**

**Claims priority, application Finland, Apr. 11, 1988, 881660**

**Int. Cl.⁵ B01D** *19/00*

**U.S. Cl. 55—36** **36 Claims**



1. A method of separating gas with a centrifugal pump from a medium being pumped comprising:

introducing medium to be pumped through the pump inlet into said pump having a gas discharge system;

separating gas from said medium by the action of a plurality of rotating pumping vanes mounted on the impeller back plate and extending towards the pump inlet;

collecting said gas around the center of said centrifugal pump at the front side of the impeller;

discharging said gas from said impeller front side through a plurality of gas discharge openings each located adjacent said pumping vanes and extending through said impeller back plate towards the back side of said impeller; p1 providing a plurality of rear vanes at said back side of said impeller back plate so that, when viewed in a circumferential direction, said gas discharge openings in said impeller back plate are located between said rear vanes, the number of said rear vanes being greater than the number of said pumping vanes;

separating said medium travelled with said gas through said opening from said gas by means of said rear vanes; and

generating, by the rotation of said rear vanes, in said spaces between said rear vanes at said back side of said impeller back plate a combination of radial forces, forces directed parallel to the periphery of said impeller and inertial forces so as to prevent said flow of medium present in said spaces from entering the gas discharge system of said pump.

---

### 5,019,137
### METHOD FOR CLEANING GASES CONTAINING CONDENSABLE COMPONENTS

**Seppo K. Ruottu, Kotka, Finland, assignor to A. Ahlstrom Corporation, Karhula, Finland**

**Continuation of Ser. No. 852,950, Apr. 13, 1986, abandoned. This application Apr. 12, 1990, Ser. No. 508,497**

**Claims priority, application Finland, Sep. 14, 1984, 843606**

**Int. Cl.⁵ B01D** *53/12*

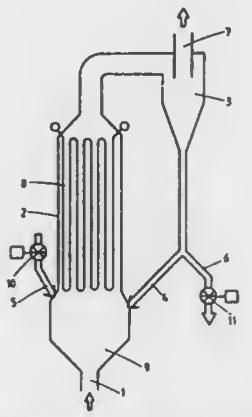
**U.S. Cl. 55—73** **21 Claims**

1. In a circulating fluidized bed reactor having a discrete lower mixing chamber in a lower part of the reactor and a discrete cooling zone, with a smaller cross-sectional area than the mixing chamber, in said reactor spaced above said mixing chamber and the mixing chamber and the cooling zone thus together forming a reactor chamber in the circulating fluidized bed reactor, a method for cleaning hot gases containing substantially predetermined condensable components, comprising the steps of:

(a) directing the hot gases containing the predetermined condensable components into the mixing chamber in said lower part of the circulating fluidized bed reactor, so as to fluidize the bed material in the fluidized bed reactor and transport particles through the mixing chamber and the cooling zone spaced above said mixing chamber;

(b) reducing the temperature of the hot gases in the mixing chamber, substantially by direct heat transfer, by mixing into the hot gases in the mixing chamber solid particles in an amount having a heat capacity sufficient to cool the gases therein essentially to the condensation temperature of substantially the entirety of the predetermined condensable components of the hot gases in the mixing chamber;

(c) directing the mixture of the solid particles and the gases concurrently as a gas-solid suspension having said reduced temperature upwards from the mixing chamber into the cooling zone and with increased velocity through the cooling zone for reducing the temperature of the solid particles and further reducing the temperature of the hot gases;



(d) discharging a mixture of cooled solid particles and gases from the cooling zone of the reactor and separating cooled particles from the gases in a particle separator connected to the outlet of the cooling zone;

(e) recirculating at least a part of the cooled separated particles into the mixing chamber, for cooling the hot gases therein;

(f) feeding additional solid particles into the mixing chamber for increasing the amount of solid particles and thereby the heat capacity flow of the solid particles in the mixing chamber for cooling the hot gases; and

(g) controlling the cooling of the hot gases in said mixing chamber by controlling at least the magnitude of one of the flow of the (1) cooled separated particles recirculated and (2) the additional solid particles fed into the mixing chamber thereby to enable the hot gases to be cooled in the mixing chamber to the condensation temperature of substantially the entirety of the predetermined condensable components thereof.

---

### 5,019,138
### OVERSPRAY REMOVAL SYSTEMS FOR COATING BOOTHS OR THE LIKE

**William J. Farrah, 41 Windemere Pl., Grosse Pointe Farms, Mich. 48236, and Jay W. Pease, 16628 E. Jefferson, Grosse Pointe Park, Mich. 48230**

**Filed May 23, 1989, Ser. No. 355,907**

**Int. Cl.⁵ B01D** *53/18*

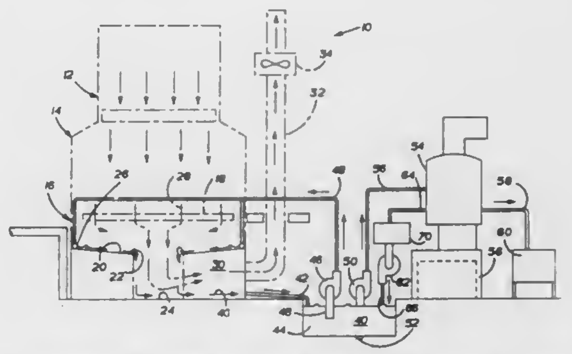
**U.S. Cl. 55—89** **8 Claims**

1. A method for removal of overspray in coating booths or the like, said method comprising the steps of:

providing a solubilizing paint solvent adjacent an area where a coating operating is being conducted;

contacting overspray from said coating operation with said paint solvent;

dissolving said coating overspray in said paint solvent such that said paint solvent and coating overspray form a paint solvent solution;



continually circulating said paint solvent solution to maintain said overspray and said paint solvent in the paint solvent solution; and

removing undesirable elements from said paint solvent solution.

---

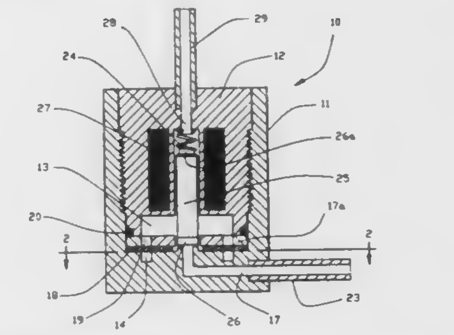
### 5,019,139
### VALVE MEMBRANE COMBINATION

**Mark A. LaPack, and James C. Tou, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 22, 1989, Ser. No. 455,472**

**Int. Cl.⁵ B01D** *53/22*

**U.S. Cl. 55—158** **19 Claims**



1. A valve, comprising:

(a) a semipermeable membrane having a first side and a second side;

(b) a body, the body defining a cavity therein, the cavity being partitioned by the membrane into a first cavity portion exposed to the first side of the membrane and a second cavity portion exposed to the second side of the membrane, the body having a first passageway thereinto, the body having a second passageway thereinto, the body having a third passageway thereinto, the first passageway having a first end opening into the first cavity portion and a second end opening to the exterior of the body, the second passageway having a first end opening into the first cavity portion and a second end opening to the exterior of the body, the third passageway having a first end opening into the second cavity portion and a second end opening to the exterior of the body, so that a fluid can be flowed through the first passageway, into the first cavity portion and then through the second passageway, the fluid containing a component that can permeate across the membrane into the second cavity portion and then can flow out of the body through the third passageway; and

(c) means for controllably closing the third passageway so

VOL
1126
ISS
4
MY
28
1991
UMI

that flow through the third passageway from the second cavity portion can be controllably stopped, the means for controllably closing the third passageway being positioned within the cavity.

---

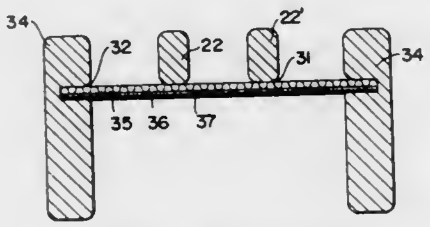
### 5,019,140
### IRRADIATED EXPANDED POLYTETRAFLUOROETHYLENE COMPOSITES, AND DEVICES USING THEM, AND PROCESSES FOR MAKING THEM

**John J. Bowser, Newark, Del., and Christopher T. Hyde, Lincoln University, Pa., assignors to W. L. Gore & Associates, Inc., Newark, Del.**

**Filed Dec. 21, 1988, Ser. No. 287,811**

**Int. Cl.$^5$ B01D** *19/00*

**U.S. Cl. 55—159** **14 Claims**



1. A radiation-resistant polytetrafluoroethylene composite comprising:

(a) a layer of woven metal material which has an elongation of less than 25% after 100 hours under a load of 2.0 pounds per inch, and

(b) a layer of microporous hydrophobic polytetrafluoroethylene membrane,

wherein the properties of the layers are such that the composite is capable of withstanding either (i) at least 20 pounds per square inch of pressure, or (ii) the water entry pressure of the membrane, whichever is less, for 100 hours in the Pressurization Test without rupturing.

---

### 5,019,141
### VENT LINE SEPARATOR

**Jeffrey H. Granville; John Church, and David H. Hodgkins, all of Modesto, Calif., assignors to Parker Hannifin Corp., Cleveland, Ohio**

**Filed Oct. 11, 1990, Ser. No. 596,201**

**Int. Cl.$^5$ B01D** *19/00*

**U.S. Cl. 55—170** **11 Claims**

1. A liquid storage tank vent line separator, comprising:

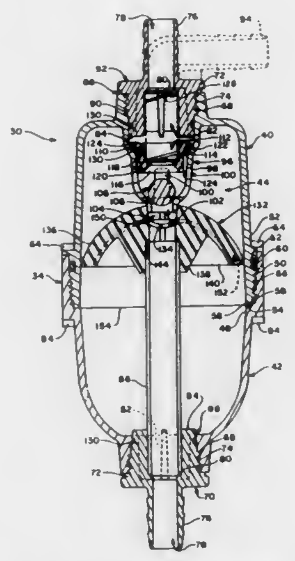
means for defining a chamber;

means for introducing liquid and gas fluid into said chamber means;

means for providing fluid communication between said chamber means and the atmosphere;

means in said chamber for diverting the flow of liquid from said introducing means to a lower portion of said chamber means and to permit the flow of vapor and gas to said fluid communication means and to permit the flow of atmospheric gas from the atmosphere through said fluid communication means to said fluid introducing means;

valve means for selectively permitting the flow of liquid and gas through said fluid communication means such that liquid is permitted to flow through said fluid communication means only above a predetermined liquid pressure in said chamber means; and



means for returning liquid in said lower portion of said chamber means to said introducing means.

---

### 5,019,142
### SOOT FILTER FOR DIESEL VEHICLES

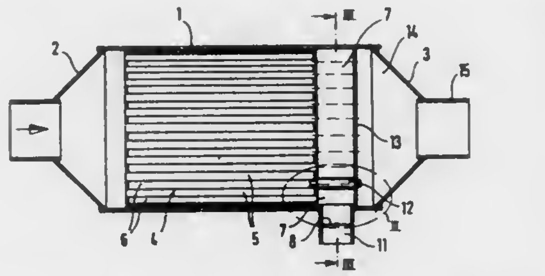
**Gerhard Waschkuttis, Haustrasse 52, 8551 Wiesenthau, Fed. Rep. of Germany**

**Filed May 16, 1989, Ser. No. 353,748**

**Claims priority, application European Pat. Off., May 17, 1988, 8806440.9**

**Int. Cl.$^5$ B01D** *46/24*

**U.S. Cl. 55—429** **14 Claims**



1. A soot filter for diesel engines comprising:

an encased filter unit having a first and second end, said filter unit attached at said fist end to an exhaust gas supply from said diesel engine and attached at said second end to an exhaust discharge line, whereby unrefined exhaust gases from said diesel engine enter said filter unit at said first end and whereby refined exhaust gases may exit said filter unit at said second end, said filter unit including:

a plurality of first elongated hollow parallel channels, each of said first channels having a first and second end, said first end open to said exhaust gas supply from said diesel engine:

a plurality of second elongated hollow parallel channels, each of said second channels having a first and second end, said second end of said second parallel channels being in communication with a refined gas discharge line, said first end of said second parallel channels are separated by filter walls; and,

means exhausting said unrefined exhaust gases through said second end of each of said first parallel channels to a

closable soot discharge vent when said closable soot discharge vent is open.

---

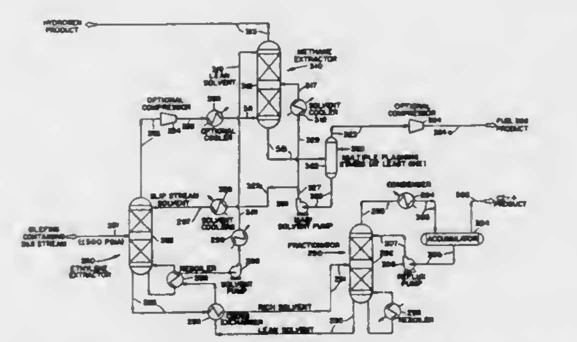
### 5,019,143
### LOW PRESSURE NONCRYOGENIC PROCESSING FOR ETHYLENE RECOVERY

**Yuv R. Mehrta, P.O. Box 670926, Houston, Tex. 77267-0926**

**Continuation-in-part of Ser. No. 100,242, Sep. 23, 1987, Pat. No. 4,832,718, which is a continuation-in-part of Ser. No. 74,226, Jul. 16, 1987, Pat. No. 4,883,514, which is a continuation-in-part of Ser. No. 24,561, Mar. 11, 1987, Pat. No. 4,740,222, which is a continuation-in-part of Ser. No. 854,383, Apr. 21, 1986, Pat. No. 4,743,282, which is a continuation-in-part of Ser. No. 828,996, Feb. 13, 1986, Pat. No. 4,696,688, and a continuation-in-part of Ser. No. 828,988, Feb. 13, 1986, Pat. No. 4,680,042, each is a continuation-in-part of Ser. No. 808,463, Dec. 13, 1985, Pat. No. 4,692,179, which is a continuation-in-part of Ser. No. 784,566, Oct. 4, 1985, Pat. No. 4,817,038, which is a continuation-in-part of Ser. No. 759,327, Jul. 26, 1985, Pat. No. 4,623,371, which is a continuation-in-part of Ser. No. 758,351, Jul. 24, 1985, Pat. No. 4,601,738, which is a continuation-in-part of Ser. No. 637,210, Aug. 3, 1984, Pat. No. 4,578,094, which is a continuation-in-part of Ser. No. 532,005, Sep. 14, 1983, Pat. No. 4,526,594, which is a continuation-in-part of Ser. No. 507,564, Jun. 24, 1983, Pat. No. 4,511,381, which is a continuation-in-part of Ser. No. 374,270, May 3, 1982, Pat. No. 4,421,535. This application Jun. 24, 1988, Ser. No. 211,466**

**Int. Cl.$^5$ F25J** *3/00*

**U.S. Cl. 62—17** **27 Claims**



1. A process for recovering ethylene from a hydrocarbon gas feed stream containing components selected from the group consisting of hydrogen, nitrogen, methane, carbon monoxide, at least 5 mol % of ethylene, ethane, heavier saturated and unsaturated hydrocarbons and mixtures thereof which comprises:

A. countercurrently contacting said hydrocarbon gas feed stream with a lean physical solvent selected from the group consisting of:

1) paraffinic solvents having molecular weights ranging from 75 to 140 and UOP characterization factors ranging from 12.0 to 13.5, said factors being independent of the aromatic content of said paraffinic solvents,

2) naphthenic solvents having molecular weights ranging from 75 to 130 and UOP characterization factors ranging from 10.5 to 12.0, said factors being independent of the aromatic content of said naphthenic solvents,

3) benzene, toluene, $C_8$–$C_{10}$ aromatic compounds having methyl, ethyl or propyl aliphatic groups specifically constituting a subgroup of o-xylene, m-xylene, p-xylene, hemimllitene, pseudocumene, mesitylene, cumene, o-ethyltoluene, m-ethyltoluene, p-ethyltoluene, n-propylbenzene, isopropylbenzene, indane, durene, isodurene, prehnitene, crude xylenes, toluene transalkylation reaction effluents, extracted $C_9$ naphtha reformates, $C_9$ heart cuts of said reformates which are enriched in $C_9$ alkylbenzenes, $C_7$–$C_9$ alkyl aromatics, and mixtures thereof; and

4) dialkyl ethers of polyalkylene glycol, N-methyl pyrollidone, dimethylformamide, propylene carbonate, sulfolene and glycol triacetate,

to produce an overhead stream which contains at least hydrogen and methane and an ethylene rich solvent bottoms stream having the methane content of final fractionated ethylene product corresponding to chemical grade ethylene of less than 5 mol % methane to polymer grade ethylene having its methane content ranging between 400 and 10 parts per million by weight, said countercurrent contacting taking place in a demethanizing-absorber column equipped with at least one reboiler and operating at pressures between 50 psig and 400 psig, and said lean physical solvent entering the top of the demethanizer-absorber column at 30 10° F. to −40° 1 F.; and

B. regenerating the ethylene rich solvent in a distillation column equipped with at least one reflux condenser and at least one reboiler to produce ethylene plus hydrocarbon product as an overhead stream and said lean physical solvent as a bottom stream, said ethylene plus hydrocarbon product being suitable for bypassing a downstream demethanizer.

---

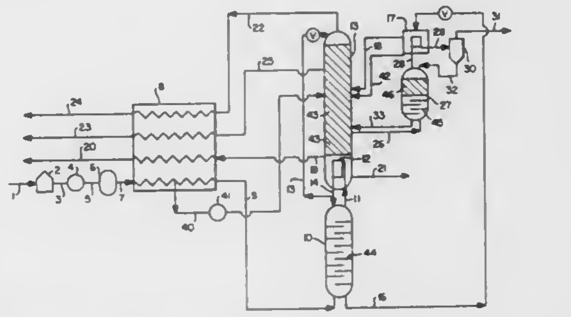
### 5,019,144
### CRYOGENIC AIR SEPARATION SYSTEM WITH HYBRID ARGON COLUMN

**Richard A. Victor; Michael J. Lockett, both of Grand Island, and James R. Dray, Kenmore, all of N.Y., assignors to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.**

**Continuation of Ser. No. 468,875, Jan. 23, 1990, abandoned. This application Jun. 19, 1990, Ser. No. 540,313**

**Int. Cl.$^5$ F25J** *3/04*

**U.S. Cl. 62—22** **27 Claims**



1. Method for cryogenic rectification comprising:

(A) providing feed comprising oxygen, nitrogen and argon into a main column system comprising at least one rectification column;

(B) separating the feed by countercurrent vapor-liquid contact within the main column system into nitrogen-rich and oxygen-rich components;

(C) passing fluid comprising argon and oxygen from said main column system into an argon column having an upper portion and a lower portion;

(D) separating the fluid by countercurrent vapor-liquid contact within the argon column into argon-enriched and oxygen-enriched components; and

(E) carrying out the countercurrent vapor-liquid contact in the argon column on vapor-liquid contacting elements comprising trays in the lower portion of the argon column, and on vapor-liquid contacting elements comprising packing in the upper portion of the argon column.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,145
### ARGON PURIFICATION

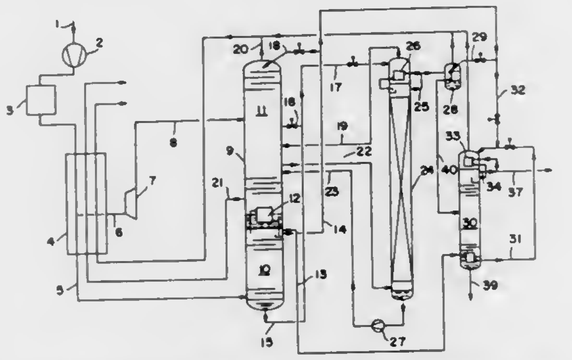
**Wilhelm Rohde, Munich, and Horst Corduan, Puchheim, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany**

**Filed Nov. 30, 1989, Ser. No. 443,529**

**Claims priority, application Fed. Rep. of Germany, Dec. 1, 1988, 3840506**

**Int. Cl.$^5$ F25J** *3/04*

**U.S. Cl. 62—22** **6 Claims**



1. In a process for air separation by low temperature rectification of air, in which air is compressed, prepurified, cooled, fed to a double rectification column comprising a high pressure column having a top and a bottom, said top being in heat exchange relationship with a low pressure column, and separated into an oxygen-rich and a nitrogen-rich fraction, and from the low pressure column of the rectification, an oxygen fraction enriched with argon is removed and, in a crude argon rectification, is separated into crude argon and a higher boiling residual fraction, the improvement which comprises conducting the crude argon rectification in a column having a head condenser, at least 150 theoretical plates, and provided with low pressure drop structured packings or fillings; and cooling the head condenser with liquid from the bottom of the high pressure column, said crude argon rectification resulting in a sufficient separation of oxygen to eliminate any use of a deoxo unit to remove oxygen from the resultant argon.

---

### 5,019,146
### METHOD FOR PRODUCING GLASS

**Koichi Hara, Ome, Japan, assignor to Hoya Corporation, Tokyo, Japan**

**Filed Apr. 23, 1990, Ser. No. 511,423**

**Claims priority, application Japan, Apr. 28, 1989, 1-111496**

**Int. Cl.$^5$ C03B** *19/06*

**U.S. Cl. 65—18.1** **12 Claims**

1. A method for producing a glass which comprises hydrolyzing a metal alkoxide in the presence of an organic solvent and ammonia water to obtain a sol solution, concentrating the resulting sol solution until a volume of the sol solution reaches 1.00–1.95 times the volume of the metal alkoxide, then gelling the concentrated sol solution with addition of a mixed solution Of an aqueous catalyst solution and an organic solvent, drying the resulting gel and thereafter heating the dry gel to sinter it.

---

### 5,019,147
### MOLD ARM CLOSING MECHANISM FOR AN INDIVIDUAL SECTION MACHINE

**Gary R. Voisine, E. Hartford, and Kenneth L. Bratton, Enfield, both of Conn., assignors to Emhart Industries, Inc., Towson, Md.**

**Filed Oct. 1, 1990, Ser. No. 591,427**

**Int. Cl.$^5$ C03B** *9/40*

**U.S. Cl. 65—360** **1 Claim**

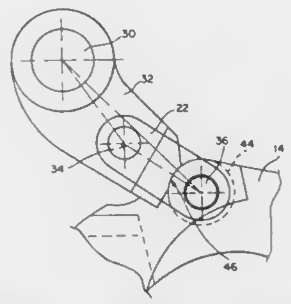
1. A mold closing mechanism for an individual section machine comprising

a mold support pivotally mounted on a pivot shaft and including a cylindrical pin extending parallel to said shaft

a driving post including an integral lever arm having a cylindrical pin extending in a direction parallel to the axis of said shaft,

a link interconnecting said cylindrical pin on said lever arm and said cylindrical pin on said mold support, the hole in said link around said mold support pin being selectively larger than said cylindrical pin,

said lever arm having a cam surface on the free end thereof, and



a cylindrical follower matingly received on said mold support pin,

said cam surface being selectively configured so that as said lever arm is rotated from a retracted position to an advanced position said cam surface will engage said cylindrical follower and forcefully pivot said mold support to said advanced position whereat the line of force between said mold support and said lever arm will lie on a line extending between the axis of said driving post and the axis of said mold support pin.

---

### 5,019,148
### HOMOGENEOUS MINERAL GRANULES BY ACID-BASE REACTION

**William P. Moore, Hopewell, Va., assignor to Agrinutrients Technology Group, Inc., Disputanta, Va.**

**Filed Jun. 14, 1988, Ser. No. 206,298**

**Int. Cl.$^5$ C05G** *3/00, 3/06, 3/10*

**U.S. Cl. 71—11** **19 Claims**

1. A stepwise method of preparing mineral granules useful in agriculture by coreacting acids and bases exhibiting abilities to form transient adhesives which will harden to form strong cements, comprising:

(a) commingling the acids and bases by mechanical means until the acids and bases have coreacted to form a transient fluid adhesive amounting to more than 25 percent of the mineral granules, the mechanical means comprising shear forces between a cylindrical vessel moving circularly around its longitudinal axis and an internal agitator rotating parallel, and in close proximity, to the vessel but in an opposite direction, the commingled acids being selected from the group consisting of sulfuric, phosphoric, polyphosphoric, acetic, propionic, oxalic, butyric, and citric acids, and the commingled bases being selected from the group consisting of calcium carbonate, calcium oxide, magnesium oxide, magnesium carbonate, ammonia alkali metal hydroxide, and alkali metal carbonate;

(b) comminuting the transient fluid adhesive, by the mechanical means used to commingle the acids and bases, until the transient fluid adhesive is reduced to particles smaller than the mineral granules to be prepared;

(c) admixing, by the mechanical means used to commingle and comminute, the transient fluid adhesive with particulate minerals useful as animal feed supplements and plant nutrients, which exhibit diameters between 0.03 and 1.0 millimeters and do not affect the ability of the fluid adhesive to harden, the admixing continuing until a mass of homogeneous plastic agglomerates are formed and forced by the mechanical means to a narrow particle size range;

(d) rolling the mass of plastic agglomerates along the wall of a cylindrical vessel, rotating around its longitudinal axis, until the fluid adhesive hardens to form a cement which binds the particulate minerals together as homogeneous attrition resistant mineral granules.

---

### 5,019,149
### FERTILIZER AND METHOD FOR FOLIAR TREATMENT OF IRON-DEFICIENT PLANTS

**Edwin F. Hawkins, Baton Rouge, La.; John G. Clapp, Jr., Greensboro, and James E. Sansing, Ashboro, both of N.C.**

**Continuation-in-part of Ser. No. 338,465, Jan. 11, 1982, abandoned, which is a continuation of Ser. No. 115,455, Jan. 25, 1980, abandoned. This application Sep. 23, 1985, Ser. No. 778,865**

**Int. Cl.$^5$ C05C** *9/00, 13/00;* **C05G** *3/00*

**U.S. Cl. 71—29** **21 Claims**

1. An iron-supplement foliar fertilizer composition for foliar-application to iron-deficient plants, consisting essentially of: a first composition consisting essentially of complexing agent, ferric iron, a water-soluble nitrogen-source, at a pH ranging from about pH 6 to about pH 7, total nitrogen from said nitrogen-source being at-least 9% by weight and having a ratio to said ferric iron of at-least 3/1, said complexing agent being present at a mole ratio from about 0.5 to about 2 relative to ferric iron, up to a phosphate percentage of about 1.5% of phosphate by weight, and a second composition comprising water, said water being present in a diluting amount sufficient such that said first composition is in aqueous solution therein, ferric iron being more than 50% of all iron present.

---

### 5,019,150
### HERBICIDAL OIL IN WATER COMBINATION COMPOSITIONS OF IMIDAZOLINONE HERBICIDES

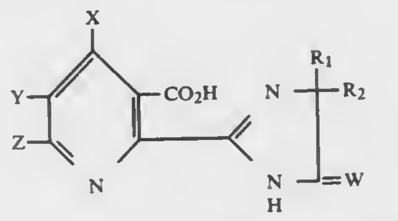
**Craig A. Martin, Pennington, and Jerry L. Johnson, Lawrenceville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 327,499, Mar. 23, 1989, Pat. No. 4,971,617, which is a division of Ser. No. 7,068, Jan. 27, 1987, Pat. No. 4,822,405. This application Aug. 20, 1990, Ser. No. 569,886**

**Int. Cl.$^5$ A01N** *43/50, 33/06*

**U.S. Cl. 71—90** **7 Claims**

1. A herbicidal concentrated oil in water emulsion composition comprising on a weight basis about 0.5% to 10% of a water soluble salt of an imidazolinyl acid represented by formula (I) below



(I)

wherein W is oxygen or sulfur; X is H, halogen, methyl or hydroxyl;

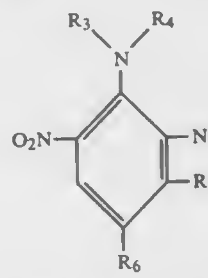
Y and Z are each hydrogen, halogen, $C_1$–$C_6$ alkyl, hydroxyloweralkyl, $C_1$–$C_6$ alkoxy, $C_1$–$C_4$ alkylthio, phenoxy, $C_1$–$C_4$ haloalkyl, nitro, cyano, $C_1$–$C_4$ alkylamino, diloweralkylamino or $C_1$–$C_4$ alkylsulfonyl group or phenyl optionally substituted with one $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy or halogen; difluoromethoxy, trifluoromethoxy, 1,1,2,2-tetrafluoroethoxy, $C_3$–$C_8$ straight or branched alkenyloxy optionally substituted with one to three halogens, or $C_3$–$C_8$ straight or branched alkynyloxy optionally substituted with one to three halogens;

and, when taken together Y and Z may form a ring which may optionally be substituted, in which YZ or ZY are represented by $—(CH_2)_n—$, $—(CH)_n—$, where n is an integer of 3 or 4, or $—(CH_2)_2—Q—$ or $—(CH)_2—Q—$, wherein Q is oxygen or sulfur, with the proviso that X is hydrogen;

$R_1$ is $C_1$–$C_4$ alkyl;

$R_2$ is $C_1$–$C_4$ alkyl or $C_3$–$C_6$ cycloalkyl; and when $R_1$ and $R_2$ are taken together with the carbon to which they are attached they may represent $C_3$–$C_6$ cycloalkyl optionally substituted with methyl;

5% to 45% of a herbicidal dinitroaniline derivative represented by formula (II) below



(II)

where $R_3$ is hydrogen, $C_2$–$C_4$ alkyl or chloroethyl, $R_4$ is $C_2$–$C_5$ alkyl, chloroethyl, 2-methallyl or cyclopropylmethyl, $R_5$ is hydrogen, methyl or amino and $R_6$ is trifluoromethyl, $C_1$–$C_3$ alkyl, $—SO_2NH_2$ or $SO_2CH_3$; with the proviso that formula (II) cannot be alpha,alpha,alpha-trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine; and with the further proviso that when Y and Z of formula (I) do not form a ring in which YZ or ZY are represented by $—(CH_2)_2—Q—$ or $—(CH)_2—Q—$, wherein Q is oxygen or sulfur, then formula (II) cannot be N-(1-ethylpropyl)-2,6-dinitro-3,4-xylidine;

5% to 40% of a water immiscible solvent;

0.5% to 5.0% of an alkylphenol polyethylene oxide condensate;

0.5% to 5.0% of an ethylene oxide/propylene oxide block copolymer;

0% to 5.0% of an anionic dispersant; and

sufficient water to total 100%.

---

### 5,019,151
### 2-PHENOXYPRIMIDINE DERIVATIVE AND HERBICIDAL COMPOSITION

**Nobuhide Wada; Yoshihiro Saito, both of Shizuoka; Shoji Kusano, Hamamatsu; Yasufumi Toyokawa, Shizuoka; Takeshige Miyazawa, Shizuoka; Satoru Takahashi, Shizuoka, and Takayoshi Takehi, Shizuoka, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan**

**Division of Ser. No. 181,319, Apr. 13, 1988, Pat. No. 4,946,495. This application Apr. 19, 1990, Ser. No. 511,346**

**Claims priority, application Japan, Apr. 14, 1987, 62-91783; Apr. 14, 1987, 62-91786; Dec. 5, 1987, 62-308283; Dec. 28, 1987, 62-336251**

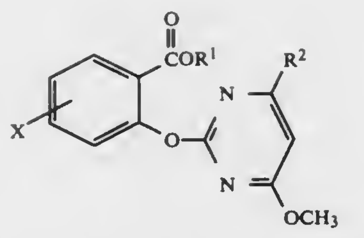
**The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.**

**Int. Cl.$^5$ A01N** *43/54;* **C07D** *239/34, 239/52, 239/60*

**U.S. Cl. 71—92** **9 Claims**

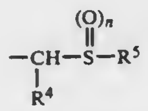
1. A 2-phenoxypyrimidine derivative having the formula (I):

VOL
1126
ISS
4
MY
28
1991
UMI



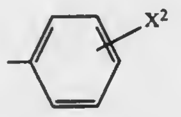
(I)

wherein X is a halogen atom; $R^1$ is a hydrogen atom or —$(CH_2)_m$ $R^3$, wherein $R^3$ is a cyano group, a formyl group, a lower dialkylamino group, a phenyl group, a pyridyl group, a trimethylsilyl group, a naphthyl group, a lower alkoxycarbonyl group, a benzoyl group, a lower alkylthio group, a phenylthio group, a lower alkylsulfonyl group or a benzyloxy group; and m is 1, 2 or 3, or a group of the formula:

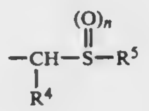


$$-\underset{R^4}{\underset{|}{CH}}-\overset{(O)_n}{\overset{\|}{S}}-R^5$$

wherein $R^4$ is a hydrogen atom or a lower alkyl group; $R^5$ is a lower alkyl group or a group of the formula:



wherein $X^2$ is a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group or a nitro group; n is 0 or 1, provided that when $R^5$ is an alkyl group, n is 1; and $R^2$ is a chlorine atom or a methoxy group; and when $R^1$ is a group of the formula:



$$-\underset{R^4}{\underset{|}{CH}}-\overset{(O)_n}{\overset{\|}{S}}-R^5$$

X is a chlorine atom at the 6-position and $R^2$ is a methoxy group; and when $R^1$ is —$(CH_2)_m R^3$, X is a halogen atom at the 6-position.

9. A herbicidal composition, which comprises a herbicidally effective amount of a 2-phenoxypyrimidine derivative of the formula (I) as defined in claim **1**, and an agricultural adjuvant.

**5,019,152**

### SUBSTITUTED TETRAZOLINONES AND THEIR USE AS HERBICIDES

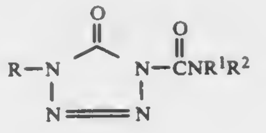
**Rupert A. Covey, Bethany; Patricia Forbes, Waterbury; Allyn R. Bell, and Allen R. Blem, both of Cheshire, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.**

**Division of Ser. No. 282,424, Dec. 9, 1988, which is a division of Ser. No. 860,712, May 7, 1986, Pat. No. 4,830,661, which is a continuation-in-part of Ser. No. 737,371, May 23, 1985, Pat. No. 4,826,529, which is a continuation-in-part of Ser. No. 560,031, Dec. 9, 1983, Pat. No. 4,618,365. This application Jul. 5, 1990, Ser. No. 548,151**

**Int. Cl.⁵ A01N** *43/48, 43/64, 43/713*

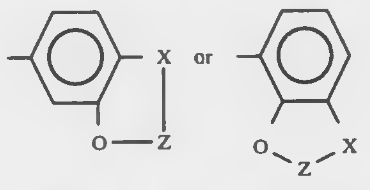
**U.S. Cl. 71—92** **2 Claims**

1. A method for controlling weeds by applying to the locus where the control of weeds is desired a herbicidally effective amount of a compound having the formula:



wherein R is:
- $C_1$–$C_4$ alkyl,
- phenyl, or
- phenyl substituted with at least one member of the group consisting of:
  - $C_1$–$C_3$ alkyl and
  - $C_1$–$C_3$ alkoxy;

$R^1$ is $C_1$–$C_4$ alkyl; and
$R^2$ is a radical having the formula:



wherein X is oxygen or $CH_2$, and
Z is —$CH_2$—$CH_2$ or —$CR^9R^{10}$— wherein $R^9$ and $R^{10}$ are the same or different and are hydrogen or methyl.

**5,019,153**

### SUBSTITUTED PYRIDINE HERBICIDES

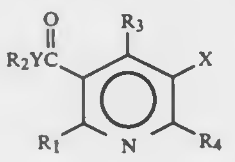
**Len F. Lee, St. Charles, Mo., and Mark G. Dolson, San Pablo, Calif., assignors to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 861,954, May 12, 1986, Pat. No. 4,885,026. This application Dec. 1, 1989, Ser. No. 444,587**

**Int. Cl.⁵ C07D** *213/80;* **A01N** *43/40*

**U.S. Cl. 71—94** **18 Claims**

1. A compound having the structural formula



wherein:
- Y is selected from O and S;
- $R_1$ and $R_4$ are independently selected from fluorinated methyl, chlorofluorinated methyl, and $C_1$–$C_4$ alkyl, provided that not both $R_1$ and $R_4$ may be $C_1$–$C_4$ alkyl;
- $R_2$ is selected from hydrogen, lower alkyl, haloalkyl, alkenyl, alkynyl, haloalkenyl, and a cation;
- $R_3$ is selected from $C_1$–$C_5$ alkyl, cycloalkyl, cycloalkylalkyl, hydroxy, and alkoxy; and
- X is selected from a halogen.

**5,019,154**

### SUBSTITUTED PHTHALIMIDO CYCLOHEXANECARBOXAMIDES AND THE USE THEREOF FOR ENHANCING GROWTH OF HYBRID TEA ROSE PLANTS

**Cyril A. Kust, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Dec. 11, 1989, Ser. No. 448,771**

**Int. Cl.⁵ A01N** *43/38*

**U.S. Cl. 71—96** **10 Claims**

1. A method for enhancing axillary bud growth of a hybrid tea rose stem which comprises applying to the roots, stems or foliage of a hybrid tea rose plant or to the soil in which the

plant is grown, an effective axillary bud growth enhancing amount of a compound 1-(3-chloro-4-methyl-phthalimido)-cyclohexanecarboxamide or 1-(3-chlorophthalimido)-cyclohexanecarboxamide.

**5,019,155**

### HERBICIDAL GRANULAR COMPOSITIONS

**Masaomi Kimpara, Hamamatsu; Kaiji Kawai, Toyohashi; Hiroshi Kikuchi, and Masai Sato, both of Iwaki, all of Japan, assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Jul. 14, 1989, Ser. No. 380,846**

**Claims priority, application Japan, Jul. 15, 1988, 63-175305**

**Int. Cl.⁵ A01N** *33/04*

**U.S. Cl. 71—121** **7 Claims**

1. Herbicidal fine granular compositions comprising on a weight to weight basis about 0.5% to 5.0% of N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitroaniline(pendimethalin); about 1.0% to 10.0% of an organic solvent having a boiling point greater than 150° C.; about 85% to 98.5% of a spherical granular carrier having an average diameter in a range of about 60μ to 750μ; and about 0% to 2% of a stabilizing agent.

**5,019,156**

### SINTERED ELECTRIC CONTACT MATERIAL FOR VACUUM SWITCH TUBE AND PROCESS FOR MANUFACTURING THE SAME

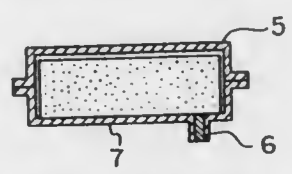
**Eizo Naya, and Mitsuhiro Okumura, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 17, 1990, Ser. No. 524,418**

**Claims priority, application Japan, Jun. 5, 1989, 1-142446**

**Int. Cl.⁵ B22F** *9/00*

**U.S. Cl. 75—245** **17 Claims**



1. A sintered electric contact material for vacuum switch tubes comprising: 50 to 70% by volume of Cr; 0.1 to 1.15% by volume of Ti; and the residual volume of Cu.

**5,019,157**

### METHOD OF MAKING EUTECTIC MIXTURE OF COPPER AND TRICOPPER PHOSPHIDE

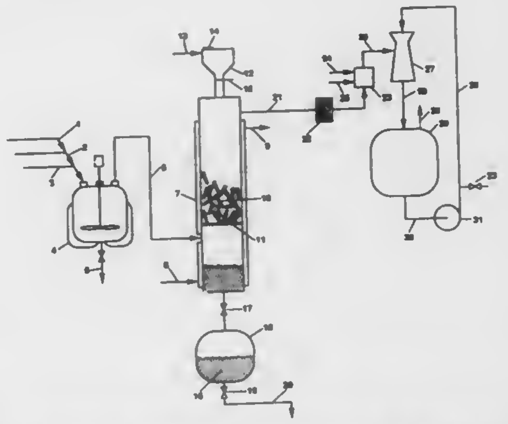
**Harry E. Buckholtz, and George T. Miller, both of Lewiston, N.Y., assignors to Occidental Chemical Corporation, Niagara, N.Y.**

**Filed Jul. 24, 1989, Ser. No. 383,502**

**Int. Cl.⁵ C22C** *9/100*

**U.S. Cl. 75—340** **11 Claims**

1. A method of making a molten eutectic mixture of copper and tricopper phosphide comprising
(1) placing elemental copper in a furnace;
(2) heating said copper to a temperature between 714° C. and 1083° C.;



(3) contacting said heated copper with phosphine, whereby said molten eutectic mixture forms on said copper; and
(4) separating said molten eutectic mixture from said copper.

**5,019,158**

### PROCESS FOR THE SEPARATION OF CALCIUM AND NITROGEN FROM LITHIUM

**Guy Bernard, Moutiers, France, assignor to Metaux Speciaux S.A., Courbevole, France**

**Filed May 16, 1990, Ser. No. 524,451**

**Claims priority, application France, Jun. 9, 1989, 89 08144**

**Int. Cl.⁵ C22B** *26/12*

**U.S. Cl. 75—408** **7 Claims**

1. A process for separating calcium and nitrogen from molten lithium, comprising the steps of:
- introducing divided alumina into the molten lithium;
- allowing the alumina to react with the molten lithium to produce aluminum and lithium oxide;
- allowing the aluminum to react with the nitrogen to produce insoluble aluminum nitride;
- allowing the lithium oxide to react with the calcium to produce insoluble calcium oxide and lithium;
- separating the insoluble calcium oxide and aluminum nitride from the molten lithium.

**5,019,159**

### PROCESS AND APPARATUS FOR THE INTRODUCTION OF GAS INTO A DISCHARGE OPENING OF A METALLURGICAL CONTAINER CONTAINING MOLTEN METAL

**Bruno Müller, Muhen, and Rolf Waltenspühl, Hünenberg, both of Switzerland, assignors to Stopinc Aktiengesellschaft, Baar, Switzerland**

**PCT No. PCT/EP88/00934, § 371 Date May 5, 1989, § 102(e) Date May 5, 1989, PCT Pub. No. WO89/05700, PCT Pub. Date Jun. 29, 1989**

**PCT Filed Oct. 18, 1988, Ser. No. 350,472**

**Claims priority, application Switzerland, Dec. 24, 1987, 05065/87**

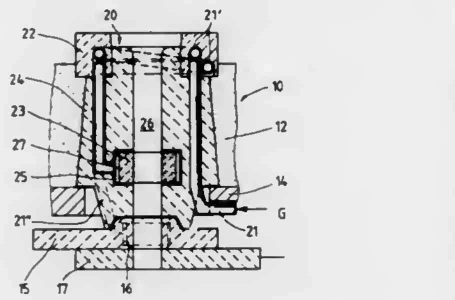
**Int. Cl.⁵ C21C** *7/00*

**U.S. Cl. 75—533** **26 Claims**

1. In a process of introducing gas into a discharge opening of a metallurgical vessel containing molten metal, the improvement comprising preventing or reducing the formation in said

VOL
1126
ISS
4
MY
28
1991
UMI

discharge opening of deposits from the molten metal and the freezing of the molten metal in said discharge opening by:



prior to introducing said gas into said discharge opening, heating said gas to a temperature of at least 1000°C.

---

### 5,019,160
## METHOD OF MODIFYING STEEL SLAG
**Mitsuhisa Harada, and Masao Tomari, both of Kitakyushu, Japan, assignors to Nippon Jiryoku Senko Co., Ltd., Kitakyushu, Japan**
**Continuation-in-part of Ser. No. 400,914, Sep. 30, 1989. This application Mar. 15, 1990, Ser. No. 493,650**
**Int. Cl.$^5$ C21B *5/04***
**U.S. Cl. 75—564** **4 Claims**

1. Method of modifying steel slag containing mainly free lime, free magnesia and dicalcium silicate, comprising:

mixing the steel slag in a molten state with boron-containing compounds capable of producing $B_2O_3$ in amounts corresponding to 0.1 to 0.4% by weight of said steel slag with a first modifier selected from the group consisting of silicate-containing stones and minerals and their weatherings, coal ash and foundry waste sand and mixtures thereof;

adding an exothermic second modifier selected from the group consistent of aluminum, aluminum dross, magnesium and magnesium slag and mixtures thereof to the slag; the first modifier is used in amounts so that the basicity of the steel slag, after the addition of the boron-containing compound, the first modifier and the exothermic modifier, is in the range of between above 1.6 and 1.9 and the exothermic modifier is added to the molten steel slag in powder form together with agitating gas.

---

### 5,019,161
## PROCESS FOR STRIPPING PLATED PLASTIC MATERIALS
**Jong-Kang Huang, Hsinchu, Taiwan, assignor to Industrial Technology Research Institute, Taiwan**
**Filed May 16, 1989, Ser. No. 352,283**
**Int. Cl.$^5$ C23F *1/00***
**U.S. Cl. 75—715** **18 Claims**

1. A process for stripping a coated plastic material wherein said plastic is coated with a copper inner layer, and at least one outer layer formed of either nickel or chromium, comprising:

a) crushing said plated plastic to form a plurality of plated plastic particles;
b) scrubbing said particles to remove one of said nickel and chromium from said plated plastic material, leaving a copper-coated plastic material;
c) separating one of said nickel and chromium from said copper-coated plastic material;
d) chemically treating said copper-coated plastic material of step (c) with a chemical solution to dissolve said copper inner layer from said plastic material;
e) separating said copper.. from said plated plastic material;
f) regenerating said chemical solution of step (d) to a form in which it can be reused to successively treat additional samples of said copper-coated plastic material of step (d).

---

### 5,019,162
## ACTIVATED CARBON FOR RECOVERY OF GOLD
**Masayuki Suzuki, Soraku; Zenji Matsumoto, Izumi, and Teruo Fukui, Nara, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**
**Filed Mar. 14, 1990, Ser. No. 493,148**
**Claims priority, application Japan, Mar. 14, 1989, 1-062642; Jul. 21, 1989, 1-190247**
**Int. Cl.$^5$ C01G *7/00***
**U.S. Cl. 75—744** **2 Claims**

1. An activated carbon for use in the process of recovery of gold which comprises adsorbing aurocyanide complexes thereon, desorbing the complexes therefrom and separating the activated carbon with a screen, the activated carbon being spherical and having a diameter of more than the opening of the screen but of not more than 2 mm; an iodine number of not less than 950 mg/g as determined by JIS K 1474–1975; and a hardness of not less than 99% as determined by JIS K 1474–1975.

---

### 5,019,163
## CORROSION/WEAR-RESISTANT METAL ALLOY COATING COMPOSITIONS
**C. Edward McComas, 2780 Firestation Rd., Martinsville, Ind. 46151**
**Division of Ser. No. 939,035, Dec. 5, 1986, Pat. No. 4,833,041, which is a continuation-in-part of Ser. No. 869,037, May 30, 1986, abandoned. This application Apr. 10, 1989, Ser. No. 335,807**
**Int. Cl.$^5$ C23C *18/34***
**U.S. Cl. 106—1.22** **5 Claims**

1. A coating bath for providing a hard, wear and corrosion resistant, ductile coating on a substrate, said bath having a pH of about 12 to about 14 and comprising

(1) the following metal ions, the amounts indicated expressed as moles per gallon of coating bath:
nickel ions, about 0.4 to about 0.9;
cobalt ions, about 0.1 to about 0.4; and
thallium ions, about $4\times10^{-5}$ to about $8\times10^{-4}$;
(2) chemical means for complexing said ions to inhibit their precipitation from the basic coating bath said chemical means comprising a metal ion complexing compound selected from the water soluble salts of tartaric acid, citric acid, oxalic acid, ethylenediamine, diethylenetriamine, triethylenetriamine, ethylenediamine tetraacetic acid and ammonia;
(3) about 0.025 to about 0.1 moles of a borohydride reducing agent per gallon of coating bath.

---

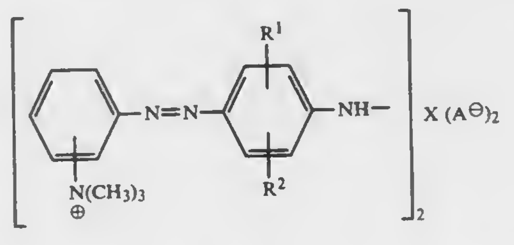
### 5,019,164
## WATER-RESISTANT INK COMPOSITION
**Hajime Tomita, and Yasuo Sonoda, both of Gunma, Japan, assignors to Kabushiki Kaisha Pilot, Tokyo, Japan**
**Filed May 9, 1990, Ser. No. 520,189**
**Claims priority, application Japan, May 10, 1989, 1-115174**
**Int. Cl.$^5$ C09D *11/02***
**U.S. Cl. 106—22** **7 Claims**

1. A water resistant ink composition comprising
A. a polyamine mixture of (a) a polyamine compound containing primary amino groups and having a molecular weight of 300 or more, (b) one or more polyamine compound(s) selected from polyamine compounds containing secondary and/or tertiary amino groups and having a molecular weight of 300 or more,
B. a stabilizing agent,
C. water,
D. an anionic dye having a solubility of 10% by weight or more in an aqueous vehicle comprising said polyamine mixture, said stabilizing agent and water, wherein the total amount of the polyamine compounds is in the range of 0.5–5% by weight.

### 5,019,165
## RECORDING FLUID FOR THE INK JET PROCESS
**Horst Bruder, Ludwigshafen, and Udo Mayer, Frankenthal, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**
**Filed Dec. 30, 1988, Ser. No. 292,432**
**Claims priority, application Fed. Rep. of Germany, Jan. 15, 1988, 3800983**
**Int. Cl.$^5$ C09D *11/02***
**U.S. Cl. 106—22** **2 Claims**

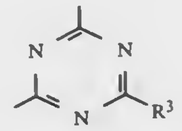
1. An ink jet process which comprises applying a recording fluid consisting essentially of 2–10% by weight of a dye, a water-miscible organic solvent, and 70 to 95% by weight of water, wherein the dye is represented by the formula I

(I)



where
$R^1$ and $R^2$ are identical or different and each is independently of the other hydrogen, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkoxy,
$A\theta$ is an anion and
X is a bridge member of the formula

—CO— or

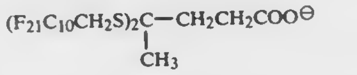


where $R^3$ is chlorine, hydroxy, $C_1$–$C_6$ alkoxy, amino, $C_1$–$C_4$-monoalkyl- or -dialkyl-amino, anilino, N-($C_1$–$C_4$-alkyl-)anilino, pyrrolidino, piperidino, morpholino, piperazino or N-($C_1$–$C_4$-alkyl)piperazino.

---

### 5,019,166
## THERMAL INK JET COMPOSITIONS
**William M. Schwarz, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**
**Filed Jan. 22, 1989, Ser. No. 370,206**
**Int. Cl.$^5$ C09D *11/02***
**U.S. Cl. 106—22** **52 Claims**

1. A thermal ink jet printing composition comprising a dye, a liquid medium containing water, and a surfactant selected from the group consisting of polyoxyethylated ethers of the formula $R—O—(CH_2CH_2O)_n—CH_2CH_2OH$ wherein R is an aliphatic hydrocarbon chain of from about 8 to about 40 carbon atoms and n is a number of from 1 to about 100, anionic bitail fluoro thio alkyls of the formula



$$(F_{21}C_{10}CH_2S)_2\underset{\substack{|\\ CH_3}}{C}—CH_2CH_2COO^{\ominus}$$

alkyl aryl sulfonates, alkyl amine quaternary salts, and mixtures thereof.

---

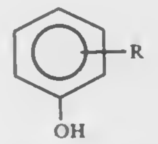
### 5,019,167
## STABILIZED ROSIN ESTERS AND HOT MELT ADHESIVES CONTAINING THEM
**Robert W. Johnson, Jr., and Kenneth E. Krajca, both of Savannah, Ga., assignors to Union Camp Corporation, Wayne, N.J.**
**Continuation of Ser. No. 211,499, Jan. 24, 1988, abandoned. This application Jul. 30, 1990, Ser. No. 561,255**
**Int. Cl.$^5$ C08L *93/04***
**U.S. Cl. 106—218** **17 Claims**

1. An improved rosin ester composition comprising a rosin ester and a zinc composition selected from the group consisting of zinc hydroxide, a zinc salt of an organic acid, and mixtures thereof, wherein said zinc composition is present in an amount effective to neutralize a major portion of any acid present in the rosin ester.

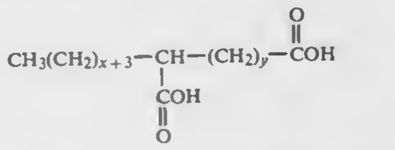
---

### 5,019,168
## CATIONIC SLURRY SEAL EMULSIFIERS
**Peter Schilling, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.**
**Division of Ser. No. 334,464, Apr. 7, 1989, abandoned. This application Nov. 6, 1989, Ser. No. 432,167**
**Int. Cl.$^5$ C08Q *95/00***
**U.S. Cl. 106—277** **7 Claims**

1. An improved emulsifier for cationic bituminous emulsions comprising the reaction product of (a) an alkyl phenol of the general form

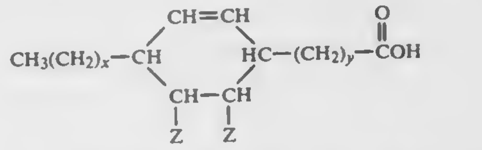


where R represents a linear or branched alkyl group, (b) an aldehyde, and (c) a polyamine compound wherein the improvement comprises a polyamine compound formed as the reaction product of a polyamine and a compound selected from the group of a tall oil fatty acid, a polycarboxylic acid corresponding to the formula



$$CH_3(CH_2)_{x+3}—\underset{\substack{|\\ \overset{}{C}OH\\ \|\\ O}}{CH}—(CH_2)_y—\overset{\substack{O\\ \|}}{C}OH$$

and a polycarboxylic acid corresponding to the formula



wherein x and y are integers from 3 to 9, x and y together equal 12, at least one Z is a carboxylic acid group and any remaining Z is hydrogen.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,169
### GRAY-BLACK ENCAPSULATED PIGMENTS AND METHOD FOR THEIR PREPARATION

**Dietrich Speer, Hanau; Akos Kiss, Wasserlos, and Peter Kleinschmit, Hanau, Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed Mar. 2, 1990, Ser. No. 487,294**

**Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906819**

**Int. Cl.$^5$ C09C** *1/62*

**U.S. Cl. 106—438** **7 Claims**

1. A gray-black encapsulated pigment, consisting essentially of transparent crystals of zirconium silicate encasing as a discrete phase, a pigmented compound which is crystalline iron titanate having the composition $FeTiO_3$.

---

### 5,019,170
### COATED FREE AGGREGATE USABLE IN WOOD CONCRETE TECHNOLOGY AND METHOD OF MAKING THE SAME

**Hansruedi Walter, and Leni M. Walter-Gurzeler, both of Windsor, S.C., assignors to Insul Holz-Beton Systems Incorp., Windsor, S.C.**

**Filed Sep. 13, 1989, Ser. No. 406,445**

**Int. Cl.$^5$ C04B** *20/10*

**U.S. Cl. 106—805** **10 Claims**

1. A free aggregate usable in forming wood concrete products, comprising:

a plurality of individual chips of fibrous organic material; and

an inorganic mineralizing coating encasing said individual chips to a degree sufficient to seal in water soluble organic matter held in the pores of said chips and prevent the leaching thereof, while maintaining said individual chips in a free aggregate form.

---

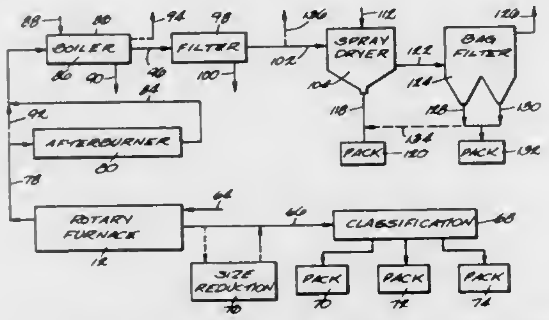
### 5,019,171
### RECLAIMING INORGANIC REINFORCEMENT COMPONENT FROM ORGANIC RESIN-CONTAINING SCRAP MATERIALS

**David G. Hanson, Jr., Calumet, and William A. Hockings, Houghton, both of Mich., assignors to Peninsula Copper Industries, Inc., Hubbell, Mich.**

**Filed Aug. 18, 1988, Ser. No. 233,619**

**Int. Cl.$^5$ C03C** *23/00*

**U.S. Cl. 134—2** **13 Claims**



1. A process for reclaiming an inorganic reinforcement component from a scrap material including a vaporizable organic resin reinforced by said reinforcement component comprising the steps of:

introducing the scrap material in comminuted form into the inlet end of an elongated, rotary furnace;

heating the scrap material to a temperature above the vaporization point of the organic resin and below a point where the structural integrity of the reinforcement component is degraded while a bed of the scrap material is being tumbled inside the furnace and moves from the inlet end toward the outlet end of the furnace;

passing a flow of purge gas through the furnace and over the surfaces of the scrap material in a direction countercurrent to the movement of the bed of scrap material to sweep the volatized gases therefrom;

withdrawing the inorganic reinforcement component from the outlet end of the furnace; and

withdrawing a stream of combined gases including the purge gas and the volatized gases from the inlet end of the furnace.

---

### 5,019,172
### CHEMICAL TREATMENT OF ALUMINUM CATHODES IN ZINC ELECTROWINNING

**George Houlachi, Kirkland; Terry J. Murphy, Pierrefonds; Jean-Pierre St-Onge, Valleyfield, and Daniel Daoust, Ormstown, all of Canada, assignors to Noranda Inc., Toronto, Canada**

**Filed Apr. 30, 1990, Ser. No. 516,929**

**Claims priority, application Canada, May 1, 1989, 598398**

**Int. Cl.$^5$ C23G** *1/02*

**U.S. Cl. 134—3** **5 Claims**

1. A process for chemically treating an aluminum cathode having at least one affected area on a surface thereof as a result of using said aluminum cathode in zinc electrowinning, said process comprising contacting at least said affected area of the surface of said aluminum cathode with a dilute hydrochloric acid aqueous solution, wherein said dilute hydrochloric acid aqueous solution contains no additives, and wherein no current is applied to said aluminum cathode while contacting at least said affected area of the surface of said aluminum cathode with said dilute hydrochloric acid aqueous solution.

---

### 5,019,173
### CLEANING METHOD FOR WATER CONTAINING VESSELS AND SYSTEMS

**Richard L. Gettings, Freeland; James B. McGee, Sanford; William C. White, Midland, and Frank Plahutnik, Jr., Midland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Sep. 29, 1988, Ser. No. 250,644**

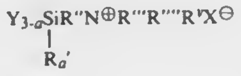
**Int. Cl.$^5$ B08B** *3/14, 17/00*

**U.S. Cl. 134—4** **32 Claims**

1. A method of enhancing the cleanability and facilitating the removal of algae and other microorganisms and soils from surfaces prone to biofouling by being exposed to and brought into contact with aqueous media containing algae and other microorganisms, comprising immobilizing on said surfaces and bonding thereto a coating of an organosilane, the organosilane being compatible in the aqueous media which has the following concentrations:

| | | | | |
|---|---|---|---|---|
| ohlorine levels | 0.5 | to | 20 | ppm |
| cyanurates | 25 | to | 100 | ppm |
| calcium hardness | 50 | to | 2,000 | ppm |
| pH | 4 | to | 8.5 | |
| alkalinity | 20 | to | 160 | ppm; |

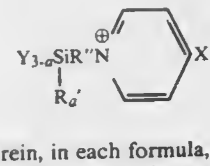
forming on the coated surfaces a layer of dead cells of the algae and other microorganisms, utilizing the layer of dead cells as a release medium to facilitate removal of succeeding layers of algae and other microorganisms that accumulate thereon, and cleaning the surfaces by dislodging the accumulated layers from the release medium layer, the organosilane having the general formula selected from the group consisting of:



$$\underset{\displaystyle R_a'}{Y_{3-a}Si}R''N^{\oplus}R'''R''''R^{v}X^{\ominus}$$

and

-continued



wherein, in each formula,

Y is R or RO where each R is an alkyl radical of 1 to 4 carbon atoms or hydrogen;

a has a value of 0, 1 or 2;

R′ is a methyl or ethyl radical;

R″ is an alkylene group of 1 to 4 carbon atoms;

R‴, R″″ and $R^{v}$ are each independently selected from a group consisting of alkyl radicals of 1 to 18 carbon atoms, $—CH_2C_6H_5$, $—CH_2CH_2OH$, $—CH_2OH$, and $—(CH_2)_xNHC(O)R^{vi}$, wherein x has a value of from 2 to 10 and $R^{vi}$ is a perfluoroalkyl radical having from 1 to 12 carbon atoms;

X is chloride, bromide, fluoride, iodide, acetate or tosylate.

---

### 5,019,174
### REMOVING OIL FROM SURFACES WITH LIPOSOMAL CLEANER

**Donald F. H. Wallach, Brookline, Mass., assignor to Micro Vesicular Systems, Inc., Nashua, N.H.**

**Continuation-in-part of Ser. No. 157,571, Mar. 3, 1988, Pat. No. 4,911,928, which is a continuation-in-part of Ser. No. 78,658, Jul. 28, 1987, Pat. No. 4,855,090, which is a continuation-in-part of Ser. No. 25,525, Mar. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 124,824, Nov. 25, 1987, Pat. No. 4,917,951. This application Sep. 21, 1989, Ser. No. 410,650**

**Int. Cl.$^5$ A61K** *7/50, 9/127;* **B08B** *7/04*

**U.S. Cl. 134—40** **6 Claims**

1. A method of removing oil from a surface comprising the steps of:

A. Providing paucilamellar lipid vesicles having 2–10 lipid bilayers surrounding a large, substantially aqueous filled amorphous center, said paucilamellar lipid vesicles having a lipid selected from the group consisting of polyoxyethylene fatty acid ethers, polyoxyethylene fatty acid esters, diethanolamides, polyoxyethylene glyceryl mono- and tristearates and oleates, and betaines as the primary structural lipid in the bilayers;

B. Introducing said paucilamellar vesicles to said surface;

C. Agitating said paucilamellar lipid vesicles on said surface with sufficient force such that at least a portion of said paucilamellar vesicles are broken and reform under said agitation, whereby said reformed vesicles encapsulate said oil; and

D. Removing said vesicles containing said encapsulated oil from said surface.

---

### 5,019,175
### METHOD FOR THE DESTRUCTION OF HALOGENATED ORGANIC COMPOUNDS IN A CONTAMINATED MEDIUM

**Charles J. Rogers; Alfred Kornel, both of Cincinnati, and Harold L. Sparks, Fayetteville, all of Ohio, assignors to The United States of America as represented by the Administrator, Environmental Protection Agency, Washington, D.C.**

**Filed May 11, 1989, Ser. No. 350,425**

**Int. Cl.$^5$ B08B** *7/00*

**U.S. Cl. 134—42** **16 Claims**

1. A method for the destruction of halogenated organic compounds contained in a contaminated medium, comprising

(a) adding an aqueous solution of polyethylene glycol to a contaminated medium containing halogenated organic compounds, the aqueous solution of polyethylene glycol being added in an amount to provide from about 0.1 to about 20 weight percent polyethylene glycol, based on the weight of the contaminated medium;

(b) adding an alkali metal hydroxide to the contaminated medium in an amount of from about 2 to about 20 weight percent based on the weight of the contaminated medium;

(c) heating the contaminated medium at a temperature and for a time sufficient to remove at least 75 weight percent of the water from the medium;

(d) further heating the medium at a temperature between about 250° C. and 350° C. for a time sufficient to effect destruction of the halogenated organic compounds; and

(e) adding an acid to the medium in an amount sufficient to provide the medium with a pH of from about 7 to about 9.

---

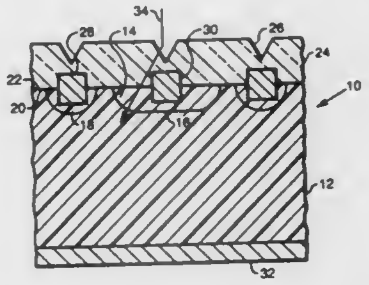
### 5,019,176
### THIN SOLAR CELL AND LIGHTWEIGHT ARRAY

**Henry W. Brandhorst, Jr., Berea, and Irving Weinberg, Rocky River, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 20, 1990, Ser. No. 495,969**

**Int. Cl.$^5$ H01L** *31/042, 31/18*

**U.S. Cl. 136—244** **26 Claims**



1. A solar cell assembly comprising

a solar cell having a front surface for receiving incident light and an oppositely disposed rear surface,

a cover glass adjacent to said front surface,

contact metallization between said cover glass and said solar cell, said contact metallization being embedded in both said cover glass and said, solar cell thereby creating a smooth interface therebetween, and

means for refracting incident light away from said contact metallization.

---

### 5,019,177
### MONOLITHIC TANDEM SOLAR CELL

**Mark W. Wanlass, Golden, Colo., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Nov. 3, 1989, Ser. No. 431,364**

**Int. Cl.$^5$ H01L** *31/068, 31/18*

**U.S. Cl. 136—249** **12 Claims**

1. A single-crystal, monolithic, tandem, photovoltaic solar cell, comprising:

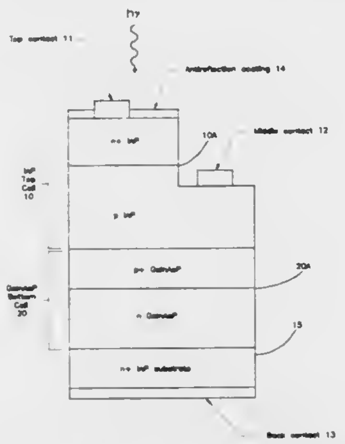
(a) an InP substrate having upper and lower surfaces;

(b) a first photoactive subcell on said upper surface of said substrate; said first subcell comprising $Ga_{0.47}In_{0.53}As$; said first subcell including a homojunction; and

(c) a second photoactive subcell on said first photoactive subcell; wherein said second subcell comprises InP; said

VOL 1126 ISS 4 MY 28 1991 UMI

second subcell including a homojunction; wherein said GaInAs is lattic-matched with said InP; and wherein said



second subcell has a larger energy bandgap than said first subcell.

---

### 5,019,178
### ALUMINUM-SILICON ALLOY ARTICLE AND METHOD FOR ITS PRODUCTION

**John Barlow, Walsall; Philip H. Evans, Lichfield; Nicholas H. Frank, Wensley, and Hamish D. Wilson, Grassmore, all of England, assignors to GKN Technology Limited, Wolverhampton, England**

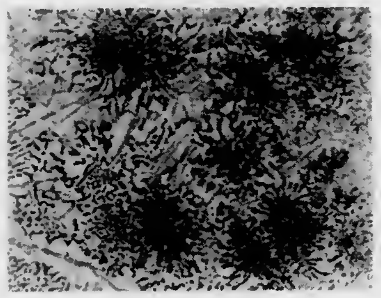
**PCT No. PCT/GB88/00875, § 371 Date Mar. 21, 1990, § 102(e) Date Mar. 21, 1990, PCT Pub. No. WO89/03895, PCT Pub. Date May 5, 1989**

**PCT Filed Oct. 17, 1988, Ser. No. 469,546**

**Claims priority, application United Kingdom, Oct. 19, 1987, 8724469**

**Int. Cl.$^5$ B22D *25/00;* C22C *21/06***

**U.S. Cl. 148—3** **10 Claims**



6. A method comprising:

producing a squeeze formed aluminium-silicon alloy article by forming a melt consisting essentially of the following composition by weight:

| | |
|---|---|
| Silicon | 14% to 16% |
| Copper | 1.9% to 2.2% |
| Nickel | 1.0% to 1.4% |
| Magnesium | · 0.4% to 0.55% |
| Iron | 0.6% to 1.0% |
| Manganese | 0.3% to 0.6% |
| Silicon Modifier | 0.02% to 0.1% |

with the balance being aluminium and any unavoidable impurities;

introducing the melt into a mould for the intended article;

applying squeezing pressure to the melt in the mould and while maintaining the melt under squeezing pressure permitting the melt to solidify under conditions of sustained temperature and pressure such that the growth rate R of the solid phase during solidification is from 1,000 to 2,500 μ/s and the temperature gradient G at the solid/liquid interface, expressed in °C./cm is such that the ratio G/R is from 100 to 1,000 °Cs/cm$^2$ and the as-formed article has an essentially eutectic microstructure containing not more than 10% of primary alpha-aluminium dendrites and is substantially free from intermetallic particles exceeding 10) in diameter.

---

### 5,019,179
### METHOD FOR PLASTIC-WORKING INGOTS OF HEAT-RESISTANT ALLOY CONTAINING BORON

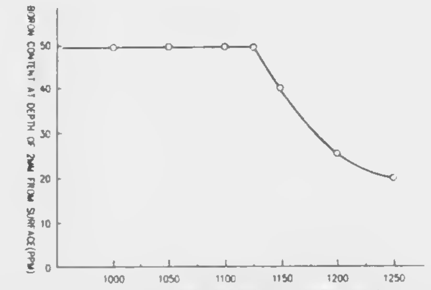
**Kensbo Sahira, Omiya; Toshiki Takeiri, and Nobuyoshi Kurauchi, both of Okegawa, all of Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan**

**Filed Mar. 19, 1990, Ser. No. 495,290**

**Claims priority, application Japan, Mar. 20, 1989, 1-68868; Mar. 20, 1989, 1-68869; Mar. 20, 1989, 1-68870**

**Int. Cl.$^5$ C22F *1/10***

**U.S. Cl. 148—11.5 N** **4 Claims**



1. In an improved method for plastic-working a heat-resistant alloy containing boron, said alloy being in the form of an ingot, comprising the steps of:

(a) subjecting the ingot of said alloy to hot working to produce a blank material; and

(b) subsequently carrying out annealing, acid-washing and cold working on the hot-worked blank material to provide a worked product,

the improvement comprising carrying out said hot working and said annealing at a temperature ranging from 1,000° C. to 1,150° C.,

wherein said alloy is a nickel-based alloy which contains 0.02% to 0.25% by weight of carbon, 10.0% to 25.0% of chromium, 10.0% to 25.0% by weight of tungsten and 0.001% to 0.1% by weight of boron as indispensable constituents.

---

### 5,019,180
### METHOD OF MANUFACTURING OF HIGH-STRENGTH SEAMLESS STEEL TUBES

**Ingo von Hagen, Krefeld; Christoph Prasser, Essen, and Gerd Homberg, Mettmann, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany**

**Filed Feb. 7, 1990, Ser. No. 477,047**

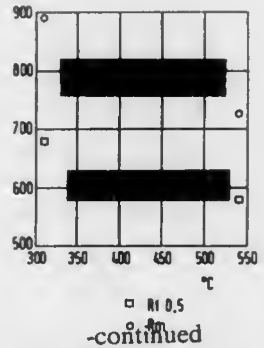
**Int. Cl.$^5$ C21D *8/10***

**U.S. Cl. 148—12 B** **5 Claims**

1. A method of manufacturing high-strength seamless steel tubes by hot rolling followed by accelerated cooling, comprising the following steps:

a) providing feed ingots of a steel annealed with aluminum and/or silicon, having the following composition in weight per cent:

| | |
|---|---|
| 0.08–0.13% | C |
| 1.40–1.90% | Mn |
| 0.20–0.50% | Cr |
| 0–0.50% | Mo |
| 0–0.70% | Ni |
| 0–0.40% | Cu |
| 0.04–0.13% | V |
| max. 0.020% | P |
| max. 0.010% | S |



the balance being iron and impurities, the sum of the contents of Cr and Mo lying within the range of about 0.20 to about 0.70% and the Cu/Ni quantity ratio in case of the presence of both elements being limited at most 1;

b) heating said feed ingots to a temperature of about 1150 to about 1280° C. and hot-rolling said ingots into tube in multiple stages; and

c) after leaving the last hot-rolling stage, quenching said tubes having a temperature above $A_{r3}$ directly from the rolling heat in about 5 to about 50 seconds substantially avoiding formation of ferrite down to a temperature range of about 340°-560° C. and thereafter further cooling said tubes in air.

---

### 5,019,181
### METHOD OF MAKING STAINLESS STEEL SHEET FOR EXTERIOR BUILDING CONSTITUENT

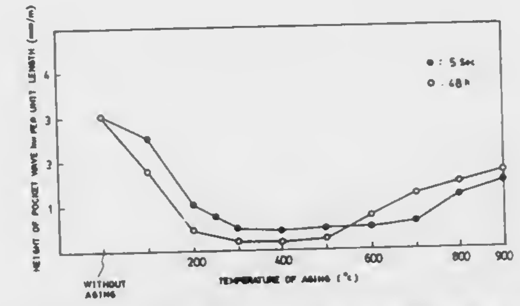
**Yoshihiro Yazawa; Yuji Sone; Keiichi Yoshioka, all of Chiba; Noboru Kinoshita, Tokyo, and Masayuki Hino, Chuo, all of Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan**

**Filed Mar. 19, 1990, Ser. No. 495,345**

**Claims priority, application Japan, Mar. 17, 1989, 1-63891**

**Int. Cl.$^5$ C21D *9/40***

**U.S. Cl. 148—12 EA** **2 Claims**



1. A method of making a stainless steel sheet for exterior building material comprising the steps of:

cold rolling a steel slab into a sheet metal, said slab being made from a ferritic stainless steel alloy comprising 10–32 wt. % of Cr, and 0.005–0.1 wt. %, in total, of C and N, the balance being Fe and unavoidable impurities;

subjecting the thus obtained sheet metal to final annealing;

subjecting the resulting sheet metal to skin-pass rolling; and,

subjecting the resulting sheet metal to aging process at a temperature of 200°-550° C. for a time period of more than 5 seconds and less than 48 hours.

---

### 5,019,182
### METHOD OF FORMING HARD STEELS BY CASE HARDENING, SHOT-PEENING AND AGING WITHOUT TEMPERING

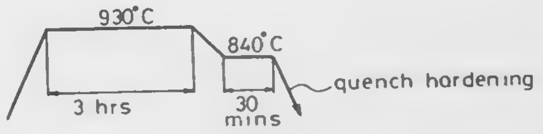
**Yukio Arimi, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Sep. 26, 1989, Ser. No. 412,774**

**Claims priority, application Japan, Sep. 27, 1988, 63-241658**

**Int. Cl.$^5$ C21D *8/00***

**U.S. Cl. 148—12.1** **6 Claims**



1. A method of manufacturing a steel member, comprising the steps of:

(a) carburizing and quenching, or carbo-nitriding and quenching a steel material;

(b) shot-peening the quenched steel material; and

(c) aging the shot-peened steel material, said method being conducted without any tempering step.

---

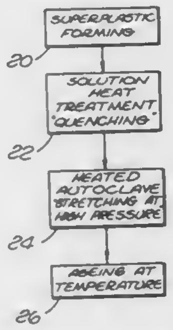
### 5,019,183
### PROCESS FOR ENHANCING PHYSICAL PROPERTIES OF ALUMINUM-LITHIUM WORKPIECES

**Gardner R. Martin, Redondo Beach, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Sep. 25, 1989, Ser. No. 411,967**

**Int. Cl.$^5$ C22F *1/04***

**U.S. Cl. 148—12.7 A** **25 Claims**


SUPERPLASTIC FORMING
20
SOLUTION HEAT TREATMENT "QUENCHING"
22
HEATED AUTOCLAVE STRETCHING AT HIGH PRESSURE
24
AGEING AT TEMPERATURE
26

1. A process for enhancement of physical properties of an Aluminum-Lithium alloy workpiece, comprising the steps of:

(*a*) securing first and second shaping means, said first shaping means configured to form a near-net part and said second shaping means comprising female die means configured to final dimensions of said workpiece;

(*b*) fabricating a preform of said workpiece by conventional superplastic forming procedures through heating a blank of Al-Li alloy to its superplastic temperature and shaping the same to the subscale dimensions of said first shaping means;

(c) removing said preform from said first shaping means and immersing it in a suitable quenching medium;

(d) placing said preform into said second shaping means establishing a pressure tight seal between said preform and said second shaping means;

VOL
1126
ISS
4
MY
28
1991
UMI

(e) installing said preform and second shaping means into autoclave means;
(f) heating said preform within said autoclave means to an elevated temperature;
(g) applying high pressure to said preform in said second shaping means to cause it to stretch to conformity with a forming cavity of final workpiece dimensions in said second shaping means;
(h) removing said high pressure and allowing said preform to age for a specified period.

---

**5,019,184**

### CORROSION-RESISTANT NICKEL-CHROMIUM-MOLYBDENUM ALLOYS

**James R. Crum, Ona; Jon M. Poole, Barboursville, and Edward L. Hibner, Ona, all of W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.**

**Continuation-in-part of Ser. No. 338,965, Apr. 14, 1989, abandoned. This application Jan. 26, 1990, Ser. No. 467,810**

**Int. Cl.$^5$ C22F *1/10***

**U.S. Cl. 148—13** **15 Claims**

1. A process for enhancing crevice and pitting corrosion resistance of nickel-base alloys of high combined percentages of chromium, molybdenum and tungsten in various corrosive media by minimizing the formation of deleterious quantities of Mu phase which comprises subjecting an alloy consisting essentially of in weight percent about 19 to 23% chromium, about 14 to 17% molybdenum, about 2 to 4% tungsten, about 0 to about 0.1% carbon, about 0 to 0.25% titanium, about 0 to about 10% iron and the balance essentially nickel, to a homogenization treatment within the temperature range of above 1149° C. to about 1316° C. for a period of at least about 5 hours.

---

**5,019,185**

### METHOD FOR PRODUCING HIGH STRENGTH CU-NI-SN ALLOY CONTAINING MANGANESE

**Takashi Nakajima; Kenji Kubozono; Toshihiko Mori, all of Sagamihara; Takefumi Ito; Kimio Hashitsume, both of Amagasaki, and Shinichi Iwase, Sagamihara, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 15, 1989, Ser. No. 436,737**

**Claims priority, application Japan, Nov. 15, 1988, 63-288044; Sep. 11, 1989, 1-235421**

**Int. Cl.$^5$ C22C *9/02;* C21D *1/00***

**U.S. Cl. 148—13.2** **2 Claims**

1. A method for producing a high strength Cu-Ni-Sn alloy, which consist essentially of:

subjecting an alloy composed, by a weight ratio, of 3 to 25% of Ni, 3 to 9% of Sn, 0.05 to 1.5% of Mn, and a balance of Cu and unavoidable impurities to heat-treatment at a temperature of 800° C. or above, in a single phase region, followed by quenching the thus heat-treated alloy;

subsequently subjecting said alloy to further heat-treatment at a temperature ranging from 600° to 770° C. in a two-phase region, followed by quenching the thus heat-treated alloy;

subjecting said alloy to a finishing process with a processing ratio of from 0 to 60%; and

thereafter subjecting the thus processed alloy to a final heat-treatment at a temperature of from 350° to 500° C. for a period of from 3 to 300 minutes.

---

**5,019,186**

### PROCESS FOR PRODUCING CHROMIUM-CONTAINING STEEL SHEET HOT-DIP PLATED WITH ALUMINUM

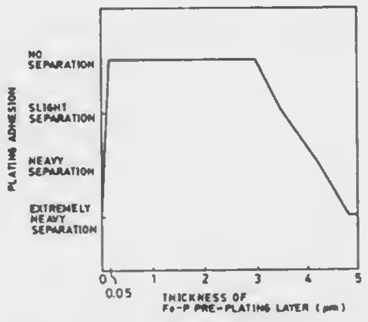
**Yasushi Kato; Keiichi Yoshioka, and Osamu Hashimoto, all of Ciba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan**

**Filed Jun. 15, 1990, Ser. No. 539,968**

**Claims priority, application Japan, Jun. 23, 1989, 1-161925**

**Int. Cl.$^5$ C25D *5/00;* B32B *15/18***

**U.S. Cl. 148—20.3** **4 Claims**



1. A method of producing a chromium-containing steel sheet hot-dip plated with aluminum, comprising: preparing a steel sheet containing not less than about 3 wt. % of chromium; pre-plating each side of said steel sheet with an iron-phosphorus alloy so as to form a pre-plating layer of said iron-phosphorus alloy about 0.05 to 3.0 μm thick on each side of said steel sheet; heating said steel sheet in a non-oxidizing atmosphere; and dipping said steel sheet in a bath of molten aluminum or a molten aluminum alloy.

---

**5,019,187**

### BRAZING PASTE FOR BONDING METAL AND CERAMIC

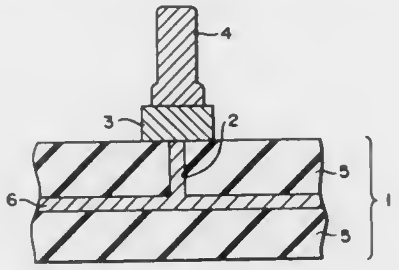
**Kiyoshi Iyogi, Kawasaki; Masako Nakahashi, Tokyo; Hiromitsu Takeda, Tokyo, and Makoto Shirokane, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Division of Ser. No. 318,331, Mar. 3, 1989, Pat. No. 4,924,033. This application Mar. 7, 1990, Ser. No. 489,532**

**Claims priority, application Japan, Mar. 4, 1988, 63-49642**

**Int. Cl.$^5$ B23K *35/34***

**U.S. Cl. 148—24** **14 Claims**



1. A brazing paste for bonding metal and ceramic, consisting essentially of:

(A) a brazing powder material containing:
  (i) a metallic brazing material as a principal component;
  (ii) at least Group IVa element selected from the group consisting of Ti, Zr and Hf, and
  (iii) a metal having a melting point higher than that of the metallic brazing material (i); and
(B) an organic binder.

**5,019,188**

### PROCESS FOR FORMING AN ALUMINUM ALLOY THIN SHEET BY HOT AND COLD ROLLING

**Jochen Hasenclever, Bonn, Fed. Rep. of Germany, assignor to Vereingte Aluminum-Werke Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Apr. 20, 1990, Ser. No. 511,105**

**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1989, 3913324**

**Int. Cl.$^5$ C22F *1/04;* C22C *21/00***

**U.S. Cl. 148—11.5 A** **4 Claims**

1. Process for manufacturing an aluminum rolled semifinished product comprising the steps of casting a rolling ingot of the following alloy composition:

Fe: 0.7–1.15 wt. %
Mn: 0.5–2.0 wt. %
Si: 0.05–0.6 wt. %
Mg: 0–0.6 wt. %
Cu: 0–0.3 wt. %
Zr: 0–0.2 wt. %
Impurities: 0–0.03 wt. %
Al: balance

homogenizing said ingot at a temperature between about 620° to 480° C. for about 2 to 20 hours, hot-rolling said homogenized ingot to a hot strip final thickness between about 2.5 to 5 mm, cold-rolling said hot-rolled strip, without intermediate annealing, to a final thickness between about 40–250 μm, and final annealing said cold-rolled strip at a temperature within the range of from about 250° to 400° C. for about 1 to 6 hours to produce a structure having a grain diameter within the range of about 5 to 15 μm and containing less than about 5 vol % of rod-shaped intermetallic phases.

---

**5,019,189**

### STEEL PIPE AND A METHOD FOR WELDING THEREOF AND PIPELINE RESISTANT TO CARBON DIOXIDE CORROSION

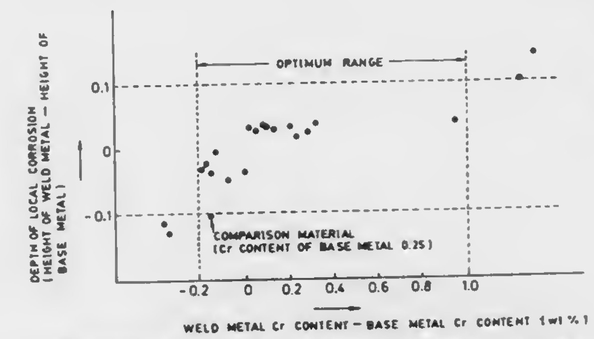
**Mitsuo Kumura, and Tatsufumi Uegaki, both of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan**

**Filed Apr. 9, 1990, Ser. No. 506,472**

**Claims priority, application Japan, Apr. 13, 1989, 64-91894; Jun. 28, 1989, 64-166170**

**Int. Cl.$^5$ B21C *37/06;* C22C *38/06***

**U.S. Cl. 148—127** **5 Claims**



1. A welded pipeline having superior resistance to carbon dioxide corrosion, comprising: at least two pipe sections each of which comprises a base metal having a composition containing not more than 0.25 wt % of C, from 0.01 to 0.50 wt % of Si; from 0.1 to 2.0 wt % of Mn; not more than 0.03 wt % of P; not more than 0.01 wt % of S; from 0.25 to 1.0 wt % of Cr; from 0.01 to 0.10 wt % of Al, and the balance substantially Fe and impurities; and a welded joint connecting said pipe sections and comprising a weld metal connecting said pipe sections together, said welded joint having a Cr content ranging between a value which is 0.2 wt % based on the total weight of the base metal smaller than the Cr content of said base metal based on the total weight of the base metal and a value which is 1.0 wt %, based on the total weight of the base metal greater than the Cr content of said base metal based on the total weight of the base metal.

---

**5,019,190**

### FE-BASED SOFT MAGNETIC ALLOY

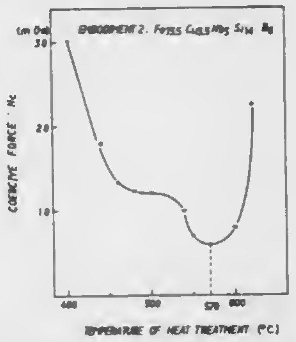
**Takao Sawa; Masami Okamura, both of Yokohama, and Yumiko Takahashi, Koshigaya, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 20, 1989, Ser. No. 454,019**

**Claims priority, application Japan, Dec. 20, 1988, 63-319417**

**Int. Cl.$^5$ H01F *1/04***

**U.S. Cl. 148—306** **3 Claims**



1. An Fe-based soft magnetic alloy essentially consisting of an Fe-based aloy, characterized in that said Fe-based alloy includes fine crystal grains having an average size of 300 Å or less and each of said fine crystal grains is composed of a body-centered cubic phase at least partially including a super lattice.

---

**5,019,191**

### MAGNETIC STEEL PLATE FOR USE AS A MAGNETIC SHIELDING MEMBER AND A METHOD FOR THE MANUFACTURE THEREOF

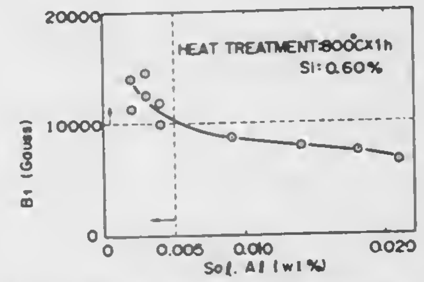
**Ryuji Ogata; Naokazu Nakano, and Shuichi Suzuki, all of Ibaraki, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,279**

**Claims priority, application Japan, Dec. 22, 1988, 63-325623; Aug. 24, 1989, 1-218171; Oct. 19, 1989, 1-272592**

**Int. Cl.$^5$ H01F *1/147***

**U.S. Cl. 148—307** **14 Claims**



1. A magnetic steel plate for shielding magnetic flux which consists essentially of, by weight %:

C: not greater than 0.05%,
Si: greater than 0.30%, but not greater than 1.50%,
Mn: not greater than 0.50%, sol Al: less than 0.005%, with the balance being Fe and incidental impurities,

the magnetic steel plate having a ferrite grain size number of 0 (zero) or smaller.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,192
## PRIMARY/DETONATOR COMPOSITIONS SUITABLE FOR USE IN ALUMINUM CUPS

**Coodly P. Ramaswamy, Christiana, Pa., assignor to Breed Automotive Technology, Inc., Boonton Township,, N.J.**

**Filed Oct. 5, 1990, Ser. No. 593,853**

**Int. Cl.$^5$ C06B** *33/06*

**U.S. Cl. 149—42** **4 Claims**

1. A primer/detonator composition housed in an aluminum cup comprised of the following: antimony sulfide, potassium chlorate, zirconium and lead ferrocyanide.

---

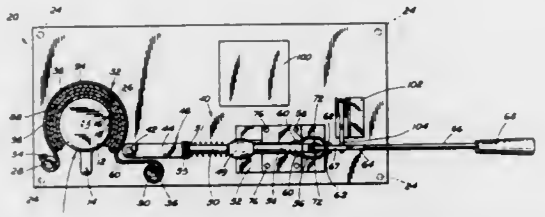
### 5,019,193
## ARRANGEMENT FOR AND METHOD OF APPLYING HEAT-TRANSFERRABLE DECALCOMANIA TO MUGS

**Salvatore Aramini, Massapequa, N.Y., assignor to Speedy Die, Inc., Deer Park, N.Y.**

**Filed Aug. 29, 1988, Ser. No. 237,540**

**Int. Cl.$^5$ B32B** *31/00*

**U.S. Cl. 156—64** **8 Claims**



1. An arrangement for applying heat-transferrable decalcomania to a circumferential surface of a container, comprising:
- (a) a flexible, sheet-like heating blanket;
- (b) cover means for wrapping the flexible blanket around a major portion of the circumferential surface of the container over which the decalcomania has been laid, and for urging the blanket toward said major circumferential portion to press the decalcomania against said major circumferential portion, wherein said major circumferential portion extends around the container over an arc greater than 180 degrees; and
- (c) heater means for generating heat at the blanket sufficient to transfer the decalcomania to said major circumferential potion of the container;

the arrangement further comprising a support for stationarily mounting the container during operation of the heater means; and wherein the blanket has longitudinally spaced-apart regions stationarily mounted on the support, and a movable region located between the stationary spaced-apart regions;

wherein the cover means includes means for moving the movable region over a distance to a heating position in which the blanket is in close, intimate, heat-transfer contact with said major circumferential portion of the container; and

wherein the spaced-apart regions of the blank are end regions extending past, and out of contact with, the container; and wherein the movable region of the blanket is a contact region in contact with, and pushed by, the moving means during movement to the heat position.

8. A method of applying heat-transferrable decalcomania to a circumferential surface of a container, comprising the steps of:
- (a) positioning decalcomania around a major portion the circumferential surface of the container;
- (b) wrapping a flexible, sheet-like, heating blanket around the decalcomania and the major circumferential portion of the container wherein the major circumferential portion extends around the container over an arc greater than 180 degrees;
- (c) urging the blanket toward the major circumferential portion of the container to press the decalcomania against the major circumferential portion;
- (d) generating heat at the blanket sufficient to transfer the decalcomania to the major circumferential portion of the container; and

wherein the urging step is performed by stationarily mounting one end region of the blanket, and by pushing another region of the blanket away from said one end region to tauten the blanket and hold the blanket in intimate, close, heat-transfer relation with the major circumferential portion of the container.

---

### 5,019,194
## METHOD FOR MANUFACTURING A WEB OF PLASTIC TURF FOR SPORTS GROUNDS

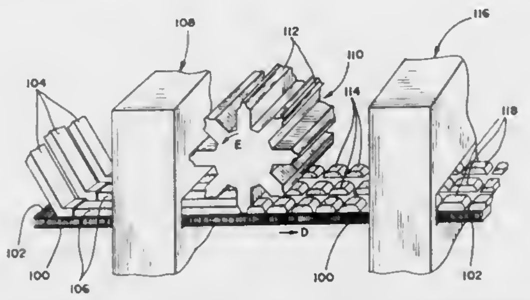
**Hans-Joachim Friedrich, Auenwald, Fed. Rep. of Germany, assignor to J. F. Adolff AG, Backnang, Fed. Rep. of Germany**

**Continuation of Ser. No. 145,837, Jan. 20, 1988, abandoned. This application May 15, 1989, Ser. No. 352,773**

**Claims priority, application Fed. Rep. of Germany, Jan. 29, 1987, 3702575; Sep. 2, 1987, 3729267**

**Int. Cl.$^5$ B32B** *31/00*

**U.S. Cl. 156—61** **9 Claims**



1. A method for manufacturing a water-permeable web with resilient cushion elements for synthetic turf, comprising the steps of:
- (a) providing a longitudinally extending supporting web having water drainage openings therethrough and defining a longitudinal direction;
- (b) depositing plastic material adapted to be solidified by heat treatment, in the form of elongate, spaced, rib-shaped plastic agglomerate strips on said supporting web in such manner that said rib-shaped agglomerate strips extend in the longitudinal direction of the supporting web and are transversely spaced in relation to one another and uncovered, water-permeable portions of the supporting web are provided between the strips;
- (c) mechanically dividing said rib-shaped agglomerate strips transversely to their longitudinal direction into a series of spaced, unfinished cushion elements and simultaneously forming spaced transverse water drainage channels through each of said agglomerate strips between said unfinished cushion elements, and
- (d) converting said unfinished cushion elements into said resilient cushion elements while maintaining the spaced relationships by heating the plastic material and thereby simultaneously bonding said resilient cushion elements to the supporting web.

---

### 5,019,195
## METHOD OF ENCAPSULATING A COATED SUBSTRATE

**George F. Skinner, 4218 Gladstone La., Charlotte, N.C. 28205**

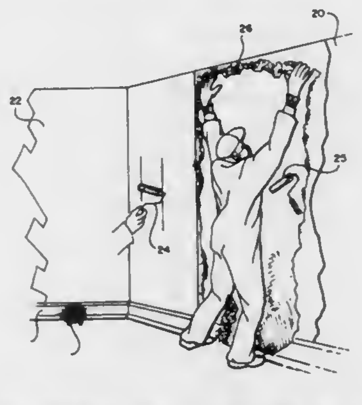
**Filed Mar. 17, 1989, Ser. No. 325,376**

**Int. Cl.$^5$ B32B** *31/00;* **E04F** *13/00*

**U.S. Cl. 156—71** **10 Claims**

1. A method for encapsulating a layer bonded to a substrate to prevent portions of said layer from becoming detached and randomly distributed, comprising the steps of:

- a) covering said layer with an adhesive material capable of penetrating said layer and bonding to said substrate;
- b) combining a fibrous material with said adhesive; and
- c) applying a second layer of adhesive, such that said adhesive penetrates said fibrous material to form a stratified layer, said stratified layer comprising an outer layer, an intermediate layer and an inner layer, said outer layer consisting primarily of said adhesive, said intermediate layer consisting primarily of a mixture of said adhesive and said fibrous material, said inner layer including materials comprising said layer and portions of said adhesive.



---

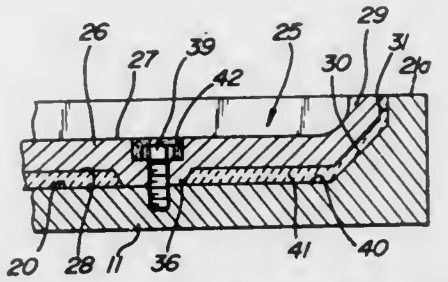
### 5,019,196
## SAND MULLER BOWL LINER

**Kenneth D. McKibben, and Thomas E. Wuepper, both of Au Gres, Mich., assignors to CMI International, Inc., Pontiac, Mich.**

**Filed Nov. 20, 1989, Ser. No. 439,171**

**Int. Cl.$^5$ B32B** *7/12*

**U.S. Cl. 156—91** **8 Claims**



1. A method for lining the interior wear surface of a sand muller bowl having an interior, generally horizontally arranged, generally circular face for supporting sand and over which a muller plow blade travels for mulling such sand upon said face, and having an integral, outer edge, upstanding rim portion substantially surrounding such face for containing the sand upon the face, comprising the steps of:

preparing a thin wall liner to overlay and cover substantially all of the muller bowl interior face and the interior surface of the rim portion around the face, with the liner having an inner surface and an outer surface which are formed in substantially the same size and shape as the bowl face and rim portion for closely fitting within the muller bowl and for providing an inner surface for supporting and mulling sand;

positioning the liner within the muller bowl, with a major portion of the liner exterior surface being spaced inwardly, away from the muller bowl face, but with means for supporting the liner upon the muller bowl face to provide a roughly uniform, narrow in cross section space between the bowl face and the liner inner surface;

filling the space with a material which bonds together and forms a load absorbing layer between the liner outer surface and the bowl face;

whereby the liner may be positioned within a worn muller bowl or an unworn muller bowl for extending the useful lives thereof.

---

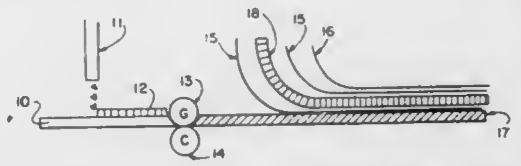
### 5,019,197
## METHOD OF MAKING COMPOSITES HAVING LAYERS OF THE SAME OR DIFFERENT FIRMNESS

**Lionel A. Henderson, 433 Charleston Ave., Columbus, Ohio 43214**

**Filed Nov. 7, 1988, Ser. No. 267,825**

**Int. Cl.$^5$ B32B** *31/20, 31/28*

**U.S. Cl. 156—212** **7 Claims**



1. A method for making composites having layers of the same or different firmness which comprises:
- a. providing a porous soft layer material selected from the group consisting of fiber and open cell polyurethane foam;
- b. impregnating said porous soft layer material with about one to five times its weight in curable resin;
- c. sandwiching a layer of hot melt film between said resin impregnated material and a second layer of material;
- d. simultaneously curing the resin in said resin impregnated soft layer and shaping the assembled layers in a mold to form a rigid composite.

---

### 5,019,198
## METHOD FOR THE DECORATIVE SURFACE COATING OF FLAT SUBSTRATES

**Werner Schäfer, Essen-Kettwig, and Manfred Scheiba, Essen, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 241,943, Sep. 8, 1988. This application Mar. 8, 1990, Ser. No. 490,785**

**Int. Cl.$^5$ B44C** *1/00*

**U.S. Cl. 156—230** **13 Claims**

1. In a method of surface improving a generally flat substrate by providing it with a surface coating, wherein a transfer sheet having a backing and being coated with synthetic resin is pressed with a pressing tool at elevated temperature onto the substrate, so that the resin of the transfer sheet is transferred to the substrate, whereafter the backing is pulled off, the improvement which comprises

providing a transfer sheet having
  - a first pigment free layer of a transparent thermoplastic or duroplastic synthetic resin which is capable of flowing when pressed at elevated temperatures, said first layer being adjacent said backing,
  - a second layer of thermoplastic or duroplastic synthetic resin which is capable of flowing when pressed at elevated temperatures, said second layer being superimposed on said first layer, said second layer having incorporated therein 2 to 40% by weight, calculated on the amount of synthetic resin, of a flake-shaped lamellar pigment and

pressing said transfer sheet onto the substrate by means of a press tool which is devoid of surface pattern or profile at a temperature and pressure effective to cause the first and second layers to flow and the pigment particles to orient themselves in the direction of flow, whereby a surface coating with a marbleized appearance is obtained.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,199

## METHOD OF JOINING WOOD MATERIAL TO PLASTIC MATERIAL

**Klaus Menke, Bruchsal; Peter Wiesert, Wiesbaden; Klaus Wollmann, Limburg, and Bernd Best, Morfelden-Walldorf, all of Fed. Rep. of Germany, assignors to Erwin Behr GmbH & Co KG, Wendlingen/Neckar, Fed. Rep. of Germany**

**Filed Apr. 11, 1989, Ser. No. 336,326**

**Claims priority, application Fed. Rep. of Germany, Apr. 19, 1988, 3813025**

**Int. Cl.$^5$ B29C** *45/00, 45/16*

U.S. Cl. 156—245 **2 Claims**

1. Method of joining wood material to plastic material, comprising the steps of:

(a) injection molding a thermoplastic material onto an anchoring layer having a high specific surface to provide a composite, wherein a fabric or a non-woven is used as the anchoring layer, wherein the step of injection molding includes spraying thermoplastic material on one side of the anchoring layer leaving exposed another side of the fabric or non-woven surface under such conditions that no bleed-through of the thermoplastic material occurs through the fabric or non-woven;

(b) applying an adhesive and adhesively joining the composite to the wood material, and wherein the step of adhesively joining includes joining the exposing side of the fabric or non-woven surface to the wood material.

---

### 5,019,200

## METHOD OF FABRICATING MULTILAYER CAPACITOR

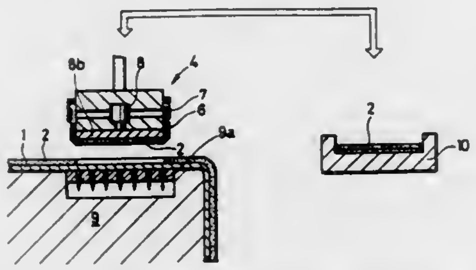
**Shoichi Kawabata, and Toshimi Yoshimura, both of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Dec. 15, 1989, Ser. No. 451,300**

**Claims priority, application Japan, Dec. 15, 1988, 63-317359**

**Int. Cl.$^5$ B32B** *31/18*

U.S. Cl. 156—245 **7 Claims**



1. A method of fabricating a multilayer capacitor, comprising the steps of:

forming a ceramic green sheet which is so thin that it cannot be handled accurately without additional support, and supporting said ceramic green sheet on a supporting film;

applying an electrode paste for forming an inner electrode on said ceramic green sheet;

cutting said ceramic green sheet supported on said supporting film to a predetermined size by employing a cutting head having drawing means, and drawing and holding the ceramic green sheet into the cutting head, to strip the same from said supporting film;

transferring the ceramic green sheet transversely away from said supporting film, while held in said cutting head, to a metallic mold; and

laminating a plurality of ceramic green sheets in said metallic mold to obtain a laminated body by repeating said step of stripping the ceramic green sheet of predetermined size from said supporting film and said step of transferring the ceramic green sheet to said metallic mold;

wherein said cutting head comprises a main body containing an air cylinder and a cylinder head fixed to a cylinder rod portion of said air cylinder, and so constructed that said cylinder head can be moved by the air cylinder between a position close to the main body and a position separated from the main body;

wherein a plurality of section holes connected to the drawing means is formed in said cylinder head; and

wherein said cylinder head is driven in a direction that is away from the main body subsequent to the step of transferring the ceramic green sheet held in said cutting head to the metallic mold, thereby causing the ceramic green sheet to enter the metallic mold.

---

### 5,019,201

## EXTERNAL-CIRCUIT CONNECTING METHOD AND PACKAGING STRUCTURE

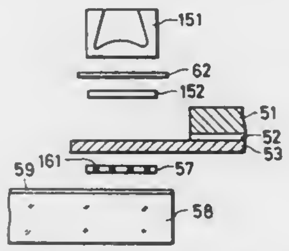
**Shigeki Yabu, Machida, and Hiroshi Takabayashi, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 186,943, Apr. 27, 1988, abandoned. This application Feb. 21, 1990, Ser. No. 483,312**

**Claims priority, application Japan, May 1, 1987, 62-66674[U]; Jun. 12, 1987, 62-146379; Jul. 2, 1987, 62-166417**

**Int. Cl.$^5$ B32B** *31/00;* **H01B** *7/00*

U.S. Cl. 156—273.9 **17 Claims**



1. A method of electrically connecting first and second conductive material films which face each other and which are separated from each other, wherein the method comprises the steps of:

providing a first substrate with the first conductive material film, and a second substrate with the second conductive material film, with the second conductive film having upper and lower surfaces that are exposed;

disposing the first substrate and the second substrate in such a manner that the first conductive material film and the lower exposed surface of the second conductive material film face each other and are spaced from each other;

disposing an anisotropic conductive member, in which a conductive material is contained in an insulating resin, between the first conductive material film and the lower exposed surface of the second conductive material film;

positioning an insulating member on the upper exposed surface of the second conductive material film; and

heating under pressure the anisotropic conductive member disposed between the first conductive material film and the lower exposed surface of the second conductive material film.

8. A method for electrically connecting a first series of semiconductors with a first conductive material film disposed on one side of a substrate and electrically connecting a second series of semiconductors with a second conductive material film disposed on an opposite side of the substrate, wherein the method for connecting each semiconductor in the first and second series comprises the steps of:

fixing a third conductive material film to a first film carrier, with the third conductive material film having upper and lower surfaces extending beyond both ends of the first film carrier;

fixing a fourth conductive material film to a second film carrier, with the fourth conductive material film having upper and lower surfaces extending beyond both ends of the second film carrier;

electrically connecting a semiconductor from the first series of semiconductors to the bottom surface of a first end of the third conductive material film;

electrically connecting a semiconductor from the second series of semiconductors to the upper surface of a first end of the fourth conductive material film;

electrically connecting a second end of the third conductive material film to the first conductive material film disposed on the substrate; and

electrically connecting a second end of the fourth conductive material film to the second conductive material film disposed on the substrate.

---

### 5,019,202

## PROCESS FOR PRODUCING DECORATIVE SHEETS HAVING EMBOSSED PATTERN

**Ichiro Kawahata, Itabashi; Takashi Matano, Miyoshi; Hideki Kato, Shiki, and Mutsuo Shima, Sayama, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 13, 1988, Ser. No. 283,848**

**Claims priority, application Japan, Dec. 15, 1987, 62-316783; Dec. 15, 1987, 62-316784; Dec. 28, 1987, 62-333490**

**Int. Cl.$^5$ B32B** *31/00*

U.S. Cl. 156—277 **7 Claims**

1. A process for producing decorative sheets having an embossed pattern corresponding to a printed pattern layer, said process comprising the steps of:

forming a printed pattern layer on a base paper for the decorative sheet by use of a printing ink containing (a) a current agent or a polymerization catalyst and (b) a curable resin, the curing or catalytic action of said curing agent and polymerization catalyst being blocked and thereby inactivated, said printing ink being liquid repellent;

releasing the block state of said curing agent or polymerization catalyst thereby curing said curable resin in said printed pattern layer;

coating the whole surface of said printed pattern layer with a coating agent for the formation of a top coating layer; and

solidifying said coating agent thereby forming the top coating layer of which the portions corresponding to the liquid repellent printed pattern layer are made concaved.

---

### 5,019,203

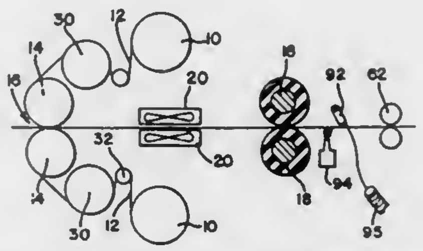
## DOUBLE SIDED LAMINATING MACHINE

**Karl Singer, Barrington Hills, Ill., assignor to D&K Custom Machine Design, Inc., Elk Grove Village, Ill.**

**Continuation-in-part of Ser. No. 104,604, Oct. 5, 1987, abandoned, which is a division of Ser. No. 903,391, Sep. 3, 1986, Pat. No. 4,743,334, which is a continuation-in-part of Ser. No. 830,852, Feb. 19, 1986, abandoned. This application Aug. 4, 1989, Ser. No. 389,510**

**Int. Cl.$^5$ B32B** *31/10, 31/12, 31/20*

U.S. Cl. 156—309.9 **10 Claims**



1. A method of laminating heat-activated adhesive film to opposite surfaces of an article comprising the steps of feeding a pair of continuous sheets of film having a heat-activated adhesive thereon from separate supply sources between a pair of heated laminating rollers and simultaneously feeding articles between said sheets of film to said laminating rollers,

positioning a pair of freely-rotating preheat rollers between said supply sources and said laminating rollers to contact an uncoated surface of said sheets of film,

producing a sinusoidal path for said sheets of film to produce extended surface engagement of substantially more than 90° between said sheets of film and both said preheat rollers and said laminating rollers,

heating said preheat rollers to a temperature in the range of about 200°-220° F. to heat said sheets of film to a temperature below the activating temperature for said adhesive,

and heating said laminating rollers to a temperature in the range of about 250°-260° F. to heat said sheets of film above the heat-activating temperature of said adhesive.

9. A continuous laminating system for double laminating an article comprising a pair of laminating rollers in pressure-engaging contact with each other to form a nip which receives an article to be laminated;

a pair of film supply rolls, each supplying a continuous web of laminating film with heat activatable adhesive thereon into said nip;

a pair of preheat rollers respectively spaced from the respective supply rolls and the laminating rollers and engaging said webs of laminating film;

a pair of reversing rollers respectively between said supply rolls and said preheat rollers producing extended surface contact of approximately 180° between said webs of laminating film and said preheat rollers;

said laminating rollers being positioned so as to have extended surface contact of substantially more than 90° with said webs of laminating film;

a first pair of pull rollers spaced from said laminating rollers with drive means for pulling said webs of laminating film from said supply rolls across said preheat rollers and through said laminating rollers;

first heating means for heating said preheat rollers to a temperature below the activating temperature of said adhesive; and

second heating means for heating said laminating rollers to a temperature above said activating temperature of said adhesive to thereby prevent stretching or elongation of the webs of laminating film between the preheat rollers and the laminating rollers.

---

### 5,019,204

## METHOD OF PRODUCING MAT PACKETS FROM SHEETS OF ADHESIVE MATERIAL AND APPARATUS FOR IMPLEMENTING THE METHOD

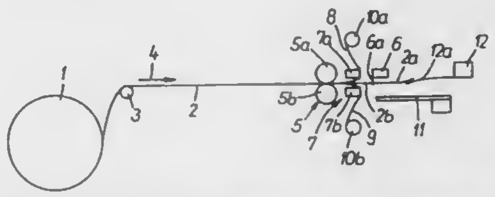
**Richard Brüssel, Sulzfeld, Fed. Rep. of Germany, assignor to Krupp Maschinentechnik GmbH, Essen, Fed. Rep. of Germany**

**Filed Nov. 8, 1989, Ser. No. 433,336**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 3838270**

**Int. Cl.$^5$ B32B** *31/00*

U.S. Cl. 156—264 **10 Claims**



1. In a method of producing strip stacks from an adhesive panel covered with release layers on opposite panel faces, including the cyclical steps of longitudinally advancing the panel by a feed device through a clamping device to a cutting device in incremental amounts corresponding to the desired width of the strips to be produced, removing the release layers from the portion of the panel which is positioned intermediate the clamping device and the cutting device, thus forming a freely extending end section of the panel, clamping the panel

VOL
1126
ISS
4
MY
28
1991
UMI

by the clamping device for immobilizing the panel, cutting a strip from the panel with the cutting device while the panel is immobilized to form a strip stack on a transporting device, the improvement subsequent to each cutting step, to form a strip stack, comprising the steps of: moving a supporting element underneath the freely extending end section of the panel which was previously immobilized for supporting the panel; releasing the panel from the clamping device; moving the supporting element away from said cutting device in synchronism with the advancing of the panel and the freely extending end section through the incremental amount; and removing the supporting element from the freely extending end section upon immobilizing the panel and before cutting the strip therefrom.

---

### 5,019,205
## APPARATUS FOR WET ETCHING OF THIN FILMS

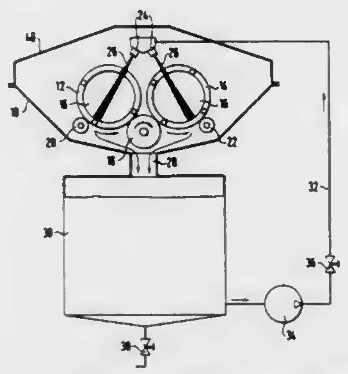
**Helmut Endl, Freising, and Helmut Rinck, Langenbach, both of Fed. Rep. of Germany, assignors to Texas Instruments Deutschland GmbH, Fed. Rep. of Germany**

**Filed Jun. 9, 1989, Ser. No. 364,266**

**Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820591**

**Int. Cl.⁵ C23F** ***3/00***

**U.S. Cl. 156—345** **4 Claims**



1. Apparatus for subjecting semiconductor slices to a liquid treatment, said apparatus comprising:

a housing providing a liquid treatment chamber therewithin;
at least one substantially cylindrical basket providing a slice carrier, said basket being of open framework and disposed in the chamber of said housing, said carrier being adapted to receive a plurality of semiconductor slices in fixed, spaced substantially parallel concentric relationship with the respective axes of the plurality of semiconductor slices coinciding with the longitudinal axis of said carrier;
jet spray means mounted within the chamber of said housing in spaced relation to said carrier for directing a substantially flat jet spray of liquid transversely across the longitudinal axis of said carrier and along the extent thereof;
means operably connected to said carrier for imparting rotation thereto about the longitudinal axis of said carrier, said rotation-imparting means comprising:
a pair of rollers mounted within the chamber of said housing and having respective longitudinal axes in spaced parallel relation with respect to the longitudinal axis of said carrier,
one of said rollers being a drive roller and the other roller being an idler roller, and
said basket being disposed on said pair of rollers and in engagement therewith and being rotated in one of a clockwise direction and a counterclockwise direction in response to the rotation of said drive roller in the other of a clockwise direction and a counterclockwise direction; and
means for providing liquid to said jet spray means;
whereby said carrier is rotated about its longitudinal axis in response to the rotation of said drive roller upon actuation of said rotation-imparting means such that the fixedly mounted semiconductor slices therein are rotated with the carrier while a flat jet spray of liquid is being directed by said jet spray means across and along the extent of the longitudinal axis of said carrier to wet the opposite faces of each of the semiconductor slices with the liquid.

---

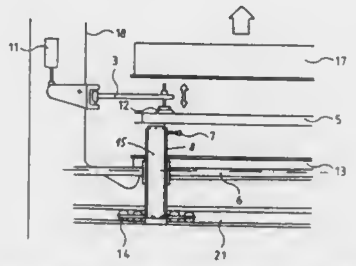
### 5,019,206
## APPARATUS FOR THE INSERTION OF LAMINATED PACKS INTO HOT PRESSES

**Friedrich B. Bielfeldt, Eppingen, Fed. Rep. of Germany, assignor to Maschinenfabrik J. Dieffenbacher GmbH & Co., Eppingen, Fed. Rep. of Germany**

**Filed Jun. 28, 1989, Ser. No. 373,063**

**Int. Cl.⁵ B30B** ***15/30***

**U.S. Cl. 156—538** **12 Claims**



1. An apparats for inserting a laminated pack into a press area of a hot press having two longitudinal sides and for removing the laminated pack from the hot press, comprising:

a plurality of vacuum suction lifters disposed at the two longitudinal sides of the hot press;
said vacuum suction lifters being movable into and out of the press area;
a plurality of supporting devices disposed along the two longitudinal sides, said supporting devices being movable into and out of the press area;
said press lifters and support devices cooperating with each other so that the vacuum suction lifters, after the press has opened, move into a daylight opening of the press, lift a finished panel and deposit it onto the supporting devices, which have moved in below to receive the lifted panel, whereupon the supporting devices, as the finished panel is moved out, move into the daylight opening of the hot press to remove a new laminated pack from a supply means and deposit the pack onto a heating plate of the press by moving laterally out of the press area;
said vacuum suction lifters being extendable in a horizontally pivotable and vertically extendable manner;
said supporting devices comprising rolling belt trays for carrying conveying belts, the rolling belt trays being arranged longitudinally before and after the bottom heating plate;
first splined and second guide shafts extending over the press width for guiding said supporting devices;
drive pulleys arranged at an inlet end of the press cooperating with the rolling belt trays;
a positioning and drive means for moving said drive pulleys on said first, splined guide shaft at outer holding positions into variable center operating positions in the press area; and
a motor for driving the first splined guide shaft and the drive pulleys, so that the conveying belts are rotationally movable via the drive and deflection pulleys.

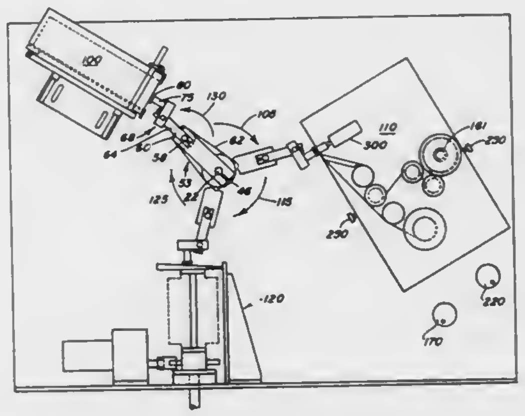
### 5,019,207
## PRODUCT LABEL HANDLING MACHINE

**Gary W. McCoy, Evans City, Pa., assignor to Carl Strutz and Company, Inc., Mars, Pa.**

**Filed Apr. 29, 1989, Ser. No. 342,324**

**Int. Cl.⁵ B65C** ***9/02, 9/08***

**U.S. Cl. 156—571** **37 Claims**



1. An apparatus for transporting a workpiece between a plurality of stations including a t least one workpiece pick-up station, at lest one workpiece treatment station and at least one workpiece deposit station, said apparatus comprising:

a housing, a motor, and a first shaft rotatably driven by the motor;
means for handling said workpiece; and
means for connecting said first shaft to said handling means for transporting the handling means between said plurality of stations, said means for connecting including:
first pulley means fastened to said housing;
arm means fixedly secured at a mid-portion thereof to said first shaft, said arm mans rotatably supporting, at opposite ends thereof, second and third shafts substantially parallel to said first shaft;
second pulley means fixedly secured to a first end of said second shaft;
third pulley means fixedly secured to a first end of said third shaft; and
belt means for linking said first pulley means to said second pulley means and for linking said first pulley means to said third pulley means,
whereby the arrangement of the connecting means is such that rotation of said first shaft in a first direction causes a corresponding rotational translation of said arm means in said first direction, and, through cooperation of said first pulley means, said second pulley means, said third pulley means, and said belt means, an opposite rotation is obtained in said second shaft and said third shaft.

---

### 5,019,208
## METHOD FOR DETERMINING THE DEPTH OF PERMEATION OF A MODIFIER INTO THE INTERIOR OF A THERMOPLASTIC ARTICLE

**Eugene J. Karwacki, Jr., Orefield, and Fred M. Kimock, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

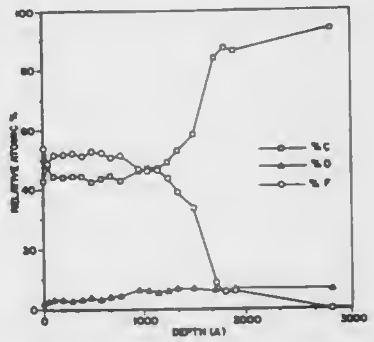
**Filed Mar. 23, 1990, Ser. No. 498,077**

**Int. Cl.⁵ B44C** ***1/22;*** **B29C** ***37/00;*** **C03C** ***15/00, 25/06***

**U.S. Cl. 156—626** **22 Claims**

1. A method for profiling the elemental composition and chemical structure of a thermoplastic article as a function of distance below an exterior surface of the thermoplastic article comprising:

(a) ablating the exterior surface of the thermoplastic article to a first predetermined distance below the exterior surface with a pulsed ultraviolet energy source having a fluence level and pulse duration sufficient to expose a first interior surface having a chemical structure and elemental composition which is substantially unaffected by the energy source;
(b) analyzing the elemental composition and chemical structure of the first interior surface by a surface sensitive spectrographic technique;
(c) ablating the first interior surface of the thermoplastic article to a subsequent predetermined distance by subjecting the first interior surface to the pulsed ultraviolet energy source to expose a successive interior surface;



(d) analyzing the elemental composition and chemical structure of the successive interior surface by a surface sensitive spectrographic technique;
(e) repeating steps c and d until reaching a final predetermined depth; and
(f) correlating the elemental composition and chemical structure and elemental composition of each successive interior surface as a function of distance below the exterior surface to establish a profile of the elemental composition and chemical structure of the thermoplastic article.

---

### 5,019,209
## METHOD OF MANUFACTURING AND USING A CARRIER TAPE FOR BONDING IC DEVICES

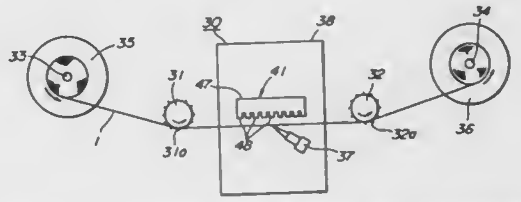
**Takashi Hiraide, Fussa; Ituro Kusunoki, Akishima, and Joji Tajima, Fussa, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 332,608, Mar. 31, 1989. This application Sep. 10, 1990, Ser. No. 580,262**

**Claims priority, application Japan, Apr. 6, 1988, 63-82886; Apr. 6, 1988, 63-82887; Apr. 12, 1988, 63-48273[U]**

**Int. Cl.⁵ C23F** ***1/02;*** **B44C** ***1/22;*** **C03C** ***15/00, 25/06***

**U.S. Cl. 156—630** **8 Claims**



1. A method of manufacturing a carrier tape, comprising the steps of:

perforating IC device holes arranged in a matrix of a plurality of rows × a plurality of columns in a central portion of an elongate insulating tape and perforating a plurality of arrays of sprocket holes along a longitudinal direction of said insulating tape in both side edge portions thereof;
attaching a metal foil having a width corresponding to at least said central portion of said insulating tape to one surface of said insulating tape;
coating a photoresist on said metal foil;
exposing said photoresist by using a mask having predetermined patterns;
filling an etching resist in said IC device holes;

VOL
1126
ISS
4
MY
28
1991
UMI

forming a first matrix conductive lead surrounding said IC device holes and a plurality of finger leads connected to said first conductive lead and projecting inside one of said IC device holes by removing said photoresist and said metal foil in reverse; and

plating said first conductive lead and said finger leads.

---

### 5,019,210
### METHOD FOR ENHANCING THE ADHESION OF POLYMER SURFACES BY WATER VAPOR PLASMA TREATMENT

**Ned J. Chou, Yorktown Heights; Ronald D. Goldblatt, Rye Brook; John E. Heidenreich, III; Steven E. Molis, both of Yorktown Heights, and Luis M. Ferreiro, deceased, late of Bardonia, all of N.Y. by Annette Mitchell, legal representative , assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 3, 1989, Ser. No. 332,656**

**Int. Cl.$^5$ B44C** *1/22;* **B29C** *37/00;* **C03C** *15/00;* **B32B** *31/00*

**U.S. Cl. 156—643** **16 Claims**

1. A method comprising:

providing a first and second polymer body;

treating at least a part of the surface of at least one of said first and said second polymer bodies with a water vapor containing plasma; and

contacting the treated surface of at least one of said first and said second polymer bodies with at least a part of the surface of the other of said first and said second polymer bodies.

---

### 5,019,211
### TISSUE WEBS CONTAINING CURLED TEMPERATURE-SENSITIVE BICOMPONENT SYNTHETIC FIBERS

**Robert D. Sauer, Fremont, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.**

**Continuation-in-part of Ser. No. 130,710, Dec. 9, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 256,346**

**Int. Cl.$^5$ D21D** *3/00*

**U.S. Cl. 162—111** **7 Claims**

1. A process for making a creped tissue web comprising:

(a) forming a wet web from an aqueous slurry containing a blend of cellulosic fibers and temperature-sensitive bicomponent synthetic fibers;

(b) raising the temperature of the web such that the web is at least partially dried and the temperature-sensitive bicomponent synthetic fibers curl to increase the bulk of the web, said temperature being sufficiently low to avoid melting of the temperature-sensitive bicomponent synthetic fibers and substantial bonding of the temperature-sensitive bicomponent synthetic fibers to other fibers in the web; and

(c) creping the web to produce a creped tissue web having sufficient tensile strength for use as facial tissue, bath tissue, or paper towels.

---

### 5,019,212
### METHOD FOR PRODUCING GAS-PERMEABLE PARCELLING FILM

**Yoshikazu Morita; Yoshiaki Inoue, and Syuji Wakamatsu, all of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Co., Japan**

**Division of Ser. No. 186,166, Apr. 26, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 391,662**

**Claims priority, application Japan, Apr. 27, 1987, 62-102012**

**Int. Cl.$^5$ D21H** *13/00*

**U.S. Cl. 162—157.3** **28 Claims**

1. A method of producing a gas-permeable parcelling film for use in a container for isolating a product to be preserved from a freshness keeping agent placed within the container, comprising the steps of:

subjecting plastic fibers formed from at least one of polyolefins, polyamides, polyesters and copolymers of the aforementioned to a paper-making process and a drying process to obtain a sheet of said plastic fibers;

impregnating said sheet of plastic fibers with a fluororesin to obtain a fluororesin impregnated sheet;

drying said fluororesin impregnated sheet; and

forming said fluororesin impregnated sheet into a predetermined shape to obtain said parcelling film.

---

### 5,019,213
### METHOD AND APPARATUS IN THE DRYING SECTION OF A PAPER MAKING MACHINE FOR SPEEDING THE THREADING OF A PAPER OR PAPERBOARD WEB

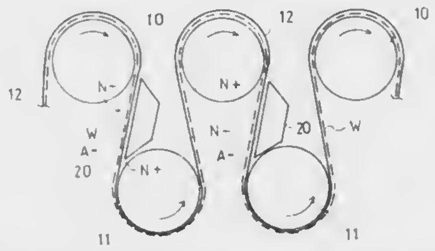
**Raimo Virta; Vesa Vuorinen, both of Turku, and Reijo Ruottu, Kaarina, all of Finland, assignors to Valmet Paper Machinery Inc., Finland**

**Filed Apr. 24, 1990, Ser. No. 513,544**

**Claims priority, application Finland, May 2, 1989, 892099**

**Int. Cl.$^5$ D21F** *5/02*

**U.S. Cl. 162—193** **9 Claims**



1. In a method for speeding the threading of a paper or paperboard web in a paper or paperboard making machine of the type wherein a single-wire draw is applied and said threading is facilitated by cutting said web to form a leader band, and wherein at least one blow box is used to facilitate contact between said web and a drying wire by preventing the formation of respective positive fluid pressures in a plurality of nips respectively defined by said drying wire and a plurality of drying cylinders, said method comprising the steps of:

providing said at least one blow box with a plurality of closable blow sections and providing said at least one blow box with at least two nozzles respectively having slots whose openings face substantially transversely to the running direction of said web and with a carrier face between at least two adjacent said nozzle slots, said carrier face and said drying wire defining a space, said blow box extending at least across the entire width of said web;

producing negative pressure in said space by blowing air jets through said at least two of said nozzle slots; and

closing those of said plurality of closable blow sections that are located such that they are not substantially transverse to any portion of said leader band of said web;

opening those of said plurality of closable blow sections that are located such that they are substantially transverse to said leader band of said web;

the improvement comprising the steps of providing one or more threading ropes contacting said leader band, and providing a plurality of lateral nozzles in said at least one blow box and another plurality of nozzles in said at least one blow box, each of said plurality of lateral nozzles being respectively connected to a respective one f said another plurality of nozzles, blowing air blown through said lateral nozzles, and also blowing air flows through said another plurality of nozzles to respectively alter the paths of said air blown through said lateral nozzles such that said air flows through said lateral nozzles are turned away from said one or more threading ropes so that they do not blow said leader band away from said one or more threading ropes.

---

### 5,019,214
### TWIN-WIRE FORMER FOR THE PRODUCTION OF A WEB OF PAPER

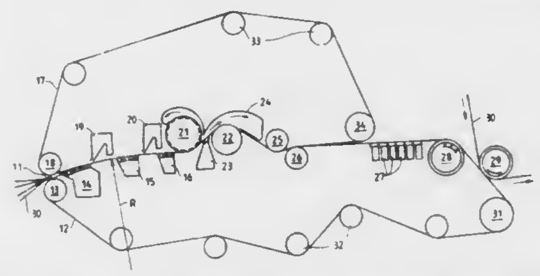
**Albrecht Meinecke; Dieter Egelhof, and Wilfried Weiss, all of Heidenheim, Fed. Rep. of Germany, assignors to J.M. Voith GmbH, Fed. Rep. of Germany**

**Filed Dec. 15, 1989, Ser. No. 451,818**

**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1988, 3842155**

**Int. Cl.$^5$ D21F** *1/00*

**U.S. Cl. 162—301** **13 Claims**



1. A twin-wire former for producing a relatively thick web from a fiber suspension which is relatively dry upon reaching the downstream end of said twin-wire former, wherein the fiber suspension is fed through the exit of a head in the form of a machine-wide stream, the twin-wire former comprising:

a lower wire belt in the form of an endless loop having an upper run which predominantly extends generally horiztonally;

an upper wire belt in the form of an endless loop having a lower run which generally overlies and cooperates with the upper run of the lower wire belt, with respective portions of their generally horizontal upper and lower runs forming a twin-wire zone;

means supporting the upper and lower wire belts for defining a path of the twin-wire zone which comprises:

an entrance wedge adjacent to said head box exit at which the lower run of the upper wire belt and the upper run of the lower wire belt are first brought together;

wherein the means supporting the upper and lower wire belts form the entrance wedge in the initial region of the twin-wire zone and the entrance wedge is positioned at the exit slot of the head box which discharges directly into the entrance wedge;

downstream of the entrance wedge, a slightly upwardly curved initial portion of the path having a relatively large radius of curvature in the range of 5 to 30 m;

wherein the initial portion of the path in the twin-wire zone includes in it a plurality of twin-wire supporting elements in the following sequence downstream of the entrance wedge;

a forming table having a curved travel surface over which the lower wire belt passes and disposed within the loop of the lower wire belt,

a dewatering element arranged within the loop of the upper wire belt above the lower run of the upper wire belt and positioned for removing water which may in part be caused to leave the wire belts as a result of having passed the preceding curved travel surface, and

an initial suction box having a curved travel surface within the loop of the lower wire belt;

a second dewatering element arranged within the loop of the upper wire belt downstream from the initial suction box for in part removing the water caused to exit from the lower run of the upper wire belt by the curved travel surface of the initial suction box, and

a further suction box within the loop of the lower wire belt and downstream of the second dewatering element;

downstream of the initial portion of the path, a non-suction forming roll within the loop of the upper wire, and the twin-wires passing in a downwardly convex curve over a relatively small arcuate sector of about 30° to 60° of the forming roll, at the lower region and up the lower ascending quadrant of the forming roll;

downstream of the support roll, means separating the upper wire belt from the lower wire belt;

further downstream in the path of the lower wire belt, suction means for suctioning the lower wire belt and for defining the final dewatering path of the lower wire belt after the twin-wire zone, wherein the suction means operating on the lower wire belt comprises a plurality of suction boxes adjacent to the lower wire belt and further comprises a wire suction roll disposed downstream in the path of the lower wire belt from the suction boxes, and the lower wire belt partially wrapping the suction roll, after which the web has a relatively high solids content, despite also having high basis weight.

---

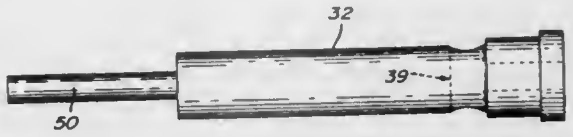
### 5,019,215
### HEADBOX WITH CONDUITS HAVING MULTIPLY CONNECTED DOMAINS

**Luc Y. Fortier, Pierrefonds, and Andre G. Piette, Dollard-Des-Ormeaux, both of Canada, assignors to Groupe Laperrier & Verreault, Inc., Canada**

**Filed Oct. 17, 1988, Ser. No. 258,485**

**Int. Cl.$^5$ D21F** *1/02*

**U.S. Cl. 162—343** **13 Claims**



1. A headbox comprising:

an inlet chamber communicating with a source of fiber suspension, said fiber suspension having a direction of flow through the headbox;

an outlet chamber downstream of said inlet chamber, said outlet chamber comprising a discharge opening;

a diffuser mounted between said inlet chamber and said outlet chamber to establish a fluid path from said inlet chamber to said outlet chamber, said diffuser including a plurality of conduits in fluid communication with said inlet and outlet chambers, each conduit being divided in at least two successive portions, referenced as a first portion and a second portion establishing first and second fiber suspension passages respectively, said first passage having a smaller cross-sectional area than said second passage, each of said conduits including an elongated stem mounted therein such that said second portion is free of said stem, said first passage being defined between said stem and an inner wall of said conduit, said first passage defining in cross-section a multiply connected domain; and

said elongated stem constituting means to create an abrupt enlargement of the cross-sectional area of the conduit at a juncture between said passages in the direction of flow

VOL
1126
ISS
4
MY
28
1991
UMI

through the headbox, for producing a vortex in the flow of fiber suspension through the conduit.

---

### 5,019,216
## HEADBOX WITH COARSE AND FINE ADJUSTMENT OF THE SLICE

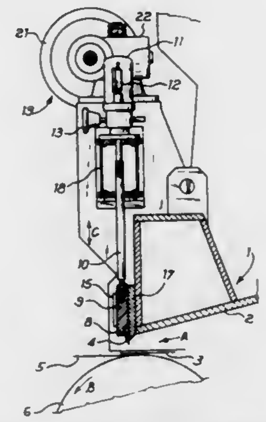
**Rodolfo Segalla, and Sergio Bottene, both of Schio, Italy, assignors to Comer S.p.A., Vincenza, Italy**

**Continuation of Ser. No. 355,831, May 22, 1989, abandoned, which is a continuation of Ser. No. 149,113, Jan. 27, 1988, abandoned. This application Aug. 1, 1990, Ser. No. 562,423**

**Claims priority, application Italy, Jun. 25, 1987, 21054 A/87**

**Int. Cl.$^5$ D21F *1/06***

**U.S. Cl. 162—344** **2 Claims**



1. A headbox for a paper machine, said headbox comprising: an upper lip and a lower lip, a wall member of said upper lip forming with said lower lip a flow path for fibrous slurry, a straightening member on said wall member projecting into said path from said wall member, wherein said upper lip has a face inclined in the direction of the flow path and said wall member has a bottom face angularly inclined relative to said upper lip face and sloping down to said straightening member, a plurality of micrometrical devices individually controlled connected by means of control rods to said flow straightening member at spaced points along the length thereof to fine-adjust the linearity of said flow straightening member and a beam supporting said devices, wherein said headbox includes turbulence control means for modifying the turbulence of said flow, said turbulence control means including means for coarse-displacing said beam up and down in a vertical direction simultaneously with said control rods and said straightening member to thereby adjustably move said flow straightening member through strokes of given coarse amplitudes along said wall to coarse-adjustably project said flow straightening member a length relative to said wall into said path to modify the turbulence of the slurry flow passing therethrough.

---

### 5,019,217
## SEPARATION OF M-XYLENE FROM O-XYLENE BY EXTRACTIVE DISTILLATION USING ESTERS

**Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, and George Bentu, Bozeman, Mont., assignors to Lloyd Berg, Bozeman, Mont.**

**Filed Feb. 7, 1990, Ser. No. 476,583**

**The portion of the term of this patent subsequent to Dec. 18, 2001, has been disclaimed.**

**Int. Cl.$^5$ B01D *3/40;* C07C *7/08***

**U.S. Cl. 203—51** **1 Claim**

1. A method for recovering m-xylene from mixtures of m-xylene and o-xylene which comprises distilling a mixture of m-xylene and o-xylene in a rectification column in the presence of about one part of an extractive agent per part of m-xylene—o-xylene mixture, recovering m-xylene as overhead product and obtaining the o-xylene and the extractive agent from the stillpot, wherein said extractive agent consists of at least one material selected from the group consisting of diisononyl adipate, benzyl acetate, diethylene glycol ethyl ether acetate, ethylene glycol diacetate, ethylene glycol butyl ether acetate, ethyl phenyl acetate, glycerol triacetate, dimethyl glutarate, tributyl phosphate, tricresyl phosphate, dimethyl sebacate, dimethyl succinate and dimethyl adipate.

---

### 5,019,218
## VACUUM DISTILLATION PROCESS

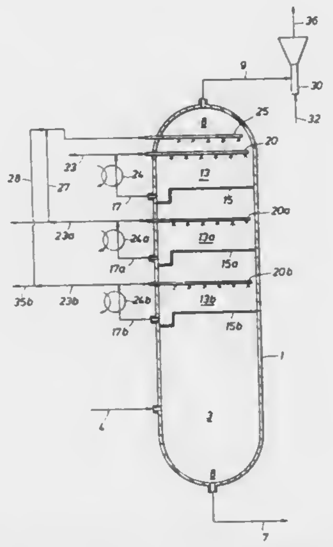
**Johannes A. Hamer, and Pieter van der Heijden, both of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Feb. 7, 1990, Ser. No. 476,183**

**Claims priority, application United Kingdom, Feb. 10, 1989, 8903011**

**Int. Cl.$^5$ B01D *3/10***

**U.S. Cl. 203—87** **2 Claims**



1. Vacuum distillation process comprising introducing a preheated feed which contains liquid and vapor into an inlet section of an upright distillation column operating at a subatmospheric pressure, said column having a top section disposed at the uppermost part thereof and a bottom section disposed at the lowermost part thereof, said inlet section being disposed between said top section and said bottom section; removing liquid from said bottom section of the distillation column, allowing vapor to pass through at least two condensation sections disposed one above the other in the distillation column between said inlet section and said top section; withdrawing vapor from the top section; spraying into each condensation section liquid having a temperature below that of the vapor in each said condensation section, and removing liquid from each condensation section, wherein the liquid which is sprayed into each condensation section comprises liquid removed from that condensation section which has been cooled by indirect heat exchange, and wherein the cooled liquid which is sprayed in the uppermost condensation section comprises at least part of the liquid removed from the condensation section disposed below the uppermost condensation section, and wherein the cooled liquid sprayed into the vapor passing through the uppermost condensation section comprises between 0.5 and 1 kg of liquid removed from at least one condensation section disposed below the uppermost condensation section per kg of liquid removed from the uppermost condensation section.

### 5,019,219
## VACUUM DISTILLATION PROCESS

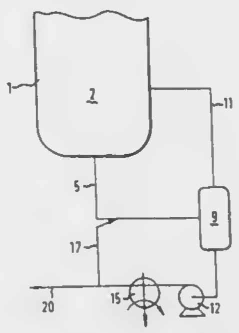
**Johannes A. Hamer, and Pieter Van Der Heijden, both of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Feb. 9, 1990, Ser. No. 477,407**

**Claims priority, application United Kingdom, Feb. 10, 1989, 8903013**

**Int. Cl.$^5$ B01D *3/10***

**U.S. Cl. 203—91** **1 Claim**



1. A vacuum distillation process in a vacuum distillation column operating at subatmospheric pressure having a bottom section which consists essentially of introducing to said column through a column inlet a vapor-liquid admixture, separating said vapor-liquid and allowing said vapor to rise inside said distillation column and allowing said liquid to drop to said bottom section of said column, removing said liquid from said bottom part of said column to an external liquid collection vessel, removing liquid from said collection vessel, cooling said liquid removed from said collection vessel, and passing a portion of said cooled liquid into the liquid passing from the column to said collection vessel wherein the fraction of the cooled liquid which is introduced into the liquid passed from the column to the collecting vessel is equal to between 30 to 70% by volume of said cooled liquid.

---

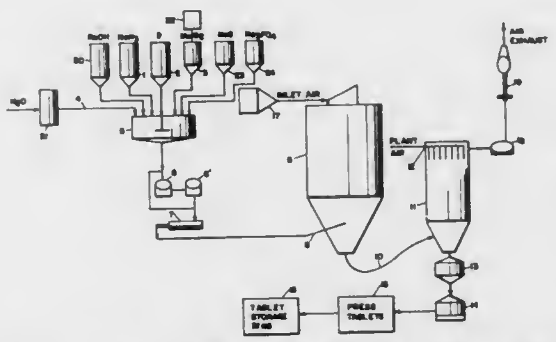
### 5,019,220
## PROCESS FOR MAKING AN ENHANCED THERMAL AND IGNITION STABILITY AZIDE GAS GENERANT

**Robert D. Taylor, Hynum; Gary L. Smith, and Ritchie Olsen, both of Ogden, all of Utah, assignors to Morton International, Inc., Chicago, Ill.**

**Filed Aug. 6, 1990, Ser. No. 563,772**

**Int. Cl.$^5$ C06B *21/00***

**U.S. Cl. 264—3.4** **43 Claims**



1. In a process of making gas generant pellets or tablets wherein powdered ingredients of a generant azide and an oxidizer and/or reactant therefor are slurried in water, subjected to wet grinding, dried to a powder material which is then further processed to produce the pellets or tablets, the improvement wherein the order of addition of the ingredients in the slurry stage comprises first adding a base to the water to adjust the pH to be within the range of greater than 8.0 up to about 12.5, then adding said oxidant/reactant and finally the azide whereby the azide addition is made to a basic mixture of the other ingredients thus prohibiting the formation of hydrazoic acid at hazardous concentration levels.

---

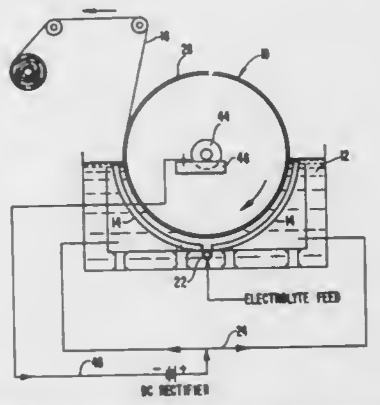
### 5,019,221
## ELECTROPLATING DRUM CATHODE WITH HIGH CURRENT-CARRYING CAPABILITY

**Joseph M. Khalid, and Chakrakody V. Shastry, both of East Windsor, N.J., assignors to Yates Industries, Bordentown, N.J.**

**Filed Jan. 18, 1989, Ser. No. 298,120**

**Int. Cl.$^5$ C25D *1/04, 17/00***

**U.S. Cl. 204—13** **12 Claims**



12. A process for producing metal foil by electrodepositing the metal foil on a drum cathode, wherein the metal foil is deposited on a drum cathode comprising:

(a) a cylindrical base cylinder having first and second ends;

(b) a cylindrical titanium top cylinder on the outer surface of said base cylinder, said top cylinder having first and second ends each adjacent a corresponding end of said base cylinder; and

(c) an electrical connection means of high ductility and high current-carrying capacity integrally connecting each end of said top cylinder and said base cylinder and extending circumferentially around said ends, said electrical connection means including at least a first weldment comprising a metal capable of being welded to titanium and a second weldment capable of being welded to said base cylinder and wherein said first and second weldments are electrically connected.

---

### 5,019,222
## TREATMENT OF COPPER FOIL FOR PRINTED CIRCUITS

**Eiji Hino, and Keisuke Yamanishi, both of Hitachi, Japan, assignors to Nikko Gould Foil Co., Ltd., Tokyo, Japan**

**Filed Apr. 27, 1990, Ser. No. 515,927**

**Claims priority, application Japan, May 2, 1989, 1-112226; May 2, 1989, 1-112227**

**Int. Cl.$^5$ C25D *3/58, 7/06***

**U.S. Cl. 204—27** **4 Claims**

1. A process for the treatment of a copper foil for printed circuits characterized by forming, on the surface of the copper foil to be treated, an electroplated alloy layer selected from the group consisting of electro-plated layers of binary alloys composed of from 20 to 40 $mg/dm^2$ copper and from 100 to 3000 $\mu g/dm^2$ cobalt and ternary alloys composed of from 20 to 40 $mg/dm^2$ copper, from 100 to 3000 $\mu g/dm^2$ cobalt, and from 100 to 1000$\mu g/dm^2$ nickel.

VOL 1126
ISS 4
MY 28
1991
UMI

### 5,019,223
## BLACK CHROMIUM PLATING BATH USEFUL FOR SOLAR REFLECTING COATINGS

**Vatia K. W. Grips; Indira Rajagopal, and Sundarapandium Rajagopalan, all of Bangalore, India, assignors to The Council of Scientific & Industrial Research, New Delhi, India**

**Continuation-in-part of Ser. No. 259,272, Oct. 18, 1988, abandoned. This application Jul. 18, 1990, Ser. No. 554,106**

**Claims priority, application European Pat. Off., Jan. 5, 1988, 8830004801**

**Int. Cl.⁵ C25D *3/04***

**U.S. Cl. 204—51** **23 Claims**

1. A black chromium plating bath which comprises 2–20 grams per liter of nitrate ions, 3–40 grams per liter of borate ions, 0.5–5 grams per liter of fluosilicate ions and the balance being an aqueous, solution of sulphate-free chromic acid, wherein said bath is substantially free of oxalic acid which forms carbonaceous impurities in said black chromium.

---

### 5,019,224
## ELECTROLYTIC PROCESS

**David A. Denton, Warrington, and Peter C. S. Hayfield, Bickenhill, both of Great Britain, assignors to Imperial Chemical Industries PLC, London, England**

**Filed Feb. 14, 1990, Ser. No. 479,689**

**Claims priority, application United Kingdom, Feb. 14, 1989, 8903322**

**Int. Cl.⁵ C25D *3/30, 3/22***

**U.S. Cl. 204—54.1** **11 Claims**

1. An electrolytic process which comprises electrolysing an aqueous electrolyte in an electrolytic cell having at least one anode and at least one cathode, evolving oxygen at the anode, and effecting the electrolysis at an anode current density of at least 3 $kA/m^2$, in which the anode comprises a substrate of which at least a part thereof is provided with an outer surface of tantalum metal, or of an alloy thereof, at least part of the tantalum metal or tantalum alloy surface having a coating of an electrocatalytically-active material.

---

### 5,019,225
## MOLTEN SALT ELECTROWINNING ELECTRODE, METHOD AND CELL

**Dominique Darracq, Ville-la-Grand, France; Jean-Jacques Duruz, Geneva, Switzerland, and Claude Durmelat, Ferney-Voltaire, France, assignors to Moltech Invent S.A., Luxembourg**

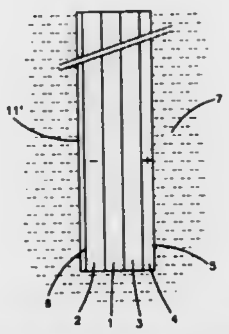
**PCT No. PCT/EP87/00472, § 371 Date Feb. 15, 1989, § 102(e) Date Feb. 15, 1989, PCT Pub. No. WO88/01313, PCT Pub. Date Feb. 25, 1988**

**PCT Filed Aug. 19, 1987, Ser. No. 350,585**

**Claims priority, application Switzerland, Aug. 21, 1986, 86810373.0**

**Int. Cl.⁵ C25C *3/06, 3/08***

**U.S. Cl. 204—67** **22 Claims**



1. A method of producing a metal by electrolysis of a compound of said metal dissolved in a molten salt electrolyte, wherein an anodic surface is preserved by maintaining in the electrolyte ions of cerium alone or cerium with another metal $M_1$ selected from other rare earth metals, alkaline earth metals, or alkali metals, characterized by cathodically polarizing a cathode comprising: a cathodic substrate which consists of one or more borides of cerium boride alone or cerium boride together with one or more borides of metals $M_1$ or metals $M_2$, wherein the metals $M_2$ are selected from Ti, Sr, Hf, V, Nb, Ta Cr, Mo, W, Mg,Si, Al, La, Y, Mn, Fe, Co, and Ni; and a cathodic surface which consists of at least one boride from the group consisting of (a) cerium boride alone, (b) cerium boride together with boride of at least one metal from group $M_1$ or $M_2$, and (c) borides of metals $M_2$, with the proviso that one or more of the cathodic substrate and the cathodic surface may further contain additives from the group consisting of micro-dispersed aluminum, TiN and CeN, whereby the concentration of the cerium ions plus other $M_1$ ions, when present, in the electrolyte serves also to preserve the cathode.

---

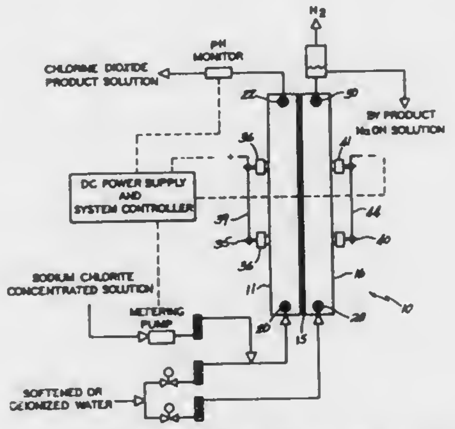
### 5,019,226
## ELECTROCHEMICAL METHOD FOR PRODUCING CHLORINE DIOXIDE SOLUTIONS

**David W. Cawlfield, and Jerry J. Kaczur, both of Cleveland, Tenn., assignors to Olin Corporation, Cheshire, Conn.**

**Filed Dec. 26, 1989, Ser. No. 456,437**

**Int. Cl.⁵ C25B *1/00***

**U.S. Cl. 204—101** **15 Claims**


H2
PH MONITOR
CHLORINE DIOXIDE PRODUCT SOLUTION
22
30
BY PRODUCT NaOH SOLUTION
36
41
DC POWER SUPPLY AND SYSTEM CONTROLLER
39
44
35
40
36
SODIUM CHLORITE CONCENTRATED SOLUTION
11
16
10
METERING PUMP
20
15
28
SOFTENED OR DEIONIZED WATER

1. A continuous electrochemical process for producing chlorine dioxide solution from an aqueous alkali metal chlorite solution in an electrolytic celi having an aqueous catholyte solution and a separator between the anolyte and catholyte compartments, comprising the steps of:

(a) feeding an aqueous alkali metal chlorite solution into the anolyte compartment of the electrolytic cell to form the anolyte;

(b) feeding an aqueous solution into the catholyte compartment of the cell to form the aqueous catholyte solution;

(c) electrolyzing the anolyte by directing the anolyte in a single pass through a porous, high surface area anode having a surface area to volume ratio of at least about 50 $cm^2/cm^3$ to convert chlorite ions on the high surface area anode to produce a chlorine-free solution of chlorine dioxide in the anolyte compartment and to cause the alkali metal ions to pass through the separator into the catholyte compartment; and

(d) removing the chlorine dioxide solution from the anolyte compartment.

---

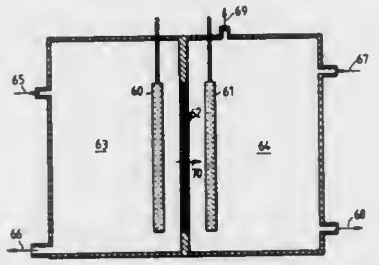
### 5,019,227
## ELECTROCHEMICAL METHOD FOR PRODUCING HYDROGEN AND SULFUR

**Ralph E. White, College Station; Zhenhua Mao, Bryan, and Supramaniam Srinivasan, both of College Station, all of Tex., assignors to The Texas A&M University System, College Station, Tex.**

**Filed Nov. 9, 1987, Ser. No. 433,698**

**Int. Cl.⁵ C25B *1/00, 1/02***

**U.S. Cl. 204—128** **25 Claims**



1. A method for removing sulfide ions from a sulfide ion containing solution comprising:

forming a mixture containing the sulfide ion containing solution by adding a sulfide concentration balancing amount of a basic solution; and

electrochemically precipitating sulfur from the mixture in an electrochemical cell.

---

### 5,019,228
## ELECTROPOLISHING METHOD FOR DECONTAMINATION PURPOSES

**Robert Weber, Uttenreuth, and Hubert Stamm, Nurrmberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jul. 28, 1989, Ser. No. 387,069**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825708**

**Int. Cl.⁵ C25F *3/16***

**U.S. Cl. 204;129.75** **10 Claims**

1. Electropolishing method for decontaminating component parts in nuclear facilities, which comprises enriching deionized water with an electrolyte that can be processed by a water processing plant present in the nuclear facility, the deionized water being enriched with the electrolyte to form an electrolyte solution in order to assure electrical conductivity, electropolishing with the electrolyte solution, removing removal material from the electrolyte solution, and supplying the remaining electrolyte solution to the facility's own water processing plant for processing.

---

### 5,019,229
## METHOD OF CONTROLLING EPOXY RESIN ETCHANT ION CONCENTRATION

**Hans-Joachim Grapentin; Tomas Kayser, and Andrea Riedl, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

**Filed Jul. 5, 1989, Ser. No. 375,716**

**Claims priority, application Fed. Rep. of Germany, Jul. 5, 1988, 3823137**

**Int. Cl.⁵ C25F *5/00, 7/02;* B44C *1/22, 15/00***

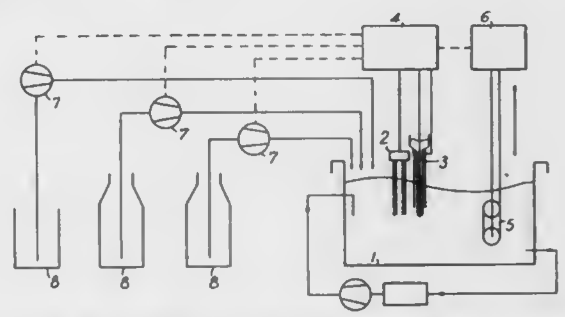
**U.S. Cl. 204—130** **10 Claims**

1. A method of etching an epoxy resin having a high back-etching rate, in particular bores with printed circuit boards, with stable, strong basic alkaline permanganate etching solution, said method comprising the steps of

a. providing a permanganate etching solution;

b. stabilizing the permanganate etching solution by electrochemical anodal oxidation with a direct current voltage of 0.5 to 0.25 volt and a current density of 0.1 to 20 $A/dm^2$;

c. controlling permanganate and OH-ion concentration by measuring the same by using at least one of electrochemical concentration measurement and photometric concentration measurement, and by metering the solution in accordance with deviation of a measurement value from a nominal value; and



d. effecting etching of the epoxy resin with a backetching rate of greater than 3 um.

---

### 5,019,230
## APPARATUS AND METHOD FOR REMOVING LIQUID FROM LIQUID BEARING MATERIAL

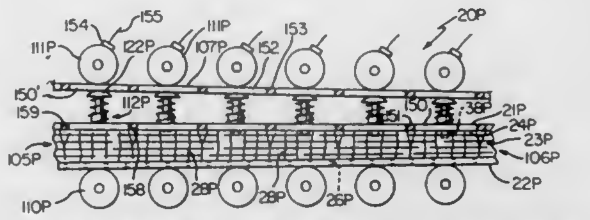
**James T. Candor, 5440 Cynthia La., Dayton, Ohio 45429**

**Continuation-in-part of Ser. No. 454,718, Dec. 21, 1989, Pat. No. 4,975,166, which is a continuation-in-part of Ser. No. 386,579, Jul. 27, 1989, abandoned, which is a continuation-in-part of Ser. No. 284,197, Dec. 14, 1988, Pat. No. 4,877,503, which is a continuation-in-part of Ser. No. 213,709, Jun. 30, 1988, abandoned, which is a continuation-in-part of Ser. No. 189,974, May 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 62,201, Jun. 15, 1987, Pat. No. 4,780,188, which is a continuation-in-part of Ser. No. 32,746, Mar. 31, 1987, Pat. No. 4,767,514. This application Mar. 30, 1990, Ser. No. 502,506**

**The portion of the term of this patent subsequent to Dec. 4, 2007, has been disclaimed.**

**Int. Cl.⁵ B01D *57/02***

**U.S. Cl. 204—182.1** **19 Claims**



1. In an apparatus for removing liquid from liquid bearing material and comprising a first electrode means and a second electrode means, said first and second electrode means having portions thereof disposed adjacent each other and defining an inlet means to said adjacent portions and an outlet means from said adjacent portions, said apparatus comprising a rotatable drum means having an outer peripheral surface means, said outer peripheral surface means comprising said first electrode means, said second electrode means comprising a movable endless bèlt means having said adjacent portion thereof spaced from said adjacent portion of said outer peripheral surface means in a generally concentric manner therewith, means for feeding said liquid bearing material into said inlet means, means for moving said liquid bearing material from said inlet means to said outlet means so that sections of said material serially move from said inlet means to said outlet means while being disposed between said adjacent portions, and means for creating a voltage between said first and second electrode means so as to create an electrostatic field arrangement between said adjacent portions of said first and second electrode means for acting through said material that is disposed theebetween to remove

VOL
1126
ISS
4
MY
28
1991
UMI

liquid from that said material, the improvement wherein said apparatus has means for providing different voltages between different parts of said first and second electrode means so that different intensities of the electrostatic field arrangement serially act through each said section of said material as each said section of material moves from said inlet means to said outlet means.

---

### 5,019,231
## ELECTRO-BLOTTING OF ELECTROPHORETICALLY RESOLVED FLUROESCENT-LABELED SACCHARIDES AND DETECTION OF ACTIVE STRUCTURES WITH PROTEIN PROBES

**Brian K. Brandley; Paul G. James, both of Alameda, and Michael Tiemeyer, Oakland, all of Calif., assignors to Glycomed, Incorporated, Alameda, Calif.**

**Filed Feb. 16, 1990, Ser. No. 481,367**

**The portion of the term of this patent subsequent to Dec. 4, 2007, has been disclaimed.**

**Int. Cl.$^5$ C07H *1/06;* C25B *7/00***

**U.S. Cl. 204—182.1** **15 Claims**

1. A method of separating and analyzing saccharides within a mixture of saccharides, comprising the steps of:
reacting the saccharides in the mixture with 4-amino-1-naphthalene sulfonic acid in order to form conjugates;
subjecting the conjugates to electrophoretic separation in a gel;
electro-blotting the separated saccharides in the gel to the surface of a support membrane; and
contacting labeled probes with the membrane and determining binding affinity of the probes to saccharides on the membrane.

---

### 5,019,232
## MEDIUM FOR ELECTROPHORESIS

**Theresa J. Wilson; Louis C. Haddad, both of St. Paul, and Donald F. Hagen, Woodbury, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jun. 1, 1990, Ser. No. 531,836**

**Int. Cl.$^5$ C25B *1/00;* B01D *15/08;* C02F *1/28***

**U.S. Cl. 204—182.8** **34 Claims**

1. A medium for electrophoresis comprising
(a) a polytetrafluoroethylene (PTFE) fibril matrix, and
(b) particulate having an average size in the range of 1 to 600 micrometers electrically mobile ions, and sufficient liquid in the interstitial spaces of said matrix to allow for ion transport,
the ratio of said particulate to PTFE being in the range of 99:1 to 4:1 by weight, and said ions being present in said liquid in an amount to provide a solution of concentration in the range of 1 to 1000 millimolar, and wherein almost all of said particulate are separate one from another and are isolated in cages or cage-like structures of PTFE microfibers.

---

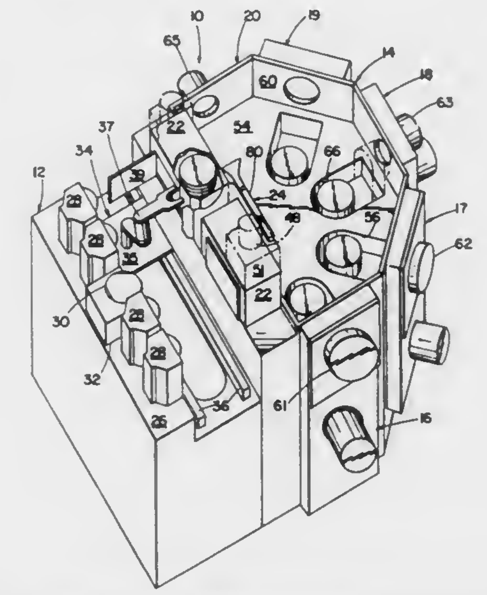
### 5,019,233
## SPUTTERING SYSTEM

**Julian G. Blake, Cambridge; Richard S. Muka, Topsfield, and Peter R. Younger, Newton, all of Mass., assignors to Eaton Corporation, Cleveland, Ohio**

**Continuation of Ser. No. 264,571, Oct. 31, 1988, abandoned. This application Nov. 8, 1989, Ser. No. 434,605**

**Int. Cl.$^5$ C23C *14/34;* B65G *49/05***

**U.S. Cl. 204—792.12** **12 Claims**



1. In a method for processing substrates, the steps of moving substrates into a first vacuum chamber to form a first batch of substrates within said chamber, evacuating said first vacuum chamber to a subatmospheric pressure, heating said first batch of substrates to effect degassing thereof within said first vacuum chamber, transferring said first batch of substrates as a unit from said first vacuum chamber to a transfer site within a second vacuum chamber, evacuating said second vacuum chamber to a subatmospheric pressure, transferring said substrates from said first batch at said transfer site one at a time to any one of a plurality of transfer stations within said second vacuum chamber, and then transferring a substrate from said one of a plurality of transfer stations to a vacuum processing chamber adjacent the transfer station.

7. Apparatus for processing substrates comprising a first vacuum chamber; a second vacuum chamber communicating with said first vacuum chamber; means for selectively effecting vacuum isolation between said first vacuum chamber and said second vacuum chamber; a plurality of third vacuum chambers each communicating with said second vacuum chamber; means for forming a batch of substrates within said first vacuum chamber; heating means within said first vacuum chamber operable to degas said batch of substrates; first transfer means operable to transfer said batch of substrates as a unit from said first vacuum chamber to a transfer site within said second vacuum chamber; a plurality of substrate transfer stations within said second vacuum chamber, each of said transfer stations being disposed adjacent one of said third vacuum chambers; second transfer means operable to transfer substrates one at a time between said transfer site and any one of said transfer stations and between one transfer station and any other transfer station in random order; third transfer means operatively associated with each of said transfer stations and operable to transfer a substrate from said transfer station to an adjacent third vacuum chamber and means associated with each of said transfer stations for effecting vacuum isolation between said second vacuum chamber and a third vacuum chamber adjacent that transfer station.

---

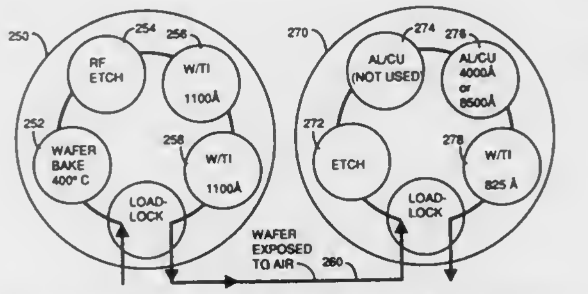
### 5,019,234
## SYSTEM AND METHOD FOR DEPOSITING TUNGSTEN/TITANIUM FILMS

**Guy A. Harper, San Jose, Calif., assignor to VLSI Technology, Inc., San Jose, Calif.**

**Filed Jun. 8, 1990, Ser. No. 537,470**

**Int. Cl.$^5$ C23C *14/34;* H01L *21/441***

**U.S. Cl. 204—192.17** **8 Claims**



1. A method of forming a metal layer on a semiconductor wafer, the steps of the method comprising, in sequence:
forming a tungsten/titanium layer on a semiconductor wafer by sputtering tungsten/titanium onto said semiconductor wafer in an evacuated chamber;
exposing said tungsten/titanium layer to air; and
then, forming an aluminum layer over said tungsten/titanium layer on said semiconductor wafer;
whereby said step of exposing said tungsten/titanium layer causes at least partial oxidation of the titanium in said tungsten/titanium layer.

7. A system for forming a metal layer on a semiconductor wafer, comprising:
a first evacuated sputter station which deposits a first portion of a first tungsten/titanium layer on a semiconductor wafer;
a second evacuated sputter station which receives said semiconductor wafer from said first evacuated sputter station and which deposits a second portion of said first tungsten/titanium layer on top of said first portion of said tungsten/titanium layer;
a third evacuated sputter station which receives said semiconductor wafer after processing of said semiconductor wafer in said second evacuated sputter station and which deposits an aluminum layer over said first tungsten/titanium layer on said semiconductor wafer;
a fourth evacuated sputter station which receives said semiconductor wafer after processing of said semiconductor wafer in said third evacuated sputter station and which deposits a second tungsten/titanium layer over said aluminum layer; said first tungsten/titanium, aluminum and second tungsten/titanium layers together comprising a metal layer on said semiconductor wafer;
said first and second sputter stations forming a tungsten/titanium layer inside said first and second sputter stations which increases in thickness with the processing of each said semiconductor wafer; and
whereby said system forms said first tungsten/titanium layer for each semiconductor wafer in two steps in two sequential sputter stations, which reduces the amount of tungsten/titanium deposited inside each said sputter station during the processing of each semiconductor wafer, thereby increasing the number of wafers which can be processed by said sputter stations before said tungsten/titanium deposited inside said first and second sputter stations exceeds a prefefined threshold thickness, at which time said system needs to be shut down so as to remove tungsten/titanium deposited inside said first and second sputter stations.

---

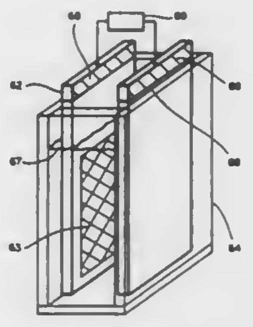
### 5,019,235
## METHOD AND ARTICLES EMPLOYING ION EXCHANGE MATERIAL

**Eric D. Nyberg, Belmont; Ken A. Klingman, Menlo Park; Jeff Curtis, San Francisco, and Ray F. Stewart, Redwood City, Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 217,244, Jul. 11, 1988, abandoned, which is a division of Ser. No. 17,375, Feb. 20, 1987, Pat. No. 4,888,098, which is a continuation-in-part of Ser. No. 932,763, Nov. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 831,758, Feb. 20, 1986, abandoned. This application Feb. 1, 1990, Ser. No. 474,704**

**Int. Cl.$^5$ C25B *11/00***

**U.S. Cl. 204—282** **10 Claims**



1. An article comprising:
(a) a conductive polymer electrode; and
(b) an ion exchange material which is in electrical and physical contact with and substantially entirely surrounds all surfaces of the electrode;
whereby if the article is placed in an electrolyte and an electrochemical reaction takes place at the interface between the electrode and the ion exchange material, substantially all the ionic species generated at the electrode pass through the ion exchange material.

---

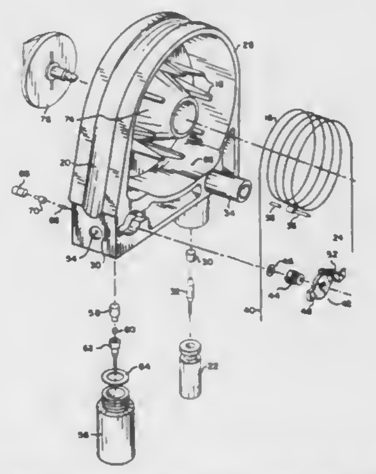
### 5,019,236
## RETRACTABLE MEMBER FOR FLUID, OPTICAL AND ELECTRICAL COMMUNICATION IN CAPILLARY ZONE ELECTROPHORESIS

**James E. Young, La Honda, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Mar. 19, 1990, Ser. No. 495,889**

**Int. Cl.$^5$ G01N *27/26***

**U.S. Cl. 204—299 R** **17 Claims**



1. An apparatus for operatively connecting an electrophoresis capillary tube to a housing assembly for fluid, optical and

VOL
1126
ISS
4
MY
28
1991
UMI

electrical communication between said capillary tube and said housing assembly, said apparatus comprising,

a capillary cassette having mounting means for removably attaching said cassette to said housing assembly, said cassette having a capillary tube secured therein,

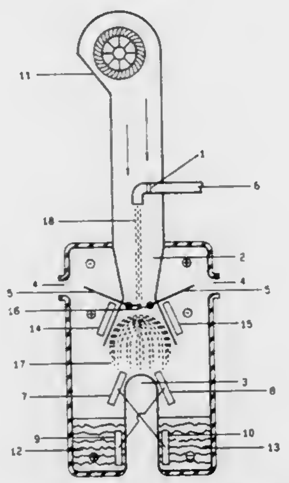
a door member having hinge means for pivotally connecting said door means to said housing assembly, said door member having an open position in spaced relation to said cassette and having a closed position in contact with said cassette,

detector means fixed to said door member for monitoring electrophoretic migration, said detector means being in alignment to optically monitor said migration within said capillary tube when said detector door is in said closed position, and

vacuum means for selectively channeling a vacuum pressure to said capillary tube, said vacuum means having a fitting coupled to said door member in a manner to cause displacement of said fitting in response to said pivoting door member, said fitting being disposed to provide fluid communication with said capillary cassette when said door member is in a closed position.

---

### 5,019,237
## METAL-ION VAPOR ACCELERATOR CELL
**Paul Briant, and Norma Frederick, both of P.O. Box 10794, Beverly Hills, Calif. 90213**
**Filed Sep. 19, 1989, Ser. No. 409,146**
**Int. Cl.⁵ B01D** *17/06*
**U.S. Cl. 204—302** **3 Claims**



1. An apparatus for separating and removing heavy metals from a liquid ionic conductor containing heavy metals comprising:

a separating zone comprising:

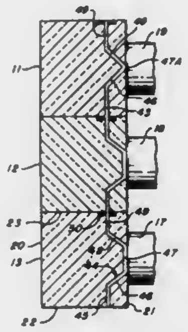
an inlet means for directing a liquid ionic conductor through an orifice in said separating zone; first and second electrodes disposed on opposite sides of said orifice; a means for producing pulsed direct current corona discharge operatively connected to said electrodes; a means for deflecting ions produced in said corona discharge, disposed vertically below said first and second electrodes;

a collecting zone disposed vertically below said separating zone comprising:

a first tank for collecting positive ions; a second tank for collecting negative ions; a rectangular hemisphere separator for separating said first and second tanks, with a means on said separator for collecting heavy metal ions.

---

### 5,019,238
## MEANS FOR QUANTITATIVE DETERMINATION OF ANALYTE IN LIQUIDS
**Alan D. Cormier, Newburyport, Mass., and Melvin S. Weinberg, Nashua, N.H., assignors to Baxter Diagnostics Inc., Deerfield, Ill.**
**Continuation of Ser. No. 105,555, Oct. 6, 1987, abandoned, which is a continuation of Ser. No. 887,522, Jul. 21, 1986, abandoned, which is a continuation of Ser. No. 594,246, Mar. 28, 1984, Pat. No. 4,627,893. This application Jan. 25, 1990, Ser. No. 477,172**
**The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.**
Int. Cl.⁵ G01N *27/28, 27/414*
U.S. Cl. 204—409 7 Claims



1. A testing module unit dimensioned and arranged to be used with at least one other module unit in an arrangement for testing an analyte in a liquid,

said module unit having a body and a narrow diameter through passageway,

said passageway having an enlarged chamber intermediate ends of said passageway, said chamber being formed on one side by a membrane of an electrode,

said chamber lying substantially in a plane with a first portion of said passageway opening into an inlet of said chamber at an angle to said plane to cause turbulence substantially confined to said opening while permitting smooth flow beyond said opening whereby said chamber acts as a defuser at its entrance and as a nozzle at an exit thereof,

said chamber inlet having an opposed outlet with said chamber varying in cross section from said opening to exit,

said varying cross section being enlarged toward the center of the chamber and restricted at said exit in a predetermined shape to permit said chamber to act as a defuser and nozzle,

said passageway having a cross-sectional area corresponding to a diameter of from 0.015 inch to 0.05 inch,

said chamber having a maximum cross-sectional area less than ten times the cross-sectional area of said passageway,

said chamber defining an area greater than an area defined by said membrane whereby said membrane is wholly encompassed by said chamber,

said chamber comprising means for receiving an electrode holder in operative alignment therewith.

---

### 5,019,239
## INVERTED FRACTIONATION APPARATUS AND USE IN A HEAVY OIL CATALYTIC CRACKING PROCESS
**Hartley Owen, Belle Mead, N.J., assignor to Mobil Oil Corp., Fairfax, Va.**
**Filed Nov. 21, 1989, Ser. No. 439,755**
**Int. Cl.⁵ C10G** *9/16*
**U.S. Cl. 208—48 Q** **13 Claims**

1. A process for fractionating a superheated, cracked vapor stream having a temperature above about 750 F. and comprising a full boiling range cracked product stream including normally gaseous hydrocarbons, at least a plurality of normally liquid product streams selected from the group of naphtha

boiling range hydrocarbons, light cycle oil boiling range hydrocarbons, heavy cycle oil boiling range hydrocarbons and mixtures thereof into liquid product fractions, said process comprising charging said superheated vapor to a vertical distillation apparatus having a height of at least 20 meters, and comprising an upper desuperheating zone and a lower fractionation zone;

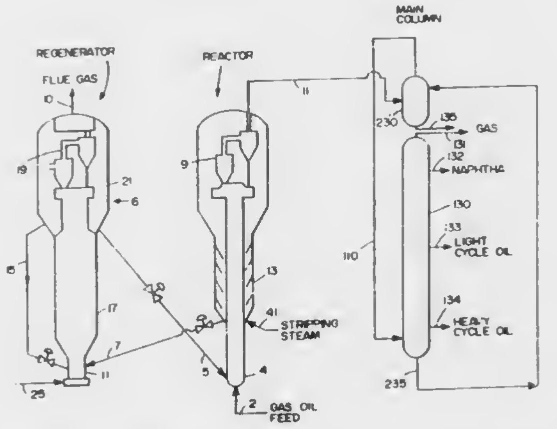
cooling and condensing at least a portion of said superheated cracked vapor in said upper desuperheating zone, said upper desuperheating zone comprising:

a vapor inlet having an elevation of at least 10 meters for superheated vapor;

a vaporizable liquid inlet at an upper portion of said desuperheating zone for addition of a recycled liquid hydrocarbon stream having a boiling point from said lower fractionation zone;

a vapor liquid contact means intermediate said superheated vapor inlet and said vaporizable liquid inlet for direct contact heat exchange of superheated vapor with said vaporizable liquid to produce a vaporized product fraction and a condensed heavy liquid product;

at least one vapor outlet at an upper portion of said desuperheating zone connective with said lower fractionation section for removal of vaporized product from the desuperheating zone;



at least one heavy liquid product outlet at a lower portion of said desuperheating zone for removal of a hydrocarbon liquid stream comprising hydrocarbons having a boiling point above the boiling point of said recycled liquid hydrocarbon stream; and

fractionating into product fractions said vaporized product from said desuperheating zone in a lower fractionation zone beneath said desuperheating zone, said fractionation zone having at least a lower portion and an upper portion said fractionation zone comprising:

a fractionator vapor liquid contact means for fractionation of said vaporized product fractions from said desuperheating zone into a plurality of normally liquid products,

a fractionator vapor inlet having an elevation below the desuperheating zone, said vapor inlet connecting the base portion of the fractionator with the vapor outlet of the desuperheating zone

a plurality of fractionator product outlets for removal of a plurality of normally liquid products streams selected from the group of naphtha boiling range hydrocarbons, light cycle oil boiling range hydrocarbons, heavy cycle oil boiling range hydrocarbons and mixtures thereof, and

a recycle line for recycle of a normally liquid product stream from said fractionation zone up to said desuperheating zone.

---

### 5,019,240
## HYDROCRACKING PROCESS
**Donald F. Best, Mahopac; Gary N. Long, Putnam Valley; Regis J. Pellet, Croton-On-Hudson; Jule A. Rabo, Armonk, and Edward T. Wolynic, Scarsdale, all of N.Y., assignors to UOP, Des Plaines, Ill.**
**Continuation of Ser. No. 139,756, Dec. 30, 1987, abandoned, which is a division of Ser. No. 764,618, Aug. 12, 1985, Pat. No. 4,735,928, which is a continuation of Ser. No. 490,951, May 2, 1983, abandoned. This application Jan. 18, 1990, Ser. No. 446,848**
Int. Cl.⁵ C10G *47/20*
U.S. Cl. 208—111 2 Claims

1. The process for hydrocarbon conversion of a hydrocarbon feedstock under effective hydrocracking conditions to produce lower boiling hydrocarbons which comprises contacting said hydrocarbon feedstock in the presence of hydrogen with a catalyst which is prepared by

(a) treating with an effective amount of at least one rare earth cation, a zeolitic alumino-silicate which has a mole ratio of oxides in the anhydrous state of

$$(0.85\text{-}1.1)M_{2/n}O:Al_2O_3:xSiO_2$$

wherein M is a cation having a valence of "n"; "x" has a value greater than 6.0 and equal to or less than 9.0, has an X-ray powder diffraction pattern having at least the d-spacings of Table A and has extraneous silicon atoms in the crystal lattice in the form of framework $SiO_4$ tetrahedra;

(b) thermally treating the product of step (a) at an effective temperature in the presence of an effective amount of steam;

(c) ammonium-exchanging the product of step (b); and

(d) providing the product of step (c) with an effective amount of at least one hydrogenation component selected from the group consisting of Pt, Pd, Rh and Ru.

---

### 5,019,241
## METHOD OF PASSIVATING ALKALI METALS ON FLUID CATALYTIC CRACKING CATALYSTS USING ALUMINUM CONTAINING COMPOUNDS
**David R. Forester, Conroe, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.**
**Filed Apr. 27, 1990, Ser. No. 515,815**
**Int. Cl.⁵ C10G** *11/18*
**U.S. Cl. 208—120** **13 Claims**

1. In a hydrocarbon cracking process having a reactor devoid of added hydrogen and a regenerator containing oxygen-containing gas wherein a hydrocarbon material containing in excess of 0.5 ppm sodium contacts a zeolite containing cracking catalyst having reaction sites and said sodium contaminates said cracking catalyst by deposition onto said reaction sites, the improvement which comprises adding to said hydrocarbon material for deposition onto said catalyst during the cracking process a sufficient amount of an aluminum containing compound without halogen atoms for the purpose of reducing the contaminating effect of said sodium deposited on said catalyst by the hydrocarbon material.

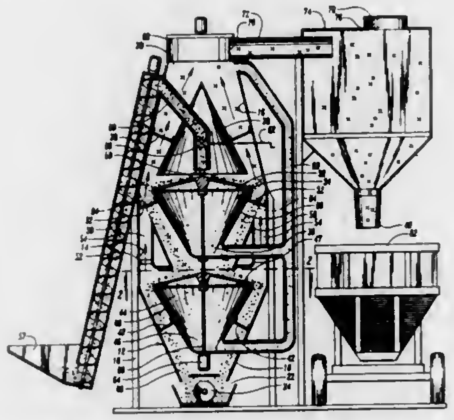
---

### 5,019,242
## PARTICULATE MATERIAL CLEANING APPARATUS
**Harlan J. Donelson, 3705 Windmill La., Plano, Tex. 75054**
**Filed Jul. 12, 1990, Ser. No. 551,322**
**Int. Cl.⁵ B07B** *9/00*
**U.S. Cl. 209—29** **10 Claims**

1. A grain cleaner, for cleaning particulate grain comprised of relatively heavy whole grain particles, and relatively lightweight fine grain particles and foreign material, comprising, an upstanding vertically disposed housing having upper and lower ends,

VOL
1126
ISS
4
MY
28
1991
UMI

upper and lower vertically spaced hoppers having upper and lower ends in said housing,
screen members on the upper ends of said hoppers,
said hoppers being laterally spaced from said housing to create a substantially continuous vertical first air conduit from the lower to the upper end of said housing,
fan means to move air upwardly through said first air conduit,
a second air conduit means connecting the lower ends of said hoppers and the upper end of said housing,
means for supplying particulate grain comprised of relatively heavy whole grain particles, and relatively lightweight fine grain particles and foreign material, to the upper end of said housing for deposit thereof on the screen member on said upper hopper,
and an exit port in the upper end of said housing and in communication with said first air conduit, whereby whole grain particles will move downwardly over the screen member on said upper hopper, thence downwardly around said upper hopper to the screen member on said lower hopper, thence downwardly around said lower hopper to the lower end of said housing, with said fan means pulling said fine grain particles and any lightweight foreign particulate material upwardly through said first and second air conduits to said exit port.



---

## 5,019,243
## APPARATUS FOR COLLECTING BLOOD

**James A. McEwen, 10551 Bamberton Drive, Richmond, British Columbia, Canada V7A 1K6 ; William J. Godolphin, 827 West 24th Avenue, Vancouver, British Columbia, Canada V5Z-2C2 ; Rainer M. Bohl, 41 East 40th Avenue, Vancouver, British Columbia, Canada V5W 1L3 ; Mark N. Dance, 115 West 11th Avenue, Vancouver, British Columbia, Canada V5Y 1S8 ; Marty L. Furse, #7 1870 Yew Street, Vancouver, British Columbia, Canada V6K 3G2 , and John C. Osborne, 4040 Toronto Street, Port Coquitlam, British Columbia, Canada V3B 6X8**

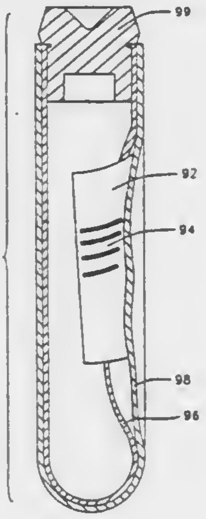
**Continuation-in-part of Ser. No. 192,847, May 11, 1988, abandoned, which is a continuation of Ser. No. 33,769, Apr. 3, 1987, Pat. No. 4,828,716. This application May 2, 1989, Ser. No. 346,065**

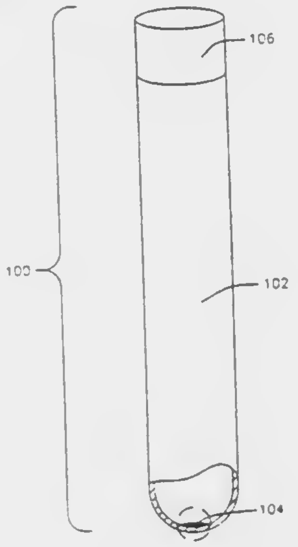
**Int. Cl.$^5$ B01D *21/26;* B01L *3/14***

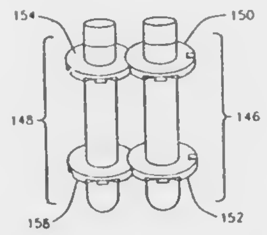
**U.S. Cl. 210—94** **3 Claims**

1. Fluid collection apparatus comprising:
a tubular first layer formed of a first material;
a tubular second layer formed of a second material and attached to and substantially covering the first layer; and further including
a protected label enclosed between the first and second layer for carrying indicia wherein the label carrying the indicia is made of a material differing from the materials of the first and second layers.

2. Fluid collection apparatus comprising:
a tubular first layer formed of a first material;
a tubular second layer formed of a second material and attached to and substantially covering the first layer;
wherein the second layer includes a radially extending collar that includes mating means for attaching one collar directly to another collar without any other components.







3. Fluid collection apparatus comprising:
a tubular first layer formed of a first material;
a tubular second layer formed of a second material and attached to and substantially covering the first layer;
wherein a portion of a surface of the first layer is roughened relative to the remaining portion of the surface thereby to facilitate coagulation of an entire specimen of blood contained in the fluid collection apparatus.

---

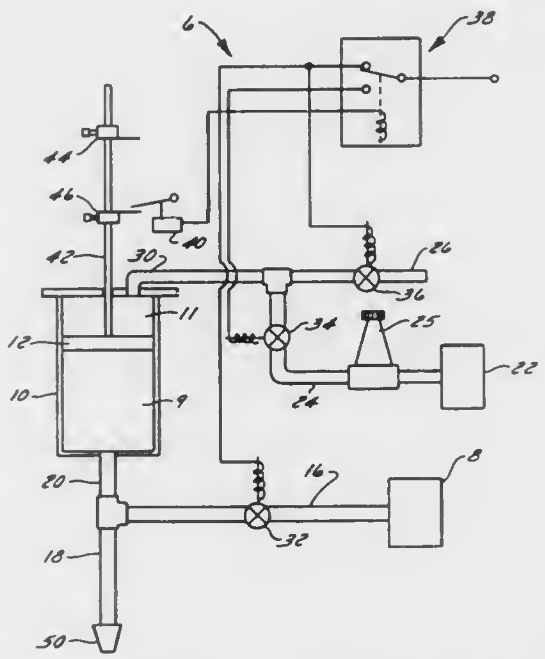
## 5,019,244
## METHOD OF SEPARATING MINERAL PARTICLES BY FROTH FLOTATION

**Howard W. Cole, Jr., P.O. Box S, Burgin, Ky. 40310**

**Continuation-in-part of Ser. No. 123,569, Nov. 16, 1987, Pat. No. 4,830,737. This application Dec. 21, 1988, Ser. No. 287,457**

**Int. Cl.$^5$ B03D *1/02***

**U.S. Cl. 209—164** **4 Claims**



1. A method for the separation of mineral particles from mineral-bearing ore, wherein said ore has been ground into fine particles comprising a mixture of mineral particles and non-mineral gangue particles, and said mixture of fine mineral and gangue particles has been combined with water and chemicals to form a pulp having an upper surface and having a desired specific gravity selected to effect separation of said mineral particles from said gangue, the improved method of separating mineral particles from said pulp of mineral and gangue particles, comprising the steps of:
producing a quantity of small bubble foam from a mixture of air, water and surfactant forced through a foamer having tortuous passages therein; each of said small bubbles comprising a highly stressed film surrounding an air pocket;
introducing a selected quantity of said small bubble foam produced by said foamer into an apparatus having a piston-cylinder arrangement including a lower-cylinder chamber for containing said small bubble foam, said piston-cylinder arrangement having metering and relay means to control the quantity and delivery of said small bubble foam introduced into said lower cylinder chamber;
interrupting said introduction of said small bubble foam into said lower cylinder chamber of piston-cylinder arrangement after a selected quantity of said small bubble foam has been received into said lower cylinder chamber; and
forcing said selected quantity of said small bubble foam out of said lower cylinder chamber using said piston-cylinder arrangement to inject said selected quantity of said small bubble foam below the surface of said pulp;
whereby the said surface film of each of said small bubbles of said small bubble foam disperses into said pulp leaving a multitude of air pockets which interact with said pulp to entrap said mineral particles of said pulp and effect separation thereof from said gangue particles.

---

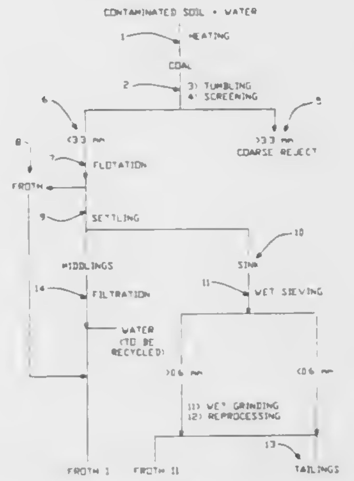
## 5,019,245
## METHOD FOR RECOVERY OF HYDROCARBONS FORM CONTAMINATED SOIL OR REFUSE MATERIALS

**Teresa Ignasiak, 417 Heffernan Drive, Edmonton, Alberta, Canada T6R 1E7 ; Ali A. Turak, 3125 - 109 Street, Edmonton, Alberta, Canada T6J 4N6 ; Wanda Pawlak, 407 Saddleback Road, #203, Edmonton, Alberta, Canada T6J 4M6 ; Boleslaw L. Ignasiak, 10967 34 A Avenue, Edmonton, Alberta, Canada T6J 2T9 ; Carlos R. Guerra, 6050 Boulevard E., West New York, N.J. 07093, and Melvin L. Zwillenberg, 475 Richmond Ave., Maplewood, N.J. 07040**

**Filed Jun. 2, 1989, Ser. No. 360,313**

**Int. Cl.$^5$ B03D *1/02. 9/02. 9/06;* C10G *1/00***

**U.S. Cl. 209—166** **7 Claims**



1. A method for separating an inert solid substantially inorganic fraction comprising sand or soil from tarry or oily organic matter in a feedstock comprising said fraction and said organic matter, comprising the steps of:
(a) combining said feedstock with pulverized coal and with water to form a first mixture, the ratio of the estimated weight of said organic fraction in said feedstock to the dry basis weight of said coal being in the range of about 1.0:10 to about 4.0:10;
(b) agitating said first mixture at a temperature in the range of about 60°-95° C., then separating coarse particles of greater than a predetermined size from said first mixture to yield a resultant mixture without said coarse particles;
(c) adding to said resultant mixture from step (b) separated from said coarse particles up to about 0.10% by weight of a frothing agent and optionally up to 2% of froth collecting agent, based on the total weight of said coal used in said step (a) thereby forming a second mixture;
(d) agitating said second mixture to form a floating froth comprising agglomerates of said coal and said tarry or oily organic matter;
(e) separating said froth from said second mixture.

---

## 5,019,246
## FROTHING PROCEDURE USING POLYMERIC SULFIDE MINERAL DEPRESSANTS

**Samuel S. Wang, New Haven, and D. R. Nagaraj, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 7/433,241, Nov. 8, 1989, Pat. No. 4,966,938, which is a divislon of Ser. No. 7/221,389, Jul. 19, 1988, Pat. No. 4,902,765. This application Aug. 10, 1990, Ser. No. 572,923**

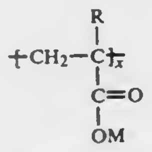
**Int. Cl.$^5$ B03D *1/02***

**U.S. Cl. 209—167** **5 Claims**

1. A method for the beneficiation of value sulfide minerals from sulfide ores with selective separation of sulfide minerals which comprises:

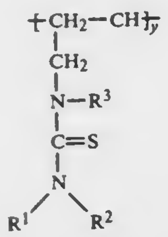
VOL
1126
ISS
4
MY
28
1991
UMI

a) providing an aqueous pulp slurry of finely-divided, liberated ore particles;
b) conditioning said pulp slurry with an effective amount of a synthetic depressant, a sulfide mineral collector and a frothing agent, respectively, said depressant comprising a polymer comprising:
(i) x units of the formula:



$$\left[ CH_2 - \underset{\underset{OM}{|}}{\underset{C=O}{\underset{|}{\overset{\overset{R}{|}}{C}}}} \right]_x$$

(ii) y units of the formula:



(iii) z units of the formula:

wherein R is hydrogen or a $C_1$–$C_4$ alkyl group, $R^1$ and $R^2$ are, individually, hydrogen, a $C_1$–$C_4$ alkyl group, or an aryl group and M is hydrogen, an alkali metal ammonium, $R^3$ is hydrogen, a $C_1$–$C_4$ alkyl group or an aryl group and Z represents the polymerization residue of any copolymerizable monomer except an acrylamide; x represents a residual mole percent fraction; y is a mole percent fraction ranging from about 1.0% to about 49.0%, by weight, based on the total weight of x, y, and z; z is a mole percent fraction ranging from about 0% to about 49.0%, by weight, same basis, and the molecular weight of said polymer is between about 1000 and about 1,000,000; and
C) collecting the value sulfide mineral by froth flotation.

---

### 5,019,247
### PULSED MAGNET SYSTEM

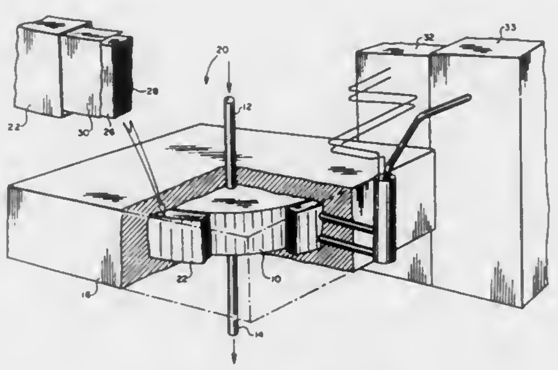
**John R. Purcell, San Diego; Sibley C. Burnett, Cardiff by the Sea, and Lewis R. Creedon, San Diego, all of Calif., assignors to Advanced Cryo Magnetics, Inc., San Diego, Calif.**

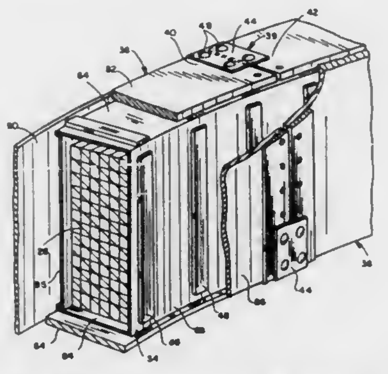
**Filed Nov. 20, 1989, Ser. No. 439,422**

**Int. Cl.$^5$ B03C** *1/02;* **H02H** *7/00*

**U.S. Cl. 209—224** **16 Claims**

1. A magnetic separator for use in dividing a more magnetizable component of a material from a less magnetizable component of the material, said separator comprising:
a vacuum vessel defining an opening through which the material to be separated passes;
cryogenic containment vessel means disposed within said vacuum vessel; and
a superconducting coil disposed within said cryogenic containment vessel for providing a magnetic field to effect the separation of the first component from the second component, said vessel means including a helium vessel comprising a relatively thin metallic inner tube for holding liquid helium and said coil, said helium vessel further including a relatively thick outer tube encompassing said inner tube and a relatively rigid insulative spacer means disposed between said inner and outer tubes so that said tubes are not in contact with each other, said outer tube being predominantly metallic and having at least one joint formed of insulative material to prevent said outer tube from forming a low electrical resistance loop, said inner tube providing a vacuum seal and said outer tube providing structural support for said inner tube whereby eddy current losses resulting from ramping of the current to said coil are reduced.





---

### 5,019,248
### APPARATUS FOR GRADING FIBROUS MATERIAL

**Andrew F. Kaldor, Dover Heights, Australia, assignor to Ankal Pty Limited, Australia**

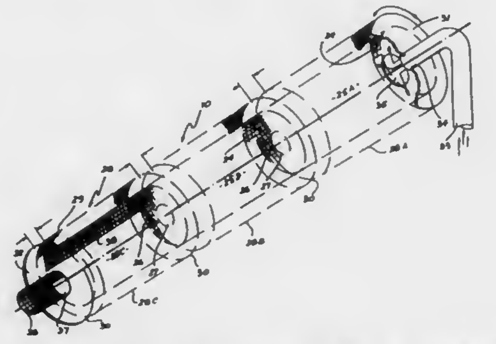
**PCT No. PCT/AU87/00378, § 371 Date Jul. 10, 1989, § 102(e) Date Jul. 10, 1989, PCT Pub. No. WO88/03444, PCT Pub. Date May 19, 1988**

**PCT Filed Nov. 11, 1987, Ser. No. 381,638**

**Claims priority, application Australia, Nov. 14, 1986, PH8969**

**Int. Cl.$^5$ B07B** *1/24, 1/55*

**U.S. Cl. 209—240** **10 Claims**



1. An apparatus for grading fibrous material into a fibrous phase and a more solid phase, comprising:
a hollow body for rotation on an inclined axis having an inner perforated wall and upper inlet and lower outlet ends,
an end plate at the inlet end of the body having an opening for the introduction of fibrous material for grading,
a plurality of unobstructed annular partitions within the body and spaced along its axis to define axially aligned compartments within the body,
a plurality of longitudinally extending, circumferentially spaced mesh baffles within each of said compartments and extending between adjacent ones of said partitions, and
an outer perforated wall surrounding said inner perforated wall and rotatable therewith and being divided into longitudinal sections by at least one gap, whereby with rotation of said body while downwardly inclined from said inlet to said outlet ends fibrous phase of the material is conveyed by the baffles through a central opening in each of said annular partitions and via each of said compartments in turn to discharge from the outlet end, while a more solid phase is discharged through said inner perforated wall of the body and then through said outer perforated wall and/or said at least one gap therein.

---

### 5,019,249
### APPARATUS FOR HANDLING SHEETS OF PAPER

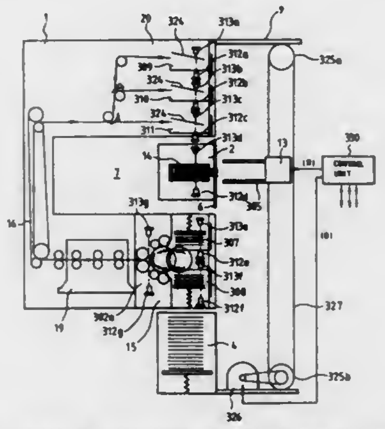
**Kazunari Sugai, Shiunjimachi; Osamu Takeuchi; Yasuyuki Wakasa, both of Nakajomachi; Kenji Taguchi, Shibatashi, and Toshio Ogata, Nakajomachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 16, 1988, Ser. No. 245,209**

**Claims priority, application Japan, Sep. 18, 1987, 62-232187; Mar. 11, 1988, 63-56063; Apr. 6, 1988, 63-82918**

**Int. Cl.$^5$ B07C** *5/38;* **G07D** *7/00*

**U.S. Cl. 209—534** **59 Claims**



1. An apparatus for handling sheets of paper, comprising:
depositing/dispensing means for receiving from an operator sheets of paper to be deposited into the apparatus and for dispensing sheets of paper to an operator from the apparatus;
storage box means for storing sheets of paper within the apparatus that are to be dispensed to an operator and for receiving sheets of paper that are deposited into the apparatus by an operator;
counting and inspecting means for counting out a number of sheets of paper that matches a number of sheets requested by an operator and for counting and inspecting sheets of paper deposited into the apparatus by an operator;
transporting means for transporting sheets of paper between said storage box means and said counting and inspection means, and between said counting and inspection means and said depositing/dispensing means;
control means for controlling said transporting means, said counting and inspecting means, and said depositing/dispensing means in accordance with a transaction requested by an operator and input means for inputting a transaction request by an operator;
said counting and inspecting means having a hopper unit for supporting a stack of sheets of paper, and a stacker unit for receiving and stacking the sheets of paper received from said hopper unit; and
said hopper unit being separated from said stacker unit to form a space thereinbetween, said depositing/dispensing means being movably provided within said space.

---

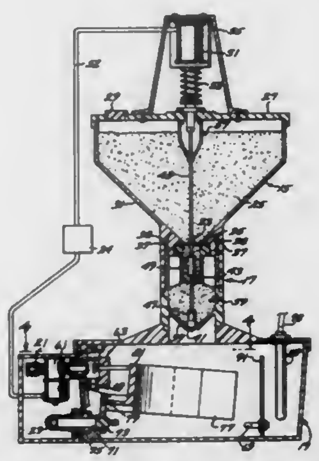
### 5,019,250
### AUTOMATIC CHEMICAL DISPENSER

**Walter C. Lorenzen, P.O. Box 443, Avalon, Catalina Island, Calif. 90704**

**Filed Sep. 8, 1989, Ser. No. 404,866**

**Int. Cl.$^5$ B01D** *35/00*

**U.S. Cl. 210—85** **18 Claims**



1. An apparatus for introducing a preselected quantity of chemical into a body of liquid comprising:
a hopper for storing a substantial quantity of such chemical, said hopper having an outlet;
a first valve for sealing said hopper outlet;
a metering chamber disposed directly below said hopper outlet and configured to receive a preselected quantity of chemical from said hopper upon opening said first valve, said metering chamber having an outlet;
a second valve for sealing said metering chamber outlet;
a mixing basin disposed directly below said metering chamber outlet, said mixing basin incorporating means for maintaining a preselected level of liquid therein;
means for directing liquid from such body of liquid to said mixing basin and means for returning liquid from said mixing basin to such body of liquid;
a connecting rod extending down through the interior of said hopper and into said metering chamber to which said first and said second valves are rigidly affixed in a ganged relationship such that when said rod is pulled upwardly, said first valve seals said hopper outlet while said second valve simultaneously opens said metering chamber's outlet and when said connecting rod is pushed downwardly, said first valve opens said hopper outlet while said second valve simultaneously seals the metering chamber outlet;
actuation means for normally pushing said connecting rod downwardly and upon actuation, pulling said connecting rod upwardly.

---

### 5,019,251
### FILTER APPARATUS WITH A SPRING LOADED SAFETY VALVE PLATE

**Göran Sundholm, Magistervägen 34 B, SF-02700 Grankulla, Finland**

**Filed Apr. 19, 1989, Ser. No. 340,221**

**Claims priority, application Finland, Apr. 29, 1988, 882025**

**Int. Cl.$^5$ B01D** *27/10*

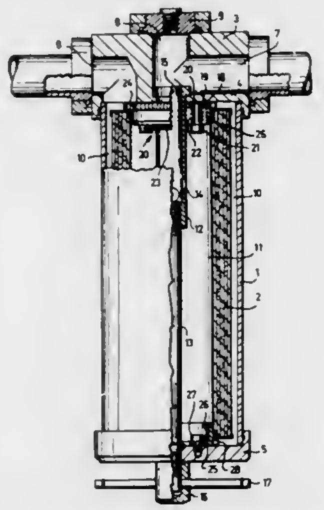
**U.S. Cl. 210—133** **2 Claims**

1. A filter apparatus for filtering liquid, comprising a tubular filter element disposed within a casing, the liquid being arranged to flow within the casing through the filter wall and out

VOL
1126
ISS
4
MY
28
1991
UMI

through a central cavity in said filter element, a spring-loaded safety valve plate being provided inside said casing at one end thereof and comprising, at a distance from its outer edge, a seal member positioned against said end of the casing and a cylindrical part extending axially into the filter element for centering said filter element in a sealing manner

wherein the tubular filter element is open at its both ends, a similar plate is provided at the opposite end of the casing with respect to the safety valve, said plate comprising a cylindrical part extending axially inwards within the casing for centering the filter element in a sealing manner, whereby the cylindrical part is surrounded by a spiral spring between the filter element and the end of the casing, the plate being secured in permanent close contact with the ends of the casing.



---

### 5,019,252
### PORTABLE WATER PURIFIER

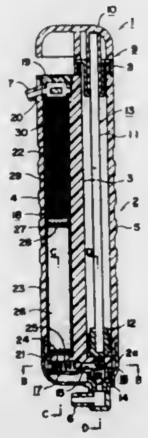
**Eiichi Kamei; Yasushi Shimomura, both of Hirakata; Yasuo Kanda, and Tadashi Ogawa, both of Tokyo, all of Japan, assignors to Ube Industries, Ltd., Yamaguchi; Iwatani & Co., Ltd., Oosaka and LEC, Inc., Tokyo, all of, Japan**

**Continuation of Ser. No. 315,207, Feb. 22, 1989, abandoned, which is a continuation of Ser. No. 175,582, Mar. 28, 1988, abandoned, which is a continuation of Ser. No. 16,872, Feb. 20, 1987, abandoned. This application Feb. 6, 1990, Ser. No. 476,133**

**Claims priority, application Japan, Feb. 20, 1986, 61-22147[U]**

**Int. Cl.$^5$ C02F** *9/00*

**U.S. Cl. 210—136** **3 Claims**



1. A portable water purifier comprising:

an upright oblong pump chamber containing a hand pump therein;

an upright oblong water-purifying chamber containing therein a readily exchangeable cartridge which comprises an upper cylinder containing porous hollow fibers therein, and a lower cylinder containing an active carbon therein, both cylinders being combined together to form the cartridge, said water-purifying chamber having an opening at the top thereof;

a removable cap coupled to said water-purifying chamber for closing said opening in said water-purifying chamber;

said exchangeable cartridge being removable through said opening at the top of said water-purifying chamber by lifting said cartridge out through said opening, upon removal of said cap;

said pump chamber and said water-purifying chamber being arranged side-by-side substantially in parallel to each other with a partition separating the two chambers;

a passage arranged at bottom portions of said pump chamber and water-purifying chamber for providing a water communication path therebetween;

a water inlet at a lower portion of said water-purifying chamber;

a water outlet at an upper portion of said water-purifying chamber; and

said water inlet and said passage being provided with respective check valve means for limiting the flow of water only to a direction from said water inlet into said water-purifying chamber.

---

### 5,019,253
### APPARATUS FOR COLLECTING AND DISCHARGING WASTE MATERIAL

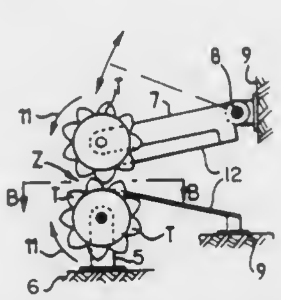
**Edward V. Byers, Kinoulton, England, assignor to Micharel Richard Byers, Fareham, England**

**PCT No. PCT/GB86/00043, § 371 Date Nov. 20, 1988, § 102(e) Date Nov. 20, 1988, PCT Pub. No. WO86/04268, PCT Pub. Date Jul. 31, 1986**

**PCT Filed Jan. 23, 1986, Ser. No. 910,524**

**Int. Cl.$^5$ C02F** *1/40;* **E02B** *15/04*

**U.S. Cl. 210—158** **10 Claims**



1. Apparatus for collecting and discharging solid and viscous liquid waste material comprising:

at least one rotatable shaft;

a plurality of support means for said at least one shaft, means for mounting said support means in spaced relationship for swinging movement with said at least one shaft, a plurality of teeth on each said shaft, each said tooth having side flanks and a leading tooth edge which is presented to the material to be collected by said teeth as said at least one shaft rotates;

a plurality of material-clearing elements mounted between said support means, said elements having material-clearing blade edges defining a series of slits respectively between which said teeth on said shaft pass with said side flanks in closely spaced adjacent relationship to said blade edges for removal of material collected from said teeth; and

wherein the angular relationship between the blade edges of said elements and the leading edges of said teeth is such that the angle formed at any time between the leading

edge of each advancing tooth and the adjacent blade edge of a respective one of said slits through which said teeth on each said support means pass is of a magnitude sufficient to ensure that said teeth and said elements do not bite or cut into said solid and viscous liquid waste material to an extent which would prevent said waste material passing smoothly from said teeth.

---

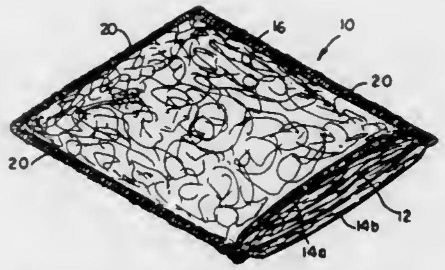
### 5,019,254
### FILTER PAD WITH POCKET AND METHOD OF USING THE SAME

**Albert Abrevaya, Chalfont, and Joel M. Goldstein, Ambler, both of Pa., assignors to Aquarium Pharmaceuticals, Inc., Chalfont, Pa.**

**Filed Aug. 16, 1989, Ser. No. 394,598**

**Int. Cl.$^5$ E04H** *3/16*

**U.S. Cl. 210—169** **25 Claims**



1. An aquarium filter pad for filtering aquarium water comprising at least two pad layers of a permeable, nonwoven polymer material, wherein one pad layer is connected to another pad layer to form a pocket therebetween having an opening extending into the pocket, at least one of the pad layers being sufficiently rigid to maintain the shape of the filter pad in an aquarium filter apparatus during use, said at least one rigid pad layer having a density of at least about 9 oz/yd$^2$.

---

### 5,019,255
### DEVICE FOR SEPARATION OF A LIQUID MEDIUM CONTAINING CONSTITUENTS WHICH ARE SEPARABLE IN A FILTER

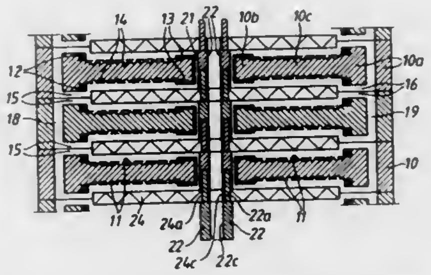
**Erik Dahlquist, Västerås, and Åke Enekull, both of Västerås, Sweden, assignors to ABB Atom AB, Västerås, Sweden**

**Filed Nov. 10, 1988, Ser. No. 269,416**

**Claims priority, application Sweden, Nov. 12, 1987, 8704422**

**Int. Cl.$^5$ B01D** *25/38*

**U.S. Cl. 210—225** **9 Claims**



1. A device for separation of constituents from a liquid medium, the device comprising a plurality of plate units stacked in a direction, each plate unit comprising two sheets of filter media located on opposite sides of the plate, one inlet communicating with each sheet for supply of a liquid medium, one outlet communicating with each sheet for discharge of the reject part of the liquid medium, one outlet communicating with channels located within the plate between the sheets for discharge of the permeate liquid medium which has passed through the sheet and a rotor arranged on an outer surface of each sheet and having parts which are movable along the outer surface of the sheet, wherein the improvement comprises:

the stack of plate units are arranged one after the other in the stacking direction and are formed with one outer portion, one inner portion, and a mid-portion located therebetween, wherein

- (i) the outer portion has a greater height than the mid-portion and the inner portion and contacts intermediate seals, which in turn contact the outer portion of adjacent plate units,
- (ii) the inlet for the liquid medium and the outlets for the reject and the permeate are arranged in the outer portion,
- (iii) The sheets are arranged in the mid-portion on respective sides of the plate unit, and
- (iv) each said inner portion is provided with a through-hole in which is arranged a respective ring-shaped rotatable shaft piece said shaft piece including a through-hole extending in the stacking direction and opposed sides oriented perpendicular to the stacking direction, each rotor being supported between the opposed sides of adjacent shaft pieces, each shaft piece including connections comprising at least one pin located on one of said opposed sides and at least one hole located on the other of said opposed sides, wherein each said at least one pin is located so as to be received within the said at least one hole of an adjacent shaft piece, whereby said connections can be released by drawing the connections, and therefore the plate units, in the stacking directions of the plate unit, and one shaft piece in one of the plate units is connectible to a drive means, whereby said shaft pieces comprise a shaft passing through the stack of plates and are divisible in the stacking direction.

---

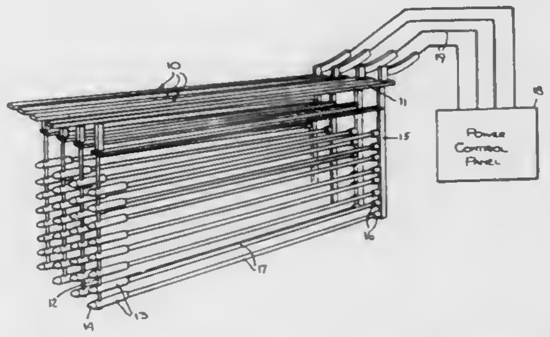
### 5,019,256
### ULTRAVIOLET LAMP RACK ASSEMBLY

**Lee Ifill, Abington; Robert Walker, Bluebell; Steven Wolfe, Lansdale, and Fiore Schena, Warminster, all of Pa., assignors to Fischer & Porter Company, Warminster, Pa.**

**Filed Oct. 19, 1990, Ser. No. 600,597**

**Int. Cl.$^5$ C02** *1/32*

**U.S. Cl. 210—232** **14 Claims**



1. A UV lamp rack assembly adapted to be installed in a channel conducting a stream of water to be irradiated with ultraviolet rays, said assembly comprising:

- (a) a horizontal hanger bar having at an upstream position a vertical rod depending therefrom, and having at a downstream position a vertical conduit depending therefrom;
- (b) a series of swivel sleeves pivotally mounted at spaced points along the rod whereby each sleeve can be swivelled in a horizontal plane from a position normal to the rod to an angular position with respect thereto;
- (c) a series of detachable couplers mounted on the conduit at corresponding points therealong, each coupler having a lamp socket housed therein which is connected through the conduit to an external power source; and
- (d) a lamp unit extending between each of the sleeves and a

VOL
1126
ISS
4
MY
28
1991
UMI

corresponding coupler, said unit being constituted by a protective tube which is closed at its upstream end and an elongated UV lamp disposed within the tube and having terminal pins at its downstream end, the upstream end of the unit being slidably received in a rear section of the sleeve beyond which is an intermediate clearance zone, the downstream end of the unit being secured to the coupler with the terminal pins of the lamp plugged into the socket, whereby to remove a particular lamp unit from the assembly, the downstream end thereof is detached from its coupler and the lamp is unplugged from its socket, the unit then being shifted axially in the upstream direction into the clearance zone to a degree sufficient to clear the coupler, so that the unit may then be swung on its swivel sleeve to an angular position permitting withdrawal of the unit from its sleeve.

---

### 5,019,257

### PARALLEL FILTERING CIRCUIT WITH CONDUITS OF DIFFERENT RATES

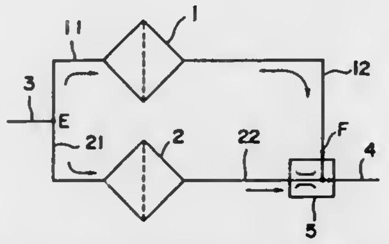
**Tadashi Suzuki, Machida, and Yoneji Wada, Urawa, both of Japan, assignors to Takano Corporation, Japan**

**Continuation of Ser. No. 311,368, Feb. 13, 1989, abandoned, which is a continuation of Ser. No. 114,207, Oct. 28, 1987, abandoned. This application Mar. 15, 1990, Ser. No. 494,815**

**Claims priority, application Japan, Jun. 19, 1987, 62-151367**

**Int. Cl.$^5$ B01D** *36/00*

**U.S. Cl. 210—253** **5 Claims**



1. A parallel filter circuit for delivery of filtered fluid to an element, said circuit comprising a plurality of filters fluidly connected in parallel with each other in a plurality of conduits, said conduits being connected between a common inlet and a separate common outlet to provide parallel flow without substantial interruption, at least two of said plurality of conduits having different rates of fluid flow therethrough, said common outlet located downstream of said filters and upstream of said element, wherein said circuit consists essentially of said plurality of conduits having different resistance to fluid flow.

---

### 5,019,258

### HORIZONTAL BELT VACUUM FILTRATION APPARATUS

**Henri G. W. Pierson, Tenerife, South Africa, assignor to D & C Limited, Monrovia, Liberia**

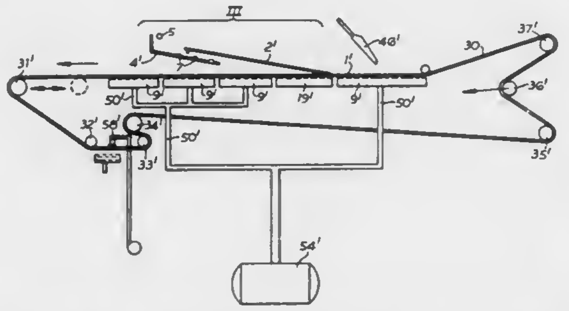
**Filed May 24, 1990, Ser. No. 527,830**

**Claims priority, application United Kingdom, Jun. 2, 1989, 8912742**

**Int. Cl.$^5$ B01D** *33/60*

**U.S. Cl. 210—258** **18 Claims**

1. Vacuum filtration apparatus comprising an endless filter belt, guide means for guiding said belt around a path so as to provide an upper run, feed means for feeding slurry to be filtered onto said upper run, vacuum means for drawing filtrate through said belt to form a filter cake thereon, and drive means for moving said belt, wherein the improvement comprises a first plate mounted in inclined disposition above said belt upper run and having a lower end directed upstream relative to movement of said belt upper run and extending across said belt and an upper end directed downstream so that as said drive means progresses said filter cake moves upwards over said plate, means for washing the cake located immediately below the upper end of said plate, and means for returning the washed cake from said washing means to said belt upper run downstream of said plate.



---

### 5,019,259

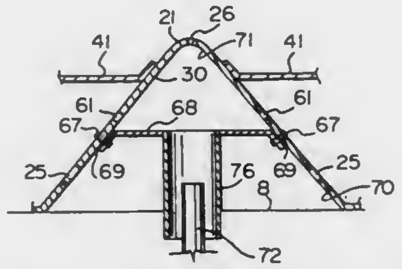
### FILTER UNDERDRAIN APPARATUS WITH PARTITIONED DISTRIBUTOR CONDUITS

**John B. Hambley, 4232-16A Street S.E., Calgary, Alberta, Canada T2G 3V1**

**Filed Jun. 15, 1989, Ser. No. 365,904**

**Int. Cl.$^5$ B01D** *24/12*

**U.S. Cl. 210—274** **18 Claims**



1. A filter underdrain apparatus comprising plate means of generally V-shaped cross sections, a plurality of said plate means being assembled in juxtaposed relationship to define alternating V-shaped troughs and inverted V-shaped arches, perforate grid means for extending across each trough proximate the top thereof between adjacent arches for supporting filter media; a first row of air vent holes extending longitudinally of said plate means proximate the top of said arches, a row of water inlet/outlet means extending longitudinally of said plate means beneath said grid means proximate the bottom of each side of each said arch, and partition means in each said arch between said air vent holes and said water inlet/outlet, said partition means dividing the interior of the arch into a lower water passage and an upper air passage.

---

### 5,019,260

### FILTRATION MEDIA WITH LOW PROTEIN ADSORBABILITY

**Thomas C. Gsell, Glen Cove, and Isaac Rothman, Brooklyn, both of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.**

**Continuation-in-part of Ser. No. 945,569, Dec. 23, 1986, Pat. No. 4,906,374. This application Dec. 7, 1989, Ser. No. 447,415**

**The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.**

**Int. Cl.$^5$ B01D** *71/34*

**U.S. Cl. 210—490** **29 Claims**

1. A porous polymeric medium having a low affinity for amide group-containing materials comprising:

a porous polyvinylidene difluoride substrate; and

a surface-modifying polymeric material having a low affinity for amide group-containing materials formed in situ at and covalently bonded to the surface of said polyvinylidene difluoride substrate, said surface-modifying polymeric material being derived from a monofunctional monomer having at least one hydroxyl group.

---

### 5,019,261

### PERMEABLE, POROUS POLYMERIC MEMBRANE WITH HYDROPHILIC CHARACTER METHODS FOR PREPARING SAID MEMBRANES AND THEIR USE

**Flemming F. Stengaard, Nakskov, Denmark, assignor to Dow Danmark A/S, Denmark**

**Continuation of Ser. No. 89,550, Aug. 26, 1987, abandoned. This application May 9, 1989, Ser. No. 350,694**

**Claims priority, application Denmark, Aug. 27, 1986, 4079/86**

**Int. Cl.$^5$ B01D** *69/12*

**U.S. Cl. 210—490** **10 Claims**

1. A permeable, porous polymeric ultrafiltration or microfiltration membrane with hydrophilic character wherein the hydrophilic character of the membrane is obtained by treatment of the membrane surface with a solution comprising one or more hydrophilic, mono- or polymeric compounds selected from the group consisting of soluble, OH-containing cellulose derivatives, polyvinyl-alcohols and low molecular weight, polyfunctional, NH- or OH-containing compounds in the presence of a crosslinking agent, followed by rendering the layer depositing during the treatment insoluble on the membrane surface by means of an acid catalyzed reaction at elevated temperatures in order to attach the hydrophilic material to the membrane.

---

### 5,019,262

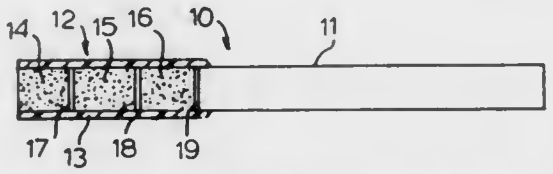
### HYDROPHILIC MICROPOROUS MEMBRANE

**Ying Wang, Scarborough, Canada, assignor to International Applied Sciences, Inc., Pinebrook, N.J.**

**Filed Oct. 6, 1989, Ser. No. 418,275**

**Int. Cl.$^5$ B01Z** *67/00*

**U.S. Cl. 210—490** **16 Claims**



1. A membrane having controlled porosity that is prepared in an oil-in-water system by a process that comprises the steps of:

(a) forming an oil-in-water dispersion wherein the oil phase contains a hydrophilic polymer;

(b) adding to the dispersion a pore forming agent and a crosslinking agent or a coagulant for the polymer to form a suspension;

(c) casting the thus formed suspension on a substrate;

(d) evaporating the water from the suspension cast on the substrate to concentrate and coagulate the polymer present while enveloping the pore forming agent with the polymer; and

(e) removing the pore forming agent from the coagulated polymer.

7. A filter for the separation of tar and other toxic components from tobacco smoke that comprises a hydrophilic polymer membrane having a porosity within a predetermined range made in accordance with the process of claim 1.

---

### 5,019,263

### MEMBRANE COMPOSED OF A PURE MOLECULAR SIEVE

**Werner O. Haag, Lawrenceville, and John G. Tsikoyiannis, Princeton, both of N.J., assignors to Mobil Oil Corp., Fairfax, Va.**

**Filed Jun. 5, 1990, Ser. No. 533,328**

**Int. Cl.$^5$ B01D** *39/16*

**U.S. Cl. 210—500.25** **17 Claims**

1. A non-composited, microporous membrane comprising a continuous array of crystalline molecular sieve material.

---

### 5,019,264

### MULTILAYER REVERSE OSMOSIS MEMBRANE OF POLYAMIDE-UREA

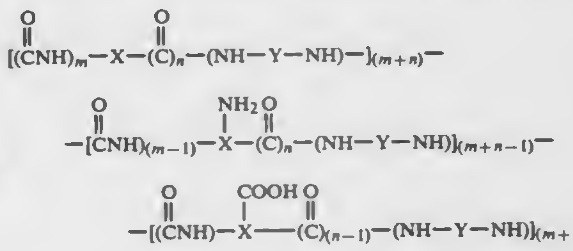
**Samuel D. Arthur, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jul. 31, 1990, Ser. No. 560,512**

**Int. Cl.$^5$ B01D** *71/54, 71/56, 71/60*

**U.S. Cl. 210—500.37** **7 Claims**

1. A reverse osmosis membrane that shows improved salt rejection, flux, and productivity, comprising a polyamideurea separating layer in contact with a polysulfone substrate, wherein said polyamideurea comprises the formula:



$$[(\overset{O}{\overset{\|}{C}}NH)_m-X-(\overset{O}{\overset{\|}{C}})_n-(NH-Y-NH)-]_{(m+n)}-$$

$$-[\overset{O}{\overset{\|}{C}}NH)_{(m-1)}-\overset{NH_2}{\overset{|}{X}}-(\overset{O}{\overset{\|}{C}})_n-(NH-Y-NH)]_{(m+n-1)}-$$

$$-[(\overset{O}{\overset{\|}{C}}NH)-\overset{COOH}{\overset{|}{X}}-(\overset{O}{\overset{\|}{C}})_{(n-1)}-(NH-Y-NH)]_{(m+n-1)}$$

where

$m,n>0$,

$m+n\geqq 3$,

$X=a\ (m+n)$ valent organic group, and

$Y=a$ divalent organic group.

---

### 5,019,265

### PROCESS FOR ACTIVATING THE OPERATION OF A SYSTEM FOR ANAEROBIC DIGESTION OF SOLID ORGANIC RESIDUES

**Philip Hervé, Pignan, France, assignor to 501 Eparco S.A. Societe Anonyme de Droit Francais, Paris, France**

**Filed Jun. 29, 1989, Ser. No. 374,077**

**Claims priority, application France, Jul. 1, 1988, 88 08940**

**Int. Cl.$^5$ C02F** *3/28*

**U.S. Cl. 210—603** **14 Claims**

1. A process for enhancing the operation of a system, wherein anaerobic bacterial digestion of organic residues takes place, by qualitatively modifying hydrolysis taking place in said system, said process comprising the step of contacting said system with an inorganic solid capable of fractionating cellulose fibers and densifying flocs contained in said system so that the volume of the sludge present in the system is decreased at

VOL 1126 ISS 4 MY 28 1991 UMI

an equal solids content, said solid comprising an aluminum silicate and having:

(a) a surface area of about 20 to 120 $m^2/g$;
(b) a cation exchange capacity of about 5 to 80 meq/100 grams;
(c) about 2 to 12 percent by weight volatile matter;
(d) a pH in water of about 6.5 to 8; and
(e) a redox potential in water of about 0 to −600 mV;

in an amount and for a period of time sufficient to enhance the operation of said system.

5. A process for enhancing the operation of a system, wherein anaerobic bacterial digestion of organic residues takes place, by promoting methane formation in said system, said process comprising the step of contacting said system with an inorganic solid capable of catalyzing the process of methane formation taking place in said system so that volatile fatty acids are removed from said system, said solid comprising an aluminum silicate and having:

(a) a surface area of about 20 to 120 $m^2/g$;
(b) a cation exchange capacity of about 5 to 80 meq/100 grams;
(c) about 2 to 12 percent by weight volatile matter;
(d) a pH in water of about 6.5 to 8; and
(e) a redox potential in water of about 0 to −600 mV;

in an amount and for a period of time sufficient to enhance the operation of said system.

---

### 5,019,266

## WASTE WATER PURIFICATION PROCESS WITH BATCHWISE SUPPLY OF WASTE WATER TO THE ACTIVATED SLUDGE TANK

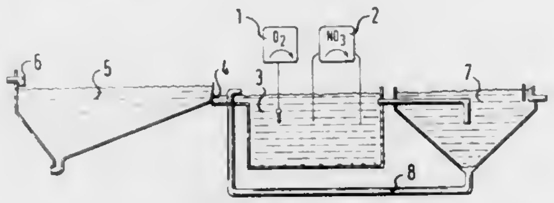
**Carl-Johannes Soeder, Dortmund; Erich Zanders, Elsdorf; Thomas Raphael, Dortmund; Heiner Keusen, Juelich, and Joost Groeneweg, Kreuzau, all of Fed. Rep. of Germany, assignors to Forschungszentrum Juelich GmbH, Juelich, Fed. Rep. of Germany**

**Filed Mar. 28, 1988, Ser. No. 174,386**

**Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710325**

**Int. Cl.$^5$ C02F** ***3/30***

**U.S. Cl. 210—605** **11 Claims**



1. A waste water purification process comprising the steps of:

rapidly admitting waste water to an activated sludge tank in response to a decrease in bacterial metabolism below a predetermined value, the volume of waste water admitted being at most about 30% of the volume of the tank;

throttling aeration during admission of the waste water to a value equivalent to an amount of dissolved oxygen less than or equal to about 0.5 mg/1 until the nitrate content in the tank has dropped below a preset nitrate limit value, and then

aerating the waste water;

treated waste water being continuously discharged from the tank during the purification process.

---

### 5,019,267

## PROCESS FOR MESOPHILIC OR THERMOPHILIC AEROBICO-ENZYMIC CONDITIONING OF LIQUID ORGANIC SUBSTANCES AND BIOMASS

**Friedrich Eberhard, Dresden; Gottfried Schramm, Berlin; Ulrich Holesovsky, Halle; Peter Richardt, Halle-Neustadt; Steffen Ehrig, Dresden; Karin Jobst, Radebeul; Hans-Jürgen Blobel; Friedrich Kutzsche, both of Dresden; Gerda Koschade, Freital; Hannelore Friedrich, Dresden, and Rolf Nitzsche, Kirschau, all of German Democratic Rep., assignors to Prowatec GmbH Halle, Halle, German Democratic Rep.**

**Filed Aug. 18, 1989, Ser. No. 395,619**

**Claims priority, application German Democratic Rep., Sep. 14, 1988, 3197856**

**Int. Cl.$^5$ C02F** ***3/02, 11/14***

**U.S. Cl. 210—606** **8 Claims**

1. A process for the enzymatic, aerobic conditioning of a liquid containing organic matter, comprising contacting in an aerobic reaction said liquid with from about 0.001% to about 0.1% wt. based on the organic matter content dry basis of said liquid of a chelating agent, and with from about 0.001% to about 1.5% wt. same basis of one or more enzymes adapted to break down said organic matter, aerating the resulting mixture, and terminating said aerobic reaction when from about 30% to about 50% wt. of the particles of said organic matter are smaller than 1$\mu$m, and from about 40% to about 70% wt. of the particles of said organic matter are smaller than 5$\mu$m, and subjecting said mixture to a nonaerated postreaction phase until from about 15% to about 20% wt. of said particles are smaller than 1$\mu$m, and from about 30% to about 40% wt. of said particles are smaller than 5$\mu$m, and then recovering the solids content of the mixture by separation of its liquid content.

---

### 5,019,268

## METHOD AND APPARATUS FOR PURIFYING WASTE WATER

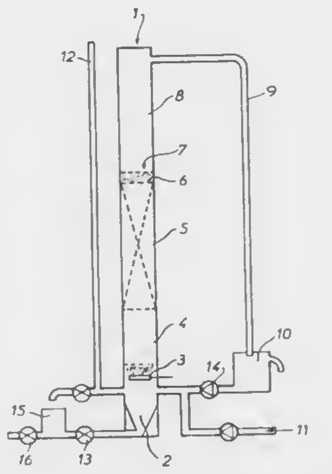
**Franck Rogalla, Asnieres, France, assignor to OTV (Omnium de Traitements et de Valorisation), Courbevoie, France**

**Filed Jun. 15, 1989, Ser. No. 366,385**

**Claims priority, application France, Jun. 16, 1988, 88 8061**

**Int. Cl.$^5$ C02F** ***3/06***

**U.S. Cl. 210—617** **8 Claims**



1. A process for the biological purification of waste water by treating with oxygenated gas using ascending co-currents in a single reactor containing as filtering means a lower fluidized bed zone and an upper fixed bed zone, the improvement wherein the beds contain particles consisting of expanded materials having a density lower than the density of water, the particles of the fixed bed being both smaller and lighter than the particles of the fluidized bed,

wherein the arrangement of particles and beds satisfies the following equation:

$$\frac{D1}{D2} = \frac{S2 - SL}{S1 - SL}$$

wherein D1 is the average diameter of the particles of the lower fluidized bed, **S1** is the volume mass of the lower fluidized bed, D2 is the average diameter of the particles of the upper bed, **S2** is the volume mass of the particles of the upper bed, and **SL** is the volume mass of the liquid; and wherein **D1** is about 3 to about 15 mm, D2 is about 1 to about 10 mm, **S1** is about 300 to bout 800 g/l; **S2** is bout 20 to 100 g/l; the height of the fluidized bed being from about 0.2 to about 2 meters and the height of the fixed bed being from about 0.5 to about 3 meters.

---

### 5,019,269

## POLYMERS DERIVED FROM CROSSLINKED POLYSTYRENES AND DEXTRANS, THEIR METHODS OF PREPARATION AND THEIR APPLICATIONS FOR THE ANALYSIS AND PURIFICATION OF MOLECULES OF BIOLOGICAL ORIGIN

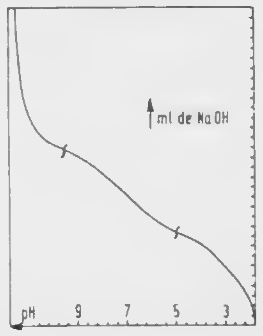
**Didier Letourneur, Aulnay; Colette Douzon, Paris; Véronique Migonney, Eaubonne; Daniel A. Muller, Soisy sus Montmorency, and Marcel Jozefowicz, Lamorlaye, all of France, assignors to Centre National de la Recherche Scientifique, Paris, France**

**Division of Ser. No. 235,113, Aug. 22, 1988, Pat. No. 4,950,712. This application Mar. 21, 1990, Ser. No. 497,560**

**Claims priority, application France, Aug. 21, 1987, 87 11813**

**Int. Cl.$^5$ B01D** ***15/08***

**U.S. Cl. 210—635** **12 Claims**



7. In a process of affinity chromatography, the improvement comprising using as a stationary phase a base polymer selected from the group consisting of a crosslinked styrene polymer or copolymer or a crosslinked dextran, in which chains of the base polymer or copolymer are substituted with one or more groups, which may be identical or different, belonging to the following categories:

—Z—$A_1$;
—Z—$A_2$;
—Z—$A_1$—Z'—$A_2$;
—Z—$A_1$—$A_3$—$A_2$;
—Z—$A_1$—$A_4$

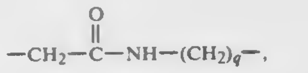
wherein

Z and Z' are chosen from the following moieties;

—$(CH_2)$—$_n$, n being 1 to 12, optionally made hydrophilic by the replacement of at least one H by an OH; or

—O—$(CH_2)$—$_r$, r being 0 to 12, optionally being made hydrophilic by the replacement of at least on H by an OH; or

——$SO_2NH$—$(CH_2)_m$—, m being 1 to 12, moiety —$(CH_2)_m$— optionally being made hydrophilic by the replacement of at least one H by an OH; and in the case of the modification of a cross-linked dexatran, also



$$-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-NH-(CH_2)_q-,$$

q being 1 to 12, the residue —$(CH_2)$q— optionally being made hydrophilic by the replacement of at least one H by an OH;

$A_1$ denotes a phosphorylated moiety

$A_2$ denotes a chemical moiety derived from a purine base or a pyrimidine base;

$A_3$ denotes a chemical group derived from a sugar; and

$A_4$ denotes a moiety of a molecule participating in the polar structure of a phospholipid.

---

### 5,019,270

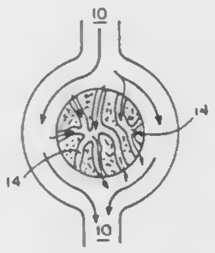
## PERFUSIVE CHROMATOGRAPHY

**Noubar B. Afeyan, Brookline, Mass.; Fred E. Regnier, West Lafayette, Ind., and Robert C. Dean, Jr., Norwich, Vt., assignors to PerSeptive Biosystems, Inc., Cambridge, Mass.**

**Continuation of Ser. No. 376,885, Jul. 6, 1989, abandoned. This application Oct. 9, 1990, Ser. No. 595,661**

**Int. Cl.$^5$ B01D** ***15/08***

**U.S. Cl. 210—656** **34 Claims**



30. A chromatography method comprising the steps of:

(A) providing a chromatography matrix defining:
  interconnected first and second throughpore sets, the members of said first throughpore set having a greater mean diameter then the members of said second throughpore set, and
  surface regions in fluid communication with the members of said second throughpore set which reversibly interact with a large biological molecule, and
(B) passing a fluid mixture of solutes including a said large biological molecule through said matrix at a rate sufficient
  to induce convective fluid flow through both said throughpore sets,
  to induce a convective flow rate within said second throughpore set greater than the rate of diffusion of said biological molecule within said second throughpore set and to produce in said second throughpore set a Peclet Number greater than 1.0.

---

### 5,019,271

## EXTRACTIVE CHROMATOGRAPHIC SEPARATION PROCESS FOR RECOVERING 3,5-DIETHYLTOLUENE

**Hermann A. Zinnen, Evanston, Ill., assignor to UOP, Des Plaines, Ill.**

**Continuation of Ser. No. 292,184, Dec. 30, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 443,800**

**The portion of the term of this patent subsequent to Jul. 10, 2007, has been disclaimed.**

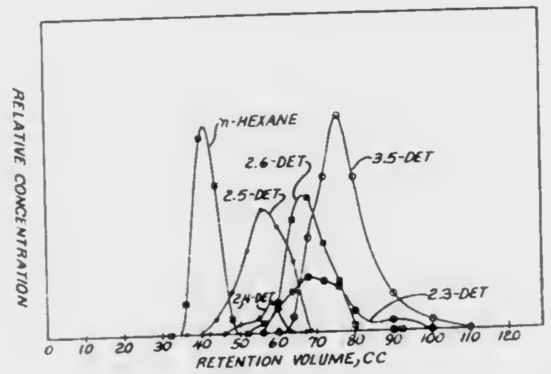
**Int. Cl.$^5$ B01D** ***15/08***

**U.S. Cl. 210—656** **6 Claims**

1. A process for separating 3,5-diethyltoluene from a feed mixture comprising 3,5-diethyltoluene and at least one isomer thereof, said process comprising contacting said mixture at adsorption conditions with an adsorbent comprising an X type zeolite, cation exchanged with a potassium cation thereby selectively adsorbing said 3,5-diethyltoluene, removing the

VOL
1126
ISS
4
MY
28
1991
UMI

remainder of said mixture from said adsorbent, and then recovering said 3,5-diethyltoluene by desorption at desorption conditions with a desorbent material comprising a monocyclic alkylsubstituted aromatic hydrocarbon having a boiling point differing by at least 5° C. from those of the components of the feed mixture.



---

**5,019,272**

### METHOD OF WASHING FILTERS HAVING MAGNETIC PARTICLES THEREON

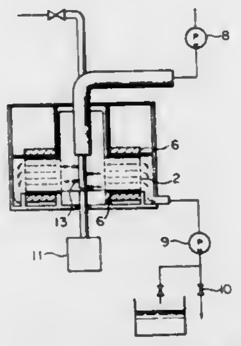
**Motofumi Kurahashi; Masanori Takemoto; Naoki Chishi; Eizoo Takeuchi, and Yoshinori Nakauma, all of Tokai City, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 277,243, Nov. 29, 1988, abandoned. This application Mar. 16, 1990, Ser. No. 503,159**

**Claims priority, application Japan, Nov. 30, 1987, 62-302992; Jun. 10, 1988, 63-141539**

**Int. Cl.$^5$ B01D** *35/06*

**U.S. Cl. 210—695** **4 Claims**



1. A method of washing a magnetic filter constituted by ferromagnetic small-gauge wires and having a longitudinal axis and opposite ends, by removing from the magnetic filter magnetic particles clinging thereto, comprising:
- establishing a magnetic field through the filter and which alternates in polarity in a direction around said longitudinal axis and which extends in a direction parallel to said longitudinal axis; rotating the magnetic filter with respect to said magnetic field about said longitudinal axis; and
- jetting washing fluid through the magnetic filter between the respective opposite ends of the filter in a direction transverse to said longitudinal axis while rotating the magnetic filter.

---

**5,019,273**

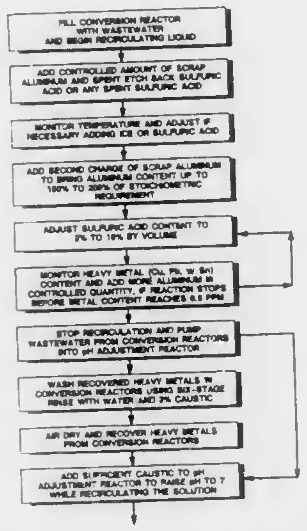
### METHOD FOR RECOVERY OF HEAVY METALS FROM HIGHLY CONCENTRATED WASTEWATER SOLUTIONS

**Joseph Fehsenfeld, Barrington, and Boro Vujasin, Des Plaines, both of Ill., assignors to Midwest Printed Circuits Services, Inc., Wheeling, Ill.**

**Filed Apr. 30, 1990, Ser. No. 517,335**

**Int. Cl.$^5$ C02F** *1/62, 1/70*

**U.S. Cl. 210—719** **12 Claims**


FILL CONVERSION REACTOR WITH WASTEWATER AND BEGIN RECIRCULATING LIQUID
ADD CONTROLLED AMOUNT OF SCRAP ALUMINUM AND SPENT ETCH BACK SULFURIC ACID OR ANY SPENT SULFURIC ACID
MONITOR TEMPERATURE AND ADJUST IF NECESSARY ADDING ICE OR SULFURIC ACID
ADD SECOND CHARGE OF SCRAP ALUMINUM TO BRING ALUMINUM CONTENT UP TO 180% TO 200% OF STOICHIOMETRIC REQUIREMENT
ADJUST SULFURIC ACID CONTENT TO 5% TO 10% BY VOLUME
MONITOR HEAVY METAL (Cu, Pb, w, Sn) CONTENT AND ADD MORE ALUMINUM IN CONTROLLED QUANTITY, IF REACTION STOPS BEFORE METAL CONTENT REACHES 0.5 PPM
STOP RECIRCULATION AND PUMP WASTEWATER FROM CONVERSION REACTORS INTO pH ADJUSTMENT REACTOR
WASH RECOVERED HEAVY METALS IN CONVERSION REACTORS USING SIX-STAGE RINSE WITH WATER AND 3% CAUSTIC
AIR DRY AND RECOVER HEAVY METALS FROM CONVERSION REACTORS
ADD SUFFICIENT CAUSTIC TO pH ADJUSTMENT REACTOR TO RAISE pH TO 7 WHILE RECIRCULATING THE SOLUTION

1. A method of reclaiming heavy metal from a concentrated wastewater solution containing heavy metal cations and an acid, comprising the steps of:
- a. adding to said wastewater a bed of scrap aluminum in a total amount between about 160% and about 180% of the stoichiometric requirement for complete reduction of the dissolved heavy metal cations to their elemental states;
- b. adjusting the acid content of said wastewater to 5% to 20% by volume;
- c. allowing said heavy metal cations to react with said scrap aluminum, whereby said aluminum is oxidized and said heavy metal cations are reduced to their elemental states, and demetallized wastewater is produced;
- d. neutralizing said demetallized wastewater with caustic to produce a treated effluent.

---

**5,019,274**

### METHODS FOR TREATING HYDROCARBON RECOVERY OPERATIONS AND INDUSTRIAL WATERS

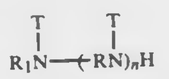
**Neil E. S. Thompson, Creve Coeur, and Robert G. Asperger, Des Peres, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 208,627, Jun. 20, 1988, Pat. No. 4,864,075, which is a continuation-in-part of Ser. No. 7,701, Jan. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 645,740. Aug. 30, 1984, abandoned. This application Jun. 30, 1989, Ser. No. 374,900**

**Int. Cl.$^5$ C02F** *1/54*

**U.S. Cl. 210—729** **26 Claims**

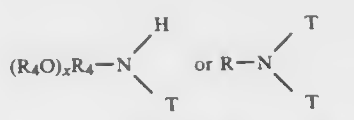
1. A method of water clarification by flocculation of suspended solids from an aqueous effluent and the removal of the flocculated solids to produce clarified water comprising adding to said aqueous effluent an effective flocculating amount of a compound having the formula



$$R_1\overset{T}{\overset{|}{N}}\!-\!\!\!-\!(R\overset{T}{\overset{|}{N}})_nH$$

being 12,

wherein T is hydrogen, C(=S) SR$_2$,



$$(R_4O)_xR_4-N\begin{matrix}H\\ T\end{matrix} \quad \text{or } R-N\begin{matrix}T\\ T\end{matrix}$$

with the proviso that at least two T s are C(=S)SR$_2$; R is an alkylene having 2–30 carbon atoms; R$_1$ is hydrogen or an alkyl having 1–30 carbon atoms; R$_2$ is an alkali metal, an alkaline earth metal, or N(R$_3$)$_4$ where R$_3$ is a lower alkyl; R$_4$ is C$_2$–C$_4$ alkylene; x is an integer of 3–200; and n is an integer of 1–10 and removing the resulting flocculated solids from the effluent.

---

**5,019,275**

### METHOD OF FLOCCULATION WITH CATIONIC TERPOLYMER FLOCCULANTS

**Frederick J. Good, Jr., Camillus, and Ronald E. Highsmith, Skaneateles, both of N.Y., assignors to Polypure, Inc., Solvay, N.Y.**

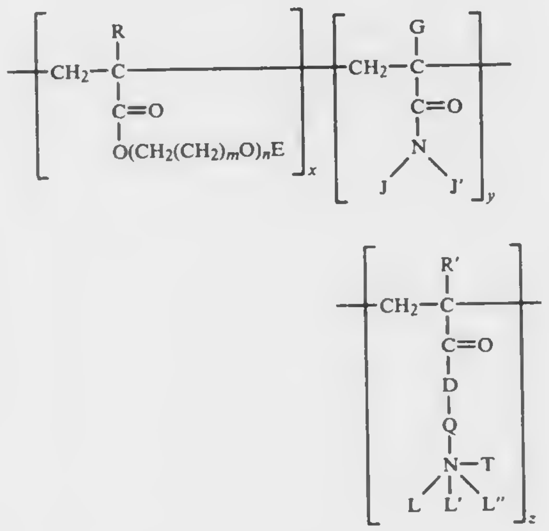
**Division of Ser. No. 337,909, Apr. 14, 1989, Pat. No. 4,981,936. This application Aug. 15, 1990, Ser. No. 567,908**

**Int. Cl.$^5$ C02F** *1/56*

**U.S. Cl. 210—734** **10 Claims**

1. In the method of flocculating particles and or suspended matter in an aqueous media by the addition of a flocculating agent to the aqueous media the improvement which comprises adding an aqueous solution of a terpolymer to the water to be flocculated, said terpolymer being of the formula:

(11)



$$\left[-CH_2-\underset{\underset{O(CH_2(CH_2)_mO)_nE}{|}}{\underset{C=O}{\underset{|}{\overset{R}{\overset{|}{C}}}}}-\right]_x\left[-CH_2-\underset{\underset{N(J)(J')}{|}}{\underset{C=O}{\underset{|}{\overset{G}{\overset{|}{C}}}}}-\right]_y\left[-CH_2-\underset{C(=O)-D-Q-N(T)(L)(L')(L'')}{\overset{R'}{\overset{|}{C}}}-\right]_z$$

wherein
- R is selected from the group consisting of hydrogen and methyl;
- R′ is selected from the group consisting of hydrogen and lower alkyl having from 1 to 6 carbon atoms;
- D is selected from the group consisting of oxygen and NH;
- E is selected from the group consisting of hydrogen and lower alkyl having from 1 to 6 carbon atoms;
- G is selected from the group consisting of hydrogen and lower alkyl having from 1 to 6 carbon atoms;
- J and J′ are independently selected from the group consisting of hydrogen and lower alkyl having from 1 to 6 carbon atoms;
- L, L′ and L″ are independently selected from the group consisting of hydrogen, alkyl containing 1 to 18 carbon atoms, hydroxyalkyl containing 1 to 18 carbon atoms and aryl;
- Q is selected from the group consisting of alkyl containing from 1 to 6 carbon atoms and hydroxyalkyl containing from 1 to 6 carbon atoms;
- T is an anion selected from the group consisting of chloride, alkyl sulfate of 1 to 4 carbon atoms and mixtures thereof;
- m is an integer from 1 to 2;
- n is an integer from 1 to 5;
- x, y and z are each a number from 0.01 to 0.99 and the sum of x, y and z is 1; and
- said terpolymer having a molecular weight from 1,000,000 to 50,000,000.

---

**5,019,276**

### METHOD OF AND PLANT FOR PURIFYING WATER

**Bengt Kock, Sandviken, and Klas Holm, Saltsjo-Boo, both of Sweden, assignors to BK Va-Leveranser AB, Sandviken, Sweden**

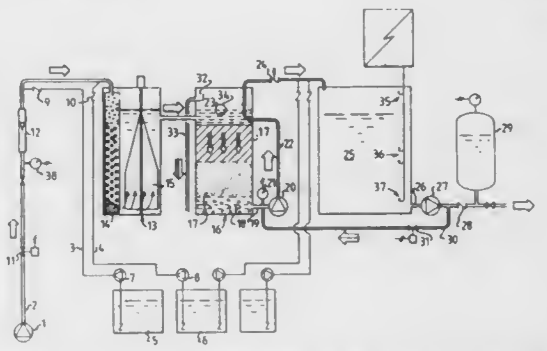
**PCT No. PCT/SE88/00514, § 371 Date Jun. 4, 1990, § 102(e) Date Jun. 4, 1990, PCT Pub. No. WO89/03239, PCT Pub. Date Apr. 20, 1989**

**PCT Filed Oct. 6, 1988, Ser. No. 469,423**

**Claims priority, application Sweden, Oct. 7, 1987, 8703856**

**Int. Cl.$^5$ B01D** *37/04;* **C02F** *9/00*

**U.S. Cl. 210—744** **8 Claims**



1. In a method for purifying water in an open, solid filter bed of a type in which chemicals are added to water to be purified, the water is thereafter passed through the filter bed, and the filter bed is periodically regenerated by counter-flow flushing, the improvement wherein the following method steps are included:
- creating a partial vacuum downstream of the filter bed by applying a vacuum side of a pump thereto for causing the water to be purified to flow under force of said partial vacuum through the bed at a substantially constant rate; and
- operating a control valve arranged on a pressure side of said pump for helping to keep the flow at the said substantially constant rate.

---

**5,019,277**

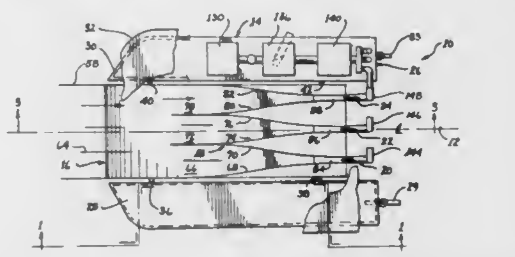
### OIL SKIMMING APPARATUS AND METHOD

**John B. Andelin, RR3, Box 626, Williston, N. Dak. 58801**

**Filed May 22, 1990, Ser. No. 527,141**

**Int. Cl.$^5$ E02B** *15/04*

**U.S. Cl. 210—776** **12 Claims**



1. Skimming apparatus for skimming oil off water comprising:
- a boat subassembly;
- a single primary skimming wing subassembly adjustably connected to said boat;

VOL
1126
ISS
4
MY
28
1991
UMI

a channel subassembly dividing said wing into a plurality of channels;

a plurality of secondary skimming units respectively disposed at outlet ends of the channels; and

oil collector subassembly means connected to said secondary skimming units for collecting and storing the oil.

---

**5,019,278**

### CONTINUOUS WASHED SAND FILTER AND WASHER

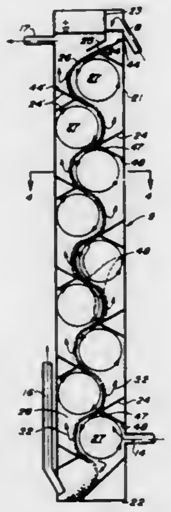
**Sten F. Jacquet, Stockholm, Sweden, assignor to Baker Hughes Incorporated, Houston, Tex.**

**Filed May 12, 1989, Ser. No. 351,152**

**Claims priority, application Sweden, May 26, 1988, 8801959**

**Int. Cl.$^5$ B01D *24/46***

U.S. Cl. 210—792 **17 Claims**



13. A method for co-current washing of granular filter media made dirty in a water treatment filter, with a washing fluid, comprising the steps of:

providing a vessel for holding a quantity of granular filter media and having upper and lower ends and baffle means in a vessel cavity therebetween, said baffle means comprising a plurality of inclined baffle members in spaced vertical arrangement in the vessel and extending alternatively from opposite sides of the vessel;

delivering a continuous flow of dirty media to be cleaned to the vessel at a point adjacent its upper end;

withdrawing cleaned media from the vessel at a point adjacent its lower end;

delivering a continuous flow of clean washing fluid to the vessel at a first location;

withdrawing dirtied washing fluid from the vessel at a second location;

directing the granular media to flow down through the vessel in a continuous relatively wide, but thin stream along a generally inclined flow path on an upper surface of each baffle member with portions of the flow path of the media cascading freely between each of the baffle members and the baffle member below it;

directing the washing fluid to flow in hydraulic vortices within the vessel along with and in the same direction as the streams of granular media for said portions of said flow path of the granular media for retaining the flow of granular media in said relatively wide, thin stream for substantially its entire flow through the vessel;

directing a portion of said vortices through said freely cascading granular media wide thin stream; and

wherein the granular media while flowing in a relatively wide, thin stream is washed by the washing fluid.

---

**5,019,279**

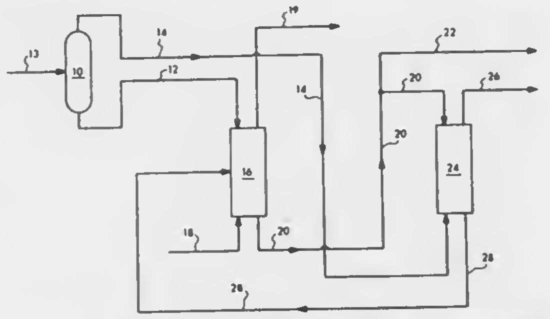
### PROCESS FOR ENRICHING A GAS

**Hiemi K. Haines, Englewood, and Richard L. Christiansen, Littleton, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio**

**Filed Dec. 21, 1989, Ser. No. 454,332**

**Int. Cl.$^5$ E21B *43/22;* B01F *3/02, 3/04***

U.S. Cl. 252—8.554 **19 Claims**



1. A process for preparing enriched gas for use in the displacement of hydrocarbons in a subterranean hydrocarbon-bearing formation, comprising the steps of:

contacting oil which has been separated from hydrocarbons produced from a subterranean formation and which contains intermediate hydrocarbon compounds with a first gas under conditions such that the first gas strips intermediate hydrocarbon compounds from the oil to form stripped oil, the first gas thereby becoming enriched with intermediate hydrocarbon compounds;

contacting the stripped oil with a second gas containing intermediate hydrocarbon compounds under conditions such that the stripped oil absorbs intermediate hydrocarbon compounds from the second gas to form enriched oil; and p1 contacting the enriched oil with the first gas under conditions such that the first gas strips intermediate hydrocarbon compounds from the enriched oil to become further enriched with intermediate hydrocarbon compounds.

---

**5,019,280**

### ION-PAIR COMPLEX CONDITIONING AGENT WITH BENZENE SULFONATE/ALKYL BENZENE SULFONATE ANIONIC COMPONENT AND COMPOSITIONS CONTAINING SAME

**Debra S. Caswell; Mark H. Mao; Robert Mermelstein, and Ellen S. Baker, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

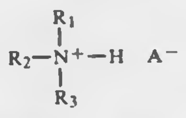
**Continuation-in-part of Ser. No. 108,838, Oct. 15, 1981, Pat. No. 4,915,854, which is a continuation-in-part of Ser. No. 930,840, Nov. 14, 1986, abandoned. This application Feb. 8, 1989, Ser. No. 308,353**

**The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.**

**Int. Cl.$^5$ D06M *13/34***

U.S. Cl. 252—8.8 **38 Claims**

1. A conditioning agent for static control and softening of fabrics comprising water-insoluble particles having an average diameter of from about 40 microns to about 300 microns, said particles comprising a protonated alkyl amine-anionic compound ion-pair complex having the formula:



$$R_2-\overset{\displaystyle R_1}{\underset{\displaystyle R_3}{N^+}}-H \quad A^-$$

wherein each $R_1$ and $R_2$ independently is $C_{12}$–$C_{20}$ alkyl or alkenyl, each $R_3$ is H or $CH_3$, and $A^-$ is an anionic compound selected from the group consisting of linear $C_1$–$C_5$ alkyl benzene sulfonates and benzene sulfonates, and mixtures of said ion-pair complexes.

---

**5,019,281**

### HYDROPHILIC SOFTHAND AGENCY FOR FIBROUS MATERIALS AND USE THEREOF

**Heinrich Singer, Horgau, and Gabriele Köppel, Meitingen, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Dec. 12, 1989, Ser. No. 450,134**

**Int. Cl.$^5$ D06M *13/46, 15/22***

U.S. Cl. 252—8.8 **14 Claims**

1. A hydrophilic softhand agent for fibrous materials, comprising

(1) a water-soluble ammonium salt which has at least one saturated or unsaturated $C_9$ to $C_{24}$ fatty acid radical and has been quaternized with a di-$C_1$–$C_2$-alkyl ester of a $C_1$–$C_2$-alkylphosphonic acid,

(2) at least one further quaternary ammonium compound other than component (1), having at least one long-chain, saturated or unsaturated alkyl radical of 12 to 24 carbon atoms, and

(3) a dispersed emulsifiable polyethylene wax having an acid number of 5 to 115 and a saponification number of 15 to 150, said polyethylene wax being an emulsifiable polyethylene with carboxylic acid functional groups which may be partially esterified.

---

**5,019,282**

### ORGANIC ESTER, AMIDE OR AMINE SALTS OF PHOSPHORODITHIOATE SUBSTITUTE CARBOXYLIC ANHYDRIDES AS MULTIFUNCTIONAL ADDITIVES

**Liehpao O. Farng, Lawrenceville; John P. Doner, Sewell, and Andrew G. Horodysky, Cherry Hill, all of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Filed Dec. 21, 1989, Ser. No. 454,584**

**Int. Cl.$^5$ C10M *137/10***

U.S. Cl. 252—32.7 E **15 Claims**

1. An improved composition comprising a major amount of an oil of lubricating viscosity or a grease prepared therefrom and a minor multifunctional antioxidant, antiwear and/or anticorrosion amount of an additive product of reaction comprising a phosphorodithioate substituted hydrocarbyl carboxylic anhydride-derived organic ester, amide or amine salt thereof selected from the group consisting of:

O,O-di-2-methyl-1-propyl-S-(2-hydroxypropyl)-phosphorodithioate-dodecenyl-succinic anhydride aniline adduct;

O,O-di-2-methyl-1-propyl-S-(2-hydroxypropyl)-phosphorodithioate-dodecenyl-succinic anhydride-mixed $C_{12}$–$C_{14}$ alkylamine adduct;

O,O-di-2-methyl-1-propyl-S-(2-hydroxypropyl)-phosphorodithioate-dodecenyl-succinic anhydride-bis(2-ethylhexyl) amine adduct;

O,O-di-4methyl-2-pentyl-S-(2-hydroxypropyl) phosphorodithioate-dodecenyl-succinic anhydride-2-butanol adduct;

O,O-di-4-methyl-2-pentyl-S-(2-hydroxypropyl)-phosphorodithioate-dodecenyl-succinic anhydride-dibutyl amine adduct;

O,O-di-4-methyl-2-pentyl-S-(2-hydroxypropyl)-phosphorodithioate-dodecenyl-succinic anhydride-(bis-2-hydroxethyl cocoamine) adduct;

O,O-di-4-methyl-2-pentyl-S-(2-hydroxypropyl)-phosphorodithioate-dodecenyl-succinic anhydride-polyoxyalkylene amine adduct and

O,O-di-(2-ethylhexyl-S-(2-hydroxypropyl)-phosphorodithioate-dodecenyl succinic anhydride-aniline adduct.

---

**5,019,283**

### ENHANCING ANTIWEAR AND FRICTION REDUCING CAPABILITY OF CERTAIN XANTHATE CONTAINING MOLYBDENUM SULFIDE COMPOUNDS

**Morton Beltzer; Jacob J. Habeeb, both of Westfield; James N. Francis, Maplewood, all of N.J., and Karla S. Colle, Houston, Tex., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed Sep. 7, 1989, Ser. No. 404,141**

**Int. Cl.$^5$ C10M *135/14, 141/06***

U.S. Cl. 252—33.6 **9 Claims**

1. A method of enhancing the antiwear and friction reducing properties of a lubricating oil composition comprising an oil of lubricating viscosity and a molybedenum and xanthate containing additive formed by reacting $Mo(CO)_6$ with a dixanthogen of the formula $(ROCS_2)_2$ wherein R is an organo group having a sufficient number of carbon atoms to render the additive soluble in the oil, the method comprising: adding to said oil composition a polydentate ligand or mixtures thereof.

---

**5,019,284**

### MULTIFUNCTIONAL LUBRICANT ADDITIVES AND COMPOSITIONS THEREOF

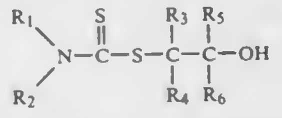
**Lienpao Farng, Lawrenceville, and Andrew G. Horodysky, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Filed Jul. 19, 1989, Ser. No. 381,882**

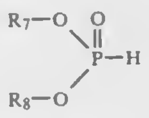
**Int. Cl.$^5$ C10M *137/04, 135/18***

U.S. Cl. 252—46.7 **26 Claims**

1. An improved lubricant composition comprising a major proportion of a oil of lubricating viscosity or grease or other solid lubricant prepared therefrom and a minor proportion of an ashless, non-metallic multifunctional antioxidant/antiwear/extreme pressure additive product comprising a dithiocarbamate derived organic hydrogen phosphonate or mixtures thereof prepared by reacting in molar quantities, less than molar quantities or more than molar quantities a S-hydroxyalkyl N,N-dialkyl dithiocarbamate having the following generalized structure:



and a dihydrocarbyl hydrogen phosphonate having the following generalized structure:



where $R_1$, $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ are hydrogen or $C_1$ to about $C_{60}$ hydrocarbyl optionally containing sulfur nitrogen and/or oxygen and where $R_7$ and $R_8$ are $C_1$ to about $C_6$ hydrocarbyl optionally containing nitrogen, sulfur and/or oxygen.

---

**5,019,285**

### THIOALKANOIC ACID SUBSTITUTED N,N-DIALKYLHYDROXYLAMINES AND STABILIZED LUBRICANT COMPOSITIONS

**Samuel Evans, Marly, Switzerland; David Chasan, Teaneck, N.J., and Raymond Seltzer, New City, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Jan. 26, 1990, Ser. No. 471,167**

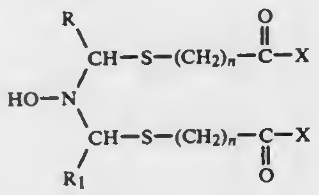
**Int. Cl.$^5$ C10M *133/08;* C07C *333/02, 327/22, 321/12***

U.S. Cl. 252—47.5 **10 Claims**

6. A lubricant composition comprising a mineral oil or a

VOL
1126
ISS
4
MY
28
1991
UMI

synthetic fluid or mixtures thereof and an effective stabilizing amount of a compound of formula (I)



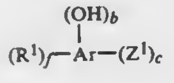
(I)

wherein R and $R_1$ are independently H, $C_1$–$C_{18}$-alkyl, or $C_6$–$C_{10}$-aryl, X is independently $OR_2$, $SR_2$ or $NR_3R_4$, $R_2$ is H, $C_1$–$C_{24}$-alkyl, $C_5$–$C_{12}$-cycloalkyl, $C_7$–$C_9$-aralkyl or —$(CH_2CH_2O)_mCH_2CH_2OR_5$ wherein m is 0–6 and $R_5$ is $C_1$–$C_{18}$alkyl, n is 1 or 2, and $R_3$ and $R_4$ are independently H, $C_1$–$C_{18}$-alkyl or $C_6$–$C_{10}$-aryl.

### 5,019,286
### LOW VISCOSITY AROMATIC CARBONATE LUBRICATING OIL CONCENTRATES

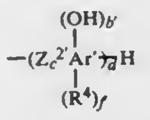
**Gerald Shaw, Plainfield, and Paul K. Ladwig, Randolph, both of N.J., assignors to Exxon Chemical Patents, Inc., Linden, N.J.**
**Filed Feb. 26, 1990, Ser. No. 484,289**
**Int. Cl.⁵ C10M** *141/02*
**U.S. Cl. 252—48.2** **42 Claims**

1. A low viscosity aromatic carbonate lubricating oil concentrate which comprises lubricating oil, aromatic carbonate and an aromatic carbonate solubilizing effective amount of at least one oil soluble co-additive selected from the group consisting of compounds of the formula:



$$(R^1)_f\!-\!\overset{(OH)_b}{Ar}\!-\!(Z^1)_c$$

wherein $R^1$ is $C_1$ to $C_{20}$ substituted or unsubstituted hydrocarbyl, Ar is $C_6$ to $C_{20}$ aromatic group, and $Z^1$ is a member selected from the group consisting of —(O)COR², —N(R³)—T², —X—T¹, and —D¹—T³ wherein $R^2$ is H or $C_1$ to $C_{20}$ hydrocarbyl, $R^3$ is H or $C_1$ to $C_6$ hydrocarbyl, $T^2$ is substituted or unsubstituted aryl, X is O or S, $T^1$ is a group of the formula:



$$-(Z^2_{c'}\overset{(OH)_{b'}}{\underset{(R^4)_{f'}}{Ar'}})_d H$$

wherein Ar' is $C_6$ to $C_{20}$ aromatic group, $Z^2$ is divalent $C_1$ to $C_{10}$ alkylene or $C_3$ to $C_{10}$ cycloalkylene, $R^4$ is $C_1$ t o $C_{20}$ substituted or unsubstituted hydrocarbyl, c' is 0 or 1, d is an integer of at least 1, and f' and b' are each integers of from 0 to 3, with the proviso that the sum of f' and b' does not exceed the unsatisfied valence of Ar', $D^1$ is a $C_1$ to $C_{10}$ hydrocarbon linking group and $T^3$ is an alkylene polyamine group, optionally substituted by one or more hydroxy-(optionally hydrocarbyl-substituted) aromatic groups, wherein f, b and c are each integers of from 0 to 3, with the proviso that the sum of f, b and c does not exceed the unsatisfied valence of Ar.

### 5,019,287
### ENHANCED WEAR RESISTANT ADDITIVE AND LUBRICATION OIL COMPOSITION CONTAINING SAME

**Thomas F. Derosa, Passaic, N.J.; Benjamin J. Kaufman, Hopewell Junction, and Rosemary J. Jennejahn, Nelsonville, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.**
**Filed Dec. 1, 1989, Ser. No. 444,221**
**Int. Cl.⁵ C10M** *147/00*
**U.S. Cl. 252—54.6** **15 Claims**

1. A lubricating oil comprising a major amount of an oil of lubricating viscosity and a minor viscosity improving amount of a additive prepared by the steps comprising:

(a) reacting a polymer prepared from ethylene and at least one ($C_3$–$C_{10}$) alpha-monoolefin comprising from about 15 to 80 mole percent of ethylene and from about 20 to 85 mole percent of said ($C_3$–$C_{10}$) alpha-monoolefin and having a number average molecular weight ranging from about 5,000 to 500,000;

(b) reacting said polymer with 2-isocyanoethyl-acrylate which has a reactive pendant isocyano group within its structure;

(c) reacting said reaction polymer in step (b) with a perfluoroaliphatic alcohol group consisting of a unique weight average distribution of perfluoroaliphatic groups represented by the following formula:

$$CF_3(CF_2)_a\!-\!(CH_2)_b\!-\!OH$$

wherein a ranges from 1 to 20 and b ranges from 2 to 10; and

(d) recovering the product additive composition.

---

### 5,019,288
### CLEANING COMPOSITION FOR COPPER AND COPPER ALLOYS AND METHOD OF MANUFACTURE THEREOF

**Silverio M. Garcia, Louisville, Colo., assignor to Chem-Shield, Inc., Ogden, Utah**
**Filed Dec. 22, 1989, Ser. No. 456,987**
**Int. Cl.⁵ C09K** *13/04;* **C23G** *1/02;* **B44C** *1/22;* **C23F** *1/00*
**U.S. Cl. 252—79.2** **39 Claims**

1. An acidic solution for use as a cleaning composition for , copper and copper alloys thereof, said composition comprising a solution of from about 1–20 weight percent hydrochloric acid, and about 80–99 weight percent of an aqueous hydrochloric acid based composition having a pH of less than about 1.0, yet substantially non-reactive with compounds having low oxidative states including human skin tissue.

---

### 5,019,289
### STABLE LIQUID DETERGENT CONTAINING INSOLUBLE OXIDANT

**Robert L. Gray, Danbury, Conn.; David Peterson; Loren Chen, both of Pleasanton, Calif., and Gregory V. Buskirk, Danville, Calif., assignors to The Clorox Company, Oakland, Calif.**
**Continuation-in-part of Ser. No. 276,599, Nov. 25, 1988, Pat. No. 4,891,147. This application Dec. 29, 1989, Ser. No. 458,873**
**The portion of the term of this patent subsequent to Jan. 2, 2007, has been disclaimed.**
**Int. Cl.⁵ C11D** *3/395, 7/54;* **C01B** *15/00*
**U.S. Cl. 252—95** **20 Claims**

1. A phase stable liquid detergent composition containing at least one insoluble oxidant, comprising:

(a) a liquid phase which comprises: (i) an effective amount of at least one surfactant selected from the group consisting of anionic, nonionic, cationic, amphoteric, zwitterionic surfactants, and mixtures thereof; (ii) a liquid carrier therefor, comprising organic water soluble or dispersible solvents, water, or a mixture thereof; and

(b) an effective amount of a water insoluble oxidant stably suspended in said liquid phase, which maintains oxidative stability, said water insoluble oxidant being an alkaline earth metal peroxide or a Group IIB peroxide; said detergent composition being buffered to a pH of greater than 8.

---

### 5,019,290
### METHOD OF FORMULATING HIGH CAUSTIC PASTE DISHWASHING COMPOSITIONS MADE COMPOSITIONS THEREBY, WHEREIN PHOSPHATE REVERSION IS MINIMIZED

**Anthony J. Bruegge, Cincinnati; Denny E. Dangherty, West Chester, and Terrence J. Sabatelli, Cincinnati, all of Ohio, assignors to DuBois Chemicals, inc., Cincinnati, Ohio**
**Division of Ser. No. 171,759, Mar. 22, 1988, abandoned. This application Jun. 7, 1989, Ser. No. 362,561**
**Int. Cl.⁵ C11D** *11/00, 7/12, 7/16, 17/06*
**U.S. Cl. 252—135** **7 Claims**

1. A method of formulating a paste detergent composition having from about 35% to about 50% NaOH, water and at least about 20% hydratable detergent builders including at least 10% phosphate sequesterant based on the total weight of the composition said method comprising mixing the NaOH, water and builders and maintaining an effective portion of said NaOH at less than 130° F. at all times during mixing to thereby prevent hydration of said portion of NaOH thereby maintaining said detergent as a paste to avoid reversion of said phosphate sequesterant.

7. A high caustic paste detergent composition comprising 35 to 50% sodium hydroxide and at least 10% alkali metal tripolyphosphate wherein a portion of said sodium hydroxide is a nonhydrated portion and is an amount effective to prevent formation of a solid detergent and maintain said detergent as a paste.

---

### 5,019,291
### COMPOSITION FOR REMOVING ASBESTOS

**James N. G. Faulks, Hampshire, England, assignor to BP Chemicals Limited, London, England**
**Filed Feb. 1, 1989, Ser. No. 304,951**
**Claims priority, application United Kingdom, Feb. 9, 1988, 8802959**
**Int. Cl.⁵ B08B** *7/00;* **C11D** *1/72, 1/722, 3/37*
**U.S. Cl. 252—174.22** **5 Claims**

1. An asbestos stripping concentrate composition which consists of:

(a) from 1 to 20% by weight of a $C_{12}$ to $C_{20}$ secondary alcohol alkoxylate having a molecular weight in the range 500 to 700.

(b) from 0.1 to 20% by weight of a polyoxyethylene-oxypropylene block copolymer having an average molecular weight in the range 1800 to 2000 and an ethylene oxide content of between 8 and 12% by weight.

(c) from 10 to 60% by weight of a random polyoxyethylene oxypropylene glycol ether having an average molecular weight in the range 1500 to 3500 and an ethylene oxide content of between 40 and 75% by weight.

(d) optionally a dye in an amount effective to visually determine the extent of asbestos wetting after application.

(e) the balance if required being water.

---

### 5,019,292
### DETERGENT COMPOSITIONS

**André C. Baeck, Bonheiden, Belgium, and Young S. Oh, Fairfield, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**
**Continuation-in-part of Ser. No. 68,281, Jun. 30, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 287,978**
**Claims priority, application European Pat. Off., Jun. 28, 1988, 88201330.3**
**Int. Cl.⁵ C11D** *3/12, 1/75*
**U.S. Cl. 252—174.25** **13 Claims**

1. A granular detergent composition comprising: at least about 1% of a detersive surfactant; from about 5% to about 35% detergent builders; from about 1% to about 25% of a hectorite clay as a fabric softening ingredient, wherein said hectorite clay consists essentially of clay of natural origin having the general formula:

$$[(Mg_{3x}Li_x)\,Si_{4-y}Me^{III}{}_y\,O_{10}(OH_{2-z}F_z)]^{-(x+y)}\,\frac{(x+y)\,M^{n+}}{n}$$

wherein $Me^{III}$ is Al, Fe, or B; or y=0; $M^{n+}$ is a monovalent (n=1) or divalent (n=2) metal ion, said clay having a layer charge distribution (x+y) such that at least 50% of the layer charge is in the range of from about 0.23 to about 0.31; and in addition to said hectorite clay, from about 1% to about 10% of an additional fabric softening ingredient comprising: an amine of the formula $R_1 R_2 R_3 N$, wherein $R_1$ is selected from $C_6$ to $C_{20}$ hydrocarbyl groups, $R_2$ is selected from $C_1$ to $C_{20}$ hydrocarbyl groups and $R_3$ is selected from $C_1$ to $C_{20}$ hydrocarbyl or hydrogen groups; or an amide of the formula $R_{10}R_{11}NCOR_{12}$, wherein $R_{10}$ and $R_{11}$ are independently selected from $C_1$–$C_{22}$ alkyl, alkenyl, hydroxy alkyl, aryl, and alkyl-aryl groups; $R_{12}$ is hydrogen, a $C_1$–$C_{22}$ alkyl or alkenyl, an aryl group, an alkyl-aryl group, or an O-$R_{13}$ group, wherein $R_{13}$ is selected from a $C_1$–$C_{22}$ alkyl or alkenyl group, an aryl, or an alkyl-aryl group; or a 1-(higher alkyl) amide (lower alkyl)-2-(higher alkyl) imidazoline, wherein said higher alkyl is an alkyl having from about 12 to about 22 carbon atoms, and said lower alkyl is an alkyl having from about 1 to about 4 carbon atoms.

---

### 5,019,293
### USE OF HYDROGEN PEROXIDE IN PREPARING MAGNESIUM CONTAINING SILICATE SOLS FOR COATING AND FIBER FORMATION

**James M. Burlitch, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.**
**Filed Jun. 12, 1989, Ser. No. 364,106**
**Int. Cl.⁵ B01J** *13/00;* **C04B** *35/20*
**U.S. Cl. 252—313.1** **12 Claims**

1. A process for producing a stable, substantially homogeneous, substantially magnesium hydroxide-free, light transmitting magnesium containing silicate sol having a gel content of less than 1% by weight, said process comprising the steps of:

(a) preparing a solution in solvent of (i) metal alkoxide comprising magnesium alkoxide and (ii) silicon alkoxide in amounts such that the atomic ratio of Mg to Si ranges from 0.3:1 to 4:1 and the solvent is present in an amount ranging from about 40 to 90% by weight, said solvent being an aliphatic, cycloaliphatic or aromatic compound containing from 1 to 20 carbon atoms and at least one functional group selected from the group consisting of ether and hydroxyl, said magnesium alkoxide having the formula $Mg(OR)_2$ wherein R is an aliphatic, cycloaliphatic or aromatic group which contains from 1 to 20 carbon atoms and optionally at least one functional group selected from the group consisting of ether and hydroxyl, and said silicon alkoxide having the formula $Si(OR')_nQ_m$ wherein R' is $C_1$–$C_4$ alkyl and Q is selected from the group consisting of $C_1$–$C_{20}$ alkyl, $C_2$–$C_4$ alkenyl, phenyl and di-s-butoxyaluminumoxy groups and hydrogen and fluorine atoms and n is 3 or 4 and m is 4−n;

(b) adding to said solution at a temperature of 10° to 30° C. reactant consisting of an acidic proton-containing peroxy compound or an acidic proton-containing peroxy compound and water over a period of about 0.5 hours to 48 hours in an amount ranging from that stoichiometrically equivalent to one alkoxy group of each alkoxide molecule of (i) and (ii) to that stoichiometrically equivalent to all the alkoxy groups of the alkoxide molecules of (i) and (ii) and reacting during said addition and also thereafter, the portion of the reacting after the period of addition being carried out for up to 4 days at a temperature ranging from 10° C. up to about 65° C.; the allocation between peroxy compound and any water, the time period for addition, the quantity of solvent present and the temperature of reaction being such that no precipitation occurs, the occur-

VOL
1126
ISS
4
MY
28
1991
UMI

rence of reaction of the silicon alkoxide being denotable by failure to detect silicon containing compounds in volatiles emanating from the reaction mixture by gas chromatography.

---

### 5,019,294
### ALPHA-MERCAPTOESTER SUBSTITUTED DIORGANOPOLYSILOXANES

**Michel Gay, Lyons, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France**

**Division of Ser. No. 159,914, Feb. 24, 1988, Pat. No. 4,937,365. This application Apr. 25, 1990, Ser. No. 514,216**

**Claims priority, application France, Feb. 24, 1987, 87 02618**

**Int. Cl.**$^5$ **C09K** *15/32;* **C08K** *5/24*

**U.S. Cl. 252—400.31** **6 Claims**

1. A composition of matter which comprises a vinyl chloride-based polymer and an effective amount of a stabilizer therefor, said stabilizer comprising a diorganopolysiloxane having the general formula (1):

$$R_3Si-\left[OSi(R)-(YOCOCH(R')SH)-\right]_p-\left[OSiR_2\right]_r-\left[OSi(R)(YOH)\right]_q-OSiR_3 \tag{1}$$

in which:

the symbols R, which are identical or different, are each $C_1$–$C_8$ linear or branched chain alkyl, phenyl or 3,3,3-trifluoropropyl radicals, at least 80% of the radicals R being methyl radicals;

the symbols Y, which are identical or different, are each $C_1$–$C_{18}$ linear or branched chain alkylene radicals, optionally extended by poly(ethylene oxide), poly(propylene oxide) or mixture thereof;

R′ is a hydrogen atom or a $C_1$–$C_8$ linear or branched chain alkyl radical;

p is an integer ranging from 1 to 50;

q is an integer ranging from 0 to 30; and

r is an integer ranging from 0 to 500.

---

### 5,019,295
### FOAMABLE SILICONE RUBBER COMPOSITION

**Takeo Yoshida, and Masaharu Takahashi, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Mar. 30, 1990, Ser. No. 501,714**

**Claims priority, application Japan, Mar. 31, 1989, 1-82532**

**Int. Cl.**$^5$ **H01B** *1/06*

**U.S. Cl. 252—518** **10 Claims**

1. A process which comprises microwaving a foamable silicone rubber composition consisting essentially of:

(A) a diorganopolysiloxane having the average unit formula:

$$(R^1)_aSiO_{\frac{4-a}{2}}$$

wherein $R^1$ represents a substituted or unsubstituted monovalent hydrocarbon group, $R^1$'s in the molecule may be the same or different, at least 98 mol% of the $R^1$'s are alkyl groups having from 1 to 4 carbon atoms, and a represents a number of from 1.95 to 2.05, and having an average polymerization degree of from 3,000 to 30,000,

(B) a powdery silica filler,

(C) an electroconductive metallic oxide powder having an average particle diameter of not more than 30 μm and a specific resistance of not more than 500 ϕ·m,

(D) a foaming agent, and

(E) a vulcanizing agent.

---

### 5,019,296
### SERINE-N,N-DIACETIC ACID AND DERIVATIVES AS COMPLEXING AGENTS AND DETERGENTS CONTAINING SAME

**Richard Baur, Mutterstadt; Felix Richter, Bruehl; Stefan Birnbach; Rolf Fikentscher, both of Ludwigshafen; Alfred Oftring, Ludwigshafen, and Ekhard Winkler, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Division of Ser. No. 177,366, Apr. 4, 1988. This application Aug. 7, 1990, Ser. No. 563,326**

**Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712329**

**Int. Cl.**$^5$ **C11D** *3/30, 3/33;* **C07C** *229/00*

**U.S. Cl. 252—546** **4 Claims**

1. A detergent containing serine-N,N-diacetic acid or a sodium, potassium, ammonium or an organic amine salt thereof, in an amount from 0.1 to 2% by weight, based on the total weight, as a complexing agent for heavy metal and/or alkaline earth metal ions.

---

### 5,019,297
### PROCESS FOR ISOMERIZING OLEFINICALLY UNSATURATED SECONDARY ALCOHOLS

**Michael J. Virnig, Santa Rosa, Calif., assignor to Henkel Research Corporation, Santa Rosa, Calif.**

**Filed Apr. 18, 1989, Ser. No. 339,735**

**Int. Cl.**$^5$ **C09F** *7/08;* **C11L** *3/14*

**U.S. Cl. 260—405.6** **9 Claims**

1. A process for isomerizing an olefinically unsaturated secondary alcohol wherein the carbon-carbon double bond and the alcohol functionality of said secondary alcohol are separated only by methylene groups which comprises: (1) reacting said olefinically unsaturated secondary alcohol in the presence of a catalyst effective amount of a substantially fully hydrogenated palladium catalyst at a temperature of from about 200° C. to about 300° C. to produce a reaction mixture, (2) passing hydrogen through said reaction mixture until the iodine number of said reaction mixture is less than about 10 to produce a saturated ketone, and (3) separating said catalyst from said ketone.

---

### 5,019,298
### OPTICALLY ACTIVE AROMATIC CARBOXYLIC ACID DERIVATIVES AND PROCESS FOR PRODUCING THE SAME

**Masayoshi Minai, Moriyama, and Takayuki Higashii, Kishiwada, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

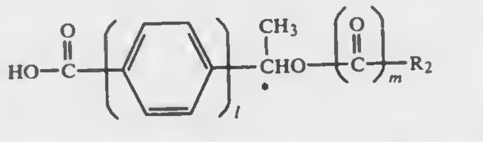
**Filed Apr. 25, 1988, Ser. No. 186,020**

**Claims priority, application Japan, Apr. 30, 1987, 62-109513; Sep. 22, 1987, 62-238191; Mar. 4, 1988, 63-52454**

**Int. Cl.**$^5$ **C07C** *05/08, 69/76, 59/00*

**U.S. Cl. 260—410.5** **4 Claims**

1. An optically active aromatic carboxylic acid derivative represented by the formula:



$$HO-\overset{O}{\overset{\|}{C}}-\left(C_6H_4\right)_l-\underset{\bullet}{\overset{CH_3}{\overset{|}{C}}}HO-\left(\overset{O}{\overset{\|}{C}}\right)_m-R_2$$

wherein $R_{32}$ represents an alkoxyalkyl group having 1 to 20 carbon atoms or an alkyl group having 1 to 20 carbon atoms, which alkyl group may be substituted with a halogen atom; l represents a number of 1 or 2; m represents a number of 0 or 1; and * indicates asymmetric carbon atom.

---

### 5,019,299
### PROCESS FOR THE MANUFACTURE OF WAX-LIKE ESTERIFICATION PRODUCTS

**Adolf Kuehnle, Marl, and Helmut Kehr, Schermbeck, both of Fed. Rep. of Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Continuation of Ser. No. 283,029, Nov. 30, 1988, abandoned, which is a continuation of Ser. No. 204,961, Jun. 9, 1988, abandoned, which is a continuation of Ser. No. 90,415, Aug. 26, 1987, abandoned, which is a continuation of Ser. No. 759,571, Jul. 26, 1985, abandoned. This application Jun. 6, 1990, Ser. No. 534,010**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1984, 3427884**

**Int. Cl.**$^5$ **C09F** *5/08, 7/10*

**U.S. Cl. 260—410.6** **21 Claims**

1. A process for the preparation of waxy esterification products comprising reacting acidic, hard paraffin oxidation products of synthetic origin with an alcohol in the molten state in the presence of an effective amount of a catalytic zinc compound.

---

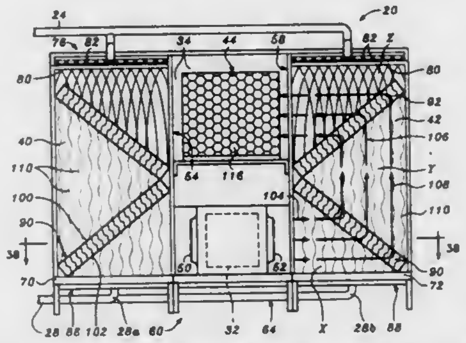
### 5,019,300
### DIRECT CONTACT WATER-TO-AIR HEAT EXCHANGER AND METHOD

**Thomas L. Davis; John P. Shell; Robert N. Elliott, III, all of Raleigh, and Carsie K. Denning, Coats, all of N.C., assignors to Carolina Power & Light Company, Raleigh; North Carolina Alternative Energy Corporation, Research Triangel Park and North Carolina Department of Economic, Raleigh, all of, N.C.**

**Filed Jul. 25, 1990, Ser. No. 557,634**

**Int. Cl.**$^5$ **B01F** *3/04*

**U.S. Cl. 261—23.1** **20 Claims**



1. A direct contact water-to-air heat exchanger characterized by low power requirements for the circulation of air and water therethrough and the thermodynamically efficient provision of near moisture saturated cooled or warmed conditioned air to satisfy a cooling or heating load, said heat exchanger comprising:

a vertically extending columnar air/water contact chamber defining upper and lower ends and a sidewall structure;

an opening in the sidewall structure proximate the lower end of the chamber for permitting introduction of air to be conditioned into the chamber in a substantially horizontal flow direction;

an opening in the sidewall structure proximate the upper end of the chamber for permitting discharge of conditioned air from the chamber;

first inclined turning vane means located in the lower part of said chamber;

second inclined turning vane means located in the upper part of said chamber;

said first and second turning vane means serving to define three zones in said chamber, a first lower zone in which the air flow is substantially horizontal as a continuation of the introduced air, a second middle zone located between the turning vanes wherein the air flow is substantially upward, and a third upper zone in which the flow is at least partially horizontally directed toward the air discharge means;

water spray means located at the upper end of said chamber for spraying water at a predetermined temperature into said chamber for a downward gravity assisted passage through the three zones; and

water collection means located at the lower end of said chamber for collecting water that has passed through the chamber.

---

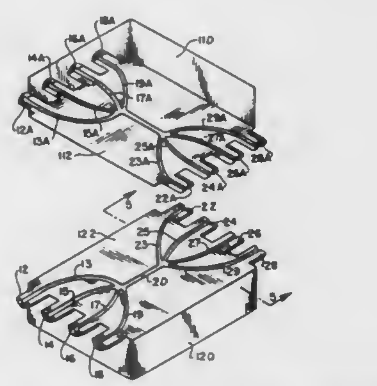
### 5,019,301
### METHOD OF INJECTION MOLDING STAR-COUPLERS

**Michael H. Coden, New York, and Bulusu V. Dutt, Yorktown Heights, both of N.Y., assignors to Codenoll Technology Corporation, Yonkers, N.Y.**

**Continuation of Ser. No. 297,009, Jan. 12, 1989, abandoned. This application Jul. 27, 1990, Ser. No. 560,264**

**Int. Cl.**$^5$ **B29D** *11/00;* **G02B** *6/28*

**U.S. Cl. 264—1.5** **7 Claims**



1. A method for constructing a star-coupler comprising the steps of:

forming by injection molding a first section and a second section each having a plurality of channels therein including a mixing zone, a plurality of input connector portions and a plurality of output connector portions, each of said input and output connector portions being adapted for connection to a mating fiber optic connector, being connected to at least one of said channels, and being integral with the section in which it is molded; and said channels, input connector portions and output connector portions of said second section being configured so as to align and mate with said channels, input connector portions and output connector portions of said first section;

filling said plurality of channels in each of said first and second sections with a core material for transmitting optical signals; and

fastening said first section to said second section so as to align said channels and said connector portions of said first section with said channels and said connector portions of said second section, thus forming a corresponding plurality of channels and connectors,

wherein said step of filling may occur prior or subsequent to said step of fastening.

---

### 5,019,302
### METHOD FOR GRANULATION

**Robert E. Sparks, Kirkwood; Norbert S. Mason, Clayton, and Michael Center, St. Louis, all of Mo., assignors to Washington University Technology Associates, Inc., St. Louis, Mo.**

**Filed Mar. 12, 1986, Ser. No. 838,828**

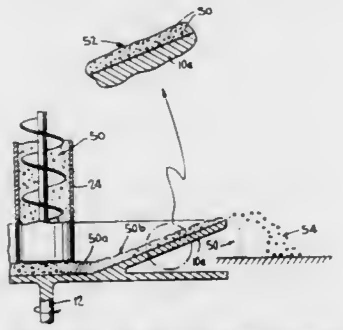
**Int. Cl.**$^5$ **B29B** *9/08, 9/10*

**U.S. Cl. 264—8** **11 Claims**

1. A process for granulation of a powdery material comprising (a) providing a quantity of a feed material containing a material to be granulated in fine particulate form, which mate-

VOL
1126
ISS
4
MY
28
1991
UMI

rial is capable of being partially or completely melted for a short period of time without deleterious affect, or a particulate material to be granulated admixed with a particulate, meltable binder; (b) depositing said feed material onto the central portions of the surface of a spreader means at least portions of which are maintained at a temperature at or above the melting point of the meltable component in said feed material, the spreader means having peripheral portions which are spaced from the central portions in normal operation and inclined side portions between the central and peripheral portions thereof; (c) rapidly spreading the feed material substantially radially outwardly by centrifugal force produced by rotating the spreader means about a central axis; (d) providing at least a portion of the feed material with a velocity component in the direction of the surface of the spreader means by said centrifugal force to maintain said portion of the feed material in contact with the heated surface of the spreader means as it moves radially outwardly to melt that portion substantially solely by contact with the heated surface to form a layer of a liquid component from the melted portion of the feed material on the surface of the spreader means; (e) adjusting the rate of feeding of said material, the energy input to the surface of the spreader means, and the rotational speed of the spreader means so that there is sufficient time for at least partial melting of the meltable component of said feed material, but insufficient time to deleteriously affect the material to be granulated; and (f) discharging the material to be granulated including the liquid component from the peripheral portions of the spreader means into an atmosphere cooler than the melting point of the meltable component of the feed material to form granules therefrom in the cooler atmosphere which are larger than the particle size of the feed material.



---

### 5,019,303

### PROCESS FOR PRODUCING POLYACETYLENE

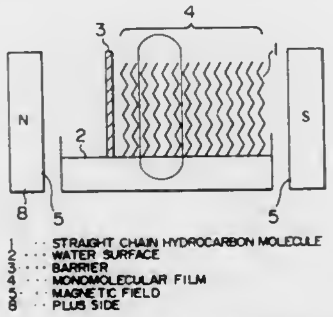
**Norihisa Mino, Settsu, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed May 4, 1989, Ser. No. 347,213**

**Claims priority, application Japan, May 11, 1988, 63-113904; Aug. 9, 1988, 63-198210**

**Int. Cl.$^5$ B29C** *41/02;* **C08F** *38/02*

**U.S. Cl. 264—22** **11 Claims**



1. A process for producing a polyacetylene film comprising the steps of spreading organic molecules being a straight-chain hydrocarbon with an acetylene group (—C≡C—) having a highly polarizable group or a group having an unpaired electron with one end of the group being formed of a hydrophilic group and the other end with a hydrophobic group, dissolved in an organic solvent over a water surface, evaporating off said organic solvent, gathering the organic molecules containing the acetylene group spread over the water surface, and then applying a surface pressure thereto to form a monomolecular film of the organic molecules on the water surface, transferring said monomolecular film onto a substrate, irradiating said monomolecular film with an energy beam to thereby polymerize the acetylene group in said organic film to form a polyacetylene film, in which, after the acetylene monomolecular film has been transferred onto the substrate, the acetylene monomolecular film is irradiated by the energy beam to form the polyacetylene film while a magnetic field is being applied to the film.

---

### 5,019,304

### PROCESS FOR THE PRODUCTION OF FOAM CUSHIONS FROM DIFFERENT FLUID REACTION MIXTURES

**Martin Brock, Cologne; Ralf Busch, Ketsch, and Ralf Pohlig, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**

**Filed Aug. 1, 1988, Ser. No. 226,506**

**Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727129**

**Int. Cl.$^5$ B29C** *67/22*

**U.S. Cl. 264—45.1** **3 Claims**

1. A process for the production of foam cushions from different fluid reaction mixtures comprising introducing a first reaction mixture and at least one other reaction mixture into a mold cavity and leaving the mixtures to react to form a cushion having zones of differing elasticity or firmness, characterized in that one of the two reaction mixtures is not introduced into the mold cavity until it has creamed up and is already viscous, and in that the second reaction mixture, which has not creamed up, is introduced at the same time or later.

---

### 5,019,305

### PROCESS FOR THE PRODUCTION OF FOAM CUSHIONS FROM DIFFERENT FLUID REACTION MIXTURES

**Martin Brock, Cologne; Ralf Busch, Ketsch, and Ralf Pohlig, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**

**Filed Aug. 1, 1988, Ser. No. 226,507**

**Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727131**

**Int. Cl.$^5$ B29C** *67/22*

**U.S. Cl. 264—45.1** **2 Claims**

1. A process for the production of foam cushions from different fluid reaction mixtures comprising introducing a first and at least one other reaction mixture into a mold cavity and leaving the mixtures to react to form a cushion having zones of differing elasticity or rigidity characterized in that the reaction mixtures are not introduced into the mod cavity until they have started to cream up, are already viscous, and have already undergone a reduction in density of at least two thirds.

---

### 5,019,306

### HIGH FREQUENCY DIELECTRIC COMPOSITION

**Rong-Fong Huang, and Dean Anderson, both of Albuquerque, N. Mex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Division of Ser. No. 458,911, Dec. 29, 1989, Pat. No. 4,992,398. This application Nov. 14, 1990, Ser. No. 612,373**

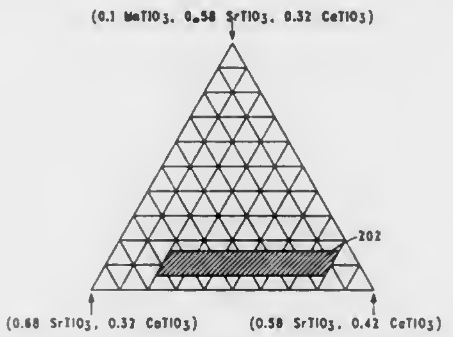
**Int. Cl.$^5$ C04B** *35/46*

**U.S. Cl. 264—66** **15 Claims**

1. A method for preparing a perovskite-type crystal dielectric ceramic to selectively obtain a formulation consisting essentially of (1−m) parts $(Sr_xCa_yMn_z)TiO_3$ per m parts silicon-oxygen containing compound and having a relatively high dielectric constant together with a relatively low non-linear temperature coefficient, which comprises:

(A) providing mixed powder composed of a material consisting essentially of $(Sr_xCa_yMn_z)TiO_3$, wherein x, y, and z satisfy the following relationships: $0.98<x+y+z<1.02$, $0.34<y<0.4$, and $0.0075<z<0.015$, by combining suitable proportions of a strontium compound, a calcium compound, a titanium-oxygen containing compound of insufficient amounts of titanate compounds are selected in the previous steps, and a manganese compound to form a mixture, suitably mixing and pulverizing;

(B) calcining by heating said mixed powder to a temperature of 1100° C. to 1200° C. and maintaining that temperature for at least two hours;



(C) mixing the $(Sr_xCa_yMn_z)TiO_3$ with a suitable amount of a silicon-oxygen containing compound such as $CaTiSiO_5$, $CaSiO_3$, or $SiO_2$ to obtain a formulation (1−m) parts of $(Sr_xCa_yMn_z)TiO_3$ per m parts silicon-oxygen containing compound, wherein m is mole fraction, and such that x, y, z, and m satisfy the following relationships:

$0.98<x+y+z<1.02$, $0.34<y<0.4$, $0.0075<Z<0.015$, and $0.005<m<0.015$;

(D) reducing particle size;

(E) forming and

(F) sintering at a temperature range of 1280° C. to 1400° C. for two to eight hours.

---

### 5,019,307

### METHOD AND APPARATUS FOR THE MANUFACTURE OF HOLLOW CERAMIC BEAMS USING MULTIPLE MOLDING MANDRELS

**John R. Brewer, Hillsboro; Joseph M. Swenson, Forest Grove, and Reginald R. Maas, Newberg, all of Oreg., assignors to Coors Ceramic Company, Golden, Colo.**

**Filed Mar. 3, 1989, Ser. No. 319,652**

**Int. Cl.$^5$ C04B** *35/64*

**U.S. Cl. 264—67** **11 Claims**

1. A method of manufacture of hollow ceramic beams, comprising the steps:

providing a flexible mold for forming the beams;

mounting a plurality of rigid mandrels in substantially parallel spaced relationship within said mold with spacer means separating said mandrels;

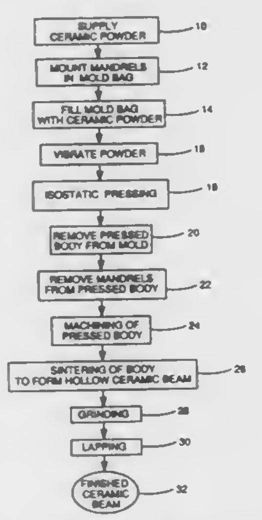
filling the mold with ceramic-forming powder around said mandrels and moving the spacer means during filling to maintain said spaced relationship so that the mandrels are separated by a portion of said powder;

pressing said mold inwardly with substantially uniform pressure to compress said powder against the mandrels and thereby form a compressed body of powder surrounding said mandrels which are separated by at least one partition portion of said body;

removing said body from said mold;

removing said mandrels from said body to leave a hollow compressed body; and

firing said hollow compressed body to sinter the material of said body into a hollow ceramic beam having an outer wall and at least one internal support partition formed integral with the outer wall of said beam.


SUPPLY CERAMIC POWDER
10
MOUNT MANDRELS IN MOLD BAG
12
FILL MOLD BAG WITH CERAMIC POWDER
14
VIBRATE POWDER
16
ISOSTATIC PRESSING
18
REMOVE PRESSED BODY FROM MOLD
20
REMOVE MANDRELS FROM PRESSED BODY
22
MACHINING OF PRESSED BODY
24
SINTERING OF BODY TO FORM HOLLOW CERAMIC BEAM
26
GRINDING
28
LAPPING
30
FINISHED CERAMIC BEAM
32

---

### 5,019,308

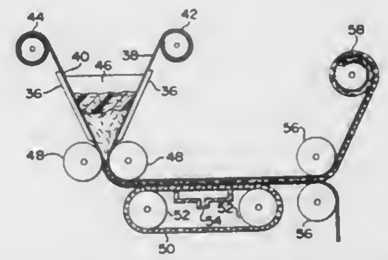
### METHOD OF MAKING A PTFE BASED TAPE SUITABLE FOR IMPREGNATION INTO A POROUS METAL MATRIX

**George C. Pratt, Ann Arbor, and Michael D. Montpetit, Chelsea, both of Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.**

**Division of Ser. No. 605,037, Apr. 30, 1984, Pat. No. 4,615,854. This application May 28, 1986, Ser. No. 869,463**

**Int. Cl.$^5$ B32B** *27/02, 31/00*

**U.S. Cl. 264—87** **9 Claims**



1. A method of making a PTFE based tape suitable for impregnation into a porous metal matrix comprising mixing a liquid dispersion of PTFE with a coagulant to form a paste, placing said paste between a layer of supporting material and a layer of filter paper to form a sandwich, compressing said sandwich, transferring said sandwich to a gauze-like material so that said filter paper layer of said sandwich is adjacent the gauze-like material, applying a vacuum to the gauze-like material and adjacent filter paper layer to remove some excess liquid from said paste, and removing said layer of filter paper from said sandwich to leave a tape comprising PTFE and liquid and a layer of supporting material.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,309

### METHOD OF AND APPARATUS FOR PRODUCING A PIPE OF THERMOPLASTIC SYNTHETIC RESIN

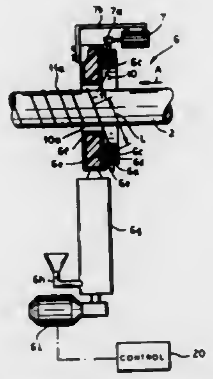
**Erwin Brunnhofer, Fuldabrück, Fed. Rep. of Germany, assignor to Technoform Caprano & Brunnhofer KG, Fuldabruck, Fed. Rep. of Germany**

**Filed Oct. 16, 1989, Ser. No. 422,389**

**Claims priority, application Fed. Rep. of Germany, Jan. 24, 1989, 3901928**

**Int. Cl.$^5$ B29C *47/06***

**U.S. Cl. 264—103** **14 Claims**



1. A method of making a pipe, comprising the steps of:
(a) extruding a core tube of a thermoplastic synthetic resin;
(b) translationally advancing said core tube along a path at a linear speed;
(c) rotating at an angular velocity around said core tube as said core tube is advanced along said path a plurality of nozzle rings each formed with at least one spinning orifice and said nozzle rings spaced along said path of said tube and rotatable therearound with different angular velocities with respect to a sense of rotation or magnitude, extruding from said nozzle rings in a hot state a plurality of strands of a reinforcing plastic capable of cooling to form monofilaments, cooling the strands to form said monofilaments along a path of the strands from said orifices to said core tube, and winding said monofilaments around said core tube as a reinforcing winding thereon;
(d) maintaining a difference between a rate at which said strands are extruded from said orifices and a rate at which said monofilaments are wound on said tube to stretch said monofilaments over the path of said strands and prior to winding of said monofilaments on said tube;
(e) applying an extruded bonding layer to completely encompass said tube from a nonrotatable nozzle rings; and
(f) winding by steps (c) and (d) at least one further monofilament onto said extruded layer with another rotatable nozzle ring.

---

### 5,019,310

### METHOD FOR MAKING MOLDED SOLID BODY OF INCINERATED WASTE MATERIAL

**Yoshikazu Kobayashi, Hiroshima, Japan, assignor to Kabushiki Kaisha Miike Tekkosho, Hiroshima, Japan**

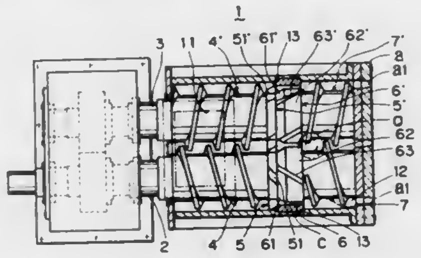
**Filed Nov. 23, 1988, Ser. No. 275,425**

**Claims priority, application Japan, Dec. 28, 1987, 62-334282; Aug. 22, 1988, 63-207739**

**Int. Cl.$^5$ B29B *11/10***

**U.S. Cl. 264—122** **1 Claim**

1. A method of making a molded solid body of incinerated waste material comprising the ordered steps of
kneading, crushing, and feeding a mixture of ash-like incinerated waste and plastic materials with a pair of first screws;
grinding and compressing the same to generate heat with a rotary compressing means connected to said pair of first screws;
releasing the same from its compressed state to evaporate water therefrom; and
extruding the same through a replaceable perforated plate having a plurality of tapered perforations of a polygonal or cross-form cross section into a dense bar-like shape by a pair of second screws coaxial with said pair of first screws.



---

### 5,019,311

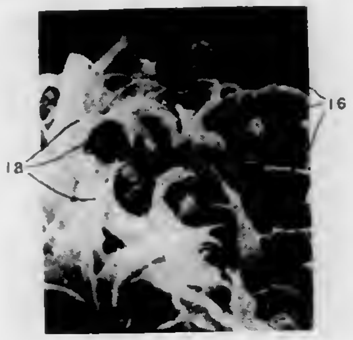
### PROCESS FOR THE PRODUCTION OF MATERIALS CHARACTERIZED BY A CONTINUOUS WEB MATRIX OR FORCE POINT BONDING

**Evan E. Koslow, Westport, Conn., assignor to Koslow Technologies Corporation, Bridgeport, Conn.**

**Continuation-in-part of Ser. No. 314,651, Feb. 23, 1989, abandoned. This application Dec. 22, 1989, Ser. No. 455,997**

**Int. Cl.$^5$ B01D *27/04;* B32B *31/00***

**U.S. Cl. 264—122** **118 Claims**



1. A method of forming a composite material which comprises:
providing a quantity of first particles of a binder material, said first particles having diameters between about 0.1 and about 150 micrometers;
providing a quantity of second particles of a primary material having a softening temperature substantially greater than the softening temperature of said binder material, said second particles having diameters between about 0.1 and about 3,000 micrometers;
combining the first and second quantities of particles in a substantially uniform mixture wherein said binder material is present in an amount of at least about 3% by weight of the mixture;
heating said substantially uniform mixture, in the absence of pressure or shear sufficient to convert the binder particles into a continuous phase through the composite material, to a temperature substantially above the softening temperature of said binder material but to a temperature less than the softening temperature of said primary material;
thereafter applying pressure and shear to the heated mixture sufficient substantially immediately to convert at least a portion of the binder material particles into a substantially continuous webbing structure through the composite material; and
substantially immediately after formation of said continuous binder structure, rapidly cooling said mixture to below the softening point of the binder material to retain said converted binder material in its continuous webbing structure condition to produce the composite material.

---

### 5,019,312

### METHOD FOR ASSEMBLING A BICYCLE FRAME

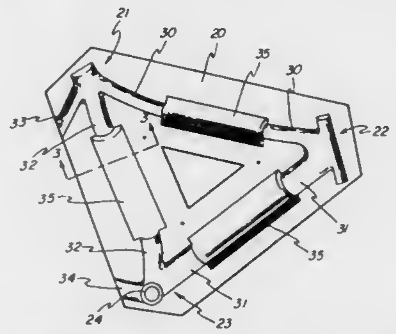
**Stephen J. Bishop, West Carrollton, Ohio, assignor to Huffy Corporation, Miamisburg, Ohio**

**Filed Sep. 27, 1990, Ser. No. 588,503**

**Continuation of application Ser. No. 437,860, filed Nov. 17, 1989 abandoned, which is a divisIon of Ser. No. 259,383 now U.S. Pat. No. 4,900,050 issued on Feb. 13, 1990**

**Int. Cl.$^5$ B29C *43/18***

**U.S. Cl. 264—152** **8 Claims**



1. In the manufactured of a bicycle frame comprising a plurality of preformed rigid permanent frame members having end portions thereof in converging abutted relation, the method of forming a lug joint incorporating said abutting end portions of said frame members, comprising the steps of:
(a) assembling said permanent frame members in predetermined relation wherein converging end portions thereof abut to define three joints,
(b) preliminarily securing said abutting end portions of said frame members together in said joint defining relation,
(c) encasing each of said joints in multiple layers of oriented organic fibers which are impregnated with liquid resin and which are sized to wrap only end portions of said frame members and to form web portions extending across the space between the wrapped portions of said frame members while leaving exposed the portions of said frame members between said wrapped portions, and
(d) causing said resin to set while holding said layers in compressed relation around said joints and thereby causing said fiber layers to adhere together and to secure said joined frame members permanently together.

---

### 5,019,313

### METHOD FOR MOLDING CONTAINERS AND FORMING HOLE THEREIN

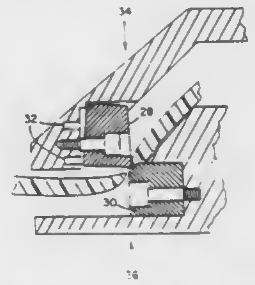
**Richard T. Warburton, Canandaigua, N.Y., assignor to Mobil Oil Corporation, Fairfax, Va.**

**Division of Ser. No. 311,809, Feb. 16, 1989, Pat. No. 4,909,721. This application Jan. 18, 1990, Ser. No. 466,797**

**Int. Cl.$^5$ B29C *51/32***

**U.S. Cl. 264—154** **5 Claims**

1. In the process of creating an orifice in a plastic part during the shape molding thereof comprising:
placing moldable plastic between a pair of conformable mold members and applying compression thereto wherein during said molding opposed key members in each mold member pierce and form an orifice in said plastic;
the improvement comprising: providing a cutting edge on one key member adjacent to a planar face thereon and a vertical surface having a bevelled edge on the other key member; one of said keys being fixed in its mold part and the other key being located in its mold part and supported so as to be free to be moved independently thereof by turning or tilting; registering said keys and closing said mold parts so that initial contact will involve said cutting edge, said bevelled edge and said plastic therebetween, thereby turning or tilting said other key so that said vertical surface is in contact with and parallel to said planar face; further closing said mold parts so that said cutting edge will ride off said bevelled edge surface and slide across said vertical surface, piercing and enlarging a latch opening in said plastic; and separating said mold parts, removing the shaped plastic and positioning the mold member carrying said free to move key so that it will return by force of gravity to its original position occupied just prior to said initial contact.



---

### 5,019,314

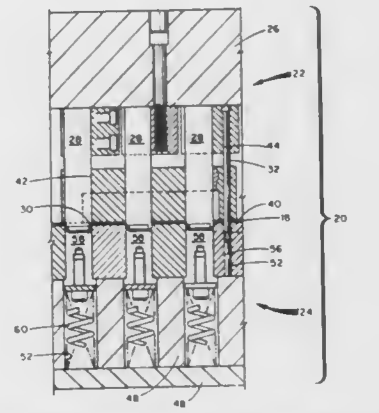
### PROCESS FOR DIE CUTTING PLASTIC SHEETS

**Albert A. Burlando, Flanders, N.J., assignor to Almetek Industries, Inc., Hackettstown, N.J.**

**Filed Dec. 16, 1985, Ser. No. 809,489**

**Int. Cl.$^5$ B26D *3/08***

**U.S. Cl. 264—156** **5 Claims**



1. A process for producing a card of date pieces from a sheet of thermoplastic material including preprinted data in repetitive sequential form, which comprises:
(a) introducing said sheet of thermoplasic material including preprinted data thereof into a first station of a plurality of stations of a die cutting assembly including cooperating male and female die members formed in lines and rows, each of said stations including a portion of all of said cooperating male and female die members, one of said die members including a slot;
(b) registering said sheet of thermoplastic material to align said preprinted data with respect to said cooperating male and female die members in each of said stations:
(c) moving said male die members through a plane of said sheet of thermoplastic material and into said female die members to form data pieces having residual attachment to said sheet of thermoplastic material corresponding to said slot of one of said die members;
(d) indexing said sheet of thermoplastic material successively through said plurality of stations and successively repeating step (b) and (c); and
(e) successively removing cards of data pieces from said die cutting assembly.

VOL
1126
ISS
4
MY
28
1991
UMI

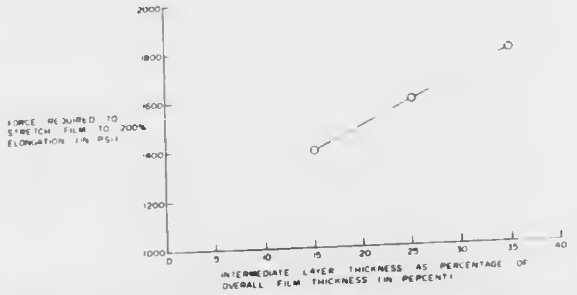
### 5,019,315
### PREPARING MULTI-LAYER COEXTRUDED POLYOLEFIN STRETCH WRAP FILMS

**Gregory M. Wilson, Rochester, N.Y., assignor to Mobil Oil Corporation, Fairfax, Va.**

**Filed Oct. 25, 1988, Ser. No. 262,407**

**Int. Cl.$^5$ B29C** *47/06*

**U.S. Cl. 264—171** **24 Claims**



1. A method of preparing a thermoplastic stretch wrap film capable of stretching upon exerting a force during application of the film to an article or group of articles to be wrapped comprising coextruding a film having at least three layers, said three layers having two outer layers of linear low density polyethylene consisting essentially of ethylene copolymerized with a minor amount of at least one alpha olefin having from 4 to 10 carbon atoms and an intermediate layer of high pressure low density polyethylene, wherein the force required to stretch the film is controlled by intermediate layer thickness established during said step of coextruding.

---

### 5,019,316
### METHOD FOR PRODUCING THERMOPLASTIC SYNTHETIC YARN

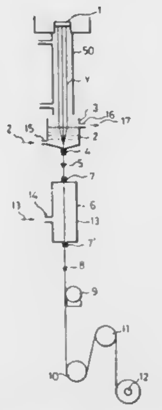
**Kunihiko Ueda, Otsu; Katsumi Hasegawa, Kusatsu, and Nobuyuki Kuriyama, Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan**

**Division of Ser. No. 69,703, Jul. 2, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 383,434**

**Claims priority, application Japan, Jul. 3, 1986, 61-157039**

**Int. Cl.$^5$ D01D** *5/088, 5/14*

**U.S. Cl. 264—178 F** **15 Claims**



1. A method for producing a thermoplastic synthetic yarn comprising the steps of continuously downwardly extruding a fiber-forming thermoplastic polymer in molten state from a spinneret to form a filament yarn, passing the as-spun yarn through a liquid cooling bath disposed beneath the spinneret and thence through a hot chamber filled with pressurized steam, the yarn being drawn at least during its passage through the hot chamber, wherein

(a) the liquid bath has a restricted yarn exit path therein, which yarn exit path is provided with an aperture connected to a first conduit for injecting pressurized air transversely to the yarn exit path and another aperture connected to a second conduit for receiving and exhausting the air injected from the first conduit which is mixed with a mist released from the running yarn,

(b) the hot chamber is provided with narrow inlet and outlet paths having a size allowing the yarn to pass through but substantially preventing the pressurized steam from escaping from the chamber,

(c) the water content of the cooled yarn prior to introduction to the hot chamber is not more than 20% relative to the yarn weight, and

(d) a yarn take-up speed at a stage downstream of the hot chamber is from 2500 m/min to 6000 m/min.

---

### 5,019,317
### PROCESS FOR THE PRODUCTION OF MOLDED PRODUCTS USING INTERNAL MOLD RELEASE AGENTS

**Gregory H. Slocum, Pittsburgh, and Donald W. Schumacher, Bethel Park, both of Pa., assignors to Mobay Corporation, Pittsburgh, Pa.**

**Filed May 24, 1989, Ser. No. 356,958**

**Int. Cl.$^5$ B29C** *45/00*

**U.S. Cl. 264—300** **7 Claims**

1. A process for producing a molded product comprising:

A) reacting:
  i) an organic isocyanate component selected from the group consisting of:
    a) an organic polyisocyanate having an isocyanate group content of from 5 to 45% by weight, prepared by reacting:
      1) an organic di- and/or polyisocyanate, and
      2) an active hydrogen containing fatty acid ester prepared by reacting an alcohol or a polyol with an aliphatic, saturated or unsaturated fatty acid, said ester being characterized in that at least one aliphatic acid which contains more than 8 carbon atoms is built into the molecule, said ester further characterized as having an acid number of from 0 to 100 and a hydroxyl number of from 0 to 150 with at least one of said numbers being greater than zero, said ester having an average molecular weight of from 500 to 5000, and
    b) a mixture of from about 2 to about 20% by weight of a fatty acid and from about 80 to about 98% by weight of an organic di- and/or polyisocyanate having an isocyanate group content of from about 20 to about 33% by weight, with
  ii) an isocyanate reactive component selected from the group consisting of
    a) a mixture comprising:
      1) from about 0.5 to about 10% by weight, based on the weight of components ii)a)2) and ii)a)3), of a zinc carboxylate containing from 8 to 24 carbon atoms per carboxylate group,
      2) from about 0.5 to 100% by weight, based on the weight of components ii)a)2) and ii)a)3), of a compatibilizer which compatibilizes said carboxylate in component ii)a), and
      3) from 0 to about 99.5% by weight, based on the weight of components ii)a)2), and ii)a)3), of at least one hydroxyl group containing compound other than said compatibilizer,
    b) an isocyanate reactive mixture comprising from about 2 to about 50% by weight of a fatty acid and from about 50 to about 98% by weight of a hydroxyl group containing compound, with the proviso that when the isocyanate component is i)a), the isocyanate reactive component is ii)b) and when the isocyanate component is i)b), the isocyanate reactive component is ii)a), and with the further proviso that the components are reacted at an isocyanate index of from about 90 to about 400 in a closed mold,

B) allowing the components to react, and

C) removing the product from the mold.

---

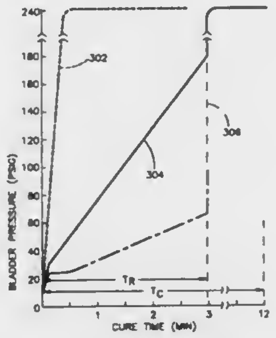
### 5,019,318
### TIRE MOLD WITH BLADDER PRESSURIZATION SYSTEM

**William F. Mattson, Hinckley, Ohio, assignor to The Uniroyal Goodrich Tire Company, Akron, Ohio**

**Filed Jul. 27, 1989, Ser. No. 385,741**

**Int. Cl.$^5$ B29C** *35/04*

**U.S. Cl. 264—315** **14 Claims**



1. An apparatus for curing an article made from a material capable of flowing prior to curing, said apparatus comprising:

a mold including surface means defining a cavity for shaping the article;

a vent passage for communicating the cavity with the exterior of said mold to allow fluid to escape from between the article and said surface means defining the cavity;

means for pressing the article against said surface means defining the cavity for a predetermined curing time in response to fluid pressurization; and

means for gradually increasing the fluid pressurization of said pressing means from a first pressure to a second pressure greater than the first pressure during an initial period of the predetermined curing time and which initial period is sufficiently long to permit fluid to escape from between the article and said surface means defining the cavity, said means for gradually increasing the fluid pressurization of said pressing means comprising:

a fluid pressure source;

a fluid conduit connecting said pressing means with said fluid pressure source; and

restrictor means comprising a restrictor member located completely within said fluid conduit.

---

### 5,019,319
### GOLF BALL

**Makoto Nakamura, Fujimi; Toshlo Honda; Toshio Chikaraishi, both of Akishima, and Yukio Fukuura, Sayama, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

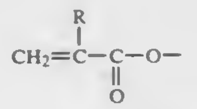
**Filed Mar. 8, 1990, Ser. No. 490,240**

**Claims priority, application Japan, Mar. 8, 1989, 1-55933**

**Int. Cl.$^5$ A63B** *37/02, 37/06, 37/00*

**U.S. Cl. 273—218** **6 Claims**

1. A one-piece or core of a multi-layered golf ball comprising a rubber composition comprising a modified diene rubber, said diene rubber being selected from the group consisting of polybutadiene rubbers, natural rubbers, and polyisoprene rubbers, and said modified diene rubber including a group having the formula:



$$\mathrm{CH_2{=}\overset{\overset{\displaystyle R}{|}}{C}-\underset{\underset{\displaystyle O}{\|}}{C}-O-} \qquad (1)$$

wherein R is hydrogen or an alkyl radical having 1 to 5 carbon atoms, wherein the group of formula (1) is present in an amount of about 1/500 to about 1/20,000 molar equivalent per unit weight of said diene rubber, about 10 to about 50 parts by weight of a co-crosslinking agent, about 0.5 to about 5 parts by weight of a free radical releasing agent, and about 10 to about 80 parts by weight of a filler per 100 parts by weight of the base rubber component.

---

### 5,019,320
### GOLF BALL

**Yoshimi Hasegawa, Yokosuka; Shinichi Kakiuchi, Yokohama, and Seisuke Tomita, Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed Apr. 23, 1990, Ser. No. 513,479**

**Claims priority, application Japan, Apr. 24, 1989, 1-104103**

**Int. Cl.$^5$ A63B** *37/12*

**U.S. Cl. 273—235 R** **17 Claims**

1. A gold ball comprising a core enclosed in a cover, characterized in that said cover is formed of a composition comprising 100 parts by weight of an ionomer resin comprising an ionic copolymer of an olefin having 2 to 5 carbon atoms and a metal salt of an unsaturated monocarboxylic acid having 2 to 8 carbon atoms, and 0.1 to 6 parts by weight of a low-molecular weight polyethylene wax having an average molecular weight of about 1000 to about 10,000.

---

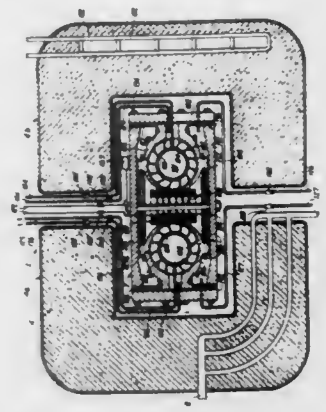
### 5,019,321
### MODULAR FUSION POWER APPARATUS USING DISPOSABLE CORE

**Robert W. Bussard, Arlington, Va., assignor to FDX Patents Holding Company, N.V., New York, N.Y.**

**Continuation of Ser. No. 333,046, Apr. 4, 1989, abandoned, which is a division of Ser. No. 113,362, Oct. 27, 1987, Pat. No. 4,859,399, which is a continuation of Ser. No. 738,906, May 29, 1985, abandoned, which is a continuation of Ser. No. 408,635, Aug. 16, 1982, abandoned, which is a division of Ser. No. 87,439, Oct. 22, 1979, Pat. No. 4,367,193, which is a continuation of Ser. No. 841,903, Oct. 13, 1977, abandoned. This application Aug. 16, 1990, Ser. No. 568,622**

**Int. Cl.$^5$ G21B** *1/00*

**U.S. Cl. 376—133** **14 Claims**



1. A fusion power generating means for generating thermal energy from fusion reactions in an ionized plasma of fusible fuel comprising:

(a) a fusion core unit including as components thereof,
  1) a vacuum plasma cavity for containing said fusible fuel,

VOL
1126
ISS
4
MY
28
1991
UMI

said cavity in the form of a toroid surrounding a central region;
2) a plurality of toroidal field coils surrounding said plasma cavity for generating a toroidal magnetic field therein; and
3) ohmic heating means for inducing an ohmic heating current in the ionized plasma within the plasma cavity of said fusion core unit for raising the temperature of said plasma, said ohmic heating means including a transformer means contained within said central region so that said toroidal plasma cavity surrounds said transformer means, and said ohmic heating current generating a poloidal magnetic field within said plasma, said components of said fusion core unit being so arranged and interconnected as to allow handling of said fusion core unit as a single entity;

(b) disconnectable means extending into said fusion core unit for delivering said fusible fuel therein;
(c) disconnectable means for transporting a cooling fluid to and through the toroidal field coils of said fusion core unit;
(d) a power supply connected through disconnectable means to said toroidal field coils for generating a toroidal magnetic field for confining the ionized plasma within the plasma cavity of said fusion core unit, said toroidal magnetic field having a strength of on the order of greater than 100 KG;
(e) said plurality of toroidal field coils comprising high-strength, non-superconducting conductors for sustaining said toroidal magnetic field and for withstanding said thermal energy;
(f) blanket means, positioned completely outside of and substantially surrounding said toroidal field coils, said blanket means comprising at least two modules;
(g) said toroidal field coils and said plasma cavity have no blanket means therebetween;
(h) means for connecting and disconnecting each of said disconnectable means, means for separating said at least two modules of said blanket means a distance sufficient to allow removal of the fusion core unit, means for removing and inserting a fusion core unit as a single entity between the separated modules of said blanket means;
(i) blanket cooling fluid transport means connected to said blanket means for transporting a cooling fluid to and through said blanket means; and
(j) means, connected to at least one of the blanket cooling fluid transport means and the toroidal field cooling fluid transport means, for extracting thermal energy therefrom.

---

5,019,322

### GAS COOLED NUCLEAR REACTOR WITH A PEBBLE BED OF SPHERICAL OPERATING ELEMENTS

**Cornelia von Charzewski, Maxdorf; Dietrich Leithner, Mannbeim; Hermann Schmitt, Winnweiler, and Josef Schoening, Hambruecken, all of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Dortmund, Fed. Rep. of Germany**

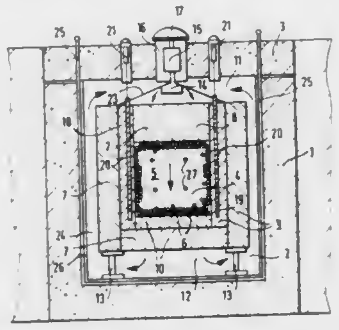
**Continuation of Ser. No. 14,390, Feb. 13, 1987, abandoned. This application Aug. 19, 1988, Ser. No. 233,980**

**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1986, 3604869**

**Int. Cl.⁵ G21C *1/00;* G21G *1/02, 4/02***

**U.S. Cl. 376—158** **5 Claims**

1. A gas cooled nuclear reactor having a pebble bed of operating elements and no absorber rods directly insertable into said bed of operating rods directly insertable into said bed of operating elements, said reactor comprising:
a graphite reflector comprised of top, bottom and side reflectors which define the core of said reflector;
trim and shutdown means comprising a plurality of absorber rods displaceably positioned in vertical channels of said side reflector;
a pile consisting essentially of spherical pebble operating elements which remain stationary in said core during operating of said reactor, said spherical operating elements include absorber neutron source material activatable in neutron flux;



wherein said first neutron source material is located within a spherical graphite neutron source element and said second neutron source material is located within a spherical graphite neutron source element.

---

5,019,323

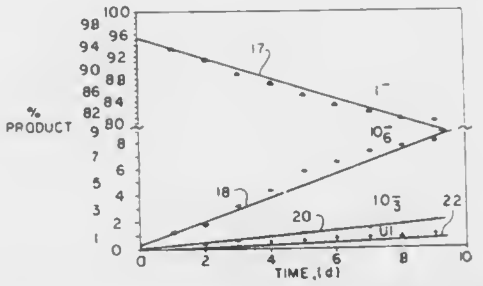
### METHOD OF PRODUCING IODINE-124 AND META-IODOBENZYLGUANIDINE CONTAINING IODINE-124

**Richard M. Lambrecht; Muhammad A. Qureshi, and Munawwar Sajjad, all of Riyadb, Saudi Arabia, assignors to King Faisal Specialist Hospital and Research Centre, Riyahd, Saudi Arabia**

**Continuation-in-part of Ser. No. 42,129, Apr. 24, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 318,492**

**Int. Cl.⁵ G21G *1/10***

U.S. Cl. 376—201 **15 Claims**



1. A method of producing Iodine-124, said method comprising:
placing a target means comprising copper in a nickel plating solution and electroplating said target means with nickel;
placing the resulting target means in an isotopically enriched Tellurium-124 dioxide plating solution and electroplating said target means with Tellurium-124;
placing the resulting target means in line with a deuteron beam of a cyclotron, thereby irradiating the Tellurium-124 and creating Iodine-124 by the $^{124}Te(d,2n)^{124}I$ reaction; and
separating the Iodine-124 from the target means.

5,019,324

### CENTERING ARRANGEMENT FOR ALIGNING THE MUTUALLY ADJACENT OPENINGS OF A LOCK AND A CONTAINER FOR HOLDING RADIOACTIVE MATERIALS

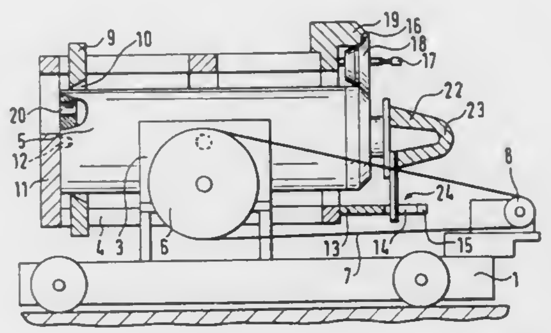
**Burkart Schulte, Minden; Norbert Hardt, Hanover, and Rainer Köbne, Zell/Main, all of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany**

**Filed Sep. 18, 1989, Ser. No. 408,266**

**Claims priority, application Fed. Rep. of Germany, Sep. 19, 1988, 3831774**

**Int. Cl.⁵ G21F *7/00;* G21C *19/32***

**U.S. Cl. 376—260** **8 Claims**



1. In a nuclear facility having a lock, a container, and a centering arrangement for aligning a lock opening in the lock with a loading opening in the base wall of the container for holding radioactive materials passed through the two openings when the container is docked at the lock, the centering arrangement comprising:
a guided vehicle movable in a horizontal direction;
a carrier pivotally mounted on said vehicle for pivotal movement between a vertical position and a horizontal position;
said lock having a fixed point thereon;
said carrier having a carrier longitudinal axis and disposed on said vehicle so as to cause said axis to be in alignment with said fixed point when said carrier is in said horizontal position;
said carrier having an upper region defining an opening through which the container is lowered when loaded into said carrier while said carrier is in said vertical position;
said carrier and said container conjointly defining first, second and third contact engaging interfaces as said container is lowered into said carrier;
first centering means at said first interface for adjusting the rotational position of the container about the longitudinal axis thereof to precenter the loading opening with respect to the lock opening;
second centering means at said second interface for positioning the container so as to cause the longitudinal axis thereof to be centered on said carrier longitudinal axis with a first degree of accuracy;
third centering means at said third interface for further positioning the container so as to cause the longitudinal axis thereof to be centered to said carrier longitudinal axis with a second degree of accuracy greater than said first degree of accuracy thereby providing a precise alignment of said loading opening with said lock opening when the container is docked at said lock; and,
holding means for securing said container in said carrier after the container is completely lowered and centered in said carrier.

---

5,019,325

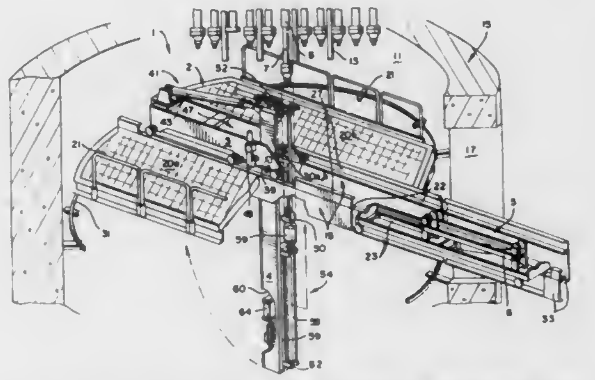
### METHOD FOR REMOVING AND INSTALLING A CONTROL ROD DRIVE

**Richard C. Larson, Lake Zurich; Keith R. Spencer, West Miltmore, both of Ill.; Don P. Alercia, Monroeville, Pa.; Horst Kwech, Lake Bluff, Ill.; Thomas J. Litka, Chicago, Ill., and Guy J. Ford, Apollo, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Division of Ser. No. 262,994, Oct. 26, 1988, Pat. No. 4,973,443. This application Apr. 20, 1990, Ser. No. 512,249**

**Int. Cl.⁵ G21C *19/20***

U.S. Cl. 376—260 **13 Claims**



1. A method for removing and installing an elongated control rod drive from a drive housing mounted in the vessel of a boiling water reactor of the type having an undervessel cavity with a pair of elongated service rails by means of a control rod drive installation and removal assembly including a carriage means and an elongated cradle means pivotally connected to said carriage means, wherein said carriage means includes a plurality of pair of carriage wheels that rollingly engage the service rails, and a remotely operable drive train coupled to at least one of the carriage wheels for remotely moving said carriage means along said service rails, and wherein said cradle means has a lifting and lowering means that includes both a leadscrew drive assembly and a hydraulic cylinder and piston means for moving a control rod drive between a position where its length subsumes the length of the cradle means, and a position where it is installed within said drive housing, comprising the steps of
detachably securing a control rod drive onto said cradle means of said assembly in a position such that the length of the control rod drive subsumes the length of the cradle means;
remotely moving said carriage means of said assembly along said service rails in said undervessel to a selected point along the longitudinal axis of said rails with said cradle means in a horizontal position;
pivoting said cradle means into a vertical position, and
lifting said control rod drive into an installed position within said drive housing by said lifting and lowering means.

---

5,019,326

### PELLET HANDLING AND EXTERNAL INSPECTION EQUIPMENT

**Yoshitaka Yaginuma; Motobide Tokiya, and Naoya Saito, all of Ibaraki, Japan, assignors to Mitsubishi Nuclear Fuel Co., Tokyo, Japan**

**Filed Nov. 16, 1989, Ser. No. 437,015**

**Claims priority, application Japan, Nov. 16, 1988, 63-289499; Nov. 9, 1989, 1-292027**

**Int. Cl.⁵ G21C *21/02***

**U.S. Cl. 376—261** **16 Claims**

10. A pellet handling equipment for conveying pellets, and detecting and ejecting flawed pellets, the pellet handling equipment comprising:

VOL
1126
ISS
4
MY
28
1991
UMI

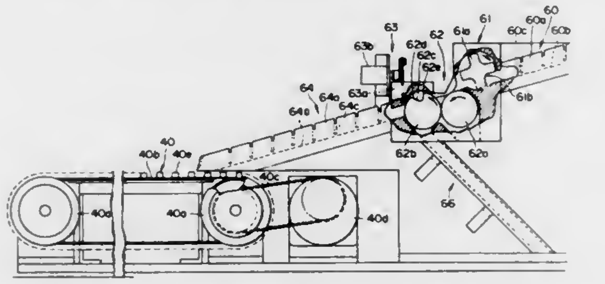
(a) a first roller means supported generally horizontal and rotatable about an axis thereof for a rotation in a predetermined direction;

(b) a second roller means disposed parallel and adjacent to the first roller means, supported rotatable about an axis thereof for a rotation in a same direction with the first roller means, the second roller means being provided with a slot formed in a circumferential surface thereof and extending in the axial direction, the slot being capable of receiving each one of the pellets;

(c) a pellet supplying means for intermittently supplying the pellets to the first and second roller means;

(d) a flaw detecting means capable of detecting flaws of each of the pellets by taking images of the pellets as the pellets are being supported and rotated by the first and the second roller means, and judging existence of flaws on the pellets;

(e) a sorting means disposed adjacent to the second roller means for receiving the pellets from the second roller means, the sorting means comprises a shutter for selectively proceeding the pellets according to the judgement of the flaw detecting means;



(f) a first pellet transfer unit provided adjacent to the sorting means for receiving the pellets on which flaw is not detected; and

(g) a second pellet discard unit provided adjacent to the second roller means underneath thereof for receiving the pellets on which flaws are detected,

whereby each of the intermittently supplied pellets is supported by the first and second roller means therebetween so that the axis of the pellet is parallel to the axes of the first and second roller means, rotated about an axis thereof as the first and second roller means rotate, examined regarding the existence of flaws, trapped in the slot of the second roller means, and selectively conveyed into one of the first transfer unit and second pellet discard unit according to the existence of flaws.

---

## 5,019,327

## FUEL ASSEMBLY TRANSFER BASKET FOR POOL TYPE NUCLEAR REACTOR VESSELS

**Alan W. Fanning, and Nicholas L. Ramsour, both of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.**

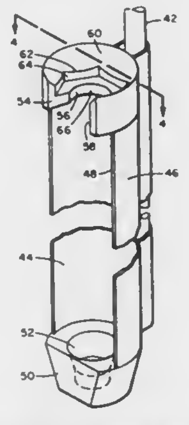
**Filed Jan. 25, 1990, Ser. No. 469,984**
**Int. Cl.⁵ G21C *19/10***

**U.S. Cl. 376—268** **10 Claims**

10. A nuclear reactor fuel assembly transfer basket with a side access loading and unloading port for fuel assembly transfer service within a pool type nuclear reactor vessel, comprising:

a generally vertically positioned hollow cylindrical body affixed to a manipulative depending support means movable in vertical directions and having an elongated side access port extending the length of the cylindrical body,

said generally vertically positioned cylindrical body having a lower end annular base member with a conical shaped central opening concentric with the central axis of the cylindrical body extending vertically therethrough and sloping inward in the downward direction, and an upper end semicircular cap member having a central opening concentric with the central axis of the cylindrical body extending vertically therethrough with an upper annular surface sloping downward and inward towards the central opening and an adjoining intermediate portion comprising a flat horizontal semi-circular plane area extending partially around the central opening and having a peripheral vertical edge extending upward from said plane are of a partial hexagonal cross-section and an adjoining lower semicircular portion.



---

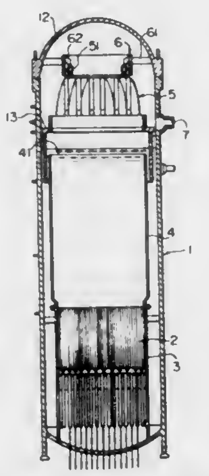
## 5,019,328

## NATURAL CIRCULATION TYPE BOILING LIGHT-WATER REACTOR

**Tsuyoshi Niino; Tadakazu Nakayama; Ryozo Tsuruoka; Minoru Miki; Nobukatsu Iwata, and Kazuhito Koyama, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Ibaraki, both of, Japan**

**Filed Mar. 29, 1989, Ser. No. 330,318**
**Claims priority, application Japan, Mar. 31, 1988, 63-79093**
**Int. Cl.⁵ G21C *19/42***

**U.S. Cl. 376—310** **9 Claims**



1. A natural circulation type boiling light-water reactor comprising:

a pressure vessel divided into a steam/water chamber and a steam chamber;

a reactor core disposed within said steam/water chamber to generate main steam which contains radioactive isotope $^{16}N$, said reactor core including a plurality of fuel elements;

a shroud disposed within said steam/water chamber encircling said reactor core;

a steam dryer assembly through which the main steam generated from said shroud passes into said steam chamber to reduce a wetness fraction of said main steam;

a chimney connected at one end thereof to said shroud and extending within said steam/water chamber toward said steam chamber, through which the main steam flows together with said radioactive isotope $^{16}N$, said chimney being filled with light water as coolant and having the other end thereof opened toward said steam dryer assembly;

a steam outlet through which the main steam generated is drawn out of said pressure vessel, said steam outlet being provided in a wall of said pressure vessel; and

steam passage means through which the main steam generated passes from said shroud to said steam outlet via said steam dryer assembly.

---

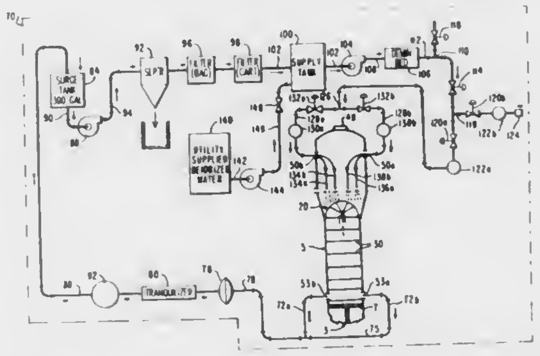
## 5,019,329

## SYSTEM AND METHOD FOR VERTICALLY FLUSHING A STEAM GENERATOR DURING A SHOCK WAVE CLEANING OPERATION

**Richard D. Franklin, Hemet, Calif.; Gregg D. Auld, Trafford, and David E. Murray, Connellsville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 26, 1989, Ser. No. 456,436**
**Int. Cl.⁵ G21C *19/42***

**U.S. Cl. 376—316** **29 Claims**



1. A method for loosening and removing sludge and debris from the interior of the vessel of a heat exchanger having a top portion and a bottom portion and that contains one or more heat exchanger components, comprising the steps of:

a. introducing a sufficient amount of liquid in said heat exchanger vessel to submerge at least a portion of the interior thereof that includes some of said sludge, debris and heat exchanger components;

b. generating a succession of shock waves within the liquid to loosen said sludge and debris, and

c. vertically flushing the interior of the vessel by suctioning off said liquid from the bottom portion of said vessel while simultaneously introducing liquid into the top portion of said vessel.

---

## 5,019,330

## METHOD OF FORMING IMPROVED TUNGSTEN INGOTS

**Bernard P. Bewlay, Schenectady, and James Day, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Aug. 3, 1990, Ser. No. 562,348**
**Int. Cl.⁵ B22F *1/00***

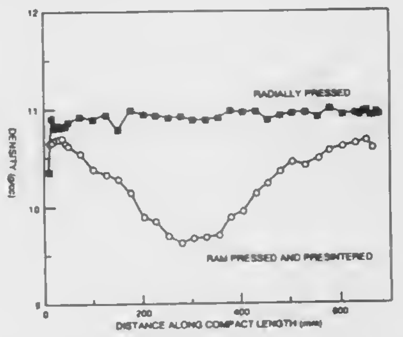
**U.S. Cl. 419—39** **9 Claims**

1. A method for forming a tungsten ingot suitable for reduction to filamentary wire used in incandescent lamps, comprising;

disposing a doped tungsten powder in an elongate cylindrical elastic mold having an internal void space between sealing means at both ends of the mold, the powder completely filling the void space between the sealing means to have a fill density that minimizes settling of the powder;

consolidating the powder into a cylindrical compact by applying a pressure uniformly to the outer surface of the mold of at least about 560 kg/cm²;

decompressing the mold with a controlled reduction in pressure up to about 70 kg/cm²/second; and



sintering the compact to a density of at least about 85 percent of theoretical density to form the ingot.

---

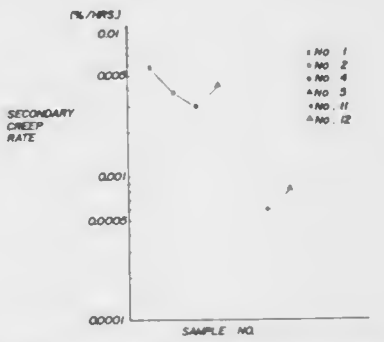
## 5,019,331

## HEAT-RESISTANT ALLOY

**Teruo Yoshimoto, Suita, and Makoto Takahashi, Hirakata, both of Japan, assignors to Kubota Corporation, Osaka, Japan**

**Filed Apr. 3, 1990, Ser. No. 503,575**
**Claims priority, application Japan, Apr. 5, 1989, 1-86562**
**Int. Cl.⁵ C22C *38/48, 19/05***

**U.S. Cl. 420—51** **2 Claims**



1. A heat-resistant alloy having high creep deformation resistance and high ductility after aging and consisting essentially of, in % by weight, 0.3–0.8% of C, 0.5–3% of Si, over 0% to not greater than 2% of Mn, at least 23% to less than 30% of Cr, 40–55% of Ni, 0.2–1.8% of Nb, over 0.08% to not greater than 0.2% of N, 0.01–0.5% of Ti and/or 0.01–0.5% of Zr, and the balance Fe and inevitable impurities.

---

## 5,019,332

## HEAT, CORROSION, AND WEAR RESISTANT STEEL ALLOY

**Dwight D. Wegman, Oley; Edward A. Wanner, Leesport; Wilson P. Rehrer, Reading, and Sunil Widge, Dryville, all of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.**

**Continuation of Ser. No. 168,924, Mar. 16, 1988, Pat. No. 4,929,419. This application Apr. 27, 1990, Ser. No. 515,107**
**The portion of the term of this patent subsequent to May 29, 2007, has been disclaimed.**
**Int. Cl.⁵ C22C *38/46***

**U.S. Cl. 420—59** **20 Claims**

1. A precipitation strengthenable, austenitic steel alloy that provides a good combination of high temperature strength, corrosion resistance, and wear resistance, said alloy, in weight percent, consisting essentially of about

VOL
1126
ISS
4
MY
28
1991
UMI

| | w/o |
|---|---|
| Carbon | 1.50 max. |
| Manganese | 3.0–10.0 |
| Silicon | 2.0 max. |
| Phosphorous | 0.10 max. |
| Sulfur | 0.05 max. |
| Chromium | 18–28 |
| Nickel | 4.5–10.0 |
| Molybdenum | 0.5 max. |
| Vanadium | 0.75–4.0 |
| Boron | Up to 0.03 |
| Nitrogen | 1.0 max. |
| Tungsten | 0.5 max. |
| Niobium | 0.5 max. |

and the balance essentially Iron, wherein

$$\%C+\%N \geqq 0.65+0.15(\%V)+0.04[(\%Mo)+0.5(\%W)],$$

and

$$\%C+\%N \leqq 0.65+0.38(V)+0.08[(\%Mo)+0.5(\%W)].$$

---

### 5,019,333

### ZIRCONIUM ALLOY FOR USE IN SPACER GRIDS FOR NUCLEAR REACTOR FUEL CLADDINGS

**Takeshi Isobe; Yutaka Matsuo, both of Omiya, and Yasuo Ichihara, Naka, all of Japan, assignors to Mitsubishi Metal Corporation and Mitsubishi Nuclear Fuel Co., Ltd., both of Tokyo, Japan**

**Filed Oct. 10, 1989, Ser. No. 419,139**

**Claims priority, application Japan, Oct. 26, 1988, 63-270112**

**Int. Cl.$^5$ C22C** *16/00*

**U.S. Cl. 420—422** **20 Claims**

1. A zirconium alloy for use in spacer grids for nuclear reactor fuel claddings, consisting essentially of, on a weight percent basis,

2.5 to 10% Nb,

0.01 to 1.5% of one or more components selected from the group consisting of oxides of Y and oxides of rare earth elements, and

the remainder being Zr and incidental impurities.

---

### 5,019,334

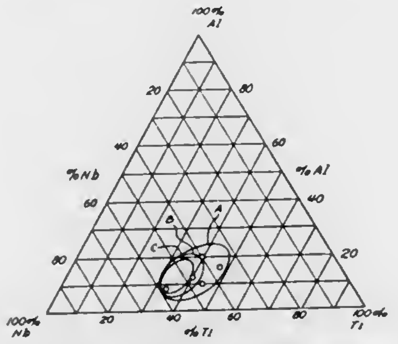
### LOW DENSITY HIGH STRENGTH ALLOYS OF NB-TI-AL FOR USE AT HIGH TEMPERATURES

**Melvin R. Jackson, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 202,357, Jun. 6, 1988, abandoned. This application Jul. 25, 1989, Ser. No. 385,029**

**Int. Cl.$^5$ C22C** *29/00*

**U.S. Cl. 420—426** **6 Claims**



1. As a composition of matter, an alloy consisting essentially of niobium, titanium, and aluminum in the approximate concentration in atom percent as follows: titanium 31 to 48, aluminum 8 to 21, the balance being essentially niobium.

---

### 5,019,335

### GOLD COLORED METAL ALLOY

**Daniel Davitz, 921 Harlem, Glenview, Ill. 60025**

**Filed Jul. 10, 1989, Ser. No. 377,575**

**Int. Cl.$^5$ C22C** *9/00, 9/04, 9/06*

**U.S. Cl. 420—481** **10 Claims**

2. A gold color, highly tarnish resistant metyal alloy which consists essentially of by weight 75 to 82% copper, 5 to 15% nickel, 1 to 12% indium, and 0 to 12% zinc.

---

### 5,019,336

### MICRO-ADDITIONS TO TIN ALLOYS

**Howard H. Liebermann, Succasunna, and Tedd P. Hardman, Landing, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Continuation of Ser. No. 323,119, Mar. 13, 1989, abandoned, which is a continuation of Ser. No. 119,205, Nov. 5, 1987, abandoned, which is a continuation of Ser. No. 914,433, Oct. 2, 1986, abandoned. This application Jan. 11, 1990, Ser. No. 464,608**

**Int. Cl.$^5$ C22C** *13/00*

**U.S. Cl. 420—557** **3 Claims**

1. A tin-based alloy consisting essentially of silver, antimony, tin, and at least one element selected from the group consisting of zinc, phosphorus, aluminum, magnesium, gallium and calcium, the total concentration in the alloy of elements of said group being between about 3 and about 100 parts per million, by weight, and sufficient to inhibit substantially oxidation of tin during melting of the alloy.

---

### 5,019,337

### DUCTILE INTERMETALLIC COMPOUNDS FOR DENTAL APPLICATIONS

**Richard M. Waterstrat, Gaithersburg, Md., assignor to American Dental Association Health Foundation, Gaithersburg, Md.**

**Filed Feb. 16, 1990, Ser. No. 480,727**

**Int. Cl.$^5$ C22C** *16/00, 5/04, 30/00*

**U.S. Cl. 420—580** **17 Claims**

2. An alloy composition having a cubic CsCl or B2 type structure which can undergo stress-induced martensitic transformations at or near mouth or body temperature and consisting essentially of about 35 to about 60% by weight of a first element selected from Group IVB of the periodic table, about 1 to about 60% by weight of a second element selected from the group consisting of the elements from Group VIII excluding nickel, Group IIIA and Group IVA of the periodic table, and about 1 to about 60% by weight of a third element selected from Group VIII excluding nickel of the periodic table.

---

### 5,019,338

### ALLOY FOR BUILDING JP VALVE

**Shinji Oishi; Masahiro Nakagawa; Mototsugu Koyama, all of Toyota; Kanichi Tanaka, Yawata; Syozo Nagai, and Kensuke Hidaka, both of Kyoto, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan and Fukuda Metal Foil and Powder Co., Ltd., Japan**

**Continuation-in-part of Ser. No. 385,075, Jul. 26, 1989, Pat. No. 4,948,559. This application Oct. 26, 1989, Ser. No. 428,293**

**Claims priority, application Japan, Jul. 30, 1988, 63-191888; Jul. 12, 1989, 1-179422**

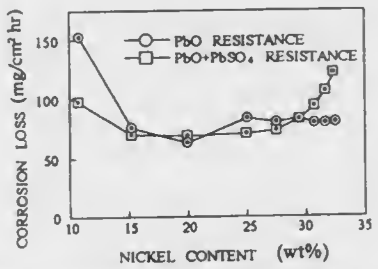
**The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.**

**Int. Cl.$^5$ C22C** *30/00*

**U.S. Cl. 420—586.1** **11 Claims**

1. An alloy for building up a valve consisting essentially of, with respect to the total weight of said alloy taken as 100%, 30 to 40% by weight of chromium; 15 to 31% by weight of nickel;

7 to 20% by weight of molybdenum; 0.7 to 2.2% by weight of carbon; 1.5% or less by weight of silicon; and balance of iron



and inevitable impurities, and said alloy being in a form of powder having a size in the range of 80 to 350 mesh.

---

### 5,019,339

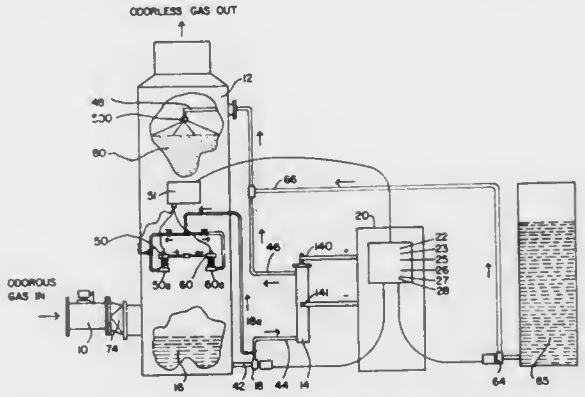
### CONTROL SYSTEM FOR ODOR ELIMINATING APPARATUS

**Lawrence V. Keeney, Boulder City; William B. Misch, and James H. Parrott, both of Las Vegas, all of Nev., assignors to Pacific Engineering and Production Co. of Nevada, Henderson, Nev.**

**Filed Feb. 26, 1988, Ser. No. 160,701**

**Int. Cl.$^5$ G05B** *1/00*

**U.S. Cl. 422—3** **32 Claims**



1. A system for controlling unwanted odor comprising:

means, which manufacture a chemical that will react with said unwanted odor to neutralize the same, for at least partially neutralizing said unwanted odor with said chemical, said means for manufacturing said first-named chemical having such limited capacity that it will not fully neutralize said odor during peak odor conditions,

another means for providing a chemical which will react with said unwanted odor to neutralize the same, and

control means responsive to the amount of unwanted odor for controlling the production, up to a given limit, of said manufactured chemical at a rate related to the amount of said unwanted odor to be neutralized; said control means controlling said another means to provide a chemical under peak odor conditions to thereby further neutralize the odors.

---

### 5,019,340

### ALCOHOL-BASED ALUMINUM CORROSION INHIBITOR COMPOSITIONS COMPRISING POLYSILYL COMPOUNDS

**Paul H. Mohr, Chappaqua, and Enrico J. Pepe, Amawalk, both of N.Y., assignors to First Brands Corporation, Danbury, Conn.**

**Division of Ser. No. 229,698, Aug. 5, 1988, Pat. No. 4,965,334. This application Apr. 23, 1990, Ser. No. 513,540**

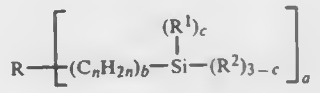
**Int. Cl.$^5$ C23F** *11/00;* **C09K** *5/00*

**U.S. Cl. 422—7** **48 Claims**

1. A process for protecting an aluminum surface in the cooling system of an internal combustion engine in contact with a composition inhibited against high temperature aluminum cavitation erosion corrosion comprising contacting said aluminum surface with a composition comprising:

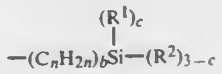
(a) an alcohol, and

(b) an effective amount to protect aluminum surfaces from high temperature cavitation erosion corrosion of a polysilyl compound of the formula:



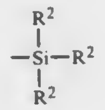
$$R\left[(C_nH_{2n})_b-\overset{(R^1)_c}{\overset{|}{Si}}-(R^2)_{3-c}\right]_a$$

wherein R is a substituted or unsubstituted organic radical; $R^1$ is selected from the group consisting of hydrogen, monovalent hydrocarbon radicals and substituted monovalent hydrocarbon radicals; $R^2$ is a monovalent moiety hydrolyzable to a hydroxyl group, each $R^2$ being the same or different; a is an integer from 2 to 4, inclusive; b is an integer having a value of 0 or 1; n is an integer from 1 to 36, inclusive; and c is an integer having a value of 0 or 1; each



$$-(C_nH_{2n})_b\overset{(R^1)_c}{\overset{|}{Si}}-(R^2)_{3-c}$$

group being the same or different, with the proviso that the compound have at least one



$$-\underset{R^2}{\underset{|}{\overset{R^2}{\overset{|}{Si}}}}-R^2$$

group.

---

### 5,019,341

### METHOD OF INHIBITING CORROSION OF METAL SURFACES IN CONTACT WITH A CORROSIVE HYDROCARBON CONTAINING MEDIUM

**Joseph H. Y. Niu, Houston; James G. Edmondson, Conroe, and Scott E. Lehrer, Houston, all of Tex., assignors to Betz Laboratories, Inc., Trevose, Pa.**

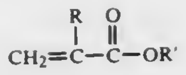
**Filed Aug. 11, 1986, Ser. No. 895,542**

**Int. Cl.$^5$ C23F** *11/14*

**U.S. Cl. 422—7** **11 Claims**

1. A method of inhibiting corrosion of metal surfaces in contact with a corrosive hydrocarbon-containing medium comprising contacting said metal surfaces with a hydrocarbon soluble polymerization reaction product of a) a component consisting essentially of tallowtriamine or tallowtetramine or mixtures thereof and b) an acrylic acid type compound having the structure,

VOL 1126 ISS 4 MY 28 1991 UMI



$$CH_2{=}\overset{R}{\overset{|}{C}}{-}\overset{O}{\overset{\|}{C}}{-}OR'$$

wherein R is hydrogen or methyl, and R′ is methyl, ethyl, propyl, isopropyl, butyl, amyl, or hexyl.

---

### 5,019,342

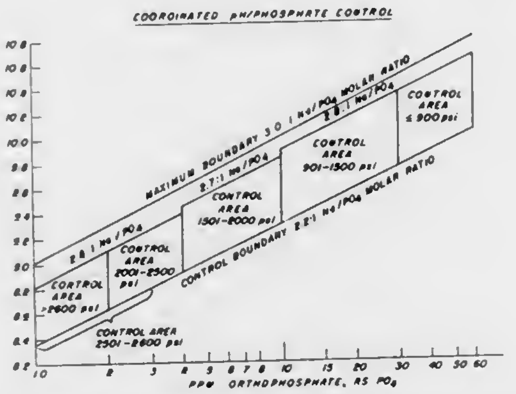
### METHOD FOR MITIGATION OF CAUSTIC CORROSION IN COORDINATED PHOSPHATE/PH TREATMENT PROGRAMS FOR BOILERS

**John A. Muccitelli, Feasterville, and Nancy A. Feldman, Trevose, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Oct. 25, 1989, Ser. No. 427,287**

**Int. Cl.$^5$ C23F *11/06***

**U.S. Cl. 422—16** **8 Claims**



1. A method for controlling caustic corrosion in a boiler water system treated with a coordinated phosphate/pH program comprising adding diethanolamine to said boiler water system treated with a coordinated phosphate/pH program.

---

### 5,019,343

### CONTROL OF CORROSION IN AQUEOUS SYSTEMS USING CERTAIN PHOSPHONOMETHYL AMINES

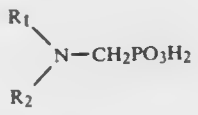
**Chih M. Hwa, Palatine; John A. Kelly, Crystal Lake, both of Ill.; Janet Neton, West Chester, Ohio; Patricia M. Scanlon, Arlington, Mass., and Roger R. Gaudette, Hudson, N.H., assignors to W. R. Grace & Co.-Conn., New York, N.Y.**

**Filed Dec. 15, 1989, Ser. No. 452,153**

**Int. Cl.$^5$ C23F *11/08***

**U.S. Cl. 422—16** **9 Claims**

1. A process for inhibiting corrosion of an iron based metal in contact wit the system water in an aqueous system consisting essentially of the step of incorporating into the system water an effective amount of a water soluble phosphonomethyl amine having the formula:



$$(R_1)(R_2)N{-}CH_2PO_3H_2$$

wherein either $R_1$ is selected from hydrogen, hydrocarbyl, and hydroxy-substituted, alkoxy-substituted, carboxyl-substituted, and sulfonyl-substituted hydrocarbyl; and $R_2$ is selected from hydrocarbyl, hydroxy-substituted, alkoxy-substituted, carboxyl-substituted, sulfonyl-substituted hydrocarbyl,

$—CH_2PO_3H_2$, and $—C_2H_4N(CH_2PO_3H_2)_2$; or

$R_1$ and $R_2$ together form an alicyclic ring having 3 to 5 carbon atoms in the ring; and having a cloud point of at least about 25 ppm as determined by the CA500 cloud point test or a water soluble salt of said phosphonomethyl amine.

---

### 5,019,344

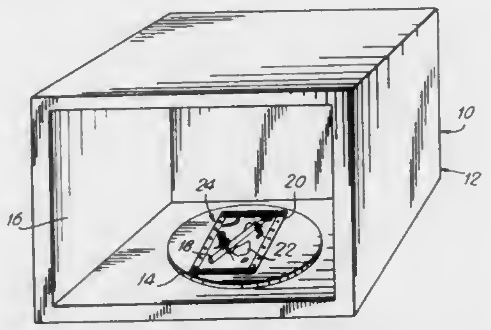
### METHOD FOR STERILIZING ARTICLES SUCH AS DENTAL HANDPIECES

**Barry S. Kutner, Wilton, and Daniel A. Latowicki, Newtown, both of Conn., assignors to Flexiclave, Inc., Del.**

**Filed Apr. 21, 1988, Ser. No. 184,246**

**Int. Cl.$^5$ A61L *2/12***

**U.S. Cl. 422—21** **8 Claims**



1. A method for sterilizing at least one article by vapor under pressure comprising the steps of:

introducing at least one article to be sterilized and a quantity of liquid into a collapsible pouch formed of material at least partially transparent to radiation through a sealable opening therein, said quantity of liquid being sufficient so that when said pouch opening is sealed to form a gas-tight assembly and said liquid is vaporized, an overpressure is created within said pouch which will expand said pouch to a visually-apparent distended condition;

sealing said pouch opening to form a gas-tight assembly; and

irradiating said gas-tight assembly with said radiation while shielding said at least one article from said radiation to vaporize said liquid so that said collapsible pouch expands to a visually-apparent distended condition to produce an atmosphere of hot vapor under pressure in said gas-tight assembly, while shielding said at least one article from said radiation,

whereby said at least one article situated within said gas-tight assembly is sterilized under the effect of vapor under pressure.

---

### 5,019,345

### METHOD FOR STERILIZING CONTAINERS

**Jürgen W. Lorenz, Munich, Fed. Rep. of Germany, assignor to Wagner GmbH, Fed. Rep. of Germany**

**PCT No. PCT/EP87/00266, § 371 Date Jan. 22, 1988, § 102(e) Date Jan. 22, 1988, PCT Pub. No. WO87/07151, PCT Pub. Date Dec. 3, 1987**

**PCT Filed May 21, 1987, Ser. No. 154,345**

**Claims priority, application Fed. Rep. of Germany, May 22, 1986, 3617153**

**Int. Cl.$^5$ A61L *2/00***

**U.S. Cl. 422—26** **6 Claims**

1. The method of sterilizing material within an autoclave, comprising the steps of:

locating the material within a container, the container including a vacuum valve and an admission valve;

locating the container within the autoclave;

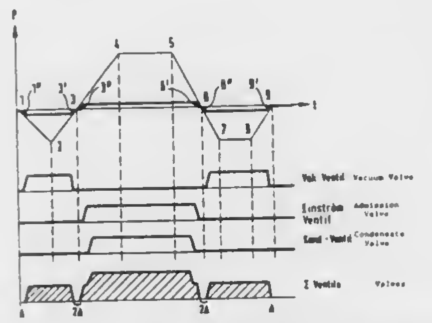
thereafter reducing the pressure within the autoclave from a starting pressure to a first negative peak pressure and thereafter increasing the pressure within the autoclave from the first negative peak pressure to the starting pressure;

opening the vacuum valve while reducing the pressure within the autoclave from said starting pressure to said first negative peak pressure, keeping the vacuum valve open while the pressure within the autoclave is at the first negative peak pressure and closing the vacuum valve while increasing the pressure within the autoclave from said first negative peak pressure to said starting pressure;

thereafter increasing the pressure within the autoclave from the starting pressure to a positive peak pressure and thereafter reducing the pressure within the autoclave from the positive peak pressure to the starting pressure;

opening the admission valve while increasing the pressure within the autoclave from the starting pressure to the positive peak pressure, keeping the admission valve open while the pressure within the autoclave is at the positive peak pressure and closing the admission valve while reducing the pressure within the autoclave from the positive peak pressure to the starting pressure;

thereafter reducing the pressure within the autoclave from the starting pressure to a second negative peak pressure and thereafter increasing the pressure within the autoclave from the second negative peak pressure to an end pressure; and



opening the vacuum valve while reducing the pressure within the autoclave from the starting pressure to the second negative peak pressure, keeping the vacuum valve open while the pressure within the autoclave is at the second negative peak pressure and closing the vacuum while increasing the pressure from the second negative peak pressure to the end pressure.

wherein the vacuum valve includes a sealed chamber which expands and contracts according to the pressure within the autoclave, wherein reducing the pressure within the autoclave from the starting pressure to either the first or second negative peak pressure causes the chamber to expand and thereby open the vacuum valve, wherein maintaining the pressure within the autoclave at either the first or second negative peak pressure keeps the chamber expanded and thereby keeps the vacuum valve open and wherein increasing the pressure within the autoclave either from the first negative peak pressure to the starting pressure or from the second negative peak pressure to the end pressure causes the chamber to contract and thereby close the vacuum valve.

---

### 5,019,346

### DRAIN TREATMENT PRODUCT AND METHOD OF USE

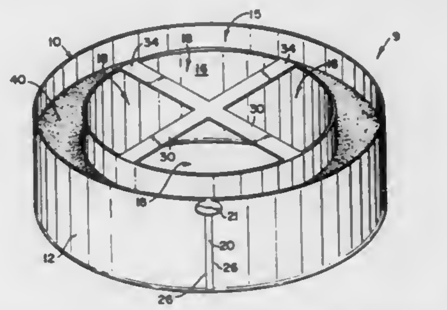
**Francis L. Richter, Circle Pines; James Wilson, Maplewood, and Daniel E. Pedersen, Cottage Grove, all of Minn., assignors to Ecolab Inc., St. Paul, Minn.**

**Filed Sep. 21, 1988, Ser. No. 247,279**

**Int. Cl.$^5$ A01N *0/00;* E03D *9/02;* B65D *85/02;* B08B *9/00***

**U.S. Cl. 422—28** **38 Claims**

1. A drain sanitizing article for dispensing a chemical sanitizing agent, capable of sanitizing running and standing drainage, said drain sanitizing article comprising a housing, a said housing having an inner wall, defining an opening in said housing for the passage of drainage over the article into the drain, an outer wall, and a bottom wall, said bottom wall cooperatively connecting said inner and outer walls and forming an inner cavity in said housing, and a hardened aqueous soluble chemical sanitizing agent, said chemical sanitizing agent contained within the inner cavity of said housing.



---

### 5,019,347

### INTEGRAL MULTILAYER ANALYTICAL ELEMENT

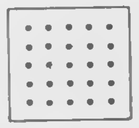
**Nobuo Hiratsuka, and Asaji Kondo, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 227,451, Aug. 2, 1988, abandoned, which is a continuation of Ser. No. 922,760, Oct. 24, 1986, abandoned, which is a continuation of Ser. No. 745,916, Jun. 18, 1985, abandoned. This application Feb. 20, 1990, Ser. No. 481,800**

**Claims priority, application Japan, Jun. 19, 1984, 59-126267**

**Int. Cl.$^5$ G01N *31/22***

**U.S. Cl. 422—56** **7 Claims**



1. An integral multilayer analytical element for quantitative analysis having a first microporous sheet and at least one other microporous sheet on a transparent support, said first microporous sheet and other microporous sheet being arranged adjacent to each other to form an interface, wherein said first microporous sheet and other microporous sheet are combined by an adhesive provided in the form of dots, stripes, or a check pattern at the interface so as to allow uniform passage of a liquid through said interface.

---

### 5,019,348

### AUTOMATED CHEMICAL CONVERSION UNIT IN A PEPTIDE/PROTEIN SEQUENATOR

**Jack I. Ohms; Majid Qadeer, both of Palo Alto, and Harry A. Penhasi, Cupertino, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Continuation of Ser. No. 203,577, May 26, 1988, abandoned, which is a continuation of Ser. No. 782,619, Oct. 1, 1985, abandoned, which is a continuation of Ser. No. 500,670, Jun. 3, 1983, abandoned. This application Jan. 26, 1989, Ser. No. 303,004**

**Int. Cl.$^5$ G01N *35/06***

**U.S. Cl. 422—63** **9 Claims**

1. An apparatus for conducting chemical reactions using reagents and solvents to react with a sample, said apparatus comprising:

a reaction vessel for containing a sample;

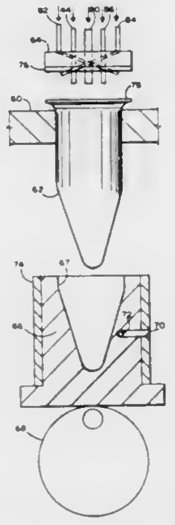
means for transferring reagents and solvents to said reaction vessel;

a fraction collector comprising a delivery head and a plurality of containers, each container being removable from

VOL 1126 ISS 4 MY 28 1991 UMI

said apparatus to provide a storage vessel for a product of a reaction;

means for sequentially positioning each said container in a sealed relationship with said delivery head in said fraction collector and for removing each said container from sealed relationship with the delivery head when it is positioned in sealed relationship with the delivery head;



means for transferring a reaction product from said reaction vessel to said delivery head and thence to each said container when it is positioned in sealed relationship with the delivery head; and

means for conducting a reaction in each said container when it is positioned in sealed relationship with the delivery head.

---

### 5,019,349
### PIPE FOR MEASURING ERYTHROCYTE SEDIMENTATION RATE

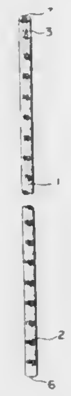
**Issei Suzuki, 3311-17, Fukami, Yamato-shi, Kanagawa-ken, Japan**

**Continuation of Ser. No. 428,031, Oct. 27, 1989, abandoned, which is a continuation of Ser. No. 925,898, Nov. 3, 1986, abandoned. This application Aug. 1, 1990, Ser. No. 562,449**

**Claims priority, application Japan, Nov. 8, 1985, 60-171843[U]**

**Int. Cl.$^5$ B01L** *3/02;* **G01N** *33/49*

**U.S. Cl. 422—73** **2 Claims**



1. In combination, a graduated, transparent, hollow pipe for measuring erythrocyte sedimentation rates and including a zero level graduation mark, and a spherical plug body of an air-permeable but water-absorbing swellable synthetic resin comprised throughout of interconnected randomly distributed particles and positioned within said hollow pipe such that the lower surface of said plug body is at the same level within the pipe as the zero level graduation mark of the pipe whereby the plug, upon swelling, provides sealing off of the tube to prevent blood from passing beyond the zero level graduation mark.

---

### 5,019,350
### FLUORESCENT POLYMERS

**David Rhum, Old Lyme, and Richard S. Matthews, North Stonington, both of Conn., assignors to Pfizer Hospital Products, Inc., New York, N.Y.**

**Filed Feb. 13, 1986, Ser. No. 829,350**

**Int. Cl.$^5$ G01N** *21/64*

**U.S. Cl. 422—82.07** **20 Claims**

1. A sensor for the determination of the concentration of a dissolved substance in an aqueous medium comprising an optical fiber having a distal end to which is stably bonded an adherent, water-insoluble, stable, rapid response fluorescent polymeric indicator comprising an organic polymeric portion to which is covalently bonded, through ester or amide linkages, a plurality of fluorescent organic substituents, which may be the same or different, said polymeric portion being derived from an organic polymer having functionality consisting of hydroxyl or amine groups depending from the polymer chain and said fluorescent organic substituents being derived from fluorescent indicator molecules having, in addition to the desired fluorescent and indicating properties, linking functionality suitable for forming ester or amide linkages with said polymer functionality, said linking functionality being located sufficiently remote from the fluorescent portion of the indicator molecules so that it does not adversely affect the fluorescent indicating capability of the indicator molecule when the said amide or ester linkages are formed.

---

### 5,019,351
### AGGLUTINATION REACTION SLIDE

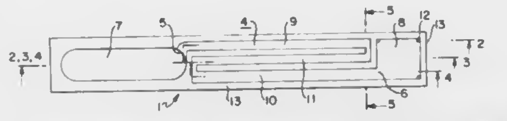
**Peter Schulz, Pfreimd, Fed. Rep. of Germany, assignor to Hoffman-La Roche Inc., Nutley, N.J.**

**Continuation of Ser. No. 343,108, Apr. 25, 1989, abandoned. This application Oct. 9, 1990, Ser. No. 593,594**

**Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814585**

**Int. Cl.$^5$ G01N** *21/03*

**U.S. Cl. 422—99** **17 Claims**



1. A test element for an agglutination test of a sample-reagent mixture, comprising at least one pair of plate members defining therebetween a reaction capillary having a predetermined thickness for the sample-reagent mixture to flow through the capillary, the reaction capillary having an input end and an output end, the input end of the reaction capillary being fluidically connected to a zone for receiving and mixing the sample with the reagent, wherein:

the reaction capillary has a substantially rectangular cross-sectional configuration in a direction perpendicular to the flow of the sample-reagent mixture,

the reaction capillary further has an upstream region with a thickness at the input end of between about 50 and about 100 μm and a downstream region with a thickness at the output end of between about 200 and about 300 μm, the thickness of the reaction capillary increasing from the upstream region toward the downstream region, and

the increase in the reaction capillary thickness is substantially continuous and linear over the length of each region.

---

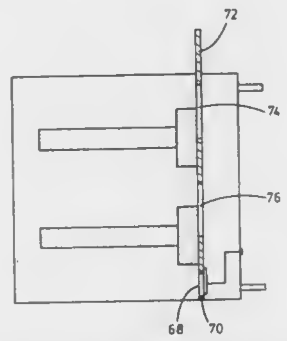
### 5,019,352
### SCENTED AIR FILTER FOR USE WITH A FORCED AIR CENTRAL HEATING AND COOLING SYSTEM

**Jose Gonzalez, 1913 Lantana Ct., Virginia Beach, Va. 23456**

**Filed Aug. 21, 1990, Ser. No. 570,440**

**Int. Cl.$^5$ A62B** *7/08*

**U.S. Cl. 422—123** **6 Claims**



1. An air filter for use in conjunction with a forced air central heating and cooling system, which comprises:

(A) a frame element which is sized to be removably mounted between an intake duct and a heating and cooling unit of a forced air central heating and cooling system;

(B) a porous filter media mounted on said frame element to be fluidically interposed between the intake duct and the heating and cooling unit; and

(C) a mass transfer system mounted on said frame element and including

  (1) a fluid reservior extending along one side of said frame element and having a fluid inlet and a fluid drain and containing liquid mass therein,

  (2) wick elements connected to said fluid reservoir and extending across said frame element and being in mass transferring contact with said filter media, said wick elements each including a base portion and an elongated body portion which has a mass transfer coefficient that causes mass from said reservoir to be transferred to air flowing through said filter media, and

  (3) a plate movably mounted on said frame element to be interposed between said wick base portions and said reservoir, said plate including wick media and blocking media that is impermeable to the liquid contained in said reservoir, and being movable from a position placing said plate wick media in position to fluidically connect said wick element base portions to said reservoir to a position placing said blocking media between said wick element base portions and said fluid reservoir.

---

### 5,019,353
### REACTOR SYSTEM FOR CONVERSION OF ALKANES TO ALKENES IN AN EXTERNAL FCC CATALYST COOLER

**Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Continuation-in-part of Ser. No. 144,990, Jan. 19, 1988, Pat. No. 4,840,928. This application Mar. 17, 1989, Ser. No. 324,783**

**Int. Cl.$^5$ F27B** *15/00, 15/16;* **B01J** *8/18*

**U.S. Cl. 422—144** **7 Claims**

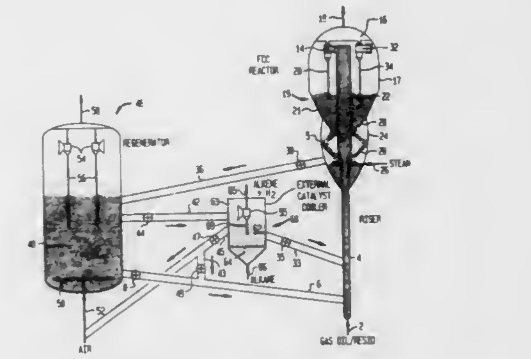
6. A fluid catalystic cracking reactor system comprising:

pressurized regenerator vessel means for regenerating a coke-contaminated fluid cracking catalyst in a regeneration zone including means for maintaining oxidation regeneration temperature and means for injecting said regenerator zone with sufficient oxygen-containing regeneration gas to maintain a dense fluid bed of regenerator catalyst so as to regenerate the catalyst before returning it to a fluid catalytic cracker reactor vessel;

first valved conduit means including control means for withdrawing a controlled stream of said regenerated catalyst from said regenerator vessel directly into a dehydrogenation zone;

dehydrogenation reactor means in which said dehydrogenation zone is defined and maintained at a temperature below that in said regeneration zone, said dehydrogenation reactor means being located externally relative to said cracker reactor vessel and regenerator vessel means;

fluid handling means for introducing a lower alkane feedstream consisting essentially of a major proportion of propane into said dehydrogenation reactor means in an amount sufficient to maintain hot withdrawn catalyst in a



state of fluidization in said dehydrogenation reactor means while said catalyst is being cooled;

second valved conduit means for transporting cooled catalyst from said dehydrogenation zone and selectively controlling flow of said catalyst to said regeneration vessel and to said fluid cracker reactor vessel; and

third conduit means for withdrawing olefins generated in said dehydrogenation reactor vessel outside of said system, in an effluent stream separate from effluent from said fluid cracker reactor vessel to allow recovery and subsequent utilization of said olefins.

---

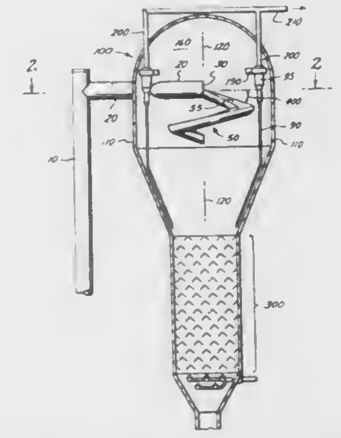
### 5,019,354
### FLUID CATALYTIC CRACKING CATALYST-VAPOR SEPARATOR

**Henry C. Chan, Bellaire, Tex., assignor to Texaco Inc., White Plains, N.Y.**

**Filed Jul. 12, 1990, Ser. No. 551,366**

**Int. Cl.$^5$ F27B** *15/10, 15/12, 15/02*

**U.S. Cl. 422—145** **5 Claims**



1. A fluidized catalytic cracking apparatus comprising a reactor vessel, a riser reactor outisde said vessel and a separator inside said vessel for rapidly disengaging and separating catalyst from cracked vapor product,

said riser reactor having a transitional portion traversing a

VOL
1126
ISS
4
MY
28
1991
UMI

wall of said reactor vessel and a horizontal discharge outlet in fluid communication with said separator,

said separator comprising a downwardly spiraling open top channel of U-shape cross section.

---

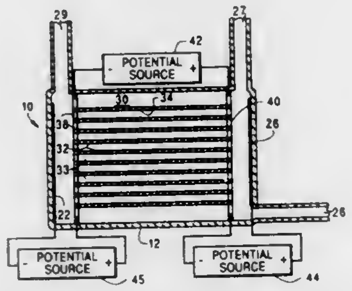
### 5,019,355
## ELECTRICAL DEVICE FOR CONVERSION OF MOLECULAR WEIGHTS

**William M. Sackinger, Fairbanks, Ak., assignor to University of Alaska, Fairbanks, Ak.**

**Continuation of Ser. No. 102,361, Sep. 28, 1987, abandoned. This application Feb. 22, 1990, Ser. No. 485,856**

**Int. Cl.$^5$ B10J** *19/08*

**U.S. Cl. 422—186.04** **40 Claims**



1. An apparatus for converting molecules having a first molecular weight into molecules having a second molecular weight, comprising:

a reaction chamber means having chamber walls, inlet gas means, first outlet gas means, and second outlet gas means;

a plurality of tubular means, each having a longitudinal axis, joined together in an array so that the longitudinal axes of said tubular means are disposed substantially parallel with each other, said array being mounted in said reaction chamber means and each of said plurality of tubular means having an interior surface exposed to said molecules having the first molecular weight, said surface having a semiconducting layer;

a first external potential source electrically connected to said array of tubular means so that an electrical current flows through said semiconducting layers, and so that at least a portion of electrons of said current is available at said interior surfaces of said tubular means for providing charges for converting said molecules having the first molecular weight into said molecules having the second molecular weight.

---

### 5,019,356
## STEAM REFORMER WITH INTERNAL HEAT RECOVERY

**Ludwig Silberring, Winzerhalde 30, CH-8049 Zurich, Switzerland**

**PCT No. PCT/EP87/00240, § 371 Date Jan. 22, 1988, § 102(e) Date Jan. 22, 1988, PCT Pub. No. WO87/07247, PCT Pub. Date Dec. 3, 1987**

**PCT Filed May 23, 1986, Ser. No. 155,726**

**Claims priority, application Switzerland, May 23, 1986, 2090/86**

**Int. Cl.$^5$ B01J** *8/04;* **F28D** *1/00*

**U.S. Cl. 422—191** **5 Claims**

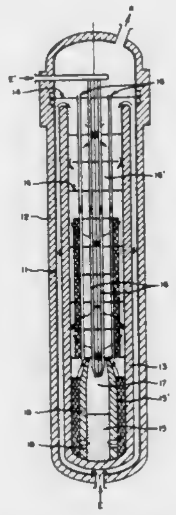
1. An apparatus for endothermic catalytic reactions of gases at high temperature and pressure comprising:

(a) a pressure vessel having a gas inlet means at one end of said vessel for the introduction of feed substances, a second gas inlet means near an opposite end of said vessel for the introduction of an oxygen-containing gas, and a gas outlet at said opposite end of said vessel for removing gaseous reaction products;

(b) an inner thermal isolating hull open at one end and positioned within said vessel so as to provide a confined path between an inner wall of said vessel and an outer wall of said inner thermal isolating hull extending substantially throughout the length of said vessel for conveying said feed substances from said gas inlet to the open end of the hull;

(c) a tube bundle heat exchanger disposed within said inner thermal isolating hull extending from said open end of said hull toward a closed end of said hull, said heat exchanger having tubes in open communication with said gas outlet and gaseous reaction products formed near the closed end of the hull, and having tubes in closed communication with said gas inlet means for oxygen-containing gas;

(d) a mixing chamber with a burner defining a heating means disposed between an end of said heat exchanger and said closed end of said hull wherein partially reacted feed substances and said oxygen-containing gases enter and are combusted forming said gaseous reaction products in the presence of a second block of catalytic material heat energy is supplied to said gaseous reaction products where said gaseous reaction products enter said tubes and exit through said gas outlet;



(e) a first block of catalytic material disposed between said tubes of said tube bundle heat exchanger and said hull, wherein said feed substances flow around said tubes of said tube bundle heat exchanger and through said first block of catalytic material; and

(f) a second block of catalytic material disposed near said closed end of said hull wherein said gaseous reaction products exiting from said mixing chamber are allowed to reach thermodynamic equilibrium.

---

### 5,019,357
## REACTOR SYSTEM FOR UPGRADING LIGHT OLEFINS IN STAGED REACTORS

**Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Continuation-in-part of Ser. No. 118,926, Nov. 10, 1987, Pat. No. 4,777,316. This application May 23, 1988, Ser. No. 197,363**

**The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.**

**Int. Cl.$^5$ B01J** *8/04, 8/18*

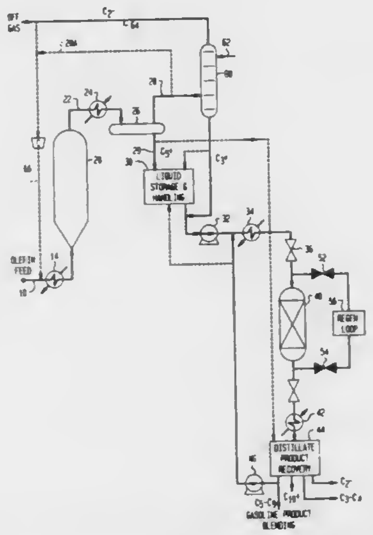
**U.S. Cl. 422—192** **11 Claims**

4. A semicontinuous multistage catalytic system for conversion of light olefinic gas feedstock to distillate range hydrocarbons, comprising:

first reactor means for maintaining a fluidized bed of medium pore acid zeolite catalyst particles in a primary reaction stage in a turbulent reactor bed maintained under reaction severity conditions effective to convert a major amount of light olefins at elevated temperature, said catalyst having an average catalyst particle size of about 20 to 100 microns and average acid cracking activity of about 0.1 to 20;

means for passing hot feedstock vapor upwardly through the fluidized catalyst bed in a single pass under reaction conditions to convert light olefins substantially to intermediate range olefins;

fluid handling means for maintaining fluidized bed conditions through the reactor bed at a superficial fluid velocity of about 0.3 to 2 meters per second and a weight hourly space velocity of about 0.5 to 80 parts of light olefin per part by weight of fluidized catalyst;



means for recovering from primary stage effluent stream an olefinic intermediate hydrocarbon stream comprising a major amount of $C_5^+$ intermediate olefins;

second reactor means for further oligomerizing at least the $C_5^+$ olefins in the intermediate stream in an intermittently operated secondary stage high pressure reaction zone under low temperature and high pressure conditions in contact with a fixed bed of medium pore shape selective acid oligomerization catalyst to further upgrade intermediate hydrocarbons to $C_{10}^+$ distillate product; and

fluid handling means for periodically interrupting flow of intermediate hydrocarbons to the secondary stage reaction zone and regenerating the fixed bed catalyst while accumulating intermediate hydrocarbons from the primary zone effluent.

---

### 5,019,358
## REACTOR WITH HYDROGEN ADSORPTION ALLOY

**Hiroshi Suzuki; Hiroshi Ishikawa; Keisuke Oguro; Akihiko Kato; Teruya Okada; Shizuo Sakamoto; Hiroyuki Kawashima, and Keizo Sakaguchi, all of Osaka, Japan, assignors to Agency of Industrial Science & Technology and Kurimoto Ltd.**

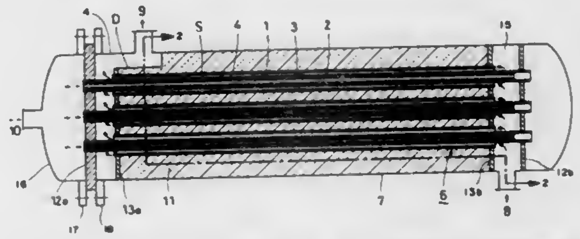
**Filed Sep. 7, 1988, Ser. No. 241,194**

**Claims priority, application Japan, Apr. 1, 1988, 63-81839**

**Int. Cl.$^5$ B01J** *8/06*

**U.S. Cl. 422—197** **3 Claims**

1. A reactor with hydrogen adsorption alloy comprising: a tank defining a transverse direction; at least one hollow cylindrical hydrogen adsorption alloy compact situated in said tank; a heat transfer pipe which tightly encloses the outer periphery of each of said compacts; a thermal reaction element associated with each compact, each thermal reaction element associated with each compact, each thermal reaction element comprising the heat transfer pipe which tightly encloses an associated compact and a jacket pipe enclosing, in parallel, the heat transfer pipe and defining a gap therebetween forming a path; means associated with said tank for feeding and discharging hydrogen gas to and from a hollow part of each compact; further means associated with said tank for feeding and discharging a heating or cooling medium to and from said path between each heat transfer pipe and its associated jacket pipe, said tank hermetically accommodating each compact and associated heat transfer pipe and thermal reaction element; heat insulating material; a pipe plate in said tank which supports and holds the thermal reaction elements; and a further pipe plate in said tank which supports and holds the heat transfer pipes, wherein:



the outer peripheral surface of each thermal reaction element forms with each other thermal reaction element and the inner surface of the tank a space filled with the heat insulating material;

said pipe plate and further pipe plates are situated to define a chamber therebetween within said tank; and

said pipe plate and the adjacent heat insulating material forming a transversely extending stepped cutaway portion in said pipe plate and said insulating material, connected to the chamber in said tank.

---

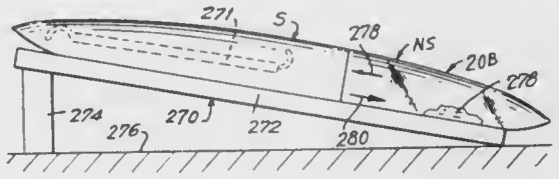
### 5,019,359
## METHOD AND APPARATUS FOR RAPID STERILIZATION OF MATERIAL

**Barry S. Kutner, Wilton, and Daniel A. Latowicki, Newton, both of Conn., assignors to Flexiclave, Inc., Del.**

**Continuation-in-part of Ser. No. 274,768, Nov. 22, 1988, which is a continuation-in-part of Ser. No. 184,246, Apr. 21, 1988. This application Nov. 22, 1989, Ser. No. 440,793**

**Int. Cl.$^5$ A61L** *2/12*

**U.S. Cl. 422—294** **35 Claims**



1. An assembly for use in sterilizing at least one object by vapor under pressure, including:

a collapsible pouch comprising flexible vapor-impermeable sheet material forming an interior and a sealable opening into said interior through which said at least one object can be introduced into said interior, said sheet material including a first wall portion comprising microwave electromagnetic radiation shield material substantially surrounding and defining a first interior portion of said collapsible pouch which is adapted to receive said at least one object and which is maintained substantially free from microwave electromagnetic radiation during irradiation of said pouch by microwave irradiating means, and a second wall portion comprising microwave electromagnetic radiation transparent material substantially surrounding and defining a second interior portion of said collapsible pouch which is exposed to microwave electromagnetic radiation during irradiation of said pouch by microwave irradiating means; and

means for positioning said pouch such that said first shielded

VOL
1126
ISS
4
MY
28
1991
UMI

interior portion of said collapsible pouch that is substantially free of radiation during irradiation is elevated to a position that is higher than said second unshielded interior portion of said collapsible pouch which is exposed to said radiation.

---

### 5,019,360

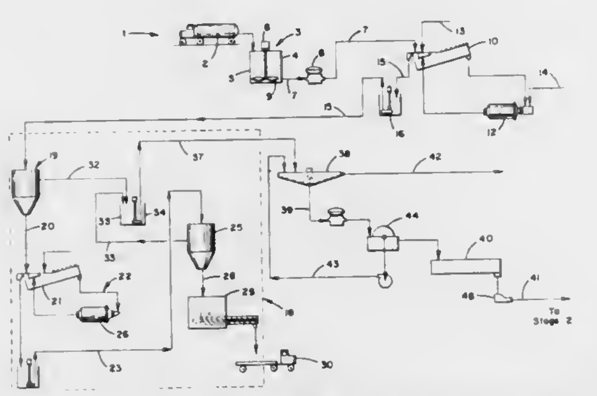
### METHOD FOR THE PROCESSING OF FLY ASH, SCRUBBER SLUDGE AND THE LIKE; AND PRODUCT

**John M. Lehto, Cokato, Minn., assignor to Northern States Power Company, Minneapolis, Minn.**

**Continuation of Ser. No. 464,584, Jan. 11, 1990, abandoned, which is a continuation of Ser. No. 124,664, Nov. 24, 1987, abandoned. This application Jun. 8, 1990, Ser. No. 535,998**

**Int. Cl.$^5$ B01F** *1/00*

**U.S. Cl. 423—132** **5 Claims**



1. A method of processing fly ash material having bulk silicates, magnesium, magnetic iron and aluminum components therein; said method including the steps of:

(a) removing a magnetic component of said fly ash material by a magnetic separation to leave a non-magnetic component; said magnetic component including iron component therein;
(b) extracting the non-magnetic component from step (a) with sulfuric acid leach under reflux at atmospheric pressure, to form a sludge residue and a hot sulfuric acid liquor; said hot sulfuric acid liquor having the magnesium and aluminum components dissolved therein;
(c) separating the sludge residue and the hot sulfuric acid liquor form step (b);
(d) subjecting the sludge residue from step (c) to an aqueous ammonium carbonate extraction to form an aqueous solution having a white precipitate therein;
(e) separating the white precipitate of step (d) from the aqueous solution;
(f) cooling, without acid neutralization, the hot sulfuric acid liquor from step (b) to precipitate a crude solid including ammonium sulfate and magnesium sulfate from the resulting cooled acid liquor;
(g) separating the cooled acid liquor and the crude solid precipitate of step (f) without acid neutralization of the cooled acid liquor;
(h) extracting the crude solid precipitate from step (g) with an aqueous ammonium solution to form a nonacidic solid precipitate including crude aluminum hydroxide and magnesium hydroxide and an aqueous solution including ammonium sulfate;
(i) separating the aqueous solution including ammonium sulfate from the solid precipitate of step (h);
(j) extracting the solid precipitate from step (i) with aqueous sodium hydroxide to form an aqueous sodium hydroxide solution including aluminum hydroxide dissolved therein, and an insoluble solid residue including magnesium hydroxide;
(k) separating the aqueous sodium hydroxide solution from the insoluble solid residue of step (j); and,
(l) precipitating aluminum hydroxide from said aqueous sodium hydroxide solution of step (k).

---

### 5,019,361

### REMOVAL AND RECOVERY OF SULPHUR DIOXIDE FROM GAS STREAMS

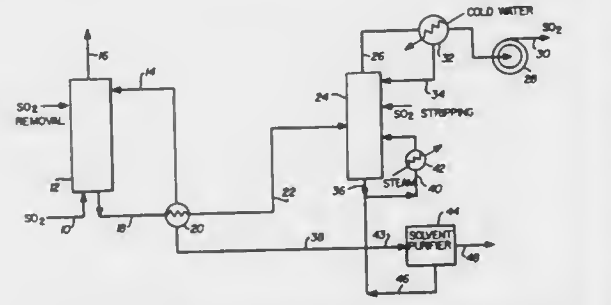
**Leo E. Hakka, Dollard des Ormeaux, Canada, assignor to Union Carbide Canada Limited, Danbury, Conn.**

**Continuation-in-part of Ser. No. 273,028, Nov. 19, 1988, abandoned. This application Jun. 2, 1989, Ser. No. 360,404**

**Claims priority, application Canada, Nov. 9, 1988, 582,680**

**Int. Cl.$^5$ C01B** *17/00, 17/16, 31/20*

**U.S. Cl. 423—243** **30 Claims**



1. A cyclic process for the removal of sulphur dioxide from a sulphur dioxide containing gas stream using an absorbent medium and for the regeneration of the absorbent medium, which comprises:

(a) contacting said gas stream at substantially atmospheric pressure with an aqueous absorbing medium containing a water-soluble half salt of a diamine at a temperature of from about 10° to about 60° C. to absorb sulphur dioxide from said gas stream in amounts of at least about 100 g of sulphur dioxide per kg of absorbing medium, said diamine in free base form having a molecular weight of less than about 300 and said diamine in half salt form having a pKa value for the free nitrogen atom of about 5 to about 7.3, said aqueous absorbing medium containing at least 1 mole of water for each mole of sulphur dioxide to be absorbed and comprising less than about 80 wt. % of water;
(b) stripping gaseous sulphur dioxide from said spent absorbing medium at a temperature of about 50° to about 110° C. and at least about 30° C. greater than said contact temperature to form a regenerated aqueous absorbing medium;
(c) recovering the gaseous sulphur dioxide; and
(d) recycling said regenerated aqueous absorbing medium to said contacting step.

---

### 5,019,362

### ION EXCHANGE METHOD FOR THE PURIFICATION OF SCANDIUM

**William J. Rourke, Worcester, and Samuel Natansohn, Sharon, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Oct. 18, 1989, Ser. No. 423,312**

**Int. Cl.$^5$ C01F** *17/00*

**U.S. Cl. 423—21.5** **14 Claims**

1. A process for purifying scandium comprising:

(a) adjusting the pH of an aqueous solution containing scandium with base to between approximately 2.05 and 3.5;
(b) adding a chelating resin having an iminodiacetic acid functionality in the hydrogen form to the aqueous solution containing scandium and allowing the resulting slurry to equilibrate;
(c) adjusting the pH of the slurry containing scandium and chelating resin with base to between approximately 1.9 to 2.25;

(d) collecting the slurry from step (c) and drawing off the solution;
(e) rinsing the collected slurry with dilute mineral acid in an amount sufficient to remove metals retained by the resin less strongly than scandium;
(f) passing diglycolic acid through the collected slurry to remove the scandium absorbed on the chelating resin and collecting the digylcolic acid containing scandium;
(g) passing the diglycolic containing scandium through a chelating resin having an iminodiacetic acid functionality in the hydrogen form;
(h) collecting the diglycolic acid coming out of the chelating resin;
(i) passing the diglycolic acid collected from step (h) through a strong cation exchange resin having a sulphonic acid functionality wherein the scandium is absorbed;
(j) passing an ammonium nitrate solution through the strong cation exchange resin having a sulphonic acid functionality and collecting the resulting solution of ammonium nitrate containing scandium;
(k) adding oxalic acid to the collected ammonium nitrate solution containing scandium to form a precipitate of scandium oxalate; and
(l) collecting the scandium oxalate precipitate.

---

### 5,019,363

### PROCESS FOR HYDROMETALLURGICAL TREATMENT OF AN INDIUM CHLORIDE SOLUTION

**Yves Le Quesne, Paris, and Paolo Fossi, Elancourt, both of France, assignors to Metaleurop S.A., Fontenay-Sous-Bois, France**

**PCT No. PCT/FR88/00573, § 371 Date Jul. 19, 1989, § 102(e) Date Jul. 19, 1989, PCT Pub. No. WO89/04877, PCT Pub. Date Jun. 1, 1989**

**PCT Filed Nov. 24, 1988, Ser. No. 391,531**

**Claims priority, application France, Nov. 24, 1987, 87 16290**

**Int. Cl.$^5$ C22B** *3/38*

**U.S. Cl. 423—87** **12 Claims**

1. Process for the hydrometallurgical treatment of a solution of indium chloride and at least one element selected from the group consisting of tin and antimony, comprising the following steps:

a) adjusting the concentration of free chloride ion in said solution to a value within the range of 3 to 12N by addition of a chloride selected the group consisting of a chloride of an alkali metal, a chloride of an alkaline earth metal and a mixture of these, and adjusting the acidity of said solution to a value in the range 1 to 6N;
b) separating the indium and the at least one element from the adjusted solution obtained in step a) by bringing said adjusted solution into contact with an organic phase comprising trialkyl phosphate, so as to obtain an organic phase containing the indium and the at least one element;
c) extracting the indium from the organic phase obtained in step b) by bringing said organic phase into contact with a solution of 0.1 to 3N hydrochloric acid so as to obtain a solution of indium chloride;
d) extracting the at least one element from the organic phase obtained in step c) by bringing into contact said organic phase with an alkaline sodium solution comprising an alkali metal hydroxide.

---

### 5,019,364

### METHOD FOR PURIFYING GASEOUS HYDRIDES

**Koichi Kitahara; Takashi Shimada, both of Kanagawa, and Keiichi Iwata, Niigata, all of Japan, assignors to Japan Pionics Co., Ltd., Tokyo, Japan**

**Filed Nov. 13, 1990, Ser. No. 611,603**

**Int. Cl.$^5$ B01D** *53/34;* **C01B** *3/16*

**U.S. Cl. 423—210** **7 Claims**

1. A method for purifying a gaseous hydride, which comprises bringing a crude gaseous hydride into contact with at least one member selected from the group consisting of copper arsenides, copper phosphides, copper silicides, copper selenides, copper borides and copper sulfides to remove oxygen contained in the crude gaseous hydride wherein the gaseous hydrides are present in a concentration of at least 0.1% by volume.

---

### 5,019,365

### QUATERNARY POLYAMINES AS SULFITE OXIDATION INHIBITORS

**Stephen A. Bedell, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 277,159, Nov. 29, 1988, abandoned. This application Jun. 29, 1990, Ser. No. 546,075**

**Int. Cl.$^5$ C01B** *17/00, 17/45;* **C09K** *15/16, 15/22*

**U.S. Cl. 423—243** **20 Claims**

1. In a process for scrubbing sulfur dioxide from a gas stream comprising the step of contacting the gas stream with an aqueous alkali solution to form sulfites therein, the improvement wherein:

the alkali solution contains an effective amount of a cationic polyelectrolyte to inhibit oxidation of the sulfites to sulfates, said polyelectrolyte being a water soluble polymer containing quaternary amine groups.

---

### 5,019,366

### PROCESS FOR PREPARING COMPOUND METAL OXIDE

**Kazubiro Sakai, Saitama, Japan, assignor to Mitsubishi Metal Corporation, Tokyo, Japan**

**Filed May 19, 1989, Ser. No. 354,198**

**Claims priority, applicatioo Japan, May 23, 1988, 63-123971**

**Int. Cl.$^5$ C01F** *17/00*

**U.S. Cl. 423—592** **6 Claims**

1. A process for preparing a metal oxide of bismuth, strontium, calcium and copper comprising:

dissolving
(1) a $C_1$–$C_6$ alkoxide of bismuth,
(2) a $C_1$–$C_6$ alkoxide of strontium,
(3) a $C_1$–$C_6$ alkoxide of calcium, and
(4) an organic acid salt, a $C_1$–$C_6$ alkoxy-$\beta$-diketo complex, $\beta$-diketo complex, or $\beta$-ketoester complex of copper

in an organic solvent, in the same content ratio of the metals as that in the object compound metal oxide;

allowing the mixture oxide to react at the refluxing temperature; and
thermally decomposing the resultant reaction mixture while in sprayed condition.

---

### 5,019,367

### METHOD FOR PRODUCING BOEHMITE

**Yasuo Oguri, Tokyo; Takao Koga, and Toshio Itoh, both of Niigata, all of Japan, assignors to Mitsubishi Kasei Corporation and Kasei Naoetsu Industries Limited, both of Tokyo, Japan**

**Filed Mar. 9, 1990, Ser. No. 491,153**

**Claims priority, application Japan, Mar. 14, 1989, 1-61452**

**Int. Cl.$^5$ C01F** *7/02*

**U.S. Cl. 423—626** **7 Claims**

1. A method for producing boehmite, which comprises subjecting aluminum hydroxide dispersed in water to treatment under heat and pressure in the presence of maleic acid and/or malic acid.

VOL
1126
ISS
4
MY
28
1991
UMI

5,019,368

### DETECTION OF NECROTIC MALIGNANT TISSUE AND ASSOCIATED THERAPY

**Alan L. Epstein, LaCanada, and Clive R. Taylor, S. Pasadena, both of Calif., assignors to Cancer Biologics, Inc., Tustin, Calif.**

**Filed Feb. 23, 1989, Ser. No. 314,437**

**Int. Cl.$^5$ A61K** *43/00, 49/02, 39/00;* **C07K** *15/28*

**U.S. Cl. 424—1.1** **9 Claims**

8. A monoclonal antibody to an insoluble intracellular antigen present in cells which may be induced to be permeable, or in cell ghosts of substantially all neoplastic and normal cells, but not present on the exterior of living cells of said mammal, wherein said antibody is bound to a moiety comprising at least in part an alpha-emitting radionuclide or a beta-emitting radionuclide.

---

5,019,369

### METHOD OF TARGETING TUMORS IN HUMANS

**Cary A. Presant, San Marino, and Richard T. Proffitt, Arcadia, both of Calif., assignors to Vestar, Inc., San Dimas, Calif.**

**Continuation of Ser. No. 674,201, Nov. 23, 1984, abandoned, and a continuation-in-part of Ser. No. 663,503, Oct. 22, 1984, abandoned, and a continuation-in-part of Ser. No. 663,550, Oct. 22, 1984, abandoned, and a continuation-in-part of Ser. No. 363,593, Mar. 30, 1982, abandoned. This application Dec. 1, 1988, Ser. No. 279,316**

**Int. Cl.$^5$ A61K** *43/00, 9/133, 49/02*

**U.S. Cl. 424—1.1** **14 Claims**

1. A method of targeting tumors in the breast, lung, prostate, kidney, colon, lymph, bone, lymph node, soft tissue including mediastinum, liver and spinal cord in humans comprising providing small umilamellar vesicles of less than about 2000Å comprising chemically pure phospholipid molecules that are stable to leakage in vitro and in vivo, incorporating a radioactive or chemotherapeutic agent into said vesicles and introducing such vesicles into the bloodstream of a human to obtain movement of the vesicles to the tumor for treating and/or imaging said tumor.

---

5,019,370

### BIODEGRADABLE, LOW BIOLOGICAL TOXICITY RADIOGRAPHIC CONTRAST MEDIUM AND METHOD OF X-RAY IMAGING

**Michael J. Jay, and U. Yun Ryo, both of Lexington, Ky., assignors to University of Kentucky Research Foundation, Lexington, Ky.**

**Filed Jul. 10, 1989, Ser. No. 377,396**

**Int. Cl.$^5$ A61K** *49/04, 9/14;* **A61B** *5/00*

**U.S. Cl. 424—4** **19 Claims**

1. A biodegradable, low biological toxicity, particulate radiographic contrast medium, comprising

biodegradable polymeric spheres of estimated average molecular weight about $10^5$ to $10^7$ daltons, average diameter about 10–1,000 nm or about 0.01–1.0 micron, said spheres carrying an at least radiographic contrasting amount of a radiographically opaque element and said polymeric spheres have a polymer backbone made up of polymerized monomer radiographically opaque units or said polymeric spheres are a copolymer which has a backbone of monomer radiographically opaque units and other monomers that is copolymerized.

---

5,019,371

### NOVEL X-RAY CONTRAST AGENTS, COMPOSITIONS AND METHODS

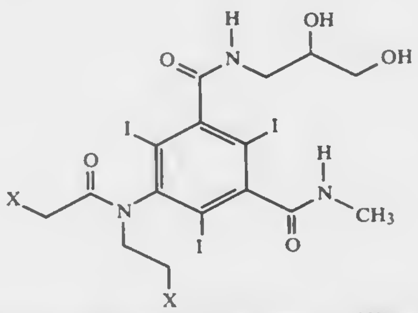
**Youlin Lin, Chesterfield; Rebecca A. Wallace, Manchester, and David H. White, Florissant, all of Mo., assignors to Mallinckrodt Medical, Inc., St. Louis, Mo.**

**Filed Nov. 21, 1990, Ser. No. 616,495**

**Int. Cl.$^5$ A61K** *49/04;* **C07C** *233/05*

**U.S. Cl. 424—5** **6 Claims**

1. A radiological composition containing a compound of the formula:



wherein the X groups may be the same or different selected from a group consisting of hydroxy and alkoxy containing from one to six carbon atoms, in an effective amount to provide satisfactory x-ray visualization together with a pharmaceutically acceptable radiological vehicle.

---

5,019,372

### MAGNETICALLY MODULATED POLYMERIC DRUG RELEASE SYSTEM

**Judah Folkman, Brookline; Robert S. Langer, Jr., Somerville, and Dean S. T. Hsieh, Cambridge, all of Mass., assignors to The Children's Medical Center Corporation, Boston, Mass.**

**Continuation of Ser. No. 879,914, Jun. 27, 1986, abandoned. This application Sep. 7, 1990, Ser. No. 579,050**

**Int. Cl.$^5$ A61K** *9/00, 9/16;* **A61L** *15/03*

**U.S. Cl. 424—9** **15 Claims**

1. A method of administering a biologically active substance to an animal, e.g., a human, said method comprising

preparing an implant for said animal of a medically responsive composition in the form of a body sized and shaped for placement in the environment of use, said environment including an aqueous fluid, said body comprising, in admixture, a first phase comprising a biocompatible, plastically deformable, polymeric matrix, said polymeric matrix being insoluble in the environment of use, a second phase comprising a biologically active substance distributed throughout said matrix to be released to said aqueous fluid outside said matrix, and a third phase comprising a magnetically responsive substance encapsulated within said matrix so that, upon exposure of said body to an oscillating magnetic field, the rate of release of said biologically active substance to said aqueous fluid is increased,

in order to subject said body in said animal to an oscillating magnetic field which creates sufficient disturbance to increase the rate of release of said biologically active substance.

---

5,019,373

### ORAL COMPOSITION

**Peter Carter, Burton, and Kevin Hammond, Wirral, both of Great Britain, assignors to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.**

**Filed Nov. 29, 1989, Ser. No. 442,741**

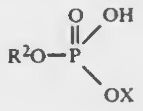
**Claims priority, application United Kingdom, Dec. 1, 1988, 8828018**

**Int. Cl.$^5$ A61K** *7/16, 7/18*

**U.S. Cl. 424—52** **4 Claims**

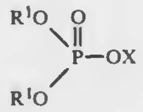
1. An aqueous oral composition having an anticaries effect upon teeth which contains an essential anticaries agent which essentially comprises:

(a) from 0.1 to 95% by weight of a monoalkyl or monoalkenyl phosphate salt or mixtures thereof having the structure:



and

(b) from 0.1 to 95% by weight of a dialkyl or dialkenyl phosphate salt or mixtures thereof having the structure:



where

$R^1$ is the same or different and is chosen from saturated or unsaturated, branched or unbranched alkyl or alkenyl groups having an average of from 6 to 9 carbon atoms,

$R^2$ is chosen from alkyl or alkenyl groups having an average of from 6 to 18 carbon atoms and

X is chosen from sodium, potassium, ammonium, substituted ammonium and alkylolamine.

---

5,019,374

### DENTIFRICES

**Stephen J. Raven, Wirral, Great Britain, assignor to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.**

**Filed Jan. 25, 1990, Ser. No. 470,024**

**Claims priority, application United Kingdom, Jan. 25, 1989, 8901587**

**Int. Cl.$^5$ A61K** *7/16, 7/18*

**U.S. Cl. 424—52** **4 Claims**

1. A toothpaste comprising:

(i) a finely-divided solid particulate abrasive present in an effective amount for abrasively cleaning teeth;

(ii) sodium trimetaphosphate present in an effective amount for anti-caries protection;

(iii) sodium fluoride present in an effective amount when combined with said sodium trimetaphosphate to deliver anti-caries protection; and

(iv) a liquid phase within which is stably dispersed said solid particulate abrasive, said liquid phase comprising from about 1 to about 20% by weight of ingredients selected from the group consisting of polyethylene glycols, lower aliphatic alcohols, urea and mixtures thereof, and a humectant selected from the group consisting of glycerol present in at least 40% by weight of the toothpaste and sorbitol syrup present in at least 50% by weight of the toothpaste, and said sodium trimetaphosphate which is present being dissolved in said liquid phase in amounts less than 80% of total amount of sodium trimetaphosphate in the toothpaste, while a remainder of said sodium trimetaphosphate is present in undissolved form in said liquid phase.

---

5,019,375

### LOW RESIDUE ANTIPERSPIRANT CREAMS

**Paul R. Tanner; Randolph G. Nunn, Jr., both of Cincinnati, Ohio, and John P. Luebbe, Lawrenceburg, Ind., assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Mar. 14, 1989, Ser. No. 323,524**

**Int. Cl.$^5$ A61K** *7/32, 7/34, 7/36, 7/38*

**U.S. Cl. 424—66** **10 Claims**

1. An antiperspirant cream composition, having a penetration force value of from about 60 grams to about 500 grams, comprising:

(a) from about 20% to about 70% of a volatile silicone material;

(b) from about 5% to about 35% of a particulate antiperspirant active;

(c) from about 3% to about 10% of a clay thickening agent;

(d) from about 0.1% to about 5% of an activator for said clay thickening agent; and

(e) from about 5% to about 40% of a non-volatile paraffinic hydrocarbon fluid, said non-volatile paraffinic hydrocarbon fluid being mineral oil.

---

5,019,376

### SPARKLING PEARLESCENT PERSONAL CARE COMPOSITIONS

**Heidi J. Uick, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.**

**Continuation of Ser. No. 323,480, Mar. 13, 1989, abandoned. This application Oct. 22, 1990, Ser. No. 600,274**

**Int. Cl.$^5$ A61K** *7/075*

**U.S. Cl. 424—70** **8 Claims**

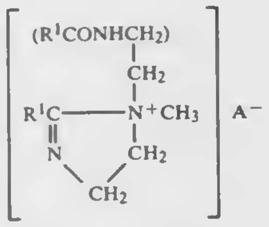
1. A method of making a cationic oil-in-water emulsion having a sparkling pearlescent appearance comprising the steps of:

I. blending

(a) from about 0.1% to 5% based on the total weight of the emulsion of at least one cationic surfactant selected from the group consisting of quaternary ammonium compounds of the formula

$$[R^1R^2N^+R^3R^4]A^-;$$

$$[R^1R^2N^+(R^5)_2]A^-; \text{ and}$$



where $R^1$ is an alkyl group having an average of 8 to 23 carbon atoms, $R^2$ is an alkyl group of 1 to 4 carbon atoms, $R^3$ is $R^1$ or $R^2$, $R^4$ is $R^2$ or a benzyl group, $R^5$ is $(CH_2CH_2O)_nH$ where n is an integer of from 1 to 50, and A is an anion wherein the first formula does not include compounds where $R^2$, $R^3$ and $R^4$ each have from 1 to 4 carbon atoms;

(b) from about 1 to 10% by weight based on the total weight of the emulsion of

(i) a fatty acid having an average of from 12 to 16 carbon atoms per molecule and

(ii) a fatty monoalcohol having an average of from 12 to 18 carbon atoms per molecule

in a 70:30 to 95:5 by weight ratio of (i) to (ii);

VOL
1126
ISS
4
MY
28
1991
UMI

(c) an effective amount of a pH adjusting agent to obtain a pH of from about 2 to 5 in the emulsion; and
(d) a sufficient amount of water to obtain from 25 to 30 parts by weight of a first intermediate mixture;
II. homogenizing the first intermediate mixture;
III. separately mixing together
(e) from, 0.5 to 2.0% by weight based on the total weight of the emulsion of a compatible thickening agent; and
(f) a sufficient amount of water to obtain from 70 to 75 parts of a second intermediate mixture;
IV. mixing 25–30 parts of the first intermediate mixture with 70–75 parts of the second intermediate mixture together to obtain a total of 100 parts of the emulsion; and
V. aging the emulsion at room temperature until it contains irregular platelet crystals which provide a sparkling pearlescent appearance.

---

### 5,019,377
### LOW GLASS TRANSISTION TEMPERATURE ADHESIVE COPOLYMERS FOR USE IN HAIR STYLING PRODUCTS

**Peter M. Torgerson, Washington Court House, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Division of Ser. No. 285,137, Dec. 16, 1988, abandoned, which is a continuation of Ser. No. 131,863, Dec. 11, 1987, abandoned. This application Jul. 13, 1989, Ser. No. 379,516**

**The portion of the term of this patent subsequent to Oct. 16, 2007, has been disclaimed.**

**Int. Cl.$^5$ A61K** *7/11*

**U.S. Cl. 424—70** **12 Claims**

1. Hair styling compositions comprising:
(a) from about 0.1% to about 20% of a low glass transition temperature adhesive copolymer which is a random copolymer having the general structure:

$$(H_x)_m—(L_y)_n$$

wherein:
(A) H is one or more monomer components with relatively high glass transition temperatures, at least one H monomer component being selected from the group consisting of acrylate amides and methacrylate amides;
(B) L is one or more monomer components with relatively low glass transition temperatures, at least one L monomer component being selected from the group consisting of acrylate esters and methacrylate esters;
(C) x and y are integers of 1 or greater, and x+y is an integer of 2 or greater; and
(D) m:n is the weight ratio of H to L monomer components, and the ratio of m:n is within the range of from about 20:1 to about 1:20;
and wherein further said adhesive copolymers have a single glass transition temperature within the range of from about 0° C. to about 80° C.; and
(b) from about 80% to about 99.9% of a carrier suitable for applying the adhesive copolymer to hair.

---

### 5,019,378
### ELASTOMERIC COMPOSITION CONTAINING THERAPEUTIC AGENTS AND ARTICLES MANUFACTURED THEREFROM

**Dwight L. Allen, Akron, Ohio, assignor to Cuno, Incorporated, Meriden, Conn.**

**Division of Ser. No. 138,867, Dec. 29, 1987, Pat. No. 4,867,968. This application Aug. 18, 1989, Ser. No. 395,488**

**Int. Cl.$^5$ C08K** *5/54;* **C08J** *3/22;* **C08L** *7/02;* **A61K** *31/74*

**U.S. Cl. 424—78** **1 Claim**

1. A process for preparation of a stable elastomeric composition of matter containing a therapeutic agent comprising the steps of:
blending a carrier component selected from the group consisting of polysiloxane emulsions, together with clay and titanium dioxide to form a masterbatch;
dispersing a therapeutically effective amount of said therapeutic agent in said masterbatch;
adding said masterbatch and disbursed therapeutic agent to a rubber latex selected from the group consisting of natural rubber, synthetic rubber or mixtures thereof with stirring said masterbatch comprising:
at least about 3 parts by weight, per 100 parts of rubber, of said carrier component;
at least 2.5 parts by weight per 100 parts of rubber, of clay; and
at least about 1.5 parts by weight, per 100 parts of rubber, of titanium dioxide; and thereafter
forming and curing a product from said stable elastomeric composition of matter said elastomeric composition having from about 7.5 to 30 parts by weight, based upon the weight of 100 parts of said rubber, of said masterbatch.

---

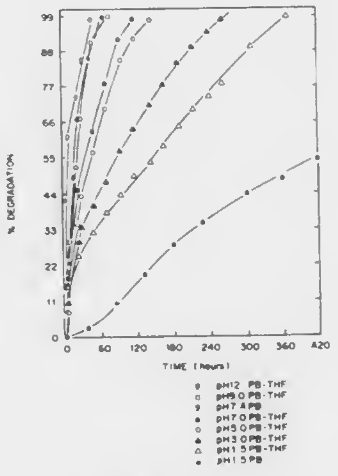
### 5,019,379
### UNSATURATED POLYANHYDRIDES

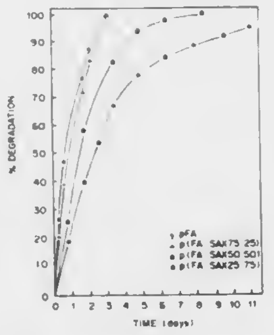
**Abraham J. Domb, Brookline, and Robert S. Langer, Somerville, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Jul. 31, 1987, Ser. No. 80,090**

**Int. Cl.$^5$ A61M** *3/00;* **A61K** *31/74*

**U.S. Cl. 424—78** **15 Claims**





1. An unsaturated polyanhydride copolymer of aliphatic and aromatic dicarboxylic acids and a diacid selected from the group consisting of fumaric acid and 1,4-phenylenediacrylic acid having at least one double bond available for crosslinking, wherein said polyanhydride has a melting point of less than about 200° C. and a high degree of crystallinity and is soluble in organic solvents.

9. A method for controlled drug delivery comprising providing an unsaturated biocompatible polyanhydride copolymer of aliphatic and aromatic dicarboxylic acids and a diacid selected from the group consisting of fumaric acid and 1,4-phenylenediacrylic acid having at least one double bond available for crosslinking, wherein said polyanhydride has a melting point of less than about 200° C. and a high degree of crystallinity and is soluble in organic solvents, and a bioactive compound.

---

### 5,019,380
### NOVEL ANTIMICROBIAL COMPOSITIONS AND PROCESS FOR PREPARING THE SAME

**David J. Heiler, Avon, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.**

**Filed Apr. 27, 1990, Ser. No. 515,394**

**Int. Cl.$^5$ A61K** *31/78*

**U.S. Cl. 424—81** **16 Claims**

1. An antimicrobial composition of matter comprising the reaction product from the reaction of polyvinylpyrrolidone and hypochlorite wherein the ratio of polyvinylpyrrolidone to hypochlorite is from about 1:100 to about 1:0.0001 by weight and wherein substantially all of the hypochlorite is reacted with the polyvinylpyrrolidone.

---

### 5,019,381
### METHOD FOR LOWERING CHOLESTEROL LEVELS USING GM-CSF

**Marc Garnick, Brookline, Mass., assignor to Genetics Institute, Inc., Cambridge, Mass.**

**Filed Mar. 21, 1988, Ser. No. 170,478**

**Int. Cl.$^5$ A61K** *37/02*

**U.S. Cl. 424—85.1** **1 Claim**

1. A method for lowering cholesterol levels in a primate by systemically administering to said primate a cholesterol reducing amount of a pharmaceutical composition comprising GM-CSF in admixture with a pharmaceutically acceptable carrier.

---

### 5,019,382
### TREATMENT OF IMMUNO-RESISTANT DISEASE WITH LOW-DOSE INTERFERON

**Joseph M. Cummins, Jr., Amarillo, Tex., assignor to The Texas A&M University System, College Station, Tex.**

**Continuation of Ser. No. 927,834, Nov. 6, 1986, abandoned. This application Jan. 17, 1990, Ser. No. 465,527**

**Int. Cl.$^5$ A61K** *37/66*

**U.S. Cl. 424—85.4** **14 Claims**

1. An improved method of treatment of infectious disease of viral origin in human, canine and feline species said method consisting essentially of contacting about 0.01 to about 5 IU of interferon/lb of body weight per dose with the oral and pharyngeal mucosa of said species.

---

### 5,019,383
### FATTY ACID CARRIERS FOR SYNTHETIC PEPTIDES

**Thomas P. Hopp, New York, N.Y., assignor to New York Blood Center, Inc., New York, N.Y.**

**Continuation of Ser. No. 942,562, Dec. 16, 1986, abandoned, which is a continuation of Ser. No. 358,150, Mar. 15, 1982, abandoned, which is a continuation-in-part of Ser. No. 223,558, Jan. 9, 1981, abandoned, which is a continuation-in-part of Ser. No. 272,855, Jun. 12, 1981, abandoned. This application Sep. 8, 1989, Ser. No. 405,102**

**Int. Cl.$^5$ A61K** *39/00*

**U.S. Cl. 424—88** **21 Claims**

1. A synthetic antigen comprising a carrier coupled to a peptide residue,
(a) the peptide residue having an N terminal amino group and a C terminal carboxy group, said peptide residue comprising a naturally occurring sequence of at least six amino acids, said peptide residue containing an epitope and being coupled to the carrier which comprises
(b) one or more alkyl or alkenyl fatty acid groups having at least 12 carbon atoms, said coupling occurring at a site selected from the group consisting of
(i) one or more of said fatty acid groups being coupled to one or more functional groups of a polyfunctional group which is bound to the N-terminal amino group of the peptide residue,
(ii) one or more of said fatty acid groups being coupled to one or more functional groups of a polyfunctional group which is bound to the C-terminal carboxy group of the peptide residue.
(iii) one of said fatty acid groups being coupled to the N-terminal amino group of the peptide residue and one or more of said fatty acid groups being coupled to one or more functional groups of a polyfunctional group which is bound to the C-terminal carboxy group of the peptide residue, and
(iv) one or more of said fatty acid groups being coupled to one or more functional groups of a polyfunctional group which is bound to the N-terminal amino group of the peptide residue and one or more of said fatty acid groups being coupled to one or more functional groups of a polyfunctional group which is bound to the C-terminal carboxy group of the peptide residue.

---

### 5,019,384
### IMMUNONODULATING COMPOSITIONS AND THEIR USE

**Malcolm L. Gefter, Weston, Mass., and Jean G. Guillet, Paris, France, assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation of Ser. No. 66,812, Jun. 25, 1987, abandoned, which is a continuation-in-part of Ser. No. 17,343, Feb. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 924,286, Oct. 29, 1986, abandoned, and a continuation-in-part of Ser. No. 880,134, Jun. 30, 1986, abandoned. This application Nov. 13, 1989, Ser. No. 434,548**

**Int. Cl.$^5$ A61K** *39/00, 39/002, 39/02, 39/12*

**U.S. Cl. 424—88** **13 Claims**

1. A method for modulating the immune response of a cellular system to an epitope of a first antigen to which said cellular system is immunologically responsive, said cellular system comprising T-cells restricted by a first Class II transplantation antigen and antigen presenting cells comprising said first Class II transplantation antigen, said method comprising:
bringing together said cellular system with a polypeptide of fewer than about 100 amino acids consisting essentially of: a first domain of an about 8 to 30 amino acid sequence of an immunodominant sequence containing an agretope and said epitope of said first antigen or a mutated sequence thereof restricted by said transplantation antigen; and a second domain comprising an epitopic site of a second antigen other than said first antigen, wherein said polypeptide has a higher binding affinity site for said transplantation antigen than said second antigen, as a result of the presence of said immunodominant sequence or mutated sequence thereof;
whereby the immune response of said cellular system to said epitope of said first antigen is modulated.

---

### 5,019,385
### NOVEL LYMPHOPINE LK 2 AND PHARMACEUTIC COMPOSITIONS CONTAINING SAME

**Masakazu Mitsuhashi, and Masashi Kurimoto, both of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan**

**Filed Oct. 28, 1985, Ser. No. 792,158**

**Claims priority, application Japan, Nov. 9, 1984, 59-236356; Nov. 9, 1984, 59-236357; Feb. 18, 1985, 60-28396; Jul. 30, 1985, 60-166754**

**Int. Cl.$^5$ C07K** *15/12*

**U.S. Cl. 424—85** **26 Claims**

1. A lymphokine (LK 2), which has the following physicochemical properties:
(1) Molecular weight:
20,000±2,000 daltons;
(2) Isoelectric point:

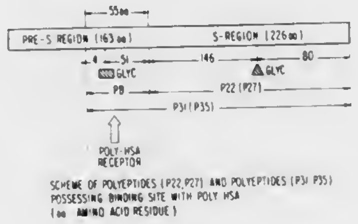
VOL
1126
ISS
4
MY
28
1991
UMI

$pI=6.2\pm0.3$;
(3) Electrophoretic mobility:
on Disc-PAGE, $Rf=0.29\pm0.02$;
(4) uv-Absorption spectrum:
an absorption maximum at a wave length of about 280 nm;
(5) Solubility in solvents:
soluble in water, saline and phosphate buffer,
scarcely soluble or insoluble in ethyl ether, ethyl acetate or chloroform;
(6) Coloring reaction:
protein-positive by Lowry's method or the microburet method,
saccharide-positive by the phenol-sulfuric acid method or anthrone-sulfuric acid method;
(7) Biological activities:
cytotoxic on L 929 cell,
substantially not growth-inhibitive on KB cell,
substantially free from interferon activity;
(8) Stability in aqueous solution:
stable up to 60° C. when incubated at pH 7.2 for 30 minutes,
stable in the pH range of 4.0–11.0 when incubated at 4° C. for 16 hours; and
(9) Stability on cryopreservation:
stable at −10° C. over a period of one month or longer.

---

### 5,019,386
## HEPATITIS B VACCINE

**Atsuhiko Machida, Kanagawa, and Tetsuo Nakamura, Tokyo, both of Japan, assignors to Institute of Immunology Co., Ltd., Koraku, Japan**
**Continuation of Ser. No. 759,207, Jul. 26, 1985, abandoned. This application Aug. 29, 1988, Ser. No. 239,028**
**Claims priority, application Japan, Jul. 31, 1984, 159124/84**
**Int. Cl.$^5$ A61K *39/29;* C07K *7/08***
**U.S. Cl. 424—89** **8 Claims**



1. A polypeptide having the amino acid sequence of Asp-Pro-Arg-Val-Arg-Gly-Leu-Try-Phe-Pro-Ala-Gly-Gly-Ser-Ser-Ser-Gly-Thr-Val.

---

### 5,019,387
## PRODUCTION OF ANTIBODIES TO HIV

**Barton F. Haynes, and Thomas J. Palker, both of Durham, N.C., assignors to Duke University, Durham, N.C.**
**Filed Sep. 8, 1987, Ser: No. 93,854**
**Int. Cl.$^5$ A61K *39/12, 37/02***
**U.S. Cl. 424—89** **15 Claims**

1. An essentially pure form of a hydrophilic peptide consisting essentially of an amino acid sequence of about 9 to 35 units in length and corresponding to at least one antigenic determinant of the envelope glycoprotein of human immunodeficiency virus (HIV) recognized by B lymphocytes, said peptide, when covalently linked to a carrier molecule, induces in a primate the production of high titers of antibodies that neutralize HIV.

---

### 5,019,388
## *BORDETELLA BRONCHISEPTICA* VACCINE

**Albert L. Brown; Joseph C. Frantz, and Richard H. Peetz, all of Lincoln, Nebr., assignors to Norden Laboratories Inc., Lincoln, Nebr.**
**Continuation of Ser. No. 270,428, Nov. 9, 1988, Pat. No. 4,888,169, which is a continuation of Ser. No. 918,424, Oct. 14, 1986, abandoned. This application Sep. 12, 1989, Ser. No. 405,807**
**Int. Cl.$^5$ A61K *39/02;* A01N *37/00***
**U.S. Cl. 424—92** **8 Claims**

1. A process for preparing a vaccine for protecting a canine animal against disease caused by Bordetella bronchiseptica which comprises inactivating whole Bordetella bronchiseptica cells with glutaraldehyde and adding L-lysine in an amount sufficient to complex residual free glutaraldehyde groups.

---

### 5,019,389
## METHOD OF CONTROLLING CROP AND PLANT PESTS

**Robert D. Riggs, and Dong G. Kim, both of Fayetteville, Ak., assignors to University of Arkansas, Fayetteville, Ak.**
**Filed Oct. 13, 1988, Ser. No. 257,505**
**Int. Cl.$^5$ A01N *63/00***
**U.S. Cl. 424—93** **11 Claims**

1. A method for controlling crop pests and parasites comprising the step of treating a crop with a sufficient quantity of a substantially pure culture of Arkansas Fungus 18-A so as to control the pests.

---

### 5,019,390
## ANTICANCER AGENT—IMIC

**Robert D. McCarthy, deceased, late of RD Aaronsburg by Jeanne L. McCarthy, administratrix ; Arun Kilara, and David B. Pierce, both of State College, all of Pa., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.**
**Filed May 29, 1987, Ser. No. 56,504**
**Int. Cl.$^5$ H61K *35/12***
**U.S. Cl. 424—535** **17 Claims**

1. An antineoplastic agent designated IMIC having the following characteristics:
(a) present in the retentate of dialyzed skim milk;
(b) has a molecular weight of about 165–230;
(c) bound to a protein in the proteose-peptone fraction of milk;
(d) non-dialyzable in the native state;
(e) soluble in water;
(f) insoluble in organic hydrocarbon solvents;
(g) acid stable;
(h) not bound or retained by a $C_{18}$ or $C_8$ reverse phase HPLC columns.
(i) not retained by a $C_{18}$ or silica gel sep. pak;
(j) has λ maximum absorbance at 207 nm and 278 nm (UV) in neutral and acidic solution and in a basic solution at 223 and 290 nm;
(k) provides a bioactive peak with a retention time of about 7.0 to about 7.8 minutes upon fractionation by HPLC (High Performance Liquid Chromatography) on a Biorad Aminex 87 WX resin column (30 cm×7.9 mm) with 0.05 $NH_3SO_4$ as the mobile phase and with a flow rate of 0.7 ml/minute;
(l) provides a bioactive peak with a retention time of about 9.9 minutes upon fractionation on an HPLC Biorad Ag 50 WX-8 resin column (22 mm×30 cm) with 0.035N formic acid as the mobile phase and a flow rate of about 4 ml/minutes.
(m) inhibits cholesterolgenesis.

### 5,019,391
## SKIN TREATING COMPOSITION, METHOD OF PRODUCING THE SAME AND TREATMENT OF SKIN THEREWITH

**Thomas Bunte; Wolfgang Parr, and Eduard Heyl, all of Berlin, Fed. Rep. of Germany, assignors to HEYL Chemisch-parmazeutische Fabrik GmbH & Co KG, Fed. Rep. of Germany**
**Continuation-in-part of Ser. No. 209,095, Jun. 17, 1988, abandoned. This application Aug. 23, 1988, Ser. No. 235,922**
**Claims priority, application Fed. Rep. of Germany, Jun. 26, 1987, 3721190**
**Int. Cl.$^5$ A61K *35/72***
**U.S. Cl. 424—195.1** **17 Claims**

1. Cosmetic composition for the treatment of skin, comprising an exclusion volume from gel filtration of a lysate from yeast cultures of the species *Saccharomyces cerevisiae,* wherein
the isolated fraction promotes protein and biosynthesis of skin cells when applied topically, and
the active fraction being obtained by
(a) growing cultures of *Saccharomyces cerevisiae,* centrifuging the same, rinsing with physiological saline and centrifuging to obtain a sediment;
(b) suspending the thus-obtained sediment in a buffer of neutral pH, and preparing mechanically a lysate of the cells;
(c) centrifuging the thus-prepared lysate in order to remove cell nuclei and debris;
(d) subjecting the lysate to gel filtration on a cross-linked dextran to obtain an exclusion volume therefrom; and
(e) recovering said exclusion volume from the gel filtration.

---

### 5,019,392
## ENCAPSULATION OF PARASITICIDES

**Donald F. H. Wallach, Brookline, Mass., assignor to Micro-Pak, Inc., Wilmington, Del.**
**Continuation-in-part of Ser. No. 157,571, Mar. 3, 1988, Pat. No. 4,911,928, which is a continuation-in-part of Ser. No. 25,525, Mar. 13, 1987, abandoned, and a continuation-in-part of Ser. No. 78,658, Jul. 28, 1987, Pat. No. 4,855,090, and a continuation-in-part of Ser. No. 124,824, Nov. 24, 1987, Pat. No. 4,917,915. This application Dec. 20, 1988, Ser. No. 286,731**
**The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.**
**Int. Cl.$^5$ A01N *25/26;* A61K *9/127***
**U.S. Cl. 424—420** **18 Claims**

8. A formulation active against parasites comprising at least one active water insoluble parasiticide dispersed in a water immiscible oily material which acts as a carrier, said water immiscible oily material encapsulated in the amorphous central transport cavity of a paucilamellar lipid vesicle, said lipid vesicle having a nonphospholipid material selected from the group consisting of polyoxyethylene fatty esters, polyoxyethylene fatty ethers, diethanolamines, long chain acyl hexosamides, long chain acyl amino acid amides, long chain acyl amides, polyoxyethylene sorbitan oleates, polyoxyethylene glyceryl monostearates and monooleates, glycerol monostearates and monoleates, and mixtures thereof as its primary lipid source.

18. A method of treatment of animals or their products to prevent or eradicate infestation with parasites comprising the step of treating with an effective amount of the formulation of claim 8.

---

### 5,019,393
## BIOCOMPATIBLE SUBSTANCE WITH THROMBORESISTANCE

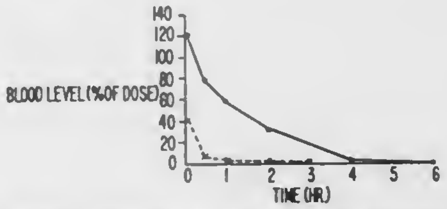
**Ralph K. Ito, Quincy, and Frank W. LoGerfo, Belmont, both of Mass., assignors to New England Deaconess Hospital Corporation, Boston, Mass.**
**Filed Aug. 3, 1988, Ser. No. 227,728**
**Int. Cl.$^5$ A61F *2/00;* A61K *9/22***
**U.S. Cl. 424—423** **37 Claims**

1. A biocompatible substance with thromboresistance comprising:
(a) a synthetic, polymeric, biocompatible material;
(b) at least one biocompatible base coat layer adhered to at least one surface of said material; and
(c) a thrombogenesis inhibitor immobilized on said base coat layer, said thrombogenesis inhibitor being other than hirudin or an active analog or fragment of hirudin,
said base coat layer having a component capable of binding said thrombogenesis inhibitor.

---

### 5,019,394
## LIPOSOME COMPOSITION AND ITS PRODUCTION

**Naoru Hamaguchi, Ibaraki; Katsumi Iga, Snita, and Yasuaki Ogawa, Otokuni, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**
**Filed Feb. 24, 1988, Ser. No. 159,945**
**Claims priority, application Japan, Feb. 25, 1987, 62-43442**
**Int. Cl.$^5$ A61K *9/127;* B01J *13/02, 13/12;* A61N *2/00***
**U.S. Cl. 424—423** **9 Claims**



1. A liposome composition for intravenous administration of a therapeutic water-soluble drug, said composition comprising a plurality of liposomes containing the water-soluble drug, said liposomes having a membrane composed of a phospholipid of which acyl groups are saturated acyl groups and an anionic surfactant having a Krafft point of 37° C. or more, and said anionic surfactant being an alkali metal salt of acyltaurine or acylmethyltaurine.

---

### 5,019,395
## COMPOSITIONS WITH ENHANCED PENETRATION

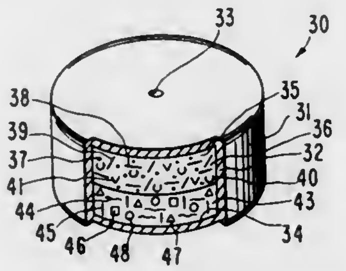
**Majid Mahjour, Netcong; Bernadette Mauser, Lyndhurst; Zahra Rashidbaigi, Morris Plains, and Edwards E. Linn, Wanaque, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**
**Continuation-in-part of Ser. No. 165,322, Mar. 8, 1988, abandoned. This application Aug. 9, 1989, Ser. No. 391,808**
**Int. Cl.$^5$ A61F *13/00***
**U.S. Cl. 424—449** **23 Claims**

1. A transmembranally administerable composition with enhanced penetration comprising:
(a) about 0.1% to about 8% of a therapeutically active medicament selected from the group consisting of diphenhydramine, tetrahydroaminoacridine, atenolol, tazifylline, 2-methoxy-4-[2-(5-methyl-1H-pyrazol-3-yl)ethenyl]-phenol, diltiazem, verapamil, estradiol, progesterone, a mixture of estradiol and progesterone and hydrocortisone,
(b) about 0% to about 99.8% of solvent, and
(c) about 0% to about 15% of silicone dioxide gelling agent.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,396
### DELIVERY DISPENSER FOR TREATING CARDIAC ARRHYTHMIAS

**Atul D. Ayer; Anthony L. Kuczynski; Patrick S. L. Wong, all of Palo Alto; Lawrence G. Hamel, Sunnyvale, and Maureen L. Jordan, Mt. View, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.**
**Filed May 12, 1989, Ser. No. 350,996**
**Int. Cl.$^5$ A61K** *9/24*
**U.S. Cl. 424—473** **7 Claims**

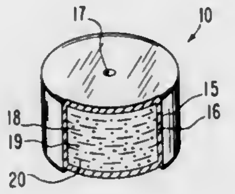


1. An improvement in an osmotic dosage form for delivering a drug to an environment of use, wherein the dosage form comprises:
(a) a wall comprising in at least a part a composition permeable to the passage of fluid, which wall defines and surrounds;
(b) an internal lumen;
(c) at least one passageway in the wall that connects the exterior with the interior of the dosage form; and wherein the improvement comprises:
(d) a first composition in the lumen comprising (1) a dosage amount of a therapeutically acceptable, (2) 10 mg to 200 mg of a polyethylene oxide comprising a 150,000 to 200,000 molecular weight, and (3) 5 mg to 200 mg of polyethylene oxide comprising a 275,000 to 325,000 molecular weight, which polyethylene oxides (2) and (3) act together for substantially lessening the incidence of a premature release of drug from the dosage form; and,
(e) a second composition in the lumen comprising a polyethylene oxide comprising from 30 mg to 240 mg of a 5,000,000 to 7,800,000 molecular weight, which second composition cooperates with the first composition during operation of the dosage form and displaces the first composition from the dosage form through the passageway in a rate controlled amount over time.

---

### 5,019,397
### AQUEOUS EMULSION FOR PHARMACEUTICAL DOSAGE FORM

**Patrick S. L. Wong, Hayward, and Felix Theeuwes, Los Altos, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.**
**Filed Apr. 21, 1988, Ser. No. 184,478**
**Int. Cl.$^5$ A61K** *9/24*
**U.S. Cl. 424—473** **4 Claims**



1. An osmotic device comprising:
(a) a wall comprising an aqueous emulsion of a lower alkylacrylate-lower methacrylate wherein the lower alkyl comprises 1 to 7 carbon atoms and an aqueous emulsion of ethyl cellulose, said wall formed by calescence at a temperature up to 65° C. for up to 72 hours, which wall surrounds;
(b) a compartment;
(c) a therapeutically effective amount of drug in the compartment; and,
(d) at least one passageway in the wall connecting the exterior with the interior of the device for delivering drug over time.

---

### 5,019,398
### PHARMACEUTICAL COMPOSITION PROVIDING THE SUSTAINED-RELEASE OF VALPROIC ACID

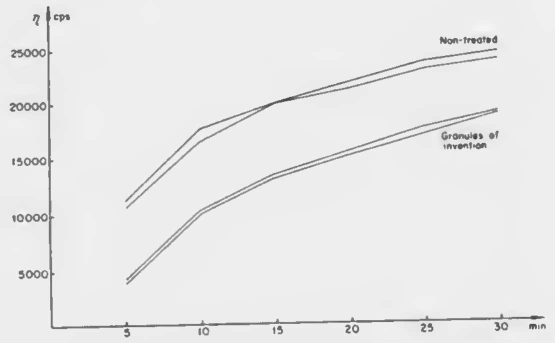
**Georges Daste, Eysines, France, assignor to Sanofi, Paris, France**
**Filed Feb. 23, 1990, Ser. No. 483,721**
**Claims priority, application France, Feb. 27, 1989, 8902493**
**Int. Cl.$^5$ A61K** *9/36*
**U.S. Cl. 424—480** **5 Claims**

1. A tablet sustaining release for more than 8 hours, the active ingredient of which is constituted by the complex formed between one mole of valproic acid and one mole of sodium valproate, and excipients comprising 8% to 10% by weight relative to the weight of the complex of a matrix of hydroxypropylmethylcellulose of viscosity from 8000 to 12000 mPa.s, and 8% to 10% by weight relative to the weight of the complex of hydrated silica.

---

### 5,019,399
### GRANULAR PRODUCT (IV)

**Curt H. Appelgren, Kungsbacka, and Ulf A. Odda, Uppsala, both of Sweden, assignors to Lejus Medical Aktiebolag, Molndal, Sweden**
**Filed Jul. 7, 1989, Ser. No. 376,577**
**Int. Cl.$^5$ A61K** *9/16*
**U.S. Cl. 424—493** **4 Claims**



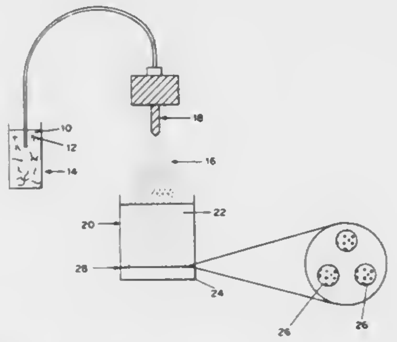
1. A wettable granular product comprising a solid product coated with a water-soluble material comprising polyethylene glycol in combination with xylitol, sorbitol, lactitol or lecithin, which water-soluble material is coated onto the solid product in the form of a melt, wherein the solid product is 70–97% by weight and the water-soluble material is 30–3% by weight.

---

### 5,019,400
### VERY LOW TEMPERATURE CASTING OF CONTROLLED RELEASE MICROSPHERES

**Wayne R. Gombotz, Lexington; Michael S. Healy, E. Bridgewater, and Larry R. Brown, Newton, all of Mass., assignors to Enzytech, Inc., Cambridge, Mass.**
**Filed May 1, 1989, Ser. No. 346,143**
**Int. Cl.$^5$ A61K** *9/58;* **B29B** *9/00;* **C08K** *7/16;* **B01J** *13/02*
**U.S. Cl. 424—497** **18 Claims**

1. A method for preparing polymeric microspheres comprising
a) freezing droplets of polymer solution by atomizing the droplets into a liquified gas, having a temperature below the freezing point of the polymer solution effective to immediately freeze the atomized polymer solution upon contact, said liquified gas overlaying a layer of frozen liquid non-solvent for the polymer, wherein the polymer solvent is miscible in the liquid non-solvent;



b) thawing the polymer solvent in the frozen droplets of polymer solution; and
c) extracting the solvent from the droplets into a liquid non-solvent to form spherical polymeric microspheres.

---

### 5,019,401
### ALUMINUM SALTS IN THE TREATMENT OF BONE DISEASE

**Marc K. Drezner, and L. Darryl Quarles, both of Durham, N.C., assignors to Duke University, Durham, N.C.**
**Continuation of Ser. No. 913,398, Sep. 30, 1986, abandoned. This application Jun. 12, 1989, Ser. No. 364,590**
**Int. Cl.$^5$ A61K** *33/14*
**U.S. Cl. 424—662** **8 Claims**

1. A liquid pharmaceutical composition for stimulating the formation of new mammalian bone, which comprises an effective amount of one or more water-soluble aluminum salts and water for injection, wherein said water-soluble aluminum salt is selected from the group consisting of aluminum acetate, aluminum bromate, aluminum chlorate, aluminum citrate, aluminum sulfate, aluminum lactate, and aluminum nitrate; said liquid composition having a concentration of said aluminum salt therein of about 0.1 to 20% by weight.

---

### 5,019,402
### COMPOSITION AND PROCEDURE FOR DISINFECTING BLOOD AND BLOOD COMPONENTS

**Robert D. Kross, Bellmore, N.Y., and David I. Scheer, Guilford, Conn., assignors to Alcide Corporation, Norwalk, Conn.**
**Continuation-in-part of Ser. No. 230,785, Aug. 10, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 483,205**
**Int. Cl.$^5$ A61K** *35/16*
**U.S. Cl. 424—665** **8 Claims**

1. A process for disinfecting blood fractions, blood components or blood cells not to include red blood cells comprising adding a chlorine dioxide liberating compound to a heat activated saccharide compound in an organic acid buffer to form a disinfecting solution wherein the saccharide compound is activated by heating at a temperature of from about 50° C. to about 150° C. for at least about 1 minute; and adding the disinfecting solution to the blood fractions, blood components or blood cells.

---

### 5,019,403
### COATINGS FOR SUBSTRATES INCLUDING HIGH MOISTURE EDIBLE SUBSTRATES

**John M. Krochta, Davis, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**
**Filed Dec. 13, 1989, Ser. No. 450,192**
**Int. Cl.$^5$ A23B** *4/10*
**U.S. Cl. 426—89** **20 Claims**

1. A method for coating a substrate, which comprises:
(a) applying an emulsion or suspension to the surface of a substrate, said emulsion or suspension comprising an aqueous solution of a water-soluble protein material and a hydrophobic material, and
(b) adjusting said protein material in said emulsion or suspension to about its isoelectric point.

---

### 5,019,404
### MULTICOLOR CONFECTION EXTRUSION SYSTEM

**Robert J. Meisner, Hinsdale, Ill., assignor to Kraft General Foods, Inc., Glenview, Ill.**
**Division of Ser. No. 921,224, Oct. 20, 1986, Pat. No. 4,925,380. This application Feb. 28, 1990, Ser. No. 486,106**
**Int. Cl.$^5$ A23L** *1/27*
**U.S. Cl. 426—249** **3 Claims**

1. A method for producing a multicolored, aerated confection product comprising the steps of:
preparing a first aerated confection blend having a predetermined color;
heating the confection blend to a processing temperature of at least about 120 degrees Fahrenheit;
dividing said aerated confection blend into a plurality of aerated confection streams;
introducing and mixing a coloring agent having a color different from the predetermined color throughout at least one of said aerated confection streams to provide a plurality of at least two differently colored aerated confection streams having substantially identical rheological properties;
separating a first one of said plurality of differently colored aerated confection streams in a first extrusion means into a first aerated confection product stream comprising a plurality of individual extrusion streams;
separating at least a second one of said plurality of differently colored aerated confection streams in a second extrusion means into a second aerated confection product stream comprising a plurality of individual extrusion streams;
combining individual ones of said extrusion streams formed from said first colored and said second colored aerated confection streams under sufficient pressure in a final extrusion means to fuse the extrusion streams together without substantial intermingling of said differently colored extrusion streams, to form multicolored strands of predetermined cross-section;
the combining step further comprising individually adjusting the flow rate of one said differently colored aerated confection streams to adjust the cross-sectional shape of each of said differently colored extrusion streams forming said multicolored strand; and
severing the multicolored strands without substantially intermingling the differently colored extrusion streams across the severed face of the severed strand pieces to produce multicolored confection products.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,405
### PROCESS FOR MANUFACTURE OF NON-BLEEDING MARASCHINO CHERRIES

**Gerald M. Sapers, Warrington, Pa., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Nov. 5, 1990, Ser. No. 608,919**

Int. Cl.$^5$ A23L *1/275*

U.S. Cl. 426—250 9 Claims

1. A method for dyeing a food commodity comprising:
(a) displacing water contained in a food commodity with ethyl alcohol to form an alcohol treated food commodity,
(b) placing said treated food commodity into an ethyl alcohol solution of a dye soluble in alcohol but insoluble in water and allowing said dye to equilibrate within the treated food commodity and alcoholic dye solution to form a dyed food commodity, and
(c) displacing the alcohol in the dyed food commodity with water while leaving said dye contained in the dyed food commodity.

---

### 5,019,406
### FIBER ADDITIVES FOR FRYING BATTERS

**Jit F. Ang; William B. Miller, and Irene M. Blais, all of Berlin, N.H., assignors to James River Corporation of Virginia, Richmond, Va.**

**Filed Jul. 13, 1989, Ser. No. 379,358**

Int. Cl.$^5$ A23B *9/14*

U.S. Cl. 426—302 15 Claims

1. A batter for coating and forming fried food products which reduces lipid retention and increases moisture content in the food product after frying including 0.3 to 3.0% by weight of an edible substantially insoluble cellulose fiber additive having an average fiber length of 50 to 500 microns.

---

### 5,019,407
### METHOD FOR PASTEURIZING LIQUID WHOLE EGG PRODUCTS

**Kenneth R. Swartzel, Raleigh, and Hershell R. Ball, Jr., New Hill, both of N.C., assignors to North Carolina State University, Raleigh, N.C.**

**Filed Jan. 23, 1990, Ser. No. 468,606**

Int. Cl.$^5$ A23B *5/005;* A23L *1/32*

U.S. Cl. 426—399 18 Claims

1. A method of pasteurizing a liquid whole egg product in a continuous flow apparatus, said method comprising the steps of:
(a) providing an egg yolk product stream and an egg white product stream;
(b) heating the egg yolk product stream to a predetermined temperature greater than the highest temperature of the egg white product stream; and then
(c) recombining the egg yolk product stream and the egg white product stream to form a whole egg product stream, the whole egg product stream having a second predetermined temperature; said second predetermined temperature being the result of recombining the egg yolk product stream and the egg white product stream.

---

### 5,019,408
### METHOD FOR THE ULTRAPASTEURIZATION OF LIQUID WHOLE EGG PRODUCTS

**Kenneth R. Swartzel; Hershell R. Ball, Jr., and Mohammad-Hossein Hamid-Samimi, all of Raleigh, N.C., assignors to North Carolina State University, Raleigh, N.C.**

**Continuation of Ser. No. 535,718, Jun. 11, 1990, Pat. No. 4,994,291, which is a continuation of Ser. No. 311,594, Feb. 16, 1989, Pat. No. 4,957,759, which is a continuation of Ser. No. 904,744, Sep. 8, 1986, Pat. No. 4,808,425. This application Dec. 17, 1990, Ser. No. 628,716**

**The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.**

Int. Cl.$^5$ A23L *3/00*

U.S. Cl. 426—399 19 Claims

1. A method of ultrapasteurizing a liquid whole egg product, comprising passing the liquid whole egg product as a continuous stream through a pasteurizing apparatus, during which the liquid whole egg product is
(a) heated to a predetermined holding temperature by contacting said liquid whole egg product to a heated surface, then
(b) maintained at said predetermined holding temperature for a predetermined holding time, and then
(c) cooled, wherein the total thermal treatment received by the liquid whole egg product is defined by an equivalent temperature and an equivalent time defining a point above the 5% SPL (BATCH) line of FIG. 3, but insufficient to cause coagulation of the liquid whole egg product, and then
(d) aseptically packaged to provide a packaged liquid whole egg product characterized by a refrigerated shelf life of about four weeks to about 36 weeks.

19. A method according to claim **1**, **4**, **8**, **12**, **16**, wherein said liquid whole egg product is a liquid whole egg blend which is about 24–38% egg solids and about 12% or less of added nonegg ingredients.

---

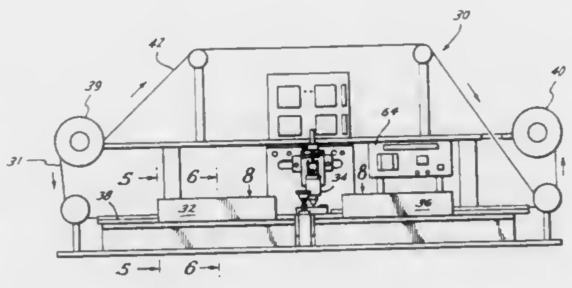
### 5,019,409
### METHOD FOR COATING THE TOP OF AN ELECTRICAL DEVICE

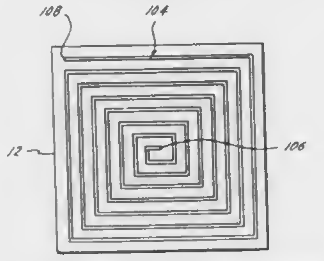
**Mary A. Wesling, and Kimberly J. Sherman, both of Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.**

**Filed Jan. 27, 1989, Ser. No. 303,512**

Int. Cl.$^5$ C23C *26/00*

U.S. Cl. 427—96 20 Claims





1. A method of encapsulating the top of an electrical device comprising,

heating the electrical device for reducing the viscosity of an applied encapsulant,
dispensing a liquid encapsulant including an epoxy resin, said encapsulant having a viscosity of greater than 15,000 c.p.s., in a plurality of separated lines onto the top of the heated electrical device by pressure through a needle while moving the needle relative to the top,
moving the needle, while dispensing the epoxy, relative to the top in a concentric pattern from the center to the perimeter of the top,
providing a coating having an average thickness of no greater than 15 mils, and
heating and gelling the coating after being applied to the device.

---

### 5,019,410
### YEAST PACKAGE

**Teresa H. Pors, Delft, and Johannes B. Van Der Plaat, Leiderdorp, both of Netherlands, assignors to Gist-Brocades NV, Delft, Netherlands**

**PCT No. PCT/NL88/00014, § 371 Date Feb. 2, 1989, § 102(e) Date Feb. 2, 1989, PCT Pub. No. WO88/07482, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 30, 1988, Ser. No. 286,949**

**Claims priority, application European Pat. Off., Apr. 2, 1987, 87200613**

Int. Cl.$^5$ C12G *1/00*

U.S. Cl. 426—8 17 Claims

1. Permeable package containing 1–500 mg yeast (dry matter) comprising a water-resistant filter material having a thickness of at least 0.12 mm which prevents the yeast from growing through the filter material during a fermentation process, and wherein the filter material is, independent of pressure during said fermentation process, permeable for water, alcohol, glucose, nutrients and carbonates and/or dissolved carbon dioxide.

---

### 5,019,411
### PROCESS FOR BACTERIAL DECONTAMINATION OF VEGETABLE FOODS

**Eric A. Johnson, Madison, Wis.; Ernani Dell'Acqua, and Lorenzo Ferrari, both of Milano, Italy, assignors to SPA Societa' Prodotti Antibiotici S.p.A., Milan, Italy**

**Filed Feb. 8, 1990, Ser. No. 476,726**

**Claims priority, application Italy, Feb. 27, 1989, 19564 A/89**

Int. Cl.$^5$ A23L *3/3463*

U.S. Cl. 426—52 5 Claims

1. A process for the decontamination of vegetable foods contaminated with Listeria comprising:
treating the surface of a vegetable with an amount of a solution comprising lysozyme, or salts thereof, and a metal chelating agent, said amount being effective to decontaminate vegetable foods contaminated with Listeria.

---

### 5,019,412
### METHOD AND APPARATUS FOR MANUFACTURING DRIED FOODS

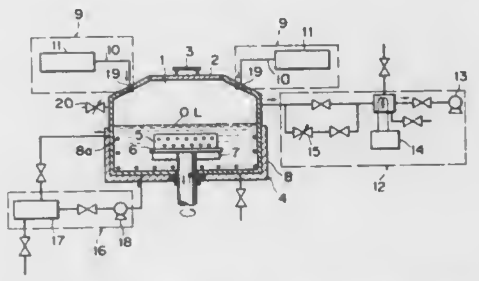
**Ryuichi Hattori, Kyoto, Japan, assignor to House Food Industrial Co., Ltd., Japan**

**Continuation of Ser. No. 238,052, Aug. 30, 1988, abandoned. This application May 15, 1989, Ser. No. 352,179**

**Claims priority, application Japan, Sep. 1, 1987, 62-218863**

Int. Cl.$^5$ A23L *1/00;* H05B *6/00*

U.S. Cl. 426—242 13 Claims



1. A method for manufacturing dried foods by radiating raw food materials with microwaves while immersed in oil under reduced pressure conditions.

---

### 5,019,413
### PROCESS FOR IMPROVING THE QUALITY OF ROBUSTA COFFEE

**Rainer Becker, Verden; Brigitte Schlabs, Bremen, and Claus Weisemann, Verden, all of Fed. Rep. of Germany, assignors to Jacobs Suchard AG, Zurich, Switzerland**

**Filed Oct. 22, 1990, Ser. No. 601,301**

**Claims priority, application Fed. Rep. of Germany, Oct. 28, 1989, 3936020**

Int. Cl.$^5$ A23F *5/02, 5/16*

U.S. Cl. 426—460 19 Claims

1. A process for improving the quality of Robusta coffee by treating raw Robusta coffee beans with steam at elevated temperatures and elevated pressure and subsequently roasting said beans, comprising the steps of increasing the water content of the Robusta coffee beans to a level ranging from 30% to 45% and subsequently treating the coffee beans with saturated steam having a temperature ranging from 135° C. to 140° C. at a pressure ranging from 3 bar to 4 bar for a time period of 40 min to 120 min, especially for removing 2-methylisoborneol.

---

### 5,019,414
### PIPEABLE GELLED FOOD AND ETHYL ALCOHOL BEVERAGES

**Mario A. Valdes, 10 Wait Street, Apt. #202, Boston, Mass. 02120**

**Continuation-in-part of Ser. No. 205,153, Jun. 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 936,269, Dec. 1, 1986, abandoned. This application Nov. 28, 1989, Ser. No. 442,061**

Int. Cl.$^5$ A23L *1/0534, 1/0532*

U.S. Cl. 426—573 14 Claims

1. An edible thickened or gelled composition of a liquid form of food product comprising:
a weight amount of said liquid form of food product to be gelled;
food grade carboxymethylcellulose in an amount of between about 0.80% and about 3.00% of said amount by weight of said liquid form of food product and wherein said food grade carboxymethylcellulose is characterized by having a degree of substitution of 7;
fractioning by sieving said composition through a fine mesh sieve; and
restirring said sieved mixture thereby producing said edible

VOL
1126
ISS
4
MY
28
1991
UMI

thickened or gelled composition in the form of a pipeable gel.

---

5,019,415

### PROCESS FOR DEPOSITING AN ADHERENT SILVER FILM

**Christian Oehr, Reusten, and Harald Suhr, Tübingen, both of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

**Filed Aug. 16, 1989, Ser. No. 394,828**

**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3828211**

**Int. Cl.$^5$ B05D** *3/06*

**U.S. Cl. 427—39** **15 Claims**

1. In a process for depositing an adherent silver film, the improvement comprising the step of depositing said silver film from a glow discharge zone in a gas phase containing a volatile silver compound, said silver compound also being an organic compound.

---

5,019,416

### METHOD OF MODIFYING THE SURFACE OF A PARTICLE COMPRISING A MAGNETIC PARTICLE

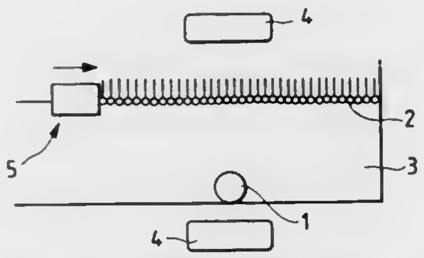
**Katsu Honzawa, Shizuoka, Japan, assignor to Hamamatsu Photonics K. K., Shizuoka, Japan**

**Filed Mar. 22, 1990, Ser. No. 497,200**

**Claims priority, application Japan, Mar. 23, 1989, 1-71350**

**Int. Cl.$^5$ B05D** *3/14*

**U.S. Cl. 427—47** **10 Claims**



1. A method of modifying a surface of a particle comprising a magnetic particle, comprising the steps of:
forming a first monomolecular film of a first compound on a surface of a liquid of a second compound;
submerging said particle comprising a magnetic particle in said liquid of a second compound; and
pulling out said particle from said liquid of a second compound by applying a magnetic force to said particle so as to cause said particle to pass through an air-film-liquid interface;
to form a first monomolecular coat of the first monomolecular film of a first compound on the surface of said particle.

---

5,019,417

### PIPE LINING SYSTEM

**Gerald G. Northcutt, P.O. Box 244, Tehachapi, Calif. 93561**

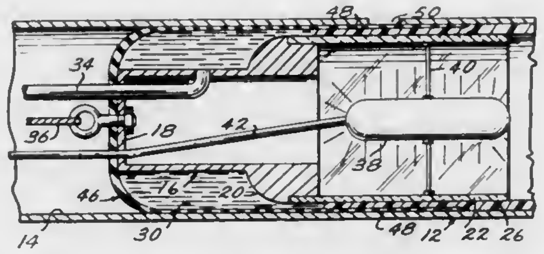
**Filed Aug. 15, 1989, Ser. No. 393,802**

**Int. Cl.$^5$ B05D** *3/06, 7/22;* **B05C** *11/02, 1/04*

**U.S. Cl. 427—54.1** **10 Claims**

1. A method of lining a pipe utilizing a pipe-received forwardly traveling apparatus comprising a forward seal and a following cylindrical platen defining a chamber therebetween, the method including the steps of:
forming the platen of a radiant energy transparent material and with an internal source of radiant energy;
introducing a flowable liner-forming material into said chamber;
distributing the flowable material in an annular space about and along said cylindrical platen between said platen and the pipe to define a constant thickness liner, and supporting said material in said space by said platen as the apparatus travels forward to form the liner in intimate contact with the pipe; and
subjecting the liner material to radiant energy through said platen, as said material is supported by said platen, for curing or accelerating the curing of the liner material.

10. Apparatus for lining a pipe with flowable lining material cured in situ, said apparatus being adapted for forward travel through a pipe during the lining thereof, and comprising a leading seal and a following spreader, said seal and said spreader being longitudinally spaced from each other and defining a chamber therebetween for receiving flowable lining material therein, platen means immediately following said spreader for forming spread lining material into intimate lining engagement with a surrounding pipe, and means for emitting radiant energy for curing or accelerating the curing of the lining material, said means for emitting radiant energy being contained within said platen means for forward travel therewith, said platen means being formed of radiant-energy transparent material, said seal includes a trailing flexible circumferential edge portion engagable with a surrounding pipe upon the introduction of the flowable lining material, said trailing peripheral edge portion of said seal extending rearwardly from said seal about said chamber and spreader, and at least partially about said platen means in outwardly spaced relation thereto for the confining of the flowable material therebetween for enhanced stability of the lining material.



---

5,019,418

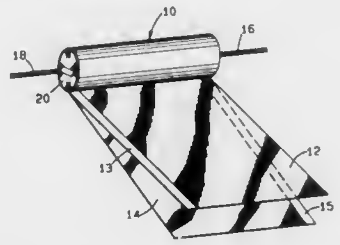
### METALLIZED FILM CAPACITOR PROCESS

**Raynor Linzey, Adams, and Herbert L. Rice, Williamstown, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.**

**Division of Ser. No. 710,834, Mar. 12, 1985, abandoned. This application May 9, 1988, Ser. No. 198,605**

**Int. Cl.$^5$ H01G** *7/00*

**U.S. Cl. 427—79** **4 Claims**



1. A process for making a self-healing metallized film capacitor comprising:
selecting a thickness of metallization to be applied to a film for termination of the capacitor;
selecting a sheet resistivity for said metallization for self-healing of the capacitor;
computing a bulk resistivity for said metallization from said thickness and said sheet resistivity;
selecting a material for said metallization having said computed bulk resistivity; and
metallizing said film with said material.

---

5,019,419

### PROCESS FOR PRODUCING AN ELECTRONIC PART

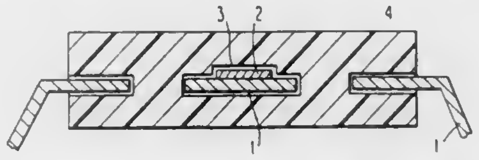
**Yasuji Matsumoto; Maya Moriyama, and Yasushi Kuwahara, all of Gunma, Japan, assignors to Toshiba Silicone Co. Ltd., Tokyo, Japan**

**Filed Nov. 29, 1989, Ser. No. 442,759**

**Claims priority, application Japan, Nov. 30, 1988, 63-302703**

**Int. Cl.$^5$ B05D** *5/12*

**U.S. Cl. 427—96** **15 Claims**



1. A process for producing an electronic part which comprises:
coating a predetermined surface of the electronic part with a composition comprising as basic ingredients 100 parts by weight of a polyorganosiloxane having an alkenyl group, 0.01 to 10 parts by weight of an organic peroxide and 0.01 to 20 parts by weight of an adhesion promoter, thereby to form a layer of the composition adhered to the predetermined surface of the electronic part;
subjecting said electronic part having adhered thereto the composition layer to heat treatment with hot air, thereby to convert said composition layer into a layer of a cured elastomer having a surface tackiness; and
forming a protective sealing resin layer on said cured elastomer layer having said surface tackiness.

---

5,019,420

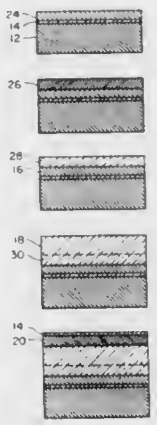
### PROCESS FOR FORMING A REDUCED ELECTROCHROMIC LAYER IN CONTACT WITH AN ION CONDUCTING OXIDE

**R. David Rauh, Newton, Mass., assignor to EIC Laboratories, Inc., Norwood, Mass.**

**Filed Jan. 17, 1989, Ser. No. 297,760**

**Int. Cl.$^5$ G02F** *1/01;* **B05D** *5/12*

**U.S. Cl. 427—126.3** **7 Claims**



4. A process for forming an electrochromic device comprising,
depositing onto a substrate a transparent electrically conducting layer,
depositing upon the deposited transparent electrically conducting layer an electrochromic layer,
depositing upon the deposited electrochromic layer a metallic thin film capable of injecting insertion atoms into said electrochromic layer which metallic thin film is from the group consisting of a metallic alloy and metallic composite to form a resultant layered structure,
depositing upon said resultant layered structure in an oxidizing atmosphere an ionically conducting oxide,
depositing upon the deposited ionically conducting oxide a counter electrode,
and depositing upon the deposited counter electrode a second transparent electrically conducting layer.

---

5,019,421

### METHOD OF MAKING A THERMOCOLOR RIBBON FOR A THERMAL PRINTING PROCESS

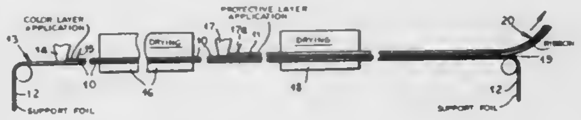
**Norbert Mecke, Hanover, and Heinrich Krauter, Neustadt, both of Fed. Rep. of Germany, assignors to Pelikan Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Filed May 12, 1989, Ser. No. 351,624**

**Claims priority, application Fed. Rep. of Germany, May 16, 1988, 3816636**

**Int. Cl.$^5$ B41M** *3/12*

**U.S. Cl. 427—152** **8 Claims**



1. A method of making a thermal-transfer ribbon which comprises the steps of:
(a) forming a transfer layer composed of at least one binder selected from the group which consists of waxes and plastic materials and at least one coloring agent incorporated in said binder, said transfer layer melting upon heating to a melting temperatures sufficient to transfer a portion of said layer in a symbol pattern; and
(b) applying to one side of said transfer layer, a protective polymer layer by coating said side of said transfer layer with at least one polymerizable substance selected from the group which consists of a monomer and a prepolymer, and subjecting said substance to in situ polymerization, said monomer being selected from the group which consists of styrene and substituted acrylates, and said prepolymer being selected from the group which consists of reactive acrylate resins, unsaturated polyester resins and acrylate-modified epoxide resins.

---

5,019,422

### METHOD FOR PRODUCING A LIQUID IMPERMEABLE, GAS PERMEABLE FOAM BARRIER

**Kenneth R. Rose, and Martin M. Williams, both of Harrisburg, N.C., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Filed Feb. 27, 1989, Ser. No. 316,459**

**Int. Cl.$^5$ B05D** *5/00*

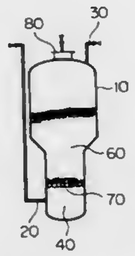
**U.S. Cl. 427—245** **41 Claims**

1. A process for producing a liquid impermeable, gas permeable, microporous, polymeric foam barrier system which comprises the steps of:
introducing a gas into a polymeric latex to form a gas permeable microporous foam;
applying said foam to a substrate;
drying the foam upon said substrate;
applying to the dried foam a composition for imparting liquid repellency thereto; and
curing the resulting foam barrier system by subjecting the resulting foam barrier system to an elevated temperature.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,423
### EQUIPMENT AND METHOD FOR SUPPLY OF ORGANIC METAL COMPOUND

**Atsuhiko Hiai, Takaishi, and Kazuo Wakimura, Sennan, both of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Japan**
**Filed Dec. 21, 1988, Ser. No. 289,807**
**Claims priority, application Japan, Dec. 24, 1987, 62-325385**
**Int. Cl.$^5$ C23C** *16/00*
**U.S. Cl. 427—248.1** **10 Claims**



1. Supply equipment for stable supply of feed gas of an organic metal compound at a constant concentration which comprises a generally cylindrical vessel having a solid organic metal compound housed therein, said vessel comprising an upper cylinder supported on and extending upwardly from a smaller diameter, coaxial lower cylinder,

an inlet tube communicating with said lower cylinder for providing carrier gas for vaporizing said organic metal compound, an outlet tube communicating with said upper cylinder for letting out the carrier gas substantially saturated with the vaporized organic metal compound,

a room provided in the lower part of the lower cylinder of the vessel, said room being connected to said carrier gas inlet tube,

a packet bed of a solid organic metal compound formed above said room and extending upwardly from said lower cylinder into said upper cylinder, and

a partition with a plurality of pores in said lower cylinder partitioning said room and said packed bed, the carrier gas introduced into said room in said lower cylinder being passed through said partition to and through said packed bed whereby it becomes substantially saturated with the organic metal compound, said organic metal compound-saturated carrier gas emerging from said packed bed into said upper cylinder and exiting said equipment through said outlet tube.

---

### 5,019,424
### METHOD OF PRODUCING A DECORATIVE CONTAINER

**John Strelnieks, Indianapolis, Ind., assignor to Moonflower Vases Company, Indianapolis, Minn.**
**Filed Dec. 12, 1988, Ser. No. 283,292**
**Int. Cl.$^5$ B05D** *3/12, 5/06, 7/24*
**U.S. Cl. 427—264** **11 Claims**

1. A method of producing a decorative container comprising the steps of:

dipping a rigid container in a first bath of molten colored wax to adhere a layer of said wax to said container;

removing the container from the bath;

holding the container out of the bath long enough for the adhered layer of wax on the container to solidify;

dipping the wax container into a second bath of molten wax of a second color to adhere a second layer of wax to the solidified first layer of wax;

removing the waxed container from the second bath;

holding the container out of the bath long enough for the second layer of wax to solidify; and

carving designs completely through at least the second layer of wax.

---

### 5,019,425
### PROCESS FOR THE PRE-TREATMENT OF SYNTHETIC MATERIALS

**Michael Römer, and Ludwig Stein, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**
**Filed Nov. 23, 1988, Ser. No. 275,712**
**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3740369**
**Int. Cl.$^5$ B05D** *3/10*
**U.S. Cl. 427—305** **22 Claims**

1. Process for pretreatment of a synthetic material selected from the group consisting of polyetherimide, polycarbonate and polyester-Co-carbonate for adhesive chemical metallization, comprising the step of applying from 0.05 to 200 gm/l of a quaternary base having a pH value of 13-14 dissolved in an organic solvent selected from the group consisting of water-soluble organic solvents, alcohol-soluble organic solvents and ether-soluble organic solvents onto said material selected from the group consisting of polyetherimide, polycarbonate and polyester-Co-carbonate, said quaternary base being selected from the group consisting of quaternary phosphonium and quaternary arsonium hydroxides, so that said metallization provides an adherent metal layer on said material.

---

### 5,019,426
### TOPICAL TREATMENT FOR SEALING CARBON AND GRAPHITE SURFACES

**James B. Noe, Florence, Ala., and Charles C. Chiu, Strongsville, Ohio, assignors to Union Carbide Corporation, Danbury, Conn.**
**Continuation-in-part of Ser. No. 62,635, Jun. 16, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 274,778**
**Int. Cl.$^5$ B05D** *3/02*
**U.S. Cl. 427—314** **12 Claims**

1. A method for converting a molded carbon or graphite porous body into a carbon or graphite structure having a nonporous surface comprising the steps of:

(a) forming a low viscosity treating solution composed of a polymerizable resin selected from the group consisting of polyimides, polybenzimidazoles, bismaleimides, polyarylketones, and polyphenylene sulfides dissolved in a solvent;

(b) applying said treating solution to the surface of said carbon or graphite porous body;

(c) repeating step (b) for a sufficient number of times until the porosity of the surface of said carbon or graphite body is essentially eliminated; and

(d) treating the surface of the carbon or graphite body to slowly raise the temperature at the surface to a temperature between about 240° C. and 450° C. and at a heating rate between 25° C. per hour and 60° C. per hour to polymerize the resin in situ without carbonizing said resin so as to form an essentially carbon or graphite body with a non-porous surface.

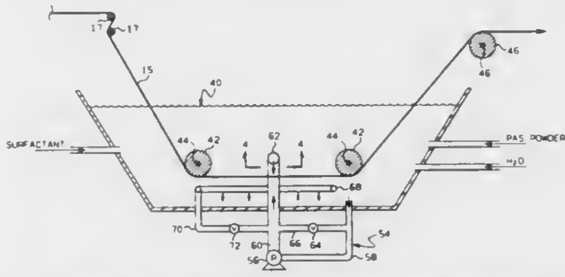
---

### 5,019,427
### APPARATUS AND PROCESS FOR IMPROVED THERMOPLASTIC PREPREG MATERIALS

**David A. Soules, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**
**Filed Apr. 24, 1989, Ser. No. 342,415**
**Int. Cl.$^5$ B05D** *3/02*
**U.S. Cl. 427—375** **13 Claims**

1. In a method of producing prepreg material, the improvement comprising:

(a) passing a plurality of filaments through a slurry bath containing a thermoplastic resin to be impregnated into and coated on the filaments, and



(b) while in said slurry bath, contacting said plurality of filaments with at leas one high velocity curtain of said slurry.

---

### 5,019,428
### MODIFIED POLYURETHANES CONTAINING PERFLUOROALIPHATIC GROUPS AND USE THEREOF

**Simpert Lüdemann, Bobingen; Michael Bernheim, Aystetten; Bernhard Sandner, Diedorf; Erich Rössler, Stadtbergen-Leitershofen, and Hans-Burkhardt Vogel, Lörrach/Brombach, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Filed Jan. 25, 1989, Ser. No. 301,681**
**Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3802633; Sep. 16, 1988, 3831452**
**Int. Cl.$^5$ B05D** *3/02*
**U.S. Cl. 427—387** **16 Claims**

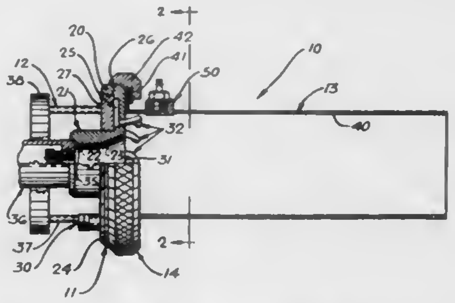
1. A method for the oil or water repellent finishing of a fiber material which comprises the step of applying, in the form of an organic solution or aqueous dispersion, a modified polyurethane which contains perfluoroaliphatic groups and is obtained by reacting an oligo(poly)urethane containing free hydroxyl or isocyanate groups and perfluoroaliphatic groups ($R_f$) (compound 1) with a polysiloxane having at least 2 functional groups (compound 2) at elevated temperature in the presence or absence of an inert gas atmosphere and in the presence or absence of a catalyst and within or without a carrier medium, the equivalence ratio between the free hydroxyl and isocyanate groups on the oligo(poly) urethane and the functional groups on the polysiloxane reacting therewith having been chosen in such a way that all the reactive groups on compound (1) have been converted.

---

### 5,019,429
### HIGH DENSITY THERMAL SPRAY COATING AND PROCESS

**Larry N. Moskowitz, and Donald J. Lindley, both of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.**
**Continuation-in-part of Ser. No. 138,815, Dec. 28, 1987, Pat. No. 4,869,936. This application Aug. 11, 1989, Ser. No. 392,451**
**The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.**
**Int. Cl.$^5$ B05D** *3/00*
**U.S. Cl. 427—422** **9 Claims**

1. A method of depositing a layer on a substrate in an atmosphere containing ambient air having an oxygen content above about 1,000 parts per million comprising directing a high velocity jet stream of hot gases carrying metal particles at said substrate through a shroud effective to maintain a helically flowing stream of inert gas substantially concentrically around the particle carrying jet stream so as to essentially isolate said particle carrying jet stream from said atmosphere, wherein the volume of voids and oxide inclusions in said layer represents



less than about 1% of said layer's volume, and oxide in said layer represents less than about 1% of the layer by weight.

---

### 5,019,430
### METHOD OF PRODUCING A SILICON CARBIDE-BASED BODY

**Ian Higgins, Preston, and Andrew Baxendale, Up Holland, both of United Kingdom, assignors to United Kingdom Atomic Energy Authority, London, England**
**Filed Nov. 3, 1989, Ser. No. 431,209**
**Claims priority, application United Kingdom, Nov. 10, 1988, 8826299; Mar. 20, 1989, 8906342**
**Int. Cl.$^5$ C04B** *35/56*
**U.S. Cl. 427—430.1** **11 Claims**

1. A method of producing a body comprising silicon carbide, the method comprising, infiltrating with molten silicon a porous compact comprising silicon carbide and carbon so that the silicon reacts with the carbon, the compact including a secondary phase dispersed within the compact, the secondary phase comprising a titanium compound having a particle size between 5 and 30 μm.

---

### 5,019,431
### METHOD OF MAKING ARTIFICIAL FOLIAGE

**David L. Osment, and Dwayne Fulton, both of Osage Beach, Mo., assignors to Osment Models, Inc., Linn Creek, Mo.**
**Filed Oct. 20, 1989, Ser. No. 425,057**
**Int. Cl.$^5$ B32B** *27/40;* **B44F** *7/00*
**U.S. Cl. 428—15** **7 Claims**

1. A method of preparing substrate-free simulated vegetation for use in man made replications of natural landscapes, said method comprising:

providing a mass of finely ground foamed particles;

providing a quantity of an adhesive solution characterized by the ability to bind said ground particles together;

mixing said adhesive solution and said ground particles together to thoroughly coat the latter with the former thereby forming a homogeneous mass;

placing said homogeneous mass onto a substrate;

drying said homogeneous mass to remove the adhesive solvent components of said solution; and

removing said dried homogeneous mass from said substrate.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,432
### CONTAINER FOR STABILIZED AQUEOUS PHOSPHOENOLPYRUVIC ACID

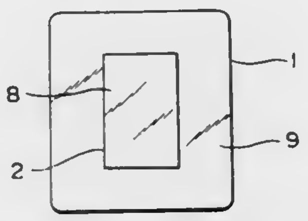
**Hirotaka Kawamura; Norio Obtsu, both of Ube, and Shinichiro Utiumi, Tokyo, all of Japan, assignors to Ube Industries, Ltd., Ube, Japan**

**Division of Ser. No. 126,602, Nov. 30, 1987, Pat. No. 4,889,943. This application Oct. 10, 1989, Ser. No. 419,152**

**Claims priority, application Japan, Dec. 5, 1986, 61-288937; Dec. 12, 1986, 61-294750**

**Int. Cl.$^5$ B65D** *30/22*

**U.S. Cl. 428—35.4** **33 Claims**



1. A container in combination with a solution of phosphoenolpyruvic acid, the container comprising an outer bag comprising a polyvinyl chloride type resin and an inner bag comprising an alkali resistant resin, said inner bag having stored therein an aqueous solution of phosphoenolpyruvic acid or a salt thereof at a pH of 10 to 13.

---

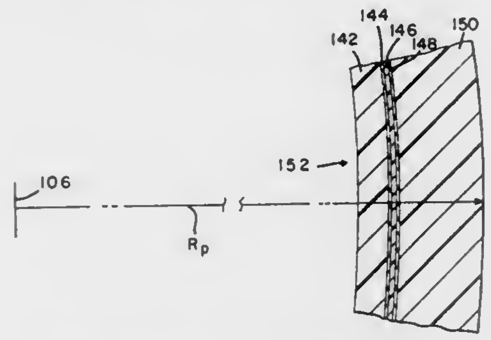
### 5,019,433
### MULTI-LAYER MOLTEN PLASTIC BODY

**Milton Briggs, York, Pa., and Erich O. Teutsch, Marietta, Ga., assignors to General Electric Corporation, N.Y. and Graham Engineering Corporation, Pa.**

**Continuation of Ser. No. 221,547, Jul. 20, 1988, abandoned, which is a division of Ser. No. 922,198, Oct. 23, 1986, Pat. No. 4,798,526, which is a continuation of Ser. No. 886,734, Jul. 17, 1986, abandoned, and Ser. No. 878,701, Jun. 26, 1986, abandoned. This application Nov. 3, 1989, Ser. No. 432,412**

**Int. Cl.$^5$ B65D** *1/02*

**U.S. Cl. 428—35.7** **3 Claims**



1. A synthetic polymeric resin parison having an annular body flowed through the die of a co-extrusion head, the body comprising;

- a first substrate tube of a first synthetic polymeric resin having a high melt flow temperature within a first predetermined range; and
- a second substrate tube of a second synthetic polymeric resin concentric with and in surface-to-surface contact with the first substrate tube, said second resin having a low melt flow temperature about 200 degrees F. less than the first predetermined range and being continuous and undegraded.

---

### 5,019,434
### MOLDED SLOW-RELEASE AIR FRESHENER

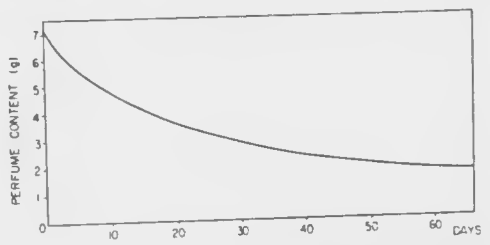
**Yuichi Matsumoto, Abiko, Japan, assignor to Soda Aromatic Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 69,293, Jul. 2, 1987, abandoned. This application Oct. 26, 1989, Ser. No. 427,977**

**Claims priority, application Japan, Jul. 8, 1986, 61-158779**

**Int. Cl.$^5$ A61L** *9/04*

**U.S. Cl. 428—35.7** **41 Claims**



1. A molded slow-release air freshener prepared by having a liquid perfume composition absorbed into a porous sheet-like product which has been obtained by partially melt-bonding the particles of an ethylene-vinyl acetate copolymer powder in the form of a sheet with each other to obtain said porous sheet-like product having continuous gas-permeable pores and a bulk density in the range of 0.4 to 0.8 g/cm$^3$, said molded slow-release air freshener having an increased apparent volume of at least 1.2 times as large as its apparent volume before the absorption of said liquid perfume composition.

---

### 5,019,435
### COMPOSITE REINFORCEMENT ELEMENTS WOVEN IN THREE DIMENSIONS

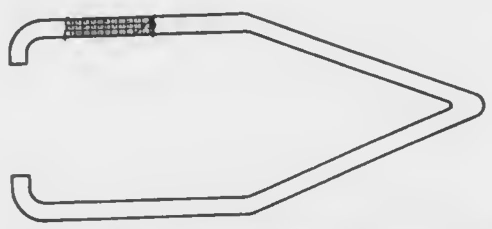
**Georges J. J. Cahuzac, Sait Jean D'Illac, and Francois Monget, Merignac, both of France, assignors to Societe Nationale Industrielle et Aerospatiale, Paris, France**

**Division of Ser. No. 173,754, Mar. 22, 1988, Pat. No. 4,917,756. This application Apr. 24, 1989, Ser. No. 342,486**

**Claims priority, application France, Mar. 25, 1987, 87 04126**

**Int. Cl.$^5$ B32B** *3/10, 5/12, 9/00*

**U.S. Cl. 428—36.1** **6 Claims**



1. A composite reinforcement element of complex evolutive shape woven in three dimensions and at least three directions, comprising at least three superimposed and crossed even layers of threads, and a continuous thread extending perpendicularly through said layers, said layers being impregnated with a binder, said binder being polymerized after impregnation, wherein said layers are initially maintained assembled, before the impregnation and the polymerization of the binder, merely by a conjugate action of gripping and friction of the threads of the layers on said continuous thread which extends therethrough and which forms on an internal surface of the element successive protruding open loops which are interconnected on the external surface of the element, said continuous thread being maintained in position solely by frictional forces.

---

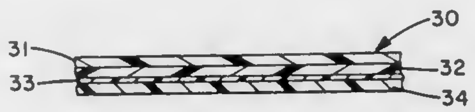
### 5,019,436
### LABEL ASSEMBLY AND METHOD OF MANUFACTURING

**Kurt M. Schramer, 4267 Hile Rd., Stow, Ohio 44224; Alfred W. Norman, 158 Stonington Dr., Hudson, Ohio 44236, and Kevin Nelson, 4725 Periwinkle Ct., Appleton, Wis. 54915**

**Filed Sep. 19, 1988, Ser. No. 246,080**

**Int. Cl.$^5$ G09F** *3/00*

**U.S. Cl. 428—40** **23 Claims**



1. A label assembly having two parts comprising:

- a base stock being constructed of first and second layers of polymer material having first and second surfaces, said first surfaces of each being bonded by controlled adhesion to each other to create a releasable interfacial bond therebetween;
- said second layer of polymer material being provided with a first adhesive layer over its second surface for application to a mounting surface;
- a face stock being constructed of a top sheet with first and second surfaces having a second adhesive layer over its second surface;
- said face stock being adhered to said base stock on said second surface of said first layer of polymer material by means of said second adhesive layer;
- a releasable portion being formed when said face stock is adhered to said base stock wherein said face stock and said first layer of polymer material are separable from said base stock wherein said interfacial bond has sufficient strength to allow handling of said label assembly without separation of said releasable portion until such separation is desired by breaking said releasable interfacial bond between said first and second layers of polymer material.

---

### 5,019,437
### REPAIRABLE BROADLOOM CARPET

**Robert S. Weiner, Marietta, Ga., assignor to Prince St. Technologies Ltd., Atlanta, Ga.**

**Filed Apr. 20, 1989, Ser. No. 340,637**

**Int. Cl.$^5$ B32B** *33/00, 27/12*

**U.S. Cl. 428—87** **27 Claims**

1. A broadloom carpet having a backing system comprising synthetic fibers, and which substantially exhibits an "invisible edge" when cut, said broadloom carpet including:

- a broadloom pile;
- a primary backing supporting said broadloom pile comprising synthetic fibers;
- a secondary backing that comprises synthetic fibers and which is adhesively bonded to said primary backing to provide said primary backing with added stiffness, said secondary backing being coatable with a pressure-sensitive adhesive to allow said broadloom carpet to be layed upon a floor in a manner similar to laying of floor tile, said primary and secondary backing being further characterized by a total weight per square yard of approximately 47 ounces; and
- a latex adhesive for bonding said primary and secondary backings that is characterized by a minimum scrim delamination peel strength of approximately 5 pounds per inch and a minimum tuft binding strength of approximately 16 pounds.

---

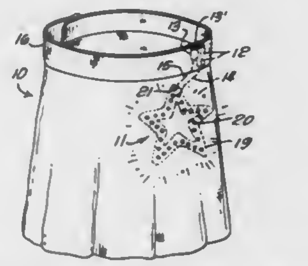
### 5,019,438
### LEATHER ARTICLE DECORATED WITH LIGHT EMITTING DIODES

**Carmen Rapisarda, 1715 Edgecomb, Covina, Calif. 91724**

**Filed Nov. 16, 1989, Ser. No. 437,193**

**Int. Cl.$^5$ B32B** *9/02;* **D06C** *23/00*

**U.S. Cl. 428—102** **5 Claims**



1. A leather article decorated with light emitting diodes comprising:

- an area of flexible leather having an outer surface and an inner surface;
- a first length of flat, braided conductor sewn against the inner surface of said area of flexible leather;
- a second length of flat, braided conductor sewn against the inner surface of said area of flexible leather, said second length being sewn parallel to but spaced from said first length;
- a plurality of holes formed in said area of leather between said first and second lengths;
- a plurality of light emitting diodes, each diode having a lens portion, and a first and a second lead extending therefrom and positioned on the back of said area of leather, each first lead being electrically connected to said first length of flat, braided conductor and each second lead being electrically connected to said second length of flat, braided conductor, and said lens portion of each light emitting diode extending through one of said plurality of holes in said area of leather; and
- battery means connected through switch means to said first and second lengths whereby when said switch means is closed, the light emitting diodes are energized.

---

### 5,019,439
### THERMOPLASTIC RESIN FILM MATRIX WITH CONTINUOUS TAPES

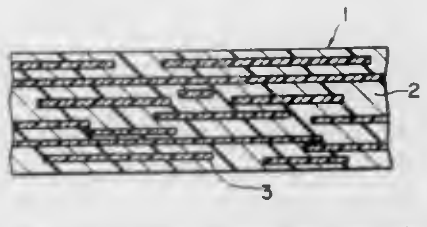
**Yoshiaki Momose, Hadano, Japan, assignor to JSP Corporation, Japan**

**Continuation-in-part of Ser. No. 335,852, Apr. 10, 1989, abandoned. This application Dec. 22, 1989, Ser. No. 455,020**

**Claims priority, application Japan, Apr. 12, 1988, 63-88244; Apr. 22, 1988, 63-99720; European Pat. Off., Apr. 11, 1989, 89303547**

**Int. Cl.$^5$ B32B** *5/02, 3/12, 27/02, 27/04*

**U.S. Cl. 428—178** **15 Claims**



1. A composite, thermoplastic resin film comprising a matrix in the form of a film and formed of a first thermoplastic resin, and a plurality of substantially continuous tapes dispersed within said matrix with the plane of each of said tapes being substantially parallel with the plane of said matrix and each formed of a second thermoplastic resin different from said first

VOL
1126
ISS
4
MY
28
1991
UMI

resin, a portion of said tapes having a width of at least 200 times the thickness of the matrix so that the composite film has an oxygen permeation rate of 0.12–900 cc/m$^2$.day.atm at a temperature of 20° C. and a relative humidity of 65%.

---

### 5,019,440
### DECORATIVE PLATE

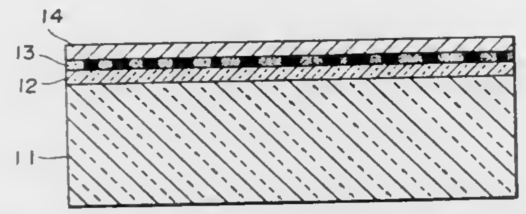
**Yasukichi Ogasawara; Kazuo Ishige, and Keizo Ogata, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 269,715, Nov. 10, 1988, abandoned. This application Oct. 4, 1989, Ser. No. 417,077**

**Claims priority, application Japan, Nov. 18, 1987, 62-176150[U]; May 26, 1989, 1-61034[U]**

**Int. Cl.$^5$ B32B** *9/00*

**U.S. Cl. 428—195** **19 Claims**



1. A decorative glass plate comprising a primer layer of light-permeable polyurethane resin which is a room temperature-curing resin and has a thickness of 100 $\mu$m, a transfer-printing layer of a printed image formed of an ink containing a pigment and a binder, and a cured resin layer, these layers being formed consecutively on one surface of a light-permeable glass plate.

---

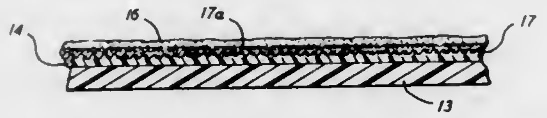
### 5,019,441
### METHOD OF RESTORING AND CONSERVING OIL PAINTINGS AND RESULTING INTEGRATED PERMANENT STRUCTURE

**Harold I. Zeliger, 18 Spring Hill Ter., Spring Valley, N.Y. 10977, and Frank J. Nussbaum, Point Lookout, N.Y., assignors to Harold I. Zeliger**

**Filed Mar. 20, 1989, Ser. No. 326,019**

**Int. Cl.$^5$ B32B** *35/00, 3/00*

**U.S. Cl. 428—196** **15 Claims**



1. A process for integrating and conserving an oil painting on canvas, the painting including a layer of oil paint having an exposed face surface, a ground layer, and a layer of woven canvas having an exposed back surface, the paint layer being attached to the ground layer on the canvas layer, wherein the comprises:

a) removing at least the port of the back surface of the canvas layer bearing paint sufficient to break the weave so as to eliminate any stress introduced by the canvas layer in the paint layer;

b) providing a dimensionally stable new backing of a material having a life expectancy comparable to the expected life of the paint in the paint layer, the backing having a front face and a back face;

c) applying a uniform coating of a liquid coherant to at least one of the back of the painting and the front face of the new backing, the liquid coherant being capable of penetrating the remaining canvas layer and ground layer and of curing to a form having a life expectancy comparable to the life expectancy of the new backing material and of securely bonding, in the cured form, to the paint layer and to the new backing material without any deleterious effect on the paint layer; and

d) compressing and integrating the painting and the new backing together by applying uniform pressure to the face surface of the paint layer and to the rear face of the backing until the coherant has cured.

---

### 5,019,442
### OVERLAY FILMS

**Tadatoshi Ogawa, and Seiichiro Ima, both of Ichihara, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Jul. 25, 1989, Ser. No. 385,079**

**Claims priority, application Japan, Jul. 29, 1988, 63-191922**

**Int. Cl.$^5$ B32B** *27/08*

**U.S. Cl. 428—215** **16 Claims**

1. An overlay film which comprises

(1) a base layer and

(2) a substrate layer formed on at least one side of said base layer, consisting of a resin composition which comprises

(i) 10 to 95% by weight of at least one ethylene copolymer containing 50 to 95% by weight of ethylene unit selected from the group consisting of ethyleneacrylic acid ester copolymers, ethylene-methacrylic acid ester copolymers, ethylene-acrylic acid copolymer, ethylene-methacylic acid copolymer, ethylene-unsaturated glycidylate copolymers, ethylene-unsaturated dicarboxylic acid anhydride-acrylic acid ester terpolymers and ethylene-unsaturated dicarboxylic acid anhydridemethacrylic acid ester terpolymers and

(ii) 5 to 90% by weight of a crystalline polyolefin having a melting point of 110° C. or higher.

---

### 5,019,443
### CURVED, LAMINATED IMPACT-RESISTANT PANEL

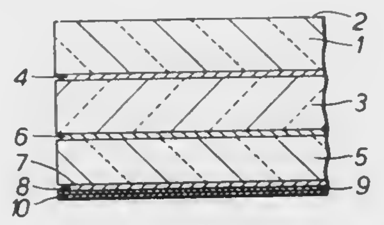
**Christopher W. G. Hall, Redditch, England, assignor to Pilkington plc, Merseyside, England**

**Division of Ser. No. 114,405, Oct. 20, 1987, Pat. No. 4,908,083, Continuation-in-part of Ser. No. 22,521, Mar. 9, 1987, abandoned, Continuation of Ser. No. 879,498, Jun. 24, 1986, abandoned, which is a continuation of Ser. No. 718,271, Apr. 1, 1985, abandoned. This application Dec. 12, 1989, Ser. No. 448,964**

**Claims priority, application United Kingdom, Apr. 4, 1984, 8408664; Jan. 8, 1985, 8500471**

**Int. Cl.$^5$ B32B** *17/10, 27/36*

**U.S. Cl. 428—215** **16 Claims**



1. A curved, laminated, impact-resistant panel having a front glass sheet and a rear glass sheet, the rear glass sheet having a front face and a rear face which is opposite to the face of the panel which receives the impact, and a polycarbonate sheet up to about 1 mm thick which is adhered to the rear face of said rear glass sheet without preforming to match the conformation of the rear glass sheet, and which carries a thin self healing, polyurethane coating of thickness up to about 0.5 mm.

### 5,019,444
### POLYVINYLIDENE FLUORIDE PRODUCTS WITH A SURFACE ADAPTED TO ADHERE TO AN INCOMPATIBLE POLYMER AND PROCESS FOR TREATING THE SURFACE OF A POLYVINYLIDENE FLUORIDE MATERIAL TO ENABLE IT TO ADHERE TO AN INCOMPATIBLE POLYMER

**Gilbert Duperray, Civrieus D'Azergues, and Daniel Wolff, Lyon, both of France, assignors to Atochem, France**

**Filed Jun. 5, 1989, Ser. No. 361,267**

**Claims priority, application France, Jun. 9, 1988, 8807696**

**Int. Cl.$^5$ B32B** *5/16, 27/08;* **B05D** *3/08*

**U.S. Cl. 428—262** **15 Claims**

1. A polyvinylidene fluoride product having at least one surface with improved adhesion to an incompatible polymer, said at least one surface covered with a porous polyvinylidene fluoride layer adhered thereto without a bonding intermediate.

5. The product of claim **1**, wherein the polyvinylidene fluoride layer is a resilient, porous polyvinylidene fluoride cloth.

---

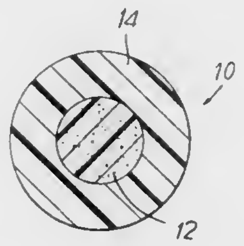
### 5,019,445
### WHITE BLACKOUT FABRIC

**Herschel Sternlieb, Brunswick, Me., assignor to Charles Samelson Co., New York, N.Y.**

**Continuation-in-part of Ser. No. 362,084, Jun. 5, 1989, abandoned, which is a continuation-in-part of Ser. No. 233,013, Aug. 17, 1988, abandoned. This application Jun. 22, 1990, Ser. No. 542,014**

**Int. Cl.$^5$ B32B** *5/16;* **D02G** *3/00*

**U.S. Cl. 428—323** **10 Claims**



1. A white blackout fiber consisting essentially of a polymeric core component and a polymeric sheath component, said core component containing a light blocking substance that substantially prevents the transmission of light therethrough and a whitening agent, said sheath component containing a whitening agent therein, said light blocking substance in said core component being 0.005–0.01% of the weight of the core component, said whitening agent being in the core and the sheath component combined in the amount of 3%–10% by weight of the fiber.

---

### 5,019,446
### ENHANCEMENT OF MECHANICAL PROPERTIES OF POLYMERS BY THIN FLAKE ADDITION AND APPARATUS FOR PRODUCING SUCH THIN FLAKES

**Lee R. Bunnell, Sr., Kennewick, Wash., assignor to Battelle Memorial Institute, Richland, Wash.**

**Division of Ser. No. 275,071, Nov. 21, 1988, Pat. No. 4,987,175. This application Oct. 18, 1990, Ser. No. 599,889**

**Int. Cl.$^5$ C08K** *7/00*

**U.S. Cl. 428—324** **10 Claims**

1. A composition comprising:

a polymer; and

a flake reinforcing material distributed throughout the polymer in an effective amount to structurally reinforce the polymer, individual flakes of the flake reinforcing material

(a) being less than or equal to 1000 Angstroms in thickness,

(b) having an aspect ratio greater than or equal to 100, and

(c) being significantly oriented throughout the polymer to render the composition anisotropic.

---

### 5,019,447
### ORIENTED POLYPROPYLENE FILM STRUCTURE

**Lajos E. Keller, Luxemburg, Luxembourg, assignor to Mobil Oil Corporation, Fairfax, Va.**

**Continuation of Ser. No. 178,994, Feb. 3, 1988, abandoned. This application Dec. 12, 1989, Ser. No. 453,136**

**Claims priority, application United Kingdom, Apr. 18, 1986, 8609550**

**Int. Cl.$^5$ B32B** *5/16*

**U.S. Cl. 428—327** **7 Claims**

1. In an oriented polypropylene film structure which comprises an oriented propylene polymer base layer, a layer of a vinyidene chloride polymer on at least one surface of the base layer and a metal layer applied directly to the vinylidene chloride polymer layer, the improvement comprising employing a vinylidene chloride polymer layer which contains less than 0.3% by weight of migratable emulsifier such that the gloss of the metal layer and the adhesion of the metal layer to vinylidene chloride polymer are improved as compared to those obtained with a vinylidene chloride polymer layer containing more than 0.3% by weight of migratable emulsifier.

---

### 5,019,448
### COMPOSITE PANEL

**Wilhelm Kleosch, and Dietmar Plöbst, both of Kaprun, Austria, assignors to Intec Plastic Products Gesellschaft m.b.H., Piesendorf, Austria**

**Filed Aug. 22, 1988, Ser. No. 234,950**

**Claims priority, application Austria, Aug. 24, 1987, 2106/87**

**Int. Cl.$^5$ B32B** *27/08*

**U.S. Cl. 428—332** **2 Claims**

1. A composite panel from which an internal bathtub casing can be manufactured by deep drawing, which panel comprises an acrylonitrile-butadiene-styrene substrate, a coating of poly(-methyl methacrylate) on said substrate, and a top coat having a thickness of from more than 0.1 mm to less than 0.5 mm on said coating, which top coat consists of a mixture of 30–70 weight % of polyvinylidene fluoride and the remainder of poly(methyl methacrylate).

---

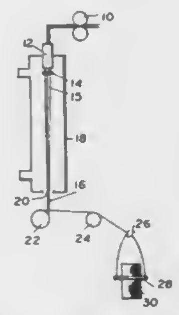
### 5,019,449
### SPINNERET AND YARN PRODUCED THEREBY

**Wade J. Truesdale, York, S.C.; Bryan B. Moore, Pineville, N.C., and Greg F. Benjock, Rock Hill, S.C., assignors to Celanese Fibers, Inc., New York, N.Y.**

**Filed Mar. 10, 1987, Ser. No. 24,119**

**Int. Cl.$^5$ D02G** *3/00*

**U.S. Cl. 428—397** **14 Claims**



1. A cellulose acetate filament for the production of yarn, said filament having a cross-sectional shape comprised of a pair of generally symmetrical polygonal sub-sections each having at least three lobes and joined one to the other by a bridging portion extending between adjacent facing sides of said sub-sections.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,450
### FIBER REINFORCED COMPOSITIONS AND METHOD OF PRODUCING SUCH COMPOSITIONS

**Frederic N. Cogswell, Welwyn Garden City; David J. Hezzell, Biggleswade, and Peter J. Williams, Barton-le-Clay, all of England, assignors to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 133,237, Dec. 14, 1987, abandoned, which is a continuation of Ser. No. 804,114, Dec. 3, 1985, abandoned, which is a division of Ser. No. 537,713, Sep. 30, 1983, Pat. No. 4,559,262, which is a continuation of Ser. No. 341,186, Jan. 20, 1982, abandoned. This application Aug. 30, 1989, Ser. No. 401,488**

**Claims priority, application United Kingdom, Jan. 21, 1981, 8101821; Jul. 28, 1981, 8123160; Nov. 17, 1981, 8134597**

**The portion of the term of this patent subsequent to Dec. 17, 2002, has been disclaimed.**

**Int. Cl.$^5$ B32B** *5/08*

**U.S. Cl. 428—402** **7 Claims**

1. Pellets of reinforced thermoplastics material containing at least 30% by volume of parallel, aligned reinforcing filaments between 2 and 100 mm in length, the filaments extending through the length of the pellets, the pellets having been cut from a continuous reinforced product prepared by melt pultrusion and which pellets can be injection moulded into an article in which the fibres are present in the form of randomly dispersed individual filaments at least 50% by weight of the filaments of the pellets retaining a length of greater than 2 mm in the moulded article.

---

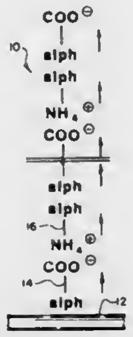
### 5,019,451
### NON-CENTROSYMMETRIC, MULTI-LAYER LANGMUIR-BLODGETT FILMS

**Jerome B. Lando, Shaker Heights, Ohio, assignor to Edison Polymer Innovation Corp., Broadview Heights, Ohio**

**Filed Apr. 27, 1989, Ser. No. 344,276**

**Int. Cl.$^5$ B32B** *9/00*

**U.S. Cl. 428—411.1** **8 Claims**



1. A non-centrosymmetric polymerized film structure formed from unsaturated, amphiphilic, polymerizable salts having molecular configurations adapted for ordering in adjacent parallel rows, wherein a plurality of said adjacent ordered parallel rows are positioned in substantially adjacent monomolecular parallel layers to form said film structure having up to about nine layers, said salts comprising members selected from the group consisting of (1) a terminally unsaturated, straight chain aliphatic acid in association with a terminally unsaturated, straight chain aliphatic amine, and (2) an unsaturated polymerizable salt containing both a polar group and a mesogen, being capable of mesomorphic molecular arrangement.

---

### 5,019,452
### THERMAL TRANSFER MATERIAL

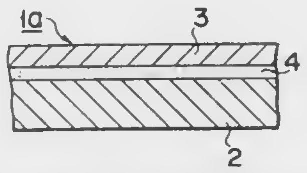
**Niro Watanabe, Oomiya; Masato Yoshida, Kasukabe, and Noriyuki Ito, Saitama, all of Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 168,183, Mar. 15, 1988, abandoned. This application Jun. 6, 1990, Ser. No. 534,357**

**Claims priority, application Japan, Mar. 18, 1987, 62-63529; Nov. 4, 1987, 62-278896; Nov. 28, 1987, 62-301377**

**Int. Cl.$^5$ B41M** *5/26*

**U.S. Cl. 428—422** **6 Claims**



1. A thermal transfer material comprising:
a heat-resistant support; and
a first thermal transfer recording layer stacked on said support and mainly consisting of a coloring agent, a hot-melt material comprising a linear saturated polyester resin prepared by condensation polymerization of a dicarboxylic acid component and diol component and having a glass transition point falling within the range of 50° to 110° C., and a lubricating agent selected from the group consisting of Teflon and polyethylene, said hot-melt material being capable of being thermally transferred and adhesively secured to an image receiving layer to form an adhesively secured image.

---

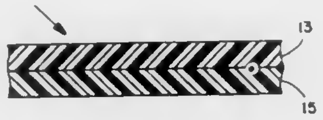
### 5,019,453
### COMPOSITE MATERIAL AND METHOD OF MAKING SAME

**Richard J. Guerra, 32 B St., Hudson, N.H. 03051**

**Division of Ser. No. 775,207, Sep. 12, 1985. This application Sep. 22, 1987, Ser. No. 99,806**

**Int. Cl.$^5$ B32B** *27/08*

**U.S. Cl. 428—518** **40 Claims**



1. A method for forming a laminate comprising a first layer of polyolefin and a second layer of vinylidene chloride homopolymer or copolymer, the method comprising the steps of:
applying a solution comprising a hexavalent chromium compound and an acid to the second layer;
substantially removing the solution from the second layer; and
simultaneously pressing together and heating the first layer and the second layer to form a laminate.

---

### 5,019,454
### POWDERS FOR PRODUCING HARD MATERIALS IN SHORT REACTION TIMES FOR FILLING HOLLOW WIRES FOR ELECTRIC ARC SPRAYING

**Karl-Hermann Busse, Friedrichplatz 6, D-5900 Siegen-Geisweid, Fed. Rep. of Germany**

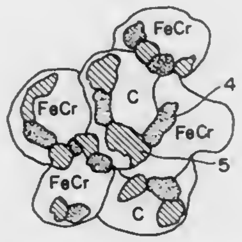
**Filed Jul. 20, 1988, Ser. No. 233,100**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1987, 3730753**

**Int. Cl.$^5$ B22F** *1/00*

**U.S. Cl. 428—570** **2 Claims**

1. Powders for producing hard materials in short reaction times, comprising granules of metallic and nonmetallic starting materials bonded to one another by spray-drying or agglomeration using organic or inorganic binders, said metallic starting materials being selected from the group consisting of Al, Ni, Ti, Cr, Mo, V, Zr and Ta and said nonmetallic starting materials being selected from the group consisting of $Cr_3C_2$, WC, C, SiC, $TiB_2$, $CrB_2$, $B_4C$, TiC, VC, TiN and $Si_3N_4$, whereby said metallic and non-metallic starting materials react exothermically during electric arc spraying to produce a hard substance, further comprising at least one member selected from the group consisting of $Cr_2O_3$, $ZrO_2$, $TiO_2$, CoO, $Al_2O_3$ and $CeO_2$.



---

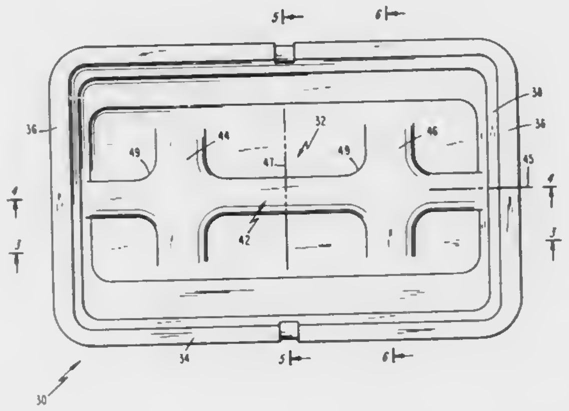
### 5,019,455
### SOW MOLD AND SOW INGOT

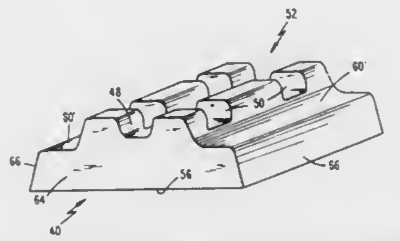
**Robert Downie; Ray D. Peterson; Nolan E. Richards, and Roger D. White, all of Lauderdale County, Ala., assignors to Reynolds Metal Company, Richmond, Va.**

**Filed Oct. 30, 1989, Ser. No. 428,525**

**Int. Cl.$^5$ B22D** *3/00, 7/06*

**U.S. Cl. 428—584** **21 Claims**





1. A mold for casting a molten metal into a metal ingot, comprising a mold box having a bottom wall and side walls projecting upward from the bottom wall to define a mold cavity therewith for receiving said molten metal, said bottom wall including a first raised zone projecting into the cavity and extending longitudinally along the length direction of the bottom wall and adapted to form a longitudinal depression of corresponding cross section into a bottom surface of the ingot formed therein, and at least two second raised zones projecting into the cavity and extending transversely along the width of the bottom wall and adapted to form respective transverse depressions of corresponding cross section in a bottom surface of the ingot, wherein said second raised zones define raised depressions in the ingot bottom communnicating with opposing longitudinal sides of the ingot and which raised depressions are spaced from each other to receive a pair of fork lift tines entering said depressions from a direction generally perpendicular to one of the opposing longitudinal ingot sides for ease of handling;

13. In a sow ingot cast from a molten metal, the improvement comprising a bottom surface of the ingot including a longitudinally extending depression and at least two transversely extending depressions configured to define an ingot bottom surface to volume ratio enabling a solidification front in the molten metal to occur that generally moves from the bottom surface to a top surface of the ingot wherein said at least two transversely extending depressions communicate with longitudinally extending sides of the ingot and are spaced from each other to receive a pair of fork lift blades entering the depressions from a direction perpendicular to one of the longitudinally extending sides for ease of handling.

---

### 5,019,456
### ARTICLE WHICH CAN CHANGE ITS SHAPE

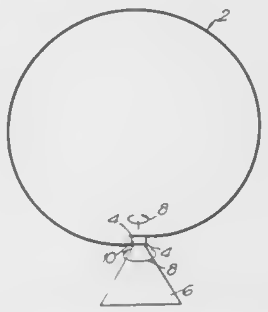
**Jean-Marc Philippe, Paris, France, assignor to Raychem Corporation, Menlo Park, Calif.**

**Filed Aug. 25, 1988, Ser. No. 236,572**

**Claims priority, application United Kingdom, Aug. 25, 1987, 8720025**

**Int. Cl.$^5$ H01H** *37/46*

**U.S. Cl. 428—591** **8 Claims**



1. An article comprising a strip of material and at least one actuator capable of moving spaced apart points of the strip relative to each other wherein the actuator is arranged to move the spaced apart points of the strip relative to each other in single or parallel planes.

---

### 5,019,457
### CONDUCTOR USED AS A FUSE

**Masanobu Nishio, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Continuation of Ser. No. 281,838, Dec. 8, 1988, abandoned. This application Feb. 7, 1990, Ser. No. 477,132**

**Claims priority, application Japan, Oct. 13, 1988, 63-258050; Nov. 24, 1988, 63-296881**

**Int. Cl.$^5$ C22C** *11/00;* **H01B** *1/02;* **H01H** *85/06*

**U.S. Cl. 428—606** **4 Claims**

1. An integrated circuit component, comprising a fuse conductor wire having a diameter within the range of 0.05 to 0.3 mm, said fuse conductor wire being made of an alloy consisting of 3 to 20% by weight of silver the balance being lead and any unavoidable impurity, said alloy enabling drawing said fuse conductor wire down to said diameter range of 0.05 to 0.3 mm for assuring a circuit breaker current suitable for protecting said integrated circuit component.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,458

## PROTECTED SILVERED SUBSTRATES AND MIRRORS CONTAINING THE SAME

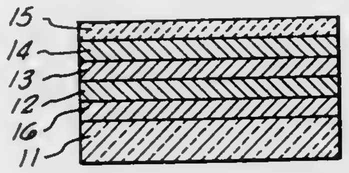
**Zvi Elgat, and Joel P. Warschawski, both of Jerusalem, Israel, assignors to Luz Industries Israel, Ltd., Jerusalem, Israel**

**Filed Apr. 19, 1989, Ser. No. 340,421**

**Claims priority, application Israel, May 12, 1988, 86366**

**Int. Cl.⁵ G02B *5/08***

**U.S. Cl. 428—630** **7 Claims**



5. A weather and abrasion resistance front surface solar concentrator mirror comprising a substrate having a layer of substantially silver, deposited on the outer surface thereof, a layer of zinc sulfide secured to said silver layer, a layer of aluminum oxide secured to said layer of zinc sulfide and a layer of silicon dioxide secured to said layer of aluminum oxide, and further including a layer of $Al_2O_3$ or chromium-nickel alloy between said substrate and said layer of substantially silver to improve the adhesion of said silver layer to said substrate.

---

### 5,019,459

## HIGH TEMPERTURE CORROSION RESISTANT BIMETALLIC CYLINDER

**Schiao F. Chou, Pulaski, and Willie Roberson, Blacksburg, both of Va., assignors to Xaloy Incorporated, Pulaski, Va.**

**Filed Apr. 5, 1990, Ser. No. 505,159**

**Int. Cl.⁵ C22C *30/00, 19/03;* B32B *15/00***

**U.S. Cl. 428—656** **16 Claims**

1. A cylinder for an injection molding machine, said cylinder being formed of a steel selected from the group consisting of ASTM 193B-16 carbon steel and duplex stainless steel, and having a corrosion and wear resistant, carbide-and boride-containing, alloy inlay comprising the following ingredients in approximately the proportions set forth below:

| Ingredient | Weight Percent |
|---|---|
| Carbon | 1.5 to 4.5 |
| Silicon | 1.5 to 3.5 |
| Boron | 1.0 to 3.0 |
| Cobalt | 1.0 to 6.0 |
| Tungsten | 30.0 to 60.0 |
| Nickel | balance |

---

### 5,019,460

## GALVANNEALED STEEL SHEET HAVING IMPROVED SPOT-WELDABILITY

**Akira Yasuda; Hideo Koumura; Koji Yamato, and Koichi Yasuda, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,515**

**Int. Cl.⁵ B32B *15/00***

**U.S. Cl. 428—659** **2 Claims**

1. A method of producing a galvannealed steel sheet having superior spot-weldability characteristics, comprising the steps of: in a conventional cold rolling line, producing a cold rolled steel sheet containing 0.005 wt% or less of C. 0.005 to 0.05 wt% of Ti, 0.01 to 0.1 wt% of Al, 0.005 to 0.015 wt% of Nb and 0.0002 to 0.002 wt% of B, annealing said steel sheet at a temperature ranging between 770° and 900° C.; rapidly cooling the annealed steel sheet to a temperature ranging between 380° C. and 530° C. at a cooling rate of 10°C./sec or more; in a continuous hot-dip galvanizing process, dipping said steel sheet into a galvanizing bath having an A1 content of 0.13 wt% or more so as to form a galvanized sheet; and subjecting said sheet to a heat-treatment to obtain an galvannealed sheet whose Fe content of the surface layer ranges between 9 and 12 wt%.

---

### 5,019,461

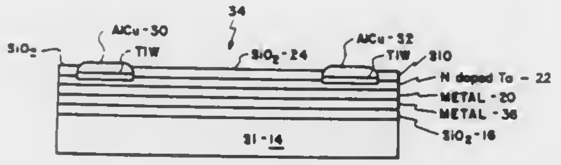
## RESISTIVE OVERLAYER FOR THIN FILM DEVICES

**James A. Schuetz, Maple Grove, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Dec. 8, 1986, Ser. No. 939,316**

**Int. Cl.⁵ B32B *15/04;* H01L *27/12***

**U.S. Cl. 428—688** **8 Claims**



1. A thin film solid state device, wherein electrical current can flow through said device from a first to a second location, said device comprising:

a semiconductor substrate having a principal surface;

an insulating material on said principal surface;

an electrically conductive thin film material overlying said insulating material;

a resistive material overlying, at least in part, and being in contact with, said conductive thin film material, wherein said first and said second locations are on a surface of said resistive material, said surface of said resistive material being oppositely disposed from said conductive thin film material, wherein said resistive layer will not diffuse into said conductive thin film conductive material, and wherein said conductive thin film material; and said resistive material each are continuous between said first and said second locations; and

electrical contacts at said first and said second locations, wherein the resistivity and dimensions of said resistive material and of said locations are such that less than half of said current will flow solely within said resistive material in passing between said first and said second locations through said contacts, and such that magnitude of said current will remain above a desired level.

---

### 5,019,462

## SHEET-LIKE, MULTILAYER MAGNETO-OPTICAL RECORDING MATERIAL

**Helmut Steininger, Worms, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Jan. 24, 1989, Ser. No. 301,026**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1988, 3803000**

**Int. Cl.⁵ G11B *7/00***

**U.S. Cl. 428—694** **9 Claims**

1. A magneto-optical recording element comprising:

(A) an optically transparent dimensionally stable substrate and

(B) a thermally alterable recording layer which contains an amorphous lanthanide/transition metal alloy and, at least on the side facing away from the substrate (A) has a 0.1–20 nm thick surface zone with an outer interface and an inner interface and which contains one or more of the substances carbon, oxygen and nitrogen wherein the concentration of one or more of said substances in the surface zone initially decreases then increases and thereafter decreases, from its outer interface to its inner interface, this occurring once or repeatedly, so that separate strata result.

---

### 5,019,463

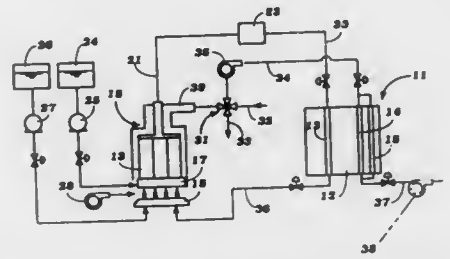
## FUEL CELL SYSTEM

**Hisayoshi Matsubara; Yutaka Mizuno, and Toshiharu Hanajima, all of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Oct. 26, 1989, Ser. No. 427,756**

**Int. Cl.⁵ H01M *8/04***

**U.S. Cl. 429—12** **9 Claims**



1. A fuel cell system for generating electrical power from a reaction of a reformed fuel with air in said fuel cell comprising a source of fuel, a reformer for reforming fuel from said source through the application of heated air thereto, and valve means for selectively supplying the heated air exhausted from said reformer to an air port of said fuel cell for rapid start up or unheated air to the air port of said fuel cell for normal operation thereof.

---

### 5,019,464

## MOLTEN CARBONATE FUEL BATTERY WITH ELECTROLYTE MIGRATION CONTROL

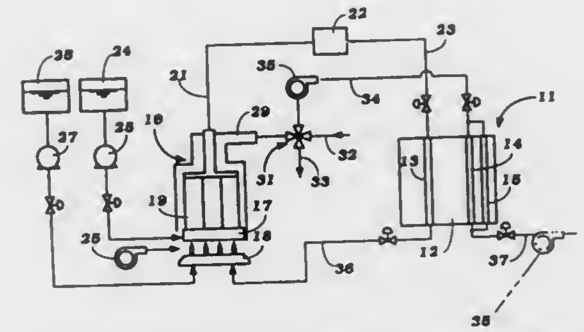
**Kenro Mitsuda; Hideo Maeda; Hiroaki Urushibata, and Toshiaki Murahashi, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 27, 1990, Ser. No. 499,656**

**Claims priority, application Japan, Aug. 3, 1989, 1-203221**

**Int. Cl.⁵ H01M *8/14***

**U.S. Cl. 429—34** **2 Claims**



1. A molten carbonate fuel battery comprising a stack of molten carbonate fuel cells with separators disposed between adjacent cells, each cell including an anode electrode, an anode reaction gas flow path, a cathode electrode, a cathode reaction gas flow path and a matrix, the cells at the respective ends of the stack including the end anode and end cathode which define the negative and positive ends of the stack, respectively; said stack further including an half-cell anode disposed on the outer side of said end cathode of the stack with a separator disposed between said end cathode and said half-cell anode, and a half-cell cathode disposed on the outer side of said end anode of the stack with a separator disposed between said end anode and said half-cell cathode, said half-cell anode including an anode electrode and an anode reaction gas flow path, but not including a matrix, said half-cell cathode including a cathode electrode and a cathode reaction gas flow path, but not including a matrix.

---

### 5,019,465

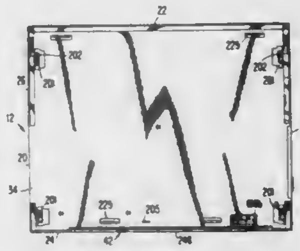
## LOCKING ARRANGEMENT FOR A BATTERY PACK

**Matthew A. Herron, and Dennis J. Boyle, both of Menlo Park, Calif., assignors to Dynabook Technologies Corporation, Westlake Village, Calif.**

**Filed Mar. 6, 1989, Ser. No. 319,179**

**Int. Cl.⁵ H01M *2/10***

**U.S. Cl. 429—97** **11 Claims**



1. A removable battery pack apparatus for use with an appliance having surface contact means for electrical engagement with mating contact means on said apparatus when said apparatus and said appliance are disposed in mutually assembled relation, said apparatus comprising:

a housing for battery cells including oppositely spaced, generally flat, plate-like members forming the upper and lower surfaces of said housing and a side wall extending about the periphery of said housing between and interconnecting said upper and lower surface-forming members;

contact means on the upper of said surfaces for electrical engagement with mating contact means on said appliance when said battery pack is operatively attached to said appliance;

coupling means including a plurality of mutually spaced hook-shaped coupling elements which open in the direction of said contact means on one of said apparatus and said appliance engageable with mating receptacles on the other, and operative to induce relative movement between said apparatus and said appliance to effect a wiping action between the contact means on the respective elements when said apparatus and said appliance undergo relative movement to and from the latched position therebetween.

---

### 5,019,466

## ELECTROCHEMICAL CELL

**Johan Coetzer; Anthony A. Meintjes, both of Pretoria, and Keith T. Adendorff, Springs, all of South Africa, assignors to Lilliwyte Societe Anonyme, Luxembourg**

**Filed Dec. 20, 1989, Ser. No. 452,828**

**The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.**

**Int. Cl.⁵ H01M *4/36;* C25C *3/02***

**U.S. Cl. 429—103** **22 Claims**

1. A method of making an electrochemical cell of the type comprising an anode compartment containing at the operating temperature of the cell and when the cell is in its charged state, a molten alkali metal anode, and a cathode compartment containing, at said operating temperature and when the cell is in its discharged state, an alkali metal aluminium halide molten salt electrolyte which is also molten at the operating temperature of the cell, and having the formula $MAlHal_4$, wherein M is the alkali metal of the anode and Hal is a halide, the cathode compartment containing also a cathode which comprises an electronically conductive electrolyte-permeable matrix which has

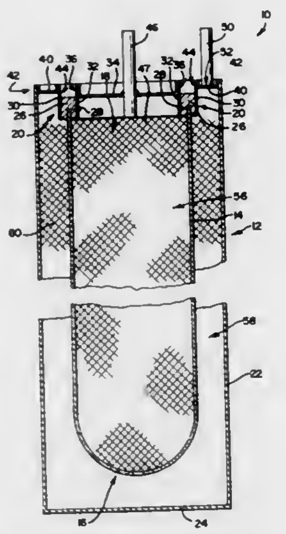
VOL
1126
ISS
4
MY
28
1991
UMI

dispersed therein Cu as an active cathode substance, the matrix being impregnated with said electrolyte, and, separating the anode compartment from the cathode compartment, a separator which comprises a solid conductor of the ions of the alkali metal of the anode or a micromolecular sieve which contains said alkali metal sorbed therein, the method comprising

loading into the cathode compartment of a cell housing comprising an anode compartment separated from a cathode compartment by a separator which is a solid conductor of ions of alkali metal M or is a micromolecular sieve which contains alkali metal M sorbed therein,

an alkali metal aluminium halide molten salt electrolyte having the formula $MAlHal_4$ wherein M is the alkali metal of the anode and Hal is a halide;

Cu as an active cathode substance; and



an alkali metal halide MHal wherein M and Hal are respectively an alkali metal and a halide; thereby to make an electrochemical cell precursor; and

charging the precursor at a temperature at which the molten salt electrolyte and alkali metal M are molten, thereby to halogenate the Cu, with alkali metal being produced and passing through the separator into the anode compartment, the proportions of alkali metal halide MHal, Cu and molten salt electrolyte loaded into the cathode compartment being selected so that when the cell is fully charged and all the available active cathode substance has been halogenated, the proportion of alkali metal ions and aluminium ions is such that the solubility of the active cathode substance in the molten electrolyte is at or near its minimum.

---

### 5,019,467
## THIN PRIMARY CELL

**Yasuo Fujiwara, Urawa, Japan, assignor to Kimoto & Co., Ltd., Japan**

**Continuation of Ser. No. 196,623, May 19, 1988, abandoned.**
**This application Jul. 10, 1989, Ser. No. 377,741**
**Claims priority, application Japan, Nov. 13, 1987, 62-286922**
**Int. Cl.⁵ H01M** *6/18*

**U.S. Cl. 429—127** 6 Claims

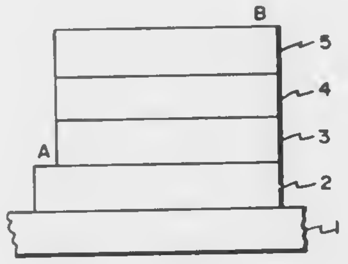
1. A thin primary cell, in the form of at least one ply of a flexible film of a thickness sufficiently thin to allow the film to be cut by scissors to a length providing a selected size and capacity, said film having a thickness of not more than 0.10 mm and consisting of the following layers, in succession:

a positive current collection layer composed of a first polymer and a particulate conductive material selected from the group consisting of carbon grains, carbon fibers, graphite and metallic oxides dispersed in a matrix of said first polymer and having a thickness of 0.1–20 μm;

a positive active layer consisting essentially of a particulate manganese dioxide dispersed in a second polymer and having a thickness of 0.1–20 μm;

a solid polyelectrolyte layer composed of a matrix of a non-crystalline polymer and an alkali metal salt dispersed in said non-crystalline polymeric matrix and having a thickness of 0.1–10 μm; and

a thin metallic film layer having a thickness of 1–50 μm.



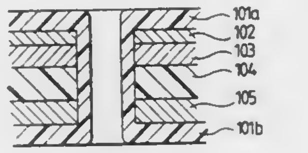
---

### 5,019,468
## SHEET TYPE STORAGE BATTERY AND PRINTED WIRING BOARD CONTAINING THE SAME

**Takeshi Miyabayashi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Oct. 24, 1989, Ser. No. 425,952**
**Claims priority, application Japan, Oct. 27, 1988, 63-271792; Oct. 28, 1988, 63-274251; Oct. 31, 1988, 63-274776; Oct. 31, 1988, 63-274778**
**Int. Cl.⁵ H01M** *10/02*

**U.S. Cl. 429—191** 3 Claims



1. A sheet type storage battery, comprising:

a negative electrode layer;

a solid electrolyte layer;

a positive electrode layer, said negative electrode layer, said solid electrolyte layer and said positive electrode layer being laminated in this order;

at least one throughhole formed through said negative electrode layer, said solid electrolyte layer and said positive electrolyte layer; and

a thermoplastic resin film laminated on at least one of the surfaces of said positive and negative electrode layers and on an inner surface of said throughhole, said thermoplastic film being extendible and weldable by an ultrasonic welding.

---

### 5,019,469
## PROCESS FOR PRODUCTION OF AN ELECTROCHEMICAL SUB-ASSEMBLY COMPRISING AN ELECTRODE AND AN ELECTROLYTE, AND THE SUB-ASSEMBLY OBTAINED IN THIS WAY

**Daniel Muller, Pau, France, assignor to Societe Nationale Elf Aquitaine, Courbevoie, France and Hydro-Quebec, Montreal, Canada**

**Division of Ser. No. 333,625, Feb. 21, 1989, Pat. No. 4,968,319.**
**This application May 7, 1990, Ser. No. 519,464**
**Claims priority, application PCT Int'l Appl., Jun. 16, 1980, PCT/FR88/00314**
**Int. Cl.⁵ H01M** *6/18*

**U.S. Cl. 429—192** 6 Claims

1. An electrochemical two-layer electrolyte/electrode sub-

assembly comprising, in the form of thin films, a layer of a composite positive electrode composed of the agglomeration product in a composite mass of material with ion conduction, composed of a salt in solution in a macromolecular material, an electrochemically active material and an electron conductor material, and of a solid electrolyte layer itself comprised of a salt in solution in a macromolecular material, characterized by the fact that it presents a chemical and physical continuum between the macromolecular material of the positive electrode and that of the electrolyte at the interface of the positive electrode and electrolyte layers.

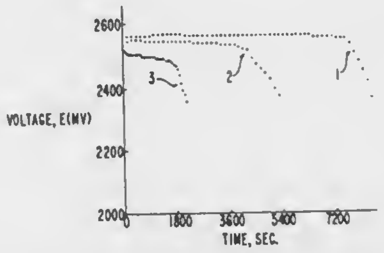
---

### 5,019,470
## METAL CHLORIDE CATHODE FOR A BATTERY

**Ratnakumar V. Bugga, Arcadia; Salvador DiStefano, Albambre, and C. Perry Bankston, Studio City, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 30, 1990, Ser. No. 503,409**
**Int. Cl.⁵ H01M** *4/58, 4/04*

**U.S. Cl. 429—223** 14 Claims



1. In a method of fabricating a rechargeable battery which includes a positive electrode which contains a chloride of a selected metal when the electrode is in its active state, the improvement comprising fabricating the positive electrode by: providing a porous matrix composed of a metal which is at least as noble as the selected metal; providing a solution of the chloride of the selected metal; and impregnating the matrix with the chloride from the solution.

---

### 5,019,471
## MULTICOLOR IMAGE PRODUCT

**Hisashi Mino, Saitama; Takeshi Iijima, Higashimatsuyama, and Kuniaki Monden, Sakado, all of Japan, assignors to Sanyo-Kokusaku Pulp Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 225,582, Jul. 28, 1988, abandoned, which is a continuation of Ser. No. 914,578, Oct. 3, 1986, abandoned, which is a continuation of Ser. No. 634,254, Jul. 25, 1984, abandoned. This application Aug. 10, 1989, Ser. No. 391,827**
**Claims priority, application Japan, Jul. 25, 1983, 58-137346**
**Int. Cl.⁵ G03C** *1/90, 11/12*

**U.S. Cl. 430—11** 5 Claims

1. A two-color image product comprising:

(A) a transfer support sheet;

(B) an adhesive layer of a heat-fusible and bondable material on a surface of said transfer support sheet;

(C) a first image layer of a first color and comprising image areas of a water-insoluble resin component and non-image areas, said image areas being bonded to the surface of said adhesive layer;

(D) a first intermediate layer consisting of a single layer of a material which is harmless to hue and transparency and having opposed first and second surfaces, said second surface of said first intermediate layer being adhered to the image area of the first image layer and directly fused to said adhesive layer at the non-image areas of the first image layer, said first intermediate layer at its second surface being:

(1) non-sticky at room temperature,

(2) heat-fusible and directly transferable to another heat-fusible surface at a temperature which prevents dimensional change and deformation of the surfaces so as to provide exact registration of the two-color image, and

(3) water-insoluble;

said first intermediate layer at its first surface being:

(1) non-sticky at room temperature,

(2) heat-fusible and directly transferable to another image or heat-fusible surface at a temperature which prevents dimensional change and deformation of the surfaces so as to provide exact registration of the two-color image, and

(3) water-insoluble;

(E) a second image layer of a second color and comprising image areas of a water-insoluble resin component and non-image areas, said image areas being bonded to the first surface of the first intermediate layer; and

(F) a second intermediate layer consisting of a single layer of a material which is harmless to hue and transparency and having opposed first and second surfaces, said second surface of said second intermediate layer being adhered to the image areas of the second image layer and being directly fused to the first surface of the first intermediate layer at the non-image areas of the second image layer, said second intermediate layer at its second surface being:

(1) non-sticky at room temperature,

(2) heat-fusible and directly transferable to another heat-fusible surface at a temperature which prevents dimensional change and deformation of the surfaces so as to provide exact registration of the two-color image, and

(3) water-insoluble; and

said second intermediate layer at its first surface being:

(1) non-sticky at room temperature,

(2) heat-fusible and directly transferable to another image or heat-fusible surface at a temperature which prevents dimensional change and deformation of the surfaces so as to provide exact registration of the two-color image, and

(3) water-insoluble.

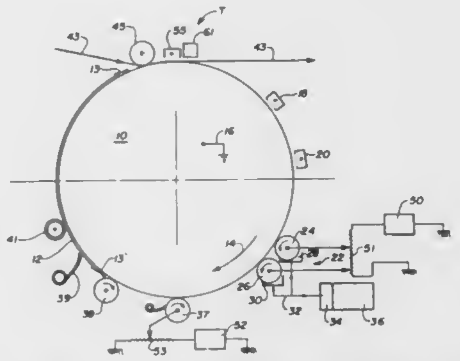
---

### 5,019,472
## METHOD FOR DUPLICATING PRESS CHARACTERISTIC DOT GAIN IN ELECTROSTATIC PROOFING SYSTEMS

**Kerin S. Benack, Chicago, Ill., and Arthur J. Taggi, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Sep. 12, 1988, Ser. No. 243,293**
**Int. Cl.⁵ G03G** *13/01*

**U.S. Cl. 430—43** 11 Claims



1. A method for use in a halftone electrostatic proofing system comprising a plurality of printing stations, each one of the stations having a master with a latent halftone electrostatic image, a corona charging module adapted to deposit a charge on the master, a toning module for applying an electrostatic toner to the master and a transfer station for transferring toner from the master to a transfer paper, the image consisting of a plurality of dots having varying diameters and conductivity

VOL
1126
ISS
4
MY
28
1991
UMI

different than a remainder of the master, comprising the steps of:

applying a layer of liquid toner on one of the masters; and

subjecting the image with the layer of the toner to a preselected electrical field to control toner receptivity of portions of the image to produce a predetermined change in the diameter of the dots to simulate a printed image having a predetermined dot gain in accordance with desired dot gain values, wherein the subjecting step further comprises producing the change in the diameter of the dots to simulate the printed image having a predetermined dot gain curve.

---

## 5,019,473
## ELECTROPHOTOGRAPHIC RECORDING ELEMENTS CONTAINING PHOTOCONDUCTIVE PERYLENE PIGMENTS

**Khe C. Nguyen, Pittsford, and William T. Gruenbaum, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

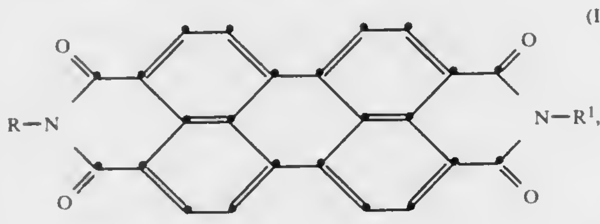
**Filed Feb. 23, 1990, Ser. No. 485,113**

**Int. Cl.$^5$ G03G** *5/14*

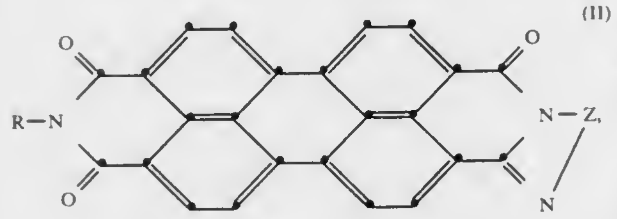
**U.S. Cl. 430—58** **12 Claims**

1. An electrophotographic recording element having a layer comprising a photoconductive perylene pigment that is sufficiently finely and uniformly dispersed in a polymeric binder to provide the element with an electrophotographic speed at least substantially equivalent to the electrophotographic speed of an element having a corresponding layer formed from the same pigment by vacuum sublimation in the absence of said polymeric binder, said perylene pigment having the formula:

(I)

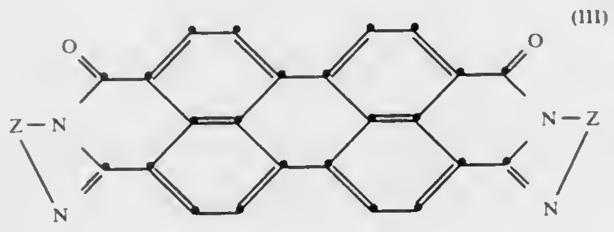


(II)



or

(III)

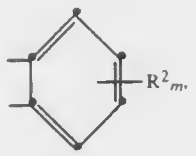


where

each R is a phenethyl radical,

$R^1$ is hydrogen, alkyl, cycloalkyl, aralkyl, aryl, heteroaryl, alkoxy, mono- or dialkylamino, or when the compound of Formula I is a dimer, $R^1$ is 1,4-phenylene,

each Z is 2,3-naphthylene, 2,3-pyridylene, 3,4-pyridylene, 3,4,5,6-tetrahydro-1,2-phenylene, 9,10-phenanthrylene, 1,8-naphthylene, the radical



where

$R^2$ is alkyl, cycloalkyl, aralkyl, aryl, heteroaryl, alkoxy, dialkylamino, halogen, cyano, or nitro, or when the compound of Formula II is a dimer, Z is 1,2,4,5-benzenetetrayl or 3,3',4,4'-biphenyltetrayl, and

m is a number from 0 to 4.

---

## 5,019,474
## ELECTROPHOTOGRAPHIC PHOTORECEPTOR

**Naonori Makino; Shigeru Ohno; Satoshi Hoshi, and Katsuji Kitatani, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Apr. 4, 1990, Ser. No. 504,205**

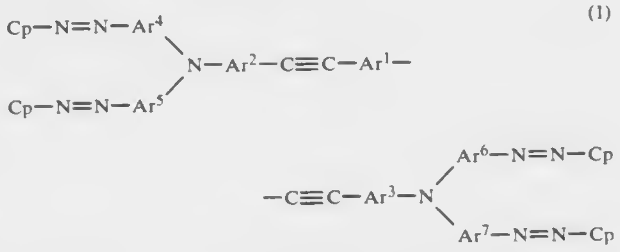
**Claims priority, application Japan, Apr. 5, 1989, 1-86589**

**Int. Cl.$^5$ G03G** *5/06*

**U.S. Cl. 430—76** **10 Claims**

1. An electrophotographic photoreceptor comprising on an electrically conductive support a layer containing a charge-transporting compound and a charge-generating compound or a charge-transporting compound-containing layer and a charge-generating compound-containing layer, wherein said charge-generating compound is a tetrakisazo compound represented by the general formula (1):

(1)



wherein $Ar^1$, $Ar^2$, $Ar^3$, $Ar^4$, $Ar^5$, $Ar^6$ and $Ar^7$ each represents an arylene group, divalent condensed polycyclic aromatic group or divalent heterocyclic aromatic group; and Cp represents a coupler residue.

---

## 5,019,475
## IMAGE RECORDING MEDIUM COMPRISING A COLOR DEVELOPER LAYER FORMED ON A THERMOPLASTIC RESIN LAYER

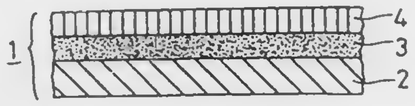
**Shunichi Higashiyama, Yokkaichi, and Keiko Suzuki, Okazaki, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

**Filed Mar. 22, 1990, Ser. No. 497,360**

**Claims priority, application Japan, Apr. 28, 1989, 1-109760; Aug. 18, 1989, 1-213281**

**Int. Cl.$^5$ G03C** *1/72, 5/24;* **F41M** *5/26*

**U.S. Cl. 430—138** **17 Claims**



1. A recording medium comprising:

a base sheet;

a thermoplastic resin layer formed on at least one side of said base sheet; and

a color developer layer formed on said thermoplastic resin layer and capable of color development by reaction with a dye precursor, wherein said base sheet is separable from said thermoplastic resin layer when said recording medium is heated to a predetermined temperature.

---

## 5,019,476
## OPTICAL RECORDING MEDIUM

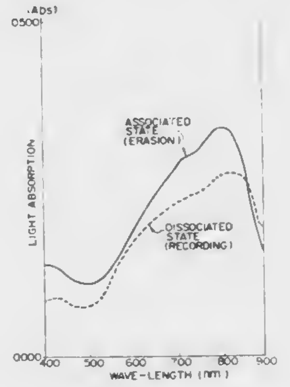
**Toshiyuki Kanno, Tokyo; Naoyuki Ueno, Machida; Seiji Kondo, Hachioji; Yasuji Nagata, Hachioji; Jun Kanehira, Hachioji; Hideshi Takahashi, Hachioji, and Yoshiko Uematsu, Atsugi, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Nov. 13, 1989, Ser. No. 435,946**

**Claims priority, application Japan, Nov. 16, 1988, 63-289733; Nov. 21, 1988, 63-292461; Dec. 28, 1988, 63-333500**

**Int. Cl.$^5$ G02F** *1/13;* **C09K** *19/02*

**U.S. Cl. 430—20** **17 Claims**



1. An optical recording medium which has no electrode layer and comprises:

a transparent substrate; and

a recording layer, formed on said transparent substrate, and comprising at least one type of a liquid crystal polymer compound having side chain groups provided with molecular rotation power or power of changing a state such as an agglomeration or an arrangement, and a dye compound having absorbing power for recording light,

wherein upon radiation of recording light on said recording layer, affinity and association between the polymer compound and the dye compound are induced or dissociation and separation of the dye compound from the polymer compound are induced due to differences in chemical and physical characteristics such as a glass transition point and a melting point between the side chain groups of said polymer compound and said dye compound thereby to enclose said dye compound between regularly arranged side chain groups of said polymer compound and to change optical characteristics of the recording medium, thereby accumulating/erasing optical information and reading the optical information by utilizing the optical changes.

---

## 5,019,477
## VINYLTOLUENE AND STYRENE COPOLYMERS AS RESINS FOR LIQUID ELECTROSTATIC TONERS

**Thomas C. Felder, Downingtown, Pa., assignor to DX Imaging, Lionville, Pa.**

**Filed Jul. 5, 1989, Ser. No. 375,660**

**Int. Cl.$^5$ G03G** *9/13, 9/135*

**U.S. Cl. 430—115** **17 Claims**

1. A liquid electrostatic developer consisting essentially of:

(a) a non-polar liquid having a kauri-butanol value of less than 30;

(b) thermoplastic resin particles comprising a mixture of (1) a polyethylene homopolymer or a copolymer of (i) ethylene and (ii) acrylic acid, methacrylic acid or the alkyl esters thereof, wherein (ii) comprises about 0.1–20 weight percent of said copolymer and (2) a random copolymer of (iii) a monomer selected from the group consisting of vinyltoluene and styrene and (iv) a monomer selected from the group consisting of butadiene and acrylate, wherein said thermoplastic resin particles are dispersed in said non-polar liquid; and

(c) an ionic or zwitterionic charge director compound which is soluble in said non-polar liquid.

---

## 5,019,478
## SELECTED TRIHYDROXYBENZOPHENONE COMPOUNDS AND THEIR USE IN PHOTOACTIVE COMPOUNDS AND RADIATION SENSITIVE MIXTURES

**Medhat A. Toukhy, Barrington, and Alfred T. Jeffries, III., Providence, both of R.I., assignors to Olin Hunt Specialty Products, Inc., Cheshire, Conn.**

**Filed Oct. 30, 1989, Ser. No. 429,298**

**Int. Cl.$^5$ G03C** *1/52*

**U.S. Cl. 430—165** **10 Claims**

1. A radiation sensitive mixture comprising an alkali-soluble binder resin and at least one photoactive compound comprising a compound of formula (V):

wherein $R_2$ is selected from the group consisting of an OD group, a halide group, a lower alkyl group having 1 to 4 carbon atoms, and a lower alkoxy group having 1 to 4 carbon atoms; and D is selected from the group consisting of an o-naphthoquinone diazide sulfonyl group and hydrogen; with the proviso that at least four D's are o-naphthoquinone diazide sulfonyl groups; and wherein the amount of said binder resin being about 70% to 95% by weight and the amount of photoactive compound being from about 5% to about 30% by weight, based on the total solids content of said radiation sensitive mixture.

---

## 5,019,479
## POSITIVE TYPE RADIATION-SENSITIVE RESIN COMPOSITION COMPRISING A PHOTOSENSITIZER AND A NOVOLAK RESIN

**Hiroshi Oka; Chozo Okuda; Yoshinori Yoshida; Toshihiko Takahashi, all of Yokkaichi; Yoichi Kamoshida, Yokohama, and Takao Miura, Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 26,196, Mar. 16, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 373,592**

**Claims priority, application Japan, Mar. 28, 1986, 61-70552; Jun. 23, 1986, 61-146459**

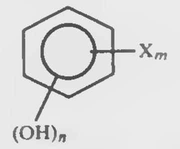
**Int. Cl.$^5$ G03C** *1/60, 1/54*

**U.S. Cl. 430—172** **12 Claims**

1. A positive type radiation-sensitive composition comprising:

(a) an alkali-soluble novolac resin produced by condensing a carbonyl compound and a phenol mixture consisting essentially of 30–90 mole % of m-cresol and 70–10 mole % of at least one compound represented by the formula (1) other than m-cresol;

(1)



wherein X is $-CH_3$, $-C_2H_5$, $-C(CH_3)_3$; n is 1; and m is an integer satisfying $3 \geqq m \geqq 1$, in which resin when the polystyrenereduced molecular weight is determined by a gel permeation chromatography using a monodisperse polystyrene as the standard, maximum values a, b and c present, respectively, in the molecular weight ranges of 6,300 to 25,000, 2,500 to 6,000 and 150 to 900 in the molecular weight distribution curve obtained satisfy the following relationships:

$$a/b = 0.2\text{–}1.3$$

$$c/b = 0.5\text{–}1.5$$

and (b) a 1,2-quinonediazide compound comprising at least

VOL
1126
ISS
4
MY
28
1991
UMI

one 1,2-quinonediazidesulfonic acid ester of (poly)hydroxyphenyl aryl ketone selected from the group consisting of tetrahydroxybenzophenone, pentahydroxybenzophenone and hexahydroxybenzophenone in an amount sufficient to form a resist image upon irradiation and subsequent development.

---

### 5,019,480
## INFRARED ABSORBING INDENE-BRIDGED-POLYMETHINE DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

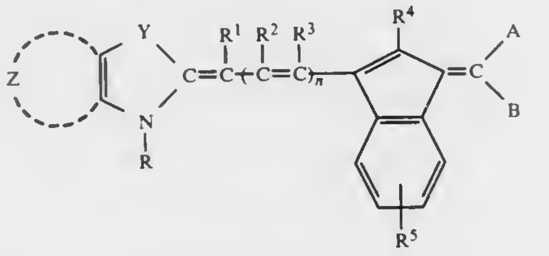
**Charles D. DeBoer, and Steven Evans, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 16, 1989, Ser. No. 367,064**

**Int. Cl.$^5$ G03C *8/00:* B41M *5/035***

**U.S. Cl. 430—200** 17 Claims

1. In a dye-donor element for laser-induced thermal dye transfer comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, the improvement wherein said infrared-absorbing material is an idene-bridged-polymethine dye having the following formula:



wherein:

R represents a substituted or unsubstituted alkyl or cycloalkyl group having from 1 to about 6 carbon atoms or an aryl or hetaryl group having from about 5 to about 10 atoms;

$R^1$, $R^2$, $R^3$, $R^4$ and $R^5$ each independently represents hydrogen, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxycarbonyl, alkoxycarbonyl, sulfonyl, carbamoyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or hetaryl group; or any two of said R, $R^1$, $R^2$, $R^3$, $R^4$ and $R^5$ groups may be joined together to form a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;

A represents —COR, —$CO_2R$, —CONHR, —$CONR_2$, —$SO_2R$, —$SO_2NHR$, —$SO_2NR_2$ or —CN:

B represents A or hydrogen, —R, —SR, —OR or —NR;

or A or B may be joined together to form a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;

Y represents a dialkyl-substituted carbon atom, a vinylene group, an oxygen atom, a sulfur atom, a selenium atom, a tellurium atom, NR, or a direct bond to the carbon at the $R^2$ position;

Z represents hydrogen or the atoms necessary to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring; and

n is 0 to 3.

---

### 5,019,481
## AQUEOUS BASE DEVELOPABLE NEGATIVE RESIST COMPOSITIONS

**Hiroshi Ito, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 25, 1989, Ser. No. 411,960**

**Int. Cl.$^5$ G03F *7/004***

**U.S. Cl. 430—270** 10 Claims

1. An aqueous base developable negative resist composition comprising a phenolic resin, a material which generates acid when exposed to radiation, and a small molecule selected from the group consisting of high boiling aldehydes, imides and amides which upon irradiation and postbake of the composition reacts with the phenolic resin to decrease its rate of dissolution.

---

### 5,019,482
## POLYMER/OXIME ESTER/COUMARIN COMPOUND PHOTOSENSITIVE COMPOSITION

**Hideo Ai; Nobuhiko Suga; Satoshi Ogitani; Hideaki Takahashi, and Akihiko Ikeda, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Aug. 5, 1988, Ser. No. 228,416**

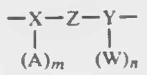
**Claims priority, application Japan, Aug. 12, 1987, 62-199920; Aug. 19, 1987, 62-204276**

**Int. Cl.$^5$ G03F *7/031***

**U.S. Cl. 430—283** 24 Claims

1. A photosensitive composition comprising:

(a) a polymer having recurring units represented by the formula

 [I]

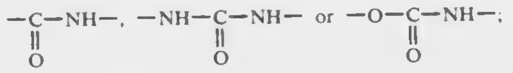
$$-\underset{(A)_m}{\underset{|}{X}}-Z-\underset{(W)_n}{\underset{|}{Y}}-$$

wherein

X is a (2+m) valent $C_{6\text{-}30}$ carbocyclic group or heterocyclic group;

Y is a (2+n) valent $C_{6\text{-}30}$ carbocyclic group or heterocyclic group;

Z is



$$-\underset{\overset{\|}{O}}{C}-NH-,\ -NH-\underset{\overset{\|}{O}}{C}-NH-\ \text{or}\ -O-\underset{\overset{\|}{O}}{C}-NH-;$$

A is —COOR* or —$COO^{\ominus}R^{**\oplus}$ wherein each of R* and R** is a group having a carbon-carbon double bond;

W is a group capable of reacting with the carbonyl group of A to form a ring on heating;

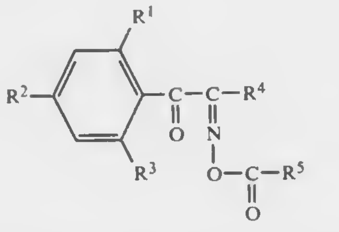
A and W are arranged in ortho- or peri-position to Z;

m is 1 or 2; and

n is 0, 1 or 2,

(b) 1 to 20% by weight, based on the weight of polymer (a), of a compound having a terminal ethylenically unsaturated group;

(c) 0.1 to 20% by weight, based on the weight of polymer (a), of an oxime ester compound represented by the formula



[II]

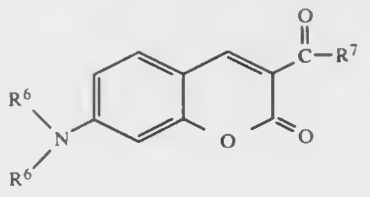
wherein

each of $R^1$, $R^2$ and $R^3$ is a hydrogen atom, a $C_{1\text{-}6}$ alkyl group, a $C_{1\text{-}6}$ alkoxy group or a nitro group;

$R^4$ is a $C_{7\text{-}11}$ aromatic acyl group, a $C_{2\text{-}7}$ aliphatic acyl group, a $C_{2\text{-}7}$ alkoxycarbonyl group, a $C_{6\text{-}10}$ aromatic sulfonyl group or a $C_{1\text{-}6}$ aliphatic sulfonyl group;

$R^5$ is a $C_{1\text{-}6}$ alkyl group, a $C_{1\text{-}6}$ alkoxy group, a $C_{6\text{-}10}$ aromatic group or a $C_{6\text{-}10}$ aryloxy group; and

(d) 0.01 to 10% by weight, based on the weight of polymer (a), of a coumarin compound represented by the formula



wherein

$R^6$ is a methyl group or an ethyl group; and

$R^7$ is a $C_{1\text{-}7}$ alkoxy group or benzyloxy group.

---

### 5,019,483
## AQUEOUS DEVELOPABLE PHOTORESIST CONTAINING WEAK ALKALI SOLUBLE OR DISPERSIBLE THIOL COMPOUNDS

**Dhei-Jhai Lin, Taoyuan; Jim-Chyuan Shieh, Miaoli Hsien, and Hsien-Kuang Lin, Taipei, all of Taiwan, assignors to 501 Industrial Technology Research Institute, Hsinchu, Taiwan**

**Filed Sep. 13, 1989, Ser. No. 406,461**

**Int. Cl.$^5$ G03C *1/725, 1/73***

**U.S. Cl. 430—288** 15 Claims

1. An aqueous alkali developable photoresist composition comprising at least

1) a carboxyl group-containing polymeric binder,
2) 1–15% by weight of a photoinitiator based on the binder,
3) 20–100% by weight based on the binder, of a photoreactive monomer or oligomer containing at least two ethylenically unsaturated double bonds, said monomer or oligomer being selected from the group consisting of polyacrylates and polymethylacrylates,
4) 0.05–5% by weight based on the binder of a weak aqueous alkali soluble or dispersible thiol compound represented by the formula:

$$(X)_a—R—(SH)_b$$

were a, b are integers equal to or greater than 1, R is an organic moiety of molecular weight less than 500, and X is a carboxyl group-containing moiety or hydrophilic organic polymeric segment.

---

### 5,019,484
## METHOD AND APPARATUS FOR FORMING COLOR PROOF

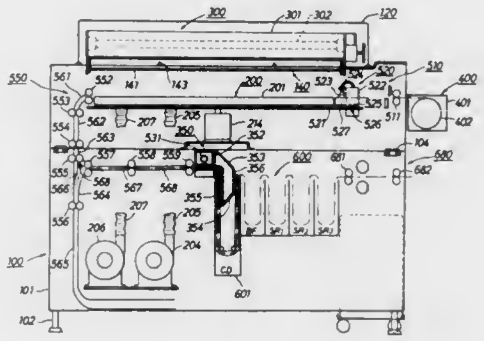
**Hitoshi Shimaoka; Shigera Mizuo; Akira Akashi, and Miyuki Hosoi, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan**

**Filed Dec. 19, 1988, Ser. No. 285,937**

**Claims priority, application Japan, Dec. 18, 1987, 62-320699; Dec. 21, 1987, 62-324347; Jan. 30, 1988, 63-20351**

**Int. Cl.$^5$ G03C *7/00***

**U.S. Cl. 430—293** 5 Claims



1. A color proof formation method, comprising the steps of:

placing a first original film at a predetermined position upon an original mounting table;

fixing a color photosensitive material at a predetermined position upon a color photosensitive material mounting table, which is separate from, disposed beneath, and independently movable with respect to said original mounting table in a vertical mode between an upper position and a lower position, when said color photosensitive material mounting table is disposed at said lower position such that said color photosensitive material is substantially vertically aligned with said first original film disposed upon said original mounting table;

elevating said color photosensitive material mounting table from said lower position to said upper position such that said color photosensitive material fixed upon said color photosensitive material mounting table is disposed in tight contact with said first original film disposed upon said original mounting table;

exposing said color photosensitive material through said first original film by means of a light source;

lowering said color photosensitive material mounting table from said upper position to said lower position so as to separate said color photosensitive material mounting table, with said color photosensitive material fixed thereon, from said original mounting table with said first original film disposed thereon;

replacing said first original film disposed upon said original table with a second original film while said color photosensitive material is retained at said predetermined position upon said color photosensitive material mounting table; and

repeating said steps of elevating said color photosensitive material mounting table, exposing said color photosensitive material, lowering said color photosensitive material mounting table, and replacing a predetermined original film with a successive original film a predetermined number of times so as to form a color proof.

---

### 5,019,485
## PROCESS OF USING AN ELECTRICALLY CONDUCTIVE LAYER-PROVIDING COMPOSITION FOR FORMATION OF RESIST PATTERNS

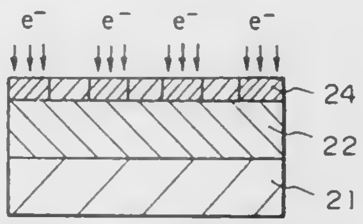
**Yuko Nakamura, Kawasaki, and Satoshi Takechi, Machida, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Oct. 12, 1989, Ser. No. 420,427**

**Claims priority, application Japan, Oct. 13, 1988, 63-256022**

**Int. Cl.$^5$ G03C *5/00***

**U.S. Cl. 430—296** 14 Claims



1. A process for the formation of resist patterns in an electron beam lithographic process, comprising the steps of:

forming an electrically conductive layer, from a composition comprising a conducting or semiconducting polymer having a good solubility in solvents and/or a non-conducting precursor thereof and a photo-acid generator which, upon exposure to an ultraviolet radiation having a wavelength of 300 nm or less, release a proton acid and cause a proton doping to the polymer to thereby increase an electrical conductivity of the polymer to a level sufficient to cause a discharge an accumulated electrical charge in the electrically conductive layer and/or one or more layers adjacent thereto in the electron beam lithographic process, in the electron beam lithographic pro-

VOL
1126
ISS
4
MY
28
1991
UMI

cess, in a selected layer position of an electron beam resist structure,

exposing the electrically conductive layer to the ultraviolet radiation to cause an increase of the conductivity of the polymer thereof, and

pattern-wise exposing an electron beam-sensitive resist layer to an electron beam, in the presence of the electrically conductive layer adjacent to the resist layer.

---

**5,019,486**

### METHOD FOR FORMING PLATE CHARACTERS IN A HALF-TONE GRAVURE PLATEMAKING PROCESS

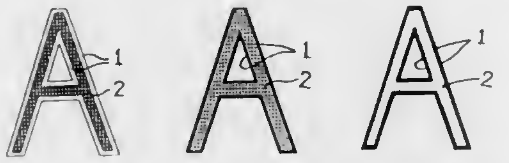
**Koichi Takakura, Chiba, Japan, assignor to Think Laboratory Co., Ltd., Chiba, Japan**

**Filed Feb. 8, 1990, Ser. No. 477,325**

**Claims priority, application Japan, Jul. 3, 1989, 1-171382**

**Int. Cl.$^5$ G03F** *7/004*

**U.S. Cl. 430—307** **2 Claims**



1. A method for forming plate characters in a half-tone gravure platemaking process, characterized in that a laser beam of a laser exposure apparatus is moved so that said laser beam irradiates a photosensitive material in spots, thus forming plate characters on said photosensitive material, each plate character being formed so that:

an outline of each character is formed of continuous groove-shaped cells;

an area inside said outline of said character is formed of independent dot-shaped cells which correspond to a dot percentage of a shadow portion; and

said groove-shaped cells of said outline portion of each character have as narrow a width as possible without causing ink flow when said groove-shaped cells are filled with ink as a result of a plate surface being wiped by a doctor blade.

---

**5,019,487**

### METHOD OF MANUFACTURING A METAL MATRIX AND A MASTER DISC SUITABLE FOR THE MANUFACTURE OF MATRICES

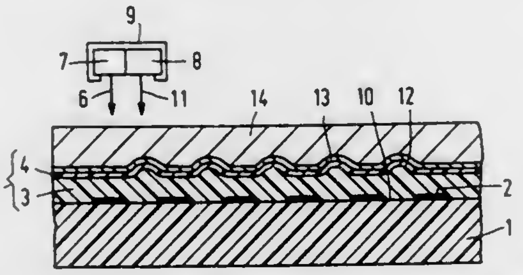
**Dirk J. Gravesteijn; Josephus M. Wijn, and Johannes P. J. G. van Liempd, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 246,584, Sep. 19, 1988, abandoned. This application Mar. 28, 1989, Ser. No. 329,738**

**Claims priority, application Netherlands, Feb. 11, 1988, 8800335**

**Int. Cl.$^5$ G03F** *1/02*

**U.S. Cl. 430—322** **3 Claims**



1. Method of manufacturing a metal matrix particularly adapted for the manufacture of optically readable synthetic resin information carriers, characterized in that a substrate plate is provided on one side with a reflective optical structure and a recording layer, the recording layer comprises a synthetic resin double-layer having an expansion layer facing the substrate plate and a retention layer positioned on the side of the expansion layer away from the substrate, an optically reflective structure is provided at the interface of the substrate plate and the expansion layer or at the interface of the expansion layer and said retention layer or at the interface of air and said retention layer thereby forming a master disc, the optical structure of the master disc thus obtained is scanned by a continuous, first laser light beam, the recording layer is exposed to a second laser light beam which is controlled by the first beam and pulsated in a conformity with information to be recorded, information bits being thus formed in the recording layer due to the exposure to said second laser light beam, the recording layer is then provided with a metal skin and the metal skin, in which the surface structure of the recording layer is copied, is removed from the recording layer thus forming the metal matrix.

---

**5,019,488**

### METHOD OF PRODUCING AN IMAGE REVERSAL NEGATIVE PHOTORESIST HAVING A PHOTO-LABILE BLOCKED IMIDE

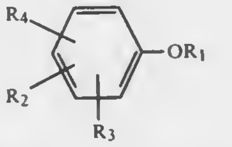
**Donald C. Mammato, Lebanon; Sangya Jain, Bridgewater, both of N.J.; Dana Durham, East Greenwich, R.I.; Mark A. Spak, Edison, N.J.; Douglas A. Usifer, Belle Mead, N.J., and Michael McFarland, Washington, N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

**Continuation of Ser. No. 250,866, Sep. 29, 1988, abandoned. This application Apr. 24, 1990, Ser. No. 517,530**

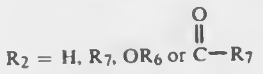
**Int. Cl.$^5$ G03C** *5/16;* **G03F** *7/40, 7/022, 7/039*

**U.S. Cl. 430—325** **35 Claims**

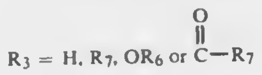
1. A method of producing a negative image which comprises
- a. providing a layer of a substantially dry photosensitive composition on a substrate said composition comprising
  - i. a photosensitive compound capable of generating a sufficient amount of a strong acid upon exposure to radiant energy, such that said acid, upon subsequent heating to a sufficient temperature is capable of deblocking a blocked hydrophobic polymer, to render the polymer soluble in an aqueous alkaline solution, said photosensitive compound being selected from the group consisting of
    - 1. an oxime sulfonate ester; and
    - 2. a compound having the formula



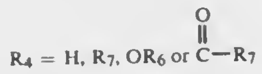
wherein $R_1$ = 1,2 benzoquinone-2-diazide-4-sulfonyl;
1,2 naphthoquinone-2-diazide-4-sulfonyl;
or
1,2 anthroquinone-2-diazide-4-sulfonyl



$$R_2 = \text{H, } R_7\text{, } OR_6 \text{ or } \overset{\overset{\text{O}}{\|}}{\text{C}}-R_7$$



$$R_3 = \text{H, } R_7\text{, } OR_6 \text{ or } \overset{\overset{\text{O}}{\|}}{\text{C}}-R_7$$



$$R_4 = \text{H, } R_7\text{, } OR_6 \text{ or } \overset{\overset{\text{O}}{\|}}{\text{C}}-R_7$$

$R_6$ = H, alkyl, aryl, aralkyl or $R_1$
$R_7$ = alkyl, aryl or aralkyl; and

  - ii. a blocked hydrophobic polymer in sufficient amount to form a uniform layer of said composition on the substrate; and
- b. imagewise exposing said layer to sufficient radiant energy to generate an acid without de-blocking said polymer; and
- c. in the absence of a post-exposure baking step, treating the exposed layer with a gaseous base to neutralize the acid generated in step (b) to a salt via an acid-base reaction; and
- d. removing excess base; and
- e. overall flood exposing the layer to generate an acid in areas not exposed in step (b); and
- f. baking the exposed layer of step (e) at a sufficient temperature and for a sufficient time to deblock said polymer in the area not exposed in step (b); and
- g. developing the layer with an aqueous alkaline developer to remove the layer except for the portion exposed in step (b).

---

**5,019,489**

### COLOR PHOTOGRAPHIC ELEMENT AND PROCESS

**Arlyce T. Bowne, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 26, 1989, Ser. No. 385,607**

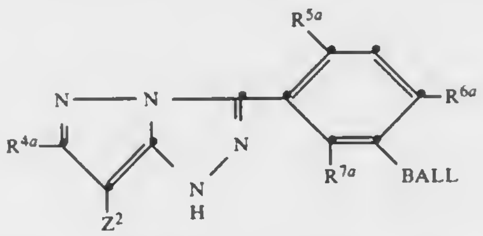
**Int. Cl.$^5$ G03C** *1/46, 7/32*

**U.S. Cl. 430—379** **6 Claims**

1. A color photographic silver halide element comprising a support bearing at least one red-sensitive silver halide emulsion layer comprising at least one cyan dye-forming coupler, at least one green-sensitive silver halide emulsion layer comprising at least one magenta dye-forming coupler and at least one blue-sensitive silver halide emulsion layer containing at least one yellow dye-forming coupler wherein

(A) the cyan dye-forming coupler is a phenolic coupler comprising in the 2-position a group —NHCO—$R^1$ wherein $R^1$ is perfluoroalkyl or perfluoroaryl and in the 5-position a group —NHCO—$R^2$ wherein $R^2$ is a substituted ballast group;

(B) the magenta dye-forming coupler is a 2-equivalent pyrazolo-[3,2-c]-s-triazole represented by the formula:



wherein $Z^2$ is hydrogen or a coupling-off group; and $R^{4a}$, $R^{5a}$, $R^{6a}$ and $R^{7a}$ individually are alkyl containing 1 to 4 carbon atoms; and BALL is a ballast group;

(C) the yellow dye-forming coupler is a 2-equivalent pivaloylacetanilide coupler comprising a substituted hydantoin or phenoxy coupling-off group; when the coupling-off group is phenoxy, the anilide moiety contains ortho-alkoxy or orthoaryloxy.

---

**5,019,490**

### SILVER HALIDE PHOTOGRAPHIC MATERIALS

**Hidetoshi Kobayashi, and Osamu Takahashi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Oct. 17, 1988, Ser. No. 258,537**

**Claims priority, application Japan, Oct. 15, 1987, 62-260356**

**Int. Cl.$^5$ G03C** *1/46*

**U.S. Cl. 430—503** **20 Claims**

1. Silver halide photographic materials comprising a support carrying at least one hydrophilic organic colloid layer in which at least one photographically useful reagent which is sparingly soluble in water is dispersed with at least one ethylenic addition polymerized polymer which contains at least 50% by weight of trifluorochloroethylene units as fine lipophilic particles, said photographically useful reagent being selected from photographically useful couplers, anti-fogging agents, anti-color fading agents, film hardening agents, oil soluble filter dyes, oil soluble anti-halation dyes, oil soluble ultraviolet absorbents, brightening agents, DIR compounds, developing agents, DDR couplers, DRR compounds, dye developing agents, development inhibitors and precursors thereof, development accelerators and precursors thereof.

---

**5,019,491**

### SILVER HALIDE PHOTOGRAPHIC MATERIAL

**Kazuhiko Takeuchi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 329,153, Mar. 27, 1989, abandoned. This application Oct. 9, 1990, Ser. No. 595,622**

**Claims priority, application Japan, Mar. 25, 1988, 63-71029**

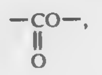
**Int. Cl.$^5$ G03C** *1/76*

**U.S. Cl. 430—523** **18 Claims**

1. A silver halide photographic material comprising a support having thereon at least one light-sensitive silver halide emulsion layer, at least one layer of the material containing the combination of a lubricant in an amount of from 0.0001 to 2.0 grams per square meter of the photographic material and a water-soluble compound represented by formula (I) in ana amount of from 0.0001 to 2.0 grams per square meter of the photographic material:

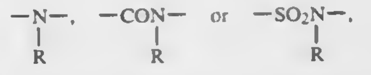
$$\text{A-X-Y-B} \qquad \text{(I)}$$

wherein A represents s substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group or a substituted or unsubstituted aryl group each containing from 8 to 25 atoms; x represents —O—,



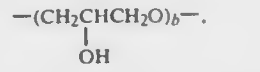
$$-\underset{\underset{\text{O}}{\|}}{\text{C}}\text{O}-,$$

—S—,



$$-\underset{\underset{\text{R}}{|}}{\text{N}}-,\quad -\text{CO}\underset{\underset{\text{R}}{|}}{\text{N}}- \quad\text{or}\quad -\text{SO}_2\underset{\underset{\text{R}}{|}}{\text{N}}-,$$

wherein R represents an alkyl group containing from 1 to 10 carbon atoms or group -Y-B; Y represents a group containing at least $—(CH_2CH_2O)_a—$ and



$$-(\text{CH}_2\underset{\underset{\text{OH}}{|}}{\text{C}}\text{HCH}_2\text{O})_b-.$$

wherein a is an integer from 5 to 50, and b is an integer 2 to 20; B represents hydrogen, an alkyl group containing at most 8 carbon atoms, or a phenyl group.

---

**5,019,492**

### PHOTOGRAPHIC ELEMENT AND PROCESS COMPRISING A BLOCKED PHOTOGRAPHICALLY USEFUL COMPOUND

**John M. Buchanan; Ewell R. Cook; Jared B. Mooberry; Gary S. Proehl, all of Rochester; Stephen P. Singer, Spencerport, all of N.Y., and William N. Washburn, LaJolla, Calif., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 26, 1989, Ser. No. 343,981**

**Int. Cl.$^5$ G03C** *7/305*

**U.S. Cl. 430—543** **8 Claims**

1. A photographic element comprising a support bearing at least one silver halide photographic emulsion layer and a

VOL
1126
ISS
4
MY
28
1991
UMI

blocked photographically useful compound comprising a photographically useful group and a blocking group that is capable of releasing the photographically useful group upon processing the photographic element wherein the blocking group

- (a) comprises two electrophilic groups, the least electrophilic of which is bonded directly or through a releasable timing group to the photographically useful group;
- (b) is capable of reacting with a dinucleophile; and,
- (c) the two electrophilic groups are separated from each other by a substituted atom that enables a nucleophilic displacement reaction to occur with release of PUG upon processing the photographic element in the presence of a dinucleophilic reagent.

---

### 5,019,493

## SILVER HALIDE PHOTOGRAPHIC MATERIAL AND METHOD OF FORMING A DYE IMAGE THEREON

**Hirokazu Sato, and Shigeto Hirabayashi, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

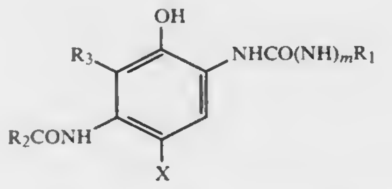
**Continuation of Ser. No. 107,410, Oct. 13, 1987, abandoned. This application Jan. 29, 1990, Ser. No. 476,110**

**Claims priority, application Japan, Oct. 13, 1986, 61-242785**

**Int. Cl.$^5$ G03C** *7/32, 7/34*

**U.S. Cl. 430—553** **4 Claims**

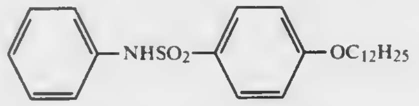
1. A silver halide photographic material that has one or more silver halide emulsion layers on a support, wherein at least one of said silver halide emulsion layers contains at least one cyan coupler represented by the following general formula (I):



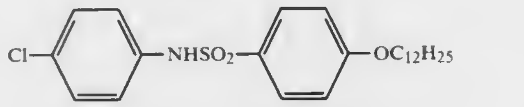
(I)

where $R_1$ and $R_2$ are each an alkyl group, a cycloalkyl group, an alkenyl group, an aryl group or a heterocyclic group; $R_3$ is a hydrogen atom, a halogen atom, an alkyl group or an alkoxy group, provided that $R_2$ and $R_3$ may cooperate to form a ring; X is a hydrogen atom or a group that is capable of being eliminated upon reaction with the oxidation product of a color developing agent; and m is 0 or 1;

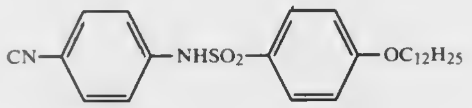
and at least one non-color forming compound selected from the group consisting of the following compounds:



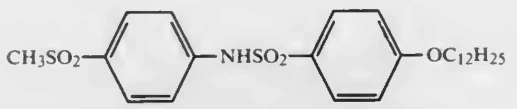
(1)



(2)

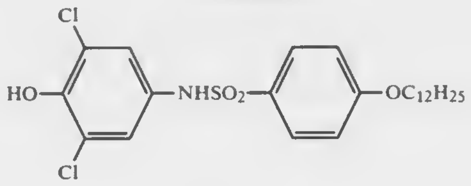


(3)

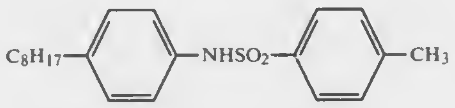


(4)

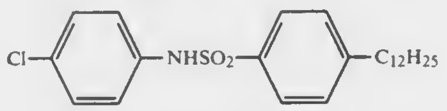
-continued



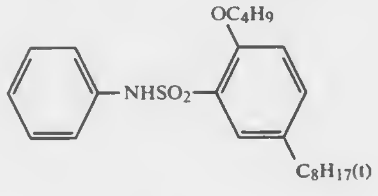
(5)



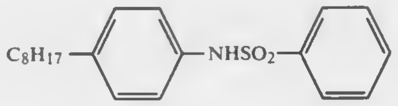
(6)



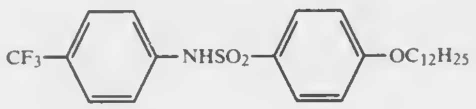
(7)



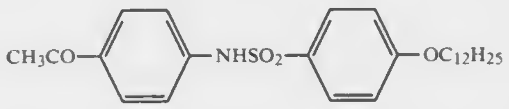
(8)



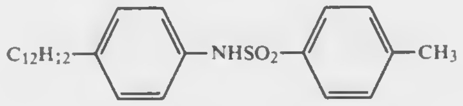
(9)



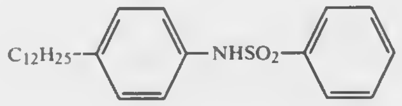
(10)



(11)



(12)



(13)

---

### 5,019,494

## SILVER HALIDE PHOTOGRAPHIC MATERIAL

**Ichizo Toya, and Ryoichi Nemori, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

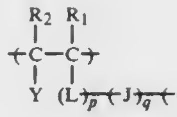
**Filed Feb. 27, 1989, Ser. No. 315,865**

**Claims priority, application Japan, Feb. 26, 1988, 63-43504**

**Int. Cl.$^5$ G03C** *1/10, 1/04*

**U.S. Cl. 430—600** **7 Claims**

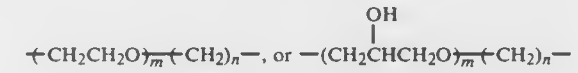
1. A silver halide photographic material which comprises a support having thereon at least one hydrophilic colloid layer, wherein said hydrophilic colloid layer comprises (a) a binder comprising a dextran having a molecular weight of at least 100,000 and (b) a synthetic water-soluble ionic polymer containing a repeating unit represented by formula (P):



$$-\!\left(\overset{R_2}{\underset{Y}{C}}-\overset{R_1}{\underset{(L)_p-(J)_q-(Q)_r}{C}}\right)\!-$$

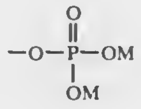
(P)

wherein $R_1$ and $R_2$ may be the same or different, and each represents a hydrogen atom, an alkyl group, a halogen atom, or —$CH_2COOM$ wherein M represents a hydrogen atom or a cation group; Y represents a hydrogen atom or a carboxyl group including a salt thereof; L represents —CONH—, —NHCO—, —COO—, —OCO—, —CO—, —$SO_2$—, —NH$SO_2$—, —$SO_2$HN— or —O—; J represents an alkylene group, an arylene group, an aralkylene group,



$$-(CH_2CH_2O)_m(CH_2)_n-, \text{ or } -(CH_2\overset{OH}{\overset{|}{C}}HCH_2O)_m(CH_2)_n-$$

wherein m is an integer of from 0 to 40 and n is an integer of from 0 to 4; Q represents —COOM, —$SO_3$M,



$$-O-\underset{\underset{OM}{|}}{\overset{\overset{O}{\|}}{P}}-OM$$

or —OM wherein M is defined as above;
p and q each represents 0 or 1; and r is an integer.

---

### 5,019,495

## TISSUE CULTURE ANTIVIRAL PROCESSES AND COMPOSITIONS

**Edward Shanbrom, 2252 Liane La., Santa Ana, Calif. 92705**

**Continuation-in-part of Ser. No. 321,522, Mar. 9, 1989, abandoned, Ser. No. 290,161, Dec. 28, 1988, Pat. No. 4,891,221, and Ser. No. 276,113, Nov. 23, 1988, abandoned. This application Nov. 7, 1989, Ser. No. 433,541**

**Int. Cl.$^5$ A01N** *1/02;* **C12N** *5/00*

**U.S. Cl. 435—1** **6 Claims**

1. A method for treating tissue culture medium comprising mixing such tissue culture medium with a composition consisting essentially of one or more glycyrrhizic triterpenoid compounds in a concentration of from about 0.0001 to about 5 wt/% based on culture medium and from about five to about one hundred times that amount of delipidated albumin, the concentration being sufficient to substantially inactivate susceptible viruses found in animal fluids and tissues.

---

### 5,019,496

## PHOTOPOLYMERIZATION DIAGNOSTIC TEST COMPOSITION AND METHOD FOR IMMUNOASSAY AND NUCLEIC ACID ASSAY

**Gerald Oster, 241 W. 11th St., New York, N.Y. 10014, and Baruch J. Davis, Mount Sinai Medical Center, 1 Gustave Levy Pl., New York, N.Y. 10029**

**Filed Feb. 17, 1989, Ser. No. 312,544**

**Int. Cl.$^5$ G01N** *33/53;* **C12Q** *1/68*

**U.S. Cl. 435—6** **40 Claims**

1. A diagnostic test composition for detecting and measuring an analyte possessing biologic activity, the composition comprising

- (a) a photocatalyst system capable of converting a monomer to a polymer upon exposure to light, said photocatalyst system operating by free radical polymerization, the photocatalyst system comprising chemical moieties comprising a photosensitizer for photopolymerization and an electron donor, the electron donor being capable of donating electrons only when the photosensitizer is in a light excited state, and 1) said analyte comprising a ligand which either contains at least one of said chemical moieties or is a generator of a least one of said chemical moieties, or 2) in the case that the analyte lacks any photocatalyst property, the analyte is linked by a specific ligand to a generator of at least one of said chemical moieties, said ligand being one member of either an antibody/antigen pair or a hybridization probe/target pair, and
- (b) at least one monomer capable of undergoing addition polymerization, said monomer being selected from the group consisting of acrylamide, N-octyl acrylamide, methacrylamide, N-methylacrylamide, acrylic acid, methacrylic acid, hydroxymethyl acrylamide, methylene bisacrylamide, acrylonitrile, methyl acrylate, ethylene glycol methacrylate, propylene glycol methacrylate, acrylamide propane sulfonic acid, N-(3-aminopropyl)-methacrylamide, pentaerythritoltriacrylate, polyethyleneglycol diacrylate, vinyl pyrrolidine, vinyl pyridine, multivalent salts of acrylic acid, multivalent salts of methacrylic acid and combinations of the aforesaid monomers.

---

### 5,019,497

## HUMAN SQUAMOUS LUNG CARCINOMA CELL SPECIFIC ANTIGENS AND ANTIBODIES

**Lennart Olsson, Rigshospitalet 9, Blegdamsvej, Copenhagen, Denmark DK-2100**

**Continuation of Ser. No. 701,322, Feb. 13, 1985, abandoned. This application Jul. 5, 1988, Ser. No. 215,056**

**Int. Cl.$^5$ G01N** *33/53, 33/577;* **C07K** *15/14;* **C12N** *15/00*

**U.S. Cl. 435—7.23** **27 Claims**

1. A monoclonal antibody specific for a glycoprotein which is a marker for human squamous lung carcinoma, where the marker is a carbohydrate sequence found on a plurality of glycoproteins in excess of about 50kDal and substantially absent in (1) carcinomas of organs other than lung, (2) leukemias and (3) sarcomas; and wherein said monoclonal antibody specific for a glycoprotein binds to the saccharide portion of said glycoprotein which is recognized specifically by IgM monoclonal antibody designated 43-9F secreted by hybridoma cell line having deposit no. ECACC 85013101.

---

### 5,019,498

## METHOD OF ASSAYING HIGH MOLECULAR HYALURONIC ACID AND KIT OF REAGENTS FOR SUCH ASSAY

**Kenji Chichibu, Saitama, Japan, assignor to Chugai Seiyaku Kabushiki Kaiska, Tokyo, Japan**

**Filed Mar. 1, 1988, Ser. No. 162,672**

**Claims priority, application Japan, Mar. 3, 1987, 62-48518**

**Int. Cl.$^5$ G01N** *33/535, 33/53, 33/566, 33/543*

**U.S. Cl. 435—7.5** **12 Claims**

1. A method of assaying a high molecular hyaluronic acid having at least two sites available for coupling to a hyaluronic acid binding protein comprising the following steps: adding a sample containing a hyaluronic acid of interest to a first hyaluronic acid binding protein that is absorbed on a solid phase, thereby permitting the first absorbed hyaluronic acid binding protein to bind to the hyaluronic acid of interest; further adding either a second hyaluronic acid binding protein and a marker or a second hyaluronic acid binding protein labelled with a marker, said first hyaluronic acid binding protein being the same as said second hyaluronic acid binding protein, thereby forming a complex of sandwich structure in which the haluronic acid of interest is held between the solid phase adsorbed hyaluronic acid binding protein and the labelled hyaluronic acid binding protein; and measuring the quantity of said hyaluronic acid of interest in terms of the marker in said complex.

VOL
1126
ISS
4
MY
28
1991
UMI

**5,019,499**

### METHOD OF PRODUCING PEPTIDES BY TRANSFORMING MYELOMA CELLS WITH A RECOMBINANT PLASMID

**Kenji Murakami; Yasuaki Tonooka; Norie Saito; Kokichi Nakasuji, and Norifumi Sugiyama, all of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan**

**Filed Apr. 14, 1987, Ser. No. 38,177**

**Claims priority, application Japan, Apr. 14, 1986, 61-85527**

**Int. Cl.$^5$ C12N** *15/00*

**U.S. Cl. 435—69.1** **6 Claims**

1. A method of producing desired polypeptides comprising:

(1) transforming myeloma cells with a vector having the SV40 early promoter sequence on both the 5′ upstream and 3′ downstream sides of the gene coding for the desired polypeptide;

(2) cultivating the transformed cells, and

(3) purifying the desired polypeptide.

---

**5,019,500**

### IGF-I FUSION PROTEINS; PROTECTION OF IGF-I FROM DEGRADATION BY HOST CELL PROTEASES; AND PROCESSES FOR THE PRODUCTION THEREOF

**Ikuo Ueda, Toyonaka; Mineo Niwa, Mukoo; Yoshimasa Saito, Osaka; Susumu Sato, Osaka; Hiroki Ono, Osaka, and Tadashi Kitaguchi, Amagasaki, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan**

**Continuation of Ser. No. 708,636, Mar. 6, 1985, abandoned. This application Jul. 11, 1988, Ser. No. 217,885**

**Claims priority, application United Kingdom, Mar. 19, 1984, 8407044; Sep. 25, 1984, 8424197**

**Int. Cl.$^5$ C12N** *15/00, 15/17, 15/20, 15/70;* **C07K** *7/40*

**U.S. Cl. 435—69.1** **11 Claims**

1. A gene encoding IGF-I fused to a protective protein or peptide, in which said protective protein or peptide is a protein or a peptide having a methionine residue as its carboxy-terminal amino acid, is fused to IGF-I through said methionine residue, and is used for the protection of IGF-I from degradation by protease in cells of *E. coli.*

10. A process for the production of IGF-I fused to a protective protein or peptide which comprises:

(a) culturing *E. coli* containing an expression plasmid containing a promoter and a gene encoding IGF-I fused to a protective protein or peptide, in which said protective protein or peptide is a protein or a peptide having a methionine residue as its carboxy-terminal amino acid, is fused to IGF-I through said methionine residue, and is used for the protection of IGF-I from degradation by protease in cells of *E. coli,* and

(b) recovering IGF-I fused to said protective protein or peptide from the culture.

---

**5,019,501**

### PROCESS FOR THE ACTIVATION OF PROMOTERS OF BACTERIA

**Robert J. H. Okker, Oegstgeest; Egbertus J. J. Lugtenberg, Woerden, and Robbert A. Schilperoort, Anthonie Duycklaan 10c, 2334 CD Leiden, all of Netherlands, assignors to Rijksuniversileit Leiden and Robbert Adriaan Schilperoort, both of Leiden, Netherlands**

**Continuation of Ser. No. 737,153, May 23, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 317,062**

**Claims priority, application Netherlands, Jun. 4, 1984, 8401781**

**Int. Cl.$^5$ C12P** *21/00;* **C12N** *15/00, 15/03, 15/05, 15/70, 15/67;* **A01C** *1/00*

**U.S. Cl. 435—69.1** **17 Claims**

1. A process for activating genes in microorganisms comprising incubating a microorganism containing a gene-promoter construct with a plant, or plant exudate or a portion thereof, said gene-promoter construct having a promoter controlling the expression of a gene to be activated, said promoter in the gene promoter construct comprising the vir promoter, said gene to be activated being one not naturally present with the promoter in said construct.

---

**5,019,502**

### PROCESS FOR REMOVING BACTERIAL ENDOTOXIN FROM GRAM-NEGATIVE POLYSACCHARIDES

**Mark S. Rienstra, and Edgar M. Scattergood, both of Lansdale, Pa., assignors to Merck & Company, Inc., Rahway, N.J.**

**Continuation of Ser. No. 443,024, Nov. 30, 1989, abandoned, which is a continuation of Ser. No. 364,911, Jun. 12, 1989, abandoned. This application Oct. 3, 1990, Ser. No. 593,535**

**Int. Cl.$^5$ C12P** *1/04, 19/04;* **C12R** *1/21*

**U.S. Cl. 435—101** **5 Claims**

1. A method for removing endotoxins from a Gram-negative bacteria fermentation product which comprises the steps of:

(a) growing Gram-negative bacteria in fermentation broth, releasing polysaccharide into the broth, and adding alcohol to remove impurities by precipitation;

(b) isolating the high molecular weight species and resolubilizing them in phenol and extracting other impurities;

(c) precipitating and removing impurities by adding ethanol to the product of (b);

(d) drying the resulting solution of (c), and dissolving the resulting powder in a solution of chelating agent and detergent and mixing nonionic resin under suitable conditions; and

(e) removing the resin, chelating agent and detergent and precipitating the polysaccharide from solution with ethanol, centrifuging the precipitate, triturating the pellet with ethanol, and drying the resulting product to form a powder.

---

**5,019,503**

### METHOD FOR PRODUCTION OF L-THREONINE

**Masato Terasawa; Yukie Satoo, and Hideaki Yukawa, all of Ibashiki, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan**

**Filed Jun. 2, 1987, Ser. No. 56,774**

**Claims priority, application Japan, Jun. 2, 1986, 61-127776**

**Int. Cl.$^5$ C12P** *13/08;* **C12N** *1/20*

**U.S. Cl. 435—115** **11 Claims**

1. A process for producing L-threonine, comprising:

(i) subjecting L- or DL-homoserine to enzymatic reaction with glucose or ethanol, in a biotin-free synthetic complete medium in the presence of cells of biotin-requiring microorganism *Brevibacterium flavum* MJ-233 (FERM BP-1497) or mutant strain thereof capable of producing L-threonine, and

(ii) harvesting L-threonine from the reaction mixture.

---

**5,019,504**

### PRODUCTION OF TAXOL OR TAXOL-LIKE COMPOUNDS IN CELL CULTURE

**Alice A. Christen, Metairie; Donna M. Gibson, New Orleans, and John Bland, Kenner, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Mar. 23, 1989, Ser. No. 327,493**

**Int. Cl.$^5$ C12P** *17/02, 1/00;* **C12N** *5/02, 5/04*

**U.S. Cl. 435—123** **18 Claims**

1. A method of producing taxane ring-containing alkaloid compounds from cell cultures of *Taxus brevifolia* comprising the steps of:

a. providing living tissue of said *Taxus brevifolia;*

b. providing a nutrient culture medium suitable for said cell culture formation from said tissue;

c. culturing said tissue on said medium to produce calli or cell suspensions derived therefrom and

d. recovering said taxane ring-containing alkaloid compounds from said calli or suspension culture.

**5,019,505**

### ENZYMES HAVING ALPHA-GLYCEROL-3-PHOSPHATE OXIDASE ACTIVITY, PRODUCTION AND USE THEREOF

**Clare H. R. Ferguson, St. Stephens; Anne M. Macadam, Canterbury; Jane E. Ince, Canterbury, and Christopher J. Knowles, Canterbury, all of England, assignors to GEnzyme (U.K.) Ltd., England**

**Filed Jul. 22, 1987, Ser. No. 75,941**

**Claims priority, application United Kingdom, Jul. 29, 1986, 8618469**

**Int. Cl.$^5$ C12P** *7/26;* **C12N** *9/04;* **C12Q** *1/26*

**U.S. Cl. 435—148** **8 Claims**

1. A process for the preparation of an enzyme having α-glycerol-3-phosphate oxidase activity characterized in that the α-glycerol-3-phosphate oxidase has a Km of less than 2.5 mM, wherein the process comprises culturing a *Propionibacterium,* harvesting and disrupting the cells, separating a cell-free extract and at least partially purifying the desired enzyme.

---

**5,019,506**

### PLASMID AND USES THEREOF

**Charles Daly; Gerald F. Fitzgerald, both of Cork; Aidan Coffey, Waterford; Veronica A. Costello, Kerry; Maeve C. Murphy, Wexford, all of Ireland, and Andreas Baumgartner, Bern, Switzerland, assignors to University College, Cork, Cork, Ireland**

**Continuation-in-part of Ser. No. 52,343, May 21, 1987, abandoned. This application Sep. 8, 1988, Ser. No. 242,259**

**Claims priority, application Ireland, May 21, 1986, 1352/86; Sep. 17, 1987, 2518/87**

**Int. Cl.$^5$ C12N** *15/00, 1/20*

**U.S. Cl. 435—172.3** **6 Claims**

1. A plasmid having the identifying characteristics of a plasmid selected from the group consisting of:

plasmid pCI750 as deposited in bacterial strain *S. lactis* AB001 at the National Collection of Industrial Bacteria, Aberdeen, Scotland, under accession no. 12261,

plasmid pCI777 as deposited in bacterial strain *S. lactis* AB002 at the National Collection of Industrial Bacteria, Aberdeen, Scotland, under accession no. 12262, **and**

plasmid pCI528 as deposited in bacterial strain, *S. lactis* AB002 at the National Collection of Industrial Bacteria, Aberdeen, Scotland, under accession no. 12478.

---

**5,019,507**

### NOVEL CYCLOMALTODEXTRIN GLUCANOTRANSFERASE

**Koki Hirikoshi, Tokyo, Japan, assignor to Rikagaku Kenkyusho, Wako, Japan**

**Filed Feb. 3, 1989, Ser. No. 305,631**

**Claims priority, application Japan, Feb. 4, 1988, 63-24478**

**Int. Cl.$^5$ C12N** *9/10;* **C12R** *1/07;* **C12P** *19/18*

**U.S. Cl. 435—193** **1 Claim**

1. A cyclomaltodextrin glucanotransferase having the following physical properties:

(a) Action: Cuts α-1,4-glucopyranoside bonds of an α-1,4-glucan such as starch and glycogen, or partial hydrolysate thereof and transfers it to form cyclodextrins and produces β-cylsodextrin as the initial reaction product of CDs-formation reaction;

(b) Substrate specificity: Reacts with a maltooligosaccharide having α-1,4-glucopyranosidic linkages with a chain length less than that of maltotriose to form various maltooligosaccharides with various molecular weight and cyclodextrins by intermolecular coupling and disproportionating reactions between substrates;

(c) Optimum pH: About 6.5

(d) Stable pH: Stable at pH 6 to 9 at 40° C. for 2 hours;

(e) Optimum temperature: About 65° C.;

(f) Inactivation condition: Completely inactivated by treatment at pH of 4.5 and 11.5 at a temperature of 40° C. for 2 hours and by treatment at pH of 6 at 75° C. for 15 minutes;

(g) Heat stability: Stable up to 50° C. under the condition of pH 6 for 15 minutes and residual activity at 60° C. and 70° C. is 95% and 20% respectively under the same condition;

(h) Inhibition: Inhibited by mercury (II) or copper (II);

(i) Activation and stabilization: Stabilized by calcium;

(j) Molecular weight (SDS-polyacrylamide gel electrophoresis): 36,000±1,000;

(k) Isoelectric point (chromatofocusing): 4.8±0.1.

---

**5,019,508**

### SYNOVIAL PHOSPHOLIPASES

**Lorin K. Johnson, Pleasanton; Jeffrey J. Seilhamer, Milpitas, both of Calif.; Waldemar Pruzanski, and Peter Vadas, both of Ontario, Canada, assignors to Biotechnology Research Partners, Ltd., Calif. and The University of Toronto Innovations Foundation, Ontario, Canada**

**Continuation-in-part of Ser. No. 89,883, Aug. 27, 1987, abandoned. This application Jul. 6, 1988, Ser. No. 215,726**

**Int. Cl.$^5$ C12N** *9/20, 15/55;* **C07H** *15/12*

**U.S. Cl. 435—198** **25 Claims**

12. A method of producing a recombinant mammalian synovial phospholipase $A_2$ comprising:

providing a population of transformed cells containing a replicon functional in said cells, said replicon comprising a coding sequence under the control of a promoter functional in said cells, said coding sequence encoding a mammalian synovial phospholipase $A_2$, said population being substantially free of other cells;

growing said population under conditions whereby said mammalian synovial phospholipase $A_2$ is expressed; and

recovering said mammalian synovial phospholipase $A_2$.

---

**5,019,509**

### METHOD AND COMPOSITIONS FOR THE PRODUCTION OF L-ALANINE AND DERIVATIVES THEREOF

**J. David Rozzell, Cambridge, Mass., assignor to Genetics Institute, Inc., Cambridge, Mass.**

**Filed Apr. 20, 1988, Ser. No. 183,860**

**Int. Cl.$^5$ C12N** *1/21, 15/6, 15/65, 13/06;* **C12P** *13/06*

**U.S. Cl. 435—232** **8 Claims**

1. An isolated DNA sequence encoding aspartate beta decarboxylase, said sequence being identical or substantially identical to the coding region of the sequence depicted in FIG. 1 and being free from a nucleotide sequence encoding another enzyme.

---

**5,019,510**

### ISOLATION, MOLECULAR CLONING AND SEQUENCING OF AN HIV-1 ISOLATE FROM A GABONESE DONOR

**Simon Wain-Hobson, Montigny le Bretonneux; Thierry Huet, Aubervilliers; Eric Delaporte, and Francoise Brun-Vezinet, both of Paris, all of France, assignors to Institut Pasteur, Paris, France**

**Filed Oct. 28, 1987, Ser. No. 113,655**

**Int. Cl.$^5$ C12N** *7/02*

**U.S. Cl. 435—235.1** **7 Claims**

1. A human retrovirus, wherein the retrovirus is a mutant of Human Immunodeficiency Virus-1 (HIV-1) which has all the identifying characteristics of HIV-1 OVI, and is in a purified form.

VOL 1126
ISS 4
MY 28 1991
UMI

### 5,019,511

### ERYTHROCYTIC MEMBRANE ANTIGENS OF *P. FALCIPARUM*-INFECTED ERYTHROCYTES

**Robert T. Reese, 10886 Aviary Ct., San Diego, Calif. 92131, and Harold A. Stanley, 8689 Via Mallorca, La Jolla, Calif. 92037**

**Continuation of Ser. No. 891,752, Jul. 31, 1986. This application Apr. 14, 1988, Ser. No. 183,456**

**Int. Cl.$^5$ C12N** *5/00;* **A61K** *35/14;* **C07K** *3/00, 13/00*

**U.S. Cl. 435—240.27** **2 Claims**

1. Hybridoma cell line ATCC HB 9152 which produces a monoclonal antibody that specifically binds to a polypeptide of approximate molecular weight 45,000 present in the membrane of erythrocytes parasitized with *P. falciparum* and not present in the membrane of non-parasitized erythrocytes.

---

### 5,019,512

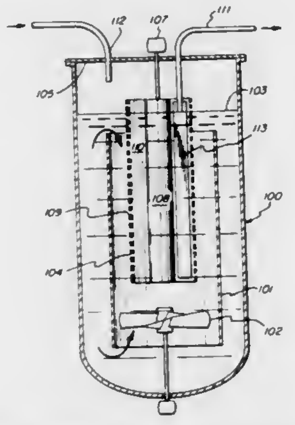
### SPIN FILTER FOR REMOVING SUBSTANTIALLY CELL-FREE CULTURE MEDIUM FROM SUSPENSION CELL CULTURE SYSTEM

**Roland Varecka, Hayward, and Rudolf F. Bliem, Castro Valley, both of Calif., assignors to Baxter International Inc., Deerfield, Ill.**

**Filed Mar. 17, 1989, Ser. No. 325,286**

**Int. Cl.$^5$ C12M** *3/02, 3/06*

**U.S. Cl. 435—240.25** **6 Claims**



1. A suspension culture apparatus for the in vitro perfusion suspension culture of animal cells suspended in liquid culture medium therefor, comprising:

a culture vessel;

an impeller within said culture vessel;

first rotating means for rotating said impeller in a given axial direction in a plane substantially perpendicular to the longitudinal axis of said vessel for promoting axial flow, relative to said longitudinal axis, of cells and culture medium within said culture vessel;

an inlet in liquid communication with said culture vessel for at least intermittent addition of culture medium to said culture vessel;

a spin filter arranged in said culture vessel, and oriented substantially along said longitudinal axis, comprised of a hollow receptacle composed of porous liquid-permeable material, at least a portion of the interior of said hollow receptacle defining a substantially cell-free liquid withdrawal space for receiving culture medium from said culture vessel which has passed into said withdrawal space across said porous liquid-permeable material of said receptacle, said porous liquid-permeable material having an average pore size sufficient to substantially exclude passage therethrough of materials greater than about 8 to 10 microns in size;

second rotating means, distinct from said first rotating means, for at least periodically rotating said spin filter independent of, and in an axial direction, relative to said longitudinal axis, opposite to that of, said impeller;

liquid withdrawal means arranged in said liquid withdrawal space for at least intermittently removing substantially cell-free culture medium from said space and from said culture vessel; and

one or more vertically-oriented stationary baffles arranged in said liquid withdrawal space.

---

### 5,019,513

### ANTI-BACTERIAL T-CELL FACTOR

**Dennis L. Kasper, Newton Center; Dori F. Zaleznik, Newton Highlands, and Robert W. Finberg, Roslindale, all of Mass., assignors to The Brigham and Women's Hospital, Inc., Boston, Mass.**

**Continuation of Ser. No. 741,232, Jun. 4, 1985, abandoned. This application Jan. 12, 1989, Ser. No. 296,849**

**Int. Cl.$^5$ C12N** *5/18;* **C12P** *21/00*

**U.S. Cl. 435—240.26** **5 Claims**

1. A hybrid cell producing a water-soluble factor, wherein said factor protects against formation of abscesses caused by *Bacteraides fragilis* bacterium, said cell comprising a fusion product of:

(1) a suppressor T cell from a mammal immunized with said bacterium or a capsular polysaccharide thereof; and

(2) a thymoma cell.

---

### 5,019,514

### *AUREOBASIDIUM PULLULANS* STRAIN, PROCESS FOR ITS PREPARATION, AND USE THEREOF

**August Böck, Geltendorf; Konrad Lechner, and Otto Huber, both of Munich, all of Fed. Rep. of Germany, assignors to Consortium fur elektrochemische Industrie GmbH, Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 925,708, Oct. 30, 1986, abandoned. This application Nov. 27, 1989, Ser. No. 471,112**

**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1985, 3539180**

**Int. Cl.$^5$ C12N** *1/14*

**U.S. Cl. 435—254** **1 Claim**

1. A culture of *Aureobasidium pullulans* strain P 56, or strains derived therefrom, which produce pullulan and have a lower quantity level of melanin than *Aureobasidium pullulans* ATCC 9348.

---

### 5,019,515

### METHOD OF CONTROLLING AND OPTIMIZING INDUSTRIAL PROCESSES FOR THE MANUFACTURE OF TEXTILE FINISHING AND IMPROVING AGENTS VIA FLOW INJECTION ANALYSIS

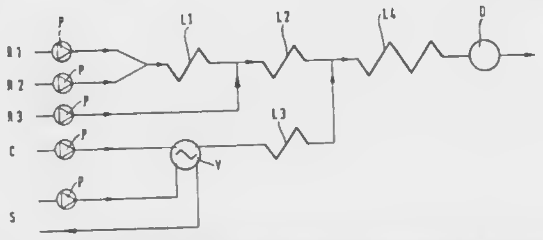
**Markus Gisin, Aesch, and Christian Thommen, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 36,960, Apr. 10, 1987, abandoned. This application Aug. 23, 1988, Ser. No. 237,670**

**Claims priority, application Switzerland, Apr. 18, 1986, 1568/86; Feb. 3, 1987, 385/87**

**Int. Cl.$^5$ G01N** *35/08*

**U.S. Cl. 436—52** **12 Claims**



1. A method on on-line controlling and optimizing processes for the manufacture of textile finishing and improving agents and their intermediates which comprises the steps of

(a) automatically sampling, over at least a last portion of the processes,

(b) injecting samples from step (a) into a carrier stream, and then

(c) transporting the carrier stream to a spectrophotometric detector,

(d) spectrophotometrically measuring at least one characteristic of the samples,

(e) controlling the process to an optimum end point based on at least one of said characteristics, and

(f) repeating steps (a) through (e).

---

### 5,019,516

### LEAD EXTRACTION AND ANALYSIS

**Patrick M. Wiese, Loveland, Colo., assignor to Hach Company, Loveland, Colo.**

**Continuation-in-part of Ser. No. 364,652, Jun. 9, 1989, abandoned. This application Feb. 23, 1990, Ser. No. 484,416**

**Int. Cl.$^5$ G01N** *21/00*

**U.S. Cl. 436—77** **11 Claims**

6. In a method for the quantitative determination of the amount of lead present in a sample of potable water, the improvement which comprises the steps of:

(a) adjusting the pH of said sample to less than about 4;

(b) adding to said sample a quantity of complexing agent sufficient to form a complex with said lead in said sample; wherein said complexing agent comprises a dipolar compound selected from the group consisting of tris-(hydroxymethyl)aminomethane, glycine, 2,2-bis(hydroxymethyl)-2,2′,2″-nitriloethanol, and 4-morpholineethane-sulfonic acid;

(c) adjusting the pH of said water to the range of about 6 to 10;

(d) passing said sample through unmodified cellulosic or siliceous fibers at a rate of about 10 to 100 mL. per minute, wherein said fibers are contained in a column, wherein said complex is retained on the surface of said fibers; and

(e) colorimetrically determining the amount of lead extracted from said water.

---

### 5,019,517

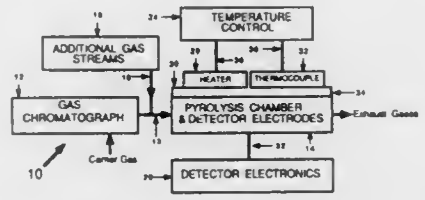
### SYSTEM, DETECTOR AND METHOD FOR TRACE GASES

**Dale M. Coulson, 21 Willow Rd., Apt. 13, Menlo Park, Calif. 94025**

**Filed Apr. 15, 1988, Ser. No. 182,153**

**Int. Cl.$^5$ G01N** *21/71, 31/12, 27/62, 25/18*

**U.S. Cl. 436—753** **23 Claims**



1. A system for detection of a component in a first gas stream, which comprises a source of the first gas stream containing the component to be detected, a detector including a pyrolysis chamber, said first gas stream source being connected to supply the first gas stream to said pyrolysis chamber, said detector including a pair of detector electrodes in said pyrolysis chamber, the electrodes of said detector comprising an anode and a cathode spaced from said anode and mounted on an insulating support, a source of an electrical potential connected to establish a potential difference between said anode and said cathode, said anode and said cathode being of a conductive material substantially free of an alkali metal, a heater independent of said pair of detector electrodes connected to said pyrolysis chamber, said heater comprises a tube furnace including a resistance heater, an insulating layer over said resistance heater, and a temperature sensor mounted in said tube furnace, means connected to said heater for controlling said heater to establish a given temperature in said pyrolysis chamber, said means for controlling said heater and said heater being configured to establish a temperature between about 700 and about 1000 degrees Centigrade and a detector circuit connected to receive an output signal from at least one of said pair of detector electrodes.

---

### 5,019,518

### PROCESS FOR THE DETECTION OF CHEMICAL WARFARE AGENTS

**Wolfgang Diehl, Frankfurt, and Monika Hepp, Weiterstadt, both of Fed. Rep. of Germany, assignors to Battelle-Institut e.V., Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jan. 27, 1989, Ser. No. 302,753**

**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1988, 3803142**

**Int. Cl.$^5$ G01N** *21/76*

**U.S. Cl. 436—172** **8 Claims**

1. Process for the detection of a chemical warfare agent, liquid or chemical warfare agent in a liquid comprising providing a detection reagent capable of fluorescing and dissolving in a solvent, chemical warfare agents S-LOST (bis(2-chloroethyl) sulfide), N-LOST (bis(2-chloroethyl)methylamine hydrochloride) and/or VX O-ethyl S-(2-diisoproplyaminoethyl)methylthiophosphonate not being soluble in the solvent, the detection reagent being soluble in the phase of the respective chemical warfare agent and exhibiting in the boundary layer between the phase of S-LOST, N-LOST or VS and the solvent phase or in the pure S-LOST, N-LOST and/or VS phase a fluorescence property different from that in the solvent phase, and contacting said detection agent with a chemical warfare agent so that the detection reagent is diffused into the phase of the chemical warfare agent, where the fluorescent light emitted by the detection reagent in the boundary layer between the phase of the chemical warfare agent and the solvent phase or in the phase of the chemical warfare agent is different form that emitted in the solvent phase.

---

### 5,019,519

### METHOD FOR THE MANUFACTURE OF OPTICAL SEMICONDUCTOR DEVICE

**Hideaki Tanaka; Shigeyuki Akiba; Masatoshi Suzuki, all of Tokyo, and Katsuyuki Utaka, Musashino, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 28, 1989, Ser. No. 316,865**

**Claims priority, application Japan, Mar. 11, 1988, 63-56248**

**Int. Cl.$^5$ H01L** *21/265*

**U.S. Cl. 437—22** **3 Claims**

1. An optical semiconductor device manufacturing method comprising an ion implantation step of implanting ions into a compound semiconductor wafer through using an ion implantation mask and subsequently effecting an annealing step of activating atoms in the compound semiconductor wafer with an annealing mask film existing on the wafer, characterized in:

that the ion implantation step and the annealing step are performed in succession after growing mono- or multi-layered compound semiconductor layers defining the ion implantation mask and defining the annealing mask film on the compound semiconductor wafer, and said implanting of ions into the compound semiconductor wafer being effected through the annealing mask film using the ion implantation mask.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,520
## METHOD FOR PREPARING A HIGH MOBILITY, LIGHTLY-DOPED CHANNEL MIS-TYPE FET WITH REDUCED LATCH UP AND PUNCHTHROUGH

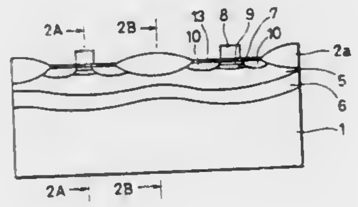
**Shigeki Komori; Shigeru Kusunoki, and Katsuhiro Tsukamoto, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

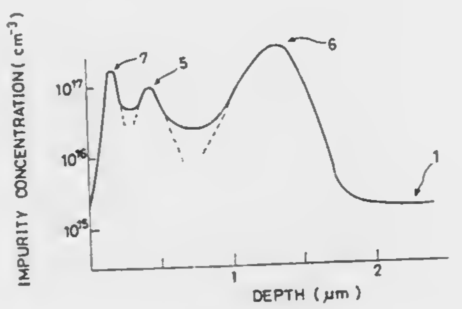
**Filed Apr. 30, 1990, Ser. No. 516,643**

**Claims priority, application Japan, Nov. 29, 1989, 1-311264**

**Int. Cl.$^5$ H01L** *21/334*

U.S. Cl. 437—26 12 Claims





2. The method according to claim **1** wherein said predetermined energy includes a third one of said energy levels causing a third peak of said impurity concentration distribution at a position deeper than said second peak, said third peak acting to prevent a latch-up phenomenon of said MISFET.

---

### 5,019,521
## PAIRED POLYPEPTIDES

**John Krupcy, Glen Rock, N.J., assignor to Photest Diagnostics, Inc., Waldwick, N.J.**

**Filed Mar. 12, 1990, Ser. No. 491,523**

**Int. Cl.$^5$ G01N** *33/53, 33/544;* **C12Q** *1/00;* **C12N** *11/06*

U.S. Cl. 436—500 15 Claims

1. A binding assay reagent comprising a backbone polypeptide comprising glutamic acid residues and lysine residues in proportions such that the backbone polypeptide has a net positive charge, said backbone polypeptide having a molecular mass of $\geqq 2.0 \times 10^5$ Daltons, an optical dye, or alternatively, an optical label covalently bound to the backbone polypeptide, a specific binding molecule covalently bound to the backbone polypeptide, and an enhancing peptide associated with the backbone polypeptide, said enhancing peptide being comprised of a mixture of (a) acidic and basic amino acid monomer residues having opposite stereochemical configurations or (b) mixtures of homopolymers of acidic amino acids and basic amino acids wherein the homopolymers may be of the same or different stereochemical configurations, and wherein said enhancing peptide is electrically neutral or has a net negative charge.

---

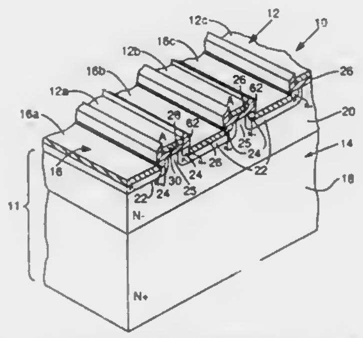
### 5,019,522
## METHOD OF MAKING TOPOGRAPHIC PATTERN DELINEATED POWER MOSFET WITH PROFILE TAILORED RECESSED SOURCE

**Theodore O. Meyer; John W. Mosier, II; Douglas A. Pike, Jr., all of Bend; Theodore G. Hollinger, Redmond, and Dah W. Tsang, Bend, all of Oreg., assignors to Advanced Power Technology, Inc., Bend, Oreg.**

**Division of Ser. No. 194,874, May 17, 1988, Pat. No. 4,895,810, which is a continuation-in-part of Ser. No. 842,771, Mar. 21, 1986, Pat. No. 4,748,103. This application Jan. 2, 1990, Ser. No. 460,258**

**Int. Cl.$^5$ H01L** *21/70*

U.S. Cl. 437—29 10 Claims



1. A method of producing a MOS device on a semiconductor substrate upper surface, said method comprising:
- forming a first oxide layer of a first thickness on the substrate upper surface,
- forming a protective layer comprising a polysilicon layer of an initial thickness over the oxide layer,
- patterning the protective layer in accordance with a defined outline characteristic,
- exposing a portion of the upper surface of the semiconductor substrate within a boundary determined by the defined outline characteristic,
- simultaneously etching silicon in the exposed substrate portion and in the protective layer to form a trench with a base and sidewalls of a first depth and to remove a portion of the initial thickness of the polysilicon layer leaving a remaining portion of the polysilicon layer on the first oxide layer, and
- depositing conductive material to form a first conductive layer on the substrate in the base of the trench,
- the remaining portion of the polysilicon layer being doped so as to form a second conductive layer, the first conductive layer being vertically spaced from the second conductive layer by at least the thickness of the first oxide layer so as to be electrically separated therefrom.

---

### 5,019,523
## PROCESS FOR MAKING POLYSILICON CONTACTS TO IC MESAS

**Tohru Nakamura, Hoya; Takao Miyazaki, Hachioji; Susumu Takahashi; Ichiro Imaizumi; Takahiro Okabe, all of Tokyo; Minoru Nagata, Kodaira, and Masao Kawamura, Fuchu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

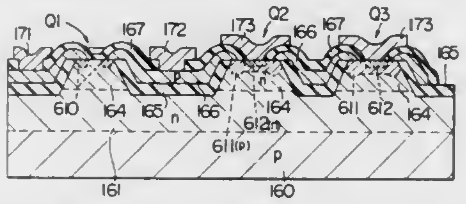
**Continuation of Ser. No. 159,346, Feb. 23, 1988, abandoned, which is a division of Ser. No. 56,127, Jun. 1, 1987, Pat. No. 4,933,737, which is a continuation of Ser. No. 443,554, Nov. 22, 1982, abandoned, which is a continuation of Ser. No. 158,366, Jun. 11, 1980. This application Mar. 30, 1990, Ser. No. 501,964**

**Claims priority, application Japan, Jun. 18, 1979, 54-75715**

**Int. Cl.$^5$ H01L** *21/283, 21/31*

U.S. Cl. 437—31 24 Claims

1. A method of manufacturing a semiconductor device, comprising the steps of:
- (a) forming a protruding portion and another portion in a surface of a semiconductor body of a first conductivity type by removing predetermined unnecessary portions of the surface of the semiconductor body, said another portion being adjacent to said protruding portion and having a substantially planar surface that is lower than an upper surface of said protruding portion;
- (b) forming a first insulating film on said another portion by thermally oxidizing an exposed portion of the surface of the semiconductor body, said first insulating film leaving a part of a surface of said protruding portion exposed;
- (c) forming a conductive polycrystalline semiconductor film of a second conductivity type opposite to said first conductivity type on said first insulating film, said polycrystalline semiconductor film contacting the exposed surface of said protruding portion;



- (d) thermally oxidizing a surface of said polycrystalline semiconductor film and the upper surface of the protruding portion to form a second insulating film thereon;
- (e) selectively removing the second insulating film formed on the upper surface of said protruding portion to expose said upper surface;
- (f) forming a first region of said second conductivity type in said protruding portion, which first region is electrically connected to said polycrystalline semiconductor film; and
- (g) doping an impurity of said first conductivity type into an upper surface region of said protruding portion to form a second region on said first region, said second region being apart from an upper peripheral edge portion of said protruding portion by a substantially constant distance.

---

### 5,019,524
## METHOD OF MANUFACTURING A HETEROJUNCTION BIPOLAR TRANSISTOR

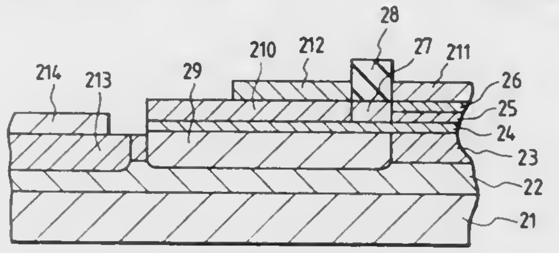
**Katsuhiko Mitani, Kokubunji; Tomonori Tanoue, Ebina; Chushiro Kusano, Tokorozawa; Masayoshi Kobayashi, Hachioji, and Susumu Takahashi, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Division of Ser. No. 233,010, Aug. 17, 1988, abandoned. This application Aug. 30, 1989, Ser. No. 401,506**

**Claims priority, application Japan, Aug. 24, 1987, 62-208109**

**Int. Cl.$^5$ H01L** *21/20, 21/265*

U.S. Cl. 437—31 32 Claims



1. A method of manufacturing a heterojunction bipolar transistor, comprising the steps of:
- forming a collector layer, base layer and emitter layer in order on a semiconductor substrate;
- forming an insulating film on a designated emitter region of said emitter layer;
- forming said emitter region by etching, using said insulating film as a mask, so as to expose an outer base region of the base layer;
- depositing a layer of a high resistivity undoped compound-semiconductor material on said outer base region so as to bury the emitter region, the layer of high resistivity undoped compound-semiconductor material contacting said emitter region, wherein the layer of high resistivity undoped compound-semiconductor material contains at least one element contained in both said emitter layer and said base layer as a constituent element thereof;
- forming said insulating film with a side-wall insulator film;
- forming a base contact layer by ion-implantation of an impurity exhibiting a same conductivity type as that of said base layer into said layer of high resistivity undoped compound-semiconductor material, using said insulating film and said side-wall insulator film as a mask; and
- forming an emitter electrode, a base electrode and a collector electrode on said emitter region, said base region and said semiconductor substrate, respectively.

---

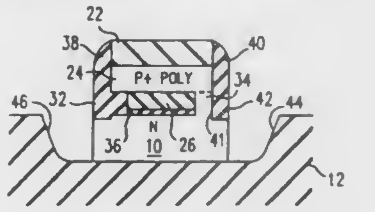
### 5,019,525
## METHOD FOR FORMING A HORIZONTAL SELF-ALIGNED TRANSISTOR

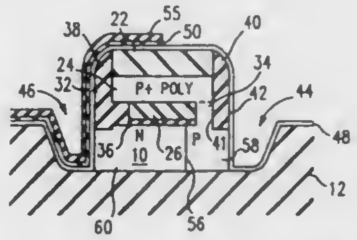
**Robert L. Virkus, Garland; David B. Spratt, and Eldon J. Zorinsky, both of Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

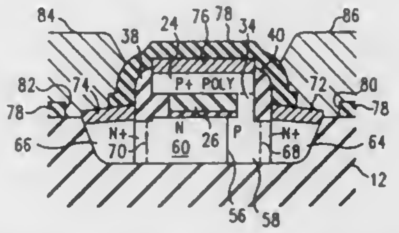
**Division of Ser. No. 300,144, Jan. 23, 1989, abandoned, which is a continuation of Ser. No. 86,466, Aug. 18, 1987, abandoned. This application Jul. 5, 1990, Ser. No. 548,177**

**Int. Cl.$^5$ H01L** *21/265*

U.S. Cl. 437—32 15 Claims







15. A method for forming a horizontal transistor, comprising:
- forming an island of semiconductor material of the first conductivity type over an insulating layer, the island having an upper surface and a coplanar bottom surface;
- forming a stacked structure comprised of a first layer of insulating material adjacent the island of semiconductor material, a layer of doped polycrystalline silicon of a second conductivity type opposite to the first conductivity type and a second layer of insulating material, the stacked structure having two oppositely disposed essentially vertical walls, one vertical wall defining an emitter side of the transistor and one vertical wall defining the collector side of the transistor;
- removing a portion of the first insulating layer on the vertical wall of the stacked structure on the emitter side to form an undercut region under the doped polycrystalline silicon layer in the stacked structure;
- filling the undercut region with polycrystalline silicon to

VOL
1126
ISS
4
MY
28
1991
UMI

form a contact between the doped polycrystalline silicon stacked structure and the substrate, the filled portion forming the base contact with the surface of the semiconductor material;

forming a sidewall oxide layer on each of the vertical walls of the stacked structure, the outermost surface of the sidewall oxide on the emitter side of the stacked structure defining a reference edge;

forming a trench on both the emitter side of the stacked structure and the collector side of the stacked structure, the outermost surfaces of the sidewall oxide layers defining one vertical wall of the trenches, the emitter and collector trenches extending from the upper surface of the island of semiconductor material to the bottom surface thereof;

depositing a thin layer of polycrystalline silicon over the island of semiconductor material;

masking off the collector side of the transistor;

introducing impurities into the polycrystalline silicon layer in the emitter trench;

driving the impurities in the polycrystalline silicon layer into the vertical wall of the emitter trench aligned with the reference edge to form a metallurgical junction on the opposite side of the polycrystalline filler to form a collector-base metallurgical junction that has a graded impurity profile;

filling the emitter and collector trenches with a layer of doped polycrystalline silicon of the first conductivity type;

removing the second insulating layer in the stacked structure and forming silicide layers over the doped polycrystalline silicon layer in the stacked structure and the doped polycrystalline silicon layers in the emitter and collector trenches to form the base contact, emitter contact and collector contact, respectively; and

forming interconnects with the base, collector and emitter contacts of the transistor to allow interconnection with remaining circuits.

---

### 5,019,526

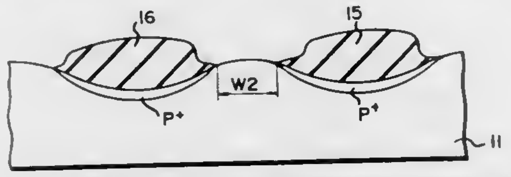
## METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE HAVING A PLURALITY OF ELEMENTS

**Hiroyuki Yamane, Nagoya; Yasushi Higuchi, Kariya, and Tetsuo Fujii, Toyohashi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Sep. 26, 1988, Ser. No. 249,514**

**Int. Cl.$^5$ H01L *21/265***

U.S. Cl. 437—37 **11 Claims**



1. A method of manufacturing a semiconductor device having a semiconductor substrate and a plurality of elements formed on the substrate, said method comprising the steps of:

oxidizing the entire surface of the semiconductor substrate, thereby forming a pad oxide film thereon;

forming a pattern of silicon nitride film on those parts of the pad oxide film where the elements will be formed;

forming a heat oxide film on those parts of the pad oxide film which are exposed;

injecting ions selected from the group consisting of Si, N and C into the surface of the heat oxide film with such an acceleration energy that the ions do not pass through the silicon nitride film, thereby to change the quality of the heat oxide film to form a reformed layer;

removing the pattern of silicon nitride film by means of a first etching process; and

etching a part of the heat oxide film, excluding the region where the reformed layer has been formed, by a second etching process using an acid solution.

---

### 5,019,527

## METHOD OF MANUFACTURING NON-VOLATILE SEMICONDUCTOR MEMORIES, IN WHICH SELECTIVE REMOVAL OF FIELD OXIDATION FILM FOR FORMING SOURCE REGION AND SELF-ADJUSTED TREATMENT FOR FORMING CONTACT PORTION ARE SIMULTANEOUSLY PERFORMED

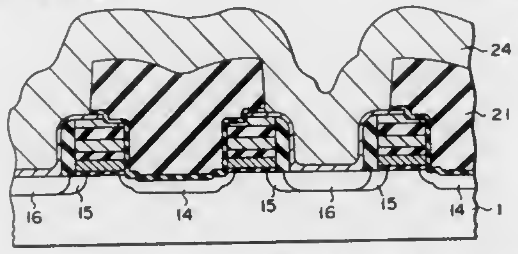
**Yoichi Ohshima, Yokohama, and Seiichi Mori, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Aug. 9, 1990, Ser. No. 564,768**

**Claims priority, application Japan, Aug. 11, 1989, 1-208806**

**Int. Cl.$^5$ H01L *21/265***

U.S. Cl. 437—43 **12 Claims**



1. A semiconductor device manufacturing method comprising:

a step of forming strip shaped first insulating films separately extending in parallel with one another over a surface of a semiconductor substrate of a first conductivity type;

a step of forming over the semiconductor substrate and the strip shaped first insulating films a plurality of stacked gate structures extending in parallel with one another and in perpendicular to the strip shaped first insulating films, each stacked gate structure including a second insulating film, a floating gate electrode, a third insulating film, a control gate electrode, a fourth insulating film, and an etching stop film having a slower etching speed than the fourth insulating film;

a step of self-align removing those portions of each of the first insulating films that are located between any two of the adjacent stacked gate structures extending in parallel with one another and are located above source forming regions with using one end side of each of the stacked gate structures as a part of a mask, so as to expose those portions of the semiconductor substrate that are located at the source forming regions;

a step of self-align introducing impurities of a second conductivity type into each of the source forming regions using the one end side of each of the stacked gate structures as a mask;

a step of forming fifth insulating films on the side wall portions of each of the stacked gate structures;

a step of self-align introducing impurities of the second conductivity type into each of drain forming regions using the other end side of each of the stacked gate structures;

a step of self-align exposing those portions of the semiconductor substrate that are located at the drain forming regions with using as parts of a mask the fifth insulating films each formed on the other end side of each of the stacked gate structures;

a step of forming conductive layers which contact with surfaces of the exposed drain regions and cover at least those parts of the fifth insulating films that are laid on the walls located at the drain regions of any two adjacent stacked gate structures with corresponding one of the exposed drain regions being interposed between them;

a step of forming a sixth insulating film on the resultant structure;

a step of making contact holes by selectively removing the sixth insulating film with using the conductive layers as stoppers; and

a step of forming wiring patterns on those portions of the sixth insulating films that include the contact holes.

---

### 5,019,529

## HETEROEPITAXIAL GROWTH METHOD

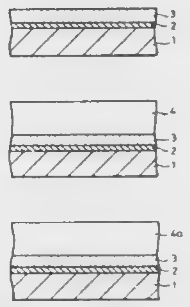
**Kanetake Takasaki, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed May 2, 1989, Ser. No. 346,455**

**Claims priority, application Japan, May 17, 1988, 63-118224**

**Int. Cl.$^5$ H01L *21/20***

U.S. Cl. 437—132 **8 Claims**



1. A heteroepitaxial growth method wherein a group III-V compound semiconductor is formed on a silicon substrate, said method comprising the steps of:

(a) forming a first amorphous group III-V compound semiconductor layer on the silicon substrate,

(b) forming a crystalline group III-V compound semiconductor layer on the first amorphous group III-V compound semiconductor layer,

(c) forming a second amorphous group III-V compound semiconductor layer, having a thickness greater than the thickness of the crystalline group III-V compound semiconductor layer, on the crystalline group III-V compound semiconductor layer,

(d) subjecting the second amorphous group III-V compound semiconductor layer to solid phase epitaxial growth method step at a temperature lower than that at which the crystalline group III-V compound semiconductor layer was formed in step (b), whereby the second amorphous group III-V compound semiconductor layer is changed to a single crystalline group III-V compound semiconductor layer, and

(e) forming an element in said thus changed single crystalline group III-V semiconductor layer.

---

### 5,019,530

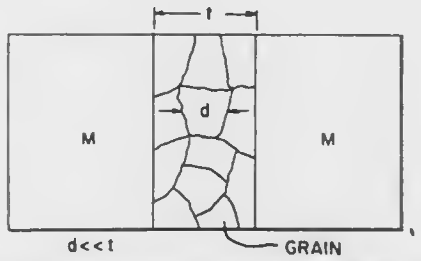
## METHOD OF MAKING METAL-INSULATOR-METAL JUNCTION STRUCTURES WITH ADJUSTABLE BARRIER HEIGHTS

**Alan W. Kleinsasser, Putnam Valley, and Jerry M. Woodall, Bedford, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 20, 1990, Ser. No. 512,245**

**Int. Cl.$^5$ H01L *29/56***

U.S. Cl. 437—175 **8 Claims**



1. A method for fabricating junctions composed of metal electrodes separated by a polycrystalline alloy barrier to form metal-insulator-metal junctions with selected barrier height and shape as a function of polycrystalline alloy composition comprising the steps of

depositing a first metal electrode,

depositing a selected graded multi alloy polycrystalline semiconductor barrier on said first metal electrode at a first interface, said semiconductor barrier multi alloy having a composition that is graded in the content of said separate alloys, and

depositing a second metal electrode on said semiconductor at a second interface, wherein said grading of said semiconductor alloy composition is selected to provide selected Fermi level pinning positions at said metal-semiconductor interfaces and at the grain boundaries of said semiconductor, thereby providing selected barrier heights throughout said combination electrode, semiconductor and electrode structure resulting in barriers of selected shapes.

---

### 5,019,531

## PROCESS FOR SELECTIVELY GROWING THIN METALLIC FILM OF COPPER OR GOLD

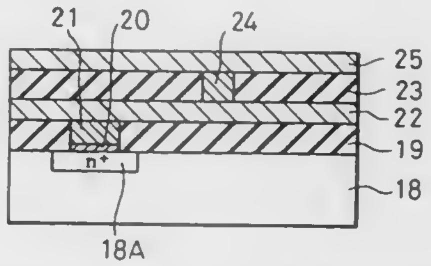
**Nobuyoshi Awaya, and Yoshinobu Arita, both of Isehara, Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan**

**Filed May 19, 1989, Ser. No. 354,158**

**Claims priority, application Japan, May 23, 1988, 63-124006; Dec. 26, 1988, 63-326063**

**Int. Cl.$^5$ H01L *21/44;* C23C *16/00***

U.S. Cl. 437—180 **21 Claims**



1. A process for growing a thin metallic film, comprising the steps of:

maintaining a substrate, having on the surface thereof a first material consisting of metal or a metallic silicide and a second material selected from the group consisting of silicon oxide, silicon nitride and titanium nitride, under a reduced pressure;

heating an organic complex or organometallic compound of gold or copper as a starting material to evaporate the same;

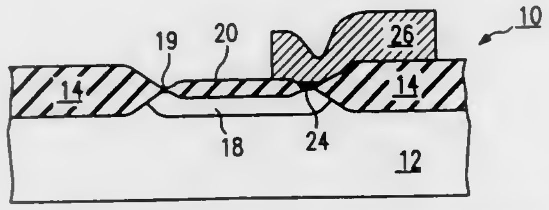
heating said substrate to a temperature equal to or higher than the decomposition temperature, on said first material, of a vapor of said evaporated starting material; and

feeding a gas stream consisting essentially of the vapor of said evaporated starting material being kept at a temperature lower than the decomposition temperature thereof and a reducing gas onto said heated substrate to selectively grow a thin metallic film of gold or copper only on the surface of said first material.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,532
### METHOD FOR FORMING A FUSE AND FUSE MADE THEREBY

**Cetin Kaya, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**
**Continuation of Ser. No. 457,443, Dec. 27, 1989, abandoned. This application Sep. 21, 1990, Ser. No. 587,508**
**Int. Cl.$^5$ H01L** *29/44*
**U.S. Cl. 437—186** **17 Claims**



1. A method for forming a fuse at a face of a semiconductor layer, comprising the steps of:

growing a first insulator layer laterally adjacent to at least one edge of a predefined diffusion region of the semiconductor layer, such that the first insulator layer has a sloping lateral boundary adjacent the diffusion region;

implanting a dopant in the diffusion region using the sloping lateral boundary as a mask, such that the concentration of the implanted dopant decreases as a function of the thickness of the first insulator layer thereover;

growing a second insulator layer on the diffusion region, said second insulator layer having a thickness varying with the implanted dopant concentration of the diffusion region thereunder;

selectively etching adjacent portions of the first and second insulator layers to expose a region on the face;

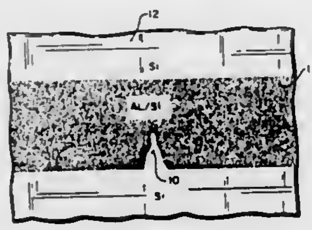
forming a dielectric fuse layer on the exposed region; and

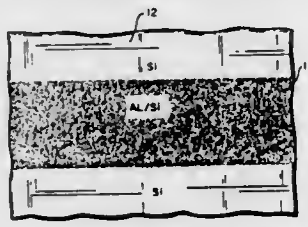
forming a conductor to adjoin the dielectric fuse layer.

---

### 5,019,533
### THERMAL TREATMENT OF SILICON INTEGRATED CIRCUIT CHIPS TO PREVENT AND HEAL VOIDS IN ALUMINUM METALLIZATION

**Edward F. Cuddihy, Tujunga; Russell A. Lawton, La Crescenta, and Thomas R. Gavin, Canyon Country, all of Calif., assignors to The United States of America as represented by the administrator of the National Aeronautics and Space Administration, Washington, D.C.**
**Filed May 26, 1989, Ser. No. 357,758**
**Int. Cl.$^5$ H01L** *21/324*
**U.S. Cl. 437—199** **5 Claims**



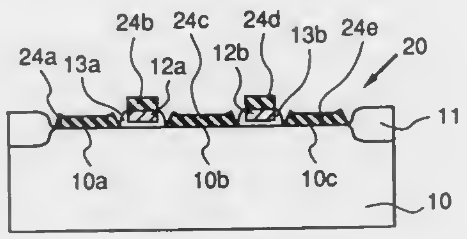


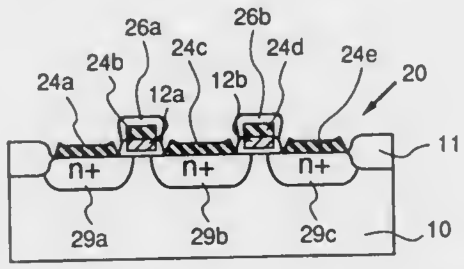
1. A method of preventing voids, or healing such voids once they have developed, in aluminum metallization conductor lines of micron widths and thicknesses on a silicon integrated circuit chip upon subjecting said chip to thermal treatment upon depositing said aluminum metallization conductor lines, and at any time thereafter, comprising the steps of subjecting said chip to thermal treatment for a period sufficient to allow diffusion of silicon into voids of aluminum metallization conductor lines and then rapidly cooling said chip at a rate sufficient to prevent precipitation of silicon from said aluminum metallization conductor lines by quickly immersing said chip in a volume of liquid nitrogen at a temperature sufficiently below 25° C. to provide said sufficient cooling rate, wherein said inert liquid is nitrogen, and the temperature of said thermal treatment is in the range between 200° C. and 400° C.

---

### 5,019,534
### PROCESS OF MAKING SELF-ALIGNED CONTACT USING DIFFERENTIAL OXIDATION

**Nan-Hsiung Tsai, Cupertino, and Yun-Sheng Hwang, Sunnyvale, both of Calif., assignors to MOS Electronics, Sunnyvale, Calif.**
**Filed Oct. 31, 1989, Ser. No. 429,580**
**Int. Cl.$^5$ H01L** *21/473*
**U.S. Cl. 437—200** **10 Claims**





1. A method for forming an integrated circuit structure comprising the steps of:

forming above a silicon substrate conductive structures of polysilicon, said conductive structures having top surfaces and sidewalls, said polysilicon being sufficiently more heavily doped than said silicon substrate that a subsequent step of oxidizing a refractory silicide to be formed on said silicon substrate and said polysilicon conductive structures is sufficiently faster above said polysilicon conductive structures than above said silicon substrate that uniform oxide removal can expose said silicide above said silicon substrate and not expose said silicide above said polysilicon conductive structures;

forming sidewall spacers against said sidewalls, said sidewall spacers being formed from an electrically insulating material;

forming a layer of refractory metal on a top surface of said integrated circuit structure, said refractory metal contacting said top surfaces of said conductive structures, said side wall spacers, and exposed portions of said silicon substrate;

heating said integrated circuit structure sufficiently to cause portions of said refractory metal which contact said top surfaces of said conductive structures and said exposed portions of said silicon substrate to form said refractory silicide;

removing unreacted portions of said refractory metal;

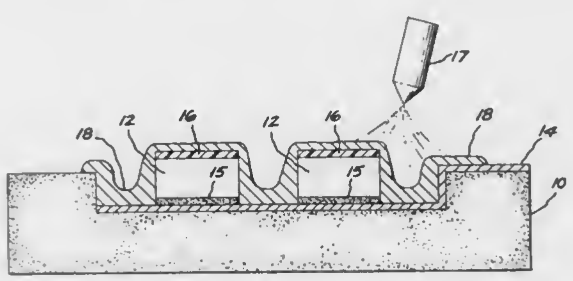
oxidizing said refractory silicide; and

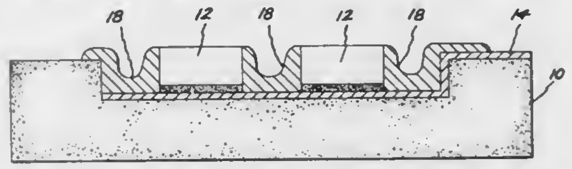
removing oxide using a process which occurs at a constant rate for all exposed oxide, said removing continuing to an extent which exposes said refractory silicide contacting said silicon substrate and does not expose said refractory silicide contacting said conductive structures.

---

### 5,019,535
### DIE ATTACHMENT METHOD USING NONCONDUCTIVE ADHESIVE FOR USE IN HIGH DENSITY INTERCONNECTED ASSEMBLIES

**Robert J. Wojnarowski, Ballston Lake, and Charles W. Eichelberger, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**
**Filed Mar. 28, 1989, Ser. No. 329,478**
**Int. Cl.$^5$ H01L** *21/60, 23/14, 23/485*
**U.S. Cl. 437—209** **16 Claims**





1. A method of electrically connecting an integrated circuit chip to a ground or voltage bias, comprising the steps of:

affixing said integrated circuit chip to a substrate with a nonconductive adhesive;

protecting an electrically active area of said integrated chip from misapplied metallization by applying a removable layer of protective material over said electrically active area;

coating said integrated circuit chip and said substrate with one layer of metallization, said layer of metallization providing an electrical connection from said integrated circuit chip to said ground or voltage bias; and

removing said removable layer of protective material.

---

### 5,019,536
### LOWER GLOSS PROTECTIVE COVERING

**Harvey W. Taylor, Jr., Sayre, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**
**Division of Ser. No. 479,818, Feb. 14, 1990, Pat. No. 4,971,893, which is a division of Ser. No. 285,312, Nov. 3, 1988, Pat. No. 4,921,776, which is a continuation of Ser. No. 31,613, Mar. 30, 1987, abandoned. This application Jul. 25, 1990, Ser. No. 557,083**
**Int. Cl.$^5$ B32B** *27/36, 27/34, 27/30, 27/00*
**U.S. Cl. 428—220** **27 Claims**

1. An element comprising:

(i) a thin, substantially transparent, nonphotosensitive, integral polymeric film having a thickness not greater than 0.002 cm, said polymeric film consisting essentially of a mixture of at least two slightly incompatible polymers, said mixture of slightly incompatible polymers having been dissolved in an essentially organic solvent system, coated on a strippable substrate and dried, so that said polymeric film exhibits a 20° specular gloss that is at least 5% lower than a film prepared any one of said polymer constituents, the mixture of slightly incompatible polymers selected from the group consisting of:

(a) an ethylene/vinylacetate copolymer and polymethyl methacrylate;
(b) an ethylene/vinylacetate copolymer, polymethyl methacrylate, and polyvinylacetate;
(c) polycarbonate and polymethylmethacrylate;
(d) polycarbonate and polystyrene;
(e) two different polyamides;
(f) polybutylmethacrylate and a polyamide;
(g) a polyester and polybutylmethacrylate;
(h) a polyester and polystyrene;
(i) polyvinylacetate, polymethylmethacrylate, and polyethylene glycol; and,

said strippable substrate.

---

### 5,019,537
### FORMING AIDS FOR CERAMIC MATERIALS, CERAMIC BODIES FORMED BY USING THE AIDS, AND PROCESS OF PRODUCING CERAMIC PRODUCTS

**Kiminari Kato, and Masahiro Shirai, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Aichi, Japan**
**Continuation of Ser. No. 903,703, Sep. 4, 1986. This application Apr. 21, 1988, Ser. No. 186,692**
**Claims priority, application Japan, Sep. 10, 1985, 60-201138**
**Int. Cl.$^5$ C04B** *11/02, 11/04, 105/02, 107/02*
**U.S. Cl. 501—1** **33 Claims**

1. A forming aid for use in greenware processing steps of a subsequently fired ceramic body comprising:

at least one material selected from the group consisting of thermoplastic resins, waxes, and combinations thereof; and

a mineral oil present in an amount between 60% and 95% by volume of the total volume of said forming aid;

whereby said forming aid is mixed with a ceramic material during greenware processing steps of a ceramic body and then subsequently removed from said ceramic body by heating.

---

### 5,019,538
### COLORED PHOTOSENSITIVE OPAL GLASSES

**Nicholas F. Borrelli, Elmira, and Dennis W. Smith, Corning, both of N.Y., assignors to Coring Incorporated, Corning, N.Y.**
**Filed Nov. 13, 1989, Ser. No. 434,222**
**Int. Cl.$^5$ C03C** *4/04, 14/00*
**U.S. Cl. 501—13** **2 Claims**

1. An opaque glass article wherein at least a portion thereof has an integral colored surface layer of a thickness not exceeding about 1 mm, said surface layer containing NaF crystallites in a concentration of at least about 0.1% by volume and of a size of at least about 0.1 micron in diameter with a deposit of metallic silver on the surface of at least a portion of at least some of the individual crystallites, said surface portion of said crystallites having said deposit of metallic silver being less than about 200 Å in the smallest dimension, said glass being essentially free from materials strongly absorbing of ultraviolet radiations, being in a reduced state, and consisting essentially, expressed in terms of weight percent in the oxide basis, of about 14–18% $Na_2O$, 0–6% ZnO, 6–12% $Al_2O_3$, 0–5% $B_2O_3$, 0–0.2% $Sb_2O_3$, 0–0.1% SnO, 65–72% $SiO_2$, and 0.007–0.04% Ag, 0.008–0.05% $CeO_2$, 0.7–1.25% Br, and 1.5–2.5% F as analyzed in the glass, the sum of those components constituting at least 90% of the total composition.

VOL
126
SS
4
MY
28
1991
UMI

### 5,019,539

## PROCESS FOR PREPARING SELF-SUPPORTING BODIES HAVING CONTROLLED POROSITY AND GRADED PROPERTIES AND PRODUCTS PRODUCED THEREBY

**Terry D. Claar, and William B. Johnson, both of Newark, Del., assignors to Lanxide Technology Company, LP, Newark, Del.**

**Filed Jan. 13, 1989, Ser. No. 296,961**

**Int. Cl.⁵ C04B** *35/10*

**U.S. Cl. 501—87** **15 Claims**

1. A method of producing a self-supporting body comprising:

mixing a particulate parent metal in at least a portion of a boron carbide material and heating said mixture to a temperature sufficient to cause a reaction between said particulate parent metal and said boron carbide material, said reaction occurring in a substantially inert atmosphere, to form at least one boron-containing compound and a parent metal carbon-containing compound; and

continuing said reaction for a time sufficient to produce a self-supporting body comprising a parent metal boron-containing compound and a parent metal carbon-containing compound, said self-supporting body exhibiting a graded porosity.

---

### 5,019,540

## METAL DIBORIDE BASE SINTERED CERAMIC AND METHOD OF PRODUCING SAME

**Toru Kuramoto, Ube; Hitoshi Tukuda, Ichikawa, and Hiroshi Ono, Ube, all of Japan. assignors to Central Glass Company, Limited, Ube, Japan**

**Filed Mar. 9, 1990, Ser. No. 491,063**

**Claims priority, application Japan, Mar. 13, 1989, 1-60539**

**Int. Cl.⁵ C04B** *35/58*

**U.S. Cl. 501—96** **6 Claims**

1. A metal diboride base sintered ceramic, consisting essentially of:

a base component which is at least one metal diboride selected from the group consisting of $TiB_2$ and $ZrB_2$;

an auxiliary component which is at least one metal compound selected from the group consisting of VC, VN, $MoSi_2$, MoC and MoN, the amount of said auxiliary component being such that the total content of V and Mo in the sintered ceramic is 0.5–99.5 wt % of said base component;

at least one nitride which is selected from the group consisting of TiN, ZrN, TaN, NbN, CrN, AlN and BN and amounts, in total, to 1–50 wt % of said base component; and

carbon amounting to 0.5–10 wt % of said base component and existing as carbides.

---

### 5,019,541

## METHOD FOR PRODUCING SELF-SUPPORTING CERAMIC BODIES WITH ALTERED MICROSTRUCTURES

**Robert C. Kantner, Newark, Del.; Michael K. Aghajanian, Bel Air; Stanislav Antolin, Elkton, both of Md.; Alan S. Nagelberg; Ratnesh K. Dwivedi, both of Wilmington, Del.; assignors to Lanxide Technology Company, LP, Newark, Del.**

**Continuation of Ser. No. 168,798, Mar. 16, 1988, abandoned, which is a continuation-in-part of Ser. No. 908,453, Sep. 17, 1986, abandoned. This application Jul. 2, 1990, Ser. No. 547,404**

**Int. Cl.⁵ C04B** *35/10*

**U.S. Cl. 501—127** **18 Claims**

1. A method for producing a self-supporting ceramic body comprising (1) a ceramic matrix obtained by oxidation of a parent metal comprising a primary chemical constituent to form a polycrystalline material comprising an oxidation reaction product which is the product of reaction of said parent metal with an oxidant; and (2) a metallic constituent, said method comprising:

(a) conjoining said parent metal with at least one dopant comprising at least one primary chemical constituent;

(b) conjoining said parent metal and said dopant with at least one process modifier, said at least one process modifier comprising at least one material selected from the group consisting of copper, silver, gold, titanium, zirconium, hafnium, manganese, iron, cobalt, nickel, platinum, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, technetium, rhenium, rubidium, osmium, rhodium, iridium, and palladium, and said at least one process modifier being present in an amount greater than 0.1% and less than 2% by weight of said parent metal when the formation of said oxidation reaction product is begun, said at least one process modifier having a composition wherein a primary chemical constituent therein is different from said primary chemical constituent of said parent metal and said at least one primary chemical constituent in said at least one dopant;

(c) heating said parent metal in the presence of an oxidant to a temperature above its melting point but below the melting point of said oxidation reaction product to form a body of molten metal and at said temperature reacting said molten metal with said oxidant to form an oxidation reaction product, which product is in contact with and extends between said body of molten metal and said oxidant, and at said temperature transporting said molten metal through said oxidation reaction product towards said oxidant so that fresh oxidation reaction product continues to form at an interface between said oxidant and previously formed oxidation reaction product, thereby growing a progressively thicker body of said oxidation reaction product and continuing said reaction for a time sufficient to produce said ceramic body; and

(d) recovering said ceramic body, wherein said ceramic body is characterized by an altered microstructure relative to substantially the same oxidation reaction product produced without a process modifier.

---

### 5,019,542

## PROCESSING FOR REGENERATING SUGAR DECOLORIZING ION EXCHANGE RESINS, WITH REGENERANT RECOVERY

**Luis R. Bento, Matoshinbos, Portugal, assignor to RAR - Refinarias De Accucar Reunidas, S.A., Portugal**

**Filed Jan. 8, 1990, Ser. No. 461,674**

**Int. Cl.⁵ B01J** *20/34;* **C13J** *1/06;* **C13D** *3/12;* **B01D** *15/04*

**U.S. Cl. 502—25** **13 Claims**

1. A process for regenerating sugar decolorizing ion exchange resins charged with sugar colorants, thereby producing regenerated ion exchange resins and liquid effluents containing said sugar colorants, and for treating a part of said effluents for removing a part of the sugar colorants contained therein, said process comprising the steps of

(a) passing through said resins a low sodium chloride concentration aqueous solution, comprising from 30 to 70 g.l. of sodium chloride and having a pH between 10 and 13, thereby obtaining a first effluent containing the sugar colorants with low affinity to said resin,

(b) passing through the resins resulting from step (a) a higher sodium chloride concentration aqueous solution comprising from 80 to 120 g./l. of sodium chloride and having a pH between 9 and 13, thereby obtaining a second effluent containing the sugar colorants with higher affinity to said resins, and

(c) chemically precipitating from said second effluent a part of said sugar colorants with higher affinity to said resins, thereby obtaining a third effluent made partly free of said sugar colorants.

### 5,019,543

## HIGH SILICA CRYSTALLINE ZEOLITES AND PROCESS FOR THEIR PREPARATION

**Stephen M. Davis, Baton Rouge, and W. Scott Varnado, Denham Springs, both of La., assignors to Exxon Research & Engineering Company, Florham Park, N.J.**

**Filed Jul. 5, 1989, Ser. No. 375,446**

**Int. Cl.⁵ B01J** *29/06, 29/08*

**U.S. Cl. 502—64** **29 Claims**

1. A process for increasing the silica to aluminum (Si/Al) mole ratio in the crystal lattice of a crystalline aluminosilicate zeolite, said process comprising:

(1) hydrothermally treating said zeilite for a period of time sufficient to effect removal of alumina from said crystal lattice, thereby increasing the Si/Al ratio of the zeilite and forming a non-framework amorphous phase alumina by-product on said zeolite; and

(2) extracting the amorphous phase alumina selectively with respect to the alumina in said crystal lattice of said zeolite to produce a zeolite product substantially retaining its degree of framework crystallinity with respect to the dealuminized zeolite produced in step (1),

said extracting step being carried out by one of the following processes:

a) contacting the treated zeolite of step (1) with a solution of an organic acid selected from the group consisting of $Cl_x F_{3-x} COOH$, $RCF_2 COOH$ or $RCCl_2 COOH$, wherein x is 1, 2 or 3 and R is phenyl or an alkyl group having from 1 to 10 carbon atoms, for a sufficient time and under process conditions suitable to remove a substantial portion of the amorphous phase alumina from said zeolite; or alternatively

b) loading the treated zeolite of step (1) with an organic blocking agent to block access to the framework aluminum centers of the zeolite, and contacting said blocked zeolite with a solution of an extracting agent for sufficient time and under process conditions suitable to remove a substantial portion of the amorphous phase alumina from said zeolite.

**21**. The process of claim **1**, wherein the zeolite product of step (2) is subsequently ionexchanged or treated with an additive.

**22**. The process of claim **21**, wherein the additive is a catalytic metal employed in hydrocracking, reforming, or hydrotreating.

---

### 5,019,544

## DISCRETE TUNGSTEN COMPLEXES AS OXYGEN AND WATER RESISTANT DCPD POLYMERIZATION CATALYSTS

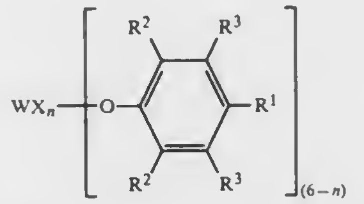
**Andrew Bell, New Castle, Del., assignor to Hercules Incorporated, Wilmington, Del.**

**Division of Ser. No. 315,075, Feb. 24, 1989, Pat. No. 4,981,931. This application Aug. 9, 1990, Ser. No. 564,905**

**Int. Cl.⁵ C08F** *4/78*

**U.S. Cl. 502—102** **4 Claims**

1. A catalyst composition for the preparation of a polymer of a strained ring non-conjugated polycyclic cycloolefin monomer which comprises a tungsten catalyst compound having the formula



wherein X is Cl or Br, n is 2 or 3, $R^1$ is a H, Cl an alkyl group having 1 to 10 carbons, an alkoxy group having 1 to 8 carbons or a phenyl group, $R^2$ is H or an alkyl group having 1 to 9 carbons and $R^3$ is a H or an alkyl group having 1 to 10 carbon atoms and an activator compound having the formula $SnR_3H$ wherein R is selected from the group consisting of a phenyl group and an alkyl group having 1 to 10 carbon atoms.

---

### 5,019,545

## PROCESS FOR MANUFACTURE OF MALEIC ANHYDRIDE CATALYSTS

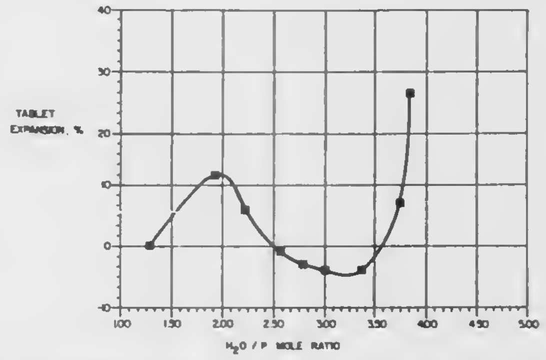
**Muin S. Haddad, and William S. Eryman, both of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.**

**Continuation-in-part of Ser. No. 225,523, Jul. 28, 1988, abandoned. This application Oct. 26, 1988, Ser. No. 262,743**

**The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.**

**Int. Cl.⁵ B01J** *27/198, 37/28;* **C07D** *307/34*

**U.S. Cl. 502—209** **28 Claims**



1. A process for the manufacture of a phosphorus-vanadium oxide catalyst suitable for use in the manufacture of maleic anhydride from butane, benzene, butene or butadiene which process comprises reacting in a reaction mixture at a temperature of about 0° C. to about 200° C. a vanadium compound in an organic ether solvent, with a phosphoryl halide in the presence of water wherein the molar ratio of water to phosphorus from the phosphoryl halide is in the range of about 2.25:1 to about 3.75:1, eliminating the solvent and activating the catalyst by the addition of butane, benzene, butene or butadiene at a temperature of about 300° C. to about 500° C., and wherein an oxygen containing gas is introduced into said reaction mixture at a rate sufficient to provide an atmosphere comprising at least about 0.1 wt. % oxygen during said reacting.

---

### 5,019,546

## CATALYST FOR PURIFYING EXHAUST GAS AND METHOD OF MANUFACTURING THE SAME

**Hiroshi Murakami, Hiroshima; Masayuki Koishi, Kure; Shoko Yatagai, Hiroshima, and Kazuko Yamagata, Kure, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Feb. 5, 1990, Ser. No. 475,770**

**Claims priority, application Japan, Feb. 16, 1989, 1-37774**

**Int. Cl.⁵ B01J** *21/04, 21/06, 23/10, 23/40*

**U.S. Cl. 502—303** **13 Claims**

1. A catalyst for purifying exhaust gas, comprising:

a catalyst carrier;

a first coating layer which is formed on a surface of said catalyst carrier and mainly consists of active alumina containing platinum and rhodium; and

a second coating layer which is formed on a surface of said first coating layer and mainly consists of palladium and a composite powder including oxides of zirconium and lanthanum fixed on a surface of cerium oxide.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,547

### PROCESS FOR PREPARING PRECURSORS OF CATALYSTS CONTAINING COPPER, ALUMINUM AND ZINC, USABLE FOR THE SYNTHESIS AND THE DECOMPOSITION OF METHANOL AND CATALYSTS OBTAINED FROM THE PRECURSORS

**Patrick Chaumette, Bougival; Fabienne Le Peltier, Rueil-Malmaison; Raymond Szymanski, Maisons Laffitte; Philippe Courty, Houilles, and Catherine Verdon, Rueil-Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**

**Filed Apr. 24, 1990, Ser. No. 514,059**

**Claims priority, application France, Apr. 24, 1989, 89 05424**

**Int. Cl.$^5$ B01J** *21/04, 23/06, 23/72*

**U.S. Cl. 502—342** **25 Claims**

1. A process for preparing a precursor of catalyst containing copper, aluminum and zinc, at least 50% by weight of said precursor being made up of the mixing of a phase called roderite consisting essentially of copper, aluminum and zinc and showing an atomic ratio (Cu+Zn)/Al ranging from 3.5 to 16 and an atomic ratio Zn/Al ranging from 1.6 to 6, and of a phase called prespinel consisting essentially of copper, aluminum and zinc and showing an atomic ratio (Cu+Zn)/Al ranging from 0.20 to 2.10 and an atomic ratio Zn/Al ranging from 0.10 to 1.50, characterized in that said precursor results from the mixing of two ternary precursors each comprising copper, aluminum and zinc, one of said ternary precursors containing at least 50% by weight of roderite phase and the other one of said ternary precursors containing at least 50% by weight of prespinel phase, said mixing taking place between, on one hand, one of the ternary precursors obtained at the end of one of stages 1) to 4) of a process P comprising the following stages:

1)co-precipitation reaction within a reactor previously containing water between an aqueous solution of at least one compound of a constituent selected from the group consisting of the alkali metals and the ammonium ion, said compound being selected from the group consisting of the carbonates, the hydrogenocarbonates and the hydroxides, and an aqueous solution containing, in the form of compounds selected from the group consisting of the soluble salts and the soluble complexes, copper, aluminum and zinc in such proportions that the atomic ratio (Cu+Zn)/Al ranges from 3.5 to 16 and the atomic ratio Zn/Al ranges from 1.6 to 6, said reaction taking place at a pH value ranging from 6.3 to 7.3, at a temperature ranging from 70 to 90° C., with a residence time ranging from 0.1 to 60 minutes,
2) filtration, then water washing of the product obtained at the end of stage 1),
3) drying of the product obtained at the end of stage 2), between 50° and 200° C.,
4) calcination of the product obtained at the end of stage 3), between 250° and 500° C.,

and, on the other hand, one of the ternary precursors obtained at the end of one of stages 1) to 4) of a process P' comprising the following stages:

1) co-precipitation reaction within a reactor previously containing water between an aqueous solution of at least one compound of a constituent selected from the group consisting of the alkali metals and the ammonium ion, said compound being selected from the group consisting of the carbonates, the hydrogenocarbonates and the hydroxides and an aqueous solution containing, in the form of compounds selected from the group consisting of the soluble salts and the soluble complexes, copper, aluminum and zinc in such proportions that the atomic ratio (Cu+Zn)/Al ranges from 0.20 to 2.10 and the atomic ratio Zn/Al ranges from 0.10 to 1.50, said reaction taking place at a pH value ranging from 6.3 to 7.3, at a temperature ranging from 45° to 65° C., with a residence time ranging from 0.1 to 60 minutes,
2) filtration, then water washing of the product obtained at the end of stage 1),
3) drying of the product obtained at the end of stage 2), between 50° and 200° C.,
4) calcination of the product obtained at the end of stage 3), between 250° and 500° C.,

said mixing being followed by:

filtering and water washing, then drying between 50° and 200° C., and afterwards calcining between 250° and 500° C., if at least one of the two ternary precursors which have been mixed together has been previously obtained at the end of stage 1) of one of the processes P and P',

drying between 50° and 200° C., then calcining between 250° and 500° C., if one of the ternary precursors which have been mixed together has been previously obtained at the end of stage 2) of any one of processes P and P', the other one of the two ternary precursors which have been mixed together being obtained at the end of one of stages 2) to 4) of one of the processes P and P',

calcining between 250° and 500° C., if the two ternary precursors which have been mixed together have been previously obtained at the end of one of stages 3) and 4) of one of the processes P and P'.

---

### 5,019,548

### HEAT SENSITIVE RECORDING MATERIAL

**Toshitake Suzuki, Kobe; Fumio Seyama; Shuki Okauchi, both of Osaka; Toranosuke Saito, Ibaraki; Masakatu Kitani, Kobe, and Takashi Ishibashi, Ibaraki, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo and Sanko Kaihatsu Kagaku Kenkyusho Corporation, Osaka, both of, Japan**

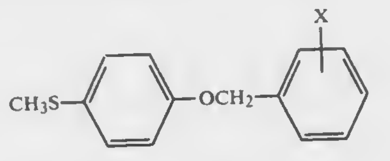
**Filed Aug. 24, 1989, Ser. No. 397,821**

**Claims priority, application Japan, Sep. 7, 1988, 63-225129; Sep. 20, 1988, 63-238551**

**Int. Cl.$^5$ B41M** *5/18*

**U.S. Cl. 503—209** **7 Claims**

1. A heat sensitive recording material comprising a substrate and a recording layer thereof incorporating a colorless or light-colored basic dye and a color acceptor reactive with the dye to form a color when contacted therewith, wherein said color acceptor is at least one compound selected from the group consisting of 4-hydroxy-4'-isopropyloxydiphenylsulfone, 4,4'-(1,3-dimethyl-butylidene)bisphenol, 4,4'-(1-phenylethylidene)bisphenol, 4,4'-(p-phenylenediisopropylidene)bisphenol and 4,4'-(m-phenylenediisopropylidene)bisphenol, and wherein to the recording layer is added at least one heat-fusible substance represented by the formula (I)



(I)

wherein X is hydrogen atom, halogen atom, $C_{1-4}$ alkyl or $C_{1-4}$ alkoxyl.

---

### 5,019,549

### DONOR ELEMENT FOR THERMAL IMAGING CONTAINING INFRA-RED ABSORBING SQUARYLIUM COMPOUND

**Reid E. Kellogg, 808 Princeton Road, Wilmington, Del. 19807; Evan D. Laganis, 204 West Crest Road, Wilmington, Del. 19803, and Sheau-Hwa Ma, 29 Constitution Drive, Chadds-ford, Pa. 19317**

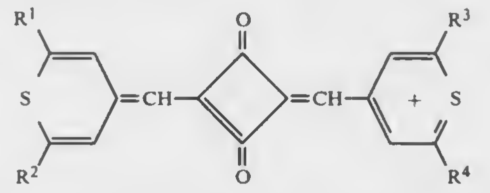
**Filed Oct. 25, 1990, Ser. No. 603,278**

**Int. Cl.$^5$ B41M** *5/035, 5/26*

**U.S. Cl. 503—227** **28 Claims**

1. A donor element for a laser-induced thermal transfer process, said donor element comprising a support bearing thereon a colorant layer, said colorant layer comprising a

colorant and an infra-red absorbing material said infra-red absorbing material having the structure:



wherein each of $R^1$, $R^2$, $R^3$, and $R^4$ is independently an alkyl group of from one to eight carbon atoms.

---

### 5,019,550

### SUBLIMATION TYPE THERMOSENSITIVE IMAGE TRANSFER RECORDING MEDIUM, AND THERMOSENSITIVE RECORDING METHOD USING THE SAME

**Akira Suzuki, Mishima; Hidehiro Mochizuki, Numazu; Masaru Shimada, Shizuoka, and Hiroyuki Uemura, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

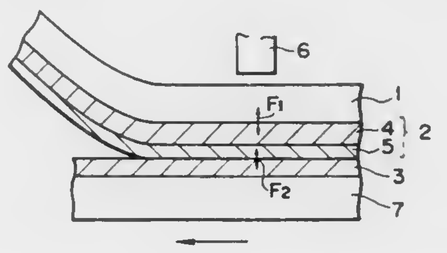
**Filed Jul. 13, 1989, Ser. No. 379,099**

**Claims priority, application Japan, Jul. 15, 1988, 63-175147; Jul. 15, 1988, 63-175148; Nov. 8, 1988, 63-201420**

**The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.**

**Int. Cl.$^5$ B41M** *5/035, 5/26*

**U.S. Cl. 503—227** **25 Claims**



1. A sublimation type thermosensitive image transfer recording medium comprising:

a support;

a dye supplying layer formed on said support, comprising a sublimable dye and an organic binder agent in which said sublimable dye is dispersed; and

an image transfer facilitating layer formed on said dye supplying layer, comprising said sublimable dye, an organic binder agent in which said sublimable dye is dispersed, and a lubricant or releasing material having lubricant or releasing properties, which is dispersed in said image transfer facilitating layer or present on the outer surface of said image transfer facilitating layer.

---

### 5,019,551

### SUPERCONDUCTING CONTACT STRUCTURE

**Mutsuo Hidaka, Tokyo, Japan, assignor to NEC Corporation, Japan**

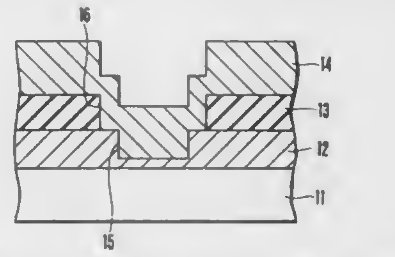
**Filed Sep. 6, 1988, Ser. No. 240,930**

**Claims priority, application Japan, Sep. 10, 1987, 62-227637**

**Int. Cl.$^5$ B32B** *9/00*

**U.S. Cl. 505—1** **7 Claims**

1. A superconducting contact structure for making an electrical connection between a layer of yttrium-barium-copper oxide superconductor and a layer of metal superconductor formed layer on layer, wherein said oxide superconductor is formed on a substrate and comprises a layered structure with surfaces of said layers being parallel to the surface of said substrate, and has at least one recess formed in a surface of said oxide superconductor, said recess having sidewalls and a bottom surface, all of which are in contact with said metal superconductor.



---

### 5,019,552

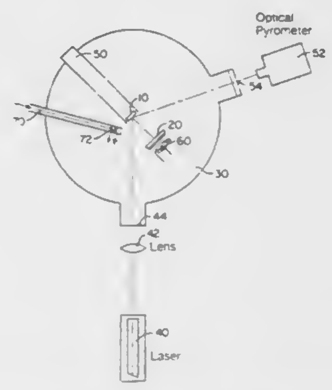
### LONG-LASER-PULSE METHOD OF PRODUCING THIN FILMS

**Mehdi Balooch; Donald K. Olander, both of Berkeley, and Richard E. Russo, Walnut Creek, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Feb. 20, 1990, Ser. No. 482,131**

**Int. Cl.$^5$ B05D** *3/06, 5/12*

**U.S. Cl. 505—1** **25 Claims**



1. A method of depositing a thin film of a superconducting ceramic material on a substrate by laser evaporation, comprising the steps of:

providing a solid target of the material and the substrate spaced therefrom in an evacuated chamber;

maintaining the substrate at a first predetermined elevated temperature;

vaporizing a portion of the material from the target by a laser beam having a peak power density in the range between $10^5$–$10^6$ W/cm$^2$ and a pulse width in the range between 0.5 to 2.0 milliseconds; and

forming the a thin film of the superconducting ceramic material on the substrate from the vaporized target material.

---

### 5,019,553

### SR$_2$ (BI$_{1-a}$PBA)$_x$CU$_y$O$_z$ METAL OXIDE MATERIAL

**Jun Akimitsu, and Tohru Den, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 13, 1988, Ser. No. 283,924**

**Claims priority, application Japan, Dec. 17, 1987, 62-317579**

**Int. Cl.$^5$ C01F** *11/02;* **C01G** *3/02, 29/00;* **H01L** *39/12*

**U.S. Cl. 505—1** **2 Claims**

1. A superconductive metal oxide material represented by the compositional formula:

$$Sr_z(Bi_{1-a}Ph_a)_xCu_yO_z$$

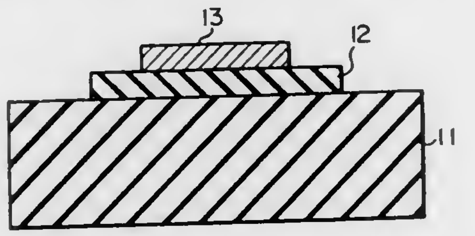
VOL
1126
ISS
4
MY
28
1991
UMI

wherein $0.166 \leqq a < 0.4$
$2 \leqq X \leqq 3.5$
$2 \leqq Y \leqq 3.5$
$X + y \geqq 5$
$4 < Z$.
in said compositional formula.

---

### 5,019,554
### STRUCTURE OF SUPERCONDUCTIVE WIRING HAVING SIALON BUFFER LAYER THEREUNDER

**Takuo Takeshita, and Tadashi Sugihara, both of Saitama, Japan, assignors to Mitsubishi Metal Corp., Tokyo, Japan**
**PCT No. PCT/JP88/01309, § 371 Date Aug. 18, 1989, § 102(e) Date Aug. 18, 1989, PCT Pub. No. WO89/06440, PCT Pub. Date Jul. 13, 1989**
**PCT Filed Dec. 23, 1988, Ser. No. 415,355**
**Claims priority, application Japan, Dec. 25, 1987, 62-332981**
**Int. Cl.⁵ C04B** ***41/89;*** **H01B** ***12/06;*** **H01L** ***21/88***
**U.S. Cl. 505—1** **4 Claims**

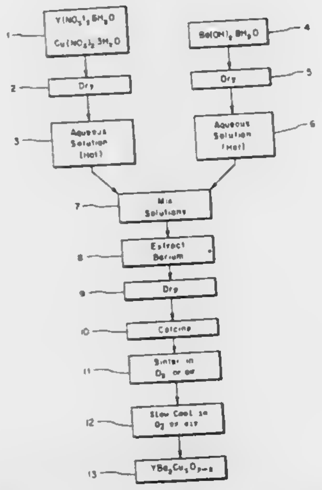


1. A superconductive wiring structure comprising:
an insulating layer,
a buffer layer formed on said insulating layer, and
a wiring pattern formed on said buffer layer having a wiring strip formed of a superconductive ceramic material containing at least one element selected from the group consisting of scandium, yttrium and lanthanides, at least one alkaline earth metal, copper and oxygen, wherein said buffer layer is formed of SiAlON, which is a substance hardly reacting on said superconductive ceramic material in a high temperature ambient.

---

### 5,019,555
### HIGH PURITY SUPERCONDUCTING COMPOSITIONS AND METHODS FOR THEIR FABRICATION

**Jack Chin, Carlsbad, and Samuel S. Liang, San Diego, both of Calif., assignors to General Atomics, Calif.**
**Filed Aug. 10, 1988, Ser. No. 230,788**
**Int. Cl.⁵ H01B** ***12/00;*** **H01L** ***39/12***
**U.S. Cl. 505—1** **16 Claims**



1. The method of producing a superconducting material precursor of high purity having the general formula $MBA_2Cu_3O_{7-x}$ where x is from about 0 to 0.5, which comprises the steps of:
providing a first aqueous solution comprising M and copper nitrates wherein M is selected from the group consisting of yttrium and the rare earth elements;
heating said first solution to a temperature of from about 85 to 100° C.;
providing a second aqueous solution comprising barium hydroxide;
heating said second solution to a temperature of from about 80 to 110° C.;
mixing said solutions whereby a precipitate forms; and
removing said precipitate from the mixture;
whereby a high purity precursor suitable for use in making a high $T_c$ superconductor results.

8. The method of producing a superconducting material of high purity having the general formula $MBA_2Cu_3O_{7-x}$ where x is from about 0 to 0.5, which comprises the steps of:
providing a first aqueous solution comprising M and copper nitrates wherein M is selected from the group consisting of yttrium and the rare earth elements;
heating said first solution to a temperature of from about 85 to 100° C;
providing a second aqueous solution comprising barium hydroxide;
heating said second solution to a temperature of from about 80 to 110° C.;
mixing said solutions whereby a precipitate forms;
removing said precipitate from the mixture; and
calcining said precipitate whereby a superconducting material results.

---

### 5,019,556
### INHIBITORS OF ANGIOGENIN

**Robert Shapiro, Holliston, and Bert L. Vallee, Brookline, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.**
**Continuation-in-part of Ser. No. 38,250, Apr. 14, 1987, abandoned, and a continuation-in-part of Ser. No. 38,008, Apr. 14, 1987, Pat. No. 4,966,964. This application Apr. 5, 1988, Ser. No. 177,942**
**Int. Cl.⁵ C07K** ***15/06, 15/12;*** **A61K** ***37/02, 35/50***
**U.S. Cl. 514—2** **3 Claims**

1. A method of inhibiting growth of a tumor neovascularized as a result of angiogenin production in an animal, comprising administering an inhibitor of the angiogenic activity of angiogenin in sufficient quantity to inhibit said angiogenic activity in said tumor, wherein said inhibitor comprises human placental ribonuclease inhibitor, or a substantially equivalent protein from non-placental human tissue or from non-human mammalian tissue.

---

### 5,019,557
### METHOD FOR THE EFFECTIVE TREATMENT OF DISEASE CONDITIONS IN HUMANS ASSOCIATED WITH HTLV-III INFECTION

**Ferris N. Pitts, Jr., 3500 E. California, Pasadena, Calif. 91107, and Allen D. Allen, 11900 Louise Ave., Granada Hills, Calif. 91344**
**Continuation of Ser. No. 243,198, Sep. 8, 1988, abandoned, which is a continuation of Ser. No. 907,363, Sep. 15, 1986, abandoned. This application Jul. 10, 1989, Ser. No. 378,497**
**Int. Cl.⁵ A61K** ***37/02;*** **B28B** ***1/26, 21/08, 21/36***
**U.S. Cl. 514—2** **11 Claims**

1. A method for the effective treatment of human disease conditions associated with HTLV-III, said method comprising the steps of:
hyperimmunizing a human patient infected with HTLV-III through the repeated administration of an effective dosage of killed polio vaccine; and

---

### 5,019,558
### METHOD FOR TREATING MEMORY DISTURBANCES USING ARGININE ASPARTATE

**Georges Cehovic, 7 rue de La Vallé , 91120 Palaiseau, and Emmanuel Panconi, Rue de Maréchal Gallieni, 33700 Merignac, both of France**
**Filed May 9, 1988, Ser. No. 191,391**
**Int. Cl.⁵ A61K** ***37/00, 31/33***
**U.S. Cl. 514—11** **3 Claims**

1. A method for treating a patient suffering from memory disturbances that comprises administering an effective amount of arginine aspartate to a patient whose memory disturbance has been caused by the administration of benzodiazepines, cholinolytics or electroshock.

---

### 5,019,559
### WOUND HEALING USING PDGF AND IGF-II

**Harry N. Antoniades, Newton, and Samuel E. Lynch, Jamaica Plain, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.**
**Continuation of Ser. No. 234,196, Aug. 18, 1988, which is a continuation-in-part of Ser. No. 120,606, Nov. 16, 1987, which is a continuation-in-part of Ser. No. 930,762, Nov. 14, 1986. This application Nov. 16, 1988, Ser. No. 272,090**
**Int. Cl.⁵ A61K** ***37/36***
**U.S. Cl. 514—21** **10 Claims**

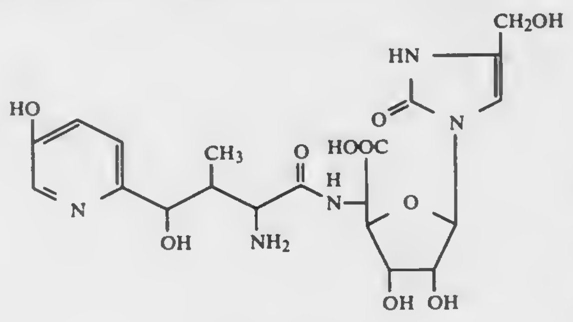
1. A method for healing an external wound of a mammal comprising applying to said wound a wound-healing amount of a composition comprising purified platelet-derived growth factor and purified insulin-like growth factor II.

---

### 5,019,560
### METHOD FOR TREATING FUNGAL INFECTIONS WITH NIKKOMYCIN DERIVATIVES

**Richard F. Hector, Dublin, Calif.; Klaus Schaller, Wuppertal; Heinrich F. Moeschler, and Manfred Plempel, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer AG, Leverkusen, Fed. Rep. of Germany**
**Filed Oct. 3, 1988, Ser. No. 252,613**
**Int. Cl.⁵ A61K** ***31/71, 31/70***
**U.S. Cl. 514—43** **7 Claims**

1. A method of treating a mammal infected with a dimorphic, highly chitinous fungi, the method comprising administering to the mammal therapeutically effective amounts of a nikkomycin derivative having the following structure:



---

### 5,019,561
### TREATMENT OF PARKINSON'S DISEASE WITH NADPH

**Jorg Birkmayer, Schwarzspanierstrasse 15, A-1090 Vienna, Austria**
**Filed May 15, 1989, Ser. No. 351,345**
**Claims priority, application Austria, Jun. 3, 1988, 1454/88**
**The portion of the term of this patent subsequent to Nov. 13, 2007, has been disclaimed.**
**Int. Cl.⁵ A61K** ***31/455, 31/70;*** **C07H** ***19/207***
**U.S. Cl. 514—52** **4 Claims**

1. A method of treating Parkinsonism, said method comprising the step of administering to a patient suffering from Parkinsonism an effective amount of the enzyme cofactor NADPH or a physiologically compatible salt thereof.

---

### 5,019,562
### GROWTH INHIBITING AGENT AND THE USE THEREOF

**Moses J. Folkman, Brookline, Mass., and Paul B. Weisz, Yardley, Pa., assignors to The Trustees of the University of Pennsylvania/Childrens Hospital Corporation, Philadelphia, Pa.**
**Continuation of Ser. No. 295,638, Jan. 10, 1989, abandoned, which is a continuation-in-part of Ser. No. 145,407, Jan. 19, 1988, abandoned. This application Nov. 9, 1989, Ser. No. 434,659**
**Int. Cl.⁵ A61K** ***31/70;*** **C08B** ***37/02, 37/16***
**U.S. Cl. 514—58** **24 Claims**

1. A composition for inhibiting undesired or pathological cell or tissue growth, including angiogenesis, in mammals, including humans, comprising (I) an ionic derivative of α-, β- or γ-cyclodextrin in combination with (2) a latent growth-inhibiting steroid or a non-steroidal growth-inhibiting organic compound, in which the derivative is characterized by a solubility at 0° C. in distilled water at least about 20 gm/100 ml of water.

---

### 5,019,563
### PHARMACEUTICAL COMPOSITION

**Christopher Hunter, Leeds, and David Yau, Hull, both of United Kingdom, assignors to Reckitt & Colman Products Limited, London, England**
**Filed May 25, 1989, Ser. No. 356,691**
**Claims priority, application United Kingdom, Jun. 9, 1988, 8813682**
**Int. Cl.⁵ C08B** ***37/16;*** **A61K** ***31/715***
**U.S. Cl. 514—58** **7 Claims**

1. A complex of β-cyclodextrin with an ibuprofen salt selected from the sodium, potassium, ammonium, magnesium, calcium, arginine, glycine or lysine salts in which the molar ratio of ibuprofen to β-cyclodextrin is within the range of from 1:0.20 to 1:0.75.

---

### 5,019,564
### NON-CLAY AGRICULTURAL GRANULE

**H. Edward Lowe, Cassopolis, Mich.; Ricky L. Yoder, Elkhart, and Clayton C. Nelson, Granger, both of Ind., assignors to Edward Lowe Industries, Inc., Cassopolis, Mich.**
**Continuation-in-part of Ser. No. 846,126, Mar. 31, 1986, abandoned. This application Oct. 19, 1987, Ser. No. 111,016**
**Int. Cl.⁵ A01N** ***33/08, 33/12, 57/00***
**U.S. Cl. 514—75** **19 Claims**

1. An agricultural granule adapted for carrying an incorporated chemical, said granule comprising 10–100% plant fiber and from 0–90% of a mineral filler, said granule being substantially inert with regard to said incorporated chemical, said plant fibers forming interlocking bonds to form said granule without requiring a separate chemical binder.

6. A method of producing a granule capable of carrying agricultural chemicals comprising the steps of:
a) providing a quantity of plant fiber slurry wherein the slurry includes at least 10% by weight of the plant fiber;
b) adjusting the moisture content of said slurry to allow fiber size reduction;
c) reducing the fiber size of said slurry;
d) agitating said slurry in the absence of separate chemical binders whereupon said plant fibers interlock and bond to form granules which are substantially chemically inert; and
e) drying said granules.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,565
### FUNGICIDAL PYRIDYL IMIDATES

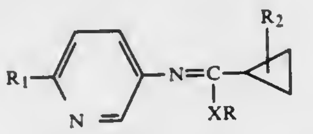
**Don R. Baker, Orinda, and Keith H. Brownell, San Jose, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.**

**Division of Ser. No. 198,906, May 26, 1988, Pat. No. 4,894,379, which is a division of Ser. No. 36,543, Apr. 15, 1987, Pat. No. 4,767,771, which is a continuation-in-part of Ser. No. 944,170, Dec. 22, 1986, abandoned, which is a continuation of Ser. No. 859,153, May 2, 1986, abandoned. This application Dec. 4, 1989, Ser. No. 444,924**

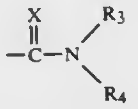
**Int. Cl.$^5$ C07D** *213/74;* **C07F** *9/201;* **H61K** *31/44*

**U.S. Cl. 514—89** **6 Claims**

1. A compound having the structural formula



wherein R is selected from the group consisting of $C_3$–$C_4$ carboalkoxyalkyl, $C_1$–$C_6$ alkoxy substituted thiophosphorus and



$$-\overset{\overset{X}{\|}}{C}-N\begin{matrix}R_3\\ \\R_4\end{matrix}$$

wherein $R_3$ and $R_4$ are $C_1$–$C_{10}$ aklyl or a 6 member heterocyclic ring formed from N and the $R_3$ and $R_4$ groups, $R_1$ is selected from the group consisting of halogen, $C_1$–$C_3$ alkoxy and $C_1$–$C_3$ haloalkoxy, $R_2$ is hydrogen, and X is S or O; or fungicidally acceptable organic or inorganic salt thereof.

---

### 5,019,566
### METHOD OF TREATING INFLAMMATION WITH INOSITOL TRIPHOSPHATE

**Matti Siren, Montagnola/Lugano, Switzerland, assignor to Perstorp AB, Perstorp, Sweden**

**Continuation-in-part of Ser. No. 38,230, Apr. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 15,679, Feb. 17, 1987, Pat. No. 4,792,390, which is a continuation-in-part of Ser. No. 788,801 Oct. 18, 1985, Pat. No. 4,735,936**

**Claims priority, application Sweden, Apr. 16, 1986, 8601709-2**

**Int. Cl.$^5$ A01N** *57/00, 37/08, 31/08;* **C12N** *9/96*

**U.S. Cl. 514—103** **2 Claims**

1. A method of treating an inflammatory condition in a human or an animal comprising administering to a human or an animal in need thereof pharmaceutically effective amount of at least one isomer of an inositol triphosphate.

---

### 5,019,567
### BENZOYL PEROXIDE—QUATERNARY AMMONIUM LIPOPHILIC SALICYLATE BASED PHARMACEUTICAL AND COSMETIC COMPOSITIONS AND THEIR USE ESPECIALLY IN TREATMENT OF ACNE

**Michel Philippe, Antony; Michel Hocquaux; Henri Sebag, both of Paris; Irina Beck, Villepinte, and Jean P. Laugier, Antony, all of France, assignors to L'Oreal, Paris, France**

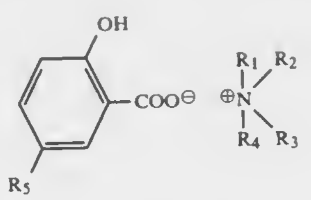
**Filed Nov. 23, 1988, Ser. No. 276,155**

**Claims priority, application France, Nov. 24, 1987, 87 16280**

**Int. Cl.$^5$ A61K** *31/605, 31/14*

**U.S. Cl. 514—164** **12 Claims**

1. A pharmacoutical or cosmetic composition for topical application comprising in combination, in a physiologically aceptable support, benzoyl peroxide and at least one quaternary ammonium lipophilic salicylate having general formula (I):



wherein:

(i) $R_1$, $R_2$, $R_3$ and $R_4$ may be identical or different and represent a linear $C_1$ to $C_{18}$ saturated alkyl radical which may contain one or more hydroxyl group(s) at the chain end or in the chain; or

(ii) $R_3$ and/or $R_4$ represent the group:

$R_8$—$OC_2H_3R_7]_n[OCH_2$—CHOH—$CH_2]_p$

where

$0 \leqq n \leqq 4$ and p represents 0 or 1;

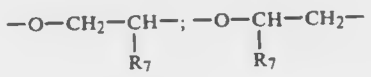
$R_8$ represents H or a $C_1$ to $C_{18}$ alkyl, alkenyl, alkylcycloalkyl or alkylaryl radical, the alkyl groups being branched or linear and where the aliphatic or aromatic cycles may have one or more $C_1$ to $C_4$ alkyl or alkoxy substitutent(s);

$R_7$ represents H, $CH_3$ or $CH_2OH$; and when

$R_7$ represents $CH_2OH$, $R_8$ is then other than H and p equals 1;

Otherwise p=0;

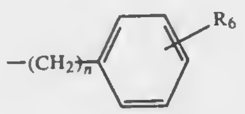
Group ($OC_2H_3R_7$) represents one or other of the following chains:



$$-O-CH_2-\underset{\underset{R_7}{|}}{CH}-;\ -O-\underset{\underset{R_7}{|}}{CH}-CH_2-$$

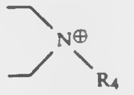
$R_1$ and $R_2$ having the meanings given in paragraph (i);

(iii) $R_4$ represents the group:



where n is 0 or 1 and $R_1$, $R_2$ and $R_3$ have the meanings given above, $R_6$ represents hydrogen, hydroxyl, halogen, an alkyl or hydroxyalkyl group, or a $C_1$ to $C_{18}$ acyl group; or

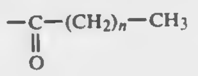
(iv) $R_1$ and $R_2$ form an aromatic heterocycle (in which case $R_3$ does not exist) conforming to the formula:



$R_4$ having the meanings given above, or

(v) $R_1$ and $R_2$ form a non-aromatic, saturated or unsaturated heterocycle which may be interrupted by an oxygen atom in which case $R_4$ represents a group as defined above and $R_3$ a group as defined in (i); or

(vi) $R_1$, $R_2$ and $R_3$ form a non-aromatic saturated or unsaturated bicyclic group, $R_4$ representing in this case a group as defined above; and $R_5$ represents a group having formula:



$$-\underset{\underset{O}{\|}}{C}-(CH_2)_n-CH_3$$

where n is an integer and varies from 0 to 16.

### 5,019,568
### STEROIDAL GLYCOLIPIDS AS HOST RESISTANCE STIMULATORS AGAINST VIRAL INFECTION

**Philippe L. Durette, New Providence; William K. Hagmann, Westfield, and Mitree M. Ponpipom, Branchburg, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

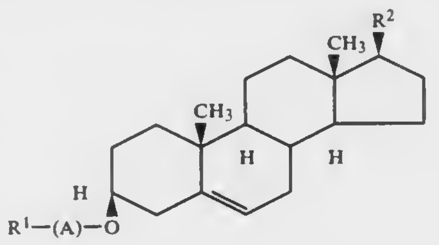
**Continuation of Ser. No. 63,197, Jun. 18, 1987, abandoned. This application Jun. 21, 1989, Ser. No. 370,058**

**The portion of the term of this patent subsequent to Nov. 13, 2007, has been disclaimed.**

**Int. Cl.$^5$ A01N** *45/00, 43/04;* **C07G** *3/00;* **C07H** *15/24, 15/00, 23/00*

**U.S. Cl. 514—171** **9 Claims**

1. A pharmaceutical composition for enhancing human host resistance against opportunistic infection in an individual immunocompromised by and AIDS-related virus, consisting essentially of an anti-viral anti-AIDS drug selected from the group consisting of ansamycin, ribavirin, dideoxycitidine, HPA-23, AL-721, foscarnet, and azidothymidine and a glycolipid compound consisting essentially of the formula:



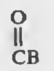
where:

$R^1$ is $\alpha$or $\beta$-D-1-thiomannopyranoside,

$\alpha$or $\beta$-L-1-thiofucopyranoside;

A is $(CH_2)_n$ where n is 5–7, or $(CH_2)_kX(CH_2)_m$ where X is O S or NH and k and m are independently 2–4 and the sum of k and m is 4–6;

$R^2$ is $C_1$–$C_8$ linear or branched alkyl or $C_2$–$C_{10}$ linear or branched alkene;



$$\overset{\overset{O}{\|}}{C}B$$

where B is $C_1$–$C_8$ alkyl, $C_1$–$C_8$ alkoxy, $NR^3R^4$ where $R^3$ and $R^4$ are independently H, $C_1$–$C_4$ alkyl; $CH(CH_3)D$ where D is OH, $NH_2$, $NHR^5$ where $R^5$ is $C_1$–$C_{10}$ alkyl;

and pharmaceutically acceptable salts thereof, wherein said anti-AIDS drug is present in a weight ratio between about 1:3 and 3:1 based on the weight of said glycolipid compound and said composition also containing a pharmaceutically acceptable carrier therefor.

---

### 5,019,569
### REVERSAL OF GLUCOCORTICOID-INDUCED SKIN ATROPHY

**Albert M. Kligman, Philadelphia, Pa.; James A. Mezick, East Brunswick, N.J., and Robert J. Capetola, Doylestown, Pa., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.**

**Continuation-in-part of Ser. No. 925,935, Nov. 3, 1986, Pat. No. 4,889,847. This application Aug. 31, 1989, Ser. No. 401,362**

**The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.**

**Int. Cl.$^5$ A61K** *31/07, 31/56*

**U.S. Cl. 514—171** **15 Claims**

1. A method for reversing the effects of glucocorticoid-induced skin atrophy which comprises topically administering to the glucocorticoid-treated skin a pharmaceutical composition comprising an effective amount of a retinoid and a pharmaceutically acceptable carrier.

---

### 5,019,570
### CEPHALOSPORIN COMPOUNDS

**Jean C. Arnould, Cromontreuil; Dominique Boucherot, Rilly La Montagne, both of France; David H. Davies, Macclesfield, England; Frederick H. Jung, Rilly La Montagne, France, and Colin J. Strawson, Congleton, England, assignors to Imperial Chemical Industries PLC, London, England and I.C.I. Pharma, Cergy Cedex, France**

**Filed Jul. 25, 1988, Ser. No. 223,988**

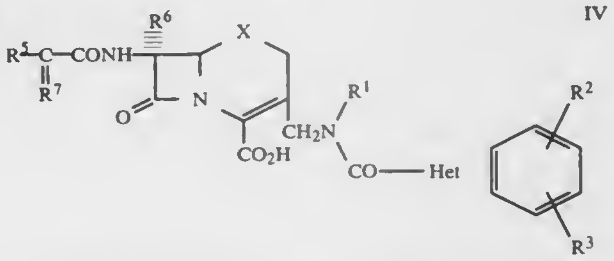
**Claims priority, application European Pat. Off., Jul. 23, 1987, 87401718.9**

**Int. Cl.$^5$ C07D** *501/48;* **A61K** *31/545*

**U.S. Cl. 514—202** **9 Claims**

1. A compound of formula IV

IV



or a pharmaceutically acceptable salt or ester thereof, wherein:

$R^1$ is hydrogen, $C_{1-6}$alkyl optionally substituted by halo, hydroxy, $C_{1-4}$alkoxy, carboxy, amino, cyano, $C_{1-6}$alkanoylamino, phenyl or heteroaryl, or $R^1$ is $C_{2-6}$alkenyl;

Het is a pyrazinone, pyridinone, pyridazinone or pyrimidinone ring, or is a thione equivalent of such a ring, said rings having a substituent $R^4$ on one nitrogen atom:

the ring Het being fused by any two adjacent carbon atoms to the benzene ring; and Het being bonded via a carbon atom to the —$CH_2NR^1CO$— group;

$R^2$ is hydroxy or an in vivo hydrolysable ester thereof;

$R^3$ is ortho to $R^2$ and is hydroxy or an in vivo hydrolysable ester thereof;

$R^4$ is hydrogen or hydroxy, or $C_{1-6}$alkoxy, phenoxy, $C_{2-6}$alkenyl or $C_{1-6}$alkyl, (any of these groups being optionally substituted by hydroxy, $C_{1-6}$alkoxy, cyano, amino, $C_{1-6}$alkylamino, di-$C_{1-6}$alkylamino, carboxy, $C_{1-6}$alkoxycarbonyl, $C_{1-6}$alkanoyloxy, carbamoyl, $C_{1-6}$alkylcarbamoyl, di-$C_{1-6}$alkylcarbamoyl, $C_{1-6}$alkoxycarbonylamino, phenyl, phenyl$C_{1-6}$alkyl, carboxyaminocarbonyl, $C_{1-6}$alkoxycarbonylaminocarbonyl, benzoyl or $C_{3-8}$cycloalkyl) or $R^4$ is phenyl, $C_{3-8}$ cycloalkyl, amino, $C_{1-6}$alkylamino or di-$C_{1-6}$alkylamino: wherein the fused Het-benzene ring system and any phenyl group are optionally substituted by at least one substituent selected from $C_{1-6}$alkyl, halo, hydroxy, hydroxy $C_{1-6}$alkyl, cyano, trifluoromethyl, nitro, amino, $C_{1-6}$alkylamino, di-$C_{1-6}$alkylamino, phenyl $C_{1-6}$alkylamino, $C_{1-6}$alkanoyl, $C_{1-6}$alkoxy, $C_{1-6}$alkylthio, $C_{1-6}$alkanoyloxy, carbamoyl, $C_{1-6}$alkylcarbamoyl, di-$C_{1-6}$alkyl carbamoyl, carboxy, carboxy $C_{1-6}$alkyl, $C_{1-6}$alkoxycarbonyl$C_{1-6}$alkyl, sulpho, sulpho$C_{1-6}$alkyl, sulphonamido, $C_{1-6}$alkylsulphonamido, $C_{1-6}$alkoxycarbonyl, $C_{1-6}$alkanoylamino, thioureido and amidino;

X is sulphur or sulphinyl;

$R^6$ is hydrogen, methoxy or formamido; $R^5$ is 2-aminothiazol-4-yl or 2-aminooxazol-4-yl each optionally substituted in the 5-position by fluorine, chlorine or bromine, or $R^5$ is 5-aminoisothiazol-3-yl, 5-amino-1,2,4-thiadiazol-3-yl, 3-aminopyrazol-5-yl, 3-aminopyrazol-4-yl, 2-aminopyrimidin-5-yl, 2-aminopyrid-6-yl, 4-aminopyrimidin-2-yl, 2-amino-1,3,4-thiadiazol-5-yl or 5-amino-1-methyl-1,2,4-triazol-3-yl;

$R^7$ is of the formula =N.O.$R^8$ (having the syn configuration about the double bond) wherein $R^8$ is hydrogen, (1–6C)alkyl, (3–8C)cycloalkyl, (1–3C)alkyl(3–6C)cycloalkyl, (3–6C)cycloalkyl(1–3C)alkyl, (3–6C)alkenyl optionally

VOL
1126
ISS
4
MY
28
1991
UMI

substituted by carboxy, (5–8C)cycloalkenyl, (3–6C)alkynyl, (2–5C)alkylcarbamoyl, phenylcarbamoyl, benzylcarbamoyl, (1–4C)alkylcarbamoyl(1–4C)alkyl, di(1–4C)alkylcarbamoyl(1–4C)alkyl, (1–4C)haloalkylcarbamoyl(-1–4C)alkyl, (1–3C)haloalkyl, (2–6C)hydroxyalkyl, (1–4C-)alkoxy(2–4C)alkyl, (1–4C)alkylthio(2–4C)alkyl, (1–4C-)alkanesulphinyl(1–4C)alkyl, (1–4C)alkanesulphonyl(1–4-C)alkyl, (2–6C)aminoalkyl, (1–4C)alkylamino(1–6C)alkyl, (2–8C)dialkylamino(2–6C)alkyl, (1–5C)cyanoalkyl, 3-amino-3-carboxypropyl, 2-(amidinothio)ethyl, 2-(N-aminoamidinothio)ethyl, tetrahydropyran-2-yl, theitan-3-yl, 2-oxopyrrolidinyl, or 2-oxotetrahydrofuranyl, or $R^8$ is of the formula V:

$$-(CH_2)_q-C(COOH)=CR^9R^{10} \qquad V$$

wherein q is one or two and $R^9$ and $R^{10}$ are independently hydrogen or $C_{1-4}$alkyl; or $R^8$ is of the formula VI:

$$-CR^{11}R^{12}-(CH_2)_r-COR^{13} \qquad VI$$

wherein r is 0–3, $R^{11}$ is hydrogen, (1–3C)alkyl or methylthio, $R^{12}$ is hydrogen (1–3C)alkyl, (3–7C)cycloalkyl, cyano, carboxy, (2–5C)carboxyalkyl or methanesulphonylamino, or $R^{11}$ and $R^{12}$ are joined to form, together with the carbon to which they are attached, a (3–7C)carbocyclic ring, and $R^{13}$ is hydroxy, amino, (1–4C)alkoxy, (1–4C)alkylamino or of the formula $NHOR^{14}$ in which $R^{14}$ is hydrogen or (1–4C)alkyl;

or $R^7$ may be of the formula $=CH.R^{15}$ wherein $R^{15}$ is hydrogen, halogen, (1–6C)alkyl, (3–7C)cycloalkyl, (2–6C)alkenyl, (3–7C)cycloalkenyl, phenyl or benzyl.

---

### 5,019,571

## 1-CARBACEPHALOSPORIN ANTIBIOTICS

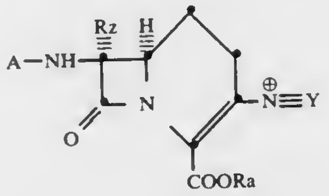
**Gwendolyn K. Cook, and John H. McDonald, III, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation of Ser. No. 147,471, Jan. 25, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 428,452**

**Int. Cl.⁵ C07D** *471/04, 473/00;* **A61K** *31/435, 31/47*

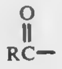
**U.S. Cl. 514—210** 18 Claims

1. A compound of the formula



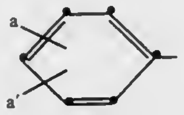
I

wherein A is hydrogen or an acyl group



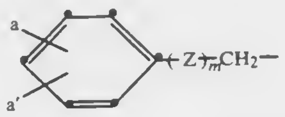
$$R\overset{O}{\overset{\|}{C}}-$$

wherein R is hydrogen, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ alkyl substituted by cyano, carboxy, halogen, amino, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylthio, trifluoromethyl, or trifluoromethylthio, naphthyl, an optionally substituted phenyl group represented by the formula



wherein a and a' independently are hydrogen, halogen, hydroxy, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkanoyloxy, $C_1$–$C_4$ *l alkyl,* $C_1$–$C_4$ alkylthio, amino, $C_1$–$C_4$ alkanoylamino, $C_1$–$C_4$ alkylsulfonylamino, carboxy, carbamoyl, hydroxymethyl, aminomethyl, or carboxymethyl;

a group represented by the formula



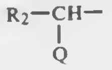
wherein a and a' have the same meanings as defined above, Z is O or S, and m is **0** or **1**;

a heteroarylmethyl group represented by the formula

$$R_1-CH_2-$$

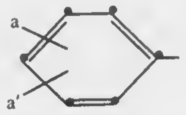
wherein $R_1$ is thienyl, furyl, benzothienyl, benzofuryl, indolyl, triazolyl, tetrazolyl, oxazolyl, thiazolyl, oxadiazolyl, thiadiazolyl, and such heteroaryl groups substituted by amino, hydroxy, halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylsulfonylamino;

a substituted methyl group represented by the formula

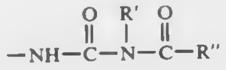


$$R_2-\underset{Q}{\underset{|}{C}}H-$$

wherein $R_2$ is cyclohexa-1,4-dienyl, or an optionally substituted phenyl group represented by the formula

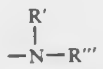


wherein a and a' have the above defined meanings, or $R_2$ is $R_1$ as defined above, and Q is hydroxy, $C_1$–$C_4$ alkanoyloxy, carboxy, sulfo, amino, or a substituted amino group represented by the formula



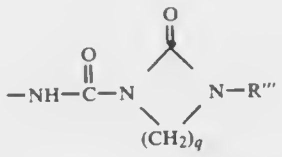
$$-NH-\overset{O}{\overset{\|}{C}}-\overset{R'}{\overset{|}{N}}-\overset{O}{\overset{\|}{C}}-R''$$

wherein R″ is $C_1$–$C_4$ alkyl, furyl, thienyl, phenyl, halophenyl, nitrophenyl, styryl, halostyryl or a group



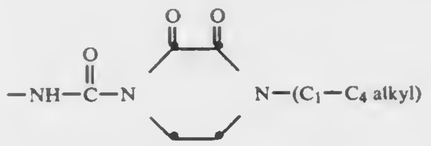
$$-\overset{R'}{\overset{|}{N}}-R'''$$

wherein each R′ is independently hydrogen or $C_1$–$C_3$ alkyl, and R‴ is hydrogen, $C_1$–$C_3$ alkylsulfonyl, $C_1$–$C_3$ alkyl, or $C_1$–$C_4$ alkanoyl; or Q is a substituted amino group represented by the formula

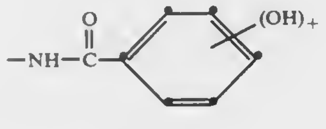


wherein R‴ has the same meaning as defined above and q is 2 or 3;

or Q is a substituted amino group represented by the formula

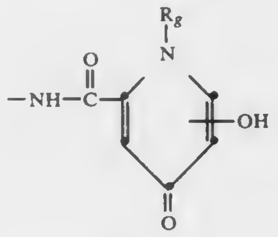


or a benzamido gorup represented by the formula

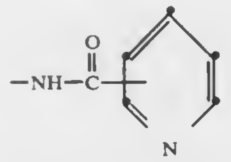


wherein t is 1 to 3;

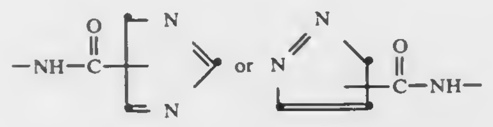
a pyridone gorup



a pyridyl group

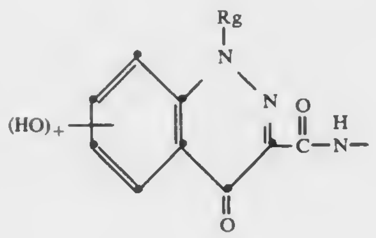


or said pyridyl group substituted by $C_1$–$C_4$ alkyl, amino, carboxy, hydroxy or halogen; and imidazolyl or pyrazolyl group

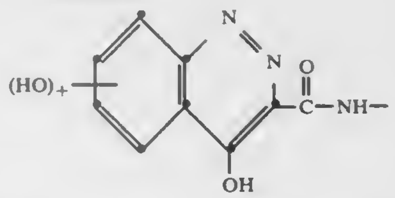


or said imidazolyl or pyrazolyl rings substituted by $C_1$–$C_4$ alkyl, carboxy, amino, or halogen;

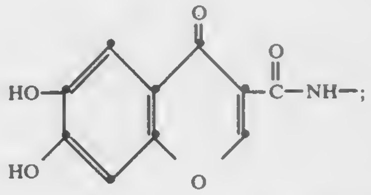
a benzpyridazin-4-one group or tautomer thereof



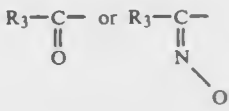
-continued



wherein rg is hydrogen or $C_1$–$C_3$ alkyl, and t is 1 to 3; or a benzpyranone group

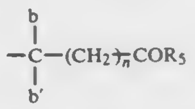


or R is a keto group or an oximino-substituted group represented by the formulae



$$R_3-\underset{O}{\underset{\|}{C}}- \text{ or } R_3-\underset{N-OR_4}{\underset{\|}{C}}-$$

wherein $R_3$ is $R_1$ or $R_2$ as defined above and $R_4$ is hydrogen, $C_1$–$C_4$ alkyl, or a group represented by the formula



$$-\underset{b'}{\underset{|}{\overset{b}{\overset{|}{C}}}}-(CH_2)_n-COR_5$$

wherein b and b′ independently are hydrogen or $C_1$–$C_3$ alkyl, or b and b′, when taken together with the carbon to which they are bonded, form a 3-to 6-membered carbocyclic ring, n is 0–3, and $R_5$ is hydroxy, $C_1$–$C_4$ alkoxy, amino, $C_1$–$C_4$ alkylamino, or di ($C_1$–$C_4$ alkyl) amino;

$R_a$ is a negative charge;

$R_z$ is hydrogen, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylthio, or a formamido group, —NHCHO;

$—N^{\oplus}\equiv Y$ is

a) a pyridinium ring, whicy may be substituted with one or two of the following substituents: $C_1$ to $C_6$ alkyl, $C_1$ to $C_6$ substituted alkyl, $C_3$ to $C_7$ cycloalkyl, $C_3$ to $C_7$ substituted cycloalkyl, $C_5$ to $C_7$ cycloalkenyl, $C_5$ to $C_7$ substituted cycloalkenyl, halo, cyano, hydroxy, protected hydroxy, $C_1$ to $C_4$ alkoxy, $C_1$ to $C_4$ alkylthio, $C_1$ $C_4$ alkylsulfoxide, $C_1$ to $C_4$ alkylsulfonyl, phenyl, substituted phenyl, formyl, $C_2$ to $C_4$ alkanoyl, benzyl, benzoyl, amino, protected amino, $C_1$ to $C_4$ alkylamino, di($C_1$ to $C_4$ alkyl)amino, trifluoromethyl, carboxy, protected carboxy, $C_1$ to $C_4$ alkoxycarbonyl, aminomethyl, protected aminomethyl, carboxymethy, protected carboxymethyl, carbamoyl, which may be substituted once or twice with a $C_1$ to $C_6$ alkyl group, an aminosulfonyl group (which may be substituted once or twice with a $C_1$ to $C_6$ alkyl group), or a sulfonic acid;

b) a quinolinium, isoquinolinium, (1 to 2)-pyradi-zinium, (1or 3)-pyrimidinium, $N^3$-($C_1$–$C_4$ alkyl)-imidazolinium, pyridazinium, phthalazinium, quinazolinium, purinium, pyrazinium, thiazolinium, isothiazolinium, oxazolinium, isoxazolinium, (3 or 4)-1,3,4-thiadiazolinium, (2 or 4)-1,2,4-thiadia-zolinium, (2 or 5)-1,2,5-thiadiazolinium, (3 or 4)-1,3,4-oxadiazolinium, (2 or 4)-1,2,4-oxadiazolinium, or a (2 or 5)-1,2,5-oxadiazolinium ring, or the mono or di-substituted derivatives thereof, wherein the

VOL
1126
ISS
4
MY
28
1991
UMI

substitutents can be the same or different (and in the case of the quinolinium or isoquinolinium rings, on one or both rings) and are amino, protected amino, $C_1$ to $C_4$ alkylamino, di($C_1$ to $C_4$ alkyl)amino, hydroxy, protected hydroxy, $C_1$ to $C_4$ alkoxy, $C_1$ to $C_4$ alkylthio, $C_1$ to $C_4$ alkylsulfoxide, $C_1$ to $C_4$ alkylsulfonyl, cyano, halo, $C_1$ to $C_6$ alkyl, $C_1$ to $C_6$ substituted alkyl, trifluoromethyl, $C_3$ to $C_7$ cycloalkyl, $C_3$ to $C_7$ substituted cycloalkyl, $C_5$ to $C_7$ cycloalkenyl, $C_5$ to $C_7$ substituted cycloalkenyl, sulfonic acid, carboxy, protected carboxy, $C_1$ to $C_4$ alkoxy-carbonyl, hydroxy-($C_1$ to $C_3$ alkyl), protected hydroxy-($C_1$ to $C_3$ alkyl), formyl, $C_2$ to $C_4$ alkanoyl, an aminosulfonyl group (which may be substituted once or twice with a $C_1$ to $C_6$ alkyl group), carbamoyl (which may be substituted once or twice with a $C_1$ to $C_6$ alkyl group), amino-methyl, protected aminomethyl, carboxymethyl, (protected carboxy)methyl, phenyl, substituted phenyl, benzoyl or benzyl;

c) a gorup of the formula

$$-\overset{\oplus}{N}\;\; R_e \quad \text{with } (C_1-C_4 \text{ alkyl}) \text{ on } N$$

wherein $R_e$ together with the nitrogen atom to which it is attached form a saturated or partially unsaturated 4 to 10 membered heterocyclic ring which may contain one sulfur or one oxygen and one or more nitrogen atoms and whereinthe substitutent may be $C_1$ to $C_6$ alkyl, $C_1$ to $C_6$ substituted cycloalkyl, $C_5$ to $C_7$ cycloalkenyl, $C_5$ to $C_7$ substituted cycloalkenyl, halo, cyano, hydroxy, protected hydroxy, $C_1$ to $C_4$ alkoxy, $C_1$ to $C_4$ alkylthio, $C_1$ to $C_4$ alkylsulfoxide, $C_1$ to $C_4$ alkylsulfonyl, phenyl, substituted phenyl, formyl, $C_2$ to $C_4$ alkanoyl, benzyl, benzoyl, amino, protected amino $C_1$ to $C_4$ alkylamino, di($C_1$ to $C_4$ alkyl)amino, trifluoromethyl, arboxy, protected carboxy, $C_1$ to $C_4$ alkoxycarbonyl, aminomethyl, protected aminomethyl, carboxymethyl, protected carboxy-methyl, carbamoyl (which may be substituted once or twice with a $C_1$ to $C_6$ alkyl group), amino-sulfonyl (which may be substituted once or twice with a $C_1$ to $C_6$ alkyl group), or sulfonic acid, or the benzo-fused analogs of the substituted or unsubstituted, saturated or partially unsaturated ring, or

$—N\oplus\equiv Y$ is tri($C_1$-$C_4$ alkyl)ammonium;

and pharmaceutically acceptable salts thereof.

17. A method for treating bacterial infections in man and other animals which comprises administrating an antibacterially effective amount of an antibiotic compound of claim 1 or a pharmaceutically acceptable salt thereof.

---

## 5,019,572
## IMIDAZOLE COMPOUNDS AND THEIR USE AS TRANSGLUTAMINASE INHIBITORS

**David A. Claremon, Audbon; John J. Baldwin, Gwynedd Valley, and David C. Remy, North Wales, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

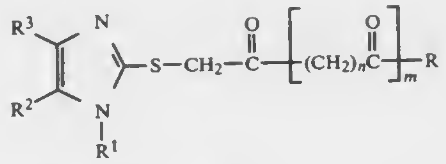
**Filed Feb. 7, 1990, Ser. No. 476,863**

**Int. Cl.$^5$ A61K** *31/55;* **C07D** *233/66, 419/12, 403/12*

**U.S. Cl. 514—213** **11 Claims**

1. An imidazole compound selected from

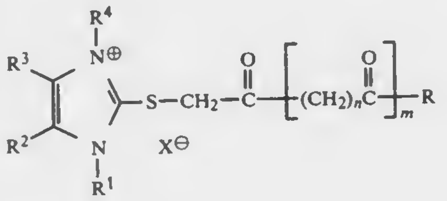
(A) an imidazole having the formula



(I)

or its acid addition salt, or

(B) an imidazolium salt having the formula



(II)

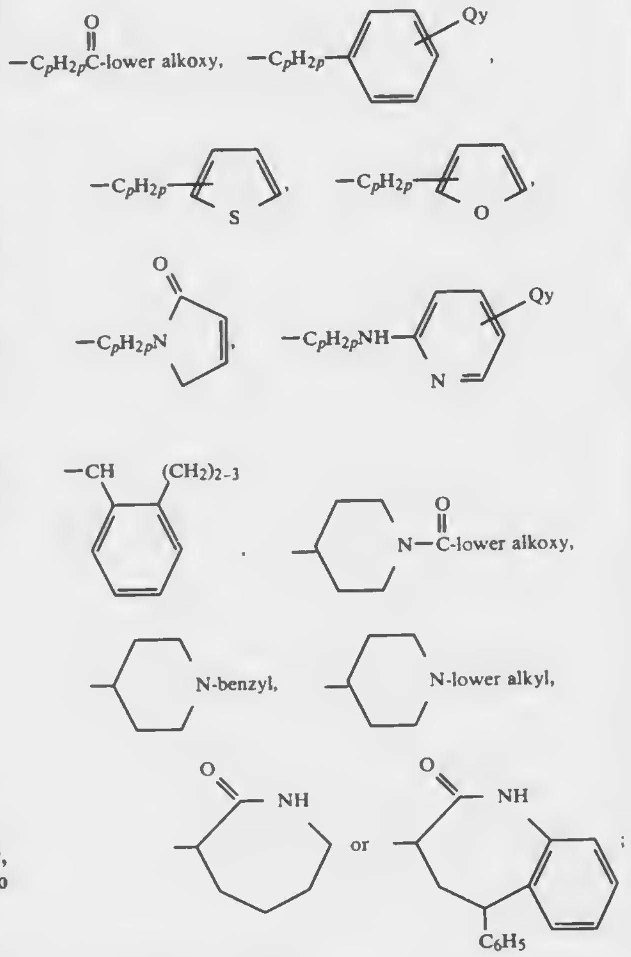
wherein in the above formulas

R is OR′ or NR″R‴

wherein

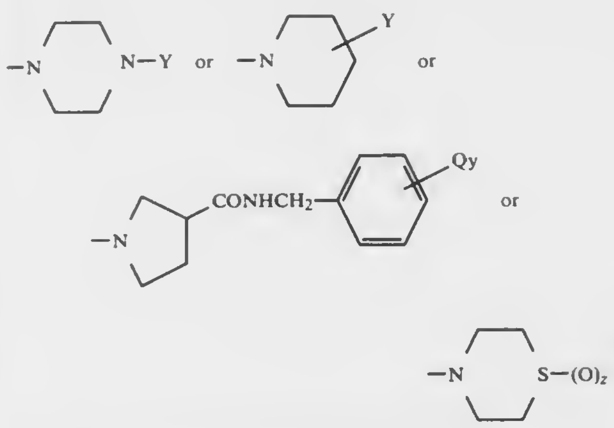
R′ is hydrogen, lower alkyl, lower alkanoyl, phenyl, or substituted phenyl having from 1 to 3 substituents selected from hydroxy, alkoxy, alkyl, and nitro and from 1 to 5 substituents when the substituent is halo;

R″ is hydrogen, lower alkyl,



R‴ is hydrogen or lower alkyl; or

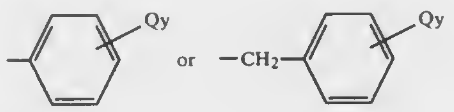
R″ and R‴ together with N is



wherein in the foregoing and subsequent formulas

Q is independently hydroxy, lower alkoxy, lower alkyl, halo and nitro

Y is lower alkyl,



p is 1 to 4

y is 0 to 4, and

z is 0 to 2;

$R^1$ is lower alkyl, benzyl;

$R^2$ is hydrogen, lower alkyl, or cycloalkyl;

$R^3$ is hydrogen, lower alkyl, or cycloalkyl;

$R^4$ is lower alkyl, benzyl;

$R^2$ and $R^3$ taken together form an alkylene chain of 3 to 10 carbon atoms;

X is an anion of a pharmaceutically acceptable salt;

m is 1; and

n is from 1 to 3.

---

## 5,019,573
## SUBSTITUTED DIBENZOFURANS AND METHODS OF USING SAME

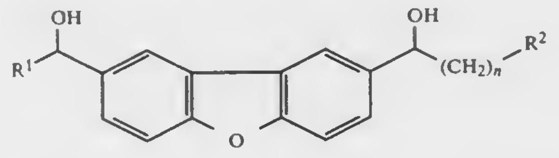
**T. Scott Shoupe, Southbury, Conn.; David C. Baker, Tuscaloosa, Ala.; Stephen M. Coutts, Rancho Santa Fe, Calif., and Elli S. Hand, Tuscaloosa, Ala., assignors to Euroceltique, S.A., Luxembourg, Luxembourg**

**Filed Sep. 19, 1989, Ser. No. 409,630**

**Int. Cl.$^5$ A61K** *31/535, 31/34;* **C07D** *405/02, 307/91*

**U.S. Cl. 514—232.8** **23 Claims**

1. A compound having the formula:



wherein

(a) n is an integer from 1 to 5;

(b) $R^1$ is selected from the group consisting of alkyl; phenyl, substituted phenyl substituted by Cl, Br, I, $-CF_3$, $-OCH_3$, alkyl, -CN, $-NH_2$, $-CONH_2$ or $NO_2$; $Ph(CH_2)_n$ wherein n is 1–5; Ph $(CH_2)_n$ wherein Ph is substituted by Cl, Br, I, $-CF_3$, $-OCH_3$, alkyl, -CN, $-NH_2$, $-CONH_2$ or $NO_2$; and

(c) $R^2$ is selected from the group consisting of $CO_2R^3$ wherein $R^3$ is alkyl, aryl or aralkyl; alkanoate salt; $C(O)NR^4R^5$ wherein $R^4$ is H, alkyl or aryl and $R^5=R^4$ or is one of the other $R^4$ substituents, or $R^4$ and $R^5$ form a heterocyclic ring with the N as the sole heteroatom; tetrazole; sulfinic acid; sulfonic acid; and half esters of sulfur acids or sulfonamides derived therefrom.

---

## 5,019,574
## 3,4-DIAMINOQUINOLINE AND 3,4-DIAMINO-5,6,7,8-TETRAHYDROQUINOLINE COMPOUNDS USEFUL FOR IMPROVING PSYCHONEURAL FUNCTION

**Yutaka Miura; Mitsutaka Yoshida, both of Shizuoka; Yasuo Fujimura; Sakae Takaku, both of Saitama, and Yukifumi Noda, Shizuoka, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan**

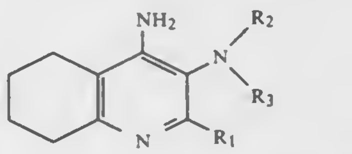
**Filed Sep. 28, 1989, Ser. No. 414,170**

**Claims priority, application Japan, Sep. 30, 1988, 63-246237**

**Int. Cl.$^5$ A61K** *31/525, 31/47;* **C07D** *413/00, 215/42*

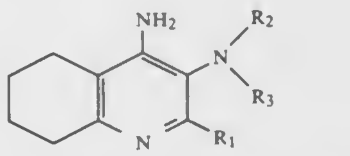
**U.S. Cl. 514—235.2** **11 Claims**

1. A 4-aminoquinoline or 4-amino-5,6,7,8-tetrahydroquinoline compound represented by the formula:



wherein $R_1$ is a hydrogen atom, a hydroxyl group, a linear or branched chain lower alkyl group or a cycloalkyl group which may be substituted by a hydroxyl group, a lower alkoxy group, a lower alkyl group or a cycloalkyl group which contains a carbonyl group, or a group —NH—B where B is a lower alkyl group, a cycloalkyl group, or a phenyl group; $R_2$ and $R_3$, which may be the same or different, each represents a hydrogen atom, a lower alkyl group, a lower alkyl carbonyl group, or when taken together, form a pyrrolidino group, a piperidino group, a morpholino group, or an N-methylpiperazinyl group, together with the nitrogen atom; or an acid addition salt of said quinoline or 5,6,7,8-tetrahydroquinoline compound; and when $R_1$ is a hydrogen atom, $R_2$ and $R_3$ are neither a hydrogen atom nor an ethyl group at the same time.

7. A pharmaceutical composition for improving psychoneural function which contains a pharmaceutically acceptable vehicle and an active ingredient which is a 4-aminoquinoline or 4-amino-5,6,7,8-tetrahydroquinoline compound represented by the formula:



wherein $R_1$ is a hydrogen atom, a hydroxyl group, a linear or branched chain lower alkyl group or a cycloalkyl group which may be substituted by a hydroxyl group, a lower alkoxy group, a lower alkyl group or a cycloalkyl group which contains a carbonyl group, or a group —NH—B where B is a lower alkyl group, a cycloalkyl group, or a phenyl group; $R_2$ and $R_3$, which may be the same or different, each represents a hydrogen atom, a lower alkyl group, a lower alkyl carbonyl group, or when taken together, form a pyrrolidino group, a piperidino group, a morpholino group, or an N-methylpiperazinyl group, together with the nitrogen atom; or an acid addition salt of

VOL
1126
ISS
4
MY
28
1991
UMI

said quinoline or 5,6,7,8-tetrahydroquinoline compound; and when $R_1$ is a hydrogen atom, $R_2$ and $R_3$ are neither a hydrogen atom nor an ethyl group at the same time.

---

### 5,019,575

### NOVEL PYRIDAZINONE COMPOUNDS, COMPOSITIONS THEREOF AND METHOD OF USE

**Heimo O. Haikala, Espoo; Erkki J. Honkanen, Vantaa; Kari K. Lönnberg, Routio; Pentti T. Nore, Helsinki; Jarmo J. Pystynen, Espoo; Anne M. Luiro, Helsinki, and Aino K. Pippuri, Espoo, all of Finland, assignors to Orion-yhtymä Oy, Espoo, Finland**

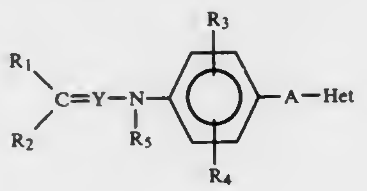
**Filed Feb. 9, 1990, Ser. No. 477,530**

**Claims priority, application United Kingdom, Feb. 11, 1989, 8903130**

**Int. Cl.$^5$ A61K** *31/50;* **C07D** *237/04*

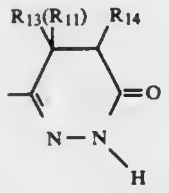
**U.S. Cl. 514—247** **13 Claims**

1. A heterocyclic compound of formula I

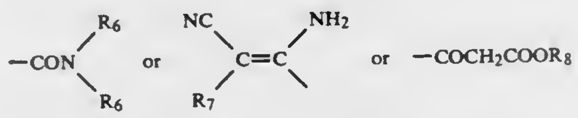


I

wherein Het represents



wherein $R_{11}$, $R_{13}$ and $R_{14}$ represent independently hydrogen or lower alkyl group, A represents a valency bond, —CH═CH— or —$CH_2$—$CH_2$— group; $R_1$ and $R_2$ independently represent nitro, cyano, halogen, carboxamido, alkoxycarbonyl, alkanoyl or one of the following groups;



wherein $R_6$ represents hydrogen or lower alkyl group, $R_8$ represents lower alkyl, $R_7$ represents cyano or $COOR_{10}$, wherein $R_{10}$ represents hydrogen or lower alkyl; $R_3$, $R_4$, and $R_5$ represent independently hydrogen, hydroxy or lower alkyl group; and Y represents N.

---

### 5,019,576

### 2-SUBSTITUTED N,N'-DITRIMETHOXYBENZOYL PIPERAZINES AND THERAPEUTIC COMPOSITIONS CONTAINING THEM

**Pierre Braquet, Garches; Eduardo Pirotzky, Paris; Jean-Jacques Godfroid, Paris, and Francoise Heymans, Paris, all of France, assignors to Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.), France**

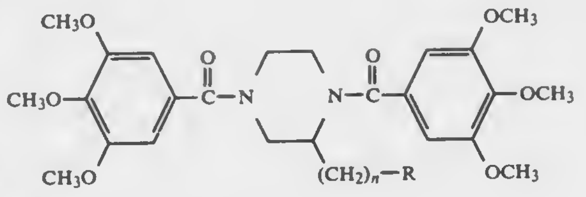
**Filed Apr. 9, 1990, Ser. No. 506,421**

**Claims priority, application United Kingdom, Apr. 15, 1989, 8908587**

**Int. Cl.$^5$ A61B** *31/495;* **C07D** *41/04*

**U.S. Cl. 514—255** **2 Claims**

1. Piperazine derivatives of the general formula I



I

wherein

-$(CH_2)_n$- represents a straight or branched chain alkyl group having from n=1 to n=20 carbon atoms, and

R represents a hydrogen atom, a branched alkyl group, a cycloalkyl group having from 5 to 10 carbon atoms, a phenyl group, optionally substituted by one or several chlorine atoms, methyl or methoxy groups, or straight or branched chain alkenyl groups having from 3 to 11 carbon atoms,

and therapeutically acceptable salts thereof.

2. Therapeutic compositions of matter containing an effective amount of at least one compound according to claim 1, associated with the usual carriers for the selected administration route.

---

### 5,019,577

### NOVEL COMPOUNDS AND USE

**Eric C. Bigham, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.**

**Filed Apr. 15, 1988, Ser. No. 181,983**

**The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.**

**Int. Cl.$^5$ A61K** *31/505;* **C07D** *239/49*

**U.S. Cl. 514—272** **4 Claims**

1. A compound selected from the group consisting of:
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-2-fluorobenzoyl]-(L)-glutamic acid,
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-3-fluorobenzoyl]-(L)-glutamic acid,
N-[4-(3-(2,4-diamino-1,1-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-3-methylbenzoyl]-(L)-glutamic acid,
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-3-(methoxy)benzoyl]-(L)-glutamic acid and
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-2-chlorobenzoyl]-(L)-glutamic acid,
or a pharmaceutically acceptable salt thereof.

3. A pharmaceutical formulation comprising a compound selected from:
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-2-fluorobenzoyl]-(L)-glutamic acid,
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-3-fluorobenzoyl]-(L)-glutamic acid,
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-3-methylbenzoyl]-(L)-glutamic acid,
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-3-(methoxy)benzoyl]-(L)-glutamic acid and
N-[4-(3-(2,4-diamino-1,6-dihydro-6-oxo-5-pyrimidinyl)-propylamino)-2-chlorobenzoyl]-(L)-glutamic acid,
or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier therefor.

---

### 5,019,578

### β-ADRENERGIC AGONISTS

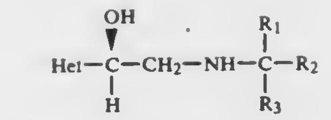
**Michael H. Fisher, Ringoes, and Matthew J. Wyvratt, Jr., Mountainside, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 185,637, Apr. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 126,987, Nov. 25, 1987, abandoned. This application Apr. 9, 1990, Ser. No. 506,312**

**Int. Cl.$^5$ C07D** *239/42;* **A61K** *31/505*

**U.S. Cl. 514—275** **4 Claims**

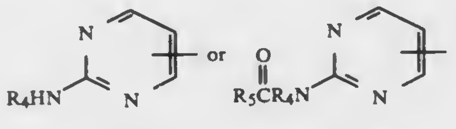
1. A compound having the formula:



$$Het—\overset{OH}{\underset{H}{C}}—CH_2—NH—\overset{R_1}{\underset{R_3}{C}}—R_2$$

wherein $R_1$, $R_2$ and $R_3$ are independently selected from hydrogen, loweralky, loweralkenyl or loweralkynyl any of which may be optionally substituted with hydroxy or loweralkoxy, or $R_1$ and $R_2$ may be joined to form a cyclic ring of from 3 to 6 members in which the ring may further be substituted by lower alkyl;

Het is



(c) (e)

wherein $R_4$ and $R_5$ are independently hydrogen, loweralkyl, phenyl, substituted phenyl, phenylloweralkyl or substituted phenyl loweralkyl

wherein the substituent is loweralkyl, loweralkoxy or halo, or the pharmaceutically acceptable acid addition salts thereof.

3. A method for the promotion of growth and increasing the feed efficiency of animals which comprises administering to such animals an effective amount of a compound of claim 1.

---

### 5,019,579

### PHARMACEUTICAL COMPOSITIONS CONTAINING DEXTRORPHAN FOR INTRANASAL APPLICATION

**Piero Del Soldato, Monza, and Silvano Casadio, Milan, both of Italy, assignors to Prodotti Formeti S.R.L., Milan, Italy**

**Continuation of Ser. No. 910,986, Sep. 24, 1986, abandoned. This application Dec. 7, 1989, Ser. No. 445,106**

**Claims priority, application Italy, Sep. 26, 1985, 22288 A/85**

**Int. Cl.$^5$ A61K** *31/44*

**U.S. Cl. 514—289** **10 Claims**

1. Pharmaceutically acceptable composition suitable to achieve a systemic therapeutic response to antitussis in warm-blooded animals, comprising:
(I) a therapeutically efficacious amount of salified dextrorphan, and
(II) a pharmaceutically acceptable non-toxic excipient for intranasal administration per dosage unit.

---

### 5,019,580

### DIOSCORETINE AND ITS USE AS A HYPOGLYCEMIC AGENT

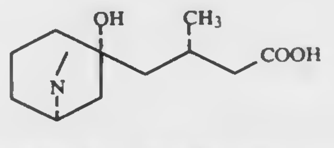
**Maurice M. Iwu, Unn. Nsukka, Nigeria, assignor to Shaman Pharmaceuticals, Inc., San Carlos, Calif.**

**Filed Dec. 19, 1989, Ser. No. 452,902**

**Int. Cl.$^5$ C07D** *221/00;* **A61K** *31/435*

**U.S. Cl. 514—299** **13 Claims**

12. A method for treatment of diabetes mellitus, comprising administering to a host suffering from diabetes mellitus:
(a) a therapeutically effective amount of dioscoretine having the structural formula:



or a pharmaceutically acceptable salt thereof; and
(b) a therapeutically effective amount of a sulfonylurea selected from the group consisting of acetohexamide, chloropropamide, tolazamide and tolbutamide.

---

### 5,019,581

### 5-SUBSTITUTED (4,5-C) IMIDAZOPYRIDINE COMPOUNDS WHICH HAVE USEFUL PLATELET ACTIVATING FACTOR ANTAGONISTIC ACTIVITY

**Ish K. Khanna, Skokie; Roger Nosal, Buffalo Grove, and Richard M. Weier, Lake Bluff, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

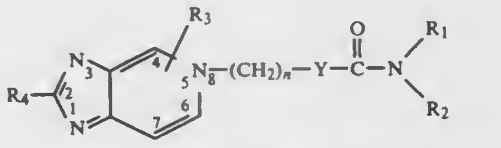
**Continuation-in-part of Ser. No. 167,671, Mar. 14, 1988, Pat. No. 4,914,108. This application Mar. 6, 1989, Ser. No. 317,871**

**The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.**

**Int. Cl.$^5$ C07D** *471/04;* **A61K** *31/53*

**U.S. Cl. 514—303** **60 Claims**

1. A compound of the formula



I

or a pharmaceutically acceptable acid addition salt thereof: wherein

$R_1$ and $R_2$ are each independently selected from hydrogen; straight or branched chain alkyl of 1 to 15 carbon atoms; cycloalkyl having 3 to 8 carbon atoms; substituted cycloalkyl which can be substituted one or more by alkyl of 1 to 6 carbon atoms; bicycloalkyl having 3 to 8 carbon atoms in each ring; pyridyl; phenyl; substituted phenyl which can be substituted one or more by a group independently selected from alkyl of 1 to 6 carbon atoms or halogen; straight or branched alkenyl having 3 to 15 carbon atoms with the proviso that the double bond of the alkenyl group cannot be adjacent to the nitrogen; and cycloalkenyl having 5 to 8 carbon atoms with the proviso that the double bond cannot be adjacent to the nitrogen; and $R_1$ and $R_2$ cannot both be hydrogen

Y is phenyl or phenyl substituted once or more than at one or more of the 2, 3, 5 or 6 position of the phenyl ring by substituents independently selected from the group consisting of alkoxy wherein the alkyl is 1 to 6 carbon atoms; halogen wherein the halogen is selected from bromo, fluoro, or chloro; straight or branched chain alkyl having 1 to 6 carbon atoms; substituted straight or branched chain alkyl which can be substituted one or more by halogen; thioalkyl wherein the alkyl is 1 to 6 carbon atoms; alkoxyalkyl wherein the alkyl groups are each 1 to 6 carbon atoms hydroxyalkyl wherein the alkyl is 1 to 6 carbon atoms; alkylthioalkyl wherein the alkyl group are each 1 to 6 carbon atoms; cyano; mercaptoalkyl wherein the alkyl is 1 to 6 carbon atoms; hydroxy; amino; alkylamino wherein the alkyl group are each 1 to 6 carbon atoms; and dialkylamino wherein the alkyl group are each 1 to 6 carbon atoms.

n is an integer of 1 to 5

$R_3$ is a group substituted at one or more of the 4, 6, or 7 positions of the pyridine ring said group being independently selected from hydrogen; alkyl of 1 to 6 carbon atoms; halogen wherein the halogen is selected from bromo, fluoro and chloro; and alkoxy wherein the alkyl is 1 to 6 carbon atoms

$R_4$ is hydrogen or alkyl of 1 to 6 carbon atoms.

56. A pharmaceutical composition useful for treating diseases or disorder mediated by platelet activating factor comprising at least one compound according to claim 1, together with one or more non-toxic pharmaceutically acceptable carriers.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,582

## PIPERIDINE COMPOUNDS AND THEIR PREPARATION AND USE

**Jorgen Drejer, Bronshoj, and Palle Jakobsen, Vaerlose, both of Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark**

**Division of Ser. No. 106,154, Oct. 8, 1987, Pat. No. 4,877,749. This application Sep. 14, 1989, Ser. No. 407,237**

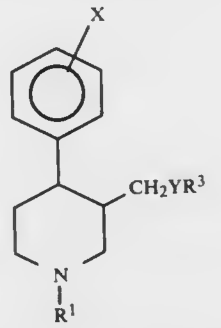
**Claims priority, application Denmark, Nov. 3, 1986, 5232/86; Jun. 25, 1987, 3234/87**

**Int. Cl.⁵ C07D** *405/12, 211/22;* **A61K** *31/445, 31/395*

**U.S. Cl. 514—321** **9 Claims**

1. A piperidine compound selected from those having the formula I

(I)



wherein $R^3$is 3,4-methylenedioxyphenyl, naphthyl or phenyl which may be substituted with one or more $C_{1-6}$-alkyl, $C_{1-6}$-alkoxy, $C_{3-8}$-cycloalkyl, $C_{3-5}$-alkylene, or benzyloxy groups, $R^1$ is straight or branched $C_{5-8}$-alkyl, $C_{4-8}$-alkenyl, $C_{4-7}$-cycloalkyl, $C_{4-8}$-cycloalkylalkyl, phenyllower-alkyl, phenyloxylower-alkyl, and lower-alkoxy-lower-alkyl,

X is hydrogen or 4-fluoro and wherein

Y is O or S,

and a salt thereof with a pharmaceutically-acceptable acid.

6. A pharmaceutical composition suitable for use in preventing calcium overload in brain cells of mammals, including humans, comprising an amount of a compound of claim 1, which is effective for inhibiting calcium uptake into brain cells, together with a pharmaceutically-acceptable carrier or diluent.

---

### 5,019,583

## N-PHENYL-N-(4-PIPERIDINYL)AMIDES USEFUL AS ANALGESICS

**Paul L. Feldman, Durham; Michael K. James, Raleigh; Marcus F. Brackeen, Durham; Michael R. Johnson, and Harry J. Leighton, both of Chapel Hill, all of N.C., assignors to Glaxo Inc., Research Triangle Park, N.C.**

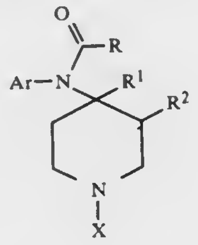
**Continuation-in-part of Ser. No. 311,311, Feb. 15, 1989, abandoned. This application Dec. 11, 1989, Ser. No. 448,497**

**Int. Cl.⁵ A61K** *31/445;* **C07D** *211/58*

**U.S. Cl. 514—327** **47 Claims**

1. A compound having the formula (I):

(I)



wherein

X is a member selected from the group consisting of: alkoxy-carbonyl-lower alkyl, lower alkyl-carbonyloxy-lower alkyl, alkenyloxy-carbonyl-lower alkyl, and $(C_{1-2})$alkoxy-$(C_{1-2})$alkoxy-carbonyl-lower alkyl

Ar is a member selected from the group consisting of phenyl and mono- di- and tri-substituted phenyl, wherein each substituent is independently selected from the group consisting of halo, lower alkyl, lower alkoxy and trifluoromethyl;

R is a member selected from the group consisting of lower alkyl, and lower alkoxy-lower alkyl;

$R^1$ is a member selected from the group consisting of hydrogen, lower alkoxy-carbonyl, and methoxymethyl; and

$R^2$ is a member selected from the group consisting of hydrogen and methyl;

and the diastereomeric and enantiomeric isomers thereof, and the pharmaceutically acceptable acid addition salts of said compounds and isomers.

---

### 5,019,584

## THERAPEUTICALLY ACTIVE CHLORO SUBSTITUTED BENZIMIDAZOLE

**Arne E. Brändström, Göteborg; Per L. Lindberg, Askim; Carl I. Starke, and Gunnel E. Sundén, both of Göteborg, all of Sweden, assignors to Aktiebolaget Hassle, Molndal, Sweden**

**Filed Dec. 20, 1989, Ser. No. 454,046**

**Claims priority, application Sweden, Dec. 22, 1988, 8804628-9**

**Int. Cl.⁵ A61K** *31/44;* **C07D** *401/00*

**U.S. Cl. 514—338** **7 Claims**

1. 5-Chloro-2-[[(3,4-dimethoxy-2-pyridinyl)methyl]sulfinyl]-1H-benzimidazole and physiologically acceptable salts thereof, as well as its optical enantiomers.

6. A method for the treatment of gastrointestinal inflammatory diseases in mammals by administering an amount of a compound as defined in claim 1 effective to inhibit gastric acid secretion.

---

### 5,019,585

## TRICYCLIC AROMATASE INHIBITORS

**Hubert J. J. Loozen, Uden, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands**

**Filed Sep. 12, 1989, Ser. No. 405,917**

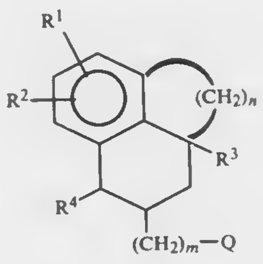
**Claims priority, application Netherlands, Sep. 12, 1988, 8802227**

**Int. Cl.⁵ C07C** *69/76*

**U.S. Cl. 514—396** **6 Claims**

1. A tricyclic aromatase inhibitor of the formula I

I



wherein

$R^1$ and $R^2$ independently of one another denote H, halogen, alkyl, alkoxy, alkylthio, OH, CN, $CF_3$, $NO_2$, and amino group which is unsubstituted or substituted by alkyl, an NH acyl group, carbonamide or a free or esterified carboxylate group;

$R^3$ is H, alkyl, alkoxyalkyl or arylalkyl;

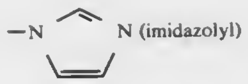
$R^4$ is H, OH, alkoxy or arylalkoxy;

m is 1 or 2;

n is 2, 3 or 4;

the broken line represents an optional bond;

Q denotes



with the proviso that when $R^1$ and $R^2$ are H, halogen, alkyl, alkoxy or OH, m=1, n=3, the broken line does not represent a bond and Q is imidazolyl, $R^3$ and $R^4$ may not both be H, and when $R_3$ or $R_4$ is an arylalkyl it is selected from the group consisting of phenyl and naphthyl, either of which may be unsubstituted or substituted by OH, halogen, CN, alkyl or alkoxy groups; or a pharmaceutically acceptable salt thereof.

6. Pharmaceutical preparation for use as an aromatase inhibitor comprising at least one compound according to claim 1 in an effective amount to provide aromatase inhibiting activity and a pharmaceutically acceptable carrier.

---

### 5,019,586

## KETONE DERIVATIVES

**Alexander W. Oxford, and Peter C. North, both of Royston, England, assignors to Glaxo Group Limited**

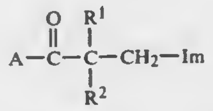
**Division of Ser. No. 180,960, Apr. 13, 1988, Pat. No. 4,918,080. This application Nov. 24, 1989, Ser. No. 440,880**

**Int. Cl.⁵ A61K** *31/415;* **C07D** *233/64, 405/10*

**U.S. Cl. 514—400** **11 Claims**

1. A compound of formula (I):

(I)

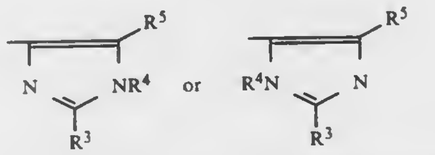


$$A-\overset{\overset{\large O}{\|}}{C}-\underset{\underset{\large R^2}{|}}{\overset{\overset{\large R^1}{|}}{C}}-CH_2-Im$$

or a physiologically acceptable salt or solvate thereof, wherein

$R^1$ and $R^2$, which may be the same or different, each represents a hydrogen atom or a $C_{1-6}$alkyl group;

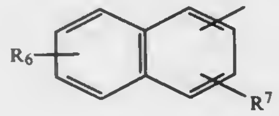
Im represents an imidazolyl group of formula:



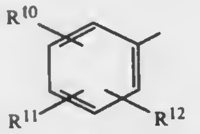
wherein one of the groups, represented by $R^3$, $R^4$ and $R^5$ is a hydrogen atom or a $C_{1-6}$alkyl, $C_{3-7}$cycloalkyl, $C_{3-6}$alkenyl, phenyl or phenyl$C_{1-3}$alkyl group, and each of the other two groups, which may be the same or different, represents a hydrogen atom or a $C_{1-6}$alkyl group; and

A is selected from groups of the formulae (a) and (b):

(a)



(b)



wherein $R^6$ and $R^7$, which may be the same or different, and may be attached to either the same or different fused rings of the naphthalene moiety, each represents a hydrogen atom, a halogen atom, or a hydroxy, $C_{1-4}$alkoxy, $C_{1-4}$alkyl or $C_{1-4}$alkylthio group, and one of $R^6$ and $R^7$ may also represent a group —$NR^8R^9$, wherein $R^8$ and $R^9$, which may be the same or different, each represents a hydrogen atom or a $C_{1-4}$alkyl group, or together with the nitrogen atom to which they are attached form a saturated 5 to 7 membered ring;

$R^{10}$ represents a hydrogen atom, a halogen atom, or a hydroxy, $C_{1-4}$alkoxy, $C_{1-4}$alkyl, $C_{1-4}$alkylthio, nitro or phenyl group, or a group —$NR^8R^9$, wherein $R^8$ and $R^9$ are as defined previously;

$R^{11}$ represents a hydrogen atom, or a $C_{1-4}$alkoxy or $C_{1-4}$alkyl group; and

$R^{12}$ represents a hydrogen atom, a halogen atom or a $C_{1-4}$alkoxy group;

or, when $R^{10}$ represents a hydrogen atom, $R^{11}$ and $R^{12}$ may be attached to adjacent carbon atoms and form the group —$O(CH_2)_nO$—where n is 1 or 2.

10. A pharmaceutical composition for treating a condition caused by disturbance or "neuronal" 5HT function which comprises an effective amount to relieve said condition of a compound of formula (I) as defined in claim 1 or a physiologically acceptable salt or solvate thereof together with at least one physiologically acceptable carrier or diluent.

---

### 5,019,587

## BICYCLIC CARBOXAMIDES, COMPOSITIONS CONTAINING SAME AND USE THEREOF

**Wolfgang V. Von Der Saal, Weinheim; Alfred Mertens, Schriesheim, and Erwin Boehm, Mannheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

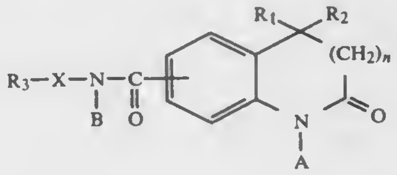
**Filed Jun. 5, 1989, Ser. No. 361,090**

**Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818830**

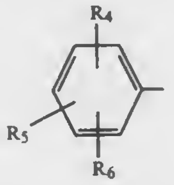
**Int. Cl.⁵ C07D** *209/34, 405/12;* **A61K** *31/40*

**U.S. Cl. 514—409** **10 Claims**

1. A compound of the formula:



wherein A is a hydrogen atom or a $C_1$–$C_6$-alkyl, $C_2$–$C_6$-alkenyl, $C_2$–$C_6$-alkynyl, benzyl or $C_3$–$C_7$-cycloalkyl radical, B is a hydrogen atom, $R_1$ is a $C_1$–$C_6$-alkyl, $C_2$–$C_6$-alkenyl, or $C_3$–$C_7$-cycloalkyl radical, $R_2$ is a $C_1$–$C_6$-alkyl, $C_2$–$C_6$-alkenyl, $C_3$–$C_7$-cycloalky, $C_1$–$C_6$-alkylcarbonyl, $C_1$–$C_6$-alkoxycarbonyl, aminocarbonyl or hydrazinocarbonyl radical or $R_1$ and $R_2$, together with the carbon atom to which they are attached, form a $C_3$–$C_7$-cycloalkyl ring, n is 0, X is a valency bond or a $C_1$–$C_6$-alkylene radical, $R_3$ is a phenyl ring of the formula:



wherein $R_4$, and $R_5$ and $R_6$ can be the same or different and each signifies a hydrogen atom, $C_1$–$C_6$-alkanesulphonyloxy, trifluoromethanesulphonyloxy, phenylsulphonylamino, $C_1$–$C_6$-alkanesulphonylamino, trifluoromethanesulphonylamino, N–$C_1$–$C_6$-alkyl-alkanesulphonylamino, N–$C_1$–$C_6$-alkyl-trifluoromethanesulphonylamino, $C_1$–$C_6$-alkylsulphenylmethyl, $C_1$–$C_6$-alkylsulphinylmethyl or $C_1$–$C_6$-alkylsulphonylmethyl radical, a carbonyl group substituted by hydroxyl, $C_1$–$C_6$-alkoxy, $C_1$–$C_6$-alkylamino or di-$C_1$–$C_6$-alkylamino, a sulphonyl group substituted by amino, $C_1$–$C_6$-

VOL
1126
ISS
4
MY
28
1991
UMI

alkylamino or di-$C_1$-$C_6$-alkylamino, a $C_1$-$C_6$-alkylcarbonylamino, aminocarbonylamino, $C_1$-$C_6$-alkylaminocarbonylamino, $C_1$-$C_6$-alkylthio, $C_1$-$C_6$-alkylsulphinyl, $C_1$-6-alkylsulphonyl, nitro, halogen, amino, hydroxy, $C_1$-$C_8$-alkyl, $C_1$-$C_6$-alkoxy, $C_2$-$C_6$-alkenyloxy, $C_2$-$C_6$-alkynyloxy, cyano-$C_1$-$C_6$-alkoxy, carboxy-$C_1$-$C_6$-alkoxy, $C_1$-$C_6$-alkoxycarbonyl-$C_1$-$C_6$-alkoxy, di-$C_1$-$C_6$-alkylamino, trifluoromethyl or cyano group, or $R_3$ is a naphthyl, tetrahydronaphthyl, biphenyl, methylenedioxyphenyl or ethylenedioxyphenyl radical; and the tautomers, optically-active forms or a physiologically acceptable salts thereof with organic and inorganic acids.

---

### 5,019,588

### 1-OXASPIRO[4,5] DECANE-7,8-DIAMINOARYLAMIDES

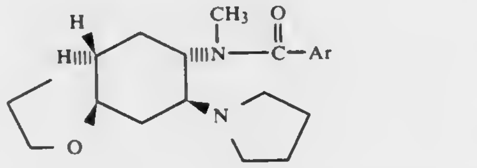
**David C. Horwell, and David C. Rees, both of Cambridge, England, assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 301,219, Jan. 24, 1989, Pat. No. 4,906,655. This application Oct. 10, 1989, Ser. No. 419,991**

**Int. Cl.$^5$ A61K** *31/34, 31/38, 31/40;* **C07D** *405/02*

**U.S. Cl. 514—409** **13 Claims**

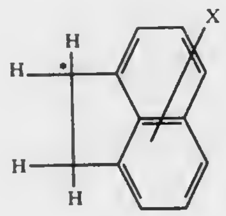
1. A compound of formula



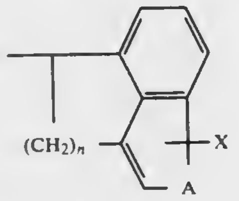
I

and the pharmaceutically acceptable acid addition salts thereof wherein

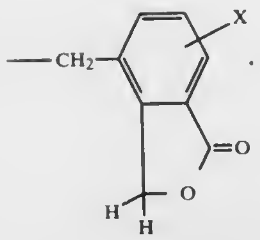
Ar is a)



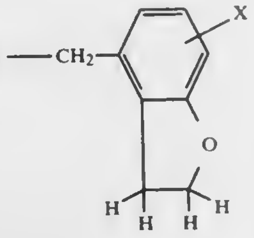
(b)



(c)

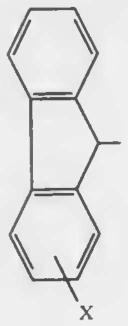


(d)



-continued

(e)



wherein

X is hydrogen, fluorine, chlorine, alkyl of from one to six carbon atoms, or carbocyclicaryl,

n is an integer from 2 to 4,

A is oxygen or sulfur,

the * indicates a chiral center,

the - - - indicates the $C_1$–$C_0$ bend may be saturated or unsaturated.

6. A pharmaceutical composition useful for alleviating pain in a mammal comprising a therapeutically effective amount of a compound according to claim 1 in combination with a pharmaceutical acceptable carrier.

---

### 5,019,589

### $\Delta^{23}$-LL-F28249 COMPOUNDS

**Goro Asato, Titusville, and Zareen Ahmed, Princeton Junction, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

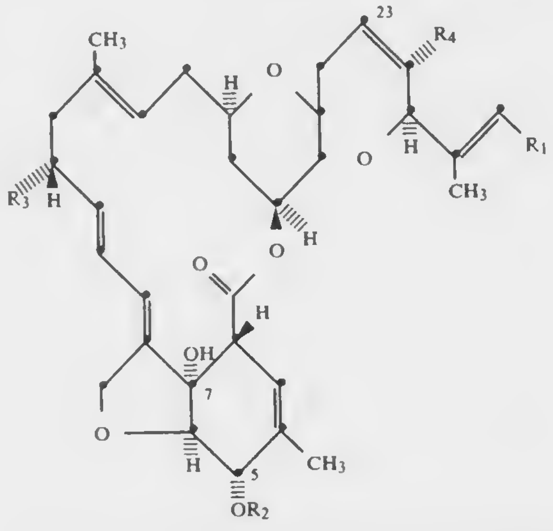
**Filed Sep. 12, 1986, Ser. No. 907,187**

**The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.**

**Int. Cl.$^5$ A61K** *31/365;* **C07D** *313/00*

**U.S. Cl. 514—450** **14 Claims**

1. A compound represented by structural formula (I):



(I)

wherein $R_1$ is methyl, ethyl or isopropyl; $R_2$ is hydrogen or methyl; $R_3$ is hydrogen, methyl or ethyl; $R_4$ is methyl or ethyl; or a pharmaceutically and pharmacologically acceptable salt thereof; with the proviso that when $R_4$ is methyl, $R_3$ cannot be methyl.

---

### 5,019,590

### ANTIMALARIAL ANALOGS OF ARTEMISININ

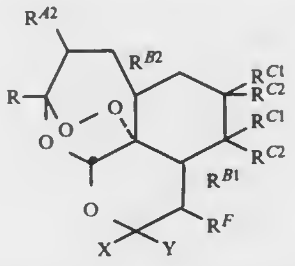
**Mitchell A. Avery, Palo Alto, and Wesley K. M. Chong, Mountain View, both of Calif., assignors to SRI International, Menlo Park, Calif.**

**Continuation of Ser. No. 108,145, Oct. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 943,555, Dec. 12, 1986, abandoned. This application Sep. 27, 1989, Ser. No. 414,730**

**Int. Cl.$^5$ A61K** *31/365;* **C07D** *493/18*

**U.S. Cl. 514—450** **9 Claims**

1. a polyoxatetracyclic compound of the formula



wherein the R's are each independently selected from the group consisting of hydrogen and a lower alkyl of 1 to 4 carbon atoms and X and Y are selected such that they together equal a carbonyl oxygen or X is a hydrogen while Y is selected from the group consisting of hydrogen, hydroxyl, alkyloxy, alkylcarbonyloxy, hydroxycarbonyloxy, alkylaminocarbonyl, alkylaminocarbonyloxy and ureido.

---

### 5,019,591

### METHOD FOR TREATING RETINOPATHY AND OTHER SMALL VESSEL DISORDERS ASSOCIATED WITH DIABETES

**Thomas W. Gardner, Franklin, and Theodore M. Hollis, State College, both of Pa., assignors to Pennsylvania Research Corporation, University Park, Pa.**

**Filed Feb. 17, 1989, Ser. No. 312,693**

**Int. Cl.$^5$ A61K** *31/34, 31/135*

**U.S. Cl. 514—461** **7 Claims**

1. A method for treating and preventing retinopathy associated with diabetes which comprises administering a therapeutically effective amount of an antihistamine or a pharmaceutically acceptable derivative thereof to a mammal having retinopathy associated with diabetes, wherein the antihistamine is selected from the group consisting of diphenhydramine, terfenadine, mequitazine, astemizole, acrivastine, SCH 29851, SK&F 93944, clemastine, ketotifen, azatadine, oxatomide, azelastine, doxepine, piperoxan (933F), 929F, 1571F, mepyramine, chlorpheniramine, triprolidine and promethazine.

---

### 5,019,592

### ARYLOXYPHENYLPROPYLAMINES AND THEIR PREPARATION AND USE

**Palle Jakobsen, Vaerlose, and Jorgen Drejer, Bronshoj, both of Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark**

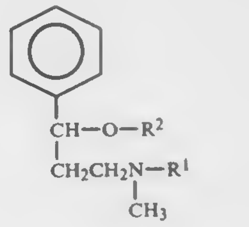
**Division of Ser. No. 473,862, Feb. 2, 1990, Pat. No. 4,970,232, which is a division of Ser. No. 277,561, Nov. 29, 1988, Pat. No. 4,962,122. This application Jul. 27, 1990, Ser. No. 558,810**

**Claims priority, application Denmark, Dec. 1, 1987, 6309/87**

**Int. Cl.$^5$ A61K** *31/275;* **C07C** *255/50*

**U.S. Cl. 514—524** **5 Claims**

1. A method of treating an indication related to calcium overload in brain cells of mammals, in a subject in need thereof, which comprises the step of administering to the said subject a calcium overload blocking amount of a compound selected from those having the formula



(I)

wherein

$R^1$ is H, $C_{3-7}$-cycloalkyl, $C_{1-10}$-alkyl, or alkenyl which may be straight, branched or cyclic, unsubstituted or substituted with $C_{1-4}$-alkoxy, aryloxy, or cycloalkyl, or cycloalkylalkyl; and

$R_2$ is up to and including $C_{10}$ aryl, which is substituted with cyano, and a salt thereof with a pharmaceutically-acceptable acid.

---

### 5,019,593

### ANTIFUNGAL FERMENTATION PRODUCTS AND COMPOSITIONS THEREOF

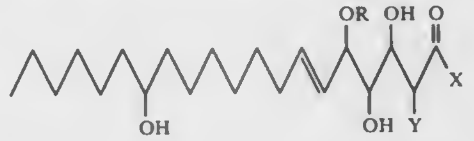
**George M. Garrity, Westfield; Maria B. Lopez, Hillside; Otto D. Hensens, Red Bank; Richard L. Monaghan, Somerset, and Deborah L. Zink, Manalapan, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Jul. 29, 1987, Ser. No. 79,192**

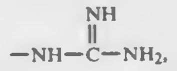
**Int. Cl.$^5$ A01N** *47/42, 37/44;* **C07C** *237/16, 229/30*

**U.S. Cl. 514—560** **11 Claims**

1. A compound of the formula



where R is —H or —$COCH_3$, X is —OH, or —$O^{\ominus}$ and Y is —$NH_2$, —$NH_3^{\oplus}$, —$NHCOCH_3$ or



$$-NH-\overset{\overset{\displaystyle NH}{\|}}{C}-NH_2,$$

provided that when R is —H and X is —OH, Y is —NH-$COCH_3$ or

$$-NH\overset{\overset{\displaystyle NH}{\|}}{C}NH_2;$$

and when R is —H or —$COCH_3$ and X is —$O^{\ominus}$, Y is —$NH_3^{\oplus}$.

10. A method for controlling fungi comprising administering an antifungally effective amount of one or more compounds of claim 1.

---

### 5,019,594

### METHOD FOR DECREASING APPETITE

**Richard J. Wurtman, Boston, and Timothy J. Maher, Milton, both of Mass., assignors to Interneuron Pharmaceuticals, Inc., New York, N.Y.**

**Filed Nov. 28, 1989, Ser. No. 442,011**

**Int. Cl.$^5$ A61K** *31/195, 31/535, 31/42*

**U.S. Cl. 514—561** **5 Claims**

1. A method of decreasing appetite in an animal by administration of an appetite-suppressing drug so as to produce a greater appetite-suppressing effect than that produced by administration of the drug alone, comprising administering to the animal an indirect-acting sympathomimetic drug capable of

VOL
1126
ISS
4
MY
28
1991
UMI

performing an appetite-suppressing function, and tyrosine or a tyrosine precursor wherein the drug and tyrosine are administered in an amount equal to 3 to 150 mgs of the drug and 250 mgs to 15 grams of tyrosine, per day.

---

### 5,019,595

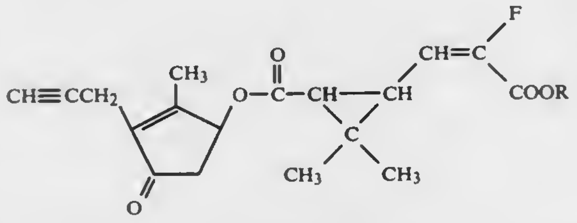
### NOVEL CARBOXYLIC ACID ESTERS AND INSECTICIDES CONTAINING THEM AS AN ACTIVE INGREDIENT

**Toshihiko Yano; Yoko Torisu, both of Ashiya; Hiroko Sekihachi, Toyonaka; Noritada Matsuo, Itami; Tohei Takagaki, Nishinomiya, and Kazunori Tsushima, Sapporo, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 360,487, Jun. 2, 1989, abandoned. This application Sep. 20, 1990, Ser. No. 585,627**
**Claims priority, application Japan, Jun. 10, 1988, 63-144143**
**Int. Cl.⁵ A01N** *53/00*

**U.S. Cl. 514—531** **14 Claims**

1. A compound represented by the formula,



wherein R represents a $C_{1-5}$ alkyl group, a $C_{3-6}$ cycloalkyl group, a $C_{3-6}$ alkenyl group, a $C_{3-6}$ alkynyl group or a $C_{1-5}$ haloalkyl group.

---

### 5,019,596

### PHARMACEUTICAL COMPOSITIONS HAVING THERAPEUTICAL ACTIVITY BASED ON MERCAPTOETHANSULPHONIC ACID

**Alberto Reiner, Cantu, and Giuseppe Vita, Segrate, both of Italy, assignors to Schering Spa, Milan, Italy**

**Division of Ser. No. 218,524, Jul. 7, 1988, abandoned, which is a continuation of Ser. No. 852,270, Apr. 15, 1986, abandoned. This application May 2, 1989, Ser. No. 348,171**
**Claims priority, application Italy, Apr. 15, 1985, 20338 A/85**
**Int. Cl.⁵ A61K** *31/185*

**U.S. Cl. 514—578** **1 Claim**

1. A method of controlling bladder carcinoma in a patient in need of treatment to control said bladder carcinoma, said method consisting essentially of administering to said patient an anti-tumorally effective amount of the sodium salt of mercaptoethansulphonic acid.

---

### 5,019,597

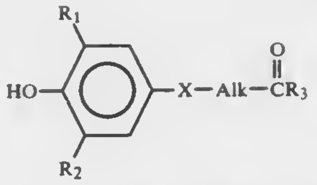
### BICYCLOALKYL TRICYCLOALKYL, AZABICYCLOALKYL AND AZATRICYCOALKYL AMIDES

**Richard A. Mueller, Glencoe; Richard A. Partis, Evanston, and James R. Deason, Wilmette, all of Ill., assignors to G. D. Searle & Co., Skokie, Ill.**

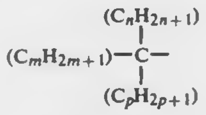
**Continuation of Ser. No. 819,761, Jan. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 809,954, Dec. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 698,050, Feb. 4, 1985, abandoned. This application Jul. 30, 1987, Ser. No. 79,731**
**Int. Cl.⁵ A61K** *31/165;* **C07C** *321/00*

**U.S. Cl. 514—618** **13 Claims**

1. A compound of the formula



wherein $R_1$ and $R_2$ are the same or different members of the group consisting of phenyl, substituted phenyl and a



$$(C_nH_{2n+1}) \atop {(C_mH_{2m+1})-\overset{|}{\underset{|}{C}}- \atop (C_pH_{2p+1})}$$

group wherein n, m and p are independently an integer of from 1 to 8 provided that n+m+p is equal to or less than 10; X is thio or sulfinyl; Alk is straight or branched chain lower alkylene, and $R_3$ is selected from the group consisting of bicycloalkylamino, tricycloalkylamino, or dicycloalkylamino.

13. A pharmaceutical composition for the treatment of inflammation and allergy comprising a therapeutically effective amount of a compound according to claim 1 and a pharmaceutically acceptable carrier.

---

### 5,019,598

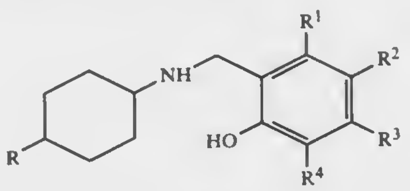
### AMINOMETHYLPHENOLS AND FUNGICIDES CONTAINING THESE COMPOUNDS

**Costin Rentzea, Heidelberg; Eberhard Ammermann, Ludwigshafen, and Gisela Lorenz, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Jun. 15, 1989, Ser. No. 366,458**
**Claims priority, application Fed. Rep. of Germany, Jun. 15, 1988, 3820292**
**Int. Cl.⁵ H01N** *33/04;* **C07C** *211/33, 211/34, 211/35*

**U.S. Cl. 514—650** **8 Claims**

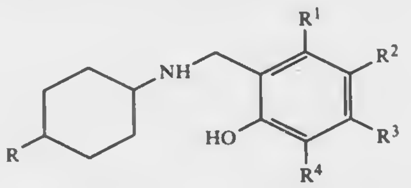
1. A compound of the formula I



I

where $R^1$, $R^3$ and $R^4$ are hydrogen, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or dimethylamino, $R^2$ is hydrogen, chlorine, bromine, $C_1$–$C_{10}$-alkyl, $C_3$–$C_8$-alkenyl, $C_1$–$C_4$-alkoxy-$C_1$–$C_4$-alkyl, cyclohexyl or phenyl, or $R^1$ and $R^2$, $R^2$ and $R^3$ or $R^3$ and $R^4$ form a carbocyclic, saturated or unsaturated five-membered or six-membered ring, and R is $C_1$–$C_5$-alkyl, and salts thereof.

8. A process for combating fungi, wherein a fungicidally effective amount of a compound of the formula I



I

where $R^1$, $R^3$ and $R^4$ are hydrogen, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or dimethylamino, $R^2$ is hydrogen, chlorine, bromine, $C_1$–$C_{10}$-alkyl, $C_3$–$C_8$-alkenyl, $C_1$–$C_4$-alkoxy-$C_1$–$C_4$-alkyl, cyclohexyl or phenyl, or $R^1$ and $R^2$, $R^2$ and $R^3$ or $R^3$ and $R^4$ form a carbocyclic, saturated or unsaturated five-membered or six-membered ring, and R is $C_1$–$C_5$-alkyl, or a salt thereof, is allowed to act on the fungi, or areas, materials, plants, soil or seed threatened by fungus attack.

---

### 5,019,599

### DEODORIZING URETHANE FOAM AND PROCESS FOR ITS PRODUCTION

**Yoshiaki Miki, Yokohama, and Tsunehisa Ueda, Zushi, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Filed Mar. 22, 1989, Ser. No. 326,982**
**Claims priority, application Japan, Mar. 25, 1988, 63-71541**
**Int. Cl.⁵ C08G** *18/14*

**U.S. Cl. 521—99** **11 Claims**

1. A deodorizing urethane foam comprising a urethane foam substrate and from 0.05 to 20% by weight, based on the urethane foam substrate, of a deodorizing component included therein, the deodorizing component comprising a Diels-Alder reaction-type addition reaction product selected from the group consisting of (1) a Diels-Alder reaction product between an alpha, beta-unsaturated dicarboxylic anhydride and a diolefin and (2) an ene-reaction product between an alpha, beta-unstaturated dicarboxylic anhydride and a monoolefin, or a derivative of the addition reaction product.

---

### 5,019,600

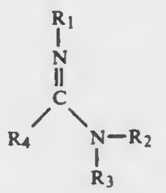
### INTERNAL MOLD RELEASE AGENT FOR USE IN REACTION INJECTION MOLDING

**John E. Dewhurst, Macungie, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 239,153, Aug. 31, 1988, Pat. No. 4,886,838. This application Sep. 12, 1989, Ser. No. 405,913**
**Int. Cl.⁵ C08G** *18/14*

**U.S. Cl. 521—117** **2 Claims**

1. An internal mold release composition comprising
(a) a zinc carboxylate containing from 8 to 24 carbon atoms per carboxylate group, and
(b) a compatibilizer comprising a salt of
(i) an amidine group-containing compound of the formula



wherein
$R_1$, $R_2$ and $R_3$ are straight or branched, saturated or unsaturated hydrocarbon chains having up to 30 carbon atoms which may be substituted by ether groups, ester groups, amide groups or amidine groups and may also be terminated by isocyanate-reactive groups,
$R_4$ corresponds to the definition of $R_1$, $R_2$ and $R_3$, but may additionally represent an aromatic substituent having 6 to 15 carbon atoms or may represent the group $—NR_2R_3$, with the proviso that when $R_4$ represents the group $—NR_2R_3$, $R_1$ can be hydrogen, and
wherein $R_1$, $R_2$, $R_3$ and $R_4$, may, with one or both of the amidine nitrogens, form a heterocyclic ring, and
(ii) a member selected from the group consisting of phenolic hydroxyl group containing compounds and aliphatic carboxylic acids, in an amount sufficient to solubilize the zinc carboxylate.

---

### 5,019,601

### ELASTOMERIC COMPOSITION CONTAINING THERAPEUTIC AGENTS AND ARTICLES MANUFACTURED THEREFROM

**Dwight L. Allen, deceased, late of Akron, Ohio by James S. Allen, Administrator, assignor to Cuno, Incorporated, Meriden, Conn.**

**Division of Ser. No. 138,867, Dec. 29, 1987, Pat. No. 4,867,968. This application Aug. 18, 1989, Ser. No. 395,956**
**Int. Cl.⁵ A61M** *25/00, 31/00;* **A61L** *29/00*

**U.S. Cl. 523—122** **6 Claims**

1. Medical and surgical instruments formed from a stable elastomeric composition comprising:
a rubber latex selected from the group consisting of natural rubber, synthetic rubber and mixtures thereof; and
from about 7.5 to 30 parts by weight, based upon the weight of 100 parts of said rubber, of a masterbatch comprising,
a therapeutically effective amount of a therapeutic agent;
at least about 3 parts by weight, per 100 based upon the weight of said rubber, of a carrier component selected from the group consisting of polysiloxane emulsions;
from about 5 to 20 parts by weight of clay, based upon the weight of said rubber; and
from about 5 to 15 parts by weight of titanium dioxide, based upon the weight of said rubber.

---

### 5,019,602

### POLYURETHANE FOAMS, COMPOSITIONS TO PREPARE SAME AND PROCESS TO PREPARE SAME

**Frank J. Lowe, Euclid, Ohio, assignor to Premier Industrial Corporation, Cleveland, Ohio**

**Filed Dec. 12, 1989, Ser. No. 449,572**
**Int. Cl.⁵ C08G** *18/14*

**U.S. Cl. 521—127** **17 Claims**

1. A polyurethane foam produced by the process comprising:
a. preparing a first substantially liquid mixture having shelf life stability comprising an isocyanate and an epoxide;
b. preparing a second substantially liquid mixture comprising a polyether polyol, a catalyst and an accelerator;
c. combining of the first and second substantially liquid mixtures.

---

### 5,019,603

### PROCESS FOR THE PRODUCTION OF POROUS PHENOLIC RESIN FIBERS

**Yoshikazu Arita, Takasaki; Yukio Abe, Maebashi; Toshi Iizuka, Takasaki; Yoshio Nakamura; Shoji Takigami, both of Kiryu, and Machiko Takigami, Kiryu, all of Japan, assignors to Gunei Kagaku Kogyo Kabushiki Kaisha, Japan**

**Filed Dec. 27, 1989, Ser. No. 457,528**
**Claims priority, application Japan, Mar. 20, 1989, 1-68240**
**Int. Cl.⁵ C08J** *9/38*

**U.S. Cl. 521—181** **10 Claims**

1. A process for the production of porous phenolic resin fibers, comprising the steps of:
providing phenolic resin fibers;
graft-polymerizing to the phenolic resin fibers a vinyl group-containing monomer to form a graft polymer linked to the phenolic resin fibers, and
heating the resulting phenolic resin fibers having the graft polymer linked thereto at a temperature of 150–300° C. to thermally decompose the graft polymer.

---

### 5,019,604

### PROTECTIVE GEL COMPOSITION

**Gerald M. Lemole, 404 Tomlinson Rd., Huntingdon Valley, Pa. 19006**

**Filed Apr. 26, 1989, Ser. No. 343,417**
**Int. Cl.⁵ A61K** *31/74*

**U.S. Cl. 523—105** **17 Claims**

1. A sterilizable water-insoluble gel useful as a protective coating for skin and mucosa, comprising:

VOL
1126
ISS
4
MY
28
1991
UMI

about 50–90% by weight of lanolin as a water-insoluble base;
an amount of liquid silicone effective as a water-repellent agent;
an amount of a polypropylene glycol fatty acid ester effective as a surfactant; and
a polytetrafluorethylene powder in microspherical form as lubricating agent.

---

**5,019,605**

## LOW DENSITY, SELF-EXTINGUISHING EPOXIDE COMPOSITION

**Patrice Jannic, Rueil-Malmaison, France, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Mar. 15, 1989, Ser. No. 324,237**
**Int. Cl.$^5$ C08L** *63/00;* **C08K** *7/28, 7/26, 7/22*
**U.S. Cl. 523—219** **36 Claims**

1. A low density, fire-resistant epoxide composition comprising:
(a) from 10 to 75 percent by weight of an organic epoxide compound having an epoxide functionality of at least 1;
(b) from 1 to 25 percent by weight of an epoxide hardener;
(c) from 20 to 50 percent by weight of a smoke suppressant;
(d) from 10 to 25 percent by weight of a filler capable of reducing the density of said composition; and
(e) from 1 to 10 percent by weight of an organic phosphorous-containing compound selected from the group consisting of alkyl phosphates, aryl phosphates, alkylphosphonates, arylphosphonates, and mixtures thereof,
wherein said composition contains from about 3 to 10 weight percent bromine.

---

**5,019,606**

## AQUEOUS SOLUTIONS OF POLYAMIDOAMINE-EPICHLOROHYDRIN RESINS, AND PREPARATION AND USE THEREOF

**Manfred Marten, Mainz, and Walter Kamutzki, Dieburg, both of Fed. Rep. of Germany, assignors to Hoechst AG, Fed. Rep. of Germany**
**Filed Jun. 30, 1989, Ser. No. 374,467**
**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1988, 3822490**
**Int. Cl.$^5$ C08K** *63/00*
**U.S. Cl. 523—414** **6 Claims**

1. A process for preparing a stable aqueous resin solution having a pH of not move than 7 and containing as the resin a water-thinnable polyamidoamine-epichlorohydrin resin (A), which comprises reacting watersoluble basic polyamidoamines (B) with epichlorohydrin (C) molar ratio of 0.6 to 2 in an aqueous system and then, optionally after a prior acidification of the reaction system, reacting with a sufficient amount of the base (D) at 25° to 95° C. so that the pH is greater than 8, and subsequently adjusting the pH to not more than 7 by addition of acid.

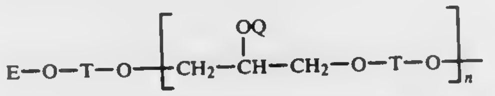
---

**5,019,607**

## MODIFIED EPOXY RESINS AND COMPOSITES

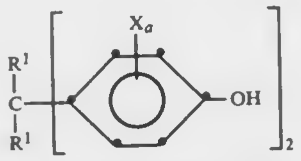
**Bradley K. Coltrain, Fairport; Gary A. Rakes, and Victoria K. Smith, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Filed Nov. 1, 1989, Ser. No. 430,038**
**Int. Cl.$^5$ C08L** *63/02;* **C08K** *5/15, 3/36*
**U.S. Cl. 523—435** **12 Claims**

1. A polyether having the formula:

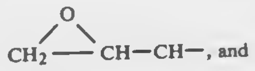


$$E-O-T-O-\left[CH_2-\overset{OQ}{CH}-CH_2-O-T-O\right]_n-$$

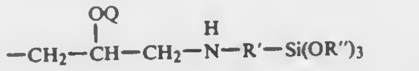
wherein T is a divalent group selected from the class consisting of (i) alkylene radicals having from two to about six carbon atoms, and arylene radicals remaining after removal of the hydroxy groups from a bisphenol having the formula:



wherein each R is independently selected from hydrogen, and alkyl radicals having up to about four carbon atoms, X is selected from halogen and alkyl radicals having from one to four carbon atoms, and "a" is a small whole number having a value from 0 to 4,
E is an end group selected from (ii)

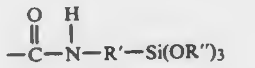


(ii)



$$-CH_2-\overset{OQ}{CH}-CH_2-\overset{H}{N}-R'-Si(OR'')_3 \quad \text{(iii)}$$

wherein R′ is an alkylene group having up to about six carbon atoms and R″ is an alkyl group having up to about six carbon atoms,
Q is selected from hydrogen and an organic group, such that from about 5 to about 95 mole percent of Q is an organic group and the remainder is hydrogen;
said organic group being selected from the class consisting of:



$$-\overset{O}{\overset{\|}{C}}-\overset{H}{N}-R'-Si(OR'')_3 \quad \text{(v)}$$

$$-R'-Si(OR'')_3\text{, and} \quad \text{(vi)}$$

$$-H_2C-CHOH-CH_2-O-R'-Si(OR'')_3 \quad \text{(vii)}$$

wherein R′ and R″ have the same significance as above; and n is a whole number, such that the weight average molecular weight of said polyether is from about 500 to about 75,000.

---

**5,019,608**

## RUBBER-MODIFIED EPOXY ADHESIVE COMPOSITIONS

**Dilipkumar N. Shah, Erie, Pa., assignor to Lord Corporation, Erie, Pa.**
**Continuation-in-part of Ser. No. 79,414, Jul. 30, 1987, Pat. No. 4,803,232. This application Feb. 7, 1989, Ser. No. 307,580**
**The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.**
**Int. Cl.$^5$ C08K** *5/05;* **C08L** *9/02, 63/00, 77/08*
**U.S. Cl. 523—456** **10 Claims**

1. An adhesive composition comprising a Component A comprising
a) about 50 to 95 parts by weight of at least one epoxy resin having more than one epoxy group, and
b) about 5 to 50 parts by weight of acrylate or methacrylate ester of aliphatic polyhydric alcohol and as a curing agent a Component B comprising:
c) about 10 to 95 parts by weight of an amine-terminated butadiene-acrylonitrile rubber;
d) about 5 to 90 parts by weight of at least one polyamidoamine derived from dimerized fatty acids of 12–28 carbon atoms and aliphatic amines, said polyamidoamine having an amine value (mg KOH/gram resin) of at least 500.

8. An adhesive composition according to claim 1 including about 1.0 to 5.0 parts of a polyol per 100 parts of Component A and about 100 to 400 parts of activated silica per 100 parts of polyol.

---

**5,019,609**

## FILMS EASILY SOLUBLE IN COLD WATER

**Shigekazu Toyonishi, and Takashi Nakajima, both of Sakai, Japan, assignors to Aicello Chemical Co., Ltd., Aichi, Japan**
**Continuation-in-part of Ser. No. 227,293, Aug. 2, 1988. This application May 11, 1990, Ser. No. 522,050**
**Int. Cl.$^5$ C08K** *5/20*
**U.S. Cl. 524—35** **8 Claims**

1. A film easily soluble in cold water, comprising a water-soluble copolymer comprising:
2 to 40 mol % allyl ester moieties;
97.5 to 50 mol % vinyl ester moieties; and
0.5 to 10 mol % of at least one member selected from the group consisting of unsaturated monocarboxylic acid, unsaturated dicarboxylic acid and anhydrides thereof;
wherein said copolymer has a degree of saponification of not less than 65 mol %.

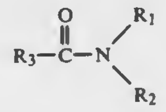
---

**5,019,610**

## PROCESS FOR THE PRODUCTION OF POLYMER-MODIFIED ASPHALTS AND ASPHALTS EMULSIONS

**Gary E. Sitz, Marysville, and Roger K. Chatterjee, Columbus, both of Ohio, assignors to Sherex Chemical Company, Inc., Dublin, Ohio**
**Filed Oct. 18, 1990, Ser. No. 599,700**
**Int. Cl.$^5$ C08F** *45/52*
**U.S. Cl. 524—61** **19 Claims**

1. A polymer-modified asphalt composition, which comprises a mixture of:
(a) a blend of from about 10 to about 75 weight-percent of one or more of a thermoplastic rubber polymer and from about 90 to about 25 weight-percent of one or more of a fatty dialkyl amide having the formula:



wherein:
$R_1$ and $R_2$ are the same or different moieties and are selected from $C_1$–$C_8$ alkyl groups; and
$R_3$ is a $C_6$–$C_{22}$ alkyl group; and
(b) an asphalt cement.

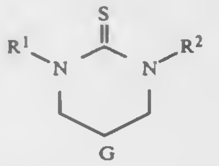
---

**5,019,611**

## NON-STAINING AND SLIGHTLY-STAINING ANTIOZONANTS

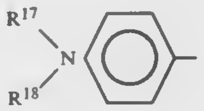
**Kevin L. Rollick, Munroe Falls; James G. Gillick, Akron, and Joseph A. Kuczkowski, Munroe Falls, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Filed Jan. 15, 1987, Ser. No. 3,520**
**Int. Cl.$^5$ C08K** *5/46;* **C07D** *251/00*
**U.S. Cl. 524—83** **28 Claims**

1. A rubber composition comprising a non-halogenated rubber susceptible to ozone degradation and an antiozonant effective amount of a compound represented by the following structural formula:

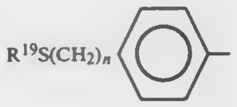


(I)

wherein G is →N—$R^3$;
wherein $R^1$, $R^2$ and $R^3$ are independently selected from the group consisting of
(a) alkyl radicals having 1 to 25 carbon atoms, wherein said alkyl may be substituted by an amino group,
(b) cycloalkyl radicals having 3 to 25 carbon atoms, wherein said cycloalkyl may be substituted by an amino group,
(c) aryl radicals having 6 to 25 carbon atoms; and
(d) radicals selected from the group consisting of those radicals represented by the following structural formulae:

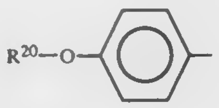


(A)



(B)

and



(C)

wherein $R^{17}$, $R^{18}$, $R^{19}$ and $R^{20}$ are independently selected from the group consisting of hydrogen; alkyl radicals having 1 to 25 carbon atoms; and aryl radicals having 6 to 25 carbon atoms; n is an integer of 1 to 6;
wherein $R^3$ can also be hydrogen;
wherein when a radical from member (a) or (b) is substituted with an amino group, the alpha atom of the radical is free of amino groups.

---

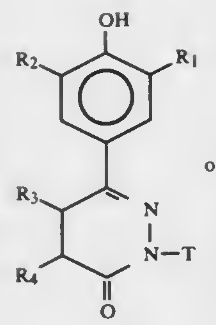
**5,019,612**

## 6-(4-HYDROXYPHENYL)-4,5-DIHYDRO-3(2H)-PYRIDAZINONES AND STABILIZED COMPOSITIONS

**Paul A. Odorisio, Edgewater, N.J., and Stephen D. Pastor, Yonkers, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Division of Ser. No. 915,446, Oct. 6, 1986, Pat. No. 4,888,423. This application Aug. 8, 1989, Ser. No. 391,214**
**Int. Cl.$^5$ C08K** *5/3477*
**U.S. Cl. 524—99** **10 Claims**

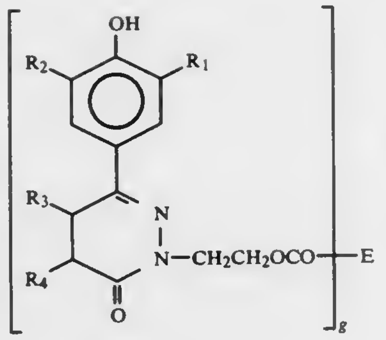
1. A stabilized composition which comprises
(a) A synthetic polymer subject to oxidative, thermal or actinic degradation, and
(b) an effective stabilizing amouunt of a compound of formula Ia or Ib

VOL
126
ISS
4
MY
28
1991
UMI



(Ia)

or



(Ib)

wherein

R₁ is alkyl of 3 to 8 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, phenyl, said phenyl substituted by alkyl of 1 to 18 carbon atoms, aralkyl of 7 to 9 carbon, or said aralkyl substituted by alkyl of 1 to 4 carbon atoms,

$R_2$ is alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, phenyl, said phenyl substituted by alkyl of 1 to 18 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 4 carbon atoms,

$R_3$ and $R_4$ are independently hydrogen or alkyl of 1 to 4 carbon atoms,

g is an integer of 2 to 4,

T has the meaning of $R_2$ or T is hydrogen or alkyl of 1 to 5 carbon atoms substituted by hydroxyl, by halogen, by alkoxy of 1 to 12 carbon atoms, by thioalkyl of 1 to 18 carbon atoms. by carboalkoxy of 2 to 19 carbon atoms or by -OCOG where G is alkyl of 1 to 18 carbon atoms, phenyl, phenyl substitued by alkyl of 1 to 4 carbon atoms, or T is 2-pyridyl, 3-pyridyl or 4-pyridyl, and

when g is 2, E is a direct bond or straight or branched chain alkylene of 2 to 10 carbon atoms, cyclohexylene or arylene of 6 to 10 carbon atoms,

when g is 3, E is propane-1,2,3-triyl, benzene-1,3,5-triyl or benzene-1,2,4-triyl, or

when g is 4, E is butane-1,2,3,4-tetrayl, benzene-1,2,4,5-tetrayl or benzophenone-3,3'4,4'-tetrayl.

---

### 5,019,613
### N-HYDROCARBYLOXY DERIVATIVES OF HINDERED AMINE-SUBSTITUTED S-TRIAZINES

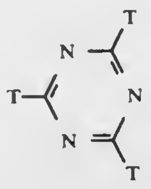
**Ramanathan Ravichandran, Nanuet, and James P. Galbo, Hartsdale, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 326,854, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 479,907**

**Int. Cl.⁵ C08K** *5/3435;* **C07D** *403/00*

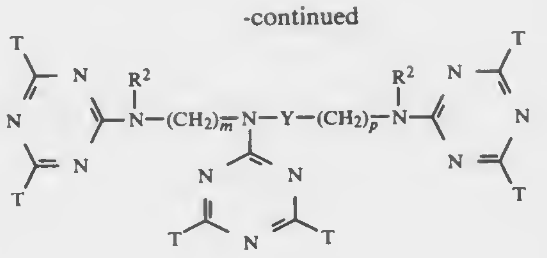
**U.S. Cl. 524—100** **21 Claims**

1. A compound corresponding to the formulae I, II or III

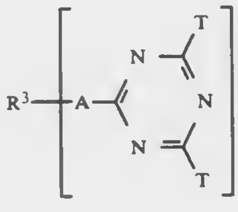


(I)

-continued

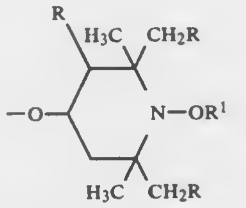


(II)



(III)

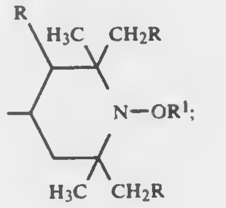
wherein T is



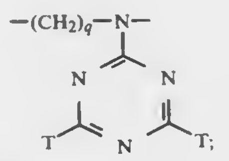
R is hydrogen or methyl;

$R^1$ is $C_1$–$C_{18}$-alkyl, $C_2$–$C_{18}$-alkeny, $C_2$–$C_{18}$-alkynyl, $C_5$–$C_{12}$-cycloalkyl, $C_5$–$C_{12}$-cycloalkenyl, $C_6$–$C_{10}$-bicycloalkyl, $C_6$–$C_{10}$-aryl, $C_7$–$C_{12}$-aralkyl or $C_7$–$C_{12}$-aralkyl substituted by $C_1$–$C_{12}$-alkyl or $C_6$–$C_{10}$aryl;

$R^2$ is hydrogen, $C_1$–$C_{12}$-alkyl or



Y is a direct bond or



m, p and q are independently 2–6;

A is oxygen, sulfur or —N($R^2$)—;

n is 2–4; and

$R^3$ is an n-valent alkane or aryl radical.

---

### 5,019,614
### STABILIZED POLYMERS

**Ebel Klei, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.**

**Filed Mar. 14, 1988, Ser. No. 167,801**

**Claims priority, application United Kingdom, Apr. 22, 1987, 8709488**

**Int. Cl.⁵ C08K** *5/3492*

**U.S. Cl. 524—100** **4 Claims**

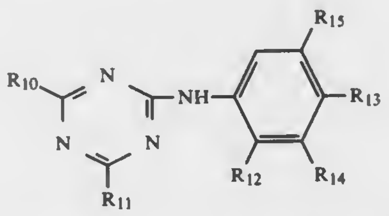
1. A composition stabilized against degradation by exposure to ultra violet light comprising

(a) a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, wherein the polymer is represented by the formula

$$—CO—CH_2—CH_2)]_x[CO—(B)]_y$$

wherein B is the moiety of propylene polymerized through the ethylenic unsaturation and the ratio of y:x is from about 0.01 to about 0.1, and intimately mixed therewith a stabilizing quantity of

(b) an aniline-substituted triazine of the formula



wherein $R_{10}$ and $R_{11}$ independently are alkyl of up to 14 carbon atoms inclusive or alkylthio of up to 14 carbon atoms inclusive, $R_{12}$ and $R_{13}$ independently are hydrogen or hydroxyl with the proviso that at least one of $R_{12}$ and $R_{13}$ is hydroxyl, $R_{14}$ and $R_{15}$ independently are hydrogen or alkyl of up to 6 carbon atoms with the proviso that at least $R_{14}$ is alkyl if $R_{12}$ is hydroxyl and at least one of $R_{14}$ and $R_{15}$ are alkyl if $R_{13}$ is hydroxyl.

---

### 5,019,615
### POLYPHENYLENE ETHER/POLYESTER BLEND WITH NITRODIAMINE COMPOUND

**Yukio Mizuno, Ehime; Takashi Maruyama, Shinichi, and Shinichi Yachigo, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan**

**Filed Apr. 5, 1990, Ser. No. 504,808**

**Claims priority, application Japan, Apr. 6, 1989, 88361**

**Int. Cl.⁵ C08K** *5/3462, 5/32*

**U.S. Cl. 524—100** **10 Claims**

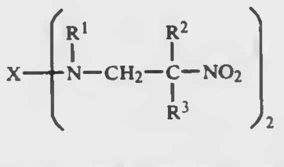
1. A resin composition which comprises:

100 parts by weight of a composition comprising

(A) 5–95% by weight of a polyphenylene ether resin and

(B) 95–5% by weight of a thermoplastic polyester and

0.01–10 parts by weight, based on said composition comprising (A) and (B), of (D) a compound comprising a dinitrodiamine represented by the formula (I):



$$X—\left(N(R^1)—CH_2—C(R^2)(R^3)—NO_2\right)_2 \quad (I)$$

wherein X represents a divalent chain aliphatic, cycloaliphatic or aromatic group which may contain halogen or oxygen, $R^1$ represents a hydrogen atom, a chain aliphatic group, a cycloaliphatic group or an aromatic group and when X and $R^1$ are both chain aliphatic groups, the nitrogen atoms may further link through $R^1$ to each other, $R^2$ and $R^3$ each independently represents a hydrogen atom or an alkyl group of 1–12 carbon atoms and $R^2$ and $R^3$ may link to each other to form a ring.

---

### 5,019,616
### COMPOSITION COMPRISING A POLYPHENYLENE-ETHER-CONTAINING POLYMERIC COMPONENT AND REINFORCING FIBERS

**Roger W. Avakian, Dalton; Popkin Shenian, Pittsfield, both of Mass., and Jan Bussink, Bergen Op Zoom, Netherlands, assignors to General Electric Company, Pittsfield, Mass.**

**Filed May 16, 1989, Ser. No. 353,785**

**Int. Cl.⁵ C08K** *5/521;* **C08L** *73/00*

**U.S. Cl. 524—141** **11 Claims**

1. A composition having improved long term heat aging, comprising a polyphenylene ether (PPE)-containing polymeric component, reinforcing fibers having a length of at from 4 to 30 mm, and a polyethyl oxazoline binder, the polymeric component containing more than 75% by weight of substantially pure PPE.

---

### 5,019,617
### RUBBER COMPOSITIONS CONTAINING CARBON BLACKS OF SPECIFIED PHYSICAL CHARACTERISTICS

**Hiroyuki Kaidoo, Yokohama, and Takao Muraki, Hiratsuka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Japan**

**Continuation of Ser. No. 281,738, Dec. 9, 1988, abandoned. This application Sep. 21, 1989, Ser. No. 412,533**

**Claims priority, application Japan, Dec. 9, 1987, 62-309469**

**Int. Cl.⁵ C08K** *3/04*

**U.S. Cl. 524—346** **4 Claims**

1. A rubber composition comprising:

(a) 100 parts by weight of a starting rubber;

(b) 0.5 to 5 parts by weight of a resorcinol, a precondensate thereof or a combination thereof;

(c) 1 to 5 parts by weight of a hexamethoxymethylmelamine; and

(d) 50 to 70 parts by weight of a carbon black having an $N_2SA$ of 90 to 100 $m^2/g$ as defined by nitrogen adsorption surface area, a DBP of 60 to 70 ml/100 g as defined by dibutyl phthalate adsorption and a ΔDst of 50 to 60 mμ as defined by the Dst mode of diameter, whereby the composition has an E' of not less than 6.0 MPa as defined by dynamic modulus and determined at an initial strain of 10% and subsequently at a dynamic strain of 2%, at a frequency of 20 Hz and at a temperature of 20° C.

---

### 5,019,618
### SPRAY DRIED PHENOL-FORMALDEHYDE RESIN COMPOSITIONS

**Shui-Tung Chiu, Coquitlam, Canada, assignor to Borden, Inc., Columbus, Ohio**

**Division of Ser. No. 385,571, Jul. 26, 1989, Pat. No. 4,950,433. This application Jun. 4, 1990, Ser. No. 532,439**

**Int. Cl.⁵ C08K** *3/38*

**U.S. Cl. 524—405** **9 Claims**

1. A curable powdered phenol-aldehyde resole resin prepared by spray drying an aqueous phenol-aldehyde resole resin containing a water soluble oxo boron compound in an amount sufficient to improve the spray dryability of the resin.

VOL
1126
ISS
4
MY
28
1991
UMI

**5,019,619**

### SINGLE-COMPONENT SEALING SUBSTANCES

**Franz-Josef Bergmann, Laudenbach; Lothar Hockenberger, Ludwigshafen, and Waltraut Schadt, Lampertheim, all of Fed. Rep. of Germany, assignors to Ruetgerswerke Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 27, 1989, Ser. No. 315,794**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809104**

**Int. Cl.$^5$ C08K** *3/22;* **C08L** *27/12*

**U.S. Cl. 524—405** **8 Claims**

1. A single-component, humidity-curing caulking and sealing composition comprising at least one mercapto-terminated polymer or oligomer or mixture thereof and as a latent hardener, an effective amount of an alkali perborate monohydrate to harden said mixed composition, as an accelerator, an effective amount of barium oxide or strontium oxide, at least one filler and at least one plasticizer for said composition, said filler and plasticizer being selected such that an aqueous slurry or aqueous extract thereof is neutral or alkaline, the heavy-metal content for the total composition being less than 0.01%, and the composition being substantially free of water.

---

**5,019,620**

### ELASTIC CROSSLINKED METATHESIS POLYMER COMPOSITION

**Zenichiro Endo, and Shigeyoshi Hara, both of Iwakuni, Japan, assignors to Hercules Incorporated, Wilmington, Del.**

**Filed Sep. 27, 1990, Ser. No. 589,292**

**Claims priority, application Japan, Oct. 3, 1989, 1-257193**

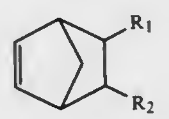
**Int. Cl.$^5$ C08K** *5/01*

**U.S. Cl. 524—485** **18 Claims**

1. A rubber-like crosslinked molded polymer article that comprises

(a) a metathesis polymer consisting essentially of

(i) 95–20 mol % of recurring units derived from at least one norbornene derivative expressed by the formula



wherein $R_1$ and $R_2$ are, independently, groups selected from hydrogen atoms, halogen atoms, and hydrocarbon groups having a carbon number of 3 or less and optionally containing halogen-substitution and wherein $R_1$ is bonded to the ring by a single or a double bond, and

(ii) 5–80 mol % of recurring units derived from at least one cycloolefin having two strained cycloolefin groups and having a metathesis polymerizability comparable to that of the norbornene derivative of (i); and

(b) at least one high-boiling liquid hydrocarbon or partially halogenated liquid hydrocarbon in an amount sufficient to plasticize said polymer and lower its apparent glass transition point to or below normal room temperature.

---

**5,019,621**

### ACRYLATE COPOLYMER ADDITIVES FOR AQUEOUS ANIONIC PAINT SYSTEMS

**Harald Rauch-Puntigam; Werner Staritzbichler, both of Graz, and Peter Morre, Feldkirchen, all of Austria, assignors to Vianova Kunstharz, A.G., Werndorf, Austria**

**Filed Sep. 28, 1989, Ser. No. 413,717**

**Claims priority, application Austria, Sep. 28, 1988, 2388/88**

**Int. Cl.$^5$ C08L** *35/06, 33/08, 67/02*

**U.S. Cl. 524—513** **6 Claims**

1. An aqueous anionic paint system comprising a water-thinnable binder resin carrying carboxyl groups and an acrylic copolymer additive containing hydroxyl groups prepared by solvent polymerization in a water-miscible or water-tolerating solvent from

(A) to 15% by weight of(meth)acrylic acid and/or maleic acid and/or its semiesters with alkanols having 1 to 14 carbon atoms.

(B) 5 to 50% by weight of hydroxyethyl (meth)acrylate and/or hydroxypropyl(meth)acrylate,

(C) 25 to 90% by weight of alkyl (meth)acrylates having an alkyl chain of from 1 to 12 carbon atoms, and

(D) up to 10% by weight of styrene,

the percentages of the components (A) to (D) totaling 100, said copolymers having an acid value of 15 to 170 mg KOH/g and a hydroxyl value of 15 to 250 mg KOH/g, and wherein the carboxyl groups of said copolymer are neutralized to at least 50% with an organic base in an amount of from 0.1 to 2.0% by weight. calculated on solids and based on the solids content of the total binder in the paint.

---

**5,019,622**

### ROSIN MODIFIED STYRENE ACRYLIC RESIN

**Roger E. Burke, Murfreesboro, and James G. Spruill, Colerain, both of N.C., assignors to Resinall Corporation, Stamford, Conn.**

**Filed Jan. 19, 1989, Ser. No. 300,274**

**Int. Cl.$^5$ C08G** *63/48;* **C04F** *277/00*

**U.S. Cl. 524—532** **19 Claims**

1. A rosin modified styrene acrylic copolymer resin comprising the heat reaction product of a solution polymerized styrene acrylic copolymer and rosin; and a solvent.

---

**5,019,623**

### PROCESS FOR PRODUCING GRAFTED ALKYD RESIN

**Mashide Amemoto; Hikaru Watanabe, both of Kumatori, and Akio Shoji, Kishiwada, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan**

**Division of Ser. No. 104,950, Oct. 6, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 385,396**

**Claims priority, application Japan, Oct. 8, 1986, 61-238014; Mar. 12, 1987, 62-55318**

**Int. Cl.$^5$ C08G** *63/91*

**U.S. Cl. 525—7.3** **10 Claims**

1. A grafted alkyd resin produced by graft-copolymerizing an alkyd resin with 0.01 to 5% by weight of at least one vinyl monomer selected from the group consisting of N,N-dialkylaminoalkyl (meth)acrylate, N,N-dialkylaminoalkyl (meth)acrylamide, (meth)acrylamide, N-methylol (meth)acrylamide, N,N-dialkyl (meth)acrylamide, diacetone (meth)acrylamide, N-vinylmorpholine, N-alkaoxymethyl (meth)acrylamide, N-vinylpyrrolidone, N,N-dialkylaminoalkyl malemide, vinylimidazole and phosphorous-containing vinyl monomers, and not more than 5.0% by weight of at least one vinyl monomer other than said nitrogen- and phosphorous-containing vinyl monomers.

---

**5,019,624**

### POLYVINYL ACETALS AND THEIR USE

**Matthias Gutweiler, Taunusstein; Robert K. Driscoll, Frankfurt am Main, and Ernst I. Leupold, Neu-Anspach, all of Fed. Rep. of Germany, assignors to Hoechst AG, Fed. Rep. of Germany**

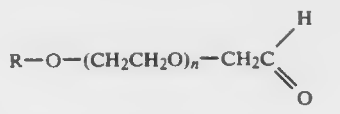
**Filed Apr. 23, 1990, Ser. No. 512,992**

**Claims priority, application Fed. Rep. of Germany, Apr. 25, 1989, 3913572**

**Int. Cl.$^5$ C08F** *8/00*

**U.S. Cl. 525—61** **9 Claims**

1. An acetal of polyvinyl alcohol, which contains acetal groups which are derived from aldehydes of the formula (I)



$$R{-}O{-}(CH_2CH_2O)_n{-}CH_2C(H){=}O \qquad (I)$$

in which n is an integer and R a linear or branched alkyl radical having 1 to 20 carbon atoms or a cycloalkyl radical or an aryl radical.

---

**5,019,625**

### COMPATIBILIZING AGENT FOR POLYCARBONATE AND POLYAMIDE POLYMER BLENDS

**Peter J. Perron, and Edward A. Bourbonais, both of Arlington, Tex., assignors to Dexter Corporation, Windsor Lock, Conn.**

**Division of Ser. No. 95,497, Sep. 10, 1987, Pat. No. 4,782,114, which is a continuation-in-part of Ser. No. 915,239, Oct. 3, 1986, abandoned. This application Oct. 6, 1988, Ser. No. 254,542**

**Int. Cl.$^5$ C08L** *77/12, 69/00, 75/04. 23/10*

**U.S. Cl. 525—66** **23 Claims**

1. A polymeric compatibilizing agent for blends of polycarbonate and polyamide resins, which comprises:

from about 10 to about 90 weight percent of a linear segmented thermoplastic elastomer having an ester segment and a hard segment of a semi-crystalline, partially aromatic polyamide based on diphenyl methane diisocyanate;

from about 90 to about 10 weight percent of an impact modifying agent comprising a maleic anhydride grafted polymer or polymeric blend to improve the low temperature impact resistance of the resin blend; and

from 0 to about 80 percent of an alloying agent of a thermoplastic resin;

wherein the melting or softening point of said compatibilizing agent is no greater than the melting or softening points of the resin constituents of the blend.

14. A polymeric compatibilizing agent for blends of a polycarbonate resin and a second, different polymer resin comprising:

from about 10 to about 90 weight percent of a compatibilizing compound of a linear segmented thermoplastic elastomer having an ester segment and a hard segment of a semi-crystalline, partially aromatic polyamide, based on diphenyl methane diisocyanate;

from about 90 to about 10 weight percent of an impact modifying agent comprising at least one polymer which is compatible with one of said polycarbonate resin and said second polymer resin to improve the low temperature impact resistance of the resin blend; and

an alloying agent of a thermoplastic resin in an amount sufficient to improve one or more other properties of the resin blend but less than about 80 weight percent, said alloying agent comprising an acrylonitrile-butadiene-styrene terpolymer, a styrene-maleic anhydride copolymer, a polyester elastomer, a methacrylate-butadiene-styrene terpolymer, polymethylmethacrylate, nitrile rubber, an ionomer of polyethylene, a polyether block amide, a polyphenylene oxide polymer or mixtures thereof;

wherein the melting or softening point of said compatibilizing agent is no greater than the melting or softening points of the polycarbonate and other polymer and resin constituents of the blend.

---

**5,019,626**

### THERMOPLASTIC MOLDING MATERIALS BASED ON POLYPHENYLENE ETHERS AND NYLONS

**Christof Taubitz, Wachenheim; Hermann Gausepohl, Mutterstadt; Erhard Seiler, Ludwigshafen; Klaus Boehlke, Hessheim, and Walter Heckmann, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Feb. 26, 1988, Ser. No. 161,135**

**Claims priority, application Fed. Rep. of Germany, Mar. 11, 1987, 3707796.1**

**Int. Cl.$^5$ C08L** *35/06, 71/04, 77/02, 77/06*

**U.S. Cl. 525—92** **3 Claims**

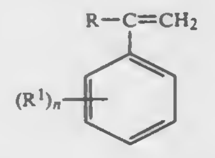
1. A thermoplastic molding material comprising as essential components:

A) 5 to 92% by weight of a polyphenylene ether which contains from 0 to 50% by weight of a styrene polymer which differs from component C);

B) 5 to 92% by weight of a nylon;

C) 3 to 50% by weight of a copolymer which does not form a separate phase and which is composed of

$C_1$) 97 to 99.9% by weight of at least one monomer selected from the group consisting of styrene and substituted styrene compounds of the formula I:



(I)

where R is hydrogen, alkyl of 1 to 8 carbon atoms or halogen, $R^1$ is alkyl of 1 to 8 carbon atoms or halogen and n is 0, 1, 2 or 3,

$C_2$) 0.1 to 3% by weight of a half ester of an $\alpha,\beta$-unsaturated dicarboxylic acid, and

$C_3$) 0 to 10% by weight of additional, nonionic comonomers; and

D) 0 to 35% by weight of a rubber impact modifier.

---

**5,019,627**

### INJECTION-MOLDING POLYOLEFIN COMPOSITION

**Shiro Honma, Ohtake; Kenichi Tominari, Iwakuni, and Masayoshi Kurisu, Ohtake, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 163,816, Feb. 23, 1988, abandoned. This application Dec. 11, 1989, Ser. No. 449,327**

**Claims priority, application Japan, Jul. 4, 1986, 61-156168**

**Int. Cl.$^5$ C08L** *23/04. 23/06*

**U.S. Cl. 525—240** **6 Claims**

1. An injection-molding polyethylene composition characterized in that

(1) it comprises an ultrahigh-molecular-weight polyethylene having an intrinsic viscosity, measured in decalin solvent at 135° C., of 10 to 40 dl/g and a low-molecular-weight or high-molecular-weight polyethylene having an intrinsic viscosity, measured in decalin solvent at 135° C., of 0.1 to 5 dl/g,

(2) the proportion of the ultrahigh-molecular-weight polyethylene is in the range of 15–40% by weight based on the total weight of the ultrahigh-molecular-weight polyethylene,

(3) it has an intrinsic viscosity $\{\eta\}_c$, measured in decalin solvent at 135° C., of 4.0 to less than 10 dl/g,

(4) it has a melting torque T of not more than 4.5 kg-cm, and

(5) it is produced by a multistep polymerization process which comprises polymerizing ethylene in at least one polymerization step to form an ultrahigh-molecular-weight polyethylene having an intrinsic viscosity of 10 to 40 dl/g and polymerizing ethylene in another polymerization step in the presence of hydrogen to form a low-molecular-weight of high-molecular-weight polyethylene

VOL
1126
ISS
4
MY
28
1991
UMI

having an intrinsic viscosity of 0.1 to 5 dl/g, both in the presence of a Ziegler-type catalyst formed from (A) a highly active titanium catalyst component containing magnesium, titanium and halogen as essential ingredients and (B) an organoaluminum compound catalyst component.

---

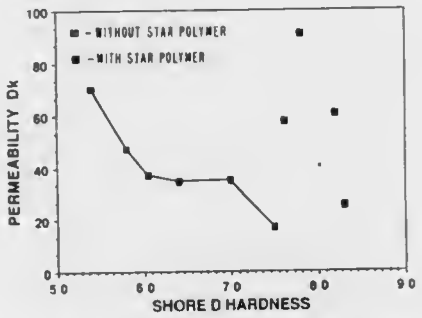
### 5,019,628
## SILICONE CONTAINING ACRYLIC STAR POLYMERS

**Harry J. Spinelli, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 10, 1990, Ser. No. 507,277**

**Int. Cl.$^5$ C08F** *275/00*

**U.S. Cl. 525—288** **11 Claims**



1. A novel silicone-containing acrylic star polymer comprised of a crosslinked core derived from one or more (meth)acrylate monomers and attached to the core at least 5 linear copolymeric arms, each with an unattached free end, which arms are derived from one or more (meth)acrylate monomers, wherein about 5 to 100% by weight of the (meth)acrylate monomers from which the arms are derived are in the form of a block consisting essentially of one or more monofunctional monomeric polysiloxanylalkyl ester units.

---

### 5,019,629
## POLYMERIZABLE STYRYLOXY RESINS AND COMPOSITIONS THEREOF

**John Woods, Dublin, Ireland; John Rooney, Basking Ridge, N.J., and Pauline Coakley, Dublin, Ireland, assignors to Loctite Corporation, Newington, Conn.**

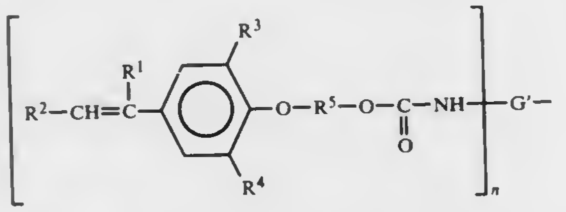
**Filed Nov. 6, 1989, Ser. No. 432,934**

**Claims priority, application Ireland, Nov. 10, 1988, 3380/88**

**Int. Cl.$^5$ C08F** *261/06*

**U.S. Cl. 525—312** **9 Claims**

1. Cationically polymerisable styryloxy resins having urethane linkages, represented by the formula III:



III

wherein

- $R^1$ and $R^2$ are H, or one of $R^1$ and $R^2$ is H and the other is methyl;
- $R^2$ and $R^4$, are H, lower alkyl, or alkoxy if $R^2$ is not methyl;
- $R^5$ is a divalent hydrocarbon radical;
- $G^1$ is the residue of an n-valent isocyanate propolymer prepared by reaction of hydroxyl terminated hydrocarbon polymer halohydrocarbon selected from the goups consisting of a diene homopolymers and copolymers with an aromatic or aliphatic diisocyanate, said prepolymer being free of amino, aliphatic thiol, aliphatic hydroxyl or other groups which interfere with cationic polymerisation;

and n is an integer of 2 or more.

---

### 5,019,630
## RUBBERY COPOLYMER, PROCESS FOR PRODUCTION THEREOF, AND VULCANIZABLE ELASTOMER COMPOSITION

**Takeshi Chida, Kokubunji; Mitsuyoshi Aonuma, Tokyo; Akio Maeda, Kawasaki; Yukihiko Morozumi, Kamakura, all of Japan, and Tetsu Ohishi, South Glamorgan, United Kingdom, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Filed Oct. 24, 1989, Ser. No. 426,038**

**Claims priority, application Japan, Oct. 27, 1988, 63-271393; Jun. 26, 1989, 1-163597**

**Int. Cl.$^5$ C08F** *14/18*

**U.S. Cl. 525—326.2** **11 Claims**

1. A rubbery linear copolymer comprising
- (A) 5 to 95% by weight of structural units formed by the free radical initiated ring opening polymerization of a 1,1-dicyano-2-vinylchloropropane, and
- (B) 95 to 5% by weight of structural units formed from the free radical initiated ring opening polymerization of a 1,1-difluoro-2-vinylcyclopropane, said copolymer having a weight average molecular weight, calculated for standard polystyrene, of 2,000 to 2,000,000;

or said linear copolymer in which a portion of the olefinic unsaturated groups contained in the structural units (A) and (B) are hydrogenated.

---

### 5,019,631
## ALKYLENE OXIDE MODIFIED POLY(2,6-DIMETHYL-P-OXYPHENYLENE)

**Otello Farias, Rome; Alberto Gandini; Raffaella Monga, both of Milan; Arnaldo Roggero, San Donato Milanese; Raffaello Sisto, and Claudio Valentini, both of Rome, all of Italy, assignors to Eniricerche S.p.A., Milan, Italy**

**Filed Aug. 21, 1989, Ser. No. 396,944**

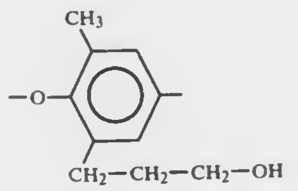
**Claims priority, application Italy, Sep. 9, 1988, 21875 A/88**

**Int. Cl.$^5$ C08G** *65/48*

**U.S. Cl. 525—396** **7 Claims**

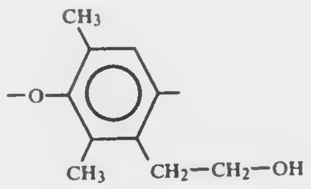
1. An amorphous modified poly (2,6-dimethyl-p-oxyphenylene) with a glass transition temperature of from 180° to 220° C. wherein on the average from 10 to 60% of said amorphous modified poly (2,6-dimethyl-p-oxyphenylene) comprise:

(a)



or

(b)



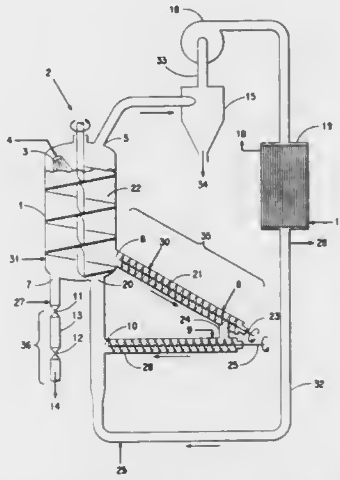
### 5,019,632
## POLYMERIZATION OF FLUOROOLEFINS IN PRESENCE OF NON-VOLATILE POLYMERIC SEED

**Edgar W. Slocum, Wilmington, Del.; Aquiles C. Sobrero, Parkersburg, W. Va., and Robert C. Wheland, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 166,484, Mar. 10, 1988, Pat. No. 4,861,845. This application Aug. 28, 1989, Ser. No. 399,656**

**Int. Cl.$^5$ C08F** *2/34, 14/18*

**U.S. Cl. 526—68** **19 Claims**



1. In a free-radical initiated process for preparing fluorinated polymers wherein at least one gaseous fluoroolefin is polymerized in a stirred polymerizer, the improvement comprising preparing a non-volatile polymeric seed in a reaction zone separate from the polymerizer by decomposing initiator in the presence of fluoromonomer to form oligomeric free radicals and condensing said radicals onto previously prepared polymer; and conveying said non-volatile seed to the polymerizer.

---

### 5,019,633
## CATALYST COMPOSITION FOR POLYMERIZING ETHYLENE

**Burkhard E. Wagner, Highland Park; George L. Goeke; Frederick J. Karol, both of Belle Mead, all of N.J., and Kathleen F. George, Crosslanes, W. Va., assignors to Technology Corporation, Danbury, Conn.**

**Continuation of Ser. No. 464,566, Feb. 7, 1983, abandoned, which is a division of Ser. No. 219,877, Dec. 24, 1980, Pat. No. 4,379,758. This application Jun. 29, 1987, Ser. No. 68,756**

**Int. Cl.$^5$ C08F** *4/651, 4/654, 10/02*

**U.S. Cl. 526—125** **1 Claim**

1. A continuous catalytic process for producing ethylene homopolymers, or copolymers containing at least 97 mol percent of ethylene and no more than 3 mol percent of one or more alpha olefins containing from 3 to 8 carbon atoms,
- said polymers being produced in granular form and having a density of from 0.94 g/cm$^3$ to 0.97 g/cm$^3$, and a melt flow ratio of from 22 to 32,
- which comprises contacting ethylene, or a mixture of ethylene and at least one alpha olefin containing from 3 to 8 carbon atoms, at a temperature of from 90° C. to 115° C. and a pressure no greater than 1000 psi, in a gas phase reaction zone, with particles of a catalyst system comprising a precursor composition having the formula

$$Mg_mTiX_p[ED]_q$$

wherein
X is Cl,
ED is tetrahydrofuran,
m is 1.5 to 5,
p is 6 to 14, and
q is 3 to 10,

said precursor composition being impregnated in silica, and said silica contains from 3 percent by weight to 50 percent by weight of the precursor composition and from 0.1 mol to 3 mols of boron trichloride per mol of tetrahydrofuran in said precursor composition,

and said precursor composition being completely activated with from 10 mols to 400 mols of an activator compound having the formula

$$Al(R'')_dX''_eH_f$$

wherein X'' is Cl or OR''', R'' and R''' are the same or different and are saturated hydrocarbon radicals containing from 1 to 14 carbon atoms, e is 0 to 1.5, f is 1 or 0 and $d+e+f=3$.

---

### 5,019,634
## GROUP TRANSFER LIVING POLYMER GRAFTED TO AN INITIATOR SUPPORT

**Fritz P. Boettcher, Newark; Ira B. Dicker; Richard C. Ebersole, both of Wilmington, all of Del., and Walter R. Hertler, Kennett Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 156,008, Feb. 16, 1988, abandoned. This application Oct. 6, 1989, Ser. No. 418,371**

**Int. Cl.$^5$ C08F** *20/12, 4/16, 20/34*

**U.S. Cl. 526—262** **6 Claims**

1. "Living" polymer comprising at least three monomer repeat units of one or more acrylic or maleimide monomers grafted to a solid support and containing at least one Group Transfer Polymerization initiating site.

---

### 5,019,635
## COPOLYMERS OF DIOXOLANES AND MALEIC ANHYDRIDE

**Richard W. Blevins, Rochester, and S. Richard Turner, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 23, 1990, Ser. No. 498,178**

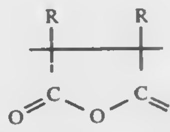
**Int. Cl.$^5$ C08F** *24/00*

**U.S. Cl. 526—266** **8 Claims**

1. A copolymer having the alternating structure

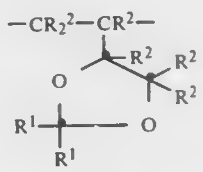
$$—A—D—A—D—A—D— \qquad (I)$$

wherein A is a monomeric unit having the formula



(II)

wherein each R is independently selected from the class consisting of hydrogen, halogen, the cyano group, and primary and secondary alkyl groups having up to about 4 carbon atoms, and D is a monomeric unit having the formula



(III)

wherein each $R^1$ taken independently is an alkyl or aryl group having up to about 10 carbon atoms, or taken together are a divalent alkylene or arylene group having up to about 20

VOL
1126
ISS
4
MY
28
1991
UMI

carbon atoms; each group indicated by $R^2$ is hydrogen or an alkyl group having one to about four carbon atoms such that the total of the number of carbon atoms in said $R^2$ groups, and the carbon atoms to which they are attached is up to about 8.

---

### 5,019,636

### POLYESTER CHAIN-EXTENDED VINYL ETHER URETHANE OLIGOMERS

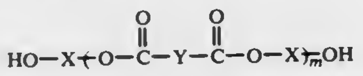
**Stephen C. Lapin, Wauconda, and James R. Snyder, Chicago, both of Ill., assignors to Allied-Signal Inc., Morris County, N.J.**

**Filed May 10, 1989, Ser. No. 350,068**

**Int. Cl.⁵ C08L** *29/10;* **C08G** *18/67*

**U.S. Cl. 526—301** **37 Claims**

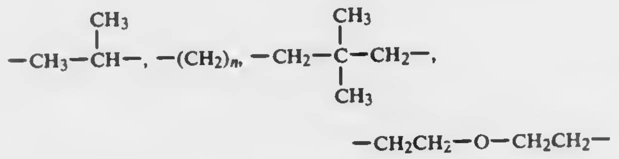
1. A vinyl ether urethane oligomer consisting essentially of the reaction product of (a) an hydroxyl-terminated polyester having the formula



$$\mathrm{HO{-}X\!\left(O{-}\overset{O}{\overset{\|}{C}}{-}Y{-}\overset{O}{\overset{\|}{C}}{-}O{-}X\right)_{m}OH}$$

where

X is a divalent radical selected from the group consisting of



$$-\mathrm{CH_3{-}\overset{CH_3}{\overset{|}{CH}}{-}},\ -(\mathrm{CH_2})_n,\ -\mathrm{CH_2{-}\overset{CH_3}{\underset{CH_3}{C}}{-}CH_2{-}},\quad -\mathrm{CH_2CH_2{-}O{-}CH_2CH_2{-}}$$

where n is an integer from 2 to 6

Y is a divalent radical selected from the group consisting of

$-(\mathrm{CH_2})_n-$

where

n is 2,3,4 and 1,2, 1,3, or 1,4 phenylene groups

m has an average value of 1 to about 100

and (b) a diisocyanate having the formula

OCN—Q—NCO

where

Q is selected from the group consisting of divalent radicals derived from toluene, 4,4′-diphenylmethane, tetramethyl xylene, isophorone, and 4,4′-dicyclohexylmethane and n-hexane

or a polyisocyanate having a functionality of 2 or more

and (c) a hydroxy monovinyl ether having the formula

$R'CH''{=}CR''O{-}Z{-}OH$

where

R′ and R″ are monovalent radicals selected from the group consisting of H and alkyl groups having 1–10 carbon atoms

Z is selected from the group consisting of divalent radicals derived from butane diol, 1,4-bis(methyl)cyclohexane diol, ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, and tripropylene glycol.

---

### 5,019,637

### ORGANOPOLYSILOXANE UREA DERIVATIVES AND ORGANOPOLYSILOXANE THIOUREA DERIVATIVES, METHODS OF THEIR PREPARATION AND USE

**Peter Panster, Im Lochseif 8, D-6458 Rodenbach, and Ulrich Deschler, Birkenweg 1, D-6450 Hanau 9, both of Fed. Rep. of Germany**

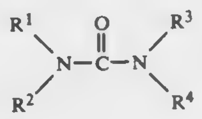
**Filed Nov. 3, 1989, Ser. No. 431,219**

**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1988, 3837415**

**Int. Cl.⁵ C08G** *77/04*

**U.S. Cl. 528—25** **15 Claims**

1. A solid polymer selected from the group consisting of an organopolysiloxane urea derivative and an organopolysiloxane thiourea derivative, said polymer constructed of recurring units of the formula:

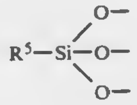


(1)

wherein

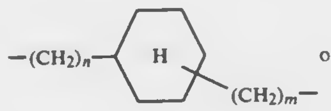
X stands for O or S and

$R^1$ is:

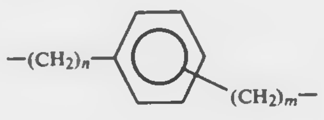


(2)

in which $R^5$ is alkylene with 1 to 10 C atoms or cycloalkylene with 5 to 8 C atoms or a group of the formula:



or

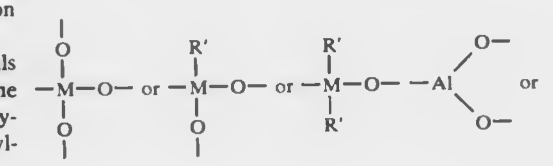


n=1–6 (on the nitrogen)

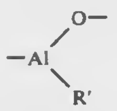
m=0–6 (on the silicon),

wherein $R^2$ has the same meaning as $R^1$ or stands for H, $R^3$ and $R^4$ have the same meaning as $R^1$ or stand for H or linear or branched alkyl with 1 to 5 C atoms and can be identical or different, and wherein always at least two but at the most three groups according to formula 2 are bound to the units according to formula 1 and the free valences of the oxygen atoms bound to the silicon atom are saturated as in silica skeletons defined by (a) silicon atoms of further groups of formula 2 (b) or via the metal atoms in one or more cross-linking bridge members; or by mixtures of (a) and (b), wherein the cross-linking bridge member is represented by the formula:

(3)



-continued



in which M is silicon, titanium or zirconium and R′ phenyl or a linear or branched alkyl with 1 to 5 C atoms and the ratio of the silicon atoms from the groups of the formula 2 to the metal atoms in the bridge members according to formula 3 is 1:0 to 1:10.

---

### 5,019,638

### RAPIDLY SETTING, MOISTURE-CURABLE HOT MELT ADHESIVES AND THEIR USE

**Hartmut Müller, Troisdorf, and Klaus Brüning, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany**

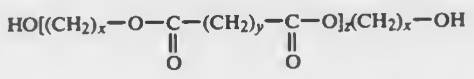
**Filed Jul. 24, 1989, Ser. No. 384,406**

**Claims priority, application Fed. Rep. of Germany, Aug. 11, 1988, 3827224**

**Int. Cl.⁵ C09G** *18/32*

**U.S. Cl. 528—83** **10 Claims**

1. A hot melt adhesive consisting essentially of the reaction product of a polyisocyanate and a hydroxypolyester, where said hydroxypolyester is a partially crystalline polyester containing exclusively aliphatic dicarboxylic acids of the formula



$$\mathrm{HO[(CH_2)_x{-}O{-}\underset{O}{\underset{\|}{C}}{-}(CH_2)_y{-}\underset{O}{\underset{\|}{C}}{-}O]_z(CH_2)_x{-}OH}$$

in which $x+y=12$ to 26 and $z=3$ to 50, and the ratio of OH groups to NCO groups is from 1:1.2 to 1:3.0.

---

### 5,019,639

### NOVEL EPOXY RESINS

**Arnold Hofer, Muttenz, and Alex Wegmann, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Apr. 2, 1990, Ser. No. 503,399**

**Claims priority, application Switzerland, Apr. 7, 1987, 1318/89**

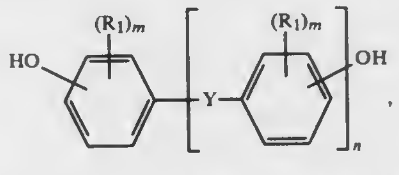
**Int. Cl.⁵ C08G** *59/02*

**U.S. Cl. 528—94** **11 Claims**

1. An epoxy resin which is obtainable by an advancement reaction comprising the steps:

(a) reacting a liquid or semi-solid aromatic epoxy resin containing on average more than one epoxy group per molecule with about 2 to 30 equivalent percent, based on the amount of epoxy equivalents of the epoxy resin to be advanced, of an aliphatic diol, in the presence of a catalytic amount of a cyclic quaternary ammonium compound, and

(b) reacting the product obtained in step (a) with about 30 to 95 equivalent percent, based on the epoxy resin to be advanced, of a bisphenol of formula I



(I)

wherein m is 0, 1 or 2, n is 0 or preferably 1, $R_1$ is $C_1$–$C_8$alkyl, chloro or, preferably, bromo, and Y is a direct C—C bond or is a radical selected from the group consisting of —CH₂—, —CHCH₃—, —C(CH₃)₂—, —O—, —S— and —SO₂—.

---

### 5,019,640

### PRODUCING A POLYETHYLENE TEREPHTHALATE BASED POLYMER FROM A LOWER DIALKYL ESTER OF A DICARBOXYLIC ACID AND A GLYCOL

**Monika Engel-Badar, Charlotte, N.C., and Bobby N. Furr, Fort Mill, S.C., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

**Continuation-in-part of Ser. No. 425,540, Oct. 23, 1989, abandoned. This application Jan. 8, 1990, Ser. No. 461,878**

**Int. Cl.⁵ C08G** *63/83*

**U.S. Cl. 528—272** **19 Claims**

1. A process for producing a polythylene terephthalate based polyester polymer from a lower dialkyl ester of a dicarboxylic acid and glycol comprising the steps of:

(a) reacting a lower dialkyl ester of a dicarboxylic acid with glycol by an ester interchange reaction at a mole ratio of between about 1.4/1 to about 2.5/1 at a suitable temperature and pressure, and in the presence of an effective amount of manganese and lithium catalyst sufficient to increase the ester interchange rate, avoid side reactions, and avoid color degradation, to yield alcohol and monomer;

(b) removing said alcohol during said ester interchange to increase the yield of said monomer;

(c) reducing the pressure to a vacuum pressure sufficient to initiate polycondensation; and

(d)polymerizing said monomer by a polycondensation reaction at a suitable temperature and pressure, and in the presence of an effective amount of an antimony catalyst, and adding during late states of or after said reducing the pressure step, and effective amount of dicarboxylic acid sufficient to increase the rate of polycondensation to produce polyester.

---

### 5,019,641

### POLYAMIDE FROM 1,3 PROPYLENE DIAMINE AND ISOPHTHALIC ACID COMPOUND

**Donald C. Clagett, and Sheldon J. Shafer, both of Pittsfield, Mass., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Jun. 6, 1990, Ser. No. 533,969**

**Int: Cl.⁵ C08G** *69/26*

**U.S. Cl. 528—347** **14 Claims**

1. A process for the preparation of a polyamide by reacting at least one diaryl ester of a dicarboxylic acid with a diamine component said process comprising:

(a) preparing a mixture of (i) at least one diaryl ester of a dicarboxylic acid having at least 6 carbon atoms and a diamine component, said diamine component including an amount of 1,3-diaminopropane, said ester having a melting point below about 145° C.;

(b) heating said mixture to an initial reaction temperature above the melting point of said diarylester and below the boiling point of said 1,3-diaminopropane for reacting said 1,3-diaminopropane with said ester to form oligomers;

(c) heating said mixture to a final reaction temperature above 145° C.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,642
## NOVEL DIAMINE COMPOUNDS, PRODUCTION OF THE SAME AND POLYAMIDEIMIDE RESINS PRODUCED THEREFROM

**Takeshi Hashimoto, Shizuoka, Japan, assignor to Tomoegawa Paper Co., Ltd., Tokyo, Japan**

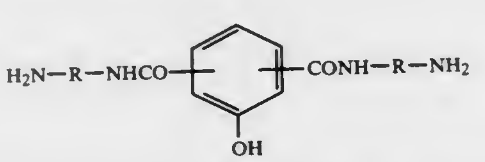
**Filed Mar. 12, 1990, Ser. No. 491,988**

**Claims priority, application Japan, Mar. 10, 1989, 1-56192; Apr. 13, 1989, 1-91892; May 12, 1989, 1-117556; Jun. 30, 1989, 1-166580**

**Int. Cl.⁵ C08G** *73/14, 65/38, 69/26;* **C07C** *255/00*

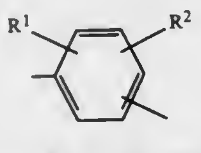
**U.S. Cl. 528—353** **3 Claims**

1. A diamine compound represented by general formula (I) below:



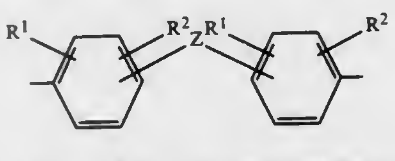
(I)

wherein R is a $C_1$-$C_{12}$ alkylene group which is unsubstituted or substituted, a group of formula (II)



(II)

where $R^1$ and $R^2$, which are the same or different, each represents a hydrogen atom, a lower alkyl group, a halogen atom, a nitrile group, a nitro group, an alkoxy group or a hydroxyl group, or a group of formula (III)



(III)

where $R^1$ and $R^2$ have the same meanings as defined above; and

Z is a simple chemical bond, —O—, >C═O, $—CH_2—$, —S—, —SO—, or $—SO_2—$.

---

### 5,019,643
## PROCESS FOR CONDENSING AT LEAST ONE EPOXIDE ON AT LEAST ONE CYCLIC ANHYDRIDE IN THE PRESENCE OF A CATALYST CONSISTING OF AT LEAST ONE TITANIUM COMPLEX

**Valérie Bagrel, Fontenay-aux-Roses; Jacques Garapon, Lyons; Rémi Touet, Saint Egreve; Catherine Huet, Chalon sur Saone, and Bernard Damin, Oullins, all of France, assignors to Institut Francais du Petrole, Rueil Malmaison; L'Air Liquide Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude, Paris and ELF France, Courbevoie, all of, France**

**Filed Mar. 12, 1990, Ser. No. 492,042**

**Claims priority, application France, Mar. 10, 1989, 89 03139**

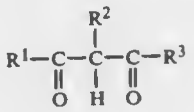
**Int. Cl.⁵ C08G** *63/42*

**U.S. Cl. 528—361** **19 Claims**

1. A process for condensing at least one aliphatic epoxide with at least 8 atoms of carbon in its molecule on at least one cyclic anhydride of a dicarboxylic acid in the presence of a catalyst consisting essentially of at least one titanium complex of the general formula (I):

$$Ti(OR)_2(L)_2 \qquad (I)$$

in which each R group independently represents a hydrocarbon group with 1 to 10 atoms of carbon and each L group independently represents a ligand of the general formula (II):



$$R^1-\underset{\underset{O}{\|}}{C}-\overset{\overset{R^2}{|}}{\underset{\underset{H}{|}}{C}}-\underset{\underset{O}{\|}}{C}-R^3 \qquad (II)$$

in which:

$R^1$ and $R^2$ represent each, independently from one another, an atom of hydrogen, a hydrocarbon group with 1 to 10 atoms of carbon, substituted or not by at least one hetero-atom or by at least one hetero-atomic group.

$R^3$ represents an atom of hydrogen, a hydrocarbon group with 1 to 10 atoms of carbon, or a group of the general formula $—O—R^4$ in which $R^4$ represents a hydrocarbon group with 1 to 24 atoms of carbon.

---

### 5,019,644
## PHOTOCURABLE DIORGANOPOLYSILOXANES CONTAINING THIOALKYL (METH) ACRYLATE FUNCTIONAL GROUPS

**Jacques Cavezzan, Villeurbanne, and Edith Cavinenc, Lyons, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France**

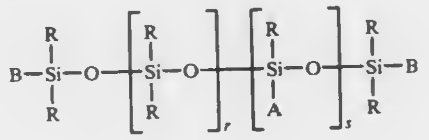
**Filed Jul. 28, 1989, Ser. No. 386,268**

**Claims priority, application France, Jul. 29, 1988, 88 10532**

**Int. Cl.⁵ B32B** *9/04*

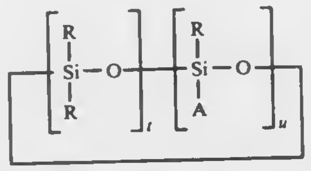
**U.S. Cl. 428—447** **12 Claims**

1. A diorganopolysiloxane comprising pendant thioalkyl (meth)acrylate functional groups and having one of the following formulae (1) or (2):



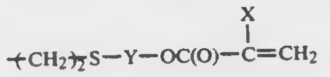
(1)

or

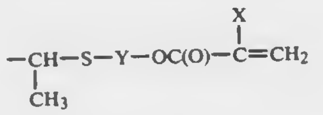


(2)

in which the symbols R, which may be identical or different, are each a $C_1$–$C_{10}$ alkyl, vinyl, phenyl or 3,3,3-trifluoropropyl radical, at least 80% of the number of the radicals R being methyl radicals; the radicals B, which may be identical or different, are each a radical R or a radical A defined below; r is an integer ranging from 0 to 200; s is an integer ranging from 0 to 50, with the proviso that, if s is 0, at least one of the two symbols B is A; u is an integer ranging from 1 to 20; t is an integer ranging from 0 to 20; t+u is equal to or greater than 3; and the symbol A is a radical having one of the formulae:



$$-(CH_2)_2-S-Y-OC(O)-\overset{\overset{X}{|}}{C}=CH_2 \qquad (3)$$

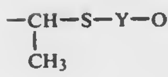


$$-\underset{\underset{CH_3}{|}}{CH}-S-Y-OC(O)-\overset{\overset{X}{|}}{C}=CH_2 \qquad (4)$$

$$-(CH_2)_2-S-Y-OH \qquad (5)$$

-continued

or



$$-\underset{\underset{CH_3}{|}}{CH}-S-Y-OH \qquad (6)$$

wherein X is a hydrogen atom or a methyl radical, at least one of the radicals A has the formula (3) or (4), and Y is a linear or branched chain divalent saturated aliphatic hydrocarbon radical containing from 2 to 10 carbon atoms.

---

### 5,019,645
## PROCESS OF REDUCING STEREOREGULAR CHARACTER OF CARBON MONOXIDE/OLEFIN COPOLYMER WITH ORGANIC BASE

**Pui K. Wong, Katy, Tex., and Eit Drent, Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed May 7, 1990, Ser. No. 520,303**

**Claims priority, application Netherlands, Jul. 26, 1989, 8901928**

**Int. Cl.⁵ C08G** *67/02*

**U.S. Cl. 528—488** **13 Claims**

1. A process for the reduction of stereoregular character of a predominantly stereoregular linear alternating polymer of carbon monoxide and an aliphatic α-olefin of at least 3 carbon atoms by contacting the stereoregular polymer with an organic base at elevated temperature.

---

### 5,019,646
## POLYPEPTIDES WITH FIBRONECTIN ACTIVITY

**Leo T. Furcht, and James B. McCarthy, both of Minneapolis, Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 89,073, Aug. 25, 1987, Pat. No. 4,839,464. This application Jul. 27, 1988, Ser. No. 225,045**

**Int. Cl.⁵ C07K** *7/06, 7/08*

**U.S. Cl. 530—326** **1 Claim**

1. A polypeptide of the formula selected from the group consisting of:

lys-asn-asn-gln-lys-ser-glu-pro-leu-ile-gly-arg-lys-lys-thr,
leu-ile-gly-arg-lys-lys-thr,
tyr-arg-val-arg-val-thr-pro-lys-glu-lys-thr-gly-pro-met-lys-glu,
ser-pro-pro-arg-arg-ala-arg-val-thr,
trp-gln-pro-pro-arg-ala-arg-ile, and mixtures thereof.

---

### 5,019,647
## GASTRIN RELEASING PEPTIDE ANTAGONIST

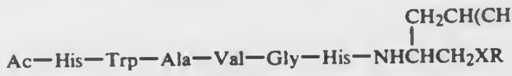
**Mark W. Riemen, Doylestown; Allen I. Oliff, Gwynedd Valley; Walfred S. Saari, Lansdale, all of Pa., and David C. Heimbrook, Ringoes, N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed May 24, 1988, Ser. No. 197,872**

**Int. Cl.⁵ C07K** *7/06, 7/30;* **A61K** *37/43*

**U.S. Cl. 530—329** **10 Claims**

1. A compound of the formula



$$Ac-His-Trp-Ala-Val-Gly-His-NH\overset{\overset{CH_2CH(CH_3)_2}{|}}{CH}CH_2XR$$

wherein Ac is acetyl, X is 0, S or N—H, R is hydrogen or an alkyl radical of 1–6 carbon atoms, or an alkyl radical of 1–6 carbon atoms containing an aromatic radical in which optically active carbon atoms are in the S configuration, wherein both the alkyl and aromatic radicals are substituted with alkyl of from 1 to 3 carbon atoms, hydroxy, alkoxy of from 1 to 3 carbon atoms, halogen, trifluoromethyl and wherein any one optically active amino acid may be substituted by its D-isomer, and glycine may be substituted by Ala or D-Ala.

---

### 5,019,648
## MONOCLONAL ANTIBODY SPECIFIC FOR THE ADHESION FUNCTION DOMAIN OF A PHAGOCYTE CELL SURFACE PROTEIN

**Stuart F. Schlossman, Newton Centre, and James D. Griffin, Sherborn, both of Mass., assignors to Dana-Farber Cancer Institute, Boston, Mass.**

**Continuation-in-part of Ser. No. 70,257, Jul. 6, 1987, abandoned. This application Mar. 7, 1988, Ser. No. 165,024**

**Int. Cl.⁵ A01K** *39/395*

**U.S. Cl. 530—387** **9 Claims**

1. A monoclonal antibody which binds specifically to the epitope defined by the MY904 antibody, wherein said binding inhibits only the adhesion-dependent functions of granulocytes and monocytes without binding the iC3b component of complement, and wherein the antibody does not bind human T and B lymphocytes, said MY904 antibody being the antibody produced by the hybridoma having ATCC accession number HB9510.

---

### 5,019,649
## METHOD FOR OBTAINING BIOLOGICALLY ACTIVE MUCOPOLYSACCHARIDES OF HIGH PURITY, BY CONTROLLED DEPOLYMERIZATION OF HEPARIN

**Jean-Claude Lormeau, Maromme; Maurice Petitou, and Jean Choay, both of Paris, all of France, assignors to Choay S.A., Paris Cedex, France**

**Continuation of Ser. No. 780,729, Sep. 27, 1985, abandoned, which is a continuation of Ser. No. 448,639, Dec. 10, 1982, abandoned. This application Oct. 19, 1987, Ser. No. 111,087**

**Claims priority, application France, Apr. 10, 1981, 81 07283**

**Int. Cl.⁵ C08B** *37/10*

**U.S. Cl. 536—21** **4 Claims**

1. In a self-regulated process for depolymerizing a heparin in an aqueous solution by providing about 0.02 to 0.1M nitrous acid and a pH of about 2 to 3 in said solution, so that an endpoint of said depolymerization process occurs when all the nitrous acid has been consumed and mucopolysaccharides are produced from said heparin having an average molecular weight of less than 6,000 daltons, the improvement in said process which comprises said aqueous solution containing about 8 to 12 weight percent of said heparin.

---

### 5,019,650
## 4-ARYL-4-PIPERIDINE (OR PYRROLIDINE OR HEXAHYDROAZEPINE) CARBINOLS AND HETEROCYCLIC ANALOGS THEREOF

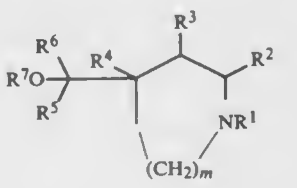
**Engelbert Ciganek, Kennett Square, Pa., and Leonard Cook, Newark, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 174,356, Mar. 28, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 398,999**

**Int. Cl.⁵ C07D** *223/07*

**U.S. Cl. 540—609** **19 Claims**

1. A compound having the formula:



(I)

wherein

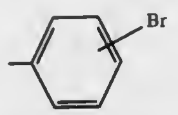
(1) when m is 2 and $R^6$ is other than H, then $R^1$ independently is $CH_3$, $C_2H_5$, n-$C_3H_7$, or allyl;

$R^2$ and $R^3$ independently are H or alkyl of 1–4 carbon atoms; or $R^1$ and $R^2$ taken together is a branched or unbranched alkylene bridge wherein the bridge is of 3 or 4 carbon atoms; or $R^2$ and $R^3$ taken together is a branched or un-

VOL
1126
ISS
4
MY
28
1991
UMI

branched alkylene bridge wherein the bridge is of 3 to 6 carbon atoms;

$R^4$ is:



(a)

(b) 1-naphthyl optionally substituted with one or two substituents, the same or different, selected from F, Cl, Br, perfluoroalkyl, alkylthio, alkoxy, phenoxy, alkyl, alkyl- or dialkylamino, said alkyl in the alkyl-containing groups being 1–12 carbon atoms.

(c) 3-pyrrolyl optionally substituted with one to three alkyl groups of 1–4 carbon atoms,

(d) 2-, or 3-thienyl optionally substituted with Cl, Br, or alkyl of 1–4 carbon atoms, provided when 2-thienyl is substituted with alkyl it is other than the 5-position, or

(e) 2-, or 3-benzothienyl or benzofuryl optionally substituted on the aromatic ring with Cl, Br or $CF_3$;

$R^5$ independently is alkyl of 1–4 carbon atoms or when taken together with $R^6$ is a branched or unbranched alkylene bridge of 3–11 carbon atoms;

$R^6$ independently is alkyl of 1–4 carbon atoms, or when taken together with $R^5$ is a branched or unbranched alkylene bridge of 3–11 carbon atoms;

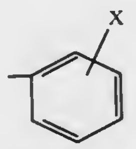
$R^7$ is H, alkyl of 1–4 carbon atoms, alkanoyl, or $—CH_2$ phenyl; and

(2) when m is 1 or 3, or when $R^6$ is H and m is 2; then $R^1$ independently is $CH_3$, $C_2H_5$, n-$C_3H_7$, or allyl;

$R^2$ and $R^3$ independently are H or alkyl of 1–4 carbon atoms; or $R^1$ and $R^2$ taken together is a branched or unbranched alkylene bridge wherein the bridge is of 3 or 4 carbon atoms; or $R^2$ and $R^3$ taken together is a branched or unbranched alkylene bridge where the bridge is of 3 to 6 carbon atoms;

$R^4$ is:

(a) phenyl or



where X is one or two substituents the same or different selected from F, Cl, Br, perfluoroalkyl, alkyl, alkyl- or dialkylamino, alkylthio, alkoxy or phenoxy, said alkyl in the alkyl-containing groups being of 1 to 12 carbon atoms;

(b) 2-, 3-, or 4-biphenyl where either or both aromatic groups are substituted with 1 or 2 substituents, the same or different selected from F, Cl, alkyl, perfluoroalkyl, alkoxy, aryloxy, alkylthio, arylthio, perfluoroalkoxy, perfluoroalkylthio and dialkylamine, amino, said alkyl and alkoxy groups being of 1–12 carbon atoms and said aryl groups being of 6–12 carbon atoms;

(c) 1- or 2-naphthyl optionally having one or two X substituents as defined in (a) above;

(d) 2-, 3-, or 4-pyridyl, or 2-, or 3-pyrrolyl optionally substituted with one to three alkyl groups of 1–4 carbon atoms;

(e) 2- or 3-thienyl optionally substituted with one substituent selected from Cl, Br, or alkyl of 1–4 carbon atoms; or

(f) 2- or 3-benzothienyl or benzofuryl optionally substituted on the aromatic ring with Cl, Br, or $CF_3$;

$R^5$ independently is alkyl of 1–4 carbon atoms, or when taken together with $R^6$ is a branched or unbranched alkylene bridge of 3–11 carbon atoms;

$R^6$ independently is H, alkyl of 1–4 carbon atoms, or when taken together with $R^5$ is a branched or unbranched alkylene bridge of 3–11 carbon atoms;

$R^7$ is H, alkyl of 1–4 carbon atoms, alkanoyl, or $—CH_2$ phenyl; or

a pharmaceutically suitable salt or N-oxide thereof, provided that when $R^6$ is H, $R^1$ is methyl and m is 2, then $R^4$ is other than $C_6H_5$, 2-$MeOC_6H_4$, 2,3-$(MeO)_2C_6H_3$ and pharmaceutically suitable salts or N-oxides thereof.

**16**. The compound of claim **1** which is 4-(3'-chlorophenyl)-α,1-dimethyl-2,3,4,5,6,7-hexahydro-1H-azepine-1-methanol, or a pharmaceutically suitable salt thereof.

---

### 5,019,651

### PROCESS FOR PREPARING 4-AMINO-1-HYDROXYBUTYLIDENE-1,1-BISPHOSPHONIC ACID (ABP) OR SALTS THEREOF

**Gerard R. Kieczykowski, Westfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.**

**Filed Jun. 20, 1990, Ser. No. 540,997**

**Int. Cl.⁵ C07F** *9/38*

**U.S. Cl. 562—13** **10 Claims**

1. A process for the preparation of 4-amino-1-hydroxybutylidene-1,1-bisphosphonic acid or salts thereof which comprises:

(a) reacting 4-aminobutyric acid with a mixture of phosphorous acid and $PCl_3$ in the presence of methanesulfonic acid;

(b) contacting the resulting mixture from Step (a) with an aqueous hydrolysis mixture, wherein the pH is maintained the range at 4 to 10 during the contacting; and

(c) recovering said 4-amino-1-hydroxybutylidene-1,1-bisphosphonic acid or salts thereof.

---

### 5,019,652

### CATALYSTS AND METHOD

**Charles E. Taylor, and Richard P. Noceti, both of Pittsburgh, Pa., assignors to The United States as represented by the United States Department of Energy, Washington, D.C.**

**Filed Apr. 30, 1990, Ser. No. 516,611**

**Int. Cl.⁵ C07C** *51/215*

**U.S. Cl. 562—549** **10 Claims**

1. A catalytic method for the production of monochloromethane with recoverable concentrations of formic acid in aqueous solution but with limited polychloromethane production comprising:

providing an oxyhydrochlorination catalyst including a pyrogenic support material, a first layer of catalyst including a metal chloride deposited on the support material, said metal chloride selected from the group consisting of chlorides of cobalt, lead, silver and nickel, and a second layer of catalyst including an alkali metal chloride and permissibly a rare earth chloride deposited on the support;

contacting the catalyst with a reactant gas mixture containing methane, HCl and oxygen at reaction conditions to produce a normalized carbon-product distribution of at least 20 mole % formic acid and monochloromethane in excess of the total polychloromethane production.

---

### 5,019,653

### PURIFICATION OF POLYAMINES DERIVED FROM POLYHYDROXYL COMPOUNDS

**George P. Speranza, Austin, and Donald H. Champion, Pflugerville, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.**

**Filed May 14, 1990, Ser. No. 522,942**

**Int. Cl.⁵ C07C** *209/00*

**U.S. Cl. 564—497** **20 Claims**

1. A method for the purification of polyamines which comprises contacting said polyamines with a treating agent selected from the group consisting of oxides, hydroxides or alkoxides of elements from the group consisting of silicon or Group IIA, IIIA, IIB, IIIB, IVB or VB (CAS designation) of the Periodic Table at a temperature of about 150° C. to 250° C. and a pressure of subatmospheric to 10 atmospheres for a period of time sufficient to lower the impurity level of said materials in the amines.

---

### 5,019,654

### FLUORINATED TERTIARY BUTYLAMINES

**Bernd Baasner; Hermann Hagemann, both of Leverkusen, and Michael Schwamborn, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

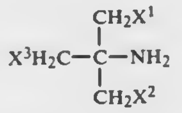
**Filed Mar. 19, 1987, Ser. No. 27,705**

**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611195**

**Int. Cl.⁵ C07C** *211/07*

**U.S. Cl. 564—510** **4 Claims**

1. A fluorinated tertiary butylamine of the formula



$$\begin{array}{c} CH_2X^1 \\ | \\ X^3H_2C—C—NH_2 \\ | \\ CH_2X^2 \end{array}$$

in which the radicals $X^1$ to $X^3$ each independently represent hydrogen or fluorine, but at least one of the radicals $X^1$ to $X^3$ must represent fluorine.

---

### 5,019,655

### METHOD OF PREPARING 4-DICHLOROPHENYL-1-TETRALONES

**Guy P. Adrian, Givors, France, assignor to Delalande S.A., Courbevoie, France**

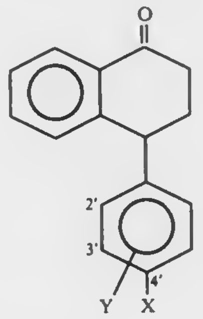
**Filed Jun. 8, 1989, Ser. No. 363,252**

**Claims priority, application France, Jun. 8, 1988, 88 07641**

**Int. Cl.⁵ C07C** *45/45*

**U.S. Cl. 568—322** **12 Claims**

1. A method of preparing 4-dichlorophenyl-1-tetralones having the formula (I)



(I)

wherein:

—X and Y each represent a chlorine atom, and Y is situated in position 2' or 3',

said method comprising the step of reacting α-naphthol with ortho-dichlorobenzene or meta-dichlorobenzene, in the presence of an acid agent.

---

### 5,019,656

### PROCESS FOR PREPARING P-HYDROXYBENZYL ALCOHOL

**Hiroshi Iwane; Takahiro Sugawara, and Naoki Suzuki, all of Ami, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan**

**Filed Feb. 27, 1990, Ser. No. 485,482**

**Claims priority, application Japan, Mar. 4, 1989, 1-52608; Jul. 11, 1989, 1-178241; Dec. 6, 1989, 1-315159**

**Int. Cl.⁵ C07C** *37/20, 39/10*

**U.S. Cl. 568—764** **13 Claims**

1. A process for preparing p-hydroxybenzyl alcohol or a derivative thereof comprising reacting a phenol selected from phenol, a 2-substituted phenol, a 3-substituted phenol, a 2,3-disubstituted phenol, a 2,5-disubstituted phenol, a 3,5-disubstituted phenol, and a 2,3,5-trisubstituted phenol and a formaldehyde source selected from formalin, paraformaldehyde, a hemiformal of a lower alcohol, and a hemiformal of a polyhydric alcohol having from 2 to 5 carbon atoms in the presence of basic catalyst, wherein the reaction is carried out in an alcoholic organic solvent in the presence of a crown ether having ability of including metallic cations in the ring thereof.

---

### 5,019,657

### PROCESS FOR THE PREPARATION OF HALOPHENOLS

**Michel Gubelmann, Lyon, and Philippe-jean Tirel, Oullins, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France**

**Filed May 2, 1989, Ser. No. 346,529**

**Claims priority, application France, May 2, 1988, 88 05848**

**Int. Cl.⁵ C07C** *39/24*

**U.S. Cl. 568—774** **13 Claims**

1. A process for the preparation of a halophenol, comprising the step of bringing a halobenzene and nitrous oxide into contact on an acidified zeolites having a $SiO_2/Al_2O_3$ ratio greater than 90:1 for a time sufficient to form said halophenol.

---

### 5,019,658

### SEPARATION OF PURE OPTICAL STEREOISOMERS BY PRESSURE CRYSTALLIZATION

**Robert P. Cahn, Millburn, N.J., assignor to Kobe Steel Limited, Kobe, Japan**

**Filed Oct. 23, 1989, Ser. No. 424,948**

**Int. Cl.⁵ C07C** *35/12, 29/78*

**U.S. Cl. 568—829** **13 Claims**

1. A process for separating an optical isomer from a mixed isomer feed, comprising melting the racemic mixture at a temperature below its thermal decomposition temperature, adjusting the temperature of the melted mixture to a temperature close to its atmospheric pressure melting point, subjecting the mixture to increasing pressure, resulting in an increase in the melting point of the mixture, maintaining said pressure below the point where spontaneous crystallization of the mixture would occur, seeding said mixture with crystals of the desired optical isomer, and recovering the crystals of the desired optical isomer from the mother liquor by liquid/solid separation.

---

### 5,019,659

### METHOD OF SEPARATING 2-NITROSOPHENOL ISOMER FROM ADMIXTURE WITH 4-NITROSOPHENOL ISOMER

**James A. Manner, Monroeville, and Charles H. Hoelscber, Murrysville, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 383,121, Jul. 20, 1989, abandoned. This application Aug. 17, 1990, Ser. No. 569,115**

**Int. Cl.⁵ C07C** *207/00*

**U.S. Cl. 568—949** **8 Claims**

1. A process for separating 2-nitrosophenol from an isomeric mixture containing 2-nitrosophenol and 4-nitrosophenol by contacting the mixture with an organic solvent cabable of preferentialy solubilizing the 2-isomer, said solvent selected from acetone, acetonitrile, chlorobenzene, chloroform, butyl chloride, ethyl acetate, methylethyl ketone, tetrahydrofuran, 2-pentanone, toluene or mixtures thereof, said solvent being used in sufficient quantity and for a time sufficient to preferentially dissolve 2-nitrosophenol from the isomeric mixture.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,660
### DIAMONDOID POLYMERIC COMPOSITIONS

**Orville L. Chapman, Los Angeles, Calif., and D. Duayne Whitehurst, Titusville, N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Filed Jan. 30, 1990, Ser. No. 472,530**
**Int. Cl.$^5$ C07C** *13/615*

**U.S. Cl. 585—22** **31 Claims**

1. A polymer comprising at least one monomer having the structure of one selected from the group consisting of diamantane, triamantane and the higher adamantalogs, said monomer being bonded through at least one double bond extending through a methylene position of said monomer.

---

### 5,019,661
### HYDROISOMERISATION PROCESS

**Thomas Mole, Surrey Hills, Australia, assignor to Commonwealth Scientific and Industrial Research Organisation and Broken Hill Proprietary Company Limited, both of Melbourne, Australia**

**Continuation-in-part of Ser. No. 143,645, Nov. 13, 1988, abandoned. This application Jun. 1, 1989, Ser. No. 360,183**
**Claims priority, application Australia, Jan. 15, 1987, PH9877**
**Int. Cl.$^5$ C07C** *5/13*

**U.S. Cl. 585—253** **11 Claims**

1. A single stage shape selective process for the hydroisomerization of a branched olefin of at least four carbon atoms to produce a less branched alkane, said process comprising contacting the olefin and a hydrogen containing gas with a catalyst consisting essentially of a shape selective zeolite and at least one metal of the platinum group primarily supported within the molecular channels and cavities of said zeolite, said zeolite being an aluminosilicate, a metallosilicate, or an aluminosilicate containing framework atoms other than silicon or aluminum, said process being conducted under conditions in which hydroisomerization predominates over both simple hydrogenation and cracking.

---

### 5,019,662
### PROCESS FOR THE PRODUCTION OF WHITE OIL FROM HEAVY AROMATIC ALKYLATE

**Bipin V. Vora, Darien, and Dusan J. Engel, Des Plaines, both of Ill., assignors to UOP, Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 195,913, May 19, 1988, abandoned. This application Feb. 23, 1990, Ser. No. 484,027**
**Int. Cl.$^5$ C10G** *23/00;* **C07C** *1/00*

**U.S. Cl. 585—323** **15 Claims**

1. In a process for the production of detergent alkylate wherein a dehydrogenation feed stream comprising linear paraffin hydrocarbons is dehydrogenated in a dehydrogenation zone and selectively hydrogenated in a selective hydrogenation zone to produce a first alkylation feed stream comprising linear mono-olefinic hydrocarbons and linear dienes which is alkylated in an alkylation zone with a second alkylation feed stream comprising aromatic-hydrocarbons to produce an alkylation zone effluent stream, the improvement comprising:

(a) fractionating the alkylation zone effluent stream to produce a light alkylate stream comprising linear mono-alkyl aromatic hydrocarbons and comprising substantially no di-alkyl aromatic hydrocarbons and a heavy alkylate stream comprising linear di-alkyl aromatics as a major component;
(b) passing substantially all of the heavy alkylate stream to an aromatics saturating zone where substantially all of the aromatic-hydrocarbons in the heavy alkylate stream are saturated to produce a saturation zone effluent stream but where essentially no hydrocracking, desulfurizing, or dentrifying takes place; and
(c) fractionating the aromatic-saturation zone effluent to produce one or more white oil streams.

---

### 5,019,663
### HEAT BALANCED PARAFFIN UPGRADING WITH CO-FED OXYGENATE

**Tai-Sheng Chou, Pennington, and Melcon G. Melconian, Princeton, both of N.J., assignors to Mobil Oil Corp., Fairfax, Va.**

**Filed Apr. 3, 1989, Ser. No. 332,185**
**Int. Cl.$^5$ C07C** *15/00*

**U.S. Cl. 585—415** **20 Claims**

1. A process for catalytically upgrading a feedstream containing $C_2$–$C_4$ paraffins comprising the steps of:

(a) maintaining a metal-containing zeolite catalyst within a reaction zone;
(b) charging said feedstream containing $C_2$–$C_4$ paraffins to said reaction zone under conversion conditions sufficient to convert at least a portion of said $C_2$–$C_4$ paraffins to aromatics; and
(c) cofeeding to said reaction zone an organic oxygenate at a flowrate such that the exothermic reaction of said organic oxygenate provides at least a portion of the endothermic heat of reaction for the conversion of said $C_2$–$C_4$ paraffins.

---

### 5,019,664
### PROCESS FOR THE CONVERSION OF PARAFFINS TO OLEFINS AND/OR AROMATICS AND LOW ACIDITY ZEOLITE CATALYST THEREFOR

**Kenneth J. Del Rossi, Mantua; Ralph M. Dessau, Edison, both of N.J.; Albin Huss, Jr., Chadds Ford, Pa.; Garry W. Kirker, Washington Township, Gloucester County, N.J.; David O. Marler, Deptford, N.J., and Randall D. Partridge, W. Trenton, N.J., assignors to Mobil Oil Corp., Fairfax, Va.**

**Continuation-in-part of Ser. No. 254,524, Oct. 6, 1988, which is a continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Jan. 24, 1990, Ser. No. 469,648**
**The portion of the term of this patent subsequent to Jan. 1, 2008, has been disclaimed.**
**Int. Cl.$^5$ C07C** *12/02*

**U.S. Cl. 585—419** **19 Claims**

1. A process for producing an olefin and/or aromatic compound which comprises contacting under suitable conversion conditions a feedstock containing a substantial amount of at least one $C_2$–$C_{12}$ aliphatic hydrocarbon with a conversion catalyst comprising a Group VIII metal species-containing, low acidity synthetic porous crystalline material characterized by an X-ray diffraction pattern including values substantially as set forth in Table I of the specification and an Alpha Value of not greater than about 150.

---

### 5,019,665
### SHAPE-SELECTIVE PROCESS FOR CONCENTRATING DIAMONDOID-CONTAINING HYDROCARBON SOLVENTS

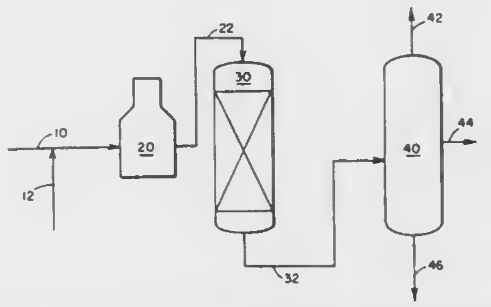
**Randall D. Partridge, W. Trenton, and D. Duayne Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corp., Fairfax, Va.**

**Filed Apr. 18, 1990, Ser. No. 510,772**
**Int. Cl.$^5$ C07C** *7/00*

**U.S. Cl. 585—803** **15 Claims**

1. A method for concentrating diamondoid compounds in a solvent comprising the steps of:

(a) providing a solvent mixture containing at least 20% by weight of normal or slightly branched paraffins having from 5 to 30 carbon atoms with at least one diamondoid compound dissolved therein;
(b) contacting said solvent mixture of step (a) with a shape-selective catalyst under conversion conditions to convert at least a portion of said normal or slightly branched paraffins to lower boiling aliphatics and to prevent conversion of more than about 10% by weight of said diamondoid compounds; and



(c) separating said lower boiling aliphatics from said solvent mixture to yield a concentrated solvent mixture enriched in said diamondoid compound.

---

### 5,019,666
### NON-POROUS POLYCARBONATE MEMBRANES FOR SEPARATION OF AROMATICS FROM SATURATES

**Guido Sartori; W. S. Winston Ho, both of Annandale; David W. Savage, Lebanon; Robert E. Noone, Neshanic Station, and Robert P. Mastondrea, Hackettstown, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Continuation-in-part of Ser. No. 228,075, Aug. 4, 1988, abandoned, and a continuation-in-part of Ser. No. 228,076, Aug. 4, 1988, abandoned. This application Mar. 9, 1990, Ser. No. 491,013**
**Int. Cl.$^5$ C07C** *7/144*

**U.S. Cl. 585—819** **18 Claims**

1. A method for separating mixtures of aromatics and non-aromatics into aromatic-enriched and non-aromatic-enriched streams comprising:

(a) contacting said aromatics/non-aromatics mixture with one side of a non-porous polycarbonate membrane, and
(b) selectively permeating the aromatic components of the mixture through the membrane.

---

### 5,019,667
### PROCESS FOR PURIFICATION OF HYDROCARBONS

**Chien C. Chao, Millwood, N.Y., and Henry Rastelli, New Fairfield, Conn., assignors to UOP, Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 206,280, Jun. 14, 1988, Pat. No. 4,935,580. This application Apr. 16, 1990, Ser. No. 509,651**
**Int. Cl.$^5$ B01D** *53/04;* **C07C** *7/13;* **C01C** *1/12*

**U.S. Cl. 585—820** **18 Claims**

1. A process for separating a minor proportion of ammonia from a hydrocarbon having a kinetic diameter of not more than about 5 Å, which process comprises contacting a feedstream comprising ammonia and the hydrocarbon with clinoptilolite that has been subjected to ion-exchange with at least one metal cation of the group consisting of lithium, sodium, potassium, calcium, magnesium, barium and strontium, zinc, copper, cobalt, iron and manganese cations to an extent sufficient to cause the ammonia to be selectively adsorbed into the clinoptilolite and withdrawing a product stream at least partially depleted in ammonia relative to the feedstream.

---

### 5,019,668
### RECOVERY OF CAROTENOIDS

**Ooi C. Keat, Butterworth; Choo Y. May, and Augustine O. S. Hock, both of Kuala Lumpur, all of Malaysia, assignors to Palm Oil Research & Development Board, Selangor, Malaysia**

**Filed Jun. 9, 1989, Ser. No. 364,375**
**Claims priority, application Australia, Jun. 14, 1988, 8768/88; Jun. 15, 1988, 8770/88**
**Int. Cl.$^5$ C07C** *7/04;* **B01D** *3/34*

**U.S. Cl. 585—864** **26 Claims**

1. A process for the recovery of carotenes present in a triglyceride oil or solution which contains carotenes, substantially without destroying the carotenes present in the oil or solution, which comprises the steps of

(a) transesterification of the triglyceride oil or solution which contains carotenes with a monohydric alcohol to produce glycerol and a monohydric alcohol ester, followed by
(b) vacuum distillation of the resultant transesterified oil or solution; characterized by
(1) the addition of 0.1 to 50% by weight of edible oil to the transesterified oil or solution which contains carotenes to form a mixture, and
(2) subjecting the resulting mixture to a pressure of less than 0.060 Torr and a temperature of less than 200° C.

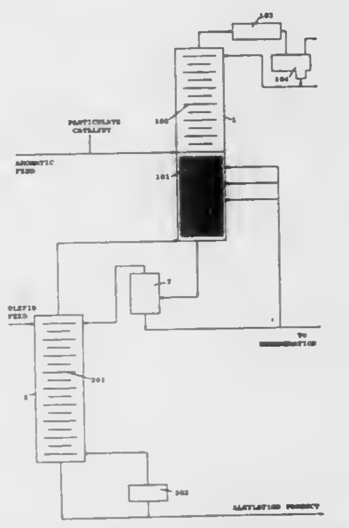
---

### 5,019,669
### ALKYLATION OF ORGANIC AROMATIC COMPOUNDS

**John R. Adams, Houston, and Lawrence A. Smith, Bellaire, both of Tex., assignors to Chemical Research & Licensing Company, Houston, Tex.**

**Filed Mar. 10, 1989, Ser. No. 321,359**
**Int. Cl.$^5$ C07C** *2/64*

**U.S. Cl. 585—446** **28 Claims**



1. A process for the alkylation of organic aromatic compounds comprising the steps of:

(a) slurrying a solid particulate acidic catalyst in an organic aromatic compound stream;
(b) concurrently:
  (i) feeding said slurried catalyst and said organic aromatic compound to a distillation column reactor in a reaction-distillation zone, said zone containing inert distillation packing, said slurried catalyst moving downward through said inert packing;
  (ii) feeding a $C_2$ to $C_{20}$ olefin to said reaction-distillation zone thereby contacting said olefin with said organic aromatic compound in the presence of said slurried catalyst to react said olefin with said organic aromatic compound to form an alkylation compound; and

VOL
1126
ISS
4
MY
28
1991
UMI

(iii) fractionating the resultant alkylation product and the unreacted organic aromatic compound and olefin in said distillation column reactor; and

(c) withdrawing said alkylation product from said distillation column reactor at a point below said reaction zone.

---

### 5,019,670
## PROCESS FOR PRODUCING ALKYLAROMATIC LUBRICANT FLUIDS

**Quang N. Lê, Cherry Hill; Bruce P. Pelrine, Trenton, and Joosup Shim, Wenonah, all of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Continuation-in-part of Ser. No. 469,999, Jan. 25, 1990, Pat. No. 4,962,256, which is a continuation-in-part of Ser. No. 254,524, Oct. 6, 1988, Pat. No. 4,954,325, which is a continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Apr. 26, 1990, Ser. No. 515,030**

**Int. Cl.$^5$ C07C** *2/66, 2/12*

**U.S. Cl. 585—467** **24 Claims**

1. A process for the preparation of alkylaromatic compounds, comprising: alkylating at least one alkylatable aromatic compound and with an alkylating agent comprising an olefinic hydrocarbon oligomer having a branch ratio less than 0.19 in the presence of a solid, porous acidic alkylation catalyst comprising a crystalline mater al characterized by an X-ray diffraction pattern including values substantially as set out in Table 1 of the specification to produce an alkylated aromatic hydrocarbon product.

---

### 5,019,671
## LIQUID PHASE ISOMERIZATION OF ALKANES

**Chao-Yang Hsu; Vasant K. Patel, both of Media; David H. Vahlsing, Wynnewood, all of Pa.; James T. Wei, Ridgewood, N.J., and Harry K. Myers, Jr., Cochranville, Pa., assignors to Sun Refining and Marketing Company, Philadelphia, Pa.**

**Filed Jul. 10, 1989, Ser. No. 378,334**

**Int. Cl.$^5$ C07C** *5/13*

U.S. Cl. 585—751 **11 Claims**

1. Method of isomerizing a feedstock comprising acyclic hydrocarbons having 4 to 7 carbon atoms per molecule which comprises contacting said feedstock in liquid phase with a catalyst comprising a sulfated and calcined solid mixture of (1) oxide or hydroxide of element from a first class consisting of Group III or Group IV elements, (2) oxide or hydroxide of metal from a second class consisting of Group V, Group VI or Group VII metals, and (3) oxide or hydroxide of Group VIII metal, the ratio of metal from said second class to Group VIII metal being in the range from 0.1:1 to 2.0:1, at a temperature in the range from 0 to 250° C., and a pressure in the range from 1 to 75 atmospheres.

---

# ELECTRICAL

### 5,019,672
## ACCESS FLOOR CONSTRUCTION

**Hugh R. A. Fish, London, England, assignor to Microfloor Systems Limited, London, England**

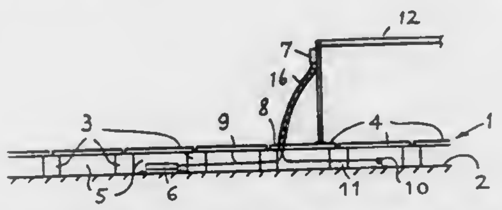
**PCT No. PCT/GB88/00034, § 371 Date Sep. 13, 1989, § 102(e) Date Sep. 13, 1989, PCT Pub. No. WO88/05615, PCT Pub. Date Jul. 28, 1988**

**PCT Filed Jan. 20, 1988, Ser. No. 391,598**

**Claims priority, application United Kingdom, Jan. 20, 1987, 8701129**

**Int. Cl.$^5$ H02G** *3/26*

**U.S. Cl. 174—48** **5 Claims**



1. An access floor construction having an access floor formed from removable panels supported on a subfloor to form an underfloor space accommodating at least one service supply which includes at least one distribution device disposed in the underfloor space, at least one of the removable panels forming the access floor having at least one access opening in at least one edge thereof, characterized by at least one service outlet disposed above floor level and having at least one associated lead connected to an adjacent distribution device in the underfloor space via said at least one access opening, the said at least one lead of the service outlet being encased in trunking from the service outlet to said at least one access opening.

---

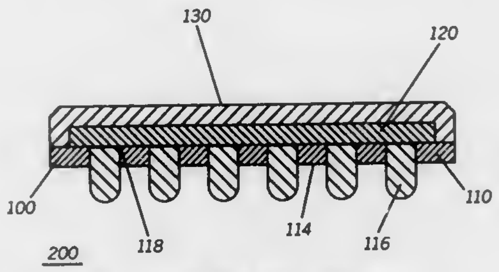
### 5,019,673
## FLIP-CHIP PACKAGE FOR INTEGRATED CIRCUITS

**Frank J. Juskey, Coral Springs; Barry M. Miles, and Marc V. Papageorge, both of Plantation, all of Fla., assignors to Motorola, Inc., Schaumberg, Ill.**

**Filed Aug. 22, 1990, Ser. No. 570,751**

**Int. Cl.$^5$ H01L** *23/28, 39/02*

**U.S. Cl. 174—52.2** **2 Claims**



1. An integrated circuit package, comprising:

an integrated circuit assembly including:

- a flip-chip having an array of bumped pads positioned on a bottom surface for providing terminals of an integrated circuit formed within said flip-chip;
- a chip carrier being coupled to said flip-chip on a top major surface having through-holes being filled with said bumped pads of said flip-chip, said chip carrier includes an arrangement of contact pads formed on a major bottom surface which are correspondingly coupled to said bumped pads;

said integrated circuit assembly being molded with a curable epoxy to provide a protective layer around exposed surfaces of said flip-chip.

---

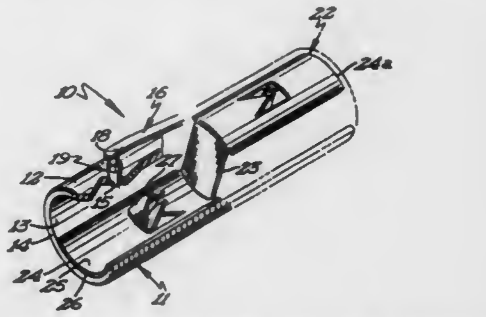
### 5,019,674
## WIRE SPLICER DEVICE

**Lance W. Greene, 9930 University Ave., NW., Coon Rapids, Minn. 55433**

**Filed Feb. 9, 1990, Ser. No. 477,759**

**Int. Cl.$^5$ H01R** *11/09*

**U.S. Cl. 174—84 R** **11 Claims**



1. A splicer device for splicing a pair of electrical conductors comprising:

- a cylindrical sleeve formed of flexible non-conductive material and having a pair of longitudinally spaced apart openings therein,
- a pair of elongate arms, each having one end thereof integral with the exterior surface of said sleeve and terminating in a free end disposed adjacent one of said openings, each arm having a pressure element extending angularly from the free end thereof towards one of said openings in the sleeve, and
- an elongate single-piece splicing member positioned within said sleeve and being formed of an electrically conductive material, said splicing member including a central element and a pair of end elements integral with said central element, said central element being offset with respect to said end elements, each end element having teeth struck therefrom located adjacent one of said openings in the sleeve whereby, when the end portions of insulation covered electrical conductors to be spliced are positioned within the sleeve, and the arms are compressed by finger pressure of a user, the compression elements on said arms will cause said teeth to penetrate the insulation of the electrical conductors and clamp the end portions of the electrical conductors in electrically connected relation with said splicing member.

---

### 5,019,675
## THICK FILM SUBSTRATE WITH HIGHLY THERMALLY CONDUCTIVE METAL BASE

**Daniel R. Blessington, Pittsford; Gary A. Kneezel, and Michael R. Campanelli, both of Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Sep. 5, 1989, Ser. No. 402,374**

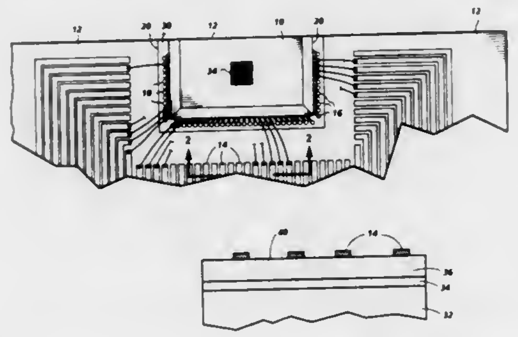
**Int. Cl.$^5$ H41J** *2/05*

**U.S. Cl. 346—140 R** **2 Claims**

1. In a thermal ink jet printer, a printhead adapted to heat ink contained within ink channels formed within the printhead by applying electrical signals to heater resistors formed within said ink channels, said electrical signals applied applied along a resistor electrode pattern connected between said resistors and an electrical input source via an intermediate electrode board substrate, said electrode board substrate, including a thermally conductive substrate comprising a conductive metal base, a passivation layer overlying said metal base, at least one

VOL
1126
ISS
4
MY
28
1991
UMI

screened and fired dielectric layer overlying said passivation layer and an electrode pattern printed on the upper surface,



said substrate electrode pattern electrically connected to said resistor electrode pattern.

---

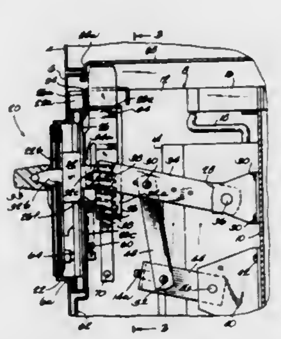
### 5,019,676
## AUXILIARY OPERATOR FOR CIRCUIT INTERRUPTING APPARATUS WITH INTERLOCK BETWEEN SWITCH AND HOUSING

**Daniel P. Heckenkamp, Sussex, Wis., assignor to Eaton Corporation, Cleveland, Ohio**

**Filed May 21, 1990, Ser. No. 525,803**

**Int. Cl.$^5$ H01H** *9/22*

**U.S. Cl. 200—50 A** **18 Claims**



1. An auxiliary operator for circuit interrupting apparatus contained in a removable unit of a motor control center cabinet, said auxiliary operator comprising:

a housing mounted on said removable unit;

a handle assembly guided for reciprocal movement in said housing;

linkage connected to said handle assembly and to circuit interrupting apparatus mounted in said unit, said apparatus being operated by appropriate movement of said handle assembly;

an interlock member movable relative to said handle assembly between a withdrawn position and an extended position, said interlock member abutting a stop fixed relative to said removable unit to define said withdrawn position and blocking removal of said unit from said cabinet by interference of said interlock member with a fixed portion of said cabinet in said extended position; and

drive means on said handle assembly engaging said interlock member for movement thereof to said extended position upon movement of said handle assembly to an ON condition of said apparatus, and disengaging said interlock member upon movement of said handle assembly to an OFF condition of said apparatus.

---

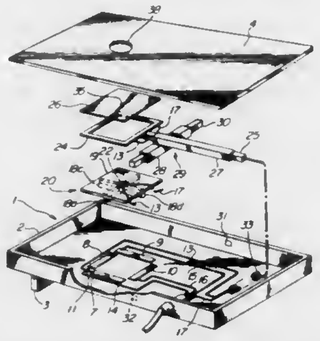
### 5,019,677
## COMPUTER INPUT DEVICE

**Balan Menen, Orange, Calif., assignor to Microslate Corp., Costa Mesa, Calif.**

**Filed Jul. 11, 1990, Ser. No. 551,621**

**Int. Cl.$^5$ G08C** *21/00*

**U.S. Cl. 178—18** **7 Claims**



1. A computer input device for positioning a cursor on a computer display screen requiring only penmanship motion to move a stylus comprising in combination:

an enclosure;

a slidable circuit;

a stylus;

said enclosure serving as a support for a hand holding said stylus, the stylus movably engaging said slidable circuit, thereby generating cursor coordinate signals and computer command signals at any cursor location on said computer display screen.

---

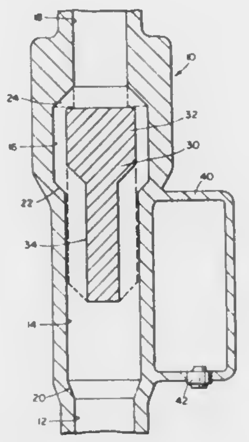
### 5,019,678
## FLUID FLOW SWITCHES WITH LOW FLOW RESISTANCE

**Robert D. K. Templeton, Ayr, and William W. Arnott, Ayrshire, both of Scotland, assignors to Gentech International Limited, Ayrshire, Scotland**

**Filed Sep. 8, 1989, Ser. No. 404,891**

**Int. Cl.$^5$ H01H** *35/38, 35/40*

**U.S. Cl. 200—81.9 M** **10 Claims**



1. A flow switch comprising:

a body with a bore extending therethrough, the bore having a relatively narrower section and a relatively wider section downstream of the narrower section;

a member movable within the narrower and wider sections of the bore such that the member is a relatively close fit in the narrower bore section, the member having a first portion which permits only limited fluid flow in the close fit clearance between the first portion and the narrower bore section, and a second portion upstream of the first portion having a flow bypass arrangement whereby substantial fluid flow is possible with the second portion located in the narrower bore section, the member being movable by fluid flow from a closed position to an open position, wherein in the closed position, both the second portion and at least part of the first portion are within the narrower bore section, whereas in the open position, the first portion and a part of the second portion are within the wider bore section thereby allowing fluid to flow; and

means for detecting whether the member is in the open position or the closed position;

wherein the flow bypass arrangement defines flow-enabling passages within the second portion of the member.

---

### 5,019,679
## FLAT SWITCH INSERTABLE INTO A MAGAZINE AND USABLE AS PART OF A SURVEY TECHNIQUE FOR READERSHIP OF PUBLICATIONS

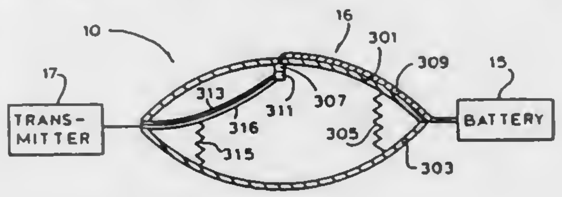
**Lee S. Weinblatt, 797 Winthrop Rd., Teaneck, N.J. 07666**

**Filed Jan. 17, 1990, Ser. No. 419,523**

**Division of 287,531, Dec. 19, 1988, Pat. No. 4,939,326, which is a continuation of 114,684, Oct. 28, 1987, abandoned, which is a division of 923,330, Oct. 23, 1986, Pat. No. 4,726,771, which is a continuation-in-part of 827,757, Feb. 7, 1986, Pat. No. 4,659,314.**

**Int. Cl.$^5$ H01H** *1/12*

**U.S. Cl. 200—508** **1 Claim**



1. A switch comprising:

a first member movable between a first position wherein it is flat and a second position wherein it is not flat;

an elongated arm connected at one end to said first member and movable between a first position assumed when the first member is in its first position and a second position assumed when the first member is in its second position;

a first contact area positioned at a connection point on said first member, said connection point being at one distance from the juncture between said arm and the first member when the first member is in its first position, and at another distance when the first member is in its second position; and

a second contact area mounted on said arm at a first distance from the juncture between said first member and the one end of said arm, said first distance being different than said one distance and substantially equal to said another distance, said second contact area engaging said first contact area when the first member assumes its second position.

---

### 5,019,680
## HEAT GENERATING CONTAINER FOR MICROWAVE OVEN

**Taisuke Morino, Suita; Mami Tanaka, Yao; Fuminori Kaneko, and Shuichi Akiyama, both of Matsubara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 8, 1989, Ser. No. 363,137**

**Claims priority, application Japan, Jun. 14, 1988, 63-78980[U]; Jun. 14, 1988, 63-7898[U]; Jun. 15, 1988, 63-149052[U]; Jun. 28, 1988, 63-86401[U]**

**Int. Cl.$^5$ H05B** *6/80*

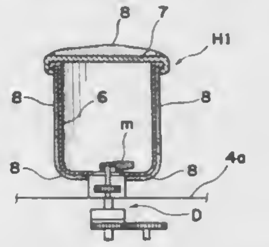
**U.S. Cl. 219—10.55 E** **11 Claims**

1. A heat generating receptacle for use in a microwave oven, said microwave oven projecting microwaves onto the receptacle and said receptacle having different sections with at least one section receiving different amounts of microwaves than another section thereof, said heat generation receptacle comprising:

a metallic main container;

a detachable metallic lid for said metallic main container; and

microwave absorbing heat generating film layers formed on an outer surface of said metallic main container and metallic lid, said microwave absorbing heat generating film layers being varied in thickness over most of the metallic main container and the lid for uniform heat generation of said main container and said lid whereby said microwave absorbing heat generating film layers accommodate the different amounts of microwaves received at the different sections of said receptacle.



---

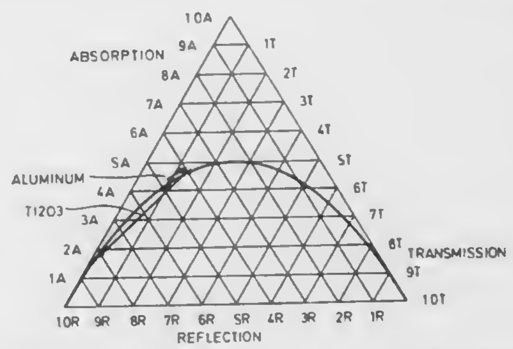
### 5,019,681
## REFLECTIVE TEMPERATURE COMPENSATING MICROWAVE SUSCEPTORS

**Matthew W. Lorence, Lakeville; Michael J. Rice, St. Paul; Ronald R. Lentz, Plymouth; Peter S. Pesheck, Brooklyn Center, and Michael R. Perry, Plymouth, all of Minn., assignors to The Pillsbury Company, Minneapolis, Minn.**

**Filed Feb. 14, 1990, Ser. No. 480,071**

**Int. Cl.$^5$ H05B** *6/80*

**U.S. Cl. 219—10.55 F** **25 Claims**



1. A susceptor having a reflectance at a predetermined microwave frequency, comprising:

a microwave interactive heating layer which is operable to heat responsive to an electric field component of microwave radiation at the predetermined microwave frequency, the microwave interactive heating layer being operable to provide an increase in reflectance by a factor of at least three during heating from 23° C. to 250° C.

---

### 5,019,682
## SEPARABLE ELECTRICAL COOKER

**In B. Lee, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suweon, Rep. of Korea**

**Filed Aug. 29, 1989, Ser. No. 399,980**

**Claims priority, application Rep. of Korea, Aug. 29, 1988, 14058/88**

**Int. Cl.$^5$ H05B** *6/12;* **E24C** *15/10*

**U.S. Cl. 219—10.493** **2 Claims**

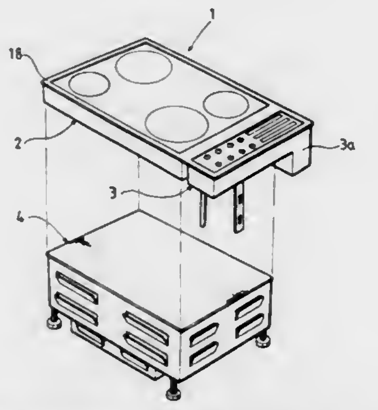
1. An electrical cooker composed of separable parts comprising:

a body;

a heating portion mounted at a first part of said body containing at least one heating coil;

VOL
1126
ISS
4
MY
28
1991
UMI

an adjusting portion mounted adjacent to said heating portion;
means disposed on said adjusting portion for controlling said at least one heating coil;
an air ventilating portion adjacent said adjusting portion, a first part of said air ventilating portion extending substantially parallel to said heating portion and a second, contiguous part extending at an angle to the first part in the direction of a second part of said body;
a first cooling means mounted in said air ventilating portion for forcing air into said heating portion;

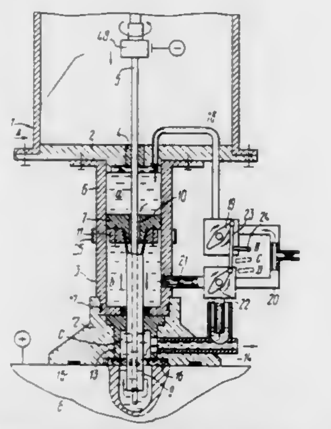


an oscillating portion mounted at said second part of said body and including first and second compartments separated by a compartment wall;
oscillating means arranged in said first compartment for operating said at least one heating coil;
a second cooling means mounted in said second compartment for forcing air to cool said oscillating portion; and
connection means for electrically connecting said heating portion, said adjusting portion and said oscillating portion, whereby said heating portion, said adjusting portion and said oscillating portion are separable from each other.

---

### 5,019,683
## ELECTROEROSIVE DRILLING OF HOLES WITH WORKING FLUID SYSTEM

**Erkin T. Abdukarimov, Ts-1,52, kv. 6., and Khaidar A. Vakhidov, massiv Chilanzer 2 kvartal, 23, kv. 6., both of Tashkent, U.S.S.R.**
**PCT No. PCT/SU88/00024, § 371 Date Sep. 26, 1989, § 102(e) Date Sep. 26, 1989, PCT Pub. No. WO89/07028, PCT Pub. Date Aug. 10, 1989**
**PCT Filed Jan. 27, 1988, Ser. No. 423,444**
**Int. Cl.$^5$ B23H** *7/30*
U.S. Cl. 219—69.2 5 Claims

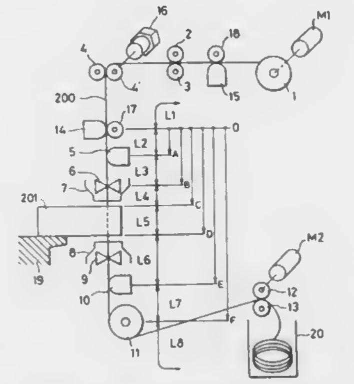


1. An apparatus for electroerosive piercing of holes in workpieces, comprising: an electrode tool in the form of a rod placed with a clearance in a shell and projecting thereform, and means for feeding and rotating the rod, a means for reciprocating the shell relative to the rod mechanically connected to said means for feeding and rotating the rod and having the form of a hydraulic cylinder having cavities, and a piston to which said shell is rigidly secured at the side of a workpiece, at least one of said cavities of said hydraulic cylinder being connected to a system for feeding and discharging a working fluid, said piston having at least one passage communicating with an interior of said shell of the electrode tool, the rod extending, with a clearance, through said passage.

---

### 5,019,684
## WIRE DISCONNECTION POSITION DETECTING APPARATUS

**Masaya Ito, Fussa, Japan, assignor to Fanuc Ltd., Yamanashi, Japan**
**PCT No. PCT/JP89/00450, § 371 Date Nov. 29, 1989, § 102(e) Date Nov. 29, 1989, PCT Pub. No. WO89/10816, PCT Pub. Date Nov. 16, 1989**
**PCT Filed Apr. 27, 1989, Ser. No. 444,132**
**Claims priority, application Japan, May 11, 1988, 63-112600**
**Int. Cl.$^5$ B23H** *7/02, 7/10*
U.S. Cl. 219—69.12 8 Claims



1. A wire disconnection position detecting apparatus, comprising:
means for detecting disconnection of a wire electrode;
means for rewinding a snapped wire electrode in the direction opposite to the feeding direction of the wire electrode so that a cut end of the wire electrode passes a first predetermined position on a wire electrode feed path;
means for detecting the rewinding amount of said wire electrode; and
means for displaying a wire disconnection position in accordance with the rewinding amount of said wire electrode thus detected.

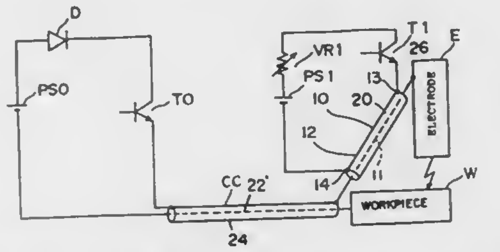
---

### 5,019,685
## DISCHARGE WORKING MACHINE

**Hideo Nishimura, Fukui, Japan, assignor to Sodick Co., Ltd., Yokohama, Japan**
**Filed Jul. 28, 1989, Ser. No. 386,118**
**Claims priority, application Japan, Apr. 13, 1989, 1-94242; Apr. 13, 1989, 1-94243; Apr. 13, 1989, 1-94244; Apr. 13, 1989, 1-94245; Apr. 13, 1989, 1-94246; Apr. 13, 1989, 1-94247**
**Int. Cl.$^5$ B23H** *1/02;* **H01B** *11/18;* **H05K** *9/00*
U.S. Cl. 219—69.13 22 Claims

1. A connection for a discharge working machine using a first current which is supplied from a power source to a workpiece through an electrode, comprising:
a first coaxial cable having a first core wire, a first shield, and a first insulator for insulating between the first core wire and first shield, the core wire connecting the power source to the workpiece;

a second coaxial cable having a second core wire, a second shield, and a second insulator for insulating between the second core wire and second shield, the second core wire connecting the first shield to the electrode;

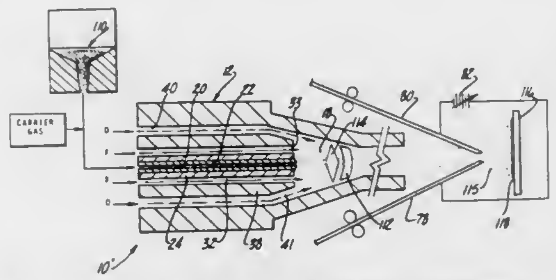


said second coaxial cable having the first current flowing in a first direction through the second core wire and a second current flowing in a second direction opposite to said first direction in the second shield.

---

### 5,019,686
## HIGH-VELOCITY FLAME SPRAY APPARATUS AND METHOD OF FORMING MATERIALS

**Daniel R. Marantz, Sands Point, N.Y., assignor to Alloy Metals, Inc., Troy, Mich.**
**Filed Sep. 20, 1988, Ser. No. 247,024**
**Int. Cl.$^5$ B23K** *9/04*
U.S. Cl. 219—76.14 80 Claims



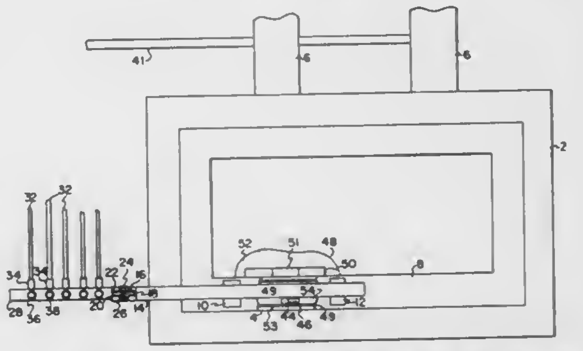
8. A supersonic thermal spray apparatus, comprising:
a powder thermal spray apparatus including a body portion having an inlet receiving powdered feedstock and a carrier gas, means heating said powdered feedstock and accelerating said heated powdered feedstock and carrier gas, and a nozzle having an inlet receiving said heated powdered feedstock and carrier gas and an outlet directing said heated powdered feedstock toward a target, said carrier gas being accelerated to supersonic velocity; and
feed means feeding a molten metal feedstock into said heated powdered feedstock adjacent said nozzle outlet, said powdered feedstock and carrier gas atomizing said molten metal feedstock and projecting said atomized molten metal feedstock substantially uniformly distributed in said heated powdered feedstock toward said target.

---

### 5,019,687
## WELDING SYSTEM AND APPARATUS

**Fritz Vogelmann, 547 Aberdeen Rd., Frankfort, Ill. 60423**
**Filed Feb. 2, 1990, Ser. No. 473,782**
**Int. Cl.$^5$ B23K** *9/04*
U.S. Cl. 219—130.1 17 Claims

1. A welding system to weld a gap portion in a work piece, comprising an elongated electrical conductor having a large cross-sectional dimension sufficient to conduct up to about 3000 amperes, an electrical power source able to provide up to about 3000 amperes of electrical current to said elongated electrical conductor and electronically connected thereto, said elongated electrical conductor being placed adjacent said gap portion of said workpiece, insulating means to electronically insulate said elongated electrical conductor from said workpiece, an elongated welding rod having a first end for welding and electrical contact with said gap portion of said workpiece and an opposite end for holding and manipulating said welding rod, said welding rod having an intermediate portion, said intermediate portion being positioned in electrical contact against the outer side wall of said elongated electrical conductor at any selected portion thereof between its opposite ends to supply electrical current to said welding rod and to said first end thereof, said first end being positioned in welding and electrical contact with said gap portion of said workpiece to create an operative electrical circuit between said intermediate portion of said welding rod and said workpiece, including said operative electrical circuit, an electrical arc being generated between said first end of said welding rod and said workpiece at the said gap portion thereof when electric power is supplied by said electrical power source to said elongated electrical conductor and said electrical circuit between said intermediate portion of said welding rod in contact with said elongated electrical conductor and said workpiece to melt portions of said welding rod at said first end thereof to fill and weld said gap portion of said work piece, said electrical power source having a positive terminal and a negative terminal, said operative electrical circuit being connected between said positive and negative terminals of said electrical power source to provide a non-grounded operative welding circuit, said welding rod being non-conductive between said intermediate portion and said opposite end thereof when said portion between said intermediate portion and said first end is conductive whereby a workman on the ground can hold and manipulate said portion of said welding rod between said intermediate portion and said opposite end to manually direct said first end of said welding rod as it is being melted to fill and weld said gap portion of said workpiece.



---

### 5,019,688
## AUXILIARY SOLDERING DEVICE FOR ELECTRIC SOLDER IRON

**Chuan-Yi Cheng, No. 92, Lane 35, Dong Hsin Road, Keelung, Taiwan**
**Filed Sep. 21, 1989, Ser. No. 410,654**
**Int. Cl.$^5$ B23K** *3/04;* **H05B** *1/00*
U.S. Cl. 219—230 1 Claim

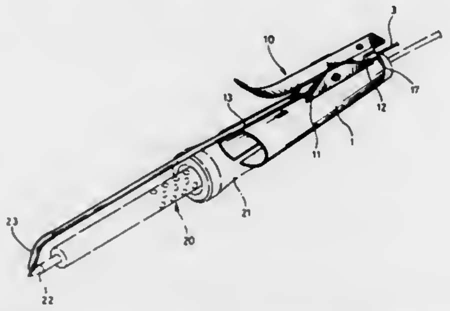
1. An auxiliary soldering device for an electric solder iron, comprising:
a sleeve member suitable to be fitted to a handle of an electric solder iron and formed with an upper groove, a connecting seat being disposed on said sleeve member and having a front end and a rear end, a first guide pipe being disposed adjacent to said rear end of said connecting seat, a second guide pipe being disposed adjacent to said front end thereof, said second guide pipe adapted to extend to a soldering tip portion of the electric solder iron, a direction bent tube being rotatably mounted at a front end of said second guide pipe to adjust supplying direction of a solder wire going through said first and second guide pipes and said direction bent tubes;
a pressing plate pivotally connected to said connecting seat,

VOL
1126
ISS
4
MY
28
1991
UMI

said pressing plate having a downward extending front end adapted to contact the solder wire;

a vane pivotally connected to said connecting seat and located above said pressing plate, said vane member having an elastic pushing plate, which is downwardly extending and adapted to abut against the solder wire; and

a spring disposed between said pressing plate and connecting seat to keep said pressing plate and vane in a horizontal



position, whereby pressing downward a front end of said vane member, said pushing plate thereof is longitudinally flexibly deformed to advance the solder wire through a certain distance, said vane member when released returning to said horizontal position via elasticity of said pushing plate, the pressing downward of the rear end of said vane member, causing said pushing plate and pressing plate to be separated from the solder wire, permitting the solder wire to be drawn out from said auxiliary soldering device.

---

### 5,019,689

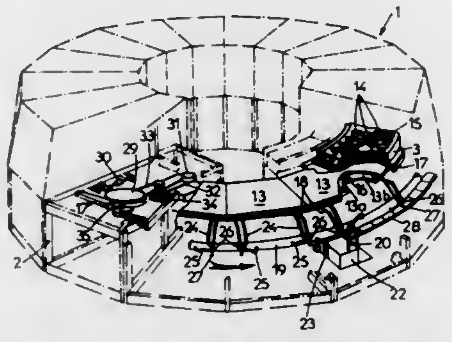
### ANNULAR FURNACES WITH A ROTARY HEARTH FOR SHAPING ONE OF THE FACES OF BLANKS OF OPTICAL LENSES TO A DESIRED PROFILE BY HEAT SAGGING AND APPLICATION OF A VACUUM

**Jean F. Bollier, Avignon, and Jean-Jacques Boumendil, La Colle Sur Loum, both of France, assignors to Piezo-Ceram Electronique, Antibes, France**

**Filed Oct. 20, 1989, Ser. No. 424,506**

**Int. Cl.$^5$ F27D *11/06***

**U.S. Cl. 219—388** **2 Claims**



1. A continuous furnace for shaping one of the faces of blanks of optical lenses to a desired profile by heat sagging of these blanks on suitably profiled jigs with the concomitant action of a vacuum, which comprises a stationary frame, an annular rotary hearth formed from a plurality of successive sections, each section being provided with a plurality of tulip-shaped supports, a stationary tunnel having at least one zone for heating the blanks at a temperature which causes them to soften and at least one zone for cooling the blanks which have one of their faces shaped, a motor for driving the hearth in rotation, a vacuum source driven in rotation with the hearth, means for connecting the tulip-shaped supports of a given section of said rotary hearth to the vacuum source when this section reaches a first predetermined position in the heating zone and for connecting said tulip-shaped supports of said given section to ambient air when said given section reaches a second predetermined position in the heating zone.

---

### 5,019,690

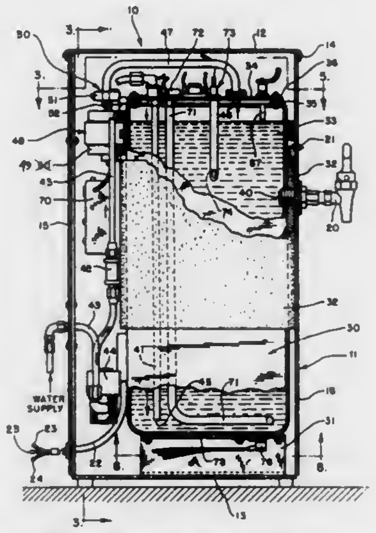
### BOILING WATER DISPENSER HAVING IMPROVED WATER TEMPERATURE CONTROL SYSTEM

**John T. Knepler, Chatham, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.**

**Filed Sep. 15, 1989, Ser. No. 407,811**

**Int. Cl.$^5$ F24H *1/10***

**U.S. Cl. 219—400** **14 Claims**



1. A boiling water dispensing apparatus comprising:

a hot water reservoir;

means including a reservoir heating element within said reservoir operable from an applied electric current for heating water in said reservoir;

inlet means for admitting cold water into said reservoir;

outlet means for discharging heated water from said reservoir;

steam detection means responsive to the presence of boiling water in said reservoir for producing a control signal indicative thereof, said steam detection means being generally thermally isolated from said hot water reservoir for preventing the temperature of the reservoir from affecting the steam detection means; and

temperature regulating means responsive to said control signal for controlling the application of electrical current to said resistance means to maintain water in said reservoir substantially at actual boiling temperature.

---

### 5,019,691

### HEATING DEVICE

**Fute Lai, No. 35, Shih-Chien Street, Tainan, Taiwan**

**Filed Jul. 11, 1990, Ser. No. 551,075**

**Int. Cl.$^5$ H05B *3/26***

**U.S. Cl. 219—432** **1 Claim**

1. A heating device comprising:

a pan made of electrically insulating and high heat conductive material and having a flat bottom being coated with a film of aluminum monoxide on an external surface;

a layer of circular super thin conductive film (STCF) attached to the external surface of the pan bottom through the aluminum monoxide film by means of calcination;

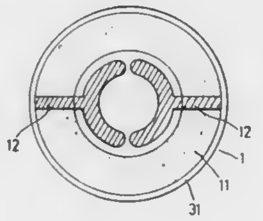
a first electrode being provided on said STCF layer along an inner portion of the external surface of the pan bottom;

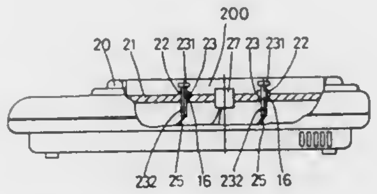
a second electrode being provided on said STCF layer along an inner portion of the external surface of the pan bottom opposite to the first electrode with ends thereof being set apart from ends of the first electrode;

a support device having a top plate formed with a plurality of bores extending vertically therethrough;

a control circuit electrically connected to an electricity power source;

a first terminal pin for applying a predetermined voltage to said first electrode having a pin slidably fitted in one of the bores of the top plate with its bottom end electrically connected to the control circuit and its top end formed with a first disc plate for contacting the first electrode means, said first disc plate being adapted to be positioned between a first position of relatively high and a second position of relatively low;





a second terminal pin for applying a predetermined voltage to said second electrode having a pin slidably fitted in another one of the bores of the top plate with its bottom end electrically connected to the control circuit and its top end formed with a second disc plate for contacting the second electrode;

an operating pin for turning on and off of a switch of the control circuit having a pin slidably fitted in another one of the bores of the top plate with its top end formed with a disc plate for contacting with the first and second disc plates for evenly supporting the pan from a first position to a second position to turn on the switch of the control circuit.

---

### 5,019,692

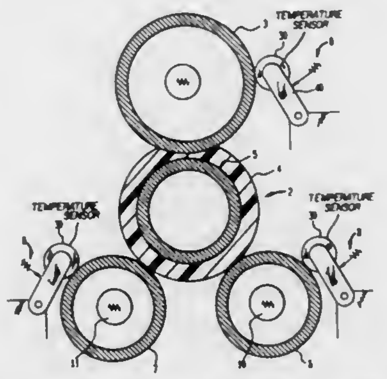
### THERMOSTATIC DEVICE FOR FUSER

**Sylvain L. Nbedi; Robert D. Bobo, both of Rochester, and Socrates Hryhorenko, Sodus, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 29, 1990, Ser. No. 500,977**

**Int. Cl.$^5$ H05B *1/02***

**U.S. Cl. 219—469** **6 Claims**



1. A fuser for fusing toner images to a receiving sheet, said fuser including:

a movable member which becomes heated during operation,

means for monitoring the temperature of a surface of said movable member, said means including

a heat conductive roller mounted in rolling contact with said movable member and rotatable by said movable member and having an inside diameter which varies according to the temperature of said roller, and

means positioned inside said roller for sensing the inside diameter of said roller and for creating an electrical signal in response to variations in said inside diameter.

---

### 5,019,693

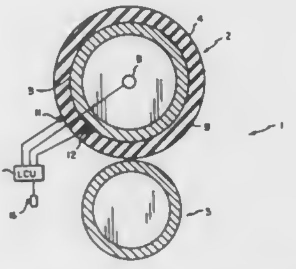
### TEMPERATURE CONTROL METHOD AND APPARATUS FOR FUSING ROLLER

**Ernest J. Tamary, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 6, 1990, Ser. No. 505,638**

**Int. Cl.$^5$ G03G *15/20;* H05B *1/02***

**U.S. Cl. 219—471** **7 Claims**



1. A method of controlling the surface temperature of a fusing roller of a roller fusing system of the type having a fusing roller and a source of heat for said fusing roller, said method comprising:

sensing the temperature TR of said surface, and comparing it to a nominal temperature $TR_1$ to obtain an error signal,

sensing the temperature of said source TC and comprising it to a nominal temperature $TC_1$ to derive an error signal,

combining said error signals using a predetermined weighting to derive a combined error signal E, and

increasing the heat added to said source as a function of said combined error signal E.

---

### 5,019,694

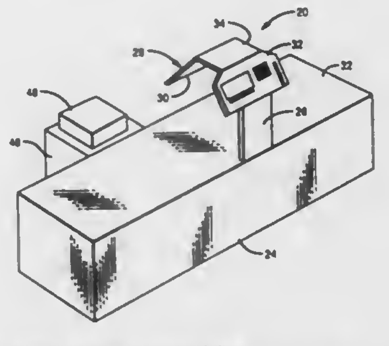
### OVERHEAD SCANNING TERMINAL

**Donald A. Collins, Jr., Ithaca, N.Y., assignor to NCR Corporation, Dayton, Ohio**

**Filed Sep. 29, 1989, Ser. No. 414,809**

**Int. Cl.$^5$ G06K *15/00***

**U.S. Cl. 235—383** **7 Claims**



1. A checkout system comprising;

a checkout counter having a supporting surface for supporting purchased merchandise items, said supporting surface having an operator's side and a customer's side;

VOL
1126
ISS
4
MY
28
1991
UMI

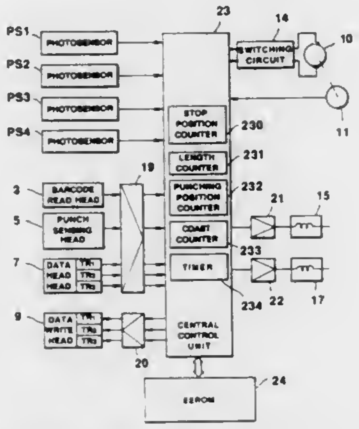
a support member mounted to said checkout counter having a head portion overhanging the supporting surface, said head portion having a first inclined portion located adjacent the operator's side of the checkout counter and a second inclined portion located adjacent the customer's side of the checkout counter;
a plurality of scanning units secured to the head portion and extending in a downward direction towards said supporting surface for scanning a coded label on a purchased merchandise item moved under the scanning units; and
display means mounted in said first and second inclined portions for displaying the price of the scanned merchandise item to an operator and a customer.

---

### 5,019,695
## PUNCHER AND METHOD OF CONTROLLING THE PUNCHER

**Eiji Itako, Sakado, Japan, assignor to Kabushiki Kaisha Nippon Conlux, Japan**

**Filed Nov. 15, 1989, Ser. No. 437,367**
**Int. Cl.$^5$ G06C *11/08;* G06F *15/12***
U.S. Cl. 235—434 15 Claims



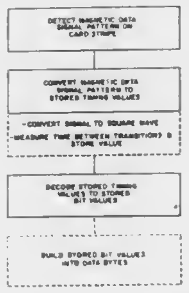
1. A card puncher comprising:
means for storing data on a target quantity of conveyance of a card corresponding to a position where the card is punched;
means for conveying the card;
means for driving the conveying means by a quantity corresponding to the data on the target quantity of conveyance;
means for measuring a quantity of coast of the card after the drive of the conveying means by the drive means is terminated; and
means for punching the card if a sum of the target quantity of conveyance and the measured quantity of coast of the card is within an allowable limit.

---

### 5,019,696
## SYSTEM AND METHOD FOR READING DATA RECORD STRIPES ON DATA CARDS

**Karl Chang, Honolulu; William R. Pape, III, Papaaloa; Victor J. Crosetti, Jr., Honolulu; Lance S. Nakamura, Pearl City; Daniel B. C. Leong, and Robert K. L. Loui, both of Honolulu, all of Hi., assignors to Verifone, Inc., Redwood City, Calif.**
**Division of Ser. No. 85,287, Aug. 10, 1987, Pat. No. 4,788,420, which is a continuation of Ser. No. 770,725, Aug. 28, 1985, abandoned. This application Nov. 28, 1988, Ser. No. 276,914**
**Int. Cl.$^5$ G06K *7/00***
U.S. Cl. 235—436 7 Claims

1. In a system for reading a data record on a data card,
a case including a card guide slot and a read head assembly mounted adjacent said card guide slot for reading said data record on said data card;
first circuit means coupled to said read head assembly for detecting data signals on said data record on a data card passing through said card guide slot and converting said data signals to a substantially square wave signal pattern representing binary signal data in the form of the timing pattern of positive and negative signal transitions of said square wave signal;
microcomputer circuit means coupled to said first circuit means and including means means operative during a real time period for detecting each of said positive and negative signal transitions in said square wave signal pattern, means operative during said real time period for registering in a plurality of individual memory locations the time interval between each successive one of said positive and negative signal transitions for all of said binary signal data in said square wave signal pattern, and means operative during a post processing time period following said real time period for analyzing the pattern of said registered time intervals stored in said individual memory locations to reconstruct said binary signal data.

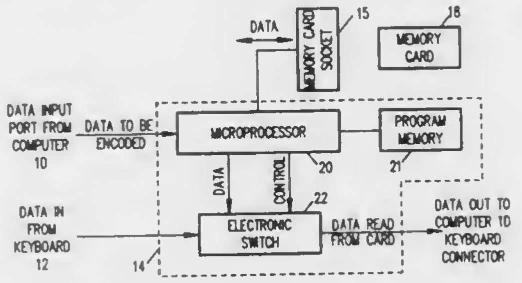

DETECT MAGNETIC DATA SIGNAL PATTERN ON CARD STRIPE
CONVERT MAGNETIC DATA SIGNAL PATTERN TO STORED TIMING VALUES
-CONVERT SIGNAL TO SQUARE WAVE
-MEASURE TIME BETWEEN TRANSITIONS & STORE VALUE
DECODE STORED TIMING VALUES TO STORED BIT VALUES
BUILD STORED BIT VALUES INTO DATA BYTES

---

### 5,019,697
## DATA COLLECTION SYSTEM USING MEMORY CARD

**Joel R. Postman, Santa Clara, Calif., assignor to TPS Electronics, Palo Alto, Calif.**

**Filed May 25, 1989, Ser. No. 356,517**
**Int. Cl.$^5$ G06K *7/06***
U.S. Cl. 235—441 6 Claims



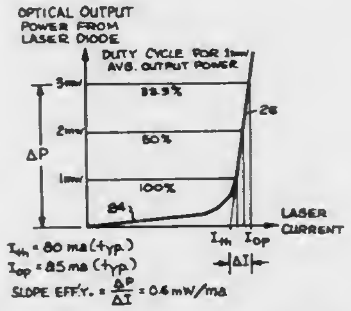
1. A data collection system for processing and storing information that is recorded electrically on an identification card having a semiconductor memory chip embedded therein comprising:
a data processor having an input terminal for receiving data;
a keyboard for generating a data signal in response to actuation by an operator;
an encoder/decoder circuit coupled to the output of said keyboard for receiving said generated data signal, said encoder/decoder circuit having an interface for coupling said circuit to said data processor input terminal;
means formed with said encoder/decoder circuit for receiving said identification card so that electrical connection is made between said memory chip and said encoder/decoder circuit.

---

### 5,019,698
## BAR CODE READING SYSTEMS HAVING ELECTRICAL POWER CONSERVATION AND LASER RADIATION POWER LIMITING MEANS

**Jay Eastman, Pittsford, N.Y., assignor to Photographic Sciences Corporation, Rochester, N.Y.**

**Filed Aug. 7, 1989, Ser. No. 390,020**
**Int. Cl.$^5$ G06K *7/10***
U.S. Cl. 235—462 8 Claims



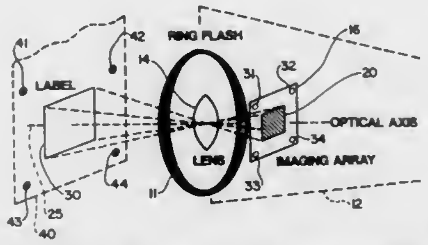
1. In a bar code reader having means for providing pulsed light beam adapted to be incident upon a bar code and which is returned therefrom, and means for providing an electrical bar code signal corresponding to such bar code in response to light returned from said bar code so as to enable decoding thereof, the improvement wherein said producing means comprises a light source having an optical power output (P) vs. electrical current (I) characteristic having a slope efficiency $\Delta P/\Delta I$ which is non-linear and characterized by an abrupt positive change between an initial region of low slope efficiency and a subsequent region of higher slope efficiency, and means for applying repetitive current pulses to said source to operate said source at a point on said characteristic in said region of higher slope efficiency and with a duty cycle such that the average optical power output is no greater than a certain level which does not exceed radiological health restrictions, and said electrical signal providing means comprises means for removing signal components of said electrical signal at the repetition rate of said current pulses.

---

### 5,019,699
## HAND-HELD OPTICAL CHARACTER READER WITH MEANS FOR INSTANTANEOUSLY READING INFORMATION FROM A PREDETERMINED AREA AT AN OPTICAL SENSING AREA

**Steven E. Koenck, Cedar Rapids, Iowa, assignor to Norand Corporation, Cedar Rapids, Iowa**

**Filed Aug. 31, 1988, Ser. No. 238,701**
**Int. Cl.$^5$ G06K *7/10***
U.S. Cl. 235—472 5 Claims



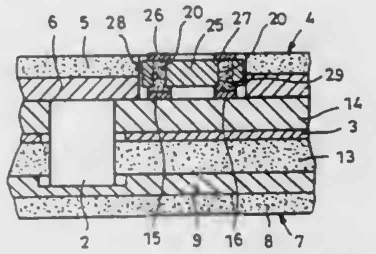
1. A portable optical reader for reading information from a first information area having information therein comprising indicia, the first information area having a predetermined height and width and disposed on a support surface external of said reader, said reader comprising:
a) an area array of photosensor elements disposed at the interior of said reader and having a selected height and width;
b) optical means for focusing an image of the first information area onto said area array and having a longitudinal optical axis and circular symmetry relative to said longitudinal axis;
c) marker source means for projecting multiple marker beams along said longitudinal axis onto the support surface and for producing multiple marker spots on the support surface, the multiple marker spots delineating on the support surface a perimeter of a predetermined second area having a predetermined height and width greater than the predetermined height and width of the first information area; and
d) light source means for illuminating the support surface and at least the predetermined second area;
e) when said portable reader is disposed relative to the support surface such that the perimeter of the predetermined second area encompasses the first information area, said optical means will focus an image of the first information area onto said area array, said height and width of said array selected such that when the perimeter of the predetermined second area encompasses the first information area, the entire image of the first information area can be focused widthwise or heightwise on said area array and in either case be read by said reader.

---

### 5,019,700
## MULTIFUNCTION CARD TYPE ELECTRONIC APPARATUS

**Noburu Tada, Yamatokoriyama; Tadaharu Mukai, Kitakatsuragi, and Katsuhide Shino, Soraku, all of Japan, assignors to Sharp Kabushiki Kaisha, Japan**

**Filed Nov. 29, 1989, Ser. No. 438,206**
**Claims priority, application Japan, Nov. 21, 1988, 63-151577[U]**
**Int. Cl.$^5$ G06K *19/06***
U.S. Cl. 235—492 4 Claims



1. A multifunction card type electronic apparatus comprising a simple flat-shaped circuit board into which electronic components are mounted; a protective member that is disposed on at least the top surface of said circuit board except for a portion of the top surface of said circuit board on which external connection terminals are to be disposed; and a terminal board on the top surface of which said external connection terminals are disposed, said terminal board being placed and bonded onto said portion of the top surface of said circuit board by means of an electrically conductive material so that said external connection terminals are electrically connected to said circuit board.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,701
### AUTOMATIC FOCUSING APPARATUS WITH MOIRE FRINGES

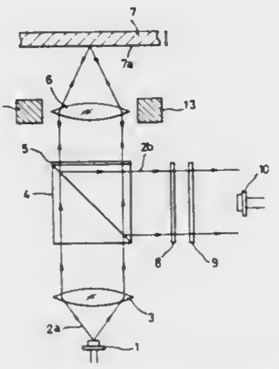
**Mitsutoshi Yagoto, and Masayuki Mino, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 332,363, Mar. 31, 1989, abandoned, which is a continuation of Ser. No. 169,420, Mar. 17, 1988, abandoned. This application Sep. 10, 1990, Ser. No. 581,416**

**Claims priority, application Japan, Mar. 17, 1987, 62-60007**

**Int. Cl.$^5$ G01J** *1/20*

**U.S. Cl. 250—201.5** **9 Claims**



8. An automatic focusing apparatus for focusing on an optical disk, comprising:
a light source;
a pair of diffraction grids;
an objective lens to focus the light from the light source on the optical disk;
photodetector means for sensing light patterns;
means for diverting the light reflected off the optical disk back through the objective lens to pass through the two diffraction grids, the two diffraction grids are displaced from one another and have an uneven diffraction alignment, said light beams creating a moiré image pattern, as a result of the relative uneven diffraction alignment of the diffraction grids, that will rotate the moiré image pattern when subject to convergent or divergent light relative to a moiré image pattern that occurs when subject to coherent light, the moiré image pattern being projected upon the photodetector means;
means for evaluating the moiré image pattern based upon corresponding signals from the photodetector means to determine the existence or non-existence of relative rotation of the moiré image compared to the moiré image pattern produced by coherent light, thereby determining a focusing error, and
means for driving the objective lens so as to correct the focusing error.

---

### 5,019,702
### PHOTOELECTRIC TRANSDUCER APPARATUS HAVING A PLURALITY OF TRANSDUCER ELEMENTS AND A PLURALITY OF CAPACITOR ELEMENTS

**Hayao Ohzu, Fuchu; Toshiji Suzuki, Machida; Akira Ishizaki, Yokohama; Nobuyoshi Tanaka, Tokyo; Shigetoshi Sugawa, Atsugi; Seiji Hashimoto, Yokohama, and Tadanori Harada, Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

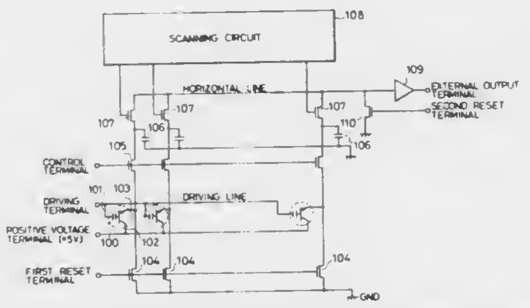
**Continuation of Ser. No. 314,275, Feb. 23, 1989, abandoned, which is a continuation of Ser. No. 929,892, Nov. 13, 1986, abandoned. This application Sep. 25, 1990, Ser. No. 587,647**

**Claims priority, application Japan, Nov. 15, 1985, 60-255027; Nov. 29, 1985, 60-269882; Oct. 8, 1986, 61-238017**

**Int. Cl.$^5$ H01J** *40/14*

**U.S. Cl. 250—208.1** **1 Claim**

1. A photoelectric transducer apparatus including:
photoelectric transducer cells arranged in rows and columns for forming an electric signal in response to incident light, each cell being capable of being non-destructively read out;
readout signal lines for reading out the electric signal from said photoelectric transducer cells;
a plurality of storing means connected to each of said signal lines for temporarily storing the electric signal from said photoelectric transducer cells; and



control means for introducing each electric signal formed in one predetermined row of said cells through one of said signal lines to one of said plurality of storing means connected to said one signal line and thereafter introducing each electric signal formed in another row of said cells through said one signal line to another one of said plurality of storing means connected to said one signal line and thereafter clearing the predetermined two rows of said cells.

---

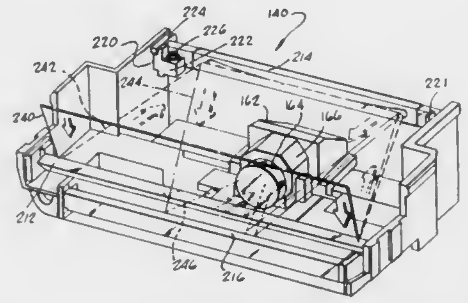
### 5,019,703
### OPTICAL SCANNER WITH MIRROR MOUNTED OCCLUDING APERTURE OR FILTER

**David W. Boyd, Greeley, and John S. Deutschbein, Longmont, both of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jan. 25, 1990, Ser. No. 471,156**

**Int. Cl.$^5$ H01J** *40/14*

**U.S. Cl. 250—208.1** **13 Claims**



1. An optical scanner device for producing machine-readable data representative of an image of a scan line object, comprising:
(a) light source means for illuminating the scan line object;
(b) lens means for focusing imaging light received from the scan line object on an image plane;
(c) at least one mirror means having a planar mirror surface for reflectively directing imaging light from the scan line object into said lens means whereby a folded imaging light path extending between the scan line object and said lens means is provided, said imaging light path being folded at an acute angle at said planar mirror surface; and
(d) occluding aperture stop means positioned in immediately adjacent, overlying relationship with said mirror surface for selectively differentially blocking light in said light path emanating from different points across the scan line object for adjusting the light intensity of the image produced on the image plane whereby blocking of light with said occluding aperture stop means at more than one location along said folded imaging light path is obviated.

---

### 5,019,704
### MEASURING CIRCUIT FOR DETECTING MEASUREMENT SIGNALS

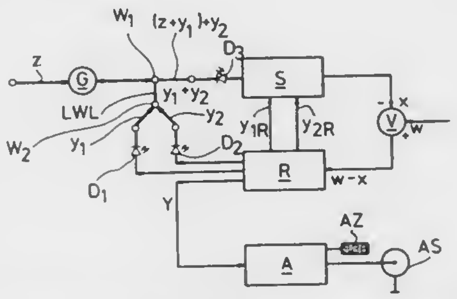
**Clifton Zimmermann, Karlsruhe; Heribert Kuerten, Neustadt, and Helmut Lewin, Bobenheim-Roxheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Dec. 12, 1989, Ser. No. 448,959**

**Claims priority, application Fed. Rep. of Germany, Jan. 7, 1989, 3900274**

**Int. Cl.$^5$ H01J** *40/14*

**U.S. Cl. 250—214 R** **4 Claims**



1. A measuring circuit for detecting measurement signals, comprising a closed control loop with a control section, a set value/target value comparator and a controller, said control section and said controller each having input means and output means, wherein the control variable connection between the controller output means and the control section input means is connected to and controlled by a measured value transducer wherein the controller output means includes a correcting variable output which is connected to an evaluation circuit.

---

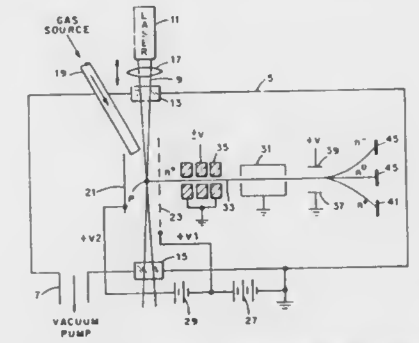
### 5,019,705
### HIGH BRILLIANCE NEGATIVE ION AND NEUTRAL BEAM SOURCE

**Robert N. Compton, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Jan. 3, 1990, Ser. No. 460,464**

**Int. Cl.$^5$ H01J** *3/04;* **H05H** *3/00*

**U.S. Cl. 250—251** **5 Claims**



1. An ion beam generator for generating high brilliance neutral particle and negative ion beams of a selected species, comprising:
a vacuum housing for enclosing an ion generating region into which a selected gaseous material to be ionized is introduced;
means for introducing a laser beam into said ion generating region at a focal point (P) corresponding to a location along a desired beam path and having a wavelength and beam energy sufficient to produce positive ions of said selected gaseous material through resonance enhanced photoionization;
means for generating an electric field in said generating region to accelerate ions of said selected material produced in said region along said beam path;
means for introducing a charge exchange medium in said beam path for converting a portion of said positive ions of said material produced in said ion generating region to neutral particles and negative ions of said selected material; and
means located downstream of said exchange medium along said beam path for redirecting said positive ions and said negative ions along separate beam paths from the neutral particle beam path.

---

### 5,019,706
### ION CYCLOTRON RESONANCE SPECTROMETER

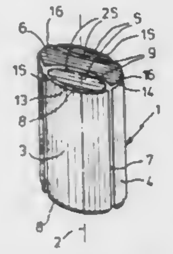
**Martin Allemann, Hinwil, and Pablo Caravatti, Winterthur, both of Switzerland, assignors to Spectrospin AG, Falladen, Switzerland**

**Filed May 3, 1990, Ser. No. 518,120**

**Claims priority, application Fed. Rep. of Germany, May 5, 1989, 3914838**

**Int. Cl.$^5$ H01J** *49/36*

**U.S. Cl. 250—291** **21 Claims**



1. A method of operating an ICR spectrometer comprising a measuring cell (1) having a plurality of side walls (3, 4) designed as rf electrodes and arranged symmetrically to an axis (2) extending in parallel to the field direction of a homogeneous magnetic field, and further electrically insulated trapping electrodes (5, 6, 35, 36, 55, 56, 85) arranged on both sides of the cell, viewed in the direction of the axis, which trapping electrodes are supplied with trapping potentials of the polarity of the ions under examination in order to prevent, to a large extent, the ions from leaving the measuring cell (1) in the direction of the axis,
wherein in order to minimize the components of the electric rf field directed in parallel to the axis, which act upon the ions in the measuring cell (1), additional electric rf signals are applied to at least one of said trapping electrodes (5, 35, 55, 56, 85) on both sides of the said measuring cell (1).

---

### 5,019,707
### HIGH SPEED WAVEFORM SAMPLING WITH A TUNNELING MICROSCOPE

**George L. Chiu, Cross River, and Jean-Marc Halbout, Larchmont, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 23, 1989, Ser. No. 327,863**

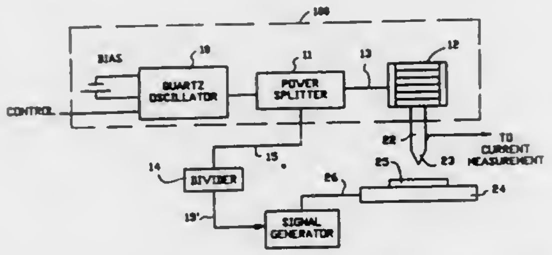
**Int. Cl.$^5$ G01N** *23/00*

**U.S. Cl. 250—306** **11 Claims**

1. A tunneling microscope for effecting measurements on a sample with a sample conductor supported thereon, said microscope comprising:
a test probe with a test probe tip supported adjacent said sample conductor,

VOL
1126
ISS
4
MY
28
1991
UMI

means for measuring samples of current in said test probe tip, and



an acoustic modulator for varying the distance between said test probe tip and said sample conductor.

---

### 5,019,708

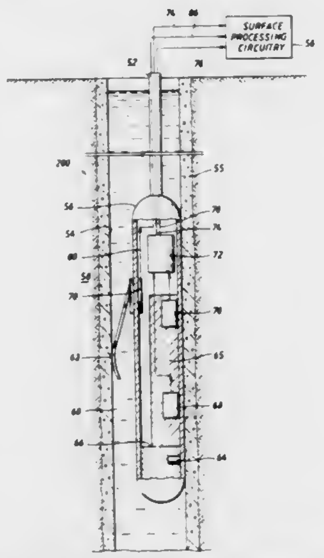
### METHOD FOR ELIMINATING THE EFFECT OF RUGOSITY FROM COMPENSATED FORMATION LOGS BY GEOMETRICAL RESPONSE MATCHING

**Charles Flaum, Houston, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.**

**Filed Oct. 5, 1989, Ser. No. 417,382**

**Int. Cl.$^5$ G01V *5/04, 5/12***

**U.S. Cl. 250—264** **30 Claims**



1. A method for determining the compensated density of a subsurface geological formation wherein the effect of rugosity is reduced or eliminated comprising the steps of:

(a) passing a logging tool through the borehole, the logging tool having associated therewith a signal source and at least two signal sensors spaced from the signal source by different distances;

(b) transmitting a signal from the signal source into the subsurface geological formation;

(c) generating sensor signals from the at least two signal sensors in response to the signal from the signal source received by the at least two signal sensors;

(d) applying vertical filters to said generated sensor signals for matching the vertical responses of the at least two signals in the "shallow" formation region; and

(e) determining a compensated density log, by combining the filtered sensor signals from step (d), wherein the contribution of the "shallow" formation region is reduced or eliminated.

---

### 5,019,709

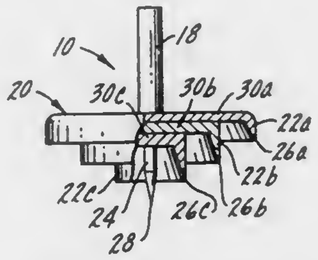
### ELECTRODE ARRANGEMENT FOR CHEATING CORONA

**Ernest H. Pfaff, 1549 Woodvale Ave., Deerfield, Ill. 60015**

**Filed Jan. 5, 1990, Ser. No. 461,334**

**Int. Cl.$^5$ H01T *19/04***

**U.S. Cl. 250—324** **8 Claims**



1. An electrode arrangement for creation of a corona over an area, the electrode being configured for attachment to a high frequency generator and being made of an electrically conductive material, the electrode arrangement comprising

a. a stem for attachment to the cororna generator,

b. a corona driving portion secured to said stem,

c. a corona emitting portion in electrical contact with said corona driving portion,

d. said corona driving portion being greater in size than said corona emitting portion such that corona from the electrode arrangement is emitted essentially from said corona emitting portion in a direction away from said corona driving portion, and

e. said corona emitting portion comprising a plurality of generally concentric emitting elements separated by spaces, said emitting elements being stepped at an increasingly greater distance from said corona driving portion from an outer emitting element to an inner emitting element, and said spaces being incapable of emitting corona.

---

### 5,019,710

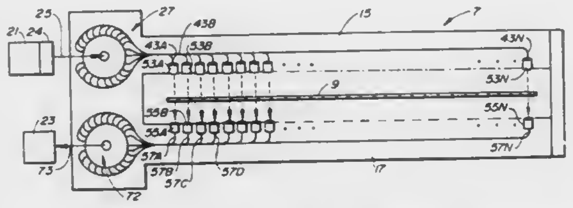
### OPTICAL SYSTEM FOR DETECTING PROPERTIES OF TRAVELING SHEET MATERIALS

**Gunnar Wennerberg; Daniel A. Gordon, and Harriss T. King, all of Cupertino, Calif., assignors to Measurex Corporation, Cupertino, Calif.**

**Filed Mar. 30, 1989, Ser. No. 331,404**

**Int. Cl.$^5$ G01N *21/01***

**U.S. Cl. 250—341** **8 Claims**



1. A system for detecting optically-sensitive properties of sheet materials during manufacture, comprising:

a) a source of light;

b) a first group of bundles of optical fibers, the first ends of the bundles being mounted to receive light from the source and the second ends of the bundles being mounted to direct the received light onto one face of a travelling sheet of material at generally regularly-spaced locations;

c) a second group of bundles of optical fibers, the first ends of the bundles of the second group being mounted at generally regularly-spaced locations to receive light which has been transmitted through the sheet material from corresponding ones of the optical fibers of the first group;

d) light detector means connected to the second ends of the optical fibers of the second group and mounted adjacent the same edge of the web of sheet material as the source of light;

e) the optical fibers of the first and second groups of bundles being of various lengths such that the light transmission paths through associated one of the fiber bundles in the first and second groups are not of constant length;

f) a first multiplexer for receiving light from said modulating means and for sequentially distributing the light to individual ones of the bundles of optical fibers in the first group, the first multiplexer including a light distributor means for conveying light simultaneously from the source to each of the bundles of optical fibers of the first group,

g) the light distributor means comprising a first mounting member which receives the ends of a first set of the bundles of the first group of optical fibers in a first circular array, a second mounting member which receives the ends of a second set of the bundles of the first group of optical fibers in a second circular array, and a rotatable member disposed between the first and second mounting members, said rotatable member having a circular array of apertures formed therein for selectively blocking and unblocking optical communication between respective ones of the bundles of fibers in the first and second sets; and

h) measurement means connected to the light detector means to provide measurements of optically sensitive properties of the sheet material based upon the detected light.

---

### 5,019,711

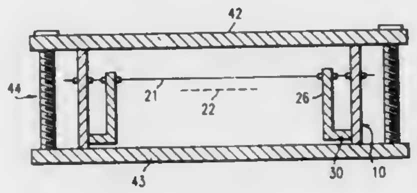
### SCANNING-LIQUID IONIZATION CHAMBER IMAGER/DOSIMETER FOR MEGAVOLTAGE PHOTONS

**Larry E. Antonuk, Ann Arbor, Mich., assignor to The Regents of the University of Michigan, Ann Arbor, Mich.**

**Filed Mar. 21, 1989, Ser. No. 326,688**

**Int. Cl.$^5$ G01T *1/185***

**U.S. Cl. 250—385.1** **11 Claims**



1. A scanning liquid ionization chamber for use with a radiation beam, comprising:

a closed housing;

a first plurality of substantially parallel wires arranged in a first plane;

a second plurality of substantially parallel wires arranged in a second plane, wherein the second plane of said second plurality of substantially parallel wires is spaced a predetermined distance from the first plane of said first plurality of substantially parallel wires, and said second plurality of wires are arranged in a direction orthogonal to the direction in which said first plurality of wires are arranged;

means for stringing and immobilizing said first plurality and said second plurality of wires, said means for stringing and immobilizing being connected to said closed housing and electrically insulating said first plurality of wires and said second plurality of wires from said closed housing;

a liquid ionization medium having a predetermined purity located inside said closed housing;

biasing means for applying a biasing voltage to at least one wire of said second plurality of wires, said radiation beam producing electrons in said ionization medium, and said biasing means in combination with said radiation beam producing a detection signal based at least in part on said electrons along at least one wire of said first plurality of wires; and

output means connected to said first plurality of wires for extracting said detection signal.

---

### 5,019,712

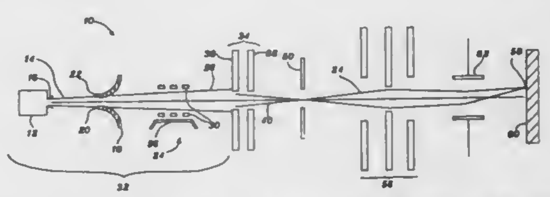
### PRODUCTION OF FOCUSED ION CLUSTER BEAMS

**Wolfgang Knauer, Malibu, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 8, 1989, Ser. No. 363,230**

**Int. Cl.$^5$ H01J *49/00***

**U.S. Cl. 250—423 R** **16 Claims**



1. Apparatus for producing a focused ion cluster beam having clusters of substantially constant mass, comprising:

a source of a beam of ionized clusters having a distribution of cluster masses, the beam being directed parallel to a beam axis;

an electrode that directs the ionized clusters of the beam through a crossover whereat those clusters not previously on the beam axis pass through the beam axis, the ionized clusters passing through the beam axis over a range of distances from the electrode due to the distribution of cluster masses; and

an apertured plate through which those clusters closest to the beam axis pass, the apertured plate being disposed at about the location of the crossover, the clusters passing through the aperture being of substantially constant mass.

---

### 5,019,713

### RADIATION THERAPY DEVICE WITH MOVEABLE APERTURE PLATE

**Ernst-Ludwig Schmidt, Kaiserslautern-Dansenberg, Fed. Rep. of Germany, assignor to Siemens Medical Laboratories, Inc., Concord, Calif.**

**Filed Apr. 9, 1990, Ser. No. 506,975**

**Claims priority, application European Pat. Off., Apr. 10, 1989, 89106272.1**

**Int. Cl.$^5$ A61N *5/10***

**U.S. Cl. 250—492.3** **5 Claims**

1. A radiation therapy device for irradiating an object with a radiation beam, said radiation therapy device comprising:

a radiation source for generating said radiation beam,

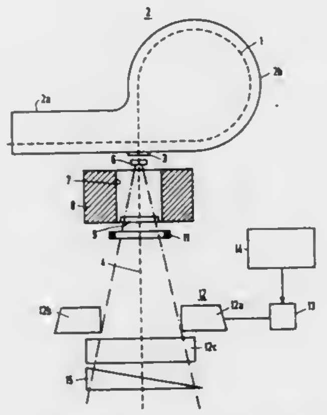
an aperture plate arrangement located in said radiation beam between said radiation source and said object and including a plurality of plates for determining a radiation field at said object,

a control device for moving at least one plate in said aperture plate arrangement during irradiation in such a manner that an effective dose decreasing in the opening direction of said plate is obtained in said radiation field,

VOL
1126
ISS
4
MY
28
1991
UMI

a filter body having a decreasing absorbability in the opening direction of said plate, and

means for placing said filter body in said radiation beam between said radiation source and said object.



---

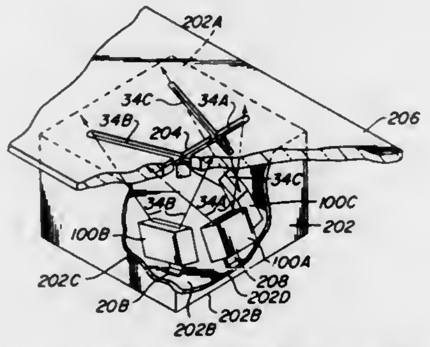
### 5,019,714
### SCANNING SYSTEM WITH ARRAY OF LASER SCANNER MODULES TO PRODUCE COMPLEX SCAN PATTERN

**Carl H. Knowles, Moorestown, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.**

**Filed Feb. 6, 1989, Ser. No. 307,032**

**Int. Cl.$^5$ G06K** *7/14*

**U.S. Cl. 250—568** **14 Claims**



1. A scanning system for reading a bar code on an object, said system comprising plural laser scanner modules and support means therefor, said system producing a complex scan pattern and projecting it into a predetermined space, said pattern being formed of plural scan lines, each of said lines being produced by a respective one of said laser scanner modules, said modules being mounted by said support means at various angles to one another to project their respective scan lines into a predetermined space, whereupon said complex scan pattern is created within said space, each of said modules comprising a housing having a window, first means for producing a laser beam and sweeping said beam from a predetermined point within said housing through a predetermined angle to produce a line scan pattern which is projected out of said window, and second means receiving light reflected off of a bar code as it is traversed by said pattern within said predetermined space and for converting said reflected light into an electrical output signal indicative of said bar code.

---

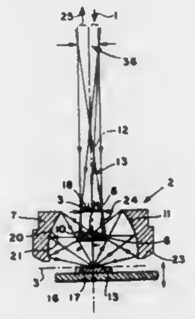
### 5,019,715
### OPTICAL SYSTEM AND METHOD FOR SAMPLE ANALYZATION

**Donald W. Sting, New Canaan; Robert G. Messerschmidt, Westport, and John A. Reffner, Stamford, all of Conn., assignors to Spectra-Tech, Inc., Stamford, Conn.**

**Filed Mar. 2, 1990, Ser. No. 487,550**

**Int. Cl.$^5$ G01N** *21/86*

**U.S. Cl. 250—571** **26 Claims**



1. An optical system for analyzing samples comprising:
a source of radiant energy emitting radiant energy along an optical path of the optical system;
a sample plane in the optical path;
a sample to be analyzed having a surface thereof placed at the sample plane;
means for directing the incident radiant energy to the sample surface including first mask means removably positioned approximately at a Fourier plane or conjugate thereof of the optical system to selectively allow only certain radiant energy to pass therethrough to target that radiant energy at preselected angles of incidence to the sample surface;
means for collecting energy reflected, emitted or transmitted from the sample including second mask means removably positioned approximately at a Fourier plane or conjugate thereof of the optical system to selectively allow only certain reflected, emitted and/or transmitted radiant energy to pass therethrough which has emanated from the sample at preselected angles of reflection, emission or transmission, and
a detector in the optical path receiving the radiant energy passing through the second mask means to analyze selected aspects of the sample.

---

### 5,019,716
### INSERTION SYSTEM FOR PRINTED PRODUCTS

**Jacques Meier, Bäretswil, and Werner Honegger, Tann Rüti, both of Switzerland, assignors to Ferag AG, Hinwil, Switzerland**

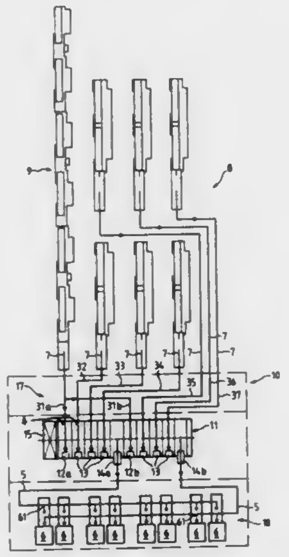
**Filed May 5, 1989, Ser. No. 350,308**

**Claims priority, application Switzerland, May 25, 1988, 1975/88**

**Int. Cl.$^5$ B65H** *5/30*

**U.S. Cl. 270—55** **12 Claims**

1. An insertion system for handling and assembling main products and preproducts to form end products comprising the combination of
an insertion drum having
a plurality of rotatable, axially spaced product receiving sections for receiving product parts,
a plurality of rotatable insertion sections between each pair of said product receiving sections,
means for axially transferring products from section to section, and
means for removing assembled end products from said insertion drum;
means defining a plurality of inlet locations for receiving main products and preproducts;
feed means for delivering main products and preproducts to at least one of said product receiving sections and to said insertion sections, said feed means including a plurality of switchable paths between said inlet area and said insertion drum so that products from any of a plurality of inlet locations can be selectively directed to different ones of said product receiving and insertion sections; and
a distributor portion including
means defining a plurality of removal stations; and
outlet conveyor means for conveying end products from said insertion drum to said removal stations.



---

### 5,019,717
### COMPUTER-CONTROLLED UNINTERRUPTABLE POWER SUPPLY

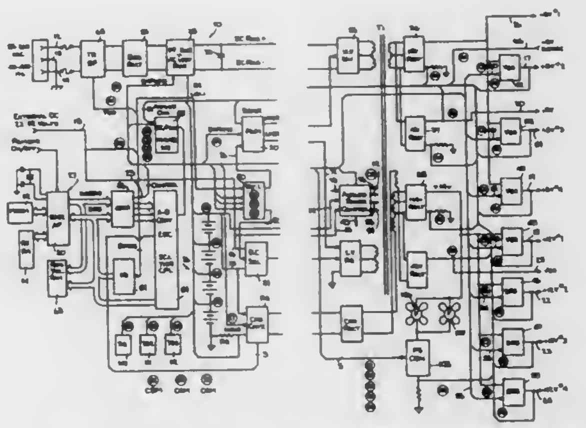
**Patrick W. McCurry, Keizer; James R. Kellogg, Medford; Karl Boekelheide, Tigard; Keaneth D. Sexton; George A. Ellson, both of Salem, and Robert A. Hocker, Molalla, all of Oreg., assignors to Elegant Design Solutions Inc., Salem, Oreg.**

**Filed Nov. 14, 1988, Ser. No. 270,715**

**Int. Cl.$^5$ H02M** *3/335*

**U.S. Cl. 307—66** **40 Claims**

1. A power supply system for receiving at least an AC power signal and a DC power signal and therefrom supplying power to apparatus for sustaining normal operation of said apparatus, comprising:
means for rectifying said AC power signal, when it is supplied to said system, and providing a rectified signal;
first regulating means for regulating said rectified signal and providing a first regulated DC signal;
second regulating means for regulating a DC signal and providing a second regulated DC signal;
control means for causing one signal of said DC power signal and said first regulated DC signal, when both said DC power signal and said AC power signal are supplied and one of them when only one of them is supplied, to be coupled to said second regulating means; said control means being settable to cause a preselected one of said DC power signal and said first regulated DC signal to be coupled to said second regulating means when both said DC power signal and said AC power signal are supplied.



---

### 5,019,718
### FREQUENCY INSENSITIVE DIGITAL PHASE ANGLE MEASURING CIRCUIT

**Joseph Foster, and Abdul Rashid, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Nov. 20, 1989, Ser. No. 438,793**

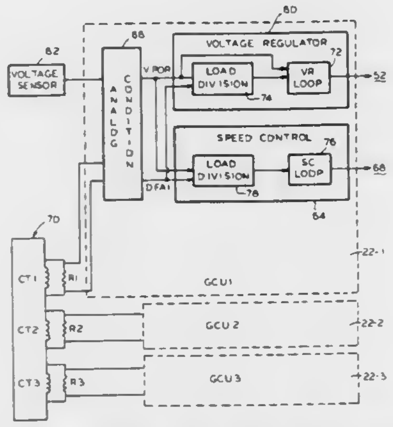
**Int. Cl.$^5$ H02J** *3/00*

**U.S. Cl. 307—84** **13 Claims**

1. In a load division control for a generator control unit in a multi-channel generating system, each channel having a main generator and an exciter providing field current to the main generator, for controlling excitation to divide loading equally between each channel responsive to a phase angle between output voltage and difference from average current for each channel, a frequency insensitive phase angle measuring circuit comprising:
a system clock generating a clocking signal at a select frequency;
a period counter responsive to said system clock and output voltage for determining period of an output voltage waveform;
a phase clock responsive to said period counter generating a

VOL
1126
ISS
4
MY
28
1991
UMI

clocking signal having a select number of clocking pulses each period of the output voltage waveform; and



a phase angle counter responsive to said phase clock the output voltage waveform and a difference from average current waveform for calculating said phase angle insensitive to frequence changes of said waveforms.

---

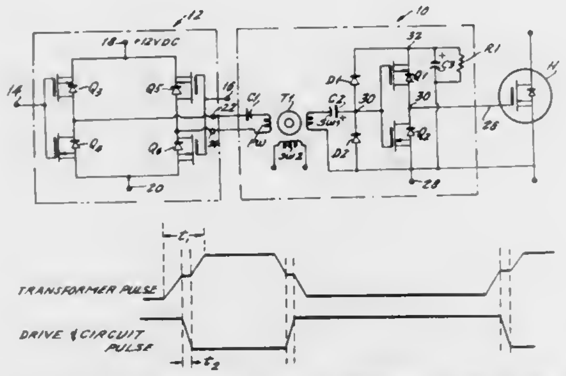
### 5,019,719
## TRANSFORMER COUPLED GATE DRIVE CIRCUIT FOR POWER MOSFETS

**Ray King, Carolina Beach, N.C., assignor to International Rectifier Corporation, El Segundo, Calif.**

**Filed Jan. 12, 1990, Ser. No. 464,221**

**Int. Cl.$^5$ H03K** ***17/687, 17/04***

**U.S. Cl. 307—246** **20 Claims**



1. A driving circuit for a power transistor, comprising:

a transformer having a primary winding responsive to an input control signal and a secondary winding for producing an output pulse having multiple control cycles wherein each control cycle comprises first and second sub-cycles; and

a gate drive circuit coupled to the secondary winding of the transformer and effective for driving the power transistor;

the gate circuit including:

a first capacitor and a coupling device, connected between the first capacitor and the secondary winding, for coupling the first capacitor to the secondary winding;

a first switching device connected between the first capacitor and a control electrode of the power transistor, in a manner which enables selective conduction of electrical charge from the first capacitor to the control electrode;

a second switching device having one terminal connected to the control electrode of the power transistor and operable in a manner which enables the second switching device to selectively turn off the power transistor; and

means for controlling the first and second switching devices;

the transformer, the first capacitor and the first and second switching devices having such construction and being so connected, and the means for controlling the first and second switching devices being so effective, as to enable electrical charge to flow from the output pulse into the first capacitor essentially during the first sub-cycle and so as to activate the first switching device to conduct the electrical charge from the first capacitor to the control electrode of the power transistor, to turn on the power transistor during the second sub-cycle.

---

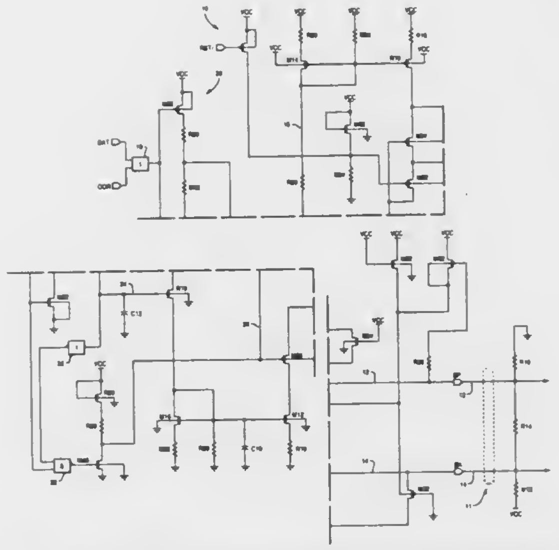
### 5,019,720
## INTEGRATED CIRCUIT DRIVER FOR SERIAL BUS HAVING OUTPUT OVERVOLTAGE PROTECTION

**Steven K. Skoog, and Ernest W. Cordan, Jr., both of Colorado Springs, Colo., assignors to NCR Corporation, Dayton, Ohio**

**Filed Mar. 12, 1990, Ser. No. 491,795**

**Int. Cl.$^5$ H03K** ***17/16***

**U.S. Cl. 307—270** **66 Claims**



1. An integrated circuit driver for high and low lines in a bus comprising:

first and second current sources connected to high and low voltage sources, respectively; and

first and second means for blocking voltage spikes higher or lower than the voltages provided by said high and low voltage sources;

wherein said first current source and said first blocking means are series connected between said high voltage supply and said high line, and said second current source and said second blocking means are series connected between said low voltage source and said low line.

---

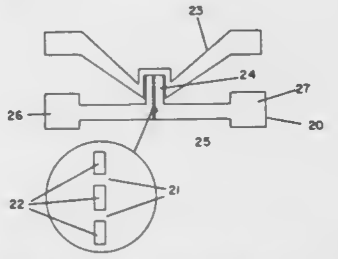
### 5,019,721
## ACTIVE SUPERCONDUCTING DEVICES FORMED OF THIN FILMS

**Jon S. Martens; James B. Beyer; James E. Nordman, and Gert K. G. Hohenwarter, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Aug. 18, 1989, Ser. No. 395,965**

**Int. Cl.$^5$ H03K** ***3/38, 17/92***

**U.S. Cl. 307—306** **33 Claims**



1. A controllable active superconducting device comprising:

(a) a main conduction channel formed of a film of superconductor on a substrate;

(b) an active weak link region interposed sin the main conduction channel, the active weak link region composed of a plurality of links formed of a thin film of superconductor separated by non-superconductive voids, the thickness and lateral dimensions of the links selected such that magnetic flux can propagate across the weak link region when it is superconducting;

(c) means for providing a magnetic flux to the active weak link region which can propagate across the weak link region to control the resistance of the weak region.

---

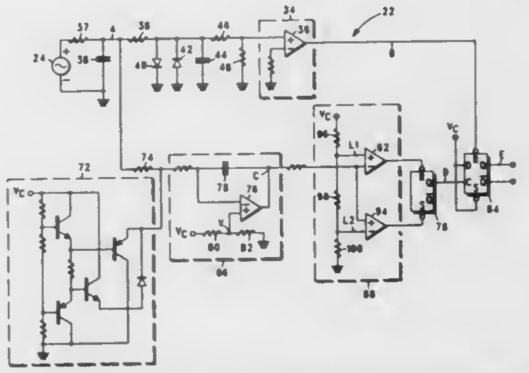
### 5,019,722
## THRESHOLD CROSSING DETECTION WITH IMPROVED NOISE REJECTION

**Robert M. Hess, Arlington Heights, and Roy E. Hunninghaus, Des Plaines, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 5, 1990, Ser. No. 489,983**

**Int. Cl.$^5$ H03K** ***5/153***

**U.S. Cl. 307—354** **10 Claims**



1. In a signal processing system that includes: (a) a detector receiving a sensor input signal for developing a detector output signal indicative of a threshold-crossing in the sensor input signal; and (b) circuitry receiving the sensor input signal for generating an integrated sensor signal that is capable of experiencing amplitude excursions between two opposite extremes, a method of processing the integrated sensor signal and the detector output signal to form a binary level output signal, comprising:

comparing the integrated sensor signal to a first reference level that is near one of the extreme amplitude excursions of the integrated sensor signal;

VOL
1126
ISS
4
MY
28
1991
UMI

comparing the integrated sensor signal to a second reference level that is near the other extreme amplitude excursion of the integrated sensor signal;

generating an intermediate output signal that is set to a first state when the integrated sensor signal reaches the first reference level while undergoing an amplitude excursion in a first direction;

setting the intermediate output signal to a second state when the integrated sensor signal reaches the second reference level while undergoing an amplitude excursion in a second, opposite direction after completing the excursion in the first direction; and

logically combining the intermediate output signal with the detector output signal to develop the binary level output signal having a transition representative of the threshold-crossing of the sensor input signal.

---

### 5,019,723

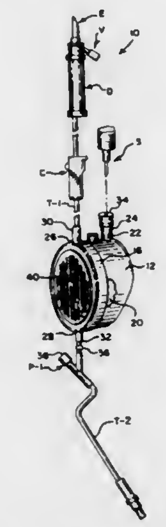
## SELF-REGULATED THERAPEUTIC AGENT DELIVERY SYSTEM AND METHOD

**Loi H. Tran, Wheaton, Ill., assignor to Controlled Release Technologies, Inc., Chicago, Ill.**

**Division of Ser. No. 129,159, Dec. 7, 1987, Pat. No. 4,871,352. This application Oct. 2, 1989, Ser. No. 416,109**

**Int. Cl.$^5$ G11C** *13/02*

**U.S. Cl. 307—400** **5 Claims**



1. A method of preparing an electret membrane comprising a polyelectrolyte salt and a porous hydrophilic polymer matrix having a charge modified ionic surface comprising the steps of:

providing the polymer matrix;

providing a solution of polyelectrolyte salt;

impregnating the polymer matrix by immersion in the polyelectrolyte solution;

elevating the temperature of the polyelectrolyte solution;

maintaining the immersed polymer matrix at the elevated temperature to form an electret membrane; and

drying the electret membrane.

---

### 5,019,724

## NOISE TOLERANT INPUT BUFFER

**David C. McClure, Carrollton, Tex., assignor to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.**

**Filed Dec. 20, 1989, Ser. No. 453,589**

**Int. Cl.$^5$ H03K** *5/22, 17/16*

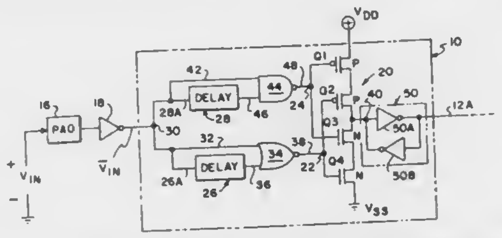
**U.S. Cl. 307—443** **16 Claims**

1. A noise tolerant interface circuit having an input node and an output node comprising, in combination:

an inverter having first and second complementary transistors, said first transistor having a source terminal for coupling to a positive supply terminal, a drain terminal and a gate terminal, and said second transistor having a source terminal for coupling to a reference potential, a drain terminal and gate terminal, the drain terminal of the first transistor being "coupled" to the drain terminal of the second transistor, and the gate terminals of said first and second transistors being connected in common;

a first NOR gate having direct and delay input terminals and an output terminal, said direct input terminal being connected to the input node of said interface circuit and said NOR gate output terminal being connected to the common gate input terminal of said inverter;

delay means having a delay input terminal connected to said interface input node and a delay output terminal connected to the delay input terminal of said NOR gate for enabling said NOR gate upon the elapse of a predetermined time interval after a signal is applied to said interface circuit input node;



said delay means including a second NOR gate having direct and delay input terminals and an output terminal, said direct input terminal of said second NOR gate being connected to said interface circuit input node; and

a plurality of inverters connected in electrical series relation between said interface input node and the delay input terminal of said second NOR gate, the output terminal of said second NOR gate being coupled to the delay input of said first NOR gate.

---

### 5,019,725

## INPUT CIRCUIT

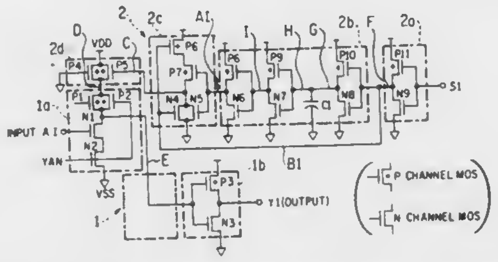
**Kenji Yoshino, Sakae, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Oct. 3, 1989, Ser. No. 416,615**

**Claims priority, application Japan, Oct. 7, 1988, 63-254566**

**Int. Cl.$^5$ H03K** *17/16*

**U.S. Cl. 307—443** **12 Claims**



1. An input circuit having a threshold voltage compensated for ground side-generated noise, said input circuit comprising:

input circuit stage means connected between a power supply side and a ground side and having an input terminal for accepting an input signal varying between "high" and "low" voltage magnitudes, said input circuit stage means having a threshold voltage which is at a magnitude located between the "high" and "low" voltage magnitudes; and

load circuit compensating means connected between the power supply side and said input circuit stage means, said load circuit compensating means including

means for temporarily increasing the threshold voltage of said input circuit stage means in response to noise generated at the ground side of said input circuit stage means to prevent the noise level from surpassing the threshold voltage as temporarily increased, thereby negating the occurrence of a glitch in the output signal from said input circuit stage means.

---

### 5,019,726

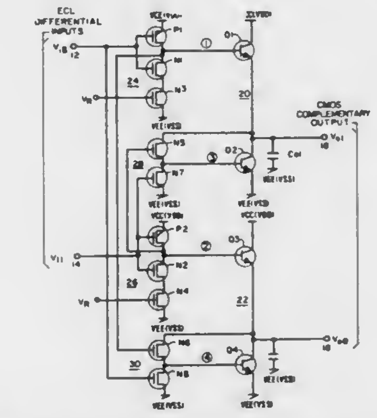
## BICMOS ECL-TO-CMOS CONVERSION CIRCUIT

**Tzen-Wen Guo, Danville, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Oct. 13, 1989, Ser. No. 420,985**

**Int. Cl.$^5$ H03K** *19/01*

**U.S. Cl. 307—446** **10 Claims**



1. A bipolar/CMOS ECL-to-CMOS conversion circuit for receiving ECL differential input signals and for converting said ECL input signals to CMOS complementary output signals, comprising:

first output stage formed of a first bipolar transistor (Q1) and a second bipolar transistor (Q2), said first bipolar transistor (Q1) having its collector connected to an upper supply potential and its emitter connected to the collector of said second bipolar transistor (Q2), said second bipolar transistor (Q2) having its collector connected also to a first output terminal (**18**) for generating one of said CMOS complementary output signals and its emitter connected to a lower supply potential;

second output stage formed of a third bipolar transistor (Q3) and a fourth bipolar transistor (Q4), said third bipolar transistor (Q3) having its collector connected to the upper supply potential and its emitter connected to the collector of said fourth bipolar transistor (Q4), said fourth bipolar transistor (Q4) having its collector connected also to a second output terminal (**16**) for generating the other one of said CMOS complementary output signal and its emitter connected to the lower supply potential;

first base drive circuit means (**24**) being responsive to one of said ECL differential input signals for generating a first control signal connected to the base of said first bipolar transistor (Q1);

second base drive circuit means (**26**) being responsive to the other one of said ECL differential input signals for generating a second control signal connected to the base of said third bipolar transistor (Q3);

third base drive circuit means (**28**) being responsive to said second control signal and the other one of said ECL differential input signals for generating a third control signal connected to the base of said second bipolar transistor (Q2);

fourth base drive circuit means (**30**) being responsive to said first control signal and said one of said ECL differential input signals for generating a fourth control signal connected to the base of said fourth bipolar transistor (Q4);

said first base drive circuit means (**24**) including a first P-channel MOS transistor (P1) and a first N-channel MOS transistor (N1), said first P-channel MOS transistor (P1) having its source connected to the upper supply potential, its gate connected to the gate of said first N-channel transistor (N1), and its drain connected to the drain of said first N-channel transistor (N1), the common gates of said first P-channel and first N-channel transistors (P1, N1) being connected to a first input terminal (**12**) for receiving said one of said ECL differential input signals, the common drains of said first P-channel and first N-channel transistors (P1, N1) being connected to the base of said first bipolar transistor (Q1);

said second base drive circuit means (**26**) including a second P-channel MOS transistor (P2) and a second N-channel MOS transistor (N2), said second P-channel transistor (P2) having its source connected to the upper supply potential, its gate connected to the gate of said second N-channel transistor (N2), and its drain connected to the drain of said second N-channel transistor (N2), the common gates of said second P-channel and second N-channel transistors (P2, N2) being connected to a second input terminal (**14**) for receiving the other one of said ECL differential input signals, the common drains of said second P-channel and second N-channel transistors (P2, N2) being connected to the base of said third bipolar transistor (Q3); and

said first base drive circuit means (**24**) further including a third N-channel MOS transistor (N3) functioning as a regulated current source, said third N-channel transistor (N3) having its drain connected to the source of said first N-channel transistor (N1), its gate connected to a CMOS gate-controlling voltage, and its source connected to the lower supply potential.

---

### 5,019,727

## SEMICONDUCTOR INTEGRATED CIRCUIT HAVING A DECODING AND LEVEL SHIFTING FUNCTION

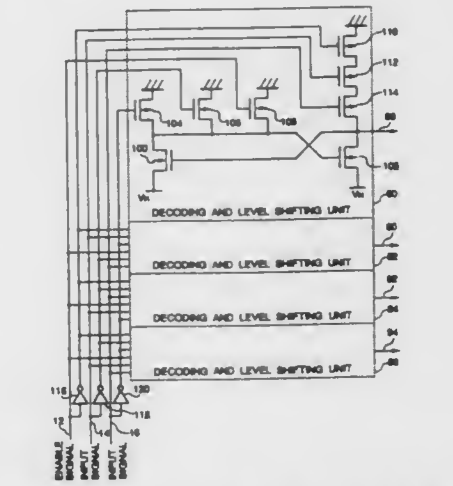
**Kazuyuki Kusaba, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Dec. 20, 1989, Ser. No. 453,607**

**Claims priority, application Japan, Dec. 20, 1988, 63-322504**

**Int. Cl.$^5$ H03K** *19/094, 19/017, 17/687, 17/04*

**U.S. Cl. 307—449** **5 Claims**



110
112
114
102
104
106
108
DECODING AND LEVEL SHIFTING UNIT
DECODING AND LEVEL SHIFTING UNIT
DECODING AND LEVEL SHIFTING UNIT
DECODING AND LEVEL SHIFTING UNIT
DECODING AND LEVEL SHIFTING UNIT
116
118
120
12
14
16
ENABLE SIGNAL
INPUT SIGNAL
INPUT SIGNAL

1. A decoding and level shifting circuit comprising first and second transistors of a first conduction type each having a source connected to a first potential corresponding to a low level, a gate and a drain of one transistor of the first and second transistors being connected to a drain and a gate of the other transistor of the first and second transistors, respectively, a first group of transistors of a second conduction type different from the first conduction type, the first group of transistors being connected in parallel between the drain of the first transistor and a second potential corresponding to a high level, gates of

VOL
1126
ISS
4
MY
28
1991
UMI

the first group of transistors being connected to receive a first group of signals, respectively, and a second group of transistors of the second conduction type connected in series between the drain of the second transistor and the second potential, gates of the second group of transistors being connected to respectively receive a second group of signals complementary to the first group of signals, the drain of the second transistor giving an output.

---

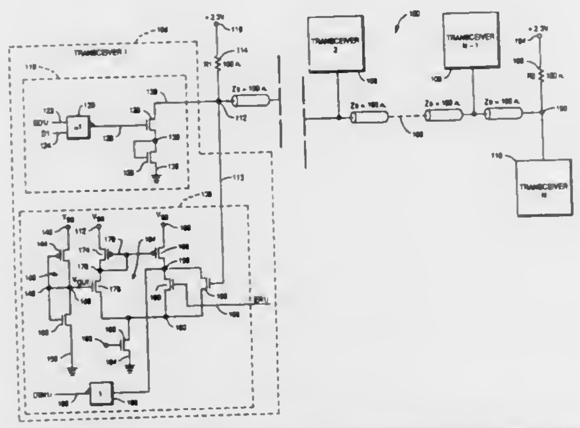
### 5,019,728
## HIGH SPEED CMOS BACKPANEL TRANSCEIVER

**Ikuo J. Sanwo, San Marcos, Calif., and James A. Donahue, Great Falls, Mont., assignors to NCR Corporation, Dayton, Ohio**

**Filed Sep. 10, 1990, Ser. No. 580,017**

**Int. Cl.$^5$ H03K** *19/092*

**U.S. Cl. 307—475** **14 Claims**



1. A high speed inter-integrated circuit (AC) chip data transceiver for, via a data transfer bus, transferring data between AC chips which internally utilize signals at first and second logic levels comprising:

pre-charge means for pre-charging said data transfer bus to a third logic level; and

pull-down means for pulling said data transfer bus down to a fourth logic level;

wherein the voltage swing between said third and fourth logic levels is lower than the voltage swing between said first and second logic levels.

---

### 5,019,729
## TTL TO CMOS BUFFER CIRCUIT

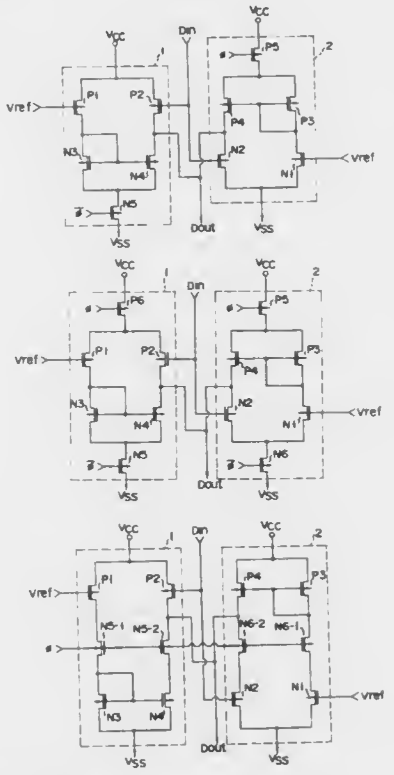
**Tohru Kimura, Sagamihara; Syuso Fujii, Kawasaki, and Takashi Ohsawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 21, 1989, Ser. No. 382,493**

**Claims priority, application Japan, Jul. 27, 1988, 63-187530**

**Int. Cl.$^5$ H03K** *19/092, 19/096, 19/003, 17/16*

**U.S. Cl. 307—475** **31 Claims**



1. A buffer circuit comprising:

a first potential supplying source;

a first MOS transistor of a first conductivity type having a source connected to said first potential supplying sourcc and a gate supplied with a reference potential;

a second MOS transistor of the first conductivity type having a source connected to said first potential supplying source and a gate supplied with an input signal;

a second potential supplying source;

a first current mirror circuit including MOS transistors of a second conductivity type and connected between the drains of said first and second MOS transistors and said second potential supplying source;

a third MOS transistor of the second conductivity type having a source connected to said second potential supplying source and a gate supplied with the reference potential;

a fourth MOS transistor of the second conductivity type having a source connected to said second potential supplying source, a drain connected to the drain of said second MOS transistor and a gate supplied with the input signal, an output signal being derived from a connection node between the drains of said second and fourth MOS transistors; and

a second current mirror circuit including MOS transistors of the first conductivity type and connected between the drains of said third and fourth MOS transistors and said first potential supplying source, wherein the second current mirror circuit is not connected in series with the first current mirror circuit.

---

### 5,019,730
## INFORMATION SEPARATION DEVICE

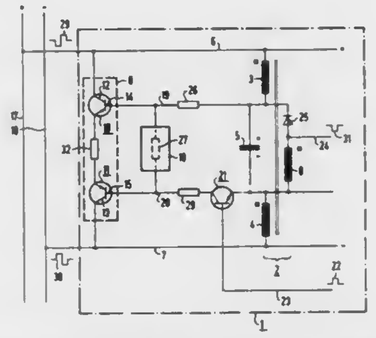
**Hermann Zierhut, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jan. 16, 1990, Ser. No. 464,925**

**Claims priority, application European Pat. Off., Jan. 27, 1989, 89101452.4**

**Int. Cl.$^5$ H03K** *5/00*

**U.S. Cl. 307—510** **6 Claims**



1. An information separation device for receiving and transmitting a voltage information bearing signal, comprising:

(a) a transformer functioning as a separating filter separating a received a.c. voltage information bearing signal from a direct current power, said transformer comprising:
  (1) a first side having at least a first and second winding, each having a first and second end;
  (2) a second side having a second winding outputting the received a.c. voltage information bearing signal;
  (3) a capacitor having a first terminal and a second terminal, said capacitor being coupled between the first end of the first winding and the second end of the second winding;
(b) a first transmission line being coupled to the second end of the first winding, and carrying the direct current power and received a.c. voltage information bearing signal;
(c) a second transmission line being coupled to the first end of the second winding, and carrying the direct current power and the a.c. voltage information bearing signal, whereby said capacitor transmits the a.c. voltage information bearing signal appearing on said first and second transmission lines;
(d) a first controllable switch having an input electrode, a control electrode, and an output electrode being coupled to the first transmission line;
(e) a second controllable switch of opposite polarity to the first controllable switch, having an input electrode being coupled to the input electrode of the first controllable switch, having a control electrode, and having an output electrode coupled to the second transmission line; and p1
(f) means for applying a load-independent voltage source across the control electrode of said first and second controllable switches when transmitting the a.c. information bearing signal.

---

### 5,019,731
## ANALOG SWITCH CIRCUIT

**Osamu Kobayashi, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed May 8, 1989, Ser. No. 348,913**

**Claims priority, application Japan, May 31, 1988, 63-133657**

**Int. Cl.$^5$ H03K** *17/687, 17/16*

**U.S. Cl. 307—571** **22 Claims**

1. An analog switch circuit, comprising:

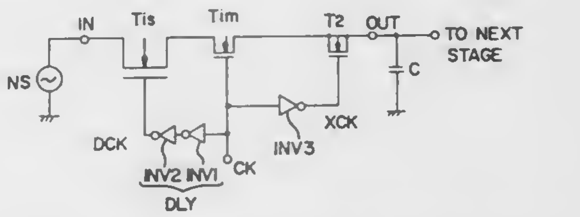
an input terminal to which an analog signal is supplied;

an output terminal;

a first transistor having first and second electrodes and a gate, the first electrode of said first transistor being connected to said input terminal;

a second transistor having first and second electrodes and a gate, the first electrode of said second transistor being coupled to the second electrode of said first transistor, the gate of said second transistor being supplied with a clock signal;

delay means operably connected between the gate of said first transistor and the gate of said second transistor, wherein said delay means is for delaying said clock signal by a predetermined time and generating a delayed clock signal supplied to the gate of said first transistor; and



a third transistor having first and second electrodes and a gate, the first and second electrodes of said third transistor being coupled to each other and to the second electrode of said second transistor and said output terminal through which an analog output signal is output, the gate of said third transistor being controlled so that said third transistor is turned ON when said second transistor is turned OFF.

---

### 5,019,732
## DISENGAGEABLE LINEAR STEPPER MOTOR WITH RECENTERED ROTOR

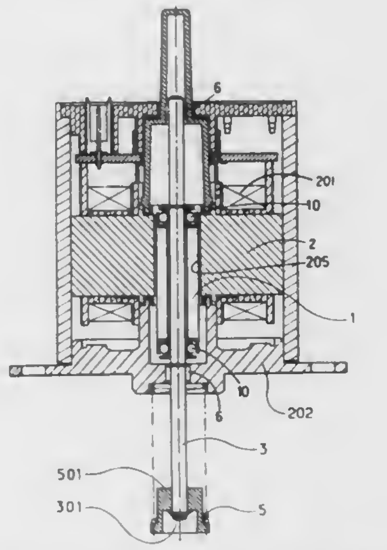
**Gilbert Spiesser, Ales, France, assignor to Sextant Avionique, Paris, France**

**Filed Mar. 13, 1989, Ser. No. 322,430**

**Claims priority, application France, Mar. 14, 1988, 88 03361; European Pat. Off., Feb. 27, 1989, 89400536.2**

**Int. Cl.$^5$ H02K** *7/08, 41/06*

**U.S. Cl. 310—49 R** **7 Claims**



1. An electric linear stepper motor comprising a multipolar stator with a threaded bore, a rotor of a diameter less than that of said bore, threaded to the same pitch as said bore and rolling cycloidally inside the latter under the action of stator forces, and a drive rod axially fast with said rotor and thus driven in linear translation, wherein said rod is rigid and the motor is

OL
126
SS
4
MY
28
1991
UMI

provided with means for imobilizing it radially in the center of said bore, as well as resilient return means for centering said rotor on said rod in the absence of stator forces.

---

### 5,019,733
### AC GENERATOR

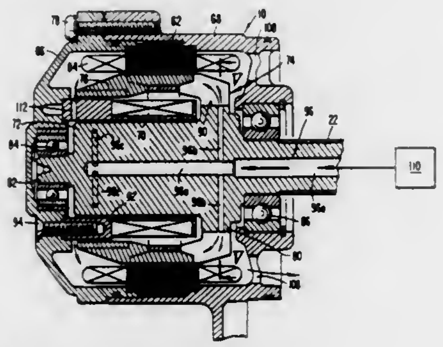
**Kouji Kano; Hajime Tabata, both of Saitama, and Toshikazu Kawakami, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 21, 1988, Ser. No. 247,256**

**Claims priority, application Japan, Sep. 25, 1987, 62-147315**

**Int. Cl.$^5$ H02K** *9/00, 1/32*

U.S. Cl. 310—61 20 Claims



1. An AC generator comprising:
a housing;
a stator wound with a stator coil secured to the inner surface of said housing;
a rotor rotatably supported within said housing including a rotating shaft having a pole core centered within said stator coil, said rotating shaft containing a first cooling passageway opening into said housing;
a field coil positioned inwardly of said pole core for magnetizing said pole core; and
said rotating shaft containing a second cooling passageway opening toward said field coil.

---

### 5,019,734
### BRAKE COUPLER FOR DISPLACEMENT-TYPE ARMATURE MOTOR

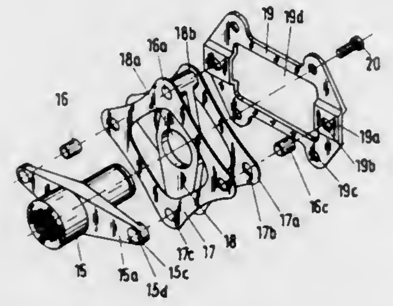
**Alfred Bernd, Herdecke; Willi England, Wetter; Heinz Flaig, Bochum; Wilhelm Hesse, Hattingen; Roland Staggl, Wetter, and Karl Zacharias, Schwerte, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany**

**Filed Mar. 21, 1990, Ser. No. 496,782**

**Claims priority, application Fed. Rep. of Germany, Mar. 21, 1989, 3909771**

**Int. Cl.$^5$ H02K** *7/06, 17/32*

U.S. Cl. 310—77 20 Claims



11. A displacement armature motor with a stator and a displacement armature axially shiftable relative to the stator against the force of a brake spring, which displacement armature is connected to a shaft, wherein the shaft is supported in the end plates of a motor casing, and where the displacement armature is supported on the shaft fixed against rotation via a deformation element attached to the shaft, which deformation element transfers the rotary torque, where the deformation element exhibits a frame with attachment positions disposed at corners of the frame, wherein a first one of said attachment positions is connected to an extension of the displacement armature and wherein a second one of said attachment positions is connected to carrier arms of a support ring, wherein the deformation element includes a first frame (17) and a second frame (17*a*), of which the second frame (17*a*) is connected via two of its attachment positions (17*b*) to an attachment plate (19), where the attachment plate (19) is connected to an extension (31) of the displacement armature, and wherein the first frame (17) is connected with two of its attachment positions to the carrier arms (15*a*) of the support ring (15), and where the first frame (17) and the second frame (17*a*) are connected to each other with their, in each case, remaining attachment positions (17*c*) via a transfer element (18).

---

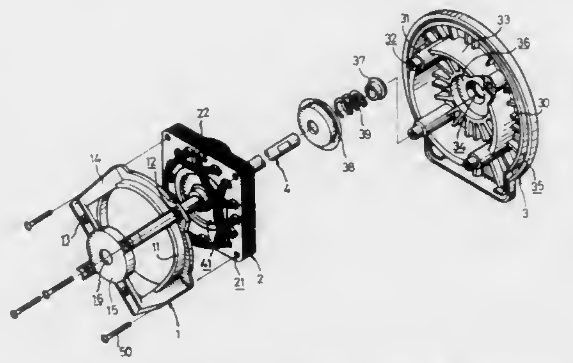
### 5,019,735
### MOTOR CONSTRUCTION FOR AN ELECTRIC FAN

**Jen J. Lee, No. 7, Alley 14, Lane 101, Shyue Fu Rd., San Ho Tsun, Ta Ya Hsiang, Taichung Hsien, Taiwan**

**Filed Aug. 7, 1990, Ser. No. 563,354**

**Int. Cl.$^5$ H02K** *15/00*

U.S. Cl. 310—89 1 Claim



1. A motor construction comprising generally a stator disposed between a casing and a cap, said casing including a ring portion and four equally spaced frame members integrally formed together so that said casing has an open structure, a disc portion with a first center hole formed therein being integrally formed in a center and coupling portion of said frame members, a first screw hole being formed in a root portion of each said frame member; said cap having a plurality of ribs formed therein so as to form a mesh grid structure, four equally spaced posts being integrally formed on an annular wall which is substantially concentrically formed in a middle portion of said cap, a second screw hole being formed in a front end of each said post, a second center hole being formed in said cap, a bearing being force-fitted in said second center hole of said cap; induction coil being wound on said stator which has an aperture formed in each of four corner areas thereof, a rotor being rotatedly disposed in a center portion of said stator, a shaft being vertically fixed to a center portion of said rotor; said casing, said stator and said cap being fixed together by four screws which are threaded through said first screw holes of said casing, passed through said apertures of said stator and threaded through said second screw holes of said cap; one end of said shaft extending through said first center hole of said casing, and another end of said shaft which has a fan blade fixed thereto being rotatedly supported by said bearing; and said motor construction has an excellent heat dissipation rate because of said open structure of said casing and said mesh grid structure of said cap.

### 5,019,736
### PROGRAMMABLE LOGIC CELL AND ARRAY

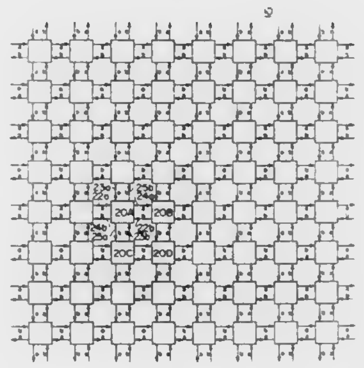
**Frederick C. Furtek, Arlington, Mass., assignor to Concurrent Logic, Inc., Sunnyvale and Apple Computer, Inc., Cupertino, both of, Calif.**

**Continuation-in-part of Ser. No. 378,106, Jul. 11, 1989, which is a division of Ser. No. 928,527, Nov. 27, 1986, Pat. No. 4,918,440.**

**This application Oct. 25, 1989, Ser. No. 427,160**

**Int. Cl.$^5$ H03K** *19/173*

U.S. Cl. 307—465 19 Claims



1. A two-dimensional array of logic cells, each cell except those at the edges of the array having four nearest neighbors, one to the left or West, one to the right or East, one above or to the North and one below or to the south, each cell comprising:
four inputs, one from each of its four nearest neighbors,
four outputs, one to each of its four nearest neighbors,
means for storing a plurality of control bits,
means for multiplexing the four inputs onto first and second input leads, the inputs connected to said input leads being specified by control bits stored in said storing means, and
logic means for generating signals on said outputs in response to signals on said input leads and control bits stored in said storing means, said logic means comprising at least means for passing signals on said input leads to said outputs without logical transformation and means for implementing at least one logical transformation on the signals on said input leads.

---

### 5,019,737
### TWIN-WALLED CASING FOR ELECTRIC MOTOR WITH FORCED AIR-COOLING

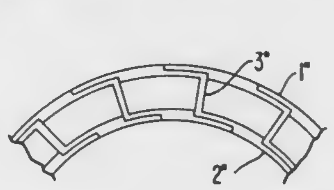
**Caoduro Bruno, Vincenza, Italy, assignor to Nowax S.r.l., Vicenza, Italy**

**Continuation-in-part of Ser. No. 310,676, Feb. 14, 1989, ahandoned. This application Dec. 29, 1989, Ser. No. 459,380**

**Claims priority, application Italy, Jul. 26, 1988, 85621 A/88**

**Int. Cl.$^5$ H02K** *5/04, 5/18, 5/20/9/16*

U.S. Cl. 310—89 5 Claims



1. A double-jacketed electric motor casing with forced air cooling, comprising:
an outer cylindrical jacket and an inner cylindrical jacket arranged coaxially and mutually spaced to define therebetween an annular interspace having open end sections thereof, said inner cylindrical jacket being arranged to internally accomodate a stator pack,
a fan-covering collector dome mounted proximate to one of said open end sections, and
a plurality of connecting ribs arranged between said outer and inner cylindrical jackets, said connecting ribs extending in a substantially radial direction and being angularly spaced to define inside said annular interspace a plurality of flow channels providing a substantially laminar flow for the cooling air,
wherein said outer and inner jackets are formed from a plurality of elongate separate elements made of stamped metal sheet, said elements having a transverse cross-section substantially Z-shaped to define in said connecting ribs a central portion connecting opposed end wings, said elements being mutually welded by substantially continuous welding along said wings thereof.

---

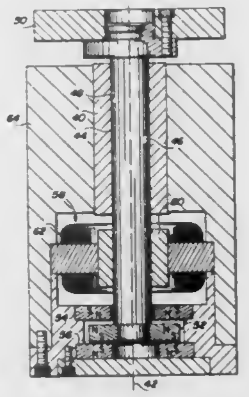
### 5,019,738
### SELF-PRESSURIZING GAS SUPPORTED SURFACE-ROUGHNESS BEARING

**August O. Weilbach, La Habra, Calif.; Derald F. Hanson, and C. Dwight Smith, both of Phoenix, Ariz., assignors to Lincoln Laser Company, Phoenix, Ariz.**

**Filed Jul. 16, 1990, Ser. No. 568,416**

**Int. Cl.$^5$ F16C** *17/04, 39/06;* **H02K** *5/16, 7/09*

U.S. Cl. 310—90.5 22 Claims



14. A self-pressurizing gas supported bearing comprising:
a. a first bearing element having a longitudinal axis and a curved inner bearing surface with a random surface texture having a first $R_a$ roughness profile;
b. a second bearing element positioned coaxially within the first bearing element and having a curved outer bearing surface with a random surface texture having a second $R_a$ roughness profile, wherein the sum of the first and second $R_a$ roughness profiles falls within the range of from about eighteen to about sixty and wherein the first and second bearing elements are aligned along the longitudinal axis such that the inner and outer bearing surfaces overlap;
c. drive means for establishing a relative rotational velocity between the inner and outer bearing surfaces where the relative rotational velocity generates a bearing stiffness force and causes the overlapping bearing surfaces to lift off and break contact; and
d. the inner and outer bearing surfaces having a geometry dimensioned to maintain a predetermined mean spacing between the overlapping surfaces of the first and second bearing elements of from a minimum mean spacing of about seventy-five microinches to a maximum mean spacing where the inner and outer bearing surfaces fail to lift off and break contact.

VOL
126
SS
4
MY
28
1991
UMI

### 5,019,739

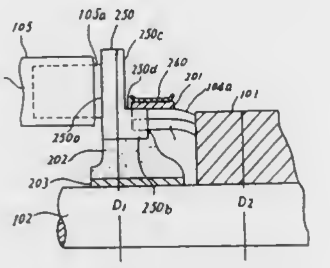
### DC MOTOR FOR AUTOMOTIVE ENGINE STARTER

**Sbuzoo Isozumi; Tetsuo Yagi, and Toshinori Tanaka, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 249,174, Aug. 15, 1988, Pat. No. 4,978,874. This application Sep. 6, 1989, Ser. No. 403,520**

**Int. Cl.$^5$ H02K** *13/04*

**U.S. Cl. 310—233** **5 Claims**



1. A dc motor, comprising:
an armature core mounted on a rotation shaft;
a commutator mounted on said rotation shaft adjacent said armature, said commutator comprising a plurality of segments linked to respective terminal parts of armature coils drawn out of said armature core;
a brush unit, disposed to contact said segments; and
a bind, arranged in a ring shape straddling over terminal parts of said armature coils and said segments,
wherein said commutator has a contacting surface for making contact with brushes of said brush unit, said contacting surface being formed as a vertical surface crossing normal to said rotation shaft and having an outside diameter larger than a diameter of said armature core,
a boss-shaped part being formed on a side part of said commutator at said armature core side, with an outside diameter equal to or larger than the diameter of said armature core,
said bind being formed of a ringed plate member with an internal diameter larger than the diameter of said armature core and disposed to be straddling over said boss-shaped part, and
a ringed terminal wire group being formed of said terminal parts connected to said segments.

---

### 5,019,740

### COLLECTOR SEGMENT

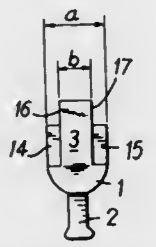
**Arno Altpeter, Sindelfingen, and Carsten Bauer, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 20, 1989, Ser. No. 425,049**

**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1988, 8815711[U]**

**Int. Cl.$^5$ H02K** *13/04*

**U.S. Cl. 310—234** **6 Claims**



1. A collector segment comprising a connecting end having a contact surface to which a loop of a wire winding of an electric machine rotor is to be welded; and a connecting lug extending radially form said collector segment in a direction opposite to a direction of a rotational axis of the electric machine rotor, said connecting lug having two opposte flat narrow sides extending substantially transverse to said contact surface, and two positioning surfaces formed on said two opposite flat narrow sides for defining a position of the wire winding loop in an extension direction of said connecting lug to thereby provide for a reliable welded connection between the wire winding loop and said contact.

---

### 5,019,741

### BRUSH HOLDER DEVICE FOR ELECTRIC MOTOR

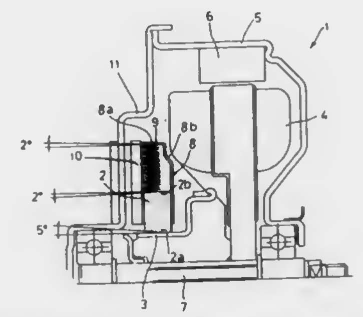
**Masashi Fukui, Tochigi, and Tomoyuki Shinoda, Gunma, both of Japan, assignors to Mitsuba Electric Manufacturing Co., Ltd., Gunma, Japan**

**Filed May 14, 1990, Ser. No. 522,818**

**Claims priority, application Japan, May 15, 1989, 1-55514[U]**

**Int. Cl.$^5$ H01R** *39/38*

**U.S. Cl. 310—239** **14 Claims**



1. A brush holder device for an electric motor comprising:
a brush holder having a bottom surface and a space with two axial ends;
a brush movably received in said brush holder and having inner and outer end surfaces;
a spring which acts between said bottom surface of said brush holder and said outer end surface of said brush so as to resiliently press said brush into contact with a commutator of said electric motor; and
means for urging said spring towards one of said axial ends of the space within said brush holder, said spring urging means comprising said bottom surface of said brush holder on which one end of said spring acts and said outer end surface of said brush on which an opposite end of said spring acts being inclined in opposite directions along the axis of said motor such that the distance between said bottom and outer end surfaces is greater at one axial end than at the other axial end of said brush holder.

---

### 5,019,742

### SAW DEVICE WITH APODIZED IDT

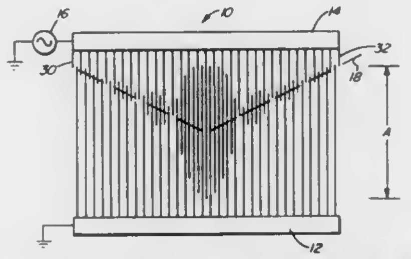
**Mark S. Suthers, Lanark; Grantley O. Este, Stittsville, and Richard W. Streater, Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Continuation of Ser. No. 839,657, Mar. 14, 1986, abandoned. This application Sep. 23, 1987, Ser. No. 102,786**

**Int. Cl.$^5$ H01L** *41/08*

**U.S. Cl. 310—313 C** **11 Claims**

1. Apparatus comprising:
a SAW (surface acoustic wave) device comprising a substrate and an IDT (inter-digital transducer) thereon, the IDT comprising two conductive rails and a plurality of inter-digital fingers extending therefrom, the fingers extending from each rail having varying lengths whereby the fingers extending from the two rails overlap to form an apodization pattern, wherein the apodization pattern has a predetermined axis which is closer to one conductive rail of the IDT at each end of the pattern than between the ends of the pattern;



a signal connection to said one conductive rail of the IDT; and
a ground connection to the other conductive rail of the IDT.

---

### 5,019,743

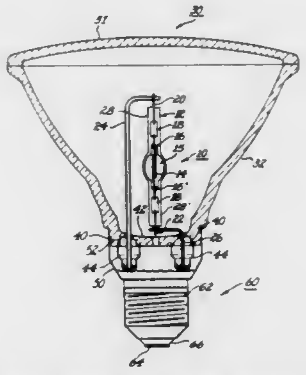
### MOUNT STRUCTURE FOR DOUBLE ENDED LAMP

**Ronald J. Olwert, Concord Township, Lake County; Frank E. Zalar, Euclid, and Walter R. Chapman, Jr., Cleveland Heights, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Nov. 17, 1989, Ser. No. 439,113**

**Int. Cl.$^5$ H01J** *5/46;* **H01K** *1/22*

**U.S. Cl. 313—25** **12 Claims**



1. A double ended lamp and mount assembly wherein said lamp comprises a light transmissive envelope containing an electric light source within and having a molybdenum alloy outer lead wire projecting outwardly from each end of said lamp mounted in a suitable mount by means of a long and a short mount wire welded to respective ones of said molybdenum alloy outer lead wires of the lamp, with the shorter mount wire being smaller in cross-section than the long mount wire, but not smaller in cross-section than the lamp lead to which it is welded and with the recrystallization temperature of the molybdenum alloy lamp lead wire to which the short mount is welded being at least about 200° C. higher than molybdenum.

---

### 5,019,744

### DIRECT HEATING TYPE CATHODE STRUCTURE

**Seung-jae Lee, Suwon, Rep. of Korea, assignor to Samsung Electron Devices Co., Ltd., Rep. of Korea**

**Filed Nov. 9, 1989, Ser. No. 433,150**

**Claims priority, application Rep. of Korea, Nov. 17, 1988, 88-15126**

**Int. Cl.$^5$ H01J** *1/16, 1/15*

**U.S. Cl. 313—346 R** **4 Claims**

1. A direct heating cathode comprising:
an electrically insulating support;
two terminals mounted in said support and separated from each other;
an emitter for emitting electrons; and
a continuous generally W-shaped heater including two opposed ends, each end being connected to one of said terminals, a central flat portion on which said emitter is mounted, two generally U-shaped portions respectively connecting said central flat portion to respective ends, and two convex shoulder projecting away from said insulating support and generally toward said emitter, each shoulder being disposed between one of said respective bent U-shaped portions and said ends.

---

### 5,019,745

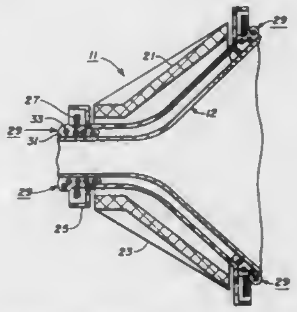
### UV-CURABLE ADHESIVE ATTACHMENT MEANS AND METHOD FOR A CATHODE-RAY TUBE-YOKE COMBINATION

**Samuel B. Deal, Lancaster, and Donald W. Bartch, Wrightsville, both of Pa., assignors to RCA Licensing Corp., Princeton, N.J.**

**Filed Aug. 24, 1989, Ser. No. 397,933**

**Int. Cl.$^5$ H01J** *29/70, 9/00*

**U.S. Cl. 313—440** **11 Claims**



1. In a combination including a cathode-ray tube having a glass envelope, a deflection yoke positioned on said envelope for producing a magnetic field, and a body of cured polymeric material attaching said yoke in a fixed position on said envelope, the improvement wherein said body of polymeric material comprises
a composition including a UV curable adhesive and UV-transmissive particles of a suitable material in an amount sufficient to accelerate the curing of said adhesive.

---

### 5,019,746

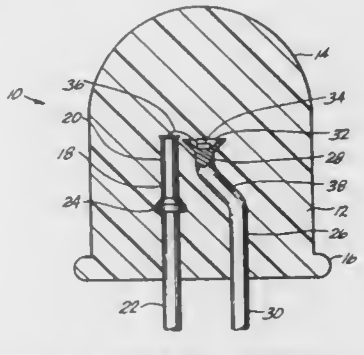
### PREFABRICATED WIRE LEADFRAME FOR OPTOELECTRONIC DEVICES

**Heinz R. Merg, Santa Clara, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Dec. 4, 1989, Ser. No. 445,430**

**Int. Cl.$^5$ H01J** *1/62*

**U.S. Cl. 313—512** **9 Claims**



1. A light-emitting diode lamp comprising:
a cathode wire having a head end and a tail end, the head end having a layer of metal foil welded thereto and having a cup shaped depression for holding a light-emitting diode formed therein,
an anode wire being parallel to the cathode wire and having

VOL
1126
ISS
4
MY
28
1991
UMI

a head end of the anode wire and a tail end, the head end being flattened and having a layer of metal foil welded thereto;

a light-emitting diode seated in the cup shaped depression of the cathode wire;

a connecting wire bonded to the diode and the anode wire; and

a transparent potting material encasing the head ends of the anode and cathode wires, the diode, and the connecting wire.

---

### 5,019,747

### ILLUMINATION CONTROL APPARATUS

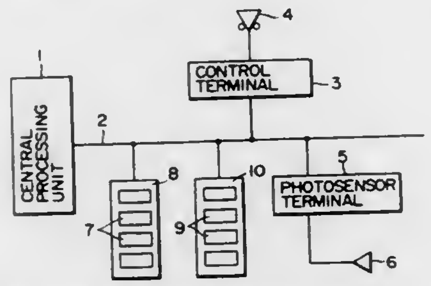
**Masayuki Morita, and Kyoji Yamazaki, both of Yokohama, Japan, assignors to Toshiba Lighting & Technology Corporation, Tokyo, Japan**

**Filed Mar. 26, 1990, Ser. No. 499,010**

**Claims priority, application Japan, Mar. 29, 1989, 1-77066**

**Int. Cl.$^5$ H05B** *37/02*

**U.S. Cl. 315—157** **16 Claims**



1. An illumination control apparatus comprising:

a supervisory slave unit, connected to a transmission line and having an operation switch and a signal generating section for outputting a signal to the transmission line, said signal generating section outputting a first signal representing an operation change of said operation switch every time it is operated and said supervisory slave unit;

a photosensor slave unit, connected to the transmission line and having a photosensor and a signal generating section for generating a signal corresponding to a light amount received by said photosensor, for outputting a second signal representing a change of a level of an illuminance output by a comparison between a preset illuminance level and an illumination value detected by the photosensor and said photosensor slave unit;

a control slave unit for controlling at least one illumination load; and

a master unit, which is connected to said control slave unit through the transmission line, and has a memory in which said control slave unit corresponding to said supervisory slave unit and photosensor slave unit is assigned, for controlling said control slave unit assigned in said memory in response to the first signal from said supervisory slave unit and the second signal from said photosensor slave unit to output a control signal to said assigned control slave unit through the transmission line for inverting an illumination state of said illumination load when the first signal representing said supervisory slave unit is input to said master unit, to output a control signal to said assigned control slave unit through the transmission line for turning off said illumination load when the second signal representing said photosensor slave unit is input to said master unit and an illuminance level change signal representing that the illuminance level is higher than a preset level is received from said photosensor slave unit through the transmission line, and to output a control signal to said assigned control slave unit through the transmission line for turning on said illumination load only when an illuminance level change signal representing that the illuminance level is lower than the preset level is received through the transmission line and said operation switch of said supervisory slave unit is ON.

---

### 5,019,748

### METHOD FOR MAKING AN ELECTROLUMINESCENT PANEL LAMP AS WELL AS PANEL LAMP PRODUCED THEREBY

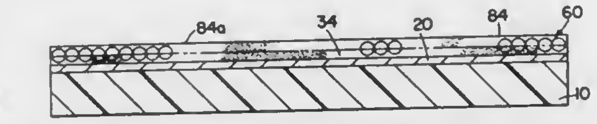
**Gustaf T. Appelberg, Fairfield, Conn., assignor to E-Lite Technologies, Inc., Watertown, Conn.**

**Continuation of Ser. No. 940,794, Dec. 12, 1986, abandoned.**

**This application Jun. 29, 1989, Ser. No. 374,582**

**Int. Cl.$^5$ H05B** *37/00*

**U.S. Cl. 315—169.3** **18 Claims**



6. An electroluminescent panel, said panel comprising:

a transparent insulating member;

a first electrically conductive layer on said member, said first conductive layer being transparent;

a first dielectric layer adjacent said first conductive layer, said first dielectric layer being transparent;

a mono-layer of phosphor particulate adjacent said first dielectric layer, said phosphor particulate mono-layer having interstitial voids between adjacent particles comprising said phosphor particulate;

a second dielectric layer adjacent said phosphor particulate mono-layer wherein said interstitial voids are substantially filled, said second dielectric layer overcoating said phosphor particles to embed them in a dielectric matrix, said second dielectric layer being transparent, and

a second electrically conductive layer adjacent to said second dielectric layer;

said second dielectric layer further forming a smooth surface on the side of said phosphor particulate mono-layer opposite said insulating member;

said second electrically conductive layer further being a vapor deposited aluminum on said smooth surface of said second dielectric layer.

---

### 5,019,749

### BACK-LIGHT DEVICE FOR A VIDEO DISPLAY APPARATUS

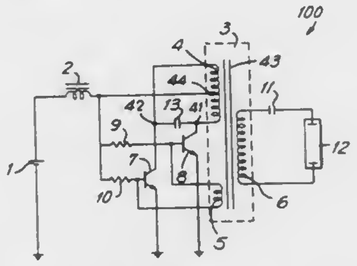
**Norio Ito, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan**

**Filed May 3, 1989, Ser. No. 346,661**

**Claims priority, application Japan, May 10, 1988, 63-113010; Jan. 20, 1989, 1-11612**

**Int. Cl.$^5$ H05B** *41/00*

**U.S. Cl. 315—224** **59 Claims**



1. A back-light device, comprising:

light source means for producing a varying level of luminance and which is characterized by a luminance-ambient temperature curve having a substantially positive slope at

temperatures which are between about −20° C. and +10° C.; and

ballast means for controlling the level of luminance produced by the light source means and which is characterized by a capacitance-ambient temperature curve having a substantially negative slope at temperatures between about −20° C. and +10° C.

---

### 5,019,750

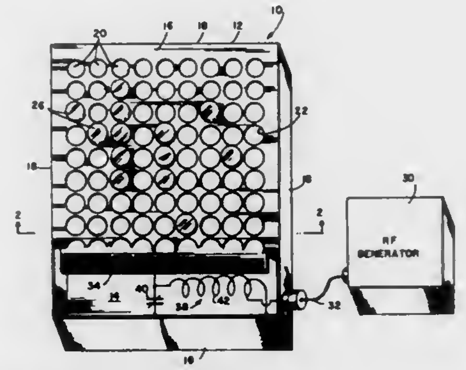
### RADIO-FREQUENCY DRIVEN DISPLAY

**Valery A. Godyak, North Andover, Mass., assignor to GTE Products Corporation, Danvers, Mass.**

**Filed Jan. 16, 1990, Ser. No. 466,104**

**Int. Cl.$^5$ H05B** *41/16*

**U.S. Cl. 315—248** **9 Claims**



1. A video display comprising:

a metallic housing defined by a back wall and a front wall, said front wall being spaced from said back wall by side walls, said front wall defining therein a plurality of holes each surrounded by an adjacent cylindrical surface formed in said front wall;

a plurality of electrodeless lamps, each of said lamps disposed within a respective hole in said front wall;

RF means for providing RF energy to said housing; and

coupling means within said housing for coupling RF energy from said RF means to said electrodeless lamps, said coupling means including said cylindrical surface surrounding each of said lamps.

---

### 5,019,751

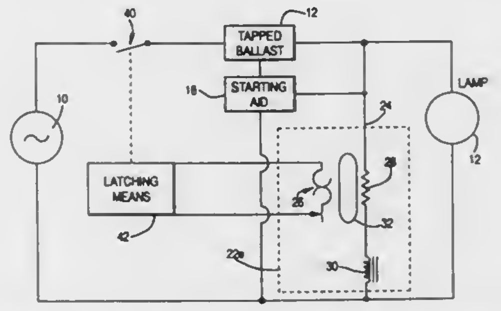
### END-OF-LIFE LAMP STARTER DISABLING CIRCUIT

**Isaac L. Flory, IV, and Joe A. Nuckolls, both of Blacksburg, Va., assignors to Hubbell Incorporated, Orange, Conn.**

**Filed Sep. 15, 1989, Ser. No. 407,616**

**Int. Cl.$^5$ H05B** *41/14*

**U.S. Cl. 315—290** **9 Claims**



1. A disabling circuit for deactivating a gas discharge lamp starting and operating circuit when the lamp exhibits end-of-life cycling, the starting and operating circuit being of the type having an AC power source, a ballast connected to said power source, starting circuit means for supplying high-voltage, high-frequency pulses to start an extinguished lamp and lamp circuit means for connecting said starting and operating circuit to a gas discharge lamp, the disabling circuit comprising the combination of

a thermal switch having normally closed contacts responsive to a predetermined elevated temperature to open;

a heating element connected in parallel circuit relationship with said lamp circuit means so that the voltage across said lamp is applied to said element;

means for supporting said heating element in a selected heat conducting relationship with said thermal switch so that said predetermined elevated temperature is reached and said contacts are opened after an interval of time and the dissipation of an amount of energy resulting from repeatedly high lamp open-circuit voltage accompanying end-of-life cycling; and

latching circuit means connected to said contacts and to said AC source to disconnect said source from said starting and operating circuit when said contacts open and to maintain said source disconnected until said latching circuit means is manually reset;

said means for supporting said heating element in heat conducting relationship with said thermal switch including a mass of polymeric material having a predetermined thickness and means for holding said element and said switch against opposite sides of said mass.

---

### 5,019,752

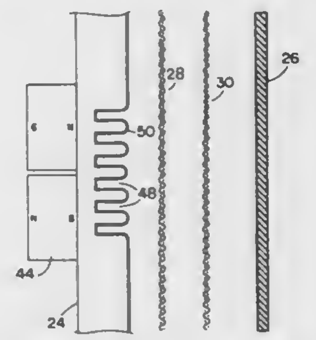
### PLASMA SWITCH WITH CHROME, PERTURBATED COLD CATHODE

**Robert W. Schumacher, Canoga Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 16, 1988, Ser. No. 207,603**

**Int. Cl.$^5$ H01J** *1/32, 17/14, 15/02*

**U.S. Cl. 315—344** **36 Claims**



1. A plasma switch comprising:

a vacuum housing

a cold cathode within the housing which provides a source of secondary electrons,

an anode spaced from the cathode, a source grid disposed between the anode and cathode within the housing,

means for introducing an ionizable gas into the space between the cathode and source grid, said cathode and source grid maintaining a plasma therebetween in response to a predetermined voltage differential between the cathode and source grid,

a control grid disposed between said source grid and anode for selectively enabling and terminating a plasma path between the cathode and anode, and thereby closing and opening the switch, in response to control voltage signals applied to the control grid, and

a magnet means confining the plasma to a predetermined area between the cathode and anode,

said cathode having a series of perturbations which increase the effective cathode surface exposed to the plasma compared to a smooth-walled cathode, said perturbations being shaped to confine secondary electrons emitted from

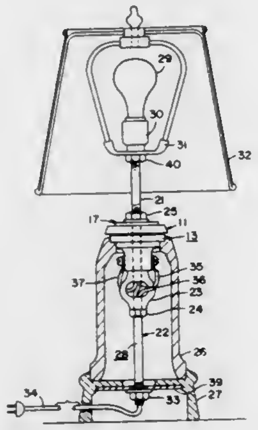
VOL
126
SS
4
MY
28
1991
UMI

the cathode to increase the average effective path length of said second electrons through the plasma, said perturbations each having a depth suitable for reducing the forward voltage drop of the switch while allowing the plasma to penetrate into the perturbation.

### 5,019,753
### LAMP STRUCTURE WITH COAXIAL RING SWITCH MODULE

**Leo Strauss, 18 Judith Ct., East Rockaway, N.Y. 11518**
**Filed Mar. 5, 1990, Ser. No. 488,263**
**Int. Cl.$^5$ F21S** *1/12*

U.S. Cl. 315—362 1 Claim



1. Electric lamp comprising:

a base, a rigid tubular core member supported on said base, an electric light bulb receptacle mounted on said rigid tubular core member,

means for controlling the light mode of the lamp electrically connected to said electric light bulb receptacle and coaxially mounted on said rigid tubular core member,

an external operating ring rotatable on a cylindrical portion of insulated body member included in and coaxial with said means for controlling the lighting mode of the lamp, whereby said means for controlling the lighting mode of the lmap may be operated from any point on its periphery and is easy to find and operate,

wherein said base, pedestal members adjacent to said base, and an insulated body member included in said means for controlling the lighting mode of the lamp, are coaxially clamped in end-to-end arrangement onto said rigid tubular core member, said tubular core member passing through axial openings in said base,

said pedestal members, said insulated body member, and abutment means for axially clamping said base, said pedestal members and said insulated body member in tight assembly onto said rigid tubular core member.

### 5,019,754
### HORIZONTAL DEFLECTION CIRCUIT

**Makoto Onozawa, Yokohama; Michitaka Ohsawa, Fujisawa, and Katsuhiko Tonami, Chigasaki, all of Japan, assignors to Hitachi Video Engineering, Inc. and Hitachi, Ltd., Tokyo, Japan**
**Filed Sep. 27, 1989, Ser. No. 413,456**
**Claims priority, application Japan, Sep. 29, 1988, 63-242448**
**Int. Cl.$^5$ G09G** *1/04*

U.S. Cl. 315—408 5 Claims

1. A horizontal deflection circuit comprising:

a horizontal deflection coil through which a horizontal deflection current periodically flows;

a semiconductor switching element through which the horizontal deflection current selectively flows to the horizontal deflection coil, the semiconductor switching element having a control terminal;

a drive circuit for generating a drive current having first and second periods that are alternatingly repeated with a horizontal deflection frequency, the drive circuit having first and second input/output ends; and,

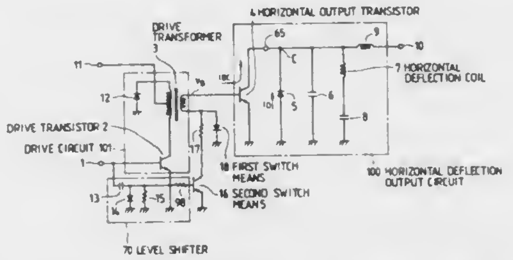
a drive current path disposed between the drive circuit and ground for supplying the drive current from the drive circuit to the control terminal, the drive current path including:

a diode element,

an other switching element connected in parallel with the diode element,

the parallel connected diode and the other switching element being connected in series with the drive circuit and the control terminal such that (i) a reverse bias is applied to the control terminal of the semiconductor switching element through the diode during the drive current first period and (ii) a forward bias is applied to the control terminal through the other switching element during the drive current second period,

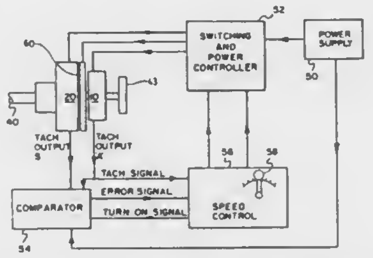
wherein the first input/output end of the drive circuit is connected to the control terminal of the semiconductor switching element, and the parallel connected diode and the other switching element are connected between the second input/output end of the drive circuit and ground.



### 5,019,755
### ELECTRIC MOTOR DRIVE SYSTEM

**David E. Walker, #90 1055 Shawnmarr Road, Mississauga, Ontario, Canada L5H 3V2**
**Continuation-in-part of Ser. No. 336,139, Apr. 11, 1989, abandoned. This application Mar. 5, 1990, Ser. No. 487,845**
**Int. Cl.$^5$ H02K** *17/34*

U.S. Cl. 318—13 10 Claims



1. An electric motor drive system which comprises:

a first elcctric motor having a predetermined power rating;

a first drive shaft to which said first electric motor is drivingly coupled;

a second electric motor having a predetermined power rating higher than said first motor;

a second drive shaft to which said second electric motor is drivingly coupled;

an epicyclic gear system in turn comprising:

a sun gear to which said first drive shaft is drivingly coupled for rotation in a forward direction;

a ring gear to which said second drive shaft is drivingly coupled for rotation in said forward direction;

a plurality of planetary gears meshing with both said sun gear and said ring gear;

an output drive coupled to said planetary gears for conjoint rotation therewith about said sun gear;

first one-way rotation restraining means operatively coupled to said ring gear and restraining rotation of said ring gear in a reverse direction only, said first one-way rotation restraining means permitting free rotation in said forward direction whereby said ring gear is free to rotate in said forward direction under the influence of said second motor;

second one-way rotation restraining means operatively coupled to said first drive shaft for restraining rotation thereof in a reverse direction while permitting free rotation in the forward direction;

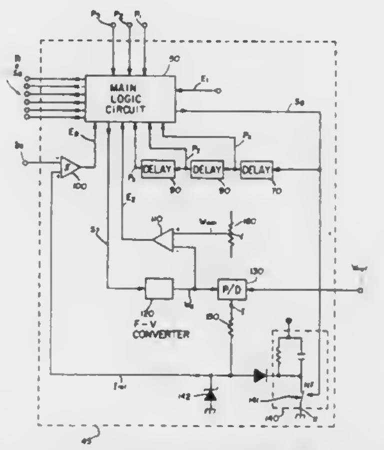
clutch means operable to lock said shafts together whereby to apply motion of one said motor, to the other said motor, and,

control means for selectively supplying electrical power to one or the other or both of said motors, and for operating said clutch means.

### 5,019,756
### PROCESS AND ELECTRONIC CIRCUIT FOR CONTROLLING A BRUSHLESS DIRECT CURRENT MOTOR

**Marcos G. Schwarz, Joinville, Brazil, assignor to Empresa Brasileira De Compressores S.A., Joinville SC, Brazil**
**Filed Mar. 27, 1990, Ser. No. 500,143**
**Claims priority, application Brazil, Mar. 27, 1989, PI8901539**
**Int. Cl.$^5$ H02P** *6/02*

U.S. Cl. 318—254 15 Claims



1. A method for controlling a brushless direct current motor having a stator with coils and a rotor with permanent magnets of the type which detects the rotor position by induced voltages and is operated and controlled by circuit means including:

an invertor which supplies current to the stator coils, means for detecting the rotor-stator relative position by the induced voltages, and a control circuit which processes information on the current supplied by the invertor to the stator coils, information on the position of the rotor, information on the reference speed, by sending control signals to the switching devices of the invertor;

the method of control cycle comprising the steps of:

(a) supplying current to a predetermined assembly of the stator coils, with an increasing intensity up to a predetermined limit to place the rotor at a predetermined position;

(b) transferring current to at least one other predetermined assembly of the stator coils to cause the rotor to move to another position corresponding to a pitch in the desired rotor turning direction;

(c) commuting rotor rotation to self-controlled form and detecting the rotor position by the induced voltages;

(d) operating in the self-controlled form with the rotor at a speed higher than a predetermined minimum value; and

(e) interrupting the current supply to the motor when the condition of the motor speed is lower than the predetermined minimum value.

6. An electronic circuit for controlling a brushless direct current motor, having a coiled stator and a rotor having permanent magnets and detecting the rotor position by induced voltages comprising:

invertor circuit means having a plurality of switching elements for supplying current to the coils of the stator,

means for detecting the rotor position by the induced voltages,

control circuit means for processing information on current supplied by said invertor circuit means to the stator coils, information on the rotor position, information on the reference speed, sending control signals to the switching elements of the invertor circuit means, with logic circuit means including;

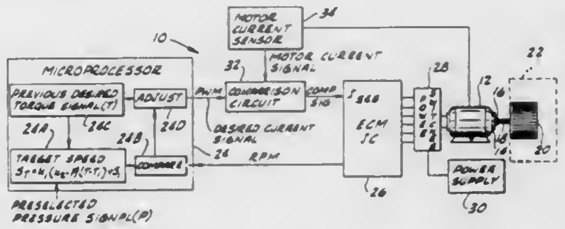
comparator means for the control of the current supplied to the motor; and

a Proportional - Integral - Derivative circuit, which receives an analog signal corresponding to the motor speed, a signal supplied externally corresponding to the speed to be supplied to the motor, and supplies an analog signal corresponding to the current to be applied to the motor.

### 5,019,757
### METHOD AND APPARATUS FOR CONTROLLING A BLOWER MOTOR IN AN AIR HANDLING SYSTEM TO PROVIDE CONSTANT PRESSURE

**Brian L. Beifus, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.**
**Filed Mar. 19, 1990, Ser. No. 495,419**
**Int. Cl.$^5$ H02P** *7/06*

U.S. Cl. 318—254 22 Claims



1. Apparatus for controlling a motor having a stationary assembly with a plurality of winding stages for carrying motor current and further having a rotatable assembly in driving relation with a blower in an air handling system, the apparatus providing control of the blower speed over a range of flow restriction variations to maintain air pressure in the system at a relatively constant preselected level, and which apparatus is adapted to receive a preselected pressure signal representing the preselected pressure level, the apparatus comprising:

means for providing a motor torque signal representative of the torque of the motor;

means for providing a speed signal representative of the speed of the motor;

a microprocessor, responsive to both the preselected pressure signal and the speed signal, for generating a desired torque signal which is a function of the preselected pressure signal, the speed signal, and a previous desired torque signal;

means for comparing the desired torque signal to the motor torque signal and for supplying a comparison signal representative of the comparison; and

means for applying a motor voltage to one or more of the winding stages at a time in accordance with the comparison signal and for commutating the winding stages in a preselected sequence to rotate the rotatable assembly whereby the blower is driven by varying the motor speed according to motor torque to maintain substantially constant pressure in the system substantially independent of variations in the flow restrictions.

VOL
1126
ISS
4
MY
28
1991
UMI

17. Method for controlling a dynamoelectric machine having a stationary assembly with a plurality of winding stages for carrying motor current and further having a rotatable assembly in driving relation with a blower in an air handling system, the method providing control of the blower speed over a range of flow restriction variations to maintain air pressure in the system at a relatively constant preselected level, the method comprising the steps of:

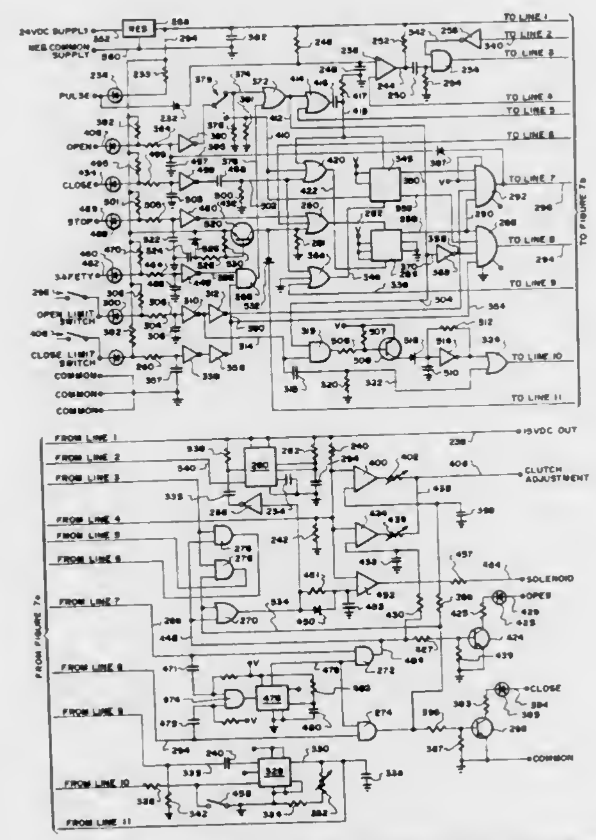
- sensing the torque of the motor;
- sensing the speed of the motor;
- determining, by use of a microprocessor which is responsive to the preselected air pressure level and the sensed motor speed, a desired torque which is a function of the preselected air pressure level, the sensed motor speed and a previous desired torque;
- comparing the desired torque to the sensed motor torque;
- applying a motor voltage to one or more of the winding stages at a time in accordance with the comparison; and
- commutating the winding stages in a preselected sequence to rotate the rotatable assembly whereby the blower is driven by varying the motor speed according to the motor torque to maintain substantially constant pressure in the system substantially independent of variations in the flow restriction.

---

### 5,019,758
## GATE OPERATING MECHANISM

**Richard V. Jones, Reseda, and Angel E. Ramirez, Glendale, both of Calif., assignors to Court Security Systems, Inc., Van Nuys, Calif.**

**Filed Oct. 26, 1990, Ser. No. 593,769**
**Int. Cl.$^5$ H02P** ***3/00***
**U.S. Cl. 318—264** **7 Claims**



1. A gate opening and closing mechanism for moving a gate between a closed position and an open position, said mechanism comprising:

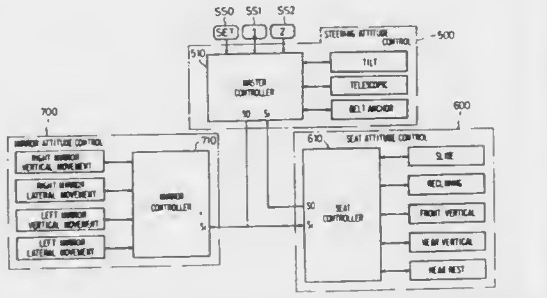
- an output shaft adapted to be connected to the gate to cause moving of the gate;
- an electrically operated motor, a clutch being operated by said motor, said output shaft being connected to said clutch, said clutch being capable of assuming multiple levels of power engagement to thereby use just a sufficient amount of force required to move the gate according to the conditions present at the given time; and
- a direct drive mechanism associated with said clutch, said direct drive mechanism being movable between an engaging position and a disengaging position, with said direct drive mechanism in said engaging position said output shaft being in a direct drive relationship with said motor, with said direct drive mechanism in said disengaging position said output shaft being connected to said motor only through said clutch.

---

### 5,019,759
## ATTITUDE CONTROL SYSTEM WITH INDEPENDENT CONTROLLERS FOR CONTROLLING ONBOARD UNITS

**Shinji Takemura, Chiryu; Masaki Mori, Toyota; Tomoaki Katayama, Nagoya; Hideo Kegasa, and Kenichi Ohnishi, both of Toyota, all of Japan, assignors to Aisin Seiki K.K., Aichi, Japan**

**Filed Dec. 6, 1989, Ser. No. 446,960**
**Claims priority, application Japan, Dec. 6, 1988, 63-308599**
**Int. Cl.$^5$ G05B** ***19/04;*** **G05D** ***3/10***
**U.S. Cl. 318—466** **7 Claims**



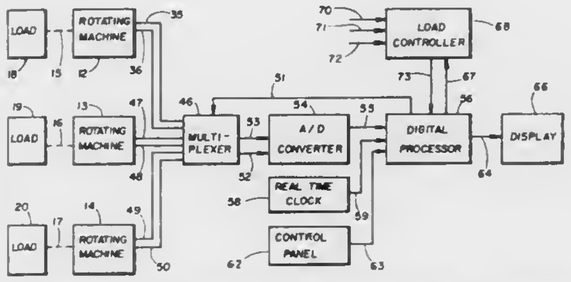
1. An attitude control system for onboard units comprising:

- a plurality of attitude adjusting means each including electric drive means operable to adjust the attitude of each of mutually different onboard units;
- at least one master switch means for delivering a primary attitude control command related to all of the plurality of attitude adjusting means;
- master electronic control means operable in accordance with a given control program and connected to the master switch means and at least one of the plurality of attitude adjusting means for controlling the at least one connected attitude adjusting means in response to the primary attitude control command and for delivering a secondary attitude control command in response to the primary attitude control command; and
- slave electronic control means operable in accordance with an independent control program which is separate from the program associated with the master electronic control means and connected to the remaining ones of the plurality of attitude adjusting means and the master electronic control means for controlling the connected ones of the plurality of attitude adjusting means in response to the secondary attitude control command delivered by the master electronic control means.

### 5,019,760
## THERMAL LIFE INDICATOR

**Frank Y. Chu, Islington, and Blake A. Lloyd, Mississauga, both of Canada, assignors to Electric Power Research Institute, Palo Alto, Calif.**

**Filed Dec. 7, 1989, Ser. No. 447,266**
**Int. Cl.$^5$ G01K** ***3/04***
**U.S. Cl. 318—490** **2 Claims**



1. An apparatus for continuously determining the consumed insulation life of an electrical winding in a rotating machine, comprising:

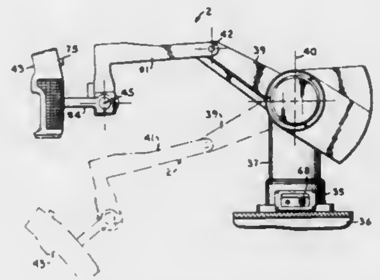
- control panel means for allowing entry of a service factor constant SF and two aging constants $T_R$ and HIC, said factor constant SF being a function of the power rating of said rotating machine containing said insulation, and said aging constants being a function of the thermal class of the insulation used in said winding;
- sensing means for measuring a temperature of said insulation;
- clock means for specifying a present time and date, and for outputting a timing signal defining a recurring time period;
- processing means coupled to said clock means and sensing means for receiving said timing signal, reading said measured temperature in accordance with said timing signal, determining the average temperature of the insulation during each said time period over a plurality of consecutive time periods, determining a consumed life of the insulation for each time period, and summing said determined consumed life for the plurality of consecutive time periods to determine a total consumed life over said plurality of consecutive time periods; and
- display means for displaying said total consumed life.

---

### 5,019,761
## FORCE FEEDBACK CONTROL FOR BACKHOE

**Brett W. Kraft, 11667 W. 90th St., Overland Park, Kans. 66214**

**Filed Feb. 21, 1989, Ser. No. 313,958**
**Int. Cl.$^5$ G06F** ***15/46;*** **B25J** ***9/00***
**U.S. Cl. 318—568.11** **15 Claims**



1. A force reflecting control system for an earthworking implement including an implement frame with an earthworking tool articulated thereto and a tool actuator connected between said implement frame and said tool, said system comprising:

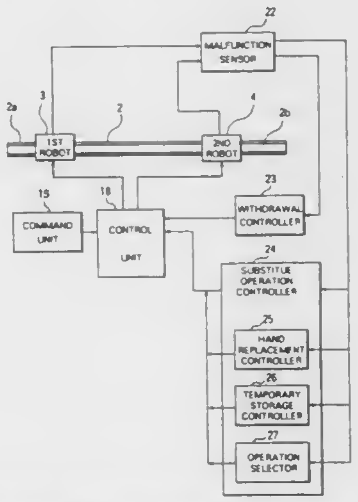
- (a) an operator input device including an operator frame with an operator control element articulated thereto;
- (b) an operator position sensor coupled between said operator frame and said element and providing an element position signal;
- (c) a feedback motor connected between said operator frame and said element and operable to apply a counter articulation force between said operator frame and said element;
- (d) a tool position sensor adapted for operative coupling between an earthworking implement frame and an earthworking tool articulated thereto, said tool position sensor providing a tool position signal;
- (e) a tool load sensor adapted for operative coupling to a tool actuator connected between said implement frame and said tool and providing a load signal having a parameter indicative of a resistance to articulation of said tool relative to said implement frame upon activation of said tool actuator;
- (f) control means having said element position sensor, said feedback motor, said tool position sensor, and said tool load sensor coupled thereto and adapted for coupling of said tool actuator thereto;
- (g) said control means activating said tool actuator to urge said tool to articulate said tool relative to said implement frame in substantial synchronism with an proportion to an articulation of said operator element relative to said operator frame; and
- (h) said control means activating said feedback motor to apply said counter articulation force between said element and said operator frame in proportion to said parameter of said load signal to thereby reflect to said operator element said resistance to articulation of said tool relative to said implement frame.

---

### 5,019,762
## INDUSTRIAL ROBOT APPARATUS

**Hisao Kato, Inazawa City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 1, 1990, Ser. No. 531,679**
**Claims priority, application Japan, Jun. 5, 1989, 1-142628**
**Int. Cl.$^5$ G05B** ***19/42;*** **B23Q** ***3/155***
**U.S. Cl. 318—568.12** **5 Claims**



1. An industrial robot apparatus comprising:

- a pathway for guiding robots, the pathway having first and second ends;
- first and second robots disposed on the pathway for movement along the pathway;
- first and second withdrawal spaces connected to the first and second ends of the pathway, each of the withdrawal

VOL
1126
ISS
4
MY
28
1991
UMI

spaces being large enough to house at least one of the robots;

a malfunction sensor for sensing when one of the robots malfunctions;

a withdrawal controller responsive to the malfunction sensor for withdrawing a malfunctioning robot into one of the withdrawal spaces;

a plurality of first detachable hands for use by the first robot and a plurality of second detachable hands for use by the second robot, each of the robots having one of the hands detachably mounted thereon;

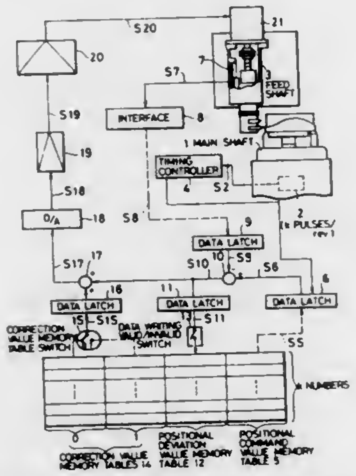
a hand replacement controller for controlling a normal robot to replace a detachable hand thereof with one of the hands for use by a malfunctioning robot when the malfunction sensor detects a malfunction of one of the robots; and

means for controlling the normal robot to perform the operation normally performed by the malfunctioning robot.

---

### 5,019,763
### LEARNING CONTROL METHOD IN NUMERICAL CONTROL MACHINE TOOL

**Toshiteru Komatsu, Aichi, Japan, assignor to Kabushiki Kaisha Okuma Tekkosho, Aichi, Japan**
**Filed Jul. 26, 1989, Ser. No. 385,416**
**Claims priority, application Japan, Jul. 29, 1988, 63-190174**
**Int. Cl.$^5$ G05B** *19/25*
**U.S. Cl. 318—571** **18 Claims**


S20
20
21
S7
FEED SHAFT
S19
19
INTERFACE
8
1 MAIN SHAFT
TIMING CONTROLLER
S2
S18
D/A
18
S8
9
PULSES/rev
DATA LATCH
S17
17
S10
S9
S6
DATA LATCH
DATA LATCH
DATA LATCH
CORRECTION VALUE MEMORY TABLE SWITCH
DATA WRITING VALID/INVALID SWITCH
S11
S5
n NUMBERS
CORRECTION VALUE MEMORY TABLES 14
POSITIONAL DEVIATION VALUE MEMORY TABLE 12
POSITIONAL COMMAND VALUE MEMORY TABLE 5

1. A learning control method for a numerical control machine tool which synchronously controls a rotational angle of a main shaft and a position of a feed shaft, said method comprising the steps of:

(a) loading positional command values into a first data table, the positional command values being indicative of a desired position of the feed shaft relative to various rotational angles of the main shaft;

(b) loading correction values into a second data table;

(c) periodically detecting a position of the feed shaft at predetermined rotational angles of the main shaft to obtain actual positional values;

(d) subtracting one of the positional command values and the actual positional values from the other of the positional command values and the actual positional values to obtain positional deviation values;

(e) processing the positional deviation values in a predetermined manner to obtain processed positional deviation values;

(f) adding the correction values to the processed positional deviation values to obtain new correction values;

(g) loading the new correction values into the first data table;

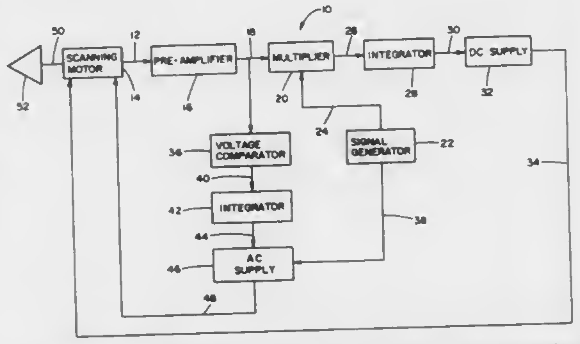
(h) repeating steps (c) through (g), which together constitute a correction value renewal cycle, until a deviation difference between the positional deviation values of an Nth correction value renewal cycle and the positional deviation values of an (N+1)th correction value renewal cycle decreases to less than a predetermined parameter value, N being a positive integer; and,

(i) controlling the position of the feed shaft during operation of the machine tool according to the sum of the positional deviation values and the new correction values.

---

### 5,019,764
### PORTABLE LASER SCANNING SYSTEM AND SCANNING METHODS HAVING A RESONANT MOTOR CONTROL CIRCUIT

**Sheldon Chang, Port Jefferson, N.Y., assignor to Symbol Technologies, Inc., Bohemia, N.Y.**
**Filed Mar. 13, 1989, Ser. No. 322,188**
**Int. Cl.$^5$ H02K** *29/08*
**U.S. Cl. 318—627** **29 Claims**



1. A miniature, hand-held scanning device for repetitively scanning a target, said device having a laser beam generating means, at least one high speed scanning motor and a resonant motor circuit for controlling said scanning motor, said resonant motor circuit comprising:

first circuit means for automatically tuning a scanning motor to resonance; and

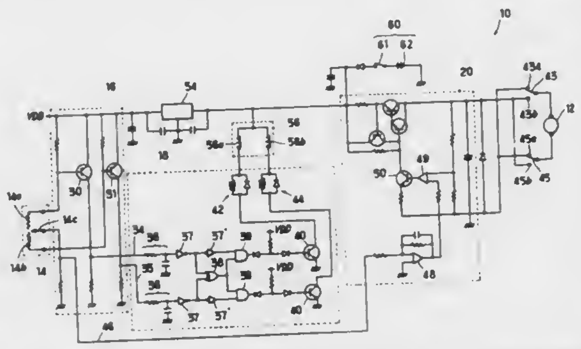
second circuit means for automatically controlling the amplitude of oscillation of the scanning motor;

said tuning means and said controlling means being driven from a single feedback signal obtained directly from the scanning motor, said single feedback signal being a second harmonic of a voltage induced in said resonant motor.

---

### 5,019,765
### MOTOR CONTROL DEVICE FOR POWERED SEAT

**Hiromitsu Ogasawara, Akishima, Japan, assignor to Tachi-S Co. Ltd., Tokyo, Japan**
**Filed Mar. 13, 1990, Ser. No. 492,674**
**Int. Cl.$^5$ G05B** *11/01*
**U.S. Cl. 318—628** **8 Claims**



1. A motor control device for a powered seat in which the best includes a seating posture adjustment means therein and a movable part of said seating posture adjustment means is moved and adjustable by control of aid motor, said motor control device comprising:

a switch means for selectively determining a rotation direction of said motor and capable of depression for a stepless adjustment of a rotation rate of said motor;

a drive circuit connected electronically with said switch means;

a voltage-variable power supply circuit connected electrically with said switch mean and motor; and

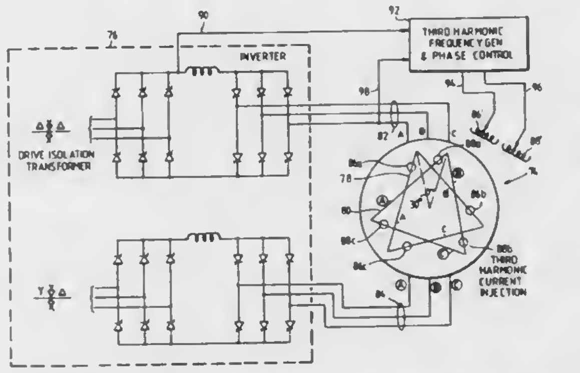
a relay means having an electrical communication with both said drive circuit and voltage-variable power supply circuit;

whereby a switch-over operation of said switch means imparts a signal to determine said rotation direction of said motor and a depressing/releasing operation of said switch means causes a step-less variation of a voltage to said motor, thereby permitting said rotation rate of said motor to be increased and decreased in a stepless way, continuously from said switchover operation.

---

### 5,019,766
### METHOD AND APPARATUS FOR IMPROVING PERFORMANCE OF AC MACHINES

**John S. Hsu, and Herbert H. Woodson, both of Austin, Tex., assignors to University of Texas, Austin, Tex.**
**Continuation-in-part of Ser. No. 888,818, Jul. 22, 1986, abandoned. This application Jul. 7, 1989, Ser. No. 376,622**
**Int. Cl.$^5$ H02M** *5/45*
**U.S. Cl. 318—807** **15 Claims**


90
92
76
INVERTER
THIRD HARMONIC FREQUENCY GEN & PHASE CONTROL
98
94
96
DRIVE ISOLATION TRANSFORMER
THIRD HARMONIC CURRENT INJECTION

10. An apparatus for exciting a polyphase alternating current machine having at least one set of stator windings to controllably produce a flux wave of a preselected configuration in an air-gap of said machine, comprising:

means for exciting at least a portion of said stator windings with a polyphase fundamental frequency current and generating a resultant fundamental flux wave rotating in the air-gap of said machine at a first preselected speed;

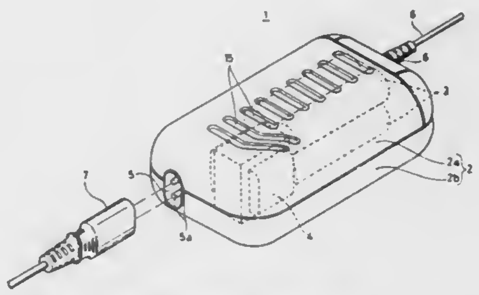
means for exciting at least a portion of said stator windings with an odd harmonic frequency current of said fundamental frequency current and generating a resultant odd harmonic flux wave rotating in the air-gap of said machine at said first preselected speed; and

means for adjusting the phase relationship of said harmonic flux wave relative to said fundamental flux wave to produce a resultant flux wave having a peak amplitude greater than the amplitude of the fundamental flux wave.

---

### 5,019,767
### PORTABLE POWER SUPPLY

**Ichiro Shirai, Kyoto, and Kazuhiko Sakuragi, Fukuoka, both of Japan, assignors to Nintendo Co., Ltd., Kyoto, Japan**
**Filed Feb. 12, 1990, Ser. No. 479,149**
**Claims priority, application Japan, Feb. 16, 1989, 1-17744[U]; Feb. 16, 1989, 1-17745[U]**
**Int. Cl.$^5$ H01M** *10/46;* **A45F** *5/00*
**U.S. Cl. 320—2** **20 Claims**



1. A portable power supply, comprising:

a body case;

an attaching portion for detachably attaching said body case to an article of clothing worn on a human body;

an input portion provided exposed from said body case and capable of being connected to a commercial power source through a connecting cord;

a voltage lowering portion contained in said body case for lowering the voltage of power supplied from said input portion;

a storage battery contained in said body case, charged by an output from said voltage lowering portion;

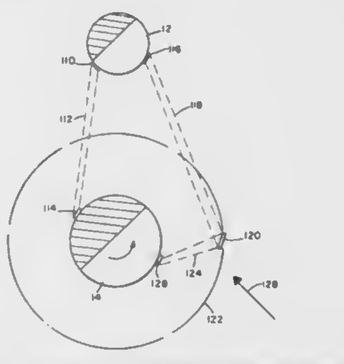
an output portion provided exposed from said body case and capable of being connected to a prescribed electronic device through a connecting cord for supplying power charged in said storage battery to the device; and

a cord connected to said output portion, said cord including a tip end portion having a plug portion with noise preventing means.

---

### 5,019,768
### POWER COLLECTION AND TRANSMISSION SYSTEM AND METHOD

**David R. Criswell, 4003 Camino Lindo, San Diego, Calif. 92122, and Robert D. Waldron, 15339 Regalado St., Hacienda Heights, both of Calif. 91745**
**Continuation of Ser. No. 732,352, May 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 513,444, Jul. 13, 1983, abandoned. This application Feb. 11, 1988, Ser. No. 157,081**
**Int. Cl.$^5$ B64G** *1/00;* **H02M** *7/00*
**U.S. Cl. 322—2 R** **25 Claims**



1. A lunar power station, comprising: solar power collecting means positioned about the lunar surface for intercepting solar radiant power;

VOL
1126
ISS
4
MY
28
1991
UMI

power receiving means located on earth;

means defining a power transmitting aperture of predetermined area comprising an array of physically separate, spaced apart microwave power sources for transmitting separate beams of microwave radiation and an array of separate, microwave reflecting surfaces interleaved with the array of microwave sources within the transmitting area, each reflecting surface associated with at least one of the microwave power sources and comprising means for redirecting microwave radiation emitted from the respective microwave source into a common beam direction directed towards said power receiving means and for expanding the effective area of the respective beam, said reflecting surfaces being postioned to lie within said power transmitting aperture when viewed from said power receiving means; and

phase control means associated with said power sources for controlling the relative phase of the separate transmitting beams to form at least one composite power beam of predetermined, at least partially convergent shape directed at said receiving means, said phase control means including means allowing for variations in the lunar elevation relative to said receiving means during cycles of the moon;

said power receiving means being located in the radiating near field region of said transmitted single power beam.

---

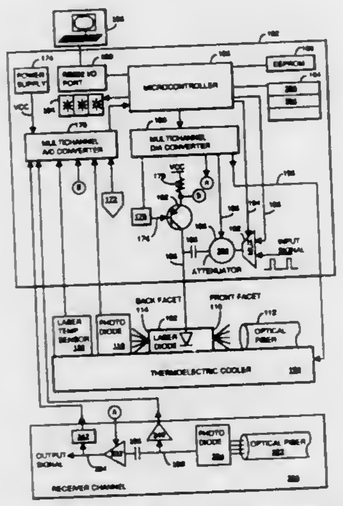
### 5,019,769
## SEMICONDUCTOR LASER DIODE CONTROLLER AND LASER DIODE BIASING CONTROL METHOD

**Frank H. Levinson, Redwood City, Calif., assignor to Finisar Corporation, Menlo Park, Calif.**

**Filed Sep. 14, 1990, Ser. No. 583,178**

**Int. Cl.$^5$ H01S** *3/10*

**U.S. Cl. 372—31** **25 Claims**



1. A controller for a laser diode, comprising:

an optical power sensor which receives a portion of the light emitted from a laser diode and generates an optical power measurement signal corresponding to the optical power of the light received by said power sensor;

a drive current circuit, coupled to said laser diode, which applies a specified level of drive current through said laser diode; and

a digital data processor, coupled to said optical power sensor and to said drive current circuit, which sets said specified level of drive current applied to said laser diode and receives said optical power measurement signal from said optical power sensor; said digital data processor being programmed to step said drive current through a sequence of values, to compute operating characteristics of said laser diode based on received optical power measurement signals for each drive current value, and to select a drive current level for said laser diode based on said received optical power measurement signals.

---

### 5,019,770
## SWITCHING POWER SOURCE DEVICE HAVING ENERGY RECOVERY

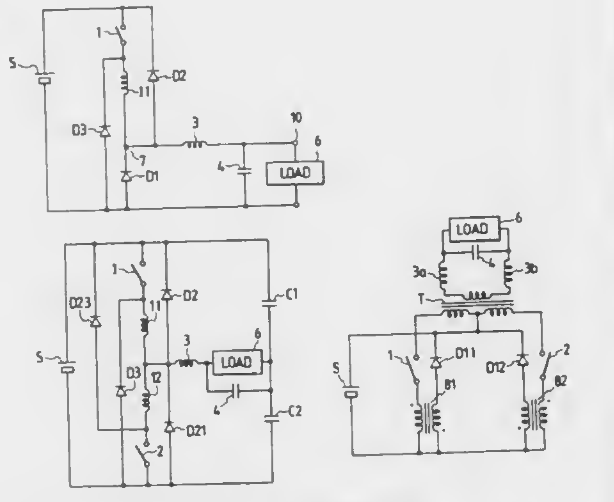
**Kosuke Harada; Hiroshi Sakamoto, and Takazi Nakamizo, all of Fukuoka, Japan, assignors to Kyushu University and Nishimu Electronics Industries Co., Ltd., both of Fukuoka, Japan**

**Filed Oct. 24, 1989, Ser. No. 426,572**

**Claims priority, application Japan, Oct. 26, 1988, 63-270068**

**Int. Cl.$^5$ G05F** *1/56;* **H02M** *7/48*

**U.S. Cl. 323—282** **11 Claims**



1. A switching power source comprising:

a pair of output terminals suited for electrical connection to a load means, and a pair of input terminals suited for electrical connection to a constant polarity electrical power source;

a first switch element, a reactor and filter means which are electrically connected with each other in series between one of the input terminals and one of the output terminals;

a second switch element electrically connected between the other input terminal and both the reactor and the filter means; and

means for causing energy stored in the reactor to be fed back to said constant polarity electrical power source electrically connected to the pair of input terminals for regeneration thereof when the first and second switch elements are in the OFF state,

with the first switch element to be switched between ON and OFF states so as to have selected ratios of time in each.

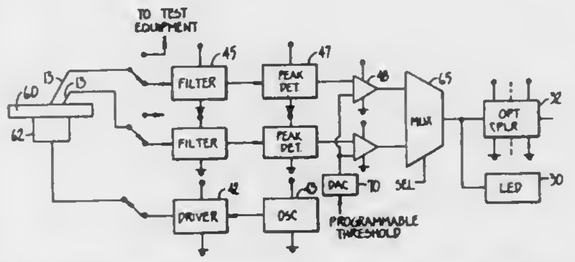
### 5,019,771
## CONTACT SENSING FOR INTEGRATED CIRCUIT TESTING

**Tsen-Shau Yang, Cupertino; Ger-Chih Chou, San Jose, and Fu-Chieh Hsu, Saratoga, all of Calif., assignors to Knights Technology, Inc., Santa Clara, Calif.**

**Continuation of Ser. No. 349,203, May 9, 1990, abandoned, which is a continuation-in-part of Ser. No. 334,256, Apr. 5, 1988, abandoned. This application May 21, 1990, Ser. No. 527,661**

**Int. Cl.$^5$ G01R** *27/04, 31/28*

**U.S. Cl. 324—158 P** **12 Claims**



8. Circuitry for sensing the status of electrical contact between a plurality of probes and a device under test ("DUT"), comprising:

generator means, having a generator reference terminal and a generator output terminal, for providing a first signal on said generator output terminal relative to said generator reference terminal, said first signal having a defined characteristic; and

a corresponding plurality of detector means, each associated with a respective one of the probes, each having a detector input terminal, a detector output terminal, and a detector reference terminal, for providing a second signal on said detector output terminal relative to said detector reference terminal, said second signal representing the amount of signal having the defined characteristic relative to said detector reference terminal appearing at said detector input terminal;

said generator and detector reference terminals being electrically connected to each other; and

means for selectively establishing a contact sensing mode and a measurement mode, said contact sensing mode being characterized in that said generator and detector reference terminals are at least partially isolated from the DUT, said generator output terminal is coupled to the DUT, and the probes are coupled to said detector input terminals, whereupon said second signals provide indications of the degree of electrical contact between the probe tips and the DUT, said measurement mode being characterized in that said generator output terminal is disconnected from the DUT and said probe is connected to the test apparatus.

---

### 5,019,772
## TEST SELECTION TECHNIQUES

**Jeffrey H. Dreibelbis, Williston; John A. Gabric, and Erik L. Hedberg, both of Essex Junction, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 23, 1989, Ser. No. 355,589**

**Int. Cl.$^5$ G01R** *31/28*

**U.S. Cl. 324—158 R** **25 Claims**

1. An integrated circuit system comprising

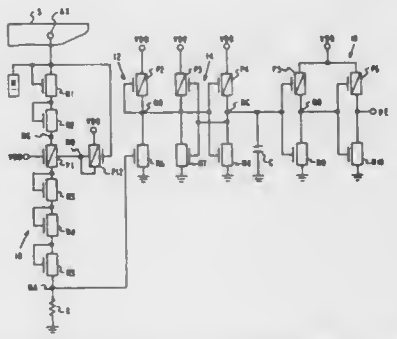
a semiconductor substrate,

a pin connected to said semiconductor substrate,

integrated circuit means connected to said pin and disposed on said semiconductor substrate and operable at a first voltage,

test selection means having an output terminal connected to said pin for producing a control pulse at said output terminal for a given period of time and operable at a second voltage higher than said first voltage,

means for applying said second voltage to said pin during a first portion of said given period of time, and



means for applying said first voltage to said pin during a second portion of said given period of time without said first portion.

---

### 5,019,773
## METHOD AND APPARATUS FOR DETECTING POSITIONS AND/OR SPEED OF A MOVING BODY USING TWO PHASE SIGNALS

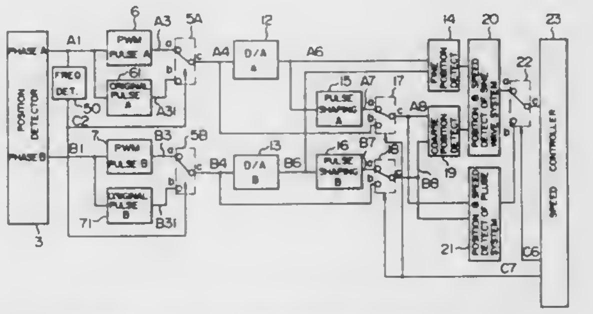
**Yasuyuki Sugiura, Takahagi; Rika Oue, Mito; Kunio Miyashita; Hiroshi Nagase, both of Hitachi; Nobuyoshi Mutoh, Katsuta; Sumio Kobayashi, Chiba, and Hiroshi Sugai, Sakura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 22, 1989, Ser. No. 397,130**

**Claims priority, application Japan, Aug. 24, 1988, 63-208399**

**Int. Cl.$^5$ G01P** *3/489, 3/48;* **G01B** *7/30;* **H02P** *7/00*

**U.S. Cl. 324—166** **7 Claims**



1. A position detecting apparatus comprising:

a position detector for generating two analog detection signals, said two analog detection signals being out of phase depending on movement of a rotating or moving body;

a pair of PWM pulse forming circuits each responsive to an associated one of said analog detection signals for producing a PWM pulse signal having a pulse width representative of positions of said body;

a pair of D/A converters for converting said PWM pulse signals to reproduced analog signals;

a pair of original pulse circuits for converting said analog detection signals from said position detector to rectangular wave pulse signals;

a pair of first switches each connected to receive the PWM pulse signal from an associated one of said PWM pulse forming circuits and the rectangular wave signal from an associated one of said original pulse circuits for selecting one of the PWM pulse signal and the rectangular wave signal to supply the selected signal to an associated one of said D/A converters, the signal selection being such that at least one of the PWM signal and the rectangular wave signal is selected when the moving speed is relatively low and relatively high, respectively;

VOL 1126
ISS 4
MY 28 1991
UMI

- a pair of pulse shaping circuits for shaping said reproduced analog signals from said D/A converters to form pulse signals;
- a coarse position detector connected to said pulse shaping circuits for detecting a coarse of said body from edges of the pulse signals from said pulse shaping circuits;
- a fine position detector connected to said pair of D/A converters for detecting a fine position of said body from said reproduced analog signals from said D/A converters; and
- a third switch for selecting one of the outputs from the coarse and fine position detectors depending on the speed of said body.

---

5,019,774

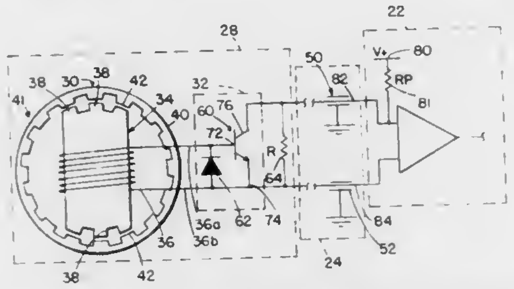
### METHOD AND APPARATUS FOR SENSING THE ROTATIONAL SPEED OF AN AIRCRAFT WHEEL WITH AN AMPLIFIER AND TRANSDUCER LOCATED IN THE WHEEL AND A CIRCUIT TO CHECK THE INTEGRITY OF THE TRANSDUCER

**Jerome C. Rosenberg, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Aug. 5, 1988, Ser. No. 228,977**

**Int. Cl.⁵ G01P** *3/48, 3/54;* **G01B** *7/14;* **B60T** *8/70*

**U.S. Cl. 324—174** **20 Claims**



1. An apparatus for sensing a rotational speed of a wheel of an aircraft landing gear during landing, comprising:

- a transducer means located adjacent said wheel for producing a signal having a frequency proportional to said wheel's rotational speed;
- an amplifying circuit means located adjacent said wheel for amplifying said signal, said amplifying circuit means including a transistor having a collector and an emitter;
- a sensing circuit means located remotely from said amplifying circuit for receiving said signal and sensing wheel speed;
- a two-wire transmission line means extending from said amplifying circuit to said sensing circuit for transmitting said signal from said amplifying circuit to said sensing circuit;
- a power supply means located remotely from said wheel for providing power to said amplifying circuit, said power supply being coupled to said transmission line to provide power to said amplifying circuit along said transmission line;
- a resistor coupled between said collector and said emitter, said collector being coupled to said power supply means and said emitter being coupled to ground, said power supply means placing a voltage across said resistor to check the integrity of said apparatus.

---

5,019,775

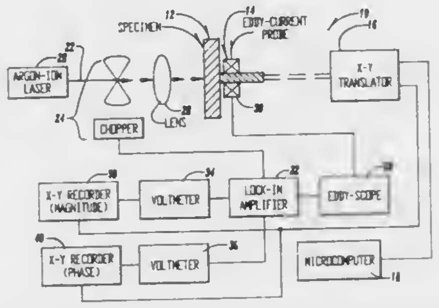
### CALIBRATING AN EDDY-CURRENT-PROBE USING A MODULATED THERMAL ENERGY SOURCE

**John C. Moulder, and James H. Rose, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Continuation of Ser. No. 383,801, Jul. 21, 1989, Pat. No. 4,950,990. This application Apr. 17, 1990, Ser. No. 510,112**

**Int. Cl.⁵ G01R** *35/00*

**U.S. Cl. 324—202** **2 Claims**



1. A method of mapping the response pattern of an eddy-current probe comprising:

- positioning a calibration fixture of previously known characteristics adjacent to an eddy-current probe means having a detection area;
- generating a modulated thermal source;
- directing the modulated thermal source onto the calibration fixture at a localized area on the fixture;
- scanning the localized area across the fixture coincident with at least the detection area of the probe means;
- detecting with the probe means changes in the electrical conductivity in the localized scanned area, the changes caused by localized temperature changes in the specimens; and
- recording the detected changes in electrical conductivity to create a mapping of the response area of the probe.

---

5,019,776

### MAGNETIC POSITION DETECTION APPARATUS HAVING TWO MAGNETIC RECORDING MEDIUM TRACKS WITH MAGNETORESISTORS ARRANGED IN A BRIDGE CIRCUIT SO AS TO ELIMINATE EVEN ORDER HARMONIC DISTORTION

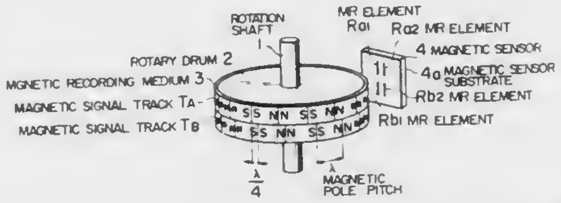
**Syooichi Kawamata; Tadashi Takahashi, and Kunio Miyashita, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 23, 1989, Ser. No. 355,343**

**Claims priority, application Japan, May 26, 1988, 63-127149**

**Int. Cl.⁵ G01B** *7/14, 33/02;* **G01P** *3/42*

**U.S. Cl. 324—207.12** **8 Claims**



1. An apparatus for magnetically detecting a positional relation between first and second members the positions of which change relative to each other comprising:

- a magnetic recording medium carried on said first member, two or more tracks being provided on said magnetic recording medium, corresponding to the respective phases of two or more detection signals to be detected by the apparatus, with a multiplicity of magnetic poles magnetized at the same pitch and in a direction in which the positional relation between said first and second members changes, the magnetic poles in any one of said tracks being magnetized so as to be shifted with respect to the magnetic poles in the other track by an amount corresponding to a phase difference between the detection signal for the phase which corresponds to the one track and the detection signal for the phase which corresponds to the other track; and
- a magnetic sensor substrate supported by said second member, said magnetic sensor substrate including a plurality of magnetoresistive elements which are respectively provided corresponding to said tracks and the electrical resistance value of each of which changes in response to a magnetic field originating from the magnetic poles in the corresponding track, the magnetoresistive elements being combined for every phase to which each track corresponds, so that an electric signal corresponding to the electrical resistance values of the combined magnetoresistive elements is generated as said detection signal, each of the magnetoresistive elements corresponding to any one of said tracks and the corresponding one of the magnetoresistive elements corresponding to the other track being disposed at the same position when viewed in the direction in which the positional relation between said first and second members changes;
- wherein four magnetoresistive elements are provided corresponding to each of said tracks and at an interval equal to one half of the magnetic pole pitch, and a difference between an electric signal obtained by a circuit in which two adjacent elements of the four magnetoresistive elements at one side from the center thereof are connected in series with each other and an electric signal obtained by a circuit in which two other adjacent elements of the four magnetoresistive elements at the other side from the center thereof are connected in series with each other is outputted as said detection signal.

---

5,019,777

### EDDY CURRENT TESTING PROGRAM WITH SCANNING PROBE HEAD HAVING PARALLEL AND NORMAL SENSING COILS

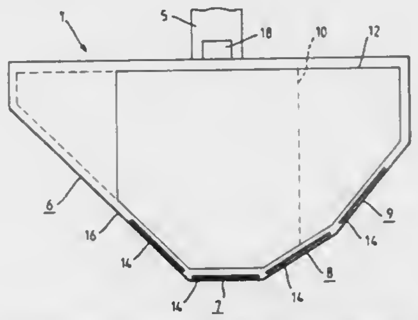
**James A. Gulliver, Wantage; Christopher C. Holt, Abingdon; Kenneth D. Boness, Blewbury, all of England, and Martin R. Anderson, deceased, late of Culham Station, England by Donna J. Anderson, administratix , assignors to United Kingdom Atomic Energy Authority, London, England**

**Filed Nov. 6, 1989, Ser. No. 431,638**

**Claims priority, application United Kingdom, Nov. 7, 1988, 8825977**

**Int. Cl.⁵ G01N** *27/90;* **G01R** *33/12*

**U.S. Cl. 324—242** **4 Claims**



1. An eddy current testing system including a multi-faceted probe head for scanning in a predetermined direction and orientation over a surface of a body under test, said probe head having mounted thereon an exciting coil positioned with its axis parallel to the predetermined direction of scan for creating eddy currents in a body under test which circulate orthogonally to the direction of scan of the probe head, the exciting coil encompassing at least one eddy current sensing coil having its coil axis parallel with the exciting coil axis and at least one eddy current sensing coil with its axis substantially normal to that of the exciting coil and adapted in use to be placed adjacent the surface of the body under test, means for producing driving signals and applying them to the exciting coil in the probe head, and means for processing and displaying signals produced in the sensing coils to indicate the presence of surface breaking discontinuities in the body under test.

---

5,019,778

### MAGNETIC RESONANCE APPARATUS WITH AN OPTIMIZED DETECTION FIELD

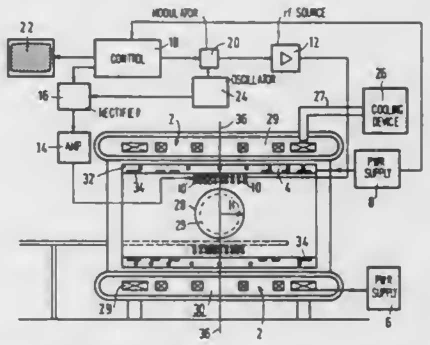
**Wilhelmus R. M. Mens, and Jan Konijn, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 24, 1989, Ser. No. 426,335**

**Claims priority, application Netherlands, Oct. 24, 1988, 8802609**

**Int. Cl.⁵ G01R** *33/20*

**U.S. Cl. 324—322** **10 Claims**



1. A magnetic resonance apparatus comprising:

- a magnet system for generating a steady magnetic field:
- A gradient magnet system for generating a gradient magnetic field; and
- an rf coil system including an rf coil for generating a magnetic field, said rf coil comprising a set of spaced parallel current carrying conductors extending in a given direction parallel to an axis of symmetry, each conductor of a uniform cross section area along its length, said coil system including means for generating non-constant currents in said conductors along their lengths for producing a given magnetic field between the conductors in the direction of said axis.

---

5,019,779

### IGNITION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

**Kiyoshi Ookawa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 26, 1990, Ser. No. 498,652**

**Claims priority, application Japan, Mar. 27, 1989, 1-33223; Mar. 28, 1989, 1-34360**

**Int. Cl.⁵ F02P** *17/00*

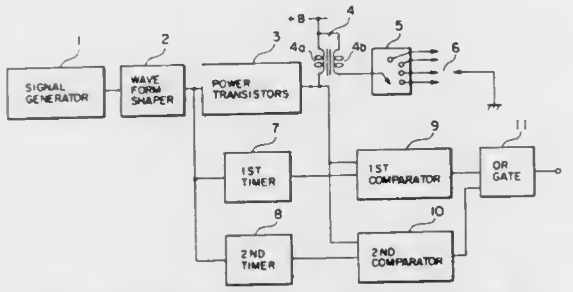
**U.S. Cl. 324—388** **12 Claims**

1. An ignition apparatus for an internal combustion engine comprising:

- an ignition signal generator which generates an ignition signal in synchrony with the rotation of an engine;
- an ignition coil having a primary winding and a secondary winding;
- a switching circuit connected to the ignition signal generator and the primary winding of the ignition coil for controlling the flow of current through the primary winding in accordance with the ignition signal;
- a first timer for measuring a first length of time from the ignition signal; and
- a first comparator responsive to the first timer for comparing the winding voltage of one of the windings of the ignition

VOL 1126
ISS 4
MY 28 1991
UMI

coil with a first reference voltage when the first length of time elapses and generating a corresponding output signal, wherein the first reference voltage is chosen to be smaller than the winding voltage when the first length of time elapses if the secondary winding of the ignition coil is connected to an open circuit.



---

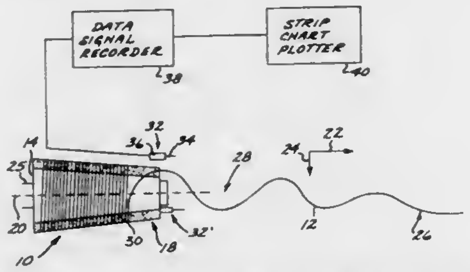
### 5,019,780
## METHOD AND APPARATUS FOR MONITORING OPTICAL FIBERS DURING PAYOUT

**Wilbur M. Bailey, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Oct. 23, 1989, Ser. No. 425,645**

**Int. Cl.$^5$ G01R** *29/12*

**U.S. Cl. 324—457** **19 Claims**



1. A process for measuring an optical fiber as the optical fiber is payed out from a support, comprising the steps of:

providing a support having an optical fiber wound in turns thereupon;

paying out the optical fiber from the support; and

measuring the electromagnetic field produced by payout of the optical fiber.

---

### 5,019,781
## SOURCE LEVEL CONTROL FOR IMPEDANCE METER

**Shigeru Tanimoto, and Kouichi Takeuchi, both of Hachiojishi, Japan, assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation of Ser. No. 522,405, May 10, 1990, abandoned, which is a continuation of Ser. No. 302,849, Jan. 27, 1989, abandoned. This application Oct. 25, 1990, Ser. No. 604,382**

**Claims priority, application Japan, Jan. 29, 1988, 63-20955**

**Int. Cl.$^5$ G01R** *27/28*

**U.S. Cl. 324—649** **5 Claims**

1. A measurement apparatus for measuring a property of a device under test at a predetermined AC level, the device under test having first and second terminals, the measurement apparatus comprising:

(a) a signal source means for applying an AC signal with a controllable AC level to the first terminal of the device under test;

(b) feedback circuit means, connected to the second terminal of the device under test. for forcing the second terminal of the device under test to be virtually grounded;

(c) synchronous detector means, connected to the first terminal of said device under test and to the feedback circuit means, for obtaining measurement signals representing current and voltage of the device under test, and for performing synchronous detection of the measurement signals;

(d) analog-digital converter means, connected to the synchronous detector means, for performing analog-digital conversion by integrating an output of the synchronous detector means; and

(e) digital logic means, connected to the analog-digital converter means and responsive to an output of the analog-digital converter means, for intermittently controlling the AC level of the signal source means, whereby the AC level applied to the device under test is maintained at the predetermined AC level.

---

### 5,019,782
## METHOD FOR DETERMINING THE QUALITIES AND/OR FREQUENCIES OF ELECTRICAL TUNED CIRCUITS

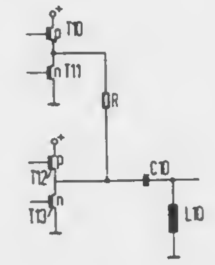
**Eckart Schatter, Zorneding, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 118,752, Nov. 5, 1987, abandoned. This application Mar. 20, 1990, Ser. No. 497,769**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1986, 3638389**

**Int. Cl.$^5$ G01R** *27/28*

**U.S. Cl. 324—655** **1 Claim**



1. A proximity sensing apparatus for sensing proximity of an electrical tuned circuit with an inductor to an electrically conductive object, the tuned circuit having a given period of resonance, wherein the state of the sensing apparatus depends upon the quality of the tuned circuit, and wherein the quality of the tuned circuit depends upon the distance between said inductor and the electrically conductive object; comprising means for exciting the tuned circuit with an electrical pulse having short rise and fall times compared with said period; means for evaluating decay of oscillations in said tuned circuit after the end of the pulse; means for periodically supplying pulses to the tuned circuit; means for feeding pulses of alternating polarity to the tuned circuit; evaluating the resultant decay of the oscillations in pairs; and means for determining the proximity on the basis of said decay.

---

### 5,019,783
## PRECISION TRANSDUCER CIRCUIT AND LINEARIZATION METHOD

**Robert M. Cadwell, Los Altos, Calif., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Jan. 30, 1989, Ser. No. 304,359**

**Int. Cl.$^5$ G01R** *27/26*

**U.S. Cl. 324—662** **25 Claims**

1. Transducer apparatus, comprising:

a first conductive plate;

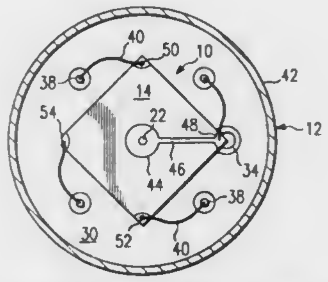
a second conductive plate;

a member, mounted between said first and second plates such that at least a part of said member is movable with respect to said first and second plates;

a transducer circuit connected to said transducer for producing a first ramp voltage having a slope proportional to a reciprocal capacitance between said first plate and said movable manner, and for producing a second ramp voltage having a slope proportional to a reciprocal capacitance between said second plate and said movable member;

a circuit responsive to said ramp voltages for producing respective DC voltages proportional to said reciprocal capacitances; and

a subtracting circuit responsive to said DC voltages for effectively subtracting representations of the reciprocal capacitances produced by said transducer circuit.



---

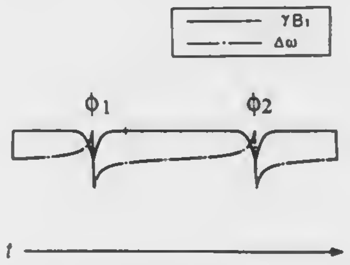
### 5,019,784
## TIME SYMMETRIC PULSE TO UNIFORMLY ROTATE MAGNETIZATION VECTORS BY AN ARBITRARY ANGLE IN THE PRESENCE OF LARGE B1 INHOMOGENEITIES AND RESONANCE OFFSETS

**Michael Garwood, Shorewood, and Kamil Ugurbil, Maple Plain, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.**

**Filed Aug. 11, 1989, Ser. No. 393,530**

**Int. Cl.$^5$ G01R** *33/20*

**U.S. Cl. 324—307** **13 Claims**



1. A method for achieving plane rotations of magnetic spins in matter under the influence of a spin aligning magnetic field $B_0$ utilizing an adiabatic pulse having $B_1$ components transverse to said $B_0$ field wherein said pulse introduces a field $\Delta\omega$ in said matter equal to the time dependent difference of the spins and wherein the vector sum of $B_1$ and $\Delta\omega/\gamma$ introduce an effective field $B^e$ in said matter, where $\gamma$ is the gyromagnetic ratio, said method comprising generating said adiabatic pulse to be symmetrical in amplitude and phase about is center and to include a pair of discontinous phase shifts $\phi_1$, $\phi_2$ in $B_1$ of substantially equal and opposite sign symmetrically positioned in said pulse, each phase shift executed concomitantly with an inversion in $\Delta\omega$ to cause a flip in $B^e$ in the frequency modulated frame of reference so that said pulse achieves a plane rotation of said spins with a high degree of insensitivity to off-resonance effects.

---

### 5,019,785
## FREQUENCY SYNTHESIZING DEVICE

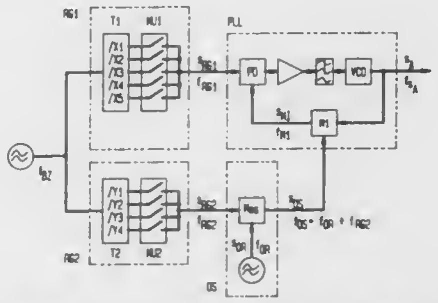
**Bruno Fognini, Zurich, Switzerland, and Helmut Heinz, Munich, Fed. Rep. of Germany, assignors to Siemens-Albis Aktiengesellschaft, Zurich, Switzerland**

**Filed Oct. 18, 1989, Ser. No. 423,074**

**Claims priority, application Switzerland, Oct. 18, 1988, 03876/88**

**Int. Cl.$^5$ H03L** *7/00;* **H03B** *19/00*

**U.S. Cl. 328—14** **12 Claims**



12. A frequency synthesizing device for the generation of signals covering various frequency channels, including first and second reference frequency generators, an offset stage providing an output signal ($s_{os}$) and a phase-locked loop being operated as a tracking filter and having a voltage-controlled oscillator and first and second inputs, wherein:

the first and second reference frequency generators (RG1, RG2) generate respective first and second signals ($s_{RG1}$) and ($s_{RG2}$) which are applied to the first input of the phase-locked loop (PLL) and to the offset stage (OS) respectively, and whose respective frequencies ($f_{RG1,RG2}$) are selectable to be equal to a fraction of a standard frequency ($f_{BZ}$);

the frequency ($f_{OS}$) of the output signal ($s_{OS}$) of the offset stage (OS) is applied to the second input of the phase-locked loop (PLL) and takes on one of

(a) the value of a predetermined frequency ($f_{OR}$) of an offset reference signal ($s_{OR}$) and

(b) the value of a frequency ($f_{OR}+/-f_{RG2}$) of a sum or difference signal formed by combining signals ($s_{OR}$) and ($s_{RG2}$);

at the output of the voltage-controlled oscillator (VCO) in the phase controlled loop (PLL) there is generated the output signal ($s_A$) of the frequency synthesizing device at a frequency ($fs_A$) formed by the addition of the frequency ($f_{RG1}$) and ($f_{OS}$) of the signals ($s_{RG1}$) and ($s_{OS}$), respectively; and

wherein all the frequencies of the reference frequency generators (RG1, RG2) and the offset stage (OS) are selectable and combinable with one another such that the resulting sidebands always lie outside the bandwidth of the tracking filter.

---

### 5,019,786
## PHASE MEASUREMENT SYSTEM USING A DITHERED CLOCK

**Christopher R. Fairley, San Jose, and Steven R. Patterson, Livermore, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Nov. 17, 1989, Ser. No. 437,575**

**Int. Cl.$^5$ G01R** *25/00*

**U.S. Cl. 328—133** **20 Claims**

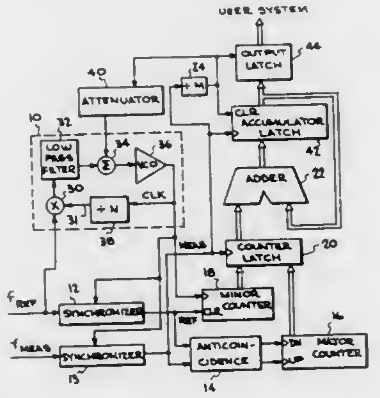
1. A method for measuring the phase shift between a reference input signal and a measured input signal with leading edges, comprising the steps of:

generating a dithered clock signal with a rising edge, and a constantly varying phase;

measuring the phase difference between the reference input

VOL
1126
ISS
4
MY
28
1991
UMI

signal and the measured input signal when triggered by the dithered clock signal; and



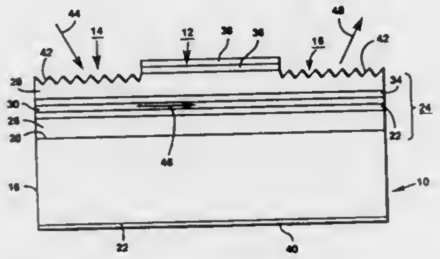
averaging a plurality of measurements of the phase differences between the reference input signal and the measured input signal.

---

### 5,019,787
### OPTICAL AMPLIFIER

**Nils W. Carlson, Lawrence Township, Mercer County; Gary A. Evans, West Windsor Township, Mercer County; Jacob M. Hammer, Princeton Borough, Mercer County, and Michael Ettenberg, West Windsor Township, Mercer County, all of N.J., assignors to David Sarnoff Research Center, Inc., Princeton, N.J.**

**Filed Oct. 30, 1989, Ser. No. 428,695**
**Int. Cl.$^5$ H01S *3/19;* H01L *33/00***
**U.S. Cl. 330—4.3 18 Claims**



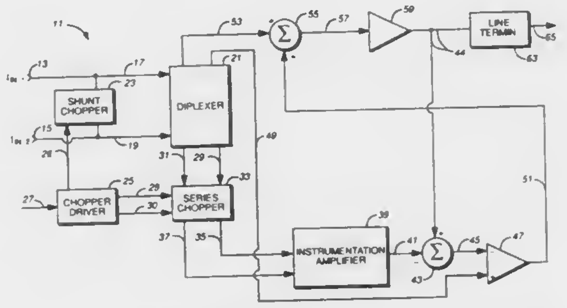
1. An optical amplifier comprising:
a body of a semiconductor material;
a grating on said body for receiving a beam of light and directing the beam along the path through said body;
a gain section in said body along said path through which the beam passes, said gain section being capable of amplifying the beam; and
a grating on said body for receiving the amplified beam of light from the gain section and directing the amplified beam out of the body;
each of the gratings having a period such that only the first grating order of the light is coupled out of the amplifier and the second grating order is not coupled into the fundamental mode of the waveguide so that self-oscillation of the light in the waveguide does not occur so as to provide only a single pass gain.

---

### 5,019,788
### AMPLIFIER WITH WIDE DYNAMIC RANGE

**Michael C. Fischer, Palo Alto, and William E. Strasser, Montara, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Aug. 16, 1989, Ser. No. 395,114**
**Int. Cl.$^5$ H03F *3/68***
**U.S. Cl. 330—9 52 Claims**



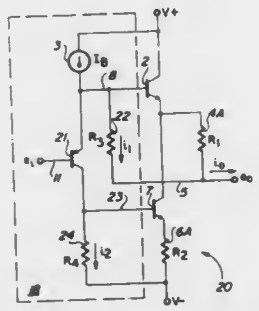
1. Amplifier apparatus comprising:
diplexer means for receiving an input signal, for producing a low frequency component signal from the input signal and issuing this signal as a first diplexer output signal, and for producing a high frequency component signal from the input signal and issuing this signal as a second diplexer output signal;
low frequency amplification means for receiving as an input signal the first diplexer output signal, for amplifying this input signal to produce a first amplified signal, for forming the sum of this signal and a composite output signal, and for amplifying this sum signal to produce and issue a low frequency output signal; and
high frequency amplification means for receiving as input signals the second diplexer output signal and the low frequency output signal, for forming and amplifying the sum of these two input signals to produce and issue the composite output signal.

---

### 5,019,789
### ADAPTIVE BIAS CIRCUIT FOR PREVENTING TURNOFF IN A PUSH-PULL STAGE

**Jerald G. Graeme, and Steven D. Millaway, both of Tucson, Ariz., assignors to Burr-Brown Corporation, Tucson, Ariz.**

**Filed Jun. 26, 1990, Ser. No. 544,231**
**Int. Cl.$^5$ H03F *3/26***
**U.S. Cl. 330—273 11 Claims**



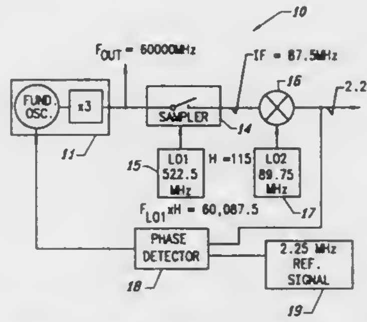
1. A push-pull output circuit comprising in combination:
(a) a pullup transistor and a pulldown transistor of a first conductivity type, an emitter of the pullup transistor being coupled to a collector of the pulldown transistor;
(b) a first resistor coupled between an output conductor and the emitter of the pullup transistor, and a second resistor coupled between an emitter of the pulldown transistor and a first supply voltage conductor, a collector of the pullup transistor being coupled to a second supply voltage conductor; (c) a bias circuit including
i. a phase splitting transistor having a first current carrying electrode coupled to a constant bias current source and a base of the pullup transistor, a second current carrying electrode coupled to a base of the pulldown transistor, and a control electrode coupled to receive an input signal,
ii. a third resistor coupled between the base of the pullup transistor and the output conductor;
iii. a fourth resistor coupled between the base of the pulldown transistor and a terminal of the second resistor that is coupled to the first supply voltage conductor.

---

### 5,019,790
### METHOD FOR ELIMINATING SUBHARMONIC FALSE LOCKING IN SAMPLER AND FREQUENCY MULTIPLIER BASED SOURCE LOCKING SYSTEMS

**Peter M. Kapetanic, Morgan Hill, Calif., assignor to Wiltron Company, Morgan Hill, Calif.**

**Filed Jun. 21, 1990, Ser. No. 541,586**
**Int. Cl.$^5$ H03L *7/10, 7/16***
**U.S. Cl. 331—16 6 Claims**



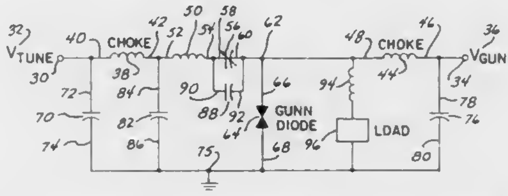
1. In a sampler based phase-locked-loop having a signal source and a local oscillator, said signal source having a source oscillator and a frequency multiplier for multiplying the frequency of said source oscillator by a factor M for providing an output signal having a fundamental frequency $F_s$ and a plurality of subharmonic frequencies, and said phase-locked-loop having a source search range, a method for preventing a subharmonic false lock of said phase-locked-loop comprising the step of:
operating said local oscillator at a predetermined frequency $F_{LO1}$ such that said phase-locked-loop is prevented from locking onto a subharmonic of said source frequency $F_s$ as said phase-locked-loop searches for a lock within said source search range.

---

### 5,019,791
### MILLIMETER WAVE OSCILLATOR WITH FLICKER (1/F) NOISE SUPPRESSION

**Leonard D. Cohen, Brooklyn, N.Y., assignor to All Systems, Inc., Deer Park, N.Y.**

**Filed Aug. 6, 1990, Ser. No. 563,246**
**Int. Cl.$^5$ H03B *7/00, 7/06;* H03L *1/00***
**U.S. Cl. 331—96 30 Claims**



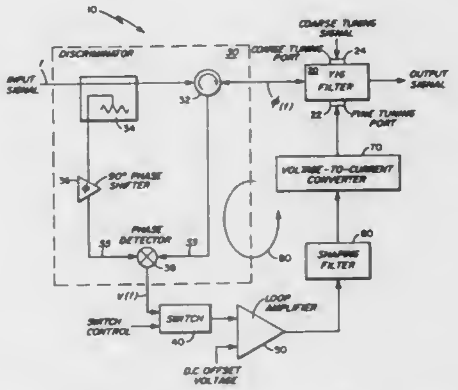
1. A method for reducing noise in an oscillator operational in the millimeter wave and microwave range, comprising providing an active circuit including an active element with a negative resistance, providing a resonator circuit coupled to said active circuit and providing resonant circuitry in combination therewith, suppressing flicker (1/f) noise by reducing oscillator pushing to zero.

---

### 5,019,792
### SIGNAL TRACKING ELECTRONICALLY TUNABLE FILTER

**Robert DiBiase, Carlisle; Zvi Galani, Bedford, and Raymond C. Waterman, Jr., Westford, all of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed Oct. 23, 1989, Ser. No. 425,144**
**Int. Cl.$^5$ H03H *11/00***
**U.S. Cl. 333—17.1 9 Claims**



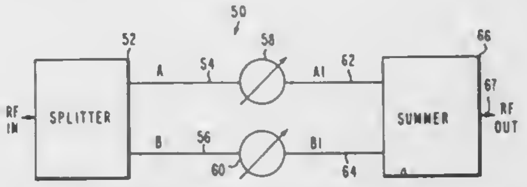
4. A method of operating a bandpass filter comprising the steps of:
(a) overcoupling an applied R.F. signal having a frequency to a Yttrium Iron Garnet (YIG) filter so that at least a portion of the applied R.F. signal is reflected from the YIG filter to produce a first signal indicative of a center frequency of a passband of the YIG filter;
(b) forming a fine tuning signal from the first signal and the applied R.F. signal, the fine tuning signal having an amplitude indicative of the magnitude of the difference between the frequency of the applied R.F. signal and the center frequency of the passband of the YIG filter and having a polarity indicative of a direction in which the center frequency of the passband is to be changed to make the center frequency coincident with the frequency of the applied R.F. signal; and
(c) applying the fine tuning signal to the YIG filter for keeping the center frequency of the passband of the YIG filter coincident with the frequency of the applied R.F. signal.

---

### 5,019,793
### DIGITALLY IMPLEMENTED VARIABLE PHASE SHIFTER AND AMPLITUDE WEIGHTING DEVICE

**Kevin M. McNab, Hawthorne, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed May 21, 1990, Ser. No. 526,160**
**Int. Cl.$^5$ H01P *1/18***
**U.S. Cl. 333—156 15 Claims**



1. A variable phase shifter and amplitude weighting device for selectively varying the phase and amplitude of an input RF

VOL
1126
ISS
4
MY
28
1991
UMI

signal, $RF_{IN}$, in order to thereby produce an output RF signal, $RF_{OUT}$, having a selected phase and amplitude, the device including:

means for splitting the input RF signal, $RF_{IN}$, into RF signal components A and B;

means for selectively shifting the phase of said RF signal components A and B, to thereby produce selectively phase-shifted signal components A1 and B1;

means for combining said selectively phase-shifted signal components A1 and B1, to thereby produce the output RF signal, $RF_{OUT}$ having a selected phase and amplitude; and wherein:

C represents the selected amplitude, and $\phi_c$ represents the selected phase angle of said $RF_{OUT}$ signal;

$\phi_a$ represents the phase angle of said signal component A:

$\phi_b$ represents the phase angle of said signal component B; and,

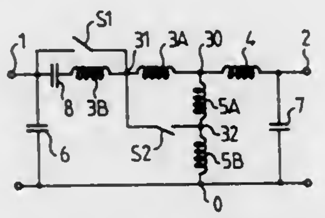
said selectively phase shifting means is adapted to phase shift said signal components A and B in accordance with the equations $\phi_a=\phi_c+\cos^{-1}(\tfrac{1}{2}C)$ and $\phi_b=\phi_c-\cos^{-1}(\tfrac{1}{2}C)$.

---

### 5,019,794
## BANDPASS FILTER HAVING AN ADJUSTABLE BANDWIDTH

**Jacques Letessier, Suresnes, and Philippe Castelli, Paris, both of France, assignors to U. S. Philips Corporation, New York, N.Y.**

**Filed Mar. 2, 1990, Ser. No. 487,566**
**Claims priority, application France, Mar. 17, 1989, 89 03523**
**Int. Cl.$^5$ H03H** *7/12*
U.S. Cl. 333—174 2 Claims



1. A bandpass filter having an adjustable bandwidth, comprising a first capacitive element arranged in shunt across an input of said bandpass filter; two inductive branches serially arranged between said input and an output of said bandpass filter, said two inductive branches having a central point therebetween; a shunting inductive branch arranged at said central point; and a second capacitive element arranged in shunt across said output, characterized in that one of said two serially-arranged inductive branches comprises, in series from said central point, a first and a second inductances and a capacitor, said first and a second inductances having a common point therebetween; said shunting inductive branch comprising two serially-arranged inductances having a connection point therebetween; and said bandpass filter further comprising a first switch arranged between said common point and an end of said one serially-arranged inductive branch remote from said central point, and a second switch arranged between said common point and said connection point, whereby when one of said first and second switches is open, the other of said first and second switches is closed.

---

### 5,019,795
## SPLICE BLOCK FOR SECURITY SYSTEM SWITCH

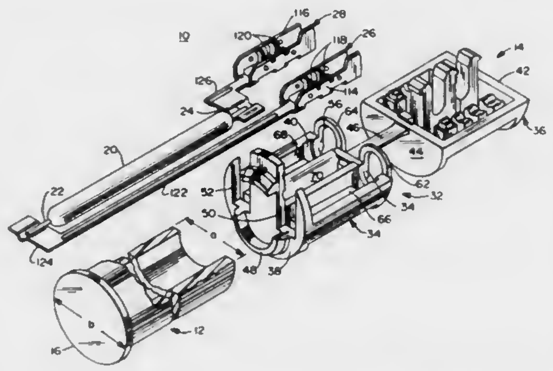
**Arvind Patel, Naperville; William Lenz, Crestwood, and Jack J. Schafer, LaGrange, all of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Filed Dec. 6, 1989, Ser. No. 446,746**
**Int. Cl.$^5$ H01H** *45/04;* **H01K** *4/24*
U.S. Cl. 335—205 28 Claims

1. In a condition responsive security system switch including a generally cylindrical switch housing having a generally circular rear end and condition responsive switch means therein for alternately completing and breaking a circuit in response to a selected condition, said switch further including terminals electrically connected to said condition responsive switch means and extending from the rear end of the switch housing, wherein the improvement comprises a splice block comprising:

a generally cylindrical splice block housing having a front wall substantially conforming to the configuration of the rear end of the switch housing and engageable therewith, the front wall of the splice block housing including at least one aperture extending therethrough for receiving portions of the terminals extending from the rear end of the switch housing, terminal receiving means disposed in said housing for securely positioning portions of terminals therein, a rear wall having wire receiving apertures extending therethrough generally in line with the terminal receiving means; and

an actuator selectively engageable in alternate first and second positions relative to the splice block housing, whereby the engagement of the actuator in the first position enables insertion of wires into the wire receiving apertures and generally into alignment with portions of the terminals disposed in the terminal receiving means, and wherein engagement of the actuator in the second position electrically connects the terminals to the wires.

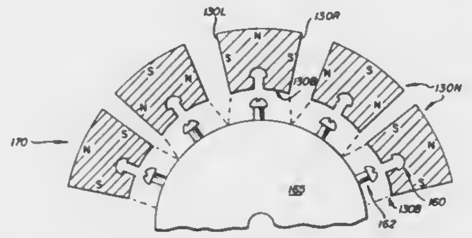


---

### 5,019,796
## BAR MAGNET FOR CONSTRUCTION OF A MAGNETIC ROLLER CORE

**James K. Lee, Brighton; Donald J. McJury, Brockport; Michael A. Pickup, Brighton, and Kelly S. Robinson, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 22, 1989, Ser. No. 455,117**
**Int. Cl.$^5$ H01F** *7/02*
U.S. Cl. 335—302 41 Claims



1. A magnet for a magnetic core, the magnet comprising:

a body of hard magnetic material having magnetic domains therein; and

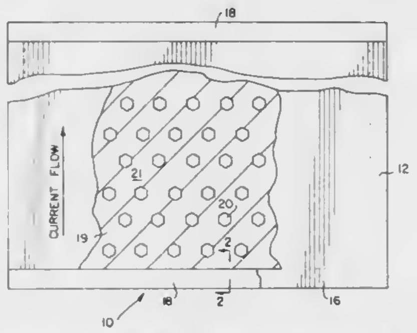
a first magnetic pole face and second and third generally mutually opposing magnetic pole faces, the first pole face being of a first polarity and located generally transverse to said second and third pole faces, the second and third pole faces being of a polarity opposite to that of the first pole face, and the domains being aligned along generally diverging curved paths between the first pole face and the second and third pole faces.

---

### 5,019,797
## ELECTRICAL RESISTANCE DEVICE

**John A. Marstiller, Marston Mills; Paul H. Bodensiek, Waltham, and Frederick G. J. Grise, Osterville, all of Mass., assignors to Flexwatt Corporation, West Wareham, Mass.**

**Division of Ser. No. 142,625, Jan. 11, 1988, Pat. No. 4,888,089, which is a continuation-in-part of Ser. No. 138,857, Dec. 29, 1987, Pat. No. 4,892,998. This application Sep. 29, 1989, Ser. No. 414,532**
**Int. Cl.$^5$ H01C** *3/00*
U.S. Cl. 338—333 13 Claims



1. An electrical resistance device including a conductive metal pattern carried on an insulating surface, said device being characterized in that

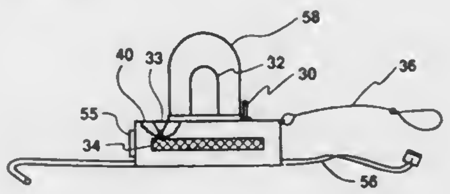
a portion of said conductive metal pattern includes a two-dimensional array of substantially identical areas of said substrate devoid of conductive material ("voids") within a mesh of conductive material on said substrate, said voids being arranged such that the centers of sets of three adjacent voids are positioned at the corners of triangles and the overall direction of current flow in said device is generally not parallel to sides of said triangles.

---

### 5,019,798
## OVERHEAD WARNING DEVICE

**Wayne H. Pherigo, Jr., 709 Pauline, Pasadena, Tex. 77502**

**Filed Jan. 26, 1990, Ser. No. 470,595**
**Int. Cl.$^5$ G08B** *7/06*
U.S. Cl. 340—326 6 Claims



1. An overhead warning device for affixation to an overhead crane, said device comprising:

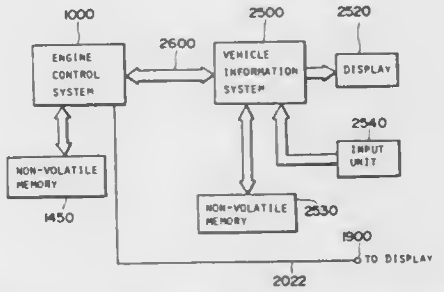
a. a housing;
b. battery means within said housing;
c. a horn within said housing;
d. a 360° rotatable beacon lamp exterior of said housing;
e. electrical switch means mounted on said housing to activate or deactivate the horn and the lamp;
f. magnetic means on a side of the housing to affix the device to a metallic load; and
g. a safety cable to affix the device to the load or the crane wherein the safety cable has a first end attached to the housing and a second end having a loop, and whereby said horn and the beacon lamp may be activated by the switch means to provide a warning function during operation of the overhead crane.

---

### 5,019,799
## ELECTRONIC DEVICE WITH SELF-MONITOR FOR AN AUTOMOTIVE VEHICLE

**Katsunori Oshiage, Yokosuka; Akio Hosaka, and Akito Yamamoto, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Continuation of Ser. No. 925,528, Oct. 28, 1986, abandoned, which is a continuation of Ser. No. 836,216, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 405,426, Aug. 5, 1982, abandoned. This application Apr. 15, 1987, Ser. No. 38,442**
**Claims priority, application Japan, Aug. 6, 1981, 56-116150[U]; Aug. 6, 1981, 56-122415**
**Int. Cl.$^5$ B60Q** *1/00*
U.S. Cl. 340—438 20 Claims



1. A self-monitor system for an automotive electronic control system, comprising:

a first sensor sensing a relevant operational parameter relative to a vehicle component to be controlled by said electronic control system and producing a first sensor signal having a value representative of the sensed operational parameter;

a second sensor sensing a relevant operational parameter relative to a vehicle operating condition and producing a second sensor signal having a value representative of the sensed vehicle operating condition;

a first digital processor permanently mounted on said vehicle and responsive to said first sensor signal to derive a control signal for controlling operation of said vehicle component on the basis of said first sensor signal values, said first digital processor performing a self-checking checking program for checking operation of segments of said control system and said sensor and detecting faulty operation of each segment and sensor whenever failure occurs;

a memory associated with said first digital processor for storing fault data including identification of the faulty segment;

a second digital processor also permanently mounted on said vehicle and normally operable independently of said first digital processor and being responsive to said second sensor signal to derive information corresponding to said vehicle operating condition, said second digital processor having an external connector terminal for connection to said first digital processor through a data bus, a display unit, and a manually operable input device, said second digital processor further responsive to a check demand manually input through said input device to establish communication with said first digital processor to feed said demand to said first digital processor in order to trigger the latter for performing said self-checking program to said first digital processor and to display fault data stored in said memory on said display unit; and

said second digital processor operative for receiving a plurality of vehicle operation parameters from a plurality of sensors and for processing same to provide output data to said display unit, said output data including vehicle trip

VOL
1126
ISS
4
MY
28
1991
UMI

and speed data selectively displayed in response to actuation of said input device.

---

**5,019,800**

## SYSTEM FOR MEASURING THE OIL LEVEL OF AN OIL PAN OF THE CRANKCASE OF AN INTERNAL COMBUSTION ENGINE

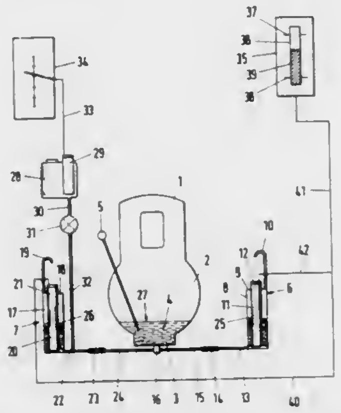
**Gustav Gallert, Hasenweg 19, 4230 Wesel, Fed. Rep. of Germany**

**Filed Sep. 29, 1989, Ser. No. 414,364**

**Claims priority, application Fed. Rep. of Germany, Oct. 1, 1988, 3833453**

**Int. Cl.$^5$ B60Q** *1/00*

**U.S. Cl. 340—450.3** **27 Claims**



1. A system for measuring the oil level in an oil pan of an engine crankcase, the system comprising:
- a first oil level measuring device external to said oil pan and in fluid communication with the oil pan and generating a first signal indicative of the oil level within said first measuring device;
- a second oil level measuring device external to said oil pan and in fluid communication with the oil pan and said first measuring device, said second measuring device generating a second signal indicative of the oil level within said second measuring device, said second measuring device being located such that an imaginary line extends between said second measuring device, the middle of the oil pan and said first measuring device, the imaginary line corresponding the oil level in said oil pan and said first and second measuring devices; and
- means for indicating the oil level of the oil pan in response to a measured value derived from the first and second signals.

---

**5,019,801**

## ARTICLE SURVEILLANCE SYSTEM HAVING TARGET REMOVAL SENSOR

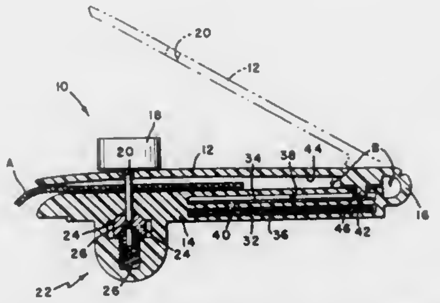
**Philip M. Anderson, III, Madison, N.J., assignor to Identitech, Essex, N.J.**

**Continuation of Ser. No. 384,841, Jul. 24, 1989, abandoned, which is a continuation of Ser. No. 102,974, Sep. 30, 1987, abandoned. This application Jan. 4, 1990, Ser. No. 463,771**

**Int. Cl.$^5$ G08B** *19/00, 13/14*

**U.S. Cl. 340—522** **16 Claims**

1. An article surveillance marker, comprising:
- a marker body;
- means for generating a first signal in response to an applied magnetic interrogation field, said first signal indicating conveyance of an article to which said surveillance marker is attached from an authorized area;
- means for generating through mechanical vibration a second signal is response to an applied interrogation field, said second signal having a different frequency than said first signal, indicating unauthorized removal of the surveillance marker from the article; and



- means for damping the mechanical vibration of and thereby deactivating said second signal generating means when said surveillance marker is attached to the article to be protected.

---

**5,019,802**

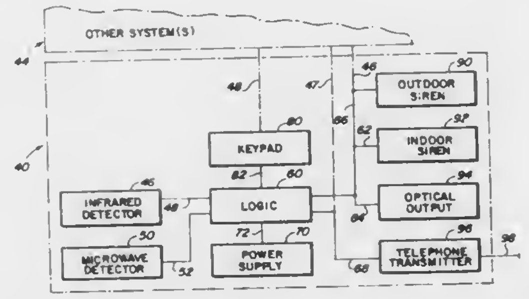
## INTRUSION DETECTION APPARATUS

**Raymond C. Brittain, 2133 W. Highland Ave., Phoenix, Ariz. 85015, and Roy Gomez, 1307 E. Sequoia Dr., Phoenix, Ariz. 85024**

**Filed Dec. 15, 1989, Ser. No. 451,096**

**Int. Cl.$^5$ G08B** *19/00*

**U.S. Cl. 340—522** **15 Claims**



1. Intrusion alarm apparatus for a swimming pool comprising, in combination:
- first detector means for detecting mass and for providing a first output in response to the detector mass in the area of the swimming pool;
- second detector means for detecting movement and for providing a second output in response to the detected movement in the area of the swimming pool;
- logic means for receiving the first and second outputs and for providing a third output in response to the received first and second outputs;
- keypad means, including a keypad adjacent to the swimming pool, for enabling the logic means to provide the third output in response to a first predetermined code and for preventing a logic means from providing the third output in response to a second predetermined code; and
- first alarm means for receiving the third output and for providing at least a single alarm signal in response to the received third output.

**5,019,803**

## DETECTOR UNITS

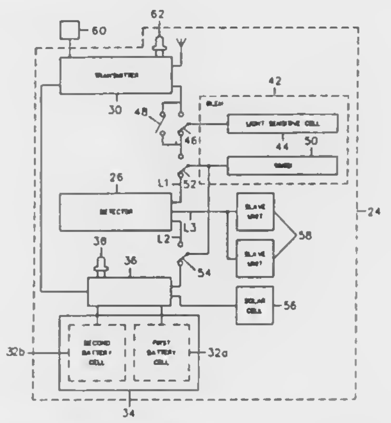
**Morris Maram, 135 President Street, Johannesburg 2001, South Africa**

**Filed Dec. 2, 1988, Ser. No. 278,775**

**Claims priority, application South Africa, Dec. 2, 1987, 87/9036**

**Int. Cl.$^5$ G08B** *1/08*

**U.S. Cl. 340—539** **16 Claims**



14. A detector unit comprising:
- a detector for developing a detector signal when actuated,
- signalling means including a radio frequency transmitter connected to the detector for transmitting said detector signal when the detector is actuated,
- timing means for resetting a given time period in response to each successive detector signal received, and
- means connected to said detector and to said timing means for preventing a said detector signal from being emitted by said transmitter after a first time until after said timing means has received no detector signal for said given time period.

---

**5,019,804**

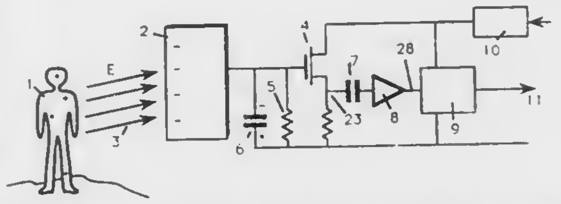
## APPARATUS AND METHOD FOR DETECTING MOVEMENT OF AN OBJECT

**Jacob Fraden, 72 Hampton Rd., Hamden, Conn. 06518**

**Filed Apr. 10, 1989, Ser. No. 335,795**

**Int. Cl.$^5$ G08B** *13/26*

**U.S. Cl. 340—562** **7 Claims**



1. An apparatus for detecting movement of an object carrying a charge in an environment having miscellaneous varying charges, said apparatus comprising:
- a pair of sensor electrodes, in sufficiently close proximity to said object so that capacitive coupling can exist between said object and one of said pair, said electrodes being so arranged with respect to each other that they are not always in simultaneous equal proximity with said moving object,
- a first circuit means for sensing change in electric charge and for providing a varying signal indicative of that charge, connected to a first of said sensor electrodes for sensing change in electrical charge of said first sensor electrode, and for providing an indicative first varying signal,
- a second circuit means for sensing change in electric charge and for providing a second varying signal indicative of that charge, connected to a second of said sensor electrodes for sensing change in electrical charge of said second sensor electrode, and for providing an indicative second varying signal,
- a third circuit means for comparing said first varying signal with said second varying signal and providing a third signal indicative of a difference between said first and second signals, connected to said first and second circuit means for receiving said first and second signals,
- a fourth circuit means for comparing said third varying signal against a threshold level and providing a fourth signal when the threshold is exceeded, connected to said third circuit means for receiving said third signal, said fourth signal being indicative of movement of said object, and
- power supply means, connected to said apparatus for providing sufficient power to operate the circuit means of said apparatus.

---

**5,019,805**

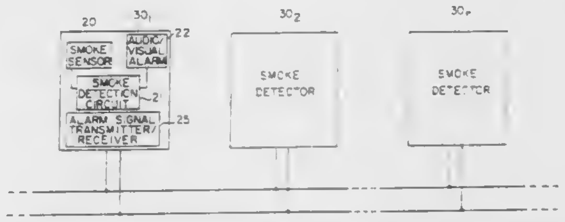
## SMOKE DETECTOR WITH STROBED VISUAL ALARM AND REMOTE ALARM COUPLING

**Ricky L. Curl, Pinson, and Lowell E. Roberts, Irondale, both of Ala., assignors to Flash-Alert Inc., Birmingham, Ala.**

**Filed Feb. 3, 1989, Ser. No. 305,916**

**Int. Cl.$^5$ G08B** *17/10*

**U.S. Cl. 340—628** **5 Claims**



1. A portable, smoke detector and alarm unit comprising:
- (a) smoke sensor means for sensing the presence of smoke and outputting a smoke indicator signal;
- (b) smoke detection means responsive to the smoke indicator signal from said smoke sensor means for comparing the smoke indicator signal with a predetermined threshold and outputting a first alarm signal when said smoke indicator passes said threshold;
- (c) a strobe light for providing a visual alarm;
- (d) a power supply;
- (e) triggering means responsive to the first alarm signal for providing a triggering signal to said strobe light such that said strobe light is triggered to flash at a substantial constant rate, said triggering means including:
  - (i) a timing capacitor operatively coupled to the power supply and to a trigger electrode of said strobe light;
  - (ii) first switch means operatively connected to said timing capacitor and responsive to the first alarm signal for enabling said timing capacitor to charge to at least a threshold voltage to trigger said strobe light;
  - (iii) second switch means responsive to the voltage across said timing capacitor and activated to complete a circuit to cause discharging of said timing capacitor when the timing capacitor voltage is at least at the threshold voltage to trigger said strobe light for flashing; and
- (f) an energy storage capacitor connected to the power supply and to said strobe light for storing electrical energy independently of said first alarm signal to flash said strobe light when triggered.

VOL
126
ISS
4
MY
28
1991
UMI

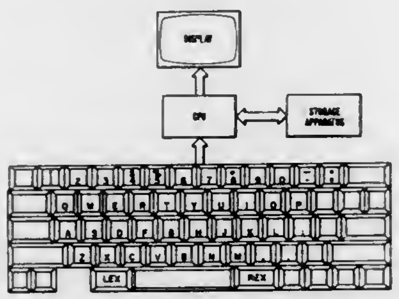
### 5,019,806
## METHOD AND APPARATUS FOR CONTROL OF AN ELECTRONIC DISPLAY

**Jef Raskin, Cupertino, and James Winter, Los Angeles, both of Calif., assignors to Information Appliance, Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 30,277, Mar. 23, 1987, abandoned, which is a continuation of Ser. No. 605,448, Apr. 30, 1984, abandoned. This application Apr. 11, 1989, Ser. No. 338,413**

**Int. Cl.⁵ G09G** *5/00*

U.S. Cl. 340—706 **11 Claims**



1. Apparatus for designating a desired region of the contents of a computer storage apparatus comprising:

a processing unit coupled to the storage apparatus;
a display connected to the processing unit;
a keyboard connected to the processing unit to control the processing unit and the display; and
first and second switchable designation means coupled to the processing unit for causing the processing unit to search the storage apparatus for a pattern entered into the keyboard while at least one of the first and second switchable designation means is activated, wherein the first designation means causes the processing unit to search for the pattern in a first direction from a selected location on the display and the second designation means causes the processing unit to search in an opposite direction from said selected location.

---

### 5,019,807
## DISPLAY SCREEN

**John J. Stapletnn, and Barbara K. Stapleton, both of E. Brunswick, N.J., assignors to StapleVision, Inc., Brunswick, N.J.**

**Continuation of Ser. No. 654,609, Jul. 25, 1984, abandoned. This application Feb. 27, 1989, Ser. No. 316,589**

**Int. Cl.⁵ G09G** *3/00*

U.S. Cl. 340—718 **12 Claims**

1. A large area display screen for displaying video and/or color graphic images, said screen comprising:

a plurality of picture elements arranged in color triads for generating light in response to an electric filed, said color triads being arranged in a two dimensional matrix of orthogonal rows and columns, with each triad being disposed at an intersection between a row and a column;
support means for supporting said picture elements;
driving means including row selection means for selecting said row and column selection means for selecting said column, said row and column selection means cooperating to select the rows and columns of said matrix in a preselected pattern;
a plurality of switching circuits, each switching circuit being connected to one of said rows and one of said columns and to at least one triad to update said triad when the corresponding row and column is selected respectively by said row selection means and said column selection means, each switching circuit including a plurality of parallel circuit branches, each branch including at least two thin film switching transistors in series, each said switching circuit being arranged to selectively activate said triad when all of the switching transistors are functional or when at least one of the thin film switching transistors of a switching circuit is functional and at least one of the remaining thin film switching transistors of that switching circuit is shorted or opened, said switching circuits forming a fault tolerant network immune to short and open circuits.

---

### 5,019,808
## FULL COLOR LIQUID CRYSTAL DISPLAY

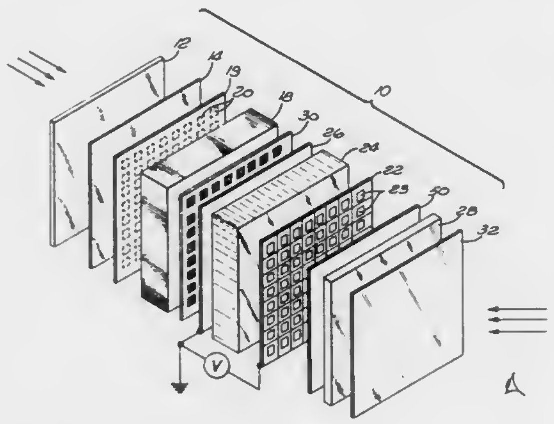
**John C. Prince, Kettleby, and James F. Farrell, Pickering, both of Canada, assignors to Litton Systems Canada Limited, Etobicoke, Canada**

**Continuation-in-part of Ser. No. 922,186, Oct. 23, 1986, Pat. No. 4,799,050. This application Nov. 14, 1988, Ser. No. 270,074**

**The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.**

**Int. Cl.⁵ G09G** *3/18*

U.S. Cl. 340—765 **14 Claims**



1. A display comprising in combination:

a) a layer of liquid crystal material;
b) a planar array of transparent control electrodes associated with said layer of liquid crystal material for forming a planar array of adjacent modulated light-conducting cells;
c) a planar matrix of discrete phosphor elements, each of said elements in light-conducting communication with a rear end of a light pipe of a fiber optic plane disposed behind said layer of liquid crystal material and in front of said planar matrix of discrete phosphor elements;
d) said plate including a plurality of adjacent and parallel light-conducting pipes, each pipe comprising a plurality of optical fibers wherein said phosphor elements are distributed into groupings of adjacent elements comprising differing emission spectra such that the color of light emitted from each of said groupings can span the full spectrum of visible light;
e) an ultraviolet light source located behind said planar matrix of discrete phosphor elements for irradiating said elements with ultraviolet light;
f) a first filter means located behind said planar matrix of discrete phosphor elements and in front of said ultraviolet light source for transmitting ultraviolet light to said phosphor layer and for reflecting visible ambient light incident thereupon;
g) a second filter means located in front of said planar matrix and behind said plate for transmitting visible ambient light to said matrix and for reflecting ultraviolet light incident thereupon; and
h) said planar array of transparent control electrodes is located adjacent and in front of said layer of liquid crystal material.

---

### 5,019,809
## TWO-DIMENSIONAL EMULATION OF THREE-DIMENSIONAL TRACKBALL

**Michael Chen, Sunnyvale, Calif., assignor to University of Toronto Innovations Foundation, Toronto, Canada**

**Continuation of Ser. No. 225,970, Jul. 29, 1988, abandoned. This application Feb. 14, 1990, Ser. No. 483,264**

**Int. Cl.⁵ G09G** *5/00*

U.S. Cl. 340—815.31 **30 Claims**

1. A method for rotating an object displayed in three-dimensional representation on a computer controlled video display system having a computer and a video display, the method comprising the steps of:

providing a reference circle;
providing a user actuated input controller for selectively positioning a reference indicator recognized by the computer;
signaling the computer to activate a control movement mode wherein the movement of the reference indicator in the control movement mode is for rotating the displayed object about an axis that is determined by the direction of the control movement of the reference indicator and the location of the control movement of the reference indicator relative to the reference circle;
moving the reference indicator in the control movement mode using the input controller by moving said input controller in two-dimensions to provide a defined movement; and
rotating the displayed object about any arbitrary axis in 3-dimensional space when said reference indicator is within said reference circle, said rotating being in accordance with the defined movement in the control movement mode.

---

### 5,019,810
## APPARATUS FOR DETECTING MALFUNCTION OF INTERFACE CIRCUIT IN COMMUNICATION LINE BETWEEN CONTROLLERS IN A VEHICLE CONTROL SYSTEM

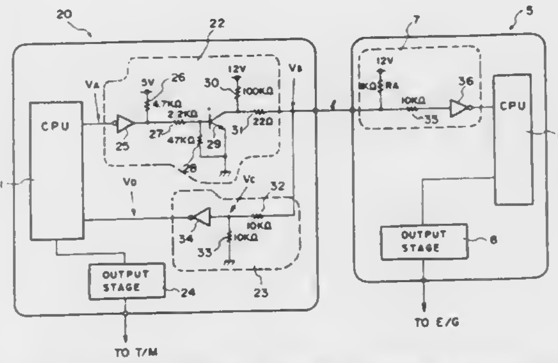
**Yasunobu Ito, and Kunihiro Yamada, both of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 268,755, Jan. 19, 1988, abandoned. This application Apr. 13, 1990, Ser. No. 508,465**

**Claims priority, application Japan, Dec. 28, 1987, 62-329503**

**Int. Cl.⁵ H04Q** *9/00;* **G05B** *23/02*

U.S. Cl. 340—825.06 **5 Claims**



1. A system for detecting a malfunction of an interface circuit in a communication line between two controllers in a vehicle control system, comprising:

a first electronic controller for controlling a vehicle transmission,
a second electronic controller for controlling a vehicle engine, and
a communication line connected between the first electronic controller and the second electronic controller,
said first electronic controller having
a first central processing unit,
a communication circuit connected between the first central processing unit and the communication line,
a first output stage connected between the first central processing unit and the communication line,
a monitoring circuit connected between the first central processing unit and the communication line,
said second electronic controller having
a second central processing unit,
a second output stage connected between the second electronic controller and the vehicle engine, and
an interface circuit connected between the second central processing unit and the communication line,
said interface circuit including a pull-up resistor connected between the second central processing unit and the communication line, and wherein
said first central processing unit outputs a signal to the communication circuit for producing a torque reduction signal in the second central processing unit,
said first central processing unit determines an abnormal or normal condition on the basis of comparing the signal output from the monitoring circuit with the signal output to the communication circuit,
said first central processing unit outputs a signal to the first output stage for reducing the line pressure applied to said vehicle transmission in the case of a normal condition, and
said first central processing unit outputs a signal to the first output stage for maintaining the line pressure to said vehicle transmission in the case of an abnormal condition.

---

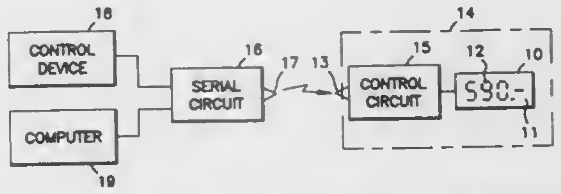
### 5,019,811
## DEVICE FOR MARKING EDGES OF SHELVES

**Sture Olsson, Västra Frölunda, and Roger Ahlm, Linköping, both of Sweden, assignors to Unigrafic AG, Zurich, Switzerland**

**Continuation of Ser. No. 882,912, Jun. 27, 1986, abandoned. This application Nov. 18, 1988, Ser. No. 273,218**

**Int. Cl.⁵ H04B** *1/00*

U.S. Cl. 340—825.17 **4 Claims**



1. A system for indicating information, such as article name and pricing on product shelving comprising:

means for transmitting coded signals containing at least both article and pricing information,
at least one receiving self powered shelf mounted wireless display unit, said display unit including:
a visually readable display;
first and second data registers;
stored article information being the specific call code for a specific display unit;
means for receiving transmitted signals and accepting only signals having a call code address corresponding with a specific display unit for address said unit;
ranging means for directing article data to said first register for storage and price data to said second register for storage;
means controlled by said microprocessor for selectively displaying data from said first and second registers on said display.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,812
## ELECTRONIC LOCKING SYSTEM

**Anders P. Göstahagberg, Kungsbacka; Evan A. Knutsson, Jämjösl ätt, and Mats O. G. Nyström, Gothenburg, all of Sweden, assignors to AB Volvo, Gothenburg, Sweden**

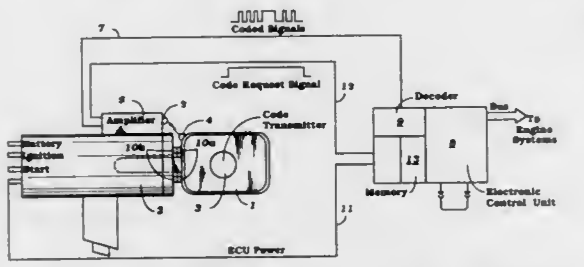
**PCT No. PCT/SE86/00316, § 371 Date Feb. 27, 1987, § 102(e) Date Feb. 27, 1987, PCT Pub. No. WO87/00234, PCT Pub. Date Jan. 15, 1987**

**PCT Filed Jun. 27, 1986, Ser. No. 36,676**

**Claims priority, application Sweden, Jul. 1, 1985, 8503257**

**Int. Cl.$^5$ B60R** *25/04*

**U.S. Cl. 340—825.31** **4 Claims**



1. An electronic locking system comprising: a conventional mechanical lock and a key for operating said lock, a code transmitter built into said key including means for transmitting coded signals in response to a code request signal when said key is used in said lock, a receiver for receiving coded signals transmitted by said code transmitter, and an electronic control unit connected to said receiver for controlling a select security function, said electronic control unit having means for transmitting code request signal to said code transmitter of said key, memory means for strong a select code signal and means for comparing a code signal received by said receiver with said stored code signal, said electronic control unit activating the select security function when said received coded signal stored therein and including seal means for preventing operation of said select security function unit said seal means has been disabled for permitting normal mechanical lock operations, disabling said seal means being effective to permit said electronic control unit to store a code signal permanently upon the first use of said key in said lock after said seal means has been disabled and when first receiving a coded signal from said receiver, said electronic control unit thereafter activating said security function only when the permanently stored code signal is received from a key used in said lock.

---

### 5,019,813
## SYSTEM FOR THE CONTACTLESS EXCHANGE OF DATA

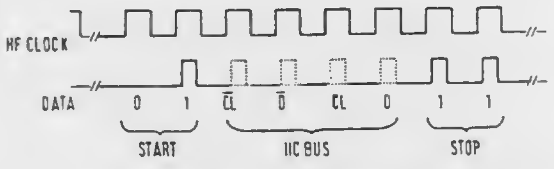
**Harm J. Kip, Lichtenvoorde, and Willem H. J. Venema, Enschede, both of Netherlands, assignors to N.V. Nederlandsche Apparatenfabriek Nedap, De groenlo, Netherlands**

**Filed Apr. 12, 1988, Ser. No. 180,745**

**Claims priority, application Netherlands, Apr. 13, 1987, 8700861**

**Int. Cl.$^5$ H04B** *5/00*

**U.S. Cl. 340—825.54** **17 Claims**



1. A system for the contactless exchange of data between a transceiver and a passive data carrier, said data carrier comprising at least one digital memory means and at least one digital control device for controlling said memory means, and wherein the data carrier has a single-coil receiver circuit connected to a controllable switch means and, in operation, in response to an electromagnetic a.c. field generated by a transceiver, provides via at least one rectifier means supply power to active components of the data carrier as well as clock signals for controlling digital components of the data carrier, characterized in that the transceiver comprises a modulator for the amplitude modulation of said a.c. field received by said coil receiver circuit and that the control device, connected to said coil through a two-branch voltage divider so the voltage at the clock signal input is higher than at the data signal input, has two inputs for receiving clock signals and data signals from the receiver circuit and includes level detectors cooperating with said inputs and arranged to allow the passage of an input signal voltage exceeding a pre-determined value as a valid input signal pulse to said memory means.

---

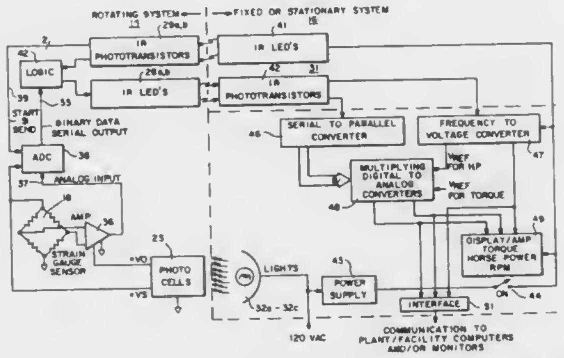
### 5,019,814
## WIRELESS DATA COUPLING SYSTEM AND METHOD

**David H. Biggs, Gardnerville, Nev.; John K. Little, Tucson, Ariz., and Philip C. Hanifan, Gardnerville, Nev., assignors to Bently Nevada Corp., Minden, Nev.**

**Continuation-in-part of Ser. No. 50,715, May 13, 1987, abandoned. This application Apr. 28, 1988, Ser. No. 187,197**

**Int. Cl.$^5$ G08C** *19/16;* **G02B** *27/00*

**U.S. Cl. 340—870.290** **12 Claims**



1. A wireless data coupling system for transmitting data from a rotating shaft to a stationary receiver comprising:

means included in said stationary receiver for generating a start signal and at least one send signal;

register means mounted on said shaft for storing said data as a string of binary digits;

first light receiving means mounted on said shaft for receiving said start signal from said stationary receiver for loading said register with said binary digits;

second light receiving means mounted on said shaft adjacent said first light receiving means for receiving only at least one send signal from said means for generating said send signal;

and at least a pair of light transmitting means mounted on said shaft responsive to said at least one send signal for transmitting to said receiver said binary digits stored in said register along with at least one sync signal corresponding to said at least one send signal.

---

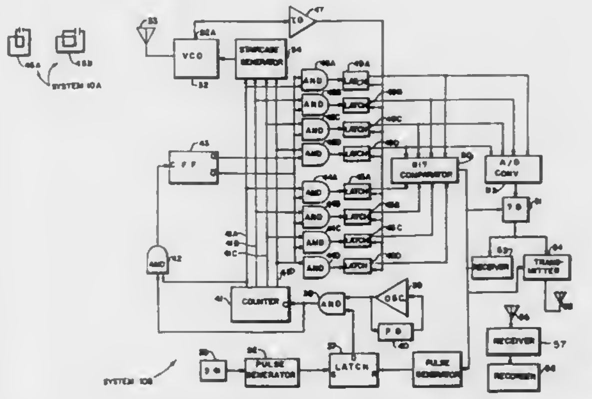
### 5,019,815
## RADIO FREQUENCY CONTROLLED INTERROGATOR-RESPONDER SYSTEM WITH PASSIVE CODE GENERATOR

**Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840, and Christian Grund, 707L Eagle Heights, Madison, Wis. 53705**

**Continuation of Ser. No. 699,573, Feb. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 298,743, Sep. 2, 1981, Pat. No. 4,532,511, which is a continuation-in-part of Ser. No. 84,429, Oct. 12, 1979, Pat. No. 4,288,689. This application Mar. 3, 1987, Ser. No. 21,217**

**Int. Cl.$^5$ G08G** *1/01*

**U.S. Cl. 340—933** **4 Claims**



1. A system for identifying objects comprising in combination:

(a) a plurality of passive code generating micro-miniature electrical circuits each containing a shortwave transmitting means and each supported by its own substrate, antenna means connected to each of said code generating circuits, each of said microminiature electrical circuits having a programmed code therein and acting to generate and shortwave transmit, when energized, at least one code which is different from the codes generated by others of said plurality of code generating electrical circuits, means associated with each of said microminiature electrical circuits for receiving and converting radio-frequency energy when the circuit is in movement through a radio-frequency energy field to electrical energizing signal and means for applying said electrical energizing signals to electrically energize and power the code generating and shortwave transmitting means of each circuit, to shortwave transmit its programmed code,

(b) means for securing each of said microminiature electrical circuits to respective of a plurality of different objects by attaching said circuits and their substrate to said objects,

(c) a detection station including means for generating and applying an energy field in the form of radio-frequency energy of sufficient field strength to cause said means for receiving and converting to operatively energize each of said microminiature electrical circuits when each is in an operative location with respect to said energy field,

(d) a shortwave receiving means at said detection station operable for receiving shortwave signals generated by the shortwave transmitting means of each of said micro-miniature electrical circuits when operatively disposed in and energized by said energy field and converting the shortwave signals received to electrical signals defining the codes sensed by said receiving means,

(e) means operable during relative movement between said objects and said detection station to cause said electrical signals defining the codes transmitted to and received by the shortwave receiving means of the detection station to be generated as electrical signals on an output of said detection station,

(f) a remote receiving station for receiving code signals generated by said detection station,

(g) electronic computing means at said remote receiving station operable to process and analyze the code signals received by the receiving means of said remote receiving station, said electronic computing means being operable to generate control signals in accordance with the code signals received by the receiving means of said remote receiving station,

(h) means connected to said electronic computing means for receiving and utilizing said control signals,

(i) said means for utilizing said control signals includes a plurality of electrical switches and means controlled by the operation of said switches for controlling further relative movement between said objects and said detection station after each object is operatively located in said radio-frequency energy field of said detection station, and

(j) means at said detection station for detecting when an object is present, said means for detecting being operative to energize said energy field generating means upon detection of an object to generate and apply shortwave energy to said receiving and converting means of said object to cause said code generating electrical circuit thereof to generate its code when the object containing said circuit is operatively located at said detection station.

---

### 5,019,816
## DECODING APPARATUS FOR DIGITAL SIGNAL

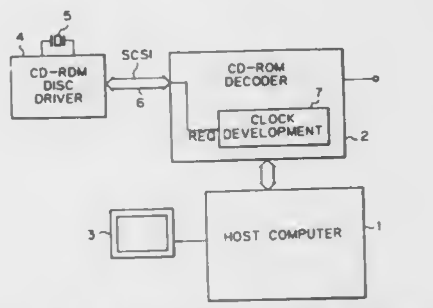
**Yoshimasa Hosono, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Jun. 26, 1990, Ser. No. 543,445**

**Claims priority, application Japan, Jun. 27, 1989, 1-165030**

**Int. Cl.$^5$ H03M** *7/32*

**U.S. Cl. 341—77** **8 Claims**



1. A decoding apparatus for digital signal comprising:

detecting means for detecting a leading edge of a request signal which requests transmission of sequential data as digital signal;

clock generator for generating a clock signal in response to output signal from said detecting means; and

(decoding circuit for decoding sequential data in accordance with the clock signal.

---

### 5,019,817
## ANALOGUE-TO-DIGITAL CONVERTER

**Alan Ryder, Nr. Aldershot, England, assignor to Schlumberger Technologies Limited, Farnborough, England**

**Filed Aug. 14, 1990, Ser. No. 567,144**

**Claims priority, application United Kingdom, Aug. 24, 1989, 8919275**

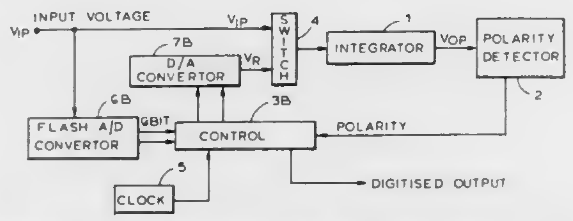
**Int. Cl.$^5$ H03M** *1/50*

**U.S. Cl. 341—129** **10 Claims**

1. An analogue to digital converter comprising an integrator, a selector switch means for applying to the integrator input, during a sampling period, an unknown voltage and for applying to the integrator input a first reference signal, a control means connected to the selector switch means, and a polarity detector connected between the output of the integra-

VOL
126
ISS
4
MY
28
1991
UMI

tor and the control means, the control means being arranged to control the application of the first reference signal to the integrator by the selector switch means so as to reduce the magnitude of the integrator output voltage at the end of the sampling period, a further known reference signal being connectable by the selector switch means to the integrator input after the sampling period in place of the unknown voltage and of the first reference signal, and having the appropriate polarity to further reduce the magnitude of the integrator output voltage towards zero, characterized in that the control means receives from a voltage measuring means a magnitude signal indicative of the magnitude of the unknown voltage and from the voltage measuring means or the polarity detector a polarity signal indicative of the polarity of the unknown voltage, and in that the control means effects application of the first reference signal to the integrator input, in response to the magnitude and polarity signals, concurrently with the unknown voltage during at least part of the sampling period of the integrator.



---

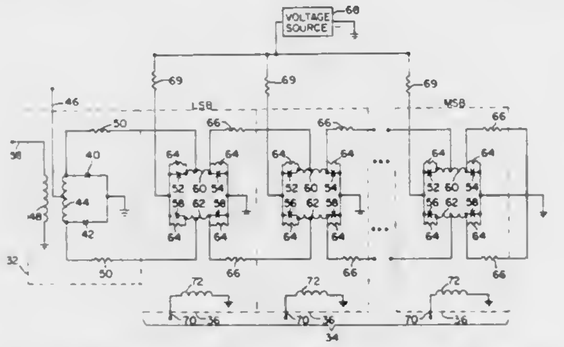
### 5,019,818
### SUPERCONDUCTING ANALOG-TO-DIGITAL CONVERTER WITH GROUNDED FOUR-JUNCTION SQUID BIDIRECTIONAL COUNTER

**Gregory S. Lee, West Los Angeles, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Aug. 24, 1989, Ser. No. 397,923**

**Int. Cl.$^5$ H03M** *1/00, 1/20;* **H03K** *19/195*

**U.S. Cl. 341—133** **35 Claims**



1. A superconducting counting analog-to-digital converter, comprising:

- a superconducting quantum interference device (SQUID) quantizer;
- means for applying a varying analog signal to the SQUID quantizer; and
- a bidirectional binary counter having a plurality of stages of grounded four-junction SQUID flip-flops connected together in a cascade arrangement from the least significant bit (LSB) to the most significant bit (MSB);
- wherein the quantizer generates up-count and down-count voltage pulses for increasing and decreasing values of the analog signal and the bidirectional binary counter algebraically counts the voltage pulses, increasing the binary count when up-count pulses are received and decreasing the binary count when down-count pulses are received.

---

### 5,019,819
### DIGITAL-TO-ANALOG CONVERSION CIRCUIT

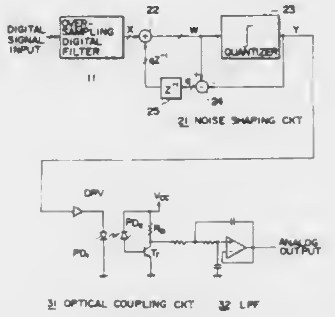
**Shigenobu Kimura, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan**

**Filed Apr. 26, 1990, Ser. No. 514,859**

**Claims priority, application Japan, May 2, 1989, 1-113262**

**Int. Cl.$^5$ H03M** *3/00, 1/66*

**U.S. Cl. 341—143** **10 Claims**



1. A digital-to-analog conversion circuit comprising:

- input means receiving a pulse-code modulated digital signal;
- conversion means for converting the pulse-code modulated digital signal to a pulse wave signal containing analog amplitude information in a time axis direction;
- buffer means comprising electrically insulated coupling means for transmitting output of said conversion means through said coupling means; and
- analog output means comprising an analog low-pass filter for delivering out output of said buffer means through said analog low-pass filter.

---

### 5,019,820
### SERIAL-PARALLEL TYPE A/D CONVERTER HAVING REFERENCE RESISTOR CHAIN AND CURRENT SOURCE ARRAY

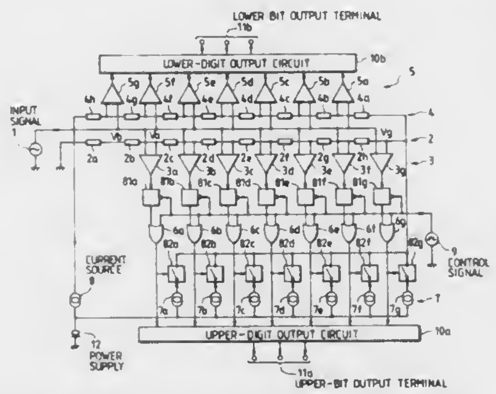
**Akira Matsuzawa, Neyagawa, and Haruyasu Yamada, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Aug. 29, 1989, Ser. No. 400,311**

**Claims priority, application Japan, Aug. 29, 1988, 63-213976**

**Int. Cl.$^5$ H03M** *1/14*

**U.S. Cl. 341—156** **4 Claims**


LOWER BIT OUTPUT TERMINAL
11b
LOWER-DIGIT OUTPUT CIRCUIT
10b
5
INPUT SIGNAL
1
4
2
3
CURRENT SOURCE
8
9
CONTROL SIGNAL
7
12
POWER SUPPLY
UPPER-DIGIT OUTPUT CIRCUIT
10a
11a
UPPER-BIT OUTPUT TERMINAL

1. A serial-parallel type a/d converter comprising:

- (a) plural first comparators whose one input is supplied with an input analog signal to be converted into a digital signal for producing upper-digit signals of said a/d converter;
- (b) potential producing means responsive to a control signal and said upper-digit signals for producing and supplying plural first different potentials determined according to a first arithmetic progression with respect to a reference potential to respective another inputs of said first comparators when said control signal is of a first state, and for producing N−1 (N is a natural number) second different potentials determined according to a second arithmetic progression with respect to a potential determined in accordance with said upper-digit signals when said control signal is of a second state, common difference of said second arithmetic progression being 1/N of that of said first arithmetic progression; and
- (c) second comparators whose one input is supplied with said input signal, another inputs of said second comparators being supplied with said N−1 second potentials respectively for producing lower-digit signals of said a/d converter;
- wherein said potential producing means comprises:
  - (i) a first potential divider including series-connected first resistors having a predetermined resistance respectively, said reference potential being applied to one end of the first potential divider, for producing said first different potentials;
  - (ii) a current source array having plural first current sources for respectively producing a unit current;
  - (iii) switching means having plural switches responsive to said upper-digit signals and said control signal for outputting a first current obtained from all said first current sources when said control signal is of said first state and outputting a second current selectively obtained from said first current sources in accordance with said upper-digit signals when said control signal is of said second state;
  - (iv) a second potential divider including N series-connected second resistors having said predetermined resistance respectively, one end of the second potential divider being supplied with said second current, for producing said second different potentials; and
  - (v) a second current source for producing and supplying said current to another end of said second potential divider.

---

### 5,019,821
### BIAS CIRCUIT FOR A SUBRANGING ANALOG TO DIGITAL CONVERTER

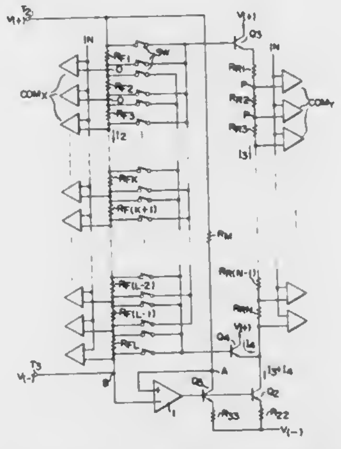
**Yasuhiro Sugimoto, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 7, 1989, Ser. No. 447,413**

**Claims priority, application Japan, Dec. 8, 1988, 63-310702**

**Int. Cl.$^5$ H03M** *1/14*

**U.S. Cl. 341—156** **11 Claims**



1. A bias circuit for a subranging analog to digital (A/D) converter of the type in which a potential between adjacent resistors of a first ladder resistor network is compared with an analog input voltage to determine upper order bits of a digital value, and a potential within a fixed range about the analog input signal value is transferred through analog switches and transistors to ladder resistors of a second ladder resistor network to determine lower order bits of the digital value, said bias circuit comprising:

- first and second voltage input terminals for supplying respective first and second fixed potentials to first and second ends of said first resistor network;
- an operational amplifier having first and second input terminals and an output terminal, the first input terminal receiving a reference voltage of a predetermined potential;
- a first current source connected to the output terminal of said operational amplifier and being controlled by said operational amplifier;
- a resistive element connected between said first voltage input terminal and said first current source, a node between said resistive element and said first current source being connected to the second input terminal of said operational amplifier, and said operational amplifier and said first current source operating so that the potential applied to the second input terminal of said operational amplifier is equal to the reference voltage, and that a current flowing through said resistive element is proportional to a current flowing through the resistors of said first ladder resistor network; and
- a second current source connected between the resistors of said second ladder resistor network and the output terminal of said operational amplifier, for operating, under control of the output signal of said operational amplifier, such that a current proportional to the current flowing through said resistive element flows into the resistors of said second ladder resistor network, wherein the resistors comprising said first ladder resistor network, said second ladder resistor network, and said resistive element are of the same kind.

---

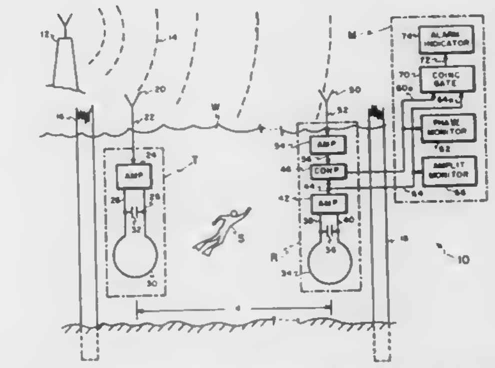
### 5,019,822
### MARINE OBJECT DETECTOR

**James L. Kirkland, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jul. 9, 1973, Ser. No. 379,513**

**Int. Cl.$^5$ G01S** *13/00;* **H04B** *13/02;* **G01V** *3/08*

**U.S. Cl. 342—22** **4 Claims**



1. Apparatus for sensing an anomaly in a body of electrically conductive liquid, said apparatus comprising:

- a first transmitter of first radio wave signals having a predetermined frequency, said first transmitter being operative to broadcast said first radio wave signals through the air adjacent said body of liquid;
- a first receiving antenna at a predetermined first location for receiving said first radio wave signals through the air from said first transmitter;
- a second transmitter, connected to said first receiving antenna, for transmitting into said liquid second radio wave signals having the same frequency and modulation as said first radio wave signals, said second radio wave signals being transmitted by said second transmitter with greater power than said first radio wave signals as received by

VOL 1126
ISS 4
MY 28 1991
UMI

said first receiving antenna, so as to be receivable through said liquid at a predetermined second location;

a second receiving antenna, at said second location, for receiving said first radio wave signals through the air from said first transmitter;

a third receiving antenna, at said second location, for receiving said second radio wave signals through said liquid from said second transmitter;

phase comparator means, coupled between said second and third receiving antennas, for comparing phases of said first and said second radio wave signals as received through said air and said liquid, respectively, and for generating therefrom phase difference representative signals; and

phase monitor means, connected to said phase comparator means and responsive to said phase difference representative signals, for indicating changes in phase difference when an anomaly intrudes in a zone of said liquid between said first and second locations.

---

### 5,019,823

### FREQUENCY MEASUREMENT

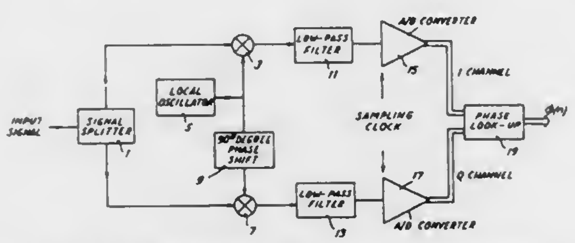
**David R. Bream, Uxbridge, and Stephen J. Roome, West Drayton, both of England, assignors to Thorn EMI PLC, London, England**

**Filed Dec. 5, 1989, Ser. No. 446,543**

**Claims priority, application United Kingdom, Dec. 10, 1988, 8828912**

**Int. Cl.$^5$ H04B** *7/00*

U.S. Cl. 342—175 3 Claims



1. Apparatus for measuring the frequency of a signal comprising; means for obtaining values of the cumulative phase of the signal at a succession of time intervals; and means for determining the gradient of a straight line which would best pass through a plot of the values against time so as to obtain an estimate of the frequency of the signal; wherein the means for obtaining values of the cumulative phase of the signal comprises a quadrature sampling system effective to produce a series of successive phase measurements of the signal, and phase unwrapping means effective to produce the values of the cumulative phase from signals representative of the successive phase measurements.

---

### 5,019,824

### MULTISTAGE ESTIMATION OF RECEIVED CARRIER SIGNAL PARAMETERS UNDER VERY HIGH DYNAMIC CONDITIONS OF THE RECEIVER

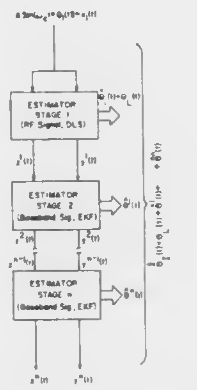
**Rajendra Kumar, Cerritos, Calif., assignor to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.**

**Filed May 1, 1990, Ser. No. 517,114**

**Int. Cl.$^5$ G01S** *13/50*

U.S. Cl. 342—195 5 Claims

1. A multistage estimator for the parameters of a received carrier signal experiencing at least Doppler and Doppler rate due to high dynamics in relative motion between a receiver and a transmitter of said signal, said signal being phase modulated at times by unknown data, and where the parameters of interest include phase, frequency and frequency derivatives, comprising a plurality of estimation stages connected in cascade for successively reducing estimation errors due to said dynamics, the first of said stages comprising means for estimating parameters of relatively high dynamic signals with relatively high estimation errors as compared to succeeding stages, each succeeding stage comprising means for yielding smaller estimation errors of parameters of lower dynamic signals, successive ones of said estimation stages averaging the received carrier signal over progressively longer intervals during which parameters of the estimation process remain nearly constant, thereby progressively reducing the effects of noise.


ESTIMATOR STAGE 1 (RF Signal, DLS)
ESTIMATOR STAGE 2 (Baseband Sig., EKF)
ESTIMATOR STAGE n (Baseband Sig., EKF)

---

### 5,019,825

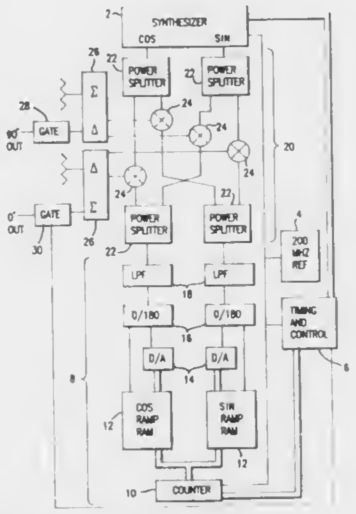
### COHERENTLY INTERRUPTIBLE FREQUENCY HOPPED CHIRP GENERATOR

**John McCorkle, College Park, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Nov. 24, 1989, Ser. No. 440,944**

**Int. Cl.$^5$ G01S** *13/522*

U.S. Cl. 342—201 12 Claims



9. A circuit comprising:

synthesizing means for generating fixed frequency signals;

chirp generating means for generating chirp signals from a digital memory storing a chirp signal sample;

mixing means for mixing the chirp signals with the fixed frequency signals forming translated chirp signals;

output means connected to said mixing means;

timing and control means for controlling the frequency of the fixed frequency signals generated by said synthesizing means, and for controlling said chirp generating means to generate the chirp signals stored in the digital memory at selectable increments of time and at selectable points in the memory so that the fixed frequency signals and the chirp signals are phase matched at selectable increments of time, and for controlling said output means to output the translated chirp signals in the form of a plurality of coherently interruptible and frequency selectable chirp subpulses.

---

### 5,019,826

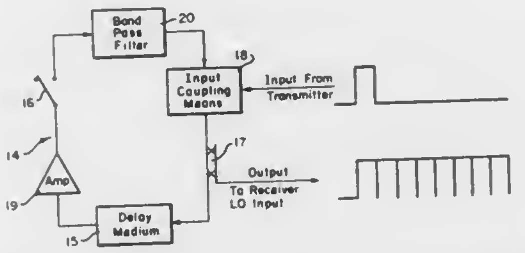
### COHERENT RADAR USING RECIRCULATING DELAY LINE

**Michael de La Chapelle, Bellevue, Wash.; Richard E. Bryan, Canoga Park, and Clark D. Brenneise, Reseda, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Sep. 29, 1988, Ser. No. 250,675**

**Int. Cl.$^5$ G01S** *7/288*

U.S. Cl. 342—202 8 Claims



3. In a radar system including a transmitter for generating successive first and second output pulses of predetermined duration along a transmission path, an antenna for radiating the transmitter output pulses toward a target for reflection therefrom as radar echo/return pulses, a duplexer for separating the transmitter output pulses and the radar echo/return pulses, an improvement comprising:

first means for coupling a portion of a first transmitter output pulse from the transmission path;

delay means for delaying said coupled portion of said first transmitter output pulse for a delay period equal to said predetermined duration;

second means for coupling a first portion of said coupled portion of said first transmitter output pulse to the receiver for phase comparison with a first radar return/echo signal;

third means for coupling a second portion of said coupled portion of said first transmitter output pulse in the transmitter for injection locking with a second transmitter output pulse, thereby achieving phase coherency between said first and said second transmitter output pulses.

---

### 5,019,827

### PLAT REFERENCE SYSTEM

**Marlin V. Wilson, Rte. 1, Box 449, Barboursville, Va. 22923**

**Continuation-in-part of Ser. No. 222,365, Jul. 20, 1988, abandoned, which is a continuation of Ser. No. 75,823, Jul. 20, 1987, abandoned. This application Dec. 13, 1988, Ser. No. 285,855**

**Int. Cl.$^5$ G01S** *1/08;* **G06F** *15/20*

U.S. Cl. 342—386 18 Claims

1. A plat reference system to control a multidirectional flow of energy through a common media in a multidimensional space, between a first plat reference system and an unprescribed plurality of other plat reference systems, each using a common plat reference, said plurality of other plat reference systems having variable spatial locations and movements in said multidimensional space, said plat reference system comprising:

means for selecting mathematical information specifying said common plat reference;

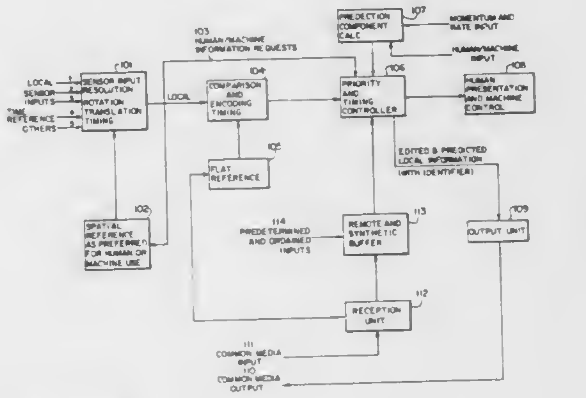
means within said multidimensional space for emitting into said common media energy of known approximate intensity and approximate propagation characteristics;

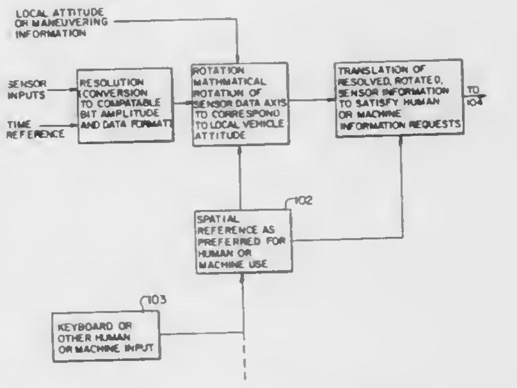
means for encoding information into said emitted energy;

means for determining a spatial location of said emitter within said multidimensional space;

means to correlate said location with said plat reference, to form a plat reference correlation;

means to determine from said plat reference correlation a time of emitting energy;


LOCAL SENSOR INPUTS
TIME REFERENCE
OTHERS
101
SENSOR INPUT RESOLUTION ROTATION TRANSLATION TIMING
103 HUMAN/MACHINE INFORMATION REQUESTS
LOCAL
104
COMPARISON AND ENCODING TIMING
107
PREDECTION COMPONENT CALC
MOMENTUM AND RATE INPUT
HUMAN/MACHINE INPUT
106
PRIORITY AND TIMING CONTROLLER
108
HUMAN PRESENTATION AND MACHINE CONTROL
105
PLAT REFERENCE
EDITED & PREDICTED LOCAL INFORMATION (WITH IDENTIFIER)
102
SPATIAL REFERENCE AS PREFERRED FOR HUMAN OR MACHINE USE
114 PREDETERMINED AND OPDAINED INPUTS
113
REMOTE AND SYNTHETIC BUFFER
109
OUTPUT UNIT
112
RECEPTION UNIT
111 COMMON MEDIA INPUT
110 COMMON MEDIA OUTPUT


LOCAL ATTITUDE OR MANEUVERING INFORMATION
SENSOR INPUTS
TIME REFERENCE
RESOLUTION CONVERSION TO COMPATABLE BIT AMPLITUDE AND DATA FORMAT
ROTATION MATHMATICAL ROTATION OF SENSOR DATA AXIS TO CORRESPOND TO LOCAL VEHICLE ATTITUDE
TRANSLATION OF RESOLVED, ROTATED, SENSOR INFORMATION TO SATISFY HUMAN OR MACHINE INFORMATION REQUESTS
TO 104
102
SPATIAL REFERENCE AS PREFERRED FOR HUMAN OR MACHINE USE
103
KEYBOARD OR OTHER HUMAN OR MACHINE INPUT

means to determine from said plat reference correlation a time for reception of energy;

means for receiving energy from said common media;

means for detecting information from said received energy; and

means for displaying said information to a human being or machine interface.

---

### 5,019,828

### HIGH RESOLUTION NAVIGATION AND MAPPING SYSTEM

**Arnold Schoolman, Kansas City, Mo., assignor to Schoolman Scientific Corp., Kansas City, Mo.**

**Continuation of Ser. No. 179,656, Apr. 8, 1988, abandoned, which is a continuation-in-part of Ser. No. 935,066, Nov. 21, 1986, Pat. No. 4,737,972, which is a continuation of Ser. No. 671,436, Nov. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 616,385, Jun. 1, 1984, Pat. No. 4,559,555, which is a continuation-in-part of Ser. No. 351,917, Feb. 24, 1982, abandoned. This application Nov. 16, 1990, Ser. No. 616,746**

**Int. Cl.$^5$ G01S** *3/02, 5/02*

U.S. Cl. 342—457 4 Claims

1. A portable navigation system for locating a mobile personnel station operating within a predetermined region, said location being relative to a set of relatively distant, substantially fixed reference stations broadcasting respective location signals and comprising:

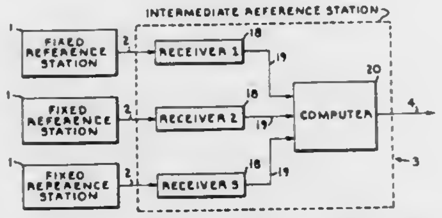
(a) a plurality of portable relay stations;

(b) each relay station, when inactive, being adapted to be transported to a location which is relatively near the personnel station operating region, each said relay station including relay receiver means which, upon activation of

VOL
1126
ISS
4
MY
28
1991
UMI

said relay station, receives location signals from said reference stations, each said relay station also including relay computer means deriving current location coordinates of said relay station from said location signals and wireless link means to output a respective relay station location signal indicating an absolute location of said relay station; and

(c) said mobile personnel station including:
  (1) personnel receiver means receiving the relay location signals from said plurality of relay stations;
  (2) map storage means storing data representing a plurality of stereoscopic maps of the region of operation;



  (3) display means operable to stereoscopically display said maps and station indicia representing a relative location of said personnel stations on a map displayed on said display means; and
  (4) personnel computer means interfaced among said personnel receiver means, said map storage means, and said display means; said personnel computer means calculating absolute personnel station coordinates of a location of said personnel station relative to said relay stations, causing a map surrounding said location of said personnel station to be retrieved from said map storage means and displayed on said display means, and causing said station indicia to be displayed on the displayed map at a position corresponding to said personnel station coordinates.

---

### 5,019,829

### PLUG-IN PACKAGE FOR MICROWAVE INTEGRATED CIRCUIT HAVING COVER-MOUNTED ANTENNA

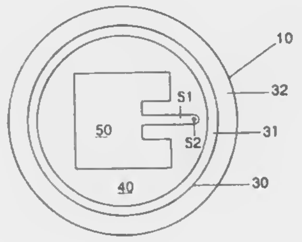
**Douglas E. Heckman, 436 Oakridge Dr., Indialantic, Fla. 32903; Dawn A. Larson, 8197 Hearthstone Ct., Cincinnati, Ohio 45241; Jeffrey A. Frisco, 880 Arabia Road S.E., Palm Bay, Fla. 32907, and David A. Haskins, 7349 Ohio Avenue, Hammond, Ind. 46323**

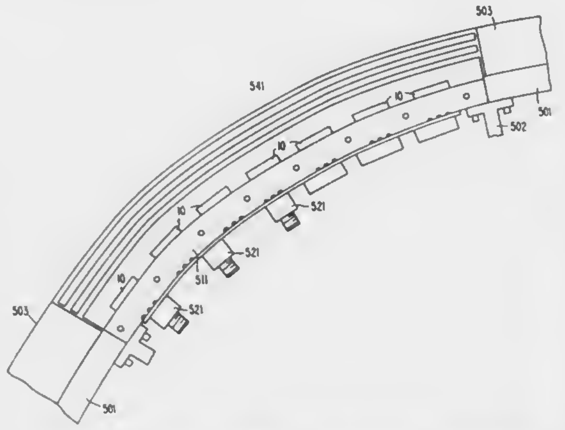
**Filed Feb. 8, 1989, Ser. No. 307,503**

**Int. Cl.$^5$ H01Q** *13/08, 1/28;* **H03H** *7/38;* **H05K** *5/06*

**U.S. Cl. 343—700 MS** **60 Claims**

57. A multi-component antenna mounted to a vehicle structure comprising:
a transmission line structure integrally supported with said vehicle structure; and
a plurality of microwave signal processing/antenna modules supported adjacent to and coupled with said transmission line structure, each of said microwave signal processing-/antenna modules including
  a microwave circuit component carrier having a conductive support upon a generally planar surface of which a microwave integrated circuit component is mounted, said support having at least one aperture therethrough extending from an interior portion of said module whereat said microwave circuit component is mounted to an exterior portion of said module,
  a conductor element supported within and extending through a respective aperture in said conductive support, so as to form a transmission line therethrough between said interior portion of said module, whereat said microwave circuit component is mounted, and an exterior portion thereof, said conductor element being coupled to a portion of said transmission line structure,
  a cover engageable with said support and enclosing therewith a cavity within which said microwave circuit component is mounted on said conductive support,
an antenna element supported on an outer surface of a top portion of said cover, said outer surface of said top portion of said cover being parallel to the generally planar surface of said conductive support upon which said microwave circuit component is mounted, said antenna element comprising a conductive layer extending parallel to said generally planar surface, so that the launch direction of an electromagnetic wave emitted by said antenna is orthogonal to said generally planar surface,
first means, extending through said top portion of said cover, for providing a signal path from said microwave circuit component mounted within said cavity to said antenna element, and
second means for providing a conductive path between said conductor element and said microwave circuit component mounted on said conductive support.





---

### 5,019,830

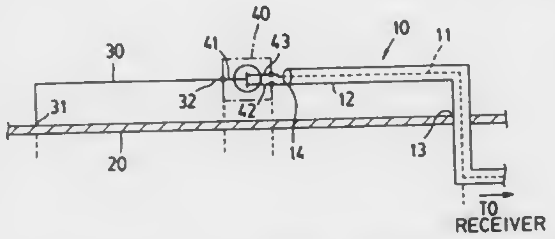
### AMPLIFIED FM ANTENNA WITH PARALLEL RADIATOR AND GROUND PLANE

**Takuji Harada, Hiratsuka, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 13, 1989, Ser. No. 311,238**

**Int. Cl.$^5$ H01Q** *1/26, 9/16*

**U.S. Cl. 343—701** **12 Claims**



1. An FM wave receiving antenna comprising:
a coaxial line made of a central core and an inductive outer sheath, said coaxial line being provided substantially parallel to a surface of a horizontal metal conductor, and one end of said inductive outer sheath being connected to said metal conductor;
a parallel conductor provided substantially parallel to said metal conductor, one end of said parallel conductor connected to said metal conductor; and
an amplifier means having three terminals with a first terminal connected to said inductive outer sheath, a second terminal connected to a second end of said parallel conductor and a third terminal connected to said central core of said coaxial line, said amplifier means amplifying signals from both said parallel conductor and inductive outer sheath of said coaxial line and outputting amplified signals to said central core of said coaxial line.

---

### 5,019,831

### DUAL END RESONANT SLOT ARRAY ANTENNA FEED HAVING A SEPTUM

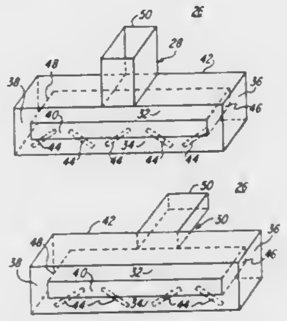
**Hung Y. Yee, and Phillip N. Richardson, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 736,009, May 20, 1985, abandoned.**

**This application Mar. 2, 1988, Ser. No. 188,637**

**Int. Cl.$^5$ H01Q** *13/12*

**U.S. Cl. 343—771** **7 Claims**



1. An antenna for transmitting or receiving rf energy comprising:
a resonant waveguide having spaced-apart first and second sections therein, said first section having a first side and said second section having a second side, said first and second sections spaced apart by a septum positioned generally parallel to said first and second sides with each section having opposing ends,
a plurality of substantially equally spaced slots formed on said first side of said first section,
waveguide feed means coupled to said second section, said second section simultaneously coupling substantially equal portions of said rf energy to opposing ends of said second section, and
waveguide bends for coupling said equal portions of rf energy from opposing ends of said second section into corresponding opposing ends of said first section to form, by the interaction of said equal portions of rf energy with each other, a standing wave in said first section for exciting said slots.

---

### 5,019,832

### NESTED-CONE TRANSFORMER ANTENNA

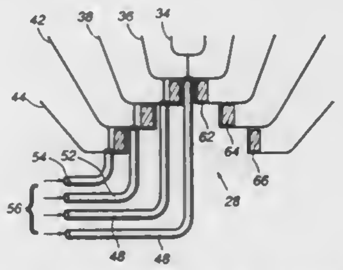
**Carl A. Ekdahl, Santa Fe, N. Mex., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Oct. 18, 1989, Ser. No. 423,174**

**Int. Cl.$^5$ H01Q** *1/36, 13/04*

**U.S. Cl. 343—774** **5 Claims**

1. An antenna for radiating an electromagnetic wave into a wave transmission medium, comprising:
a plurality of nested conical transmission line conductors defining an outer cone element, an inner cone element, and a plurality of intermediate cone elements therebetween, each said cone element diverging at a predetermined angle and defining a first end for inputting rf energy and a second end for radiating said rf energy;
a plurality of rf coaxial cables for inputting said rf energy, each said cable having a shield conductor connected to a first said cone element and a center conductor connected to a second said cone element adjacent and interior of said first cone element, said outer cone element being connected only to a shield conductor, said inner cone element being connected only to a center conductor, and each said intermediate cone element having a shield conductor connection from one said cable and a center conductor connection from another said cable;
a dielectric medium separating said cone elements from one another; and
signal isolation means connected for electrically isolating said shield conductor connection from said center conductor connection on each said intermediate element wherein said rf energy serially adds across said cone elements.



---

### 5,019,833

### PORTABLE ANTENNA APPARATUS FOR SATELLITE COMMUNICATION

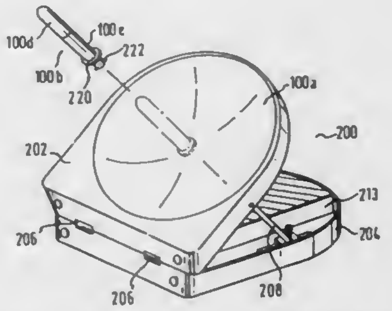
**Yasuyuki Nonaka, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Jul. 7, 1988, Ser. No. 216,077**

**Claims priority, application Japan, Jul. 7, 1987, 62-169057**

**Int. Cl.$^5$ H01Q** *19/12*

**U.S. Cl. 343—840** **6 Claims**



1. A portable satellite broadcast signal antenna apparatus for satellite communication, comprising:
antenna means for receiving satellite broadcast signals and including a parabolic reflector;
manually transportable housing means having an exposed exterior surface; and
means for adjusting an angle of the antenna means with respect to a predetermined plane for aligning the antenna means with a satellite;
said parabolic reflector of said antenna means being disposed directly on said exterior surface;
said antenna means further including an outer unit accommodating a satellite signal converter and being removably-connectable to said housing means to be mounted on said parabolic reflector;
said housing means having an interior space for receiving

/OL
126
SS
4
MY
28
1991
UMI

therein said angle adjusting means and further defining in said interior space means for accommodating said outer unit when said outer unit is removed from said parabolic reflector and the apparatus is not in use, said housing means including access means for manually inserting thereinto and removing therefrom a tuner, wherein the housing means includes a unitary housing having opposite sides, said antenna means including a microwave antenna mounted on one side of the unitary housing, and the access means includes an opening in the unitary housing on another side thereof.

---

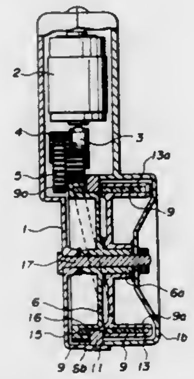
### 5,019,834
### ELECTRICALLY POWERED MECHANISM FOR EXPANDING AND CONTRACTING ANTENNA

**Mitsuhiro Suga, Warabi, Japan, assignor to Nippon Antenna Company Limited, Tokyo, Japan**

**Filed Jul. 10, 1989, Ser. No. 377,593**

**Int. Cl.$^5$ H01Q** *1/10*

**U.S. Cl. 343—877** **6 Claims**



1. An electrically powered mechanism for selectively expanding and contracting an antenna, comprising:
- antenna overcoat members telescopically connected to expand or contract the antenna;
- a drum with an operation strip wound therearound and coupled to the antenna overcoat members;
- a rotary member coupled to a motor and having a strip-receiving groove in the form of an arc around its center of rotation;
- a case body to which said rotary member is rotatively coupled and having a guide means for guiding said operation strip between the rotary member and the drum, and between the rotary member and the antenna overcoat members so as to maintain some portion of said operation strip in the strip-receiving arcuate groove of the rotary member; and
- means for applying motive force to the operation strip when said rotary member is rotated based on the thickness of the operation strip, the radius of curvature of said strip-receiving groove, and the width of said strip-receiving groove;
- wherein said guide means includes a first guide groove between the drum and the rotary member, a second guide groove between the rotary member and the antenna overcoat members, and an arcuate projection protruding into said strip-receiving groove of the rotary member, and extending at least part way between the first and second guide groove means.

---

### 5,019,835
### IMAGE FORMING APPARATUS AND IMAGE FORMING METHOD USING A NEGATIVE IMAGE INSULATING PATTERN FORMED ON AN ELECTROCONDUCTIVE SUBSTRATE

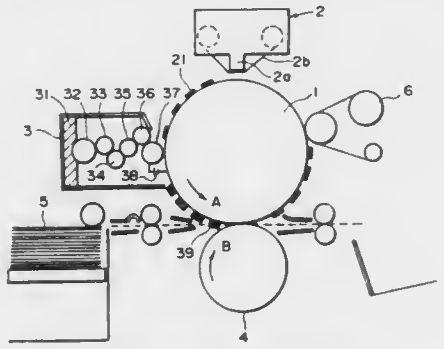
**Kohzoh Arahara, Kawasaki; Kenichi Matsumoto, Tokyo; Hiroshi Fukumoto, Kawasaki; Takashi Kai, Hadano; Osamu Hoshino, Ebina; Toshiya Yuasa; Noboru Tohyama, both of Kawasaki, and Motokazu Kobayashi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 3, 1989, Ser. No. 416,458**

**Claims priority, application Japan, Oct. 4, 1988, 63-250169**

**Int. Cl.$^5$ G01D** *15/16;* **B41N** *1/16, 3/00*

**U.S. Cl. 346—1.1** **14 Claims**



1. An image forming apparatus comprising:
- an electroconductive substrate;
- an electroconductive member disposed opposite to the electroconductive substrate;
- plate-forming means for forming an insulating pattern on the electroconductive substrate;
- means for providing a recording material between the electroconductive substrate and the electroconductive member, said recording material being capable of changing its adhesiveness corresponding to the polarity of a voltage applied thereto; and
- means for applying a voltage between the electroconductive substrate and the electroconductive member.

---

### 5,019,836
### PRINTING METHOD OF THERMAL PRINTER

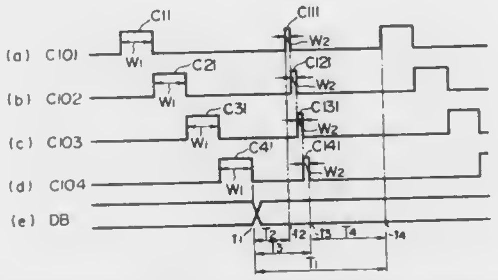
**Satoshi Iwata, and Kiyoshige Ishiyama, both of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan**

**Filed Jun. 17, 1988, Ser. No. 208,264**

**Claims priority, application Japan, Jun. 19, 1987, 62-152807**

**Int. Cl.$^5$ G01D** *15/10;* **B41J** *2/315*

**U.S. Cl. 346—76 PH** **8 Claims**



5. A thermal printer for performing printing on a printing paper, in which said printing paper is repeatedly transported forward from a print line to a next print line, relative to a transfer ribbon having a meltable ink on the surface thereof, and a thermal head having a plurality of heating elements capable of melting said ink on said transfer ribbon, and said printing paper being repeatedly transported forward from a print line to a next print line by driving a pulse motor which revolves a platen roller in contact with said printing paper, said thermal printer comprising:
- (a) control means for generating a common pulse and current-on data; and
- (b) means for generating a current-on pulse signal in response to said common pulse and said current-on data, said current-on pulse signal consisting of
  - a first pulse having a first pulse width corresponding to a first heating value for performing the printing, and
  - a second pulse having a second pulse width corresponding to a second heating value which is sufficient to melt an adhering portion formed between said heating elements and a transfer ribbon or a thermosensible paper but which is insufficient to perform the printing,

said first pulse being supplied to a driver of said thermal head so that each print line will be printed when said printing is performed, and said second pulse being supplied to said driver of said thermal head only during a non-printing period of time defined between a first instance of time when each print line is completely printed and a second instance of time when printing paper is to be transported forward a predetermined distance to said next print line.

---

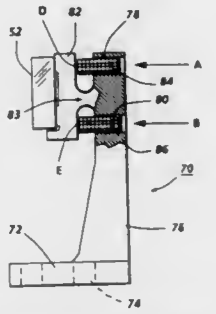
### 5,019,837
### STABLE MIRROR MOUNT ASSEMBLY FOR AN OPTICAL SCANNING SYSTEM

**Gary S. Schwarz, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 10, 1989, Ser. No. 419,247**

**Int. Cl.$^5$ H04N** *1/21*

**U.S. Cl. 346—108** **3 Claims**



3. In a laser printing system having means for generating a beam of high intensity light, a recording medium sensitive to said high intensity light, optical means comprising a plurality of optical elements including at least one mirror interposed between said light generating and said recording medium for imaging said beam to a spot at the surface of said medium, modulating means located between said light generating means and a scanner device for modulating the light beam in accordance with the information content of electrical signals, said scanner device comprising a multi-faceted polygon located in the path of said modulated beam between said beam generating means and said recording medium and having reflective facets for reflecting the beam incident thereon onto said medium, means for rotating said polygon such that the reflected light is scanned in successive traces across said medium, the improvement whereby at least one of said mirrors is located on a stable, thermal resistant mounting which includes in combination,
- an integral mounting structure having a base portion, a first relatively thick arm portion extending vertically upward from said base portion, a mirror mount portion adapted to hold a mirror in a fixed vertical position, said mirror portion integrally connected to said arm portion by a narrow, slightly flexible, neck portion extending generally in a horizontal direction from said arm portion, and
- biasing means secured in said arm portion and contacting the surface of said mirror mount portion at two or more points to apply an outward bias against the mirror mount portion, whereby said mirror is held in an accurate alignment during system thermal drift conditions.

---

### 5,019,838
### ROTATIONAL PLANAR CHART RECORDER AND CHART THEREFOR

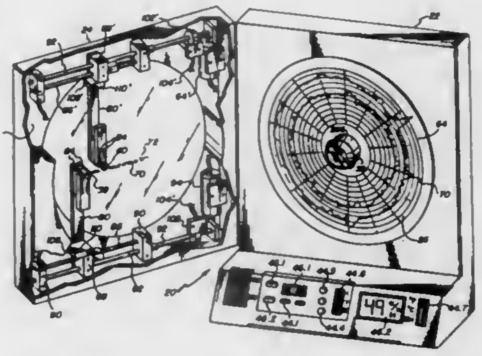
**William E. McKinley, Stamford; James P. Crimmins, Westport, and Robert G. Russell, Danbury, all of Conn., assignors to Omega Engineering, Inc., Stamford, Conn.**

**PCT No. PCT/US88/01691, § 371 Date Oct. 27, 1988, § 102(e) Date Oct. 27, 1988, PCT Pub. No. WO88/09482, PCT Pub. Date Dec. 1, 1988**

**Continuation-in-part of Ser. No. 53,083, May 22, 1987, abandoned. This PCT application May 18, 1988, Ser. No. 283,528**

**Int. Cl.$^5$ G01D** *15/16*

**U.S. Cl. 346—121** **24 Claims**



1. A rotary planar chart recorder on which values of a parameter are recorded on a rotating chart with a pen that is moved in recording directions over the chart while the chart rotates at a desired rate, comprising:
- a rotatable chart-supporting element having a chart-supporting surface surrounding a substantially central axis of rotation;
- a pen actuator for carrying a pen along a travel path relative to said chart-supporting surface;
- a windowed door movably supported opposite said chart-supporting surface to permit viewing of a chart supported on said chart-supporting surface;
- said pen actuator being coupled to said door such that the pen carried by said pen actuator is moved away from the chart-supporting surface when the door is opened;
- said pen actuator including a rotatable lead-screw aligned parallel to the travel path and coupled to the pen such that rotation of the lead screw causes movement of the pen along the travel path parallel to the lead screw;
- means for measuring the rotation of the lead screw;
- means responsive to parameter signals representative of values of a parameter for rotating the lead screw until a measured rotation reaches a desired amount corresponding to a desired parameter value-indicating position;
- means for measuring the amount of rotation of the lead screw past the desired amount and for producing a coasting signal indicative thereof; and
- means responsive to the coasting signal to compensate for coasting movements of the pen carried by said actuator.

VOL 1126
ISS 4
MY 28
1991
UMI

### 5,019,839
## RECORDING APPARATUS HAVING A MOVABLE SHEET GUIDE MEMBER

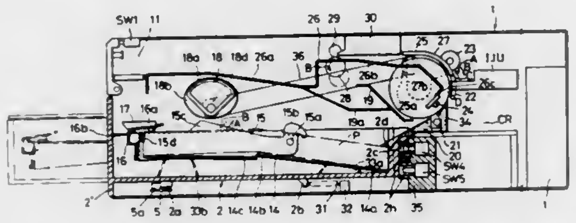
**Yoshitaka Watanabe, Tokyo; Yoshiyuki Mizoguchi, Yokohama, and Hiroyuki Hiraga, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 136,734, Dec. 22, 1987, Pat. No. 4,888,602. This application Aug. 23, 1989, Ser. No. 397,680**

**Claims priority, application Japan, Dec. 25, 1986, 61-307901; Dec. 25, 1986, 61-307908; Dec. 25, 1986, 61-307909; Dec. 25, 1986, 61-307912**

**Int. Cl.⁵ G01D** *15/24, 15/10, 15/18;* **B41J** *2/01*

U.S. Cl. 346—134 **8 Claims**



1. A recording apparatus for recording on a recording sheet, said apparatus comprising:

recording means for recording on the recording sheet;

conveying means for conveying the recording sheet;

a sheet guide member for guiding the recording sheet, said guide member being movable between a first position for guiding said recording sheet to a position for recording by said recording means and a second position, retracted from the first position;

moving means for moving said guide member to either the first position or the second position;

pinching means for pinching the recording sheet provided subsequent to said recording means with respect to a conveying direction of said recording sheet; and

control means for controlling said moving means so that said guide member is positioned at the first position when a leading end of the recording sheet conveyed by said conveying means passes through the recording position and said guide member is positioned at the second position when the recording sheet is pinched by said pinching means.

---

### 5,019,840
## RECORDING APPARATUS WITH IMPROVED SHEET FEEDING

**Yoshitaka Watanabe, Tokyo; Toshiharu Mamiya, Kawasaki; Tadashi Ishikawa, Urawa; Takashi Endo, Machida, and Jiro Moriyama, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 217,052, Jul. 11, 1988, abandoned, which is a continuation of Ser. No. 62,414, Jun. 16, 1987, abandoned, which is a continuation of Ser. No. 715,965, Mar. 25, 1985, abandoned. This application May 14, 1990, Ser. No. 522,455**

**Claims priority, application Japan, Mar. 30, 1984, 59-64953; Mar. 30, 1984, 59-64954; Mar. 30, 1984, 59-64956; Mar. 30, 1984, 59-64957**

**Int. Cl.⁵ H04N** *1/21*

U.S. Cl. 346—134 **36 Claims**

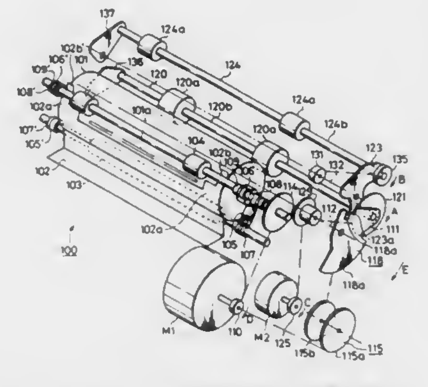
1. A recording apparatus, comprising:

recording means for recording at a predetermined recording position on a recording sheet;

a feed roller for feeding a recording sheet past the recording position in association with the recording action of said recording means;

resist means for contacting a recording sheet to determine the position of the recording sheet relative to the recording position;

sheet supplying means movable between contact and retreat positions for selective contact with a recording sheet for supplying the recording sheet to between said feed roller and resist means, wherein said sheet supplying means moves from its contact position to its retreat position to prevent contact thereof with a recording sheet simultaneously with the feeding of the recording sheet by said feed roller;



a drive source for driving said feed roller; and

operating means for moving said sheet supplying means from the contact position to the retreat position independently of the supplying operation of said sheet supplying means, using the drive power of said drive source as applied to said feed roller.

---

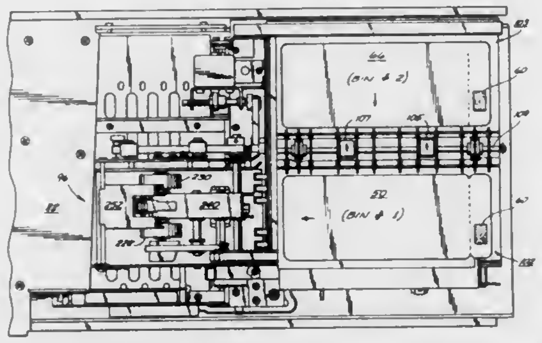
### 5,019,841
## PRINTING APPARATUS AND METHOD

**Alfred L. Fulton; Kishor M. Lakhani; Scott D. Sampson, and Kent Lowman, all of Huntsville, Ala., assignors to SCI Systems, Inc., Huntsville, Ala.**

**Division of Ser. No. 51,046, May 15, 1987. This application Mar. 22, 1989, Ser. No. 327,232**

**Int. Cl.⁵ G01D** *15/00*

U.S. Cl. 346—153.1 **2 Claims**



1. A transportation coupon form comprising an elongated sheet of printable material, said coupon form having a mark of pre-determined size at a pre-determined location adjacent one edge of said coupon form for use in detecting the position of said form during feeding of said coupon form, said form having one end adapted to provide a printing-free area for use in fastening groups of said coupon forms together, said mark being located in said printing-free area.

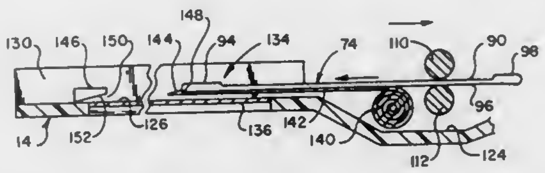
### 5,019,842
## EXTENDABLE SHADE IN INSTANT CAMERA FOR PROTECTING FILM UNIT FROM AMBIENT LIGHT

**Richard J. Fraser, Franklin, and Kenneth J. Launie, Cambridge, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 29, 1989, Ser. No. 459,342**

**Int. Cl.⁵ G03B** *17/50*

U.S. Cl. 354—86 **10 Claims**



1. An instant camera comprising:

means for supporting a film cassette containing a plurality of instant film units in position for their sequential exposure, each film unit including a transparent light transmissive outer layer having an opacifying system dispersed therein in an amount which is insufficient to adversely affect the normal photographic exposure of an underlying photosensitive layer but sufficient to reduce substantially the transmission of actinic light along the length of the film unit;

means for defining a storage chamber having a window through which an image in an exposed film unit located within said chamber may be viewed;

means for moving an exposed film unit from the cassette into said chamber, said moving means including a pair of rollers defining a bite for spreading a processing liquid containing an opacifying material between layers of an exposed film unit to initiate the formation of a visible image therein while simultaneously moving the film unit into said chamber and in superposition with said window;

opaque means mounted for movement from an inoperative position out of alignment with said window to an operative position wherein it covers only a portion of said window to thereby increase to a predetermined distance a path travelled by the exposed film unit, as measured between said bite of said par of rollers and the point at which the transparent light transmissive layer of the exposed film unit moves out of superposition with said opaque means and is struck by light entering said window, thereby rendering any light being subsequently transmitted along the length of the transparent light transmissive layer, after said predetermined distance has been travelled, non-actinic to areas of underlying portions of the photosensitive layer over which the processing liquid has, as yet, not been spread, said opaque means having an area less than that of said window; and

means for returning said opaque means to said inoperative position after said predetermined distance has been travelled.

---

### 5,019,843
## CAMERA HAVING DATA IMPRINTING FUNCTION

**Yukio Ogawa, and Kiyoshi Alyfuku, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 427,907, Oct. 24, 1989, abandoned, which is a continuation of Ser. No. 356,663, May 22, 1989, abandoned, which is a continuation of Ser. No. 194,182, May 16, 1988, abandoned. This application Jul. 31, 1990, Ser. No. 562,408**

**Claims priority, application Japan, May 18, 1987, 62-118782**

**Int. Cl.⁵ G03B** *17/24*

U.S. Cl. 354—106 **56 Claims**

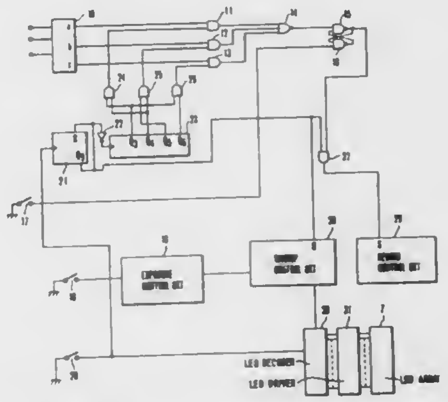
1. A camera comprising:

(A) transport means for transporting photosensitive means;

(B) data imprinting means for imprinting data on a frame of said photosensitive means during transportation by said transport means after that frame of said photosensitive means has been exposed;

(C) reader means for reading a regular maximum number of exposure frames of said photosensitive means from a code provided on said photosensitive means;

(D) counter means for counting the number of exposed frames of said photosensitive means; and



(E) restricting means for restricting, on the basis of the regular maximum number of exposure frames read out by said reader means and the counted content of said counter means, the imprinting of data on said photosensitive means during transportation beyond either the last frame or the las frame but one of said regular maximum number of exposure frames.

---

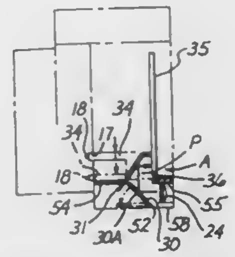
### 5,019,844
## CAMERA CONSTRUCTION AND METHOD OF USING SAME

**Robby D. Fritzer, 11679 Via Paloma, El Cajon, Calif. 92019**

**Filed Dec. 9, 1988, Ser. No. 282,405**

**Int. Cl.⁵ G03B** *15/00, 41/00*

U.S. Cl. 354—120 **14 Claims**



1. In a camera construction, an arrangement comprising:

forwardly directed front lens means for focusing a primary image of an object to be photographed, onto a frame area;

rearwardly directed rear lens means for focusing a secondary image of a different object onto a different portion of the same frame area;

reversely bent light path means for reproducing said focused secondary image onto said different portion of the same frame area;

common shutter release means for enabling said primary and secondary images to be exposed simultaneously onto different portions of the same frame area.

VOL
126
SS
4
MY
28
1991
UMI

### 5,019,845
### FLASH DEVICE FOR CAMERA

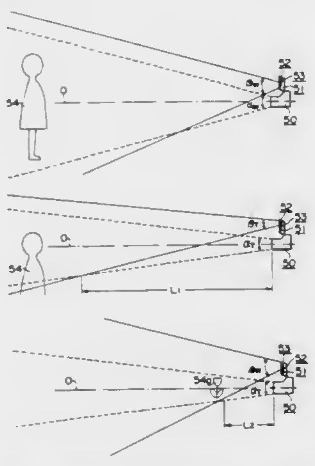
**Yasuo Asakura, Hachioji; Yuji Imai, Higashiyamato, and Yuji Kobayashi, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan**

**Filed Jun. 12, 1990, Ser. No. 537,040**

**Claims priority, application Japan, Jun. 23, 1989, 1-73989[U]; Jun. 23, 1989, 1-73990[U]; Jun. 23, 1989, 1-161895; Jun. 23, 1989, 1-161896**

**Int. Cl.$^5$ G03B *15/05***

**U.S. Cl. 354—149.1** **14 Claims**



1. A flash device for a camera having a taking lens comprising:

a plurality of flash light emitting portions having different flash illumination ranges; and

control means responsive to the focal length of the taking lens of the camera for selectively firing one of a plurality of flash light emitting portions.

---

### 5,019,846
### DATA RECORDING DEVICE FOR CAMERA

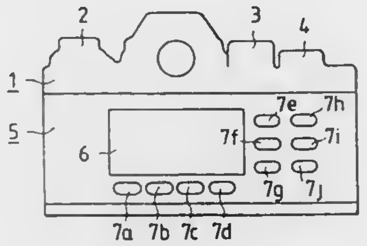
**Tetsuro Goto, Funabashi, and Kosho Miura, Yokohama, both of Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Division of Ser. No. 403,295, Sep. 5, 1989, Pat. No. 4,958,174. This application Jul. 24, 1990, Ser. No. 556,455**

**Claims priority, application Japan, Sep. 6, 1988, 63-117073; Sep. 6, 1988, 36-117074; Sep. 6, 1988, 63-223255**

**Int. Cl.$^5$ G03B *17/36***

**U.S. Cl. 354—217** **2 Claims**



1. A camera having a film counter and capable of mounting a film back incorporating therein a film counter for counting a number of exposed frames comprising;

a film counter on the side of said camera for counting the number of frames exposed and outputting it as film count information or data;

display means for said film count information or data;

means for detecting whether or not said film back is mounted on said cameras;

reception of means for receiving the film count information or data on the side of said film back; and

display control means for causing said display means to display said film count information or data on the film back received by said reception means when the output representative of the mounting of said film back and further causing said display means to display the film count information obtained by said film counter on the side of said camera when the output representative of the film count information or data detected by said detection means is not available.

---

### 5,019,847
### SHUTTER DEVICE

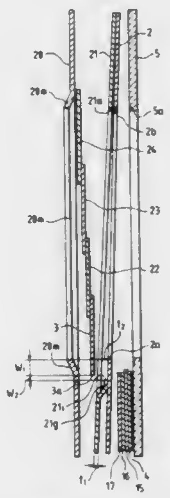
**Yoshiaki Tanabe, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan**

**Filed Sep. 12, 1990, Ser. No. 581,052**

**Claims priority, application Japan, Sep. 19, 1989, 1-108627[U]**

**Int. Cl.$^5$ G03B *9/40***

**U.S. Cl. 354—246** **4 Claims**



1. A shutter device, comprising:

aperture opening blades including a blade having an edge for forming an exposure slit and movable in a predetermined direction on a first plane;

aperture closing blades including a blade having an edge for forming an exposure slit and movable in the direction almost parallel to said predetermined direction on a second plane parallel to said first plane;

a base member disposed between said aperture opening blades and said aperture closing blades and including a first base plate disposed opposite to said aperture closing blades and a second base plate disposed opposite to said aperture opening blades, said first and second base plates each having an aperture for forming an exposure aperture;

said first and second base plates each having an edge of said aperture positioned opposite to said edge of said aperture closing blades covering said exposure aperture;

said edge of said first base plate being positioned such that said edge of said aperture closing blades covering said exposure aperture is disposed outside said aperture of said first base plate and said edge of said second base plate being positioned such that said edge of said aperture closing blades covering said exposure aperture is disposed inside said aperture of said second base plate; and

means for spacing said first and second base plate by a predetermined amount so as to set said edge of said second base plate away from said second plane.

---

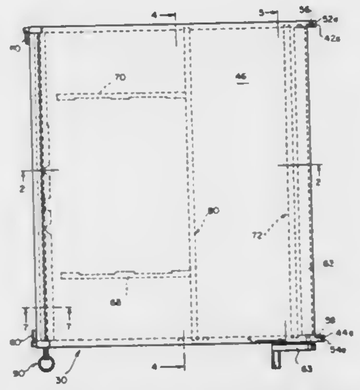
### 5,019,848
### MAGAZINE FOR A STACK OF FILM SHEETS

**Michael L. Koelsch, Rochester; John De Point, Jr., Palmyra, and Matthew DiPietro, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 25, 1990, Ser. No. 558,271**

**Int. Cl.$^5$ G03B *42/04***

**U.S. Cl. 354—277** **5 Claims**



1. In a magazine for receiving a package having a stack of film sheets enclosed within a light-tight flexible bag, the magazine having a cutter for severing the bag and a lightlock through which the bag can be removed from the magazine after the bag has been severed by the knife, the improvement comprising:

a pair of stripper bars carried by the magazine and located between the lightlock and the film sheets in the package, the bars being on opposite sides of the bag and jointly defining a curved slot that enables the flexible bag to pass between the bars as it is removed from the magazine while blocking the movement of the film sheets through the slot with the bag.

---

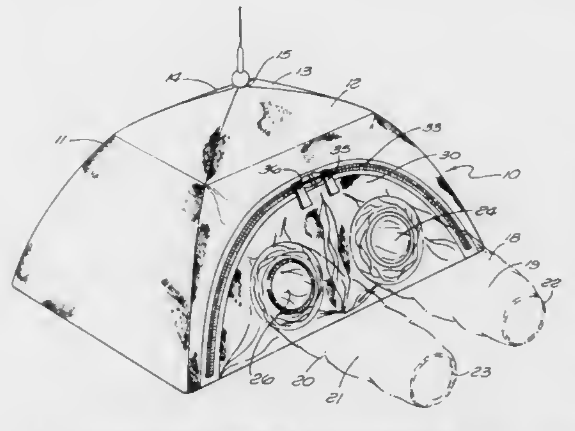
### 5,019,849
### FILM CHANGING TENT WITH INTERNAL SUPPORT STRUCTURE

**Patricia L. Harrison, 2028 Sanborn Ave., Los Angeles, Calif. 90027**

**Filed Dec. 1, 1988, Ser. No. 278,675**

**Int. Cl.$^5$ G03B *17/56***

**U.S. Cl. 354—308** **8 Claims**



1. A collapsible film changing tent comprising:

inner and outer light-impervious fabric shells connected to a light-impervious fabric floor around the periphery thereof defining an enclosure;

support means integrably connected to at least one fabric shell, said support means comprising an umbrella-like frame having an over center locking means and said support means being disposed between said outer shell and said inner fabric shell;

a pair of light-impervious fabric sleeves in communication with said enclosure extending from outside said outer shell; and

a door having a closure mechanism in one side of said outer shell at least in partial registry with a door having a closure mechanism in said inner shell.

---

### 5,019,850
### PHOTOGRAPHIC DEVELOPING APPARATUS

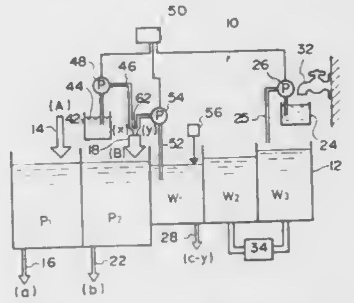
**Takatoshi Ishikawa, Kanagawa; Shigemi Saito, Tokyo; Kazuaki Yoshida, and Yoshihiro Fujita, both of Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 18, 1989, Ser. No. 395,673**

**Claims priority, application Japan, Aug. 19, 1988, 63-205880; Aug. 19, 1988, 63-205881; Aug. 19, 1988, 63-205882**

**Int. Cl.$^5$ G03D *3/06, 3/08***

**U.S. Cl. 354—322** **40 Claims**



1. A photographic developing apparatus of the type in which development is effected by passing exposed sensitive material successively through a developing vessel, a bleaching-/fixing vessel, and a rinsing vessel which comprises at least one of a water washing vessel and stabilizing vessel; comprising:

(a) a first supply means for supplying said bleaching/fixing vessel with concentrated replenishment processing liquid for bleaching and fixing;

(b) a second supply means for extracting liquid from said rinsing vessel and transferring said extracted liquid to said bleaching/fixing vessel; and

(c) an adjustment means for adjusting the ratio of the amount of said concentrated replenishment processing liquid to that of said liquid extracted from said rinsing vessel to a previously determined bleaching/fixing replenishment liquid concentration, whereby the amount of waste liquid discharged from said rinsing vessel is reduced by the amount of liquid extracted from said rinsing vessel.

---

### 5,019,851
### CAMERA SYSTEM

**Yoshihiko Azuma; Takehiro Katoh; Hiroshi Ootsuka; Toshihiko Ishimura; Masataka Hamada; Katsumi Kozakai; Norio Ishikawa, and Masayuki Ueyama, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed May 10, 1989, Ser. No. 350,518**

**Claims priority, application Japan, May 12, 1988, 63-115631; May 12, 1988, 63-115632; May 13, 1988, 63-118019**

**Int. Cl.$^5$ G03B *3/00, 13/18***

**U.S. Cl. 354—402** **12 Claims**

1. Camera system including a camera body and an interchangeable lens attachable to the camera body, comprising:

an operable member provided in the interchangeable lens having either of a first state and a second state;

a memory, provided in the interchangeable lens, for storing a first digital signal inherent in the interchangeable lens;

means, provided in the interchangeable lens, for converting the state of the operable member as a second digital signal;

means, provided in the interchangeable lens and having a

VOL
1126
ISS
4
MY
28
1991
UMI

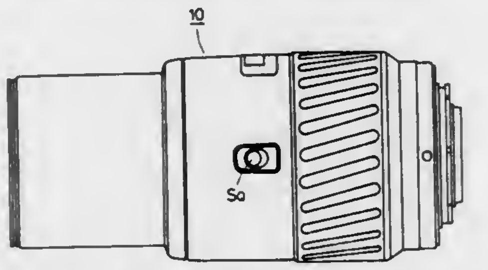
connector, for sending the first and second digital signals as a set of serial data through the connector;

means, provided in the camera body, for receiving the set of serial data from the sending means of the attached interchangeable lens through the connector;

means, provided in the camera body, for selecting one scene-portion from a first scene-portion and a second scene-portion which has an area larger than the area of the first scene-portion in response to the second digital signal included in the set of serial data;

means, provided in the camera body, for detecting focus condition of the attached interchangeable lens with respect to the scene-portion selected by the selecting means; and

means for focusing the attached interchangeable lens on the basis of a detected result of the detecting means.



---

### 5,019,852

### REPRESENTATION OF DEPTH OF FIELD IN CAMERA

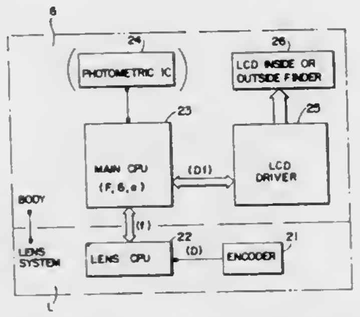
**Masato Yamamoto, Saitama; Toshimasa Yamanaka, Tokyo; Masahiro Nakajima, Tokyo, and Yutaka Ohsawa, Tokyo, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 16, 1989, Ser. No. 324,043**

**Claims priority, application Japan, Mar. 16, 1988, 63-63814**

**Int. Cl.$^5$ G03B** *3/00, 13/18, 17/18*

U.S. Cl. 354—409 35 Claims



1. A device for representing a depth of field in a camera, which comprises:

calculating means for calculating a field depth feeling Df, said field depth feeling Df being obtained by processing at least one of a calculated depth of field, an object distance, a lens hyper-focal length, a diameter of a permissible circle of confusion, a lens aperture value and a lens focal length; and

display means for displaying the depth of field on the basis of the field depth feeling Df,

wherein the field depth feeling Df is defined by the following equation:

$$Df = l/D$$

where,

l is a calculated depth of field; and

D is an object distance.

---

### 5,019,853

### EXPOSURE CONTROL APPARATUS FOR USE IN CAMERA

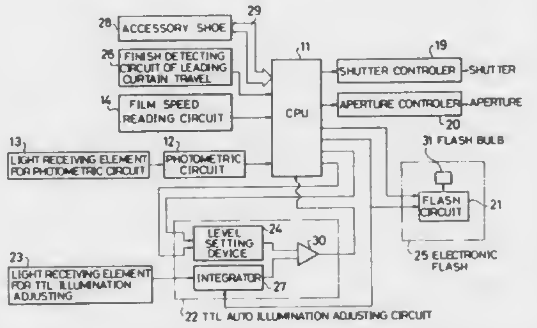
**Tosbihiro Sato, Tokyo, and Tadao Takagi, Yokobama, both of Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Continuation of Ser. No. 421,329, Oct. 16, 1989, abandoned. This application Aug. 27, 1990, Ser. No. 573,267**

**Claims priority, application Japan, Oct. 14, 1988, 63-258928; Dec. 23, 1988, 63-326918**

**Int. Cl.$^5$ G03B** *7/00*

U.S. Cl. 354—420 22 Claims


28 ACCESSORY SHOE
29
26 FINISH DETECTING CIRCUIT OF LEADING CURTAIN TRAVEL
11
19
SHUTTER CONTROLER
SHUTTER
14 FILM SPEED READING CIRCUIT
CPU
APERTURE CONTROLER
APERTURE
20
31 FLASH BULB
13 LIGHT RECEIVING ELEMENT FOR PHOTOMETRIC CIRCUIT
12 PHOTOMETRIC CIRCUIT
FLASN CIRCUIT
21
LEVEL SETTING DEVICE
24
30
25 ELECTRONIC FLASH
23 LIGHT RECEIVING ELEMENT FOR TTL ILLUMINATION ADJUSTING
INTEGRATOR
27
22 TTL AUTO ILLUMINATION ADJUSTING CIRCUIT

1. A camera of the type in which illumination adjustment can be automatically controlled when a picture is taken using either of a first flash apparatus and a second flash apparatus, comprising:

exposure value calculating means for calculating an exposure value on the basis of photometering of an object before an exposure operation is started and for outputting the calculated exposure value;

exposure value compensating means for automatically determining whether to adjust the calculated exposure value to a compensated exposure value which assures overexposure, and for outputting the calculated exposure value or automatically adjusting the calculated exposure value to the compensated exposure value and outputting the compensated exposure value, in accordance with said determination; and

exposure control means for performing an exposure operation in accordance with the exposure value which is output from said exposure value calculating means when a picture is taken using said first flash apparatus and in accordance with the exposure value which is output from said exposure value compensating means when a picture is taken using said second flash apparatus.

---

### 5,019,854

### DISPLAY SYSTEM FOR DISPLAYING INFORMATION IN THE VIEWFINDER OF A CAMERA

**Hiromu Mukai; Kohtaro Hayashi, and Yasuo Maeda, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

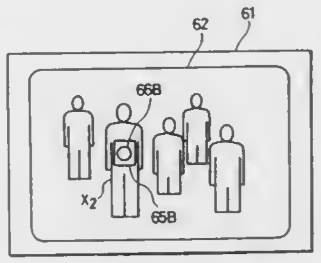
**Filed Sep. 13, 1989, Ser. No. 406,703**

**Claims priority, application Japan, Sep. 16, 1988, 63-232034; Aug. 30, 1989, 1-221763; Sep. 4, 1989, 1-227577; Sep. 4, 1989, 1-227578**

**Int. Cl.$^5$ G03B** *17/18*

U.S. Cl. 354—471 20 Claims

1. A display system for displaying information in the viewfinder of a camera, comprising a liquid crystal display of a guest-host type disposed on the optical path of the viewfinder to display information in the viewing field of the viewfinder in a positive opaque pattern on a transparent background and employing a liquid crystal of a cholesteric-nematic phase transition type having a negative anisotropic dielectric property as host, and a dichroic coloring matter having an anisotropic light absorption property as guest.



---

### 5,019,855

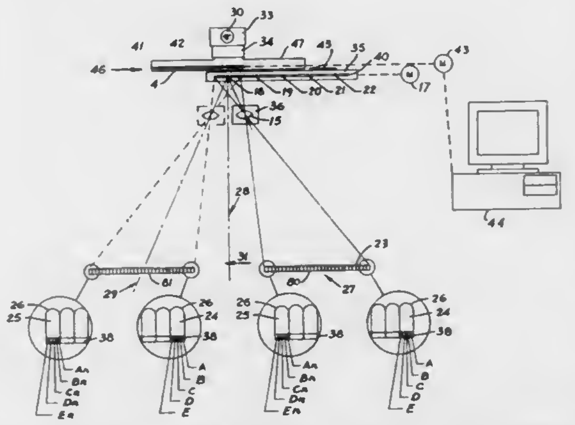
### LINEAR SHUTTER AND METHOD TO ACHIEVE UNIFORM DENSITY OF IMAGE ELEMENTS OF A 3-D PHOTOGRAPH

**Nicholas L. Lam, Quarry Bay, Hong Kong, assignor to Image Technology, Inc., Ga.**

**Filed Aug. 17, 1989, Ser. No. 395,498**

**Int. Cl.$^5$ G03B** *27/32*

U.S. Cl. 355—22 15 Claims



1. A three-dimensional printer for printing on lenticular print material a plurality of two-dimensional views of an object taken from different vantage points which comprises a projection light, a negative carrier, projection lens and a linear motion reciprocating blade shutter which is opened and closed by moving means controlled by a computer programmed to vary the speed of the shutter during printing in order to vary the duration of exposure on various parts of the lenticular print material as desired.

---

### 5,019,856

### IMAGE FORMING APPARATUS

**Kunio Ohashi, and Shoichi Nagata, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 23, 1989, Ser. No. 299,032**

**Claims priority, application Japan, Jan. 22, 1988, 63-13349**

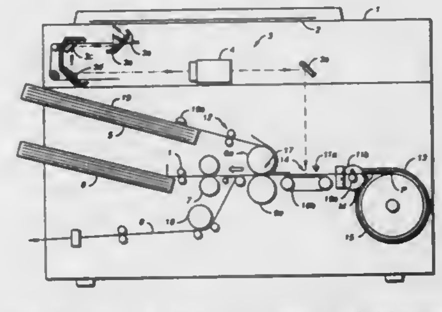
**Int. Cl.$^5$ G03B** *27/32*

U.S. Cl. 355—27 4 Claims

1. In an image forming apparatus which comprises a light-shielding housing structure and a light-shielding container disposed inside said housing structure and forms an image by storing a photosensitive sheet inside said light-shielding container, said photosensitive sheet having one surface of sheet-like base material thereof coated with microcapsules encapsulating a light-curable agent and a colorless dye, pulling said photosensitive sheet sequentially and continuously out of said container inside said light-shielding housing structure, thereafter exposing said photosensitive sheet to image-forming light at an exposure position, superposing on said photosensitive sheet an image transfer sheet having one surface of sheet-like base material thereof coated with a developing agent having a chromogenic effect on said colorless dye and compressing said photosensitive sheet and said image transfer sheet together to form a visible image on said image transfer sheet, the improvement wherein said image forming apparatus further comprises

detecting means for detecting, when said image forming apparatus detects a jammed condition of either said photosensitive sheet or said transfer sheet inside said housing structure, whether said photosensitive sheet has been exposed to external light outside said container, and

means for transporting said photosensitive sheet by a specified distance from said exposure position after said jammed condition is removed, said specified distance being determined according to the result of detection by said detecting means.



---

### 5,019,857

### PROCESS AND DEVICE FOR AUTOMATED PRODUCTION OF IMAGES ON ALL TYPES OF PHOTOGRAPHIC SUPPORTS

**André Milovanovich, Saint Sanveur, France, assignor to Caisse Regionale De Credit Agricole Mutuel De L'Yonne, France, a part interest**

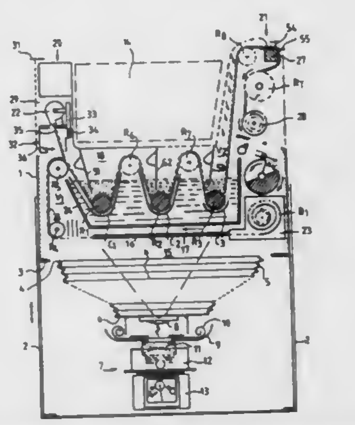
**PCT No. PCT/FR88/00336, § 371 Date Feb. 23, 1989, § 102(e) Date Feb. 23, 1989, PCT Pub. No. WO88/10445, PCT Pub. Date Dec. 29, 1988**

**PCT Filed Jun. 24, 1988, Ser. No. 334,953**

**Claims priority, application France, Jun. 25, 1987, 87 08931; Jun. 25, 1987, 87 08932; Jul. 9, 1987, 87 09910; Oct. 5, 1987, 87 13711; Apr. 12, 1988, 88 04923**

**Int. Cl.$^5$ G03B** *17/50;* **G03D** *3/12*

U.S. Cl. 355—27 22 Claims



1. Process for producing images on independent supports, each having a rear face and a sensitized front face able to record a latent image in a photographic development apparatus, comprising successively an exposure station, a plurality of processing stations for carrying out a development and for drying the supports, an extracting station and a driving station,

VOL
1126
ISS
4
MY
28
1991
UMI

wherein the supports, once developed and dried, are extracted, said process comprising:
- i—an initial phase of storing a succession of said supports on a belt, during which phase the supports are disposed, unit by unit, on the belt at given positions and are carried and held in position on this belt by temporary adhesion by means of an adhesive material, said belt adhering on said rear face in a region located behind said image; and
- ii—a phase of transferring the supports by exerting on the belt a traction in the driving station, so as to cause a continuous advance movement of the belt and by guiding the belt, so as to move the supports along a path passing through said stations according to a sequence comprising:
  - an exposure step which is effected by an enlarger using a light source consisting of an electronic flash controlled in synchronism with the passage of the supports over an exposure area;
  - a development step in the processing station;
  - a drying step;
  - an extraction step in the extracting station, wherein the supports are separated from the belt by forcing said belt to follow a curved path having a small radius of curvature.

---

### 5,019,858
## PHOTOGRAPHIC PRINTER

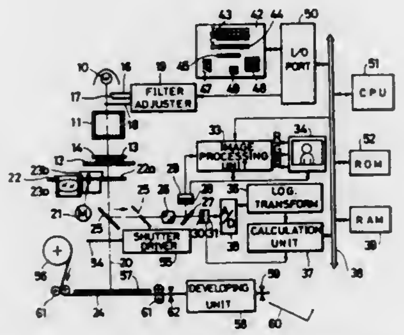
**Kenji Suzuki, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Feb. 28, 1990, Ser. No. 486,674**

**Claims priority, application Japan, Mar. 1, 1989, 1-49659**

**Int. Cl.⁵ G03B *27/80***

**U.S. Cl. 355—35** **20 Claims**



1. A photographic printer having a scanner for measuring light at each point of an original image and obtaining characteristic values based on the measured light values, and a simulator for displaying a simulated image of a finished photographic print, said printer further comprising:
- means for inputting, as a target value, a manual correction quantity determined so as to obtain a proper finished photographic print while observing said simulated image;
- a memory for storing a plurality of target values and said characteristic values; and
- means for forming a new algorithm for obtaining a correction quantity of said scanner by using said plurality of target values and characteristic values from said memory.

---

### 5,019,859
## PROCESS CONTROL FOR HIGHLIGHT COLOR WITH DEVELOPER SWITCHING

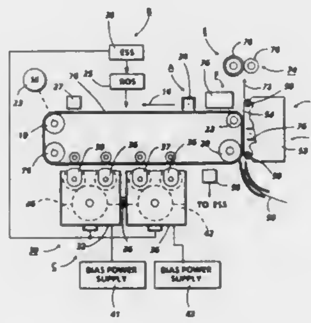
**Thomas W. Nash, Sodus, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

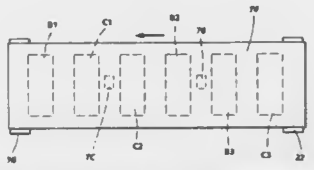
**Filed May 14, 1990, Ser. No. 522,946**

**Int. Cl.⁵ G03G *21/00***

**U.S. Cl. 355—77** **6 Claims**

1. The method of creating toner images, said method including the steps of:
- uniformly charging a charge retentive member;
- exposing said charge retentive member to form a plurality of latent electrostatic images thereon; and
- developing a plurality of said latent electrostatic images with toners having different physical properties such that at least two adjacent images are developed with one toner having the same physical properties and two other adjacent images are developed with another toner having the same physical properties which are different from the physical properties of said one toner whereby developer switching is not required between adjacent images having the same physical properties.





---

### 5,019,860
## APPARATUS FOR IMAGE FORMATION AND METHOD OF IMAGE FORMATION

**Masaaki Matsuo, Tokyo; Toshio Shimada, and Seishiro Hamada, both of Hiroshima, all of Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan**

**Filed Jun. 27, 1989, Ser. No. 371,972**

**Claims priority, application Japan, Jul. 4, 1988, 63-164984; Jul. 4, 1988, 63-164985; Jul. 4, 1988, 63-164986**

**Int. Cl.⁵ G03B *27/22***

**U.S. Cl. 355—104** **6 Claims**

1. An apparatus for forming an image by exposing an image-forming material comprised of a substrate, a photosensitive layer formed on one surface of said substrate and a protective layer on said photosensitive layer, separating said protective layer from the image-forming material and transferring part or a whole, in the thickness direction, of nonexposed portions of said photosensitive layer to an image receptor; the apparatus comprising at least a light source fort the exposure, an exposure cylinder and a second cylinder which can contact the exposure cylinder, said light source fort the exposure being arranged outside the radius of said exposure cylinder, said exposure cylinder having means for attaching said image-forming material thereto, said second cylinder having means for receiving said image-forming material attached to the surface of said exposure cylinder and holding said received image-forming material.

---

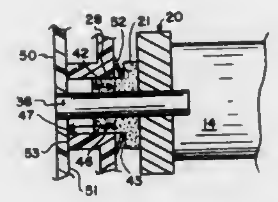
### 5,019,861
## DRIVE APPARATUS FOR A PROCESS CARTRIDGE OF AN IMAGE-FORMING APPARATUS

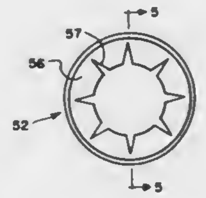
**Tyrone N. Surti, 424 Harding Industrial Dr., Nashville, Tenn. 37211**

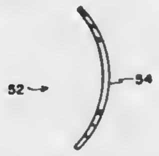
**Filed Oct. 11, 1989, Ser. No. 419,963**

**Int. Cl.⁵ G03G *15/00***

**U.S. Cl. 355—200** **12 Claims**







1. A process cartridge for use in an image-forming apparatus comprising:
- a casing;
- a photosensitive member rotatably mounted in said casing;
- a helical gear operatively coupled to said photosensitive member and adapted to receive driving force from the image-forming apparatus when mounted thereto to drive said photosensitive member, said photosensitive member being urged in a direction of its rotation axis responsive to rotation thereof by said helical gear; and
- buffering means including a member integral with said helical gear, said member including an extending portion disposed for coacting with said photosensitive member for providing a counter force thereagainst for preventing axial movement of said photosensitive member responsive to said urging of said photosensitive member in the direction of its rotation axis.

---

### 5,019,862
## HEAT CONTROL FOR PHOTORECEPTOR

**Masatsugu Nakamura; Kunio Ohashi; Shoichi Nagata, all of Nara; Kazuki Wakita, Yao; Katsuhiro Nagayama, and Tadashi Tonegawa, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 8, 1988, Ser. No. 268,652**

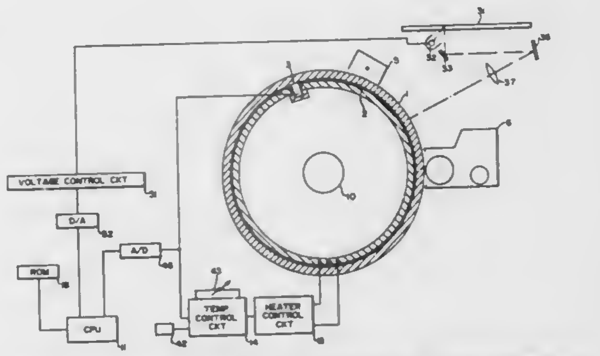
**Claims priority, application Japan, Jan. 23, 1986, 61-13343; Jan. 23, 1986, 61-13344; Jan. 23, 1986, 61-13345; Jan. 27, 1986, 61-16157; Feb. 18, 1986, 61-34256; Feb. 18, 1986, 61-34257; Feb. 18, 1986, 61-34258**

**Int. Cl.⁵ G03G *21/00***

**U.S. Cl. 355—208** **8 Claims**

1. In a photoreceptor heater controlling device comprising a heater for heating a photoreceptor,
- a temperature detecting means for measuring the temperature of said photoreceptor, and
- a heater controlling means for switching said heater on and off such that the measured temperature by said temperature detecting means is adjusted to a preset target temperature value,

the improvement wherein said photoreceptor heater controlling device further comprises
- a potential detecting means for measuring surface potential of said photoreceptor, and



- memory means storing the relationship between surface potential and surface temperature of said photoreceptor,
- said heater controlling means including a temperature setting means for identifying from said relationship a corresponding temperature value at which the value measured by said potential detecting means is a predetermined potential value and setting said corresponding temperature value as said target temperature value.

---

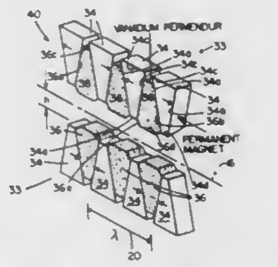
### 5,019,863
## WEDGED-POLE HYBRID UNDULATOR

**David C. Quimby, Bellevue, Wash., assignor to Amoco Corporation, Chicago, Ill.**

**Filed Sep. 30, 1987, Ser. No. 102,879**

**Int. Cl.⁵ H01F *7/00***

**U.S. Cl. 335—210** **18 Claims**



18. A device for manipulating a charged particle beam traveling along a beam path, said device comprising:
- a pair of similar permanent magnets, one of said magnets having its magnetization aligned parallel to said beam path and in a direction opposite to the magnetization of the other said magnet;
- an interstitial pole piece interposed between said magnets;
- said magnets and interstitial pole piece aligned adjacent to and parallel to said beam path; and,
- one said interstitial pole piece cross section, in a plane which contains said beam path, being tapered away from said beam path.

VOL
1126
ISS
4
MY
28
1991
UMI

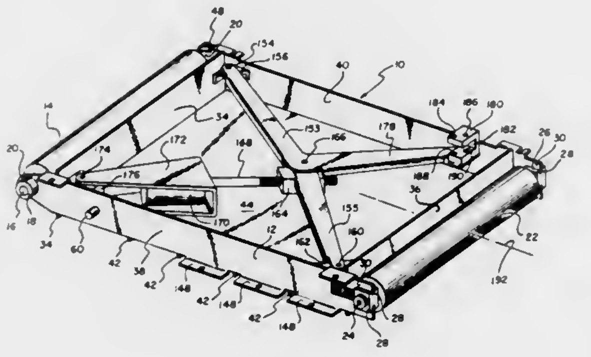
## 5,019,864
## ELECTROPHOTOGRAPHIC FILM CORE DEVICE

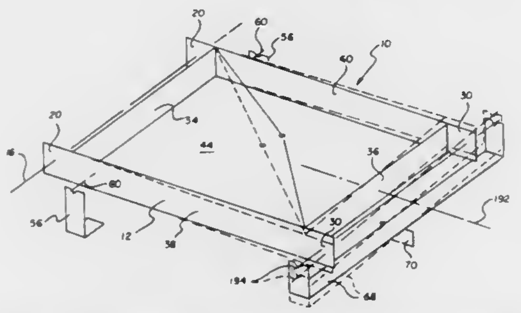
**Douglas L. Blanding, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 11, 1989, Ser. No. 420,000**

**Int. Cl.$^5$ G03G** *5/00*

U.S. Cl. 355—212 **11 Claims**





1. A belt supporting and tracking device for movably supporting an endless image receiving belt in an electrophotographic machine, said device comprising:

(a) a frame structure having spaced first and second ends, which are relatively rigid with respect to each other except in a mode in which said frame structure is distortable in twisting fashion about a steering axis extending lengthwise thereof through said second end thereof;

(b) first roller support means at said one end of said frame structure for rotatably supporting a first elongate roller;

(c) second roller support means at said second end of said frame structure for rotatably supporting a second elongate roller generally parallel to said first roller with said steering axis intersecting the center region of said second roller in generally perpendicular relation thereto;

(d) drive means for imparting longitudinal movement to said belt enwrapping said rollers and said frame structure;

(e) sensing means for sensing the lateral location of said belt relative to said sensing means along a direction transverse to the longitudinal movement direction of said belt; and

(f) adjusting means responsive to said sensing means for imparting twisting distortion to said frame structure for pivoting said second roller about said steering axis relative to said first roller to thereby control the lateral position of said belt.

---

## 5,019,865
## IMAGE PROCESSING APPARATUS WHEREIN VIBRATIONS ARE USED TO DESIGNATE A PORTION OF AN IMAGE TO BE REPRODUCED

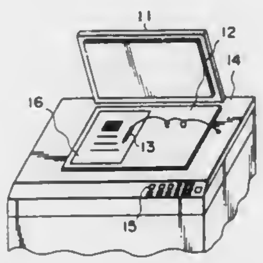
**Atsushi Tanaka, Kawasaki; Kiyoshi Kaneko, Yokohama, and Yuichiro Yoshimura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 121,040, Nov. 16, 1987, abandoned. This application Dec. 18, 1989, Ser. No. 449,053**

**Claims priority, application Japan, Nov. 20, 1986, 61-275107**

**Int. Cl.$^5$ G03G** *15/00*

U.S. Cl. 355—218 **9 Claims**



1. An image processing apparatus having a main body and comprising:

a transparent document table attached to said main body for carrying a document to be reproduced on a top surface thereof;

a vibration generator having a vibrator for generating a vibration wave that is transmitted to said document table in response to a plurality of drive pulses;

a vibration detector arranged on said document table for detecting the vibration wave being transmitted through said document table;

operation means for calculating a coordinate position of said vibration generator based on an arrival time of the greatest peak of the vibration wave detected by said vibration detector; and

reproduction control means for reading the document from the direction of a lower surface of said document table and for reproducing a portion of the document corresponding to the coordinate position calculated by said operation means.

---

## 5,019,866
## PRESSURIZED SCREEN ASSEMBLY FOR EXPOSURE OF A CONTINUOUS TONE IMAGE

**John E. Morse, E. Irondequoit, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 11, 1989, Ser. No. 419,801**

**Int. Cl.$^5$ G03G** *15/32*

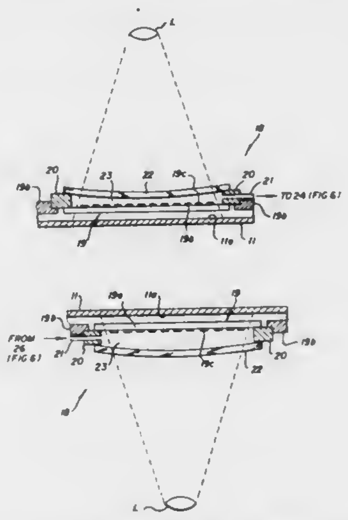
U.S. Cl. 355—239 **10 Claims**

1. A pressurized screen assembly mountable on a support for halftone exposure of a photosensitive member, comprising:

a halftoning screen member;

a light-transmissive cover, positioned in spaced relation to the screen member; and

a seal, interposed between the cover and the screen member and defining a cell therebetween, having a passage therethrough for applying a pressure to the cell;



whereby a pressure applied to the cell causes a deformation of the screen member to position same in a predetermined spaced relationship with the photosensitive member.

---

## 5,019,867
## IMAGE FORMING APPARATUS HAVING A REMOVABLE PROCESSING UNIT

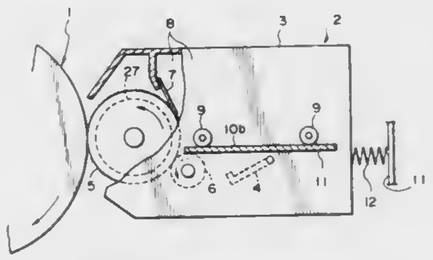
**Takeshi Yamakawa, Fujisawa, and Misao Tanzawa, Kawasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Aug. 25, 1989, Ser. No. 398,395**

**Claims priority, application Japan, Sep. 6, 1988, 63-223245**

**Int. Cl.$^5$ G03G** *15/06*

U.S. Cl. 355—245 **9 Claims**



1. An image forming apparatus comprising:

a body;

an image carrier rotatably supported by said body for forming an electrostatic latent image on a surface of said image carrier;

a processing unit having a center of gravity and a rotary body having a driving torque, the rotary body being pressed against the surface of said image carrier resulting in a frictional force, and said processing unit being supported by said body for movement toward and away from said image carrier; and

biasing means for biasing said processing unit with a force exerted in a direction for pressing said rotary body of said processing unit against said image carrier, said force of said biasing means being applied to said processing unit;

wherein a resultant force of at least the driving torque of said rotary body, said frictional force of said image carrier and said rotary body and a moment of the force of the biasing means relative to said center of gravity of said processing unit is always directed downward during operation of said image forming apparatus such that reaction forces exerted in a vertical direction by said body on said processing unit are directed upward at all times.

---

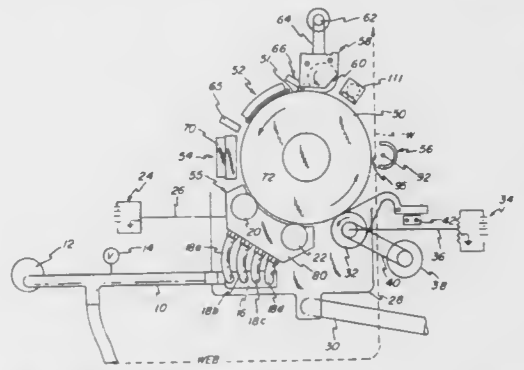
## 5,019,868
## DEVELOPER ELECTRODE AND REVERSE ROLLER ASSEMBLY FOR HIGH SPEED ELECTROPHOTOGRAPHIC PRINTING DEVICE

**Vincent T. Kubert, Melbourne, Fla.; Matthew J. Olenski, and Mark F. Duchesne, both of Dayton, Ohio, assignors to AM International, Inc., Chicago, Ill.**

**Filed Dec. 28, 1989, Ser. No. 457,195**

**Int. Cl.$^5$ G03G** *15/01, 15/10*

U.S. Cl. 355—264 **41 Claims**



1. High speed electrophotographic printing process of the type including a rotatable cylinder having a photoconductive surface rotating at a peripheral speed of at least about 100 ft./min., wherein a latent electrostatic image is formed on said surface by imparting a first charge of a given polarity and potential over said surface and subsequently exposing non-image areas of said surface to dissipate said first charge in said non-image areas to form a second charge in said non-image areas of lesser potential than and common polarity with said first charge, the improvement comprising:

providing a developer electrode comprising a liquid toner inlet and feed means for supplying a liquid toner dispersion to said surface, said liquid toner dispersion comprising a carrier liquid and, dispersed therein, solids color-imparting particles of opposite polarity than said given polarity, imparting a third charge to said developer electrode of common polarity with said first charge and having a potential intermediate that of said first and second charge, and

feeding said liquid toner dispersion to said developer electrode for application to said surface at sufficient velocity to inhibit agglomeration of said solids, color-imparting particles on said developer electrode.

---

## 5,019,869
## TONER FUSING/FINISHING DEVICE FOR SELECTING ALTERNATIVELY THE STYLE OF FINISHING ON A GLOSSY, MATTE, OR TEXTURED PRINT FINISH

**David L. Patton, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 21, 1989, Ser. No. 326,824**

**Int. Cl.$^5$ G03G** *15/20*

U.S. Cl. 355—290 **2 Claims**

1. In an electrophotographic copier which produces a print of a photographic negative having a desired finish, finishing apparatus comprises:

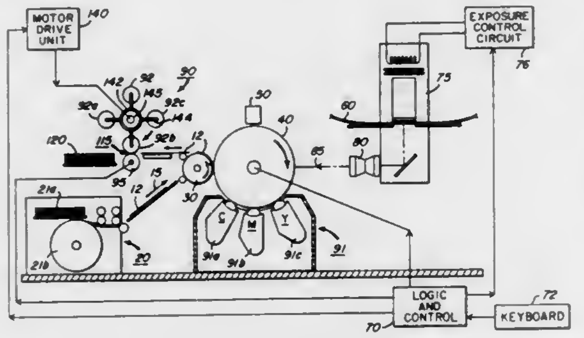
(a) a fusing roller;

(b) a plurality of finishing rollers, each of such finishing rollers having a surface selected to imparted a different finish to a print;

(c) means for moving a selected one of such finishing rollers

VOL
1126
ISS
4
MY
28
1991
UMI

into operative engagement with the fusing roller to provide a nip; and



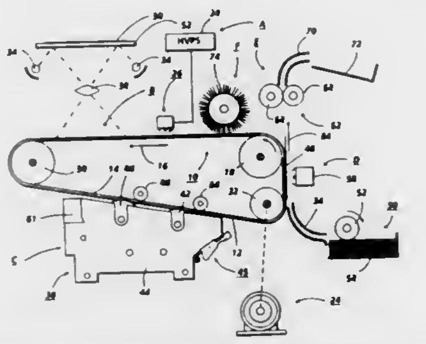
(d) means for providing heat to the nip so that when a print passes through the nip the desired finish is imparted to the print surface.

---

### 5,019,870
### TONER REMOVAL APPARATUS

**Jan Bares, Webster, N.Y., assignor to Xerox Corporation, Stamford**

**Filed Mar. 26, 1990, Ser. No. 503,598**
**Int. Cl.$^5$ G03G *21/00, 15/06***
U.S. Cl. 355—298 **16 Claims**



1. An apparatus for developing an electrostatic latent image, including:

means for transporting developer material comprising at least carrier granules having toner particles adhering thereto to the electrostatic latent image;

a housing defining a chamber having a supply of developer material therein, said transporting means being in communication with the chamber of said housing for receiving developer material, said housing having an exit port therein to discharge toner particles therefrom;

means for supplying toner particles to the chamber of said housing; and

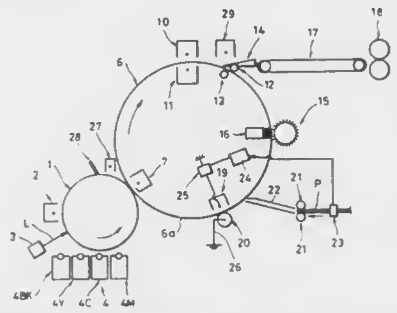
means for removing a portion of the toner particles from the chamber of said housing through the exit port therein while preventing the removal of carrier granules with the average size of the toner particles being removed from the chamber of said housing being greater than the average size of the toner particles remaining in the chamber of said housing so as to reduce the accumulation of large toner particles in the chamber of said housing.

---

### 5,019,871
### APPARATUS FOR ELECTROSTATICALLY ABSORBING AN IMAGE SUPPORTING MATERIAL ON AN IMAGE SUPPORTING CARRYING MEMBER BASED ON THE KIND OF MATERIAL USED

**Atsushi Takeda, Kawasaki, and Takashi Hasegawa, Matsudo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 448,212, Dec. 8, 1989, abandoned. This application Aug. 16, 1990, Ser. No. 568,550**
**Claims priority, application Japan, Dec. 9, 1988, 63-310090**
**Int. Cl.$^5$ G03G *21/00***
U.S. Cl. 355—309 **38 Claims**



1. An image forming apparatus comprising:

a movable image carrying member;

image forming means for forming an image on said image carrying member;

transfer means for transferring said image on the image carrying member formed by said image forming means to an image supporting member at a transfer position;

carrying means for carrying said image supporting member and for conveying said image supporting member to said transfer position in order to perform said transfer;

adsorption means for causing said image supporting member to be electrostatically adsorbed onto said carrying means by supplying said image supporting member with electric charges, said adsorption means first carrying said image supporting member to said carrying means;

detection means for detecting a kind of image supporting member to be adsorbed; and

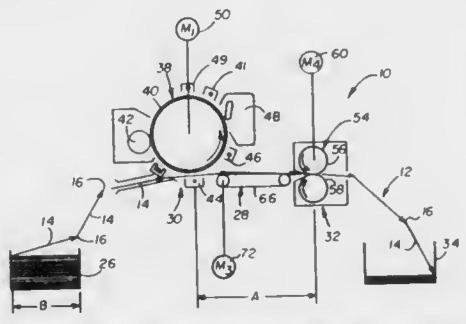
control means for controlling an electric-charge supply amount by said adsorption means according to the kind of image supporting member detected by said detection means.

---

### 5,019,872
### CONTINUOUS-FORM ELECTROPHOTOGRAPHIC PRINTER

**Theodore Zajac, Jr., Spokane, Wash., assignor to Output Technology Corporation, Spokane, Wash.**

**Filed Jun. 8, 1990, Ser. No. 535,112**
**Int. Cl.$^5$ G03G *21/00***
U.S. Cl. 355—317 **20 Claims**



1. A continuous-form electrophotographic printer for printing a continuous-form composed of a series of interconnected individual sheets each having a sheet length B between a leading edge and a trailing edge, said printer comprising:

sheet feeding means for conveying the continuous-form initially past an electrophotographic image transfer station and then past an image fixing station;

said image fixing station being spaced downstream of the image transfer station by a preset sheet movement distance A that is different from the sheet length B;

an image transfer device at the image transfer station for transferring electrophotographic images onto the individual sheets as the continuous-form is conveyed past the image transfer station;

an image fixing device at the image fixing station for fixing the transferred images to the individual sheets as the continuous-form is conveyed past the image fixing station; and

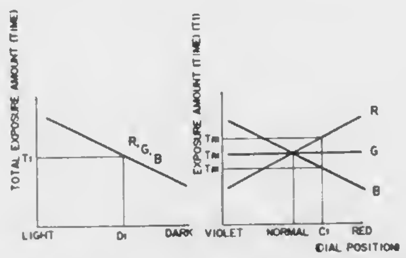
printer control means operatively connected to the sheet feeding means having a sheet registration means that is responsive to the distance A and B and to stopping and restarting of movement of the continuous-form for (a) indexing the continuous-form relative to the image fixing station to register a leading edge of a sheet with the image fixing station when the continuous-form is stopped, and (b) indexing the continuous-form relative to the image transfer station to register a leading edge of a sheet with the image transfer station when movement of the continuous-form is restarted.

---

### 5,019,873
### COLOR TONE ADJUSTABLE IMAGE RECORDING APPARATUS

**Mikio Imaeda, Bisai, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Oct. 30, 1989, Ser. No. 429,002**
**Int. Cl.$^5$ G03G *15/01***
U.S. Cl. 355—326 **17 Claims**



1. A color image recording apparatus for recording a color image, the apparatus comprising a photosensitive recording medium exposed to at least two light components differing in wavelength to superposedly form a latent image thereon the latent image developed to provide the color image having a hue and a density, the hue of the color image being varied depending on an exposure amount by each of the light components and the density of the color image being varied depending on a total exposure amount by the light components, the apparatus comprising:

means for selecting a hue from a first variable range and means for selecting a density from a second variable range;

storage means for storing information regarding exposure amounts of each of the light components relative to hues in the first variable range and densities in the second variable range;

means for automatically determining an exposure amount for all of the light components corresponding to the hue and the density selected by said selecting means according to the information stored in said storage means; and

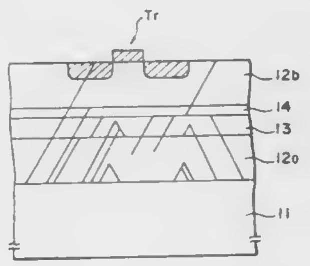
control means responsive to the exposure amount determined by said determining means for controlling the exposure amount of each of the light components applied to the photosensitive recording medium.

---

### 5,019,874
### SEMICONDUCTOR DEVICE HAVING AN EPITAXIAL LAYER GROWN HETEROEPITAXIALLY ON AN UNDERLYING SUBSTRATE

**Toshikazu Inoue, Yokohama, and Takashi Eshita, Ohmorinishi, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed May 31, 1990, Ser. No. 531,106**
**Claims priority, application Japan, May 31, 1989, 1-137865**
**Int. Cl.$^5$ H01L *29/161***
U.S. Cl. 357—16 **11 Claims**



1. A semiconductor device comprising:

a first semiconductor layer comprising a single crystal of a first semiconductor material having a first lattice constant;

a second semiconductor layer comprising a single crystal of a second semiconductor material having a second lattice constant which is different from the first lattice constant;

a third semiconductor layer comprising a third semiconductor material having a third lattice constant which is different from the first lattice constant, said third semiconductor layer being grown heteroepitaxially on the first semiconductor layer;

a fourth semiconductor layer comprising a fourth semiconductor material having a fourth lattice constant which is different from the third lattice constant, said fourth semiconductor layer being grown heteroepitaxially on the third semiconductor layer in a manner such that the second semiconductor layer is provided thereon, for preventing a first group of dislocations created in the third semiconductor layer from reaching the second semiconductor layer after passing through the fourth semiconductor layer, said fourth semiconductor layer having a thickness chosen to be larger than a critical thickness above which thickness a second group of dislocations is created in the fourth semiconductor layer at an interface between the third semiconductor layer and the fourth semiconductor layer as a result of a difference between the third lattice constant and the fourth lattice constant, said thickness of the fourth semiconductor layer being further optimized to an optimum thickness above which thickness and below which thickness there is caused an increase of the dislocation density in the second semiconductor layer; and

an active semiconductor device provided on the second semiconductor layer.

VOL
1126
ISS
4
MY
28
1991
UMI

**5,019,875**

### SEMICONDUCTOR DEVICE RADIATION HARDENED MESFET

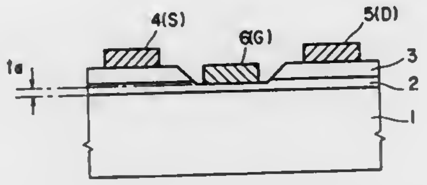
**Masanori Nishiguchi, Kanagawa, and Naoto Okazaki, Kyoto, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Japan**

**Continuation-in-part of Ser. No. 409,602, Sep. 19, 1989, abandoned. This application Oct. 26, 1990, Ser. No. 604,014**

**Claims priority, application Japan, Sep. 29, 1988, 63-245138; Sep. 29, 1988, 63-245139; Sep. 29, 1988, 63-245140; Sep. 30, 1988, 63-246631**

**Int. Cl.$^5$ H01L** *29/80*

**U.S. Cl. 357—22** **28 Claims**



1. A semiconductor device including a MESFET which has an active layer comprising GaAs crystal that is substantially evenly doped in a depth direction to have a carrier concentration $N_D$, and a threshold voltage $V_{th}$, and which normally operates when a change $\Delta V_{th}$ in the threshold voltage is within a tolerable amount $\Delta V_{thL}$,

an effective thickness $t_a$ of the active layer being $t_a < \{2\epsilon\cdot\Delta V_{thL})/(q\cdot\Delta N_D)\}^{\frac{1}{2}}$

where $\Delta N_D$ represents a decrease in the carrier concentration $N_D$ due to radiation exposure of a total exposure dose R equal to or higher than $1\times10^9$ roentgens, $\epsilon$ represents a dielectric constant of the active layer and q represents an electron charge.

---

**5,019,876**

### SEMICONDUCTOR PHOTO-ELECTRIC CONVERTER

**Jun-ichi Nishizawa, Sendai, Japan, assignor to Zaidan Hojin Handotai Kenkyu Shinkokai, Sendai, Japan**

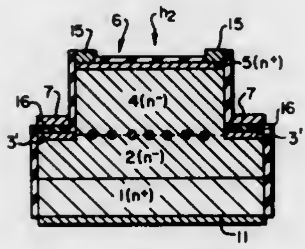
**Continuation of Ser. No. 58,618, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 825,775, Feb. 3, 1986, abandoned, which is a continuation of Ser. No. 512,027, Jul. 8, 1983, abandoned, which is a continuation of Ser. No. 39,445, May 15, 1979, Pat. No. 4,427,990, which is a continuation-in-part of Ser. No. 757,583, Dec. 27, 1976, Pat. No. 4,160,259. This application Apr. 4, 1989, Ser. No. 332,441**

**Claims priority, application Japan, Jul. 14, 1978, 53-86572; Jul. 18, 1978, 53-87988**

**The portion of the term of this patent subsequent to Jan. 24, 2001, has been disclaimed.**

**Int. Cl.$^5$ H01L** *29/80*

**U.S. Cl. 357—22** **5 Claims**



1. A static induction transistor mode photo-electric converter, which exhibits a non-saturating current versus voltage characteristic throughout its principal region of operation, comprising:

a semiconductor substrate;

a high-resistivity semiconductor region of a first conductivity type having an impurity concentration of the order of $1\times10^{14}\ \mathrm{cm}^{-3}$ and predetermined dimensions constituting at least one current channel having two ends in said substrate;

a pair of current electrode means comprising low-resistivity semiconductor regions of said first conductivity type and connected to said two ends of said current channel for receiving a main voltage from an external voltage source;

an electrically floating gate region formed adjacent to and surrounding said current channel comprising a semiconductor storage region of a second conductivity type opposite to said first conductivity type and having a low-resistivity as compared to the resistivity of said current channel region, for storing charge carriers of said second conductivity type and thereby for varying the height of the potential barrier in said current channel to control current between said current electrode means with the potential of one of said current electrode means;

a light receiving means formed in the neighborhood of said current channel for introducing external light at least into part of said semiconductor region; and

at least one pair of depletion layers formed by the built-in potential at the pn junction between said current channel region and said gate regions for pinching off said current channel in the absence of said external light;

said current electrode means and said current channel being configured substantially perpendicular with respect to said substrate.

---

**5,019,877**

### FIELD EFFECT TRANSISTOR

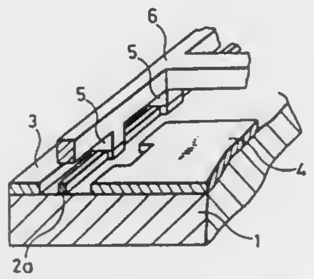
**Kenji Hosogi, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Mar. 15, 1990, Ser. No. 493,725**

**Claims priority, application Japan, Aug. 31, 1989, 1-226420**

**Int. Cl.$^5$ H01L** *29/80*

**U.S. Cl. 357—22** **8 Claims**



1. A field effect transistor comprising:

a substrate containing a conductive region;

source and drain electrodes disposed on said substrate on said conductive region;

a gate finger electrode disposed on said substrate at the conductive region between said source and drain electrodes;

a gate pad disposed on the substrate beyond said source and drain electrodes for receiving and transmitting signals to and from said gate finger electrode;

a plurality of spaced apart feeding points disposed on said gate finger electrode for receiving and transmitting signals to and from said gate finger electrode; and

an airbridge gate connection spaced from said substrate and electrically connected to each of said feeding points and to said gate pad.

---

**5,019,878**

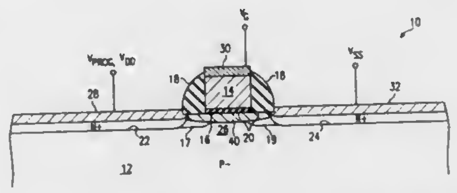
### PROGRAMMABLE INTERCONNECT OR CELL USING SILICIDED MOS TRANSISTORS

**Ping Yang, Richardson; Amitava Chatterjee, Dallas; Shian Aur, Plano, and Thomas L. Polgreen, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 31, 1989, Ser. No. 332,652**

**Int. Cl.$^5$ H01L** *29/10*

**U.S. Cl. 357—23.3** **10 Claims**



1. A method for selectively programming a field-effect transistor having a drain region formed in a semiconductor layer and a conductive layer formed adjacent said drain region, comprising the steps of:

applying a programming voltage between said drain region and a source region spaced from the drain region, the programming voltage being greater than or equal to the source-drain breakdown voltage of the transistor; and

in response to said step of applying the programming voltage, forming a conductive filament between the drain region and the source region.

---

**5,019,879**

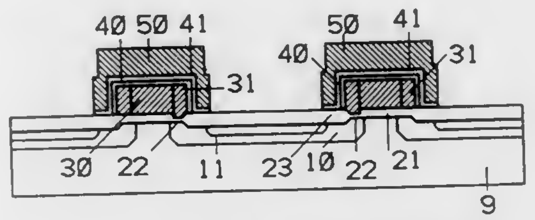
### ELECTRICALLY-FLASH-ERASABLE AND ELECTRICALLY-PROGRAMMABLE MEMORY STORAGE DEVICES WITH SELF ALIGNED TUNNEL DIELECTRIC AREA

**Te-Long Chiu, 1188 Spring Hill Way, San Jose, Calif. 95120**

**Filed Mar. 15, 1990, Ser. No. 493,750**

**Int. Cl.$^5$ H01L** *27/115, 21/235*

**U.S. Cl. 357—23.5** **8 Claims**



1. An electrically alterable, nonvolatile, floating gate type memory device, which is flash-erasable, comprising a substrate of semiconductor material having a channel region of a first type of conductivity between a first and a second region of a second type of conductivity, formed at the surface of said semiconductor substrate, said channel region providing a region within the semiconductor capable of passing an electric current between said first and said second region, a first level of patterned conducting material, constituting said floating gate, extending over said channel region, substantially between said first and said second region and electrically insulated by means of a first layer of dielectric material from said semiconductor substrate and by means of a second layer of dielectric material from a second level of patterned conducting material, constituting a control gate, overlying said floating gate and which further includes

a tunnel area defined on the surface of one of said first and second regions of the semiconductor substrate, said tunnel area being bordered on one side by the base of a portion of the length of a side wall of said floating gate and being covered with a third layer of dielectric material thinner than said first layer of dielectric material;

a tapered, lateral, seamlike appendix of conducting material juxtaposed along said portion of the length of the side wall of said floating gate, the base of said juxtaposed, tapered, lateral, seamlike appendix of conducting material abutting on the surface of said third layer of dielectric material covering said tunnel area;

said seamlike appendix being electrically connected to said patterned first level of conducting material constituting said floating gate along the entire periphery of said floating gate;

a word line extending in a first direction, said word line being connected to said control gate;

a bit line extending in a second direction and crossing said word line, said bit line being connected to the one of said first and second regions other than said one of said first and second regions which has a tunnel area on the surface thereof;

whereby said memory device constitutes the entire memory cell, without a separate access transistor being provided within the memory cell.

---

**5,019,880**

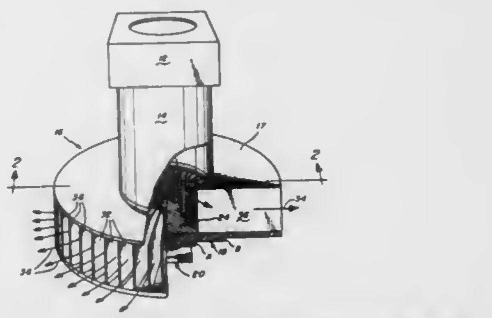
### HEAT SINK APPARATUS

**Leo M. Higgins, III., Middleboro, Mass., assignor to Prime Computer, Inc., Natick, Mass.**

**Filed Jan. 7, 1988, Ser. No. 142,462**

**Int. Cl.$^5$ H01L** *23/02*

**U.S. Cl. 357—81** **24 Claims**



1. A heat sink apparatus adapted to receive forced air from a source and comprising;

a heat sink housing including upper and lower walls, an opening in said upper wall defining a substantially centrally disposed inlet port and means extending between said upper and lower walls defining a plurality of radially extending enclosed air-flow passages communicating with said inlet port and each having an outlet port,

enclosed means for directing the air flow from said source to said inlet port,

and an air deflection member supported in said housing in-line with said inlet port, said air deflection member having a base and top end with said base wider than said top end, having a deflection surface extending between the base and top end, said deflection surface adapted to re-direct the air flow from the inlet port in a substantially orthogonal direction to said air-flow passages, and wherein said top end terminates at the inlet port substantially in an apex so as to inhibit reverse pair currents.

VOL 126
SS 4
MY 28
1991
UMI

**5,019,881**

### NONVOLATILE SEMICONDUCTOR MEMORY COMPONENT

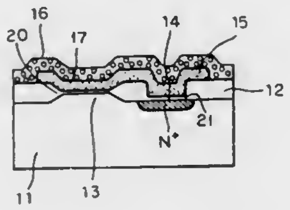
**Yun-Seung Shin, and Sung-Oh Chun, both of Seoul, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed Aug. 10, 1989, Ser. No. 391,865**

**Claims priority, application Rep. of Korea, Nov. 29, 1988, 8815779**

**Int. Cl.$^5$ H01L** *29/78*

U.S. Cl. 357—23.5 1 Claim



1. A memory cell comprising a semiconductor substrate (**11**) of a first conductivity type having a major surface,

a field isolation region (**12**) comprising a thick oxide on portions of said major surface;

source (**18**) and drain (**19**) regions of a second conductivity type in said substrate at said major surface;

a channel region (**13**) in said substrate at said major surface and disposed between said source (**18**) and drain (**19**) regions;

a tunnel region (**14**) of said first conductivity type spaced apart from said source (**18**), drain (**19**) and channel (**13**) regions, and of a higher doping concentration than said substrate (**11**);

a first dielectric layer (**20**) on said major surface overlying said channel region (**13**);

a second dielectric layer (**21**) on said major surface overlying said tunnel region (**14**);

a low resistance and continuous floating gate (**15**) extending over said first (**20**) and second (**21**) dielectric layers and over said channel and tunnel regions and partially over said field isolation region (**12**);

a third dielectric layer (**17**) extending over said floating gate (**15**); and

a low resistance and continuous control gate (**16**) extending over said third dielectric layer (**17**) and over said channel and tunnel regions and capacitively coupled to said floating gate.

---

**5,019,882**

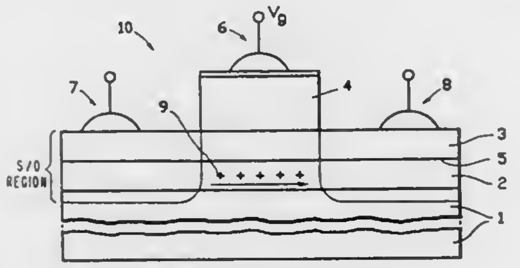
### GERMANIUM CHANNEL SILICON MOSFET

**Paul M. Solomon, Yorktown Heights, and Steven L. Wright, Peekskill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 15, 1989, Ser. No. 351,630**

**Int. Cl.$^5$ H01L** *29/68, 29/161, 29/80, 29/12*

U.S. Cl. 357—23.8 15 Claims



1. A field effect transistor of the type wherein current in a channel between ohmic contacts is influenced by a potential applied to a gate disposed over said channel the improvement comprising:

a substrate of a first monocrystalline semiconductor material,

a strained, pseudomorphic, epitaxial channel layer of an alloy of said first semiconductor material and a second semiconductor material disposed on said substrate,

an epitaxial layer of an oxidizable semiconductor material disposed on said channel layer, and,

a gate oxide layer of said oxidizable semiconductor disposed on said oxidizable semiconductor layer.

---

**5,019,883**

### INPUT PROTECTIVE APPARATUS OF SEMICONDUCTOR DEVICE

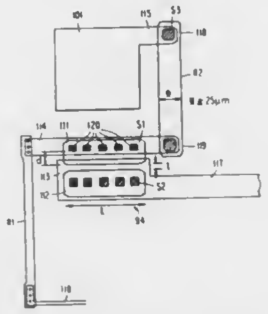
**Shigeru Mori; Michihiro Yamada; Hideshi Miyatake, and Shuji Murakami, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 148,366, Jan. 25, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 443,864**

**Claims priority, application Japan, Jan. 28, 1987, 62-19014**

**Int. Cl.$^5$ H01L** *29/06, 27/02, 29/04*

U.S. Cl. 357—23.13 19 Claims



1. An input protective apparatus for a semiconductor device (Q3), comprising an MOS transistor (Q4) having one active layer connected through a first resistor element (R1) to an input node of said device (Q3) and another active layer connected to a ground terminal of said device, a gate of said MOS transistor formed with a thick oxide insulating film,

which further comprises an external terminal (**11**) receiving an input signal to be applied to the input node of said semiconductor device (Q3) and a second resistor element (R2) connected between said external terminal (**110** and one of the active layers of said MOS transistor (Q4),

a resistance value $R_1$ of said first resistor element (R1) and a resistance value $R_2$ of said second resistor element (R2) having the relation $R_1 > R_2$, and said MOS type transistor being formed such that an on-resistance $R_3$ thereof satisfies a relation $R_3 < < R_2$.

---

**5,019,884**

### CHARGE TRANSFER DEVICE

**Masao Yamawaki, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Feb. 13, 1990, Ser. No. 479,271**

**Claims priority, application Japan, Apr. 7, 1989, 1-88294**

**Int. Cl.$^5$ H01L** *29/78, 27/02*

U.S. Cl. 357—24 5 Claims

1. A charge transfer device for transferring charge in a charge transfer direction comprising:

a semiconductor substrate of a first conductivity type;

a semiconductor layer of a second conductivity type opposite form the first conductivity type disposed on the substrate and including a surface;

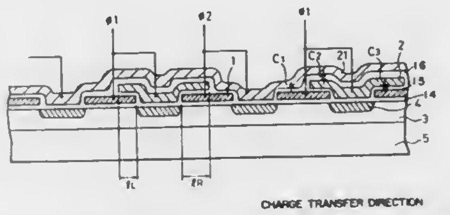
a plurality of spaced apart channels of the first conductivity type disposed in the layer at the surface;

a first electrically insulating film disposed on the surface;

a plurality of spaced apart first electrodes disposed on the first electrically insulating film, each first electrode lying between an adjacent pair of the channels;

a second electrically insulating film disposed on the first electrodes and the surface;

a plurality of spaced apart second electrodes disposed on the second electrically insulating film opposite respective alternating channels, electrically insulated from the first electrodes by the second electrically insulating film, and overlapping both of the first electrodes that are adjacent to the respective channel, the overlapping by each second electrode of an adjacent electrode that lies in a direction along which electrical charges are transferred by the charge transfer device covering a first area and the overlapping by each second electrode of an adjacent first electrode that lies opposite the direction along which electrical charges are transferred by the charge transfer device covering a second area, the second are being larger than the first area;



a third electrically insulating film disposed on the first and second electrodes and the second electrically insulating film; and

a third electrode continuous in the direction along which electrical charges are transferred by the charge transfer device disposed on the third electrically insulating film opposite the alternating channels where no second electrode is disposed and opposite the first and second electrodes, wherein each second electrode is electrically connected to the adjacent first electrode that lies in the direction along which electrical charges are transferred by the charge transfer device as a first clock phase of the charge transfer device and each first electrode lying adjacent a second electrode opposite to the direction along which electrical charges are transferred by the charge transfer device is electrically connected to the third electrode as a second clock phase of the charge transfer device whereby the first and second clock phases are stably driven by first and second clock signals 180 degrees out of phase with each other produced by a clock driver including a resonant circuit.

---

**5,019,885**

### GAS DETECTING DEVICE

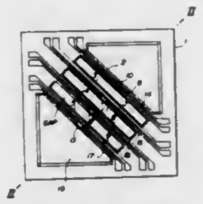
**Shinji Yagawara, and Wasaburo Ohta, both of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Mar. 28, 1990, Ser. No. 500,600**

**Claims priority, application Japan, Mar. 30, 1989, 1-80179; Jul. 7, 1989, 1-175790**

**Int. Cl.$^5$ H01L** *29/66, 29/96, 27/02;* **H01C** *7/00*

U.S. Cl. 357—25 16 Claims



1. A gas detecting device comprising:

a substrate;

a plurality of gas sensitive elements supported by said substrate and spaced apart from each other, said gas sensitive elements having respective predetermined temperatures at which gases are most effectively detected;

a plurality of pairs of electrode leads supported by said substrate, each of said plurality of pairs of electrode leads being connected to a corresponding one of said gas sensitive elements; and

heater means supported by said substrate, for heating said plurality of gas sensitive elements so that each of said gas sensitive element is set at a corresponding one of said plurality of predetermined temperatures.

---

**5,019,886**

### SEMICONDUCTOR-BASED RADIATION-DETECTOR ELEMENT

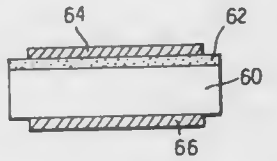
**Noritada Sato; Toshikazu Suzuki, and Osamu Ishiwata, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan**

**Continuation of Ser. No. 3,582, Jan. 15, 1987, abandoned. This application Dec. 12, 1988, Ser. No. 282,612**

**Claims priority, application Japan, Jan. 21, 1986, 61-10629**

**Int. Cl.$^5$ H01L** *31/118, 31/037, 31/0288*

U.S. Cl. 357—29 3 Claims



1. A semiconductor-based radiation-detector, including:

a semiconductor substrate having first and second surfaces, said semiconductor substrate having a single-crystal structure;

a neutron-sensitive-gas-diffused region proximate to at least one of said first and second surfaces, said diffused region being a low-temperature-plasma-CVD-formed region;

coupling means for making a rectifying connection to one of said surfaces and an ohmic connection to the other of said surfaces;

said diffused region being diffused with $^3$He gas, only, said $^3$He diffused region having an average gas concentration of substantially $10^{21}$ atoms/cm$^3$;

said coupling means including a layer of amorphous silicon deposited on said first surface, an ohmic contact on said amorphous layer and an ohmic contact on said second surface.

---

**5,019,887**

### NON-SINGLE CRYSTALLINE PHOTOSENSOR WITH HYDROGEN AND HALOGEN

**Mitsuyuki Niwa; Takayoshi Arai, both of Nagahama; Isamu Shimizu, Yokohama; Eiji Takeuchi; Tsutomu Murakami, both of Nagahama, and Shunichi Ishihara, Ebina, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 173,721, Mar. 25, 1988, abandoned. This application Oct. 11, 1990, Ser. No. 596,428**

**Claims priority, application Japan, Mar. 27, 1987, 62-73621; Mar. 27, 1987, 62-73622; Mar. 27, 1987, 62-73623; Mar. 27, 1987, 62-73624; Mar. 27, 1987, 62-73625; Mar. 27, 1987, 62-73627; Mar. 27, 1987, 62-73628; Mar. 27, 1987, 62-75706**

**Int. Cl.$^5$ H01L** *27/14*

U.S. Cl. 357—30 28 Claims

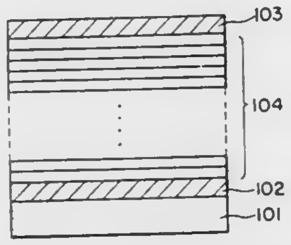
1. A photosensor having a pair of electrodes and a photoconductive member sandwiched between the pair of electrodes, said photoconductive member consisting of a laminate of a plurality of alternating layers of a first non-single crystalline thin film and a second non-single crystalline thin film,

wherein each of said first and second non-single crystalline thin films has a thickness of 10 Å–10 μm, and includes

VOL 126
SS 4
MY 28
1991
UMI

hydrogen at 0.5–10 atomic percent and halogen atoms at 0.0001–10 atomic percent;

at least one of said first and second non-single crystalline thin films includes impurity for controlling conductivity; and



said first and second non-single crystalline thin films have band gaps equal to each other and at least one of electroconduction types and electroconductivities different from each other.

---

### 5,019,888

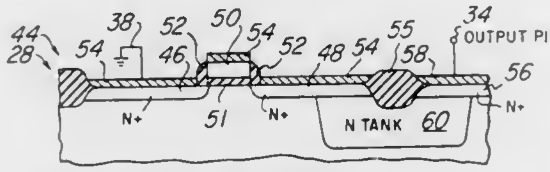
### CIRCUIT TO IMPROVE ELECTROSTATIC DISCHARGE PROTECTION

**David B. Scott, Plano; Patrick W. Bosshart, and James D. Gallia, both of Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Jul. 23, 1987, Ser. No. 76,622**

**Int. Cl.⁵ H01L** *27/02*

**U.S. Cl. 357—41** **16 Claims**



1. An output buffer for discharging both positive and negative electrostatic voltages created at the package leads of an integrated circuit comprising:

a plurality of transistors connected in parallel and operable to conduct between the package leads in response to both a positive and negative electrostatic voltage at a package lead; and

a plurality of resistive elements one each connected to one each of said transistors, such that current conducted by each of said transistors also flows through a respective resistor to a package lead, said resistors operable to limit the amount of either a positive or negative current though each of said transistors to a level at which said transistors are not damaged.

---

### 5,019,889

### SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

**Yoshio Shintani, Kokubunki, and Mikio Inatsu, Mitaka, both of Japan, assignors to Hitachi, Ltd., Japan**

**Continuation of Ser. No. 363,835, Jun. 9, 1989, Pat. No. 4,920,398. This application Feb. 8, 1990, Ser. No. 477,082**

**Claims priority, application Japan, Jun. 29, 1988, 63-162156**

**The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.**

**Int. Cl.⁵ H01L** *27/02*

**U.S. Cl. 357—42** **17 Claims**

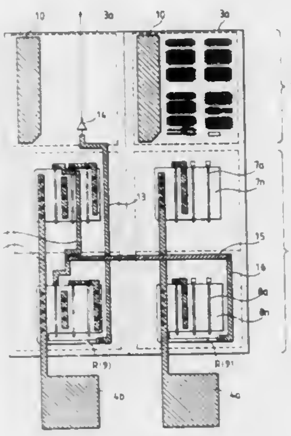
1. A semiconductor device comprising:

a semiconductor pellet;

an internal cell array constituted by arranging a plurality of basic cells formed on said semiconductor pellet;

input/output cells, for input/output buffer circuits, disposed in the outer peripheral direction of said internal cell array and each of said input/output cells having a first cell and a second cell, said first cell having first MISFETs for forming an input circuit, said second cell having second MISFETs for forming an output circuit;

external terminals disposed in such a manner as to correspond to said input/output cells and to be positioned more outward than said input/output cells; and



an amplification circuit portion of an oscillation circuit constituted by said second MISFETs.

---

### 5,019,890

### HETEROJUNCTION BIPOLAR TRANSISTOR

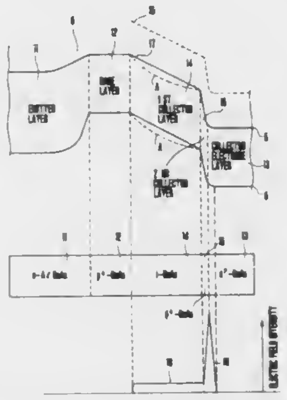
**Tadao Ishibashi, and Yoshiki Yamauchi, both of Tokyo, Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan**

**Continuation of Ser. No. 152,899, Feb. 5, 1988, abandoned. This application Sep. 14, 1990, Ser. No. 587,451**

**Claims priority, application Japan, Feb. 6, 1987, 62-24761; May 25, 1987, 62-125748**

**Int. Cl.⁵ H01L** *29/72, 29/161, 29/205*

**U.S. Cl. 357—34** **7 Claims**



1. A heterojunction bipolar transistor comprising:

an emitter layer of a first conductivity type;

a base layer of a second conductivity type adjacent to said emitter layer;

a collector buffer layer of the first conductivity type; and

a collector layer arranged between said collector buffer layer and said base layer,

wherein said collector layer includes a first collector sub-layer formed at the side of said base layer and a second collector sub-layer arranged at the side of said collector buffer layer,

said first collector sub-layer is a semiconductor layer having an impurity concentration lower than that of said base layer, and

said second collector sub-layer is a semiconductor layer of the second conductivity type having an impurity concentration higher than that of said first collector sub-layer,

wherein said first collector sub-layer and said second collector sub-layer are depleted in an operating state and form an electric field distribution determined by parameters of said base layer, said first collector sub-layer, said second collector sub-layer and said collector buffer layer.

---

### 5,019,891

### SEMICONDUCTOR DEVICE AND METHOD OF FABRICATING THE SAME

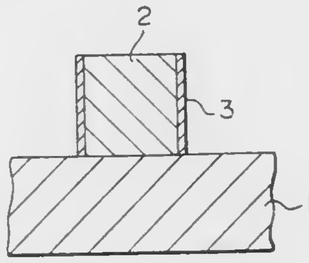
**Jin Onuki; Yasushi Koubuchi; Shinichi Fukada, all of Hitachi; Katuhiko Shiota, Ibaraki; Kunio Miyazaki, Hitachi; Tatsuo Itagaki, Tokyo, and Genji Taki, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 12, 1989, Ser. No. 296,003**

**Claims priority, application Japan, Jan. 20, 1988, 63-8349; Mar. 15, 1988, 63-59451**

**Int. Cl.⁵ H01L** *23/48, 29/44, 29/52, 29/60*

**U.S. Cl. 357—70** **39 Claims**



1. A semiconductor device having a semiconductor substrate and a plurality of conductor films formed on said substrate, each of said conductor films being made of aluminum alloy including on element selected from palladium and platinum, with a protective film which includes oxide of the selected one of palladium and platinum together with carbon being formed on the side wall of said conductor film.

---

### 5,019,892

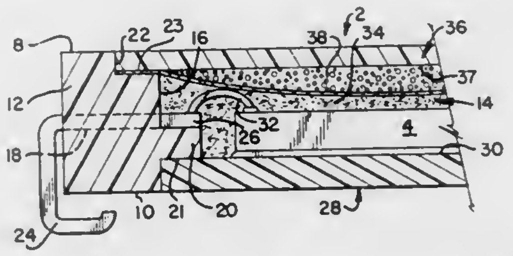
### CHIP CARRIER WITH ACCUMULATOR

**Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 18, 1988, Ser. No. 158,014**

**Int. Cl.⁵ H01L** *23/02*

**U.S. Cl. 357—74** **4 Claims**



1. A chip carrier for use with an integrated circuit, the chip carrier having a first major surface and an oppositely facing second major surface, a chip receiving opening is provided in the chip carrier and extends from the first major surface toward the second major surface, side walls are provided about the chip receiving opening, the side walls extend from the first major surface to the second major surface, a gel is provided in the chip receiving opening, the gel surrounds a chip positioned in the chip receiving opening, a cap is positioned in the chip receiving opening proximate the first major surface, the cap cooperating with the side walls to retain the gel in the chip receiving opening, terminals are provided in the chip carrier and extend from the chip receiving opening through the side walls, the chip carrier being characterized in that:

accumulator means are provided in the chip receiving opening in engagement with both said cap and said gel so that substantially no space exists therebetween, the accumulator means having resilient characteristics which allows the accumulator means to compress when a force is applied thereto, and expand back to its original volume when the force is removed, wherein said accumulator means is attached to a first surface of the cap, such that as the cap is positioned in the chip receiving opening, the accumulator means engages the gel in the chip receiving opening so that as the gel is caused to expand in the chip receiving opening, the accumulator means is compressed, thereby preventing the gel from applying large forces to the side walls and the cap of the chip carrier, and as the gel contracts, the accumulator means expands to insure that pressure is maintained on the gel in order to prevent the unrestrained motion of the gel in the chip receiving opening.

---

### 5,019,893

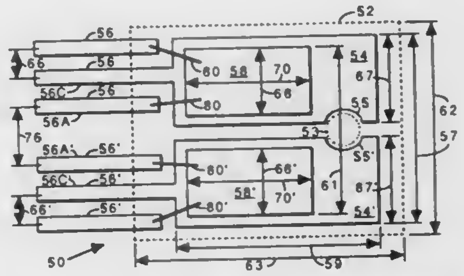
### SINGLE PACKAGE, MULTIPLE, ELECTRICALLY ISOLATED POWER SEMICONDUCTOR DEVICES

**Randall K. Frank, Scottsdale, and Jerry M. DuBois, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 1, 1990, Ser. No. 486,661**

**Int. Cl.⁵ H01L** *23/02*

**U.S. Cl. 357—81** **3 Claims**



1. A semiconductor device comprising, multiple leads for external connection protruding from a first edge of the device and having longitudinal central axes and arranged in at least two like groups each having two or more leads, wherein a first of the groups is adjacent a first end of the device and a second of the groups is adjacent a second, opposite, end of the device and, wherein, within the first and second groups the leads have a first pre-determined axis-to-axis spacing and, wherein, between the first and second groups the facing leads of the first and second groups have a second axis-to-axis spacing which is an integral multiple equal or greater than twice the first axis-to-axis spacing, and wherein at least one lead of the first group comprises a first die flag for receiving a first semiconductor device and at least one lead or the second group comprises a second die flag for receiving a second semiconductor device, wherein the first and second die flags are separated by an insulating molded-in-place encapsulation material.

---

### 5,019,894

### WHITE BALANCE ADJUSTING CIRCUIT

**Teruo Hieda, and Kenji Kyuma, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 387,695, Jul. 31, 1989, abandoned. This application Oct. 3, 1990, Ser. No. 592,635**

**Claims priority, application Japan, Aug. 8, 1988, 63-196033; Aug. 8, 1988, 63-196034**

**Int. Cl.⁵ H04N** *9/73*

**U.S. Cl. 358—29** **6 Claims**

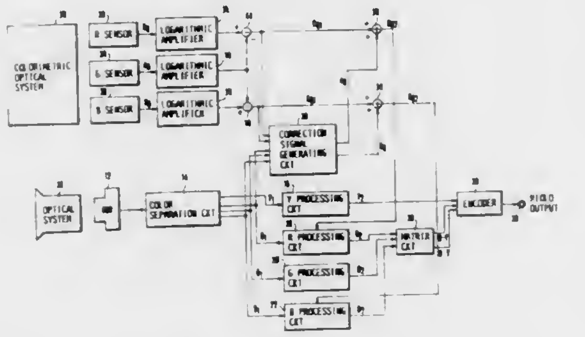
1. An image sensing apparatus comprising:

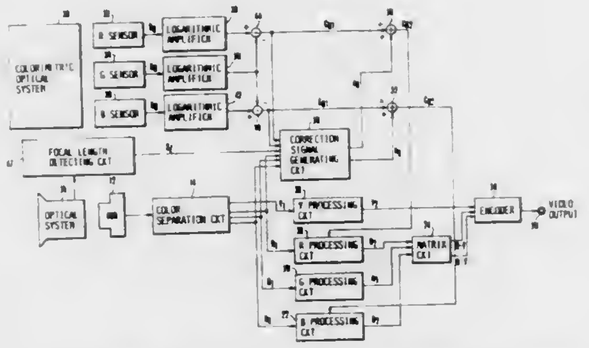
first control signal forming means for forming a first control signal to control the white balance of outputs of image

VOL
1126
ISS
4
MY
28
1991
UMI

sensing means, by using image signals provided by said image sensing means;

second control signal forming means for forming a second control signal to control the white balance of outputs of said image sensing means, by using outputs of color temperature detecting means; and





control means for controlling the white balance of outputs of said image sensing means by varying a combination of said first and second control signals in accordance with a ratio of color signals provided by said image sensing means and said color temperature detecting means.

---

**5,019,895**

### CROSS COLOR NOISE REDUCTION AND CONTOUR CORRECTION APPARATUS IN NTSC COLOR TELEVISION IMAGE PROCESSING SYSTEM

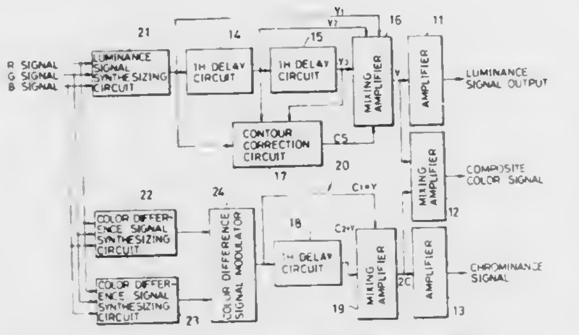
**Kazumi Yamamoto, Yokohama, and Masayuki Sugasawa, Tokyo, both of Japan, assignors to Ikegami Tsushinki Co., Ltd, Tokyo, Japan**

**Filed Jun. 5, 1990, Ser. No. 533,590**

**Claims priority, application Japan, Jun. 7, 1989, 1-142906**

**Int. Cl.$^5$ H04N** ***9/14, 9/68, 11/14***

U.S. Cl. 358—36 **1 Claim**



1. A cross color noise reduction and contour correction apparatus in NTSC color television image processing system for generating a luminance signal, a composite color signal, and a chrominance signal with correcting contours of images on the basis of R, and B signals, said cross color noise reduction and contour correction apparatus comprising:

synthesizing means for generating a synthesized luminance signal from said R, G, and B signals;

color difference signal synthesizing means for generating synthesized color difference signals from said R, G, and B signals;

modulation means for modulating said synthesized color difference signals produced from said color difference signal synthesizing means to generate a color difference signal;

first delay means for delaying said synthesized luminance signal synthesized by said synthesizing means by one horizontal scanning time;

second delay means for further delaying the signal which is delayed by said first delaying means by one horizontal scanning time;

contour correction means for correcting said contours of images on the basis of the signals produced from said first delay means, said second delay means, and said synthesizing means;

first mixing means for mixing the signals produced from said contour correction means, said first and second delaying means, and said synthesizing means to generate said luminance signal the contours of which are corrected;

third delay means for delaying said color difference signal produced from said modulation means by one horizontal scanning time;

second mixing means for mixing the signals produced from said third delay means and said modulation means to generate said chrominance signal; and

third mixing means for mixing the signals form said second mixing means and said first mixing means to generate said composite color signal.

---

**5,019,896**

### METHOD FOR FORMING HALFTONE DATA

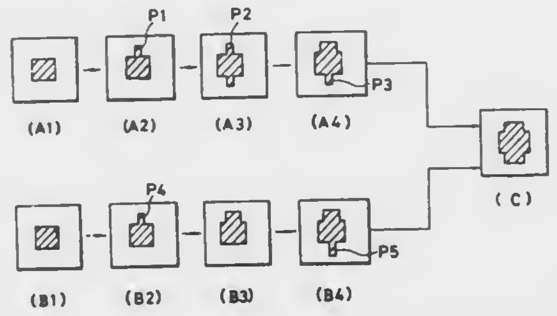
**Osamu Shimazaki, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd, Kanagawa, Japan**

**Filed Oct. 12, 1989, Ser. No. 420,414**

**Claims priority, application Japan, Oct. 13, 1988, 63-258229**

**Int. Cl.$^5$ H04N** ***1/40***

U.S. Cl. 358—75 **4 Claims**



1. In a method for forming halftone data wherein an original comprising color images of a continuous tone is scanned to obtain image signals, and the image signals are superposed wwith halftone screen signals which are electrically generated in order to form multicolor separated halftone gradation images, comprising groups of dots whose sizes depend on density and are defined within a square dot matrix, said images being reproducible by printing, the improvement comprising:

controlling the shape of the dot defined within said square dot matrix to produce a difference of about 2% or higher in percentage of blackened pixels between a first corner of at least one square dot matrix and a second corner of at least one square dot matrix.

**5,019,897**

### SCANNING APPARATUS FOR READING A COLOR IMAGE

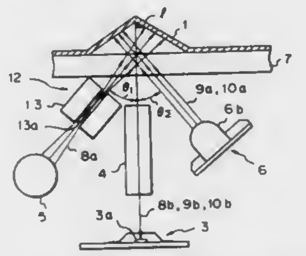
**Atsushi Shirata, and Kiyosuke Suzuki, both of c/o Sony Corporation, 7-35 Kitashinagawa, 6-chome, Shinagawa-ku, Tokyo, Japan**

**Filed Jun. 30, 1989, Ser. No. 374,055**

**Claims priority, application Japan, Jul. 7, 1988, 63-169876**

**Int. Cl.$^5$ H04N** ***1/46, 1/28;*** **G03F** ***3/8***

U.S. Cl. 358—75 **7 Claims**



1. A scanning apparatus for properly reading a color image of an original, even when said original is not perfectly flat, comprising:

light means for emitting light to a detected line of the original, said light including a plurality of color light sources having a first source of light having a length substantially equal to the width of he original for emitting a directional light corresponding to first and second colors and a second source of light having a length substantially equal to the width of the original for emitting a non-directional light corresponding to a third color;

control means for sequentially switching lighting operations of said first and second color light sources;

a photoelectric transferring device for receiving a reflected light, said reflected light being reflected from said detected line of the original; and

slit plate means arranged between said second source of light and said detected line of the original, for giving a directivity to said second source of light.

---

**5,019,898**

### REAL-TIME PSEUDOCOLOR DENSITY ENCODING OF AN IMAGE

**Tien-Hsin Chao, Valencia, and Hua-Kuang Liu, South Pasadena, both of Calif., assignors to The California Institute of Technology, Pasadena, Calif.**

**Filed Apr. 26, 1989, Ser. No. 344,243**

**Int. Cl.$^5$ H04N** ***13/00***

U.S. Cl. 358—81 **28 Claims**

1. An apparatus for pseudocolor density encoding of an image in real time, comprising:

spatial light polarization modulation (SLPM) means to which said image is applied;

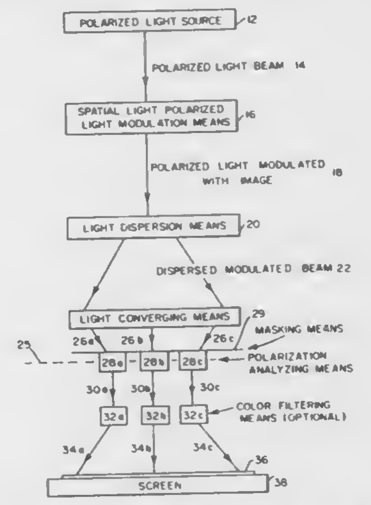
source means for providing a beam of polarized white light incident on said spatial light polarization modulation (SLPM) means;

converging means for converging a beam of light incident thereon onto a focal surface;

light dispersion means disposed between said spatial light polarization modulation (SLPM) means and said converging means, for dispersing a white-light beam emerging from said spatial light polarization modulation (SLPM) means into a dispersed beam of component colors;

a plurality of polarization analyzer means for analyzing the polarization of light incident thereon, disposed on said focal surface in different regions of said dispersed beam corresponding to different component colors, each said analyzer means having a different orientation with respect to said beam of polarized white light; and

masking means for allowing said dispersed beam to pass only through said plurality of analyzer means;


POLARIZED LIGHT SOURCE
12
POLARIZED LIGHT BEAM 14
SPATIAL LIGHT POLARIZED LIGHT MODULATION MEANS
16
POLARIZED LIGHT MODULATED WITH IMAGE
18
LIGHT DISPERSION MEANS
20
DISPERSED MODULATED BEAM 22
LIGHT CONVERGING MEANS
29
MASKING MEANS
25
26a
26b
26c
28a
28b
28c
POLARIZATION ANALYZING MEANS
30a
30b
30c
32a
32b
32c
COLOR FILTERING MEANS (OPTIONAL)
34a
34b
34c
36
SCREEN
38

wherein a plurality of analyzed beams passing through said plurality of analyzers can be superimposed to form a pseudocolored version of said image.

---

**5,019,899**

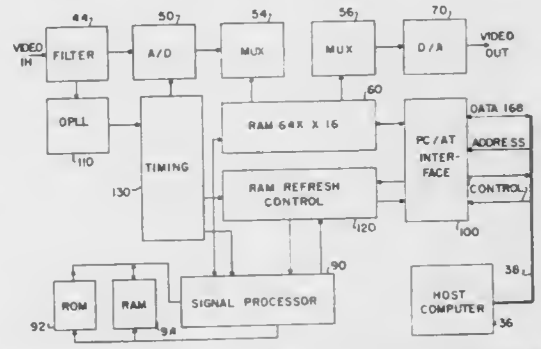
### ELECTRONIC DATA ENCODING AND RECOGNITION SYSTEM

**Glenn M. Boles, Fords; Gary W. Schober, Edison; Wen S. Chein, Piscataway; Chris P. Symanski, Union, all of N.J.; Philippe Des Rioux, New York, N.Y., and Walter Tomkoski, III, Jamesburg, N.J., assignors to Control Data Corporation, South Minneapolis, Minn.**

**Filed Nov. 1, 1988, Ser. No. 265,831**

**Int. Cl.$^5$ H04N** ***7/00, 17/00***

U.S. Cl. 358—84 **36 Claims**



1. Apparatus for continuous pattern recognition of broadcast video segments comprising

first means for digitally parametizing all of the pixels in all of the frames of video segments to be recognized to form multi-bit digital signatures therefrom related to the luminance of each pixel in each frame in accordance with a set of predetermined rules,

said first means including a memory in which the digitally parametized pixels are all stored as digital words and in a TV frame orientation of a plurality of lines corresponding to the frame from which they were derived, said first means also including means for processing substantially all of said parametized pixels to form a digital signature,

memory means coupled to said first means for storing said signatures as a database, there being groups of stored signatures for each segment to be recognized,

means for monitoring a broadcast video transmission,

means for receiving said broadcast video transmission and

OL
126
SS
4
MY
28
1991
UMI

digitally parametizing all of the pixels in all of the frames of said video transmission to form a multi-bit digital test signature from each frame of said broadcast signal in accordance with said set of predetermined rules, and

means for coupling said test signatures to said database and comparing each of said test signatures separately with every signature in all of the groups of signatures in said database whereby a match of a test signature and a stored signature occurs if the number of digital bits matched is equal to or greater than a predetermined number.

---

### 5,019,900

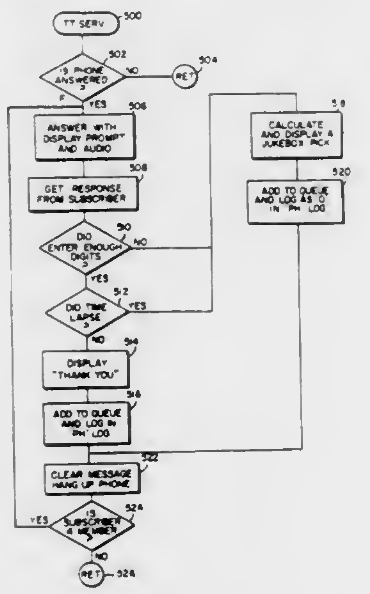
## TELEPHONE ACCESS DISPLAY SYSTEM

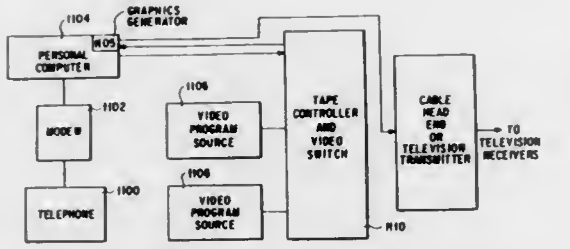
**Morris Clark, Miami Springs, Fla.; Kenneth Lawson, Salt Lake City, and James Izatt, West Jordan, both of Utah, assignors to Video Jukebox Network, Inc., Miami, Fla.**

**Continuation of Ser. No. 930,207, Nov. 14, 1986, Pat. No. 4,761,684. This application Aug. 1, 1988, Ser. No. 226,725**

**Int. Cl.$^5$ H04N *7/10;* H04H *9/00;* H04M *11/00***

**U.S. Cl. 358—86** **54 Claims**


TT SERV
500
IS PHONE ANSWERED ?
502
NO
RET
504
YES
ANSWER WITH DISPLAY PROMPT AND AUDIO
506
GET RESPONSE FROM SUBSCRIBER
508
DID ENTER ENOUGH DIGITS
510
NO
YES
DID TIME LAPSE
512
YES
NO
DISPLAY "THANK YOU"
514
ADD TO QUEUE AND LOG IN PH LOG
516
CLEAR MESSAGE HANG UP PHONE
522
IS SUBSCRIBER A MEMBER
524
YES
CALCULATE AND DISPLAY A JUKEBOX PICK
518
ADD TO QUEUE AND LOG AS IQ IN PH LOG
520
RET
526



32. Apparatus for the remote viewing of selected video program material at remote receiving locations, comprising:
(a) television broadcasting means at a central location for providing a television signal for transmission to said remote locations over a single common channel;
(b) means at said central location for providing video program signals to said television broadcasting means;
(c) at least one selectable source of video program materials;
(d) selection means for generating a selection signal for enabling each remote receiving location to select video program material to be broadcast over the single common channel with such selection being made through a telephone system keypad;
(e) programmed data processor means coupled to said at least one selectable source of video program materials and said means for providing video program signals to said television broadcasting means, said programmed data processor being responsive to the telephonically transmitted selection signal from a remote location selecting desired video program material for transmission by said television broadcasting means over the single common channel for viewing by all of said remote receiving locations on the single common channel, said programmed data processor providing control signals to said at least one selectable source of video program materials in accordance with the desired video program material selected by a remote receiving location such that selected video program material is coupled by said means for providing video program signals to said television broadcasting means for transmission over the single common channel to all of the said remote receiving locations viewing the single common channel irrespective of whether the viewers at such locations have selected any video program material so that a viewer at a remote receiving location may tune a television receiver at that location to the single common channel in order to sequentially view all of the selected video program materials transmitted by said television broadcasting means over the single common channel; and
(f) means for selecting predetermined programmed data processor selected video program material for viewing at remote receiving locations.

---

### 5,019,901

## IMAGE MOTION VECTOR SENSOR FOR SENSING IMAGE DISPLACEMENT AMOUNT

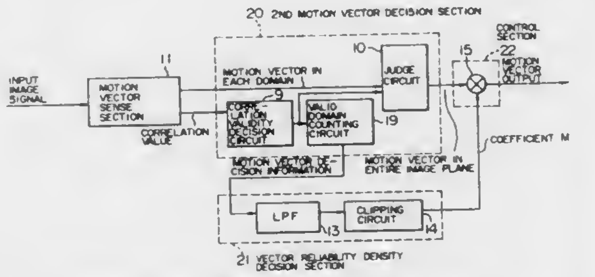
**Kenya Uomori, Katano, and Atsushi Morimura, Nara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Mar. 26, 1990, Ser. No. 498,902**

**Claims priority, application Japan, Mar. 31, 1989, 1-083461**

**Int. Cl.$^5$ H04N *7/18***

**U.S. Cl. 358—105** **8 Claims**


20 2ND MOTION VECTOR DECISION SECTION
INPUT IMAGE SIGNAL
11
MOTION VECTOR SENSE SECTION
CORRELATION VALUE
MOTION VECTOR IN EACH DOMAIN
CORRELATION VALIDITY DECISION CIRCUIT
VALID DOMAIN COUNTING CIRCUIT
10
JUDGE CIRCUIT
19
15
CONTROL SECTION
22
MOTION VECTOR OUTPUT
COEFFICIENT M
MOTION VECTOR DECISION INFORMATION
MOTION VECTOR IN ENTIRE IMAGE PLANE
LPF
13
CLIPPING CIRCUIT
14
21 VECTOR RELIABILITY DENSITY DECISION SECTION

1. An image motion vector sensor, comprising:
a motion vector sense section in which an input signal of an image plane is subdivided into a plurality of sense domains so as to compute a motion vector of an image in each said domain;
a motion vector decision section for judging validity of the motion vector in each said domain so as to decide a motion vector for an entire image plane, said motion vector decision section counting the number of the domains which contain a motion vector judged to be valid;
a vector reliability density decision section for producing a coefficient which is a function of density with respect to time of a signal proportional to said number supplied by the motion vector decision section; and
a control section for controlling a magnitude of the motion vector for the entire image plane based on the output of said vector reliability density decision section.

---

### 5,019,902

## BAND WIDTH COMPRESSING/REPRODUCING SYSTEM WITH FIELDS FOR DIFFERENT FREQUENCY COMPONENTS

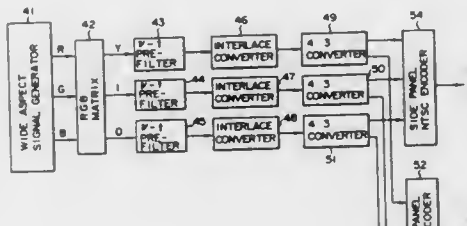
**Seijiro Yasuki, Yokohama, and Kiyoyuki Kawai, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

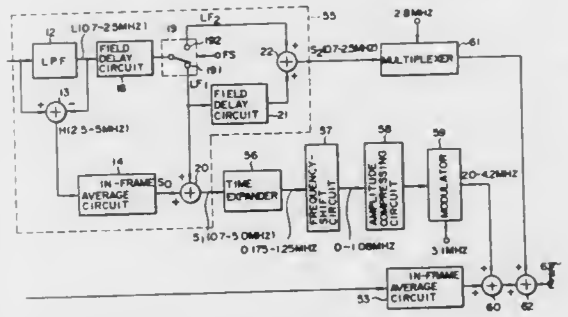
**Filed Aug. 1, 1989, Ser. No. 388,055**

**Claims priority, application Japan, Aug. 23, 1988, 63-207441**

**Int. Cl.$^5$ H04N *7/12***

**U.S. Cl. 358—133** **13 Claims**





1. A bandwidth compressing/ reproducing system comprising:
first signal output means for receiving a television signal of 2 : 1 interlace format, and outputting in one field a first signal consisting of full-bandwidth components of a horizontal transfer bandwidth of said received television signal;
signal extracting means for extracting a horizontal low frequency component, having a bandwidth of a predetermined horizontal frequency or below, from said television signal;
second signal output means for outputting, in an other field, a second signal consisting only of said horizontal low frequency component output from said signal extracting means;
adding means for adding said first and second signals output from said first and second signal output means; and
selection means for selecting said first signal from said first signal output means in said one field whereas selecting an added output from said adding means in said other field;
wherein said predetermined horizontal frequency is such that said horizontal low frequency component contains a component necessary to provide smooth motion.

---

### 5,019,903

## SPATIAL INTERPOLATION BETWEEN LINES OF A SUPERSAMPLED DIGITAL VIDEO SIGNAL IN ACCORDANCE WITH A GRADIENT VECTOR SELECTED FOR MAXIMUM MATCHING OF BLOCKS OF SAMPLES WHICH ARE OFFSET IN OPPOSITE DIRECTIONS

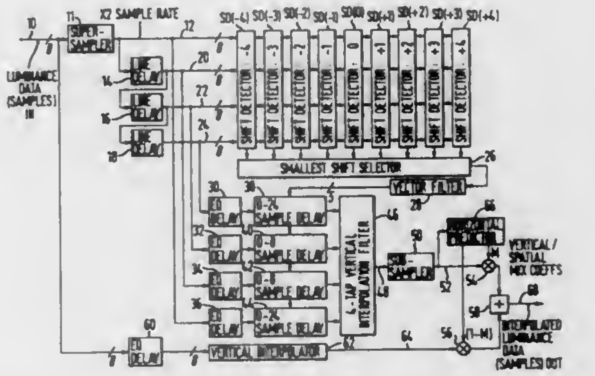
**David A. Dougall, Basingstoke; James H. Wilkinson, Heathlands, and Gavin A. Walker, Chineham, all of England, assignors to Sony Corporation, Tokyo, Japan**

**Filed Mar. 22, 1990, Ser. No. 497,514**

**Claims priority, application United Kingdom, May 4, 1989, 8910207**

**Int. Cl.$^5$ H04N *5/02***

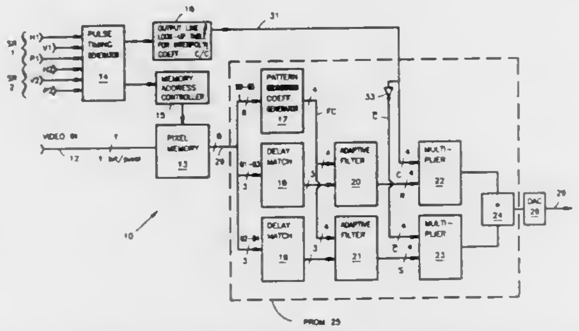
**U.S. Cl. 358—140** **17 Claims**


X2 SAMPLE RATE
SUPER-SAMPLER
LUMINANCE DATA (SAMPLES) IN
LINE DELAY
SHIFT DETECTOR
SMALLEST SHIFT SELECTOR
VECTOR FILTER
SAMPLE DELAY
4-TAP VERTICAL INTERPOLATION FILTER
SUB-SAMPLER
VERTICAL INTERPOLATOR
VERTICAL / SPATIAL MIX COEFFS
INTERPOLATED LUMINANCE DATA (SAMPLES) OUT

1. A method of spatially interpolating between lines of a digital video signal to produce interpolated lines, the method comprising the steps of:
horizontally interpolating between samples of said video signal in each of said lines to produce a supersampled signal comprising the original samples and at least one interpolated sample located between each adjacent pair of original samples;
determining, for each sample of said supersampled signal, the extend of matching between two blocks of N×M samples of said supersampled signal (where N is the number of lines and M is the number of samples), said two blocks being vertically offset from one another in opposite directions with respect to a line to be interpolated, and being horizontally offset from one another in opposite directions with respect to a predetermined sample position, said step of determining being carried out for a plurality of different horizontal offsets, including zero offset and at least one offset on each side of zero, so as to produce a respective value of the extent of matching for each of said horizontal offsets;
selecting, for each sample of the line to be interpolated, from a plurality of gradient vectors each associated with a respective one of said different horizontal offsets, the gradient vector associated with the horizontal offset that produces the greatest extent of matching between said two blocks;
spatially interpolating between samples of said video signal in different lines thereof to generate samples of the interpolated line; and
in said step of spatially interpolating, controlling the direction of interpolation, for each sample generated, in accordance with the gradient vector selected for said predetermined sample position corresponding to that generated sample.

### 5,019,904
## SCAN CONVERTER WITH ADAPTIVE VERTICAL FILTER FOR SINGLE BIT COMPUTER GRAPHICS SYSTEMS

**Jack J. Campbell, 1161 DeHaro St., San Francisco, Calif. 94110**
**Filed Dec. 4, 1989, Ser. No. 445,369**
**Int. Cl.⁵ H04N** *7/01, 7/04, 11/20, 11/06*
**U.S. Cl. 358—140** **20 Claims**



1. A television scan converter for converting video generated by single pixel bit computer graphics systems at a first scan rate into analog video at a second scan rate which is different than the first rate, the converter comprising:

clocking means responsive to horizontal, vertical and pixel clock frequencies at the first scan rate and horizontal, vertical and pixel clock frequencies at the second scan rate for generating clocking signals,

pixel memory array means for storing incoming pixel bits at the first scan rate and for retrieving vertical columns of predetermined numbers of vertically adjacent pixel bits of plural scan lines at the second scan rate,

memory address controller means responsive to the clocking means for generating and putting out pixel bit storage and retrieval addresses to the pixel memory array means,

pattern recognition filter coefficient generator means for generating a filter coefficient by detecting a bit pattern of each said vertical column of pixel bits read out from the pixel memory array means,

adaptive vertical low pass filter means connected to receive delay matched predetermined adjacent groups of pixel bits of said vertical column for adaptively low pass filtering the predetermined adjacent groups in response to the filter coefficient, so as to minimize video flicker artifacts in resultant interpolation pixels at the second scan rate in accordance with the bit patterns detected by the pattern recognition filter coefficient generator means,

interpolator means connected to the adaptive vertical low pass filter means and responsive to an interpolation coefficient C, for generating and putting out as a stream the interpolation pixels at the second scan rate, and

interpolation coefficient generator means responsive to the clocking means for generating the interpolation coefficient C for each interpolation pixel for controlling operation of the interpolator means.

---

### 5,019,905
## ENCODING AND DECODING OF MULTIPLE VIDEO SOURCES

**Yacov Pshtissky, Bayside, and Shiyang Gao, Uniondale, both of N.Y., assignors to Vicon Industries, Inc., Melville, N.Y.**
**Filed Sep. 18, 1987, Ser. No. 99,148**
**Int. Cl.⁵ H04N** *7/08*
**U.S. Cl. 358—146** **24 Claims**

1. A system for encoding and decoding multiple video sources comprising:

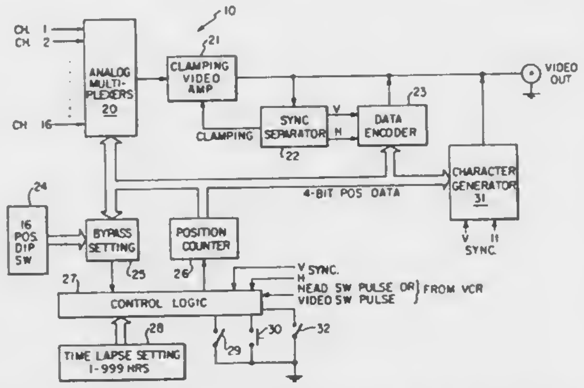
an encoder, said encoder including:

means for receiving n video input signals, where n is an integer greater than 1, each signal including a back porch portion and a sync pulse;

matrix switching means responsive to said video input signals for sequentially switching from one video input signal to the next in response to a command signal and for sequentially providing each of said n signals as an output;

counting means responsive to the sync pulses of each of said n vide signals for providing said command signal to said matrix switching means to cause it to switch from one video signal to the next;

encoding means responsive to said counting means for encoding information onto the back porch portion of each video input signal, said information corresponding to which of said signals is being encoded so as to provide an encoded video signal, said encoder includes means for clamping, the output of said matrix switching means to a zero blanking level irrespective of whether said incoming video signals are synchronized with each other; said clamping means operates in response to output sync signals in the output of the switching means when the output sync signals are present and in response to locally generated dummy sync signals when the output sync signals are absent; and



means providing said encoded video signal as an output;

a decoder, said decoder responsive to said encoded video signal and including:

means for extracting said encoded information from said encoded video signal;

means for comparing said extracted encoded information with a preselected number from the sequence 1... n, wherein n is an integer greater than 1, said preselected number corresponding to a particular video input signal desired to be displayed, and for generating a gating signal when said extracted encoded information agrees with said preselected number;

means enabled by said gating signal for storing in digital form said particular video signal corresponding to said preselected number; and

output means responsive to said stored video signal for providing said particular video signal in analog form to a video display.

---

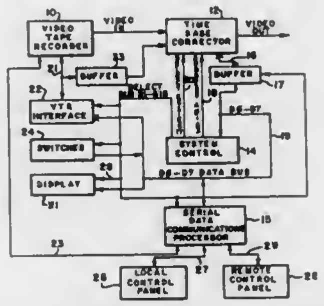
### 5,019,906
## TIME BASE CORRECTOR MEMORY ARRANGEMENT AND MEMORY CONTROL

**Jan S. Wesolowski, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.**
**Contiouation of Ser. No. 330,998, Mar. 29, 1989, abandoned, which is a continuation of Ser. No. 116,591, Nov. 3, 1987, abandoned, which is a division of Ser. No. 788,606, Oct. 17, 1985, Pat. No. 4,733,294. This application Jan. 29, 1990, Ser. No. 472,444**
**Int. Cl.⁵ H04N** *5/04*
**U.S. Cl. 358—148** **3 Claims**

1. A method for correcting time base errors in a video signal to synchronize the video signal with a reference signal having horizontal synchronizing pulses, comprising the steps of:

storing the video signal in a memory in increments of one horizontal line of video information and at a rate synchronized to horizontal pulses in said video signal;

reading the increments of the stored video signal from said memory at a rate equal to the frequency of the horizontal synchronizing pulses in said reference signal; and

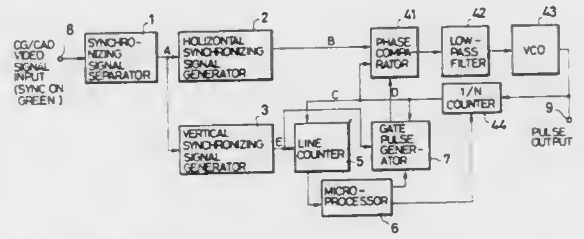


varying the time at which one of said storing and reading steps is initiated relative to the occurrence of a horizontal synchronizing pulse in its corresponding video or reference signal in increments of one-half of a horizontal line.

---

### 5,019,907
## PULSE GENERATING CIRCUIT

**Satoshi Murakoshi, and Atsushi Sakurai, both of Atsugi, Japan, assignors to Kabushiki Kaisha Yamashita Denshi Sekkei, Atsugi, Japan**
**Filed Dec. 5, 1989, Ser. No. 446,145**
**Claims priority, applicatioo Japan, Dec. 20, 1988, 63-322715**
**Int. Cl.⁵ H04N** *5/04;* **H03L** *7/00*
**U.S. Cl. 358—158** **4 Claims**


8
CG/CAD VIDEO SIGNAL INPUT (SYNC ON GREEN)
1
SYNCHRO-NIZING SIGNAL SEPARATOR
A
2
HOLIZONTAL SYNCHRONIZING SIGNAL GENERATOR
B
41
PHASE COMPA-RATOR
42
LOW-PASS FILTER
43
VCO
C
D
1/N COUNTER
44
9
PULSE OUTPUT
3
VERTICAL SYNCHRONIZING SIGNAL GENERATOR
E
LINE COUNTER
5
GATE PULSE GENER-ATOR
7
MICRO-PROCESSOR
6

1. A pulse generating circuit comprising:

a first generating circuit for generating signals in synchronism with horizontal synchronizing signals included in an inputted video signal;

a second generating circuit for generating signals in synchronism with vertical synchronizing signals included in the inputted video signal;

a PLL circuit comprising:

a phase comparator have first and second input terminals, the first of which being connected to the output of the first generating circuit;

a low-pass filter for smoothing the output of the phase comparator;

a voltage controlled oscillator for generating pulses in accordance with the output of the low-pass filter; and

a first counter for dividing the output of the voltage controlled oscillator and generating output signals which are applied to the second input terminal of the phase comparator;

a third generating circuit for generating a control signal for controlling the phase comparator so that the operation of the phase comparator is inhibited at the time of a vertical interval;

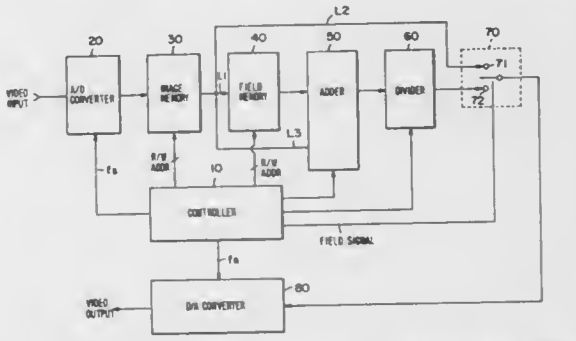
a second counter for counting the output of the first counter in one field; and

an operating circuit for receiving the second counter output and producing as a output a signal for controlling the third generating circuit.

---

### 5,019,908
## APPARATUS AND METHOD FOR REDUCING FLICKERING IN A STILL VIDEO FRAME IN A DIGITAL IMAGE PROCESSING SYSTEM

**Jung-Hoon Su, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suwon, Rep. of Korea**
**Filed Mar. 7, 1989, Ser. No. 319,691**
**Claims priority, application Rep. of Korea, Mar. 8, 1988, 1988-2383**
**Int. Cl.⁵ H04N** *5/208, 5/213*
**U.S. Cl. 358—166** **3 Claims**



1. An apparatus for reducing flickering in a video still frame produced from first and second video fields in a digital image processing system, comprising:

analog-to-digital (A/D) converter means for converting an input analog video signal into digital video data at a predetermined sampling frequency, said A/D converter means receiving as its input analog video signal first and second analog video field signal constituents of input analog video frames in succession and converting same respectively into corresponding first digital video field data and second digital video field data constituents of corresponding digital video frames;

image memory means having a data input operably coupled with a data output of said A/D converter means, said image memory also having a read-write address (R/W ADDR) control terminal, for storing and outputting data of successive first and second digital video fields of corresponding digital video frames under control of said R/W ADDR control terminal;

field memory means having a data input operably connected via a first data path (L1) with a data output of said image memory means and also having a R/W ADDR control terminal, for storing and outputting data of a first digital video field of a digital video frame under control of said R/W ADDR control terminal of said field memory means;

adder means having a first adder input operably connected via a secnd data path (L3) with a data output of said image memory means for receiving data of a second digital video field of a digital video frame output therefrom, and a second adder input operably connected with a data output of said field memory means for receiving data of said first digital video field of said digital video frame therefrom, said adder means furrther having a control terminal, for adding said data of said first digital video field data with said data of said second digital video field to produce the sum thereof;

divider means operably connected with a data output of said adder representing said sum means and also having a control terminal, for dividing the added data of said first and second digital video fields output from said adder means by two to produce an averaged data of said first digital video field data and said second digital video field data therefrom;

selector means having a first data input operably connected via a third data path (L2) with a data output of said image memory means for receiving said first digital video field

VOL 1126 ISS 4 MY 28 1991 UMI

VOL
1126
ISS
4
MY
28
1991
UMI

data output therefrom, a second data input operably connected with a data output of said divider means for receiving said averaged data of said first and second digital video field data output therefrom, and also having a data output and a control terminal, for successively coupling said first digital video data appearing on said first data input and said averaged data of said first and second digital video fields appearing on said second data input thereof to said data output thereof under control of said control terminal thereof;

digital-to-analog (D/A) converter means operably connected with the data output of said selector means, for converting, at said predetermined sampling frequency, said successively output first digital video field data and said averaged data of said first and second digital video fields into respective first and second analog video field signal constituents of an analog video frame signal output; and

controller means operably connected with said respective R/W ADDR control terminals of said image memory means and said field memory means and with said respective control terminals of said adder means, said divider means and said selector means,

firstly, for addressing said image memory means for causing said image memory means to store data of each first and second digital video field of each digital video frame and for causing said image memory means to read-out data of each said first digital video field of each said digital video frame to said data input of said field memory means via said first data path (L1) and at the same time to said first data input of said selector means via said third data path (L2) and, at the same time, for addressing said field memory means for causing said field memory means to store said data of said first digital video field read-out from said image memory means, and, at the same time, for causing said selector means to couple said read-out first digital video field data from said image memory means via said third data path (L2) and said first data input and data output of said selector means for supplying data of a first digital video field of a digital video still frame to said D/A converter means;

secondly, for addressing said image memory means to read-out said stored data of said second digital video field via said second path (L3) to said first data input of said adder means, and for addressing said field memory means for causing said field memory means to read-out said stored data of said first digital video field to said second data input of said adder means;

thirdly, for causing said adder means to add said data of said first and second digital video fields input thereto for producing the sum thereof; and

fourthly, for causing said divider means to divide said sum of said data of said first and second digital video fields by two for producing the averaged data thereof, and, at the same time, for causing said selector means to couple said averaged data of said first and second digital video fields via its second data input and data output for supplying data of a second digital video field of a digital video still frame to said D/A converter means.

---

**5,019,909**

### VIDEO CAMERA FOR PHOTOGRAPHING PAPERS

**Youichi Sawachi, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 30, 1989, Ser. No. 303,264**

**Claims priority, application Japan, Jan. 30, 1988, 63-20770**

**Int. Cl.$^5$ H04N** *5/202, 9/69*

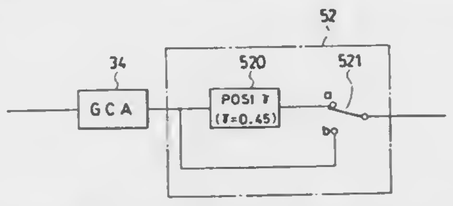
**U.S. Cl. 358—164** **9 Claims**

1. A video camera apparatus for a photographing images on papers comprising:

image pickup means for developing video signals of said images on said papers; and

signal process means for converting said video signals obtained from said image pickup means into a desired format, said signal process means including,

gamma correction means having first and second discrete gamma correction values for correcting the γ value of said video signals obtained from said image pickup means, one of said first and second discrete gamma correction values corrects the γ value of said video signals to enhance the contrast of color images and the other of said first and second discrete gamma correction values corrects the value of said video signals to enhance the contrast of black and white images, and selecting means for selecting one of said first and second discrete correction values in order to enhance the contrast for said images being photographed.



---

**5,019,910**

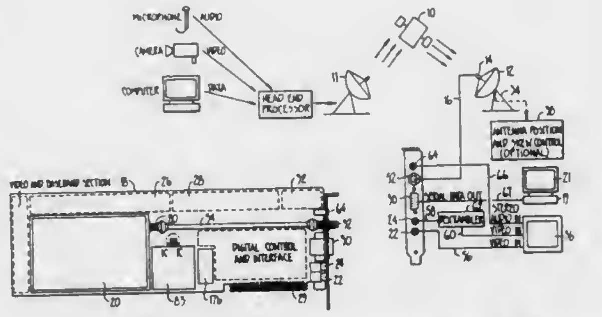
### APPARATUS FOR ADAPTING COMPUTER FOR SATELLITE COMMUNICATIONS

**Donald D. Filmer, Coquitlam, Canada, assignor to Norsat International Inc., Surrey, Canada**

**Continuation-in-part of Ser. No. 8,306, Jan. 29, 1987, abandoned. This application Sep. 12, 1988, Ser. No. 243,598**

**Int. Cl.$^5$ H04N** *5/44;* **H04B** *7/185*

**U.S. Cl. 358—188** **6 Claims**


MICROPHONE
AUDIO
CAMERA
VIDEO
COMPUTER
DATA
HEAD END PROCESSOR
10
11
12
14
ANTENNA POSITION AND MEM CONTROL (OPTIONAL)
VIDEO AND DEMODULATOR SECTION
DIGITAL CONTROL AND INTERFACE
STEREO AUDIO IN
VIDEO IN
20
21
22

1. Apparatus for receiving and demodulating a satellite broadcast signal, comprising:

(a) programmable radio frequency tuner/demodulator means for demodulating said broadcast signal to produce a baseband output signal;
(b) addressable storage means for storing tuning data representative of one or more tuning frequencies;
(c) data receptor means for receiving address data from an external source;
(d) control means for:
  (i) coupling to said data receptor means and decoding said address data to produce an address of a corresponding storage location within said storage means;
  (ii) extracting said tuning data from said corresponding storage location; and,
  (iii) programming said radio frequency tuner/demodulator means with said tuning data; and,
(e) video demodulator means for demodulating said baseband output signal to produce a video output signal, said video demodulator means comprising:
  (i) first deemphasis means for deemphasizing said baseband output signal;
  (ii) low pass filter means for low pass filtering said deemphasized baseband output signal;

  (iii) first amplifier means for amplifying said filtered, deemphasized baseband output signal;
  (iv) first polarity switching means for controllably switching the polarity of said amplified, filtered, deemphasized baseband output signal; and,
  (v) clamping means for removing dispersion from said amplified, filtered, deemphasized baseband output signal.

---

**5,019,911**

### IMAGE PICKUP APPARATUS WITH MODE DEPENDENT LIGHT MEASUREMENT

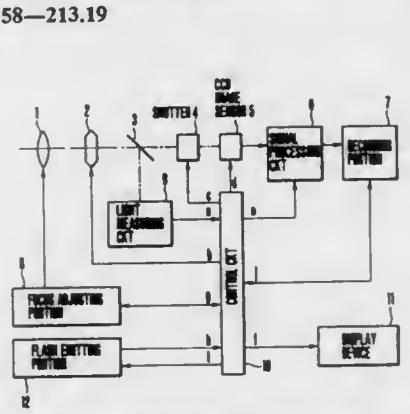
**Tadashi Okino, Kanagawa, and Makoto Ise, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 240,954, Sep. 6, 1988. This application May 18, 1990, Ser. No. 526,765**

**Claims priority, application Japan, Sep. 10, 1987, 62-225375; Sep. 10, 1987, 62-225376**

**Int. Cl.$^5$ H04N** *3/14*

**U.S. Cl. 358—213.19** **32 Claims**



1. An image pickup apparatus comprising:

(a) photoelectric converting means including picture elements arranged in rows and columns;
(b) read control means for changing over between a first mode in which a plurality of rows are combined and then read out and a second mode in which each row is read out separately;
(c) measuring means for measuring a luminance of an object to be photographed by different light measuring characteristics corresponding to said first and said second modes of said read control means, said measuring means including a light receiving element different from said photoelectric converting means; and
(d) exposure control means for controlling an amount of light incident on said photoelectric converting means in accordance with the measurement result of said measuring means.

---

**5,019,912**

### IMAGING DEVICE CAPABLE OF PICKING UP ELECTRICALLY ENLARGED IMAGES

**Noboru Matsuda, Yaita, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Mar. 31, 1989, Ser. No. 331,735**

**Claims priority, application Japan, Apr. 1, 1988, 63-81832; Apr. 1, 1988, 63-81833**

**Int. Cl.$^5$ H04N** *3/14*

**U.S. Cl. 358—213.26** **9 Claims**

1. An image pickup apparatus capable of picking up images of an object and electrically enlarging the picked up images by n times as compared to normal image pickup, when switched to an enlarging pickup mode from a normal pickup mode, wherein n is a positive integer, comprising:

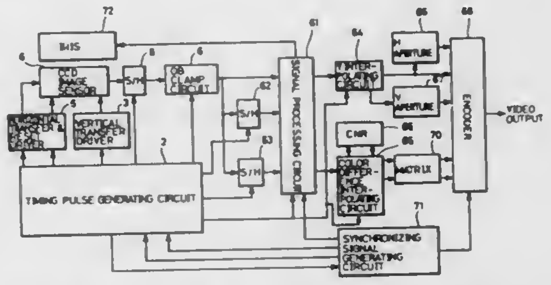
means for imaging the object including a plurality of light receiving elements arranged in horizontal and vertical directions, receiving light from the object and outputting image signals, outputs of the light receiving elements arranged in the horizontal direction being transferred in the vertical direction during a horizontal blanking period and the outputs from the light receiving elements in the horizontal direction previously transferred in said vertical direction being transferred in the horizontal direction during a horizontal scanning period to thereby provide said image signals;

switching means for switching the image pickup apparatus to said enlarging pickup mode, and outputting an enlarging instructing signal for enlarging picked up images by n times;

reference pulse signal generating means, operatively connected to said switching means, for generating reference pulse signals in response to receiving said enlarging instructing signal;

synchronizing signal generating means for generating horizontal synchronization signals and vertical synchronization signals, both said horizontal and vertical synchronization signals being synchronized with the reference pulse signals generated from said reference pulse generating means;

horizontal transfer pulse generating means, operatively connecting said reference pulse signal generating means and said switching means to said solid state imagining means, and responsive to said enlarging instructing signal from said switching means, for outputting pulses to said solid state imaging means for transferring the outputs from said light receiving elements in the horizontal direction, said pulses having a signal period n times larger than the normal image pickup signal period, in synchronization with the reference pulse signals generated from said reference pulse signal generating means;


72
BIAS
6
CCD IMAGE SENSOR
S/H
OB CLAMP CIRCUIT
SIGNAL PROCESSING CIRCUIT
61
62
64
INTERPOLATING CIRCUIT
H APERTURE
V APERTURE
66
67
68
ENCODER
VIDEO OUTPUT
MATRIX
COLOR DIFFERENCE INTERPOLATING CIRCUIT
TIMING PULSE GENERATING CIRCUIT
71
SYNCHRONIZING SIGNAL GENERATING CIRCUIT

vertical transfer pulse generating means, operatively connecting said switching means, said synchronizing signal generating means, said horizontal transfer pulse generating means and said reference pulse signal generating means to said solid state imaging means, and responsive to said horizontal and vertical synchronizing signals and said enlarging instructing signal from said switching means, for outputting vertical transfer pulses to said solid state imaging means, once in each of a plurality of n horizontal scanning periods, for transferring the outputs from said light receiving elements in the vertical direction;

high speed vertical transfer pulse generating means, operatively connected to said vertical pulse transfer generating means, said reference pulse signal generating means and said solid state imaging means, for transferring unnecessary outputs, provided by the n time enlargement, out of said light receiving elements in the vertical direction, at high speed in the vertical direction, for a predetermined number of times during two predetermined signal periods of a vertical blanking period, for generating high speed vertical transfer pulses in response to said reference pulse signals, and for interposing the generated high speed vertical transfer pulses into said vertical transfer pulses for subsequent input to said solid state imaging means; and

reading pulse generating means, operatively connected to said vertical transfer pulse generating means and said solid state imaging means, for generating reading pulses, subsequently output to said solid state imaging means, for reading image signals from said solid state image pickup means

VOL
1126
ISS
4
MY
28
1991
UMI

during said predetermined two periods in said vertical blanking period in synchronization with said horizontal synchronization signals and said vertical synchronization signals.

---

### 5,019,913

## RECORDING APPARATUS HAVING CONTROL DATA SELECTIVELY DESIGNATED IN MEMORY WHICH CORRESPONDS TO ONE OF MULTIPLE OPTICAL SCANNING SYSTEMS

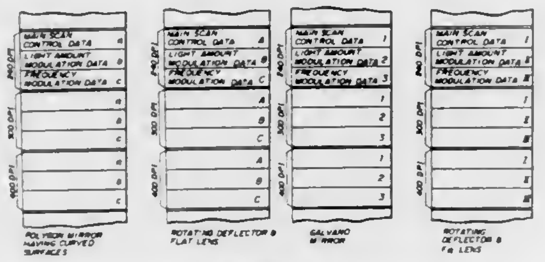
**Yukitoshi Kiya, Kawasaki; Takahiro Yagishita; Masayoshi Miyamoto, both of Yokohama; Kazuyuki Shimada, Chofu; Hideo Azumai; Yoshiharu Niito, both of Yokohama, and Keiichi Iwasaki, Suita, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Sep. 27, 1990, Ser. No. 589,197**

**Claims priority, application Japan, Oct. 2, 1989, 1-257399; Oct. 3, 1989, 1-258610; Jun. 18, 1990, 2-157671**

**Int. Cl.⁵ H04N** *1/23;* **G01D** *15/14;* **G02B** *26/10;* **G02F** *1/29*

**U.S. Cl. 358—296** **11 Claims**


MAIN SCAN CONTROL DATA
LIGHT AMOUNT MODULATION DATA
FREQUENCY MODULATION DATA
240 DPI
300 DPI
400 DPI
A
B
C
1
2
3
I
II
III
POLYGON MIRROR HAVING CURVED SURFACES
ROTATING DEFLECTOR & FLAT LENS
GALVANO MIRROR
ROTATING DEFLECTOR & Fθ LENS

1. An image recording apparatus comprising:

an image recording media;

an optical scanning system which projects a light beam corresponding to an image to be recorded onto said image recording media and which records said image on said image recording media, said optical scanning system actually provided in said image recording apparatus being one optical scanning system selected from among predetermined different optical scanning systems;

first memory means for storing a plurality of sets of control data respectively provided for said predetermined different optical scanning systems;

setting means, coupled to said first memory means, for specifying one of said predetermined different optical scanning systems provided in said image recording apparatus;

second memory means, coupled to said first memory means and said setting means, for reading out one of the sets of control data corresponding to said optical scanning system selected from among said predetermined different optical scanning systems and for storing said one of the sets of control data;

main scan controller means, coupled to said second memory means, for generating predetermined timing signals related to said one of the sets of control data stored in said second memory means; and

control means, coupled to said optical scanning system, said second memory means and said main scan controller means, for generating a control signal from said one of the sets of control data and said predetermined timing signals and for controlling said optical scanning system on the basis of said control signal so that said optical scanning system actually provided in said image recording apparatus has an optical characteristic based on said one of the sets of control data related to said optical scanning system actually provided in said image recording apparatus.

---

### 5,019,914

## SYSTEM FOR RECORDING AND/OR TRANSMITTING BINARY INFORMATION AT A HIGH DATA RATE VIA KNOWN MEANS FOR RECORDING AND/OR TRANSMITTING VIDEO INFORMATION, AND FOR DECODING THE DIGITAL DATA

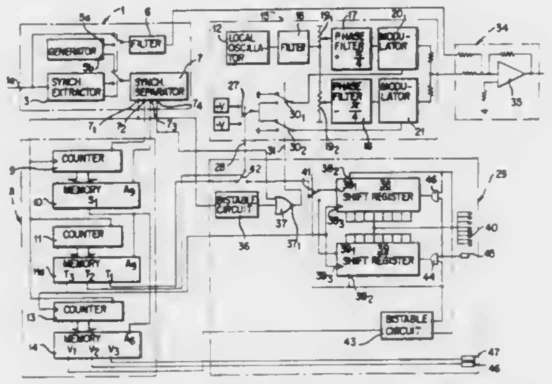
**Patrick J. Dropsy, 12 bis, Bld Saint Asile, 83430-St. Mandrier, France**

**Filed Nov. 21, 1988, Ser. No. 273,968**

**Claims priority, application France, Nov. 25, 1987, 8716325**

**Int. Cl.⁵ H04N** *5/76*

**U.S. Cl. 358—310** **15 Claims**



1. A method for encoding high data rate digital signals in binary form in a composite video signal compatible with one of the PAL- or NTSC-standards, said method comprising the steps of:

generating a carrier wave having the same frequency as a video chrominance signal carrier wave compatible with said one of the PAL or NTSC standards;

phase modulating said carrier wave 0° and 180° according to the state of the digital signals to produce a phase modulated carrier wave; and

mixing said phase modulated carrier wave, a luminance signal carrier wave and video synch pulse and phase reference burst signals compatible with said one of the PAL or NTSC standards to produce an encoded composite video signal.

15. Interface apparatus for connecting a composite video recorder compatible with one of the PAL- of NTSC- standard compatible PAL- of NTSC- standards as a digital data mass storage device to a computer, said interface apparatus comprising:

input means for inputting binary signals from said computer having a high and a low state;

quartz-stabilized oscillator means for producing a carrier wave signal having the same frequency as the chrominance signal carrier wave of a composite video signal with which the video recorder is compatible;

phase modulator means, responsive to said binary signals for phase shifting said carrier wave 0° when said binary signals are in a low state and phase shifting said carrier wave 180° when said binary signals are at a high state to produce a phase modulated carrier wave;

video synch generator means for producing video synch pulse signals;

phase reference bursts generator means for producing phase reference burst signals;

mixer means for mixing said video synch pulse signals, said phase reference burst signals and said phase modulated carrier wave to produce a resultant signal;

recorder input means for outputting the resultant signal from said mixer means to a video input of said composite video recorder;

recorder output means for receiving stored resultant signal from a video output of said composite video recorder;

passband filter means, tuned to the frequency of said phase modulated carrier wave, for passing said phase modulated carrier wave and phase reference burst of a received resultant signal as an output;

synch extractor means having an input connected to said recorder output means for supplying envelope pulses of said phase reference burst signals to synch separator means;

reference regenerator means having a first input connected to the output of said passband filter means and a second input connected to said output of said synch separator means for producing a first output which supplies a reference wave in phase with said phase reference burst signals, and a second output which supplies said phase modulated carrier wave;

phase demodulator means including a phase reference input which is connected to said first output of said reference regenerator and a modulated wave input which is connected to said second output of said reference regenerator for producing a pulse output constituting reproduction of said binary signals encoded in the received resultant signals; and

output means for outputting said binary signals to said computer.

---

### 5,019,915

## APPARATUS FOR PRINTING OR CLEARING A DISPLAYED STORED VIDEO SIGNAL

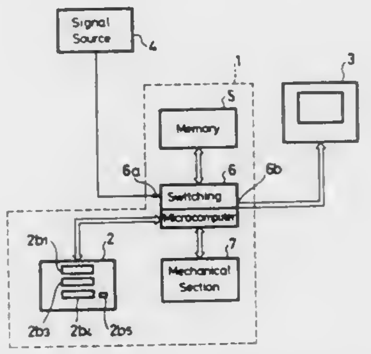
**Shogo Fujito, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed May 17, 1989, Ser. No. 353,343**

**Claims priority, application Japan, May 25, 1988, 63-127890**

**Int. Cl.⁵ H04N** *1/46*

**U.S. Cl. 358—335** **9 Claims**



6. A printing apparatus for a video signal comprising:

input means for receiving a video signal from a peripheral system;

memory means connected to the input means for storing the video signal as a still image signal;

clearing means for generating a clearing signal;

switching means connected to the input means for selecting between the stored still image signal and the video signal and outputting the selected signal;

display means connected to the switching means for displaying the selected signal;

printing means connected to the switching means for printing out the selected signal; and

will control means connected to the clearing signal means to receive the clearing signal and to the memory means, the input means, the display means and the printing means for transmitting control signals thereto, wherein when the control means is supplied with the clearing signal, the switching means is controlled by the control means so as to supply the display means with the stored still image signal and thereafter, if the clearing signal continues to be supplied to the control means, to cause the memory means to erase its contents.

---

### 5,019,916

## DIGITAL COPIER WITH A FACSIMILE FUNCTION

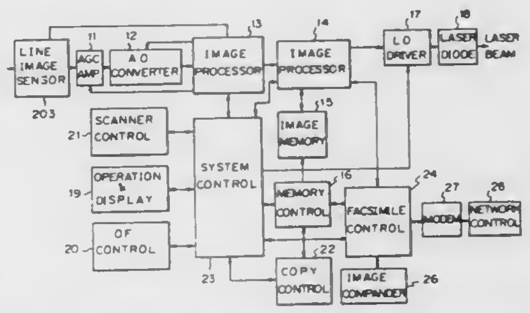
**Masaaki Ogura, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Jnn. 14, 1989, Ser. No. 368,945**

**Claims priority, application Japan, May 9, 1987, 62-113074**

**Int. Cl.⁵ H04N** *1/00*

**U.S. Cl. 358—401** **10 Claims**



1. An image forming apparatus comprising:

a plurality of paper feed sections in each of which a paper cassette may be mounted;

paper size sensing means for sensing sizes of papers which are loaded in said paper cassettes which are mounted in said paper feed sections;

paper feed section selecting means for specifying one of said paper feed sections;

setting means for setting a size of an image to be formed on a given size of paper loaded in one of the paper cassette which is mounted in any of said paper feed sections which is selected by said paper feed section selecting means;

optical means for receiving an image to be formed from an optical system;

digital reception means for receiving from an image producing means an image to be formed;

memory means for storing said image received from said digital reception means during a time period when said optical means is receiving an image; and

means for producing an image from said optical means, said digital reception means and said memory means on said paper which has been selected.

---

### 5,019,917

## COORDINATE INPUT APPARATUS

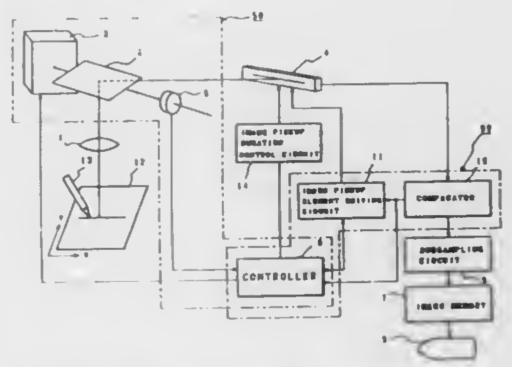
**Toshihiko Hata; Mitsunori Adachi, and Satoru Tomita, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 23, 1988, Ser. No. 197,421**

**Claims priority, application Japan, May 28, 1987, 62-132244**

**Int. Cl.⁵ H04N** *1/23, 1/024*

**U.S. Cl. 558—448** **5 Claims**



1. A coordinate input apparatus comprising:

VOL
1126
ISS
4
MY
28
1991
UMI

an image pickup apparatus which picks up an image of an object for image-taking and outputs an image signal;
a point indicator for indicating a point on said object;
a location detecting apparatus for detecting the location of the point which is indicated by said point indicator, by means of processing the image signals which are outputted from said image pickup apparatus and include an image of an object for image-taking and an image of said point indicator;
a display apparatus for displaying thereon at least one of the image taken by said image pickup apparatus and the point increased by said point indicator detected by said location detecting apparatus;
mode switching means for selectively setting either an image pickup mode for displaying an image of an object on said display apparatus or a coordinate input mode for inputting as coordinates the location of a point indicated by said point indicator and for displaying the coordinates on said display apparatus; and
an image pickup duration control circuit for controlling image pickup duration of said image pickup apparatus so that the duration is shorter when said coordinate input mode is set than when said image pickup mode is set.

---

**5,019,918**

### PORTABLE IMAGE SCANNER

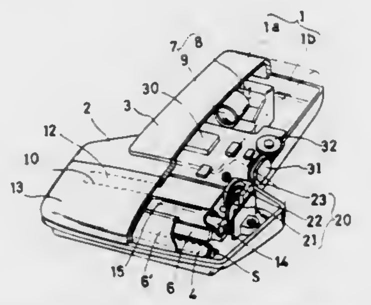
**Mineo Kubota, Yamanashi, and Kenji Masuyama, Kofu, both of Japan, assignors to Nippon Seimitsu Kogyo Kabushiki Kaisha, Kofu, Japan**

**Continuation of Ser. No. 214,050, Jun. 30, 1988, Pat. No. 4,893,189. This application Jan. 8, 1990, Ser. No. 462,121**

**Claims priority, application Japan, Sep. 11, 1987, 62-139893[U]**

**Int. Cl.$^5$ H04H** *1/024*

**U.S. Cl. 358—473** **30 Claims**



1. A portable image scanner, which comprises:
a housing having a reading aperture formed in a lower surface thereof;
a light source mounted in said housing for illuminating a reading portion to be read on an objective image plane;
a reflecting member mounted in said housing for reflecting image light reflected from the reading portion;
an image sensor mounted in said housing which receives said image light sent through said reflecting member and which is adapted to convert said image light to corresponding image data signals;
means for allowing the housing to move in a sub-scanning direction wherein the housing comprises a first part for permitting an operator to move the housing in a sub-scanning direction and a second part which is of a greater width than said first part in a main-scanning direction,
said first part of said housing being disposed at a downstream side of said housing in said sub-scanning direction and said second part being disposed at an upstream side of said housing in said sub-scanning direction,
said light source, said reading aperture and said reflecting means being positioned in said second part of said housing, said housing being provided at an upper surface thereof with a peep hole displaced to the image sensor side with respect to a portion substantially right above said reading aperture so as to form a viewing path inclined toward said image sensor side; and
a transparent member for covering said peep hole through which said reading portion can be observed.

---

**5,019,919**

### APPARATUS FOR RECORDING AND REPRODUCING DIVIDED SIGNALS OF AN ANGLE MODULATED SIGNAL

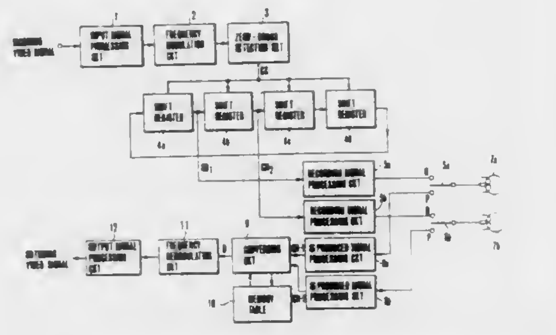
**Yoshitake Nagashima, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 3, 1987, Ser. No. 34,212**

**Claims priority, application Japan, Apr. 9, 1986, 61-082932; Apr. 9, 1986, 61-081540**

**Int. Cl.$^5$ G11B** *20/06*

**U.S. Cl. 360—22** **3 Claims**



1. An angle modulated signal recording apparatus comprising:
(a) input means for receiving an angle modulated signal;
(b) converting means for converting said angle modulated signal into a rectangular waveform signal;
(c) dividing means for producing a plurality of divided signals by inverting at different timing points according to rectangular waveform signal timing edges, said dividing means including a plurality of registers which are connected in series and operated by the edges of said rectangular waveform signal and taking-out means for taking outputs of said plurality of registers as said divided signals; and
(d) recording means for simultaneously recording said plurality of divided signals on one and the same recording medium.

---

**5,019,920**

### MAGNETIC TAPE WITH AN R-DAT FORMAT

**Itsuro Yoshimoto, Kunitachi, and Kuniyoshi Otsuki, Tachikawa, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

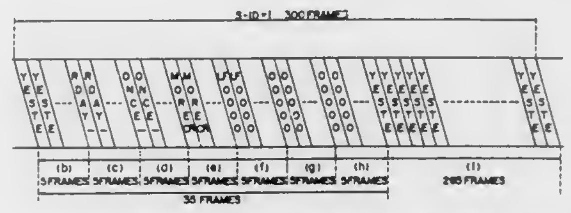
**Division of Ser. No. 323,618, Mar. 14, 1989, Pat. No. 4,939,595, which is a continuation of Ser. No. 138,912, Dec. 28, 1987, Pat. No. 4,833,549. This application Apr. 6, 1990, Ser. No. 505,986**

**Claims priority, application Japan, Jan. 7, 1987, 62-505; Sep. 26, 1987, 62-241089; Sep. 26, 1987, 62-241091**

**Int. Cl.$^5$ G11B** *5/008*

**U.S. Cl. 360—27** **14 Claims**

1. A magnetic tape on which data is recorded with an R-DAT format for reproduction in frames, comprising:
a plurality of parallel recording tracks oblique to a travel direction of a magnetic tape, a frame being composed of data on two adjacent recording tracks, and with each track having a PCM audio recording area and a sub-code recording area;
said sub-code recording area having sub-code block data recorded therein, which includes sub-code ID data and pack data corresponding to the R-DAT format;
wherein said sub-code ID data includes control ID data which comprises a plurality of independent IDs, one of which is a start ID;
wherein the pack data comprises a set of bits including a plurality of bits of pack item data, and a plurality of bits of data block, a data block in a pack data of a character mode includes character code data and pack address data; and



wherein the sub-code block data includes said pack data of a character mode recorded in said sub-code recording area in the order of the pack address data for a plurality of frames.

---

**5,019,921**

### POP NOISE REMOVING CIRCUIT FOR A DOUBLE DECK CASSETTE TAPE RECORDER

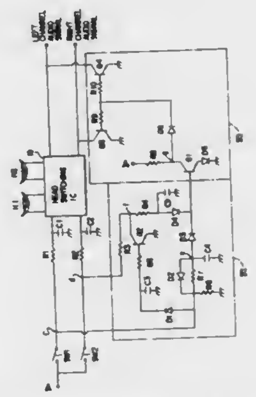
**Yang M. Kang, Kyunggi, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea**

**Filed Oct. 12, 1988, Ser. No. 256,482**

**Claims priority, application Rep. of Korea, Oct. 13, 1988, 1987-17488**

**Int. Cl.$^5$ G11B** *5/02*

**U.S. Cl. 360—67** **3 Claims**



1. A pop noise removing circuit for a double deck cassette tape recorder having first and second deck leaf switches and a head switching IC, comprising:
a power supply;
detecting means for detecting the ON-OFF operation of the first and second deck switches;
control signal generating means for generating delayed control signals in response to said detecting means; and
means for muting left and right channel output signals from said head switching IC, said muting means being controlled by said control signals generated by said control signal generating means;
said control signal generating means further comprising a first timing circuit for providing a predetermined time delay of said power supply fed to said muting means through the first deck leaf switch, a second timing circuit feeding said power supply through the second leaf deck switch to said muting means, a transistor receiving said power supply through the second leaf deck switch into its collector, and a third timing circuit feeding said power supply through the first deck leaf switch to the base of said transistor.

---

**5,019,922**

### MULTI-DISK PLAYER WITH AUTOMATIC VOLUME CONTROL

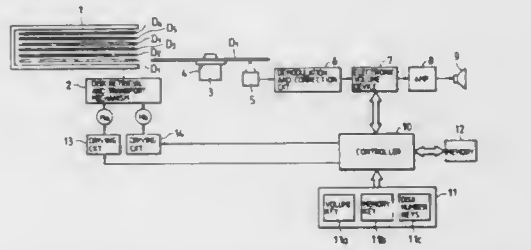
**Takahumi Shiba, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Continuation of Ser. No. 285,266, Dec. 16, 1988, abandoned. This application Jan. 24, 1991, Ser. No. 645,312**

**Claims priority, application Japan, Dec. 19, 1987, 62-322504**

**Int. Cl.$^5$ G11B** *5/027*

**U.S. Cl. 360—69** **2 Claims**



1. A multi-disk player with automatic volume control provided with a magazine including a magazine case and a plurality of trays for carrying disks, said trays being arranged in order so as to be capable of freely projecting and retracting with respect to the magazine case, wherein a tray corresponding to a disk designating number is projected and a disk placed in said magazine is transported to a playing position so as to be played, said multi-disk player comprising:
designating means for designating a disk number;
level adjusting means for adjusting the reproduction level of a signal read from a disk being played;
memory control means, including memory means, for retrieving a current reproduction level of said level adjusting means in response to a reproduction level memory command, and storing said current reproduction level in said memory means with respect to said disk number; and
level setting means for reading said stored reproduction level corresponding to a disk to be played from said memory means in response to said disk number and setting the reproduction level of said level adjusting means to said read reproduction level for playing the disk.

---

**5,019,923**

### SYSTEM FOR DISCRIMINATING TAPE SPEED MODE

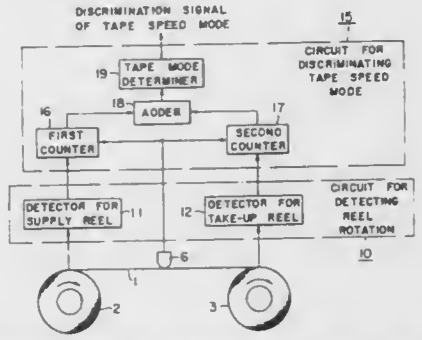
**Hiroshi Ogaki, Shibuya, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Mar. 9, 1990, Ser. No. 491,086**

**Claims priority, application Japan, Mar. 10, 1989, 1-58685**

**Int. Cl.$^5$ G11B** *15/467*

**U.S. Cl. 360—73.07** **6 Claims**


DISCRIMINATION SIGNAL OF TAPE SPEED MODE
15
CIRCUIT FOR DISCRIMINATING TAPE SPEED MODE
19
TAPE MODE DETERMINER
18
ADDER
16
FIRST COUNTER
17
SECOND COUNTER
DETECTOR FOR SUPPLY REEL
11
12
DETECTOR FOR TAKE-UP REEL
CIRCUIT FOR DETECTING REEL ROTATION
10
1
6
2
3

1. A system for discriminating a tape speed mode of a recorded tape on which control pulses are recorded in the tape speed mode, thereby a spacing of the control pulses represents the tape speed mode, said system comprising

OL
126
SS
4
MY
28
1991
UMI

reel means for winding the recorded tape and transporting the recorded tape at a varying speed;

head means for detecting said control pulses and producing detected pulses when the recorded tape is transported by the reel means rotating at a rotation rate;

means for counting said detected pulses at a rate of said rotation rate of said reel means and producing a counted value; and

means for determining said tape speed mode from said counted value by comparing the counted value with a threshold value and outputting a determined result as the tape speed mode.

---

### 5,019,924
## TAPE REEL ROTATION DETECTING APPARATUS

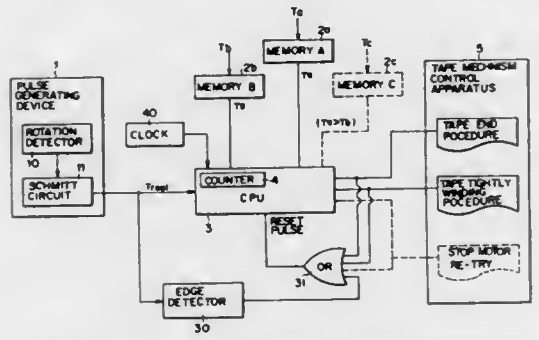
**Kazuki Takai, and Eiji Ishikura, both of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan**

**Filed Aug. 22, 1989, Ser. No. 396,906**

**Claims priority, application Japan, Aug. 29, 1988, 63-212526**

**Int. Cl.⁵ G11B** *15/52, 15/48*

**U.S. Cl. 360—73.14** **9 Claims**



1. A device for detecting rotation of a tape reel, comprising:

pulse generator means for generating a pulse in response to rotation of the reel;

first pulse length means for defining a first pulse length corresponding to an abnormally low rotation of the reel;

second pulse length means for defining a second pulse length corresponding to detection of a tape end;

detection means for detecting an abnormally low rotation of the reel and a tape end by comparing a length of said pulse from said pulse generator means with said first and second pulse lengths defined by said first and second pulse length means, for producing an abnormally low speed signal when said length of said pulse from said pulse generator means is greater than said first pulse length and less than said second pulse length, and for producing a tape end signal when said length of said pulse from said pulse generator means is greater than said second pulse length;

means responsive to said abnormally low speed signal for performing a tape tight-winding processing; and

means responsive to said tape end signal for performing a tape end processing.

---

### 5,019,925
## REEL BRAKE CONTROL DEVICE FOR OPTICALLY CONTROLLING A REEL BRAKE OF A MAGNETIC TAPE APPARATUS

**Shigeo Takemura, Yokohama, and Katsuyuki Taguchi, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 162,101, Feb. 29, 1988, abandoned. This application Mar. 20, 1990, Ser. No. 496,209**

**Claims priority, application Japan, Feb. 27, 1987, 62-45589**

**Int. Cl.⁵ G11B** *15/22*

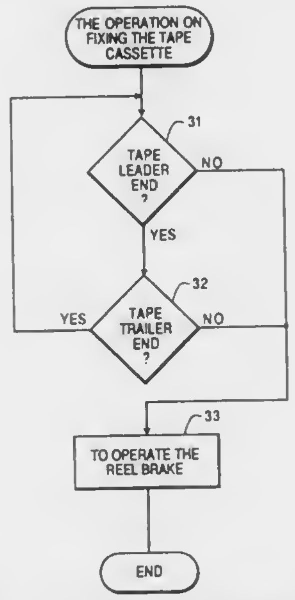
**U.S. Cl. 360—71** **1 Claim**

1. A reel brake control device for controlling a reel brake of a magnetic tape according and reproducing apparatus, the reel brake activating to engage at least one of a feed reel and a take-up reel of the magnetic tape recording to reproducing apparatus, the feed reel and the take-up reel for driving a magnetic tape of a cassette, the magnetic tape having transparent leading and trailing portions and a main non-transparent portion therebetween, the cassette for detachably engaging with the magnetic tape recording and reproducing apparatus, said reel brake control device comprising:

a tape leading end detecting means for outputting a first operating state when detecting one of the transparent leading portion of the magnetic tape and an absence of the magnetic tape, and for outputting a second operating state when detecting the main non-transparent portion of the magnetic tape;

a tape trailing end detecting means for outputting a third operating state when detecting one of the transparent trailing portion of the magnetic tape and an absence of the magnetic tape, and for outputting a fourth operating state when detecting the main non-transparent portion of the magnetic tape; and,

wherein the transparent leading and trailing portions each have a length which prevent simultaneous detection thereof by said tape leading end detecting means and said tape trailing end detecting means;


THE OPERATION ON FIXING THE TAPE CASSETTE
31
TAPE LEADER END ?
NO
YES
32
YES
TAPE TRAILER END ?
NO
33
TO OPERATE THE REEL BRAKE
END

a logic means, coupled to said tape leading end detecting means and said tape trailing end detecting means and having means for connection to the reel brake, for activating the reel brake when at least one of said second operating state and said fourth operating state is output by said tape leading end detecting means and said tape trailing end detecting means respectively, and for deactivating the reel brake when both said first operating state and said third operating state are output by said tape leading end detecting means and said tape trailing end detecting means respectively;

whereby engagement of the cassette in the magnetic tape recording and reproducing apparatus is detected when at least one of said second operating state and said fourth operating state is output by said tape leading end detecting means and said tape trailing end detecting means respectively, and whereby disengagement of the cassette from the magnetic tape recording and reproducing apparatus is detected when both said first operating state and said third operating state are output by said tape leading and detecting means and said tape trailing end detecting means respectively.

### 5,019,926
## MAGNETIC-HEAD UNIT INCLUDING ROTARY AND STATIONARY TRANSFORMER SECTIONS AND AMPLIFIER ARRANGEMENT

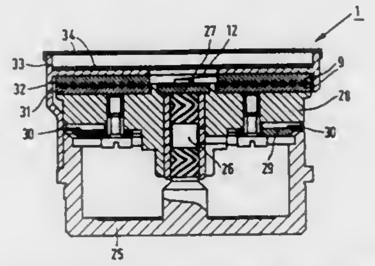
**Joannes G. M. Van Thuijl, and Aart T. Van 'T Veld, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 12, 1989, Ser. No. 337,015**

**Claims priority, application Netherlands, Apr. 22, 1988, 8801049**

**Int. Cl.⁵ G11B** *33/14, 5/52*

**U.S. Cl. 360—84** **4 Claims**



1. A magnetic-head unit comprising a frame (2) and a lower and an upper drum (3, 4; 25, 28), which together define a tape-guide surface at their periphery for guiding a magnetic tape, which upper drum includes upper and lower sides and between which lower and upper drum a rotary head disc (17, 30) is interposed, which head disc is capable of rotating about an axis of rotation (4*a*) and carries a plurality of magnetic heads (18), which are electrically connected to a transformer comprising a rotary transformer section (8,; 31; 35) and a stationary transformer section (10; 32; 36), the stationary transformer section being connected to an amplifier arrangement (16) which is surrounded by a shielding cover (14, 15; 34; 38), characterized in that the stationary transformer section (10; 32; 36) is arranged above the upper side of the upper drum (4; 29), a bridge construction (11; 33; 37) is provided which serves to secure the stationary transformer section to the frame (2) of the magnetic-head unit, the amplifier arrangement (16) is situated inside the shielding cover (14, 15; 34, 38) adjacent the stationary transformer section, and a dimension of the rotary and stationary transformer sections (8, 10; 31, 32; 35, 36), viewed in a radial direction from the axis of rotation (4*a*) of the head disc (17; 30), is such that a radial extent of said sections is greater than half the radial distance from said axis of rotation to, and said sections extend beyond, the tape-guide surface of the lower and the upper drum (3, 4; 25, 28).

---

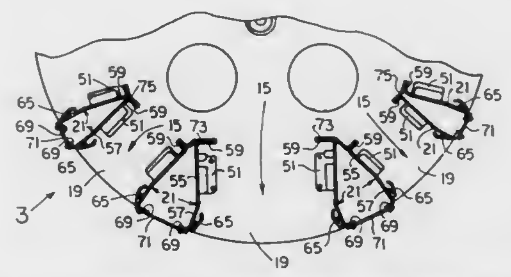
### 5,019,927
## ROTARY CASSETTE CAROUSEL

**Raymond J. Simone, St. Louis County, Mo., assignor to Automation Equipment Co., Fenton, Mo.**

**Division of Ser. No. 172,711, Mar. 24, 1988, Pat. No. 4,907,889. This application Nov. 27, 1989, Ser. No. 441,248**

**Int. Cl.⁵ G11B** *15/675*

**U.S. Cl. 360—92** **17 Claims**



1. A free standing rotary cassette carousel having a modular construction including a series of generally vertically directed strut members supported between upper and lower generally horizontally extending plates, each of said upper and lower plates having an outer circular periphery, said strut members being circumferentially spaced from each other in a predetermined arrangement about the circular periphery of said upper and lower plates, said strut members being formed to provide a plurality of cassette pockets arranged in a series of vertical columns and horizontal rows, and said strut members capable of being re-arranged in various predetermined arrangements around the circular periphery of said upper and lower plates to enlarge or reduce the cassette pockets in order to accommodate larger or smaller cassettes as desired.

---

### 5,019,928
## MAGNETIC-TAPE-CASSETTE APPARATUS COMPRISING A DECK AND A LOAD AND EJECT MECHANISM

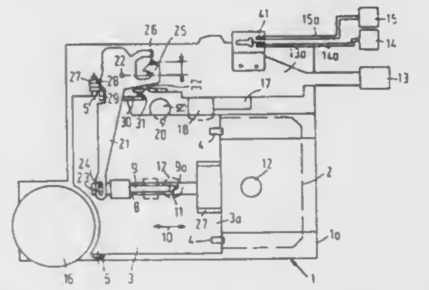
**Norbert Kunze, Ehringshausen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 2, 1989, Ser. No. 360,643**

**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819096**

**Int. Cl.⁵ G11B** *5/008*

**U.S. Cl. 360—96.5** **3 Claims**



1. A magnetic-tape-cassette apparatus (1) comprising a deck for playing magnetic-tape cassettes, which deck is constructed to be actuated via first and second actuating rods (14*a*–15*a*) and comprises a loading mechanism for inserting and lowering a magnetic-tape cassette (2) into a play position and for lifting said cassette into an unloading position, said cassette being ejected from said deck by means of a third actuating rod (13*a*), a lift lever (3) and an actuating lever (21), a follower (26) of the third actuating rod (13*a*), which follower cooperates with a pivoting guide (25) of the actuating lever (21), pivoting the actuating lever (21) into said unloading position with the aid of an eject spring (27), having first and second ends, when the guide (25) allows said pivotal movement to be performed, and a follower pin (31) of the lift lever (3) cooperating with a lift guide (32) of the third actuating rod (13*a*) to lower or to lift the lift lever (3) under control of the lift guide (32) during actuation of the third actuating rod (13*a*), characterized in that said first end of the eject spring (27) biases the actuating lever (21) to eject said cassette and said second end of the eject spring biases the lift lever (3) toward said unloading position.

---

### 5,019,929
## MAGNETIC MEDIA DUPLICATION SYSTEM

**Dan N. Costas, Fremont, Calif., assignor to Trace, Inc., San Jose, Calif.**

**Filed Sep. 1, 1988, Ser. No. 239,444**

**Int. Cl.⁵ G11B** *5/86, 5/016*

**U.S. Cl. 360—98.01** **4 Claims**

1. In a device for duplicating magnetic disks and the like comprising

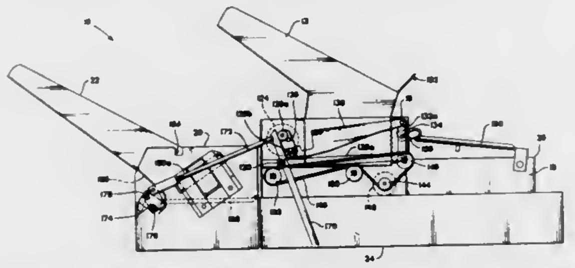
an inlet bin having a bottom and adapted to receive at least one magnetic disk, the inlet bin further having exit means for allowing a disk to exit the inlet bin,

a first motor for driving a picker along a substantially

VOL
1126
ISS
4
MY
28
1991
UMI

straight path at the bottom of the inlet bin to cause a magnetic disk to be moved out of the inlet bin via the exit means,

pressure roller means positioned substantially in a straight line path between the exit means and a disk processing device for receiving the disk as it exits from the inlet bin via the exit means, for positioning the disk in a disk processing device, and for extracting the disk from the disk processing device upon completion of processing, and



leaf spring element positioned in the straight line path between the exit means of the inlet bin and the pressure roller means for altering the direction of the disk as it is extracted from the disk processing device, the leaf spring means deforming in a first direction to permit a disk to exit the inlet bin and pass over the leaf spring element to enter a disk processing device, but not deforming in said first direction when the disk is extracted from a disk processing device, thereby redirecting the disk.

---

### 5,019,930

## NEGATIVE-PRESSURE TYPE MAGNETIC HEAD SLIDER, AND METHOD OF PRODUCING THE SAME

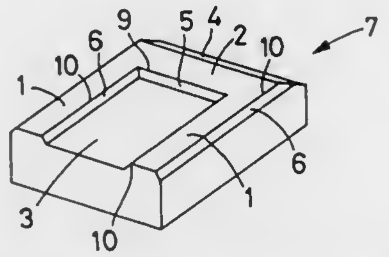
**Fuminori Takeya, Nagoya, Japan, assignor to NGK Insulators, Ltd., Japan**

**Filed Jan. 9, 1990, Ser. No. 462,224**

**Claims priority, application Japan, Jan. 9, 1989, 1-2373**

**Int. Cl.$^5$ G11B** *5/60, 17/32*

**U.S. Cl. 360—103** **7 Claims**



1. A negative-pressure type magnetic head slider, having an operating surface facing a surface of a magnetic recording medium, the head slider comprising:

an inclined portion for introducing an air stream into an air bearing clearance between the operating surface and the surface of the recording medium;

a pair of mutually spaced-apart, parallel air-bearing portions extending in a direction of flow of the air stream for causing the air stream to hold the head slider away from the surface of the recording medium;

a cross rail extending between and connecting said air-bearing portions for reducing an amount of flow of the air stream;

a pressure-reducing portion disposed between said air-bearing portions and downstream of said cross rail in the direction of flow of the air stream and cooperating with said cross rail for reducing a pressure of the air stream to thereby cause the head slider to be attracted toward the surface of the recording medium, said pressure-reducing portion being defined by a recess having a depth measured from a top surface of said air bearing portions and a surface of said cross rail; and

an inclined shoulder surface extending in a direction parallel to said cross rail, said inclined shoulder surface connecting the surface of said cross rail and a bottom surface of said recess;

wherein at least the operating surface of the head slider consists of a ferrite single crystal, said cross rail having a downstream edge line separating the surface of said cross rail and said inclined shoulder surface, said single crystal having crystal faces which are oriented such that a (111) plane of said single crystal is a plane other than a plane which is parallel to a direction of extension of a downstream edge line of said cross rail as viewed in the direction of flow of the air stream, said inclined shoulder surface having an inclination angle of at least 60° with respect to the surface of said cross rail and the bottom surface of said recess.

---

### 5,019,931

## MECHANISM FOR SUSPENDING A HEAD SLIDER OF A RECORDING APPARATUS

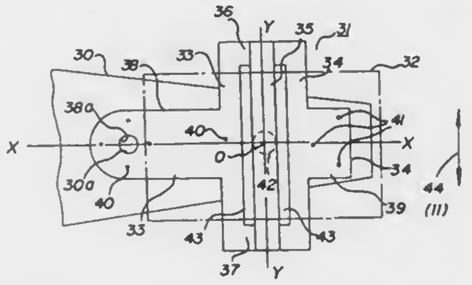
**Takeshi Ohwe, Kawasaki; Seiji Yoneoka, Kanagawa, and Minoru Takahashi, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Sep. 19, 1989, Ser. No. 409,473**

**Claims priority, application Japan, Sep. 28, 1988, 63-242947**

**Int. Cl.$^5$ G11B** *5/48, 21/16*

**U.S. Cl. 360—104** **17 Claims**



1. A suspension mechanism of a recording disk apparatus for suspending a transducer over a rotating recording disk with a predetermined spacing therebetween, and for transferring said transducer in a seek direction, said suspension mechanism comprising:

a load beam having a resilient section for generating loading force and a loading protrusion forming a loading point at a surface portion in the vicinity of a free end of said load beam;

a gimbal spring, having a central leg portion with a top surface and a rear surface and two side leg portions disposed in parallel with and on opposite sides of said central leg portion, each being connected thereto at each end thereof, said side leg portions being fixed to said surface portion of said load beam at each of a plurality of fixing positions, enabling said loading protrusion to contact with the rear surface of said central leg portion such that said loading point and said fixing positions are substantially aligned in a direction normal to the seek direction of said transducer; and

a head slider carrying said transducer, said head slider being adhered to the top surface of said central leg portion.

---

### 5,019,932

## HARD DISK DRIVE HAVING A CARRIAGE LOCK MECHANISM

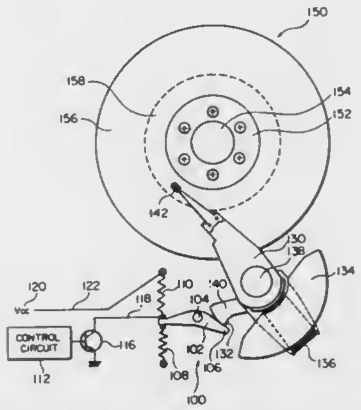
**Akitoshi Iwata, Ome, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Dec. 18, 1989, Ser. No. 451,778**

**Claims priority, application Japan, Dec. 23, 1988, 63-325349**

**Int. Cl.$^5$ G11B** *5/54*

**U.S. Cl. 360—105** **8 Claims**



1. A hard disk drive having a magnetic head for recording and reproducing data in a magnetic disk, a carriage for supporting in place said magnetic head and moving said magnetic head to position on said magnetic disk, and a lock mechanism for locking said carriage at a prescribed position,

said lock mechanism comprising:

a lock member having an engaging part for locking said carriage at the position prescribed for locking said carriage by being brought into engagement with a counter-engaging part disposed on said carriage,

a first urging means for urging said lock member in the direction in which said engaging part is brought into engagement with said counter-engaging part disposed on said carriage,

a second urging means having a shape memory alloy the shape of which changes from a first shape to a second shape on exposure to heat generated by flow of electric current therein, said second urging means for urging said lock member in the direction in which said lock member releases engagement with said counter-engage member disposed on said carriage according to a change of said shape memory alloy's shape from the first shape to the second shape when electric current flows in said shape memory alloy, and

control means for controlling the supply of electric power to said second urging means.

---

### 5,019,933

## DEBRIS CONTROL IN AN ENCLOSED MAGNETIC TAPE CARTRIDGE

**Herbert Karsh, Laguna Beach, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.**

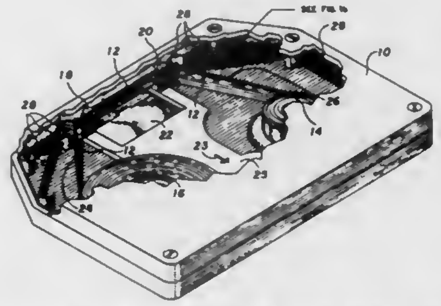
**Filed Nov. 24, 1989, Ser. No. 440,924**

**Int. Cl.$^5$ G11B** *23/02*

**U.S. Cl. 360—132** **1 Claim**

1. A magnetic tape cartridge containing (1) a pair of rotatable reels for transporting tape from one reel to the other reel, and (2) a material having a sticky surface exposed for holding debris that comes in contact with said sticky surface, the improvement comprising:

a protective mesh screen covering said sticky surface of said material to prevent the magnetic tape from contacting said stick surface while exposing sufficient area of said sticky surface for capturing debris.



---

### 5,019,934

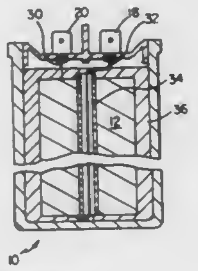
## CAPACITOR CIRCUIT INTERRUPTION

**Jeffrey A. Bentley, Riverside, R.I., and Thomas A. Murphy, New Bedford, Mass., assignors to Aerovox Incorporated, New Bedford, Mass.**

**Continuation of Ser. No. 287,676, Dec. 20, 1988, abandoned, which is a continuation of Ser. No. 170,655, Mar. 17, 1988, abandoned, which is a continuation of Ser. No. 870,623, Jun. 4, 1986, abandoned. This application Jan. 29, 1990, Ser. No. 471,704**

**Int. Cl.$^5$ H02H** *7/16;* **H01H** *1/11*

**U.S. Cl. 361—15** **19 Claims**



1. A capacitor comprising

a capacitive element,

a housing containing said element,

a central portion of a wall of said housing capable of moving outwardly in response to a buildup of internal pressure within said capacitor, said outward movement including an abrupt outward movement in which said central wall portion moves rapidly between two positions in response to an increase in internal pressure, said central wall portion being made of polymer, and being connected to adjoining portions of said housing by a surrounding annular portion also made of polymer, said annular portion abruptly undergoing a change in shape during said abrupt outward movement,

means for retarding movement of said capacitive element in the direction of said outward movement during said pressure buildup,

at least one terminal in said housing for making an electrical connection to said capacitive element, said terminal being supported on said wall portion,

a wire electrically connecting said capacitive element to said terminal, said wire having a preweakened region,

said abrupt outward movement providing sufficient tensile force to break the preweakened region in said wire and separate the broken ends of said wire to prevent reconnection.

VOL 126
SS 4
MY 28 1991
UMI

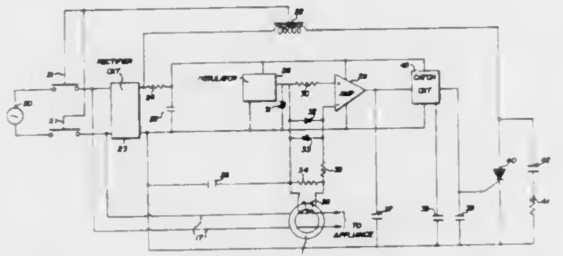
5,019,935

### PROTECTION CIRCUIT FOR ELECTRICAL APPLIANCE

**Ikuro Nakamura, Flat A3,14/F, 6 Dragon Terrace, North Point, Hong Kong**

**Filed Apr. 6, 1990, Ser. No. 506,322**
**Int. Cl.$^5$ H02H** *3/28*

**U.S. Cl. 361—45** **1 Claim**



1. A protection device for electrical appliance with a pair of wires connecting the electrical appliance with a source; said device comprising

a bridge rectifier circuit for converting the source from AC to DC;

a differential transformer comprising a generally toroidal magnetic core having a hole therein through which said pair of wires is passed, and a winding having two ends and disposed on said toroidal core;

a resistor;

a pair of oppositely biased diodes connected across said two ends of said differential transformer;

switching means comprising a solenoid and a switch driven by said solenoid, for connecting and disconnecting said source to said pair of wires connected to said electrical appliance;

an SCR device having a normally non-operated state and an operated state for connecting said source to said solenoid to cause said switch to disconnect said source from said electrical appliance;

a voltage regulator having three terminals and connected to said bridge rectifier circuit for providing regulated voltage to an amplifier and a latched trigger circuit;

an amplifier for amplifying a signal from said winding of said differential transformer representing differential current between the pair of wires and for producing an output signal in response thereto; said amplifier comprising a pair of potential terminals and a pair of input terminals, another of said pair of input terminals being connected to one of said two ends of said winding of said differential transformer and one of said pair of input terminals being connected to said resistor, two of said three terminals of said voltage regulator being connected to said pair of potential terminals of said amplifier, and another of said three terminals of said voltage regulator being connected to said resistor and therethrough to one of said input terminals of said amplifier;

a Zener diode having one terminal directly connected to said resistor and therethrough to said one of said input terminals of said amplifier, and another terminal directly connected to one of said potential terminals of said amplifier, for controlling the threshold level of current detected by the differential transformer and applied to the amplifier so that flase faults do not trigger the SCR; and

a latched-trigger means responsive to the signal from said amplifier for generating a trigger signal and for applying the trigger signal to the SCR to cause said SCR to be in an operating state so that in response to leakage current in the electrical appliance, the differential current through the pair of wires is detected by the windings of the differential transformer and applied to the amplifier and then to cause the latch-trigger means to generate and apply the trigger signal to the SCR and cause the SCR to energize the solenoid and thereby cause the switch to disconnect the wire leading to the electrical appliance from the source.

---

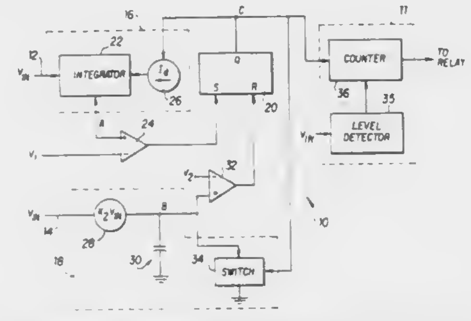
5,019,936

### VOLTAGE-TO-FREQUENCY SQUARED CIRCUIT

**Henry J. Zylstra, Alburnett, and Steven J. Flock, Cedar Rapids, both of Iowa, assignors to Square D Company, Palatine, Ill.**

**Filed Mar. 31, 1989, Ser. No. 331,926**
**Int. Cl.$^5$ H02H** *3/26*

**U.S. Cl. 361—93** **25 Claims**



1. A voltage-to-frequency converter for use in a circuit interrupter which protects a conductor from excessive current, comprising:

means producing a signal correlative to the current flowing in said conductor;

means for delivering a frequency signal having a frequency correlative to the square of the magnitude of said produced signal, wherein said delivering means includes:

first means altering a first portion of the period of said frequency signal in response to the magnitude of said produced signal, said first means comprises am integrator which charges to a first preselected setpoint at a rate responsive to the magnitude of said produced signal, whereby the charging time determines the duration of said first portion of the period of said frequency signal; and

second means altering a second portion of the period of said frequency signal in response to the magnitude of said produced signal said second means comprises a current source which charges a storage element to a second preselected setpoint at a rate responsive to the magnitude of said produced signal, whereby the charging time determines the duration of said second portion of the period of said frequency signal;

said first means further comprises a current source which discharges said integrator at a substantially constant rate; and

said second means further comprises a discharge path having a switch to render said discharge path conductive when said switch is in a closed position, and nonconductive when said switch is in an open position.

---

5,019,937

### CIRCUIT IMPROVEMENT APPARATUS HAVING COMBINATION CURRENT LIMITING FUSE AND RESETTABLE VACUUM SWITCH TO PREVENT SINGLE-PHASING OF THREE-PHASE LOADS

**Lloyd R. Beard, Centralia, Mo., assignor to A. B. Chance Company, Centralia, Mo.**

**Filed Oct. 30, 1989, Ser. No. 429,152**
**Int. Cl.$^5$ H02H** *3/08*

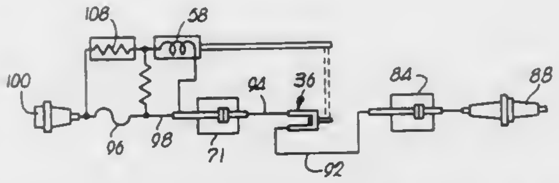
**U.S. Cl. 361—102** **10 Claims**

9. A current interrupting apparatus adapted to be interposed in a single phase electrical circuit, the apparatus comprising:

a fuse interposed in the circuit and including a fusible element which fuses in response to a fault current of a first predetermined magnitude experienced by the circuit;

a current interrupter electrically connected in series with the fuse for interrupting the current through the circuit, the current interrupter including a pair of normally closed electrical contacts and opening means for moving the pair of contacts to an open position; and

current interrupter triggering means for triggering operation of the opening means of the current interrupter in response to fusing of the fusible element of the fuse to protect the circuit from the effects of a fault current in the circuit, the current interrupter triggering means including a triggering circuit with a solenoid electrically connected in parallel with the fuse and operable upon fusing of the fusible element of the fuse to trigger operation of the opening means of the current interrupter.



---

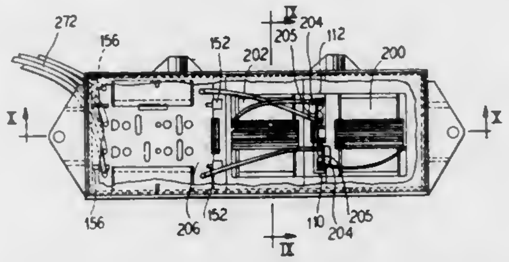
5,019,938

### ENCLOSURE FOR AND/OR ENCLOSURE CONTAINING A BALLAST CIRCUIT

**Sri P. Sridharan, Hickory Hills, and Frank Jungman, Addison, both of Ill., assignors to Radionic Industries Inc., Chicago, Ill.**

**Filed Mar. 9, 1990, Ser. No. 491,069**
**Int. Cl.$^5$ H05K** *5/02;* **H01F** *15/02*

**U.S. Cl. 361—377** **20 Claims**



7. A combination ballast circuit and enclosure therefor, said enclosure comprised in a substantially rectangular closure being divided into sections aligned from one end of said box to another, said sections being aligned as follows:

a first transformer section;

a thermal protector section;

a second transformer section; and

a printed circuit board section, said thermal protector section comprising upstanding U-shaped channel members which also serve to form a barrier separating said first and second transformer sections, said printed board section and said second transformer section being separated by means of upstanding ribs which also serve to secure a printed circuit board of said ballast circuit in said printed circuit board section.

---

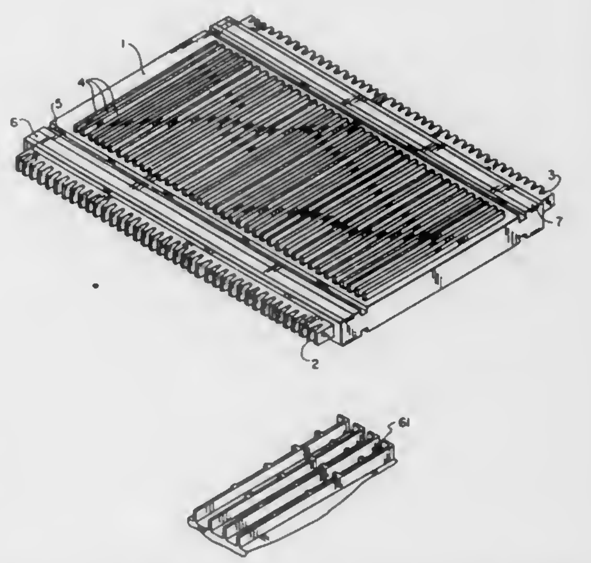
5,019,939

### THERMAL MANAGEMENT PLATE

**William A. Reimer, Wheaton, Ill., assignor to AG Communication Systems Corp., Phoenix, Ariz.**

**Filed Oct. 24, 1989, Ser. No. 427,272**
**Int. Cl.$^5$ H05K** *7/20*

**U.S. Cl. 361—386** **5 Claims**



1. A thermal management plate to provide support for printed circuit board assemblies and for conduction of thermal energy from said assemblies to the environment, said plate comprising:

a base of thermal energy conductive material, including top and bottom surfaces and front and rear edges;

a plurality of thermal energy conductive printed circuit board assembly locator elements mounted on at least one of said surfaces;

said locator elements each configured to provide thermal energy conductive coupling between a printed circuit board assembly and said thermal management plate;

each of said locator elements including a machined surface to make contact with a printed circuit board assembly;

each of said printed circuit board assembly locator elements including a plurality of projections of diminishing lengths to provide an overall wedge-like configuration adapted to assist in forcing a printed circuit board assembly against the machined surface of one of said locator elements;

thermal energy dissipating fins located on at least one of said edges;

whereby thermal energy generated by said printed circuit board assemblies supported by said thermal management plate is conducted via said locator elements, to said base then via said fins to the environment.

---

5,019,940

### MOUNTING APPARATUS FOR ELECTRONIC DEVICE PACKAGES

**Donald L. Clemens, The Colony, Tex., assignor to Thermalloy Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 17,915, Feb. 24, 1987, abandoned. This application Dec. 3, 1987, Ser. No. 128,390**
**Int. Cl.$^5$ H05K** *7/20*

**U.S. Cl. 361—386** **24 Claims**

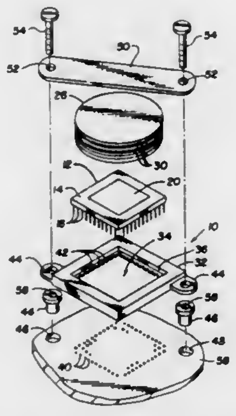
1. Apparatus mounting an assembly comprising a heat sink and an electronic device package having a plurality of downwardly depending leads on a printed circuit board having a

VOL
1126
ISS
4
MY
28
1991
UMI

plurality of preformed locations receiving the leads of the electronic device package comprising:

(a) frame means defining a cavity receiving the electronic device package having said plurality of downwardly depending leads with said leads extending through said frame means;

(b) clip means engaging said heat sink;



(c) means securing said clip means to said frame means and urging said heat sink into intimate thermal contact with the electronic device package; and

(d) means solderably mounting said frame means on said printed circuit board with the leads of the electronic device package received by said preformed locations on the printed circuit board.

---

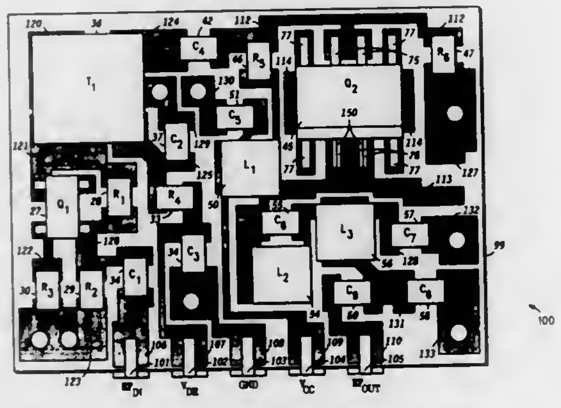
### 5,019,941
### ELECTRONIC ASSEMBLY HAVING ENHANCED HEAT DISSIPATING CAPABILITIES

**Scott Craft, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Nov. 3, 1989, Ser. No. 431,422**

**Int. Cl.⁵ H05K** *7/20*

**U.S. Cl. 361—386** **16 Claims**



1. An electronic assembly comprising:

a substrate having first and second conductive layers on first and second opposed surfaces, respectively;

a first conductive pad of said first conductive layer having a first and a second edge;

a second conductive pad of said first conductive layer having an edge thereof juxtaposed and thermally coupled by convection to said first edge of said first conductive pad, said second conductive pad being thermally coupled to said second conductive layer; and

a heat generating electrical component having heat conductive leads coupled to at least said first conductive pad and heat from said first conductive pad thermally coupled to said second conductive layer by way of said second conductive pad.

---

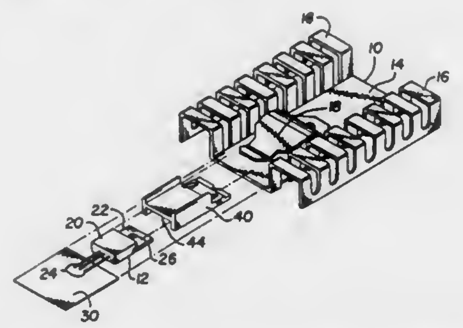
### 5,019,942
### INSULATING APPARATUS FOR ELECTRONIC DEVICE ASSEMBLIES

**Donald L. Clemens, The Colony, Tex., assignor to Thermalloy Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 126,823, Nov. 30, 1987, abandoned, which is a continuation of Ser. No. 887,191, Jul. 21, 1986, abandoned. This application Feb. 29, 1988, Ser. No. 162,283**

**Int. Cl.⁵ H05K** *7/20*

**U.S. Cl. 361—388** **7 Claims**



1. A unitary insulating cover for providing a predetermined creep distance between an electronic device package and a heat sink having a base portion and a spring clip for retaining said electronic device package between said spring clip and said base portion and in thermal contact with said base portion comprising:

(a) an elongated monolithic body of electrically insulating material adapted to be interposed between an electronic device package and a spring clip for retaining the electronic device package between the spring clip and the base of a heat sink, said monolithic body having a length at least as long as the length of the electronic device package to be retained between the spring clip and the heat sink base portion; and

(b) substantially parallel walls depending from the full length of opposite edges of said body cooperating with said body to define a cavity adapted to receive and substantially enclose the full length of the electronic device package.

---

### 5,019,943
### HIGH DENSITY CHIP STACK HAVING A ZIGZAG-SHAPED FACE WHICH ACCOMMODATES CONNECTIONS BETWEEN CHIPS

**Charles J. Fassbender, Poway; Jerry I. Tustanlwskyj, Mission Viejo, and Harshadrai Vora, Poway, all of Calif., assignors to Unisys Corporation, Blue Bell, Pa.**

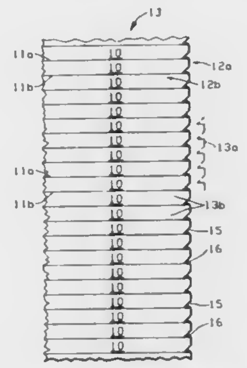
**Filed Feb. 14, 1990, Ser. No. 479,791**

**Int. Cl.⁵ H01L** *23/04*

**U.S. Cl. 361—396** **17 Claims**

1. A high density integrated circuit module that is comprised of a plurality of integrated circuit chips; each of said chips having top and bottom surfaces and thin sides; and all of said chips being arranged in a stack in which the sides of said chips form multiple faces of said stack; wherein:

one face of said stack has a zigzag shape which exposes a portion of the top surface of each chip on said one face; and,



bonding pads, for carrying input/output signals to/from said chips, are located on the exposed top surface portions of said chips.

---

### 5,019,944
### MOUNTING SUBSTRATE AND ITS PRODUCTION METHOD, AND PRINTED WIRING BOARD HAVING CONNECTOR FUNCTION AND ITS CONNECTION METHOD

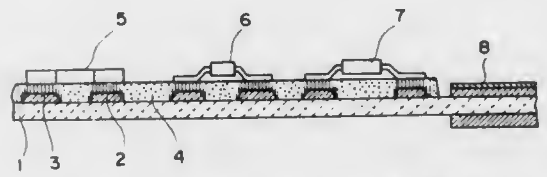
**Masahito Ishii, Hino; Tatsuo Kataoka, Kawaguchi, and Yoshitaka Tanaka, Urawa, all of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Nihombashi, Japan**

**Filed May 25, 1989, Ser. No. 357,030**

**Claims priority, application Japan, Aug. 31, 1988, 63-215020; Sep. 9, 1988, 63-224714; Feb. 28, 1989, 1-45111**

**Int. Cl.⁵ H05K** *1/00*

**U.S. Cl. 361—400** **15 Claims**



1. A mounting substrate comprising a substrate having formed thereon a conductor circuit, components connected electrically to said circuit and mounted onto said substrate, wherein each electrical connection portion of said circuit has a large number of metal nodules formed on said conductor by plating thereon, the nodules-formed connection portions and the mating connection portions of said components are fixed by an adhesive provided therebetween, whereby said circuit and said components are mechanically connected to each other and electrically connected to one another via the nodules.

---

### 5,019,945
### BACKPLANE INTERCONNECTION SYSTEM

**Robert Smolley, Porteuguese Bend, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Continuation-in-part of Ser. No. 835,818, Mar. 8, 1986, which is a continuation-in-part of Ser. No. 499,137, May 31, 1983, abandoned, and a continuation-in-part of Ser. No. 499,136, May 31, 1983, Pat. No. 4,574,331. This application Jul. 25, 1989, Ser. No. 384,533**

**The portion of the term of this patent subsequent to Aug. 4, 2003, has been disclaimed.**

**Int. Cl.⁵ H05K** *1/11*

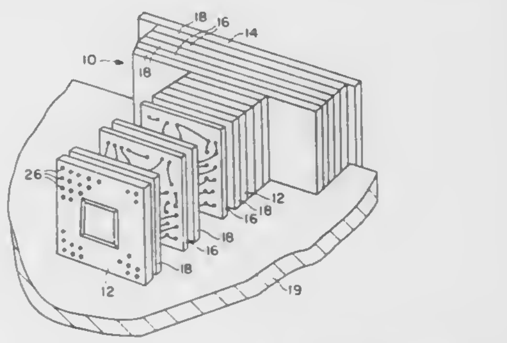
**U.S. Cl. 361—412** **19 Claims**

1. A backplane interconnection system, comprising:

an interface board having contact areas on both surfaces of the interface board and selected connections between the contact areas;

a plurality of interconnecting circuit boards, each interconnecting circuit board having contact areas on both surfaces of the interconnecting circuit board and selected connections between the contact areas;

a plurality of insulating boards, the insulating boards and the interconnecting circuit boards being alternately arranged with an insulating board positioned adjacent the interface board, each insulating board having openings at positions corresponding to the contact areas;



a plurality of conductive connector elements disposed in selected ones of the openings in the insulating boards for making electrical contact between the contact areas; and

one or more strip transmission lines and one or more microstrip transmission lines formed on one or more of the interconnecting circuit boards;

wherein a compressive force applied to the interface board, the interconnecting circuit boards and the insulating boards forces the connector elements into contact with the contact areas.

---

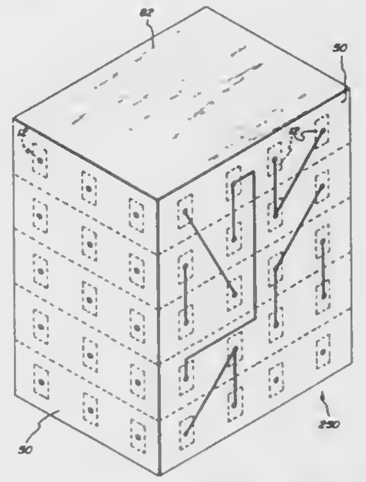
### 5,019,946
### HIGH DENSITY INTERCONNECT WITH HIGH VOLUMETRIC EFFICIENCY

**Charles W. Eichelberger, Schenectady, and Robert J. Wojnarowski, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 27, 1988, Ser. No. 250,010**

**Int. Cl.⁵ H05K** *1/11*

**U.S. Cl. 361—414** **22 Claims**



1. A stack of interconnected integrated circuits, comprising:

a plurality of substrates in a stacked configuration, each of said substrates having an integrated circuit positioned thereof, respectively;

electrical connecting means on each of said substrates, respectively, for providing electrical connection sites on a side of said stacked configuration of said plurality of substrates, said electrical connection means on each of said

VOL
1126
ISS
4
MY
28
1991
UMI

substrates, respectively, being electrically connected to said integrated circuit positioned on each of said substrates, respectively;

holding means for holding said substrates together in said stacked configuration; and

interconnecting means comprising an insulative film laminated to said side of said stacked configuration of said plurality of substrates, and conductor means positioned on said insulative film and passing through via holes in said film to selected ones of said electrical connection sites for selectively interconnecting said selected ones of said sites.

---

### 5,019,947

## CODING DEVICE FOR PRINTED CIRCUIT CARDS WHICH CAN BE INSERTED INTO A PRINTED CIRCUIT CARD RACK

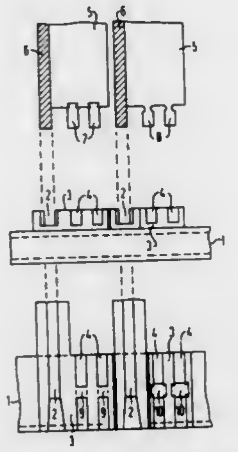
**Leo Pelzl, Holzkirchen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Feb. 7, 1986, Ser. No. 827,062**

**Claims priority, application Fed. Rep. of Germany, Mar. 28, 1985, 3511337**

**Int. Cl.$^5$ H02B *1/02***

**U.S. Cl. 361—415** **5 Claims**



1. A coding device for printed circuit cards insertable into a printed circuit card rack and provided with a plug connection connector, characterized in that coding elements (3) are mounted on the front upper and lower subracks (1) of the printed circuit card frame between the guide rails (2) for the printed circuit cards, said coding elements (3) formed with one or more slots (4) which extend parallel to said guide rails (2); and webs (7, 8) corresponding to said slots (4) are attached to the upper and lower end faces of said plug connection connector (5) to form cooperating coding elements which are receivable in said slots.

---

### 5,019,948

## T-RAIL PRINTED CIRCUIT BOARD GUIDE AND SUPPORT

**Edward Steketee, and Brad E. Clements, both of Fort Collins, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Nov. 10, 1989, Ser. No. 434,203**

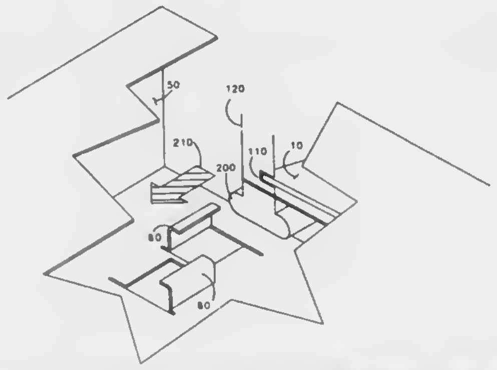
**Int. Cl.$^5$ H05K *7/14***

**U.S. Cl. 361—415** **16 Claims**

1. Apparatus for slidable mounting of a printed circuit board into a housing of the type including a mounting surface, wherein said board includes opposite side edges, the apparatus comprising in combination:

(a) first and second elongated slide members each having a support portion and a rail portion connected thereto, wherein each said support portion includes an elongated groove extending along the length of each slide member, wherein said groove in said first slide member faces said groove in said second slide member, wherein each said rail portion includes an engaging surface;

a housing including a mounting surface, wherein said mounting surface includes spaced-apart gripping means for receiving the slide members, for guiding the slide members, for making contact to the engaging surface of each rail portion, and for securing each slide member to the housing in all direction except along the length of each rail portion;



wherein said grooves are adapted to retain the opposite side of the printed circuit board in a manner such that the printed circuit board is parallel to said mounting surface and each said support portion comprises a plurality of grooves arranged and constructed to receive a plurality of printed circuit boards.

---

### 5,019,949

## SOLID ELECTROLYTIC CAPACITOR

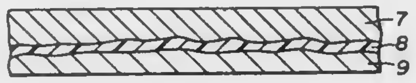
**Hironosuke Ikeda; Nobuhiro Furukawa; Koji Nishio, all of Hirakata; Masahisa Fujimoto, Osaka; Hitoshi Ono, Yokohana, and Osamu Ando, Kawasaki, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka and Mitsubishi Kasei Corporation, Tokyn, both of, Japan**

**Continuation-in-part of Ser. No. 353,821, May 18, 1989, abandoned. This application Mar. 15, 1990, Ser. No. 493,688**

**Claims priority, application Japan, May 20, 1988, 63-123646; May 20, 1988, 63-123648; May 20, 1988, 63-123649; May 20, 1988, 63-123650**

**Int. Cl.$^5$ H01G *9/00***

**U.S. Cl. 361—525** **11 Claims**



1. A solid electrolytic capacitor comprising an electrode , wherein said electrode is formed by means for conducting electrolytic oxidation in an electrolyte containing a monomer of a conductive polymer dissolved therein through the use of a metal having a roughened surface as an anode to thereby simultaneously form an anodic oxidation layer and a conductive polymer layer on said metal.

---

### 5,019,950

## TIMED BEDSIDE NIGHT-LIGHT

**Gerald L. R. Johnson, 6764 Manning Ave., N., Stillwater, Minn. 55082**

**Filed May 25, 1990, Ser. No. 528,535**

**Int. Cl.$^5$ A47B *23/06***

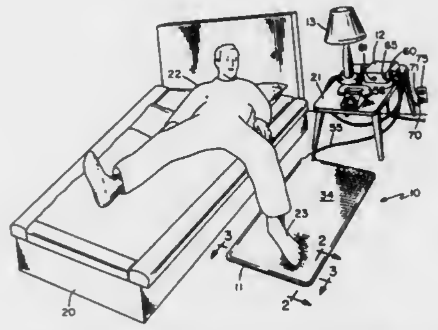
**U.S. Cl. 362—130** **15 Claims**

1. A timed bedside night-light combination comprising:

a lamp,

a bedside mat on the floor adjacent the lamp and having pressure responsive normally open switch means therein and operating in response to pressure applied onto the mat as by a person stepping onto the mat, and

control means connected between an electric power source and the lamp and comprising a delay timer, the control means connected to the switch means, the control means also comprising a switching device closing and opening to turn the lamp on and off, the switching device closing in response to operation of the switching means to turn the light on when the mat is stepped on, and the switching device opening in response to operation of the delay timer to turn the lamp off after a predetermined delay.



---

### 5,019,951

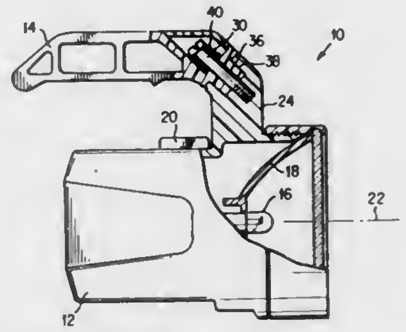
## SPOTLIGHT WITH ADJUSTABLE HANDLE

**Ralph F. Osterhout, San Francisco, and Peter M. Fogg, Burlingame, both of Calif., assignors to Rayovac Corporation, Madison, Wis.**

**Filed Nov. 28, 1989, Ser. No. 442,280**

**Int. Cl.$^5$ F21L *15/20***

**U.S. Cl. 362—191** **8 Claims**



1. A hand-held light comprising:

an enclosure, said enclosure defining a longitudinal axis and being configured to contain a source of electrical power and at least one light bulb;

means in the enclosure for enabling the projection of a light beam along an axis generally parallei to the longitudinal axis of the enclosure;

a handle; and

means for pivotally securing the handle to the enclosure, whereby the handle may be shifted between a first position generally parallel to the longitudinal axis of the enclosure and located to one side of spaced apart from the enclosures, and a second position generally normal to the longitudinal axis of the enclosure.

---

### 5,019,952

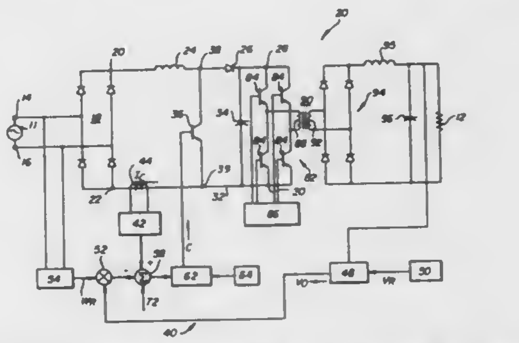
## AC TO DC POWER CONVERSION CIRCUIT WITH LOW HARMONIC DISTORTION

**Joseph L. Smolenski, Pittsfield; Gerard W. Christopher, Dalton; John C. Wright, and Alfred E. Relation, both of Pittsfield, all of Mass., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Nov. 20, 1989, Ser. No. 439,319**

**Int. Cl.$^5$ H02M *3/335;* G05F *1/56***

**U.S. Cl. 363—16** **11 Claims**



I. A power conversion circuit for converting AC input power to DC output power for application to a DC load connected across a pair of load terminals, said circuit comprising:

a rectifier including an input for receiving AC input power and an output for developing a full-wave rectified AC voltage;

a boost inductor and a diode connected in series between said rectifier output and one of said load terminals;

a capacitor connected across said load terminals;

switching means connected in series with said inductor across said rectifier output;

current sensing means for generating a first signal representative of the circuit current flowing through said boost inductor;

voltage sensing means for generating a second signal representative of a DC voltage appearing across said load terminals;

first means connected to said rectifier input for generating a harmonic distortion-free waveform reference signal representative of an AC input voltage sinusoidal waveform;

a multiplier for generating a third signal equal to the product of said second signal and said waveform reference signal;

second means for generating a fourth signal representative of the relative magnitudes of said first and third signals;

third means for generating a series of timing pulses at a fixed frequency; and

a pulse width modulator responsive to said fourth signal and said timing pulses for closing said switching means with the occurrence of each said timing pulse and opening said switching means during each interval between consecutive timing pulses when said first signal rises to the magnitude of said third signal, whereby to force the circuit current flowing through said boost inductor into close amplitude conformity with the AC input voltage waveform.

---

### 5,019,953

## HIGH VOLTAGE GENERATOR FOR TELEVISION RECEIVER

**Seiji Kawaberi, and Hisashi Iwamotu, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Feb. 23, 1990, Ser. No. 483,861**

**Claims priority, application Japan, Feb. 23, 1989, 1-41911**

**Int. Cl.$^5$ H04N *3/185;* H02M *3/335***

**U.S. Cl. 363—21** **5 Claims**

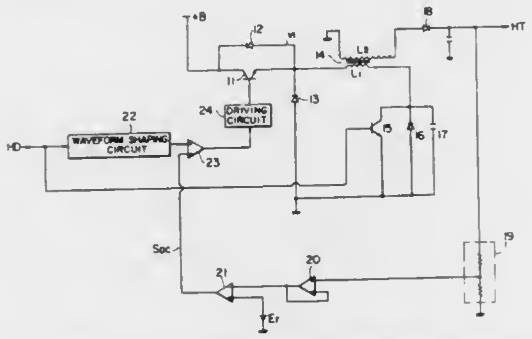
1. A high voltage generator wherein a voltage from a power source is supplied via a coil to an output transistor, a damper diode and a resonance capacitor connected in parallel with one

VOL
1126
ISS
4
MY
28
1991
UMI

another, and flyback pulses generated due to the resonance by the inductance of said coil and said resonance capacitor are boosted and rectified, said high voltage generator further comprising:

(a) control switching elements **11**, **12** connected between said coil and said power source;

(b) a driving circuit **24** for driving said control switching elements;



(c) a flywheel diode **13** connected between the output terminal of said control switching elements and the ground; and

(d) a control feedback loop with a modulator for controlling the off-time phase of said switching elements in accordance with the high voltage output during the on-time of said output transistor.

---

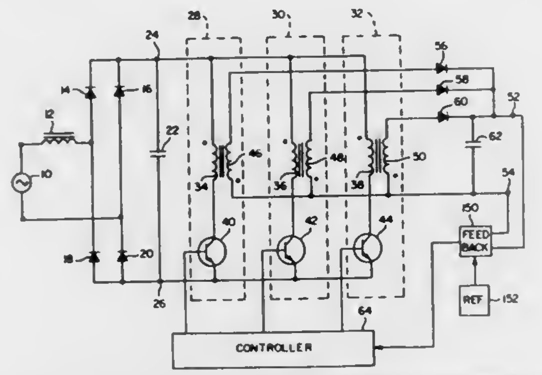
### 5,019,954
### AC/DC CONVERSION WITH REDUCED SUPPLY WAVEFORM DISTORTION

**Leo B. Bourgeault, Wall, and Alfred W. Wohlberg, Neptune, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Jun. 23, 1989, Ser. No. 370,945**

**Int. Cl.$^5$ H02M** *3/335*

**U.S. Cl. 363—21** **20 Claims**



1. An AC/DC converter for providing a regulated DC signal from an AC signal, comprising:

first filter means for filtering a harmonic frequency fed back to the AC signal;

rectifier means connected to said first filter means for rectifying the AC signal to provide a DC signal across two terminals of said rectifier means;

a plurality of flyback circuits, each having a first winding connected in series with switching means for enabling and disabling current flow which are connected in parallel to said rectifier means, each of said plurality of flyback circuits further having a second winding which is inductively related to said first winding, said second winding from each of said plurality of flyback circuits being connected in parallel through an ORing diode at an output of the AC/DC converter;

controller means for repeatedly and sequentially enabling and disabling said switching means in each of said plurality of flyback circuits such that said first winding in each of said plurality of flyback circuits is energized by said DC signal when said series switching means is enabled and said second winding in each of said plurality of flyback circuits is energized by said inductively related first winding when said series switching means is disabled so as to provide the regulated DC signal at said output of the AC/DC converter; and

the cutoff frequency of the first filter means is MNf, where f equals the frequency of the AC signal, M equals the number of flyback circuits and N equals the number of times per period of the AC signal that said switching means are enabled and disabled.

---

### 5,019,955
### DC-TO-AC VOLTAGE CONVERTER HAVING GALVANICALLY SEPARATE INPUT AND OUTPUT CIRCUITS

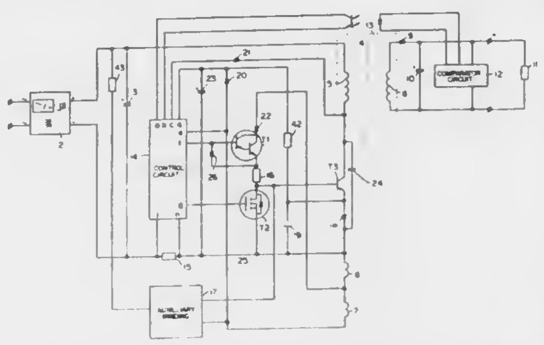
**Gerben S. Hoeksma, Winterswijk, Netherlands, assignor to N.V. Nederlandsche Appartenfabriek Nedap, De Groenlo, Netherlands**

**Filed Mar. 14, 1990, Ser. No. 494,104**

**Claims priority, application Netherlands, Mar. 14, 1989, 8900609**

**Int. Cl.$^5$ H02M** *7/537*

**U.S. Cl. 363—21** **12 Claims**



1. A DC-to-AC voltage converter having galvanically separate input and output circuits, and comprising a converter transformer having at least one primary winding; a resonance capacitor connected to said at least one primary winding; a switching transistor having a collector-emitter path series-connected tot he at least one primary winding and a base-collector area; and drive means for the switching transistor, wherein charge storage in the base-collector area of the switching transistor provides base drive for the switching transistor; control means for detecting an increase of voltage in the collector-emitter path of the switching transistor and for providing in response to such an increase and at least in a period to time directly following the increase an additional base drive current for the switching transistor, which additional base drive current is gradually increased at a predetermined rate in such a manner that a storage time of the switching transistor remains substantially constant over an operating range of the converter.

---

### 5,019,956
### POWER CONTROL APPARATUS

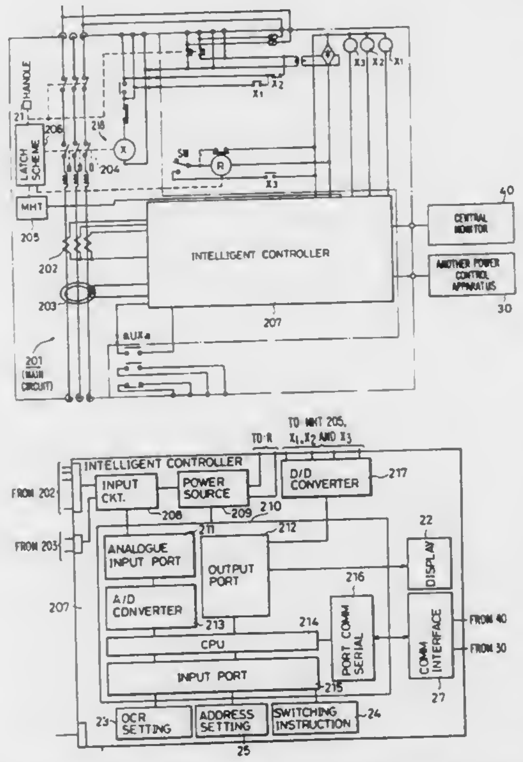
**Katsutoyo Nakayama; Toshimichi Morii, both of Tokyo, and Toshihide Kamino, Osaka, all of Japan, assignors to Ohbayashi Corporation, Osaka; Morii Dengyo Kabushi Kaisha, Tokyo and Terasaki Denki Sangyo, Osaka, all of, Japan**

**Filed Nov. 14, 1989, Ser. No. 436,211**

**Claims priority, application Japan, Nov. 16, 1988, 63-289763**

**Int. Cl.$^5$ H02H** *6/00*

**U.S. Cl. 363—50** **7 Claims**



1. A power control apparatus for controlling the supply of plural phase electrical power to a main circuit, comprising:

circuit breaking means having contacts connected in said main circuit and selectively operable to close said contacts for supplying said electrical power to said main circuit and to open said contacts and thereby break the supply of electrical power to said main circuit, and to switch said contacts between open and closed conditions;

means for detecting the present level of current flowing in said main circuit and providing a corresponding, current level detection output;

setting means for setting a predetermined current level value and predetermined conditions relating to breaking of the main circuit when the present current level exceeds the predetermined current level set value;

means for supplying switching instructions for switching of said circuit breaking means;

control means responsive to said switching instructions for controlling said circuit breaking means to switch between said open and closed conditions of said contacts and further responsive to the set values of said setting means and the current level detection output of said detecting means for generating a current level monitor signal and, in response to the current level in said main circuit exceeding said predetermined current level set value, for generating an output signal in accordance with said predetermined conditions;

tripping means, responsive to the output signal of said control means, for operating said circuit breaking means to break the main circuit; and

display means for receiving and displaying the predetermined current level set value from the setting means and for receiving the current level monitor signal output of said control means and displaying the corresponding present main circuit current value.

---

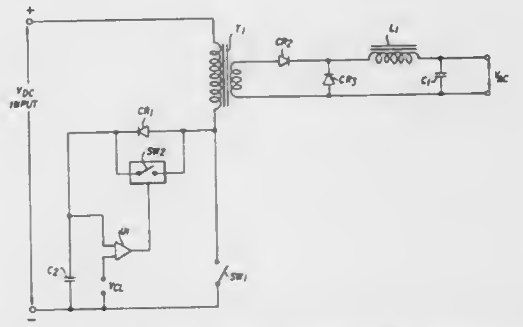
### 5,019,957
### FORWARD CONVERTER TYPE OF SWITCHED POWER SUPPLY

**Bruce L. Wilkinson, 5518 Norton St., Torrance, Calif. 90503**

**Filed Jul. 24, 1989, Ser. No. 383,594**

**Int. Cl.$^5$ H02H** *7/122*

**U.S. Cl. 363—56** **5 Claims**



1. A switched power supply of the forward converter type including: a transformer having primary and secondary windings; an input circuit having first and second input terminals adapted to be connected to a direct current source, said first input terminal being connected to said primary winding; and first switching means series connected between said second input terminal and said primary winding to cause current flow in said primary winding when said first switching means is turned on; a clamping circuit including a capacitor and a diode series connected across said first switching means, said capacitor being charged to a voltage of a particular polarity by the inductive current in said transformer during an initial portion of each interval during which said first switching means is turned off; second switching means connected across said diode; and control circuitry connected to said capacitor and to said second switching means to cause said second switching means to close after the inductive current in said primary winding reverses to cause said capacitor to be discharged back into said transformer during a subsequent portion of each interval during which said first switching means is turned off after the inductive current in said primary winding reverses.

---

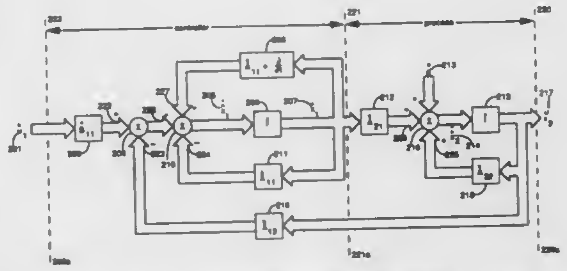
### 5,019,958
### GENERALIZED SYNTHESIS OF CONTROL SYSTEMS OF ZERO-ORDER/INSTANTANEOUS RESPONSE AND INFINITE DISTURBANCE REJECTION RATIO

**Ljubomir D. Varga, Deskaseva 6, 11000, Beograd, Yugoslavia, and Novica A. Losic, 7802-23 Ave., Kenosha, Wis. 53140**

**Filed Feb. 12, 1990, Ser. No. 479,275**

**Int. Cl.$^5$ H02P** *5/00, 7/00*

**U.S. Cl. 363—97** **10 Claims**



1. A method for synthesizing control systems of zero order and infinite disturbance rejection ratio comprising:

VOL
1126
ISS
4
MY
28
1991
UMI

controlling an output column vector of a process under the control, supplying an input column vector to a controller,

passing said input column vector through a controller input matrix; thereby producing a controller input matrix vector product,

supplying a resulting control matrix vector product from said output column vector,

sensing or estimating states of said output column vector and passing them through a control matrix; thereby producing said resulting control matrix vector product,

feeding back said resulting control matrix vector product in a negative feedback loop with respect to said controller input matrix vector product; thereby producing an error matrix vector product,

supplying a resulting controller system matrix vector product from a controller state vector,

sensing or estimating states of said controller state vector and passing them through a resulting controller system matrix; thereby producing said resulting controller system matrix vector product,

feeding back said resulting controller system matrix vector product in a negative feedback loop with respect to said error matrix vector product

supplying a controller feedback matrix and state derivatives from said controller state vector,

passing the sensed or the estimated states of said controller state vector through a controller system matrix and differentiation feedback operator; thereby producing said controller feedback matrix and state derivatives,

feeding back said controller feedback matrix and state derivatives in a positive feedback loop with respect to said error matrix vector product,

summing algebraically said error matrix vector product with said resulting controller system matrix vector product and with said controller feedback matrix and state derivatives in an inner controller matrix algebraic summer,

passing a result of the summation in said inner controller matrix algebraic summer through an inherent integration in said controller; thereby obtaining the states of said controller state vector,

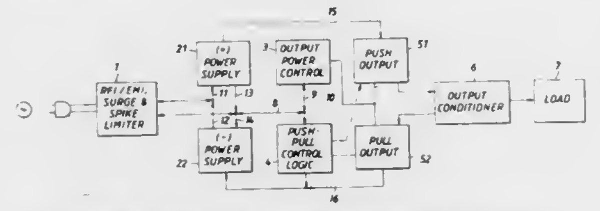
supplying the states of said controller state vector, obtained passing said result of the summation in said inner controller matrix algebraic summer through said inherent integration in said controller, for controlling said output column vector of said process under the control, whereby said process under the control is being made of zero order dynamics and infinite disturbance rejection ratio.

---

## 5,019,959
## BALLAST CIRCUIT

**Ralph R. MacDonald, and William M. Menger, both of Houston, Tex., assignors to Innovative Controls, Inc., Houston, Tex.**

**Filed Sep. 19, 1988, Ser. No. 245,823**
**Int. Cl.$^5$ H02M** *7/537*
**U.S. Cl. 363—134** **45 Claims**



1. A ballast circuit for a discharge tube comprising,

means for supplying a.c. line power including an a.c. high line and an a.c. neutral line,

rectifying means including first rectifying means connected between said a.c. high line and said a.c. neutral line for providing positive d.c. voltage between a positive d.c. line and said a.c. neutral line, and a second rectifying means connected between said a.c. high line and said a.c. neutral line for providing negative d.c. voltage between a negative d.c. voltage line and said a.c. neutral line,

transformer means having oppositely wound first and second input windings and an output winding, said first input winding connected in series with a first electronically controlled switch means to said positive d.c. line and a push-pull common point, said second input winding connected in series with a second electronically controlled switch means to said negative d.c. voltage line and said push-pull common point,

reactance circuit means connected between said push-pull common point and said a.c. neutral line,

electronic control circuit means powered from said rectifying means for generating a high frequency a.c. control signal having first and second half cycles and for closing said first electronically controlled switch means only during said first half cycles of saio a.c. control signal and for closing said second electronically controlled switch means only during said second half cycles of said a.c. control signal, and

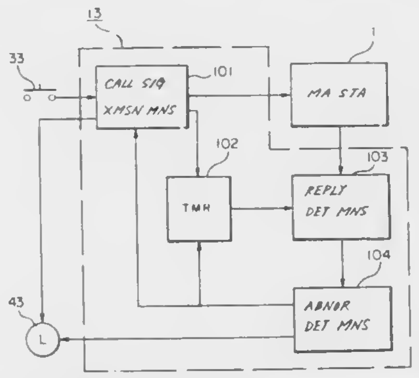
a discharge tube connected to said output winding of said transformer winding, whereby a.c. voltage is applied to said discharge tube and said circuit functions as a ballast for said discharge tube.

---

## 5,019,960
## MASTER-SLAVE SIGNAL TRANSFER SYSTEM FOR ELEVATOR

**Hiroshi Ando, and Junichi Tanino, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed May 11, 1989, Ser. No. 350,169**
**Claims priority, application Japan, May 13, 1988, 63-116382**
**Int. Cl.$^5$ G06F** *15/46;* **B66B** *1/14*
**U.S. Cl. 364—132** **4 Claims**



1. A master-slave system for monitoring transmission of elevator cell signals comprising:

a plurality of slave stations each having call signal transmission means for transmitting call signals and illuminating call registration lamps;

a master station which receives said call signals from said slave station and transmits a call registration signal to a slave station responding to a call signal thereupon;

each of said slave stations having:

a timer which measures a time interval between transmission of a call signal and receipt of a call registration signal at a respective slave station;

reply detection means, for transmitting an output signal when a call registration signal has not been received within a predetermined time interval; and

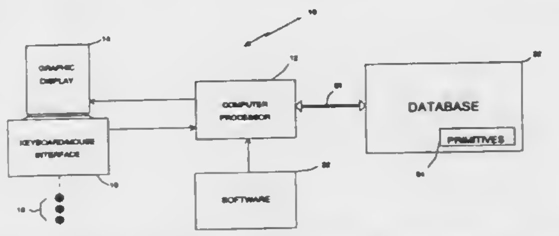
abnormality detection means operable responsive to the output signal from said reply detection means for initiating retransmission of a call signal and resetting said timer, said abnormality detection means also being operable for extinguishing said call registration lamps when the output signal is not transmitted after retransmitting a call signal a predetermined number of times.

---

## 5,019,961
## COMPUTER APPARATUS AND METHOD FOR LOGICAL MODELLING

**Mark Addesso, Hamden; Venkatraman R. Iyer, New Haven, and Robert M. Dunn, Redding, all of Conn., assignors to Cadware, Inc., New Haven, Conn.**

**Filed Apr. 5, 1989, Ser. No. 334,080**
**Int. Cl.$^5$ G06F** *15/46*
**U.S. Cl. 364—192** **30 Claims**



16. A method for creating modelling methodologies to enable a modeler to build evaluatable models for intended applications comprising the steps of:

providing a set of primitives including:

(a) entities,

(b) relationships for associating entities, and

(c) attributes for setting conditions on relationships;

storing said primitives in a model database;

creating modelling objects from said stored entities, relationships and attributes;

storing said modelling objects in said database;

establishing modes for viewing said stored modelling objects;

defining logical relationships between elements of said modelling objects and views thereof;

storing said logical relationships in the database; and

providing a user with access to said modelling objects through views thereof, to enable the user to create models for an intended application by manipulating said views to edit entities and relationships in said model database in accordance with a methodology defined by the types of modelling objects provided, and the relationships and attributes applicable thereto.

---

## 5,019,962
## DIRECT MEMORY ACCESS CONTROLLER FOR A MULTI-MICROCOMPUTER SYSTEM

**Tsuneo Funabashi, Tokyo; Kaoru Sakoshita, Kodaira, both of Japan, and Hiroshi Yonezawa, Cupertino, Calif., assignors to Hitachl, Ltd., Tokyo, Japan**

**Filed Jan. 15, 1988, Ser. No. 144,523**
**Claims priority, application Japan, Jan. 16, 1987, 62-5977**
**Int. Cl.$^5$ G06F** *15/16, 13/28, 13/38*
**U.S. Cl. 364—200** **6 Claims**

1. A multi-microcomputer system comprising:

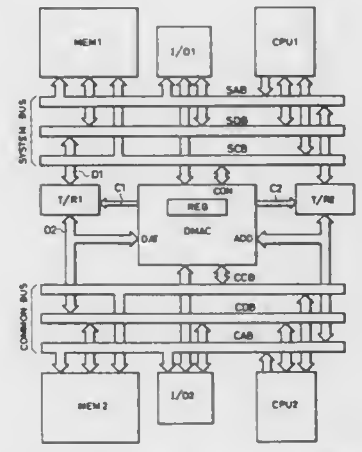
a first microcomputer system, said first microcomputer system includes a first microprocessor, a first memory unit, a first address bus, and a first data bus;

a second microcomputer system, said second microcomputer system includes a second microprocessor, a second memory unit, a second address bus, and a second data bus;

coupling means for electrically coupling said first and second microcomputer systems wherein said first data bus and said second data bus are coupled through first coupling means and said first address bus and said second address bus are coupled through second coupling means wherein said first coupling means has a first data transmitting function of transmitting data on said first data bus to said second data bus, a second data transmitting function of transmitting data on said second data bus to said first data bus, and a data non-transmitting function of inhibiting transmission of the data between said first data bus and said second data bus, and wherein any one of said first data transmitting function, said second transmitting function and said data non-transmitting function is selectively validated by the first coupling means in response to control signals;

a direct memory access controller;

said direct memory access controller including means for controlling a data transfer operation which is executed between said first microcomputer system and said second microcomputer system;



said direct memory access controller further including means for controlling a data transfer operation which is executed within said first microcomputer;

said direct memory access controller further including means for controlling a data transfer operation which is executed within said second microcomputer system; and,

said direct memory access controller further including means for generating the control signals to control the coupling means.

---

## 5,019,963
## DATA PROCESSING NETWORK WITH UPGRADING OF FILES

**Graham R. Alderson, Eastleigh; Peter R. MacFarlane, Winchester, both of United Kingdom, and Tohru Mori, Fujisawa, Japan, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 21, 1988, Ser. No. 171,315**
**Claims priority, application United Kingdom, Apr. 2, 1987, 8707848**
**Int. Cl.$^5$ G06F** *13/38*
**U.S. Cl. 364—200** **20 Claims**

1. In a data processing network having at least one host processor connected to a plurality of workstations of various types containing different facilities installed thereon, the host processor containing a copy of a latest version of each of the facilities, a method of updating the facilities stored in the workstations, said method comprising the steps of:

transmitting a query by the host processor to one or more of said plurality of workstations;

transmitting a signal from each of the plurality of workstations to the host processor in response to the query indicating the type of workstation and facilities installed thereon; and

updating by the host processor all the facilities stored on each of the respective plurality of workstations each having a version which is different from the latest version of the respective facilities stored in the host processor in response to the signal transmitted thereby.

VOL
1126
ISS
4
MY
28
1991
UMI

## 5,019,964
## DEVICE FOR INTERFACING DATA COMMUNICATIONS

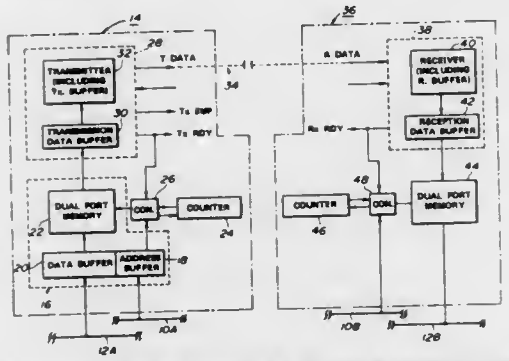
**Akito Yamamoto, Yokohama; Takashi Ueno, and Akio Sumizawa, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Japan**

**Filed Aug. 25, 1987, Ser. No. 89,064**

**Claims priority, application Japan, Aug. 27, 1986, 61-200967**

**Int. Cl.$^5$ G06B** *15/00*

**U.S. Cl. 364—200** **11 Claims**



1. A device for interfacing data communications between a transmitter having a first processing unit, a first data bus, and a first address bus and a receiver having a second processing unit, a second data bus, and a second address bus comprising:

(a) a first data storage circuit connected to the first data bus and the first address bus for receiving and storing parallel form data transmitted by the first processing unit onto the first data bus;

(b) a transmission data buffer connected to the first data storage circuit for holding the data received and stored by the first data storage circuit;

(c) a transmission unit connected to the transmission data buffer and to a data transmission line for transmitting the data held by the transmission data buffer over the data transmission line;

(d) a reception unit connected to the transmission line for receiving the data transmitted over the data transmission line by the transmission unit;

(e) a second data storage circuit connected to the reception unit and to the second data bus and the second address bus for holding the data received by the reception unit so that the data held by the second data storage circuit can be supplied to the second processing unit via the second data bus;

wherein the first data storage circuit comprises:

a data buffer connected to the first data bus for receiving the parallel form data transmitted by the first processing unit onto the first data bus;

an address buffer connected to the first address bus for receiving address data transmitted by the first processing unit onto the first address bus;

a first timing control circuit connected to the address buffer to receive an input signal therefrom, each input signal generated at a time when address data on the address bus is received by the address buffer;

a first counter connected to the first timing control circuit to count the number of input signals received; and

a first dual port memory connected to the data buffer and to the transmission data buffer for storing the data received by the data buffer as a series of data bytes, the dual port memory having a plurality of data storage addresses, the series of data bytes being stored in a series of contiguous data storage addresses beginning with a predetermined data storage address, each data byte being stored in an address of the dual port memory specified according to a counted value in the first counter;

whereby handling and transmission of data stored in the first dual port memory is achieved without CPU intervention.

---

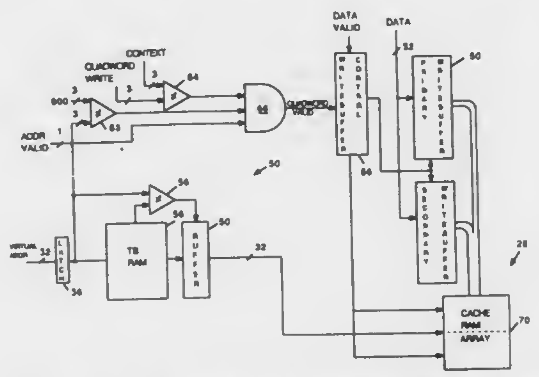
## 5,019,965
## METHOD AND APPARATUS FOR INCREASING THE DATA STORAGE RATE OF A COMPUTER SYSTEM HAVING A PREDEFINED DATA PATH WIDTH

**David A. Webb, Jr., Berlin; Ricky C. Hetherington, Northboro; Ronald M. Salett, Framingham; Trvggve Fossum, Northboro, and Dwight P. Manley, Holliston, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed Feb. 3, 1989, Ser. No. 306,826**

**Int. Cl.$^5$ G06F** *13/00*

**U.S. Cl. 364—200** **10 Claims**



9. A computer system having an execution unit and a memory access unit; a bus linking said memory access unit and said execution unit; said memory access unit including a cache memory for storing data; wherein the improvement comprises:

said execution unit including means for executing write instructions, said write instructions including longword write instructions and quadword write instructions, each of said write instructions specifying a destination address;

said cache memory connected to a quadword size data access path for writing longwords and quadwords of data into said cache memory;

said bus having a longword size data path for conveying a longword of data from said execution unit to said memory access unit to be written into said cache memory in executing each of said write instructions;

said execution unit further including means, connected to said executing means and said longword size data path, for transmitting a first longword of data over said longword size data path when executing each of said longword write instructions, each of said longword write instructions specifying said first longword, and for successively transmitting first and second longwords of a quadword of data over said longword size data path when executing each of said quadword write instructions, each of said quadword write instructions specifying said first and second longwords of the quadword of data;

said memory access unit including a longword-size first write buffer having an input connected to said longword size data path and an output connected to a low-order section of said quadword size data access path for receiving and storing a longword from said longword size data path which is to be stored in said cache memory at a destination address that is aligned on quadword boundaries, and a longword-size second write buffer having an input connected to said longword size data path and an output connected to a high-order section of said quadword size data access path for receiving and storing a longword from said longword size data path which is to be stored in said cache memory at a destination address that is not aligned on quadword boundaries;

said execution unit further including means, connected to said executing means and said bus, for generating a context signal over said bus when each of said write instructions is executed, said context signal indicating whether each of said write instructions is either a longword write instruction or a quadword write instruction;

said execution unit further including means, connected to said executing means and said bus, for generating an address alignment signal when each of said write instructions is executed, said address alignment signal indicating whether the destination address specified by each of said write instructions is either aligned on a quadword boundary or is not aligned on a quadword boundary;

said execution unit further including means, connected to said executing means and said bus, for generating a data valid signal over said bus indicating the second longword of the quadword specified by each of said quadword write instructions is valid;

control means, connected to said bus, said first and second write buffers, and said cache memory, responsive to said context signal and said address alignment signal for writing said first longword of data specified by each of said longword write instructions from said first write buffer over said low-order section into said cache memory when said context signal indicates a longword write instruction and said address alignment signal indicates that the destination address specified by each of said longword write instructions is aligned on a quadword boundary, for writing said first longword of data specified by each of said longword write instructions from said second write buffer over said high-order section into said cache memory when said context signal indicates a longword write instruction and said address alignment signal indicates that the destination address specified by each of said longword write instructions is not aligned on a quadword boundary, and for writing said first and second longwords of said quadword of data specified by each of said quadword write instructions from said first write buffer over said low-order section and from said second write buffer over said high-order section into said cache memory when said context signal indicates a quadword write instruction and when said address alignment signal indicates that the destination address specified by each of said quadword write instructions is aligned on a quadword boundary, said control means further being responsive to said data valid signal for inhibiting the writing of the quadword of data from the first and second write buffers into said cache memory until said data valid signal indicates receipt of a valid second longword of data for the quadword;

said transmitting means including means, connected to said executing means and said bus, for transmitting the destination address specified by each of said write instructions over said bus when executing each of said write instructions; said memory access unit further including determining means, connected to said bus and said cache memory, responsive to said destination address for determining whether said cache memory has data stored at said destination address to provide a hit signal when said cache memory has data stored at said destination address; said control means further being connected to said determining means and being responsive to said hit signal to disable the writing of longwords of data from said first and second write buffers into said cache memory in an absence of said hit signal; and

wherein said determining means includes means for performing a lookup in said cache memory during transmission over said bus of the second longword of each of said quadword write instructions to determine whether said cache memory has data stored at the destination address of each of said quadword write instructions so that a presence of said hit signal enables the writing of longwords of data from said first and second write buffers into said cache memory upon receipt from said bus of the second longword of each of said quadword write instructions.

---

## 5,019,966
## DUAL PROCESSORS USING BUSY SIGNAL FOR CONTROLLING TRANSFER FOR PREDETERMINED LENGTH DATA WHEN RECEIVING PROCESSOR IS PROCESSING PREVIOUSLY RECEIVED DATA

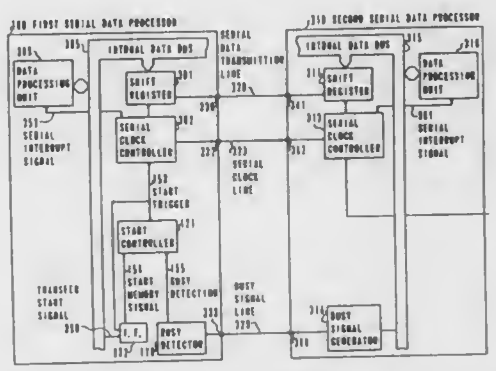
**Sayuri Saito; Kazutoshi Yoshizawa, and Yoshitaka Kitada, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Sep. 1, 1987, Ser. No. 91,813**

**Claims priority, application Japan, Sep. 1, 1986, 61-206406; Sep. 1, 1986, 61-206408**

**Int. Cl.$^5$ G06F** *13/42, 15/16*

**U.S. Cl. 364—200** **17 Claims**



17. A data transfer system including:

a first data processor and a second data processor coupled through a data transfer line connected through a pull-up resistor to a voltage supply and through a clock line,

said first processor comprising first data processing means for supplying data of predetermined length to be transferred and generating a transfer start signal for next data to be next transferred of said data of predetermined length after transfer of preceding data of said data of predetermined length has been completed;

data transferring means receiving said data of predetermined length to be transferred from said data processing means for serially transferring, bit-by-bit, said data of predetermined length through buffer means to a data transferring terminal connected to said data transfer line, said data transferring means supplying a synchronous clock to a clock transfer terminal connected to said clock line;

means connected to said data transferring terminal for detecting a transfer inhibit signal supplied from said second data processor during a period in which said preceding data received by said second data processor is processed in said second data processor;

flag means receiving said transfer start signal from said data processing means for temporarily holding said transfer start signal; and

transfer control means associated with said data transferring means for controlling said data transferring means to stop transfer of said data of predetermined length during a period in which said transfer inhibiting signal is active and to start transfer of said data of predetermined length when said transfer inhibiting signal becomes inactive and said flag means is set by said transfer start signal and also to reset said flag means whereby said data processing means can perform another processing operation during a period in which said data of predetermined length is being transferred and during another period in which said transfer inhibiting signal is effective; and

said second data processor comprising second data processing means for processing data received from said first data processor and generating a transfer acknowledge signal when processing of said received data has been completed, data receiving means connected to a data receiving terminal connected to said data transfer line for serially receiving said data of predetermined length through said data transfer line from said first data processor in response

VOL
1126
ISS
4
MY
28
1991
UMI

to said transfer acknowledge signal generated by said second data processing means, said data receiving means being also connected to a clock receiving terminal connected to said clock line, and a transfer inhibit signal generator for generating said transfer inhibit signal through a buffer circuit to said first data processor in response to completion of reception of said data of predetermined length and maintaining said transfer inhibit signal until said transfer acknowledge signal is generated, and making said transfer inhibit signal inactive when said transfer acknowledge signal is generated.

---

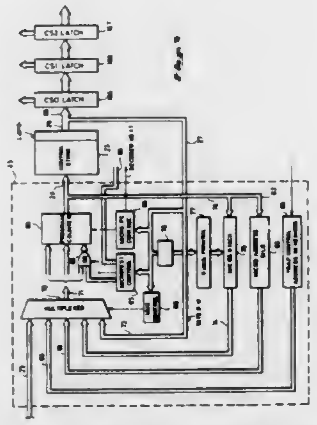
### 5,019,967
### PIPELINE BUBBLE COMPRESSION IN A COMPUTER SYSTEM

**William R. Wheeler, Hudson, and George M. Uhler, Marlborough, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed Jul. 20, 1988, Ser. No. 221,988**

**Int. Cl.⁵ G06F** *9/38*

**U.S. Cl. 364—200** **21 Claims**



1. A method of operating a pipelined processing unit in a digital computer, said pipelined processing unit having at least a first pipeline segment and a second pipeline segment for processing information, said first pipeline segment processing information in said pipeline upstream of said second pipeline segment; said processing of information in said second pipeline segment being capable of causing a stall condition which results in waiting for processing information and capable of producing a bubble in said first pipeline segment during which said first pipeline segment does no useful processing of information; and control means in said pipelined processing unit for controlling said processing of information and responsive to said stall condition and said bubble; said method comprising the steps of:

- a) detecting a bubble in the first pipeline segment by said control means;
- b) detecting a stall condition in the second pipeline segment by said control means; and
- c) overwriting the bubble in the first pipeline segment by said processing of information, under control by said control means, thereby compressing the bubble.

---

### 5,019,968
### THREE-DIMENSIONAL VECTOR PROCESSOR

**Yulan Wang, 475 E. Canon Green, and Steven E. Butner, 6226 W. Moreland Pl., both of Goleta, Calif. 93117**

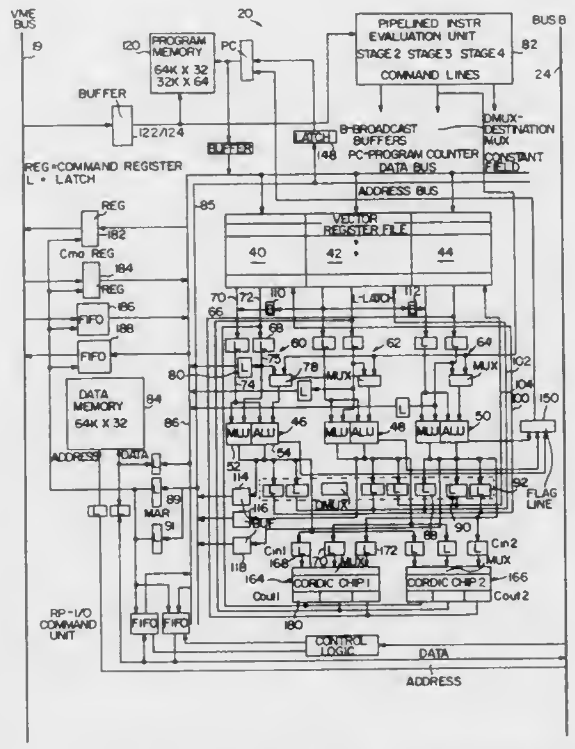
**Filed Mar. 29, 1988, Ser. No. 174,653**

**Int. Cl.⁵ G06F** *9/315, 9/38, 15/347, 15/31*

**U.S. Cl. 364—200** **14 Claims**

1. A processor for receiving and executing a series of program instructions and data provided from a memory, for carrying out vector/vector and scalar/vector arithmetic operations, comprising:

- a. a data transfer input means for receiving the series of program instructions and data from memory;
- b. I, J, and K register files coupled to said data transfer input mans for receiving operands therefrom, each containing a plurality of registers for storing scalar values for the components of a plurality of three-dimensional vectors;
- c. I, J, and K execution units coupled to said I, J, and K register files for performing arithmetic operations on operands placed in the execution units;
- d. I, J, and K operand pathways connecting each I, J, and K register file, respectively, with the corresponding I, J, and K execution units, for transferring operands stored in selected register locations to the corresponding execution units, in response to data-fetch commands carried in the program instructions, each said I, J, and K operand pathways including a first and second data bus;
- e. first and second broadcast buffer connecting I and J operand pathways and J and K operand pathways, respectively, for passing operands between each pair of the operand pathways, in response to pathway exchange commands carried in the program instructions;
- f. data-return means coupled to said I, J, and K execution units and said I, J, and K register files for returning operands from the execution units to selected locations in the register files, in response to write-to-register commands in the program instructions;
- g. data-transfer output means having its inputs coupled to the outputs of said I, J and K execution units and further having its outputs coupled to the memory for passing selected operands from the processor to the memory, in response to write-to-memory commands carried in the program instructions; and,
- h. a program evaluation unit coupled to said I, J, and K register files and to said data transfer input means for passing commands in the program instructions to the register files, the execution units, the broadcast buffers, the data-return means, and the data-transfer input means and output means.



### 5,019,969
### COMPUTER SYSTEM FOR DIRECTLY TRANSFERRING VACTOR ELEMENTS FROM REGISTER TO REGISTER USING A SINGLE INSTRUCTION

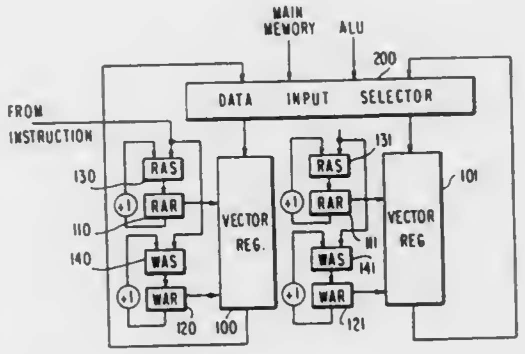
**Hiroyuki Izumisawa, and Seiichiro Kinoshita, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Jul. 2, 1985, Ser. No. 751,112**

**Claims priority, application Japan, Jul. 2, 1984, 59-136773; Jul. 2, 1984, 59-136774; Jul. 2, 1984, 59-136775; Jul. 2, 1984, 59-136776**

**Int. Cl.⁵ G06F** *15/16, 15/347, 15/80, 13/12*

**U.S. Cl. 364—200** **8 Claims**



1. Vector processing apparatus for a computer of the type which performs an operation in accordance with an instruction, said apparatus comprising:

- instruction receiving means for receiving an instruction from said computer;
- first storage means for storing a plurality of data elements;
- second storage means for storing a plurality of data elements;
- read addressing means responsive to said instruction received by said receiving means for providing read addresses to one of said first and second storage means for reading out data elements therefrom, wherein said read addressing means comprises:
  - a read address register for providing said read addresses to said one storage means;
  - incrementing means coupled to said read address register for incrementing the read address currently in said read address register to obtain an incremented read address;
  - first means for providing a read start address; and
  - read address selector means coupled to said incrementing means and coupled to said first means and responsive to said instruction for first providing said read start address and thereafter providing said incremented read address to said read address register, wherein said instruction includes a field containing said read start address, wherein said first means comprises means for providing a predetermined read start address and means for selectively providing one of said predetermined read start address and said address contained in said field of said instruction;
- said vector processing apparatus further comprising:
- write addressing means responsive to said instruction received by said receiving means for providing write addresses to the other of said first and second storage means for writing into said other storage means the data elements read out of said one storage means; and
- selector means coupled to inputs and outputs of both of said first and second storage means and responsive to said instruction for passing the output from said one storage means to the input of said other storage means.

---

### 5,019,970
### IC CARD

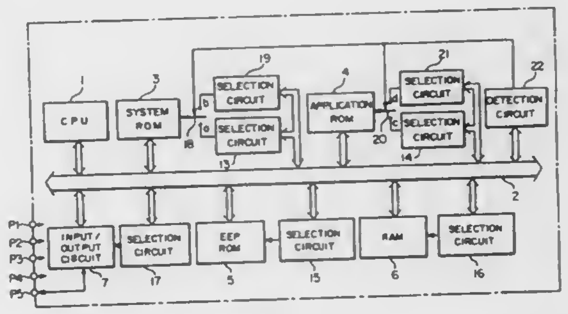
**Atsuo Yamaguchi; Kenichi Takahira; Shigeru Furuta; Takesi Inoue; Toshiyuki Matsubara, and Shuzo Fujioka, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Nov. 28, 1988, Ser. No. 276,539**

**Claims priority, application Japan, Jun. 30, 1988, 63-160746**

**Int. Cl.⁵ G06F** *12/00, 9/00*

**U.S. Cl. 364—200** **2 Claims**



1. An IC card comprising:

- a CPU having an addressable memory space including a plurality of memory addresses, each memory address being uniquely addressable by means of at least one of a plurality of instruction words, each instruction word having a predetermined length, the addressable memory space including a special page including a plurality of special memory addresses which are addressable by instruction words which are shorter in length than the instruction words used for addressing memory addresses not included in the special page;
- a first memory for storing a first program for execution by said CPU, said first memory including a starting address in which is stored a first instruction of the first program;
- a second memory for storing a second program for execution by said CPU, said second memory including a starting address in which is stored a first instruction of the second program and a predetermined address, wherein said CPU is programmed to address the predetermined address prior to executing the second program;
- a bus connecting said CPU to said first and second memories;
- selection means connected to said bus and said first and second memories and having a first state and a second state and for enabling, in the first state, said first memory when said CPU addresses a first range of memory addresses and said second memory when said CPU addresses a second range of memory addresses, and for enabling, in the second state, said first memory when said CPU addresses a third range of memory addresses and said second memory when said CPU addresses a fourth range of memory addresses, wherein the first and fourth ranges at least partially include the special page and said selection means is normally in the first state;
- detection means connected to said bus for detecting when said CPU addresses the predetermined address of said second memory, thereby indicating that said CPU is about to execute the second program, and for producing a changeover signal in response thereto; and
- changeover means connected to said detection means and said first and second memories and connected for switching said selection means to the second state from the first state in response to the changeover signal, whereby the second program in said second memory may be addressed in the special page by a shorter instruction word.

VOL
1126
ISS
4
MY
28
1991
UMI

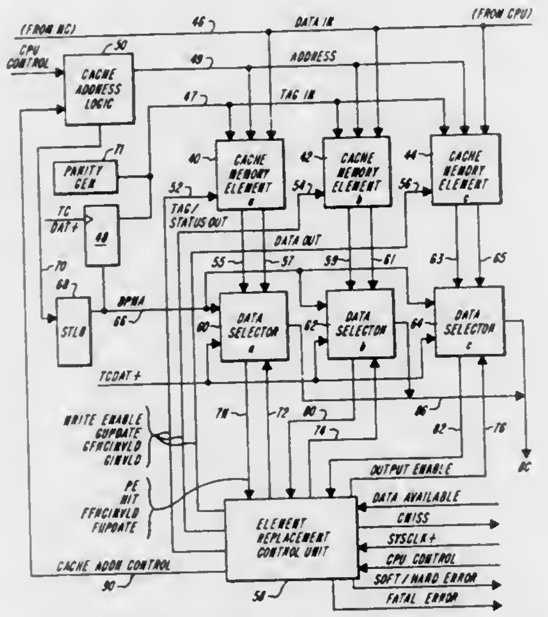
### 5,019,971
### HIGH AVAILABILITY CACHE ORGANIZATION

**Brian Lefsky, West Newton, and Mary E. Natusch, Westford, both of Mass., assignors to Prime Computer, Inc., Natick, Mass.**

**Continuation of Ser. No. 37,695, Apr. 13, 1987, abandoned. This application Aug. 21, 1989, Ser. No. 396,785**

**Int. Cl.$^5$ G06F** *9/30*

**U.S. Cl. 364—200** **15 Claims**



1. A high availability set associative cache memory for use as a buffer between a main memory and a central processing unit, said cache memory comprising:

multiple sets of cache memory cells contained in a plurality of cache memory elements, each of the cache memory cells including a data field, a tag field and a status field that are stored in commonly addressed storage locations and are commonly accessed for reading and writing, and each of the sets of cache memory cells including a cache memory cell from each of said memory elements, said status field including a force bit having a set state that indicates a physically defective, nonoperational condition and a reset state that indicates a normal condition of a cache memory cell associated with said force bit;

read means for reading data from said cache memory including

means for addressing a prescribed set of said cache memory cells,

means for comparing said tag field for each cache memory cell in said prescribed set with a physical address and for providing a hit signal when one of the tag fields and said physical address are equal, and

output enable means responsive to the reset state of said force bit and to said hit signal for enabling one of the cache memory cells in said prescribed set to provide

its data field to said central processing unit;

write means for storing data from said main memory in said prescribed set of cache memory cells;

means for determining that a cache memory cell is in a physically defective, nonoperational condition and for setting said force bit for the physically defective cache memory cell to the set state; and

means responsive to the set state of said force bit for the physically defective cache memory cell for suppressing data read therefrom and for preventing storage of data in the physically defective memory cell.

---

### 5,019,972
### CONTROL METHOD FOR AN AUTOMATIC BREAD BAKING MACHINE

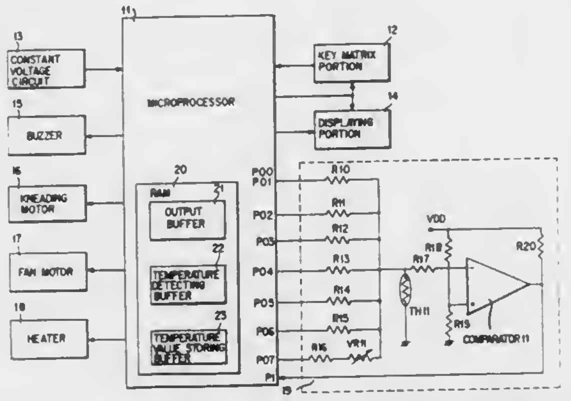
**Jong S. Rim, Suweon, Rep. of Korea, assignor to Sam Sung Electronic Co. Ltd., Seoul, Rep. of Korea**

**Filed Jun. 9, 1989, Ser. No. 363,973**

**Claims priority, application Rep. of Korea, Jun. 9, 1988, 6874/88**

**Int. Cl.$^5$ G06F** *15/20*

**U.S. Cl. 364—400** **2 Claims**



1. In an automatic bread baking machine for adjusting the temperature accoding to the programming store in a microprocessor and performing the baking of the bread, a control method of a temperature detecting circuit comprises two routines:

a temperature value detecting routine including the steps of;

outputting a high voltage signal in order from output terminals of the microprocessor,

stopping the outputting of a first voltage signal in response to receipt of a second voltage signal at the input terminals;

storing the vlue of the temperature sensed by a thermistor in a temperature value detecting buffer;

controlling the driving of the kneading motor and the fan motor and the heating of the heater to preform the baking of the bread in response t the stored values; and

a thermistor abnormal detecting routine including the steps of;

judging whether the value stored in the storing buffer is one of a first or second values after performing said routine only upon starting the bread baking machine to determine whether the theremistor is abnormal, and stopping the baking machine if the thermistor is abnormal.

---

### 5,019,973
### POKER GAME METHOD

**Joseph Wilcox, Las Vegas, Nev., and Alfred H. Wilms, Schilde, Belgium, assigners to Gaming and Technology, Inc., Las Vegas, Nev.**

**Filed Mar. 8, 1989, Ser. No. 320,493**

**Int. Cl.$^5$ A63F** *1/00*

**U.S. Cl. 364—412** **15 Claims**

1. A method of playing a poker game in which a winning hand generates a payout to a player using a computer and a video screen which comprises:

registering a first wager with said computer;

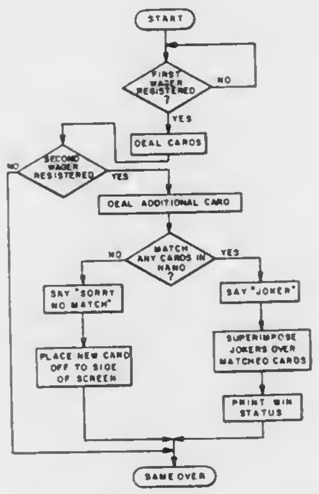
generating and displaying on said video screen a first representation of a card hand consisting of plurality of cards from a deck of cards, each card in said deck of cards having a face value;

determining the poker rank of said hand based upon said face values of said first represented cards;

enabling said player to register a second wager with said computer;

if said second wager is registered, generating and displaying on said video screen a representation of an additional card from said deck of cards;

if said second wager has been registered, comparing the face value of said additional card with the face value of each of said first represented cards in said card hand and if said face value of said additional card matches the face value of a first card in said card hand, changing the value of all cards in said card hand having the same face value as said additional card to that of a joker to form a new poker rank for said hand;



determining whether and in what amount said payout is to be made to said player according to said new poker rank of said hand from a predetermined payout table; and

terminating said poker game.

---

### 5,019,974
### DIABETES MANAGEMENT SYSTEM AND APPARATUS

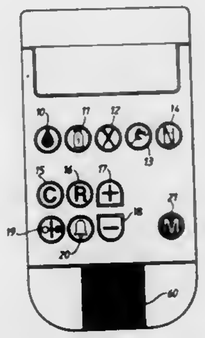
**Andreas G. F. Beckers, Maastricht, Netherlands, assignor to Diva Medical Systems bv, Maastricht, Netherlands**

**Continuation of Ser. No. 186,477, Apr. 26, 1988, abandoned. This application Feb. 22, 1990, Ser. No. 483,582**

**Claims priority, application European Pat. Off., May 1, 1987, 87304029.9**

**Int. Cl.$^5$ G06F** *15/42;* **A61B** *5/00;* **G06K** *15/21*

**U.S. Cl. 364—413.02** **12 Claims**



9. A method of treating a patient having a medical condition which method comprises:

(a) deriving a program of treatment or medication from patient information and medical condition including diet, exercise and insulin including pre-stored guidelines for diabetic therapy which permit the patient to make alterations in therapy by using the guidelines without the necessity of connecting back up to a central computer;

(b) providing the patient with a portable monitor means comprising a computer having a memory, a monitor display means and a keyboard means for accessing pre-stored guidelines comprising action keys;

(c) loading the program into the computer to display on the monitor display means at appropriate times the desired treatment or medication including guidelines for blood glucose therapy, insulin therapy, diet therapy, exercise therapy and urine therapy;

(d) recording in the computer memory information of treatment or medication performed by the patient, entered by the patient by use of the keyboard means in response to the display of pre-stored guidelines for a treatment or medication which prompts the patient to enter the information at the appropriate time by use of the keyboard means;

(e) retrieving the recorded information;

(f) revising the program of treatment or medication in light of the information recorded and the pre-stored guidelines provided;

(g) providing the patient with an interface means in the custody of the patient for reading the information stored in the monitor means and to provide a printout tape on command of the patient of selected patient therapy information graphically or numerically;

(h) displaying at appropriate times to the patient information from the program including guidelines relative to the desired treatment options for medication therapy, diet therapy and exercise therapy for that patient to prompt the patient to perform the displayed information at the appropriate time and to provide options for deviations responsive to information provided by the interface means.

12. A system of outpatient treatment management of diabetes which system comprises:

(a) a master computer programmed to receive input as to patient information and diabetic medical condition initially to develop and periodically revise on the basis of subsequent data of a patient received from a portable monitor the optimum program of diabetic treatment including patient therapy and medication information for the patient and to load individualized instructions of diabetic treatment into the portable monitor to be stored;

(b) computer storage means for storing individual patient data inputted and for storing subsequent input data received from the monitor;

(c) analyzing means for comparing individual patient data including insulin dosage, diet and exercise and medical conditions with previous individual patient data stored in the master computer with the said optimum program and for changing the optimum program of treatment responsive to subsequent input data including patient therapy information for the patient on a periodic basis;

(d) the portable monitor in the possession of the patient;

(e) interface means in the custody of the patient for enabling the master computer and the portable monitor to exchange information and for displaying on an interface display means on a daily basis individual summary patient data or graphical information on a printout tape to provide the patient with a basis for variation in therapy and medication;

(f) the monitor comprising:

  (i) a monitor display means to display information to the patient;

  (ii) a keyboard;

  (iii) a programmed computer into which computer treatment information is entered by the patient's use of the keyboard;

  (iv) storage means for accepting and storing patient treatment information from the master computer;

  (v) monitor storage means for accepting patient therapy information entered by the patient's use of the keyboard and blood glucose values automatically measured by the blood glucose optical test means for access by the patient's use of the keyboard;

  (vi) a blood glucose optical test means to measure auto-

VOL
1126
ISS
4
MY
28
1991
UMI

matically the blood glucose value of the patient from a test strip;

(vii) the monitor computer being programmed;

(1) to display at appropriate times to the patient from the storage means information relative to the desired treatment or medication dose to prompt the patient to make an election of treatment or therapy and to perform the displayed information at the appropriate time;

(2) to accept and store in the monitor storage means the prompted information entered by the patient on the keyboard to include the automatic storage of present blood glucose measurements from the blood glucose test means; and

(3) to display guidelines for medication, diet and exercise, with change options, to permit the patient to select by use of the keyboard variations to the guidelines on a daily basis;

(viii) monitor display means for displaying treatment guidelines with change options to permit the patient to select by use of the key means variations to optimum guidelines available on a daily basis; and

(g) key means included in the keyboard for recording or processing patient treatment information selected by the patient in the monitor therapy storage means from a plurality of individualized choices.

---

### 5,019,975

### METHOD FOR CONSTRUCTING A DATA BASE IN A MEDICAL IMAGE CONTROL SYSTEM

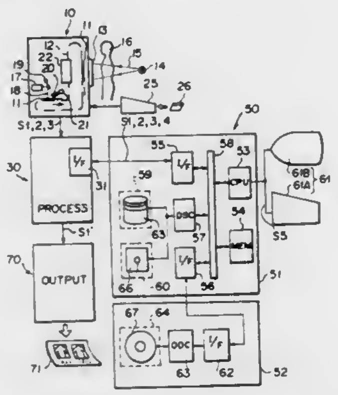
**Hachiro Mukai, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation-in-part of Ser. No. 275,623, Nov. 15, 1988, abandoned. This application Apr. 25, 1989, Ser. No. 342,828**

**Claims priority, application Japan, Feb. 7, 1989, 1-27842**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 364—413.13** **9 Claims**



1. A method for constructing a data base in a medical image control system in which image signals representing medical images are filed on a recording medium and said image signals are retrieved by use of said data base,

said method comprising the steps of recording image retrieval signal data in said data base, said image retrieval signal data including information indicating the time at which each medical image is recorded, a rank of importance for each medical image, and a number indicating how many times the image signals corresponding to each medical image filed on said recording medium base have been retrieved; incrementing said number each time a corresponding image signal is retrieved; and, when said data base is full of image retrieval signal data, deleting the image retrieval signal data corresponding to the image signals of the medical image in which at least (i) said time at which said medical image is recorded is earlier than a predetermined time and (ii) said rank of importance of said medical image is lower than a predetermined value.

---

### 5,019,976

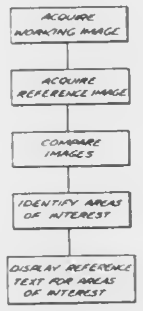
### METHOD AND SYSTEM FOR RETRIEVING TEXT ASSOCIATED WITH A REFERENCE IMAGE CORRESPONDENCE TO A SELECTED PATIENT IMAGE

**Lee C. Chiu, Palos Verdes Estates; Yuki N. Ko, Cerritos, and Keith N. Wong, Torrance, all of Calif., assignors to New World Down Hole Tools**

**Continuation of Ser. No. 059,533, Jun. 8, 1987. This application Jan. 8, 1990, Ser. No. 461,979**

**Int. Cl.$^5$ G06F** *15/42*

**U.S. Cl. 364—413.13** **22 Claims**


ACQUIRE WORKING IMAGE
ACQUIRE REFERENCE IMAGE
COMPARE IMAGES
IDENTIFY AREAS OF INTEREST
DISPLAY REFERENCE TEXT FOR AREAS OF INTEREST

1. A method for analyzing the data corresponding to a working image displayed on an electronic visual display device comprising:

a) first acquiring a working image from a working image file;

b) second acquiring a reference image from a reference image file;

c) third comparing the working image with the reference image;

d) fourth identifying areas of interest; and

e) fifth acquiring text from a reference text file after the working image and the reference image have been acquired, displayed, and compared and displaying the text regarding areas of interest.

13. A system for analyzing the data corresponding to a working image to be displayed on an electronic visual display device providing textbook information regarding particular areas of interest within the working image, comprising:

a working image file, having at least one working image;

a reference image file, having at least one reference image that corresponds to at least one working image in the working image file;

means for identifying a particular area within said reference image of said reference image file which corresponds to a particular area of interest identified within said working image of said working image file;

a means for accessing reference text after identification of the particular area of interest in said reference image, having reference text corresponding to said particular area of interest in said working image; and

means for displaying the reference text corresponding to the area of interest.

---

### 5,019,977

### LIGHT PEN INTERACTIVE WEATHER PARAMETER DISPLAY SYSTEM

**Daniel J. LaPointe, Bar Harbor; Michael Vietti, Atlantic, and John S. Baer, Bar Harbor, all of Me., assignors to RainWise, Inc., Bar Harbor, Me.**

**Filed Nov. 7, 1988, Ser. No. 268,802**

**Int. Cl.$^5$ G06F** *15/54;* **G01W** *1/04*

**U.S. Cl. 364—420** **21 Claims**

1. A weather station display system comprising:

a plurality of local weather parameter sensors each comprising a transducer for measuring values of a weather parameter at the location of the weather station display system and generating electrical signals representative of the measurement values of the local weather parameter;

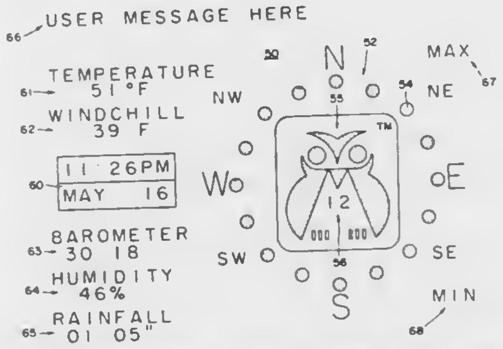
electrical converting means for converting electrical signals representative of weather parameter measurement values to digitally coded weather data for digital signal processing;

computer processor means for digital signal processing and storage of the digitally coded weather data;

screen memory means comprising a current screen memory for storing current screen display information including screen display format data and digitally coded weather data for raster scanning onto a raster screen display;

raster control means operatively coupled to the computer processor and screen memory means for controlling and timing scanning access to the screen memory for updating the screen memory and for refresh of a raster screen display;

program memory means comprising screen display format data, said program memory means being operatively coupled to the computer processor for loading screen display format data to the screen memory means and raster control means for initializing the screen display format, said screen display format data comprising at least a main screen display format establishing an arrangement of a plurality of weather parameter character locations for weather data to appear in the form of current weather parameter characters on a raster screen display;



a light pen operatively coupled to the raster control means and computer processor for interrogating character locations of the screen display format on a raster screen display for selectively modifying displayed characters;

first program means stored in the program memory means causing the computer processor to sample periodically the digitally coded weather data from the respective weather parameter sensors and to update the weather data stored in the screen memory means for display on a raster screen display;

and second program means stored in the program memory causing the computer processor to respond to light pen interrogation of character locations of the screen display format on a raster screen display for selectively modifying displayed characters;

said raster control means generating digital signals scanned from the screen memory means representing said screen display format data and digitally coded weather data and also generating television video timing signals;

digital to video analog convertor means for converting said digital signals scanned from the screen memory means and said video timing signals to a composite video analog signal;

video frequency modulator means for modulating the composite video signal on a standard television channel frequency carrier and providing television output signals for real time display of local weather data; and

a standard television set at the location of the weather station display system for real time display of said local weather data in the desired screen display format and means for coupling the television output signals to an input of said standard television set;

said main screen display format comprising a maximum measurement value interrogation location and a minimum measurement value interrogation locations;

said first program means causing the computer processor means to determine and store maximum and minimum measurement values of the weather parameters and the respective times of occurrence; and

said second program means stored in the program memory means causing the computer processor to respond to light pen interrogation of one of the maximum and minimum measurement value interrogation locations followed by light pen sensing of a selected weather parameter character location by displaying the respective maximum or minimum measurement value measured during a previous selected time interval using maximum and minimum weather parameter characters distinguishable from current weather parameter characters.

---

### 5,019,978

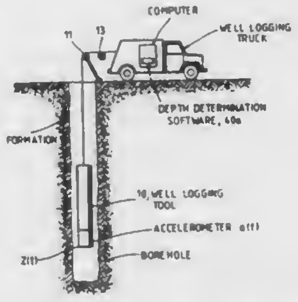
### DEPTH DETERMINATION SYSTEM UTILIZING PARAMETER ESTIMATION FOR A DOWNHOLE WELL LOGGING APPARATUS

**Allen Q. Howard, Jr., Kingswood, Tex., and David J. Rossi, Newtown, Conn., assignors to Schlumberger Technology Corporation, Houston, Tex.**

**Filed Sep. 1, 1988, Ser. No. 240,025**

**Int. Cl.$^5$ E21B** *47/04;* **G01B** *7/26, 7/04*

**U.S. Cl. 364—422** **12 Claims**



8. A method of correcting a depth reading produced from a depth wheel when a well logging tool, suspended from a cable, is lowered into or drawn from a borehole of an oil well, said well logging tool including an accelerometer means for producing an acceleration output signal indicative of the instantaneous acceleration of said tool along the axis of said borehole, comprising the steps of:

estimating a set of resonance parameters associated with a resonance behavior of the tool-cable system when said tool is disposed at an approximate depth in said borehole in response to said output signal from said accelerometer means indicative of said instantaneous acceleration of said tool;

producing a correction factor in response to said set of resonance parameters; and

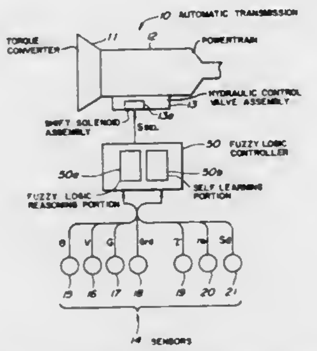
correcting said depth reading from said depth wheel using said correction factor to perform the correction.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,019,979

### CONTROL FOR AUTOMATIC TRANSMISSION

**Hiroshi Takahashi, Zushi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**
**Filed Feb. 13, 1989, Ser. No. 309,442**
**Claims priority, application Japan, Feb. 12, 1988, 63-30659**
**Int. Cl.$^5$ B60K** *41/18;* **G05D** *17/02*
**U.S. Cl. 364—424.1** **6 Claims**



4. A method of controlling an automatic transmission of a motor vehicle, comprising the steps of:

detecting parameters indicative of running conditions which the motor vehicle is involved in and generating a series of signals indicative of said parameters detected;

providing a series of rules of thumb, each being expressed by a series of membership functions of said signals and recommending an action which the automatic transmission should take;

testing said series of rules of thumb one after another based on said signals to determine the degrees to which said series of rules of thumb are satisfied;

determining a speed ratio position which the automatic transmission should take in response to the degrees determined and generating an output signal indicative of said speed ratio position determined;

sampling each of said series of signals and calculating a variance of the data sampled for each of said series of signals;

comparing the variance of the data sampled for each of said series of signals with a predetermined reference;

modifying at least one of said series of membership functions of at least one of said series of rules of thumb when the variance is less than said predetermined reference; and

shifting responsive to said output signal the automatic transmission to said speed ratio position indicated by said output signal.

---

### 5,019,980

### GENERAL PURPOSE AVIONICS DISPLAY MONITOR

**Benjamin F. Starr, Lynnwood, Wash.; Mark L. Wallace, Aurora, Colo.; Gaylen M. Talley, and Paul M. Woo, both of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.**
**Filed Jul. 14, 1989, Ser. No. 380,130**
**Int. Cl.$^5$ G06F** *15/20, 11/00*
**U.S. Cl. 364—424.04** **19 Claims**

1. A general purpose avionics display monitor comprising:

(a) an interface means for interfacing a data processing system to a plurality of aircraft data buses for conveying data from the aircraft data buses to the data processing system, said interface means including:

  (i) a dual port shared memory;

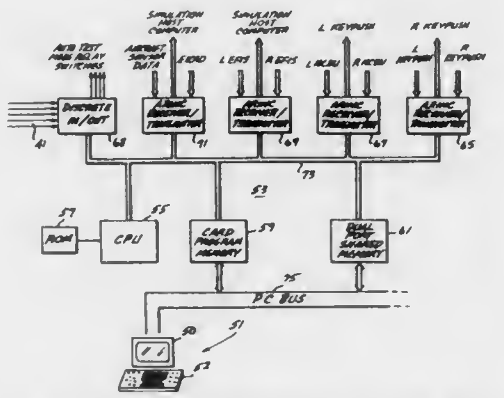
  (ii) a program memory;

  (iii) a plurality of data receivers suitable for connection to aircraft data buses for receiving data flowing on said aircraft data buses;

  (iv) a transfer data bus coupled to one port of said dual port shared memory, and said plurality of data receivers for transferring data therebetween; and

  (v) a CPU coupled to said transfer data bus, said CPU programmed to control the flow of data on said transfer data bus such that data received by said plurality of data receivers is first transferred to said program memory in a rapid manner and later transferred in a slower manner to said dual port shared memory; and

(b) a data processing system coupled to the other port of said dual port shared memory for receiving data stored in said dual port shared memory and for displaying and storing said data, said data processing system including:



  (i) a user interface mechanism for receiving user commands;

  (ii) a mass storage for receiving data from said dual port shared memory and storing said data when a user causes a first predetermined command to be generated by said user interface mechanism; and

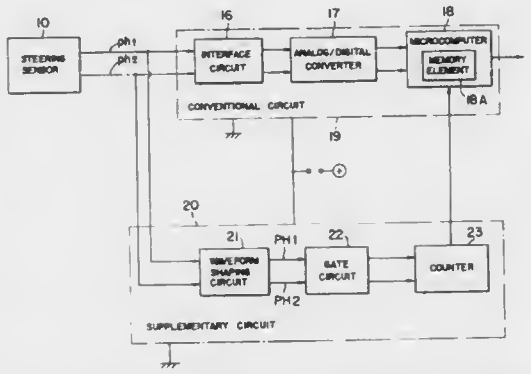
  (iii) a monitor for displaying data received from said dual port shared memory.

---

### 5,019,981

### DEVICE AND METHOD FOR DECREASING POWER CONSUMPTION OF A STEERING ANGLE DETECTING SYSTEM FOR VEHICLE

**Saiichiro Oshita; Toyohiko Mouri, and Tsutomu Takahashi, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Mar. 2, 1990, Ser. No. 487,300**
**Claims priority, application Japan, Mar. 9, 1989, 1-57100; Oct. 4, 1989, 1-259443**
**Int. Cl.$^5$ B62D** *5/06*
**U.S. Cl. 364—424.05** **2 Claims**



1. A device for decreasing power consumption in a steering angle detection system having a steering sensor for generating two signals of sine wave-like with a phase discrepancy of a predetermined degree responsive to a rotation of a steering shaft, and a steering angle calculating means responsive to said signals from said steering sensor for calculating an absolute steering angle and for storing said absolute steering angle in a memory while an ignition switch is turned on, said calculating means receiving no power supply when the ignition switch is turned off with the exception of the memory;

said device comprising means for providing power when the ignition switch is turned off:

shaping means for shaping said two signals of sine wave-like into two signals of rectangular pulse-like;

counter means for counting a number of rectangular pulses output from said shaping means in order to detect an amount of the steering angle change when the ignition switch is turned off; and

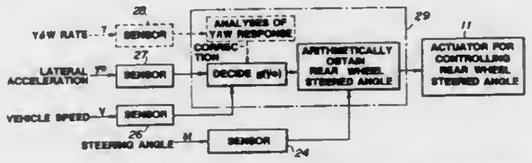
said calculating means for further reading said number of pulses from said counter means to correct the absolute steering angle stored in the memory when said switch is turned on again.

---

### 5,019,982

### METHOD OF CONTROLLING REAR WHEELS OF A FOUR-WHEEL STEERING MOTOR VEHICLES

**Yoshimi Furukawa, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Continuation-in-part of Ser. No. 118,398, Nov. 5, 1987, which is a continuation-in-part of Ser. No. 690,167, Jan. 16, 1985, Pat. No. 4,964,481. This application Sep. 21, 1989, Ser. No. 410,281**
**Claims priority, application Japan, Sep. 22, 1988, 63-237794**
**Int. Cl.$^5$ B62D** *6/04*
**U.S. Cl. 364—424.05** **6 Claims**



2. A method of controlling a rear wheel steer angle of a four-wheel steering motor vehicle having front road wheels, rear road wheels, a steering wheel, a front wheel steering mechanism for turning the front road wheels in response to steering action of the steering wheel, and a rear wheel steering mechanism for turning the rear road wheels in response to the turning of the front road wheels, said method comprising the steps of:

detecting a lateral acceleration and a front wheel steer angle;

determining a final ratio of said rear wheel steer angle to said front wheel steer angle based on the detected lateral acceleration;

determining a target rear wheel steer angle from said final ratio and said front wheel steer angle;

turning said rear road wheels to said target rear wheel steer angle; and

determining said final ratio such that a transient yaw rate gain represented by a ratio of an increase in a yaw rate to an increase in said front wheel steer angle immediately after the motor vehicle is steered is positive while the lateral acceleration is smaller than a predetermined value.

---

### 5,019,983

### AUTOMATIC STEERING APPARATUS USING REFLECTED SIGNALS

**Herman P. Schutten, Bayside, Wis.; Dwight B. Stephenson, Savage, and Oliver W. Johnson, Chaska, both of Minn., assignors to Eaton Corporation, Cleveland, Ohio**
**Filed Feb. 21, 1989, Ser. No. 313,644**
**Int. Cl.$^5$ G06F** *15/50;* **A01D** *34/00*
**U.S. Cl. 364—424.07** **6 Claims**

1. A steering system that automatically steers a vehicle to track rows of spaced-apart plants, comprising:

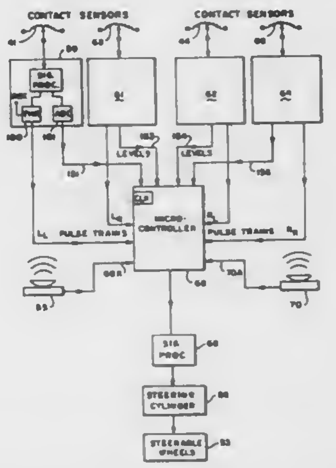
plant sensor means on the vehicle for sensing said plants when the vehicle encounters plants and for providing signals thereupon:

means for ascertaining from said signals of said plant sensor means the lateral position of said vehicle relative to said plant rows and providing lateral-position information signals;

integration means for receiving and integrating said lateral-position information signals and providing integrated signals;

wave transmission and receiving means for ascertaining, from reflections of transmitted waves, the speeds of parts of the vehicle relative to the ground, comprising:

at least two means spaced apart laterally of the vehicle, which transmit said waves toward and receive reflected waves from the ground, for measuring the ground speeds of their respective locations on the vehicle and for providing ground-speed signals accordingly;



processing means utilizing said ground-speed signals for determining speed-difference information between said locations on the vehicle of said means for measuring the ground speeds of their respective locations;

means for combining said lateral-position information signals and said integrated signals and said speed-difference information to provide steering command signals;

actuator means receiving said steering command signals and responsive thereto for orienting the steerable wheels of said vehicle proportional to said steering command signals and thus steering said vehicle to follow a course along said rows.

---

### 5,019,984

### VEHICLE WHEEL SLIP CONTROL SYSTEM

**Syouichi Masaki, Anjo; Hiromi Maehata, Kariya; Kazunori Sakai, Nagoya, and Tatsuo Sugitani, Mishima, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**
**Continuation of Ser. No. 89,173, Aug. 25, 1987, abandoned. This application Jun. 15, 1989, Ser. No. 366,656**
**Claims priority, application Japan, Aug. 27, 1986, 61-200856**
**Int. Cl.$^5$ B60T** *8/60*
**U.S. Cl. 364—426.02** **21 Claims**

12. A vehicle wheel slip control system comprising:

(a) a plurality of sensors, each detecting a rotational speed of a detected vehicle wheel, the detected vehicle wheels including a pair of non-driven, front wheels including a left-side and a right-side vehicle wheel;

(b) means for calculating an estimated vehicle speed on the basis of a highest of the detected vehicle wheel rotational speeds;

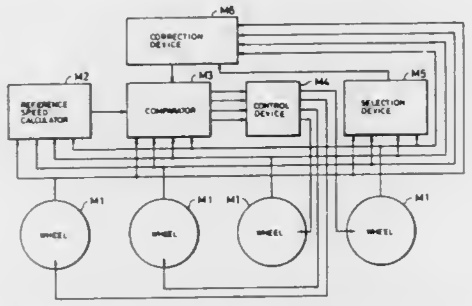
(c) means for calculating a first slip detection reference value on the basis of the estimated vehicle speed and a predetermined coefficient;

(d) means for calculating a higher of the detected vehicle wheel speeds of said pair of the left-side and right-side vehicle wheels;

VOL
1126
ISS
4
MY
28
1991
UMI

(e) means for calculating a difference between the calculated higher vehicle wheel speed, and the detected vehicle wheel speed of each said vehicle wheels detected by said sensors;

(f) means for correcting the first slip detection reference value in accordance with the respective calculated differences and thereby converting the first slip detection reference value into second slip detection reference values;



(g) means for comparing the detected vehicle wheel speeds with the second slip detection reference values; and

(h) means for controlling slip conditions of the respective vehicle wheels in accordance with results of said comparisons.

---

### 5,019,985

### ANTI-SKID BRAKE CONTROL SYSTEM FOR AUTOMOTIVE VEHICLE, PARTICULARLY FOR VEHICLE HAVING SELECTIVE TWO-WHEEL AND FOUR-WHEEL DRIVE POWER TRAIN

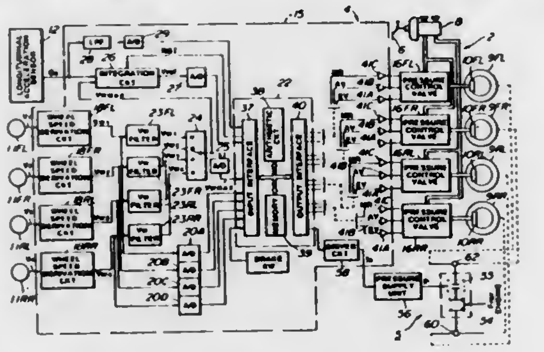
**Yoshiki Yasuno, Kanagawa; Yasuki Ishikawa, Tokyo; Akira Higashimata, and Takeshi Fujishiro, both of Kanagawa, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Mar. 30, 1989, Ser. No. 330,620**

**Claims priority, application Japan, Mar. 31, 1988, 63-78563**

**Int. Cl.$^5$ G06F** *7/70, 15/50;* **B60T** *8/86;* **B60K** *17/356*

**U.S. Cl. 364—426.02** **18 Claims**



1. A combination comprising:

a power train control system associated with an automotive internal combustion engine for distributing driving torque gererated by said engine to primary driving wheels which are permanently coupled with said engine and auxiliary driving wheels which are disconnectably coupled with said engine, said power train control system being operative between a two-wheel drive mode for distributing driving torque only to said primary wheels and a four-wheel drive mode for distributing driving torque to all of said primary and auxiliary wheels;

an anti-skid brake control system for controlling braking pressure for maintaining wheel slippage in the vicinity of a predetermined optimum level, said anti-skid control system comprising:

a plurality of wheel cylinders;

a braking circuit connecting a pressurized fluid source to a respective wheel cylinder of said plurality of wheel cylinders for each of said primary and auxiliary wheels for building up braking pressure in the latter;

a plurality of pressure control valve means, each disposed in said braking circuit, for controlling braking pressure in an associated one of said wheel cylinders, each of said pressure control valve means being operable for increasing braking pressure in said associated one of said wheel cylinders in a first mode and for decreasing braking pressure in said associated one of said wheel cylinders in a second mode;

a plurality of first sensors, each monitoring rotation speed of an associated one of said primary and auxiliary wheels for producing a wheel speed indicative signal;

second means for deriving wheel slippage on the basis of said wheel speed indicative signal and producing wheel slippage data with respect to each of said wheels;

third means for producing a first control signal for controlling an operation mode of each of said pressure control valve means independently of other ones of said valve means for switching said operation mode between said first and second mode in order to maintain wheel slippage at each wheel in the vicinity of said predetermined optimum value, on the basis of said wheel slippage data; and

fourth means, active while said third means is active, for detecting wheel slippage at said primary wheels which is greater than a predetermined wheel slippage criterion for producing a second control signal for controlling said power train control system to set said operation mode at said four-wheel drive mode.

---

### 5,019,986

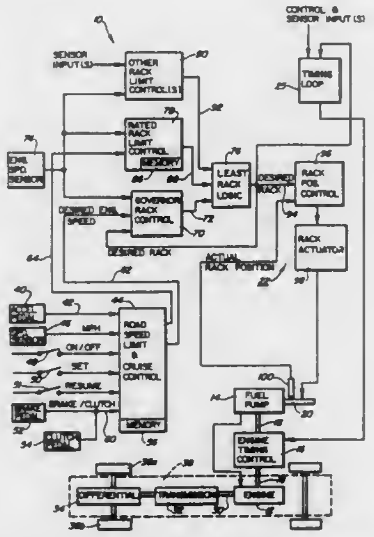
### METHOD OF OPERATING A VEHICLE ENGINE

**Edward E. Londt, Fort Wayne, Ind., and Robert T. Schaar, Chillicothe, Ill., assignors to Caterpillar Inc., Peoria and Navistar International Corporation, Chicago, both of, Ill.**

**Filed Apr. 27, 1990, Ser. No. 515,727**

**Int. Cl.$^5$ B60K** *31/00*

**U.S. Cl. 364—426.04** **10 Claims**



1. A method of operating an engine of a vehicle equipped with a cruise control which is engageable to control the speed of the vehicle wherein the engine is controlled by an engine control that establishes fuel delivery limits as a function of speed of the vehicle, the method comprising the steps of:

(a) operating the engine in accordance with fuel delivery limits within a first range of delivery limits when the cruise control is engaged and the speed of the vehicle is less than a first speed limit whereby the engine is controlled to permit acceleration of the vehicle under a certain number of operating conditions thereof;

(b) operating the engine in accordance with fuel delivery limits within a second range of delivery limits less than the first range of delivery limits when the speed of the vehicle is greater than the first speed limit but less than a second speed limit; and

(c) operating the engine in accordance with fuel delivery limits within a third range of delivery limits less than the second range of delivery limits when the vehicle speed is greater than the second speed limit whereby the engine is controlled to permit acceleration of the vehicle under a number of operating conditions less than said certain number of operating conditions.

---

### 5,019,987

### CRUISE CONTROL APPARATUS FOR A VEHICLE

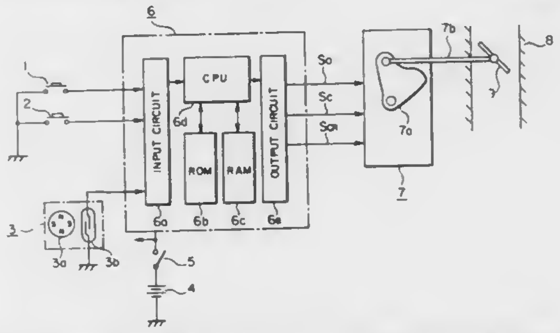
**Yasuo Naito; Kazuyori Katayama, and Hiroyuki Kouzuki, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 22, 1989, Ser. No. 440,185**

**Claims priority, application Japan, Dec. 23, 1988, 63-327131**

**Int. Cl.$^5$ B60K** *31/00*

**U.S. Cl. 364—426.04** **2 Claims**



2. A cruise control apparatus for a vehicle having a throttle valve and a throttle actuator, comprising:

a speed sensor for sensing the speed of the vehicle;

memory means for storing the vehicle speed sensed by said speed sensor in a first area as a first target speed and in a second area as a second target speed in response to an operator set command signal;

comparison means for comparing said first target speed and said second target speed and outputting either one of said target speeds as a final target speed if the target speeds are equal to each other, but outputting a lower one of said target speeds as said final target speed if there is disagreement therebetween;

cruise control means connected to receive the output of said comparison means and responsive thereto for controlling the throttle actuator to move the throttle valve to a target degree of opening which corresponds to said final target speed; and

cruise control cancellation means operable to cancel the cruise control operation of said cruise control means if there is disagreement between said first and second target speeds.

---

### 5,019,988

### METHOD FOR GENERATING TRIGGER PULSES

**Manfred Glehr, Eggenfelden, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

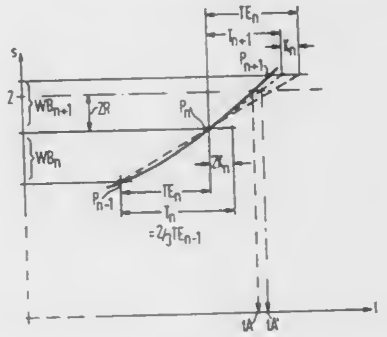
**Filed May 16, 1989, Ser. No. 352,365**

**Claims priority, application Fed. Rep. of Germany, May 16, 1988, 3816643**

**Int. Cl.$^5$ F02P** *5/15*

**U.S. Cl. 364—431.03** **1 Claim**

1. A method for generating trigger pulses at allocated trigger points in time tA for the control of periodically repeating events of an internal combustion engine, whereby an angular position of a crank shaft in the internal combustion engine at which a trigger pulse is to be generated relative to a reference mark is calculated with a control angle on the basis of linear extrapolation, comprising the steps of: proceeding from the reference mark after every rotation of the crank shaft by a given angle, ZV, through a given range thereby defined, measuring a real running time $TE_n$ for a rotation of the crank shaft through a range, $WE_n$, required therefore; calculating the running time $T_{n+1}$ for a further rotation of the crank shaft through a next given range $WB_{n+1}$ according to the equation:



$$T_{n+1}=TE_n-K_n$$

where

$$K_n=\tfrac{1}{2}(T_n-TE_n)\text{ and}$$

where, $T_n$ is a calculated running time that was calculated preceding the calculating of $T_{n+1}$; calculating a target range in which the control angle lies and calculating the size of a remaining angle, ZR, between the beginning of the target range and the control angle; and calculating the trigger point in time, tA, of every trigger pulse calculated from the beginning of the target range according to the equation:

$$tA=\frac{ZR}{ZV}\times T_{n+1};\text{ and}$$

using the trigger point in time, tA, to control the internal combustion engine.

---

### 5,019,989

### VEHICLE ENGINE OUTPUT CONTROL METHOD AND APPARATUS

**Katsunori Ueda; Makoto Shimada; Yoshiaki Danno, all of Kyoto; Kazuhide Togai, Takatsuki, and Masato Yoshida, Kyoto, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 27, 1989, Ser. No. 441,777**

**Claims priority, application Japan, Dec. 1, 1988, 63-304797; Dec. 1, 1988, 63-304799; Dec. 15, 1988, 63-317418**

**Int. Cl.$^5$ G06F** *15/48, 15/50;* **G06G** *7/70;* **F02D** *23/00*

**U.S. Cl. 364—431.05** **28 Claims**

1. An engine output control method for a vehicle, comprising the steps of:

setting a target output of an engine in accordance with an operation condition of a vehicle;

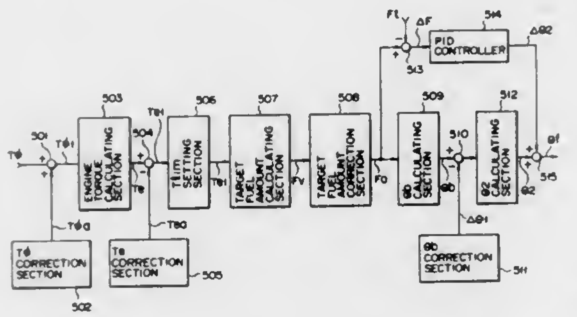
converting the target output into a target fuel supply amount to said engine;

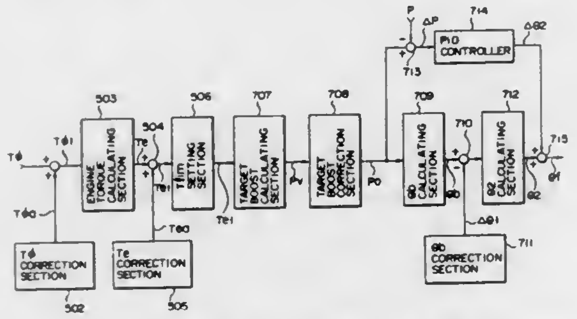
converting the target fuel supply amount into a target opening of a throttle valve provided to an intake path of said engine;

correcting the target opening in accordance with a deviation

VOL
1126
ISS
4
MY
28
1991
UMI

between an actual fuel supply amount to said engine and the target fuel supply amount; and





open/close-controlling said throttle valve in accordance with the corrected target opening.

---

### 5,019,990

## POSITION DETECTOR FOR MOVING VEHICLE

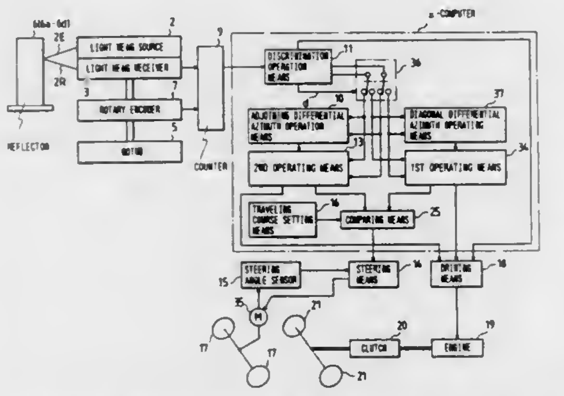
**Kenji Kamimura, and Sadachika Tsuzuki, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 22, 1989, Ser. No. 454,824**

**Claims priority, application Japan, Jan. 7, 1989, 1-1868**

**Int. Cl.$^5$ G06F** *15/50*

**U.S. Cl. 364—449** **5 Claims**



1. A position detecting system for a moving vehicle wherein a position of the moving vehicle is detected on the basis of received light beam signals from light-emitting means disposed at at least four reference points, the system comprising:

a light-receiving means carried on the moving vehicle for rotation in the horizontal direction for receiving the light beam signals,

a means for detecting the azimuth of each light-emitting means with respect to the moving vehicle on the basis of light receiving intervals in the light-receiving means,

a means for predicting the direction of the light-emitting means to be detected in the next scanning on the basis of the azimuths detected in the azimuth detecting means,

a means for calculating the position of the moving vehicle on the basis of the detected azimuths if the detected position of the light-emitting means is in the direction predicted in the predicting means, and

a means for calculating the azimuth of the undetected light-emitting means on the basis of the positions of the remaining light-emitting means other than the undetected light-emitting means if the detected position of the light-emitting means is out of the direction predicted in the predicting means, and for predicting the azimuth at which the undetected light-emitting means is to be detected in the next scanning.

---

### 5,019,991

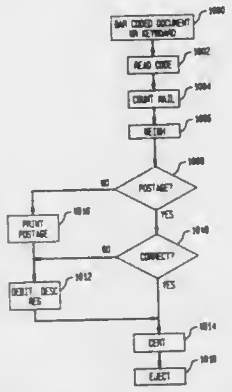
## CERTIFIED WEIGHER-SHORT PAID MAIL

**Ronald P. Sansone, Weston, Conn.; Raymond Keating, Purdys, N.Y.; Joseph W. Wall, and Robert T. Durst, Jr., both of Monroe, Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Dec. 16, 1988, Ser. No. 285,146**

**Int. Cl.$^5$ G07B** *17/02*

**U.S. Cl. 364—464.03** **9 Claims**



1. A mailing system for accurate accounting for payment of mail pieces to be mailed, comprising: accounting means for storing data corresponding to postage funds, a source of mail pieces having postage imprinted thereon, certified weighing means for weighing said mail pieces, data processing means coupled to said accounting means and to said weighing means for determining postage required for mailing said mail pieces and reducing the postage funds in accordance with any difference between the determined postage required and the postage imprinted on said mail pieces, and printing means in communication with said data processing means for printing a human readable certification on said mail pieces for certifying that the data in said accounting means was modified to account for the proper postage required to mail said mail pieces.

---

### 5,019,992

## SYSTEM FOR DESIGNING INTERCOMMUNICATION NETWORKS

**George T. Brown, Apalachin, N.Y.; David B. Millis, Friendsville, Pa.; Paul R. Reynolds, Morrisville, N.C., and Ronald P. Nowak, Endicott, N.Y., assignors to International Business Machines Corp., Armonk, N.Y.**

**Division of Ser. No. 89,201, Aug. 24, 1987, Pat. No. 4,939,668. This application Sep. 29, 1989, Ser. No. 414,488**

**Int. Cl.$^5$ G06F** *15/46*

**U.S. Cl. 364—468** **3 Claims**

1. A system for designing a cable for use within a product, said system comprising:

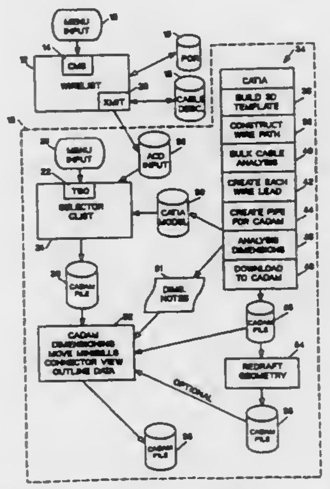
a data input system comprising

a database,

means for inputting plan of record cabling information into said database, and

means for inputting cable description information into said database;

a modelling system comprising means for geometrically modelling the cable to determine geometric information about the cable including the length of the cable, said modelling system and said data input system being operable independently of and in parallel with each other to minimize cycle time in designing said cable; and



means, coupled to said data input system and said modelling system, for generating a bill of materials based on said plan of record cabling information, said cable description information, and said cable geometry information.

---

### 5,019,993

## MACHINE FOR MEASURING AND MATHEMATICALLY DEFINING THE SURFACE OF THREE-DIMENSIONAL MODELS, PARTICULARLY FOR THE MANUFACTURE OF MOLDS WITH NUMERIC-CONTROL MACHINE TOOLS

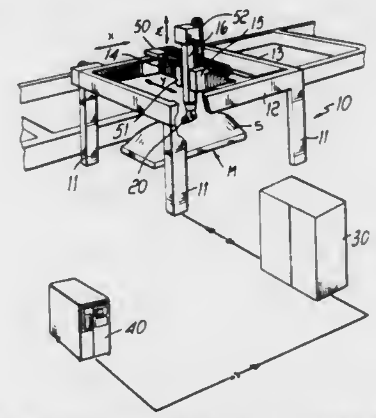
**Piera L. Montalcini, and Antonio Racciu, both of Turin, Italy, assignors to Advanced Data Processing Adp S.r.l., Turin, Italy**

**Filed Oct. 24, 1988, Ser. No. 261,301**

**Claims priority, application Italy, Oct. 26, 1987, 53750/87[U]**

**Int. Cl.$^5$ G06F** *15/46;* **G01B** *9/00*

**U.S. Cl. 364—474.29** **4 Claims**



1. A machine for measuring and mathematically defining a three-dimensional surface, comprising, in combination:

a supporting frame,

a plurality of guides on said supporting frame,

a robotized support movable along said guides,

a measure head rigid with said robotized support, said measure head including head including light emitting means generating, at each instant, a beam of light directed toward and striking a three-dimensional surface at a reflection point to generate a reflected beam of light, light detecting means for detecting the reflected beam of light, and distance measuring means for measuring at each instant the distance between said measure head and the reflection point of the three-dimensional surface from the reflected beam of light,

scan movement means for moving said measure head along a scanning line,

height adjusting means for moving said measure head perpendicular to said scanning line,

means for maintaining said measure head at a preset constant distance from the reflection point of the three-dimensional surface, said means for maintaining the preset constant distance being connected to said distance measuring means to receive therefrom the measured distance and correspondingly controlling said height adjusting means,

rotating means for rotating said measure head,

means for maintaining said measure head at each instant perpendicular to the three-dimensional surface at the reflection point, said means for maintaining the measure head perpendicular to the three-dimensional surface being connected to said measure head to receive the measured distance and comprising means for determining a vector normal to the three-dimensional surface at the reflection point,

processing means for calculating the coordinates of the reflection points of the three-dimensional surface, and

means for storing said coordinates,

wherein said measure head comprises two laser measuring elements arranged side by side on said robotized support and rigid therewith for determining the vector normal to the three-dimensional surface, said laser measuring elements including each respective light emitting means and light detecting means for simultaneously scanning two parallel paths on the three dimensional surface as successions of homologous points, said machine further comprising means for processing the determined normal vector which are connected to said means for determining the normal vector, means for controlling said rotating means being provided which are connected to said means for processing the determined normal vector and which maintain said measure head at each instant perpendicular to the three-dimensional surface at the reflection point.

---

### 5,019,994

## METHOD AND APPARATUS FOR DRYING ARTICLES IN A CONTINUOUS FEED PROCESS

**Donald D. Rainville, Manassas, Va., assignor to Universal Dynamics Corporation, Woodbridge, Va.**

**Filed May 31, 1989, Ser. No. 359,218**

**Int. Cl.$^5$ G05D** *23/24;* **F26B** *21/10*

**U.S. Cl. 364—477** **22 Claims**

3. A method for drying articles, comprising the steps of

(a) causing a normal steady-state flow of a plurality of articles through a drying chamber while simultaneously causing a drying medium heated to a normal operating inlet temperature to pass through said drying chamber and contact the articles therein;

(b) next detecting the normal operating inlet temperature of the drying medium after it is heated and before it contacts the articles in the drying chamber;

(c) thereafter detecting an outlet temperature of the drying medium after it has contacted the articles in the drying chamber;

(d) next computing the difference between the normal operating inlet temperature of the drying medium and the outlet temperature of the drying medium after it has contacted the articles in the drying chamber;

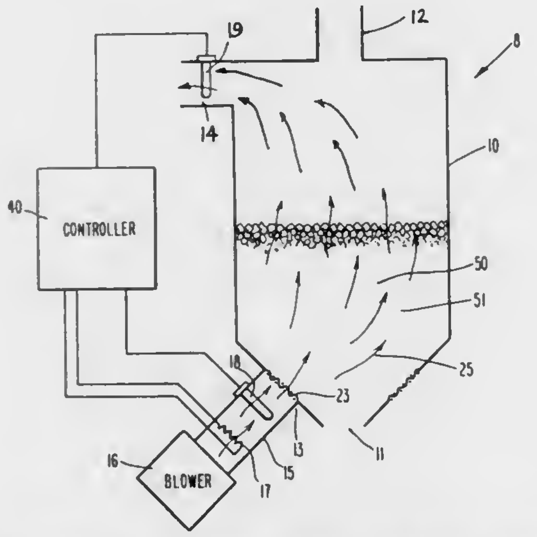
(e) thereafter comparing to a first pre-selected temperature difference said difference between the normal operating inlet temperature of the drying medium and the outlet temperature of the drying medium after it has contacted the articles;

(f) when said difference between the normal operating inlet

VOL
1126
ISS
4
MY
28
1991
UMI

temperature and the outlet temperature of the drying medium after it has contacted the articles is less than the first pre-selected temperature, thereafter changing the normal operating inlet temperature of the drying medium to an energy saving inlet temperature, said energy saving inlet temperature being less than the normal operating inlet temperature of the drying medium;

(g) next computing the difference between the energy saving inlet temperature and the outlet temperature of the drying medium after it has contacted the articles;



(h) thereafter comparing to a second pre-selected temperature difference said difference between the energy saving inlet temperature and the outlet temperature of the drying medium after it has contacted the articles; and,

(i) when the difference between the energy saving inlet temperature and the outlet temperature of the drying medium after it has contacted the articles is greater than the second pre-selected temperature difference, thereafter increasing the energy saving inlet temperature of the drying medium to the normal operating inlet temperature of the drying medium.

---

### 5,019,995
## INPUT SIGNAL DISCRIMINATION METHOD

**Yoshiyuki Saito, Minamitsuru, and Junichi Sato, Hachioji, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**

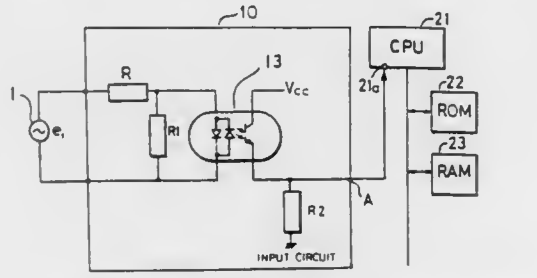
**PCT No. PCT/JP88/00791, § 371 Date Mar. 20, 1989, § 102(e) Date Mar. 20, 1989, PCT Pub. No. WO89/01633, PCT Pub. Date Feb. 23, 1989**

**PCT Filed Aug. 10, 1988, Ser. No. 332,456**

**Claims priority, application Japan, Aug. 19, 1987, 62-206105**

**Int. Cl.$^5$ H03K** *5/22;* **G06F** *15/20*

U.S. Cl. 364—483 3 Claims



1. An input signal discrimination method of discriminating an AC input signal, said method comprising the steps of:

a) carrying out a pulse count during a time in which the AC input signal remains above a predetermined threshold level and during a time in which the AC input signal remains below the predetermined threshold level;

b) deciding that the AC input signal is ON when the number of pulses counted while the AC input signal remains above the predetermined threshold level is large than a previously calculated number of pulses; and

c) deciding that the AC input signal is OFF when the number of pulses counted while the AC input signal remains below the predetermined threshold level is larger than the previously calculated number of pulses.

---

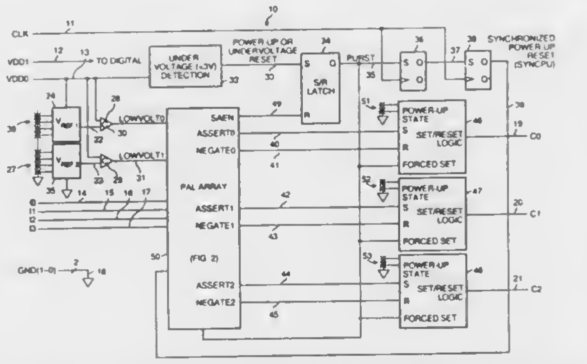
### 5,019,996
## PROGRAMMABLE POWER SUPPLY LEVEL DETECTION AND INITIALIZATION CIRCUITRY

**Sai-keung Lee, Milpitas, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Continuation of Ser. No. 237,764, Aug. 29, 1988, abandoned. This application Sep. 13, 1990, Ser. No. 584,421**

**Int. Cl.$^5$ G06F** *9/00;* **G08B** *21/00*

U.S. Cl. 364—483 38 Claims



1. An apparatus for generating control signals for supply to and control of a signal processing system, the apparatus being connected to a power supply, the power supply having an output level to which the apparatus is responsive, the apparatus receiving a reference signal indicating an analog threshold, the apparatus comprising:

means, connected to the power supply and to receive the reference signal, for generating a threshold signal indicating whether the output level is above or below the analog threshold; and

programmable logic means, connected to receive the threshold signal, for generating the control signals in response to the threshold signal.

---

### 5,019,997
## ADAPTIVE LITHOGRAPHY ACCOMMODATION OF TOLERANCES IN CHIP POSITIONING IN HIGH DENSITY INTERCONNECTION STRUCTURES

**Thoedore R. Haller, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Jun. 5, 1989, Ser. No. 361,623**

**Int. Cl.$^5$ G06F** *15/60*

U.S. Cl. 364—488 19 Claims

13. A method of forming a high density interconnect circuit comprising:

providing a substrate and a plurality of integrated circuits, each of said integrated circuits having a plurality of chip contact pads thereon;

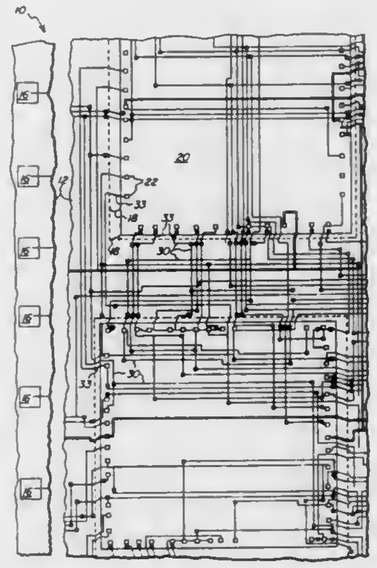
bonding each of said integrated circuits to said substrate within a maximum plus and minus tolerance $T_{max}$ of a predetermined ideal location;

determining the actual location of each of said integrated circuit chip contact pads relative to its ideal location;

disposing a dielectric layer over said substrate and said integrated circuits;

forming a via hold in alignment with each chip contact pad to be connected to a first overlying conductor layer with the position of each of said via holes with respect to the center of its associated chip contact pad being dependent on the location of said chip contact pad relative to is ideal location; and

forming a patterned conductor layer over said dielectric layer with said conductor layer having an ideal configuration and including chip contact islands, each of which, for the ideal locations of said chip contact pads, overlies the associated one of said chip contact pads, said chip contact islands having a size which ensures that so long as said maximum tolerance $T_{max}$ is not exceeded in chip contact pad placement, each of said chip contact islands overlaps and extends into said via hole disposed over the associated chip contact pad and into contact with said associated chip contact pad.



---

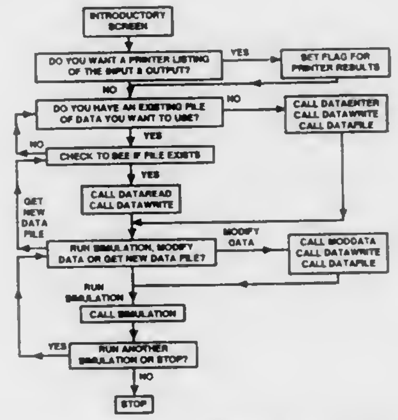
### 5,019,998
## KNOWLEDGE SYSTEM AND METHOD FOR SIMULATING CHEMICAL CONTROLLED RELEASE DEVICE PERFORMANCE

**Christina E. Cowan; Peter Van Voris; Gary P. Streile, all of Richland; Dominic A. Cataldo, Kennewick, all of Wash., and Frederick G. Burton, West Jefferson, Ohio, assignors to Battelle Memorial Institute, Richland, Wash.**

**Filed Jan. 30, 1989, Ser. No. 303,770**

**Int. Cl.$^5$ G06F** *15/20*

U.S. Cl. 364—496 17 Claims


INTRODUCTORY SCREEN
DO YOU WANT A PRINTER LISTING OF THE INPUT & OUTPUT?
YES
SET FLAG FOR PRINTER RESULTS
NO
DO YOU HAVE AN EXISTING FILE OF DATA YOU WANT TO USE?
NO
CALL DATAENTER
CALL DATAWRITE
CALL DATAFILE
YES
NO
CHECK TO SEE IF FILE EXISTS
YES
CALL DATAREAD
CALL DATAWRITE
GET NEW DATA FILE
RUN SIMULATION, MODIFY DATA OR GET NEW DATA FILE?
MODIFY DATA
CALL MODDATA
CALL DATAWRITE
CALL DATAFILE
RUN SIMULATION
CALL SIMULATION
YES
RUN ANOTHER SIMULATION OR STOP?
NO
STOP

1. A knowledge system for simulating the performance of a controlled release device for producing a sustained release of an active chemical into a media, the controlled release device having device and active chemical parameters, the system comprising a computer having:

input means for selectively entering at least one of a plurality of input data parameters, including device parameters, media parameters, active chemical parameters and, device release rate; and second parameters including device minimum effective inhibition zone, and an effective lifetime of the device;

a judgmental knowledge base including logic of 1) determining at least one of the second parameters from the first parameters; and 2) determining one of the first parameters from the other of the first parameters and the second parameters;

a display operatively connected to the judgmental knowledge base to display the results of the determinations.

---

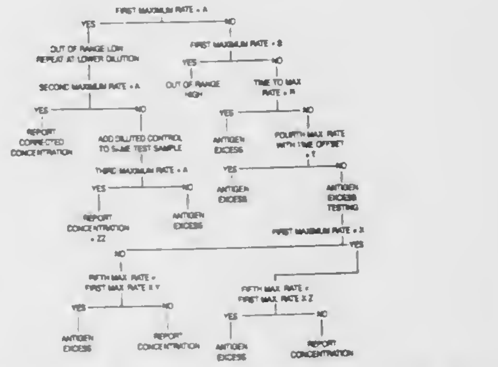
### 5,019,999
## IMMUNOANALYSIS METHOD FOR DISCRIMINATING BETWEEN ANTIGEN EXCESS AND ANTIBODY EXCESS CONDITIONS

**Chester Swirski, Jr., Hopewell Junction, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.**

**Filed Sep. 30, 1988, Ser. No. 252,420**

**Int. Cl.$^5$ G01N** *31/00;* **G06F** *15/20*

U.S. Cl. 364—497 4 Claims



1. An immunochemical method for analyzing a bodily fluid comprising the steps of:

1) generating a reference curve by

a) preparing a series of standard samples of fluid containing varied known amounts of an analyte, whereby each of said samples contains a known concentration of said analyte;

b) initiating reaction of each of said standard samples with a predetermined amount of a complementary immunoreagent capable of forming an insoluble complex by reaction with said analyte to form a reaction mixture, whereby a precipitate of an immunocomplex begins to form in said reaction mixture and the formation of said precipitate continues over a period of time, whereby an increasing amount of said precipitate is present in said reaction mixture;

c) for each of said reaction mixtures, detecting a physical property of said reaction mixture having a magnitude which is quantitatively proportional to the amount of said precipitate present in said reaction mixture and generating a signal having a numerical value proportional to the magnitude of said physical property;

d) recording the value of said signal at a plurality of times within said period of time, whereby an assembly of data, comprising the numerical values of said signals and the times at which said values were recorded, is collected, said data representing the amount of said precipitate formed as a function of time;

e) defining a mathematical function which represents the amount of said precipitate formed as a function of time in said reaction mixture, said function having the form

VOL 1126
ISS 4
MY 28 1991
UMI

$$S = \frac{M \times t^m}{(K + t^n)} + B$$

wherein S represents the amount of said precipitate, t represents time, m and n are constants between 1 and 3 preselected to provide an assumed precipitate versus time curve, and M, K and B are constants derived by fitting the data recorded in step 1) d) to said mathematical function;

f) mathematically fitting the data recorded in step 1) d) to the function defined in step 1) e), whereby numerical values are determined for constants M, K and B and said constants in the function of step 1) e) are replaced by said numerical values;

g) determining a maximum rate of formation of said precipitate for each reaction mixture by calculating a maximum rate of change of said function of step 1) e) from the constants M, K and B; and

h) plotting said maximum rate of formation calculated in step 1) g) for each of said samples against the concentration of said analyte in said reaction mixture, whereby a reference curve is generated representing said maximum rate of formation of said precipitate which is characteristic of each concentration of said analyte, said reference curve having the property that said maximum rate of formation of precipitate

has a maximum value defining an equivalence point for a concentration of said analyte approximately equivalent to said predetermined amount of complementary immunoreagent,

has a value lower than said maximum value for a concentration of said analyte less than said equivalence point, and

has a value lower than said maximum value for a concentration of analyte in excess of said equivalence point;

i) defining a point A representing a concentration below said equivalence point on said reference curve which corresponds to a minimum concentration of said analyte to be reported from said reference curve;

j) defining a point B representing a concentration below said equivalence point on said reference curve which corresponds to a maximum concentration of said analyte to be reported from said reference curve;

k) defining a point X representing a concentration below said equivalence point on said reference curve between point A and point B;

2) initiating reaction of a fluid sample which is an aliquot of a body fluid sample containing an unknown quantity of said analyte with said predetermined amount of said complementary immunoreagent to form a test sample, whereby a precipitate of said immunocomplex begins to form in said test sample and the formation of said precipitate continues over a period of time;

3) calculating a maximum rate of formation of said precipitate formed in step 2) by

a) detecting in said test sample said physical property of step 1) c) which is quantitatively proportional to the amount of said precipitate present in said reaction mixture at any time and generating a signal having a numerical value proportional to the magnitude of said physical property;

b) recording the values of said signal of step 3) a) at a plurality of times within said period of time of step 2), whereby an assembly of data, comprising the numerical values of said signal of step 3) a) and the times at which said values were recorded, is collected, said data representing the amount of said precipitate formed in step 2) as a function of time;

c) mathematically fitting the data recorded in step 3) b) to the function defined in step 1) e), whereby numerical values are determined for constants M, K and B and said constants in the function of step 1) e) are replaced by said numerical values;

d) determining a maximum rate of formation of said precipitate formed in step 2) by calculating a maximum rate of change of said function of step 1) e) from the constants M, K and B;

4) identifying the maximum rate of formation of said precipitate calculated in step 3) d) as a first maximum rate and if said first maximum rate is less than that associated with point A, rejecting said sample as too dilute for accurate measurement and repeating steps 2) and 3) using a less dilute fluid sample;

5) identifying the maximum rate of formation of said precipitate calculated in step 4) using said less dilute fluid sample as a second maximum rate, and if said second maximum rate is greater than that associated with point A, and less than that associated with point B,

reading a concentration of said analyte from the reference curve at the point corresponding to said second calculated maximum rate of formation and reporting the concentration of said analyte in said test sample of step 4;

6) if said second maximum rate of formation is less than that associated with point A,

adding to said test sample of step 4) a solution containing a predetermined amount of said analyte and again calculating a maximum rate of formation of precipitate of said immunocomplex by performing steps 3) a) through 3) d);

7) identifying said maximum rate of formation of said precipitate calculated in step 6) as a third maximum rate and if said third maximum rate is greater than that associated with point A,

reporting said less dilute sample as containing a concentration of analyte which is less than the concentration associated with point A;

8) if said third maximum rate is less than that associated with point A,

reporting said test sample as presenting a condition of antigen excess;

9) if said first maximum rate is greater than that associated with point A and greater than that associated with point B,

reporting said test sample as containing an amount of analyte too great for accurate measurement;

10) if said first maximum rate of formation is greater than that associated with point A and less than that associated with point B,

calculating a time interval between said reaction initiation of step 2) and the time said reaction reaches said first maximum rate;

11) if the time interval calculated in step 10) is greater than a predetermined interval;

reporting said test sample as presenting a condition of antigen excess;

12) if the time interval calculated in step 10) is less than said predetermined interval of step 11),

determining a second precipitate versus time function from the data recorded in step 3) b) by again performing step 3) c) through step 3) d) using a value $t - D$ in place of t, where D is a predetermined time, and all data points collected at less than time D are omitted from the curve fitting procedure, and calculating from said second precipitate versus time function a fourth maximum reaction rate;

13) if said fourth maximum reaction rate is greater than a predetermined value T,

reporting said test sample as presenting a condition of antigen excess;

14) if said fourth maximum reaction rate is less than or equal to said predetermined value T,

adding a second aliquot of said sample to said reaction and again performing steps 3) a) through 3) d) to calculate therefrom a fifth maximum reaction rate;

15) if said first maximum reaction rate is greater than that associated with point X and said first maximum reaction rate multiplied by a predetermined factor Z is less than or equal to said fifth maximum reaction rate,

reporting said test sample as presenting a condition of antigen excess;

16) if said first maximum reaction rate is greater than that associated with point X and said first maximum reaction rate multiplied by a predetermined factor Z is greater than said fifth maximum reaction rate,

reporting a concentration of analyte in the test sample by reading a value corresponding to the first maximum reaction rate from the reference curve between points A and B;

17) if said first maximum reaction rate is less than or equal to that associated with point X and said first maximum reaction rate multiplied by a predetermined factor Y is less than or equal to said fifth maximum reaction rate,

reporting the test sample as presenting a condition of antigen excess;

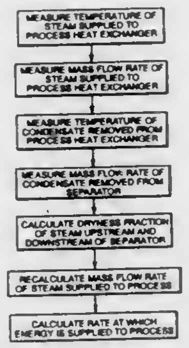
18) if said first maximum reaction rate is less than or equal to that associated with point X and said first maximum reaction rate multiplied by a predetermined factor Y is greater than said fifth maximum reaction rate,

reporting a concentration of analyte in the test sample by reading a value corresponding to said first maximum reaction rate from the reference curve between points A and B.

---

### 5,020,000
### MEASURING DRYNESS FRACTION

**Richard Q. Carmichael, Huntley, United Kingdom, assignor to Spirax-Sarco Limited, Cheltenham, United Kingdom**
**Filed Oct. 26, 1988, Ser. No. 262,839**
**Claims priority, application United Kingdom, Oct. 26, 1987, 8725025**
**Int. Cl.⁵ G01N *9/36;* G06F *15/20***
**U.S. Cl. 364—500** **9 Claims**


MEASURE TEMPERATURE OF STEAM SUPPLIED TO PROCESS HEAT EXCHANGER
MEASURE MASS FLOW RATE OF STEAM SUPPLIED TO PROCESS HEAT EXCHANGER
MEASURE TEMPERATURE OF CONDENSATE REMOVED FROM PROCESS HEAT EXCHANGER
MEASURE MASS FLOW RATE OF CONDENSATE REMOVED FROM SEPARATOR
CALCULATE DRYNESS FRACTION OF STEAM UPSTREAM AND DOWNSTREAM OF SEPARATOR
RECALCULATE MASS FLOW RATE OF STEAM SUPPLIED TO PROCESS
CALCULATE RATE AT WHICH ENERGY IS SUPPLIED TO PROCESS

1. A method of calculating the dryness fraction of fluid supplied via a steam separator to a process, the method comprising the steps of:

storing values for the efficiency of the separator at a plurality of input steam and condensate mass flow rates and a plurality of values for the input fluid of a parameter from which the temperature of the input fluid can be derived;

measuring the mass flow rate, and the value of said parameter, of fluid supplied to the process;

measuring the mass flow rate of condensate removed by the separator from the fluid;

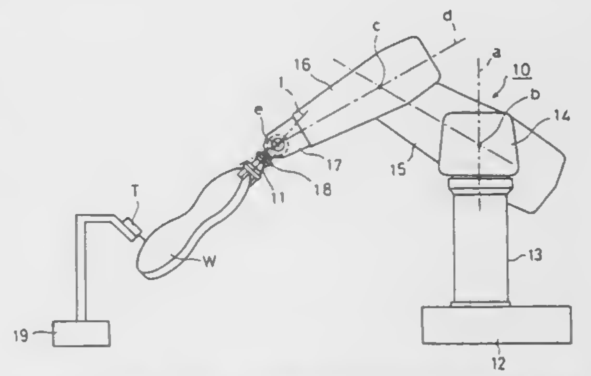
selecting a stored value of the efficiency of the separator corresponding to the measured mass flow rate and the measured value of said parameter;

calculating the dryness fraction of fluid supplied to the process on the basis of said measured mass flow rates and the corresponding stored value of the efficiency of the separator.

---

### 5,020,001
### ROBOT CONTROLLER

**Katsumi Yamamoto, Takahama; Tadashi Koyama, Okazaki; Toshio Aono, Kariya, and Toshiro Itaya, Aichi, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan**
**Filed Sep. 15, 1989, Ser. No. 407,585**
**Claims priority, application Japan, Sep. 19, 1988, 63-235738**
**Int. Cl.⁵ G05B *19/42***
**U.S. Cl. 364—513** **4 Claims**



1. A robot controller for having a workpiece held by a robot in a hand thereof and for having said workpiece machined by moving it through control over the position and attitude of said hand against a tool fixedly mounted on a tool bed, comprising:

a first memory means for storing as tool data those data representing the position of the tip of said tool fixedly mounted on said tool bed as well as the attitude of said tool;

a second memory means for storing as teaching data at a plurality of teaching points, those data representing the position of the origin of a coordinate system fixed to said hand of said robot as well as the attitude of said hand with respect to each of said plurality of teachings points along a machining path determined on said workpiece;

a calculating means for calculating as relative tool data at each teaching point those data representing the attitude of said tool and the position of the tip thereof located in said coordinate system fixed to said hand of said robot, said calculating being accomplished through the use of tool data stored in said first memory means and of said teaching data at each teaching point stored in said second memory means;

a first interpolation means for setting interpolation points along the machining path between any adjacent two of said teaching points according to a specified machining velocity, in order to calculate as interpolation relative tool data the position of said tool in said coordinate system fixed to said hand as well as the attitude of said tool at each of said interpolation points by the use of said relative tool data in effect at said two adjacent teaching points;

a second interpolation means for calculating as interpolation teaching data those data representing the attitude of said hand and the position of the origin of said coordinate system fixed to said hand of said robot at each of said interpolation points, said calculation being accomplished through the use of said interpolation relative tool data at each interpolation point calculated by said first interpolation means and of said tool data stored in said first memory means; and

a control means for calculating rotation angles on movable axes of said robot based on said interpolation teaching data in effect at each interpolation point and calculated by said second interpolation means, in order to control the position and attitude of said hand of said robot by having said movable axes follow said rotation angles.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,020,002

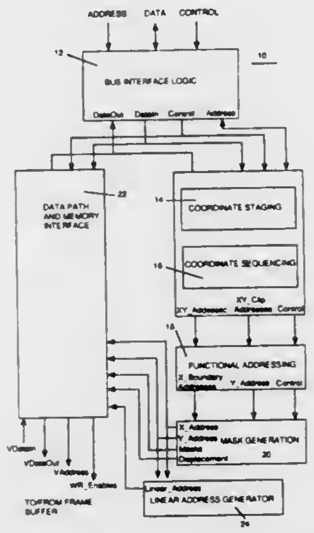
## METHOD AND APPARATUS FOR DECOMPOSING A QUADRILATERAL FIGURE FOR DISPLAY AND MANIPULATION BY A COMPUTER SYSTEM

**Chris Malachowsky, Santa Clara, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.**

**Filed Dec. 20, 1988, Ser. No. 287,128**

**Int. Cl.⁵ G06F *15/62***

U.S. Cl. 364—518 **17 Claims**



1. A circuit for selecting the line segments of a quadrilateral graphic figure to be displayed by a computer output display which line segments include points on scan lines common to the line segments comprising means for providing signals indicative of the vertices of a figure to be displayed, means for providing comparisons of the relative positions of such vertices as they are to be displayed, means for selecting a starting vertex for determining the line segments which include points on common scan lines, means for selecting a first line segment connected to the starting vertex, means for selecting a second line segment connected to the starting vertex, and means for providing output signals indicative of line segments selected.

---

### 5,020,003

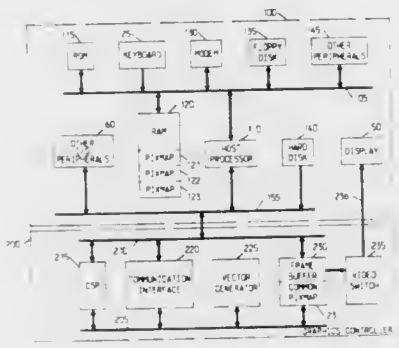
## GRAPHICS CONTROLLER IMAGE CREATION

**David Mosbenberg, Marlboro, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Sep. 29, 1988, Ser. No. 250,889**

**Int. Cl.⁵ G06F *3/14***

U.S. Cl. 364—518 **5 Claims**



1. A graphics system for use in a workstation having a display comprising

at least first and second memories each having a plurality of memory locations, blocks of locations in said first memory being allocated for use as respective resident pixmaps, and

a block of locations in said second memory being allocated for use as an off-screen pixmap,

a graphics processor for defining in respective memory locations of a memory identified in a drawing instruction an image specified by said drawing instruction,

means, responsive to receipt of a drawing instruction specifying a particular image and identifying one of said resident pixmaps, for changing said drawing instruction so that it identifies said off-screen pixmap, for supplying said changed drawing instruction to said graphics processor and for transferring to said one of said resident pixmaps the contents of said off-screen pixmap when said image has been defined in said off-screen pixmap.

---

### 5,020,004

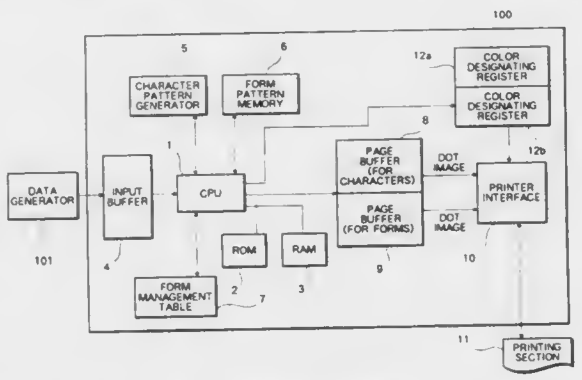
## IMAGE OUTPUT APPARATUS CAPABLE OF OUTPUTTING FORMS IN SPECIAL COLORS

**Masaru Igarashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 23, 1989, Ser. No. 299,447**

**Int. Cl.⁵ G06K *15/00***

U.S. Cl. 364—519 **18 Claims**



1. An image output apparatus comprising:

input means for inputting data; and

processing means for processing data inputted by said input means and for outputting image information based on processed data,

said processing means further comprising:

a first memory unit for storing data related to form information to be outputted, and

a second memory unit for storing color information representing a reproduction color for use in reproducing said form information.

---

### 5,020,005

## IMAGE OVERLAY PRINTING CONTROLLING METHOD AND APPARATUS FOR PRINTER

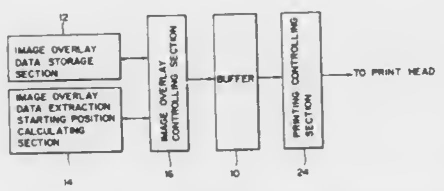
**Katuyasu Fujii, Tachikawa, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Mar. 16, 1990, Ser. No. 495,679**

**Claims priority, application Japan, Mar. 20, 1989, 1-68651**

**Int. Cl.⁵ G06K *15/00***

U.S. Cl. 364—519 **2 Claims**


12
IMAGE OVERLAY DATA STORAGE SECTION
IMAGE OVERLAY DATA EXTRACTION STARTING POSITION CALCULATING SECTION
IMAGE OVERLAY CONTROLLING SECTION
BUFFER
PRINTING CONTROLLING SECTION
TO PRINT HEAD
14
16
10
24

1. An image overlay printing controlling apparatus for a printer which prints using print data stored in a buffer, comprising;

image overlay storage means having image overlay basic data for a predetermined total number of columns stored therein;

means for calculating, in case image overlay start columns for adjacent upper and lower print lines when image overlay printing is to be effected continuously for at least two print lines are different from each other, a value of a remainder to be obtained by dividing the image overlay start column for the lower print line by the total column number of the image overlay basic data as an image overlay data extraction starting position; and

image overlay controlling means for starting extraction of data from a column of the image overlay basic data designated by the value of the remainder calculated by said image overlay data extraction starting position calculating means and for producing a printing command after the extracted data are all stored into said buffer.

---

### 5,020,006

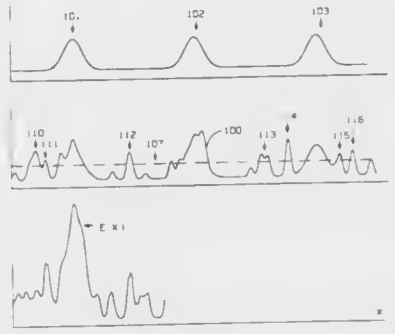
## METHOD FOR FINDING A REFERENCE POINT

**Frederik Sporon-Fiedler, San Mateo, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed May 3, 1989, Ser. No. 346,766**

**Int. Cl.⁵ G01N *21/86;* G01B *11/00;* G06F *15/31***

U.S. Cl. 364—550 **5 Claims**



1. In conjunction with an apparatus including means for positioning an object and means for scanning the surface of said object to produce a signal indicative of the properties of the surface of said object along a predetermined scan path, a method for operating said apparatus so as to locate the signal from a first fiducial mark, having a width $\pm w_1$, which is separated by a distance D from a second fiducial mark, having a width $\pm w_2$, when said signal is corrupted by a noise signal, said method comprising the steps of:

scanning the surface of said object along a path passing through said first and second fiducial marks thereby generating a signal M(x) indicative of the surface of said object along said path, wherein x is the distance along said path;

convolving M(x) with a filter function F(x) to form an enhanced function E(x), wherein $F(x+c)>0$ for at least one value of x between $-w_1$ and $+w_1$, $F(x+c)=0$ for x between $D+w_1$ and $D-w_2$, and $F(x+c)>0$ for at least one value of x between $D-w_2$ and $D+w_2$, where c is a constant;

analyzing E(x) to determine the location the portion of E(x) resulting from said first fiducial mark, and

moving said object to a position related to said first fiducial mark.

---

### 5,020,007

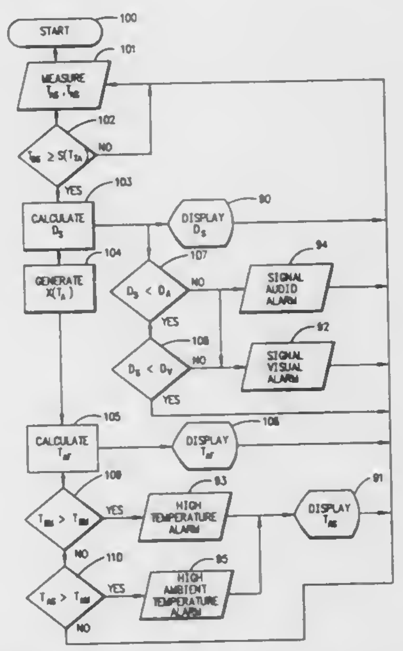
## METHOD FOR MONITORING THE HEALTH OF PHYSICAL SYSTEMS PRODUCING WASTE HEAT

**Samuel C. Wu, 10205 W. Exposition Ave., Lakewood, Colo. 80226, and Charles E. Brossia, 1748 E. Ross La., Highlands Ranch, Colo. 80126**

**Filed Mar. 10, 1988, Ser. No. 166,180**

**Int. Cl.⁵ G06F *15/20;* G01K *13/00***

U.S. Cl. 364—551.01 **20 Claims**



1. A method of monitoring the health of a monitored physical system of a type that produces waste heat at a waste heat temperature ($T_B$) as a function of ambient temperature ($T_A$) and discharges such waste heat into its ambient environment to generate the degradation of the physical system's health when compared to a standardized model of the physical system in good health, wherein the physical system has a maximum rated operating temperature ($T_{MR}$) and a failure temperature ($T_F$) at which the physical system fails, the method comprising the steps of:

measuring the waste heat temperature ($T_B$) discharged by the standardized model as a function of ambient temperature ($T_A$) and developing a standard baseline profile $S(T_A)$ of the standardized model representing the physical system in good health;

storing the standard baseline profile $S(T_A)$ in a memory means for retaining information suitable for later retrieval. said memory means accessible to a microprocessor;

measuring the ambient temperature of the monitored physical system by a first sensor monitored by said microprocessor to obtain a sample ambient temperature ($T_{AS}$) at a sample time;

measuring the temperature of the waste heat of the monitored physical system by a second sensor monitored by said microprocessor at said sample time to obtain a sample waste heat temperature ($T_{BS}$);

generating an expected waste heat temperature $S(T_{AS})$ corresponding to the sample ambient temperature ($T_{AS}$) from said standard baseline profile stored in said memory means; and

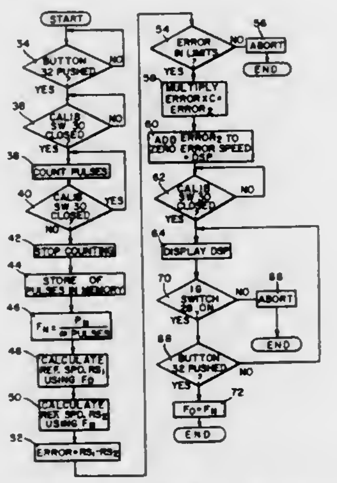
generating a proportionalized degradation indicator of the health of the monitored physical system by comparing in said microprocessor the sample waste heat temperature ($T_{BS}$) to the expected waste heat temperature $S(T_{AS})$ at the sample ambient temperature ($T_{AS}$).

VOL
126
ISS
4
MY
28
1991
UMI

### 5,020,008
## METHOD OF CALIBRATING VEHICLE SPEED SIGNALS

**John D. Chambers, Avon Lake; Duncan E. Estep, Elyria; Walter E. Frankiewicz, North Olmstead; Ronald W. Friend, Elyria, and James M. Lawson, Wellington, all of Ohio, assignors to Allied-Signal Inc., Morristown, N.J.**

**Filed Jun. 5, 1989, Ser. No. 361,191**
**Int. Cl.$^5$ G01B *22/00***
**U.S. Cl. 364—561** **10 Claims**



1. Method of establishing a distance calibration factor for use in calibrating a signal representing vehicle speed comprising the steps of providing a vehicle having a sensor which generates a pulsed output in response to vehicle motion and a microcontroller for calculating a vehicle speed from said pulsed output, said microcontroller including memory means for memorizing said calibration factor used by said microcontroller to calculate vehicle speed, driving the vehicle over a predetermined measured stance, causing said microcontroller to count the pulses generated while the vehicle is traveling over the measured distance and to memorize the number of pulses counted as a measured pulse count, causing said microcontroller to calculate a new calibration factor based upon the number of pulses counted, and storing the new calibration factor in memory inplace of the old calibration factor previously stored in memory, said new calibration factor being calculated as a function of a nominal pulse count and the number of pulses counted when the vehicle is driven over the measured distance.

---

### 5,020,009
## METHOD AND APPARATUS FOR PREPARING MEASUREMENT SPECIFICATIONS OF ELECTRONIC CIRCUITS

**Teruaki Ogata, and Yuko Sudou, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

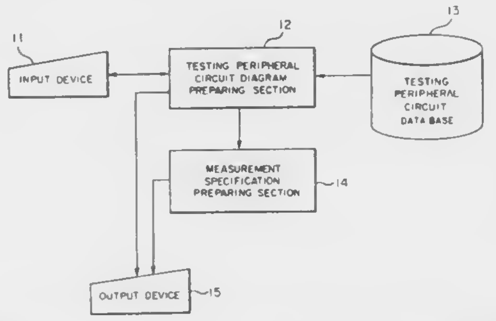
**Filed Mar. 22, 1989, Ser. No. 327,042**
**Claims priority, application Japan, Jan. 19, 1989, 1-8682**
**Int. Cl.$^5$ G01R *31/28***
**U.S. Cl. 364—580** **5 Claims**

4. An apparatus for preparing measurement specifications for use in making measurements of a plurality of measurement items of properties of an electronic circuit comprising:

input means for receiving and outputting the measurement items and measurement standard of the electronic circuit;

a data base for storing and outputting a basic peripheral circuit diagram of the electronic circuit and a plurality of testing peripheral circuit modules which are standardized in advance;

testing peripheral circuit diagram preparing means, connected to said input means for receiving the measurement items and measurement standard from said input means and to said data base for receiving the basic peripheral circuit diagram and the testing peripheral circuit modules, for preparing and outputting a plurality of testing peripheral circuit diagrams for individual measurement items by adding selected ones of the testing peripheral circuit modules stored in said data base to the basic peripheral circuit diagram stored in said data base on the basis of the measurement items and measurement standard of the electronic circuit, and for (b) preparing and outputting an overall testing peripheral circuit diagram for use in making measurements corresponding to all the measurement items by synthesizing the plurality of testing peripheral circuit diagrams with one another;


11
INPUT DEVICE
12
TESTING PERIPHERAL CIRCUIT DIAGRAM PREPARING SECTION
13
TESTING PERIPHERAL CIRCUIT DATA BASE
MEASUREMENT SPECIFICATION PREPARING SECTION
14
OUTPUT DEVICE
15

measurement specification preparing means, connected to said testing peripheral circuit diagram preparing means for receiving the overall testing peripheral circuit diagram and the plurality of testing peripheral circuit diagrams, for preparing measurement specifications for individual measurement items for use in making measurements employing the overall testing peripheral circuit diagram from the overall testing peripheral circuit diagram and the plurality of testing peripheral circuit diagrams; and

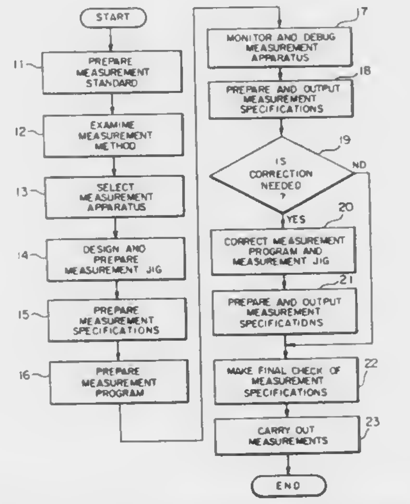
output means for outputting said measurement specifications prepared by said measurement specification preparing means.

---

### 5,020,010
## METHOD FOR PREPARING AND EVALUATING MEASUREMENT SPECIFICATONS FOR AN ELECTRONIC CIRCUIT

**Teruaki Ogata, and Yuko Sudou, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Mar. 22, 1989, Ser. No. 327,045**
**Claims priority, application Japan, Jan. 19, 1989, 1-8681**
**Int. Cl.$^5$ G01R *31/28***
**U.S. Cl. 364—580** **7 Claims**


START
11
PREPARE MEASUREMENT STANDARD
12
EXAMINE MEASUREMENT METHOD
13
SELECT MEASUREMENT APPARATUS
14
DESIGN AND PREPARE MEASUREMENT JIG
15
PREPARE MEASUREMENT SPECIFICATIONS
16
PREPARE MEASUREMENT PROGRAM
17
MONITOR AND DEBUG MEASUREMENT APPARATUS
18
PREPARE AND OUTPUT MEASUREMENT SPECIFICATIONS
19
IS CORRECTION NEEDED ?
NO
YES
20
CORRECT MEASUREMENT PROGRAM AND MEASUREMENT JIG
21
PREPARE AND OUTPUT MEASUREMENT SPECIFICATIONS
22
MAKE FINAL CHECK OF MEASUREMENT SPECIFICATIONS
23
CARRY OUT MEASUREMENTS
END

1. A method for preparing measurement specifications for an electronic circuit on a test facility which includes a measurement apparatus and operates according to a language form in accordance with a measurement standard including at least one measurement item for testing the circuit by means of the measurement apparatus, said method comprising the steps of:

preparing an overall testing peripheral circuit including the circuit for which measurement specifications are to be prepared and at least one standardized testing peripheral circuit module corresponding to the at least one measurement item;

designing a measurement jig including the overall testing peripheral circuit and an interface for interfacing the overall testing peripheral circuit with the measurement apparatus;

preparing a measurement specification for each measurement item based on input signals, switch settings, and input/output signal paths of the overall testing peripheral circuit;

preparing a measurement program in the language form of the measurement apparatus on the basis of the measurement specification;

operating the measurement apparatus according to the measurement program to produce results of operation of the measurement apparatus with respect to each measurement item;

evaluating the results to determine whether correction of the measurement program or the jig is needed;

correcting the measurement program and the design of the measurement jig in accordance with needed corrections, if any, found by said step of evaluating; and

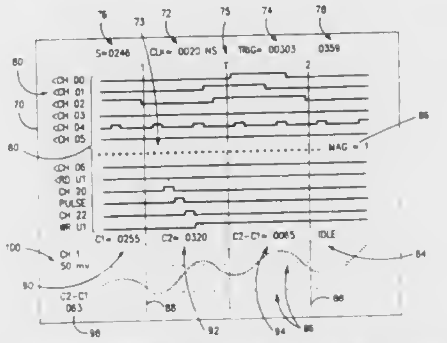
preparing new measurement specifications based on the corrections, if any, made in said step of correcting.

---

### 5,020,011
## SYSTEM FOR DISPLAYING ADAPTIVE INFERENCE TESTING DEVICE INFORMATION

**William D. Stark, Ithaca, and Gregory C. Prestas, Candor, both of N.Y., assignors to Array Analysis, Inc., Ithaca, N.Y.**

**Filed Nov. 7, 1989, Ser. No. 433,591**
**Int. Cl.$^5$ G05B *19/02;* G06F *11/00;* G09G *1/06;* G01R *23/16***
**U.S. Cl. 364—580** **22 Claims**



12. An adaptive inference system having an operative program for predicting causes of a previously unobserved fault appearing in an electric or electronic device or assembly from relationships with other known and previously stored fault data and information gathered for said electric or electronic device or assembly in prior tests, said adaptive inference system, including apparatus for testing and displaying performance of said electrical or electronic devices or assemblies in a test sequence presented in graphical form upon a time dependent display, comprising:

a) means for displaying test data and information respective of performance of said electrical or electronic device or assembly along a time dependent axis of a display screen, said test data containing performance data along all operative channels of said device or assembly, including means for highlighting failures in performance along any of said channels for ease of viewing, and said test information containing test evaluation information of said performance data including tolerance information, said test evaluation information being stored for comparison with data and information of prior tests to provide a figure of merit of a probable cause of failure; and

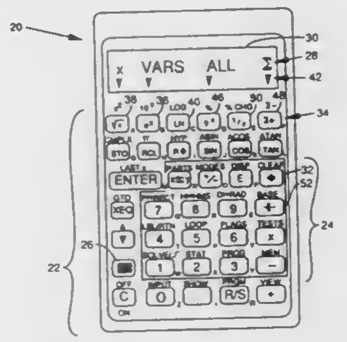
b) means for positioning at least one graphics sub-display on said display screen during display of said test.

---

### 5,020,012
## METHOD AND APPARATUS FOR MATCHING MENU LABELS WITH KEYS

**Randall L. Stockberger, and Christopher M. Bunsen, both of Corvallis, Oreg., assignors to Hewlett Packard Company, Palo Alto, Calif.**

**Continuation of Ser. No. 285,841, Dec. 15, 1988, abandoned. This application Sep. 25, 1990, Ser. No. 590,451**
**Int. Cl.$^5$ G06F *3/00***
**U.S. Cl. 364—709.14** **14 Claims**



1. A method of uniquely associating menu labels with corresponding keys, comprising:

displaying upon display means menu labels (**28**) in proximity to a set (**34**) of keys;

defining keys within the set (**34**) to execute procedures associated with the menu labels (**28**); and

displaying upon said display means an annunciator (**42**) between each menu label displayed and a key defined to execute a procedure associated therewith to unambiguously indicate the association of label with key;

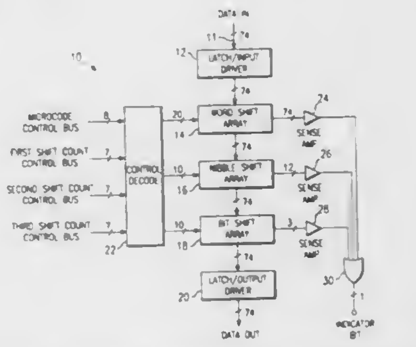
wherein the menu labels are unconstrained in size and location relative to the keys corresponding thereto.

---

### 5,020,013
## BIDIRECTIONAL VARIABLE BIT SHIFTER

**Robert D. Maher, III, Carrollton, and Patrick Antaki, Plano, both of Tex., assignors to Cyrix Corporation, Richardson, Tex.**

**Filed Sep. 29, 1989, Ser. No. 415,037**
**Int. Cl.$^5$ G06F *7/00***
**U.S. Cl. 364—715.08** **7 Claims**



1. A circuit for shifting a plurality of data bits comprising:

VOL
126
SS
4
MY
28
1991
UMI

input circuitry operable to receive, store and output the plurality of data bits;

a word shift array operable to selectively shift said plurality of data bits a multiple of a first preselected number of bit positions in either one of two selectable directions, said word shift array coupled to said input circuitry;

a nibble shift array operable to shift said plurality of data bits a multiple of a second preselected number of bit positions in said selected direction, wherein said second preselected number is less than said first preselected number, said nibble shift array coupled to said work shift array;

a bit shift array operable to shift said plurality of data bits a multiple of a third preselected number of bit positions in said selected direction, wherein said third preselected number is less than said second preselected number, said bit shift array coupled to said nibble shift array;

output circuitry coupled to said bit shift array and operable to receive, store and output the shifted data bits; and

a plurality of indicator circuits, one of said plurality coupled to each of said word, nibble and bit shift arrays for detecting whether significant data bits have been shifted right past the least significant bit on right shift operations, said indicator circuits comprising a bit indicator circuit associated with each data bit which could be shifted right past the least significant bit position during right shift operations, said bit indicator circuit each comprising:

a first pass transistor having a drain, a source coupled to a predetermined voltage level, and a gate coupled to an indicator control signal associated with a selected plurality of data bits; and a second pass transistor having a source coupled to said drain of said first pass transistor, a gate coupled to a respective data bit associated with a particular bit indicator circuit, and a drain coupled to an indicator output signal line coupled to a selected plurality of bit indicator circuits;

said indicator circuits each further comprising:

a sense amplifier circuit having an output and an input coupled to said indicator output signal line and operable to receive signals indicating the shifting of significant data bits rights past the least significant bit position from said bit indicator circuitries through said indicator output signal line;

a logic-OR circuit having a plurality of inputs and an output, one of said plurality of inputs coupled to a respective output of said sense amplifier circuits said logic-OR circuit operable to generate an indicator bit as the logic-OR function of the outputs of said sense or amplifier circuits; and

control decode circuitry coupled to and operable to control said word, nibble and bit shift arrays and to receive and decode control signals input into said control decode circuitry.

---

**5,020,014**

### GENERIC INTERPOLATION PIPELINE PROCESSOR

**Michael S. Miller, Champlin, and Hendrik A. E. Spaanenburg, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Feb. 7, 1989, Ser. No. 307,354**

**Int. Cl.⁵ G06F *7/38***

**U.S. Cl. 364—723** **6 Claims**

1. Interpolation processor circuit apparatus embedded in a semiconductor chip for use in a video display system wherein the interpolation processor circuit apparatus comprises:

(a) state machine means for controlling the operation of the interpolation processor apparatus wherein the state machine means includes a Join Endpoints input (JOIN), an Enable Input Registers output (ENIR), a Chip Select input (CSEL), first and second Input Data Valid inputs (IDV1 and IDV2), and an Enable Counter Load output (ENCNT);

(b) a prologue stage including

(i) a first input register means for receiving a first X coordinate,

(ii) a second input register means for receiving a second X coordinate,

(iii) a third input register means for receiving a first Y coordinate,

(iv) a fourth input register means for receiving a second Y coordinate,

(v) wherein the first, second, third and fourth register means are structured and arranged to be controlled by the state machine means so as to be loaded as enabled by the activation of the CSEL, IDV1 and IDV2 inputs of the state machine,

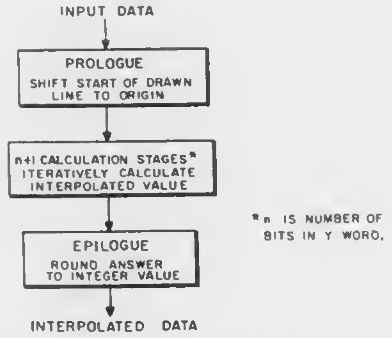
(vi) a first adder means coupled to the first and second input registers for summing the contents of the first and second input registers and providing an RX result at a first adder output,

(vii) a first output register for receiving the RX result from the first adder output,

(viii) a second adder means coupled to the third and fourth registers for taking the deference between the first Y coordinate and the second Y coordinate and providing an RY result at a second adder output,

(ix) a second output register coupled to receive the RY result from the second adder output,

(x) a first counter means coupled to the first input register means for generating a quantity CX at a first counter output where CX is initially equivalent to the absolute value of $(x-x_1)$ where x is an independent variable and $x_1$ is the first X coordinate, and


INPUT DATA
PROLOGUE
SHIFT START OF DRAWN LINE TO ORIGIN
n+1 CALCULATION STAGES*
ITERATIVELY CALCULATE INTERPOLATED VALUE
EPILOGUE
ROUND ANSWER TO INTEGER VALUE
INTERPOLATED DATA
*n IS NUMBER OF BITS IN Y WORD.

(xi) a second counter means coupled to the third input register means for generating a quantity CY at a second counter output where CY is initially equivalent to the value of the first Y coordinate;

(c) a plurality of identical calculation stages wherein each calculation stage includes:

(i) means for adding RX and CX to generate a new value of CX at an output using the complement of the sign of RX as a carry input wherein a sign LS is generated from the addition of RX and CX,

(ii) means coupled to the output of the means for adding CX and RX, for determining whether to pass the new value of CX or the previous value of CX to the next calculation stage based on the sign LS wherein the first of said calculation stages has its means for adding RX and CX coupled to the first output register and the first counter output to receive values for RX and CX, and wherein the first and subsequent calculation stages each have RX and CX output registers coupled to pass values for RX and CX to the means for adding RX and CX in the next calculation stage;

(iii) means for adding RY and CY to generate a new value of CY at an output, and

(iv) means coupled to the output of the means for adding RY and CY for determining whether to pass the new value of CY to the next calculation stage or the previous value of CY based on the sign LS wherein the first of said calculation stages has its means for adding RY and CY coupled to the second output register and the second counter output to receive value for RY and CY, and wherein the first and subsequent calculation stages each have RY and CY output registers coupled to pass values for RY and CY to the means for adding RY and CY in the next calculation stage.

---

**5,020,015**

### MULTICHANNEL DIGITAL SIGNAL CORRELATOR OR STRUCTURATOR

**Robin Jones, and Martin Johnson, both of Worcester, England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

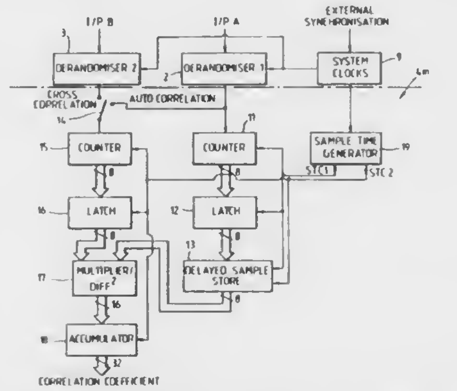
**PCT No. PCT/GB87/00845, § 371 Date May 16, 1989, § 102(e) Date May 16, 1989, PCT Pub. No. WO88/04079, PCT Pub. Date Jun. 2, 1988**

**PCT Filed Nov. 26, 1987, Ser. No. 359,755**

**Claims priority, application United Kingdom, Nov. 27, 1986, 8628397**

**Int. Cl.⁵ G06F *15/336***

**U.S. Cl. 364—728.03** **11 Claims**



1. A digital signal processor comprising means for receiving a signal which varies in time forming an input signal; a plurality of channels each receiving said input signal and providing an output; and means for storing the output from each channel and for providing, from the output of each channel collectively, a required mathematical function output; each channel comprising:

sampling means for sampling said input signal in successive sample time intervals (Tm) and for providing a sampled signal;

delay means for delaying the output of the sampling means by a delay value and providing a delayed signal;

arithmetic means having a first input for receiving a sampled signal, a second input for receiving said delayed signal, and an output for providing the result of a mathematical operation on said sampled and delayed inputs at said output; and

accumulator means for receiving the output of the arithmetic means in successive sample time intervals; said sample time intervals (Tm) and delay values (τm) being independently variable within and between each channel.

---

**5,020,016**

### CIRCUIT FOR DETECTING ZERO RESULT OF ADDITION/SUBTRACTION BY SIMULTANEOUSLY PROCESSING EACH PAIR OF CORRESPONDING BITS OF A PAIR OF GIVEN NUMBERS IN PARRALEL

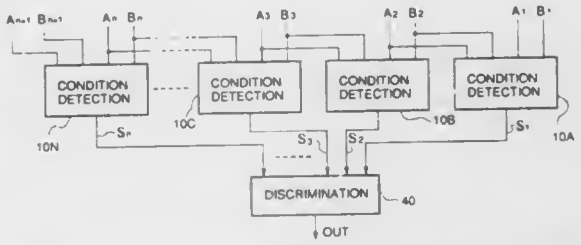
**Masako Nakano, and Yutaka Yamagami, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed May 1, 1989, Ser. No. 345,253**

**Claims priority, application Japan, Apr. 29, 1988, 63-108863**

**Int. Cl.⁵ G06F *7/50***

**U.S. Cl. 364—736.5** **9 Claims**



1. A zero detection circuit for detecting whether or not a result of addition/subtraction between a pair of binary numbers A and B, each of said binary numbers composed of a plurality of bits, becomes zero for all of said plurality of bits, comprising:

a logic circuit for receiving said pair of binary numbers A and B and generating an active unitary discrimination signal, said logic circuit including unitary logic circuits in number corresponding to a maximum digit number of said pair of binary numbers A and B, each of said unitary logic circuits including

first logic means for generating a first logic signal when a first condition is fulfilled, said first condition being if (Ai, Bi)=(0,0), $(A_{i+1}, B_{i+1})$=(0,0), where suffix "i" is a natural number indicative of a digit place of said pair of binary numbers A and B,

second logic means for generating a second logic signal when a second condition is fulfilled, said second condition being if (Ai, Bi)=(0, 0), $(A_{i+1}, B_{i+1})$=(1, 1),

third logic means for generating a third logic signal when a third condition is fulfilled, said third condition being if (Ai, Bi)=(1, 1), $(A_{i+1}, B_{i+1})$=(0, 1) or (1, 0),

fourth logic means for generating a fourth logic signal when a fourth condition is fulfilled, said fourth condition being if (Ai, Bi)=(1,0) or (0, 1), $(A_{i+1}, B_{i+1})$=(1, 0) or (0, 1), and

output logic means receiving said first to fourth logic signals for generating said active unitary zero discrimination signal when any one of said first to fourth conditions is fulfilled;

an auxiliary logic circuit for generating an active auxiliary detection signal only when a pair of least significant bits $(A_1, B_1)$ of said pair of binary numbers A and B is neither (0, 1) nor (1, 0); and

an output circuit receiving said unitary zero discrimination signal from said output logic means and said auxiliary detection signal from said auxiliary logic circuit for generating a zero discrimination signal when both said unitary zero discrimination signal and said auxiliary detection signal are active.

VOL
126
SS
4
MY
28
1991
UMI

### 5,020,017

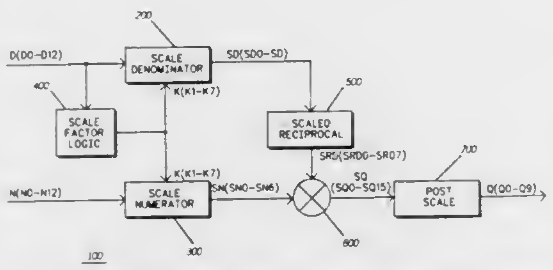
### METHOD AND APPARATUS FOR OBTAINING THE QUOTIENT OF TWO NUMBERS WITHIN ONE CLOCK CYCLE

**William J. Ooms, Chandler, Ariz.; Clifford D. Leitch, Coral Springs, Fla., and Rene M. Delgado, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 335,319, Jun. 6, 1988, abandoned. This application Sep. 17, 1990, Ser. No. 584,399**

**Int. Cl.$^5$ G06F** *7/52*

**U.S. Cl. 364—761** 4 Claims



1. An apparatus for providing binary signals representative of a number approximating quotient of two numbers represented by a numerator signal and a denominator signal within a single clock cycle, comprising:

a first combinational logic device coupled to said denominator signal for generating a scale factor signal in accordance with magnitude of said denominator signal to scale said denominator signal to be within a predetermined range;

a second combinational logic device coupled to said denominator signal and said scale factor signal for generating a scaled denominator signal representative of a number within said predetermined range derived from scaling said denominator signal by said scale factor signal;

a memory device being addressed by said scaled denominator signal having stored therein signal representations corresponding to reciprocals of said scaled denominators within said predetermined range;

combinational multiplier device being coupled to said memory device for multiplying said signal corresponding to reciprocal of said scaled denominator by said numerator signal.

---

### 5,020,018

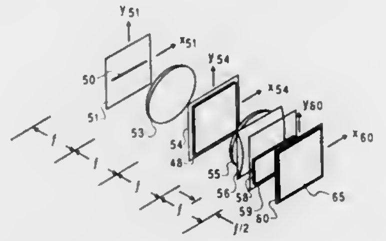
### OUTER PRODUCT OPTICAL INTERFEROMETER WITH HOLOGRAM

**Jonathan D. Cohen, Hanover, Md., assignor to The United States of America as represented by the Director of National Security Agency, Washington, D.C.**

**Filed Mar. 1, 1989, Ser. No. 318,031**

**Int. Cl.$^5$ G06E** *3/00, 7/19*

**U.S. Cl. 364—837** 2 Claims



1. An outer product interferometer, comprising:

a light source located in an input plane having one-dimensional extent along an axis;

means for effecting a two-dimensional Fourier transform of light leaving said input plane, said two-dimensional transform occurring in a transform plane, said transform plane possessing a first spatial dimension parallel to said axis of said light source and a second spatial dimension orthogonal to said first spatial dimension;

means in said transform plane for modulating light from said two-dimensional Fourier transform, said modulation including the sum of two contributions whose complex phases are distinct bilinear functions of said first spatial dimension and said second spatial dimension; and

means for effecting a one-dimensional Fourier transform of said modulated light in said first spatial dimension and an image of said modulated light in said second spatial dimension; and

means in an output plane for detecting said one-dimensional Fourier transform and said image.

---

### 5,020,019

### DOCUMENT RETRIEVAL SYSTEM

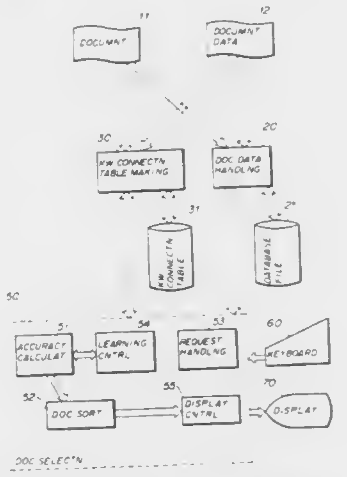
**Yasushi Ogawa, Yokohama, Japan, assignor to Ricoh Company, Ltd., Japan**

**Filed May 25, 1990, Ser. No. 528,490**

**Claims priority, application Japan, May 29, 1989, 1-132696; Jul. 25, 1989, 1-190519**

**Int. Cl.$^5$ G06F** *15/40, 7/22*

**U.S. Cl. 364—900** 8 Claims



1. A document retrieval system comprising:

keyword connection table making means for making a keyword connection table which describes a weight of each keyword connection among a first set of keywords from each of documents registered in a database file, and, upon request, the keyword connection table making means acting to update a weight of a keyword connection prerecorded on a keyword connection table file to make a new keyword connection table containing a modified weight of the keyword connection;

document selection means including means for selecting output documents from the database file by reference to the keyword connection table file, the output documents being in conformity with a query containing a second set of keywords initially given by a user;

document accuracy calculating means for calculating a document accuracy which is obtained with a weight of each keyword connection between a third set of keywords from a document out of the output documents and the second set of keywords from the query when the user modifies a document accuracy of the document, the document accuracy calculating means computing a document accuracy for each of the output documents in a prescribed manner by reference to the keyword connection table;

document sorting means for sorting the output documents in downward sequential order of the document accuracy computed by the document accuracy calculating means;

learning control means for modifying a weight of each keyword connection previously assigned between the third set of keywords from the document and the second set of keywords from the query in a prescribed manner when the user makes an evaluation on whether the document accuracy of the document previously computed by the document accuracy calculating means is in conformity with the query after the output documents are aligned by the document sorting means in downward sequential order of the document accuracy previously computed by the document accuracy calculating means; and

means for providing the user with multiple choices of a numerical value between 0 and 1 for each document accuracy of the output documents when the suer inputs an evaluation value to the document retrieval system after making the evaluation on whether the document accuracy of each of the output documents is in conformity with the query, the multiple choices each including binary 0 and 1 representing two distinctly opposed evaluations made by the user with respect to the query, or 0 being not in conformity with the query and 1 being in conformity with the query, the multiple choices each further including any intermediate numerical value between 0 and 1 representing an ambiguous evaluation, made by the user, that cannot be represented by the two distinctly opposed evaluation only.

---

### 5,020,020

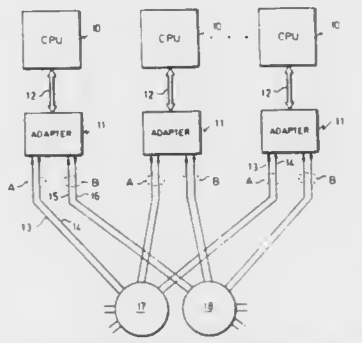
### COMPUTER INTERCONNECT SYSTEM WITH TRANSMIT-ABORT FUNCTION

**Stephen T. Pomfret, Maynard, Mass.; Richard Lary, Colorado Springs, Colo., and Yerell Boaen, Grofon, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed Apr. 7, 1989, Ser. No. 335,130**

**Int. Cl.$^5$ G06F** *13/14;* **H04L** *12/56*

**U.S. Cl. 364—900** 20 Claims



1. A computer interconnect system for packet data transmission between a first node and a second node by an intermediate node, comprising:

(a) transmit/receive means at said first node coupled by a path to said second node for transmitting a packet to said second node via said intermediate node or for receiving a packet at said first node, said transmit/receive means including means for aborting transmission of a packet before the packet ends when said intermediate node signals by a flow control signal directed to said first node that said packet can not be successfully forwarded by said intermediate node to said second node;

(b) packet buffer means for temporarily storing packets of data received from said path or to be transmitted on said path;

(d) coupling means for transferring packets between said transmit/receive means and said packet buffer means;

(e) processor means, and data transfer means for transferring a packet from said processor means to said packet buffer means before transmission by said transmit/receive means, and for transferring a packet from said packet buffer means to said processor means after receiving said packet by said transmit/receive means.

---

### 5,020,021

### SYSTEM FOR AUTOMATIC LANGUAGE TRANSLATION USING SEVERAL DICTIONARY STORAGE AREAS AND A NOUN TABLE

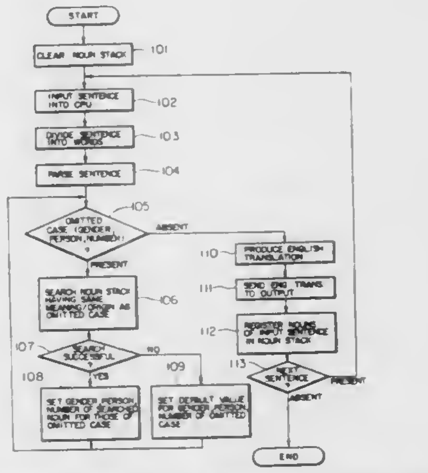
**Hiroyuki Kaji, Tama, and Yoshihiko Nitta, Sagamihara, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 10, 1986, Ser. No. 817,624**

**Claims priority, application Japan, Jan. 14, 1985, 60-4625**

**Int. Cl.$^5$ G06F** *15/38*

**U.S. Cl. 364—900** 6 Claims


START
CLEAR NOUN STACK
101
INPUT SENTENCE INTO CPU
102
DIVIDE SENTENCE INTO WORDS
103
PARSE SENTENCE
104
105
OMITTED CASE (GENDER, PERSON, NUMBER) ?
ABSENT
PRESENT
110
PRODUCE ENGLISH TRANSLATION
111
SEND ENG. TRANS TO OUTPUT
SEARCH NOUN STACK HAVING SAME MEANING/ORIGIN AS OMITTED CASE
106
112
REGISTER NOUNS OF INPUT SENTENCE IN NOUN STACK
107
SEARCH SUCCESSFUL ?
NO
109
113
NEXT SENTENCE ?
PRESENT
108
YES
ABSENT
SET GENDER PERSON NUMBER OF SEARCHED NOUN FOR THOSE OF OMITTED CASE
SET DEFAULT VALUE FOR GENDER PERSON NUMBER OF OMITTED CASE
END

1. A translation method for a machine translation apparatus for translating a source language sentence being input to said machine translation apparatus into an equivalent target language sentence, said source language sentence including a plurality of words and being inputted to said machine translation apparatus in a form of an electrical signal from an input device, said machine translation apparatus carrying out predetermined translation processes by referring to an electronic data storage device having a word dictionary storage area, a sentence pattern dictionary storage area and a table storage, said word dictionary storage area storing a plurality of word records each defining a relation among a source language word, a part of speech of said source language word, a target language word corresponding to said source language word and a semantic feature of these words, said sentence pattern dictionary storage area including a plurality of sentence pattern records each of which defines cases governed by a predicated in the source language sentence and includes semantic features of respective cases, said cases being arranged in each sentence pattern record in accordance with a word order of target language words in an apparent structure of the target language sentence, said method comprising the steps of:

(a) dividing said source language sentence inputted by said input device into a plurality of words by referring to said word dictionary storage area to search for a predicate and nouns in said source language sentence;

(b) storing contents of respective word records of said word dictionary storage area, each of which includes a source language word corresponding to one of the nouns obtained by a search of said input source language sentence, sequentially into a noun stack area within said table storage area;

(c) parsing said source language sentence by referring to one sentence pattern record in said sentence pattern dictionary storage area which includes a predicate same as that obtained by the search of said input source language sentence, and judging whether a case, which is indispensable for the translating of the input source language sentence

VOL
126
SS
4
MY
28
1991
UMI

into a target language sentence, is omitted in said input source language sentence or not;

(d) when it is judged at the step (c) that a case is omitted, searching, among word records in said noun stack area, for one word record having the same semantic feature as that of said omitted case of said input source language sentence; and

(e) substituting a noun defined by said one word record obtained by the search of said noun stack area for said omitted case, and arranging a target language word for said noun to be substituted and target language words corresponding to words of said input source language sentence obtained from word records in said word dictionary storage area in accordance with the word order defined by said one sentence pattern record.

---

### 5,020,022
## PRINTING APPARATUS FOR USE WITH A DETACHABLE MEMORY

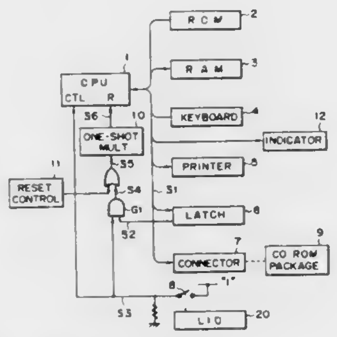
**Yoshikazu Shibamiya, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 15, 1988, Ser. No. 285,301**

**Claims priority, application Japan, Mar. 15, 1984, 59-48171**

**Int. Cl.$^5$ G06F** *13/00*

**U.S. Cl. 364—900** **7 Claims**



1. A printing apparatus comprising:

printing means for printing indicia on a printing medium;

connection means for detachably connecting a memory to the apparatus;

processing means for controlling the apparatus, accessing data stored int he memory connected to the apparatus, and controlling said printing means in accordance with the accessed data; and

detection means for detecting removal of the memory from the apparatus,

wherein said processing means, in response to a detection of removal by said detection means, suspends the control of the apparatus if said printing means is not being controlled by said processing means, and is initialized for the control of the apparatus if said printing means is being controlled by said processing means.

---

### 5,020,023
## AUTOMATIC VERNIER SYNCHRONIZATION OF SKEWED DATA STREAMS

**Thomas B. Smith, Wilton, Conn., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 23, 1989, Ser. No. 314,608**

**Int. Cl.$^5$ G06F** *11/16*

**U.S. Cl. 364—900** **8 Claims**

1. A technique for automatically removing at a receiver the skew between multiple correlated synchronous data streams transmitted to said receiver by a plurality of transmitters comprising the steps of:

marking at each of said transmitters data streams transmitted by said transmitters into frames under the control of local transmitter clocks, said local transmitter clocks being synchronized with one another;

loading data from said data steams into respective FIFO registers at said receiver under the control of recovered clocks, said recovered clocks being derived from said data streams;

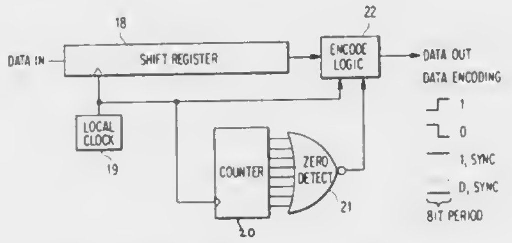
unloading data from said FIFO registers at the receiver under the control of a local receiver clock, said local receiver clock being synchronized with said transmitter clocks;

checking frame marked data in said data streams for a synchronization fault at the receiver, a synchronization fault being a failure to detect a frame mark at a time when said frame mark is expected;

when a synchronization fault is detected for one of said data streams, inhibiting the loading and unloading of the FIFO register for that data stream and then purging the FIFO register;

detecting a frame header in said data stream and enabling the loading of the FIFO register with the first value to arrive which is marked as a frame header; and

at a next succeeding time for an expected frame header, initiating normal unloading of the FIFO register.



---

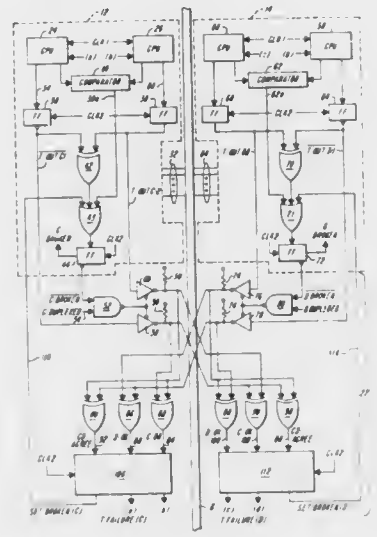
### 5,020,024
## METHOD AND APPARATUS FOR DETECTING SELECTED ABSENCE OF DIGITAL LOGIC SYNCHRONISM

**Jeffrey L. Williams, Hopkinton, Mass., assignor to Stratus Computer, Inc., Marlboro, Mass.**

**Filed Jan. 16, 1987, Ser. No. 3,732**

**Int. Cl.$^5$ G06F** *1/04, 1/12*

**U.S. Cl. 364—900** **10 Claims**



1. In digital logic apparatus having a clock element and having first and second digital logic elements, each of which executes computational logic operations and which together are arranged for providing comparable substantive operation with selected synchronism relative to said clock element, the improvement comprising

- A. means for detecting comparable substantive operation of said first and second logic elements,
- B. means for producing a first output signal in response to comparable substantive operation of said first and second elements coincident with said selected relative synchronism, and for producing said first output signal identically in response to non-comparable substantive operation of said first and second elements, and
- C. means for producing a different second output signal in response to comparable substantive operation of said first and second elements coincident with the absence of said selected relative synchronism.

---

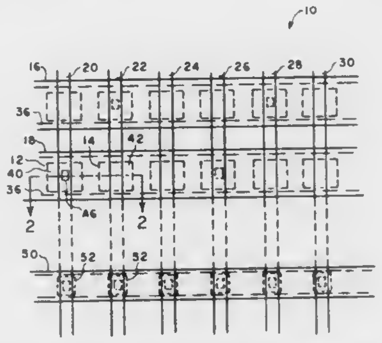
### 5,020,025
## CAPACITIVELY COUPLED READ-ONLY MEMORY

**Michael Nix, and Clayton D. English, both of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Jan. 9, 1990, Ser. No. 462,625**

**Int. Cl.$^5$ G11C** *17/04, 11/24*

**U.S. Cl. 365—102** **20 Claims**



1. A read-only memory for storing plural bits of information comprising:

a plurality of memory cells arranged in an array, each said memory cell including capacitor means having a relatively high capacitance or a relatively low capacitance for representing a bit of information stored therein, wherein said capacitor means comprises a single capacitor for providing said relatively high capacitance or a pair of series coupled capacitors for providing said relatively low capacitance.

---

### 5,020,026
## METHOD AND APPARATUS FOR READING AND PROGRAMMING ELECTRICALLY PROGRAMMABLE MEMORY CELLS

**John F. Schreck, and Phat C. Truong, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 14, 1989, Ser. No. 450,702**

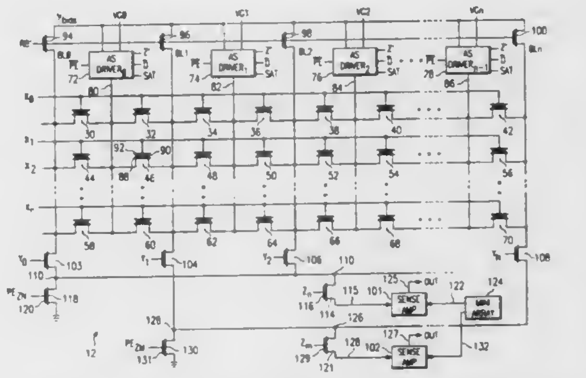
**Int. Cl.$^5$ G11C** *11/40*

**U.S. Cl. 365—104** **26 Claims**

20. Apparatus for reading and programming a plurality of memory cells each having current paths with first and second terminals, comprising:

means for selecting one of said plurality of cells;

means for reading said selected memory cell by coupling said first terminal to ground and said second terminal to a sense node; and



means for programming said selected memory cell by coupling said first terminal to a program bias voltage and said second terminal to ground.

---

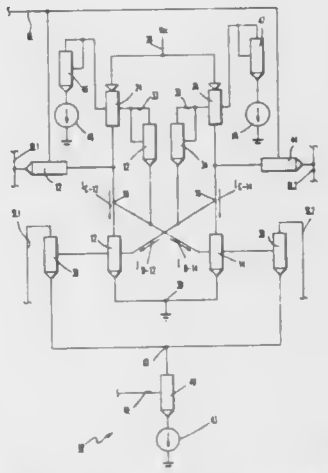
### 5,020,027
## MEMORY CELL WITH ACTIVE WRITE LOAD

**David B. Cochran, Beacon, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 6, 1990, Ser. No. 505,955**

**Int. Cl.$^5$ G11C** *11/00, 11/34*

**U.S. Cl. 365—154** **15 Claims**



1. A memory cell responsive to a write enable signal for storing write signals present on a pair of write bit lines and responsive to a read enable signal for presenting stored data on a pair of read sense lines, comprising:

first and second NPN bipolar transistors having commonly connected emitters, a base of said first NPN bipolar transistor connected to a collector of said second NPN bipolar transistor at a first node, a base of said second NPN bipolar transistor connected to a collector of said first NPN transistor at a second node;

first and second PNP bipolar transistors configured as loads for said first and second NPN bipolar transistors, said first and second PNP bipolar transistors having commonly connected emitters, said first PNP bipolar transistor having a collector connected to said first node, said second PNP bipolar transistor having a collector connected to said second node;

current draining means responsive to said write enable signal for draining current from a selected one of said first and second nodes; and

biasing means responsive to said current draining means for

VOL 126
ISS 4
MY 28 1991
UMI

biasing a selected one of said first and second PNP bipolar transistors into an active mode of operation;

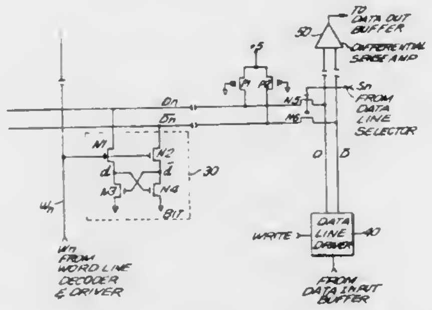
such that said selected one of said first and second PNP bipolar transistors is activated in a timer manner to provide current to said selected one of said first and second nodes and to provide current to the collector of one of the first and second NPN bipolar transistors connected to said selected one of said first and second nodes after the current draining means has drained current from said selected one of said first and second nodes.

---

### 5,020,028
### FOUR TRANSISTOR STATIC RAM CELL

**Frank Wanlass, Cupertino, Calif., assignor to Standard Microsystems Corporation, Hauppauge, N.Y.**

**Filed Aug. 7, 1989, Ser. No. 390,086**
**Int. Cl.$^5$ G11C *11/403***
**U.S. Cl. 365—154** **15 Claims**



1. In a read-write memory including a word line and complementary data lines and a memory cell, said memory cell comprising complementary data nodes for storing data signals at one of two levels thereat, the data signals on said data nodes requiring periodic refreshing to retain their desired values, said memory cell including first and second MOS transistors each having one output terminal respectively connected to one of said data lines, a second output terminal connected respectively to said data nodes and a control terminal connected to said word line, and third and fourth MOS transistors each having one output terminal connected respectively to one of said data nodes and a control terminal connected respectively to the other of said data nodes, said memory further comprising means for applying a first control signal at a first level to said word line during a read or write operation and for applying a second control signal to the word line at a level lower than that of said first control signal during a refresh operation, said lower level signal turning on said first and second transistors to a higher on resistance than said higher-level first control signal, said control signal applying means including an address decoder for providing an address signal and a refresh counter for providing a refresh signal and a word line driver having first and second inputs respectively receiving said address signal and said refresh signal and effective to produce said first control signal when it receives said address signal and said second control signal when it receives said refresh signal.

---

### 5,020,029
### STATIC SEMICONDUCTOR MEMORY DEVICE WITH PREDETERMINED THRESHOLD VOLTAGES

**Katsuki Ichinose, and Tomohisa Wada, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 3, 1990, Ser. No. 547,263**
**Claims priority, application Japan, Jul. 5, 1989, 1-174876**
**Int. Cl.$^5$ G11C *7/00, 11/40, 11/00***
**U.S. Cl. 365—154** **11 Claims**

1. A static semiconductor memory device comprising:

at least one memory cell;

a word line provided for selecting said memory cell; and

a bit line pair formed by first and second bit lines for writing or reading data in or from selected said memory cell,

each said memory cell including:

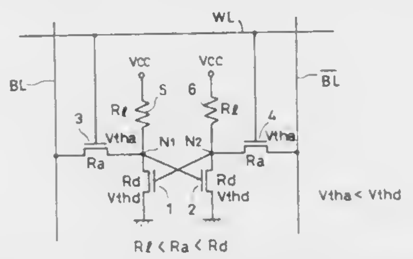
first and second storage nodes for storing complementary data,

first load means being coupled between a prescribed source potential and said first storage node, and having a prescribed resistance value,

second load means being coupled between said prescribed source potential and said second storage node, and having a prescribed resistance value,

a first semiconductor element being coupled between said first storage node and the ground potential, and having a control terminal connected to said second storage node,

a second semiconductor element being coupled between said second storage node and the ground potential, and having a control terminal connected to said first storage node,



a third semiconductor element being coupled between said first bit line and said first storage node, and having a control terminal connected to said word line, and

a fourth semiconductor element being coupled between said second bit line and said second storage node, and having a control terminal connected to said word line,

threshold voltages of said first and second semiconductor elements being so set that respective ones of said first and second semiconductor elements have first OFF resistance values which are larger than respective said resistance values of said first and second load means,

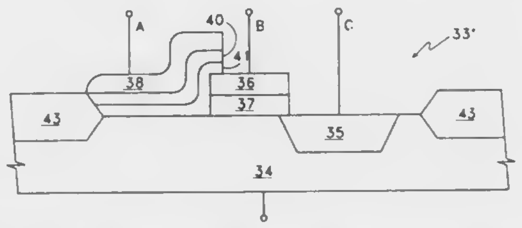
threshold voltages of respective said third an fourth semiconductor elements being so set that respective ones of said third and fourth semiconductor elements have second OFF resistance values which are larger than respective said resistance values of said first and second load means and smaller than said first OFF resistance values of said first and second semiconductor elements.

---

### 5,020,030
### NONVOLATILE SNOS MEMORY CELL WITH INDUCED CAPACITOR

**Robert J. Huber, 1145 E. Millbrook Way, Bountiful, Utah 84010**

**Filed Oct. 31, 1988, Ser. No. 265,409**
**Int. Cl.$^5$ G11C *7/00***
**U.S. Cl. 365—185** **19 Claims**



1. A nonvolatile semiconductor memory device comprising:

a substrate of a first conductivity type;

a region of a second conductivity type formed in a surface of said substrate;

first gate means for generating an inversion layer in said substrate adjacent said region;

first insulating means for insulating said first gate means from said substrate;

second gate means for generating an inversion layer in said substrate contiguous with said inversion layer generated by said first gate means;

charge retaining means for retaining a charge, said charge retaining means being disposed between said second gate means and said substrate; and

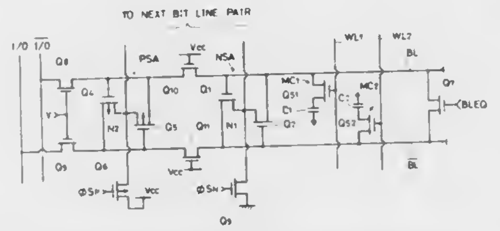
second insulating means for insulating said charge retaining means from said substrate, said second insulating means selectively permitting transfer of a carrier.

---

### 5,020,031
### DYNAMIC SEMICONDUCTOR MEMORY DEVICE HAVING IMPROVED VOLTAGE READ-OUT

**Hideshi Miyatake, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 1, 1989, Ser. No. 444,218**
**Claims priority, application Japan, Dec. 5, 1988, 63-308186**
**Int. Cl.$^5$ G11C *13/00, 11/40***
**U.S. Cl. 365—203** **17 Claims**



12. A semiconductor memory device comprising:

a plurality of memory cells each comprising N-channel MOS first transistor and a capacitor, said capacitor holding one of first potential and ground potential, said memory cells being arranged in plural rows and plural columns;

a plurality of word lines installed corresponding to each row of the memory cells and used to select the memory cells of each row;

a plurality of bit line pairs installed corresponding to every of said bit line pairs of the memory cells, the bit lines included in each column being connected to a first transistor each of the corresponding memory cells;

a plurality of first sense amplifiers connected to each of said bit line pairs for generating a potential equal to a power source potential;

a plurality of second sense amplifiers connected to each of said bit line pairs for amplifying the potential of one of the bit lines included in the connected bit line pair into the ground potential;

a plurality of N-channel MOS second transistors each connected between each of said first sense amplifiers and each of the bit lines included in each of said bit line pairs for dropping the power source potential generated in said first sense amplifiers by the threshold voltage into said first potential and for amplifying the potential of the other of the bit lines included in the connected bit line pair to attain said first potential; and

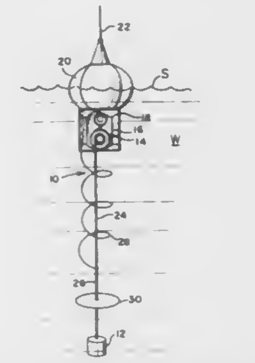
a plurality of equalizing means installed corresponding to each of said bit line pairs for equalizing said first potential generated to each of the bit lines included in the corresponding bit line pair and said ground potential into intermediate potential between them.

---

### 5,020,032
### SONOBUOY SUSPENSION SYSTEM

**John R. Dale, Pennsburg, and Lawrence F. Coar, Warminster, both of Pa., assignors to United States of America, Washington, D.C.**

**Filed Dec. 5, 1983, Ser. No. 558,263**
**Int. Cl.$^5$ H04B *1/59;* B63B *21/52***
**U.S. Cl. 367—4** **8 Claims**



1. A suspension system for providing wave-motion isolation between a float and a submersible package, comprising:

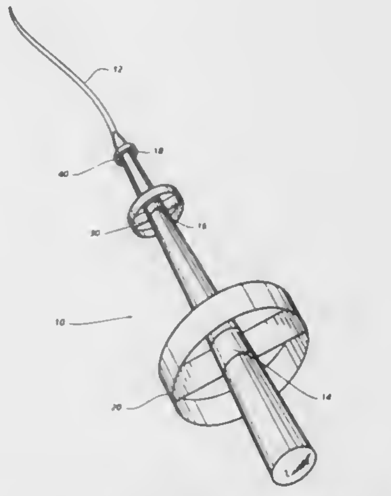
a spring means adapted to be connected to the float at one end and to the submersible package at the other end, said spring means having a near-zero gradient throughout the extension thereof and a resisting force substantially equal to the wet weight load of any submersible package at a preselected extended depth.

---

### 5,020,033
### LARGE EDDY BREAK-UP DEVICE FOR TOWED ARRAYS

**Norman Toplosky, Voluntown, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 28, 1990, Ser. No. 590,271**
**Int. Cl.$^5$ G01V *1/38***
**U.S. Cl. 367—20** **3 Claims**



1. A large eddy break-up device for a towed array having a plurality of sections interconnected by a plurality of couplings using one member of said plurality of couplings at each of a plurality of junction points and a plurality of spoiler wings of similar structure secured to said towed array at each of said plurality of junction points using a corresponding member of said plurality of couplings, each member of said plurality of spoiler wings comprises:

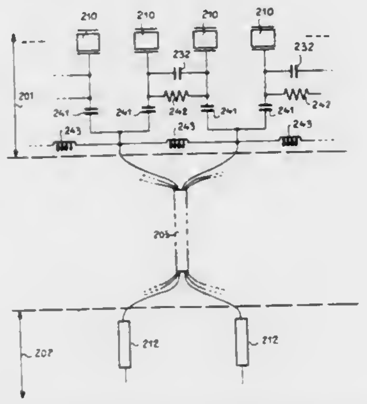
VOL
1126
ISS
4
MY
28
1991
UMI

- a first half of said spoiler wings and a second half of said spoiler wing wherein each said first and second halves having a pair of radial flat flanges, and semi-circular airfoils in between said pair of flanges;
- means for securing said pair of flat flanges on said first half of said spoiler wing with the corresponding pair of flat flanges on said second half of said spoiler wing and thus forming a circular airfoil; and
- means for securing said plurality of spoiler wings to a corresponding member said plurality of couplings interconnecting various sections of the towed array.

---

### 5,020,034
## DIRECTIONAL ANTENNA WITH MULTIPLE TRANSDUCERS, IN PARTICULAR FOR A SONAR

**Marc Solal, Nice, and Jean-Francois Gelly, Valbonne, both of France, assignors to Thomson CSF, Paris, France**
**Filed Mar. 7, 1988, Ser. No. 167,487**
**Claims priority, application France, Mar. 6, 1987, 87 03072**
**Int. Cl.⁵ G01S** *3/06*
**U.S. Cl. 367—138** 9 Claims

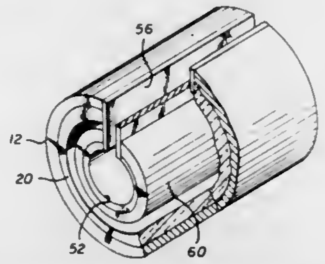


1. A directional acoustic antenna, in particular for a sonar, comprising:
- a group of transducers,
- a group of sources for feeding said transducers to form at least one directional channel including undesired grating lobes, the number of sources being at most equal to half the number of transducers, and
- an interpolation network for connecting said sources to the transducers while decreasing the amplitude of the grating lobes to a level of the same order of magnitude than that obtained with a number of sources equal to the number of transducers.

---

### 5,020,035
## TRANSDUCER ASSEMBLIES

**Harry W. Kompanek, Santa Barbara, Calif., assignor to Undersea Transducer Technology, Inc., Ventura, Calif.**
**Filed Mar. 30, 1989, Ser. No. 331,256**
**Int. Cl.⁵ H04R** *17/00*
**U.S. Cl. 367—159** 23 Claims

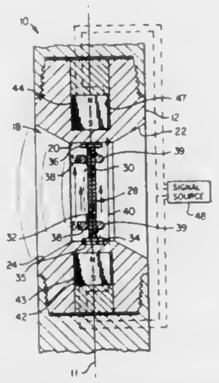


1. In combination in a transducer assembly for providing a transducing action between a voltage applied to the transducer assembly and vibrations in the transducer assembly,
- a support member disposed in a looped configuration and having an opening and having external and internal peripheries, and
- a transducer supported within the support member and made from a piezoelectric material and having an opening corresponding in position to the axial opening in the support member,
- The support member being continuous in its internal periphery and being provided with thinner dimensions at particular positions in the external periphery of the support member to reduce the weight of the support member and to control the frequency of vibrations on the transducer assembly, and
- a material lighter and more compliant than the support member and filling the thinner dimensions of the support member.

---

### 5,020,036
## MAGNETOSTRICTIVE TRANSDUCER FOR LOGGING TOOL

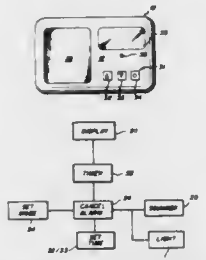
**Steven G. Petermann, Plano, and Keith W. Katahara, Allen, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.**
**Filed Feb. 6, 1990, Ser. No. 475,607**
**Int. Cl.⁵ G01V** *1/40;* **H01L** *41/10;* **H04B** *13/00*
**U.S. Cl. 367—168** 9 Claims



1. An acoustic signal transmitting transducer for a wellbore logging tool, said tool including a housing section having a generally transverse cavity formed therein having a throat portion and opposed portions opening to opposite sides of said housing section and adapted to be occupied by a liquid, said transducer comprising:
- an element defined by a composite plate member disposed in said throat portion of said cavity for displacement within said cavity to generate an acoustic wave in said liquid;
- means for generating a magnetic field passing through at least said throat portion of said cavity occupied by said element comprising at least one electromagnet means disposed in said housing section adjacent to said cavity and electrical signal generating means connected to said electromagnet means for generating a changing magnetic field to effect variable displacement of said plate member; and
- said plate member includes a part formed of a magnetostrictive material and which part is responsive to said magnetic field to change its length to effect bending of said plate member to displace liquid within said cavity for generating an acoustic signal.

### 5,020,037
## ALARM PILL BOX

**Malcolm R. Raven, 6756 Bridlewood St., Boca Raton, Fla. 33433**
**Filed Jan. 26, 1989, Ser. No. 301,530**
**Int. Cl.⁵ G04B** *47/00;* **G07F** *11/00*
**U.S. Cl. 368—10** 3 Claims

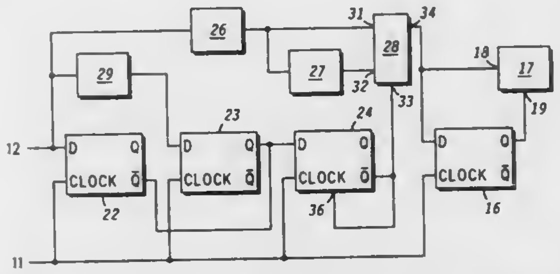


1. In a timed medication container having a case with at least one medication compartment; a lid means for covering said compartment; an alarm, display means, and an electronic circuit including a timer programmable to generate alarm actuating signals at each of a plurality of alarm times and display actuating signals, an improvement characterized in that:
- said display means includes means for indicating the number of times the lid means is opened in response to the alarm;
- said container further includes a switch actuated by movement of the lid means between closed and open positions, said switch being in a first state when the lid means is closed and being in a second state when the lid means is open;
- said electronic circuit being responsive to the switch to supply an actuating signal to the indicating means upon a change of state of the switch subsequent to the generation of an alarm signal; and
- said electronic circuit includes means for setting the plurality of alarm times, said setting means being operable only when the switch is in the second state.

---

### 5,020,038
## ANTIMETASTABLE STATE CIRCUIT

**Mavin Swapp, Mesa, and Charles Collis, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Jan. 3, 1990, Ser. No. 460,495**
**Int. Cl.⁵ G04F** *8/00, 10/00*
**U.S. Cl. 368—120** 12 Claims

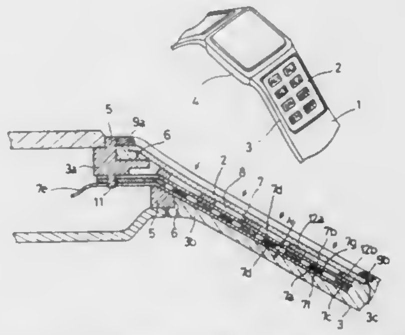


1. A method for measuring time between two asynchronous pulse edges comprising the steps of: providing a time measurement circuit coupled to first and second edges; testing the first edge with respect to the second edge to determine if the edges would cause a metastable state in the time measurement circuit; and delaying the first edge by a predetermined amount if a metastable state would exist.

---

### 5,020,039
## WATCH CASING WITH WRIST BAND SWITCH

**Takasuke Yokote, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan**
**Filed Mar. 9, 1990, Ser. No. 491,440**
**Claims priority, application Japan, Mar. 10, 1989, 1-27731[U]**
**Int. Cl.⁵ G04B** *37/12, 1/00*
**U.S. Cl. 368—282** 18 Claims



1. In a watch casing having an internal frame and a wrist band which is provided with a band switch comprised of a switch member composed of a flexible substrate, the wrist band comprising:
- a band base composed of a flexible elastomer and formed integrally with the internal frame and having an elongated cavity adjacent to the internal frame and extending lengthwise of the band base;
- a flat switch member disposed in the elongated cavity of the band base, the switch member comprising a pair of films spaced from each other and switch contacts disposed on opposed inner faces of the films and operable to couple with one another to effect a switch function;
- a band cover disposed on the band base to cover the elongated cavity to define adjacent to the internal frame an opening through which the flat switch member is inserted into the elongated cavity, the band cover being composed of an elastic sheet printed with switch marks;
- a band sealer composed of an elastomer and molded along a periphery of the band cover integrally with the band base; and
- means disposed in the internal frame for holding an end portion of the flat switch member which extends through the opening into the inside of the internal frame.

---

### 5,020,040
## OVERWRITING SYSTEM FOR MAGNETO-OPTICAL RECORDING WITH SELF TIMING TRACK

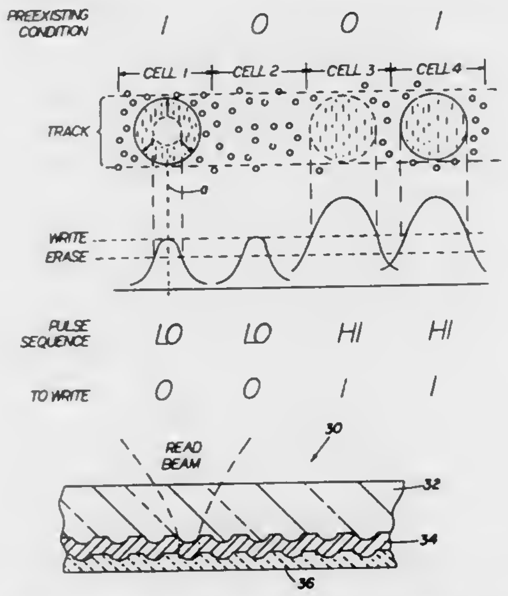
**Neville K. Lee, Medfield, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.**
**Filed Jun. 24, 1987, Ser. No. 65,931**
**Int. Cl.⁵ G11B** *13/04, 11/12, 11/10*
**U.S. Cl. 369—13** **14 Claims**

1. A method of overwriting a magneto-optical recording medium having a layer of magnetic material substantially uniformly initialized in one magnetic orientation deposited on a substrate made of nonmagnetic material, comprising the steps of
- defining respective locations of memory cells in the magnetic layer by embedding in said substrate optically recoverable nonmagnetic indicia distributed corresponding to said cells and superimposed respectively with said cells,
- optically recovering said indicia,
- directing energy within a first predetermined range at a spot, in accordance with said recovered indicia, substantially centered within a cell in said magnetic layer to write thermally a magnetic symbol representing a bit of one of two possible states by either leaving the cell unaffected if it does not already have a walled domain or by reversing

VOL 1126
ISS 4
MY 28 1991
UMI

the polarity of a preexisting walled domain with a predetermined magnetic polarity in the cell, and

directing energy within a second predetermined range substantially mutually exclusive of the first range, at a spot in accordance with said recovered indicia substantially centered within another cell in said magnetic layer to write thermally a magnetic symbol representing a bit of the other state by either leaving said another cell unaffected if it already contains a walled domain with a predetermined magnetic polarity or by reversing the polarity of a region within said another cell to create a walled domain if said another cell did not already have a walled domain.

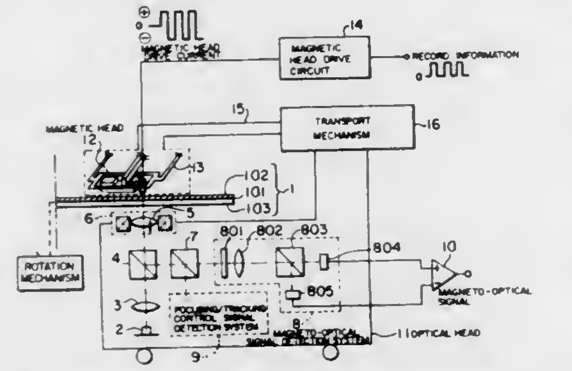


---

### 5,020,041
## MAGNETO-OPTICAL MEMORY APPARATUS HAVING A FLOATING MAGNETIC HEAD

**Takeshi Nakao, Sagamihara; Masahiro Ojima, Tokyo; Yoshinori Miyamura, Tokyo; Toyoji Okuwaki, Tokyo; Youichi Kawakubo, Tokorozawa; Yoshinori Takenchi, Ibaraki, and Yuzo Yamaguchi, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 8, 1988, Ser. No. 153,094**
**Claims priority, application Japan, Mar. 6, 1987, 62-50040**
**Int. Cl.$^5$ G11B** *13/04, 11/12*
**U.S. Cl. 369—13** **23 Claims**



1. A magneto-optical memory apparatus comprising:

a magneto-optical recording medium having a recording film thereon;

magnetic field application means including modulation means for applying a modulated magnetic field in accordance with information to be recording to said medium;

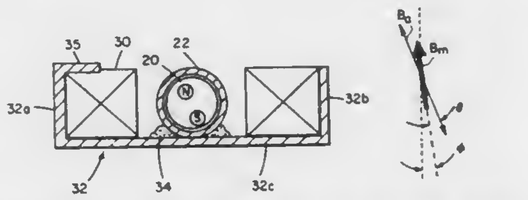
an optical head for continuously applying a high power laser light beam to said medium; wherein said magnetic field application means further includes a floating magnetic head arranged on the opposite side of the recording medium to the side of the optical head, the floating magnetic head floating with respect to the recording medium only by air pressure means, and said light beam is applied to a substrate of the recording medium while the magnetic field is applied to the recording film of the recording medium.

---

### 5,020,042
## APPARATUS FOR SELECTIVELY INVERTING A MAGNETIC BIAS FIELD USING A ROD-SHAPED PERMANENT MAGNET SURROUNDED WITH AN ELECTRICALLY CONDUCTIVE DAMPING MEANS

**William T. Fearnside, Fishers, and David M. Orlicki, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 25, 1989, Ser. No. 411,973**
**Int. Cl.$^5$ G11B** *13/04, 11/12*
**U.S. Cl. 369—13** **7 Claims**



1. Apparatus for selectively inverting an external magnetic field in a magneto-optic recording system so that information can be selectively recorded on or erased from a magneto-optic recording element of said system moving through said field, said apparatus comprising:

(a) a rod-shaped permanent magnet having its north and south magnetic poles oriented along its cross-sectional dimension;
(b) means for supporting said magnet for axial rotation;
(c) means for biasing the rotational position of said magnet within said support toward either of two nominal positions, 180° apart;
(d) means for exerting a torque on said magnet to cause said magnet to rotate from one nominal position toward the other nominal position; and
(e) electrically conductive means surrounding said magnet for damping any tendency for the magnet to oscillate about either of said nominal positions.

---

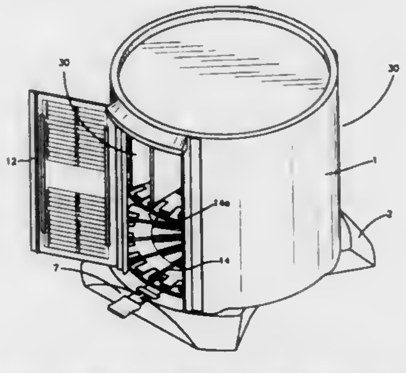
### 5,020,043
## ELECTRONIC MEDIA STORAGE APPARATUS

**Arthur Kohler, Mentor, Ohio, assignor to Chagrin Plastic Methods, Inc., Mentor, Ohio**

**Filed Feb. 14, 1989, Ser. No. 310,775**
**Int. Cl.$^5$ G11B** *7/08;* **A47B** *21/06*
**U.S. Cl. 369—36** **14 Claims**

1. An electronic media storage apparatus comprising:

(a) a housing means having a horizontal base and case, said case having a horizontal top wall and a cylindrical side wall, said side wall having an access opening formed therein; and
(b) a carousel means comprising:
  (i) a vertical shaft, the lower end of said shaft rotatably secured to said base, the shaft having upper and lower end portions; and
  (ii) a horizontal lower disk fixedly secured to the lower end portion of said shaft, said lower disk having upper and lower surfaces, said lower disk having a plurality of radially extending circumferentially spaced lower disk electronic media receiving slots formed in the upper surface thereof; and
  (iii) a horizontal upper disk fixedly secured to the upper end portion of said shaft in vertically spaced parallel relation to said lower disk, said upper disk having upper and lower surfaces, said upper disk having a plurality of radially extending circumferentially spaced upper disk electronic media receiving slots formed in the lower surface thereof with each of said upper disk electronic media receiving slots corresponding to a lower disk electronic media receiving slot; and
(c) indexing means for stopping rotary motion of said upper and lower disks at a preselected electronic media receiving slot.

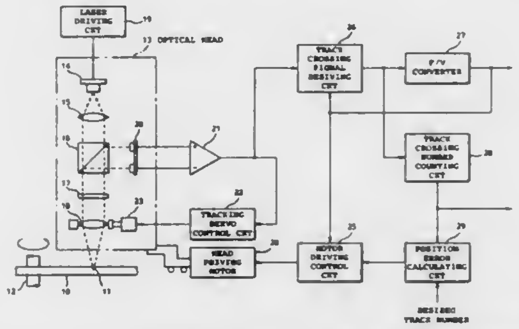


---

### 5,020,044
## HEAD POSITIONING SYSTEM FOR USE IN INFORMATION RECORDING/REPRODUCING DEVICE WITH MEANS FOR DERIVING TRACK CROSSING SIGNAL FROM TRACKING ERROR SIGNAL

**Shigeru Shimonou, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Jan. 23, 1989, Ser. No. 300,426**
**Claims priority, application Japan, Jan. 21, 1988, 63-11923**
**Int. Cl.$^5$ G11B** *21/10, 7/00*
**U.S. Cl. 369—44.28** **2 Claims**


LASER DRIVING CKT
11 OPTICAL HEAD
TRACK CROSSING SIGNAL DERIVING CKT
F/V CONVERTER
TRACK CROSSING NUMBER COUNTING CKT
TRACKING SERVO CONTROL CKT
HEAD DRIVING MOTOR
MOTOR DRIVING CONTROL CKT
POSITION ERROR CALCULATING CKT
DESIRED TRACK NUMBER

1. In a head positioning system for use in an information recording/reproducing system comprising a write/read head for a desired one of recording tracks of an information recording disk, a tracking error detecting means for detecting a deflection of the head from a center of the desired track to produce a tracking error signal, said tracking error signal comprising an alternating signal component representing said track crossing of the head and noise components when said head travels along said disk at a travelling velocity, said head positioning system comprising head driving motor means for driving said head along said information recording disk and motor driving control means responsive to a position error signal to control operation of said head driving motor means, wherein the improvement comprises:

a velocity detecting means for generating a velocity signal indicative of a moving velocity of said head relative to said information recording disk during access to a track of said information recording disk;

said motor driving control means being responsive to said velocity signal and controlling a rotating speed of said head driving motor means;

track crossing signal deriving means for deriving said alternating signal component as a track crossing signal from said tracking error signal, said track crossing signal deriving means comprising current control means responsive to said velocity signal for producing a DC current having a current level corresponding to an absolute value of said velocity signal, and a diode circuit having a slew rate for permitting said alternating signal component to pass therethrough as said track crossing signal with removing said noise components, said slew rate being controlled by said DC current so that said alternating signal component reliably passes even if the frequency of said alternating signal component increases;

track crossing number counting means responsive to said track crossing signal for transforming said track crossing signal into a pulse signal and for counting pulses of said pulse signal to produce a counted number as a current track position; and

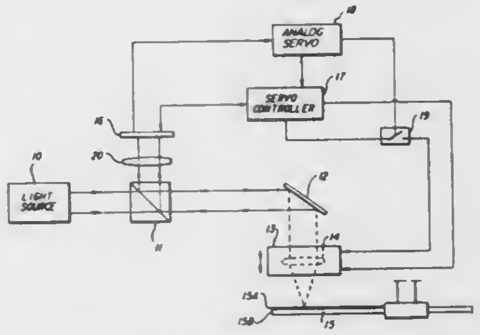
position error calculating means coupled to said track crossing number counting means for comparing said current track position and a desired track number previously set thereto to produce an error between said current track position and said desired track number as the position error signal, said motor driving control means responsive to said position error signal for driving said head driving motor means until said position error signal becomes zero.

---

### 5,020,045
## FOCUS ACQUISITION SERVO SYSTEM AND ASSOCIATED METHOD

**Gerald J. Smart, and Daniel L. Nelson, both of Penfield, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 19, 1988, Ser. No. 286,094**
**Int. Cl.$^5$ G11B** *7/00*
**U.S. Cl. 369—44.29** **10 Claims**



6. A focus acquisition servo system for quickly focusing a light beam on the recording surface of an optical disk comprising:

optical means for directing a beam of light to the recording surface of an optical disk;

focusing means for causing the point of focus to move in response to a control signal;

detector means for detecing the light refelected from the surface of the optical disk and for providing signals indicative of the point of focus of said focusing means with respect to the recording surface of the optical disk; and

controller means for commencing focus on the recording surface of the optical disk by providing a control signal which accelerates the focusing means to a focus position in jumps and decelerates the focusing means to a rough focus position and, upon reaching the rough focus position, provides a ramping control signal to drive the focusing means to a fine focusing position.

VOL
1126

ISS
4

MY
28

1991

UMI

**5,020,046**

### APPARATUS FOR REPRODUCING RECORDED DATA FROM A DISC EMPLOYING VARIABLE REGENERATED CLOCK DELAY COMPENSATING FOR VARIABLE RECORDING CONDITIONS

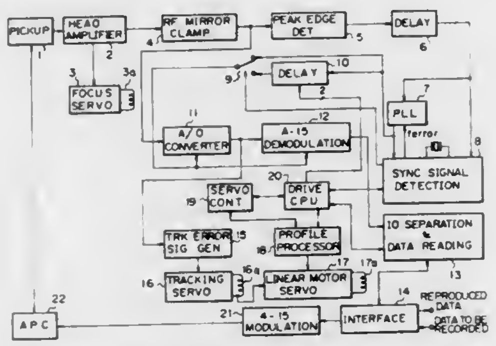
**Tadashi Ueda, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Dec. 21, 1988, Ser. No. 287,149**

**Claims priority, application Japan, Jun. 16, 1988, 63-148915**

**Int. Cl.⁵ G11B** *7/00*

U.S. Cl. 369—60 5 Claims



1. An apparatus for reproducing data recorded on an information recording disc having alternately a first region with pre-recorded clock information and a second region with data information along the circumferential direction of said disc in the form of tracks, the apparatus comprising:

clock generating means for generating a clock signal comprising a train of clock pulses on the basis of said clock information read from said recording disc;

variable delay means for delaying said clock signal by a variable delay time; and

control means for changing the variable delay time of said variable delay means during at least a reproduction period of data from said second region of said information recording disc.

---

**5,020,047**

### METHOD AND DEVICE FOR RADIATION BEAM SCANNING A RADIATION-SENSITIVE SURFACE OF A ROTATING CARRIER

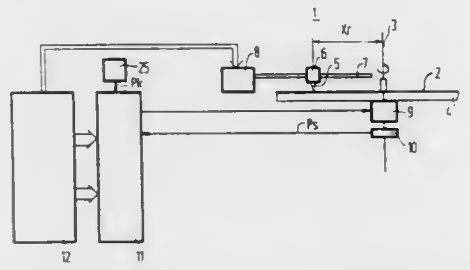
**René H. Hamer, and Cornelis P. DuPau, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 99,568, Sep. 22, 1987, Pat. No. 4,864,554. This application May 23, 1988, Ser. No. 197,364**

**Claims priority, application Netherlands, Jun. 22, 1987, 8701448**

**Int. Cl.⁵ G11B** *19/24. 17/22*

U.S. Cl. 369—240 8 Claims



1. A method of scanning a radiation-sensitive layer of a disc-shaped carrier which rotates about a center of rotation by means of a radiation beam which is directed towards the carrier at a point of incidence removed from the center by a distance, the carrier having an angular velocity being substantially inversely proportional to the distance between the center and the point of incidence, the method comprising the steps of:

generating clock pulses of predetermined frequency and velocity pulses of a frequency proportional to the angular velocity of the carrier and the predetermined frequency being higher than that of the velocity pulses,

correcting a sum value by a first correction value in response to a clock pulse;

correcting the sum value by a second correction value of a sign opposite to that of the first correction value in response to a velocity pulse;

controlling the angular velocity of the record carrier depending on the sum velocity so as to maintain a value for which the average of the sum value remains substantially constant, and

maintaining the ratio between the second and the first correction value at a value proportional to said distance by changing the value of at least one of the first correction value and the second correction value.

---

**5,020,048**

### OPTICAL INFORMATION RECORDING MEDIUM HAVING A PROTECTIVE FILM WHICH CAN BE STRIPPED

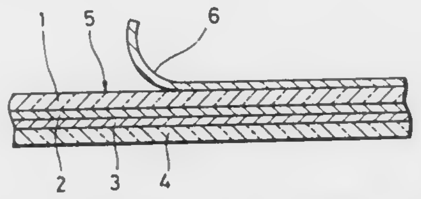
**Yuji Arai, Gunma; Hiroshi Ogawa, and Masahiro Hotori, both of Kanagawa, all of Japan, assignors to Taiyo Yuden Co., Ltd., Japan and Sony Corporation, Tokyo, Japan**

**Filed Dec. 12, 1989, Ser. No. 449,559**

**Claims priority, application Japan, Dec. 17, 1988, 63-318808**

**Int. Cl.⁵ G11B** *7/24*

U.S. Cl. 369—291 13 Claims



1. An optical information recording medium having at least a transparent substrate and a recording layer which is capable of recording information when irradiated with laser beams from the transparent substrate side, comprising:

a protective, hygroscopic, antistatic electricity film formed on a light incident surface of the transparent substrate in such a manner that the protective film can be stripped therefrom.

---

**5,020,049**

### OPTICAL SUB-CARRIER MULTIPLEX TELEVISION TRANSMISSION SYSTEM USING A LINEAR LASER DIODE

**George E. Bodeep, Point Pleasant; Thomas E. Darcie, Middletown; Edward J. Flynn, Summit, all of N.J.; Jan Lipson, Breinigsville, Pa.; Carl J. McGrath, Atkinson, N.H.; Charles B. Roxlo, Bridgewater, N.J.; Mark S. Schaefer, Salem, N.H., and L. C. Upadhyayula, Macungie Township, Lehigh County, Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Oct. 13, 1989, Ser. No. 420,849**

**Int. Cl.⁵ H04J** *1/00*

U.S. Cl. 370—3 6 Claims

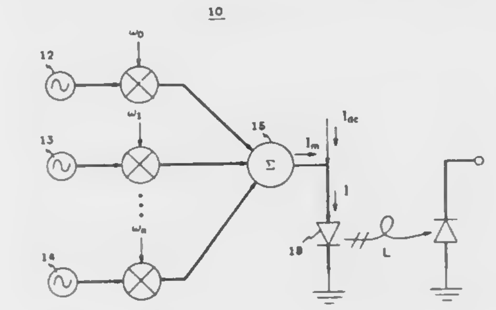
1. A sub-carrier multiplex transmission system comprising

means for frequency division multiplexing a plurality of channels into a multiplexed input signal;

means for supplying a dc bias current;

means for combining said dc bias current and the multiplexed input signal into a laser drive current; and

a semiconductor laser, responsive to the laser drive current, for producing an optical output including the plurality of channels and their second-order and third-order distortion signals, the dc bias current being a current for which a first derivative of laser power with respect to laser drive current is approximately a maximum.



---

**5,020,050**

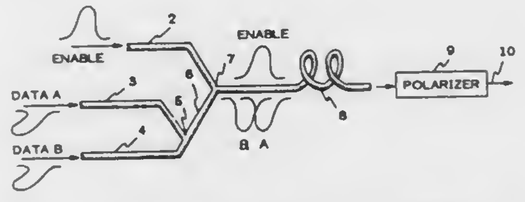
### CASCADABLE OPTICAL COMBINATORIAL LOGIC GATES

**Mohammed N. Islam, Hazlet, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Oct. 13, 1989, Ser. No. 420,972**

**Int. Cl.⁵ H04J** *3/00*

U.S. Cl. 370—4 11 Claims



1. An optical combinatorial logic device comprising

means for generating an enable signal in a prescribed time slot, said time slot substantially corresponding to a pulse width of said enable signal,

means responsive to at least a first data signal for combining said enable signal with said at least first data signal in a prescribed relationship, and

means coupled to said signal combining means for substantially removing said enable signal from said prescribed time slot at an output of said device when said at least first data signal is present.

---

**5,020,051**

### DUPLEX COMMUNICATIONS METHOD AND SYSTEM

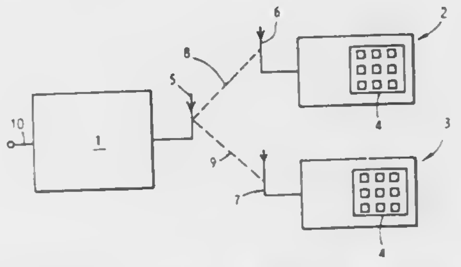
**Graham E. Beesley; David J. McCabe, both of Winchester, England, and Jasjit S. Saini, Rosheim, France, assignors to Shaye Communications Limited, Hampshire, England**

**Filed Dec. 18, 1989, Ser. No. 451,749**

**Claims priority, application United Kingdom, Dec. 20, 1988, 8829661**

**Int. Cl.⁵ H04B** *1/56*

U.S. Cl. 370—29 21 Claims



1. A method of establishing a digital time-division duplex radio communication link between one of a plurality of portable units and a base unit forming a cordless telephone system, said radio link being normally effected by a ping-pong format comprising alternate bursts of transmitted signal and reception with one end of the link transmitting while the other is receiving, and wherein the base unit includes a number of transceivers at least equal to the number of portable units, and each portable unit includes a transceiver whereby the aforesaid radio link may be established, said method comprising synchronising the transmission bursts from each of the active base transceivers so that they all have the same start time and burst duration and defining, between successive synchronised transmission bursts, a reception window during which the base unit transceivers are in a reception mode to listen for signals from the portable units.

---

**5,020,052**

### PACKET SWITCHING NETWORK

**Martin L. F. DePrycker, St. Niklaas, and Michel P. M. DeSomer, Aalst, both of Belgium, assignors to Alcatel N.V., Amsterdam, Netherlands**

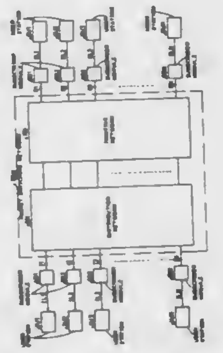
**PCT No. PCT/EP87/00792, § 371 Date Jun. 15, 1989, § 102(e) Date Jun. 15, 1989, PCT Pub. No. WO88/04869, PCT Pub. Date Jun. 30, 1988**

**PCT Filed Dec. 15, 1987, Ser. No. 377,825**

**Claims priority, application Belgium, Dec. 19, 1986, 2/61131**

**Int. Cl.⁵ H04Q** *11/04*

U.S. Cl. 370—60 18 Claims



1. Packet switching network (BSN) to transmit packets of information through a plurality of interconnected first and second switching modules (BSE) included therein, each of said switching modules having a plurality of receive ports (RX1/RX8) to receive said packets, a plurality of transmit ports (TX1/TX8) to transmit said packets, and selection means to select one of its transmit ports and to transfer packets arriving at one of its receive ports to said selected transmit port, said network including at least one of said first switching modules of which said selection means are at least able to select one of the transmit ports thereof without using routing information (RF) included in said packets, and at least one of said second switching modules of which said selection means are controlled by routing information included in said packets to select one of the transmit ports thereof, characterized in that, only for the first packet (SETUP) of a communication, the selection means of said first switching module select one of the transmit ports (TX1/TX8) thereof without using routing information (RF) contained in said packet, whereas for the following packets belonging to the same communication, the selection means of said first switching module select one of the transmit ports thereof under the control of routing information included in said following packets and relating to the route followed by said first packet.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,020,053
## CHANNEL ACCESS SYSTEM

**Minoru Ishikawa, Tochigi, and Nobuki Nakata, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**
**Filed Apr. 17, 1990, Ser. No. 510,198**
**Claims priority, application Japan, Apr. 17, 1989, 1-96992**
**Int. Cl.$^5$ H04J** *3/22*
U.S. Cl. 370—84 9 Claims

1. A channel access system comprising:

n channel parts for receiving m channels of voice signals and for outputting voice frequency data and signaling data; and

a multiplexer part for receiving the voice frequency data and the signaling data of the m channels from said n channel parts and for supplying channel access signals to said n channel parts for designating a channel of the voice frequency data,

each of said n channel parts including:

a coder for coding a corresponding one of said voice signals into one of said voice frequency data;

a decoder for decoding the channel access signals and for generating a synchronizing signal which is synchronized to a corresponding one of said channel access signals which designates a particular channel;

a signaling converter for converting the corresponding one of said voice signals into a corresponding one of said signaling data having a first transmission speed; and

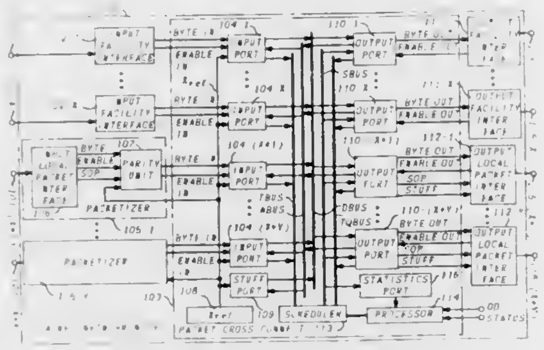
a speed converting circuit for converting the transmission speed of said signaling data from the first transmission speed to a second transmission speed which is higher than the first transmission speed,

said synchronizing signal controlling a coding timing of said coder and a speed conversion timing of said speed converting circuit.

---

### 5,020,054
## PACKET FORMAT INCLUDING UNIQUE NETWORK IDENTITY

**Carl J. May, Jr., 15 Donner St., Holmdel, N.J. 07733**
**Filed Jun. 23, 1989, Ser. No. 371,229**
**Int. Cl.$^5$ H04J** *3/00*
U.S. Cl. 370—94.1 25 Claims



1. Apparatus for generating a packet including at least a transport word, i.e., header, comprising:

means for generating said transport word including a predetermined number of groups of bit positions each including a predetermined number of said bit positions, predetermined ones of said transport word bit positions forming an at least one prescribed parity check field;

a source of a reference code word having a number of bits, said reference code word being independent from any information in the transport word;

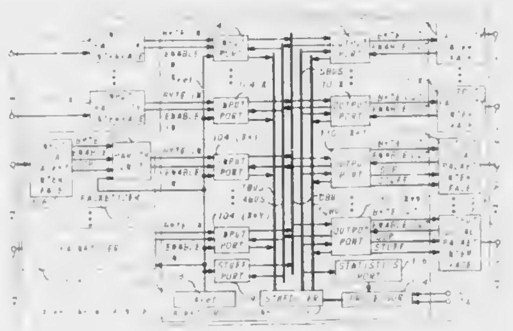
means for generating an at least first prescribed parity check from bits in a number of predetermined bit positions of said transport word and predetermined ones of said number of bits of said reference code word; and

means for inserting a number of bits representative of said at least first prescribed parity check into a corresponding number of bit positions forming said at least first prescribed parity check field in said transport word.

---

### 5,020,055
## MULTI-LENGTH PACKET FORMAT INCLUDING FIXED LENGTH INFORMATION WORDS

**Carl J. May, Jr., 15 Donner Street, Holmdel, N.J. 07733**
**Filed Jun. 23, 1989, Ser. No. 371,232**
**Int. Cl.$^5$ H04J** *3/00*
U.S. Cl. 370—94.1 17 Claims



1. Apparatus for generating a packet including a transport word, i.e.. header, comprising:

means for generating said transport word including a first predetermined number of groups of bit positions, first predetermined ones of said transport word bit positions forming a length indicator field and second predetermined ones of said transport word bit positions forming a breakage indicator field;

a source of user information:

means for formatting said user information into packet information words to be appended to said transport word, each of said packet information words having a second predetermined number of groups of bit positions;

means for obtaining a count of a number of said packet information words and for generating a first representation of said number of packet information words;

means for inserting said first representation in said packet length indicator field;

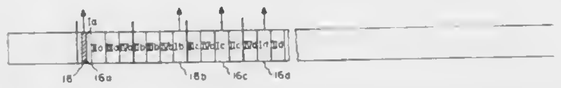
means for obtaining a count of a number of groups of bit positions not including user information in a last one of said packet information words in the packet and for generating a second representation of said number of groups of bit positions not including user information; and

means for inserting said second representation in said breakage indicator field.

---

### 5,020,056
## REDUCTION OF SYNCHRONOUS FADING EFFECTS BY TIME HOPPING OF USER SLOTS IN TDMA FRAMES

**Sandeep Chennakeshu, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.**
**Filed May 2, 1989, Ser. No. 346,760**
**Int. Cl.$^5$ H04J** *3/16*
U.S. Cl. 370—95.3 8 Claims



1. A method for reduction of synchronous fading in a TDMA communications system, comprising the steps of:

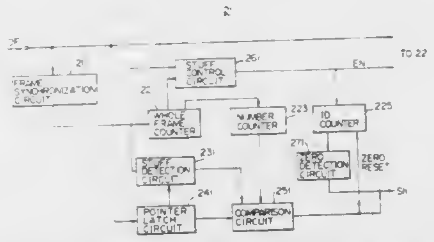
assigning each user to a time slot in which data to or from that user appears; and

varying the position of the time slot assigned to that particular user to be in a different part of each successive frame.

---

### 5,020,057
## EASY DETECTION OF HEAD POSITION OF INFORMATION DATA VIA RECEPTION PROCESSING UNIT IN SYNCHRONOUS MULTIPLEX TRANSMISSION APPARATUS

**Atsuki Taniguchi, Kawasaki; Haruo Yamashita, Yokohama; Tomohiro Ishihara, Hachioji, and Takaaki Wakisaka, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**
**Filed Dec. 4, 1989, Ser. No. 444,864**
**Claims priority, application Japan, Dec. 5, 1988, 63-309097**
**Int. Cl.$^5$ H04J** *3/06*
U.S. Cl. 370—102 3 Claims



1. A reception processing unit in a synchronous multiplex transmission system, the reception processing unit receiving a data transmission of successive bytes, transmitted at a predetermined byte rate and organized as successive, plural data frames, each data frame including a supervisory data field of a fixed byte length, Ls, and an associated, information data field having a head position and being of a fixed byte length, Li, each supervisory data field including a pointer, which indicates the head position of the information data field in each data frame absent any stuff, and frame synchronization bytes, and wherein either a negative or a positive stuff may be present, or absent, in any such data frame, and, when present, each positive stuff and each negative stuff respectively advances and delays the head position of the information data field relative to the head position indicated by the pointer and correspondingly advances and delays the time interval of the effective information data field relatively to the time interval of the respectively associated data frame, said reception processing unit functioning to detect the respective head positions of respective information data fields of successive, data frames, as received thereby, and outputting successive head detection signals for identifying the corresponding head positions of said respective, successive information data fields and successive enable signals for enabling the extraction of said respective and successive, effective information data fields, and comprising:

information data field detection means for detecting each said time interval in which an effective information data field exists and outputting an enable signal corresponding to, and during, that time interval, and counting means, respective to and enabled by each said enable signal, for performing a counting operation, said counting means including means for generating byte count pulses corresponding to the successive bytes of the data transmission, means for defining the fixed byte length Li as a predetermined count value Li, and said counting means counting the byte count pulses only during receipt of the enable signal and terminating the counting operation of the byte count pulses when the enable signal terminates, said counting means further including means for resetting the count thereof to zero in response either to a reset signal applied thereto or to the count thereof reaching the fixed byte count Li;

said information data field detection means comprising:

a first counting unit which continuously counts the successive byte count pulses for the combined total bytes (Ls+Li) of each of said successive data frames, as received,

a stuff detection unit which receives and examines the respective supervisory data fields of said successive, received data frames and detects the presence or absence of a negative stuff or a positive stuff in each thereof and produces corresponding negative and positive stuff detection outputs,

an effective information data extraction unit which is responsive to the negative and positive stuff outputs of said stuff detection unit and produces said enable signals as an output thereof, each said enable signal being produced during the time interval of, sand thereby enabling the selective extraction of, the effective information data field of a corresponding data frame of the received data transmission, regardless of the advanced or delayed relationship thereof relatively to the corresponding, successive data frame, and

a head position detection unit which is responsive to the absence of any negative or positive stuff output of said stuff detection unit, and thus the absence of the detection of any positive or negative stuff in a received data frame, and further is responsive to the head position indicated by the associated pointer for each such data frame, and produces the head position detection output, said head position detection unit receiving and examining said successively received supervisory data fields of respective, said successive data frames and detecting the corresponding head positions indicated by the pointers thereof and outputting said head detection signals when, for each said data frame, the series of byte numbers of the data frame matches the head position indicated by the pointer for that data frame; and

said counting means comprising a second counting unit which is operative in response to receipt of said enable signal for producing said head detection signal as an output thereof for each said information data field for which a negative or a positive stuff is present in the respective data frame;

said first counting unit more particularly comprising:

a frame synchronization circuit which detects the frame synchronization bytes in each of said supervisory data fields of said successively received and respective data frames, and establishes frame synchronization for the successive data frames, and

a whole frame counter which is enabled for counting be each said frame synchronization output and count, in succession, the series of byte count pulses, from the head position, of each said data frame;

said stuff detection circuit more particularly comprising:

a pointer latch circuit which receives and detects each said pointer from said respective, successive data frames and, for each said detected pointer, stores the head position indicated by said detected pointer,

a stuff detection circuit which receives and analyzes each of said head positions, as detected and stored in said pointer latch circuit, and detects, in accordance with the data pattern of the pointer defining each said head position, whether a positive or negative stuff is present in the corresponding data frame, and

said effective information data extraction unit comprising a stuff control circuit which generates and produces said enables signal output, said stuff control circuit being responsive to the count output of said whole frame counter, corresponding to the series of bytes of the data frame counted thereby and, selectively, producing the negative and positive stuff detection outputs of said stuff detection circuit;

said second counting unit more particularly comprising:

an information data counter which, in response to said enable signal output of said stuff control circuit, performs a counting operation in accordance with the successive byte count pulses of the received data transmission, and

VOL
1126
ISS
4
MY
28
1991
UMI

a zero detection circuit which produces the head detection signal output, said zero detection circuit detecting a zero reset count value of said information data counter and, in response thereto, producing said head detection signal output; and

said head position detection unit more particularly comprising:

a number counter which indicates the byte number of a series of bytes successively counted by said whole frame counter, and

a comparison circuit which is responsive to and rendered operational only in the absence of both said negative and positive stuff detection outputs of said stuff detection circuit and, when operation, detects coincidence or noncoincidence of said head position produced from said pointer latch circuit and said byte number, said head detection signal being output by said comparison circuit and the information data counter being reset to zero when said coincidence is detected.

---

### 5,020,058

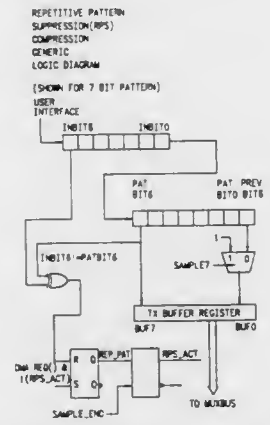
## PACKET VOICE/DATA COMMUNICATION SYSTEM HAVING PROTOCOL INDEPENDENT REPETITIVE PACKET SUPPRESSION

**Brian D. Holden, Half Moon Bay; Randall M. Presuhn, Campbell; William L. Robertson, San Jose, and Gaymond W. Schultz, Los Altos, all of Calif., assignors to Stratacom, Inc., Campbell, Calif.**

**Filed Jan. 23, 1989, Ser. No. 299,404**

**Int. Cl.$^5$ H04B *1/66;* G04L *3/02***

**U.S. Cl. 370—109** **11 Claims**



1. A package voice/data communication system comprising

means for transmitting data packets in a data bit stream from a first location to one or more second locations over a multi-time slot digital facility,

means for queuing said data packets along with voice packets,

compression means at said first location for determining whether said data stream has one or more data packets filled with repetitive patterns of configurable length, said compression means including means for suppressing said data packets such that the suppressed data packets are not transmitted to said second locations,

means at said first location for controlling the impact of bit errors and dropped packets by sending a packet if a certain number of consecutive data packets have been suppressed,

expansion means at said second location for replicating said repetitive patterns into the portion of said data stream which corresponds to the suppressed data packets.

---

### 5,020,059

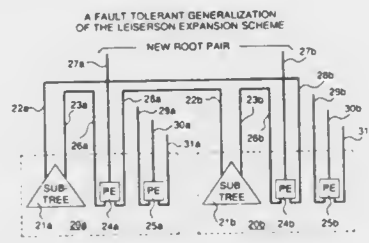
## RECONFIGURABLE SIGNAL PROCESSOR

**Allen L. Gorin, Fair Lawn; Patrick A. Makofsky, Randolph; Nancy Morton, Dover; Neal C. Oliver, Madison; Richard R. Shively, Convent Station, all of N.J., and Christopher A. Stanziola, Hyde Park, N.Y., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Mar. 31, 1989, Ser. No. 331,411**

**Int. Cl.$^5$ G06F *11/18***

**U.S. Cl. 371—11.3** **14 Claims**



1. A process for embedding a desired tree node topology in an assembly of processing elements fixedly interconnected through controllably enabled element ports, comprising the steps of:

defining a desired tree node interconnection topology,

determining a processor element port-to-port connection arrangement for the given said assembly which maximizes use of processors known to be operable,

modifying said port-to-port connection arrangement to minimize tree depth, and

embedding said modified processor element connection arrangement into said assembly of elements by enabling selected ones of said processor element ports.

---

### 5,020,060

## ERROR CODE CORRECTION DEVICE HAVING A GALOIS ARITHMETIC UNIT

**Katsumi Murai, Kyoto, and Makoto Usui, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

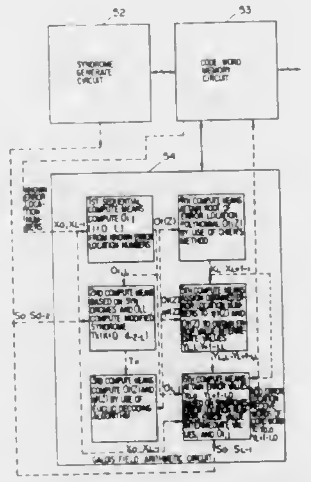
**PCT No. PCT/JP88/00646, § 371 Date Feb. 17, 1989, § 102(e) Date Feb. 17, 1989, PCT Pub. No. WO89/00363, PCT Pub. Date Jan. 12, 1989**

**PCT Filed Jun. 28, 1988, Ser. No. 313,963**

**Claims priority, application Japan, Jun. 30, 1987, 62-162763; Jul. 15, 1987, 62-176167**

**Int. Cl.$^5$ G06F *11/10***

**U.S. Cl. 371—37.1** **2 Claims**


52
53
SYNDROME GENERATE CIRCUIT
CODE WORD MEMORY CIRCUIT
54
1ST SEQUENTIAL COMPUTE MEANS COMPUTE σi,j (i=0...L) FROM KNOWN ERROR LOCATION NUMBERS
4TH COMPUTE MEANS
2ND COMPUTE MEANS BASED ON SYNDROMES AND σi,L COMPUTE MODIFIED SYNDROME
3RD COMPUTE MEANS
X0, XL-1
S0 Sd-2
Tk
X0 XL-1
S0 Sd-1
GALOIS FIELD ARITHMETIC CIRCUIT

1. An error code correction apparatus provided with a Galois field arithmetic unit for correcting errors produced in code words by use of inputted error correcting codes, constituted of elements of a Galois field GF($2^r$) wherein r-bit binary data constitute a symbol having a minimum distance d and including post-reception errors, and location numbers ranging from $X_0$ to $X_{L-1}$ whose error locations are partially known out of all the locations of errors produced in said received error correcting codes, comprising:

a syndrome generating circuit for generating $d-1$ syndromes ranging from $S_0$ to $S_{d-2}$ by product-summing code word information symbol locations with coefficients predetermined in response to the code word information symbol locations;

a first compute means for attaining the expansion coefficients $\sigma_{i,j}$ for error location polynomials ranging from the 0- to L-dimension which have known error location numbers as their roots and are defined by

$$\begin{aligned}\sigma_j(Z) &= \prod_{i=0}^{j}(Z-X_i)\\ &= \sigma_{j,j}\times Z^j+\sigma_{j-1,j}\times Z^{j-1}+\ldots+\\ &\quad\ \sigma_{i,j}\times Z^i+\ldots+\sigma_{0,j}\end{aligned}$$

(where $0\leqq j\leqq L$ and $0\leqq i\leqq j$);

a second compute means for computing a modified $T_k$ for k ranging from 0 to $d-2-L$ by use of the L-dimension error location polynomial expansion coefficients $\sigma_{i,L}$ out of the results obtained from said first compute means and the syndrome ranging from $S_0$ to $S_{d-2}$ computed by said syndrome generating circuit, according to an expression

$$T_k=\sum_{i=0}^{L}\sigma_{i,L}\times S_{k+1};$$

a third compute means, using said modified syndrome $T_k$ in place of syndromes ranging from $S_0$ to $S_{d-2}$ in a correcting code decoding procedure free of erasure correction, for determining location polynomial coefficients and error evaluating expression coefficients through operating syndromes ranging from $S_0$ to $S_{d-2}$ and, complying with said error correcting code decoding procedures free of erasure correction, for determining the expansion coefficients or $\sigma_{i,L+t-1}$ for the t-dimension error location polynomial relative to the error location numbers ranging from $X_L$ to $X_{L+t-1}$ for t errors other than said known error location numbers, to be defined by

$$\begin{aligned}\sigma_j(Z) &= \prod_{i=L}^{L+t-i}(Z-X_i)\\ &= \sigma_{L+t-1,L+t-1}\times Z^t+\\ &\quad\ \sigma_{L+t-2,L+t-1}\times Z^{t-1}+\ldots+\\ &\quad\ \sigma_{L+1,L+t-1}\times Z+\sigma_{L,L+t-1},\end{aligned}$$

and for determining the expansion coefficients of $\eta_{i,t}$ for the error evaluating polynomial for the intermediate error values to be obtained, to be defined by

$$\eta_t(Z)=\sum_{i=L}^{L+t-1}Y_{i,L}\times X_i\times\prod_{j=L,\,j=i}^{L+t+1}(Z-X_j);$$

a fourth compute means for determining the error location numbers ranging from $X_L$ to $X_{L+t-1}$ which are the roots of the t dimension error location polynomial relevant to the errors other than said known error locations obtained by said third compute means;

a fifth compute means for determining error quantity intermediate values ranging from $Y_{L,L}$ to $Y_{L+t-1,L}$ to be obtained by substituting the t error location numbers obtained by said fourth compute means into an expression

$$Y_{i,L}=\eta_t(X_i)/(X_i\sigma_t(X_i))$$

wherein the error evaluating polynomial is divided by the error location polynomial obtained by said third compute means as differentiated in form; and

a sixth compute means for consecutive computation for determining the ultimate error quantities ranging from $Y_{L+t-1,0}$ to $Y_{0,0}$ regarding all the L+ error location numbers, for computing $Y_{j,j}$ by use of an expression

$$Y_{i,j}=\sum_{i=j+1}^{L+t-1}Y_{i,j+1}/(X_i+X_j)+\sum_{i=0}^{j}\sigma_{i,j}\times S_i$$

wherein j is allowed to change from $L-1$ to 0 under the condition $i\leqq j$, and for consecutively obtaining the results in a next computing step for the determination of $Y_{j-1,j-1}$ with j decreased by one wherein the intermediate results of the respective computations with a right-hand side put to $Y_{i,j+1}/X_i+X_j)=Y_{i,j}$ and the results of the computation of the above left-hand side $Y_{j,j}$ are used consecutively for substitution;

and said apparatus performing a correction by adding thus obtained error quantities ranging from $Y_{L+t-1,0}$ to $Y_{0,0}$ to location symbols indicated by said received code word error location numbers ranging from $X_{L+t-1}$ to $X_0$.

---

### 5,020,061

## FREE ELECTRON LASER WITH A GASEOUS MEDIUM WIGGLER AND METHOD TO USE THIS LASER

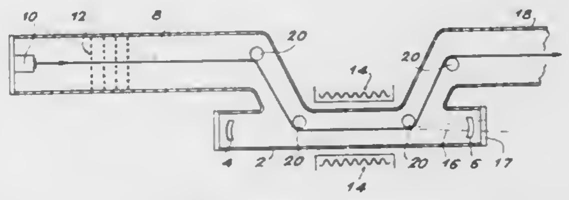
**Claude Etievant, Versailles, France, and Hans Wilhelmsson, Gothenburg, Sweden, assignors to Commissariat A l'Energie Atomique, Paris, France**

**Filed Jul. 24, 1990, Ser. No. 556,463**

**Claims priority, application France, Jul. 25, 1989, 89 09991**

**Int. Cl.$^5$ H01S *3/00***

**U.S. Cl. 372—2** **8 Claims**



1. A free electron laser including:

a principal chamber traversed by a beam of previously accelerated electrons,

a wiggler which generates in this principal chamber a periodic magnetic field interacting with the beam of electrons, and

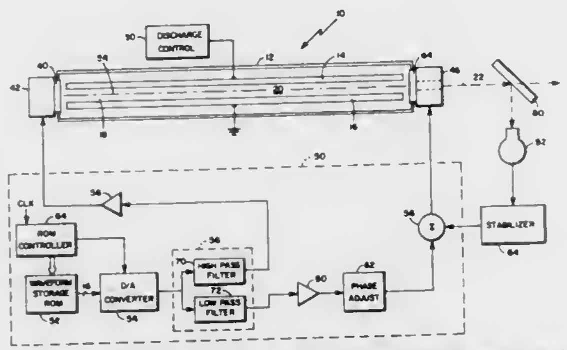
means to fill the principal chamber with a gas formed of atoms or molecules having at least one resonance line at a determined frequency, wherein said laser further includes means to tune the laser to this resonance line, thereby enabling the laser to produce a light whose frequency is close to said determined frequency.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,020,062
## APPARATUS AND METHOD FOR FREQUENCY MODULATING A WAVEGUIDE LASER

**Francis J. Cusack, Jr., Acton, and Clarke E. Harris, Wayland, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed May 3, 1990, Ser. No. 518,610**
**Int. Cl.⁵ G01C** *3/08;* **G01P** *3/36;* **H01S** *3/082*
U.S. Cl. 372—23 **26 Claims**



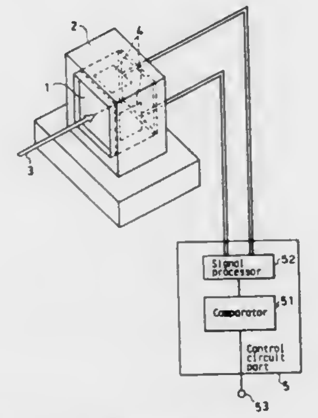
1. In a gas laser having a waveguide cavity, said cavity defined at the ends thereof by movable endpieces, an apparatus for modulating the optical length of said cavity, said apparatus comprising:
first and second transducers coupled to said movable endpieces, said first and second transducers being responsive to electrical control signals for modulating the positions of said endpieces;
means for generating a modulation signal; and
means for separating said modulation signal into a first signal including fundamental frequency components greater than a first predetermined cutoff frequency and a second signal including harmonic frequency components less than a second predetermined cutoff frequency substantially equal to the first cutoff frequency, said first and second signals being coupled respectively to said first and second transducers.

---

### 5,020,063
## LASER APPARATUS

**Toshiharu Okada, Ibaraki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Dec. 14, 1989, Ser. No. 450,480**
**Claims priority, application Japan, Dec. 21, 1988, 63-322649**
**Int. Cl.⁵ H01S** *3/10*
U.S. Cl. 372—34 **5 Claims**



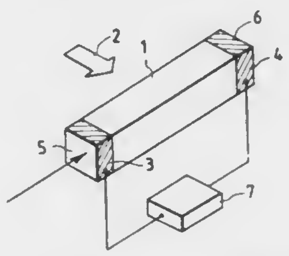
1. A laser apparatus comprising:
a frequency conversion element for producing higher harmonic wave light by receiving light from a laser which is oscillating in fundamental frequency, and
detection means, which is bonded on the surface of said frequency conversion element in order to detect surface temperature of said frequency conversion element.

---

### 5,020,064
## ELECTROMAGNETIC WAVE DEVICE

**Yoshihiko Mizushima; Takashi Iida; Toru Hirohata; Kenichi Sugimoto; Yoshihisa Warashina, and Kazutoshi Nakajima, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan**

**Filed Aug. 14, 1989, Ser. No. 393,275**
**Claims priority, application Japan, Aug. 30, 1988, 63-215817**
**Int. Cl.⁵ H01S** *3/00*
U.S. Cl. 372—37 **11 Claims**



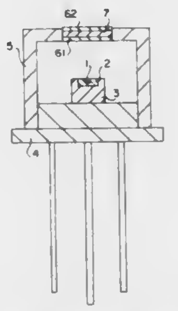
1. An electromagnetic wave device, comprising:
a medium carrying free carriers, said medium having a plasma frequency and a cyclotron frequency;
means for applying a magnetic field to said medium;
means for applying a first input electromagnetic wave having a first frequency to said medium in a direction substantially perpendicular to said magnetic field; and
means for accelerating said carriers in a direction substantially identical to the direction of said first input electromagnetic wave; wherein
a frequency of said first input electromagnetic wave is within a range defined by the plasma frequency of said medium plus or minus the cyclotron frequency of said medium, and
a polarization direction of said input electromagnetic wave is substantially perpendicular both to said magnetic field and the direction of said first input electromagnetic wave; whereby
said device has a function of amplifying said first input electromagnetic wave.

---

### 5,020,065
## SEMICONDUCTOR LASER DEVICE

**Katsuhisa Tada, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jan. 8, 1990, Ser. No. 461,915**
**Claims priority, application Japan, Sep. 5, 1989, 1-229503**
**Int. Cl.⁵ H01S** *3/19*
U.S. Cl. 372—44 **4 Claims**



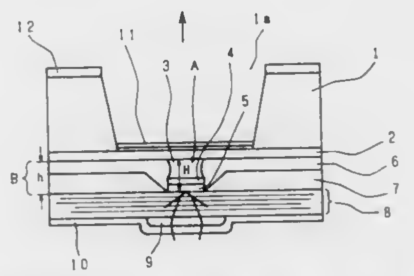
1. A semiconductor laser device comprising:
a laser element which emits laser light;
a cap covering and hermetically sealing said laser element within a package, said cap having, in its top wall, a hole through which laser light is emitted; and
reflected light blocking means disposed in said hole in said top wall of said cap
wherein said reflected light blocking means comprises a twisted-nematic liquid crystal cell and a pair of polarizers between which said twisted-nematic liquid crystal cell is disposed.

---

### 5,020,066
## SURFACE-EMITTING-TYPE SEMICONDUCTOR LASER DEVICE

**Kenichi Iga, Machida; Akira Ibaraki, Hirakata; Kenji Kawashima, Moriguchi; Kotaro Furusawa, Higashiosaka, and Toru Ishikawa, Takatsuki, all of Japan, assignors to Development Corporation of Japan; Tokyo Institute of Technology, both of Tokyo and Sanyo Electric Co., Ltd., Osaka, all of, Japan**

**Filed Dec. 27, 1989, Ser. No. 457,256**
**Claims priority, application Japan, Dec. 28, 1988, 63-332067**
**Int. Cl.⁵ H01S** *3/19*
U.S. Cl. 372—45 **20 Claims**



1. A surface-emitting-type semiconductor laser apparatus, comprising:
a substrate;
a buried part comprising an active region;
a burying part for blocking current and which is formed around said buried part;
a first reflecting mirror consisting of a conductive semiconductor multilayer film and which is installed on said buried part and said burying part;
a second reflecting mirror formed opposite said first reflecting mirror with said active region sandwiched between said first and second reflecting mirrors, said burying part being sandwiched between said substrate and semiconductor multilayer film, said first and second reflecting mirrors cooperating with each other to have a Bragg wavelength, which is indicative of a reflecting characteristic of said mirrors, set to match a longitudinal mode one mode higher than the longitudinal mode of oscillation in pulse operation;
a first electrode which is formed on a surface of said semiconductor multilayer film that faces away from said active region; and
a second electrode which is formed on said substrate, said substrate being sandwiched between said second electrode and said burying part.

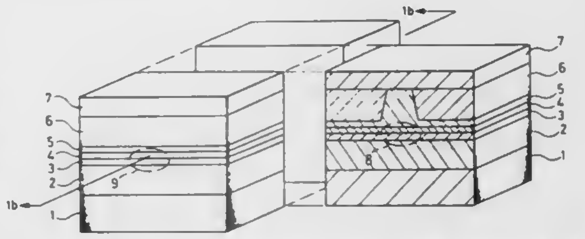
---

### 5,020,067
## SEMICONDUCTOR LASER DEVICE

**Masato Okada, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jan. 30, 1990, Ser. No. 472,285**
**Claims priority, application Japan, Feb. 1, 1989, 1-24453**
**Int. Cl.⁵ H01S** *3/19*
U.S. Cl. 372—46 **9 Claims**

1. A semiconductor laser device including facets through which laser light is emitted comprising:
an n type GaAs substrate;
an n type $Al_xGa_{1-x}As$ first cladding layer disposed on said n type GaAs substrate;
an n type $Al_yGa_{1-y}As$ $(x>y)$ light guide layer disposed on said first cladding layer;
an $Al_zGa_{1-z}As$ $(y>z)$ active layer disposed on said light guide layer;
a p type $Al_xGa_{1-x}As$ second cladding layer disposed on said active layer and including a stripe ridge except in the neighborhood of at least one of the facets, said stripe ridge having a top surface opposite the substrate;
an n type GaAs current blocking layer disposed on said second cladding layer, but not on the top surface, burying the ridge; and
a p type GaAs contact layer disposed on said current blocking layer and the top surface of said ridge.

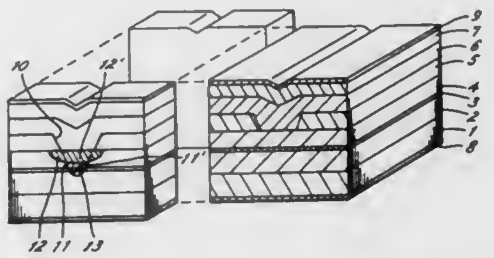


---

### 5,020,068
## SEMICONDUCTOR LASER DEVICE

**Kunihiko Isshiki, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 6, 1989, Ser. No. 432,215**
**Claims priority, application Japan, Nov. 9, 1988, 63-283291**
**Int. Cl.⁵ H01S** *3/19*
U.S. Cl. 372—46 **11 Claims**



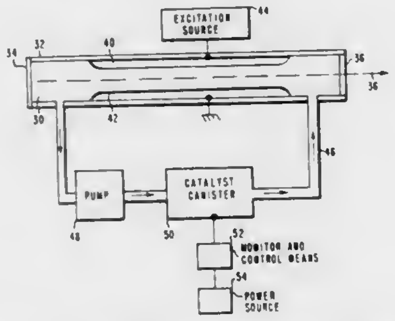
1. In a semiconductor laser having opposed first and second facets comprising:
at least a first conductivity type lower cladding layer, an active layer including a quantum well structure, a second connectivity type first upper cladding layer, a first conductivity type current blocking layer, and a second conductivity type second upper cladding layer successively disposed on a first conductivity type semiconductor substrate, the current blocking layer having a central elongate stripe shaped current confinement groove extending between the facets;
dopant impurities of the first conductivity type penetrating the first upper cladding layer and forming disordering regions positioned adjacent the facets which invade and disorder the quantum well to create disordered active layer regions; and
dopant impurities of the second conductivity type penetrating an upper portion of the first upper cladding layer and forming separating regions positioned adjacent the facets which separate the current blocking layer and the disordering regions to prevent current leakage between the current blocking layer and the disordering regions.

VOL
1126
ISS
4
MY
28
1991
UMI

## 5,020,069
## PLATINUM CATALYST FOR FORMING CARBON DIOXIDE

**John A. McNeil, Los Angeles, and David B. Cohn, Torrance, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 18, 1989, Ser. No. 452,141**
**Int. Cl.$^5$ H01S *3/22;* B01J *23/44***
**U.S. Cl. 372—59** **10 Claims**



1. In a platinum wire catalytic apparatus for catalyzing the reaction of carbon monoxide and oxygen to form carbon dioxide by directly heating said catalyst to an activation temperature of about 1000° C. wherein the improvement comprises a layer of platinum black deposited on the surface of said platinum wire to form a coating whereby said wire with said coating is directly heated to an activation temperature within the range of about 150 to 300° C.

---

## 5,020,070
## GAS LASER

**Igino Lombardo, Sharon, Mass., assignor to I. L. Med., Inc., Walpole, Mass.**

**Filed Dec. 14, 1989, Ser. No. 450,580**
**Int. Cl.$^5$ H01S *3/03***
**U.S. Cl. 372—65** **18 Claims**

1. A gas laser comprising:

an outer quartz tube including two end cap assemblies fashioned from one or more materials, each characterized by a low thermal expansion coefficient that is substantially compatible with the thermal expansion coefficient of quartz;

two mirror elements, disposed coaxially and secured respectively by said end cap assemblies;

inner tube support means disposed within said outer tube;

an inner tube coaxially disposed between said mirror elements, and supported by said inner tube support means;

cooling means in thermally coupled relation with a central portion of said inner tube; and

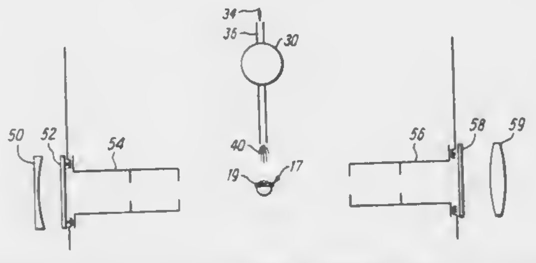
a pair of electrodes, each electrode proximate to a respective end of said inner tube.

---

## 5,020,071
## CHEMICAL PROCESS YIELDING STIMULATING EMISSION OF VISIBLE RADIATION VIA FAST NEAR RESONANT ENERGY TRANSFER

**James L. Gole, Atlanta, Ga.; James R. Woodward, Chagrin Falls, Ohio, and Stephen H. Cobb, Mayfield, Ky., assignors to Georgia Tech Research Corporation, Atlanta, Ga.**

**Continuation-in-part of Ser. No. 296,512, Jan. 12, 1989. This application Jul. 3, 1989, Ser. No. 375,043**
**Int. Cl.$^5$ H01S *3/095***
**U.S. Cl. 372—89** **21 Claims**



1. A chemical process yielding stimulated emission of visible radiation via fast rear resonant intermolecular energy transfer comprising the steps of:

(a) providing a first source of vapor selected from the group consisting of metal or semimetal vapor to be reacted with an appropriate reactant to produce a metastable excited state reaction product which serves as an energy storage medium;

(b) providing a second source of atomic vapor selected from the group consisting of metal or semimetal vapor to serve as receptor atoms to receive the energy from said metastable excited state of the reaction product;

(c) providing a source of reactant to react with the first source of vapor in a highly exothermic reaction which liberates energy exceeding 2.5 eV; said reactant being selected from the group consisting of ozone, nitrogen oxide, nitrogen dioxide, and halides;

(d) chemically reacting the reactant and the first source of vapor to form metastable states of a final reaction product;

(e) transferring energy stored in the metastable states of the said reaction product to the second source of atomic vapor serving as receptor atoms by means of near resonant energy transfer to form electronically excited receptor atoms in a population inversion relative to a lower level of excitation of said receptor atoms; and

(f) providing a mirror configuration having first and second mirrors and windows associated with said mirrors, wherein said mirrors are chosen such that

$$0<g_1g_2<1,$$

where

$g_1=1-L/r_1$
$g_2=1-L/r_2$
$L$=separation between the mirrors (cavity length)
$r_1$=radius of curvature of said first mirror
$r_2$=radius of curvature of said second mirror
$L<r_1$ and
$L<r_2$,

said first and second mirrors being placed on opposite ends of an enclosed amplification zone such that the inverted population and multiple reflections allows for oscillation via the repeated passage of light through the inverted gain medium operative at the wavelength of the amplified transition associated with the population inversion created among the energy levels of the receptor atoms in a stable cavity configuration,

said windows being operative in the wavelength ranges for the transition of the amplifying medium defined by the length of the cavity and radii of curvature of said mirrors, and

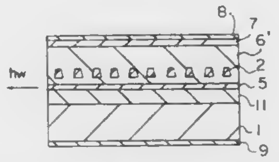
said mirror configuration causing light associated with the amplified transition to undergo multiple passes through the inverted gain medium yielding oscillation of stimulated emission of visible radiation.

---

## 5,020,072
## SEMICONDUCTOR LASER DEVICE

**Yuji Abe; Hiroshi Sugimoto; Kenichi Ohtsuka; Toshiyuki Oishi, and Teruhito Matsui, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Sep. 1, 1989, Ser. No. 401,745**
**Claims priority, application Japan, May 22, 1989, 1-129346**
**Int. Cl.$^5$ H01S *3/08***
**U.S. Cl. 372—96** **11 Claims**



1. A semiconductor laser device comprising:

a semiconductor substrate of a first conductivity type;

a semiconductor first cladding layer of the first conductivity type disposed on said substrate;

an active layer disposed on said first cladding layer;

a first semiconductor layer of a second conductivity type opposite the first conductivity type having a larger energy band gap than said active layer, a discontinuous semiconductor diffraction grating layer of the second conductivity type having a larger energy band gap than said active layer and a smaller energy band gap than said first semiconductor layer, and a second semiconductor layer of the second conductivity type having the same composition as said first semiconductor layer successively disposed on said active layer, said second semiconductor layer extending through said discontinuous diffraction layer to said first semiconductor layer at periodically disposed parallel grooves extending through said diffraction grating and second semiconductor layers to said first semiconductor layer;

a semiconductor second cladding layer having the same composition as said first semiconductor layer and of the second conductivity type disposed on said second semiconductor layer;

a semiconductor contact layer of the second conductivity type disposed on said second cladding; and

first and second electrode disposed on said substrate and said contact layer, respectively.

---

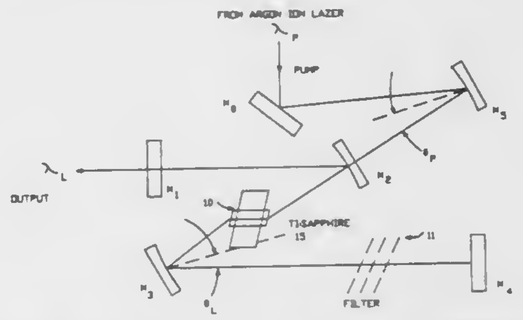
## 5,020,073
## APPARATUS FOR ALIGNING THE OPTIC AXIS OF AN INTRA-CAVITY BIREFRINGENT ELEMENT, AND TUNABLE LASER USING SAME

**Anthony J. Alfrey, Half Moon Bay, and James A. Palmer, San Jose, both of Calif., assignors to Spectra-Physics, Mountain View, Calif.**

**Filed Mar. 7, 1989, Ser. No. 319,980**
**Int. Cl.$^5$ H01S *3/08***
**U.S. Cl. 372—105** **34 Claims**

1. An apparatus for aligning a laser gain medium in an optical path, the gain medium having a first face and a second face, at least one of the first and second faces at Brewster's angle so that a plane of polarization is defined, comprising:

rotatable means, having an axis of rotation and an adjustable angular position about the axis of rotation, for securing the gain medium in the optical path so that the optical path intersects the first and second faces, and wherein the axis of rotation is normal to the one face at Brewster's angle; and



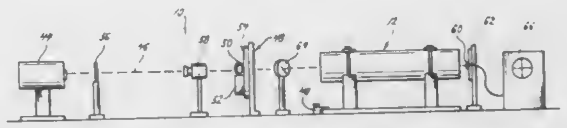
means, connected to the rotatable means, for adjusting the adjustable angular position relative to the plane of polarization.

---

## 5,020,074
## LASER ALIGNMENT SYSTEM

**Gordon H. Lerfald, 378 Chapel Ridge, Hazelwood, Mo. 63042**

**Filed Feb. 23, 1990, Ser. No. 483,809**
**Int. Cl.$^5$ H01S *3/086***
**U.S. Cl. 372—107** **22 Claims**



1. A method of aligning a waveguide laser having a waveguide bore with one waveguide segment, comprising the steps of:

(a) propagating a test laser beam into a selected end port of the waveguide laser and through the waveguide bore substantially parallel to the longitudinal axis of the waveguide bore such that said test laser beam contacts opposing wall portions along a first axis and a second axis of said selected end port;

(b) reflecting said test laser beam off an endmost reflecting element located at the end of the waveguide bore opposite said selected end and back through the waveguide bore so that said test laser beam exits from said selected end port;

(c) detecting the waveguide wall diffraction patterns of said reflected test laser beam after said reflected test laser beam has exited from said selected end port; and

(d) adjusting the position of the endmost reflecting element until said waveguide wall diffraction patterns of said reflected test laser beam are substantially symmetrical.

---

## 5,020,075
## DIRECT SEQUENCE SPREAD SPECTRUM MODULATION APPARATUS

**Hisao Tachika, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 5, 1989, Ser. No. 402,882**
**Claims priority, application Japan, Sep. 6, 1988, 63-222757**
**Int. Cl.$^5$ H04L *27/12***
**U.S. Cl. 375—1** **14 Claims**

1. A direct sequence spread spectrum modulation apparatus, comprising:

data input means for sequentially inputting a plurality of data bits, each having a data value, to be modulated;

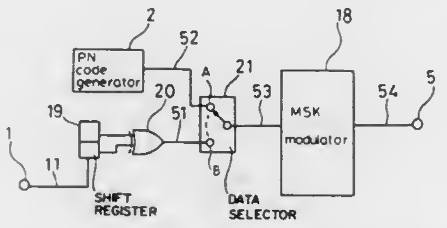
spread code generating means for sequentially generating a plurality of psuedo noise codes, each including a plurality of sequential bits;

selection means, operatively connected to said data input

VOL
1126
ISS
4
MY
28
1991
UMI

means and said spread code generating means, for alternatively selecting and subsequently outputting, subsequently generated and input pseudo noise codes and data bits, respectively; and

spread spectrum modulation means, operatively connected to said selection means, for receiving said sequentially output psuedo noise codes and data bits and for spread spectrum modulating each data bit by the preceding psuedo noise codes such that the last sequential bit of a received psuedo noise code is phase shifted by a first value from the first sequential bit and a subsequently received data bit is phase shifted, by said first value upon said data bit being of a first data value and is shifted by a second value, equal to the negative of said first value, upon said data bit being of a second data value to thereby achieve a gradually generated phase difference of $\pi$ and O respectively, in data modulation of a thus generated spread spectrum modulated signal.



---

### 5,020,076

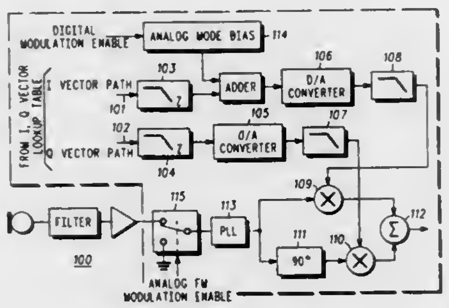
### HYBRID MODULATION APPARATUS

**Stephen V. Cahill, Palatine; Steven F. Gillig, Roselle, and Thomas J. Walczak, Palatine, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed May 21, 1990, Ser. No. 526,156**

**Int. Cl.$^5$ H04L** *25/00, 27/00*

**U.S. Cl. 375—5** **26 Claims**



1. A hybrid modulation apparatus, with a voice signal input, having at least a digital mode and an analog mode, the apparatus comprising:

(a) differential quadrature phase shift keying (DQPSK) means, coupled to the voice signal, for generating a $\pi/4$-shifted DQPSK signal in the digital mode, the means comprising:
an I vector source coupled to an I vector path; and
a Q vector source coupled to a Q vector path;

(b) first mixing means having a first input, a second input, and an output, the first input coupled to the I vector path;

(c) second mixing means having a first input, a second input, and an output, the first input coupled to the Q vector path;

(d) offset oscillator means for generating a frequency modulated signal in the analog mode and a carrier frequency in the digital mode, the means having an output coupled to the second input of the first mixing means, and a modulation input;

(e) switching means having a first input coupled to the voice signal, a second input coupled to ground potential, and an output coupled to the modulation input of the offset oscillator means, the switching means coupling the voice signal to the offset oscillator means in the analog mode and the ground potential to the offset oscillator means in the digital mode;

(f) phase shifting means having an input and an output, the input coupled to the output of the offset oscillator means and the output coupled to the second input of the second mixing means;

(g) control means coupled to the first input of the first mixing means, for enabling the analog mode; and

(h) combining means, having an output, for combining the outputs of the first and second mixing means, the combining means output is an output of the hybrid modulation apparatus.

---

### 5,020,077

### MODEM AND DATA COMMUNICATION SYSTEM

**Scott A. Rhodes, Marangaroo, Australia, assignor to Transcom Australia Limited, Western Australia, Australia**

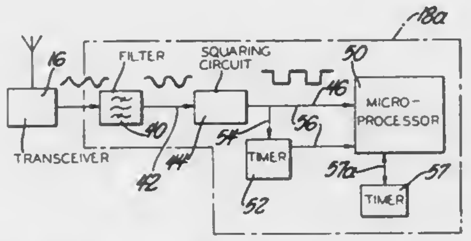
**PCT No. PCT/AU87/00280, § 371 Date Apr. 21, 1989, § 102(e) Date Apr. 21, 1989, PCT Pub. No. WO88/01458, PCT Pub. Date Feb. 25, 1988**

**PCT Filed Aug. 20, 1987, Ser. No. 347,885**

**Claims priority, application Australia, Aug. 22, 1986, PH 7606**

**Int. Cl.$^5$ H04B** *1/38*

**U.S. Cl. 375—8** **12 Claims**



1. A modem for a data communication apparatus, said modem being arranged for connection between a source of band limited audio logic such as a radio transceiver and a host computer, the modem characterized in that it comprises:

(A) a data receiver having:

(a) a band pass filter having an input arranged to be connected to the source of band limited audio logic,

(b) a squaring circuit connected to an output of the band pass filter to produce a substantially square wave signal comprising a plurality of cycles with rapid zero crossings, said cycles forming logic bits of data with changes of state between a logical high and a logical low value and said logic bits of data forming logic bytes of data;

(c) an audio period timer connected to an output of the squaring circuit and configured to develop a count indicative of the time delay between consecutive zero crossing in the same direction;

(d) a bandwidth window configured to receive the count from the audio period timer, and to filter the counts to detect when the bits of data have one of the changes of state from a logical high to a logical low and vice versa;

(e) a bit rate timer configured to develop a further count and to issue an interrupt signal to predict when the bits of data have one of the changes of state from a logical high to a logical low and vice versa;

(f) a bit rate synchronization means responsive to said changes of state of the data bits and configured to alter the bit rate timer when the predicted time at which said changes of state occur does not coincide with the actual changes of state, so as to establish bit-wise synchronous communication;

(B) a data transmitter having:

(a) generator means to generate said cycles for said bits of data; and

(b) lower pass filter means connected to receive the cycles from the generator means to filter out high frequency components from the generated cycles to produce a band-limited audio frequency logic signal.

---

### 5,020,078

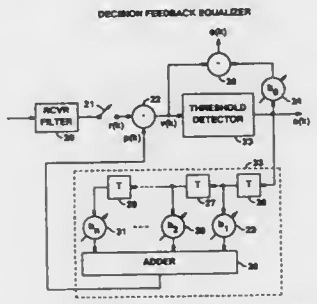
### BAUDRATE TIMING RECOVERY TECHNIQUE

**Pedro M. Crespo, Bedminster, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.**

**Filed Aug. 11, 1989, Ser. No. 392,772**

**Int. Cl.$^5$ H04B** *3/14;* **H03H** *7/30*

**U.S. Cl. 375—12** **4 Claims**



1. A receiver for digital signals comprising

a sampling gate, a subtracter and a threshold detector connected in series,

a tapped delay line including a plurality of taps,

means for applying the output of said threshold detector to the input of said tapped delay line,

a respective first and a respective second multiplier connected to each tap of said delay line,

means for accumulating the outputs of said first multipliers and applying the first accumulated output to said subtracter,

means for accumulating the outputs of said second multipliers and applying the second accumulated output to control the phase of said sampling gate.

---

### 5,020,079

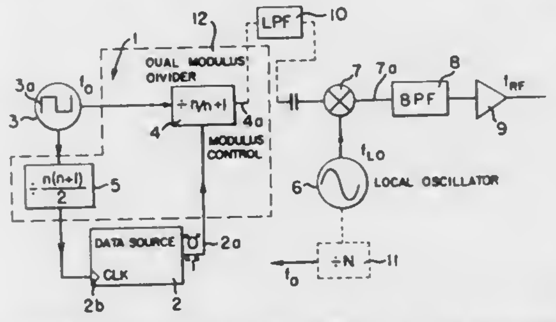
### APPARATUS FOR GENERATING A MINIMUM-SHIFT-KEYING SIGNAL

**Jan Vancraeynest, White Plains, N.Y., assignor to Nynex Corporation, New York, N.Y.**

**Filed Nov. 17, 1989, Ser. No. 438,511**

**Int. Cl.$^5$ H04L** *27/12*

**U.S. Cl. 375—64** **10 Claims**



1. Apparatus for generating an MSK signal indicative of data comprised of first and second data types and whose data rate corresponds to a frequency $f_d$, comprising:

means for generating a digital clock signal of preselected frequency $f_0$;

frequency divider means adapted to be responsive to said data and responsive to said digital clock signal for generating said MSK signal by dividing the frequency $f_0$ of said digital clock signal by a first integer n when said data is of said first data type and for dividing the frequency $f_0$ of said digital clock signal by a second integer equal to $(n+1)$ when said data is of said second data type, said integer n being such as to satisfy the relationship $f_d=f_0\cdot 2/(n(n+1))$;

a local oscillator for generating a local oscillator signal at a frequency $f_{LO}$ which is higher than that of said frequency divider means;

means for multiplying said MSK signal generated by said frequency divider means by said local oscillator signal;

and said means for generating said digital clock signal being responsive to said local oscillator signal and comprising further divider means for dividing the frequency $f_{LO}$ of said local oscillator signal to generate said digital clock signal.

---

### 5,020,080

### DEMODULATION METHOD AND DEMODULATOR FOR DIGITAL SIGNALS WITH AMPLITUDES OF CONSTANT ENVELOPE, CONTINUOUSLY MODULATED IN PHASE AND/OR IN FREQUENCY

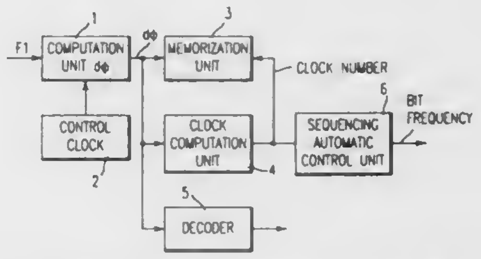
**Yannick Tanguy, Paris, and Jose Robineau, Ste Genevieve des Bois, both of France, assignors to Thomson-CSF, Puteaux, France**

**Filed Jun. 23, 1989, Ser. No. 370,864**

**Claims priority, application France, Jun. 24, 1988, 88 08525**

**Int. Cl.$^5$ H04L** *27/14*

**U.S. Cl. 375—80** **9 Claims**



1. A method for the demodulation of digital signals continuously modulated in phase and/or frequency, the digital signals consisting of sequences of symbols that have the same duration T and are juxtaposed with one another in time, the symbols being transmitted by means of phase and/or frequency jumps, and method consisting in:

detecting the phase of the signal modulated in the form of a signal with an amplitude that is variable as a function of the phase variations of the modulating signal;

sampling, according to a sampling period equal to T/N, the phase of the detected modulated signal, inside each symbol T period by means of a comb of sampling pulses obtained from N clock pulses evenly spaced out by a time interval equal to T/N;

computing the differential phase angle $d\phi$ separating each phase sample of a detected current symbol from the homologue sample located at the same place in the symbol detected at the previous symbol period;

encoding each differential phase angle $d\phi$ in assigning it an encoding cost depending on its amplitude;

computing the sums of the encoding costs for homologue samples located in the same place in each symbol and belonging to a determined number L of consecutive symbols;

identifying, among the sums of the encoding costs obtained, the sum which gives the greatest result in memorizing the place number occupied, in each symbol, by the corresponding samples;

taking, as a symbols synchronizing clock, to define the synchronization instants of demodulator, that clock which, in the comb of pulses, matches with the memorized place number;

VOL
1126
ISS
4
MY
28
1991
UMI

and decoding the differential phase angle which matches the memorized place number sample.

---

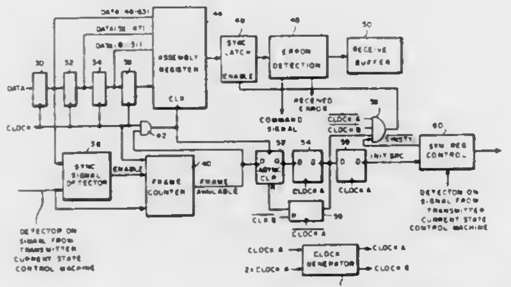
### 5,020,081
### COMMUNICATION LINK INTERFACE WITH DIFFERENT CLOCK RATE TOLERANCE

**John D. Allen, Bolton, and Jeffrey V. Hill, Malden, both of Mass., assignors to Data General Corporation, Westboro, Mass.**

**Continuation-in-part of Ser. No. 252,460, Sep. 30, 1988, now Defensive Publication No. 4.910,754. This application Sep. 19, 1989, Ser. No. 409,251**

**Int. Cl.$^5$ H04L** *7/00*

**U.S. Cl. 375—118** **27 Claims**



1. A communication link interface for receiving data supplied at an independent clock rate over a communication link comprising:

an assembly register for holding n consecutive data words in parallel, where n is an integer greater than or equal to 2;

means, responsive to the independent clock rate on the communication link, for simultaneously loading n consecutive data words into said assembly register;

a clock for providing a receiver's clock signal in each of a continuous series of clock cycles; and

means, responsive to said receiver's clock signal, for causing said n consecutive data words to be taken simultaneously in parallel from said assembly register after a delay of at least a fraction of one clock cycle.

---

### 5,020,082
### ASYNCHRONOUS COUNTER

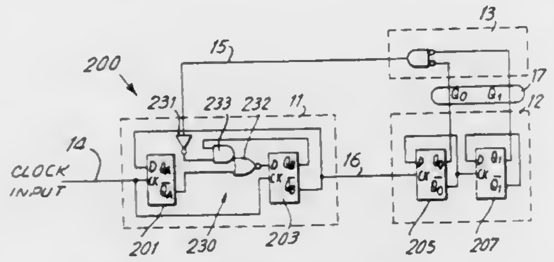
**Koji Takeda, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan**

**Filed Jun. 13, 1989, Ser. No. 365,583**

**Claims priority, application Japan, Jun. 15, 1988, 63-147753; Jun. 30, 1988, 63-162872; Aug. 10, 1988, 63-199126**

**Int. Cl.$^5$ H03K** *21/00, 23/00*

**U.S. Cl. 377—44** **42 Claims**



1. An asynchronous, nonlogical counter,

preceding counter means having only two flip-flops, characterized by a frequency dividing ratio of less than five and operable for receiving a first clock signal and for producing a first output signal based on said frequency dividing ratio, said first output signal having a value based on a two, three or four value counting system;

succeeding counter means having n flip-flops, characterized by an additional frequency dividing ratio of $2^n$ and operable for receiving a second clock signal based on said first output signal and for producing a second output signal based on said additional frequency dividing ratio, said second output signal having a value based on a $2^n$ counting system, wherein n is a natural number; and

control means for producing a control signal based on said second output signal, said preceding counter means being sensitive to said control signal for varying said frequency dividing ratio.

---

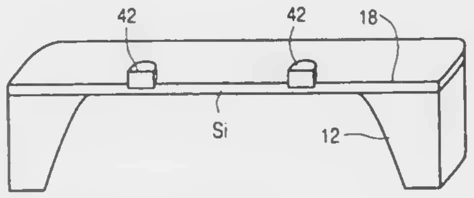
### 5,020,083
### X-RAY MASKS, THEIR FABRICATION AND USE

**Martin P. Lepselter, Summit, and Herbert A. Waggener, Pottersville, both of N.J., assignors to Lepton Inc., Murry Hill, N.J.**

**Continuation-in-part of Ser. No. 341,616, Apr. 21, 1989. This application May 19, 1989, Ser. No. 354,408**

**Int. Cl.$^5$ G21K** *5/00*

**U.S. Cl. 378—35** **6 Claims**



1. An arrangement comprising:

a membrane of an X-ray transparent material having a first thickness;

a structurally rigid support for holding said membrane at a portion of said membrane;

said X-ray transparent material having a plurality of gaps extending at least partially through said membrane;

an X-ray opaque material included within said gaps and forming a structure with said X-ray transparent material;

said X-ray opaque material filling each of said gaps substantially entirely and extending out of said membrane.

---

### 5,020,084
### ORE ANALYSIS

**Malcolm E. A. Robertson, Ottery St Mary, England, assignor to National Research Development Corporation, London, England**

**PCT No. PCT/GB87/00626, § 371 Date Mar. 10, 1989, § 102(e) Date Mar. 10, 1989, PCT Pub. No. WO88/02111, PCT Pub. Date Mar. 24, 1988**

**PCT Filed Sep. 7, 1987, Ser. No. 334,973**

**Claims priority, application United Kingdom, Sep. 12, 1986, 8621983**

**Int. Cl.$^5$ G21K** *3/00*

**U.S. Cl. 378—46** **27 Claims**

1. A method for analyzing a sample of ore for at least one heavy metal, said method comprising the steps of:

exciting the ore with high energy x-rays to produce a fluorescence emission spectrum, and

measuring the intensity of the K-emission bands of the metal or metals in the spectrum,

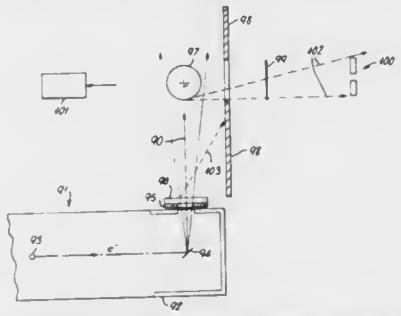
said method further including:

(a) producing X-rays by using an X-ray tube as a source,

(b) eliminating most of a high energy bremsstrahlung peak by interposing a metallic filter between the source and the sample to give high energy bremsstrahlung radiation of 100–130 keV incident upon the sample, and

(c) counting and comparing the number of fluorescence photons emitted in each of a plurality of energy bands, the width and energy of the bands being chosen in relation to K-emission peaks of the at least one heavy metal in the sample, and

wherein photons are counted in each of two background energy bands lying to either side of a $K\alpha_1$ peak and in each of two signal energy bands lying between the background bands to either side of a peak maximum, total counts of photons in the background and in the signal bands being compared, the two background bands being substantially equal in energy width and the two signal bands being substantially equal in energy width.



---

### 5,020,085
### X-RAY IMAGE PROCESSING DEVICE

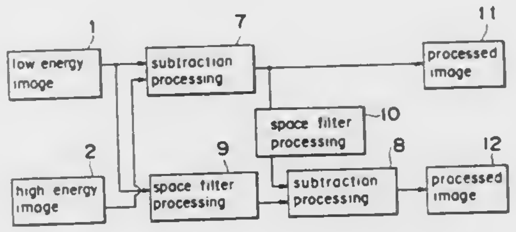
**Toshiyuki Kawara, Moriguchi; Hiroshi Tsutsui, Yawata; Hiromasa Funakoshi, Hirakata, and Yoshiyuki Yoshizumi, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 18, 1990, Ser. No. 510,687**

**Claims priority, application Japan, Apr. 19, 1989, 64-99421**

**Int. Cl.$^5$ H05G** *1/64;* **G21K** *3/00*

**U.S. Cl. 378—99** **4 Claims**



1. An x-ray image processing device comprising;

means for obtaining low energy image information which is logarithmic conversion image information of a penetration image of an object radiated by low energy X-ray,

means for obtaining high energy image information which is logarithmic conversion image information of a penetration image of an object radiated by high energy X-ray,

means for subtracting the low energy image information and the high energy image information to output a first image, and

means for subtracting the first image and the low energy image information to output a second image.

---

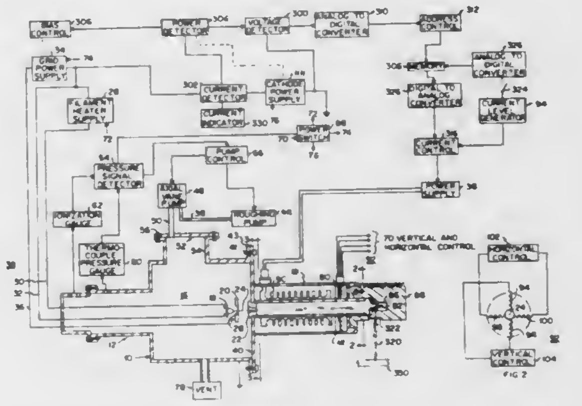
### 5,020,086
### MICROFOCUS X-RAY SYSTEM

**Richard S. Peugeot, Stone Mountain, Ga., assignor to Ridge, Inc.**

**Continuation of Ser. No. 924,697, Oct. 29, 1986, which is a continuation of Ser. No. 593,125, Mar. 26, 1984, Pat. No. 4,688,241, which is a continuation-in-part of Ser. No. 510,660, Jul. 5, 1983, Pat. No. 4,521,902. This application Feb. 24, 1989, Ser. No. 316,235**

**Int. Cl.$^5$ H05G** *1/52*

**U.S. Cl. 378—113** **16 Claims**



1. A microfocus X-ray system comprising:

a generally elongated vacuum enclosure;

electron beam generation means positioned within said enclosure for generating an electron beam;

a grid spaced from said electron beam generation means, said grid having an aperture through which an electron beam emitted by said electron beam generation means passes in a line generally along the longitudinal dimension of said enclosure;

acceleration means, including an anode and biasing means for positively biasing said anode with respect to said electron beam generation means, for accelerating electrons of said electron beam;

focusing means for acting on said electron beam as accelerated by said acceleration means and focusing said electron beam into a narrow beam on the order of 1 to 100 microns in width;

a metal target positioned to receive said electron beam and discharge X rays toward an object to be exposed outside of said enclosure;

horizontal beam deflection means responsive to a first square wave electrical signal for precipitously changing the horizontal path of the focused said electron beam such that it precipitously changes the point of impact on said target and therefrom produces X-ray radiation from essentially only two separated points of said target;

vertical beam deflection means responsive to a second square wave electrical signal for changing the vertical path of the focused said electron beam such that it changes the area of impact on said target of said electron beam;

signal means for continuously and sequentially generating said first square wave electrical signal and coupling it to said horizontal deflection means

second signal means for continuously and sequentially generating said second square wave electrical signal and coupling it to said vertical deflection means; and

display means, including X ray-to-visible light conversion means positioned to receive images of said X-ray beams transiting a said object, for sequentially and in real time displaying images only in terms of X rays emanating from said two separated points on said target.

VOL
1126
ISS
4
MY
28
1991
UMI

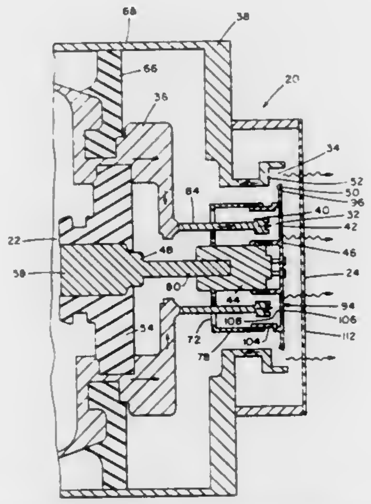
### 5,020,087
## DIODE FOR PROVIDING X-RAYS

**William H. Rix, San Diego, and John P. Shannon, deceased, late of Escondido, both of Calif. by Cynthia N. Shannon, legal representative , assignors to Maxwell Laboratories, Inc., San Diego, Calif.**

**Filed Nov. 9, 1989, Ser. No. 434,935**

**Int. Cl.$^5$ H01J** *35/06. 35/00. 35/10. 35/08*

U.S. Cl. 378—134 **14 Claims**



1. A diode for generating X-rays and adapted for connection to a source of high electrical energy having a source of high energy electrons and a ground, said diode having a first end from which said X-rays are emitted, a second end and an axis extending between said ends, said diode comprising:
- a ring cathode connected to said electron source;
- an intermediate anode spaced from said ring cathode and with at least a portion of said intermediate anode being disposed between said ring cathode and said diode first end, said intermediate anode having means for decelerating electrons to cause the generation of X-rays emitted from said first end;
- an intermediate cathode disposed radially outwardly of said intermediate anode and connected thereto; and
- an inverse anode spaced from said intermediate cathode, said inverse and anode being disposed radially outwardly of said intermediate cathode and said inverse anode being positioned between said intermediate cathode and said diode second end, said inverse anode having means for decelerating electrons to cause the generation of X-rays emitted from said diode first end generally radially outwardly of the X-rays resulting from said intermediate anode. said inverse anode being connected to said ground whereby said diode forms a pair of anode-cathode gaps in series to divide the energy of the electrons and to cause more uniform emission of X-rays from said diode first end.

---

### 5,020,088
## TISSUE SAMPLE LOCALIZER DEVICE AND METHOD

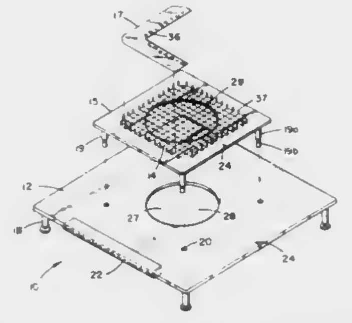
**John A. Tobin, No. 3 E. Pleasant, St. Paul, Minn. 55127**

**Continuation of Ser. No. 173,313, Mar. 25, 1988, abandoned. This application Mar. 15, 1990, Ser. No. 496,095**

**Int. Cl.$^5$ H05G** *1/28. 1/00*

U.S. Cl. 378—164 **12 Claims**

12. A tissue localizer device for radiographically localizing selected tissue abnormalities, comprising:
- (a) a tissue holder constructed and arranged for receipt of a tissue sample removed from a patient, said tissue sample to be radiographically imaged and then pathologically analyzed whole remaining immobilized on said tissue holder; and
- (b) a reference grid comprising grid material constructed and arranged to define at least one aperture suitable for passage of at least one elongate needle-like member through said reference grid for insertion into the tissue sample; said grid material comprising grid sections suitable for formation of a grid pattern image on a radiographic image taken of said reference grid, said tissue holder, and the tissue sample; whereby said reference grid may then be removed without dislocating any needle-like member extending therethrough to permit subsequent pathological analysis of the radiographically imaged and localized tissue sample abnormalities, while the tissue sample remains in place on said tissue holder, so that each said elongate needle-like member may be inserted into the tissue sample and remain therein after removal of the reference grid.



---

### 5,020,089
## X-RAY EXAMINATION INSTALLATION WITH COORDINATED POSITIONING OF THE IMAGING SYSTEM AND THE PATIENT SUPPORT MECHANISM

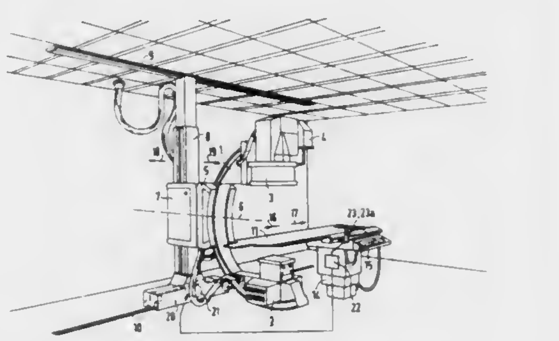
**Bernhard M. Cramer, Wuppertal; Erhard Jenner, Hessdorf, and Wolfgang Minderle, Neustadt A.D. Aisch, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Oct. 13, 1989, Ser. No. 420,914**

**Claims priority, application European Pat. Off., Oct. 25, 1988, 88117778.6; Feb. 10, 1989, 89102330.1**

**Int. Cl.$^5$ H05G** *1/02*

U.S. Cl. 378—196 **7 Claims**



1. An x-ray examination installation comprising:
- a support table adapted to support a patient;
- imaging means adapted for irradiating said patient with x-rays while on said support table and for generating an x-ray image of said patient;
- motor-driven means for positioning said imaging means;
- means for manually adjusting the position of said support table having a total range of movement along an axis, and including means for dividing said total range of movement into a plurality of sub-ranges and for operating said motor-driven means only in selected sub-ranges; and
- control means connected to said means for manually positioning said patient support table and to said motor driven means for positioning said imaging means for operating said motor-driven means to move said imaging means in a direction opposite to movement of said patient support table.

---

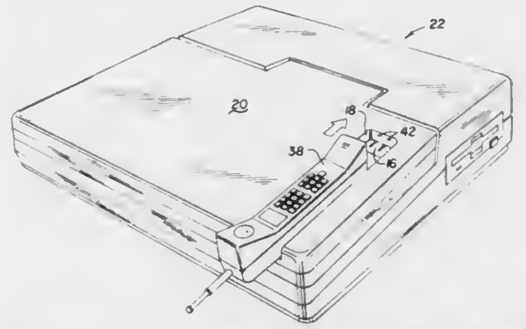
### 5,020,090
## APPARATUS FOR REMOVABLY CONNECTING A CELLULAR PORTABLE TELEPHONE TO A COMPUTER

**Walker C. Morris, Dallas, Tex., assignor to Intelligence Technology Corporation, Dallas, Tex.**

**Filed Nov. 13, 1989, Ser. No. 434,934**

**Int. Cl.$^5$ H04M** *11/00*

U.S. Cl. 379—58 **15 Claims**



1. Apparatus for removably connecting a cellular portable telephone to a computer having at least a housing, a generally planar surface in the housing, a power supply and a modem, said apparatus comprising:
- a track formed in the generally planar surface of the housing and structured to slidably receive a cellular portable telephone whose battery pack has been removed, said track comprising:
  - a base portion of predetermined width and length and having a generally planar upper surface, a first end portion and a second end portion;
  - a first edge portion extending outwardly from said base portion in a cantilever manner along the length of said base portion;
  - a second edge portion extending outwardly from said base portion in a cantilever manner along the length of said base portion, said second edge portion being positioned opposite said first edge portion;
- a first electrical connector operatively positioned at the end of said first end portion;
- a second electrical connector operatively positioned at the end of said second end portion and operatively connected to the power supply of the computer;
- data interface circuitry operatively connected between said first electrical connector and the modem.

---

### 5,020,091
## AUTOMATIC NEW RADIOTELEPHONE SYSTEM REGISTRATION NOTIFICATION

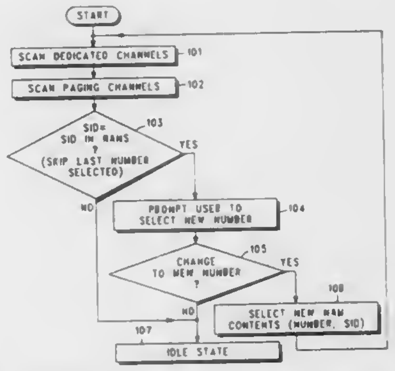
**Robert K. Krolopp, Lisle; Jeffery L. Mullins, Palatine, and Thomas J. Auchter, Barrington, all of Ill., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Dec. 26, 1989, Ser. No. 457,111**

**Int. Cl.$^5$ H04M** *11/00*

U.S. Cl. 379—58 **2 Claims**

1. A method for notification of registration of a radiotelephone device having a display, a keypad, and a memory. the memory having a plurality of telephone numbers and corresponding system identification numbers, the radiotelephone device operating in at least two cellular radiotelephone systems, each cellular radiotelephone system having a unique system identification number and a plurality of frequencies, the pluality of frequencies comprising at least one control frequency and at least one paging frequency, comprising the steps of:
- (A) scanning the plurality of frequencies for the at least one control frequency;
- (B) scanning the plurality of frequencies for the at least one paging frequency;
- (C) receiving the unique system identification number over the at least one paging frequency;
- (D) comparing the unique system identification number to the plurality of corresponding system identification numbers;
- (E) if the unique system identification number is equal to one of the plurality of corresponding system identification numbers, generating a perceptible indication to a user to allow the user to switch to a system telephone number that is one of the plurality of telephone numbers that corresponds to one of the plurality of corresponding system identification numbers that is equal to the unique system identification number;
- (F) if the user switches to the system telephone number, repeating from step A; and
- (G) waiting for a paging signal, indicating an incoming radiotelephone call, on a frist paging frequency.


START
SCAN DEDICATED CHANNELS
101
SCAN PAGING CHANNELS
102
SID= SID IN RAMS ? (SKIP LAST NUMBER SELECTED)
103
YES
NO
PROMPT USER TO SELECT NEW NUMBER
104
CHANGE TO NEW NUMBER ?
105
YES
NO
SELECT NEW NAM CONTENTS (NUMBER, SID)
108
107
IDLE STATE

---

### 5,020,092
## DUAL-BANDWIDTH CELLULAR TELEPHONE

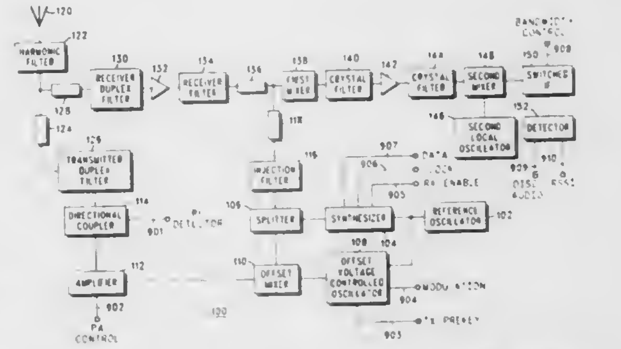
**Sharon E. T. Phillips, Lake in the Hills, and Scott N. Carney, Hoffman Estates, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Division of Ser. No. 370,666, Jun. 23, 1989, Pat. No. 4,972,455. This application Aug. 24, 1990, Ser. No. 572,724**

**The portion of the term of this patent subsequent to Nov. 20, 2007, has been disclaimed.**

**Int. Cl.$^5$ H04M** *11/00;* **H04B** *1/40*

U.S. Cl. 379—59 **12 Claims**



1. A cellular telephone communicating cellular telephone calls on a first set of cellular radio channels having a first cellular telephone signalling protocol and a second set of cellular radio channels having a second cellular telephone signalling protocol, said cellular telephone comprising:
- antenna means for receiving and transmitting cellular telephone call signals on said cellular radio channels:

VOL
1126
ISS
4
MY
28
1991
UMI

dialing means for dialing digits of telephone numbers;
synthesizing means for generating a reference signal;
cellular transmitting means coupled to the antenna means for transmitting cellular telephone call signals on said cellular radio channels;
cellular receiving means coupled to the antenna means and the reference signal for receiving cellular telephone call signals on said cellular radio channels, said cellular receiving further including intermediate frequency means having dual-bandwidth filtering means and switching means for generating an intermediate frequency signal having a predetermined frequency, the dual-bandwidth filtering means switchable between a first predetermined bandwidth including the predetermined frequency and a second predetermined bandwidth that includes the predetermined frequency and has a magnitude less than that of the first predetermined bandwidth, and the switching means being responsive to a bandwidth control signal having first and second states for switching said dual-bandwidth filtering means between the first and second predetermined bandwidths, respectively; and
control means including memory means for storing a control program, said control means being coupled to the dialing means, cellular transmitting means, and cellular receiving means for automatically transmitting and receiving cellular telephone calls on said cellular radio channels using the control program, said control means generating the first state of the bandwidth control signal for cellular telephone calls on said first set of cellular radio channels and generating the second state of the bandwidth control signal for cellular telephone calls on said second set of cellular radio channels.

---

**5,020,093**

### CELLULAR TELEPHONE OPERABLE ON DIFFERENT CELLULAR TELEPHONE SYSTEMS

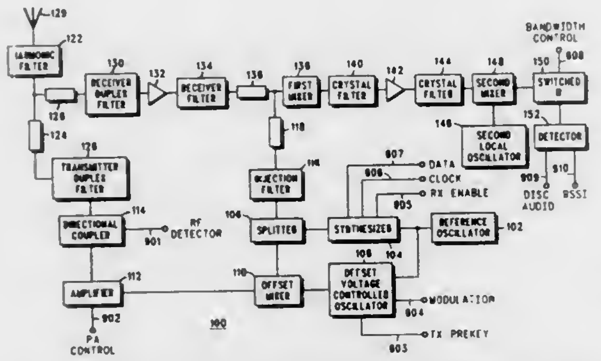
**Ali Pireh, Hoffman Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 370,675, Jun. 23, 1989, abandoned. This application Dec. 20, 1989, Ser. No. 453,553**

**The portion of the term of this patent subsequent to Nov. 20, 2007, has been disclaimed.**

**Int. Cl.$^5$ H04M *11/00;* H04B *1/40***

U.S. Cl. 379—59 **24 Claims**



1. A cellular telephone communicating cellular telephone calls on at least first and second cellular telephone systems each having different cellular radio channels, said cellular telephone comprising:
antenna means for receiving and transmitting cellular telephone call signals on said cellular radio channels;
dialing means for dialing digits of telephone numbers;
cellular transmitting means coupled to the antenna means for transmitting cellular telephone call signals on the cellular radio channels of the first and second cellular telephone systems;
cellular receiving means coupled to the antenna means for receiving cellular telephone call signals on the cellular radio channels of the first and second cellular telephone systems, said cellular receiving means further including intermediate frequency means having first filtering means having a first predetermined bandwidth, second filtering means having a second predetermined bandwidth that has a magnitude less than that of the first predetermined bandwidth, and switching means responsive to a bandwidth control signal having first and second states for switching between the first and second filtering means, respectively; and
control means including memory means for storing first and second control programs, said control means being coupled to the dialing means, cellular transmitting means, and cellular receiving means for automatically transmitting and receiving cellular telephone calls on the first cellular telephone system using the first control program and on the second cellular telephone system using the second control program, said control means generating the first state of the bandwidth control signal for cellular telephone calls on said first cellular telephone system and generating the second state of the bandwidth control signal for cellular telephone calls on said second cellular telephone system, and said control means monitoring the cellular radio channels to detect the absence of cellular service and switching between the first and second cellular telephone systems when cellular service has been absent for a predetermined time interval.

---

**5,020,094**

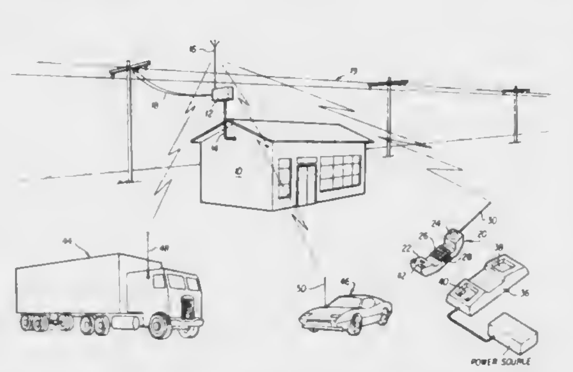
### CORDLESS TELEPHONE NETWORK

**Mark S. Rash, Rte. 1, Box 481, Goode, Va. 24556; Nicholas D. Harrison, 2915 Creekwood Rd., Norfolk, Va. 23518, and F. Prince Butler, 6127 Beechtree Dr., Alexandria, Va. 22310**

**Division of Ser. No. 137,206, Dec. 23, 1987. This application Aug. 1, 1989, Ser. No. 387,976**

**Int. Cl.$^5$ H04M *11/00***

U.S. Cl. 379—62 **12 Claims**



1. A cordless telephone network including a hand-held unit having a memorized distinctive ID code and including a cordless telephone transmitter/receiver means for cordlessly communicating 2-way calls between said hand-held unit and any one of a plurality of base units, said any one of said base units and said hand-held unit including a means for scanning a plurality of cordless telephone channels when said hand-held unit is making a call and when it is receiving a call, said hand-held unit further including a means for monitoring said plurality of channels during said scanning to determine if its hand-held unit ID code is transmitted on any one of said channels when said hand-held unit is receiving a call, and for determining if a base unit is transmitting a channel clear signal when said hand-held unit is making a call;
said network further comprising a plurality of base units each including a means for transmitting a channel clear signal.

---

**5,020,095**

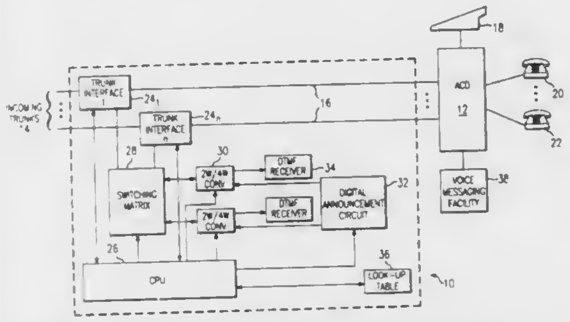
### INTERACTIVE CALL DISTRIBUTION PROCESSOR

**Sanford J. Morganstein, Elgin; Herbert J. Krakau, Elmhurst; Bakulesh A. Mehta, Downers Grove; Mark D. Klecka, DeKalb, all of Ill., and Robert Carleton, Encino, Calif., assignors to Dytel Corporation, Schaumburg, Ill.**

**Filed Nov. 16, 1988, Ser. No. 272,091**

**Int. Cl.$^5$ H04M *3/36, 3/50;* H04Q *3/64***

U.S. Cl. 379—67 **18 Claims**



1. A method for processing telephone calls inbound to a telephone switching system, comprising the steps of:
initially informing calling parties of the availability of destinations and digit information to input to reach such destinations;
causing the calling parties to be connected to respective destinations if digit information is input;
queuing calling parties who cannot be connected directly to an attendant position associated with the switching system;
providing alternate destinations other than the attendant positions;
transmitting a message to the queued calling parties regarding a selection of one said alternate destination; and
connecting the queued calling parties to respective alternate destinations, if selected by the queued calling parties.

---

**5,020,096**

### IMAGE COMMUNICATION SYSTEM HAVING IMPROVED LINE CONTROL

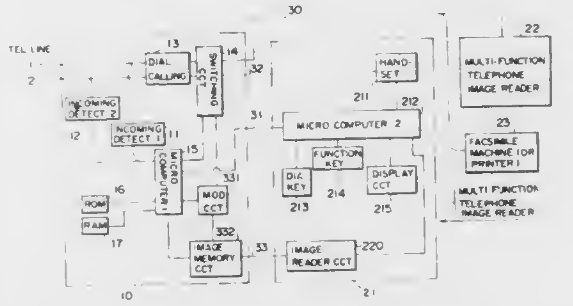
**Kenzo Sakakibara, Yokohama; Takehiro Yoshida, Tokyo, and Kozo Toda, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 167,253, Mar. 11, 1988, abandoned. This application Jan. 22, 1990, Ser. No. 465,652**

**Claims priority, application Japan, Mar. 12, 1987, 62-55416**

**Int. Cl.$^5$ H04N *1/32***

U.S. Cl. 379—100 **9 Claims**



1. An image communication system, comprising:
a plurality of communication terminals each including speech communication means for effecting speech communication and reading means for reading an image; and
line control means for selectively connecting said communication terminals to at least one communication line, wherein said line control means includes input means for inputting image data from each of said terminals, means for performing a communication procedure of image data, and send means for sending the image data input from said input means to said communication line in accordance with the communication procedure, said line control means being adapted to send image data from said plural terminals.

---

**5,020,097**

### TELEPHONE WITH DATA SETTING BY REMOTE CONTROL

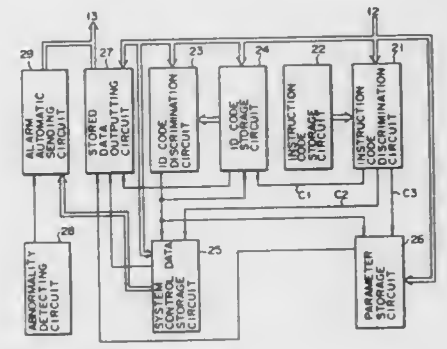
**Shigeyasu Tanaka, Atsugi, and Takaichi Furumura, Hadano, both of Japan, assignors to Anritsu Corporation, Tokyo, Japan**

**Filed Nov. 13, 1989, Ser. No. 435,947**

**Claims priority, application Japan, Nov. 18, 1988, 63-291874**

**Int. Cl.$^5$ H04M *11/00***

U.S. Cl. 379—102 **16 Claims**


12
13
29
27
23
24
22
21
ALARM AUTOMATIC SENDING CIRCUIT
STORED DATA OUTPUTTING CIRCUIT
ID CODE DISCRIMINATION CIRCUIT
ID CODE STORAGE CIRCUIT
INSTRUCTION CODE STORAGE CIRCUIT
INSTRUCTION CODE DISCRIMINATION CIRCUIT
C1
C2
C3
28
ABNORMALITY DETECTING CIRCUIT
SYSTEM CONTROL DATA STORAGE CIRCUIT
25
PARAMETER STORAGE CIRCUIT
26

1. A telephone comprising:
information receiving means for receiving information including an instruction code, an ID code and one of system control data and parameter information upon a first communication between the telephone and outside managing equipment;
instruction code storage means for storing at least first and second predetermined instruction codes;
ID code storage means for storing an ID code for identifying the telephone;
instruction-code discrimination means for comparing an instruction code received by said information receiving means from the outside managing equipment with said first and second instruction codes stored in said instruction-code storage means, for outputting a first control signal when the received instruction code corresponds to said first instruction code, and for outputting a second control signal when the received instruction code corresponds to said second instruction code;
ID code discriminating means for comparing an ID code received by said information receiving means from the outside managing equipment with said ID code stored in said ID code storage means to output an ID-code coincidence signal when a coincidence occurs therebetween;
system control data storage means responsive to said first control signal and said ID-code coincidence signal both being present for storing system control data received by said information receiving means from the outside managing equipment; and
parameter storage means responsive to said second control signal and said ID-code coincidence signal both being present for storing parameter information received by said information receiving means form the outside managing equipment.

VOL
1126
ISS
4
MY
28
1991
UMI

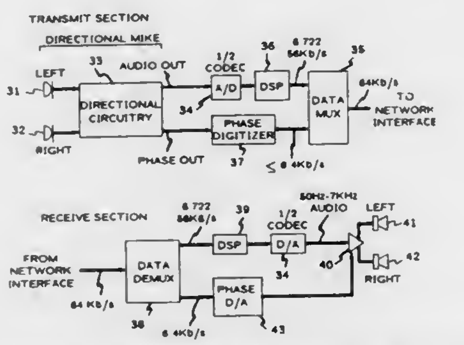
### 5,020,098
### TELEPHONE CONFERENCING ARRANGEMENT

**John R. Celli, Long Branch, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Nov. 3, 1989, Ser. No. 431,067**

**Int. Cl.$^5$ H04M** *3/56*

**U.S. Cl. 379—202** **18 Claims**



1. A telephone conferencing arrangement for communicating speech signals representative of speech sounds between telephone stations over a digital channel, the arrangement comprising:

means for measuring speech sounds originating at a first telephone station, the measuring means providing output speech signals representing the speech sounds for transmission over the digital channel;

means for determining the direction of origin of the speech sounds originating at the first telephone station;

means for encoding a phase localization signal reflective of the direction of origin of the speech sounds, the phase localization signal being transmitted to a second telephone station with the speech signals over the digital channel; and

means in the second telephone station for creating in a sound field directional speech sounds corresponding to the direction of origin of the speech sounds at the first telephone station, the direction speech sounds being created in response to receipt of the speech signals and the phase localization signal.

---

### 5,020,099
### PRIVATE BRANCH EXCHANGE

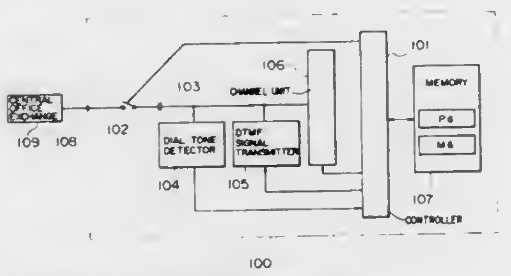
**Hiromi Katagawa, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Oct. 10, 1989, Ser. No. 419,393**

**Claims priority, application Japan, Oct. 14, 1988, 63-260051**

**Int. Cl.$^5$ H04M** *3/22, 7/14*

**U.S. Cl. 379—234** **6 Claims**



1. A telephone apparatus comprising:

signal transmission means for selectively transmitting either a dial signal of a first mode or a dial signal of a second mode to a central office line connected to said telephone apparatus;

detection means for detecting the presence or absence of a dial tone coming from said line when said line is acquired; and

recognition means for recognizing said line as a line for said first mode when said detection means detects disappearing of said dial tone after the transmission of said dial signal of the first mode from said signal transmission means but recognizing said line as a line for said second mode when the disappearing of said dial tone is not detected.

---

### 5,020,100
### TELEPHONE LINE LOOP CURRENT REGULATOR

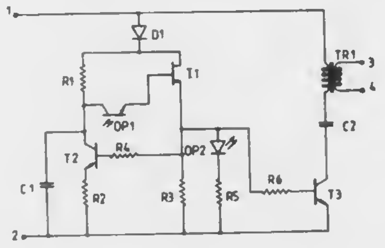
**William H. Gardiner, Cirencester, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 7, 1989, Ser. No. 377,369**

**Claims priority, application United Kingdom, Jul. 13, 1988, 8816634**

**Int. Cl.$^5$ H04M** *1/00*

**U.S. Cl. 379—379** **28 Claims**



1. A telephone line d.c. loop current regulator comprising: a gyrator circuit connected across the line, a field effect transistor connected in series with a resistor across the line, the field effect transistor forming the amplifying means of the gyrator circuit, means responsive to current flow through the field effect transistor for regulating the d.c. current through the field effect transistor, and loop current detection means connected across the resistor.

---

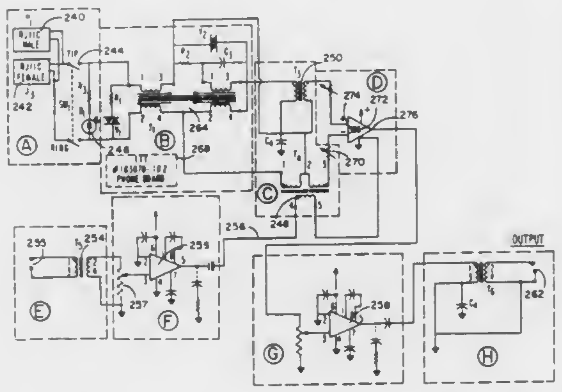
### 5,020,101
### MUSICIANS TELEPHONE INTERFACE

**Gregory R. Brotz, P.O. Box 1322, Sheboygan, Wis. 53081, and Angelo N. Dallas, Sheboygan, Wis., assignors to Gregory R. Brotz, Sheboygan, Wis.**

**Filed Apr. 10, 1989, Ser. No. 335,701**

**Int. Cl.$^5$ H04M** *9/08, 1/57*

**U.S. Cl. 379—389** **4 Claims**



1.

A telephone interface system having at least two units, one at each of at least two locations, each unit comprising:

means to interconnect the audio output of two or more musicians, at least one at an instant location and the other at a remote location over telephone lines, said means including:

means to interconnect said units to telephone lines;

input means in each unit at said instant and remote locations to receive local musical audio input from said musicians and provide an input means signal;

interface means in each unit at said instant and remote locations to receive said input means signals including means to direct such input signals from said instant location to said remote location and to direct such input means signals from said remote location to said instant location over said telephone lines;

first amplification means at said instant and remote unit locations to amplify selected of said local musical audio input means signals at said instant location from said input means;

a first transformer having an input and first, second and third outputs, said first transformer input receiving said local amplified musical audio input signal from said first amplification means, said first transformer splitting such audio input signal to its first, second and third outputs;

a second transformer receiving said audio output signal from said remote location through said means to interconnect said unit to said telephone lines, said second transformer also receiving said local musical signal input from said first output of said first transformer, said second transformer directing said local audio signal through said means to interconnect said units to said telephone lines to said remote location;

a third transformer having an output, said third transformer receiving said audio output signal from said remote location and said audio output signal from said instant location from said second output of said first transformer;

a variable resistor having an input and output receiving local audio output signal at its input from said third output of said first transformer;

a comparator having an output, said comparator receiving the remote and local audio output signals from said third transformer's output and directing said remote audio signal directly to said comparator's output, said comparator also receiving the local audio output signal from said output of said variable resistor and, if in phase, with the local output from said third transformer, said comparator directing said local audio output signal to the output of said comparator and if said local audio output signal from said variable resistor is out of phase with the local audio output signal from said third transformer, said comparator cancelling such local audio output signals and not directing them to said comparator's output;

second amplification means having an input and output at each of said instant and remote locations to receive and amplify said signals coming from said comparator; and

speaker means at said instant and remote locations to broadcast said amplified signals from said comparator to be heard at each of said instant and remote locations.

---

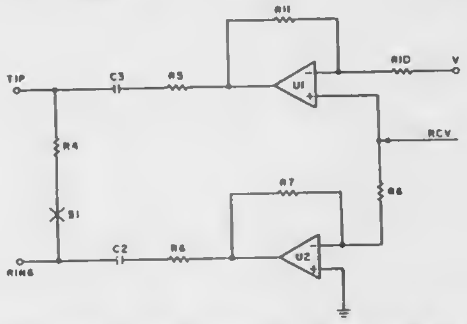
### 5,020,102
### SEMI-FLOATING AC/DC ACTIVE TERMINATION CIRCUIT WITH CURRENT SINK

**Ian A. Schorr, Chicago, Ill., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Aug. 1, 1989, Ser. No. 387,732**

**Int. Cl.$^5$ H04M** *9/08*

**U.S. Cl. 379—399** **20 Claims**



1. A transmission line termination circuit having at least tip and ring terminals and providing an AC termination impedance and a DC termination resistance comprising:

at least a first resistance element connected between the tip and ring terminals;

a first resistor and capacitor series circuit connected between the tip terminal and virtual ground;

a second resistor and capacitor series circuit connected between the ring terminal and virtual ground;

a first resistance element being the DC termination resistance and the resistance element floating with respect to the virtual ground.

---

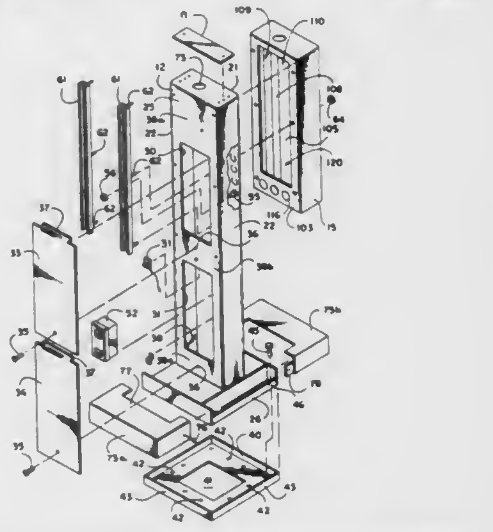
### 5,020,103
### ADJUSTABLE HEIGHT MOUNTING PEDESTAL FOR PUBLIC AND COIN TELEPHONES

**Eddie L. Holland, Cumming, Ga., assignor to Phillips & Brooks/Gladwin, Inc., Cumming, Ga.**

**Filed May 23, 1990, Ser. No. 527,760**

**Int. Cl.$^5$ H04M** *17/00, 1/11*

**U.S. Cl. 379—454** **24 Claims**



1. An improved mounting pedestal for mounting a public or coin telephone, comprising:

an elongate upright tubular post for mounting to a mounting surface;

variable height mounting means on said upright post for mounting a backboard mounting enclosure at a selectively variable height; and

a backboard mounting enclosure for mounting said telephone in a secure manner at a selected height on said upright post with said variable height mounting means.

VOL
126
SS
4
MY
28
1991
UMI

### 5,020,104

## METHOD OF REDUCING THE USEFUL BANDWIDTH OF BANDWIDTH-LIMITED SIGNALS BY CODING AND DECODING THE SIGNALS, AND SYSTEM TO CARRY OUT THE METHOD

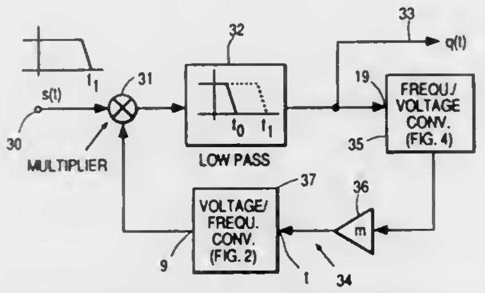
**Dan Ciulin, Pully, Switzerland, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Nov. 27, 1989, Ser. No. 441,814**

**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1988, 3842831**

**Int. Cl.$^5$ H04K *1/02***

**U.S. Cl. 380—6** **14 Claims**



1. A method of reducing the useful bandwidth of a bandwidth-limited input signal (s(t)) by coding of said input signal to derive a coded signal (q(t)), comprising

combining said input signal with a feedback signal;

low-pass filtering said combined input-and-feedback signal to derive said coded signal (q(t)),

passing the coded signal (q(t)) through a feedback loop for combination with said input signal,

and, in said feedback loop

frequency-demodulating the combined signal and forming a frequency-demodulated feedback signal;

amplifying the frequency-demodulated feedback signal; and

frequency-modulating said amplified feedback signal to form a signal with a higher FM index, said feedback signal being combined with said input signal to form said combined signal.

---

### 5,020,105

## FIELD INITIALIZED AUTHENTICATION SYSTEM FOR PROTECTIVE SECURITY OF ELECTRONIC INFORMATION NETWORKS

**Richard D. Rosen; Robert B. McCown, and Matthew S. Fleming, all of Columbus, Ohio, assignors to Applied Information Technologies Corporation, Columbus, Ohio**

**Continuation of Ser. No. 266,257, Nov. 1, 1988, abandoned, which is a continuation of Ser. No. 140,580, Jan. 4, 1988, abandoned, which is a continuation of Ser. No. 874,381, Jun. 16, 1986, Pat. No. 4,731,841. This application Aug. 17, 1989, Ser. No. 395,291**

**The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.**

**Int. Cl.$^5$ H04L *9/00***

**U.S. Cl. 380—23** **12 Claims**

1. In combination a method for authenticating the authority of any of a plurality of remote users to access a host computer, the method comprising:

(a) storing in the host computer and in each of a plurality of remote user computers the identical selected constant, instructions for using a first, non-invertible algorithm for raising a number to a power using modulo arithmetic, for performing a non-invertible authentication second algorithm which is a function of a secret key and for generating a random number;

(b) distributing the computers to the remote users;

(c) initializing the computers independently with the host computer and from a remote location selected by the remote user by:

(i) establishing communication between the host computer and a remote user computer;

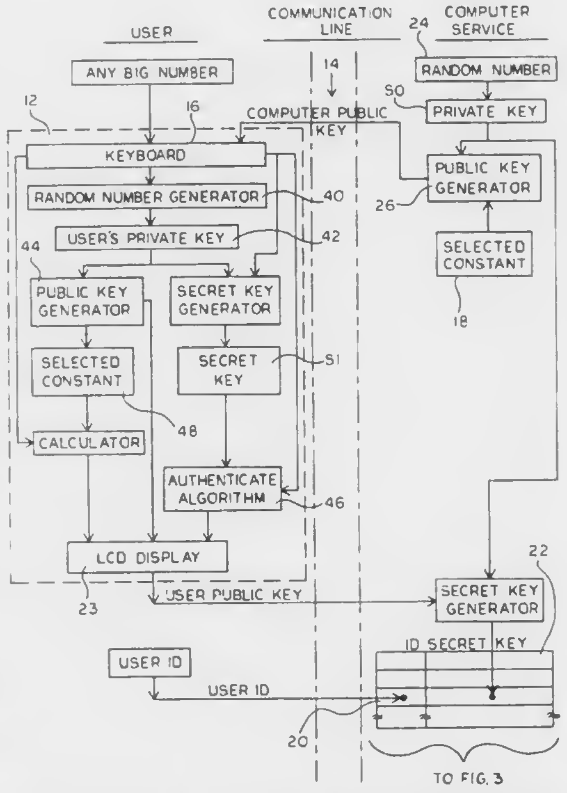
(ii) independently generating a random first number as a first key in the remote user's computer and in the host computer;

(iii) independently raising said selected constant in each of the communicating computers to that computer's first key using modulo arithmetic and said first non-invertible algorithm to generate a second key for each computer;

(iv) communicating the second key of each communicating computer to the other;

(v) generating and storing in each communicating computer the identical secret key by raising in each computer the second key of the other computer to the power of the computer's own first key using modulo arithmetic by the first non-invertible algorithm; and

(vi) disconnecting said communication;



(d) subsequently authenticating the authority of a remote user to access or continue to access the host computer by detecting whether a remote user communicating with and seeking access to the host computer has a remote user computer which has been subjected to steps (a), (b) and (c) by:

(i) generating a second number in the host computer;

(ii) communicating that second number to the remote user computer;

(iii) performing said stored, second non-invertible algorithm upon that second number in the remote user computer as a function of its stored secret key and in the host computer as a function of the same secret key;

(iv) communicating the result of said second algorithm in the remote user computer to the host computer; and

(v) comparing the transmitted result to the result obtained at the host computer; and

(e) permitting access to the host computer if the compared portions are identical and preventing access if they are not.

---

### 5,020,106

## PROCESS FOR THE CRYPTOGRAPHIC PROCESSING OF DATA AND CRYPTOGRAPHIC SYSTEMS

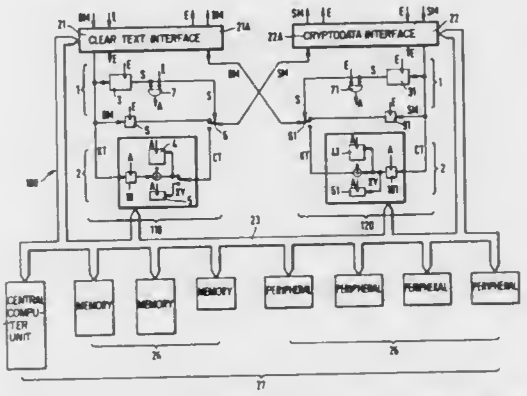
**Peter Rabold, Wangen; Hans-Jörg Klemenz, Dielsdorf, and Paul J. Schöbi, Zurich, all of Switzerland, assignors to Gretag Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Feb. 8, 1990, Ser. No. 476,626**

**Claims priority, application Switzerland, Feb. 8, 1989, 429/89**

**Int. Cl.$^5$ H04L *9/00***

**U.S. Cl. 380—49** **22 Claims**



1. Process for the cryptographic processing of data, wherein a data entity containing a clear text and data transmission routine and a coded text entity containing cryptodata and data transmission routines, are conducted in the form of packets to a cryptographic system, which comprises at least one coding/decoding generator and which produces on the output side signals containing the cryptodata or the clear data, respectively, comprising the steps of:

detecting, in a first part of the cryptographic system, the data transmission routines within the data entity or the coded text entity, respectively;

processing, in a second part of the cryptographic system, only the clear text or the cryptodata by at least one coding/decoding generator; and,

combining the clear text present after processing as the cryptodata or the cryptodata present after processing as the clear text, with the detected data transmission routines such that the coded text entity is produced as the output signal of the cryptographic system during a coding operation and the data entity is produced as the output signal during a decoding operation.

---

### 5,020,107

## LIMITED VOCABULARY SPEECH RECOGNITION SYSTEM

**Kaymar Rohani, Ft. Worth, and R. Mark Harrison, Grapevine, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 4, 1989, Ser. No. 445,518**

**Int. Cl.$^5$ G10L *7/08***

**U.S. Cl. 381—43** **8 Claims**

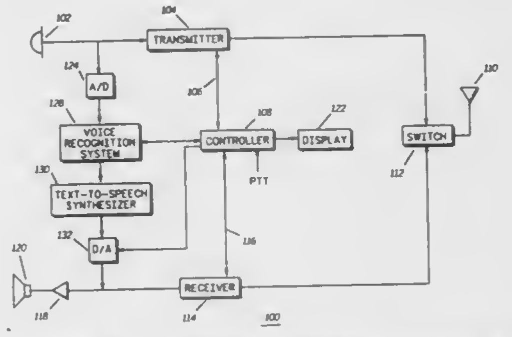
5. A device capable of being at least partially controlled via voice command, comprising:

(a) a speaker independent voice recognition means for receiving a voice signal representing one of a limited set of words or commands;

(b) means for selecting an item from a set of items associated with at least some of the limited set of words or commands to provide a selected item;

(c) means for performing a function associated with said selected item when no additional information is required to perform the function, and means for displaying another set of items associated with at least some of substantially the same limited set of words when additional information is required to perform the function;

(d) means for presenting a set of items associated with at least some of the limited set of words or commands when a voice signal representing a command to present said set of items is received.



---

### 5,020,108

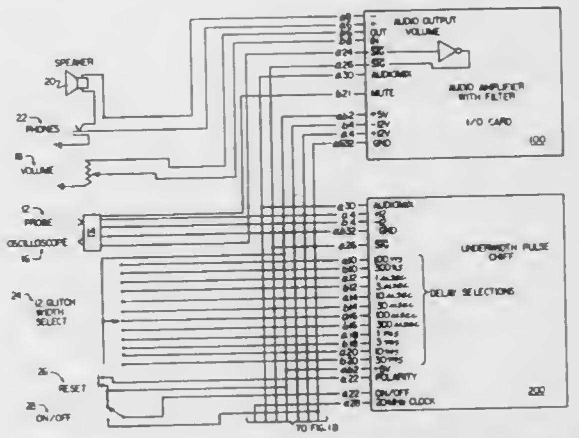
## AUDIBLE DISPLAY OF ELECTRICAL SIGNAL CHARACTERISTICS

**Thomas D. Wason, 715 W. Johnson St., Raleigh, N.C. 27603**

**Continuation of Ser. No. 46,623, May 4, 1987, abandoned. This application Dec. 18, 1989, Ser. No. 453,352**

**Int. Cl.$^5$ G10L *5/00***

**U.S. Cl. 381—48** **20 Claims**



1. An audible display device for generating a plurality of audible distinct signals, each audible signal being representative of a salient feature of an electrical signal to be analyzed, said device comprising:

(a) a plurality of distinctly separate, auditory signal waveform generating sub-circuits;

(b) input means electrically connecting said sub-circuits with said electrical signal for selectively supplying at least one electrical signal to be examined to said plurality of sub-circuits;

(c) each of said sub-circuits electronically detecting a selected salient feature of said electrical signal and producing an electrical waveform substantially dissimilar to said detected salient feature in response to the presence of said detected salient feature, each of said waveforms being representative of a distinct audible pattern of sounds and capable of being converted by a transducer to said audible pattern of sounds, said sub-circuits being able to detect at least two of the following signal characteristics: (i) pulse width; (ii) duty cycle; (iii) activity level; (iv) repetitive pattern comparison; and (v) sampled signal level; and

(d) means for selectively audibly displaying each of said patterns of sound both individually and collectively.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,020,109

## APPARATUS FOR MODULATION OF THE TIMBRE OF AN ELECTRICAL AMPLIFIER, IN PARTICULAR FOR GUITARS

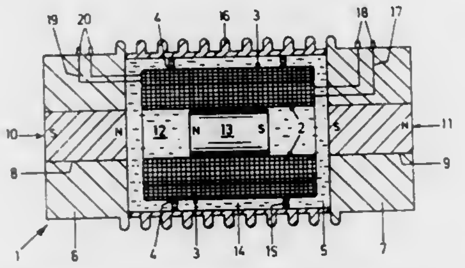
**Robert Terstall, Neustadt, Fed. Rep. of Germany, assignor to Firma Roland Meinl, Neustadt, Fed. Rep. of Germany**

**Filed Dec. 4, 1989, Ser. No. 445,061**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842367**

**Int. Cl.$^5$ H03G** *3/00*

**U.S. Cl. 381—61** **17 Claims**



11. An apparatus for modulation of the timbre of an electrical amplifier, in particular for guitars, comprising a cylindrical coil (2), which is connectable downstream of an amplifier output, a bar magnet (3) inside the cylindrical coil (2), which is deflected against restoring forces within a limited amplitude range out of its position of equilibrium, the cylindric coil (2) and the bar magnet (13) disposed in a housing (1) containing a damping or cooling fluid, an annular gap (14) between the outside of the cylindrical coil (2) and the interior wall of the housing, and cooling ribs (16) disposed on the exterior wall of said housing.

---

### 5,020,110

## ARRANGEMENT FOR CHECKING DOCUMENTS

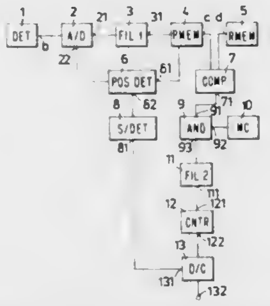
**Pawel Chominski, Huddinge, Sweden, assignor to Inter Innovation AB, Stockholm, Sweden**

**Filed Jan. 24, 1989, Ser. No. 301,012**

**Claims priority, application Sweden, Feb. 17, 1988, 8800542**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—7** **9 Claims**



1. An arrangement for checking documents, such as banknotes, checks, coupons, vouchers or like documents, comprising:

detector means operative in scanning documents, one at a time, during the transport of said documents in a longitudinal direction of the document past said means, and

signal processing means operative in processing output signals from the detector means into a document signal, comparing the thus processed signal, the document signal, with a corresponding reference signal produced from a reference document applicable to the type of document being checked, and in producing a control signal in dependence on the result of the comparison made between the document signal and the reference signal,

characterized in that the detector means, including a plurality of detector cells arranged in a row, is operative to scan with a plurality of scans transversely across the width of the document and the signal processing means comprise:

an analogue/digital converter (2) which is operative in digitizing the output signals from the detector means (1) and generating digital signals representing edge signals and a plurality of picture elements for each scan, each signal representing a picture element having one, and only one, digital bit per picture element;

a position detector (6) the input side of which is connected to the output side of the analogue/digital converter (2) and which is operative in delimiting the digital signals representing the picture elements to a window of preselected digital signals representing picture elements with significant information, selected with respect to horizontal and vertical edges of one of said documents, said window of stored digital signals representing said document signal for said respective one of said documents;

a comparison circuit (7) which is arranged on the output side of the analogue/digital converter (2), and the position detector (6) and which is operative in effecting said comparison between the document signal and said reference signal; and

a weighting circuit (9–10) which is located on the output side of the comparison circuit (7) and which is operative in weighting parts of an output signal from the comparison circuit (7) for establishing whether or not respective parts of the output signal are of particular informative significance in respect of said document of relative kind and shall therewith be taken as a basis for the control signal delivered on the output side of the arrangement.

---

### 5,020,111

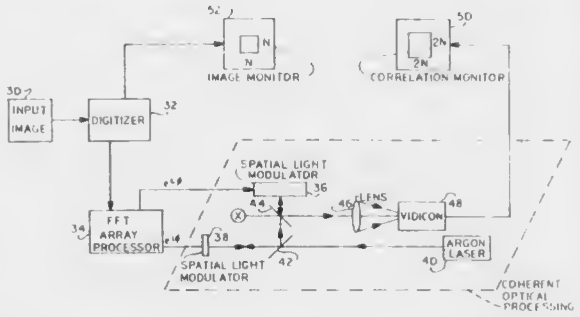
## SPATIAL SYMMETRY CUEING IMAGE PROCESSING METHOD AND APPARATUS

**Bruce A. Weber, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 14, 1988, Ser. No. 260,424**

**Int. Cl.$^5$ G06K** *9/46;* **G02B** *27/46;* **G06E** *1/00*

**U.S. Cl. 382—31** **15 Claims**



1. A method of finding man-made objects in an arbitrary scene comprising the steps of:

detecting an image of said arbitrary scene;

creating a duplicate representation of said image;

performing a symmetry transformation on said duplicate representation forming a symmetry transformed duplicate representation;

performing a crosscorrelation between said image and said symmetry transformed duplicate representation; and

identifying the presence of said man-made object in said image by matching crosscorrelation information with said image.

---

### 5,020,112

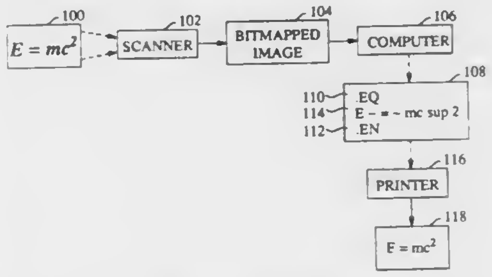
## IMAGE RECOGNITION METHOD USING TWO-DIMENSIONAL STOCHASTIC GRAMMARS

**Philip A. Chou, Chatham, N.J., assignor to At&T Bell Laboratories, Murray Hill, N.J.**

**Filed Oct. 31, 1989, Ser. No. 429,923**

**Int. Cl.$^5$ G06K** *9/62*

**U.S. Cl. 382—37** **7 Claims**



1. A method of identifying bitmapped objects of an image comprising the steps of:

comparing the templates in an object template library with all areas of like size of the image,

generating a set of signals for each such comparison that satisfies a defined matching criteria between the template and the image area being compared, said set of signals identifying the object based on the matching template, the location of the object in the image and an indication of the goodness of the match between the object and the template,

forming a series of possible parse trees of the image with a probability of occurrence for each tree, wherein each parent node and its child nodes of each parse tree satisfies a grammatical production rule, in which certain ones of the production rules define spatial relationships between objects in the image, and

selecting one of the possible parse trees having the largest probability of occurrence for further utilization.

---

### 5,020,113

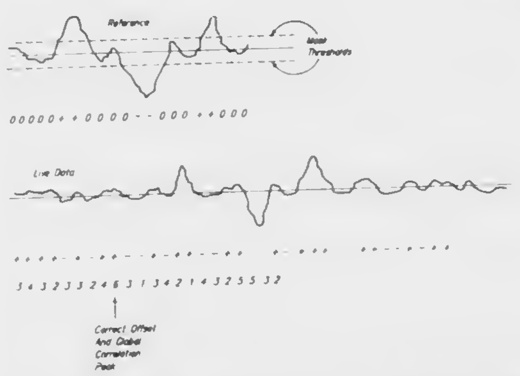
## MASKABLE BILEVEL CORRELATORS

**Thomas K. Lo, Temple City; Jack M. Sacks, Thousand Oaks; Wayne P. Simoni; Leonard A. Lee, both of Canoga Park; Harrison Nguyen, Ontario; Lynne M. Karlin, Northridge; Andy L. Quan, and Kazuo R. Hosokawa, both of Canogo Park, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Aug. 8, 1988, Ser. No. 229,407**

**Int. Cl.$^5$ G06K** *9/64*

**U.S. Cl. 382—42** **18 Claims**



1. In a method of correlating two input signals associated with a live image and a reference image, the improvement which includes the steps of:

(a) processing at least the reference image associated signal to provide a polarity bit and a mask bit for each pixel position therein, the value of the mask bit being one digital state defining an off condition if the amplitude of the signal falls between two preselected threshold levels thereby substantially filtering out noisy pixels with amplitudes between the two threshold levels, and being of an opposite state defining an on condition if the amplitude is outside of the threshold levels, the value of the polarity bit being one digital state if the amplitude is positive with respect to a predetermined reference level and being of an opposite state if the amplitude is negative with respect to a predetermined reference level at that pixel position; and

(b) using the polarity and mask bits of the processed reference signal to generate a correlation output wherein the pixel positions with a mask bit in the on condition are used in the correlation while the pixel positions with a mask bit in the off condition are not used in the correlation process, thereby producing a correlation output that is minimally affected by noise in the input signal.

---

### 5,020,114

## OBJECT DISCRIMINATING APPARATUS AND METHOD THEREFOR

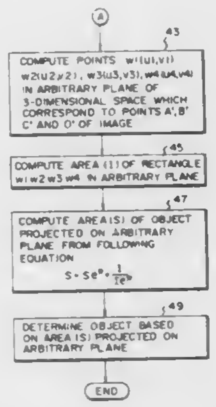
**Arisa Fujioka, Kawaguchi, and Takashi Konda, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Aug. 17, 1988, Ser. No. 233,128**

**Claims priority, application Japan, Aug. 17, 1987, 62-203707**

**Int. Cl.$^5$ G06K** *9/00*

**U.S. Cl. 382—44** **7 Claims**


A
43
COMPUTE POINTS w1(u1,v1) w2(u2,v2), w3(u3,v3), w4(u4,v4) IN ARBITRARY PLANE OF 3-DIMENSIONAL SPACE WHICH CORRESPOND TO POINTS A',B' C' AND D' OF IMAGE
45
COMPUTE AREA (1) OF RECTANGLE w1 w2 w3 w4 IN ARBITRARY PLANE
47
COMPUTE AREA (S) OF OBJECT PROJECTED ON ARBITRARY PLANE FROM FOLLOWING EQUATION
49
DETERMINE OBJECT BASED ON AREA (S) PROJECTED ON ARBITRARY PLANE
END

1. An object determining apparatus comprising:

image capturing means for capturing an image;

object detecting means for detecting an object from the image captured by said capturing means;

means for subjecting those points on the image of the object detected by said object detecting means, which have maximum and minimum values at least in x- and y-directions, to a reverse perspective transformation into a given plane in a 3-dimensional space;

means for calculating, on the basis of a ratio of an area defined by four points on the image to an area defined by four points after the reverse perspective transformation, a cross-sectional area of the object in a given plane after the reverse perspective transformation, from the area on the image; and

means for comparing a value of the area calculated by said calculating means with a predetermined area value registered in advance, thereby determining the object.

VOL 1126 ISS 4 MY 28 1991 UMI

## 5,020,115

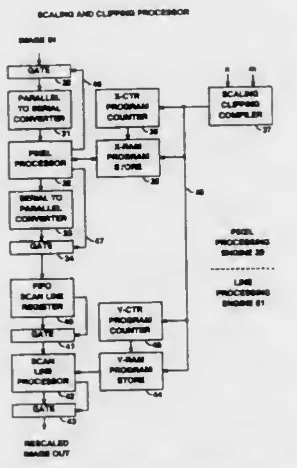
## METHODS AND APPARATUS FOR DYNAMICALLY SCALING IMAGES

**David B. Black, Ridgewood, N.J., assignor to Imnet Corporation, Pine Brook, N.J.**

**Filed Jul. 10, 1989, Ser. No. 389,460**

**Int. Cl.$^5$ G06K** *9/32*

U.S. Cl. 382—44 **18 Claims**



1. A rescaling system for digital image processing comprising

programmable pixel processing means responsive to patterns of repeat, delete and pass through pixel processing instructions to process the pixels in each scan line of said image,

programmable scan line processing means responsive to patterns of repeat, delete and pass through scan line processing instruction to process the scan lines previously processed by said pixel processing means, and means for dynamically programming said programmable pixel processing means and said programmable scan line processing means to rescale said digital image by generating said patterns on the fix,

said pixel processing means and said scan line processing means each comprising

a program store for storing said processing instructions,

a program counter, and

means responsive to said program counter for accessing and executing processing instruction from said program store.

---

## 5,020,116

## IMAGE REGISTRATION METHOD AND APPARATUS

**Malcolm Macaulay, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 13, 1989, Ser. No. 450,187**

**Int. Cl.$^5$ G06K** *9/32*

U.S. Cl. 382—44 **16 Claims**

1. An image registration system for registering the position of one or more images projected by one or more image projectors, comprising:

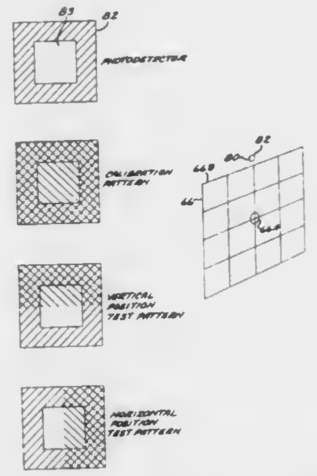
a registration sensor having a single defined active area, said registration sensor further characterized by a photodetector device having an active area and providing an output signal proportional to the intensity of the light incident on said active area, and a sensor mask having a mask opening, said sensor active area substantially centered on said mask opening, said mask providing a means for defining the active area of said photodetector device exposed to light from the image projector;

means for projecting an image which illuminates the entire active area of said sensor during a calibration time interval;

first means for sampling the output of said sensor during the calibration time interval and holding the output value as a calibration signal value;

means for projecting a vertical pattern image which nominally illuminates only one vertical half of said active area of said sensor during a vertical pattern time interval;

second means for sampling the output of said sensor during the vertical pattern time interval and holding the output value as a vertical pattern signal value;


83
82
PHOTODETECTOR
CALIBRATION PATTERN
VERTICAL POSITION TEST PATTERN
HORIZONTAL POSITION TEST PATTERN

means for projecting a horizontal pattern image which nominally illuminates only one horizontal half of said active area of said sensor during a horizontal pattern time interval;

third means for sampling the output of said sensor during the horizontal pattern time interval and holding the output value as a horizontal pattern signal value; and

means responsive to the respective calibration, vertical pattern and horizontal pattern signals for forming position correction signals to register said image.

---

## 5,020,117

## HANDWRITTEN CHARACTER STRING RECOGNITION SYSTEM

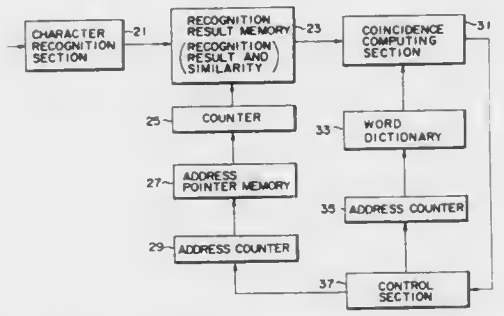
**Katsunori Ooi, Yokohama; Hiroshi Sasaki, Tokyo, and Shunji Ariyoshi, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jan. 18, 1989, Ser. No. 298,041**

**Claims priority, application Japan, Jan. 18, 1988, 63-7926; Jan. 18, 1988, 63-7927**

**Int. Cl.$^5$ G06K** *9/32*

U.S. Cl. 382—46 **11 Claims**


CHARACTER RECOGNITION SECTION
21
RECOGNITION RESULT MEMORY (RECOGNITION RESULT AND SIMILARITY)
23
COINCIDENCE COMPUTING SECTION
31
25
COUNTER
33
WORD DICTIONARY
27
ADDRESS POINTER MEMORY
35
ADDRESS COUNTER
29
ADDRESS COUNTER
37
CONTROL SECTION

1. A character string recognition system for recognizing an input character by comparing the input character with a basic character in a dictionary memory which stores characters to be recognized, said system comprising:

means for extracting, in units of a character, characters from an input character string;

means for rotating the input character string by a predetermined angle;

means for obtaining, in units of a character, recognition character candidates for each character extracted by said extracting means and each character rotated by said rotating means; and

means for obtaining a coincidence between the recognition character candidates obtained by said means for obtaining recognition character candidates, and the characters stored in said dictionary memory.

---

## 5,020,118

## IMAGE READING APPARATUS

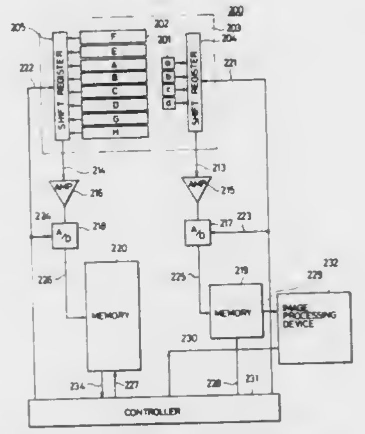
**Susumu Sugiura, Atsugi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 742,569, Jun. 7, 1985, abandoned. This application Jun. 21, 1988, Ser. No. 220,959**

**Claims priority, application Japan, Jun. 13, 1984, 59-119895; Jun. 21, 1984, 59-126331; Jun. 26, 1984, 59-130180**

**Int. Cl.$^5$ G06K** *9/38, 9/00;* **G01J** *3/50*

U.S. Cl. 382—50 **28 Claims**



1. An image reading apparatus comprising:

a first linear sensor, composed of a plurality of first photosensor elements arranged in a line configuration in a first direction, for reading an image line by line;

a second linear sensor, composed of a plurality of second photosensor elements arranged in a line configuration in the first direction, for reading an image within a strip configuration of an area including a line of an image read by said first linear sensor, the number of said second photosensor elements being larger than the number of said first photosensor elements, and each of said second photosensor elements having its length extending in a second direction perpendicular to the first direction, the length of said second photosensor elements being greater than that of said first photosensor elements;

calculating means for calculating image signals outputted from said second linear sensor to form unsharp image signals associated with image signals outputted from said first linear sensor; and

processing means for processing the image signals outputted from said first linear sensor in accordance with the unsharp image signals formed by said calculating means.

---

## 5,020,119

## SYSTEM FOR PRODUCING SERRATED, ALTERNATING PIXEL PATTERN ON CHARACTER BOUNDARIES

**Hwai T. Tai, Rochester, and John R. Thompson, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 26, 1989, Ser. No. 371,896**

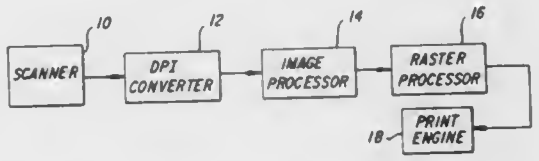
**Int. Cl.$^5$ G06K** *9/38;* **G09G** *1/06;* **G06F** *15/00*

U.S. Cl. 382—50 **25 Claims**

8. A method for processing gray level digital pixel information and converting the pixel information into two-valued binary data suitable for use by a binary output device, said method including the steps of:

determining whether a multibit digital signal being processed represents a portion of a background area, text area, or text-background boundary;

in response to a determination that the multibit digital signal being processed represents a portion of a text background boundary converting the digital signal into a signal of one binary value if it represents a background area;



converting the digital signal into a signal of the other binary value if it represents a text area;

obtaining conversion information about an adjacent processed pixel; and

converting the digital signal into a signal of the binary value which is opposite to that of said adjacent processed pixel when the adjacent processed pixel represents a portion of a text-background boundary.

---

## 5,020,120

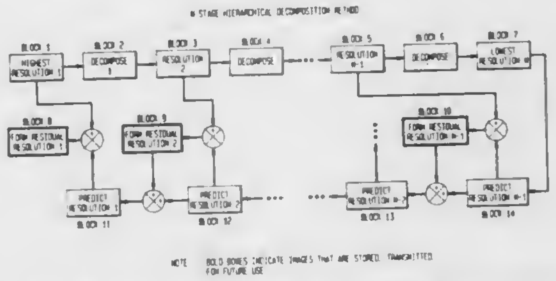
## METHODS FOR REDUCING QUANTIZATION ERROR IN HIERARCHICAL DECOMPOSITION AND RECONSTRUCTION SCHEMES

**John A. Weldy, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 22, 1989, Ser. No. 455,107**

**Int. Cl.$^5$ G06K** *9/36*

U.S. Cl. 382—56 **16 Claims**



1. A method for hierarchically decomposing digital images signals comprising the steps of:

(a) decomposing a quantized high resolution digital image signal to form a low resolution quantized digital image signal;

(b) predicting a high resolution quantized digital image signal from said low resolution quantized digital image signal of step (a);

(c) forming a high resolution residual digital image signal by taking the difference between said predicted quantized high resolution digital image signal of step (b) and said high resolution digital image signal of step (a);

(d) reducing the number of quantization levels by quantizing said high resolution residual digital image signal of step (c); (e) forming a high resolution difference signal by taking the difference between said high resolution residual digital image signal of step (c) and said reduced line high resolution residual digital image signal of step (d);

(e) decomposing said high resolution difference digital image signal of step (e) to form a digital image signal with the same resolution and number of quantization levels as said low resolution digital image signal of step (a);

(g) combining said low resolution digital image signal of step

VOL
1126
ISS
4
MY
28
1991
UMI

(a) and said low resolution digital image signal of step (f); and

(h) storing and/or transmitting said combined low resolution digital image signal of step (g) and said quantized high resolution digital image of step (d) for future use.

---

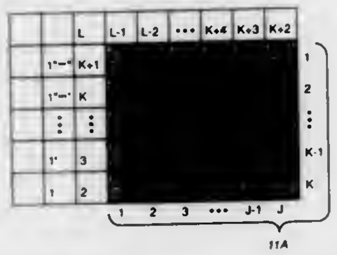
### 5,020,121
### NEIGHBORHOOD BLOCK PREDICTION BIT COMPRESSION

**Charles J. Rosenberg, Hewlett, N.Y., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Aug. 16, 1990, Ser. No. 568,002**

**Int. Cl.$^5$ G06K** *9/36*

**U.S. Cl. 382—56** **22 Claims**



1. A method of compression of data used to describe a collection of ideographic symbols, each represented as a pixel pattern on a block of pixels, the method comprising the steps of:

decomposing the block of pixels for each ideographic symbol into $M \times N$ mutually exclusive, rectangular sub-blocks of pixels, each of size J pixels $\times K$ pixels, where M, N, J and K are positive integers, the sub-blocks being numbered consecutively $s=1, 2, \ldots, S$ beginning at a selected corner of the block and proceeding consecutively row-by-row or column-by-column from the selected corner, where each sub-block is also represented by a unique two-dimensional coordinate (m,n) ($m=1, 2, \ldots, M$; $n=1, 2, \ldots, N$);

for a predetermined integer m1 in the range $1 \leqq m1 \leqq M$ and a predetermined integer n1 in the range $1 \leqq n1 \leqq N$, determining the exact pixel patterns of each of the sub-blocks numbered (m,n) for which $m=m1$ or $n=n1$ or both $m=m1$ and $n=n1$;

for each pixel sub-block with coordinates (m,n) with $1 \leqq m \leqq m1-1$ and $1 \leqq n \leqq n1-1$, determining the pixel values of the Contiguous Pixels in the sub-blocks with coordinates $(m+1,n)$, $(m+1,n+1)$ and $(m,n+1)$ and determining the Statistical Profile of the collection of ideographic symbols and associated Contiguous Pixels for each of these sub-blocks;

for each pixel sub-block with coordinates (m,n) with $1 \leqq m \leqq m1-1$ and $n1+1 \leqq n \leqq N$, determining the pixel values of the Contiguous Pixels in the sub-blocks with coordinates $(m+1,n)$, $(m+1,n-1)$ and $(m,n-1)$ and determining the Statistical Profile of the collection of ideographic symbols and associated Contiguous Pixels for each of these sub-blocks;

for each pixel sub-block with coordinates (m,n) with $m1+1 \leqq m \leqq M$ and $1 \leqq n \leqq n1-1$, determining the pixel values of the Contiguous Pixels in the sub-blocks with coordinates $(m--1,n)$. $(m-1,n+1)$ and $(m,n+1)$ and determining the Statistical Profile of the collection of ideographic symbols and associated Contiguous Pixels for each of these sub-blocks;

for each pixel sub-block with coordinates (m,n) with $m1+1 \leqq m \leqq M$ and $n1+1 \leqq n \leqq N$, determining the pixel values of the Contiguous Pixels in the sub-blocks with coordinates $(m-1,n)$, $(m-1,n-1)$ and $(m.n-1)$ and determining the Statistical Profile of the collection of ideographic symbols and associated Contiguous Pixels for each of these sub-blocks;

for each sub-block numbered $s=1, 2, \ldots, S$ for which a Statistical Profile exists, determining, from the Statistical Profile of Contiguous Pixels, the rth most probable pattern of pixels in that sub-block for each of $r=1, 2, \ldots, R-1$, where R is a selected integer $\leqq 2$, and assigning an index $a_{rs}$ corresponding to the choice of the $r^{th}$ most probable pixel pattern for the sub-block numbered s;

for each sub-block numbered $s=1, 2, \ldots, S$, assigning the index $a_{\bar{r}_s}$, if the predicted pixel pattern corresponding to the index $a_{\bar{r}_s}$ is the correct pattern, and assigning an index $a_{Rs}$ that requires use of the exact pixel pattern for sub-block s, if none of the $R-1$ predicted pixel patterns corresponding to the indices $a_{rs}$ ($r=1, 2, \ldots, R-1$) is the correct pattern, or if the coordinates (m.n) of the sub-block satisfy $m=m1$ or $n=n1$ or both $m=m1$ and $n=n1$; and

associating with each sub-block numbered $s=1, 2, \ldots, S$ the assigned index $a_{\bar{r}_s\ or\ a}{}_{Rs}$, as the case may be, as an ordered pair of numbers $(s, a_{\bar{r}_s})$ or $(s, a_{Rs})$.

---

### 5,020,122
### AUTOMATIC DOCUMENT IMAGE REVISION

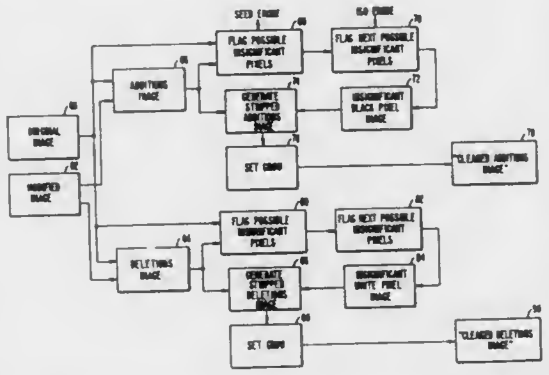
**John M. Walsh, Los Gatos, and David M. Ott, Alameda, both of Calif., assignors to Litton Industrial Automation Systems, Inc., Little Falls, N.J.**

**Continuation of Ser. No. 875,798, Jul. 20, 1987, Pat. No. 4,827,330. This application Mar. 10, 1989, Ser. No. 321,601**

**The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.**

**Int. Cl.$^5$ G06K** *9/36*

**U.S. Cl. 382—56** **5 Claims**


ORIGINAL IMAGE
MODIFIED IMAGE
ADDITIONS IMAGE
FLAG POSSIBLE INSIGNIFICANT PIXELS
FLAG NEXT POSSIBLE INSIGNIFICANT PIXELS
GENERATE STRIPPED ADDITIONS IMAGE
INSIGNIFICANT BLACK PIXEL IMAGE
"CLEANED ADDITIONS IMAGE"
DELETIONS IMAGE
FLAG POSSIBLE INSIGNIFICANT PIXELS
FLAG NEXT POSSIBLE INSIGNIFICANT PIXELS
GENERATE STRIPPED DELETIONS IMAGE
INSIGNIFICANT WHITE PIXEL IMAGE
"CLEANED DELETIONS IMAGE"

1. In a system for electronically capturing and storing images of documents in which stored documents are represented by bit maps identifying black and white pixels of the images, a method of storing entries made on a predetermined standard form document, said standard form document having a representative standard form bit map already stored in the system, comprising the steps of:

forming a binary modified-form bit map representing a modification of said binary stored-form bit map, said modification comprising said entries on said form;

comparing, pixel-by-pixel, said modified-form bit map with the stored-form bit map to determine the differences between said stored-form bit map and said modified-form bit map;

determining, pixel-by-pixel, which of said differences are significant and which are insignificant;

forming a significant-difference bit map representing significant differences between said stored-form bit map and said modified-form bit map; and

storing said significant-difference bit map in memory, whereby said entries are stored in memory separately from said predetermined form.

---

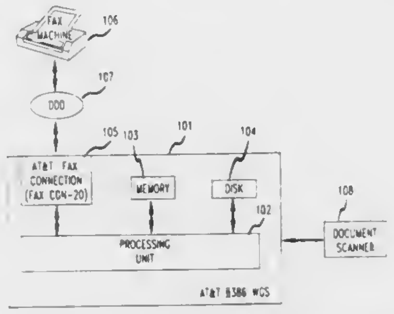
### 5,020,123
### APPARATUS AND METHOD FOR IMAGE AREA IDENTIFICATION

**Timothy J. Thompson, Howell, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 3, 1990, Ser. No. 562,292**

**Int. Cl.$^5$ G06K** *9/20*

**U.S. Cl. 382—61** **16 Claims**



1. A method of searching a scanned image of a predetermined type and determining locations therein comprising the steps of:

a. obtaining a version of said scanned image;

b. obtaining a representation of an ideally registered image of said predetermined type;

c. searching each area of a set of predetermined areas of said scanned image for at least one candidate fiducial marking, said candidate fiducial markings from each of said areas forming a set of candidate fiducial markings;

d. estimating a set of overall image distortion factors for said scanned image, based on a comparison of said candidate fiducial markings with fiducial markings of said representation of said ideally registered image of said predetermined type;

e. determining, which, if any, of said candidate fiducial markings are located more than a predetermined distance away from their expected location;

f. if any of said candidate fiducial markings are located more than said predetermined distance away from their expected location, removing from said set of candidate fiducial markings at least one candidate marking that is located more than said predetermined distance away from its expected location;

g. if any of said candidate fiducial markings were removed from said set of candidate fiducial markings in the immediately preceding step (f) go back to step (d) and repeat steps (d) through (g); and

h. supplying as an output a location for each fiducial marking of said set of candidate fiducial markings and values of said set of image distortion factors for said scanned image.

---

### 5,020,124
### METHOD AND APPARATUS FOR DETECTING DOCUMENT SIZE IN AN IMAGING SYSTEM

**Robert D'Aoust, Detroit, and David C. Williams, Ann Arbor, both of Mich., assignors to Unisys Corporation, Blue Bell, Pa.**

**Filed Oct. 10, 1989, Ser. No. 419,530**

**Int. Cl.$^5$ G06K** *9/20*

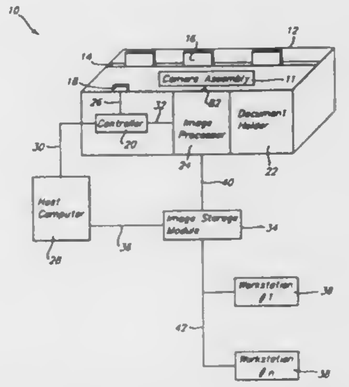
**U.S. Cl. 382—61** **8 Claims**

1. Apparatus for detecting a dimension of a generally rectangular document in a system in which the document is carried over a track to a station where the document is scanned by a sensor to create a digital image thereof, the document being scanned in a given direction over a scan line which includes a portion of the track as well as the document, said apparatus comprising:

means for defining a threshold for discriminating between the track and document image data;

detector means for generating an output in response to a predetermined consecutive number of pixels having values bearing a predetermined relationship to said threshold, said threshold being chosen so that pixel values bearing said predetermined relationship to said threshold should be associated with the track rather than with the document image data;

document presence means for generating an output in response to the presence of a document in the station; and



circuit means for storing pixel position information and providing an output which is related to the dimension of the document in response to outputs from the detector means and document presence means.

---

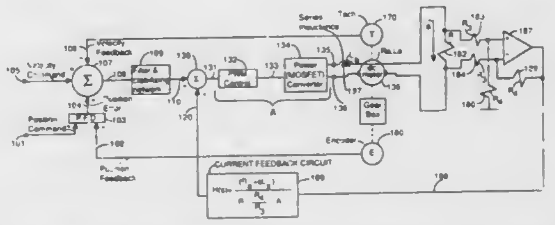
### 5,020,125
### SYNTHESIS OF LOAD-INDEPENDENT DC DRIVE SYSTEM

**Novica A. Losic, 4755-79 St., Kenosha, Wis. 53142, and Ljubomir D. Varga, Deskaseva 6, 11000 Beograd, Yugoslavia**

**Division of Ser. No. 174,148, Nov. 1, 1988, abandoned. This application Nov. 4, 1988, Ser. No. 323,630**

**Int. Cl.$^5$ H02P** *7/00*

**U.S. Cl. 388—811** **3 Claims**



1. A method for synthesizing load independent direct current drive system comprising:

accepting a source of electrical energy of a constant direct current voltage at an input,

coupling mechanically a direct current motor shaft to a load to be driven at an output,

controlling a power flow from said input to said output,

periodically enabling a power semiconductor switch in a power converter for the control of said power flow in a pulse width modulation manner,

supplying a resultant control voltage signal for periodically enabling said power semiconductor switch,

supplying a position feedback pulse train signal,

feeding back the position feedback pulse train and comparing its frequency and phase with frequency and phase of a position command pulse train in a phase frequency detector in a negative feedback manner; thereby producing a position error voltage signal proportional to a difference in frequency and phase between the two pulse trains,

supplying a velocity feedback voltage signal,

feeding back the velocity feedback signal and comparing it with a sum of a velocity command voltage and the position error signal in a summing circuit in a negative feedback manner; thereby producing an algebraic sum of the

VOL 126
SS 4
MY 28
1991
UMI

velocity feedback signal and the velocity command and the position error signal,

passing a signal obtained as said algebraic sum of three signals through a filtering and stabilizing network; thereby producing an error voltage signal proportional to said algebraic sum of the velocity feedback signal and the velocity command and the position error signal,

sensing a current through a direct current motor armature,

feeding back the sensed current signal through a current feedback circuit of a proportional and derivative function is a positive feedback loop with respect to said error voltage signal and summing the sensed current signal with said error voltage signal,

supplying said resultant control voltage signal, obtained as the sum of said error voltage signal and the current signal fed through said current feedback circuit, for periodically enabling said power semiconductor switch to control the flow of power from the input electrical source to the output mechanical load, whereby the direct current motor shaft position and velocity is made independent of said load.

---

### 5,020,126

## METHOD AND CIRCUIT FOR THE AUTOMATIC CONTROL OF THE SPEED OF A DC MOTOR BY THE CONTROL VOLTAGE OF THE MOTOR

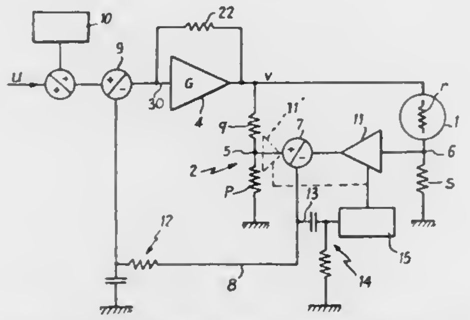
**Rémy Tabourier, L'Hay les Roses, France, assignor to Thomson-CSF, Puteaux, France**

**Filed Jan. 23, 1990, Ser. No. 469,046**

**Claims priority, application France, Jan. 27, 1989, 89 01008**

**Int. Cl.$^5$ H02P *5/00***

**U.S. Cl. 388—815** **4 Claims**



1. A method for automatically controlling a speed of a DC motor by a control voltage, wherein an armature of the DC motor is mounted in a bridge circuit and an input of a circuit for amplifying an input signal to the bridge circuit receives the control voltage and an automatic control signal corresponding to a difference between an intensity feedback signal and a voltage feedback signal picked up at first and second measuring terminals of the bridge circuit, the method comprising the steps of:

summing an AC voltage having a frequency greater than a cut-off frequency of the motor with said control voltage, said AC voltage generating an AC component of the automatic control signal representing a disequilibrium of the bridge due to a variation of the armature resistance; and

utilizing this AC component as a source of a control signal for a gain of an amplifier with an adjustable gain which amplifies an intensity feedback present at a first terminal of the bridge circuit, or a voltage feedback present at a second terminal of the bridge circuit.

---

### 5,020,127

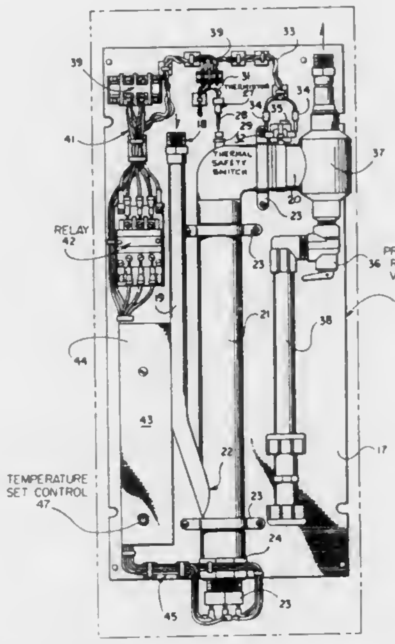
## TANKLESS ELECTRIC WATER HEATER

**Harry Eddas, Chattanooga, Tenn., and David O. Hanon, Ringgold, Ga., assignors to Energy Saving Products of Tennesse, Inc., McKenzie, Tenn.**

**Continuation of Ser. No. 112,098, Oct. 23, 1987, abandoned. This application Jan. 22, 1990, Ser. No. 465,638**

**Int. Cl.$^5$ H05B *1/02;* F24H *1/10***

**U.S. Cl. 392—488** **6 Claims**



1. An instantaneous fluid heater comprising:

a fluid heating chamber having a fluid inlet and a discharge end, a discharge chamber coupled to said discharge end, said fluid inlet and said discharge chamber being positioned such that incoming fluid under pressure flows through said chamber from said fluid inlet to said discharge chamber;

a plurality of electrical heating elements mounted within said chamber in a position for heating said fluids as it flows through said chamber;

a plurality of solid state switches, each independently controlling the supply of electrical power to a separate one of said heating elements;

a plurality of zero crossing trigger devices coupled respectively to a separate one of said solid state switches for gating said solid state switches to supply power to said heating elements;

sensor means at the discharge end of said chamber for sensing the temperature of the fluid flowing out of said chamber and for providing a control potential corresponding to the degree of need for heating energy to each of the respective ones of said trigger devices;

means for providing a ramp signal potential to each of the respective ones of said zero crossing trigger devices;

means for superimposing a different, fixed potential to each of said ramp signal potentials whereby said ramp signal potentials provided to each of said respective ones of said zero crossing trigger devices are offset by a different, fixed potential;

each of said zero crossing trigger devices including means for comparing said control potential and said ramp signal potential and causing said respective zero crossing trigger devices to selectively gate said solid state switches to energize said heating elements in response to the comparison of said potentials.

---

### 5,020,128

## TUBULAR SHEATHED ELECTRIC HEATER WITH AN OVERHEAT SAFETY DEVICE

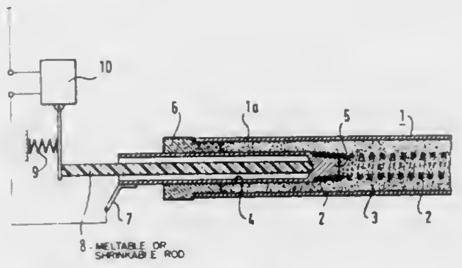
**Ingo Bleckmann, Ignaz-Rieder-Kai 11, A-5020 Salzburg, Austria**

**Filed Nov. 30, 1988, Ser. No. 278,114**

**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1987, 8715851[U]**

**Int. Cl.$^5$ H05B *1/02, 3/82;* H01H *37/32***

**U.S. Cl. 392—498** **2 Claims**



1. A tubular heater comprising:

a tubular sheath,

an electric heater coil enclosed within said tubular sheath,

a cavity within said tubular sheath,

a safety device for turning off power to said electric heater coil of said tubular heater when the tubular heater overheats,

said safety device including an electrically conductive tube in said cavity having said electric heater coil electrically connected to one end of said tube and extending away from said tube through said tubular sheath, a rod-shaped member made of a material which is thermally deformable at a certain temperature, said rod-shaped member being located in said tube and extending from said one end of said tube along a length of said tube and said rod-shaped member projecting from an open end of said tube, a normally closed switching arrangement located externally of said tubular sheath and connected in series with said tube and arranged to be actuated by movement of said rod-shaped member projecting from the open end of the tube due to the rod-shaped member undergoing deformation at the certain temperature so that the rod-shaped member acts upon said switching arrangement to turn off said heater coil of said tubular heater, said rod-shaped member in said tube being affected by excessive temperatures of said heater coil.

---

### 5,020,129

## ADDRESSABLE CONTROL SYSTEM FOR CATV PROGRAM DISTRIBUTION

**Thomas F. Martin, Richardson; John S. Chenoweth, Denton, and Paul R. Tinguely, Bedford, all of Tex., assignors to General Instrument Corporation, New York, N.Y.**

**Filed Apr. 16, 1990, Ser. No. 510,287**

**Int. Cl.$^5$ H04H *1/02;* H04N *7/16***

**U.S. Cl. 455—4** **39 Claims**

1. Cable television apparatus for supplying or denying subscriber access to cable services comprising:

a signal path for carrying cable service signals to an addressable subscriber module;

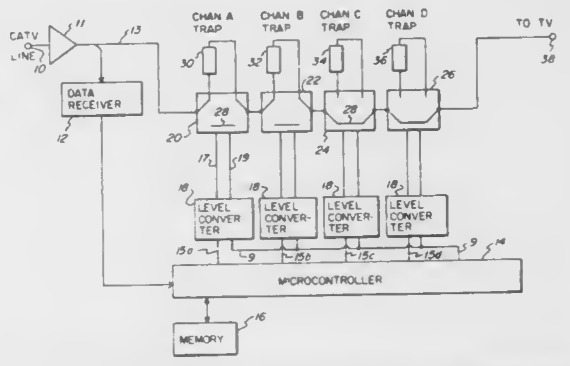
an access device contained in said subscriber module and coupled to selectively provide access to signals of a particular frequency carried on said signal path;

means operatively associated with said subscriber module for associating said access device with a logical channel designation;

means operatively associated with said subscriber module for receiving and storing a first service code for association with said logical channel;

means responsive to a communication addressed to said subscriber module for receiving and storing a set of authorized service codes for the module;

means for retrieving and comparing the stored first service code to the stored authorized service codes; and



means responsive to said comparing means for actuating said access device to provide access to a signal carried at said particular frequency if the first service code is an authorized service code.

---

### 5,020,130

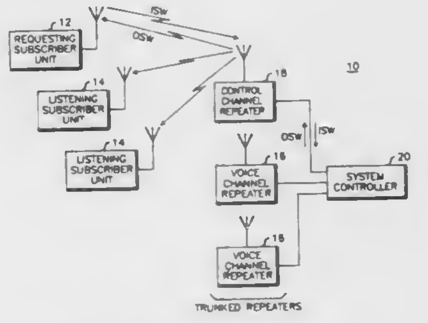
## UNIVERSAL FREQUENCY ASSIGNMENT PROTOCOL FOR TRUNKED RADIO SYSTEMS

**Gary W. Grube, Palatine, Ill.; Timotby A. Monahan-Mitchell, Deerfield Beach, Fla., and Kenneth J. Zdunek, Schaumburg, Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 2, 1988, Ser. No. 163,359**

**Int. Cl.$^5$ H04B *1/60, 7/00***

**U.S. Cl. 455—9** **12 Claims**



1. In a communication system having:

a plurality of subscriber units;

a system controller for assigning transmit and receive communication frequencies for use by at least some of said plurality of subscriber units, wherein said system controller transmits identifying information to at least some of said subscriber units, said identifying information is used by at least some of said subscriber units to determine assigned transmit and receive communication frequencies, an improvement comprising:

said at least one system controller being constructed and arranged to send said identifying information, wherein said identifying information for said transmit communication frequency is included in a first word, and said identifying information for said received communication frequency is included in a second word; and

at least some of said subscriber units are constructed and arranged to separately process said identifying information to separately determine said assigned transmit and receive communication frequencies.

VOL
1126
ISS
4
MY
28
1991
UMI

### 5,020,131
### TRANSPONDER FREQUENCY OFFSET COMPENSATION WITH RECURRENTLY ASSIGNED UNIQUE WORDS

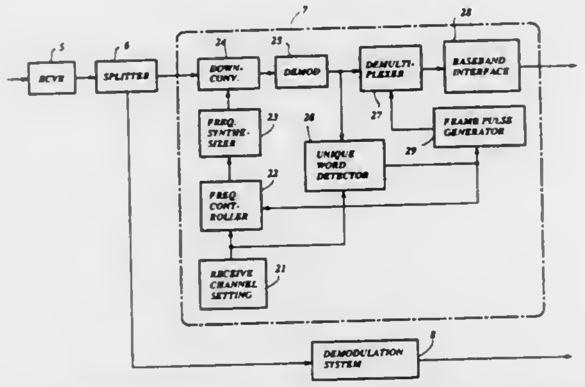
**Yasuhito Isoe, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Jan. 10, 1989, Ser. No. 295,276**

**Claims priority, application Japan, Jan. 11, 1988, 63-4132**

**Int. Cl.$^5$ H04B** *7/14*

U.S. Cl. 455—10 2 Claims



1. A single-channel-per-carrier satellite communications system having a source earth station and a destination earth station for establishing a plurality of satellite channels therebetween through a satellite transponder having a local oscillator used in common by said satellite channels for translation from up link frequencies to corresponding down link frequencies, said source earth station comprising a plurality of modulation systems corresponding respectively to said satellite channels, said destination earth station comprising a plurality of demodulation systems corresponding respectively to said satellite channels, said satellite communications systems comprising:

said modulation systems being divided into a plurality of groups corresponding respectively to a plurality of groups of said satellite channels, and said demodulation systems being likewise divided into a plurality of groups corresponding respectively to said groups of said satellite channels, the satellite channels of each group being covered by a range of frequency drifts caused by said satellite transponder, and a unique word being assigned to each modulation system and to each corresponding demodulation systems being exclusively unique in each group, the unique words assigned to each group being identical to those assigned to the other groups, each of said modulation systems transmitting the assigned unique word on a modulated up link carrier to said satellite transponder, each of said demodulation systems comprising;

demodulator means for demodulating a modulated down link carrier received from said transponder with a variable frequency carrier to produce a demodulator output;

unique word detector means for detecting whether said demodulator output contains a unique word assigned to the demodulation system;

variable frequency generator means responsive to said unique word detector means for generating a local carrier which varies in frequency continuously when said assigned unique word is not detected by said unique word detector means and assumes a constant frequency value which is assigned to the demodulation system when said assigned unique word is detected and applying said local carrier to said demodulator means as said variable frequency carrier; and

means for establishing frame start timing in response to the detection of said assigned unique word by said unique word detectors means.

---

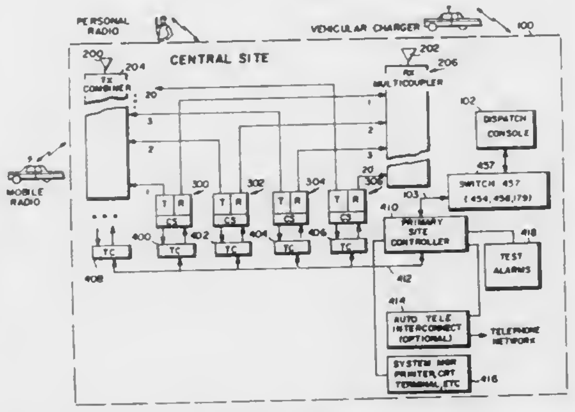
### 5,020,132
### PROCESSOR-TO-PROCESSOR COMMUNICATIONS PROTOCOL FOR A PUBLIC SERVICE TRUNKING SYSTEM

**Dimitri M. Nazarenk; Houston H. Hughes, III; Robert T. Gordon; David L. Hattey, and Bruno Yurman, all of Lynchburg, Va., assignors to Ericsson Ge Mobile Communications Inc., Lynchburg, Va.**

**Division of Ser. No. 85,572, Aug. 14, 1987, Pat. No. 4,835,731. This application Mar. 6, 1989, Ser. No. 365,810**

**Int. Cl.$^5$ H04B** *7/14;* **H04K** *11/00*

U.S. Cl. 455—17 7 Claims



1. In a trunked radio repeater system having an architecture of a site controller communicating with RF repeater means and a downlink trunking card module, said RF repeater means and downlink trunking card module each having control functions and being capable of communicating with each other independently of the site controller, a method of communicating digital signals over a downlink between said site controller located at an RF repeater site and a processor located remotely from said site, said RF repeater site including a plurality of said RF repeater means for communicating digital control signals with mobile radio units over RF channels using a predefined digital signalling protocol, said method comprising the steps of:

(1) communicating digital signals in a first predefined protocol between said site controller and said downlink trunking card module over a first serial data link;

(2) translating said first protocol digital signals between said first protocol and a second predefined protocol with said downlink trunking card module;

(3) communicating said digital signals in said second protocol between said downlink trunking card module and a switch trunking card module located remotely from said site over a second serial data link;

(4) translating said second protocol digital signals between said second protocol and a third predefined protocol with said switch trunking card module; and

(5) communicating said third protocol digital signals between said switch trunking card module and said processor over a third serial data link,

wherein said first and second protocols are different from one another, and said second protocol is substantially identical to the signalling protocol used to communicate digital control signals between said repeater means and said mobile radio units over said RF channels.

---

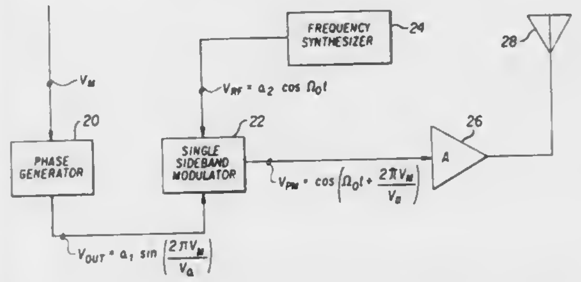
### 5,020,133
### PHASE/FREQUENCY MODULATOR

**Dieter R. Lohrmann, Lanham, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jun. 21, 1989, Ser. No. 369,398**

**Int. Cl.$^5$ H04B** *1/00*

U.S. Cl. 455—43 8 Claims


FREQUENCY SYNTHESIZER
24
28
$V_M$
$V_{RF} = a_2 \cos \Omega_0 t$
20
PHASE GENERATOR
22
SINGLE SIDEBAND MODULATOR
26
A
$V_{PM} = \cos\left(\Omega_0 t + \frac{2\pi V_M}{V_a}\right)$
$V_{OUT} = a_1 \sin\left(\frac{2\pi V_M}{V_a}\right)$

1. Signal modulation apparatus for modulating an r. f. carrier signal, comprising:

a first phase generator, connected to receive a first varying voltage signal, for generating an output signal having a phase proportional to the amplitude of the first varying signal, wherein the first phase generator comprises

a plurality of amplifiers for generating amplifier output voltages which are switched between two voltage levels in accordance with the first varying signal and a like plurality of fixed voltages supplied respectively to the amplifiers, each amplifier output voltage being switched to one voltage level whenever the first varying signal rises above the fixed voltage supplied to the amplifier and each amplifier being switched to the other voltage level whenever the first varying voltage falls below the fixed voltage supplied to the amplifier,

fixed voltage generating means for generating the fixed voltages supplied respectively to the amplifiers, and

summing means for summing the amplifier output voltages to generate the phase generator output signal, wherein the amplifiers are connected to receive the first varying signal and the respective fixed voltages and to supply the amplifier output voltages to the summing means as alternately arranged inversion and non-inversion amplifiers so that, in each pair of amplifiers receiving adjacent fixed voltages, one amplifier is connected as an inversion amplifier and the other amplifier is connected as a non-inversion amplifier; and

modulating means, connected to receive the r. f. carrier signal and the output signal of the first phase generator, for combining the received signals to produce a modulated carrier signal having a phase proportional to the amplitude of the first varying signal.

---

### 5,020,134
### CATV SIGNAL DISTRIBUTION SYSTEM AND LOCAL STATUS MONITOR THEREFOR

**Steven C. Pecaut, 22721 Bella Rita Cir., Boca Raton, Fla. 33433**

**Filed May 19, 1989, Ser. No. 354,205**

**Int. Cl.$^5$ H04B** *12/00*

U.S. Cl. 455—67 4 Claims

1. A signal amplifier status monitor comprising:

(a) means for detecting the variance of output signals from an amplifier beyond a prescribed range of operating parameters including means for comparing the strength of said output signals from said amplifier to a predetermined strength, said means for comparing comprising:

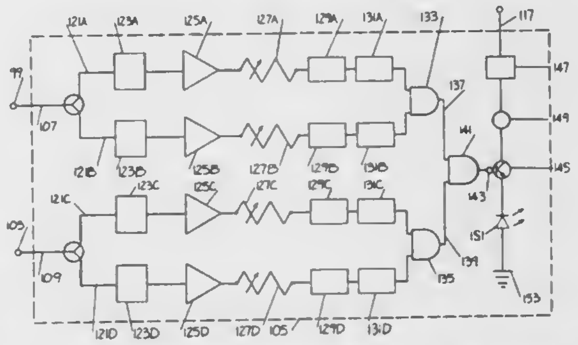
an AC-to-DC converter whereby the AC output signals from said amplifier are converted to a DC signal of varying voltage, said voltage proportional to the signal strength of said AC output signals;

means for discriminatingly passing preselected bandwidths of said output signals from said amplifier to said AC-to-DC converter;

a voltage comparator where said voltage of said DC signal from said AC-to-DC converter is compared to a predetermined voltage level with the result that the higher of the voltages compared will be output from said voltage comparator;

(b) means, responsive to said means for detecting, for generating a control signal in response to said variance;

(c) means, responsive to said control signals, for alerting a locally present service person that output signals from said amplifier have varied beyond the prescribed range of operating parameters, where said means for alerting a service person are chosen from a group consisting of aurally-detectable signals and visually-detectable signals;



(d) a switch, connecting electrical power to said means for alerting a service person, thereby activating said means for alerting a service person, said switch selectively operational in response to said control signals; and

(e) means for variably alternating said output signals from said amplifier after said output signals from said amplifier have been discriminatingly passed through said means for discriminatingly passing preselected bandwidths of said output signals from said amplifier to said AC-to-DC converter.

---

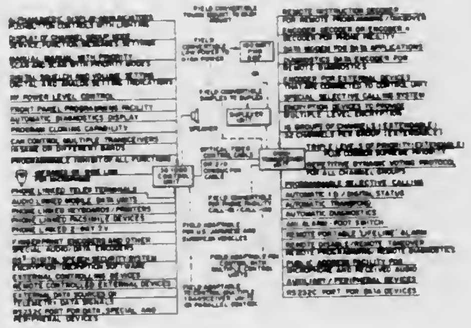
### 5,020,135
### COMPUTERIZED MULTISTANDARD, FIELD-CONVERTIBLE, MULTIREGIONAL/MULTISERVICE, REMOTE CONTROLLABLE, REMOTE PROGRAMMABLE MOBILE TWO-WAY RADIO SYSTEM WITH DIGITAL SERIAL BUS LINK, BUILT-IN PROGRAMMER AND AUTODIAGNOSTICS

**Kaspar Kasparian; John D. Ide; Thomas A. Brown, all of Raleigh; Aaron S. Rogers, Knightdale; John P. Fussell, and Ming C. Hsu, both of Raleigh, all of N.C., assignors to Teletec Corporation, Raleigh, N.C.**

**Filed Mar. 27, 1987, Ser. No. 30,743**

**Int. Cl.$^5$ H04B** *1/40*

U.S. Cl. 455—76 55 Claims



1. A multipurpose two-way radio comprising:

VOL
1126
ISS
4
MY
28
1991
UMI

(a) a Control Unit, said Control Unit having a first microprocessor, and a multiplexer for serializing digitized signals including digitized audio and a demultiplexer for deserializing digitized signals including digitized audio;
(b) a Transceiver Unit having a second microprocessor, radio function modules and a multiplexer for serializing digitized signals including digitized audio and a demultiplexer for deserializing digitized signals including digitized audio;
(c) programmable software for imparting versatility to said radio, said programmable software operating at least said first or said second microprocessor;
(d) a multiplexed full duplex serial interface providing two-way communications for digital signals including said digitized audio between said Control Unit and said Transceiver Unit; and
(e) means for transmitting and receiving said digitized signals including digitized audio over said multiplexed full duplex serial interface.

---

### 5,020,136

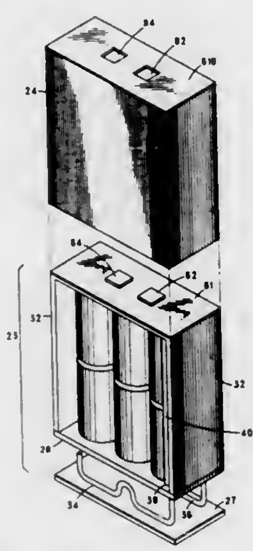
### BATTERY PACK ANTENNA SUITABLE FOR USE WITH TWO-WAY PORTABLE TRANSCEIVERS

**Stelios J. Patsiokas, Hollywood; Oscar M. Garay, North Lauderdale, and Quirino Balzano, Plantation, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 854,218, Apr. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 596,800, Apr. 4, 1984, abandoned. This application Jan. 18, 1990, Ser. No. 465,571**

**Int. Cl.$^5$ H04B** *1/08*

**U.S. Cl. 455—89** **14 Claims**



1. A battery pack/antenna, comprising:
an antenna for radiating energy;
at least one energy storage means for providing a ground plane for said antenna; and
an insulative housing containing at least said at least one energy storage means.

---

### 5,020,137

### CASE-MOUNTED RECEIVER WITH ANTENNA

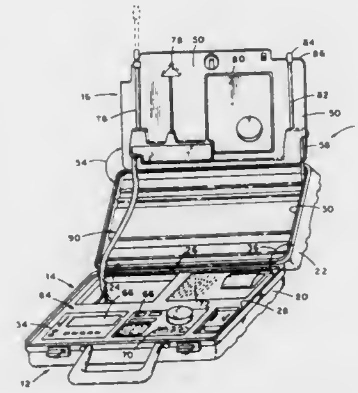
**Bruce R. Barsumian, 890 Dago Rd., Cookeville, Tenn. 38501**

**Filed Jan. 23, 1990, Ser. No. 468,647**

**Int. Cl.$^5$ H04B** *1/08*

**U.S. Cl. 455—90** **8 Claims**

1. A receiver assembly comprising:
a carrying case having first and second side portions which are hingedly joined to one another along adjacent edges for movement between opened and closed conditions, the first of the case side portions providing a receptacle having an opening which is covered by the second side portion when the first and second side portions are in the closed condition, said second side portion having one edge which is hingedly joined to said first side portion and an edge opposite said one edge, said one edge and said opposite edge of said second side portion being substantially parallel to one another;
the case further including a carrier board having an edge which is hingedly joined to said second side portion along said opposite edge thereof for hinged movement between a condition of non-use at which the board and second side portion are positioned together in a compact arrangement and the carrier board fits within the case defined by the first and second side portions when the case is closed and a condition of use at which the board extends outwardly form said second side portion which is about equal to the distance between said one edge and said opposite edge of said second side portion;



a receiver mounted within the receptacle of the first case side portion so that when the first and second side portions are in the opened condition, the receiver is exposed for use; and
antenna means operatively connected to the receiver for detecting signals for transmission to the receiver and being supportedly attached to the carrier board for movement therewith as the board is moved between its conditions of use and non-use so that when the first and second case side portions are in the opened condition and the carrier board is positioned in its condition of use, the antenna means are spaced from the receiver by a distance which is at least as great as the distance between said one edge and said opposite edge of said second side portion.

---

### 5,020,138

### RADIO COMMUNICATION APPARATUS HAVING COOLING MEANS

**Hiroshi Yasuda; Satoshi Yokoya, and Nobutaka Takao, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

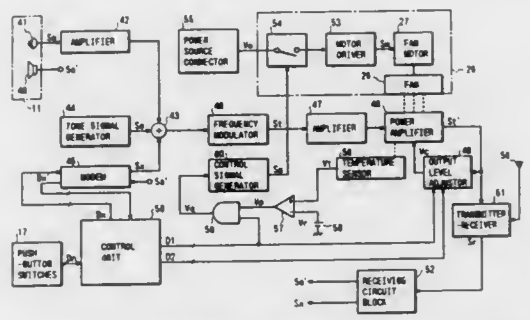
**Filed Mar. 28, 1990, Ser. No. 500,507**

**Claims priority, application Japan, Apr. 3, 1989, 1-84374**

**Int. Cl.$^5$ H04B** *1/04, 17/00;* **H05K** *7/20*

**U.S. Cl. 455—115** **19 Claims**

1. A radio communication apparatus comprising:
modulating means for modulating a carrier with a signal to be transmitted so as to produce a transmissible signal,
signal transmitting means for causing the transmissible signal to be subjected to power amplification and then for transmitting the transmissible signal after the transmissible signal was subjected to power amplification,
cooling means for forcibly cooling a heat source contained in said signal transmitting means,
condition detecting means for detecting at least one of a temperature condition of said signal transmitting means and an operating condition of said signal transmitting means, and
operation control means operative to cause said cooling means to be in operation when at least one of a particular temperature condition in which the temperature of said signal transmitting means has exceeded a predetermined value and a particular operating condition in which said signal transmitting means is detected by said condition detecting means to be in a predetermined state.



---

### 5,020,139

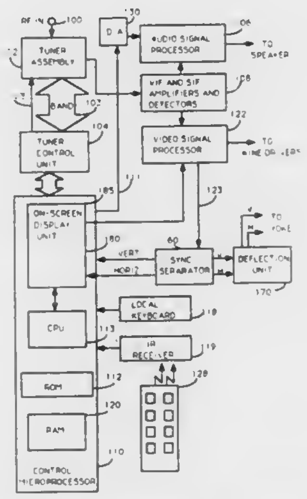
### THREE DIGIT CHANNEL ENTRY BY USE OF AN EXTENDED KEYPRESS

**Douglas M. Keenan, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Mar. 5, 1990, Ser. No. 489,392**

**Int. Cl.$^5$ H04N** *5/44;* **H04B** *11/00*

**U.S. Cl. 455—151** **8 Claims**



1. Data entry apparatus, comprising:
keyboard means including a plurality of keys for generating at an output keycodes corresponding to individual ones of said keys when said keys are activated by a user;
control means coupled to said keyboard means for receiving said keycodes and for generating a control signal in response thereto;
said control means operating in a first mode to generate said control signal upon receiving the second of two of said keycodes consecutively generated by said keyboard means, and operating in a second mode to generate said control signal upon receiving the third of three of said keycodes consecutively generated by said keyboard means;
said control means timing an interval during which the first keycode is present at said output of said keyboard when said first group of data corresponds to a predetermined value, said control means operating in said second mode when said interval exceeds a predetermined time period, and operating in said first mode when said interval does not exceed said predetermined time period.

---

### 5,020,140

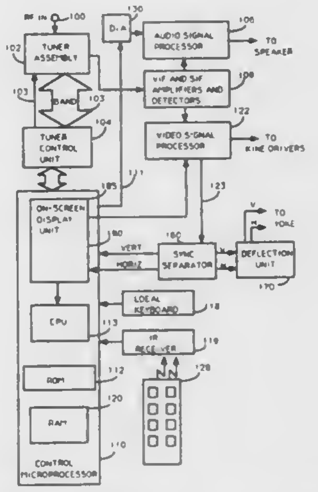
### THREE DIGIT CHANNEL ENTRY SYSTEM

**John F. Teskey, Greenfield, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Mar. 5, 1990, Ser. No. 489,391**

**Int. Cl.$^5$ H04N** *5/44;* **H04B** *11/00*

**U.S. Cl. 455—151** **9 Claims**



1. Channel selection apparatus for a television receiver, comprising:
keyboard means including a plurality of keys for generating digits of two and three digit channel numbers when said keys are activated by a user;
control means coupled to said keyboard means for receiving said digits and for generating a tuning control signal in response thereto;
said control means operating in a first mode to generate said tuning control signal upon receiving the second digit of one of said two digit channel numbers, and operating in a second mode to generate said tuning control signal upon receiving the third digit of one of said three digit channel numbers;
said control means detecting the generation of one of a two digit invalid channel number and a two digit unused channel number, and operating in said second mode in response thereto.

---

### 5,020,141

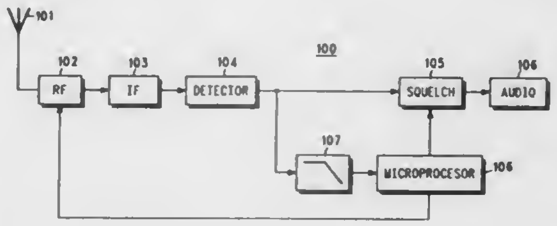
### ADAPTIVE IDENTIFYING SIGNAL DETECTOR

**William R. Meszko, Fort Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 103,785, Oct. 2, 1987, abandoned. This application Nov. 3, 1989, Ser. No. 432,334**

**Int. Cl.$^5$ H04B** *1/10, 1/16*

**U.S. Cl. 455—166** **6 Claims**



1. In a radio receiver having:

VOL
1126
ISS
4
MY
28
1991
UMI

receiver means for receiving, on any of a plurality of channels, radio frequency signals including an information signal, wherein some of said radio frequency signals also include squelch control signal;

channel selection means for selecting which of said plurality of channels will be received;

first detector means for detecting presence of a particular one of said squelch control signals within a first period of time;

squelch means for selectively rendering said information signal audible and inaudible; and channel scanning means for causing:

said channel selector means to select a particular channel;

said channel selection means to retain said particular channel when said

first detector means detects said particular one of said squelch control signals; and

said squelch means to render said information signal audible, an improvement comprising:

second detector means for detecting presence of said particular one of said squelch control signals within a second period of time, wherein said second period of time is less than said first period of time; and

control means for controlling which of said detector means is used to detect said particular one of said squelch control signals, such that said channel scanning means will cause said channel selection means to retain said particular channel and will cause said squelch means to render said information signal audible when either of said first and second detector means, as controlled by said control means, detects said particular one of said squelch control signals.

---

### 5,020,142
### AUTOMATIC SCANNING TUNER

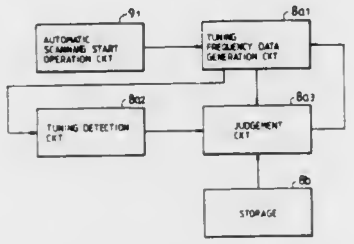
**Shinichi Shirasaka, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Apr. 14, 1989, Ser. No. 338,076**

**Claims priority, application Japan, Oct. 18, 1988, 63-260597**

**Int. Cl.$^5$ H03J *7/18***

**U.S. Cl. 455—166** **9 Claims**


91
8a1
AUTOMATIC SCANNING START OPERATION CKT
TUNING FREQUENCY DATA GENERATION CKT
8a2
8a3
TUNING DETECTION CKT
JUDGEMENT CKT
8b
STORAGE

1. An automatic scanning tuner comprising:

automatic scanning start operation means for initiating automatic scanning;

tuning frequency data generation means for shifting tuning frequency data in accordance with an operation of said automatic scanning start operation means to change a tuning frequency of said tuner;

tuning detection means for detecting whether tuning has been performed to said tuning frequency, based on said tuning frequency data from said tuning frequency data generation means;

storage means for indefinitely storing preset tuning frequencies in advance;

comparison means for comparing data corresponding to said tuning frequency data with said preset tuning frequencies each time said automatic scanning operation means is initiated; and

judgment means responsive to said comparison means for judging whether said data corresponding to said tuning frequency data is stored in said storage means;

wherein, when said tuning detection means detects a tuned state, the changing operation of the tuning frequency by said tuning frequency data generating means is continued when said judgment means judges that said data corresponding to said tuning frequency data is stored in said storage means.

---

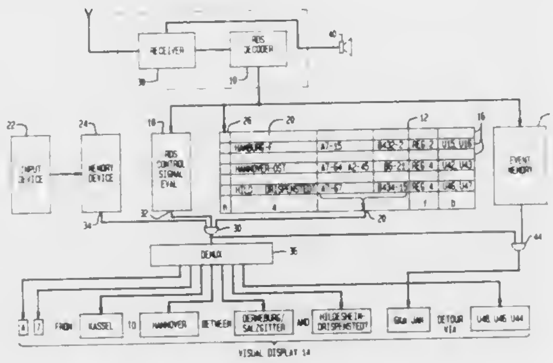
### 5,020,143
### VEHICULAR RADIO RECEIVER WITH STORED DETOUR DATA

**Ralf Duckeck, and Peter Brägas, both of Hildesheim, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Dec. 29, 1989, Ser. No. 459,147**

**Int. Cl.$^5$ H04B *1/06;* G08G *1/09***

**U.S. Cl. 455—186** **9 Claims**



1. A vehicular radio receiver, having

a decoder (10) which decodes traffic announcements, received in encoded form in a data packet and generates a digital output signal including data characteristic of route segments to which an announcement pertains and a control bit indicating whether or not each announcement includes a detour recommendation,

a memory device (12), having an address input (26) and a data output (28), and a plurality of memory fields (16), each field containing a detour recommendation and at least one route-specific characteristic, said address input (26) being connected to an output of said decoder (10);

means (14), connected (30,36) to said data output (28) of said memory device (12), for reading traffic announcement information out of a field of said memory device (12) and indicating it to a vehicle operator by at least one of visual and acoustical indications, and

an evaluation circuit (18), having an input connected to an output of said decoder (10) and a control output (32) connected to an input of said indicating means (14), and controlling said indicating means (14) in accordance with said bit to selectively indicate or suppress said detour recommendation read out of said memory (12).

---

### 5,020,144
### RADIO COMPONENT REPLACEMENT/PROGRAMMING DEVICE

**Thomas F. Shirley, Jr., Fort Worth, and Jack B. Butler, Bedford, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 30, 1988, Ser. No. 175,361**

**Int. Cl.$^5$ H04B *1/16***

**U.S. Cl. 455—186** **16 Claims**

1. A device for programming a radio, which radio includes:

at least one replaceable hardware element that supports operation of said radio;

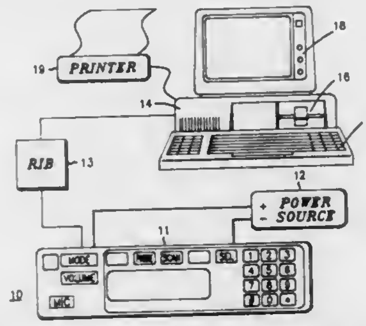
memory means for storing at least some radio control parameters;

computer means for controlling at least some radio control functions in response to said radio control parameters;

said device comprising:

A) coupling means for coupling to said memory means; and

B) means for connecting to said coupling means and for storing said radio control parameters in said memory means in a particular predefined order when programming said radio subsequent to replacing said at least one



replaceable hardware element wherein said means includes:

i) input means for receiving input from an operator; and

ii) display means for displaying both operator-only and device-assisted steps for replacing said replaceable hardware element.

---

### 5,020,145
### AM/FM BAND SELECTOR

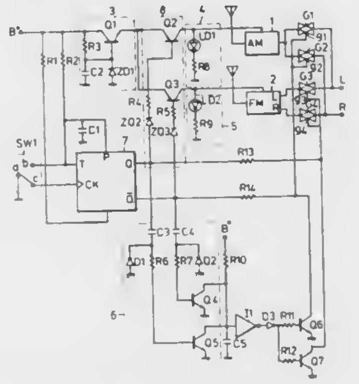
**Yong P. Hong, Icheon-2dong, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea**

**Filed Dec. 29, 1987, Ser. No. 138,950**

**Claims priority, application Rep. of Korea, Dec. 29, 1986, 21526/1986**

**Int. Cl.$^5$ H04B *1/16***

**U.S. Cl. 455—188** **14 Claims**



1. An AM/FM band selector comprising:

power supply means for supplying constant power from a power source;

a first switch for developing an AM source signal and an FM source signal;

switch means, operatively connected to said power supply means and said first switch, for supplying said constant power to either an AM receiver or an FM receiver according to said AM and FM source signals developed by said first switch;

pulse positive polarity edge detector means, operatively connected to said first switch, for instantaneously discharging a voltage of a first capacitor when said AM and FM source signals are toggled to produce a control signal; and

a plurality of analog switches, operatively connected to said pulse positive polarity edge detector means, for controlling transmission of signals from said AM and FM receivers to an audio output device;

said analog switches selecting signals from either said AM receiver or said FM receiver to be transmitted to the audio output device in response to said control signal such that said analog switches eliminate impulse noise from being transmitted to the audio output device when selecting between an AM or FM band.

---

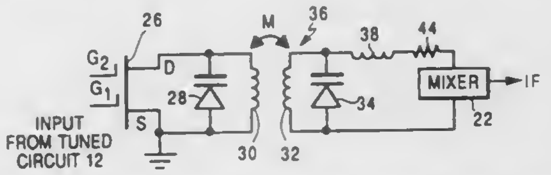
### 5,020,146
### LOSSY CONSTANT BANDWIDTH TUNED CIRCUIT

**Michael A. Pugel, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Apr. 17, 1989, Ser. No. 338,703**

**Int. Cl.$^5$ H04B *1/16;* H04N *5/50***

**U.S. Cl. 455—195** **8 Claims**



8. In a television tuner, a constant bandwidth tuned circuit comprising:

a tank circuit comprising a capacitor means coupled in parallel with a first inductance for resonating at a predetermined frequency,

a second inductance coupled in series with the first inductance, the second inductance being a constant bandwidth inductance, and

a resistance coupled in series with the second inductance, said resistance and a subsequent load comprising a total load for the tank circuit,

the value of the second inductance being selected for providing constant bandwidth signal transfer with increasing frequency between tank circuit and the subsequent load, the value of the resistance being selected for adjusting the amplitude of the signal fed to the subsequent load with increasing frequency.

---

### 5,020,147
### FM/AM BROADCAST SIGNAL CONVERTER

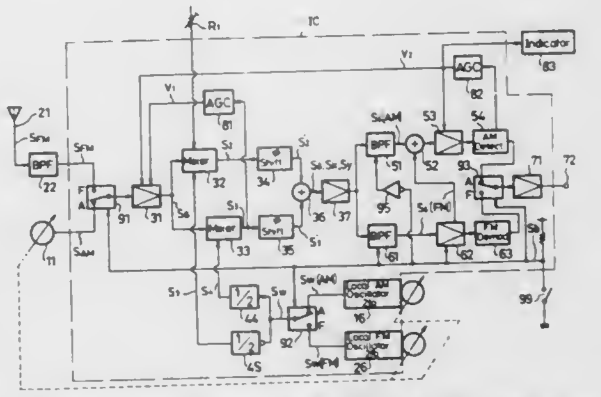
**Taiwa Okanobu, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Apr. 10, 1989, Ser. No. 335,498**

**Claims priority, application Japan, Apr. 26, 1988, 63-103345**

**Int. Cl.$^5$ H04B *1/16***

**U.S. Cl. 455—302** **25 Claims**



1. Apparatus for converting an FM broadcast signal to an intermediate frequency signal from which modulating information may be recovered, comprising:

receiving means for receiving the FM broadcast signal;

first and second mixing means for mixing the received FM

VOL
126
SS
4
MY
28
1991
UMI

broadcast signal with first and second local oscillating signals, respectively;

local oscillation means for generating said first and second local oscillating signals exhibiting a predetermined phase shift relative to each other and for supplying said first and second local oscillating signals to said first and second mixing means, respectively, said local oscillating signals being of a frequency such that said mixing means produce output signals in an intermediate frequency range of approximately two orders of magnitude less than the intermediate frequency normally produced from said received FM broadcast signal;

phase shift means coupled to said first and second mixing means for imparting predetermined phase shifts to said output signals produced by said mixing means such that image signal components present in respective ones of said produced output signals are phase shifted to be out-of-phase with each other;

combining means coupled to said phase shift means for combining said phase shifted output signals, whereby the out-of-phase image signal components are substantially cancelled; and

filter means coupled to said combining means and tuned to the intermediate frequency which is approximately two orders of magnitude less than the normal intermediate frequency for passing said output signals produced by said mixing means having frequencies within a predetermined range of said intermediate frequency which is approximately two orders of magnitude less than the normal intermediate frequency.

---

**5,020,148**

### IMAGE SUPPRESSION HARMONIC FREQUENCY CONVERTER OPERATING IN THE MICROWAVE FIELD

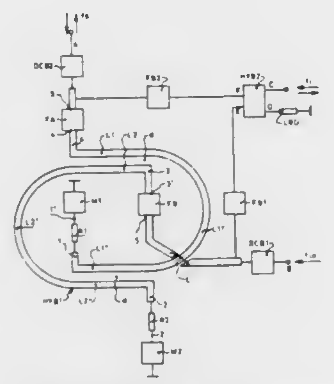
**Paolo Bonato, Milan, Italy, assignor to Siemens Telecommunicazioni S.p.A., Milan, Italy**

**Filed Dec. 22, 1988, Ser. No. 289,070**

**Claims priority, application Italy, Dec. 24, 1987, 23219**

**Int. Cl.$^5$ A04B** *1/10*

**U.S. Cl. 455—302** **15 Claims**



1. An image suppression harmonic frequency converter, comprising:

a first 3 dB in-quadrature radio frequency hybrid coupler of the tandem type with four ports, operating both with a radio frequency signal and a local frequency signal;

a first harmonic mixer connected to a first port of said first hybrid coupler;

a second harmonic mixer connected to a second port of said first hybrid coupler;

a first duplexer pass-band filter which passes both the radio frequency signal and an intermediate frequency signal and stops the local frequency signal preventing reflection thereof, said first filter having a first end connected to a fourth port of said first hybrid coupler, and a second end to which arrives or from which goes out the radio frequency signal;

a second duplexer band-pass filter which passes both the local frequency signal and the intermediate frequency signal and stops the radio frequency signal preventing reflection thereof, said second filter having a first end connected to a third port of said first hybrid coupler and a second end to which arrives the local frequency signal;

a second 3 dB in-quadrature intermediate frequency hybrid coupler with four ports which has a first port connected to said second end of said first band-pass filter, a second port connected to said second end of said second band-pass filter, a third port closing on a matched load and a fourth port to which arrives or from which goes out the intermediate frequency signal.

---

**5,020,149**

### INTEGRATED DOWN CONVERTER AND INTERDIGITAL FILTER APPARATUS AND METHOD FOR CONSTRUCTION THEREOF

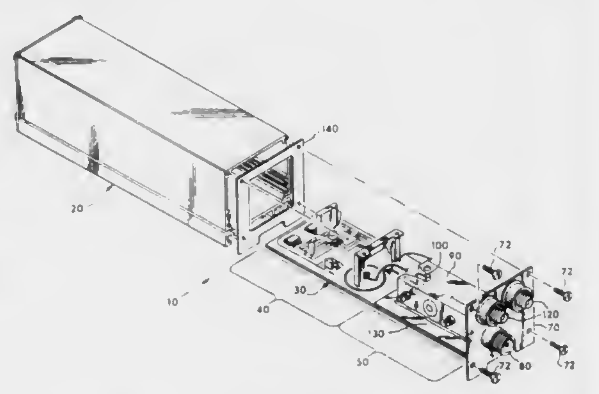
**Dale L. Hemmie, Burlington, Iowa, assignor to Conifer Corporation, Burlington, Iowa**

**Continuation-in-part of Ser. No. 102,726, Sep. 30, 1987, Pat. No. 4,791,717. This application Oct. 24, 1988, Ser. No. 261,557**

**The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.**

**Int. Cl.$^5$ H04B** *1/18, 1/08;* **H01P** *1/205;* **H05K** *7/14*

**U.S. Cl. 455—325** **8 Claims**



1. An integrated down converter interdigital filter apparatus receptive of a microwave signal for producing an electrical output signal in a predetermined band corresponding to said microwave signal comprising:

a planar surface,

a down converter located on said planar surface having an electrical signal input and an electrical signal output,

an interdigital filter also located on said planar surface, said interdigital filter comprising:

(a) a ground plane conductive surface formed on said planar surface,

(b) a conductive rectangular housing having an interior and an open bottom, said housing having said open bottom affixed to said conductive surface in order to fully enclose the interior of said housing,

(c) a plurality of conductive elements spatially located in said housing for filtering said microwave signal in said predetermined band,

(d) means connected through said housing for interconnecting said microwave signal with one of said elements,

means connected through said housing and connected to another one of said elements for interconnecting the filtered signal in said band from said interdigital filter to the input of said down converter, and

means connected to the output of said down converter for delivering said electrical signal output from said down converter.

---

**5,020,150**

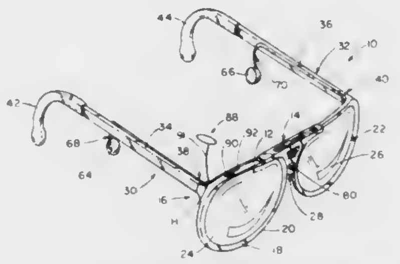
### COMBINATION RADIO AND EYEGLASSES

**John Shannon, 1215 Elgin, Houston, Tex. 77004**

**Filed Nov. 7, 1989, Ser. No. 432,849**

**Int. Cl.$^5$ H04B** *1/08*

**U.S. Cl. 455—343** **2 Claims**



1. A combination comprising: p1 A) an eyeglass frame having

(1) a front unit which includes two lens-holding elements and a top surface,

(2) a nose bridge element connecting said lens-holding elements together,

(3) two nose pads each being attached to one of said lens-holding elements,

(4) two temple pieces each of which includes

(a) a skull piece,

(b) a hinge on a front end of said skull piece attaching said skull piece to one lens-holding element of said two lens-holding element, and

(c) an end piece on a rear end of said skull piece for supporting said skull piece on a wearer's ear, and

(5) an eyeglass lens mounted in each of said two frame lens-holding elements; and

B) a radio assembly mounted in said eyeglass frame and including

(1) a radio receiver unit mounted in said nose bridge element and including

(a) a volume control located in said nose bridge element,

(b) an on/off switch located in said nose bridge element,

(c) a tuning control located in said nose bridge element.

(d) a speaker control located in said nose bridge element,

(e) a band selector located in said nose bridge element top surface, and

(f) two stereo earphones, each being mounted on one of said skull pieces and electrically connected to said radio receiver unit by a line connector, said earphones depending downwardly from said skull pieces with said line connectors being flexible so that said earphones can be placed in a wearer's ears,

(2) a power source mounted in said frame and including

(a) a battery located in said nose bridge element and connected to said radio receiver,

(b) a photovoltaic solar energy converter power source mounted on said front unit and being connected to said radio receiver in parallel with said battery and supplementing said battery, said photovoltaic solar energy converter power source including

(i) a solar energy concentrator mounted on said eyeglass frame top surface adjacent to one of said temple piece hinges,

(ii) a solar energy concentrator hinge mounted on said eyeglass frame,

(iii) a support post connecting said solar energy concentrator to said solar energy concentrator hinge for moving said solar energy concentrator from a collapsed configuration against said front unit top surface to a deployed configuration spaced from said front unit top surface,

(iv) a solar energy collector array mounted on said front unit top surface adjacent to said solar energy concentrator to have solar energy concentrated thereon by said solar energy concentrator when said solar energy concentrator is in said deployed configuration,

(c) an electrical isolating diode connecting said battery to said photovoltaic solar energy converter for permitting said parallel connected battery and photovoltaic solar energy converter power source to operate without damage to either said battery or said photovoltaic solar energy converter due to said parallel connection,

(d) a battery charger element electrically connecting said photovoltaic solar energy power converter to said battery for charging said battery using solar energy, and

(e) a power sensing device connected to said battery to sense power level in said battery and switch to said photovoltaic solar energy converter power source when power level in said battery drops below a certain level.

---

**5,020,151**

### RELEASABLE MOUNTING FOR AN AUDIO DEVICE

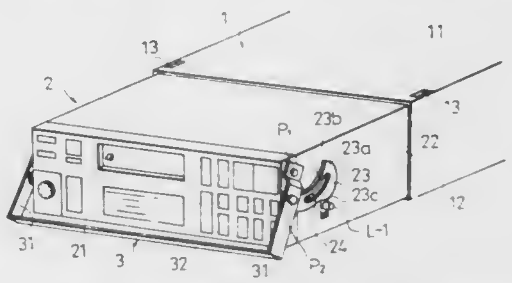
**Kazue Sampei; Takashi Suzuki, and Futoshi Ujiie, all of Iwaki, Japan, assignors to Alpine Electronics Inc., Tokyo, Japan**

**Filed Aug. 21, 1987, Ser. No. 88,697**

**Claims priority, application Japan, Nov. 11, 1986, 61-173232[U]; Nov. 11, 1986, 61-173233[U]; Mar. 20, 1987, 62-41691[U]**

**Int. Cl.$^5$ H04B** *1/06*

**U.S. Cl. 455—345** **8 Claims**



1. Releasable mounting for an automotive audio device comprising: a handle consisting of a pair of arms and a grip and provided at a front operation board of the audio device, said arms being pivotally supported on side walls of the audio device; and engage plates each pivotally supported on each said arm and having one end engaging or disengaging with respect to each engage hole of an inner case when said engage plates are moved by vertical movement of said handle.

---

**5,020,152**

### FAULT TOLERANT-FIBER OPTIC COUPLER/REPEATER FOR USE IN HIGH SPEED DATA TRANSMISSION AND THE LIKE

**Andrew S. Glista, Jr., 4126 Whispering La., Annandale, Va. 22003**

**Continuation of Ser. No. 45,469, May 4, 1987, Pat. No. 4,837,856. This application May 30, 1989, Ser. No. 357,959**

**The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.**

**Int. Cl.$^5$ H04B** *10/14*

**U.S. Cl. 455—601** **7 Claims**

1. A fault-tolerant fiber optic coupler/repeater for use in high speed data transmission, data bus and high speed parallel processors and computers, comprising:

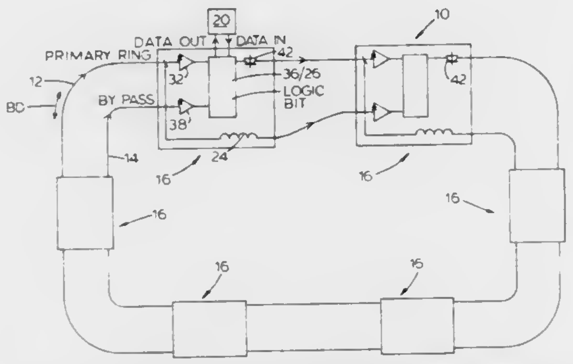
a terminal;

/OL
126
SS
4
MY
28
1991
UMI

- a primary input optical fiber connected to said terminal for conducting a primary optical signal to said terminal;
- a bypass optical fiber connected to said terminal for conducting a bypass optical signal to said terminal;
- a data input/output device connected to said terminal; and

coupling means for coupling said primary input optical fiber, said bypass optical fiber and said data input/output device together, said coupling means including a power splitting device connected to said primary input fiber and to said bypass optical fibers and causing a signal to move from said primary input optical fiber to said input/output device or to move from said primary input optical fiber to said bypass optical fiber so that said signal will bypass said terminal on said bypass optical fiber, said coupling means including

- a primary input photodiode in said primary input optical fiber,
- a bypass photodiode in said bypass optical fiber, and
- a logic means connecting said primary input photodiode and bypass photodiode to said data input/output device for determining which of said primary or said bypass optical signals to send to said data input/output device for use thereby and which of said optical signals to reject, said logic means including a first power amplitude detector connected to said primary input photodiode to receive optical signals therefrom and to generate a signal, a second power amplitude detector connected to said bypass photodiode to receive optical signals therefrom and to generate a signal, a ratio detector connected to both of said power amplitude detectors for receiving signals therefrom and for comparing the power in each of the primary and bypass optical signals to a preselected power range and for selecting the optical signal which is closer to the preselected power range and rejecting the other optical signal and for generating a ratio detector signal, a select switch connected to said ratio detector to receive the ratio detector signal therefrom and which generates a switching signal corresponding to the selected optical signal, and a switch device connected to said select switch to receive said switching signal from said select switch, said switch device including a first switch connected to said primary input photodiode and a second switch connected to said bypass photodiode, a coupling means connected to said data input/output means for connecting either said primary input photodiode to said data input/output device or said bypass photodiode to said data input/output device depending on said switching signal for passing the selected optical signal to said data input/output device via either the primary input photo diode or via the bypass photodiode depending on which of the primary input or the bypass photodiodes has an optical signal which has power characteristics closer to said preselected range stored in said ratio detector.



---

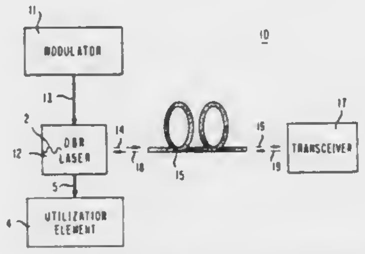
## 5,020,153
## TUNABLE NARROWBAND RECEIVER UTILIZING DISTRIBUTED BRAGG REFLECTOR LASER STRUCTURE

**Fow-Sen Choa, Marlboro, and Thomas L. Koch, Holmdel, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Feb. 8, 1989, Ser. No. 308,174**

**Int. Cl.$^5$ G02F** *2/00;* **H01S** *3/00;* **H04B** *10/00*

**U.S. Cl. 455—606** **8 Claims**



1. A method for receiving lightwave signals comprising the steps of:

- electrically biasing a distributed Bragg reflector semiconductor laser to a predetermined value for optical amplification in a range below 1.25 of a lasing threshold, $I_{th}$,
- directing said lightwave signals to impinge on said distributed Bragg reflector laser,
- deriving an electrical signal representing said lightwave signals impinging on said distributed Bragg reflector laser by amplifying said lightwave signals, by filtering said lightwave signals, and by translating changes in at least carrier density in a gain region of said distributed Bragg reflector laser into said electrical signal, said changes being caused by said lightwave signals impinging on said distributed Bragg reflector laser.

---

## 5,020,154
## TRANSMISSION LINK

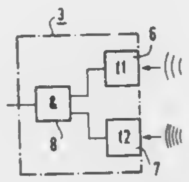
**Hermann Zierhut, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

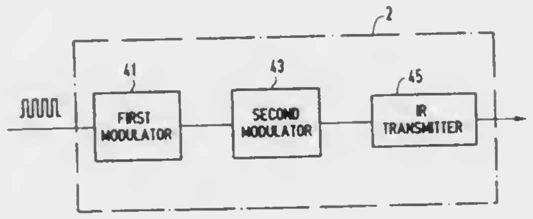
**Filed Apr. 19, 1990, Ser. No. 511,196**

**Claims priority, application European Pat. Off., Apr. 20, 1989, 89107170.6**

**Int. Cl.$^5$ H04B** *10/00*

**U.S. Cl. 455—608** **18 Claims**





1. A transmission link for transmitting a sequence of pulses and intervals over a transmission medium comprising:

- a transmitter including means for modulating pulses with at least two frequencies to form modulated pulse signals containing said two frequencies;
- a receiver having a separate evaluation circuit corresponding to each modulation frequency, each evaluation circuit having as an input said modulated pulses and providing a demodulated output; and
- an AND-gate circuit, having at least two inputs, each input being coupled to a respective output of one of said evaluation circuits, whereby said AND-gate circuit concatenates the demodulated pulse signals appearing at the outputs of said evaluation circuits

---

## 5,020,155
## AUDIO COMMENTARY SYSTEM

**Robert J. Griffin, Richmond HIll, Canada, and Steven R. Chalmer, Buffalo, N.Y., assignors to Heritage Communications Inc., Richmond Hill, Ontario, Canada**

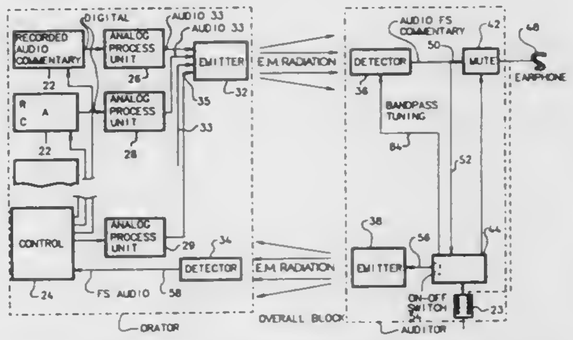
**Filed Oct. 17, 1989, Ser. No. 422,659**

**Int. Cl.$^5$ H04B** *10/00;* **G02F** *2/00*

**U.S. Cl. 455—617** **31 Claims**

8. An exhibit commentary system including an orator—associated with such exhibit and a portable auditor:

- said orator being adapted to provide transmission of electromagnetic radiation in the wavelength range 1600–400 nanometers,
- said auditor being designed to detect said transmission,
- said orator being adapted to signal information derived from frequency variable signals through ON-OFF states of said radiation,
- said auditor being adapted to detect said ON-OFF states and convert them into electrical signals,
- said orator being designed, to transmit a recorded audio commentary as said information,
- said auditor being designed to convert such electrical signals derived from said detection into audio signals,



wherein said orator is adapted to transmit on at least three frequency range channels, at least one of said channels being a protocol channel and at least two of said channels being commentary channels, and said auditor is adapted to receive said protocol channel and tunable to a selected one of said program channels, said auditor being responsible to an orator signal on said protocol channel to tune to a selected one of said commentary channels.

VOL
1126
ISS
4
MY
28
1991
UMI

# DESIGNS

MAY 28, 1991

317,072

**FROZEN DESSERT**

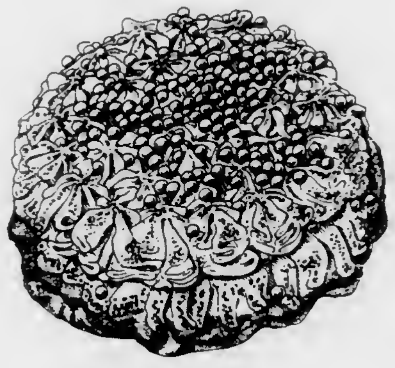
Kevin P. Hillman, Cheltenham, Great Britain, assignor to Gold Bond Ice Cream, Inc., Green Bay, Wis.

Filed Dec. 21, 1989, Ser. No. 454,873

Claims priority, application United Kingdom, Jun. 29, 1989, 1060499

Term of patent 14 years

U.S. Cl. D1—130



317,073

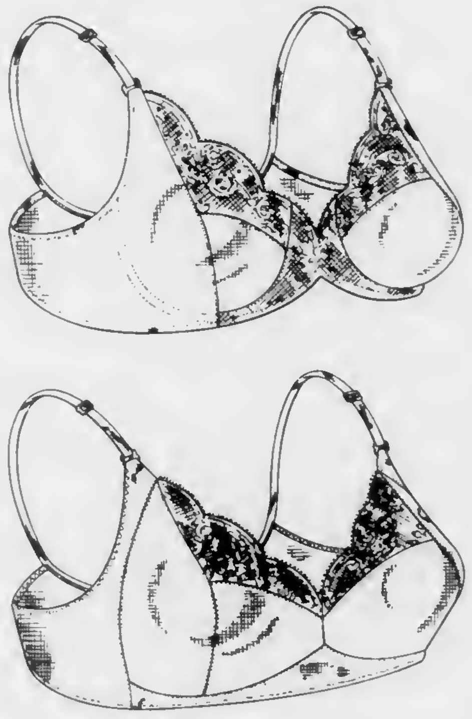
**BRASSIERE**

Phoebe Moyer, Scotch Plains, N.J., assignor to Playtex Apparel, Inc., Stamford, Conn.

Filed Sep. 30, 1988, Ser. No. 252,703

Term of patent 14 years

U.S. Cl. D2—24



317,074

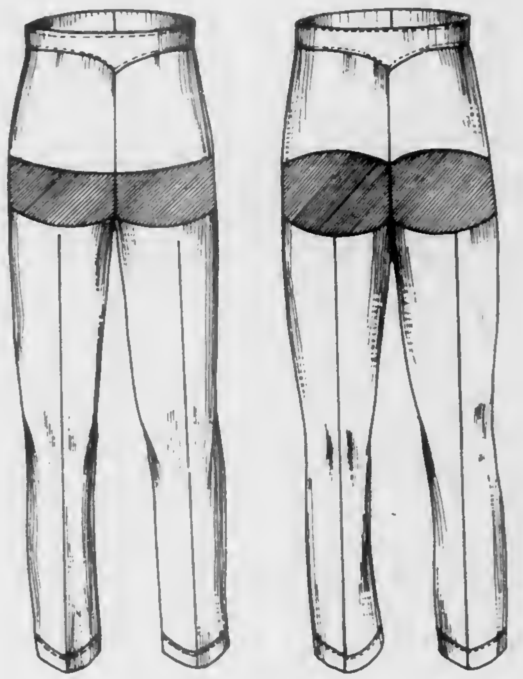
**TROUSERS**

Jerome Beasley, 8925 Nelson St., New Orleans, La. 70118

Filed Feb. 4, 1988, Ser. No. 152,246

Term of patent 14 years

U.S. Cl. D2—28



317,075

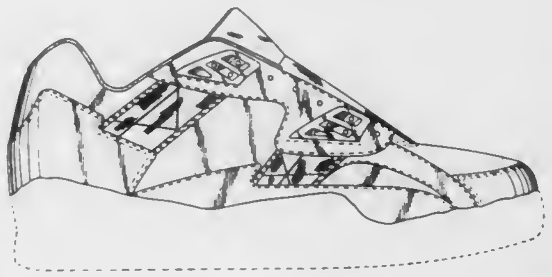
**SHOE UPPER**

Tinker L. Hatfield, and Wilson W. Smith, both of Portland, Oreg., assignors to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.

Filed Jun. 15, 1990, Ser. No. 539,529

Term of patent 14 years

U.S. Cl. D2—314



VOL
1126
ISS
4
MY
28
1991
UMI

317,076

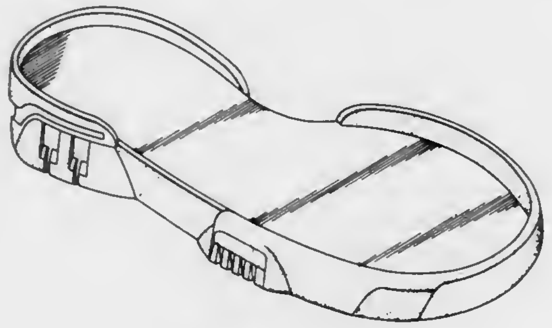
### RADIAL TENNIS SHOE

Michael H. Skinner, Boulder, Colo., assignor to Head Sports, Inc., Boulder, Colo.

Filed Mar. 4, 1988, Ser. No. 164,119

Term of patent 14 years

U.S. Cl. D2—319



317,077

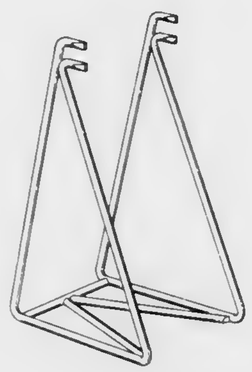
### COMBINED BOOT JACK AND HOOK

Orland L. Schulz, R.R. 1, Box 39, Bushton, Kans. 67427

Filed Jul. 20, 1987, Ser. No. 75,853

Term of patent 14 years

U.S. Cl. D2—642



317,078

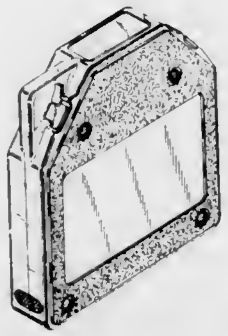
### REEL CASE

Gerald J. Niles, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Nov. 16, 1987, Ser. No. 121,585

Term of patent 14 years

U.S. Cl. D3—35



317,079

### COMBINED STORAGE AND CARRYING CONTAINER FOR CASSETTE TAPES

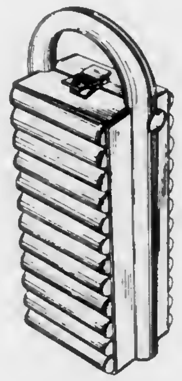
Roland Schmidt, and Klaus Lackner, both of Heidelberg, Fed. Rep. of Germany, assignors to Peter Reisenthel "programm", Puchheim, Fed. Rep. of Germany

Filed Dec. 28, 1988, Ser. No. 291,438

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1988, 17916

Term of patent 14 years

U.S. Cl. D3—35



317,080

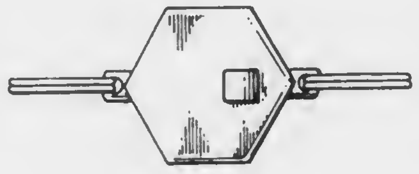
### KEY HOLDER

James R. Stillwagon, 890 Gatehouse La., Worthington, Ohio 43235, and Scott H. Lee, R.R. #2, Putnam, Conn. 06260

Division of Ser. No. 295,582, Jan. 11, 1989, Pat. No. D. 310,753. This application Sep. 4, 1990, Ser. No. 576,734

Term of patent 14 years

U.S. Cl. D3—61



317,081

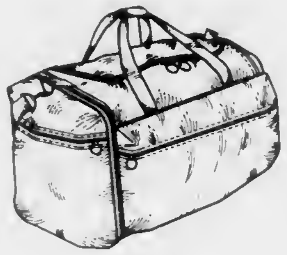
### DUFFLE BAG

William L. King, Denver, Colo., assignor to Samsonite Corporation, Denver, Colo.

Division of Ser. No. 101,331, Sep. 25, 1987. This application Oct. 2, 1990, Ser. No. 592,051

Term of patent 14 years

U.S. Cl. D3—71



317,082

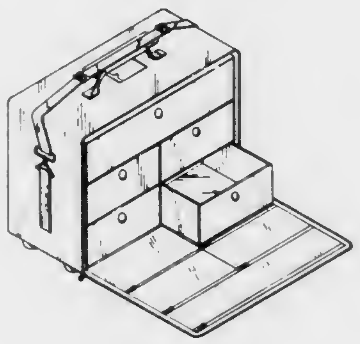
### TRAVEL ORGANIZER

Rita Madison, 4015 Dixon Rd., Little Rock, Ark. 72206

Filed Feb. 23, 1988, Ser. No. 159,570

Term of patent 14 years

U.S. Cl. D3—74



317,083

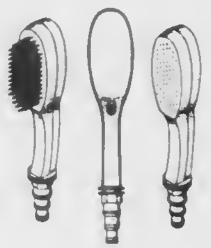
### RETRACTABLE FOUNTAIN BRUSH

Fargo Chou, No.306, Chung Cheng Road, Yungho, Taipei, Taiwan

Filed May 25, 1989, Ser. No. 356,841

Term of patent 14 years

U.S. Cl. D4—115



317,084

### TEXTILE FABRIC

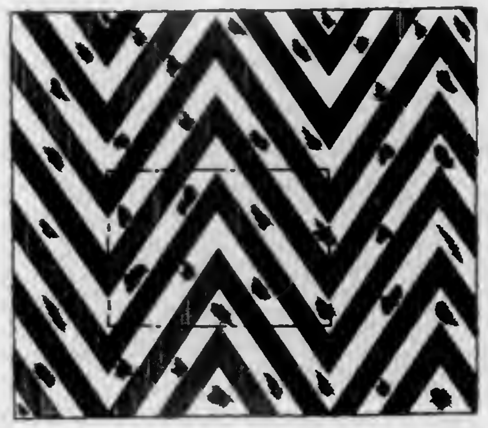
Rudolf Cerny, Steinfurt, Fed. Rep. of Germany, assignor to Arnold Kock GmbH u. Co. KG, Steinfurt, Fed. Rep. of Germany

Filed Aug. 23, 1988, Ser. No. 235,337

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 8MRBD.5B1.660

Term of patent 14 years

U.S. Cl. D5—56



317,085

### TEXTILE FABRIC

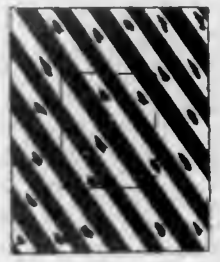
Rudolf Cerny, Steinfurt, Fed. Rep. of Germany, assignor to Arnold Kock GmbH u. Co. KG, Steinfurt, Fed. Rep. of Germany

Filed Aug. 23, 1988, Ser. No. 235,336

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 8MRBD.5B1.660

Term of patent 14 years

U.S. Cl. D5—60



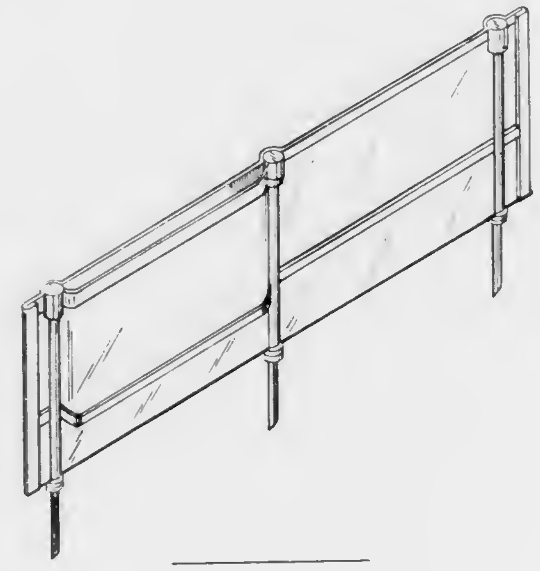
VOL 1126 ISS 4 MY 28 1991 UMI

317,086

### TRANSPARENT WIND SCREEN

Joseph D. D'Agostino, 1129 8th St., Ambridge, Pa. 15003
Filed Nov. 20, 1987, Ser. No. 123,645
Term of patent 14 years

U.S. Cl. D6—332

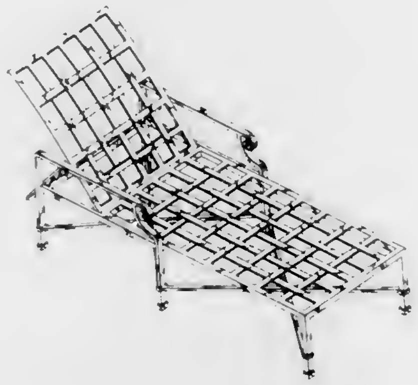


317,087

### CHAISE

Richard Frinier, Long Beach, Calif., assignor to Brown Jordan Company, El Monte, Calif.
Filed Jan. 11, 1988, Ser. No. 142,749
Term of patent 14 years

U.S. Cl. D6—361



317,088

### ARMCHAIR

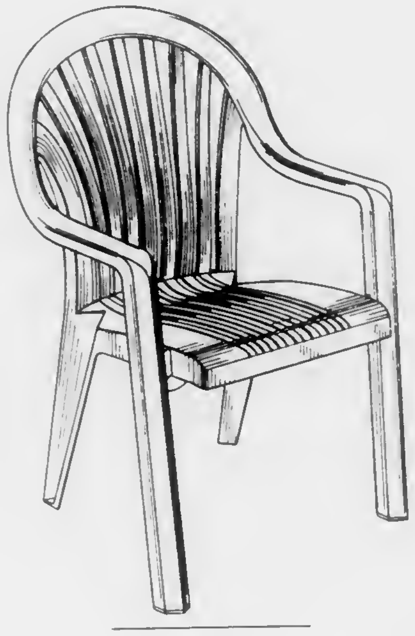
Raymond Grosfillex, Arbent 01107, Oyonnax, France
Filed Jun. 22, 1987, Ser. No. 64,457

Claims priority, application Hague, Dec. 22, 1986, DM/007953

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Term of patent 14 years

U.S. Cl. D6—379

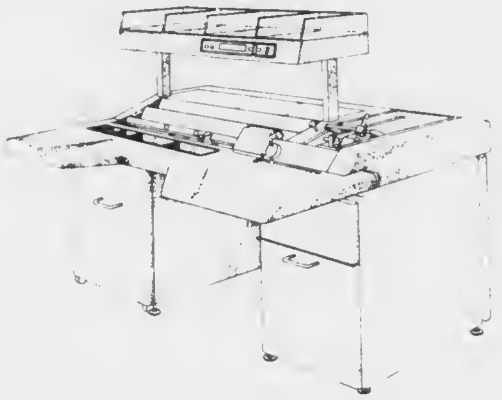


317,089

### MAIL SORTING DESK

John D. Coleman, and Eric A. Schneider, both of Philadelphia, Pa., assignors to Opex Corporation, Morrestown, N.J.
Filed Feb. 5, 1990, Ser. No. 475,091
Term of patent 14 years

U.S. Cl. D6—422

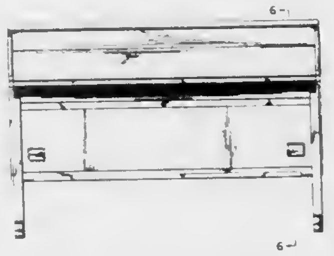


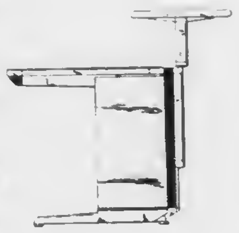
317,090

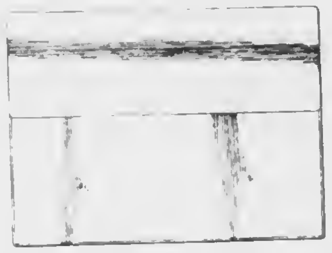
### DESK

Seiji Koguma, Warabi, Japan, assignor to Okamura Corporation, Japan
Filed Jun. 10, 1988, Ser. No. 205,469
Claims priority, application Japan, Jan. 14, 1988, 63-864
Term of patent 14 years

U.S. Cl. D6—426





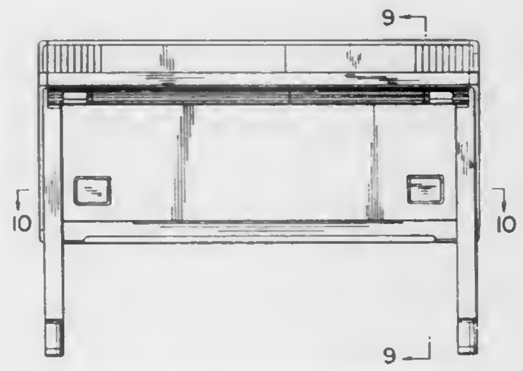


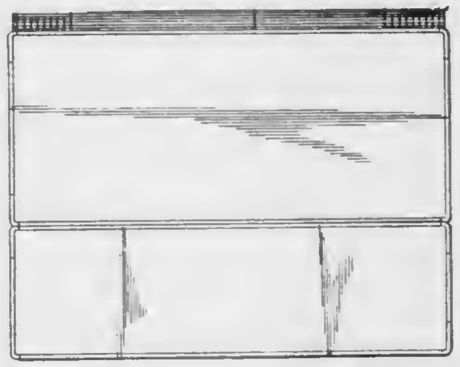
317,091

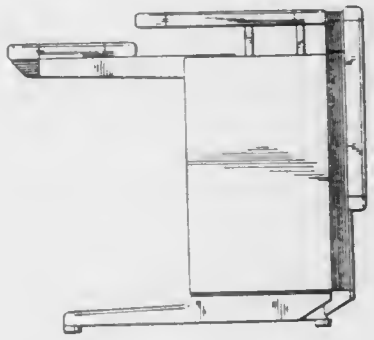
### DESK

Seiji Koguma, Warabi, Japan, assignor to Okamura Corporation, Japan
Filed Jun. 10, 1988, Ser. No. 205,470
Claims priority, application Japan, Dec. 11, 1987, 62-50477
Term of patent 14 years

U.S. Cl. D6—426







VOL
1126
ISS
4
MY
28
1991
UMI

### 317,092
### DESK

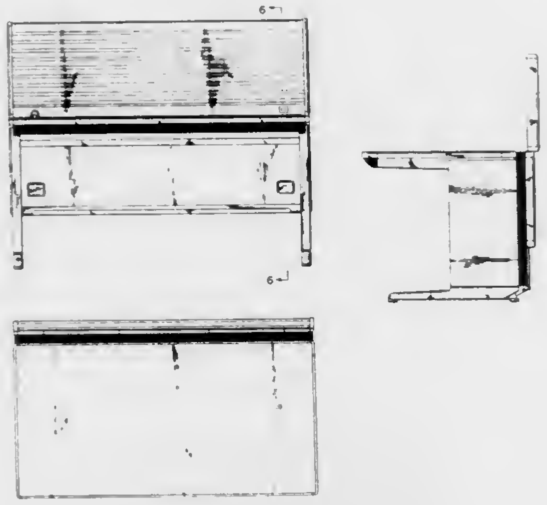
Seiji Koguma, Warabi, Japan, assignor to Okamura Corporation, Japan

Filed Jun. 10, 1988, Ser. No. 205,468

Claims priority, application Japan, Jan. 12, 1988, 63-581

Term of patent 14 years

U.S. Cl. D6—428



### 317,093
### DESK

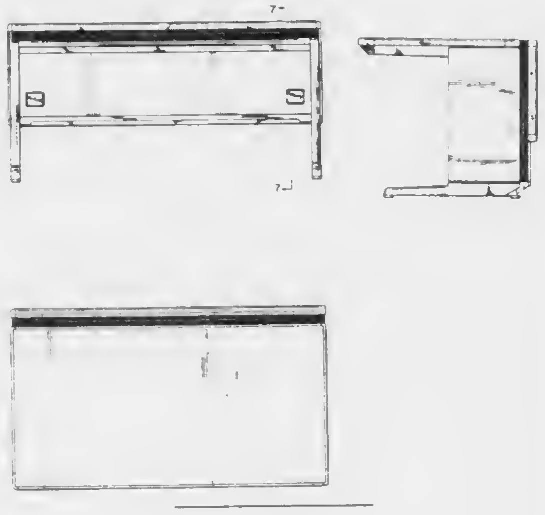
Seiji Koguma, Warabi, Japan, assignor to Okamura Corporation, Japan

Filed Jun. 10, 1988, Ser. No. 205,471

Claims priority, application Japan, Dec. 11, 1987, 62-50475

Term of patent 14 years

U.S. Cl. D6—428



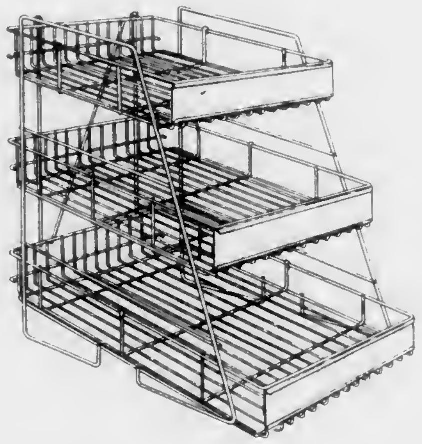
### 317,094
### DISPLAY RACK

Kenneth J. Weinberg, Searingtown, N.Y., and Charles K. Billings, Bellbrook, Ohio, assignors to Chiquita Brands, Inc., Cincinnati, Ohio

Filed Jul. 17, 1987, Ser. No. 74,500

Term of patent 14 years

U.S. Cl. D6—463



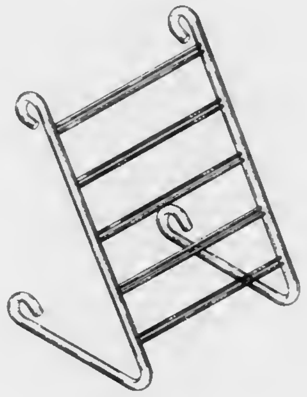
### 317,095
### EARRING STORAGE AND DISPLAY STAND

Jody L. Albers, and Delores A. Albers, both of 15647 E. Fernview, Whittier, Calif. 90604

Filed Jun. 27, 1988, Ser. No. 211,684

Term of patent 14 years

U.S. Cl. D6—464



### 317,096
### TABLE FOR USE PRIMARILY BY A WALL PAPERER

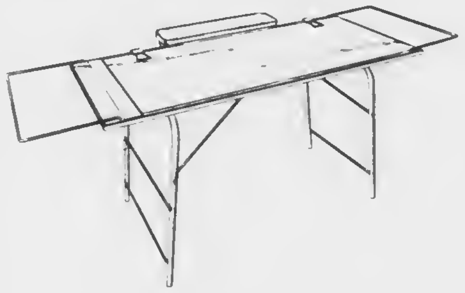
Ian McIvor, Northdown House, Glebe Road, Merstham, Surrey, England RH1 3AB

Filed Aug. 3, 1988, Ser. No. 227,742

Claims priority, application United Kingdom, Feb. 5, 1988, 1048302

Term of patent 14 years

U.S. Cl. D6—487



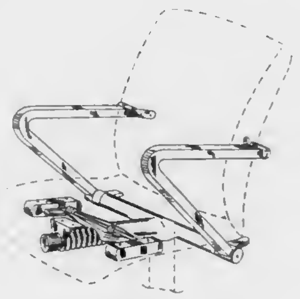
### 317,097
### SEAT FRAME

Burkhard Vogtherr, Kandern-Holzen, and Manfred Elzenbeck, Steinheim/Murr, both of Fed. Rep. of Germany, assignors to Davis Furniture Industries, Inc., High Point, N.C.

Filed Jun. 13, 1988, Ser. No. 205,785

Term of patent 14 years

U.S. Cl. D6—500



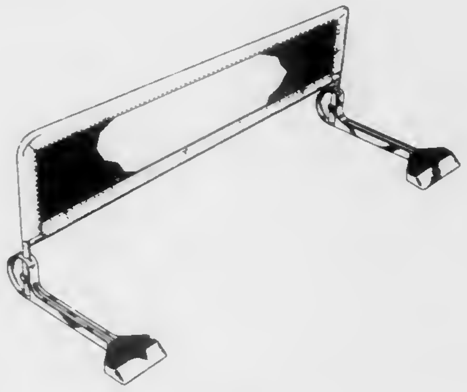
### 317,098
### SAFETY PANEL FOR ATTACHMENT TO A BED

Eric T. Shuler, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Aug. 15, 1988, Ser. No. 232,581

Term of patent 14 years

U.S. Cl. D6—503



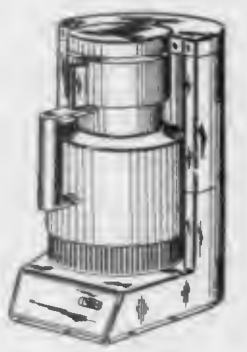
### 317,099
### COFFEEMAKER

Scott H. Micoley, Milwaukee, Wis., assignor to Sunbeam Corporation, Downers Grove, Ill.

Filed Jan. 22, 1988, Ser. No. 147,009

Term of patent 14 years

U.S. Cl. D7—309



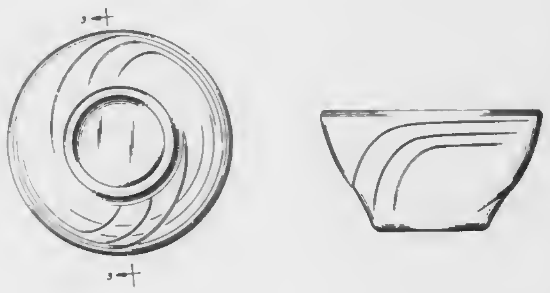
### 317,100
### BOUILLON CUP OR SIMILAR ARTICLE

Steve A. Unger, Manlius, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.

Division of Ser. No. 163,410, Mar. 3, 1988, Pat. No. Des. 313,535. This application Sep. 25, 1990, Ser. No. 588,312

Term of patent 14 years

U.S. Cl. D7—509

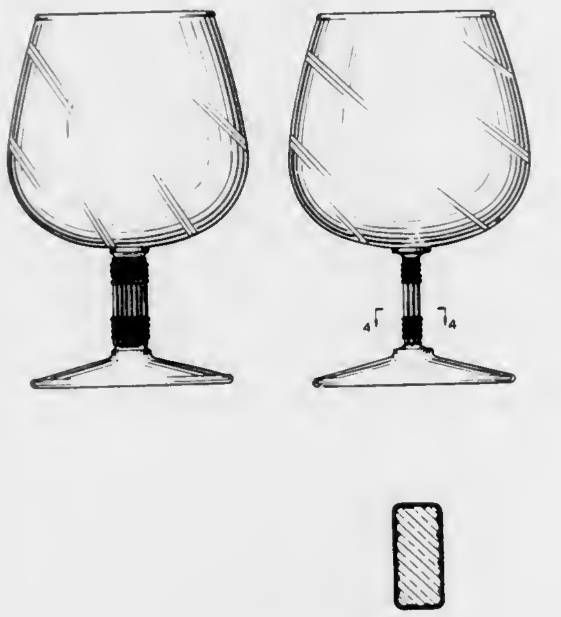


VOL
1126
ISS
4
MY
28
1991
UMI

### 317,101
### BRANDY SNIFTER

Walter Wenzl, Regen, Fed. Rep. of Germany, assignor to Christian Dior, S.A., Paris, France
Filed Nov. 7, 1988, Ser. No. 268,353
Term of patent 14 years

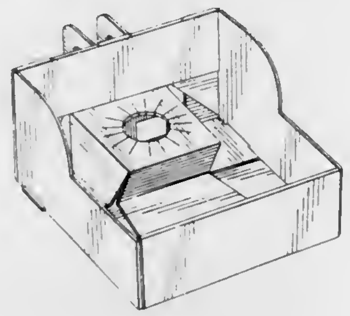
U.S. Cl. D7—537



### 317,102
### FOOD CARRYING TRAY

Ian M. Clark; Diane W. Clark, both of 46 Belorun Court, London, Ontario, Canada N6K 3K8 , and George P. Rickard, 755 Northmile Road, London, Ontario, Canada N6H 2X7
Filed Jun. 20, 1988, Ser. No. 208,633
Claims priority, application Canada, Apr. 20, 1988, 2004889
Term of patent 14 years

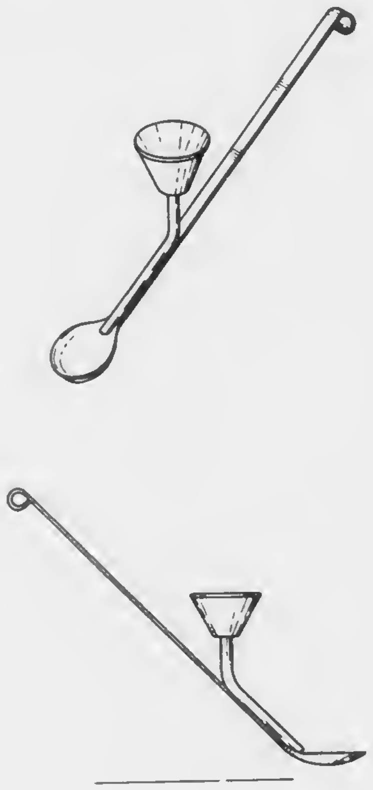
U.S. Cl. D7—549



### 317,103
### DRINK LAYERING SPOON

Patrick T. Case, 102 Wedgewood Rd., Oak Ridge, Tenn. 37830
Filed Dec. 29, 1988, Ser. No. 291,861
Term of patent 14 years

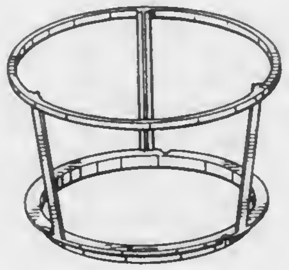
U.S. Cl. D7—643



### 317,104
### SUPPORT FOR STRAINER CONES

Russell R. Lyon, Ramona, Calif., assignor to Nicholas Herbert, Fullerton, Calif., a part interest
Filed Oct. 31, 1988, Ser. No. 264,675
Term of patent 14 years

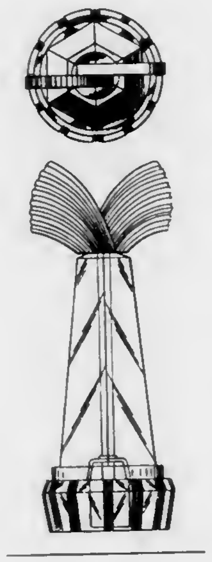
U.S. Cl. D7—667



### 317,105
### CONDIMENT MILL

William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505
Filed Nov. 6, 1989, Ser. No. 432,187
Term of patent 14 years

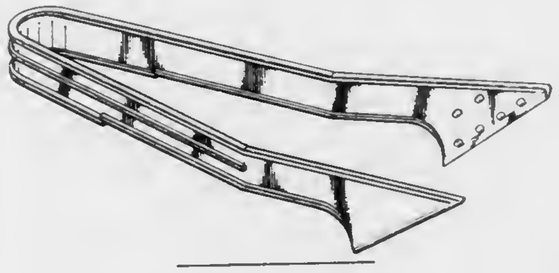
U.S. Cl. D7—679



### 317,106
### MINI-TONGS

Leonard Kosurko, 2701 Thickson Rd., South, Whitby, Ontario, Canada L1N 5R5
Filed Sep. 7, 1988, Ser. No. 241,138
Term of patent 14 years

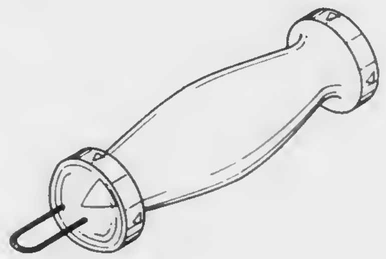
U.S. Cl. D7—686



### 317,107
### CHERRY PITTER OR SIMILAR ARTICLE

Peggy Grass, R.R. #2, Box 37, Page, Nebr. 68766
Filed Apr. 18, 1989, Ser. No. 340,160
Term of patent 14 years

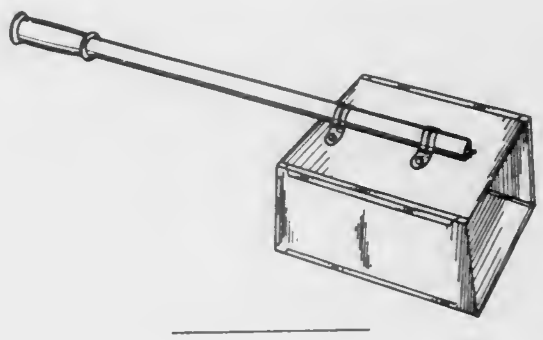
U.S. Cl. D7—693



### 317,108
### ASH SCOOP

Clarence L. Cochran, 3603 Mill Springs Dr., Stockton, Calif. 95209
Filed Jul. 17, 1989, Ser. No. 380,644
Term of patent 14 years

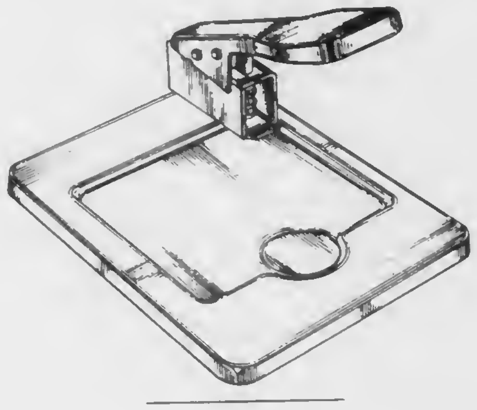
U.S. Cl. D8—10



### 317,109
### DISK CASING PUNCH TOOL

Nicholas J. Bonge, Jr., 1183 Pittsfield La., Ventura, Calif. 93001
Filed Apr. 19, 1990, Ser. No. 511,015
Term of patent 14 years

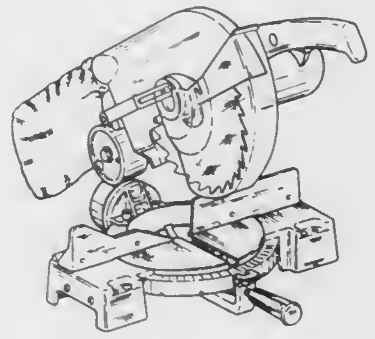
U.S. Cl. D8—14



### 317,110
### COMPOUND MITER SAW

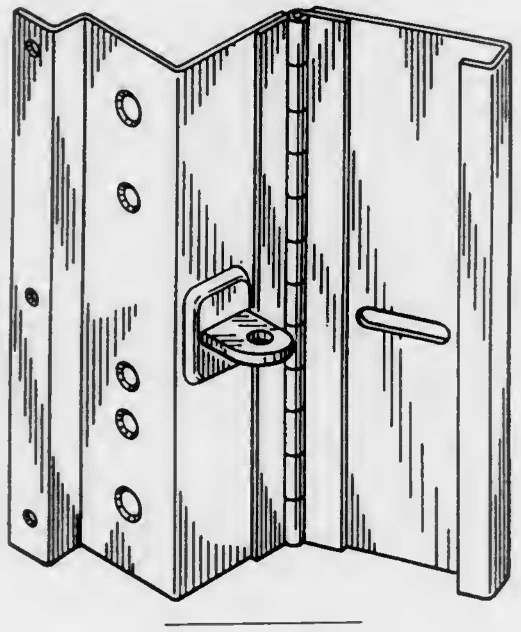
Robert W. Arehart, Cook County, Ill., assignor to Emerson Electric Co., St. Louis, Mo.
Filed Jun. 30, 1988, Ser. No. 208,639
Term of patent 14 years

U.S. Cl. D8—66

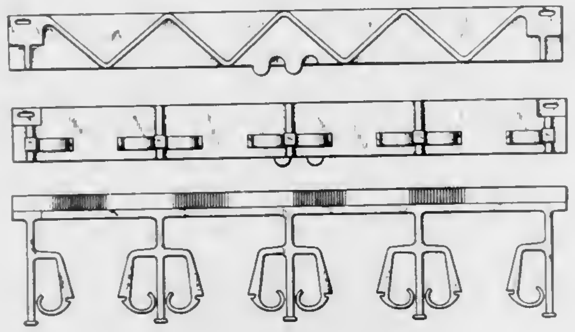


VOL
126
SS
4
MY
28
1991
UMI

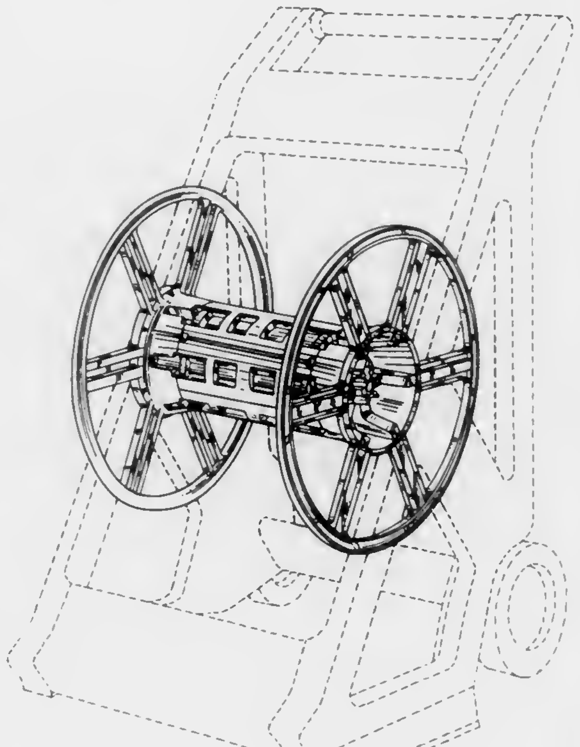
317,111
**DOOR LOCK**
Blair E. Johns, 3918 W. Coronado, Phoenix, Ariz. 85009
Division of Ser. No. 336,647, Apr. 7, 1989, abandoned, which is a continuation of Ser. No. 10,433, Feb. 3, 1987, abandoned. This application May 29, 1990, Ser. No. 530,086
Term of patent 14 years
U.S. Cl. D8—344



317,112
**COMBINED TELEPHONE BLOCK SUPPORT AND WIRE GUIDE**
Helmuth Newuirth, Garden City, and Carl Meyerhoefer, Dix Hills, both of N.Y., assignors to Porta Systems Corp., Syosset, N.Y.
Filed May 1, 1989, Ser. No. 345,650
Term of patent 14 years
U.S. Cl. D8—356

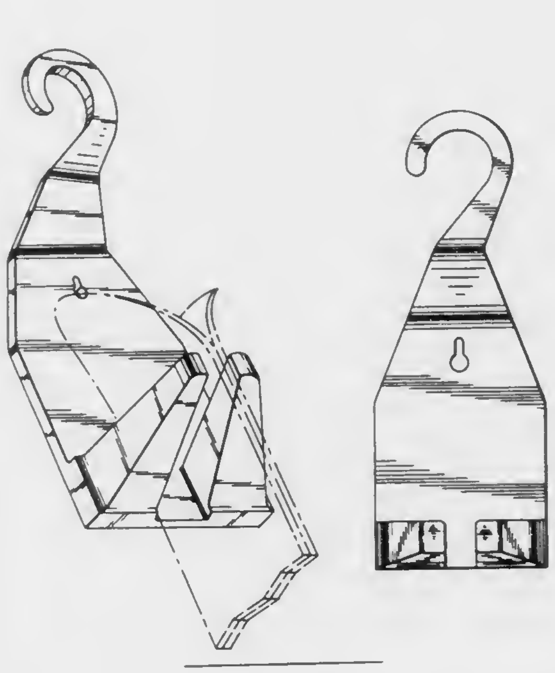


317,113
**HOSE REEL**
Ronald R. Fowler, Coolville, Ohio, assignor to O. Ames Co., Parkersburg, W. Va.
Filed Oct. 25, 1989, Ser. No. 426,395
Term of patent 14 years
U.S. Cl. D8—358

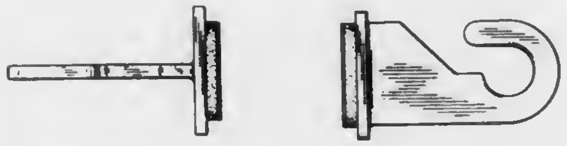


---

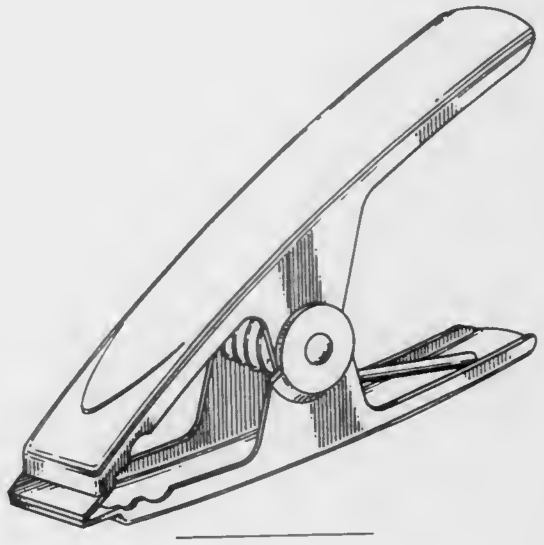
317,114
**HOOK HOLDER FOR SUPPORTING A SKI SET OR SIMILAR ARTICLE**
A. A. Raffler, 20 Whitewood Avenue, Manotick, Ontario, Canada K0A 2N0
Filed Oct. 27, 1989, Ser. No. 428,321
Term of patent 14 years
U.S. Cl. D8—367



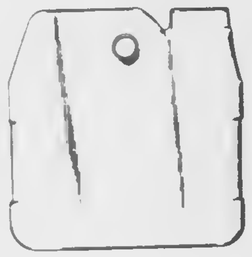
317,115
**SUPPORT HOOK FOR DECORATIVE STRAND**
Lonnie F. Gary, Lubbock, Tex., assignor to Gary Products Group, Inc., Lubbock, Tex.
Filed Jul. 28, 1989, Ser. No. 387,091
Term of patent 14 years
U.S. Cl. D8—373



317,116
**SPRING CLAMP**
Roderick L. Nimtz, Garrettsville, Ohio, assignor to Warren Tool Corporation, Hiram, Ohio
Filed Feb. 16, 1989, Ser. No. 311,588
Term of patent 14 years
U.S. Cl. D8—395



317,117
**OIL DRAIN PAN**
William F. Pollacco, 4320 Stockbridge Dr. Dumfries, Va. 22026 22309
Filed Sep. 12, 1983, Ser. No. 531,359
Term of patent 14 years
U.S. Cl. D9—307



VOL 1126 ISS 4 MY 28 1991 UMI

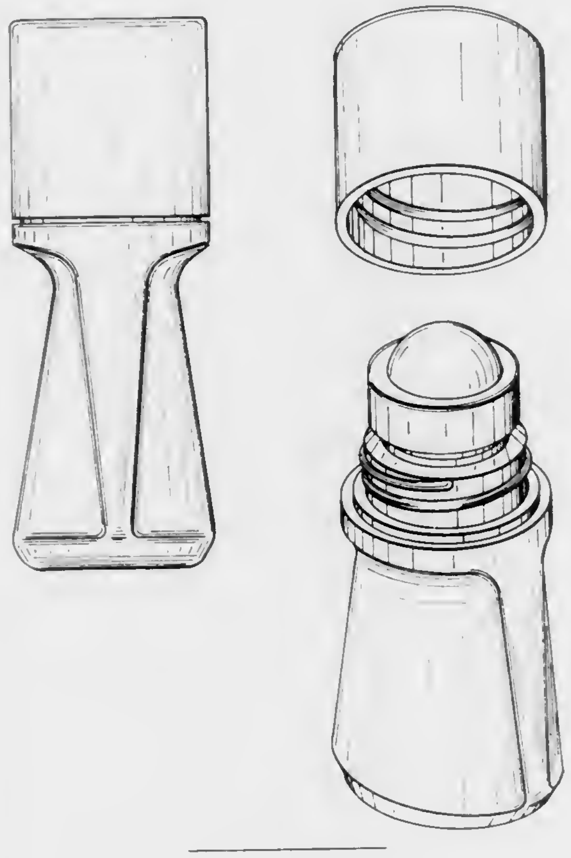
### 317,118
### COMBINED ROLL-ON DISPENSER BOTTLE AND CAP

John C. Crawford, Lake Mahopac, N.Y., assignor to Colgate-Palmolive Company, Piscataway, N.J.

Filed Jun. 23, 1988, Ser. No. 212,407

Term of patent 14 years

U.S. Cl. D9—338



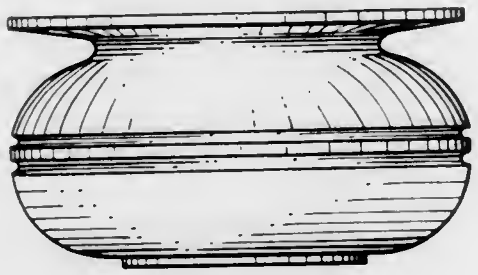
### 317,119
### CONTAINER

Jean-Jacques Vola, 6, Allee des Lauriers, 91370 Verrieres-Le-Buisson, France

Filed Sep. 8, 1988, Ser. No. 242,277

Term of patent 14 years

U.S. Cl. D9—350



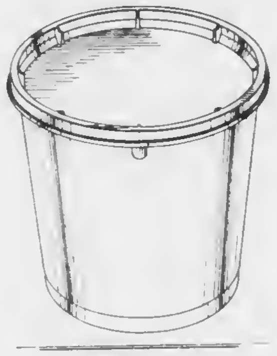
### 317,120
### COMBINED TAMPERPROOF CONTAINER AND CLOSURE

James H. Schwartzburg, Douglas County, assignor to Packer Plastics, Inc., Lawrence, Kans.

Filed May 12, 1986, Ser. No. 862,522

Term of patent 14 years

U.S. Cl. D9—352



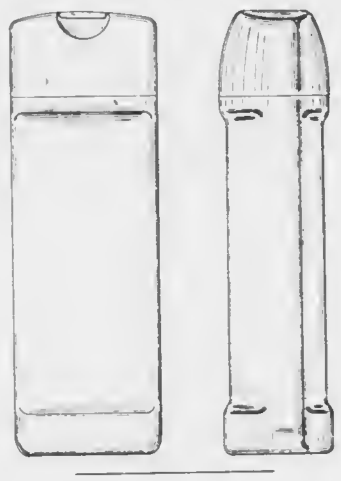
### 317,121
### COMBINED BOTTLE AND DISPENSING CAP

John C. Crawford, Lake Mahopac, N.Y., and Umberto D. I. Segati, Brussels, Belgium, assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Oct. 6, 1988, Ser. No. 254,535

Term of patent 14 years

U.S. Cl. D9—367



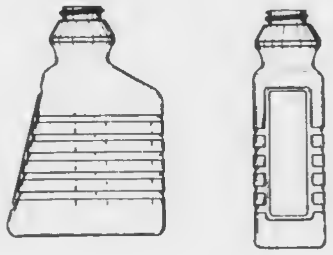
### 317,122
### BOTTLE

Charles R. Owen, Maumelle, Ark., assignor to Charlie O Company, Inc., Oklahoma City, Okla.

Filed Feb. 16, 1989, Ser. No. 311,194

Term of patent 14 years

U.S. Cl. D9—367



### 317,123
### BOTTLE

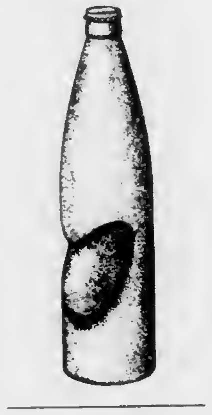
Luigi Colani, Bern, Switzerland, assignor to Valser St. Petersquelle, Vals, Switzerland

Filed Jul. 5, 1989, Ser. No. 375,841

Claims priority, application Switzerland, Jan. 6, 1989, 117139

Term of patent 14 years

U.S. Cl. D9—367



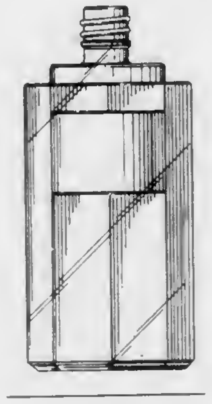
### 317,124
### PERFUME BOTTLE

Jean-Jacques Durand, LaBute, 62510, Arques, France

Filed Feb. 12, 1988, Ser. No. 155,650

Term of patent 14 years

U.S. Cl. D9—400



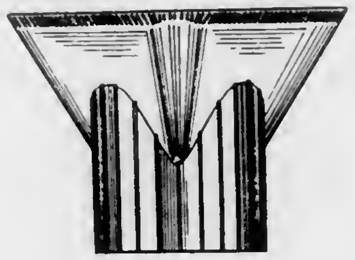
### 317,125
### CONTAINER

Emilio Ambasz, 295 Central Park West, New York, N.Y. 10024

Filed Nov. 1, 1988, Ser. No. 265,665

Term of patent 14 years

U.S. Cl. D9—417



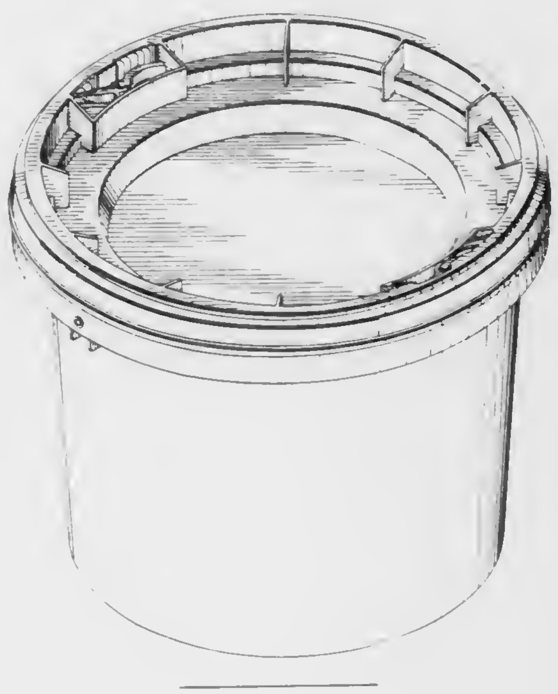
### 317,126
### COMBINED CONTAINER AND LID THEREFOR

Glenn H. Morris, Sr., 1192 Cumberland Rd., Chattanooga, Tenn. 47319

Filed Jun. 9, 1989, Ser. No. 363,947

Term of patent 14 years

U.S. Cl. D9—428



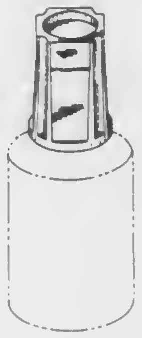
### 317,127
### CLOSURE FOR A BOTTLE OR SIMILAR ARTICLE

Dieter Zubek, Drosselweg 1a, Fed. Rep. of Germany, assignor to Citius Burotechnik, Augsburg, Fed. Rep. of Germany

Filed Oct. 25, 1988, Ser. No. 262,299

Term of patent 14 years

U.S. Cl. D9—435

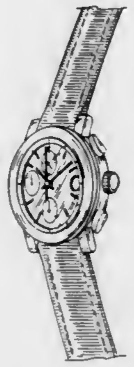


VOL
1126
ISS
4
MY
28
1991
UMI

317,128

### COMBINED WRISTWATCH AND STRAP PORTIONS

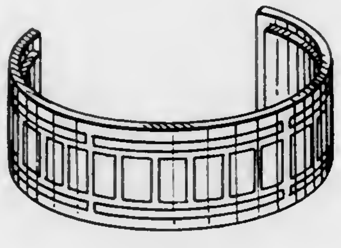
Francis Benson, Engollon, Switzerland, assignor to Girard-Perregaux, S.A., La Chaux-de-Fonds, Switzerland
Filed Apr. 6, 1988, Ser. No. 178,434
Term of patent 14 years
U.S. Cl. D10—32



317,129

### TEMPERATURE MEASURING RING

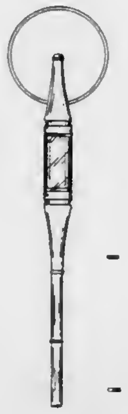
Ernst Beranek, and Peter W. Röhrig, both of Vienna, Austria, assignors to Mam Babyartikel Gesellschaft m.b.H., Vienna, Austria
Filed Apr. 4, 1988, Ser. No. 177,015
Term of patent 14 years
U.S. Cl. D10—57



317,130

### THERMOMETER FOR TESTING WINE TEMPERATURES

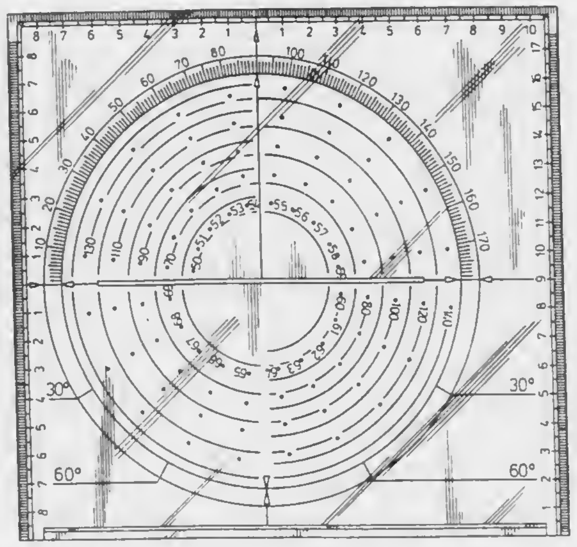
Jean Berney, Les Bioux, Switzerland, assignor to Berney Precision S.A., Switzerland
Filed Dec. 29, 1988, Ser. No. 290,920
Term of patent 14 years
U.S. Cl. D10—57



317,131

### DRAWING INSTRUMENT

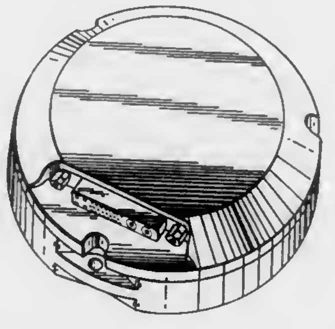
Tak-Wah Kwan, Kowloon, Hong Kong, assignor to Newpros Consumers & Appliance Limited, Kowloon, Hong Kong
Filed Jul. 7, 1988, Ser. No. 220,841
Claims priority, application United Kingdom, Jan. 7, 1988, 1047589
Term of patent 14 years
U.S. Cl. D10—64



317,132

### RING LASER GYROSCOPE HOUSING

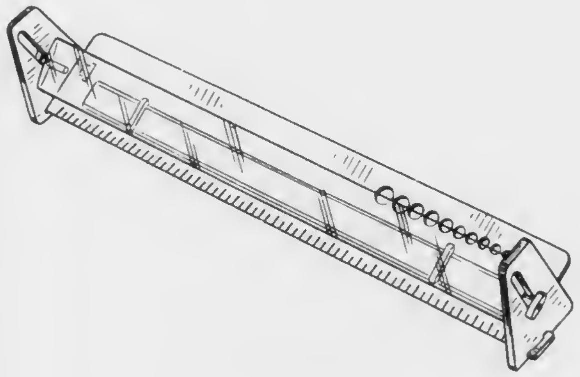
Michael A. Knipfer, Brooklyn Park; James S. Paul, Litchfield, and Robert Derry, Stacy, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.
Filed May 24, 1989, Ser. No. 356,394
Term of patent 14 years
U.S. Cl. D10—65



317,133

### COMBINED RULER AND HOLDER

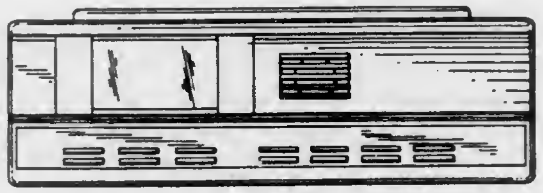
Wilhelm Kissow, Hyrdestien 4, Tune, DK 4000 Roskilde, and Ernst Kissow, Hjortevaenget 144, DK 5800 Nyborg, both of Denmark
Filed Jul. 11, 1988, Ser. No. 217,479
Claims priority, application Denmark, Jan. 12, 1988, 42/88; May 31, 1988, 684/88
Term of patent 14 years
U.S. Cl. D10—71



317,134

### REMOTE WIRELESS DISPLAY FOR A BATHROOM SCALE

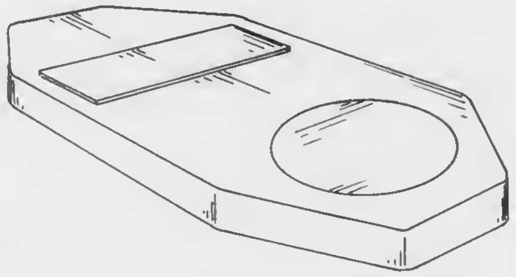
Stephen A. Francis, Milford, Conn., assignor to North American Philips Corp., New York, N.Y.
Division of Ser. No. 943,285, Dec. 17, 1986, Pat. No. D. 305,621. This application Jul. 12, 1989, Ser. No. 378,885
Term of patent 14 years
U.S. Cl. D10—94



317,135

### ELECTRONIC TOILET SEAT SIGNAL REMINDER

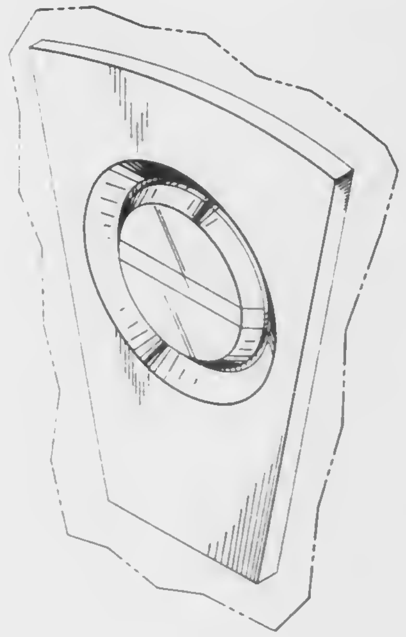
James A. Novack, 12043 Jefferson Bl., Culver City, Calif. 90230
Filed Mar. 30, 1989, Ser. No. 330,732
Term of patent 14 years
U.S. Cl. D10—104



317,136

### HALL LOCATION DIRECTION PANEL FOR ELEVATORS

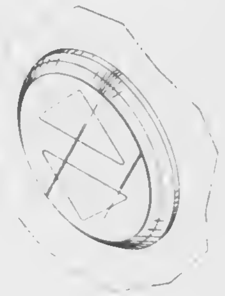
John M. Kulikowski, Glastonbury, and Richard R. Polacek, Simsbury, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.
Filed May 8, 1989, Ser. No. 349,140
Term of patent 14 years
U.S. Cl. D10—108



317,137

### HALL LOCATION DIRECTION PANEL FOR ELEVATORS

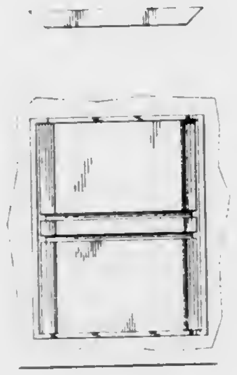
John M. Kulikowski, Glastonbury; Richard R. Polacek, Simsbury, and William Weirsman, Woodbridge, all of Conn., assignors to Otis Elevator Company, Farmington, Conn.
Filed May 12, 1989, Ser. No. 351,142
Term of patent 14 years
U.S. Cl. D10—108



VOL 1126 ISS 4 MY 28 1991 UMI

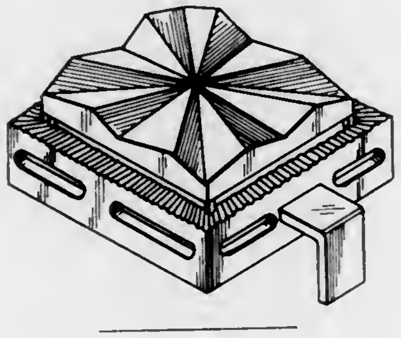
### 317,138
### HALL LOCATION DIRECTION PANEL FOR ELEVATORS

Charles W. Luckhardt, Meriden; Steven B. Davis, New Hartford, and William Weirsman, Shelton, all of Conn., assignors to Otis Elevator Company, Farmington, Conn.
Filed Jun. 19, 1989, Ser. No. 370,516
Term of patent 14 years
U.S. Cl. D10—108



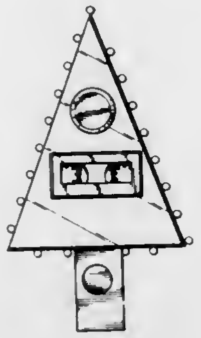
### 317,139
### JEWELRY LINK

Meang Chia, and Cheo Chia, both of Chain & Charm Manufacturers, 412 W. 6th St., Suite #1104, Los Angeles, Calif. 90014
Filed Nov. 15, 1989, Ser. No. 436,667
Term of patent 14 years
U.S. Cl. D11—93



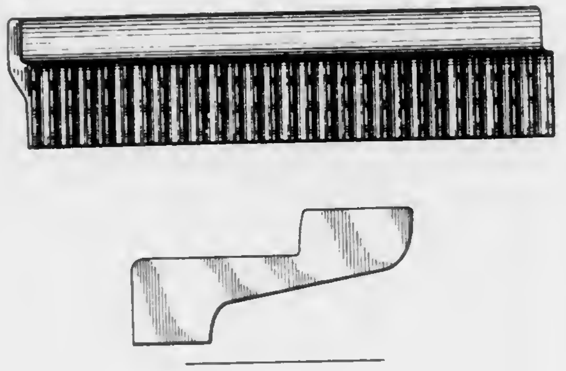
### 317,140
### COMBINED CHRISTMAS TREE ORNAMENT AND CASSETTE PLAYER

Betty B. Black, 307 McLeod Rd., Red Springs, N.C. 28377
Filed Jan. 27, 1988, Ser. No. 148,361
Term of patent 14 years
U.S. Cl. D11—117



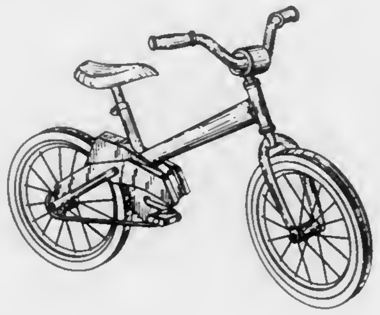
### 317,141
### ADJUSTABLE CLAMP FOR SUPPORTING A RAILWAY RAIL

Harold I. Masteller, Jr., P.O. Box 302, Springtown, Pa. 18081
Filed Feb. 21, 1989, Ser. No. 313,252
Term of patent 14 years
U.S. Cl. D12—51



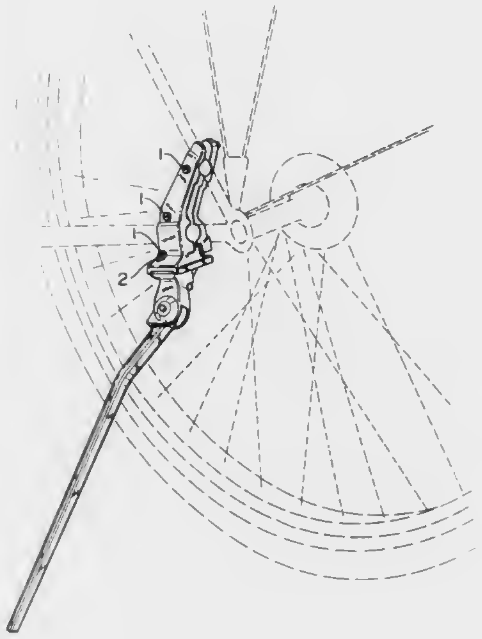
### 317,142
### BICYCLE

Stephen W. Smith, Bedford, Pa., assignor to Hedstrom Corp., Bedford, Pa.
Filed May 5, 1989, Ser. No. 347,940
Term of patent 14 years
U.S. Cl. D12—111



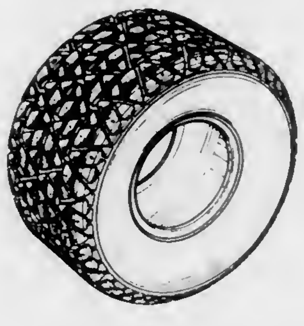
### 317,143
### KICKSTAND FOR A BICYCLE OR SIMILAR ARTICLE

Heinz Weissenberger, Klettgau, Fed. Rep. of Germany, assignor to Gebrueder Pletscher AG, Marthalen, Switzerland
Filed Dec. 19, 1988, Ser. No. 286,494
Claims priority, application Switzerland, Jun. 29, 1988, DM/011 246
Term of patent 14 years
U.S. Cl. D12—120



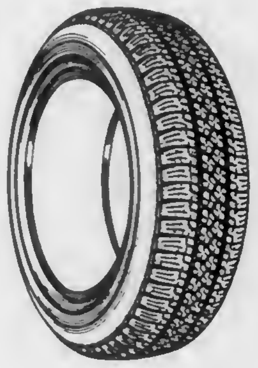
### 317,144
### AUTOMOBILE TIRE

Tetsushi Fujiki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 24, 1989, Ser. No. 328,555
Claims priority, application Japan, Oct. 20, 1988, 63-41176
Term of patent 14 years
U.S. Cl. D12—138



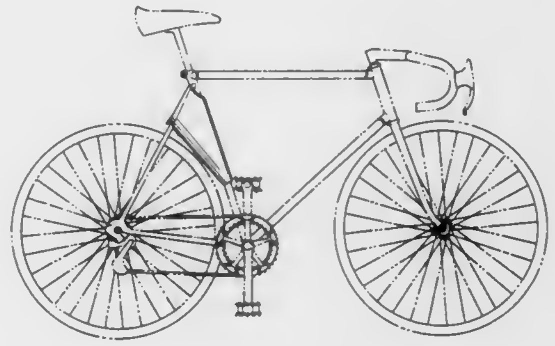
### 317,145
### AUTOMOBILE TIRE

Wako Iwamura, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Jul. 26, 1989, Ser. No. 385,183
Claims priority, application Japan, Feb. 1, 1989, 1-3459
Term of patent 14 years
U.S. Cl. D12—146



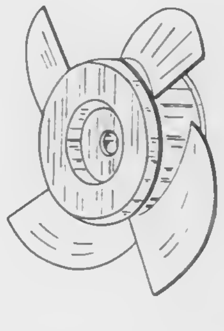
### 317,146
### DRINK HOLDER FOR A BICYCLE

Kevin D. Runkel, Midkiff, Tex., assignor to Bikestream, Inc., Midland, Tex.
Filed Apr. 10, 1989, Ser. No. 335,536
Term of patent 14 years
U.S. Cl. D12—158



### 317,147
### PROPELLER

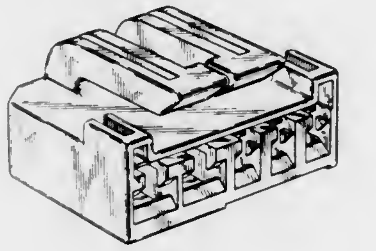
R. Douglas Hannon, and George E. Lackman, both of Odessa, Fla., assignors to Zebco Corporation, Tulsa, Okla.
Filed Jul. 24, 1989, Ser. No. 384,672
Term of patent 14 years
U.S. Cl. D12—214



VOL
1126
ISS
4
MY
28
1991
UMI

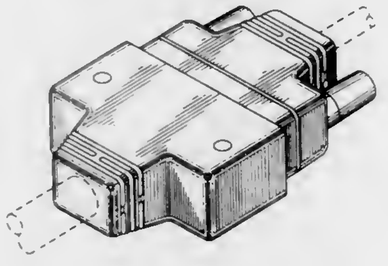
### 317,148
### HOUSING FOR AN ELECTRICAL CONNECTOR

**Seiji Kozono, and Masaru Fukuda, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan**
**Filed May 1, 1989, Ser. No. 346,867**
**Claims priority, application Japan, Nov. 1, 1988, 63-42696**
**Term of patent 14 years**
U.S. Cl. D13—146



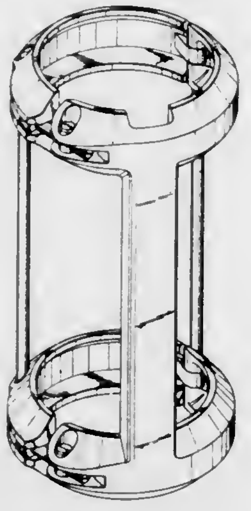
### 317,149
### REMOTE CABLE CONNECTOR OR SIMILAR ARTICLE

**William C. Phelps, and Alfred D. Meyers, both of Arlington, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Jun. 5, 1989, Ser. No. 361,601**
**Term of patent 14 years**
U.S. Cl. D13—147



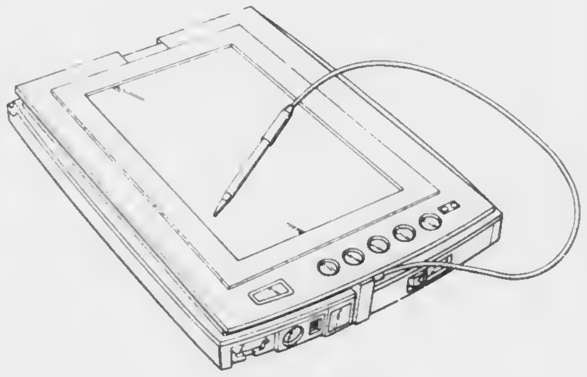
### 317,150
### CABLE PROTECTOR

**Harald Schmidt, Stavanger; Helge Skorve, and Jan Freyer, both of Hafrsfjord, all of Norway, assignors to Lasalle IPR A/S, Stavanger, Norway**
**Filed Dec. 15, 1988, Ser. No. 284,480**
**Claims priority, application Norway, Jun. 22, 1988, 69476**
**Term of patent 14 years**
U.S. Cl. D13—154



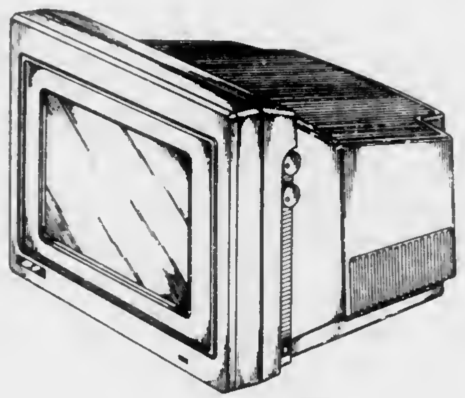
### 317,151
### INFORMATION DISPLAY AND ENTRY UNIT

**John J. Daly, San Carlos, Calif., assignor to GRiD Systems Corporation, Fremont, Calif.**
**Filed Jun. 12, 1989, Ser. No. 365,261**
**Term of patent 14 years**
U.S. Cl. D14—100



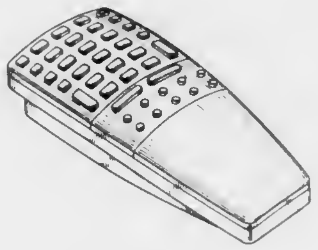
### 317,152
### VIDEO MONITOR

**John F. Czech, Mt. Prospect; Irving M. Drucker, Des Plaines, both of Ill.; Peter A. Ojeda, St. Joseph, and Anton R. Poole, Stevensville, both of Mich., assignors to Zenith Electronics Corporation, Glenview, Ill.**
**Filed May 24, 1989, Ser. No. 356,717**
**Term of patent 14 years**
U.S. Cl. D14—113



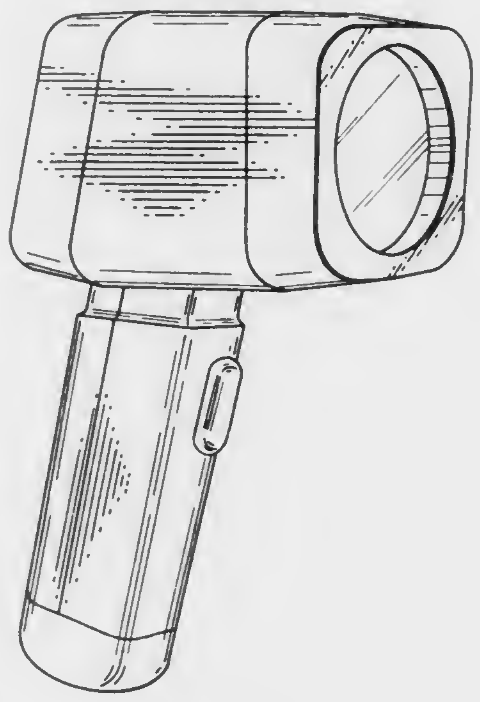
### 317,153
### COMPUTER MOUSE

**Kirk F. MacKenzie, 1558 Siesta Dr., Los Altos, Calif. 94022**
**Filed Dec. 8, 1988, Ser. No. 281,482**
**Term of patent 14 years**
U.S. Cl. D14—114



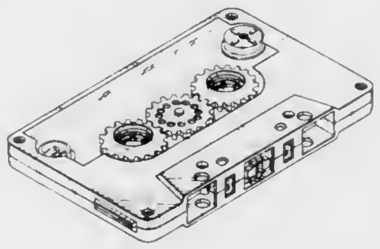
### 317,154
### BAR CODE SCANNER OR SIMILAR ARTICLE

**David M. J. Allgeier, Cumberland, Ohio, assignor to NCR Corporation, Dayton, Ohio**
**Filed May 8, 1989, Ser. No. 348,935**
**Term of patent 14 years**
U.S. Cl. D14—116



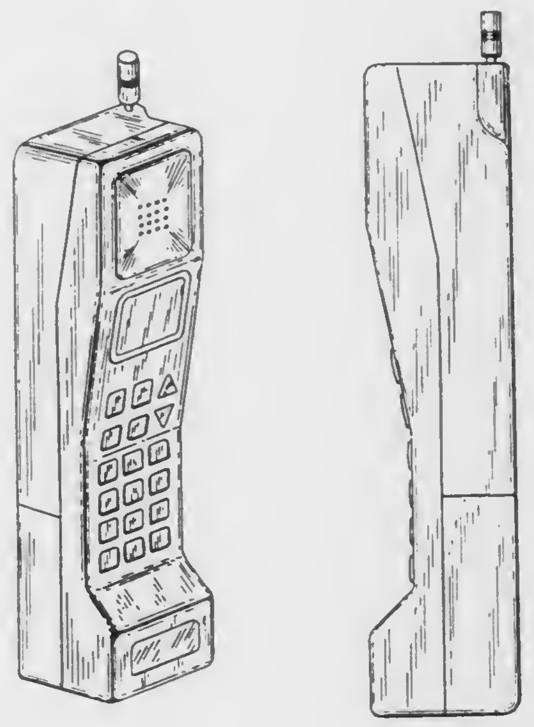
### 317,155
### DEMAGNETIZER FOR MAGNETIC HEAD OF CASSETTE TAPE RECORDER

**Hidehisa Hashimoto, Funabashi, Japan, assignor to TDK Corporation, Tokyo, Japan**
**Filed Jul. 24, 1987, Ser. No. 77,328**
**Term of patent 14 years**
U.S. Cl. D14—121



### 317,156
### PORTABLE HANDHELD TELEPHONE

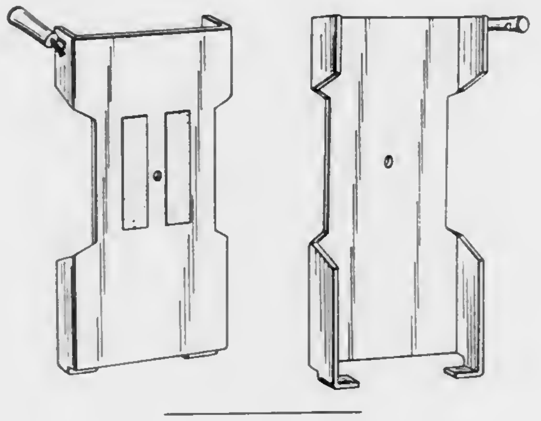
**Fernd Van Engelen; Bradley Clarkson, and William Mak, all of Calgary, Canada, assignors to NovAtel, Calgary, Canada**
**Filed Dec. 12, 1989, Ser. No. 449,609**
**Term of patent 14 years**
U.S. Cl. D14—138



VOL
126
SS
4
MY
28
1991
UMI

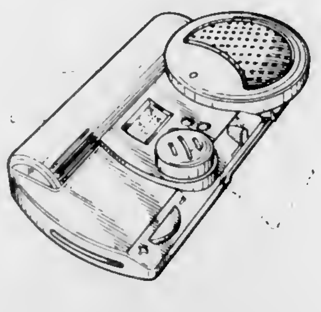
### 317,157
### SUPPORT HOLDER FOR PORTABLE HANDSET TELEPHONE

Bjorn Jondelius, Upplandsgatan 84, S-113 44 Stockholm, Sweden
Filed Apr. 28, 1989, Ser. No. 344,858
Claims priority, application Sweden, Jan. 23, 1989, 890177
Term of patent 14 years
U.S. Cl. D14—253



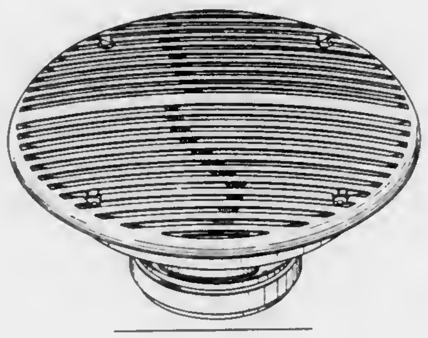
### 317,158
### WRIST RECORDER

Barry Wingate, San Jose, Calif., assignor to Chatter Box, Inc., Santa Clara, Calif.
Filed May 31, 1990, Ser. No. 530,986
Term of patent 14 years
U.S. Cl. D14—167



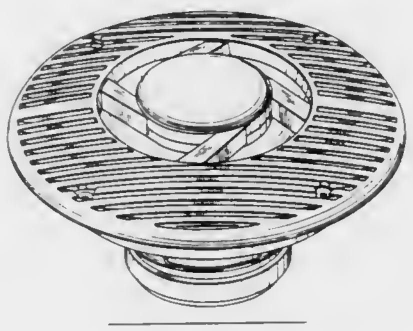
### 317,159
### LOUDSPEAKER

Hideaki Kurata, and Eiji Shintani, both of Tokyo, Japan, assignors to Pioneer Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 20, 1989, Ser. No. 368,547
Claims priority, application Japan, Dec. 27, 1988, 63-51032
Term of patent 14 years
U.S. Cl. D14—216



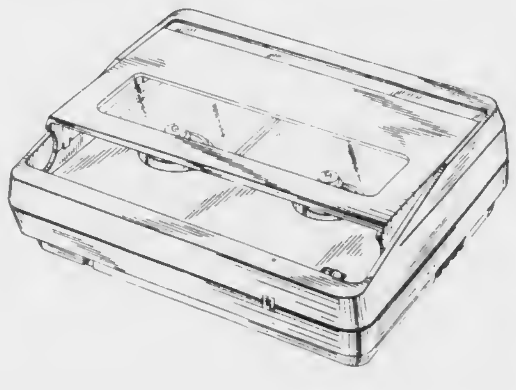
### 317,160
### LOUDSPEAKER

Hideaki Kurata, and Eiji Shintani, both of Tokyo, Japan, assignors to Pioneer Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 20, 1989, Ser. No. 369,543
Claims priority, application Japan, Dec. 27, 1988, 63-51031
Term of patent 14 years
U.S. Cl. D14—216



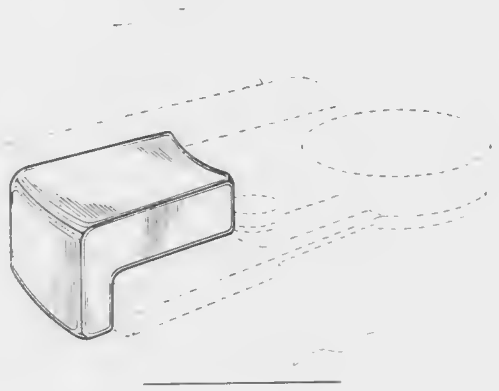
### 317,161
### VIDEO CASSETTE REWINDER

Mei-Kwei Hsu, No. 239, Sec. 4, Chung Ching North Road, Taipei, Taiwan
Filed Dec. 12, 1988, Ser. No. 283,878
Term of patent 14 years
U.S. Cl. D14—217



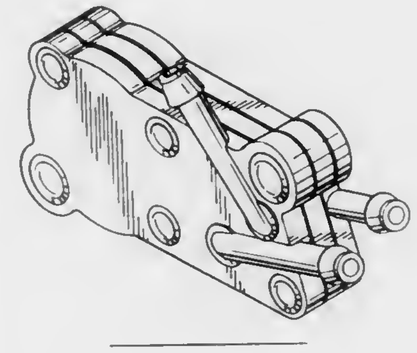
### 317,162
### MODULE FOR A WRIST RECORDER

Barry Wingate, San Jose, Calif., assignor to Chatter Box, Inc., Santa Clara, Calif.
Filed May 31, 1990, Ser. No. 532,491
Term of patent 14 years
U.S. Cl. D14—260



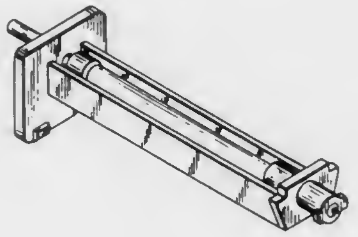
### 317,163
### FUEL PUMP FOR AN ENGINE FOR A MODEL

Akira Kaneko, Osaka, Japan, assignor to O.S. Engines Mfg. Co., Ltd., Osaka, Japan
Filed Nov. 8, 1988, Ser. No. 268,991
Term of patent 14 years
U.S. Cl. D15—5



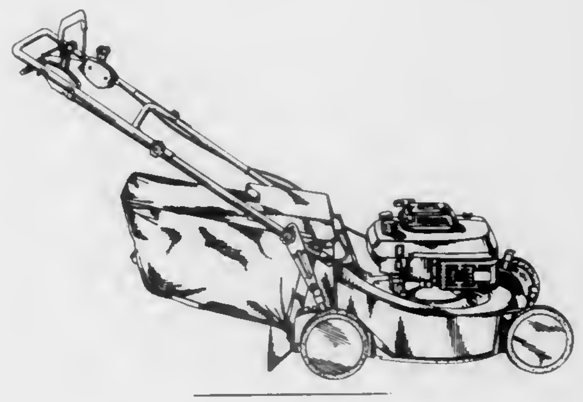
### 317,164
### PUMP TUBE MOUNT

Charles Kienholz, San Dimas, Calif., assignor to I-Flow Corporation, Irvine, Calif.
Filed Jan. 24, 1989, Ser. No. 301,731
Term of patent 14 years
U.S. Cl. D15—7



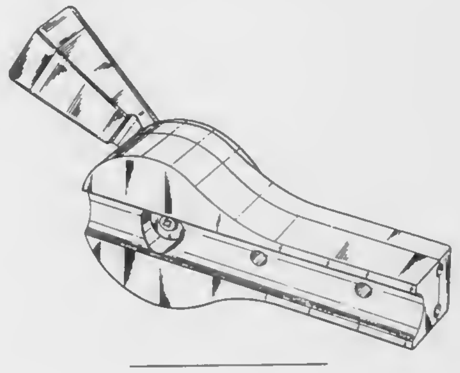
### 317,165
### LAWN MOWER

Kenneth D. Schweitz, Oconomowoc; Dean W. Benter, Horicon, both of Wis., and Kevin F. Thompson, Brooklyn, N.Y., assignors to Deere & Company, Moline, Ill.
Filed Oct. 26, 1988, Ser. No. 261,820
Term of patent 14 years
U.S. Cl. D15—14



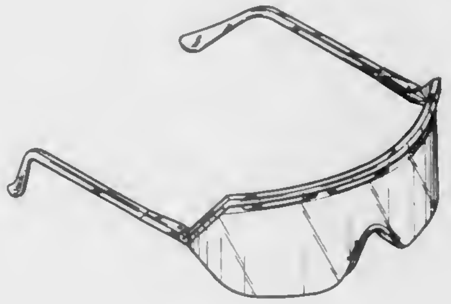
### 317,166
### THROTTLE CONTROL

Christian Häggstam, Rapsgatan 5, S-573 00 Tranås, Sweden
Filed Feb. 16, 1988, Ser. No. 155,774
Claims priority, application Sweden, Sep. 4, 1987, 87-1965
Term of patent 14 years
U.S. Cl. D15—17



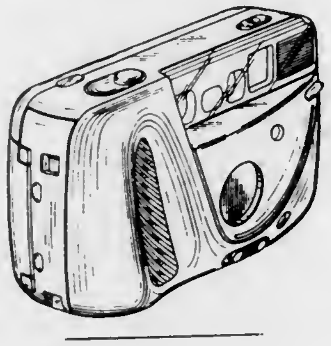
### 317,167
### SUNGLASSES

Philip Downey, 3409 E. Cortez St., West Covina, Calif. 91791
Filed Apr. 21, 1988, Ser. No. 184,591
Term of patent 14 years
U.S. Cl. D16—102

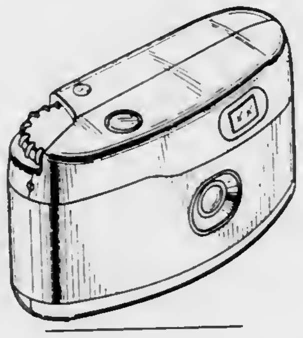


VOL
126
SS
4
MY
28
1991
UMI

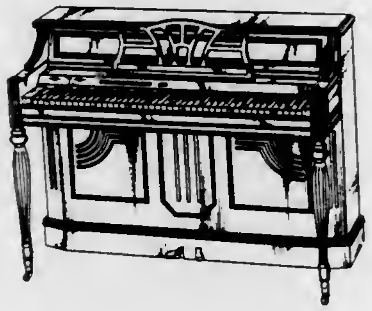
317,168
**CAMERA**
Jun Akabane, Tokyo, and Yasuki Nagaoka, Ohmiya, both of Japan, assignors to Nikon Corporation, Tokyo, Japan
Filed Jul. 21, 1988, Ser. No. 222,035
Claims priority, application Japan, Feb. 23, 1988, 63-7125
Term of patent 14 years
U.S. Cl. D16—209



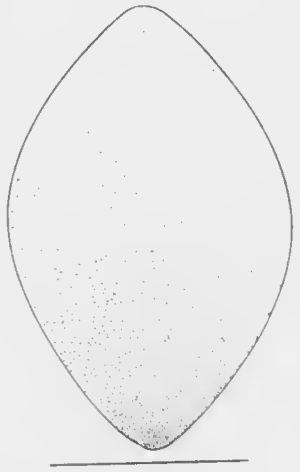
317,169
**CAMERA**
Makoto Isozaki, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Jul. 25, 1988, Ser. No. 233,967
Claims priority, application Japan, Jan. 25, 1988, 63-2606; Jan. 25, 1988, 63-2607; Jan. 25, 1988, 63-2608; Jan. 25, 1988, 63-2609; Jan. 25, 1988, 63-02610; Jan. 25, 1988, 63-2611; Feb. 27, 1988, 63-7917; Feb. 27, 1988, 63-7918; Feb. 27, 1988, 63-7919
Term of patent 14 years
U.S. Cl. D16—218



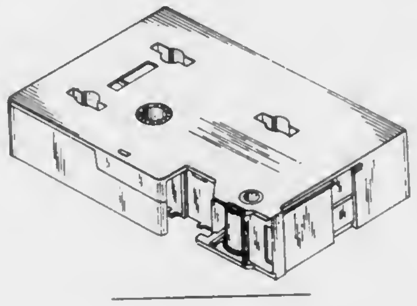
317,170
**ELECTRONIC PIANO**
Jung H. Dong, Seoul, Rep. of Korea, assignor to Samick Music Corporation, La Puente, Calif.
Filed Jul. 1, 1988, Ser. No. 214,375
Term of patent 14 years
U.S. Cl. D17—7



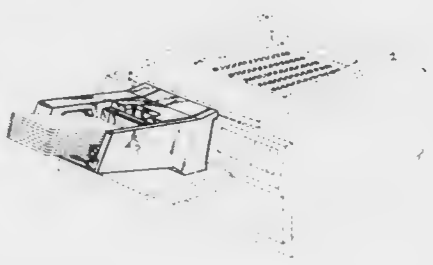
317,171
**GUITAR PICK**
Brett S. Saks, 810 Wadsworth Ave., FSU Box 689, Tallahassee, Fla. 32304
Filed Apr. 11, 1988, Ser. No. 180,856
Term of patent 14 years
U.S. Cl. D17—20



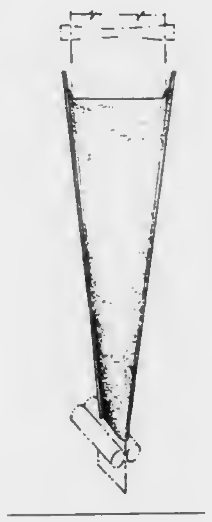
317,172
**INK RIBBON CASSETTE**
Akira Miyamoto; Tokushige Ohmiya; Genichiro Ohtani; Setsuo Kawai; Kenji Watanabe; Goro Iijima; Takeshi Matsubara, and Takanobu Kameda, all of Tokyo, Japan, assignors to King Jim Co., Ltd., Tokyo, Japan
Filed Dec. 29, 1988, Ser. No. 291,878
Claims priority, application Japan, Jul. 7, 1988, 63-26877
Term of patent 14 years
U.S. Cl. D18—12



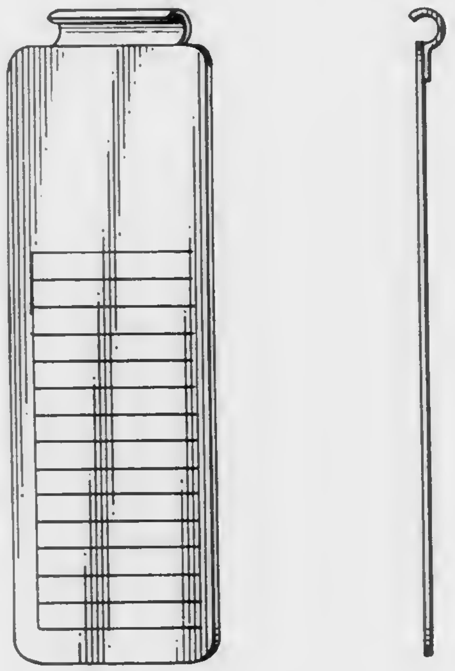
317,173
**ENVELOPE SUPPLY TRAY FOR PRINTER**
Tatsuo Kojima, and Takashi Yomo, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 11, 1988, Ser. No. 217,272
Claims priority, application Japan, Jan. 12, 1988, 63-951
Term of patent 14 years
U.S. Cl. D18—22



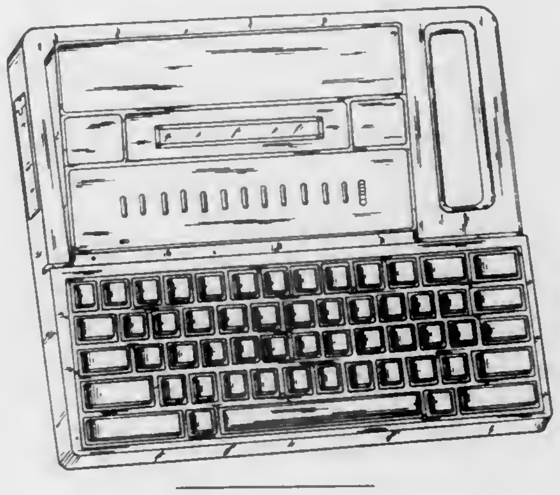
317,174
**SHEET FORMER FOLDER**
James R. Wood, 240 Oak Tree Dr., Salem, Ill. 62881
Filed Dec. 30, 1987, Ser. No. 139,363
Term of patent 14 years
U.S. Cl. D18—34



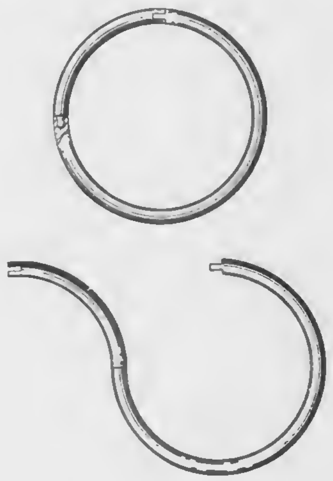
317,175
**COMBINED BOOKMARK AND WRITING INSTRUMENT CLIP**
Sandra L. Dickson, P.O. Box 1176, Newnan, Ga. 30263
Filed Aug. 8, 1989, Ser. No. 390,916
Term of patent 14 years
U.S. Cl. D19—34



317,176
**ELECTRONIC LEARNING AID**
David Cheung, Kowloon, Hong Kong, assignor to Video Technology Industries, Inc., Wheeling, Ill.
Filed Apr. 15, 1988, Ser. No. 182,050
Claims priority, application United Kingdom, Nov. 6, 1987, 1046115
Term of patent 14 years
U.S. Cl. D19—60



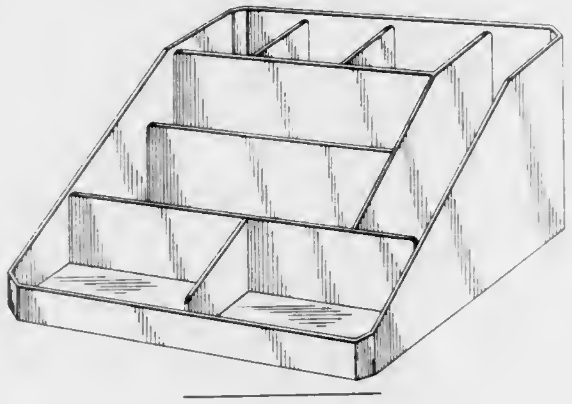
317,177
**OPENABLE RING**
Luis Wandemberg-Boschetti, P.O. Box 635, Quito, Ecuador
Filed May 13, 1987, Ser. No. 49,684
Term of patent 14 years
U.S. Cl. D19—65



VOL
126
SS
4
MY
28
1991
UMI

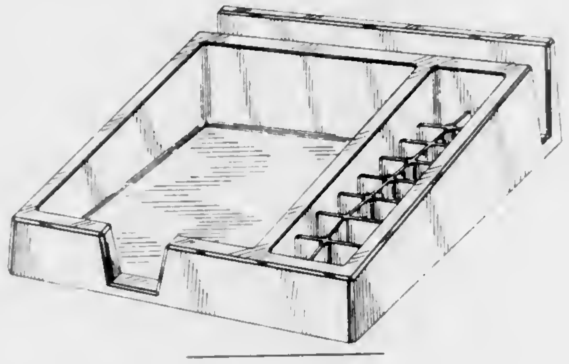
### 317,178
### DESK ORGANIZER

Heng G. Kheng, Singapore, Singapore, assignor to Metro Plastic Industry Pte. Hd., Singapore, Singapore
Filed Jun. 2, 1988, Ser. No. 201,619
Term of patent 14 years
U.S. Cl. D19—75



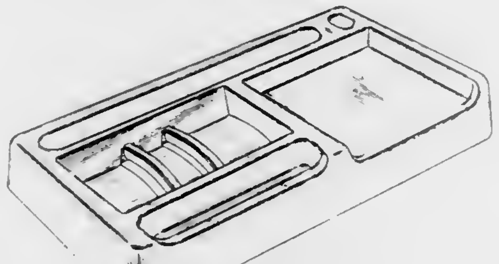
### 317,179
### COMBINED HOLDER FOR MEMO PAD AND WRITING INSTRUMENTS

Heng G. Kheng, Singapore, Singapore, assignor to Metro Plastic Industry Pte. Ltd., Singapore, Singapore
Filed Jun. 2, 1988, Ser. No. 201,618
Term of patent 14 years
U.S. Cl. D19—78



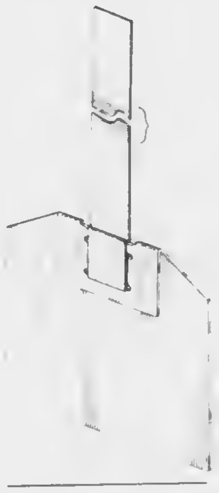
### 317,180
### DESK CADDY

John Leszczak, Roselle Park, N.J., assignor to The Bates Manufacturing Company, Hackettstown, N.J.
Filed Jul. 27, 1988, Ser. No. 225,093
Term of patent 14 years
U.S. Cl. D19—78



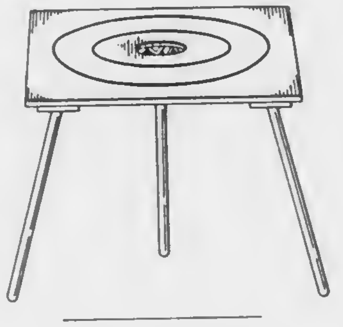
### 317,181
### BAGGAGE TAG

Hideaki Nozawa, Tokyo, Japan, assignor to Shiroh Shirakawa, Tokyo, Japan
Filed May 31, 1988, Ser. No. 200,499
Term of patent 14 years
U.S. Cl. D20—22



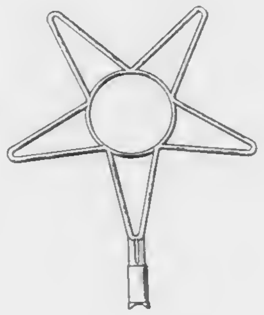
### 317,182
### PROJECTILE GAME TARGET

Frederick L. Gates, 7 Greenbriar Dr., Rochester, N.Y. 14624
Filed Jul. 25, 1988, Ser. No. 223,533
Term of patent 14 years
U.S. Cl. D21—5



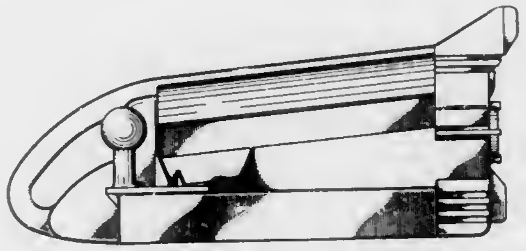
### 317,183
### BUBBLE WAND

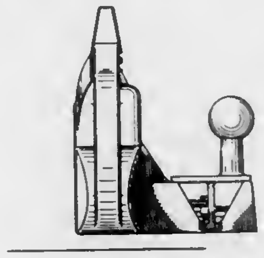
Richard L. Neuroth; Margerate A. B. Neuroth, both of R.R. Box 178-A, Epworth, Iowa 52045; Richard A. Robertson, and Elizabeth A. Robertson, both of 3065 Hales Mill Rd., Dubuque, Iowa 52001
Filed Jun. 13, 1989, Ser. No. 365,503
Term of patent 14 years
U.S. Cl. D21—61



### 317,184
### ROCKET TOY

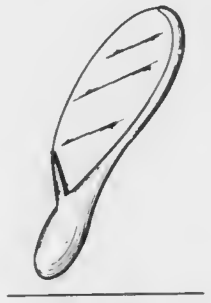
David E. Moomaw, and Janet E. Snell-Kelly, both of East Aurora, N.Y., assignors to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 11, 1988, Ser. No. 256,294
Term of patent 14 years
U.S. Cl. D21—82





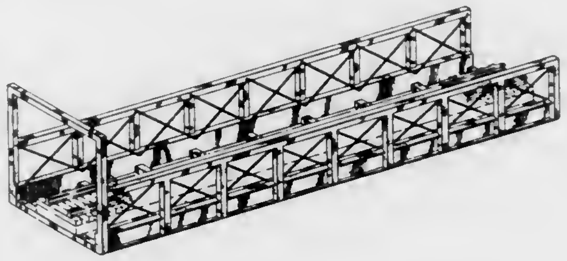
### 317,185
### AERIAL TOY

Michael C. Herring, Ste. 33-166, 4555 N. Pershing Ave., Stockton, Calif. 95207
Filed May 1, 1989, Ser. No. 346,020
Term of patent 14 years
U.S. Cl. D21—82



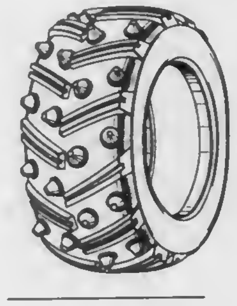
### 317,186
### MODEL RAILROAD TRAIN TRESTLE SECTION

Henry W. Schaefer, Gahanna, Ohio, assignor to The Great Train Store Corporation, Dallas, Tex.
Filed Nov. 30, 1988, Ser. No. 277,923
Term of patent 14 years
U.S. Cl. D21—141



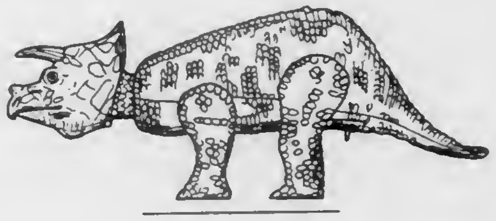
### 317,187
### TIRE FOR TOY VEHICLE

Tomoharu Suzuki, Shizuoka, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan
Filed Apr. 7, 1989, Ser. No. 334,946
Claims priority, application Japan, Oct. 7, 1988, 63-39225
Term of patent 14 years
U.S. Cl. D21—141



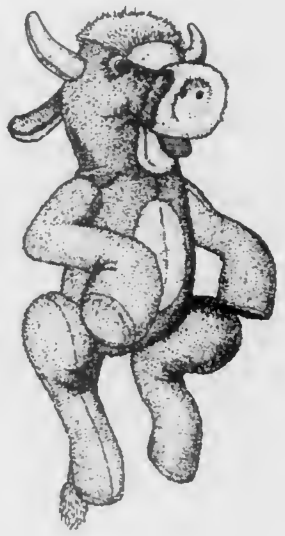
### 317,188
### TOY FIGURE

Leo S. Volpe, Mt. Laurel, N.J.; Frederick W. Kruger, Jr., Levittown, Pa., and Derek Brand, Ventura, Calif., assignors to Tyco Industries, Inc., Mt. Laurel, N.J.
Filed Aug. 12, 1988, Ser. No. 231,815
Term of patent 14 years
U.S. Cl. D21—148



### 317,189
### COW PUPPET

Catherine M. Senitt, R.R. #1, Carnarvon, Ontario, Canada K0M 1J0
Filed Aug. 9, 1988, Ser. No. 230,261
Term of patent 14 years
U.S. Cl. D21—153

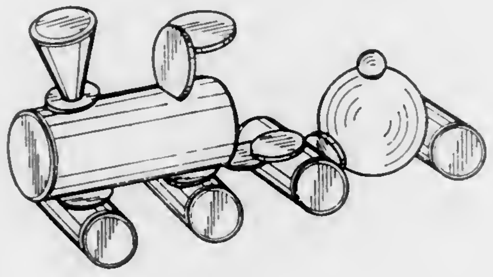


OL
126
SS
4
MY
28
1991
UMI

317,190

### TOY LOCOMOTIVE

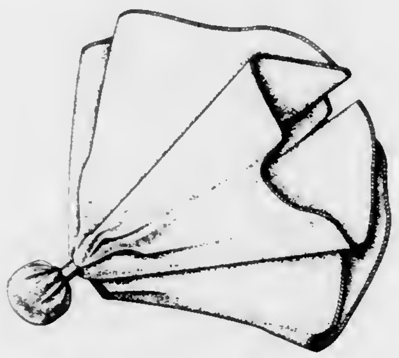
Sanja Boljević, Hercigonjina 5, 4100 Zegreb, Yugoslavia
Filed May 23, 1988, Ser. No. 197,393
Claims priority, application Yugoslavia, Nov. 25, 1987, M713/87
Term of patent 14 years
U.S. Cl. D21—129



317,191

### FOOTBALL PENALTY FLAG

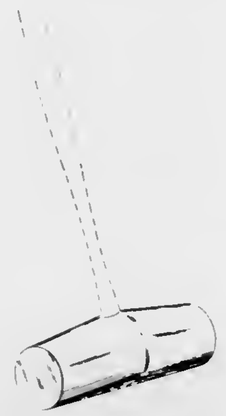
Robert B. Williams, 3808 Countryside La., Sarasota, Fla. 34233, and Linda Kuiken, 2446 Hyde Park St., Sarasota, Fla. 34239
Filed Aug. 25, 1987, Ser. No. 89,612
Term of patent 14 years
U.S. Cl. D21—199



317,192

### CROQUET MALLET HEAD

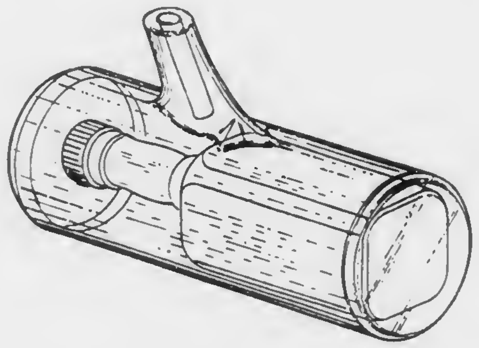
Garth Eliassen, P.O. Box 5, Sonoma, Calif. 95476
Filed Dec. 4, 1986, Ser. No. 938,120
Term of patent 14 years
U.S. Cl. D21—211



317,193

### NOVELTY GOLF PUTTER HEAD

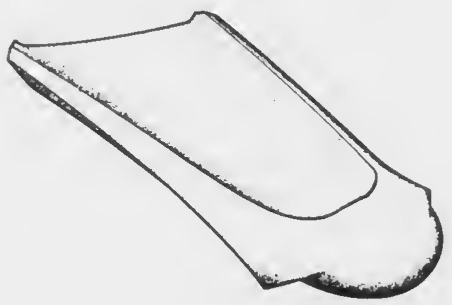
Raymond J. Florian, 14440 Elwell Rd., Belleville, Mich. 48111
Division of Ser. No. 803,848, Nov. 4, 1985, Pat. No. Des. 303,559. This application Apr. 3, 1989, Ser. No. 332,115
Term of patent 14 years
U.S. Cl. D21—215



317,194

### BODY SURFING BOARD

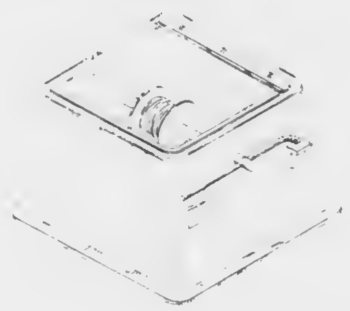
Eric J. Brocone, 817 Oliver, Pacific Beach, Calif. 92103, and Dennis L. Miller, 1208 E. 12 Mile Rd., Royal Oak, Mich. 48073
Filed Jun. 6, 1988, Ser. No. 204,186
Term of patent 14 years
U.S. Cl. D21—228



317,195

### ICE FISHING TIP-UP SIGNAL

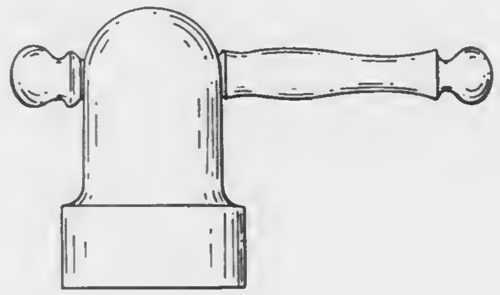
Ronald L. Hackel, Abbotsford, Wis., assignor to Diversified Enterprises of America, Inc., Abbotsford, Wis.
Filed Aug. 15, 1988, Ser. No. 231,974
Term of patent 14 years
U.S. Cl. D22—134

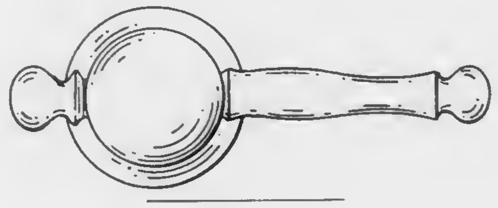


317,196

### FAUCET HANDLE

Tom E. Robbins, San Leandro, Calif., assignor to Kallista, Inc., San Leandro, Calif.
Filed Sep. 19, 1988, Ser. No. 245,548
Term of patent 14 years
U.S. Cl. D23—252

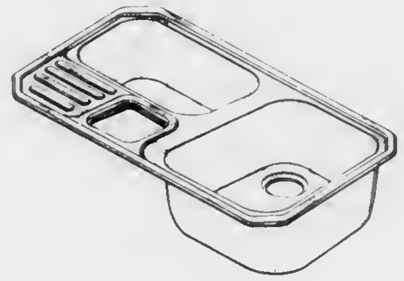




317,197

### SINK

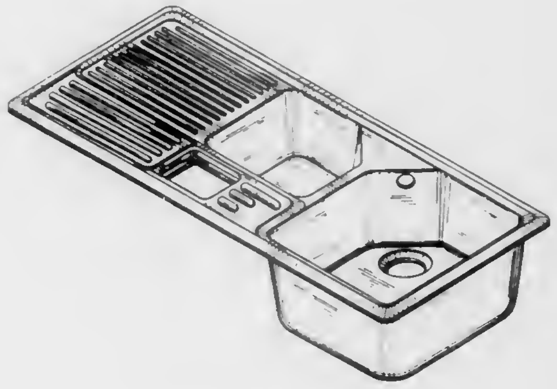
Klaus W. Göcke, Detmold, and Manfred Mück, Kürnbach, both of Fed. Rep. of Germany, assignors to Blanco GmbH & Co. KG, Oberderdingen, Fed. Rep. of Germany
Filed Jun. 20, 1989, Ser. No. 368,541
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, M8804062.3
Term of patent 14 years
U.S. Cl. D23—290



317,198

### SINK

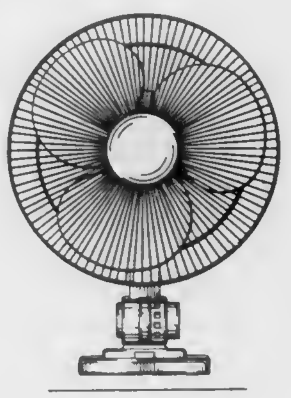
Klaus W. Göcke, Detmold, and Manfred Mück, Kürnbach, both of Fed. Rep. of Germany, assignors to Blanco GmbH & Co. KG, Oberderdingen, Fed. Rep. of Germany
Filed Jun. 20, 1989, Ser. No. 368,542
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, M 88 04 061.5
Term of patent 14 years
U.S. Cl. D23—290



317,199

### PORTABLE ELECTRICAL FAN

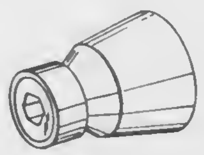
Jui-Shang Wang, Taipei, Taiwan, assignor to Duracraft Corporation, Sudbury, Mass.
Filed Aug. 9, 1989, Ser. No. 391,266
Term of patent 14 years
U.S. Cl. D23—382



317,200

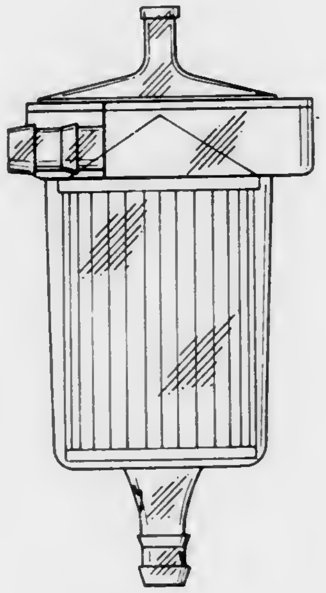
### CONNECTION SLEEVE FOR A DENTAL IMPLANT

Lars Jorneus, Gothenburg, Sweden, assignor to Nobelpharma AB, Gothenburg, Sweden
Filed Apr. 28, 1989, Ser. No. 344,843
Claims priority, application Sweden, Nov. 1, 1988, 882474
Term of patent 14 years
U.S. Cl. D24—156

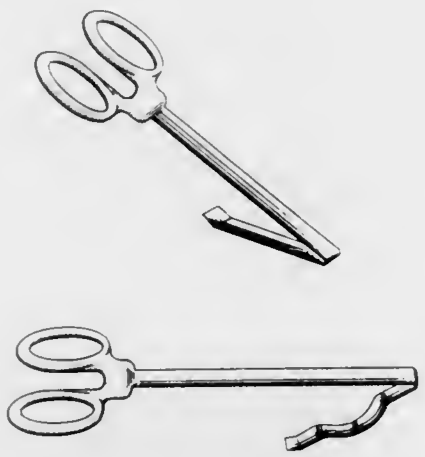


VOL
1126
ISS
4
MY
28
1991
UMI

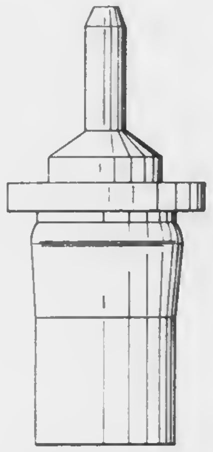
317,201
### BLOOD FILTER
Yoshihisa Sone, Tokyo, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 5, 1988, Ser. No. 152,856
Claims priority, application Japan, Sep. 2, 1987, 62-35560
Term of patent 14 years
U.S. Cl. D24—162



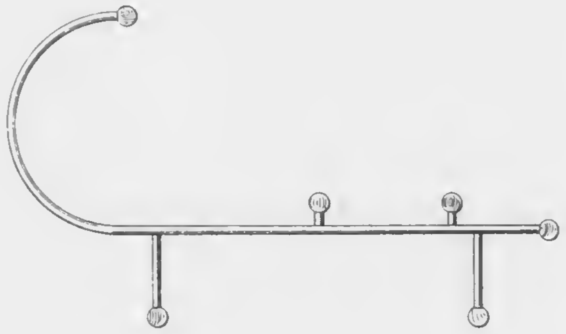
317,202
### BONE RETRACTOR
Randall J. Torre, 842 S. Clover, San Jose, Calif. 95128
Filed Mar. 31, 1989, Ser. No. 332,094
Term of patent 14 years
U.S. Cl. D24—135



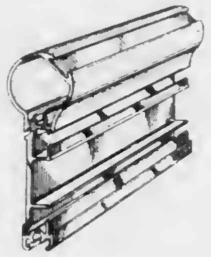
317,203
### DROPPER TIP OR SIMILAR ARTICLE
William Walsh, 3832 Beech Ave., Baltimore, Md. 21211
Filed Sep. 23, 1987, Ser. No. 100,009
Term of patent 14 years
U.S. Cl. D24—112



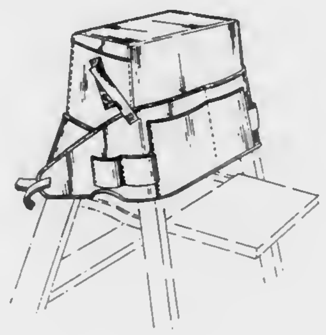
317,204
### MASSAGER
Daniel J. Henneseey, 445 S. Bryant St., Denver, Colo. 80219
Filed Aug. 21, 1989, Ser. No. 396,002
Term of patent 14 years
U.S. Cl. D24—211



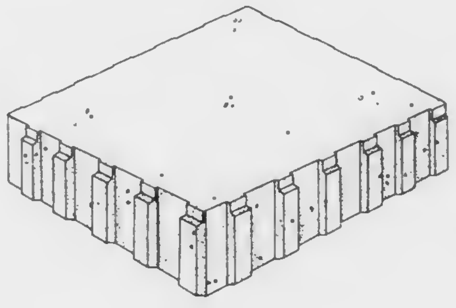
317,205
### HANDRAIL SECTION
Hans-Erik Johansson, Växjö, Sweden, assignor to Söderhamn Innovation AB, Söderhamn, Sweden
Filed Oct. 13, 1988, Ser. No. 257,045
Claims priority, application Sweden, Apr. 13, 1988, 88-0898
Term of patent 14 years
U.S. Cl. D25—38



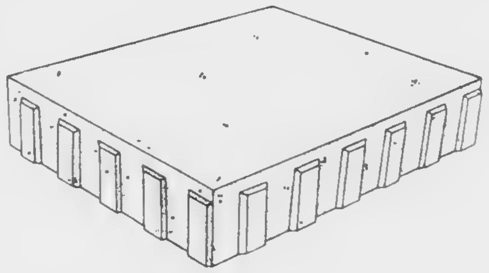
317,206
### LADDER BAG TOOL HOLDER
Glen D. Cagle, Sepulveda, Calif., assignor to Olisar Cagle International Inc., Los Angeles, Calif.
Filed Aug. 9, 1988, Ser. No. 230,475
Term of patent 14 years
U.S. Cl. D25—68



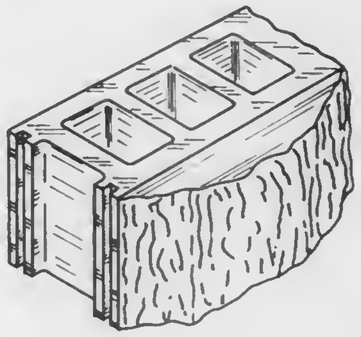
317,207
### PAVING STONE
Rolf Scheiwiller, Buolterlistrasse 9, CH-6052 Hergiswil, Switzerland
Filed Jun. 21, 1988, Ser. No. 209,351
Claims priority, application Int'l Pat. Institute, Dec. 21, 1987, DMA/000/707
Term of patent 14 years
U.S. Cl. D25—113



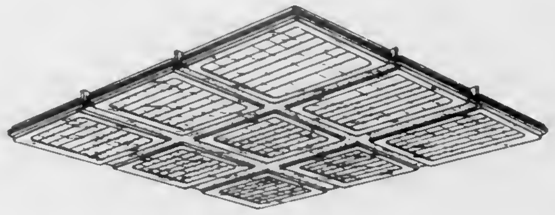
317,208
### PAVING STONE
Rolf Scheiwiller, Buolterlistrasse 9, CH-6052 Hergiswil, Switzerland
Filed Jun. 21, 1988, Ser. No. 209,356
Claims priority, application Int'l Pat. Institute, Dec. 21, 1987, DMA/000/706
Term of patent 14 years
U.S. Cl. D25—113



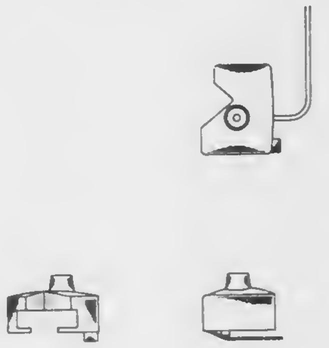
317,209
### CORNER WALL BLOCK
Paul J. Forsberg, 7600 France Ave. South, Ste. 110, Edina, Minn. 55435
Continuation-in-part of Ser. No. 863,339, May 14, 1986, Pat. No. D. 301,064. This application Dec. 5, 1988, Ser. No. 280,301
The portion of the term of this patent subsequent to May 21, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—114



317,210
### CEILING PANEL UNIT
Daniel V. Rodriguez, Mareno Valley, and Bruce P. Carey, Saugus, both of Calif., assignors to USG Interiors, Inc., Chicago, Ill.
Filed Feb. 8, 1988, Ser. No. 153,656
Term of patent 14 years
U.S. Cl. D25—138



317,211
### MICROPHONE ATTACHED LIGHT WITH LIP ACTIVATED SWITCH
Walter E. Segeren, 208 Miller Dr., Newton, Ala. 36352
Filed Jul. 23, 1987, Ser. No. 76,923
Term of patent 14 years
U.S. Cl. D26—24



VOL
1126
ISS
4
MY
28
1991
UMI

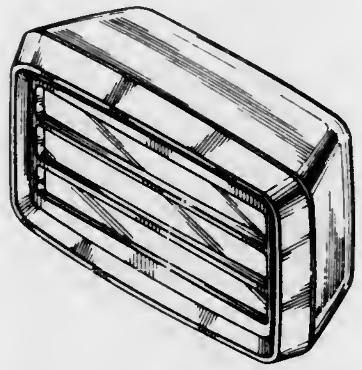
### 317,212
### VEHICLE LAMP

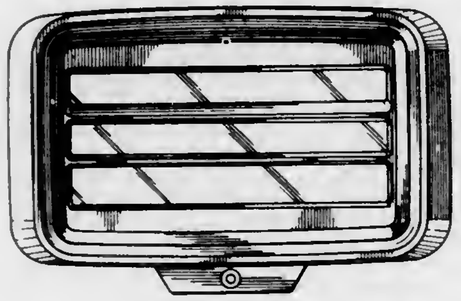
Ian J. Fettes, Newport Beach, and Frederik L. A. deRonde, Covina, both of Calif., assignors to The Grote Manufacturing Company, Inc., Madison, Ind.

Filed Feb. 4, 1988, Ser. No. 152,356

Term of patent 14 years

U.S. Cl. D26—28





### 317,213
### SPOTLIGHT HOUSING

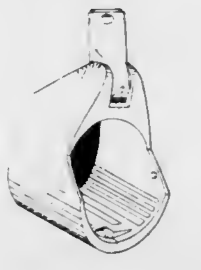
Bruno Gecchelin, Milan, Italy, assignor to Iguzzini Illuminazione S.p.A., Recanati, Italy

Filed Mar. 7, 1988, Ser. No. 164,630

Claims priority, application Italy, Sep. 15, 1987, 22337/87[U]

Term of patent 14 years

U.S. Cl. D26—63



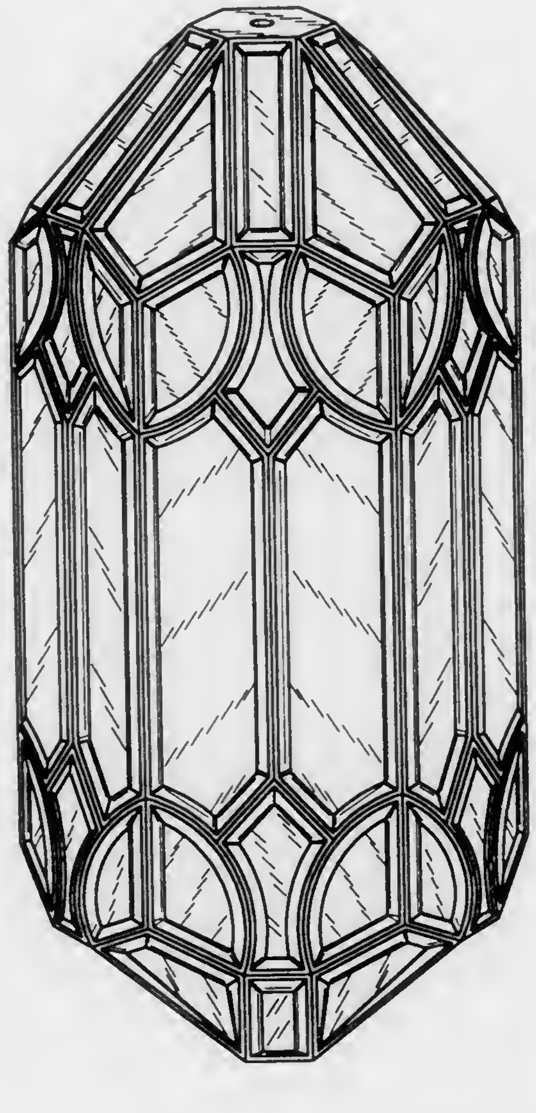
### 317,214
### LAMP SHADE

David Porter, Chagrin Falls, Ohio, assignor to L. D. Kichler Co., Cleveland, Ohio

Filed Apr. 6, 1990, Ser. No. 505,549

Term of patent 14 years

U.S. Cl. D26—130



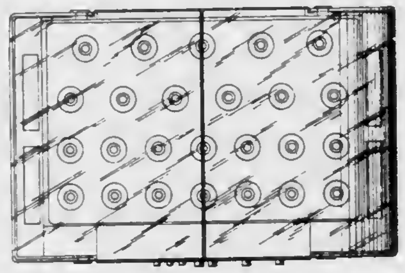
### 317,215
### PROGRAMMABLE HAIRSETTER OR SIMILAR ARTICLE

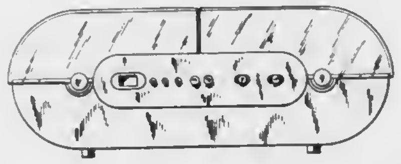
James G. Montagnino, El Paso, Tex.; George Schmidt, Douglaston, N.Y.; Daniel Santhouse, and Richard A. Gibson, Jr., both of El Paso, Tex., assignors to Helen of Troy Corporation, El Paso, Tex.

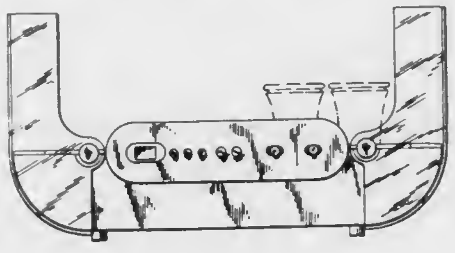
Filed Jan. 13, 1989, Ser. No. 311,571

Term of patent 14 years

U.S. Cl. D28—38







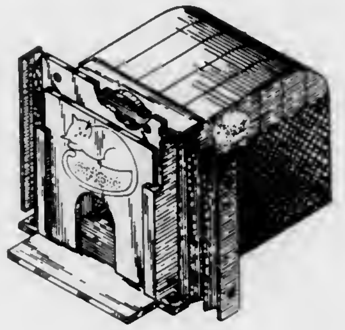
### 317,216
### WINDOW SCREENED ANIMAL ENCLOSURE OR SIMILAR ARTICLE

John Cutrone, 17-17 3rd Ave. North #9, Lake Worth, Fla. 33460

Filed Sep. 9, 1988, Ser. No. 242,078

Term of patent 14 years

U.S. Cl. D30—109



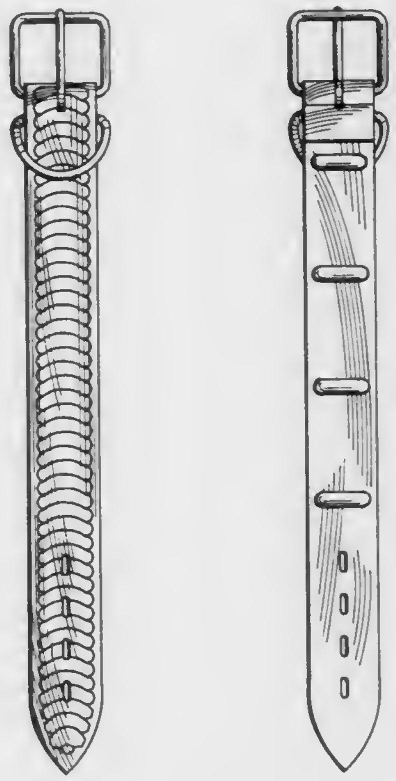
### 317,217
### FLEA COLLAR CONCEALER

Walter J. Beutler, 2845 Via Dominguez, Walnut Creek, Calif. 94596

Filed Sep. 14, 1987, Ser. No. 96,326

Term of patent 14 years

U.S. Cl. D30—152



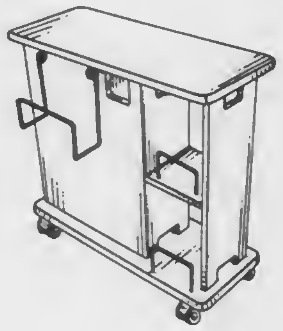
### 317,218
### STAND FOR A PERSONAL COMPUTER

Richard Leeds, 63 Hemlock Dr., Hempstead, N.Y. 11550

Filed May 15, 1987, Ser. No. 50,068

Term of patent 14 years

U.S. Cl. D34—21



VOL
1126
ISS
4
MY
28
1991
UMI

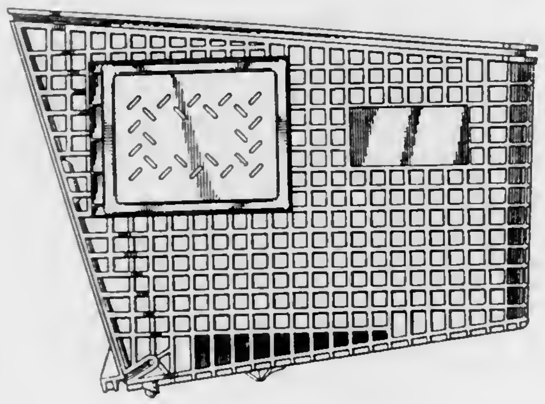
### 317,219
### COMBINED SHOPPING CART BASKET AND ADVERTISING PANELS THEREFOR

**Houston Rehrig, Pasadena, Calif., assignor to Rehrig International, Inc., Richmond, Va.**

**Filed May 4, 1988, Ser. No. 190,228**

**Term of patent 14 years**

U.S. Cl. D34—27



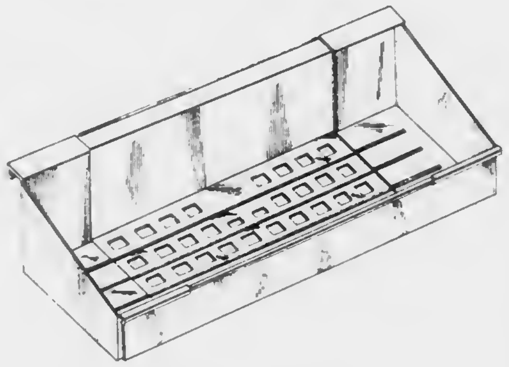
### 317,220
### EXPANDABLE STORAGE BIN

**Israel Diamond, Franklin Square, N.Y., assignor to Merchandising Display Corporation, Englewood Cliffs, N.J.**

**Filed Jun. 20, 1989, Ser. No. 369,665**

**Term of patent 14 years**

U.S. Cl. D34—40



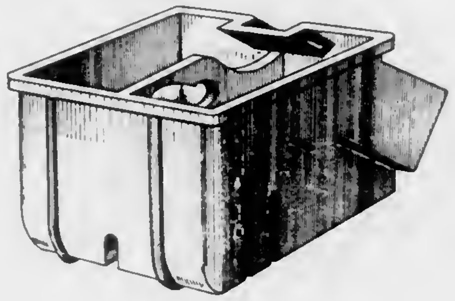
### 317,221
### UTILITY TRAY

**James W. C. Thompson, 7819 Maple St., New Orleans, La. 70118**

**Filed Aug. 23, 1988, Ser. No. 235,181**

**Term of patent 14 years**

U.S. Cl. D34—44



---

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 28TH DAY OF MAY, 1991

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A. Ahlstrom Corporation: *See—*
  - Elonen, Jorma; Timperi, Jukka; Vesala, Reijo; and Wikman, Vesa, 5,019,136, Cl. 55-36.000.
  - Meinander, Paul O., 5,018,478, Cl. 118-410.000.
  - Ruottu, Seppo K., 5,019,137, Cl. 55-73.000.
- A. B. Chance Company: *See—*
  - Beard, Lloyd R., 5,019,937, Cl. 361-102.000.
- AB A. Svensson & Co.: *See—*
  - Hannerstig, Christer, 5,018,567, Cl. 160-348.000.
- AB Bergasa Industrier: *See—*
  - Hoden, Ebbe; and Mokvist, Maja; A., 5,019,061, Cl. 604-358.000.
- AB Volvo: *See—*
  - Gostahagberg, Anders P.; Knutsson, Evan A.; and Nystrom, Mats O. G., 5,019,812, Cl. 340-825.310.
- ABB Atom AB: *See—*
  - Dahlquist, Erik; and Enekull, Åke, 5,019,255, Cl. 210-225.000.
- Abdukarimov, Erkin T.; and Vakhidov, Khaidar A. Electroerosive drilling of holes with working fluid system. 5,019,683, Cl. 219-69.200.
- Abe, Masanori; Komatsubara, Yoshiaki; and Iyama, Tsuyoshi, to Kabushiki Kaisha Toshiba. Method for manufacturing liquid crystal display device. 5,019,001, Cl. 445-3.000.
- Abe, Shunji: *See—*
  - Ohdaira, Akio; Abe, Shunji; Wakatsuki, Noboru; and Tanaka, Akira, 5,018,828, Cl. 350-96.340.
- Abe, Tomoaki: *See—*
  - Hara, Mitsuo; Kamio, Shigeru; Takao, Mitsunori; Sakita, Katsuya; and Abe, Tomoaki, 5,018,595, Cl. 180-197.000.
- Abe, Yuji; Sugimoto, Hiroshi; Ohtsuka, Kenichi; Oishi, Toshiyuki; and Matsui, Teruhito, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,020,072, Cl. 372-96.000.
- Abe, Yukio: *See—*
  - Arita, Yoshikazu; Abe, Yukio; Iizuka, Toshi; Nakamura, Yoshio; Takigami, Shoji; and Takigami, Machiko, 5,019,603, Cl. 521-181.000.
- Abplanalf, Robert H. Dispensing cap for use with pressurized container. 5,018,647, Cl. 222-108.000.
- Abrevaya, Albert; and Goldstein, Joel M., to Aquarium Pharmaceuticals, Inc. Filter pad with pocket and method of using the same. 5,019,254, Cl. 210-169.000.
- Abt, Arthur B.: *See—*
  - Towfighi, Javad; Roberts, Allan F.; Foster, Norman E.; and Abt, Arthur B., 5,019,031, Cl. 600-21.000.
- Acushnet Company: *See—*
  - Isaac, Sharon R.; and Harris, Kevin M., 5,018,742, Cl. 273-235.00A.
- Adachi, Mitsunori: *See—*
  - Hata, Toshihiko; Adachi, Mitsunori; and Tomita, Satoru, 5,019,917, Cl. 558-448.000.
- Adams, Daniel O.: *See—*
  - Robinson, David B.; Adams, Daniel O.; Penny, William H.; and Voegele, Gerald G., 5,019,041, Cl. 604-97.000.
- Adams, John R.; and Smith, Lawrence A., to Chemical Research & Licensing Company. Alkylation of organic aromatic compounds. 5,019,669, Cl. 585-446.000.
- Adams, Phillip A. Power tool fence system. 5,018,562, Cl. 144-253.00R.
- Addesso, Mark; Iyer, Venkatraman R.; and Dunn, Robert M., to Cadware, Inc. Computer apparatus and method for logical modelling. 5,019,961, Cl. 364-192.000.
- Adendorff, Keith T.: *See—*
  - Coetzer, Johan; Meintjes, Anthony A.; and Adendorff, Keith T., 5,019,466, Cl. 429-103.000.
- Adrian, Guy P., to Delalande S.A. Method of preparing 4-dichlorophenyl-1-tetralones. 5,019,655, Cl. 568-322.000.
- Advanced Cryo Magnetics, Inc.: *See—*
  - Purcell, John R.; Burnett, Sibley C.; and Creedon, Lewis R., 5,019,247, Cl. 209-224.000.
- Advanced Data Processing Adp S.r.l.: *See—*
  - Montalcini, Piera L.; and Racciu, Antonio, 5,019,993, Cl. 364-474.290.
- Advanced Micro Devices, Inc.: *See—*
  - Guo, Tzen-Wen, 5,019,726, Cl. 307-446.000.
  - Lee, Sai-keung, 5,019,996, Cl. 364-483.000.
  - Nix, Michael; and English, Clayton D., 5,020,025, Cl. 365-102.000.
- Advanced Osseous Technologies, Inc.: *See—*
  - Klapper, Robert C.; and Caillouette, James T., 5,019,083, Cl. 606-99.000.
- Advanced Power Technology, Inc.: *See—*
  - Meyer, Theodore O.; Mosier, John W., II; Pike, Douglas A., Jr.; Hollinger, Theodore G.; and Tsang, Dah W., 5,019,522, Cl. 437-29.000.
- Aegis Medical, Inc.: *See—*
  - Lee, Alan R.; Mead, David P.; Null, Robert A.; Shilling, Thomas; and Atchley, Ray, 5,019,056, Cl. 604-257.000.
- Aehnelt, Hans-Peter; Enderle, Eckhard; and Wirth, Michael, to Carl-Zeiss-Stiftung, Heidenheim/Brenz. Probe head of the switching type. 5,018,278, Cl. 33-559.000.
- Aehnelt, Hans-Peter: *See—*
  - Enderle, Eckhard; Aehnelt, Hans-Peter; Aubele, Karl-Eugen; and Wirth, Michael, 5,018,280, Cl. 33-832.000.
- Aelos Holding AG: *See—*
  - Goebel, Rudolf A.; and Stolzlechner, Konrad, 5,018,327, Cl. 52-282.000.
- Aerospatiale Societe Nationale Industrielle: *See—*
  - Le Touche, Roger, 5,018,634, Cl. 220-4.120.
- Aerotech, Inc.: *See—*
  - Aiello, Marc F., 5,018,862, Cl. 356-358.000.
- Aerovox Incorporated: *See—*
  - Bentley, Jeffrey A.; and Murphy, Thomas A., 5,019,934, Cl. 361-15.000.
- Afeyan, Noubar B.; Regnier, Fred E.; and Dean, Robert C., Jr., to PerSeptive Biosystems, Inc. Perfusive chromatography. 5,019,270, Cl. 210-656.000.
- Ag-Chem Equipment Co., Inc.: *See—*
  - Bauer, Norman A., 5,018,668, Cl. 239-655.000.
- AG Communication Systems Corp.: *See—*
  - Reimer, William A., 5,019,939, Cl. 361-386.000.
- Agency of Industrial Science & Technology: *See—*
  - Barnes, Thomas H.; Matsuda, Kiyofumi; and Ooyama, Naotake, 5,018,838, Cl. 350-347.00V.
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Aghajanian, Michael K.: *See—*
  - Kuntner, Robert C.; Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., 5,019,541, Cl. 501-127.000.
- Agrinutrients Technology Group, Inc.: *See—*
  - Moore, William P., 5,019,148, Cl. 71-11.000.
- Ahlm, Roger: *See—*
  - Olsson, Sture; and Ahlm, Roger, 5,019,811, Cl. 340-825.170.
- Ahmed, Zareen: *See—*
  - Asato, Goro; and Ahmed, Zareen, 5,019,589, Cl. 514-450.000.
- Ai, Hideo; Suga, Nobuhiko; Ogitani, Satoshi; Takahashi, Hideaki; and Ikeda, Akihiko, to Asahi Kasei Kogyo Kabushiki Kaisha. Polymer/oxime ester/coumarin compound photosensitive composition. 5,019,482, Cl. 430-283.000.
- Aicello Chemical Co., Ltd.: *See—*
  - Toyonishi, Shigekazu; and Nakajima, Takashi, 5,019,609, Cl. 524-35.000.
- Aiello, Marc F., to Aerotech, Inc. Successive fringe detection position interferometry. 5,018,862, Cl. 356-358.000.
- Aioi Seiki Kabushiki Kaisha: *See—*
  - Miyata, Ichiro; Kitaura, Ichiro; and Yonezawa, Keitaro, 5,018,617, Cl. 198-346.100.
- Air Products and Chemicals, Inc.: *See—*
  - Karwacki, Eugene J., Jr.; and Kimock, Fred M., 5,019,208, Cl. 156-626.000.
- Airfoil Textron Inc.: *See—*
  - Bailey, Carlos; and Spain, Raymond G., 5,018,271, Cl. 29-889.710.
- Aisin AW Co., Ltd.: *See—*
  - Hayakawa, Youichi; Hosono, Chihiro; and Nishida, Masaaki, 5,019,025, Cl. 475-285.000.
- Aisin AW Kabushiki Kaisha: *See—*
  - Ito, Yasunobu; and Yamada, Kunihiro, 5,019,810, Cl. 340-825.060.
- Aisin Seiki K.K.: *See—*
  - Takemura, Shinji; Mori, Masaki; Katayama, Tomoaki; Kegasa, Hideo; and Ohnishi, Kenichi, 5,019,759, Cl. 318-466.000.
- Aisin Seiki Kabushiki Kaisha: *See—*
  - Kuki, Nobuyuki; Isomura, Yukio; Suzumura, Hirokazu; and Sakakibara, Yoshikazu, 5,018,305, Cl. 49-348.000.
  - Wakabayashi, Hideaki; Kagata, Tooru; and Amano, Hiroyuki, 5,018,597, Cl. 180-247.000.
- Akashi, Akira: *See—*
  - Shimaoka, Hitoshi; Mizuo, Shigera; Akashi, Akira; and Hosoi, Miyuki, 5,019,484, Cl. 430-293.000.
- Akiba, Shigeyuki: *See—*
  - Tanaka, Hideaki; Akiba, Shigeyuki; Suzuki, Masatoshi; and Utaka, Katsuyuki, 5,019,519, Cl. 437-22.000.
- Akimitsu, Jun; and Den, Tohru, to Canon Kabushiki Kaisha. $Sr_2(Bi_{1-a}Pb_a)_xCu_yO_z$ metal oxide material. 5,019,553. Cl. 505-1.000.
- Akins, Gary L.: *See—*
  - Carnahan, David W.; French, Paul J. A.; Maury, Richard K.; Akins, Gary L.; and Oaten, Philip J., 5,018,974, Cl. 434-98.000.

VOL
126
SS
4
MY
28
1991
UMI

- Akiyama, Shuichi: *See—*
  - Morino, Taisuke; Tanaka, Mami; Kaneko, Fuminori; Ozaki, Takeyuki; and Akiyama, Shuichi, 5,019,680, Cl. 219-10.55E.
- Akkas, Tamer: *See—*
  - Missirlian, Berge; Akkas, Tamer; and Cook, Wayne A., 5,019,035, Cl. 604-22.000.
- Aktiebolaget Hassle: *See—*
  - Brandstrom, Arne E.; Lindberg, Per L.; Starke, Carl I.; and Sunden, Gunnel E., 5,019,584, Cl. 514-338.000.
- Akzo N.V.: *See—*
  - Loozen, Hubert J. J., 5,019,585, Cl. 514-396.000.
- Albrecht, David E. Adapter fitting. 5,018,769, Cl. 285-39.000.
- Albrecht, Richard W., Jr.: *See—*
  - Corsmeier, Robert J.; and Albrecht, Richard W., Jr., 5,018,943, Cl. 416-144.000.
- Alcan International Limited: *See—*
  - Dempsey, William F.; Casar, Steve; and Reed, Charles P., 5,019,111, Cl. 52-506.000.
- Alcatel N.V.: *See—*
  - DePrycker, Martin L. F.; and DeSomer, Michel P. M., 5,020,052, Cl. 370-60.000.
- Alcide Corporation: *See—*
  - Kross, Robert D.; and Scheer, David I., 5,019,402, Cl. 424-665.000.
- Alcon Laboratories, Inc.: *See—*
  - Wang, Carl C. T.; and Sundblom, Leif J., 5,019,037, Cl. 604-23.000.
- Alcon Surgical, Inc.: *See—*
  - Missirlian, Berge; Akkas, Tamer; and Cook, Wayne A., 5,019,035, Cl. 604-22.000.
- Alcorn, Arlo S. Pressure actuated valve. 5,018,547, Cl. 137-111.000.
- Aldegheri, Roberto: *See—*
  - De Bastiani, Giovanni; Faccioli, Giovanni; Aldegheri, Roberto; and Brivio, Lodovico R., 5,019.077, Cl. 606-54.000.
- Alderson, Graham R.; MacFarlane, Peter R.; and Mori, Tohru, to International Business Machines Corporation. Data processing network with upgrading of files. 5,019,963, Cl. 364-200.000.
- Alercia, Don P.: *See—*
  - Larson, Richard C.; Spencer, Keith R.; Alercia, Don P.; Kwech, Horst; Litka, Thomas J.; and Ford, Guy J., 5,019,325, Cl. 376-260.000.
- Alet, Robert; and Jezequel, Roland, to Thomson-CSF. Motion simulator for vehicle driver. 5,018,973, Cl. 434-62.000.
- Alfo AG: *See—*
  - Brennecke, Hermann; and Liere, Horst, 5,018,585, Cl. 169-48.000.
- Alfrey, Anthony J.; and Palmer, James A., to Spectra-Physics. Apparatus for aligning the optic axis of an intra-cavity birefringent element, and tunable laser using same. 5,020,073, Cl. 372-105.000.
- All Systems, Inc.: *See—*
  - Cohen, Leonard D., 5,019,791, Cl. 331-96.000.
- Allard, James J., to Pauli & Griffin. Pneumatic tube selector mechanism. 5,018,319, Cl. 51-424.000.
- Allemann, Martin; and Caravatti, Pablo, to Spectrospin AG. Ion cyclotron resonance spectrometer. 5,019,706, Cl. 250-291.000.
- Allen, Allen D.: *See—*
  - Pitts, Ferris N., Jr.; and Allen, Allen D., 5,019.557, Cl. 514-2.000.
- Allen, Dwight L., to Cuno, Incorporated. Elastomeric composition containing therapeutic agents and articles manufactured therefrom. 5,019,378, Cl. 424-78.000.
- Allen, Dwight L., to Cuno, Incorporated. Elastomeric composition containing therapeutic agents and articles manufactured therefrom. 5,019,601, Cl. 523-122.000.
- Allen, John D.; and Hill, Jeffrey V., to Data General Corporation. Communication link interface with different clock rate tolerance. 5,020,081, Cl. 375-118.000.
- Allergan, Inc.: *See—*
  - Knight, Patricia M.; and Bishop, Robert C., 5,019.097, Cl. 623-5.000.
- Allgaier, Karl-Heinz; Diehl, Christian; and Kirsche, Horst, to Messerschmitt-Bolkow-Blohm GmbH. Optical guide beam steering for projectiles. 5,018,684, Cl. 244-3.130.
- Allied-Signal Inc.: *See—*
  - Bourgeault, Leo B.; and Wohlberg, Alfred W., 5,019,954, Cl. 363-21.000.
  - Chambers, John D.; Estep, Duncan E.; Frankiewicz, Walter E.; Friend, Ronald W.; and Lawson, James M., 5,020,008, Cl. 364-561.000.
  - Lapin, Stephen C.; and Snyder, James R., 5,019.636, Cl. 526-301.000.
  - Liebermann, Howard H.; and Hardman, Tedd P., 5,019,336, Cl. 420-557.000.
  - Zupancic, Joseph J.; Petty-Weeks, Sandra L.; and Polak, Anthony J., 5,018,380, Cl. 73-23.200.
- Alloy Metals, Inc.: *See—*
  - Marantz, Daniel R., 5,019,686, Cl. 219-76.140.
- Allsop, John R. Grip locating apparatus for sporting article handle. 5,018,734, Cl. 273-75.000.
- Almetek Industries, Inc.: *See—*
  - Burlando, Albert A., 5.019,314, Cl. 264-156.000.
- Alongi, John R.: *See—*
  - Chugh, Yoginder P.; Alongi, John R.; and Linton, Joey, 5,018,907, Cl. 405-288.000.
- Alpine Electronics Inc.: *See—*
  - Sampei, Kazue; Suzuki, Takashi; and Ujiie, Futoshi, 5,020,151, Cl. 455-345.000.
- Altamura, Steven J.: *See—*
  - Kozek, Edward P.; Ruskouski, Charles R.; and Altamura, Steven J., 5,018,290, Cl. 40-570.000.
- Altnau, Ronald L., Sr., to Speed Queen Company. Filter for automatic washing machine. 5,018,372, Cl. 68-18.00F.
- Altpeter, Arno; and Bauer, Carsten, to Robert Bosch GmbH. Collector segment. 5,019,740, Cl. 310-234.000.
- Alyfuku, Kiyoshi: *See—*
  - Ogawa, Yukio; and Alyfuku, Kiyoshi, 5,019,843, Cl. 354-106.000.
- ALZA Corporation: *See—*
  - Ayer, Atul D.; Kuczynski, Anthony L.; Wong, Patrick S. L.; Hamel, Lawrence G.; and Jordan, Maureen L., 5,019,396, Cl. 424-473.000.
  - Wong, Patrick S. L.; and Theeuwes, Felix, 5,019,397, Cl. 424-473.000.
- AM International, Inc.: *See—*
  - Kubert, Vincent T.; Olenski, Matthew J.; and Duchesne, Mark F., 5,019,868, Cl. 355-264.000.
- Amann, Peter M. Ski waxing machine. 5,018,477, Cl. 118-242.000.
- Amano, Hirosato: *See—*
  - Kitamura, Takehiko; Amano, Hirosato; and Kaita, Masaharu, 5,018,962, Cl. 425-556.000.
- Amano, Hiroyuki: *See—*
  - Wakabayashi, Hideaki; Kagata, Tooru; and Amano, Hiroyuki, 5,018,597, Cl. 180-247.000.
- Amemoto, Mashide; Watanabe, Hikaru; and Shoji, Akio, to Dainippon Ink and Chemicals, Inc. Process for producing grafted alkyd resin. 5,019,623, Cl. 525-7.300.
- American Biomaterials Corporation: *See—*
  - Nichols, Joseph, 5,019,087, Cl. 606-152.000.
- American Cyanamid Company: *See—*
  - Asato, Goro; and Ahmed, Zareen, 5,019,589, Cl. 514-450.000.
  - Kimpara, Masaomi; Kawai, Kaiji; Kikuchi, Hiroshi; and Sato, Masai, 5,019,155, Cl. 71-121.000.
  - Kust, Cyril A., 5,019,154, Cl. 71-96.000.
  - Martin, Craig A.; and Johnson, Jerry L., 5,019,150, Cl. 71-90.000.
  - Wang, Samuel S.; and Nagaraj, D. R., 5,019,246, Cl. 209-167.000.
- American Dental Association Health Foundation: *See—*
  - Waterstrat, Richard M., 5,019,337, Cl. 420-580.000.
- American Mining Supply, Inc.: *See—*
  - Laphon, Gary, 5,018,908, Cl. 405-259.000.
- Americana Pools: *See—*
  - Lankheet, Jay A., 5,018,324, Cl. 52-169.700.
- Ammcō Tools, Inc.: *See—*
  - Bogaerts, Leo C.; and Cattapan, David, 5,018,228, Cl. 51-259.000.
- Ammermann, Eberhard: *See—*
  - Rentzea, Costin; Ammermann, Eberhard; and Lorenz, Gisela, 5,019,598, Cl. 514-650.000.
- Amoco Corporation: *See—*
  - Haddad, Muin S.; and Eryman, William S., 5,019,545, Cl. 502-209.000.
  - Moskowitz, Larry N.; and Lindley, Donald J., 5,019,429, Cl. 427-422.000.
  - Quimby, David C., 5,019,863, Cl. 335-210.000.
- AMP Incorporated: *See—*
  - Black, Teresa K.; English, James M.; and Shank, Michael S., 5,018,989, Cl. 439-620.000.
  - Grabbe, Dimitry G., 5,019,892, Cl. 357-74.000.
  - Mulholland, Denis G.; Schaffer, Ronald R.; and Warner, Gary N., 5,018,316, Cl. 51-216.00R.
  - Murray, Dale D.; and Reitz, Paul R., 5,018.816, Cl. 350-96.200.
- Ampex Corporation: *See—*
  - Wesolowski, Jan S., 5,019,906, Cl. 358-148.000.
- Andelin, John B. Oil skimming apparatus and method. 5,019,277, Cl. 210-776.000.
- Anderer, Wolfgang: *See—*
  - Pfab, Werner; Bergmann, Michael; Fenzlein, Paul-Gerhard; and Anderer, Wolfgang, 5,018,527, Cl. 128-635.000.
- Andersen, Phillip J.: *See—*
  - Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., 5,018,285, Cl. 29-465.000.
- Anderson, Dean: *See—*
  - Huang, Rong-Fong; and Anderson, Dean, 5,019,306, Cl. 264-66.000.
- Anderson, Donna J., administratix: *See—*
  - Gulliver, James A.; Holt, Christopher C.; Boness, Kenneth D.; and Anderson, Martin R., deceased, 5,019,777, Cl. 324-242.000.
- Anderson, John R.: *See—*
  - Helm, Herbert W.; Anderson, John R.; and Lambert, Michael P., 5,019,030, Cl. 493-342.000.
- Anderson, Martin R., deceased: *See—*
  - Gulliver, James A.; Holt, Christopher C.; Boness, Kenneth D.; and Anderson, Martin R., deceased, 5,019,777, Cl. 324-242.000.
- Anderson, Philip M., III, to Identitech. Article surveillance system having target removal sensor. 5,019,801, Cl. 340-522.000.
- Anderson, Ronald W. Fluid drainage needle method of use. 5,019,039, Cl. 604-51.000.
- Andersson, Nils A. T.; and Lindgren, Bo S., to U.S. Philips Corporation. Device for the ejection of boxes through the exit of a container and a box adapted for use in such a device. 5,018,249, Cl. 221-222.000.
- Ando, Hiroshi; and Tanino, Junichi, to Mitsubishi Denki Kabushiki Kaisha. Master-slave signal transfer system for elevator. 5,019,960, Cl. 364-132.000.
- Ando, Koki: *See—*
  - Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,018,505, Cl. 126-262.000.

- Ando, Osamu: *See—*
  - Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, 5,019,949, Cl. 361-525.000.
- Andre, Thierry: *See—*
  - Melchior, Jean; and Andre, Thierry, 5,018,354, Cl. 60-606.000.
- Andreiko, Craig; and Sterrett, Terry L., to Ormco Corporation. Braided elastic wire, with memory, for braces. 5,018,969, Cl. 433-20.000.
- Andrews, Harry N.: *See—*
  - Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 5,018,901, Cl. 403-349.000.
- Andrews, Thomas K.: *See—*
  - Waterfield, Adam P. M.; Waterfield, Norman R.; Chapman, David A.; Andrews, Thomas K.; and Humphrey, Brian, 5,018,233, Cl. 12-133.00B.
- Ang, Jit F.; Miller, William B.; and Blais, Irene M., to James River Corporation of Virginia. Fiber additives for frying batters. 5,019,406, Cl. 426-302.000.
- Anglin, Gregory V.; and Richmond, Robert W. Fabric protective cover for a drive mechanism of a bicycle. 5,018,564, Cl. 150-167.000.
- Anguelo, Michael; and Angulo, George. Stripper assembly for combustion chambers of turbine or jet engines. 5,018,320, Cl. 51-426.000.
- Angulo, George: *See—*
  - Anguelo, Michael; and Angulo, George, 5,018,320, Cl. 51-426.000.
- Ankal Pty Limited: *See—*
  - Kaldor, Andrew F., 5,019,248, Cl. 209-240.000.
- Anritsu Corporation: *See—*
  - Tanaka, Shigeyasu; and Furumura, Takaichi, 5,020,097, Cl. 379-102.000.
- Anspaugh, Dennis J.; and Sterbank, John D., to ITT Corporation. Vehicle door hinge with compound roller structure. 5,018,243, Cl. 16-335.000.
- Ant Nachrichtentechnik GmbH: *See—*
  - Schmidt, Bernhard, 5,018,819, Cl. 350-96.200.
- Antaki, Patrick: *See—*
  - Maher, Robert D., III; and Antaki, Patrick, 5,020,013, Cl. 364-715.080.
- Antolin, Stanislav: *See—*
  - Kuntner, Robert C.; Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., 5,019,541, Cl. 501-127.000.
- Antoniades, Harry N.; and Lynch, Samuel E., to President and Fellows of Harvard College. Wound healing using PDGF and IGF-II. 5,019,559, Cl. 514-21.000.
- Antonuk, Larry E., to University of Michigan, The Regents of the. Scanning-liquid ionization chamber imager/dosimeter for megavoltage photons. 5,019,711, Cl. 250-385.100.
- Aoki, Atsuhito, to Ryobi Ltd. Fishing reel having a spool shaft supported at both ends thereof. 5,018,682, Cl. 242-268.000.
- Aoki, Hikoharu: *See—*
  - Suzuki, Makoto; Watanabe, Satoshi; Tsukamoto, Takashi; Aoki, Hikoharu; Ohri, Hitomi; and Sako, Yukihiro, 5,018,817, Cl. 350-96.170.
- Aoki, Ken; Hoshi, Katsuhiko; Satoh, Shigeo; Kakinuma, Mitsuru; Togashi, Shigeru; and Saitoh, Hiromi, to Sanyo Electric Co., Ltd. Apparatus for preparing ice creams. 5,018,363, Cl. 62-135.000.
- Aono, Toshio: *See—*
  - Yamamoto, Katsumi; Koyama, Tadashi; Aono, Toshio; and Itaya, Toshiro, 5,020,001, Cl. 364-513.000.
- Aonuma, Mitsuyoshi: *See—*
  - Chida, Takeshi; Aonuma, Mitsuyoshi; Maeda, Akio; Morozumi, Yukihiko; and Ohishi, Tetsu, 5,019,630, Cl. 525-326.200.
- Appelberg, Gustaf T., to E-Lite Technologies, Inc. Method for making an electroluminescent panel lamp as well as panel lamp produced thereby. 5,019,748, Cl. 315-169.300.
- Appelgren, Curt H.; and Odda, Ulf A., to Lejus Medical Aktiebolag. Granular product (IV). 5,019,399, Cl. 424-493.000.
- Apple Computer, Inc.: *See—*
  - Furtek, Frederick C., 5,019,736, Cl. 307-465.000.
- Applied Information Technologies Corporation: *See—*
  - Rosen, Richard D.; McCown, Robert B.; and Fleming, Matthew S., 5,020,105, Cl. 380-23.000.
- Aquarium Pharmaceuticals, Inc.: *See—*
  - Abrevaya, Albert; and Goldstein, Joel M., 5,019,254, Cl. 210-169.000.
- Aquarius Rubber (AUST.) Pty. Ltd.: *See—*
  - Schalle, Werner E., 5,018,748, Cl. 277-012.000.
- Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, to Canon Kabushiki Kaisha. Image forming apparatus and image forming method using a negative image insulating pattern formed on an electroconductive substrate. 5,019,835, Cl. 346-1.100.
- Arai, Takayoshi: *See—*
  - Niwa, Mitsuyuki; Arai, Takayoshi; Shimizu, Isamu; Takeuchi, Eiji; Murakami, Tsutomu; and Ishihara, Shunichi, 5,019,887, Cl. 357-30.000.
- Arai, Yuji; Ogawa, Hiroshi; and Hotori, Masahiro, to Taiyo Yuden Co., Ltd.; and Sony Corporation. Optical information recording medium having a protective film which can be stripped. 5,020,048, Cl. 369-291.000.
- Aramini, Salvatore, to Speedy Die, Inc. Arrangement for and method of applying heat-transferrable decalcomania to mugs. 5,019,193, Cl. 156-64.000.
- Arcade, Inc.: *See—*
  - Carnahan, David W.; French, Paul J. A.; Maury, Richard K.; Akins, Gary L.; and Oaten, Philip J., 5,018,974, Cl. 434-98.000.
- Arens, Cornelis G.: *See—*
  - Geen, Oliver; and Arens, Cornelis G., 5,018,325, Cl. 52-211.000.
- Arimi, Yukio, to Mazda Motor Corporation. Method of forming hard steels by case hardening, shot-peening and aging without tempering. 5,019,182, Cl. 148-12.100.
- Arita, Yoshikazu; Abe, Yukio; Iizuka, Toshi; Nakamura, Yoshio; Takigami, Shoji; and Takigami, Machiko, to Gunei Kagaku Kogyo Kabushiki Kaisha. Process for the production of porous phenolic resin fibers. 5,019,603, Cl. 521-181.000.
- Arita, Yoshinobu: *See—*
  - Awaya, Nobuyoshi; and Arita, Yoshinobu, 5,019,531, Cl. 437-180.000.
- Ariyoshi, Shunji: *See—*
  - Ooi, Katsunori; Sasaki, Hiroshi; and Ariyoshi, Shunji, 5,020,117, Cl. 382-46.000.
- Armco Inc.: *See—*
  - Schoen, Jerry W., 5,018,267, Cl. 29-609.000.
- Armstrong-Blum Manufacturing Company, Ltd.: *See—*
  - Lucki, Walter J.; and Tober, Gerald H., 5,018,421, Cl. 83-835.000.
- Arneson, Theodore R.; Hitchcock, Robert F.; and Williams, Julie D. N., to Packaging Corporation of America. Traylike member and cover therefor. 5,018,624, Cl. 206-560.000.
- Arnold, Kurt: *See—*
  - Hager, Walter; Butzen, Edgar; Denuell, Gunther; and Arnold, Kurt, 5,018,465, Cl. 112-273.000.
- Arnott, William W.: *See—*
  - Templeton, Robert D. K.; and Arnott, William W., 5,019,678, Cl. 200-81.90M.
- Arnould, Jean C.; Boucherot, Dominique; Davies, David H.; Jung, Frederick H.; and Strawson, Colin J., to Imperial Chemical Industries PLC; and I.C.I. Pharma. Cephalosporin compounds. 5,019,570, Cl. 514-202.000.
- Array Analysis, Inc.: *See—*
  - Stark, William D.; and Prestas, Gregory C., 5,020,011, Cl. 364-580.000.
- Arther, Robert G.: *See—*
  - Rose, Wayne B.; and Arther, Robert G., 5,018,481, Cl. 119-156.000.
- Arthur, Samuel D., to Du Pont de Nemours, E. I., and Company. Multilayer reverse osmosis membrane of polyamide-urea. 5,019,264, Cl. 210-500.370.
- Asada, Takafumi, to Matsushita Electric Industrial Co., Ltd. Self acting gas bearing apparatus. 5,018,881, Cl. 384-113.000.
- Asada, Tanehiko, to Kaken Corporation Limited. Tooth structure of rotary saw blade and method of forming the same. 5,018,276, Cl. 30-347.000.
- Asahi/America, Inc.: *See—*
  - Ziu, Christopher G., 5,018,260, Cl. 24-555.000.
- Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
  - Ai, Hideo; Suga, Nobuhiko; Ogitani, Satoshi; Takahashi, Hideaki; and Ikeda, Akihiko, 5,019,482, Cl. 430-283.000.
- Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
  - Ojima, Satoshi; and Hiraide, Tsuneo, 5,018,847, Cl. 350-534.000.
  - Yamamoto, Masato; Yamanaka, Toshimasa; Nakajima, Masahiro; and Ohsawa, Yutaka, 5,019,852, Cl. 354-409.000.
- Asakura, Yasuo; Imai, Yuji; and Kobayashi, Yuji, to Olympus Optical Co., Ltd. Flash device for camera. 5,019,845, Cl. 354-149.100.
- Asato, Goro; and Ahmed, Zareen, to American Cyanamid Company. $\Delta^{23}$-LL-F28249 compounds. 5,019,589, Cl. 514-450.000.
- Asbury, James A.: *See—*
  - Carmack, Paul D.; Asbury, James A.; and Nitzberg, Leonard R., 5,018,546, Cl. 137-68.100.
- ASC Incorporated: *See—*
  - Chamings, Antony W.; Staley, Dennis W.; and Mannke, Gary, 5,018,783, Cl. 296-219.000.
- Asea Brown Boveri Ltd.: *See—*
  - Blangetti, Francisco; and Svoboda, Vaclan, 5,018,572, Cl. 165-113.000.
- Ashford Concrete, Inc.: *See—*
  - Hermann, Lorin E., 5,018,593, Cl. 180-24.020.
- Asperger, Robert G.: *See—*
  - Thompson, Neil E. S.; and Asperger, Robert G., 5,019,274, Cl. 210-729.000.
- Assink, Kenneth; Feenstra, Mark J.; and Boyer, Gerald L., Jr., to J R Automation Technologies, Inc. Hot staking machine. 5,018,957, Cl. 425-112.000.
- AT&T Bell Laboratories: *See—*
  - Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
  - Celli, John R., 5,020,098, Cl. 379-202.000.
  - Choa, Fow-Sen; and Koch, Thomas L., 5,020,153, Cl. 455-606.000.
  - Chou, Philip A., 5,020,112, Cl. 382-37.000.
  - Gorin, Allen L.; Makofsky, Patrick A.; Morton, Nancy; Oliver, Neal C.; Shively, Richard R.; and Stanziola, Christopher A., 5,020,059, Cl. 371-11.300.
  - Islam, Mohammed N., 5,020,050, Cl. 370-4.000.
  - Moshenberg, David, 5,020,003, Cl. 364-518.000.
  - Sikorski, Theodore J., 5,018,938, Cl. 414-786.000.
  - Thompson, Timothy J., 5,020,123, Cl. 382-61.000.
- Atchley, Ray: *See—*
  - Lee, Alan R.; Mead, David P.; Null, Robert A.; Shilling, Thomas; and Atchley, Ray, 5,019,056, Cl. 604-257.000.

VOL 1126
ISS 4
MY 28
1991
UMI

- Athens Corp.: *See—*
  - Davison, John; and Hsu, Chung, 5,018,855, Cl. 356-312.000.
- Atlantic Richfield Company: *See—*
  - Baillie, Lloyd A., 5,018,868, Cl. 366-10.000.
  - Petermann, Steven G.; and Katahara, Keith W., 5,020,036, Cl. 367-168.000.
  - Smith, Lonnie J., 5,018,574, Cl. 166-185.000.
- Atochem: *See—*
  - Duperray, Gilbert; and Wolff, Daniel, 5,019,444, Cl. 428-262.000.
- Attenni, Johann: *See—*
  - Humpl, Josef; Konrad, Johann; Sturm, Reinhold; and Attenni, Johann, 5,018,502, Cl. 123-514.000.
- Aubele, Karl-Eugen: *See—*
  - Enderle, Eckhard; Aehnelt, Hans-Peter; Aubele, Karl-Eugen; and Wirth, Michael, 5,018,280, Cl. 33-832.000.
- Auberon, Marcel; and Phan, Albert, to Societe Anonyme Dite: Aerospatiale Societe Nationale Industrielle. Receptacle for the storage of fluid under pressure. 5,018,638, Cl. 220-414.000.
- Auchter, Thomas J.: *See—*
  - Krolopp, Robert K.; Mullins, Jeffery L.; and Auchter, Thomas J., 5,020,091, Cl. 379-58.000.
- Audi AG: *See—*
  - Buchl, Josef, 5,018,496, Cl. 123-399.000.
  - Humpl, Josef; Konrad, Johann; Sturm, Reinhold; and Attenni, Johann, 5,018,502, Cl. 123-514.000.
- Augstein, Klaus: *See—*
  - Kroll, Willi; and Augstein, Klaus, 5,018,361, Cl. 62-85.000.
- Auld, Gregg D.: *See—*
  - Franklin, Richard D.; Auld, Gregg D.; and Murray, David E., 5,019,329, Cl. 376-316.000.
- Aur, Shian: *See—*
  - Yang, Ping; Chatterjee, Amitava; Aur, Shian; and Polgreen, Thomas L., 5,019,878, Cl. 357-23.300.
- Automation Equipment Co.: *See—*
  - Simone, Raymond J., 5,019,927, Cl. 360-92.000.
- Automotive Products plc: *See—*
  - Compton, David J.; Nix, Richard A.; and Leigh-Monstevens, Keith V., 5,018,352, Cl. 60-533.000.
- Avakian, Roger W.; Shenian, Popkin; and Bussink, Jan, to General Electric Company. Composition comprising a polyphenylene-ether-containing polymeric component and reinforcing fibers. 5,019,616, Cl. 524-141.000.
- Avco Corporation: *See—*
  - Waddington, Clive; and Milo, George T., 5,018,601, Cl. 184-6.400.
- Avery, Mitchell A.; and Chong, Wesley K. M., to SRI International. Antimalarial analogs of artemisinin. 5,019,590, Cl. 514-450.000.
- Awaya, Nobuyoshi; and Arita, Yoshinobu, to Nippon Telegraph and Telephone Corporation. Process for selectively growing thin metallic film of copper or gold. 5,019,531, Cl. 437-180.000.
- Ayer, Atul D.; Kuczynski, Anthony L.; Wong, Patrick S. L.; Hamel, Lawrence G.; and Jordan, Maureen L., to ALZA Corporation. Delivery dispenser for treating cardiac arrhythmias. 5,019,396, Cl. 424-473.000.
- Ayers, Edward P.: *See—*
  - Haavisto, John R.; and Ayers, Edward P., 5,018,811, Cl. 350-96.120.
- Aysta, James E.; Lindstrom, Richard L.; and Skelnik, Debra L., to Minnesota Mining and Manufacturing Company. Corneal holder. 5,019,084, Cl. 606-107.000.
- Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko; Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, to Minolta Camera Kabushiki Kaisha. Camera system. 5,019,851, Cl. 354-402.000.
- Azumai, Hideo: *See—*
  - Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, 5,019,913, Cl. 358-296.000.
- B. Braun Melsungen AG: *See—*
  - Mosebach, Wolfgang; Heitmeier, Rolf; Gerlach, Hans; and Rath, Dieter, 5,018,388, Cl. 73-730.000.
- Baasner, Bernd; Hagemann, Hermann; and Schwamborn, Michael, to Bayer Aktiengesellschaft. Fluorinated tertiary butylamines. 5,019,654, Cl. 564-510.000.
- Baba, Sadamu: *See—*
  - Inokuma, Takahiko; Baba, Sadamu; Imao, Shoji; Kodama, Hitoshi; and Gomi, Takeo, 5,018,915, Cl. 409-231.000.
- Bach, Stanley M., Jr.; Lang, Douglas J.; Swanson, David K.; and Dahl, Roger W., to Cardiac Pacemakers, Inc. Apparatus for common mode stimulation with bipolar sensing. 5,018,523, Cl. 128-419.0PG.
- Bacharach, Inc.: *See—*
  - Hickox, Richard M.; Spohn, William P.; and D'Amico, David J., 5,018,395, Cl. 73-864.340.
- Baeck, Andre C.; and Oh, Young S., to Procter & Gamble Company, The. Detergent compositions. 5,019,292, Cl. 252-174.250.
- Baer, John S.: *See—*
  - LaPointe, Daniel J.; Vietti, Michael; and Baer, John S., 5,019,977, Cl. 364-420.000.
- Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, to Institut Francais du Petrole; L'Air Liquide Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude; and ELF France. Process for condensing at least one epoxide on at least one cyclic anhydride in the presence of a catalyst consisting of at least one titanium complex. 5,019,643, Cl. 528-361.000.
- Bailey, Carlos; and Spain, Raymond G., to Airfoil Textron Inc. Method of making a composite blade with divergent root. 5,018,271, Cl. 29-889.710.
- Bailey, Wilbur M., to Hughes Aircraft Company. Method and apparatus for monitoring optical fibers during payout. 5,019,780, Cl. 324-457.000.
- Baillie, Lloyd A., to Atlantic Richfield Company Cement storage and mixing system. 5,018,868, Cl. 366-10.000.
- Baines, Richard M. Foot-operated door stop assembly. 5,018,241, Cl. 16-82.000.
- Baird, James C.: *See—*
  - Ryan, Leslie D.; Steinhardt, Mark J.; Spahni, Milton D.; and Baird, James C., 5,019,062, Cl. 604-359.000.
- Baker, David C.: *See—*
  - Shoupe, T. Scott; Baker, David C.; Coutts, Stephen M.; and Hand, Elli S., 5,019,573, Cl. 514-232.800.
- Baker, Don R.; and Brownell, Keith H., to ICI Americas Inc. Fungicidal pyridyl imidates. 5,019,565, Cl. 514-89.000.
- Baker, Ellen S.: *See—*
  - Caswell, Debra S.; Mao, Mark H.; Mermelstein, Robert; and Baker, Ellen S., 5,019,280, Cl. 252-8.800.
- Baker Hughes Incorporated: *See—*
  - Jacquet, Sten F., 5,019,278, Cl. 210-792.000.
- Baker, Samuel F., to Texas Iron Works, Inc. Hydraulic running and release tool with mechanical emergency release. 5,018,582, Cl. 166-382.000.
- Baldwin, John B.; and Draper, David R., to Caterpillar Inc. Break away torch holder for cutting machines. 5,018,705, Cl. 266-77.000.
- Baldwin, John J.: *See—*
  - Claremon, David A.; Baldwin, John J.; and Remy, David C., 5,019,572, Cl. 514-213.000.
- Ball, Hershell R., Jr.: *See—*
  - Swartzel, Kenneth R.; and Ball, Hershell R., Jr., 5,019,407, Cl. 426-399.000.
  - Swartzel, Kenneth R.; Ball, Hershell R., Jr.; and Hamid-Samimi, Mohammad-Hossein, 5,019,408, Cl. 426-399.000.
- Balooch, Mehdi; Olander, Donald K.; and Russo, Richard E., to United States of America, Energy. Long-laser-pulse method of producing thin films. 5,019,552, Cl. 505-1.000.
- Balzano, Quirino: *See—*
  - Patsiokas, Stelios J.; Garay, Oscar M.; and Balzano, Quirino, 5,020,136, Cl. 455-89.000.
- Banke, Kerry: *See—*
  - Suszynski, Edward D.; Banke, Kerry; and Gregory, Thomas K., 5,018,872, Cl. 374-133.000.
- Bankhead Enterprises, Inc.: *See—*
  - Kinard, Daniel P., 5,018,453, Cl. 105-72.200.
- Bankston, C. Perry: *See—*
  - Bugga, Ratnakumar V.; DiStefano, Salvador; and Bankston, C. Perry, 5,019,470, Cl. 429-223.000.
- Bany, Stephen W.; Miller, John A.; and Eaton, Brad W., to Minnesota Mining and Manufacturing Company. Adhesive fastening tab. 5,019,071, Cl. 604-389.000.
- Bares, Jan, to Xerox Corporation. Toner removal apparatus. 5,019,870, Cl. 355-298.000.
- Barlow, John; Evans, Philip H.; Frank, Nicholas H.; and Wilson, Hamish D., to GKN Technology Limited. Aluminum-silicon alloy article and method for its production. 5,019,178, Cl. 148-3.000.
- Barlow, Robert W.; Boucher, Robert W.; and Lynch, Thomas M., to GTE Products Corporation. Field installable fiber optic connector. 5,018,818, Cl. 350-96.200.
- Barmag AG: *See—*
  - Muller, Manfred, 5,018,390, Cl. 73-828.000.
- Barnes, Thomas H.; Matsuda, Kiyofumi; and Ooyama, Naotake, to Agency of Industrial Science & Technology; and Minstry of International Trade and Industry. Method and device for achieving optical spatial phase modulation. 5,018,838, Cl. 350-347.00V.
- Barnette, Charles J., to Kent Adhesive Products Co. Auxiliary binder. 5,018,765, Cl. 281-15.001.
- Barreto, Jose D. Revolving grate cooler for cooling of clinker or similar products. 5,018,968, Cl. 432-116.000.
- Barsumian, Bruce R. Case-mounted receiver with antenna. 5,020,137, Cl. 455-90.000.
- Bartch, Donald W.: *See—*
  - Deal, Samuel B.; and Bartch, Donald W., 5,019,745, Cl. 313-440.000.
- BASF Aktiengesellschaft: *See—*
  - Baur, Richard; Richter, Felix; Birnbach, Stefan; Fikentscher, Rolf; Oftring, Alfred; and Winkler, Ekhard, 5,019,296, Cl. 252-546.000.
  - Bruder, Horst; and Mayer, Udo, 5,019,165, Cl. 106-22.000.
  - Rentzea, Costin; Ammermann, Eberhard; and Lorenz, Gisela, 5,019,598, Cl. 514-650.000.
  - Steininger, Helmut, 5,019,462, Cl. 428-694.000.
  - Taubitz, Christof; Gausepohl, Hermann; Seiler, Erhard; Boehlke, Klaus; and Heckmann, Walter, 5,019,626, Cl. 525-92.000.
  - Zimmermann, Clifton; Kuerten, Heribert; and Lewin, Helmut, 5,019,704, Cl. 250-214.00R.
- Bastianello, Umberto: *See—*
  - Mengotti, Giovanni; and Pacchioni, Italo, 5,018,336, Cl. 53-435.000.
- Baten, Robert A.: *See—*
  - Boisture, Thomas B.; McGrew, Larry D.; Jeffrey, James D.; Wetzel, Robert G.; Livingston, Gene P.; and Baten, Robert A., 5,018,544, Cl. 134-111.000.
- Battelle-Institut e.V.: *See—*
  - Diehl, Wolfgang; and Hepp, Monika, 5,019,518, Cl. 436-172.000.

- Battelle Memorial Institute: *See—*
  - Bunnell, Lee R., Sr., 5,019,446, Cl. 428-324.000.
  - Cowan, Christina E.; Van Voris, Peter; Streile, Gary P.; Cataldo, Dominic A.; and Burton, Frederick G., 5,019,998, Cl. 364-496.000.
  - Sealock, L. John, Jr.; and Elliott, Douglas C., 5,019,135, Cl. 48-197.00R.
- Battenfeld GmbH: *See—*
  - Miese, Manfred; and Mai, Ernst, 5,018,961, Cl. 425-450.100.
- Bauch, Karl; Raff, Alfred; Heel, Helmut; and Leege, Norbert, to Ott Maschinentechnik GmbH. Actuating arrangement for a tool or workpiece clamping device in a machine tool spindle. 5,018,916, Cl. 409-233.000.
- Bauer, Carsten: *See—*
  - Altpeter, Arno; and Bauer, Carsten, 5,019,740, Cl. 310-234.000.
- Bauer, Mark D.: *See—*
  - Boeckmann, Hugo; Van Erden, Donald L.; and Bauer, Mark D., 5,019,027, Cl. 493-209.000.
- Bauer, Norman A., to Ag-Chem Equipment Co., Inc. Method and apparatus for initiating rotation of vertical auger devices. 5,018,668, Cl. 239-655.000.
- Bauer Spezialtiefbau GmbH: *See—*
  - Haberer, Johann, 5,018,588, Cl. 173-22.000.
- Baumgartner, Andreas: *See—*
  - Daly, Charles; Fitzgerald, Gerald F.; Coffey, Aidan; Costello, Veronica A.; Murphy, Maeve C.; and Baumgartner, Andreas, 5,019,506, Cl. 435-172.300.
- Baur, Richard; Richter, Felix; Birnbach, Stefan; Fikentscher, Rolf; Oftring, Alfred; and Winkler, Ekhard, to BASF Aktiengesellschaft. Serine-N,N-diacetic acid and derivatives as complexing agents and detergents containing same. 5,019,296, Cl. 252-546.000.
- Bausch & Lomb Incorporated: *See—*
  - Heiler, David J., 5,019,380, Cl. 424-81.000.
- Baxendale, Andrew: *See—*
  - Higgins, Ian; and Baxendale, Andrew, 5,019,430, Cl. 427-430.100.
- Baxter Diagnostics Inc.: *See—*
  - Cormier, Alan D.; and Weinberg, Melvin S., 5,019,238, Cl. 204-409.000.
- Baxter International Inc.: *See—*
  - D'Silva, Edmund D., 5,018,945, Cl. 417-12.000.
  - Varecka, Roland; and Bliem, Rudolf F., 5,019,512, Cl. 435-240.250.
- Bayer AG: *See—*
  - Hector, Richard F.; Schaller, Klaus; Moeschler, Heinrich F.; and Plempel, Manfred, 5,019,560, Cl. 514-43.000.
- Bayer Aktiengesellschaft: *See—*
  - Baasner, Bernd; Hagemann, Hermann; and Schwamborn, Michael, 5,019,654, Cl. 564-510.000.
  - Brock, Martin; Busch, Ralf; and Pohlig, Ralf, 5,019,304, Cl. 264-45.100.
  - Brock, Martin; Busch, Ralf; and Pohlig, Ralf, 5,019,305, Cl. 264-45.100.
- Bayne, Steven T.: *See—*
  - Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., 5,018,285, Cl. 29-465.000.
- Bear Automotive Service Equipment Company: *See—*
  - Hechel, Dennis L.; Niemetschek, Raymond H.; Slocum, Tobin; Kercheck, Gary R.; and Crawford, Michael C., 5,018,853, Cl. 356-155.000.
- Beard, Lloyd R., to A. B. Chance Company. Circuit improvement apparatus having combination current limiting fuse and resettable vacuum switch to prevent single-phasing of three-phase loads. 5,019,937, Cl. 361-102.000.
- Beardell, Paula. Foldable book and building structure. 5,018,764, Cl. 281-2.000.
- Beasley, Ronald L. Fire sprinkler apparatus. 5,018,770, Cl. 285-39.000.
- Beck, Irina: *See—*
  - Philippe, Michel; Hocquaux, Michel; Sebag, Henri; Beck, Irina; and Laugier, Jean P., 5,019,567, Cl. 514-164.000.
- Becker, Herbert: *See—*
  - Hirsch, Walter; and Becker, Herbert, 5,019,014, Cl. 460-106.000.
- Becker, Hilton: *See—*
  - Purkait, Bobby K.; and Becker, Hilton, 5,019,101, Cl. 623-8.000.
- Becker, Rainer; Schlabs, Brigitte; and Weisemann, Claus, to Jacobs Suchard AG. Process for improving the quality of Robusta coffee. 5,019,413, Cl. 426-460.000.
- Beckers, Andreas G. F., to Diva Medical Systems bv. Diabetes management system and apparatus. 5,019,974, Cl. 364-413.020.
- Beckman Instruments, Inc.: *See—*
  - Ohms, Jack I.; Qadeer, Majid; and Penhasi, Harry A., 5,019,348, Cl. 422-63.000.
- Bedell, Stephen A., to Dow Chemical Company, The. Quaternary polyamines as sulfite oxidation inhibitors. 5,019,365, Cl. 423-243.000.
- Bedogni, Carlo: *See—*
  - Fergni, Bruno; Venturi, Giancarlo; and Bedogni, Carlo, 5,018,225, Cl. 5-61.000.
- Beesley, Graham E.; McCabe, David J.; and Saini, Jasjit S., to Shaye Communications Limited. Duplex communications method and system. 5,020,051, Cl. 370-29.000.
- Beifus, Brian L., to General Electric Company. Method and apparatus for controlling a blower motor in an air handling system to provide constant pressure. 5,019,757, Cl. 318-254.000.
- Bell, Allyn R.: *See—*
  - Covey, Rupert A.; Forbes, Patricia; Bell, Allyn R.; and Blem, Allen R., 5,019,152, Cl. 71-92.000.
- Bell, Andrew, to Hercules Incorporated. Discrete tungsten complexes as oxygen and water resistant DCPD polymerization catalysts. 5,019,544, Cl. 502-102.000.
- Bell Communications Research, Inc.: *See—*
  - Crespo, Pedro M., 5,020,078, Cl. 375-12.000.
- Beloit Corporation: *See—*
  - Roerig, Arnold J.; and Shockley, Steven C., 5,018,402, Cl. 475-347.000.
- Beltzer, Morton; Habeeb, Jacob J.; Francis, James N.; and Colle, Karla S., to Exxon Research and Engineering Company. Enhancing antiwear and friction reducing capability of certain xanthate containing molybdenum sulfide compounds. 5,019,283, Cl. 252-33.600.
- Ben Salah, Ahmed: *See—*
  - O'Donnell, Hugh W.; and Ben Salah, Ahmed, 5,018,903, Cl. 405-170.000.
- Benack, Kerin S.; and Taggi, Arthur J., to Du Pont de Nemours, E. I., and Company. Method for duplicating press characteristic dot gain in electrostatic proofing systems. 5,019,472, Cl. 430-43.000.
- Bender, E. A. Long stroke deep well pumping unit. 5,018,350, Cl. 60-369.000.
- Benedikter, Richard; Sepp, Gunther; and Knauer, Wolfgang, to Messerschmitt-Bolkow-Blohm GmbH. Initiating sensor. 5,018,446, Cl. 102-213.000.
- Benjamin, James F.: *See—*
  - Meredith, Steven E.; and Benjamin, James F., 5,018,735, Cl. 273-80.00B.
- Benjock, Greg F.: *See—*
  - Truesdale, Wade J.; Moore, Bryan B.; and Benjock, Greg F., 5,019,449, Cl. 428-397.000.
- Bennett, Keith E.; and Staley, John R., III, to Newport Corporation. Neutral density filters. 5,018,833, Cl. 350-314.000.
- Bentley, Jeffrey A.; and Murphy, Thomas A., to Aerovox Incorporated. Capacitor circuit interruption. 5,019,934, Cl. 361-15.000.
- Bently Nevada Corp.: *See—*
  - Biggs, David H.; Little, John K.; and Hanifan, Philip C., 5,019,814, Cl. 340-870.290.
- Bento, Luis R., to RAR - Refinarias De Accucar Reunidas, S.A. Processing for regenerating sugar decolorizing ion exchange resins, with regenerant recovery. 5,019,542, Cl. 502-25.000.
- Bentu, George: *See—*
  - Berg, Lloyd; and Bentu, George, 5,019,217, Cl. 203-51.000.
- Benz & Hilgers GmbH: *See—*
  - Bohm, Jurgen; and Fischer, Georg, 5,019,127, Cl. 222-1.000.
- Berg, Lloyd; and Bentu, George, to Berg, Lloyd. Separation of m-xylene from o-xylene by extractive distillation using esters. 5,019,217, Cl. 203-51.000.
- Bergin, John A.; and Racette, Roger A., to GTE Products Corporation. Wedge lamp and clip. 5,018,992, Cl. 439-699.000.
- Bergmann, Franz-Josef; Hockenberger, Lothar; and Schadt, Waltraut, to Ruetgerswerke Aktiengesellschaft. Single-component sealing substances. 5,019,619, Cl. 524-405.000.
- Bergmann, Michael: *See—*
  - Pfab, Werner; Bergmann, Michael; Fenzlein, Paul-Gerhard; and Anderer, Wolfgang, 5,018,527, Cl. 128-635.000.
- Bergwerksverband GmbH: *See—*
  - Stephan, Peter, 5,018,919, Cl. 411-33.000.
- Bernard, Guy, to Metaux Speciaux S.A. Process for the separation of calcium and nitrogen from lithium. 5,019,158, Cl. 75-408.000.
- Bernd, Alfred; England, Willi; Flaig, Heinz; Hesse, Wilhelm; Staggl, Roland; and Zacharias, Karl, to Mannesmann Aktiengesellschaft. Brake coupler for displacement-type armature motor. 5,019,734, Cl. 310-77.000.
- Bernert, Jorg: *See—*
  - Hardtke, Hans-Herlof; and Bernert, Jorg, 5,018,607, Cl. 188-282.000.
- Bernheim, Michael: *See—*
  - Ludemann, Simpert; Bernheim, Michael; Sandner, Bernhard; Rossler, Erich; and Vogel, Hans-Burkhardt, 5,019,428, Cl. 427-387.000.
- Bertin, Kim C.; and Rubash, Harry E. Modular implant. 5,019,108, Cl. 623-23.000.
- Best, Bernd: *See—*
  - Menke, Klaus; Wiesert, Peter; Wollmann, Klaus; and Best, Bernd, 5,019,199, Cl. 156-245.000.
- Best, Donald F.; Long, Gary N.; Pellet, Regis J.; Rabo, Jule A.; and Wolynic, Edward T., to UOP. Hydrocracking process. 5,019,240, Cl. 208-111.000.
- Beth Israel Hospital, The: *See—*
  - Spears, J. Richard; and Bourgelais, Donna, 5,019,075, Cl. 606-7.000.
- Betz Laboratories, Inc.: *See—*
  - Forester, David R., 5,019,241, Cl. 208-120.000.
  - Muccitelli, John A.; and Feldman, Nancy A., 5,019,342, Cl. 422-16.000.
  - Niu, Joseph H. Y.; Edmondson, James G.; and Lehrer, Scott E., 5,019,341, Cl. 422-7.000.
- Bewlay, Bernard P.; and Day, James, to General Electric Company. Method of forming improved tungsten ingots. 5,019,330, Cl. 419-39.000.
- Beyer, James B.: *See—*
  - Martens, Jon S.; Beyer, James B.; Nordman, James E.; and Hohenwarter, Gert K. G., 5,019,721, Cl. 307-306.000.
- Bezwada, Rao S.; and Shalaby, Shalaby W., to Ethicon, Inc. Crystalline copolymers of p-dioxanone and poly(alkylene oxides). 5,019,094, Cl. 606-230.000.
- BICC Public Limited Company: *See—*
  - Rowland, Simon M., 5,018,825, Cl. 350-96.230.

VOL 126
ISS 4
MY 28 1991
UMI

- Bieberbach, George: *See—*
  - Obermeyer, Franklin D.; Cruz, Richard R.; and Bieberbach, George, 5,018,772, Cl. 292-39.000.
- Bielas, Michael S.; and El-Wailly, Tamim F., to Honeywell Inc. Fiber optic gyroscope balanced plural serrodyne generators combined signal phase difference control. 5,018,860, Cl. 356-350.000.
- Bielecki, John R.; and France, Thomas J. Ceiling fan cleaner apparatus. 5,018,944, Cl. 416-146.00R.
- Bielfeldt, Friedrich B., to Maschinenfabrik J. Dieffenbacher GmbH & Co. Apparatus for the insertion of laminated packs into hot presses. 5,019,206, Cl. 156-538.000.
- Biggs, David H.; Little, John K.; and Hanifan, Philip C., to Bently Nevada Corp. Wireless data coupling system and method. 5,019,814, Cl. 340-870.290.
- Bigham, Eric C., to Burroughs Welcome Co. Novel compounds and use. 5,019,577, Cl. 514-272.000.
- Bigo, Louis B., to Poclain Hydraulics, Societe Anonyme. Mechanism employing fluid under pressure provided with a rotor, a stator and a device for assembling these two elements. 5,018,433, Cl. 91-498.000.
- Billman, Fred L.; Jamison, Mark D.; and Wortley, Russell B., to S. C. Johnson & Son, Inc. Squeezable fluid container. 5,018,646, Cl. 222-107.000.
- BioAgriTech, Inc., a Florida corporation: *See—*
  - Peek, Thomas W.; and Floyd, John B., 5,018,299, Cl. 43-107.000.
- Biomet, Inc.: *See—*
  - Wiley, Roy C., 5,019,105, Cl. 623-22.000.
- Biotechnology Research Partners, Ltd.: *See—*
  - Johnson, Lorin K.; Seilhamer, Jeffrey J.; Pruzanski, Waldemar; and Vadas, Peter, 5,019,508, Cl. 435-198.000.
- Birch, Martin J., to STC PLC. Addressing scheme for multiplexed ferro-electric liquid crystal. 5,018,834, Cl. 350-333.000.
- Birkmayer, Jorg. Treatment of Parkinson's disease with NADPH. 5,019,561, Cl. 514-52.000.
- Birnbach, Stefan: *See—*
  - Baur, Richard; Richter, Felix; Birnbach, Stefan; Fikentscher, Rolf; Oftring, Alfred; and Winkler, Ekhard, 5,019,296, Cl. 252-546.000.
- Bishop, Robert C.: *See—*
  - Knight, Patricia M.; and Bishop, Robert C., 5,019,097, Cl. 623-5.000.
- Bishop, Stephen J., to Huffy Corporation. Method for assembling a bicycle frame. 5,019,312, Cl. 264-152.000.
- Bishop, Willis E. Disposable coasters. 5,018,695, Cl. 248-346.100.
- Bittel, John A. Tear top can opener. 5,018,409, Cl. 81-3 550.
- Bittel, Robert W.; and Rhine, Jules W., Jr., to Lucerne Products, Inc. Electrical adapter for interconnection with a switch. 5,018,983, Cl. 439-76.000.
- BK Va-Leveranser AB: *See—*
  - Kock, Bengt; and Holm, Klas, 5,019,276, Cl. 210-744.000.
- Black, David B., to Imnet Corporation. Methods and apparatus for dynamically scaling images. 5,020,115, Cl. 382-44.000.
- Black, Teresa K.; English, James M.; and Shank, Michael S., to AMP Incorporated. Electrical connector containing components and method of making same. 5,018,989, Cl. 439-620.000.
- Blais, Irene M.: *See—*
  - Ang, Jit F.; Miller, William B.; and Blais, Irene M., 5,019,406. Cl. 426-302.000.
- Blake, Joseph W., III: *See—*
  - Hoffman, J. Kenneth; and Blake, Joseph W., III, 5,019,053, Cl. 604-220.000.
- Blake, Julian G.; Muka, Richard S.; and Younger, Peter R., to Eaton Corporation. Sputtering system. 5,019,233, Cl. 204-792.120.
- Bland, John: *See—*
  - Christen, Alice A.; Gibson, Donna M.; and Bland, John, 5,019,504, Cl. 435-123.000.
- Blanding, Douglas L., to Eastman Kodak Company. Electrophotographic film core device. 5,019,864, Cl. 355-212.000.
- Blaney, Ted L.: *See—*
  - Freeland, Mary E.; and Blaney, Ted L., 5,019,066, Cl. 604-385.200.
- Blangetti, Francisco; and Svoboda, Vaclan, to Asea Brown Boveri Ltd. Steam condenser 5,018,572, Cl. 165-113.000.
- Bleckmann, Ingo. Tubular sheathed electric heater with an overheat safety device. 5,020,128, Cl. 392-498.000.
- Blem, Allen R.: *See—*
  - Covey, Rupert A.; Forbes, Patricia; Bell, Allyn R.; and Blem, Allen R., 5,019,152, Cl. 71-92.000.
- Blessington, Daniel R.; Kneezel, Gary A.; and Campanelli, Michael R., to Xerox Corporation. Thick film substrate with highly thermally conductive metal base. 5,019,675, Cl. 346-140.00R.
- Blevins, Richard W.; and Turner, S. Richard, to Eastman Kodak Company. Copolymers of dioxolanes and maleic anhydride. 5,019,635, Cl. 526-266.000.
- Bliem, Rudolf F.: *See—*
  - Varecka, Roland; and Bliem, Rudolf F., 5,019,512, Cl. 435-240.250.
- Blobel, Hans-Jurgen: *See—*
  - Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
- Bloom, Frank: *See—*
  - Raj, Kuldip; Moskowitz, Ronald; Moses, Joseph; Bonvouloir, James; and Bloom, Frank, 5,018,751, Cl. 277-80.000.
- Blumenstein, Fritz: *See—*
  - Uhlig, Gunter; Blumenstein, Fritz; and Witte, Gerhard, 5,019,022, Cl 475-209.000.
- Boaen, Yerell: *See—*
  - Pomfret, Stephen T.; Lary, Richard; and Boaen, Yerell, 5,020,020, Cl. 364-900.000.
- Bobo, Melvin, to General Electric Company. Air temperature measurement. 5,018,873, Cl. 374-144.000.
- Bobo, Robert D.: *See—*
  - Nbedi, Sylvain L.; Bobo, Robert D.; and Hryhorenko, Socrates, 5,019,692, Cl. 219-469.000.
- Bobst SA: *See—*
  - Jaton, Jean-Philippe, 5,019,026, Cl. 493-147.000.
- BOC Group, Inc., The: *See—*
  - Lee, Ron C.; and Kirschner, Mark J., 5,018,358, Cl. 62-48.100.
- Bock, August; Lechner, Konrad; and Huber, Otto, to Consortium fur elektrochemische Industrie GmbH. *Aureobasidium pullulans* strain, process for its preparation, and use thereof. 5,019,514, Cl. 435-254.000.
- Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., to AT&T Bell Laboratories. Optical sub-carrier multiplex television transmission system using a linear laser diode. 5,020,049, Cl. 370-3.000.
- Bodensiek, Paul H.: *See—*
  - Marstiller, John A.; Bodensiek, Paul H.; and Grise, Frederick G. J., 5,019,797, Cl. 338-333.000.
- Boeckmann, Hugo; Van Erden, Donald L.; and Bauer, Mark D., to Dow Chemical Company, The. Method and apparatus for sealing reclosable flexible containers without spot sealing. 5,019,027, Cl. 493-209.000.
- Boehlke, Klaus: *See—*
  - Taubitz, Christof; Gausepohl, Hermann; Seiler, Erhard; Boehlke, Klaus; and Heckmann, Walter, 5,019,626, Cl. 525-92.000.
- Boehm, Erwin: *See—*
  - Von Der Saal, Wolfgang V.; Mertens, Alfred; and Boehm, Erwin, 5,019,587, Cl. 514-409.000.
- Boehringer Mannheim Corporation: *See—*
  - Van Zile, Richard R.; and McNulty, Donald E., 5,019,103, Cl. 623-20.000.
- Boehringer Mannheim GmbH: *See—*
  - Von Der Saal, Wolfgang V.; Mertens, Alfred; and Boehm, Erwin, 5,019,587, Cl. 514-409.000.
- Boeing Company, The: *See—*
  - Matich, Charles B., 5,018,397, Cl. 73-866.500.
  - Rosenberg, Jerome C., 5,019,774, Cl. 324-174.000.
  - Starr, Benjamin F.; Wallace, Mark L.; Talley, Gaylen M.; and Woo, Paul M., 5,019,980, Cl. 364-424.040.
- Boekelheide, Karl: *See—*
  - McCurry, Patrick W.; Kellogg, James R.; Boekelheide, Karl; Sexton, Kenneth D.; Ellson, George A.; and Hocker, Robert A., 5,019,717, Cl. 307-66.000.
- Boettcher, Fritz P.; Dicker, Ira B.; Ebersole, Richard C.; and Hertler, Walter R., to Du Pont de Nemours, E. I., and Company. Group transfer living polymer grafted to an initiator support. 5,019,634, Cl 526-262.000.
- Bogaerts, Leo C.; and Cattapan, David, to Ammco Tools, Inc. Brake lathe with hand-held grinder and method of grinding. 5,018,228, Cl. 51-259.000.
- Bohl, Rainer M.: *See—*
  - McEwen, James A.; Godolphin, William J.; Bohl, Rainer M.; Dance, Mark N.; Furse, Marty L.; and Osborne, John C., 5,019,243, Cl. 210-94.000.
- Bohm, Jurgen; and Fischer, Georg, to Benz & Hilgers GmbH. Dosing a liquid. 5,019,127, Cl. 222-1.000.
- Boisture, Thomas B.; McGrew, Larry D.; Jeffrey, James D.; Wetzel, Robert G.; Livingston, Gene P.; and Baten, Robert A., to Ohmstede Mechanical Services, Inc. Apparatus for cleaning heat exchanger tube bundles. 5,018,544, Cl. 134-111.000.
- Bolduc, Lee R. Aerosol dispenser with sealed actuator and aerosol dispensing method. 5,018,643, Cl. 222-1.000.
- Boles, Glenn M.; Schober, Gary W.; Chein, Wen S.; Symanski, Chris P.; Des Rioux, Philippe; and Tomkoski, Walter, III, to Control Data Corporation. Electronic data encoding and recognition system. 5,019,899, Cl. 358-84.000.
- Bolger, Richard P., to Illinois Tool Works Inc. Position sensor systems for a print head. 5,018,443, Cl. 101-228.000.
- Bolliand, Robert, to Vetrotex Saint-Gobain S.A.; and Institut Textile de France. Method and apparatus for needling of glass mat and composite product made from said mat. 5,018,255, Cl. 28-107.000.
- Bollier, Jean F.; and Boumendil, Jean-Jacques, to Piezo-Ceram Electronique. Annular furnaces with a rotary hearth for shaping one of the faces of blanks of optical lenses to a desired profile by heat sagging and application of a vacuum. 5,019,689, Cl. 219-388.000.
- Bom, Cornelis J. G.: *See—*
  - van der Lely, Ary; and Bom, Cornelis J. G., 5,018,669, Cl. 239-665.000.
- Bonato, Paolo, to Siemens Telecommunicazioni S.p.A. Image suppression harmonic frequency converter operating in the microwave field 5,020,148, Cl. 455-302.000.
- Boness, Kenneth D.: *See—*
  - Gulliver, James A.; Holt, Christopher C.; Boness, Kenneth D.; and Anderson, Martin R., deceased, 5,019,777, Cl. 324-242.000.
- Bonier-Sahuc, Monique F. Pulverulent product stabilizing soils in place and method of application. 5,018,906, Cl. 405-263.000.
- Bonvouloir, James: *See—*
  - Raj, Kuldip; Moskowitz, Ronald; Moses, Joseph; Bonvouloir, James; and Bloom, Frank, 5,018,751, Cl. 277-80.000.

- Borden, Inc.: *See—*
  - Chiu, Shui-Tung, 5,019,618, Cl. 524-405.000.
- Bordin, Italo, to C.I.M. S.r.l. Rolling machine particularly for producing croissants. 5,018,439, Cl. 99-450.200.
- Borrelli, Nicholas F.; and Smith, Dennis W., to Coring Incorporated. Colored photosensitive opal glasses. 5,019,538, Cl. 501-13.000.
- Bosshart, Patrick W.: *See—*
  - Scott, David B.; Bosshart, Patrick W.; and Gallia, James D., 5,019,888, Cl. 357-41.000.
- Bota, Keiji; and Sawa, Kenji, to Mazda Motor Corporation. Control systems for power trains provided in vehicles. 5,018,408, Cl. 74-866.000.
- Bottene, Sergio: *See—*
  - Segalla, Rodolfo; and Bottene, Sergio, 5,019,216, Cl. 162-344.000.
- Boucher, J. Raymond: *See—*
  - Chabane, Mohamed, Boucher, J. Raymond; and Pan, Ali, 5,018,268, Cl. 29-728.000.
- Boucher, Robert W.: *See—*
  - Barlow, Robert W.; Boucher, Robert W.; and Lynch, Thomas M., 5,018,818, Cl. 350-96.200.
- Boucherot, Dominique: *See—*
  - Arnould, Jean C.; Boucherot, Dominique; Davies, David H.; Jung, Frederick H.; and Strawson, Colin J., 5,019,570, Cl. 514-202.000.
- Boudreau, Robert A.; and Rideout, William C., to GTE Laboratories Incorporated. Method of optically coupling an uptapered single-mode optical fiber to optoelectronic components. 5,018,820, Cl. 350-96.200.
- Boumendil, Jean-Jacques: *See—*
  - Bollier, Jean F.; and Boumendil, Jean-Jacques, 5,019,689, Cl. 219-388.000.
- Bourbonais, Edward A.: *See—*
  - Perron, Peter J.; and Bourbonais, Edward A., 5,019,625, Cl. 525-66.000.
- Bourgeault, Leo B.; and Wohlberg, Alfred W., to Allied-Signal Inc. AC/DC conversion with reduced supply waveform distortion. 5,019,954, Cl. 363-21.000.
- Bourgelais, Donna: *See—*
  - Spears, J. Richard; and Bourgelais, Donna, 5,019,075, Cl. 606-7.000.
- Bowen, Thomas C.: *See—*
  - Newman, Neil A.; and Bowen, Thomas C., 5,018,996, Cl. 440-75.000.
- Bowne, Arlyce T., to Eastman Kodak Company. Color photographic element and process. 5,019,489, Cl. 430-379.000.
- Bowser, John J.; and Hyde, Christopher T., to W. L. Gore & Associates, Inc. Irradiated expanded polytetrafluoroethylene composites, and devices using them, and processes for making them. 5,019,140, Cl. 55-159.000.
- Boyd, David W.; and Deutschbein, John S., to Hewlett-Packard Company. Optical scanner with mirror mounted occluding aperture or filter. 5,019,703, Cl. 250-208.100.
- Boyer, Gerald L., Jr.: *See—*
  - Assink, Kenneth; Feenstra, Mark J.; and Boyer, Gerald L., Jr., 5,018,957, Cl. 425-112.000.
- Boyle, Dennis J.: *See—*
  - Herron, Matthew A.; and Boyle, Dennis J., 5,019,465, Cl. 429-97.000.
- BP Chemicals Limited: *See—*
  - Faulks, James N G., 5,019,291, Cl. 252-174.220.
- Brace Technologies, Inc.: *See—*
  - Grood, Edward S.; Butler, David L.; Ledyard, D. Michael; and Hoffman, Steven D., 5,018,514, Cl. 128-80.00C.
- Brackeen, Marcus F.: *See—*
  - Feldman, Paul L.; James, Michael K.; Brackeen, Marcus F.; Johnson, Michael R.; and Leighton, Harry J., 5,019,583, Cl. 514-327.000.
- Braddick, Britt O.; and Langer, Michael, to Texas Iron Works, Inc. Arrangement and method for conducting substance and seal therefor. 5,018,579, Cl. 166-291.000.
- Brady, Jack D.; Graves, Kenny M.; Paschke, Larry F.; and Golumbeski, John M., to Crown Andersen, Inc. Waste treatment system. 5,018,457, Cl. 110-346.000.
- Bragas, Peter: *See—*
  - Duckeck, Ralf; and Bragas, Peter, 5,020,143, Cl. 455-186.000.
- Brainy Toys Inc.: *See—*
  - Maier, Steven E.; and Maier, Helmut W., 5,018,743, Cl. 273-242.000.
- Bramlage Gesellschaft mit beschrankter Haftung: *See—*
  - Hackmann, Ludger; and Wilken, Josef, 5,018,644, Cl 221-65.000.
- Branan, Larry J., to Branan, Larry J. Industrial funnel apparatus with operable lid for use with 55 gallon drums. 5,018,559, Cl. 141-339.000.
- Brandhorst, Henry W., Jr.; and Weinberg, Irving, to United States of America, National Aeronautics and Space Administration. Thin solar cell and lightweight array. 5,019,176, Cl. 136-244.000.
- Brandley, Brian K.; James, Paul G.; and Tiemeyer, Michael, to Glycomed, Incorporated. Electro-blotting of electrophoretically resolved fluroescent-labeled saccharides and detection of active structures with protein probes. 5,019,231, Cl. 204-182.100.
- Brandstrom, Arne E.; Lindberg, Per L.; Starke, Carl I.; and Sunden, Gunnel E., to Aktiebolaget Hassle. Therapeutically active chloro substituted benzimidazole. 5,019,584, Cl. 514-338.000.
- Braquet, Pierre; Pirotzky, Eduardo; Godfroid, Jean-Jacques; and Heymans, Francoise, to Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.). 2-substituted N,N'-ditrimethoxybenzoyl piperazines and therapeutic compositions containing them 5,019,576, Cl 514-255.000.
- Bratton, Kenneth L.: *See—*
  - Voisine, Gary R.; and Bratton, Kenneth L., 5,019,147, Cl. 65-360.000.
- Braun, Curt, to Hunter Engineering Company, Inc. Strip drying or curing oven. 5,018,966, Cl. 432-59.000.
- Brazelton, Carl L.; Litherland, Troy C.; and Johnston, James G., to Stranco, Inc. Dual-pump mixing and feeding apparatus. 5,018,870, Cl. 366-161.000.
- Brazelton, Carl L.; and Litherland, Troy C., to Stranco, Inc. Polymer dilution and activation apparatus. 5,018,871, Cl. 366-168.000.
- Bream, David R.; and Roome, Stephen J., to Thorn EMI PLC. Frequency measurement. 5,019,823, Cl. 342-175.000.
- Breckner, Raymond A.; Henriksson, Kurt K.; Sharratt, Leslie C.; and Sharratt, Leslie M., to Innovac Technology Inc. Fluid pump apparatus. 5,018,946, Cl. 417-197.000.
- Breed Automotive Technology, Inc.: *See—*
  - Ramaswamy, Coodly P., 5,019,192, Cl. 149-42.000.
- Brennecke, Hermann; and Liere, Horst, to Alfo AG. Safety device to relieve explosive pressures. 5,018,585, Cl. 169-48.000.
- Brenneise, Clark D.: *See—*
  - de La Chapelle, Michael; Bryan, Richard E.; and Brenneise, Clark D., 5,019,826, Cl. 342-202.000.
- Brenner, Barry H. Specialized case and attachment for carrying posters and other documents in the rolled up condition. 5,018,609, Cl. 190-108.000.
- Bretaudeau, Jean-Pierre; and Salaud, Jean-Luc, to Hutchinson. Hydraulic antivibratory devices. 5,018,699, Cl. 248-562.000.
- Brewer, John R.; Swenson, Joseph M.; and Maas, Reginald R., to Coors Ceramic Company. Method and apparatus for the manufacture of hollow ceramic beams using multiple molding mandrels. 5,019,307, Cl. 264-67.000.
- Briant, Paul; and Frederick, Norma. Metal-ion vapor accelerator cell. 5,019,237, Cl. 204-302.000.
- Bridgestone Corporation: *See—*
  - Hasegawa, Yoshimi; Kakiuchi, Shinichi; and Tomita, Seisuke, 5,019,320, Cl. 273-235.00R.
  - Nakamura, Makoto; Honda, Toshio; Chikaraishi, Toshio; and Fukuura, Yukio, 5,019,319, Cl. 273-218.000.
  - 012aki, Nobuo; and Morikawa, Shoichi, 5,018,701, Cl. 248-631.000.
- Briggs, Milton; and Teutsch, Erich O., to General Electric Corporation; and Graham Engineering Corporation. Multi-layer molten plastic body. 5,019,433, Cl. 428-35.700.
- Brigham and Women's Hospital, Inc., The: *See—*
  - Kasper, Dennis L.; Zaleznik, Dori F.; and Finberg, Robert W., 5,019,513, Cl. 435-240.260.
- Bristol-Meyers Squibb Company: *See—*
  - Schelhas, Klaus-Deiter, 5,019,107, Cl. 623-23.000.
- British Aerospace Public Limited Company: *See—*
  - Malvern, Allan, 5,018,858, Cl. 356-350.000.
- British Telecommunications public limited company: *See—*
  - Wyatt, Richard; and Cameron, Keith H., 5,018,831, Cl. 350-162.170.
- Brittain, Raymond C.; and Gomez, Roy. Intrusion detection apparatus. 5,019,802, Cl. 340-522.000.
- Brivio, Lodovico R.: *See—*
  - De Bastiani, Giovanni; Faccioli, Giovanni; Aldegheri, Roberto; and Brivio, Lodovico R., 5,019,077, Cl. 606-54.000.
- Brock, Martin; Busch, Ralf; and Pohlig, Ralf, to Bayer Aktiengesellschaft. Process for the production of foam cushions from different fluid reaction mixtures. 5,019,304, Cl. 264-45.100.
- Brock, Martin; Busch, Ralf; and Pohlig, Ralf, to Bayer Aktiengesellschaft. Process for the production of foam cushions from different fluid reaction mixtures. 5,019,305, Cl. 264-45.100.
- Brocklehurst, Charles E., to Sew Simple Systems, Inc. Edge finishing system. 5,018,462, Cl. 112-121.120.
- Brodin, Christer. Tug release connector 5,018,254, Cl. 24-601.500.
- Broken Hill Proprietary Company Limited: *See—*
  - Mole, Thomas, 5,019,661, Cl. 585-253.000.
- Brossia, Charles E.: *See—*
  - Wu, Samuel C.; and Brossia, Charles E., 5,020,007, Cl. 364-551.010.
- Brother Kogyo Kabushiki Kaisha: *See—*
  - Higashiyama, Shunichi; and Suzuki, Keiko, 5,019,475, Cl. 430-138.000.
  - Imaeda, Mikio, 5,019,873, Cl. 355-326.000.
  - Miyabayashi, Takeshi, 5,019,468, Cl. 429-191.000.
  - Suzuki, Makoto; Watanabe, Satoshi, Tsukamoto, Takashi; Aoki, Hikoharu; Ohri, Hitomi; and Sako, Yukihiro, 5,018,817, Cl 350-96.170.
- Brotz, Gregory R.; and Dallas, Angelo N., to Brotz, Gregory R Musicians telephone interface. 5,020,101, Cl. 379-389.000.
- Brown, Albert L.; Frantz, Joseph C.; and Peetz, Richard H., to Norden Laboratories Inc. *Bordetella bronchiseptica* vaccine. 5,019,388, Cl. 424-92.000.
- Brown, Charles J., to STC PLC. Cable anchorage 5,018,251, Cl. 24-122.600.
- Brown, George T.; Millis, David B.; Reynolds, Paul R.; and Nowak, Ronald P., to International Business Machines Corp. System for designing intercommunication networks. 5,019,992, Cl. 364-468.000
- Brown, Glenn E. Mask for adminstering an anesthetic gas to a patient. 5,018,519, Cl. 128-203.290.
- Brown, Jim W. Bladed dart projectile 5,018,747, Cl. 273-422.000
- Brown, Larry R.: *See—*
  - Gombotz, Wayne R., Healy, Michael S., and Brown, Larry R., 5,019,400, Cl 424-497.000

VOL
126
SS
4
MY
28
1991
UMI

Brown, Thomas A.: *See—*

Kasparian, Kaspar; Ide, John D.; Brown, Thomas A.; Rogers, Aaron S.; Fussell, John P.; and Hsu, Ming C., 5,020,135, Cl. 455-76.000.

Brownell, Keith H.: *See—*

Baker, Don R.; and Brownell, Keith H., 5,019,565, Cl. 514-89.000.

Brownrigg, Patrick; Vali, Victor; and Youmans, Bruce. Method for eliminating the temperature sensitivity of an optical fiber and a temperature insensitive optical fiber. 5,018,827, Cl. 350-96.300.

Bruder, Horst; and Mayer, Udo, to BASF Aktiengesellschaft. Recording fluid for the ink jet process. 5,019,165, Cl. 106-22.000.

Bruegge, Anthony J.; Daugherty, Denny E.; and Sabatelli, Terrence J., to DuBois Chemicals, inc. Method of formulating high caustic paste dishwashing compositions made compositions thereby, wherein phosphate reversion is minimized. 5,019,290, Cl. 252-135.000.

Bruhm, Ronald. Elastomeric weather seal flashing and method of manufacture. 5,018,333, Cl. 52-741.000.

Brun-Vezinet, Francoise: *See—*

Wain-Hobson, Simon; Huet, Thierry; Delaporte, Eric; and Brun-Vezinet, Francoise, 5,019,510, Cl. 435-235.100.

Bruning, Klaus: *See—*

Muller, Hartmut; and Bruning, Klaus, 5,019,638, Cl. 528-83.000.

Brunnhofer, Erwin, to Technoform Caprano & Brunnhofer KG. Method of and apparatus for producing a pipe of thermoplastic synthetic resin. 5,019,309, Cl. 264-103.000.

Bruno, Caoduro, to Nowax S.r.l. Twin-walled casing for electric motor with forced air-cooling. 5,019,737, Cl. 310-89.000.

Brunswick Corporation: *See—*

Newman, Neil A.; and Bowen, Thomas C., 5,018,996, Cl. 440-75.000.

Brussel, Richard, to Krupp Maschinentechnik GmbH. Method of producing mat packets from sheets of adhesive material and apparatus for implementing the method. 5,019,204, Cl. 156-264.000.

Bryan, Richard E.: *See—*

de La Chapelle, Michael; Bryan, Richard E.; and Brenneise, Clark D., 5,019,826, Cl. 342-202.000.

Buand, Thierry M. M., to S.A. Donnay International. Handgrip for a racket for ball games. 5,018,733, Cl. 273-75.000.

Buchanan, John M.; Cook, Ewell R.; Mooberry, Jared B.; Proehl, Gary S.; Singer, Stephen P.; and Washburn, William N., to Eastman Kodak Company. Photographic element and process comprising a blocked photographically useful compound. 5,019,492, Cl. 430-543.000.

Buchdrucker, Ewald, to MTD Products Inc. Steering control for snowblowers. 5,018,592, Cl. 180-19.300.

Buchl, Josef, to Audi AG. Method and apparatus for throttle valve control in internal combustion engines. 5,018,496, Cl. 123-399.000.

Buckholtz, Harry E.; and Miller, George T., to Occidental Chemical Corporation. Method of making eutectic mixture of copper and tricopper phosphide. 5,019,157, Cl. 75-340.000.

Bugga, Ratnakumar V.; DiStefano, Salvador; and Bankston, C. Perry, to United States of America, National Aeronautics and Space Administration. Metal chloride cathode for a battery. 5,019,470, Cl. 429-223.000.

Bulluck, S. Thomas, Jr. Tobacco barn with heat exchanger system. 5,018,281, Cl. 34-35.000.

Bunker, David D.; and Bunker, David L. Neck adjustment mechanism for stringed instruments. 5,018,423, Cl. 84-293.000.

Bunker, David L.: *See—*

Bunker, David D.; and Bunker, David L., 5,018,423, Cl. 84-293.000.

Bunn-O-Matic Corporation: *See—*

Knepler, John T., 5,019,690, Cl. 219-400.000.

Bunnell, Lee R., Sr., to Battelle Memorial Institute. Enhancement of mechanical properties of polymers by thin flake addition and apparatus for producing such thin flakes. 5,019,446, Cl. 428-324.000.

Bunsen, Christopher M.: *See—*

Stockberger, Randall L.; and Bunsen, Christopher M., 5,020,012, Cl. 364-709.140.

Bunte, Thomas; Parr, Wolfgang; and Heyl, Eduard, to HEYL Chemisch-parmazeutische Fabrik GmbH & Co KG. Skin treating composition, method of producing the same and treatment of skin therewith. 5,019,391, Cl. 424-195.100.

Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, to Mannesmann AG. Method for continuous casting of thin slab ingots. 5,018,569, Cl. 164-454.000.

Burdenko, Igor. Swimming pool apparatus comprising submerged track for deep water walking and running. 5,018,723, Cl. 272-70.000.

Burdorff, Mark A., to Whirlpool Corporation. Dishwasher overfill protection device. 5,018,550, Cl. 137-387.000.

Burke, Richard D.: *See—*

Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.

Burke, Roger E.; and Spruill, James G., to Resinall Corporation. Rosin modified styrene acrylic resin. 5,019,622, Cl. 524-532.000.

Burke, Roy D. Inflatable dinghy bracket. 5,018,475, Cl. 114-365.000.

Burlando, Albert A., to Almetek Industries, Inc. Process for die cutting plastic sheets. 5,019,314, Cl. 264-156.000.

Burlitch, James M., to Cornell Research Foundation, Inc. Use of hydrogen peroxide in preparing magnesium containing silicate sols for coating and fiber formation. 5,019,293, Cl. 252-313.100.

Burnell, John F. Rotary lawn mower blade assembly. 5,019,113, Cl. 56-295.000.

Burnett, Sibley C.: *See—*

Purcell, John R.; Burnett, Sibley C.; and Creedon, Lewis R., 5,019,247, Cl. 209-224.000.

Burr-Brown Corporation: *See—*

Graeme, Jerald G.; and Millaway, Steven D., 5,019,789, Cl. 330-273.000.

Burroughs Welcome Co.: *See—*

Bigham, Eric C., 5,019,577, Cl. 514-272.000.

Burrous, Allen J.; Colaprete, Silvio; and Kehrli, David W., to Schlegel Corporation. Self-draining threshold for an out-swinging door. 5,018,307, Cl. 49-471.000.

Burton, Frederick G.: *See—*

Cowan, Christina E.; Van Voris, Peter; Streile, Gary P.; Cataldo, Dominic A.; and Burton, Frederick G., 5,019,998, Cl. 364-496.000.

Busch, Ralf: *See—*

Brock, Martin; Busch, Ralf; and Pohlig, Ralf, 5,019,304, Cl. 264-45.100.

Brock, Martin; Busch, Ralf; and Pohlig, Ralf, 5,019,305, Cl. 264-45.100.

Buskirk, Gregory V.: *See—*

Gray, Robert L.; Peterson, David; Chen, Loren; and Buskirk, Gregory V., 5,019,289, Cl. 252-95.000.

Bussard, Robert W., to FDX Patents Holding Company, N.V. Modular fusion power apparatus using disposable core. 5,019,321, Cl. 376-133.000.

Busse, Karl-Hermann. Powders for producing hard materials in short reaction times for filling hollow wires for electric arc spraying. 5,019,454, Cl. 428-570.000.

Bussink, Jan: *See—*

Avakian, Roger W.; Shenian, Popkin; and Bussink, Jan, 5,019,616, Cl. 524-141.000.

Butler, David L.: *See—*

Grood, Edward S.; Butler, David L.; Ledyard, D. Michael; and Hoffman, Steven D., 5,018,514, Cl. 128-80.00C.

Butler, David O. Locking fastener. 5,018,252, Cl. 24-453.000.

Butler, F. Prince: *See—*

Rash, Mark S.; Harrison, Nicholas D.; and Butler, F. Prince, 5,020,094, Cl. 379-62.000.

Butler, Gordon, to Caltherm Corporation. Thermostat having soft mounting structure. 5,018,664, Cl. 236-34.500.

Butler, Jack B.: *See—*

Shirley, Thomas F., Jr.; and Butler, Jack B., 5,020,144, Cl. 455-186.000.

Butler, Thomas M.; and Sancic, David. Apparatus for inhibiting stress corrosion cracking. 5,018,706, Cl. 266-80.000.

Butner, Steven E.: *See—*

Wang, Yulan; and Butner, Steven E., 5,019,968, Cl. 364-200.000.

Butzen, Edgar: *See—*

Hager, Walter; Butzen, Edgar; Denuell, Gunther; and Arnold, Kurt, 5,018,465, Cl. 112-273.000.

Byers, Edward V., to Byers, Micharel Richard. Apparatus for collecting and discharging waste material. 5,019,253, Cl. 210-158.000.

Byers, Micharel Richard: *See—*

Byers, Edward V., 5,019,253, Cl. 210-158.000.

Byrley, Frank D. Vending machine for particulate comestibles. 5,018,615, Cl. 194-241.000.

C.I.M. S.r.l.: *See—*

Bordin, Italo, 5,018,439, Cl. 99-450.200.

C. van der Lely N.V.: *See—*

van der Lely, Ary; and Bom, Cornelis J. G., 5,018,669, Cl. 239-665.000.

Cadware, Inc.: *See—*

Addesso, Mark; Iyer, Venkatraman R.; and Dunn, Robert M., 5,019,961, Cl. 364-192.000.

Cadwell, Robert M., to Dresser Industries, Inc. Precision transducer circuit and linearization method. 5,019,783, Cl. 324-662.000.

Caers, Johan F. J. M.: *See—*

Klomp, Johannes T.; Van De Ven, Adrianus J. C.; and Caers, Johan F. J. M., 5,018,659, Cl. 228-121.000.

Cahill, Stephen V.; Gillig, Steven F.; and Walczak, Thomas J., to Motorola, Inc. Hybrid modulation apparatus. 5,020,076, Cl. 375-5.000.

Cahn, Robert P., to Kobe Steel Limited. Separation of pure optical stereoisomers by pressure crystallization. 5,019,658, Cl. 568-829.000.

Cahuzac, Georges J. J.; and Monget, Francois, to Societe Nationale Industrielle et Aerospatiale. Composite reinforcement elements woven in three dimensions. 5,019,435, Cl. 428-36.100.

Caillouette, James T.: *See—*

Klapper, Robert C.; and Caillouette, James T., 5,019,083, Cl. 606-99.000.

Caisse Regionale De Credit Agricole Mutuel De L'Yonne: *See—*

Milovanovich, Andre, 5,019,857, Cl. 355-27.000.

California Institute of Technology, The: *See—*

Chao, Tien-Hsin; and Liu, Hua-Kuang, 5,019,898, Cl. 358-81.000.

Caltherm Corporation: *See—*

Butler, Gordon, 5,018,664, Cl. 236-34.500.

Calvert, Rodney K., to Mead Corporation, The. Machine for erecting sleeve type cartons. 5,019,029, Cl. 493-315.000.

Cameron, Keith H.: *See—*

Wyatt, Richard; and Cameron, Keith H., 5,018,831, Cl. 350-162.170.

Campanelli, Michael R.: *See—*

Blessington, Daniel R.; Kneezel, Gary A.; and Campanelli, Michael R., 5,019,675, Cl. 346-140.00R.

Campbell, Jack J. Scan converter with adaptive vertical filter for single bit computer graphics systems. 5,019,904, Cl. 358-140.000.

Campbell, William P. Method of and apparatus for increased transfer of heat into or out of the body. 5,018,521, Cl. 128-363.000.

Campos, Trineu. Apparatus for checking air leaks in vehicle tire rims. 5,018,381, Cl. 73-45.500.

Cancer Biologics, Inc.: *See—*

Epstein, Alan L.; and Taylor, Clive R., 5,019,368, Cl. 424-1.100.

Candor, James T. Apparatus and method for removing liquid from liquid bearing material. 5,019,230, Cl. 204-182.100.

Canfield, Michael A. Portable insulated tent—cot. 5,018,227, Cl. 5-113.000.

Canon Kabushiki Kaisha: *See—*

Akimitsu, Jun; and Den, Tohru, 5,019,553, Cl. 505-1.000.

Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.

Hieda, Teruo; and Kyuma, Kenji, 5,019,894, Cl. 358-29.000.

Hiramatsu, Soichi, 5,018,886, Cl. 400-545.000.

Hirano, Hirofumi; Omo, Shinichi; and Fukui, Hiroshi, 5,018,884, Cl. 400-126.000.

Honjo, Takeshi; Kobayashi, Kenji; Yoshida, Akimaro; and Saeki, Takami, 5,018,714, Cl. 271-3.100.

Igarashi, Masaru, 5,020,004, Cl. 364-519.000.

Matsumura, Isao, 5,018,851, Cl. 351-214.000.

Mouri, Akihiro; Toyono, Tsutomu; Kaneko, Shuzo; Inaba, Yutaka; and Kanbe, Junichiro, 5,018,841, Cl. 350-350.00S.

Nagashima, Yoshitake, 5,019,919, Cl. 360-22.000.

Nakasugi, Mikio; and Watanabe, Yoshiaki, 5,018,880, Cl. 384-112.000.

Niwa, Mitsuyuki; Arai, Takayoshi; Shimizu, Isamu; Takeuchi, Eiji; Murakami, Tsutomu; and Ishihara, Shunichi, 5,019,887, Cl. 357-30.000.

Ogawa, Yukio; and Alyfuku, Kiyoshi, 5,019,843, Cl. 354-106.000.

Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, 5,019,702, Cl. 250-208.100.

Okino, Tadashi; and Ise, Makoto, 5,019,911, Cl. 358-213.190.

Sakakibara, Kenzo; Yoshida, Takehiro; and Toda, Kozo, 5,020,096, Cl. 379-100.000.

Shibamiya, Yoshikazu, 5,020,022, Cl. 364-900.000.

Sugiura, Susumu, 5,020,118, Cl. 382-50.000.

Takeda, Atsushi; and Hasegawa, Takashi, 5,019,871, Cl. 355-309.000.

Tanaka, Atsushi; Kaneko, Kiyoshi; and Yoshimura, Yuichiro, 5,019,865, Cl. 355-218.000.

Watanabe, Yoshitaka; Mizoguchi, Yoshiyuki; and Hiraga, Hiroyuki, 5,019,839, Cl. 346-134.000.

Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; Endo, Takashi; and Moriyama, Jiro, 5,019,840, Cl. 346-134.000.

Yabu, Shigeki; and Takabayashi, Hiroshi, 5,019,201, Cl. 156-273.900.

Yamazaki, Shoichi, 5,018,845, Cl. 350-500.000.

Yoshida, Akimaro; and Honjo, Takeshi, 5,018,716, Cl. 271-227.000.

Capetola, Robert J.: *See—*

Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., 5,019,569, Cl. 514-171.000.

Caravatti, Pablo: *See—*

Allemann, Martin; and Caravatti, Pablo, 5,019,706, Cl. 250-291.000.

Cardiac Pacemakers, Inc.: *See—*

Bach, Stanley M., Jr.; Lang, Douglas J.; Swanson, David K.; and Dahl, Roger W., 5,018,523, Cl. 128-419.0PG.

Cardoza, Joseph W., Jr.; and Glass, Randolph P., to Glass, Randolph P. Field game apparatus and method. 5,018,746, Cl. 273-411.000.

Carl Freudenberg, Firma: *See—*

Forch, Hans, 5,018,749, Cl. 277-27.000.

Carl Schmale GmbH & Co. KG: *See—*

Freermann, Johannes, 5,018,416, Cl. 83-14.000.

Carl Strutz and Company, Inc.: *See—*

McCoy, Gary W., 5,019,207, Cl. 156-571.000.

Carl-Zeiss-Stiftung, Heidenheim/Brenz: *See—*

Aehnelt, Hans-Peter; Enderle, Eckhard; and Wirth, Michael, 5,018,278, Cl. 33-559.000.

Enderle, Eckhard; Aehnelt, Hans-Peter; Aubele, Karl-Eugen; and Wirth, Michael, 5,018,280, Cl. 33-832.000.

Carleton, Robert: *See—*

Morganstein, Sanford J.; Krakau, Herbert J.; Mehta, Bakulesh A.; Klecka, Mark D.; and Carleton, Robert, 5,020,095, Cl. 379-67.000.

Carlson, J. David, to Lord Corporation. Electrophoretic fluid damper. 5,018,606, Cl. 188-267.000.

Carlson, John, to Teleflex Incorporated. Variable ratio steering helm. 5,018,469, Cl. 114-144.00R.

Carlson, Nils W.; Evans, Gary A.; Hammer, Jacob M.; and Ettenberg, Michael, to David Sarnoff Research Center, Inc. Optical amplifier. 5,019,787, Cl. 330-4.300.

Carmack, Paul D.; Asbury, James A.; and Nitzberg, Leonard R., to Helix Enterprises, Inc. Fuel supply detachable coupling. 5,018,546, Cl. 137-68.100.

Carmichael, Richard Q., to Spirax-Sarco Limited. Measuring dryness fraction. 5,020,000, Cl. 364-500.000.

Carnahan, David W.; French, Paul J. A.; Maury, Richard K.; Akins, Gary L.; and Oaten, Philip J., to Arcade, Inc.; and Perfume International, Inc., part interest to each. Coloring book or the like with ink-reactive, fragrance-releasing areas. 5,018,974, Cl. 434-98.000.

Carnegie-Mellon University: *See—*

Engelhardt, K. G.; Edwards, Roger A.; Sample, Whitney S.; and Sandrof, Michael F., 5,019,112, Cl. 53-474.000.

Carney, Scott N.: *See—*

Phillips, Sharon E. T.; and Carney, Scott N., 5,020,092, Cl. 379-59.000.

Carolina Power & Light Company: *See—*

Davis, Thomas L.; Shell, John P.; Elliott, Robert N., III; and Denning, Carsie K., 5,019,300, Cl. 261-23.100.

Carpenter, Herbert L., Jr.; and Hale, James A., to Greif Bros. Corp. End construction with hollow beam construction for a drum. 5,018,641, Cl. 220-634.000.

Carpenter Technology Corporation: *See—*

Wegman, Dwight D.; Wanner, Edward A.; Rehrer, Wilson P.; and Widge, Sunil, 5,019,332, Cl. 420-59.000.

Carrier Corporation: *See—*

Zohler, Steven R.; and Lewis, Richard C., 5,018,573, Cl. 165-133.000.

Carson, William S. Truck body and apparatus for automated collection of recyclable materials. 5,018,929, Cl. 414-408.000.

Carter, David G.; Green, Derek J.; and Collins, Michael C., to National Starch and Chemical Investment Holding Corporation. Use of reactive hot melt adhesive for packaging applications. 5,018,337, Cl. 53-458.000.

Carter, Peter; and Hammond, Kevin, to Chesebrough-Pond's USA Co., Division of Conopco, Inc. Oral composition. 5,019,373, Cl. 424-52.000.

Casadio, Silvano: *See—*

Del Soldato, Piero; and Casadio, Silvano, 5,019,579, Cl. 514-289.000.

Casar, Steve: *See—*

Dempsey, William F.; Casar, Steve; and Reed, Charles P., 5,019,111, Cl. 52-506.000.

Casey, William J.: *See—*

Clearman, Jack F.; Casey, William J.; Furin, Olivia P.; and Stewart, Grant M., 5,019,122, Cl. 131-194.000.

Casio Computer Co., Ltd.: *See—*

Hiraide, Takashi; Kusunoki, Ituro; and Tajima, Joji, 5,019,209, Cl. 156-630.000.

Iijima, Tatsuya; and Morokuma, Hiroshi, 5,018,430, Cl. 84-625.000.

Uchiyama, Shigeru, 5,018,427, Cl. 84-603.000.

Uchiyama, Shigeru; and Obata, Katsuhiko, 5,018,428, Cl. 84-616.000.

Yamaya, Hideo; and Iba, Akio, 5,018,429, Cl. 84-622.000.

Yoshimoto, Itsuro; and Otsuki, Kuniyoshi, 5,019,920, Cl. 360-27.000.

Caspar, Hans-Peter: *See—*

Schutten, Dagmar; Schmitz, Hans-Joachim; Caspar, Hans-Peter; Kolschbach, Veit M.; Znoyek, Gerald; and Wenzel, Norbert, 5,018,826, Cl. 350-96.290.

Cassens, Nicholas, Jr.; and Rodrigues, Robert. Making a taphole. 5,018,709, Cl. 266-271.000.

Castagnola, Andrew: *See—*

Taylor, Harry W., IV; and Castagnola, Andrew, 5,018,295, Cl. 43-14.000.

Castelli, Philippe: *See—*

Letessier, Jacques; and Castelli, Philippe, 5,019,794, Cl. 333-174.000.

Caswell, Debra S.; Mao, Mark H.; Mermelstein, Robert; and Baker, Ellen S., to Procter & Gamble Company, The. Ion-pair complex conditioning agent with benzene sulfonate/alkyl benzene sulfonate anionic component and compositions containing same. 5,019,280, Cl. 252-8.800.

Cataldo, Dominic A.: *See—*

Cowan, Christina E.; Van Voris, Peter; Streile, Gary P.; Cataldo, Dominic A.; and Burton, Frederick G., 5,019,998, Cl. 364-496.000.

Caterpillar Inc.: *See—*

Baldwin, John B.; and Draper, David R., 5,018,705, Cl. 266-77.000.

Londt, Edward E.; and Schaar, Robert T., 5,019,986, Cl. 364-426.040.

Price, Robert J., 5,018,591, Cl. 180-9.500.

Roussin, Michael A.; and Crowell, Charles M., Jr., 5,018,792, Cl. 299-37.000.

Cattapan, David: *See—*

Bogaerts, Leo C.; and Cattapan, David, 5,018,228, Cl. 51-259.000.

Caumanns, Fritz, to Grote & Hartmann GmbH & Co. KG. Process and apparatus for assembling an electrical connector onto two electric wires. 5,018,270, Cl. 29-863.000.

Cavezzan, Jacques; and Cavinenc, Edith, to Rhone-Poulenc Chimie. Photocurable diorganopolysiloxanes containing thioalkyl (meth) acrylate functional groups. 5,019,644, Cl. 428-447.000.

Cavinenc, Edith: *See—*

Cavezzan, Jacques; and Cavinenc, Edith, 5,019,644, Cl. 428-447.000.

Cawley, Dennis; and Cawley, Richard. Fire suppression system for a decorative tree. 5,018,586, Cl. 169-56.000.

Cawley, Richard: *See—*

Cawley, Dennis; and Cawley, Richard, 5,018,586, Cl. 169-56.000.

Cawlfield, David W.; and Kaczur, Jerry J., to Olin Corporation. Electrochemical method for producing chlorine dioxide solutions. 5,019,226, Cl. 204-101.000.

Cedergreen, Steven D., to Tempress Incorporated. Foldable seat. 5,018,788, Cl. 297-378.000.

Cehovic, Georges; and Panconi, Emmanuel. Method for treating memory disturbances using arginine aspartate. 5,019,558, Cl. 514-11.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Celanese Fibers, Inc.: *See—*
  - Truesdale, Wade J.; Moore, Bryan B.; and Benjock, Greg F., 5,019,449, Cl. 428-397.000.
- Celli, John R., to AT&T Bell Laboratories. Telephone conferencing arrangement. 5,020,098, Cl. 379-202.000.
- Center, Michael: *See—*
  - Sparks, Robert E.; Mason, Norbert S.; and Center, Michael, 5,019,302, Cl. 264-8.000.
- Central Glass Company, Limited: *See—*
  - Kuramoto, Toru; Tukuda, Hitoshi; and Ono, Hiroshi, 5,019,540, Cl. 501-96.000.
- Centre National de la Recherche Scientifique: *See—*
  - Letourneur, Didier; Douzon, Colette; Migonney, Veronique; Muller, Daniel A.; and Jozefowicz, Marcel, 5,019,269, Cl. 210-635.000.
- CF&I Steel Corporation: *See—*
  - Cryderman, Robert L.; and Winkley, John C., 5,018,666, Cl. 238-122.000.
- Chabagno, Jean-Michel: *See—*
  - Muller, Daniel; Chabagno, Jean-Michel; and Duval, Michel, 5,019,469, Cl. 429-192.000.
- Chabane, Mohamed; Boucher, J. Raymond; and Pan, Ali, to Northern Telecom Limited. Apparatus for forming metal shield from tape. 5,018,268, Cl. 29-728.000.
- Chagrin Plastic Methods, Inc.: *See—*
  - Kohler, Arthur, 5,020,043, Cl. 369-36.000.
- Chalmer, Steven R.: *See—*
  - Griffin, Robert J.; and Chalmer, Steven R., 5,020,155, Cl. 455-617.000.
- Chalmers, Eric J., to Possis Corporation. Cutting head for water jet cutting machine. 5,018,670, Cl. 239-433.000.
- Chambers, John D.; Estep, Duncan E.; Frankiewicz, Walter E.; Friend, Ronald W.; and Lawson, James M., to Allied-Signal Inc. Method of calibrating vehicle speed signals. 5,020,008, Cl. 364-561.000.
- Chamings, Antony W.; Staley, Dennis W.; and Mannke, Gary, to ASC Incorporated. Slidable, foldable, and removable vehicle sunroof. 5,018,783, Cl. 296-219.000.
- Champion, Donald H.: *See—*
  - Speranza, George P.; and Champion, Donald H., 5,019,653, Cl. 564-497.000.
- Chan, Henry C., to Texaco Inc. Fluid catalytic cracking catalyst-vapor separator. 5,019,354, Cl. 422-145.000.
- Chang, Chin L.; and Dankwort, Rudolf C., to Honeywell Inc. Fiber optic gyroscope balanced plural serrodyne modulators phase difference control. 5,018,859, Cl. 356-350.000.
- Chang, Karl; Pape, William R., III; Crosetti, Victor J., Jr.; Nakamura, Lance S.; Leong, Daniel B. C.; and Loui, Robert K. L., to Verifone, Inc. System and method for reading data record stripes on data cards. 5,019,696, Cl. 235-436.000.
- Chang, Sheldon, to Symbol Technologies, Inc. Portable laser scanning system and scanning methods having a resonant motor control circuit. 5,019,764, Cl. 318-627.000.
- Chao, Chien C.; and Rastelli, Henry, to UOP. Process for purification of hydrocarbons. 5,019,667, Cl. 585-820.000.
- Chao-Chin, Lin; and Kuo-Heng, Tseng, to Regency, Inc. Toy car chassis intermittent tilt and steering structure. 5,019,009, Cl. 446-437.000.
- Chao, Tien-Hsin; and Liu, Hua-Kuang, to California Institute of Technology, The. Real-time pseudocolor density encoding of an image. 5,019,898, Cl. 358-81.000.
- Chapman, David A.: *See—*
  - Waterfield, Adam P. M.; Waterfield, Norman R.; Chapman, David A.; Andrews, Thomas K.; and Humphrey, Brian, 5,018,233, Cl. 12-133.00B.
- Chapman, Orville L.; and Whitehurst, D. Duayne, to Mobil Oil Corporation. Diamondoid polymeric compositions. 5,019,660, Cl. 585-22.000.
- Chapman, Walter R., Jr.: *See—*
  - Olwert, Ronald J.; Zalar, Frank E.; and Chapman, Walter R., Jr., 5,019,743, Cl. 313-25.000.
- Charles, Gene. Shoulder brace. 5,018,513, Cl. 128-78.000.
- Charles Samelson Co.: *See—*
  - Sternlieb, Herschel, 5,019,445, Cl. 428-323.000.
- Chasan, David: *See—*
  - Evans, Samuel; Chasan, David; and Seltzer, Raymond, 5,019,285, Cl. 252-47.500.
- Chason, Marc K., to Motorola, Inc. Field emission device having preformed emitters. 5,019,003, Cl. 445-24.000.
- Chatterjee, Amitava: *See—*
  - Yang, Ping; Chatterjee, Amitava; Aur, Shian; and Polgreen, Thomas L., 5,019,878, Cl. 357-23.300.
- Chatterjee, Roger K.: *See—*
  - Sitz, Gary E.; and Chatterjee, Roger K., 5,019,610, Cl. 524-61.000.
- Chaumette, Patrick; Le Peltier, Fabienne; Szymanski, Raymond; Courty, Philippe; and Verdon, Catherine, to Institut Francais du Petrole. Process for preparing precursors of catalysts containing copper, aluminum and zinc, usable for the synthesis and the decomposition of methanol and catalysts obtained from the precursors. 5,019,547, Cl. 502-342.000.
- Chauvet, Henri. Drive system for track mounted undercarriages and method for use thereof. 5,018,452, Cl. 104-172.003.
- Chein, Wen S.: *See—*
  - Boles, Glenn M.; Schober, Gary W.; Chein, Wen S.; Symanski, Chris P.; Des Rioux, Philippe; and Tomkoski, Walter, III, 5,019,899, Cl. 358-84.000.
- Chelyapin, Oleg A.: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Chem-Shield, Inc.: *See—*
  - Garcia, Silverio M., 5,019,288, Cl. 252-79.200.
- Chemical Research & Licensing Company: *See—*
  - Adams, John R.; and Smith, Lawrence A., 5,019,669, Cl. 585-446.000.
- Chemische Werke Huels Aktiengesellschaft: *See—*
  - Kuehnle, Adolf; and Kehr, Helmut, 5,019,299, Cl. 260-410.600.
- Chen, Loren: *See—*
  - Gray, Robert L.; Peterson, David; Chen, Loren; and Buskirk, Gregory V., 5,019,289, Cl. 252-95.000.
- Chen, Michael, to University of Toronto Innovations Foundation. Two-dimensional emulation of three-dimensional trackball. 5,019,809, Cl. 340-815.310.
- Chen, Wenpeng, to Martin Marietta Corporation. Optical switch device. 5,018,842, Cl. 350-354.000.
- Cheng, Chuan-Yi. Auxiliary soldering device for electric solder iron. 5,019,688, Cl. 219-230.000.
- Cheng, Kenny, to Nichols, Joanna A. Front seat reversing structure for dual-seat baby stroller. 5,018,754, Cl. 280-47.400.
- Cheng, Li-Jen; and Liu, Tsuen-Hsi, to United States of America, National Aeronautics and Space Administration. Motion detection, novelty filtering, and target tracking using an interferometric technique with GaAs phase conjugate mirror. 5,018,852, Cl. 356-28.500.
- Chennakeshu, Sandeep, to General Electric Company. Reduction of synchronous fading effects by time hopping of user slots in TDMA frames. 5,020,056, Cl. 370-95.300.
- Chenoweth, John S.: *See—*
  - Martin, Thomas F.; Chenoweth, John S.; and Tinguely, Paul R., 5,020,129, Cl. 455-4.000.
- Chesebrough-Pond's USA Co., Division of Conopco, Inc.: *See—*
  - Carter, Peter; and Hammond, Kevin, 5,019,373, Cl. 424-52.000.
  - Raven, Stephen J., 5,019,374, Cl. 424-52.000.
- Chesnut, Paul B.; Moore, Michael W.; and Sarrell, Ivan D., to Tenelex Industries, Inc. Internal air damper for a combination refrigerator-freezer. 5,018,364, Cl. 62-187.000.
- Chichibu, Kenji, to Chugai Seiyaku Kabushiki Kaiska. Method of assaying high molecular hyaluronic acid and kit of reagents for such assay. 5,019,498, Cl. 435-7.500.
- Chida, Takeshi; Aonuma, Mitsuyoshi; Maeda, Akio; Morozumi, Yukihiko; and Ohishi, Tetsu, to Nippon Zeon Co., Ltd. Rubbery copolymer, process for production thereof, and vulcanizable elastomer composition. 5,019,630, Cl. 525-326.200.
- Chikaraishi, Toshio: *See—*
  - Nakamura, Makoto; Honda, Toshio; Chikaraishi, Toshio; and Fukuura, Yukio, 5,019,319, Cl. 273-218.000.
- Children's Hospital of Eastern Ontario: *See—*
  - Uttley, Derek, 5,018,931, Cl. 414-495.000.
- Children's Medical Center Corporation, The: *See—*
  - Folkman, Judah; Langer, Robert S., Jr.; and Hsieh, Dean S. T., 5,019,372, Cl. 424-9.000.
- Chin, Jack; and Liang, Samuel S., to General Atomics. High purity superconducting compositions and methods for their fabrication. 5,019,555, Cl. 505-1.000.
- Chiron-Werke GmbH & Co. KG: *See—*
  - Winkler, Hans-Henning; and Rutschle, Eugen, 5,018,265, Cl. 29-568.000.
- Chishi, Naoki: *See—*
  - Kurahashi, Motofumi; Takemoto, Masanori; Chishi, Naoki; Takeuchi, Eizoo; and Nakauma, Yoshinori, 5,019,272, Cl. 210-695.000.
- Chiu, Charles C.: *See—*
  - Noe, James B.; and Chiu, Charles C., 5,019,426, Cl. 427-314.000.
- Chiu, George L.; and Halbout, Jean-Marc, to International Business Machines Corporation. High speed waveform sampling with a tunneling microscope. 5,019,707, Cl. 250-306.000.
- Chiu, Hsiu-Hui, to Sunshon Molding Co., Ltd. Angle adjustment device for handle of stroller. 5,018,405, Cl. 74-529.000.
- Chiu, Lee C.; Ko, Yuki N.; and Wong, Keith N., to New World Down Hole Tools. Method and system for retrieving text associated with a reference image correspondence to a selected patient image. 5,019,976, Cl. 364-413.130.
- Chiu, Martin T.; and Firth, Derek A. Hanging basket liner. 5,018,300, Cl. 47-67.000.
- Chiu, Shui-Tung, to Borden, Inc. Spray dried phenol-formaldehyde resin compositions. 5,019,618, Cl. 524-405.000.
- Chiu, Te-Long. Electrically-flash-erasable and electrically-programmable memory storage devices with self aligned tunnel dielectric area. 5,019,879, Cl. 357-23.500.
- Choa, Fow-Sen; and Koch, Thomas L., to AT&T Bell Laboratories. Tunable narrowband receiver utilizing distributed Bragg reflector laser structure. 5,020,153, Cl. 455-606.000.
- Choay, Jean: *See—*
  - Lormeau, Jean-Claude; Petitou, Maurice; and Choay, Jean, 5,019,649, Cl. 536-21.000.
- Choay S.A.: *See—*
  - Lormeau, Jean-Claude; Petitou, Maurice; and Choay, Jean, 5,019,649, Cl. 536-21.000.
- Choi, Kyungseok, to Samsung Electron Devices Co., Ltd. Method for the fabrication of a direct-heated cathode structure and an apparatus therefor. 5,019,005, Cl. 445-36.000.

- Chominski, Pawel, to Inter Innovation AB. Arrangement for checking documents. 5,020,110, Cl. 382-7.000.
- Chong, Wesley K. M.: *See—*
  - Avery, Mitchell A.; and Chong, Wesley K. M., 5,019,590, Cl. 514-450.000.
- Chou, Ger-Chih: *See—*
  - Yang, Tsen-Shau; Chou, Ger-Chih; and Hsu, Fu-Chieh, 5,019,771, Cl. 324-158.00P.
- Chou, Ned J.; Goldblatt, Ronald D.; Heidenreich, John E., III; Molis, Steven E.; and Ferreiro, Luis M., deceased (by Mitchell, Annette, legal representative), to International Business Machines Corporation. Method for enhancing the adhesion of polymer surfaces by water vapor plasma treatment. 5,019,210, Cl. 156-643.000.
- Chou, Philip A., to At&T Bell Laboratories. Image recognition method using two-dimensional stochastic grammars. 5,020,112, Cl. 382-37.000.
- Chou, Schiao F.; and Roberson, Willie, to Xaloy Incorporated. High temperture corrosion resistant bimetallic cylinder. 5,019,459, Cl. 428-656.000.
- Chou, Tai-Sheng; and Melconian, Melcon G., to Mobil Oil Corp. Heat balanced paraffin upgrading with co-fed oxygenate. 5,019,663, Cl. 585-415.000.
- Chrisologue, Fabrice, to Valeo. Sliding cursor control device, especially for a heating and/or air conditioning installation of an automotive vehicle. 5,018,476, Cl. 116-322.000.
- Christen, Alice A.; Gibson, Donna M.; and Bland, John, to United States of America, Agriculture. Production of taxol or taxol-like compounds in cell culture. 5,019,504, Cl. 435-123.000.
- Christen, Werner: *See—*
  - Eirich, Paul; and Christen, Werner, 5,018,673, Cl. 241-62.000.
- Christenson, Ronald E.: *See—*
  - McNeilus, Garwin; and Christenson, Ronald E., 5,018,755, Cl. 280-81.100.
- Christiansen, Richard L.: *See—*
  - Haines, Hiemi K.; and Christiansen, Richard L., 5,019,279, Cl. 252-8.554.
- Christopher, Gerard W.: *See—*
  - Smolenski, Joseph L.; Christopher, Gerard W.; Wright, John C.; and Relation, Alfred E., 5,019,952, Cl. 363-16.000.
- Chromcraft Furniture Corporation: *See—*
  - Sheckells, Amuel E., 5,018,789, Cl. 297-444.000.
- Chu, Frank Y.; and Lloyd, Blake A., to Electric Power Research Institute. Thermal life indicator. 5,019,760, Cl. 318-490.000.
- Chugai Seiyaku Kabushiki Kaisha: *See—*
  - Miura, Yutaka; Yoshida, Mitsutaka; Fujimura, Yasuo; Takaku, Sakae; and Noda, Yukifumi, 5,019,574, Cl. 514-235.200.
- Chugai Seiyaku Kabushiki Kaiska: *See—*
  - Chichibu, Kenji, 5,019,498, Cl. 435-7.500.
- Chugh, Yoginder P.; Alongi, John R.; and Linton, Joey. Mine roof system. 5,018,907, Cl. 405-288.000.
- Chun, Sung-Oh: *See—*
  - Shin, Yun-Seung; and Chun, Sung-Oh, 5,019,881, Cl. 357-23.500.
- Church, John: *See—*
  - Granville, Jeffrey H.; Church, John; and Hodgkins, David H., 5,019,141, Cl. 55-170.000.
- Ciba-Geigy Corporation: *See—*
  - Davis, Herb; and Wetzel, Charles R., 5,019,132, Cl. 8-527.000.
  - Evans, Samuel; Chasan, David; and Seltzer, Raymond, 5,019,285, Cl. 252-47.500.
  - Gisin, Markus; and Thommen, Christian, 5,019,515, Cl. 436-52.000.
  - Hofer, Arnold; and Wegmann, Alex, 5,019,639, Cl. 528-94.000.
  - Ludemann, Simpert; Bernheim, Michael; Sandner, Bernhard; Rossler, Erich; and Vogel, Hans-Burkhardt, 5,019,428, Cl. 427-387.000.
  - Odorisio, Paul A.; and Pastor, Stephen D., 5,019,612, Cl. 524-99.000.
  - Ravichandran, Ramanathan; and Galbo, James P., 5,019,613, Cl. 524-100.000.
  - Singer, Heinrich; and Koppel, Gabriele, 5,019,281, Cl. 252-8.800.
  - Su, Kai C.; and Stevens-Crowe, Jeanne S., 5,018,849, Cl. 351-162.000.
- Ciganek, Engelbert; and Cook, Leonard, to Du Pont de Nemours, E. I., and Company. 4-aryl-4-piperidine (or pyrrolidine or hexahydroazepine) carbinols and heterocyclic analogs thereof. 5,019,650, Cl. 540-609.000.
- Cimex Limited: *See—*
  - Holman, Andrew P., 5,018,240, Cl. 15-349.000.
- Ciokajlo, John J.; and Hauser, Ambrose A., to General Electric Company. Mechanical blade tip clearance control apparatus for a gas turbine engine. 5,018,942, Cl. 415-173.200.
- Ciulin, Dan, to Robert Bosch GmbH. Method of reducing the useful bandwidth of bandwidth-limited signals by coding and decoding the signals, and system to carry out the method. 5,020,104, Cl. 380-6.000.
- Claar, Terry D.; and Johnson, William B., to Lanxide Technology Company, LP. Process for preparing self-supporting bodies having controlled porosity and graded properties and products produced thereby. 5,019,539, Cl. 501-87.000.
- Clagett, Donald C.; and Shafer, Sheldon J., to General Electric Company. Polyamide from 1,3 propylene diamine and isophthalic acid compound. 5,019,641, Cl. 528-347.000.
- Clairol Incorporated: *See—*
  - Flood, Lawrence A., 5,019,130, Cl. 8-423.000.
- Clapp, John G., Jr.: *See—*
  - Hawkins, Edwin F.; Clapp, John G., Jr.; and Sansing, James E., 5,019,149, Cl. 71-29.000.
- Claremon, David A.; Baldwin, John J.; and Remy, David C., to Merck & Co., Inc. Imidazole compounds and their use as transglutaminase inhibitors. 5,019,572, Cl. 514-213.000.
- Clarion Co., Ltd.: *See—*
  - Takai, Kazuki; and Ishikura, Eiji, 5,019,924, Cl. 360-73.140.
- Clark, Morris; Lawson, Kenneth; and Izatt, James, to Video Jukebox Network, Inc. Telephone access display system. 5,019,900, Cl. 358-86.000.
- Clarke-Pounder, Ian J. H.; and Farrar, Edward L., to Ingersoll-Rand Company. Pulp log discharge system for a debarking drum. 5,019,123, Cl. 144-208.00B.
- Classic Modular Systems, Inc.: *See—*
  - Schenck, Robert; Hoffman, Jeffrey H.; Klein, Michael N.; and Kouba, Gene R., 5,018,628, Cl. 211-153.000.
- Clausen, Knud, to Clausen, Knud; and Fitzsimmons, Murray R. Wall panel system. 5,018,323, Cl. 52-36.000.
- Clearman, Jack F.; Casey, William J.; Furin, Olivia P.; and Stewart, Grant M., to R. J. Reynolds Tobacco Company. Smoking article with an enclosed heat conductive capsule containing an aerosol forming substance. 5,019,122, Cl. 131-194.000.
- Clemens, Donald L., to Thermalloy Incorporated. Mounting apparatus for electronic device packages. 5,019,940, Cl. 361-386.000.
- Clemens, Donald L., to Thermalloy Incorporated. Insulating apparatus for electronic device assemblies. 5,019,942, Cl. 361-388.000.
- Clement, Thomas P.; and Weber, David P., to Mectra Labs, Inc. Medical device valving mechanism. 5,019,054, Cl. 604-248.000.
- Clements, Brad E.: *See—*
  - Steketee, Edward; and Clements, Brad E., 5,019,948, Cl. 361-415.000.
- Clifton, Norman E., Jr.: *See—*
  - Rogers, William H.; and Clifton, Norman E., Jr., 5,018,654, Cl. 224-244.000.
- Clorox Company, The: *See—*
  - Gray, Robert L.; Peterson, David; Chen, Loren; and Buskirk, Gregory V., 5,019,289, Cl. 252-95.000.
  - Stanislowski, Anna G.; England, J. Bruce; and Ratcliff, Steven D., 5,018,482, Cl. 119-173.000.
- CMI International, Inc.: *See—*
  - McKibben, Kenneth D.; and Wuepper, Thomas E., 5,019,196, Cl. 156-91.000.
- Coakley, Pauline: *See—*
  - Woods, John; Rooney, John; and Coakley, Pauline, 5,019,629, Cl. 525-312.000.
- Coar, Lawrence F.: *See—*
  - Dale, John R.; and Coar, Lawrence F., 5,020,032, Cl. 367-4.000.
- Coates, Bradley J.: *See—*
  - Whiteside, Leo A.; and Coates, Bradley J., 5,019,104, Cl. 623-20.000.
- Cobb, Stephen H.: *See—*
  - Gole, James L.; Woodward, James R.; and Cobb, Stephen H., 5,020,071, Cl. 372-89.000.
- Cochran, David B., to International Business Machines Corporation. Memory cell with active write load. 5,020,027, Cl. 365-154.000.
- Coden, Michael H.; and Dutt, Bulusu V., to Codenoll Technology Corporation. Method of injection molding star-couplers. 5,019,301, Cl. 264-1.500.
- Codenoll Technology Corporation: *See—*
  - Coden, Michael H.; and Dutt, Bulusu V., 5,019,301, Cl. 264-1.500.
- Coe, Mayne R., Jr. Process for improvement of tone in violins and related instruments. 5,018,422, Cl. 84-275.000.
- Coetzer, Johan; Meintjes, Anthony A.; and Adendorff, Keith T., to Lilliwyte Societe Anonyme. Electrochemical cell. 5,019,466, Cl. 429-103.000.
- Coffey, Aidan: *See—*
  - Daly, Charles; Fitzgerald, Gerald F.; Coffey, Aidan; Costello, Veronica A.; Murphy, Maeve C.; and Baumgartner, Andreas, 5,019,506, Cl. 435-172.300.
- Cogswell, Frederic N.; Hezzell, David J.; and Williams, Peter J., to Imperial Chemical Industries PLC. Fiber reinforced compositions and method of producing such compositions. 5,019,450, Cl. 428-402.000.
- Cohen, Jonathan D., to United States of America, National Security Agency. Outer product optical interferometer with hologram. 5,020,018, Cl. 364-837.000.
- Cohen, Leonard D., to All Systems, Inc. Millimeter wave oscillator with flicker (l/f) noise suppression. 5,019,791, Cl. 331-96.000.
- Cohn, David B.: *See—*
  - McNeil, John A.; and Cohn, David B., 5,020,069, Cl. 372-59.000.
- Colaprete, Silvio: *See—*
  - Burrous, Allen J.; Colaprete, Silvio; and Kehrli, David W., 5,018,307, Cl. 49-471.000.
- Colby, Paul N., to Spirex Corporation. Apparatus for grooving the barrel of a plasticating machine. 5,018,917, Cl. 409-296.000.
- Cold Jet, Inc.: *See—*
  - Lloyd, Daniel L., 5,018,667, Cl. 239-132.500.
- Cole, Howard W., Jr. Method of separating mineral particles by froth flotation. 5,019,244, Cl. 209-164.000.
- Cole, R. Clay: *See—*
  - El Rabaa, Wadood; Cole, R. Clay; and Meadows, David L., 5,018,578, Cl. 166-281.000.
- Colle, Karla S.: *See—*
  - Beltzer, Morton; Habeeb, Jacob J.; Francis, James N.; and Colle, Karla S., 5,019,283, Cl. 252-33.600.
- Collins, Donald A., Jr., to NCR Corporation. Overhead scanning terminal. 5,019,694, Cl. 235-383.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Collins, Michael C.: *See—*
  - Carter, David G.; Green, Derek J.; and Collins, Michael C., 5,018,337, Cl. 53-458.000.
- Collis, Charles: *See—*
  - Swapp, Mavin; and Collis, Charles, 5,020,038, Cl. 368-120.000.
- Colt Industries, Inc.: *See—*
  - Dougherty, Michael, 5,018,495, Cl. 123-339.000.
- Coltrain, Bradley K.; Rakes, Gary A.; and Smith, Victoria K., to Eastman Kodak Company. Modified epoxy resins and composites. 5,019,607, Cl. 523-435.000.
- Columbia University in the City of New York, Trustees of: *See—*
  - Fox, Charles L., Jr.; Modak, Shanta M.; and Sampath, Lester A., 5,019,096, Cl. 623-1.000.
- Comer S.p.A.: *See—*
  - Segalla, Rodolfo; and Bottene, Sergio, 5,019,216, Cl. 162-344.000.
- Commissariat A l'Energie Atomique: *See—*
  - Etievant, Claude; and Wilhelmsson, Hans, 5,020,061, Cl. 372-2.000.
- Commonwealth Scientific and Industrial Research Organisation: *See—*
  - Mole, Thomas, 5,019,661, Cl. 585-253.000.
- Compton, David J.; Nix, Richard A.; and Leigh-Monstevens, Keith V., to Automotive Products plc. Modular prefilled hydraulic control apparatus. 5,018,352, Cl. 60-533.000.
- Compton, Robert N., to United States of America, Energy. High brilliance negative ion and neutral beam source. 5,019,705, Cl. 250-251.000.
- Computed Anatomy Incorporated: *See—*
  - Gersten, Martin; Maus, Roy; and Tibbling, Lars, 5,018,850, Cl. 351-212.000.
- Concurrent Logic, Inc.: *See—*
  - Furtek, Frederick C., 5,019,736, Cl. 307-465.000.
- Conifer Corporation: *See—*
  - Hemmie, Dale L , 5,020,149, Cl. 455-325.000.
- Conoco Inc.: *See—*
  - Williams, Jerry G., 5,018,583, Cl. 166-385.000.
- Consortium fur elektrochemische Industrie GmbH: *See—*
  - Bock, August; Lechner, Konrad; and Huber, Otto, 5,019,514, Cl. 435-254.000.
- Consulier Engineering, Inc.: *See—*
  - Shaffer, James E., 5,018,708, Cl. 254-266.000.
- Continental Aktiengesellschaft: *See—*
  - Frerichs, Udo; Kuhlmann, Eckhard; Kohler, Heinrich; and Metge, Axel, 5,018,565, Cl. 152-379.300.
- Continental White Cap Inc.: *See—*
  - Schmidt, Frank J., 5,018,632, Cl. 215-230.000.
- Control Data Corporation: *See—*
  - Boles, Glenn M.; Schober, Gary W.; Chein, Wen S.; Symanski, Chris P.; Des Rioux, Philippe; and Tomkoski, Walter, III, 5,019,899, Cl. 358-84.000.
- Controlled Release Technologies, Inc.: *See—*
  - Tran, Loi H., 5,019,723, Cl. 307-400.000.
- Cook, Ewell R.: *See—*
  - Buchanan, John M.; Cook, Ewell R.; Mooberry, Jared B.; Proehl, Gary S.; Singer, Stephen P.; and Washburn, William N., 5,019,492, Cl. 430-543.000.
- Cook, Gwendolyn K.; and McDonald, John H., III, to Eli Lilly and Company. 1-carbacephalosporin antibiotics. 5,019,571, Cl. 514-210.000.
- Cook, Leonard: *See—*
  - Ciganek, Engelbert; and Cook, Leonard, 5,019,650, Cl. 540-609.000.
- Cook, Roger D. Adjustable exercise equipment. 5,018,725, Cl. 272-118.000.
- Cook, Tunis A., to PSG Industries, Inc. Digital thermometer with pivotable probe. 5,018,875, Cl. 374-208.000.
- Cook, Wayne A.: *See—*
  - Missirlian, Berge; Akkas, Tamer; and Cook, Wayne A., 5,019,035, Cl. 604-22.000.
- Cooper, Frank W., Jr.: *See—*
  - Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 5,018,901, Cl. 403-349.000.
- Coors Ceramic Company: *See—*
  - Brewer, John R.; Swenson, Joseph M.; and Maas, Reginald R., 5,019,307, Cl. 264-67.000.
- Cordan, Ernest W., Jr.: *See—*
  - Skoog, Steven K.; and Cordan, Ernest W., Jr., 5,019,720, Cl. 307-270.000.
- Cordis Corporation: *See—*
  - Hillstead, Richard A., 5,019,085, Cl. 606-108.000.
  - Truckai, Csaba, 5,019,057, Cl. 604-282.000.
- Corduan, Horst: *See—*
  - Rohde, Wilhelm; and Corduan, Horst, 5,019,145, Cl. 62-22.000.
- Coring Incorporated: *See—*
  - Borrelli, Nicholas F.; and Smith, Dennis W., 5,019,538, Cl. 501-13.000.
- Coriolis Corporation: *See—*
  - Iversen, Arthur H., 5,018,570, Cl. 164-461.000.
- Cormier, Alan D.; and Weinberg, Melvin S., to Baxter Diagnostics Inc. Means for quantitative determination of analyte in liquids. 5,019,238, Cl. 204-409.000.
- Cornell, Daniel M. Three in one exercise bench. 5,018,727, Cl. 272-144.000.
- Cornell Research Foundation, Inc.: *See—*
  - Burlitch, James M., 5,019,293, Cl. 252-313.100.
- Corsmeier, Robert J.; and Albrecht, Richard W., Jr., to General Electric Company. Boltless balance weight for turbine rotors. 5,018,943, Cl. 416-144.000.
- Corso Bros., Inc.: *See—*
  - Corso, Thomas I., 5,018,663, Cl. 229-117.130.
- Corso, Thomas I., to Corso Bros., Inc. Hand carryable resh produce container. 5,018,663, Cl. 229-117.130.
- Corvita Corporation: *See—*
  - Pinchuk, Leonard, 5,019,090, Cl. 606-194.000.
- Costas, Dan N., to Trace, Inc. Magnetic media duplication system. 5,019,929, Cl. 360-98.010.
- Costello, Veronica A.: *See—*
  - Daly, Charles; Fitzgerald, Gerald F.; Coffey, Aidan; Costello, Veronica A.; Murphy, Maeve C.; and Baumgartner, Andreas, 5,019,506, Cl. 435-172.300.
- Coulson, Dale M. System, detector and method for trace gases. 5,019,517, Cl. 436-753.000.
- Council of Scientific & Industrial Research, The: *See—*
  - Grips, Vatia K. W.; Rajagopal, Indira; and Rajagopalan, Sundarapandium, 5,019,223, Cl. 204-51.000.
- Court Security Systems, Inc.: *See—*
  - Jones, Richard V.; and Ramirez, Angel E., 5,019,758, Cl. 318-264.000.
- Courty, Philippe: *See—*
  - Chaumette, Patrick; Le Peltier, Fabienne; Szymanski, Raymond; Courty, Philippe; and Verdon, Catherine, 5,019,547, Cl. 502-342.000.
- Coutts, Stephen M.: *See—*
  - Shoupe, T. Scott; Baker, David C.; Coutts, Stephen M.; and Hand, Elli S., 5,019,573, Cl. 514-232.800.
- Covey, Rupert A.; Forbes, Patricia; Bell, Allyn R.; and Blem, Allen R., to Uniroyal Chemical Company, Inc. Substituted tetrazolinones and their use as herbicides. 5,019,152, Cl. 71-92.000.
- Cowan, Christina E.; Van Voris, Peter; Streile, Gary P.; Cataldo, Dominic A.; and Burton, Frederick G., to Battelle Memorial Institute. Knowledge system and method for simulating chemical controlled release device performance. 5,019,998, Cl. 364-496.000.
- Cox, Eric R.; and Leliaert, Philippe J., to Imperial Chemical Industries PLC. Fibre optic data network. 5,018,815, Cl. 350-96.150.
- Cox, James W.: *See—*
  - Lewis, Alfred M.; and Cox, James W., 5,019,120, Cl. 123-557.000.
- Craft, Scott, to Motorola, Inc. Electronic assembly having enhanced heat dissipating capabilities. 5,019,941, Cl. 361-386.000.
- Cramer, Bernhard M.; Jenner, Erhard; and Minderle, Wolfgang, to Siemens Aktiengesellschaft. X-ray examination installation with coordinated positioning of the imaging system and the patient support mechanism. 5,020,089, Cl. 378-196.000.
- Crawford, Michael C.: *See—*
  - Hechel, Dennis L.; Niemetschek, Raymond H.; Slocum, Tobin; Kercheck, Gary R.; and Crawford, Michael C., 5,018,853, Cl. 356-155.000.
- Creatividad Y Desarrollo, S.A. (Creatyde, S.A.): *See—*
  - Trillo Martinez, Federico; and Gargallo Jimeno, Jose M., 5,018,543, Cl. 132-291.000.
- Creedon, Lewis R.: *See—*
  - Purcell, John R.; Burnett, Sibley C.; and Creedon, Lewis R., 5,019,247, Cl. 209-224.000.
- Crespo, Pedro M., to Bell Communications Research, Inc. Baudrate timing recovery technique. 5,020,078, Cl. 375-12.000.
- Crimmins, James P.: *See—*
  - McKinley, William E.; Crimmins, James P.; and Russell, Robert G., 5,019,838, Cl. 346-121.000.
- Criswell, David R.; and Waldron, Robert D. Power collection and transmission system and method. 5,019,768, Cl. 322-2.00R.
- Croisier, Jean-Paul, to Interpatent Anstalt. Apparatus for handling a load by arm, notably for a truck or trailer. 5,018,932, Cl. 414-498.000.
- Cronin-Golomb, Mark; and Gonsalves, Robert A., to Tufts University. Achromatic volume holography apparatus. 5,018,801, Cl. 350-3.610.
- Crosetti, Victor J., Jr.: *See—*
  - Chang, Karl; Pape, William R., III; Crosetti, Victor J., Jr.; Nakamura, Lance S.; Leong, Daniel B. C.; and Loui, Robert K. L., 5,019,696, Cl. 235-436.000.
- Crowell, Charles M., Jr.: *See—*
  - Roussin, Michael A.; and Crowell, Charles M., Jr., 5,018,792, Cl. 299-37.000.
- Crown Andersen, Inc.: *See—*
  - Brady, Jack D.; Graves, Kenny M.; Paschke, Larry F.; and Golumbeski, John M., 5,018,457, Cl. 110-346.000.
- Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., to Nordson Corporation. Powder feed hopper. 5,018,909, Cl. 406-138.000.
- Crum, James R.; Poole, Jon M.; and Hibner, Edward L., to Inco Alloys International, Inc. Corrosion-resistant nickel-chromium-molybdenum alloys. 5,019,184, Cl. 148-13.000.
- Cruz, Richard R.: *See—*
  - Obermeyer, Franklin D.; Cruz, Richard R.; and Bieberbach, George, 5,018,772, Cl. 292-39.000.
- Cryderman, Robert L.; and Winkley, John C., to CF&I Steel Corporation. Unitary one quarter mile long railroad rail free of weld seams. 5,018,666, Cl. 238-122.000.
- Cuddihy, Edward F.; Lawton, Russell A.; and Gavin, Thomas R., to United States of America, National Aeronautics and Space Administration. Thermal treatment of silicon integrated circuit chips to prevent and heal voids in aluminum metallization. 5,019,533, Cl. 437-199.000.
- Cummins, Joseph M., Jr., to Texas A&M University System, The. Treatment of immuno-resistant disease with low-dose interferon. 5,019,382, Cl. 424-85.400.

- Cuno, Incorporated: *See—*
  - Allen, Dwight L., 5,019,378, Cl. 424-78.000.
  - Allen, Dwight L., 5,019,601, Cl. 523-122.000.
- Cur, Nihat O.; and Kirby, David B., to Whirlpool Corporation. Multicompartment vacuum insulation panels. 5,018,328, Cl. 50-406.000.
- Curl, Ricky L.; and Roberts, Lowell E., to Flash-Alert Inc. Smoke detector with strobed visual alarm and remote alarm coupling. 5,019,805, Cl. 340-628.000.
- Currey, Albert B.: *See—*
  - Hull, Harold L.; and Currey, Albert B., 5,018,651, Cl. 224-42.440.
- Curtis, Jeff: *See—*
  - Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., 5,019,235, Cl. 204-282.000.
- Cusack, Francis J., Jr.; and Harris, Clarke E., to Raytheon Company. Apparatus and method for frequency modulating a waveguide laser. 5,020,062, Cl. 372-23.000.
- Cutright, Edwin L.; Keen, Billy J., Jr.; Scott, G. Robert; and Van Davelaar, Peter C., to Philip Morris Incorporated. Tensioning and gluing methods and apparatus for tube winding machines. 5,019,024, Cl. 493-280.000.
- Cyb, Frederick F. Heat-resistant exhaust manifold and method of preparing same. 5,018,661, Cl. 228-176.000.
- Cyrix Corporation: *See—*
  - Maher, Robert D., III; and Antaki, Patrick, 5,020,013, Cl. 364-715.080.
- Cziptschirsch, Kurt; Dabringhaus, Volker; and Wegel, Peter, to Gebr. Happich GmbH. Ashtray for vehicles. 5,018,800, Cl. 312-344.100.
- D & C Limited: *See—*
  - Pierson, Henri G. W., 5,019,258, Cl. 210-258.000.
- D&K Custom Machine Design, Inc.: *See—*
  - Singer, Karl, 5,019,203, Cl. 156-309.900.
- Dabringhaus, Volker: *See—*
  - Cziptschirsch, Kurt; Dabringhaus, Volker; and Wegel, Peter, 5,018,800, Cl. 312-344.100.
- Dahl, Roger W.: *See—*
  - Bach, Stanley M., Jr.; Lang, Douglas J.; Swanson, David K.; and Dahl, Roger W., 5,018,523, Cl. 128-419.0PG.
- Dahlquist, Erik; and Enekull, Åke, to ABB Atom AB. Device for separation of a liquid medium containing constituents which are separable in a filter. 5,019,255, Cl. 210-225.000.
- Dai Nippon Insatsu Kabushiki Kaisha: *See—*
  - Kawahata, Ichiro; Matano, Takashi; Kato, Hideki; and Shima, Mutsuo, 5,019,202, Cl. 156-277.000.
- Daiichi Seiyaku Co., Ltd.: *See—*
  - Murakami, Kenji; Tonooka, Yasuaki; Saito, Norie; Nakasuji, Kokichi; and Sugiyama, Norifumi, 5,019,499, Cl. 435-69.100.
- Daimler-Benz AG: *See—*
  - Durschimidt, Ferry; Kolb, Harmut; Strauss, Wolfgang; and Weckenmann, Hartmut, 5,018,348, Cl. 60-274.000.
  - Henseler, Wolfgang, 5,018,761, Cl. 280-730.000.
- Dainippon Ink and Chemicals, Inc.: *See—*
  - Amemoto, Mashide; Watanabe, Hikaru; and Shoji, Akio, 5,019,623, Cl. 525-7.300.
- Dainippon Screen Mfg. Co., Ltd.: *See—*
  - Shirota, Hiroyuki, 5,018,807, Cl. 350-6.800.
- Dale, John R.; and Coar, Lawrence F., to United States of America, America. Sonobuoy suspension system. 5,020,032, Cl. 367-4.000.
- Dallas, Angelo N.: *See—*
  - Brotz, Gregory R.; and Dallas, Angelo N., 5,020,101, Cl. 379-389.000.
- Daly, Charles; Fitzgerald, Gerald F.; Coffey, Aidan; Costello, Veronica A.; Murphy, Maeve C.; and Baumgartner, Andreas, to University College, Cork. Plasmid and uses thereof. 5,019,506, Cl. 435-172.300.
- D'Amico, David J.: *See—*
  - Hickox, Richard M.; Spohn, William P.; and D'Amico, David J., 5,018,395, Cl. 73-864.340.
- Damin, Bernard: *See—*
  - Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, 5,019,643, Cl. 528-361.000.
- Dana-Farber Cancer Institute: *See—*
  - Schlossman, Stuart F.; and Griffin, James D., 5,019,648, Cl. 530-387.000.
- Dance, Mark N.: *See—*
  - McEwen, James A.; Godolphin, William J.; Bohl, Rainer M.; Dance, Mark N.; Furse, Marty L.; and Osborne, John C., 5,019,243, Cl. 210-94.000.
- Danfoss A/S: *See—*
  - Gronback, Jens, 5,019,114, Cl. 72-467.000.
- Dankwort, Rudolf C.: *See—*
  - Chang, Chin L.; and Dankwort, Rudolf C., 5,018,859, Cl. 356-350.000.
- Danna, Dominick; Krauter, Allan I.; and Lia, Raymond A., to Welch Allyn, Inc. Fluid controlled biased bending neck. 5,018,506, Cl. 128-4.000.
- Danno, Yoshiaki: *See—*
  - Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,018,383, Cl. 73-118.100.
  - Ueda, Katsunori; Shimada, Makoto; Danno, Yoshiaki; Togai, Kazuhide; and Yoshida, Masato, 5,019,989, Cl. 364-431.050.
- Daoust, Daniel: *See—*
  - Houlachi, George; Murphy, Terry J.; St-Onge, Jean-Pierre; and Daoust, Daniel, 5,019,172, Cl. 134-3.000.
- D'Aoust, Robert; and Williams, David C., to Unisys Corporation. Method and apparatus for detecting document size in an imaging system. 5,020,124, Cl. 382-61.000.
- Darcie, Thomas E.: *See—*
  - Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
- Darracq, Dominique; Duruz, Jean-Jacques; and Durmelat, Claude, to Moltech Invent S.A. Molten salt electrowinning electrode, method and cell. 5,019,225, Cl. 204-67.000.
- Darrin, Alain, to Technique du Verre Tisse S.a. Process for connecting and assembling tubular elements, in particular for constructing a bicycle frame. 5,018,900, Cl. 403-267.000.
- Da Silva, Domingos; and Guinnard, Roland, to Fabriques de Tabac Reunies, S.A. Method and apparatus for joining and feeding strips of paper. 5,018,535, Cl. 131-60.000.
- Daste, Georges, to Sanofi. Pharmaceutical composition providing the sustained-release of valproic acid. 5,019,398, Cl. 424-480.000.
- Data General Corporation: *See—*
  - Allen, John D.; and Hill, Jeffrey V., 5,020,081, Cl. 375-118.000.
- Daugherty, Denny E.: *See—*
  - Bruegge, Anthony J.; Daugherty, Denny E.; and Sabatelli, Terrence J., 5,019,290, Cl. 252-135.000.
- Dauzy, Bruce C.: *See—*
  - Esper, Leo J.; Jorgensen, David C.; Murrah, Howard E.; Schneider, Michael G.; Phillips, Raymond M.; and Dauzy, Bruce C., 5,018,660, Cl. 229-125.420.
- Dave McKee (Sheffield) Limited: *See—*
  - Lawson, Kenneth T., 5,018,377, Cl. 72-12.000.
- David Bull Laboratories Pty. Ltd.: *See—*
  - Rohrbough, John, 5,019,052, Cl. 604-203.000.
- David Sarnoff Research Center, Inc.: *See—*
  - Carlson, Nils W.; Evans, Gary A.; Hammer, Jacob M.; and Ettenberg, Michael, 5,019,787, Cl. 330-4.300.
- Davies, David H.: *See—*
  - Arnould, Jean C.; Boucherot, Dominique; Davies, David H.; Jung, Frederick H.; and Strawson, Colin J., 5,019,570, Cl. 514-202.000.
- Davies, Eric, deceased (by Williams, William P., executor); and McAllister, Ian R., to Williams, William Price. Apparatus and method for transporting an injured person. 5,018,226, Cl. 5-82.00R.
- Davis, Baruch J.: *See—*
  - Oster, Gerald; and Davis, Baruch J., 5,019,496, Cl. 435-6.000.
- Davis, Herb; and Wetzel, Charles R., to Ciba-Geigy Corporation. Process for the preparation of concentrated 1:2 metal complex dye preparations. 5,019,132, Cl. 8-527.000.
- Davis, Richard S.; Lee, Jordan R.; and MacFarlane, Glen R., to General Motors Corporation. Pressure relief system for a check valve. 5,018,486, Cl. 123-52.0MF.
- Davis, Stephen M.; and Varnado, W. Scott, to Exxon Research & Engineering Company. High silica crystalline zeolites and process for their preparation. 5,019,543, Cl. 502-64.000.
- Davis, Thomas L.; Shell, John P.; Elliott, Robert N., III; and Denning, Carsie K., to Carolina Power & Light Company; North Carolina Alternative Energy Corporation; and North Carolina Department of Economic. Direct contact water-to-air heat exchanger and method. 5,019,300, Cl. 261-23.100.
- Davison, John; and Hsu, Chung, to Athens Corp. Atomic absorption process monitoring. 5,018,855, Cl. 356-312.000.
- Davitz, Daniel. Gold colored metal alloy. 5,019,335, Cl. 420-481.000.
- Dawson, Chris R.; Parks, Gerald R.; and Dondero, John, to Gregory, John R. Non-fogging goggles. 5,018,223, Cl. 2-436.000.
- Day, James: *See—*
  - Bewlay, Bernard P.; and Day, James, 5,019,330, Cl. 419-39.000.
- de La Chapelle, Michael; Bryan, Richard E.; and Brenneise, Clark D., to Hughes Aircraft Company. Coherent radar using recirculating delay line. 5,019,826, Cl. 342-202.000.
- Deal, Samuel B.; and Bartch, Donald W., to RCA Licensing Corp. UV-curable adhesive attachment means and method for a cathode-ray tube-yoke combination. 5,019,745, Cl. 313-440.000.
- Dean, Robert C., Jr.: *See—*
  - Afeyan, Noubar B.; Regnier, Fred E.; and Dean, Robert C., Jr., 5,019,270, Cl. 210-656.000.
- Deason, James R.: *See—*
  - Mueller, Richard A.; Partis, Richard A.; and Deason, James R., 5,019,597, Cl. 514-618.000.
- De Bastiani, Giovanni; Faccioli, Giovanni; Aldegheri, Roberto; and Brivio, Lodovico R., to ORTHOFIX S.r.l. External splint. 5,019,077, Cl. 606-54.000.
- DeBoer, Charles D.; and Evans, Steven, to Eastman Kodak Company. Infrared absorbing indene-bridged-polymethine dyes for dye-donor element used in laser-induced thermal dye transfer. 5,019,480, Cl. 430-200.000.
- DeBoer, Gary T.: *See—*
  - Toth, Eric S.; DeBoer, Gary T.; and Pham, Linh H., 5,018,633, Cl. 248-311.200.
- Deere & Company: *See—*
  - Fellner, Ronald W., 5,018,283, Cl. 37-141.00T.
  - Gage, Douglas M., 5,018,935, Cl. 414-729.000.
  - Hirsch, Walter; and Becker, Herbert, 5,019,014, Cl. 460-106.000.
  - Sparks, Richard M.; and Tjepkes, Kendall D., 5,018,750, Cl. 277-38.000.
  - Walters, James C., 5,018,345, Cl. 56-14.900.
- Degussa Aktiengesellschaft: *See—*
  - Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,019,169, Cl. 106-438.000.
- Delalande S.A.: *See—*
  - Adrian, Guy P., 5,019,655, Cl. 568-322.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Delamare, Guy R.: *See—*
  - Thomas, Pierre A.; and Delamare, Guy R., 5,018,904, Cl. 405-196.000.
- Delaporte, Eric: *See—*
  - Wain-Hobson, Simon; Huet, Thierry; Delaporte, Eric; and Brun-Vezinet, Francoise, 5,019,510, Cl. 435-235.100.
- Delgado, Rene M.: *See—*
  - Ooms, William J.; Leitch, Clifford D.; and Delgado, Rene M., 5,020,017, Cl. 364-761.000.
- Dell'Acqua, Ernani: *See—*
  - Johnson, Eric A.; Dell'Acqua, Ernani; and Ferrari, Lorenzo, 5,019,411, Cl. 426-52.000.
- Del Rossi, Kenneth J.; Dessau, Ralph M.; Huss, Albin, Jr.; Kirker, Garry W.; Marler, David O.; and Partridge, Randall D., to Mobil Oil Corp. Process for the conversion of paraffins to olefins and/or aromatics and low acidity zeolite catalyst therefor. 5,019,664, Cl. 585-419.000.
- Del Soldato, Piero; and Casadio, Silvano, to Prodotti Formeti S.R.L. Pharmaceutical compositions containing dextrorphan for intranasal application. 5,019,579, Cl. 514-289.000.
- Dempsey, William F.; Casar, Steve; and Reed, Charles P., to Alcan International Limited. Fascia panel structures. 5,019,111, Cl. 52-506.000.
- Den, Tohru: *See—*
  - Akimitsu, Jun; and Den, Tohru, 5,019,553, Cl. 505-1.000.
- Den Besten, Leroy E. Rotationally and axially movable bit. 5,018,793, Cl. 299-86.000.
- Deniega, Jess: *See—*
  - Pedlick, Jack; Vincze, Bela; and Deniega, Jess, 5,018,657, Cl. 227-178.000.
- Denning, Carsie K.: *See—*
  - Davis, Thomas L.; Shell, John P.; Elliott, Robert N., III; and Denning, Carsie K., 5,019,300, Cl. 261-23.100.
- Denton, David A.; and Hayfield, Peter C. S., to Imperial Chemical Industries PLC. Electrolytic process. 5,019,224, Cl. 204-54.100.
- Denuell, Gunther: *See—*
  - Hager, Walter; Butzen, Edgar; Denuell, Gunther; and Arnold, Kurt, 5,018,465, Cl. 112-273.000.
- DePietro, Matthew: *See—*
  - Koelsch, Michael L.; De Point, John, Jr.; and DePietro, Matthew, 5,019,848, Cl. 354-277.000.
- De Point, John, Jr.: *See—*
  - Koelsch, Michael L.; De Point, John, Jr.; and DePietro, Matthew, 5,019,848, Cl. 354-277.000.
- DePrycker, Martin L. F.; and DeSomer, Michel P. M., to Alcatel N.V. Packet switching network. 5,020,052, Cl. 370-60.000.
- Derosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., to Texaco Inc. Enhanced wear resistant additive and lubrication oil composition containing same. 5,019,287, Cl. 252-54.600.
- Deschler, Ulrich: *See—*
  - Panster, Peter; and Deschler, Ulrich, 5,019,637, Cl. 528-25.000.
- DeSomer, Michel P. M.: *See—*
  - DePrycker, Martin L. F.; and DeSomer, Michel P. M., 5,020,052, Cl. 370-60.000.
- Des Rioux, Philippe: *See—*
  - Boles, Glenn M.; Schober, Gary W.; Chein, Wen S.; Symanski, Chris P.; Des Rioux, Philippe; and Tomkoski, Walter, III, 5,019,899, Cl. 358-84.000.
- Dessau, Ralph M.: *See—*
  - Del Rossi, Kenneth J.; Dessau, Ralph M.; Huss, Albin, Jr.; Kirker, Garry W.; Marler, David O.; and Partridge, Randall D., 5,019,664, Cl. 585-419.000.
- Deutschbein, John S.: *See—*
  - Boyd, David W.; and Deutschbein, John S., 5,019,703, Cl. 250-208.100.
- Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH: *See—*
  - Schulte, Burkart; Hardt, Norbert; and Kohne, Rainer, 5,019,324, Cl. 376-260.000.
- Development Corporation of Japan: *See—*
  - Iga, Kenichi; Ibaraki, Akira; Kawashima, Kenji; Furusawa, Kotaro; and Ishikawa, Toru, 5,020,066, Cl. 372-45.000.
- Dewees, John G.: *See—*
  - Pasquale, Frank; and Dewees, John G., 5,018,291, Cl. 40-642.000.
- Dewhurst, John E., to Mobay Corporation. Internal mold release agent for use in reaction injection molding. 5,019,600, Cl. 521-117.000.
- Dexter Corporation: *See—*
  - Perron, Peter J.; and Bourbonais, Edward A., 5,019,625, Cl. 525-66.000.
- Diana Dolls Fashions, Inc.: *See—*
  - Perez, Sam S.; and Malinowski, Susan, 5,019,068, Cl. 604-386.000.
- Diatek, Inc.: *See—*
  - Suszynski, Edward D.; Banke, Kerry; and Gregory, Thomas K., 5,018,872, Cl. 374-133.000.
- DiBiase, Robert; Galani, Zvi; and Waterman, Raymond C., Jr., to Raytheon Company. Signal tracking electronically tunable filter. 5,019,792, Cl 333-17.100.
- Dicker, Ira B.: *See—*
  - Boettcher, Fritz P.; Dicker, Ira B.; Ebersole, Richard C.; and Hertler, Walter R., 5,019,634, Cl. 526-262.000.
- Diederich, Walter J., to TPV Energy System, Inc. Pulsating gas powered light source. 5,018,963, Cl. 431-1.000.
- Diehl, Christian: *See—*
  - Allgaier, Karl-Heinz; Diehl, Christian; and Kirsche, Horst, 5,018,684, Cl. 244-3.130.
- Diehl, Wolfgang; and Hepp, Monika, to Battelle-Institut e.V. Process for the detection of chemical warfare agents. 5,019,518, Cl. 436-172.000.
- Digital Equipment Corporation: *See—*
  - Lee, Neville K., 5,020,040, Cl. 369-13.000.
  - Pomfret, Stephen T.; Lary, Richard; and Boaen, Yerell, 5,020,020, Cl. 364-900.000.
  - Webb, David A., Jr.; Hetherington, Ricky C.; Salett, Ronald M.; Fossum, Trvggvue; and Manley, Dwight P., 5,019,965, Cl. 364-200.000.
  - Wheeler, William R.; and Uhler, George M., 5,019,967, Cl. 364-200.000.
- Dinsmore, Daniel, Jr.: *See—*
  - Sullivan, Michael J.; Dussault, Douglas G.; and Dinsmore, Daniel, Jr., 5,018,472, Cl. 114-244.000.
- DiStefano, Salvador: *See—*
  - Bugga, Ratnakumar V.; DiStefano, Salvador; and Bankston, C. Perry 5,019,470, Cl. 429-223.000.
- Diva Medical Systems bv: *See—*
  - Beckers, Andreas G. F., 5,019,974, Cl. 364-413.020.
- Dobric, Milan. Mower attachment. 5,018,239, Cl. 15-328.000.
- Dr. Ing. h.c.F. Porsche AG. *See—*
  - Muller, Robert, 5,018,404, Cl. 74-477.000.
- Dohi, Masahiro; and Nageno, Koji, to Sony Corporation. Headphone device. 5,018,599, Cl. 181-129.000.
- Dolan, Henry J. Lumbar traction device. 5,018,512, Cl. 128-75.000.
- Doll, Friedhelm, to Turbo-Werk Messtechnik GmbH. Inductive flow meter. 5,018,391, Cl. 73-861.170.
- Dolson, Mark G.: *See—*
  - Lee, Len F.; and Dolson, Mark G., 5,019,153, Cl. 71-94.000.
- Domb, Abraham J.; and Langer, Robert S., to Massachusetts Institute of Technology. Unsaturated polyanhydrides. 5,019,379, Cl. 424-78.000.
- Don Reynolds International Limited: *See—*
  - Reynolds, Donald A., 5,018,326, Cl. 52-235.000.
- Donahue, James A.: *See—*
  - Sanwo, Ikuo J.; and Donahue, James A., 5,019,728, Cl. 307-475.000.
- Doncaster, Daniel J.: *See—*
  - Woodbridge, Keith W.; Doncaster, Daniel J.; and Hamblin, Ronald F., 5,018,898, Cl. 403-11.000.
- Dondero, John: *See—*
  - Dawson, Chris R.; Parks, Gerald R., and Dondero, John, 5,018.223, Cl. 2-436.000.
- Donelson, Harlan J. Particulate material cleaning apparatus. 5,019,242, Cl. 209-29.000.
- Doner, John P.: *See—*
  - Farng, Liehpao O.; Doner, John P.; and Horodysky, Andrew G., 5,019,282, Cl. 252-32.70E.
- Dornier Luftfahrt GmbH: *See—*
  - Zimmer, Herbert, 5,018,686, Cl. 244-106.000.
- Dorschner, Terry A., to Raytheon Company. Deflector for an optical beam including refractive means. 5,018,835, Cl. 350-336.000.
- Dougall, David A.; Wilkinson, James H.; and Walker, Gavin A., to Sony Corporation. Spatial interpolation between lines of a supersampled digital video signal in accordance with a gradient vector selected for maximum matching of blocks of samples which are offset in opposite directions. 5,019,903, Cl. 358-140.000.
- Dougherty, Michael, to Colt Industries, Inc. Automatic idle speed circuitry. 5,018,495, Cl. 123-339.000.
- Douzon, Colette: *See—*
  - Letourneur, Didier; Douzon, Colette; Migonney, Veronique; Muller, Daniel A.; and Jozefowicz, Marcel, 5,019,269, Cl. 210-635.000.
- Dow Chemical Company, The: *See—*
  - Bedell, Stephen A., 5,019,365, Cl. 423-243.000.
  - Boeckmann, Hugo; Van Erden, Donald L.; and Bauer, Mark D., 5,019,027, Cl. 493-209.000.
  - LaPack, Mark A.; and Tou, James C., 5,019,139. Cl. 55-158.000.
- Dow Corning Corporation: *See—*
  - Gettings, Richard L.; McGee, James B.; White, William C.; and Plahutnik, Frank, Jr., 5,019,173, Cl. 134-4.000.
- Dow Corning Wright Corporation: *See—*
  - Whiteside, Leo A.; and Coates, Bradley J., 5,019,104, Cl. 623-20.000.
- Dow Danmark A/S: *See—*
  - Stengaard, Flemming F., 5,019,261, Cl. 210-490.000.
- Dowling, Lorne B., to International Brace Ltd. Shipping brace for cardboard containers. 5,018,693, Cl. 248-217.200.
- Downey, Joseph T.: *See—*
  - McKee, John M.; and Downey, Joseph T., 5,018,837, Cl. 350-345.000.
- Downie, Robert; Peterson, Ray D.; Richards, Nolan E.; and White, Roger D., to Reynolds Metal Company. Sow mold and sow ingot. 5,019,455, Cl. 428-584.000.
- Doyle, Keith A. Golf ball driving practice apparatus. 5,018,731, Cl. 273-35.00B.
- Draiswerke GmbH: *See—*
  - Eirich, Paul; and Christen, Werner, 5,018,673, Cl. 241-62.000.
- Draper, David R.: *See—*
  - Baldwin, John B.; and Draper, David R., 5,018,705, Cl. 266-77.000.
- Dray, James R.: *See—*
  - Victor, Richard A.; Lockett, Michael J.; and Dray, James R., 5,019,144, Cl. 62-22.000.
- Dreibelbis, Jeffrey H.; Gabric, John A.; and Hedberg, Erik L., to International Business Machines Corporation. Test selection techniques. 5,019,772, Cl. 324-158.00R.

- Drejer, Jorgen; and Jakobsen, Palle, to Novo Nordisk A/S. Piperidine compounds and their preparation and use. 5,019,582, Cl. 514-321.000.
- Drejer, Jorgen: *See—*
  - Jakobsen, Palle; and Drejer, Jorgen, 5,019,592, Cl. 514-524.000.
- Drent, Eit: *See—*
  - Wong, Pui K.; and Drent, Eit, 5,019,645, Cl. 528-488.000.
- Dresser Industries, Inc.: *See—*
  - Cadwell, Robert M., 5,019,783, Cl. 324-662.000.
- Drezner, Marc K.; and Quarles, L. Darryl, to Duke University. Aluminum salts in the treatment of bone disease. 5,019,401, Cl. 424-662.000.
- Driscoll, Robert K.: *See—*
  - Gutweiler, Matthias; Driscoll, Robert K.; and Leupold, Ernst I., 5,019,624, Cl. 525-61.000.
- Dropsy, Patrick J. System for recording and/or transmitting binary information at a high data rate via known means for recording and/or transmitting video information, and for decoding the digital data. 5,019,914, Cl. 358-310.000.
- D'Silva, Edmund D., to Baxter International Inc. Accurate peristaltic pump. 5,018,945, Cl. 417-12.000.
- Dual-Lite, Inc.: *See—*
  - Kozek, Edward P.; Ruskouski, Charles R.; and Altamura, Steven J., 5,018,290, Cl. 40-570.000.
- DuBois Chemicals, inc.: *See—*
  - Bruegge, Anthony J.; Daugherty, Denny E.; and Sabatelli, Terrence J., 5,019,290, Cl. 252-135.000.
- DuBois, Jerry M.: *See—*
  - Frank, Randall K.; and DuBois, Jerry M., 5,019,893, Cl. 357-81.000.
- Duchesne, Mark F.: *See—*
  - Kubert, Vincent T.; Olenski, Matthew J.; and Duchesne, Mark F., 5,019,868, Cl. 355-264.000.
- Duckeck, Ralf; and Bragas, Peter, to Robert Bosch GmbH. Vehicular radio receiver with stored detour data. 5,020,143, Cl. 455-186.000.
- Duke University: *See—*
  - Drezner, Marc K.; and Quarles, L. Darryl, 5,019,401, Cl. 424-662.000.
  - Haynes, Barton F.; and Palker, Thomas J., 5,019,387, Cl. 424-89.000.
- Dunn, Robert M.: *See—*
  - Addesso, Mark; Iyer, Venkatraman R.; and Dunn, Robert M., 5,019,961, Cl. 364-192.000.
- Dunse. Walter D. Blind ringer tossing game. 5,018,745, Cl. 273-338.000.
- DuPau, Cornelis P.: *See—*
  - Hamer, Rene H.; and DuPau, Cornelis P., 5,020,047, Cl. 369-240.000.
- Duperray, Gilbert; and Wolff, Daniel, to Atochem. Polyvinylidene fluoride products with a surface adapted to adhere to an incompatible polymer and process for treating the surface of a polyvinylidene fluoride material to enable it to adhere to an incompatible polymer. 5,019,444, Cl. 428-262.000.
- Du Pont de Nemours, E. I., and Company: *See—*
  - Arthur, Samuel D., 5,019,264, Cl. 210-500.370.
  - Benack, Kerin S.; and Taggi, Arthur J., 5,019,472, Cl. 430-43.000.
  - Boettcher, Fritz P.; Dicker, Ira B.; Ebersole, Richard C.; and Hertler, Walter R., 5,019,634, Cl. 526-262.000.
  - Ciganek, Engelbert; and Cook, Leonard, 5,019,650, Cl. 540-609.000.
  - Slocum, Edgar W.; Sobrero, Aquiles C.; and Wheland, Robert C., 5,019,632, Cl. 526-68.000.
  - Spinelli, Harry J., 5,019,628, Cl. 525-288.000.
  - Taylor, Harvey W., Jr., 5,019,536, Cl. 428-220.000.
- Duracraft Corporation: *See—*
  - Wang, Jui-Shang, 5,018,951, Cl. 417-423.150.
- Durette, Philippe L.; Hagmann, William K.; and Ponpipom, Mitree M., to Merck & Co., Inc. Steroidal glycolipids as host resistance stimulators against viral infection. 5,019,568, Cl. 514-171.000.
- Durham, Dana: *See—*
  - Mammato, Donald C.; Jain, Sangya; Durham, Dana; Spak, Mark A.; Usifer, Douglas A.; and McFarland, Michael, 5,019,488, Cl. 430-325.000.
- Durham, Dwight H., to Southwire Company. Wiring device terminal. 5,018,993, Cl. 439-801.000.
- Durkoppwerke GmbH: *See—*
  - Riss, Gerhard, 5,019,116, Cl. 112-121.140.
- Durmelat, Claude: *See—*
  - Darracq, Dominique; Duruz, Jean-Jacques; and Durmelat, Claude, 5,019,225, Cl. 204-67.000.
- Durschimidt, Ferry; Kolb, Harmut; Strauss, Wolfgang; and Weckenmann, Hartmut, to Daimler-Benz AG. Method for detecting the condition of catalytic converters. 5,018,348, Cl. 60-274.000.
- Durst, Robert T., Jr.: *See—*
  - Sansone, Ronald P.; Keating, Raymond; Wall, Joseph W.; and Durst, Robert T., Jr., 5,019,991, Cl. 364-464.030.
- Duruz, Jean-Jacques: *See—*
  - Darracq, Dominique; Duruz, Jean-Jacques; and Durmelat, Claude, 5,019,225, Cl. 204-67.000.
- Dussault, Douglas G.: *See—*
  - Sullivan, Michael J.; Dussault, Douglas G.; and Dinsmore, Daniel, Jr., 5,018,472, Cl. 114-244.000.
- Dutt, Bulusu V.: *See—*
  - Coden, Michael H.; and Dutt, Bulusu V., 5,019,301, Cl. 264-1.500.
- Duval, Michel: *See—*
  - Muller, Daniel; Chabagno, Jean-Michel; and Duval, Michel, 5,019,469, Cl. 429-192.000.
- Dwivedi, Ratnesh K.: *See—*
  - Kuntner, Robert C.; Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., 5,019,541, Cl. 501-127.000.
  - Kuntner, Robert C.; Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., 5,019,541, Cl. 501-127.000.
- DX Imaging: *See—*
  - Felder, Thomas C., 5,019,477, Cl. 430-115.000.
- Dykes, Robert M.: *See—*
  - Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 5,019,012, Cl. 452-46.000.
- Dynabook Technologies Corporation: *See—*
  - Herron, Matthew A.; and Boyle, Dennis J., 5,019,465, Cl. 429-97.000.
- Dynamic Research, Inc.: *See—*
  - Wiley, Kenneth D.; Zellner, John W.; St. Laurent, Andre; Newman, James A.; Szabo, Thomas J.; and Shewchenko, Nicholas, 5,018,977, Cl. 434-274.000.
- Dynapert Inc.: *See—*
  - Farassat, Farhad, 5,018,658, Cl. 228-4.500.
- Dytel Corporation: *See—*
  - Morganstein, Sanford J.; Krakau, Herbert J.; Mehta, Bakulesh A.; Klecka, Mark D.; and Carleton, Robert, 5,020,095, Cl. 379-67.000.
- Dzubak, Alan L.: *See—*
  - Monson, Robert J.; and Dzubak, Alan L., 5,018,785, Cl. 297-159.000.
- E-Lite Technologies, Inc.: *See—*
  - Appelberg, Gustaf T., 5,019,748, Cl. 315-169.300.
- Eastern Company, The: *See—*
  - Weinerman, Lee S.; and Vargus, Joel T., 5.018,373, Cl. 70-99.000.
- Eastman, Jay, to Photographic Sciences Corporation. Bar code reading systems having electrical power conservation and laser radiation power limiting means. 5,019,698, Cl. 235-462.000.
- Eastman Kodak Company: *See—*
  - Blanding, Douglas L., 5,019,864, Cl. 355-212.000.
  - Blevins, Richard W.; and Turner, S. Richard, 5,019,635, Cl. 526-266.000.
  - Bowne, Arlyce T., 5,019,489, Cl. 430-379.000.
  - Buchanan, John M.; Cook, Ewell R.; Mooberry, Jared B.; Proehl, Gary S.; Singer, Stephen P.; and Washburn, William N., 5,019,492, Cl. 430-543.000.
  - Coltrain, Bradley K.; Rakes, Gary A.; and Smith, Victoria K., 5,019,607, Cl. 523-435.000.
  - DeBoer, Charles D.; and Evans, Steven, 5,019,480, Cl. 430-200.000.
  - Fearnside, William T.; and Orlicki, David M., 5,020,042, Cl. 369-13.000.
  - Karsh, Herbert, 5,019,933, Cl. 360-132.000.
  - Kessler, David, 5,018,805, Cl. 350-6.500.
  - Koelsch, Michael L.; De Point, John, Jr.; and DePietro, Matthew, 5,019,848, Cl. 354-277.000.
  - Lee, James K.; McJury, Donald J.; Pickup, Michael A.; and Robinson, Kelly S., 5,019,796, Cl. 335-302.000.
  - Meyers, Mark M.; Lee, James K.; Narayan, Badhri; and Roddy, James E., 5,018,808, Cl. 350-6.910.
  - Morse, John E., 5,019,866, Cl. 355-239.000.
  - Nbedi, Sylvain L.; Bobo, Robert D.; and Hryhorenko, Socrates, 5,019,692, Cl. 219-469.000.
  - Nguyen, Khe C.; and Gruenbaum, William T., 5,019,473, Cl. 430-58.000.
  - Patton, David L., 5,019,869, Cl. 355-290.000.
  - Roddy, James E.; and Narayan, Badhri, 5,018,813, Cl. 350-96.140.
  - Smart, Gerald J.; and Nelson, Daniel L., 5,020,045, Cl. 369-44.290.
  - Tai, Hwai T.; and Thompson, John R., 5,020,119, Cl. 382-50.000.
  - Tamary, Ernest J., 5,019,693, Cl. 219-471.000.
  - Weldy, John A., 5,020,120, Cl. 382-56.000.
- Eastman Machine Company: *See—*
  - Jung, Rolf; and Nalecz, Andrew A., 5,018,713, Cl. 270-31.000.
- Eaton, Brad W.: *See—*
  - Bany, Stephen W.; Miller, John A.; and Eaton, Brad W., 5,019,071, Cl. 604-389.000.
- Eaton Corporation: *See—*
  - Blake, Julian G.; Muka, Richard S.; and Younger, Peter R., 5,019,233, Cl. 204-792.120.
  - Heckenkamp, Daniel P., 5,019,676, Cl. 200-50.00A.
  - Janson, David A., 5,019,021, Cl. 475-150.000.
  - Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., 5,019,983, Cl 364-424.070.
- Ebara, Katsuya: *See—*
  - Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.
- Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, to Prowatec GmbH Halle. Process for mesophilic or thermophilic aerobico-enzymic conditioning of liquid organic substances and biomass. 5,019,267, Cl. 210-606.000.
- Eberhardt, Hans-Georg: *See—*
  - Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.
- Eberhart, Douglas E. Pocketed beach towel. 5,018,229, Cl. 5-417.000.

VOL 126
ISS 4
MY 28
1991
UMI

- Ebersole, Richard C.: *See—*
  - Boettcher, Fritz P.; Dicker, Ira B.; Ebersole, Richard C.; and Hertler, Walter R., 5,019,634, Cl. 526-262.000.
- Eberspacher, J.: *See—*
  - Kroner, Martin, 5,018,490, Cl. 123-196.0AB.
- Ecolab Inc.: *See—*
  - Richter, Francis L.; Wilson, James; and Pedersen, Daniel E., 5,019,346, Cl. 422-28.000.
- Eddas, Harry; and Hanon, David O., to Energy Saving Products of Tennesse, Inc. Tankless electric water heater. 5,020,127, Cl. 392-488.000.
- Edison Polymer Innovation Corp.: *See—*
  - Lando, Jerome B., 5,019,451, Cl. 428-411.100.
- Edmondson, James G.: *See—*
  - Niu, Joseph H. Y.; Edmondson, James G.; and Lehrer, Scott E., 5,019,341, Cl. 422-7.000.
- Edward Lowe Industries, Inc.: *See—*
  - Lowe, H. Edward; Yoder, Ricky L.; and Nelson, Clayton C., 5,019,564, Cl. 514-75.000.
- Edwards, Roger A.: *See—*
  - Engelhardt, K. G.; Edwards, Roger A.; Sample, Whitney S.; and Sandrof, Michael F., 5,019,112, Cl. 53-474.000.
- Egelhof, Dieter: *See—*
  - Meinecke, Albrecht; Egelhof, Dieter; and Weiss, Wilfried, 5,019,214, Cl. 162-301.000.
- Ehrenberg, Hans J.: *See—*
  - Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.
- Ehrig, Steffen: *See—*
  - Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
- EIC Laboratories, Inc.: *See—*
  - Rauh, R. David, 5,019,420, Cl. 427-126.300.
- Eichelberger, Charles W.; and Wojnarowski, Robert J., to General Electric Company. High density interconnect with high volumetric efficiency. 5,019,946, Cl. 361-414.000.
- Eichelberger, Charles W.: *See—*
  - Wojnarowski, Robert J.; and Eichelberger, Charles W., 5,019,535, Cl. 437-209.000.
- Eidson, Edward W., II. Paint dispersing training grenade. 5,018,449, Cl. 102-498.000.
- Eilender, Kasriel. Low friction multilayer pad with foam backing. 5,019,064, Cl. 604-378.000.
- Eirich, Paul; and Christen, Werner, to Draiswerke GmbH. Continuously working mixer. 5,018,673, Cl. 241-62.000.
- Ekdahl, Carl A., to United States of America, Energy. Nested-cone transformer antenna. 5,019,832, Cl. 343-774.000.
- Electric Power Research Institute: *See—*
  - Chu, Frank Y.; and Lloyd, Blake A., 5,019,760, Cl. 318-490.000.
- Elegant Design Solutions Inc.: *See—*
  - McCurry, Patrick W.; Kellogg, James R.; Boekelheide, Karl; Sexton, Kenneth D.; Ellson, George A.; and Hocker, Robert A., 5,019,717, Cl. 307-66.000.
- ELF France: *See—*
  - Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, 5,019,643, Cl. 528-361.000.
- Elgat, Zvi; and Warschawski, Joel P., to Luz Industries Israel, Ltd. Protected silvered substrates and mirrors containing the same. 5,019,458, Cl. 428-630.000.
- Eli Lilly and Company: *See—*
  - Cook, Gwendolyn K.; and McDonald, John H., III, 5,019,571, Cl. 514-210.000.
- Elliott, Douglas C.: *See—*
  - Sealock, L. John, Jr.; and Elliott, Douglas C., 5,019,135, Cl. 48-197.00R.
- Elliott, Robert N., III: *See—*
  - Davis, Thomas L.; Shell, John P.; Elliott, Robert N., III; and Denning, Carsie K., 5,019,300, Cl. 261-23.100.
- Ellson, George A.: *See—*
  - McCurry, Patrick W.; Kellogg, James R.; Boekelheide, Karl; Sexton, Kenneth D.; Ellson, George A.; and Hocker, Robert A., 5,019,717, Cl. 307-66.000.
- Elonen, Jorma; Timperi, Jukka; Vesala, Reijo; and Wikman, Vesa, to A. Ahlstrom Corporation. Method and apparatus for separating gas with a pump from a medium being pumped. 5,019,136, Cl. 55-36.000.
- Elopak Systems, A.G.: *See—*
  - Esper, Leo J.; Jorgensen, David C.; Murrah, Howard E.; Schneider, Michael G.; Phillips, Raymond M.; and Dauzy, Bruce C., 5,018,660, Cl. 229-125.420.
- El Rabaa, Wadood; Cole, R. Clay; and Meadows, David L., to Halliburton Company. Method of arresting hydraulic fracture propagation. 5,018,578, Cl. 166-281.000.
- El-Wailly, Tamim F.: *See—*
  - Bielas, Michael S.; and El-Wailly, Tamim F., 5,018,860, Cl. 356-350.000.
- Emhart Industries, Inc.: *See—*
  - Voisine, Gary R.; and Bratton, Kenneth L., 5,019,147, Cl. 65-360.000.
- Empresa Brasileira De Compressores S.A.: *See—*
  - Schwarz, Marcos G., 5,019,756, Cl. 318-254.000.
- Enderle, Eckhard; Aehnelt, Hans-Peter; Aubele, Karl-Eugen; and Wirth, Michael, to Carl-Zeiss-Stiftung, Heidenheim/Brenz. Method and device for the operation of a workpiece-contacting probe head of the switching type. 5,018,280, Cl. 33-832.000.
- Enderle, Eckhard: *See—*
  - Aehnelt, Hans-Peter; Enderle, Eckhard; and Wirth, Michael, 5,018,278, Cl. 33-559.000.
- Endl, Helmut; and Rinck, Helmut, to Texas Instruments Deutschland GmbH. Apparatus for wet etching of thin films. 5,019,205, Cl. 156-345.000.
- Endo, Takashi: *See—*
  - Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; Endo, Takashi; and Moriyama, Jiro, 5,019,840, Cl. 346-134.000.
- Endo, Zenichiro; and Hara, Shigeyoshi, to Hercules Incorporated. Elastic crosslinked metathesis polymer composition. 5,019,620, Cl. 524-485.000.
- Enekull, Åke: *See—*
  - Dahlquist, Erik; and Enekull, Åke, 5,019,255, Cl. 210-225.000.
- Energy Saving Products of Tennesse, Inc.: *See—*
  - Eddas, Harry; and Hanon, David O., 5,020,127, Cl. 392-488.000.
- Engel, Adalbert; Engel, Christoph; and Engel, Uta-Marie, to Engel, Adalbert (Lorrach). Method and apparatus for perforating and/or severing tubular bodies. 5,019,028, Cl. 493-290.000.
- Engel, Adalbert (Lorrach): *See—*
  - Engel, Adalbert; Engel, Christoph; and Engel, Uta-Marie, 5,019,028, Cl. 493-290.000.
- Engel-Badar, Monika; and Furr, Bobby N., to Hoechst Celanese Corporation. Producing a polyethylene terephthalate based polymer from a lower dialkyl ester of a dicarboxylic acid and a glycol. 5,019,640, Cl. 528-272.000.
- Engel, Christoph: *See—*
  - Engel, Adalbert; Engel, Christoph; and Engel, Uta-Marie, 5,019,028, Cl. 493-290.000.
- Engel, Dusan J.: *See—*
  - Vora, Bipin V.; and Engel, Dusan J., 5,019,662, Cl. 585-323.000.
- Engel, Uta-Marie: *See—*
  - Engel, Adalbert; Engel, Christoph; and Engel, Uta-Marie, 5,019,028, Cl. 493-290.000.
- Engelhardt, K. G.; Edwards, Roger A.; Sample, Whitney S.; and Sandrof, Michael F., to Carnegie-Mellon University. Robotic food service packaging system. 5,019,112, Cl. 53-474.000.
- Engerand, Jean-Luc; and Mattei, Jean-Pierre, to Messier-Hispano-Bugatti; and R. Alkan & Cie. Vehicle wheel made of composite material. 5,018,795, Cl. 301-63.0PW.
- Engineered Instruments, Inc.: *See—*
  - Mraz, Dennis, 5,018,389, Cl. 73-784.000.
- England, J. Bruce: *See—*
  - Stanislowski, Anna G.; England, J. Bruce; and Ratcliff, Steven D., 5,018,482, Cl. 119-173.000.
- England, Willi: *See—*
  - Bernd, Alfred; England, Willi; Flaig, Heinz; Hesse, Wilhelm; Staggl, Roland; and Zacharias, Karl, 5,019,734, Cl. 310-77.000.
- English, Clayton D.: *See—*
  - Nix, Michael; and English, Clayton D., 5,020,025, Cl. 365-102.000.
- English, James M.: *See—*
  - Black, Teresa K.; English, James M.; and Shank, Michael S., 5,018,989, Cl. 439-620.000.
- Eniricerche S.p.A.: *See—*
  - Farias, Otello; Gandini, Alberto; Monga, Raffaella; Roggero, Arnaldo; Sisto, Raffaello; and Valentini, Claudio, 5,019,631, Cl. 525-396.000.
- Enomoto, Ryo; and Yamada, Masaya, to Ibiden Co., Ltd. Method for producing a second harmonic wave generating device. 5,018,810, Cl. 350-96.120.
- Enzytech, Inc.: *See—*
  - Gombotz, Wayne R.; Healy, Michael S.; and Brown, Larry R., 5,019,400, Cl. 424-497.000.
- Epema, Sytse: *See—*
  - Hooghiem, Jelle; van der Sloot, Bart; and Epema, Sytse, 5,018,605, Cl. 188-165.000.
- Epstein, Alan L.; and Taylor, Clive R., to Cancer Biologics, Inc. Detection of necrotic malignant tissue and associated therapy. 5,019,368, Cl. 424-1.100.
- Equine Innovations, Inc.: *See—*
  - Evertson, Sarah K., 5,018,341, Cl. 54-66.000.
- Ericsson Ge Mobile Communications Inc.: *See—*
  - Nazarenk, Dimitri M.; Hughes, Houston H., III; Gordon, Robert T.; Hattey, David L.; and Yurman, Bruno, 5,020,132, Cl. 455-17.000.
- Erwin Behr GmbH & Co KG: *See—*
  - Menke, Klaus; Wiesert, Peter; Wollmann, Klaus; and Best, Bernd, 5,019,199, Cl. 156-245.000.
- Eryman, William S.: *See—*
  - Haddad, Muin S.; and Eryman, William S., 5,019,545, Cl. 502-209.000.
- Eshita, Takashi: *See—*
  - Inoue, Toshikazu; and Eshita, Takashi, 5,019,874, Cl. 357-16.000.
- Esper, Leo J.; Jorgensen, David C.; Murrah, Howard E.; Schneider, Michael G.; Phillips, Raymond M.; and Dauzy, Bruce C., to Elopak Systems, A.G. Container and blank for constructing same. 5,018,660, Cl. 229-125.420.
- Essilor International Cie Generale d'Optique: *See—*
  - Mercier, Jean-Louis, 5,019,098, Cl. 623-6.000.
- Esslinger, David: *See—*
  - Rebne, Thomas M.; and Esslinger, David, 5,019,125, Cl. 206-532.000.

- Estep, Duncan E.: *See—*
  - Chambers, John D.; Estep, Duncan E.; Frankiewicz, Walter E.; Friend, Ronald W.; and Lawson, James M., 5,020,008, Cl. 364-561.000.
- Ester, Grantley O.: *See—*
  - Suthers, Mark S.; Ester, Grantley O.; and Streater, Richard W., 5,019,742, Cl. 310-313.00C.
- Estkowski, Michael H.; and Minor, Don E., to Shepherd Products U.S. Inc. Chair seat tilt control. 5,018,787, Cl. 297-302.000.
- Etat Francais, Represente Par Le Delegue General Pour L'Armament: *See—*
  - Melchior, Jean; and Andre, Thierry, 5,018,354, Cl. 60-606.000.
- Etheredge, Robert W., III. Novel phosphorescent condoms. 5,018,532, Cl. 128-844.000.
- Ethicon, Inc.: *See—*
  - Bezwada, Rao S.; and Shalaby, Shalaby W., 5,019,094, Cl. 606-230.000.
  - Pedlick, Jack; Vincze, Bela; and Deniega, Jess, 5,018,657, Cl. 227-178.000.
- Etievant, Claude; and Wilhelmsson, Hans, to Commissariat A l'Energie Atomique. Free electron laser with a gaseous medium wiggler and method to use this laser. 5,020,061, Cl. 372-2.000.
- Ettenberg, Michael: *See—*
  - Carlson, Nils W.; Evans, Gary A.; Hammer, Jacob M.; and Ettenberg, Michael, 5,019,787, Cl. 330-4.300.
- Etudes Et Constructions Mecaniques: *See—*
  - Pelissier, Laurent, 5,018,551, Cl. 137-571.000.
- Euroceltique, S.A.: *See—*
  - Shoupe, T. Scott; Baker, David C.; Coutts, Stephen M.; and Hand, Elli S., 5,019,573, Cl. 514-232.800.
- Evangelista, Michael L.; and Lia, Raymond A., to Welch Allyn, Inc. Folded bladder for fluid dynamic muscle. 5,018,436, Cl. 92-92.000.
- Evans, Gary A.: *See—*
  - Carlson, Nils W.; Evans, Gary A.; Hammer, Jacob M.; and Ettenberg, Michael, 5,019,787, Cl. 330-4.300.
- Evans, Philip H.: *See—*
  - Barlow, John; Evans, Philip H.; Frank, Nicholas H.; and Wilson, Hamish D., 5,019,178, Cl. 148-3.000.
- Evans, Samuel; Chasan, David; and Seltzer, Raymond, to Ciba-Geigy Corporation. Thioalkanoic acid substituted N,N-dialkylhydroxylamines and stabilized lubricant compositions. 5,019,285, Cl. 252-47.500.
- Evans, Steven: *See—*
  - DeBoer, Charles D.; and Evans, Steven, 5,019,480, Cl. 430-200.000.
- Evertson, Sarah K., to Equine Innovations, Inc. Molded saddle pad with encapsulated layers. 5,018,341, Cl. 54-66.000.
- Exxon Chemical Patents, Inc.: *See—*
  - Shaw, Gerald; and Ladwig, Paul K., 5,019,286, Cl. 252-48.200.
- Exxon Research and Engineering Company: *See—*
  - Beltzer, Morton; Habeeb, Jacob J.; Francis, James N.; and Colle, Karla S., 5,019,283, Cl. 252-33.600.
  - Davis, Stephen M.; and Varnado, W. Scott, 5,019,543, Cl. 502-64.000.
  - Sartori, Guido; Ho, W. S. Winston; Savage, David W.; Noone, Robert E.; and Mastondrea, Robert P., 5,019,666, Cl. 585-819.000.
- F. L. Saino Manufacturing Co.: *See—*
  - Longoria, Ritchie L., 5,018,304, Cl. 49-340.000.
- F. L. Smithe Machine Company, Inc.: *See—*
  - Helm, Herbert W.; Anderson, John R.; and Lambert, Michael P., 5,019,030, Cl. 493-342.000.
- Fabriques de Tabac Reunies, S.A.: *See—*
  - Da Silva, Domingos; and Guinnard, Roland, 5,018,535, Cl. 131-60.000.
- Faccioli, Giovanni: *See—*
  - De Bastiani, Giovanni; Faccioli, Giovanni; Aldegheri, Roberto; and Brivio, Lodovico R., 5,019,077, Cl. 606-54.000.
- Fahmuller, Maximilian, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Winding device to wind up yarn in spinning or winding machines. 5,018,677, Cl. 242-18.0DD.
- Fairley, Christopher R.; and Patterson, Steven R., to United States of America, Energy. Phase measurement system using a dithered clock. 5,019,786, Cl. 328-133.000.
- Fanning, Alan W.; and Ramsour, Nicholas L., to General Electric Company. Fuel assembly transfer basket for pool type nuclear reactor vessels. 5,019,327, Cl. 376-268.000.
- Fanuc Ltd.: *See—*
  - Ito, Masaya, 5,019,684, Cl. 219-69.120.
  - Saito, Yoshiyuki; and Sato, Junichi, 5,019,995, Cl. 364-483.000.
- Farassat, Farhad, to Dynapert Inc. Bonding wedge. 5,018,658, Cl. 228-4.500.
- Farias, Otello; Gandini, Alberto; Monga, Raffaella; Roggero, Arnaldo; Sisto, Raffaello; and Valentini, Claudio, to Eniricerche S.p.A. Alkylene oxide modified poly(2,6-dimethyl-p-oxyphenylene). 5,019,631, Cl. 525-396.000.
- Farng, Liehpao O.; Doner, John P.; and Horodysky, Andrew G., to Mobil Oil Corporation. Organic ester, amide or amine salts of phosphorodithioate substitute carboxylic anhydrides as multifunctional additives. 5,019,282, Cl. 252-32.70E.
- Farng, Lienpao; and Horodysky, Andrew G., to Mobil Oil Corporation. Multifunctional lubricant additives and compositions thereof. 5,019,284, Cl. 252-46.700.
- Farnsworth, Dennis G., to Newington Corp. Wrench. 5,018,410, Cl. 81-13.000.
- Farr, Andrew F., to Interventional Technologies Inc. Ovoid atherectomy cutter. 5,019,088, Cl. 606-159.000.
- Farr, Andrew F., to Interventional Technologies Inc. Atherectomy advancing probe and method of use. 5,019,089, Cl. 606-172.000.
- Farrah, William J.; and Pease, Jay W. Overspray removal systems for coating booths or the like. 5,019,138, Cl. 55-89.000.
- Farrar, Edward L.: *See—*
  - Clarke-Pounder, Ian J. H.; and Farrar, Edward L., 5,019,123, Cl. 144-208.00B.
- Farrell, James F.: *See—*
  - Prince, John C.; and Farrell, James F., 5,019,808, Cl. 340-765.000.
- Fassbender, Charles J.; Tustaniwskyj, Jerry I.; and Vora, Harshadrai, to Unisys Corporation. High density chip stack having a zigzag-shaped face which accommodates connections between chips. 5,019,943, Cl. 361-396.000.
- Fast, Jacob. Label holder for parts bin. 5,018,287, Cl. 40-312.000.
- Faulks, James N. G., to BP Chemicals Limited. Composition for removing asbestos. 5,019,291, Cl. 252-174.220.
- FDX Patents Holding Company, N.V.: *See—*
  - Bussard, Robert W., 5,019,321, Cl. 376-133.000.
- Fearnside, William T.; and Orlicki, David M., to Eastman Kodak Company. Apparatus for selectively inverting a magnetic bias field using a rod-shaped permanent magnet surrounded with an electrically conductive damping means. 5,020,042, Cl. 369-13.000.
- Federal-Mogul Corporation: *See—*
  - Pratt, George C.; and Montpetit, Michael D., 5,019,308, Cl. 264-87.000.
- Feenstra, Mark J.: *See—*
  - Assink, Kenneth; Feenstra, Mark J.; and Boyer, Gerald L., Jr., 5,018,957, Cl. 425-112.000.
- Fehsenfeld, Joseph; and Vujasin, Boro, to Midwest Printed Circuits Services, Inc. Method for recovery of heavy metals from highly concentrated wastewater solutions. 5,019,273, Cl. 210-719.000.
- Feilen, Michael A. Lawn mower blade replacement cutting edge apparatus. 5,018,347, Cl. 56-295.000.
- Feistenauer, Harald: *See—*
  - Sawatzki, Harry L.; and Feistenauer, Harald, 5,018,399, Cl. 74-110.000.
- Felder, Thomas C., to DX Imaging. Vinyltoluene and styrene copolymers as resins for liquid electrostatic toners. 5,019,477, Cl. 430-115.000.
- Feldman, Martin. Roller-type paint applicator. 5,018,236, Cl. 15-230.110.
- Feldman, Nancy A.: *See—*
  - Muccitelli, John A.; and Feldman, Nancy A., 5,019,342, Cl. 422-16.000.
- Feldman, Paul L.; James, Michael K.; Brackeen, Marcus F.; Johnson, Michael R.; and Leighton, Harry J., to Glaxo Inc. N-phenyl-N-(4-piperidinyl)amides useful as analgesics. 5,019,583, Cl. 514-327.000.
- Fellner, Ronald W., to Deere & Company. Loader bucket tooth. 5,018,283, Cl. 37-141.00T.
- Fenzlein, Paul-Gerhard: *See—*
  - Pfab, Werner; Bergmann, Michael; Fenzlein, Paul-Gerhard; and Anderer, Wolfgang, 5,018,527, Cl. 128-635.000.
- Ferag AG: *See—*
  - Meier, Jacques; and Honegger, Werner, 5,019,716, Cl. 270-55.000
- Ferco Internatioinal Usine De Ferrures De Batiment: *See—*
  - Kautt, Jean-Jacques, 5,018,264, Cl. 29-564.800.
- Ferco International: *See—*
  - Prevot, M. Gerard, 5,018,306, Cl. 49-425.000.
- Fergni, Bruno; Venturi, Giancarlo; and Bedogni, Carlo, to Italpres S.n.c. di Frengni Bruno & C. Appparatus for preventing and healing bedsores in long-term inpatients. 5,018,225, Cl. 5-61.000.
- Ferguson, Clare H. R.; Macadam, Anne M.; Ince, Jane E.; and Knowles, Christopher J., to GEnzyme (U.K.) Ltd. Enzymes having alpha-glycerol-3-phosphate oxidase activity, production and use thereof. 5,019,505, Cl. 435-148.000.
- Ferrari, Lorenzo: *See—*
  - Johnson, Eric A.; Dell'Acqua, Ernani; and Ferrari, Lorenzo, 5,019,411, Cl. 426-52.000.
- Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., to Space Industries Partnership. L. P. Ring latched coupler. 5,018,901, Cl. 403-349.000.
- Ferreiro, Luis M., deceased: *See—*
  - Chou, Ned J.; Goldblatt, Ronald D.; Heidenreich, John E., III; Molis, Steven E.; and Ferreiro, Luis M., deceased, 5,019,210, Cl. 156-643.000.
- Ferrell, Thomas L.; Warmack, Robert J.; and Reddick, Robin C. Photon scanning tunneling microscopy. 5,018,865, Cl. 356-376.000.
- Ferrofluidics Corporation: *See—*
  - Raj, Kuldip; Moskowitz, Ronald; Moses, Joseph; Bonvouloir, James; and Bloom, Frank, 5,018,751, Cl. 277-80.000.
- Fiegel, Gunnar; and Schreiter, Stefan, to Webasto AG Fahrzeugtechnik. Wind deflector for motor vehicle roofs with a slidable cover. 5,018,782, Cl. 296-217.000.
- Fierus, Gerd: *See—*
  - Fierus, Udo; and Fierus, Gerd, 5,018,310, Cl. 51-80.0BS.
- Fierus, Udo; and Fierus, Gerd. Knife sharpener. 5,018,310, Cl. 51-80.0BS.
- Fikentscher, Rolf: *See—*
  - Baur, Richard; Richter, Felix; Birnbach, Stefan; Fikentscher, Rolf; Oftring, Alfred; and Winkler, Ekhard, 5,019,296, Cl. 252-546.000.
- Filmer, Donald D., to Norsat International Inc. Apparatus for adapting computer for satellite communications. 5,019,910, Cl. 358-188.000.
- Finberg, Robert W.: *See—*
  - Kasper, Dennis L.; Zaleznik, Dori F.; and Finberg, Robert W., 5,019,513, Cl. 435-240.260.

VOL
1126
ISS
4
MY
28
1991
UMI

- Finisar Corporation: *See—*
  - Levinson, Frank H., 5,019,769, Cl. 372-31.000.
- Fink, Reinhold: *See—*
  - Wolf, Gunter; and Fink, Reinhold, 5,018,492, Cl. 123-198.00E.
- Finke, Donald R., to Lubricating Specialties Company. Cotton picker spindle lubrication apparatus, method and lubrication cartridge therefore. 5,018,343, Cl. 56-12.100.
- Finkenauer, Robert: *See—*
  - Krueckel, Peter; Moeck, Gerhard; and Finkenauer, Robert, 5,018,892, Cl. 401-68.000.
- Firequip Helmets, Inc.: *See—*
  - Lane, Abbott A.; and Hetzel, John M., Jr., 5,018,220, Cl. 2-5.000.
- First Brands Corporation: *See—*
  - Mohr, Paul H.; and Pepe, Enrico J., 5,019,340, Cl. 422-7.000.
- Firth, Derek A.: *See—*
  - Chiu, Martin T.; and Firth, Derek A., 5,018,300, Cl. 47-67.000.
- Fischer, Georg: *See—*
  - Bohm, Jurgen; and Fischer, Georg, 5,019,127, Cl. 222-1.000.
- Fischer, Horst: *See—*
  - Maier, Ulrich; and Fischer, Horst, 5,018,378, Cl. 72-283.000.
- Fischer, Michael C.; and Strasser, William E., to Hewlett-Packard Company. Amplifier with wide dynamic range. 5,019,788, Cl. 330-9.000.
- Fischer & Porter Company: *See—*
  - Ifill, Lee; Walker, Robert; Wolfe, Steven; and Schena, Fiore, 5,019,256, Cl. 210-232.000.
- Fish, Hugh R. A., to Microfloor Systems Limited. Access floor construction. 5,019,672, Cl. 174-48.000.
- Fish, Robert D. Auxiliary oil pumping and draining system. 5,018,491, Cl. 123-196.00S.
- Fisher, Michael H.; and Wyvratt, Matthew J., Jr., to Merck & Co., Inc. $\beta$-adrenergic agonists. 5,019,578, Cl. 514-275.000.
- Fitzgerald, Gerald F.: *See—*
  - Daly, Charles; Fitzgerald, Gerald F.; Coffey, Aidan; Costello, Veronica A.; Murphy, Maeve C.; and Baumgartner, Andreas, 5,019,506, Cl. 435-172.300.
- Fitzsimmons, Murray R.: *See—*
  - Clausen, Knud, 5,018,323, Cl. 52-36.000.
- Flaig, Heinz: *See—*
  - Bernd, Alfred; England, Willi; Flaig, Heinz; Hesse, Wilhelm; Staggl, Roland; and Zacharias, Karl, 5,019,734, Cl. 310-77.000.
- Flash-Alert Inc.: *See—*
  - Curl, Ricky L.; and Roberts, Lowell E., 5,019,805, Cl. 340-628.000.
- Flaum, Charles, to Schlumberger Technology Corporation. Method for eliminating the effect of rugosity from compensated formation logs by geometrical response matching. 5,019,708, Cl. 250-264.000.
- Fleming, Matthew S.: *See—*
  - Rosen, Richard D.; McCown, Robert B.; and Fleming, Matthew S., 5,020,105, Cl. 380-23.000.
- Flexiclave, Inc.: *See—*
  - Kutner, Barry S.; and Latowicki, Daniel A., 5,019,344, Cl. 422-21.000.
  - Kutner, Barry S.; and Latowicki, Daniel A., 5,019,359, Cl. 422-294.000.
- Flexwatt Corporation: *See—*
  - Marstiller, John A.; Bodensiek, Paul H.; and Grise, Frederick G. J., 5,019,797, Cl. 338-333.000.
- Flock, Steven J.: *See—*
  - Zylstra, Henry J.; and Flock, Steven J., 5,019,936, Cl. 361-93.000.
- Flood, Lawrence A., to Clairol Incorporated. Substituted N-aryl pyrroles in oxidative hair dye compositions. 5,019,130, Cl. 8-423.000.
- Flory, Donald M.: *See—*
  - Parker, Donald L.; and Flory, Donald M., 5,018,798, Cl. 303-117.000.
- Flory, Isaac L., IV; and Nuckolls, Joe A., to Hubbell Incorporated. End-of-life lamp starter disabling circuit. 5,019,751, Cl. 315-290.000
- Floyd, John B.: *See—*
  - Peek, Thomas W.; and Floyd, John B., 5,018,299, Cl. 43-107.000.
- Flugger, Frederick F. Tray. 5,019,124, Cl. 206-45.000.
- Flynn, Edward J.: *See—*
  - Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
- Focke & Co.: *See—*
  - Focke, Heinz; and Liedtke, Kurt, 5,018,625, Cl. 206-621.000.
- Focke, Heinz; and Liedtke, Kurt, to Focke & Co. Foil pack for paper tissues. 5,018,625, Cl. 206-621.000.
- Fogg, Peter M.: *See—*
  - Osterhout, Ralph F.; and Fogg, Peter M., 5,019,951, Cl. 362-191.000.
- Fognini, Bruno; and Heinz, Helmut, to Siemens-Albis Aktiengesellschaft. Frequency synthesizing device. 5,019,785, Cl. 328-14.000.
- Folkman, Judah; Langer, Robert S., Jr.; and Hsieh, Dean S. T., to Children's Medical Center Corporation, The. Magnetically modulated polymeric drug release system. 5,019,372, Cl. 424-9.000.
- Folkman, Moses J.; and Weisz, Paul B., to University of Pennsylvania/-Childrens Hospital Corporation, The Trustees of the. Growth inhibiting agent and the use thereof. 5,019,562, Cl. 514-58.000
- Forbes, Patricia: *See—*
  - Covey, Rupert A.; Forbes, Patricia; Bell, Allyn R.; and Blem, Allen R., 5,019,152, Cl. 71-92.000.
- Forbess, Russell G.: *See—*
  - McIntyre, Glover C.; Lacombe, Robert J.; and Forbess, Russell G., 5,018,458, Cl. 110-346.000.
- Forch, Hans, to Carl Freudenberg, Firma. Slide ring seal. 5,018,749, Cl. 277-27.000.
- Ford, Guy J.: *See—*
  - Larson, Richard C.; Spencer, Keith R.; Alercia, Don P.; Kwech, Horst; Litka, Thomas J.; and Ford, Guy J., 5,019,325, Cl. 376-260.000.
- Ford New Holland, Inc.: *See—*
  - McClure, John R.; Weaver, Marvin G., Jr.; and Strosser, Richard P., 5,018,342, Cl. 56-10.500.
  - Steinkamp, John O.; and Morrison, William S., 5,018,934, Cl. 414-695.500.
- Forester, David R., to Betz Laboratories, Inc. Method of passivating alkali metals on fluid catalytic cracking catalysts using aluminum containing compounds. 5,019,241, Cl. 208-120.000.
- Forrester, William D.: *See—*
  - Jacobs, H. Montgomery; and Forrester, William D., 5,018,918, Cl. 410-145.000.
- Forschungszentrum Juelich GmbH: *See—*
  - Soeder, Carl-Johannes; Zanders, Erich; Raphael, Thomas; Keusen, Heiner; and Groeneweg, Joost, 5,019,266, Cl. 210-605.000.
- Fortier, Luc Y.; and Piette, Andre G., to Groupe Laperrier & Verreault, Inc. Headbox with conduits having multiply connected domains. 5,019,215, Cl. 162-343.000.
- Forzano, Richard, to RJF Industries, Inc. Wall repair method and device. 5,018,331, Cl. 52-514.000.
- Fossi, Paolo: *See—*
  - Le Quesne, Yves; and Fossi, Paolo, 5,019,363, Cl. 423-87.000.
- Fossum, Trvggvue: *See—*
  - Webb, David A., Jr.; Hetherington, Ricky C.; Salett, Ronald M.; Fossum, Trvggvue; and Manley, Dwight P., 5,019,965, Cl. 364-200.000.
- Foster, Charles D. Method and apparatus for periodic chemical cleanings of turbines. 5,018,355, Cl. 60-646.000.
- Foster, Joseph; and Rashid, Abdul, to Sundstrand Corporation. Frequency insensitive digital phase angle measuring circuit. 5,019,718, Cl. 307-84.000.
- Foster, Norman E.: *See—*
  - Towfighi, Javad; Roberts, Allan F.; Foster, Norman E.; and Abt, Arthur B., 5,019,031, Cl. 600-21.000.
- Foster, Ronald. Dinghy towing mechanism and method. 5,018,473, Cl. 114-249.000.
- Fourneaux, Roger, to S. A. Saurer Diederichs (Societe Anonyme). Weft-switching system with telescoping nozzles. 5,018,557, Cl. 139-450.000.
- Fox, Charles L., Jr.; Modak, Shanta M.; and Sampath, Lester A., to Columbia University in the City of New York, Trustees of. Infection-resistant compositions, medical devices and surfaces and methods for preparing and using same. 5,019,096, Cl. 623-1.000.
- Fraden, Jacob. Apparatus and method for detecting movement of an object. 5,019,804, Cl. 340-562.000.
- France, Thomas J.: *See—*
  - Bielecki, John R.; and France, Thomas J., 5,018,944, Cl. 416-146.00R.
- Francis, James N.: *See—*
  - Beltzer, Morton; Habeeb, Jacob J.; Francis, James N.; and Colle, Karla S., 5,019,283, Cl. 252-33.600.
- Frank, Nicholas H.: *See—*
  - Barlow, John; Evans, Philip H.; Frank, Nicholas H.; and Wilson, Hamish D., 5,019,178, Cl. 148-3.000.
- Frank, Randall K.; and DuBois, Jerry M., to Motorola, Inc. Single package, multiple, electrically isolated power semiconductor devices. 5,019,893, Cl. 357-81.000.
- Frankiewicz, Walter E.: *See—*
  - Chambers, John D.; Estep, Duncan E.; Frankiewicz, Walter E.; Friend, Ronald W.; and Lawson, James M., 5,020,008, Cl. 364-561.000.
- Franklin, Richard D.; Auld, Gregg D.; and Murray, David E., to Westinghouse Electric Corp. System and method for vertically flushing a steam generator during a shock wave cleaning operation. 5,019,329, Cl. 376-316.000.
- Franks, George J., Jr. Telephone interface mounting clamp. 5,018,984, Cl. 439-92.000.
- Frantz, Joseph C.: *See—*
  - Brown, Albert L.; Frantz, Joseph C.; and Peetz, Richard H., 5,019,388, Cl. 424-92.000.
- Franz, Lennart: *See—*
  - Politi, Jean-Marie; and Franz, Lennart, 5,018,552, Cl. 137-614.110.
- Franzen, Hans U.: *See—*
  - Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.
- Fraser, Richard J.; and Launie, Kenneth J., to Polaroid Corporation. Extendable shade in instant camera for protecting film unit from ambient light. 5,019,842, Cl. 354-86.000.
- Frederick, Norma: *See—*
  - Briant, Paul; and Frederick, Norma, 5,019,237, Cl. 204-302.000.
- Freeland, Mary E.; and Blaney, Ted L., to Proctor & Gamble Company, The. Absorbent article having a waistpanel. 5,019,066, Cl. 604-385.200.
- Freermann, Johannes, to Carl Schmale GmbH & Co. KG. Method of and apparatus for cutting pieces from an elongated textile web. 5,018,416, Cl. 83-14.000.
- Freismuth, John S.; and Knowles, Robert G., to Litton Systems, Inc. Environmentally sealed multichannel fiber optic connector. 5,018,822, Cl. 350-96.200.
- Freitag, Wolfgang. Electrical connector. 5,018,986, Cl. 439-421.000.

- French, Paul J. A.: *See—*
  - Carnahan, David W.; French, Paul J. A.; Maury, Richard K.; Akins, Gary L.; and Oaten, Philip J., 5,018,974, Cl. 434-98.000.
- Frerichs, Udo; Kuhlmann, Eckhard; Kohler, Heinrich; and Metge, Axel, to Continental Aktiengesellschaft. Filler ring for a vehicle wheel and tire assembly. 5,018,565, Cl. 152-379.300.
- Frey, Otto; and Koch, Rudolf, to Sulzer Brothers Limited. Rasp-like reaming instrument. 5,019,082, Cl. 606-85.000.
- Frick, Michael J., to Siemens Automotive L.P. I.C. engine airflow meter having speed-based automatic gain control. 5,018,385, Cl. 73-118.200.
- Friedrich, Hannelore: *See—*
  - Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
- Friedrich, Hans-Joachim, to J. F. Adolff AG. Method for manufacturing a web of plastic turf for sports grounds. 5,019,194, Cl. 156-61.000.
- Friend, Ronald W.: *See—*
  - Chambers, John D.; Estep, Duncan E., Frankiewicz, Walter E.; Friend, Ronald W.; and Lawson, James M., 5,020,008, Cl. 364-561.000.
- Frigg, Robert: *See—*
  - Perren, Stephen M.; Frigg, Robert; Gisin, Paul; and Mathys, Robert, Jr., 5,019,078, Cl. 606-61.000.
- Frisco, Jeffrey A.: *See—*
  - Heckman, Douglas E.; Larson, Dawn A.; Frisco, Jeffrey A.; and Haskins, David A., 5,019,829, Cl. 343-700.0MS.
- Fritz Studer AG: *See—*
  - Wyss, Peter, 5,018,309, Cl. 51-72.00R.
- Fritzer, Robby D. Camera construction and method of using same. 5,019,844, Cl. 354-120.000.
- Frost, Blair A. Angle setting device. 5,018,277, Cl. 33-538.000.
- Fry, Francis J.; and Griffith, Steven L. System and method using chemicals and ultrasound or ultrasound alone to replace more conventional surgery. 5,018,508, Cl. 128-24.0AA.
- Fuji Electric Co., Ltd.: *See—*
  - Sato, Noritada; Suzuki, Toshikazu; and Ishiwata, Osamu, 5,019,886, Cl. 357-29.000.
- Fuji Jukogyo Kabushiki Kaisha: *See—*
  - Kashima, Takamitau; and Monden, Hitoshi, 5,018,483, Cl. 123-1.00A.
  - Kodama, Yukio, 5,018,596, Cl. 180-233.000.
  - Naitoh, Takao, 5,018,484, Cl. 123-41.120.
  - Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,019,981, Cl. 364-424.050.
  - Takahashi, Akira; and Soejima, Yuji, 5,018,594, Cl. 180-140.000.
- Fuji Kagakushi, Kogyo Co., Ltd.: *See—*
  - Omura, Motoko, 5,018,419, Cl. 83-451.000.
- Fuji Photo Film Co., Ltd.: *See—*
  - Hiratsuka, Nobuo; and Kondo, Asaji, 5,019,347, Cl. 422-56.000.
  - Ishikawa, Takatoshi; Saito, Shigemi; Yoshida, Kazuaki; and Fujita, Yoshihiro, 5,019,850, Cl. 354-322.000.
  - Kobayashi, Hidetoshi; and Takahashi, Osamu, 5,019,490, Cl. 430-503.000.
  - Makino, Naonori; Ohno, Shigeru; Hoshi, Satoshi; and Kitatani, Katsuji, 5,019,474, Cl. 430-76.000.
  - Mukai, Hachiro, 5,019,975, Cl. 364-413.130.
  - Nagashima, Yasuo; Soeda, Haruo; Sato, Masamichi; and Kubo, Takashi, 5,018,257, Cl. 29-90.010.
  - Saiga, Yoshiharu; Yoshimura, Makoto; and Hara, Susumu, 5,018,679, Cl. 242-67.10R.
  - Sawachi, Youichi, 5,019,909, Cl. 358-164.000.
  - Suzuki, Kenji, 5,019,858, Cl. 355-35.000.
  - Takeuchi, Kazuhiko, 5,019,491, Cl. 430-523.000.
  - Toya, Ichizo; and Nemori, Ryoichi, 5,019,494, Cl. 430-600.000.
- Fuji Photo Film Co., Ltd: *See—*
  - Shimazaki, Osamu, 5,019,896, Cl. 358-75.000.
- Fujii, Katuyasu, to Fujitsu Limited. Image overlay printing controlling method and apparatus for printer. 5,020,005, Cl. 364-519.000.
- Fujii, Syuso: *See—*
  - Kimura, Tohru; Fujii, Syuso; and Ohsawa, Takashi, 5,019,729, Cl. 307-475.000.
- Fujii, Tetsuo: *See—*
  - Yamane, Hiroyuki; Higuchi, Yasushi; and Fujii, Tetsuo, 5,019,526, Cl. 437-37.000.
- Fujimoto, Masahisa: *See—*
  - Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, 5,019,949, Cl. 361-525.000.
- Fujimura, Yasuo: *See—*
  - Miura, Yutaka; Yoshida, Mitsutaka; Fujimura, Yasuo; Takaku, Sakae; and Noda, Yukifumi, 5,019,574, Cl. 514-235.200.
- Fujioka, Arisa; and Konda, Takashi, to Kabushiki Kaisha Toshiba. Object discriminating apparatus and method therefor. 5,020,114, Cl. 382-44.000.
- Fujioka, Shuzo: *See—*
  - Yamaguchi, Atsuo; Takahira, Kenichi; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,019,970, Cl. 364-200.000.
- Fujisawa Pharmaceutical Company, Ltd.: *See—*
  - Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, 5,019,500, Cl. 435-69.100.
- Fujishiro, Takeshi: *See—*
  - Yasuno, Yoshiki; Ishikawa, Yasuki; Higashimata, Akira; and Fujishiro, Takeshi, 5,019,985, Cl. 364-426.020.
- Fujita, Kazuo. Electrically-operated folding stage system. 5,018,322, Cl. 52-7.000.
- Fujita, Yoshihiro: *See—*
  - Ishikawa, Takatoshi; Saito, Shigemi; Yoshida, Kazuaki; and Fujita, Yoshihiro, 5,019,850, Cl. 354-322.000.
- Fujita, Yutaka, to Tokyo Electric Co., Ltd. Vector font processing in a printing device. 5,018,883, Cl. 400-121.000.
- Fujito, Shogo, to Sony Corporation. Apparatus for printing or clearing a displayed stored video signal. 5,019,915, Cl. 358-335.000.
- Fujitsu Limited: *See—*
  - Fujii, Katuyasu, 5,020,005, Cl. 364-519.000.
  - Inoue, Toshikazu; and Eshita, Takashi, 5,019,874, Cl. 357-16.000.
  - Ishikawa, Minoru; and Nakata, Nobuki, 5,020,053, Cl. 370-84.000.
  - Kobayashi, Osamu, 5,019,731, Cl. 307-571.000.
  - Nakamura, Yuko; and Takechi, Satoshi, 5,019,485, Cl. 430-296.000.
  - Ohdaira, Akio; Abe, Shunji; Wakatsuki, Noboru; and Tanaka, Akira, 5,018,828, Cl. 350-96.340.
  - Ohwe, Takeshi; Yoneoka, Seiji; and Takahashi, Minoru, 5,019,931, Cl. 360-104.000.
  - Takasaki, Kanetake, 5,019,529, Cl. 437-132.000.
  - Taniguchi, Atsuki; Yamashita, Haruo; Ishihara, Tomohiro; and Wakisaka, Takaaki, 5,020,057, Cl. 370-102.000.
- Fujiwara, Yasuo, to Kimoto & Co., Ltd. Thin primary cell. 5,019,467, Cl. 429-127.000.
- Fukada, Shinichi: *See—*
  - Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi; Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, 5,019,891, Cl. 357-70.000.
- Fukino, Kunihiro: *See—*
  - Inadome, Kiyotaka; Imanari, Hitoshi; Fukino, Kunihiro; and Takayama, Toru, 5,018,843, Cl. 350-429.000.
- Fukuda, Hiroyuki: *See—*
  - Suzuki, Akira; Hibino, Hiroki; Fukuda, Hiroyuki; Takahashi, Yutaka; and Ishikawa, Akibumi, 5,018,509, Cl. 128-6.000.
- Fukuda, Masatami: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Fukuda Metal Foil and Powder Co., Ltd.: *See—*
  - Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 5,019,338, Cl. 420-586.100.
- Fukuda, Yoshimasa, to Texas Instruments Incorporated. Optical switching device. 5,018,812, Cl. 350-96.140.
- Fukui, Hiroshi: *See—*
  - Hirano, Hirofumi; Omo, Shinichi; and Fukui, Hiroshi, 5,018,884, Cl. 400-126.000.
- Fukui, Masashi; and Shinoda, Tomoyuki, to Mitsuba Electric Manufacturing Co., Ltd. Brush holder device for electric motor. 5,019,741, Cl. 310-239.000.
- Fukui, Teruo: *See—*
  - Suzuki, Masayuki; Matsumoto, Zenji; and Fukui, Teruo, 5,019,162, Cl. 75-744.000.
- Fukumoto, Hiroshi: *See—*
  - Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.
- Fukutani, Iwao: *See—*
  - Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, 5,018,990, Cl. 439-620.000.
- Fukuura, Yukio: *See—*
  - Nakamura, Makoto; Honda, Toshio; Chikaraishi, Toshio; and Fukuura, Yukio, 5,019,319, Cl. 273-218.000.
- Fuller Company: *See—*
  - Paul, Kermit D., 5,018,869, Cl. 366-101.000.
- Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, to SCI Systems, Inc. Printing apparatus and method. 5,019,841, Cl. 346-153.100.
- Fulton, Dwayne: *See—*
  - Osment, David L.; and Fulton, Dwayne, 5,019,431, Cl. 428-15.000.
- Funabashi, Tsuneo; Sakoshita, Kaoru; and Yonezawa, Hiroshi, to Hitachi, Ltd. Direct memory access controller for a multi-microcomputer system. 5,019,962, Cl. 364-200.000.
- Funakoshi, Hiromasa: *See—*
  - Kawara, Toshiyuki; Tsutsui, Hiroshi; Funakoshi, Hiromasa; and Yoshizumi, Yoshiyuki, 5,020,085, Cl. 378-99.000.
- Furcht, Leo T.; and McCarthy, James B., to University of Minnesota, Regents of the. Polypeptides with fibronectin activity. 5,019,646, Cl. 530-326.000.
- Furin, Olivia P.: *See—*
  - Clearman, Jack F.; Casey, William J.; Furin, Olivia P.; and Stewart, Grant M., 5,019,122, Cl. 131-194.000.
- Furr, Bobby N.: *See—*
  - Engel-Badar, Monika; and Furr, Bobby N., 5,019,640, Cl. 528-272.000.
- Furse, Marty L.: *See—*
  - McEwen, James A.; Godolphin, William J.; Bohl, Rainer M.; Dance, Mark N.; Furse, Marty L.; and Osborne, John C., 5,019,243, Cl. 210-94.000.
- Furtek, Frederick C., to Concurrent Logic, Inc.; and Apple Computer, Inc. Programmable logic cell and array. 5,019,736, Cl. 307-465.000.
- Furukawa, Nobuhiro: *See—*
  - Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, 5,019,949, Cl. 361-525.000.

VOL 1126
ISS 4
MY 28
1991
UMI

- Furukawa, Yoshimi, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling rear wheels of a four-wheel steering motor vehicles. 5,019,982, Cl. 364-424.050.
- Furumura, Takaichi: *See—*
  - Tanaka, Shigeyasu; and Furumura, Takaichi, 5,020,097, Cl 379-102.000.
- Furusawa, Kotaro: *See—*
  - Iga, Kenichi; Ibaraki, Akira; Kawashima, Kenji; Furusawa, Kotaro; and Ishikawa, Toru, 5,020,066, Cl. 372-45.000.
- Furuta, Shigeru: *See—*
  - Yamaguchi, Atsuo; Takahira, Kenichi; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,019,970, Cl. 364-200.000.
- Fushiya, Fusao; and Yamaguchi, Shinobu, to Makita Electric Works, Ltd Sander. 5,018,314, Cl. 51-170.0MT.
- Fussell, John P.: *See—*
  - Kasparian, Kaspar; Ide, John D.; Brown, Thomas A.; Rogers, Aaron S.; Fussell, John P.; and Hsu, Ming C., 5,020,135, Cl. 455-76.000.
- G. D. Searle & Co.: *See—*
  - Khanna, Ish K.; Nosal, Roger; and Weier, Richard M., 5,019,581, Cl. 514-303.000.
  - Mueller, Richard A.; Partis, Richard A.; and Deason, James R., 5,019,597, Cl. 514-618.000.
- G.D. Societa per Azioni: *See—*
  - Gamberini, Antonio; and Ghini, Marco, 5,018,539, Cl. 131-280.000.
- G.I R.: *See—*
  - Weynant nee Girones, Renee P., 5,018,874, Cl. 374-205.000.
- Gabric, John A.: *See—*
  - Dreibelbis, Jeffrey H.; Gabric, John A.; and Hedberg, Erik L., 5,019,772, Cl. 324-158.00R.
- Gage, Douglas M., to Deere & Company. Automatic pressure relief system for a hydraulic motor. 5,018,935, Cl. 414-729.000.
- Gagnon, Jean H.: *See—*
  - Lee, Leonard G.; McLean, Francis A.; and Gagnon, Jean H., 5,018,315, Cl. 51-213.000.
- Galani, Zvi: *See—*
  - DiBiase, Robert; Galani, Zvi; and Waterman, Raymond C., Jr., 5,019,792, Cl. 333-17.100.
- Galbo, James P.: *See—*
  - Ravichandran, Ramanathan; and Galbo, James P., 5,019,613, Cl 524-100.000.
- Galiana Sabater, Amando: *See—*
  - Segui Pastor, Vicente M.; Galiana Sabater, Amando; and Segui Pastor, Enrique, 5,019,043, Cl. 604-110.000.
- Gallert, Gustav. System for measuring the oil level of an oil pan of the crankcase of an internal combustion engine. 5,019,800, Cl. 340-450.300.
- Gallia, James D.: *See—*
  - Scott, David B.; Bosshart, Patrick W.; and Gallia, James D., 5,019,888, Cl. 357-41.000.
- Gamberini, Antonio; and Ghini, Marco, to G.D. Societa per Azioni Cigarette ejection device. 5,018,539, Cl. 131-280.000.
- Gaming and Technology, Inc.: *See—*
  - Wilcox, Joseph; and Wilms, Alfred H., 5,019,973, Cl. 364-412.000
- Gandini, Alberto: *See—*
  - Farias, Otello; Gandini, Alberto; Monga, Raffaella; Roggero, Arnaldo; Sisto, Raffaello; and Valentini, Claudio, 5,019,631, Cl. 525-396.000.
- Gandrud, Dale E.; and Nelson, Randall C., to Gandy Company. Brush attachment. 5,018,587, Cl. 172-612.000.
- Gandy Company: *See—*
  - Gandrud, Dale E.; and Nelson, Randall C., 5,018,587, Cl 172-612.000.
- Ganser, Anton, to Otto Wohr GmbH. Lifting device for a platform for storage of motor vehicles. 5,018,925, Cl. 414-240.000.
- Gao, Shiyang: *See—*
  - Pshtissky, Yacov: and Gao, Shiyang, 5,019,905, Cl. 358-146.000.
- Garapon, Jacques: *See—*
  - Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, 5,019,643, Cl. 528-361.000.
- Garay, Oscar M.: *See—*
  - Patsiokas, Stelios J.; Garay, Oscar M.; and Balzano, Quirino, 5,020,136, Cl. 455-89.000.
- Garcia, Silverio M., to Chem-Shield, Inc. Cleaning composition for copper and copper alloys and method of manufacture thereof 5,019,288, Cl. 252-79 200.
- Gardiner, William H., to U.S. Philips Corporation. Telephone line loop current regulator. 5,020,100, Cl. 379-379.000.
- Gardner, Thomas W.; and Hollis, Theodore M., to Pennsylvania Research Corporation. Method for treating retinopathy and other small vessel disorders associated with diabetes. 5,019,591, Cl. 514-461.000.
- Gargallo Jimeno, Jose M.: *See—*
  - Trillo Martinez, Federico; and Gargallo Jimeno, Jose M., 5,018,543, Cl. 132-291.000.
- Garnick, Marc, to Genetics Institute, Inc. Method for lowering cholesterol levels using GM-CSF. 5,019,381, Cl. 424-85.100.
- Garrity, George M.; Lopez, Maria B.; Hensens, Otto D.; Monaghan, Richard L.; and Zink, Deborah L., to Merck & Co., Inc. Antifungal fermentation products and compositions thereof. 5,019,593, Cl. 514-560.000.
- Garwood, Michael; and Ugurbil, Kamil, to University of Minnesota, Regents of the. Time symmetric pulse to uniformly rotate magnetization vectors by an arbitrary angle in the presence of large B1 inhomogeneities and resonance offsets. 5,019,784, Cl. 324-307.000.
- Gas Research Institute: *See—*
  - Hemsath, Klaus H.; Staffin, H. Kenneth; and Owsiany, Michael, 5,018,707, Cl. 266-254.000.
- Gaston-Johansson, Fannie. Apparatus and method for providing a multidimensional indication of pain. 5,018,526, Cl. 128-630.000.
- Gateaud, Andre , to Robot Coupe S.A. Auxiliary working bowl for a food processor. 5,018,675, Cl. 241-282.200.
- Gaudette, Roger R.: *See—*
  - Hwa, Chih M.; Kelly, John A.; Neton, Janet; Scanlon, Patricia M.; and Gaudette, Roger R., 5,019,343, Cl. 422-16.000.
- Gausepohl, Hermann: *See—*
  - Taubitz, Christof; Gausepohl, Hermann; Seiler, Erhard; Boehlke, Klaus; and Heckmann, Walter, 5,019,626, Cl. 525-92.000.
- Gavin, Thomas R.: *See—*
  - Cuddihy, Edward F.; Lawton, Russell A.; and Gavin, Thomas R., 5,019,533, Cl. 437-199.000.
- Gay, Michel, to Rhone-Poulenc Chimie. Alpha-mercaptoester substituted diorganopolysiloxanes. 5,019.294, Cl. 252-400.310.
- Gebr. Happich GmbH: *See—*
  - Cziptschirsch, Kurt; Dabringhaus, Volker; and Wegel, Peter, 5,018,800, Cl. 312-344.100.
- Gebr. Hofmann GmbH & Co. KG Maschinenfabrik: *See—*
  - Monch, Uwe, 5,019,017, Cl. 474-102.000.
- Gebruder Buhler AG: *See—*
  - Gmur, Bruno, 5,018,648, Cl. 222-272.000.
- Geen, Oliver; and Arens, Cornelis G. System and method for shielding the periphery of a framework of a building opening adjacent a building surface. 5,018,325, Cl. 52-211.000.
- Gefter, Malcolm L.; and Guillet, Jean G., to Massachusetts Institute of Technology. Immunonodulating compositions and their use. 5,019,384, Cl. 424-88.000.
- Gelly, Jean-Francois: *See—*
  - Solal, Marc; and Gelly, Jean-Francois, 5,020,034, Cl. 367-138.000.
- Gelman, Gideon, to Product Innovations. Changeable sign display device with improved panel suspension. 5,018,289, Cl. 40-472.000.
- General Atomics: *See—*
  - Chin, Jack; and Liang, Samuel S., 5,019,555, Cl. 505-1.000.
- General Electric Company: *See—*
  - Avakian, Roger W.; Shenian, Popkin; and Bussink, Jan, 5,019,616, Cl. 524-141.000.
  - Beifus, Brian L., 5,019,757, Cl. 318-254 000.
  - Bewlay, Bernard P.; and Day, James, 5,019,330, Cl. 419-39.000.
  - Bobo, Melvin, 5,018,873, Cl. 374-144.000.
  - Chennakeshu, Sandeep, 5,020,056, Cl. 370-95.300.
  - Ciokajlo, John J.; and Hauser, Ambrose A., 5,018,942, Cl. 415-173.200.
  - Clagett, Donald C.; and Shafer, Sheldon J., 5,019,641, Cl. 528-347.000.
  - Corsmeier, Robert J.; and Albrecht, Richard W., Jr., 5,018,943, Cl. 416-144.000.
  - Eichelberger, Charles W.; and Wojnarowski, Robert J., 5,019,946, Cl. 361-414.000.
  - Fanning, Alan W.; and Ramsour, Nicholas L., 5,019,327, Cl. 376-268.000.
  - Haller, Thoedore R., 5,019,997, Cl. 364-488.000.
  - Jackson, Melvin R., 5,019,334, Cl. 420-426.000.
  - Olwert, Ronald J.; Zalar, Frank E.; and Chapman, Walter R., Jr., 5,019,743, Cl. 313-25.000.
  - Smolenski, Joseph L.; Christopher, Gerard W.; Wright, John C.; and Relation, Alfred E., 5,019,952, Cl. 363-16.000.
  - Wojnarowski, Robert J.; and Eichelberger, Charles W., 5,019,535, Cl. 437-209.000.
- General Electric Corporation: *See—*
  - Briggs, Milton; and Teutsch, Erich O., 5,019,433, Cl. 428-35.700.
- General Instrument Corporation: *See—*
  - Martin, Thomas F.; Chenoweth, John S.; and Tinguely, Paul R., 5,020,129, Cl. 455-4.000.
- General Motors Corporation: *See—*
  - Davis, Richard S.; Lee, Jordan R.; and MacFarlane, Glen R., 5,018,486, Cl. 123-52.0MF.
  - Haka, Raymond J., 5,018,434, Cl. 92-29.000
  - Parker, Donald L.; and Flory, Donald M., 5,018,798, Cl. 303-117.000.
  - Pugh, Cecil C., 5.018,353, Cl. 60-562.000.
- Genetics Institute, Inc.: *See—*
  - Garnick, Marc, 5,019,381, Cl. 424-85.100.
  - Rozzell, J. David, 5,019,509, Cl. 435-232.000.
- Gentech International Limited: *See—*
  - Templeton, Robert D. K.; and Arnott, William W., 5,019,678, Cl. 200-81.90M.
- GEnzyme (U.K.) Ltd.: *See—*
  - Ferguson, Clare H. R.; Macadam, Anne M.; Ince, Jane E.; and Knowles, Christopher J., 5,019,505, Cl. 435-148.000.
- George Enterprises, Inc.: *See—*
  - Reitz, George J., 5,018,912, Cl. 408-115.00R
- Geo. J. Cox Ltd.: *See—*
  - Waterfield, Adam P. M.; Waterfield, Norman R.; Chapman, David A.; Andrews, Thomas K.; and Humphrey, Brian, 5,018,233, Cl. 12-133.00B.
- George, Kathleen F.: *See—*
  - Wagner, Burkhard E.; Goeke, George L.; Karol, Frederick J.; and George, Kathleen F., 5,019,633, Cl. 526-125.000.
- Georget, Pierre, to Hutchinson. Device for tensioning a power transmission belt. 5,019,018, Cl. 474-117.000.

- Georgia Tech Research Corporation: *See—*
  - Gole, James L.; Woodward, James R.; and Cobb, Stephen H., 5,020,071, Cl. 372-89.000.
- Gerber Childrenswear, Inc.: *See—*
  - Simmons, Frances B., 5,019,067, Cl. 604-385.200.
- Gerhard Klemm Maschinenfabrik GmbH & Co.: *See—*
  - Otte, Erhard, 5,018,351, Cl. 60-448.000.
- Geria, Navin M., to Warner-Lambert Company. Ointment applicator and method of using. 5,019,033, Cl. 604-2.000.
- Gerlach, Hans: *See—*
  - Mosebach, Wolfgang; Heitmeier, Rolf; Gerlach, Hans; and Rath, Dieter, 5,018,388, Cl. 73-730.000.
- Gersten, Martin; Maus, Roy; and Tibbling, Lars, to Computed Anatomy Incorporated. Illuminated ring device. 5,018,850, Cl. 351-212.000.
- Gesellschaft fur Geratebau mbH: *See—*
  - Hubner, Hans-Jorg, 5,018,518, Cl. 128-202.220.
  - Hubner, Hans-Jorg; and Rische, Heribert, 5,018,520, Cl. 128-205.120.
- Gettings, Richard L.; McGee, James B., White, William C.; and Plahutnik, Frank, Jr , to Dow Corning Corporation. Cleaning method for water containing vessels and systems. 5,019,173, Cl. 134-4.000.
- Ghini, Marco: *See—*
  - Gamberini. Antonio; and Ghini, Marco, 5,018,539, Cl. 131-280.000.
- Gibson, Donna M.: *See—*
  - Christen, Alice A.; Gibson, Donna M.; and Bland, John, 5,019,504, Cl. 435-123.000.
- Gilano, Michael; Langford, Gordon B.; and Gilano, Michael A., to Ohio Art Company, The. Magnetic visual display. 5,018,979, Cl. 434-409.000.
- Gilano, Michael A.: *See—*
  - Gilano, Michael; Langford, Gordon B.; and Gilano, Michael A., 5,018,979, Cl. 434-409.000.
- Gillette Company, The: *See—*
  - Trotta, Robert A., 5,018,274, Cl. 30-50.000.
- Gillick, James G.: *See—*
  - Rollick, Kevin L.; Gillick, James G.; and Kuczkowski, Joseph A., 5,019,611, Cl. 524-83.000.
- Gillig, Steven F.: *See—*
  - Cahill, Stephen V.; Gillig, Steven F.; and Walczak, Thomas J., 5,020,076, Cl. 375-5.000.
- Gilman, Thomas, to Kendall Company, The. See through absorbent dressing. 5,018,515, Cl. 128-155.000.
- Gilman, Thomas H., to Kendall Company, The. Delivery system for a wound dressing. 5,018,516, Cl. 128-155.000.
- Gilson, Warren E. Continuously adjustable diluting device for mixing predetermined volumes of liquid. 5,018,394, Cl. 73-864.180.
- Gisin, Markus; and Thommen, Christian, to Ciba-Geigy Corporation. Method of controlling and optimizing industrial processes for the manufacture of textile finishing and improving agents via flow injection analysis. 5,019,515, Cl. 436-52.000.
- Gisin, Paul: *See—*
  - Perren, Stephen M.; Frigg, Robert; Gisin, Paul; and Mathys, Robert, Jr., 5,019,078, Cl. 606-61.000.
- Gist-Brocades NV: *See—*
  - Pors, Teresa H.; and Van Der Plaat, Johannes B., 5,019,410, Cl. 426-8.000.
- GKN Automotive Inc.: *See—*
  - Uchman, Frederick J., 5,019,016, Cl. 464-111.000.
- GKN Technology Limited: *See—*
  - Barlow, John; Evans, Philip H.; Frank, Nicholas H.; and Wilson, Hamish D., 5,019,178, Cl. 148-3.000.
- Glass, Randolph P.: *See—*
  - Cardoza, Joseph W., Jr.; and Glass, Randolph P., 5,018,746, Cl. 273-411.000.
- Glaxo Group Limited. *See—*
  - Oxford, Alexander W.; and North, Peter C., 5,019,586, Cl. 514-400.000.
- Glaxo Inc.: *See—*
  - Feldman, Paul L.; James, Michael K.; Brackeen, Marcus F.; Johnson, Michael R.; and Leighton, Harry J., 5,019,583, Cl. 514-327.000.
- Glehr, Manfred, to Siemens Aktiengesellschaft. Method for generating trigger pulses. 5,019,988, Cl. 364-431.030.
- Glista, Andrew S., Jr. Fault tolerant-fiber optic coupler/repeater for use in high speed data transmission and the like. 5,020,152, Cl. 455-601.000.
- Glycomed, Incorporated: *See—*
  - Brandley, Brian K.; James, Paul G.; and Tiemeyer, Michael, 5,019,231, Cl. 204-182.100.
- Gmur, Bruno, to Gebruder Buhler AG Cylinder discharge. 5,018,648, Cl. 222-272.000.
- Goble, Rowland H. Pickup truck attachment apparatus. 5,018,778, Cl. 296-159.000.
- Godfroid, Jean-Jacques: *See—*
  - Braquet, Pierre; Pirotzky, Eduardo; Godfroid, Jean-Jacques; and Heymans, Francoise, 5,019,576, Cl. 514-255.000.
- Godolphin, William J.: *See—*
  - McEwen, James A.; Godolphin, William J.; Bohl, Rainer M.; Dance, Mark N.; Furse, Marty L.; and Osborne, John C., 5,019,243, Cl. 210-94.000
- Godyak, Valery A., to GTE Products Corporation. Radio-frequency driven display. 5,019,750, Cl. 315-248.000.
- Goebel, Rudolf A.; and Stolzlechner, Konrad, to Aelos Holding AG. Prefabricated plate elements for the construction of insulating chambers. 5,018,327, Cl. 52-282.000.
- Goeke, George L.: *See—*
  - Wagner, Burkhard E.; Goeke, George L.; Karol, Frederick J., and George, Kathleen F., 5,019,633, Cl. 526-125.000.
- Goldberg, Edward M.; and Melinyshyn, Lev, to Uresil Corporation. Apparatus and method for collecting body fluids. 5,019,059, Cl. 604-317.000.
- Goldblatt, Ronald D.: *See—*
  - Chou, Ned J.; Goldblatt, Ronald D.; Heidenreich, John E., III; Molis, Steven E.; and Ferreiro, Luis M., deceased, 5,019,210, Cl. 156-643.000.
- Goldman, Jerome: *See—*
  - Goldman, Marvin; Goldman, Jerome; Goldman, Terry; Phillips, Gerald; and Pesin, Joseph, 5,018,480, Cl. 119-26.000.
- Goldman, Marvin; Goldman, Jerome; Goldman, Terry; Phillips, Gerald; and Pesin, Joseph, to Penn Plax, Inc. Simulated tree branch for small animal enclosures. 5,018,480, Cl. 119-26.000.
- Goldman, Terry: *See—*
  - Goldman, Marvin; Goldman, Jerome; Goldman, Terry; Phillips, Gerald; and Pesin, Joseph, 5,018,480, Cl. 119-26.000.
- Goldstar Co., Ltd.: *See—*
  - Hong, Yong P., 5,020,145, Cl 455-188.000.
- Goldstein, Glenn A.; and Gross, Clifford M Ergonomic adjustable chair and method. 5,018,786, Cl. 297-284.000.
- Goldstein, Joel M.: *See—*
  - Abrevaya, Albert; and Goldstein, Joel M., 5,019,254, Cl. 210-169.000
- Gole, James L.; Woodward, James R.; and Cobb, Stephen H., to Georgia Tech Research Corporation. Chemical process yielding stimulating emission of visible radiation via fast near resonant energy transfer. 5,020,071, Cl. 372-89.000.
- Golumbeski, John M.: *See—*
  - Brady, Jack D.; Graves, Kenny M.; Paschke, Larry F.; and Golumbeski, John M., 5,018,457, Cl. 110-346.000.
- Gombotz, Wayne R.; Healy, Michael S.; and Brown, Larry R., to Enzytech, Inc. Very low temperature casting of controlled release microspheres. 5,019,400, Cl. 424-497.000.
- Gomez, Roy: *See—*
  - Brittain, Raymond C.; and Gomez, Roy, 5,019,802, Cl. 340-522.000.
- Gomi, Takeo: *See—*
  - Inokuma, Takahiko; Baba, Sadamu; Imao, Shoji; Kodama, Hitoshi; and Gomi, Takeo, 5,018,915, Cl. 409-231.000.
- Goncalves, Antonin, to L'Oreal. Applicator device for a liquid comprising a dome made of a porous material. 5,018,894, Cl. 401-202.000.
- Gonsalves, Robert A.: *See—*
  - Cronin-Golomb, Mark; and Gonsalves, Robert A., 5,018,801, Cl. 350-3.610.
- Gonzalez, Jose. Scented air filter for use with a forced air central heating and cooling system. 5,019,352, Cl 422-123.000.
- Good, Frederick J., Jr.; and Highsmith, Ronald E., to Polypure, Inc. Method of flocculation with cationic terpolymer flocculants. 5,019,275, Cl. 210-734.000.
- Goode, William B., to Teledyne Industries, Inc. Valve design to reduce cavitation and noise. 5,018,703, Cl. 251-127.000.
- Goodyear Tire & Rubber Company, The: *See—*
  - Rollick, Kevin L.; Gillick, James G.; and Kuczkowski, Joseph A., 5,019,611, Cl. 524-83.000.
- Goosen, Carl C. Drainage blood collection apparatus. 5,019,060, Cl. 604-319.000.
- Gordon, Daniel A.: *See—*
  - Wennerberg, Gunnar; Gordon, Daniel A.; and King, Harriss T., 5,019,710, Cl. 250-341.000.
- Gordon, Robert T.: *See—*
  - Nazarenk, Dimitri M.; Hughes, Houston H., III; Gordon, Robert T.; Hattey, David L.; and Yurman, Bruno, 5,020,132, Cl. 455-17.000.
- Gorin, Allen L.; Makofsky, Patrick A.; Morton, Nancy; Oliver, Neal C.; Shively, Richard R.; and Stanziola, Christopher A., to AT&T Bell Laboratories. Reconfigurable signal processor. 5,020,059, Cl. 371-11.300.
- Gostahagberg, Anders P.; Knutsson, Evan A.; and Nystrom, Mats O. G., to AB Volvo. Electronic locking system. 5,019,812, Cl. 340-825.310.
- Goto, Takuo: *See—*
  - Tanimoto, Hitoshi; Motono, Koichiro; and Goto, Takuo, 5,018,671, Cl. 241-16.000.
- Goto, Tetsuro; and Miura, Kosho, to Nikon Corporation. Data recording device for camera. 5,019,846, Cl. 354-217.000.
- Gotz, Hans, to Uraca Pumpenfabrik GmbH & Co. KG. Diaphragm pump. 5,018,949, Cl. 417-339.000.
- Grabbe, Dimitry G., to AMP Incorporated. Chip carrier with accumulator. 5,019,892, Cl. 357-74.000.
- Graber Industries, Inc.: *See—*
  - Johnson, Daniel C., 5,018,626, Cl. 211-105.100.
- Grace Sewing Machine Co., Ltd.: *See—*
  - Nakajima, Nobuo, 5,018,463, Cl. 112-121.290.
- Graeme, Jerald G.; and Millaway, Steven D., to Burr-Brown Corporation. Adaptive bias circuit for preventing turnoff in a push-pull stage. 5,019,789, Cl. 330-273.000.
- Graham Engineering Corporation: *See—*
  - Briggs, Milton; and Teutsch, Erich O., 5,019,433, Cl. 428-35.700.
- Grandi, Rene . Cooking and cooling transfer apparatus at will for automatic introduction and evacuation of containers which contain foods or products having a variable duration of cooking and cooling. 5,018,438, Cl. 99-335.000.
- Grant, Michael L. Intravenous catheter shield and retainer. 5,018,534, Cl. 128-877.000.

VOL
1126
ISS
4
MY
28
1991
UMI

Grauville, Jeffrey H.; Church, John; and Hodgkins, David H., to Parker Hannifin Corp. Vent line separator. 5,019,141, Cl. 55-170.000.

Grapentin, Hans-Joachim; Kayser, Tomas; and Riedl, Andrea, to Schering Aktiengesellschaft. Method of controlling epoxy resin etchant ion concentration. 5,019,229, Cl. 204-130.000.

Grassberger, Roland; and Knapp, Alfons, to Masco GmbH. Single-handle mixer valve with a ball-type valving member. 5,018,553, Cl. 137-625.410.

Graves, Kenny M.: *See—*

Brady, Jack D.; Graves, Kenny M.; Paschke, Larry F.; and Golumbeski, John M., 5,018,457, Cl. 110-346.000.

Gravesteijn, Dirk J.; Wijn, Josephus M.; and van Liempd, Johannes P. J. G., to U.S. Philips Corporation. Method of manufacturing a metal matrix and a master disc suitable for the manufacture of matrices. 5,019,487, Cl. 430-322.000.

Gray, Robert L.; Peterson, David; Chen, Loren; and Buskirk, Gregory V., to Clorox Company, The. Stable liquid detergent containing insoluble oxidant. 5,019,289, Cl. 252-95.000.

Gray, Thomas J.; and Martinson, Edwin O., to Quadrastat Corporation. Apparatus for positioning a work implement. 5,018,431, Cl. 91-363.00R.

Green, Derek J.: *See—*

Carter, David G.; Green, Derek J.; and Collins, Michael C., 5,018,337, Cl. 53-458.000.

Greene, Lance W. Wire splicer device. 5,019,674, Cl. 174-84.00R.

Gregory, John R.: *See—*

Dawson, Chris R.; Parks, Gerald R.; and Dondero, John, 5,018,223, Cl. 2-436.000.

Gregory, Thomas K.: *See—*

Suszynski, Edward D.; Banke, Kerry; and Gregory, Thomas K., 5,018,872, Cl. 374-133.000.

Greif Bros. Corp.: *See—*

Carpenter, Herbert L., Jr.; and Hale, James A., 5,018,641, Cl. 220-634.000.

Gretag Aktiengesellschaft: *See—*

Rabold, Peter; Klemenz, Hans-Jorg; and Schobi, Paul J., 5,020,106, Cl. 380-49.000.

Griffin, James D.: *See—*

Schlossman, Stuart F.; and Griffin, James D., 5,019,648, Cl. 530-387.000.

Griffin, Robert J.; and Chalmer, Steven R., to Heritage Communications Inc. Audio commentary system. 5,020,155, Cl. 455-617.000.

Griffith, Steven L.: *See—*

Fry, Francis J.; and Griffith, Steven L., 5,018,508, Cl. 128-24.0AA.

Grips, Vatia K. W.; Rajagopal, Indira; and Rajagopalan, Sundarapandium, to Council of Scientific & Industrial Research, The. Black chromium plating bath useful for solar reflecting coatings. 5,019,223, Cl. 204-51.000.

Grise, Frederick G. J.: *See—*

Marstiller, John A.; Bodensiek, Paul H.; and Grise, Frederick G. J., 5,019,797, Cl. 338-333.000.

Grishanin, Gennady G.: *See—*

Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.

Groeneweg, Joost: *See—*

Soeder, Carl-Johannes; Zanders, Erich; Raphael, Thomas; Keusen, Heiner; and Groeneweg, Joost, 5,019,266, Cl. 210-605.000.

Gronbaek, Jens, to Danfoss A/S. Moulding tool and method of making same. 5,019,114, Cl. 72-467.000.

Grood, Edward S.; Butler, David L.; Ledyard, D. Michael; and Hoffman, Steven D., to Brace Technologies, Inc. Knee brace. 5,018,514, Cl. 128-80.00C.

Gross, Clifford M.: *See—*

Goldstein, Glenn A.; and Gross, Clifford M., 5,018,786, Cl. 297-284.000.

Grote & Hartmann GmbH & Co. KG: *See—*

Caumanns, Fritz, 5,018,270, Cl. 29-863.000.

Groupe Laperrier & Verreault, Inc.: *See—*

Fortier, Luc Y.; and Piette, Andre G., 5,019,215, Cl 162-343.000.

Grove, Clinton E.: *See—*

Swenson, Gleo S.; Grove, Robert D.; and Grove, Clinton E., 5,018,777, Cl. 296-100.000.

Grove, Robert D.: *See—*

Swenson, Gleo S.; Grove, Robert D.; and Grove, Clinton E., 5,018,777, Cl. 296-100.000.

Grubbs, Harvey J.; Prasad, Ravi; and Howell, Tony M., to Philip Morris Incorporated. Process for removal of basic materials. 5,018,540, Cl. 131-297.000.

Grube, Gary W.; Monahan-Mitchell, Timothy A.; and Zdunek, Kenneth J., to Motorola, Inc. Universal frequency assignment protocol for trunked radio systems. 5,020,130, Cl. 455-9.000.

Gruenbaum, William T.: *See—*

Nguyen, Khe C.; and Gruenbaum, William T., 5,019,473, Cl. 430-58.000.

Grumelot, Albert L.: *See—*

Mitchell, William J.; and Grumelot, Albert L., 5,018,470, Cl. 114-183.00R.

Grumman Aerospace Corporation: *See—*

Kolstee, Hans M., 5,018,937, Cl. 414-783.000.

Grund, Christian: *See—*

Lemelson, Jerome H.; and Grund, Christian, 5,019,815, Cl. 340-933.000.

Gsell, Thomas C.; and Rothman, Isaac, to Pall Corporation. Filtration media with low protein adsorbability. 5,019,260, Cl. 210-490.000.

GTE Laboratories Incorporated: *See—*

Boudreau, Robert A.; and Rideout, William C., 5,018,820, Cl. 350-96.200.

Rourke, William J.; and Natansohn, Samuel, 5,019,362, Cl. 423-21.500.

GTE Products Corporation: *See—*

Barlow, Robert W.; Boucher, Robert W.; and Lynch, Thomas M., 5,018,818, Cl. 350-96.200.

Bergin, John A.; and Racette, Roger A., 5,018,992, Cl. 439-699.000.

Godyak, Valery A., 5,019,750, Cl. 315-248.000.

Hoffman, J. Kenneth; and Blake, Joseph W., III, 5,019,053, Cl. 604-220.000.

Gu, Hansen; and Wu, Dumin. Apparatus and method for generating vital information signals. 5,018,524, Cl. 128-421.000.

Guardian Hitch, Inc.: *See—*

Villalon, S. Leonard; Olds, James D.; and Shoffner, William H., 5,018,759, Cl. 280-507.000.

Gubelmann, Michel; and Tirel, Philippe-jean, to Rhone-Poulenc Chimie. Process for the preparation of halophenols. 5,019,657, Cl. 568-774.000.

Guerra, Carlos R.: *See—*

Ignasiak, Teresa; Turak, Ali A.; Pawlak, Wanda; Ignasiak, Boleslaw L.; Guerra, Carlos R.; and Zwillenberg, Melvin L., 5,019,245, Cl. 209-166.000.

Guerra, Richard J. Composite material and method of making same. 5,019,453, Cl. 428-518.000.

Guillet, Jean G.: *See—*

Gefter, Malcolm L.; and Guillet, Jean G., 5,019,384, Cl. 424-88.000.

Guinnard, Roland: *See—*

Da Silva, Domingos; and Guinnard, Roland, 5,018,535, Cl. 131-60.000.

Gulbrandson, William E., to Onan Corporation. Armature winding arrangement and method for electrical machine. 5,018,676, Cl. 242-7.030.

Gulliver, James A.; Holt, Christopher C.; Boness, Kenneth D.; and Anderson, Martin R., deceased (by Anderson, Donna J., administratix), to United Kingdom Atomic Energy Authority. Eddy current testing program with scanning probe head having parallel and normal sensing coils. 5,019,777, Cl. 324-242.000.

Gunei Kagaku Kogyo Kabushiki Kaisha: *See—*

Arita, Yoshikazu; Abe, Yukio; Iizuka, Toshi; Nakamura, Yoshio; Takigami, Shoji; and Takigami, Machiko, 5,019,603, Cl. 521-181.000.

Guo, Tzen-Wen, to Advanced Micro Devices, Inc. BiCMOS ECL-to-CMOS conversion circuit. 5,019,726, Cl. 307-446.000.

Guptill, Brian N., to M & J MacIver Holdings Ltd.; and Marr's Leisure Products (1977) Inc., a part interest. Skeg protector. 5,018,997, Cl. 440-76.000.

Guschin, Sergei V.: *See—*

Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.

Gusev, Jury P.: *See—*

Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.

Gutridge, John. Microscope. 5,018,846, Cl. 350-513.000.

Guttinger, Peter; Langen, H. J. Paul; and Langen, Ronald J., to H. J. Langen & Sons Limited. Carton loading machine having load accumulator. 5,018,334, Cl. 53-152.000.

Gutweiler, Matthias; Driscoll, Robert K.; and Leupold, Ernst I., to Hoechst AG. Polyvinyl acetals and their use. 5,019,624, Cl. 525-61.000.

Guy, Gabriel; and Zellweger, Conrad, to LN Industries S.A. Spring-action hinge for spectacle frame. 5,018,242, Cl. 16-228.000.

H. J. Langen & Sons Limited: *See—*

Guttinger, Peter; Langen, H. J. Paul; and Langen, Ronald J., 5,018,334, Cl. 53-152.000.

Haag, Werner O.; and Tsikoyiannis, John G., to Mobil Oil Corp. Membrane composed of a pure molecular sieve. 5,019,263, Cl. 210-500.250.

Haavisto, John R.; and Ayers, Edward P., to Northrop Corporation. Asymmetric optical waveguides for minimizing bending losses and techniques for fabricating same. 5,018,811, Cl. 350-96.120.

Habeeb, Jacob J.: *See—*

Beltzer, Morton; Habeeb, Jacob J.; Francis, James N.; and Colle, Karla S., 5,019,283, Cl. 252-33.600.

Haberer, Johann, to Bauer Spezialtiefbau GmbH. Anchor drilling implement. 5,018,588, Cl. 173-22.000.

Hach Company: *See—*

Wiese, Patrick M., 5,019,516, Cl. 436-77.000.

Hackmann, Ludger; and Wilken, Josef, to Bramlage Gesellschaft mit beschrankter Haftung. Dispenser for the dispensing of individual tablets. 5,018,644, Cl. 221-65.000.

Haddad, Louis C.: *See—*

Wilson, Theresa J.; Haddad, Louis C.; and Hagen, Donald F., 5,019,232, Cl. 204-182.800.

Haddad, Muin S.; and Eryman, William S., to Amoco Corporation. Process for manufacture of maleic anhydride catalysts. 5,019,545, Cl. 502-209.000.

Hafelein, Reinhard: *See—*

Seeger, Walter; Mussler, Rudiger; and Hafelein, Reinhard, 5,018,272, Cl. 29-890.080.

Hagemann, Hermann: *See—*

Baasner, Bernd; Hagemann, Hermann; and Schwamborn, Michael, 5,019,654, Cl. 564-510.000.

Hagen, Donald F.: *See—*

Wilson, Theresa J.; Haddad, Louis C.; and Hagen, Donald F., 5,019,232, Cl. 204-182.800.

Hager, Walter; Butzen, Edgar; Denuell, Gunther; and Arnold, Kurt, to Pfaff Industriemaschinen GmbH. Sewing machine with thread monitor. 5,018,465, Cl. 112-273.000.

Hagiwara, Tarou: *See—*

Kumasaka, Hideyuki; Takao, Kouji; Kuriyama, Hiroshi; Hagiwara, Tarou; and Miyazaki, Kenichi, 5,018,781, Cl. 296-210.000.

Hagmann, William K.: *See—*

Durette, Philippe L.; Hagmann, William K.; and Ponpipom, Mitree M., 5,019,568, Cl. 514-171.000.

Hahn, Mansop M.; Lundry, Jerry L.; and Mohn, Larry W., to United States of America, Army. System for controlling turbulence inside and just outside a cavity. 5,018,683, Cl. 244-1.00R.

Haikala, Heimo O.; Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., to Orion-yhtyma Oy. Novel pyridazinone compounds, compositions thereof and method of use. 5,019,575, Cl. 514-247.000.

Haines, Hiemi K.; and Christiansen, Richard L., to Marathon Oil Company. Process for enriching a gas. 5,019,279, Cl. 252-8.554.

Haining, Michael L. Intravenous catheter and insertion device. 5,019,049, Cl. 604-165.000.

Haka, Raymond J., to General Motors Corporation. Self-adjusting servo mechanism for actuating a friction band assembly in a planetary gear set. 5,018,434, Cl. 92-29.000.

Hakamata, Kyoji: *See—*

Hoshiba, Akihiko; and Hakamata, Kyoji, 5,018,503, Cl. 123-580.000.

Hake, Lawrence W., to Needlepoint Guard, Inc. Hypodermic needle guard. 5,019,051, Cl. 604-198.000.

Hakka, Leo E., to Union Carbide Canada Limited. Removal and recovery of sulphur dioxide from gas streams. 5,019,361, Cl. 423-243.000.

Halbout, Jean-Marc: *See—*

Chiu, George L.; and Halbout, Jean-Marc, 5,019,707, Cl. 250-306.000.

Hale Fire Pump Company: *See—*

Sulmone, Michael, 5,018,665, Cl. 236-93.00A.

Hale, James A.: *See—*

Carpenter, Herbert L., Jr.; and Hale, James A., 5,018,641, Cl. 220-634.000.

Hale, Robert B. Golf putting practice device. 5,018,739, Cl. 273-201.000.

Hall, Christopher W. G., to Pilkington plc. Curved, laminated impact-resistant panel. 5,019,443, Cl. 428-215.000.

Hall, L. D. Sand release apparatus and method. 5,018,581, Cl. 166-373.000.

Hall Surgical Division of Zimmer Inc.: *See—*

Linden, Harry A., 5,019,038, Cl. 604-49.000.

Haller, Thoedore R., to General Electric Company. Adaptive lithography accommodation of tolerances in chip positioning in high density interconnection structures. 5,019,997, Cl. 364-488.000.

Halliburton Company: *See—*

El Rabaa, Wadood; Cole, R. Clay; and Meadows, David L., 5,018,578, Cl. 166-281.000.

Hamada, Masataka: *See—*

Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko; Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.

Hamada, Seishiro: *See—*

Matsuo, Masaaki; Shimada, Toshio; and Hamada, Seishiro, 5,019,860, Cl. 355-104.000.

Hamada, Toshihiko: *See—*

Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.

Hamaguchi, Naoru; Iga, Katsumi; and Ogawa, Yasuaki, to Takeda Chemical Industries, Ltd. Liposome composition and its production. 5,019,394, Cl. 424-423.000.

Hamamatsu Photonics K. K.: *See—*

Honzawa, Katsu, 5,019,416, Cl. 427-47.000.

Hamamatsu Photonics Kabushiki Kaisha: *See—*

Mizushima, Yoshihiko; Iida, Takashi; Hirohata, Toru; Sugimoto, Kenichi; Warashina, Yoshihisa; and Nakajima, Kazutoshi, 5,020,064, Cl. 372-37.000.

Hambley, John B. Filter underdrain apparatus with partitioned distributor conduits. 5,019,259, Cl. 210-274.000.

Hamblin, Ronald F.: *See—*

Woodbridge, Keith W.; Doncaster, Daniel J.; and Hamblin, Ronald F., 5,018,898, Cl. 403-11.000.

Hamel, Lawrence G.: *See—*

Ayer, Atul D.; Kuczynski, Anthony L.; Wong, Patrick S. L.; Hamel, Lawrence G.; and Jordan, Maureen L., 5,019,396, Cl. 424-473.000.

Hamer, Johannes A.; and van der Heijden, Pieter, to Shell Oil Company. Vacuum distillation process. 5,019,218, Cl. 203-87.000.

Hamer, Johannes A.; and Van Der Heijden, Pieter, to Shell Oil Company. Vacuum distillation process. 5,019,219, Cl. 203-91.000.

Hamer, Rene H.; and DuPau, Cornelis P., to U.S. Philips Corporation. Method and device for radiation beam scanning a radiation-sensitive surface of a rotating carrier. 5,020,047, Cl. 369-240.000.

Hamid-Samimi, Mohammad-Hossein: *See—*

Swartzel, Kenneth R.; Ball, Hershell R., Jr.; and Hamid-Samimi, Mohammad-Hossein, 5,019,408, Cl. 426-399.000.

Hammer, Jacob M.: *See—*

Carlson, Nils W.; Evans, Gary A.; Hammer, Jacob M.; and Ettenberg, Michael, 5,019,787, Cl. 330-4.300.

Hammond, Kevin: *See—*

Carter, Peter; and Hammond, Kevin, 5,019,373, Cl. 424-52.000.

Hampel, Klaus; and Schrudde, Reinhold, to Kochs Adler Aktiengesellschaft. Cutting device. 5,018,464, Cl. 112-130.000.

Hamu, Kaino J. Printing screen stretch frame. 5,018,442, Cl. 101-127.100.

Hanajima, Toshiharu: *See—*

Matsubara, Hisayoshi; Mizuno, Yutaka; and Hanajima, Toshiharu, 5,019,463, Cl. 429-12.000.

Hand, Elli S.: *See—*

Shoupe, T. Scott; Baker, David C.; Coutts, Stephen M.; and Hand, Elli S., 5,019,573, Cl. 514-232.800.

Hanifan, Philip C.: *See—*

Biggs, David H.; Little, John K.; and Hanifan, Philip C., 5,019,814, Cl. 340-870.290.

Hannen, Reiner W.; Vermeulen, Norbert P.; and Pieters, Hans-Theo, to MSK - Verpackungs-Systeme Gesellschaft Mit Beschrankter. Apparatus for shrink-wrapping palletized goods. 5,018,339, Cl. 53-557.000.

Hannerstig, Christer, to AB A. Svensson & Co. Method for forming tie-back poufs. 5,018,567, Cl. 160-348.000.

Hanon, David O.: *See—*

Eddas, Harry; and Hanon, David O., 5,020,127, Cl. 392-488.000.

Hanson, David G., Jr.; and Hockings, William A., to Peninsula Copper Industries, Inc. Reclaiming inorganic reinforcement component from organic resin-containing scrap materials. 5,019,171, Cl. 134-2.000.

Hanson, Derald F.: *See—*

Weilbach, August O.; Hanson, Derald F.; and Smith, C. Dwight, 5,019,738, Cl. 310-90.500.

Hapstack, Mark, to United States of America, Energy. Extendable pipe crawler. 5,018,451, Cl. 104-138.200.

Hara, Koichi, to Hoya Corporation. Method for producing glass. 5,019,146, Cl. 65-18.100.

Hara, Mitsuo; Kamio, Shigeru; Takao, Mitsunori; Sakita, Katsuya; and Abe, Tomoaki, to Nippondenso Co., Ltd. Traction control system. 5,018,595, Cl. 180-197.000.

Hara, Shigeyoshi: *See—*

Endo, Zenichiro; and Hara, Shigeyoshi, 5,019,620, Cl. 524-485.000.

Hara, Susumu: *See—*

Saiga, Yoshiharu; Yoshimura, Makoto; and Hara, Susumu, 5,018,679, Cl. 242-67.10R.

Harada Kogyo Kabushiki Kaisha: *See—*

Harada, Takuji, 5,019,830, Cl. 343-701.000.

Harada, Kosuke; Sakamoto, Hiroshi; and Nakamizo, Takazi, to Kyushu University; and Nishimu Electronics Industries Co., Ltd. Switching power source device having energy recovery. 5,019,770, Cl. 323-282.000.

Harada, Mitsuhisa; and Tomari, Masao, to Nippon Jiryoku Senko Co., Ltd. Method of modifying steel slag. 5,019,160, Cl. 75-564.000.

Harada, Tadanori: *See—*

Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, 5,019,702, Cl. 250-208.100.

Harada, Takuji, to Harada Kogyo Kabushiki Kaisha. Amplified FM antenna with parallel radiator and ground plane. 5,019,830, Cl. 343-701.000.

Haraguchi, Hiroshi: *See—*

Nagase, Kenichi; Haraguchi, Hiroshi; Mizuno, Toshiaki; and Kamada, Takayuki, 5,018,362, Cl. 62-133.000.

Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corporation. Reactor system for conversion of alkanes to alkenes in an external FCC catalyst cooler. 5,019,353, Cl. 422-144.000.

Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corporation. Reactor system for upgrading light olefins in staged reactors. 5,019,357, Cl. 422-192.000.

Harbor, Michael O.: *See—*

Reeves, Allen; Harbor, Michael O.; Reina, Patrick V.; and Sandgren, Richard T., 5,018,715, Cl. 271-19.000.

Hardin, Gary P.; and Leonard, Ronald, to SID Corp., Inc. Lifting and transporting device. 5,018,930, Cl. 414-458.000.

Hardman, Tedd P.: *See—*

Liebermann, Howard H.; and Hardman, Tedd P., 5,019,336, Cl. 420-557.000.

Hardt, Norbert: *See—*

Schulte, Burkart; Hardt, Norbert; and Kohne, Rainer, 5,019,324, Cl. 376-260.000.

Hardtke, Hans-Herlof; and Bernert, Jorg, to Lisega GmbH. Hydraulic dashpot for pipeline systems. 5,018,607, Cl. 188-282.000.

Hardtke, Hans-Herlof, to Lisega GmbH. Suspension device for conveying loads, particularly pipes. 5,018,700, Cl. 248-571.000.

Hare, Nicholas S., Sr. Electro-rheological fuel injector. 5,019,119, Cl. 123-500.000.

Harman, Dane P., to Harman Stove and Welding, Inc. Feed system for pellet burning stove. 5,018,455, Cl. 110-110.000.

Harman Stove and Welding, Inc.: *See—*

Harman, Dane P., 5,018,455, Cl. 110-110.000.

VOL 1126 ISS 4 MY 28 1991 UMI

- Harnly, James M.; Moulton, Gary P.; and O'Haver, Thomas C., to United States of America, Agriculture; and University of Maryland, The. Continuum source atomic absorption spectrometry. 5,018,856, Cl. 356-312.000.
- Harper, Guy A., to VLSI Technology, Inc. System and method for depositing tungsten/titanium films. 5,019,234, Cl. 204-192.170.
- Harris, Bruce F.: *See—*
  - Whittaker, Sean E.; and Harris, Bruce F., 5,018,720, Cl. 271-272.000.
- Harris, Clarke E.: *See—*
  - Cusack, Francis J., Jr.; and Harris, Clarke E., 5,020,062, Cl. 372-23.000.
- Harris, Kevin M.: *See—*
  - Isaac, Sharon R.; and Harris, Kevin M., 5,018,742, Cl. 273-235.00A.
- Harrison, Nicholas D.: *See—*
  - Rash, Mark S.; Harrison, Nicholas D.; and Butler, F. Prince, 5,020,094, Cl. 379-62.000.
- Harrison, Patricia L. Film changing tent with internal support structure. 5,019,849, Cl. 354-308.000.
- Harrison, R. Mark: *See—*
  - Rohani, Kaymar; and Harrison, R. Mark, 5,020,107, Cl. 381-43.000.
- Hartlepp, Karl. Sortation equipment. 5,018,928, Cl. 414-339.000.
- Hartley, William L., to P.T.P. Industries. Battery display package. 5,018,622, Cl. 206-333.000.
- Hartman, William B. Skin blemish measuring and recording system and method. 5,018,531, Cl. 128-774.000.
- Hasan, S. Riaz; and Thomas, Louis, to Illinois Tool Works Inc. Attachment of roofing washer with heat-sealed screw-washer assemblage. 5,018,329, Cl. 52-410.000.
- Hasebe, Nobutoshi, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Pinion clutch for starter. 5,018,611, Cl. 192-42.000.
- Hasegawa, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Sewing machine. 5,018,466, Cl. 112-275.000.
- Hasegawa, Katsumi: *See—*
  - Ueda, Kunihiko; Hasegawa, Katsumi; and Kuriyama, Nobuyuki, 5,019,316, Cl. 264-178.00F.
- Hasegawa, Takashi: *See—*
  - Takeda, Atsushi; and Hasegawa, Takashi, 5,019,871, Cl. 355-309.000.
- Hasegawa, Yoshimi; Kakiuchi, Shinichi; and Tomita, Seisuke, to Bridgestone Corporation. Golf ball. 5,019,320, Cl. 273-235.00R.
- Hasenclever, Jochen, to Vereingte Aluminum-Werke Aktiengesellschaft. Process for forming an aluminum alloy thin sheet by hot and cold rolling. 5,019,188, Cl. 148-11.50A.
- Hashimoto, Osamu: *See—*
  - Kato, Yasushi; Yoshioka, Keiichi; and Hashimoto, Osamu, 5,019,186, Cl. 148-20.300.
- Hashimoto, Seiji: *See—*
  - Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, 5,019,702, Cl. 250-208.100.
- Hashimoto, Takeshi, to Tomoegawa Paper Co., Ltd. Novel diamine compounds, production of the same and polyamideimide resins produced therefrom. 5,019,642, Cl. 528-353.000.
- Hashitsume, Kimio: *See—*
  - Nakajima, Takashi; Kubozono, Kenji; Mori, Toshihiko; Ito, Takefumi; Hashitsume, Kimio; and Iwase, Shinichi, 5,019,185, Cl. 148-13.200.
- Haskins, David A.: *See—*
  - Heckman, Douglas E.; Larson, Dawn A.; Frisco, Jeffrey A.; and Haskins, David A., 5,019,829, Cl. 343-700.0MS.
- Hata, Toshihiko; Adachi, Mitsunori; and Tomita, Satoru, to Mitsubishi Denki Kabushiki Kaisha. Coordinate input apparatus. 5,019,917, Cl. 558-448.000.
- Hato, Hitoshi: *See—*
  - Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susumu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 5,018,839, Cl. 350-347.00R.
- Hattey, David L.: *See—*
  - Nazarenk, Dimitri M.; Hughes, Houston H., III; Gordon, Robert T.; Hattey, David L.; and Yurman, Bruno, 5,020,132, Cl. 455-17.000.
- Hattori, Ryuichi, to House Food Industrial Co., Ltd. Method and apparatus for manufacturing dried foods. 5,019,412, Cl. 426-242.000.
- Hauser, Ambrose A.: *See—*
  - Ciokajlo, John J.; and Hauser, Ambrose A., 5,018,942, Cl. 415-173.200.
- Hawerkamp, Manfred. Pre-press tube. 5,018,555, Cl. 138-155.000.
- Hawkins, Edwin F.; Clapp, John G., Jr.; and Sansing, James E. Fertilizer and method for foliar treatment of iron-deficient plants. 5,019,149, Cl. 71-29.000.
- Hawkins, Richard H. Apparatus for the reduction of apnaa in the edentulous. 5,018,533, Cl. 128-848.000.
- Hawley, Donita A.: *See—*
  - Hawley, Steven E., 5,018,415, Cl. 81-15.900.
- Hawley, Steven E., to Hawley, Donita A. Door security latch opener and method of using same. 5,018,415, Cl. 81-15.900.
- Haworth, Walter; and Wood, Alfred, to Hollingsworth (U.K.) Limited. Drafting apparatus with autolevelling. 5,018,248, Cl. 19-240.000.
- Hayakawa, Youichi; Hosono, Chihiro; and Nishida, Masaaki, to Aisin AW Co., Ltd. Carrier device in an automatic transmission. 5,019,025, Cl. 475-285.000.
- Hayashi, Kohtaro: *See—*
  - Mukai, Hiromu; Hayashi, Kohtaro; and Maeda, Yasuo, 5,019,854, Cl. 354-471.000.
- Hayashi, Yoshitaka; and Ohmi, Hayato, to Nippon Seiko Kabushiki Kaisha. Rotational speed detector. 5,018,384, Cl. 73-118.100.
- Hayfield, Peter C. S.: *See—*
  - Denton, David A.; and Hayfield, Peter C. S., 5,019,224, Cl. 204-54.100.
- Haynes, Barton F.; and Palker, Thomas J., to Duke University. Production of antibodies to HIV. 5,019,387, Cl. 424-89.000.
- Hazelbaker, Loren A. Protective shield. 5,018,222, Cl. 2-49.00A.
- Hazenbroek, Jacobus E. On line breast halver and processor. 5,019,013, Cl. 452-151.000.
- Healy, Michael S.: *See—*
  - Gombotz, Wayne R.; Healy, Michael S.; and Brown, Larry R., 5,019,400, Cl 424-497.000.
- Hechel, Dennis L.; Niemetschek, Raymond H.; Slocum, Tobin; Kercheck, Gary R.; and Crawford, Michael C., to Bear Automotive Service Equipment Company. Angle sensor with CCD 5,018,853, Cl. 356-155.000.
- Hecht, Thomas R.: *See—*
  - Peck, R. Michael; Hecht, Thomas R.; and Livingston, Howard F., 5,018,672, Cl. 241-37.500.
- Heckenkamp, Daniel P., to Eaton Corporation. Auxiliary operator for circuit interrupting apparatus with interlock between switch and housing. 5,019,676, Cl. 200-50.00A.
- Hecker, Joel; Stern, Howard; and Heydenburg, Tom, to Robotic Vision Systems, Inc. Three-dimensional volumetric sensor. 5,018,803, Cl. 350-3.710.
- Heckman, Douglas E.; Larson, Dawn A.; Frisco, Jeffrey A.; and Haskins, David A. Plug-in package for microwave integrated circuit having cover-mounted antenna. 5,019,829, Cl. 343-700.0MS.
- Heckmann, Walter: *See—*
  - Taubitz, Christof; Gausepohl, Hermann; Seiler, Erhard; Boehlke, Klaus; and Heckmann, Walter, 5,019,626, Cl. 525-92.000.
- Hector, Richard F.; Schaller, Klaus; Moeschler, Heinrich F.; and Plempel, Manfred, to Bayer AG. Method for treating fungal infections with nikkomycin derivatives. 5,019,560, Cl. 514-43.000.
- Hedberg, Erik L.: *See—*
  - Dreibelbis, Jeffrey H.; Gabric, John A.; and Hedberg, Erik L., 5,019,772, Cl. 324-158.00R.
- Heel, Helmut: *See—*
  - Bauch, Karl; Raff, Alfred; Heel, Helmut; and Leege, Norbert, 5,018,916, Cl. 409-233.000.
- Heidenreich, John E., III: *See—*
  - Chou, Ned J.; Goldblatt, Ronald D.; Heidenreich, John E., III; Molis, Steven E.; and Ferreiro, Luis M., deceased, 5,019,210, Cl. 156-643.000.
- Heiler, David J., to Bausch & Lomb Incorporated. Novel antimicrobial compositions and process for preparing the same. 5,019,380, Cl. 424-81.000.
- Heimbrook, David C.: *See—*
  - Riemen, Mark W.; Oliff, Allen I.; Saari, Walfred S.; and Heimbrook, David C., 5,019,647, Cl. 530-329.000.
- Heinz, Helmut: *See—*
  - Fognini, Bruno; and Heinz, Helmut, 5,019,785, Cl. 328-14.000.
- Heitmeier, Rolf: *See—*
  - Mosebach, Wolfgang; Heitmeier, Rolf; Gerlach, Hans; and Rath, Dieter, 5,018,388, Cl. 73-730.000.
- Helix Enterprises, Inc.: *See—*
  - Carmack, Paul D.; Asbury, James A.; and Nitzberg, Leonard R., 5,018,546, Cl. 137-68.100.
- Helix Technology Corporation: *See—*
  - Livingstone, James; Higham, Graham J.; and Pruitt, Gerald R., 5,018,357, Cl. 62-6.000.
- Helm, Herbert W.; Anderson, John R.; and Lambert, Michael P., to F. L. Smithe Machine Company, Inc. Envelope blank forming machine. 5,019,030, Cl. 493-342.000.
- Hemer, H. Michael, to Trextron Inc. Drive system for prosthetic fasteners. 5,019,080, Cl. 606-73.000.
- Hemmie, Dale L., to Conifer Corporation. Integrated down converter and interdigital filter apparatus and method for construction thereof. 5,020,149, Cl. 455-325.000.
- Hemsath, Klaus H.; Staffin, H. Kenneth; and Owsiany, Michael, to Gas Research Institute. Heating furnace. 5,018,707, Cl. 266-254.000.
- Henderson, Lionel A. Method of making composites having layers of the same or different firmness. 5,019,197, Cl. 156-212.000.
- Hendry, Robert: *See—*
  - Markunas, Robert J.; Hendry, Robert; and Rudder. Ronald A., 5,018,479, Cl. 118-723.000.
- Henkel Research Corporation: *See—*
  - Virnig, Michael J., 5,019,297, Cl. 260-405.600.
- Hennink, Wilhelmus E.; and Huizer, leendert, to Nederlandse Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek TNO. Use of a polymer network, method for preparing a prepolymer and also preparation which yields a polymer network after curing. 5,019,100. Cl. 623-6.000.
- Henriksson, Kurt K.: *See—*
  - Breckner, Raymond A.; Henriksson, Kurt K.; Sharratt, Leslie C.; and Sharratt, Leslie M., 5,018,946, Cl. 417-197.000.
- Henseler, Wolfgang, to Daimler-Benz AG. Safety device in the form of an airbag for motor vehicles. 5,018,761, Cl. 280-730.000.
- Hensens, Otto D.: *See—*
  - Garrity, George M.; Lopez, Maria B.; Hensens, Otto D.; Monaghan, Richard L.; and Zink, Deborah L., 5,019,593, Cl. 514-560.000.
- Hepp, Monika: *See—*
  - Diehl, Wolfgang; and Hepp, Monika, 5,019,518, Cl. 436-172.000.

- Herberg, Joseph R.: *See—*
  - Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 5,018,901, Cl. 403-349.000.
- Hercules Incorporated: *See—*
  - Bell, Andrew, 5,019,544, Cl. 502-102.000.
  - Endo, Zenichiro; and Hara, Shigeyoshi, 5,019,620, Cl. 524-485.000.
- Heritage Communications Inc.: *See—*
  - Griffin, Robert J.; and Chalmer, Steven R., 5,020,155, Cl. 455-617.000.
- Hermann, Lorin E., to Ashford Concrete, Inc. High lift tag axle for trucks. 5,018,593, Cl. 180-24.020.
- Hermes, Matthew E.: *See—*
  - Kaplan, Donald S.; and Hermes, Matthew E., 5,019,093, Cl. 606-228.000.
- Herron, Matthew A.; and Boyle, Dennis J., to Dynabook Technologies Corporation. Locking arrangement for a battery pack. 5,019,465, Cl. 429-97.000.
- Hertler, Walter R.: *See—*
  - Boettcher, Fritz P.; Dicker, Ira B.; Ebersole, Richard C.; and Hertler, Walter R., 5,019,634, Cl. 526-262.000.
- Herve, Philip, to 501 Eparco S.A. Societe Anonyme de Droit Francais. Process for activating the operation of a system for anaerobic digestion of solid organic residues. 5,019,265, Cl. 210-603.000.
- Hess, Robert M.; and Hunninghaus, Roy E., to Motorola, Inc. Threshold crossing detection with improved noise rejection. 5,019,722, Cl. 307-354.000.
- Hesse, Wilhelm: *See—*
  - Bernd, Alfred; England, Willi; Flaig, Heinz; Hesse. Wilhelm; Staggl, Roland; and Zacharias, Karl, 5,019,734, Cl. 310-77.000.
- Hetherington, Ricky C.: *See—*
  - Webb, David A., Jr.; Hetherington, Ricky C.; Salett, Ronald M.; Fossum, Trvggvue; and Manley, Dwight P., 5,019,965, Cl. 364-200.000.
- Hetzel, John M., Jr.: *See—*
  - Lane, Abbott A.; and Hetzel, John M., Jr., 5,018,220, Cl. 2-5.000.
- Heurtel, Bertrand J. J. M.; Mondoloni, Pierre-Louis; and Serre, Jacques R., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A. Blade fixing arrangement for a turbomachine rotor. 5,018,941, Cl. 416-220.00R.
- Hewlett-Packard Company: *See—*
  - Boyd, David W.; and Deutschbein, John S., 5,019,703, Cl. 250-208.100.
  - Fischer, Michael C.; and Strasser, William E., 5,019,788, Cl. 330-9.000.
  - Merg, Heinz R., 5,019,746, Cl. 313-512.000.
  - Rosenberg, Charles J., 5,020,121, Cl. 382-56.000.
  - Sporon-Fiedler, Frederik, 5,020,006, Cl. 364-550.000.
  - Steketee, Edward; and Clements, Brad E., 5,019,948, Cl. 361-415.000.
  - Stockberger, Randall L.; and Bunsen, Christopher M., 5,020,012, Cl. 364-709.140.
  - Tanimoto, Shigeru; and Takeuchi, Kouichi, 5,019,781, Cl. 324-649.000.
  - Young, James E., 5,019,236, Cl. 204-299.00R.
- Heydenburg, Tom: *See—*
  - Hecker, Joel; Stern, Howard; and Heydenburg, Tom, 5,018,803, Cl. 350-3.710.
- HEYL Chemisch-parmazeutische Fabrik GmbH & Co KG: *See—*
  - Bunte, Thomas; Parr, Wolfgang; and Heyl, Eduard, 5,019,391, Cl. 424-195.100.
- Heyl, Eduard: *See—*
  - Bunte, Thomas; Parr, Wolfgang; and Heyl, Eduard, 5,019,391, Cl. 424-195.100.
- Heymans, Francoise: *See—*
  - Braquet, Pierre; Pirotzky, Eduardo; Godfroid, Jean-Jacques; and Heymans, Francoise, 5,019,576, Cl. 514-255.000.
- Hezzell, David J.: *See—*
  - Cogswell, Frederic N.; Hezzell, David J.; and Williams, Peter J., 5,019,450, Cl. 428-402.000.
- Hiai, Atsuhiko; and Wakimura, Kazuo, to Mitsui Toatsu Chemicals, Inc. Equipment and method for supply of organic metal compound. 5,019,423, Cl. 427-248.100.
- Hibino, Hiroki: *See—*
  - Suzuki, Akira; Hibino, Hiroki; Fukuda, Hiroyuki; Takahashi, Yutaka; and Ishikawa, Akibumi, 5,018,509, Cl. 128-6.000.
- Hibner, Edward L.: *See—*
  - Crum, James R.; Poole, Jon M.; and Hibner, Edward L., 5,019,184, Cl. 148-13.000.
- Hickox, Richard M.; Spohn, William P.; and D'Amico, David J., to Bacharach, Inc. Gas sampling device with improved mixed flow fan. 5,018,395, Cl. 73-864.340.
- HICG Products, Inc.: *See—*
  - Olson, Heidi S., 5,018,694, Cl. 248-340.000.
- Hidaka, Kensuke: *See—*
  - Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 5,019,338, Cl. 420-586.100.
- Hidaka, Mutsuo, to NEC Corporation. Superconducting contact structure. 5,019,551, Cl. 505-1.000.
- Hieda, Teruo; and Kyuma, Kenji, to Canon Kabushiki Kaisha. White balance adjusting circuit. 5,019,894, Cl. 358-29.000.
- Higashii, Takayuki: *See—*
  - Minai, Masayoshi; and Higashii, Takayuki, 5,019,298, Cl. 260-410.500.
- Higashiizumi, Takao: *See—*
  - Morita, Dai; Hirota, Yuichi; and Higashiizumi, Takao, 5,018,528, Cl. 128-661.090.
- Higashimata, Akira: *See—*
  - Yasuno, Yoshiki; Ishikawa, Yasuki; Higashimata, Akira; and Fujishiro, Takeshi, 5,019,985, Cl. 364-426.020.
- Higashiyama, Shunichi; and Suzuki, Keiko, to Brother Kogyo Kabushiki Kaisha. Image recording medium comprising a color developer layer formed on a thermoplastic resin layer. 5,019,475, Cl. 430-138.000.
- Higgins, Ian; and Baxendale, Andrew, to United Kingdom Atomic Energy Authority. Method of producing a silicon carbide-based body. 5,019,430, Cl. 427-430.100.
- Higgins, Leo M., III., to Prime Computer, Inc. Heat sink apparatus. 5,019,880, Cl. 357-81.000.
- Higgins, Susan L.: *See—*
  - Lynn, Karen K.; and Higgins, Susan L., 5,019,050, Cl. 604-179.000.
- Higham, Graham J.: *See—*
  - Livingstone, James; Higham, Graham J.; and Pruitt, Gerald R., 5,018,357, Cl. 62-6.000.
- Highsmith, Ronald E.: *See—*
  - Good, Frederick J., Jr.; and Highsmith, Ronald E., 5,019,275, Cl. 210-734.000.
- Higuchi, Yasushi: *See—*
  - Yamane, Hiroyuki; Higuchi, Yasushi; and Fujii, Tetsuo, 5,019,526, Cl. 437-37.000.
- Hiki, Toshio: *See—*
  - Nishimura, Hiroshi; Miyasaka, Masao; Itoh, Nobuhiko; Hiki, Toshio; and Igarashi, Akira, 5,018,888, Cl. 400-616.100.
- Hikone, Makoto: *See—*
  - Suzuki, Motoharu; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, 5,018,762, Cl. 280-731.000.
- Hill, Jeffrey V.: *See—*
  - Allen, John D.; and Hill, Jeffrey V., 5,020,081, Cl. 375-118.000.
- Hillstead, Richard A., to Cordis Corporation. Apparatus and method for placement of a stent within a subject vessel. 5,019,085, Cl. 606-108.000.
- Himeno, Kiyoshi; and Konishi, Kazuhisa, to Mitsubishi Kasei Corporation. Method for dyeing polyester-containing fibers in an alkaline dyeing bath and dyeing assistant, an amino-acid compound. 5,019,133, Cl. 8-531.000.
- Himmelwright, Gary S., to Santa Barbara Research Center. Single channel high power fiber optic connector. 5,018,823, Cl. 350-96.210.
- Hino, Eiji; and Yamanishi, Keisuke, to Nikko Gould Foil Co., Ltd. Treatment of copper foil for printed circuits. 5,019,222, Cl. 204-27.000.
- Hino, Isao, to NHK Spring Co., Ltd. Hinge device for coupling a member rotatable to another. 5,018,244, Cl. 16-342.000.
- Hino, Masayuki: *See—*
  - Yazawa, Yoshihiro; Sone, Yuji; Yoshioka, Keiichi; Kinoshita, Noboru; and Hino, Masayuki, 5,019,181, Cl. 148-12.0EA.
- Hirabayashi, Shigeto: *See—*
  - Sato, Hirokazu; and Hirabayashi, Shigeto, 5,019,493, Cl. 430-553.000.
- Hiraga, Hiroyuki: *See—*
  - Watanabe, Yoshitaka; Mizoguchi, Yoshiyuki; and Hiraga, Hiroyuki, 5,019,839, Cl. 346-134.000.
- Hirai, Katsunori, to Isuzu Motors Limited. Heat-insulating piston. 5,018,489, Cl. 123-193.00P.
- Hiraide, Takashi; Kusunoki, Ituro; and Tajima, Joji, to Casio Computer Co., Ltd. Method of manufacturing and using a carrier tape for bonding IC devices. 5,019,209, Cl. 156-630.000.
- Hiraide, Tsuneo: *See—*
  - Ojima, Satoshi; and Hiraide, Tsuneo, 5,018,847, Cl. 350-534.000.
- Hiramatsu, Soichi, to Canon Kabushiki Kaisha. Recording apparatus. 5,018,886, Cl. 400-545.000.
- Hirano, Hirofumi; Omo, Shinichi; and Fukui, Hiroshi, to Canon Kabushiki Kaisha. Recording apparatus in which a plurality of carriages can be connected and separated. 5,018,884, Cl. 400-126.000.
- Hirata, Shinichi: *See—*
  - Itaoka, Toshinari; and Hirata, Shinichi, 5,019,040, Cl. 604-95.000.
- Hiratsuka, Nobuo; and Kondo, Asaji, to Fuji Photo Film Co., Ltd. Integral multilayer analytical element. 5,019,347, Cl. 422-56.000.
- Hirikoshi, Koki, to Rikagaku Kenkyusho. Novel cyclomaltodextrin glucanotransferase. 5,019,507, Cl. 435-193.000.
- Hirohata, Toru: *See—*
  - Mizushima, Yoshihiko; Iida, Takashi; Hirohata, Toru; Sugimoto, Kenichi; Warashina, Yoshihisa; and Nakajima, Kazutoshi, 5,020,064, Cl. 372-37.000.
- Hirokawa, Takeshi: *See—*
  - Kiyoshige, Masanori; Okada, Tomonobu; Kawashima, Takashi; and Hirokawa, Takeshi, 5,018,317, Cl. 51-410.000.
- Hirose, Teruyoshi: *See—*
  - Roser, Daniel J.; and Hirose, Teruyoshi, 5,018,702, Cl. 248-904.000.
- Hirota, Yuichi: *See—*
  - Morita, Dai; Hirota, Yuichi; and Higashiizumi, Takao, 5,018,528, Cl. 128-661.090.
- Hirsch, Walter; and Becker, Herbert, to Deere & Company. Foreign object protection device for a harvesting machine. 5,019,014, Cl. 460-106.000.
- Hitachi Automotive Engineering Co., Ltd.: *See—*
  - Hasebe, Nobutoshi, 5,018,611, Cl. 192-42.000.
- Hitachi Engineering Co., Ltd.: *See—*
  - Niino, Tsuyoshi; Nakayama, Tadakazu; Tsuruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, 5,019,328, Cl. 376-310.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Hitachi Koki Company, Limited: *See—*
  - Kurosawa, Hideki, 5,019,023, Cl. 475-269.000.
  - Matsuno, Junichi; Ogasawara, Tsuyoshi; Kawauchi, Masataka; and Tsuji, Yasuyuki, 5,018,718, Cl. 271-245.000.
  - Nishimura, Hiroshi; Miyasaka, Masao; Itoh, Nobuhiko; Hiki, Toshio; and Igarashi, Akira, 5,018,888, Cl. 400-616.100.
- Hitachi, Ltd.: *See—*
  - Funabashi, Tsuneo; Sakoshita, Kaoru; and Yonezawa, Hiroshi, 5,019,962, Cl. 364-200.000.
  - Hasebe, Nobutoshi, 5,018,611, Cl. 192-42.000.
  - Kaji, Hiroyuki; and Nitta, Yoshihiko, 5,020,021, Cl. 364-900.000.
  - Kawamata, Syooichi; Takahashi, Tadashi; and Miyashita, Kunio, 5,019,776, Cl. 324-207.120.
  - Matsuno, Junichi; Ogasawara, Tsuyoshi; Kawauchi, Masataka; and Tsuji, Yasuyuki, 5,018,718, Cl. 271-245.000.
  - Mitani, Katsuhiko; Tanoue, Tomonori; Kusano, Chushiro; Kobayashi, Masayoshi; and Takahashi, Susumu, 5,019,524, Cl. 437-31.000.
  - Nakamura, Tohru; Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, 5,019,523, Cl. 437-31.000.
  - Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, 5,020,041, Cl. 369-13.000.
  - Niino, Tsuyoshi; Nakayama, Tadakazu; Tsuruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, 5,019,328, Cl. 376-310.000.
  - Onozawa, Makoto; Ohsawa, Michitaka; and Tonami, Katsuhiko, 5,019,754, Cl. 315-408.000.
  - Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi; Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, 5,019,891, Cl. 357-70.000.
  - Sugai, Kazunari; Takeuchi, Osamu; Wakasa, Yasuyuki; Taguchi, Kenji; and Ogata, Toshio, 5,019,249, Cl. 209-534.000.
  - Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi; Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, 5,019,773, Cl. 324-166.000.
  - Watanabe, Haruo; Nakamura, Ichiro; Okamoto, Yoshio; and Konno, Hitoshi, 5,018,501, Cl. 123-472.000.
  - Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.
  - Yasunobu, Seiji; Miyamoto, Shoji; and Ihara, Hirokazu, 5,018,689, Cl. 246-182.00B.
  - Yoshio, Shintani; and Mikio, Inatsu, 5,019,889, Cl. 357-42.000.
- Hitachi Video Engineering, Inc.: *See—*
  - Onozawa, Makoto; Ohsawa, Michitaka; and Tonami, Katsuhiko, 5,019,754, Cl. 315-408.000.
- Hitchcock, Robert F.: *See—*
  - Arneson, Theodore R.; Hitchcock, Robert F.; and Williams, Julie D. N., 5,018,624, Cl. 206-560.000.
- Ho, W. S. Winston: *See—*
  - Sartori, Guido; Ho, W. S. Winston; Savage, David W.; Noone, Robert E.; and Mastondrea, Robert P., 5,019,666, Cl. 585-819.000.
- Hochtemperatur-Reaktorbau GmbH: *See—*
  - von Charzewski, Cornelia; Leithner, Dietrich; Schmitt, Hermann; and Schoening, Josef, 5,019,322, Cl. 376-158.000.
- Hock, Augustine O. S.: *See—*
  - Keat, Ooi C.; May, Choo Y.; and Hock, Augustine O. S., 5,019,668, Cl. 585-864.000.
- Hockenberger, Lothar: *See—*
  - Bergmann, Franz-Josef; Hockenberger, Lothar; and Schadt, Waltraut, 5,019,619, Cl. 524-405.000.
- Hocker, Robert A.: *See—*
  - McCurry, Patrick W.; Kellogg, James R.; Boekelheide, Karl; Sexton, Kenneth D.; Ellson, George A.; and Hocker, Robert A., 5,019,717, Cl. 307-66.000.
- Hockings, William A.: *See—*
  - Hanson, David G., Jr.; and Hockings, William A., 5,019,171, Cl. 134-2.000.
- Hocquaux, Michel: *See—*
  - Philippe, Michel; Hocquaux, Michel; Sebag, Henri; Beck, Irina; and Laugier, Jean P., 5,019,567, Cl. 514-164.000.
- Hoden, Ebbe; and Mokvist, Maja; A., to AB Bergasa Industrier. Tampon and a method for its manufacture. 5,019,061, Cl. 604-358.000.
- Hodges, B. Eugene. Stackable soil pipe spacer flange. 5,018,224, Cl. 4-252.00R.
- Hodgkins, David H.: *See—*
  - Granville, Jeffrey H.; Church, John; and Hodgkins, David H., 5,019,141, Cl 55-170.000.
- Hoechst AG: *See—*
  - Gutweiler, Matthias; Driscoll, Robert K.; and Leupold, Ernst I., 5,019,624, Cl. 525-61.000.
  - Marten, Manfred, and Kamutzki, Walter, 5,019,606, Cl. 523-414.000.
- Hoechst Aktiengesellschaft: *See—*
  - Kulitzscher, Berndt, 5,018,554. Cl. 138-26.000.
- Hoechst Celanese Corporation: *See—*
  - Engel-Badar, Monika; and Furr, Bobby N., 5,019,640, Cl. 528-272.000.
  - Mammato, Donald C.; Jain, Sangya; Durham, Dana; Spak, Mark A.; Usifer, Douglas A.; and McFarland, Michael, 5,019,488, Cl. 430-325.000.
- Hoecht, Dietrich H., to Scientific-Atlanta, Inc. Pedestal assembly having a reduced volume in a lubricant filled housing. 5,018,407, Cl. 74-606.00R.
- Hoeksma, Gerben S., to N.V. Nederlandsche Appartenfabriek Nedap. DC-to-AC voltage converter having galvanically separate input and output circuits. 5,019,955, Cl. 363-21.000.
- Hoelscher, Charles H.: *See—*
  - Manner, James A.; and Hoelscher, Charles H., 5,019,659, Cl. 568-949.000.
- Hoene, Eberhard. Anti-refluxive internal ureteral stent with a dynamic hood-valve at the vesical end for prevention of urinary reflux into the upper urinary tract upon increase of vesical pressure. 5,019,102, Cl. 623-12.000.
- Hofer, Arnold; and Wegmann, Alex, to Ciba-Geigy Corporation. Novel epoxy resins. 5,019,639, Cl. 528-94.000.
- Hoffman, Brian: *See—*
  - Hutchinson, James; Hoffman, Brian; and Pollack, Steven, 5,018,266, Cl. 29-568.000.
- Hoffman, J. Kenneth; and Blake, Joseph W., III, to GTE Products Corporation. Hypodermic syringe. 5,019,053, Cl. 604-220.000.
- Hoffman, Jeffrey H.: *See—*
  - Schenck, Robert; Hoffman, Jeffrey H.; Klein, Michael N.; and Kouba, Gene R., 5,018,628, Cl. 211-153.000.
- Hoffman-La Roche Inc.: *See—*
  - Schulz, Peter, 5,019,351, Cl. 422-99.000.
- Hoffman, Steven D.: *See—*
  - Grood, Edward S.; Butler, David L.; Ledyard, D. Michael; and Hoffman, Steven D., 5,018,514, Cl. 128-80.00C.
- Hognestad, Jon; and Selvig, Einar K., to Media Craft a.s. Apparatus for separating a number of periodicals from a stack of periodicals. 5,018,940, Cl. 414-796.800.
- Hohenwarter, Gert K. G.: *See—*
  - Martens, Jon S.; Beyer, James B.; Nordman, James E.; and Hohenwarter, Gert K. G., 5,019,721, Cl. 307-306.000.
- Holden, Brian D.; Presuhn, Randall M.; Robertson, William L.; and Schultz, Gaymond W., to Stratacom, Inc. Packet voice/data communication system having protocol independent repetitive packet suppression. 5,020,058, Cl. 370-109.000.
- Holesovsky, Ulrich: *See—*
  - Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
- Holland, Eddie L., to Phillips & Brooks/Gladwin, Inc. Adjustable height mounting pedestal for public and coin telephones. 5,020,103, Cl. 379-454.000.
- Holland, Robert J.: *See—*
  - Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.
- Hollinger, Theodore G.: *See—*
  - Meyer, Theodore O.; Mosier, John W., II; Pike, Douglas A., Jr.; Hollinger, Theodore G.; and Tsang, Dah W., 5,019,522, Cl. 437-29.000.
- Hollingsworth (U.K.) Limited: *See—*
  - Haworth, Walter; and Wood, Alfred, 5,018,248, Cl. 19-240.000.
- Hollis, Theodore M.: *See—*
  - Gardner, Thomas W.; and Hollis, Theodore M, 5,019,591, Cl. 514-461.000.
- Holloway, Thomas F. Cosmetic stick dispenser. 5,018,893, Cl. 401-75.000.
- Hollstein, Thomas E.: *See—*
  - Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.
- Holm, Klas: *See—*
  - Kock, Bengt; and Holm, Klas, 5,019,276, Cl. 210-744.000.
- Holman, Andrew P., to Cimex Limited. Carpet cleaner. 5,018,240, Cl. 15-349.000.
- Holmberg, Arthur, Jr.; and Wilson, David E., to Rockwell International Corporation. Magnetic rotary thermal joint. 5,018,571, Cl. 165-41.000.
- Holmberg, Scott H., to Honeywell, Inc. Method of manufacturing flat panel backplanes including electrostatic discharge prevention and displays made thereby. 5,019,002. Cl. 445-24.000.
- Holt, Christopher C.: *See—*
  - Gulliver, James A.; Holt, Christopher C.; Boness, Kenneth D.; and Anderson, Martin R., deceased, 5,019,777, Cl. 324-242.000.
- Holtzclaw, James O., Jr., to Hunter Company, The. Rifle sling with rifle rest. 5,018,652, Cl. 224-150.000.
- Homberg, Gerd: *See—*
  - von Hagen, Ingo; Prasser, Christoph; and Homberg, Gerd, 5,019,180, Cl. 148-12.00B.
- Homer, Hollandse Meet- En Regelsystemen B.V.: *See—*
  - Krop, Hugo K., 5,018,830, Cl. 350-105.000.
- Honda Giken Kogyo Kabushiki Kaisha: *See—*
  - Furukawa, Yoshimi, 5,019,982, Cl. 364-424.050.
  - Kamimura, Kenji; and Tsuzuki, Sadachika, 5,019,990, Cl. 364-449.000.
  - Kano, Kouji; Tabata, Hajime; and Kawakami, Toshikazu, 5,019,733, Cl. 310-61.000.
- Honda, Toshio: *See—*
  - Nakamura, Makoto; Honda, Toshio; Chikaraishi, Toshio; and Fukuura, Yukio, 5,019,319, Cl. 273-218.000.
- Honegger, Werner: *See—*
  - Meier, Jacques; and Honegger, Werner, 5,019,716, Cl. 270-55.000.

- Honeywell Inc.: *See—*
  - Bielas, Michael S.; and El-Wailly, Tamim F., 5,018,860, Cl. 356-350.000.
  - Chang, Chin L.; and Dankwort, Rudolf C., 5,018,859, Cl. 356-350.000.
  - Holmberg, Scott H., 5,019,002, Cl. 445-24.000.
  - Miller, Michael S.; and Spaanenburg, Hendrik A. E., 5,020,014, Cl. 364-723.000.
  - Sanders, Glen A.; Smith, Robert B.; and Rouse, Gordon F., 5,018,857, Cl. 356-350.000.
  - Schuetz, James A., 5,019,461, Cl. 428-688.000.
- Hong, Kwang Y. Mechanical shovel. 5,018,282, Cl. 37-130.000.
- Hong, Yong P., to Goldstar Co., Ltd. AM/FM band selector. 5,020,145, Cl. 455-188.000.
- Honjo, Takeshi; Kobayashi, Kenji; Yoshida, Akimaro; and Saeki, Takami, to Canon Kabushiki Kaisha. Original handling apparatus. 5,018,714, Cl. 271-3.100.
- Honjo, Takeshi: *See—*
  - Yoshida, Akimaro; and Honjo, Takeshi, 5,018,716, Cl. 271-227.000.
- Honkanen, Erkki J.: *See—*
  - Haikala, Heimo O.; Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., 5,019,575, Cl. 514-247.000.
- Honma, Shiro; Tominari, Kenichi; and Kurisu, Masayoshi, to Mitsui Petrochemical Industries, Ltd. Injection-molding polyolefin composition. 5,019,627, Cl. 525-240.000.
- Honzawa, Katsu, to Hamamatsu Photonics K. K. Method of modifying the surface of a particle comprising a magnetic particle. 5,019,416, Cl. 427-47.000.
- Hooghiem, Jelle; van der Sloot, Bart; and Epema, Sytse, to Tebel Pneumatiek B.V. Magnetic rail brake device. 5,018,605, Cl. 188-165.000.
- Hook, Bertil: *See—*
  - Tenerz, Lars; and Hook, Bertil, 5,018,529, Cl. 128-667.000.
- Hooper, David: *See—*
  - Jurchuk, Paul; Hooper, David; Staff, Alan; and Sitt, Hans, 5,018,338, Cl. 53-532.000.
- Hoover Group, Inc.: *See—*
  - Thomas, Larry D., 5,018,752, Cl. 277-152.000.
- Hoover, Thomas M., to Orbital Walbro Corporation. Air/fuel ratio control in an internal combustion engine. 5,018,498, Cl. 123-435.000.
- Hoover Universal, Inc.: *See—*
  - Siegrist, Ronald R., 5,018,696, Cl. 248-429.000.
- Hopp, Thomas P., to New York Blood Center, Inc. Fatty acid carriers for synthetic peptides. 5,019,383, Cl. 424-88.000.
- Horgan, Gary A. Card file adaptor. 5,018,897, Cl. 402-79.000.
- Hori, Toshio: *See—*
  - Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, 5,018,990, Cl. 439-620.000.
- Horikawa, Mituo; and Moritsu, Kazuki, to Mitsubishi Denki Kabushiki Kaisha. Cryogenic refrigeration apparatus. 5,018,359, Cl. 62-51.100.
- Hornbeck, Larry J., to Texas Instruments Incorporated. Architecture and process for integrating DMD with control circuit substrates. 5,018,256, Cl. 29-25.010.
- Horodysky, Andrew G.: *See—*
  - Farng, Liehpao O.; Doner, John P.; and Horodysky, Andrew G., 5,019,282, Cl. 252-32.70E.
  - Farng, Lienpao; and Horodysky, Andrew G., 5,019,284, Cl. 252-46.700.
- Horton, James, to OCA Applied Optics, Inc. Passive beam derotator. 5,018,844, Cl. 350-486.000.
- Horwell, David C.; and Rees, David C., to Warner-Lambert Company. 1-oxaspiro[4,5] decane-7,8-diaminoarylamides. 5,019,588, Cl. 514-409.000.
- Hosaka, Akio: *See—*
  - Katsunori, Oshiage; Hosaka, Akio; and Yamamoto, Akito, 5,019,799, Cl. 340-438.000.
- Hoshi, Katsuhiko: *See—*
  - Aoki, Ken; Hoshi, Katsuhiko; Satoh, Shigeo; Kakinuma, Mitsuru; Togashi, Shigeru; and Saitoh, Hiromi, 5,018,363, Cl. 62-135.000.
- Hoshi, Kouichi: *See—*
  - Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, 5,018,494, Cl. 123-339.000.
- Hoshi, Satoshi: *See—*
  - Makino, Naonori; Ohno, Shigeru; Hoshi, Satoshi; and Kitatani, Katsuji, 5,019,474, Cl. 430-76.000.
- Hoshiba, Akihiko; and Hakamata, Kyoji, to Sanshin Kogyo Kabushiki Kaisha. Fuel increasing system for engine. 5,018,503, Cl. 123-580.000.
- Hoshino, Osamu: *See—*
  - Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.
- Hosogi, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Field effect transistor. 5,019,877, Cl. 357-22.000.
- Hosoi, Miyuki: *See—*
  - Shimaoka, Hitoshi; Mizuo, Shigera; Akashi, Akira; and Hosoi, Miyuki, 5,019,484, Cl. 430-293.000.
- Hosokawa, Kazuo R.: *See—*
  - Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.
- Hosono, Chihiro: *See—*
  - Hayakawa, Youichi; Hosono, Chihiro; and Nishida, Masaaki, 5,019,025, Cl. 475-285.000.
- Hosono, Yoshimasa, to Sony Corporation. Decoding apparatus for digital signal. 5,019,816, Cl. 341-77.000.
- Hot-Hed, Inc.: *See—*
  - Wardlaw, Louis J., III, 5,018,321, Cl. 52-2.170.
- Hotori, Masahiro: *See—*
  - Arai, Yuji; Ogawa, Hiroshi; and Hotori, Masahiro, 5,020,048, Cl. 369-291.000.
- Houlachi, George; Murphy, Terry J.; St-Onge, Jean-Pierre; and Daoust, Daniel, to Noranda Inc. Chemical treatment of aluminum cathodes in zinc electrowinning. 5,019,172, Cl. 134-3.000.
- House Food Industrial Co., Ltd.: *See—*
  - Hattori, Ryuichi, 5,019,412, Cl. 426-242.000.
- Howard, Allen Q., Jr.; and Rossi, David J., to Schlumberger Technology Corporation. Depth determination system utilizing parameter estimation for a downhole well logging apparatus. 5,019,978, Cl. 364-422.000.
- Howell, Tony M.: *See—*
  - Grubbs, Harvey J.; Prasad, Ravi; and Howell, Tony M., 5,018,540, Cl. 131-297.000.
- Hoya Corporation: *See—*
  - Hara, Koichi, 5,019,146, Cl. 65-18.100.
- Hrenyo, John, to Tekni-Plex Inc. Molded plastic overwrap tray. 5,018,623, Cl. 206-557.000.
- Hryhorenko, Socrates: *See—*
  - Nbedi, Sylvain L.; Bobo, Robert D.; and Hryhorenko, Socrates, 5,019,692, Cl. 219-469.000.
- Hsieh, Dean S. T.: *See—*
  - Folkman, Judah; Langer, Robert S., Jr.; and Hsieh, Dean S. T., 5,019,372, Cl. 424-9.000.
- Hsu, Chao-Yang; Patel, Vasant K.; Vahlsing, David H.; Wei, James T.; and Myers, Harry K., Jr., to Sun Refining and Marketing Company. Liquid phase isomerization of alkanes. 5,019,671, Cl. 585-751.000.
- Hsu, Chung: *See—*
  - Davison, John; and Hsu, Chung, 5,018,855, Cl. 356-312.000.
- Hsu, Fu-Chieh: *See—*
  - Yang, Tsen-Shau; Chou, Ger-Chih; and Hsu, Fu-Chieh, 5,019,771, Cl. 324-158.00P.
- Hsu, John S.; and Woodson, Herbert H., to University of Texas. Method and apparatus for improving performance of AC machines. 5,019,766, Cl. 318-807.000.
- Hsu, Ming C.: *See—*
  - Kasparian, Kaspar; Ide, John D.; Brown, Thomas A.; Rogers, Aaron S.; Fussell, John P.; and Hsu, Ming C., 5,020,135, Cl. 455-76.000.
- Huang, Chi-Chieh. Cutting device. 5,018,275, Cl. 30-124.000.
- Huang, Jong-Kang, to Industrial Technology Research Institute. Process for stripping plated plastic materials. 5,019,161, Cl. 75-715.000.
- Huang, Rong-Fong; and Anderson, Dean, to Motorola, Inc. High frequency dielectric composition. 5,019,306, Cl. 264-66.000.
- Hubbell Incorporated: *See—*
  - Flory, Isaac L., IV; and Nuckolls, Joe A., 5,019,751, Cl. 315-290.000.
- Huber, Otto: *See—*
  - Bock, August; Lechner, Konrad; and Huber, Otto, 5,019,514, Cl. 435-254.000.
- Huber, Robert J. Nonvolatile SNOS memory cell with induced capacitor. 5,020,030, Cl. 365-185.000.
- Hubner, Hans-Jorg, to Gesellschaft fur Geratebau mbH. Gas work with sensing and alarm means. 5,018,518, Cl. 128-202.220.
- Hubner, Hans-Jorg; and Rische, Heribert, to Gesellschaft fur Geratebau mbH. Aeration or breathing apparatus. 5,018,520, Cl. 128-205.120.
- Huels Aktiengesellschaft: *See—*
  - Muller, Hartmut; and Bruning, Klaus, 5,019,638, Cl. 528-83.000.
- Huet, Catherine: *See—*
  - Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, 5,019,643, Cl. 528-361.000.
- Huet, Thierry: *See—*
  - Wain-Hobson, Simon; Huet, Thierry; Delaporte, Eric; and Brun-Vezinet, Francoise, 5,019,510, Cl. 435-235.100.
- Huffy Corporation: *See—*
  - Bishop, Stephen J., 5,019,312, Cl. 264-152.000.
- Hughes Aircraft Company: *See—*
  - Bailey, Wilbur M., 5,019,780, Cl. 324-457.000.
  - de La Chapelle, Michael; Bryan, Richard E.; and Brenneise, Clark D., 5,019,826, Cl. 342-202.000.
  - Knauer, Wolfgang, 5,019,712, Cl. 250-423.00R.
  - Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.
  - Macaulay, Malcolm, 5,020,116, Cl. 382-44.000.
  - McNab, Kevin M., 5,019,793, Cl. 333-156.000.
  - McNeil, John A.; and Cohn, David B., 5,020,069, Cl. 372-59.000.
  - Peterson, Stanley P. D., 5,018,678, Cl. 242-47.000.
  - Schumacher, Robert W., 5,019,752, Cl. 315-344.000.
- Hughes, Houston H., III: *See—*
  - Nazarenk, Dimitri M.; Hughes, Houston H., III; Gordon, Robert T.; Hattey, David L.; and Yurman, Bruno, 5,020,132, Cl. 455-17.000.
- Hughes, Jeffrey T. Game call. 5,019,008, Cl. 446-207.000.
- Huizer, leendert: *See—*
  - Hennink, Wilhelmus E.; and Huizer, leendert, 5,019,100, Cl. 623-6.000.
- Hukamachi, Etsuko. Tobacco substitute. 5,018,541, Cl. 131-359.000.
- Hull, Harold L.; and Currey, Albert B. Side or end dump article carrier. 5,018,651, Cl. 224-42.440.

VOL 1126 ISS 4 MY 28 1991 UMI

- Humphrey, Brian: *See—*
  - Waterfield, Adam P. M.; Waterfield, Norman R.; Chapman, David A.; Andrews, Thomas K.; and Humphrey, Brian, 5,018,233, Cl. 12-133.00B.
- Humpl, Josef; Konrad, Johann; Sturm, Reinhold; and Attenni, Johann, to Audi AG. Apparatus for the degassing of fuel. 5,018,502, Cl. 123-514.000.
- Hunninghaus, Roy E.: *See—*
  - Hess, Robert M.; and Hunninghaus, Roy E., 5,019,722, Cl. 307-354.000.
- Hunt, James R.: *See—*
  - Udell, Kent S.; Sitar, Nicholas; Hunt, James R.; and Stewart, Lloyd D., Jr., 5,018,576, Cl. 166-272.000.
- Hunter, Christopher; and Yau, David, to Reckitt & Colman Products Limited. Pharmaceutical composition. 5,019,563, Cl. 514-58.000.
- Hunter Company, The: *See—*
  - Holtzclaw, James O., Jr., 5,018,652, Cl. 224-150.000.
- Hunter Engineering Company, Inc.: *See—*
  - Braun, Curt, 5,018,966, Cl. 432-59.000.
- Hunziker, Werner. Apparatus for surface treatment of workpieces. 5,018,318, Cl. 51-417.000.
- Huss, Albin, Jr.: *See—*
  - Del Rossi, Kenneth J.; Dessau, Ralph M.; Huss, Albin, Jr.; Kirker, Garry W.; Marler, David O.; and Partridge, Randall D., 5,019,664, Cl. 585-419.000.
- Hutchinson: *See—*
  - Bretaudeau, Jean-Pierre; and Salaud, Jean-Luc, 5,018,699, Cl. 248-562.000.
  - Georget, Pierre, 5,019,018, Cl. 474-117.000.
- Hutchinson, James; Hoffman, Brian; and Pollack, Steven, to Megamation Incorporated. Novel means for mounting a tool to a robot arm. 5,018,266, Cl. 29-568.000.
- Hwa, Chih M.; Kelly, John A.; Neton, Janet; Scanlon, Patricia M.; and Gaudette, Roger R., to W. R. Grace & Co.-Conn. Control of corrosion in aqueous systems using certain phosphonomethyl amines. 5,019,343, Cl. 422-16.000.
- Hwang, Yun-Sheng: *See—*
  - Tsai, Nan-Hsiung; and Hwang, Yun-Sheng, 5,019,534, Cl. 437-200.000.
- Hyde, Christopher T.: *See—*
  - Bowser, John J.; and Hyde, Christopher T., 5,019,140, Cl. 55-159.000.
- Hydro-Quebec: *See—*
  - Muller, Daniel; Chabagno, Jean-Michel; and Duval, Michel, 5,019,469, Cl. 429-192.000.
- Hydro Rene Luc: *See—*
  - Porel, Louis C., 5,018,753, Cl. 277-165.000.
- I.C.I. Pharma: *See—*
  - Arnould, Jean C.; Boucherot, Dominique; Davies, David H.; Jung, Frederick H.; and Strawson, Colin J., 5,019,570, Cl. 514-202.000.
- I L. Med., Inc.: *See—*
  - Lombardo, Igino, 5,020,070, Cl. 372-65.000.
- Iba, Akio: *See—*
  - Yamaya, Hideo; and Iba, Akio, 5,018,429, Cl. 84-622.000.
- Ibaraki, Akira: *See—*
  - Iga, Kenichi; Ibaraki, Akira; Kawashima, Kenji; Furusawa, Kotaro; and Ishikawa, Toru, 5,020,066, Cl. 372-45.000.
- Ibiden Co., Ltd.: *See—*
  - Enomoto, Ryo; and Yamada, Masaya, 5,018,810, Cl. 350-96.120
- Ichihara, Yasuo: *See—*
  - Isobe, Takeshi; Matsuo, Yutaka; and Ichihara, Yasuo, 5,019,333, Cl. 420-422.000.
- Ichikawa, Masaharu, to Yaka Feudor K.K. Liquid fuel gasifying device and method for producing the device, and burning device. 5,018,965, Cl. 431-344.000.
- Ichinose, Katsuki; and Wada, Tomohisa, to Mitsubishi Denki Kabushiki Kaisha. Static semiconductor memory device with predetermined threshold voltages. 5,020,029, Cl. 365-154.000.
- ICI Americas Inc.: *See—*
  - Baker, Don R.; and Brownell, Keith H., 5,019,565, Cl. 514-89.000
- Ida, Mitsuru; and Yamaguchi, Yasuhiro, to Sony Corporation. Translation cam means. 5,018,401, Cl. 74-354.000.
- Ide, John D.: *See—*
  - Kasparian, Kaspar; Ide, John D., Brown, Thomas A.; Rogers, Aaron S.; Fussell, John P. and Hsu, Ming C., 5,020,135, Cl. 455-76.000
- Identitech: *See—*
  - Anderson, Philip M., III, 5,019,801, Cl. 340-522.000
- Ifill, Lee; Walker, Robert, Wolfe, Steven; and Schena, Fiore, to Fischer & Porter Company. Ultraviolet lamp rack assembly. 5,019,256, Cl. 210-232.000.
- Iga, Katsumi: *See—*
  - Hamaguchi, Naoru; Iga, Katsumi; and Ogawa, Yasuaki, 5,019,394, Cl. 424-423.000
- Iga, Kenichi, Ibaraki, Akira, Kawashima, Kenji; Furusawa, Kotaro; and Ishikawa, Toru, to Development Corporation of Japan; Tokyo Institute of Technology; and Sanyo Electric Co., Ltd. Surface-emitting-type semiconductor laser device. 5,020,066, Cl. 372-45.000.
- Igarashi, Akira: *See—*
  - Nishimura, Hiroshi; Miyasaka, Masao; Itoh, Nobuhiko, Hiki, Toshio; and Igarashi, Akira, 5,018,888, Cl. 400-616.100.
- Igarashi, Masaru, to Canon Kabushiki Kaisha. Image output apparatus capable of outputting forms in special colors. 5,020,004, Cl. 364-519.000
- Ignasiak, Boleslaw L.: *See—*
  - Ignasiak, Teresa; Turak, Ali A.; Pawlak, Wanda, Ignasiak, Boleslaw L.; Guerra, Carlos R.; and Zwillenberg, Melvin L., 5,019,245, Cl. 209-166.000.
- Ignasiak, Teresa; Turak, Ali A.; Pawlak, Wanda; Ignasiak, Boleslaw L.; Guerra, Carlos R.; and Zwillenberg, Melvin L. Method for recovery of hydrocarbons form contaminated soil or refuse materials. 5,019,245, Cl. 209-166.000.
- Iguchi, Yuichi: *See—*
  - Matsubara, Hidetsugu; Iguchi, Yuichi; Tanaka, Shinya; and Miyashita, Kazuya, 5,018,953, Cl. 418-201.100.
- Ihara Chemical Industry Co., Ltd.: *See—*
  - Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.
- Ihara, Hirokazu: *See—*
  - Yasunobu, Seiji; Miyamoto, Shoji; and Ihara, Hirokazu, 5,018,689, Cl. 246-182.00B.
- Iida, Takashi: *See—*
  - Mizushima, Yoshihiko; Iida, Takashi; Hirohata, Toru; Sugimoto, Kenichi; Warashina, Yoshihisa; and Nakajima, Kazutoshi, 5,020,064, Cl. 372-37.000.
- Iijima, Takeshi: *See—*
  - Mino, Hisashi; Iijima, Takeshi; and Monden, Kuniaki, 5,019,471, Cl. 430-11.000.
- Iijima, Tatsuya; and Morokuma, Hiroshi, to Casio Computer Co., Ltd. Electronic musical instrument with a touch response function. 5,018,430, Cl. 84-625.000.
- Iizuka, Toshi: *See—*
  - Arita, Yoshikazu; Abe, Yukio; Iizuka, Toshi; Nakamura, Yoshio; Takigami, Shoji; and Takigami, Machiko, 5,019,603, Cl. 521-181.000.
- Ikeda, Akihiko: *See—*
  - Ai, Hideo; Suga, Nobuhiko; Ogitani, Satoshi; Takahashi, Hideaki, and Ikeda, Akihiko, 5,019,482, Cl. 430-283.000.
- Ikeda Bussan Co., Ltd.: *See—*
  - Mizuno, Hisayoshi; and Mori, Masami, 5,018,958, Cl. 425-117.000.
- Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, to Sanyo Electric Co., Ltd.; and Mitsubishi Kasei Corporation. Solid electrolytic capacitor. 5,019,949, Cl. 361-525.000.
- Ikegami Tsushinki Co., Ltd.: *See—*
  - Yamamoto, Kazumi; and Sugasawa, Masayuki, 5,019,895, Cl. 358-36.000.
- Iliuta, Radu. Golf ball cup ejecting apparatus. 5,018,730, Cl. 273-34.00A.
- Illinois Tool Works Inc.: *See—*
  - Bolger, Richard P., 5,018,443, Cl. 101-228.000.
  - Hasan, S. Riaz; and Thomas, Louis, 5,018,329, Cl. 52-410.000.
  - Marco, Leslie S.; Klygis, Mindaugas J.; and Weaver, William N., 5,018,620, Cl. 206-150.000.
- Ima, Seiichiro: *See—*
  - Ogawa, Tadatoshi; and Ima, Seiichiro, 5,019,442, Cl. 428-215.000.
- Imaeda, Mikio, to Brother Kogyo Kabushiki Kaisha. Color tone adjustable image recording apparatus. 5,019,873, Cl. 355-326.000.
- Image Technology, Inc.: *See—*
  - Lam, Nicholas L., 5,019,855, Cl. 355-22.000.
- Imai, Yuji: *See—*
  - Asakura, Yasuo, Imai, Yuji; and Kobayashi, Yuji, 5,019,845, Cl. 354-149.100.
- Imaizumi, Ichiro: *See—*
  - Nakamura, Tohru, Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, 5,019,523, Cl. 437-31.000.
- Imaizumi, Tomio, to Tokico Ltd. Hydraulic shock absorber. 5,018,608, Cl. 188-322.150.
- Imanari, Hitoshi: *See—*
  - Inadome, Kiyotaka. Imanari, Hitoshi; Fukino, Kunihiro; and Takayama, Toru, 5,018,843, Cl. 350-429.000.
- Imao, Shoji: *See—*
  - Inokuma, Takahiko, Baba, Sadamu; Imao, Shoji; Kodama, Hitoshi; and Gomi, Takeo, 5,018,915, Cl. 409-231.000.
- Imnet Corporation: *See—*
  - Black, David B., 5,020,115, Cl. 382-44.000.
- Imperial Chemical Industries PLC: *See—*
  - Arnould, Jean C.; Boucherot, Dominique; Davies, David H.; Jung, Frederick H.; and Strawson, Colin J., 5,019,570, Cl. 514-202.000.
  - Cogswell, Frederic N., Hezzell, David J.; and Williams, Peter J., 5,019,450, Cl. 428-402.000.
  - Cox, Eric R.; and Lehaert, Philippe J., 5,018,815, Cl. 350-96.150.
  - Denton, David A.; and Hayfield, Peter C. S., 5,019,224, Cl. 204-54.100.
  - Ridyard, Denis R. A.; and Smith, Peter, 5,019,134, Cl. 8-549.000.
- INA Walzlageer Schaeffler KG: *See—*
  - Seegers, Hanns, 5,018,393, Cl. 73-862.340.
- INA Walzlager Schaeffler KG: *See—*
  - Rabe, Jurgen, 5,018,879, Cl. 384-51.000.
- Inaba, Yutaka: *See—*
  - Mouri, Akihiro; Toyono, Tsutomu; Kaneko, Shuzo; Inaba, Yutaka, and Kanbe, Junichiro, 5,018,841, Cl. 350-350.00S
- Inadome, Kiyotaka, Imanari, Hitoshi; Fukino, Kunihiro; and Takayama, Toru, to Nikon Corporation. Zoom lens apparatus with lens units for zooming and focusing. 5,018,843, Cl. 350-429.000
- Ince, Jane E.: *See—*
  - Ferguson, Clare H. R., Macadam, Anne M., Ince, Jane E.; and Knowles, Christopher J., 5,019,505, Cl. 435-148.000.

- Inco Alloys International, Inc.: *See—*
  - Crum, James R.; Poole, Jon M.; and Hibner, Edward L., 5,019,184, Cl. 148-13.000.
- Industrial Technology Research Institute: *See—*
  - Huang, Jong-Kang, 5,019,161, Cl. 75-715.000.
- Information Appliance, Inc.: *See—*
  - Raskin, Jef; and Winter, James, 5,019,806, Cl. 340-706.000.
- Ing. C. Olivetti & C., S.p.A.: *See—*
  - Uggetti, Sergio, 5,018,885, Cl. 400-196.000.
- Ingersoll-Rand Company: *See—*
  - Clarke-Pounder, Ian J. H.; and Farrar, Edward L., 5,019,123, Cl. 144-208.00B.
- Innovac Technology Inc.: *See—*
  - Breckner, Raymond A.; Henriksson, Kurt K.; Sharratt, Leslie C.; and Sharratt, Leslie M., 5,018,946, Cl. 417-197.000.
- Innovative Controls, Inc.: *See—*
  - MacDonald, Ralph R.; and Menger, William M., 5,019,959, Cl. 363-134.000.
- Inokuma, Takahiko; Baba, Sadamu; Imao, Shoji; Kodama, Hitoshi; and Gomi, Takeo, to Toshiba Kikai Kabushiki Kaisha; and Mitsubishi Rayon Company, Ltd. Spindles of machine tools. 5,018,915, Cl. 409-231.000.
- Inoue, Shinichiro: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Inoue, Takashi: *See—*
  - Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, 5,019,117, Cl. 118-723.000.
- Inoue, Takesi: *See—*
  - Yamaguchi, Atsuo; Takahira, Kenichi; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,019,970, Cl. 364-200.000.
- Inoue, Toshikazu; and Eshita, Takashi, to Fujitsu Limited. Semiconductor device having an epitaxial layer grown heteroepitaxially on an underlying substrate. 5,019,874, Cl. 357-16.000.
- Inoue, Yoshiaki: *See—*
  - Morita, Yoshikazu; Inoue, Yoshiaki; and Wakamatsu, Syuji, 5,019,212, Cl. 162-157.300.
- Insituform of North America, Inc.: *See—*
  - Wells, Jeff P., 5,018,545, Cl. 134-113.000.
- Institut Francais du Petrole: *See—*
  - Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, 5,019,643, Cl. 528-361.000.
  - Chaumette, Patrick; Le Peltier, Fabienne; Szymanski, Raymond; Courty, Philippe; and Verdon, Catherine 5,019,547, Cl. 502-342.000.
- Institut Pasteur: *See—*
  - Wain-Hobson, Simon; Huet, Thierry, Delaporte, Eric, and Brun-Vezinet, Francoise, 5,019,510, Cl. 435-235.100.
- Institut Textile de France: *See—*
  - Bolliand, Robert, 5,018,255, Cl. 28-107.000.
- Institute of Immunology Co., Ltd.: *See—*
  - Machida, Atsuhiko; and Nakamura, Tetsuo, 5,019,386, Cl. 424-89.000.
- Insul Holz-Beton Systems Incorp.: *See—*
  - Walter, Hansruedi; and Walter-Gurzeler, Leni M., 5,019,170, Cl. 106-805.000.
- Intec Plastic Products Gesellschaft m.b.H.: *See—*
  - Kleosch, Wilhelm; and Plobst, Dietmar, 5,019,448, Cl. 428-332.000.
- Intelligence Technology Corporation: *See—*
  - Morris, Walker C., 5,020,090, Cl. 379-58.000.
- Inter Innovation AB: *See—*
  - Chominski, Pawel, 5,020,110, Cl. 382-7.000.
- Inter System Verfahrenstechnik GmbH: *See—*
  - Kohler, Reinhard, 5,019,046, Cl. 604-110.000.
- International Applied Sciences, Inc.: *See—*
  - Wang, Ying, 5,019,262, Cl. 210-490.000.
- International Brace Ltd.: *See—*
  - Dowling, Lorne B., 5,018,693, Cl. 248-217.200.
- International Business Machines Corporation: *See—*
  - Alderson, Graham R.; MacFarlane, Peter R.; and Mori, Tohru, 5,019,963, Cl. 364-200.000.
  - Brown, George T.; Millis, David B.; Reynolds, Paul R.; and Nowak, Ronald P., 5,019,992, Cl. 364-468.000.
  - Chiu, George L.; and Halbout, Jean-Marc, 5,019,707, Cl. 250-306.000.
  - Chou, Ned J.; Goldblatt, Ronald D.; Heidenreich, John E., III, Molis, Steven E.; and Ferreiro, Luis M., deceased, 5,019,210, Cl. 156-643.000.
  - Cochran, David B., 5,020,027, Cl. 365-154.000.
  - Dreibelbis, Jeffrey H.; Gabric, John A.; and Hedberg, Erik L., 5,019,772, Cl. 324-158.00R.
  - Ito, Hiroshi, 5,019,481, Cl. 430-270.000.
  - Kleinsasser, Alan W.; and Woodall, Jerry M., 5,019,530, Cl. 437-175.000.
  - Malagrino, Gerald D., Jr.; and Nelson, Dale A., 5,018,311, Cl. 51-140.000.
  - McCray, Charles M.; Nadler, Brandon S.; Sedgwick, David M.; and Traxler, David M., 5,018,887, Cl. 400-616.100.
  - Smith, Thomas B., 5,020,023, Cl. 364-900.000
  - Solomon, Paul M., and Wright, Steven L. 5,019,882, Cl. 357-23.800
- International Rectifier Corporation: *See—*
  - King, Ray, 5,019,719, Cl. 307-246.000
- International Thermal Packaging, Inc.: *See—*
  - Steidl, Gary V.; Sabin, Cullen M.; and Thomas, Dennis A., 5,018,368, Cl. 62-480.000.
- Interneuron Pharmaceuticals, Inc.: *See—*
  - Wurtman, Richard J.; and Maher, Timothy J., 5,019,594, Cl. 514-561.000.
- Interpatent Anstalt: *See—*
  - Croisier, Jean-Paul, 5,018,932, Cl. 414-498.000.
- Interventional Technologies Inc.: *See—*
  - Farr, Andrew F., 5,019,088, Cl. 606-159.000.
  - Farr, Andrew F., 5,019,089, Cl. 606-172.000.
- Iowa State University Research Foundation, Inc.: *See—*
  - Moulder, John C.; and Rose, James H., 5,019,775, Cl. 324-202.000.
- Isaac, Sharon R.; and Harris, Kevin M., to Acushnet Company. Golf ball clear coating with optical brighteners. 5,018,742, Cl. 273-235.00A.
- Ise, Makoto: *See—*
  - Okino, Tadashi; and Ise, Makoto, 5,019,911, Cl. 358-213.190.
- Iseki & Co., Ltd.: *See—*
  - Ishimaru, Takeshi; and Matsuke, Satoshi, 5,018,346, Cl. 56-202.000.
- Ishibashi, Tadao; and Yamauchi, Yoshiki, to Nippon Telegraph and Telephone Corporation. Heterojunction bipolar transistor. 5,019,890, Cl. 357-34.000.
- Ishibashi, Takashi: *See—*
  - Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, 5,019,548, Cl. 503-209.000.
- Ishida, Masahiko; Yamakawa, Nobuaki; and Shiida, Masahiro, to Yazaki Corporation. Method for press-installing wires. 5,018,269, Cl. 29-861.000.
- Ishige, Kazuo: *See—*
  - Ogasawara, Yasukichi; Ishige, Kazuo; and Ogata, Keizo, 5,019,440, Cl. 428-195.000.
- Ishiguro, Yoichi: *See—*
  - Ooe, Masaharu; Ishiguro, Yoichi; and Tanaka, Gotaro, 5,018,824, Cl. 350-96.210.
- Ishihara, Shunichi: *See—*
  - Niwa, Mitsuyuki; Arai, Takayoshi; Shimizu, Isamu; Takeuchi, Eiji; Murakami, Tsutomu; and Ishihara, Shunichi, 5,019,887, Cl. 357-30.000.
- Ishihara, Tomohiro: *See—*
  - Taniguchi, Atsuki; Yamashita, Haruo; Ishihara, Tomohiro; and Wakisaka, Takaaki, 5,020,057, Cl. 370-102.000.
- Ishii, Masahito; Kataoka, Tatsuo; and Tanaka, Yoshitaka, to Mitsui Mining & Smelting Co., Ltd. Mounting substrate and its production method, and printed wiring board having connector function and its connection method. 5,019,944, Cl. 361-400.000.
- Ishikawa, Akibumi: *See—*
  - Suzuki, Akira; Hibino, Hiroki; Fukuda, Hiroyuki; Takahashi, Yutaka; and Ishikawa, Akibumi, 5,018,509, Cl. 128-6.000.
- Ishikawa, Hiroshi: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Ishikawa, Minoru; and Nakata, Nobuki, to Fujitsu Limited. Channel access system. 5,020,053, Cl. 370-84.000.
- Ishikawa, Norio: *See—*
  - Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko, Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.
- Ishikawa, Tadashi: *See—*
  - Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi, Endo, Takashi; and Moriyama, Jiro, 5,019,840, Cl. 346-134.000.
- Ishikawa, Takatoshi; Saito, Shigemi; Yoshida, Kazuaki; and Fujita, Yoshihiro, to Fuji Photo Film Co., Ltd. Photographic developing apparatus. 5,019,850, Cl. 354-322.000.
- Ishikawa, Toru: *See—*
  - Iga, Kenichi; Ibaraki, Akira; Kawashima, Kenji; Furusawa, Kotaro, and Ishikawa, Toru, 5,020,066, Cl. 372-45.000.
- Ishikawa, Yasuki: *See—*
  - Yasuno, Yoshiki; Ishikawa, Yasuki; Higashimata, Akira; and Fujishiro, Takeshi, 5,019,985, Cl. 364-426.020.
- Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
  - Matsubara, Hidetsugu; Iguchi, Yuichi; Tanaka, Shinya; and Miyashita, Kazuya, 5,018,953, Cl. 418-201.100
- Ishikura, Eiji: *See—*
  - Takai, Kazuki; and Ishikura, Eiji, 5,019,924, Cl. 360-73.140.
- Ishimaki, Takashi; and Simura, Toshio, to Tokico Ltd. Hydraulic pressure control valve. 5,018,796, Cl. 303-9.750.
- Ishimaru, Takeshi; and Matsuke, Satoshi, to Iseki & Co., Ltd. Mowed grass container for mowing machine. 5,018,346, Cl. 56-202.000.
- Ishimoto, Kazumi: *See—*
  - Izumi, Yasuo; Ishimoto, Kazumi; and Makino, Yutaka, 5,018,936, Cl. 414-752.000.
- Ishimura, Toshihiko: *See—*
  - Azuma, Yoshihiko, Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko; Hamada, Masataka, Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.
- Ishiwata, Osamu: *See—*
  - Sato, Noritada, Suzuki, Toshikazu, and Ishiwata, Osamu, 5,019,886, Cl. 357-29.000.
- Ishiyama, Kiyoshige: *See—*
  - Iwata, Satoshi; and Ishiyama, Kiyoshige, 5,019,836, Cl. 346-76.0PH

VOL
1126
ISS
4
MY
28
1991
UMI

Ishizaki, Akira: *See—*

Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, 5,019,702, Cl. 250-208.100.

Islam, Mohammed N., to AT&T Bell Laboratories. Cascadable optical combinatorial logic gates. 5,020,050, Cl. 370-4.000.

Isobe, Takeshi; Matsuo, Yutaka; and Ichihara, Yasuo, to Mitsubishi Metal Corporation; and Mitsubishi Nuclear Fuel Co., Ltd. Zirconium alloy for use in spacer grids for nuclear reactor fuel claddings. 5,019,333, Cl. 420-422.000.

Isoe, Yasuhito, to NEC Corporation. Transponder frequency offset compensation with recurrently assigned unique words. 5,020,131, Cl. 455-10.000.

Isomura, Yukio: *See—*

Kuki, Nobuyuki; Isomura, Yukio; Suzumura, Hirokazu; and Sakakibara, Yoshikazu, 5,018,305, Cl. 49-348.000.

Isozumi, Shuzoo; Yagi, Tetsuo; and Tanaka, Toshinori, to Mitsubishi Denki Kabushiki Kaisha. Dc motor for automotive engine starter. 5,019,739, Cl. 310-233.000.

Isshiki, Kunihiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,020,068, Cl. 372-46.000.

Isuzu Motors Limited: *See—*

Hirai, Katsunori, 5,018,489, Cl. 123-193.00P

Itagaki, Tatsuo: *See—*

Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi, Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, 5,019,891, Cl. 357-70.000.

Itako, Eiji, to Kabushiki Kaisha Nippon Conlux. Puncher and method of controlling the puncher. 5,019,695, Cl. 235-434.000.

Italpres S.n.c. di Frengni Bruno & C.: *See—*

Fergni, Bruno; Venturi, Giancarlo; and Bedogni, Carlo, 5,018,225, Cl. 5-61.000.

Itaoka, Toshinari; and Hirata, Shinichi, to Koshin Sangyo Kabushiki Kaisha. Catheter. 5,019,040, Cl. 604-95.000.

Itaya, Toshiro: *See—*

Yamamoto, Katsumi; Koyama, Tadashi; Aono, Toshio; and Itaya, Toshiro, 5,020,001, Cl. 364-513.000.

Ito, Hiroshi, to International Business Machines Corporation. Aqueous base developable negative resist compositions. 5,019,481, Cl. 430-270.000.

Ito, Hiroyasu, to Mitsubishi Denki Kabushiki Kaisha. Elevator hoist apparatus. 5,018,603, Cl. 187-17.000.

Ito, Masaya, to Fanuc Ltd. Wire disconnection position detecting apparatus. 5,019,684, Cl. 219-69.120.

Ito, Norio, to Seiko Epson Corporation. Back-light device for a video display apparatus. 5,019,749, Cl. 315-224.000.

Ito, Noriyuki: *See—*

Watanabe, Niro; Yoshida, Masato; and Ito, Noriyuki, 5,019,452, Cl. 428-422.000.

Ito, Ralph K.; and LoGerfo, Frank W., to New England Deaconess Hospital Corporation. Biocompatible substance with thromboresistance. 5,019,393, Cl. 424-423.000.

Ito, Takefumi: *See—*

Nakajima, Takashi; Kubozono, Kenji; Mori, Toshihiko; Ito, Takefumi; Hashitsume, Kimio; and Iwase, Shinichi, 5,019,185, Cl. 148-13.200.

Ito, Yasunobu; and Yamada, Kunihiro, to Aisin AW Kabushiki Kaisha. Apparatus for detecting malfunction of interface circuit in communication line between controllers in a vehicle control system. 5,019,810, Cl. 340-825.060.

Itoh, Nobuhiko: *See—*

Nishimura, Hiroshi; Miyasaka, Masao; Itoh, Nobuhiko; Hiki, Toshio; and Igarashi, Akira, 5,018,888, Cl. 400-616.100.

Itoh, Toshio: *See—*

Oguri, Yasuo; Koga, Takao; and Itoh, Toshio, 5,019,367, Cl. 423-626.000.

ITT Corporation: *See—*

Anspaugh, Dennis J.; and Sterbank, John D., 5,018,243, Cl 16-335.000.

Moore, John R., 5,018,985, Cl. 439-174.000.

Iversen, Arthur H., to Coriolis Corporation. Method and apparatus for manufacturing composite superconducting strip. 5,018,570, Cl. 164-461.000.

Iwamoto, Hisashi: *See—*

Kawaberi, Seiji; and Iwamoto, Hisashi, 5,019,953, Cl. 363-21.000.

Iwane, Hiroshi; Sugawara, Takahiro; and Suzuki, Naoki, to Mitsubishi Petrochemical Co., Ltd. Process for preparing p-hydroxybenzyl alcohol. 5,019,656, Cl. 568-764.000.

Iwasaki, Keiichi: *See—*

Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, 5,019,913, Cl. 358-296.000.

Iwase, Shinichi: *See—*

Nakajima, Takashi; Kubozono, Kenji; Mori, Toshihiko; Ito, Takefumi; Hashitsume, Kimio; and Iwase, Shinichi, 5,019,185, Cl. 148-13.200.

Iwata, Akitoshi, to Kabushiki Kaisha Toshiba. Hard disk drive having a carriage lock mechanism. 5,019,932, Cl. 360-105.000.

Iwata, Keiichi: *See—*

Kitahara, Koichi; Shimada, Takashi; and Iwata, Keiichi, 5,019,364, Cl. 423-210.000.

Iwata, Nobukatsu: *See—*

Niino, Tsuyoshi; Nakayama, Tadakazu; Tsaruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, 5,019,328, Cl. 376-310.000.

Iwata, Satoshi; and Ishiyama, Kiyoshige, to Shinko Electric Co., Ltd. Printing method of thermal printer. 5,019,836, Cl. 346-76.0PH.

Iwatani & Co., Ltd.: *See—*

Kamei, Eiichi; Shimomura, Yasushi; Kanda, Yasuo; and Ogawa, Tadashi, 5,019,252, Cl. 210-136.000.

Iwu, Maurice M., to Shaman Pharmaceuticals, Inc. Dioscoretine and its use as a hypoglycemic agent. 5,019,580, Cl. 514-299.000.

Iyama, Tsuyoshi: *See—*

Abe, Masanori; Komatsubara, Yoshiaki; and Iyama, Tsuyoshi, 5,019,001, Cl. 445-3.000.

Iyer, Venkatraman R.: *See—*

Addesso, Mark; Iyer, Venkatraman R.; and Dunn, Robert M., 5,019,961, Cl. 364-192.000.

Iyogi, Kiyoshi; Nakahashi, Masako; Takeda, Hiromitsu; and Shirokane, Makoto, to Kabushiki Kaisha Toshiba. Brazing paste for bonding metal and ceramic. 5,019,187, Cl. 148-24.000.

Izatt, James: *See—*

Clark, Morris; Lawson, Kenneth; and Izatt, James, 5,019,900, Cl. 358-86.000.

Izumi, Yasuo; Ishimoto, Kazumi; and Makino, Yutaka, to Matsushita Electric Industrial Co., Ltd. Electronic parts engaging apparatus. 5,018,936, Cl. 414-752.000.

Izumisawa, Hiroyuki; and Kinoshita, Seiichiro, to NEC Corporation. Computer system for directly transferring vactor elements from register to register using a single instruction. 5,019,969, Cl. 364-200.000.

J. F. Adolff AG: *See—*

Friedrich, Hans-Joachim, 5,019,194, Cl. 156-61.000.

J.M. Voith GmbH: *See—*

Meinecke, Albrecht; Egelhof, Dieter; and Weiss, Wilfried, 5,019,214, Cl. 162-301.000.

J R Automation Technologies, Inc.: *See—*

Assink, Kenneth; Feenstra, Mark J.; and Boyer, Gerald L., Jr., 5,018,957, Cl. 425-112.000.

Jacks, Samuel L.: *See—*

Meyer, Fred J.; and Jacks, Samuel L., 5,018,234, Cl. 15-104.330.

Jackson, Melvin R., to General Electric Company. Low density high strength alloys of Nb-Ti-Al for use at high temperatures. 5,019,334, Cl. 420-426.000.

Jacobs, H. Montgomery; and Forrester, William D. Load restraint bar for cargo vehicles. 5,018,918, Cl. 410-145.000.

Jacobs Suchard AG: *See—*

Becker, Rainer; Schlabs, Brigitte; and Weisemann, Claus, 5,019,413, Cl. 426-460.000.

Jacquet, Sten F., to Baker Hughes Incorporated. Continuous washed sand filter and washer. 5,019,278, Cl. 210-792.000.

Jaguar Cars Limited: *See—*

Randle, Steven J., 5,018,488, Cl. 123-90.550.

Jain, Sangya: *See—*

Mammato, Donald C.; Jain, Sangya; Durham, Dana; Spak, Mark A.; Usifer, Douglas A.; and McFarland, Michael, 5,019,488, Cl. 430-325.000.

Jakobsen, Palle; and Drejer, Jorgen, to Novo Nordisk A/S. Aryloxyphenylpropylamines and their preparation and use. 5,019,592, Cl. 514-524.000.

Jakobsen, Palle: *See—*

Drejer, Jorgen; and Jakobsen, Palle, 5,019,582, Cl. 514-321.000.

James, Michael K.: *See—*

Feldman, Paul L.; James, Michael K.; Brackeen, Marcus F.; Johnson, Michael R.; and Leighton, Harry J., 5,019,583, Cl 514-327.000.

James, Paul G.: *See—*

Brandley, Brian K.; James, Paul G.; and Tiemeyer, Michael, 5,019,231, Cl. 204-182.100.

James River Corporation of Virginia: *See—*

Ang, Jit F.; Miller, William B.; and Blais, Irene M., 5,019,406, Cl. 426-302.000.

Jamison, Mark D.: *See—*

Billman, Fred L.; Jamison, Mark D.; and Wortley, Russell B., 5,018,646, Cl. 222-107.000.

Jannic, Patrice, to Minnesota Mining and Manufacturing Company. Low density, self-extinguishing epoxide composition. 5,019,605, Cl. 523-219.000.

Jannson, Joanna L.: *See—*

Jannson, Tomasz P.; and Jannson, Joanna L., 5,018,814, Cl. 350-96.150.

Jannson, Tomasz P.; and Jannson, Joanna L., to Physical Optics Corporation. Broadband single-mode optical coupler. 5,018,814, Cl. 350-96.150.

Janson, David A., to Eaton Corporation. Modulating limited slip differential. 5,019,021, Cl. 475-150.000.

Japan as represented by Director of Construction Machinery Works of Hokkaido Development Bureau: *See—*

Mikami, Shiro; Ooshima, Seiju; and Nagahara, Yoshio, 5,018,284, Cl. 37-233.000.

Japan Pionics Co., Ltd.: *See—*

Kitahara, Koichi; Shimada, Takashi; and Iwata, Keiichi, 5,019,364, Cl. 423-210.000.

Japan Synthetic Rubber Co., Ltd.: *See—*

Oka, Hiroshi; Okuda, Chozo; Yoshida, Yoshinori; Takahashi, Toshihiko; Kamoshida, Yoichi; and Miura, Takao, 5,019,479, Cl. 430-172.000.

Jarosz, John M.: *See—*

Steiner, Johann; and Jarosz, John M , 5,019,004, Cl. 445-30.000.

Jarvenkyla, Jyri, to Uponor N.V. Device for producing a grate construction and a grate construction. 5,018,959, Cl. 425-325.000.

Jaton, Jean-Philippe, to Bobst SA. Device for aligning box blanks within a machine used for processing them. 5,019,026, Cl. 493-147.000.

Jay, Eric C., to Jay Medical, Ltd. Customized seat cushion. 5,018,790, Cl. 297-458.000.

Jay Medical, Ltd.: *See—*

Jay, Eric C., 5,018,790, Cl. 297-458.000.

Jay, Michael J.; and Ryo, U. Yun, to University of Kentucky Research Foundation. Biodegradable, low biological toxicity radiographic contrast medium and method of x-ray imaging. 5,019,370, Cl. 424-4.000.

Jeffrey, James D.: *See—*

Boisture, Thomas B.; McGrew, Larry D.; Jeffrey, James D.; Wetzel, Robert G.; Livingston, Gene P.; and Baten, Robert A., 5,018,544, Cl. 134-111.000.

Jeffries, Alfred T., III.: *See—*

Toukhy, Medhat A.; and Jeffries, Alfred T., III., 5,019,478, Cl. 430-165.000.

Jellen, David L., to Malibu Boats, Inc. Ski rope attachment device. 5,018,474, Cl. 114-253.000.

Jennejahn, Rosemary J.: *See—*

Derosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., 5,019,287, Cl. 252-54.600.

Jenner, Erhard: *See—*

Cramer, Bernhard M.; Jenner, Erhard; and Minderle, Wolfgang, 5,020,089, Cl. 378-196.000.

Jergenson, Jerg B., to Microparticle Technology, Inc. Shielded counter-rotating spinner assembly for microparticalization of liquid. 5,018,954, Cl. 425-8.000.

Jezequel, Roland: *See—*

Alet, Robert; and Jezequel, Roland, 5,018,973, Cl. 434-62.000.

Jimenez, Antonio; and Rochat, Pierre-Maurice, to Mefina S.A. Adjustment device for feeding cloth in a cloth transport mechanism for a sewing machine. 5,018,467, Cl. 112-315.000.

Jobst, Karin: *See—*

Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.

Johanson, Lars. Workpiece holding system. 5,019,129, Cl. 269-71.000.

John Sterling Corporation: *See—*

Kluge, Richard G., 5,018,302, Cl. 49-56.000.

Johnson, Daniel C., to Graber Industries, Inc. Curtain rod and end bracket assembly. 5,018,626, Cl. 211-105.100.

Johnson, Douglas L. Clamp for installing drawer fronts. 5,018,711, Cl. 269-43.000.

Johnson, Eric A.; Dell'Acqua, Ernani; and Ferrari, Lorenzo, to SPA Societa' Prodotti Antibiotici S.p.A. Process for bacterial decontamination of vegetable foods. 5,019,411, Cl. 426-52.000.

Johnson, Gary D.: *See—*

Stavin, Norman M.; and Johnson, Gary D., 5,018,773, Cl. 294-1.100.

Johnson, Gerald E.; and Rivera, James A., to Otis Elevator Company. Balanced self adjustable escalator handrail drive. 5,018,616, Cl. 198-335.000.

Johnson, Gerald L. R. Timed bedside night-light. 5,019,950, Cl. 362-130.000.

Johnson, Jerry L.: *See—*

Martin, Craig A.; and Johnson, Jerry L., 5,019,150, Cl. 71-90.000.

Johnson, Lorin K.; Seilhamer, Jeffrey J.; Pruzanski, Waldemar; and Vadas, Peter, to Biotechnology Research Partners, Ltd.; and University of Toronto Innovations Foundation, The. Synovial phospholipases. 5,019,508, Cl. 435-198.000.

Johnson, Martin: *See—*

Jones, Robin; and Johnson, Martin. 5,020,015, Cl. 364-728.030.

Johnson, Michael R.: *See—*

Feldman, Paul L.; James, Michael K.; Brackeen, Marcus F.; Johnson, Michael R.; and Leighton, Harry J., 5,019,583, Cl 514-327.000.

Johnson, Norman L. Tank for treating units of a product. 5,018,440, Cl. 99-535.000.

Johnson, Oliver W.: *See—*

Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., 5,019,983, Cl. 364-424.070.

Johnson, Robert W., Jr.; and Krajca, Kenneth E., to Union Camp Corporation. Stabilized rosin esters and hot melt adhesives containing them. 5,019,167, Cl. 106-218.000.

Johnson, William B.: *See—*

Claar, Terry D.; and Johnson, William B., 5,019,539, Cl. 501-87.000.

Johnston, James G.: *See—*

Brazelton, Carl L.; Litherland, Troy C.; and Johnston, James G., 5,018,870, Cl. 366-161.000.

Jones, Harry A. T. Pulley tire rim configuration. 5,019,019, Cl. 474-166.000.

Jones, Jeffrey K. Frosted sculpture method and apparatus. 5,018,360, Cl. 62-66.000.

Jones, Richard V.; and Ramirez, Angel E., to Court Security Systems, Inc. Gate operating mechanism. 5,019,758, Cl. 318-264.000.

Jones, Robin; and Johnson, Martin, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Multichannel digital signal correlator or structurator. 5,020,015, Cl. 364-728.030

Jordan, Maureen L.: *See—*

Ayer, Atul D.; Kuczynski, Anthony L.; Wong, Patrick S. L.; Hamel, Lawrence G.; and Jordan, Maureen L., 5,019,396, Cl. 424-473.000.

Jorgensen, David C.: *See—*

Esper, Leo J.; Jorgensen, David C.; Murrah, Howard E.; Schneider, Michael G.; Phillips, Raymond M.; and Dauzy, Bruce C., 5,018,660, Cl. 229-125.420.

Jozefowicz, Marcel: *See—*

Letourneur, Didier; Douzon, Colette; Migonney, Veronique; Muller, Daniel A.; and Jozefowicz, Marcel, 5,019,269, Cl. 210-635.000.

JSP Corporation: *See—*

Momose, Yoshiaki, 5,019,439, Cl. 428-178.000.

Judd, Wendell, to Technology Development Corporation. Method and apparatus for recycling paper pulp sludge. 5,018,459, Cl. 110-346.000.

Jung, Frederick H.: *See—*

Arnould, Jean C.; Boucherot, Dominique; Davies, David H.; Jung, Frederick H.; and Strawson, Colin J., 5,019,570, Cl. 514-202.000.

Jung, Rolf; and Nalecz, Andrew A., to Eastman Machine Company. Cloth-spreading apparatus having improved control means. 5,018,713, Cl. 270-31.000.

Jung, Seung T.; Park, Soo H.; and Kim, Chun K., to Samsung Electronic Co., Ltd. Laser pick-up. 5,018,804, Cl. 350-3.710.

Jungman, Frank: *See—*

Sridharan, Sri P.; and Jungman, Frank, 5,019,938, Cl. 361-377.000.

Junkin, William W.: *See—*

Pearson, Timothy R.; and Junkin, William W., 5,018,736, Cl. 273-439.000.

Jurchuk, Paul; Hooper, David; Staff, Alan; and Sitt, Hans, to Thurne Engineering Co., Limited. Sliced food handling device. 5,018,338, Cl. 53-532.000.

Juskey, Frank J.; Miles, Barry M.; and Papageorge, Marc V., to Motorola, Inc. Flip-chip package for integrated circuits. 5,019,673, Cl. 174-52.200.

K. K. Anretto: *See—*

Yokoi, Yasuna, 5,018,511, Cl. 128-33.000.

Kabushiki Kaisha Daikin Seisakusho: *See—*

Nagano, Tamio, 5,018,613, Cl. 192-70.250.

Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See—*

Mitsuhashi, Masakazu; and Kurimoto, Masashi, 5,019,385, Cl. 424-85.000.

Kabushiki Kaisha Kawakami Seisakusho: *See—*

Nasu, Nobuo, 5,018,418, Cl. 83-177.000.

Kabushiki Kaisha Kobe Seiko Sho: *See—*

Tsuboi, Noboru, 5,018,947, Cl. 417-295.000.

Kabushiki Kaisha Komatsu Seisakusho: *See—*

Yoshinada, Hiroshi; and Takeda, Shu, 5,018,922, Cl. 414-5.000.

Kabushiki Kaisha Miike Tekkosho: *See—*

Kobayashi, Yoshikazu, 5,019,310, Cl. 264-122.000.

Kabushiki Kaisha Nippon Conlux: *See—*

Itako, Eiji, 5,019,695, Cl. 235-434.000.

Kabushiki Kaisha Nisshin Seisa Kusho: *See—*

Yamane, Shuji; and Tou, Seiji, 5,018,313, Cl. 51-165.710.

Kabushiki Kaisha Okuma Tekkosho: *See—*

Komatsu, Toshiteru, 5,019,763, Cl. 318-571.000.

Kabushiki Kaisha Pilot: *See—*

Tomita, Hajime; and Sonoda, Yasuo, 5,019,164, Cl. 106-22.000.

Kabushiki Kaisha Toshiba: *See—*

Abe, Masanori; Komatsubara, Yoshiaki; and Iyama, Tsuyoshi, 5,019,001, Cl. 445-3.000.

Fujioka, Arisa; and Konda, Takashi, 5,020,114, Cl. 382-44.000.

Iwata, Akitoshi, 5,019,932, Cl. 360-105.000.

Iyogi, Kiyoshi; Nakahashi, Masako; Takeda, Hiromitsu; and Shirokane, Makoto, 5,019,187, Cl. 148-24.000.

Kimura, Tohru; Fujii, Syuso; and Ohsawa, Takashi, 5,019,729, Cl 307-475.000.

Nonaka, Yasuyuki, 5,019,833, Cl. 343-840.000.

Ohshima, Yoichi; and Mori, Seiichi, 5,019,527, Cl. 437-43.000.

Ooi, Katsunori; Sasaki, Hiroshi; and Ariyoshi, Shunji, 5,020,117, Cl. 382-46.000.

Sawa, Takao; Okamura, Masami; and Takahashi, Yumiko, 5,019,190, Cl. 148-306.000.

Sugimoto, Yasuhiro, 5,019,821, Cl. 341-156.000.

Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susumu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 5,018,839, Cl. 350-347.00R.

Yasuki, Seijiro; and Kawai, Kiyoyuki, 5,019,902, Cl. 358-133.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*

Tanaka, Hiroshi; Kawamura, Chuichi; and Ohno, Junichi, 5,018,366, Cl. 62-228.500.

Kabushiki Kaisha Universal: *See—*

Okada, Kazuo, 5,018,737, Cl. 273-143.00R.

Kabushiki Kaisha Yamashita Denshi Sekkei: *See—*

Murakoshi, Satoshi; and Sakurai, Atsushi, 5,019,907, Cl 358-158.000.

Kabushikikaisha Barudan: *See—*

Kato, Katsuyuki; and Yaguchi, Zinichi, 5,018,461, Cl. 112-104.000.

Kaczur, Jerry J.: *See—*

Cawlfield, David W.; and Kaczur, Jerry J., 5,019,226, Cl 204-101.000

Kagata, Tooru: *See—*

Wakabayashi, Hideaki; Kagata, Tooru; and Amano, Hiroyuki, 5,018,597, Cl. 180-247.000.

VOL 1126 ISS 4 MY 28 1991 UMI

- Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, to Kotobuko & Co., Ltd. Writing instrument with eraser dispenser. 5,018,891, Cl. 401-52.000.
- Kagi, Rene , to Riwisa AG Kunststoffwerke; Wernli, Bruno P.; Richner, Gerold; and Richner, Peter. Fluid cell arrangement for compressed air motors. 5,018,435, Cl. 92-48.000.
- Kai, Takashi: *See—*
  - Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.
- Kaidoo, Hiroyuki; and Muraki, Takao, to Yokohama Rubber Co., Ltd., The. Rubber compositions containing carbon blacks of specified physical characteristics. 5,019,617, Cl. 524-346.000.
- Kaita, Masaharu: *See—*
  - Kitamura, Takehiko; Amano, Hirosato; and Kaita, Masaharu, 5,018,962, Cl. 425-556.000.
- Kaji, Hiroyuki; and Nitta, Yoshihiko, to Hitachi, Ltd. System for automatic language translation using several dictionary storage areas and a noun table. 5,020,021, Cl. 364-900.000.
- Kaken Corporation Limited: *See—*
  - Asada, Tanehiko, 5,018,276, Cl. 30-347.000.
- Kakinuma, Mitsuru: *See—*
  - Aoki, Ken; Hoshi, Katsuhiko; Satoh, Shigeo; Kakinuma, Mitsuru; Togashi, Shigeru; and Saitoh, Hiromi, 5,018,363, Cl. 62-135.000.
- Kakiuchi, Shinichi: *See—*
  - Hasegawa, Yoshimi; Kakiuchi, Shinichi; and Tomita, Seisuke, 5,019,320, Cl. 273-235.00R.
- Kaldor, Andrew F., to Ankal Pty Limited. Apparatus for grading fibrous material. 5,019,248. Cl. 209-240.000.
- Kamada, Takayuki: *See—*
  - Nagase, Kenichi; Haraguchi, Hiroshi; Mizuno, Toshiaki; and Kamada, Takayuki, 5,018,362, Cl 62-133.000.
- Kamagami, Shinichi: *See—*
  - Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susumu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 5,018,839, Cl. 350-347.00R.
- Kamei, Eiichi; Shimomura, Yasushi; Kanda, Yasuo; and Ogawa, Tadashi, to Ube Industries, Ltd.; Iwatani & Co., Ltd.; and LEC, Inc. Portable water purifier. 5,019,252, Cl. 210-136.000.
- Kamimura, Kenji; and Tsuzuki, Sadachika, to Honda Giken Kogyo Kabushiki Kaisha. Position detector for moving vehicle. 5,019,990, Cl. 364-449.000.
- Kamino, Toshihide: *See—*
  - Nakayama, Katsutoyo; Morii, Toshimichi; and Kamino. Toshihide. 5,019,956, Cl. 363-50.000.
- Kamio, Shigeru: *See—*
  - Hara, Mitsuo; Kamio, Shigeru; Takao, Mitsunori; Sakita, Katsuya; and Abe, Tomoaki, 5,018,595, Cl. 180-197.000.
- Kamisaka, Takashi: *See—*
  - Noda, Yasushi; Shimozawa, Kenji; and Kamisaka, Takashi, 5,018,836, Cl. 350-247.000.
- Kamiya, Saburo; and Tanimoto, Akikazu, to Nikon Corporation. Laser beam transmitting apparatus. 5,018,848, Cl. 350-572.000.
- Kamoshida, Yoichi: *See—*
  - Oka, Hiroshi; Okuda, Chozo; Yoshida, Yoshinori; Takahashi, Toshihiko; Kamoshida, Yoichi; and Miura, Takao, 5,019,479, Cl. 430-172.000.
- Kamutzki, Walter: *See—*
  - Marien, Manfred; and Kamutzki, Walter, 5,019,606, Cl. 523-414.000.
- Kanai, Hiroshi: *See—*
  - Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, 5,018,494, Cl. 123-339.000.
- Kanbe, Junichiro: *See—*
  - Mouri, Akihiro; Toyono, Tsutomu; Kaneko, Shuzo; Inaba, Yutaka: and Kanbe, Junichiro, 5,018,841, Cl. 350-350.00S.
- Kanda, Yasuo: *See—*
  - Kamei, Eiichi; Shimomura, Yasushi; Kanda. Yasuo; and Ogawa, Tadashi, 5,019,252, Cl. 210-136.000.
- Kanehira, Jun: *See—*
  - Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, 5,019,476, Cl. 430-20.000.
- Kaneko, Fuminori: *See—*
  - Morino, Taisuke; Tanaka, Mami; Kaneko, Fuminori; Ozaki, Takeyuki; and Akiyama, Shuichi, 5,019,680, Cl. 219-10.55E.
- Kaneko, Kiyoshi: *See—*
  - Tanaka, Atsushi; Kaneko, Kiyoshi; and Yoshimura, Yuichiro, 5,019,865, Cl. 355-218.000.
- Kaneko, Shuzo: *See—*
  - Mouri, Akihiro; Toyono, Tsutomu; Kaneko, Shuzo; Inaba, Yutaka: and Kanbe, Junichiro, 5,018,841, Cl. 350-350.00S.
- Kang, Yang M., to Samsung Electronics Co., Ltd. Pop noise removing circuit for a double deck cassette tape recorder. 5,019,921, Cl. 360-67.000.
- Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, to Olympus Optical Co., Ltd. Optical recording medium. 5,019,476, Cl. 430-20.000.
- Kano, Kouji; Tabata, Hajime; and Kawakami, Toshikazu, to Honda Giken Kogyo Kabushiki Kaisha. AC generator. 5,019,733, Cl. 310-61.000.
- Kantz, John F., to Union Carbide Chemicals and Plastics Technology Corporation. Packaging assembly for contaminable materials. 5,018,877, Cl. 383-67.000.
- Kanzaki Paper Manufacturing Co., Ltd.: *See—*
  - Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, 5,019,548, Cl. 503-209.000.
- Kao Corporation: *See—*
  - Tanaka, Nobuhiro, 5,018,927, Cl. 414-331.000.
  - Tanimoto, Hitoshi; Motono, Koichiro; and Goto, Takuo, 5,018,671, Cl. 241-16.000.
- Kapetanic, Peter M., to Wiltron Company. Method for eliminating subharmonic false locking in sampler and frequency multiplier based source locking systems. 5,019,790, Cl. 331-16.000.
- Kaplan, Donald S.; and Hermes, Matthew E., to United States Surgical Corporation. Braided suture. 5,019,093, Cl. 606-228.000.
- Karlin, Lynne M.: *See—*
  - Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.
- Karol, Frederick J.: *See—*
  - Wagner, Burkhard E.; Goeke, George L.; Karol, Frederick J.; and George, Kathleen F., 5,019,633, Cl. 526-125.000.
- Karsh, Herbert, to Eastman Kodak Company. Debris control in an enclosed magnetic tape cartridge. 5,019,933, Cl. 360-132.000.
- Karwacki, Eugene J., Jr.; and Kimock, Fred M., to Air Products and Chemicals, Inc. Method for determining the depth of permeation of a modifier into the interior of a thermoplastic article. 5,019,208, Cl. 156-626.000.
- Kasamatsu, Kiyoto: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Kasei Naoetsu Industries Limited: *See—*
  - Oguri, Yasuo; Koga, Takao; and Itoh, Toshio, 5,019,367, Cl. 423-626.000.
- Kashima, Takamitau; and Monden, Hitoshi, to Fuji Jukogyo Kahushiki Kaisha. Fuel injection quantity control device for alcohol engine. 5,018,483, Cl. 123-1.00A.
- Kasparian, Kaspar; Ide, John D.; Brown, Thomas A.; Rogers, Aaron S.; Fussell, John P.; and Hsu, Ming C., to Teletec Corporation. Computerized multistandard, field-convertible, multiregional/multiservice, remote controllable, remote programmable mobile two-way radio system with digital serial bus link, built-in programmer and autodiagnostics. 5,020,135, Cl. 455-76.000.
- Kasper, Dennis L.; Zaleznik, Dori F.; and Finberg, Robert W., to Brigham and Women's Hospital, Inc., The. Anti-bacterial T-cell factor. 5,019,513, Cl. 435-240.260.
- Katagawa, Hiromi, to Matsushita Electric Industrial Co., Ltd. Private branch exchange. 5,020,099, Cl. 379-234.000.
- Katahara, Keith W.: *See—*
  - Petermann, Steven G.; and Katahara, Keith W., 5,020,036, Cl. 367-168.000.
- Kataoka, Tatsuo: *See—*
  - Ishii, Masahito; Kataoka, Tatsuo; and Tanaka, Yoshitaka, 5,019,944, Cl. 361-400.000.
- Katayama, Akira: *See—*
  - Terunuma, Hiroshi; Tsukahara, Daiki; and Katayama, Akira, 5,018,832, Cl. 350-276.0SL.
- Katayama, Kazuyori: *See—*
  - Naito, Yasuo; Katayama, Kazuyori; and Kouzuki, Hiroyuki, 5,019,987, Cl. 364-426.040.
- Katayama, Tomoaki: *See—*
  - Takemura, Shinji; Mori, Masaki; Katayama, Tomoaki; Kegasa, Hideo; and Ohnishi, Kenichi, 5,019,759, Cl. 318-466.000.
- Kathcon, Inc.: *See—*
  - Peck, R. Michael; Hecht, Thomas R.; and Livingston, Howard F., 5,018,672, Cl. 241-37.500.
- Kato, Akihiko: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Kato, Akira, to Victor Company of Japan, Ltd. Tape reel of a cassette tape. 5,018,680, Cl. 242-71.800.
- Kato, Hideki: *See—*
  - Kawahata, Ichiro; Matano, Takashi; Kato, Hideki; and Shima, Mutsuo, 5,019,202. Cl. 156-277.000.
- Kato, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Industrial robot apparatus. 5,019,762, Cl. 318-568.120.
- Kato, Katsuyuki; and Yaguchi, Zinichi, to Kabushikikaisha Barudan. Label supply apparatus and label supply method. 5,018,461, Cl 112-104.000.
- Kato, Kiminari; and Shirai, Masahiro, to NGK Insulators, Ltd. Forming aids for ceramic materials, ceramic bodies formed by using the aids, and process of producing ceramic products. 5,019,537, Cl. 501-1.000.
- Kato, Naoki, to Sanshin Kogyo Kabushiki Kaisha. Cowling arrangement for outboard motor. 5,018,998, Cl. 440-77.000.
- Kato, Yasushi; Yoshioka, Keiichi; and Hashimoto, Osamu, to Kawasaki Steel Corporation. Process for producing chromium-containing steel sheet hot-dip plated with aluminum. 5,019,186, Cl. 148-20.300.
- Katoh, Takehiro: *See—*
  - Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko, Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.
- Katsunori, Oshiage; Hosaka, Akio; and Yamamoto, Akito, to Nissan Motor Company, Limited. Electronic device with self-monitor for an automotive vehicle. 5,019,799, Cl. 340-438.000.

- Katz, Paul C.; Pisciotto, Patrick A.; and Robin, Gary I., to Triplex Manufacturing Co. Fuse holder assembly. 5,018,991, Cl. 439-621.000.
- Kaufman, Benjamin J.: *See—*
  - Derosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., 5,019,287, Cl. 252-54.600.
- Kautt, Jean-Jacques, to Ferco Internatioinal Usine De Ferrures De Batiment. Machine for fitting seals into a groove. 5,018,264, Cl. 29-564.800.
- Kawabata, Choji: *See—*
  - Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,018,505, Cl. 126-262.000.
- Kawabata, Shoichi; and Yoshimura, Toshimi, to Murata Manufacturing Co., Ltd. Method of fabricating multilayer capacitor. 5,019,200, Cl. 156-245.000.
- Kawaberi, Seiji; and Iwamoto, Hisashi, to Sony Corporation. High voltage generator for television receiver. 5,019,953, Cl. 363-21.000.
- Kawaguchi, Akira: *See—*
  - Shirai, Keiichi; Kawaguchi, Akira; and Kitazima, Sunao, 5,018,379, Cl. 72-354.600.
- Kawahata, Ichiro; Matano, Takashi; Kato, Hideki; and Shima, Mutsuo, to Dai Nippon Insatsu Kabushiki Kaisha. Process for producing decorative sheets having embossed pattern. 5,019,202, Cl. 156-277.000.
- Kawahira, Masayoshi: *See—*
  - Oyaide, Shinichi; Kawahira, Masayoshi; and Miyazawa, Toshio, 5,018,889, Cl. 400-642.000.
- Kawai, Kaiji: *See—*
  - Kimpara, Masaomi; Kawai, Kaiji; Kikuchi, Hiroshi; and Sato, Masai, 5,019,155, Cl. 71-121.000.
- Kawai, Kiyoyuki: *See—*
  - Yasuki, Seijiro; and Kawai, Kiyoyuki, 5,019,902, Cl. 358-133.000.
- Kawakami, Toshikazu: *See—*
  - Kano, Kouji; Tabata, Hajime; and Kawakami, Toshikazu, 5,019,733, Cl. 310-61.000.
- Kawakubo, Youichi: *See—*
  - Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, 5,020,041, Cl. 369-13.000.
- Kawamata, Syooichi; Takahashi, Tadashi; and Miyashita, Kunio, to Hitachi, Ltd. Magnetic position detection apparatus having two magnetic recording medium tracks with magnetoresistors arranged in a bridge circuit so as to eliminate even order harmonic distortion. 5,019,776, Cl. 324-207.120.
- Kawamura, Chuichi: *See—*
  - Tanaka, Hiroshi; Kawamura, Chuichi; and Ohno, Junichi, 5,018,366, Cl. 62-228.500.
- Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, to Ube Industries, Ltd. Container for stabilized aqueous phosphoenolpyruvic acid. 5,019,432, Cl. 428-35.400.
- Kawamura, Masao: *See—*
  - Nakamura, Tohru; Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, 5,019,523, Cl. 437-31.000.
- Kawano, Yukita: *See—*
  - Kusakabe, Katsuhiko; Maruyama, Hitoshi; Kawano, Yukita; Matsui, Susumu; Taniguchi, Tsutomu; and Obayashi, Akira, 5,018,301, Cl. 47-1.100.
- Kawara, Toshiyuki; Tsutsui, Hiroshi; Funakoshi, Hiromasa; and Yoshizumi, Yoshiyuki, to Matsushita Electric Industrial Co., Ltd. X-ray image processing device. 5,020,085, Cl. 378-99.000.
- Kawasaki Jukogyo Kabushiki Kaisha: *See—*
  - Kiyoshige, Masanori; Okada, Tomonobu; Kawashima, Takashi; and Hirokawa, Takeshi, 5,018,317, Cl. 51-410.000.
- Kawasaki Steel Corporation: *See—*
  - Kato, Yasushi; Yoshioka, Keiichi; and Hashimoto, Osamu, 5,019,186, Cl. 148-20.300.
  - Kumura, Mitsuo; and Uegaki, Tatsufumi, 5,019,189, Cl. 148-127.000.
  - Yasuda, Akira; Koumura, Hideo; Yamato, Koji; and Yasuda, Koichi, 5,019,460, Cl. 428-659.000.
  - Yazawa, Yoshihiro; Sone, Yuji; Yoshioka, Keiichi; Kinoshita, Noboru; and Hino, Masayuki, 5,019,181, Cl. 148-12.0EA.
- Kawashima, Hiroyuki: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Kawashima, Kenji: *See—*
  - Iga, Kenichi; Ibaraki, Akira; Kawashima, Kenji; Furusawa, Kotaro; and Ishikawa, Toru, 5,020,066, Cl. 372-45.000.
- Kawashima, Takashi: *See—*
  - Kiyoshige, Masanori; Okada, Tomonobu; Kawashima, Takashi; and Hirokawa, Takeshi, 5,018,317, Cl. 51-410.000.
- Kawauchi, Masataka: *See—*
  - Matsuno, Junichi; Ogasawara, Tsuyoshi; Kawauchi, Masataka; and Tsuji, Yasuyuki, 5,018,718, Cl. 271-245.000.
- Kaya, Cetin, to Texas Instruments Incorporated. Method for forming a fuse and fuse made thereby. 5,019,532, Cl. 437-186.000.
- Kayser, Tomas: *See—*
  - Grapentin, Hans-Joachim; Kayser, Tomas; and Riedl, Andrea, 5,019,229, Cl. 204-130.000.
- Kazanskaya, Irina V., administrator: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Keat, Ooi C.; May, Choo Y.; and Hock, Augustine O. S., to Palm Oil Research & Development Board. Recovery of carotenoids. 5,019,668, Cl. 585-864.000.
- Keating, Raymond: *See—*
  - Sansone, Ronald P.; Keating, Raymond; Wall, Joseph W.; and Durst, Robert T., Jr., 5,019,991, Cl. 364-464.030.
- Keen, Billy J., Jr.: *See—*
  - Cutright, Edwin L.; Keen, Billy J., Jr.; Scott, G. Robert; and Van Davelaar, Peter C., 5,019,024, Cl. 493-280.000.
- Keenan, Douglas M., to RCA Licensing Corporation. Three digit channel entry by use of an extended keypress. 5,020,139, Cl. 455-151.000.
- Keeney, Lawrence V.; Misch, William B.; and Parrott, James H., to Pacific Engineering and Production Co. of Nevada. Control system for odor eliminating apparatus. 5,019,339, Cl. 422-3.000.
- Kegasa, Hideo: *See—*
  - Takemura, Shinji; Mori, Masaki; Katayama, Tomoaki; Kegasa, Hideo; and Ohnishi, Kenichi, 5,019,759, Cl. 318-466.000.
- Kehr, Helmut: *See—*
  - Kuehnle, Adolf; and Kehr, Helmut, 5,019,299, Cl. 260-410.600.
- Kehrli, David W.: *See—*
  - Burrous, Allen J.; Colaprete, Silvio; and Kehrli, David W., 5,018,307, Cl. 49-471.000.
- Keister, Larry V. Graphic tape slicer. 5,018,417, Cl. 83-156.000.
- Keller, Lajos E., to Mobil Oil Corporation. Oriented polypropylene film structure. 5,019,447, Cl. 428-327.000.
- Kelley, James W.; and McWilliams, Roger D. Apparatus for measurement and calculation of moment of inertia. 5,018,382, Cl. 73-65.000.
- Kellogg, James R.: *See—*
  - McCurry, Patrick W.; Kellogg, James R.; Boekelheide, Karl; Sexton, Kenneth D.; Ellson, George A.; and Hocker, Robert A., 5,019,717, Cl. 307-66.000.
- Kellogg, Reid E.; Laganis, Evan D.; and Ma, Sheau-Hwa. Donor element for thermal imaging containing infra-red absorbing squarylium compound. 5,019,549, Cl. 503-227.000.
- Kelly, John A.: *See—*
  - Hwa, Chih M.; Kelly, John A.; Neton, Janet; Scanlon, Patricia M.; and Gaudette, Roger R., 5,019,343, Cl. 422-16.000.
- Kendall Company, The: *See—*
  - Gilman, Thomas, 5,018,515, Cl. 128-155.000.
  - Gilman, Thomas H., 5,018,516, Cl. 128-155.000.
- Kennedy, Michael B., Jr., to Wild Tails, Inc. Audible fishing lure. 5,018,297, Cl. 43-42.280.
- Kent Adhesive Products Co.: *See—*
  - Barnette, Charles J., 5,018,765, Cl. 281-15.001.
- Kercheck, Gary R.: *See—*
  - Hechel, Dennis L.; Niemetschek, Raymond H.; Slocum, Tohin; Kercheck, Gary R.; and Crawford, Michael C., 5,018,853, Cl. 356-155.000.
- Kerr, Peter, to Schuler Incorporated. Mechanical locking device. 5,018,406, Cl. 74-569.000.
- Kessler, David, to Eastman Kodak Company. Laser printer. 5,018,805, Cl. 350-6.500.
- Keusen, Heiner: *See—*
  - Soeder, Carl-Johannes; Zanders, Erich; Raphael, Thomas; Keusen, Heiner; and Groeneweg, Joost, 5,019,266, Cl. 210-605.000.
- Khalid, Joseph M.; and Shastry, Chakrakody V., to Yates Industries. Electroplating drum cathode with high current-carrying capability. 5,019,221, Cl. 204-13.000.
- Khanna, Ish K.; Nosal, Roger; and Weier, Richard M., to G. D. Searle & Co. 5-substituted (4,5-c) imidazopyridine compounds which have useful platelet activating factor antagonistic activity. 5,019,581, Cl. 514-303.000.
- Kharkovski Institut Radioelectroniki: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Kharkovski Medicinsky Institute: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- KHP, Inc.: *See—*
  - Kramer, Dale C., 5,018,933, Cl. 414-542.000
- Kibblewhite, Ian E.; and Strunk, Robert H., to SPS Technologies, Inc. Electrical contact mechanism for ultrasonic transducers on fasteners. 5,018,988, Cl. 439-577.000.
- Kida, Hideo: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Kieczykowski, Gerard R., to Merck & Co., Inc. Process for preparing 4-amino-1-hydroxybutylidene-1,1-bisphosphonic acid (ABP) or salts thereof. 5,019,651, Cl. 562-13.000.
- Kikuchi, Hiroshi: *See—*
  - Kimpara, Masaomi; Kawai, Kaiji; Kikuchi, Hiroshi; and Sato, Masai, 5,019,155, Cl. 71-121.000.

VOL
1126
ISS
4
MY
28
1991
UMI

Kilara, Arun: *See—*
McCarthy, Robert D., deceased; Kilara, Arun; and Pierce, David B., 5,019,390, Cl. 424-535.000.
Kim, Chun K.: *See—*
Jung, Seung T.; Park, Soo H.; and Kim, Chun K., 5,018,804, Cl. 350-3.710.
Kim, Dong G.: *See—*
Riggs, Robert D.; and Kim, Dong G., 5,019,389, Cl. 424-93.000.
Kimberly-Clark Corporation: *See—*
Roessler, Thomas H.; and Siebers, Bruce M., 5,019,073, Cl. 604-391.000.
Sauer, Robert D., 5,019,211, Cl. 162-111.000.
Stamatiou, Paul O.; and Stevens, Christopher R., 5,018,235, Cl. 15-215.000.
Kimock, Fred M.: *See—*
Karwacki, Eugene J., Jr.; and Kimock, Fred M., 5,019,208, Cl. 156-626.000.
Kimoto & Co., Ltd.: *See—*
Fujiwara, Yasuo, 5,019,467, Cl. 429-127.000.
Kimpara, Masaomi; Kawai, Kaiji; Kikuchi, Hiroshi; and Sato, Masai, to American Cyanamid Company. Herbicidal granular compositions. 5,019,155, Cl. 71-121.000.
Kimura, Shigenobu, to Yamaha Corporation. Digital-to-analog conversion circuit. 5,019,819, Cl. 341-143.000.
Kimura, Tohru; Fujii, Syuso; and Ohsawa, Takashi, to Kabushiki Kaisha Toshiba. TTL to CMOS buffer circuit. 5,019,729, Cl. 307-475.000.
Kinard, Daniel P., to Bankhead Enterprises, Inc. Auxiliary railroad wheel lift assembly for road vehicle. 5,018,453, Cl. 105-72.200.
Kinder, William D. Foundation shoring method and means. 5,018,905, Cl. 405-230.000.
King, Bradley W. Support rack. 5,018,691, Cl. 248-99.000.
King Faisal Specialist Hospital and Research Centre: *See—*
Lambrecht, Richard M.; Qureshi, Muhammad A.; and Sajjad, Munawwar, 5,019,323, Cl. 376-201.000.
King, Harriss T.: *See—*
Wennerberg, Gunnar; Gordon, Daniel A.; and King, Harriss T., 5,019,710, Cl. 250-341.000.
King, Ray, to International Rectifier Corporation. Transformer coupled gate drive circuit for power MOSFETS. 5,019,719, Cl. 307-246.000.
Kinoshita, Noboru: *See—*
Yazawa, Yoshihiro; Sone, Yuji; Yoshioka, Keiichi; Kinoshita, Noboru; and Hino, Masayuki, 5,019,181, Cl. 148-12.0EA.
Kinoshita, Seiichiro: *See—*
Izumisawa, Hiroyuki; and Kinoshita, Seiichiro, 5,019,969, Cl. 364-200.000.
Kip, Harm J.; and Venema, Willem H. J., to N.V. Nederlandsche Apparatenfabriek Nedap. System for the contactless exchange of data. 5,019,813, Cl. 340-825.540.
Kirby, David B.: *See—*
Cur, Nihat O.; and Kirby, David B., 5,018,328, Cl. 50-406.000.
Kirker, Garry W.: *See—*
Del Rossi, Kenneth J.; Dessau, Ralph M.; Huss, Albin, Jr.; Kirker, Garry W.; Marler, David O.; and Partridge, Randall D., 5,019,664, Cl. 585-419.000.
Kirkland, James L., to United States of America, Navy. Marine object detector. 5,019,822, Cl. 342-22.000.
Kirma, Safa, to Messerschmitt-Bolkow-Blohm GmbH. End housing for multipole electrical plug and socket connectors. 5,018,987, Cl. 439-445.000.
Kirsche, Horst: *See—*
Allgaier, Karl-Heinz; Diehl, Christian; and Kirsche, Horst, 5,018,684, Cl. 244-3.130.
Kirschner, Mark J.: *See—*
Lee, Ron C.; and Kirschner, Mark J., 5,018,358, Cl. 62-48.100.
Kishi, Katsunobu, to Nitto Kohki Co., Ltd. Chamfering tool. 5,018,914, Cl. 409-178.000.
Kishi, Tomomi; Nonami, Kanshi; Takeuchi, Masahiko; Yoshitani, Naoyuki; and Niwa, Hideo, to Toyota Jidosha Kabushiki Kaisha; and Sanmei Electric Co., Ltd. Apparatus for separating iron sheets. 5,018,939, Cl. 414-795.400.
Kiss, Akos: *See—*
Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,019,169, Cl. 106-438.000.
Kitada, Yoshitaka: *See—*
Saito, Sayuri; Yoshizawa, Kazutoshi; and Kitada, Yoshitaka, 5,019,966, Cl. 364-200.000.
Kitaguchi, Tadashi: *See—*
Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, 5,019,500, Cl. 435-69.100.
Kitahara, Koichi; Shimada, Takashi; and Iwata, Keiichi, to Japan Pionics Co., Ltd. Method for purifying gaseous hydrides. 5,019,364, Cl. 423-210.000.
Kitamura, Takehiko; Amano, Hirosato; and Kaita, Masaharu, to Sumitomo Heavy Industries, Ltd. Injection molding die apparatus for use in the production of substrate of optical disk. 5,018,962, Cl. 425-556.000.
Kitani, Masakatu: *See—*
Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, 5,019,548, Cl. 503-209.000.
Kitatani, Katsuji: *See—*
Makino, Naonori; Ohno, Shigeru; Hoshi, Satoshi; and Kitatani, Katsuji, 5,019,474, Cl. 430-76.000.
Kitaura, Ichiro: *See—*
Miyata, Ichiro; Kitaura, Ichiro; and Yonezawa, Keitaro, 5,018,617, Cl. 198-346.100.
Kitazima, Sunao: *See—*
Shirai, Keiichi; Kawaguchi, Akira; and Kitazima, Sunao, 5,018,379, Cl. 72-354.600.
Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, to Ricoh Company, Ltd. Recording apparatus having control data selectively designated in memory which corresponds to one of multiple optical scanning systems. 5,019,913, Cl. 358-296.000.
Kiyoshige, Masanori: Okada, Tomonobu; Kawashima, Takashi; and Hirokawa, Takeshi, to Kawasaki Jukogyo Kabushiki Kaisha. Abrasive water jet cutting apparatus. 5,018,317, Cl. 51-410.000.
Klapper, Robert C.; and Caillouette, James T., to Advanced Osseous Technologies, Inc. Implanting and removal of orthopedic prostheses. 5,019,083, Cl. 606-99.000.
Klecka, Mark D.: *See—*
Morganstein, Sanford J.; Krakau, Herbert J.; Mehta, Bakulesh A.; Klecka, Mark D.; and Carleton, Robert, 5,020,095, Cl. 379-67.000.
Klei, Ebel, to Shell Oil Company. Stabilized polymers. 5,019,614, Cl. 524-100.000.
Klein, Gary G. High efficiency bicycle frame. 5,018,758, Cl. 280-281.100.
Klein, Michael N.: *See—*
Schenck, Robert; Hoffman, Jeffrey H.; Klein, Michael N.; and Kouba, Gene R., 5,018,628, Cl. 211-153.000.
Kleinsasser, Alan W.; and Woodall, Jerry M., to International Business Machines Corporation. Method of making metal-insulator-metal junction structures with adjustable barrier heights. 5,019,530, Cl. 437-175.000.
Kleinschmit, Peter: *See—*
Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,019,169, Cl. 106-438.000.
Klemenz, Hans-Jorg: *See—*
Rabold, Peter; Klemenz, Hans-Jorg; and Schobi, Paul J., 5,020,106, Cl. 380-49.000.
Klemp, Walter V. Tapeless super-absorbent disposable diaper. 5,019,069, Cl. 604-387.000.
Kleosch, Wilhelm; and Plobst, Dietmar, to Intec Plastic Products Gesellschaft m.b.H. Composite panel. 5,019,448, Cl. 428-332.000.
Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., to Ortho Pharmaceutical Corporation. Reversal of glucocorticoid-induced skin atrophy. 5,019,569, Cl. 514-171.000.
Klingman, Ken A.: *See—*
Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., 5,019,235, Cl. 204-282.000.
Klintmalm, Goran B., to Pilling Company. Liver transplant clamp. 5,019,092, Cl. 606-207.000.
Klomp, Johannes T.; Van De Ven, Adrianus J. C.; and Caers, Johan F. J. M., to U.S. Philips Corp. Method of bonding a metal oxide to a metal. 5,018,659, Cl. 228-121.000.
Kluge, Richard G., to John Sterling Corporation. Burglar bar safety latch assembly. 5,018,302, Cl. 49-56.000.
Klygis, Mindaugas J.: *See—*
Marco, Leslie S.; Klygis, Mindaugas J.; and Weaver, William N., 5,018,620, Cl. 206-150.000.
KM-kabelmetal AG: *See—*
Maier, Ulrich; and Fischer, Horst, 5,018,378, Cl. 72-283.000.
Knapp, Alfons: *See—*
Grassberger, Roland; and Knapp, Alfons, 5,018,553, Cl. 137-625.410.
Knauer, Wolfgang, to Hughes Aircraft Company. Production of focused ion cluster beams. 5,019,712, Cl. 250-423.00R.
Knauer, Wolfgang: *See—*
Benedikter, Richard; Sepp, Gunther; and Knauer, Wolfgang, 5,018,446, Cl. 102-213.000.
Kneezel, Gary A.: *See—*
Blessington, Daniel R.; Kneezel, Gary A.; and Campanelli, Michael R., 5,019,675, Cl. 346-140.00R.
Kneller, James F.: *See—*
Pardue, Jerry E.; and Kneller, James F., 5,018,577, Cl. 166-279.000.
Knepler, John T., to Bunn-O-Matic Corporation. Boiling water dispenser having improved water temperature control system. 5,019,690, Cl. 219-400.000.
Knight, Patricia M.; and Bishop, Robert C., to Allergan, Inc. Corneal onlay lenses and methods for attaching same. 5,019,097, Cl. 623-5.000.
Knights Technology, Inc.: *See—*
Yang, Tsen-Shau; Chou, Ger-Chih; and Hsu, Fu-Chieh, 5,019,771, Cl. 324-158.00P.
Knowles, Carl H., to Metrologic Instruments, Inc. Scanning system with array of laser scanner modules to produce complex scan pattern. 5,019,714, Cl. 250-568.000.
Knowles, Christopher J.: *See—*
Ferguson, Clare H. R.; Macadam, Anne M.; Ince, Jane E.; and Knowles, Christopher J., 5,019,505, Cl. 435-148.000.
Knowles, Robert G.: *See—*
Freismuth, John S.; and Knowles, Robert G., 5,018,822, Cl. 350-96.200.
Knutsson, Evan A.: *See—*
Gostahagberg, Anders P.; Knutsson, Evan A.; and Nystrom, Mats O. G., 5,019,812, Cl. 340-825.310.
Ko, Yuki N.: *See—*
Chiu, Lee C.; Ko, Yuki N.; and Wong, Keith N., 5,019,976, Cl. 364-413.130.

Kobayashi, Hidetoshi; and Takahashi, Osamu, to Fuji Photo Film Co., Ltd. Silver halide photographic materials. 5,019,490, Cl. 430-503.000.
Kobayashi, Kenji: *See—*
Honjo, Takeshi; Kobayashi, Kenji; Yoshida, Akimaro; and Saeki, Takami, 5,018,714, Cl. 271-3.100.
Kobayashi, Masayoshi: *See—*
Mitani, Katsuhiko; Tanoue, Tomonori; Kusano, Chushiro; Kobayashi, Masayoshi; and Takahashi, Susumu, 5,019,524, Cl. 437-31.000.
Kobayashi, Motokazu: *See—*
Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.
Kobayashi, Osamu, to Fujitsu Limited. Analog switch circuit. 5,019,731, Cl. 307-571.000.
Kobayashi, Sumio: *See—*
Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi; Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, 5,019,773, Cl. 324-166.000.
Kobayashi, Yoshikazu, to Kabushiki Kaisha Miike Tekkosho. Method for making molded solid body of incinerated waste material. 5,019,310, Cl. 264-122.000.
Kobayashi, Yuji: *See—*
Asakura, Yasuo; Imai, Yuji; and Kobayashi, Yuji, 5,019,845, Cl. 354-149.100.
Kobe Steel Limited: *See—*
Cahn, Robert P., 5,019,658, Cl. 568-829.000.
Koch, Rudolf: *See—*
Frey, Otto; and Koch, Rudolf, 5,019.082, Cl. 606-85.000.
Koch, Thomas L.: *See—*
Choa, Fow-Sen; and Koch, Thomas L., 5,020,153, Cl. 455-606.000.
Kochs Adler Aktiengesellschaft: *See—*
Hampel, Klaus; and Schrudde, Reinhold, 5,018,464, Cl. 112-130.000.
Kock, Bengt; and Holm, Klas, to BK Va-Leveranser AB. Method of and plant for purifying water. 5,019,276, Cl. 210-744.000.
Kodama, Hitoshi: *See—*
Inokuma, Takahiko; Baba, Sadamu; Imao, Shoji; Kodama, Hitoshi; and Gomi, Takeo, 5,018,915, Cl. 409-231.000.
Kodama, Yukio, to Fuji Jukogyo Kabushiki Kaisha. Power transmitting system for a four-wheel drive vehicle. 5,018,596, Cl. 180-233.000.
Koelsch, Michael L.; De Point, John, Jr.; and DePietro, Matthew, to Eastman Kodak Company. Magazine for a stack of film sheets. 5,019,848, Cl. 354-277.000.
Koenck, Steven E., to Norand Corporation. Hand-held optical character reader with means for instantaneously reading information from a predetermined area at an optical sensing area. 5,019,699, Cl. 235-472.000.
Koepnick, Klaus: *See—*
Schneider, Friedhelm; Koepnick, Klaus; and Wowra, Henrik, 5,019,115, Cl. 82-1.110.
Koga, Takao: *See—*
Oguri, Yasuo; Koga, Takao; and Itoh, Toshio, 5,019,367, Cl. 423-626.000.
Kohler, Arthur, to Chagrin Plastic Methods, Inc. Electronic media storage apparatus. 5,020,043, Cl. 369-36.000.
Kohler, Heinrich: *See—*
Frerichs, Udo; Kuhlmann, Eckhard; Kohler, Heinrich; and Metge, Axel, 5,018,565, Cl. 152-379.300.
Kohler, Reinhard, to Inter System Verfahrenstechnik GmbH. Single use syringe. 5,019,046, Cl. 604-110.000.
Kohne, Rainer: *See—*
Schulte, Burkart; Hardt, Norbert; and Kohne, Rainer, 5,019,324, Cl. 376-260.000.
Koike, Yasushi; and Tajima, Akio, to Seikosha Co., Ltd. Paper feed device for printer. 5,018,655, Cl. 226-101.000.
Koishi, Masayuki: *See—*
Murakami, Hiroshi; Koishi, Masayuki; Yatagai, Shoko; and Yamagata, Kazuko, 5,019,546, Cl. 502-303.000.
Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Tanaka, Hideaki; Akiba, Shigeyuki; Suzuki, Masatoshi; and Utaka, Katsuyuki, 5,019,519, Cl. 437-22.000.
Kolars Arms: *See—*
Mainland, Donald R., 5,018,293, Cl. 42-77.000.
Kolb, Harmut: *See—*
Durschimidt, Ferry; Kolb, Harmut; Strauss, Wolfgang; and Weckenmann, Hartmut, 5,018,348, Cl. 60-274.000.
Kolschbach, Veit M.: *See—*
Schutten, Dagmar; Schmitz, Hans-Joachim; Caspar, Hans-Peter; Kolschbach, Veit M.; Znoyek, Gerald; and Wenzel, Norbert, 5,018,826, Cl. 350-96.290.
Kolstee, Hans M., to Grumman Aerospace Corporation. Shearclip-handling tool. 5,018,937, Cl. 414-783.000.
Komatsu, Toshiteru, to Kabushiki Kaisha Okuma Tekkosho. Learning control method in numerical control machine tool. 5,019,763, Cl. 318-571.000.
Komatsubara, Yoshiaki: *See—*
Abe, Masanori; Komatsubara, Yoshiaki; and Iyama, Tsuyoshi, 5,019,001, Cl. 445-3.000.
Komori, Shigeki; Kusunoki, Shigeru; and Tsukamoto, Katsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Method for preparing a high mobility, lightly-doped channel mis-type FET with reduced latch up and punchthrough. 5,019,520, Cl. 437-26.000.
Kompanek, Harry W., to Undersea Transducer Technology, Inc. Transducer assemblies. 5,020,035, Cl. 367-159.000.
Konda, Takashi: *See—*
Fujioka, Arisa; and Konda, Takashi, 5,020,114, Cl. 382-44.000.
Kondaurov, Vladimir N.: *See—*
Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
Kondo, Asaji: *See—*
Hiratsuka, Nobuo; and Kondo, Asaji, 5,019,347, Cl. 422-56.000.
Kondo, Seiji: *See—*
Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, 5,019,476, Cl. 430-20.000.
Kondo, Susumu: *See—*
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susumu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 5,018,839, Cl. 350-347.00R.
Kondratenko, Oleg J.: *See—*
Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
Konica Corporation: *See—*
Shimaoka, Hitoshi; Mizuo, Shigera; Akashi, Akira; and Hosoi, Miyuki, 5,019,484, Cl. 430-293.000.
Konijn, Jan: *See—*
Mens, Wilhelmus R. M.; and Konijn, Jan, 5,019,778, Cl. 324-322.000.
Konishi, Hirokazu: *See—*
Yamamoto, Taizo; and Konishi, Hirokazu, 5,018,335, Cl. 53-281.000.
Konishi, Kazuhisa: *See—*
Himeno, Kiyoshi; and Konishi, Kazuhisa, 5.019,133, Cl. 8-531.000.
Konishiroku Photo Industry Co., Ltd.: *See—*
Sato, Hirokazu; and Hirabayashi, Shigeto, 5,019,493, Cl. 430-553.000.
Konno, Hitoshi: *See—*
Watanabe, Haruo; Nakamura, Ichiro; Okamoto, Yoshio; and Konno, Hitoshi, 5,018,501, Cl. 123-472.000.
Konobevtsev, Oleg F., deceased (by Kazanskaya, Irina V., administrator); Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., to Kharkovski Medicinsky Institute; and Kharkovski Institut Radioelectroniki. Device for dental electroanalgesia. 5,018,525, Cl. 128-421.000.
Konrad, Johann: *See—*
Humpl, Josef; Konrad, Johann; Sturm, Reinhold; and Attenni, Johann, 5,018,502, Cl. 123-514.000.
Konsbruck, Jeannot: *See—*
Melan, Corneille; Konsbruck, Jeannot; and Kremer, Andre, 5,018,923, Cl. 414-10.000.
Koppel, Gabriele: *See—*
Singer, Heinrich; and Koppel, Gabriele, 5,019,281, Cl. 252-8.800.
Korea Advanced Institute of Science and Technology: *See—*
Shin, Sang Y.; and Son, Yung S., 5,018,809, Cl. 350-96.120.
Kornel, Alfred: *See—*
Rogers, Charles J.; Kornel, Alfred; and Sparks, Harold L., 5,019,175, Cl. 134-42.000.
Koschade, Gerda: *See—*
Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
Koseki, Yasuo: *See—*
Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.
Koshin Sangyo Kabushiki Kaisha: *See—*
Itaoka, Toshinari; and Hirata, Shinichi, 5,019,040, Cl. 604-95.000.
Koslow, Evan E., to Koslow Technologies Corporation. Process for the production of materials characterized by a continuous web matrix or force point bonding. 5,019,311, Cl. 264-122.000.
Koslow Technologies Corporation: *See—*
Koslow, Evan E., 5,019,311, Cl. 264-122.000.
Kotobuko & Co., Ltd.: *See—*
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 5,018,891, Cl. 401-52.000.
Kouba, Gene R.: *See—*
Schenck, Robert; Hoffman, Jeffrey H.; Klein, Michael N.; and Kouba, Gene R., 5,018,628, Cl. 211-153.000.
Koubuchi, Yasushi: *See—*
Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi; Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, 5,019,891, Cl. 357-70.000.
Koumura, Hideo: *See—*
Yasuda, Akira; Koumura, Hideo; Yamato, Koji; and Yasuda, Koichi, 5,019,460, Cl. 428-659.000.
Koura, Soushichi; and Yamagishi, Jun, to Ohi Seisakusho Co., Ltd. Automatic door operating system. 5,018,303, Cl. 49-280.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Kouzuki, Hiroyuki: *See—*
  - Naito, Yasuo; Katayama, Kazuyori; and Kouzuki, Hiroyuki, 5,019,987, Cl. 364-426.040.
- Koyama, Kazuhito: *See—*
  - Niino, Tsuyoshi; Nakayama, Tadakazu; Tsuruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, 5,019,328, Cl. 376-310.000.
- Koyama, Mototsugu: *See—*
  - Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 5,019,338, Cl. 420-586.100.
- Koyama, Tadashi: *See—*
  - Yamamoto, Katsumi; Koyama, Tadashi; Aono, Toshio; and Itaya, Toshiro, 5,020,001, Cl. 364-513.000.
- Kozakai, Katsumi: *See—*
  - Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko; Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.
- Kozek, Edward P.; Ruskouski, Charles R.; and Altamura, Steven J., to Dual-Lite, Inc. Exit sign. 5,018,290, Cl. 40-570.000.
- Kozuka, Hajime, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Steering angle control apparatus for vehicle. 5,018,757, Cl. 280-96.100.
- Kraemer, Sandy F.; and Kraemer, Tyler D. Hand held paddle structure. 5,018,732, Cl. 273-67.00B.
- Kraemer, Tyler D.: *See—*
  - Kraemer, Sandy F.; and Kraemer, Tyler D., 5,018,732, Cl. 273-67.00B.
- Kraft, Brett W. Force feedback control for backhoe. 5,019,761, Cl 318-568.110.
- Kraft General Foods, Inc.: *See—*
  - Meisner, Robert J., 5,019,404, Cl. 426-249.000.
- Krajca, Kenneth E.: *See—*
  - Johnson, Robert W., Jr.; and Krajca, Kenneth E., 5,019,167, Cl. 106-218.000.
- Krakau, Herbert J.: *See—*
  - Morganstein, Sanford J.; Krakau, Herbert J.; Mehta, Bakulesh A.; Klecka, Mark D.; and Carleton, Robert, 5,020,095, Cl. 379-67.000.
- Kramer, Dale C., to KHP, Inc. Device for transferring an invalid to and from an automobile. 5,018,933, Cl. 414-542.000.
- Krauter, Allan I., to Welch Allyn, Inc. Helical fluid-actuated torsional motor. 5,019,121, Cl. 128-4.000.
- Krauter, Allan I.: *See—*
  - Danna, Dominick; Krauter, Allan I.; and Lia, Raymond A., 5,018,506, Cl. 128-4.000.
- Krauter, Heinrich: *See—*
  - Mecke, Norbert: and Krauter, Heinrich. 5,019,421, Cl. 427-152.000.
- Kremer, Andre: *See—*
  - Melan, Corneille; Konsbruck, Jeannot; and Kremer, Andre, 5,018,923, Cl. 414-10.000.
- Kriesel, Marshall S., to Science Incorporated. Fluid delivery apparatus. 5,019,047, Cl. 604-132.000.
- Krivulya, Gennady F.: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V., Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Krochta, John M., to United States of America, Agriculture. Coatings for substrates including high moisture edible substrates 5,019,403, Cl 426-89.000.
- Kroll, Willi; and Augstein, Klaus, to KSR Kuhlsysteme und Recycling GmbH & Co. KG. Method and apparatus for disposal and reprocessing of environmentally hazardous substances from refrigeration systems. 5,018,361, Cl. 62-85.000.
- Krolopp, Robert K.; Mullins, Jeffery L.; and Auchter, Thomas J., to Motorola Inc. Automatic new radiotelephone system registration notification. 5,020,091, Cl. 379-58.000.
- Kroner, Martin, to Eberspacher, J. Heating system, in particular for motor vehicles, with an internal combustion engine and a heater. 5,018,490, Cl. 123-196.0AB.
- Krop, Hugo K., to Homer, Hollandse Meet- En Regelsystemen B.V. Authenticity mark, document carrying such mark, and process and device for reading and validating such mark. 5,018,830, Cl. 350-105.000.
- Kross, Robert D.; and Scheer, David I., to Alcide Corporation. Composition and procedure for disinfecting blood and blood components. 5,019,402, Cl. 424-665.000.
- Krueckel, Peter; Moeck, Gerhard; and Finkenauer, Robert, to Schwan-Stabilo Schwanhaeusser GmbH & Co. Applicator device for a stick of spreadable material. 5,018,892, Cl. 401-68.000.
- Krupey, John, to Photest Diagnostics, Inc. Paired polypeptides. 5,019,521, Cl. 436-500.000.
- Krupp Maschinentechnik GmbH: *See—*
  - Brussel, Richard, 5,019,204, Cl. 156-264.000.
- KSR Kuhlsysteme und Recycling GmbH & Co. KG: *See—*
  - Kroll, Willi; and Augstein, Klaus, 5,018,361, Cl. 62-85.000.
- Kubert, Vincent T.; Olenski, Matthew J.; and Duchesne, Mark F., to AM International, Inc. Developer electrode and reverse roller assembly for high speed electrophotographic printing device. 5,019,868, Cl. 355-264.000.
- Kubo, Takashi: *See—*
  - Nagashima, Yasuo; Soeda, Haruo; Sato, Masamichi; and Kubo, Takashi, 5,018,257, Cl. 29-90.010.
- Kubota Corporation: *See—*
  - Yoshimoto, Teruo; and Takahashi, Makoto, 5,019,331, Cl. 420-51.000.
- Kubota, Ltd.: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Kubota, Mineo; and Masuyama, Kenji, to Nippon Seimitsu Kogyo Kabushiki Kaisha. Portable image scanner. 5,019,918, Cl. 358-473.000.
- Kubozono, Kenji: *See—*
  - Nakajima, Takashi; Kubozono, Kenji; Mori, Toshihiko; Ito, Takefumi; Hashitsume, Kimio; and Iwase, Shinichi, 5,019,185, Cl. 148-13.200.
- Kuczkowski, Joseph A.: *See—*
  - Rollick, Kevin L.; Gillick, James G.; and Kuczkowski, Joseph A., 5,019,611, Cl. 524-83.000.
- Kuczynski, Anthony L.: *See—*
  - Ayer, Atul D.; Kuczynski, Anthony L.; Wong, Patrick S. L.; Hamel, Lawrence G.; and Jordan, Maureen L., 5,019,396, Cl. 424-473.000.
- Kuehnle, Adolf; and Kehr, Helmut, to Chemische Werke Huels Aktiengesellschaft. Process for the manufacture of wax-like esterification products. 5,019,299, Cl. 260-410.600.
- Kuerten, Heribert: *See—*
  - Zimmermann, Clifton; Kuerten, Heribert; and Lewin, Helmut, 5,019,704, Cl. 250-214.00R.
- Kuhlmann, Eckhard: *See—*
  - Frerichs, Udo; Kuhlmann, Eckhard; Kohler, Heinrich; and Metge, Axel, 5,018,565, Cl. 152-379.300.
- Kuki, Nobuyuki; Isomura, Yukio; Suzumura, Hirokazu; and Sakakibara, Yoshikazu, to Aisin Seiki Kabushiki Kaisha. Window regulator apparatus. 5,018,305, Cl. 49-348.000.
- Kuklin, Georgy S.: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A., Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Kulitzscher, Berndt, to Hoechst Aktiengesellschaft. Device for the damping of pumps with intermittent delivery. 5,018,554, Cl. 138-26.000.
- Kumar, Rajendra, to United States of America, Administrator, National Aeronautics and Space Administration. Multistage estimation of received carrier signal parameters under very high dynamic conditions of the receiver. 5,019,824, Cl. 342-195.000.
- Kumasaka, Hideyuki; Takao, Kouji; Kuriyama, Hiroshi; Hagiwara, Tarou; and Miyazaki, Kenichi, to Nissan Motor Co., Ltd. Roof structure for modular vehicle body and method of building same 5,018,781, Cl. 296-210.000.
- Kumiai Chemical Industry Co., Ltd.: *See—*
  - Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.
- Kumura, Mitsuo; and Uegaki, Tatsufumi, to Kawasaki Steel Corporation. Steel pipe and a method for welding thereof and pipeline resistant to carbon dioxide corrosion. 5,019,189, Cl. 148-127.000.
- Kuno, Yukinobu: *See—*
  - Shimosaka, Satoru; Kuno, Yukinobu; Takagi, Yukio; and Mizuno, Masuo, 5,018,561, Cl. 144-209.00R.
- Kuntner, Robert C., Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., to Lanxide Technology Company, LP. Method for producing self-supporting ceramic bodies with altered microstructures. 5,019,541, Cl. 501-127.000.
- Kunze, Norbert, to U.S. Philips Corporation. Magnetic-tape-cassette apparatus comprising a deck and a load and eject mechanism. 5,019,928, Cl. 360-96.500.
- Kuo-Heng, Tseng: *See—*
  - Chao-Chin, Lin; and Kuo-Heng, Tseng, 5,019,009, Cl. 446-437.000.
- Kupfernagel, Artur; and Nitsch, Dieter, to MBB GmbH. Door/hatch actuation. 5,018,687, Cl. 244-129.500.
- Kurahashi, Motofumi; Takemoto, Masanori; Chishi, Naoki; Takeuchi, Eizoo; and Nakauma, Yoshinori, to Nippon Steel Corporation. Method of washing filters having magnetic particles thereon. 5,019,272, Cl. 210-695.000.
- Kuramoto, Toru; Tukuda, Hitoshi; and Ono, Hiroshi, to Central Glass Company, Limited. Metal diboride base sintered ceramic and method of producing same. 5,019,540, Cl. 501-96.000.
- Kurata, Kazuhiko, to NEC Corporation. Optical connector ferrule and method for assembling the same. 5,018,821, Cl. 350-96.200.
- Kurauchi, Nobuyoshi: *See—*
  - Sahira, Kensho; Takeiri, Toshiki; and Kurauchi, Nobuyoshi, 5,019,179, Cl. 148-11.50N.
- Kuribara, Ritsuo; Okubo, Kiyoshi; Yokoi, Koichi; and Sadakata, Kiyoshi, to Nippon Seiko Kabushiki Kaisha. Yoke for universal joint and manufacturing method therefor. 5,018,899, Cl. 403-57.000.
- Kurimoto Ltd.: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Kurimoto, Masashi. *See—*
  - Mitsuhashi, Masakazu; and Kurimoto, Masashi, 5,019,385, Cl. 424-85.000.

- Kurisu, Masayoshi: *See—*
  - Honma, Shiro; Tominari, Kenichi; and Kurisu, Masayoshi, 5,019,627, Cl. 525-240.000.
- Kuriyama, Hiroshi: *See—*
  - Kumasaka, Hideyuki; Takao, Kouji; Kuriyama, Hiroshi; Hagiwara, Tarou; and Miyazaki, Kenichi, 5,018,781, Cl. 296-210.000.
- Kuriyama, Nobuyuki: *See—*
  - Ueda, Kunihiko; Hasegawa, Katsumi; and Kuriyama, Nobuyuki, 5,019,316, Cl. 264-178.00F.
- Kurokawa, Hideaki: *See—*
  - Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.
- Kurosawa, Hideki, to Hitachi Koki Company, Limited. Speed changer mechanism for electrically powered tool. 5,019,023, Cl. 475-269.000.
- Kusaba, Kazuyuki, to NEC Corporation. Semiconductor integrated circuit having a decoding and level shifting function. 5,019,727, Cl. 307-449.000.
- Kusakabe, Katsuhiko; Maruyama, Hitoshi; Kawano, Yukita; Matsui, Susumu; Taniguchi, Tsutomu; and Obayashi, Akira, to Takara Shuzo Co., Ltd. Method of cultivating mushrooms. 5,018,301, Cl. 47-1.100.
- Kusano, Chushiro: *See—*
  - Mitani, Katsuhiko; Tanoue, Tomonori; Kusano, Chushiro; Kobayashi, Masayoshi; and Takahashi, Susumu, 5,019,524, Cl. 437-31.000.
- Kusano, Shoji: *See—*
  - Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.
- Kust, Cyril A., to American Cyanamid Company. Substituted phthalimido cyclohexanecarboxamides and the use thereof for enhancing growth of hybrid tea rose plants. 5,019,154, Cl. 71-96.000.
- Kusunoki, Ituro: *See—*
  - Hiraide, Takashi; Kusunoki, Ituro; and Tajima, Joji, 5,019,209, Cl. 156-630.000.
- Kusunoki, Shigeru: *See—*
  - Komori, Shigeki; Kusunoki, Shigeru; and Tsukamoto, Katsuhiro, 5,019,520, Cl. 437-26.000.
- Kutner, Barry S.; and Latowicki, Daniel A., to Flexiclave, Inc. Method for sterilizing articles such as dental handpieces. 5,019,344, Cl. 422-21.000.
- Kutner, Barry S.; and Latowicki, Daniel A., to Flexiclave, Inc. Method and apparatus for rapid sterilization of material. 5,019,359, Cl. 422-294.000.
- Kutzsche, Friedrich: *See—*
  - Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
- Kuwahara, Yasushi: *See—*
  - Matsumoto, Yasuji; Moriyama, Maya; and Kuwahara, Yasushi, 5,019,419, Cl. 427-96.000.
- Kuyath, Dorothy P. Teaching system for enhancing the learning of sets of facts. 5,018,976, Cl. 434-207.000.
- Kwech, Horst: *See—*
  - Larson, Richard C.; Spencer, Keith R.; Alercia, Don P.; Kwech, Horst; Litka, Thomas J.; and Ford, Guy J., 5,019,325, Cl. 376-260.000.
- Kyuma, Kenji: *See—*
  - Hieda, Teruo; and Kyuma, Kenji, 5,019,894, Cl. 358-29.000.
- Kyushu University: *See—*
  - Harada, Kosuke; Sakamoto, Hiroshi; and Nakamizo, Takazi, 5,019,770, Cl. 323-282.000.
- Lacombe, Robert J.: *See—*
  - McIntyre, Glover C.; Lacombe, Robert J.; and Forbess, Russell G., 5,018,458, Cl. 110-346.000.
- Ladwig, Paul K.: *See—*
  - Shaw, Gerald; and Ladwig, Paul K., 5,019,286, Cl. 252-48.200.
- Laganis, Evan D.: *See—*
  - Kellogg, Reid E.; Laganis, Evan D.; and Ma, Sheau-Hwa, 5,019,549, Cl. 503-227.000.
- Lai, Fute. Heating device. 5,019,691, Cl. 219-432.000.
- L'Air Liquide Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude: *See—*
  - Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, 5,019,643, Cl. 528-361.000.
  - Politi, Jean-Marie; and Franz, Lennart, 5,018,552, Cl. 137-614.110.
- Lakhani, Kishor M.: *See—*
  - Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, 5,019,841, Cl. 346-153.100.
- Lam, Nicholas L., to Image Technology, Inc. Linear shutter and method to achieve uniform density of image elements of a 3-D photograph. 5,019,855, Cl. 355-22.000.
- Lamar, Robert. Scaffolding rack. 5,018,629, Cl. 211-194.000.
- Lambert, Michael P.: *See—*
  - Helm, Herbert W.; Anderson, John R.; and Lambert, Michael P., 5,019,030, Cl. 493-342.000.
- Lambertus, Friedrich, to Werner & Pfleiderer GmbH. Process for producing an orifice plate for pelletizing of plastics. 5,018,273, Cl. 29-890.142.
- Lambrecht, Richard M.; Qureshi, Muhammad A.; and Sajjad, Munawwar, to King Faisal Specialist Hospital and Research Centre. Method of producing Iodine-124 and meta-iodobenzylguanidine containing Iodine-124. 5,019,323, Cl. 376-201.000.
- Lando, Jerome B., to Edison Polymer Innovation Corp. Non-centrosymmetric, multi-layer Langmuir-Blodgett films. 5,019,451, Cl. 428-411.100.
- Lane, Abbott A.; and Hetzel, John M., Jr., to Firequip Helmets, Inc. Firefighter's helmet. 5,018,220, Cl. 2-5.000.
- Lang, Douglas J.: *See—*
  - Bach, Stanley M., Jr.; Lang, Douglas J.; Swanson, David K.; and Dahl, Roger W., 5,018,523, Cl. 128-419.0PG.
- Langen, H. J. Paul: *See—*
  - Guttinger, Peter; Langen, H. J. Paul; and Langen, Ronald J., 5,018,334, Cl. 53-152.000.
- Langen, Ronald J.: *See—*
  - Guttinger, Peter; Langen, H. J. Paul; and Langen, Ronald J., 5,018,334, Cl. 53-152.000.
- Langer, Michael: *See—*
  - Braddick, Britt O.; and Langer, Michael, 5,018,579, Cl. 166-291.000.
- Langer, Robert S.: *See—*
  - Domb, Abraham J.; and Langer, Robert S., 5,019,379, Cl. 424-78.000.
- Langer, Robert S., Jr.: *See—*
  - Folkman, Judah; Langer, Robert S., Jr.; and Hsieh, Dean S. T., 5,019,372, Cl. 424-9.000.
  - Weaver, James C.; Powell, Kevin T.; and Langer, Robert S., Jr., 5,019,034, Cl. 604-20.000.
- Langford, Gordon B.: *See—*
  - Gilano, Michael; Langford, Gordon B.; and Gilano, Michael A., 5,018,979, Cl. 434-409.000.
- Lankheet, Jay A., to Americana Pools. Swimming pool wall. 5,018,324, Cl. 52-169.700.
- Lanxide Technology Company, LP: *See—*
  - Claar, Terry D.; and Johnson, William B., 5,019,539, Cl. 501-87.000.
  - Kuntner, Robert C.; Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., 5,019,541, Cl. 501-127.000.
- LaPack, Mark A.; and Tou, James C., to Dow Chemical Company, The. Valve membrane combination. 5,019,139, Cl. 55-158.000.
- La Padura, Nathan P. Multiple-head tool. 5,018,411, Cl. 81-57.500.
- Laphon, Gary, to American Mining Supply, Inc. Anchor assembly for a mine roof bolt. 5,018,908, Cl. 405-259.000.
- Lapin, Stephen C.; and Snyder, James R., to Allied-Signal Inc. Polyester chain-extended vinyl ether urethane oligomers. 5,019,636, Cl. 526-301.000.
- LaPointe, Daniel J.; Vietti, Michael; and Baer, John S., to RainWise, Inc. Light pen interactive weather parameter display system. 5,019,977, Cl. 364-420.000.
- Larson, Dawn A.: *See—*
  - Heckman, Douglas E.; Larson, Dawn A.; Frisco, Jeffrey A.; and Haskins, David A., 5,019,829, Cl. 343-700.0MS.
- Larson, Richard C.; Spencer, Keith R.; Alercia, Don P.; Kwech, Horst; Litka, Thomas J.; and Ford, Guy J., to Westinghouse Electric Corp. Method for removing and installing a control rod drive. 5,019,325, Cl. 376-260.000.
- Lary, Richard: *See—*
  - Pomfret, Stephen T.; Lary, Richard; and Boaen, Yerell, 5,020,020, Cl. 364-900.000.
- Latowicki, Daniel A.: *See—*
  - Kutner, Barry S.; and Latowicki, Daniel A., 5,019,344, Cl. 422-21.000.
  - Kutner, Barry S.; and Latowicki, Daniel A., 5,019,359, Cl. 422-294.000.
- Laugier, Jean P.: *See—*
  - Philippe, Michel; Hocquaux, Michel; Sebag, Henri; Beck, Irina; and Laugier, Jean P., 5,019,567, Cl. 514-164.000.
- Launie, Kenneth J.: *See—*
  - Fraser, Richard J.; and Launie, Kenneth J., 5,019,842, Cl. 354-86.000.
- Lawson, James M.: *See—*
  - Chambers, John D.; Estep, Duncan E.; Frankiewicz, Walter E.; Friend, Ronald W.; and Lawson, James M., 5,020,008, Cl. 364-561.000.
- Lawson, Kenneth: *See—*
  - Clark, Morris; Lawson, Kenneth; and Izatt, James, 5,019,900, Cl. 358-86.000.
- Lawson, Kenneth T., to Dave McKee (Sheffield) Limited. Hot rolling of metal strip. 5,018,377, Cl. 72-12.000.
- Lawton, Russell A.: *See—*
  - Cuddihy, Edward F.; Lawton, Russell A.; and Gavin, Thomas R., 5,019,533, Cl. 437-199 000.
- Le, Quang N.; Pelrine, Bruce P.; and Shim, Joosup, to Mobil Oil Corporation. Process for producing alkylaromatic lubricant fluids. 5,019,670, Cl. 585-467.000.
- LEC, Inc.: *See—*
  - Kamei, Eiichi; Shimomura, Yasushi; Kanda, Yasuo; and Ogawa, Tadashi, 5,019,252, Cl 210-136.000.
- Lechner, Konrad: *See—*
  - Bock, August; Lechner, Konrad; and Huber, Otto, 5,019,514, Cl. 435-254.000.
- Ledyard, D. Michael: *See—*
  - Grood, Edward S.; Butler, David L.; Ledyard, D. Michael; and Hoffman, Steven D., 5,018,514, Cl. 128-80.00C.
- Lee, Alan R.; Mead, David P.; Null, Robert A., Shilling, Thomas, and Atchley, Ray, to Aegis Medical, Inc. Bowel care apparatus. 5,019,056, Cl. 604-257.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Lee, David G. High security axial pin tumbler lock. 5,018,376, Cl. 70-491.000.
- Lee, Gregory S., to TRW Inc. Superconducting analog-to-digital converter with grounded four-junction squid bidirectional counter. 5,019,818, Cl. 341-133.000.
- Lee, In B., to Samsung Electronics Co., Ltd. Separable electrical cooker. 5,019,682, Cl. 219-10.493.
- Lee, James K.; McJury, Donald J.; Pickup, Michael A.; and Robinson, Kelly S., to Eastman Kodak Company. Bar magnet for construction of a magnetic roller core. 5,019,796, Cl. 335-302.000.
- Lee, James K.: *See--*
  - Meyers, Mark M.; Lee, James K.; Narayan, Badhri; and Roddy, James E., 5,018,808, Cl. 350-6.910.
- Lee, Jen J. Motor construction for an electric fan. 5,019,735, Cl. 310-89.000.
- Lee, Jordan R.: *See—*
  - Davis, Richard S.; Lee, Jordan R.; and MacFarlane, Glen R., 5,018,486, Cl. 123-52.0MF.
- Lee, Len F.; and Dolson, Mark G., to Monsanto Company. Substituted pyridine herbicides. 5,019,153, Cl. 71-94.000.
- Lee, Leonard A.: *See—*
  - Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.
- Lee, Leonard G.; McLean, Francis A.; and Gagnon, Jean H., to Lee Valley Tools Ltd. Apparatus for holding and storing sharpening stones. 5,018,315, Cl. 51-213.000.
- Lee, Neville K., to Digital Equipment Corporation. Overwriting system for magneto-optical recording with self timing track. 5,020,040, Cl. 369-13.000.
- Lee, Peter M. Instrument for selectivity separating strands of hair. 5,018,542, Cl. 132-139.000.
- Lee, Ron C.; and Kirschner, Mark J., to BOC Group, Inc., The. Cryogen delivery apparatus. 5,018,358, Cl. 62-48.100.
- Lee, Sai-keung, to Advanced Micro Devices, Inc. Programmable power supply level detection and initialization circuitry. 5,019,996, Cl. 364-483.000.
- Lee, Sang D. Hypodermic syringe with a locking needle assembly and syringe combination. 5,019,045, Cl. 604-110.000.
- Lee, Seung-jae, to Samsung Electron Devices Co., Ltd. Direct heating type cathode structure. 5,019,744, Cl. 313-346.00R.
- Lee Valley Tools Ltd.: *See—*
  - Lee, Leonard G.; McLean, Francis A.; and Gagnon, Jean H., 5,018,315, Cl. 51-213.000.
- Leege, Norbert: *See—*
  - Bauch, Karl; Raff, Alfred; Heel, Helmut; and Leege, Norbert, 5,018,916, Cl. 409-233.000.
- Lefsky, Brian; and Natusch, Mary E., to Prime Computer, Inc. High availability cache organization. 5,019,971, Cl. 364-200.000.
- Lehrer, Scott E.: *See—*
  - Niu, Joseph H. Y.; Edmondson, James G.; and Lehrer, Scott E., 5,019,341, Cl. 422-7.000.
- Lehto, John M., to Northern States Power Company. Method for the processing of fly ash, scrubber sludge and the like; and product. 5,019,360, Cl. 423-132.000.
- Leifeld, Ferdinand, to Trutzschler GmbH & Co. KG. Passage width adjusting device for a sliver trumpet. 5,018,246, Cl. 19-150.000.
- Leigh-Monstevens, Keith V.: *See—*
  - Compton, David J.; Nix, Richard A.; and Leigh-Monstevens, Keith V., 5,018,352, Cl. 60-533.000.
- Leighton, Harry J.: *See—*
  - Feldman, Paul L.; James, Michael K.; Brackeen, Marcus F.; Johnson, Michael R.; and Leighton, Harry J., 5,019,583, Cl. 514-327.000.
- Leitch, Clifford D.: *See—*
  - Ooms, William J.; Leitch, Clifford D.; and Delgado, Rene M., 5,020,017, Cl. 364-761.000.
- Leithner, Dietrich: *See—*
  - von Charzewski, Cornelia; Leithner, Dietrich; Schmitt, Hermann; and Schoening, Josef, 5,019,322, Cl. 376-158.000.
- Lejus Medical Aktiebolag: *See—*
  - Appelgren, Curt H.; and Odda, Ulf A., 5,019,399, Cl. 424-493.000.
- Leliaert, Philippe J.: *See—*
  - Cox, Eric R.; and Leliaert, Philippe J., 5,018,815, Cl. 350-96.150.
- Lemaster, Guy N. Caulk and glazing tool. 5,018,956, Cl. 425-87.000.
- Lemelson, Jerome H.; and Grund, Christian. Radio frequency controlled interrogator-responder system with passive code generator. 5,019,815, Cl. 340-933.000.
- Lemole, Gerald M. Protective gel composition. 5,019,604, Cl. 523-105.000.
- Lenk, Rainer: *See—*
  - Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.
- Lentz, Ronald R.: *See—*
  - Lorence, Matthew W.; Rice, Michael J.; Lentz, Ronald R.; Pesheck, Peter S.; and Perry, Michael R., 5,019,681, Cl. 219-10.55F.
- Lenz, William: *See—*
  - Patel, Arvind; Lenz, William; and Schafer, Jack J., 5,019,795, Cl. 335-205.000.
- Leonard, Ronald: *See—*
  - Hardin, Gary P.; and Leonard, Ronald, 5,018,930, Cl. 414-458.000.
- Leong, Daniel B. C.: *See—*
  - Chang, Karl; Pape, William R., III; Crosetti, Victor J., Jr.; Nakamura, Lance S.; Leong, Daniel B. C.; and Loui, Robert K. L., 5,019,696, Cl. 235-436.000.
- Le Peltier, Fabienne: *See—*
  - Chaumette, Patrick; Le Peltier, Fabienne; Szymanski, Raymond; Courty, Philippe; and Verdon, Catherine, 5,019,547, Cl. 502-342.000.
- Lepselter, Martin P.; and Waggener, Herbert A., to Lepton Inc. X-ray masks, their fabrication and use. 5,020,083, Cl. 378-35.000.
- Lepton Inc.: *See—*
  - Lepselter, Martin P.; and Waggener, Herbert A., 5,020,083, Cl. 378-35.000.
- Le Quesne, Yves; and Fossi, Paolo, to Metaleurop S.A. Process for hydrometallurgical treatment of an indium chloride solution. 5,019,363, Cl. 423-87.000.
- Lerfald, Gordon H. Laser alignment system. 5,020,074, Cl. 372-107.000.
- Letessier, Jacques; and Castelli, Philippe, to U. S. Philips Corporation. Bandpass filter having an adjustable bandwidth. 5,019,794, Cl. 333-174.000.
- Le Touche, Roger, to Aerospatiale Societe Nationale Industrielle. Suspended skin for thermal insulation of cryogenic propellants. 5,018,634, Cl. 220-4.120.
- Letourneur, Didier; Douzon, Colette; Migonney, Veronique; Muller, Daniel A.; and Jozefowicz, Marcel, to Centre National de la Recherche Scientifique. Polymers derived from crosslinked polystyrenes and dextrans, their methods of preparation and their applications for the analysis and purification of molecules of biological origin. 5,019,269, Cl. 210-635.000.
- Leupold, Ernst I.: *See—*
  - Gutweiler, Matthias; Driscoll, Robert K.; and Leupold, Ernst I., 5,019,624, Cl. 525-61.000.
- Levinson, Frank H., to Finisar Corporation. Semiconductor laser diode controller and laser diode biasing control method. 5,019,769, Cl. 372-31.000.
- Lewin, Helmut: *See—*
  - Zimmermann, Clifton; Kuerten, Heribert; and Lewin, Helmut, 5,019,704, Cl. 250-214.00R.
- Lewis, Alfred M.; and Cox, James W. Vapor-accelerated combustion fuel system. 5,019,120, Cl. 123-557.000.
- Lewis, Richard C.: *See—*
  - Zohler, Steven R.; and Lewis, Richard C., 5,018,573, Cl. 165-133.000.
- Lewkowitz, Bernd. Door light. 5,018,330, Cl. 52-455.000.
- Lia, Raymond A.: *See—*
  - Danna, Dominick; Krauter, Allan I.; and Lia, Raymond A., 5,018,506, Cl. 128-4.000.
  - Evangelista, Michael L.; and Lia, Raymond A., 5,018,436, Cl. 92-92.000.
- Liang, Samuel S.: *See—*
  - Chin, Jack; and Liang, Samuel S., 5,019,555, Cl. 505-1.000.
- Liardet, Claude. Expiration-resisting apparatus designed for improving pulmonary ventilation. 5,018,517, Cl. 128-200.240.
- Liebermann, Howard H.; and Hardman, Tedd P., to Allied-Signal Inc. Micro-additions to tin alloys. 5,019,336, Cl. 420-557.000.
- Liebich, Max. Method and tobacco product for use by the consumer for making cigarettes. 5,018,536, Cl. 131-70.000.
- Liedtke, Kurt: *See—*
  - Focke, Heinz; and Liedtke, Kurt, 5,018,625, Cl. 206-621.000.
- Liere, Horst: *See—*
  - Brennecke, Hermann; and Liere, Horst, 5,018,585, Cl. 169-48.000.
- Lilliwyte Societe Anonyme: *See—*
  - Coetzer, Johan; Meintjes, Anthony A.; and Adendorff, Keith T., 5,019,466, Cl. 429-103.000.
- Lin, Dhei-Jhai; Shieh, Jim-Chyuan; and Lin, Hsien-Kuang, to 501 Industrial Technology Research Institute. Aqueous developable photoresist containing weak alkali soluble or dispersible thiol compounds. 5,019,483, Cl. 430-288.000.
- Lin, Hsien-Kuang: *See—*
  - Lin, Dhei-Jhai; Shieh, Jim-Chyuan; and Lin, Hsien-Kuang, 5,019,483, Cl. 430-288.000.
- Lin, Youlin; Wallace, Rebecca A.; and White, David H., to Mallinckrodt Medical, Inc. Novel x-ray contrast agents, compositions and methods. 5,019,371, Cl. 424-5.000.
- Lincoln Laser Company: *See—*
  - Weilbach, August O.; Hanson, Derald F.; and Smith, C. Dwight, 5,019,738, Cl. 310-90.500.
- Lindberg, Per L.: *See—*
  - Brandstrom, Arne E.; Lindberg, Per L.; Starke, Carl I.; and Sunden, Gunnel E., 5,019,584, Cl. 514-338.000.
- Linde Aktiengesellschaft: *See—*
  - Rohde, Wilhelm; and Corduan, Horst, 5,019,145, Cl. 62-22.000
- Linden, Harry A., to Hall Surgical Division of Zimmer Inc. Irrigation system for surgical procedures. 5,019,038, Cl. 604-49.000.
- Lindgren, Bo S.: *See—*
  - Andersson, Nils A. T.; and Lindgren, Bo S., 5,018,249, Cl. 221-222.000.
- Lindley, Donald J.: *See—*
  - Moskowitz, Larry N.; and Lindley, Donald J., 5,019,429, Cl. 427-422.000.
- Lindstrom, Richard L.: *See—*
  - Aysta, James E.; Lindstrom, Richard L.; and Skelnik, Debra L., 5,019,084, Cl. 606-107.000.
- Linn, Edwards E.: *See—*
  - Mahjour, Majid; Mauser, Bernadette; Rashidbaigi, Zahra; and Linn, Edwards E., 5,019,395, Cl. 424-449.000.

- Linton, Joey: *See—*
  - Chugh, Yoginder P.; Alongi, John R.; and Linton, Joey, 5,018,907, Cl. 405-288.000.
- Linzey, Raynor; and Rice, Herbert L., to Sprague Electric Company. Metallized film capacitor process. 5,019,418, Cl. 427-79.000.
- Lipson, Jan: *See—*
  - Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
- Lisega GmbH: *See—*
  - Hardtke, Hans-Herlof; and Bernert, Jorg, 5,018,607, Cl. 188-282.000.
  - Hardtke, Hans-Herlof, 5,018,700, Cl. 248-571.000.
- Liss, Jonathan H. Name forming game apparatus and method. 5,018,728, Cl. 273-459.000.
- Litherland, Troy C.: *See—*
  - Brazelton, Carl L.; Litherland, Troy C.; and Johnston, James G., 5,018,870, Cl. 366-161.000.
  - Brazelton, Carl L.; and Litherland, Troy C., 5,018,871, Cl. 366-168.000.
- Litka, Thomas J.: *See—*
  - Larson, Richard C.; Spencer, Keith R.; Alercia, Don P.; Kwech, Horst; Litka, Thomas J.; and Ford, Guy J., 5,019,325, Cl. 376-260.000.
- Little, John K.: *See—*
  - Biggs, David H.; Little, John K.; and Hanifan, Philip C., 5,019,814, Cl. 340-870.290.
- Litton Industrial Automation Systems, Inc.: *See—*
  - Walsh, John M.; and Ott, David M., 5,020,122, Cl. 382-56.000.
- Litton Systems Canada Limited: *See—*
  - Prince, John C.; and Farrell, James F., 5,019,808, Cl. 340-765.000.
- Litton Systems, Inc.: *See—*
  - Freismuth, John S.; and Knowles, Robert G., 5,018,822, Cl. 350-96.200.
- Liu, Hua-Kuang: *See—*
  - Chao, Tien-Hsin; and Liu, Hua-Kuang, 5,019,898, Cl. 358-81.000.
- Liu, Tsuen-Hsi: *See—*
  - Cheng, Li-Jen; and Liu, Tsuen-Hsi, 5,018,852, Cl. 356-28.500.
- Livingston, Gene P.: *See—*
  - Boisture, Thomas B.; McGrew, Larry D.; Jeffrey, James D.; Wetzel, Robert G.; Livingston, Gene P.; and Baten, Robert A., 5,018,544, Cl. 134-111.000.
- Livingston, Howard F.: *See—*
  - Peck, R. Michael; Hecht, Thomas R.; and Livingston, Howard F., 5,018,672, Cl. 241-37.500.
- Livingstone, James; Higham, Graham J.; and Pruitt, Gerald R., to Helix Technology Corporation. Temperature control system for a cryogenic refrigeration. 5,018,357, Cl. 62-6.000.
- Lloyd, Blake A.: *See—*
  - Chu, Frank Y.; and Lloyd, Blake A., 5,019,760, Cl. 318-490.000.
- Lloyd, Daniel L., to Cold Jet, Inc. Phase change injection nozzle. 5,018,667, Cl. 239-132.500.
- LN Industries S.A.: *See—*
  - Guy, Gabriel; and Zellweger, Conrad, 5,018,242, Cl. 16-228.000.
- Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., to Hughes Aircraft Company. Maskable bilevel correlators. 5,020,113, Cl. 382-42.000.
- Lockett, Michael J.: *See—*
  - Victor, Richard A.; Lockett, Michael J.; and Dray, James R., 5,019,144, Cl. 62-22.000.
- Loctite Corporation: *See—*
  - Woods, John; Rooney, John; and Coakley, Pauline, 5,019,629, Cl. 525-312.000.
- LoGerfo, Frank W.: *See—*
  - Ito, Ralph K.; and LoGerfo, Frank W., 5,019,393, Cl. 424-423.000.
- Lohrmann, Dieter R., to United States of America, Army. Phase/frequency modulator. 5,020,133, Cl. 455-43.000.
- Lombardo, Igino, to I. L. Med., Inc. Gas laser. 5,020,070, Cl. 372-65.000.
- Lonati, Francesco, to Lonati S.p.A. Device for activating knitting cams in circular knitting machines. 5,018,369, Cl. 66-40.000.
- Lonati S.p.A.: *See—*
  - Lonati, Francesco, 5,018,369, Cl. 66-40.000.
- Londt, Edward E.; and Schaar, Robert T., to Caterpillar Inc.; and Navistar International Corporation. Method of operating a vehicle engine. 5,019,986, Cl. 364-426.040
- Long, Gary N.: *See—*
  - Best, Donald F.; Long, Gary N.; Pellet, Regis J.; Rabo, Jule A.; and Wolynic, Edward T., 5,019,240, Cl. 208-111.000.
- Longoria, Ritchie L., to F. L. Saino Manufacturing Co. Door operator. 5,018,304, Cl. 49-340.000.
- Lonnberg, Kari K.: *See—*
  - Haikala, Heimo O.; Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., 5,019,575, Cl. 514-247.000.
- Loozen, Hubert J. J., to Akzo N.V. Tricyclic aromatase inhibitors. 5,019,585, Cl. 514-396.000.
- Lopez, Maria B.: *See—*
  - Garrity, George M.; Lopez, Maria B.; Hensens, Otto D.; Monaghan, Richard L.; and Zink, Deborah L., 5,019,593, Cl. 514-560.000.
- Lord Corporation: *See—*
  - Carlson, J. David, 5,018,606, Cl. 188-267.000.
  - Shah, Dilipkumar N., 5,019,608, Cl. 523-456.000.
- L'Oreal: *See—*
  - Goncalves, Antonin, 5,018,894, Cl. 401-202.000.
  - Philippe, Michel; Hocquaux, Michel; Sebag, Henri; Beck, Irina; and Laugier, Jean P., 5,019,567, Cl. 514-164.000.
- Lorence, Matthew W.; Rice, Michael J.; Lentz, Ronald R.; Pesheck, Peter S.; and Perry, Michael R., to Pillsbury Company, The. Reflective temperature compensating microwave susceptors. 5,019,681, Cl. 219-10.55F.
- Lorenz, Gisela: *See—*
  - Rentzea, Costin; Ammermann, Eberhard; and Lorenz, Gisela, 5,019,598, Cl. 514-650.000.
- Lorenz, Jurgen W., to Wagner GmbH. Method for sterilizing containers. 5,019,345, Cl. 422-26.000.
- Lorenzen, Walter C. Automatic chemical dispenser. 5,019,250, Cl. 210-85.000.
- Lormeau, Jean-Claude; Petitou, Maurice; and Choay, Jean, to Choay S.A. Method for obtaining biologically active mucopolysaccharides of high purity, by controlled depolymerization of heparin. 5,019,649, Cl. 536-21.000.
- Losic, Novica A.; and Varga, Ljubomir D. Synthesis of load-independent DC drive system. 5,020,125, Cl. 388-811.000.
- Losic, Novica A.: *See—*
  - Varga, Ljubomir D.; and Losic, Novica A., 5,019,958, Cl. 363-97.000.
- Loui, Robert K. L.: *See—*
  - Chang, Karl; Pape, William R., III; Crosetti, Victor J., Jr.; Nakamura, Lance S.; Leong, Daniel B. C.; and Loui, Robert K. L., 5,019,696, Cl. 235-436.000.
- Lovelace, Donald E.: *See—*
  - Miller, Walter E., Jr.; Mitchell, Robert R.; and Lovelace, Donald E., 5,018,447, Cl. 102-213.000.
- Lowe, Frank J., to Premier Industrial Corporation. Polyurethane foams, compositions to prepare same and process to prepare same. 5,019,602, Cl. 521-127.000.
- Lowe, H. Edward; Yoder, Ricky L.; and Nelson, Clayton C., to Edward Lowe Industries, Inc. Non-clay agricultural granule. 5,019,564, Cl. 514-75.000.
- Lowman, Kent: *See—*
  - Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, 5,019,841, Cl. 346-153.100.
- Lu, Jieh-Shan. Nipple assembly with alarm buzzer and body temperature indicator. 5,019,095, Cl. 606-234.000.
- Lubricating Specialties Company: *See—*
  - Finke, Donald R., 5,018,343, Cl. 56-12.100.
- Lucas, Jan H., to Shell Internationale Research Maatschappij B.V. Pump column. 5,018,549, Cl. 137-355.230.
- Luceno, Elizabeth. Earring device. 5,018,365, Cl. 63-12.000.
- Lucerne Products, Inc.: *See—*
  - Bittel, Robert W.; and Rhine, Jules W., Jr., 5,018,983, Cl. 439-76.000.
- Lucki, Walter J.; and Tober, Gerald H., to Armstrong-Blum Manufacturing Company, Ltd. Saw blade tooth geometry. 5,018,421, Cl. 83-835.000.
- Ludemann, Simpert; Bernheim, Michael; Sandner, Bernhard; Rossler, Erich; and Vogel, Hans-Burkhardt, to Ciba-Geigy Corporation. Modified polyurethanes containing perfluoroaliphatic groups and use thereof. 5,019,428, Cl. 427-387.000.
- Ludin, Stig: *See—*
  - Sjte, Lars, ml/o/ holm; and Ludin, Stig, 5,018,948, Cl. 417-302.000.
- Luebbe, John P.: *See—*
  - Tanner, Paul R.; Nunn, Randolph G., Jr.; and Luebbe, John P., 5,019,375, Cl. 424-66.000.
- Lugtenberg, Egbertus J. J.: *See—*
  - Okker, Robert J. H.; Lugtenberg, Egbertus J. J.; and Schilperoort, Robbert A., 5,019,501, Cl. 435-69.100.
- Luiro, Anne M.: *See—*
  - Haikala, Heimo O.; Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., 5,019,575, Cl. 514-247.000.
- Lund, David M., to Lund Industries, Incorporated. Cab fairing. 5,018,779, Cl. 296-180.100.
- Lund Industries, Incorporated. *See—*
  - Lund, David M., 5,018,779, Cl. 296-180.100.
- Lundry, Jerry L.: *See—*
  - Hahn, Mansop M.; Lundry, Jerry L.; and Mohn, Larry W., 5,018,683, Cl. 244-1.00R.
- Luz Industries Israel, Ltd.: *See—*
  - Elgat, Zvi; and Warschawski, Joel P., 5,019,458, Cl. 428-630.000.
- Lynch, Samuel E.: *See—*
  - Antoniades, Harry N.; and Lynch, Samuel E., 5,019,559, Cl. 514-21.000.
- Lynch, Thomas M.: *See—*
  - Barlow, Robert W.; Boucher, Robert W.; and Lynch, Thomas M., 5,018,818, Cl. 350-96.200.
- Lynn, Karen K.; and Higgins, Susan L. Securing device and method. 5,019,050, Cl. 604-179.000.
- Lyons, Joseph B., Jr.: *See—*
  - Meuron, Bruce R.; and Lyons, Joseph B., Jr., 5,018,685, Cl. 244-3.140.
- M & J MacIver Holdings Ltd.: *See—*
  - Guptill, Brian N., 5,018,997, Cl. 440-76.000.
- Ma, Sheau-Hwa: *See—*
  - Kellogg, Reid E.; Laganis, Evan D.; and Ma, Sheau-Hwa, 5,019,549, Cl. 503-227.000.
- Maag-Gear-Wheel & Machine Co. Ltd.: *See—*
  - Seiberlich, Walter, 5,018,913, Cl. 409-34.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Maas, Reginald R.: *See—*
  - Brewer, John R.; Swenson, Joseph M.; and Maas, Reginald R., 5,019,307, Cl. 264-67.000.
- Macadam, Anne M.: *See—*
  - Ferguson, Clare H. R.; Macadam, Anne M.; Ince, Jane E.; and Knowles, Christopher J., 5,019,505, Cl. 435-148.000.
- Macaulay, Malcolm, to Hughes Aircraft Company. Image registration method and apparatus. 5,020,116, Cl. 382-44.000.
- MacDonald, Ralph R.; and Menger, William M., to Innovative Controls, Inc. Ballast circuit. 5,019,959, Cl. 363-134.000.
- MacFarlane, Glen R.: *See—*
  - Davis, Richard S.; Lee, Jordan R; and MacFarlane, Glen R., 5,018,486, Cl. 123-52.0MF.
- MacFarlane, Peter R.: *See—*
  - Alderson, Graham R.; MacFarlane, Peter R.; and Mori, Tohru, 5,019,963, Cl. 364-200.000.
- Machida, Atsuhiko; and Nakamura, Tetsuo, to Institute of Immunology Co., Ltd. Hepatitis B vaccine. 5,019,386, Cl. 424-89.000.
- Maeda, Akio: *See—*
  - Chida, Takeshi; Aonuma, Mitsuyoshi; Maeda, Akio; Morozumi, Yukihiko; and Ohishi, Tetsu, 5,019,630, Cl. 525-326.200.
- Maeda, Hideo: *See—*
  - Mitsuda, Kenro; Maeda, Hideo; Urushibata, Hiroaki; and Murahashi, Toshiaki, 5,019,464, Cl. 429-34.000.
- Maeda, Yasuo: *See—*
  - Mukai, Hiromu; Hayashi, Kohtaro; and Maeda, Yasuo, 5,019,854, Cl. 354-471.000.
- Maehata, Hiromi: *See—*
  - Masaki, Syouichi; Maehata, Hiromi; Sakai, Kazunori; and Sugitani, Tatsuo, 5,019,984, Cl. 364-426.020.
- Magneco/Metrel, Inc.: *See—*
  - Soofi, Madjid, 5,018,710, Cl. 266-280.000.
- Maher, Robert D., III; and Antaki, Patrick, to Cyrix Corporation. Bidirectional variable bit shifter. 5,020,013, Cl. 364-715.080.
- Maher, Timothy J.: *See—*
  - Wurtman, Richard J.; and Maher, Timothy J., 5,019,594, Cl. 514-561.000.
- Mahjour, Majid; Mauser, Bernadette; Rashidbaigi, Zahra; and Linn, Edwards E., to Warner-Lambert Company. Compositions with enhanced penetration. 5,019,395, Cl. 424-449.000.
- Mai, Ernst: *See—*
  - Miese, Manfred; and Mai, Ernst, 5,018,961, Cl. 425-450.100.
- Maier, Helmut W.: *See—*
  - Maier, Steven E.; and Maier, Helmut W., 5,018,743, Cl. 273-242.000.
- Maier, Steven E.; and Maier, Helmut W., to Brainy Toys Inc. Board game. 5,018,743, Cl. 273-242.000.
- Maier, Ulrich; and Fischer, Horst, to KM-kabelmetal AG. Mold making. 5,018,378, Cl. 72-283.000.
- Mainland, Donald R., to Kolars Arms. Shotgun shell ejector/extractor means for skeet gun carrier barrel having smaller gauge tube therein. 5,018,293, Cl. 42-77.000.
- Maki, Minoru: *See—*
  - Umezono, Shiro; and Maki, Minoru, 5,018,403, Cl. 74-425.000.
- Makino, Naonori; Ohno, Shigeru; Hoshi, Satoshi; and Kitatani, Katsuji, to Fuji Photo Film Co., Ltd. Electrophotographic photoreceptor. 5,019,474, Cl. 430-76.000.
- Makino, Yutaka: *See—*
  - Izumi, Yasuo; Ishimoto, Kazumi; and Makino, Yutaka, 5,018,936, Cl. 414-752.000.
- Makita Electric Works, Ltd.: *See—*
  - Fushiya, Fusao; and Yamaguchi, Shinobu, 5,018,314, Cl. 51-170.0MT.
- Makofsky, Patrick A.: *See—*
  - Gorin, Allen L.; Makofsky, Patrick A.; Morton, Nancy; Oliver, Neal C.; Shively, Richard R.; and Stanziola, Christopher A., 5,020,059, Cl. 371-11.300.
- Malachowsky, Chris, to Sun Microsystems, Inc. Method and apparatus for decomposing a quadrilateral figure for display and manipulation by a computer system. 5,020,002, Cl. 364-518.000.
- Malagrino, Gerald D., Jr.; and Nelson, Dale A., to International Business Machines Corporation. Magnetic disk burnishing method and apparatus. 5,018,311, Cl. 51-140.000.
- Malibu Boats, Inc.: *See—*
  - Jellen, David L., 5,018,474, Cl. 114-253.000.
- Malinowski, Susan: *See—*
  - Perez, Sam S.; and Malinowski, Susan, 5,019,068, Cl. 604-386.000.
- Mallinckrodt Medical, Inc.: *See—*
  - Lin, Youlin; Wallace, Rebecca A.; and White, David H., 5,019,371, Cl. 424-5.000.
- Malvern, Allan, to British Aerospace Public Limited Company. Ring resonator gyroscope control system with gain difference equalization. 5,018,858, Cl. 356-350.000.
- Mamiya, Toshiharu: *See—*
  - Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; Endo, Takashi; and Moriyama, Jiro, 5,019,840, Cl. 346-134.000.
- Mammato, Donald C.; Jain, Sangya; Durham, Dana; Spak, Mark A.; Usifer, Douglas A.; and McFarland, Michael, to Hoechst Celanese Corporation. Method of producing an image reversal negative photoresist having a photo-labile blocked imide. 5,019,488, Cl. 430-325.000.
- Mandrels, Inc.: *See—*
  - Parsons, Ronald C., 5,018,575, Cl. 166-242.000.
- Manley, Dwight P.: *See—*
  - Webb, David A., Jr.; Hetherington, Ricky C.; Salett, Ronald M.; Fossum, Trvggvue; and Manley, Dwight P., 5,019,965, Cl. 364-200.000.
- Manner, James A.; and Hoelscher, Charles H., to PPG Industries, Inc. Method of separating 2-nitrosophenol isomer from admixture with 4-nitrosophenol isomer. 5,019,659, Cl. 568-949.000.
- Mannesmann AG: *See—*
  - Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.
- Mannesmann Aktiengesellschaft. *See—*
  - Bernd, Alfred; England, Willi; Flaig, Heinz; Hesse, Wilhelm; Staggl, Roland; and Zacharias, Karl, 5,019,734, Cl. 310-77.000.
  - von Hagen, Ingo; Prasser, Christoph; and Homberg, Gerd, 5,019,180, Cl. 148-12.00B.
- Mannesmann Rexroth GmbH: *See—*
  - Reimer, Hans-Jurgen, 5,018,631, Cl. 212-250.000.
- Mannke, Gary: *See—*
  - Chamings, Antony W.; Staley, Dennis W.; and Mannke, Gary, 5,018,783, Cl. 296-219.000.
- Mao, Mark H.: *See—*
  - Caswell, Debra S.; Mao, Mark H.; Mermelstein, Robert; and Baker, Ellen S., 5,019,280, Cl. 252-8.800.
- Mao, Zhenhua: *See—*
  - White, Ralph E.; Mao, Zhenhua; and Srinivasan, Supramaniam, 5,019,227, Cl. 204-128.000.
- Maram, Morris. Detector units. 5,019,803, Cl. 340-539.000.
- Marantz, Daniel R., to Alloy Metals, Inc. High-velocity flame spray apparatus and method of forming materials. 5,019,686, Cl. 219-76.140.
- Marathon Oil Company: *See—*
  - Haines, Hiemi K.; and Christiansen, Richard L., 5,019,279, Cl. 252-8.554.
- Marco, Leslie S.; Klygis, Mindaugas J.; and Weaver, William N., to Illinois Tool Works Inc. Carrier stock with band segments extending between opposite edges. 5,018,620, Cl. 206-150.000.
- Margolin, George D. Unit dose syringe with rotatable needle. 5,019,048, Cl. 604-153.000.
- Marion Merrell Dow Inc.: *See—*
  - Rebne, Thomas M.; and Esslinger, David, 5,019,125, Cl. 206-532.000.
- Markous, Ezaria Y. Piston pushing tool. 5,018,261, Cl. 29-239.000.
- Markunas, Robert J.; Hendry, Robert; and Rudder, Ronald A., to Reserach Triangle Institute, Inc. Remote plasma enhanced CVD method and apparatus for growing an epitaxial semconductor layer. 5,018,479, Cl. 118-723.000.
- Marler, David O.: *See—*
  - Del Rossi, Kenneth J.; Dessau, Ralph M.; Huss, Albin, Jr.; Kirker, Garry W.; Marler, David O.; and Partridge, Randall D., 5,019,664, Cl. 585-419.000.
- Marr's Leisure Products (1977) Inc.: *See—*
  - Guptill, Brian N., 5,018,997, Cl. 440-76.000.
- Marsan, Mario S.; and Thompson, Leonard R., to Procter & Gamble Company, The. Absorbent articles containing mechanical pulp and polymeric gelling material. 5,019,063, Cl. 604-368.000.
- Marshall, Robert L. Sports saddle. 5,018,340, Cl. 54-44.000.
- Marstiller, John A.; Bodensiek, Paul H.; and Grise, Frederick G. J., to Flexwatt Corporation. Electrical resistance device. 5,019,797, Cl. 338-333.000.
- Marten, Manfred; and Kamutzki, Walter, to Hoechst AG. Aqueous solutions of polyamidoamine-epichlorohydrin resins, and preparation and use thereof. 5,019,606, Cl. 523-414.000.
- Martens, Jon S.; Beyer, James B.; Nordman, James E.; and Hohenwarter, Gert K. G., to Wisconsin Alumni Research Foundation. Active superconducting devices formed of thin films. 5,019,721, Cl. 307-306.000.
- Martin, Craig A.; and Johnson, Jerry L., to American Cyanamid Company. Herbicidal oil in water combination compositions of imidazolinone herbicides. 5,019,150, Cl. 71-90.000.
- Martin, Gardner R., to Rockwell International Corporation. Process for enhancing physical properties of aluminum-lithium workpieces. 5,019,183, Cl. 148-12.70A.
- Martin, James A.: *See—*
  - Silvestri, George J., Jr.; Martin, James A.; and Ulrich, Douglas R., 5,018,356, Cl. 60-646.000.
- Martin Marietta Corporation: *See—*
  - Chen, Wenpeng, 5,018,842, Cl. 350-354.000.
- Martin, Thomas F.; Chenoweth, John S.; and Tinguely, Paul R., to General Instrument Corporation. Addressable control system for CATV program distribution. 5,020,129, Cl. 455-4.000.
- Martinson, Edwin O.: *See—*
  - Gray, Thomas J.; and Martinson, Edwin O., 5,018,431, Cl. 91-363.00R.
- Maruyama, Hitoshi: *See—*
  - Kusakabe, Katsuhiko; Maruyama, Hitoshi; Kawano, Yukita; Matsui, Susumu; Taniguchi, Tsutomu; and Obayashi, Akira, 5,018,301, Cl. 47-1.100.
- Maruyama, Takashi: *See—*
  - Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, 5,019,615, Cl. 524-100.000.
- Marzoli, Pietro B.; and Vezzoli, Emilio. Apparatus for opening and mixing staple cotton. 5,018,245, Cl. 19-145.500.
- Masaki, Syouichi; Maehata, Hiromi; Sakai, Kazunori; and Sugitani, Tatsuo, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Vehicle wheel slip control system. 5,019,984, Cl. 364-426.020.
- Maschinenfabrik J. Dieffenbacher GmbH & Co.: *See—*
  - Bielfeldt, Friedrich B., 5,019,206, Cl. 156-538.000.
- Maschinenfabrik Rieter AG: *See—*
  - Schneider, Ulf; and Schmid, Rene , 5,018,247, Cl. 19-205.000.

- Masco GmbH: *See—*
  - Grassberger, Roland; and Knapp, Alfons, 5,018,553, Cl. 137-625.410.
- Mason, Norbert S.: *See—*
  - Sparks, Robert E.; Mason, Norbert S.; and Center, Michael, 5,019,302, Cl. 264-8.000.
- Massachusetts Institute of Technology: *See—*
  - Domb, Abraham J.; and Langer, Robert S., 5,019,379, Cl. 424-78.000.
  - Gefter, Malcolm L.; and Guillet, Jean G., 5,019,384, Cl. 424-88.000.
  - Weaver, James C.; Powell, Kevin T.; and Langer, Robert S., Jr., 5,019,034, Cl. 604-20.000.
- Master Concepts Inc.: *See—*
  - Mitchell, William J.; and Grumelot, Albert L., 5,018,470, Cl. 114-183.00R.
- Mastondrea, Robert P.: *See—*
  - Sartori, Guido; Ho, W. S. Winston; Savage, David W.; Noone, Robert E.; and Mastondrea, Robert P., 5,019,666, Cl. 585-819.000.
- Masuyama, Kenji: *See—*
  - Kubota, Mineo; and Masuyama, Kenji, 5,019,918, Cl. 358-473.000.
- Matano, Takashi: *See—*
  - Kawahata, Ichiro; Matano, Takashi; Kato, Hideki; and Shima, Mutsuo, 5,019,202, Cl. 156-277.000.
- Mathys, Robert, Jr.: *See—*
  - Perren, Stephen M.; Frigg, Robert; Gisin, Paul; and Mathys, Robert, Jr., 5,019,078, Cl. 606-61.000.
- Matich, Charles B., to Boeing Company, The. Transducer input shaft lock mechanism. 5,018,397, Cl. 73-866.500.
- Matsubara, Hidetsugu; Iguchi, Yuichi; Tanaka, Shinya; and Miyashita, Kazuya, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Rotor with eccentrically positioned retainer pin. 5,018,953, Cl. 418-201.100.
- Matsubara, Hisayoshi; Mizuno, Yutaka; and Hanajima, Toshiharu, to Yamaha Hatsudoki Kabushiki Kaisha. Fuel cell system. 5,019,463, Cl. 429-12.000.
- Matsubara, Toshiyuki: *See—*
  - Yamaguchi, Atsuo; Takahira, Kenichi; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,019,970, Cl. 364-200.000.
- Matsuda, Kiyofumi: *See—*
  - Barnes, Thomas H.; Matsuda, Kiyofumi; and Ooyama, Naotake, 5,018,838, Cl. 350-347.00V.
- Matsuda, Noboru, to Sharp Kabushiki Kaisha. Imaging device capable of picking up electrically enlarged images. 5,019,912, Cl. 358-213.260.
- Matsui, Susumu: *See—*
  - Kusakabe, Katsuhiko; Maruyama, Hitoshi; Kawano, Yukita; Matsui, Susumu; Taniguchi, Tsutomu; and Obayashi, Akira, 5,018,301, Cl. 47-1.100.
- Matsui, Teruhito: *See—*
  - Abe, Yuji; Sugimoto, Hiroshi; Ohtsuka, Kenichi; Oishi, Toshiyuki; and Matsui, Teruhito, 5,020,072, Cl. 372-96.000.
- Matsuke, Satoshi: *See—*
  - Ishimaru, Takeshi; and Matsuke, Satoshi, 5,018,346, Cl. 56-202.000.
- Matsumoto, Kenichi: *See—*
  - Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.
- Matsumoto, Kenji: *See—*
  - Yokouchi, Takahito; Matsumoto, Kenji; and Odoi, Kozo, 5,018,784, Cl. 296-219.000.
- Matsumoto, Shoichi: *See—*
  - Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susumu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 5,018,839, Cl. 350-347.00R.
- Matsumoto, Yasuji; Moriyama, Maya; and Kuwahara, Yasushi, to Toshiba Silicone Co. Ltd. Process for producing an electronic part. 5,019,419, Cl. 427-96.000.
- Matsumoto, Yuichi, to Soda Aromatic Co., Ltd. Molded slow-release air freshener. 5,019,434, Cl. 428-35.700.
- Matsumoto, Zenji: *See—*
  - Suzuki, Masayuki; Matsumoto, Zenji; and Fukui, Teruo, 5,019,162, Cl. 75-744.000.
- Matsumura, Isao, to Canon Kabushiki Kaisha. Slit illuminating apparatus. 5,018,851, Cl. 351-214.000.
- Matsuno, Junichi; Ogasawara, Tsuyoshi; Kawauchi, Masataka; and Tsuji, Yasuyuki, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Sheet registration method and apparatus for calculation of delay time and sheet feed control thereby. 5,018,718, Cl. 271-245.000.
- Matsuo, Masaaki; Shimada, Toshio; and Hamada, Seishiro, to Toyo Ink Manufacturing Co., Ltd. Apparatus for image formation and method of image formation. 5,019,860, Cl. 355-104.000.
- Matsuo, Noritada: *See—*
  - Yano, Toshihiko; Torisu, Yoko; Sekihachi, Hiroko; Matsuo, Noritada; Takagaki, Tohei; and Tsushima, Kazunori, 5,019,595, Cl. 514-531.000.
- Matsuo, Yutaka: *See—*
  - Isobe, Takeshi; Matsuo, Yutaka; and Ichihara, Yasuo, 5,019,333, Cl. 420-422.000.
- Matsuoka, Hiroki: *See—*
  - Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, 5,018,494, Cl. 123-339.000.
- Matsuoka, Noriyuki, to Yamaichi Electric Mfg. Co., Ltd. Contact equipped with a bypass element. 5,018,981, Cl. 439-71.000.
- Matsushita Electric Industrial Co., Ltd.: *See—*
  - Asada, Takafumi, 5,018,881, Cl. 384-113.000.
  - Hasegawa, Hiroshi, 5,018,466, Cl. 112-275.000.
  - Izumi, Yasuo; Ishimoto, Kazumi; and Makino, Yutaka, 5,018,936, Cl. 414-752.000.
  - Katagawa, Hiromi, 5,020,099, Cl. 379-234.000.
  - Kawara, Toshiyuki; Tsutsui, Hiroshi; Funakoshi, Hiromasa; and Yoshizumi, Yoshiyuki, 5,020,085, Cl. 378-99.000.
  - Matsuzawa, Akira; and Yamada, Haruyasu, 5,019,820, Cl. 341-156.000.
  - Mino, Norihisa, 5,019,303, Cl. 264-22.000.
  - Murai, Katsumi; and Usui, Makoto, 5,020,060, Cl. 371-37.100.
  - Ogawa, Kazufumi, 5,018,829, Cl. 350-96.340.
  - Ogawa, Kazufumi, 5,018,840, Cl. 350-349.000.
  - Okada, Toshiharu, 5,020,063, Cl. 372-34.000.
  - Takemura, Shigeo; and Taguchi, Katsuyuki, 5,019,925, Cl. 360-71.000.
  - Uomori, Kenya; and Morimura, Atsushi, 5,019,901, Cl. 358-105.000.
- Matsuzawa, Akira; and Yamada, Haruyasu, to Matsushita Electric Industrial Co., Ltd. Serial-parallel type A/D converter having reference resistor chain and current source array. 5,019,820, Cl. 341-156.000.
- Mattei, Jean-Pierre: *See—*
  - Engerand, Jean-Luc; and Mattei, Jean-Pierre, 5,018,795, Cl. 301-63.0PW.
- Matthews, Richard S.: *See—*
  - Rhum, David; and Matthews, Richard S., 5,019,350, Cl. 422-82.070.
- Mattson, William F., to Uniroyal Goodrich Tire Company, The. Tire mold with bladder pressurization system. 5,019,318, Cl. 264-315.000.
- Mauffette, Claude, to Quada Internationale Ltd. Tamper proof hanger with interchangeable shoulder cups. 5,018,650, Cl. 223-93.000.
- Maury, Richard K.: *See—*
  - Carnahan, David W.; French, Paul J. A.; Maury, Richard K.; Akins, Gary L.; and Oaten, Philip J., 5,018,974, Cl. 434-98.000.
- Maus, Roy: *See—*
  - Gersten, Martin; Maus, Roy; and Tibbling, Lars, 5,018,850, Cl. 351-212.000.
- Mauser, Bernadette: *See—*
  - Mahjour, Majid; Mauser, Bernadette; Rashidbaigi, Zahra; and Linn, Edwards E., 5,019,395, Cl. 424-449.000.
- Mauser-Werke GmbH: *See—*
  - Pyzytulla, Dietmar R., 5,018,642, Cl. 220-675.000.
- Maxwell Laboratories, Inc.: *See—*
  - Rix, William H.; and Shannon, John P., deceased, 5,020,087, Cl. 378-134.000.
- May, Brian E., to North Broadway Corp. Pool cleaning system. 5,018,890, Cl. 401-46.000.
- May, Carl J., Jr. Packet format including unique network identity. 5,020,054, Cl. 370-94.100.
- May, Carl J., Jr. Multi-length packet format including fixed length information words. 5,020,055, Cl. 370-94.100.
- May, Choo Y.: *See—*
  - Keat, Ooi C.; May, Choo Y.; and Hock, Augustine O. S., 5,019,668, Cl. 585-864.000.
- Mayer, Udo: *See—*
  - Bruder, Horst; and Mayer, Udo, 5,019,165, Cl. 106-22.000.
- Mazda Motor Corporation: *See—*
  - Arimi, Yukio, 5,019,182, Cl. 148-12.100.
  - Bota, Keiji; and Sawa, Kenji, 5,018,408, Cl. 74-866.000.
  - Murakami, Hiroshi; Koishi, Masayuki; Yatagai, Shoko; and Yamagata, Kazuko, 5,019,546, Cl. 502-303.000.
  - Yokouchi, Takahito; Matsumoto, Kenji; and Odoi, Kozo, 5,018,784, Cl. 296-219.000.
  - Yoshii, Noboru; and Umeda, Takashi, 5,018,780, Cl. 296-203.000.
- MBB GmbH: *See—*
  - Kupfernagel, Artur; and Nitsch, Dieter, 5,018,687, Cl. 244-129.500.
- McAllister, Ian R.: *See—*
  - Davies, Eric, deceased; and McAllister, Ian R., 5,018,226, Cl. 5-82.00R.
- McCabe, David J.: *See—*
  - Beesley, Graham E.; McCabe, David J.; and Saini, Jasjit S., 5,020,051, Cl. 370-29.000.
- McCarthy, James B.: *See—*
  - Furcht, Leo T.; and McCarthy, James B., 5,019,646, Cl. 530-326.000.
- McCarthy, Jeanne L., administratrix: *See—*
  - McCarthy, Robert D., deceased; Kilara, Arun; and Pierce, David B., 5,019,390, Cl. 424-535.000.
- McCarthy, Robert D., deceased (by McCarthy, Jeanne L., administratrix); Kilara, Arun; and Pierce, David B., to Research Corporation Technologies, Inc. Anticancer agent—IMIC. 5,019,390, Cl. 424-535.000.
- McClure, David C., to SGS-Thomson Microelectrónics, Inc. Noise tolerant input buffer. 5,019,724, Cl. 307-443.000.
- McClure, John R.; Weaver, Marvin G., Jr.; and Strosser, Richard P., to Ford New Holland, Inc. Method for shear bar adjustment in a forage harvester. 5,018,342, Cl. 56-10.500.
- McComas, C. Edward. Corrosion/wear-resistant metal alloy coating compositions. 5,019,163, Cl. 106-1.220.
- McCorkle, John, to United States of America, Army. Coherently interruptible frequency hopped chirp generator. 5,019,825, Cl. 342-201.000.
- McCown, Robert B.: *See—*
  - Rosen, Richard D.; McCown, Robert B.; and Fleming, Matthew S., 5,020,105, Cl. 380-23.000.
- McCoy, Gary W., to Carl Strutz and Company, Inc. Product label handling machine. 5,019,207, Cl. 156-571.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- McCray, Charles M.; Nadler, Brandon S.; Sedgwick, David M.; and Traxler, David M., to International Business Machines Corporation Forms feed tractor having modified pin spacing. 5,018,887, Cl. 400-616.100.
- McCurry, Patrick W.; Kellogg, James R.; Boekelheide, Karl; Sexton, Kenneth D.; Ellson, George A.; and Hocker, Robert A., to Elegant Design Solutions Inc. Computer-controlled uninterruptable power supply. 5,019,717, Cl. 307-66.000.
- McDonald, John H., III: *See—*
  - Cook, Gwendolyn K.; and McDonald, John H., III, 5,019,571, Cl. 514-210.000.
- McDonnell Douglas Corporation: *See—*
  - Speakman, Eugene R., 5,018,920, Cl. 411-43.000.
- McEwen, James A.; Godolphin, William J.; Bohl, Rainer M.; Dance, Mark N.; Furse, Marty L.; and Osborne, John C. Apparatus for collecting blood. 5,019,243, Cl. 210-94.000.
- McFarland, Michael: *See—*
  - Mammato, Donald C.; Jain, Sangya; Durham, Dana; Spak, Mark A.; Usifer, Douglas A.; and McFarland, Michael, 5,019,488, Cl. 430-325.000.
- McGarrah, Christopher M.: *See—*
  - McGarrah, Robert G.; and McGarrah, Christopher M., 5,018,692, Cl. 248-188.300.
- McGarrah, Robert G.; and McGarrah, Christopher M., to PepsiCo Inc. Vending machine antirock mechanism. 5,018,692, Cl. 248-188.300.
- McGee, James B.: *See—*
  - Gettings, Richard L.; McGee, James B.; White, William C.; and Plahutnik, Frank, Jr., 5,019,173, Cl. 134-4.000.
- McGhie, James R. High-capacity lift crane assembly. 5,018,630, Cl. 212-233.000.
- McGrath, Carl J.: *See—*
  - Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
- McGrew, Larry D.: *See—*
  - Boisture, Thomas B.; McGrew, Larry D.; Jeffrey, James D.; Wetzel, Robert G.; Livingston, Gene P.; and Baten, Robert A., 5,018,544, Cl. 134-111.000.
- McGuffee, Dennis. Steady hand. 5,018,294, Cl. 42-94.000.
- McIntyre, Glover C.; Lacombe, Robert J.; and Forbess, Russell G., to Zimpro Passavant Environmental Systems, Inc. Furnace combustion zone temperature control method. 5,018,458, Cl. 110-346.000.
- McJury, Donald J.: *See—*
  - Lee, James K.; McJury, Donald J.; Pickup, Michael A.; and Robinson, Kelly S., 5,019,796, Cl. 335-302.000.
- McKee, John M.; and Downey, Joseph T., to Motorola, Inc. Enhanced contrast liquid crystal display device. 5,018,837, Cl. 350-345.000.
- McKenna, Henry A.; and Richards, David A. Rope assembly. 5,018,775, Cl. 294-74.000.
- McKibben, Kenneth D.; and Wuepper, Thomas E., to CMI International, Inc. Sand muller bowl liner. 5,019,196, Cl. 156-91.000.
- McKinley, William E.; Crimmins, James P.; and Russell, Robert G., to Omega Engineering, Inc. Rotational planar chart recorder and chart therefor. 5,019,838, Cl. 346-121.000.
- McLatchy, Marion L.: *See—*
  - Williams, John R.; and McLatchy, Marion L., 5,019,011, Cl. 449-27.000.
- McLean, Francis A.: *See—*
  - Lee, Leonard G.; McLean, Francis A.; and Gagnon, Jean H., 5,018,315, Cl. 51-213.000.
- McLennan, William R., to Victaulic Company of America. Segmented coupling for pipes. 5,018,548, Cl. 137-315.000.
- McLennan, William R., to Victaulic Company of America. Pipe coupling with in-coupling flow controller. 5,018,704, Cl. 251-148.000.
- McNab, Kevin M., to Hughes Aircraft Company. Digitally implemented variable phase shifter and amplitude weighting device. 5,019,793, Cl. 333-156.000.
- McNeil, John A.; and Cohn, David B., to Hughes Aircraft Company. Platinum catalyst for forming carbon dioxide. 5,020,069, Cl. 372-59.000.
- McNeilus, Garwin; and Christenson, Ronald E., to McNeilus Truck and Manufacturing, Inc. Tag axle for work vehicles. 5,018,755, Cl. 280-81.100.
- McNeilus Truck and Manufacturing, Inc.: *See—*
  - McNeilus, Garwin; and Christenson, Ronald E., 5,018,755, Cl. 280-81.100.
- McNulty, Donald E.: *See—*
  - Van Zile, Richard R.; and McNulty, Donald E., 5,019,103, Cl. 623-20.000.
- McWilliams, Roger D.: *See—*
  - Kelley, James W.; and McWilliams, Roger D., 5,018,382, Cl. 73-65.000.
- Mead Corporation, The: *See—*
  - Calvert, Rodney K., 5,019,029, Cl. 493-315.000.
- Mead, David P.: *See—*
  - Lee, Alan R.; Mead, David P.; Null, Robert A.; Shilling, Thomas; and Atchley, Ray, 5,019,056, Cl. 604-257.000.
- Meadows, David L.: *See—*
  - El Rabaa, Wadood; Cole, R. Clay; and Meadows, David L., 5,018,578, Cl. 166-281.000.
- Measurex Corporation: *See—*
  - Wennerberg, Gunnar; Gordon, Daniel A.; and King, Harriss T., 5,019,710, Cl. 250-341.000.
- Mecke, Norbert; and Krauter, Heinrich, to Pelikan Aktiengesellschaft. Method of making a thermocolor ribbon for a thermal printing process. 5,019,421, Cl. 427-152.000.
- Mectra Labs, Inc.: *See—*
  - Clement, Thomas P.; and Weber, David P., 5,019,054, Cl. 604-248.000.
- Media Craft a.s.: *See—*
  - Hognestad, Jon; and Selvig, Einar K., 5,018,940, Cl. 414-796.800.
- Medtronic, Inc.: *See—*
  - Mehra, Rahul, 5,018,522, Cl. 128-419.0PG.
- Mefina S.A.: *See—*
  - Jimenez, Antonio; and Rochat, Pierre-Maurice, 5,018,467, Cl. 112-315.000.
  - Plomb, Francis, 5,018,420, Cl. 83-748.000.
- Megamation Incorporated: *See—*
  - Hutchinson, James; Hoffman, Brian; and Pollack, Steven, 5,018,266, Cl. 29-568.000.
- Mehra, Rahul, to Medtronic, Inc. Ramped waveform non-invasive pacemaker. 5,018,522, Cl. 128-419.0PG.
- Mehrta, Yuv R. Low pressure noncryogenic processing for ethylene recovery. 5,019,143, Cl. 62-17.000.
- Mehta, Bakulesh A.: *See—*
  - Morganstein, Sanford J.; Krakau, Herbert J.; Mehta, Bakulesh A.; Klecka, Mark D.; and Carleton, Robert, 5,020,095, Cl. 379-67.000.
- Meier, Jacques; and Honegger, Werner, to Ferag AG. Insertion system for printed products. 5,019,716, Cl. 270-55.000.
- Meier, Joseph A., Jr. Film stacker clip. 5,018,895, Cl. 402-4.000.
- Meinan Machinery Works, Inc.: *See—*
  - Shimosaka, Satoru; Kuno, Yukinobu; Takagi, Yukio; and Mizuno, Masuo, 5,018,561, Cl. 144-209.00R.
- Meinander, Paul O., to A. Ahlstrom Corporation. Method and apparatus for coating a paper web. 5,018,478, Cl. 118-410.000.
- Meinecke, Albrecht; Egelhof, Dieter; and Weiss, Wilfried, to J.M Voith GmbH. Twin-wire former for the production of a web of paper. 5,019,214, Cl. 162-301.000.
- Meintjes, Anthony A.: *See—*
  - Coetzer, Johan; Meintjes, Anthony A.; and Adendorff, Keith T., 5,019,466, Cl. 429-103.000.
- Meisner, Robert J., to Kraft General Foods, Inc. Multicolor confection extrusion system. 5,019,404, Cl. 426-249.000.
- Melan, Corneille; Konsbruck, Jeannot; and Kremer, Andre, to Paul Wurth S.A. Automated bricklaying apparatus. 5,018,923, Cl. 414-10.000.
- Melchior, Jean; and Andre, Thierry, to Etat Francais, Represente Par Le Delegue General Pour L'Armament. Auxiliary combustion chambers for supercharged internal combustion engines and internal combustion engines equipped with such a chamber. 5,018,354, Cl. 60-606.000.
- Melconian, Melcon G.: *See—*
  - Chou, Tai-Sheng; and Melconian, Melcon G., 5,019,663, Cl. 585-415.000.
- Melinyshyn, Lev: *See—*
  - Goldberg, Edward M.; and Melinyshyn, Lev, 5,019,059, Cl. 604-317.000.
- Melvin, Terence: *See—*
  - Stiefel, Joseph F.; Nesbitt, R. D.; and Melvin, Terence, 5,018,741, Cl. 273-232.000.
- Menen, Balan, to Microslate Corp. Computer input device. 5,019,677, Cl. 178-18.000.
- Menger, William M.: *See—*
  - MacDonald, Ralph R.; and Menger, William M., 5,019,959, Cl. 363-134.000.
- Mengotti, Giovanni; and Pacchioni, Italo, to Bastianello, Umberto. System and process for producing or treating cylindrical articles and apparatus employable therein. 5,018,336, Cl. 53-435.000.
- Menke, Klaus; Wiesert, Peter; Wollmann, Klaus; and Best, Bernd, to Erwin Behr GmbH & Co KG. Method of joining wood material to plastic material. 5,019,199, Cl. 156-245.000.
- Mennella, Robert M. Divided separable trash bag. 5,018,876, Cl. 383-1.000.
- Mens, Wilhelmus R. M.; and Konijn, Jan, to U.S. Philips Corporation. Magnetic resonance apparatus with an optimized detection field. 5,019,778, Cl. 324-322.000.
- Mercat, Jean-Pierre, to STE Look. Method and system for zero-resetting of a torque-measuring device, especially on a cycle or like vehicle. 5,018,392, Cl. 73-862.190.
- Mercier, Jean-Louis, to Essilor International Cie Generale d'Optique. Sight-correcting optical component such as an intra-ocular implant or contact lens. 5,019,098, Cl. 623-6.000.
- Merck & Co., Inc.: *See—*
  - Claremon, David A.; Baldwin, John J.; and Remy, David C., 5,019,572, Cl. 514-213.000.
  - Durette, Philippe L.; Hagmann, William K.; and Ponpipom, Mitree M., 5,019,568, Cl. 514-171.000.
  - Fisher, Michael H.; and Wyvratt, Matthew J., Jr., 5,019,578, Cl. 514-275.000.
  - Garrity, George M.; Lopez, Maria B.; Hensens, Otto D.; Monaghan, Richard L.; and Zink, Deborah L., 5,019,593, Cl. 514-560.000.
  - Kieczykowski, Gerard R., 5,019,651, Cl. 562-13.000.
  - Riemen, Mark W.; Oliff, Allen I.; Saari, Walfred S.; and Heimbrook, David C., 5,019,647, Cl. 530-329.000.
  - Rienstra, Mark S.; and Scattergood, Edgar M., 5,019,502, Cl. 435-101.000.
- Meredith, Steven E.; and Benjamin, James F., to Sandvik Special Metals Corporation. Low kick point golf cluh shaft. 5,018,735, Cl. 273-80.00B.

- Merg, Heinz R., to Hewlett-Packard Company. Prefabricated wire leadframe for optoelectronic devices. 5,019,746, Cl. 313-512.000.
- Mermelstein, Robert: *See—*
  - Caswell, Debra S.; Mao, Mark H.; Mermelstein, Robert; and Baker, Ellen S., 5,019,280, Cl. 252-8.800.
- Mertens, Alfred: *See—*
  - Von Der Saal, Wolfgang V.; Mertens, Alfred; and Boehm, Erwin, 5,019,587, Cl. 514-409.000.
- Messerschmidt, Robert G.: *See—*
  - Sting, Donald W.; Messerschmidt, Robert G.; and Reffner, John A., 5,019,715, Cl. 250-571.000.
- Messerschmitt-Bolkow-Blohm GmbH: *See—*
  - Allgaier, Karl-Heinz; Diehl, Christian; and Kirsche, Horst, 5,018,684, Cl. 244-3.130.
  - Benedikter, Richard; Sepp, Gunther; and Knauer, Wolfgang, 5,018,446, Cl. 102-213.000.
  - Kirma, Safa, 5,018,987, Cl. 439-445.000.
- Messier-Hispano-Bugatti: *See—*
  - Engerand, Jean-Luc; and Mattei, Jean-Pierre, 5,018,795, Cl. 301-63.0PW.
- Meszko, William R., to Motorola, Inc. Adaptive identifying signal detector. 5,020,141, Cl. 455-166.000.
- Metaleurop S.A.: *See—*
  - Le Quesne, Yves; and Fossi, Paolo, 5,019,363, Cl. 423-87.000.
- Metaux Speciaux S.A.: *See—*
  - Bernard, Guy, 5,019,158, Cl. 75-408.000.
- Metge, Axel: *See—*
  - Frerichs, Udo; Kuhlmann, Eckhard; Kohler, Heinrich; and Metge, Axel, 5,018,565, Cl. 152-379.300.
- Metrologic Instruments, Inc.: *See—*
  - Knowles, Carl H., 5,019,714, Cl. 250-568.000.
- Metts, Glenn A., to P & J Industries, Inc. Coating and brazing technique. 5,018,662, Cl. 228-208.000.
- Meuron, Bruce R.; and Lyons, Joseph B., Jr., to United States of America, Navy. Data link and return link. 5,018,685, Cl. 244-3.140.
- Meyer, Fred J.; and Jacks, Samuel L. Drain auger. 5,018,234, Cl. 15-104.330.
- Meyer, Jay A.: *See—*
  - Speraw, Floyd G.; and Meyer, Jay A., 5,018,982, Cl. 439-74.000.
- Meyer, Theodore O.; Mosier, John W., II; Pike, Douglas A., Jr.; Hollinger, Theodore G.; and Tsang, Dah W., to Advanced Power Technology, Inc. Method of making topographic pattern delineated power MOSFET with profile tailored recessed source. 5,019,522, Cl. 437-29.000.
- Meyers, Mark M.; Lee, James K.; Narayan, Badhri; and Roddy, James E., to Eastman Kodak Company. Method and apparatus for beam displacement in a light beam scanner. 5,018,808, Cl. 350-6.910.
- Mezick, James A.: *See—*
  - Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., 5,019,569, Cl. 514-171.000.
- Micro-Pak, Inc.: *See—*
  - Wallach, Donald F. H., 5,019,392, Cl. 424-420.000.
- Micro Vesicular Systems, Inc.: *See—*
  - Wallach, Donald F. H., 5,019,174, Cl. 134-40.000.
- Microelectronics and Computer Technology Corporation: *See—*
  - Wesling, Mary A.; and Sherman, Kimberly J., 5,019,409, Cl. 427-96.000.
- Microfloor Systems Limited: *See—*
  - Fish, Hugh R. A., 5,019,672, Cl. 174-48.000.
- Microparticle Technology, Inc.: *See—*
  - Jergenson, Jerg B., 5,018,954, Cl. 425-8.000.
- Microslate Corp.: *See—*
  - Menen, Balan, 5,019,677, Cl. 178-18.000.
- Midwest Printed Circuits Services, Inc.: *See—*
  - Fehsenfeld, Joseph; and Vujasin, Boro, 5,019,273, Cl. 210-719.000.
- Miese, Manfred; and Mai, Ernst, to Battenfeld GmbH. Hydraulic closing unit. 5,018,961, Cl. 425-450.100.
- Migonney, Veronique: *See—*
  - Letourneur, Didier; Douzon, Colette; Migonney, Veronique; Muller, Daniel A.; and Jozefowicz, Marcel, 5,019,269, Cl. 210-635.000.
- Mikami, Shiro; Ooshima, Seiju; and Nagahara, Yoshio, to Japan as represented by Director of Construction Machinery Works of Hokkaido Development Bureau. Snow plow for vehicles. 5,018,284, Cl. 37-233.000.
- Miki, Minoru: *See—*
  - Niino, Tsuyoshi; Nakayama, Tadakazu; Tsuruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, 5,019,328, Cl. 376-310.000.
- Miki, Yoshiaki; and Ueda, Tsunehisa, to Nippon Zeon Co., Ltd. Deodorizing urethane foam and process for its production. 5,019,599, Cl. 521-99.000.
- Mikio, Inatsu: *See—*
  - Yoshio, Shintani; and Mikio, Inatsu, 5,019,889, Cl. 357-42.000.
- Miles, Barry M.: *See—*
  - Juskey, Frank J.; Miles, Barry M.; and Papageorge, Marc V., 5,019,673, Cl. 174-52.200.
- Millaway, Steven D.: *See—*
  - Graeme, Jerald G.; and Millaway, Steven D., 5,019,789, Cl. 330-273.000.
- Miller, Don. Bag support. 5,018,637, Cl. 220-404.000.
- Miller, George T.: *See—*
  - Buckholtz, Harry E.; and Miller, George T., 5,019,157, Cl. 75-340.000.
- Miller, Jack V. Toy glider with variable dihedral wings. 5,019,007, Cl. 446-62.000.
- Miller, James M.; and Wargo, James A., to University of Pennsylvania, Trustees of. Collapsible bollards. 5,018,902, Cl. 404-6.000.
- Miller, John A.: *See—*
  - Bany, Stephen W.; Miller, John A.; and Eaton, Brad W., 5,019,071, Cl. 604-389.000.
- Miller, Michael S.; and Spaanenburg, Hendrik A. E., to Honeywell Inc. Generic interpolation pipeline processor. 5,020,014, Cl. 364-723.000.
- Miller, Walter E., Jr.; Mitchell, Robert R.; and Lovelace, Donald E., to United States of America, Army. Device and method for monitoring the presence of an object in space. 5,018,447, Cl. 102-213.000.
- Miller, William B.: *See—*
  - Ang, Jit F.; Miller, William B.; and Blais, Irene M., 5,019,406, Cl. 426-302.000.
- Miller, William S.: *See—*
  - Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.
- Millis, David B.: *See—*
  - Brown, George T.; Millis, David B.; Reynolds, Paul R.; and Nowak, Ronald P., 5,019,992, Cl. 364-468.000.
- Milo, George T.: *See—*
  - Waddington, Clive; and Milo, George T., 5,018,601, Cl. 184-6.400.
- Milovanovich, Andre, to Caisse Regionale De Credit Agricole Mutuel De L'Yonne, a part interest. Process and device for automated production of images on all types of photographic supports. 5,019,857, Cl. 355-27.000.
- Minai, Masayoshi; and Higashii, Takayuki, to Sumitomo Chemical Company, Limited. Optically active aromatic carboxylic acid derivatives and process for producing the same. 5,019,298, Cl. 260-410.500.
- Minderle, Wolfgang: *See—*
  - Cramer, Bernhard M.; Jenner, Erhard; and Minderle, Wolfgang, 5,020,089, Cl. 378-196.000.
- Minks, Floyd M. Engine spark control apparatus. 5,018,493, Cl. 123-335.000.
- Minnesota Mining and Manufacturing Company: *See—*
  - Aysta, James E.; Lindstrom, Richard L.; and Skelnik, Debra L., 5,019,084, Cl. 606-107.000.
  - Bany, Stephen W.; Miller, John A.; and Eaton, Brad W., 5,019,071, Cl. 604-389.000.
  - Jannic, Patrice, 5,019,605, Cl. 523-219.000.
  - Polski, Stephen P., 5,019,072, Cl. 604-389.000.
  - Wilson, Theresa J.; Haddad, Louis C.; and Hagen, Donald F., 5,019,232, Cl. 204-182.800.
- Mino, Hisashi; Iijima, Takeshi; and Monden, Kuniaki, to Sanyo-Kokusaku Pulp Co., Ltd. Multicolor image product. 5,019,471, Cl. 430-11.000.
- Mino, Masayuki: *See—*
  - Yagoto, Mitsutoshi; and Mino, Masayuki, 5,019,701, Cl. 250-201.500.
- Mino, Norihisa, to Matsushita Electric Industrial Co., Ltd. Process for producing polyacetylene. 5,019,303, Cl. 264-22.000.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko; Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.
  - Mukai, Hiromu; Hayashi, Kohtaro; and Maeda, Yasuo, 5,019,854, Cl. 354-471.000.
  - Yagoto, Mitsutoshi; and Mino, Masayuki, 5,019,701, Cl. 250-201.500.
- Minor, Don E.: *See—*
  - Estkowski, Michael H.; and Minor, Don E., 5,018,787, Cl. 297-302.000.
- Minstry of International Trade and Industry: *See—*
  - Barnes, Thomas H.; Matsuda, Kiyofumi; and Ooyama, Naotake, 5,018,838, Cl. 350-347.00V.
- Miraglia, Humbert G., Jr. Portable screen printer. 5,018,441, Cl. 101-123.000.
- Misch, William B.: *See—*
  - Keeney, Lawrence V.; Misch, William B.; and Parrott, James H., 5,019,339, Cl. 422-3.000.
- Missirlian, Berge; Akkas, Tamer; and Cook, Wayne A., to Alcon Surgical, Inc. Cutting assembly for surgical cutting instrument. 5,019,035, Cl. 604-22.000.
- Mitani, Katsuhiko; Tanoue, Tomonori; Kusano, Chushiro; Kobayashi, Masayoshi; and Takahashi, Susumu, to Hitachi, Ltd. Method of manufacturing a heterojunction bipolar transistor. 5,019,524, Cl. 437-31.000.
- Mitchell, Annette, legal representative: *See—*
  - Chou, Ned J.; Goldblatt, Ronald D.; Heidenreich, John E., III; Molis, Steven E.; and Ferreiro, Luis M., deceased, 5,019,210, Cl. 156-643.000.
- Mitchell, James L., to Ridewell Corporation. Control for self steering suspension assembly. 5,018,756, Cl. 280-81.600.
- Mitchell, Robert R.: *See—*
  - Miller, Walter E., Jr.; Mitchell, Robert R.; and Lovelace, Donald E., 5,018,447, Cl. 102-213.000.
- Mitchell, William J.; and Grumelot, Albert L., to Master Concepts Inc. Linear actuated valve with remote actuation. 5,018,470, Cl. 114-183.00R.
- Mitsuba Electric Manufacturing Co., Ltd.: *See—*
  - Fukui, Masashi; and Shinoda, Tomoyuki, 5,019,741, Cl. 310-239.000.
- Mitsubishi Denki Kabushiki Kaisha: *See—*
  - Abe, Yuji; Sugimoto, Hiroshi; Ohtsuka, Kenichi; Oishi, Toshiyuki; and Matsui, Teruhito, 5,020,072, Cl. 372-96.000.
  - Ando, Hiroshi; and Tanino, Junichi, 5,019,960, Cl. 364-132.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Hata, Toshihiko; Adachi, Mitsunori; and Tomita, Satoru, 5,019,917, Cl. 558-448.000.
- Horikawa, Mituo, and Moritsu, Kazuki, 5,018,359, Cl. 62-51.100.
- Hosogi, Kenji, 5,019,877, Cl. 357-22.000.
- Ichinose, Katsuki; and Wada, Tomohisa, 5,020,029, Cl. 365-154.000.
- Isozumi, Shuzoo; Yagi, Tetsuo; and Tanaka, Toshinori, 5,019,739, Cl. 310-233.000.
- Isshiki, Kunihiko, 5,020.068, Cl. 372-46.000.
- Ito, Hiroyasu, 5,018,603, Cl. 187-17.000.
- Kato, Hisao, 5,019,762, Cl. 318-568.120.
- Komori, Shigeki; Kusunoki, Shigeru; and Tsukamoto, Katsuhiro, 5,019,520, Cl. 437-26.000.
- Mitsuda, Kenro; Maeda, Hideo; Urushibata, Hiroaki; and Murahashi, Toshiaki, 5,019,464, Cl. 429-34.000.
- Miyatake, Hideshi, 5,020,031, Cl. 365-203.000.
- Mori, Shigeru; Yamada, Michihiro; Miyatake, Hideshi; and Murakami, Shuji, 5,019,883, Cl. 357-23.130.
- Naito, Yasuo; Katayama, Kazuyori; and Kouzuki, Hiroyuki, 5,019,987, Cl. 364-426.040.
- Nakagawa, Taiichi, 5,018,398, Cl. 74-7.00R.
- Nakajima, Takashi; Kubozono, Kenji; Mori, Toshihiko; Ito, Takefumi; Hashitsume, Kimio; and Iwase, Shinichi, 5,019,185, Cl. 148-13.200.
- Naya, Eizo; and Okumura, Mitsuhiro, 5,019,156, Cl. 75-245.000.
- Ogata, Teruaki; and Sudou, Yuko, 5,020,009, Cl. 364-580.000.
- Ogata, Teruaki; and Sudou, Yuko, 5,020,010, Cl. 364-580.000.
- Okada, Masato, 5,020,067, Cl. 372-46.000.
- Ookawa, Kiyoshi, 5,019,779, Cl. 324-388.000.
- Tachika, Hisao, 5,020,075, Cl. 375-1.000.
- Tada, Katsuhisa, 5,020,065, Cl. 372-44.000.
- Takami, Akira, 5,018,400, Cl. 74-198.000.
- Tanino, Junichi, 5,018,604, Cl. 187-121.000.
- Yamaguchi, Atsuo; Takahira, Kenichi; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,019,970, Cl. 364-200.000.
- Yamawaki, Masao, 5,019,884, Cl. 357-24.000.

Mitsubishi Gas Chemical Co.: *See—*
- Morita, Yoshikazu; Inoue, Yoshiaki; and Wakamatsu, Syuji, 5,019,212, Cl. 162-157.300.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
- Kozuka, Hajime, 5,018,757, Cl. 280-96.100.
- Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,018,383, Cl. 73-118.100.
- Ueda, Katsunori; Shimada, Makoto; Danno, Yoshiaki; Togai, Kazuhide; and Yoshida, Masato, 5,019,989, Cl. 364-431.050.

Mitsubishi Kasei Corporation: *See—*
- Himeno, Kiyoshi; and Konishi, Kazuhisa, 5,019,133, Cl. 8-531.000.
- Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, 5,019,949, Cl. 361-525.000.
- Oguri, Yasuo; Koga, Takao; and Itoh, Toshio, 5,019,367, Cl. 423-626.000.

Mitsubishi Metal Corporation: *See—*
- Isobe, Takeshi; Matsuo, Yutaka; and Ichihara, Yasuo, 5,019,333, Cl. 420-422.000.
- Sahira, Kensho; Takeiri, Toshiki; and Kurauchi, Nobuyoshi, 5,019,179, Cl. 148-11.50N.
- Sakai, Kazuhiro, 5,019,366, Cl. 423-592.000.
- Shirai, Keiichi; Kawaguchi, Akira; and Kitazima, Sunao, 5,018,379, Cl. 72-354.600.
- Takeshita, Takuo; and Sugihara, Tadashi, 5,019,554, Cl. 505-1.000.

Mitsubishi Nuclear Fuel Co.: *See—*
- Yaginuma, Yoshitaka; Tokiya, Motohide; and Saito, Naoya, 5,019,326, Cl. 376-261.000.

Mitsubishi Nuclear Fuel Co., Ltd.: *See—*
- Isobe, Takeshi; Matsuo, Yutaka; and Ichihara, Yasuo, 5,019,333, Cl. 420-422.000.

Mitsubishi Petrochemical Co., Ltd.: *See—*
- Iwane, Hiroshi; Sugawara, Takahiro; and Suzuki, Naoki, 5,019,656, Cl. 568-764.000.
- Terasawa, Masato; Satoo, Yukie; and Yukawa, Hideaki, 5,019,503, Cl. 435-115.000.

Mitsubishi Rayon Company, Ltd.: *See—*
- Inokuma, Takahiko; Baba, Sadamu; Imao, Shoji; Kodama, Hitoshi; and Gomi, Takeo, 5,018,915, Cl. 409-231.000.

Mitsuda, Kenro; Maeda, Hideo; Urushibata, Hiroaki; and Murahashi, Toshiaki, to Mitsubishi Denki Kabushiki Kaisha. Molten carbonate fuel battery with electrolyte migration control. 5,019,464, Cl. 429-34.000.

Mitsuhashi, Masakazu; and Kurimoto, Masashi, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Novel lymphopine LK 2 and pharmaceutic compositions containing same. 5,019,385, Cl. 424-85.000.

Mitsui Mining & Smelting Co., Ltd.: *See—*
- Ishii, Masahito; Kataoka, Tatsuo; and Tanaka, Yoshitaka, 5,019,944, Cl. 361-400.000.

Mitsui Petrochemical Industries, Ltd.: *See—*
- Ohdaira, Akio; Abe, Shunji; Wakatsuki, Noboru; and Tanaka, Akira, 5,018,828, Cl. 350-96.340.

Mitsui Petrochemical Industries, Ltd.: *See—*
- Honma, Shiro; Tominari, Kenichi; and Kurisu, Masayoshi, 5,019,627, Cl. 525-240.000.

Mitsui Toatsu Chemicals, Inc.: *See—*
- Hiai, Atsuhiko; and Wakimura, Kazuo, 5,019,423, Cl. 427-248 100.

Mitsuya, Yoshihide: *See—*
- Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 5,018,891, Cl. 401-52.000.

Miura, Kosho: *See—*
- Goto, Tetsuro; and Miura, Kosho, 5,019,846, Cl. 354-217.000.

Miura, Takao: *See—*
- Oka, Hiroshi; Okuda, Chozo; Yoshida, Yoshinori; Takahashi, Toshihiko; Kamoshida, Yoichi; and Miura, Takao, 5,019,479, Cl. 430-172.000.

Miura, Yutaka; Yoshida, Mitsutaka; Fujimura, Yasuo; Takaku, Sakae; and Noda, Yukifumi, to Chugai Seiyaku Kabushiki Kaisha. 3,4-diaminoquinoline and 3,4-diamino-5,6,7,8-tetrahydroquinoline compounds useful for improving psychoneural function. 5,019,574, Cl. 514-235.200.

Miyabayashi, Takeshi, to Brother Kogyo Kabushiki Kaisha. Sheet type storage battery and printed wiring board containing the same. 5,019,468, Cl. 429-191.000.

Miyamoto, Masayoshi: *See—*
- Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, 5,019,913, Cl. 358-296.000.

Miyamoto, Shoji: *See—*
- Yasunobu, Seiji; Miyamoto, Shoji; and Ihara, Hirokazu, 5,018,689, Cl. 246-182.00B.

Miyamura, Yoshinori: *See—*
- Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, 5,020,041, Cl. 369-13.000.

Miyasaka, Masao: *See—*
- Nishimura, Hiroshi; Miyasaka, Masao; Itoh, Nobuhiko; Hiki, Toshio; and Igarashi, Akira, 5,018,888, Cl. 400-616.100

Miyashita, Kazuya: *See—*
- Matsubara, Hidetsugu; Iguchi, Yuichi; Tanaka, Shinya; and Miyashita, Kazuya, 5,018,953, Cl. 418-201.100.

Miyashita, Kunio: *See—*
- Kawamata, Syooichi; Takahashi, Tadashi; and Miyashita, Kunio, 5,019,776, Cl. 324-207.120.
- Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi; Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, 5,019,773, Cl. 324-166.000.

Miyata, Ichiro; Kitaura, Ichiro; and Yonezawa, Keitaro, to Aioi Seiki Kabushiki Kaisha. Workpiece pallet changer for machine tools. 5,018,617, Cl. 198-346.100.

Miyatake, Hideshi, to Mitsubishi Denki Kabushiki Kaisha. Dynamic semiconductor memory device having improved voltage read-out. 5,020,031, Cl. 365-203.000.

Miyatake, Hideshi: *See—*
- Mori, Shigeru; Yamada, Michihiro; Miyatake, Hideshi; and Murakami, Shuji, 5,019,883, Cl. 357-23.130.

Miyazaki, Kenichi: *See—*
- Kumasaka, Hideyuki; Takao, Kouji; Kuriyama, Hiroshi; Hagiwara, Tarou; and Miyazaki, Kenichi, 5,018,781, Cl. 296-210.000.

Miyazaki, Kunio: *See—*
- Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi; Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, 5,019,891, Cl. 357-70.000.

Miyazaki, Takao: *See—*
- Nakamura, Tohru; Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, 5,019,523, Cl. 437-31.000.

Miyazawa, Takeshige: *See—*
- Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji, Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru, and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.

Miyazawa, Toshio: *See—*
- Oyaide, Shinichi; Kawahira, Masayoshi; and Miyazawa, Toshio, 5,018,889, Cl. 400-642.000.

Mizoguchi, Yoshiyuki: *See—*
- Watanabe, Yoshitaka; Mizoguchi, Yoshiyuki; and Hiraga, Hiroyuki, 5,019,839, Cl. 346-134.000.

Mizuno, Hisayoshi; and Mori, Masami, to Ikeda Bussan Co., Ltd. Mold for skin covered foamed plastic molding. 5,018,958, Cl. 425-117.000.

Mizuno, Masuo: *See—*
- Shimosaka, Satoru; Kuno, Yukinobu; Takagi, Yukio; and Mizuno, Masuo, 5,018,561, Cl. 144-209.00R.

Mizuno, Toshiaki: *See—*
- Nagase, Kenichi; Haraguchi, Hiroshi; Mizuno, Toshiaki; and Kamada, Takayuki, 5,018,362, Cl. 62-133.000.

Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, to Sumitomo Chemical Company, Ltd. Polyphenylene ether/polyester blend with nitrodiamine compound. 5,019,615, Cl. 524-100.000.

Mizuno, Yutaka: *See—*
- Matsubara, Hisayoshi; Mizuno, Yutaka; and Hanajima, Toshiharu, 5,019,463, Cl. 429-12.000.

Mizuo, Shigera. *See—*
- Shimaoka, Hitoshi; Mizuo, Shigera; Akashi, Akira; and Hosoi, Miyuki. 5,019,484, Cl. 430-293.000.

Mizushima, Yoshihiko; Iida, Takashi; Hirohata, Toru; Sugimoto, Kenichi; Warashina, Yoshihisa; and Nakajima, Kazutoshi, to Hamamatsu Photonics Kabushiki Kaisha. Electromagnetic wave device. 5,020,064, Cl. 372-37.000.

MMOQ, Ltd.: *See—*
- Nitsch, James L., Jr., 5,019,131, Cl. 8-457.000.

Mobay Corporation: *See—*
- Dewhurst, John E., 5,019,600, Cl. 521-117.000.
- Rose, Wayne B.; and Arther, Robert G., 5,018,481, Cl. 119-156.000.

- Slocum, Gregory H.; and Schumacher, Donald W., 5,019,317, Cl. 264-300.000.

Mobil Oil Corporation: *See—*
- Chapman, Orville L.; and Whitehurst, D. Duayne, 5,019,660, Cl. 585-22.000.
- Chou, Tai-Sheng; and Melconian, Melcon G., 5,019,663, Cl. 585-415.000.
- Del Rossi, Kenneth J.; Dessau, Ralph M.; Huss, Albin, Jr.; Kirker, Garry W.; Marler, David O.; and Partridge, Randall D., 5,019,664, Cl. 585-419.000.
- Farng, Liehpao O.; Doner, John P.; and Horodysky, Andrew G., 5,019,282, Cl. 252-32.70E.
- Farng, Lienpao; and Horodysky, Andrew G., 5,019,284, Cl. 252-46.700.
- Haag, Werner O.; and Tsikoyiannis, John G., 5,019,263, Cl. 210-500.250.
- Harandi, Mohsen N.; and Owen, Hartley, 5,019,353, Cl. 422-144.000.
- Harandi, Mohsen N.; and Owen, Hartley, 5,019,357, Cl. 422-192.000.
- Keller, Lajos E., 5,019,447, Cl. 428-327.000.
- Le, Quang N.; Pelrine, Bruce P.; and Shim, Joosup, 5,019,670, Cl. 585-467.000.
- Owen, Hartley, 5,019,239, Cl. 208-48.00Q.
- Partridge, Randall D.; and Whitehurst, D. Duayne, 5,019,665, Cl. 585-803.000.
- Warburton, Richard T., 5,019,313, Cl. 264-154.000.
- Wilson, Gregory M., 5,019,315, Cl. 264-171.000.

Mochizuki, Hidehiro: *See—*
- Suzuki, Akira; Mochizuki, Hidehiro; Shimada, Masaru; and Uemura, Hiroyuki, 5,019,550, Cl. 503-227.000.

Modak, Shanta M.: *See—*
- Fox, Charles L., Jr.; Modak, Shanta M.; and Sampath, Lester A., 5,019,096, Cl. 623-1.000.

Moeck, Gerhard: *See—*
- Krueckel, Peter; Moeck, Gerhard; and Finkenauer, Robert, 5,018,892, Cl. 401-68.000.

Moeschler, Heinrich F.: *See—*
- Hector, Richard F.; Schaller, Klaus; Moeschler, Heinrich F.; and Plempel, Manfred, 5,019,560, Cl. 514-43.000.

Mohn, Larry W.: *See—*
- Hahn, Mansop M.; Lundry, Jerry L.; and Mohn, Larry W., 5,018,683, Cl. 244-1.00R.

Mohr, Paul H.; and Pepe, Enrico J., to First Brands Corporation. Alcohol-based aluminum corrosion inhibitor compositions comprising polysilyl compounds. 5,019,340, Cl. 422-7.000.

Mokvist, Maja; A.: *See—*
- Hoden, Ebbe; and Mokvist, Maja; A., 5,019,061, Cl. 604-358.000.

Mole, Thomas, to Commonwealth Scientific and Industrial Research Organisation; and Broken Hill Proprietary Company Limited. Hydroisomerisation process. 5,019,661, Cl. 585-253.000.

Molex Incorporated: *See—*
- Patel, Arvind; Lenz, William; and Schafer, Jack J , 5,019,795, Cl. 335-205.000.

Molins PLC: *See—*
- Stewart, David B.; and Wood, Godfrey A., 5,018,538, Cl. 131-109.100.

Molis, Steven E.: *See—*
- Chou, Ned J.; Goldblatt, Ronald D.; Heidenreich, John E., III; Molis, Steven E.; and Ferreiro, Luis M., deceased, 5,019,210, Cl. 156-643.000.

Moltech Invent S.A.: *See—*
- Darracq, Dominique; Duruz, Jean-Jacques; and Durmelat, Claude, 5,019,225, Cl. 204-67.000.

Momose, Yoshiaki, to JSP Corporation. Thermoplastic resin film matrix with continuous tapes. 5,019,439, Cl. 428-178.000.

Monaghan, Richard L.: *See—*
- Garrity, George M.; Lopez, Maria B.; Hensens, Otto D.; Monaghan, Richard L.; and Zink, Deborah L., 5,019,593, Cl. 514-560.000.

Monahan-Mitchell, Timothy A.: *See—*
- Grube, Gary W.; Monahan-Mitchell, Timothy A.; and Zdunek, Kenneth J., 5,020,130, Cl. 455-9.000.

Monch, Uwe, to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik. Monitoring arrangement for a drive belt. 5,019,017, Cl. 474-102.000.

Monden, Hitoshi: *See—*
- Kashima, Takamitau; and Monden, Hitoshi, 5,018,483, Cl. 123-1.00A.

Monden, Kuniaki: *See—*
- Mino, Hisashi; Iijima, Takeshi; and Monden, Kuniaki, 5,019,471, Cl. 430-11.000.

Mondoloni, Pierre-Louis: *See—*
- Heurtel, Bertrand J. J. M.; Mondoloni, Pierre-Louis; and Serre, Jacques R., 5,018,941, Cl. 416-220.00R.

Monga, Raffaella: *See—*
- Farias, Otello; Gandini, Alberto; Monga, Raffaella; Roggero, Arnaldo; Sisto, Raffaello; and Valentini, Claudio, 5,019,631, Cl. 525-396.000.

Monget, Francois: *See—*
- Cahuzac, Georges J. J.; and Monget, Francois, 5,019,435, Cl. 428-36.100.

Monsanto Company: *See—*
- Lee, Len F.; and Dolson, Mark G., 5,019,153, Cl. 71-94.000.

Monson, Robert J.; and Dzubak, Alan L. Folding table. 5,018,785, Cl. 297-159.000.

Montalcini, Piera L.; and Racciu, Antonio, to Advanced Data Processing Adp S.r.l. Machine for measuring and mathematically defining the surface of three-dimensional models, particularly for the manufacture of molds with numeric-control machine tools. 5,019,993, Cl. 364-474.290.

Montaldi, David H. One-piece disposable speculum. 5,018,507, Cl. 128-17.000.

Montano, Venses J. Bicycle lock. 5,018,374, Cl. 70-233.000.

Montpetit, Michael D.: *See—*
- Pratt, George C.; and Montpetit, Michael D., 5,019,308, Cl. 264-87.000.

Mooberry, Jared B.: *See—*
- Buchanan, John M.; Cook, Ewell R.; Mooberry, Jared B.; Proehl, Gary S.; Singer, Stephen P.; and Washburn, William N., 5,019,492, Cl. 430-543.000.

Moonflower Vases Company: *See—*
- Strelnieks, John, 5,019,424, Cl. 427-264.000.

Moore, Bryan B.: *See—*
- Truesdale, Wade J.; Moore, Bryan B.; and Benjock, Greg F., 5,019,449, Cl. 428-397.000.

Moore, John A., to Silver Systems Limited. Relating to support rails. 5,018,627, Cl. 211-123.000.

Moore, John R., to ITT Corporation. Connector with modular terminal devices. 5,018,985, Cl. 439-174.000.

Moore, Michael W.: *See—*
- Chesnut, Paul B.; Moore, Michael W.; and Sarrell, Ivan D., 5,018,364, Cl. 62-187.000.

Moore, William P., to Agrinutrients Technology Group, Inc. Homogeneous mineral granules by acid-base reaction. 5,019,148, Cl. 71-11.000.

Morganstein, Sanford J.; Krakau, Herbert J.; Mehta, Bakulesh A.; Klecka, Mark D.; and Carleton, Robert, to Dytel Corporation. Interactive call distribution processor. 5,020,095, Cl. 379-67.000.

Mori, Masaki: *See—*
- Takemura, Shinji; Mori, Masaki; Katayama, Tomoaki; Kegasa, Hideo; and Ohnishi, Kenichi, 5,019,759, Cl. 318-466.000.

Mori, Masami: *See—*
- Mizuno, Hisayoshi; and Mori, Masami, 5,018,958, Cl. 425-117.000.

Mori, Seiichi: *See—*
- Ohshima, Yoichi; and Mori, Seiichi, 5,019,527, Cl. 437-43.000.

Mori, Shigeru; Yamada, Michihiro; Miyatake, Hideshi; and Murakami, Shuji, to Mitsubishi Denki Kabushiki Kaisha. Input protective apparatus of semiconductor device. 5,019,883, Cl. 357-23.130.

Mori, Tohru: *See—*
- Alderson, Graham R.; MacFarlane, Peter R.; and Mori, Tohru, 5,019,963, Cl. 364-200.000.

Mori, Toshihiko: *See—*
- Nakajima, Takashi; Kubozono, Kenji; Mori, Toshihiko; Ito, Takefumi; Hashitsume, Kimio; and Iwase, Shinichi, 5,019,185, Cl. 148-13.200.

Morii Dengyo Kabushi Kaisha: *See—*
- Nakayama, Katsutoyo; Morii, Toshimichi; and Kamino, Toshihide, 5,019,956, Cl. 363-50.000.

Morii, Toshimichi: *See—*
- Nakayama, Katsutoyo; Morii, Toshimichi; and Kamino, Toshihide, 5,019,956, Cl. 363-50.000.

Morikawa, Shoichi: *See—*
- 012aki, Nobuo; and Morikawa, Shoichi, 5,018,701, Cl. 248-631.000.

Morimura, Atsushi: *See—*
- Uomori, Kenya; and Morimura, Atsushi, 5,019,901, Cl. 358-105.000.

Morino, Taisuke; Tanaka, Mami; Kaneko, Fuminori; Ozaki, Takeyuki; and Akiyama, Shuichi, to Sharp Kabushiki Kaisha. Heat generating container for microwave oven. 5,019,680, Cl. 219-10.55E.

Morita, Dai; Hirota, Yuichi; and Higashiizumi, Takao, to Yokogawa Medical Systems, Limited. Pulse Doppler ultrasonic diagnostic system. 5,018,528, Cl. 128-661.090.

Morita, Masayuki; and Yamazaki, Kyoji, to Toshiba Lighting & Technology Corporation. Illumination control apparatus. 5,019,747, Cl. 315-157.000.

Morita, Yoshikazu; Inoue, Yoshiaki; and Wakamatsu, Syuji, to Mitsuhishi Gas Chemical Co. Method for producing gas-permeable parcelling film. 5,019,212, Cl. 162-157.300.

Moritsu, Kazuki: *See—*
- Horikawa, Mituo; and Moritsu, Kazuki, 5,018,359, Cl. 62-51.100.

Moriyama, Jiro: *See—*
- Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; Endo, Takashi; and Moriyama, Jiro, 5,019,840, Cl. 346-134.000.

Moriyama, Maya: *See—*
- Matsumoto, Yasuji; Moriyama, Maya; and Kuwahara, Yasushi, 5,019,419, Cl. 427-96.000.

Morofuji, Akihiko; and Morotomi, Masaki, to Toyo Seikan Kaisha Ltd. Multiple color printing method for metallic container and thin plate metal and printed matter. 5,018,640, Cl. 220-456.000.

Morokuma, Hiroshi: *See—*
- Iijima, Tatsuya; and Morokuma, Hiroshi, 5,018,430, Cl. 84-625.000.

Morotomi, Masaki: *See—*
- Morofuji, Akihiko; and Morotomi, Masaki, 5,018,640, Cl. 220-456.000.

Morozumi, Yukihiko. *See—*
- Chida, Takeshi; Aonuma, Mitsuyoshi; Maeda, Akio; Morozumi, Yukihiko; and Ohishi, Tetsu, 5,019,630, Cl. 525-326.200.

Morre, Peter: *See—*
- Rauch-Puntigam, Harald; Staritzbichler, Werner; and Morre, Peter, 5,019,621, Cl. 524-513.000.

Morris, Walker C., to Intelligence Technology Corporation. Apparatus for removably connecting a cellular portable telephone to a computer. 5,020,090, Cl. 379-58.000.

VOL
1126
ISS
4
MY
28
1991
UMI

Morrison, William S.: *See—*
  Steinkamp, John O.; and Morrison, William S., 5,018,934, Cl. 414-695.500.
Morse, John E., to Eastman Kodak Company. Pressurized screen assembly for exposure of a continuous tone image. 5,019,866, Cl. 355-239.000.
Morton International, Inc.: *See—*
  Taylor, Robert D.; Smith, Gary L.; and Olsen, Ritchie, 5,019,220, Cl. 264-3.400.
Morton, Nancy: *See—*
  Gorin, Allen L.; Makofsky, Patrick A.; Morton, Nancy; Oliver, Neal C.; Shively, Richard R.; and Stanziola, Christopher A., 5,020,059, Cl. 371-11.300.
MOS Electronics: *See—*
  Tsai, Nan-Hsiung; and Hwang, Yun-Sheng, 5,019,534, Cl. 437-200.000.
Mosebach, Wolfgang; Heitmeier, Rolf; Gerlach, Hans; and Rath, Dieter, to B. Braun Melsungen AG. Pressure sensor for infusion conduits. 5,018,388, Cl. 73-730.000.
Moses, David L.: *See—*
  Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.
Moses, Joseph: *See—*
  Raj, Kuldip; Moskowitz, Ronald; Moses, Joseph; Bonvouloir, James; and Bloom, Frank, 5,018,751, Cl. 277-80.000.
Moshenberg, David, to AT&T Bell Laboratories. Graphics controller image creation. 5,020,003, Cl. 364-518.000.
Mosier, John W., II: *See—*
  Meyer, Theodore O.; Mosier, John W., II; Pike, Douglas A., Jr.; Hollinger, Theodore G.; and Tsang, Dah W., 5,019,522, Cl. 437-29.000.
Moskowitz, Larry N.; and Lindley, Donald J., to Amoco Corporation. High density thermal spray coating and process. 5,019,429, Cl. 427-422.000.
Moskowitz, Ronald: *See—*
  Raj, Kuldip; Moskowitz, Ronald; Moses, Joseph; Bonvouloir, James; and Bloom, Frank, 5,018,751, Cl. 277-80.000.
Motono, Koichiro: *See—*
  Tanimoto, Hitoshi; Motono, Koichiro; and Goto, Takuo, 5,018,671, Cl. 241-16.000.
Motorola, Inc.: *See—*
  Cahill, Stephen V.; Gillig, Steven F.; and Walczak, Thomas J., 5,020,076, Cl. 375-5.000.
  Chason, Marc K., 5,019,003, Cl. 445-24.000.
  Craft, Scott, 5,019,941, Cl. 361-386.000.
  Frank, Randall K.; and DuBois, Jerry M., 5,019,893, Cl. 357-81.000.
  Grube, Gary W.; Monahan-Mitchell, Timothy A.; and Zdunek, Kenneth J., 5,020,130, Cl. 455-9.000.
  Hess, Robert M.; and Hunninghaus, Roy E., 5,019,722, Cl. 307-354.000.
  Huang, Rong-Fong; and Anderson, Dean, 5,019,306, Cl. 264-66.000.
  Juskey, Frank J.; Miles, Barry M.; and Papageorge, Marc V., 5,019,673, Cl. 174-52.200.
  Krolopp, Robert K.; Mullins, Jeffery L.; and Auchter, Thomas J., 5,020,091, Cl. 379-58.000.
  McKee, John M.; and Downey, Joseph T., 5,018,837, Cl. 350-345.000.
  Meszko, William R., 5,020.141, Cl. 455-166.000.
  Ooms, William J.; Leitch, Clifford D.; and Delgado, Rene M., 5,020,017, Cl. 364-761.000.
  Patsiokas, Stelios J.; Garay, Oscar M.; and Balzano, Quirino, 5,020,136, Cl. 455-89.000.
  Phillips, Sharon E. T.; and Carney, Scott N., 5,020,092, Cl. 379-59.000.
  Pireh, Ali, 5,020,093, Cl. 379-59.000.
  Rohani, Kaymar; and Harrison, R. Mark, 5,020,107, Cl. 381-43.000.
  Shirley, Thomas F., Jr.; and Butler, Jack B., 5,020,144, Cl. 455-186.000.
  Swapp, Mavin; and Collis, Charles, 5,020,038, Cl. 368-120.000.
Moulder, John C.; and Rose, James H., to Iowa State University Research Foundation, Inc. Calibrating an eddy-current-probe using a modulated thermal energy source. 5,019,775, Cl. 324-202.000.
Moulton, Gary P.: *See—*
  Harnly, James M.; Moulton, Gary P.; and O'Haver, Thomas C., 5,018,856, Cl. 356-312.000.
Mouri, Akihiro; Toyono, Tsutomu; Kaneko, Shuzo; Inaba, Yutaka; and Kanbe, Junichiro, to Canon Kabushiki Kaisha. Driving method for optical modulation device. 5,018,841, Cl. 350-350.00S.
Mouri, Toyohiko: *See—*
  Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,019,981, Cl. 364-424.050.
Mraz, Dennis, to Engineered Instruments, Inc. Rock-stress measuring method. 5,018,389, Cl. 73-784.000.
MSK - Verpackungs-Systeme Gesellschaft Mit Beschrankter: *See—*
  Hannen, Reiner W.; Vermeulen, Norbert P.; and Pieters, Hans-Theo, 5,018,339, Cl. 53-557.000.
MTD Products Inc.: *See—*
  Buchdrucker, Ewald, 5,018,592, Cl. 180-19.300.
Muccitelli, John A.; and Feldman, Nancy A., to Betz Laboratories, Inc. Method for mitigation of caustic corrosion in coordinated phosphate/ph treatment programs for boilers. 5,019,342, Cl. 422-16.000.
Mueller, Richard A.; Partis, Richard A.; and Deason, James R., to G. D. Searle & Co. Bicycloalkyl tricycloalkyl, azabicycloalkyl and azatricycoalkyl amides. 5,019,597, Cl. 514-618.000.
Muka, Richard S.: *See—*
  Blake, Julian G.; Muka, Richard S.; and Younger, Peter R., 5,019,233, Cl. 204-792.120.
Mukai, Hachiro, to Fuji Photo Film Co., Ltd. Method for constructing a data base in a medical image control system. 5,019,975, Cl. 364-413.130.
Mukai, Hiromu; Hayashi, Kohtaro; and Maeda, Yasuo, to Minolta Camera Kabushiki Kaisha. Display system for displaying information in the viewfinder of a camera. 5,019,854, Cl. 354-471.000.
Mukai, Tadaharu: *See—*
  Tada, Noburu; Mukai, Tadaharu; and Shino, Katsuhide, 5,019,700, Cl. 235-492.000.
Mulholland, Denis G.; Schaffer, Ronald R.; and Warner, Gary N., to AMP Incorporated. Polishing fixture for optical fiber of push-pull connector. 5,018,316, Cl. 51-216.00R.
Muller, Bruno; and Waltenspuhl, Rolf, to Stopinc Aktiengesellschaft. Process and appartus for the introduction of gas into a discharge opening of a metallurgical container containing molten metal. 5,019,159, Cl. 75-533.000.
Muller, Daniel; Chabagno, Jean-Michel; and Duval, Michel, to Societe Nationale Elf Aquitaine; and Hydro-Quebec. Process for production of an electrochemical sub-assembly comprising an electrode and an electrolyte, and the sub-assembly obtained in this way. 5,019,469, Cl. 429-192.000.
Muller, Daniel A.: *See—*
  Letourneur, Didier; Douzon, Colette; Migonney, Veronique; Muller, Daniel A.; and Jozefowicz, Marcel, 5,019,269, Cl. 210-635.000.
Muller, David F., to Summit Technology, Inc. Laser reprofiling system employing an erodable mask. 5,019,074, Cl. 606-5.000.
Muller, Hartmut; and Bruning, Klaus, to Huels Aktiengesellschaft. Rapidly setting, moisture-curable hot melt adhesives and their use. 5,019,638, Cl. 528-83.000.
Muller, Manfred, to Barmag AG. Method and apparatus for monitoring the tension and quality of an advancing yarn. 5,018,390, Cl. 73-828.000.
Muller, Pierre: *See—*
  Stauffer, Jorg; and Muller, Pierre, 5,019,110, Cl. 19-128.000.
Muller, Robert, to Dr. Ing. h.c.F. Porsche AG. Control arrangement for a gear shift transmission. 5,018,404, Cl. 74-477.000.
Mullins, Jeffery L.: *See—*
  Krolopp, Robert K.; Mullins, Jeffery L.; and Auchter, Thomas J., 5,020,091, Cl. 379-58.000.
Murahashi, Toshiaki: *See—*
  Mitsuda, Kenro; Maeda, Hideo; Urushibata, Hiroaki; and Murahashi, Toshiaki, 5,019,464, Cl. 429-34.000.
Murai, Katsumi; and Usui, Makoto, to Matsushita Electric Industrial Co., Ltd. Error code correction device having a galois arithmetic unit. 5,020,060, Cl. 371-37.100.
Murakami, Hiroshi; Koishi, Masayuki; Yatagai, Shoko; and Yamagata, Kazuko, to Mazda Motor Corporation. Catalyst for purifying exhaust gas and method of manufacturing the same. 5,019,546, Cl. 502-303.000.
Murakami, Kenji; Tonooka, Yasuaki; Saito, Norie; Nakasuji, Kokichi; and Sugiyama, Norifumi, to Daiichi Seiyaku Co., Ltd. Method of producing peptides by transforming myeloma cells with a recombinant plasmid. 5,019,499, Cl. 435-69.100.
Murakami, Shuji: *See—*
  Mori, Shigeru; Yamada, Michihiro; Miyatake, Hideshi; and Murakami, Shuji, 5,019,883, Cl. 357-23.130.
Murakami, Tsutomu: *See—*
  Niwa, Mitsuyuki; Arai, Takayoshi; Shimizu, Isamu; Takeuchi, Eiji; Murakami, Tsutomu; and Ishihara, Shunichi, 5,019,887, Cl. 357-30.000.
Muraki, Takao: *See—*
  Kaidoo, Hiroyuki; and Muraki, Takao, 5,019,617, Cl. 524-346.000.
Murakoshi, Satoshi; and Sakurai, Atsushi, to Kabushiki Kaisha Yamashita Denshi Sekkei. Pulse generating circuit. 5,019,907, Cl. 358-158.000.
Murata Kikai Kabushiki Kaisha: *See—*
  Yoshida, Kaichiro; Takada, Hiroshi; and Nakajima, Toshio, 5,018,556, Cl. 139-68.000.
Murata Manufacturing Co., Ltd.: *See—*
  Kawabata, Shoichi; and Yoshimura, Toshimi, 5,019,200, Cl. 156-245.000.
  Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, 5,018,990, Cl. 439-620.000.
Murayama, Akio: *See—*
  Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susumu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 5,018,839, Cl. 350-347.00R.
Murphy, Maeve C.: *See—*
  Daly, Charles; Fitzgerald, Gerald F.; Coffey, Aidan; Costello, Veronica A.; Murphy, Maeve C.; and Baumgartner, Andreas, 5,019,506, Cl. 435-172.300.
Murphy, Terry J.: *See—*
  Houlachi, George; Murphy, Terry J.; St-Onge, Jean-Pierre; and Daoust, Daniel, 5,019,172, Cl. 134-3.000.
Murphy, Thomas A.: *See—*
  Bentley, Jeffrey A.; and Murphy, Thomas A., 5,019,934, Cl. 361-15.000.
Murrah, Howard E.: *See—*
  Esper, Leo J.; Jorgensen, David C.; Murrah, Howard E.; Schneider, Michael G.; Phillips, Raymond M.; and Dauzy, Bruce C., 5,018,660, Cl. 229-125.420.

Murray, Dale D.; and Reitz, Paul R., to AMP Incorporated. Optical delay switch and variable delay system. 5,018,816, Cl. 350-96.200.
Murray, David E.: *See—*
  Franklin, Richard D.; Auld, Gregg D.; and Murray, David E., 5,019,329, Cl. 376-316.000.
Mussler, Rudiger: *See—*
  Seeger, Walter; Mussler, Rudiger; and Hafelein, Reinhard, 5,018,272, Cl. 29-890.080.
Mutoh, Nobuyoshi: *See—*
  Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi; Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, 5,019,773, Cl. 324-166.000.
Myers, Harry K., Jr.: *See—*
  Hsu, Chao-Yang; Patel, Vasant K.; Vahlsing, David H.; Wei, James T.; and Myers, Harry K., Jr., 5,019,671, Cl. 585-751.000.
Myneni, Ganapati R., to Southeastern Universities Research Association. Cryogenic liquid level measuring apparatus. 5,018,387, Cl. 73-295.000.
Nadler, Brandon S.: *See—*
  McCray, Charles M.; Nadler, Brandon S.; Sedgwick, David M.; and Traxler, David M., 5,018,887, Cl. 400-616.100.
Nagahara, Yoshio: *See—*
  Mikami, Shiro; Ooshima, Seiju; and Nagahara, Yoshio, 5,018,284, Cl. 37-233.000.
Nagahisa, Kouichi. Sliding device. 5,018,721, Cl. 272-56.5SS.
Nagai, Syozo: *See—*
  Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 5,019,338, Cl. 420-586.100.
Nagamatsu, Tsutomu: *See—*
  Washizu, Takehiro; and Nagamatsu, Tsutomu, 5,018,485, Cl. 123-52.0MB.
Nagano, Tamio, to Kabushiki Kaisha Daikin Seisakusho. Intermediate plate positioning mechanism for twin clutch. 5,018,613, Cl. 192-70.250.
Nagaraj, D. R.: *See—*
  Wang, Samuel S.; and Nagaraj, D. R., 5,019,246, Cl. 209-167.000.
Nagase, Hiroshi: *See—*
  Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi; Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, 5,019,773, Cl. 324-166.000.
Nagase, Kenichi; Haraguchi, Hiroshi; Mizuno, Toshiaki; and Kamada, Takayuki, to Nippondenso Co., Ltd. Apparatus for controlling automotive air conditioner. 5,018,362, Cl. 62-133.000.
Nagashima, Yasuo; Soeda, Haruo; Sato, Masamichi; and Kubo, Takashi, to Fuji Photo Film Co., Ltd. Magnetic sheet polishing device. 5,018,257, Cl. 29-90.010.
Nagashima, Yoshitake, to Canon Kabushiki Kaisha. Apparatus for recording and reproducing divided signals of an angle modulated signal. 5,019,919, Cl. 360-22.000.
Nagata, Minoru: *See—*
  Nakamura, Tohru; Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, 5,019,523, Cl. 437-31.000.
Nagata, Shoichi: *See—*
  Nakamura, Masatsugu; Ohashi, Kunio; Nagata, Shoichi; Wakita, Kazuki; Nagayama, Katsuhiro; and Tonegawa, Tadashi, 5,019,862, Cl. 355-208.000.
  Ohashi, Kunio; and Nagata, Shoichi, 5,019,856, Cl. 355-27.000.
Nagata, Yasuji: *See—*
  Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, 5,019,476, Cl. 430-20.000.
Nagayama, Katsuhiro: *See—*
  Nakamura, Masatsugu; Ohashi, Kunio; Nagata, Shoichi; Wakita, Kazuki; Nagayama, Katsuhiro; and Tonegawa, Tadashi, 5,019,862, Cl. 355-208.000.
Nagelberg, Alan S.: *See—*
  Kuntner, Robert C.; Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., 5,019,541, Cl. 501-127.000.
  Kuntner, Robert C.; Aghajanian, Michael K.; Antolin, Stanislav; Nagelberg, Alan S.; Dwivedi, Ratnesh K.; Nagelberg, Alan S.; and Dwivedi, Ratnesh K., 5,019,541, Cl. 501-127.000.
Nageno, Koji: *See—*
  Dohi, Masahiro; and Nageno, Koji, 5,018,599, Cl. 181-129.000.
Naito, Yasuo; Katayama, Kazuyori; and Kouzuki, Hiroyuki, to Mitsubishi Denki Kabushiki Kaisha. Cruise control apparatus for a vehicle. 5,019,987, Cl. 364-426.040.
Naitoh, Takao, to Fuji Jukogyo Kabushiki Kaisha. Cooling fan controlling apparatus. 5,018,484, Cl. 123-41.120.
Nakagawa, Masahiro: *See—*
  Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 5,019,338, Cl. 420-586.100.
Nakagawa, Taiichi, to Mitsubishi Denki Kabushiki Kaisha. Engine starter with a pinion shifter unit. 5,018,398, Cl. 74-7.00R.
Nakahashi, Masako: *See—*
  Iyogi, Kiyoshi; Nakahashi, Masako; Takeda, Hiromitsu; and Shirokane, Makoto, 5,019,187, Cl. 148-24.000.
Nakajima, Kazutoshi: *See—*
  Mizushima, Yoshihiko; Iida, Takashi; Hirohata, Toru; Sugimoto, Kenichi; Warashina, Yoshihisa; and Nakajima, Kazutoshi, 5,020,064, Cl. 372-37.000
Nakajima, Masahiro: *See—*
  Yamamoto, Masato; Yamanaka, Toshimasa; Nakajima, Masahiro; and Ohsawa, Yutaka, 5,019,852, Cl. 354-409.000.
Nakajima, Nobuo, to Pegasus Sewing Machine Mfg., Co., Ltd.; and Grace Sewing Machine Co., Ltd. Stacking device having clamps along a circulating conveyor for clamping, conveying, and stacking sewn articles from a sewing machine to a cloth holding stand. 5,018,463, Cl. 112-121.290.
Nakajima, Takashi; Kubozono, Kenji; Mori, Toshihiko; Ito, Takefumi; Hashitsume, Kimio; and Iwase, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Method for producing high strength Cu-Ni-Sn alloy containing manganese. 5,019,185, Cl. 148-13.200.
Nakajima, Takashi: *See—*
  Toyonishi, Shigekazu; and Nakajima, Takashi, 5,019,609, Cl. 524-35.000.
Nakajima, Tomohiro, to Ricoh Company, Ltd. Image forming apparatus. 5,018,806, Cl. 350-6.700.
Nakajima, Toshio: *See—*
  Yoshida, Kaichiro; Takada, Hiroshi; and Nakajima, Toshio, 5,018,556, Cl. 139-68.000.
Nakamizo, Takazi: *See—*
  Harada, Kosuke; Sakamoto, Hiroshi; and Nakamizo, Takazi, 5,019,770, Cl. 323-282.000.
Nakamura, Ichiro: *See—*
  Watanabe, Haruo; Nakamura, Ichiro; Okamoto, Yoshio; and Konno, Hitoshi, 5,018,501, Cl. 123-472.000.
Nakamura, Ikuro. Protection circuit for electrical appliance. 5,019,935, Cl. 361-45.000.
Nakamura, Lance S.: *See—*
  Chang, Karl; Pape, William R., III; Crosetti, Victor J., Jr.; Nakamura, Lance S.; Leong, Daniel B. C.; and Loui, Robert K. L., 5,019,696, Cl. 235-436.000.
Nakamura, Makoto; Honda, Toshio; Chikaraishi, Toshio; and Fukuura, Yukio, to Bridgestone Corporation. Golf ball. 5,019,319, Cl. 273-218.000.
Nakamura, Masatsugu; Ohashi, Kunio; Nagata, Shoichi; Wakita, Kazuki; Nagayama, Katsuhiro; and Tonegawa, Tadashi, to Sharp Kabushiki Kaisha. Heat control for photoreceptor. 5,019,862, Cl. 355-208.000.
Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, to Sumitomo Metal Industries Ltd. Plasma apparatus. 5,019,117, Cl. 118-723.000.
Nakamura, Tetsuo: *See—*
  Machida, Atsuhiko; and Nakamura, Tetsuo, 5,019,386, Cl. 424-89.000.
Nakamura, Tohru; Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, to Hitachi, Ltd. Process for making polysilicon contacts to IC mesas. 5,019,523, Cl. 437-31.000.
Nakamura, Yoshio: *See—*
  Arita, Yoshikazu; Abe, Yukio; Iizuka, Toshi; Nakamura, Yoshio; Takigami, Shoji; and Takigami, Machiko, 5,019,603, Cl. 521-181.000.
Nakamura, Yuko; and Takechi, Satoshi, to Fujitsu Limited. Process of using an electrically conductive layer-providing composition for formation of resist patterns. 5,019,485, Cl. 430-296.000.
Nakano, Masako; and Yamagami, Yutaka, to NEC Corporation. Circuit for detecting zero result of addition/subtraction by simultaneously processing each pair of corresponding bits of a pair of given numbers in parralel. 5,020,016, Cl. 364-736.500.
Nakano, Naokazu: *See—*
  Ogata, Ryuji; Nakano, Naokazu; and Suzuki, Shuichi, 5,019,191, Cl. 148-307.000.
Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, to Hitachi, Ltd. Magneto-optical memory apparatus having a floating magnetic head. 5,020,041, Cl. 369-13.000.
Nakasugi, Mikio; and Watanabe, Yoshiaki, to Canon Kabushiki Kaisha. Dynamic pressure bearing device. 5,018,880, Cl. 384-112.000.
Nakasuji, Kokichi: *See—*
  Murakami, Kenji; Tonooka, Yasuaki; Saito, Norie; Nakasuji, Kokichi; and Sugiyama, Norifumi, 5,019,499, Cl. 435-69.100.
Nakata, Nobuki: *See—*
  Ishikawa, Minoru; and Nakata, Nobuki, 5,020,053, Cl. 370-84.000.
Nakauma, Yoshinori: *See—*
  Kurahashi, Motofumi; Takemoto, Masanori; Chishi, Naoki; Takeuchi, Eizoo; and Nakauma, Yoshinori, 5,019,272, Cl. 210-695.000.
Nakayama, Katsutoyo; Mori, Toshimichi; and Kamino, Toshihide, to Ohbayashi Corporation; Morii Dengyo Kabushi Kaisha; and Terasaki Denki Sangyo. Power control apparatus. 5,019,956, Cl. 363-50.000.
Nakayama, Satoshi: *See—*
  Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, 5,019,117, Cl. 118-723.000.
Nakayama, Tadakazu: *See—*
  Niino, Tsuyoshi; Nakayama, Tadakazu; Tsuruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, 5,019,328, Cl. 376-310.000.
Nakazato, Youichi: *See—*
  Kageyama, Hidehei; Mitsuya, Yoshihide, and Nakazato, Youichi, 5,018,891, Cl. 401-52.000.
Nakfoor, Emil A.: *See—*
  Sodich, Ernest O., 5,018,598, Cl. 181-106.000.
Nalco Chemical Company: *See—*
  Pardue, Jerry E.; and Kneller, James F., 5,018,577, Cl. 166-279.000
Nalecz, Andrew A.: *See—*
  Jung, Rolf; and Nalecz, Andrew A., 5,018,713, Cl. 270-31.000

VOL
1126
ISS
4
MY
28
1991
UMI

- Namba, Seiji: *See—*
  - Shiratani, Takaaki; and Namba, Seiji, 5,018,882, Cl. 384-484.000.
- Napadov, Mikhail A.: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Narayan, Badhri: *See—*
  - Meyers, Mark M.; Lee, James K.; Narayan, Badhri; and Roddy, James E., 5,018,808, Cl. 350-6.910.
  - Roddy, James E.; and Narayan, Badhri, 5,018,813, Cl. 350-96.140.
- Naser, Georg; and Schneider, Siegfried, to Siemens Aktiengesellschaft. Arrangement for measuring physiologically generated weak biomagnetic signals while the examination subject is at rest and exercising. 5,018,724, Cl. 272-73.000.
- Nash, Thomas W., to Xerox Corporation. Process control for highlight color with developer switching. 5,019,859, Cl. 355-77.000.
- Nasu, Nobuo, to Kabushiki Kaisha Kawakami Seisakusho. Apparatus for cutting laminated sheet material. 5,018,418, Cl. 83-177.000.
- Natansohn, Samuel: *See—*
  - Rourke, William J.; and Natansohn, Samuel, 5,019,362, Cl. 423-21.500.
- National Research Council of Canada: *See—*
  - Rioux, Marc, 5,018,854, Cl. 356-376.000.
- National Research Development Corporation: *See—*
  - Robertson, Malcolm E. A., 5,020,084, Cl. 378-46.000.
- National Starch and Chemical Investment Holding Corporation: *See—*
  - Carter, David G.; Green, Derek J.; and Collins, Michael C., 5,018,337, Cl. 53-458.000.
- Natusch, Mary E.: *See—*
  - Lefsky, Brian; and Natusch, Mary E., 5,019,971, Cl. 364-200.000.
- Naumann, Richard C. Transmission servicing tool. 5,018,414, Cl. 81-484.000.
- Navistar International Corporation: *See—*
  - Londt, Edward E.; and Schaar, Robert T., 5,019,986, Cl. 364-426.040.
- Naya, Eizo; and Okumura, Mitsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Sintered electric contact material for vacuum switch tube and process for manufacturing the same. 5,019,156, Cl. 75-245.000.
- Nazarenk, Dimitri M.; Hughes, Houston H., III; Gordon, Robert T.; Hattey, David L.; and Yurman, Bruno, to Ericsson Ge Mobile Communications Inc. Processor-to-processor communications protocol for a public service trunking system. 5,020,132, Cl. 455-17.000.
- Nbedi, Sylvain L.; Bobo, Robert D.; and Hryhorenko, Socrates, to Eastman Kodak Company. Thermostatic device for fuser. 5,019,692, Cl. 219-469.000.
- NCR Corporation: *See—*
  - Collins, Donald A., Jr., 5,019,694, Cl. 235-383.000.
  - Sanwo, Ikuo J.; and Donahue, James A., 5,019,728, Cl. 307-475.000.
  - Skoog, Steven K.; and Cordan, Ernest W., Jr., 5,019,720, Cl. 307-270.000.
  - Speraw, Floyd G.; and Meyer, Jay A., 5,018,982, Cl. 439-74.000.
  - Whittaker, Sean E.; and Harris, Bruce F., 5,018,720, Cl. 271-272.000.
  - Wilson, Hillis L.; Passer, Barry E.; and Yaichuk, Peter W., 5,018,719, Cl. 271-246.000.
- NEC Corporation: *See—*
  - Hidaka, Mutsuo, 5,019,551, Cl. 505-1.000.
  - Isoe, Yasuhito, 5,020,131, Cl. 455-10.000.
  - Izumisawa, Hiroyuki; and Kinoshita, Seiichiro, 5,019,969, Cl. 364-200.000.
  - Kurata, Kazuhiko, 5,018,821, Cl. 350-96.200.
  - Kusaba, Kazuyuki, 5,019,727, Cl. 307-449.000.
  - Nakano, Masako; and Yamagami, Yutaka, 5,020,016, Cl. 364-736.500.
  - Saito, Sayuri; Yoshizawa, Kazutoshi; and Kitada, Yoshitaka, 5,019,966, Cl. 364-200.000.
  - Shimonou, Shigeru, 5,020,044, Cl. 369-44.280.
- Nederlandse Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek TNO: *See—*
  - Hennink, Wilhelmus E.; and Huizer, leendert, 5,019,100, Cl. 623-6.000.
- Needlepoint Guard, Inc.: *See—*
  - Hake, Lawrence W., 5,019,051, Cl. 604-198.000.
- Negus, Fred W. Knock-down semi-rigid table assembly. 5,018,454, Cl. 108-150.000.
- Nelle, Joseph A. Hand held wand with on/off switch remotely connected to motor/fan. 5,018,238, Cl. 15-314.000.
- Nelson, Clayton C.: *See—*
  - Lowe, H. Edward; Yoder, Ricky L.; and Nelson, Clayton C., 5,019,564, Cl. 514-75.000.
- Nelson, Dale A.: *See—*
  - Malagrino, Gerald D., Jr.; and Nelson, Dale A., 5,018,311, Cl. 51-140.000.
- Nelson, Daniel L.: *See—*
  - Smart, Gerald J.; and Nelson, Daniel L., 5,020,045, Cl. 369-44.290.
- Nelson, Kevin: *See—*
  - Schramer, Kurt M.; Norman, Alfred W.; and Nelson, Kevin, 5,019,436, Cl. 428-40.000.
- Nelson, Randall C.: *See—*
  - Gandrud, Dale E.; and Nelson, Randall C., 5,018,587, Cl. 172-612.000.
- Nelson, Ronald L.: *See—*
  - Schumacher, Thomas H.; and Nelson, Ronald L., 5,018,444, Cl. 101-366.000.
- Nemori, Ryoichi: *See—*
  - Toya, Ichizo; and Nemori, Ryoichi, 5,019,494, Cl. 430-600.000.
- Nesbitt, R. D.: *See—*
  - Stiefel, Joseph F.; Nesbitt, R. D.; and Melvin, Terence, 5,018,741, Cl. 273-232.000.
- Neton, Janet: *See—*
  - Hwa, Chih M.; Kelly, John A., Neton, Janet; Scanlon, Patricia M.; and Gaudette, Roger R., 5,019,343, Cl. 422-16.000.
- New England Deaconess Hospital Corporation: *See—*
  - Ito, Ralph K.; and LoGerfo, Frank W., 5,019,393, Cl. 424-423.000.
- New World Down Hole Tools: *See—*
  - Chiu, Lee C.; Ko, Yuki N.; and Wong, Keith N., 5,019,976, Cl. 364-413.130.
- New York Blood Center, Inc.: *See—*
  - Hopp, Thomas P., 5,019,383, Cl. 424-88.000.
- Neward, Theodore C. Manipulable vacuum extractor for childbirth and method of using the same. 5,019,086, Cl. 606-123.000.
- Newington Corp.: *See—*
  - Farnsworth, Dennis G., 5,018,410, Cl. 81-13.000.
- Newman, Allen: *See—*
  - Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.
- Newman, James A.: *See—*
  - Wiley, Kenneth D.; Zellner, John W.; St. Laurent, Andre; Newman, James A.; Szabo, Thomas J.; and Shewchenko, Nicholas, 5,018,977, Cl. 434-274.000.
- Newman, Neil A.; and Bowen, Thomas C., to Brunswick Corporation. Flow control fluid coupling marine transmission. 5,018,996, Cl. 440-75.000.
- Newport Corporation: *See—*
  - Bennett, Keith E.; and Staley, John R., III, 5,018,833, Cl. 350-314.000.
- NGK Insulators, Ltd.: *See—*
  - Kato, Kiminari; and Shirai, Masahiro, 5,019,537, Cl. 501-1.000.
  - Takeya, Fuminori, 5,019,930, Cl. 360-103.000.
- Nguyen, Harrison: *See—*
  - Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.
- Nguyen, Khe C.; and Gruenbaum, William T., to Eastman Kodak Company. Electrophotographic recording elements containing photoconductive perylene pigments. 5,019,473, Cl. 430-58.000.
- NHK Spring Co., Ltd.: *See—*
  - Hino, Isao, 5,018,244, Cl. 16-342.000.
- Nichols, Joanna A.: *See—*
  - Cheng, Kenny, 5,018,754, Cl. 280-47.400.
- Nichols, Joseph, to American Biomaterials Corporation. Nerve regeneration conduit. 5,019,087, Cl. 606-152.000.
- Nichols, Ronald L.: *See—*
  - Rank, William R.; Nichols, Ronald L.; and Schoenberger, Stephanie G., 5,018,530, Cl. 128-749.000.
- Niemetschek, Raymond H.: *See—*
  - Hechel, Dennis L.; Niemetschek, Raymond H.; Slocum, Tobin; Kercheck, Gary R.; and Crawford, Michael C., 5,018,853, Cl. 356-155.000.
- Niino, Tsuyoshi; Nakayama, Tadakazu; Tsuruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Natural circulation type boiling light-water reactor. 5,019,328, Cl. 376-310.000.
- Niito, Yoshiharu: *See—*
  - Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, 5,019,913, Cl. 358-296.000.
- Nikaido, Teruo; and Ohi, Ichiro, to Tomy Company, Ltd. Transformable block toys. 5,019,010, Cl. 446-487.000.
- Nikko Gould Foil Co., Ltd.: *See—*
  - Hino, Eiji; and Yamanishi, Keisuke, 5,019,222, Cl. 204-27.000.
- Nikon Corporation: *See—*
  - Goto, Tetsuro; and Miura, Kosho, 5,019,846, Cl. 354-217.000.
  - Inadome, Kiyotaka; Imanari, Hitoshi; Fukino, Kunihiro; and Takayama, Toru, 5,018,843, Cl. 350-429.000.
  - Kamiya, Saburo; and Tanimoto, Akikazu, 5,018,848, Cl. 350-572.000.
  - Sato, Toshihiro; and Takagi, Tadao, 5,019,853, Cl. 354-420.000.
  - Tanabe, Yoshiaki, 5,019,847, Cl. 354-246.000.
  - Terunuma, Hiroshi; Tsukahara, Daiki; and Katayama, Akira, 5,018,832, Cl. 350-276.0SL.
- Nintendo Co., Ltd.: *See—*
  - Shirai, Ichiro; and Sakuragi, Kazuhiko, 5,019,767, Cl. 320-2.000.
- Nippon Antenna Company Limited: *See—*
  - Suga, Mitsuhiro, 5,019,834, Cl. 343-877.000.
- Nippon Elanco Kabushiki Kaisha: *See—*
  - Yamamoto, Taizo; and Konishi, Hirokazu, 5,018,335, Cl. 53-281.000.
- Nippon Gear Co., Ltd.: *See—*
  - Umezono, Shiro; and Maki, Minoru, 5,018,403, Cl. 74-425.000.
- Nippon Jiryoku Senko Co., Ltd.: *See—*
  - Harada, Mitsuhisa; and Tomari, Masao, 5,019,160, Cl. 75-564.000.
- Nippon Seiko Kabushiki Kaisha: *See—*
  - Hayashi, Yoshitaka; and Ohmi, Hayato, 5,018,384, Cl. 73-118.100.
  - Kuribara, Ritsuo; Okubo, Kiyoshi; Yokoi, Koichi; and Sadakata, Kiyoshi, 5,018,899, Cl. 403-57.000.

  - Shiratani, Takaaki; and Namba, Seiji, 5,018,882, Cl. 384-484.000.
  - Tsukada, Toru; and Yamada, Hitoshi, 5,018,878, Cl. 384-44.000.
- Nippon Seimitsu Kogyo Kabushiki Kaisha: *See—*
  - Kubota, Mineo; and Masuyama, Kenji, 5,019,918, Cl. 358-473.000.
- Nippon Steel Corporation: *See—*
  - Kurahashi, Motofumi; Takemoto, Masanori; Chishi, Naoki; Takeuchi, Eizoo; and Nakauma, Yoshinori, 5,019,272, Cl. 210-695.000.
- Nippon Telegraph and Telephone Corporation: *See—*
  - Awaya, Nobuyoshi; and Arita, Yoshinobu, 5,019,531, Cl. 437-180.000.
  - Ishibashi, Tadao; and Yamauchi, Yoshiki, 5,019,890, Cl. 357-34.000.
- Nippon Zeon Co., Ltd.: *See—*
  - Chida, Takeshi; Aonuma, Mitsuyoshi; Maeda, Akio; Morozumi, Yukihiko; and Ohishi, Tetsu, 5,019,630, Cl. 525-326.200.
  - Miki, Yoshiaki; and Ueda, Tsunehisa, 5,019,599, Cl. 521-99.000.
- Nippondenso Co., Ltd.: *See—*
  - Hara, Mitsuo; Kamio, Shigeru; Takao, Mitsunori; Sakita, Katsuya; and Abe, Tomoaki, 5,018,595, Cl. 180-197.000.
  - Masaki, Syouichi; Maehata, Hiromi; Sakai, Kazunori; and Sugitani, Tatsuo, 5,019,984, Cl. 364-426.020.
  - Nagase, Kenichi; Haraguchi, Hiroshi; Mizuno, Toshiaki; and Kamada, Takayuki, 5,018,362, Cl. 62-133.000.
  - Yamane, Hiroyuki; Higuchi, Yasushi; and Fujii, Tetsuo, 5,019,526, Cl. 437-37.000.
- Nishida, Masaaki: *See—*
  - Hayakawa, Youichi; Hosono, Chihiro; and Nishida, Masaaki, 5,019,025, Cl. 475-285.000.
- Nishiguchi, Masanori; and Okazaki, Naoto, to Sumitomo Electric Industries, Ltd. Semiconductor device radiation hardened MESFET. 5,019,875, Cl. 357-22.000.
- Nishimu Electronics Industries Co., Ltd.: *See—*
  - Harada, Kosuke; Sakamoto, Hiroshi; and Nakamizo, Takazi, 5,019,770, Cl. 323-282.000.
- Nishimura, Hideo, to Sodick Co., Ltd. Discharge working machine. 5,019,685, Cl. 219-69.130.
- Nishimura, Hiroshi; Miyasaka, Masao; Itoh, Nobuhiko; Hiki, Toshio; and Igarashi, Akira, to Hitachi Koki Co., Ltd. Paper tension adjusting device and method for a printer. 5,018,888, Cl. 400-616.100.
- Nishio, Koji: *See—*
  - Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, 5,019,949, Cl. 361-525.000.
- Nishio, Masanobu, to Sumitomo Electric Industries, Ltd. Conductor used as a fuse. 5,019,457, Cl. 428-606.000.
- Nishizawa, Jun-ichi, to Zaidan Hojin Handotai Kenkyu Shinkokai. Semiconductor photo-electric converter. 5,019,876, Cl. 357-22.000.
- Niskanen, Juhani, to Valmet Paper Machinery Inc. Support system for a variable-crown roll. 5,018,258, Cl. 29-116.200.
- Nissan Motor Company, Limited: *See—*
  - Katsunori, Oshiage; Hosaka, Akio; and Yamamoto, Akito, 5,019,799, Cl. 340-438.000.
  - Kumasaka, Hideyuki; Takao, Kouji; Kuriyama, Hiroshi; Hagiwara, Tarou; and Miyazaki, Kenichi, 5,018,781, Cl. 296-210.000.
  - Suzuki, Motoharu; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, 5,018,762, Cl. 280-731.000.
  - Takahashi, Hiroshi, 5,019,979, Cl. 364-424.100.
  - Yamamoto, Akito; Ueno, Takashi; and Sumizawa, Akio, 5,019,964, Cl. 364-200.000.
  - Yasuno, Yoshiki; Ishikawa, Yasuki; Higashimata, Akira; and Fujishiro, Takeshi, 5,019,985, Cl. 364-426.020.
- Nissin Shokuhin Kabushiki Kaisha: *See—*
  - Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,018,505, Cl. 126-262.000.
- Nitsch, Dieter: *See—*
  - Kupfernagel, Artur; and Nitsch, Dieter, 5,018,687, Cl. 244-129.500.
- Nitsch, James L., Jr., to MMOQ, Ltd. Redyeing suppressed bleached fabric. 5,019,131, Cl. 8-457.000.
- Nitta, Yoshihiko: *See—*
  - Kaji, Hiroyuki; and Nitta, Yoshihiko, 5,020,021, Cl. 364-900.000.
- Nitto Kohki Co., Ltd.: *See—*
  - Kishi, Katsunobu, 5,018,914, Cl. 409-178.000.
- Nitzberg, Leonard R.: *See—*
  - Carmack, Paul D.; Asbury, James A.; and Nitzberg, Leonard R., 5,018,546, Cl. 137-68.100.
- Nitzsche, Rolf: *See—*
  - Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
- Niu, Joseph H. Y.; Edmondson, James G.; and Lehrer, Scott E., to Betz Laboratories, Inc. Method of inhibiting corrosion of metal surfaces in contact with a corrosive hydrocarbon containing medium. 5,019,341, Cl. 422-7.000.
- Niwa, Hideo: *See—*
  - Kishi, Tomomi; Nonami, Kanshi; Takeuchi, Masahiko; Yoshitani, Naoyuki; and Niwa, Hideo, 5,018,939, Cl. 414-795.400.
- Niwa, Mineo: *See—*
  - Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, 5,019,500, Cl. 435-69.100.
- Niwa, Mitsuyuki; Arai, Takayoshi; Shimizu, Isamu; Takeuchi, Eiji; Murakami, Tsutomu; and Ishihara, Shunichi, to Canon Kabushiki Kaisha. Non-single crystalline photosensor with hydrogen and halogen. 5,019,887, Cl. 357-30.000.
- Nix, Michael; and English, Clayton D., to Advanced Micro Devices, Inc. Capacitively coupled read-only memory. 5,020,025, Cl. 365-102.000.
- Nix, Richard A.: *See—*
  - Compton, David J.; Nix, Richard A.; and Leigh-Monstevens, Keith V., 5,018,352, Cl. 60-533.000.
- Noceti, Richard P.: *See—*
  - Taylor, Charles E.; and Noceti, Richard P., 5,019,652, Cl. 562-549.000.
- Noda, Yasushi; Shimozawa, Kenji; and Kamisaka, Takashi, to Teac Corporation. Optical disc apparatus lens drive apparatus and method for the manufacture of such. 5,018,836, Cl. 350-247.000.
- Noda, Yukifumi: *See—*
  - Miura, Yutaka; Yoshida, Mitsutaka; Fujimura, Yasuo; Takaku, Sakae; and Noda, Yukifumi, 5,019,574, Cl. 514-235.200.
- Noe, James B.; and Chiu, Charles C., to Union Carbide Corporation. Topical treatment for sealing carbon and graphite surfaces. 5,019,426, Cl. 427-314.000.
- Nonaka, Yasuyuki, to Kabushiki Kaisha Toshiba. Portable antenna apparatus for satellite communication. 5,019,833, Cl. 343-840.000.
- Nonami, Kanshi: *See—*
  - Kishi, Tomomi; Nonami, Kanshi; Takeuchi, Masahiko; Yoshitani, Naoyuki; and Niwa, Hideo, 5,018,939, Cl. 414-795.400.
- Noone, Robert E.: *See—*
  - Sartori, Guido; Ho, W. S. Winston; Savage, David W.; Noone, Robert E.; and Mastondrea, Robert P., 5,019,666, Cl. 585-819.000.
- Norand Corporation: *See—*
  - Koenck, Steven E., 5,019,699, Cl. 235-472.000.
- Noranda Inc.: *See—*
  - Houlachi, George; Murphy, Terry J.; St-Onge, Jean-Pierre; and Daoust, Daniel, 5,019,172, Cl. 134-3.000.
- Nordan, Lee T. Intraocular multifocal lens method for correcting the aphakic eye. 5,019,099, Cl. 623-6.000.
- Norden Laboratories Inc.: *See—*
  - Brown, Albert L.; Frantz, Joseph C.; and Peetz, Richard H., 5,019,388, Cl. 424-92.000.
- Nordman, James E.: *See—*
  - Martens, Jon S.; Beyer, James B.; Nordman, James E.; and Hohenwarter, Gert K. G., 5,019,721, Cl. 307-306.000.
- Nordson Corporation: *See—*
  - Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.
- Nore, Pentti T.: *See—*
  - Haikala, Heimo O.; Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., 5,019,575, Cl. 514-247.000.
- Norman, Alfred W.: *See—*
  - Schramer, Kurt M.; Norman, Alfred W.; and Nelson, Kevin, 5,019,436, Cl. 428-40.000.
- Norsat International Inc.: *See—*
  - Filmer, Donald D., 5,019,910, Cl. 358-188.000.
- North Broadway Corp.: *See—*
  - May, Brian E., 5,018,890, Cl. 401-46.000.
- North Carolina Alternative Energy Corporation: *See—*
  - Davis, Thomas L.; Shell, John P.; Elliott, Robert N., III; and Denning, Carsie K., 5,019,300, Cl. 261-23.100.
- North Carolina Department of Economic: *See—*
  - Davis, Thomas L.; Shell, John P.; Elliott, Robert N., III; and Denning, Carsie K., 5,019,300, Cl. 261-23.100.
- North Carolina State University: *See—*
  - Swartzel, Kenneth R.; and Ball, Hershell R., Jr., 5,019,407, Cl. 426-399.000.
  - Swartzel, Kenneth R.; Ball, Hershell R., Jr.; and Hamid-Samimi, Mohammad-Hossein, 5,019,408, Cl. 426-399.000.
- North, Peter C.: *See—*
  - Oxford, Alexander W.; and North, Peter C., 5,019,586, Cl. 514-400.000.
- Northcutt, Gerald G. Pipe lining system. 5,019,417, Cl. 427-54.100.
- Northern States Power Company: *See—*
  - Lehto, John M., 5,019,360, Cl. 423-132.000.
- Northern Telecom Limited: *See—*
  - Chabane, Mohamed; Boucher, J. Raymond; and Pan, Ali, 5,018,268, Cl. 29-728.000.
  - Suthers, Mark S.; Ester, Grantley O.; and Streater, Richard W., 5,019,742, Cl. 310-313.00C.
- Northrop Corporation: *See—*
  - Haavisto, John R.; and Ayers, Edward P., 5,018,811, Cl. 350-96.120.
- Nosal, Roger: *See—*
  - Khanna, Ish K.; Nosal, Roger; and Weier, Richard M., 5,019,581, Cl. 514-303.000.
- Novo Nordisk A/S: *See—*
  - Drejer, Jorgen; and Jakobsen, Palle, 5,019,582, Cl. 514-321.000.
  - Jakobsen, Palle; and Drejer, Jorgen, 5,019,592, Cl. 514-524.000.
- Nowak, Ronald P.: *See—*
  - Brown, George T.; Millis, David B.; Reynolds, Paul R.; and Nowak, Ronald P., 5,019,992, Cl. 364-468.000.
- Nowax S.r.l.: *See—*
  - Bruno, Caoduro, 5,019,737, Cl. 310-89.000.
- Nuckolls, Joe A.: *See—*
  - Flory, Isaac L., IV; and Nuckolls, Joe A., 5,019,751, Cl. 315-290.000.
- Null, Robert A.: *See—*
  - Lee, Alan R.; Mead, David P.; Null, Robert A.; Shilling, Thomas; and Atchley, Ray, 5,019,056, Cl. 604-257.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Nunn, Randolph G., Jr.: *See—*
  - Tanner, Paul R.; Nunn, Randolph G., Jr.; and Luebbe, John P., 5,019,375, Cl. 424-66.000.
- Nussbaum, Frank J.: *See—*
  - Zeliger, Harold I.; and Nussbaum, Frank J., 5,019,441, Cl. 428-196.000.
- N.V. Nederlandsche Apparatenfabriek Nedap: *See—*
  - Kip, Harm J.; and Venema, Willem H. J., 5,019,813, Cl. 340-825.540.
- N.V. Nederlandsche Appartenfabriek Nedap: *See—*
  - Hoeksma, Gerben S., 5,019,955, Cl. 363-21.000.
- Nyberg, Erie D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., to Raychem Corporation. Method and articles employing ion exchange material. 5,019,235, Cl. 204-282.000.
- Nynex Corporation: *See—*
  - Vancraeynest, Jan, 5,020,079, Cl. 375-64.000.
- Nystrom, Mats O. G.: *See—*
  - Gostahagberg, Anders P.; Knutsson, Evan A.; and Nystrom, Mats O. G., 5,019,812, Cl. 340-825.310.
- Oaten, Philip J.: *See—*
  - Carnahan, David W.; French, Paul J. A.; Maury, Riehard K.; Akins, Gary L.; and Oaten, Philip J., 5,018,974, Cl. 434-98.000.
- Obata, Katsuhiko: *See—*
  - Uchiyama, Shigeru; and Obata, Katsuhiko, 5,018,428, Cl. 84-616.000.
- Obayashi, Akira: *See—*
  - Kusakabe, Katsuhiko; Maruyama, Hitoshi; Kawano, Yukita; Matsui, Susumu; Taniguchi, Tsutomu; and Obayashi, Akira, 5,018,301, Cl. 47-1.100.
- Obermeyer, Franklin D.; Cruz, Richard R.; and Bieberbach, George, to Westinghouse Electric Corp. Latching device for securing a closure to a cask for transporting radioactive waste. 5,018,772, Cl. 292-39.000.
- O'Boyle, Matthew. Flow regulator and method. 5,019,055, Cl. 604-249.000.
- OCA Applied Optics, Inc.: *See—*
  - Horton, James, 5,018,844, Cl. 350-486.000.
- Occidental Chemical Corporation: *See—*
  - Buckholtz, Harry E.; and Miller, George T., 5,019,157, Cl. 75-340.000.
- O'Connell, John J., Jr. Cylindrical container and dispenser for spherical objects. 5,018,621, Cl. 206-204.000.
- Odda, Ulf A.: *See—*
  - Appelgren, Curt H.; and Odda, Ulf A., 5,019,399, Cl. 424-493.000.
- Odoi, Kozo: *See—*
  - Yokouchi, Takahito; Matsumoto, Kenji; and Odoi, Kozo, 5,018,734, Cl. 296-219.000.
- O'Donnell, Hugh W.; and Ben Salah, Ahmed. Pipe connection device. 5,018,903, Cl. 405-170.000.
- Odorisio, Paul A.; and Pastor, Stephen D., to Ciba-Geigy Corporation. 6-(4-hydroxyphenyl)-4,5-dihydro-3(2H)-pyridazinones and stabilized compositions. 5,019,612, Cl. 524-99.000.
- Oehr, Christian; and Suhr, Harald, to Schering Aktiengesellschaft. Process for depositing an adherent silver film. 5,019,415, Cl. 427-39.000.
- Oftring, Alfred: *See—*
  - Baur, Richard; Richter, Felix; Birnbach, Stefan; Fikentscher, Rolf; Oftring, Alfred; and Winkler, Ekhard, 5,019,296, Cl. 252-546.000.
- Ogaki, Hiroshi, to Victor Company of Japan, Ltd. System for discriminating tape speed mode. 5,019,923, Cl. 360-73.070.
- Ogasawara, Hiromitsu, to Tachi-S Co. Ltd. Motor control deviee for powered seat. 5,019,765, Cl. 318-628.000.
- Ogasawara, Tsuyoshi: *See—*
  - Matsuno, Junichi; Ogasawara, Tsuyoshi; Kawauchi, Masataka; and Tsuji, Yasuyuki, 5,018,718, Cl. 271-245.000.
- Ogasawara, Yasukichi; Ishige, Kazuo; and Ogata, Keizo, to Toyo Ink Manufacturing Co., Ltd. Decorative plate. 5,019,440, Cl. 428-195.000.
- Ogata, Keizo: *See—*
  - Ogasawara, Yasukichi; Ishige, Kazuo; and Ogata, Keizo, 5,019,440, Cl. 428-195.000.
- Ogata, Ryuji; Nakano, Naokazu; and Suzuki, Shuichi, to Sumitomo Metal Industries, Ltd. Magnetic steel plate for use as a magnetic shielding member and a method for the manufacture thereof. 5,019,191, Cl. 148-307.000.
- Ogata, Teruaki; and Sudou, Yuko, to Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for preparing measurement specifieations of electronic eircuits. 5,020,009, Cl. 364-580.000.
- Ogata, Teruaki; and Sudou, Yuko, to Mitsubishi Denki Kabushiki Kaisha. Method for preparing and evaluating measurement specificatons for an electronic circuit. 5,020,010, Cl. 364-580.000.
- Ogata, Toshio: *See—*
  - Sugai, Kazunari; Takeuchi, Osamu; Wakasa, Yasuyuki; Taguchi, Kenji; and Ogata, Toshio, 5,019,249, Cl. 209-534.000.
- Ogawa, Hiroshi: *See—*
  - Arai, Yuji; Ogawa, Hiroshi; and Hotori, Masahiro, 5,020,048, Cl. 369-291.000.
- Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Optical fiber and method of producing the same. 5,018,829, Cl. 350-96.340.
- Ogawa, Kazufumi, to Matsushita Electrie Industrial Co., Ltd. Image display device having a photosetting binder. 5,018,840, Cl. 350-349.000.
- Ogawa, Tadashi: *See—*
  - Kamei, Eiichi; Shimomura, Yasushi; Kanda, Yasuo; and Ogawa, Tadashi, 5,019,252, Cl. 210-136.000.
- Ogawa, Tadatoshi; and Ima, Seiichiro, to Sumitomo Chemical Company, Limited. Overlay films. 5,019,442, Cl. 428-215.000.
- Ogawa, Yasuaki: *See—*
  - Hamaguchi, Naoru; Iga, Katsumi; and Ogawa, Yasuaki, 5,019,394, Cl. 424-423.000.
- Ogawa, Yasushi, to Ricoh Company, Ltd. Document retrieval system. 5,020,019, Cl. 364-900.000.
- Ogawa, Yukio; and Alyfuku, Kiyoshi, to Canon Kabushiki Kaisha. Camera having data imprinting function. 5,019,843, Cl. 354-106.000.
- Ogitani, Satoshi: *See—*
  - Ai, Hideo; Suga, Nobuhiko; Ogitani, Satoshi; Takahashi, Hideaki; and Ikeda, Akihiko, 5,019,482, Cl. 430-283.000.
- Ogura, Masaaki, to Ricoh Company, Ltd. Digital copier with a facsimile function. 5,019,916, Cl. 358-401.000.
- Oguri, Yasuo; Koga, Takao; and Itoh, Toshio, to Mitsubishi Kasei Corporation; and Kasei Naoetsu Industries Limited. Method for producing boehmite. 5,019,367, Cl. 423-626.000.
- Oguro, Keisuke: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Oh, Young S.: *See—*
  - Baeck, Andre C.; and Oh, Young S., 5,019,292, Cl. 252-174.250.
- Ohashi, Kunio; and Nagata, Shoichi, to Sharp Kabushiki Kaisha. Image forming apparatus. 5,019,856, Cl. 355-27.000.
- Ohashi, Kunio: *See—*
  - Nakamura, Masatsugu; Ohashi, Kunio; Nagata, Shoichi; Wakita, Kazuki; Nagayama, Katsuhiro; and Tonegawa, Tadashi, 5,019,862, Cl. 355-208.000.
- Ohashi, Michihiro: *See—*
  - Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, 5,018,494, Cl. 123-339.000.
- O'Haver, Thomas C.: *See—*
  - Harnly, James M.; Moulton, Gary P.; and O'Haver, Thomas C., 5,018,856, Cl. 356-312.000.
- Ohbayashi Corporation: *See—*
  - Nakayama, Katsutoyo; Morii, Toshimichi; and Kamino, Toshihide, 5,019,956, Cl. 363-50.000.
- Ohdaira, Akio; Abe, Shunji; Wakatsuki, Noboru; and Tanaka, Akira, to Mitsui Petrochemcial Industries, Ltd.; and Fujitsu Limited. Optical fiber. 5,018,828, Cl. 350-96.340.
- Ohi, Ichiro: *See—*
  - Nikaido, Teruo; and Ohi, Ichiro, 5,019,010, Cl. 446-487.000.
- Ohi Seisakusho Co., Ltd.: *See—*
  - Koura, Soushichi; and Yamagishi, Jun, 5,018,303, Cl. 49-280.000.
- Ohio Art Company, The: *See—*
  - Gilano, Michael; Langford, Gordon B.; and Gilano, Michael A., 5,018,979, Cl. 434-409.000.
- Ohishi, Tetsu: *See—*
  - Chida, Takeshi; Aonuma, Mitsuyoshi; Maeda, Akio; Morozumi, Yukihiko; and Ohishi, Tetsu, 5,019,630, Cl. 525-326.200.
- Ohkouchi, Isao: *See—*
  - Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.
- Ohmi, Hayato: *See—*
  - Hayashi, Yoshitaka; and Ohmi, Hayato, 5,018,384, Cl. 73-118.100.
- Ohms, Jack I.; Qadeer, Majid; and Penhasi, Harry A., to Beckman Instruments, Inc. Automated chemical conversion unit in a peptide/-protein sequenator. 5,019,348, Cl. 422-63.000.
- Ohmstede Mechanical Services, Inc.: *See—*
  - Boisture, Thomas B.; McGrew, Larry D.; Jeffrey, James D.; Wetzel, Robert G.; Livingston, Gene P.; and Baten, Robert A., 5,018,544, Cl. 134-111.000.
- Ohnishi, Kenichi: *See—*
  - Takemura, Shinji; Mori, Masaki; Katayama, Tomoaki; Kegasa, Hideo; and Ohnishi, Kenichi, 5,019,759, Cl. 318-466.000.
- Ohno, Junichi: *See—*
  - Tanaka, Hiroshi; Kawamura, Chuichi; and Ohno, Juniehi, 5,018,366, Cl. 62-228.500.
- Ohno, Shigeru: *See—*
  - Makino, Naonori; Ohno, Shigeru; Hoshi, Satoshi; and Kitatani, Katsuji, 5,019,474, Cl. 430-76.000.
- Ohri, Hitomi: *See—*
  - Suzuki, Makoto; Watanabe, Satoshi; Tsukamoto, Takashi; Aoki, Hikoharu; Ohri, Hitomi; and Sako, Yukihiro, 5,018,817, Cl. 350-96.170.
- Ohsawa, Michitaka: *See—*
  - Onozawa, Makoto; Ohsawa, Michitaka; and Tonami, Katsuhiko, 5,019,754, Cl. 315-408.000.
- Ohsawa, Takashi: *See—*
  - Kimura, Tohru; Fujii, Syuso; and Ohsawa, Takashi, 5,019,729, Cl. 307-475.000.
- Ohsawa, Yutaka: *See—*
  - Yamamoto, Masato; Yamanaka, Toshimasa; Nakajima, Masahiro; and Ohsawa, Yutaka, 5,019,852, Cl. 354-409.000.
- Ohshima, Yoichi; and Mori, Seiichi, to Kabushiki Kaisha Toshiba. Method of manufacturing non-volatile semiconductor memories, in which selective removal of field oxidation film for forming source region and self-adjusted treatment for forming contaet portion are simultaneously performed. 5,019,527, Cl. 437-43.000.
- Ohta, Wasaburo: *See—*
  - Yagawara, Shinji; and Ohta, Wasaburo, 5,019,885, Cl. 357-25.000.
- Ohtsu, Norio: *See—*
  - Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, 5,019,432, Cl. 428-35.400.

- Ohtsuka, Kenichi: *See—*
  - Abe, Yuji; Sugimoto, Hiroshi; Ohtsuka, Kenichi; Oishi, Toshiyuki; and Matsui, Teruhito, 5,020,072, Cl. 372-96.000.
- Ohwe, Takeshi; Yoneoka, Seiji; and Takahashi, Minoru, to Fujitsu Limited. Mechanism for suspending a head slider of a recording apparatus. 5,019,931, Cl. 360-104.000.
- Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, to Canon Kabushiki Kaisha. Photoelectric transducer apparatus having a plurality of transducer elements and a plurality of capacitor elements. 5,019,702, Cl. 250-208.100.
- Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, to Toyota Jidosha Kabushiki Kaisha; and Fukuda Metal Foil and Powder Co., Ltd. Alloy for building JP valve. 5,019,338, Cl. 420-586.100.
- Oishi, Toshiyuki: *See—*
  - Abe, Yuji; Sugimoto, Hiroshi; Ohtsuka, Kenichi; Oishi, Toshiyuki; and Matsui, Teruhito, 5,020,072, Cl. 372-96.000.
- Ojima, Masahiro: *See—*
  - Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, 5,020,041, Cl. 369-13.000.
- Ojima, Satoshi; and Hiraide, Tsuneo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Observation and/or cultivation instrument for cells. 5,018,847, Cl. 350-534.000.
- Oka, Hiroshi; Okuda, Chozo; Yoshida, Yoshinori; Takahashi, Toshihiko; Kamoshida, Yoichi; and Miura, Takao, to Japan Synthetic Rubber Co., Ltd. Positive type radiation-sensitive resin composition comprising a photosensitizer and a novolak resin. 5,019,479, Cl. 430-172.000.
- Okabe, Takahiro: *See—*
  - Nakamura, Tohru; Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, 5,019,523, Cl. 437-31.000.
- Okada, Kazuo, to Kabushiki Kaisha Universal. Slot machine. 5,018,737, Cl. 273-143.00R.
- Okada, Masato, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,020,067, Cl. 372-46.000.
- Okada, Teruya: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Okada, Tomonobu: *See—*
  - Kiyoshige, Masanori; Okada, Tomonobu; Kawashima, Takashi; and Hirokawa, Takeshi, 5,018,317, Cl. 51-410.000.
- Okada, Toshiharu, to Matsushita Electric Industrial Co., Ltd. Laser apparatus. 5,020,063, Cl. 372-34.000.
- Okamoto, Yoshio: *See—*
  - Watanabe, Haruo; Nakamura, Ichiro; Okamoto, Yoshio; and Konno, Hitoshi, 5,018,501, Cl. 123-472.000.
- Okamura, Masami: *See—*
  - Sawa, Takao; Okamura, Masami; and Takahashi, Yumiko, 5,019,190, Cl. 148-306.000.
- Okano, Masami; and Takeuchi, Kunihiro, to Zexel Corporation. System for vehicle safety devices. 5,018,763, Cl. 280-735.000.
- Okanobu, Taiwa, to Sony Corporation. FM/AM broadcast signal converter. 5,020,147, Cl. 455-302.000.
- Okauchi, Shuki: *See—*
  - Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, 5,019,548, Cl. 503-209.000.
- Okazaki, Naoto: *See—*
  - Nishiguchi, Masanori; and Okazaki, Naoto, 5,019,875, Cl. 357-22.000.
- Okino, Tadashi; and Ise, Makoto, to Canon Kabushiki Kaisha. Image pickup apparatus with mode dependent light measurement. 5,019,911, Cl. 358-213.190.
- Okita, Ryozo, to Sanshin Kogyo Kabushiki Kaisha. Tilting/trimming system for marine propulsion unit. 5,018,994, Cl. 440-61.000.
- Okker, Robert J. H.; Lugtenberg, Egbertus J. J.; and Schilperoort, Robbert A., to Rijksuniversileit Leiden; and Schilperoort, Robbert Adriaan. Process for the activation of promoters of bacteria. 5,019,501, Cl. 435-69.100.
- Okubo, Kiyoshi: *See—*
  - Kuribara, Ritsuo; Okubo, Kiyoshi; Yokoi, Koichi; and Sadakata, Kiyoshi, 5,018,899, Cl. 403-57.000.
- Okuda, Chozo: *See—*
  - Oka, Hiroshi; Okuda, Chozo; Yoshida, Yoshinori; Takahashi, Toshihiko; Kamoshida, Yoichi; and Miura, Takao, 5,019,479, Cl. 430-172.000.
- Okumura, Mitsuhiro: *See—*
  - Naya, Eizo; and Okumura, Mitsuhiro, 5,019,156, Cl. 75-245.000.
- Okuwaki, Toyoji: *See—*
  - Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, 5,020,041, Cl. 369-13.000.
- Olander, Donald K.: *See—*
  - Balooch, Mehdi; Olander, Donald K.; and Russo, Richard E., 5,019,552, Cl. 505-1.000.
- Olds, James D.: *See—*
  - Villalon, S. Leonard; Olds, James D.; and Shoffner, William H., 5,018,759, Cl. 280-507.000.
- Olenski, Matthew J.: *See—*
  - Kubert, Vincent T.; Olenski, Matthew J.; and Duchesne, Mark F., 5,019,868, Cl. 355-264.000.
- Oliff, Allen I.: *See—*
  - Riemen, Mark W.; Oliff, Allen I.; Saari, Walfred S.; and Heimbrook, David C., 5,019,647, Cl. 530-329.000.
- Olin Corporation: *See—*
  - Cawlfield, David W.; and Kaczur, Jerry J., 5,019,226, Cl. 204-101.000.
- Olin Hunt Specialty Products, Inc.: *See—*
  - Toukhy, Medhat A.; and Jeffries, Alfred T., III., 5,019,478, Cl. 430-165.000.
- Oliver, Glenn W., to Oliver, Glenn W. Rallye wheel hubcap retaining device. 5,018,794, Cl. 301-37.0AT.
- Oliver, Neal C.: *See—*
  - Gorin, Allen L.; Makofsky, Patrick A.; Morton, Nancy; Oliver, Neal C.; Shively, Richard R.; and Stanziola, Christopher A., 5,020,059, Cl. 371-11.300.
- Olsen, Ritchie: *See—*
  - Taylor, Robert D.; Smith, Gary L.; and Olsen, Ritchie, 5,019,220, Cl. 264-3.400.
- Olson, Heidi S., to HICO Products, Inc. Clothes hanger spacer. 5,018,694, Cl. 248-340.000.
- Olsson, Lennart. Human squamous lung carcinoma cell specific antigens and antibodies. 5,019,497, Cl. 435-7.230.
- Olsson, Sture; and Ahlm, Roger, to Unigrafic AG. Device for marking edges of shelves. 5,019,811, Cl. 340-825.170.
- Olwert, Ronald J.; Zalar, Frank E.; and Chapman, Walter R., Jr., to General Electric Company. Mount structure for double ended lamp. 5,019,743, Cl. 313-25.000.
- Olympus Optical Co., Ltd.: *See—*
  - Asakura, Yasuo; Imai, Yuji; and Kobayashi, Yuji, 5,019,845, Cl. 354-149.100.
  - Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, 5,019,476, Cl. 430-20.000.
  - Suzuki, Akira; Hibino, Hiroki; Fukuda, Hiroyuki; Takahashi, Yutaka; and Ishikawa, Akibumi, 5,018,509, Cl. 128-6.000.
- Omega Engineering, Inc.: *See—*
  - McKinley, William E.; Crimmins, James P.; and Russell, Robert G., 5,019,838, Cl. 346-121.000.
- Omo, Shinichi: *See—*
  - Hirano, Hirofumi; Omo, Shinichi; and Fukui, Hiroshi, 5,018,884, Cl. 400-126.000.
- OMS-Optical Measuring Systems: *See—*
  - Richert, Gerald R., 5,018,864, Cl. 356-372.000.
- Omura, Hideo: *See—*
  - Suzuki, Motoharu; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, 5,018,762, Cl. 280-731.000.
- Omura, Motoko, to Fuji Kagakushi, Kogyo Co., Ltd. Used ink ribbon cutting apparatus. 5,018,419, Cl. 83-451.000.
- Onan Corporation: *See—*
  - Gulbrandson, William E., 5,018,676, Cl. 242-7.030.
- Ono, Hiroki: *See—*
  - Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, 5,019,500, Cl. 435-69.100.
- Ono, Hiroshi: *See—*
  - Kuramoto, Toru; Tukuda, Hitoshi; and Ono, Hiroshi, 5,019,540, Cl. 501-96.000.
- Ono, Hitoshi: *See—*
  - Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, 5,019,949, Cl. 361-525.000.
- Ono, Yuichi: *See—*
  - Takikawa, Kazunori; and Ono, Yuichi, 5,018,612, Cl. 192-58.00B.
- Onoda, Risuke: *See—*
  - Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.
- Onoue, Akihiro, to Sanshin Kogyo Kabushiki Kaisha. Propeller driving device of marine propulsion unit. 5,018,999, Cl. 440-78.000.
- Onozawa, Makoto; Ohsawa, Michitaka; and Tonami, Katsuhiko, to Hitachi Video Engineering, Inc.; and Hitachi, Ltd. Horizontal deflection circuit. 5,019,754, Cl. 315-408.000.
- Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi; Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, to Hitachi, Ltd. Semiconductor device and method of fabricating the same. 5,019,891, Cl. 357-70.000.
- Ooe, Masaharu; Ishiguro, Yoichi; and Tanaka, Gotaro, to Sumitomo Electric Industries, Ltd. Process for fusion-splicing hermetically coated optical fibers. 5,018,824, Cl. 350-96.210.
- Ooi, Katsunori; Sasaki, Hiroshi; and Ariyoshi, Shunji, to Kabushiki Kaisha Toshiba. Handwritten character string recognition system. 5,020,117, Cl. 382-46.000.
- Ookawa, Kiyoshi, to Mitsubishi Denki Kabushiki Kaisha. Ignition apparatus for an internal combustion engine. 5,019,779, Cl. 324-388.000.
- Ooms, William J.; Leitch, Clifford D.; and Delgado, Rene M., to Motorola, Inc. Method and apparatus for obtaining the quotient of two numbers within one clock cycle. 5,020,017, Cl. 364-761.000.
- Ooshima, Seiju: *See—*
  - Mikami, Shiro; Ooshima, Seiju; and Nagahara, Yoshio, 5,018,284, Cl. 37-233.000.
- Ootsuka, Hiroshi: *See—*
  - Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko; Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.

VOL
1126
ISS
4
MY
28
1991
UMI

Ooyama, Naotake: *See—*

Barnes, Thomas H.; Matsuda, Kiyofumi; and Ooyama, Naotake, 5,018,838, Cl. 350-347.00V.

Oppenheimer, Henry W., to Ultimate Plastics, Inc. Pilfer-resistant display device. 5,018,253, Cl. 24-458.000.

Orbital Walbro Corporation: *See—*

Hoover, Thomas M., 5,018,498, Cl. 123-435.000.

Orion-yhtyma Oy: *See—*

Haikala, Heimo O.; Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., 5,019,575, Cl. 514-247.000.

Orlicki, David M.: *See—*

Fearnside, William T.; and Orlicki, David M., 5,020,042, Cl. 369-13.000.

Ormco Corporation: *See—*

Andreiko, Craig; and Sterrett, Terry L., 5,018,969, Cl. 433-20.000.

Ortho Pharmaceutical Corporation: *See—*

Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., 5,019,569, Cl. 514-171.000.

ORTHOFIX S.r.l.: *See—*

De Bastiani, Giovanni; Faccioli, Giovanni; Aldegheri, Roberto; and Brivio, Lodovico R., 5,019,077, Cl. 606-54.000.

Osawa, Kouichi: *See—*

Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, 5,018,494, Cl. 123-339.000.

Osborne, John C.: *See—*

McEwen, James A.; Godolphin, William J.; Bohl, Rainer M.; Dance, Mark N.; Furse, Marty L.; and Osborne, John C., 5,019,243, Cl. 210-94.000.

Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, to Fuji Jukogyo Kabushiki Kaisha. Device and method for decreasing power consumption of a steering angle detecting system for vehicle. 5,019,981, Cl. 364-424.050.

Osment, David L.; and Fulton, Dwayne, to Osment Models, Inc. Method of making artificial foliage. 5,019,431, Cl. 428-15.000.

Osment Models, Inc.: *See—*

Osment, David L.; and Fulton, Dwayne, 5,019,431, Cl. 428-15.000.

Osten, Donald E., to Packard Instrument Company. Method and apparatus for performing high sensitivity fluorescence measurements. 5,018,866, Cl. 356-417.000.

Oster, Gerald; and Davis, Baruch J. Photopolymerization diagnostic test composition and method for immunoassay and nucleic acid assay. 5,019,496, Cl. 435-6.000.

Osterhout, Ralph F.; and Fogg, Peter M., to Rayovac Corporation Spotlight with adjustable handle. 5,019,951, Cl. 362-191.000.

Otis Elevator Company: *See—*

Johnson, Gerald E.; and Rivera, James A., 5,018,616, Cl. 198-335.000.

Salmon, John K.; and Yoo, Young S., 5,018,602, Cl. 187-1.00R.

Otsuki, Kuniyoshi: *See—*

Yoshimoto, Itsuro; and Otsuki, Kuniyoshi, 5,019,920, Cl. 360-27.000.

Ott, David M.: *See—*

Walsh, John M.; and Ott, David M., 5,020,122, Cl. 382-56.000.

Ott Maschinentechnik GmbH: *See—*

Bauch, Karl; Raff, Alfred; Heel, Helmut; and Leege, Norbert, 5,018,916, Cl. 409-233.000.

Otte, Erhard, to Gerhard Klemm Maschinenfabrik GmbH & Co. Hydromechanical drive. 5,018,351, Cl. 60-448.000.

Otto Wehr GmbH: *See—*

Ganser, Anton, 5,018,925, Cl. 414-240.000.

OTV (Omnium de Traitements et de Valorisation): *See—*

Rogalla, Franck, 5,019,268, Cl. 210-617.000.

Oue, Rika: *See—*

Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi, Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, 5,019,773, Cl. 324-166.000.

Outboard Marine Corporation: *See—*

VanRens, Russell J., 5,018,568, Cl. 164-34.000.

Output Technology Corporation: *See—*

Zajac, Theodore, Jr., 5,019,872, Cl. 355-317.000.

Owen, Hartley, to Mobil Oil Corp. Inverted fractionation apparatus and use in a heavy oil catalytic cracking process. 5,019,239, Cl. 208-48.00Q.

Owen, Hartley: *See—*

Harandi, Mohsen N.; and Owen, Hartley, 5,019,353, Cl. 422-144.000.

Harandi, Mohsen N.; and Owen, Hartley, 5,019,357, Cl. 422-192.000.

Owsiany, Michael: *See—*

Hemsath, Klaus H.; Staffin, H. Kenneth; and Owsiany, Michael, 5,018,707, Cl. 266-254.000.

Oxford, Alexander W.; and North, Peter C., to Glaxo Group Limited. Ketone derivatives. 5,019,586, Cl. 514-400.000.

Oyaide, Shinichi; Kawahira, Masayoshi; and Miyazawa, Toshio, to Tokyo Electric Co., Ltd. Sheet conveying apparatus for a printer 5,018,889, Cl. 400-642.000.

Ozaki, Takeyuki: *See—*

Morino, Taisuke; Tanaka, Mami; Kaneko, Fuminori; Ozaki, Takeyuki; and Akiyama, Shuichi, 5,019,680, Cl. 219-10.55E.

P & J Industries, Inc.: *See—*

Metts, Glenn A., 5,018,662, Cl. 228-208.000.

P.T P. Industries: *See—*

Hartley, William L., 5,018,622, Cl. 206-333.000.

Pacchioni, Italo: *See—*

Mengotti, Giovanni; and Pacchioni, Italo, 5,018,336, Cl. 53-435.000.

Pacific Engineering and Production Co. of Nevada: *See—*

Keeney, Lawrence V.; Misch, William B.; and Parrott, James H., 5,019,339, Cl. 422-3.000.

Packaging Corporation of America: *See—*

Arneson, Theodore R.; Hitchcock, Robert F.; and Williams, Julie D. N., 5,018,624, Cl. 206-560.000.

Packard Instrument Company: *See—*

Osten, Donald E., 5,018,866, Cl. 356-417.000.

Padi, Gyula. Spherical dice with interchangeable orientation insert members. 5,018,738, Cl. 273-146.000.

Palatchy, Josef, to Quikcoup, Incorporated. Pipe coupling hinge. 5,018,768, Cl. 285-24.000.

Palker, Thomas J.: *See—*

Haynes, Barton F.; and Palker, Thomas J., 5,019,387, Cl. 424-89.000.

Pall Corporation: *See—*

Gsell, Thomas C.; and Rothman, Isaac, 5,019,260, Cl. 210-490.000.

Palm Oil Research & Development Board: *See—*

Keat, Ooi C.; May, Choo Y.; and Hock, Augustine O. S . 5,019,668, Cl. 585-864.000.

Palmer, James A.: *See—*

Alfrey, Anthony J.; and Palmer, James A., 5,020,073, Cl. 372-105.000.

Palmer, Karl. Round bale carrier and rear unloader. 5,018,924, Cl. 414-245.000.

Pan, Ali: *See—*

Chabane, Mohamed; Boucher, J. Raymond; and Pan, Ali, 5,018,268, Cl. 29-728.000.

Panconi, Emmanuel: *See—*

Cehovic, Georges; and Panconi, Emmanuel, 5,019,558, Cl. 514-11.000.

Panster, Peter; and Deschler, Ulrich. Organopolysiloxane urea derivatives and organopolysiloxane thiourea derivatives, methods of their preparation and use. 5,019,637, Cl. 528-25.000.

Papageorge, Marc V.: *See—*

Juskey, Frank J.; Miles, Barry M.; and Papageorge, Marc V., 5,019,673, Cl. 174-52.200.

Pape, William R., III: *See—*

Chang, Karl; Pape, William R., III; Crosetti, Victor J., Jr.; Nakamura, Lance S.; Leong, Daniel B. C.; and Loui, Robert K L., 5,019,696, Cl. 235-436.000.

Pardue, Jerry E.; and Kneller, James F., to Nalco Chemical Company. Phosphinate inhibitor for scale squeeze applications. 5,018,577, Cl. 166-279.000.

Park, Soo H.: *See—*

Jung, Seung T.; Park, Soo H., and Kim, Chun K., 5,018,804, Cl. 350-3.710.

Parker, Donald L.; and Flory, Donald M., to General Motors Corporation. Isolation valve. 5,018,798, Cl. 303-117.000.

Parker Hannifin Corp.: *See—*

Granville, Jeffrey H.; Church, John; and Hodgkins, David H., 5,019,141, Cl. 55-170.000.

Parker Kinetic Designs, Inc.: *See—*

Weldon, James M., 5,018,590, Cl. 175-105.000.

Parks, Gerald R.: *See—*

Dawson, Chris R.; Parks, Gerald R.; and Dondero, John, 5,018,223, Cl. 2-436.000.

Parr, Wolfgang: *See—*

Bunte, Thomas; Parr, Wolfgang; and Heyl, Eduard, 5,019,391, Cl. 424-195.100.

Parrish, Robert W.; and Parrish, Walter F., to Parrish, Robert W Decorative curbing machine. 5,018,955, Cl. 425-64.000.

Parrish, Walter F.: *See—*

Parrish, Robert W.; and Parrish, Walter F., 5,018,955, Cl. 425-64.000.

Parrott, James H.: *See—*

Keeney, Lawrence V.; Misch, William B.; and Parrott, James H., 5,019,339, Cl. 422-3.000.

Parschat, Lothar: *See—*

Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.

Parsons, Ronald C., to Mandrels, Inc. Apparatus for reducing abrasion and corrosion in mandrels. 5,018,575, Cl. 166-242.000.

Partis, Richard A.: *See—*

Mueller, Richard A.; Partis, Richard A ; and Deason, James R., 5,019,597, Cl. 514-618.000.

Partridge, Randall D.; and Whitchurst, D. Duayne, to Mobil Oil Corp. Shape-selective process for concentrating diamondoid-containing hydrocarbon solvents. 5,019,665, Cl. 585-803.000.

Partridge, Randall D.: *See—*

Del Rossi, Kenneth J.; Dessau, Ralph M.; Huss, Albin, Jr.; Kirker, Garry W.; Marler, David O.; and Partridge, Randall D., 5,019,664, Cl. 585-419.000.

Paschke, Larry F.: *See—*

Brady, Jack D.; Graves, Kenny M.; Paschke, Larry F.; and Golumbeski, John M., 5,018,457, Cl. 110-346.000.

Pasquale, Frank; and Dewees, John G., to Trans World Marketing Corporation. Display holder. 5,018,291, Cl. 40-642.000.

Passer, Barry E.: *See—*

Wilson, Hillis L.; Passer, Barry E.; and Yaichuk, Peter W., 5,018,719, Cl. 271-246.000.

Pastor, Stephen D.: *See—*

Odorisio, Paul A.; and Pastor, Stephen D., 5,019,612, Cl. 524-99.000.

Patel, Arvind; Lenz, William; and Schafer, Jack J., to Molex Incorporated. Splice block for security system switch. 5,019,795, Cl. 335-205.000.

Patel, Vasant K.: *See—*

Hsu, Chao-Yang; Patel, Vasant K.; Vahlsing, David H.; Wei, James T.; and Myers, Harry K., Jr., 5,019,671, Cl. 585-751.000.

Patil, Arun-Angelo: *See—*

Yamanashi, William S.; and Patil, Arun-Angelo, 5,019,076, Cl. 606-45.000.

Patracuolia, Paul A. Method for playing a board game. 5,018,744, Cl. 273-248.000.

Patsiokas, Stelios J.; Garay, Oscar M.; and Balzano, Quirino, to Motorola, Inc. Battery pack antenna suitable for use with two-way portable transceivers. 5,020,136, Cl. 455-89.000.

Patterson, Steven R.: *See—*

Fairley, Christopher R.; and Patterson, Steven R., 5,019,786, Cl. 328-133.000.

Pattok, Greg R.: *See—*

Rolinski, Adam E.; and Pattok, Greg R., 5,018,610, Cl. 192-4.00A.

Patton, David L., to Eastman Kodak Company. Toner fusing/finishing device for selecting alternatively the style of finishing on a glossy, matte, or textured print finish. 5,019,869, Cl. 355-290.000.

Paul, Kermit D., to Fuller Company. Method and apparatus using feed conveying fluid for blending the feed and/or separating debris from the feed. 5,018,869, Cl. 366-101.000.

Paul Wurth S.A.: *See—*

Melan, Corneille; Konsbruck, Jeannot; and Kremer, Andre, 5,018,923, Cl. 414-10.000.

Pauli & Griffin: *See—*

Allard, James J., 5,018,319, Cl. 51-424.000.

Pawlak, Wanda: *See—*

Ignasiak, Teresa; Turak, Ali A.; Pawlak, Wanda; Ignasiak, Boleslaw L.; Guerra, Carlos R.; and Zwillenberg, Melvin L., 5,019,245, Cl. 209-166.000.

Pearl Musical Instrument Co.: *See—*

Suzuki, Seiji, 5,018,426, Cl. 84-422.300.

Pearson, Timothy R.; and Junkin, William W., to Wakeman & deForrest Corporation. Interactive game system and method. 5,018,736, Cl. 273-439.000.

Pease, Jay W.: *See—*

Farrah, William J.; and Pease, Jay W., 5,019,138, Cl. 55-89.000.

Pecaut, Steven C. CATV signal distribution system and local status monitor therefor. 5,020,134, Cl. 455-67.000.

Pech, Rudiger. Device for the presentation of objects. 5,018,978, Cl. 434-376.000.

Peck, R. Michael; Hecht, Thomas R.; and Livingston, Howard F., to Kathcon, Inc. Organic material reduction apparatus. 5,018,672, Cl. 241-37.500.

Peddinghaus, Carl Ullrich: *See—*

Stursberg, Bernd, 5,018,911, Cl. 408-13.000.

Pedersen, Daniel E.: *See—*

Richter, Francis L.; Wilson, James; and Pedersen, Daniel E., 5,019,346, Cl. 422-28.000.

Pedlick, Jack; Vincze, Bela; and Deniega, Jess, to Ethicon, Inc. Pneumatically actuated surgical stapler head. 5,018,657, Cl. 227-178.000.

Peek, Thomas W.; and Floyd, John B., to BioAgriTech, Inc., a Florida corporation. Pesticide delivery device. 5,018,299, Cl. 43-107.000.

Peetz, Richard H.: *See—*

Brown, Albert L.; Frantz, Joseph C.; and Peetz, Richard H., 5,019,388, Cl. 424-92.000.

Pegasus Sewing Machine Mfg., Co., Ltd.: *See—*

Nakajima, Nobuo, 5,018,463, Cl. 112-121.290.

Pelikan Aktiengesellschaft: *See—*

Mecke, Norbert; and Krauter, Heinrich, 5,019,421, Cl. 427-152.000.

Pelissier, Laurent, to Etudes Et Constructions Mecaniques. Device for injecting gas under high pressure and high flow rate into an airtight treatment chamber and for recovery of the same. 5,018,551, Cl. 137-571.000.

Pellet, Regis J.: *See—*

Best, Donald F.; Long, Gary N.; Pellet, Regis J.; Rabo, Jule A.; and Wolynic, Edward T., 5,019,240, Cl. 208-111.000.

Pelrine, Bruce P.: *See—*

Le, Quang N.; Pelrine, Bruce P.; and Shim, Joosup, 5,019,670, Cl. 585-467.000.

Pelzl, Leo, to Siemens Aktiengesellschaft. Coding device for printed circuit cards which can be inserted into a printed circuit card rack. 5,019,947, Cl. 361-415.000.

Pemberton, Joseph H. Exhaust efficiency increasing apparatus. 5,018,349, Cl. 60-313.000.

Penhasi, Harry A.: *See—*

Ohms, Jack I.; Qadeer, Majid; and Penhasi, Harry A., 5,019,348, Cl. 422-63.000.

Peninsula Copper Industries, Inc.: *See—*

Hanson, David G., Jr.; and Hockings, William A., 5,019,171, Cl. 134-2.000.

Penn Plax, Inc.: *See—*

Goldman, Marvin; Goldman, Jerome; Goldman, Terry; Phillips, Gerald; and Pesin, Joseph, 5,018,480, Cl. 119-26.000.

Pennsylvania Research Corporation: *See—*

Gardner, Thomas W.; and Hollis, Theodore M., 5,019,591, Cl. 514-461.000.

Towfighi, Javad; Roberts, Allan F.; Foster, Norman E.; and Abt, Arthur B., 5,019,031, Cl. 600-21.000.

Penny, Glenn S., to Stim Lab, Inc. Cell assembly for determining conductivity and permeability. 5,018,396, Cl. 73-865.600.

Penny, William H.: *See—*

Robinson, David B.; Adams, Daniel O.; Penny, William H.; and Voegele, Gerald G., 5,019,041, Cl. 604-97.000.

Pepe, Enrico J.: *See—*

Mohr, Paul H.; and Pepe, Enrico J., 5,019,340, Cl. 422-7.000.

PepsiCo Inc.: *See—*

McGarrah, Robert G.; and McGarrah, Christopher M., 5,018,692, Cl. 248-188.300.

Perez, Sam S.; and Malinowski, Susan, to Diana Dolls Fashions, Inc. Washable diaper with absorbent liner. 5,019,068, Cl. 604-386.000.

Perfume International, Inc.: *See—*

Carnahan, David W.; French, Paul J. A.; Maury, Richard K.; Akins, Gary L.; and Oaten, Philip J., 5,018,974, Cl. 434-98.000.

Perren, Stephen M., Frigg, Robert; Gisin, Paul; and Mathys, Robert, Jr., to Synthes (U.S.A.). Bone screw. 5,019,078, Cl. 606-61.000.

Perron, Peter J.; and Bourbonais, Edward A., to Dexter Corporation. Compatibilizing agent for polycarbonate and polyamide polymer blends. 5,019,625, Cl. 525-66.000.

Perry, Michael R.: *See—*

Lorence, Matthew W.; Rice, Michael J.; Lentz, Ronald R.; Pesheck, Peter S.; and Perry, Michael R., 5,019,681, Cl. 219-10.55F.

PerSeptive Biosystems, Inc.: *See—*

Afeyan, Noubar B.; Regnier, Fred E.; and Dean, Robert C., Jr., 5,019,270, Cl. 210-656.000.

Perstorp AB: *See—*

Siren, Matti, 5,019,566, Cl. 514-103.000.

Pesheck, Peter S.: *See—*

Lorence, Matthew W.; Rice, Michael J.; Lentz, Ronald R.; Pesheck, Peter S.; and Perry, Michael R., 5,019,681, Cl. 219-10.55F.

Pesin, Joseph: *See—*

Goldman, Marvin; Goldman, Jerome; Goldman, Terry; Phillips, Gerald; and Pesin, Joseph, 5,018,480, Cl. 119-26.000.

Petermann, Steven G.; and Katahara, Keith W., to Atlantic Richfield Company. Magnetostrictive transducer for logging tool. 5,020,036, Cl. 367-168.000.

Peterson, David: *See—*

Gray, Robert L.; Peterson, David; Chen, Loren; and Buskirk, Gregory V., 5,019,289, Cl. 252-95.000.

Peterson, Ray D.: *See—*

Downie, Robert; Peterson, Ray D.; Richards, Nolan E.; and White, Roger D., 5,019,455, Cl. 428-584.000.

Peterson, Stanley P. D., to Hughes Aircraft Company. Fiber payout machine. 5,018,678, Cl. 242-47.000.

Peterson, Steven R. Multiple position footstrap track for sailboards. 5,018,468, Cl. 114-39.200.

Petitou, Maurice: *See—*

Lormeau, Jean-Claude; Petitou, Maurice; and Choay, Jean, 5,019,649, Cl. 536-21.000.

Petrolite Corporation: *See—*

Thompson, Neil E. S.; and Asperger, Robert G., 5,019,274, Cl. 210-729.000.

Petty-Weeks, Sandra L.: *See—*

Zupancic, Joseph J.; Petty-Weeks, Sandra L.; and Polak, Anthony J., 5,018,380, Cl. 73-23.200.

Peugeot, Richard S., to Ridge, Inc. Microfocus X-ray system. 5,020,086, Cl. 378-113.000.

Pfab, Werner; Bergmann, Michael; Fenzlein, Paul-Gerhard; and Anderer, Wolfgang, to Siegert GmbH. Sensor for the measurement of ion activity. 5,018,527, Cl. 128-635.000.

Pfaff, Ernest H. Electrode arrangement for cheating corona. 5,019,709, Cl. 250-324.000.

Pfaff Industriemaschinen GmbH: *See—*

Hager, Walter; Butzen, Edgar; Denuell, Gunther; and Arnold, Kurt, 5,018,465, Cl. 112-273.000.

Schilling, Lothar; and Schmidt, Gottfried, 5,018,460, Cl 112-103.000.

Pfizer Hospital Products, Inc.: *See—*

Rhum, David; and Matthews, Richard S., 5,019,350, Cl. 422-82.070.

Pfluger, Manfred: *See—*

Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.

Pham, Linh H.: *See—*

Toth, Eric S.; DeBoer, Gary T.; and Pham, Linh H., 5,018,633, Cl. 248-311.200.

Phan, Albert: *See—*

Auberon, Marcel; and Phan, Albert, 5,018,638, Cl. 220-414.000.

Phelps, Russell L., to Xerox Corporation. Stapling apparatus. 5,018,656, Cl. 227-84.000.

Pherigo, Wayne H., Jr. Overhead warning device. 5,019,798, Cl. 340-326.000.

Philip Morris Incorporated: *See—*

Cutright, Edwin L.; Keen, Billy J., Jr.; Scott, G. Robert; and Van Davelaar, Peter C., 5,019,024, Cl. 493-280.000.

Grubbs, Harvey J.; Prasad, Ravi; and Howell, Tony M., 5,018,540, Cl. 131-297.000.

Philipp Holzmann AG: *See—*

Schafer, 5,018,639, Cl. 220-426.000.

Philippe, Jean-Marc, to Raychem Corporation. Article which can change its shape. 5,019,456, Cl. 428-591.000.

Philippe, Michel; Hocquaux, Michel; Sebag, Henri; Beck, Irina; and Laugier, Jean P., to L'Oreal. Benzoyl peroxide—quaternary ammonium lipophilic salicylate based pharmaceutical and cosmetic compo-

VOL 1126 ISS 4 MY 28 1991 UMI

sitions and their use especially in treatment of acne. 5,019,567, Cl 514-164.000.

Phillips & Brooks/Gladwin, Inc.: *See—*

Holland, Eddie L., 5,020,103, Cl. 379-454.000.

Phillips, Gerald: *See—*

Goldman, Marvin; Goldman, Jerome; Goldman, Terry; Phillips, Gerald; and Pesin, Joseph, 5,018,480, Cl. 119-26.000.

Phillips Petroleum Company: *See—*

Soules, David A., 5,019,427, Cl. 427-375.000.

Phillips, Raymond M.: *See—*

Esper, Leo J.; Jorgensen, David C.; Murrah, Howard E.; Schneider, Michael G.; Phillips, Raymond M.; and Dauzy, Bruce C., 5,018,660, Cl. 229-125.420.

Phillips, Sharon E. T.; and Carney, Scott N., to Motorola, Inc. Dual-bandwidth cellular telephone. 5,020,092, Cl. 379-59.000.

Photest Diagnostics, Inc.: *See—*

Krupey, John, 5,019,521, Cl. 436-500.000.

Photographic Sciences Corporation: *See—*

Eastman, Jay, 5,019,698, Cl. 235-462.000.

Physical Optics Corporation: *See—*

Jannson, Tomasz P.; and Jannson, Joanna L., 5,018,814, Cl. 350-96.150.

Pickup, Michael A.: *See—*

Lee, James K.; McJury, Donald J.; Pickup, Michael A.; and Robinson, Kelly S., 5,019,796, Cl. 335-302.000.

Pierce, David B.: *See—*

McCarthy, Robert D., deceased; Kilara, Arun, and Pierce, David B., 5,019,390, Cl. 424-535.000.

Pierson, Henri G. W., to D & C Limited. Horizontal belt vacuum filtration apparatus. 5,019,258, Cl. 210-258.000.

Pieters, Hans-Theo: *See—*

Hannen, Reiner W.; Vermeulen, Norbert P.; and Pieters, Hans-Theo, 5,018,339, Cl. 53-557.000.

Piette, Andre G.: *See—*

Fortier, Luc Y.; and Piette, Andre G., 5,019,215, Cl. 162-343.000.

Piezo-Ceram Electronique: *See—*

Bollier, Jean F.; and Boumendil, Jean-Jacques, 5,019,689, Cl. 219-388.000.

Piironen, Timo H., to Rautaruukki Oy. Method and apparatus for the inspection of specularly reflective surfaces. 5,018,867, Cl 356-445.000.

Pike, Douglas A., Jr.: *See—*

Meyer, Theodore O.; Mosier, John W., II; Pike, Douglas A., Jr.; Hollinger, Theodore G.; and Tsang, Dah W., 5,019,522, Cl. 437-29.000.

Pilkington plc: *See—*

Hall, Christopher W. G., 5,019,443, Cl. 428-215.000.

Pilling Company: *See—*

Klintmalm, Goran B., 5,019,092, Cl. 606-207.000.

Pillsbury Company, The: *See—*

Lorence, Matthew W.; Rice, Michael J.; Lentz, Ronald R.; Pesheck, Peter S.; and Perry, Michael R., 5,019,681, Cl. 219-10.55F.

Pinchuk, Leonard, to Corvita Corporation. Radially expandable endoprosthesis and the like. 5,019,090, Cl. 606-194.000.

Pinney, Richard C. Locking screw for modular framework. 5,018,921, Cl. 411-393.000.

Pioneer Electronic Corporation: *See—*

Shiba, Takahumi, 5,019,922, Cl. 360-69.000.

Shirasaka, Shinichi, 5,020,142, Cl. 455-166.000.

Ueda, Tadashi, 5,020,046, Cl. 369-60.000.

Pippuri, Aino K.: *See—*

Haikala, Heimo O., Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., 5,019,575, Cl. 514-247.000.

Pireh, Ali, to Motorola, Inc. Cellular telephone operable on different cellular telephone systems. 5,020,093, Cl. 379-59.000.

Pirotzky, Eduardo: *See—*

Braquet, Pierre; Pirotzky, Eduardo; Godfroid, Jean-Jacques; and Heymans, Francoise, 5,019,576, Cl. 514-255.000.

Pisciotto, Patrick A.: *See—*

Katz, Paul C.; Pisciotto, Patrick A.; and Robin, Gary I., 5,018,991, Cl. 439-621.000.

Pitney Bowes Inc.: *See—*

Sansone, Ronald P.; Keating, Raymond; Wall, Joseph W.; and Durst, Robert T., Jr., 5,019,991, Cl. 364-464.030.

Pitts, Ferris N., Jr.; and Allen, Allen D. Method for the effective treatment of disease conditions in humans associated with HTLV-III infection. 5,019,557, Cl. 514-2.000.

Plahutnik, Frank, Jr.: *See—*

Gettings, Richard L.; McGee, James B.; White, William C.; and Plahutnik, Frank, Jr., 5,019,173, Cl. 134-4.000.

Plempel, Manfred: *See—*

Hector, Richard F.; Schaller, Klaus; Moeschler, Heinrich F.; and Plempel, Manfred, 5,019,560, Cl. 514-43.000.

Pleschiutschnigg, Fritz-Peter: *See—*

Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.

Plobst, Dietmar: *See—*

Kleosch, Wilhelm; and Plobst, Dietmar, 5,019,448, Cl. 428-332.000.

Plomb, Francis, to Mefina S.A. Machine tool. 5,018,420, Cl. 83-748.000.

Poclain Hydraulics, Societe Anonyme: *See—*

Bigo, Louis B., 5,018,433, Cl. 91-498.000.

Pohlig, Ralf: *See—*

Brock, Martin; Busch, Ralf; and Pohlig, Ralf, 5,019,304, Cl. 264-45.100.

Brock, Martin; Busch, Ralf; and Pohlig, Ralf, 5,019,305, Cl. 264-45.100.

Polak, Anthony J.: *See—*

Zupancic, Joseph J., Petty-Weeks, Sandra L.; and Polak, Anthony J., 5,018,380, Cl. 73-23.200.

Polaroid Corporation: *See—*

Fraser, Richard J.; and Laurie, Kenneth J., 5,019,842, Cl. 354-86.000.

Polgreen, Thomas L.: *See—*

Yang, Ping; Chatterjee, Amitava; Aur, Shian; and Polgreen, Thomas L., 5,019,878, Cl. 357-23.300.

Politi, Jean-Marie; and Franz, Lennart, to L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procedes Georges Claude. Valve assembly for packing fluid under pressure and packing provided with such assembly. 5,018,552, Cl. 137-614.110.

Pollack, Steven: *See—*

Hutchinson, James; Hoffman, Brian; and Pollack, Steven, 5,018,266, Cl. 29-568.000.

Polski, Stephen P., to Minnesota Mining and Manufacturing Company. Disposable diaper that is fastened by contact between overlapping adhesive patches. 5,019,072, Cl. 604-389.000.

Polypure, Inc.: *See—*

Good, Frederick J., Jr.; and Highsmith, Ronald E., 5,019,275, Cl. 210-734.000.

Pomfret, Stephen T.; Lary, Richard; and Boaen, Yerell, to Digital Equipment Corporation. Computer interconnect system with transmit-abort function. 5,020,020, Cl. 364-900.000.

Ponpipom, Mitree M.: *See—*

Durette, Philippe L.; Hagmann, William K.; and Ponpipom, Mitree M., 5,019,568, Cl. 514-171.000.

Poole, Jon M.: *See—*

Crum, James R.; Poole, Jon M.; and Hibner, Edward L., 5,019,184, Cl. 148-13.000.

Porat, Amir: *See—*

Porat, Michael; and Porat, Amir, 5,019,091, Cl. 606-205.000.

Porat, Michael; and Porat, Amir. Forceps. 5,019,091, Cl. 606-205.000.

Porel, Louis C., to Hydro Rene Luc. Compositions for hydraulic joint. 5,018,753, Cl. 277-165.000.

Pors, Teresa H.; and Van Der Plaat, Johannes B., to Gist-Brocades NV. Yeast package. 5,019,410, Cl. 426-8.000.

Possis Corporation: *See—*

Chalmers, Eric J., 5,018,670, Cl. 239-433.000.

Post, Steven W. Foldable clothes hanger rail system. 5,019,126, Cl. 211-104.000.

Postman, Joel R., to TPS Electronics. Data collection system using memory card. 5,019,697, Cl. 235-441.000.

Powell, Kevin T.: *See—*

Weaver, James C.; Powell, Kevin T.; and Langer, Robert S., Jr., 5,019,034, Cl. 604-20.000.

PPG Industries, Inc.: *See—*

Manner, James A.; and Hoelscher, Charles H., 5,019,659, Cl. 568-949.000.

Prasad, Ravi: *See—*

Grubbs, Harvey J.; Prasad, Ravi; and Howell, Tony M., 5,018,540, Cl. 131-297.000.

Prasser, Christoph: *See—*

von Hagen, Ingo; Prasser, Christoph; and Homberg, Gerd, 5,019,180, Cl. 148-12.00B.

Pratt, George C.; and Montpetit, Michael D., to Federal-Mogul Corporation. Method of making a PTFE based tape suitable for impregnation into a porous metal matrix. 5,019,308, Cl. 264-87.000.

Prazisions-Werkzeuge AG: *See—*

Weiss, Hardy P., 5,018,910, Cl. 406-144.000.

Precision Fukuhara Works, Ltd.: *See—*

Tsuchiya, Koji, 5,018,370, Cl. 66-55.000.

Pregenzer, Bruno: *See—*

Trawoger, Werner; and Pregenzer, Bruno, 5,018,971, Cl. 433-92.000.

Premier Industrial Corporation: *See—*

Lowe, Frank J., 5,019,602, Cl. 521-127.000.

Presant, Cary A.; and Proffitt, Richard T., to Vestar, Inc. Method of targeting tumors in humans. 5,019,369, Cl. 424-1.100.

President and Fellows of Harvard College: *See—*

Antoniades, Harry N.; and Lynch, Samuel E., 5,019,559, Cl. 514-21.000.

Shapiro, Robert; and Vallee, Bert L., 5,019,556, Cl. 514-2.000.

Prestas, Gregory C.: *See—*

Stark, William D.; and Prestas, Gregory C., 5,020,011, Cl. 364-580.000.

Presuhn, Randall M.: *See—*

Holden, Brian D.; Presuhn, Randall M.; Robertson, William L.; and Schultz, Gaymond W., 5,020,058, Cl. 370-109.000.

Prevot, M. Gerard, to Ferco International. Bearing device for sliding leaf of doors, windows or the like. 5,018,306, Cl. 49-425.000.

Price, Robert J., to Caterpillar Inc. Track laying work vehicle. 5,018,591, Cl. 180-9.500.

Prime Computer, Inc.: *See—*

Higgins, Leo M., III., 5,019,880, Cl. 357-81.000.

Lefsky, Brian; and Natusch, Mary E., 5,019,971, Cl. 364-200.000.

Prince Corporation: *See—*

Toth, Eric S.; DeBoer, Gary T.; and Pham, Linh H., 5,018,633, Cl. 248-311.200.

Prince, John C.; and Farrell, James F., to Litton Systems Canada Limited. Full color liquid crystal display. 5,019,808, Cl. 340-765.000.

Prince St. Technologies Ltd.: *See—*

Weiner, Robert S., 5,019,437, Cl. 428-87.000.

Procter & Gamble Company, The: *See—*

Baeck, Andre C.; and Oh, Young S., 5,019,292, Cl. 252-174.250.

Caswell, Debra S.; Mao, Mark H.; Mermelstein, Robert; and Baker, Ellen S., 5,019,280, Cl. 252-8.800.

Marsan, Mario S.; and Thompson, Leonard R., 5,019,063, Cl. 604-368.000.

Ryan, Leslie D.; Steinhardt, Mark J.; Spahni, Milton D.; and Baird, James C., 5,019,062, Cl. 604-359.000.

Scripps, Charles L., 5,019,065, Cl. 604-385.100.

Tanner, Paul R.; Nunn, Randolph G., Jr.; and Luebbe, John P., 5,019,375, Cl. 424-66.000.

Torgerson, Peter M., 5,019,377, Cl. 424-70.000.

Proctor & Gamble Company, The: *See—*

Freeland, Mary E.; and Blaney, Ted L., 5,019,066, Cl. 604-385.200.

Prodotti Formeti S.R.L.: *See—*

Del Soldato, Piero; and Casadio, Silvano, 5,019,579, Cl. 514-289.000.

Product Innovations: *See—*

Gelman, Gideon, 5,018,289, Cl. 40-472.000.

Proehl, Gary S.: *See—*

Buchanan, John M.; Cook, Ewell R.; Mooberry, Jared B.; Proehl, Gary S.; Singer, Stephen P.; and Washburn, William N., 5,019,492, Cl. 430-543.000.

Proffitt, Richard T.: *See—*

Presant, Cary A.; and Proffitt, Richard T., 5,019,369, Cl. 424-1.100.

Prowatec GmbH Halle: *See—*

Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.

Pruitt, Gerald R.: *See—*

Livingstone, James; Higham, Graham J.; and Pruitt, Gerald R., 5,018,357, Cl. 62-6.000.

Pruzanski, Waldemar: *See—*

Johnson, Lorin K.; Seilhamer, Jeffrey J.; Pruzanski, Waldemar; and Vadas, Peter, 5,019,508, Cl. 435-198.000.

PSG Industries, Inc.: *See—*

Cook, Tunis A., 5,018,875, Cl. 374-208.000.

Pshtissky, Yacov; and Gao, Shiyang, to Vicon Industries, Inc. Encoding and decoding of multiple video sources. 5,019,905, Cl. 358-146.000.

Pugel, Michael A., to RCA Licensing Corporation. Lossy constant bandwidth tuned circuit. 5,020,146, Cl. 455-195.000.

Pugh, Cecil C., to General Motors Corporation. Center compensating master cylinder. 5,018,353, Cl. 60-562.000.

Purcell, John R.; Burnett, Sibley C.; and Creedon, Lewis R., to Advanced Cryo Magnetics, Inc. Pulsed magnet system. 5,019,247, Cl. 209-224.000.

Purkait, Bobby K.; and Becker, Hilton. Self-sealing valve for implantable device. 5,019,101, Cl. 623-8.000.

Putz, Carl F., II. Trolling device for fishing. 5,018,296, Cl. 43-43.120.

Pystynen, Jarmo J.: *See—*

Haikala, Heimo O.; Honkanen, Erkki J.; Lonnberg, Kari K.; Nore, Pentti T.; Pystynen, Jarmo J.; Luiro, Anne M.; and Pippuri, Aino K., 5,019,575, Cl. 514-247.000.

Pyzytulla, Dietmar R., to Mauser-Werke GmbH. Vessel. 5,018,642, Cl. 220-675.000.

Qadeer, Majid: *See—*

Ohms, Jack I.; Qadeer, Majid; and Penhasi, Harry A., 5,019,348, Cl. 422-63.000.

Quada Internationale Ltd.: *See—*

Mauffette, Claude, 5,018,650, Cl. 223-93.000.

Quadrastat Corporation: *See—*

Gray, Thomas J.; and Martinson, Edwin O., 5,018,431, Cl. 91-363.00R.

Quan, Andy L.: *See—*

Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.

Quantametrics Inc.: *See—*

Remo, John L., 5,018,861, Cl. 356-353.000.

Quarles, L. Darryl: *See—*

Drezner, Marc K.; and Quarles, L. Darryl, 5,019,401, Cl. 424-662.000.

Quikcoup, Incorporated: *See—*

Palatchy, Josef, 5,018,768, Cl. 285-24.000.

Quimby, David C., to Amoco Corporation. Wedged-pole hybrid undulator. 5,019,863, Cl. 335-210.000.

Qureshi, Muhammad A.: *See—*

Lambrecht, Richard M.; Qureshi, Muhammad A.; and Sajjad, Munawwar, 5,019,323, Cl. 376-201.000.

R. Alkan & Cie: *See—*

Engerand, Jean-Luc; and Mattei, Jean-Pierre, 5,018,795, Cl. 301-63.0PW.

R. J. Reynolds Tobacco Company: *See—*

Clearman, Jack F.; Casey, William J.; Furin, Olivia P.; and Stewart, Grant M., 5,019,122, Cl. 131-194.000.

Rabe, Jurgen, to INA Walzlager Schaeffler KG. Cage for rolling bearings with longitudinal movements. 5,018,879, Cl. 384-51.000.

Rabo, Jule A.: *See—*

Best, Donald F.; Long, Gary N.; Pellet, Regis J.; Rabo, Jule A.; and Wolynic, Edward T., 5,019,240, Cl. 208-111.000.

Rabold, Peter; Klemenz, Hans-Jorg; and Schobi, Paul J., to Gretag Aktiengesellschaft. Process for the cryptographic processing of data and cryptographic systems. 5,020,106, Cl. 380-49.000.

Racciu, Antonio: *See—*

Montalcini, Piera L.; and Racciu, Antonio, 5,019,993, Cl. 364-474.290.

Racette, Roger A.: *See—*

Bergin, John A.; and Racette, Roger A., 5,018,992, Cl. 439-699.000.

Radionic Industries Inc.: *See—*

Sridharan, Sri P.; and Jungman, Frank, 5,019,938, Cl. 361-377.000.

Radisensor AB: *See—*

Tenerz, Lars; and Hook, Bertil, 5,018,529, Cl. 128-667.000.

Raff, Alfred: *See—*

Bauch, Karl; Raff, Alfred; Heel, Helmut; and Leege, Norbert, 5,018,916, Cl. 409-233.000.

Rahmfeld, Werner: *See—*

Burau, Armin; Eberhardt, Hans-Georg; Ehrenberg, Hans J.; Franzen, Hans U.; Lenk, Rainer; Parschat, Lothar; Pfluger, Manfred; Pleschiutschnigg, Fritz-Peter; and Rahmfeld, Werner, 5,018,569, Cl. 164-454.000.

Rainville, Donald D., to Universal Dynamics Corporation. Method and apparatus for drying articles in a continuous feed process. 5,019,994, Cl. 364-477.000.

RainWise, Inc.: *See—*

LaPointe, Daniel J.; Vietti, Michael; and Baer, John S., 5,019,977, Cl. 364-420.000.

Raj, Kuldip; Moskowitz, Ronald; Moses, Joseph; Bonvouloir, James; and Bloom, Frank, to Ferrofluidics Corporation. Stacked pole-piece ferrofluid seal apparatus. 5,018,751, Cl. 277-80.000.

Rajagopal, Indira: *See—*

Grips, Vatia K. W.; Rajagopal, Indira; and Rajagopalan, Sundarapandium, 5,019,223, Cl. 204-51.000.

Rajagopalan, Sundarapandium: *See—*

Grips, Vatia K. W.; Rajagopal, Indira; and Rajagopalan, Sundarapandium, 5,019,223, Cl. 204-51.000.

Rakes, Gary A.: *See—*

Coltrain, Bradley K.; Rakes, Gary A.; and Smith, Victoria K., 5,019,607, Cl. 523-435.000.

Ramaswamy, Coodly P., to Breed Automotive Technology, Inc. Primary/detonator compositions suitable for use in aluminum cups. 5,019,192, Cl. 149-42.000.

Ramirez, Angel E.: *See—*

Jones, Richard V.; and Ramirez, Angel E., 5,019,758, Cl. 318-264.000.

Ramsour, Nicholas L.: *See—*

Fanning, Alan W.; and Ramsour, Nicholas L., 5,019,327, Cl. 376-268.000.

Randle, Steven J., to Jaguar Cars Limited. Hydraulic tappets. 5,018,488, Cl. 123-90.550.

Rank, William R.; Nichols, Ronald L.; and Schoenberger, Stephanie G., to Research Corporation Technologies, Inc. Helical-tipped lesion localization needle device and method of using the same. 5,018,530, Cl. 128-749.000.

Raphael, Thomas: *See—*

Soeder, Carl-Johannes; Zanders, Erich; Raphael, Thomas; Keusen, Heiner; and Groeneweg, Joost, 5,019,266, Cl. 210-605.000.

Rapisarda, Carmen. Leather article decorated with light emitting diodes. 5,019,438, Cl. 428-102.000.

RAR - Refinarias De Accucar Reunidas, S.A.: *See—*

Bento, Luis R., 5,019,542, Cl. 502-25.000.

Rash, Mark S.; Harrison, Nicholas D.; and Butler, F. Prince. Cordless telephone network. 5,020,094, Cl. 379-62.000.

Rashid, Abdul: *See—*

Foster, Joseph; and Rashid, Abdul, 5,019,718, Cl. 307-84.000.

Rashidbaigi, Zahra: *See—*

Mahjour, Majid; Mauser, Bernadette; Rashidbaigi, Zahra; and Linn, Edwards E., 5,019,395, Cl. 424-449.000.

Raskin, Jef; and Winter, James, to Information Appliance, Inc. Method and apparatus for control of an electronic display. 5,019,806, Cl. 340-706.000.

Rasmussen, Donald D. Strap connector. 5,018,774, Cl. 294-74.000.

Rastelli, Henry: *See—*

Chao, Chien C.; and Rastelli, Henry, 5,019,667, Cl. 585-820.000.

Ratcliff, Steven D.: *See—*

Stanislowski, Anna G.; England, J. Bruce; and Ratcliff, Steven D., 5,018,482, Cl. 119-173.000.

Rath, Dieter: *See—*

Mosebach, Wolfgang; Heitmeier, Rolf; Gerlach, Hans; and Rath, Dieter, 5,018,388, Cl. 73-730.000.

Rauch-Puntigam, Harald; Staritzbichler, Werner; and Morre, Peter, to Vianova Kunstharz, A.G. Acrylate copolymer additives for aqueous anionic paint systems. 5,019,621, Cl. 524-513.000.

Rauh, R. David, to EIC Laboratories, Inc. Process for forming a reduced electrochromic layer in contact with an ion conducting oxide. 5,019,420, Cl. 427-126.300.

Rautaruukki Oy: *See—*

Piironen, Timo H., 5,018,867, Cl. 356-445.000.

Raven, Malcolm R. Alarm pill box. 5,020,037, Cl. 368-10.000.

Raven, Stephen J., to Chesebrough-Pond's USA Co., Division of Conopco, Inc. Dentifrices. 5,019,374, Cl. 424-52.000.

Ravichandran, Ramanathan; and Galbo, James P., to Ciba-Geigy Corporation. N-hydrocarbyloxy derivatives of hindered amine-substituted S-triazines. 5,019,613, Cl. 524-100.000.

Raychem Corporation: *See—*

Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., 5,019,235, Cl. 204-282.000.

VOL 1126
ISS 4
MY 28
1991
UMI

Philippe, Jean-Marc, 5,019,456, Cl. 428-591.000.
Rayovac Corporation: *See—*
  Osterhout, Ralph F.; and Fogg, Peter M., 5,019,951, Cl. 362-191.000.
Raytheon Company: *See—*
  Cusack, Francis J., Jr.; and Harris, Clarke E., 5,020,062, Cl. 372-23.000.
  DiBiase, Robert; Galani, Zvi; and Waterman, Raymond C., Jr., 5,019,792, Cl. 333-17.100.
  Dorschner, Terry A., 5,018,835, Cl. 350-336.000.
RCA Licensing Corp.: *See—*
  Deal, Samuel B.; and Bartch, Donald W., 5,019,745, Cl. 313-440.000.
  Keenan, Douglas M., 5,020,139, Cl. 455-151.000.
  Pugel, Michael A., 5,020,146, Cl. 455-195.000.
  Teskey, John F., 5,020,140, Cl. 455-151.000.
Rebne, Thomas M.; and Esslinger, David, to Marion Merrell Dow Inc. Dispensing container. 5,019,125, Cl. 206-532.000.
Reckitt & Colman Products Limited: *See—*
  Hunter, Christopher; and Yau, David, 5,019,563, Cl. 514-58.000.
Red Kap Industries: *See—*
  Reeves, Allen; Harbor, Michael O.; Reina, Patrick V.; and Sandgren, Richard T., 5,018,715, Cl. 271-19.000.
Reddick, Robin C.: *See—*
  Ferrell, Thomas L.; Warmack, Robert J.; and Reddick, Robin C., 5,018,865, Cl. 356-376.000.
Reed, Charles P.: *See—*
  Dempsey, William F.; Casar, Steve; and Reed, Charles P., 5,019,111, Cl. 52-506.000.
Rees, David C.: *See—*
  Horwell, David C.; and Rees, David C., 5,019,588, Cl. 514-409.000.
Reese, Robert T.; and Stanley, Harold A. Erythrocytic membrane antigens of *P. falciparum*-infected erythrocytes. 5,019,511, Cl. 435-240.270.
Reeves, Allen; Harbor, Michael O.; Reina, Patrick V.; and Sandgren, Richard T., to Red Kap Industries. Fabric pickup device. 5,018,715, Cl. 271-19.000.
Reffner, John A.: *See—*
  Sting, Donald W.; Messerschmidt, Robert G.; and Reffner, John A., 5,019,715, Cl. 250-571.000.
Regency, Inc.: *See—*
  Chao-Chin, Lin; and Kuo-Heng, Tseng, 5,019,009, Cl. 446-437.000.
Regnier, Fred E.: *See—*
  Afeyan, Noubar B.; Regnier, Fred E.; and Dean, Robert C., Jr., 5,019,270, Cl. 210-656.000.
Rehrer, Wilson P.: *See—*
  Wegman, Dwight D.; Wanner, Edward A.; Rehrer, Wilson P.; and Widge, Sunil, 5,019,332, Cl. 420-59.000.
Reimer, Hans-Jurgen, to Mannesmann Rexroth GmbH. Hoist device for a load hanging on hoist ropes, in particular a container-crane. 5,018,631, Cl. 212-250.000.
Reimer, William A., to AG Communication Systems Corp. Thermal management plate. 5,019,939, Cl. 361-386.000.
Reina, Patrick V.: *See—*
  Reeves, Allen; Harbor, Michael O.; Reina, Patrick V.; and Sandgren, Richard T., 5,018,715, Cl. 271-19.000.
Reiner, Alberto; and Vita, Giuseppe, to Schering Spa. Pharmaceutical compositions having therapeutical activity based on mercaptoethansulphonic acid. 5,019,596, Cl. 514-578.000.
Reinhart, Lawrence W. Electrohydraulic method and apparatus. 5,018,950, Cl. 417-383.000.
Reitz, George J., to George Enterprises, Inc. Drilling jig for stair rails. 5,018,912, Cl. 408-115.00R.
Reitz, Paul R.: *See—*
  Murray, Dale D.; and Reitz, Paul R., 5,018,816, Cl. 350-96.200.
Relation, Alfred E.: *See—*
  Smolenski, Joseph L.; Christopher, Gerard W.; Wright, John C.; and Relation, Alfred E., 5,019,952, Cl. 363-16.000.
Remo, John L., to Quantametrics Inc. Methods and means for full-surface interferometric testing of grazing incidence mirrors. 5,018,861, Cl. 356-353.000.
Remondet, Jean-Pierre. Snow surfboard. 5,018,760, Cl. 280-609.000.
Remy, David C.: *See—*
  Claremon, David A.; Baldwin, John J.; and Remy, David C., 5,019,572, Cl. 514-213.000.
Rentzea, Costin; Ammermann, Eberhard; and Lorenz, Gisela, to BASF Aktiengesellschaft. Aminomethylphenols and fungicides containing these compounds. 5,019,598, Cl. 514-650.000.
Research Corporation Technologies, Inc.: *See—*
  McCarthy, Robert D., deceased; Kilara, Arun; and Pierce, David B., 5,019,390, Cl. 424-535.000.
  Rank, William R.; Nichols, Ronald L.; and Schoenberger, Stephanie G., 5,018,530, Cl. 128-749.000.
Reserach Triangle Institute, Inc.: *See—*
  Markunas, Robert J.; Hendry, Robert; and Rudder, Ronald A., 5,018,479, Cl. 118-723.000.
Resinall Corporation: *See—*
  Burke, Roger E.; and Spruill, James G., 5,019,622, Cl. 524-532.000.
Rexnord Antriebstechnik Zweigniederlassung der Rexnord Gesellschaft mbH: *See—*
  Wasserfuhr, Wilhelm, 5,019,015, Cl. 464-99.000.
Reynolds, Donald A., to Don Reynolds International Limited. Building system. 5,018,326, Cl. 52-235.000.
Reynolds Metal Company: *See—*
  Downie, Robert; Peterson, Ray D.; Richards, Nolan E.; and White, Roger D., 5,019,455, Cl. 428-584.000.
Reynolds, Paul R.: *See—*
  Brown, George T.; Millis, David B.; Reynolds, Paul R.; and Nowak, Ronald P., 5,019,992, Cl. 364-468.000.
Rhine, Jules W., Jr.: *See—*
  Bittel, Robert W.; and Rhine, Jules W., Jr., 5,018,983, Cl. 439-76.000.
Rhodes, Scott A., to Transcom Australia Limited. Modem and data communication system. 5,020,077, Cl. 375-8.000.
Rhone-Poulenc Chimie: *See—*
  Cavezzan, Jacques; and Cavinenc, Edith, 5,019,644, Cl. 428-447.000.
  Gay, Michel, 5,019,294, Cl. 252-400.310.
  Gubelmann, Michel; and Tirel, Philippe-jean, 5,019,657, Cl. 568-774.000.
Rhum, David; and Matthews, Richard S., to Pfizer Hospital Products, Inc. Fluorescent polymers. 5,019,350, Cl. 422-82.070.
Riba, Gunther. Tunnel finisher. 5,018,371, Cl. 68-5.00C.
Rice, Herbert L.: *See—*
  Linzey, Raynor; and Rice, Herbert L., 5,019,418, Cl. 427-79.000.
Rice, Michael J.: *See—*
  Lorence, Matthew W.; Rice, Michael J.; Lentz, Ronald R.; Pesheck, Peter S.; and Perry, Michael R., 5,019,681, Cl. 219-10.55F.
Richards, David A.: *See—*
  McKenna, Henry A.; and Richards, David A., 5,018,775, Cl. 294-74.000.
Richards, Nolan E.: *See—*
  Downie, Robert; Peterson, Ray D.; Richards, Nolan E.; and White, Roger D., 5,019,455, Cl. 428-584.000.
Richardson, Phillip N.: *See—*
  Yee, Hung Y.; and Richardson, Phillip N., 5,019,831, Cl. 343-771.000.
Richardt, Peter: *See—*
  Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
Richert, Gerald R., to OMS-Optical Measuring Systems. Product discrimination system and method therefor. 5,018,864, Cl. 356-372.000.
Richmond, Robert W.: *See—*
  Anglin, Gregory V.; and Richmond, Robert W., 5,018,564, Cl. 150-167.000.
Richner, Gerold: *See—*
  Kagi, Rene , 5,018,435, Cl. 92-48.000.
Richner, Peter: *See—*
  Kagi, Rene , 5,018,435, Cl. 92-48.000.
Richter, Felix: *See—*
  Baur, Richard; Richter, Felix; Birnbach, Stefan; Fikentscher, Rolf; Oftring, Alfred; and Winkler, Ekhard, 5,019,296, Cl. 252-546.000.
Richter, Francis L.; Wilson, James; and Pedersen, Daniel E., to Ecolab Inc. Drain treatment product and method of use. 5,019,346, Cl. 422-28.000.
Ricoh Company, Ltd.: *See—*
  Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, 5,019,913, Cl. 358-296.000.
  Nakajima, Tomohiro, 5,018,806, Cl. 350-6.700.
  Ogawa, Yasushi, 5,020,019, Cl. 364-900.000.
  Ogura, Masaaki, 5,019,916, Cl. 358-401.000.
  Suzuki, Akira; Mochizuki, Hidehiro; Shimada, Masaru; and Uemura, Hiroyuki, 5,019,550, Cl. 503-227.000.
  Yagawara, Shinji; and Ohta, Wasaburo, 5,019,885, Cl. 357-25.000.
  Yamakawa, Takeshi; and Tanzawa, Misao, 5,019,867, Cl. 355-245.000.
Rideout, William C.: *See—*
  Boudreau, Robert A.; and Rideout, William C., 5,018,820, Cl. 350-96.200.
Ridewell Corporation: *See—*
  Mitchell, James L., 5,018,756, Cl. 280-81.600.
Ridge, Inc.: *See—*
  Peugeot, Richard S., 5,020,086, Cl. 378-113.000.
Ridyard, Denis R. A.; and Smith, Peter, to Imperial Chemical Industries PLC. Reactive dyes. 5,019,134, Cl. 8-549.000.
Riedl, Andrea: *See—*
  Grapentin, Hans-Joachim; Kayser, Tomas; and Riedl, Andrea, 5,019,229, Cl. 204-130.000.
Riemen, Mark W.; Oliff, Allen I.; Saari, Walfred S.; and Heimbrook, David C., to Merck & Co., Inc. Gastrin releasing peptide antagonist. 5,019,647, Cl. 530-329.000.
Rienstra, Mark S.; and Scattergood, Edgar M., to Merck & Company, Inc. Process for removing bacterial endotoxin from gram-negative polysaccharides. 5,019,502, Cl. 435-101.000.
Riggs, Robert D.; and Kim, Dong G., to University of Arkansas. Method of controlling crop and plant pests. 5,019,389, Cl. 424-93.000.
Rijksuniversileit Leiden: *See—*
  Okker, Robert J. H.; Lugtenberg, Egbertus J. J.; and Schilperoort, Robbert A., 5,019,501, Cl. 435-69.100.
Rikagaku Kenkyusho: *See—*
  Hirikoshi, Koki, 5,019,507, Cl. 435-193.000.
Rim, Jong S., to Sam Sung Electronic Co. Ltd. Control method for an automatic bread baking machine. 5,019,972, Cl. 364-400.000.
Rinck, Helmut: *See—*
  Endl, Helmut; and Rinck, Helmut, 5,019,205, Cl. 156-345.000.
Ringtex-Kolifrath S.a.r.l.: *See—*
  Stauffer, Jorg; and Muller, Pierre, 5,019,110, Cl. 19-128.000.

Rioux, Marc, to National Research Council of Canada. Three dimensional imaging device. 5,018,854, Cl. 356-376.000.
Rische, Heribert: *See—*
  Hubner, Hans-Jorg; and Rische, Heribert, 5,018,520, Cl. 128-205.120.
Riss, Gerhard, to Durkoppwerke GmbH. Sewing machine apparatus for the succesive production of a number of stitch groups in a workpiece. 5,019,116, Cl. 112-121.140.
Rivera, James A.: *See—*
  Johnson, Gerald E.; and Rivera, James A., 5,018,616, Cl. 198-335.000.
Riwisa AG Kunststoffwerke: *See—*
  Kagi, Rene , 5,018,435, Cl. 92-48.000.
Rix, William H.; and Shannon, John P., deceased (by Shannon, Cynthia N., legal representative), to Maxwell Laboratories, Inc. Diode for providing X-rays. 5,020,087, Cl. 378-134.000.
RJF Industries, Inc.: *See—*
  Forzano, Richard, 5,018,331, Cl. 52-514.000.
Robb, John R. Snap-apart universal jointed electrical device. 5,018,980, Cl. 439-8.000.
Roberson, Willie: *See—*
  Chou, Schiao F.; and Roberson, Willie, 5,019,459, Cl. 428-656.000.
Robert Bosch GmbH: *See—*
  Altpeter, Arno; and Bauer, Carsten, 5,019,740, Cl. 310-234.000.
  Ciulin, Dan, 5,020,104, Cl. 380-6.000.
  Duckeck, Ralf; and Bragas, Peter, 5,020,143, Cl. 455-186.000.
Roberts, Allan F.: *See—*
  Towfighi, Javad; Roberts, Allan F.; Foster, Norman E.; and Abt, Arthur B., 5,019,031, Cl. 600-21.000.
Roberts, Lowell E.: *See—*
  Curl, Ricky L.; and Roberts, Lowell E., 5,019,805, Cl. 340-628.000.
Robertson, Jack R. Refined suspension procedure with implement for treating female stress incontinence. 5,019,032, Cl. 600-29.000.
Robertson, Malcolm E. A., to National Research Development Corporation. Ore analysis. 5,020,084, Cl. 378-46.000.
Robertson, William L.: *See—*
  Holden, Brian D.; Presuhn, Randall M.; Robertson, William L.; and Schultz, Gaymond W., 5,020,058, Cl. 370-109.000.
Robin, Gary I.: *See—*
  Katz, Paul C.; Pisciotto, Patrick A.; and Robin, Gary I., 5,018,991, Cl. 439-621.000.
Robineau, Josee : *See—*
  Tanguy, Yannick; and Robineau, Josee , 5,020,080, Cl. 375-80.000.
Robinson, David B.; Adams, Daniel O.; Penny, William H.; and Voegele, Gerald G., to SciMed Life Systems, Inc. Balloon catheter inflation device. 5,019,041, Cl. 604-97.000.
Robinson, Kelly S.: *See—*
  Lee, James K.; McJury, Donald J.; Pickup, Michael A.; and Robinson, Kelly S., 5,019,796, Cl. 335-302.000.
Robot Coupe S.A.: *See—*
  Gateaud, Andre , 5,018,675, Cl. 241-282.200.
Robotic Vision Systems, Inc.: *See—*
  Hecker, Joel; Stern, Howard; and Heydenburg, Tom, 5,018,803, Cl. 350-3.710.
Rochat, Pierre-Maurice: *See—*
  Jimenez, Antonio; and Rochat, Pierre-Maurice, 5,018,467, Cl. 112-315.000.
Rockwell International Corporation: *See—*
  Holmberg, Arthur, Jr.; and Wilson, David E., 5,018,571, Cl. 165-41.000.
  Martin, Gardner R., 5,019,183, Cl. 148-12.70A.
  Schorr, Ian A., 5,020,102, Cl. 379-399.000.
Roddy, James E.; and Narayan, Badhri, to Eastman Kodak Company. Multichannel integrated optic modulator for laser printer. 5,018,813, Cl. 350-96.140.
Roddy, James E.: *See—*
  Meyers, Mark M.; Lee, James K.; Narayan, Badhri; and Roddy, James E., 5,018,808, Cl. 350-6.910.
Rodrigues, Robert: *See—*
  Cassens, Nicholas, Jr.; and Rodrigues, Robert, 5,018,709, Cl. 266-271.000.
Roerig, Arnold J.; and Shockley, Steven C., to Beloit Corporation. Planetary gear drive for controlled defection rolls. 5,018,402, Cl. 475-347.000.
Roessler, Thomas H.; and Siebers, Bruce M., to Kimberly-Clark Corporation. Disposable diaper with improved mechanical fastening system. 5,019,073, Cl. 604-391.000.
Rogalla, Franck, to OTV (Omnium de Traitements et de Valorisation). Method and apparatus for purifying waste water. 5,019,268, Cl. 210-617.000.
Rogers, Aaron S.: *See—*
  Kasparian, Kaspar; Ide, John D.; Brown, Thomas A.; Rogers, Aaron S.; Fussell, John P.; and Hsu, Ming C., 5,020,135, Cl. 455-76.000.
Rogers, Charles J.; Kornel, Alfred; and Sparks, Harold L., to United States of America, Administrator, Environmental Protection Agency. Method for the destruction of halogenated organic compounds in a contaminated medium. 5,019,175, Cl. 134-42.000.
Rogers, William H.; and Clifton, Norman E., Jr., to Safariland Ltd., Inc. Handgun holster with trigger guard restraint. 5,018,654, Cl. 224-244.000.
Roggero, Arnaldo: *See—*
  Farias, Otello; Gandini, Alberto; Monga, Raffaella; Roggero, Arnaldo; Sisto, Raffaello; and Valentini, Claudio, 5,019,631, Cl. 525-396.000.
Rohani, Kaymar; and Harrison, R. Mark, to Motorola, Inc. Limited vocabulary speech recognition system. 5,020,107, Cl. 381-43.000.
Rohde, Wilhelm; and Corduan, Horst, to Linde Aktiengesellschaft. Argon purification. 5,019,145, Cl. 62-22.000.
Rohrbough, John, to David Bull Laboratories Pty. Ltd. Bipartite injector device. 5,019,052, Cl. 604-203.000.
Roland Meinl, Firma: *See—*
  Terstall, Robert, 5,020,109, Cl. 381-61.000.
Rolinski, Adam E.; and Pattok, Greg R., to Sparton Corporation. Service brake and shift lever interlock system. 5,018,610, Cl. 192-4.00A.
Rollick, Kevin L.; Gillick, James G.; and Kuczkowski, Joseph A., to Goodyear Tire & Rubber Company, The. Non-staining and slightly-staining antiozonants. 5,019,611, Cl. 524-83.000.
Romandetto, Joseph G. Joint guard. 5,018,221, Cl. 2-16.000.
Romer, Michael; and Stein, Ludwig, to Schering Aktiengesellschaft. Process for the pre-treatment of synthetic materials. 5,019,425, Cl. 427-305.000.
Roome, Stephen J.: *See—*
  Bream, David R.; and Roome, Stephen J., 5,019,823, Cl. 342-175.000.
Rooney, John: *See—*
  Woods, John; Rooney, John; and Coakley, Pauline, 5,019,629, Cl. 525-312.000.
Rose, James H.: *See—*
  Moulder, John C.; and Rose, James H., 5,019,775, Cl. 324-202.000.
Rose, Kenneth R.; and Williams, Martin M., to Union Oil Company of California. Method for producing a liquid impermeable, gas permeable foam barrier. 5,019,422, Cl. 427-245.000.
Rose, Wayne B.; and Arther, Robert G., to Mobay Corporation. Insect control device for livestock containing coumaphos. 5,018,481, Cl. 119-156.000.
Rosen, Richard D.; McCown, Robert B.; and Fleming, Matthew S., to Applied Information Technologies Corporation. Field initialized authentication system for protective security of electronic information networks. 5,020,105, Cl. 380-23.000.
Rosenberg, Charles J., to Hewlett-Packard Company. Neighborhood block prediction bit compression. 5,020,121, Cl. 382-56.000.
Rosenberg, Jerome C., to Boeing Company, The. Method and apparatus for sensing the rotational speed of an aircraft wheel with an amplifier and transducer located in the wheel and a circuit to check the integrity of the transducer. 5,019,774, Cl. 324-174.000.
Roser, Daniel J.; and Hirose, Teruyoshi, to Sumitec Inc. Adjustable inclinometer mounting assembly. 5,018,702, Cl. 248-904.000.
Ross, Gary. Safety mug for liquids with improved top which permits the liquid to retain its temperature while it is in the mug and further retain the liquid if the mug is bumped. 5,018,636, Cl. 220-90.400.
Ross, Randall D., to Zimmer, Inc. Bone screw. 5,019,079, Cl. 606-72.000.
Rossi, David J.: *See—*
  Howard, Allen Q., Jr.; and Rossi, David J., 5,019,978, Cl. 364-422.000.
Rossler, Erich: *See—*
  Ludemann, Simpert; Bernheim, Michael; Sandner, Bernhard; Rossler, Erich; and Vogel, Hans-Burkhardt, 5,019,428, Cl. 427-387.000.
Roth Technik GmbH: *See—*
  Seeger, Walter; Mussler, Rudiger; and Hafelein, Reinhard, 5,018,272, Cl. 29-890.080.
Rothman, Isaac: *See—*
  Gsell, Thomas C.; and Rothman, Isaac, 5,019,260, Cl. 210-490.000.
Rourke, William J.; and Natansohn, Samuel, to GTE Laboratories Incorporated. Ion exchange method for the purification of scandium. 5,019,362, Cl. 423-21.500.
Rouse, Gordon F.: *See—*
  Sanders, Glen A.; Smith, Robert B.; and Rouse, Gordon F., 5,018,857, Cl. 356-350.000.
Roussin, Michael A.; and Crowell, Charles M., Jr., to Caterpillar Inc. Impact ripper apparatus with linear reciprocating ram. 5,018,792, Cl. 299-37.000.
Rovner, Philip L. Mouthpiece system for woodwind instruments. 5,018,425, Cl. 84-383.00R.
Rowland, Simon M., to BICC Public Limited Company. Overhead optical transmission system. 5,018,825, Cl. 350-96.230.
Roxlo, Charles B.: *See—*
  Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
Rozzell, J. David, to Genetics Institute, Inc. Method and compositions for the production of l-alanine and derivatives thereof. 5,019,509, Cl. 435-232.000.
Rubash, Harry E.: *See—*
  Bertin, Kim C.; and Rubash, Harry E., 5,019,108, Cl. 623-23.000.
Ruben, Margaret. Undergarment shield. 5,019,070, Cl. 604-387.000.
Ruckert, Wolf-Dietrich K., to Theodor Braun, Ges, m.b.H. Ticket vending machine. 5,018,614, Cl. 194-236.000.
Rudder, Ronald A.: *See—*
  Markunas, Robert J.; Hendry, Robert; and Rudder, Ronald A., 5,018,479, Cl. 118-723.000.
Ruetgerswerke Aktiengesellschaft: *See—*
  Bergmann, Franz-Josef; Hockenberger, Lothar; and Schadt, Waltraut, 5,019,619, Cl. 524-405.000.
Ruottu, Reijo: *See—*
  Virta, Raimo; Vuorinen, Vesa; and Ruottu, Reijo, 5,019,213, Cl. 162-193.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Ruottu, Seppo K., to A. Ahlstrom Corporation. Method for cleaning gases containing condensable components. 5,019,137, Cl. 55-73.000.
- Ruskouski, Charles R.: *See—*
  - Kozek, Edward P.; Ruskouski, Charles R.; and Altamura, Steven J., 5,018,290, Cl. 40-570.000.
- Russell, Robert G.: *See—*
  - McKinley, William E.; Crimmins, James P.; and Russell, Robert G., 5,019,838, Cl. 346-121.000.
- Russo, Richard E.: *See—*
  - Balooch, Mehdi; Olander, Donald K.; and Russo, Richard E., 5,019,552, Cl. 505-1.000.
- Rutledge, Jack, Jr., to Squibb, John P.; Spratlin, W. B.; and Widener, James. Anti-lock air brake system for wheeled vehicles. 5,018,799, Cl. 303-118.000.
- Rutschle, Eugen: *See—*
  - Winkler, Hans-Henning; and Rutschle, Eugen, 5,018,265, Cl. 29-568.000.
- Ryan, Leslie D.; Steinhardt, Mark J.; Spahni, Milton D.; and Baird, James C., to Procter & Gamble Company, The. Bicomponent material. 5,019,062, Cl. 604-359.000.
- Ryder, Alan, to Schlumberger Technologies Limited. Analogue-to-digital converter. 5,019,817, Cl. 341-129.000.
- Ryo, U. Yun: *See—*
  - Jay, Michael J.; and Ryo, U. Yun, 5,019,370, Cl. 424-4.000.
- Ryobi Ltd.: *See—*
  - Aoki, Atsuhito, 5,018,682, Cl. 242-268.000.
- S. A. Saurer Diederichs (Societe Anonyme): *See—*
  - Fourneaux, Roger, 5,018,557, Cl. 139-450.000.
- S. C. Johnson & Son, Inc.: *See—*
  - Billman, Fred L.; Jamison, Mark D.; and Wortley, Russell B., 5,018,646, Cl. 222-107.000.
  - Uick, Heidi J., 5,019,376, Cl. 424-70.000.
- Saari, Walfred S.: *See—*
  - Riemen, Mark W.; Oliff, Allen I.; Saari, Walfred S.; and Heimbrook, David C., 5,019,647, Cl. 530-329.000.
- Sabatelli, Terrence J.: *See—*
  - Bruegge, Anthony J.; Daugherty, Denny E.; and Sabatelli, Terrence J., 5,019,290, Cl. 252-135.000.
- Sabin, Cullen M.: *See—*
  - Steidl, Gary V.; Sabin, Cullen M.; and Thomas, Dennis A., 5,018,368, Cl. 62-480.000.
- Sabocheck, Michael K.: *See—*
  - Sadwick, Paul V.; and Sabocheck, Michael K., 5,018,717, Cl. 271-207.000.
- Sachetti, Terrance W. Cover. 5,018,232, Cl. 5-482.000.
- Sackinger, William M., to University of Alaska. Electrical device for conversion of molecular weights. 5,019,355, Cl. 422-186.040.
- Sacks, Jack M.: *See—*
  - Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.
- Sadakata, Kiyoshi: *See—*
  - Kuribara, Ritsuo; Okubo, Kiyoshi; Yokoi, Koichi; and Sadakata, Kiyoshi, 5,018,899, Cl. 403-57.000.
- Sadwick, Paul V.; and Sabocheck, Michael K., to Xerox Corporation. Sheet stacking apparatus. 5,018,717, Cl. 271-207.000.
- Saeki, Takami: *See—*
  - Honjo, Takeshi; Kobayashi, Kenji; Yoshida, Akimaro; and Saeki, Takami, 5,018,714. Cl. 271-3.100.
- Safariland Ltd., Inc.: *See—*
  - Rogers, William H.; and Clifton, Norman E., Jr., 5,018,654, Cl. 224-244.000.
- Sahira, Kensho; Takeiri, Toshiki; and Kurauchi, Nobuyoshi, to Mitsubishi Metal Corporation. Method for plastic-working ingots of heat-resistant alloy containing boron. 5,019,179, Cl. 148-11.50N.
- Sahota, Harvinder. Balloon catheters. 5,019,042, Cl. 604-101.000.
- Saiga, Yoshiharu; Yoshimura, Makoto; and Hara, Susumu, to Fuji Photo Film Co., Ltd. Magnetic recording medium wind-up method. 5,018,679, Cl. 242-67.10R.
- Saini, Jasjit S.: *See—*
  - Beesley, Graham E.; McCabe, David J.; and Saini, Jasjit S., 5,020,051, Cl. 370-29.000.
- St. Laurent, Andre: *See—*
  - Wiley, Kenneth D.; Zellner, John W.; St. Laurent, Andre; Newman, James A.; Szabo, Thomas J.; and Shewchenko, Nicholas, 5,018,977, Cl. 434-274.000.
- St-Onge, Jean-Pierre: *See—*
  - Houlachi, George; Murphy, Terry J.; St-Onge, Jean-Pierre; and Daoust, Daniel, 5,019,172, Cl. 134-3.000.
- Saito, Naoya: *See—*
  - Yaginuma, Yoshitaka; Tokiya, Motohide; and Saito, Naoya, 5,019,326, Cl. 376-261.000.
- Saito, Norie: *See—*
  - Murakami, Kenji; Tonooka, Yasuaki; Saito, Norie; Nakasuji, Kokichi; and Sugiyama, Norifumi, 5,019,499, Cl. 435-69.100.
- Saito, Sayuri; Yoshizawa, Kazutoshi; and Kitada, Yoshitaka, to NEC Corporation. Dual processors using busy signal for controlling transfer for predetermined length data when receiving processor is processing previously received data. 5,019,966, Cl. 364-200.000.
- Saito, Shigemi: *See—*
  - Ishikawa, Takatoshi; Saito, Shigemi; Yoshida, Kazuaki; and Fujita, Yoshihiro, 5,019,850, Cl. 354-322.000.
- Saito, Taranosuke: *See—*
  - Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, 5,019,548, Cl. 503-209.000.
- Saito, Yoshihiro: *See—*
  - Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.
- Saito, Yoshimasa: *See—*
  - Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, 5,019,500, Cl. 435-69.100.
- Saito, Yoshiyuki; and Sato, Junichi, to Fanuc Ltd. Input signal discrimination method. 5,019,995, Cl. 364-483.000.
- Saitoh, Hiromi: *See—*
  - Aoki, Ken; Hoshi, Katsuhiko; Satoh, Shigeo; Kakinuma, Mitsuru; Togashi, Shigeru; and Saitoh, Hiromi, 5,018,363, Cl. 62-135.000.
- Sajjad, Munawwar: *See—*
  - Lambrecht, Richard M.; Qureshi, Muhammad A.; and Sajjad, Munawwar, 5,019,323, Cl. 376-201.000.
- Sakaguchi, Keizo: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Sakai, Kazuhiro, to Mitsubishi Metal Corporation. Process for preparing compound metal oxide. 5,019,366, Cl. 423-592.000.
- Sakai, Kazunori: *See—*
  - Masaki, Syouichi; Maehata, Hiromi; Sakai, Kazunori; and Sugitani, Tatsuo, 5,019,984, Cl. 364-426.020.
- Sakakibara, Kenzo; Yoshida, Takehiro; and Toda, Kozo, to Canon Kabushiki Kaisha. Image communication system having improved line control. 5,020,096, Cl. 379-100.000.
- Sakakibara, Yoshikazu: *See—*
  - Kuki, Nobuyuki; Isomura, Yukio; Suzumura, Hirokazu; and Sakakibara, Yoshikazu, 5,018,305, Cl. 49-348.000.
- Sakamoto, Hiroshi: *See—*
  - Harada, Kosuke; Sakamoto, Hiroshi; and Nakamizo, Takazi, 5,019,770, Cl. 323-282.000.
- Sakamoto, Osamu, to Sanshin Kogyo Kabushiki Kaisha. Bearing structure for two-cycle internal combustion engine. 5,019,118, Cl. 123-196.00W.
- Sakamoto, Shizuo: *See—*
  - Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, 5,019,358, Cl. 422-197.000.
- Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, to Murata Manufacturing Co., Ltd. Filter connector. 5,018,990, Cl. 439-620.000.
- Sakatsuji, Takao: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Sakita, Katsuya: *See—*
  - Hara, Mitsuo; Kamio, Shigeru; Takao, Mitsunori; Sakita, Katsuya; and Abe, Tomoaki, 5,018,595, Cl. 180-197.000.
- Sako, Yukihiro: *See—*
  - Suzuki, Makoto; Watanabe, Satoshi; Tsukamoto, Takashi; Aoki, Hikoharu; Ohri, Hitomi; and Sako, Yukihiro, 5,018,817, Cl. 350-96.170.
- Sakoshita, Kaoru: *See—*
  - Funabashi, Tsuneo; Sakoshita, Kaoru; and Yonezawa, Hiroshi, 5,019,962, Cl. 364-200.000.
- Sakuragi, Kazuhiko: *See—*
  - Shirai, Ichiro; and Sakuragi, Kazuhiko, 5,019,767, Cl. 320-2.000.
- Sakurai, Atsushi: *See—*
  - Murakoshi, Satoshi; and Sakurai, Atsushi, 5,019,907, Cl. 358-158.000.
- Salaud, Jean-Luc: *See—*
  - Bretaudeau, Jean-Pierre; and Salaud, Jean-Luc, 5,018,699, Cl. 248-562.000.
- Salett, Ronald M.: *See—*
  - Webb, David A., Jr.; Hetherington, Ricky C.; Salett, Ronald M.; Fossum, Trvggvue; and Manley, Dwight P., 5,019,965, Cl 364-200.000.
- Salmon, John K.; and Yoo, Young S., to Otis Elevator Company. Reduction of noise and vibration in an elevator car by selectively reducing air turbulence. 5,018,602, Cl. 187-1.00R.
- Salo, Vladimir I.: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Sam Sung Electronic Co. Ltd.: *See—*
  - Rim, Jong S., 5,019,972, Cl. 364-400.000.
- Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, to Kubota, Ltd. Lawn mower with blower unit. 5,018,344, Cl. 56-13.300.
- Sampath, Lester A.: *See—*
  - Fox, Charles L., Jr.; Modak, Shanta M.; and Sampath, Lester A., 5,019,096, Cl. 623-1.000.
- Sampei, Kazue; Suzuki, Takashi; and Ujiie, Futoshi, to Alpine Electronics Inc. Releasable mounting for an audio device. 5,020,151, Cl 455-345.000.
- Sample, Whitney S.: *See—*
  - Engelhardt, K. G.; Edwards, Roger A.; Sample, Whitney S.; and Sandrof, Michael F., 5,019,112, Cl. 53-474.000.

- Sampson, Scott D.: *See—*
  - Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, 5,019,841, Cl. 346-153.100.
- Samsung Electron Devices Co., Ltd.: *See—*
  - Choi, Kyungseok, 5,019,005, Cl. 445-36.000.
  - Lee, Seung-jae, 5,019,744, Cl. 313-346.00R.
- Samsung Electronic Co., Ltd.: *See—*
  - Jung, Seung T.; Park, Soo H.; and Kim, Chun K., 5,018,804, Cl. 350-3.710.
- Samsung Electronics Co., Ltd.: *See—*
  - Kang, Yang M., 5,019,921, Cl. 360-67.000.
  - Lee, In B., 5,019,682, Cl. 219-10.493.
  - Shin, Yun-Seung; and Chun, Sung-Oh, 5,019,881, Cl. 357-23.500.
  - Su, Jung-Hoon, 5,019,908, Cl. 358-166.000.
- Sancic, David: *See—*
  - Butler, Thomas M.; and Sancic, David, 5,018,706, Cl. 266-80.000.
- Sanders, Glen A.; Smith, Robert B.; and Rouse, Gordon F., to Honeywell Inc. Passive ring resonator gyro with polarization rotating ring path. 5,018,857, Cl. 356-350.000.
- Sandgren, Richard T.: *See—*
  - Reeves, Allen; Harbor, Michael O.; Reina, Patrick V.; and Sandgren, Richard T., 5,018,715, Cl. 271-19.000.
- Sandner, Bernhard: *See—*
  - Ludemann, Simpert; Bernheim, Michael; Sandner, Bernhard; Rossler, Erich; and Vogel, Hans-Burkhardt, 5,019,428, Cl. 427-387.000.
- Sandrof, Michael F.: *See—*
  - Engelhardt, K. G.; Edwards, Roger A.; Sample, Whitney S.; and Sandrof, Michael F., 5,019,112, Cl. 53-474.000.
- Sandvik Special Metals Corporation: *See—*
  - Meredith, Steven E.; and Benjamin, James F., 5,018,735, Cl. 273-80.00B.
- San Juan, Antonio B. Toaster. 5,018,437, Cl. 99-327.000.
- Sanko Kaihatsu Kagaku Kenkyusho Corporation: *See—*
  - Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, 5,019,548, Cl. 503-209.000.
- Sanmei Electric Co., Ltd.: *See—*
  - Kishi, Tomomi; Nonami, Kanshi; Takeuchi, Masahiko; Yoshitani, Naoyuki; and Niwa, Hideo, 5,018,939, Cl. 414-795.400.
- Sanofi: *See—*
  - Daste, Georges, 5,019,398, Cl. 424-480.000.
- Sanshin Kogyo Kabushiki Kaisha: *See—*
  - Hoshiba, Akihiko; and Hakamata, Kyoji, 5,018,503, Cl. 123-580.000.
  - Kato, Naoki, 5,018,998, Cl. 440-77.000.
  - Okita, Ryozo, 5,018,994, Cl. 440-61.000.
  - Onoue, Akihiro, 5,018,999, Cl. 440-78.000.
  - Sakamoto, Osamu, 5,019,118, Cl. 123-196.00W.
  - Sumigawa, Yukio, 5,018,995, Cl. 440-63.000.
- Sansing, James E.: *See—*
  - Hawkins, Edwin F.; Clapp, John G., Jr.; and Sansing, James E., 5,019,149, Cl. 71-29.000.
- Sansone, Ronald P.; Keating, Raymond; Wall, Joseph W.; and Durst, Robert T., Jr., to Pitney Bowes Inc. Certified weigher-short paid mail. 5,019,991, Cl. 364-464.030.
- Santa Barbara Research Center: *See—*
  - Himmelwright, Gary S., 5,018,823, Cl. 350-96.210.
- Sanwo, Ikuo J.; and Donahue, James A., to NCR Corporation. High speed CMOS backpanel transceiver. 5,019,728, Cl. 307-475.000.
- Sanyo Electric Co., Ltd.: *See—*
  - Aoki, Ken; Hoshi, Katsuhiko; Satoh, Shigeo; Kakinuma, Mitsuru; Togashi, Shigeru; and Saitoh, Hiromi, 5,018,363, Cl. 62-135.000.
  - Iga, Kenichi; Ibaraki, Akira; Kawashima, Kenji; Furusawa, Kotaro; and Ishikawa, Toru, 5,020,066, Cl. 372-45.000.
  - Ikeda, Hironosuke; Furukawa, Nobuhiro; Nishio, Koji; Fujimoto, Masahisa; Ono, Hitoshi; and Ando, Osamu, 5,019,949, Cl. 361-525.000.
- Sanyo-Kokusaku Pulp Co., Ltd.: *See—*
  - Mino, Hisashi; Iijima, Takeshi; and Monden, Kuniaki, 5,019,471, Cl. 430-11.000.
- Sapers, Gerald M., to United States of America, Agriculture. Process for manufactur of non-bleeding maraschino cherries. 5,019,405, Cl. 426-250.000.
- Sarrell, Ivan D.: *See—*
  - Chesnut, Paul B.; Moore, Michael W.; and Sarrell, Ivan D., 5,018,364, Cl. 62-187.000.
- Sartori, Guido; Ho, W. S. Winston; Savage, David W.; Noone, Robert E.; and Mastondrea, Robert P., to Exxon Research and Engineering Company. Non-porous polycarbonate membranes for separation of aromatics from saturates. 5,019,666, Cl. 585-819.000.
- Sasaki, Hiroshi: *See—*
  - Ooi, Katsunori; Sasaki, Hiroshi; and Ariyoshi, Shunji, 5,020,117, Cl. 382-46.000.
- Sato, Hirokazu; and Hirabayashi, Shigeto, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic material and method of forming a dye image thereon. 5,019,493, Cl. 430-553.000.
- Sato, Junichi: *See—*
  - Saito, Yoshiyuki; and Sato, Junichi, 5,019,995, Cl. 364-483.000.
- Sato, Masai: *See—*
  - Kimpara, Masaomi; Kawai, Kaiji; Kikuchi, Hiroshi; and Sato, Masai, 5,019,155, Cl. 71-121.000.
- Sato, Masamichi: *See—*
  - Nagashima, Yasuo; Soeda, Haruo; Sato, Masamichi; and Kubo, Takashi, 5,018,257, Cl. 29-90.010.
- Sato, Noritada; Suzuki, Toshikazu; and Ishiwata, Osamu, to Fuji Electric Co., Ltd. Semiconductor-based radiation-detector element. 5,019,886, Cl. 357-29.000.
- Sato, Susumu: *See—*
  - Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, 5,019,500, Cl. 435-69.100.
- Sato, Toshihiro; and Takagi, Tadao, to Nikon Corporation. Exposure control apparatus for use in camera. 5,019,853, Cl. 354-420.000.
- Sato, Tsuyoshi: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Satoh, Shigeo: *See—*
  - Aoki, Ken; Hoshi, Katsuhiko; Satoh, Shigeo; Kakinuma, Mitsuru; Togashi, Shigeru; and Saitoh, Hiromi, 5,018,363, Cl. 62-135.000.
- Satoo, Yukie: *See—*
  - Terasawa, Masato; Satoo, Yukie; and Yukawa, Hideaki, 5,019,503, Cl. 435-115.000.
- Sauer, Robert D., to Kimberly-Clark Corporation. Tissue webs containing curled temperature-sensitive bicomponent synthetic fibers. 5,019,211, Cl. 162-111.000.
- Saurer-Allma GmbH, Firma: *See—*
  - Sawatzki, Harry L.; and Feistenauer, Harald, 5,018,399, Cl. 74-110.000.
- Savage, David W.: *See—*
  - Sartori, Guido; Ho, W. S. Winston; Savage, David W.; Noone, Robert E.; and Mastondrea, Robert P., 5,019,666, Cl. 585-819.000.
- Sawa, Kenji: *See—*
  - Bota, Keiji; and Sawa, Kenji, 5,018,408, Cl. 74-866.000.
- Sawa, Takao; Okamura, Masami; and Takahashi, Yumiko, to Kabushiki Kaisha Toshiba. Fe-based soft magnetic alloy. 5,019,190, Cl. 148-306.000.
- Sawachi, Youichi, to Fuji Photo Film Co., Ltd. Video camera for photographing papers. 5,019,909, Cl. 358-164.000.
- Sawada, Hiroshi: *See—*
  - Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, 5,018,494, Cl. 123-339.000.
- Sawatzki, Harry L.; and Feistenauer, Harald, to Saurer-Allma GmbH, Firma. Mechanical servomotor. 5,018,399, Cl. 74-110.000.
- Scanlon, Patricia M.: *See—*
  - Hwa, Chih M.; Kelly, John A.; Neton, Janet; Scanlon, Patricia M.; and Gaudette, Roger R., 5,019,343, Cl. 422-16.000.
- Scattergood, Edgar M.: *See—*
  - Rienstra, Mark S.; and Scattergood, Edgar M., 5,019,502, Cl. 435-101.000.
- Schaar, Robert T.: *See—*
  - Londt, Edward E.; and Schaar, Robert T., 5,019,986, Cl. 364-426.040.
- Schadt, Waltraut: *See—*
  - Bergmann, Franz-Josef; Hockenberger, Lothar; and Schadt, Waltraut, 5,019,619, Cl. 524-405.000.
- Schaefer, Mark S.: *See—*
  - Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
- Schaefer, Willi, to Siemens Aktiengesellschaft. Patient supporting means having a pivotable patient supporting plate. 5,018,712, Cl. 269-323.000.
- Schafer, to Philipp Holzmann AG. Storage container for low-temperature liquids. 5,018,639, Cl. 220-426.000.
- Schafer, Jack J.: *See—*
  - Patel, Arvind; Lenz, William; and Schafer, Jack J., 5,019,795, Cl. 335-205.000.
- Schafer, Werner; and Scheiba, Manfred, to Th. Goldschmidt AG. Method for the decorative surface coating of flat substrates. 5,019,198, Cl. 156-230.000.
- Schaffer, Ronald R.: *See—*
  - Mulholland, Denis G.; Schaffer, Ronald R.; and Warner, Gary N., 5,018,316, Cl. 51-216.00R.
- Schalle, Werner E., to Aquarius Rubber (AUST.) Pty. Ltd. Seal device. 5,018,748, Cl. 277-012.000.
- Schaller, Klaus: *See—*
  - Hector, Richard F.; Schaller, Klaus; Moeschler, Heinrich F.; and Plempel, Manfred, 5,019,560, Cl. 514-43.000.
- Schatter, Eckart, to Siemens Aktiengesellschaft. Method for determining the qualities and/or frequencies of electrical tuned circuits. 5,019,782, Cl. 324-655.000.
- Scheer, David I.: *See—*
  - Kross, Robert D.; and Scheer, David I., 5,019,402, Cl. 424-665.000.
- Scheiba, Manfred: *See—*
  - Schafer, Werner; and Scheiba, Manfred, 5,019,198, Cl. 156-230.000.
- Schelhas, Klaus-Deiter, to Bristol-Meyers Squibb Company. Prosthesis for partially replacing the joint head of a human bone. 5,019,107, Cl. 623-23.000.
- Schena, Fiore: *See—*
  - Ifill, Lee; Walker, Robert; Wolfe, Steven; and Schena, Fiore, 5,019,256, Cl. 210-232.000.
- Schenck, Robert; Hoffman, Jeffrey H.; Klein, Michael N.; and Kouba, Gene R., to Classic Modular Systems, Inc. Working surface. 5,018,628, Cl. 211-153.000.
- Schering Aktiengesellschaft: *See—*
  - Grapentin, Hans-Joachim; Kayser, Tomas; and Riedl, Andrea, 5,019,229, Cl. 204-130.000.

VOL 1126
ISS 4
MY 28 1991
UMI

- Oehr, Christian; and Suhr, Harald, 5,019,415, Cl. 427-39.000.
- Romer, Michael; and Stein, Ludwig, 5,019,425, Cl. 427-305.000.
- Schering Spa: *See—*
  - Reiner, Alberto; and Vita, Giuseppe, 5,019,596, Cl. 514-578.000.
- Schilling, Lothar; and Schmidt, Gottfried, to Pfaff Industriemaschinen GmbH. Embroidering machine with a mounting device for individual embroidery hoops. 5,018,460, Cl. 112-103.000.
- Schilling, Peter, to Westvaco Corporation. Cationic slurry seal emulsifiers. 5,019,168, Cl. 106-277.000.
- Schilperoort, Robbert A.: *See—*
  - Okker, Robert J. H.; Lugtenberg, Egbertus J. J.; and Schilperoort, Robbert A., 5,019,501, Cl. 435-69.100.
- Schilperoort, Robbert Adriaan: *See—*
  - Okker, Robert J. H.; Lugtenberg, Egbertus J. J.; and Schilperoort, Robbert A., 5,019,501, Cl. 435-69.100.
- Schlabs, Brigitte: *See—*
  - Becker, Rainer; Schlabs, Brigitte; and Weisemann, Claus, 5,019,413, Cl. 426-460.000.
- Schlegel Corporation: *See—*
  - Burrous, Allen J.; Colaprete, Silvio; and Kehrli, David W., 5,018,307, Cl. 49-471.000.
- Schlossman, Stuart F.; and Griffin, James D., to Dana-Farber Cancer Institute. Monoclonal antibody specific for the adhesion function domain of a phagocyte cell surface protein. 5,019,648, Cl. 530-387.000.
- Schlumberger Technologies Limited: *See—*
  - Ryder, Alan, 5,019,817, Cl. 341-129.000.
- Schlumberger Technology Corporation: *See—*
  - Flaum, Charles, 5,019,708, Cl. 250-264.000.
  - Howard, Allen Q., Jr.; and Rossi, David J., 5,019,978, Cl. 364-422.000.
- Schmeiser, Morelle & Watts: *See—*
  - Wicker, Ralph C., 5,018,767, Cl. 283-67.000.
- Schmid, Rene : *See—*
  - Schneider, Ulf; and Schmid, Rene , 5,018,247, Cl. 19-205.000.
- Schmidt, Bernhard, to Ant Nachrichtentechnik GmbH. Method for centering and mounting a light waveguide in a sleeve, and apparatus for use in the method. 5,018,819, Cl. 350-96.200.
- Schmidt, Ernst-Ludwig, to Siemens Medical Laboratories, Inc. Radiation therapy device with moveable aperture plate. 5,019,713, Cl. 250-492.300.
- Schmidt, Frank J., to Continental White Cap Inc. Tamper evident closure. 5,018,632, Cl. 215-230.000.
- Schmidt, Gottfried: *See—*
  - Schilling, Lothar; and Schmidt, Gottfried, 5,018,460, Cl. 112-103.000.
- Schmitt, Hermann: *See—*
  - von Charzewski, Cornelia; Leithner, Dietrich; Schmitt, Hermann; and Schoening, Josef, 5,019,322, Cl. 376-158.000.
- Schmitz, Hans-Joachim: *See—*
  - Schutten, Dagmar; Schmitz, Hans-Joachim; Caspar, Hans-Peter; Kolschbach, Veit M.; Znoyek, Gerald; and Wenzel, Norbert, 5,018,826, Cl. 350-96.290.
- Schneider, Friedhelm; Koepnick, Klaus; and Wowra, Henrik, to Wilhelm Hegenscheidt Gesellschaft mbH, Firma. Method and apparatus for producing fractured chips when performing a turning operation 5,019,115, Cl. 82-1.110.
- Schneider, Michael G.: *See—*
  - Esper, Leo J.; Jorgensen, David C.; Murrah, Howard E.; Schneider, Michael G.; Phillips, Raymond M.; and Dauzy, Bruce C., 5,018,660, Cl. 229-125.420.
- Schneider, Roy W.; and Sierra, Christopher D. Aircraft engine propeller overspeed protection technical field. 5,019,006, Cl. 416-35.000.
- Schneider, Siegfried: *See—*
  - Naser, Georg; and Schneider, Siegfried, 5,018,724, Cl. 272-73.000.
- Schneider, Ulf; and Schmid, Rene , to Maschinenfabrik Rieter AG. Cleaning machine for textile fibres with drum having reduced diameter over the length. 5,018,247, Cl. 19-205.000.
- Schober, Gary W.: *See—*
  - Boles, Glenn M.; Schober, Gary W.; Chein, Wen S.; Symanski, Chris P.; Des Rioux, Philippe; and Tomkoski, Walter, III, 5,019,899, Cl. 358-84.000.
- Schobi, Paul J.: *See—*
  - Rabold, Peter, Klemenz, Hans-Jorg; and Schobi, Paul J., 5,020,106, Cl. 380-49.000.
- Schoen, Jerry W., to Armco Inc. Method of forming a laminate. 5,018,267, Cl. 29-609.000.
- Schoenberger, Stephanie G.: *See—*
  - Rank, William R.; Nichols, Ronald L.; and Schoenberger, Stephanie G., 5,018,530, Cl. 128-749.000.
- Schoening, Josef: *See—*
  - von Charzewski, Cornelia; Leithner, Dietrich; Schmitt, Hermann; and Schoening, Josef, 5,019,322, Cl. 376-158.000.
- Schoolman, Arnold, to Schoolman Scientific Corp. High resolution navigation and mapping system. 5,019,828, Cl. 342-457.000.
- Schoolman Scientific Corp.: *See—*
  - Schoolman, Arnold, 5,019,828, Cl. 342-457.000.
- Schorr, Ian A., to Rockwell International Corporation. Semi-floating AC/DC active termination circuit with current sink. 5,020,102, Cl. 379-399.000.
- Schramer, Kurt M.; Norman, Alfred W.; and Nelson, Kevin. Label assembly and method of manufacturing. 5,019,436, Cl. 428-40.000.
- Schramm, Gottfried: *See—*
  - Eberhard, Friedrich; Schramm, Gottfried; Holesovsky, Ulrich; Richardt, Peter; Ehrig, Steffen; Jobst, Karin; Blobel, Hans-Jurgen; Kutzsche, Friedrich; Koschade, Gerda; Friedrich, Hannelore; and Nitzsche, Rolf, 5,019,267, Cl. 210-606.000.
- Schreck, John F.; and Truong, Phat C., to Texas Instruments Incorporated. Method and apparatus for reading and programming electrically programmable memory cells. 5,020,026, Cl. 365-104.000.
- Schreinemakers, Josephus. Correcting articulation defect in dentate human jaw. 5,018,972, Cl. 433-215.000.
- Schreiter, Stefan: *See—*
  - Fiegel, Gunnar; and Schreiter, Stefan, 5,018,782, Cl. 296-217.000.
- Schroder, Hubert E. Fastening device for necklaces. 5,018,250, Cl. 24-116.00A.
- Schrudde, Reinhold: *See—*
  - Hampel, Klaus; and Schrudde, Reinhold, 5,018,464, Cl. 112-130.000.
- Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See—*
  - Fahmuller, Maximilian, 5,018,677, Cl. 242-18.0DD.
- Schuetz, James A., to Honeywell Inc. Resistive overlayer for thin film devices. 5,019,461, Cl. 428-688.000.
- Schuler Incorporated: *See—*
  - Kerr, Peter, 5,018,406, Cl. 74-569.000.
- Schulte, Burkart; Hardt, Norbert; and Kohne, Rainer, to Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH. Centering arrangement for aligning the mutually adjacent openings of a lock and a container for holding radioactive materials. 5,019,324, Cl. 376-260.000.
- Schultz, Gaymond W.: *See—*
  - Holden, Brian D.; Presuhn, Randall M.; Robertson, William L.; and Schultz, Gaymond W., 5,020,058, Cl. 370-109.000.
- Schulz, Peter, to Hoffman-La Roche Inc. Agglutination reaction slide. 5,019,351, Cl. 422-99.000.
- Schumacher, Donald W.: *See—*
  - Slocum, Gregory H.; and Schumacher, Donald W., 5,019,317, Cl. 264-300.000.
- Schumacher, Robert W., to Hughes Aircraft Company. Plasma switch with chrome, perturbated cold cathode. 5,019,752, Cl. 315-344.000.
- Schumacher, Thomas H.; and Nelson, Ronald L., to WPC Machinery Corporation. Ink applying system for a printing apparatus. 5,018,444, Cl. 101-366.000.
- Schutten, Dagmar; Schmitz, Hans-Joachim; Caspar, Hans-Peter; Kolschbach, Veit M.; Znoyek, Gerald; and Wenzel, Norbert, to U.S. Philips Corp. Roll manufactured with a light waveguide conductor. 5,018,826, Cl. 350-96.290.
- Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., to Eaton Corporation. Automatic steering apparatus using reflected signals. 5,019,983, Cl. 364-424.070.
- Schwalbach, Stephen. Dental fluoride applicator and method for using same. 5,018,967, Cl. 433-37.000.
- Schwamborn, Michael: *See—*
  - Baasner, Bernd; Hagemann, Hermann; and Schwamborn, Michael, 5,019,654, Cl. 564-510.000.
- Schwan-Stabilo Schwanhaeusser GmbH & Co.: *See—*
  - Krueckel, Peter; Moeck, Gerhard; and Finkenauer, Robert, 5,018,892, Cl. 401-68.000.
- Schwarz, Gary S., to Xerox Corporation. Stable mirror mount assembly for an optical scanning system. 5,019,837, Cl. 346-108.000.
- Schwarz, Marcos G., to Empresa Brasileira De Compressores S.A. Process and electronic circuit for controlling a brushless direct current motor. 5,019,756, Cl. 318-254.000.
- Schwarz, William M., to Xerox Corporation. Thermal ink jet compositions. 5,019,166, Cl. 106-22.000.
- SCI Systems, Inc.: *See—*
  - Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, 5,019,841, Cl. 346-153.100.
- Science Incorporated: *See—*
  - Kriesel, Marshall S., 5,019,047, Cl. 604-132.000.
- Scientific-Atlanta, Inc.: *See—*
  - Hoecht, Dietrich H., 5,018,407, Cl. 74-606.00R.
- SciMed Life Systems, Inc.: *See—*
  - Robinson, David B.; Adams, Daniel O.; Penny, William H.; and Voegele, Gerald G., 5,019,041, Cl. 604-97.000.
- Scott, David B.; Bosshart, Patrick W.; and Gallia, James D., to Texas Instruments Incorporated. Circuit to improve electrostatic discharge protection. 5,019,888, Cl. 357-41.000.
- Scott, G. Robert: *See—*
  - Cutright, Edwin L.; Keen, Billy J., Jr.; Scott, G. Robert; and Van Davelaar, Peter C., 5,019,024, Cl. 493-280.000.
- Scripps, Charles L., to Procter & Gamble Company, The. Disposable absorbent article with combination mechanical and adhesive tape fastener system. 5,019,065, Cl. 604-385.100.
- Sealock, L. John, Jr.; and Elliott, Douglas C., to Battelle Memorial Institute. Method for the catalytic conversion of lignocellulosic materials. 5,019,135, Cl. 48-197.00R.
- Sebag, Henri: *See—*
  - Philippe, Michel; Hocquaux, Michel; Sebag, Henri; Beck, Irina; and Laugier, Jean P., 5,019,567, Cl. 514-164.000.
- Sedgwick, David M.: *See—*
  - McCray, Charles M.; Nadler, Brandon S.; Sedgwick, David M.; and Traxler, David M., 5,018,887, Cl. 400-616.100.
- Seeger, Walter; Mussler, Rudiger; and Hafelein, Reinhard, to Roth Technik GmbH. Method of making an exhaust catalyst by securing wire mesh onto an arbor. 5,018,272, Cl. 29-890.080.
- Seegers, Hanns, to INA Walzlageer Schaeffler KG. Device for determining torque transmitted in a shaft. 5,018,393, Cl. 73-862.340.
- Segalla, Rodolfo; and Bottene, Sergio, to Comer S.p.A. Headbox with coarse and fine adjustment of the slice. 5,019,216, Cl. 162-344.000.

- Segui Pastor, Enrique: *See—*
  - Segui Pastor, Vicente M.; Galiana Sabater, Amando; and Segui Pastor, Enrique, 5,019,043, Cl. 604-110.000.
- Segui Pastor, Vicente M.; Galiana Sabater, Amando; and Segui Pastor, Enrique, to Segui Pastor, Vincent Miguel. Syringe with needle retraction capability. 5,019,043, Cl. 604-110.000.
- Segui Pastor, Vincent Miguel: *See—*
  - Segui Pastor, Vicente M.; Galiana Sabater, Amando; and Segui Pastor, Enrique, 5,019,043, Cl. 604-110.000.
- by Seiberlich, Walter, to Maag-Gear-Wheel & Machine Co. Ltd. Device for controlling the tool position depending on the stroke position. 5,018,913, Cl. 409-34.000.
- Seibu Electric & Machinery Co., Ltd.: *See—*
  - Tanaka, Nobuhiro, 5,018,927, Cl. 414-331.000.
- Seiko Epson Corporation: *See—*
  - Ito, Norio, 5,019,749, Cl. 315-224.000.
  - Takeda, Koji, 5,020,082, Cl. 377-44.000.
- Seiko Instruments Inc.: *See—*
  - Yokote, Takasuke, 5,020,039, Cl. 368-282.000.
- Seikosha Co., Ltd.: *See—*
  - Koike, Yasushi; and Tajima, Akio, 5,018,655, Cl. 226-101.000.
- Seiler, Erhard: *See—*
  - Taubitz, Christof; Gausepohl, Hermann; Seiler, Erhard; Boehlke, Klaus; and Heckmann, Walter, 5,019,626, Cl. 525-92.000.
- Seilhamer, Jeffrey J.: *See—*
  - Johnson, Lorin K.; Seilhamer, Jeffrey J.; Pruzanski, Waldemar; and Vadas, Peter, 5,019,508, Cl. 435-198.000.
- Sekihachi, Hiroko: *See—*
  - Yano, Toshihiko; Torisu, Yoko; Sekihachi, Hiroko; Matsuo, Noritada; Takagaki, Tohei; and Tsushima, Kazunori, 5,019,595, Cl. 514-531.000.
- Seltzer, Raymond: *See—*
  - Evans, Samuel; Chasan, David; and Seltzer, Raymond, 5,019,285. Cl. 252-47.500.
- Selvig, Einar K.: *See—*
  - Hognestad, Jon; and Selvig, Einar K., 5,018,940, Cl. 414-796.800.
- Sepp, Gunther: *See—*
  - Benedikter, Richard; Sepp, Gunther; and Knauer, Wolfgang, 5,018,446, Cl. 102-213.000.
- Serre, Jacques R.: *See—*
  - Heurtel, Bertrand J. J. M.; Mondoloni, Pierre-Louis; and Serre, Jacques R., 5,018,941, Cl. 416-220.00R.
- Sew Simple Systems, Inc.: *See—*
  - Brocklehurst, Charles E., 5,018,462, Cl. 112-121.120.
- Sextant Avionique: *See—*
  - Spiesser, Gilbert, 5,019,732, Cl. 310-49.00R.
- Sexton, Kenneth D.: *See—*
  - McCurry, Patrick W.; Kellogg, James R.; Boekelheide, Karl; Sexton, Kenneth D.; Ellson, George A.; and Hocker, Robert A., 5,019,717, Cl. 307-66.000.
- Seyama, Fumio: *See—*
  - Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, 5,019,548, Cl. 503-209.000.
- SGS-Thomson Microelectronics, Inc.: *See—*
  - McClure, David C., 5,019,724, Cl. 307-443.000.
- Shafer, Sheldon J.: *See—*
  - Clagett, Donald C.; and Shafer, Sheldon J., 5,019,641, Cl. 528-347.000.
- Shaffer, James E., to Consulier Engineering, Inc. Winch apparatus 5,018,708, Cl. 254-266.000.
- Shah, Dilipkumar N., to Lord Corporation. Rubber-modified epoxy adhesive compositions. 5,019,608, Cl. 523-456.000.
- Shah, Reza H. Remote-controlled gas barbeque igniting system. 5,018,964, Cl. 431-45.000.
- Shalaby, Shalaby W.: *See—*
  - Bezwada, Rao S.; and Shalaby, Shalaby W., 5,019,094, Cl. 606-230.000.
- Shaman Pharmaceuticals, Inc.: *See—*
  - Iwu, Maurice M., 5,019,580, Cl. 514-299.000.
- Shanbrom, Edward. Tissue culture antiviral processes and compositions. 5,019,495, Cl. 435-1.000.
- Shank, Michael S.: *See—*
  - Black, Teresa K.; English, James M.; and Shank, Michael S., 5,018,989, Cl. 439-620.000.
- Shannon, Cynthia N., legal representative: *See—*
  - Rix, William H.; and Shannon, John P., deceased, 5,020,087, Cl. 378-134.000.
- Shannon, John. Combination radio and eyeglasses. 5,020,150, Cl. 455-343.000.
- Shannon, John P., deceased: *See—*
  - Rix, William H.; and Shannon, John P., deceased, 5,020,087, Cl. 378-134.000.
- Shapiro, Robert; and Vallee, Bert L., to President and Fellows of Harvard College. Inhibitors of angiogenin. 5,019,556, Cl. 514-2.000.
- Sharp, Bruce R. Storage tank system with internal overfill means. 5,018,558, Cl. 141-198.000.
- Sharp Kabushiki Kaisha: *See—*
  - Matsuda, Noboru, 5,019,912, Cl. 358-213.260.
  - Morino, Taisuke; Tanaka, Mami; Kaneko, Fuminori; Ozaki, Takeyuki; and Akiyama, Shuichi, 5,019,680, Cl. 219-10.55E.
  - Nakamura, Masatsugu; Ohashi, Kunio; Nagata, Shoichi; Wakita, Kazuki; Nagayama, Katsuhiro; and Tonegawa, Tadashi, 5,019,862, Cl. 355-208.000.
  - Ohashi, Kunio; and Nagata, Shoichi, 5,019,856, Cl. 355-27.000.
  - Tada, Noburu; Mukai, Tadaharu; and Shino, Katsuhide, 5,019,700, Cl. 235-492.000.
  - Tsukamoto, Kimihide, 5,018,560, Cl. 141-364.000.
- Sharratt, Leslie C.: *See—*
  - Breckner, Raymond A.; Henriksson, Kurt K.; Sharratt, Leslie C.; and Sharratt, Leslie M., 5,018,946, Cl. 417-197.000.
- Sharratt, Leslie M.: *See—*
  - Breckner, Raymond A.; Henriksson, Kurt K.; Sharratt, Leslie C., and Sharratt, Leslie M., 5,018,946, Cl. 417-197.000.
- Shastry, Chakrakody V.: *See—*
  - Khalid, Joseph M.; and Shastry, Chakrakody V., 5,019,221, Cl. 204-13.000.
- Shaw, Gerald; and Ladwig, Paul K., to Exxon Chemical Patents, Inc. Low viscosity aromatic carbonate lubricating oil concentrates. 5,019,286, Cl. 252-48.200.
- Shaye Communications Limited: *See—*
  - Beesley, Graham E.; McCabe, David J.; and Saini, Jasjit S., 5,020,051, Cl. 370-29.000.
- Sheckells, Amuel E., to Chromcraft Furniture Corporation. Mounting assembly for back of tubular frame seating. 5,018,789, Cl. 297-444.000.
- Shell Internationale Research Maatschappij B.V.: *See—*
  - Lucas, Jan H., 5,018,549, Cl. 137-355.230.
- Shell, John P.: *See—*
  - Davis, Thomas L.; Shell, John P.; Elliott, Robert N., III; and Denning, Carsie K., 5,019,300, Cl. 261-23.100.
- Shell Oil Company: *See—*
  - Hamer, Johannes A.; and van der Heijden, Pieter, 5,019,218, Cl. 203-87.000.
  - Hamer, Johannes A.; and Van Der Heijden, Pieter, 5,019,219, Cl. 203-91.000.
  - Klei, Ebel, 5,019,614, Cl. 524-100.000.
  - Wong, Pui K.; and Drent, Eit, 5,019,645, Cl. 528-488.000.
- Shenian, Popkin: *See—*
  - Avakian, Roger W.; Shenian, Popkin; and Bussink, Jan, 5,019,616, Cl. 524-141.000.
- Shepenko, Anatoly G.: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Shepherd Products U.S. Inc.: *See—*
  - Estkowski, Michael H.; and Minor, Don E., 5,018,787, Cl. 297-302.000.
- Sherex Chemical Company, Inc.: *See—*
  - Sitz, Gary E.; and Chatterjee, Roger K., 5,019,610, Cl. 524-61.000.
- Sherman, Kimberly J.: *See—*
  - Wesling, Mary A.; and Sherman, Kimberly J., 5,019,409, Cl. 427-96.000.
- Shewchenko, Nicholas: *See—*
  - Wiley, Kenneth D.; Zellner, John W.; St. Laurent, Andre; Newman, James A.; Szabo, Thomas J.; and Shewchenko, Nicholas, 5,018,977, Cl. 434-274.000.
- Shiba, Takahumi, to Pioneer Electronic Corporation. Multi-disk player with automatic volume control. 5,019,922, Cl. 360-69.000.
- Shibamiya, Yoshikazu, to Canon Kabushiki Kaisha. Printing apparatus for use with a detachable memory. 5,020,022, Cl. 364-900.000.
- Shieh, Jim-Chyuan: *See—*
  - Lin, Dhei-Jhai; Shieh, Jim-Chyuan; and Lin, Hsien-Kuang, 5,019,483, Cl. 430-288.000.
- Shiida, Masahiro: *See—*
  - Ishida, Masahiko; Yamakawa, Nobuaki; and Shiida, Masahiro, 5,018,269, Cl. 29-861.000.
- Shilling, Thomas: *See—*
  - Lee, Alan R.; Mead, David P.; Null, Robert A.; Shilling, Thomas; and Atchley, Ray, 5,019,056, Cl. 604-257.000
- Shim, Joosup: *See—*
  - Le, Quang N.; Pelrine, Bruce P.; and Shim, Joosup, 5,019,670, Cl. 585-467.000.
- Shima, Mutsuo: *See—*
  - Kawahata, Ichiro; Matano, Takashi; Kato, Hideki; and Shima, Mutsuo, 5,019,202, Cl. 156-277.000.
- Shimada, Kazuyuki: *See—*
  - Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, 5,019,913, Cl. 358-296.000.
- Shimada, Makoto: *See—*
  - Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,018,383, Cl. 73-118.100.
  - Ueda, Katsunori; Shimada, Makoto; Danno, Yoshiaki; Togai, Kazuhide; and Yoshida, Masato, 5,019,989, Cl. 364-431.050.
- Shimada, Masaru: *See—*
  - Suzuki, Akira; Mochizuki, Hidehiro; Shimada, Masaru; and Uemura, Hiroyuki, 5,019,550, Cl. 503-227.000.
- Shimada, Takashi: *See—*
  - Kitahara, Koichi; Shimada, Takashi; and Iwata, Keiichi, 5,019,364, Cl. 423-210.000.
- Shimada, Toshio: *See—*
  - Matsuo, Masaaki; Shimada, Toshio; and Hamada, Seishiro, 5,019,860, Cl. 355-104.000.
- Shimamura, Munemasa: *See—*
  - Suzuki, Motoharu; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, 5,018,762, Cl. 280-731.000.

VOL 1126
ISS 4
MY 28
1991
UMI

- Shimaoka, Hitoshi; Mizuo, Shigera; Akashi, Akira; and Hosoi, Miyuki, to Konica Corporation. Method and apparatus for forming color proof. 5,019,484, Cl. 430-293.000.
- Shimazaki, Osamu, to Fuji Photo Film Co., Ltd. Method for forming halftone data. 5,019,896, Cl. 358-75.000.
- Shimizu, Isamu: *See—*
  - Niwa, Mitsuyuki; Arai, Takayoshi; Shimizu, Isamu; Takeuchi, Eiji; Murakami, Tsutomu; and Ishihara, Shunichi, 5,019,887, Cl. 357-30.000.
- Shimomura, Yasushi: *See—*
  - Kamei, Eiichi; Shimomura, Yasushi; Kanda, Yasuo; and Ogawa. Tadashi, 5,019,252, Cl. 210-136.000.
- Shimonou, Shigeru, to NEC Corporation. Head positioning system for use in information recording/reproducing device with means for deriving track crossing signal from tracking error signal. 5,020,044, Cl. 369-44.280.
- Shimosaka, Satoru; Kuno, Yukinobu; Takagi, Yukio; and Mizuno. Masuo, to Meinan Machinery Works, Inc. Veneer lathe. 5,018,561, Cl. 144-209.00R.
- Shimozawa, Kenji: *See—*
  - Noda, Yasushi; Shimozawa, Kenji; and Kamisaka, Takashi, 5,018,836, Cl. 350-247.000.
- Shin-Etsu Chemical Co., Ltd.: *See—*
  - Yoshida, Takeo; and Takahashi, Masaharu, 5,019,295, Cl. 252-518.000.
- Shin, Sang Y.; and Son, Yung S., to Korea Advanced Institute of Science and Technology. Fabrication method and structure of optical waveguides. 5,018,809, Cl. 350-96.120.
- Shin, Yun-Seung; and Chun, Sung-Oh, to Samsung Electronics Co., Ltd. Nonvolatile semiconductor memory component. 5,019,881, Cl. 357-23.500.
- Shinkai, Tatsuya, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Valve timing mechanism with eccentric bushing on rocker shaft. 5,018,487, Cl. 123-90.160.
- Shinko Electric Co., Ltd.: *See—*
  - Iwata, Satoshi; and Ishiyama, Kiyoshige, 5,019,836, Cl. 346-76.0PH.
- Shino, Katsuhide: *See—*
  - Tada, Noburu; Mukai, Tadaharu; and Shino, Katsuhide, 5,019,700, Cl. 235-492.000.
- Shinoda, Tomoyuki: *See—*
  - Fukui, Masashi; and Shinoda, Tomoyuki, 5,019,741, Cl. 310-239.000.
- Shiota, Katuhiko: *See—*
  - Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi; Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, 5,019,891, Cl. 357-70.000.
- Shirai, Ichiro; and Sakuragi, Kazuhiko, to Nintendo Co., Ltd. Portable power supply. 5,019,767, Cl. 320-2.000.
- Shirai, Keiichi; Kawaguchi, Akira; and Kitazima, Sunao, to Mitsubishi Metal Corporation. Apparatus and method for crimping end of can body. 5,018,379, Cl. 72-354.600.
- Shirai, Masahiro: *See—*
  - Kato, Kiminari; and Shirai, Masahiro, 5,019,537, Cl. 501-1.000.
- Shirasaka, Shinichi, to Pioneer Electronic Corporation. Automatic scanning tuner. 5,020,142, Cl. 455-166.000.
- Shirata, Atsushi; and Suzuki, Kiyosuke. Scanning apparatus for reading a color image. 5,019,897, Cl. 358-75.000.
- Shiratani, Takaaki; and Namba, Seiji, to Nippon Seiko Kabushiki Kaisha. Apparatus for supporting rotary shaft in vehicle transmission. 5,018,882, Cl. 384-484.000.
- Shirley, Thomas F., Jr.; and Butler, Jack B., to Motorola, Inc. Radio component replacement/programming device. 5,020,144, Cl. 455-186.000.
- Shirokane, Makoto: *See—*
  - Iyogi, Kiyoshi; Nakahashi, Masako; Takeda, Hiromitsu; and Shirokane, Makoto, 5,019,187, Cl. 148-24.000.
- Shirota, Hiroyuki, to Dainippon Screen Mfg. Co., Ltd. Lens system for optical beam scanner. 5,018,807, Cl. 350-6.800.
- Shively, Richard R.: *See—*
  - Gorin, Allen L.; Makofsky, Patrick A.; Morton, Nancy; Oliver, Neal C.; Shively, Richard R.; and Stanziola, Christopher A., 5,020,059, Cl. 371-11.300.
- Shockley, Steven C.: *See—*
  - Roerig, Arnold J.; and Shockley, Steven C., 5,018,402, Cl. 475-347.000.
- Shoemaker, Randy R. Front draw handgun holster. 5,018,653, Cl. 224-198.000.
- Shoffner, William H.: *See—*
  - Villalon, S. Leonard; Olds, James D.; and Shoffner, William H., 5,018,759, Cl. 280-507.000.
- Shoji, Akio: *See—*
  - Amemoto, Mashide; Watanabe, Hikaru; and Shoji, Akio, 5,019,623, Cl. 525-7.300.
- Shoupe, T. Scott; Baker, David C.; Coutts, Stephen M.; and Hand, Elli S., to Euroceltique, S.A. Substituted dibenzofurans and methods of using same. 5,019,573, Cl. 514-232.800.
- Shutic, Jeffrey R.: *See—*
  - Crum, Gerald W.; Burke, Richard D.; Holland, Robert J.; Newman, Allen; Moses, David L.; Miller, William S.; Hollstein, Thomas E.; and Shutic, Jeffrey R., 5,018,909, Cl. 406-138.000.
- SID Corp., Inc.: *See—*
  - Hardin, Gary P.; and Leonard, Ronald, 5,018,930, Cl. 414-458.000.
- Siebers, Bruce M.: *See—*
  - Roessler, Thomas H.; and Siebers, Bruce M., 5,019,073, Cl. 604-391.000.
- Siegert GmbH: *See—*
  - Pfah, Werner; Bergmann, Michael; Fenzlein, Paul-Gerhard; and Anderer, Wolfgang, 5,018,527, Cl. 128-635.000.
- Siegrist, Ronald R., to Hoover Universal, Inc. Power seat adjuster with floating drive mechanism. 5,018,696, Cl. 248-429.000.
- Siemens Aktiengesellschaft: *See—*
  - Cramer, Bernhard M.; Jenner, Erhard; and Minderle, Wolfgang, 5,020,089, Cl. 378-196.000.
  - Glehr, Manfred, 5,019,988, Cl. 364-431.030.
  - Naser, Georg; and Schneider, Siegfried, 5,018,724, Cl. 272-73.000.
  - Pelzl, Leo, 5,019,947, Cl. 361-415.000.
  - Schaefer, Willi, 5,018,712, Cl. 269-323.000.
  - Schatter, Eckart, 5,019,782, Cl. 324-655.000.
  - Weber, Robert; and Stamm, Hubert, 5,019,228, Cl. 204,129.75-.
  - Zierhut, Hermann, 5,019,730, Cl. 307-510.000.
  - Zierhut, Hermann, 5,020,154, Cl. 455-608.000.
- Siemens-Albis Aktiengesellschaft: *See—*
  - Fognini, Bruno; and Heinz, Helmut, 5,019,785, Cl. 328-14.000.
- Siemens Automotive L.P.: *See—*
  - Frick, Michael J., 5,018,385, Cl. 73-118.200.
- Siemens Medical Laboratories, Inc.: *See—*
  - Schmidt, Ernst-Ludwig, 5,019,713, Cl. 250-492.300.
- Siemens Telecommunicazioni S.p.A.: *See—*
  - Bonato, Paolo, 5,020,148, Cl. 455-302.000.
- Sierra, Christopher D.: *See—*
  - Schneider, Roy W.; and Sierra, Christopher D., 5,019,006, Cl 416-35.000.
- Sifly, Raymond W.: *See—*
  - Terbrugge, Neville C.; Terbrugge, Gary; and Sifly, Raymond W., 5,018,504, Cl. 125-26.000.
- Sikorski, Theodore J., to AT&T Bell Laboratories. Method and apparatus for separating chips. 5,018,938, Cl. 414-786.000.
- Silberring, Ludwig. Steam reformer with internal heat recovery. 5,019,356, Cl. 422-191.000.
- Silver Systems Limited: *See—*
  - Moore, John A., 5,018,627, Cl. 211-123.000.
- Silvestri, George J., Jr.; Martin, James A.; and Ulrich, Douglas R., to Westinghouse Electric Corp. Temperature control of a steam turbine steam to minimize thermal stresses 5,018,356, Cl. 60-646.000.
- Simmons, Frances B., to Gerber Childrenswear, Inc. Garment with protective elastic leg dams. 5,019,067, Cl. 604-385.200.
- Simonc, Raymond J., to Automation Equipment Co. Rotary cassette carousel. 5,019,927, Cl. 360-92.000.
- Simoni, Wayne P.: *See—*
  - Lo, Thomas K.; Sacks, Jack M.; Simoni, Wayne P.; Lee, Leonard A.; Nguyen, Harrison; Karlin, Lynne M.; Quan, Andy L.; and Hosokawa, Kazuo R., 5,020,113, Cl. 382-42.000.
- Simura, Toshio: *See—*
  - Ishimaki, Takashi; and Simura, Toshio, 5,018,796, Cl. 303-9.750.
- Singer, Heinrich; and Koppel, Gabriele, to Ciba-Geigy Corporation. Hydrophilic softhand agency for fibrous materials and use thereof. 5,019,281, Cl. 252-8.800.
- Singer, Karl, to D&K Custom Machine Design, Inc. Double sided laminating machine. 5,019,203, Cl. 156-309.900.
- Singer, Roy E., to Wenger Manufacturing, Inc. Flaking roll apparatus. 5,018,960, Cl. 425-367.000.
- Singer, Stephen P.: *See—*
  - Buchanan, John M.; Cook, Ewell R.; Mooberry, Jared B.; Proehl, Gary S.; Singer, Stephen P.; and Washburn, William N., 5,019,492, Cl. 430-543.000.
- Siren, Matti, to Perstorp AB. Method of treating inflammation with inositol triphosphate. 5,019.566, Cl. 514-103.000.
- Sisto, Raffaello: *See—*
  - Farias, Otello; Gandini, Alberto; Monga, Raffaella; Roggero, Arnaldo; Sisto, Raffaello; and Valentini, Claudio, 5,019,631, Cl. 525-396.000.
- Sitar, Nicholas: *See—*
  - Udell, Kent S.; Sitar, Nicholas; Hunt, James R.; and Stewart, Lloyd D., Jr., 5,018,576, Cl. 166-272.000.
- Sitt, Hans: *See—*
  - Jurchuk, Paul; Hooper, David; Staff, Alan; and Sitt, Hans, 5,018,338, Cl. 53-532.000.
- Sitz, Gary E.; and Chatterjee, Roger K., to Sherex Chemical Company, Inc. Process for the production of polymer-modified asphalts and asphalts emulsions. 5,019,610, Cl. 524-61.000.
- Six, Albert J. Magnetically delivered ink. 5,018,445, Cl. 101-489.000.
- Sjogren, Rolf, to Wamac AB. Device for temporarily storing a succession of newspapers. 5,018,618, Cl. 198-347.300.
- Sjte, Lars, ml/o/ holm; and Ludin, Stig, to Svenska Rotor Maskiner AB. Rotary displacement compressor with adjustable outlet port edge. 5,018,948, Cl. 417-302.000.
- Skelnik, Debra L.: *See—*
  - Aysta, James E.; Lindstrom, Richard L.; and Skelnik, Debra L., 5,019,084, Cl. 606-107.000.
- SKF (UK) Limited: *See—*
  - Woodbridge, Keith W.; Doncaster, Daniel J.; and Hamblin, Ronald F., 5,018,898, Cl. 403-11.000.
- Skinner, George F. Method of encapsulating a coated substrate. 5,019,195, Cl. 156-71.000.
- Skipper, Uvon. Section milling tool. 5,018,580, Cl. 166-298.000.
- Skoog, Steven K.; and Cordan, Ernest W., Jr., to NCR Corporation. Integrated circuit driver for serial bus having output overvoltage protection. 5,019,720, Cl. 307-270.000.
- Slater, Daniel. Platform for weighing and simultaneously massaging user. 5,018,510, Cl. 128-33.000.

- Slobodyanik, Ljudmila S.: *See—*
  - Konobevtsev, Oleg F., deceased; Napadov, Mikhail A.; Grishanin, Gennady G.; Kuklin, Georgy S.; Krivulya, Gennady F.; Guschin, Sergei V.; Kondaurov, Vladimir N.; Chelyapin, Oleg A.; Slobodyanik, Ljudmila S.; Gusev, Jury P.; Kondratenko, Oleg J.; Salo, Vladimir I.; and Shepenko, Anatoly G., 5,018,525, Cl. 128-421.000.
- Slocum, Edgar W.; Sobrero, Aquiles C.; and Wheland, Robert C., to Du Pont de Nemours, E. I., and Company. Polymerization of fluoroolefins in presence of non-volatile polymeric seed. 5,019,632, Cl. 526-68.000.
- Slocum, Gregory H.; and Schumacher, Donald W., to Mobay Corporation. Process for the production of molded products using internal mold release agents. 5,019,317, Cl. 264-300.000.
- Slocum, Tobin: *See—*
  - Hechel, Dennis L.; Niemetschek, Raymond H.; Slocum, Tobin; Kercheck, Gary R.; and Crawford, Michael C., 5,018,853, Cl. 356-155.000.
- Smart, Gerald J.; and Nelson, Daniel L., to Eastman Kodak Company. Focus acquisition servo system and associated method. 5,020,045, Cl. 369-44.290.
- Smith, C. Dwight: *See—*
  - Weilbach, August O.; Hanson, Derald F.; and Smith, C. Dwight, 5,019,738, Cl. 310-90.500.
- Smith, David W.: *See—*
  - Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 5,019,012, Cl. 452-46.000.
- Smith, Dennis W.: *See—*
  - Borrelli, Nicholas F.; and Smith, Dennis W., 5,019,538, Cl. 501-13.000.
- Smith, Gary L.: *See—*
  - Taylor, Robert D.; Smith, Gary L.; and Olsen, Ritchie, 5,019,220, Cl. 264-3.400.
- Smith, Henry J. Luminescent paintball for marking nighttime impacts. 5,018,450, Cl. 102-513.000.
- Smith, Lawrence A.: *See—*
  - Adams, John R.; and Smith, Lawrence A., 5,019,669, Cl. 585-446.000.
- Smith, Lonnie J., to Atlantic Richfield Company. Tubing conveyed wellbore fluid flow measurement apparatus. 5,018,574, Cl. 166-185.000.
- Smith, Peter: *See—*
  - Ridyard, Denis R. A.; and Smith, Peter, 5,019,134, Cl. 8-549.000.
- Smith, Robert B.: *See—*
  - Sanders, Glen A.; Smith, Robert B.; and Rouse, Gordon F., 5,018,857, Cl. 356-350.000.
- Smith, Thomas B., to International Business Machines Corporation. Automatic vernier synchronization of skewed data streams. 5,020,023, Cl. 364-900.000.
- Smith, Victoria K.: *See—*
  - Coltrain, Bradley K.; Rakes, Gary A.; and Smith, Victoria K., 5,019,607, Cl. 523-435.000.
- Smolenski, Joseph L.; Christopher, Gerard W.; Wright, John C.; and Relation, Alfred E., to General Electric Company. AC to DC power conversion circuit with low harmonic distortion. 5,019,952, Cl. 363-16.000.
- Smolley, Robert, to TRW Inc. Backplane interconnection system. 5,019,945, Cl. 361-412.000.
- Snyder, James R.: *See—*
  - Lapin, Stephen C.; and Snyder, James R., 5,019,636, Cl. 526-301.000.
- Sobczak, Michael L. Extendible ladder. 5,018,600, Cl. 182-70.000.
- Sobrero, Aquiles C.: *See—*
  - Slocum, Edgar W.; Sobrero, Aquiles C.; and Wheland, Robert C., 5,019,632, Cl. 526-68.000.
- Societe Anonyme Dite: Aerospatiale Societe Nationale Industrielle: *See—*
  - Auberon, Marcel; and Phan, Albert, 5,018,638, Cl. 220-414.000.
- S.A. Donnay International: *See—*
  - Buand, Thierry M. M., 5,018,733, Cl. 273-75.000.
- Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.): *See—*
  - Braquet, Pierre; Pirotzky, Eduardo; Godfroid, Jean-Jacques; and Heymans, Francoise, 5,019,576, Cl. 514-255.000.
- Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A.: *See—*
  - Heurtel, Bertrand J. J. M.; Mondoloni, Pierre-Louis; and Serre, Jacques R., 5,018,941, Cl. 416-220.00R.
- Societe Nationale Elf Aquitaine: *See—*
  - Muller, Daniel; Chabagno, Jean-Michel; and Duval, Michel, 5,019,469, Cl. 429-192.000.
- Societe Nationale Industrielle et Aerospatiale: *See—*
  - Cahuzac, Georges J. J.; and Monget, Francois, 5,019,435, Cl. 428-36.100.
- Soda Aromatic Co., Ltd.: *See—*
  - Matsumoto, Yuichi, 5,019,434, Cl. 428-35.700.
- Sodich, Ernest O., to Nakfoor, Emil A.; and Vyas, Mahesh, a part interest. Apparatus for generating seismic waves 5,018,598, Cl. 181-106.000.
- Sodick Co., Ltd.: *See—*
  - Nishimura, Hideo, 5,019,685, Cl. 219-69.130.
- Soeda, Haruo: *See—*
  - Nagashima, Yasuo; Soeda, Haruo; Sato, Masamichi; and Kubo, Takashi, 5,018,257, Cl. 29-90.010.
- Soeder, Carl-Johannes; Zanders, Erich; Raphael, Thomas; Keusen, Heiner; and Groeneweg, Joost, to Forschungszentrum Juelich GmbH. Waste water purification process with batchwise supply of waste water to the activated sludge tank. 5,019,266, Cl. 210-605.000.
- Soejima, Yuji: *See—*
  - Takahashi, Akira; and Soejima, Yuji, 5,018,594, Cl. 180-140.000.
- Solal, Marc; and Gelly, Jean-Francois, to Thomson CSF. Directional antenna with multiple transducers, in particular for a sonar. 5,020,034, Cl. 367-138.000.
- Solomon, Paul M.; and Wright, Steven L., to International Business Machines Corporation. Germanium channel silicon MOSFET. 5,019,882, Cl. 357-23.800.
- Son, Yung S.: *See—*
  - Shin, Sang Y.; and Son, Yung S., 5,018,809, Cl. 350-96.120.
- Sone, Yuji: *See—*
  - Yazawa, Yoshihiro; Sone, Yuji; Yoshioka, Keiichi; Kinoshita, Noboru; and Hino, Masayuki, 5,019,181, Cl. 148-12.0EA.
- Sonoda, Yasuo: *See—*
  - Tomita, Hajime; and Sonoda, Yasuo, 5,019,164, Cl. 106-22.000.
- Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Idling speed control device of an engine. 5,018,494, Cl. 123-339.000.
- Sony Corporation: *See—*
  - Arai, Yuji; Ogawa, Hiroshi; and Hotori, Masahiro, 5,020,048, Cl. 369-291.000.
  - Dohi, Masahiro; and Nageno, Koji, 5,018,599, Cl. 181-129.000.
  - Dougall, David A.; Wilkinson, James H.; and Walker, Gavin A., 5,019,903, Cl. 358-140.000.
  - Fujito, Shogo, 5,019,915, Cl. 358-335.000.
  - Hosono, Yoshimasa, 5,019,816, Cl. 341-77.000.
  - Ida, Mitsuru; and Yamaguchi, Yasuhiro, 5,018,401, Cl. 74-354.000.
  - Kawaberi, Seiji; and Iwamoto, Hisashi, 5,019,953, Cl. 363-21.000.
  - Okanobu, Taiwa, 5,020,147, Cl. 455-302.000.
  - Yasuda, Hiroshi; Yokoya, Satoshi; and Takao, Nobutaka, 5,020,138, Cl. 455-115.000.
- Soofi, Madjid, to Magneco/Metrel, Inc. Method and devices for removing alumina and other inclusions from steel contained in tundishes. 5,018,710, Cl. 266-280.000.
- Soules, David A., to Phillips Petroleum Company. Apparatus and process for improved thermoplastic prepreg materials. 5,019,427, Cl. 427-375.000.
- Southeastern Universities Research Association: *See—*
  - Myneni, Ganapati R., 5,018,387, Cl. 73-295.000.
- Southwire Company: *See—*
  - Durham, Dwight H., 5,018,993, Cl. 439-801.000.
- SPA Societa' Prodotti Antibiotici S.p.A.: *See—*
  - Johnson, Eric A.; Dell'Acqua, Ernani; and Ferrari, Lorenzo, 5,019,411, Cl. 426-52.000.
- Spaanenburg, Hendrik A. E.: *See—*
  - Miller, Michael S.; and Spaanenburg, Hendrik A. E., 5,020,014, Cl. 364-723.000.
- Space Industries Partnership, L. P.: *See—*
  - Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 5,018,901, Cl. 403-349.000.
- Spahni, Milton D.: *See—*
  - Ryan, Leslie D.; Steinhardt, Mark J.; Spahni, Milton D.; and Baird, James C., 5,019,062, Cl. 604-359.000.
- Spain, Raymond G.: *See—*
  - Bailey, Carlos; and Spain, Raymond G., 5,018,271, Cl. 29-889.710.
- Spak, Mark A.: *See—*
  - Mammato, Donald C.; Jain, Sangya; Durham, Dana; Spak, Mark A.; Usifer, Douglas A.; and McFarland, Michael, 5,019,488, Cl. 430-325.000.
- Spalding & Evenflo Companies, Inc.: *See—*
  - Stiefel, Joseph F.; Nesbitt, R. D.; and Melvin, Terence, 5,018,741, Cl. 273-232.000.
  - Sullivan, Michael J., 5,018,740, Cl. 273-220.000.
- Sparks, Harold L.: *See—*
  - Rogers, Charles J.; Kornel, Alfred; and Sparks, Harold L., 5,019,175, Cl. 134-42.000.
- Sparks, Richard M.; and Tjepkes, Kendall D., to Deere & Company. Shaft seal assembly. 5,018,750, Cl. 277-38.000.
- Sparks, Robert E.; Mason, Norbert S.; and Center, Michael, to Washington University Technology Associates, Inc. Method for granulation. 5,019,302, Cl. 264-8.000.
- Sparton Corporation: *See—*
  - Rolinski, Adam E.; and Pattok, Greg R., 5,018,610, Cl. 192-4.00A.
- Speakman, Eugene R., to McDonnell Douglas Corporation. Interference fit bolt and sleeve. 5,018,920, Cl. 411-43.000.
- Spears, J. Richard; and Bourgelais, Donna, to Beth Israel Hospital, The. Method and apparatus for angioplasty. 5,019,075, Cl. 606-7.000.
- Spears, Susan T. Holder for pre-rigged fishing leaders. 5,018,298, Cl. 43-57.200.
- Spectra-Physics: *See—*
  - Alfrey, Anthony J.; and Palmer, James A., 5,020,073, Cl. 372-105.000.
- Spectra-Tech, Inc.: *See—*
  - Sting, Donald W.; Messerschmidt, Robert G.; and Reffner, John A., 5,019,715, Cl. 250-571.000.
- Spectrospin AG: *See—*
  - Allemann, Martin; and Caravatti, Pablo, 5,019,706, Cl. 250-291.000.
- Speed Queen Company: *See—*
  - Altnau, Ronald L., Sr., 5,018,372, Cl 68-18.00F.
- Speedy Die, Inc.: *See—*
  - Aramini, Salvatore, 5,019,193, Cl. 156-64.000

VOL 1126 ISS 4 MY 28 1991 UMI

- Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, to Degussa Aktiengesellschaft. Gray-black encapsulated pigments and method for their preparation. 5,019,169, Cl. 106-438.000.
- Spencer, Keith R.: *See—*
  - Larson, Richard C.; Spencer, Keith R.; Alercia, Don P.; Kwech, Horst; Litka, Thomas J.; and Ford, Guy J., 5,019,325, Cl. 376-260.000.
- Speranza, George P.; and Champion, Donald H., to Texaco Chemical Company. Purification of polyamines derived from polyhydroxyl compounds. 5,019,653, Cl. 564-497.000.
- Speraw, Floyd G.; and Meyer, Jay A., to NCR Corporation. Adapter for stacking printed circuit boards. 5,018,982, Cl. 439-74.000.
- Spiesser, Gilbert, to Sextant Avionique. Disengageable linear stepper motor with recentered rotor. 5,019,732, Cl. 310-49.00R.
- Spinelli, Harry J., to Du Pont de Nemours, E. I., and Company. Silicone containing acrylic star polymers. 5,019,628, Cl. 525-288.000.
- Spirax-Sarco Limited: *See—*
  - Carmichael, Richard Q., 5,020,000, Cl. 364-500.000.
- Spirex Corporation: *See—*
  - Colby, Paul N., 5,018,917, Cl. 409-296.000.
- Spohn, William P.: *See—*
  - Hickox, Richard M.; Spohn, William P.; and D'Amico, David J., 5,018,395, Cl. 73-864.340.
- Sporon-Fiedler, Frederik, to Hewlett-Packard Company. Method for finding a reference point. 5,020,006, Cl. 364-550.000.
- Sprague Electric Company: *See—*
  - Linzey, Raynor; and Rice, Herbert L., 5,019,418, Cl. 427-79.000.
- Spratlin, W. B.: *See—*
  - Rutledge, Jack, Jr., 5,018,799, Cl. 303-118.000.
- Spratt, David B.: *See—*
  - Virkus, Robert L.; Spratt, David B.; and Zorinsky, Eldon J., 5,019,525, Cl. 437-32.000.
- Spruill, James G.: *See—*
  - Burke, Roger E.; and Spruill, James G., 5,019,622, Cl. 524-532.000.
- SPS Technologies, Inc.: *See—*
  - Kibblewhite, Ian E.; and Strunk, Robert H., 5,018,988, Cl. 439-577.000.
- Square D Company: *See—*
  - Zylstra, Henry J.; and Flock, Steven J., 5,019,936, Cl. 361-93.000.
- Squibb, John P.: *See—*
  - Rutledge, Jack, Jr., 5,018,799, Cl. 303-118.000.
- SRI International: *See—*
  - Avery, Mitchell A.; and Chong, Wesley K. M., 5,019,590, Cl. 514-450.000.
- Sridharan, Sri P.; and Jungman, Frank, to Radionic Industries Inc. Enclosure for and/or enclosure containing a ballast circuit. 5,019,938, Cl. 361-377.000.
- Srinivasan, Supramaniam: *See—*
  - White, Ralph E.; Mao, Zhenhua; and Srinivasan, Supramaniam, 5,019,227, Cl. 204-128.000.
- Stadele, Norbert: *See—*
  - Weimar, Michael; and Stadele, Norbert, 5,018,681, Cl. 242-131.000.
- Staff, Alan: *See—*
  - Jurchuk, Paul; Hooper, David; Staff, Alan; and Sitt, Hans, 5,018,338, Cl. 53-532.000.
- Staffin, H. Kenneth: *See—*
  - Hemsath, Klaus H.; Staffin, H. Kenneth; and Owsiany, Michael, 5,018,707, Cl. 266-254.000.
- Staggl, Roland: *See—*
  - Bernd, Alfred; England, Willi; Flaig, Heinz; Hesse, Wilhelm; Staggl, Roland; and Zacharias, Karl, 5,019,734, Cl. 310-77.000.
- Stagni, Rino: *See—*
  - Triolo, Innocenzo; and Stagni, Rino, 5,018,500, Cl. 123-463.000.
- Stahl, Norman O. Method and apparatus for removing gelatinous tissue. 5,019,036, Cl. 604-22.000.
- Staley, Dennis W.: *See—*
  - Chamings, Antony W.; Staley, Dennis W.; and Mannke, Gary, 5,018,783, Cl. 296-219.000.
- Staley, John R., III: *See—*
  - Bennett, Keith E.; and Staley, John R., III, 5,018,833, Cl. 350-314.000.
- Stallings, Robert L., Jr.; and Wilcox, Floyd J., Jr., to United States of America, National Aeronautics. Passive venting technique for shallow cavities. 5,018,688, Cl. 244-137.400.
- Stamatiou, Paul O.; and Stevens, Christopher R., to Kimberly-Clark Corporation. Mat holder. 5,018,235, Cl. 15-215.000.
- Stamm, Hubert: *See—*
  - Weber, Robert; and Stamm, Hubert, 5,019.228, Cl. 204;129.75-.
- Standard Microsystems Corporation: *See—*
  - Wanlass, Frank, 5,020,028, Cl. 365-154.000.
- Standard Products Company, The: *See—*
  - Vaughan, Robert A., 5,018,308, Cl. 49-491.000.
- Stanislowski, Anna G.; England, J. Bruce; and Ratcliff, Steven D., to Clorox Company, The. Combined odor controlling animal litter. 5,018,482, Cl. 119-173.000.
- Stanley, Harold A.: *See—*
  - Reese, Robert T.; and Stanley, Harold A., 5,019,511, Cl. 435-240.270.
- Stanziola, Christopher A.: *See—*
  - Gorin, Allen L.; Makofsky, Patrick A.; Morton, Nancy; Oliver, Neal C.; Shively, Richard R.; and Stanziola, Christopher A., 5,020,059, Cl. 371-11.300.
- Stapleton, Barbara K.: *See—*
  - Stapleton, John J.; and Stapleton, Barbara K., 5,019,807, Cl. 340-718.000
- Stapleton, John J.; and Stapleton, Barbara K., to StapleVision, Inc. Display screen. 5,019,807, Cl. 340-718.000.
- StapleVision, Inc.: *See—*
  - Stapleton, John J.; and Stapleton, Barbara K., 5,019,807, Cl. 340-718.000.
- Staritzbichler, Werner: *See—*
  - Rauch-Puntigam, Harald; Staritzbichler, Werner; and Morre, Peter, 5,019,621, Cl. 524-513.000.
- Stark, William D.; and Prestas, Gregory C., to Array Analysis, Inc. System for displaying adaptive inference testing device information. 5,020,011, Cl. 364-580.000.
- Starke, Carl I.: *See—*
  - Brandstrom, Arne E.; Lindberg, Per L.; Starke, Carl I.; and Sunden, Gunnel E., 5,019,584, Cl. 514-338.000.
- Starr, Benjamin F.; Wallace, Mark L.; Talley, Gaylen M.; and Woo, Paul M., to Boeing Company, The. General purpose avionics display monitor. 5,019,980, Cl. 364-424.040.
- Stauffer, Jorg; and Muller, Pierre, to Ringtex-Kolifrath S.a.r.l. Needle ring with needles for the combing cylinder of an open-end spinning machine. 5,019,110, Cl. 19-128.000.
- Stavin, Norman M.; and Johnson, Gary D., to Stavin, Norman M. Manual push feeder device for woodworking machines. 5,018,773, Cl. 294-1.100.
- STC PLC: *See—*
  - Birch, Martin J., 5,018,834, Cl. 350-333.000.
  - Brown, Charles J., 5,018,251, Cl. 24-122.600.
- STE Look: *See—*
  - Mercat, Jean-Pierre, 5,018,392, Cl. 73-862.190.
- Steberger, Paul. Sandless beach blankets. 5,018,[illegible]30, Cl. 5-420.000.
- Steckis, Al. Deflashing apparatus. 5,018,312, Cl. 51-164.100.
- Steidl, Gary V.; Sabin, Cullen M.; and Thomas, Dennis A., to International Thermal Packaging, Inc. Multi-staged desiccant refrigeration device. 5,018,368, Cl. 62-480.000.
- Stein, Ludwig: *See—*
  - Romer, Michael; and Stein, Ludwig, 5,019,425, Cl. 427-305.000.
- Steinberger, Ned, to Steinberger Sound Corporation. Tuning peg. 5,018,424, Cl. 84-304.000.
- Steinberger Sound Corporation: *See—*
  - Steinberger, Ned, 5,018,424, Cl. 84-304.000.
- Steiner, Johann; and Jarosz, John M., to Zenith Electronics Corporation. Method of manufacturing cathode ray tubes with binary coded faceplates. 5,019,004, Cl. 445-30.000.
- Steinhardt, Mark J.: *See—*
  - Ryan, Leslie D.; Steinhardt, Mark J.; Spahni, Milton D.; and Baird, James C., 5,019,062, Cl. 604-359.000.
- Steininger, Helmut, to BASF Aktiengesellschaft. Sheet-like, multilayer magneto-optical recording material. 5,019,462, Cl. 428-694.000.
- Steinkamp, John O.; and Morrison, William S., to Ford New Holland, Inc. Backhoe hydraulic cylinder decelerator. 5,018,934, Cl. 414-695.500.
- Steketee, Edward; and Clements, Brad E., to Hewlett-Packard Company. T-rail printed circuit board guide and support. 5,019,948, Cl. 361-415.000.
- Stengaard, Flemming F., to Dow Danmark A/S. Permeable, porous polymeric membrane with hydrophilic character methods for preparing said membranes and their use. 5,019,261, Cl. 210-490.000.
- Stephan, Peter, to Bergwerksverband GmbH. Combined rigid profile and stretching roof bolt with expansion element. 5,018,919, Cl. 411-33.000.
- Stephens, William H. Method and apparatus for preventing eyeglasses from sinking in water. 5,019,000, Cl. 441-006.000.
- Stephenson, Dwight B.: *See—*
  - Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., 5,019,983, Cl. 364-424.070.
- Sterbank, John D.: *See—*
  - Anspaugh, Dennis J.; and Sterbank, John D., 5,018,243, Cl. 16-335.000.
- Stern, Howard: *See—*
  - Hecker, Joel; Stern, Howard; and Heydenburg, Tom, 5,018,803, Cl. 350-3.710.
- Stern, Melvin J. Method for making a metal screen door frame. 5,018,263, Cl. 29-469.500.
- Sternad, William A. Automatic storage and retrieval apparatus. 5,018,926, Cl. 414-253.000.
- Sternlieb, Herschel, to Charles Samelson Co. White blackout fabric. 5,019,445, Cl. 428-323.000.
- Sterrett, Terry L.: *See—*
  - Andreiko, Craig; and Sterrett, Terry L., 5,018,969, Cl. 433-20.000.
- Stevens, Christopher R.: *See—*
  - Stamatiou, Paul O.; and Stevens, Christopher R., 5,018,235, Cl. 15-215.000.
- Stevens-Crowe, Jeanne S.: *See—*
  - Su, Kai C.; and Stevens-Crowe, Jeanne S., 5,018,849, Cl. 351-162.000.
- Stevens, William E. Marine fender for pilings of marine structures. 5,018,471, Cl. 114-219.000.
- Stewart, David B.; and Wood, Godfrey A., to Molins PLC. Cigarette making machine. 5,018,538, Cl. 131-109.100.
- Stewart, Grant M.: *See—*
  - Clearman, Jack F.; Casey, William J.; Furin, Olivia P.; and Stewart, Grant M., 5,019.122, Cl. 131-194.000.
- Stewart, Lloyd D., Jr.: *See—*
  - Udell, Kent S.; Sitar, Nicholas; Hunt, James R.; and Stewart, Lloyd D., Jr., 5,018,576, Cl. 166-272.000.

- Stewart, Ray F.: *See—*
  - Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., 5,019,235, Cl. 204-282.000.
- Stiefel, Joseph F.; Nesbitt, R. D.; and Melvin, Terence, to Spalding & Evenflo Companies, Inc. Golf ball. 5,018,741, Cl. 273-232.000.
- Stihl, Andreas: *See—*
  - Wolf, Gunter; and Fink, Reinhold, 5,018,492, Cl. 123-198.00E.
- Stim Lab, Inc.: *See—*
  - Penny, Glenn S., 5,018,396, Cl. 73-865.600.
- Sting, Donald W.; Messerschmidt, Robert G.; and Reffner, John A., to Spectra-Tech, Inc. Optical system and method for sample analyzation. 5,019,715, Cl. 250-571.000.
- Stockberger, Randall L.; and Bunsen, Christopher M., to Hewlett Packard Company. Method and apparatus for matching menu labels with keys. 5,020,012, Cl. 364-709.140.
- Stolzlechner, Konrad: *See—*
  - Goebel, Rudolf A.; and Stolzlechner, Konrad, 5,018,327, Cl. 52-282.000.
- Stopinc Aktiengesellschaft: *See—*
  - Muller, Bruno; and Waltenspuhl, Rolf, 5,019,159, Cl. 75-533.000.
- Storandt, Duane L. Applicator mitt. 5,019,058, Cl. 604-290.000.
- Stordahl, Finn R. Implant teeth—permanent bases with replaceable caps. 5,018,970, Cl. 433-75.000.
- Stranco, Inc.: *See—*
  - Brazelton, Carl L.; Litherland, Troy C.; and Johnston, James G., 5,018,870, Cl. 366-161.000.
  - Brazelton, Carl L.; and Litherland, Troy C., 5,018,871, Cl. 366-168.000.
- Strasser, William E.: *See—*
  - Fischer, Michael C.; and Strasser, William E., 5,019,788, Cl. 330-9.000.
- Stratacom, Inc.: *See—*
  - Holden, Brian D.; Presuhn, Randall M.; Robertson, William L.; and Schultz, Gaymond W., 5,020,058, Cl. 370-109.000.
- Stratus Computer, Inc.: *See—*
  - Williams, Jeffrey L., 5,020,024, Cl. 364-900.000.
- Strauss, Leo. Lamp structure with coaxial ring switch module. 5,019,753, Cl. 315-362.000.
- Strauss, Wolfgang: *See—*
  - Durschimidt, Ferry; Kolb, Harmut; Strauss, Wolfgang; and Weckenmann, Hartmut, 5,018,348, Cl. 60-274.000.
- Strawson, Colin J.: *See—*
  - Arnould, Jean C.; Boucherot, Dominique; Davies, David H.; Jung, Frederick H.; and Strawson, Colin J., 5,019,570, Cl. 514-202.000.
- Streater, Richard W.: *See—*
  - Suthers, Mark S.; Ester, Grantley O.; and Streater, Richard W., 5,019,742, Cl. 310-313.00C.
- Streile, Gary P.: *See—*
  - Cowan, Christina E.; Van Voris, Peter; Streile, Gary P.; Cataldo, Dominic A.; and Burton, Frederick G., 5,019,998, Cl. 364-496.000.
- Strelnieks, John, to Moonflower Vases Company. Method of producing a decorative container. 5,019,424, Cl. 427-264.000.
- Strosser, Richard P.: *See—*
  - McClure, John R.; Weaver, Marvin G., Jr.; and Strosser, Richard P., 5,018,342, Cl. 56-10.500.
- Strunk, Robert H.: *See—*
  - Kibblewhite, Ian E.; and Strunk, Robert H., 5,018,988, Cl. 439-577.000.
- Sturm, Reinhold: *See—*
  - Humpl, Josef; Konrad, Johann; Sturm, Reinhold; and Attenni, Johann, 5,018,502, Cl. 123-514.000.
- Stursberg, Bernd, to Peddinghaus, Carl Ullrich. Drilling apparatus for structural steel shapes. 5,018,911, Cl. 408-13.000.
- Su, Jung-Hoon, to SamSung Electronics Co., Ltd. Apparatus and method for reducing flickering in a still video frame in a digital image processing system. 5,019,908, Cl. 358-166.000.
- Su, Kai C.; and Stevens-Crowe, Jeanne S., to Ciba-Geigy Corporation. Colored contact lens and methods of making the same. 5,018,849, Cl. 351-162.000.
- Sudou, Yuko: *See—*
  - Ogata, Teruaki; and Sudou, Yuko, 5,020,009, Cl. 364-580.000.
  - Ogata, Teruaki; and Sudou, Yuko, 5,020,010, Cl. 364-580.000.
- Suga, Mitsuhiro, to Nippon Antenna Company Limited. Electrically powered mechanism for expanding and contracting antenna. 5,019,834, Cl. 343-877.000.
- Suga, Nobuhiko: *See—*
  - Ai, Hideo; Suga, Nobuhiko; Ogitani, Satoshi; Takahashi, Hideaki; and Ikeda, Akihiko, 5,019,482, Cl. 430-283.000.
- Sugai, Hiroshi: *See—*
  - Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi; Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, 5,019,773, Cl. 324-166.000.
- Sugai, Kazunari; Takeuchi, Osamu; Wakasa, Yasuyuki; Taguchi, Kenji; and Ogata, Toshio, to Hitachi, Ltd. Apparatus for handling sheets of paper. 5,019,249, Cl. 209-534.000.
- Sugasawa, Masayuki: *See—*
  - Yamamoto, Kazumi; and Sugasawa, Masayuki, 5,019,895, Cl. 358-36.000.
- Sugawa, Shigetoshi: *See—*
  - Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, 5,019,702, Cl. 250-208.100.
- Sugawara, Takahiro: *See—*
  - Iwane, Hiroshi; Sugawara, Takahiro; and Suzuki, Naoki, 5,019,656, Cl. 568-764.000.
- Sugihara, Tadashi: *See—*
  - Takeshita, Takuo; and Sugihara, Tadashi, 5,019,554, Cl. 505-1.000.
- Sugimoto, Hiroshi: *See—*
  - Abe, Yuji; Sugimoto, Hiroshi; Ohtsuka, Kenichi; Oishi, Toshiyuki; and Matsui, Teruhito, 5,020,072, Cl. 372-96.000.
- Sugimoto, Kenichi: *See—*
  - Mizushima, Yoshihiko; Iida, Takashi; Hirohata, Toru; Sugimoto, Kenichi; Warashina, Yoshihisa; and Nakajima, Kazutoshi, 5,020,064, Cl. 372-37.000.
- Sugimoto, Shigeo: *See—*
  - Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.
- Sugimoto, Yasuhiro, to Kabushiki Kaisha Toshiba. Bias circuit for a subranging analog to digital converter. 5,019,821, Cl. 341-156.000.
- Sugitani, Tatsuo: *See—*
  - Masaki, Syouichi; Maehata, Hiromi; Sakai, Kazunori; and Sugitani, Tatsuo, 5,019,984, Cl. 364-426.020.
- Sugiura, Susumu, to Canon Kabushiki Kaisha. Image reading apparatus. 5,020,118, Cl. 382-50.000.
- Sugiura, Yasuyuki; Oue, Rika; Miyashita, Kunio; Nagase, Hiroshi; Mutoh, Nobuyoshi; Kobayashi, Sumio; and Sugai, Hiroshi, to Hitachi, Ltd. Method and apparatus for detecting positions and/or speed of a moving body using two phase signals. 5,019,773, Cl. 324-166.000.
- Sugiyama, Norifumi: *See—*
  - Murakami, Kenji; Tonooka, Yasuaki; Saito, Norie; Nakasuji, Kokichi; and Sugiyama, Norifumi, 5,019,499, Cl. 435-69.100.
- Suhr, Harald: *See—*
  - Oehr, Christian; and Suhr, Harald, 5,019,415, Cl. 427-39.000.
- Sullivan, Michael J.; Dussault, Douglas G.; and Dinsmore, Daniel, Jr., to United States of America, Navy. Horizontally moveable weight stabilizing device. 5,018,472, Cl. 114-244.000.
- Sullivan, Michael J., to Spalding & Evenflo Companies, Inc. Golf ball core. 5,018,740, Cl. 273-220.000.
- Sulmone, Michael, to Hale Fire Pump Company. Thermal relief valve. 5,018,665, Cl. 236-93.00A.
- Sulzer Brothers Limited: *See—*
  - Frey, Otto; and Koch, Rudolf, 5,019,082, Cl. 606-85.000.
  - Willert, Hans-Georg, 5,019,106, Cl. 623-22.000.
- Sumigawa, Yukio, to Sanshin Kogyo Kabushiki Kaisha. Tilt handle. 5,018,995, Cl. 440-63.000.
- Sumitec Inc.: *See—*
  - Roser, Daniel J.; and Hirose, Teruyoshi, 5,018,702, Cl. 248-904.000.
- Sumitomo Chemical Company, Limited: *See—*
  - Minai, Masayoshi; and Higashii, Takayuki, 5,019,298, Cl. 260-410.500.
  - Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, 5,019,615, Cl. 524-100.000.
  - Ogawa, Tadatoshi; and Ima, Seiichiro, 5,019,442, Cl. 428-215.000.
  - Yano, Toshihiko; Torisu, Yoko; Sekihachi, Hiroko; Matsuo, Noritada; Takagaki, Tohei; and Tsushima, Kazunori, 5,019,595, Cl. 514-531.000.
- Sumitomo Electric Industries, Ltd.: *See—*
  - Nishiguchi, Masanori; and Okazaki, Naoto, 5,019,875, Cl. 357-22.000.
  - Nishio, Masanobu, 5,019,457, Cl. 428-606.000.
  - Ooe, Masaharu; Ishiguro, Yoichi; and Tanaka, Gotaro, 5,018,824, Cl. 350-96.210.
  - Takata, Koji, 5,018,797, Cl. 303-117.000.
- Sumitomo Heavy Industries, Ltd.: *See—*
  - Kitamura, Takehiko; Amano, Hirosato; and Kaita, Masaharu, 5,018,962, Cl. 425-556.000.
- Sumitomo Metal Industries Ltd.: *See—*
  - Nakamura, Seiichi; Nakayama, Satoshi; and Inoue, Takashi, 5,019,117, Cl. 118-723.000.
  - Ogata, Ryuji; Nakano, Naokazu; and Suzuki, Shuichi, 5,019,191, Cl. 148-307.000.
- Sumizawa, Akio: *See—*
  - Yamamoto, Akito; Ueno, Takashi; and Sumizawa, Akio, 5,019,964, Cl. 364-200.000.
- Summit Technology, Inc.: *See—*
  - Muller, David F., 5,019,074, Cl. 606-5.000.
- Sun Microsystems, Inc.: *See—*
  - Malachowsky, Chris, 5,020,002, Cl. 364-518.000.
- Sun Refining and Marketing Company: *See—*
  - Hsu, Chao-Yang; Patel, Vasant K.; Vahlsing, David H.; Wei, James T.; and Myers, Harry K., Jr., 5,019,671, Cl. 585-751.000.
- Sundblom, Leif J.: *See—*
  - Wang, Carl C. T.; and Sundblom, Leif J., 5,019,037, Cl. 604-23.000.
- Sunden, Gunnel E.: *See—*
  - Brandstrom, Arne E.; Lindberg, Per L.; Starke, Carl I.; and Sunden, Gunnel E., 5,019,584, Cl. 514-338.000.
- Sundholm, Goran. Filter apparatus with a spring loaded safety valve plate. 5,019,251, Cl. 210-133.000.
- Sundstrand Corporation: *See—*
  - Foster, Joseph; and Rashid, Abdul, 5,019,718, Cl. 307-84.000.
- Sunshon Molding Co., Ltd.: *See—*
  - Chiu, Hsiu-Hui, 5,018,405, Cl. 74-529.000.
- Surti, Tyrone N. Drive apparatus for a process cartridge of an image-forming apparatus. 5,019,861, Cl. 355-200.000.
- Suszynski, Edward D.; Banke, Kerry; and Gregory, Thomas K., to Diatek, Inc. Probe assembly for infrared thermometer. 5,018,872, Cl. 374-133.000.
- Suthers, Mark S.; Ester, Grantley O.; and Streater, Richard W., to Northern Telecom Limited. Saw device with apodized IDT. 5,019,742, Cl. 310-313.00C.

VOL
1126
ISS
4
MY
28
1991
UMI

- Suzuki, Akira; Hibino, Hiroki; Fukuda, Hiroyuki; Takahashi, Yutaka; and Ishikawa, Akibumi, to Olympus Optical Co., Ltd. Endoscope insertion controlling apparatus. 5,018,509, Cl. 128-6.000.
- Suzuki, Akira; Mochizuki, Hidehiro; Shimada, Masaru; and Uemura, Hiroyuki, to Ricoh Company, Ltd. Sublimation type thermosensitive image transfer recording medium, and thermosensitive recording method using the same. 5,019,550, Cl. 503-227.000.
- Suzuki, Hiroshi; Ishikawa, Hiroshi; Oguro, Keisuke; Kato, Akihiko; Okada, Teruya; Sakamoto, Shizuo; Kawashima, Hiroyuki; and Sakaguchi, Keizo, to Agency of Industrial Science & Technology; and Kurimoto Ltd. Reactor with hydrogen adsorption alloy. 5,019,358, Cl. 422-197.000.
- Suzuki, Issei. Pipe for measuring erythrocyte sedimentation rate. 5,019,349, Cl. 422-73.000.
- Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Shinkai, Tatsuya, 5,018,487, Cl. 123-90.160.
- Suzuki, Keiko: *See—*
  - Higashiyama, Shuiichi; and Suzuki, Keiko, 5,019,475, Cl 430-138.000.
- Suzuki, Kenji, to Fuji Photo Film Co., Ltd. Photographic printer. 5,019,858, Cl. 355-35.000.
- Suzuki, Kiyosuke: *See—*
  - Shirata, Atsushi, and Suzuki, Kiyosuke, 5,019,897, Cl. 358-75.000.
- Suzuki, Makoto; Watanabe, Satoshi; Tsukamoto, Takashi; Aoki, Hikoharu; Ohri, Hitomi; and Sako, Yukihiro, to Brother Kogyo Kabushiki Kaisha. Method of optically coupling optical fiber to waveguide on substrate, and optical device produced by the method 5,018,817, Cl. 350-96.170.
- Suzuki, Masatoshi: *See—*
  - Tanaka, Hideaki; Akiba, Shigeyuki, Suzuki, Masatoshi; and Utaka, Katsuyuki, 5,019,519, Cl. 437-22.000.
- Suzuki, Masayuki; Matsumoto, Zenji; and Fukui, Teruo, to Takeda Chemical Industries, Ltd. Activated carbon for recovery of gold. 5,019,162, Cl. 75-744.000.
- Suzuki, Motoharu; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, to Nissan Motor Company, Ltd. Air-bag device 5,018,762, Cl. 280-731.000.
- Suzuki, Naoki: *See—*
  - Iwane, Hiroshi; Sugawara, Takahiro; and Suzuki, Naoki, 5,019,656, Cl. 568-764.000.
- Suzuki, Ryoichi: Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, to Nissin Shokuhin Kabushiki Kaisha. Self-heating container. 5,018,505, Cl. 126-262.000.
- Suzuki, Seiji, to Pearl Musical Instrument Co. Hi-hat stand apparatus for supporting a pair of cymbals. 5,018,426, Cl. 84-422.300.
- Suzuki, Shuichi: *See—*
  - Ogata, Ryuji; Nakano, Naokazu; and Suzuki, Shuichi, 5,019,191, Cl. 148-307.000.
- Suzuki, Tadashi; and Wada, Yoneji, to Takano Corporation. Parallel filtering circuit with conduits of different rates. 5,019,257, Cl 210-253.000.
- Suzuki, Takashi: *See—*
  - Sampei, Kazue; Suzuki, Takashi; and Ujiie, Futoshi, 5,020,151, Cl. 455-345.000.
- Suzuki, Toshiji: *See—*
  - Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, 5,019,702, Cl. 250-208.100.
- Suzuki, Toshikazu: *See—*
  - Sato, Noritada; Suzuki, Toshikazu; and Ishiwata, Osamu, 5,019,886, Cl. 357-29.000.
- Suzuki, Toshitake; Seyama, Fumio; Okauchi, Shuki; Saito, Taranosuke; Kitani, Masakatu; and Ishibashi, Takashi, to Kanzaki Paper Manufacturing Co., Ltd.; and Sanko Kaihatsu Kagaku Kenkyusho Corporation. Heat sensitive recording material. 5,019,548, Cl. 503-209.000.
- Suzumura, Hirokazu: *See—*
  - Kuki, Nobuyuki; Isomura, Yukio; Suzumura, Hirokazu; and Sakakibara, Yoshikazu, 5,018,305, Cl. 49-348.000.
- Svenska Rotor Maskiner AB: *See—*
  - Sjte, Lars, ml/o/ holm; and Ludin, Stig, 5,018,948, Cl. 417-302.000.
- Svoboda, Vaclan: *See—*
  - Blangetti, Francisco; and Svoboda, Vaclan, 5,018,572, Cl. 165-113.000.
- Swanson, David K.: *See—*
  - Bach, Stanley M., Jr.; Lang, Douglas J ; Swanson, David K.; and Dahl, Roger W., 5,018,523, Cl. 128-419.0PG.
- Swapp, Mavin; and Collis, Charles, to Motorola, Inc. Antimetastable state circuit. 5,020,038, Cl 368-120.000.
- Swartzel, Kenneth R.; and Ball, Hershell R., Jr., to North Carolina State University. Method for pasteurizing liquid whole egg products. 5,019,407, Cl. 426-399.000.
- Swartzel, Kenneth R.; Ball, Hershell R., Jr.; and Hamid-Samimi, Mohammad-Hossein, to North Carolina State University. Method for the ultrapasteurization of liquid whole egg products. 5,019,408, Cl. 426-399.000.
- Swenson, Gleo S.; Grove, Robert D.; and Grove, Clinton E. Hinge and connection assembly for removable truck topper. 5,018,777, Cl. 296-100.000.
- Swenson, Joseph M.: *See—*
  - Brewer, John R.; Swenson, Joseph M.; and Maas, Reginald R., 5,019,307, Cl. 264-67.000.
- Swirski, Chester, Jr., to Technicon Instruments Corporation. Immunoanalysis method for discriminating between antigen excess and antibody excess conditions. 5,019,999, Cl. 364-497.000.
- Symanski, Chris P.: *See—*
  - Boles, Glenn M.; Schober, Gary W.; Chein, Wen S.; Symanski, Chris P.; Des Rioux, Philippe; and Tomkoski, Walter, III, 5,019,899, Cl. 358-84.000.
- Symbol Technologies, Inc.: *See—*
  - Chang, Sheldon, 5,019,764, Cl. 318-627.000.
- Synthes (U.S.A.): *See—*
  - Perren, Stephen M.; Frigg, Robert; Gisin, Paul; and Mathys, Robert, Jr., 5,019,078, Cl. 606-61.000.
- Szabo, Thomas J.: *See—*
  - Wiley, Kenneth D.; Zellner, John W.; St. Laurent, Andre; Newman, James A.; Szabo, Thomas J.; and Shewchenko, Nicholas, 5,018,977, Cl. 434-274.000.
- Szymanski, Raymond: *See—*
  - Chaumette, Patrick; Le Peltier, Fabienne; Szymanski, Raymond; Courty, Philippe; and Verdon, Catherine, 5,019,547, Cl. 502-342.000.
- Tabata, Hajime: *See—*
  - Kano, Kouji; Tabata, Hajime; and Kawakami, Toshikazu, 5,019,733, Cl. 310-61.000.
- Tabourier, Remy, to Thomson-CSF. Method and circuit for the automatic control of the speed of a DC motor by the control voltage of the motor. 5,020,126, Cl. 388-815.000.
- Tachi-S Co. Ltd.: *See—*
  - Ogasawara, Hiromitsu, 5,019,765, Cl. 318-628.000.
- Tachika, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Direct sequence spread spectrum modulation apparatus. 5,020,075, Cl. 375-1.000.
- Tada, Katsuhisa, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,020,065, Cl. 372-44.000.
- Tada, Noburu; Mukai, Tadaharu; and Shino, Katsuhide, to Sharp Kabushiki Kaisha. Multifunction card type electronic apparatus. 5,019,700, Cl. 235-492.000.
- Taggi, Arthur J.: *See—*
  - Benack, Kerin S.; and Taggi, Arthur J., 5,019,472, Cl. 430-43.000.
- Taguchi, Katsuyuki: *See—*
  - Takemura, Shigeo; and Taguchi, Katsuyuki, 5,019,925, Cl. 360-71.000.
- Taguchi, Kenji: *See—*
  - Sugai, Kazunari; Takeuchi, Osamu; Wakasa, Yasuyuki; Taguchi, Kenji; and Ogata, Toshio, 5,019,249, Cl. 209-534 000.
- Tai, Hwai T.; and Thompson, John R., to Eastman Kodak Company System for producing serrated, alternating pixel pattern on character boundaries. 5,020,119, Cl 382-50.000.
- Taiyo Yuden Co., Ltd.: *See—*
  - Arai, Yuji; Ogawa, Hiroshi; and Hotori, Masahiro, 5,020,048, Cl. 369-291.000.
- Tajima, Akio: *See—*
  - Koike, Yasushi; and Tajima, Akio, 5,018,655, Cl. 226-101.000.
- Tajima, Joji: *See—*
  - Hiraide, Takashi; Kusunoki, Ituro; and Tajima, Joji, 5,019,209, Cl 156-630.000.
- Takabayashi, Hiroshi: *See—*
  - Yabu, Shigeki; and Takabayashi, Hiroshi, 5,019,201, Cl. 156-273.900.
- Takada, Hiroshi: *See—*
  - Yoshida, Kaichiro; Takada, Hiroshi; and Nakajima, Toshio, 5,018,556, Cl. 139-68.000.
- Takagaki, Tohei: *See—*
  - Yano, Toshihiko; Torisu, Yoko; Sekihachi, Hiroko; Matsuo, Noritada; Takagaki, Tohei; and Tsushima, Kazunori, 5,019,595, Cl. 514-531.000.
- Takagi, Tadao: *See—*
  - Sato, Toshihiro; and Takagi, Tadao, 5,019,853, Cl. 354-420.000.
- Takagi, Yukio: *See—*
  - Shimosaka, Satoru; Kuno, Yukinobu; Takagi, Yukio; and Mizuno, Masuo, 5,018,561, Cl. 144-209.00R.
- Takahashi, Akira; and Soejima, Yuji, to Fuji Jukogyo Kabushiki Kaisha. Rear-wheel steering system for four-wheel steering vehicle. 5,018,594, Cl. 180-140.000.
- Takahashi, Hideaki: *See—*
  - Ai, Hideo; Suga, Nobuhiko; Ogitani, Satoshi; Takahashi, Hideaki; and Ikeda, Akihiko, 5,019,482, Cl. 430-283.000.
- Takahashi, Hideshi: *See—*
  - Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, 5,019,476, Cl. 430-20.000.
- Takahashi, Hiroshi, to Nissan Motor Co., Ltd. Control for automatic transmission. 5,019,979, Cl. 364-424.100.
- Takahashi, Makoto: *See—*
  - Yoshimoto, Teruo; and Takahashi, Makoto, 5,019,331, Cl. 420-51.000.
- Takahashi, Masaharu: *See—*
  - Yoshida, Takeo; and Takahashi, Masaharu, 5,019,295, Cl. 252-518.000.
- Takahashi, Minoru: *See—*
  - Ohwe, Takeshi; Yoneoka, Seiji; and Takahashi, Minoru, 5,019,931, Cl. 360-104.000.
- Takahashi, Osamu: *See—*
  - Kobayashi, Hidetoshi; and Takahashi, Osamu, 5,019,490, Cl. 430-503.000.
- Takahashi, Sankichi: *See—*
  - Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, 5,018,367, Cl. 62-476.000.

- Takahashi, Satoru: *See—*
  - Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.
- Takahashi, Susumu: *See—*
  - Mitani, Katsuhiko; Tanoue, Tomonori; Kusano, Chushiro; Kobayashi, Masayoshi; and Takahashi, Susumu, 5,019,524, Cl. 437-31.000.
  - Nakamura, Tohru; Miyazaki, Takao; Takahashi, Susumu; Imaizumi, Ichiro; Okabe, Takahiro; Nagata, Minoru; and Kawamura, Masao, 5,019,523, Cl. 437-31.000.
- Takahashi, Tadashi: *See—*
  - Kawamata, Syooichi; Takahashi, Tadashi; and Miyashita, Kunio, 5,019,776, Cl. 324-207.120.
- Takahashi, Toshihiko: *See—*
  - Oka, Hiroshi; Okuda, Chozo; Yoshida, Yoshinori; Takahashi, Toshihiko; Kamoshida, Yoichi; and Miura, Takao, 5,019,479, Cl. 430-172.000.
- Takahashi, Tsutomu: *See—*
  - Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,019,981, Cl. 364-424.050.
- Takahashi, Yumiko: *See—*
  - Sawa, Takao; Okamura, Masami; and Takahashi, Yumiko, 5,019,190, Cl. 148-306.000.
- Takahashi, Yutaka: *See—*
  - Suzuki, Akira; Hibino, Hiroki; Fukuda, Hiroyuki; Takahashi, Yutaka; and Ishikawa, Akibumi, 5,018,509, Cl. 128-6.000.
- Takahira, Kenichi: *See—*
  - Yamaguchi, Atsuo; Takahira, Kenichi; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,019,970, Cl. 364-200.000.
- Takai, Kazuki; and Ishikura, Eiji, to Clarion Co., Ltd. Tape reel rotation detecting apparatus. 5,019,924, Cl. 360-73.140.
- Takaku, Sakae: *See—*
  - Miura, Yutaka; Yoshida, Mitsutaka; Fujimura, Yasuo; Takaku, Sakae; and Noda, Yukifumi, 5,019,574, Cl. 514-235.200.
- Takakura, Koichi, to Think Laboratory Co., Ltd. Method for forming plate characters in a half-tone gravure platemaking process. 5,019,486, Cl. 430-307.000.
- Takami, Akira, to Mitsubishi Denki Kabushiki Kaisha. Continuously variable traction drive speed changer. 5,018,400, Cl. 74-198.000.
- Takano Corporation: *See—*
  - Suzuki, Tadashi; and Wada, Yoneji, 5,019,257, Cl. 210-253.000.
- Takao, Kouji: *See—*
  - Kumasaka, Hideyuki; Takao, Kouji; Kuriyama, Hiroshi; Hagiwara, Tarou; and Miyazaki, Kenichi, 5,018,781, Cl. 296-210.000.
- Takao, Mitsunori: *See—*
  - Hara, Mitsuo; Kamio, Shigeru; Takao, Mitsunori; Sakita, Katsuya; and Abe, Tomoaki, 5,018,595, Cl. 180-197.000.
- Takao, Nobutaka: *See—*
  - Yasuda, Hiroshi; Yokoya, Satoshi; and Takao, Nobutaka, 5,020,138, Cl. 455-115.000.
- Takara Shuzo Co., Ltd.: *See—*
  - Kusakabe, Katsuhiko; Maruyama, Hitoshi; Kawano, Yukita; Matsui, Susumu; Taniguchi, Tsutomu; and Obayashi, Akira, 5,018,301, Cl. 47-1.100.
- Takasaki, Kanetake, to Fujitsu Limited. Heteroepitaxial growth method. 5,019,529, Cl. 437-132.000.
- Takata, Koji, to Sumitomo Electric Industries, Ltd. Fluid pressure controller. 5,018,797, Cl. 303-117.000.
- Takayama, Toru: *See—*
  - Inadome, Kiyotaka; Imanari, Hitoshi; Fukino, Kunihiro; and Takayama, Toru, 5,018,843, Cl. 350-429.000.
- Takechi, Satoshi: *See—*
  - Nakamura, Yuko; and Takechi, Satoshi, 5,019,485, Cl. 430-296.000.
- Takeda, Atsushi; and Hasegawa, Takashi, to Canon Kabushiki Kaisha. Apparatus for electrostatically absorbing an image supporting material on an image supporting carrying member based on the kind of material used. 5,019,871, Cl. 355-309.000.
- Takeda Chemical Industries, Ltd.: *See—*
  - Hamaguchi, Naoru; Iga, Katsumi; and Ogawa, Yasuaki, 5,019,394, Cl. 424-423.000.
  - Suzuki, Masayuki; Matsumoto, Zenji; and Fukui, Teruo, 5,019,162, Cl. 75-744.000.
- Takeda, Hiromitsu: *See—*
  - Iyogi, Kiyoshi; Nakahashi, Masako; Takeda, Hiromitsu; and Shirokane, Makoto, 5,019,187, Cl. 148-24.000.
- Takeda, Koji, to Seiko Epson Corporation. Asynchronous counter. 5,020,082, Cl. 377-44.000.
- Takeda, Shu: *See—*
  - Yoshinada, Hiroshi; and Takeda, Shu, 5,018,922, Cl. 414-5.000.
- Takchi, Takayoshi: *See—*
  - Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.
- Takeiri, Toshiki: *See—*
  - Sahira, Kensho; Takeiri, Toshiki; and Kurauchi, Nobuyoshi, 5,019,179, Cl. 148-11.50N.
- Takemoto, Akiyoshi: *See—*
  - Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
- Takemoto, Masanori: *See—*
  - Kurahashi, Motofumi; Takemoto, Masanori; Chishi, Naoki; Takeuchi, Eizoo; and Nakauma, Yoshinori, 5,019,272, Cl. 210-695.000.
- Takemura, Shigeo; and Taguchi, Katsuyuki, to Matsushita Electric Industrial Co., Ltd. Reel brake control device for optically controlling a reel brake of a magnetic tape apparatus. 5,019,925, Cl. 360-71.000.
- Takemura, Shinji; Mori, Masaki; Katayama, Tomoaki; Kegasa, Hideo; and Ohnishi, Kenichi, to Aisin Seiki K.K. Attitude control system with independent controllers for controlling onboard units. 5,019,759, Cl. 318-466.000.
- Takeshita, Takuo; and Sugihara, Tadashi, to Mitsubishi Metal Corp. Structure of superconductive wiring having SiAlON buffer layer thereunder. 5,019,554, Cl. 505-1.000.
- Takeuchi, Akira: *See—*
  - Suzuki, Ryoichi, Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,018,505, Cl. 126-262.000.
- Takeuchi, Eiji: *See—*
  - Niwa, Mitsuyuki; Arai, Takayoshi; Shimizu, Isamu; Takeuchi, Eiji; Murakami, Tsutomu; and Ishihara, Shunichi, 5,019,887, Cl. 357-30.000.
- Takeuchi, Eizoo: *See—*
  - Kurahashi, Motofumi; Takemoto, Masanori; Chishi, Naoki; Takeuchi, Eizoo; and Nakauma, Yoshinori, 5,019,272, Cl. 210-695.000.
- Takeuchi, Kazuhiko, to Fuji Photo Film Co., Ltd. Silver halide photographic material 5,019,491, Cl. 430-523.000.
- Takeuchi, Kouichi: *See—*
  - Tanimoto, Shigeru; and Takeuchi, Kouichi, 5,019,781, Cl. 324-649.000.
- Takeuchi, Kunihiro: *See—*
  - Okano, Masami; and Takeuchi, Kunihiro, 5,018,763, Cl. 280-735.000.
- Takeuchi, Masahiko: *See—*
  - Kishi, Tomomi; Nonami, Kanshi; Takeuchi, Masahiko; Yoshitani, Naoyuki; and Niwa, Hideo, 5,018,939, Cl. 414-795.400.
- Takeuchi, Osamu: *See—*
  - Sugai, Kazunari; Takeuchi, Osamu; Wakasa, Yasuyuki; Taguchi, Kenji; and Ogata, Toshio, 5,019,249, Cl. 209-534.000.
- Takeuchi, Yoshinori: *See—*
  - Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, 5,020,041, Cl. 369-13.000.
- Takeya, Fuminori, to NGK Insulators, Ltd. Negative-pressure type magnetic head slider, and method of producing the same. 5,019,930, Cl. 360-103.000.
- Taki, Genji: *See—*
  - Onuki, Jin; Koubuchi, Yasushi; Fukada, Shinichi; Shiota, Katuhiko; Miyazaki, Kunio; Itagaki, Tatsuo; and Taki, Genji, 5,019,891, Cl 357-70.000.
- Takigami, Machiko: *See—*
  - Arita, Yoshikazu; Abe, Yukio; Iizuka, Toshi; Nakamura, Yoshio; Takigami, Shoji; and Takigami, Machiko, 5,019,603, Cl. 521-181.000.
- Takigami, Shoji: *See—*
  - Arita, Yoshikazu; Abe, Yukio; Iizuka, Toshi; Nakamura, Yoshio; Takigami, Shoji; and Takigami, Machiko, 5,019,603, Cl. 521-181.000.
- Takikawa, Kazunori; and Ono, Yuichi, to Usui Kokusai Sangyo Kaisha Limited. Temperature-controlled fan fluid coupling. 5,018,612, Cl. 192-58.00B.
- Talley, Gaylen M.: *See—*
  - Starr, Benjamin F.; Wallace, Mark L.; Talley, Gaylen M.; and Woo, Paul M., 5,019,980, Cl. 364-424.040.
- Tamary, Ernest J., to Eastman Kodak Company. Temperature control method and apparatus for fusing roller. 5,019,693, Cl. 219-471.000.
- Tanabe, Yoshiaki, to Nikon Corporation. Shutter device. 5,019,847, Cl. 354-246.000.
- Tanaka, Akira: *See—*
  - Ohdaira, Akio; Abe, Shunji; Wakatsuki, Noboru; and Tanaka, Akira, 5,018,828, Cl. 350-96.340.
- Tanaka, Atsushi; Kaneko, Kiyoshi; and Yoshimura, Yuichiro, to Canon Kabushiki Kaisha. Image processing apparatus wherein vibrations are used to designate a portion of an image to be reproduced. 5,019,865, Cl. 355-218.000.
- Tanaka, Gotaro: *See—*
  - Ooe, Masaharu; Ishiguro, Yoichi; and Tanaka, Gotaro, 5,018,824, Cl. 350-96.210.
- Tanaka, Hideaki; Akiba, Shigeyuki; Suzuki, Masatoshi; and Utaka, Katsuyuki, to Kokusai Denshin Denwa Kabushiki Kaisha. Method for the manufacture of optical semiconductor device. 5,019,519, Cl. 437-22.000.
- Tanaka, Hiroshi; Kawamura, Chuichi; and Ohno, Junichi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Control circuit unit for a variable capacity compressor incorporating a solenoid-operated capacity control valve. 5,018,366, Cl. 62-228.500.
- Tanaka, Kanichi: *See—*
  - Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 5,019,338, Cl. 420-586.100.
- Tanaka, Mami: *See—*
  - Morino, Taisuke; Tanaka, Mami; Kaneko, Fuminori; Ozaki, Takeyuki; and Akiyama, Shuichi, 5,019,680, Cl. 219-10.55E.
- Tanaka, Nobuhiro, to Kao Corporation; and Seibu Electric & Machinery Co., Ltd. Method for assembling and storing goods, apparatus thereof, and method for controlling the apparatus. 5,018,927, Cl. 414-331.000.

VOL 1126 ISS 4 MY 28 1991 UMI

- Tanaka, Nobuyoshi: *See—*
  - Ohzu, Hayao; Suzuki, Toshiji; Ishizaki, Akira; Tanaka, Nobuyoshi; Sugawa, Shigetoshi; Hashimoto, Seiji; and Harada, Tadanori, 5,019,702, Cl. 250-208.100.
- Tanaka, Shigeyasu; and Furumura, Takaichi, to Anritsu Corporation. Telephone with data setting by remote control. 5,020,097, Cl. 379-102.000.
- Tanaka, Shinya: *See—*
  - Matsubara, Hidetsugu; Iguchi, Yuichi; Tanaka, Shinya; and Miyashita, Kazuya, 5,018,953, Cl. 418-201.100.
- Tanaka, Toshinori: *See—*
  - Isozumi, Shuzoo; Yagi, Tetsuo; and Tanaka, Toshinori, 5,019,739, Cl. 310-233.000.
- Tanaka, Yoshitaka: *See—*
  - Ishii, Masahito; Kataoka, Tatsuo; and Tanaka, Yoshitaka, 5,019,944, Cl. 361-400.000.
- Tanguy, Yannick; and Robineau, Josee , to Thomson-CSF. Demodulation method and demodulator for digital signals with amplitudes of constant envelope, continuously modulated in phase and/or in frequency. 5,020,080, Cl. 375-80.000.
- Taniguchi, Atsuki; Yamashita, Haruo; Ishihara, Tomohiro; and Wakisaka, Takaaki, to Fujitsu Limited. Easy detection of head position of information data via reception processing unit in synchronous multiplex transmission apparatus. 5,020,057, Cl. 370-102.000.
- Taniguchi, Tsutomu: *See—*
  - Kusakabe, Katsuhiko; Maruyama, Hitoshi; Kawano, Yukita; Matsui, Susumu; Taniguchi, Tsutomu; and Obayashi, Akira, 5,018,301, Cl. 47-1.100.
- Tanimoto, Akikazu: *See—*
  - Kamiya, Saburo; and Tanimoto, Akikazu, 5,018,848, Cl. 350-572.000.
- Tanimoto, Hitoshi; Motono, Koichiro; and Goto, Takuo, to Kao Corporation. Process for the continuous granulation of high density detergent granules. 5,018,671, Cl. 241-16.000.
- Tanimoto, Shigeru; and Takeuchi, Kouichi, to Hewlett-Packard Company. Source level control for impedance meter. 5,019,781, Cl. 324-649.000.
- Tanino, Junichi, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for transmitting signal for group supervision of elevators. 5,018,604, Cl. 187-121.000.
- Tanino, Junichi: *See—*
  - Ando, Hiroshi; and Tanino, Junichi, 5,019,960, Cl. 364-132.000.
- Tanner, Paul R.; Nunn, Randolph G., Jr.; and Luebbe, John P., to Procter & Gamble Company, The. Low residue antiperspirant creams. 5,019,375, Cl. 424-66.000.
- Tanoue, Tomonori: *See—*
  - Mitani, Katsuhiko; Tanoue, Tomonori; Kusano, Chushiro; Kobayashi, Masayoshi; and Takahashi, Susumu, 5,019,524, Cl. 437-31.000.
- Tanzawa, Misao: *See—*
  - Yamakawa, Takeshi; and Tanzawa, Misao, 5,019,867, Cl. 355-245.000.
- Taubitz, Christof; Gausepohl, Hermann; Seiler, Erhard; Boehlke, Klaus; and Heckmann, Walter, to BASF Aktiengesellschaft. Thermoplastic molding materials based on polyphenylene ethers and nylons. 5,019,626, Cl. 525-92.000.
- Taylor, Charles E.; and Noceti, Richard P., to United States of America, Energy. Catalysts and method. 5,019,652, Cl. 562-549.000.
- Taylor, Clive R.: *See—*
  - Epstein, Alan L.; and Taylor, Clive R., 5,019,368, Cl. 424-1.100.
- Taylor, Harry W., IV; and Castagnola, Andrew. Roller purse ring. 5,018,295, Cl. 43-14.000.
- Taylor, Harvey W., Jr., to Du Pont de Nemours, E. I., and Company. Lower gloss protective covering. 5,019,536, Cl. 428-220.000.
- Taylor, Robert D.; Smith, Gary L.; and Olsen, Ritchie, to Morton International, Inc. Process for making an enhanced thermal and ignition stability azide gas generant. 5,019,220, Cl. 264-3.400.
- Teac Corporation: *See—*
  - Noda, Yasushi; Shimozawa, Kenji; and Kamisaka, Takashi, 5,018,836, Cl. 350-247.000.
- Tebel Pneumatiek B.V.: *See—*
  - Hooghiem, Jelle; van der Sloot, Bart; and Epema, Sytse, 5,018,605, Cl. 188-165.000.
- Technic Geoproduction: *See—*
  - Thomas, Pierre A.; and Delamare, Guy R., 5,018,904, Cl. 405-196.000.
- Technicon Instruments Corporation: *See—*
  - Swirski, Chester, Jr., 5,019,999, Cl. 364-497.000.
- Technique du Verre Tisse S.a.: *See—*
  - Darrin, Alain, 5,018,900, Cl. 403-267.000.
- Technoform Caprano & Brunnhofer KG: *See—*
  - Brunnhofer, Erwin, 5,019,309, Cl. 264-103.000.
- Technology Corporation: *See—*
  - Wagner, Burkhard E.; Goeke, George L.; Karol, Frederick J.; and George, Kathleen F., 5,019,633, Cl. 526-125.000.
- Technology Development Corporation: *See—*
  - Judd, Wendell, 5,018,459, Cl. 110-346.000.
- Tekni-Plex Inc.: *See—*
  - Hrenyo, John, 5,018,623, Cl. 206-557.000.
- Teledyne Industries, Inc.: *See—*
  - Goode, William B., 5,018,703, Cl. 251-127.000.
- Teleflex Incorporated: *See—*
  - Carlson, John, 5,018,469, Cl. 114-144.00R.
- Teletec Corporation: *See—*
  - Kasparian, Kaspar; Ide, John D.; Brown, Thomas A.; Rogers, Aaron S.; Fussell, John P.; and Hsu, Ming C., 5,020,135, Cl. 455-76.000.
- Templet, Vicki J., to Wallace Computer Services, Inc. Method of implementing travel planning and product therefor. 5,018,766, Cl. 462-18.000.
- Templeton, Robert D. K.; and Arnott, William W., to Gentech International Limited Fluid flow switches with low flow resistance. 5,019,678, Cl. 200-81.90M.
- Tempress Incorporated: *See—*
  - Cedergreen, Steven D., 5,018,788, Cl. 297-378.000.
- Tenelex Industries, Inc.: *See—*
  - Chesnut, Paul B.; Moore, Michael W.; and Sarrell, Ivan D., 5,018,364, Cl. 62-187.000.
- Tenerz, Lars; and Hook, Bertil, to Radisensor AB. Miniaturized sensor for physiological pressure measurements. 5,018,529, Cl. 128-667.000.
- Terasaki Denki Sangyo: *See—*
  - Nakayama, Katsutoyo; Morii, Toshimichi; and Kamino, Toshihide, 5,019,956, Cl. 363-50.000.
- Terasawa, Masato; Satoo, Yukie; and Yukawa, Hideaki, to Mitsubishi Petrochemical Co., Ltd. Method for production of l-threonine. 5,019,503, Cl. 435-115.000.
- Terbrugge, Gary: *See—*
  - Terbrugge, Neville C.; Terbrugge, Gary; and Sifly, Raymond W., 5,018,504, Cl. 125-26.000.
- Terbrugge, Neville C.; Terbrugge, Gary; and Sifly, Raymond W. Method and apparatus for cleaning used bricks. 5,018,504, Cl. 125-26.000.
- Terstall, Robert, to Roland Meinl, Firma. Apparatus for modulation of the timbre of an electrical amplifier, in particular for guitars. 5,020,109, Cl. 381-61.000.
- Terunuma, Hiroshi; Tsukahara, Daiki; and Katayama, Akira, to Nikon Corporation. Device for preventing generation of harmful light in objective lens assembly. 5,018,832, Cl. 350-276.0SL.
- Teskey, John F., to RCA Licensing Corporation. Three digit channel entry system. 5,020,140, Cl. 455-151.000.
- Teutsch, Erich O.: *See—*
  - Briggs, Milton; and Teutsch, Erich O., 5,019,433, Cl. 428-35.700.
- Texaco Chemical Company: *See—*
  - Speranza, George P.; and Champion, Donald H., 5,019,653, Cl. 564-497.000.
- Texaco Inc.: *See—*
  - Chan, Henry C., 5,019,354, Cl. 422-145.000.
  - Derosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., 5,019,287, Cl. 252-54.600.
- Texas A&M University System, The: *See—*
  - Cummins, Joseph M., Jr., 5,019,382, Cl. 424-85.400.
  - White, Ralph E.; Mao, Zhenhua; and Srinivasan, Supramaniam, 5,019,227, Cl. 204-128.000.
- Texas Instruments Deutschland GmbH: *See—*
  - Endl, Helmut; and Rinck, Helmut, 5,019,205, Cl. 156-345.000.
- Texas Instruments Incorporated: *See—*
  - Fukuda, Yoshimasa, 5,018,812, Cl. 350-96.140.
  - Hornbeck, Larry J., 5,018,256, Cl. 29-25.010.
  - Kaya, Cetin, 5,019,532, Cl. 437-186.000.
  - Schreck, John F.; and Truong, Phat C., 5,020,026, Cl 365-104.000.
  - Scott, David B.; Bosshart, Patrick W.; and Gallia, James D., 5,019,888, Cl. 357-41.000.
  - Virkus, Robert L.; Spratt, David B.; and Zorinsky, Eldon J., 5,019,525, Cl. 437-32.000.
  - Yang, Ping; Chatterjee, Amitava; Aur, Shian; and Polgreen, Thomas L., 5,019,878, Cl. 357-23.300.
  - Yee, Hung Y.; and Richardson, Phillip N., 5,019,831, Cl. 343-771.000.
  - Yoshino, Kenji, 5,019,725, Cl. 307-443.000.
- Texas Iron Works, Inc.: *See—*
  - Baker, Samuel F., 5,018,582, Cl. 166-382.000.
  - Braddick, Britt O.; and Langer, Michael, 5,018,579, Cl. 166-291.000.
- Th. Goldschmidt AG: *See—*
  - Schafer, Werner; and Scheiba, Manfred, 5,019,198, Cl. 156-230.000.
- Theeuwes, Felix: *See—*
  - Wong, Patrick S. L.; and Theeuwes, Felix, 5,019,397, Cl 424-473.000.
- Theodor Braun, Ges, m.b.H: *See—*
  - Ruckert, Wolf-Dietrich K., 5,018,614, Cl. 194-236.000.
- Thermalloy Incorporated: *See—*
  - Clemens, Donald L., 5,019,940, Cl. 361-386.000.
  - Clemens, Donald L., 5,019,942, Cl. 361-388.000.
- Thevenot, Louis: *See—*
  - Vareille, Aime ; Vuillod, Yves; and Thevenot, Louis, 5,018,863, Cl. 356-369.000.
- Think Laboratory Co., Ltd.: *See—*
  - Takakura, Koichi, 5,019,486, Cl. 430-307.000.
- Thomas, Dennis A.: *See—*
  - Steidl, Gary V.; Sabin, Cullen M.; and Thomas, Dennis A., 5,018,368, Cl. 62-480.000.
- Thomas, Larry D., to Hoover Group, Inc. Shaft seal. 5,018,752, Cl 277-152.000.
- Thomas, Louis: *See—*
  - Hasan, S. Riaz; and Thomas, Louis, 5,018,329, Cl. 52-410.000.
- Thomas, Pierre A.; and Delamare, Guy R., to Technic Geoproduction. Sea-bed support device for the legs of a self-elevating oil-rig platform 5,018,904, Cl. 405-196.000.

- Thommen, Christian: *See—*
  - Gisin, Markus; and Thommen, Christian, 5,019,515, Cl. 436-52.000.
- Thompson, John R.: *See—*
  - Tai, Hwai T.; and Thompson, John R., 5,020,119, Cl. 382-50.000.
- Thompson, Leonard R.: *See—*
  - Marsan, Mario S.; and Thompson, Leonard R., 5,019,063, Cl. 604-368.000.
- Thompson, Neil E. S.; and Asperger, Robert G., to Petrolite Corporation. Methods for treating hydrocarbon recovery operations and industrial waters. 5,019,274, Cl. 210-729.000.
- Thompson, Timothy J., to AT&T Bell Laboratories. Apparatus and method for image area identification. 5,020,123, Cl. 382-61.000.
- Thomson-CSF: *See—*
  - Alet, Robert; and Jezequel, Roland, 5,018,973, Cl. 434-62.000.
  - Solal, Marc; and Gelly, Jean-Francois, 5,020,034, Cl. 367-138.000.
  - Tabourier, Remy, 5,020,126, Cl. 388-815.000.
  - Tanguy, Yannick; and Robineau, Josee , 5,020,080, Cl. 375-80.000.
- Thoni, Ludwig. Multi-part bolted steel rim. 5,018,566, Cl. 152-396.000.
- Thorn EMI PLC: *See—*
  - Bream, David R.; and Roome, Stephen J., 5,019,823, Cl. 342-175.000.
- Thurne Engineering Co., Limited: *See—*
  - Jurchuk, Paul; Hooper, David; Staff, Alan; and Sitt, Hans, 5,018,338, Cl. 53-532.000.
- Tibbling, Lars: *See—*
  - Gersten, Martin; Maus, Roy; and Tibbling, Lars, 5,018,850, Cl. 351-212.000.
- Tiemeyer, Michael: *See—*
  - Brandley, Brian K.; James, Paul G.; and Tiemeyer, Michael, 5,019,231, Cl. 204-182.100.
- Timperi, Jukka: *See—*
  - Elonen, Jorma; Timperi, Jukka; Vesala, Reijo; and Wikman, Vesa, 5,019,136, Cl. 55-36.000.
- Tinguely, Paul R.: *See—*
  - Martin, Thomas F.; Chenoweth, John S.; and Tinguely, Paul R., 5,020,129, Cl. 455-4.000.
- Tirel, Philippe-jean: *See—*
  - Gubelmann, Michel; and Tirel, Philippe-jean, 5,019,657, Cl. 568-774.000.
- Tjepkes, Kendall D.: *See—*
  - Sparks, Richard M.; and Tjepkes, Kendall D., 5,018,750, Cl. 277-38.000.
- Tober, Gerald H.: *See—*
  - Lucki, Walter J.; and Tober, Gerald H., 5,018,421, Cl. 83-835.000.
- Tobias, Jaromir. Motor vehicle vibration isolation support mounting system. 5,018,698, Cl. 248-550.000.
- Tobin, John A. Tissue sample localizer device and method. 5,020,088, Cl. 378-164.000.
- Toda, Kozo: *See—*
  - Sakakibara, Kenzo; Yoshida, Takehiro; and Toda, Kozo, 5,020,096, Cl. 379-100.000.
- Todd, Alan B. Educational amusement device which includes a game card, and method for using the game card. 5,018,975, Cl. 434-128.000.
- Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Failure diagnostic apparatus in an engine air intake system. 5,018,383, Cl. 73-118.100.
- Togai, Kazuhide: *See—*
  - Ueda, Katsunori; Shimada, Makoto; Danno, Yoshiaki; Togai, Kazuhide; and Yoshida, Masato, 5,019,989, Cl. 364-431.050.
- Togashi, Shigeru: *See—*
  - Aoki, Ken; Hoshi, Katsuhiko; Satoh, Shigeo; Kakinuma, Mitsuru; Togashi, Shigeru; and Saitoh, Hiromi, 5,018,363, Cl. 62-135.000.
- Tohyama, Noboru: *See—*
  - Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.
- Tokico Ltd.: *See—*
  - Imaizumi, Tomio, 5,018,608, Cl. 188-322.150.
  - Ishimaki, Takashi; and Simura, Toshio, 5,018,796, Cl. 303-9.750.
- Tokiya, Motohide: *See—*
  - Yaginuma, Yoshitaka; Tokiya, Motohide; and Saito, Naoya, 5,019,326, Cl. 376-261.000.
- Tokyo Electric Co., Ltd.: *See—*
  - Fujita, Yutaka, 5,018,883, Cl. 400-121.000.
  - Oyaide, Shinichi; Kawahira, Masayoshi; and Miyazawa, Toshio, 5,018,889, Cl. 400-642.000.
- Tokyo Institute of Technology: *See—*
  - Iga, Kenichi; Ibaraki, Akira; Kawashima, Kenji; Furusawa, Kotaro; and Ishikawa, Toru, 5,020,066, Cl. 372-45.000.
- Tomari, Masao: *See—*
  - Harada, Mitsuhisa; and Tomari, Masao, 5,019,160, Cl. 75-564.000.
- Tominari, Kenichi: *See—*
  - Honma, Shiro; Tominari, Kenichi; and Kurisu, Masayoshi, 5,019,627, Cl. 525-240.000.
- Tomita, Hajime; and Sonoda, Yasuo, to Kabushiki Kaisha Pilot. Water-resistant ink composition. 5,019,164, Cl. 106-22.000.
- Tomita, Satoru: *See—*
  - Hata, Toshihiko; Adachi, Mitsunori; and Tomita, Satoru, 5,019,917, Cl. 558-448.000.
- Tomita, Seisuke: *See—*
  - Hasegawa, Yoshimi; Kakiuchi, Shinichi; and Tomita, Seisuke, 5,019,320, Cl. 273-235.00R.
- Tomkoski, Walter, III: *See—*
  - Boles, Glenn M.; Schober, Gary W.; Chein, Wen S.; Symanski, Chris P.; Des Rioux, Philippe; and Tomkoski, Walter, III, 5,019,899, Cl. 358-84.000.
- Tomlinson, John C. Fire suppressor. 5,018,584, Cl. 169-30.000.
- Tomoegawa Paper Co., Ltd.: *See—*
  - Hashimoto, Takeshi, 5,019,642, Cl. 528-353.000.
- Tomy Company, Ltd.: *See—*
  - Nikaido, Teruo; and Ohi, Ichiro, 5,019,010, Cl. 446-487.000.
- Tonami, Katsuhiko: *See—*
  - Onozawa, Makoto; Ohsawa, Michitaka; and Tonami, Katsuhiko, 5,019,754, Cl. 315-408.000.
- Tonegawa, Tadashi: *See—*
  - Nakamura, Masatsugu; Ohashi, Kunio; Nagata, Shoichi; Wakita, Kazuki; Nagayama, Katsuhiro; and Tonegawa, Tadashi, 5,019,862, Cl. 355-208.000.
- Tonooka, Yasuaki: *See—*
  - Murakami, Kenji; Tonooka, Yasuaki; Saito, Norie; Nakasuji, Kokichi; and Sugiyama, Norifumi, 5,019,499, Cl. 435-69.100.
- Toplosky, Norman, to United States of America, Navy. Large eddy break-up device for towed arrays. 5,020,033, Cl. 367-20.000.
- Toppan Printing Co., Ltd.: *See—*
  - Watanabe, Niro; Yoshida, Masato; and Ito, Noriyuki, 5,019,452, Cl. 428-422.000.
- Toray Industries, Inc.: *See—*
  - Ueda, Kunihiko; Hasegawa, Katsumi; and Kuriyama, Nobuyuki, 5,019,316, Cl. 264-178.00F.
- Torgerson, Peter M., to Procter & Gamble Company, The. Low glass transistion temperature adhesive copolymers for use in hair styling products. 5,019,377, Cl. 424-70.000.
- Torisu, Yoko: *See—*
  - Yano, Toshihiko; Torisu, Yoko; Sekihachi, Hiroko; Matsuo, Noritada; Takagaki, Tohei; and Tsushima, Kazunori, 5,019,595, Cl. 514-531.000.
- Toshiba Kikai Kabushiki Kaisha: *See—*
  - Inokuma, Takahiko; Baba, Sadamu; Imao, Shoji; Kodama, Hitoshi; and Gomi, Takeo, 5,018,915, Cl. 409-231.000.
- Toshiba Lighting & Technology Corporation: *See—*
  - Morita, Masayuki; and Yamazaki, Kyoji, 5,019,747, Cl. 315-157.000.
- Toshiba Silicone Co. Ltd.: *See—*
  - Matsumoto, Yasuji; Moriyama, Maya; and Kuwahara, Yasushi, 5,019,419, Cl. 427-96.000.
- Toth, Eric S.; DeBoer, Gary T.; and Pham, Linh H., to Prince Corporation. Container holder. 5,018,633, Cl. 248-311.200.
- Tou, James C.: *See—*
  - LaPack, Mark A.; and Tou, James C., 5,019,139, Cl. 55-158.000.
- Tou, Seiji: *See—*
  - Yamane, Shuji; and Tou, Seiji, 5,018,313, Cl. 51-165.710.
- Touet, Remi: *See—*
  - Bagrel, Valerie; Garapon, Jacques; Touet, Remi; Huet, Catherine; and Damin, Bernard, 5,019,643, Cl. 528-361.000.
- Toukhy, Medhat A.; and Jeffries, Alfred T., III., to Olin Hunt Specialty Products, Inc. Selected trihydroxybenzophenone compounds and their use in photoactive compounds and radiation sensitive mixtures. 5,019,478, Cl. 430-165.000.
- Towfighi, Javad; Roberts, Allan F.; Foster, Norman E.; and Abt, Arthur B., to Pennsylvania Research Corporation, The. Protective device for performing cranial autopsies. 5,019,031, Cl. 600-21.000.
- Townsend Engineering Company: *See—*
  - Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 5,019,012, Cl. 452-46.000.
- Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., to Townsend Engineering Company. Encased product and method and apparatus for encasing same. 5,019,012, Cl. 452-46.000.
- Toya, Ichizo; and Nemori, Ryoichi, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 5,019,494, Cl. 430-600.000.
- Toyo Ink Manufacturing Co., Ltd.: *See—*
  - Matsuo, Masaaki; Shimada, Toshio; and Hamada, Seishiro, 5,019,860, Cl. 355-104.000.
  - Ogasawara, Yasukichi; Ishige, Kazuo; and Ogata, Keizo, 5,019,440, Cl. 428-195.000.
- Toyo Seikan Kaisha Ltd.: *See—*
  - Morofuji, Akihiko; and Morotomi, Masaki, 5,018,640, Cl. 220-456.000.
- Toyoda Koki Kabushiki Kaisha: *See—*
  - Yamamoto, Katsumi; Koyama, Tadashi; Aono, Toshio; and Itaya, Toshiro, 5,020,001, Cl. 364-513.000.
- Toyokawa, Yasufumi: *See—*
  - Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 5,019,151, Cl. 71-92.000.
- Toyonishi, Shigekazu; and Nakajima, Takashi, to Aicello Chemical Co., Ltd. Films easily soluble in cold water. 5,019,609, Cl. 524-35.000.
- Toyono, Tsutomu: *See—*
  - Mouri, Akihiro; Toyono, Tsutomu; Kaneko, Shuzo; Inaba, Yutaka; and Kanbe, Junichiro, 5,018,841, Cl. 350-350.00S.
- Toyota Jidosha Kabushiki Kaisha: *See—*
  - Kishi, Tomomi; Nonami, Kanshi; Takeuchi, Masahiko; Yoshitani, Naoyuki; and Niwa, Hideo, 5,018,939, Cl. 414-795.400.
  - Masaki, Syouichi; Maehata, Hiromi; Sakai, Kazunori; and Sugitani, Tatsuo, 5,019,984, Cl. 364-426.020.
  - Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 5,019,338, Cl. 420-586.100.

VOL
1126
ISS
4
MY
28
1991
UMI

  Sonoda, Yukihiro; Osawa, Kouichi; Kanai, Hiroshi; Hoshi, Kouichi; Matsuoka, Hiroki; Ohashi, Michihiro; and Sawada, Hiroshi, 5,018,494, Cl. 123-339.000.
TPS Electronics: *See—*
  Postman, Joel R., 5,019,697, Cl. 235-441.000.
TPV Energy System, Inc.: *See—*
  Diederich, Walter J., 5,018,963, Cl. 431-1.000.
Trace, Inc.: *See—*
  Costas, Dan N., 5,019,929, Cl. 360-98.010.
Tran, Loi H., to Controlled Release Technologies, Inc. Self-regulated therapeutic agent delivery system and method. 5,019,723, Cl. 307-400.000.
Trans World Marketing Corporation: *See—*
  Pasquale, Frank; and Dewees, John G., 5,018,291, Cl. 40-642.000.
Transcom Australia Limited: *See—*
  Rhodes, Scott A., 5,020,077, Cl. 375-8.000.
Trawoger, Werner; and Pregenzer, Bruno. Separator. 5,018,971, Cl. 433-92.000.
Traxler, David M.: *See—*
  McCray, Charles M.; Nadler, Brandon S.; Sedgwick, David M.; and Traxler, David M., 5,018,887, Cl. 400-616.100.
Treanor, David H.; and Treanor, Tracy B. Object hanger for drywall. 5,018,697, Cl. 248-547.000.
Treanor, Tracy B.: *See—*
  Treanor, David H.; and Treanor, Tracy B., 5,018,697, Cl. 248-547.000.
Trextron Inc.: *See—*
  Hemer, H. Michael, 5,019,080, Cl. 606-73.000.
Trillo Martinez, Federico; and Gargallo Jimeno, Jose M., to Creatividad Y Desarrollo, S.A. (Creatyde, S.A.). Portable shaving kit. 5,018,543, Cl. 132-291.000.
Triolo, Innocenzo; and Stagni, Rino, to Weber s.r.l. Pressure regulator device for the fuel circuit of an internal combustion engine supply system. 5,018,500, Cl. 123-463.000.
Triplex Manufacturing Co.: *See—*
  Katz, Paul C.; Pisciotto, Patrick A.; and Robin, Gary I., 5,018,991, Cl. 439-621.000.
Trotta, Robert A., to Gillette Company, The. Safety razor blade. 5,018,274, Cl. 30-50.000.
Truckai, Csaba, to Cordis Corporation. Catheter having reinforcing strands. 5,019,057, Cl. 604-282.000.
Truesdale, Wade J.; Moore, Bryan B.; and Benjock, Greg F., to Celanese Fibers, Inc. Spinneret and yarn produced thereby. 5,019,449, Cl. 428-397.000.
Truong, Phat C.: *See—*
  Schreck, John F.; and Truong, Phat C., 5,020,026, Cl. 365-104.000.
Trutzschler GmbH & Co. KG: *See—*
  Leifeld, Ferdinand, 5,018,246, Cl. 19-150.000.
TRW Inc.: *See—*
  Lee, Gregory S., 5,019,818, Cl. 341-133.000.
  Smolley, Robert, 5,019,945, Cl. 361-412.000.
Trygg, Lars E. Bottle gripping device. 5,018,776, Cl. 294-119.300.
Tsai, Nan-Hsiung; and Hwang, Yun-Sheng, to MOS Electronics. Process of making self-aligned contact using differential oxidation. 5,019,534, Cl. 437-200.000.
Tsang, Dah W.: *See—*
  Meyer, Theodore O.; Mosier, John W., II; Pike, Douglas A., Jr.; Hollinger, Theodore G.; and Tsang, Dah W., 5,019,522, Cl. 437-29.000.
Tsao, Chien-Hua. Safety hypodermic syringe. 5,019,044, Cl. 604-110.000.
Tsikoyiannis, John G.: *See—*
  Haag, Werner O.; and Tsikoyiannis, John G., 5,019,263, Cl. 210-500.250.
Tsuboi, Noboru, to Kabushiki Kaisha Kobe Seiko Sho. Screw type vacuum pump. 5,018,947, Cl. 417-295.000.
Tsuchida, Naoki, to Yamaha Hatsudoki Kabushika Kaisha. Multiple valve internal combustion engine. 5,018,497, Cl. 123-432.000.
Tsuchihashi, Hironori: *See—*
  Samejima, Kazuo; Inoue, Shinichiro; Sakatsuji, Takao; Kida, Hideo; Kasamatsu, Kiyoto; Tsuchihashi, Hironori; Takemoto, Akiyoshi; Sato, Tsuyoshi; Hamada, Toshihiko; and Fukuda, Masatami, 5,018,344, Cl. 56-13.300.
Tsuchiya, Koji, to Precision Fukuhara Works, Ltd. Central stitch controlling apparatus for circular knitting machine. 5,018,370, Cl. 66-55.000.
Tsuji, Yasuyuki: *See—*
  Matsuno, Junichi; Ogasawara, Tsuyoshi; Kawauchi, Masataka; and Tsuji, Yasuyuki, 5,018,718, Cl. 271-245.000.
Tsukada, Toru; and Yamada, Hitoshi, to Nippon Seiko Kabushiki Kaisha. Linear guide apparatus using roller type linear bearing. 5,018,878, Cl. 384-44.000.
Tsukahara, Daiki: *See—*
  Terunuma, Hiroshi; Tsukahara, Daiki; and Katayama, Akira, 5,018,832, Cl. 350-276.0SL.
Tsukamoto, Katsuhiro: *See—*
  Komori, Shigeki; Kusunoki, Shigeru; and Tsukamoto, Katsuhiro, 5,019,520, Cl. 437-26.000.
Tsukamoto, Kimihide, to Sharp Kabushiki Kaisha. Developer supplying structure for a developing device. 5,018,560, Cl. 141-364.000.
Tsukamoto, Takashi: *See—*
  Suzuki, Makoto; Watanabe, Satoshi; Tsukamoto, Takashi; Aoki, Hikoharu; Ohri, Hitomi; and Sako, Yukihiro, 5,018,817, Cl. 350-96.170.
Tsuruoka, Ryozo: *See—*
  Niino, Tsuyoshi; Nakayama, Tadakazu; Tsuruoka, Ryozo; Miki, Minoru; Iwata, Nobukatsu; and Koyama, Kazuhito, 5,019,328, Cl. 376-310.000.
Tsushima, Kazunori: *See—*
  Yano, Toshihiko; Torisu, Yoko; Sekihachi, Hiroko; Matsuo, Noritada; Takagaki, Tohei; and Tsushima, Kazunori, 5,019,595, Cl. 514-531.000.
Tsutsui, Hiroshi: *See—*
  Kawara, Toshiyuki; Tsutsui, Hiroshi; Funakoshi, Hiromasa; and Yoshizumi, Yoshiyuki, 5,020,085, Cl. 378-99.000.
Tsuzuki, Sadachika: *See—*
  Kamimura, Kenji; and Tsuzuki, Sadachika, 5,019,990, Cl. 364-449.000.
Tufts University: *See—*
  Cronin-Golomb, Mark; and Gonsalves, Robert A., 5,018,801, Cl. 350-3.610.
Tukuda, Hitoshi: *See—*
  Kuramoto, Toru; Tukuda, Hitoshi; and Ono, Hiroshi, 5,019,540, Cl. 501-96.000.
Tully, Clay E., to Yale Security Inc. Lockset having electric means for disabling and enabling the outer handle. 5,018,375, Cl. 70-472.000.
Turak, Ali A.: *See—*
  Ignasiak, Teresa; Turak, Ali A.; Pawlak, Wanda; Ignasiak, Boleslaw L.; Guerra, Carlos R.; and Zwillenberg, Melvin L., 5,019,245, Cl. 209-166.000.
Turbo-Werk Messtechnik GmbH: *See—*
  Doll, Friedhelm, 5,018,391, Cl. 73-861.170.
Turner, S. Richard: *See—*
  Blevins, Richard W.; and Turner, S. Richard, 5,019,635, Cl. 526-266.000.
Tustaniwskyj, Jerry I.: *See—*
  Fassbender, Charles J.; Tustaniwskyj, Jerry I.; and Vora, Harshadrai, 5,019,943, Cl. 361-396.000.
Ube Industries, Ltd.: *See—*
  Kamei, Eiichi; Shimomura, Yasushi; Kanda, Yasuo; and Ogawa, Tadashi, 5,019,252, Cl. 210-136.000.
  Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, 5,019,432, Cl. 428-35.400.
Uchiyama, Shigeru, to Casio Computer Co., Ltd. Input apparatus of electronic system for extracting pitch data from compressed input waveform signal. 5,018,427, Cl. 84-603.000.
Uchiyama, Shigeru; and Obata, Katsuhiko, to Casio Computer Co., Ltd. Electronic musical instrument in which musical tones are generated on the basis of pitches extracted from an input waveform signal. 5,018,428, Cl. 84-616.000.
Uchman, Frederick J., to GKN Automotive Inc. Anti-shudder tripod constant velocity universal joint. 5,019,016, Cl. 464-111.000.
Udell, Kent S.; Sitar, Nicholas; Hunt, James R.; and Stewart, Lloyd D., Jr., to University of California, The Regents of the. Process for in situ decontamination of subsurface soil and groundwater. 5,018,576, Cl. 166-272.000.
Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, to Fujisawa Pharmaceutical Company, Ltd. IGF-I fusion proteins; protection of IGF-I from degradation by host cell proteases; and processes for the production thereof. 5,019,500, Cl. 435-69.100.
Ueda, Katsunori; Shimada, Makoto; Danno, Yoshiaki; Togai, Kazuhide; and Yoshida, Masato, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Vehicle engine output control method and apparatus. 5,019,989, Cl. 364-431.050.
Ueda, Katsunori: *See—*
  Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,018,383, Cl. 73-118.100.
Ueda, Kunihiko; Hasegawa, Katsumi; and Kuriyama, Nobuyuki, to Toray Industries, Inc. Method for producing thermoplastic synthetic yarn. 5,019,316, Cl. 264-178.00F.
Ueda, Tadashi, to Pioneer Electronic Corporation. Apparatus for reproducing recorded data from a disc employing variable regenerated clock delay compensating for variable recording conditions. 5,020,046, Cl. 369-60.000.
Ueda, Tsunehisa: *See—*
  Miki, Yoshiaki; and Ueda, Tsunehisa, 5,019,599, Cl. 521-99.000.
Uegaki, Tatsufumi: *See—*
  Kumura, Mitsuo; and Uegaki, Tatsufumi, 5,019,189, Cl. 148-127.000.
Uematsu, Yoshiko: *See—*
  Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, 5,019,476, Cl. 430-20.000.
Uemura, Hiroyuki: *See—*
  Suzuki, Akira; Mochizuki, Hidehiro; Shimada, Masaru; and Uemura, Hiroyuki, 5,019,550, Cl. 503-227.000.
Ueno, Naoyuki: *See—*
  Kanno, Toshiyuki; Ueno, Naoyuki; Kondo, Seiji; Nagata, Yasuji; Kanehira, Jun; Takahashi, Hideshi; and Uematsu, Yoshiko, 5,019,476, Cl. 430-20.000.
Ueno, Takashi: *See—*
  Yamamoto, Akito; Ueno, Takashi; and Sumizawa, Akio, 5,019,964, Cl. 364-200.000.
Ueyama, Masayuki: *See—*
  Azuma, Yoshihiko; Katoh, Takehiro; Ootsuka, Hiroshi; Ishimura, Toshihiko; Hamada, Masataka; Kozakai, Katsumi; Ishikawa, Norio; and Ueyama, Masayuki, 5,019,851, Cl. 354-402.000.
Uggetti, Sergio, to Ing. C. Olivetti & C., S.p.A. Cassette for a printing ribbon for typewriters. 5,018,885, Cl. 400-196.000.

Ugurbil, Kamil: *See—*
  Garwood, Michael; and Ugurbil, Kamil, 5,019,784, Cl. 324-307.000.
Uhler, George M.: *See—*
  Wheeler, William R.; and Uhler, George M., 5,019,967, Cl. 364-200.000.
Uhlig, Gunter; Blumenstein, Fritz; and Witte, Gerhard, to Volkswagen AG. Speed change arrangement. 5,019,022, Cl. 475-209.000.
Uick, Heidi J., to S. C. Johnson & Son, Inc. Sparkling pearlescent personal care compositions. 5,019,376, Cl. 424-70.000.
Ujiie, Futoshi: *See—*
  Sampei, Kazue; Suzuki, Takashi; and Ujiie, Futoshi, 5,020,151, Cl. 455-345.000.
Ulrich, Douglas R.: *See—*
  Silvestri, George J., Jr.; Martin, James A.; and Ulrich, Douglas R., 5,018,356, Cl. 60-646.000.
Ultimate Plastics, Inc.: *See—*
  Oppenheimer, Henry W., 5,018,253, Cl. 24-458.000.
Umeda, Takashi: *See—*
  Yoshii, Noboru; and Umeda, Takashi, 5,018,780, Cl. 296-203.000.
Umezono, Shiro; and Maki, Minoru, to Nippon Gear Co., Ltd. Globoid worm gear speed reduction apparatus. 5,018,403, Cl. 74-425.000.
Undersea Transducer Technology, Inc.: *See—*
  Kompanek, Harry W., 5,020,035, Cl. 367-159.000.
Unigrafic AG: *See—*
  Olsson, Sture; and Ahlm, Roger, 5,019,811, Cl. 340-825.170.
Union Camp Corporation: *See—*
  Johnson, Robert W., Jr.; and Krajca, Kenneth E., 5,019,167, Cl. 106-218.000.
Union Carbide Canada Limited: *See—*
  Hakka, Leo E., 5,019,361, Cl. 423-243.000.
Union Carbide Chemicals and Plastics Technology Corporation: *See—*
  Kantz, John F., 5,018,877, Cl. 383-67.000.
Union Carbide Corporation: *See—*
  Noe, James B.; and Chiu, Charles C., 5,019,426, Cl. 427-314.000.
Union Carbide Industrial Gases Technology Corporation: *See—*
  Victor, Richard A.; Lockett, Michael J.; and Dray, James R., 5,019,144, Cl. 62-22.000.
Union Oil Company of California: *See—*
  Rose, Kenneth R.; and Williams, Martin M., 5,019,422, Cl. 427-245.000.
Uniroyal Chemical Company, Inc.: *See—*
  Covey, Rupert A.; Forbes, Patricia; Bell, Allyn R.; and Blem, Allen R., 5,019,152, Cl. 71-92.000.
Uniroyal Goodrich Tire Company, The: *See—*
  Mattson, William F., 5,019,318, Cl. 264-315.000.
Unisys Corporation: *See—*
  D'Aoust, Robert; and Williams, David C., 5,020,124, Cl. 382-61.000.
  Fassbender, Charles J.; Tustaniwskyj, Jerry I.; and Vora, Harshadrai, 5,019,943, Cl. 361-396.000.
United Kingdom Atomic Energy Authority: *See—*
  Gulliver, James A.; Holt, Christopher C.; Boness, Kenneth D.; and Anderson, Martin R., deceased, 5,019,777, Cl. 324-242.000.
  Higgins, Ian; and Baxendale, Andrew, 5,019,430, Cl. 427-430.100.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
  Jones, Robin; and Johnson, Martin, 5,020,015, Cl. 364-728.030.
United States of America
  Administrator, Environmental Protection Agency: *See—*
    Rogers, Charles J.; Kornel, Alfred; and Sparks, Harold L., 5,019,175, Cl. 134-42.000.
  Administrator, National Aeronautics and Space Administration: *See—*
    Kumar, Rajendra, 5,019,824, Cl. 342-195.000.
  Agriculture: *See—*
    Christen, Alice A.; Gibson, Donna M.; and Bland, John, 5,019,504, Cl. 435-123.000.
    Harnly, James M.; Moulton, Gary P.; and O'Haver, Thomas C., 5,018,856, Cl. 356-312.000.
    Krochta, John M., 5,019,403, Cl. 426-89.000.
    Sapers, Gerald M., 5,019,405, Cl. 426-250.000.
  America: *See—*
    Dale, John R.; and Coar, Lawrence F., 5,020,032, Cl. 367-4.000.
  Army: *See—*
    Hahn, Mansop M.; Lundry, Jerry L.; and Mohn, Larry W., 5,018,683, Cl. 244-1.00R.
    Lohrmann, Dieter R., 5,020,133, Cl. 455-43.000.
    McCorkle, John, 5,019,825, Cl. 342-201.000.
    Miller, Walter E., Jr.; Mitchell, Robert R.; and Lovelace, Donald E., 5,018,447, Cl. 102-213.000.
    Weber, Bruce A., 5,020,111, Cl. 382-31.000.
  Energy: *See—*
    Balooch, Mehdi; Olander, Donald K.; and Russo, Richard E., 5,019,552, Cl. 505-1.000.
    Compton, Robert N., 5,019,705, Cl. 250-251.000.
    Ekdahl, Carl A., 5,019,832, Cl. 343-774.000.
    Fairley, Christopher R.; and Patterson, Steven R., 5,019,786, Cl. 328-133.000.
    Hapstack, Mark, 5,018,451, Cl. 104-138.200.
    Taylor, Charles E.; and Noceti, Richard P., 5,019,652, Cl. 562-549.000.
    Wanlass, Mark W., 5,019,177, Cl. 136-249.000.
  National Aeronautics: *See—*
    Stallings, Robert L., Jr.; and Wilcox, Floyd J., Jr., 5,018,688, Cl. 244-137.400.
  National Aeronautics and Space Administration: *See—*
    Brandhorst, Henry W., Jr.; and Weinberg, Irving, 5,019,176, Cl. 136-244.000.
    Bugga, Ratnakumar V.; DiStefano, Salvador; and Bankston, C. Perry, 5,019,470, Cl. 429-223.000.
    Cheng, Li-Jen; and Liu, Tsuen-Hsi, 5,018,852, Cl. 356-28.500.
    Cuddihy, Edward F.; Lawton, Russell A.; and Gavin, Thomas R., 5,019,533, Cl. 437-199.000.
  National Security Agency: *See—*
    Cohen, Jonathan D., 5,020,018, Cl. 364-837.000.
  Navy: *See—*
    Kirkland, James L., 5,019,822, Cl. 342-22.000.
    Meuron, Bruce R.; and Lyons, Joseph B., Jr., 5,018,685, Cl. 244-3.140.
    Sullivan, Michael J.; Dussault, Douglas G.; and Dinsmore, Daniel, Jr., 5,018,472, Cl. 114-244.000.
    Toplosky, Norman, 5,020,033, Cl. 367-20.000.
    Winyard, David C., 5,018,952, Cl. 418-195.000.
U.S. Philips Corporation: *See—*
  Andersson, Nils A. T.; and Lindgren, Bo S., 5,018,249, Cl. 221-222.000.
  Gardiner, William H., 5,020,100, Cl. 379-379.000.
  Gravesteijn, Dirk J.; Wijn, Josephus M.; and van Liempd, Johannes P. J. G., 5,019,487, Cl. 430-322.000.
  Hamer, Rene H.; and DuPau, Cornelis P., 5,020,047, Cl. 369-240.000.
  Klomp, Johannes T.; Van De Ven, Adrianus J. C.; and Caers, Johan F. J. M., 5,018,659, Cl. 228-121.000.
  Kunze, Norbert, 5,019,928, Cl. 360-96.500.
  Letessier, Jacques; and Castelli, Philippe, 5,019,794, Cl. 333-174.000.
  Mens, Wilhelmus R. M.; and Konijn, Jan, 5,019,778, Cl. 324-322.000.
  Schutten, Dagmar; Schmitz, Hans-Joachim; Caspar, Hans-Peter; Kolschbach, Veit M.; Znoyek, Gerald; and Wenzel, Norbert, 5,018,826, Cl. 350-96.290.
  Van Thuijl, Joannes G. M.; and Van 'T Veld, Aart T., 5,019,926, Cl. 360-84.000.
United States Surgical Corporation: *See—*
  Kaplan, Donald S.; and Hermes, Matthew E., 5,019,093, Cl. 606-228.000.
Universal Dynamics Corporation: *See—*
  Rainville, Donald D., 5,019,994, Cl. 364-477.000.
University College, Cork: *See—*
  Daly, Charles; Fitzgerald, Gerald F.; Coffey, Aidan; Costello, Veronica A.; Murphy, Maeve C.; and Baumgartner, Andreas, 5,019,506, Cl. 435-172.300.
University of Alaska: *See—*
  Sackinger, William M., 5,019,355, Cl. 422-186.040.
University of Arkansas: *See—*
  Riggs, Robert D.; and Kim, Dong G., 5,019,389, Cl. 424-93.000.
University of California, The Regents of the: *See—*
  Udell, Kent S.; Sitar, Nicholas; Hunt, James R.; and Stewart, Lloyd D., Jr., 5,018,576, Cl. 166-272.000.
University of Kentucky Research Foundation: *See—*
  Jay, Michael J.; and Ryo, U. Yun, 5,019,370, Cl. 424-4.000.
University of Maryland, The: *See—*
  Harnly, James M.; Moulton, Gary P.; and O'Haver, Thomas C., 5,018,856, Cl. 356-312.000.
University of Michigan, The Regents of the: *See—*
  Antonuk, Larry E., 5,019,711, Cl. 250-385.100.
University of Minnesota, Regents of the: *See—*
  Furcht, Leo T.; and McCarthy, James B., 5,019,646, Cl. 530-326.000.
  Garwood, Michael; and Ugurbil, Kamil, 5,019,784, Cl. 324-307.000.
University of Pennsylvania, Trustees of: *See—*
  Miller, James M.; and Wargo, James A., 5,018,902, Cl. 404-6.000.
University of Pennsylvania/Childrens Hospital Corporation, The Trustees of the: *See—*
  Folkman, Moses J.; and Weisz, Paul B., 5,019,562, Cl. 514-58.000.
University of Texas: *See—*
  Hsu, John S.; and Woodson, Herbert H., 5,019,766, Cl. 318-807.000.
University of Toronto Innovations Foundation: *See—*
  Chen, Michael, 5,019,809, Cl. 340-815.310.
  Johnson, Lorin K.; Seilhamer, Jeffrey J.; Pruzanski, Waldemar; and Vadas, Peter, 5,019,508, Cl. 435-198.000.
Uomori, Kenya; and Morimura, Atsushi, to Matsushita Electric Industrial Co., Ltd. Image motion vector sensor for sensing image displacement amount. 5,019,901, Cl. 358-105.000.
UOP: *See—*
  Best, Donald F.; Long, Gary N.; Pellet, Regis J.; Rabo, Jule A.; and Wolynic, Edward T., 5,019,240, Cl. 208-111.000.
  Chao, Chien C.; and Rastelli, Henry, 5,019,667, Cl. 585-820.000.
  Vora, Bipin V.; and Engel, Dusan J., 5,019,662, Cl. 585-323.000.
  Zinnen, Hermann A., 5,019,271, Cl. 210-656.000.
Upadhyayula, L. C.: *See—*
  Bodeep, George E.; Darcie, Thomas E.; Flynn, Edward J.; Lipson, Jan; McGrath, Carl J.; Roxlo, Charles B.; Schaefer, Mark S.; and Upadhyayula, L. C., 5,020,049, Cl. 370-3.000.
Uponor N.V.: *See—*
  Jarvenkyla, Jyri, 5,018,959, Cl. 425-325.000.
Uraca Pumpenfabrik GmbH & Co. KG: *See—*
  Gotz, Hans, 5,018,949, Cl. 417-339.000.
Uresil Corporation: *See—*
  Goldberg, Edward M.; and Melinyshyn, Lev, 5,019,059, Cl. 604-317.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Urushibata, Hiroaki: *See—*
  - Mitsuda, Kenro; Maeda, Hideo; Urushibata, Hiroaki; and Murahashi, Toshiaki, 5,019,464, Cl. 429-34.000.
- Usifer, Douglas A.: *See—*
  - Mammato, Donald C.; Jain, Sangya; Durham, Dana; Spak, Mark A.; Usifer, Douglas A.; and McFarland, Michael, 5,019,488, Cl. 430-325.000.
- Usui Kokusai Sangyo Kaisha Limited: *See—*
  - Takikawa, Kazunori; and Ono, Yuichi, 5,018,612, Cl. 192-58.00B.
  - Usui, Masayoshi, 5,018,499, Cl. 123-456.000.
- Usui, Makoto: *See—*
  - Murai, Katsumi; and Usui, Makoto, 5,020,060, Cl. 371-37.100.
- Usui, Masayoshi, to Usui Kokusai Sangyo Kaisha Ltd. Fuel delivery rail assembly. 5,018,499, Cl. 123-456.000.
- Utaka, Katsuyuki: *See—*
  - Tanaka, Hideaki; Akiba, Shigeyuki; Suzuki, Masatoshi; and Utaka, Katsuyuki, 5,019,519, Cl. 437-22.000.
- Utiumi, Shinichiro: *See—*
  - Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, 5,019,432, Cl. 428-35.400.
- Uttley, Derek, to Children's Hospital of Eastern Ontario. Method and apparatus for handling infant transport incubators. 5,018,931, Cl. 414-495.000.
- Vadas, Peter: *See—*
  - Johnson, Lorin K.; Seilhamer, Jeffrey J.; Pruzanski, Waldemar; and Vadas, Peter, 5,019,508, Cl. 435-198.000.
- Vahlsing, David H.: *See—*
  - Hsu, Chao-Yang; Patel, Vasant K.; Vahlsing, David H.; Wei, James T.; and Myers, Harry K., Jr., 5,019,671, Cl. 585-751.000.
- Vakhidov, Khaidar A.: *See—*
  - Abdukarimov, Erkin T.; and Vakhidov, Khaidar A., 5,019,683, Cl. 219-69.200.
- Valdes, Mario A. Pipeable gelled food and ethyl alcohol beverages. 5,019,414, Cl. 426-573.000.
- Valentini, Claudio: *See—*
  - Farias, Otello; Gandini, Alberto; Monga, Raffaella; Roggero, Arnaldo; Sisto, Raffaello; and Valentini, Claudio, 5,019,631, Cl. 525-396.000.
- Valeo: *See—*
  - Chrisologue, Fabrice, 5,018,476, Cl. 116-322.000.
- Vali, Victor: *See—*
  - Brownrigg, Patrick; Vali, Victor; and Youmans, Bruce, 5,018,827, Cl. 350-96.300.
- Vallee, Bert L.: *See—*
  - Shapiro, Robert; and Vallee, Bert L., 5,019,556, Cl. 514-2.000.
- Valley, Charles R. Dipstick wipe-off tool. 5,018,237, Cl. 15-244.100.
- Valmet Paper Machinery Inc.: *See—*
  - Niskanen, Juhani, 5,018,258, Cl. 29-116.200.
  - Virta, Raimo; Vuorinen, Vesa; and Ruottu, Reijo, 5,019,213, Cl. 162-193.000.
- Van Doorne's Transmissie B.V.: *See—*
  - van Lith, Johannes H., 5,019,020, Cl. 474-240.000.
- Vancraeynest, Jan, to Nynex Corporation. Apparatus for generating a minimum-shift-keying signal. 5,020,079, Cl. 375-64.000.
- Van Davelaar, Peter C.: *See—*
  - Cutright, Edwin L.; Keen, Billy J., Jr.; Scott, G. Robert; and Van Davelaar, Peter C., 5,019,024, Cl. 493-280.000.
- van der Heijden, Pieter: *See—*
  - Hamer, Johannes A.; and van der Heijden, Pieter, 5,019,218, Cl. 203-87.000.
  - Hamer, Johannes A.; and Van Der Heijden, Pieter, 5,019,219, Cl. 203-91.000.
- van der Lely, Ary; and Bom, Cornelis J. G., to C. van der Lely N.V. Spreader for spreading granular and/or powdery material. 5,018,669, Cl. 239-665.000.
- Van Der Plaat, Johannes B.: *See—*
  - Pors, Teresa H.; and Van Der Plaat, Johannes B., 5,019,410, Cl. 426-8.000.
- van der Sloot, Bart: *See—*
  - Hooghiem, Jelle; van der Sloot, Bart; and Epema, Sytse, 5,018,605, Cl. 188-165.000.
- Van De Ven, Adrianus J. C.: *See—*
  - Klomp, Johannes T.; Van De Ven, Adrianus J. C.; and Caers, Johan F. J. M., 5,018,659, Cl. 228-121.000.
- Van Erden, Donald L.: *See—*
  - Boeckmann, Hugo; Van Erden, Donald L.; and Bauer, Mark D., 5,019,027, Cl. 493-209.000.
- van Liempd, Johannes P. J. G.: *See—*
  - Gravesteijn, Dirk J.; Wijn, Josephus M.; and van Liempd, Johannes P. J. G., 5,019,487, Cl. 430-322.000.
- van Lith, Johannes H., to Van Doorne's Transmissie B.V. Transverse element for a driving belt. 5,019,020, Cl. 474-240.000.
- Vanni, Robert R. Snap ring assembly. 5,018,896, Cl. 402-38.000.
- VanRens, Russell J., to Outboard Marine Corporation. Lost foam engine block pattern. 5,018,568, Cl. 164-34.000.
- Van 'T Veld, Aart T.: *See—*
  - Van Thuijl, Joannes G. M.; and Van 'T Veld, Aart T., 5,019,926, Cl. 360-84.000.
- Van Thuijl, Joannes G. M.; and Van 'T Veld, Aart T., to U.S. Philips Corporation. Magnetic-head unit including rotary and stationary transformer sections and amplifier arrangement. 5,019,926, Cl. 360-84.000.
- Van Voris, Peter: *See—*
  - Cowan, Christina E.; Van Voris, Peter; Streile, Gary P.; Cataldo, Dominic A.; and Burton, Frederick G., 5,019,998, Cl. 364-496.000.
- Van Zile, Richard R.; and McNulty, Donald E., to Boehringer Mannheim Corporation. Tibial wedge system. 5,019,103, Cl. 623-20.000.
- Varecka, Roland; and Bliem, Rudolf F., to Baxter International Inc. Spin filter for removing substantially cell-free culture medium from suspension cell culture system. 5,019,512, Cl. 435-240.250.
- Vareille, Aime ; Vuillod, Yves; and Thevenot, Louis. Apparatus for analysis by ellipsometry, procedure for ellipsometric analysis of a sample and application to the measurement of variations in the thickness of thin films. 5,018,863, Cl. 356-369.000.
- Varga, Ljubomir D.; and Losic, Novica A. Generalized synthesis of control systems of zero-order/instantaneous response and infinite disturbance rejection ratio. 5,019,958, Cl. 363-97.000.
- Varga, Ljubomir D.: *See—*
  - Losic, Novica A.; and Varga, Ljubomir D., 5,020,125, Cl. 388-811.000.
- Vargus, Joel T.: *See—*
  - Weinerman, Lee S.; and Vargus, Joel T., 5,018,373, Cl. 70-99.000.
- Varnado, W. Scott: *See—*
  - Davis, Stephen M.; and Varnado, W. Scott, 5,019,543, Cl. 502-64.000.
- Vaughan, Robert A., to Standard Products Company, The. Belt weatherstrip for automotive vehicle. 5,018,308, Cl. 49-491.000.
- Vazquez, Francisco S. Tool support. 5,018,413, Cl. 87-462.000.
- Venema, Willem H. J.: *See—*
  - Kip, Harm J.; and Venema, Willem H. J., 5,019,813, Cl. 340-825.540.
- Ventimiglia, Peter G. Portable mannequin with improved display features. 5,018,649, Cl. 223-68.000.
- Venturi, Giancarlo: *See—*
  - Fergni, Bruno; Venturi, Giancarlo; and Bedogni, Carlo, 5,018,225, Cl. 5-61.000.
- Verdon, Catherine: *See—*
  - Chaumette, Patrick; Le Peltier, Fabienne; Szymanski, Raymond; Courty, Philippe; and Verdon, Catherine, 5,019,547, Cl. 502-342.000.
- Vereingte Aluminum-Werke Aktiengesellschaft: *See—*
  - Hasenclever, Jochen, 5,019,188, Cl. 148-11.50A.
- Verifone, Inc.: *See—*
  - Chang, Karl; Pape, William R., III; Crosetti, Victor J., Jr.; Nakamura, Lance S.; Leong, Daniel B. C.; and Loui, Robert K. L., 5,019,696, Cl. 235-436.000.
- Vermeulen, Norbert P.: *See—*
  - Hannen, Reiner W.; Vermeulen, Norbert P.; and Pieters, Hans-Theo, 5,018,339, Cl. 53-557.000.
- Vesala, Reijo: *See—*
  - Elonen, Jorma; Timperi, Jukka; Vesala, Reijo; and Wikman, Vesa, 5,019,136, Cl. 55-36.000.
- Vestar, Inc.: *See—*
  - Presant, Cary A.; and Proffitt, Richard T., 5,019,369, Cl. 424-1.100.
- Vetrotex Saint-Gobain S.A.: *See—*
  - Bolliand, Robert, 5,018,255, Cl. 28-107.000.
- Vezzoli, Emilio: *See—*
  - Marzoli, Pietro B.; and Vezzoli, Emilio, 5,018,245, Cl. 19-145.500.
- Vianova Kunstharz, A.G.: *See—*
  - Rauch-Puntigam, Harald; Staritzbichler, Werner; and Morre, Peter, 5,019,621, Cl. 524-513.000.
- Vicon Industries, Inc.: *See—*
  - Pshtissky, Yacov; and Gao, Shiyang, 5,019,905, Cl. 358-146.000.
- Victaulic Company of America: *See—*
  - McLennan, William R., 5,018,548, Cl. 137-315.000.
  - McLennan, William R., 5,018,704, Cl. 251-148.000.
- Victor Company of Japan, Ltd.: *See—*
  - Kato, Akira, 5,018,680, Cl. 242-71.800.
  - Ogaki, Hiroshi, 5,019,923, Cl. 360-73.070.
- Victor, Richard A.; Lockett, Michael J.; and Dray, James R., to Union Carbide Industrial Gases Technology Corporation. Cryogenic air separation system with hybrid argon column. 5,019,144, Cl. 62-22.000.
- Video Jukebox Network, Inc.: *See—*
  - Clark, Morris; Lawson, Kenneth; and Izatt, James, 5,019,900, Cl 358-86.000.
- Vietti, Michael: *See—*
  - LaPointe, Daniel J.; Vietti, Michael; and Baer, John S., 5,019,977, Cl. 364-420.000.
- Villalon, S. Leonard: Olds, James D.; and Shoffner, William H., to Guardian Hitch, Inc. Tamper resistant trailer hitch. 5,018,759, Cl. 280-507.000.
- Vincze, Bela: *See—*
  - Pedlick, Jack; Vincze, Bela; and Deniega, Jess, 5,018,657, Cl. 227-178.000.
- Virkus, Robert L.; Spratt, David B.; and Zorinsky, Eldon J., to Texas Instruments Incorporated. Method for forming a horizontal self-aligned transistor. 5,019,525, Cl. 437-32.000.
- Virnig, Michael J., to Henkel Research Corporation. Process for isomerizing olefinically unsaturated secondary alcohols. 5,019,297, Cl. 260-405.600.
- Virta, Raimo; Vuorinen, Vesa; and Ruottu, Reijo, to Valmet Paper Machinery Inc. Method and apparatus in the drying section of a paper making machine for speeding the threading of a paper or paperboard web. 5,019,213, Cl. 162-193.000.
- Vita, Giuseppe: *See—*
  - Reiner, Alberto; and Vita, Giuseppe, 5,019,596, Cl. 514-578.000.
- VLSI Technology, Inc.: *See—*
  - Harper, Guy A., 5,019,234, Cl. 204-192.170.

- Voegele, Gerald G.: *See—*
  - Robinson, David B.; Adams, Daniel O.; Penny, William H.; and Voegele, Gerald G., 5,019,041, Cl. 604-97.000.
- Vogel, Hans-Burkhardt: *See—*
  - Ludemann, Simpert; Bernheim, Michael; Sandner, Bernhard; Rossler, Erich; and Vogel, Hans-Burkhardt, 5,019,428, Cl. 427-387.000.
- Vogelmann, Fritz. Welding system and apparatus. 5,019,687, Cl. 219-130.100.
- Voisin, Jerome P. Multi-axial rotation system for artificial ankle. 5,019,109, Cl. 623-49.000.
- Voisine, Gary R.; and Bratton, Kenneth L., to Emhart Industries, Inc. Mold arm closing mechanism for an individual section machine. 5,019,147, Cl. 65-360.000.
- Volkswagen AG: *See—*
  - Uhlig, Gunter; Blumenstein, Fritz; and Witte, Gerhard, 5,019,022, Cl. 475-209.000.
- von Charzewski, Cornelia; Leithner, Dietrich; Schmitt, Hermann; and Schoening, Josef, to Hochtemperatur-Reaktorbau GmbH. Gas cooled nuclear reactor with a pebble bed of spherical operating elements. 5,019,322, Cl. 376-158.000.
- Von Der Saal, Wolfgang V.; Mertens, Alfred; and Boehm, Erwin, to Boehringer Mannheim GmbH. Bicyclic carboxamides, compositions containing same and use thereof. 5,019,587, Cl. 514-409.000.
- von Hagen, Ingo; Prasser, Christoph; and Homberg, Gerd, to Mannesmann Aktiengesellschaft. Method of manufacturing of high-strength seamless steel tubes. 5,019,180, Cl. 148-12.00B.
- Vora, Bipin V.; and Engel, Dusan J., to UOP. Process for the production of white oil from heavy aromatic alkylate. 5,019,662, Cl. 585-323.000.
- Vora, Harshadrai: *See—*
  - Fassbender, Charles J.; Tustaniwskyj, Jerry I.; and Vora, Harshadrai, 5,019,943, Cl. 361-396.000.
- Vuillod, Yves: *See—*
  - Vareille, Aime ; Vuillod, Yves; and Thevenot, Louis, 5,018,863, Cl. 356-369.000.
- Vujasin, Boro: *See—*
  - Fehsenfeld, Joseph; and Vujasin, Boro, 5,019,273, Cl. 210-719.000.
- Vuorinen, Vesa: *See—*
  - Virta, Raimo; Vuorinen, Vesa; and Ruottu, Reijo, 5,019,213, Cl. 162-193.000.
- Vyas, Mahesh: *See—*
  - Sodich, Ernest O., 5,018,598, Cl. 181-106.000.
- W. L. Gore & Associates, Inc.: *See—*
  - Bowser, John J.; and Hyde, Christopher T., 5,019,140, Cl. 55-159.000.
- W. R. Grace & Co.-Conn.: *See—*
  - Hwa, Chih M.; Kelly, John A.; Neton, Janet; Scanlon, Patricia M.; and Gaudette, Roger R., 5,019,343, Cl. 422-16.000.
- Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, to Kumiai Chemical Industry Co., Ltd.; and Ihara Chemical Industry Co., Ltd. 2-phenoxyprimidine derivative and herbicidal composition. 5,019,151, Cl. 71-92.000.
- Wada, Tomohisa: *See—*
  - Ichinose, Katsuki; and Wada, Tomohisa, 5,020,029, Cl. 365-154.000.
- Wada, Yoneji: *See—*
  - Suzuki, Tadashi; and Wada, Yoneji, 5,019,257, Cl. 210-253.000.
- Waddington, Clive; and Milo, George T., to Avco Corporation. Integrated emergency lubrication system having single feed line to bearings. 5,018,601, Cl. 184-6.400.
- Waggener, Herbert A.: *See—*
  - Lepselter, Martin P.; and Waggener, Herbert A., 5,020,083, Cl. 378-35.000.
- Wagner, Burkhard E.; Goeke, George L.; Karol, Frederick J.; and George, Kathleen F., to Technology Corporation. Catalyst composition for polymerizing ethylene. 5,019,633, Cl. 526-125.000.
- Wagner GmbH: *See—*
  - Lorenz, Jurgen W., 5,019,345, Cl. 422-26.000.
- Wain-Hobson, Simon; Huet, Thierry; Delaporte, Eric; and Brun-Vezinet, Francoise, to Institut Pasteur. Isolation, molecular cloning and sequencing of an HIV-1 isolate from a Gabonese donor. 5,019,510, Cl. 435-235.100.
- Wakabayashi, Hideaki; Kagata, Tooru; and Amano, Hiroyuki, to Aisin Seiki Kabushiki Kaisha. Free wheel hub control system. 5,018,597, Cl. 180-247.000.
- Wakamatsu, Syuji: *See—*
  - Morita, Yoshikazu; Inoue, Yoshiaki; and Wakamatsu, Syuji, 5,019,212, Cl. 162-157.300.
- Wakasa, Yasuyuki: *See—*
  - Sugai, Kazunari; Takeuchi, Osamu; Wakasa, Yasuyuki; Taguchi, Kenji; and Ogata, Toshio, 5,019,249, Cl. 209-534.000.
- Wakatsuki, Noboru: *See—*
  - Ohdaira, Akio; Abe, Shunji; Wakatsuki, Noboru; and Tanaka, Akira, 5,018,828, Cl. 350-96.340.
- Wakeman & deForrest Corporation: *See—*
  - Pearson, Timothy R.; and Junkin, William W., 5,018,736, Cl. 273-439.000.
- Wakimura, Kazuo: *See—*
  - Hiai, Atsuhiko; and Wakimura, Kazuo, 5,019,423, Cl. 427-248.100.
- Wakisaka, Takaaki: *See—*
  - Taniguchi, Atsuki; Yamashita, Haruo; Ishihara, Tomohiro; and Wakisaka, Takaaki, 5,020,057, Cl. 370-102.000.
- Wakita, Kazuki: *See—*
  - Nakamura, Masatsugu; Ohashi, Kunio; Nagata, Shoichi; Wakita, Kazuki; Nagayama, Katsuhiro; and Tonegawa, Tadashi, 5,019,862, Cl. 355-208.000.
- Walczak, Thomas J.: *See—*
  - Cahill, Stephen V.; Gillig, Steven F.; and Walczak, Thomas J., 5,020,076, Cl. 375-5.000.
- Waldron, Robert D.: *See—*
  - Criswell, David R.; and Waldron, Robert D., 5,019,768, Cl. 322-2.00R.
- Walker, David E. Electric motor drive system. 5,019,755, Cl. 318-13.000.
- Walker, Gavin A.: *See—*
  - Dougall, David A.; Wilkinson, James H.; and Walker, Gavin A., 5,019,903, Cl. 358-140.000.
- Walker, Robert: *See—*
  - Ifill, Lee; Walker, Robert; Wolfe, Steven; and Schena, Fiore, 5,019,256, Cl. 210-232.000.
- Wall, Joseph W.: *See—*
  - Sansone, Ronald P.; Keating, Raymond; Wall, Joseph W.; and Durst, Robert T., Jr., 5,019,991, Cl. 364-464.030.
- Wallace Computer Services, Inc.: *See—*
  - Templet, Vicki J., 5,018,766, Cl. 462-18.000.
- Wallace, Mark L.: *See—*
  - Starr, Benjamin F.; Wallace, Mark L.; Talley, Gaylen M.; and Woo, Paul M., 5,019,980, Cl. 364-424.040.
- Wallace, Rebecca A.: *See—*
  - Lin, Youlin; Wallace, Rebecca A.; and White, David H., 5,019,371, Cl. 424-5.000.
- Wallach, Donald F. H., to Micro Vesicular Systems, Inc. Removing oil from surfaces with liposomal cleaner. 5,019,174, Cl. 134-40.000.
- Wallach, Donald F. H., to Micro-Pak, Inc. Encapsulation of parasiticides. 5,019,392, Cl. 424-420.000.
- Walsh, John M.; and Ott, David M., to Litton Industrial Automation Systems, Inc. Automatic document image revision. 5,020,122, Cl. 382-56.000.
- Waltenspuhl, Rolf: *See—*
  - Muller, Bruno; and Waltenspuhl, Rolf, 5,019,159, Cl. 75-533.000.
- Walter-Gurzeler, Leni M.: *See—*
  - Walter, Hansruedi; and Walter-Gurzeler, Leni M., 5,019,170, Cl. 106-805.000.
- Walter, Hansruedi; and Walter-Gurzeler, Leni M., to Insul Holz-Beton Systems Incorp. Coated free aggregate usable in wood concrete technology and method of making the same. 5,019,170, Cl. 106-805.000.
- Walters, James C., to Deere & Company. Crop harvester having angular draft tongue for accommodating sharp turns. 5,018,345, Cl. 56-14.900.
- Wamac AB: *See—*
  - Sjogren, Rolf, 5,018,618, Cl. 198-347.300.
- Wang, Carl C. T.; and Sundblom, Leif J., to Alcon Laboratories, Inc. Pneumatic retinopexy injector. 5,019,037, Cl. 604-23.000.
- Wang, Jason. Neck guard pillow. 5,018,231, Cl. 5-436.000.
- Wang, Jui-Shang, to Duracraft Corporation. Portable electrical fan. 5,018,951, Cl. 417-423.150.
- Wang, Samuel S.; and Nagaraj, D. R., to American Cyanamid Company. Frothing procedure using polymeric sulfide mineral depressants. 5,019,246, Cl. 209-167.000.
- Wang, Ying, to International Applied Sciences, Inc. Hydrophilic microporous membrane. 5,019,262, Cl. 210-490.000.
- Wang, Yulan; and Butner, Steven E. Three-dimensional vector processor. 5,019,968, Cl. 364-200.000.
- Wanlass, Frank, to Standard Microsystems Corporation. Four transistor static RAM cell. 5,020,028, Cl. 365-154.000.
- Wanlass, Mark W., to United States of America, Energy. Monolithic tandem solar cell. 5,019,177, Cl. 136-249.000.
- Wanner, Edward A.: *See—*
  - Wegman, Dwight D.; Wanner, Edward A.; Rehrer, Wilson P.; and Widge, Sunil, 5,019,332, Cl. 420-59.000.
- Warashina, Yoshihisa: *See—*
  - Mizushima, Yoshihiko; Iida, Takashi; Hirohata, Toru; Sugimoto, Kenichi; Warashina, Yoshihisa; and Nakajima, Kazutoshi, 5,020,064, Cl. 372-37.000.
- Warburton, Richard T., to Mobil Oil Corporation. Method for molding containers and forming hole therein. 5,019,313, Cl. 264-154.000.
- Wardlaw, Louis J., III, to Hot-Hed, Inc. Subterranean well welding habitat. 5,018,321, Cl. 52-2.170.
- Wargo, James A.: *See—*
  - Miller, James M.; and Wargo, James A., 5,018,902, Cl. 404-6.000.
- Warmack, Robert J.: *See—*
  - Ferrell, Thomas L.; Warmack, Robert J.; and Reddick, Robin C., 5,018,865, Cl. 356-376.000.
- Warner, Gary N.: *See—*
  - Mulholland, Denis G.; Schaffer, Ronald R.; and Warner, Gary N., 5,018,316, Cl. 51-216.00R.
- Warner-Lambert Company: *See—*
  - Geria, Navin M., 5,019,033, Cl. 604-2.000.
  - Horwell, David C.; and Rees, David C., 5,019,588, Cl. 514-409.000.
  - Mahjour, Majid; Mauser, Bernadette; Rashidbaigi, Zahra; and Linn, Edwards E., 5,019,395, Cl. 424-449.000.
- Warschawski, Joel P.: *See—*
  - Elgat, Zvi; and Warschawski, Joel P., 5,019,458, Cl. 428-630.000.
- Waschkuttis, Gerhard. Soot filter for diesel vehicles. 5,019,142, Cl. 55-429.000.

VOL
1126
ISS
4
MY
28
1991
UMI

- Washburn, William N.: *See*—
  - Buchanan, John M.; Cook, Ewell R.; Mooberry, Jared B., Prochl, Gary S.; Singer, Stephen P.; and Washburn, William N., 5,019,492, Cl. 430-543.000.
- Washington University Technology Associates, Inc.: *See*—
  - Sparks, Robert E.; Mason, Norbert S.; and Center, Michael, 5,019,302, Cl. 264-8.000.
- Washizu, Takehiro; and Nagamatsu, Tsutomu, to Yamaha Hatsudoki Kabushiki Kaisha. Intake system for automative engine. 5,018,485, Cl. 123-52.0MB.
- Wason, Thomas D. Audible display of electrical signal characteristics. 5,020,108, Cl. 381-48.000.
- Wasserfuhr, Wilhelm, to Rexnord Antriebstechnik Zweigniederlassung der Rexnord Gesellschaft mbH. Flexible shaft coupling. 5,019,015, Cl. 464-99.000.
- Watanabe, Haruo; Nakamura, Ichiro; Okamoto, Yoshio; and Konno, Hitoshi, to Hitachi, Ltd. Electromagnetic fuel injection valve apparatus. 5,018,501, Cl. 123-472.000.
- Watanabe, Hikaru: *See*—
  - Amemoto, Mashide; Watanabe, Hikaru; and Shoji, Akio, 5,019,623, Cl. 525-7.300.
- Watanabe, Niro; Yoshida, Masato; and Ito, Noriyuki, to Toppan Printing Co., Ltd. Thermal transfer material. 5,019,452, Cl. 428-422.000.
- Watanabe, Robert S. Laminectomy surgical process. 5,019,081, Cl. 606-79.000.
- Watanabe, Satoshi: *See*—
  - Suzuki, Makoto; Watanabe, Satoshi; Tsukamoto, Takashi; Aoki, Hikoharu; Ohri, Hitomi, and Sako, Yukihiro, 5,018,817, Cl. 350-96.170.
- Watanabe, Yoshiaki: *See*—
  - Nakasugi, Mikio; and Watanabe, Yoshiaki, 5,018,880, Cl. 384-112.000.
- Watanabe, Yoshitaka; Mizoguchi, Yoshiyuki; and Hiraga, Hiroyuki, to Canon Kabushiki Kaisha. Recording apparatus having a movable sheet guide member. 5,019,839, Cl. 346-134.000.
- Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; Endo, Takashi; and Moriyama, Jiro, to Canon Kabushiki Kaisha. Recording apparatus with improved sheet feeding. 5,019,840, Cl. 346-134.000.
- Waterfield, Adam P. M.; Waterfield, Norman R.; Chapman, David A.; Andrews, Thomas K.; and Humphrey, Brian, to Geo. J. Cox Ltd. Last. 5,018,233, Cl. 12-133.00B.
- Waterfield, Norman R.: *See*—
  - Waterfield, Adam P. M.; Waterfield, Norman R.; Chapman, David A.; Andrews, Thomas K.; and Humphrey, Brian, 5,018,233, Cl. 12-133.00B.
- Waterman, Raymond C., Jr.: *See*—
  - DiBiase, Robert; Galani, Zvi, and Waterman, Raymond C., Jr., 5,019,792, Cl. 333-17.100.
- Waterstrat, Richard M., to American Dental Association Health Foundation. Ductile intermetallic compounds for dental applications. 5,019,337, Cl. 420-580.000.
- Watts, John D. Threaded tubular connection. 5,018,771, Cl. 285-333.000.
- Weaver, James C.; Powell, Kevin T.; and Langer, Robert S., Jr., to Massachusetts Institute of Technology. Control of transport of molecules across tissue using electroporation. 5,019,034, Cl. 604-20.000.
- Weaver, Marvin G., Jr.: *See*—
  - McClure, John R.; Weaver, Marvin G., Jr.; and Strosser, Richard P., 5,018,342, Cl. 56-10.500.
- Weaver, William N.: *See*—
  - Marco, Leslie S.; Klygis, Mindaugas J.; and Weaver, William N., 5,018,620, Cl. 206-150.000.
- Webasto AG Fahrzeugtechnik: *See*—
  - Fiegel, Gunnar; and Schreiter, Stefan, 5,018,782, Cl. 296-217.000.
- Webb, David A., Jr.; Hetherington, Ricky C.; Salett, Ronald M.; Fossum, Tryggvue; and Manley, Dwight P., to Digital Equipment Corporation. Method and apparatus for increasing the data storage rate of a computer system having a predefined data path width. 5,019,965, Cl. 364-200.000.
- Weber, Bruce A., to United States of America, Army. Spatial symmetry cueing image processing method and apparatus. 5,020,111, Cl. 382-31.000.
- Weber, David P.: *See*—
  - Clement, Thomas P.; and Weber, David P., 5,019,054, Cl. 604-248.000.
- Weber, Robert; and Stamm, Hubert, to Siemens Aktiengesellschaft. Electropolishing method for decontamination purposes. 5,019,228, Cl. 204;129.75-.
- Weber s.r.l.: *See*—
  - Triolo, Innocenzo; and Stagni, Rino, 5,018,500, Cl. 123-463.000.
- Weckenmann, Hartmut: *See*—
  - Durschimidt, Ferry; Kolb, Harmut; Strauss, Wolfgang; and Weckenmann, Hartmut, 5,018,348, Cl. 60-274.000.
- Wegel, Peter: *See*—
  - Cziptschirsch, Kurt; Dabringhaus, Volker; and Wegel, Peter, 5,018,800, Cl. 312-344.100.
- Wegman, Dwight D.; Wanner, Edward A.; Rehrer, Wilson P.; and Widge, Sunil, to Carpenter Technology Corporation. Heat, corrosion, and wear resistant steel alloy. 5,019,332, Cl. 420-59.000.
- Wegmann, Alex: *See*—
  - Hofer, Arnold; and Wegmann, Alex, 5,019,639, Cl. 528-94.000.
- Wei, James T.: *See*—
  - Hsu, Chao-Yang; Patel, Vasant K.; Vahlsing, David H.; Wei, James T.; and Myers, Harry K., Jr., 5,019,671, Cl. 585-751.000.
- Weier, Richard M.: *See*—
  - Khanna, Ish K.; Nosal, Roger; and Weier, Richard M., 5,019,581, Cl. 514-303.000.
- Weilbach, August O.; Hanson, Derald F.; and Smith, C. Dwight, to Lincoln Laser Company. Self-pressurizing gas supported surface-roughness bearing. 5,019,738, Cl. 310-90.500.
- Weimar, Michael; and Stadele, Norbert, to Zinser Textilmaschinen GmbH. Roving bobbin creel for a textile ring spinning machine or the like. 5,018,681, Cl. 242-131.000.
- Weinberg, Irving: *See*—
  - Brandhorst, Henry W., Jr.; and Weinberg, Irving, 5,019,176, Cl. 136-244.000.
- Weinberg, Melvin S.: *See*—
  - Cormier, Alan D.; and Weinberg, Melvin S., 5,019,238, Cl 204-409.000.
- Weinblatt, Lee S. Flat switch insertable into a magazine and usable as part of a survey technique for readership of publications. 5,019,679, Cl. 200-508.000.
- Weiner, Robert S., to Prince St. Technologies Ltd. Repairable broadloom carpet. 5,019,437, Cl. 428-87.000.
- Weinerman, Lee S.; and Vargus, Joel T., to Eastern Company, The. Sliding door lock. 5,018,373, Cl. 70-99.000.
- Weisemann, Claus: *See*—
  - Becker, Rainer; Schlabs, Brigitte; and Weisemann, Claus, 5,019.413, Cl. 426-460.000.
- Weiss, Hardy P., to Prazisions-Werkzeuge AG. Process for increasing the quantity of powder dispensed in a powder coating system, as well as powder coating system. 5,018,910, Cl. 406-144.000.
- Weiss, Wilfried: *See*—
  - Meinecke, Albrecht; Egelhof, Dieter; and Weiss, Wilfried, 5,019,214, Cl. 162-301.000.
- Weisz, Paul B.: *See*—
  - Folkman, Moses J.; and Weisz, Paul B., 5,019,562, Cl. 514-58.000.
- Welch Allyn, Inc.: *See*—
  - Danna, Dominick; Krauter, Allan I.; and Lia, Raymond A., 5,018,506, Cl. 128-4.000.
  - Evangelista, Michael L.; and Lia, Raymond A., 5,018,436, Cl. 92-92.000.
  - Krauter, Allan I., 5,019,121, Cl. 128-4.000.
- Weldon, James M., to Parker Kinetic Designs, Inc. Electromagnetic drilling apparatus. 5,018,590, Cl. 175-105.000.
- Weldy, John A., to Eastman Kodak Company. Methods for reducing quantization error in hierarchical decomposition and reconstruction schemes. 5,020,120, Cl. 382-56.000.
- Wells, Jeff P., to Insituform of North America, Inc. Apparatus for cleaning interior of a lateral pipeline. 5,018,545, Cl. 134-113.000.
- Wenger Manufacturing, Inc.: *See*—
  - Singer, Roy E., 5,018,960, Cl. 425-367.000.
- Wennerberg, Gunnar; Gordon, Daniel A.; and King, Harriss T., to Measurex Corporation. Optical system for detecting properties of traveling sheet materials. 5,019,710, Cl. 250-341.000.
- Wenzel, Norbert: *See*—
  - Schutten, Dagmar; Schmitz, Hans-Joachim; Caspar, Hans-Peter; Kolschbach, Veit M.; Znoyek, Gerald; and Wenzel, Norbert, 5,018,826, Cl. 350-96.290.
- Werner & Pfleiderer GmbH: *See*—
  - Lambertus, Friedrich, 5,018,273, Cl. 29-890.142.
- Wernli, Bruno P.: *See*—
  - Kagi, Rene , 5,018.435, Cl. 92-48.000.
- Wesling, Mary A.; and Sherman, Kimberly J., to Microelectronics and Computer Technology Corporation. Method for coating the top of an electrical device. 5,019,409, Cl. 427-96.000.
- Wesolowski, Jan S., to Ampex Corporation. Time base corrector memory arrangement and memory control. 5,019,906, Cl. 358-148.000.
- West, Dennis E. Linkage assembly for trigger/sear assemblies. 5,018,292, Cl. 42-69.020.
- Westinghouse Electric Corp.: *See*—
  - Franklin, Richard D.; Auld, Gregg D.; and Murray, David E., 5,019,329, Cl. 376-316.000.
  - Larson, Richard C.; Spencer, Keith R.; Alercia, Don P.; Kwech, Horst; Litka, Thomas J.; and Ford, Guy J., 5,019,325, Cl. 376-260.000.
  - Obermeyer, Franklin D.; Cruz, Richard R.; and Bieberbach, George, 5,018,772, Cl. 292-39.000.
  - Silvestri, George J., Jr.; Martin, James A.; and Ulrich, Douglas R., 5,018,356, Cl. 60-646.000.
- Westvaco Corporation: *See*—
  - Schilling, Peter, 5,019,168, Cl. 106-277.000.
- Wetzel, Charles R.: *See*—
  - Davis, Herb; and Wetzel, Charles R., 5,019,132, Cl. 8-527.000.
- Wetzel, Robert G.: *See*—
  - Boisture, Thomas B.; McGrew, Larry D.; Jeffrey, James D.; Wetzel, Robert G.; Livingston, Gene P.; and Baten, Robert A., 5,018,544, Cl. 134-111.000.
- Weynant nee Girones, Renee P., to G.I.R. Temperature monitoring device containing at least one element of an alloy which memorizes its shape. 5,018,874, Cl. 374-205.000.
- Wheatcroft, Royce. Belt splicing apparatus. 5,018,262, Cl. 29-243.510.
- Wheeler, William R.; and Uhler, George M., to Digital Equipment Corporation. Pipeline bubble compression in a computer system. 5,019,967, Cl. 364-200.000.
- Wheland, Robert C.: *See*—
  - Slocum, Edgar W.; Sobrero, Aquiles C.; and Wheland, Robert C., 5,019,632, Cl. 526-68.000.
- Whirlpool Corporation: *See*—
  - Burdorff, Mark A., 5,018,550, Cl. 137-387.000.

  - Cur, Nihat O.; and Kirby, David B., 5,018,328, Cl. 50-406.000.
- White, David H.: *See*—
  - Lin, Youlin; Wallace, Rebecca A.; and White, David H., 5,019,371, Cl. 424-5.000.
- White, Hollis N., Jr. Hydrostatic steering device with a radially free floating valve member. 5,018,432, Cl. 91-375.00R.
- White, Ralph E.; Mao, Zhenhua; and Srinivasan, Supramaniam, to Texas A&M University System, The. Electrochemical method for producing hydrogen and sulfur. 5,019,227, Cl. 204-128.000.
- White, Roger D.: *See*—
  - Downie, Robert; Peterson, Ray D.; Richards, Nolan E.; and White, Roger D., 5,019,455, Cl. 428-584.000.
- White, William C.: *See*—
  - Gettings, Richard L.; McGee, James B.; White, William C.; and Plahutnik, Frank, Jr., 5,019,173, Cl. 134-4.000.
- Whitehurst, D. Duayne: *See*—
  - Chapman, Orville L.; and Whitehurst, D. Duayne, 5,019,660, Cl. 585-22.000.
  - Partridge, Randall D.; and Whitehurst, D. Duayne, 5,019,665. Cl. 585-803.000.
- Whiteside, Leo A.; and Coates, Bradley J., to Dow Corning Wright Corporation. Patellar prosthesis and method of making the same. 5,019,104, Cl. 623-20.000.
- Whitmore, Henry B. Exercise treadmill belt. 5,018,722, Cl. 272-69.000.
- Whittaker, Michael T. Fluid containment and access device for a beverage container. 5,018,635, Cl. 220-90.200.
- Whittaker, Sean E.; and Harris, Bruce F., to NCR Corporation. Document transport module. 5,018,720, Cl. 271-272.000.
- Wicker, Ralph C., to Schmeiser, Morelle & Watts. Counterfeit protected document. 5,018,767, Cl. 283-67.000.
- Widener, James: *See*—
  - Rutledge, Jack, Jr., 5,018.799, Cl. 303-118.000.
- Widge, Sunil: *See*—
  - Wegman, Dwight D.; Wanner, Edward A.; Rehrer, Wilson P.; and Widge, Sunil, 5,019,332, Cl. 420-59.000.
- Widmer, Stanley W. Latch mechanism for a railboard track switch cover. 5,018,690, Cl. 246-428.000.
- Wiese, Patrick M., to Hach Company. Lead extraction and analysis. 5,019,516, Cl. 436-77.000.
- Wiesert, Peter: *See*—
  - Menke, Klaus; Wiesert, Peter; Wollmann, Klaus; and Best, Bernd, 5,019,199, Cl. 156-245.000.
- Wijn, Josephus M.: *See*—
  - Gravesteijn, Dirk J.; Wijn, Josephus M.; and van Liempd, Johannes P. J. G., 5,019,487, Cl. 430-322.000.
- Wikman, Vesa: *See*—
  - Elonen, Jorma; Timperi, Jukka; Vesala, Reijo; and Wikman, Vesa, 5,019,136, Cl. 55-36.000.
- Wilcox, Floyd J., Jr.: *See*—
  - Stallings, Robert L., Jr.; and Wilcox, Floyd J., Jr., 5,018,688, Cl. 244-137.400.
- Wilcox, Joseph; and Wilms, Alfred H., to Gaming and Technology, Inc. Poker game method. 5,019,973, Cl. 364-412.000.
- Wild Tails, Inc.: *See*—
  - Kennedy, Michael B., Jr., 5,018,297, Cl. 43-42.280.
- Wildman, Alexander J. Method of design and manufacture of laminated orthodontic brackets. 5,018,259, Cl. 29-160.600.
- Wiley, Kenneth D.; Zellner, John W.; St. Laurent, Andre; Newman, James A.; Szabo, Thomas J.; and Shewchenko, Nicholas, to Dynamic Research, Inc. Motorcycle accident simulating test dummy. 5,018,977, Cl. 434-274.000.
- Wiley, Roy C., to Biomet, Inc. Acetabular cup prosthesis assembly. 5,019,105, Cl. 623-22.000.
- Wilhelm Hegenscheidt Gesellschaft mbH, Firma: *See*—
  - Schneider, Friedhelm; Koepnick, Klaus; and Wowra, Henrik, 5,019,115, Cl. 82-1.110.
- Wilhelmsson, Hans: *See*—
  - Etievant, Claude; and Wilhelmsson, Hans, 5,020,061, Cl. 372-2.000.
- Wilken, Josef: *See*—
  - Hackmann, Ludger; and Wilken, Josef, 5,018,644, Cl. 221-65.000.
- Wilkerson, Cecil L. Batting practice machine. 5,018,729, Cl. 273-26.00E.
- Wilkinson, Bruce L. Forward converter type of switched power supply. 5,019,957, Cl. 363-56.000.
- Wilkinson, James H.: *See*—
  - Dougall, David A.; Wilkinson, James H.; and Walker, Gavin A., 5,019,903, Cl. 358-140.000.
- Willert, Hans-Georg, to Sulzer Brothers Limited. Fixing stem for a prosthesis. 5,019,106, Cl. 623-22.000.
- Williams, Clarence F. Strip shingle alignment tool. 5,018,279, Cl. 33-649.000.
- Williams, David C.: *See*—
  - D'Aoust, Robert; and Williams, David C., 5,020,124, Cl. 382-61.000.
- Williams, James M. Process for finding the depth of a lost return zone. 5,018,589, Cl. 175-72.000.
- Williams, Jeffrey L., to Stratus Computer, Inc. Method and apparatus for detecting selected absence of digital logic synchronism. 5,020,024, Cl. 364-900.000.
- Williams, Jerry G., to Conoco Inc. Well process using a composite rod-stiffened pressurized cable. 5,018,583, Cl. 166-385.000.
- Williams, John R.; and McLatchy, Marion L. Closure for brood chamber. 5,019,011, Cl. 449-27.000.
- Williams, Julie D. N.: *See*—
  - Arneson, Theodore R.; Hitchcock, Robert F.; and Williams, Julie D. N., 5,018,624, Cl. 206-560.000.
- Williams, Martin M.: *See*—
  - Rose, Kenneth R.; and Williams, Martin M., 5,019,422, Cl. 427-245.000.
- Williams Patent Crusher and Pulverizer Company: *See*—
  - Williams, Robert M., 5,018,456, Cl. 110-342.000.
- Williams, Peter J.: *See*—
  - Cogswell, Frederic N.; Hezzell, David J.; and Williams, Peter J., 5,019,450, Cl. 428-402.000.
- Williams, Robert M., to Williams Patent Crusher and Pulverizer Company. System for disposing of sludge. 5,018,456, Cl. 110-342.000.
- Williams, Robert M. Grate assembly in a down draft impact mill. 5,018,674, Cl. 241-88.400.
- Williams, William P., executor: *See*—
  - Davies, Eric, deceased; and McAllister, Ian R., 5,018,226, Cl. 5-82.00R.
- Williams, William Price: *See*—
  - Davies, Eric, deceased; and McAllister, Ian R., 5,018,226, Cl. 5-82.00R.
- Wilms, Alfred H.: *See*—
  - Wilcox, Joseph; and Wilms, Alfred H., 5,019,973, Cl. 364-412.000.
- Wilson, David E.: *See*—
  - Holmberg, Arthur, Jr.; and Wilson, David E., 5,018,571, Cl. 165-41.000.
- Wilson, Gregory M., to Mobil Oil Corporation. Preparing multi-layer coextruded polyolefin stretch wrap films. 5,019,315, Cl. 264-171.000.
- Wilson, Hamish D.: *See*—
  - Barlow, John; Evans, Philip H.; Frank, Nicholas H.; and Wilson, Hamish D., 5,019,178, Cl. 148-3.000.
- Wilson, Hillis L.; Passer, Barry E.; and Yaichuk, Peter W., to NCR Corporation. Aligner mechanism for aligning a document in a business machine. 5,018,719, Cl. 271-246.000.
- Wilson, James: *See*—
  - Richter, Francis L.; Wilson, James; and Pedersen, Daniel E., 5,019,346, Cl. 422-28.000.
- Wilson, Marlin V. Plat reference system. 5,019,827, Cl. 342-386.000.
- Wilson, Theresa J.; Haddad, Louis C.; and Hagen, Donald F., to Minnesota Mining and Manufacturing Company. Medium for electrophoresis. 5,019,232, Cl. 204-182.800.
- Wilson, William A. Conveyor belt dumping mechanism using horizontal idlers and impact slides. 5,018,619, Cl. 198-839.000.
- Wiltron Company: *See*—
  - Kapetanic, Peter M., 5,019,790, Cl. 331-16.000.
- Winkler, Ekhard: *See*—
  - Baur, Richard; Richter, Felix; Birnbach, Stefan; Fikentscher, Rolf; Oftring, Alfred; and Winkler, Ekhard, 5,019,296, Cl. 252-546.000.
- Winkler, Hans-Henning; and Rutschle, Eugen, to Chiron-Werke GmbH & Co. KG. Machine tool. 5,018,265, Cl. 29-568.000.
- Winkley, John C.: *See*—
  - Cryderman, Robert L.; and Winkley, John C., 5,018,666, Cl. 238-122.000.
- Winter, James: *See*—
  - Raskin, Jef; and Winter, James, 5,019,806, Cl. 340-706.000.
- Winyard, David C., to United States of America, Navy. Single screw mechanism with gaterotor housing at intermediate pressure. 5,018,952, Cl. 418-195.000.
- Wirth, Michael: *See*—
  - Aehnelt, Hans-Peter; Enderle, Eckhard; and Wirth, Michael, 5,018,278, Cl. 33-559.000.
  - Enderle, Eckhard; Aehnelt, Hans-Peter; Aubele, Karl-Eugen; and Wirth, Michael, 5,018,280, Cl. 33-832.000.
- Wisconsin Alumni Research Foundation: *See*—
  - Martens, Jon S.; Beyer, James B.; Nordman, James E.; and Hohenwarter, Gert K. G., 5,019,721, Cl. 307-306.000.
- Witte, Gerhard: *See*—
  - Uhlig, Gunter; Blumenstein, Fritz; and Witte, Gerhard, 5,019,022, Cl. 475-209.000.
- Wohlberg, Alfred W.: *See*—
  - Bourgeault, Leo B.; and Wohlberg, Alfred W., 5,019,954, Cl. 363-21.000.
- Wojnarowski, Robert J.; and Eichelberger, Charles W., to General Electric Company. Die attachment method using nonconductive adhesive for use in high density interconnected assemblies. 5,019,535, Cl. 437-209.000.
- Wojnarowski, Robert J.: *See*—
  - Eichelberger, Charles W.; and Wojnarowski, Robert J., 5,019,946, Cl. 361-414.000.
- Wolf, Gunter; and Fink, Reinhold, to Stihl, Andreas. Work apparatus having one handle for one-handed operation. 5,018,492, Cl. 123-198.00E.
- Wolfe, Steven: *See*—
  - Ifill, Lee; Walker, Robert; Wolfe, Steven; and Schena, Fiore, 5,019,256, Cl. 210-232.000.
- Wolff, Daniel: *See*—
  - Duperray, Gilbert; and Wolff, Daniel, 5,019,444, Cl. 428-262.000.
- Wollmann, Klaus: *See*—
  - Menke, Klaus; Wiesert, Peter; Wollmann, Klaus; and Best, Bernd, 5,019,199, Cl. 156-245.000.
- Wolynic, Edward T.: *See*—
  - Best, Donald F.; Long, Gary N.; Pellet, Regis J.; Rabo, Jule A.; and Wolynic, Edward T., 5,019,240, Cl. 208-111.000.
- Wong, Keith N.: *See*—
  - Chiu, Lee C.; Ko, Yuki N.; and Wong, Keith N., 5,019,976, Cl. 364-413.130.
- Wong, Patrick S. L.; and Theeuwes, Felix, to Alza Corporation. Aqueous emulsion for pharmaceutical dosage form. 5,019,397, Cl. 424-473.000.

VOL 1126
ISS 4
MY 28
1991
UMI

- Wong, Patrick S. L.: *See—*
  - Ayer, Atul D.; Kuczynski, Anthony L.; Wong, Patrick S. L.; Hamel, Lawrence G.; and Jordan, Maureen L., 5,019,396, Cl. 424-473.000.
- Wong, Pui K.; and Drent, Eit, to Shell Oil Company. Process of reducing stereoregular character of carbon monoxide/olefin copolymer with organic base. 5,019,645, Cl. 528-488 000.
- Woo, Paul M.: *See—*
  - Starr, Benjamin F.; Wallace, Mark L.; Talley, Gaylen M.; and Woo, Paul M., 5,019,980, Cl. 364-424.040.
- Wood, Alfred: *See—*
  - Haworth, Walter; and Wood, Alfred, 5,018,248, Cl. 19-240.000.
- Wood, Godfrey A.: *See—*
  - Stewart, David B.; and Wood, Godfrey A., 5,018,538, Cl. 131-109.100.
- Woodall, Jerry M.: *See—*
  - Kleinsasser, Alan W.; and Woodall, Jerry M., 5,019.530, Cl. 437-175.000.
- Woodbridge, Keith W.; Doncaster, Daniel J.; and Hamblin, Ronald F., to SKF (UK) Limited. Preventing movement of an article along a shaft. 5,018,898, Cl. 403-11.000.
- Woods, John; Rooney, John; and Coakley, Pauline, to Loctite Corporation. Polymerizable styryloxy resins and compositions thereof. 5,019,629, Cl. 525-312.000.
- Woodson, Herbert H.: *See—*
  - Hsu, John S.; and Woodson, Herbert H., 5,019,766, Cl. 318-807.000.
- Woodward, James R.: *See—*
  - Gole, James L.; Woodward, James R.; and Cobb, Stephen H., 5,020,071, Cl. 372-89.000.
- Wortley, Russell B.: *See—*
  - Billman, Fred L.; Jamison, Mark D.; and Wortley, Russell B., 5,018,646, Cl. 222-107.000.
- Wowra, Henrik: *See—*
  - Schneider, Friedhelm; Koepnick, Klaus; and Wowra, Henrik, 5,019,115, Cl. 82-1.110.
- WPC Machinery Corporation: *See—*
  - Schumacher, Thomas H.; and Nelson, Ronald L., 5,018,444, Cl. 101-366.000.
- Wright, John C.: *See—*
  - Smolenski, Joseph L.; Christopher, Gerard W.; Wright, John C.; and Relation, Alfred E., 5,019,952, Cl. 363-16.000.
- Wright, Steven L.: *See—*
  - Solomon, Paul M.; and Wright, Steven L., 5,019,882, Cl. 357-23.800.
- Wu, Dumin: *See—*
  - Gu, Hansen; and Wu, Dumin, 5,018,524, Cl. 128-421.000.
- Wu, Samuel C.; and Brossia, Charles E. Method for monitoring the health of physical systems producing waste heat. 5,020,007, Cl. 364-551.010.
- Wuepper, Thomas E.: *See—*
  - McKibben, Kenneth D.; and Wuepper, Thomas E., 5,019,196, Cl. 156-91.000.
- Wurtman, Richard J.; and Maher, Timothy J., to Interneuron Pharmaceuticals, Inc. Method for decreasing appetite. 5,019,594, Cl. 514-561.000.
- Wyatt, Richard; and Cameron, Keith H., to British Telecommunications public limited company. Optical resonant device. 5,018,831, Cl. 350-162.170.
- Wylie, Albert A., III. Open-end ratchet wrench. 5,018,412, Cl. 81-111.000.
- Wyss, Peter, to Fritz Studer AG. Universal grinder. 5,018,309, Cl. 51-72.00R.
- Wyvratt, Matthew J., Jr.: *See—*
  - Fisher, Michael H.; and Wyvratt, Matthew J., Jr., 5,019,578, Cl. 514-275.000.
- Xaloy Incorporated: *See—*
  - Chou, Schiao F.; and Roberson, Willie, 5,019,459, Cl. 428-656.000.
- Xerox Corporation: *See—*
  - Bares, Jan, 5,019,870, Cl. 355-298.000.
  - Blessington, Daniel R.; Kneezel, Gary A.; and Campanelli, Michael R., 5,019,675, Cl. 346-140.00R.
  - Nash, Thomas W., 5,019,859, Cl. 355-77.000.
  - Phelps, Russell L., 5,018,656, Cl. 227-84.000.
  - Sadwick, Paul V.; and Sabocheck, Michael K., 5,018,717, Cl. 271-207.000.
  - Schwarz, Gary S., 5,019,837, Cl. 346-108.000.
  - Schwarz, William M., 5,019,166, Cl. 106-22.000.
- Yabu, Shigeki; and Takabayashi, Hiroshi, to Canon Kabushiki Kaisha. External-circuit connecting method and packaging structure. 5,019,201, Cl. 156-273.900.
- Yachigo, Shinichi: *See—*
  - Mizuno, Yukio; Maruyama, Takashi; and Yachigo, Shinichi, 5,019,615, Cl. 524-100.000.
- Yagawara, Shinji; and Ohta, Wasaburo, to Ricoh Company, Ltd. Gas detecting device. 5,019,885, Cl. 357-25.000.
- Yagi, Tetsuo: *See—*
  - Isozumi, Shuzoo; Yagi, Tetsuo; and Tanaka, Toshinori, 5,019,739, Cl. 310-233.000.
- Yaginuma, Yoshitaka; Tokiya, Motohide; and Saito, Naoya, to Mitsubishi Nuclear Fuel Co. Pellet handling and external inspection equipment. 5,019,326, Cl. 376-261.000.
- Yagishita, Takahiro: *See—*
  - Kiya, Yukitoshi; Yagishita, Takahiro; Miyamoto, Masayoshi; Shimada, Kazuyuki; Azumai, Hideo; Niito, Yoshiharu; and Iwasaki, Keiichi, 5,019,913, Cl. 358-296.000.
- Yagoto, Mitsutoshi; and Mino, Masayuki, to Minolta Camera Kabushiki Kaisha. Automatic focusing apparatus with moire fringes. 5,019,701, Cl. 250-201.500.
- Yaguchi, Zinichi: *See—*
  - Kato, Katsuyuki; and Yaguchi, Zinichi, 5,018,461, Cl. 112-104.000.
- Yaichuk, Peter W.: *See—*
  - Wilson, Hillis L.; Passer, Barry E.; and Yaichuk, Peter W., 5,018,719, Cl. 271-246.000.
- Yaka Feudor K.K.: *See—*
  - Ichikawa, Masaharu, 5,018,965, Cl. 431-344.000.
- Yale Security Inc.: *See—*
  - Tully, Clay E., 5,018,375, Cl. 70-472.000.
- Yamada, Akira; Ohkouchi, Isao; Koseki, Yasuo; Kurokawa, Hideaki; Ebara, Katsuya; Takahashi, Sankichi; Onoda, Risuke; and Sugimoto, Shigeo, to Hitachi, Ltd. Cooling energy generator with cooling energy accumulator. 5,018,367, Cl. 62-476.000.
- Yamada, Haruyasu: *See—*
  - Matsuzawa, Akira; and Yamada, Haruyasu, 5,019,820, Cl. 341-156.000.
- Yamada, Hitoshi: *See—*
  - Tsukada, Toru; and Yamada. Hitoshi, 5,018,878, Cl. 384-44.000.
- Yamada, Kunihiro: *See—*
  - Ito, Yasunobu; and Yamada, Kunihiro, 5,019,810, Cl. 340-825.060.
- Yamada, Masaya: *See—*
  - Enomoto, Ryo; and Yamada, Masaya, 5,018,810, Cl. 350-96.120.
- Yamada, Michihiro: *See—*
  - Mori, Shigeru; Yamada, Michihiro; Miyatake, Hideshi; and Murakami, Shuji, 5,019,883, Cl. 357-23.130.
- Yamagami, Yutaka: *See—*
  - Nakano, Masako; and Yamagami, Yutaka, 5,020,016, Cl. 364-736.500.
- Yamagata, Kazuko: *See—*
  - Murakami, Hiroshi; Koishi, Masayuki; Yatagai, Shoko; and Yamagata, Kazuko, 5,019,546, Cl. 502-303.000.
- Yamagishi, Jun: *See—*
  - Koura, Soushichi; and Yamagishi, Jun, 5,018,303, Cl. 49-280.000.
- Yamaguchi, Atsuo; Takahira, Kenichi; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, to Mitsubishi Denki Kabushiki Kaisha. IC card. 5,019,970, Cl. 364-200.000.
- Yamaguchi, Shinobu: *See—*
  - Fushiya, Fusao; and Yamaguchi, Shinobu, 5,018,314, Cl. 51-170.0MT.
- Yamaguchi, Yasuhiro: *See—*
  - Ida, Mitsuru; and Yamaguchi, Yasuhiro, 5,018,401, Cl. 74-354.000.
- Yamaguchi, Yuzo: *See—*
  - Nakao, Takeshi; Ojima, Masahiro; Miyamura, Yoshinori; Okuwaki, Toyoji; Kawakubo, Youichi; Takeuchi, Yoshinori; and Yamaguchi, Yuzo, 5,020,041, Cl. 369-13.000.
- Yamaha Corporation: *See—*
  - Kimura, Shigenobu, 5,019,819, Cl. 341-143.000.
- Yamaha Hatsudoki Kabushika Kaisha: *See—*
  - Tsuchida, Naoki, 5,018,497, Cl. 123-432.000.
- Yamaha Hatsudoki Kabushiki Kaisha: *See—*
  - Matsubara, Hisayoshi; Mizuno, Yutaka; and Hanajima, Toshiharu, 5,019,463, Cl. 429-12.000.
  - Washizu, Takehiro; and Nagamatsu, Tsutomu, 5,018,485, Cl. 123-52.0MB.
- Yamaichi Electric Mfg. Co., Ltd.: *See—*
  - Matsuoka, Noriyuki, 5,018,981, Cl. 439-71.000.
- Yamakawa, Nobuaki: *See—*
  - Ishida, Masahiko; Yamakawa, Nobuaki; and Shiida, Masahiro, 5,018,269, Cl. 29-861.000.
- Yamakawa, Takeshi; and Tanzawa, Misao, to Ricoh Company, Ltd. Image forming apparatus having a removable processing unit. 5,019,867, Cl. 355-245.000.
- Yamamoto, Akito; Ueno, Takashi; and Sumizawa, Akio, to Nissan Motor Co., Ltd. Device for interfacing data communications. 5,019,964, Cl. 364-200.000.
- Yamamoto, Akito: *See—*
  - Katsunori, Oshiage: Hosaka, Akio; and Yamamoto, Akito, 5,019,799, Cl. 340-438.000.
- Yamamoto, Katsumi; Koyama, Tadashi; Aono, Toshio; and Itaya, Toshiro, to Toyoda Koki Kabushiki Kaisha. Robot controller. 5,020,001, Cl. 364-513.000.
- Yamamoto, Kazumi; and Sugasawa, Masayuki, to Ikegami Tsushinki Co., Ltd. Cross color noise reduction and contour correction apparatus in NTSC color television image processing system. 5,019,895, Cl. 358-36.000.
- Yamamoto, Masato; Yamanaka, Toshimasa; Nakajima, Masahiro; and Ohsawa, Yutaka, to Asahi Kogaku Kogyo Kabushiki Kaisha. Representation of depth of field in camera. 5,019,852, Cl. 354-409.000.
- Yamamoto, Taizo; and Konishi, Hirokazu, to Nippon Elanco Kabushiki Kaisha. Capsule charging apparatus. 5,018,335, Cl. 53-281.000.
- Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susumu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, to Kabushiki Kaisha Toshiba. Liquid crystal display device. 5,018,839, Cl. 350-347.00R.
- Yamanaka, Toshimasa: *See—*
  - Yamamoto, Masato; Yamanaka, Toshimasa; Nakajima, Masahiro; and Ohsawa, Yutaka, 5,019,852, Cl. 354-409.000.
- Yamanashi, William S.; and Patil, Arun-Angelo. Radio frequency surgical tool and method. 5,019,076, Cl. 606-45.000.
- Yamane, Hiroyuki; Higuchi, Yasushi; and Fujii, Tetsuo, to Nippondenso Co., Ltd. Method of manufacturing a semiconductor device having a plurality of elements. 5,019,526, Cl. 437-37.000.

- Yamane, Shuji; and Tou, Seiji, to Kabushiki Kaisha Nisshin Seisa Kusho. Roundness processing device of a slipper surface of a rocker arm. 5,018,313, Cl. 51-165.710.
- Yamanishi, Keisuke: *See—*
  - Hino, Eiji; and Yamanishi, Keisuke, 5,019,222, Cl. 204-27.000.
- Yamashita, Haruo: *See—*
  - Taniguchi, Atsuki; Yamashita, Haruo; Ishihara, Tomohiro; and Wakisaka, Takaaki, 5,020,057, Cl. 370-102.000.
- Yamato, Koji: *See—*
  - Yasuda, Akira; Koumura, Hideo; Yamato, Koji; and Yasuda, Koichi, 5,019,460, Cl. 428-659.000.
- Yamauchi, Kunio: *See—*
  - Suzuki, Ryoichi; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 5,018,505, Cl. 126-262.000.
- Yamauchi, Yoshiki: *See—*
  - Ishibashi, Tadao; and Yamauchi, Yoshiki, 5,019,890, Cl. 357-34.000.
- Yamawaki, Masao, to Mitsubishi Denki Kabushiki Kaisha. Charge transfer device. 5,019,884, Cl. 357-24.000.
- Yamaya, Hideo; and Iba, Akio, to Casio Computer Co., Ltd. Waveform generating apparatus for an electronic musical instrument using filtered components of a waveform. 5,018,429, Cl. 84-622.000.
- Yamazaki, Kyoji: *See—*
  - Morita, Masayuki; and Yamazaki, Kyoji, 5,019,747, Cl. 315-157.000.
- Yamazaki, Shoichi, to Canon Kabushiki Kaisha. Photographic system for stabilizing an image including two positive lens groups, each group including a positive lens and a negative lens. 5,018,845, Cl. 350-500.000.
- Yang, Ping; Chatterjee, Amitava; Aur, Shian; and Polgreen, Thomas L., to Texas Instruments Incorporated. Programmable interconnect or cell using silicided MOS transistors. 5,019,878, Cl. 357-23.300.
- Yang, Tsai-Ten. Sound activated water spouting toy. 5,018,288, Cl. 40-406.000.
- Yang, Tsen-Shau; Chou, Ger-Chih; and Hsu, Fu-Chieh, to Knights Technology, Inc. Contact sensing for integrated circuit testing. 5,019,771, Cl. 324-158.00P.
- Yano, Toshihiko; Torisu, Yoko; Sekihachi, Hiroko; Matsuo, Noritada; Takagaki, Tohei; and Tsushima, Kazunori, to Sumitomo Chemical Company, Ltd. Novel carboxylic acid esters and insecticides containing them as an active ingredient. 5,019,595, Cl. 514-531.000.
- Yasuda, Akira; Koumura, Hideo; Yamato, Koji; and Yasuda, Koichi, to Kawasaki Steel Corporation. Galvannealed steel sheet having improved spot-weldability. 5,019,460, Cl. 428-659.000.
- Yasuda, Hiroshi; Yokoya, Satoshi; and Takao, Nobutaka, to Sony Corporation. Radio communication apparatus having cooling means. 5,020,138, Cl. 455-115.000.
- Yasuda, Koichi: *See—*
  - Yasuda, Akira; Koumura, Hideo; Yamato, Koji; and Yasuda, Koichi, 5,019,460, Cl. 428-659.000.
- Yasuki, Seijiro; and Kawai, Kiyoyuki, to Kabushiki Kaisha Toshiba. Band width compressing/reproducing system with fields for different frequency components. 5,019,902, Cl. 358-133.000.
- Yasuno, Yoshiki; Ishikawa, Yasuki; Higashimata, Akira; and Fujishiro, Takeshi, to Nissan Motor Company, Limited. Anti-skid brake control system for automotive vehicle, particularly for vehicle having selective two-wheel and four-wheel drive power train. 5,019,985, Cl. 364-426.020.
- Yasunobu, Seiji; Miyamoto, Shoji; and Ihara, Hirokazu, to Hitachi, Ltd. Method and device for stopping vehicle at predetermined position. 5,018,689, Cl. 246-182.00B.
- Yatagai, Shoko: *See—*
  - Murakami, Hiroshi; Koishi, Masayuki; Yatagai, Shoko; and Yamagata, Kazuko, 5,019,546, Cl. 502-303.000.
- Yates Industries: *See—*
  - Khalid, Joseph M.; and Shastry, Chakrakody V., 5,019,221, Cl. 204-13.000.
- Yau, David: *See—*
  - Hunter, Christopher; and Yau, David, 5,019,563, Cl. 514-58.000.
- Yazaki Corporation: *See—*
  - Ishida, Masahiko; Yamakawa, Nobuaki; and Shiida, Masahiro, 5,018,269, Cl. 29-861.000.
- Yazawa, Yoshihiro; Sone, Yuji; Yoshioka, Keiichi; Kinoshita, Noboru; and Hino, Masayuki, to Kawasaki Steel Corporation. Method of making stainless steel sheet for exterior building constituent. 5,019,181, Cl. 148-12.0EA.
- Yee, Hung Y.; and Richardson, Phillip N., to Texas Instruments Incorporated. Dual end resonant slot array antenna feed having a septum. 5,019,831, Cl. 343-771.000.
- Ying-Kit, Choi. Grating. 5,018,332, Cl. 52-666.000.
- Yoder, Ricky L.: *See—*
  - Lowe, H. Edward; Yoder, Ricky L.; and Nelson, Clayton C., 5,019,564, Cl. 514-75.000.
- Yoder, Thomas P. Mobile, extendible table with tool mount and carrier. 5,018,563, Cl. 144-286.00R.
- Yokogawa Medical Systems, Limited: *See—*
  - Morita, Dai; Hirota, Yuichi; and Higashiizumi, Takao, 5,018,528, Cl. 128-661.090.
- Yokohama Rubber Co., Ltd., The: *See—*
  - Kaidoo, Hiroyuki; and Muraki, Takao, 5,019,617, Cl. 524-346.000.
- Yokoi, Koichi: *See—*
  - Kuribara, Ritsuo; Okubo, Kiyoshi; Yokoi, Koichi; and Sadakata, Kiyoshi, 5,018,899, Cl. 403-57.000.
- Yokoi, Yasuna, to K. K. Anretto. Massager unit. 5,018,511, Cl. 128-33.000.
- Yokote, Takasuke, to Seiko Instruments Inc. Watch casing with wrist band switch. 5,020,039, Cl. 368-282.000.
- Yokouchi, Takahito; Matsumoto, Kenji; and Odoi, Kozo, to Mazda Motor Corporation. Flexible top apparatus of a vehicle. 5,018,784, Cl. 296-219.000.
- Yokoya, Satoshi: *See—*
  - Yasuda, Hiroshi; Yokoya, Satoshi; and Takao, Nobutaka, 5,020,138, Cl. 455-115.000.
- Yoneoka, Seiji: *See—*
  - Ohwe, Takeshi; Yoneoka, Seiji; and Takahashi, Minoru, 5,019,931, Cl. 360-104.000.
- Yonezawa, Hiroshi: *See—*
  - Funabashi, Tsuneo; Sakoshita, Kaoru; and Yonezawa, Hiroshi, 5,019,962, Cl. 364-200.000.
- Yonezawa, Keitaro: *See—*
  - Miyata, Ichiro; Kitaura, Ichiro; and Yonezawa, Keitaro, 5,018,617, Cl. 198-346.100.
- Yoo, Young S.: *See—*
  - Salmon, John K.; and Yoo, Young S., 5,018.602, Cl. 187-1.00R.
- Yorioka, Gerald N. Method and apparatus for determining anaerobic capacity. 5,018,726, Cl. 272-129.000.
- Yoshida, Akimaro; and Honjo, Takeshi, to Canon Kabushiki Kaisha. Sheet transporting apparatus with control means. 5,018,716, Cl. 271-227.000.
- Yoshida, Akimaro: *See—*
  - Honjo, Takeshi; Kobayashi, Kenji; Yoshida, Akimaro; and Saeki, Takami, 5,018,714, Cl. 271-3.100.
- Yoshida, Kaichiro; Takada, Hiroshi; and Nakajima, Toshio, to Murata Kikai Kabushiki Kaisha. Dobby loom with a magnetically operated hook selector. 5,018,556, Cl. 139-68.000.
- Yoshida, Kazuaki: *See—*
  - Ishikawa, Takatoshi; Saito, Shigemi; Yoshida, Kazuaki; and Fujita, Yoshihiro, 5,019,850, Cl. 354-322.000.
- Yoshida, Masato: *See—*
  - Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,018,383, Cl. 73-118.100.
  - Ueda, Katsunori; Shimada, Makoto; Danno, Yoshiaki; Togai, Kazuhide; and Yoshida, Masato, 5,019,989, Cl. 364-431.050.
  - Watanabe, Niro; Yoshida, Masato; and Ito, Noriyuki, 5,019,452, Cl. 428-422.000.
- Yoshida, Mitsutaka: *See—*
  - Miura, Yutaka; Yoshida, Mitsutaka; Fujimura, Yasuo; Takaku, Sakae; and Noda, Yukifumi, 5,019,574, Cl. 514-235.200.
- Yoshida, Takehiro: *See—*
  - Sakakibara, Kenzo; Yoshida, Takehiro; and Toda, Kozo, 5,020,096, Cl. 379-100.000.
- Yoshida, Takeo; and Takahashi, Masaharu, to Shin-Etsu Chemical Co., Ltd. Foamable silicone rubber composition. 5,019,295, Cl. 252-518.000.
- Yoshida, Yoshinori: *See—*
  - Oka, Hiroshi; Okuda, Chozo; Yoshida, Yoshinori; Takahashi, Toshihiko; Kamoshida, Yoichi; and Miura, Takao, 5,019,479, Cl. 430-172.000.
- Yoshii, Noboru; and Umeda, Takashi, to Mazda Motor Corporation. Vehicle lower body structure. 5,018,780, Cl. 296-203.000.
- Yoshimoto, Itsuro; and Otsuki, Kuniyoshi, to Casio Computer Co., Ltd. Magnetic tape with an R-DAT format. 5,019,920, Cl. 360-27.000.
- Yoshimoto, Teruo; and Takahashi, Makoto, to Kubota Corporation. Heat-resistant alloy. 5,019,331, Cl. 420-51.000.
- Yoshimura, Makoto: *See—*
  - Saiga, Yoshiharu; Yoshimura, Makoto; and Hara, Susumu, 5,018,679, Cl. 242-67.10R.
- Yoshimura, Toshimi: *See—*
  - Kawabata, Shoichi; and Yoshimura, Toshimi. 5,019,200, Cl. 156-245.000.
- Yoshimura, Yuichiro: *See—*
  - Tanaka, Atsushi; Kaneko, Kiyoshi; and Yoshimura, Yuichiro. 5,019,865, Cl. 355-218.000.
- Yoshinada, Hiroshi; and Takeda, Shu, to Kabushiki Kaisha Komatsu Seisakusho. Master/slave type manipulator. 5,018,922, Cl. 414-5.000.
- Yoshino, Kenji, to Texas Instruments Incorporated. Input circuit. 5,019,725, Cl. 307-443.000.
- Yoshio, Shintani; and Mikio, Inatsu, to Hitachi, Ltd. Semiconductor integrated circuit device. 5,019,889, Cl. 357-42.000.
- Yoshioka, Keiichi: *See—*
  - Kato, Yasushi; Yoshioka, Keiichi; and Hashimoto. Osamu, 5,019,186, Cl. 148-20.300.
  - Yazawa, Yoshihiro; Sone, Yuji; Yoshioka, Keiichi; Kinoshita, Noboru; and Hino, Masayuki, 5,019,181, Cl. 148-12.0EA.
- Yoshitani, Naoyuki: *See—*
  - Kishi, Tomomi; Nonami, Kanshi; Takeuchi, Masahiko; Yoshitani, Naoyuki; and Niwa, Hideo, 5,018,939, Cl. 414-795.400.
- Yoshizawa, Kazutoshi: *See—*
  - Saito, Sayuri; Yoshizawa, Kazutoshi; and Kitada, Yoshitaka, 5,019,966, Cl. 364-200.000.
- Yoshizumi, Yoshiyuki: *See—*
  - Kawara, Toshiyuki; Tsutsui, Hiroshi; Funakoshi, Hiromasa; and Yoshizumi, Yoshiyuki, 5,020,085, Cl. 378-99.000.
- Youmans, Bruce: *See—*
  - Brownrigg, Patrick; Vali, Victor; and Youmans, Bruce, 5,018,827, Cl. 350-96.300.
- Young, James E., to Hewlett-Packard Company Retractable member for fluid, optical and electrical communication in capillary zone electrophoresis. 5,019,236, Cl. 204-299.00R.
- Younger, Peter R.: *See—*
  - Blake, Julian G.; Muka, Richard S.; and Younger, Peter R., 5,019,233, Cl. 204-792.120.

VOL
1126
ISS
4
MY
28
1991
UMI

Yuasa, Toshiya: *See—*

Arahara, Kohzoh; Matsumoto, Kenichi; Fukumoto, Hiroshi; Kai, Takashi; Hoshino, Osamu; Yuasa, Toshiya; Tohyama, Noboru; and Kobayashi, Motokazu, 5,019,835, Cl. 346-1.100.

Yukawa, Hideaki: *See—*

Terasawa, Masato; Satoo, Yukie; and Yukawa, Hideaki, 5,019,503, Cl. 435-115.000.

Yurman, Bruno: *See—*

Nazarenk, Dimitri M.; Hughes, Houston H., III; Gordon, Robert T.; Hattey, David L.; and Yurman, Bruno, 5,020,132, Cl. 455-17.000.

Zacharias, Karl: *See—*

Bernd, Alfred; England, Willi; Flaig, Heinz; Hesse, Wilhelm; Staggl, Roland; and Zacharias, Karl, 5,019,734, Cl. 310-77.000.

Zahner, Daniel B. Tamper resistant ski ticket. 5,018,286, Cl. 40-299.000.

Zaidan Hojin Handotai Kenkyu Shinkokai: *See—*

Nishizawa, Jun-ichi, 5,019,876, Cl. 357-22.000.

Zajac, Theodore, Jr., to Output Technology Corporation. Continuous-form electrophotographic printer. 5,019,872, Cl. 355-317.000.

Zalar, Frank E.: *See—*

Olwert, Ronald J.; Zalar, Frank E.; and Chapman, Walter R., Jr., 5,019,743, Cl. 313-25.000.

Zaleznik, Dori F.: *See—*

Kasper, Dennis L.; Zaleznik, Dori F.; and Finberg, Robert W., 5,019,513, Cl. 435-240.260.

Zanders, Erich: *See—*

Soeder, Carl-Johannes; Zanders, Erich; Raphael, Thomas; Keusen, Heiner; and Groeneweg, Joost, 5,019,266, Cl. 210-605.000.

Zapf, Otto. Seating furniture. 5,018,791, Cl. 297-460.000.

Zdunek, Kenneth J.: *See—*

Grube, Gary W.; Monahan-Mitchell, Timothy A.; and Zdunek, Kenneth J., 5,020,130, Cl. 455-9.000.

Zeliger, Harold I.; and Nussbaum, Frank J., to Zeliger, Harold I. Method of restoring and conserving oil paintings and resulting integrated permanent structure. 5,019,441, Cl. 428-196.000.

Zellner, John W.: *See—*

Wiley, Kenneth D.; Zellner, John W.; St. Laurent, Andre; Newman, James A.; Szabo, Thomas J.; and Shewchenko, Nicholas, 5,018,977, Cl. 434-274.000.

Zellweger, Conrad: *See—*

Guy, Gabriel; and Zellweger, Conrad, 5,018,242, Cl. 16-228.000.

Zenith Electronics Corporation: *See—*

Steiner, Johann; and Jarosz, John M., 5,019,004, Cl. 445-30.000.

Zeoli, Paul. Method for testing pressurized water systems. 5,018,386, Cl. 73-168.000.

Zexel Corporation: *See—*

Okano, Masami; and Takeuchi, Kunihiro, 5,018,763, Cl. 280-735.000.

Zierhut, Hermann, to Siemens Aktiengesellschaft. Information separation device. 5,019,730, Cl. 307-510.000.

Zierhut, Hermann, to Siemens Aktiengesellschaft. Transmission link. 5,020,154, Cl. 455-608.000.

Zimmer, Herbert, to Dornier Luftfahrt GmbH. Hydrodynamic lift for flying boats or sea planes. 5,018,686, Cl. 244-106.000.

Zimmer, Inc.: *See—*

Ross, Randall D., 5,019,079, Cl. 606-72.000.

Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., 5,018,285, Cl. 29-465.000.

Zimmermann, Clifton; Kuerten, Heribert; and Lewin, Helmut, to BASF Aktiengesellschaft. Measuring circuit for detecting measurement signals. 5,019,704, Cl. 250-214.00R.

Zimpro Passavant Environmental Systems, Inc.: *See—*

McIntyre, Glover C.; Lacombe, Robert J.; and Forbess, Russell G., 5,018,458, Cl. 110-346.000.

Zink, Deborah L.: *See—*

Garrity, George M.; Lopez, Maria B.; Hensens, Otto D.; Monaghan, Richard L.; and Zink, Deborah L., 5,019,593, Cl. 514-560.000.

Zinnen, Hermann A., to UOP. Extractive chromatographic separation process for recovering 3,5-diethyltoluene. 5,019,271, Cl. 210-656.000.

Zinser Textilmaschinen GmbH: *See—*

Weimar, Michael; and Stadele, Norbert, 5,018,681, Cl. 242-131.000.

Zinsmeyer, Herbert G. Automotive fluids dispensing and blending system. 5,018,645, Cl. 222-14.000.

Ziu, Christopher G., to Asahi/America, Inc. Supports for double-containment thermoplastic pipe assemblies. 5,018,260, Cl. 24-555.000.

Znoyek, Gerald: *See—*

Schutten, Dagmar; Schmitz, Hans-Joachim; Caspar, Hans-Peter; Kolschbach, Veit M.; Znoyek, Gerald; and Wenzel, Norbert, 5,018,826, Cl. 350-96.290.

Zohler, Steven R.; and Lewis, Richard C., to Carrier Corporation. Method for manufacturing a high efficiency heat transfer surface and the surface so manufactured. 5,018,573, Cl. 165-133.000.

Zolman, Arden R.; Andersen, Phillip J.; and Bayne, Steven T., to Zimmer, Inc. Method of constructing prosthetic implant with wrapped porous surface. 5,018,285, Cl. 29-465.000.

Zorinsky, Eldon J.: *See—*

Virkus, Robert L.; Spratt, David B.; and Zorinsky, Eldon J., 5,019,525, Cl. 437-32.000.

Zupancic, Joseph J.; Petty-Weeks, Sandra L.; and Polak, Anthony J., to Allied-Signal Inc. Dielectric sensors. 5,018,380, Cl. 73-23.200.

Zwillenberg, Melvin L.: *See—*

Ignasiak, Teresa; Turak, Ali A.; Pawlak, Wanda; Ignasiak, Boleslaw L.; Guerra, Carlos R.; and Zwillenberg, Melvin L., 5,019,245, Cl. 209-166.000.

Zylstra, Henry J.; and Flock, Steven J., to Square D Company. Voltage-to-frequency squared circuit. 5,019,936, Cl. 361-93.000.

012aki, Nobuo; and Morikawa, Shoichi, to Bridgestone Corporation. Vibration isolating support apparatus. 5,018,701, Cl. 248-631.000.

501 Eparco S.A. Societe Anonyme de Droit Francais: *See—*

Herve, Philip, 5,019,265, Cl. 210-603.000.

501 Industrial Technology Research Institute: *See—*

Lin, Dhei-Jhai; Shieh, Jim-Chyuan; and Lin, Hsien-Kuang, 5,019,483, Cl. 430-288.000.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF MAY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bijl, Roy, to Walker-Hagou B.V. Facing cutter. Re. 33,598, Cl. 408-204.000.

Courtoy, Jean-Francois; and Marchal, Daniel, to Eurofloor S.A. Process for obtaining areas of distinctive appearance on synthetic coverings and the product derived therefrom. Re. 33,599, Cl. 428-141.000.

Ennco Display Systems, Inc.: *See—*

Ennis, Jan S., Re. 33,596, Cl. 211-105.200.

Ennis, Jan S., to Ennco Display Systems, Inc. Support for display items or the like. Re. 33,596, Cl. 211-105.200.

Eurofloor S.A.: *See—*

Courtoy, Jean-Francois; and Marchal, Daniel, Re. 33,599, Cl. 428-141.000.

Hogan Mfg., Inc.: *See—*

Sullivan, Donald B.; and Thorley, Graham R., Re. 33,595, Cl. 187-9.00R.

Levinson, Stephen E.; Rabiner, Lawrence R.; and Sondhi, Man M. Hidden Markov model speech recognition arrangement. Re. 33,597, Cl. 381-43.000.

Marchal, Daniel: *See—*

Courtoy, Jean-Francois; and Marchal, Daniel, Re. 33,599, Cl. 428-141.000.

Rabiner, Lawrence R.: *See—*

Levinson, Stephen E.; Rabiner, Lawrence R.; and Sondhi, Man M., Re. 33,597, Cl. 381-43.000.

Sondhi, Man M.: *See—*

Levinson, Stephen E.; Rabiner, Lawrence R.; and Sondhi, Man M., Re. 33,597, Cl. 381-43.000.

Sullivan, Donald B.; and Thorley, Graham R., to Hogan Mfg., Inc. Wheelchair lift. Re. 33,595, Cl. 187-9.00R.

Thorley, Graham R.: *See—*

Sullivan, Donald B.; and Thorley, Graham R., Re. 33,595, Cl. 187-9.00R.

Walker-Hagou B.V.: *See—*

Bijl, Roy, Re. 33,598, Cl. 408-204.000.

# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Fisons plc: *See—*

Thomson, James, B1 4,657,696, Cl. 252-301.170.

Hunter Engineering Co.: *See—*

Senften, David A., B1 3,892,042, Cl. 33-301.000.

Livingston, Larry J. Process for treating tobacco. B1 4,836,222, 5-28-91, Cl. 131-310.000.

Morita, Tamao, to Morita, Tamao. Engageable article using permanent magnet. B1 4,453,294, 5-28-91, Cl. 24-303.000.

Senften, David A., to Hunter Engineering Co. Electronic run-out compensator and method of electronically compensating for wobble run-out in a rotating body. B1 3,892,042, 5-28-91, Cl. 33-301.000.

Thomson, James, to Fisons plc. Scintillation counting medium and counting method. B1 4,657,696, 5-28-91, Cl. 252-301.170.

# LIST OF DESIGN PATENTEES

Akabane, Jun; and Nagaoka, Yasuki, to Nikon Corporation. Camera. 317,168, 5-28-91, Cl. D16-209.000.

Albers, Delores A.: *See—*

Albers, Jody L.; and Albers, Delores A., 317,095, Cl. D6-464.000.

Albers, Jody L., and Albers, Delores A. Earring storage and display stand. 317,095, 5-28-91, Cl. D6-464.000.

Allgeier, David M. J., to NCR Corporation. Bar code scanner or similar article. 317,154, 5-28-91, Cl. D14-116.000.

Ambasz, Emilio. Container. 317,125, 5-28-91, Cl. D9-417.000.

Arehart, Robert W., to Emerson Electric Co. Compound miter saw. 317,110, 5-28-91, Cl. D8-66.000.

Arnold Kock GmbH u. Co. KG: *See—*

Cerny, Rudolf, 317,084, Cl. D5-56.000.

Cerny, Rudolf, 317,085, Cl. D5-60.000.

Bates Manufacturing Company, The: *See—*

Leszczak, John, 317,180, Cl. D19-78.000.

Beasley, Jerome. Trousers. 317,074, 5-28-91, Cl. D2-28.000.

Benson, Francis, to Girard-Perregaux, S.A. Combined wristwatch and strap portions. 317,128, 5-28-91, Cl. D10-32.000.

Benter, Dean W.: *See—*

Schweitz, Kenneth D.; Benter, Dean W.; and Thompson, Kevin F., 317,165, Cl. D15-14.000.

Beranek, Ernst; and Rohrig, Peter W., to Mam Babyartikel Gesellschaft m.b.H. Temperature measuring ring. 317,129, 5-28-91, Cl. D10-57.000.

Berney, Jean, to Berney Precision S.A. Thermometer for testing wine temperatures. 317,130, 5-28-91, Cl. D10-57.000.

Berney Precision S.A.: *See—*

Berney, Jean, 317,130, Cl. D10-57.000.

Beutler, Walter J. Flea collar concealer. 317,217, 5-28-91, Cl. D30-152.000.

Bikestream, Inc.: *See—*

Runkel, Kevin D., 317,146, Cl. D12-158.000.

Billings, Charles K.: *See—*

Weinberg, Kenneth J.; and Billings, Charles K., 317,094, Cl. D6-463.000.

Black, Betty B. Combined christmas tree ornament and cassette player. 317,140, 5-28-91, Cl. D11-117.000.

Blanco GmbH & Co. KG: *See—*

Gocke, Klaus W.; and Muck, Manfred, 317,197, Cl. D23-290.000.

Gocke, Klaus W.; and Muck, Manfred, 317,198, Cl. D23-290.000.

Boljevic, Sanja. Toy locomotive. 317,190, 5-28-91, Cl. D21-129.000.

Bonge, Nicholas J., Jr. Disk casing punch tool. 317,109, 5-28-91, Cl. D8-14.000.

Bounds, William E. Condiment mill. 317,105, 5-28-91, Cl. D7-679.000.

Brand, Derek: *See—*

Volpe, Leo S.; Kruger, Frederick W., Jr.; and Brand, Derek, 317,188, Cl. D21-148.000.

Brocone, Eric J.; and Miller, Dennis L. Body surfing board. 317,194, 5-28-91, Cl. D21-228.000.

Brown Jordan Company: *See—*

Frinier, Richard, 317,087, Cl. D6-361.000.

Cagle, Glen D., to Olisar Cagle International Inc. Ladder bag tool holder. 317,206, 5-28-91, Cl. D25-68.000.

Canon Kabushiki Kaisha: *See—*

Kojima, Tatsuo; and Yomo, Takashi, 317,173, Cl. D18-22.000.

Carey, Bruce P.: *See—*

Rodriguez, Daniel V.; and Carey, Bruce P., 317,210, Cl. D25-138.000.

Case, Patrick T. Drink layering spoon. 317,103, 5-28-91, Cl. D7-643.000.

Cerny, Rudolf, to Arnold Kock GmbH u. Co. KG. Textile fabric. 317,084, 5-28-91, Cl. D5-56.000.

VOL
1126
ISS
4
MY
28
1991
UMI

Cerny, Rudolf, to Arnold Kock GmbH u Co. KG. Textile fabric. 317,085, 5-28-91, Cl. D5-60.000.
Charlie O Company, Inc.: *See*—
  Owen, Charles R., 317,122, Cl. D9-367.000.
Chatter Box, Inc.: *See*—
  Wingate, Barry, 317,158, Cl. D14-167.000.
  Wingate, Barry, 317,162, Cl. D14-260.000.
Cheung, David, to Video Technology Industries, Inc. Electronic learning aid. 317,176, 5-28-91, Cl. D19-60.000.
Chia, Cheo: *See*—
  Chia, Meang; and Chia, Cheo, 317,139, Cl. D11-93.000.
Chia, Meang; and Chia, Cheo. Jewelry link. 317,139, 5-28-91, Cl. D11-93.000.
Chiquita Brands, Inc.: *See*—
  Weinberg, Kenneth J.; and Billings, Charles K., 317,094, Cl. D6-463.000.
Chou, Fargo. Retractable fountain brush. 317,083, 5-28-91, Cl. D4-115.000.
Christian Dior, S.A.: *See*—
  Wenzl, Walter, 317,101, Cl. D7-537.000.
Citius Burotechnik: *See*—
  Zubek, Dieter, 317,127, Cl. D9-435.000.
Clark, Diane W.: *See*—
  Clark, Ian M.; Clark, Diane W.; and Rickard, George P., 317,102, Cl. D7-549.000.
Clark, Ian M.; Clark, Diane W.; and Rickard, George P. Food carrying tray. 317,102, 5-28-91, Cl. D7-549.000.
Clarkson, Bradley: *See*—
  Van Engelen, Fernd; Clarkson, Bradley; and Mak, William, 317,156, Cl. D14-138.000.
Cochran, Clarence L. Ash scoop. 317,108, 5-28-91, Cl. D8-10.000.
Colani, Luigi, to Valser St. Petersquelle. Bottle. 317,123, 5-28-91, Cl. D9-367.000.
Coleman, John D.; and Schneider, Eric A., to Opex Corporation. Mail sorting desk. 317,089, 5-28-91, Cl D6-422.000.
Colgate-Palmolive Company: *See*—
  Crawford, John C., 317,118, Cl. D9-338.000.
  Crawford, John C.; and Segati, Umberto D. I., 317,121, Cl. D9-367.000.
Crawford, John C., to Colgate-Palmolive Company. Combined roll-on dispenser bottle and cap. 317,118, 5-28-91, Cl. D9-338.000.
Crawford, John C.; and Segati, Umberto D. I., to Colgate-Palmolive Company. Combined bottle and dispensing cap. 317,121, 5-28-91, Cl. D9-367.000.
Cutrone, John. Window screened animal enclosure or similar article. 317,216, 5-28-91, Cl. D30-109.000.
Czech, John F.; Drucker, Irving M.; Ojeda, Peter A.; and Poole, Anton R., to Zenith Electronics Corporation. Video monitor. 317,152, 5-28-91, Cl. D14-113.000.
D'Agostino, Joseph D. Transparent wind screen. 317,086, 5-28-91, Cl. D6-332.000.
Daly, John J., to GRiD Systems Corporation. Information display and entry unit. 317,151, 5-28-91, Cl. D14-100.000.
Davis Furniture Industries, Inc.: *See*—
  Vogtherr, Burkhard; and Elzenbeck, Manfred, 317,097, Cl. D6-500.000.
Davis, Steven B.: *See*—
  Luckhardt, Charles W.; Davis, Steven B.; and Weirsman, William, 317,138, Cl. D10-108.000.
Deere & Company: *See*—
  Schweitz, Kenneth D.; Benter, Dean W.; and Thompson, Kevin F., 317,165, Cl. D15-14.000.
deRonde, Frederik L. A.: *See*—
  Fettes, Ian J.; and deRonde, Frederik L. A., 317,212, Cl. D26-28.000
Derry, Robert: *See*—
  Knipfer, Michael A.; Paul, James S.; and Derry, Robert, 317,132, Cl. D10-65.000.
Diamond, Israel, to Merchandising Display Corporation. Expandable storage bin. 317,220, 5-28-91, Cl. D34-40.000.
Dickson, Sandra L. Combined bookmark and writing instrument clip. 317,175, 5-28-91, Cl. D19-34.000.
Diversified Enterprises of America, Inc.: *See*—
  Hackel, Ronald L., 317,195, Cl. D22-134.000.
Dong, Jung H., to Samick Music Corporation. Electronic piano. 317,170, 5-28-91, Cl. D17-7.000.
Downey, Philip. Sunglasses. 317,167, 5-28-91, Cl D16-102.000.
Drucker, Irving M.: *See*—
  Czech, John F.; Drucker, Irving M.; Ojeda, Peter A.; and Poole, Anton R., 317,152, Cl. D14-113.000.
Duracraft Corporation: *See*—
  Wang, Jui-Shang, 317,199, Cl. D23-382.000.
Durand, Jean-Jacques. Perfume bottle. 317,124, 5-28-91, Cl. D9-400.000.
Eliassen, Garth. Croquet mallet head. 317,192, 5-28-91, Cl. D21-211.000.
Elzenbeck, Manfred: *See*—
  Vogtherr, Burkhard; and Elzenbeck, Manfred, 317,097, Cl. D6-500.000.
Emerson Electric Co.: *See*—
  Arehart, Robert W., 317,110, Cl. D8-66.000.
Fettes, Ian J.; and deRonde, Frederik L. A., to Grote Manufacturing Company, Inc., The. Vehicle lamp. 317,212, 5-28-91, Cl. D26-28.000.
Florian, Raymond J Novelty golf putter head. 317,193, 5-28-91, Cl. D21-215.000.
Forsberg, Paul J Corner wall block. 317,209, 5-28-91, Cl. D25-114.000.
Fowler, Robert R., to O. Ames Co. Hose reel. 317,113, 5-28-91, Cl. D8-358.000.
Francis, Stephen A., to North American Philips Corp. Remote wireless display for a bathroom scale. 317,134, 5-28-91, Cl. D10-94.000.
Freyer, Jan: *See*—
  Schmidt, Harald; Skorve, Helge; and Freyer, Jan, 317,150, Cl. D13-154.000.
Frinier, Richard, to Brown Jordan Company. Chaise. 317,087, 5-28-91, Cl. D6-361.000.
Fuji Photo Film Co., Ltd.: *See*—
  Isozaki, Makoto, 317,169, Cl. D16-218.000.
Fujiki, Tetsushi, to Sumitomo Rubber Industries, Ltd. Automobile tire. 317,144, 5-28-91, Cl. D12-138.000.
Fukuda, Masaru: *See*—
  Kozono, Seiji; and Fukuda, Masaru, 317,148, Cl. D13-146.000.
Gary, Lonnie F., to Gary Products Group, Inc. Support hook for decorative strand. 317,115, 5-28-91, Cl. D8-373.000.
Gary Products Group, Inc.: *See*—
  Gary, Lonnie F., 317,115, Cl. D8-373.000.
Gates, Frederick L. Projectile game target. 317,182, 5-28-91, Cl. D21-5.000.
Gebrueder Pletscher AG: *See*—
  Weissenberger, Heinz, 317,143, Cl. D12-120.000.
Gecchelin, Bruno, to Guzzini Illuminazione S.p.A. Spotlight housing. 317,213, 5-28-91, Cl. D26-63.000.
Gibson, Richard A., Jr.: *See*—
  Montagnino, James G.; Schmidt, George; Santhouse, Daniel; and Gibson, Richard A., Jr., 317,215, Cl. D28-38.000.
Girard-Perregaux, S.A.: *See*—
  Benson, Francis, 317,128, Cl. D10-32.000.
Gocke, Klaus W.; and Muck, Manfred, to Blanco GmbH & Co. KG Sink. 317,197, 5-28-91, Cl. D23-290.000.
Gocke, Klaus W.; and Muck, Manfred, to Blanco GmbH & Co KG. Sink. 317,198, 5-28-91, Cl. D23-290.000.
Gold Bond Ice Cream, Inc.: *See*—
  Hillman, Kevin P., 317,072, Cl. D1-130.000.
Grass, Peggy. Cherry pitter or similar article. 317,107, 5-28-91, Cl. D7-693.000.
Great Train Store Corporation, The: *See*—
  Schaefer, Henry W., 317,186, Cl. D21-141.000.
GRiD Systems Corporation: *See*—
  Daly, John J., 317,151, Cl. D14-100.000.
Grosfillex, Raymond. Armchair. 317,088, 5-28-91, Cl. D6-379.000.
Grote Manufacturing Company, Inc., The: *See*—
  Fettes, Ian J.; and deRonde, Frederik L. A., 317,212, Cl. D26-28.000.
Guzzini Illuminazione S.p.A.: *See*—
  Gecchelin, Bruno, 317,213, Cl. D26-63.000.
Hackel, Ronald L., to Diversified Enterprises of America, Inc. Ice fishing tip-up signal. 317,195, 5-28-91, Cl. D22-134.000.
Haggstam, Christian. Throttle control. 317,166, 5-28-91, Cl. D15-17.000.
Hannon, R. Douglas; and Lackman, George E., to Zebco Corporation. Propeller. 317,147, 5-28-91, Cl. D12-214.000.
Hashimoto, Hidehisa, to TDK Corporation. Demagnetizer for magnetic head of cassette tape recorder. 317,155, 5-28-91, Cl. D14-121.000.
Hatfield, Tinker L.; and Smith, Wilson W., to Nike, Inc.; and Nike International Ltd. Shoe upper. 317,075, 5-28-91, Cl. D2-314.000.
Head Sports, Inc.: *See*—
  Skinner, Michael H., 317,076, Cl. D2-319.000.
Hedstrom Corp.: *See*—
  Smith, Stephen W., 317,142, Cl. D12-111.000.
Helen of Troy Corporation: *See*—
  Montagnino, James G.; Schmidt, George; Santhouse, Daniel; and Gibson, Richard A., Jr., 317,215, Cl. D28-38.000.
Henneseey, Daniel J. Massager. 317,204, 5-28-91, Cl. D24-211.000.
Herbert, Nicholas: *See*—
  Lyon, Russell R., 317,104, Cl. D7-667.000.
Herring, Michael C. Aerial toy. 317,185, 5-28-91, Cl. D21-82.000.
Hillman, Kevin P., to Gold Bond Ice Cream, Inc. Frozen dessert. 317,072, 5-28-91, Cl. D1-130.000.
Honeywell Inc.: *See*—
  Knipfer, Michael A.; Paul, James S.; and Derry, Robert, 317,132, Cl. D10-65.000.
Hsu, Mei-Kwei. Video cassette rewinder. 317,161, 5-28-91, Cl. D14-217.000.
I-Flow Corporation: *See*—
  Kienholz, Charles, 317,164, Cl. D15-7.000.
Iijima, Goro: *See*—
  Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
Isozaki, Makoto, to Fuji Photo Film Co., Ltd. Camera. 317,169, 5-28-91, Cl. D16-218.000.
Iwamura, Wako, to Sumitomo Rubber Industries, Ltd. Automobile tire. 317,145, 5-28-91, Cl. D12-146.000.
Johansson, Hans-Erik, to Soderhamn Innovation AB. Handrail section. 317,205, 5-28-91, Cl. D25-38.000.
Johns, Blair E. Door lock. 317,111, 5-28-91, Cl. D8-344.000.
Jondelius, Bjorn. Support holder for portable handset telephone. 317,157, 5-28-91, Cl. D14-253.000.
Jorneus, Lars, to Nobelpharma AB. Connection sleeve for a dental implant. 317,200, 5-28-91, Cl. D24-156.000.
Kabushiki Kaisha Tamiya Mokei: *See*—
  Suzuki, Tomoharu, 317,187, Cl. D21-141.000.

Kallista, Inc.: *See*—
  Robbins, Tom E., 317,196, Cl. D23-252.000.
Kameda, Takanobu: *See*—
  Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
Kaneko, Akira, to O.S. Engines Mfg. Co., Ltd. Fuel pump for an engine for a model. 317,163, 5-28-91, Cl. D15-5.000.
Kawai, Setsuo: *See*—
  Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
Kheng, Heng G., to Metro Plastic Industry Pte. Hd. Desk organizer. 317,178, 5-28-91, Cl. D19-75.000.
Kheng, Heng G., to Metro Plastic Industry Pte, Ltd. Combined holder for memo pad and writing instruments. 317,179, 5-28-91, Cl. D19-78.000.
Kienholz, Charles, to I-Flow Corporation. Pump tube mount. 317,164, 5-28-91, Cl. D15-7.000.
King Jim Co., Ltd.: *See*—
  Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
King, William L., to Samsonite Corporation. Duffle bag. 317,081, 5-28-91, Cl. D3-71.000.
Kissow, Ernst: *See*—
  Kissow, Wilhelm; and Kissow, Ernst, 317,133, Cl. D10-71.000.
Kissow, Wilhelm; and Kissow, Ernst. Combined ruler and holder. 317,133, 5-28-91, Cl. D10-71.000.
Knipfer, Michael A.; Paul, James S.; and Derry, Robert, to Honeywell Inc. Ring laser gyroscope housing. 317,132, 5-28-91, Cl. D10-65.000.
Koguma, Seiji, to Okamura Corporation. Desk. 317,090, 5-28-91, Cl. D6-426.000.
Koguma, Seiji, to Okamura Corporation. Desk. 317,091, 5-28-91, Cl. D6-426.000.
Koguma, Seiji, to Okamura Corporation. Desk. 317,092, 5-28-91, Cl. D6-428.000.
Koguma, Seiji, to Okamura Corporation. Desk. 317,093, 5-28-91, Cl. D6-428.000.
Kojima, Tatsuo; and Yomo, Takashi, to Canon Kabushiki Kaisha. Envelope supply tray for printer. 317,173, 5-28-91, Cl. D18-22.000.
Kosurko, Leonard. Mini-tongs. 317,106, 5-28-91, Cl. D7-686.000.
Kozono, Seiji; and Fukuda, Masaru, to Yazaki Corporation. Housing for an electrical connector. 317,148, 5-28-91, Cl. D13-146.000.
Kruger, Frederick W., Jr.: *See*—
  Volpe, Leo S.; Kruger, Frederick W., Jr.; and Brand, Derek, 317,188, Cl. D21-148.000.
Kuiken, Linda: *See*—
  Williams, Robert B.; and Kuiken, Linda, 317,191, Cl. D21-199.000.
Kulikowski, John M ; and Polacek, Richard R., to Otis Elevator Company. Hall location direction panel for elevators. 317,136, 5-28-91, Cl. D10-108.000.
Kulikowski, John M.; Polacek, Richard R., and Weirsman, William, to Otis Elevator Company. Hall location direction panel for elevators. 317,137, 5-28-91, Cl. D10-108.000.
Kurata, Hideaki; and Shintani, Eiji, to Pioneer Kabushiki Kaisha. Loudspeaker. 317,159, 5-28-91, Cl. D14-216.000.
Kurata, Hideaki; and Shintani, Eiji, to Pioneer Kabushiki Kaisha. Loudspeaker. 317,160, 5-28-91, Cl. D14-216.000.
Kwan, Tak-Wah, to Newpros Consumers & Appliance Limited. Drawing instrument. 317,131, 5-28-91, Cl. D10-64.000.
L. D. Kichler Co.: *See*—
  Porter, David, 317,214, Cl. D26-130.000.
Lackman, George E.: *See*—
  Hannon, R. Douglas; and Lackman, George E., 317,147, Cl. D12-214.000.
Lackner, Klaus: *See*—
  Schmidt, Roland; and Lackner, Klaus, 317,079, Cl. D3-35.000.
Lasalle IPR A/S: *See*—
  Schmidt, Harald; Skorve, Helge; and Freyer, Jan, 317,150, Cl. D13-154.000.
Lee, Scott H.: *See*—
  Stillwagon, James R.; and Lee, Scott H., 317,080, Cl. D3-61.000.
Leeds, Richard. Stand for a personal computer. 317,218, 5-28-91, Cl. D34-21.000.
Leszczak, John, to Bates Manufacturing Company, The. Desk caddy. 317,180, 5-28-91, Cl. D19-78.000.
Luckhardt, Charles W.; Davis, Steven B.; and Weirsman, William, to Otis Elevator Company. Hall location direction panel for elevators. 317,138, 5-28-91, Cl. D10-108.000.
Lyon, Russell R., to Herbert, Nicholas, a part interest. Support for strainer cones. 317,104, 5-28-91, Cl. D7-667.000.
MacKenzie, Kirk F. Computer mouse. 317,153, 5-28-91, Cl. D14-114.000.
Madison, Rita. Travel organizer. 317,082, 5-28-91, Cl. D3-74.000.
Mak, William: *See*—
  Van Engelen, Fernd; Clarkson, Bradley; and Mak, William, 317,156, Cl. D14-138.000.
Mam Babyartikel Gesellschaft m.b H.: *See*—
  Beranek, Ernst; and Rohrig, Peter W., 317,129, Cl. D10-57.000.
Masteller, Harold I., Jr. Adjustable clamp for supporting a railway rail. 317,141, 5-28-91, Cl. D12-51.000.
Matsubara, Takeshi: *See*—
  Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
McIvor, Ian. Table for use primarily by a wall paperer. 317,096, 5-28-91, Cl. D6-487.000.
Merchandising Display Corporation: *See*—
  Diamond, Israel, 317,220, Cl. D34-40.000.
Metro Plastic Industry Pte. Hd.: *See*—
  Kheng, Heng G., 317,178, Cl. D19-75.000.
Metro Plastic Industry Pte, Ltd.: *See*—
  Kheng, Heng G., 317,179, Cl. D19-78.000.
Meyerhoefer, Carl: *See*—
  Newuirth, Helmuth; and Meyerhoefer, Carl, 317,112, Cl. D8-356.000.
Meyers, Alfred D.: *See*—
  Phelps, William C.; and Meyers, Alfred D., 317,149, Cl. D13-147.000.
Micoley, Scott H., to Sunbeam Corporation. Coffeemaker. 317,099, 5-28-91, Cl. D7-309.000.
Miller, Dennis L.: *See*—
  Brocone, Eric J.; and Miller, Dennis L., 317,194, Cl. D21-228.000.
Minnesota Mining and Manufacturing Company: *See*—
  Niles, Gerald J., 317,078, Cl. D3-35.000.
Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, to King Jim Co., Ltd. Ink ribbon cassette. 317,172, 5-28-91, Cl. D18-12.000.
Montagnino, James G.; Schmidt, George; Santhouse, Daniel; and Gibson, Richard A., Jr., to Helen of Troy Corporation. Programmable hairsetter or similar article. 317,215, 5-28-91, Cl. D28-38.000.
Moomaw, David E.; and Snell-Kelly, Janet E., to Quaker Oats Company, The. Rocket toy. 317,184, 5-28-91, Cl. D21-82.000.
Morris, Glenn H., Sr. Combined container and lid therefor. 317,126, 5-28-91, Cl. D9-428.000.
Motorola, Inc.: *See*—
  Phelps, William C.; and Meyers, Alfred D., 317,149, Cl. D13-147.000.
Moyer, Phoebe, to Playtex Apparel, Inc. Brassiere. 317,073, 5-28-91, Cl. D2-24.000.
Muck, Manfred: *See*—
  Gocke, Klaus W.; and Muck, Manfred, 317,197, Cl. D23-290.000.
  Gocke, Klaus W.; and Muck, Manfred, 317,198, Cl. D23-290.000.
Nagaoka, Yasuki: *See*—
  Akabane, Jun; and Nagaoka, Yasuki, 317,168, Cl. D16-209.000.
NCR Corporation: *See*—
  Allgeier, David M. J., 317,154, Cl. D14-116.000.
Neuroth, Margerate A. B.: *See*—
  Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 317,183, Cl. D21-61.000.
Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A. Bubble wand. 317,183, 5-28-91, Cl. D21-61.000.
Newpros Consumers & Appliance Limited: *See*—
  Kwan, Tak-Wah, 317,131, Cl. D10-64.000.
Newuirth, Helmuth; and Meyerhoefer, Carl, to Porta Systems Corp. Combined telephone block support and wire guide. 317,112, 5-28-91, Cl. D8-356 000.
Nike, Inc.: *See*—
  Hatfield, Tinker L.; and Smith, Wilson W., 317,075, Cl. D2-314.000.
Nike International Ltd.: *See*—
  Hatfield, Tinker L.; and Smith, Wilson W., 317,075, Cl. D2-314.000.
Nikon Corporation: *See*—
  Akabane, Jun; and Nagaoka, Yasuki, 317,168, Cl. D16-209.000.
Niles, Gerald J., to Minnesota Mining and Manufacturing Company. Reel case. 317,078, 5-28-91, Cl. D3-35.000.
Nimtz, Roderick L., to Warren Tool Corporation. Spring clamp. 317,116, 5-28-91, Cl. D8-395.000.
Nobelpharma AB: *See*—
  Jorneus, Lars, 317,200, Cl. D24-156.000.
North American Philips Corp.: *See*—
  Francis, Stephen A., 317,134, Cl. D10-94.000.
Novack, James A. Electronic toilet seat signal reminder. 317,135, 5-28-91, Cl. D10-104.000.
NovAtel: *See*—
  Van Engelen, Fernd; Clarkson, Bradley; and Mak, William, 317,156, Cl. D14-138.000.
Nozawa, Hideaki, to Shiroh Shirakawa. Baggage tag. 317,181, 5-28-91, Cl. D20-22.000.
O. Ames Co.: *See*—
  Fowler, Robert R., 317,113, Cl. D8-358.000.
O.S. Engines Mfg. Co., Ltd.: *See*—
  Kaneko, Akira, 317,163, Cl. D15-5.000.
Ohmiya, Tokushige: *See*—
  Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro, Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
Ohtani, Genichiro: *See*—
  Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
Ojeda, Peter A.: *See*—
  Czech, John F.; Drucker, Irving M.; Ojeda, Peter A.; and Poole, Anton R., 317,152, Cl. D14-113.000.
Okamura Corporation: *See*—
  Koguma, Seiji, 317,090, Cl. D6-426.000.
  Koguma, Seiji, 317,091, Cl. D6-426.000.
  Koguma, Seiji, 317,092, Cl. D6-428.000.
  Koguma, Seiji, 317,093, Cl. D6-428.000.

VOL 1126
ISS 4
MY 28
1991
UMI

- Olisar Cagle International Inc.: *See—*
  - Cagle, Glen D., 317,206, Cl. D25-68.000.
- Opex Corporation: *See—*
  - Coleman, John D.; and Schneider, Eric A., 317,089, Cl. D6-422.000.
- Otis Elevator Company: *See—*
  - Kulikowski, John M.; and Polacek, Richard R., 317,136, Cl. D10-108.000.
  - Kulikowski, John M.; Polacek, Richard R.; and Weirsman, William, 317,137, Cl. D10-108.000.
  - Luckhardt, Charles W.; Davis, Steven B.; and Weirsman, William, 317,138, Cl. D10-108.000.
- Owen, Charles R., to Charlie O Company, Inc. Bottle. 317,122, 5-28-91, Cl. D9-367.000.
- Packer Plastics, Inc.: *See—*
  - Schwartzburg, James H., 317,120, Cl. D9-352.000.
- Paul, James S.: *See—*
  - Knipfer, Michael A.; Paul, James S.; and Derry, Robert, 317,132, Cl. D10-65.000.
- Peter Reisenthel "programm" : *See—*
  - Schmidt, Roland; and Lackner, Klaus, 317,079, Cl. D3-35.000.
- Phelps, William C.; and Meyers, Alfred D., to Motorola, Inc. Remote cable connector. 317,149, 5-28-91, Cl. D13-147.000.
- Pioneer Kabushiki Kaisha: *See—*
  - Kurata, Hideaki; and Shintani, Eiji, 317,159, Cl. D14-216.000.
  - Kurata, Hideaki; and Shintani, Eiji, 317,160, Cl. D14-216.000.
- Playtex Apparel, Inc.: *See—*
  - Moyer, Phoebe, 317,073, Cl. D2-24.000.
- Polacek, Richard R.: *See—*
  - Kulikowski, John M.; and Polacek, Richard R., 317,136, Cl. D10-108.000.
  - Kulikowski, John M.; Polacek, Richard R.; and Weirsman, William, 317,137, Cl. D10-108.000.
- Pollacco, William F. Oil drain pan. 317,117, 5-28-91, Cl. D9-307.000.
- Poole, Anton R.: *See—*
  - Czech, John F.; Drucker, Irving M.; Ojeda, Peter A.; and Poole, Anton R., 317,152, Cl. D14-113.000.
- Porta Systems Corp.: *See—*
  - Newuirth, Helmuth; and Meyerhoefer, Carl, 317,112, Cl. D8-356.000.
- Porter, David, to L. D. Kichler Co. Lamp shade. 317,214, 5-28-91, Cl. D26-130.000.
- Quaker Oats Company, The: *See—*
  - Moomaw, David E.; and Snell-Kelly, Janet E., 317,184, Cl. D21-82.000.
  - Shuler, Eric T., 317,098, Cl. D6-503.000.
- Raffler, A. A. Hook holder for supporting a ski set or similar article. 317,114, 5-28-91, Cl. D8-367.000.
- Rehrig, Houston, to Rehrig International, Inc. Combined shopping cart basket and advertising panels therefor. 317,219, 5-28-91, Cl. D34-27.000.
- Rehrig International, Inc.: *See—*
  - Rehrig, Houston, 317,219, Cl. D34-27.000.
- Rickard, George P.: *See—*
  - Clark, Ian M.; Clark, Diane W.; and Rickard, George P., 317,102, Cl. D7-549.000.
- Robbins, Tom E., to Kallista, Inc. Faucet handle. 317,196, 5-28-91, Cl. D23-252.000.
- Robertson, Elizabeth A.: *See—*
  - Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 317,183, Cl. D21-61.000.
- Robertson, Richard A.: *See—*
  - Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 317,183, Cl. D21-61.000.
- Rodriguez, Daniel V.; and Carey, Bruce P., to USG Interiors, Inc. Ceiling panel unit. 317,210, 5-28-91, Cl. D25-138.000.
- Rohrig, Peter W.: *See—*
  - Beranek, Ernst; and Rohrig, Peter W., 317,129, Cl. D10-57.000.
- Runkel, Kevin D., to Bikestream, Inc. Drink holder for a bicycle. 317,146, 5-28-91, Cl. D12-158.000.
- Saks, Brett S. Guitar pick. 317,171, 5-28-91, Cl. D17-20.000.
- Samick Music Corporation: *See—*
  - Dong, Jung H., 317,170, Cl. D17-7.000.
- Samsonite Corporation: *See—*
  - King, William L., 317,081, Cl. D3-71.000.
- Santhouse, Daniel: *See—*
  - Montagnino, James G.; Schmidt, George; Santhouse, Daniel; and Gibson, Richard A., Jr., 317,215, Cl. D28-38.000.
- Schaefer, Henry W., to Great Train Store Corporation, The. Model railroad train trestle section. 317,186, 5-28-91, Cl. D21-141.000.
- Scheiwiller, Rolf. Paving stone. 317,207, 5-28-91, Cl. D25-113.000.
- Scheiwiller, Rolf. Paving stone. 317,208, 5-28-91, Cl. D25-113.000.
- Schmidt, George: *See—*
  - Montagnino, James G.; Schmidt, George; Santhouse, Daniel; and Gibson, Richard A., Jr., 317,215, Cl. D28-38.000.
- Schmidt, Harald; Skorve, Helge; and Freyer, Jan, to Lasalle IPR A/S. Cable protector. 317,150, 5-28-91, Cl. D13-154.000.
- Schmidt, Roland; and Lackner, Klaus, to Peter Reisenthel "programm" . Combined storage and carrying container for cassette tapes. 317,079, 5-28-91, Cl. D3-35.000.
- Schneider, Eric A.: *See—*
  - Coleman, John D.; and Schneider, Eric A., 317,089, Cl. D6-422.000.
- Schulz, Orland L. Combined boot jack and hook. 317,077, 5-28-91, Cl. D2-642.000.
- Schwartzburg, James H., to Packer Plastics, Inc. Combined tamper-proof container and closure. 317,120, 5-28-91, Cl. D9-352.000.
- Schweitz, Kenneth D.; Benter, Dean W.; and Thompson, Kevin F., to Deere & Company. Lawn mower. 317,165, 5-28-91, Cl. D15-14.000.
- Segati, Umberto D. I.: *See—*
  - Crawford, John C.; and Segati, Umberto D. I., 317,121, Cl. D9-367.000.
- Segeren, Walter E. Microphone attached light with lip activated switch. 317,211, 5-28-91, Cl. D26-24.000.
- Senitt, Catherine M. Cow puppet. 317,189, 5-28-91, Cl. D21-153.000.
- Shintani, Eiji: *See—*
  - Kurata, Hideaki; and Shintani, Eiji, 317,159, Cl. D14-216.000.
  - Kurata, Hideaki; and Shintani, Eiji, 317,160, Cl. D14-216.000.
- Shiroh Shirakawa: *See—*
  - Nozawa, Hideaki, 317,181, Cl. D20-22.000.
- Shuler, Eric T., to Quaker Oats Company, The. Safety panel for attachment to a bed. 317,098, 5-28-91, Cl. D6-503.000.
- Skinner, Michael H., to Head Sports, Inc. Radial tennis shoe. 317,076, 5-28-91, Cl. D2-319.000.
- Skorve, Helge: *See—*
  - Schmidt, Harald; Skorve, Helge; and Freyer, Jan, 317,150, Cl. D13-154.000.
- Smith, Stephen W., to Hedstrom Corp. Bicycle. 317,142, 5-28-91, Cl. D12-111.000.
- Smith, Wilson W.: *See—*
  - Hatfield, Tinker L.; and Smith, Wilson W., 317,075, Cl. D2-314.000.
- Snell-Kelly, Janet E.: *See—*
  - Moomaw, David E.; and Snell-Kelly, Janet E., 317,184, Cl. D21-82.000.
- Soderhamn Innovation AB: *See—*
  - Johansson, Hans-Erik, 317,205, Cl. D25-38.000.
- Sone, Yoshihisa, to Terumo Kabushiki Kaisha. Blood filter. 317,201, 5-28-91, Cl. D24-162.000.
- Stillwagon, James R.; and Lee, Scott H. Key holder. 317,080, 5-28-91, Cl. D3-61.000.
- Sumitomo Rubber Industries, Ltd.: *See—*
  - Fujiki, Tetsushi, 317,144, Cl. D12-138.000.
  - Iwamura, Wako, 317,145, Cl. D12-146.000.
- Sunbeam Corporation: *See—*
  - Micoley, Scott H., 317,099, Cl. D7-309.000.
- Suzuki, Tomoharu, to Kabushiki Kaisha Tamiya Mokei. Tire for toy vehicle. 317,187, 5-28-91, Cl. D21-141.000.
- Syracuse China Corporation: *See—*
  - Unger, Steve A., 317,100, Cl. D7-509.000.
- TDK Corporation: *See—*
  - Hashimoto, Hidehisa, 317,155, Cl. D14-121.000.
- Terumo Kabushiki Kaisha: *See—*
  - Sone, Yoshihisa, 317,201, Cl. D24-162.000.
- Thompson, James W. C. Utility tray. 317,221, 5-28-91, Cl. D34-44.000.
- Thompson, Kevin F.: *See—*
  - Schweitz, Kenneth D.; Benter, Dean W.; and Thompson, Kevin F., 317,165, Cl. D15-14.000.
- Torre, Randall J. Bone retractor. 317,202, 5-28-91, Cl. D24-135.000.
- Tyco Industries, Inc.: *See—*
  - Volpe, Leo S.; Kruger, Frederick W., Jr.; and Brand, Derek, 317,188, Cl. D21-148.000.
- Unger, Steve A., to Syracuse China Corporation. Bouillon cup or similar article. 317,100, 5-28-91, Cl. D7-509.000.
- USG Interiors, Inc.: *See—*
  - Rodriguez, Daniel V.; and Carey, Bruce P., 317,210, Cl. D25-138.000.
- Valser St. Petersquelle: *See—*
  - Colani, Luigi, 317,123, Cl. D9-367.000.
- Van Engelen, Fernd; Clarkson, Bradley; and Mak, William, to NovAtel. Portable handheld telephone. 317,156, 5-28-91, Cl. D14-138.000.
- Video Technology Industries, Inc.: *See—*
  - Cheung, David, 317,176, Cl. D19-60.000.
- Vogtherr, Burkhard; and Elzenbeck, Manfred, to Davis Furniture Industries, Inc. Seat frame. 317,097, 5-28-91, Cl. D6-500.000.
- Vola, Jean-Jacques. Container. 317,119, 5-28-91, Cl. D9-350.000.
- Volpe, Leo S.; Kruger, Frederick W., Jr.; and Brand, Derek, to Tyco Industries, Inc. Toy figure. 317,188, 5-28-91, Cl. D21-148.000.
- Walsh, William. Dropper tip or similar article. 317,203, 5-28-91, Cl. D24-112.000.
- Wandemberg-Boschetti, Luis. Openable ring. 317,177, 5-28-91, Cl. D19-65.000.
- Wang, Jui-Shang, to Duracraft Corporation. Portable electrical fan. 317,199, 5-28-91, Cl. D23-382.000.
- Warren Tool Corporation: *See—*
  - Nimtz, Roderick L., 317,116, Cl. D8-395.000.
- Watanabe, Kenji: *See—*
  - Miyamoto, Akira; Ohmiya, Tokushige; Ohtani, Genichiro; Kawai, Setsuo; Watanabe, Kenji; Iijima, Goro; Matsubara, Takeshi; and Kameda, Takanobu, 317,172, Cl. D18-12.000.
- Weinberg, Kenneth J.; and Billings, Charles K., to Chiquita Brands, Inc. Display rack. 317,094, 5-28-91, Cl. D6-463.000.
- Weirsman, William: *See—*
  - Kulikowski, John M.; Polacek, Richard R.; and Weirsman, William, 317,137, Cl. D10-108.000.
  - Luckhardt, Charles W.; Davis, Steven B.; and Weirsman, William, 317,138, Cl. D10-108.000.
- Weissenberger, Heinz, to Gebrueder Pletscher AG. Kickstand for a bicycle or similar article. 317,143, 5-28-91, Cl. D12-120.000.
- Wenzl, Walter, to Christian Dior, S.A. Brandy snifter. 317,101, 5-28-91, Cl. D7-537.000.

- Williams, Robert B.; and Kuiken, Linda. Football penalty flag. 317,191, 5-28-91, Cl. D21-199.000.
- Wingate, Barry, to Chatter Box, Inc. Wrist recorder. 317,158, 5-28-91, Cl. D14-167.000.
- Wingate, Barry, to Chatter Box, Inc. Module for a wrist recorder. 317,162, 5-28-91, Cl. D14-260.000.
- Wood, James R. Sheet former folder. 317,174, 5-28-91, Cl. D18-34.000.
- Yazaki Corporation: *See—*
  - Kozono, Seiji; and Fukuda, Masaru, 317,148, Cl. D13-146.000.
- Yomo, Takashi: *See—*
  - Kojima, Tatsuo; and Yomo, Takashi, 317,173, Cl. D18-22.000.
- Zebco Corporation: *See—*
  - Hannon, R. Douglas; and Lackman, George E., 317,147, Cl. D12-214.000.
- Zenith Electronics Corporation: *See—*
  - Czech, John F.; Drucker, Irving M.; Ojeda, Peter A.; and Poole, Anton R., 317,152, Cl. D14-113.000.
- Zubek, Dieter, to Citius Burotechnik. Closure for a bottle or similar article. 317,127, 5-28-91, Cl. D9-435.000.

---

# LIST OF PLANT PATENTEES

- Bay City Flower Co.: *See—*
  - Imazio, Bruno L., 7,536, Cl. 54.000.
- Catt, Peter, to Conard-Pyle Company, The. *Spirea japonica* — LISP variety. 7,537, 5-28-91, Cl. 54.000.
- Conard-Pyle Company, The: *See—*
  - Catt, Peter, 7,537, Cl. 54.000.
- Craig, Richard; and Glicenstein, Leon, to Research Corporation Technologies, Inc. Regal Pelargonium named 'Fantasy'. 7,538, 5-28-91, Cl. 68.000.
- Engelke, Milton C.; and Lehman, Virginia G., to Texas A & M University System. Prairie buffalograss. 7,539, 5-28-91, Cl. 88.000.
- Gardner, Leith M.: *See—*
  - Zaiger, Chris F.; Zaiger, Gary N.; Gardner, Leith M.; and Zaiger, Grant G., 7,532, Cl. 42.000.
- Glicenstein, Leon: *See—*
  - Craig, Richard; and Glicenstein, Leon, 7,538, Cl. 68.000.
- Imazio, Bruno L., to Bay City Flower Co. Heath plant named Rosemarie. 7,536, 5-28-91, Cl. 54.000.
- Lehman, Virginia G.: *See—*
  - Engelke, Milton C.; and Lehman, Virginia G., 7,539, Cl. 88.000.
- Research Corporation Technologies, Inc.: *See—*
  - Craig, Richard; and Glicenstein, Leon, 7,538, Cl. 68.000.
- Texas A & M University System: *See—*
  - Engelke, Milton C.; and Lehman, Virginia G., 7,539, Cl. 88.000.
- University of Tennessee Research Corporation, The: *See—*
  - van de Werken, Hendrik, 7,533, Cl. 54.000.
  - van de Werken, Hendrik, 7,534, Cl. 54.000.
  - van de Werken, Hendrik, 7,535, Cl. 54.000.
- van de Werken, Hendrik, to University of Tennessee Research Corporation, The. Forsythia plant named 'Fairy-Land'. 7,533, 5-28-91, Cl. 54.000.
- van de Werken, Hendrik, to University of Tennessee Research Corporation, The. 'Minikin'. 7,534, 5-28-91, Cl. 54.000.
- van de Werken, Hendrik, to University of Tennessee Research Corporation, The. Forsythia cv. 'Lemon-Screen'. 7,535, 5-28-91, Cl. 54.000.
- Zaiger, Chris F.; Zaiger, Gary N.; Gardner, Leith M.; and Zaiger, Grant G. Peach tree ("Sugar Lady"). 7,532, 5-28-91, Cl. 42.000.
- Zaiger, Gary N.: *See—*
  - Zaiger, Chris F.; Zaiger, Gary N.; Gardner, Leith M.; and Zaiger, Grant G., 7,532, Cl. 42.000.
- Zaiger, Grant G.: *See—*
  - Zaiger, Chris F.; Zaiger, Gary N.; Gardner, Leith M.; and Zaiger, Grant G., 7,532, Cl. 42.000.

VOL
1126
ISS
4
MY
28
1991
UMI

# CLASSIFICATION OF PATENTS

## ISSUED MAY 28, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

| | |
|---|---|
| **CLASS 2** | |
| 5 | 5,018,220 |
| 16 | 5,018,221 |
| 49 A | 5,018,222 |
| 436 | 5,018,223 |
| **CLASS 4** | |
| 252 R | 5,018,224 |
| **CLASS 5** | |
| 61 | 5,018,225 |
| 82 R | 5,018,226 |
| 113 | 5,018,227 |
| 417 | 5,018,229 |
| 420 | 5,018,230 |
| 436 | 5,018,231 |
| 482 | 5,018,232 |
| **CLASS 8** | |
| 423 | 5,019,130 |
| 457 | 5,019,131 |
| 527 | 5,019,132 |
| 531 | 5,019,133 |
| 549 | 5,019,134 |
| **CLASS 12** | |
| 133 B | 5,018,233 |
| **CLASS 15** | |
| 104.33 | 5,018,234 |
| 215 | 5,018,235 |
| 230.11 | 5,018,236 |
| 244.1 | 5,018,237 |
| 314 | 5,018,238 |
| 328 | 5,018,239 |
| 349 | 5,018,240 |
| **CLASS 16** | |
| 82 | 5,018,241 |
| 228 | 5,018,242 |
| 335 | 5,018,243 |
| 342 | 5,018,244 |
| **CLASS 19** | |
| 128 | 5,019,110 |
| 145.5 | 5,018,245 |
| 150 | 5,018,246 |
| 205 | 5,018,247 |
| 240 | 5,018,248 |
| **CLASS 24** | |
| 116 A | 5,018,250 |
| 122.6 | 5,018,251 |
| 303 | B1 4,453,294 |
| 453 | 5,018,252 |
| 458 | 5,018,253 |
| 555 | 5,018,260 |
| 601.5 | 5,018,254 |
| **CLASS 28** | |
| 107 | 5,018,255 |
| **CLASS 29** | |
| 25.01 | 5,018,256 |
| 90.01 | 5,018,257 |
| 116.2 | 5,018,258 |
| 160.6 | 5,018,259 |
| 239 | 5,018,261 |
| 243.51 | 5,018,262 |
| 465 | 5,018,285 |
| 469.5 | 5,018,263 |
| 564.8 | 5,018,264 |
| 568 | 5,018,265 |
| | 5,018,266 |
| 609 | 5,018,267 |
| 728 | 5,018,268 |
| 861 | 5,018,269 |
| 863 | 5,018,270 |
| 889.71 | 5,018,271 |
| 890.08 | 5,018,272 |
| 890.142 | 5,018,273 |
| **CLASS 30** | |
| 50 | 5,018,274 |
| 124 | 5,018,275 |
| 347 | 5,018,276 |
| **CLASS 33** | |
| 301 | B1 3,892,042 |
| 538 | 5,018,277 |
| 559 | 5,018,278 |
| 649 | 5,018,279 |
| 832 | 5,018,280 |
| **CLASS 34** | |
| 35 | 5,018,281 |
| **CLASS 37** | |
| 130 | 5,018,282 |
| 141 T | 5,018,283 |
| 233 | 5,018,284 |
| **CLASS 40** | |
| 299 | 5,018,286 |
| 312 | 5,018,287 |
| 406 | 5,018,288 |
| 472 | 5,018,289 |
| 570 | 5,018,290 |
| 642 | 5,018,291 |
| **CLASS 42** | |
| 69.02 | 5,018,292 |
| 77 | 5,018,293 |
| 94 | 5,018,294 |
| **CLASS 43** | |
| 14 | 5,018,295 |
| 42.28 | 5,018,297 |
| 43.12 | 5,018,296 |
| 57.2 | 5,018,298 |
| 107 | 5,018,299 |
| **CLASS 47** | |
| 1.1 | 5,018,301 |
| 67 | 5,018,300 |
| **CLASS 48** | |
| 197 R | 5,019,135 |
| **CLASS 49** | |
| 56 | 5,018,302 |
| 280 | 5,018,303 |
| 340 | 5,018,304 |
| 348 | 5,018,305 |
| 425 | 5,018,306 |
| 471 | 5,018,307 |
| 491 | 5,018,308 |
| **CLASS 50** | |
| 406 | 5,018,328 |
| **CLASS 51** | |
| 72 R | 5,018,309 |
| 80 BS | 5,018,310 |
| 140 | 5,018,311 |
| 164.1 | 5,018,312 |
| 165.71 | 5,018,313 |
| 170 MT | 5,018,314 |
| 213 | 5,018,315 |
| 216 R | 5,018,316 |
| 259 | 5,018,228 |
| 410 | 5,018,317 |
| 417 | 5,018,318 |
| 424 | 5,018,319 |
| 426 | 5,018,320 |
| **CLASS 52** | |
| 2.17 | 5,018,321 |
| 7 | 5,018,322 |
| 36 | 5,018,323 |
| 169.7 | 5,018,324 |
| 211 | 5,018,325 |
| 235 | 5,018,326 |
| 282 | 5,018,327 |
| 410 | 5,018,329 |
| 455 | 5,018,330 |
| 506 | 5,019,111 |
| 514 | 5,018,331 |
| 666 | 5,018,332 |
| 741 | 5,018,333 |
| **CLASS 53** | |
| 152 | 5,018,334 |
| 281 | 5,018,335 |
| 435 | 5,018,336 |
| 458 | 5,018,337 |
| 474 | 5,019,112 |
| 532 | 5,018,338 |
| 557 | 5,018,339 |
| **CLASS 54** | |
| 44 | 5,018,340 |
| 66 | 5,018,341 |
| **CLASS 55** | |
| 36 | 5,019,136 |
| 73 | 5,019,137 |
| 89 | 5,019,138 |
| 158 | 5,019,139 |
| 159 | 5,019,140 |
| 170 | 5,019,141 |
| 429 | 5,019,142 |
| **CLASS 56** | |
| 10.5 | 5,018,342 |
| 12.1 | 5,018,343 |
| 13.3 | 5,018,344 |
| 14.9 | 5,018,345 |
| 202 | 5,018,346 |
| 295 | 5,018,347 |
| | 5,019,113 |
| **CLASS 60** | |
| 274 | 5,018,348 |
| 313 | 5,018,349 |
| 369 | 5,018,350 |
| 448 | 5,018,351 |
| 533 | 5,018,352 |
| 562 | 5,018,353 |
| 606 | 5,018,354 |
| 646 | 5,018,355 |
| | 5,018,356 |
| **CLASS 62** | |
| 6 | 5,018,357 |
| 17 | 5,019,143 |
| 22 | 5,019,144 |
| | 5,019,145 |
| 48.1 | 5,018,358 |
| 51.1 | 5,018,359 |
| 66 | 5,018,360 |
| 85 | 5,018,361 |
| 133 | 5,018,362 |
| 135 | 5,018,363 |
| 187 | 5,018,364 |
| 228.5 | 5,018,366 |
| 476 | 5,018,367 |
| 480 | 5,018,368 |
| **CLASS 63** | |
| 12 | 5,018,365 |
| **CLASS 65** | |
| 18.1 | 5,019,146 |
| 360 | 5,019,147 |
| **CLASS 66** | |
| 40 | 5,018,369 |
| 55 | 5,018,370 |
| **CLASS 68** | |
| 5 C | 5,018,371 |
| 18 F | 5,018,372 |
| **CLASS 70** | |
| 99 | 5,018,373 |
| 233 | 5,018,374 |
| 472 | 5,018,375 |
| 491 | 5,018,376 |
| **CLASS 71** | |
| 11 | 5,019,148 |
| 29 | 5,019,149 |
| 90 | 5,019,150 |
| 92 | 5,019,151 |
| | 5,019,152 |
| 94 | 5,019,153 |
| 96 | 5,019,154 |
| 121 | 5,019,155 |
| **CLASS 72** | |
| 12 | 5,018,377 |
| 283 | 5,018,378 |
| 354.6 | 5,018,379 |
| 467 | 5,019,114 |
| **CLASS 73** | |
| 23.2 | 5,018,380 |
| 45.5 | 5,018,381 |
| 65 | 5,018,382 |
| 118.1 | 5,018,383 |
| | 5,018,384 |
| 118.2 | 5,018,385 |
| 168 | 5,018,386 |
| 295 | 5,018,387 |
| 730 | 5,018,388 |
| 784 | 5,018,389 |
| 828 | 5,018,390 |
| 861.17 | 5,018,391 |
| 862.19 | 5,018,392 |
| 862.34 | 5,018,393 |
| 864.18 | 5,018,394 |
| 864.34 | 5,018,395 |
| 865.6 | 5,018,396 |
| 866.5 | 5,018,397 |
| **CLASS 74** | |
| 7 R | 5,018,398 |
| 110 | 5,018,399 |
| 198 | 5,018,400 |
| 354 | 5,018,401 |
| 425 | 5,018,403 |
| 477 | 5,018,404 |
| 529 | 5,018,405 |
| 569 | 5,018,406 |
| 606 R | 5,018,407 |
| 866 | 5,018,408 |
| **CLASS 75** | |
| 245 | 5,019,156 |
| 340 | 5,019,157 |
| 408 | 5,019,158 |
| 533 | 5,019,159 |
| 564 | 5,019,160 |
| 715 | 5,019,161 |
| 744 | 5,019,162 |
| **CLASS 81** | |
| 3.55 | 5,018,409 |
| 13 | 5,018,410 |
| 15.9 | 5,018,415 |
| 57.5 | 5,018,411 |
| 111 | 5,018,412 |
| 484 | 5,018,414 |
| **CLASS 82** | |
| 1.11 | 5,019,115 |
| **CLASS 83** | |
| 14 | 5,018,416 |
| 156 | 5,018,417 |
| 177 | 5,018,418 |
| 451 | 5,018,419 |
| 748 | 5,018,420 |
| 835 | 5,018,421 |
| **CLASS 84** | |
| 275 | 5,018,422 |
| 293 | 5,018,423 |
| 304 | 5,018,424 |
| 383 R | 5,018,425 |
| 422.3 | 5,018,426 |
| 603 | 5,018,427 |
| 616 | 5,018,428 |
| 622 | 5,018,429 |
| 625 | 5,018,430 |
| **CLASS 87** | |
| 462 | 5,018,413 |
| **CLASS 91** | |
| 363 R | 5,018,431 |
| 375 R | 5,018,432 |
| 498 | 5,018,433 |
| **CLASS 92** | |
| 29 | 5,018,434 |
| 48 | 5,018,435 |
| 92 | 5,018,436 |
| **CLASS 99** | |
| 327 | 5,018,437 |
| 335 | 5,018,438 |
| 450.2 | 5,018,439 |
| 535 | 5,018,440 |
| **CLASS 101** | |
| 123 | 5,018,441 |
| 127.1 | 5,018,442 |
| 228 | 5,018,443 |
| 366 | 5,018,444 |
| 489 | 5,018,445 |
| **CLASS 102** | |
| 213 | 5,018,446 |
| | 5,018,447 |
| 498 | 5,018,449 |
| 513 | 5,018,450 |
| **CLASS 104** | |
| 138.2 | 5,018,451 |
| 172.003 | 5,018,452 |
| **CLASS 105** | |
| 72.2 | 5,018,453 |
| **CLASS 106** | |
| 1.22 | 5,019,163 |
| 22 | 5,019,164 |
| | 5,019,165 |
| | 5,019,166 |
| 218 | 5,019,167 |
| 277 | 5,019,168 |
| 438 | 5,019,169 |
| 805 | 5,019,170 |
| **CLASS 108** | |
| 150 | 5,018,454 |
| **CLASS 110** | |
| 110 | 5,018,455 |
| 342 | 5,018,456 |
| 346 | 5,018,457 |
| | 5,018,458 |
| | 5,018,459 |
| **CLASS 112** | |
| 103 | 5,018,460 |
| 104 | 5,018,461 |
| 121.12 | 5,018,462 |
| 121.14 | 5,019,116 |
| 121.29 | 5,018,463 |
| 130 | 5,018,464 |
| 273 | 5,018,465 |
| 275 | 5,018,466 |
| 315 | 5,018,467 |
| **CLASS 114** | |
| 39.2 | 5,018,468 |
| 144 R | 5,018,469 |
| 183 R | 5,018,470 |
| 219 | 5,018,471 |
| 244 | 5,018,472 |
| 249 | 5,018,473 |
| 253 | 5,018,474 |
| 365 | 5,018,475 |
| **CLASS 116** | |
| 322 | 5,018,476 |
| **CLASS 118** | |
| 242 | 5,018,477 |
| 410 | 5,018,478 |
| 723 | 5,018,479 |
| | 5,019,117 |
| **CLASS 119** | |
| 26 | 5,018,480 |
| 156 | 5,018,481 |
| 173 | 5,018,482 |
| **CLASS 123** | |
| 1 A | 5,018,483 |
| 41.12 | 5,018,484 |
| 52 MB | 5,018,485 |
| 52 MF | 5,018,486 |
| 90.16 | 5,018,487 |
| 90.55 | 5,018,488 |
| 193 P | 5,018,489 |
| 196 AB | 5,018,490 |
| 196 S | 5,018,491 |
| 196 W | 5,019,118 |
| 198 E | 5,018,492 |
| 335 | 5,018,493 |
| 339 | 5,018,494 |
| | 5,018,495 |
| 399 | 5,018,496 |
| 432 | 5,018,497 |
| 435 | 5,018,498 |
| 456 | 5,018,499 |
| 463 | 5,018,500 |
| 472 | 5,018,501 |
| 500 | 5,019,119 |
| 514 | 5,018,502 |
| 557 | 5,019,120 |
| 580 | 5,018,503 |
| **CLASS 125** | |
| 26 | 5,018,504 |
| **CLASS 126** | |
| 262 | 5,018,505 |
| **CLASS 128** | |
| 4 | 5,018,506 |
| | 5,019,121 |
| 6 | 5,018,509 |
| 17 | 5,018,507 |
| 24 AA | 5,018,508 |
| 33 | 5,018,510 |
| | 5,018,511 |
| 75 | 5,018,512 |
| 78 | 5,018,513 |
| 80 C | 5,018,514 |
| 155 | 5,018,515 |
| | 5,018,516 |
| 200.24 | 5,018,517 |
| 202.22 | 5,018,518 |
| 203.29 | 5,018,519 |
| 205.12 | 5,018,520 |
| 363 | 5,018,521 |
| 419 PG | 5,018,522 |
| | 5,018,523 |
| 421 | 5,018,524 |
| | 5,018,525 |
| 630 | 5,018,526 |
| 635 | 5,018,527 |
| 661.09 | 5,018,528 |
| 667 | 5,018,529 |
| 749 | 5,018,530 |
| 774 | 5,018,531 |
| 844 | 5,018,532 |
| 848 | 5,018,533 |
| 877 | 5,018,534 |
| **CLASS 131** | |
| 60 | 5,018,535 |
| 70 | 5,018,536 |
| 109.1 | 5,018,538 |
| 194 | 5,019,122 |
| 280 | 5,018,539 |
| 297 | 5,018,540 |
| 310 | B1 4,836,222 |
| 359 | 5,018,541 |
| **CLASS 132** | |
| 139 | 5,018,542 |
| 291 | 5,018,543 |
| **CLASS 134** | |
| 2 | 5,019,171 |
| 3 | 5,019,172 |
| 4 | 5,019,173 |
| 40 | 5,019,174 |
| 42 | 5,019,175 |
| 111 | 5,018,544 |
| 113 | 5,018,545 |
| **CLASS 136** | |
| 244 | 5,019,176 |
| 249 | 5,019,177 |
| **CLASS 137** | |
| 68.1 | 5,018,546 |
| 111 | 5,018,547 |
| 315 | 5,018,548 |
| 355.23 | 5,018,549 |
| 387 | 5,018,550 |
| 571 | 5,018,551 |
| 614.11 | 5,018,552 |
| 625.41 | 5,018,553 |
| **CLASS 138** | |
| 26 | 5,018,554 |
| 155 | 5,018,555 |
| **CLASS 139** | |
| 68 | 5,018,556 |
| 450 | 5,018,557 |
| **CLASS 141** | |
| 198 | 5,018,558 |
| 339 | 5,018,559 |
| 364 | 5,018,560 |
| **CLASS 144** | |
| 208 B | 5,019,123 |
| 209 R | 5,018,561 |
| 253 R | 5,018,562 |
| 286 R | 5,018,563 |
| **CLASS 148** | |
| 3 | 5,019,178 |
| 11.5 A | 5,019,188 |
| 11.5 N | 5,019,179 |
| 12 B | 5,019,180 |
| 12 EA | 5,019,181 |
| 12.1 | 5,019,182 |
| 12.7 A | 5,019,183 |
| 13 | 5,019,184 |
| 13.2 | 5,019,185 |
| 20.3 | 5,019,186 |
| 24 | 5,019,187 |
| 127 | 5,019,189 |
| 306 | 5,019,190 |
| 307 | 5,019,191 |

VOL 1126
ISS 4
MY 28
1991
UMI

**CLASS 149**
42 5,019,192

**CLASS 150**
167 5,018,564

**CLASS 152**
379.3 5,018,565
396 5,018,566

**CLASS 156**
61 5,019,194
64 5,019,193
71 5,019,195
91 5,019,196
212 5,019,197
230 5,019,198
245 5,019,199
5,019,200
264 5,019,204
273.9 5,019,201
277 5,019,202
309 9 5,019,203
345 5,019,205
538 5,019,206
571 5,019,207
626 5,019,208
630 5,019,209
643 5,019,210

**CLASS 160**
348 5,018,567

**CLASS 162**
111 5,019,211
157.3 5,019,212
193 5,019,213
301 5,019,214
343 5,019,215
344 5,019,216

**CLASS 164**
34 5,018,568
454 5,018,569
461 5,018,570

**CLASS 165**
41 5,018,571
113 5,018,572
133 5,018,573

**CLASS 166**
185 5,018,574
242 5,018,575
272 5,018,576
279 5,018,577
281 5,018,578
291 5,018,579
298 5,018,580
373 5,018,581
382 5,018,582
385 5,018,583

**CLASS 169**
30 5,018,584
48 5,018,585
56 5,018,586

**CLASS 172**
612 5,018,587

**CLASS 173**
22 5,018,588

**CLASS 174**
48 5,019,672
52.2 5,019,673
84 R 5,019,674

**CLASS 175**
72 5,018,589
105 5,018,590

**CLASS 178**
18 5,019,677

**CLASS 180**
9.5 5,018,591
19.3 5,018,592
24.02 5,018,593
140 5,018,594
197 5,018,595
233 5,018,596
247 5,018,597

**CLASS 181**
106 5,018,598
129 5,018,599

**CLASS 182**
70 5,018,600

**CLASS 184**
6.4 5,018,601

**CLASS 187**
1 R 5,018,602
9 R Re.33,595
17 5,018,603
121 5,018,604

**CLASS 188**
165 5,018,605
267 5,018,606
282 5,018,607
322 15 5,018,608

**CLASS 190**
108 5,018,609

**CLASS 192**
4 A 5,018,610
42 5,018,611
58 B 5,018,612
70 25 5,018,613

**CLASS 194**
236 5,018,614
241 5,018,615

**CLASS 198**
335 5,018,616
346.1 5,018,617
347.3 5,018,618
839 5,018,619

**CLASS 200**
50 A 5,019,676
81.9 M 5,019,678
508 5,019,679

**CLASS 203**
51 5,019,217
87 5,019,218
91 5,019,219

**CLASS 204**
13 5,019,221
27 5,019,222
51 5,019,223
54 1 5,019,224
67 5,019,225
101 5,019,226
128 5,019,227
130 5,019,229
182.1 5,019,230
5,019,231
182.8 5,019,232
192.17 5,019,234
282 5,019,235
299 R 5,019,236
302 5,019,237
409 5,019,238
792 12 5,019,233

**CLASS 206**
45 5,019,124
150 5,018,620
204 5,018,621
333 5,018,622
532 5,019,125
557 5,018,623
560 5,018,624
621 5,018,625

**CLASS 208**
48 Q 5,019,239
111 5,019,240
120 5,019,241

**CLASS 209**
29 5,019,242
164 5,019,244
166 5,019,245
167 5,019,246
224 5,019,247
240 5,019,248
534 5,019,249

**CLASS 210**
85 5,019,250
94 5,019,243
133 5,019,251
136 5,019,252
158 5,019,253
169 5,019,254
225 5,019,255
232 5,019,256
253 5,019,257
258 5,019,258
274 5,019,259
490 5,019,260
5,019,261
5,019,262
500.25 5,019,263
500.37 5,019,264
603 5,019,265
605 5,019,266
606 5,019,267
617 5,019,268
635 5,019,269
656 5,019,270
5,019,271
695 5,019,272
719 5,019,273
729 5,019,274
734 5,019,275
744 5,019,276
776 5,019,277
792 5,019,278

**CLASS 211**
104 5,019,126
105.1 5,018,626
105.2 Re.33,596
123 5,018,627
153 5,018,628
194 5,018,629

**CLASS 212**
233 5,018,630
250 5,018,631

**CLASS 215**
230 5,018,632

**CLASS 219**
10.493 5,019,682
10.55 E 5,019,680
10.55 F 5,019,681
69.12 5,019,684
69.13 5,019,685
69.2 5,019,683
76.14 5,019,686
130.1 5,019,687
230 5,019,688
388 5,019,689
400 5,019,690
432 5,019,691
469 5,019,692
471 5,019,693

**CLASS 220**
4 12 5,018,634
90.2 5,018,635
90.4 5,018,636
404 5,018,637
414 5,018,638
426 5,018,639
456 5,018,640
634 5,018,641
675 5,018,642

**CLASS 221**
65 5,018,644
222 5,018,249

**CLASS 222**
1 5,018,643
5,019,127
14 5,018,645
107 5,018,646
108 5,018,647
272 5,018,648

**CLASS 223**
68 5,018,649
93 5,018,650

**CLASS 224**
42.44 5,018,651
150 5,018,652
198 5,018,653
244 5,018,654

**CLASS 226**
101 5,018,655

**CLASS 227**
84 5,018,656
178 5,018,657

**CLASS 228**
4.5 5,018,658
121 5,018,659
176 5,018,661
208 5,018,662

**CLASS 229**
117.13 5,018,663
125.42 5,018,660

**CLASS 235**
383 5,019,694
434 5,019,695
436 5,019,696
441 5,019,697
462 5,019,698
472 5,019,699
492 5,019,700

**CLASS 236**
34 5 5,018,664
93 A 5,018,665

**CLASS 238**
122 5,018,666

**CLASS 239**
132.5 5,018,667
433 5,018,670
655 5,018,668
665 5,018,669

**CLASS 241**
16 5,018,671
37.5 5,018,672
62 5,018,673
88 4 5,018,674
282.2 5,018,675

**CLASS 242**
7.03 5,018,676
18 DD 5,018,677
47 5,018,678
67.1 R 5,018,679
71 8 5,018,680
131 5,018,681
268 5,018,682

**CLASS 244**
1 R 5,018,683
3.13 5,018,684
3 14 5,018,685
106 5,018,686
129.5 5,018,687
137.4 5,018,688

**CLASS 246**
182 B 5,018,689
428 5,018,690

**CLASS 248**
99 5,018,691
188.3 5,018,692
217.2 5,018,693
311.2 5,018,633
340 5,018,694
346.1 5,018,695
429 5,018,696
547 5,018,697
550 5,018,698
562 5,018,699
571 5,018,700
631 5,018,701
904 5,018,702

**CLASS 250**
201.5 5,019,701
208 1 5,019,702
5,019,703
214 R 5,019,704
251 5,019,705
264 5,019,708
291 5,019,706
306 5,019,707
324 5,019,709
341 5,019,710
385.1 5,019,711
423 R 5,019,712
492 3 5,019,713
568 5,019,714
571 5,019,715

**CLASS 251**
127 5,018,703
148 5,018,704

**CLASS 252**
8.554 5,019,279
8.8 5,019,280
5,019,281
32.7 E 5,019,282
33.6 5,019,283
46.7 5,019,284
47.5 5,019,285
48.2 5,019,286
54.6 5,019,287
79 2 5,019,288
95 5,019,289
135 5,019,290
174 22 5,019,291
174.25 5,019,292
301.17 B1 4,657,696
313.1 5,019,293
400.31 5,019,294
518 5,019,295
546 5,019,296

**CLASS 254**
266 5,018,708

**CLASS 260**
405.6 5,019,297
410.5 5,019,298
410 6 5,019,299

**CLASS 261**
23.1 5,019,300

**CLASS 264**
1.5 5,019,301
3.4 5,019,220
8 5,019,302
22 5,019,303
45.1 5,019,304
5,019,305
66 5,019,306
67 5,019,307
87 5,019,308
103 5,019,309
122 5,019,310
5,019,311
152 5,019,312
154 5,019,313
156 5,019,314
171 5,019,315
178 F 5,019,316
300 5,019,317
315 5,019,318

**CLASS 266**
77 5,018,705
80 5,018,706
254 5,018,707
271 5,018,709
280 5,018,710

**CLASS 269**
43 5,018,711
71 5,019,129
323 5,018,712

**CLASS 270**
31 5,018,713
55 5,019,716

**CLASS 271**
3.1 5,018,714
19 5,018,715
207 5,018,717
227 5,018,716
245 5,018,718
246 5,018,719
272 5,018,720

**CLASS 272**
56 5 SS 5,018,721
69 5,018,722
70 5,018,723
73 5,018,724
118 5,018,725
129 5,018,726
144 5,018,727

**CLASS 273**
26 E 5,018,729
34 A 5,018,730
35 B 5,018,731
67 B 5,018,732
75 5,018,733
5,018,734
80 B 5,018,735
143 R 5,018,737
146 5,018,738
201 5,018,739
218 5,019,319
220 5,018,740
232 5,018,741
235 A 5,018,742
235 R 5,019,320
242 5,018,743
248 5,018,744
338 5,018,745
411 5,018,746
422 5,018,747
439 5,018,736
459 5,018,728

**CLASS 277**
27 5,018,749
38 5,018,750
80 5,018,751
012 5,018,748
152 5,018,752
165 5,018,753

**CLASS 280**
47.4 5,018,754
81.1 5,018,755
81.6 5,018,756
96.1 5,018,757
281.1 5,018,758
507 5,018,759
609 5,018,760
730 5,018,761
731 5,018,762
735 5,018,763

**CLASS 281**
2 5,018,764
15.001 5,018,765

**CLASS 283**
67 5,018,767

**CLASS 285**
24 5,018,768
39 5,018,769
5,018,770
333 5,018,771

**CLASS 292**
39 5,018,772

**CLASS 294**
1.1 5,018,773
74 5,018,774
5,018,775
119.3 5,018,776

**CLASS 296**
100 5,018,777
159 5,018,778
180 1 5,018,779
203 5,018,780
210 5,018,781
217 5,018,782
219 5,018,783
5,018,784

**CLASS 297**
159 5,018,785
284 5,018,786
302 5,018,787
378 5,018,788
444 5,018,789
458 5,018,790
460 5,018,791

**CLASS 299**
37 5,018,792
86 5,018,793

**CLASS 301**
37 AT 5,018,794
63 PW 5,018,795

**CLASS 303**
9.75 5,018,796
117 5,018,797
5,018,798
118 5,018,799

**CLASS 307**
66 5,019,717
84 5,019,718
246 5,019,719
270 5,019,720
306 5,019,721
354 5,019,722
400 5,019,723
443 5,019,724
5,019,725
446 5,019,726
449 5,019,727
465 5,019,736
475 5,019,728
5,019,729
510 5,019,730
571 5,019,731

**CLASS 310**
49 R 5,019,732
61 5,019,733
77 5,019,734
89 5,019,735
5,019,737
90.5 5,019,738
233 5,019,739
234 5,019,740
239 5,019,741
313 C 5,019,742

**CLASS 312**
344 1 5,018,800

**CLASS 313**
25 5,019,743
346 R 5,019,744
440 5,019,745
512 5,019,746

**CLASS 315**
157 5,019,747
169.3 5,019,748
224 5,019,749
248 5,019,750
290 5,019,751
344 5,019,752
362 5,019,753
408 5,019,754

**CLASS 318**
13 5,019,755
254 5,019,756
5,019,757
264 5,019,758
466 5,019,759
490 5,019,760
568.11 5,019,761
568.12 5,019,762
571 5,019,763
627 5,019,764
628 5,019,765
807 5,019,766

**CLASS 320**
2 5,019,767

**CLASS 322**
2 R 5,019,768

**CLASS 323**
282 5,019,770

**CLASS 324**
158 P 5,019,771

158 R 5,019,772
166 5,019,773
174 5,019,774
202 5,019,775
207.12 5,019,776
242 5,019,777
307 5,019,784
322 5,019,778
388 5,019,779
457 5,019,780
649 5,019,781
655 5,019,782
662 5,019,783

**CLASS 328**
14 5,019,785
133 5,019,786

**CLASS 330**
4 3 5,019,787
9 5,019,788
273 5,019,789

**CLASS 331**
16 5,019,790
96 5,019,791

**CLASS 333**
17.1 5,019,792
156 5,019,793
174 5,019,794

**CLASS 335**
205 5,019,795
210 5,019,863
302 5,019,796

**CLASS 338**
333 5,019,797

**CLASS 340**
326 5,019,798
438 5,019,799
450.3 5,019,800
522 5,019,801
5,019,802
539 5,019,803
562 5,019,804
628 5,019,805
706 5,019,806
718 5,019,807
765 5,019,808
815.31 5,019,809
825.06 5,019,810
825.17 5,019,811
825.31 5,019,812
825.54 5,019,813
870.290 5,019,814
933 5,019,815

**CLASS 341**
77 5,019,816
129 5,019,817
133 5,019,818
143 5,019,819
156 5,019,820
5,019,821

**CLASS 342**
22 5,019,822
175 5,019,823
195 5,019,824
201 5,019,825
202 5,019,826
386 5,019,827
457 5,019,828

**CLASS 343**
700 MS 5,019,829
701 5,019,830
771 5,019,831
774 5,019,832
840 5,019,833
877 5,019,834

**CLASS 346**
1.1 5,019,835
76 PH 5,019,836
108 5,019,837
121 5,019,838
134 5,019,839
5,019,840
140 R 5,019,675
153.1 5,019,841

**CLASS 350**
3.61 5,018,801
3.71 5,018,803
5,018,804
6.5 5,018,805
6.7 5,018,806
6.8 5,018,807
6.91 5,018,808
96 12 5,018,809
5,018,810
5,018,811
96 14 5,018,812
5,018,813
96.15 5,018,814
5,018,815
96.17 5,018,817
96.2 5,018,816
5,018,818
5,018,820
96.20 5,018,819
5,018,821
5,018,822
96.21 5,018,823
5,018,824
96.23 5,018,825
96.29 5,018,826
96.30 5,018,827
96.34 5,018,828
5,018,829
105 5,018,830
162.17 5,018,831
247 5,018,836
276 SL 5,018,832
314 5,018,833
333 5,018,834
336 5,018,835
345 5,018,837
347 R 5,018,839
347 V 5,018,838
349 5,018,840
350 S 5,018,841
354 5,018,842
429 5,018,843
486 5,018,844
500 5,018,845
513 5,018,846
534 5,018,847
572 5,018,848

**CLASS 351**
162 5,018,849
212 5,018,850
214 5,018,851

**CLASS 354**
86 5,019,842
106 5,019,843
120 5,019,844
149.1 5,019,845
217 5,019,846
246 5,019,847
277 5,019,848
308 5,019,849
322 5,019,850
402 5,019,851
409 5,019,852
420 5,019,853
471 5,019,854

**CLASS 355**
22 5,019,855
27 5,019,856
5,019,857
35 5,019,858
77 5,019,859
104 5,019,860
200 5,019,861
208 5,019,862
212 5,019,864
218 5,019,865
239 5,019,866
245 5,019,867
264 5,019,868
290 5,019,869
298 5,019,870
309 5,019,871
317 5,019,872
326 5,019,873

**CLASS 356**
28.5 5,018,852
155 5,018,853
312 5,018,855
5,018,856
350 5,018,857
5,018,858
5,018,859
5,018,860
353 5,018,861
358 5,018,862
369 5,018,863
372 5,018,864
376 5,018,854
5,018,865
417 5,018,866
445 5,018,867

**CLASS 357**
16 5,019,874
22 5,019,875
5,019,876
5,019,877
23.13 5,019,883
23.3 5,019,878
23.5 5,019,879
5,019,881
23.8 5,019,882
24 5,019,884
25 5,019,885
29 5,019,886
30 5,019,887
34 5,019,890
41 5,019,888
42 5,019,889
70 5,019,891
74 5,019,892
81 5,019,880
5,019,893

**CLASS 358**
29 5,019,894
36 5,019,895
75 5,019,896
5,019,897
81 5,019,898
84 5,019,899
86 5,019,900
105 5,019,901
133 5,019,902
140 5,019,903
5,019,904
146 5,019,905
148 5,019,906
158 5,019,907
164 5,019,909
166 5,019,908
188 5,019,910
213.19 5,019,911
213.26 5,019,912
296 5,019,913
310 5,019,914
335 5,019,915
401 5,019,916
473 5,019,918

**CLASS 360**
22 5,019,919
27 5,019,920
67 5,019,921
69 5,019,922
71 5,019,925
73.07 5,019,923
73.14 5,019,924
84 5,019,926
92 5,019,927
96.5 5,019,928
98.01 5,019,929
103 5,019,930
104 5,019,931
105 5,019,932
132 5,019,933

**CLASS 361**
15 5,019,934
45 5,019,935
93 5,019,936
102 5,019,937
377 5,019,938
386 5,019,939
5,019,940
5,019,941
388 5,019,942
396 5,019,943
400 5,019,944
412 5,019,945
414 5,019,946
415 5,019,947
5,019,948
525 5,019,949

**CLASS 362**
130 5,019,950
191 5,019,951

**CLASS 363**
16 5,019,952
21 5,019,953
5,019,954
5,019,955
50 5,019,956
56 5,019,957
97 5,019,958
134 5,019,959

**CLASS 364**
132 5,019,960
192 5,019,961
200 5,019,962
5,019,963
5,019,964
5,019,965
5,019,966
5,019,967
5,019,968
5,019,969
5,019,970
5,019,971
400 5,019,972
412 5,019,973
413.02 5,019,974
413 13 5,019,975
5,019,976
420 5,019,977
422 5,019,978
424 04 5,019,980
424.05 5,019,981
5,019,982
424.07 5,019,983
424 1 5,019,979
426.02 5,019,984
5,019,985
426.04 5,019,986
5,019,987
431.03 5,019,988
431 05 5,019,989
449 5,019,990
464 03 5,019,991
468 5,019,992
474 29 5,019,993
477 5,019,994
483 5,019,995
5,019,996
488 5,019,997
496 5,019,998
497 5,019,999
500 5,020,000
513 5,020,001
518 5,020,002
5,020,003
519 5,020,004
5,020,005
550 5,020,006
551.01 5,020,007
561 5,020,008
580 5,020,009
5,020,010
5,020,011
709 14 5,020,012
715.08 5,020,013
723 5,020,014
728.03 5,020,015
736.5 5,020,016
761 5,020,017
837 5,020,018
900 5,020,019
5,020,020
5,020,021
5,020,022
5,020,023
5,020,024

**CLASS 365**
102 5,020,025
104 5,020,026
154 5,020,027
5,020,028
5,020,029
185 5,020,030
203 5,020,031

**CLASS 366**
10 5,018,868
101 5,018,869
161 5,018,870
168 5,018,871

**CLASS 367**
4 5,020,032
20 5,020,033
138 5,020,034
159 5,020,035
168 5,020,036

**CLASS 368**
10 5,020,037
120 5,020,038
282 5,020,039

**CLASS 369**
13 5,020,040
5,020,041
5,020,042
36 5,020,043
44 28 5,020,044
44.29 5,020,045
60 5,020,046
240 5,020,047
291 5,020,048

**CLASS 370**
3 5,020,049
4 5,020,050
29 5,020,051
60 5,020,052
84 5,020,053
94 1 5,020,054
5,020,055
95.3 5,020,056
102 5,020,057
109 5,020,058

**CLASS 371**
11.3 5,020,059
37.1 5,020,060

**CLASS 372**
2 5,020,061
23 5,020,062
31 5,019,769
34 5,020,063
37 5,020,064
44 5,020,065
45 5,020,066
46 5,020,067
5,020,068
59 5,020,069
65 5,020,070
89 5,020,071
96 5,020,072
105 5,020,073
107 5,020,074

**CLASS 374**
133 5,018,872
144 5,018,873
205 5,018,874
208 5,018,875

**CLASS 375**
1 5,020,075
5 5,020,076
8 5,020,077
12 5,020,078
64 5,020,079
80 5,020,080
118 5,020,081

**CLASS 376**
133 5,019,321
158 5,019,322
201 5,019,323
260 5,019,324
5,019,325
261 5,019,326
268 5,019,327
310 5,019,328
316 5,019,329

**CLASS 377**
44 5,020,082

**CLASS 378**
35 5,020,083
46 5,020,084
99 5,020,085
113 5,020,086
134 5,020,087
164 5,020,088
196 5,020,089

**CLASS 379**
58 5,020,090
5,020,091
59 5,020,092
5,020,093
62 5,020,094
67 5,020,095
100 5,020,096
102 5,020,097
202 5,020,098
234 5,020,099
379 5,020,100
389 5,020,101
399 5,020,102
454 5,020,103

**CLASS 380**
6 5,020,104
23 5,020,105
49 5,020,106

**CLASS 381**
43 Re.33,597
5,020,107
48 5,020,108
61 5,020,109

**CLASS 382**
7 5,020,110
31 5,020,111
37 5,020,112
42 5,020,113
44 5,020,114
5,020,115
5,020,116
46 5,020,117
50 5,020,118
5,020,119
56 5,020,120
5,020,121
5,020,122
61 5,020,123
5,020,124

**CLASS 383**
1 5,018,876
67 5,018,877

**CLASS 384**
44 5,018,878
51 5,018,879
112 5,018,880
113 5,018,881
484 5,018,882

**CLASS 388**
811 5,020,125
815 5,020,126

**CLASS 392**
488 5,020,127
498 5,020,128

**CLASS 400**
121 5,018,883
126 5,018,884
196 5,018,885
545 5,018,886
616.1 5,018,887
5,018,888
642 5,018,889

**CLASS 401**
46 5,018,890
52 5,018,891
68 5,018,892
75 5,018,893
202 5,018,894

**CLASS 402**
4 5,018,895
38 5,018,896
79 5,018,897

**CLASS 403**
11 5,018,898
57 5,018,899
267 5,018,900
349 5,018,901

**CLASS 404**
6 5,018,902

**CLASS 405**
170 5,018,903
196 5,018,904
230 5,018,905
259 5,018,908
263 5,018,906
288 5,018,907

**CLASS 406**
138 5,018,909
144 5,018,910

**CLASS 408**
13 5,018,911
115 R 5,018,912
204 Re.33,598

**CLASS 409**
34 5,018,913
178 5,018,914
231 5,018,915
233 5,018,916
296 5,018,917

**CLASS 410**
145 5,018,918

**CLASS 411**
33 5,018,919
43 5,018,920
393 5,018,921

**CLASS 414**
5 5,018,922
10 5,018,923
240 5,018,925
245 5,018,924
253 5,018,926
331 5,018,927
339 5,018,928
408 5,018,929
458 5,018,930
495 5,018,931
498 5,018,932
542 5,018,933
695.5 5,018,934
729 5,018,935
752 5,018,936
783 5,018,937
786 5,018,938
795.4 5,018,939
796.8 5,018,940

**CLASS 415**
173.2 5,018,942

**CLASS 416**
35 5,019,006
144 5,018,943
146 R 5,018,944
220 R 5,018,941

**CLASS 417**
12 5,018,945
197 5,018,946
295 5,018,947
302 5,018,948
339 5,018,949
383 5,018,950
423 15 5,018,951

**CLASS 418**
195 5,018,952
201 1 5,018,953

**CLASS 419**
39 5,019,330

VOL
1126
ISS
4
MY
28
1991
UMI

# CLASSIFICATION OF PATENTS

**CLASS 420**

| | |
|---|---|
| 51 | 5,019,331 |
| 59 | 5,019,332 |
| 422 | 5,019,333 |
| 426 | 5,019,334 |
| 481 | 5,019,335 |
| 557 | 5,019,336 |
| 580 | 5,019,337 |
| 586.1 | 5,019,338 |

**CLASS 422**

| | |
|---|---|
| 3 | 5,019,339 |
| 7 | 5,019,340 |
| | 5,019,341 |
| 16 | 5,019,342 |
| | 5,019,343 |
| 21 | 5,019,344 |
| 26 | 5,019,345 |
| 28 | 5,019,346 |
| 56 | 5,019,347 |
| 63 | 5,019,348 |
| 73 | 5,019,349 |
| 82.07 | 5,019,350 |
| 99 | 5,019,351 |
| 123 | 5,019,352 |
| 144 | 5,019,353 |
| 145 | 5,019,354 |
| 186.04 | 5,019,355 |
| 191 | 5,019,356 |
| 192 | 5,019,357 |
| 197 | 5,019,358 |
| 294 | 5,019,359 |

**CLASS 423**

| | |
|---|---|
| 21.5 | 5,019,362 |
| 87 | 5,019,363 |
| 132 | 5,019,360 |
| 210 | 5,019,364 |
| 243 | 5,019,361 |
| | 5,019,365 |
| 592 | 5,019,366 |
| 626 | 5,019,367 |

**CLASS 424**

| | |
|---|---|
| 1.1 | 5,019,368 |
| | 5,019,369 |
| 4 | 5,019,370 |
| 5 | 5,019,371 |
| 9 | 5,019,372 |
| 52 | 5,019,373 |
| | 5,019,374 |
| 66 | 5,019,375 |
| 70 | 5,019,376 |
| | 5,019,377 |
| 78 | 5,019,378 |
| | 5,019,379 |
| 81 | 5,019,380 |
| 85 | 5,019,385 |
| 85.1 | 5,019,381 |
| 85.4 | 5,019,382 |
| 88 | 5,019,383 |
| | 5,019,384 |
| 89 | 5,019,386 |
| | 5,019,387 |
| 92 | 5,019,388 |
| 93 | 5,019,389 |
| 195.1 | 5,019,391 |
| 420 | 5,019,392 |
| 423 | 5,019,393 |
| | 5,019,394 |
| 449 | 5,019,395 |
| 473 | 5,019,396 |
| | 5,019,397 |
| 480 | 5,019,398 |
| 493 | 5,019,399 |
| 497 | 5,019,400 |
| 535 | 5,019,390 |
| 662 | 5,019,401 |
| 665 | 5,019,402 |

**CLASS 425**

| | |
|---|---|
| 8 | 5,018,954 |
| 64 | 5,018,955 |
| 87 | 5,018,956 |
| 112 | 5,018,957 |
| 117 | 5,018,958 |
| 325 | 5,018,959 |
| 367 | 5,018,960 |
| 450.1 | 5,018,961 |
| 556 | 5,018,962 |

**CLASS 426**

| | |
|---|---|
| 8 | 5,019,410 |
| 52 | 5,019,411 |
| 89 | 5,019,403 |
| 242 | 5,019,412 |
| 249 | 5,019,404 |
| 250 | 5,019,405 |
| 302 | 5,019,406 |
| 399 | 5,019,407 |
| | 5,019,408 |
| 460 | 5,019,413 |
| 573 | 5,019,414 |

**CLASS 427**

| | |
|---|---|
| 39 | 5,019,415 |
| 47 | 5,019,416 |
| 54.1 | 5,019,417 |
| 79 | 5,019,418 |
| 96 | 5,019,409 |
| | 5,019,419 |
| 126.3 | 5,019,420 |
| 152 | 5,019,421 |
| 245 | 5,019,422 |
| 248.1 | 5,019,423 |
| 264 | 5,019,424 |
| 305 | 5,019,425 |
| 314 | 5,019,426 |
| 375 | 5,019,427 |
| 387 | 5,019,428 |
| 422 | 5,019,429 |
| 430.1 | 5,019,430 |

**CLASS 428**

| | |
|---|---|
| 15 | 5,019,431 |
| 35.4 | 5,019,432 |
| 35.7 | 5,019,433 |
| | 5,019,434 |
| 36.1 | 5,019,435 |
| 40 | 5,019,436 |
| 87 | 5,019,437 |
| 102 | 5,019,438 |
| 141 | Re.33,599 |
| 178 | 5,019,439 |
| 195 | 5,019,440 |
| 196 | 5,019,441 |
| 215 | 5,019,442 |
| | 5,019,443 |
| 220 | 5,019,536 |
| 262 | 5,019,444 |
| 323 | 5,019,445 |
| 324 | 5,019,446 |
| 327 | 5,019,447 |
| 332 | 5,019,448 |
| 397 | 5,019,449 |
| 402 | 5,019,450 |
| 411.1 | 5,019,451 |
| 422 | 5,019,452 |
| 447 | 5,019,644 |
| 518 | 5,019,453 |
| 570 | 5,019,454 |
| 584 | 5,019,455 |
| 591 | 5,019,456 |
| 606 | 5,019,457 |
| 630 | 5,019,458 |
| 656 | 5,019,459 |
| 659 | 5,019,460 |
| 688 | 5,019,461 |
| 694 | 5,019,462 |

**CLASS 429**

| | |
|---|---|
| 12 | 5,019,463 |
| 34 | 5,019,464 |
| 97 | 5,019,465 |
| 103 | 5,019,466 |
| 127 | 5,019,467 |
| 191 | 5,019,468 |
| 192 | 5,019,469 |
| 223 | 5,019,470 |

**CLASS 430**

| | |
|---|---|
| 11 | 5,019,471 |
| 20 | 5,019,476 |
| 43 | 5,019,472 |
| 58 | 5,019,473 |
| 76 | 5,019,474 |
| 115 | 5,019,477 |
| 138 | 5,019,475 |
| 165 | 5,019,478 |
| 172 | 5,019,479 |
| 200 | 5,019,480 |
| 270 | 5,019,481 |
| 283 | 5,019,482 |
| 288 | 5,019,483 |
| 293 | 5,019,484 |
| 296 | 5,019,485 |
| 307 | 5,019,486 |
| 322 | 5,019,487 |
| 325 | 5,019,488 |
| 379 | 5,019,489 |
| 503 | 5,019,490 |
| 523 | 5,019,491 |
| 543 | 5,019,492 |
| 553 | 5,019,493 |
| 600 | 5,019,494 |

**CLASS 431**

| | |
|---|---|
| 1 | 5,018,963 |
| 45 | 5,018,964 |
| 344 | 5,018,965 |

**CLASS 432**

| | |
|---|---|
| 59 | 5,018,966 |
| 116 | 5,018,968 |

**CLASS 433**

| | |
|---|---|
| 20 | 5,018,969 |
| 37 | 5,018,967 |
| 75 | 5,018,970 |
| 92 | 5,018,971 |
| 215 | 5,018,972 |

**CLASS 434**

| | |
|---|---|
| 62 | 5,018,973 |
| 98 | 5,018,974 |
| 128 | 5,018,975 |
| 207 | 5,018,976 |
| 274 | 5,018,977 |
| 376 | 5,018,978 |
| 409 | 5,018,979 |

**CLASS 435**

| | |
|---|---|
| 1 | 5,019,495 |
| 6 | 5,019,496 |
| 7.23 | 5,019,497 |
| 7.5 | 5,019,498 |
| 69.1 | 5,019,499 |
| | 5,019,500 |
| | 5,019,501 |
| 101 | 5,019,502 |
| 115 | 5,019,503 |
| 123 | 5,019,504 |
| 148 | 5,019,505 |
| 172.3 | 5,019,506 |
| 193 | 5,019,507 |
| 198 | 5,019,508 |
| 232 | 5,019,509 |
| 235.1 | 5,019,510 |
| 240.25 | 5,019,512 |
| 240.26 | 5,019,513 |
| 240.27 | 5,019,511 |
| 254 | 5,019,514 |

**CLASS 436**

| | |
|---|---|
| 52 | 5,019,515 |
| 77 | 5,019,516 |
| 172 | 5,019,518 |
| 500 | 5,019,521 |
| 753 | 5,019,517 |

**CLASS 437**

| | |
|---|---|
| 22 | 5,019,519 |
| 26 | 5,019,520 |
| 29 | 5,019,522 |
| 31 | 5,019,523 |
| | 5,019,524 |
| 32 | 5,019,525 |
| 37 | 5,019,526 |
| 43 | 5,019,527 |
| 132 | 5,019,529 |
| 175 | 5,019,530 |
| 180 | 5,019,531 |
| 186 | 5,019,532 |
| 199 | 5,019,533 |
| 200 | 5,019,534 |
| 209 | 5,019,535 |

**CLASS 439**

| | |
|---|---|
| 8 | 5,018,980 |
| 71 | 5,018,981 |
| 74 | 5,018,982 |
| 76 | 5,018,983 |
| 92 | 5,018,984 |
| 174 | 5,018,985 |
| 421 | 5,018,986 |
| 445 | 5,018,987 |
| 577 | 5,018,988 |
| 620 | 5,018,989 |
| | 5,018,990 |
| 621 | 5,018,991 |
| 699 | 5,018,992 |
| 801 | 5,018,993 |

**CLASS 440**

| | |
|---|---|
| 61 | 5,018,994 |
| 63 | 5,018,995 |
| 75 | 5,018,996 |
| 76 | 5,018,997 |
| 77 | 5,018,998 |
| 78 | 5,018,999 |

**CLASS 441**

| | |
|---|---|
| 006 | 5,019,000 |

**CLASS 445**

| | |
|---|---|
| 3 | 5,019,001 |
| 24 | 5,019,002 |
| | 5,019,003 |
| 30 | 5,019,004 |
| 36 | 5,019,005 |

**CLASS 446**

| | |
|---|---|
| 62 | 5,019,007 |
| 207 | 5,019,008 |
| 437 | 5,019,009 |
| 487 | 5,019,010 |

**CLASS 449**

| | |
|---|---|
| 27 | 5,019,011 |

**CLASS 452**

| | |
|---|---|
| 46 | 5,019,012 |
| 151 | 5,019,013 |

**CLASS 455**

| | |
|---|---|
| 4 | 5,020,129 |
| 9 | 5,020,130 |
| 10 | 5,020,131 |
| 17 | 5,020,132 |
| 43 | 5,020,133 |
| 67 | 5,020,134 |
| 76 | 5,020,135 |
| 89 | 5,020,136 |
| 90 | 5,020,137 |
| 115 | 5,020,138 |
| 151 | 5,020,139 |
| | 5,020,140 |
| 166 | 5,020,141 |
| | 5,020,142 |
| 186 | 5,020,143 |
| | 5,020,144 |
| 188 | 5,020,145 |
| 195 | 5,020,146 |
| 302 | 5,020,147 |
| | 5,020,148 |
| 325 | 5,020,149 |
| 343 | 5,020,150 |
| 345 | 5,020,151 |
| 601 | 5,020,152 |
| 606 | 5,020,153 |
| 608 | 5,020,154 |
| 617 | 5,020,155 |

**CLASS 460**

| | |
|---|---|
| 106 | 5,019,014 |

**CLASS 462**

| | |
|---|---|
| 18 | 5,018,766 |

**CLASS 464**

| | |
|---|---|
| 99 | 5,019,015 |
| 111 | 5,019,016 |

**CLASS 474**

| | |
|---|---|
| 102 | 5,019,017 |
| 117 | 5,019,018 |
| 166 | 5,019,019 |
| 240 | 5,019,020 |

**CLASS 475**

| | |
|---|---|
| 150 | 5,019,021 |
| 209 | 5,019,022 |
| 269 | 5,019,023 |
| 285 | 5,019,025 |
| 347 | 5,018,402 |

**CLASS 493**

| | |
|---|---|
| 147 | 5,019,026 |
| 209 | 5,019,027 |
| 280 | 5,019,024 |
| 290 | 5,019,028 |
| 315 | 5,019,029 |
| 342 | 5,019,030 |

**CLASS 501**

| | |
|---|---|
| 1 | 5,019,537 |
| 13 | 5,019,538 |
| 87 | 5,019,539 |
| 96 | 5,019,540 |
| 127 | 5,019,541 |

**CLASS 502**

| | |
|---|---|
| 25 | 5,019,542 |
| 64 | 5,019,543 |
| 102 | 5,019,544 |
| 209 | 5,019,545 |
| 303 | 5,019,546 |
| 342 | 5,019,547 |

**CLASS 503**

| | |
|---|---|
| 209 | 5,019,548 |
| 227 | 5,019,549 |
| | 5,019,550 |

**CLASS 505**

| | |
|---|---|
| 1 | 5,019,551 |
| | 5,019,552 |
| | 5,019,553 |
| | 5,019,554 |
| | 5,019,555 |

**CLASS 514**

| | |
|---|---|
| 2 | 5,019,556 |
| | 5,019,557 |
| 11 | 5,019,558 |
| 21 | 5,019,559 |
| 43 | 5,019,560 |
| 52 | 5,019,561 |
| 58 | 5,019,562 |
| | 5,019,563 |
| 75 | 5,019,564 |
| 89 | 5,019,565 |
| 103 | 5,019,566 |
| 164 | 5,019,567 |
| 171 | 5,019,568 |
| | 5,019,569 |
| 202 | 5,019,570 |
| 210 | 5,019,571 |
| 213 | 5,019,572 |
| 232.8 | 5,019,573 |
| 235.2 | 5,019,574 |
| 247 | 5,019,575 |
| 255 | 5,019,576 |
| 272 | 5,019,577 |
| 275 | 5,019,578 |
| 289 | 5,019,579 |
| 299 | 5,019,580 |
| 303 | 5,019,581 |
| 321 | 5,019,582 |
| 327 | 5,019,583 |
| 338 | 5,019,584 |
| 396 | 5,019,585 |
| 400 | 5,019,586 |
| 409 | 5,019,587 |
| | 5,019,588 |
| 450 | 5,019,589 |
| | 5,019,590 |
| 461 | 5,019,591 |
| 524 | 5,019,592 |
| 531 | 5,019,595 |
| 560 | 5,019,593 |
| 561 | 5,019,594 |
| 578 | 5,019,596 |
| 618 | 5,019,597 |
| 650 | 5,019,598 |

**CLASS 521**

| | |
|---|---|
| 99 | 5,019,599 |
| 117 | 5,019,600 |
| 127 | 5,019,602 |
| 181 | 5,019,603 |

**CLASS 523**

| | |
|---|---|
| 105 | 5,019,604 |
| 122 | 5,019,601 |
| 219 | 5,019,605 |
| 414 | 5,019,606 |
| 435 | 5,019,607 |
| 456 | 5,019,608 |

**CLASS 524**

| | |
|---|---|
| 35 | 5,019,609 |
| 61 | 5,019,610 |
| 83 | 5,019,611 |
| 99 | 5,019,612 |
| 100 | 5,019,613 |
| | 5,019,614 |
| | 5,019,615 |
| 141 | 5,019,616 |
| 346 | 5,019,617 |
| 405 | 5,019,618 |
| | 5,019,619 |
| 485 | 5,019,620 |
| 513 | 5,019,621 |
| 532 | 5,019,622 |

**CLASS 525**

| | |
|---|---|
| 7.3 | 5,019,623 |
| 61 | 5,019,624 |
| 66 | 5,019,625 |
| 92 | 5,019,626 |
| 240 | 5,019,627 |
| 288 | 5,019,628 |
| 312 | 5,019,629 |
| 326.2 | 5,019,630 |
| 396 | 5,019,631 |

**CLASS 526**

| | |
|---|---|
| 68 | 5,019,632 |
| 125 | 5,019,633 |
| 262 | 5,019,634 |
| 266 | 5,019,635 |
| 301 | 5,019,636 |

**CLASS 528**

| | |
|---|---|
| 25 | 5,019,637 |
| 83 | 5,019,638 |
| 94 | 5,019,639 |
| 272 | 5,019,640 |
| 347 | 5,019,641 |
| 353 | 5,019,642 |
| 361 | 5,019,643 |
| 488 | 5,019,645 |

**CLASS 530**

| | |
|---|---|
| 326 | 5,019,646 |
| 329 | 5,019,647 |
| 387 | 5,019,648 |

**CLASS 536**

| | |
|---|---|
| 21 | 5,019,649 |

**CLASS 540**

| | |
|---|---|
| 609 | 5,019,650 |

**CLASS 558**

| | |
|---|---|
| 448 | 5,019,917 |

**CLASS 562**

| | |
|---|---|
| 13 | 5,019,651 |
| 549 | 5,019,652 |

**CLASS 564**

| | |
|---|---|
| 497 | 5,019,653 |
| 510 | 5,019,654 |

**CLASS 568**

| | |
|---|---|
| 322 | 5,019,655 |
| 764 | 5,019,656 |
| 774 | 5,019,657 |
| 829 | 5,019,658 |
| 949 | 5,019,659 |

**CLASS 585**

| | |
|---|---|
| 22 | 5,019,660 |
| 253 | 5,019,661 |
| 323 | 5,019,662 |
| 415 | 5,019,663 |
| 419 | 5,019,664 |
| 446 | 5,019,669 |
| 467 | 5,019,670 |
| 751 | 5,019,671 |
| 803 | 5,019,665 |
| 819 | 5,019,666 |
| 820 | 5,019,667 |
| 864 | 5,019,668 |

**CLASS 600**

| | |
|---|---|
| 21 | 5,019,031 |
| 29 | 5,019,032 |

**CLASS 604**

| | |
|---|---|
| 2 | 5,019,033 |
| 20 | 5,019,034 |
| 22 | 5,019,035 |
| | 5,019,036 |
| 23 | 5,019,037 |
| 49 | 5,019,038 |
| 51 | 5,019,039 |
| 95 | 5,019,040 |
| 97 | 5,019,041 |
| 101 | 5,019,042 |
| 110 | 5,019,043 |
| | 5,019,044 |
| | 5,019,045 |
| | 5,019,046 |
| 132 | 5,019,047 |
| 153 | 5,019,048 |
| 165 | 5,019,049 |
| 179 | 5,019,050 |
| 198 | 5,019,051 |
| 203 | 5,019,052 |
| 220 | 5,019,053 |
| 248 | 5,019,054 |
| 249 | 5,019,055 |
| 257 | 5,019,056 |
| 282 | 5,019,057 |
| 290 | 5,019,058 |
| 317 | 5,019,059 |
| 319 | 5,019,060 |
| 358 | 5,019,061 |
| 359 | 5,019,062 |
| 368 | 5,019,063 |
| 378 | 5,019,064 |
| 385.1 | 5,019,065 |
| 385.2 | 5,019,066 |
| | 5,019,067 |
| 386 | 5,019,068 |
| 387 | 5,019,069 |
| | 5,019,070 |
| 389 | 5,019,071 |
| | 5,019,072 |
| 391 | 5,019,073 |

**CLASS 606**

| | |
|---|---|
| 5 | 5,019,074 |
| 7 | 5,019,075 |
| 45 | 5,019,076 |
| 54 | 5,019,077 |
| 61 | 5,019,078 |
| 72 | 5,019,079 |
| 73 | 5,019,080 |
| 79 | 5,019,081 |
| 85 | 5,019,082 |
| 99 | 5,019,083 |
| 107 | 5,019,084 |
| 108 | 5,019,085 |
| 123 | 5,019,086 |
| 152 | 5,019,087 |
| 159 | 5,019,088 |
| 172 | 5,019,089 |
| 194 | 5,019,090 |
| 205 | 5,019,091 |
| 207 | 5,019,092 |
| 228 | 5,019,093 |
| 230 | 5,019,094 |
| 234 | 5,019,095 |

**CLASS 623**

| | |
|---|---|
| 1 | 5,019,096 |
| 5 | 5,019,097 |
| 6 | 5,019,098 |
| | 5,019,099 |
| | 5,019,100 |
| 8 | 5,019,101 |
| 12 | 5,019,102 |
| 20 | 5,019,103 |
| | 5,019,104 |
| 22 | 5,019,105 |
| | 5,019,106 |
| 23 | 5,019,107 |
| | 5,019,108 |
| 49 | 5,019,109 |

# CLASSIFICATION OF DESIGNS

| | | |
|---|---|---|
| D1— | 130 | 317,072 |
| D2— | 24 | 317,073 |
| | 28 | 317,074 |
| | 314 | 317,075 |
| | 319 | 317,076 |
| | 642 | 317,077 |
| D3— | 35 | 317,078 |
| | | 317,079 |
| | 61 | 317,080 |
| | 71 | 317,081 |
| | 74 | 317,082 |
| D4— | 115 | 317,083 |
| D5— | 56 | 317,084 |
| | 60 | 317,085 |
| D6— | 332 | 317,086 |
| | 361 | 317,087 |
| | 379 | 317,088 |
| | 422 | 317,089 |
| | 426 | 317,090 |
| | | 317,091 |
| | 428 | 317,092 |
| | | 317,093 |
| | 463 | 317,094 |
| | 464 | 317,095 |
| | 487 | 317,096 |
| | 500 | 317,097 |
| | 503 | 317,098 |
| D7— | 309 | 317,099 |
| | 509 | 317,100 |
| | 537 | 317,101 |
| | 549 | 317,102 |
| | 643 | 317,103 |
| | 667 | 317,104 |
| | 679 | 317,105 |
| | 686 | 317,106 |
| | 693 | 317,107 |
| D8— | 10 | 317,108 |
| | 14 | 317,109 |
| | 66 | 317,110 |
| | 344 | 317,111 |
| | 356 | 317,112 |
| | 358 | 317,113 |
| | 367 | 317,114 |
| | 373 | 317,115 |
| | 395 | 317,116 |
| D9— | 307 | 317,117 |
| | 338 | 317,118 |
| | 350 | 317,119 |
| | 352 | 317,120 |
| | 367 | 317,121 |
| | | 317,122 |
| | | 317,123 |
| | 400 | 317,124 |
| | 417 | 317,125 |
| | 428 | 317,126 |
| | 435 | 317,127 |
| D10— | 32 | 317,128 |
| | 57 | 317,129 |
| | | 317,130 |
| | 64 | 317,131 |
| | 65 | 317,132 |
| | 71 | 317,133 |
| | 94 | 317,134 |
| | 104 | 317,135 |
| | 108 | 317,136 |
| | | 317,137 |
| | | 317,138 |
| D11— | 93 | 317,139 |
| | 117 | 317,140 |
| D12— | 51 | 317,141 |
| | 111 | 317,142 |
| | 120 | 317,143 |
| | 138 | 317,144 |
| | 146 | 317,145 |
| | 158 | 317,146 |
| | 214 | 317,147 |
| D13— | 146 | 317,148 |
| | 147 | 317,149 |
| | 154 | 317,150 |
| D14— | 100 | 317,151 |
| | 113 | 317,152 |
| | 114 | 317,153 |
| | 116 | 317,154 |
| | 121 | 317,155 |
| | 138 | 317,156 |
| | 167 | 317,158 |
| | 216 | 317,159 |
| | | 317,160 |
| | 217 | 317,161 |
| | 253 | 317,157 |
| | 260 | 317,162 |
| D15— | 5 | 317,163 |
| | 7 | 317,164 |
| | 14 | 317,165 |
| | 17 | 317,166 |
| D16— | 102 | 317,167 |
| | 209 | 317,168 |
| | 218 | 317,169 |
| D17— | 7 | 317,170 |
| | 20 | 317,171 |
| D18— | 12 | 317,172 |
| | 22 | 317,173 |
| | 34 | 317,174 |
| D19— | | 317,175 |
| | 60 | 317,176 |
| | 65 | 317,177 |
| | 75 | 317,178 |
| | 78 | 317,179 |
| | | 317,180 |
| D20— | 22 | 317,181 |
| D21— | 5 | 317,182 |
| | 61 | 317,183 |
| | 82 | 317,184 |
| | | 317,185 |
| | 129 | 317,190 |
| | 141 | 317,186 |
| | | 317,187 |
| | 148 | 317,188 |
| | 153 | 317,189 |
| | 199 | 317,191 |
| | 211 | 317,192 |
| | 215 | 317,193 |
| | 228 | 317,194 |
| D22— | 134 | 317,195 |
| D23— | 252 | 317,196 |
| | 290 | 317,197 |
| | | 317,198 |
| | 382 | 317,199 |
| D24— | 112 | 317,203 |
| | 135 | 317,202 |
| | 156 | 317,200 |
| | 162 | 317,201 |
| | 211 | 317,204 |
| D25— | 38 | 317,205 |
| | 68 | 317,206 |
| | 113 | 317,207 |
| | | 317,208 |
| | 114 | 317,209 |
| | 138 | 317,210 |
| D26— | 24 | 317,211 |
| | 28 | 317,212 |
| | 63 | 317,213 |
| | 130 | 317,214 |
| D28— | 38 | 317,215 |
| D30— | 109 | 317,216 |
| | 152 | 317,217 |
| D34— | 21 | 317,218 |
| | 27 | 317,219 |
| | 40 | 317,220 |
| | 44 | 317,221 |

# CLASSIFICATION OF PLANTS

| | | |
|---|---|---|
| P.— | 42 | 7,532 |
| | 54 | 7,533 |
| | | 7,534 |
| | | 7,535 |
| | | 7,536 |
| | | 7,537 |
| | 68 | 7,538 |
| | 88 | 7,539 |

VOL
1126
ISS
4
MY
28
1991
UMI

# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

| | |
|---|---|
| Alabama | 1 |
| Alaska | 2 |
| American Samoa | 3 |
| Arizona | 4 |
| Arkansas | 5 |
| California | 6 |
| Canal Zone | 7 |
| Colorado | 8 |
| Connecticut | 9 |
| Delaware | 10 |
| District of Columbia | 11 |
| Florida | 12 |
| Georgia | 13 |
| Guam | 14 |
| Hawaii | 15 |
| Idaho | 16 |
| Illinois | 17 |
| Indiana | 18 |
| Iowa | 19 |
| Kansas | 20 |
| Kentucky | 21 |
| Louisiana | 22 |
| Maine | 23 |
| Maryland | 24 |
| Massachusetts | 25 |
| Michigan | 26 |
| Minnesota | 27 |
| Mississippi | 28 |
| Missouri | 29 |
| Montana | 30 |
| Nebraska | 31 |
| Nevada | 32 |
| New Hampshire | 33 |
| New Jersey | 34 |
| New Mexico | 35 |
| New York | 36 |
| North Carolina | 37 |
| North Dakota | 38 |
| Ohio | 39 |
| Oklahoma | 40 |
| Oregon | 41 |
| Pennsylvania | 42 |
| Puerto Rico | 43 |
| Rhode Island | 44 |
| South Carolina | 45 |
| South Dakota | 46 |
| Tennessee | 47 |
| Texas | 48 |
| Utah | 49 |
| Vermont | 50 |
| Virginia | 51 |
| Virgin Islands | 52 |
| Washington | 53 |
| West Virginia | 54 |
| Wisconsin | 55 |
| Wyoming | 56 |
| U.S. Air Force | 57 |
| U.S. Army | 58 |
| U.S. Navy | 59 |

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

| | |
|---|---|
| 01 | 5,018,447 |
| | 5,018,641 |
| | 5,018,729 |
| | 5,018,747 |
| | 5,019,119 |
| | 5,019,426 |
| | 5,019,455 |
| | 5,019,805 |
| | 5,019,841 |
| 02 | 5,019,355 |
| | 5,019,389 |
| 04 | 5,018,227 |
| | 5,018,678 |
| | 5,018,859 |
| | 5,018,860 |
| | 5,018,970 |
| | 5,019,780 |
| | 5,019,789 |
| | 5,019,802 |
| | 5,019,893 |
| | 5,019,941 |
| | 5,020,017 |
| | 5,020,038 |
| 05 | 5,019,126 |
| 06 | Re.33,595 |
| | 5,018,223 |
| | 5,018,238 |
| | 5,018,295 |
| | 5,018,296 |
| | 5,018,300 |
| | 5,018,319 |
| | 5,018,343 |
| | 5,018,350 |
| | 5,018,368 |
| | 5,018,376 |
| | 5,018,382 |
| | 5,018,386 |
| | 5,018,414 |
| | 5,018,441 |
| | 5,018,442 |
| | 5,018,445 |
| | 5,018,449 |
| | 5,018,468 |
| | 5,018,474 |
| | 5,018,482 |
| | 5,018,491 |
| | 5,018,513 |
| | 5,018,519 |
| | 5,018,562 |
| | 5,018,570 |
| | 5,018,571 |
| | 5,018,576 |
| | 5,018,609 |
| | 5,018,636 |
| | 5,018,653 |
| | 5,018,695 |
| | 5,018,709 |
| | 5,018,711 |
| | 5,018,736 |
| | 5,018,738 |
| | 5,018,746 |
| | 5,018,814 |
| | 5,018,823 |
| | 5,018,827 |
| | 5,018,833 |
| | 5,018,844 |
| | 5,018,852 |
| | 5,018,855 |
| | 5,018,864 |
| | 5,018,872 |
| | 5,018,920 |
| | 5,018,921 |
| | 5,018,954 |
| | 5,018,966 |
| | 5,018,969 |
| | 5,018,977 |
| | 5,018,979 |
| | 5,018,985 |
| | 5,019,000 |
| | 5,019,002 |
| | 5,019,007 |
| | 5,019,032 |
| | 5,019,035 |
| | 5,019,037 |
| | 5,019,038 |
| | 5,019,042 |
| | 5,019,048 |
| | 5,019,052 |
| | 5,019,081 |
| | 5,019,083 |
| | 5,019,086 |
| | 5,019,088 |
| | 5,019,089 |
| | 5,019,097 |
| | 5,019,099 |
| | 5,019,101 |
| | 5,019,141 |
| | 5,019,183 |
| | 5,019,231 |
| | 5,019,234 |
| | 5,019,235 |
| | 5,019,236 |
| | 5,019,247 |
| | 5,019,250 |
| | 5,019,297 |
| | 5,019,327 |
| | 5,019,329 |
| | 5,019,348 |
| | 5,019,368 |
| | 5,019,369 |
| | 5,019,396 |
| | 5,019,397 |
| | 5,019,403 |
| | 5,019,417 |
| | 5,019,438 |
| | 5,019,465 |
| | 5,019,470 |
| | 5,019,481 |
| | 5,019,495 |
| | 5,019,508 |
| | 5,019,511 |
| | 5,019,512 |
| | 5,019,517 |
| | 5,019,533 |
| | 5,019,534 |
| | 5,019,552 |
| | 5,019,555 |
| | 5,019,557 |
| | 5,019,560 |
| | 5,019,565 |
| | 5,019,590 |
| | 5,019,660 |
| | 5,019,677 |
| | 5,019,697 |
| | 5,019,710 |
| | 5,019,712 |
| | 5,019,726 |
| | 5,019,728 |
| | 5,019,738 |
| | 5,019,746 |
| | 5,019,752 |
| | 5,019,758 |
| | 5,019,768 |
| | 5,019,769 |
| | 5,019,771 |
| | 5,019,783 |
| | 5,019,786 |
| | 5,019,788 |
| | 5,019,790 |
| | 5,019,793 |
| | 5,019,806 |
| | 5,019,809 |
| | 5,019,818 |
| | 5,019,824 |
| | 5,019,844 |
| | 5,019,849 |
| | 5,019,879 |
| | 5,019,898 |
| | 5,019,904 |
| | 5,019,906 |
| | 5,019,929 |
| | 5,019,933 |
| | 5,019,943 |
| | 5,019,945 |
| | 5,019,951 |
| | 5,019,957 |
| | 5,019,968 |
| | 5,019,976 |
| | 5,019,996 |
| | 5,020,002 |
| | 5,020,006 |
| | 5,020,028 |
| | 5,020,035 |
| | 5,020,058 |
| | 5,020,069 |
| | 5,020,073 |
| | 5,020,087 |
| | 5,020,113 |
| | 5,020,116 |
| | 5,020,122 |
| 08 | 5,018,286 |
| | 5,018,415 |
| | 5,018,652 |
| | 5,018,666 |
| | 5,018,732 |
| | 5,018,790 |
| | 5,018,895 |
| | 5,019,056 |
| | 5,019,177 |
| | 5,019,279 |
| | 5,019,288 |
| | 5,019,516 |
| | 5,019,703 |
| | 5,019,720 |
| | 5,019,948 |
| | 5,020,007 |
| 09 | 5,018,290 |
| | 5,018,472 |
| | 5,018,601 |
| | 5,018,602 |
| | 5,018,616 |
| | 5,018,692 |
| | 5,018,822 |
| | 5,018,893 |
| | 5,019,006 |
| | 5,019,055 |
| | 5,019,093 |
| | 5,019,130 |
| | 5,019,147 |
| | 5,019,152 |
| | 5,019,246 |
| | 5,019,289 |
| | 5,019,311 |
| | 5,019,344 |
| | 5,019,350 |
| | 5,019,359 |
| | 5,019,573 |
| | 5,019,715 |
| | 5,019,748 |
| | 5,019,804 |
| | 5,019,838 |
| | 5,019,961 |
| | 5,019,991 |
| | 5,020,023 |
| | 5,020,033 |
| 10 | 5,019,140 |
| | 5,019,264 |
| | 5,019,539 |
| | 5,019,541 |
| | 5,019,544 |
| | 5,019,549 |
| | 5,019,628 |
| | 5,019,632 |
| | 5,019,634 |
| 11 | 5,018,521 |
| 12 | 5,018,222 |
| | 5,018,234 |
| | 5,018,252 |
| | 5,018,263 |
| | 5,018,287 |
| | 5,018,297 |
| | 5,018,299 |
| | 5,018,320 |
| | 5,018,356 |
| | 5,018,413 |
| | 5,018,422 |
| | 5,018,470 |
| | 5,018,493 |
| | 5,018,637 |
| | 5,018,654 |
| | 5,018,708 |
| | 5,018,717 |
| | 5,018,772 |
| | 5,018,778 |
| | 5,018,837 |
| | 5,018,929 |
| | 5,018,982 |
| | 5,019,057 |
| | 5,019,060 |
| | 5,019,079 |
| | 5,019,085 |
| | 5,019,090 |
| | 5,019,673 |
| | 5,019,822 |
| | 5,019,829 |
| | 5,019,868 |
| | 5,019,900 |
| | 5,020,037 |
| | 5,020,134 |
| | 5,020,136 |
| 13 | 5,018,241 |
| | 5,018,407 |
| | 5,018,453 |
| | 5,018,457 |
| | 5,018,507 |
| | 5,018,563 |
| | 5,018,619 |
| | 5,018,770 |
| | 5,018,849 |
| | 5,018,944 |
| | 5,018,993 |
| | 5,019,029 |
| | 5,019,122 |
| | 5,019,167 |
| | 5,019,437 |
| | 5,020,071 |
| | 5,020,086 |
| | 5,020,103 |
| 15 | 5,019,696 |
| 17 | 5,018,228 |
| | 5,018,329 |
| | 5,018,347 |
| | 5,018,380 |
| | 5,018,443 |
| | 5,018,444 |
| | 5,018,510 |
| | 5,018,515 |
| | 5,018,559 |
| | 5,018,591 |
| | 5,018,620 |
| | 5,018,624 |
| | 5,018,632 |
| | 5,018,694 |
| | 5,018,705 |
| | 5,018,710 |
| | 5,018,745 |
| | 5,018,766 |
| | 5,018,792 |
| | 5,018,866 |
| | 5,018,871 |
| | 5,018,907 |
| | 5,018,945 |
| | 5,018,984 |
| | 5,018,991 |
| | 5,019,003 |
| | 5,019,004 |
| | 5,019,027 |
| | 5,019,059 |

VOL
1126
ISS
4
MY
28
1991
UMI

5,019,080
5,019,203
5,019,271
5,019,273
5,019,325
5,019,335
5,019,343
5,019,404
5,019,429
5,019,472
5,019,545
5,019,581
5,019,597
5,019,636
5,019,662
5,019,687
5,019,690
5,019,709
5,019,718
5,019,722
5,019,723
5,019,795
5,019,938
5,019,939
5,020,076
5,020,091
5,020,092
5,020,093
5,020,095
5,020,102
5,020,130
18 5,018,285
5,018,664
5,018,739
5,019,054
5,019,103
5,019,105
5,019,163
5,019,424
5,019,571
5,019,757
5,019,986
5,020,139
5,020,140
5,020,146
19 5,018,283
5,018,345
5,018,750
5,018,935
5,019,012
5,019,014
5,019,699
5,019,775
5,019,936
5,020,149
20 5,018,262
5,018,481
5,018,918
5,019,125
5,019,761
21 5,018,340
5,018,364
5,018,432
5,019,244
5,019,370
22 : 5,018,530
5,018,589
5,018,930
5,019,109
5,019,149
5,019,504
5,019,543
23 5,018,277
5,018,635
5,019,445
5,019,977
24 5,018,425
5,018,622
5,018,794
5,018,842
5,018,856
5,018,952
5,019,337
5,019,825
5,020,018
5,020,111
5,020,133
25 5,018,260
5,018,274
5,018,341
5,018,357
5,018,421
5,018,516
5,018,532
5,018,586
5,018,723
5,018,740
5,018,741
5,018,742
5,018,775
5,018,801
5,018,811
5,018,835
5,018,897
5,018,963
5,019,034

5,019,074
5,019,075
5,019,174
5,019,233
5,019,238
5,019,270
5,019,362
5,019,372
5,019,379
5,019,381
5,019,384
5,019,392
5,019,393
5,019,400
5,019,414
5,019,418
5,019,420
5,019,509
5,019,513
5,019,556
5,019,559
5,019,562
5,019,594
5,019,616
5,019,641
5,019,648
5,019,736
5,019,750
5,019,792
5,019,797
5,019,842
5,019,880
5,019,952
5,019,965
5,019,967
5,019,971
5,020,020
5,020,024
5,020,040
5,020,062
5,020,070
5,020,081
26 : 5,018,224
5,018,243
5,018,261
5,018,271
5,018,308
5,018,324
5,018,328
5,018,352
5,018,434
5,018,486
5,018,495
5,018,498
5,018,508
5,018,550
5,018,610
5,018,629
5,018,633
5,018,649
5,018,660
5,018,661
5,018,696
5,018,702
5,018,783
5,018,787
5,018,796
5,018,934
5,018,956
5,018,957
5,019,016
5,019,021
5,019,138
5,019,139
5,019,171
5,019,173
5,019,196
5,019,308
5,019,564
5,019,711
5,020,124
27 5,018,232
5,018,279
5,018,311
5,018,522
5,018,523
5,018,584
5,018,587
5,018,600
5,018,630
5,018,668
5,018,670
5,018,676
5,018,690
5,018,728
5,018,755
5,018,777
5,018,779
5,018,785
5,018,857
5,018,926
5,018,960
5,019,041
5,019,047
5,019,071
5,019,072

5,019,084
5,019,232
5,019,346
5,019,360
5,019,461
5,019,646
5,019,674
5,019,681
5,019,784
5,019,950
5,020,014
5,020,088
28 5,018,294
5,018,533
5,018,789
29 5,018,292
5,018,325
5,018,410
5,018,456
5,018,674
5,018,756
5,019,050
5,019,058
5,019,104
5,019,131
5,019,153
5,019,274
5,019,302
5,019,371
5,019,431
5,019,828
5,019,927
5,019,937
5,020,074
3,892,042
30 : 5,018,254
5,019,063
5,019,217
31 5,018,526
5,018,651
5,018,725
5,018,752
5,019,039
5,019,051
5,019,388
32 5,018,231
5,019,339
5,019,814
5,019,973
33 5,018,751
5,018,820
5,018,992
5,019,123
5,019,406
5,019,453
34 Re.33,597
5,018,230
5,018,291
5,018,330
5,018,331
5,018,358
5,018,411
5,018,531
5,018,623
5,018,657
5,018,744
5,018,877
5,018,938
5,019,033
5,019,045
5,019,087
5,019,094
5,019,113
5,019,129
5,019,132
5,019,150
5,019,154
5,019,221
5,019,239
5,019,263
5,019,282
5,019,283
5,019,284
5,019,286
5,019,287
5,019,314
5,019,336
5,019,353
5,019,357
5,019,395
5,019,488
5,019,521
5,019,568
5,019,578
5,019,589
5,019,593
5,019,612
5,019,633
5,019,651
5,019,658
5,019,663
5,019,664
5,019,665
5,019,666
5,019,670
5,019,679

5,019,714
5,019,787
5,019,801
5,019,807
5,019,815
5,019,899
5,019,954
5,020,003
5,020,049
5,020,050
5,020,054
5,020,055
5,020,059
5,020,078
5,020,083
5,020,098
5,020,112
5,020,115
5,020,123
5,020,153
35 5,018,349
5,018,374
5,019,306
5,019,832
36 5,018,221
5,018,236
5,018,253
5,018,307
5,018,312
5,018,409
5,018,424
5,018,436
5,018,480
5,018,506
5,018,573
5,018,593
5,018,621
5,018,647
5,018,656
5,018,698
5,018,706
5,018,719
5,018,720
5,018,764
5,018,767
5,018,773
5,018,786
5,018,793
5,018,803
5,018,805
5,018,808
5,018,813
5,018,850
5,018,861
5,018,876
5,018,890
5,018,924
5,018,937
5,019,036
5,019,064
5,019,070
5,019,096
5,019,121
5,019,144
5,019,157
5,019,166
5,019,193
5,019,210
5,019,240
5,019,260
5,019,275
5,019,293
5,019,301
5,019,313
5,019,315
5,019,330
5,019,334
5,019,340
5,019,380
5,019,383
5,019,402
5,019,441
5,019,473
5,019,480
5,019,489
5,019,492
5,019,496
5,019,530
5,019,535
5,019,538
5,019,607
5,019,613
5,019,635
5,019,667
5,019,675
5,019,686
5,019,692
5,019,693
5,019,694
5,019,698
5,019,707
5,019,753
5,019,764
5,019,791
5,019,796
5,019,837

5,019,848
5,019,859
5,019,864
5,019,866
5,019,869
5,019,870
5,019,882
5,019,905
5,019,946
5,019,992
5,019,997
5,019,999
5,020,011
5,020,027
5,020,042
5,020,045
5,020,056
5,020,079
5,020,119
5,020,120
5,020,121
37 5,018,281
5,018,375
5,018,471
5,018,479
5,018,606
5,018,643
5,018,887
5,018,976
5,019,008
5,019,120
5,019,195
5,019,300
5,019,387
5,019,401
5,019,407
5,019,408
5,019,422
5,019,577
5,019,583
5,019,622
5,019,640
5,019,719
5,020,108
5,020,135
38 5,019,277
39 5,018,220
5,018,229
5,018,237
5,018,267
5,018,353
5,018,373
5,018,406
5,018,417
5,018,459
5,018,514
5,018,546
5,018,558
5,018,592
5,018,662
5,018,667
5,018,707
5,018,765
5,018,798
5,018,873
5,018,896
5,018,908
5,018,909
5,018,942
5,018,943
5,018,983
5,019,062
5,019,066
5,019,175
5,019,176
5,019,197
5,019,230
5,019,280
5,019,290
5,019,312
5,019,318
5,019,375
5,019,377
5,019,378
5,019,436
5,019,451
5,019,601
5,019,602
5,019,610
5,019,611
5,019,743
5,020,008
5,020,043
5,020,105
40 5,018,396
5,018,534
5,018,583
5,018,759
5,019,076
5,019,427
41 5,018,259
5,018,298
5,018,360
5,018,512
5,018,774
5,019,307

5,019,522
5,019,717
5,020,012
42 5,018,266
5,018,316
5,018,342
5,018,395
5,018,450
5,018,455
5,018,469
5,018,548
5,018,663
5,018,665
5,018,672
5,018,685
5,018,704
5,018,727
5,018,731
5,018,769
5,018,816
5,018,818
5,018,862
5,018,869
5,018,875
5,018,901
5,018,902
5,018,912
5,018,917
5,018,988
5,018,989
5,019,030
5,019,031
5,019,053
5,019,112
5,019,124
5,019,192
5,019,207
5,019,208
5,019,254
5,019,256
5,019,317
5,019,332
5,019,342
5,019,390
5,019,405
5,019,433
5,019,477
5,019,502
5,019,536
5,019,569
5,019,572
5,019,591
5,019,600
5,019,604
5,019,608
5,019,647
5,019,650
5,019,652
5,019,659
5,019,671
5,019,745
5,019,892
5,020,032
44 : 5,018,412
5,019,478
5,019,934
45 : 5,018,451
5,018,462
5,018,504
5,018,950
5,019,011
5,019,067
5,019,168
5,019,170
5,019,449
47 5,018,304
5,018,545
5,018,715
5,018,799
5,018,865
5,018,974
5,019,226
5,019,705
5,019,861
5,020,127
5,020,137
48 5,018,256
5,018,321
5,018,544
5,018,574
5,018,575
5,018,577
5,018,578
5,018,579
5,018,580
5,018,581
5,018,582
5,018,590
5,018,598
5,018,615
5,018,645
5,018,703
5,018,722
5,018,771
5,018,868
5,018,870

---

5,018,903
5,018,905
5,018,980
5,019,049
5,019,069
5,019,092
5,019,143
5,019,227
5,019,237
5,019,241
5,019,242
5,019,341
5,019,354
5,019,365
5,019,382
5,019,409
5,019,525
5,019,532
5,019,625

5,019,645
5,019,653
5,019,669
5,019,708
5,019,724
5,019,766
5,019,798
5,019,831
5,019,878
5,019,888
5,019,940
5,019,942
5,019,959
5,019,978
5,020,013
5,020,025
5,020,026
5,020,036
5,020,090

5,020,107
5,020,129
5,020,141
5,020,144
5,020,150
49 : 5,018,547
5,018,955
5,019,108
5,019,220
5,020,030
50 : 5,019,772
51 : 5,018,385
5,018,387
5,018,540
5,018,688
5,018,975
5,019,024
5,019,148
5,019,321

5,019,352
5,019,459
5,019,751
5,019,827
5,019,994
5,020,094
5,020,132
5,020,152
4,836,222
53 : Re.33,596
5,018,397
5,018,423
5,018,542
5,018,564
5,018,683
5,018,726
5,018,735
5,018,758
5,018,788

5,019,135
5,019,446
5,019,774
5,019,826
5,019,863
5,019,872
5,019,980
5,019,998
54 5,018,355
5,019,184
55 : 5,018,293
5,018,302
5,018,372
5,018,394
5,018,402
5,018,431
5,018,440
5,018,454

5,018,568
5,018,626
5,018,628
5,018,646
5,018,853
5,018,967
5,018,996
5,019,065
5,019,073
5,019,211
5,019,376
5,019,411
5,019,676
5,019,721
5,019,983
5,020,101
5,020,125
56 : 5,018,697

## DESIGN PATENTS

01 : 317,211
04 : 317,111
05 : 317,082
317,122
06 : 317,087
317,095
317,104
317,105
317,108
317,109
317,135
317,139
317,151
317,153
317,158

317,162
317,164
317,167
317,185
317,192
317,194
317,196
317,202
317,206
317,210
317,212
317,217
317,219
08 : 317,076
317,081

317,204
09 317,134
317,136
317,137
317,138
12 317,147
317,171
317,191
317,216
13 : 317,175
17 : 317,110
317,152
317,174
19 : 317,183
20 : 317,077

317,120
22 : 317,074
317,221
24 : 317,203
26 : 317,193
27 : 317,078
317,132
317,209
31 317,107
34 : 317,073
317,180
317,188
36 317,094
317,098
317,100

317,112
317,118
317,121
317,125
317,182
317,184
317,218
317,220
37 317,140
39 317,080
317,113
317,116
317,154
317,186
317,214

41 : 317,075
42 317,086
317,089
317,141
317,142
47 : 317,103
317,126
48 : 317,115
317,146
317,149
317,215
51 317,117
55 317,099
317,165
317,195

## PLANT PATENTS

06 : 7,532
7,536

42 : 7,538

47 7,533

7,534

7,535

48 7,539

VOL
1126

ISS
4

MY
28

1991

UMI

## CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

**PLEASE PRINT OR TYPE**

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

- - - - - - - - - - - - - - - - - - - - - - - -

## SUBSCRIPTION ORDER FORM

**SUBSCRIPTION ORDER FORM**

**ENTER MY SUBSCRIPTION TO:**

**@ $ Domestic; @ $ Foreign.**

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

**PLEASE PRINT OR TYPE**

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ....................

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

VOL
1126

ISS
4

MY
28

1991

UMI

VOL
1126

ISS
4

MY
28

1991

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Harry F. Manbeck, Jr., *Commissioner*

UMI

END